FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	F 2023(039)		1
STATE	STATE DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. F 2023(039)

CSJ: 0134-07-069

NET LENGTH OF PROJECT: 1,728.20 LF = 0.327 MI

WISE COUNTY
US 380

LIMITS: FROM BU 81D TO US 81

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENT PRIECT CONSISTING OF EARTHWORK, CONCRETE PAVEMENT, TRAFFIC SIGNALS, SIGNS, TRAFFIC BARRIER, AND PAVEMENT MARKINGS

PROJECT DATA

DESIGN SPEED: US 380 DESIGN SPEED = 70 MPH
RAMP DESIGN SPEED = 45 MPH

ADT: 2023 = 17,029
2040 = 23,841

EQUATIONS: N/A
EXCEPTIONS: N/A

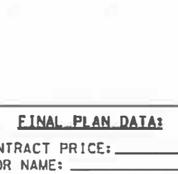
FINAL PLAN DATA:

FINAL CONTRACT PRICE: _____
CONTRACTOR NAME: _____
CONTRACTOR ADDRESS: _____
LETTING DATE: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE OF ACCEPTANCE: _____

CHANGE ORDERS & SUPP. AGREEMENTS

ALL CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED, UNLESS OTHERWISE NOTED.

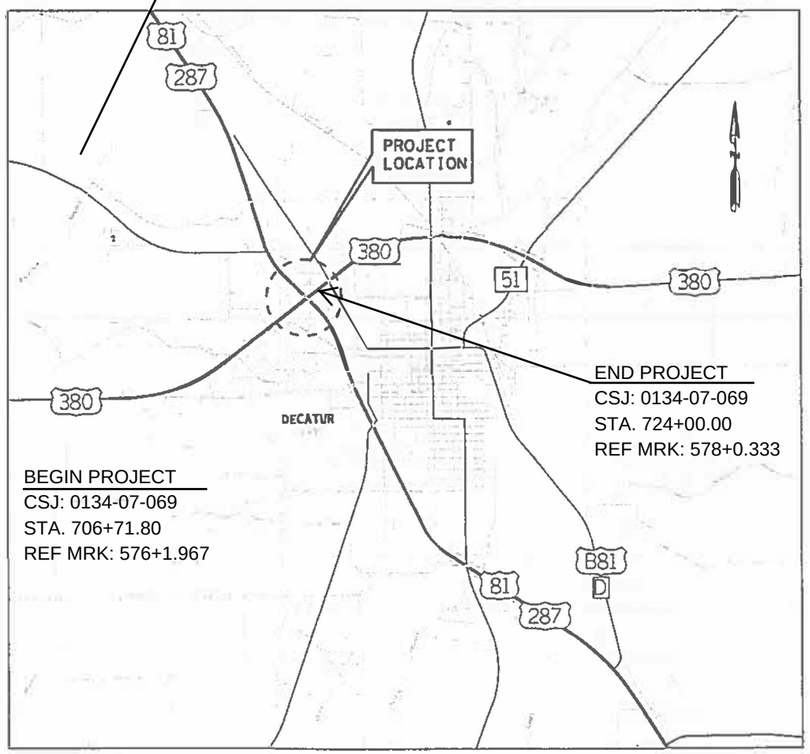
NAME _____ DATE _____



The seal appearing on this document was authorized by PHILLIP J. PAWELEK P.E. 82739, on 7.20. 20 22

Phillip J. Pawelek, P.E.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY, 2022).



BEGIN PROJECT
CSJ: 0134-07-069
STA. 706+71.80
REF MRK: 576+1.967

END PROJECT
CSJ: 0134-07-069
STA. 724+00.00
REF MRK: 578+0.333

EXCEPTIONS: NONE
EQUATIONS: NONE
RR CROSSINGS: NONE
SCALE: 1" = 5000'

NO T.D.L.R. REVIEW REQUIRED

PLANS PREPARED BY:

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

Phillip J. Pawelek, P.E. — 7-20-22
PHILLIP J. PAWELEK, P.E. PROJECT MANAGER — DATE

SUBMITTED FOR LETTING: 7/28/2022 20__
DocuSigned by: _____ P.E.
AREA ENGINEER
1C2C4AEE88A847B...

RECOMMENDED FOR LETTING: 8/2/2022 20__
DocuSigned by: _____ P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

APPROVED FOR LETTING: 8/6/2022 20__
DocuSigned by: Carl L. Johnson, PE P.E.
DISTRICT ENGINEER
2FE36139F0814C3...

	SHEET NO.	DESCRIPTION
		GENERAL
	1	US 380 TITLE SHEET
	2	US 380 INDEX OF SHEETS
	3	US 380 PROJECT LAYOUT
	4 - 5	US 380 EXISTING TYPICAL SECTIONS
	6 - 7	US 380 PROPOSED TYPICAL SECTIONS
	8, 8A & 8B	US 380 ESTIMATE AND QUANTITY SHEET
	9, 9A - 9H	US 380 GENERAL NOTES
	10 - 12	US 380 SUMMARY SHEETS
		TRAFFIC CONTROL PLAN DETAILS
	13	US 380 TRAFFIC CONTROL SEQUENCE OF CONSTRUCTION
	14	US 380 ADVANCE PROJECT WARNING SIGNING
	15	US 380 TRAFFIC CONTROL PLAN PHASING LAYOUT
	16 - 22	US 380 TRAFFIC CONTROL PLAN TYPICAL SECTIONS
	23 - 47	US 380 TRAFFIC CONTROL PLAN SHEETS
		TRAFFIC CONTROL STANDARDS
*	48 - 59	BC (1)-21 THRU BC(12)-21
*	60 - 62	TCP(1-1)-18, TCP(1-4)-18, TCP(1-5)-18
*	63 - 64	TCP(2-4)-18, TCP(2-6)-18
*	65 - 68	TCP(6-2)-12, TCP(6-3)-12, TCP(6-4)-12, TCP(6-5)-12
*	69 - 70	TCP(6-8)-14, TCP(7-1)-13
*	71	WZ(BRK)-13
*	72 - 74	WZ(BTS-1)-13, WZ (BTS-2)-13, WZ(TD)-17
*	74 A - 74B	TCP(3-2)-13, TCP(3-3)-14
		ROADWAY DETAILS
	75 - 94	US 380 EXISTING SUBSURFACE UTILITIES
	95 - 96	US 380 HORIZONTAL ALIGNMENT DATA
	97	US 380 REMOVAL LAYOUTS
	98 - 107	US 380 ROADWAY PLAN LAYOUTS
	108	COLORED TEXTURED CONCRETE DETAIL
		ROADWAY STANDARDS
*	109	CDD-FTW
*	110 - 111	SETP-CD
*	112	SSCB(1F)-10
*	113	TRAFFIC RAIL FOUNDATIONS
*	114	TRF
*	115	TRACCW-16
		TRAFFIC DETAILS
	116 - 125	US 380 SIGNS & PAVEMENT MARKING LAYOUTS
	126	SIGN DETAILS
	127 - 131	SOSS
	132	SOLS
		TRAFFIC STANDARDS
*	133 - 135	D & OM(1)-20 THRU D & M (3)-20
*	136 - 138	PM(1)-20 THRU PM(3)-20
*	139	CMP(1)-14
*	140	FPM(2)-12
*	141 - 143	TSR(3)-13, TSR(4)-13, TSR(5)-13
*	144	SMD(GEN)-08
*	145 - 147	SMD(SLIP-1)-08, SMD(SLIP-2)-08, SMD(SLIP-3)-08
*	148 - 150	SMD(2-1)-08, SMD(2-2)-08, SMD(2-3)-08

	SHEET NO.	DESCRIPTION
		TRAFFIC SIGNAL DETAILS
	151 - 154	US 380 SIGNAL LAYOUTS
		TRAFFIC SIGNAL STANDARDS
*	155 - 156	SMA-80(1)-12, SMA-80(2)-12
*	157	MA-C-12
*	158	TS-FD-12
*	159	LUM-A-12
*	160 - 164	LMA(1)-12 THRU LMA(5)-12
*	165	TS-CF-21
*	166	MA-DPD-20
*	167	TS-BP-20
*	168 - 174	ED(1)-14, ED(3)-14 THRU ED(8)-14
*	175	WV & IZ-14
		ENVIRONMENTAL DETAILS
*	176 - 177	STORM WATER POLLUTION PREVENTION PLAN (SW3P)
*	178	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)
	179 - 188	US 380 STORM WATER POLLUTION PREVENTION PLAN
		ENVIRONMENTAL STANDARDS
*	189	EC(1)-16
*	190	EC(2)-16
*	191	EC(3)-16
*	192 - 194	EC(9)-16

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
LICENSED PROFESSIONAL ENGINEER

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

PHILLIP J. PAWELEK, P.E. 09/01/2022
PHILLIP J. PAWELEK — DATE

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

INDEX OF SHEETS

SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		2
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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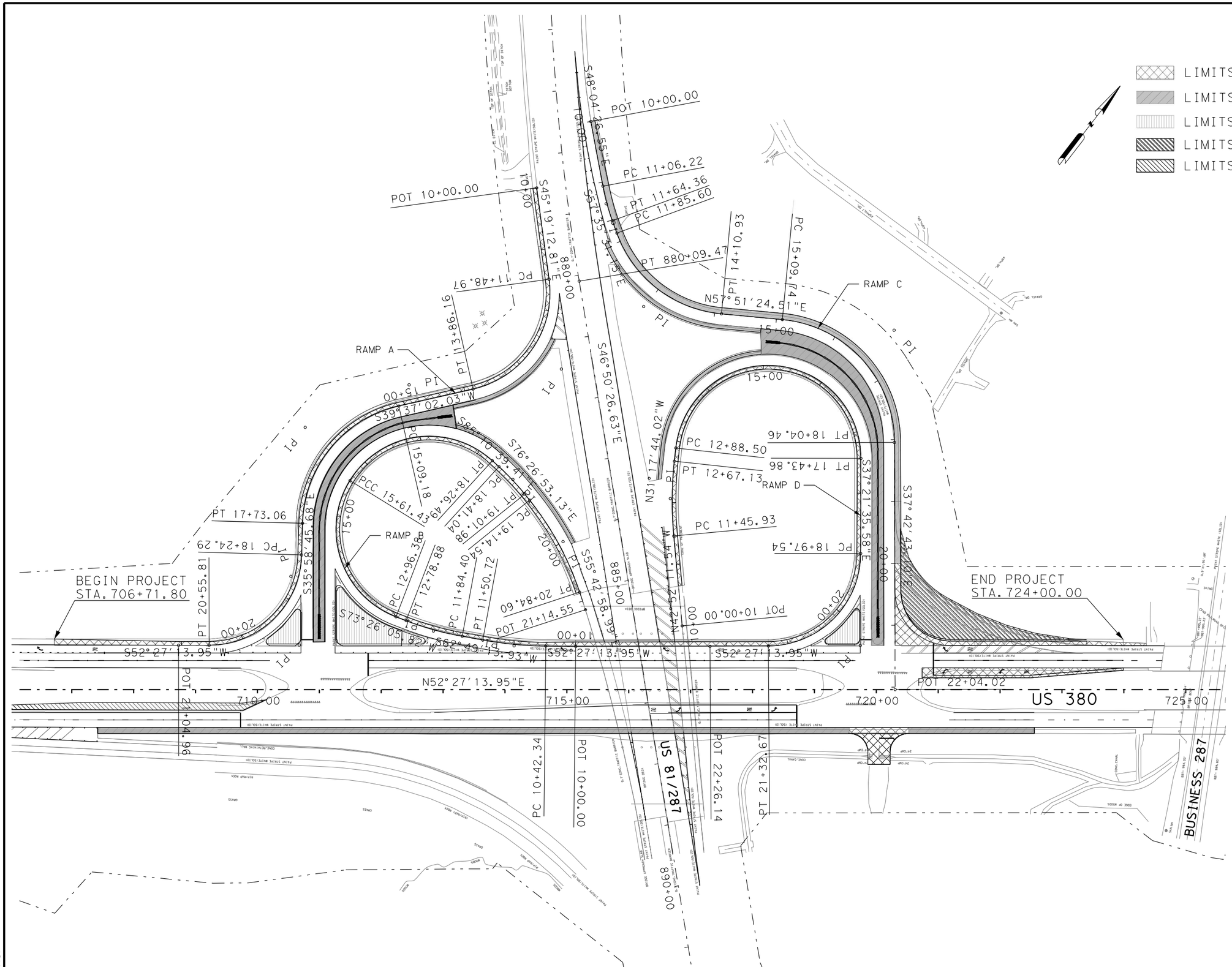

PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

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Phillip J. Pawelek, P.E.

SAB INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

PROJECT LAYOUT

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		3
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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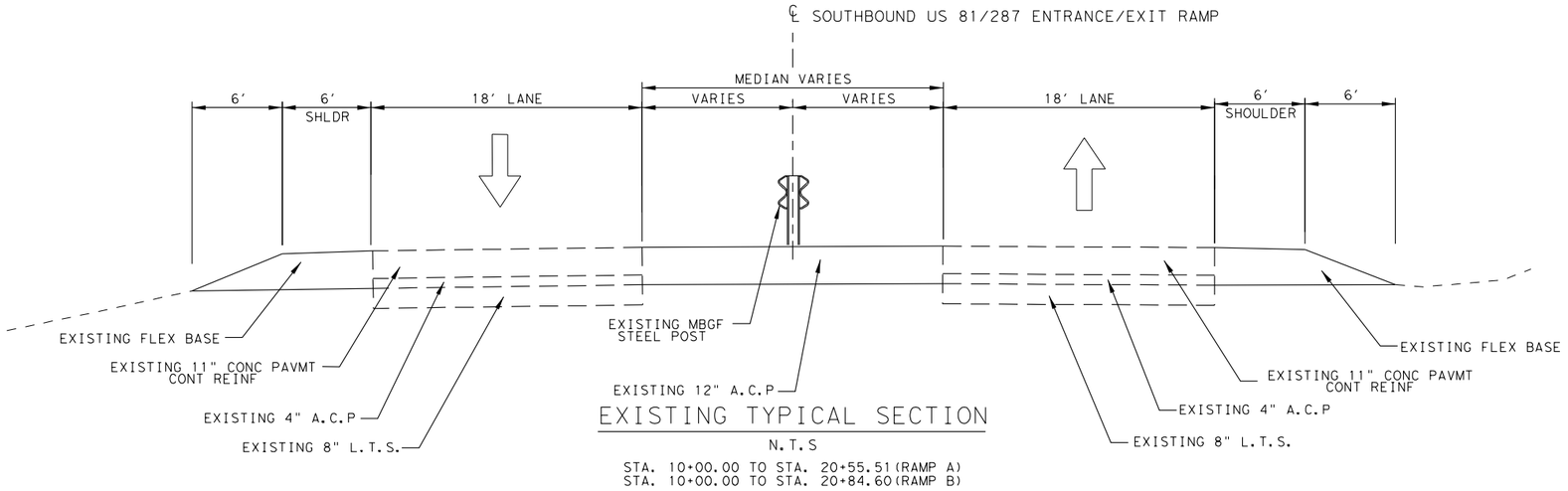

EXISTING TYPICAL SECTION

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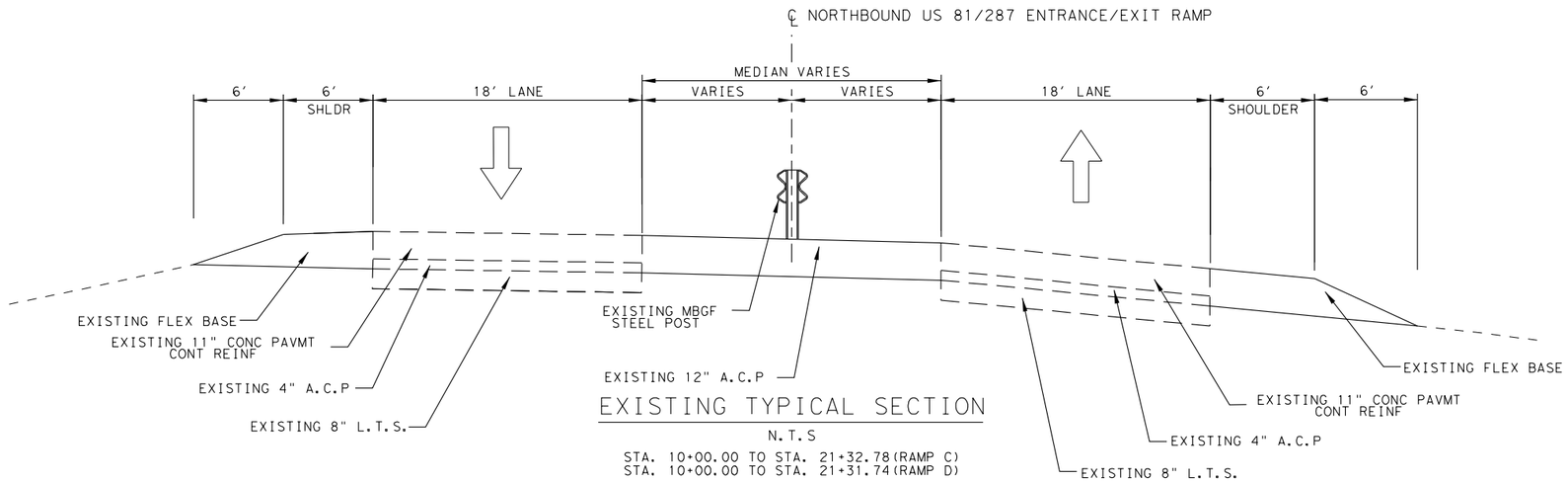
STA. 10+00.00 TO STA. 20+84.60(RAMP B)



EXISTING TYPICAL SECTION

N.T.S

STA. 10+00.00 TO STA. 21+32.78(RAMP C)
STA. 10+00.00 TO STA. 21+31.74(RAMP D)

STATE OF TEXAS
PHILLIP J. PAWELEK
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REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

EXISTING TYPICAL SECTIONS

SCALE: NOT TO SCALE SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		4
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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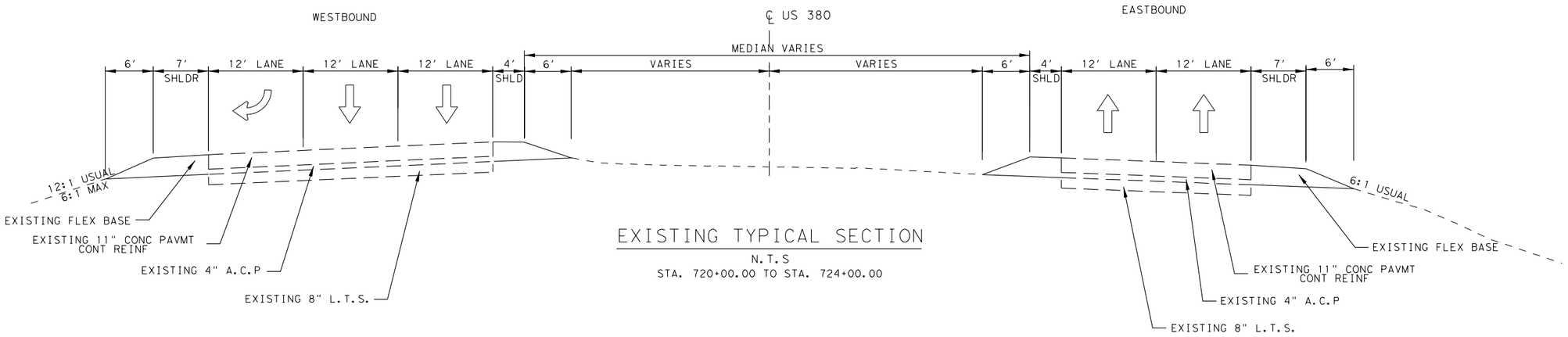
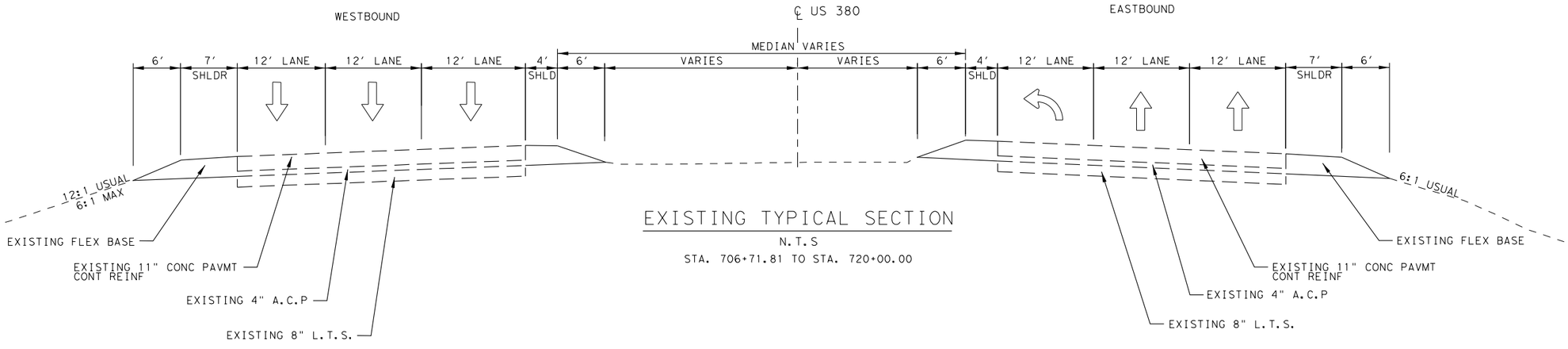


EXISTING TYPICAL SECTION

N.T.S

STA. 720+00.00 TO STA. 724+00.00



EXISTING TYPICAL SECTION

N.T.S

STA. 706+71.81 TO STA. 720+00.00

STATE OF TEXAS
PHILLIP J. PAWELEK
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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

EXISTING TYPICAL SECTIONS

SCALE: NOT TO SCALE SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		5
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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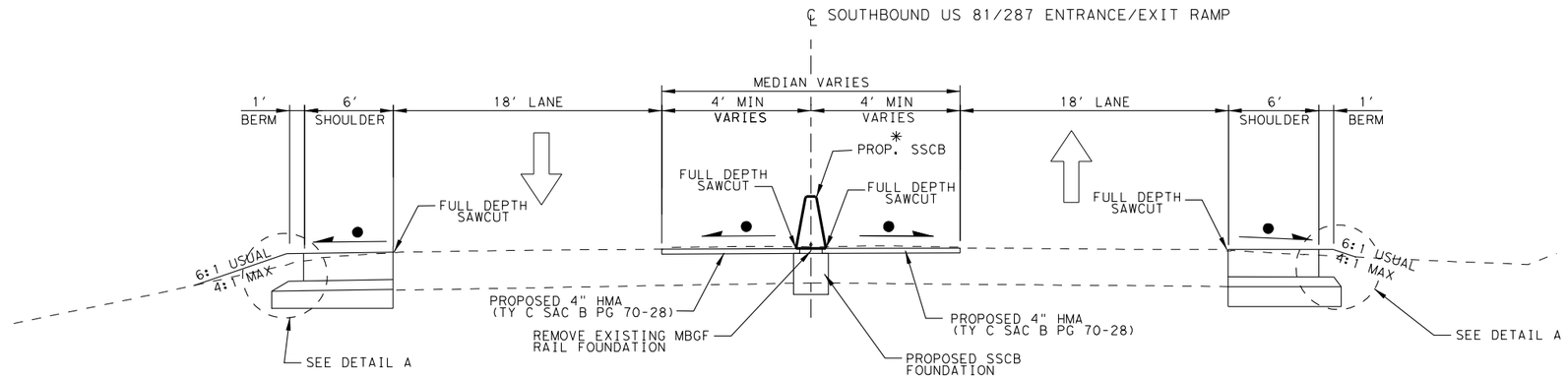
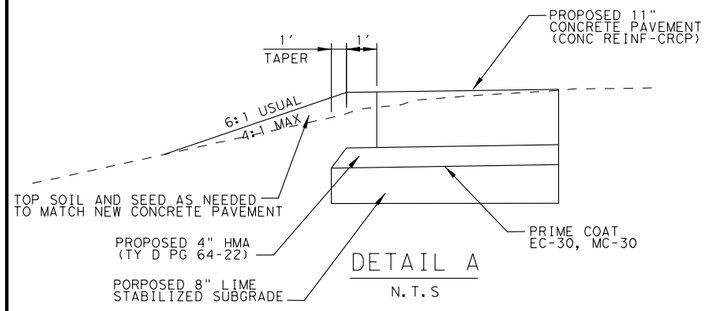


PROPOSED TYPICAL SECTION

N.T.S

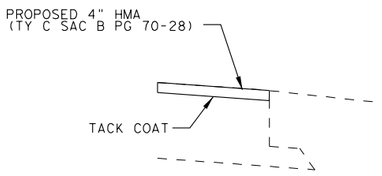
STA. 10+00.00 TO STA. 20+55.51(RAMP A)
STA. 10+00.00 TO STA. 20+86.77(RAMP B)

● - MATCH EXISTING SLOPE
✳ - ADD DRAIN SLOTS TO SSCB



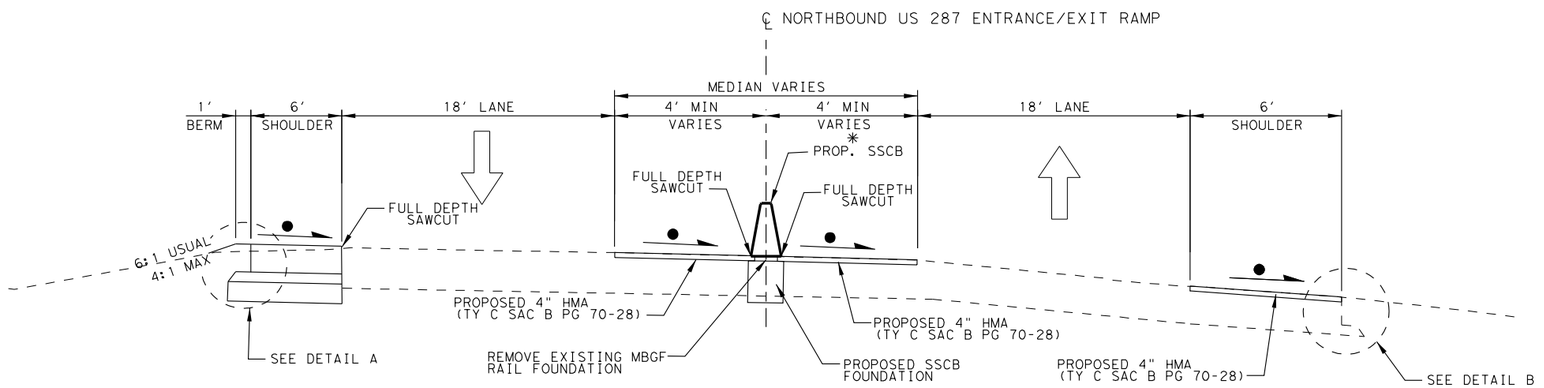
DETAIL A

N.T.S



DETAIL B

N.T.S



PROPOSED TYPICAL SECTION

N.T.S

STA. 10+00.00 TO STA. 21+32.79(RAMP C)
STA. 10+00.00 TO STA. 21+31.74(RAMP D)

● - MATCH EXISTING SLOPE
✳ - ADD DRAIN SLOTS TO SSCB

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

PROPOSED TYPICAL SECTIONS

SCALE: NOT TO SCALE SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		6
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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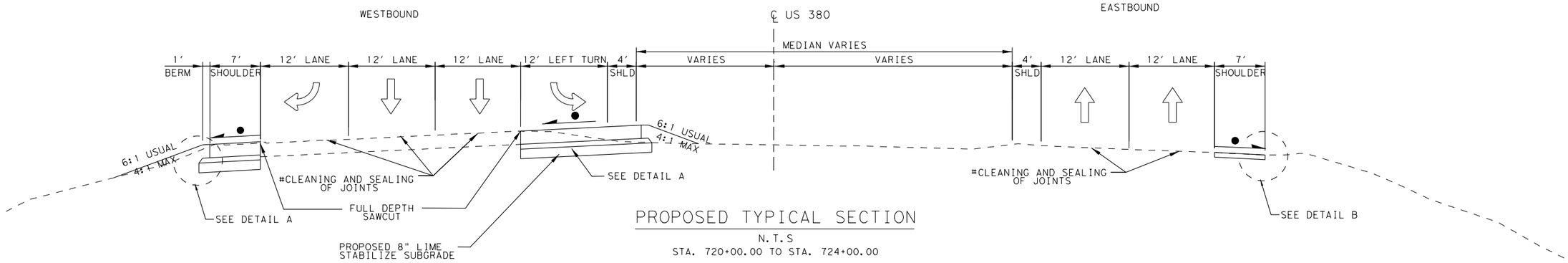


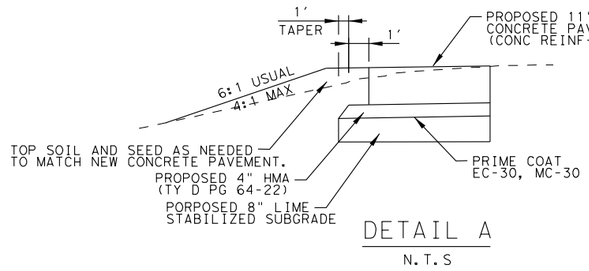
PROPOSED TYPICAL SECTION

N.T.S

STA. 720+00.00 TO STA. 724+00.00

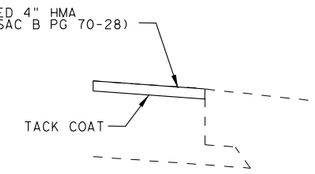
● - MATCH EXISTING SLOPE

- CLEANING AND SEALING OF JOINTS AS DIRECTED BY THE ENGINEER



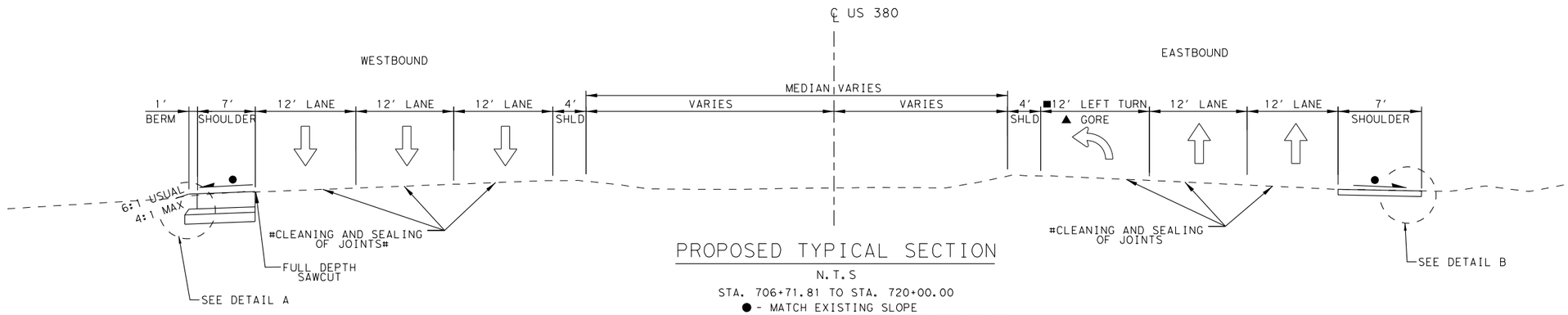
DETAIL A

N.T.S



DETAIL B

N.T.S



PROPOSED TYPICAL SECTION

N.T.S

STA. 706+71.81 TO STA. 720+00.00

● - MATCH EXISTING SLOPE

▲ - STA. 706+71.81 TO STA. 710+00.00

■ - STA. 712+86.00 TO STA. 718+72.00

- CLEANING AND SEALING OF JOINTS AS DIRECTED BY THE ENGINEER

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		7
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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Estimate & Quantity Sheet

Texas Department of Transportation

CONTROLLING PROJECT ID 0134-07-069 **DISTRICT** Fort Worth **COUNTY** Wise
HIGHWAY US 380

				CONTROL SECTION JOB	0134-07-069		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00060263			
				COUNTY	Wise			
				HIGHWAY	US 380			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL			
	100-6002	PREPARING ROW	STA	62.000		62.000		
	104-6001	REMOVING CONC (PAV)	SY	1,271.000		1,271.000		
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	181.000		181.000		
	110-6001	EXCAVATION (ROADWAY)	CY	3,104.000		3,104.000		
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	14,424.000		14,424.000		
	164-6040	DRILL SEEDING (PERM) (URBAN) (CLAY)	AC	2.980		2.980		
	168-6001	VEGETATIVE WATERING	MG	152.000		152.000		
	260-6002	LIME (HYDRATED LIME (SLURRY))	TON	77.000		77.000		
	260-6073	LIME TRT (SUBGRADE)(8")	SY	4,667.000		4,667.000		
	305-6003	SALV, HAUL & STKPL RCL APH PV (2 TO 4")	SY	6,617.000		6,617.000		
	360-6005	CONC PVMT (CONT REINF - CRCP) (11")	SY	4,302.000		4,302.000		
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	26.400		26.400		
	416-6034	DRILL SHAFT (TRF SIG POLE) (48 IN)	LF	110.000		110.000		
	420-6135	CL C CONC (RAIL FOUNDATION)(HPC)	CY	258.000		258.000		
	438-6005	CLEANING AND SEALING JOINTS	LF	4,675.000		4,675.000		
	464-6005	RC PIPE (CL III)(24 IN)	LF	96.000		96.000		
	467-6007	SET (TY I) (24 IN) (6: 1) (C)	EA	4.000		4.000		
	500-6001	MOBILIZATION	LS	0.100		0.100		
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000		
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	20.000		20.000		
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	20.000		20.000		
	506-6021	CONSTRUCTION EXITS (INSTALL) (TY 2)	SY	780.000		780.000		
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	780.000		780.000		
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	7,946.000		7,946.000		
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	7,946.000		7,946.000		
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	175.000		175.000		
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	175.000		175.000		
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	240.000		240.000		
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF	240.000		240.000		
	514-6001	PERM CTB (SGL SLOPE) (TY 1) (42)	LF	1,086.000		1,086.000		
	528-6001	COLORED TEXTURED CONC (4")	SY	1,084.000		1,084.000		
	530-6004	DRIVEWAYS (CONC)	SY	330.000		330.000		
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	971.000		971.000		
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	4.000		4.000		
	545-6024	CRASH CUSHION ATTEN (INSTALL) (TRACC)	EA	5.000		5.000		
	618-6023	CONDT (PVC) (SCH 40) (2")	LF	1,270.000		1,270.000		
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	460.000		460.000		

Estimate & Quantity Sheet

Texas Department of Transportation

CONTROLLING PROJECT ID 0134-07-069 **DISTRICT** Fort Worth **COUNTY** Wise
HIGHWAY US 380

				CONTROL SECTION JOB	0134-07-069	TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00060263		
				COUNTY	Wise		
				HIGHWAY	US 380		
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	618-6029	CONDT (PVC) (SCH 40) (3")	LF	1,115.000		1,115.000	
	618-6030	CONDT (PVC) (SCH 40) (3") (BORE)	LF	370.000		370.000	
	618-6033	CONDT (PVC) (SCH 40) (4")	LF	10.000		10.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF	2,355.000		2,355.000	
	620-6011	ELEC CONDR (NO.4) BARE	LF	870.000		870.000	
	620-6012	ELEC CONDR (NO.4) INSULATED	LF	1,740.000		1,740.000	
	621-6004	TRAY CABLE (3 CONDR) (8 AWG)	LF	2,200.000		2,200.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA	12.000		12.000	
	628-6145	ELC SRV TY D 120/240 060(NS)SS(E)SP(O)	EA	1.000		1.000	
	636-6002	ALUMINUM SIGNS (TY G)	SF	80.000		80.000	
	636-6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	18.000		18.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	28.000		28.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	5.000		5.000	
	644-6033	IN SM RD SN SUP&AM TYSB0(1)SA(U)	EA	6.000		6.000	
	644-6050	IN SM RD SN SUP&AM TYSB0(2)SA(P)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	44.000		44.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	54.000		54.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	61.000		61.000	
	658-6080	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND	EA	84.000		84.000	
	658-6083	INSTL DEL ASSM (D-SW)SZ 1(WFLX)SRF	EA	674.000		674.000	
	662-6060	WK ZN PAV MRK REMOV (W)4"(BRK)	LF	170.000		170.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	12,310.000		12,310.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	9,549.000		9,549.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	6,149.000		6,149.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	860.000		860.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	7,719.000		7,719.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	6,914.000		6,914.000	
	666-6350	REFL PAV MRK TY I (W)12"(DOT)(100MIL)	LF	150.000		150.000	
	668-6018	PREFAB PAV MRK TY B (W)(24")(SLD)	LF	195.000		195.000	
	668-6019	PREFAB PAV MRK TY B (W)(ARROW)	EA	11.000		11.000	
	668-6027	PREFAB PAV MRK TY B (W)(WORD)	EA	10.000		10.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	253.000		253.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	14,464.000		14,464.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	4,935.000		4,935.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	1,004.000		1,004.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	35.000		35.000	
	677-6019	ELIM EXT PAV MRK & MRKS (36")(YLD TRI)	EA	64.000		64.000	

Estimate & Quantity Sheet

Texas Department of Transportation

CONTROLLING PROJECT ID 0134-07-069 **DISTRICT** Fort Worth **COUNTY** Wise
HIGHWAY US 380

				CONTROL SECTION JOB	0134-07-069		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00060263			
				COUNTY	Wise			
				HIGHWAY	US 380			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL			
	678-6001	PAV SURF PREP FOR MRK (4")	LF	15,493.000		15,493.000		
	678-6004	PAV SURF PREP FOR MRK (8")	LF	6,149.000		6,149.000		
	678-6008	PAV SURF PREP FOR MRK (24")	LF	195.000		195.000		
	678-6009	PAV SURF PREP FOR MRK (ARROW)	EA	11.000		11.000		
	678-6016	PAV SURF PREP FOR MRK (WORD)	EA	10.000		10.000		
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1.000		1.000		
	682-6001	VEH SIG SEC (12")LED(GRN)	EA	14.000		14.000		
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4.000		4.000		
	682-6003	VEH SIG SEC (12")LED(YEL)	EA	15.000		15.000		
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA	3.000		3.000		
	682-6005	VEH SIG SEC (12")LED(RED)	EA	15.000		15.000		
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA	2.000		2.000		
	682-6054	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA	16.000		16.000		
	682-6056	BACKPLATE W/REF BRDR(5 SEC)(VENT)ALUM	EA	1.000		1.000		
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	1,090.000		1,090.000		
	684-6042	TRF SIG CBL (TY A)(14 AWG)(16 CONDR)	LF	3,755.000		3,755.000		
	686-6051	INS TRF SIG PL AM(S)1 ARM(48')LUM	EA	2.000		2.000		
	686-6059	INS TRF SIG PL AM(S)1 ARM(55')LUM	EA	1.000		1.000		
	686-6063	INS TRF SIG PL AM(S)1 ARM(60')LUM	EA	1.000		1.000		
	686-6065	INS TRF SIG PL AM(S)1 ARM(65')	EA	1.000		1.000		
	686-6067	INS TRF SIG PL AM(S)1 ARM(65')LUM	EA	2.000		2.000		
	760-6001	DITCH CLEANING AND RESHAPING (FOOT)	LF	1,000.000		1,000.000		
	3076-6025	D-GR HMA TY-C SAC-B PG70-22	TON	1,521.000		1,521.000		
	3076-6035	D-GR HMA TY-D PG64-22	TON	731.000		731.000		
	3076-6066	TACK COAT	GAL	662.000		662.000		
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000		
	6010-6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	2.000		2.000		
	6010-6004	CCTV MOUNT (POLE)	EA	2.000		2.000		
	6045-6001	INSTALL OF (RADD) VEHICLE DETECTORS	EA	6.000		6.000		
	6046-6001	INSTALL OF (RPD) VEHICLE DETECTORS	EA	7.000		7.000		
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA	1.000		1.000		
	6185-6003	TMA (MOBILE OPERATION)	HR	24.000		24.000		
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000		
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000		
1	310-6008	PRIME COAT (EC-30)	GAL	934.000		934.000		
	310-6009	PRIME COAT (MC-30)	GAL	934.000		934.000		

TxDOTCONNECT

Report Generated By: txdotconnect_internal_ext

Report Created On: Sep 3, 2022 9:24:17 AM

DISTRICT	COUNTY	CCSJ	SHEET
Fort Worth	Wise	0134-07-069	8B

Project Number: F 2023(039)

County: WISE **Control:** 0134-07-069

Highway: US 380

Item	Description	Rate	Unit
168	Vegetative Watering	169,400 gal./acre	1,000 gal.
260	Lime (Hydrated)(Slry)	150 lb./cu. yd.	Ton
310	Asph Mat'l (MC-30, EC-30) (Subgrade)(Priming)	0.20 gal./sq. yd.*	gal.
3076	Hot Mix (All Types)	115 lb./sq. yd.-in.	ton
3076	Tack Coat - CSS-1P	.20 gal./sq. yd.	gal.
3076	Tack Coat - Trackless Tack	0.15-0.22 gal./sq. yd.	gal.

* Based On 50% Asphalt Residue.
** Non-Pay, for Contractor's Information Only.

Special Notes

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Project Number: F 2023(039)

County: WISE **Control:** 0134-07-069

Highway: US 380

Contractor questions on this project are to be addressed to the following individual(s):

Area Engineer: Edrean Cheng_____Edrean.Cheng @txdot.gov
Assistant Area Engineer: Oscar Chavez Oscar R.Chavez @txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

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Peak Hours		Off-Peak Hours	
6 to 9 AM Monday through Friday	3 to 7 PM Monday through Friday	9 AM to 3 PM and 7 PM to 6 AM Monday through Friday	All day Saturday and Sunday

Work that requires closure of multiple travel lanes in the same direction, except as otherwise shown in the plans, are restricted to night hours between 9 PM and 6 AM.

The following Holiday/Event lane closure restriction requirements apply to this project:

No work that restricts or interferes with traffic shall be allowed between 3 PM on the day preceding a Holiday or Event and 9 AM on the day after the Holiday or Event.

Holiday Lane Closure Restrictions	
New Year's Eve and New Year's Day (December 31 through January 1)	3 PM December 30 through 9 AM January 2
Easter Holiday Weekend (Friday through Sunday)	3PM Thursday through 9 AM Monday
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Thanksgiving Holiday (Wednesday through Sunday)	3 PM Tuesday through 9 AM Monday
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Plan work schedules around the appropriate dates above to ensure productive work is performed without lane closures.

Event Lane Closure Restrictions 3 PM the day before Event to 9 AM the day after the Event			
NASCAR Races at Texas Motor Speedway (generally 3 events):	NASCAR Nationwide and Sprint Cup Series (Held in late March/early April)	NASCAR Nationwide and Sprint Cup Series (Held in Late October/early November)	Indy Series Racing and NASCAR Truck Series (Held in June)

Modifications to Lane Closure / Work Restrictions:

Submit a request in writing for approval by the Engineer a minimum of 10 days in advance of implementing a change to lane closure restrictions.

When deemed necessary, the Engineer will lengthen, shorten, or otherwise modify lane closure restrictions as traffic conditions warrant.

When deemed necessary, the Engineer will modify the list of major events when new events develop, existing events are rescheduled, or when warranted.

Special Events/ Special Situations will be handled on a case-by-case basis. No work restricting lane closures is allowed from 3 PM a day before to 9 AM the day after the Special Event or Special Situation.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work.

For dimensions of right-of-way not shown on the plans, see right-of-way map on file at the TxDOT District Office.

Provide all-weather surface for temporary ingress and egress to adjacent property, as directed. Materials, labor, equipment and incidentals necessary to provide temporary ingress and egress will not be paid for directly, but will be subsidiary to the various bid items.

Project Number: F 2023(039)

County: WISE **Control:** 0134-07-069

Highway: US 380

Where necessary, the governing slopes indicated herein may be varied from the limits shown, to the extent approved.

On superelevated curves the shoulders will have the same cross-slope as the pavement, unless otherwise indicated.

On superelevated curves where the grade line is in a sag or on a flat grade, overlay the shoulders to the extent necessary to prevent trapping of water on the high side.

Do not discolor or damage existing curb and curb and gutter during construction operations. In the event of discoloration or damage, clean or repair as directed.

Remove the grass from the crown of shoulders or pavement edges by blading or other approved methods. Payment for this work will not be made directly but will be subsidiary to the various items of the contract.

Provide temporary drain openings at all low points or other drainage structures, as required, at the Contractor's expense.

Remove any obstructions to existing drainage due to the contractor's operations, as required, at the Contractor's expense.

Install all required concrete riprap flumes immediately following the construction of ditches in which they are to be placed. In addition, apply all erosion control measures as shown on the plans or as directed, immediately following construction of channels to their required line, grade, and section.

The following standard detail sheets have been modified:
"Traffic Rail Foundations"

Item 4 – Scope of Work

Reimbursement for project overhead will not be considered until project completion has extended beyond the original Contract Time.

Item 7. Legal Relations and Responsibilities

The total area disturbed for this project is 3.16 acres. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the right of way. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the right of way to the Engineer and to the local government that operates a separate storm sewer system.

Prevention of Migratory Bird Nesting
It is anticipated that migratory birds, a protected group of species, may try to nest on bridges, culverts, vegetation, or gravel substrate, at any time of the year. The preferred nesting season for migratory birds is from February 15 through October 1. When practicable, schedule construction operations outside of the preferred nesting season. Otherwise, avoid nests containing migratory birds and perform no work in the nesting areas until the young birds have fledged.

Structures
Do not begin bridge and culvert construction operations until swallow nesting prevention is implemented, until after October 1 if it's determined that swallow nesting is actively occurring, or until it's determined swallow nests have been abandoned. If the State installed nesting deterrent on the bridges and culverts, maintain the existing nesting deterrent to prevent swallow nesting until October 1 or completion of the bridge and culvert work, whichever occurs earlier. If new nests are built and occupied after the beginning of the work, do not perform work that can interfere with or discourage swallows from returning to their nests. Prevention of swallow nesting can be performed by one of the following methods:

1. By February 15 begin the removal of any existing mud nests and all other mud placed by swallows for the construction of nests on any portion of the bridge and culverts. The Engineer will inspect the bridges and culverts for nest building activity. If swallows begin nest building, scrape or wash down all nest sites. Perform these activities daily unless the Engineer determines the need to do this work more frequently. Remove nests and mud through October 1 or until bridge and culvert construction operations are completed.

2. By February 15 place a nesting deterrent (which prevents access to the bridge and culvert by swallows) on the entire bridge (except deck and railing) and culverts.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by nesting swallows. This work is subsidiary to the various bid items.

Item 8. Prosecution and Progress

Working days will be computed and charged in accordance with Section 8.3.1.1, 'Five-Day Workweek.' 171 days have been determined to be the number of contract working days which schedule shall meet all requirements to ensure productive work is performed without lane closures.

Item 100. Preparing Right of Way

Measurement for this item will be along the centerline of the project with the limits of measurements as shown on the plans.
Removal of existing concrete pavement will be in accordance with Item 104, "Removing Concrete" except that this work will not be paid for directly, but will be subsidiary to Item 100, "Preparing Right of Way."

Item 104. Removing Concrete

When associated with a structure to be removed, removal of riprap as required, approach slabs, and shoulder drains are to be included in the unit price bid for Item 496, "Removing Structures."

Project Number: F 2023(039)

County: WISE **Control:** 0134-07-069

Highway: US 380

Item 110. Excavation

Cross-sections for pay quantity determination of earthwork may be developed photogrammetrically.

Review proposed waste sites to determine if any site is located in a "Base Floodplain" or "Floodway" as defined by the Federal Emergency Management Agency (FEMA).

If waste material from this project is placed in a base floodplain as defined by FEMA, obtain a permit from the local community responsible for enforcing National Flood Insurance Program (NFIP) regulations. Ensure that the owner of the property receiving the waste has obtained the necessary permit.

Item 161. Compost

Place approximately 4" of compost manufactured topsoil (CMT) on all cut and fill slopes (except drainage channels where flexible channel liners are indicated), at other locations shown on the plans, or as directed.

The CMT for this project as specified shall be pre-blended, to produce a suitable soil material, as directed, with 25% compost and 75% topsoil, by volume, to produce the compost manufactured topsoil. The topsoil material shall be from an approved source outside the right-of-way and in accordance with Item 160.2. Place the pre-blended compost manufactured topsoil in a loose layer approximately 4" thick, as shown on the plans.

Where "blended on-site" CMT is specified, produce the compost manufactured topsoil by incorporating 1" of compost with 3" of suitable on-site topsoil material to create a homogenous CMT mixture approximately 4" thick, as shown on the plans.

Item 164. Seeding for Erosion Control

Apply seeding required between December 1 and January 31 using seed types and mixtures as shown in Item 164.2.1, Table 3. If, in the opinion of the Engineer, this does not provide an effective vegetative cover, apply "straw or hay mulch" as specified in Article 164.3.2, "Straw or Hay Mulch Seeding" as soon as possible. After February 1, apply warm season seeding in order to establish a permanent protective vegetative cover.

Item 168. Vegetative Watering

Furnish and install an approved rain gauge at the project site, as directed. Furnishing and installation of the rain gauge will not be paid for directly, but will be subsidiary to Item 168.

Apply vegetative watering for an establishment period of thirteen weeks following application of seed or installation of sod, at a rate of 1/2 inch of water depth per week (approximately 13,030 gallons per acre). During the first four weeks after seeding, apply water twice per week, on non-consecutive days, each at half the weekly application rate. For the remainder of the establishment period, apply vegetative watering once per week during the months of January through June or September through December, at the weekly application rate; apply watering twice per week, on non-consecutive days during the months of July and August, each at

Project Number: F 2023(039)

County: WISE **Control:** 0134-07-069

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Project Number: F 2023(039)

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Item 100. Preparing Right of Way

Measurement for this item will be along the centerline of the project with the limits of measurements as shown on the plans.
Removal of existing concrete pavement will be in accordance with Item 104, "Removing Concrete" except that this work will not be paid for directly, but will be subsidiary to Item 100, "Preparing Right of Way."

Item 104. Removing Concrete

When associated with a structure to be removed, removal of riprap as required, approach slabs, and shoulder drains are to be included in the unit price bid for Item 496, "Removing Structures."

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Item 110. Excavation

Cross-sections for pay quantity determination of earthwork may be developed photogrammetrically.

Review proposed waste sites to determine if any site is located in a "Base Floodplain" or "Floodway" as defined by the Federal Emergency Management Agency (FEMA).

If waste material from this project is placed in a base floodplain as defined by FEMA, obtain a permit from the local community responsible for enforcing National Flood Insurance Program (NFIP) regulations. Ensure that the owner of the property receiving the waste has obtained the necessary permit.

Item 161. Compost

Place approximately 4" of compost manufactured topsoil (CMT) on all cut and fill slopes (except drainage channels where flexible channel liners are indicated), at other locations shown on the plans, or as directed.

The CMT for this project as specified shall be pre-blended, to produce a suitable soil material, as directed, with 25% compost and 75% topsoil, by volume, to produce the compost manufactured topsoil. The topsoil material shall be from an approved source outside the right-of-way and in accordance with Item 160.2. Place the pre-blended compost manufactured topsoil in a loose layer approximately 4" thick, as shown on the plans.

Where "blended on-site" CMT is specified, produce the compost manufactured topsoil by incorporating 1" of compost with 3" of suitable on-site topsoil material to create a homogenous CMT mixture approximately 4" thick, as shown on the plans.

Item 164. Seeding for Erosion Control

Apply seeding required between December 1 and January 31 using seed types and mixtures as shown in Item 164.2.1, Table 3. If, in the opinion of the Engineer, this does not provide an effective vegetative cover, apply "straw or hay mulch" as specified in Article 164.3.2, "Straw or Hay Mulch Seeding" as soon as possible. After February 1, apply warm season seeding in order to establish a permanent protective vegetative cover.

Item 168. Vegetative Watering

Furnish and install an approved rain gauge at the project site, as directed. Furnishing and installation of the rain gauge will not be paid for directly, but will be subsidiary to Item 168.

Apply vegetative watering for an establishment period of thirteen weeks following application of seed or installation of sod, at a rate of 1/2 inch of water depth per week (approximately 13,030 gallons per acre). During the first four weeks after seeding, apply water twice per week, on non-consecutive days, each at half the weekly application rate. For the remainder of the establishment period, apply vegetative watering once per week during the months of January through June or September through December, at the weekly application rate; apply watering twice per week, on non-consecutive days during the months of July and August, each at

one-half the weekly application rate.

Average weekly rainfall rates for the District are:

January—0.39"	April—0.86"	July—0.48"	October—0.68"
February—0.46"	May—1.00"	August—0.47"	November—0.46"
March—0.48"	June—0.63"	September—0.74"	December—0.37"

Item 260. Lime Treatment (Road-Mixed)

Apply lime by the "slurry placement" method. Allow the mixture to mellow for a minimum of 4 days after initial mixing. If moderate sulfates are present, or for other extenuating circumstances as determined by the Engineer, allow the mixture to mellow for 7 days after initial mixing.

Item 301. Asphalt Antistripping Agent

Furnish a liquid antistripping agent unless otherwise directed.

Item 310. Prime Coat

Provide an MC-30, EC-30 for this Item. MC-30 is restricted to usage from September 16 through April 15.

Item 360. Concrete Pavement

When using the Hardy Chair-Lok to support reinforcing steel, chair spacing may be increased to 1.67 sq. yd. per chair, placed in a diamond or square pattern. Do not exceed 60" longitudinal spacing.

The provisions of Article 360.6.2, "Deficient Thickness Adjustment," will not be a requirement and the pavement will not be cored.

Include the approved mix design number on each delivery ticket.

Item 421. Hydraulic Cement Concrete

For Class P (Item 360) and S (Item 421) Concrete Only: For concrete plants equipped with 2 aggregate bins or no calibrated metering system, blend manufactured and natural sand at the aggregate source only. For concrete plants equipped with a minimum of 3 bins and a calibrated metering system, blending of the separate sands on-site is permitted to meet gradation and AIR requirements.

Strength/cylinder testing equipment must be equipped with a printer for an electronic print out of all test results.

Air entrainment requirements are waived for all classes of concrete except all Class S and all Class P concrete.

Concrete will not be rejected for low air content. Adjustment to the dosage of air entrainment will be as directed or allowed by the Engineer.

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Include the approved mix design number on each delivery ticket.
Ensure that Contractor personnel performing job-control (QC) testing on concrete are ACI certified and maintain certification with annual proficiency/split tests performed with TxDOT. Provide a copy of all personnel certification papers to the Engineer at the preconstruction meeting. The Engineer may require the Contractor's testers to provide the certification papers upon arrival and before testing at the job site. Certified testers will be required to participate with certified TxDOT personnel annually for compression testing (Tex-418-A) and capping cylinders (Tex-450-A) to retain their certification on TxDOT projects.

Furnish a hard copy of all testing equipment calibration reports at the preconstruction meeting when non-TxDOT equipment is used to test concrete. Furnish updated reports as equipment is calibrated through the project contract. The calibration frequency will match TxDOT's and will apply for each piece of equipment as follows:

Slump Cone - Annual
Air Meter - Every 3 months
Compression Tester - Annual
Beam breaker - Annual

The Engineer may allow the use of local commercial laboratories under contract to provide these services. The Commercial Laboratory must fulfill requirements listed above prior to performing any work.

Item 464. Reinforced Concrete Pipe

All bends and connections in pipe must be prefabricated.

Item 502. Barricades, Signs, and Traffic Handling

The contractor force account 'safety contingency' that has been established for this project is intended to be utilized for work zone enhancements to improve the effectiveness of the traffic control plan that could typically not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's responsible person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Permanent signs may be installed when construction in an area is complete and they will not conflict with the traffic control plan for the remainder of the job.

Existing signs are to remain as long as they do not interfere with construction and they do not conflict with the traffic control plan.

Any sign not detailed in the plans but called for in the layout will be as shown in the current "Standard Highway Sign Designs for Texas".

When traffic is obstructed, arrange warning devices in accordance with the latest edition of the "Texas Manual on Uniform Traffic Control Devices".

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Cover or remove any permanent signs or any work zone signs when work or condition referenced is not occurring.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets. Provide access to all driveways during all phases of construction unless otherwise noted in the plans or as directed.

Item 506. Temporary Erosion, Sedimentation, and Environmental Controls

Remove accumulated sediment or replace SW3P controls when the capacity has been reduced by 50% or when the depth of sediment at the control structure exceeds one foot.

Item 514. Permanent Concrete Traffic Barrier

Use the cast-in-place method for all concrete traffic barrier.

Item 528. Colored Textured Concrete and Landscape Pavers

Ensure that all signal pole foundations, sign bases, electrical ground boxes, manholes, inlets and other appurtenances within the area to be paved are constructed to the proper finished grade.
Use natural stone - sculptured granite patternby l.m. scofield company.
(http://www.scofield.com/stampedconcrete_patterns32.html)

For colorants in colored textured concrete, apply dry-shake color hardener and powdered antiquing release. Apply both according to the manufacturer's recommendations. Supply the engineer with a copy of the recommendations.
Colorants or stains should math the federal standard Ams-std-20266: yellow sand.

Patterns and colorants listed are by l.m. scofield co. and are Used for examples only. Approved equals are acceptable. Protect adjacent concrete surfaces from colorants.

For the colored textured concrete base material, use flex base in conformance with Item 247 - flexible base, with the type and grade as specified elsewhere in the plans. If not specified elsewhere in the plans, use the type and grade most prevalent under production in the local area.

Use string lines to maintain true pattern lines relative to back of curb, sidewalk, pavement or edge restraint, or as directed.

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Items 530 And 531. Intersections, Driveways and Turnouts, and Sidewalks

The furnishing and installation of the sand cushion in proposed sidewalks, sidewalk ramps, and driveways will not be paid for directly but will be subsidiary to this bid item.

Item 542. Removing Metal Beam Guard Fence

Remove existing metal beam guard fence only when authorized.

Item 644. Small Roadside Sign Assemblies

Contractor to provide small sign assemblies that are "STF TRIANGULAR SLIP BASE HOUSING" or approved equal by the Engineer.

Item 658. Delineators and Object Marker Assemblies

Contractor to provide delineators that are "SHUR-TITE" or approved equal by the Engineer.
Removal of existing delineators and object marker assemblies shall be considered subsidiary to various bid items.

Item 662. Work Zone Pavement Markings

Use short term pavement markings when directed. Use white short term markers to separate traffic in the same direction. Use yellow short term pavement markings to separate traffic in opposite directions.

Protect the reflectivity and condition of temporary flexible roadway marker tabs from damage during paving operations. Any damage or loss of reflectivity to these markings will be repaired at the Contractor's entire expense.

Work zone non-remove pavement markings shall be finished no later than two-days after milling for any segment of the road.

It is the contractor's option to use work zone non-removable pavement markings as a layout for the proper installation of rumble strips. This work will not be paid directly and shall be subsidiary to Item 533.

Paint and beads may be used for Non-Removable Work Zone pavement markings, if TxDOT approved materials are used for paint and beads.

When Raised Pavement Markers (buttons) are used for Removable Markings on finished pavement surfaces, hot applied thermo adhesive must be used on concrete and bituminous adhesive on asphalt. Buttons may not be used for stop bar markings or symbols.

Any thermo or bituminous adhesive used for removable work zone markings must be removed in its entirety prior to the placement of permanent pavement markings. This work will not be paid for directly but will be subsidiary to Item 662.

All pavement joints shall follow lane line joints or as directed by the Engineer.

Item 666. Reflectorized Pavement Markings with Retroreflective Requirements

Collection of retroreflectivity readings using a mobile retroreflectometer is the preferred method. If retroreflectivity readings are collected using a portable or handheld unit, then measurement is defined as a collective average of at least 20 readings taken along a 200-foot test section. A minimum of three measurements will be required per mile of roadway. Measurements collected on a centerline stripe will be averaged separately for stripe in each direction of travel. A TxDOT inspector must witness the calibration and collection of all retro-reflectivity data.

Item 3076. Dense-Graded Hot-Mix Asphalt

RAP aggregate must meet the requirements of Table 1.

Provide aggregate with a Surface Aggregate Classification (SAC) value of __B___for the travel lanes and shoulders.

Provide aggregate with a Surface Aggregate Classification (SAC) value of_B_for the surfaces other than the travel lanes.

Natural (field) sands are not allowed.

Provide a PG 64-22 asphalt for the concrete underlayment course.

Provide a PG 70-28 asphalt for the surface course.
Furnish a CSS-1P with greater than 50% asphalt residue for the tack coat on this project. A trackless tack can be used in lieu of CSS-1P tack coat or as directed by the Engineer. The Engineer will set the rate at time of application.

Warm Mix Asphalt (WMA) is not permitted in any mix type on this project.

RAP and RAS are not permitted in any surface mixes on this project.

Grade substitution per Table 5 is not allowed.

Use the Boil Test, Test Procedure Tex-530-C, and provide only mixes that produce zero percent (0%) stripping for design verification and during production.

Include the approved mix design number on each delivery ticket.

Use a Material Transfer Device (MTD) unless otherwise directed.

Stop production after Lot 1. Review all test data and confirm any changes with the Engineer. Do not start production and placement on subsequent Lots until approved by the Engineer.

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Shoulders, crossovers, and other areas listed on the Plan sheets or as directed are not subject to in-place air void determination for this project.

Item 6001. Portable Changeable Message Signs

Provide all portable changeable message signs and arrow panels with a photoelectric device to allow for automatic dimming of operations to approximately 50% of their normal brightness when ambient light drops to approximately five footcandles, and then increase back again for daytime operations.

2 electronic portable changeable message sign unit(s) will be required. Individual or collective use of signs will be required by the Engineer when deemed necessary to supplement the traffic control plan.

Each sign must have programmed in its permanent memory the following 15 messages:

1. Exit Closed Ahead
2. Use Other Routes
3. Right Lane
4. Left Lane
5. Closed Ahead
6. Two Lane
7. Detour Ahead
8. Thru Traffic
9. Prepare To Stop
10. Merging Traffic
11. Expect 15 Minute Delay
12. Max Speed ** MPH
13. Merge Right
14. Merge Left
15. No Exit Next ** Miles

Location of the PCMS shown in the Traffic Control Plan Layouts are diagrammatical and shall be determined in the field by the contractor and approved by the TxDOT inspector.

Item 6185. Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

3 total shadow vehicles with TMA will be required for this type of work. Determine if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-2)-13 or TCP(3-3)-14; the shadow vehicle(s) with TMA specified on the traffic control plan as "required" is the quantity that has been estimated for this operation.

Basis of Estimate for Mobil TMAs			
	TMA (Mobil Operation)		
Standard	Required	Optional	Total
TCP (3-2)-13	2	1	3
TCP (3-3)-14	2	0	2

Estimated number of days for striping operations is 3 days total.

The Contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Item 6185

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide 0 additional shadow vehicle(s) with TMA for TCP (3-3)-14 and (3-4)-13 as detailed on General Note of this standard sheet.

Therefore, 2 total shadow vehicles with TMA will be required for this type of work. Determine if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

The seeding and vegetative water operations or any other operations identified by the Engineer, not to include the pavement marking operation, shall use a TMA for the protection of the operations and the traveling public. The used of a TMA on these operations will not be paid for directly but will be considered subsidiary to the pertinent bid items.

GENERAL NOTES FOR TRAFFIC ITEMS

TRAFFIC SIGNAL INSTALLATION
****

The TxDOT Signal Shop can be reached at 817-370-3661. Contact the Signal Shop in advance for notification of pre-construction meetings, delivery of equipment, request for electrical inspection, placing signals into flash or turn on, or set up of signal detection.

Provide a qualified technician, approved by the Engineer, on the project site to place the traffic signals in flash or in full operation. A qualified TxDOT signal technician must also be present.

Electronic submittal of shop drawings, working drawings, equipment manuals and product brochures is permitted for this project.

The contractor is responsible for notifying TxDOT project manager for picking up and dropping off materials

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furnished by the State. Contact the TxDOT Signal Shop 48 hours in advance of picking up to make arrangements.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work

Item 416. Drilled Shaft Foundations
Contractor shall stake foundation as shown on plans. Engineer or Engineers designee will verify and approve staked locations before installing foundations. Calculate signal head clearance and report to the Engineer or Engineers designee.

Obtain Engineer's approval of location before installing foundation.

Item 618. Conduit
After installing conduit and pulling conductor, leave a high tensile strength polyester fiber pull tape in the conduit for future use.

Item 620: Electrical Conductors
Clearly and permanently mark each conductor installed in a signal pole where it can be clearly seen from the hand hole. Use plastic zip ties with labeling plate to mark conductor with appropriate designation.

Item 621: Tray Cable
All proposed tray cable and number of conductors required shall be as shown on the plans. No splices shall be allowed.

Item 628: Electrical Services
Before installing any electrical service, consult with the appropriate utility company before beginning work and verify all metering equipment requirements with the provider have been met. Provide a commercial grade, meter base with by-pass switch if required by the utility company.

Contractor shall obtain 911 address and EISD from electric utility company then contact the TXDOT Signal Shop

to receive the Contract Request for Electrical Service Meter form to complete and return. TXDOT will make application to the Electric Utility Company for service, unless otherwise maintained by the following Cities: Arlington, Bedford, Colleyville, Euless, Fort Worth, Grand Prairie, Grapevine, Hurst, Mansfield, North Richland Hills, and Weatherford.

Item 656. Foundations for Traffic Control Devices
Contractor shall stake foundation as shown on plans. Engineer or Engineers designee will verify and approve staked locations before installing foundations.

For traffic signal controller foundation, use reinforcing bars or deformed Welded Wire Reinforcing (WWR). Provide #3 reinforcing bars spaced at 16" Spaced Center-Center. Provide deformed Welded Wire Reinforcing (WWR) as 6x6-D3xD3. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

Item 680: Installation of Highway Traffic Signals
Contractor shall contact Fort Worth District TMC 817-370-3661 prior to starting any signal modifications. Provide qualified personnel reachable by telephone and available to receive calls on a 24-hour basis. Respond to reported calls and make field assessment within 2 hours and make appropriate repairs within 24 hours.

Furnish and install all required materials, incidentals and equipment necessary for a fully operational traffic signal. The proposed equipment shall be compatible with the existing systems in the area.

Provide all illumination fixtures to be installed in this contract. Use 250W equivalent LED luminaires.

Where work requires the removal of power from the controller and cabinet assembly, erect temporary stop signs. Remove the stop signs after the traffic signals are in operation.

Deliver the cabinet, controller, accessories, and three complete sets of signal construction plans to the operating agency Signal Shop for testing. Notify the Signal Shop two working days prior to delivery of the cabinet.

Wire the signal installation to operate in accordance with phase diagrams in these plans. Timing and phasing will be maintained by the operating agency. Deliver a copy of all revisions to the original timing and phasing plans to the operating agency and TxDOT Signal Shop. One copy is to stay in the controller cabinet at the completion of the project and two supplied to the operating agency Signal Shop.

Project Inspection. Contact the TxDOT Signal Shop in advance of needed inspections. At the time of the final electrical inspection, the Inspector will create a discrepancy list to be corrected and repaired before signal is put into flash mode.

Signal Flash. Upon the satisfactory completion of repairs or corrections, contact the TxDOT Signal Shop at least one week prior to placing in flash. Schedule signal flash for Monday thru Thursday between 9:00 AM – 12:00 PM. Operate the signal in flash mode for 2-3 days prior to turning on to full actuation. The TxDOT signal

inspector and technician must be present when the signals are placed in flash.
Signal Turn-On. Upon completion of the signal flash, schedule the date and time for the turn on of the traffic signal on Monday thru Thursday between 9:00 AM – 12:00 PM. Place the traffic signal into full operation only after all required striping is complete and all conflicting signing is removed. The TxDOT signal inspector and technician must be present when the signals are placed in full color operation.

Test Period. During the 30-day test period, the Contractor will be the first responders to all trouble calls. They will, in turn contact the TxDOT Signal Shop with information about problem and repairs made. Provide qualified personnel to respond to these and all trouble calls. Provide a local telephone number, not subject to frequent changes and available to receive calls on a 24-hour basis. Respond to reported calls within a maximum of two hours. Make appropriate repairs within 24 hours or at engineer's direction.

Place a logbook in each controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. The error log in the conflict monitor shall not be cleared during the thirty-day test period without approval. If it is necessary to replace equipment, such as a controller, in order to return the signals to normal operation, TxDOT will provide temporary replacement equipment until the original equipment is repaired

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and/or replaced at the Engineer's direction.

Removal. Salvageable signal controllers and related equipment shall remain the property of TXDOT. Deliver to the TXDOT Signal Shop at 2501 SW Loop 820, Fort Worth.

Item 682: Vehicle and Pedestrian Signal Heads
Vehicle signal heads shall be yellow aluminum with 5 inch, black, aluminum, reflective border, vented back plates unless otherwise shown on plans.
Signal heads shall be installed level and plumb and aimed as directed. Cover all signal faces until placed in operation.

All new mast arm mounted signal heads to be mounted horizontally.

Item 684: Traffic Signal Cables
Clearly and permanently mark each cable as shown on the plans (CABLE 1, etc.) at each signal head, ground box, terminal block, pole base and controller. Use plastic zip ties with labeling plate to mark cable.

Provide an extra 10' for each cable terminating in the controller cabinet and coil an extra 5' of cable in each ground box.

Terminate all electrical conductors from the controller (including spares) at the termination block in the signal pole hand hole.

Item 686: Traffic Signal Pole Assemblies (Steel)
Provide all signal poles for a project from the same manufacturer.

Install mast arm damping plates at the end of SMA and DMA standard poles in accordance with the details shown in the MA-DPD standard sheet. Dampers are not recommended for LMA poles.

Plug any unused openings in the mast arms or poles with an approved material.

Provide a 3-piece bracket assembly on strain poles or drill the pole and use thimble eyebolts to attach the strand vise for the span wire.

6045: Radar Advance Detection Devices
Mount detector as shown in plans or as directed by the engineer. Adjust heights and locations of sensors to achieve the best possible detection.

Contact the TxDOT Signal Shop for assistance provide 48 hours prior to installation. Provide a factory certified representative for set up, programming, and testing of the equipment at the time of signal flash and turn on.

Installation of radar cable, all other hardware, and programming/setup is subsidiary.

6046: Install of (RPD) Vehicle Detectors

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Mount detector as shown in plans or as directed by the engineer. Adjust heights and locations of sensors to achieve the best possible detection.

Contact the TxDOT Signal Shop for assistance provide 48 hours prior to installation. Provide a factory certified representative for set up, programming, and testing of the equipment at the time of signal flash and turn on.

Installation of radar cable, all other hardware, and programming/setup is subsidiary.

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Cover or remove any permanent signs or any work zone signs when work or condition referenced is not occurring.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets. Provide access to all driveways during all phases of construction unless otherwise noted in the plans or as directed.

Item 506. Temporary Erosion, Sedimentation, and Environmental Controls

Remove accumulated sediment or replace SW3P controls when the capacity has been reduced by 50% or when the depth of sediment at the control structure exceeds one foot.

Item 514. Permanent Concrete Traffic Barrier

Use the cast-in-place method for all concrete traffic barrier.

Item 528. Colored Textured Concrete and Landscape Pavers

Ensure that all signal pole foundations, sign bases, electrical ground boxes, manholes, inlets and other appurtenances within the area to be paved are constructed to the proper finished grade.
Use natural stone - sculptured granite patternby l.m. scofield company.
(http://www.scofield.com/stampedconcrete_patterns32.html)

For colorants in colored textured concrete, apply dry-shake color hardener and powdered antiquing release. Apply both according to the manufacturer's recommendations. Supply the engineer with a copy of the recommendations.
Colorants or stains should math the federal standard Ams-std-20266: yellow sand.

Patterns and colorants listed are by l.m. scofield co. and are Used for examples only. Approved equals are acceptable. Protect adjacent concrete surfaces from colorants.

For the colored textured concrete base material, use flex base in conformance with Item 247 - flexible base, with the type and grade as specified elsewhere in the plans. If not specified elsewhere in the plans, use the type and grade most prevalent under production in the local area.

Use string lines to maintain true pattern lines relative to back of curb, sidewalk, pavement or edge restraint, or as directed.

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Items 530 And 531. Intersections, Driveways and Turnouts, and Sidewalks

The furnishing and installation of the sand cushion in proposed sidewalks, sidewalk ramps, and driveways will not be paid for directly but will be subsidiary to this bid item.

Item 542. Removing Metal Beam Guard Fence

Remove existing metal beam guard fence only when authorized.

Item 644. Small Roadside Sign Assemblies

Contractor to provide small sign assemblies that are "STF TRIANGULAR SLIP BASE HOUSING" or approved equal by the Engineer.

Item 658. Delineators and Object Marker Assemblies

Contractor to provide delineators that are "SHUR-TITE" or approved equal by the Engineer.
Removal of existing delineators and object marker assemblies shall be considered subsidiary to various bid items.

Item 662. Work Zone Pavement Markings

Use short term pavement markings when directed. Use white short term markers to separate traffic in the same direction. Use yellow short term pavement markings to separate traffic in opposite directions.

Protect the reflectivity and condition of temporary flexible roadway marker tabs from damage during paving operations. Any damage or loss of reflectivity to these markings will be repaired at the Contractor's entire expense.

Work zone non-remove pavement markings shall be finished no later than two-days after milling for any segment of the road.

It is the contractor's option to use work zone non-removable pavement markings as a layout for the proper installation of rumble strips. This work will not be paid directly and shall be subsidiary to Item 533.

Paint and beads may be used for Non-Removable Work Zone pavement markings, if TxDOT approved materials are used for paint and beads.

When Raised Pavement Markers (buttons) are used for Removable Markings on finished pavement surfaces, hot applied thermo adhesive must be used on concrete and bituminous adhesive on asphalt. Buttons may not be used for stop bar markings or symbols.

Any thermo or bituminous adhesive used for removable work zone markings must be removed in its entirety prior to the placement of permanent pavement markings. This work will not be paid for directly but will be subsidiary to Item 662.

All pavement joints shall follow lane line joints or as directed by the Engineer.

Item 666. Reflectorized Pavement Markings with Retroreflective Requirements

Collection of retroreflectivity readings using a mobile retroreflectometer is the preferred method. If retroreflectivity readings are collected using a portable or handheld unit, then measurement is defined as a collective average of at least 20 readings taken along a 200-foot test section. A minimum of three measurements will be required per mile of roadway. Measurements collected on a centerline stripe will be averaged separately for stripe in each direction of travel. A TxDOT inspector must witness the calibration and collection of all retro-reflectivity data.

Item 3076. Dense-Graded Hot-Mix Asphalt

RAP aggregate must meet the requirements of Table 1.

Provide aggregate with a Surface Aggregate Classification (SAC) value of __B___for the travel lanes and shoulders.

Provide aggregate with a Surface Aggregate Classification (SAC) value of_B_for the surfaces other than the travel lanes.

Natural (field) sands are not allowed.

Provide a PG 64-22 asphalt for the concrete underlayment course.

Provide a PG 70-28 asphalt for the surface course.
Furnish a CSS-1P with greater than 50% asphalt residue for the tack coat on this project. A trackless tack can be used in lieu of CSS-1P tack coat or as directed by the Engineer. The Engineer will set the rate at time of application.

Warm Mix Asphalt (WMA) is not permitted in any mix type on this project.

RAP and RAS are not permitted in any surface mixes on this project.

Grade substitution per Table 5 is not allowed.

Use the Boil Test, Test Procedure Tex-530-C, and provide only mixes that produce zero percent (0%) stripping for design verification and during production.

Include the approved mix design number on each delivery ticket.

Use a Material Transfer Device (MTD) unless otherwise directed.

Stop production after Lot 1. Review all test data and confirm any changes with the Engineer. Do not start production and placement on subsequent Lots until approved by the Engineer.

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Shoulders, crossovers, and other areas listed on the Plan sheets or as directed are not subject to in-place air void determination for this project.

Item 6001. Portable Changeable Message Signs

Provide all portable changeable message signs and arrow panels with a photoelectric device to allow for automatic dimming of operations to approximately 50% of their normal brightness when ambient light drops to approximately five footcandles, and then increase back again for daytime operations.

2 electronic portable changeable message sign unit(s) will be required. Individual or collective use of signs will be required by the Engineer when deemed necessary to supplement the traffic control plan.

Each sign must have programmed in its permanent memory the following 15 messages:

1. Exit Closed Ahead
2. Use Other Routes
3. Right Lane
4. Left Lane
5. Closed Ahead
6. Two Lane
7. Detour Ahead
8. Thru Traffic
9. Prepare To Stop
10. Merging Traffic
11. Expect 15 Minute Delay
12. Max Speed ** MPH
13. Merge Right
14. Merge Left
15. No Exit Next ** Miles

Location of the PCMS shown in the Traffic Control Plan Layouts are diagrammatical and shall be determined in the field by the contractor and approved by the TxDOT inspector.

Item 6185. Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

3 total shadow vehicles with TMA will be required for this type of work. Determine if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-2)-13 or TCP(3-3)-14; the shadow vehicle(s) with TMA specified on the traffic control plan as "required" is the quantity that has been estimated for this operation.

Basis of Estimate for Mobil TMAs			
	TMA (Mobil Operation)		
Standard	Required	Optional	Total
TCP (3-2)-13	2	1	3
TCP (3-3)-14	2	0	2

Estimated number of days for striping operations is 3 days total.

The Contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Item 6185

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide 0 additional shadow vehicle(s) with TMA for TCP (3-3)-14 and (3-4)-13 as detailed on General Note of this standard sheet.

Therefore, 2 total shadow vehicles with TMA will be required for this type of work. Determine if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

The seeding and vegetative water operations or any other operations identified by the Engineer, not to include the pavement marking operation, shall use a TMA for the protection of the operations and the traveling public. The used of a TMA on these operations will not be paid for directly but will be considered subsidiary to the pertinent bid items.

GENERAL NOTES FOR TRAFFIC ITEMS

TRAFFIC SIGNAL INSTALLATION
****

The TxDOT Signal Shop can be reached at 817-370-3661. Contact the Signal Shop in advance for notification of pre-construction meetings, delivery of equipment, request for electrical inspection, placing signals into flash or turn on, or set up of signal detection.

Provide a qualified technician, approved by the Engineer, on the project site to place the traffic signals in flash or in full operation. A qualified TxDOT signal technician must also be present.

Electronic submittal of shop drawings, working drawings, equipment manuals and product brochures is permitted for this project.

The contractor is responsible for notifying TxDOT project manager for picking up and dropping off materials

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furnished by the State. Contact the TxDOT Signal Shop 48 hours in advance of picking up to make arrangements.

Existing storm sewers and utilities are shown from the best available information. Verify the location of all underground facilities prior to starting work

Item 416. Drilled Shaft Foundations
Contractor shall stake foundation as shown on plans. Engineer or Engineers designee will verify and approve staked locations before installing foundations. Calculate signal head clearance and report to the Engineer or Engineers designee.

Obtain Engineer's approval of location before installing foundation.

Item 618. Conduit
After installing conduit and pulling conductor, leave a high tensile strength polyester fiber pull tape in the conduit for future use.

Item 620: Electrical Conductors
Clearly and permanently mark each conductor installed in a signal pole where it can be clearly seen from the hand hole. Use plastic zip ties with labeling plate to mark conductor with appropriate designation.

Item 621: Tray Cable
All proposed tray cable and number of conductors required shall be as shown on the plans. No splices shall be allowed.

Item 628: Electrical Services
Before installing any electrical service, consult with the appropriate utility company before beginning work and verify all metering equipment requirements with the provider have been met. Provide a commercial grade, meter base with by-pass switch if required by the utility company.

Contractor shall obtain 911 address and EISD from electric utility company then contact the TXDOT Signal Shop

to receive the Contract Request for Electrical Service Meter form to complete and return. TXDOT will make application to the Electric Utility Company for service, unless otherwise maintained by the following Cities: Arlington, Bedford, Colleyville, Euless, Fort Worth, Grand Prairie, Grapevine, Hurst, Mansfield, North Richland Hills, and Weatherford.

Item 656. Foundations for Traffic Control Devices
Contractor shall stake foundation as shown on plans. Engineer or Engineers designee will verify and approve staked locations before installing foundations.

For traffic signal controller foundation, use reinforcing bars or deformed Welded Wire Reinforcing (WWR). Provide #3 reinforcing bars spaced at 16" Spaced Center-Center. Provide deformed Welded Wire Reinforcing (WWR) as 6x6-D3xD3. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

Item 680: Installation of Highway Traffic Signals
Contractor shall contact Fort Worth District TMC 817-370-3661 prior to starting any signal modifications. Provide qualified personnel reachable by telephone and available to receive calls on a 24-hour basis. Respond to reported calls and make field assessment within 2 hours and make appropriate repairs within 24 hours.

Furnish and install all required materials, incidentals and equipment necessary for a fully operational traffic signal. The proposed equipment shall be compatible with the existing systems in the area.

Provide all illumination fixtures to be installed in this contract. Use 250W equivalent LED luminaires.

Where work requires the removal of power from the controller and cabinet assembly, erect temporary stop signs. Remove the stop signs after the traffic signals are in operation.

Deliver the cabinet, controller, accessories, and three complete sets of signal construction plans to the operating agency Signal Shop for testing. Notify the Signal Shop two working days prior to delivery of the cabinet.

Wire the signal installation to operate in accordance with phase diagrams in these plans. Timing and phasing will be maintained by the operating agency. Deliver a copy of all revisions to the original timing and phasing plans to the operating agency and TxDOT Signal Shop. One copy is to stay in the controller cabinet at the completion of the project and two supplied to the operating agency Signal Shop.

Project Inspection. Contact the TxDOT Signal Shop in advance of needed inspections. At the time of the final electrical inspection, the Inspector will create a discrepancy list to be corrected and repaired before signal is put into flash mode.

Signal Flash. Upon the satisfactory completion of repairs or corrections, contact the TxDOT Signal Shop at least one week prior to placing in flash. Schedule signal flash for Monday thru Thursday between 9:00 AM – 12:00 PM. Operate the signal in flash mode for 2-3 days prior to turning on to full actuation. The TxDOT signal

inspector and technician must be present when the signals are placed in flash.
Signal Turn-On. Upon completion of the signal flash, schedule the date and time for the turn on of the traffic signal on Monday thru Thursday between 9:00 AM – 12:00 PM. Place the traffic signal into full operation only after all required striping is complete and all conflicting signing is removed. The TxDOT signal inspector and technician must be present when the signals are placed in full color operation.

Test Period. During the 30-day test period, the Contractor will be the first responders to all trouble calls. They will, in turn contact the TxDOT Signal Shop with information about problem and repairs made. Provide qualified personnel to respond to these and all trouble calls. Provide a local telephone number, not subject to frequent changes and available to receive calls on a 24-hour basis. Respond to reported calls within a maximum of two hours. Make appropriate repairs within 24 hours or at engineer's direction.

Place a logbook in each controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. The error log in the conflict monitor shall not be cleared during the thirty-day test period without approval. If it is necessary to replace equipment, such as a controller, in order to return the signals to normal operation, TxDOT will provide temporary replacement equipment until the original equipment is repaired

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and/or replaced at the Engineer's direction.

Removal. Salvageable signal controllers and related equipment shall remain the property of TXDOT. Deliver to the TXDOT Signal Shop at 2501 SW Loop 820, Fort Worth.

Item 682: Vehicle and Pedestrian Signal Heads
Vehicle signal heads shall be yellow aluminum with 5 inch, black, aluminum, reflective border, vented back plates unless otherwise shown on plans.
Signal heads shall be installed level and plumb and aimed as directed. Cover all signal faces until placed in operation.

All new mast arm mounted signal heads to be mounted horizontally.

Item 684: Traffic Signal Cables
Clearly and permanently mark each cable as shown on the plans (CABLE 1, etc.) at each signal head, ground box, terminal block, pole base and controller. Use plastic zip ties with labeling plate to mark cable.

Provide an extra 10' for each cable terminating in the controller cabinet and coil an extra 5' of cable in each ground box.

Terminate all electrical conductors from the controller (including spares) at the termination block in the signal pole hand hole.

Item 686: Traffic Signal Pole Assemblies (Steel)
Provide all signal poles for a project from the same manufacturer.

Install mast arm damping plates at the end of SMA and DMA standard poles in accordance with the details shown in the MA-DPD standard sheet. Dampers are not recommended for LMA poles.

Plug any unused openings in the mast arms or poles with an approved material.

Provide a 3-piece bracket assembly on strain poles or drill the pole and use thimble eyebolts to attach the strand vise for the span wire.

6045: Radar Advance Detection Devices
Mount detector as shown in plans or as directed by the engineer. Adjust heights and locations of sensors to achieve the best possible detection.

Contact the TxDOT Signal Shop for assistance provide 48 hours prior to installation. Provide a factory certified representative for set up, programming, and testing of the equipment at the time of signal flash and turn on.

Installation of radar cable, all other hardware, and programming/setup is subsidiary.

6046: Install of (RPD) Vehicle Detectors

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Mount detector as shown in plans or as directed by the engineer. Adjust heights and locations of sensors to achieve the best possible detection.

Contact the TxDOT Signal Shop for assistance provide 48 hours prior to installation. Provide a factory certified representative for set up, programming, and testing of the equipment at the time of signal flash and turn on.

Installation of radar cable, all other hardware, and programming/setup is subsidiary.

US 380 - ROADWAY SUMMARY (CSJ: 0134-07-069)

SHEET NO.		LENGTH	WIDTH	FOR CONTRACTOR INFORMATION ONLY CRCP PROP. PAVEMENT AREA	CRCP PROP. SUBGRADE AREA	MILL/INLAY PROP. PAVEMENT AREA	100-6002 PREPARING ROW	110-6001 EXCAVATION (ROADWAY)	260-6002 LIME TRT (HYDRATED LIME(SLURRY) 150 LB/CY	260-6073 LIME TRT (SUBGRADE) (8")	305-6003 SALV, HAUL, & STKPL RCL APH PV (2"-4")	310-6008 PRIME COAT (EC-30) (0.2 GAL/SY)	310-6009 PRIME COAT (MC-30) (0.2 GAL/SY)	360-6005 CONC PVMT (CONT REINF-CRCP) (11")	420-6135 CL C CONC (RAIL FOUNDATION) HPC	438-6005 CLEANING AND SEALING JOINTS	464-6005 RC PIPE (CL 3) (24IN)	467-6007 SET (TY 1) (24IN) (6:1) (C)	514-6001 PERM CTB (SGL SLOPE) (TY 1) (42)
		LF	LF	SY	SY	SY	STA	CY	TON	SY	SY	GAL	GAL	SY	CY	LF	LF	EA	LF
RAMP A																			
SHEET 1 OF 2	OUTSIDE SHOULDER	550	6	367	489	0	6	312	8	489	459	98	98	444	28	550	0	0	118
	INSIDE SHOULDER	210	6	0	0	140													
	MEDIAN	125	23	0	0	319													
SHEET 2 OF 2	OUTSIDE SHOULDER	506	6	337	450	0	5	310	7	450	796	90	90	542	82	506	0	0	347
	INSIDE SHOULDER	0	0	0	0	0													
	MEDIAN	358	20	0	0	796													
RAMP B																			
SHEET 1 OF 1	OUTSIDE SHOULDER	1087	6	725	966	0	11	693	16	966	169	193	193	725	0	1086	0	0	0
	INSIDE SHOULDER	253	6	0	0	169													
	MEDIAN	0	0	0	0	0													
RAMP C																			
SHEET 1 OF 2	OUTSIDE SHOULDER	600	10	0	0	667	6	0	0	0	1,399	0	0	76	27	0	0	0	114
	INSIDE SHOULDER	281	8	0	0	250													
	MEDIAN	124	35	0	0	482													
SHEET 2 OF 2	OUTSIDE SHOULDER	400	10	0	0	444	4	0	0	0	2,517	0	0	294	120	133	0	0	507
	INSIDE SHOULDER	0	0	0	0	0													
	MEDIAN	533	35	0	0	2,073													
RAMP D																			
SHEET 1 OF 1	OUTSIDE SHOULDER	1,067	6	711	948	0	11	629	16	948	174	190	190	711	0	1,067	0	0	0
	INSIDE SHOULDER	261	6	0	0	174													
	MEDIAN	0	0	0	0	0													
US 380																			
SHEET 1 OF 4	OUTSIDE SHOULDER	158	7	0	0	123	3	160	4	250	123	50	50	194	0	228	0	0	0
	INSIDE SHOULDER	250	7	194	250	0													
	MEDIAN	0	0	0	0	0													
SHEET 2 OF 4	OUTSIDE SHOULDER	500	7	0	0	389	5	0	0	0	389	0	0	0	0	0	0	0	0
	INSIDE SHOULDER	0	0	0	0	0													
	MEDIAN	0	0	0	0	0													
SHEET 3 OF 4	OUTSIDE SHOULDER	550	7	0	0	428	6	199	5	311	428	62	62	242	0	311	0	0	0
	INSIDE SHOULDER	311	7	242	311	0													
	MEDIAN	0	0	0	0	0													
SHEET 4 OF 4	OUTSIDE SHOULDER	209	7	0	0	163	5	801	21	1,253	163	251	251	1,074	0	794	96	4	0
	INSIDE SHOULDER	0	7	596	703	0													
	MEDIAN	0	0	478	550	0													
PROJECT TOTALS				**3,650**	**4,667**	**6,616**	**62**	**3,104**	**77**	**4,667**	**6,617**	**934**	**934**	**4,302**	**258**	**4,675**	**96**	**4**	**1,086**

*ALTERNATIVE TO ITEM 310-6009.

US 380 - ROADWAY SUMMARY (CSJ: 0134-07-069)

SHEET NO.		LENGTH	WIDTH	FOR CONTRACTOR INFORMATION ONLY CRCP PROP. PAVEMENT AREA	CRCP PROP. SUBGRADE AREA	MILL/INLAY PROP. PAVEMENT AREA	528-6001 COLORED TEXTURED CONC (4")	530-6004 DRIVEWAYS (CONC)	545-6024 CRASH CUSH ATTEN (INSTALL)(TRAC C)	3076-6025 D-GR HMA TY-C SAC B PG 70-22	3076-6035 D-GR HMA TY-D PG 64-22 (460 LBS/SY)	3076-6066 TACK COAT (0.1 GAL/SY)
		LF	LF	SY	SY	SY	SY	SY	EA	TON	TON	GAL
RAMP A												
SHEET 1 OF 2	OUTSIDE SHOULDER	550	6	367	489	0	0	0	1	106	84	46
	INSIDE SHOULDER	210	6	0	0	140						
	MEDIAN	125	23	0	0	319						
SHEET 2 OF 2	OUTSIDE SHOULDER	506	6	337	450	0	200	0	1	183	78	80
	INSIDE SHOULDER	0	0	0	0	0						
	MEDIAN	358	20	0	0	796						
RAMP B												
SHEET 1 OF 1	OUTSIDE SHOULDER	1087	6	725	966	0	680	0	0	39	167	17
	INSIDE SHOULDER	253	6	0	0	169						
	MEDIAN	0	0	0	0	0						
RAMP C												
SHEET 1 OF 2	OUTSIDE SHOULDER	600	10	0	0	667	0	0	1	322	0	140
	INSIDE SHOULDER	281	8	0	0	250						
	MEDIAN	124	35	0	0	482						
SHEET 2 OF 2	OUTSIDE SHOULDER	400	10	0	0	444	0	0	1	579	0	252
	INSIDE SHOULDER	0	0	0	0	0						
	MEDIAN	533	35	0	0	2,073						
RAMP D												
SHEET 1 OF 1	OUTSIDE SHOULDER	1,067	6	711	948	0	204	0	0	40	164	17
	INSIDE SHOULDER	261	6	0	0	174						
	MEDIAN	0	0	0	0	0						
US 380												
SHEET 1 OF 4	OUTSIDE SHOULDER	158	7	0	0	123	0	0	0	28	45	12
	INSIDE SHOULDER	250	7	194	250	0						
	MEDIAN	0	0	0	0	0						
SHEET 2 OF 4	OUTSIDE SHOULDER	500	7	0	0	389	0	0	0	89	0	39
	INSIDE SHOULDER	0	0	0	0	0						
	MEDIAN	0	0	0	0	0						
SHEET 3 OF 4	OUTSIDE SHOULDER	550	7	0	0	428	0	0	0	98	56	43
	INSIDE SHOULDER	311	7	242	311	0						
	MEDIAN	0	0	0	0	0						
SHEET 4 OF 4	OUTSIDE SHOULDER	209	7	0	0	163	0	330	0	37	137	16
	INSIDE SHOULDER	0	7	596	703	0						
	MEDIAN	0	0	478	550	0						
PROJECT TOTALS				**3,650**	**4,667**	**6,616**	**1,084**	**330**	**4**	**1,521**	**731**	**662**

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SUMMARY SHEETS

SHEET 1 OF 3 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		10
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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US 380 - PAVEMENT MARKING SUMMARY (CSJ: 0134-07-069)

SHEET NO.	BEGIN STA.	END STA.	658-6026 INSTL DEL ASSM (D-SY)SZ (BRF)CTB	658-6060 REMOVE DELIN & OBJECT MARKER ASSMS	658-6080 INSTL DEL ASSM (D-SW)SZ 1(FLX)GND	658-6083 INSTL DEL ASSM (D-SW)SZ 1(FLX)SRF	666-6036 REFL PAV MRK TY I (W) 8" (SLD)(100 MIL)	666-6300 RE PM W/RET REQ TY I (W) 4" (BRK)(100 MIL)	666-6303 RE PM W/RET REQ TY I (W) 4" (SLD)(100 MIL)	666-6315 RE PM W/RET REQ TY I (Y) 4" (SLD)(100MIL)	666-6350 REFL PAV MARK TY I (W) 12" (DOT) (100MIL)	668-6018 PREFAB PAV MARK TY B (W) 24" (SLD)	668-6019 PREFAB PAV MRK TY B (W) ARROW	668-6027 PREFAB PAV MRK TY B (W) WORD	672-6010 REFL PAV MRKR TY II-C-R	677-6001 ELIM EXT PAV MRK & MRKS (4")	677-6003 ELIM EXT PAV MRK & MRKS (8")
			EA	EA	EA	EA	LF	LF	LF	LF	LF	LF	EA	EA	EA	LF	LF
RAMP A / US 81																	
SHEET 1 OF 2	10+00.00	15+50.00	6	3	8	38	181	0	549	321	0	0	0	0	8	870	181
SHEET 2 OF 2	15+50.00	20+55.51	17	10	10	0	0	0	506	394	0	19	0	0	0	900	0
RAMP B / US 81																	
SHEET 1 OF 1	10+00.00	20+86.77	0	15	20	0	0	0	1084	756	0	0	0	0	0	1,840	0
RAMP C / US 81																	
SHEET 1 OF 2	10+00.00	16+00.00	6	8	10	128	576	0	600	377	0	0	0	0	26	977	576
SHEET 2 OF 2	16+00.00	21+32.79	25	12	14	0	0	0	400	514	0	0	0	0	0	914	0
RAMP D																	
SHEET 1 OF 1	10+64.73	21+31.74	0	13	22	150	277	0	1241	932	0	16	0	0	13	2,071	191
US 380 / US 81																	
SHEET 1 OF 4	706+71.81	709+00.00	0	0	0	0	815	240	652	988	84	0	1	1	51	2000	941
SHEET 2 OF 4	709+00.00	714+00.00	0	0	0	183	662	180	762	839	0	60	0	0	40	1,680	658
SHEET 3 OF 4	714+00.00	719+50.00	0	0	0	26	2,812	260	902	940	66	40	4	4	106	2,264	1,910
SHEET 4 OF 4	719+50.00	724+00.00	0	0	0	149	826	180	1023	853	0	60	6	5	9	948	478
PROJECT TOTALS			**54**	**61**	**84**	**674**	**6,149**	**860**	**7,719**	**6,914**	**150**	**195**	**11**	**10**	**253**	**14,464**	**4,935**

US 380 - PAVEMENT MARKING SUMMARY CONT. (CSJ: 0134-07-069)

SHEET NO.	BEGIN STA.	END STA.	677-6005 ELIM EXT PAV MRK & MRKS (12")	677-6007 ELIM EXT PAV MRK & MRKS (24")	677-6019 ELIM EXT PAV MRK & MRKS (36")(YLD TRI)	678-6001 PAV SURF PREP FOR MRK (4")	678-6004 PAV SURF PREP FOR MRK (8")	678-6008 PAV SURF PREP FOR MRK (24")	678-6009 PAV SURF PREP FOR MRK (ARROW)	678-6016 PAV SURF PREP FOR MRK (WORD)
			LF	LF	EA	LF	LF	LF	EA	EA
RAMP A / US 81										
SHEET 1 OF 2	10+00.00	15+50.00	41	0	0	870	181	0	0	0
SHEET 2 OF 2	15+50.00	20+55.51	0	0	0	900	0	19	0	0
RAMP B / US81										
SHEET 1 OF 1	10+00.00	20+86.77	0	0	0	1,840	0	0	0	0
RAMP C / US 81										
SHEET 1 OF 2	10+00.00	16+00.00	0	0	0	977	576	0	0	0
SHEET 2 OF 2	16+00.00	21+32.79	0	0	0	914	0	0	0	0
RAMP D										
SHEET 1 OF 1	10+64.73	21+31.74	0	0	0	2,173	277	16	0	0
US 380 / US 81										
SHEET 1 OF 4	706+71.81	709+00.00	0	0	0	1,880	815	0	1	1
SHEET 2 OF 4	709+00.00	714+00.00	64	19	32	1,781	662	60	0	0
SHEET 3 OF 4	714+00.00	719+50.00	650	0	0	2,102	2,812	40	4	4
SHEET 4 OF 4	719+50.00	724+00.00	249	16	32	2,056	826	60	6	5
PROJECT TOTALS			**1,004**	**35**	**64**	**15,493**	**6,149**	**195**	**11**	**10**

US 380 - REMOVAL SUMMARY (CSJ: 0134-07-069)

SHEET NO.	104-6001 REMOVING CONC (PAV)	104-6017 REMOVING CONC (DRIVEWAYS)	542-6001 REMOVE METAL BEAM GUARD FENCE	542-6002 REMOVE TERMINAL ANCHOR SECTION
	SY	SY	LF	EA
REMOVAL LAYOUT	1271	181	971	4
PROJECT TOTALS	**1,271**	**181**	**971**	**4**

US 380 - SW3P SUMMARY (CSJ: 0134-07-069)

SHEET NO.	BEGIN STA.	END STA.	161-6017 COMPOST MANUF TOPSOIL (4")	164-6040 HYDROMULCH SEEDING	168-6001 VEGETATIVE WATERING	506-6002 ROCK FILTER DAM (INSTALL)(TY 2)	506-6011 ROCK FILTER DAM (REMOVE)(TY 2)	506-6021 CONSTRUCTION EXITS (INSTALL)(TY 2)	506-6024 CONSTRUCTION EXITS (REMOVE)(TY 2)	506-6038 TEMP SEDMT CONT FENCE (INSTALL)	506-6039 TEMP SEDMT CONT FENCE (REMOVE)	506-6042 BIODEG EROSN CONT LOGS (INSTALL)(18")	506-6043 BIODEG EROSN CONT LOGS (REMOVE)
			SY	AC	MG	LF	LF	SY	SY	LF	LF	LF	LF
RAMP A													
SHEET 1 OF 10	10+00.00	15+50.00	1307	0.27	14	0	0	78	78	512	512	35	35
SHEET 2 OF 10	15+50.00	20+55.51	1888	0.39	20	0	0	78	78	543	543	0	0
RAMP B													
SHEET 3 OF 10	10+00.00	20+86.77	2275	0.47	24	0	0	156	156	1,042	1,042	35	35
RAMP C													
SHEET 4 OF 10	10+00.00	16+00.00	1307	0.27	14	0	0	78	78	573	573	0	0
SHEET 5 OF 10	16+00.00	21+32.79	1694	0.35	18	0	0	0	0	814	814	0	0
RAMP D													
SHEET 6 OF 10	10+64.73	21+31.74	2420	0.50	25	0	0	156	156	1,057	1,057	35	35
US 380													
SHEET 7 OF 10	706+71.81	709+00.00	1500	0.31	16	0	0	78	78	887	887	0	0
SHEET 8 OF 10	709+00.00	714+00.00	629	0.13	7	0	0	0	0	578	578	35	35
SHEET 9 OF 10	714+00.00	719+50.00	484	0.10	5	0	0	0	0	550	550	0	0
SHEET 10 OF 10	719+50.00	724+00.00	920	0.19	10	20	20	156	156	1,390	1,390	35	35
PROJECT TOTALS			**14,424**	**2.98**	**152**	**20**	**20**	**780**	**780**	**7,946**	**7,946**	**175**	**175**

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SUMMARY SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		11
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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US 380 - SIGNAL SUMMARY (CSJ: 0134-07-069)

LOCATION	416-6032	416-6034	618-6023	618-6024	618-6029	618-6030	618-6033	620-6009	620-6011	620-6012	621-6004	624-6010	628-6145	680-6002	682-6001	682-6002	682-6003
	DRILL SHAFT (TRF SIG POLE) (36 IN)	DRILL SHAFT (TRF SIG POLE) (48 IN)	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	CONDT (PVC) (SCH 40) (3")	CONDT (PVC) (SCH 40) (3") (BORE)	CONDT (PVC) (SCH 40) (4")	ELEC CONDR (NO.6) BARE	ELEC CONDR (NO.4) BARE	ELEC CONDR (NO.4) INSULATED	TRY CABLE (3 CONDR) (8 AWG)	GROUND BOX TY D (162922)W/APRON	ELC SRV TY D 120/240 060(NS) SS(E)SP(O)	INSTALL HWY TRF SIG (ISOLATED)	VEH SIG (12") LED (GRN)	VEH SIG (12") LED (GRN ARW)	VEH SIG (12") LED (YEL)
	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
SIGNAL LAYOUT	26.4	110	1270	460	1115	370	10	2355	870	1740	2200	12	1	1	14	4	15
PROJECT TOTALS	**26.4**	**110**	**1270**	**460**	**1115**	**370**	**10**	**2355**	**870**	**1740**	**2200**	**12**	**1**	**1**	**14**	**4**	**15**

US 380 - SIGNAL SUMMARY CONT. (CSJ: 0134-07-069)

LOCATION	682-6004	682-6005	682-6006	682-6054	682-6056	684-6033	684-6042	686-6051	686-6059	686-6063	686-6065	686-6067	6010-6002	6010-6004	6045-6001	6046-6001	6058-6001
	VEH SIG (12") LED (YEL ARW)	VEH SIG (12") LED (RED)	VEH SIG (12") LED (RED AWR)	BACK PLATE W/REF BRDR (3 SEC) (VENT)ALUM	BACK PLATE W/REF BRDR (5 SEC) (VENT)ALUM	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	TRF SIG CBL (TY A) (12 AWG) (16 CONDR)	INST TRF SIG PL AM(S) 1 ARM(48')LUM	INST TRF SIG PL AM(S) 1 ARM(55')LUM	INST TRF SIG PL AM(S) 1 ARM(60')LUM	INST TRF SIG PL AM(S) 1 ARM(65')	INST TRF SIG PL AM(S) 1 ARM(65')LUM	CCTV FIELD EQUIPMENT (DIGITAL)	CCTV MOUNT (POLE)	INSTALL OF (RADD) VEHICLE DETECTORS	INSTALL OF (RPD) VEHICLE DETECTORS	BBU SYSTEM (EXTERNAL BATT CABINET)
	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
SIGNAL LAYOUT	3	15	2	16	1	1090	3755	2	1	1	1	2	2	2	6	7	1
PROJECT TOTALS	**3**	**15**	**2**	**16**	**1**	**1090**	**3755**	**2**	**1**	**1**	**1**	**2**	**2**	**2**	**6**	**7**	**1**

US 380 - TRAFFIC CONTROL SUMMARY (CSJ: 0134-07-069)

SHEET NO.	512-6001	512-6049	545-6024	662-6060	662-6063	662-6095
	PORT CTB (FUR & INST) (SGL SLOPE)(TY 1)	PORT CTB (REMOVE) (SGL SLOPE)(TY 1)	CRASH CUSH ATTEN (INSTALL) (TRACC)	WK ZN PAV MRK REMOV (W)4"(BRK)	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)
	LF	LF	EA	LF	LF	LF
PHASE 1 SHEET 1 OF 9	0	0	0	0	421	0
PHASE 1 SHEET 2 OF 9	0	0	0	0	599	555
PHASE 1 SHEET 3 OF 9	0	0	0	0	612	160
PHASE 1 SHEET 4 OF 9	0	0	0	0	1380	870
PHASE 1 SHEET 5 OF 9	0	0	0	0	505	166
PHASE 1 SHEET 6 OF 9	0	0	0	0	567	634
PHASE 1 SHEET 7 OF 9	240	240	1	0	569	122
PHASE 1 SHEET 8 OF 9	0	0	0	0	670	0
PHASE 1 SHEET 9 OF 9	0	0	0	0	1562	934
PHASE 2 SHEET 1 OF 4	0	0	0	130	458	458
PHASE 2 SHEET 2 OF 4	0	0	0	40	150	150
PHASE 2 SHEET 3 OF 4	0	0	0	0	1052	433
PHASE 2 SHEET 4 OF 4	0	0	0	0	233	558
PHASE 3 SHEET 1 OF 2	0	0	0	0	800	0
PHASE 3 SHEET 2 OF 2	0	0	0	0	345	0
PHASE 4 SHEET 1 OF 4	0	0	0	0	486	486
PHASE 4 SHEET 2 OF 4	0	0	0	0	500	174
PHASE 4 SHEET 3 OF 4	0	0	0	0	549	471
PHASE 4 SHEET4 OF 4	0	0	0	0	451	230
PHASE 5 SHEET 1 OF 2	0	0	0	0	250	0
PHASE 5 SHEET 2 OF 2	0	0	0	0	151	0
PHASE 6 SHEET 1 OF 4	0	0	0	0	0	820
PHASE 6 SHEET 2 OF 4	0	0	0	0	0	823
PHASE 6 SHEET 3 OF 4	0	0	0	0	0	470
PHASE 6 SHEET 4 OF 4	0	0	0	0	0	1,035
PROJECT TOTALS	**240**	**240**	**1**	**170**	**12,310**	**9,549**

US 380 - SIGN SUMMARY (CSJ: 0134-07-069)

SHEET NO.	BEGIN STA.	END STA.	636-6002	636-6007	644-6001	644-6004	644-6033	644-6050	644-6076
			ALUMINUM SIGN (TY G)	REPLACE EXISTING ALUMINUM SIGN (TY A)	IN SM RD SN SUP & AM 10BWG(1)SA(P)	IN SM RD SN SUP & AM 10BWG(1)SA(T)	IN SM RD SN SUP & AM TYS80 (1)SA(U)	IN SM RD SN SUP & AM TYS80 (2)SA(P)	REMOVE SM RD SN SUP & AM
			SF	SF	EA	EA	EA	EA	EA
RAMP A									
SHEET 1 OF 2	10+00.00	15+00.00	40	9	2	0	0	1	3
SHEET 2 OF 2	15+00.00	20+55.51	0	0	3	0	1	0	5
RAMP B									
SHEET 1 OF 1	10+00.00	20+86.77	0	0	2	2	0	0	4
RAMP C									
SHEET 1 OF 2	10+00.00	16+00.00	0	0	0	0	0	0	0
SHEET 2 OF 2	16+00.00	21+32.79	0	0	0	0	0	0	1
RAMP D									
SHEET 1 OF 1	10+64.73	21+31.74	0	0	5	3	2		11
US 380									
SHEET 1 OF 4	706+71.81	709+00.00	0	0	1	0	0	0	0
SHEET 2 OF 4	709+00.00	714+00.00	40	0	4	0	1	1	6
SHEET 3 OF 4	714+00.00	719+50.00	0	0	3	0	1	0	5
SHEET 4 OF 4	719+50.00	724+53.42	0	9	8	0	1	0	9
PROJECT TOTALS			**80**	**18**	**28**	**5**	**6**	**2**	**44**

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SUMMARY SHEETS

SHEET 3 OF 3 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		12
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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CONSTRUCTION SEQUENCE

The following work will be performed along US 380, as well as Northbound and Southbound US 287 entrance and exit ramps.

Refer to the TCP Phases, Advanced Warning Layout, and Phasing Layout for more detailed information.

Install all applicable barricades, signs, work zone pavement markings, and traffic control devices in accordance to the latest edition of the "Texas Manual onUniform Traffic Control Devices" (MUTCD), TCP, with the TxDOT Barricade and construction (BC) standard sheets, and the work zone (WZ) standard sheets for traffic control setup per phase.

The contractor may be required to furnish additional signs and barricades in addition to the ones shown on the Traffic Control Plan, TCP Standard Sheets, and BC Standard Sheets to maintain traffic and promote motorists' safety. This work will be considered subsidiary to the various bid items. All signs, barricades and pavement markings shall conform with the BC Standard Sheets, TCP Standard Sheets, and the latest edition of the "Texas Manual on Uniform Traffic Control Devices".

The Contractor may vary the spacing of the signs to meet traffic conditions as approved and directed by the Engineer.

Phase 1:

1. Install all necessary signs and construction warning devices per the plans and TMUTCD.
2. Install SW3P devices in accordance to the SW3P sheets or as directed by the Engineer.
3. Construct the US 380 westbound Right Turn Lane and construct the 6' concrete shoulders at all northbound and southbound US 287 entrance and exit ramps as shown on the plans. Upon completion, construct entire westbound US 380 north side concrete shoulders, 7' wide within project limits.
4. Remove traffic control devices related to this phase upon completion of the work.

Phase 2:

1. Install all necessary signs and construction warning devices per the plans and TMUTCD.
2. Construct the US 380 westbound Left Turn Lane.
3. Sawcut 8' of existing shoulder at eastbound US 380, south side, as shown on plans.
4. Remove traffic control devices related to this phase upon completion of the work.

Phase 3:

1. Install all necessary signs and construction warning devices per the plans and TMUTCD.
2. Prepare work area and construct the flush concrete traffic islands on the North side of US 380. Install signals as per TxDOT standards and signalization sheets.
3. Remove traffic control devices related to this phase upon completion of the work.

Phase 4:

1. Install all necessary signs and construction warning devices per the plans and TMUTCD.
2. Construct the US 380 eastbound 7' outside shoulder, entire project limit. Install signals as per TxDOT standards and signalization sheets.
3. Remove traffic control devices related to this phase upon completion of the work.

Phase 5:

1. Install all necessary signs and construction warning devices per the plans and TMUTCD.
2. Construct the TxDOT access concrete driveway, and new drainage RC pipe one half at a time, per the plans.
3. Remove traffic control devices related to this phase upon completion of the work.

Phase 6:

1. Install all necessary signs and construction warning devices per the plans and TMUTCD.
2. Mill and inlay 4" of hot mix asphalt to the 6' shoulders at all Northbound and Southbound US 287 entrance and exit ramps as shown on the plans.
3. Construct grade beam foundations and install single slope barrier at Northbound and Southbound US 287 entrance and exit ramps.
4. Remove traffic control devices related to this phase upon completion of the work.

Phase 7:

1. Place pavement markings and reflectors along each lane after phase 6 is concluded, truck mounted attenuator and convoy will complete one lane at a time throughout the full length of the project while maintaing two way traffic flow throughout the site.
2. Install permanent signs as show on plans and in accordance with TMUTCD.
3. Remove temporary pollution prevention devices.
4. Place permanent seeding as shown on plans and perform final clean up.
5. Remove construction traffic control devices.

Note:
The above stated phases are a suggested construction sequence. Any deviation of this traffic control plan shall be approved in writing by the engineer prior to implementation.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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SEC B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

TRAFFIC CONTROL SEQUENCE OF WORK

SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		13
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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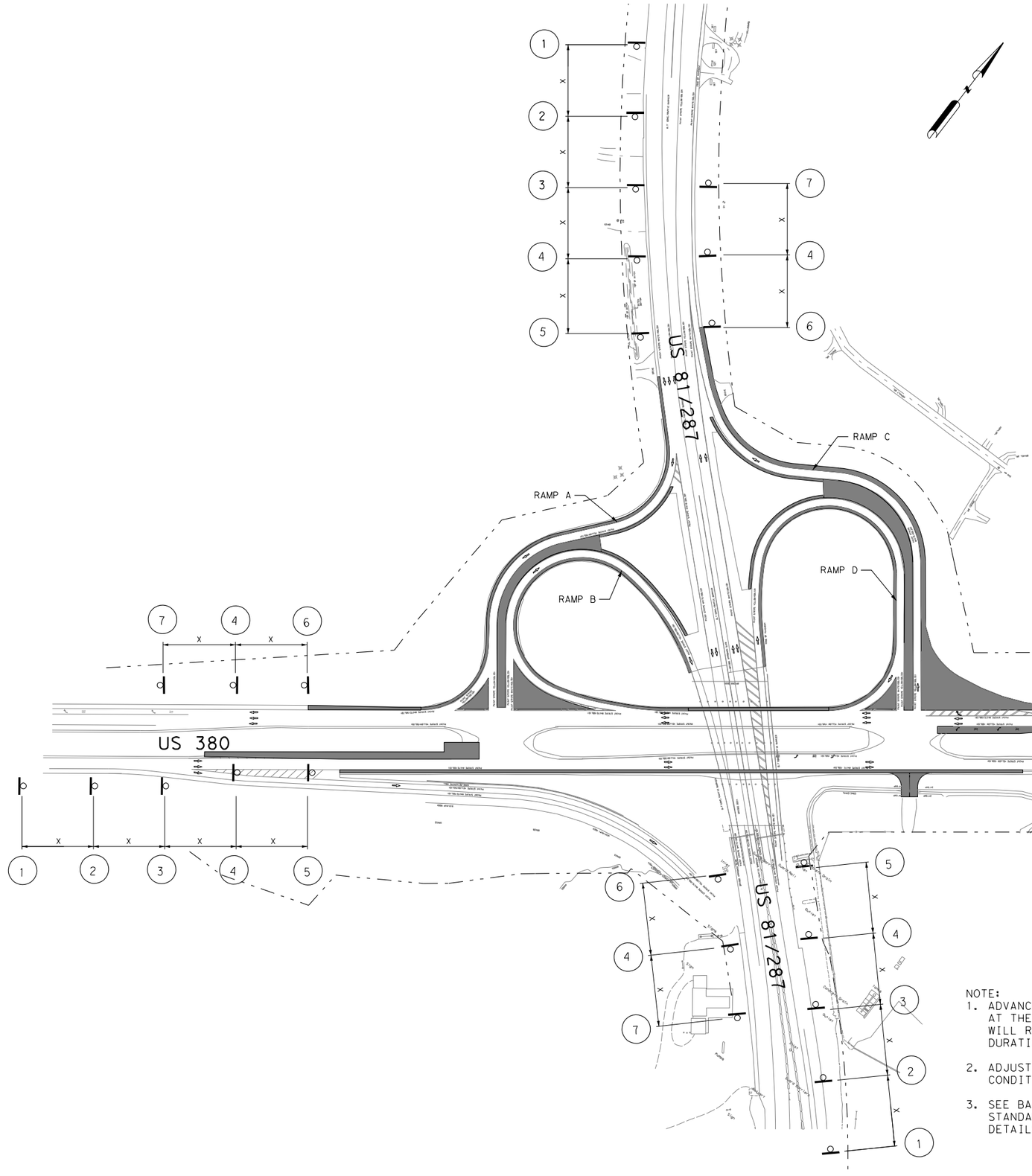

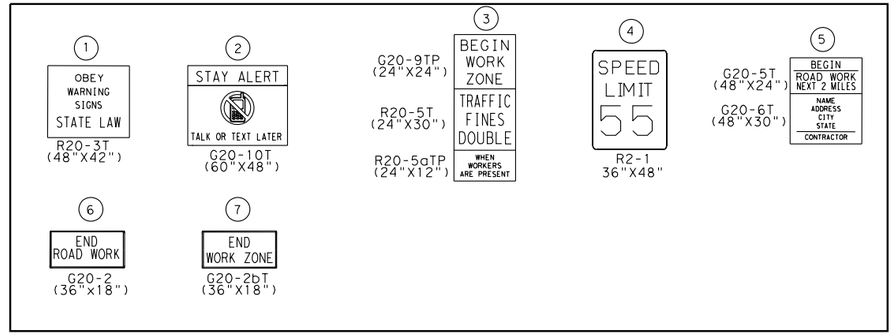

NOTE:
1. ADVANCE WARNING SIGNS TO BE PLACED AT THE START OF CONSTRUCTION AND WILL REMAIN IN PLACE FOR THE DURATION OF CONSTRUCTION.
2. ADJUST SIGNING TO FIT FIELD CONDITIONS AS NECESSARY.
3. SEE BARRICADE AND CONSTRUCTION STANDARDS FOR SIGN SPACING OR DETAILS NOT SHOWN.

LEGEND:
- SIGN ASSEMBLY
- WORK AREA
- TRAFFIC DIRECTIONAL ARROW

SIGN SPACING "X"= 500'

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SEB INFRASTRUCTURE
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US 380

TRAFFIC CONTROL PLAN ADVANCE WARNING SIGNS

ALL PHASES

SCALE: 1"=300'	SHEET 1 OF 1 SHEETS	
FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	14

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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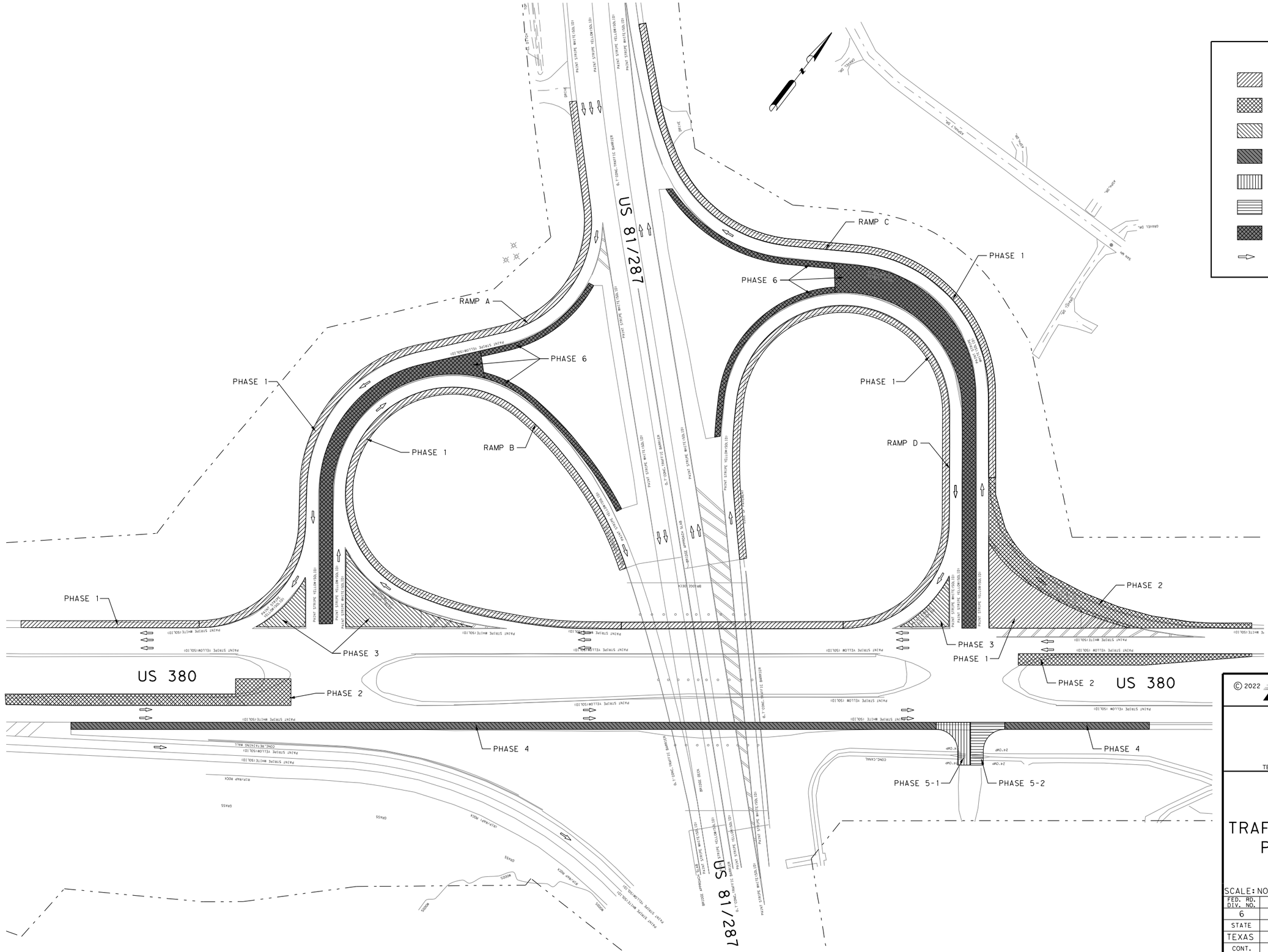

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INFRASTRUCTURE
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US 380

TRAFFIC CONTROL PLAN PHASING LAYOUT

ALL PHASES

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		15
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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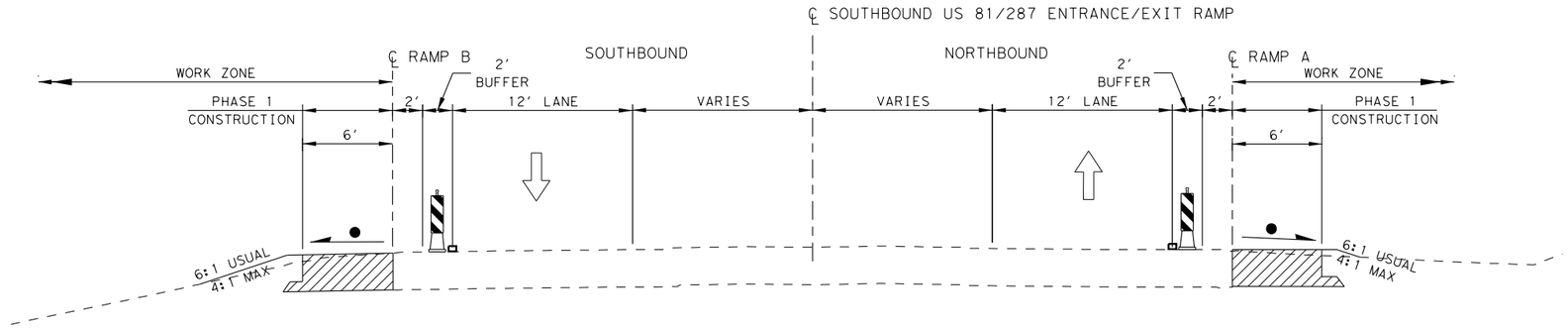
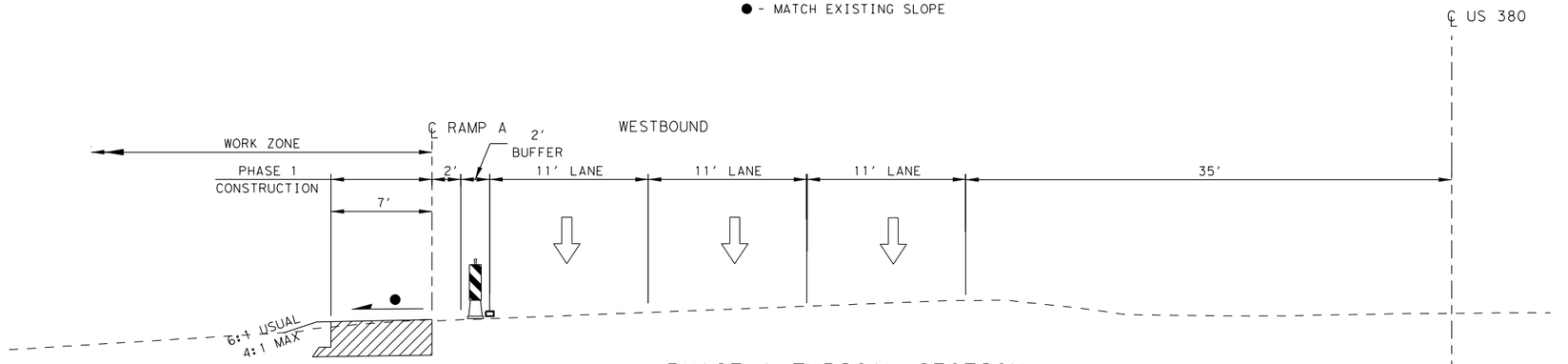


PHASE 1 TYPICAL SECTION

N.T.S

STA. 10+00.00 TO STA. 23+05.51(RAMP A)
STA. 10+00.00 TO STA. 20+84.60(RAMP B)

● - MATCH EXISTING SLOPE

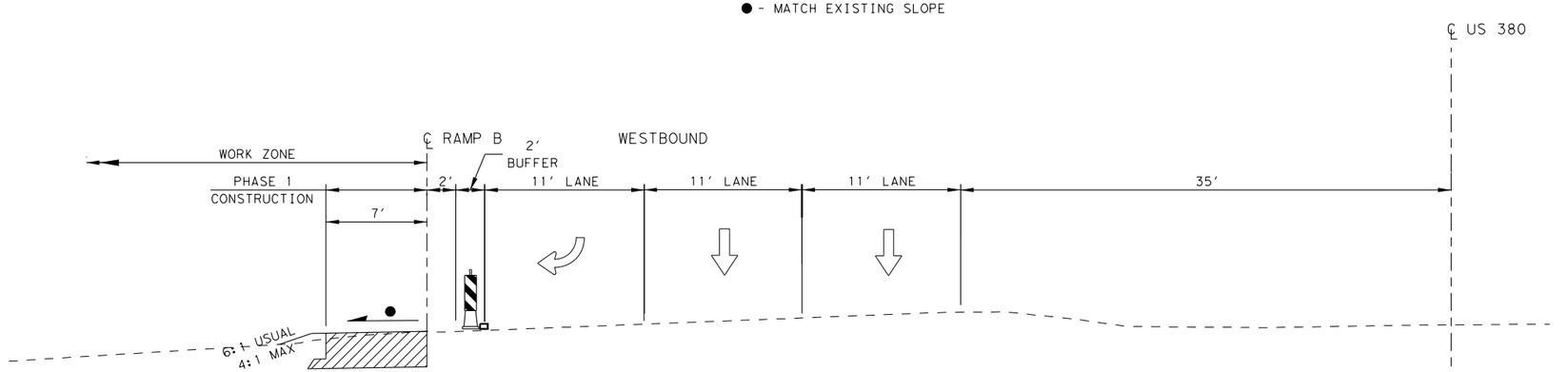


PHASE 1 TYPICAL SECTION

N.T.S

STA. 706+71.80 TO STA. 709+21.79(US 380)

● - MATCH EXISTING SLOPE



PHASE 1 TYPICAL SECTION

N.T.S

STA. 715+14.21 TO STA. 718+25.61(US 380)

● - MATCH EXISTING SLOPE

PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS

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US 380

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 1

SCALE: NOT TO SCALE SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		16
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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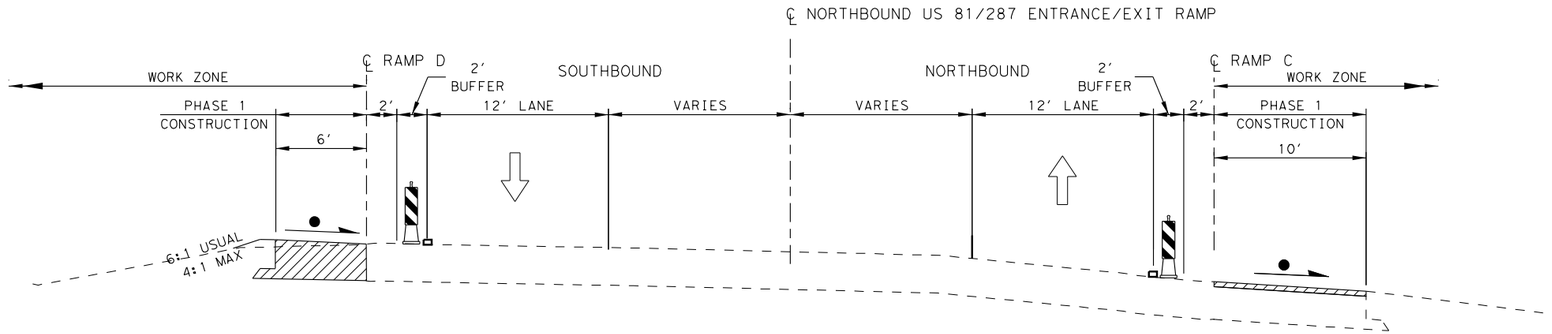
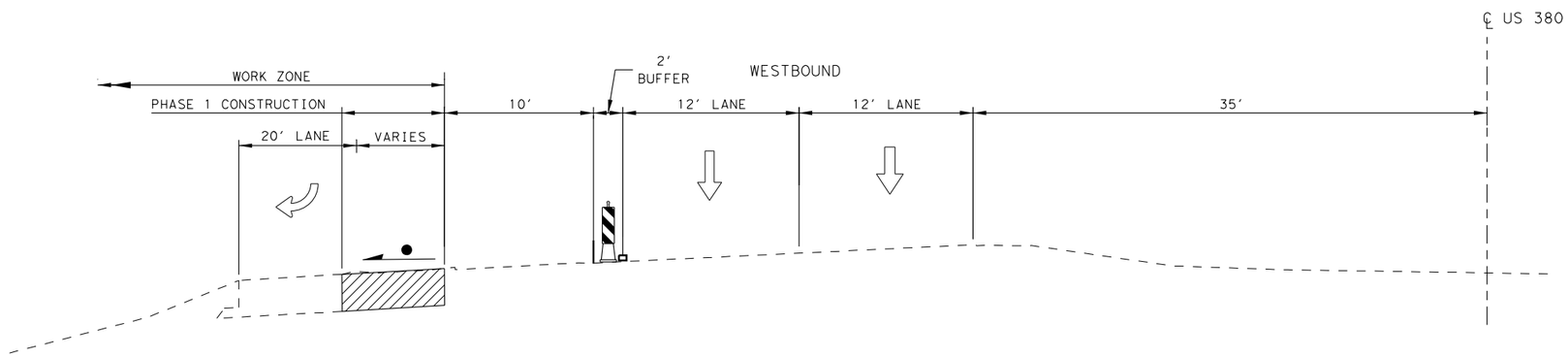


PHASE 1 TYPICAL SECTION

N.T.S

STA. 10+00.00 TO STA. 19+22.14(RAMP C)
STA. 10+00.00 TO STA. 21+31.74(RAMP D)

● - MATCH EXISTING SLOPE



PHASE 1 TYPICAL SECTION

N.T.S

STA. 720+30.50 TO STA. 724+00.00(US 380)

● - MATCH EXISTING SLOPE

PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS

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US 380

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 1

SCALE: NOT TO SCALE SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		17
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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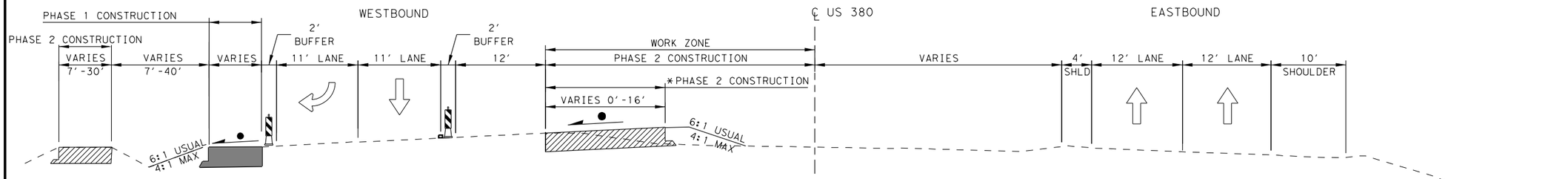
PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS



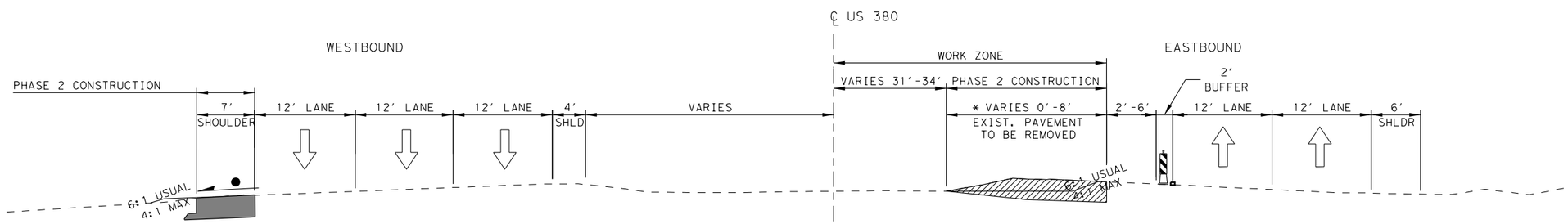
PHASE 2 TYPICAL SECTION

N.T.S

STA. 720+00.00 TO STA. 724+00.00

* STA. 720+73.57 TO STA. 721+25.59

● - MATCH EXISTING SLOPE



PHASE 2 TYPICAL SECTION

N.T.S

STA. 704+00.00 TO STA. 710+50.00

* STA. 704+00.00 TO STA. 710+15.00

● - MATCH EXISTING SLOPE

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US 380

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 2

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		18
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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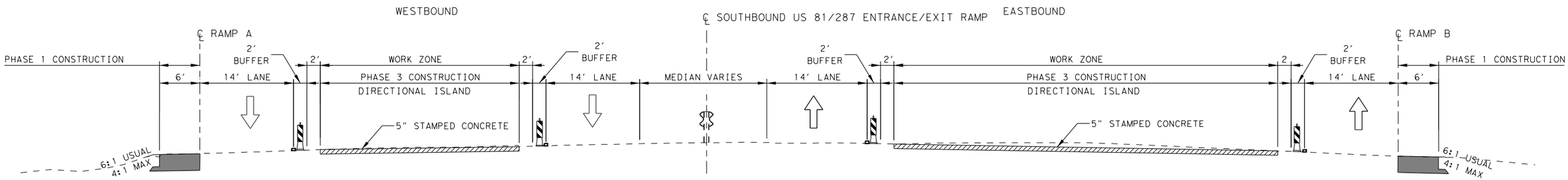
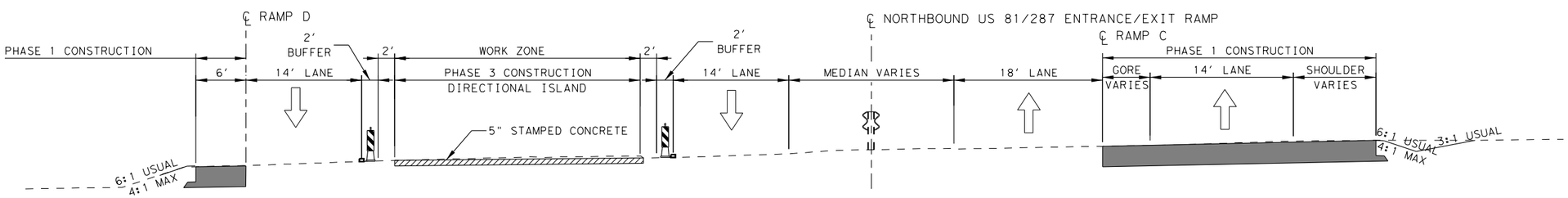
PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS



PHASE 3 TYPICAL SECTION

N.T.S



PHASE 3 TYPICAL SECTION

N.T.S

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INFRASTRUCTURE
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US 380

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 3

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		19
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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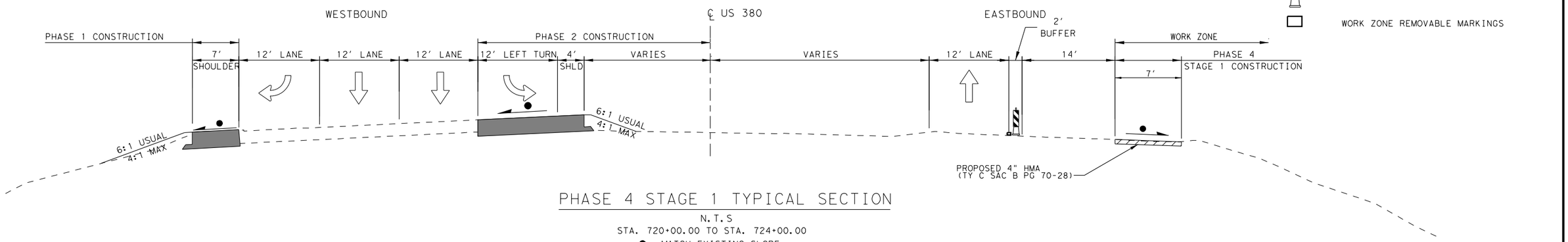
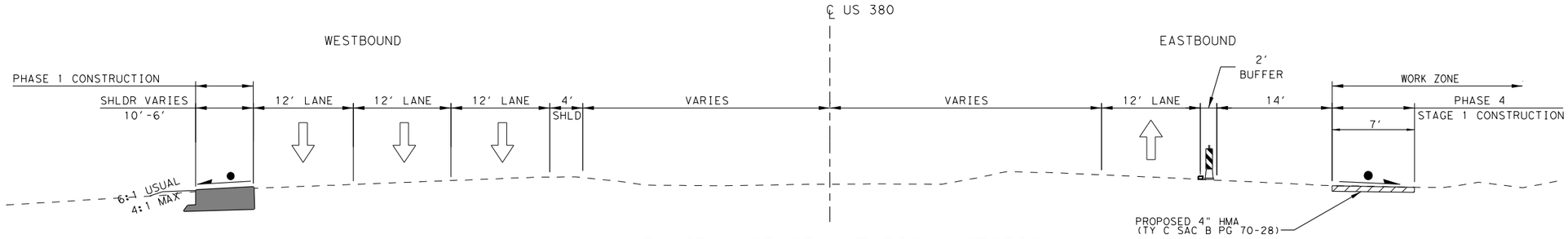
PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS



PHASE 4 STAGE 1 TYPICAL SECTION

N.T.S
STA. 720+00.00 TO STA. 724+00.00
● - MATCH EXISTING SLOPE



PHASE 4 STAGE 1 TYPICAL SECTION

N.T.S
STA. 706+71.81 TO STA. 720+00.00
● - MATCH EXISTING SLOPE

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TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 4 STAGE 1

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		20
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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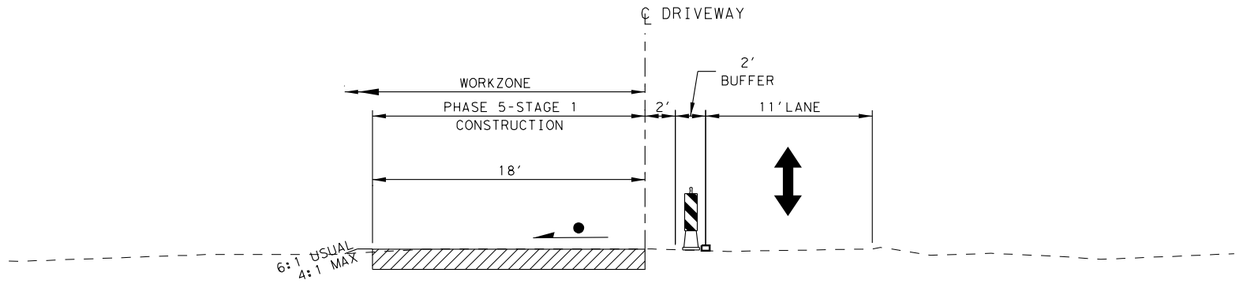
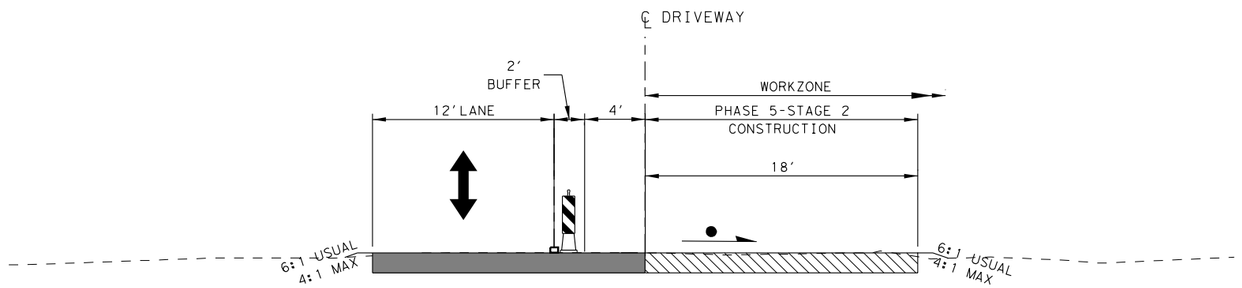


PHASE 5-STAGE 1 TYPICAL SECTION

N.T.S

● - MATCH EXISTING SLOPE



PHASE 5-STAGE 2 TYPICAL SECTION

N.T.S

● - MATCH EXISTING SLOPE

PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS

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TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 5 STAGE 1 & 2

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		21
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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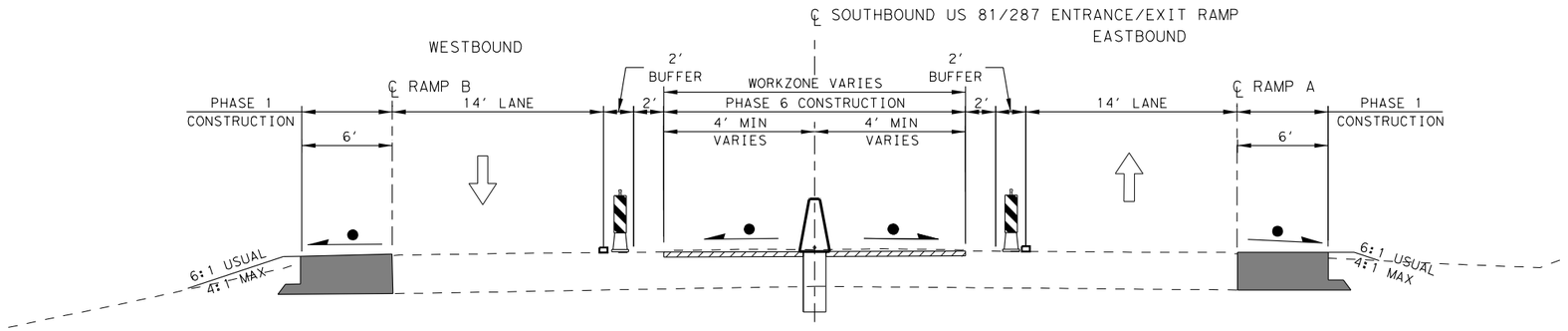
PLAN LEGEND

- ROADWAY CONSTRUCTION THIS PHASE
- ROADWAY CONSTRUCTION PREVIOUS PHASE
- TRAFFIC ARROW
- CHANNELIZING DEVICES (VERTICAL PANEL)
- WORK ZONE REMOVABLE MARKINGS



PHASE 6 TYPICAL SECTION

N.T.S

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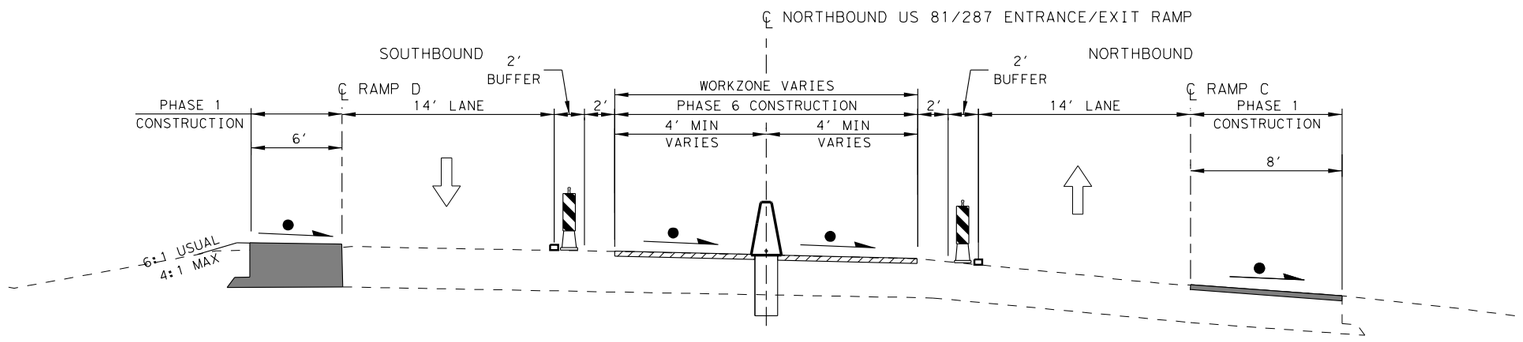
STA. 10+00.00 TO STA. 20+84.60(RAMP B)

● - MATCH EXISTING SLOPE



PHASE 6 TYPICAL SECTION

N.T.S

STA. 10+00.00 TO STA. 21+32.78(RAMP C)
STA. 10+00.00 TO STA. 21+31.74(RAMP D)

● - MATCH EXISTING SLOPE

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US 380

TRAFFIC CONTROL PLAN TYPICAL SECTIONS PHASE 6

SCALE: NOT TO SCALE SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		22
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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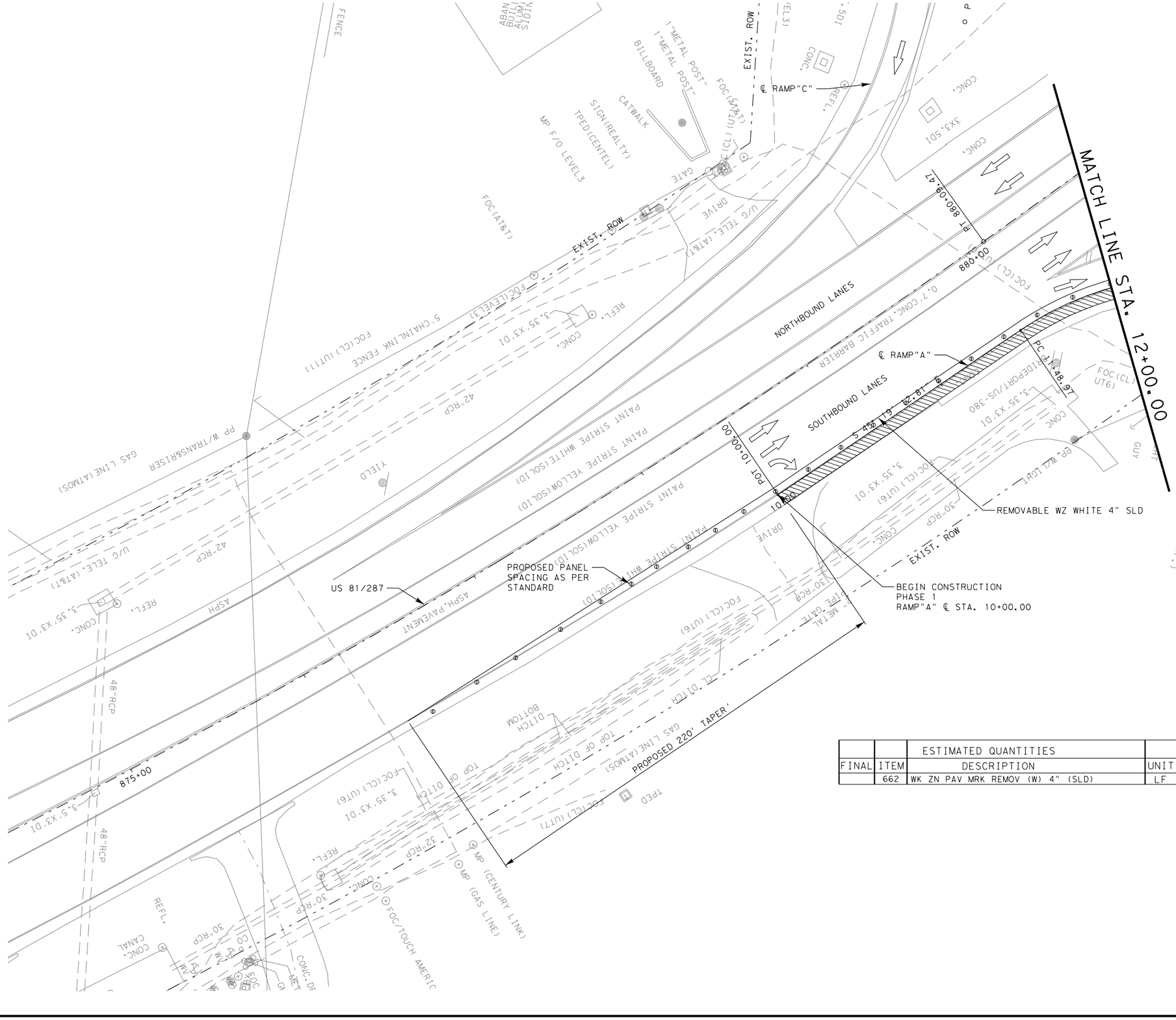
$file$



		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	421

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US 380

TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 1 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		23
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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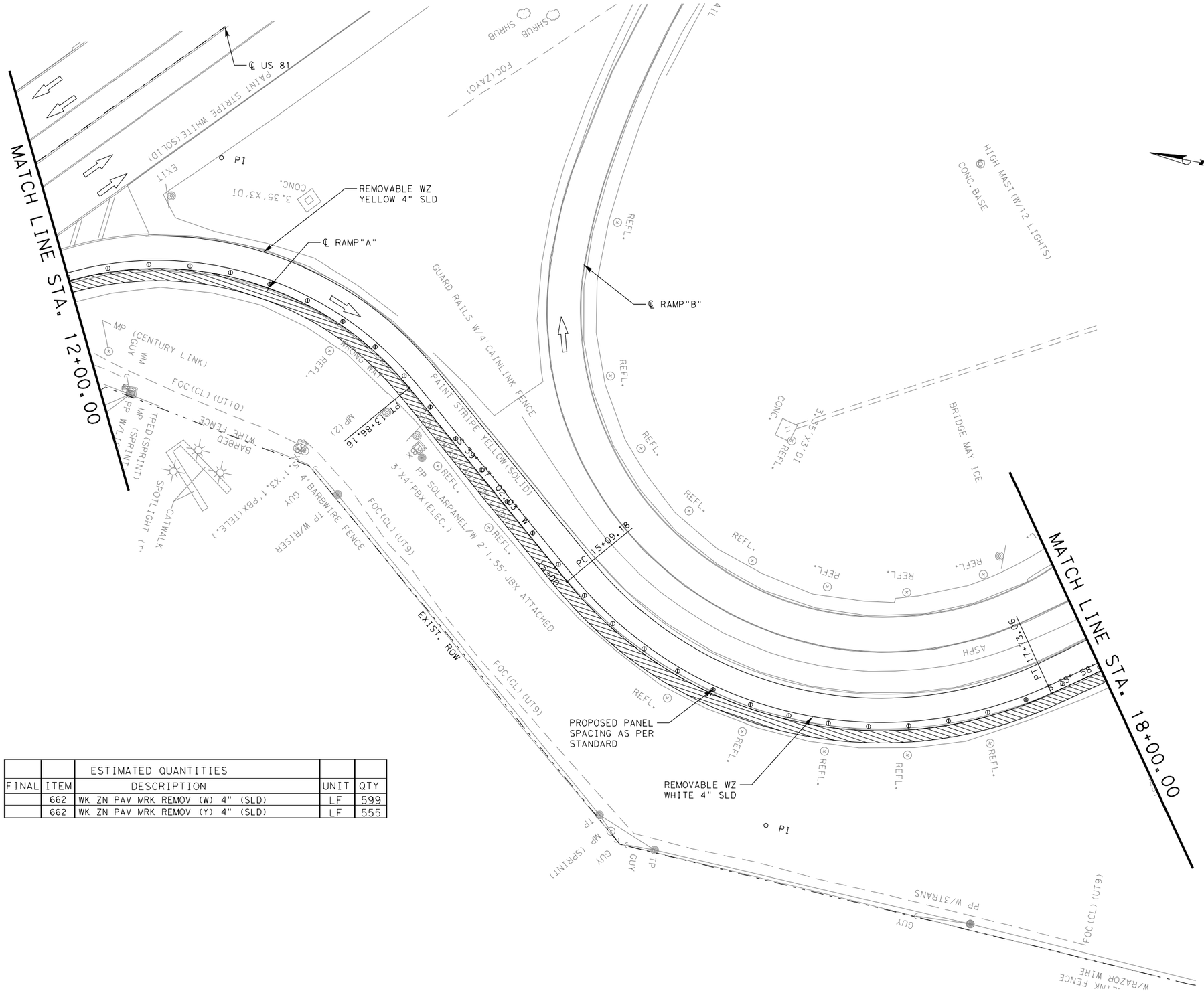
PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW



FINAL	ITEM	ESTIMATED QUANTITIES DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	599
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	555

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US 380

TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 2 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		24
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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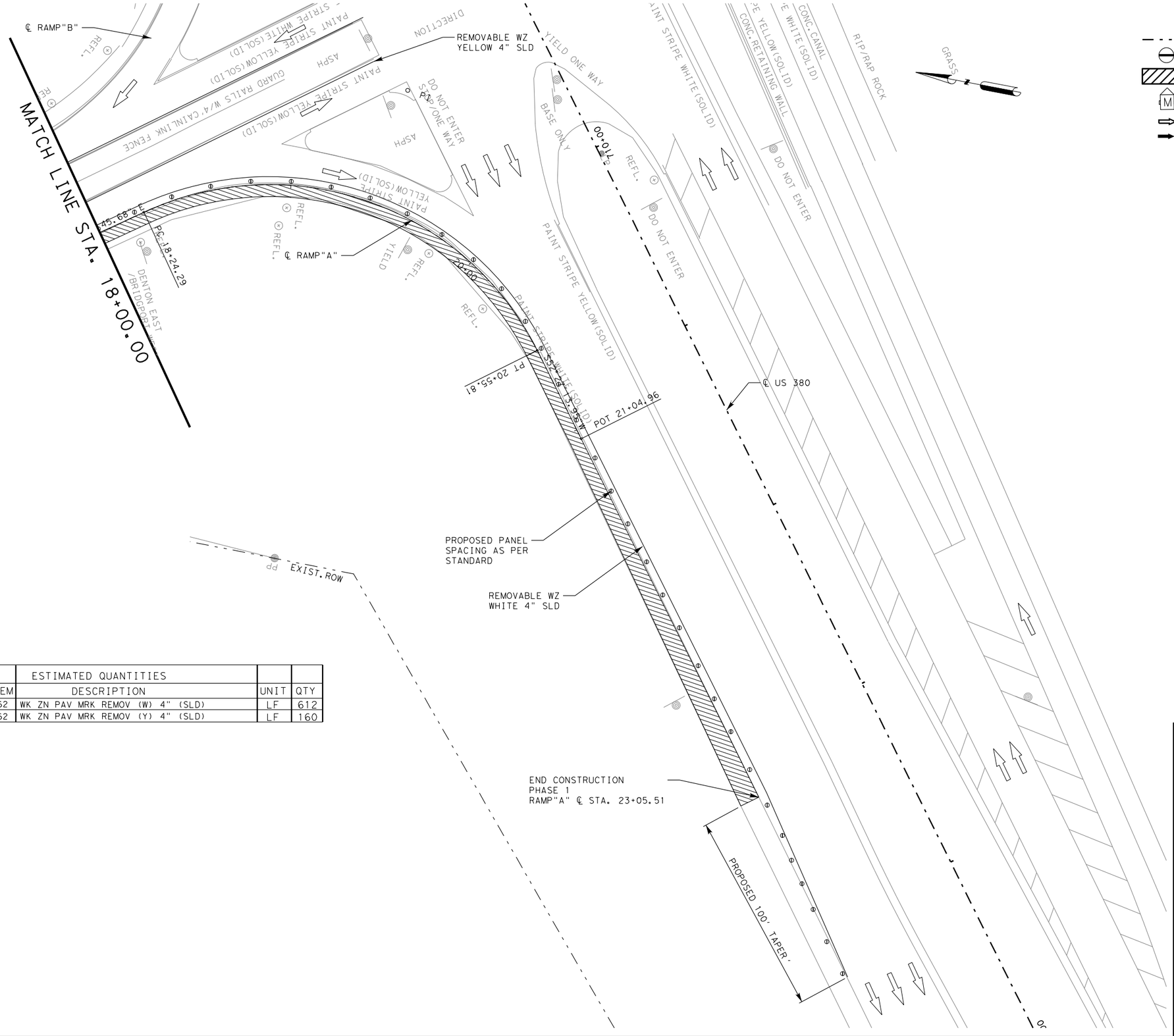

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	612
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	160

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TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 3 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		25
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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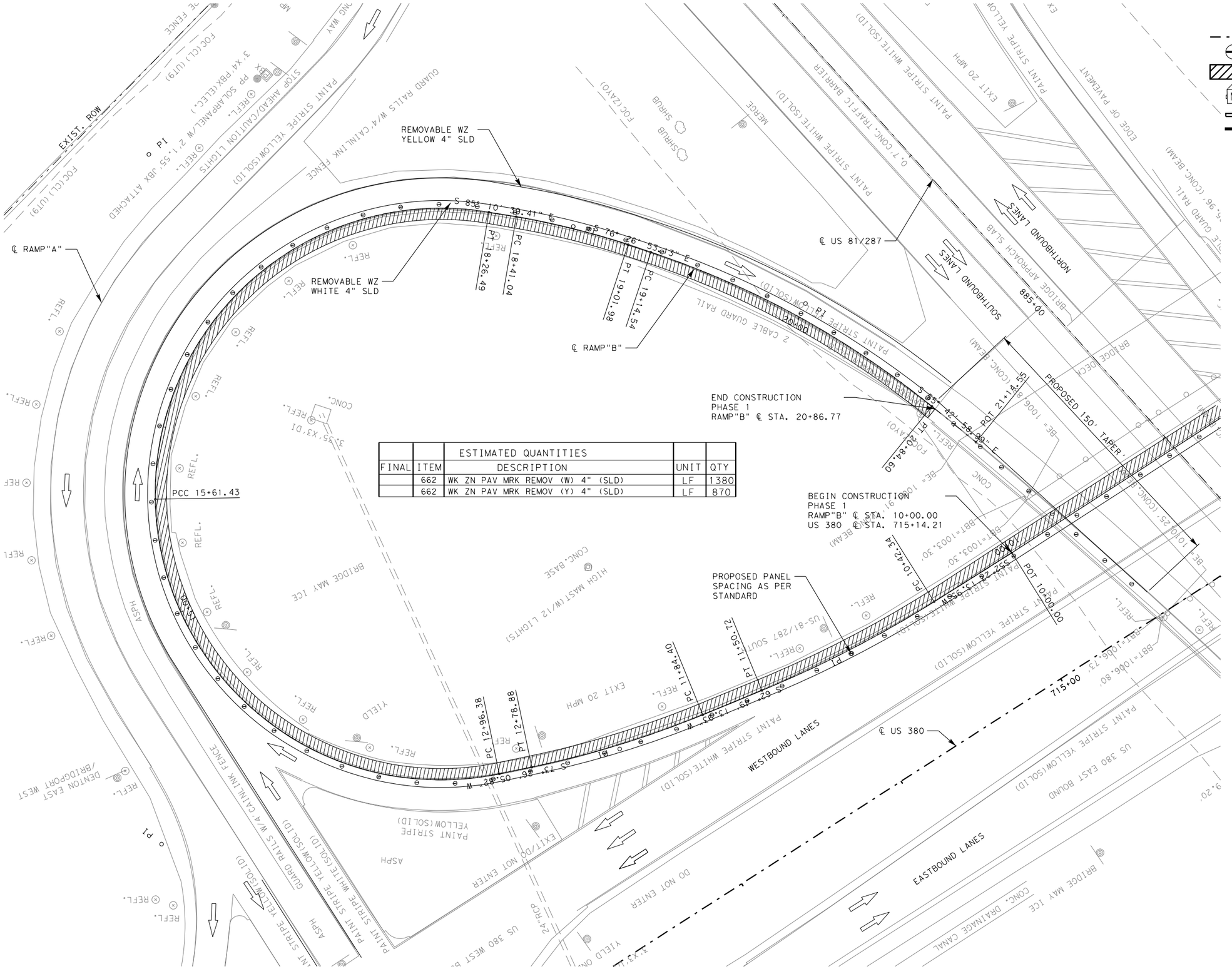

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	1380
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	870

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TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 4 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		26
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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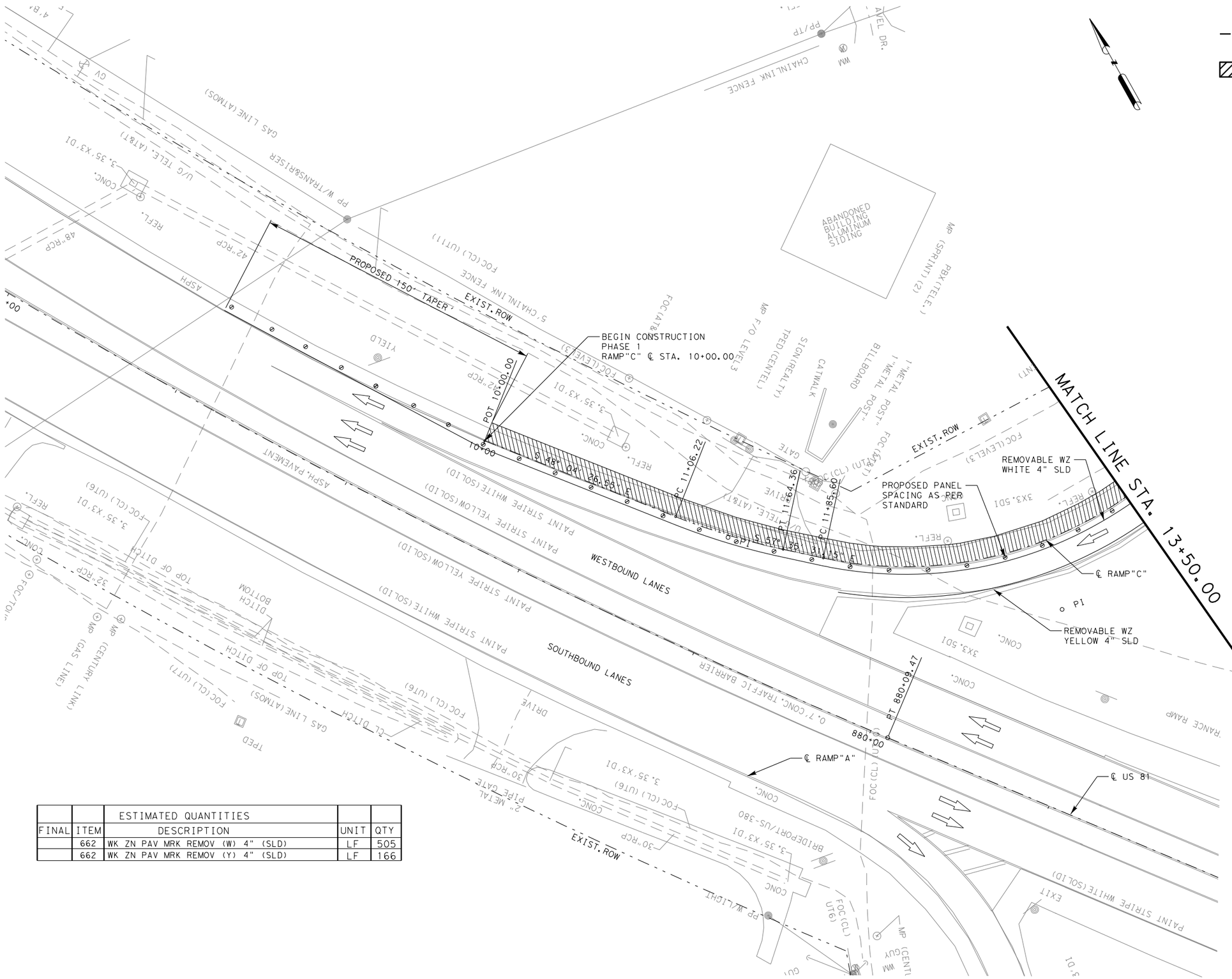

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	505
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	166

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TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 5 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	27

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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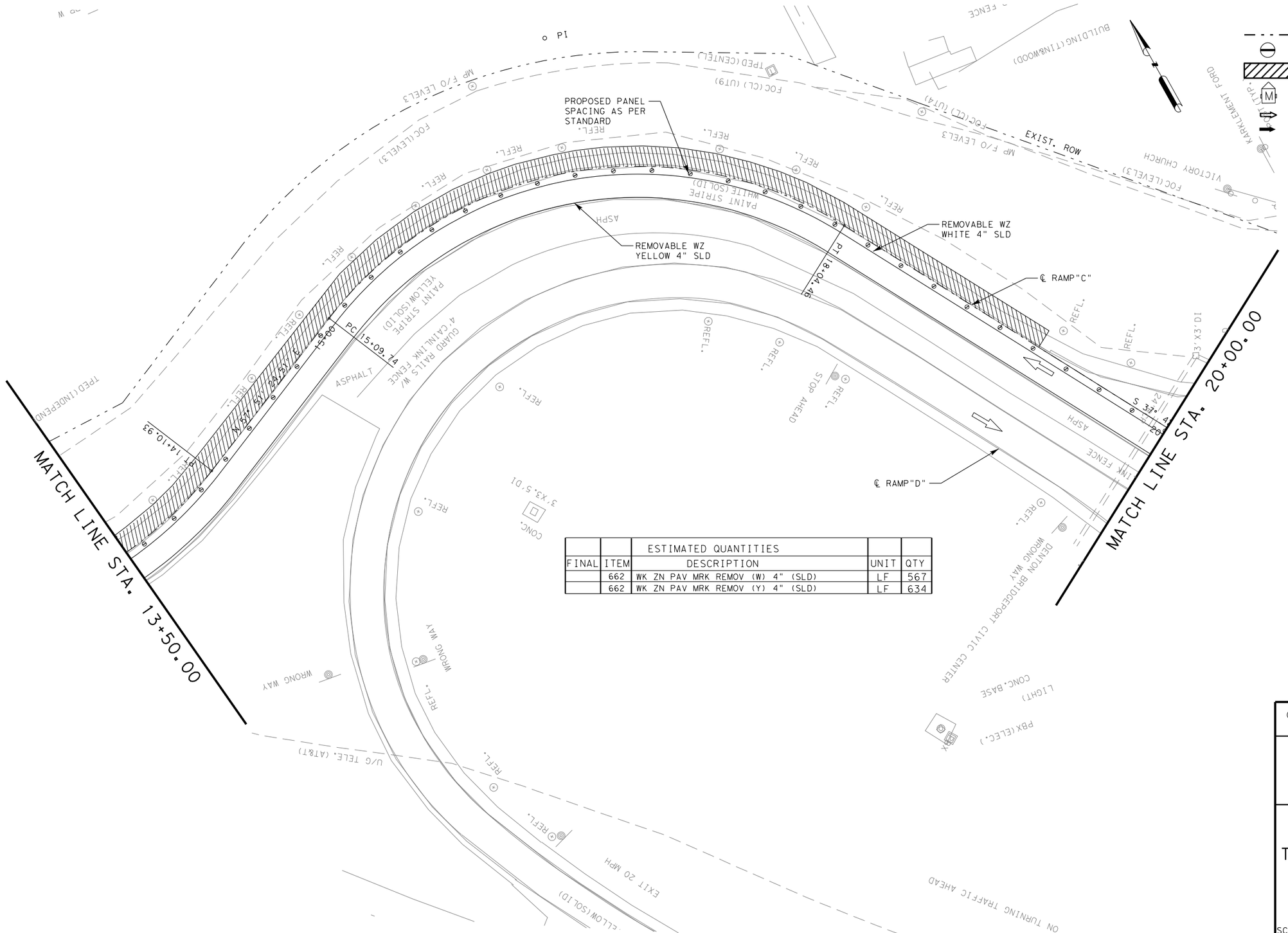

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	567
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	634

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

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US 380

TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 6 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		28
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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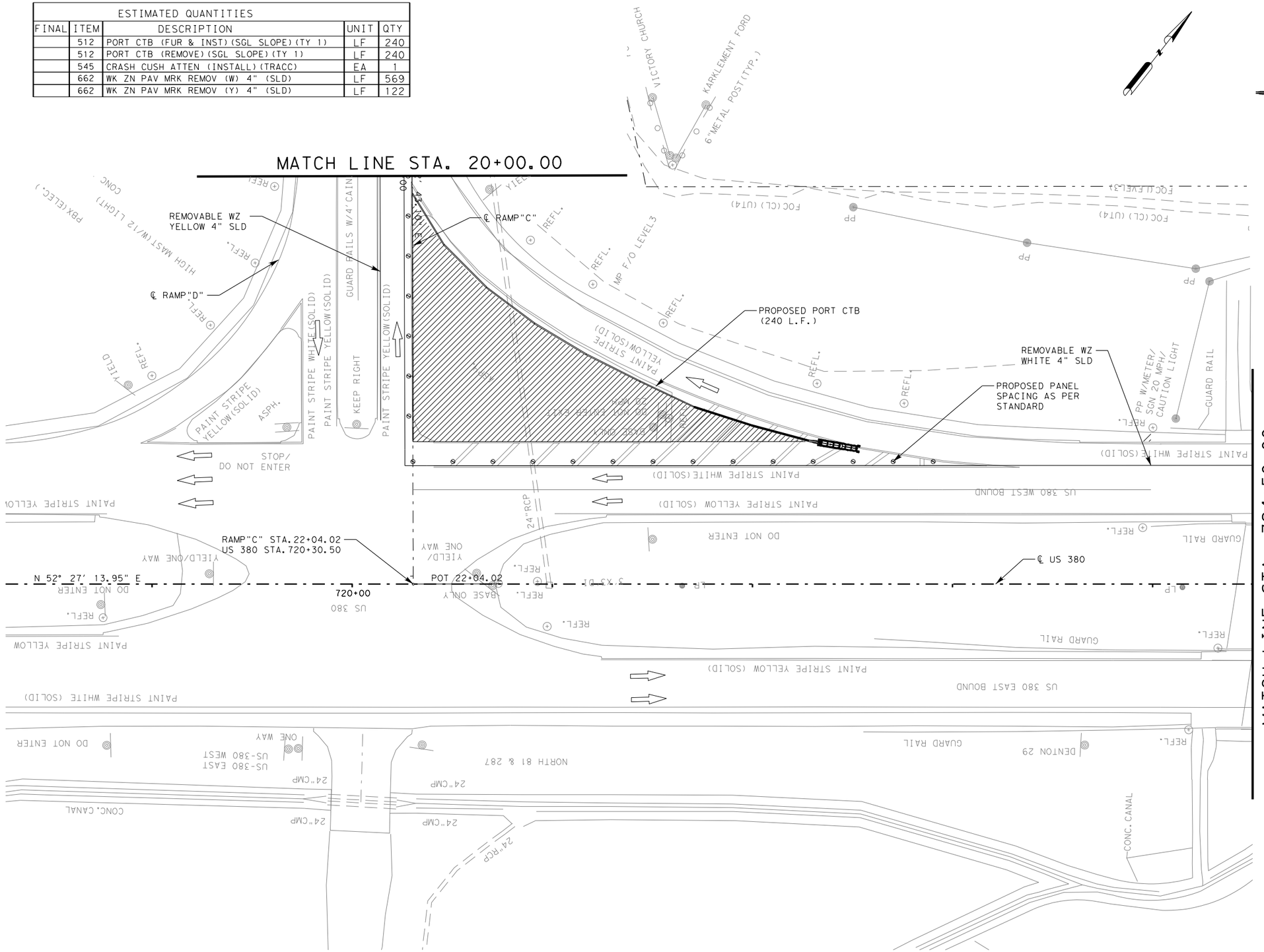
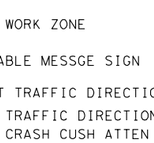
ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	512	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	240
	512	PORT CTB (REMOVE)(SGL SLOPE)(TY 1)	LF	240
	545	CRASH CUSH ATTEN (INSTALL)(TRACC)	EA	1
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	569
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	122

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW
- PROP CRASH CUSH ATTEN





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TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 7 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		29
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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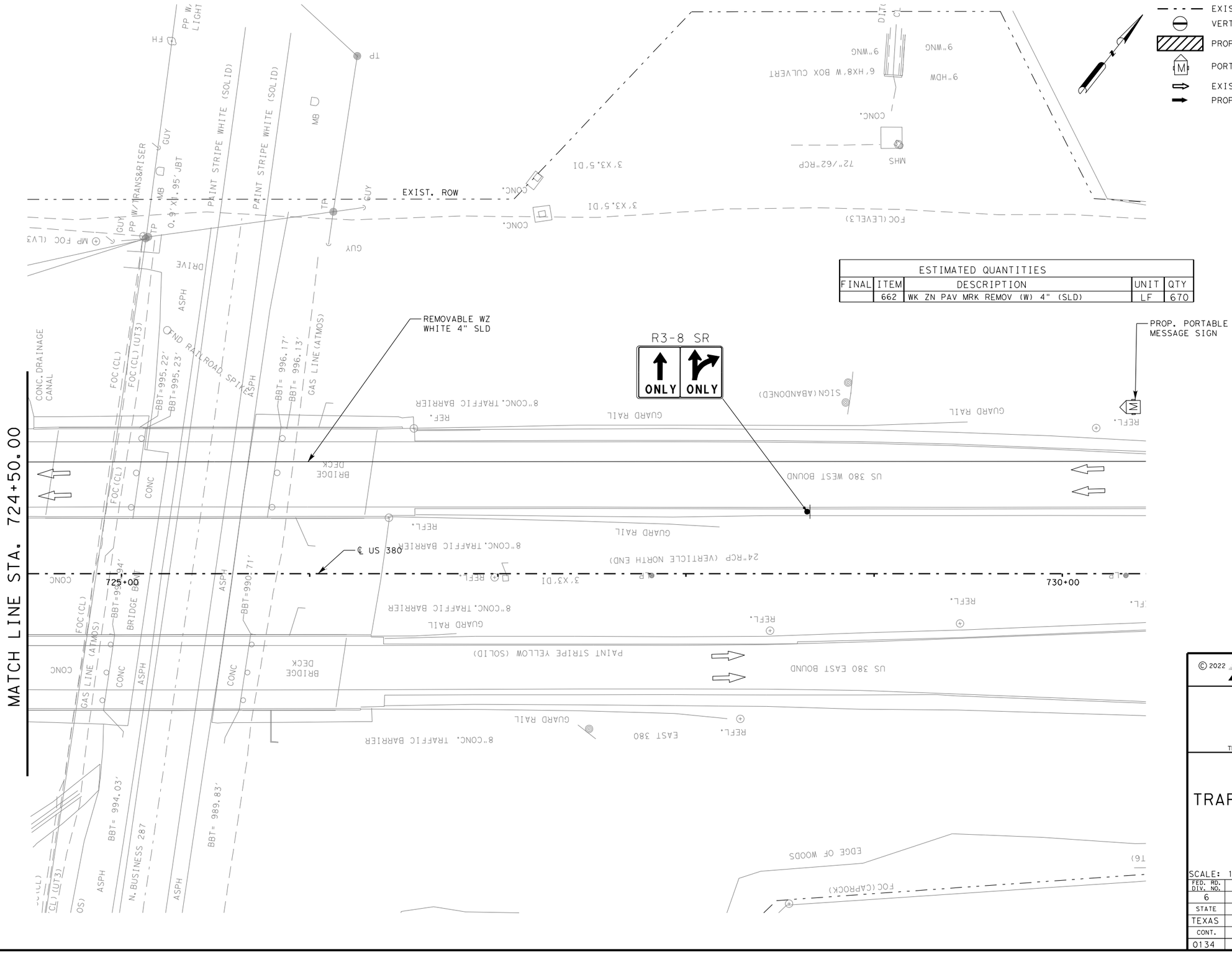
PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	670



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TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 8 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	30

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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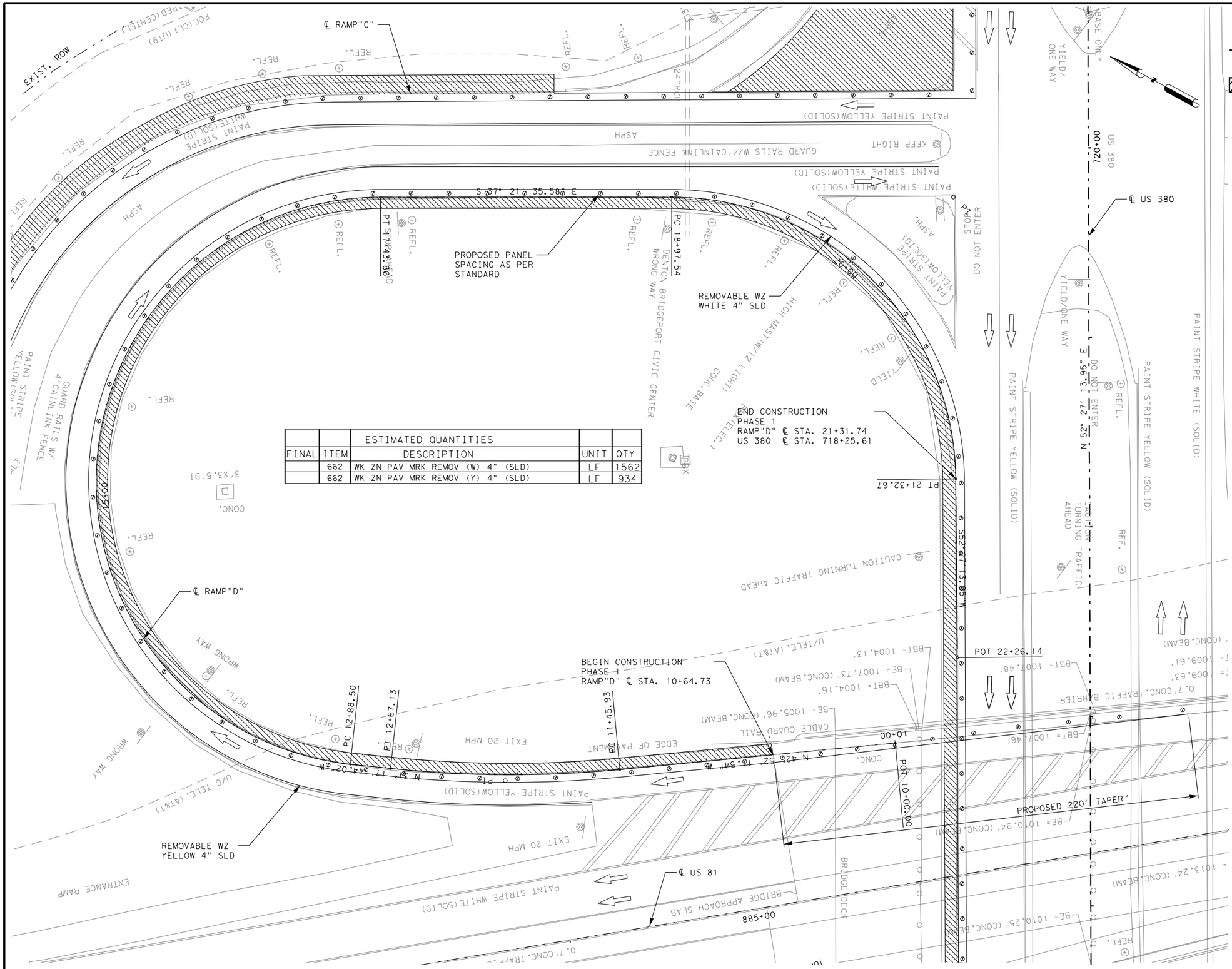

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	1562
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	934

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

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TRAFFIC CONTROL PLAN PHASE 1 LAYOUT

SCALE: 1"=50' SHEET 9 OF 9 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		31
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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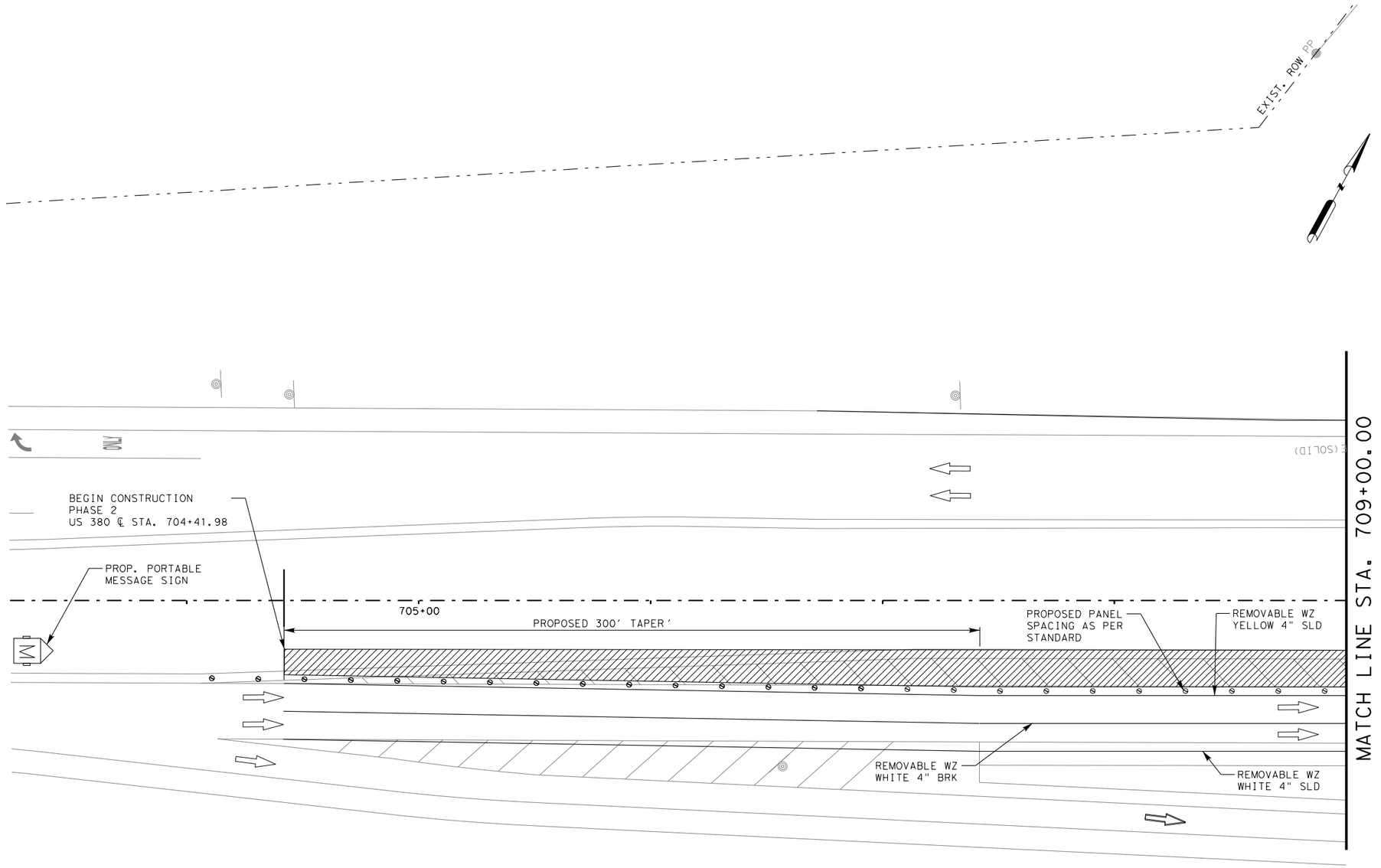
PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW



		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	458
	662	WK ZN PAV MRK REMOV (W) 4" (BRK)	LF	130
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	458

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TRAFFIC CONTROL PLAN PHASE 2 LAYOUT

SCALE: 1"=50' SHEET 1 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		32
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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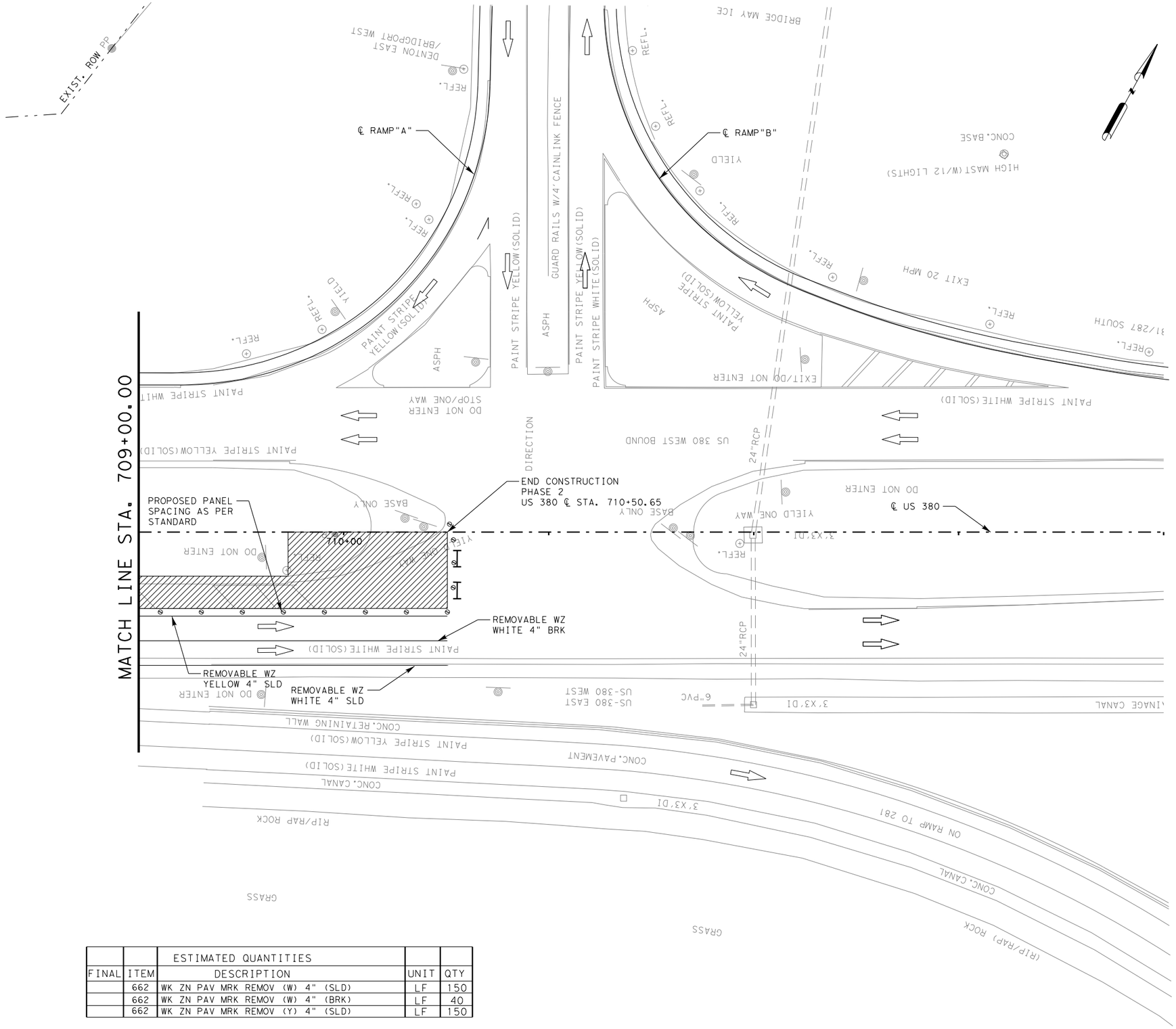

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	150
	662	WK ZN PAV MRK REMOV (W) 4" (BRK)	LF	40
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	150

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TRAFFIC CONTROL PLAN PHASE 2 LAYOUT

SCALE: 1"=50'		SHEET 2 OF 4 SHEETS	
FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		33
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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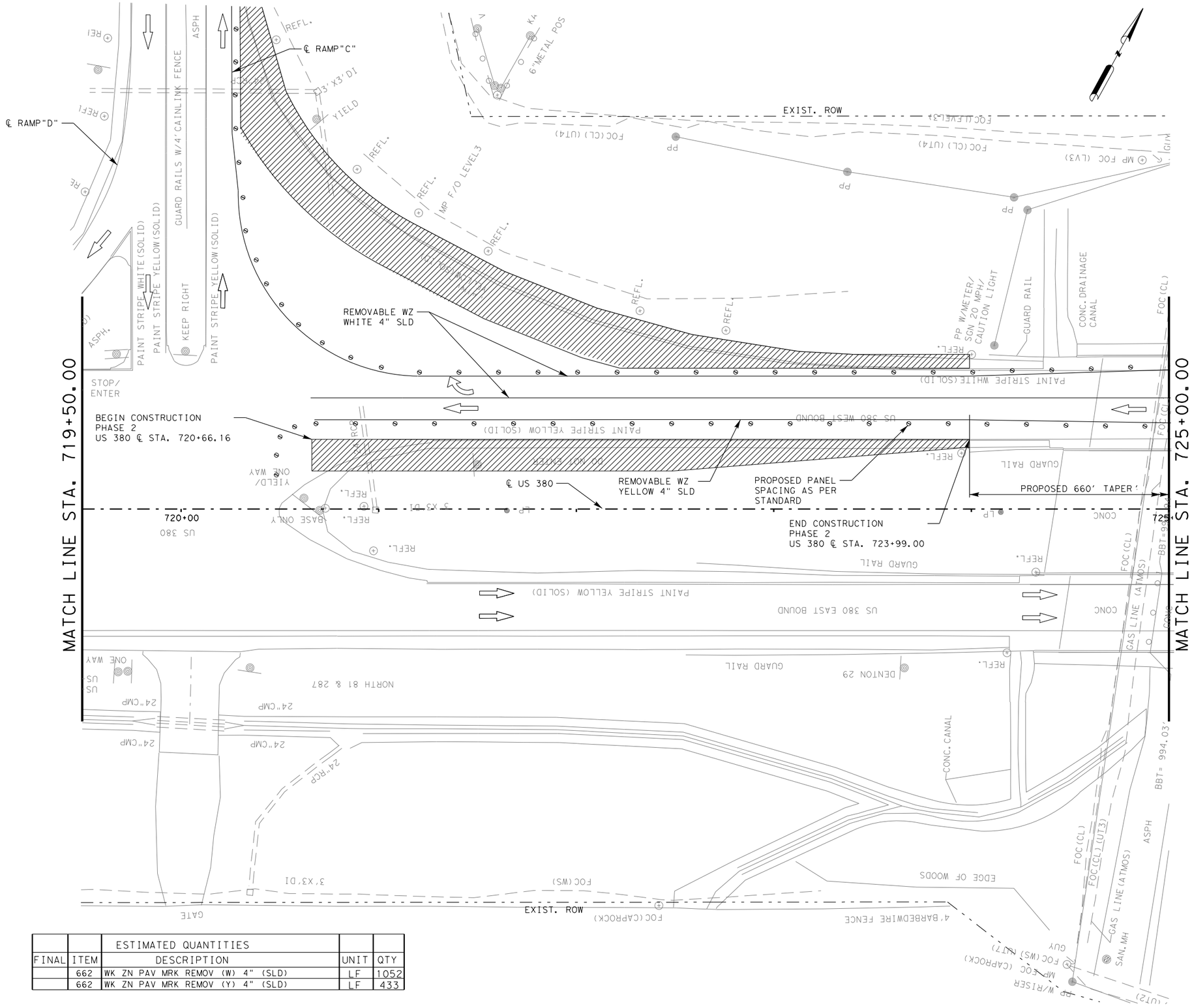

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	1052
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	433

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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

TRAFFIC CONTROL PLAN PHASE 2 LAYOUT

SCALE: 1"=50' SHEET 3 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		34
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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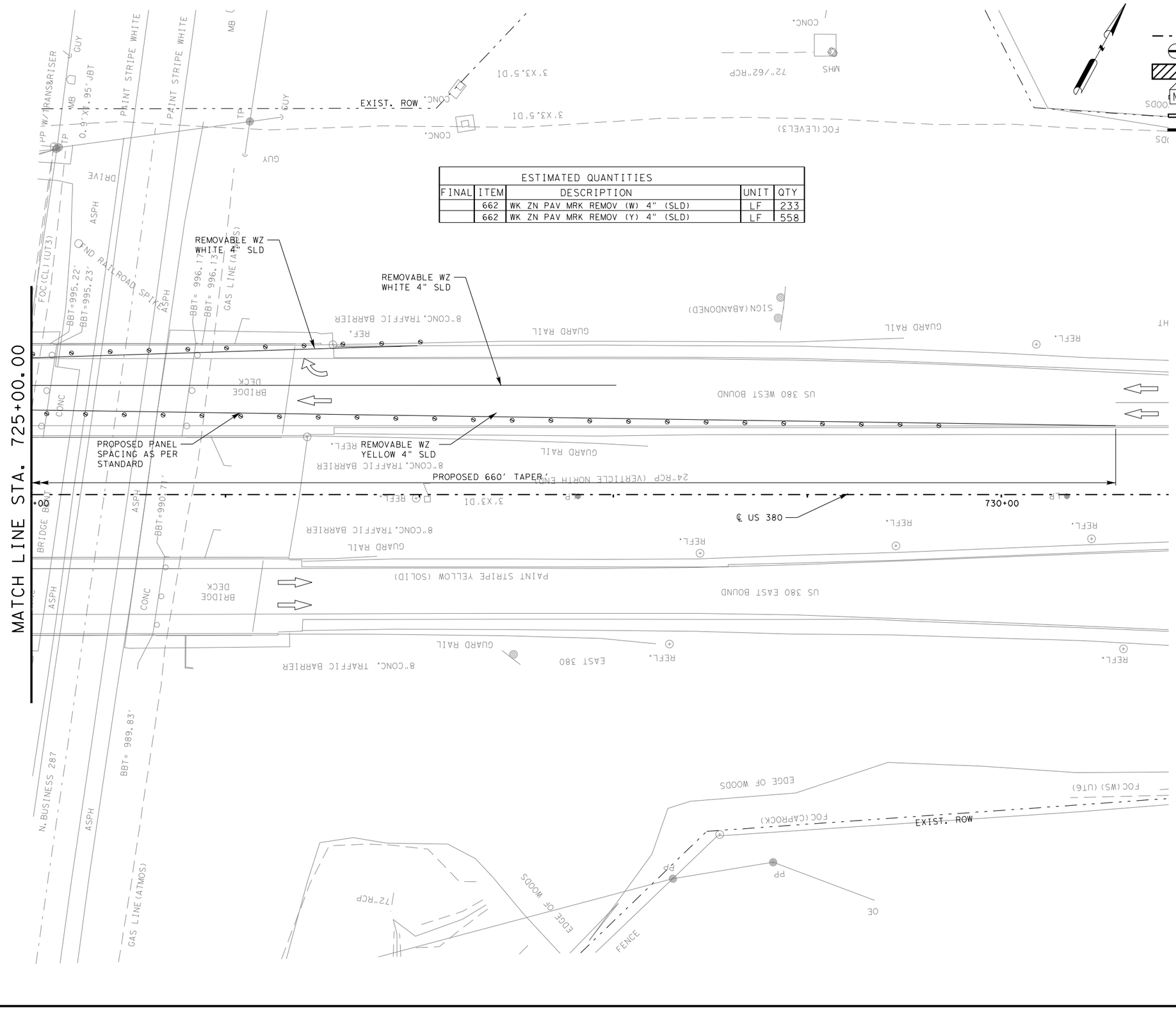

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	233
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	558

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US 380

TRAFFIC CONTROL PLAN PHASE 2 LAYOUT

SCALE: 1"=50' SHEET 4 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		35
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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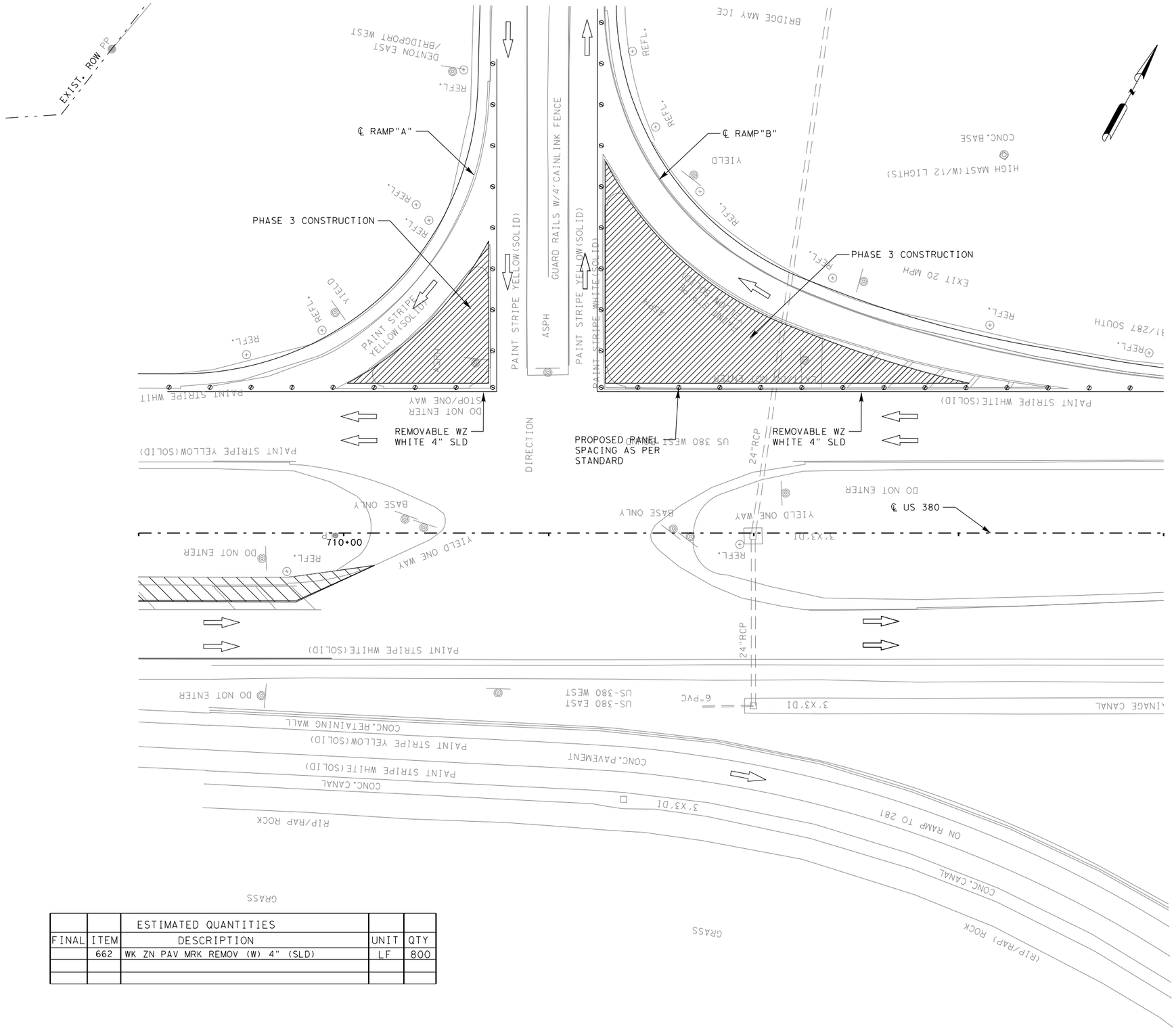

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	800

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US 380

TRAFFIC CONTROL PLAN PHASE 3 LAYOUT

SCALE: 1"=50' SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		36
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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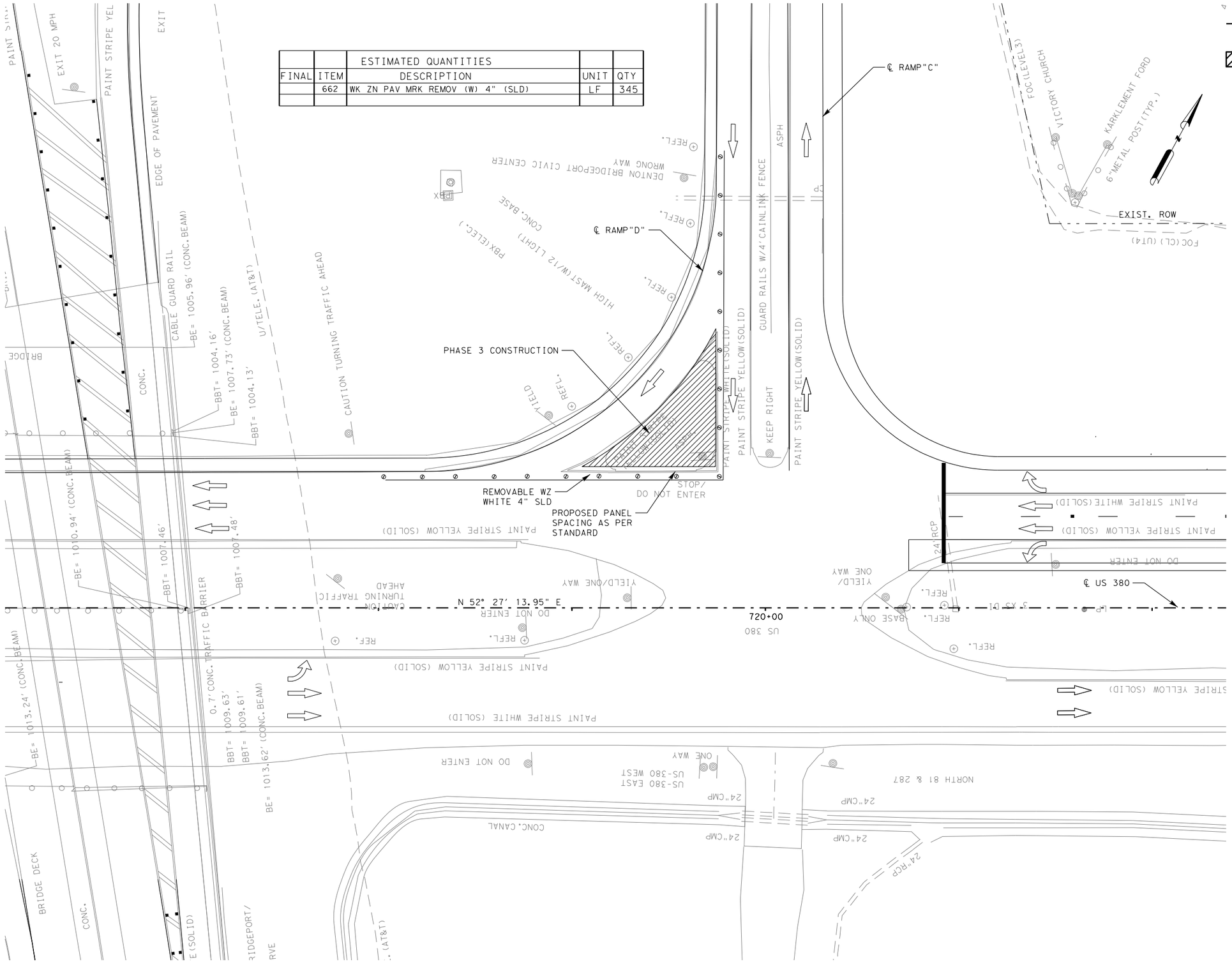
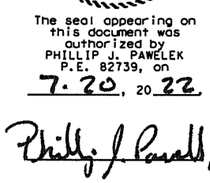
ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	345

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW





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SEC B INFRASTRUCTURE
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US 380

TRAFFIC CONTROL PLAN PHASE 3 LAYOUT

SCALE: 1"=50' SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		37
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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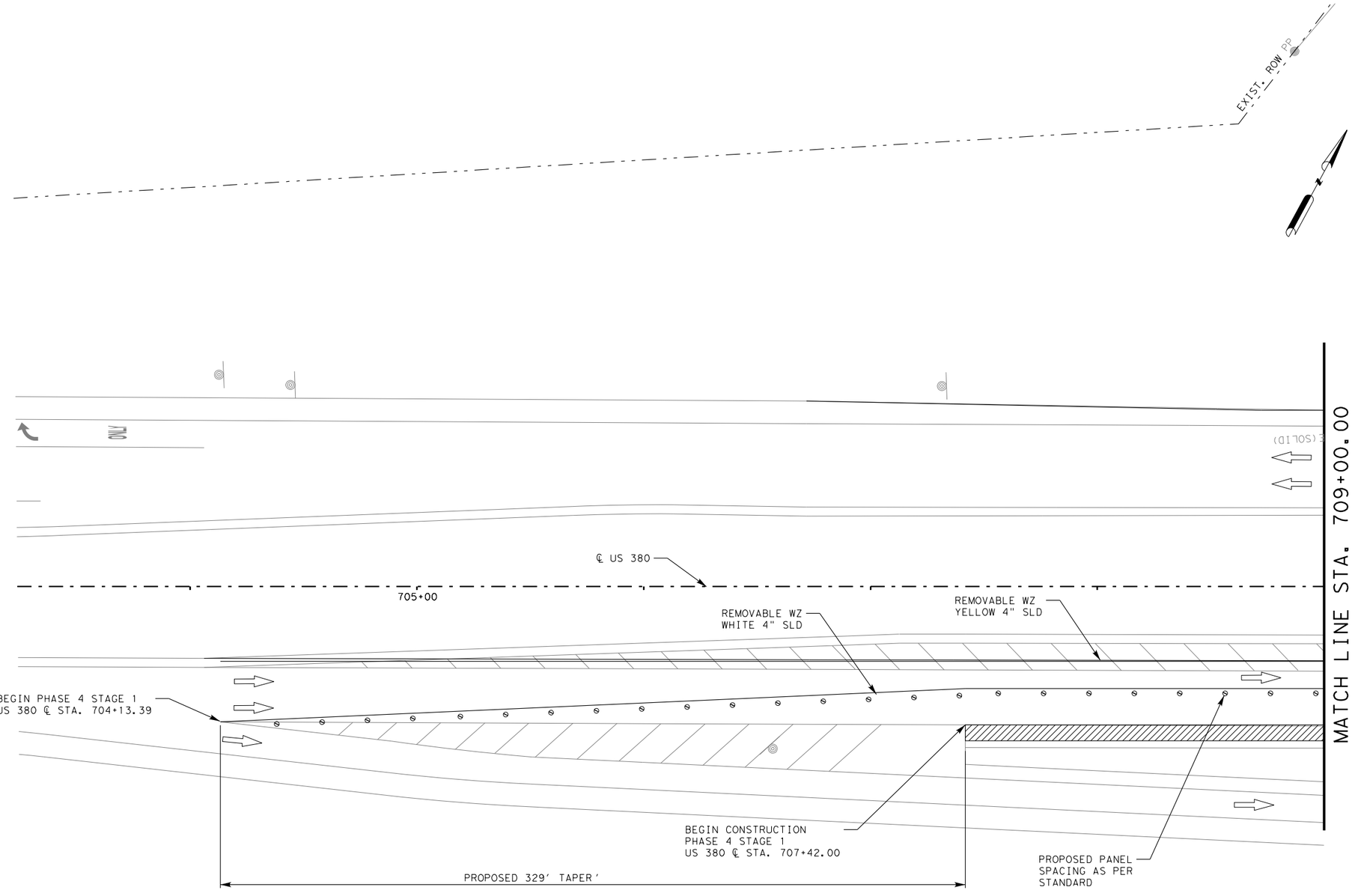
PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW



		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	486
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	486

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US 380

TRAFFIC CONTROL PLAN PHASE 4 LAYOUT

SCALE: 1"=50' SHEET 1 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		38
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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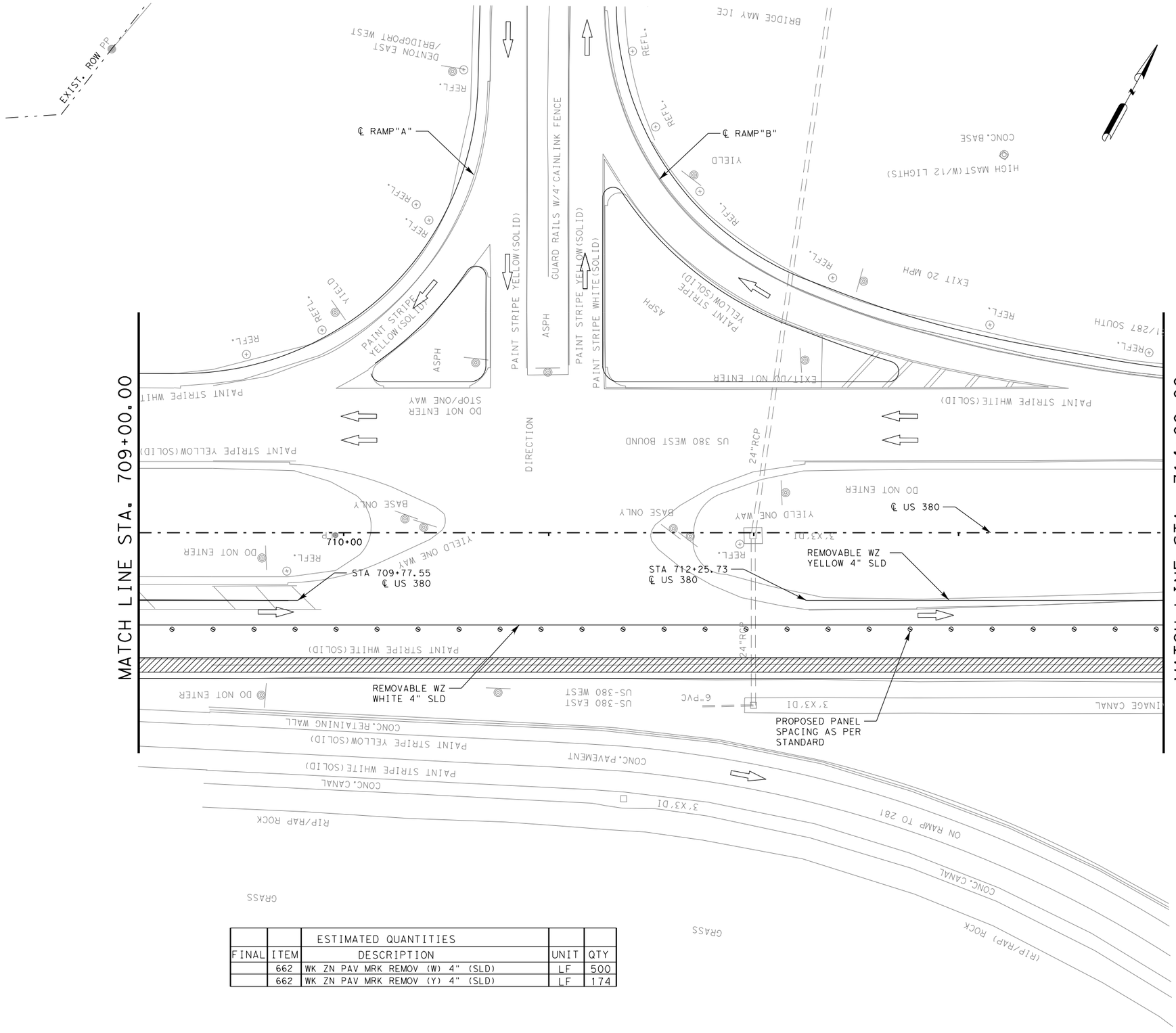

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	500
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	174

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

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TRAFFIC CONTROL PLAN PHASE 4 LAYOUT

SCALE: 1"=50' SHEET 2 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		39
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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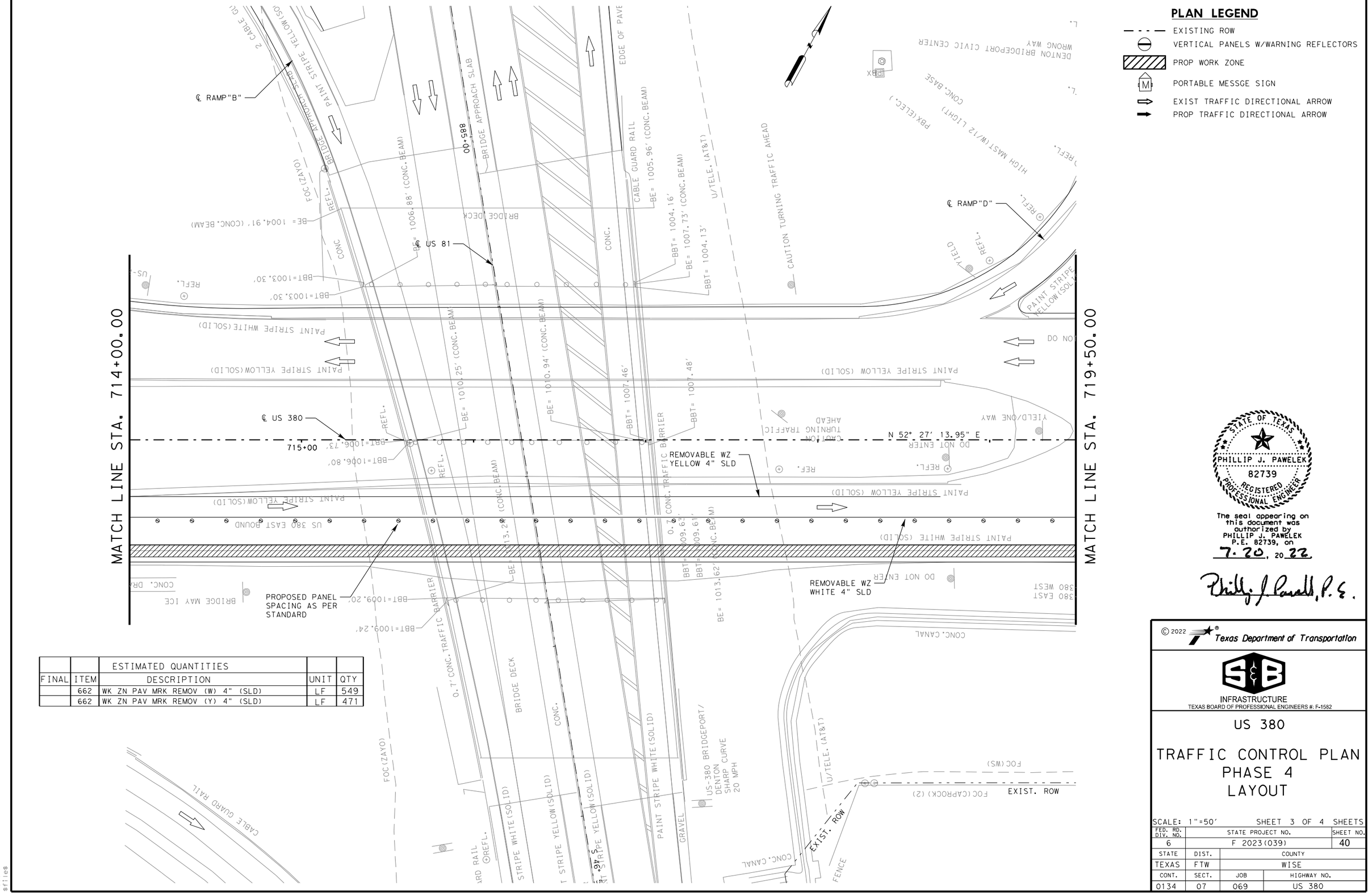

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	549
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	471

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SAB INFRASTRUCTURE
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US 380

TRAFFIC CONTROL PLAN PHASE 4 LAYOUT

SCALE: 1"=50' SHEET 3 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		40
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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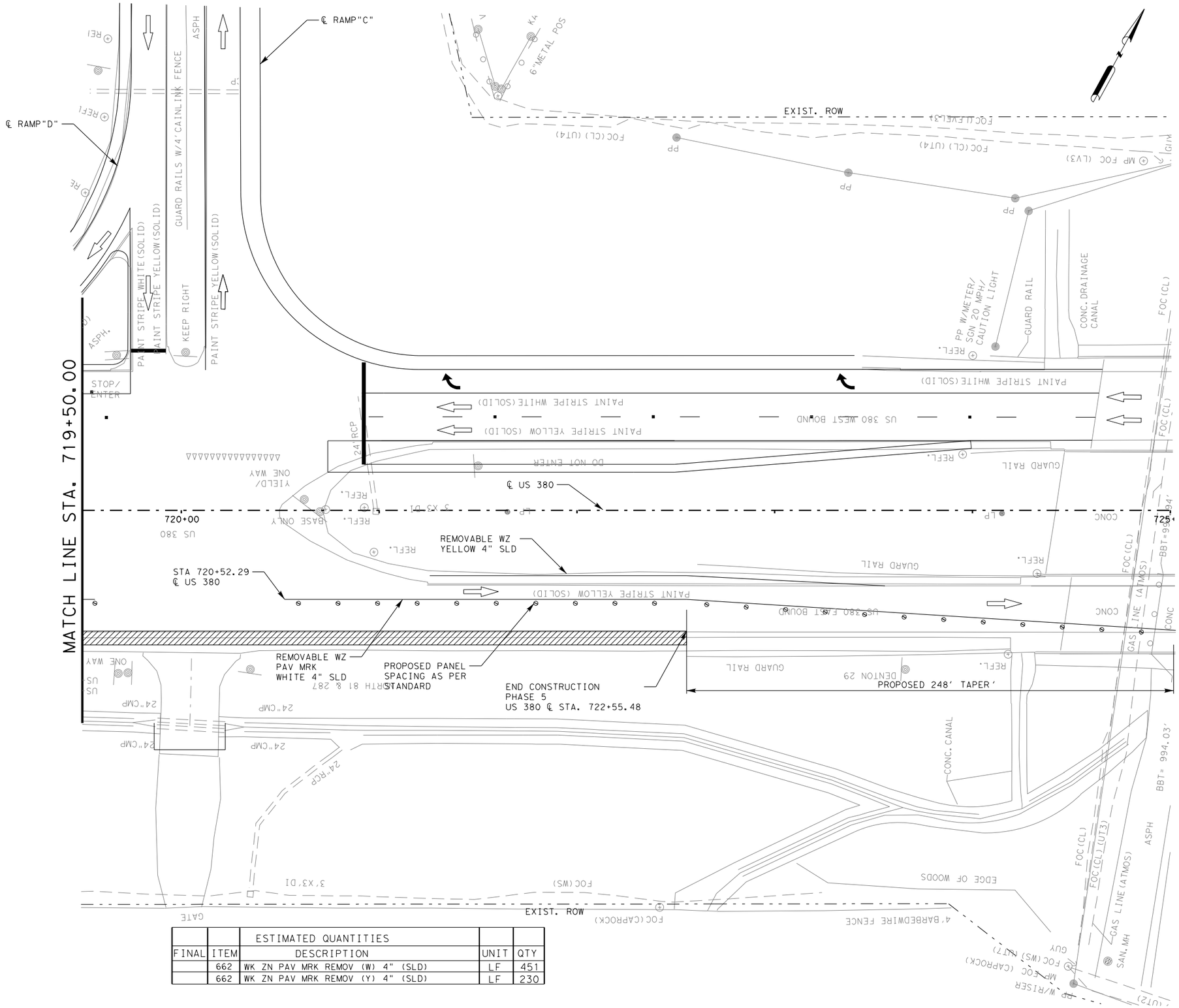

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

		ESTIMATED QUANTITIES		
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	451
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	230

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US 380

TRAFFIC CONTROL PLAN PHASE 4 LAYOUT

SCALE: 1"=50' SHEET 4 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		41
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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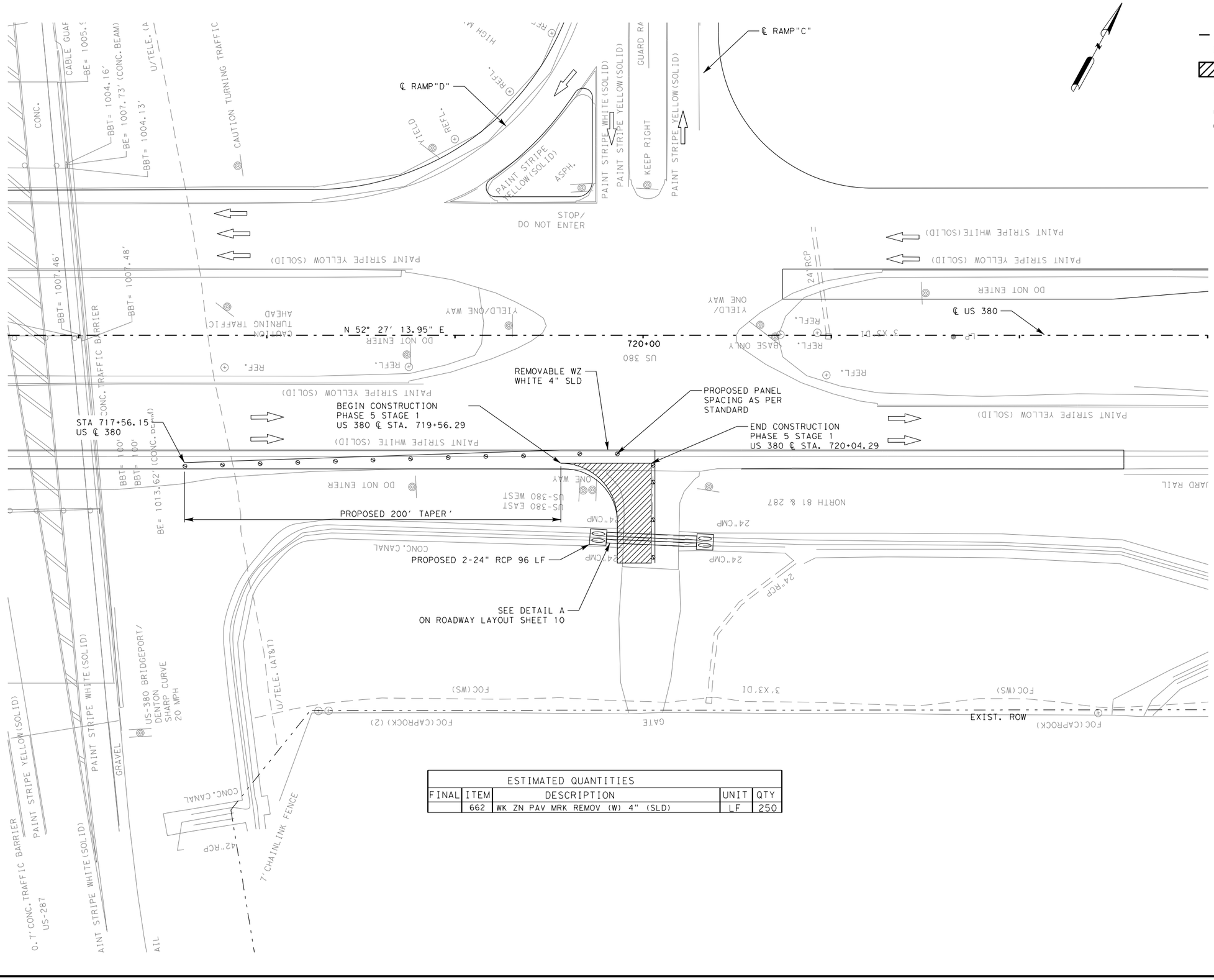

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	250

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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
TRAFFIC CONTROL PLAN PHASE 5 STAGE 1 LAYOUT

SCALE: 1"=50' SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		42
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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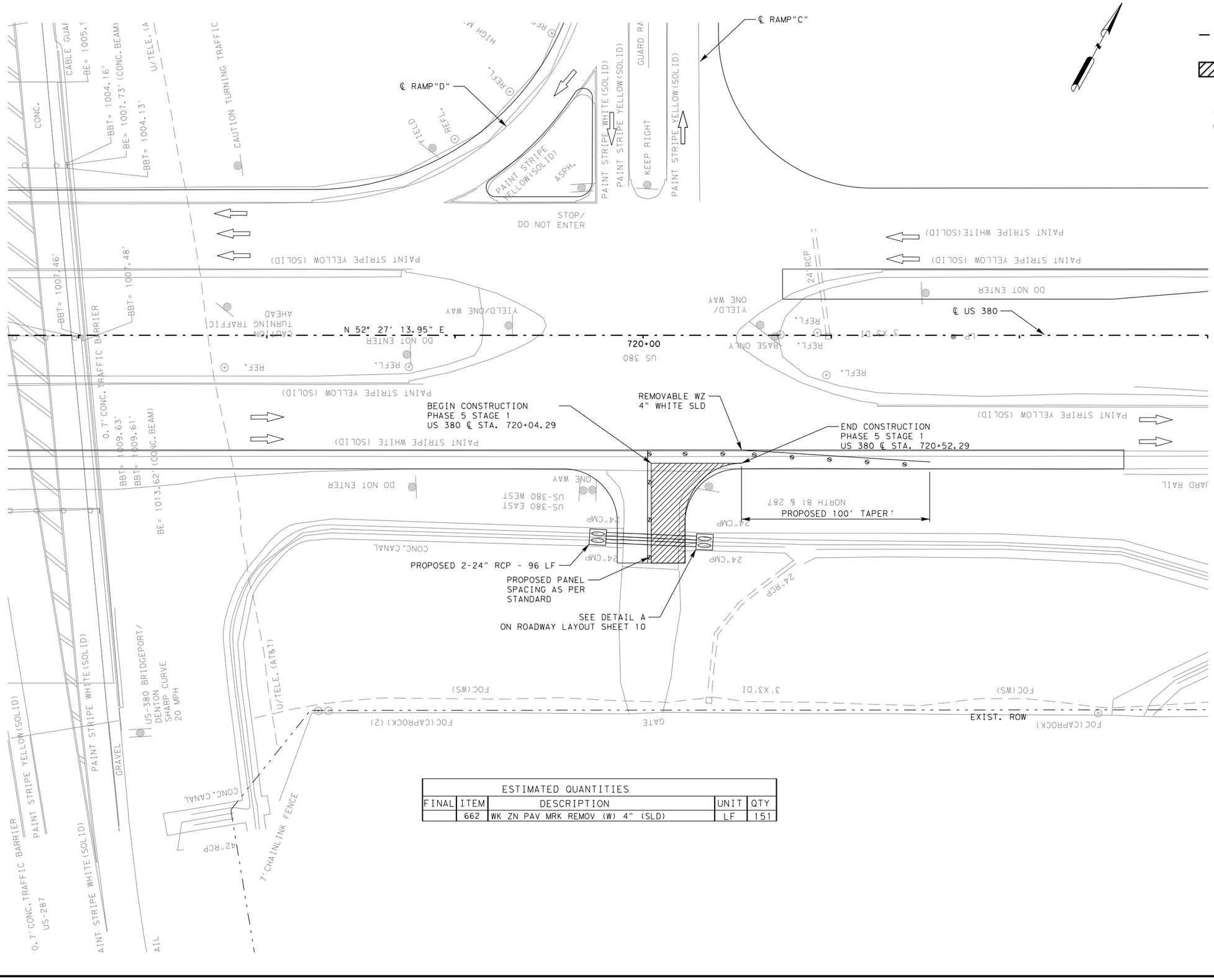

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (W) 4" (SLD)	LF	151

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US 380
TRAFFIC CONTROL PLAN PHASE 5 STAGE 2 LAYOUT

SCALE: 1"=50' SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		43
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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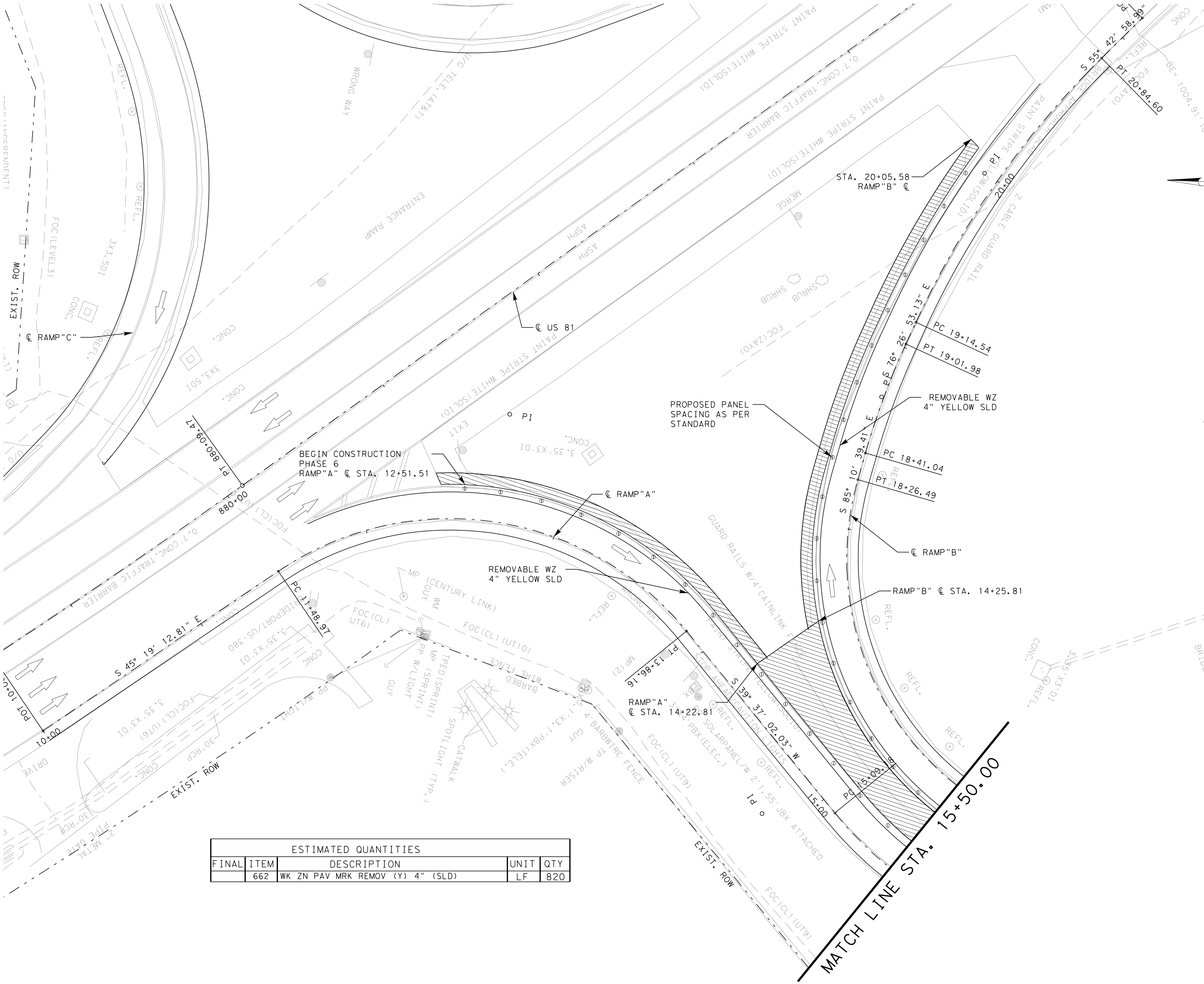

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	820

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US 380

TRAFFIC CONTROL PLAN
PHASE 6
LAYOUT

SCALE: 1"=50' SHEET 1 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.			SHEET NO.
6	F 2023(039)			44
STATE	DIST.	COUNTY		
TEXAS	FTW	WISE		
CONT.	SECT.	JOB	HIGHWAY NO.	
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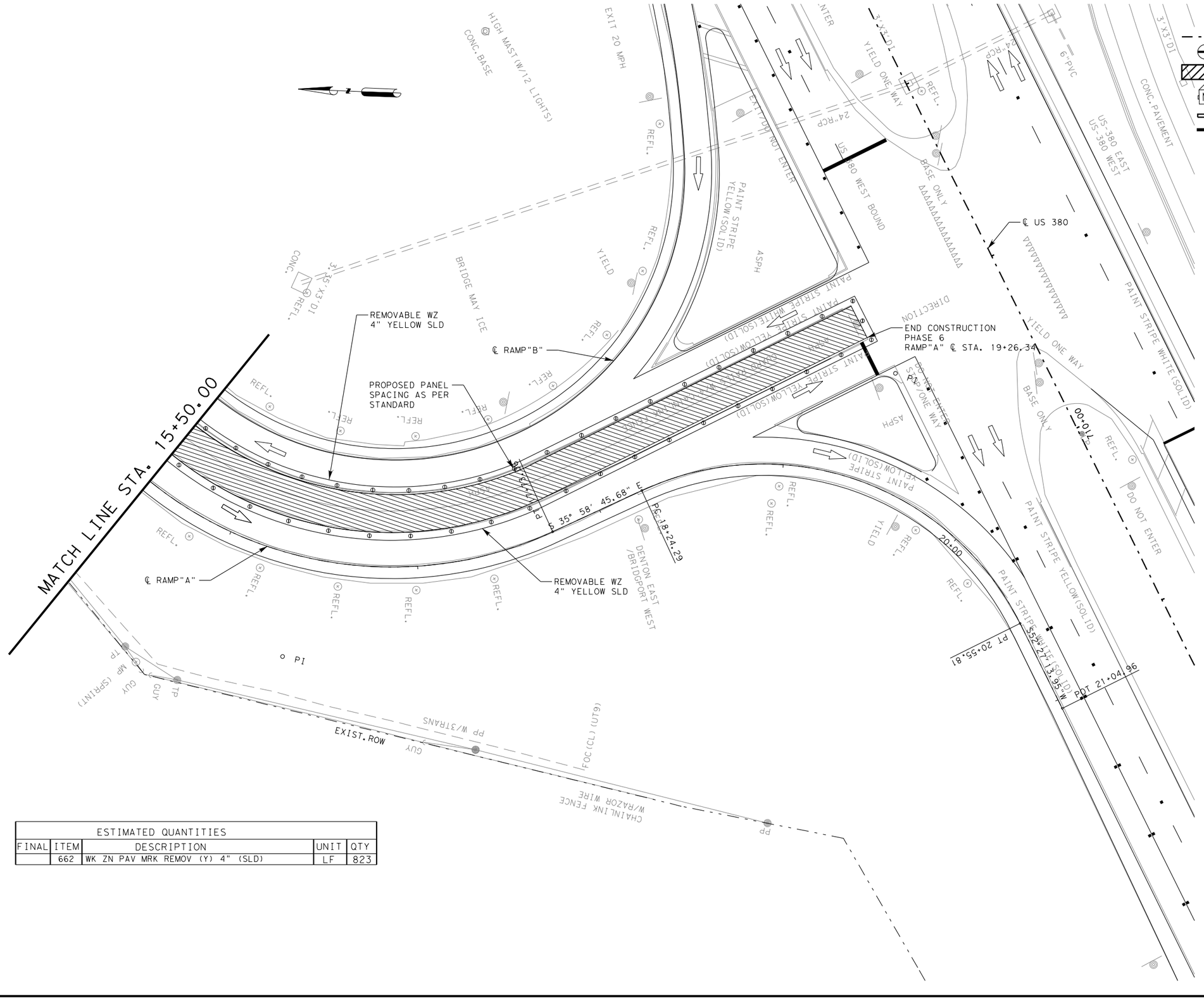

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	823

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US 380

TRAFFIC CONTROL PLAN PHASE 6 LAYOUT

SCALE: 1"=50' SHEET 2 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		45
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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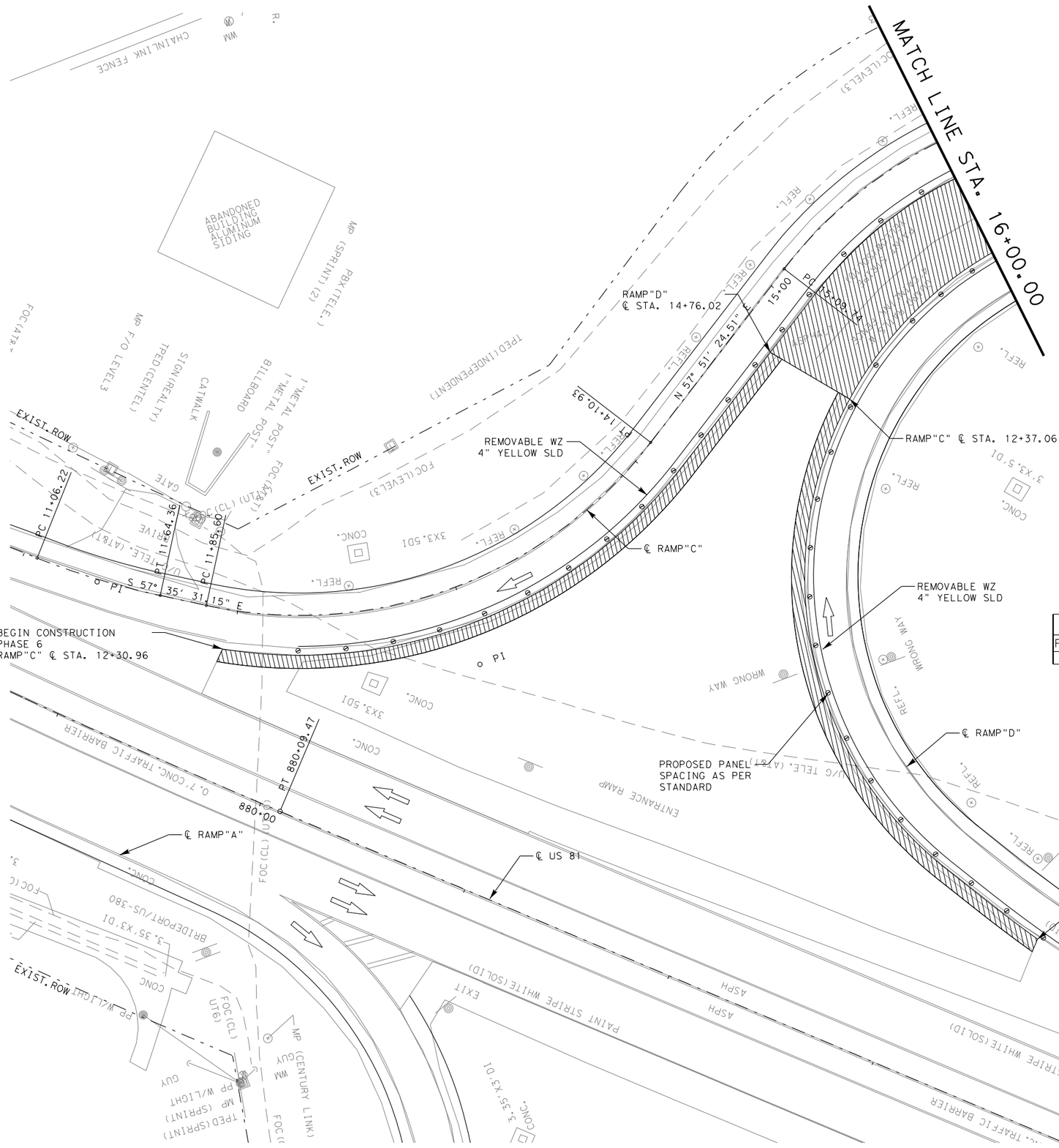

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	470

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TRAFFIC CONTROL PLAN PHASE 6 LAYOUT

SCALE: 1"=50'		SHEET 3 OF 4 SHEETS	
FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		46
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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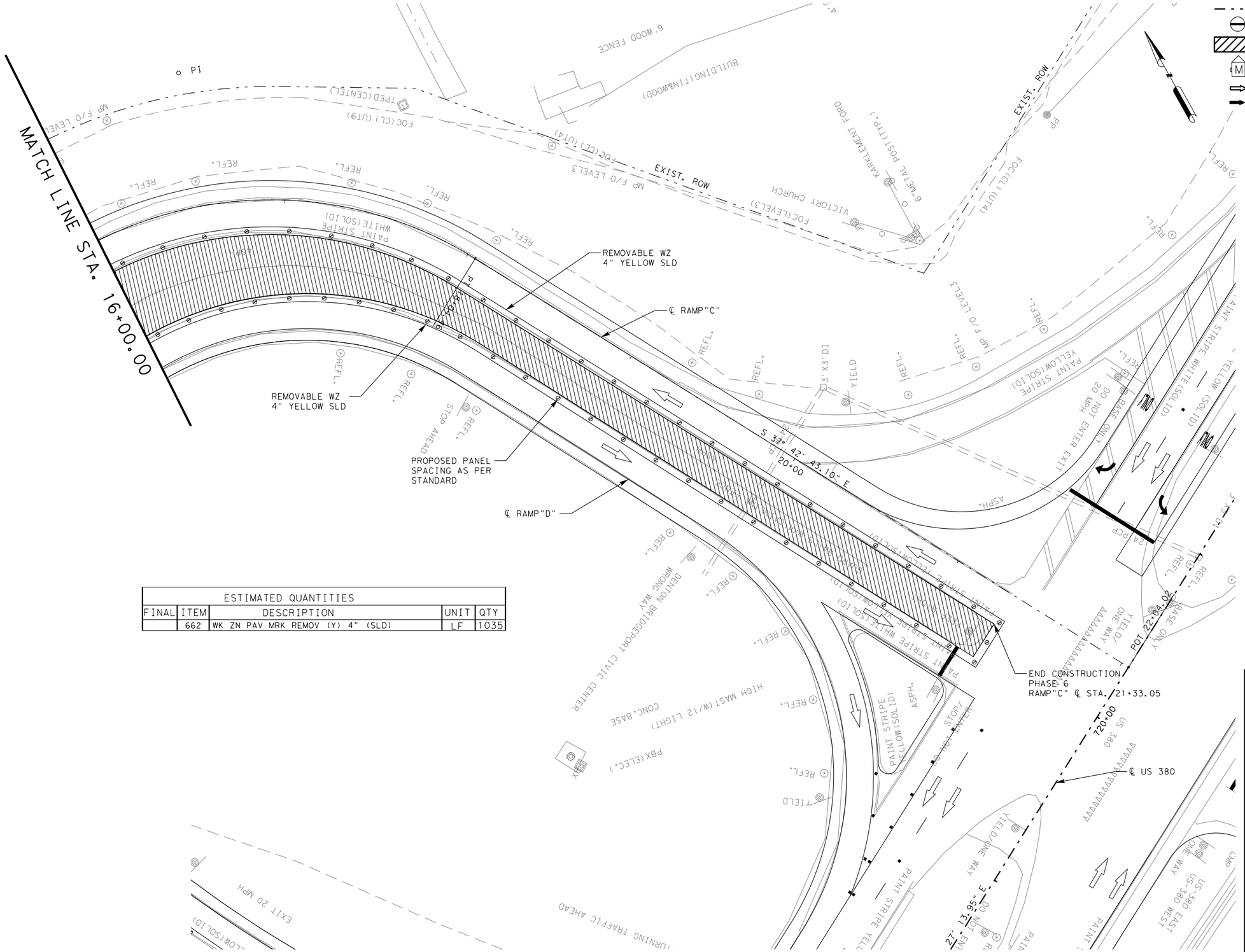

PLAN LEGEND

- EXISTING ROW
- VERTICAL PANELS W/WARNING REFLECTORS
- PROP WORK ZONE
- PORTABLE MESSGE SIGN
- EXIST TRAFFIC DIRECTIONAL ARROW
- PROP TRAFFIC DIRECTIONAL ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	662	WK ZN PAV MRK REMOV (Y) 4" (SLD)	LF	1035

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US 380

TRAFFIC CONTROL PLAN PHASE 6 LAYOUT

SCALE: 1"=50' SHEET 4 OF 4 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		47
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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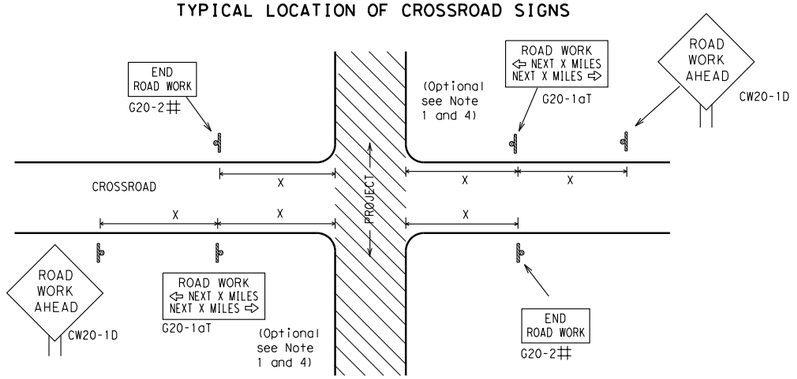
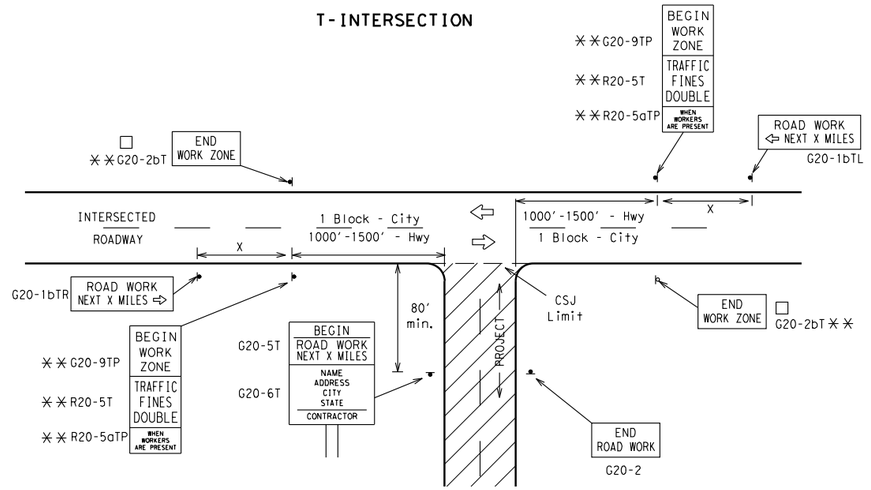
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
✳	✳[3]

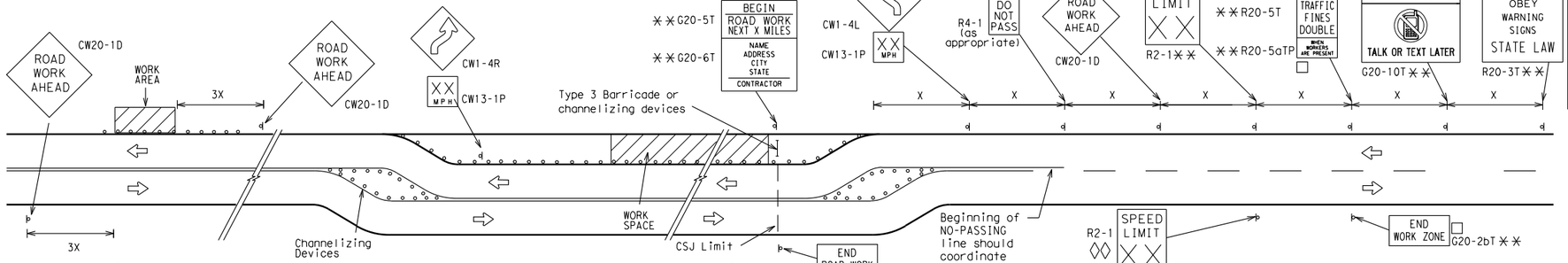
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

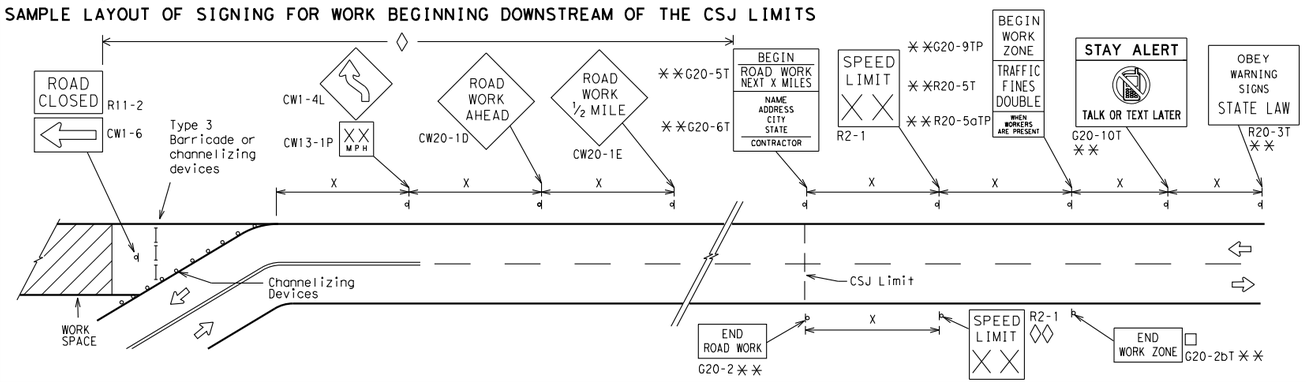
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

✳✳ CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⊢⊣	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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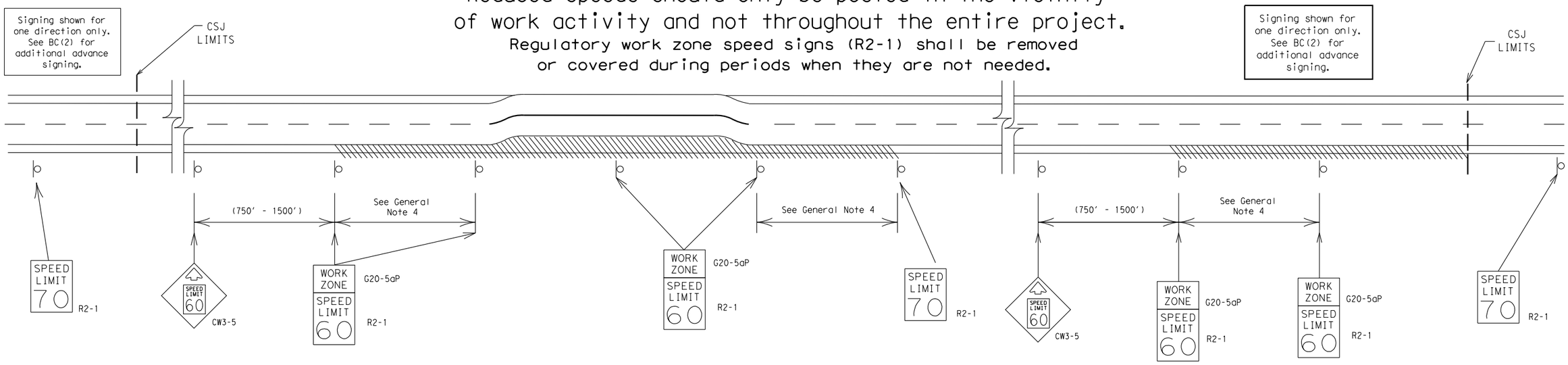
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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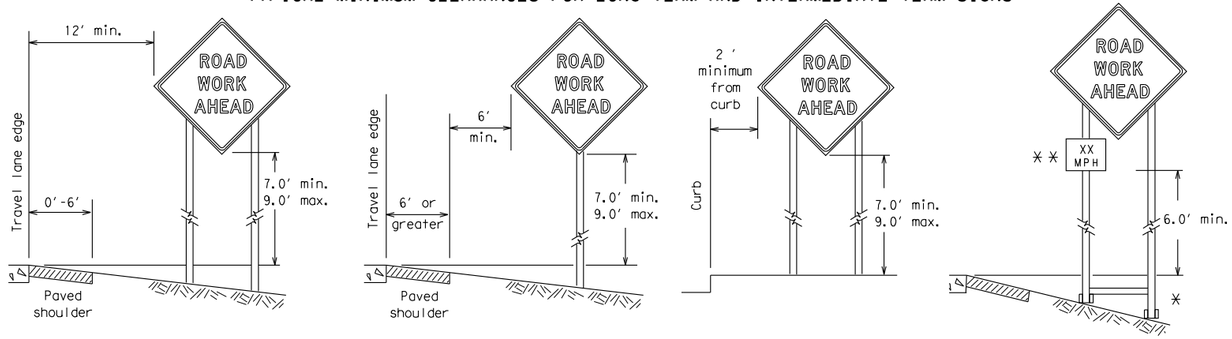
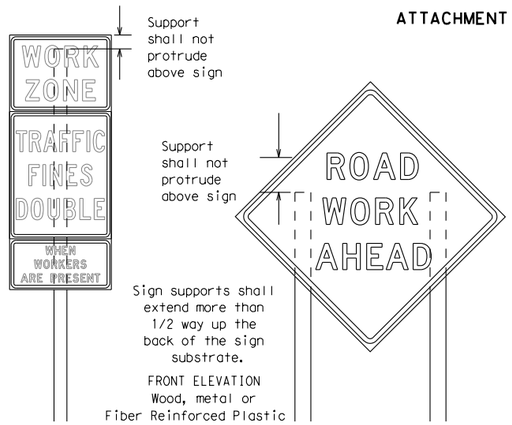
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



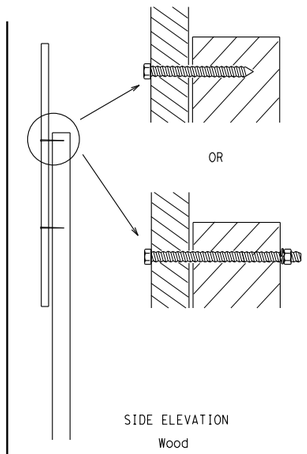
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

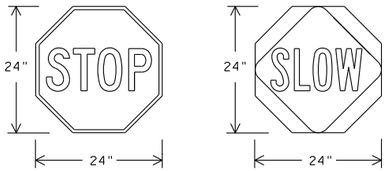
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height,the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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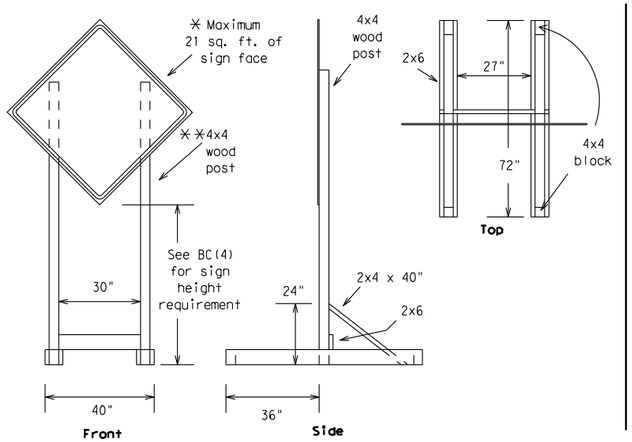
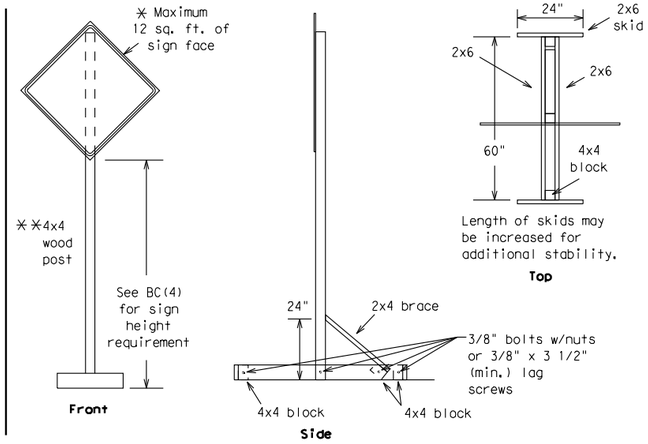
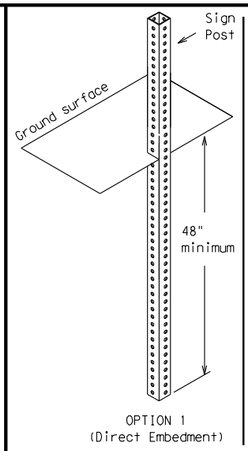
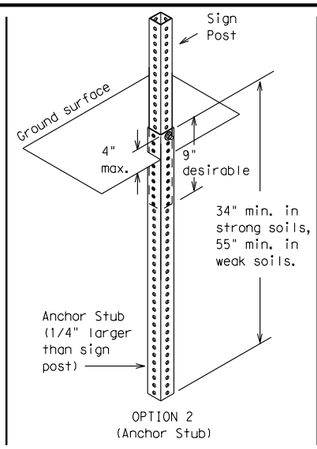


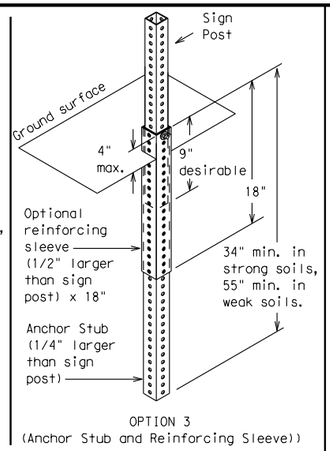


SKID MOUNTED WOOD SIGN SUPPORTS

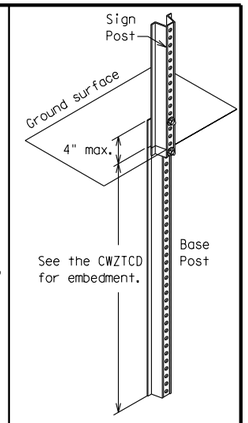
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







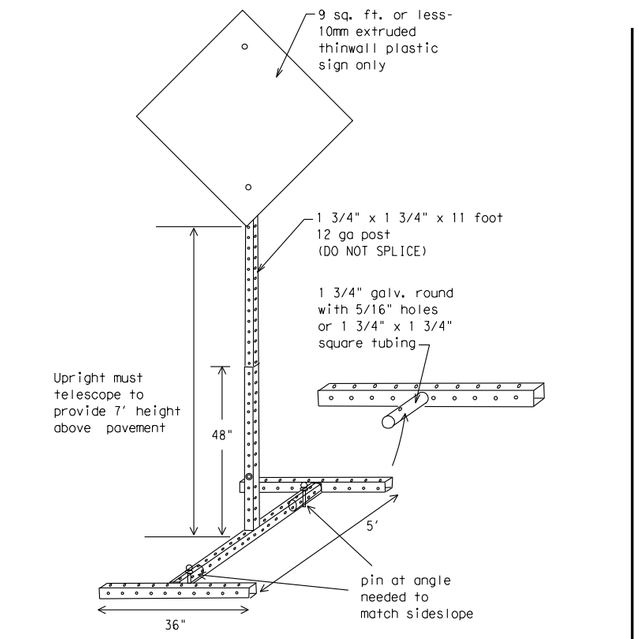
PERFORATED SQUARE METAL TUBING

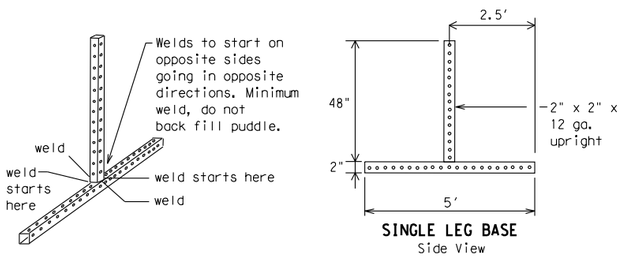


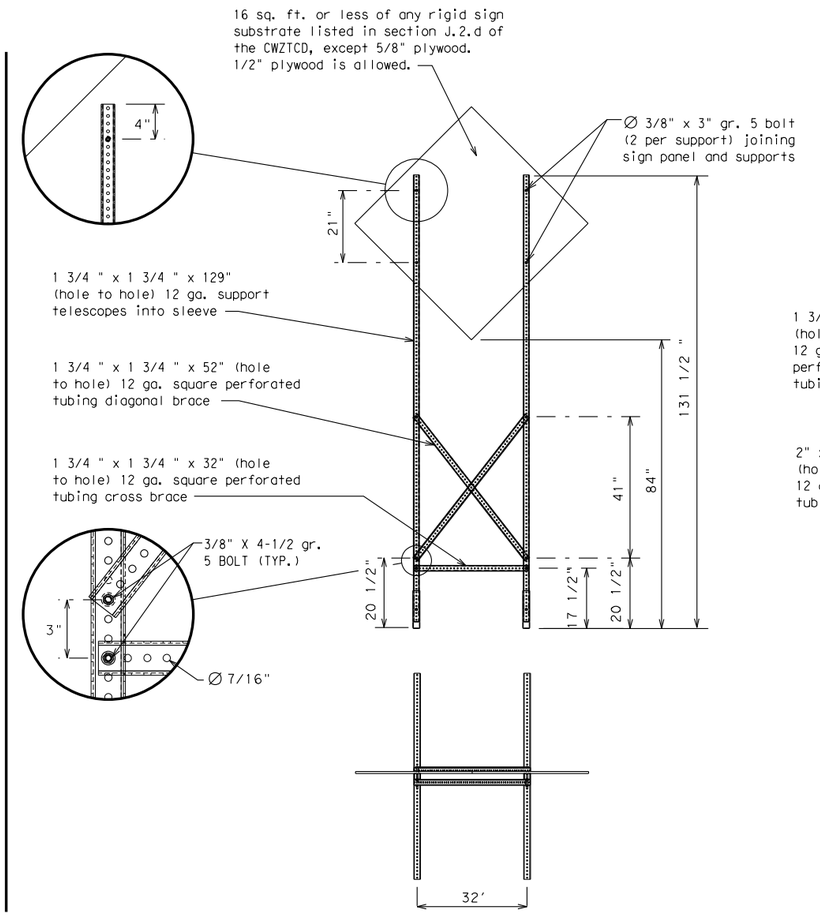
WING CHANNEL
Lap-splice/base bolted anchor

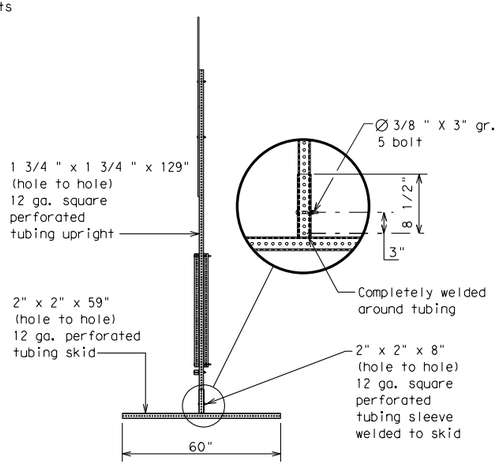
GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

□ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	WISE		52

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

** Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
9-07 8-14	DIST	COUNTY		SHEET NO.
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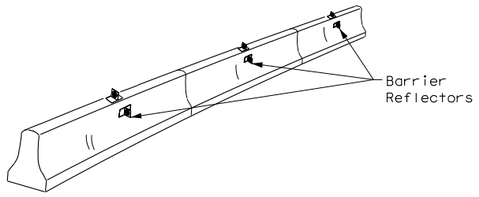
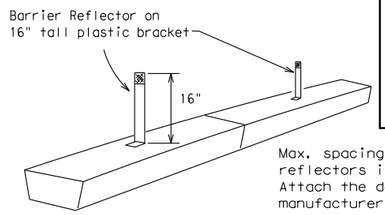
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

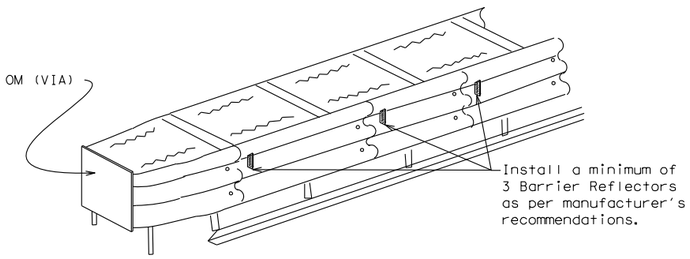


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

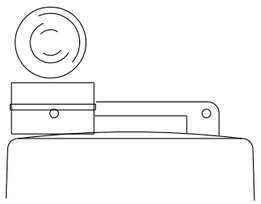


DELINEATION OF END TREATMENTS

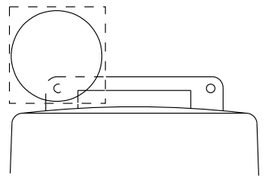
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

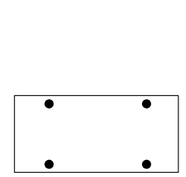
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

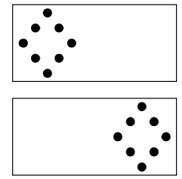
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:

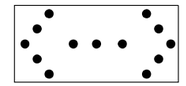


4 CORNER CAUTION

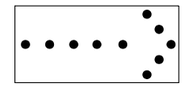
OR



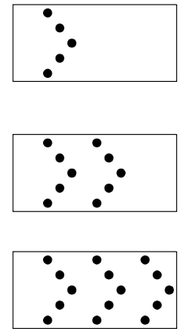
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



RIGHT/LEFT ARROW
(right arrow shown; left is similar)



RIGHT/LEFT SEQUENTIAL CHEVRON
(right chevron shown; left is similar)

5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	WISE		54

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DATE:
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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

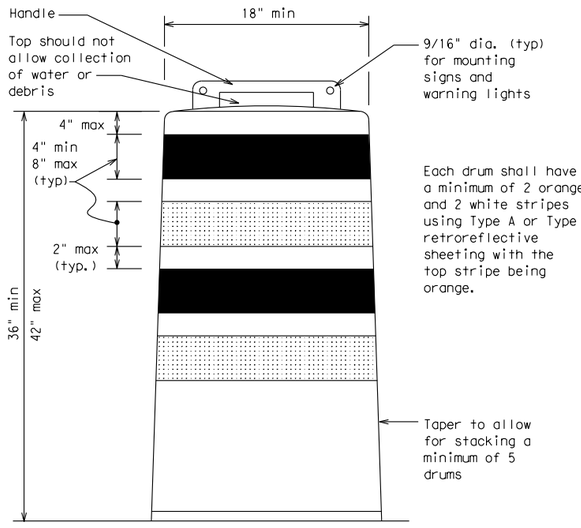
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

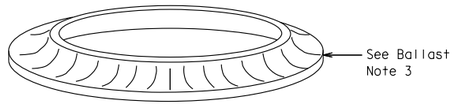
RETROREFLECTIVE SHEETING

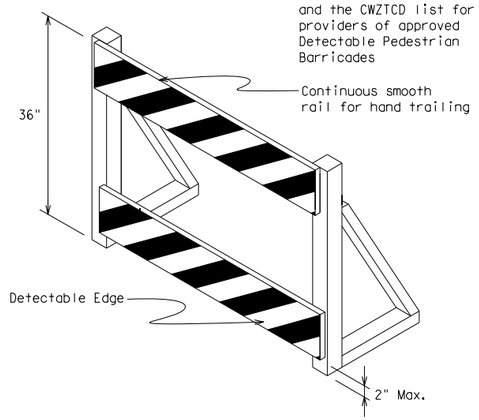
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

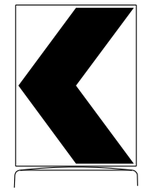




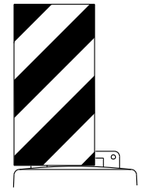


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

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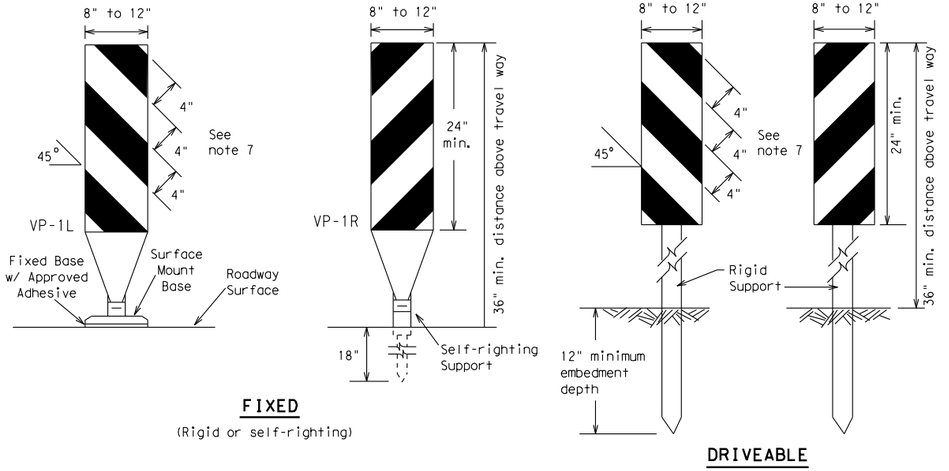
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	FTW	WISE		55
7-13				

102



FIXED

(Rigid or self-righting)

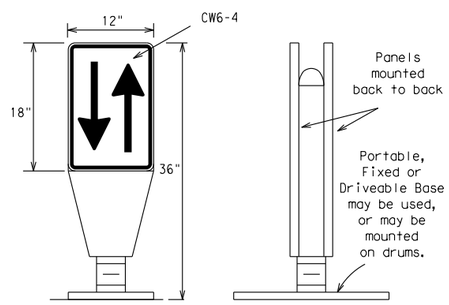
DRIVEABLE

(Rigid or self-righting)

PORTABLE

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

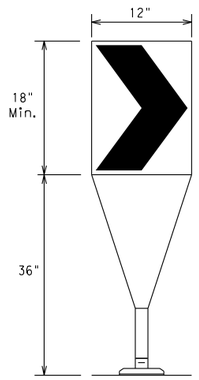
VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

DATE:
FILE:



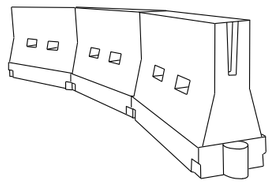
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
9-07 8-14	DIST	COUNTY		SHEET NO.
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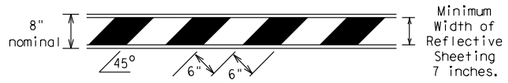
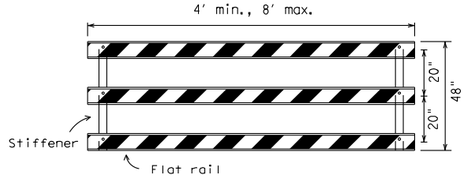
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



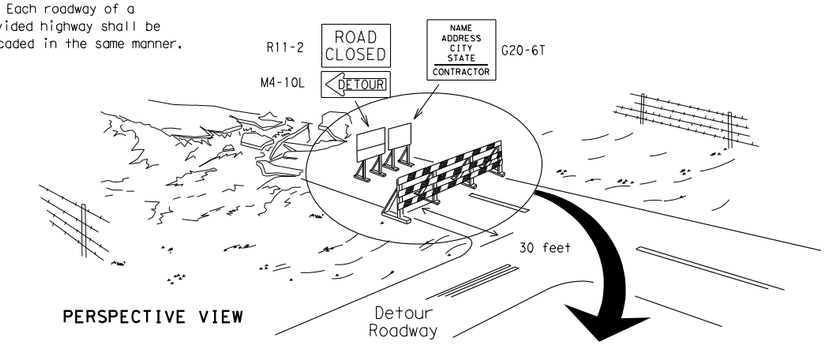
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

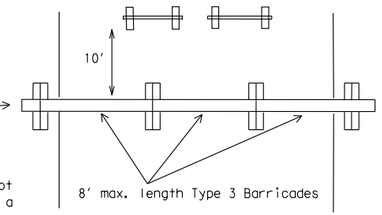
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

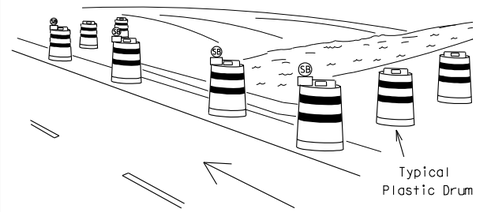
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

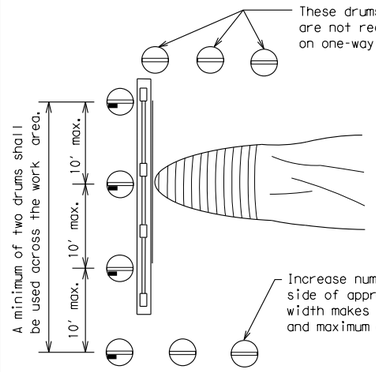
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

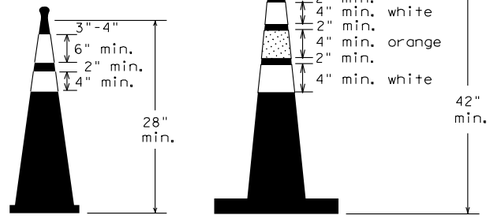
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



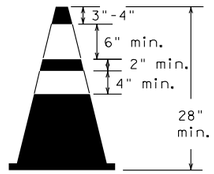
PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

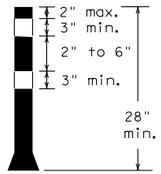
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

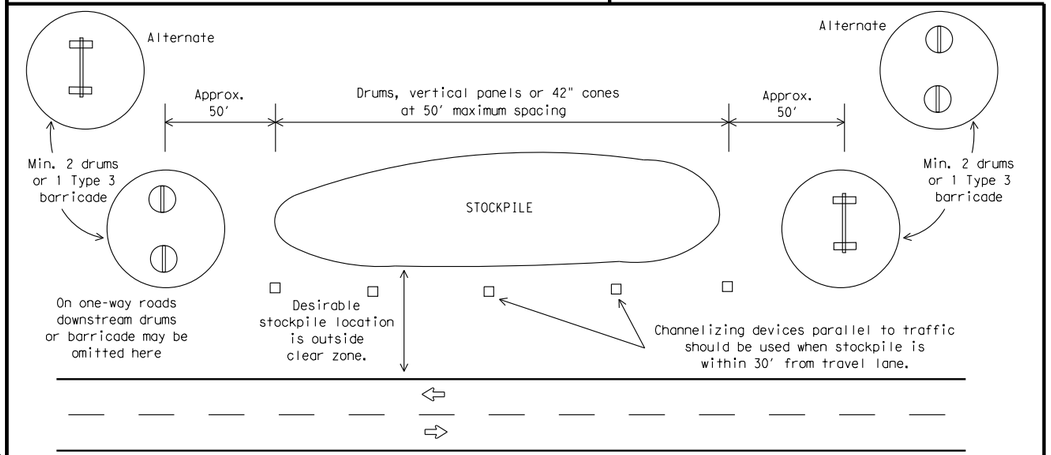


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	WISE		57

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

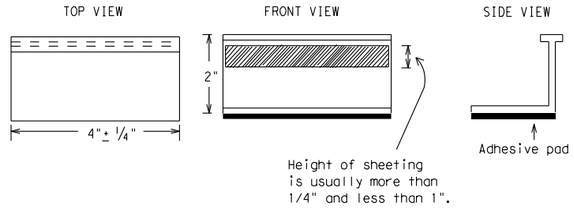
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

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Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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REVISIONS 2-98 9-07 5-21	0134	07	069	US 380
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	FTW	WISE		58

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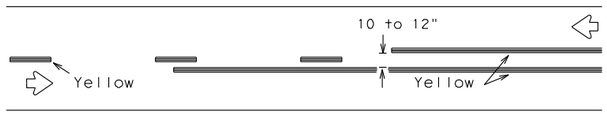
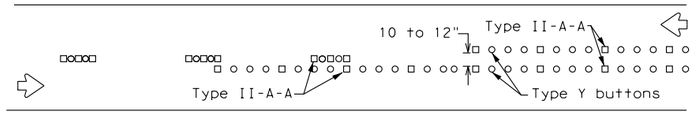
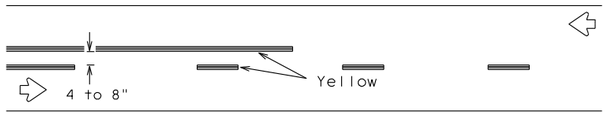
PAVEMENT MARKING PATTERNS



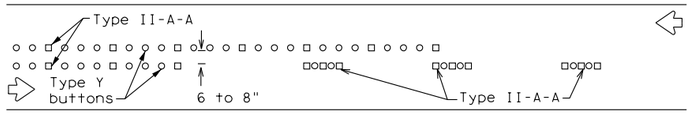
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



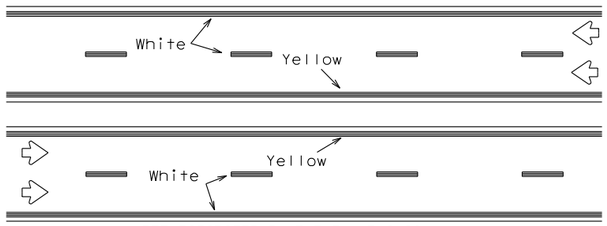
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



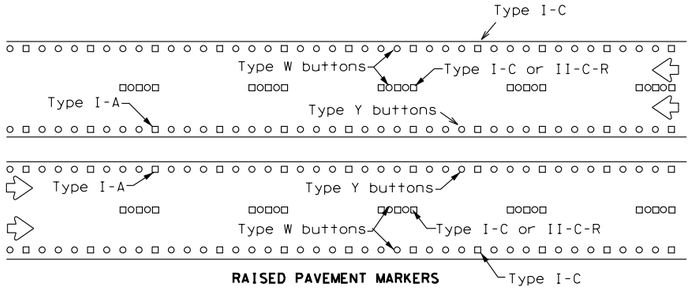
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



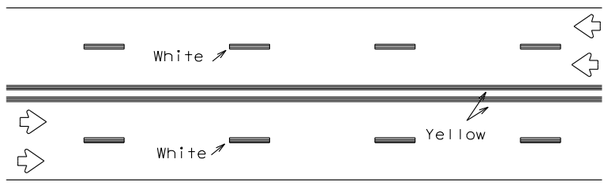
REFLECTORIZED PAVEMENT MARKINGS



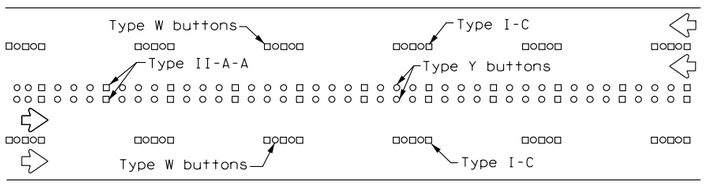
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



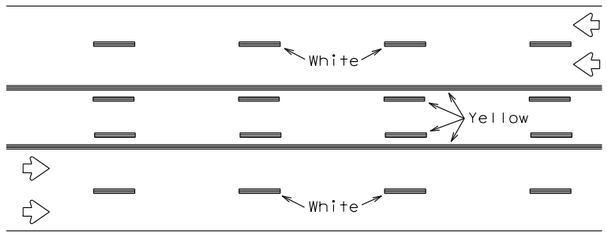
REFLECTORIZED PAVEMENT MARKINGS



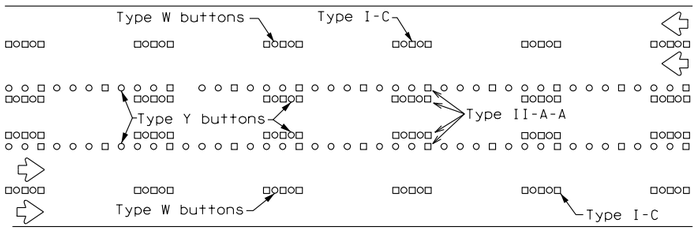
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

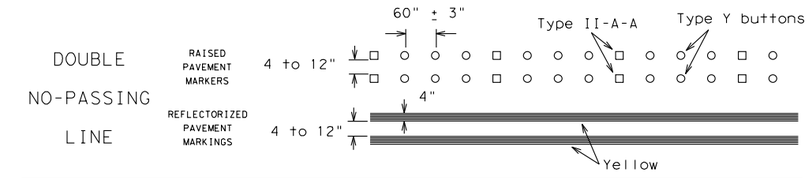
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

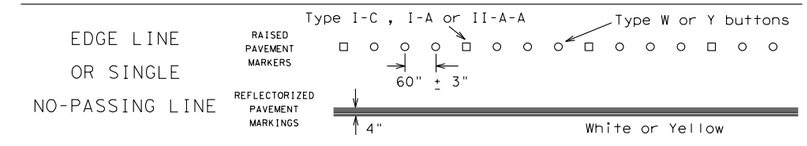
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

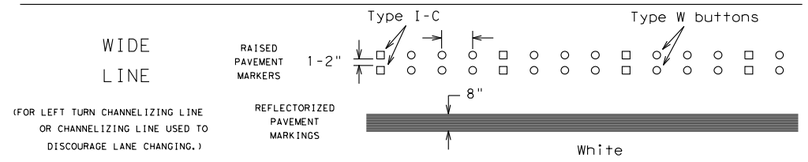


EDGE LINE OR SINGLE NO-PASSING LINE



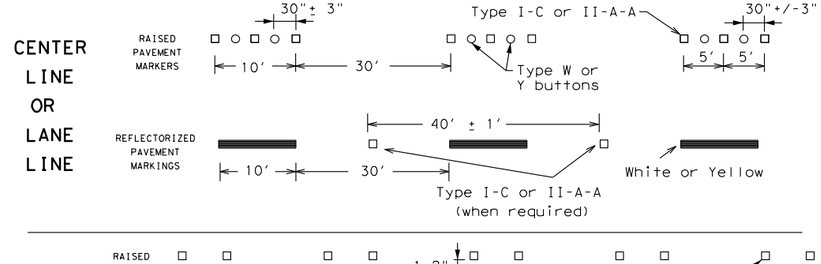
WIDE LINE

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

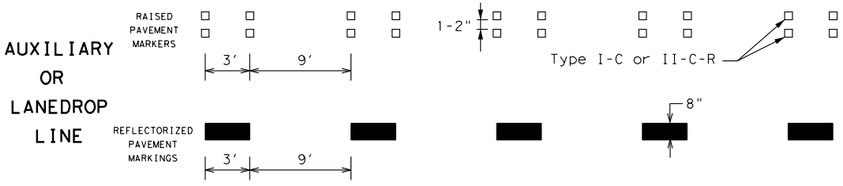


BROKEN LINES

CENTER LINE OR LANE LINE

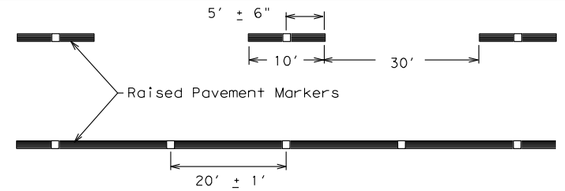


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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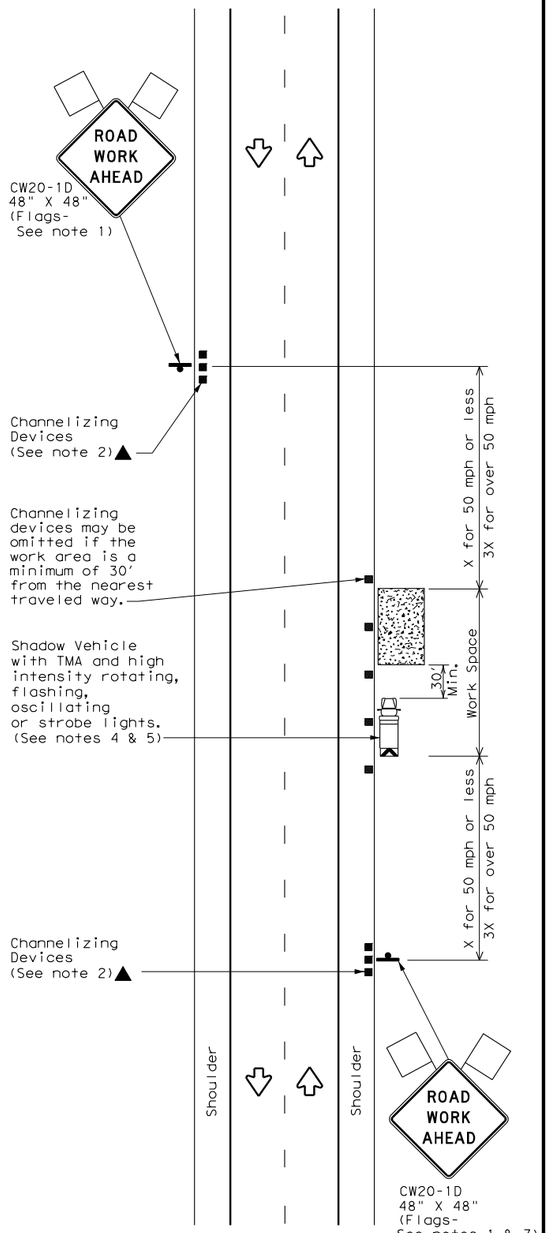
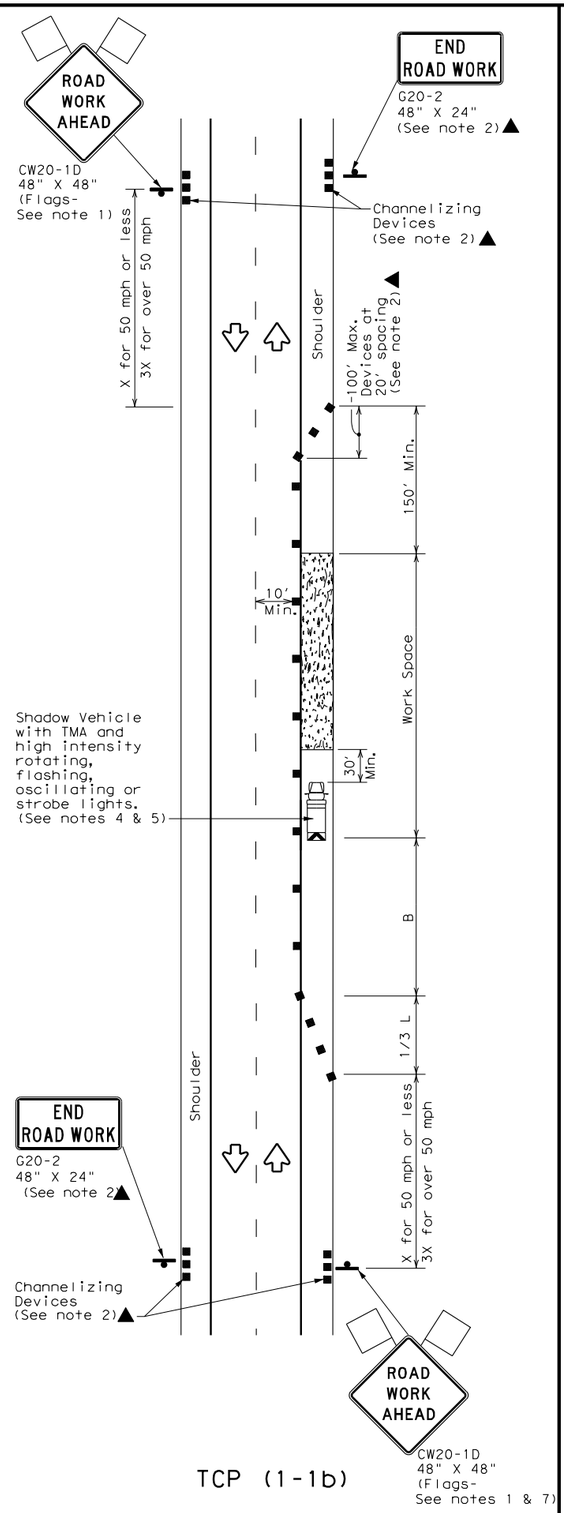


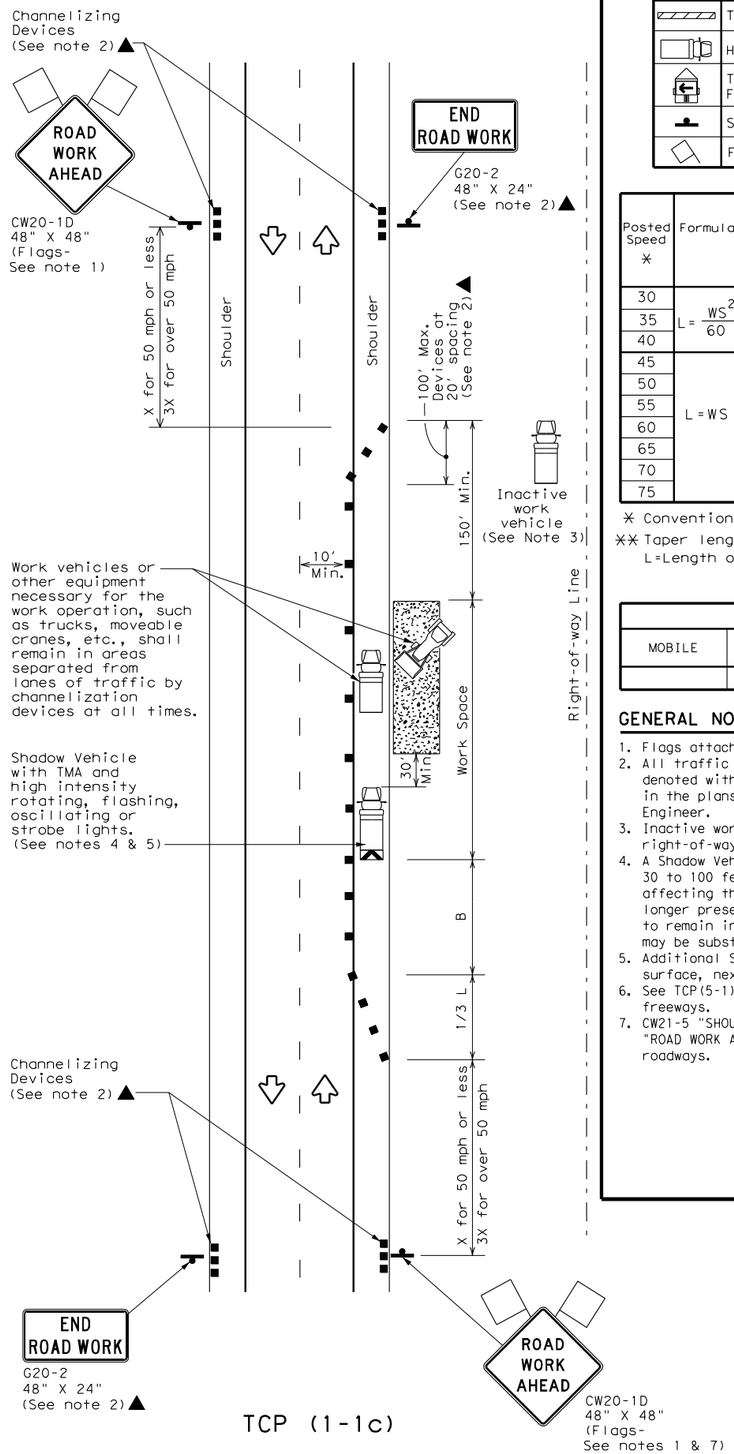
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS	013407		069	US 380
2-94 4-98	DIST	COUNTY		SHEET NO.
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1-97 2-18				

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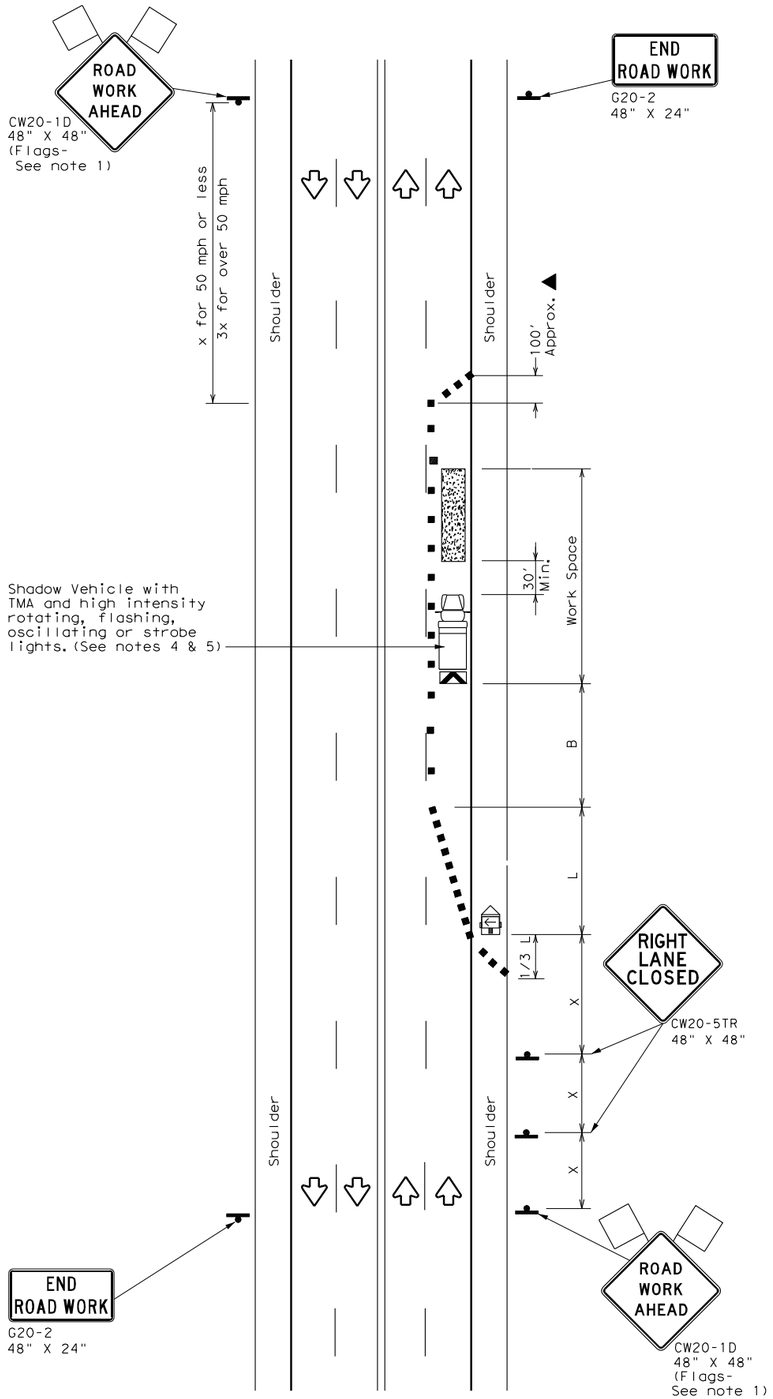
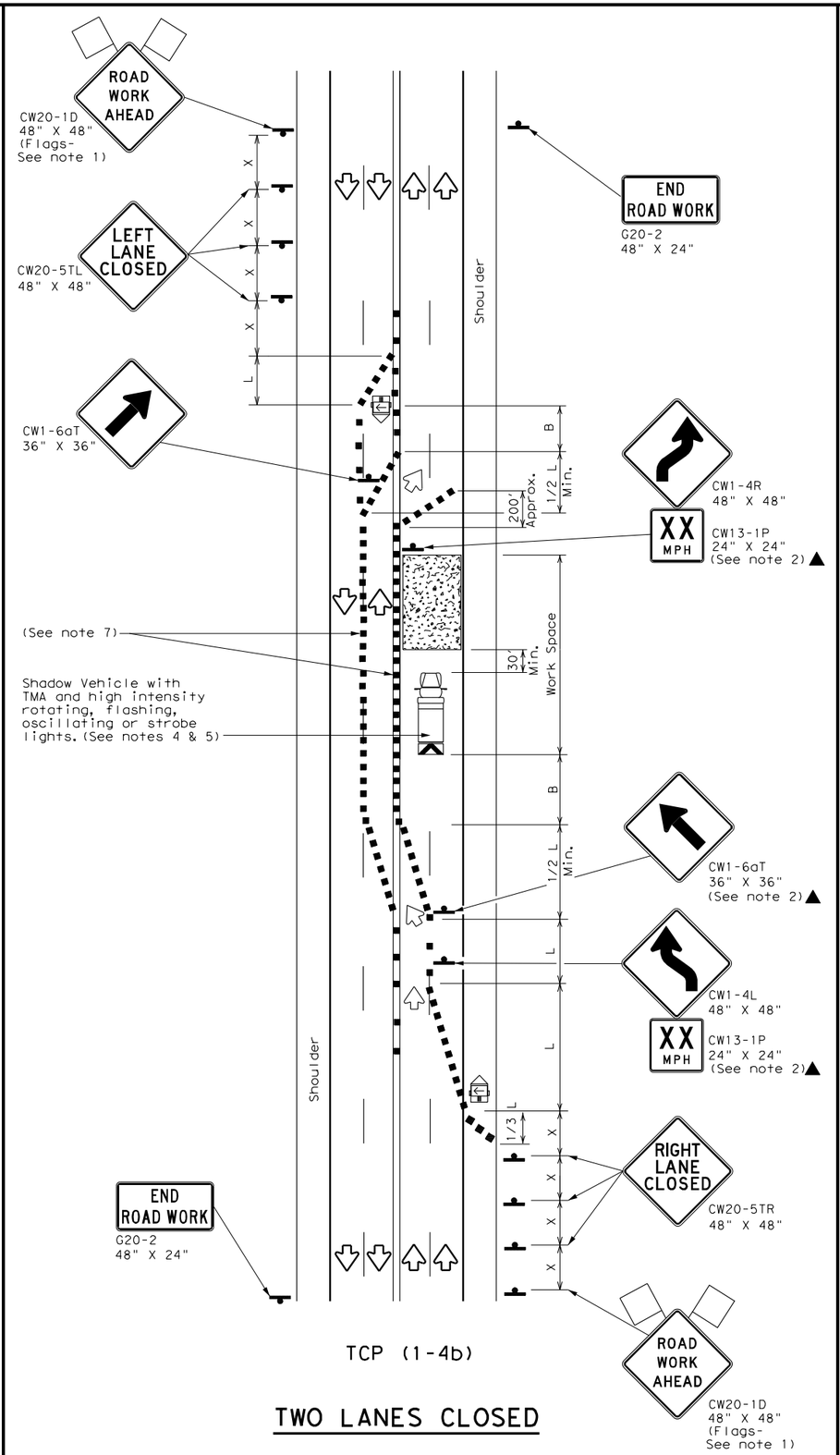


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

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TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

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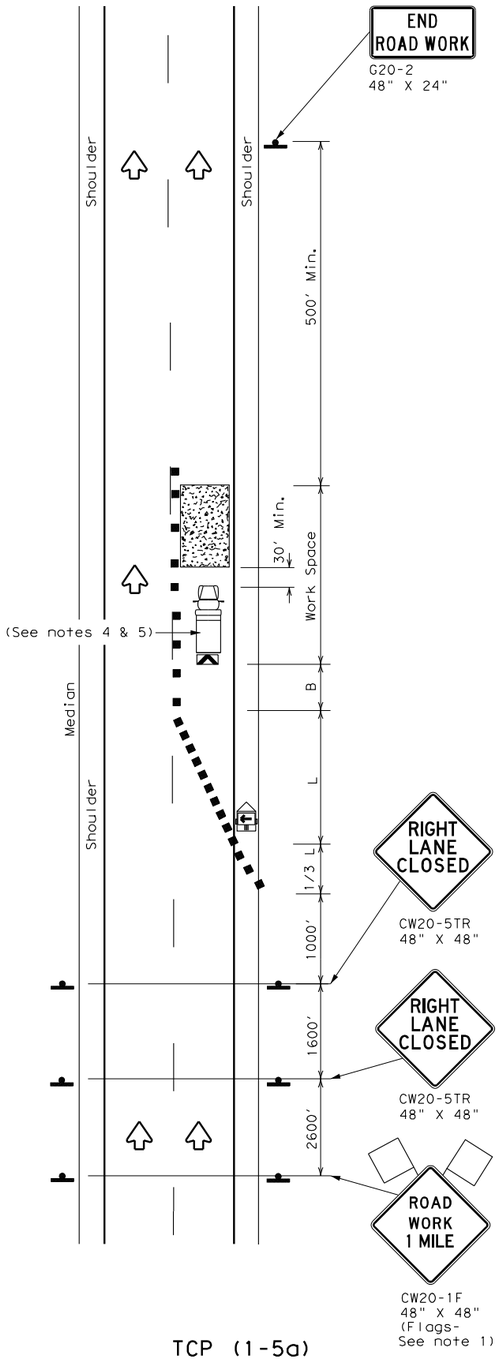
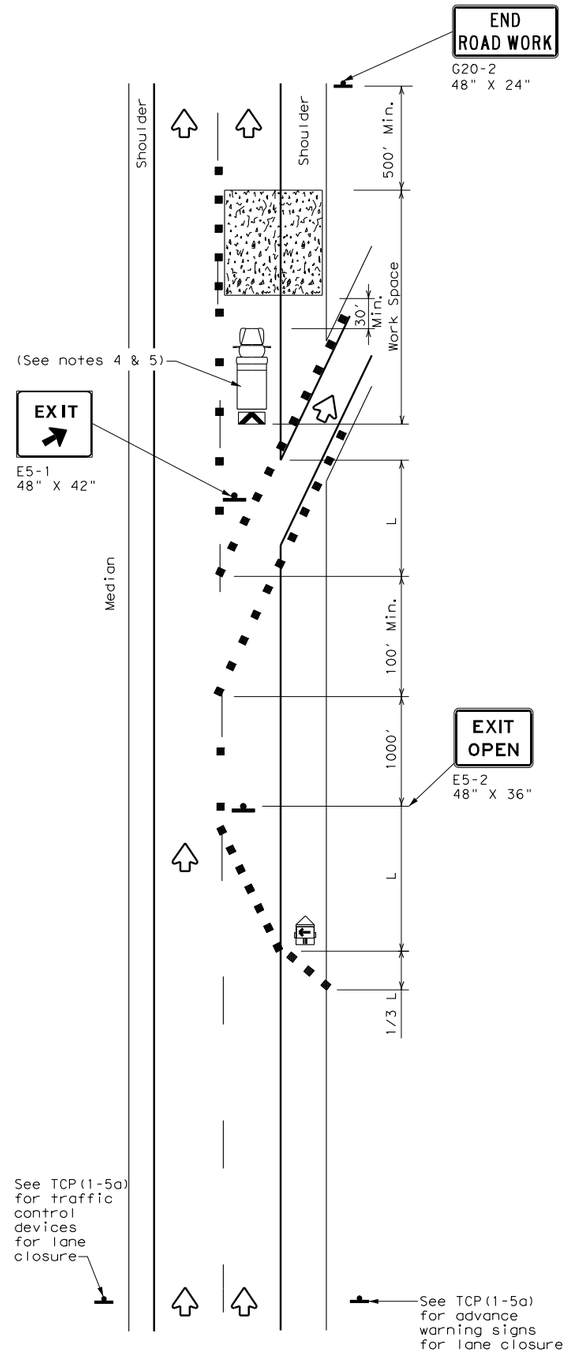


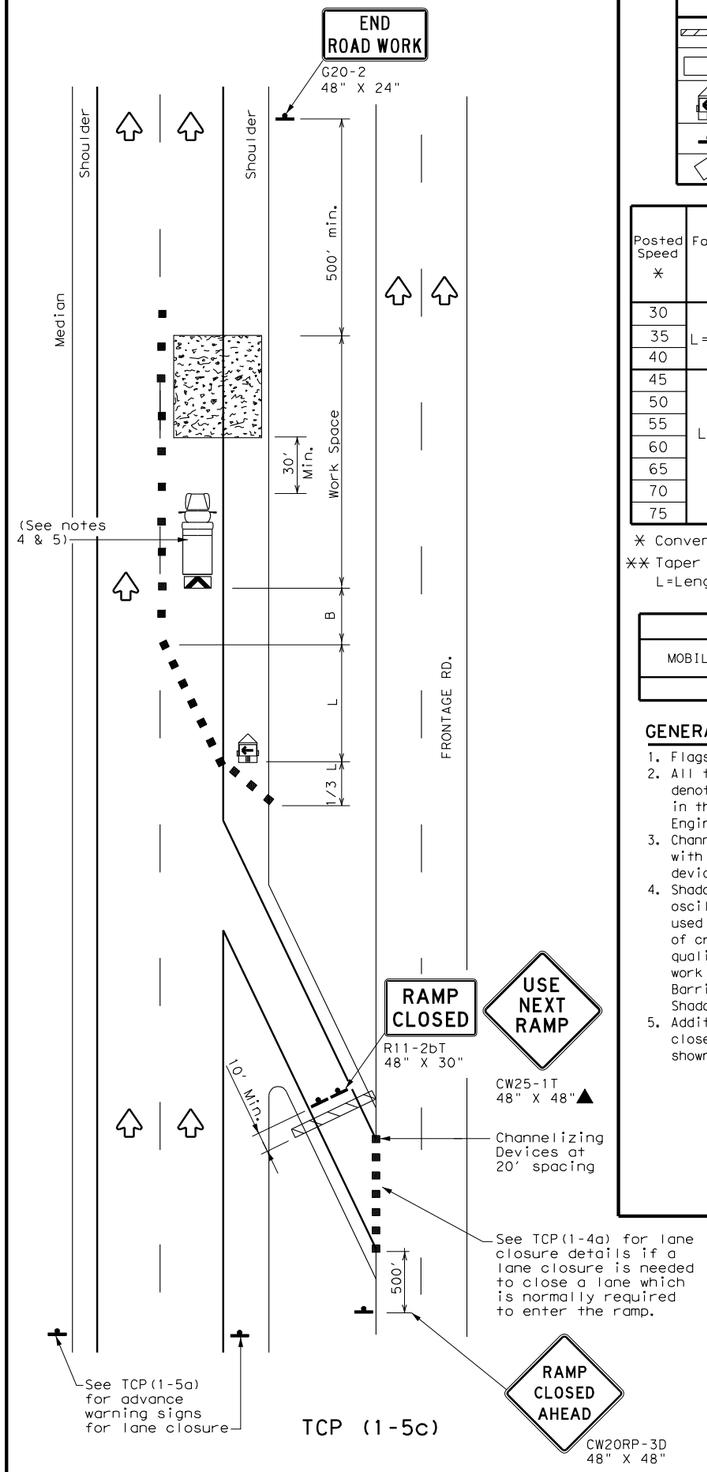
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓		

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		62

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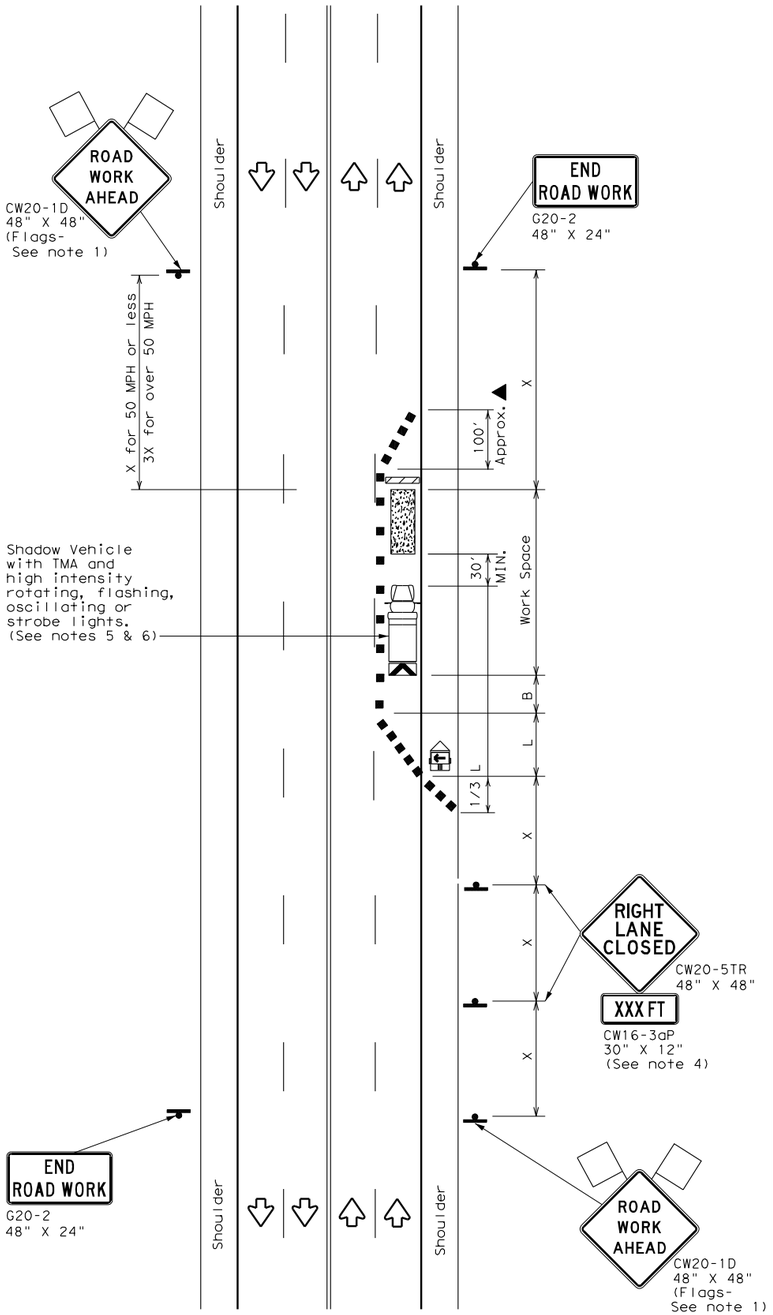
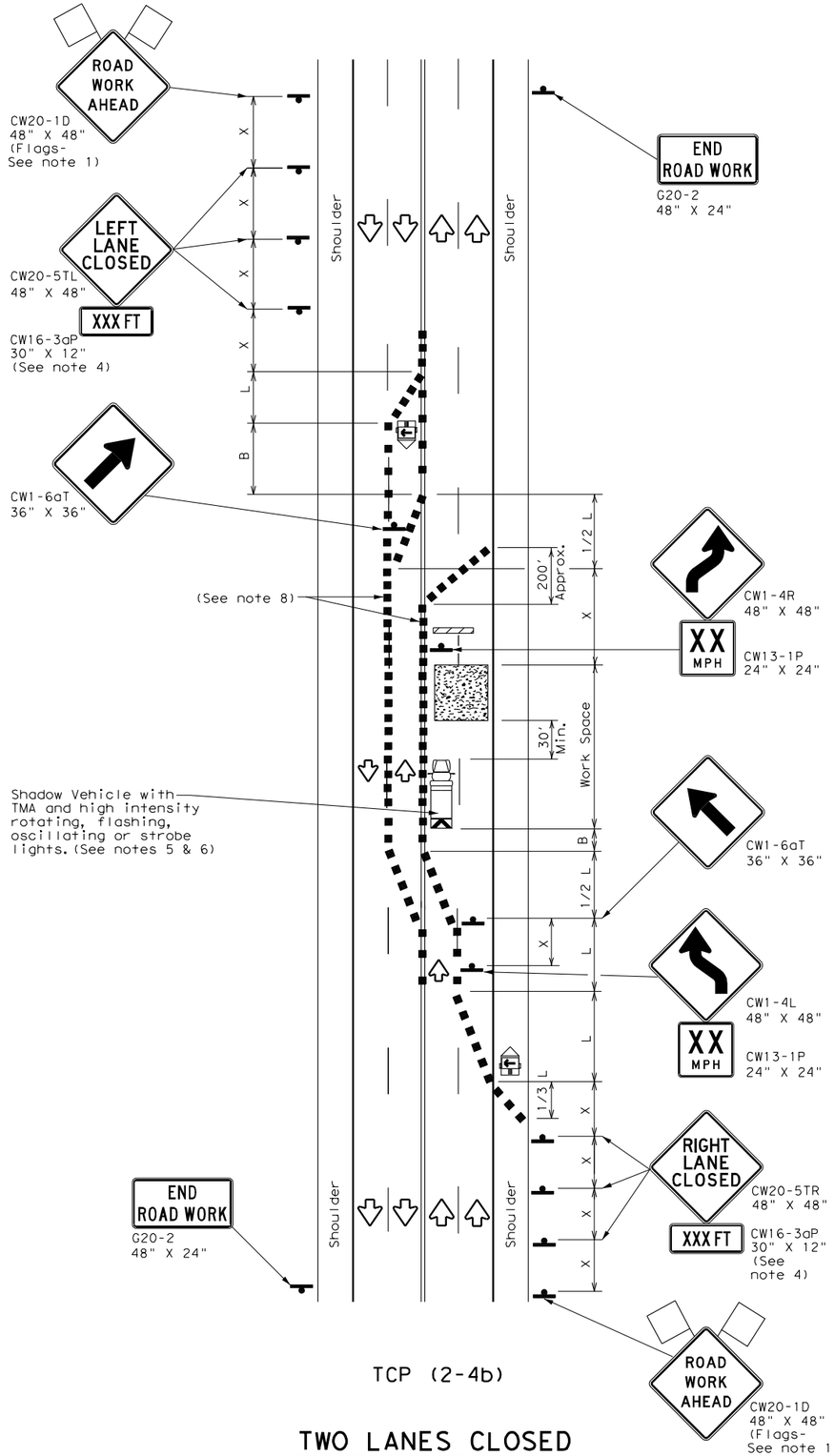
DATE:
FILE:



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	013407	069		US 380
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	FTW	WISE		63

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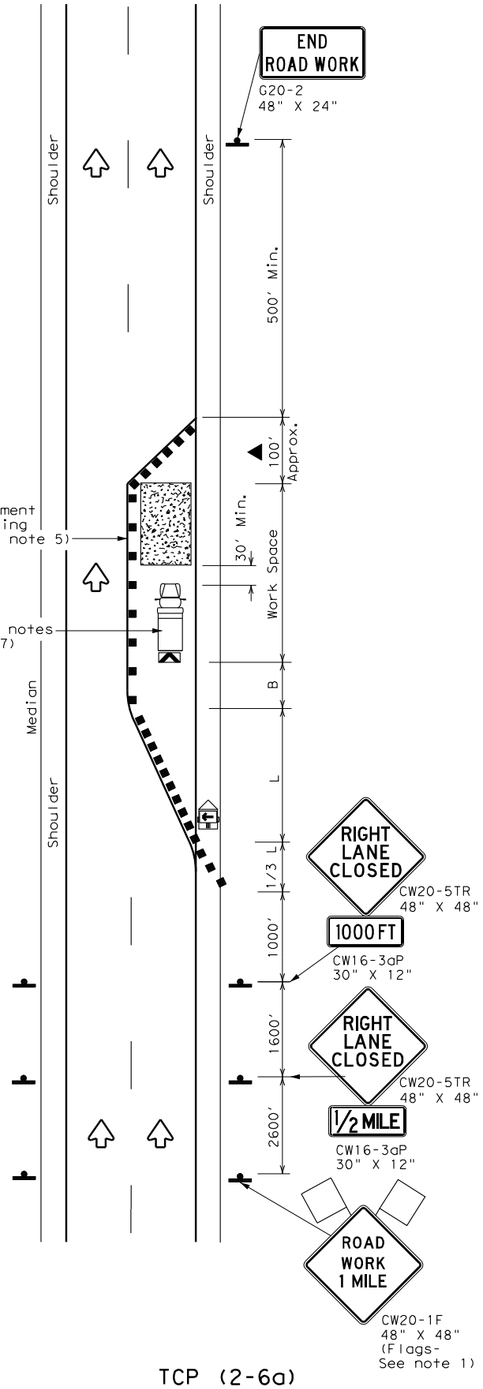
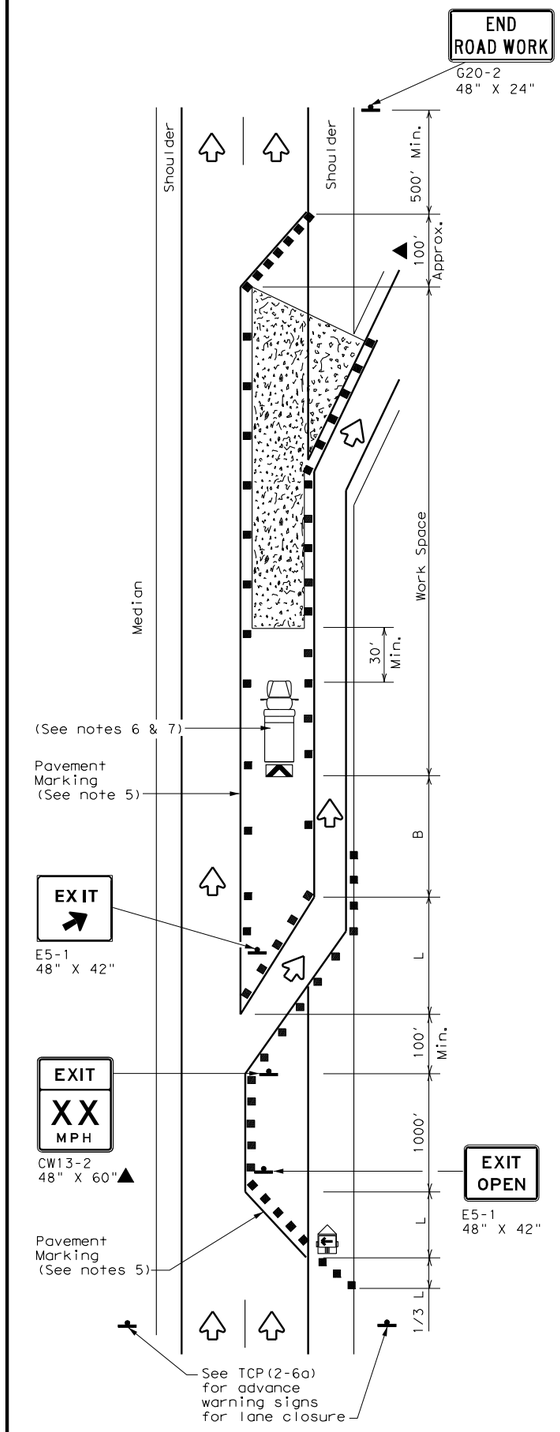
DATE:
FILE:



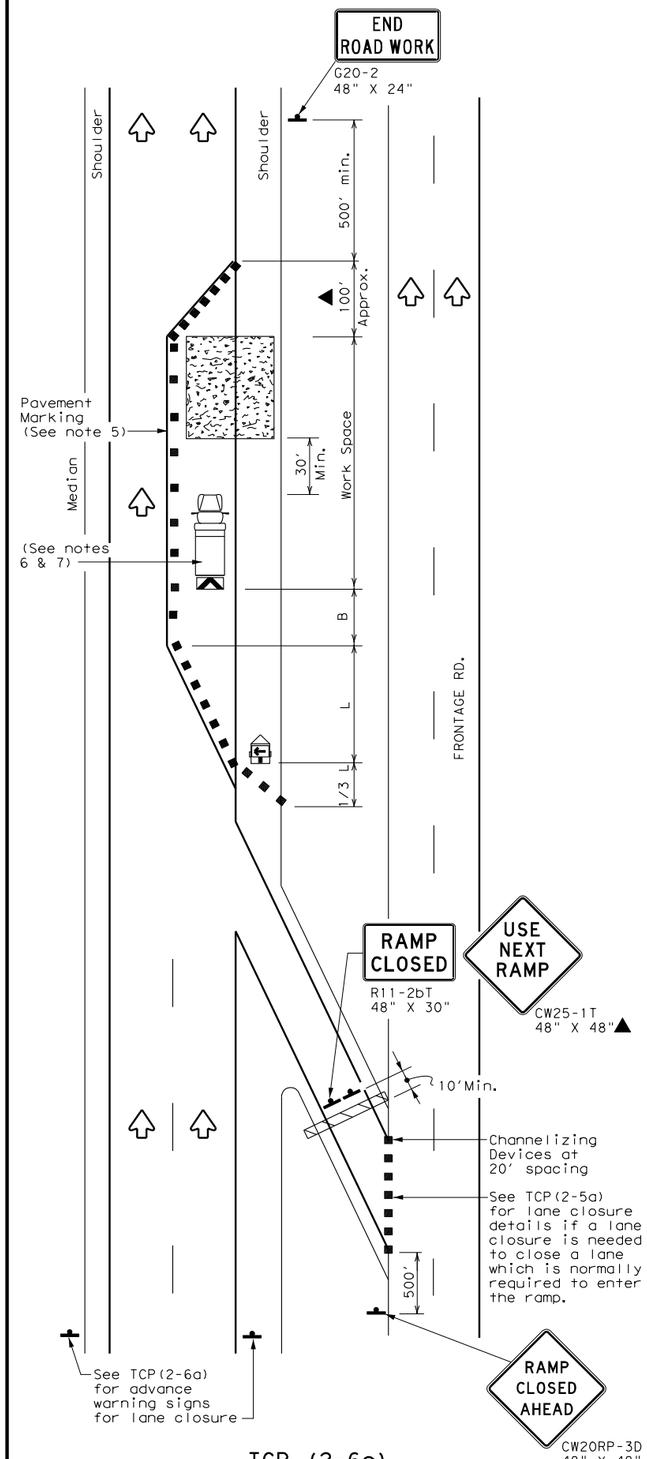
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	013407		069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		64

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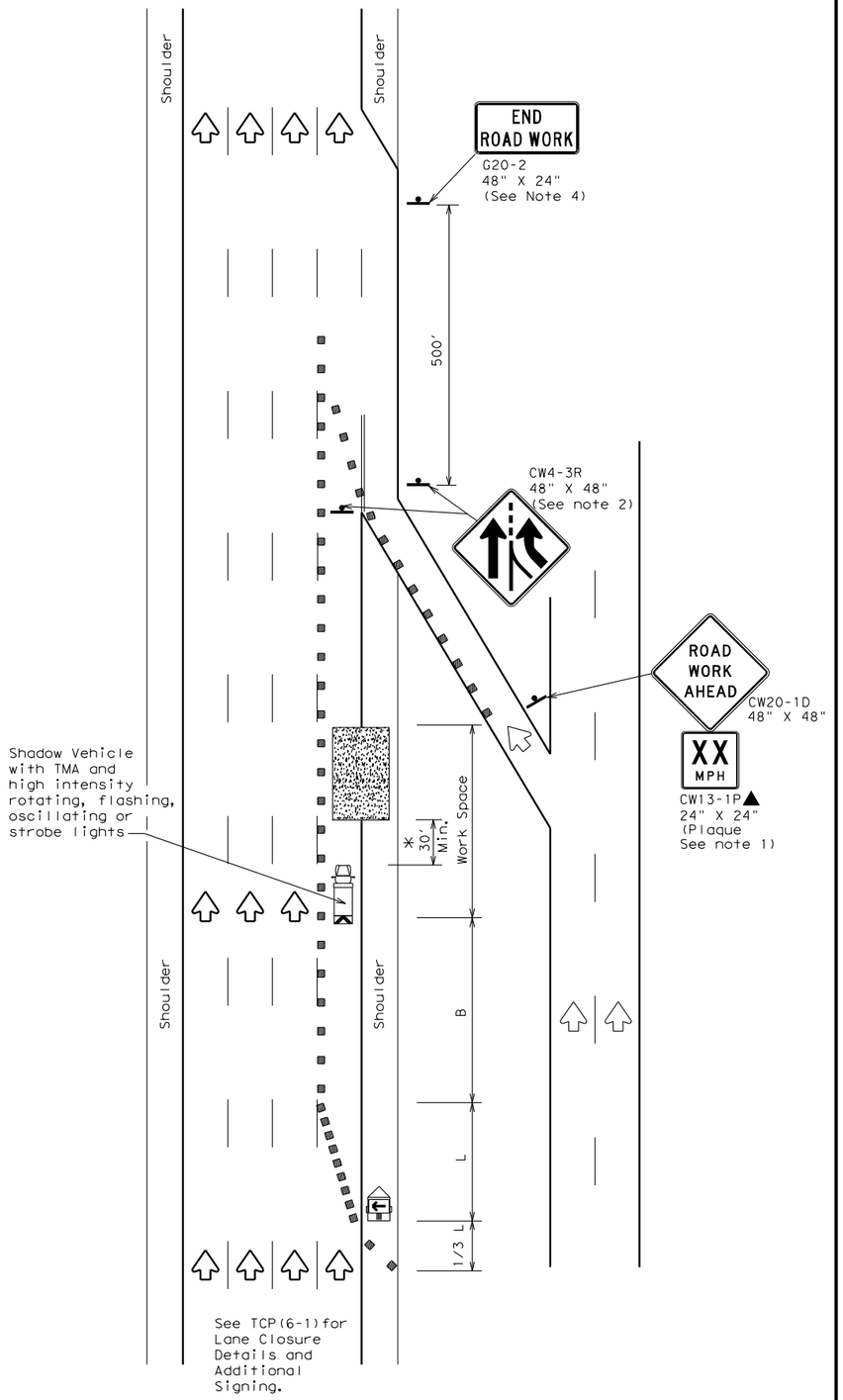
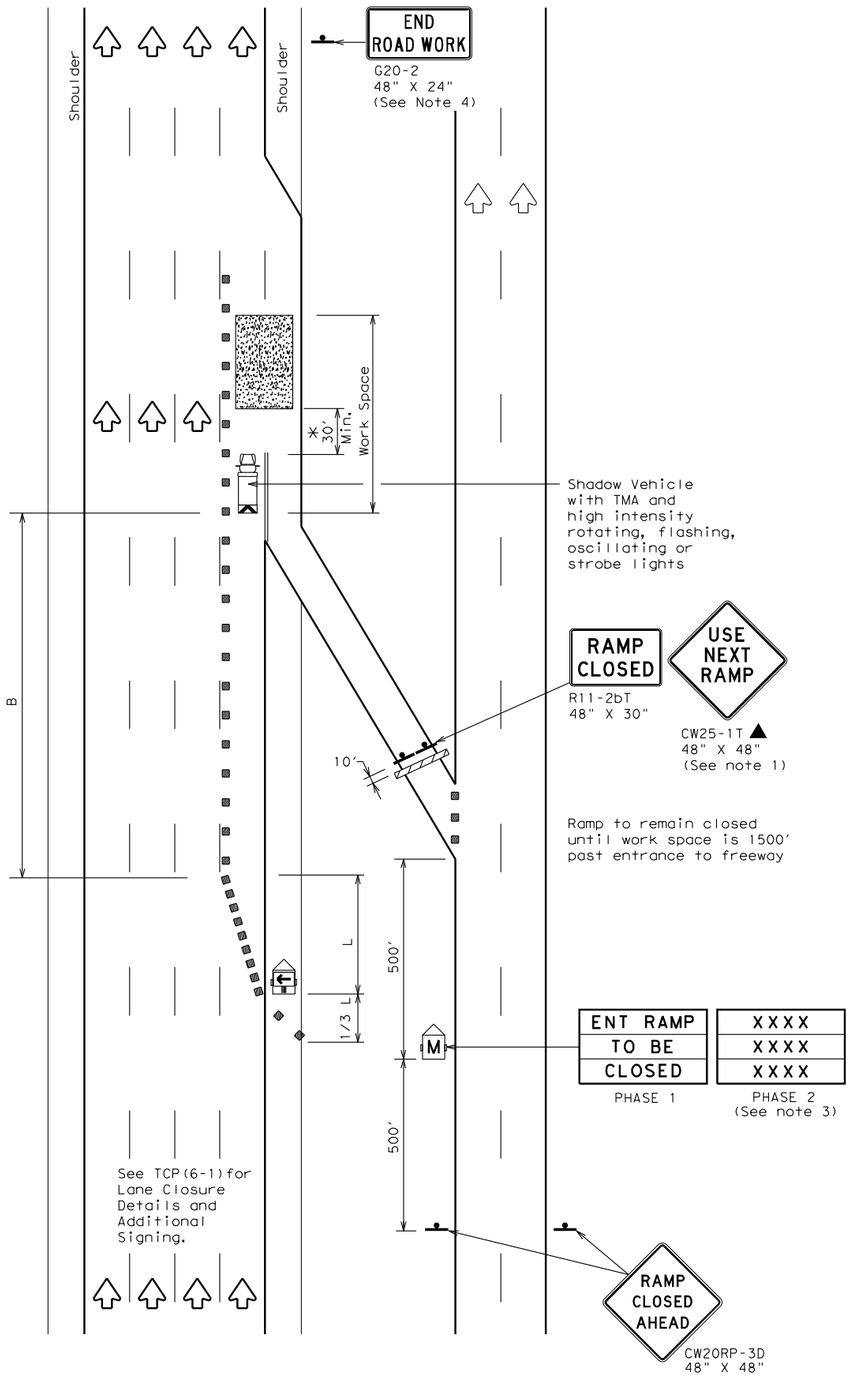
DATE:
FILE:



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

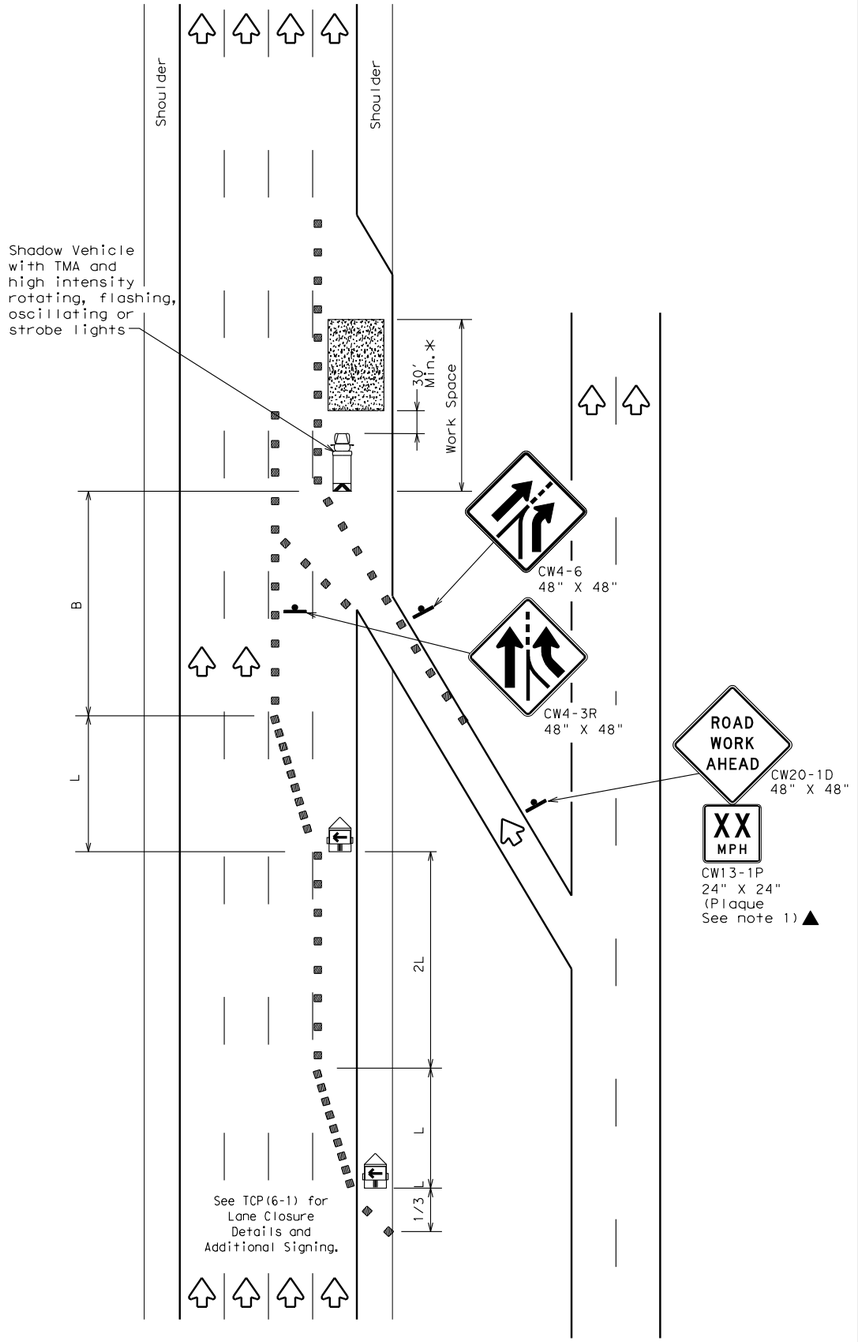
TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	WISE		65

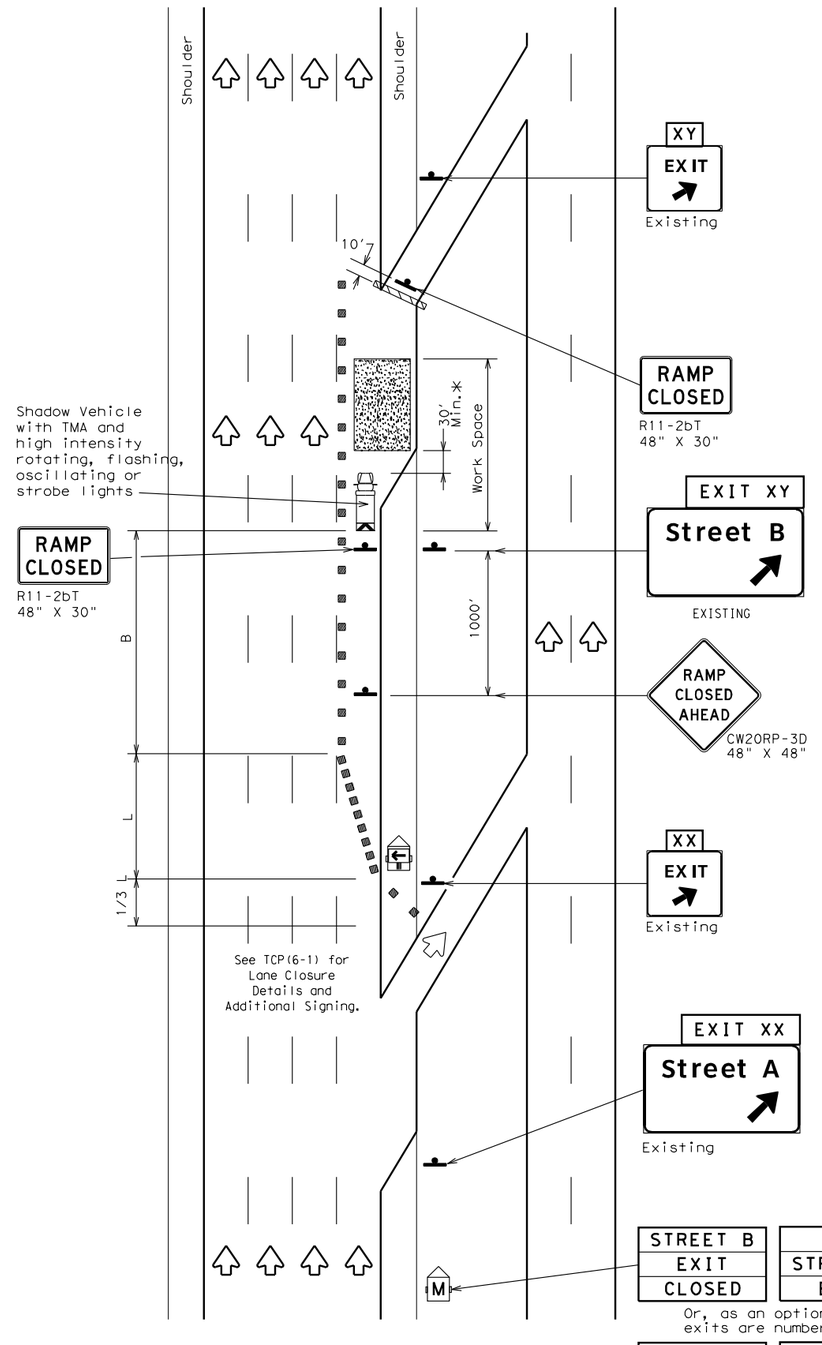
202

DATE:
FILE:



TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L = WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

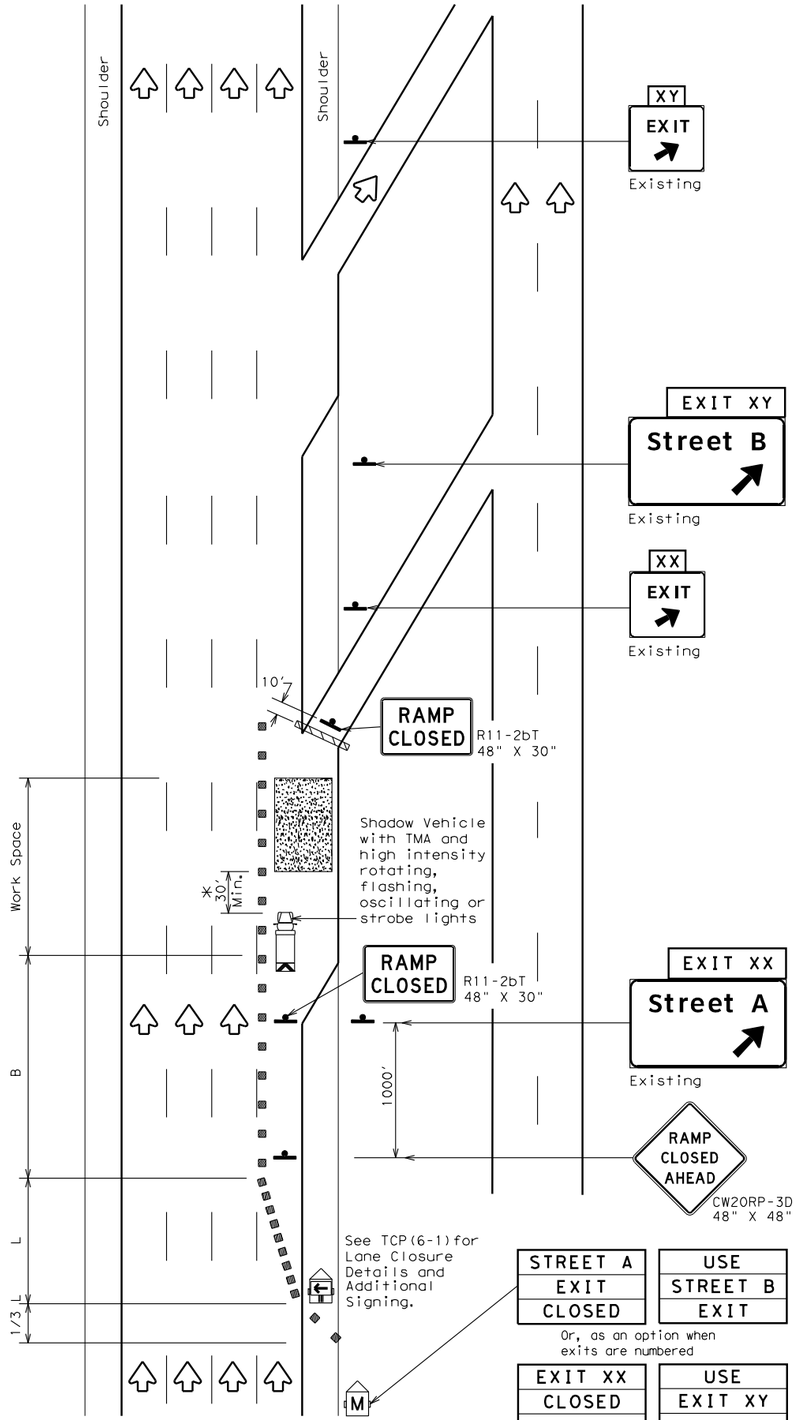
TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	013407		069	US 380
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	WISE		66

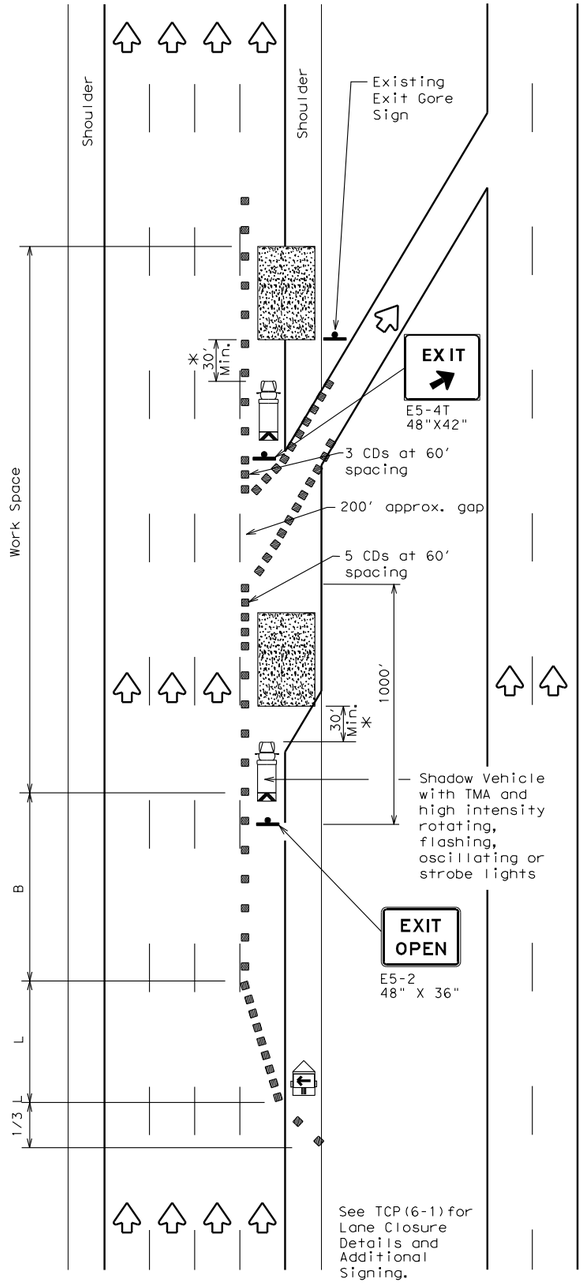
203

DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	WISE		67

DATE:
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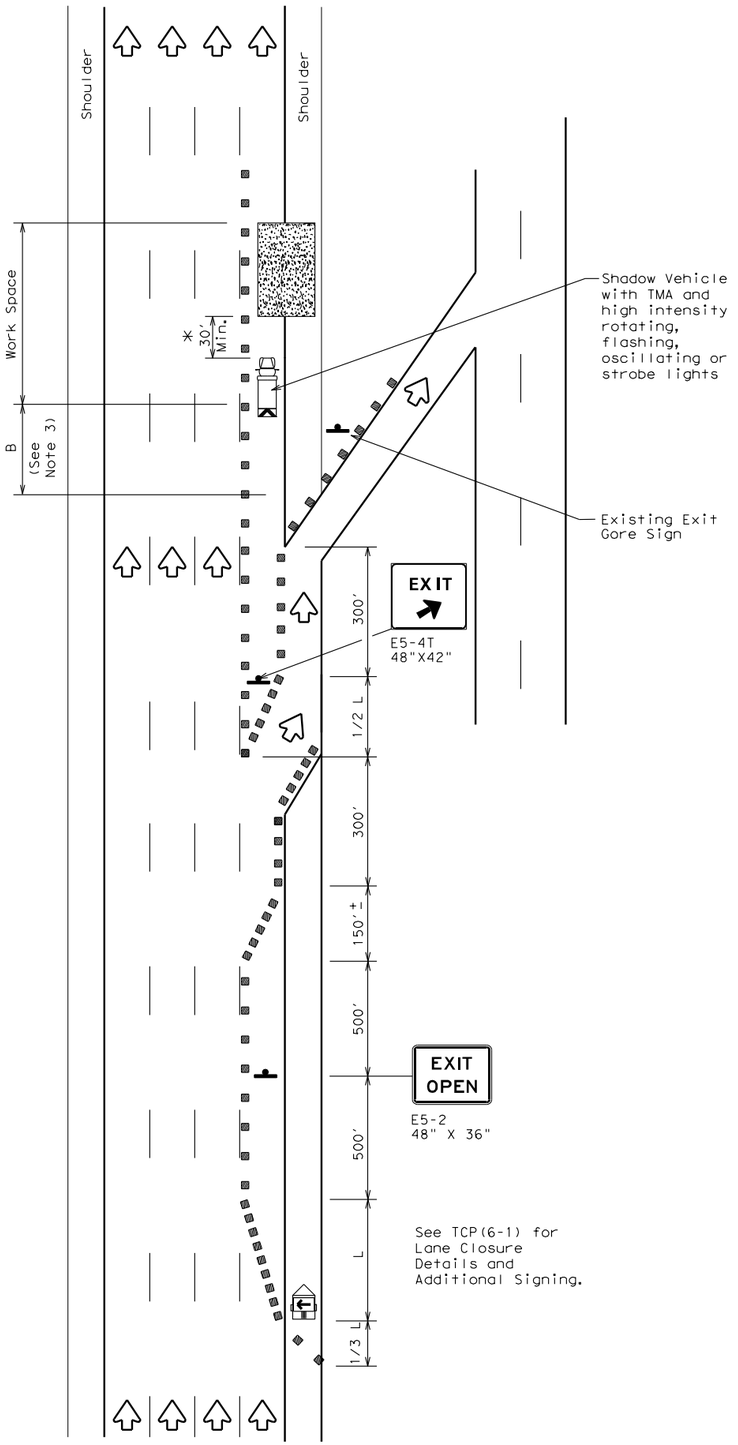
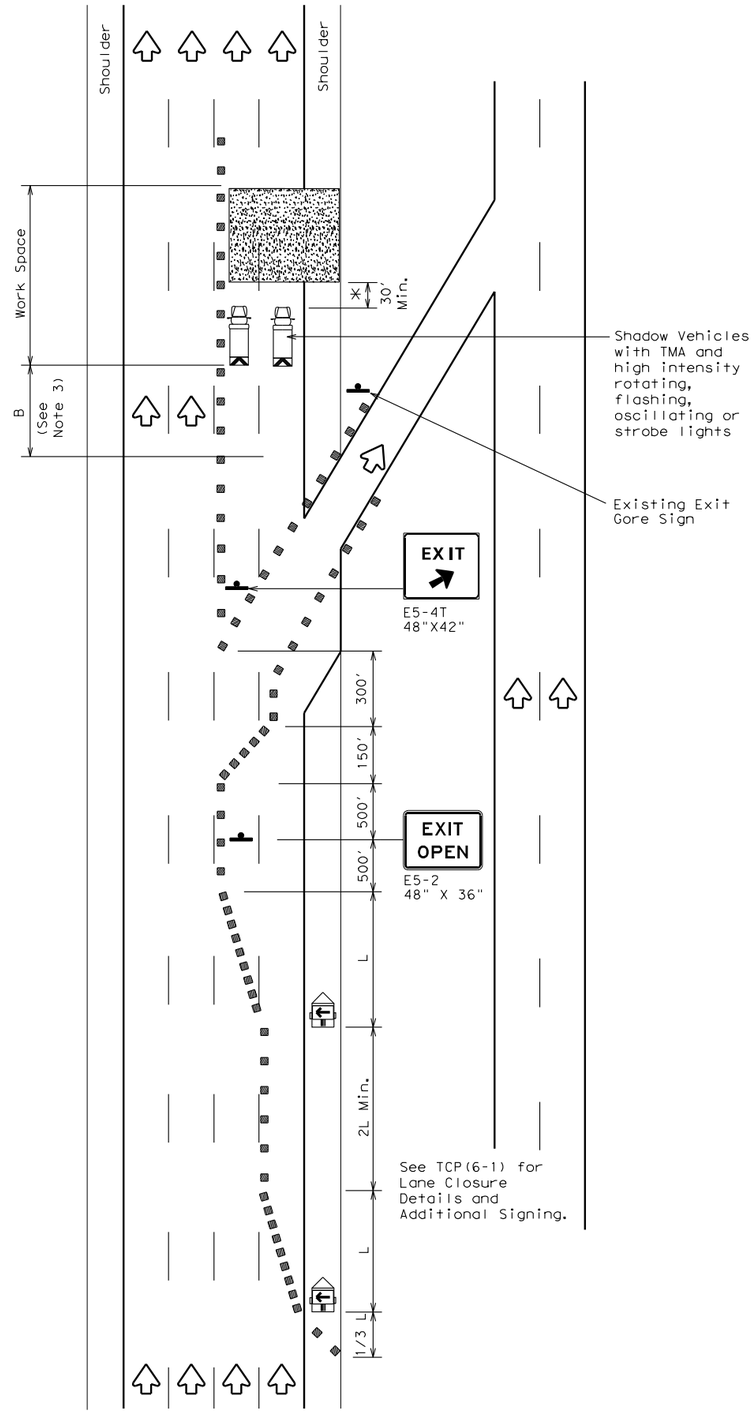


TCP (6-5a)

EXIT RAMP OPEN



TCP (6-5b)

EXIT RAMP OPEN
TWO LANE CLOSURE WITHIN 1500' PAST EXIT RAMP

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC standards for sign details.
3. If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND EXIT RAMP

TCP(6-5)-12

FILE: tcp6-5.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	WISE		68

DATE:
FILE:

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed	Formula	Minimum Desirable Taper Lengths "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT)
S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

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	DIST	COUNTY		SHEET NO.
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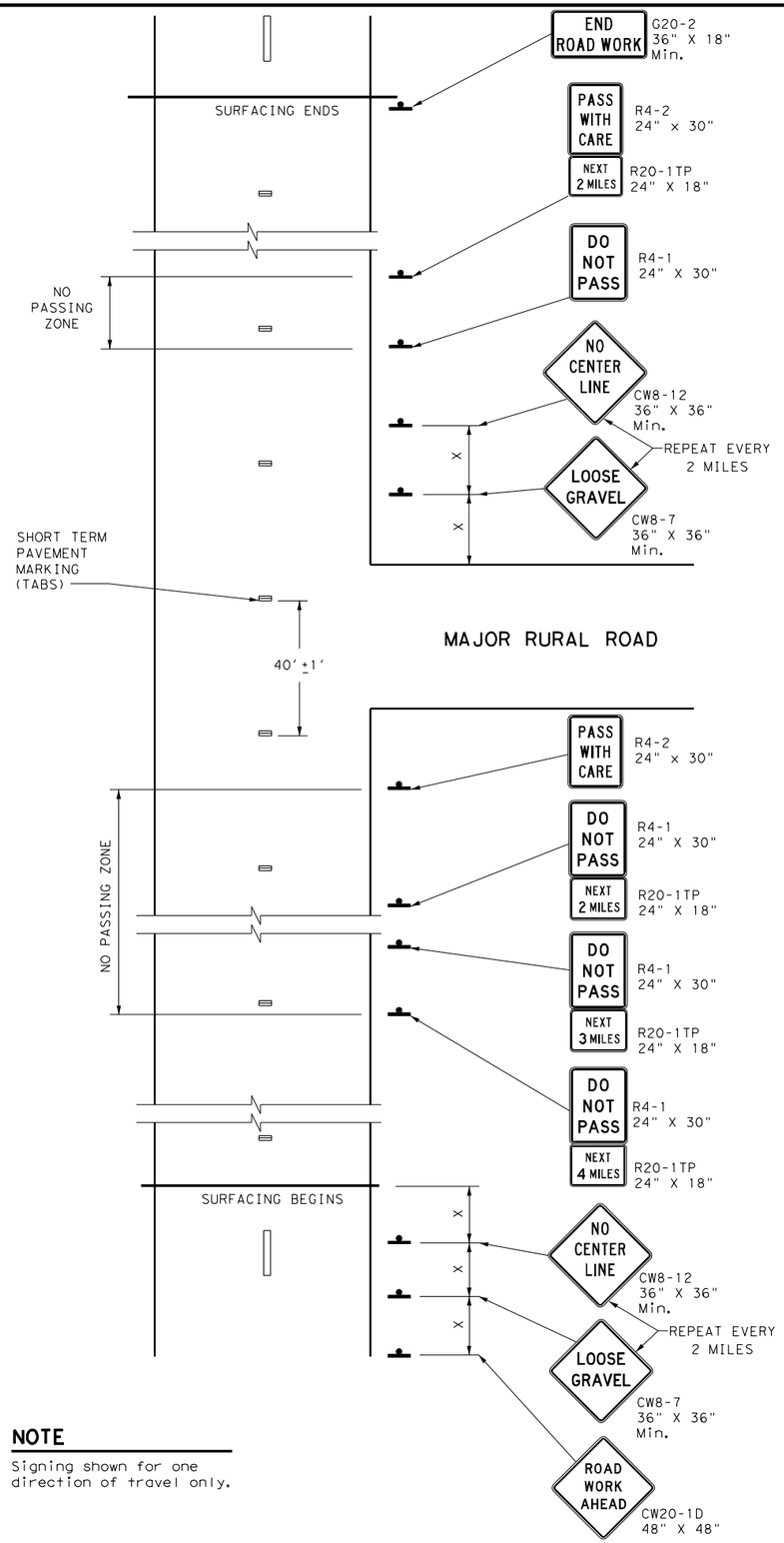
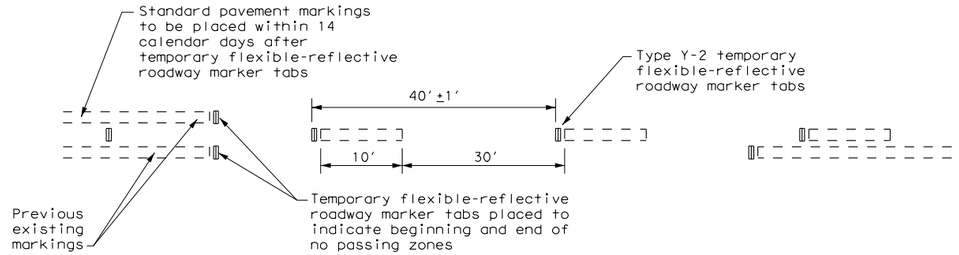


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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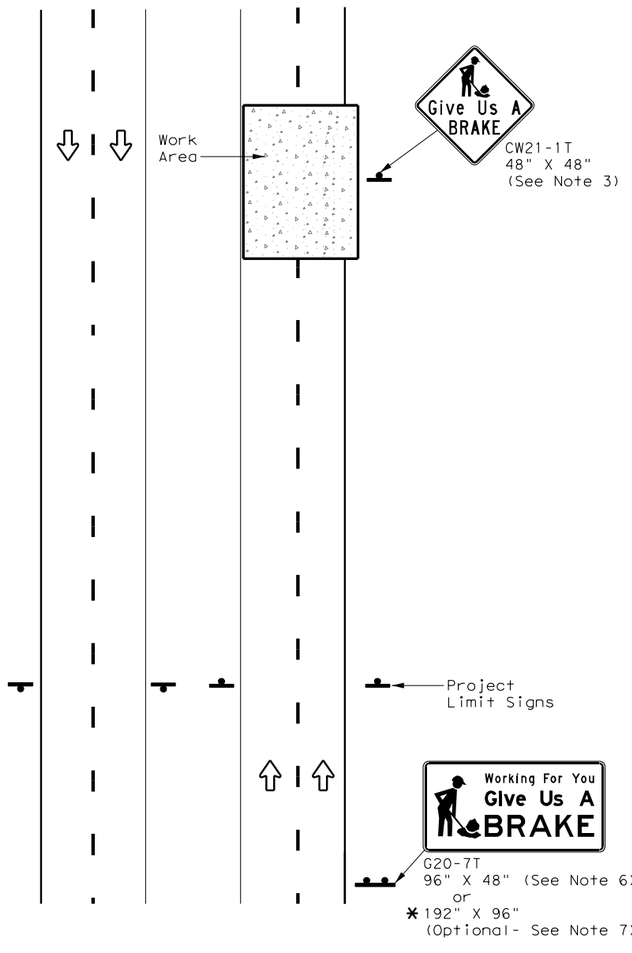
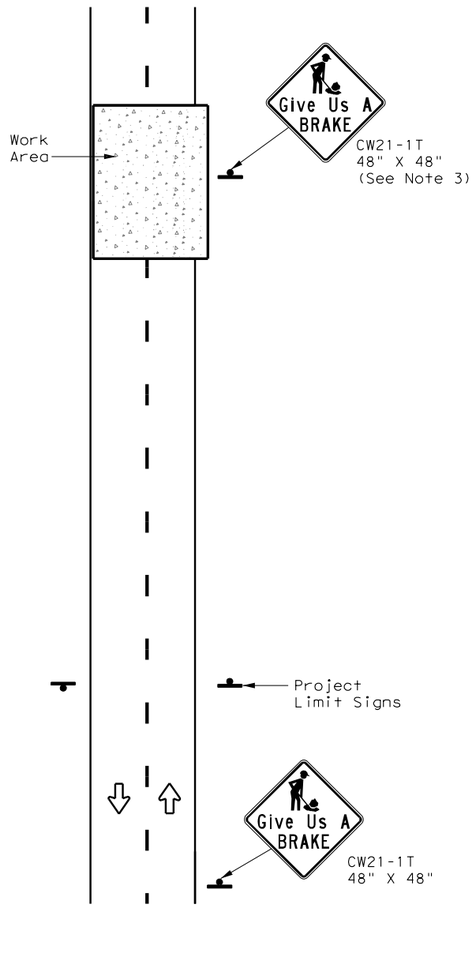


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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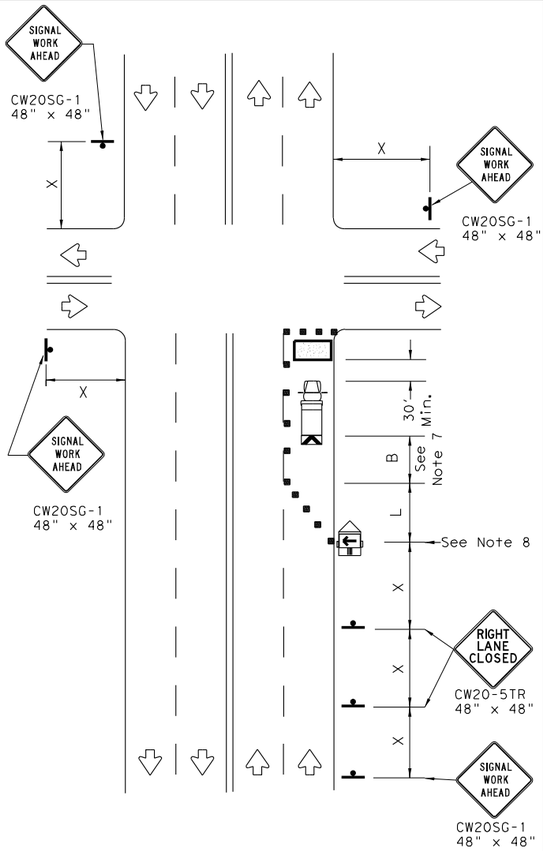
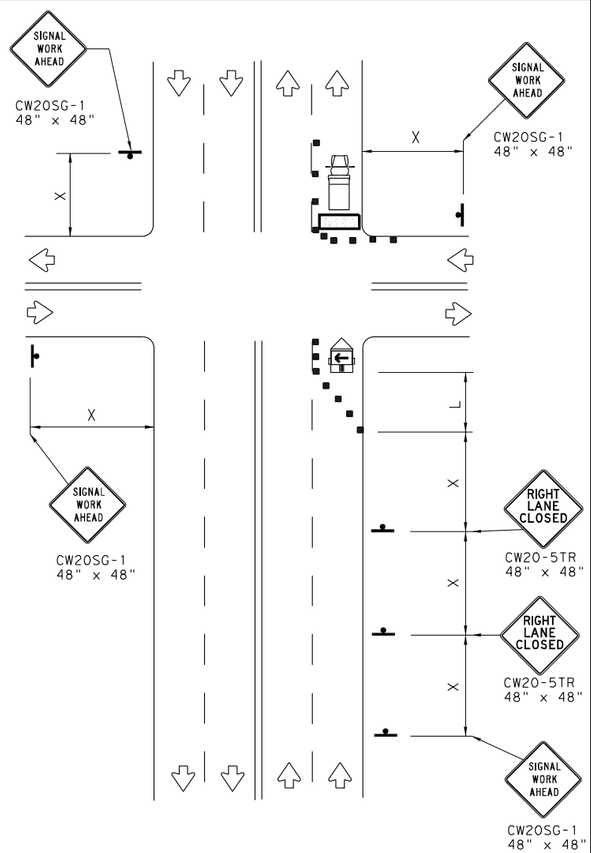


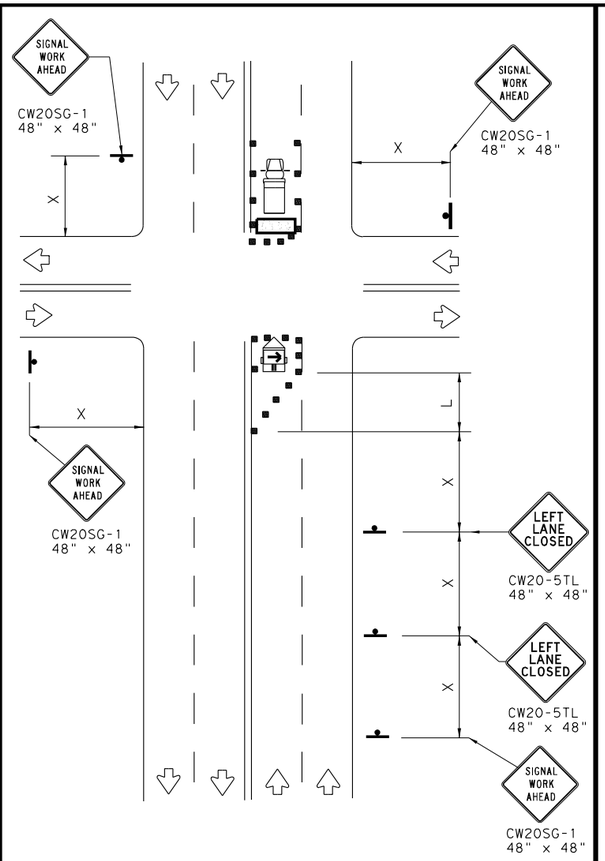
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



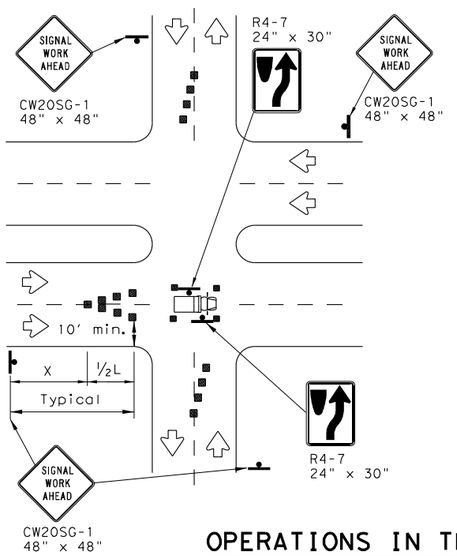
FAR SIDE RIGHT LANE CLOSURE

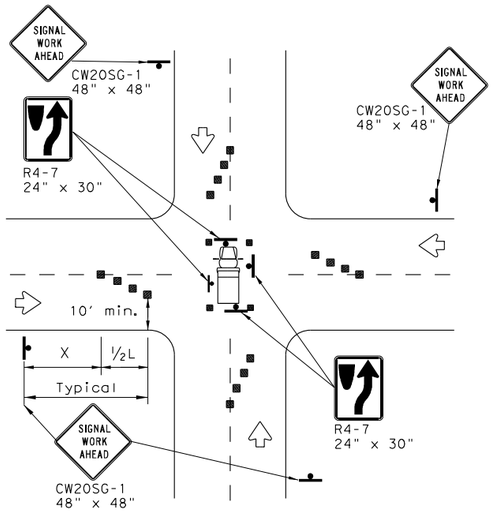
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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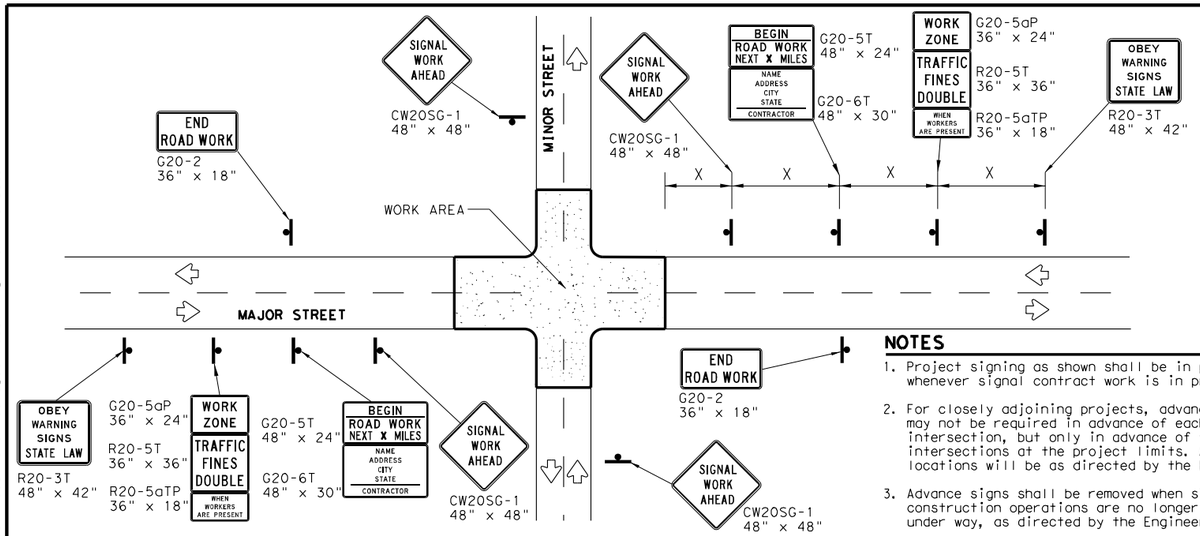


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

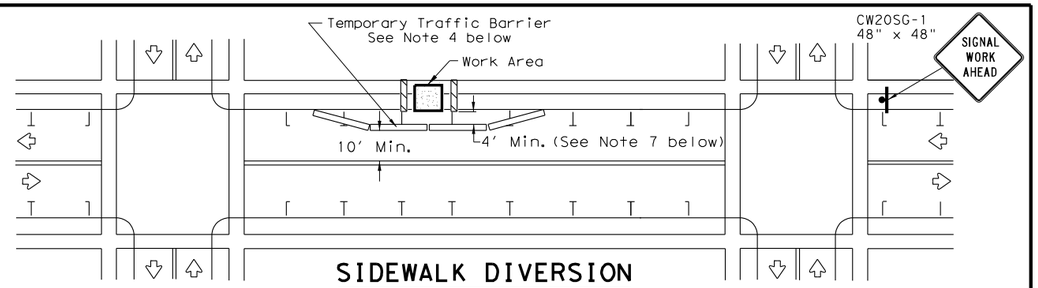
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fastners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

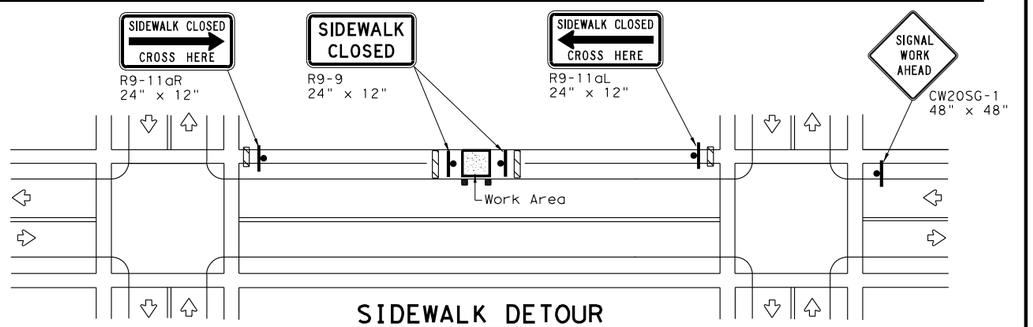
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

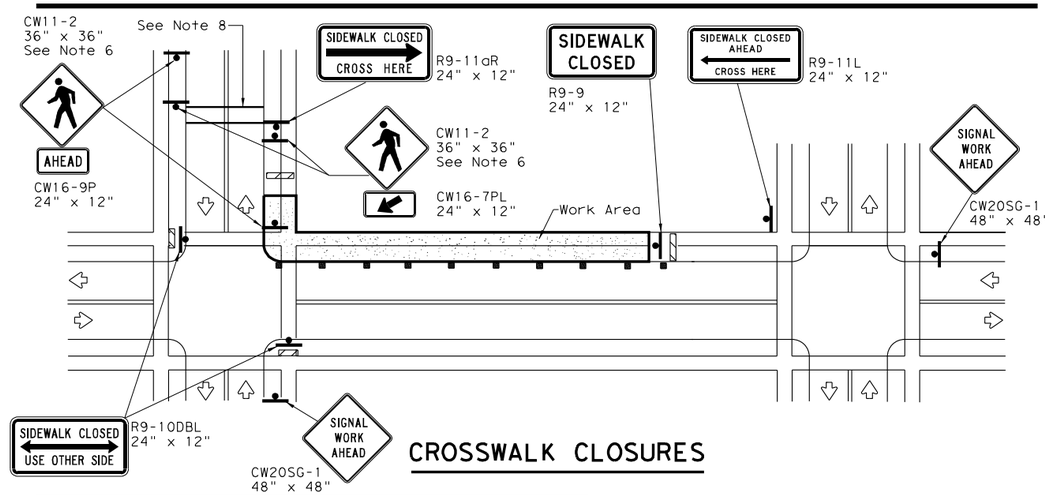
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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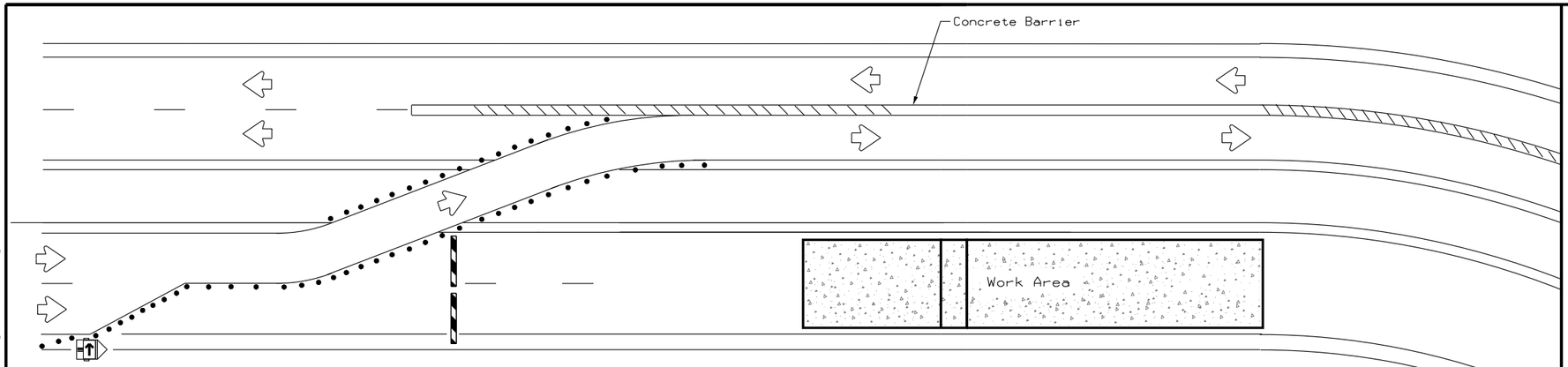


NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

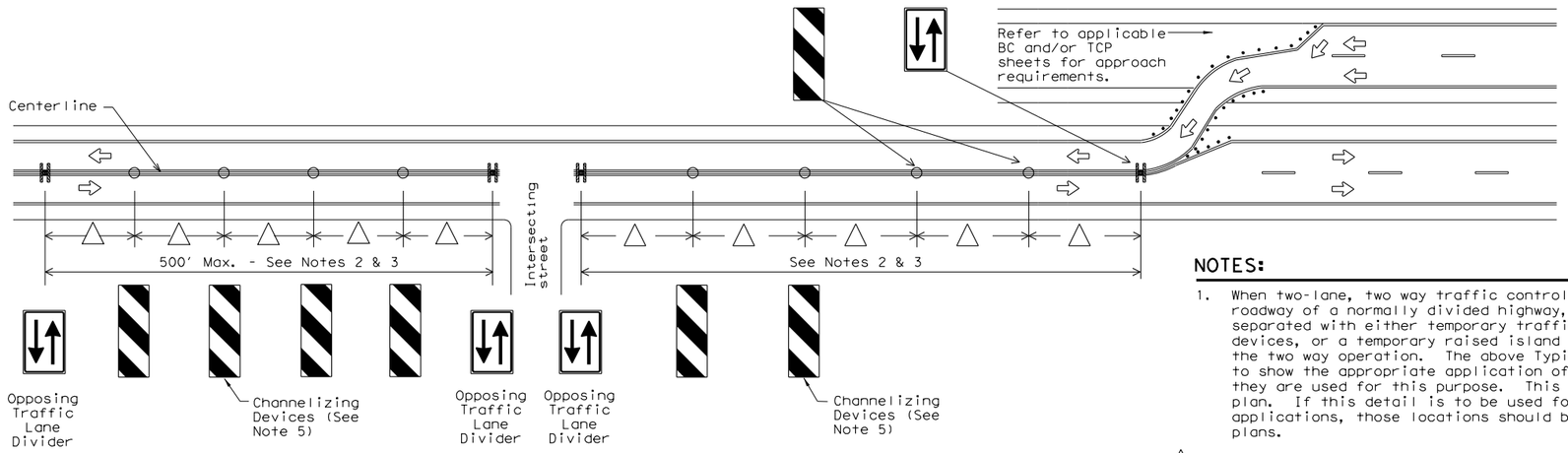
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD)describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. △ Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100′.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

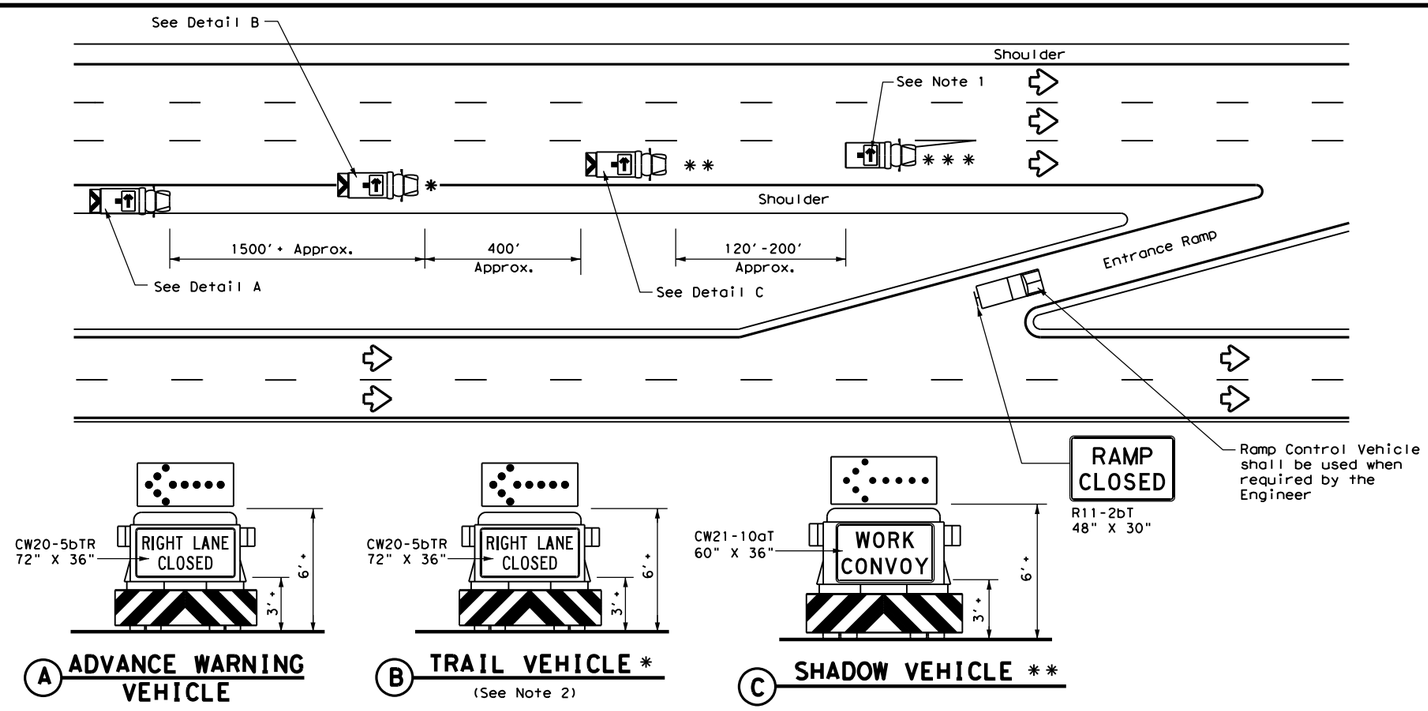
TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

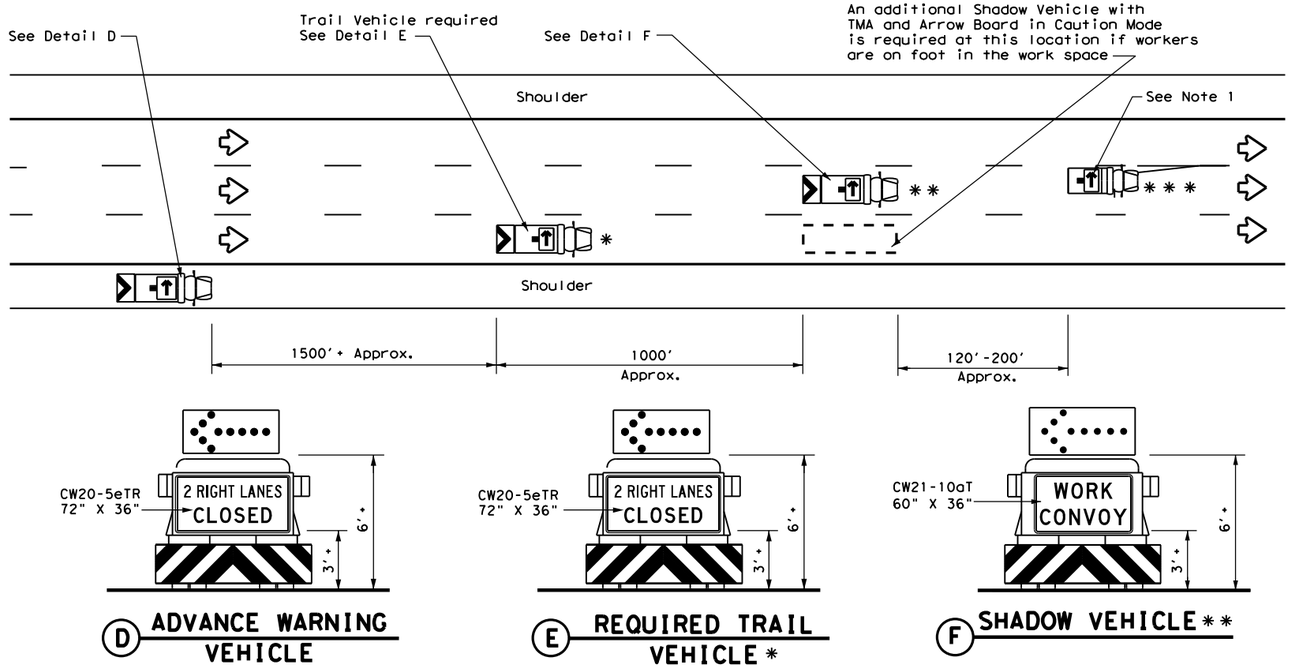
FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		74

110

DATE:
FILE:



RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



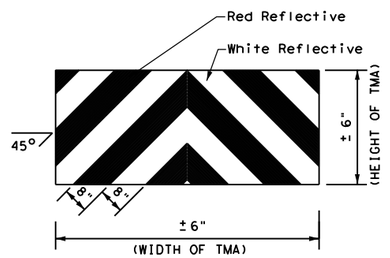
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

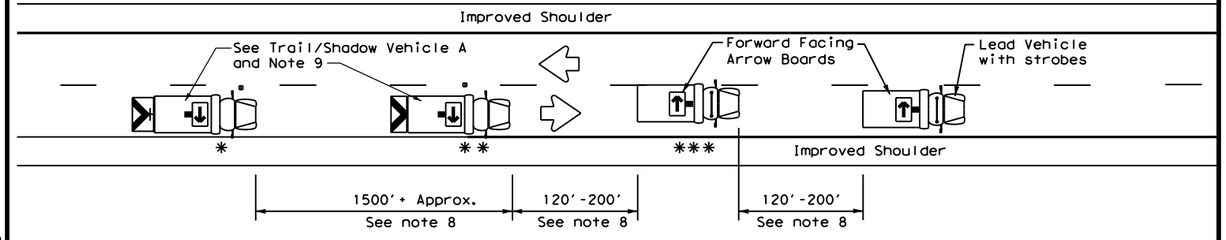
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

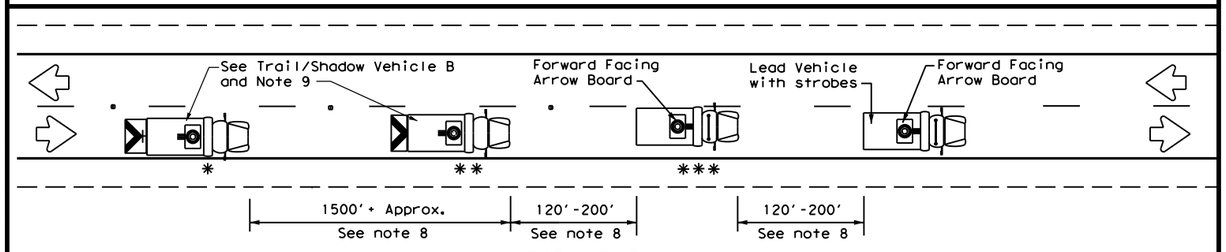
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		74A

176



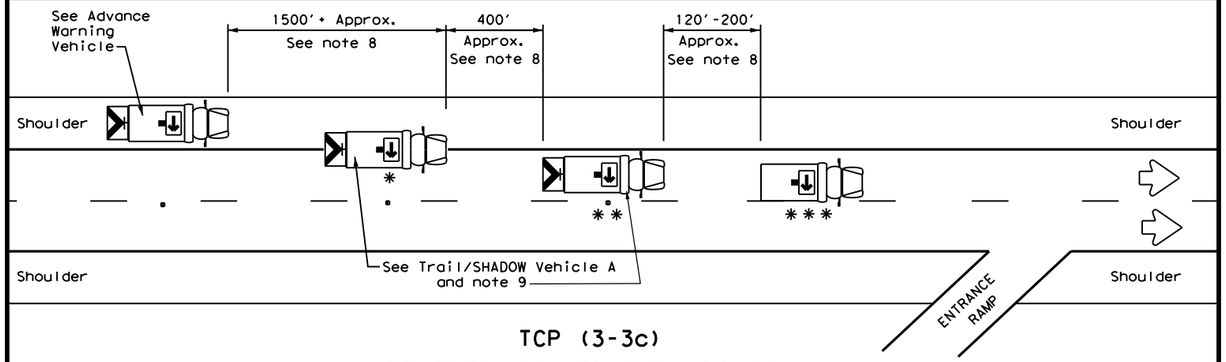
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



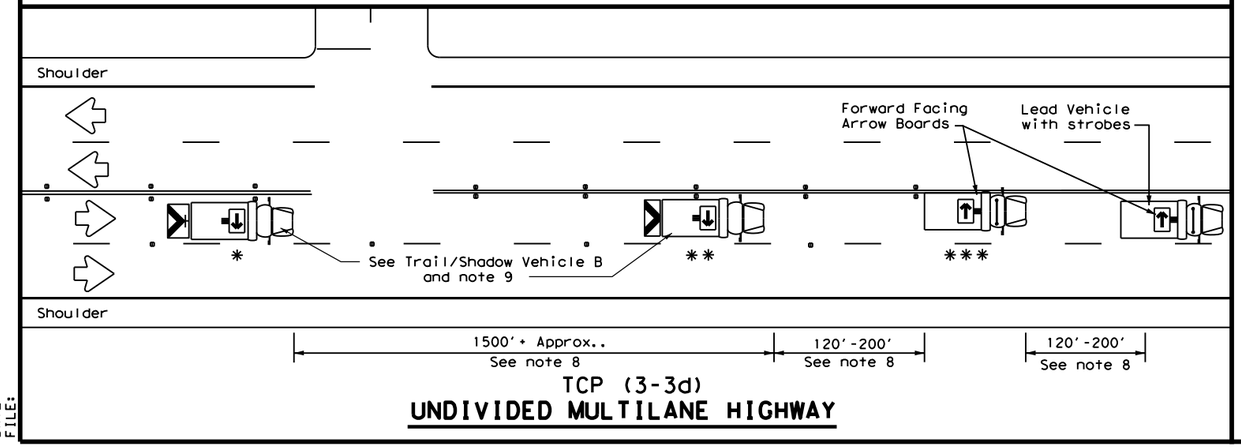
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



TCP (3-3c)

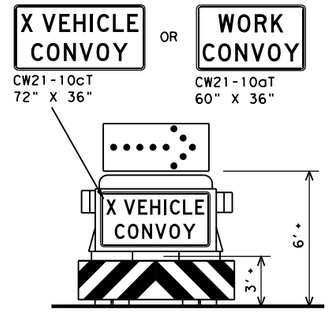
DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

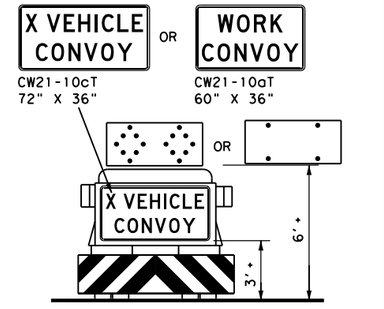
UNDIVIDED MULTILANE HIGHWAY

DATE:
FILE:



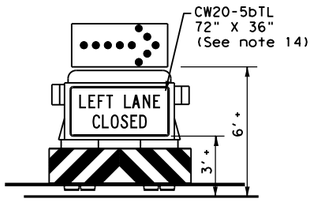
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

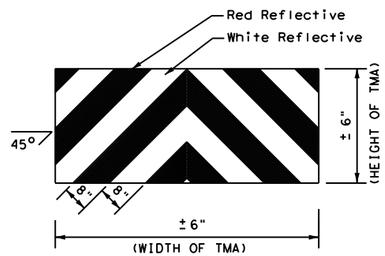


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

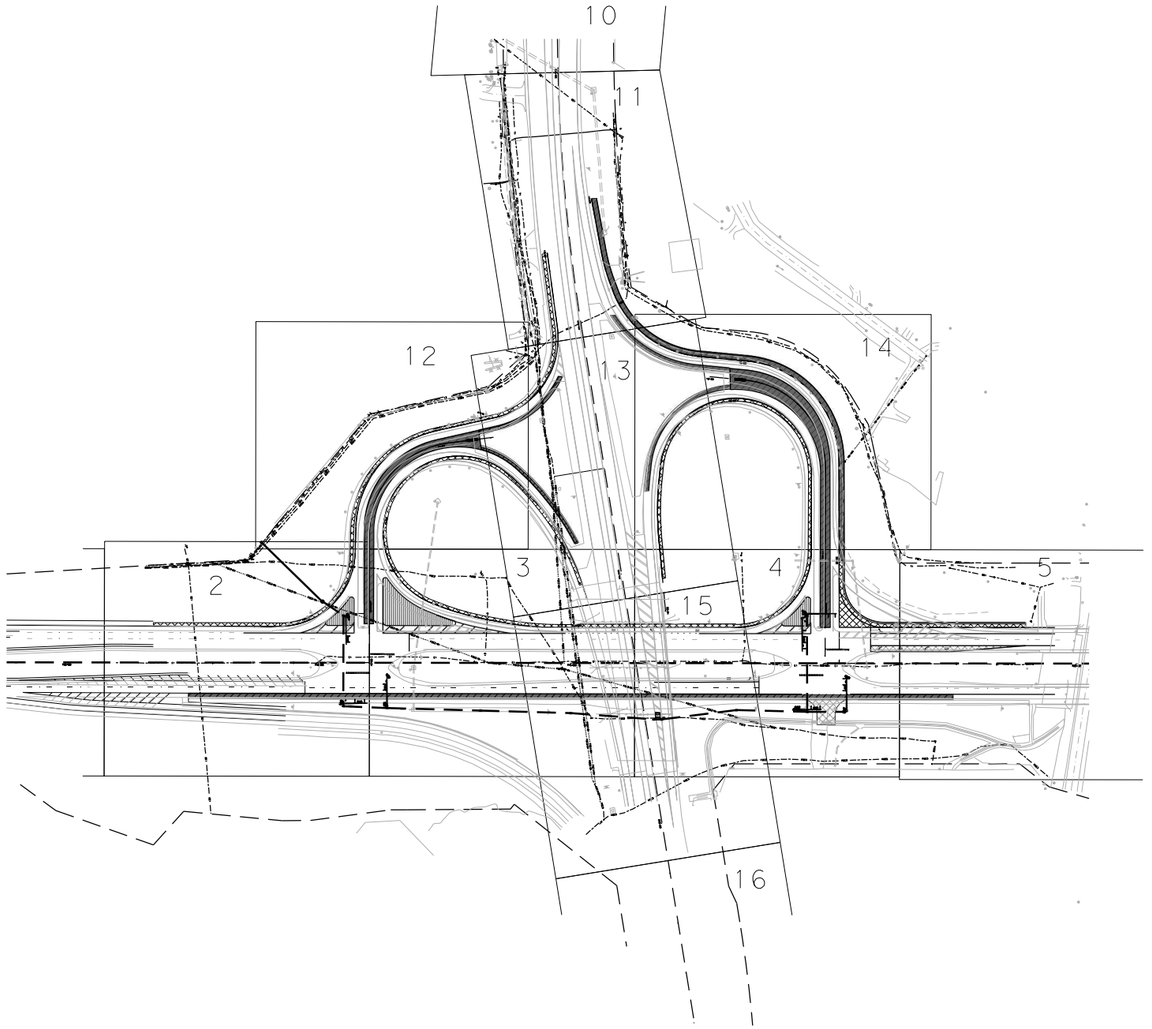
Texas Department of Transportation

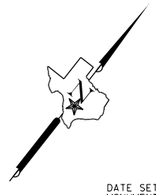
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	FTW	WISE		74B
1-97 7-14				





HORIZONTAL

150 0 150 300

SCALE IN FEET

DATE SET: 01/2017
MONUMENT: A 3 1/4" ALUMINUM OR BRONZE DISC SET ON CONCRETE WITH APPOXY MARKED "TEXAS DALLAS GPS 001307081 05".
HORIZONTAL COORDINATES ARE SURFACE COORDINATES.
US SURVEY FEET, TEXAS COORDINATE SYSTEM
NAD 83, (EPOCH 2010) NORTH CENTRAL ZONE 4202
GEOID 2012b AS DERIVED FROM THE TxDOT VRS NETWORK.
ELEVATIONS ARE NAVD 88 AS DERIVED FROM THE

TxDOT VRS NETWORK

WISE COUNTY SURFACE ADJUSTMENT FACTOR: 1.00012

CONTROL POINT No. 001307081 05
NORTHING: 7, 134, 962.782
EASTING: 2, 242, 774.232
NAVD 88 ELEVATIONS= 980.493

CONTROL POINT No. 001307081 06
NORTHING: 7, 134, 637.062
EASTING: 2, 244, 645.832
NAVD 88 ELEVATIONS= 1, 003.060

CONTROL POINT No. 001307081 07
NORTHING: 7, 140, 380.440
EASTING: 2, 240, 641.573
NAVD 88 ELEVATIONS= 921.342

CONTROL POINT No. 001307081 08
NORTHING: 7, 134, 932.548
EASTING: 2, 240, 041.474
NAVD 88 ELEVATIONS= 941.141

CONTROL POINT No. 001308136 01
NORTHING: 7, 119, 010.896
EASTING: 2, 256, 779.418
NAVD 88 ELEVATIONS= 979.671

CONTROL POINT No. 001308136 02
NORTHING: 7, 125, 011.484
EASTING: 2, 254, 038.371
NAVD 88 ELEVATIONS= 1, 029.508

CONTROL POINT No. 001308136 03
NORTHING: 7, 127, 961.745
EASTING: 2, 249, 542.99
NAVD 88 ELEVATIONS= 1, 004.230

CONTROL POINT No. 001308136 04
NORTHING: 7, 131, 116.734
EASTING: 2, 246, 732.558
NAVD 88 ELEVATIONS= 1, 019.790

INDEX OF SHEETS

UTILITY CONTACT INFORMATION

Utility Type	Owners	Contact	Phone	Email	Address
Communication	Fiberlight	Mike Bitsche	214 755 6741	Mike.Bitsche@fiberlight.com	1415 Halsey Way Suite 304, Carrollton, TX 75007
Communication	Lumen	Gerald Binkley	940 368 2964	Gerald.Binkley@centurylink.com	206 N Lane, Decatur, TX 76234
Communication	Windstream	Lisa Zingula	1 800 289 1901	Lisa.Zingula@windstream.com	1450 N Center Point Rd, Hiawatha, IA 52233
Communication	Zayo Group	Thomas Capps	817 665 8401	Thomas.Capps@zayo.com	13641 Omega Rd, Farmers Branch, TX 75244
Electric	Oncor Electric Distribution	Carlos Rodriguez	888 313 6862	Carlos.Rodriguez2@oncor.com	115 W. 7th St., Fort Worth, TX 76102
Gas	Atmos Energy	Randy Scott	816 215 4249	Randy.Scott@atmosenergy.com	142 Farm to Market Rd 730 N, Boyd, TX 76023
Water	City of Decatur	Greg Hall	940 393 0262	Ghall@decaturtx.org	1601 S State St, Decatur, TX 76234
Waste Water	City of Decatur	Greg Hall	940 393 0262	Ghall@decaturtx.org	1601 S State St, Decatur, TX 76234

PRELIMINARY

FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.
RESPONSIBLE ENGINEER:
BGE, Inc.
TBPE F-1046
GUY R BRADLEY
TEXAS LICENSE NO. 90094
8/11/2021

DATE	BY	REV	REVISION

BGE, Inc.
2595 Dallas Parkway, Suite 101, Frisco, TX 75034
Tel: 972-464-4800 • www.bgeinc.com
TBPE Registration No. F-1046

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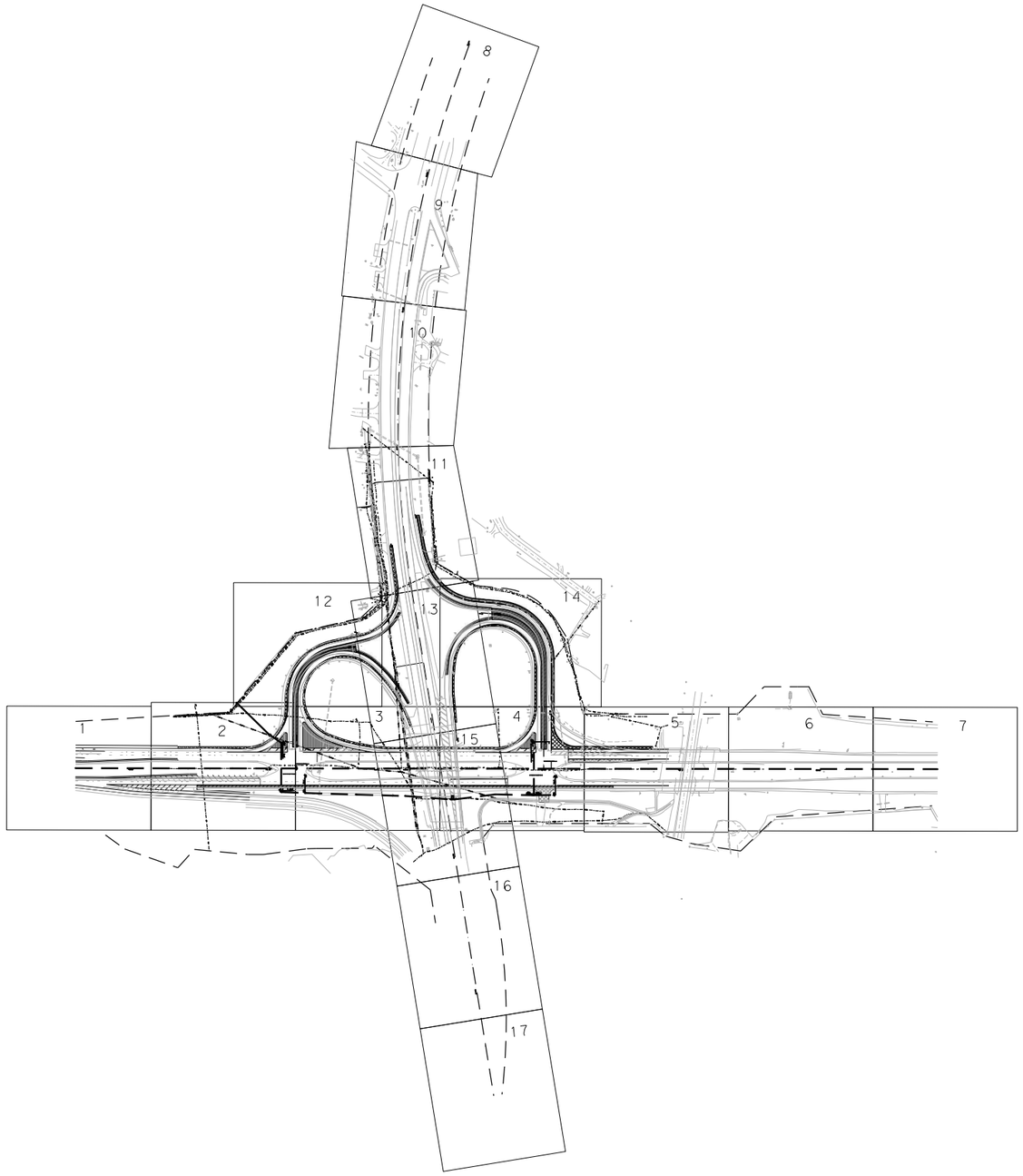
US380/US287

EXISTING UTILITY LAYOUT

SHEET 1 OF 2

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	75



HORIZONTAL
250 0 250 500
SCALE IN FEET

PRELIMINARY

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RESPONSIBLE ENGINEER:
BGE, Inc.
TBPE F-1046
GUY R BRADLEY
TEXAS LICENSE NO. 90094
8/11/2021

DATE	BY	REV	REVISION

BGE, Inc.
2595 Dallas Parkway, Suite 101, Frisco, TX 75034
Tel: 972-464-4800 • www.bgeinc.com
TBPE Registration No. F-1046

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US380/US287

EXISTING UTILITY LAYOUT

SHEET 2 OF 2

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	76

LEGEND

UNDERGROUND ELECTRIC	E1	ONCOR
UNDERGROUND ELECTRIC	E1(D)	ONCOR
OVERHEAD ELECTRIC	OE1	ONCOR
UNDERGROUND FIBER OPTIC	FOC1	LUMEN
UNDERGROUND FIBER OPTIC	FOC2	FIBERLIGHT
UNDERGROUND FIBER OPTIC	FOC2(D)	FIBERLIGHT
UNDERGROUND FIBER OPTIC	FOC3	WINDSTREAM
UNDERGROUND FIBER OPTIC	FOC3(D)	WINDSTREAM
UNDERGROUND FIBER OPTIC	FOC4	ZAYO
UNDERGROUND FIBER OPTIC	FOC4(D)	ZAYO
UNDERGROUND TELEPHONE	T1	LUMEN
GAS	G1	ATMOS
WATER	W1(D)	CITY OF DECATUR
WASTE WATER	WW1(D)	CITY OF DECATUR

- WATER METER
- WATER VALVE
- WASTE WATER MANHOLE
- WASTE WATER CLEAN OUT
- GAS METER
- GUY ANCHOR
- LIGHT POLE SMALL
- HIGH MAST LIGHTING TOWER
- MARKER POST
- TELEPHONE PEDESTAL
- TELEPHONE JUNCTION BOX
- TELEPHONE POLE
- TRAFFIC CONTROL BOX
- SIGN AND POST SIGNAL
- POWER POLE
- ELECTRIC JUNCTION BOX

QUALITY LEVEL "D": INFORMATION DERIVED FROM EXISTING RECORDS AND/OR ORAL RECOLLECTIONS.

QUALITY LEVEL "C": INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGMENT IN CORRELATING THIS INFORMATION TO QUALITY LEVEL D INFORMATION.

QUALITY LEVEL "B": INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES (AKA DESIGNATING).

QUALITY LEVEL "A": PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES, USUALLY AT A SPECIFIC POINT (AKA LOCATING).

QUALITY LEVEL LEGEND

G1	QUALITY LEVEL "B"
FOC2(D)	QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

PRELIMINARY

FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.
RESPONSIBLE ENGINEER:
BGE, Inc.
TBPE F-1046
GUY R BRADLEY
TEXAS LICENSE NO. 90094
8/11/2021

DATE	BY	REV	REVISION

BGE, Inc.
2595 Dallas Parkway, Suite 101, Frisco, TX 75034
Tel: 972-464-4800 • www.bgeinc.com
TBPE Registration No. F-1046

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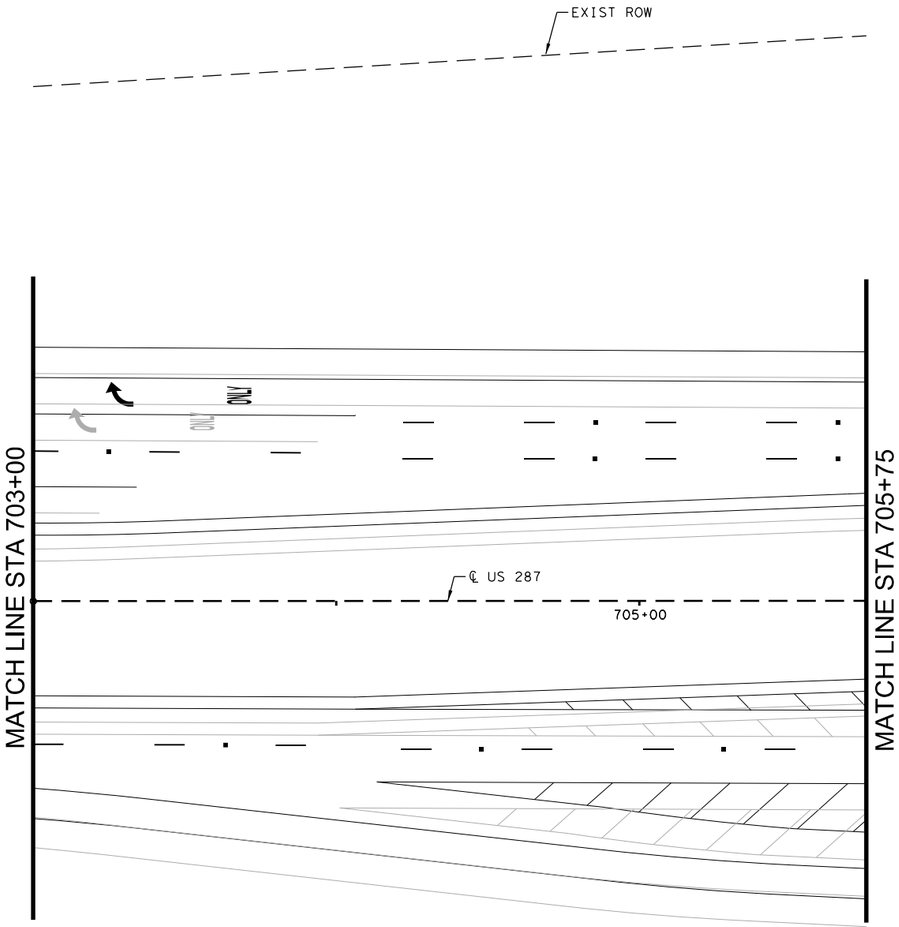
US380/US287

EXISTING UTILITY LEGEND

SCALE: N/A SHEET 1 OF 1

STATE		HIGHWAY NO.
TEXAS		US 380

STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	77



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.
RESPONSIBLE ENGINEER:
BGE, Inc.
TBPE F-1046
GUY R BRADLEY
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8/11/2021

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TBPE Registration No. F-1046

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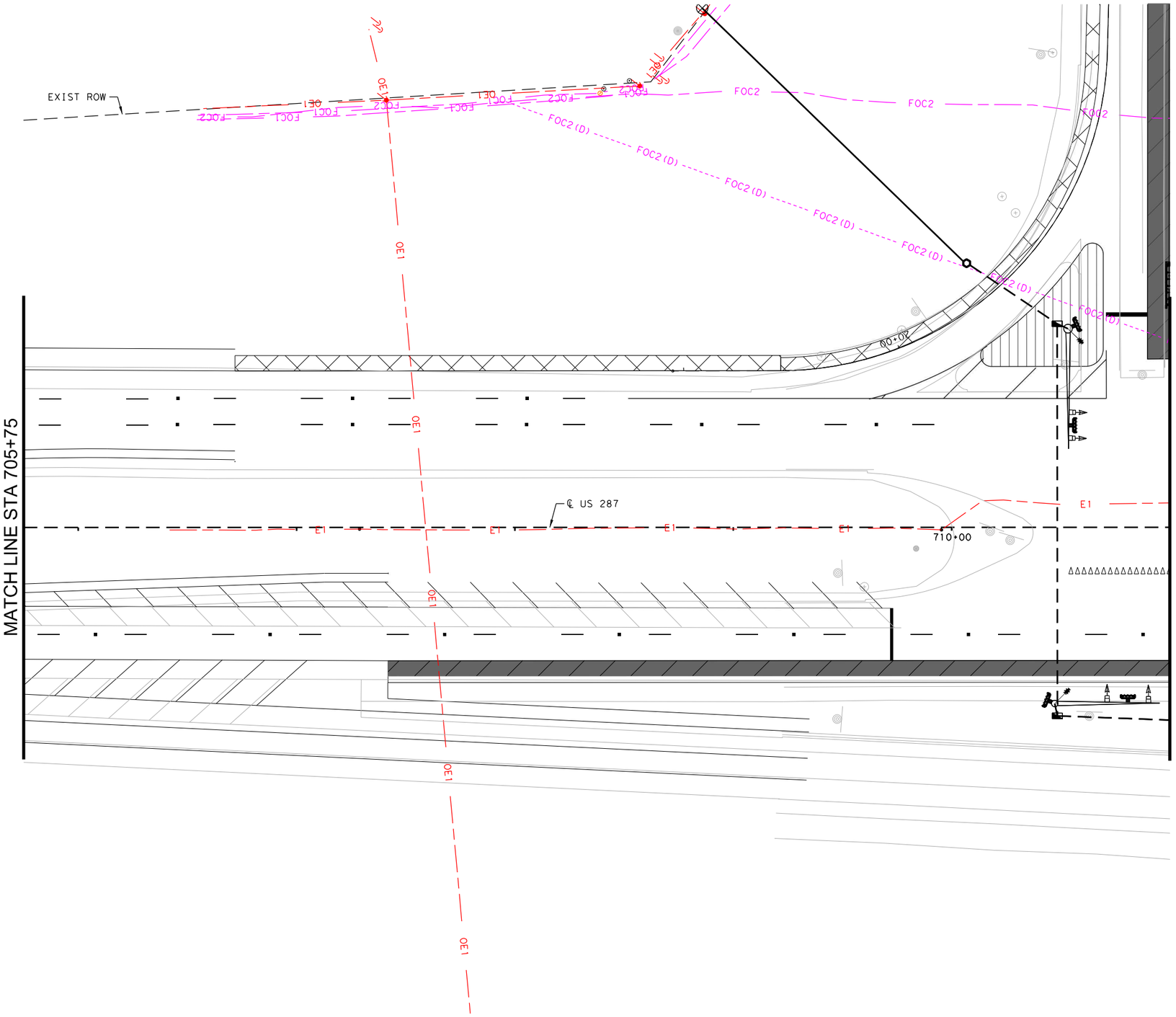
US380/US287

UTILITY LAYOUT
US 380
STA 703+00 TO STA 705+75

SCALE: 1" = 50' SHEET 1 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	78



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 2,180
LEVEL "C" 0
LEVEL "D" 373
TOTAL = 2,554

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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RESPONSIBLE ENGINEER:
BGE, Inc.
TBPE F-1046
GUY R BRADLEY
TEXAS LICENSE NO. 90094
8/11/2021

DATE	BY	REV	REVISION

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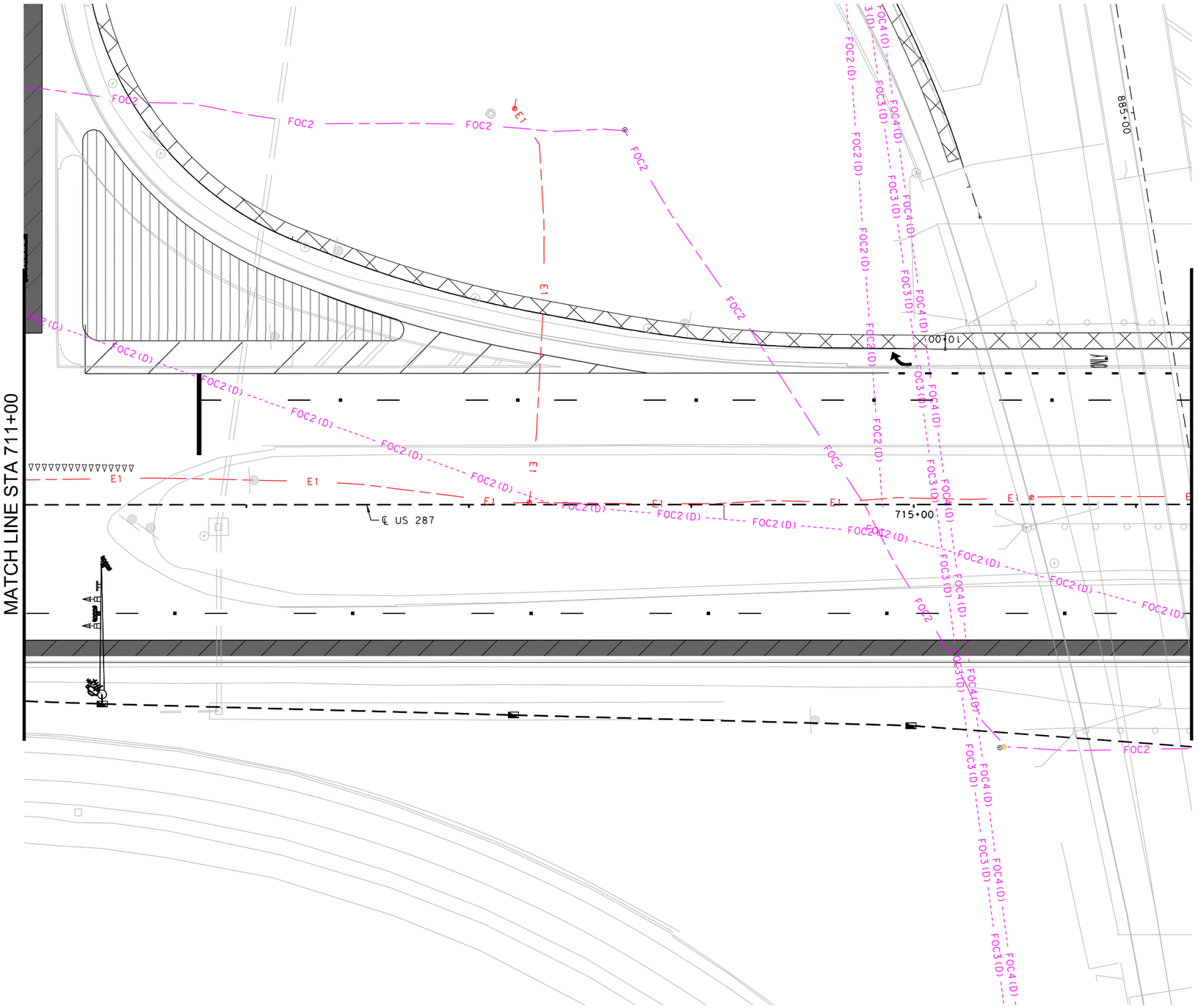
US380/US287

UTILITY LAYOUT
US 380
STA 705+75 TO STA 711+00

SCALE: 1" = 50' SHEET 2 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	79



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:

LEVEL "B"	1,389
LEVEL "C"	0
LEVEL "D"	1,692
TOTAL =	3,081

QUALITY LEVEL LEGEND

G1 — QUALITY LEVEL "B"

FOC2 (D) — QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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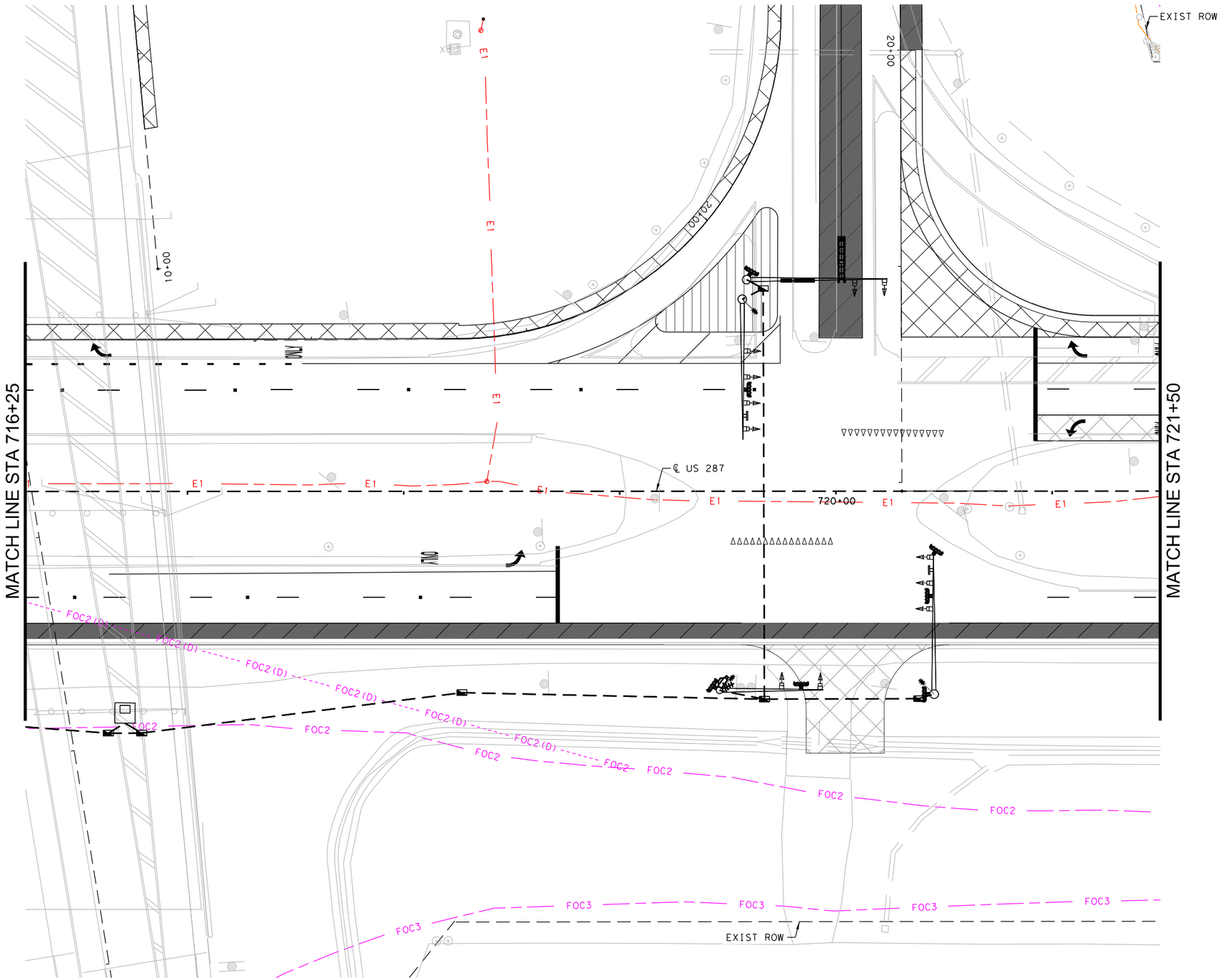
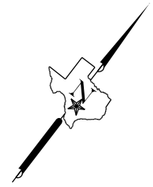
US380/US287

UTILITY LAYOUT
US 380
STA 711+00 TO STA 716+25

SCALE: 1" = 50' SHEET 3 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	80





NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:

LEVEL "B"	1,709
LEVEL "C"	0
LEVEL "D"	289
TOTAL =	1998

QUALITY LEVEL LEGEND

G1 — QUALITY LEVEL "B"

FOC2(D) — QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL

50 0 50 100

SCALE IN FEET

PRELIMINARY

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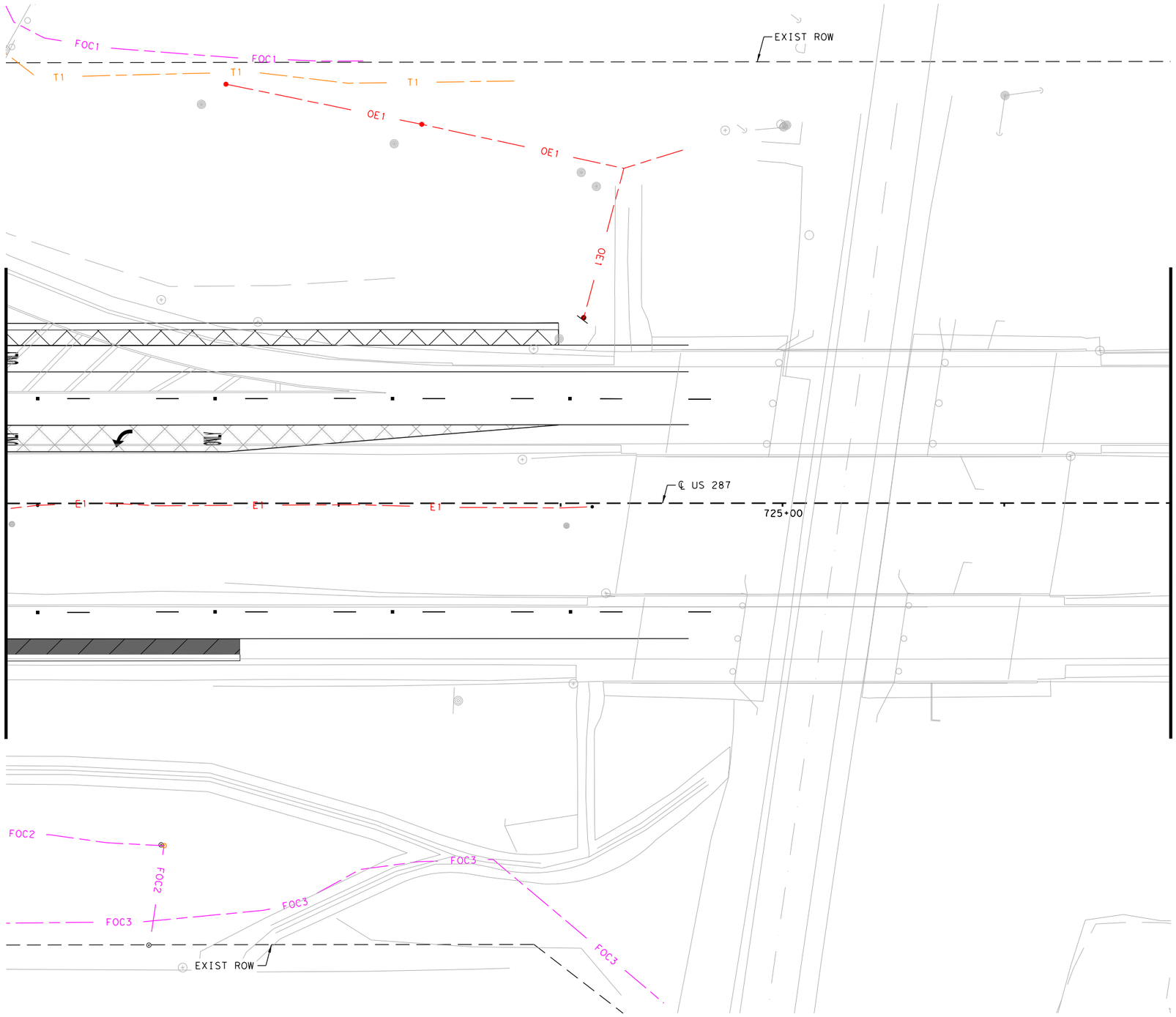
US380/US287

UTILITY LAYOUT
US 380
STA 716+25 TO STA 721+50

SCALE: 1" = 50' SHEET 4 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	81



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 1,157
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 1,157

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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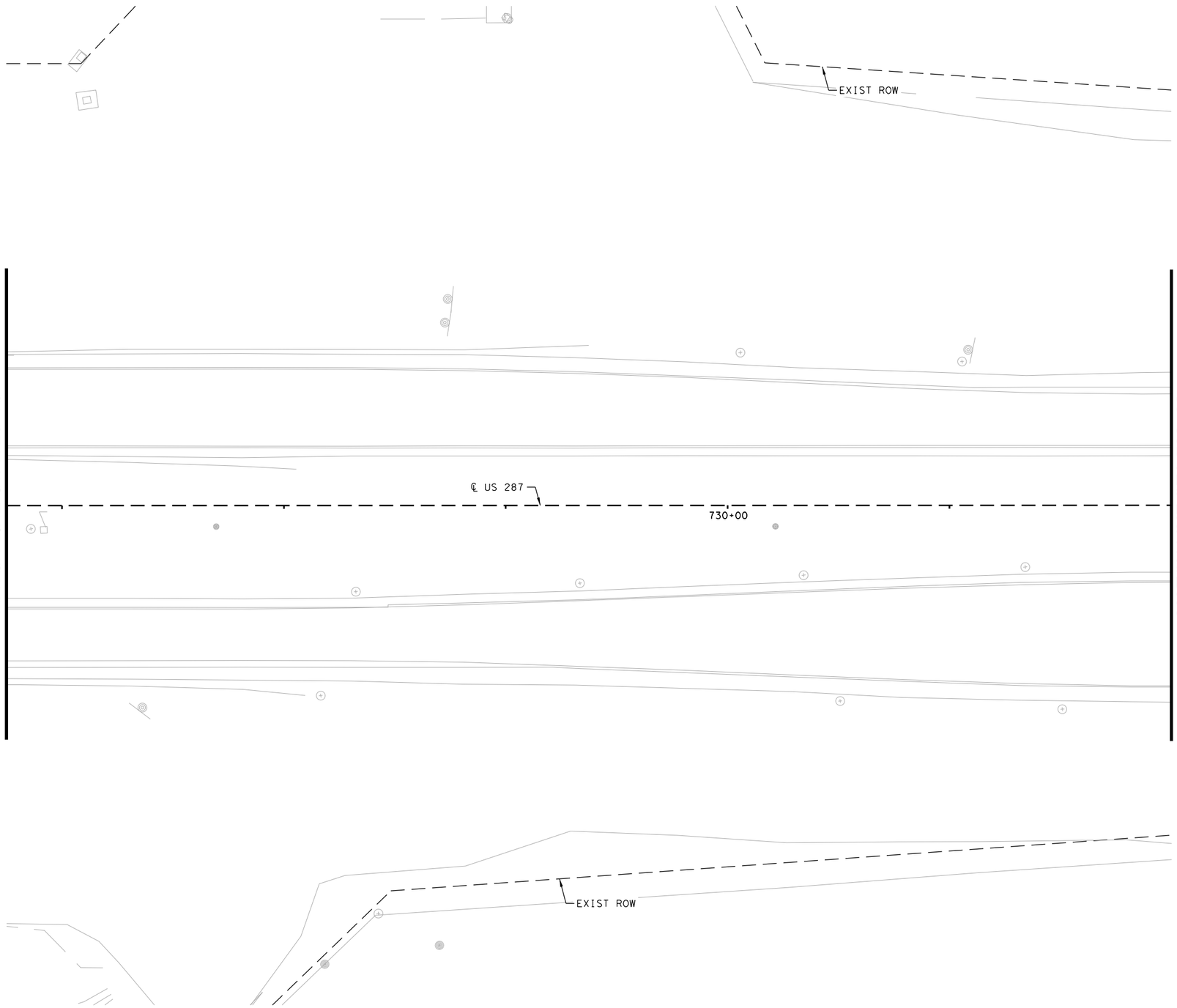
US380/US287

UTILITY LAYOUT
US 287
STA 721+50 TO STA 726+75

SCALE: 1" = 50' SHEET 5 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	82



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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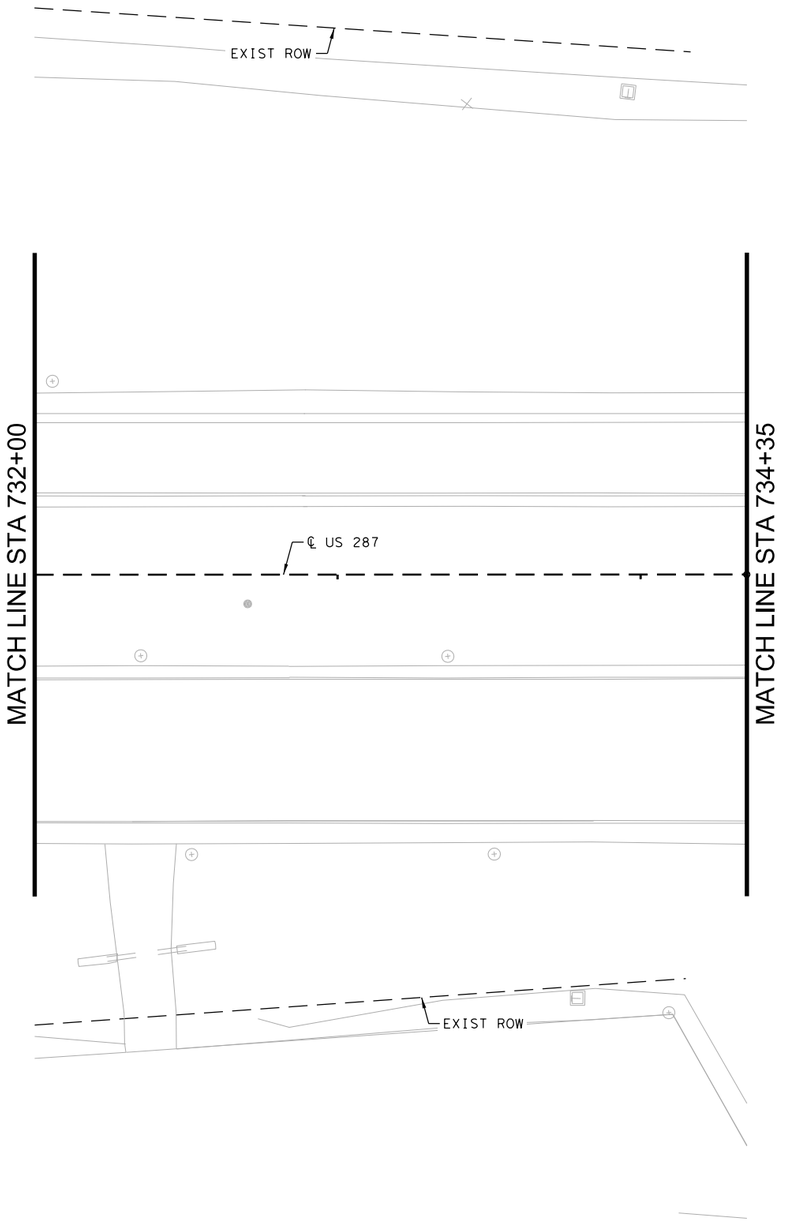
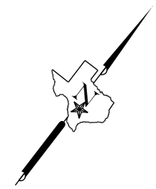
US380/US287

UTILITY LAYOUT
US 380
STA 726+75 TO STA 732+00

SCALE: 1" = 50' SHEET 6 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	83





NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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US380/US287

UTILITY LAYOUT
US 380
STA 732+00 TO STA 734+35

SCALE: 1" = 50' SHEET 7 OF 17

STATE		HIGHWAY NO.
TEXAS		US 380

STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	84

NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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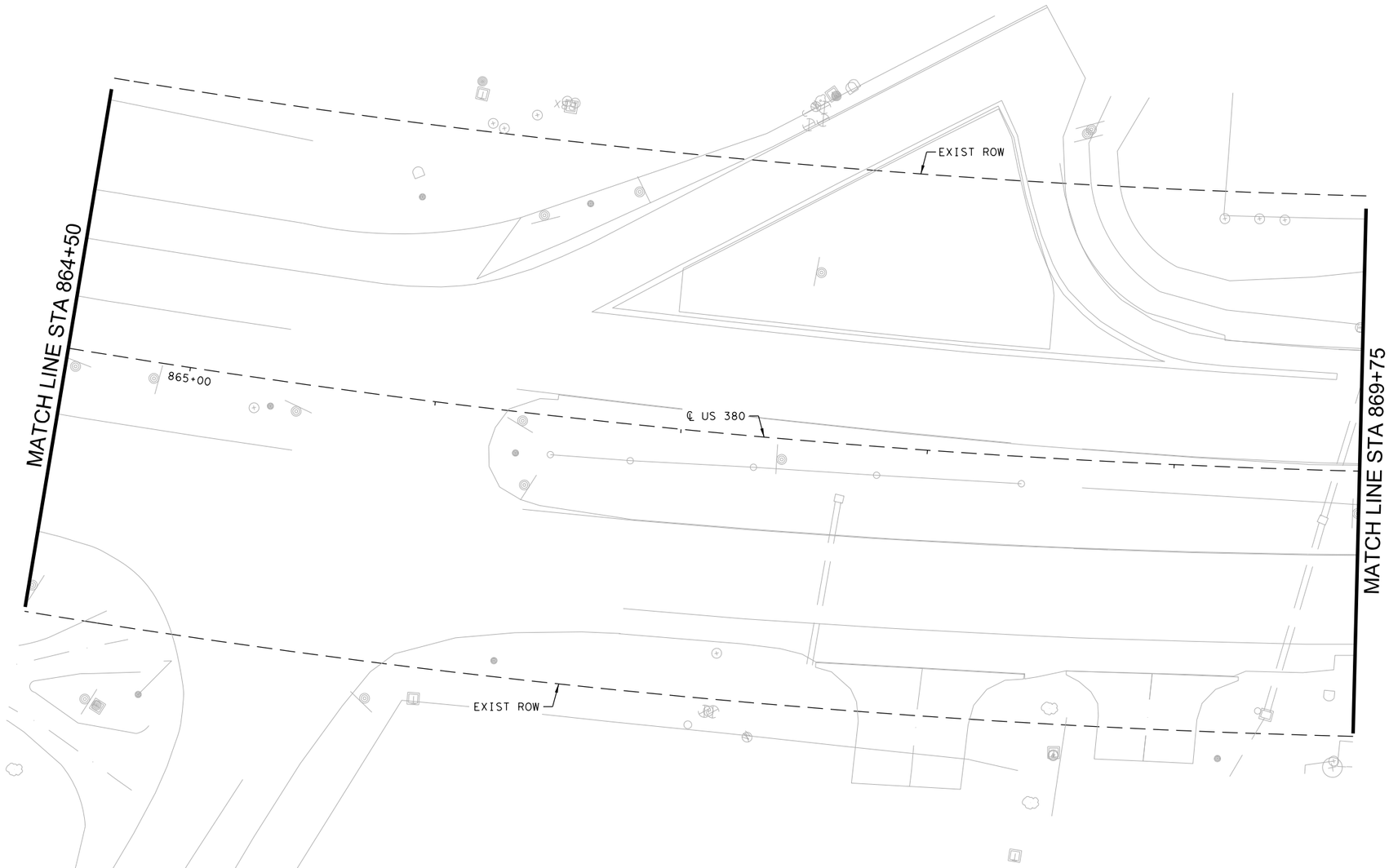
US380/US287

UTILITY LAYOUT
US 287
STA 860+00 TO STA 864+50

SCALE: 1" = 50' SHEET 8 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	85



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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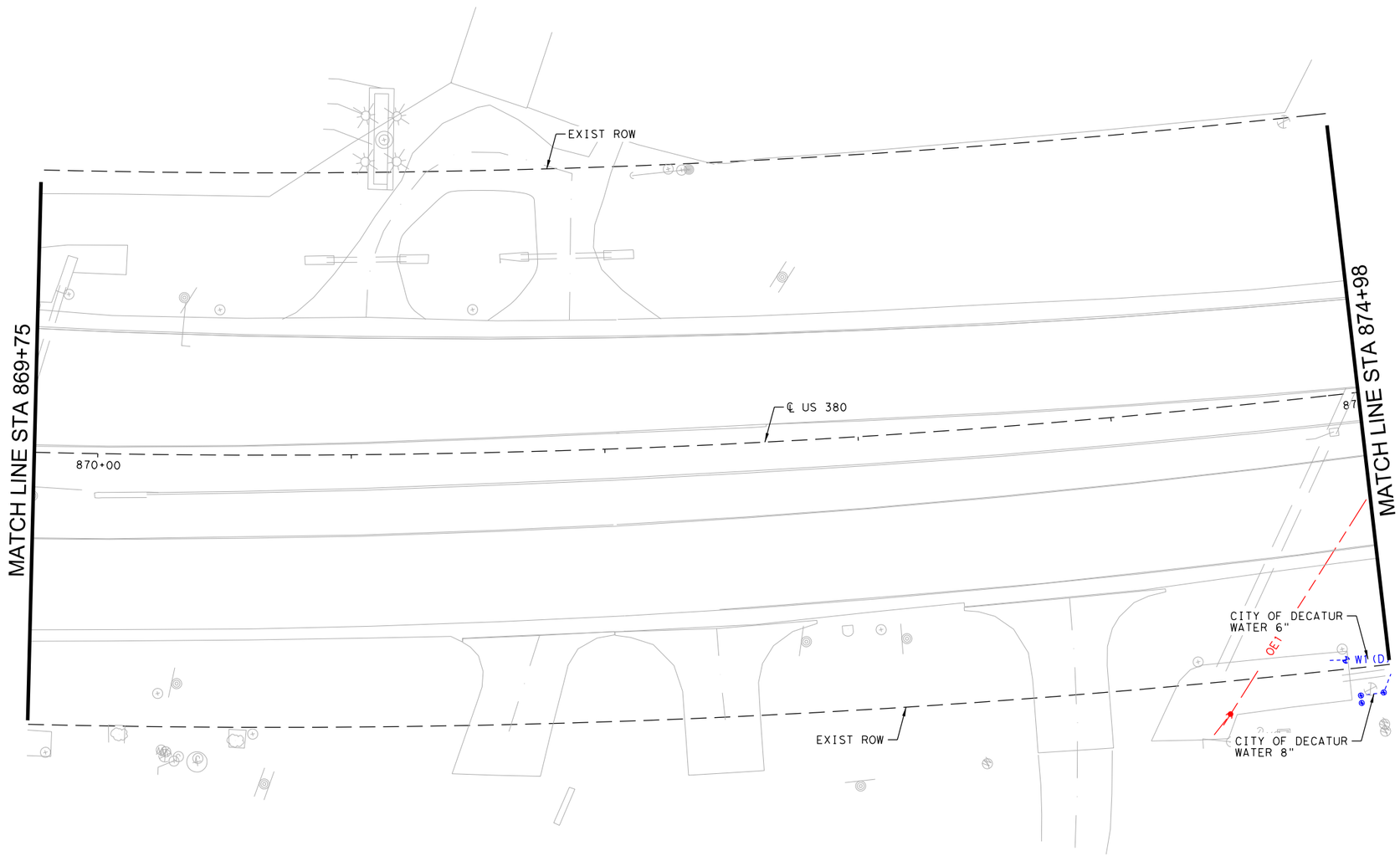
US380/US287

UTILITY LAYOUT
US 287
STA 864+50 TO STA 869+75

SCALE: 1" = 50' SHEET 9 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	86



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 113
LEVEL "C" 0
LEVEL "D" 41
TOTAL = 155

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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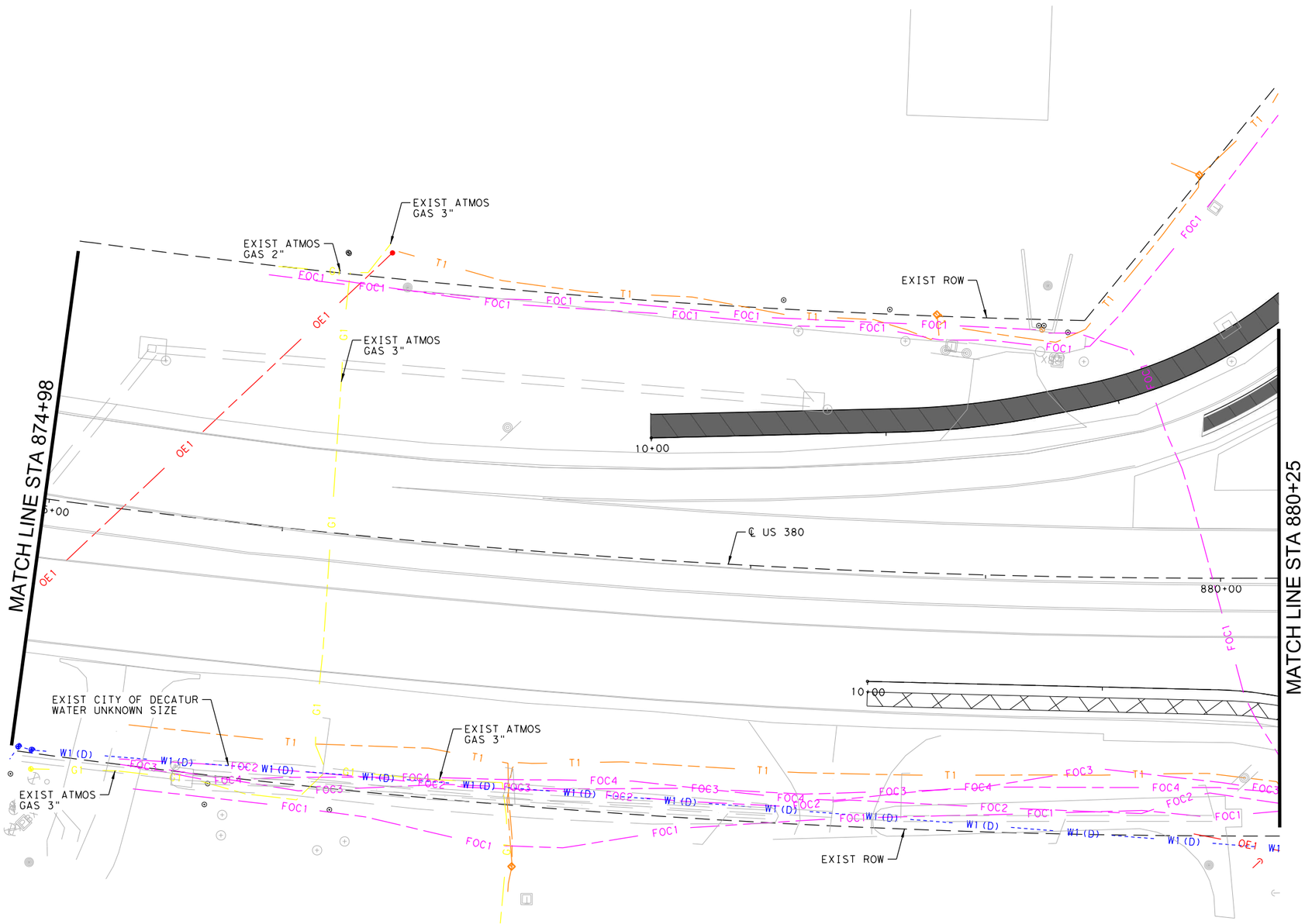
US380/US287

UTILITY LAYOUT
US 287
STA 869+75 TO STA 874+98

SCALE: 1" = 50' SHEET 10 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	87



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:

LEVEL "B"	5,085
LEVEL "C"	0
LEVEL "D"	542
TOTAL =	5,627

QUALITY LEVEL LEGEND

G1 — QUALITY LEVEL "B"

FOC2(D) — QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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RESPONSIBLE ENGINEER:
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8/11/2021

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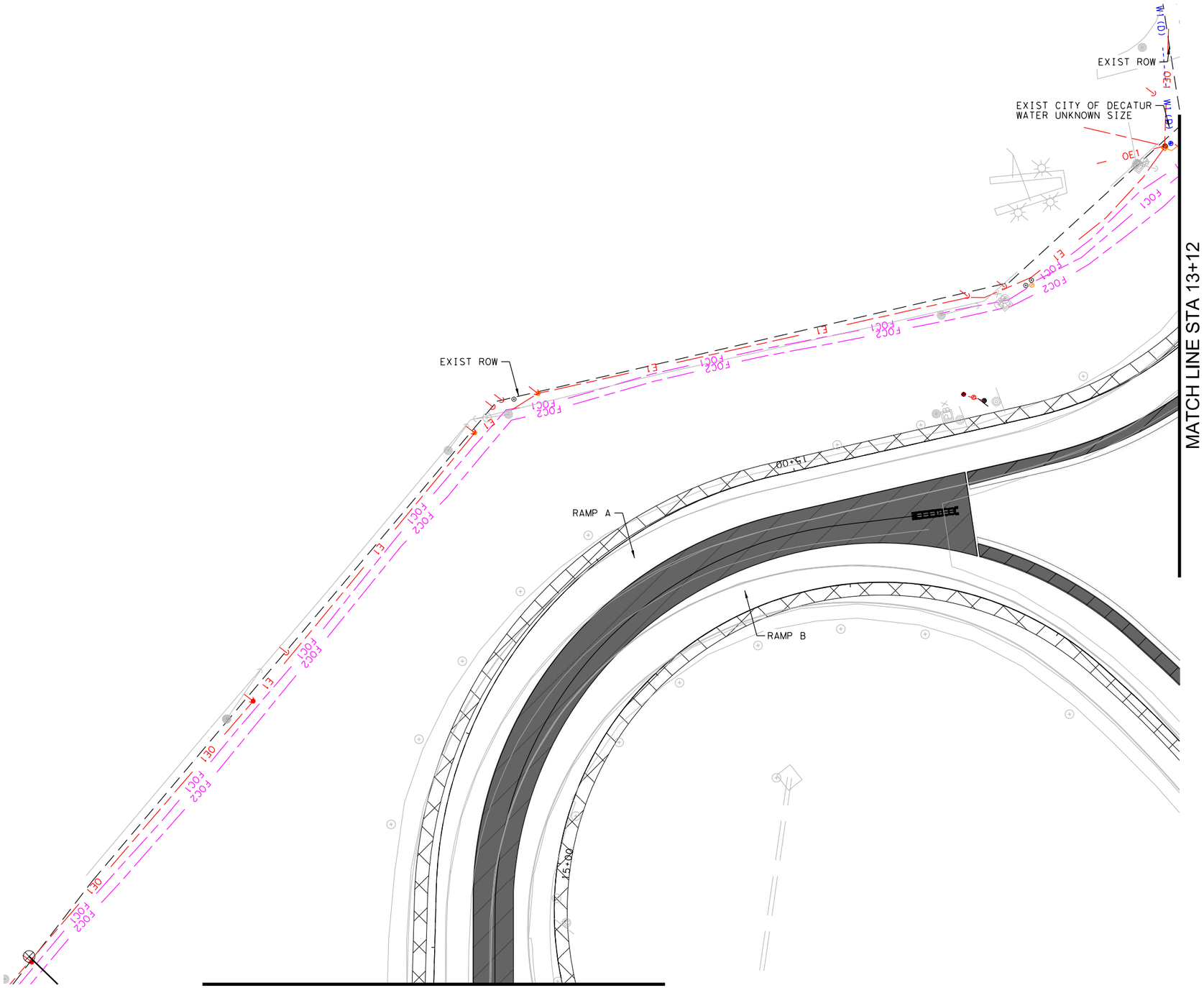
US380/US287

UTILITY LAYOUT
US 287
STA 874+98 TO STA 880+25

SCALE: 1" = 50' SHEET 11 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	88



NOTES

1. SEE SHEET XX FOR LEGEND

QUANTITIES:

LEVEL "B"	2,293
LEVEL "C"	0
LEVEL "D"	49
TOTAL =	2,342

QUALITY LEVEL LEGEND

G1 — QUALITY LEVEL "B"

FOC2(D) — QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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DATE	BY	REV	REVISION

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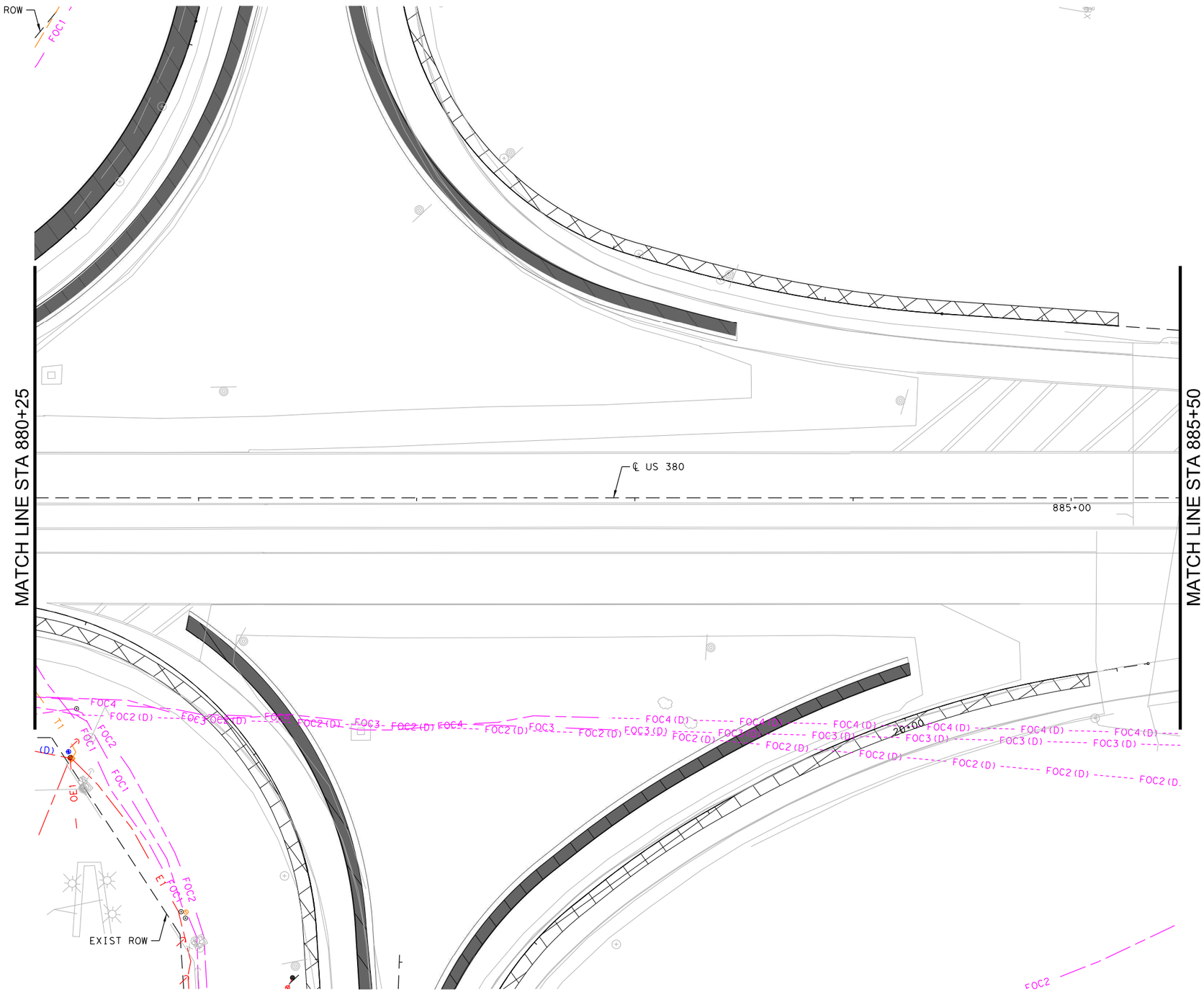
US380/US287

UTILITY LAYOUT
LOOP A/B
STA 13+12 TO STA 18+16

SCALE: 1" = 50' SHEET 12 OF 17

STATE		HIGHWAY NO.
TEXAS		US 380

STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	89



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 1,285
LEVEL "C" 0
LEVEL "D" 648
TOTAL = 1,933

QUALITY LEVEL LEGEND

C1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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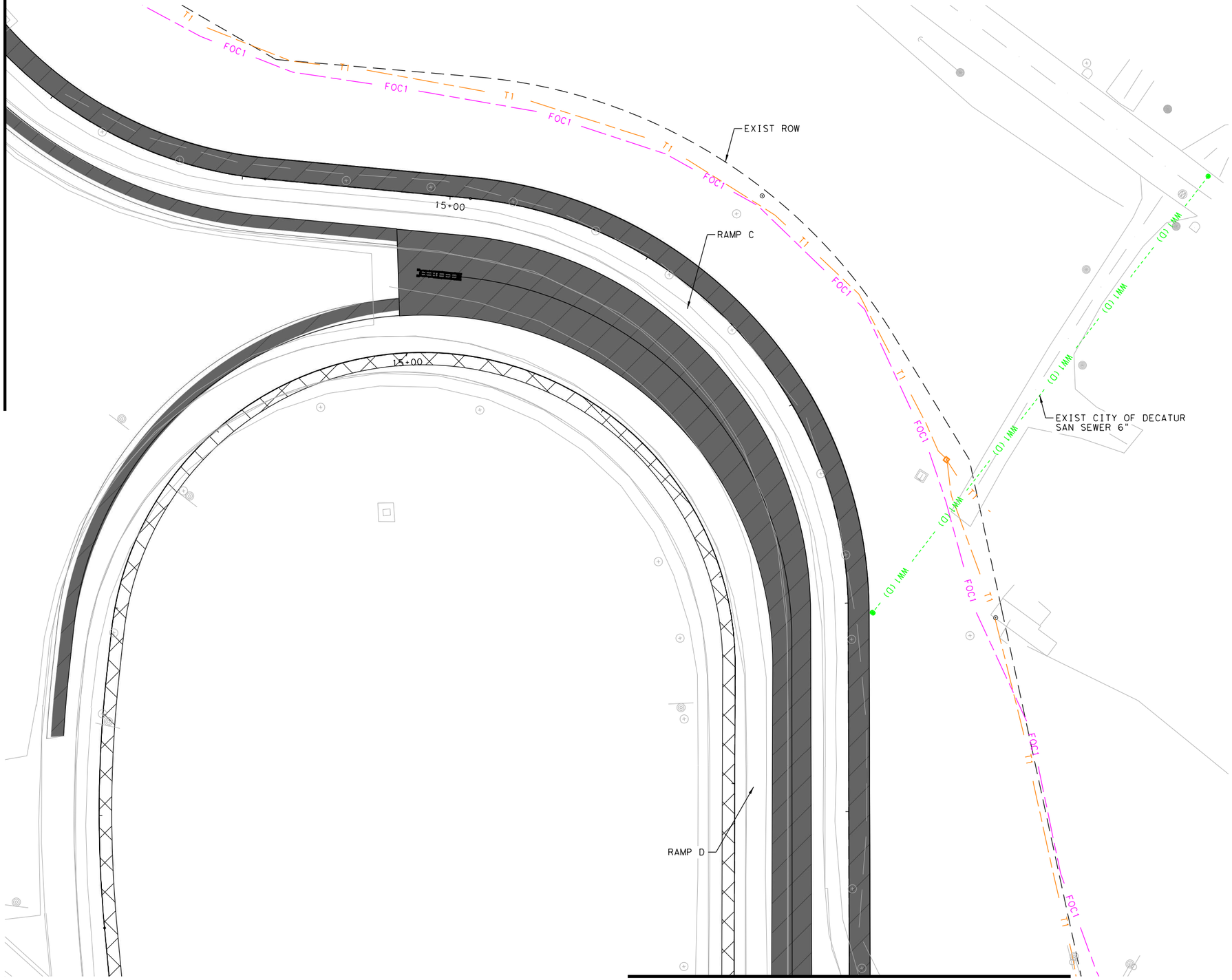
US380/US287

UTILITY LAYOUT
US 287
STA 880+25 TO STA 885+50

SCALE: 1" = 50' SHEET 13 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	90

MATCH LINE STA 13+69



MATCH LINE STA 19+70

NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:

LEVEL "B"	1,469
LEVEL "C"	0
LEVEL "D"	264
TOTAL =	1,733

QUALITY LEVEL LEGEND

G1 — QUALITY LEVEL "B"

FOC2(D) — QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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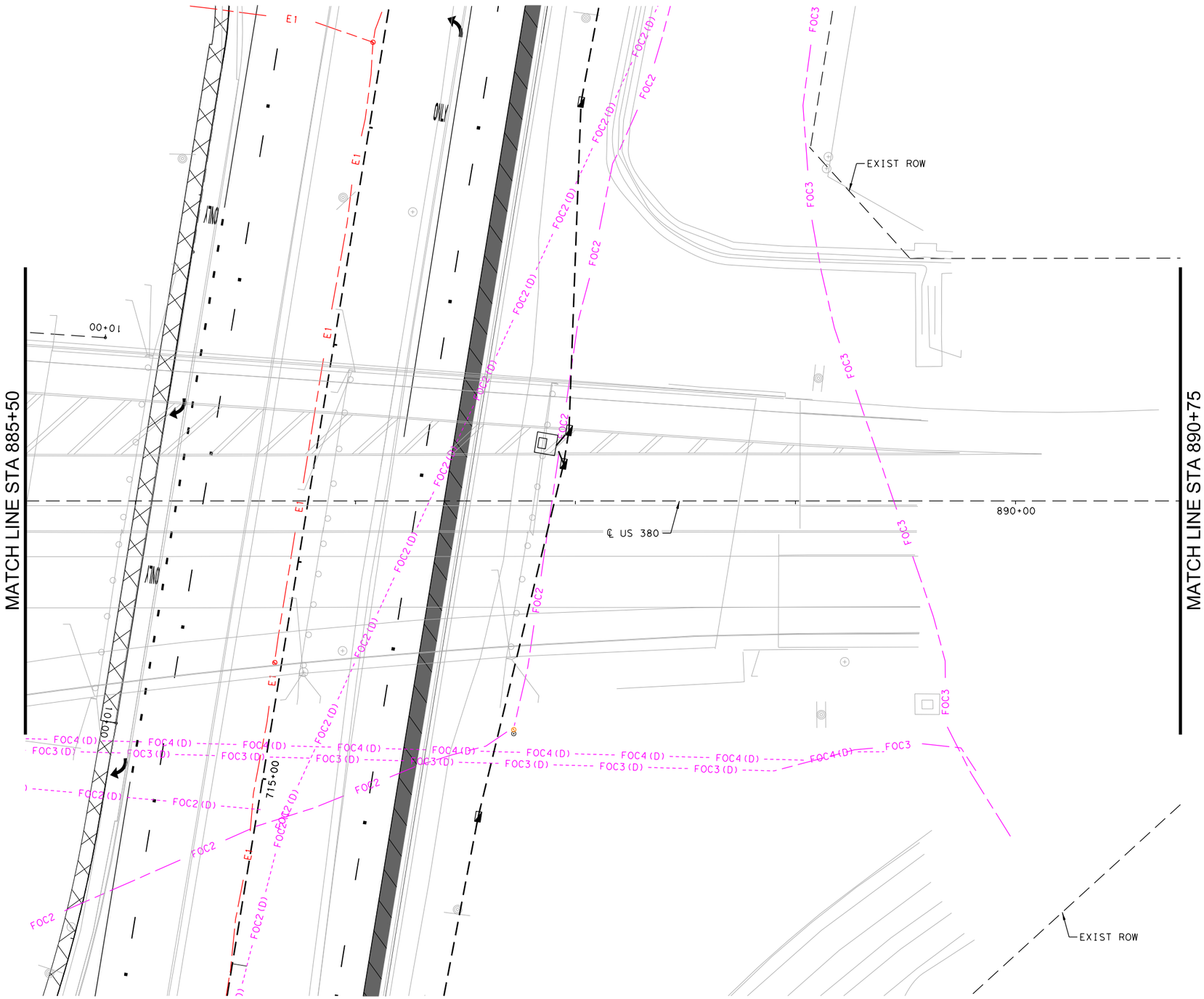
UTILITY LAYOUT
LOOP C/D
STA 13+69 TO STA 19+70

SCALE: 1" = 50' SHEET 14 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	91



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:

LEVEL "B"	1,610
LEVEL "C"	0
LEVEL "D"	1,283
TOTAL =	2,893

QUALITY LEVEL LEGEND

G1 — QUALITY LEVEL "B"

FOC2(D) — QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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RESPONSIBLE ENGINEER:
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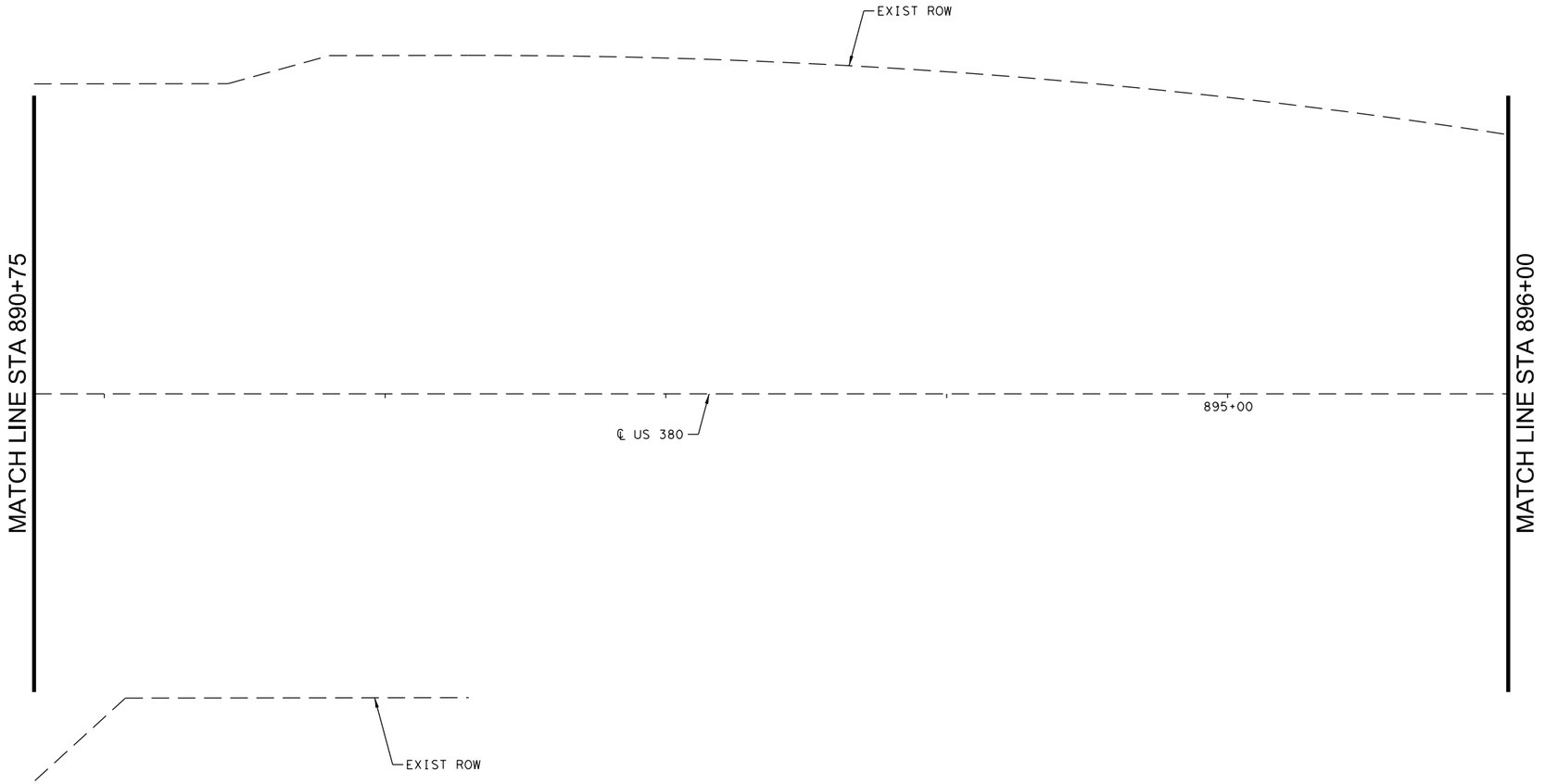
US380/US287

UTILITY LAYOUT
US 287
STA 885+50 TO STA 890+75

SCALE: 1" = 50' SHEET 15 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	92



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

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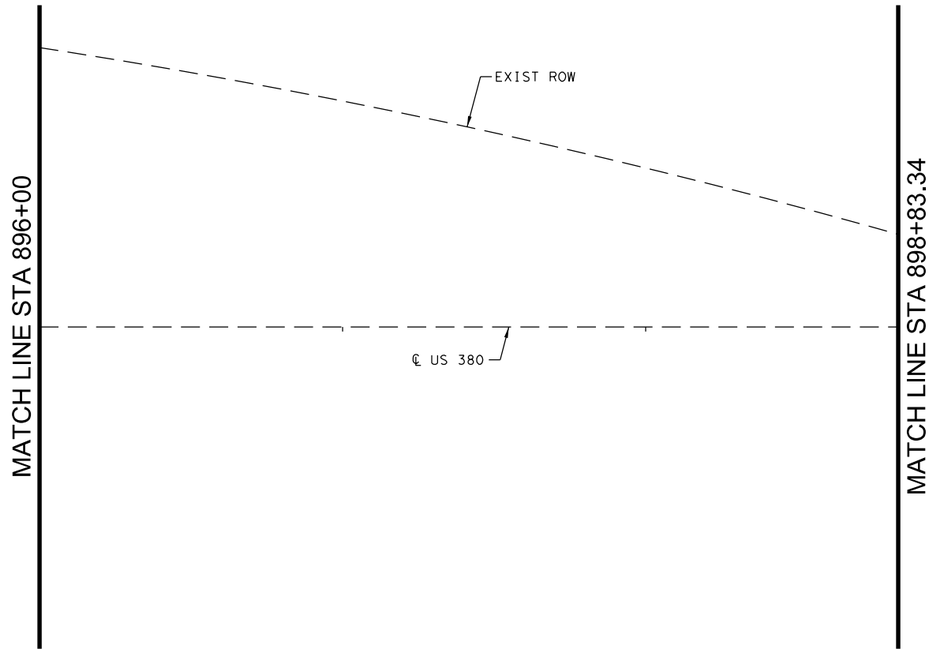
US380/US287

UTILITY LAYOUT
US 287
STA 890+75 TO STA 896+00

SCALE: 1" = 50' SHEET 16 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	93



NOTES

1. SEE SHEET 4 FOR LEGEND

QUANTITIES:
LEVEL "B" 0
LEVEL "C" 0
LEVEL "D" 0
TOTAL = 0

QUALITY LEVEL LEGEND

G1 QUALITY LEVEL "B"

FOC2(D) QUALITY LEVEL "D"

TYPICAL FOR ALL UTILITIES

HORIZONTAL
50 0 50 100
SCALE IN FEET

PRELIMINARY

FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.
RESPONSIBLE ENGINEER:
BGE, Inc.
TBPE F-1046
GUY R BRADLEY
TEXAS LICENSE NO. 90094
8/11/2021

DATE	BY	REV	REVISION

BGE, Inc.
2595 Dallas Parkway, Suite 101, Frisco, TX 75034
Tel: 972-464-4800 • www.bgeinc.com
TBPE Registration No. F-1046

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US380/US287

UTILITY LAYOUT
US 287
STA 896+00 TO STA 898+83

SCALE: 1" = 50' SHEET 17 OF 17

STATE					HIGHWAY NO.
TEXAS					US 380
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
PAR	WISE	0134	07	069	94

HORIZONTAL ALIGNMENT DATA - US 380

Beginning chain US380 description

Point 3801 X 2,243,247.04 Y 7,135,561.59 Sta 708+72.36

Course from 3801 to 3802 N 52° 27′ 13.95" E Dist 1,792.55

Point 3802 X 2,244,668.29 Y 7,136,653.97 Sta 726+64.91

Ending chain US380 description

HORIZONTAL ALIGNMENT DATA - RAMP A

Beginning chain RAMPA description

Point RAMPA1 X 2,243,211.72 Y 7,136,557.25 Sta 10+00.00

Course from RAMPA1 to PC RAMPA1 S 45° 19′ 12.81" E Dist 148.97

	Curve Data				
Curve RAMPA1					
P.I. Station	12+95.43	X	2,243,421.78	Y	7,136,349.52
Delta =	84° 56′ 14.84"	(RT)			
Degree =	35° 48′ 35.50"				
Tangent =	146.45				
Length =	237.19				
Radius =	160.00				
External =	56.91				
Long Chord =	216.06				
Mid. Ord. =	41.98				
P.C. Station	11+48.97	X	2,243,317.64	Y	7,136,452.50
P.T. Station	13+86.16	X	2,243,328.39	Y	7,136,236.71
C.C.		X	2,243,205.14	Y	7,136,338.73
Back = S	45° 19′ 12.81" E				
Ahead = S	39° 37′ 02.03" W				
Chord Bear = S	2° 51′ 05.39" E				

Course from PT RAMPA1 to PC RAMPA2 S 39° 37′ 02.03" W Dist 123.01

	Curve Data				
Curve RAMPA2					
P.I. Station	16+64.30	X	2,243,151.04	Y	7,136,022.45
Delta =	75° 35′ 47.71"	(LT)			
Degree =	28° 38′ 52.40"				
Tangent =	155.13				
Length =	263.88				
Radius =	200.00				
External =	53.11				
Long Chord =	245.15				
Mid. Ord. =	41.97				
P.C. Station	15+09.18	X	2,243,249.95	Y	7,136,141.95
P.T. Station	17+73.06	X	2,243,242.17	Y	7,135,896.92
C.C.		X	2,243,404.02	Y	7,136,014.42
Back = S	39° 37′ 02.03" W				
Ahead = S	35° 58′ 45.68" E				
Chord Bear = S	1° 49′ 08.17" W				

Course from PT RAMPA2 to PC RAMPA3 S 35° 58′ 45.68" E Dist 51.23

	Curve Data				
Curve RAMPA3					
P.I. Station	19+70.24	X	2,243,358.02	Y	7,135,737.35
Delta =	88° 25′ 59.63"	(RT)			
Degree =	38° 11′ 49.87"				
Tangent =	145.95				
Length =	231.52				
Radius =	150.00				
External =	59.29				
Long Chord =	209.21				
Mid. Ord. =	42.49				
P.C. Station	18+24.29	X	2,243,272.27	Y	7,135,855.46
P.T. Station	20+55.81	X	2,243,242.30	Y	7,135,648.40
C.C.		X	2,243,150.89	Y	7,135,767.33
Back = S	35° 58′ 45.68" E				
Ahead = S	52° 27′ 13.95" W				
Chord Bear = S	8° 14′ 14.13" W				

Course from PT RAMPA3 to RAMPA2 S 52° 27′ 13.95" W Dist 49.15

Point RAMPA2 X 2,243,203.33 Y 7,135,618.45 Sta 21+04.96

Ending chain RAMPA description

HORIZONTAL ALIGNMENT DATA - RAMP B

Beginning chain RAMPB description

Point RAMPB3 X 2,243,713.12 Y 7,136,008.44 Sta 10+00.00

Course from RAMPB3 to PC RAMPB1 S 52° 27′ 13.95" W Dist 42.34

	Curve Data				
Curve RAMPB1					
P.I. Station	10+96.77	X	2,243,636.40	Y	7,135,949.47
Delta =	10° 21′ 59.98"	(RT)			
Degree =	9° 32′ 57.47"				
Tangent =	54.43				
Length =	108.56				
Radius =	600.00				
External =	2.46				
Long Chord =	108.41				
Mid. Ord. =	2.45				
P.C. Station	10+42.34	X	2,243,679.56	Y	7,135,982.64
P.T. Station	11+50.90	X	2,243,587.98	Y	7,135,924.61
C.C.		X	2,243,313.92	Y	7,136,458.36
Back = S	52° 27′ 13.95" W				
Ahead = S	62° 49′ 13.93" W				
Chord Bear = S	57° 38′ 13.94" W				

Course from PT RAMPB1 to PC RAMPB2 S 62° 49′ 13.93" W Dist 33.50

	Curve Data				
Curve RAMPB2					
P.I. Station	12+31.77	X	2,243,516.04	Y	7,135,887.67
Delta =	10° 36′ 51.88"	(RT)			
Degree =	11° 14′ 04.08"				
Tangent =	47.38				
Length =	94.48				
Radius =	510.00				
External =	2.20				
Long Chord =	94.35				
Mid. Ord. =	2.19				
P.C. Station	11+84.40	X	2,243,558.18	Y	7,135,909.31
P.T. Station	12+78.88	X	2,243,470.63	Y	7,135,874.16
C.C.		X	2,243,325.23	Y	7,136,362.99
Back = S	62° 49′ 13.93" W				
Ahead = S	73° 26′ 05.82" W				
Chord Bear = S	68° 07′ 39.88" W				

Course from PT RAMPB2 to PC RAMPB3 S 73° 26′ 05.82" W Dist 17.50

	Curve Data				
Curve RAMPB3					
P.I. Station	14+78.34	X	2,243,279.44	Y	7,135,817.29
Delta =	100° 41′ 37.38"	(RT)			
Degree =	37° 59′ 22.83"				
Tangent =	181.97				
Length =	265.06				
Radius =	150.82				
External =	85.52				
Long Chord =	232.24				
Mid. Ord. =	54.58				
P.C. Station	12+96.38	X	2,243,453.86	Y	7,135,869.17
P.T. Station	15+61.43	X	2,243,260.83	Y	7,135,998.30
C.C.		X	2,243,410.86	Y	7,136,013.73
Back = S	73° 26′ 05.82" W				
Ahead = N	5° 52′ 16.80" W				
Chord Bear = N	56° 13′ 05.49" W				

	Curve Data				
Curve RAMPB4					
P.I. Station	17+43.40	X	2,243,242.22	Y	7,136,179.31
Delta =	100° 41′ 37.38"	(RT)			
Degree =	37° 59′ 22.83"				
Tangent =	181.97				
Length =	265.06				
Radius =	150.82				
External =	85.52				
Long Chord =	232.24				
Mid. Ord. =	54.58				
P.C. Station	15+61.43	X	2,243,260.83	Y	7,135,998.30
P.T. Station	18+26.49	X	2,243,423.54	Y	7,136,164.02
C.C.		X	2,243,410.86	Y	7,136,013.73
Back = N	5° 52′ 16.80" W				
Ahead = S	85° 10′ 39.41" E				
Chord Bear = N	44° 28′ 31.90" E				

Course from PT RAMPB4 to PC RAMPB5 S 85° 10′ 39.41" E Dist 14.55

	Curve Data				
Curve RAMPB5					
P.I. Station	18+71.57	X	2,243,468.46	Y	7,136,160.23
Delta =	8° 43′ 46.28"	(RT)			
Degree =	14° 19′ 26.20"				
Tangent =	30.53				
Length =	60.94				
Radius =	400.00				
External =	1.16				
Long Chord =	60.88				
Mid. Ord. =	1.16				
P.C. Station	18+41.04	X	2,243,438.04	Y	7,136,162.79
P.T. Station	19+01.98	X	2,243,498.14	Y	7,136,153.07
C.C.		X	2,243,404.41	Y	7,135,764.21
Back = S	85° 10′ 39.41" E				
Ahead = S	76° 26′ 53.13" E				
Chord Bear = S	80° 48′ 46.27" E				

Course from PT RAMPB5 to PC RAMPB6 S 76° 26′ 53.13" E Dist 12.56

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED
PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY
HORIZONTAL
ALIGNMENT DATA

SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		95
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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HORIZONTAL ALIGNMENT DATA - RAMP B(CONT.)

				Curve Data				

Curve RAMPB6								
P.I. Station			20+00.51	X	2,243,593.93	Y	7,136,129.98	
Delta	=	20° 43′ 54.14"	(RT)					
Degree	=	12° 11′ 26.13"						
Tangent	=	85.97						
Length	=	170.06						
Radius	=	470.00						
External	=	7.80						
Long Chord	=	169.14						
Mid. Ord.	=	7.67						
P.C. Station			19+14.54	X	2,243,510.35	Y	7,136,150.13	
P.T. Station			20+84.60	X	2,243,664.96	Y	7,136,081.56	
C.C.				X	2,243,400.22	Y	7,135,693.22	
Back	= S	76° 26′ 53.13" E						
Ahead	= S	55° 42′ 58.99" E						
Chord Bear	= S	66° 04′ 56.06" E						

Course from PT RAMPB6 to RAMPB4 S 55° 42′ 58.99" E Dist 29.94

Point RAMPB4 X 2,243,689.70 Y 7,136,064.69 Sta 21+14.55

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Ending chain RAMPB description

HORIZONTAL ALIGNMENT DATA - RAMP C

Beginning chain RAMPC description

==========

Point RAMPC1 X 2,243,215.75 Y 7,136,695.82 Sta 10+00.00

Course from RAMPC1 to PC RAMPC-1 S 48° 04′ 26.55" E Dist 106.22

				Curve Data				

Curve RAMPC-1								
P.I. Station			11+35.36	X	2,243,316.46	Y	7,136,605.38	
Delta	=	9° 31′ 04.60"	(LT)					
Degree	=	16° 22′ 12.80"						
Tangent	=	29.14						
Length	=	58.14						
Radius	=	350.00						
External	=	1.21						
Long Chord	=	58.07						
Mid. Ord.	=	1.21						
P.C. Station			11+06.22	X	2,243,294.78	Y	7,136,624.85	
P.T. Station			11+64.36	X	2,243,341.06	Y	7,136,589.76	
C.C.				X	2,243,528.64	Y	7,136,885.25	
Back	= S	48° 04′ 26.55" E						
Ahead	= S	57° 35′ 31.15" E						
Chord Bear	= S	52° 49′ 58.85" E						

Course from PT RAMPC-1 to PC RAMPC-2 S 57° 35′ 31.15" E Dist 21.24

				Curve Data				

Curve RAMPC-2								
P.I. Station			13+11.92	X	2,243,465.63	Y	7,136,510.68	
Delta	=	64° 33′ 04.34"	(LT)					
Degree	=	28° 38′ 52.40"						
Tangent	=	126.32						
Length	=	225.33						
Radius	=	200.00						
External	=	36.55						
Long Chord	=	213.60						
Mid. Ord.	=	30.90						
P.C. Station			11+85.60	X	2,243,358.99	Y	7,136,578.38	
P.T. Station			14+10.93	X	2,243,572.59	Y	7,136,577.88	
C.C.				X	2,243,466.18	Y	7,136,747.23	
Back	= S	57° 35′ 31.15" E						
Ahead	= N	57° 51′ 24.51" E						
Chord Bear	= S	89° 52′ 03.32" E						

Course from PT RAMPC-2 to PC RAMPC-3 N 57° 51′ 24.51" E Dist 98.81

				Curve Data				

Curve RAMPC-3								
P.I. Station			16+91.19	X	2,243,809.89	Y	7,136,726.99	
Delta	=	84° 25′ 52.39"	(RT)					
Degree	=	28° 38′ 52.40"						
Tangent	=	181.45						
Length	=	294.72						
Radius	=	200.00						
External	=	70.04						
Long Chord	=	268.77						
Mid. Ord.	=	51.88						
P.C. Station			15+09.74	X	2,243,656.25	Y	7,136,630.45	
P.T. Station			18+04.46	X	2,243,920.88	Y	7,136,583.45	
C.C.				X	2,243,762.66	Y	7,136,461.11	
Back	= N	57° 51′ 24.51" E						
Ahead	= S	37° 42′ 43.10" E						
Chord Bear	= S	79° 55′ 39.30" E						

Course from PT RAMPC-3 to RAMPC2 S 37° 42′ 43.10" E Dist 399.55

Point RAMPC2 X 2,244,165.29 Y 7,136,267.36 Sta 22+04.02

==========

Ending chain RAMPC description

HORIZONTAL ALIGNMENT DATA - RAMP D

Beginning chain RAMPD description

==========

Point RAMPD1 X 2,243,829.65 Y 7,136,139.23 Sta 10+00.00

Course from RAMPD1 to PC RAMPD1 N 42° 52′ 11.54" W Dist 145.93

				Curve Data				

Curve RAMPD1								
P.I. Station			12+06.74	X	2,243,689.00	Y	7,136,290.75	
Delta	=	11° 34′ 27.51"	(RT)					
Degree	=	9° 32′ 57.47"						
Tangent	=	60.81						
Length	=	121.21						
Radius	=	600.00						
External	=	3.07						
Long Chord	=	121.00						
Mid. Ord.	=	3.06						
P.C. Station			11+45.93	X	2,243,730.37	Y	7,136,246.18	
P.T. Station			12+67.13	X	2,243,657.41	Y	7,136,342.71	
C.C.				X	2,244,170.11	Y	7,136,654.38	
Back	= N	42° 52′ 11.54" W						
Ahead	= N	31° 17′ 44.02" W						
Chord Bear	= N	37° 04′ 57.78" W						

Course from PT RAMPD1 to PC RAMPD2 N 31° 17′ 44.02" W Dist 21.37

				Curve Data				

Curve RAMPD2								
P.I. Station			41+20.25	X	2,242,175.35	Y	7,138,780.70	
Delta	=	173° 56′ 08.44"	(RT)					
Degree	=	38° 11′ 49.87"						
Tangent	=	2,831.76						
Length	=	455.36						
Radius	=	150.00						
External	=	2,685.73						
Long Chord	=	299.58						
Mid. Ord.	=	142.07						
P.C. Station			12+88.50	X	2,243,646.31	Y	7,136,360.97	
P.T. Station			17+43.86	X	2,243,893.71	Y	7,136,529.91	
C.C.				X	2,243,774.49	Y	7,136,438.89	
Back	= N	31° 17′ 44.02" W						
Ahead	= S	37° 21′ 35.58" E						
Chord Bear	= N	55° 40′ 20.20" E						

Course from PT RAMPD2 to PC RAMPD3 S 37° 21′ 35.58" E Dist 153.67

				Curve Data				

Curve RAMPD3								
P.I. Station			20+47.05	X	2,244,077.69	Y	7,136,288.92	
Delta	=	89° 48′ 49.53"	(RT)					
Degree	=	38° 11′ 49.87"						
Tangent	=	149.51						
Length	=	235.13						
Radius	=	150.00						
External	=	61.79						
Long Chord	=	211.79						
Mid. Ord.	=	43.76						
P.C. Station			18+97.53	X	2,243,986.97	Y	7,136,407.76	
P.T. Station			21+32.67	X	2,243,959.15	Y	7,136,197.81	
C.C.				X	2,243,867.74	Y	7,136,316.74	
Back	= S	37° 21′ 35.58" E						
Ahead	= S	52° 27′ 13.95" W						
Chord Bear	= S	7° 32′ 49.18" W						

Course from PT RAMPD3 to RAMPD2 S 52° 27′ 13.95" W Dist 93.48

Point RAMPD2 X 2,243,885.03 Y 7,136,140.84 Sta 22+26.14

==========

Ending chain RAMPD description

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY
HORIZONTAL
ALIGNMENT DATA

SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		96
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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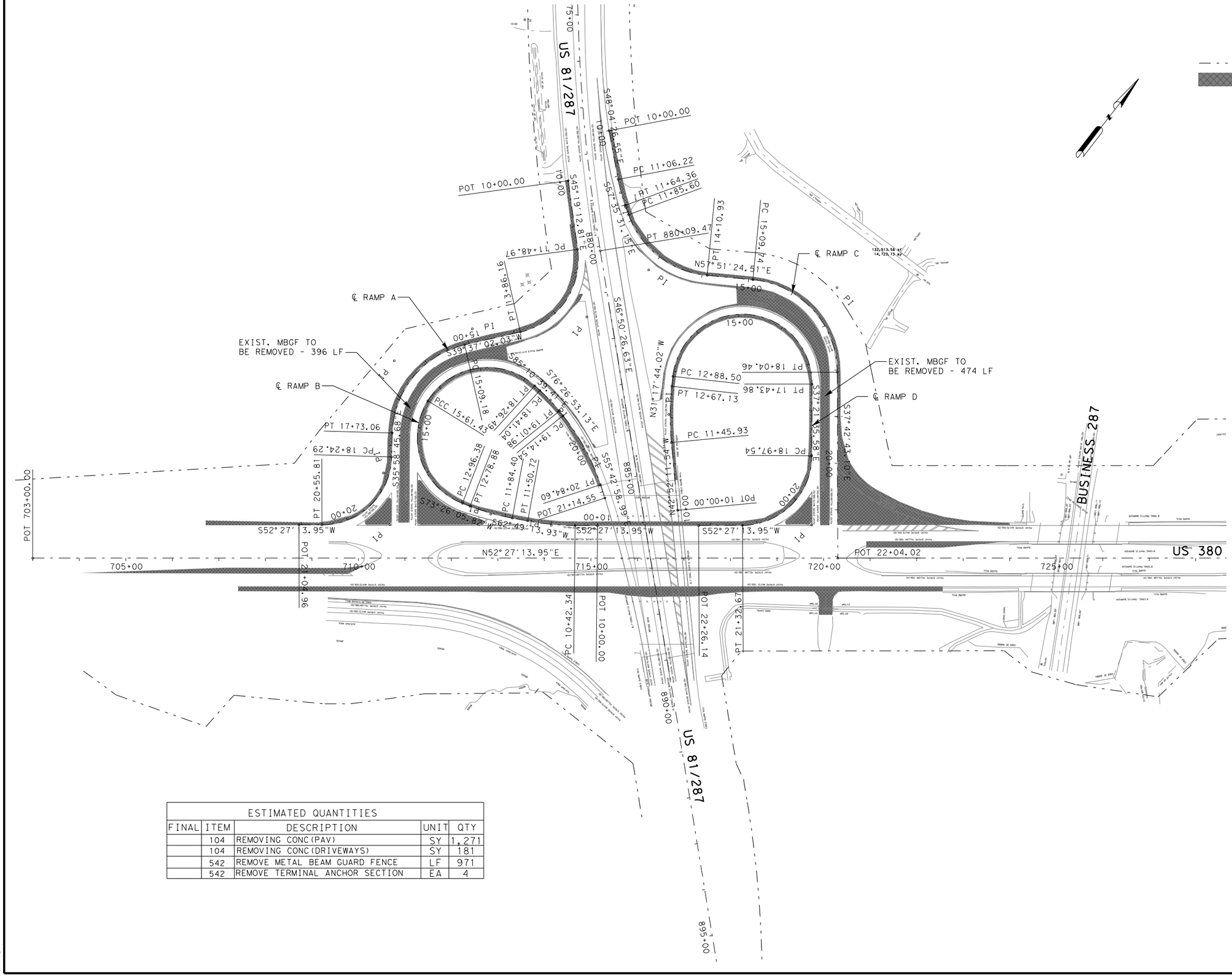
PLAN LEGEND

EXISTING RIGHT OF WAY

EXISITNG PAVEMENT TO BE REMOVED



ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	104	REMOVING CONC(PAV)	SY	1,271
	104	REMOVING CONC(DRIVEWAYS)	SY	181
	542	REMOVE METAL BEAM GUARD FENCE	LF	971
	542	REMOVE TERMINAL ANCHOR SECTION	EA	4

STATE OF TEXAS
PHILLIP J. PAWELEK
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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

REMOVAL LAYOUT

SCALE: 1"=200' SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		97
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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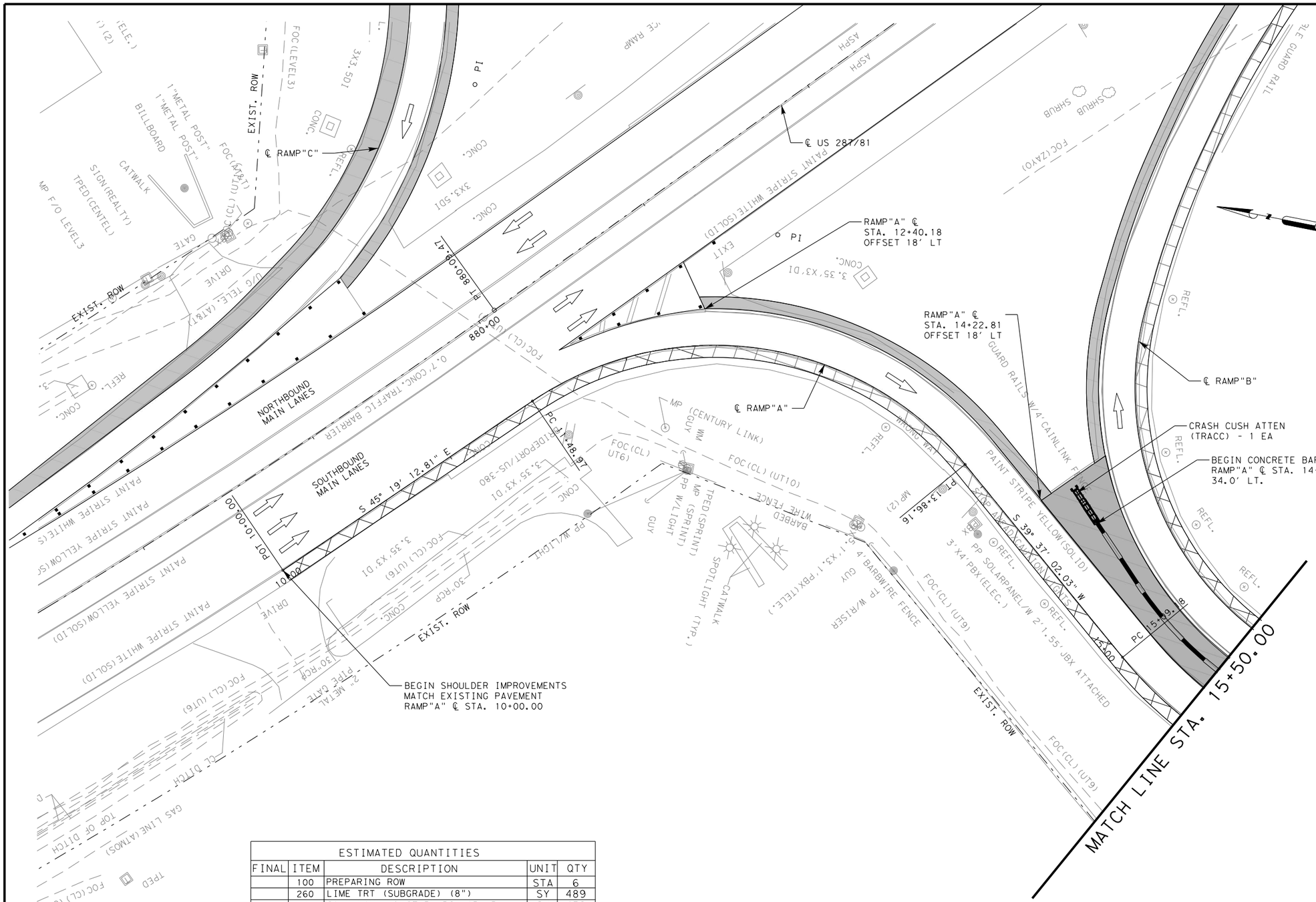

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

NOTES:

1. ALL UTILITIES ARE SHOWN FOR INFORMATION PURPOSES ONLY AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL HORIZONTAL AND VERTICAL INFORMATION.
2. CONTRACTOR TO VERIFY ELEVATIONS OF EXISTING PAVEMENT TIE-IN LOCATIONS PRIOR TO CONSTRUCTION AND MAKE ADJUSTMENTS AS NEEDED
3. SAW CUTTING SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
4. SEE TYPICAL SECTION SHEET FOR BASE REPAIR DETAIL.
5. DRIVEWAY WIDTH SHALL MATCH EXISTING. LIMIT FROM EOP TO ROW WITH MINIMUM PIPE COVER OF 4".
6. ALL NEW SHOULDERS SHOULD MATCH EXISTING WIDTHS UPON COMPLETION.
7. CLEANING OF CONCRETE SWALE WILL BE PAID UNDER ITEM 760-6001.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	6
	260	LIME TRT (SUBGRADE) (8")	SY	489
	305	SALV,HAUL, & STKPL RCL APH PV	SY	459
	310	PRIME COAT (MC3-30)	GAL	98
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	444
	438	CLEANING AND SEALING JOINTS	LF	550
	514	PERM CTB (SGL SLOPE)(TY 1)(42)	LF	118
	545	CRASH CUSH ATTEN (INSTALL)(TRACC)	EA	1
	3076	D-GR HMA TY C SAC B PG 70-22	TON	106
	3076	D-GR HMA TY-D PG 64-22	TON	84
	3076	TACK COAT	GAL	46

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (RAMP A)

SCALE: 1"=50' SHEET 1 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		98
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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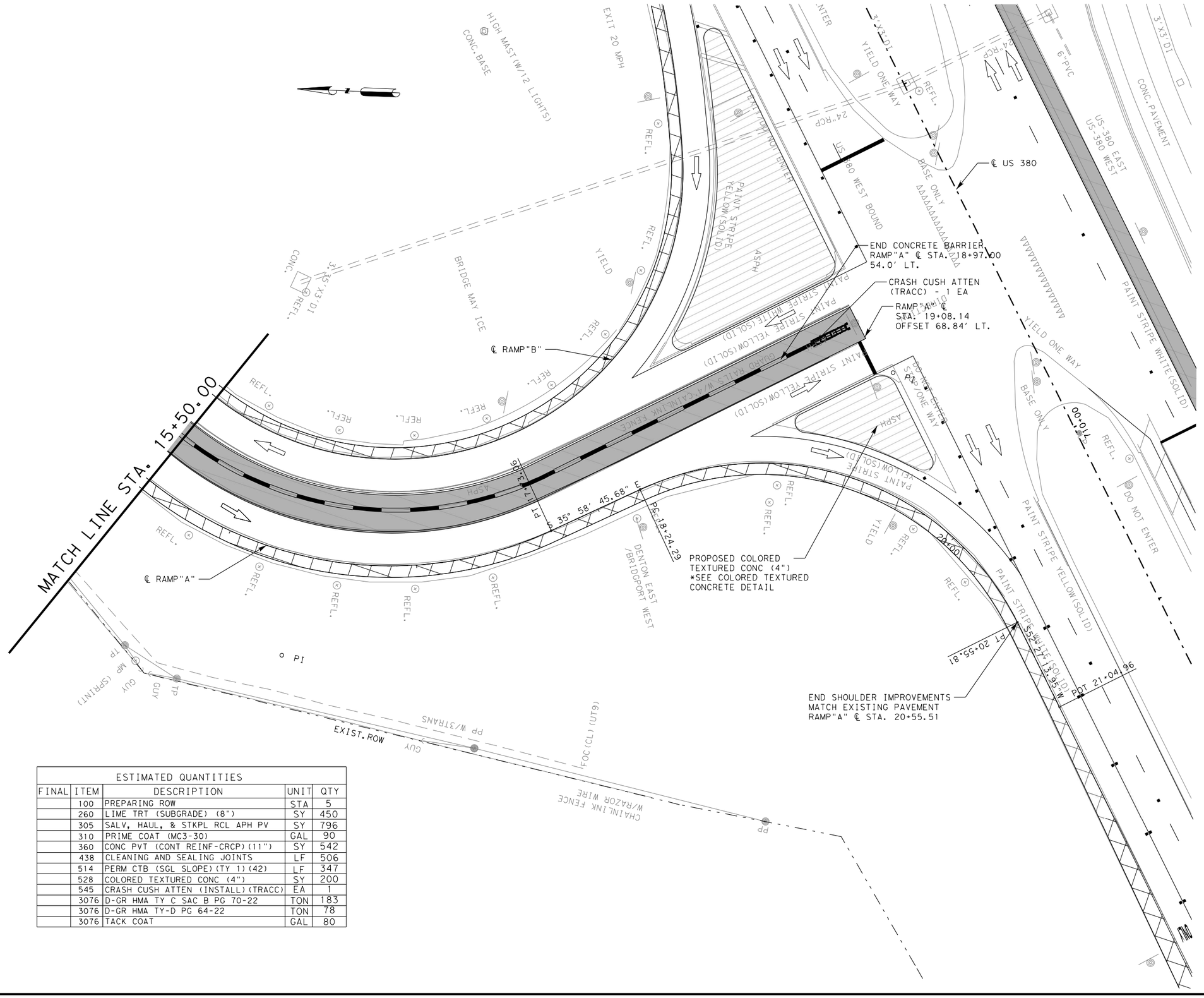

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

NOTES:

1. ALL UTILITIES ARE SHOWN FOR INFORMATION PURPOSES ONLY AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL HORIZONTAL AND VERTICAL INFORMATION.
2. CONTRACTOR TO VERIFY ELEVATIONS OF EXISTING PAVEMENT TIE-IN LOCATIONS PRIOR TO CONSTRUCTION AND MAKE ADJUSTMENTS AS NEEDED
3. SAW CUTTING SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
4. SEE TYPICAL SECTION SHEET FOR BASE REPAIR DETAIL.
5. DRIVEWAY WIDTH SHALL MATCH EXISTING. LIMIT FROM EOP TO ROW WITH MINIMUM PIPE COVER OF 4".
6. ALL NEW SHOULDERS SHOULD MATCH EXISTING WIDTHS UPON COMPLETION.
7. CLEANING OF CONCRETE SWALE WILL BE PAID UNDER ITEM 760-6001.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	5
	260	LIME TRT (SUBGRADE) (8")	SY	450
	305	SALV, HAUL, & STKPL RCL APH PV	SY	796
	310	PRIME COAT (MC3-30)	GAL	90
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	542
	438	CLEANING AND SEALING JOINTS	LF	506
	514	PERM CTB (SGL SLOPE)(TY 1)(42)	LF	347
	528	COLORED TEXTURED CONC (4")	SY	200
	545	CRASH CUSH ATTEN (INSTALL)(TRACC)	EA	1
	3076	D-GR HMA TY C SAC B PG 70-22	TON	183
	3076	D-GR HMA TY-D PG 64-22	TON	78
	3076	TACK COAT	GAL	80

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (RAMP A)

SCALE: 1"=50' SHEET 2 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		99
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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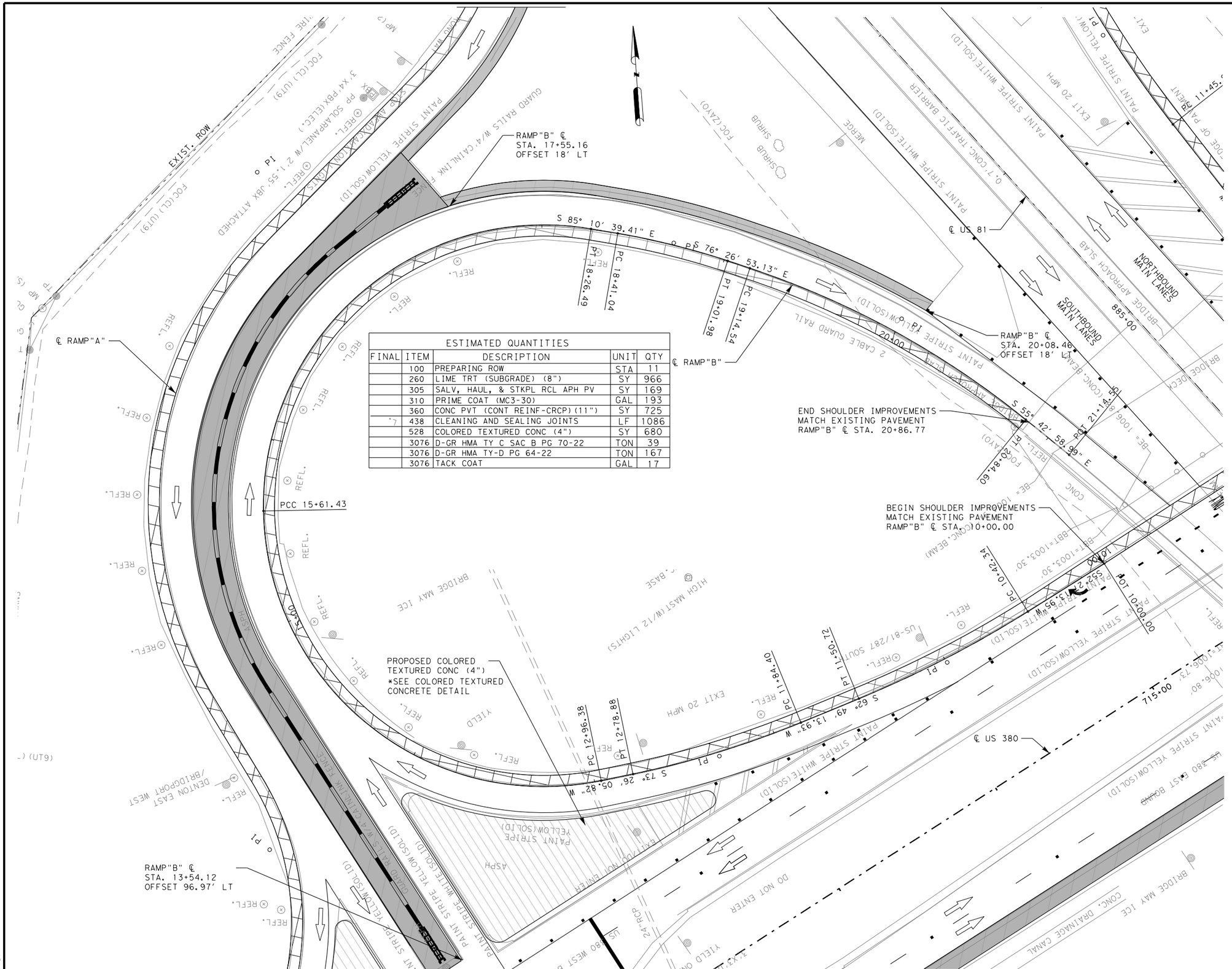

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	11
	260	LIME TRT (SUBGRADE) (8")	SY	966
	305	SALV, HAUL, & STKPL RCL APH PV	SY	169
	310	PRIME COAT (MC3-30)	GAL	193
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	725
	438	CLEANING AND SEALING JOINTS	LF	1086
	528	COLORED TEXTURED CONC (4")	SY	680
	3076	D-GR HMA TY C SAC B PG 70-22	TON	39
	3076	D-GR HMA TY-D PG 64-22	TON	167
	3076	TACK COAT	GAL	17

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

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5. DRIVEWAY WIDTH SHALL MATCH EXISTING. LIMIT FROM EOP TO ROW WITH MINIMUM PIPE COVER OF 4".
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7. CLEANING OF CONCRETE SWALE WILL BE PAID UNDER ITEM 760-6001.

STATE OF TEXAS
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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (RAMP B)

SCALE: 1"=50' SHEET 3 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		100
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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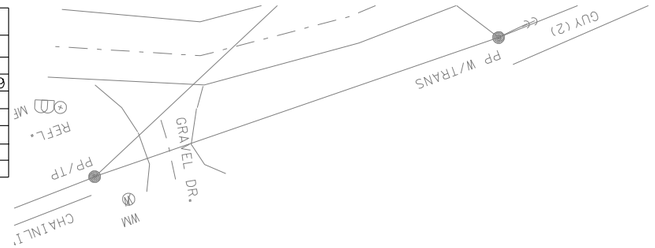
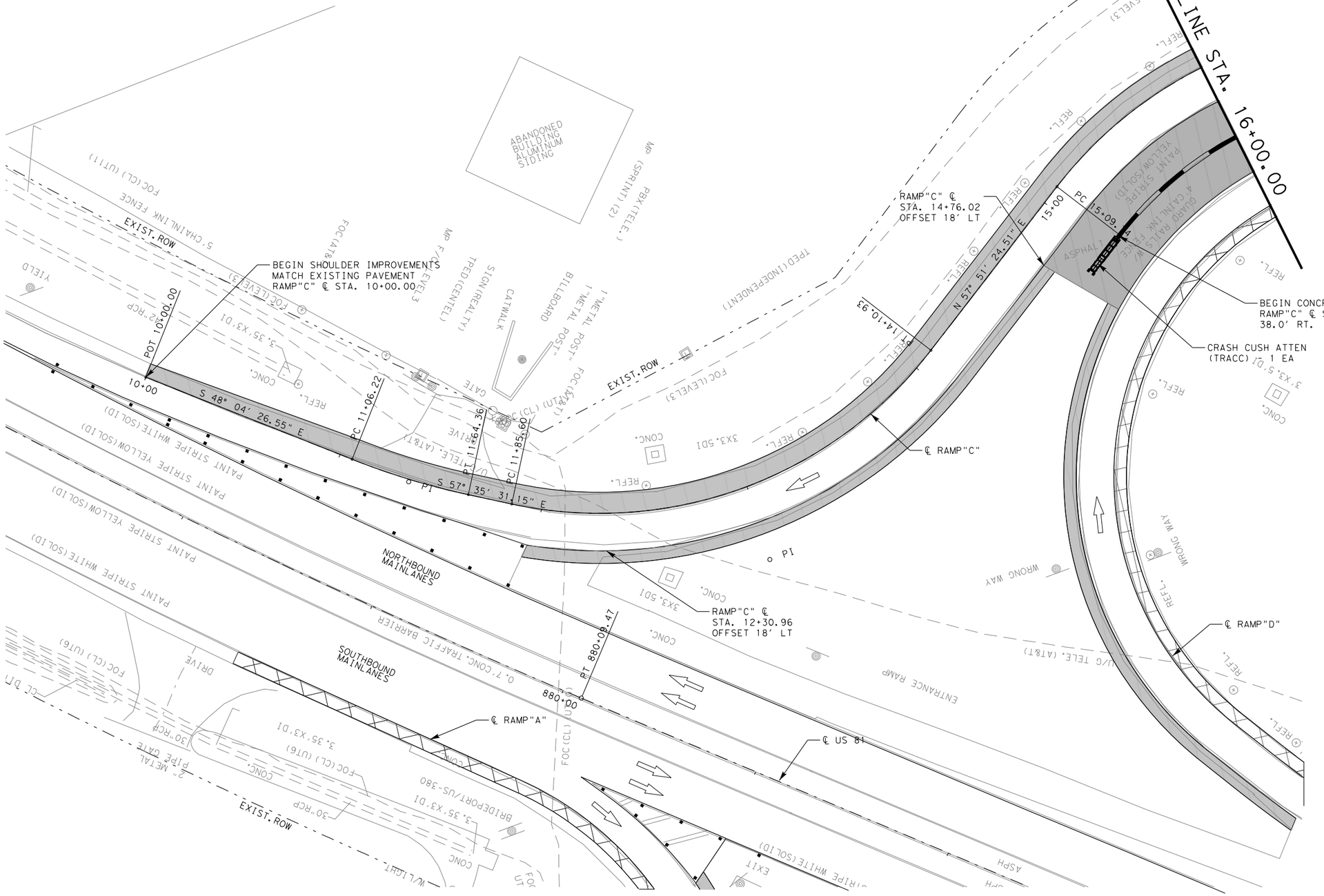
ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	6
	305	SALV,HAUL, & STKPL APH PV	SY	1,399
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	76
	514	PERM CTB (SGL SLOPE)(TY 1)(42)	LF	114
	545	CRASH CUSH ATTEN (INSTALL)(TRACC)	EA	1
	3076	D-GR HMA TY C SAC B PG 70-22	TON	322
	3076	TACK COAT	GAL	140





PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

NOTES:
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3. SAW CUTTING SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
4. SEE TYPICAL SECTION SHEET FOR BASE REPAIR DETAIL.
5. DRIVEWAY WIDTH SHALL MATCH EXISTING. LIMIT FROM EOP TO ROW WITH MINIMUM PIPE COVER OF 4".
6. ALL NEW SHOULDERS SHOULD MATCH EXISTING WIDTHS UPON COMPLETION.
7. CLEANING OF CONCRETE SWALE WILL BE PAID UNDER ITEM 760-6001.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (RAMP C)

SCALE: 1"=50' SHEET 4 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		101
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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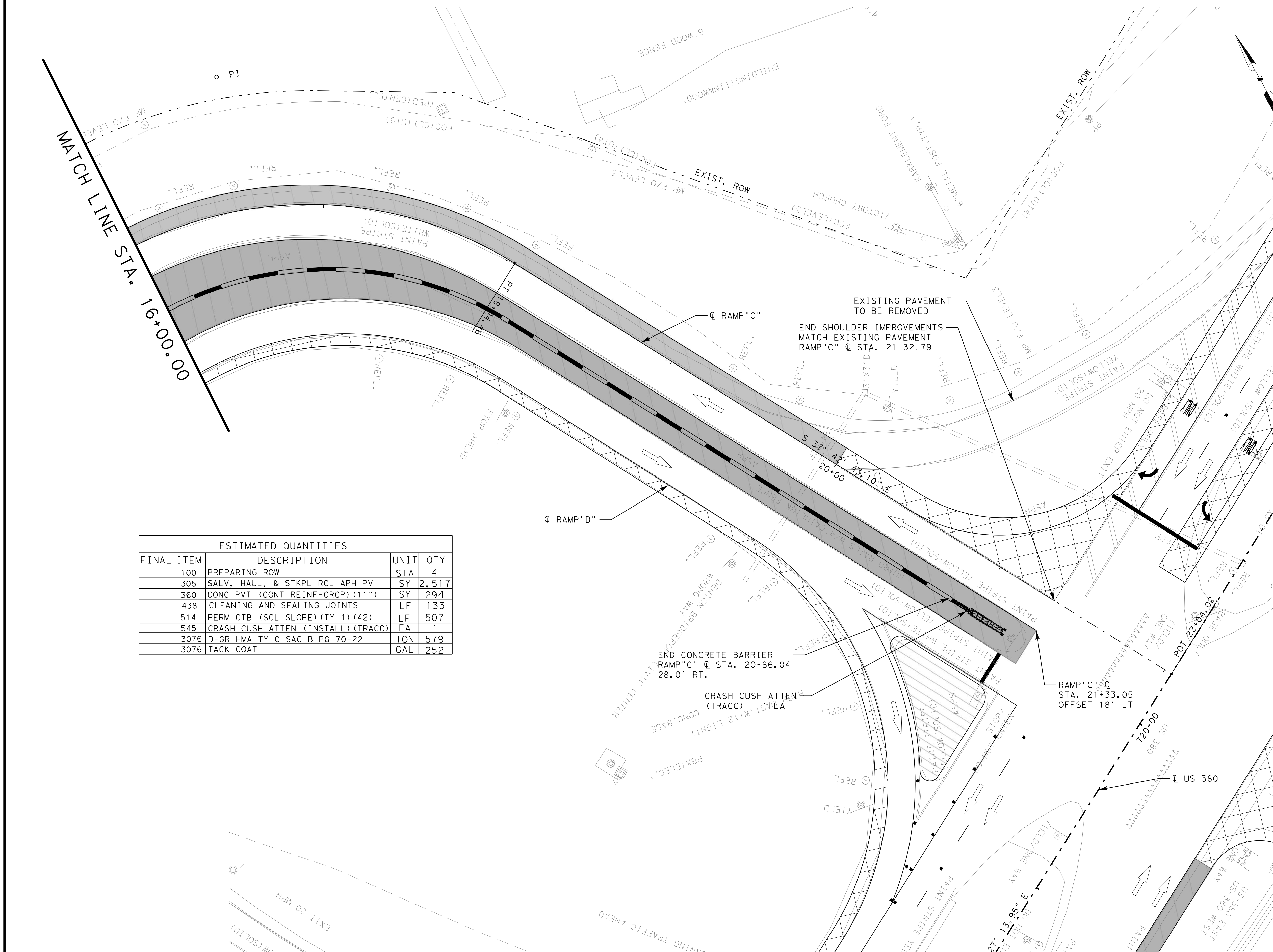

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

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6. ALL NEW SHOULDERS SHOULD MATCH EXISTING WIDTHS UPON COMPLETION.
7. CLEANING OF CONCRETE SWALE WILL BE PAID UNDER ITEM 760-6001.

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	4
	305	SALV, HAUL, & STKPL RCL APH PV	SY	2,517
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	294
	438	CLEANING AND SEALING JOINTS	LF	133
	514	PERM CTB (SGL SLOPE)(TY 1)(42)	LF	507
	545	CRASH CUSH ATTEN (INSTALL)(TRACC)	EA	1
	3076	D-GR HMA TY C SAC B PG 70-22	TON	579
	3076	TACK COAT	GAL	252

STATE OF TEXAS
PHILLIP J. PAWELEK
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Phillip J. Pawelek, P.E.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT
(RAMP C)

SCALE: 1"=50'   SHEET 5 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		102
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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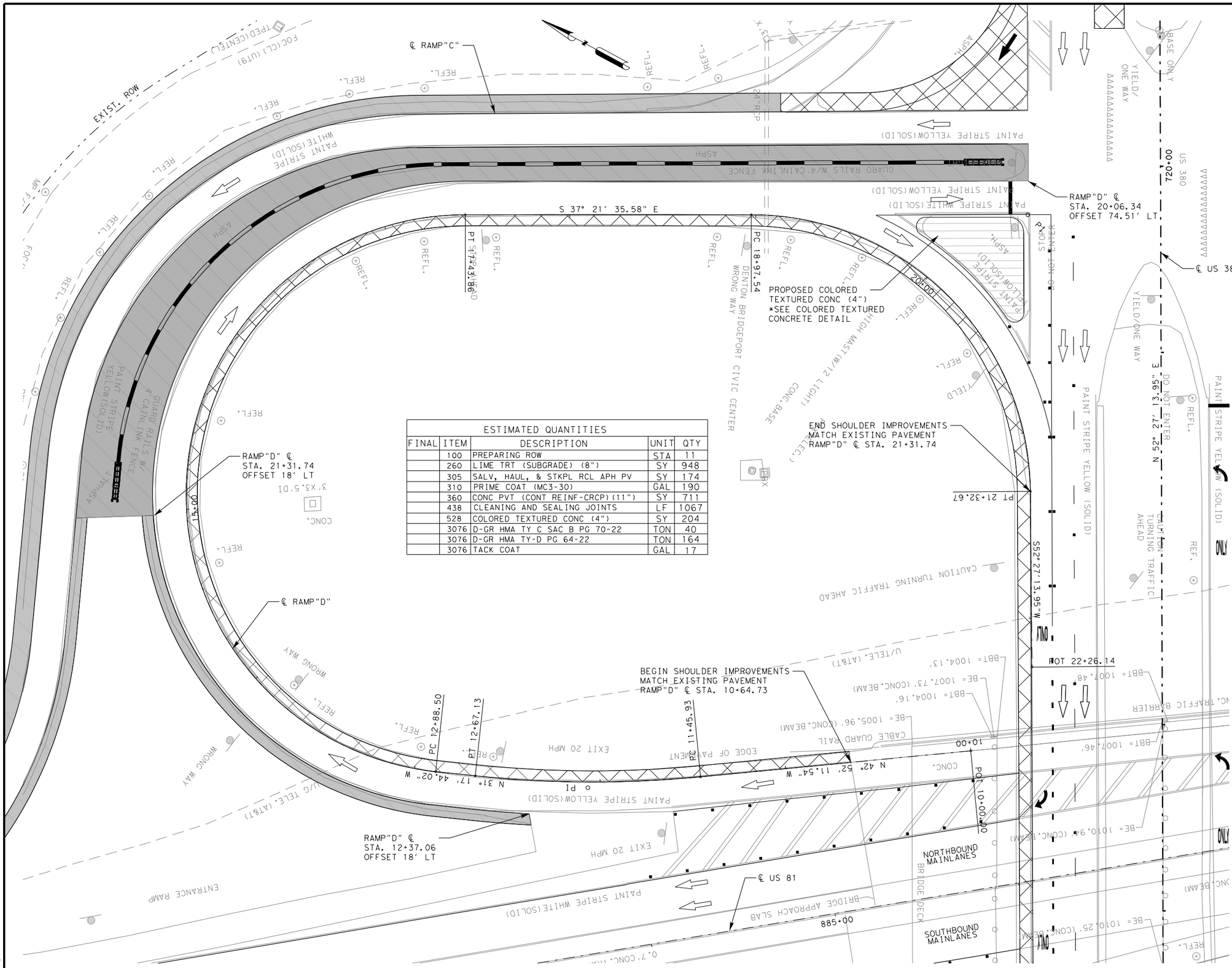

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	11
	260	LIME TRT (SUBGRADE) (8")	SY	948
	305	SALV, HAUL, & STKPL RCL APH PV	SY	174
	310	PRIME COAT (MC3-30)	GAL	190
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	711
	438	CLEANING AND SEALING JOINTS	LF	1067
	528	COLORED TEXTURED CONC (4")	SY	204
	3076	D-GR HMA TY C SAC B PG 70-22	TON	40
	3076	D-GR HMA TY-D PG 64-22	TON	164
	3076	TACK COAT	GAL	17

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

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STATE OF TEXAS
PHILLIP J. PAWELEK
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Phillip J. Pawelek, P.E.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (RAMP D)

SCALE: 1"=50' SHEET 6 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		103
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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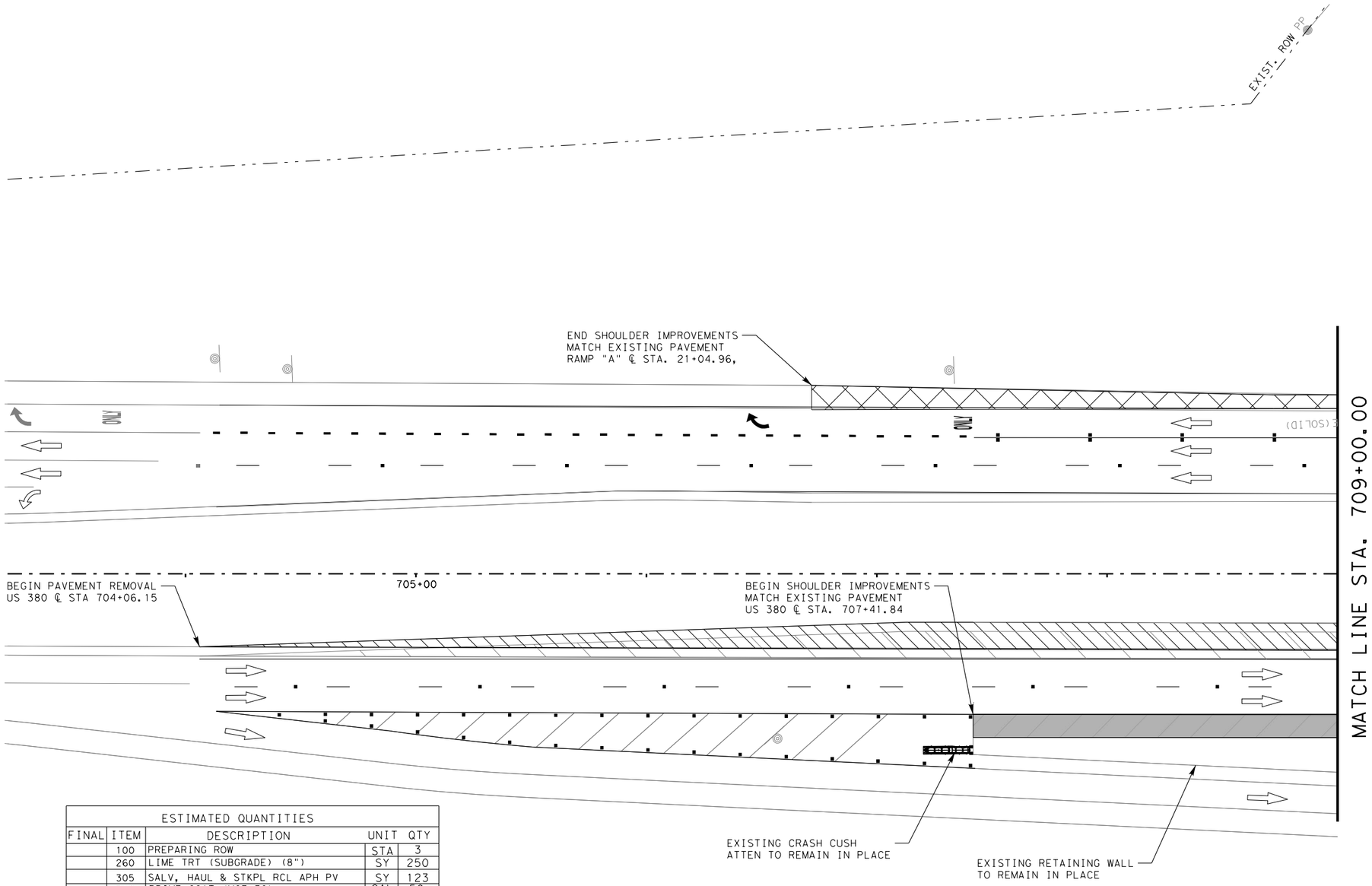

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

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ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	3
	260	LIME TRT (SUBGRADE) (8")	SY	250
	305	SALV, HAUL & STKPL RCL APH PV	SY	123
	310	PRIME COAT (MC3-30)	GAL	50
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	194
	438	CLEANING AND SEALING JOINTS	LF	228
	3076	D-GR HMA TY C SAC B PG 70-22	TON	28
	3076	D-GR HMA TY-D PG 64-22	TON	45
	3076	TACK COAT	GAL	12

STATE OF TEXAS
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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (US 380)

SCALE: 1"=50' SHEET 7 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		104
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
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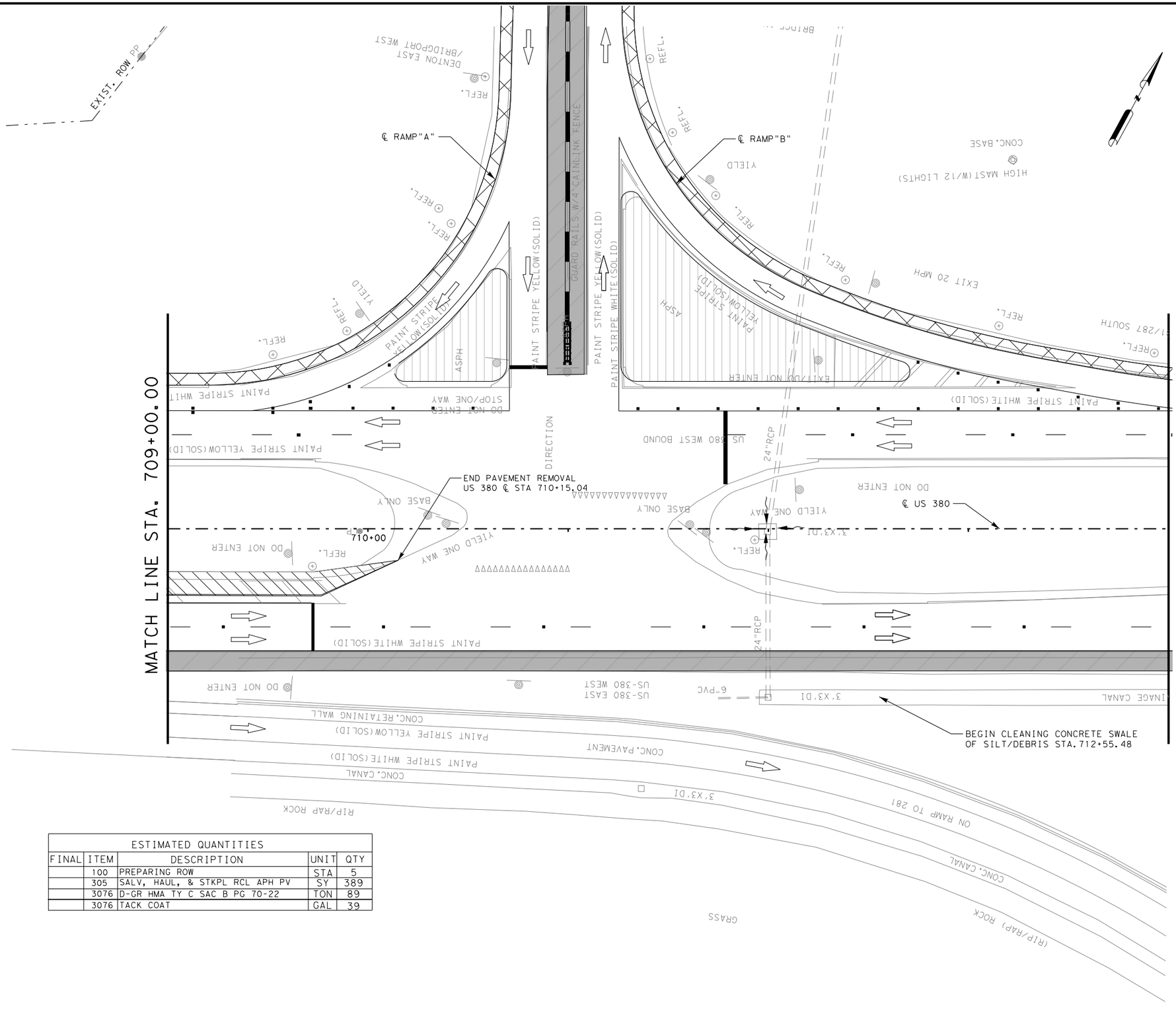

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	5
	305	SALV, HAUL, & STKPL RCL APH PV	SY	389
	3076	D-GR HMA TY C SAC B PG 70-22	TON	89
	3076	TACK COAT	GAL	39

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT
(US 380)

SCALE: 1"=50' SHEET 8 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		105
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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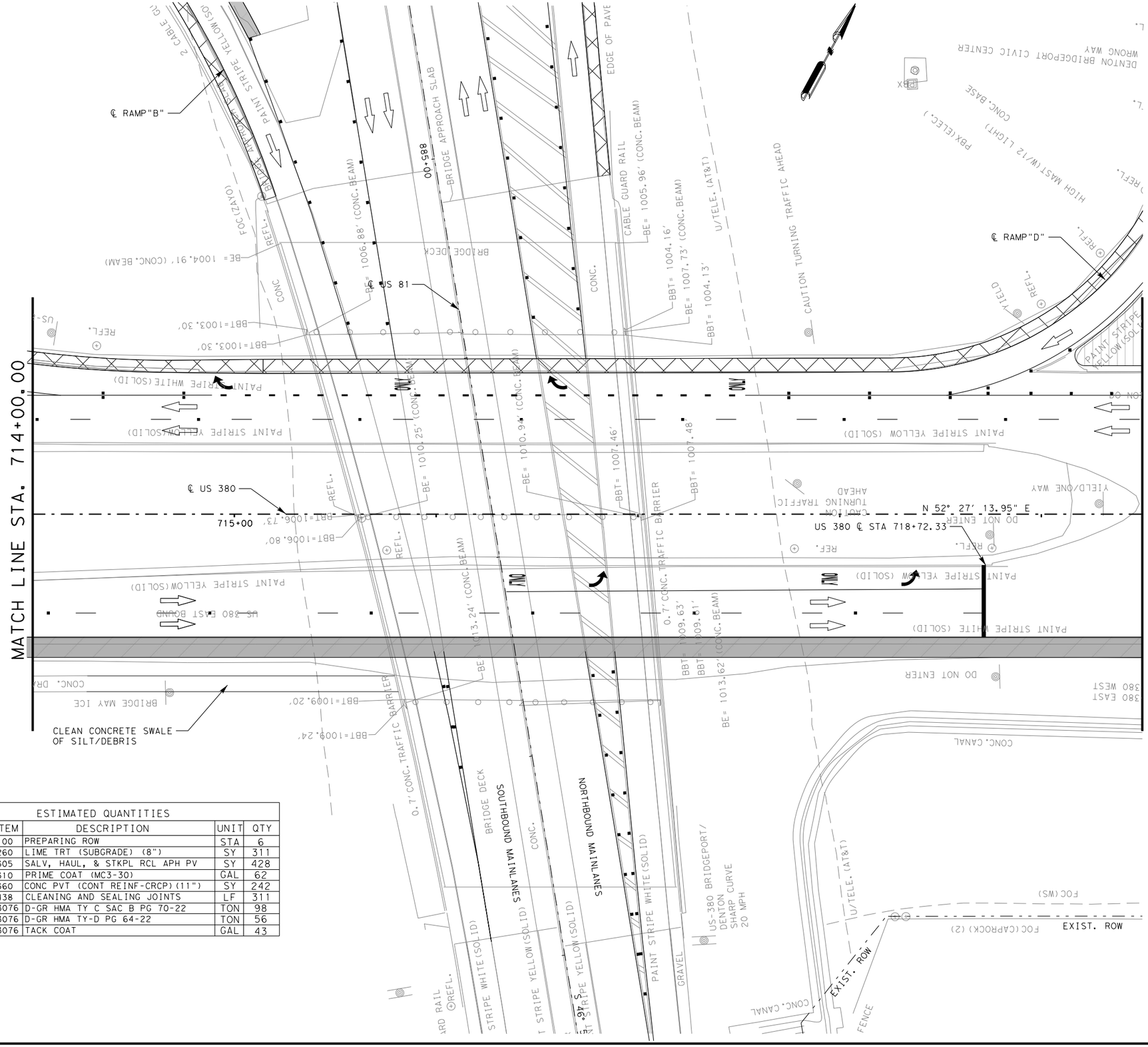

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	6
	260	LIME TRT (SUBGRADE) (8")	SY	311
	305	SALV, HAUL, & STKPL RCL APH PV	SY	428
	310	PRIME COAT (MC3-30)	GAL	62
	360	CONC PVT (CONT REINF-CRCP) (11")	SY	242
	438	CLEANING AND SEALING JOINTS	LF	311
	3076	D-GR HMA TY C SAC B PG 70-22	TON	98
	3076	D-GR HMA TY-D PG 64-22	TON	56
	3076	TACK COAT	GAL	43

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
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STATE OF TEXAS
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Phillip J. Pawelek, P.E.

SIB INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (US 380)

SCALE: 1"=50' SHEET 9 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		106
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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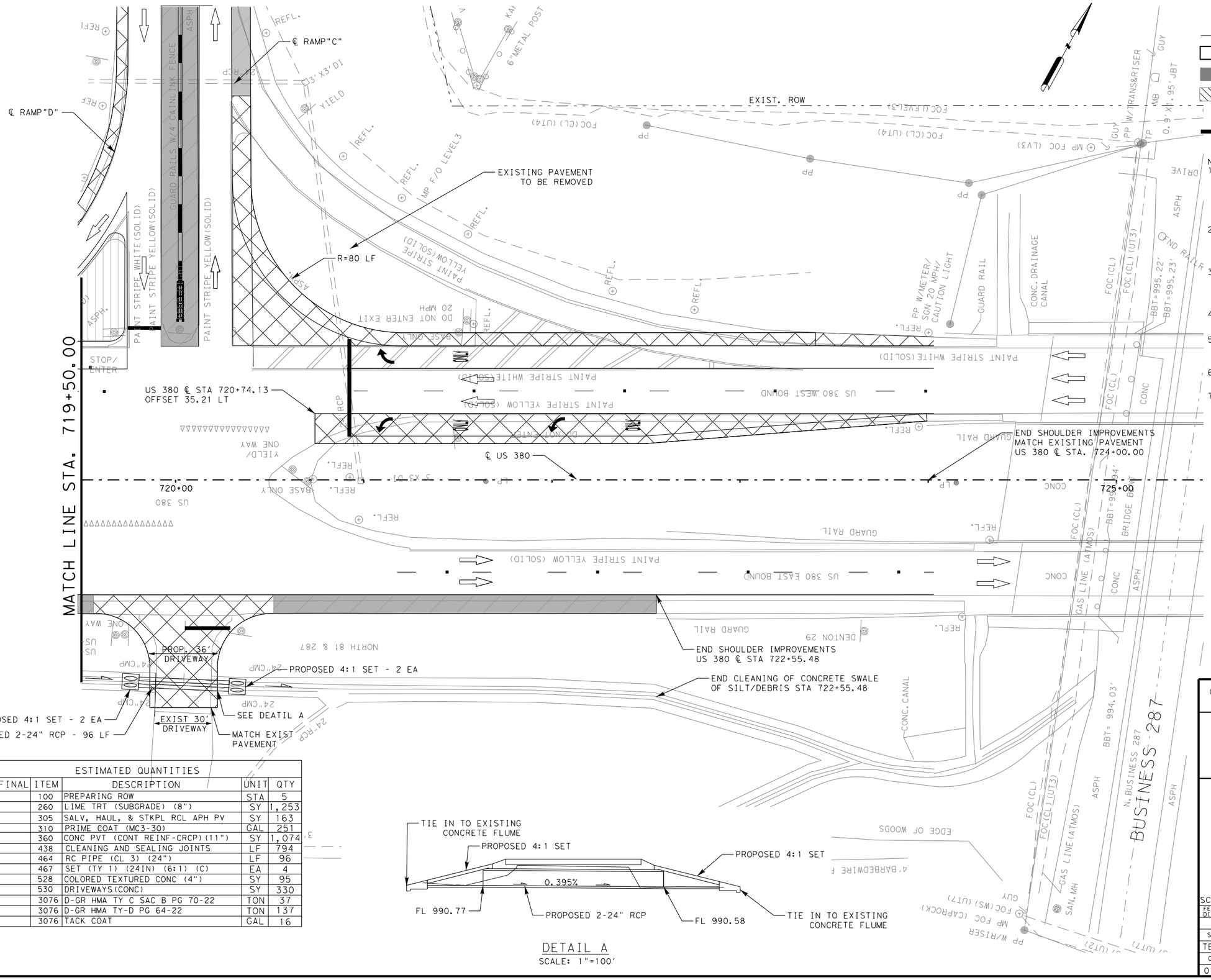

PLAN LEGEND

- EXISTING RIGHT OF WAY
- PROPOSED CONCRETE PAVEMENT
- PROPOSED MILL AND INLAY
- PAVEMENT TO BE REMOVED
- DIRECTION OF TRAFFIC FLOW
- PROPOSED CONCRETE BARRIER

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ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	100	PREPARING ROW	STA	5
	260	LIME TRT (SUBGRADE) (8")	SY	1,253
	305	SALV, HAUL, & STKPL RCL APH PV	SY	163
	310	PRIME COAT (MC3-30)	GAL	251
	360	CONC PVT (CONT REINF-CRCP)(11")	SY	1,074
	438	CLEANING AND SEALING JOINTS	LF	794
	464	RC PIPE (CL 3) (24")	LF	96
	467	SET (TY 1) (24IN) (6:1) (C)	EA	4
	528	COLORED TEXTURED CONC (4")	SY	95
	530	DRIVEWAYS(CONC)	SY	330
	3076	D-GR HMA TY C SAC B PG 70-22	TON	37
	3076	D-GR HMA TY-D PG 64-22	TON	137
	3076	TACK COAT	GAL	16

DETAIL A
SCALE: 1"=100'

STATE OF TEXAS
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Phillip J. Pawelek, P.E.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

ROADWAY LAYOUT (US 380)

SCALE: 1"=50' SHEET 10 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	107

STATE	DIST.	COUNTY
TEXAS	FTW	WISE

CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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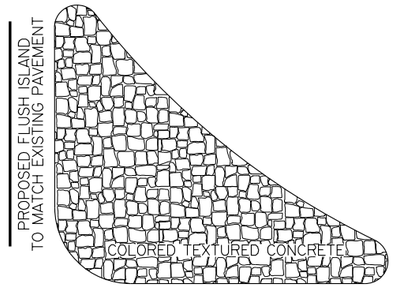
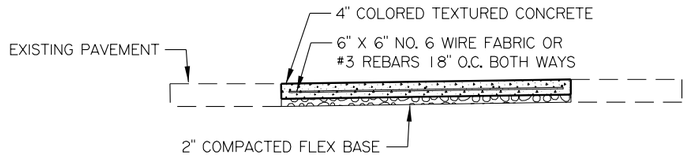
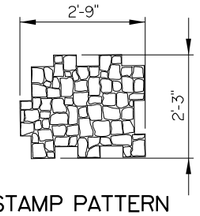


COLORED TEXTURED CONCRETE - PLAN VIEW



COLORED TEXTURED CONCRETE - SECTION VIEW



STAMP PATTERN

COLORED TEXTURED CONCRETE NOTES:

1. USE NATURAL STONE - SCULPTURED GRANITE PATTERNBY L.M. SCOFIELD COMPANY.
   (http://www.scofield.com/stampedconcrete_patterns32.html)

2. FOR COLORANTS IN COLORED TEXTURED CONCRETE, APPLY DRY-SHAKE COLOR HARDENER AND POWDERED ANTIQUING RELEASE. APPLY BOTH ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. SUPPLY THE ENGINEER WITH A COPY OF THE RECOMMENDATIONS.

3. COLORANTS:
   AMS-STD-20266: YELLOW SAND

4. PATTERNS AND COLORANTS LISTED ARE BY L.M. SCOFIELD CO. AND ARE USED FOR EXAMPLES ONLY. APPROVED EQUALS ARE ACCEPTABLE.

5. PROTECT ADJACENT CONCRETE SURFACES FROM COLORANTS.

6. FOR THE COLORED TEXTURED CONCRETE BASE MATERIAL, USE FLEX BASE IN CONFORMANCE WITH ITEM 247 - FLEXIBLE BASE, WITH THE TYPE AND GRADE AS SPECIFIED ELESWHERE IN THE PLANS. IF NOT SPECIFIED ELESWHERE IN THE PLANS, USE THE TYPE AND GRADE MOST PREVALENT UNDER PRODUCTION IN THE LOCAL AREA.

The seal appearing on this document was authorized by PHILLIP J. PAWELEK P.E. 82739, on 7-20, 2022

Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

COLORED TEXTURED CONCRETE DETAIL

SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		108
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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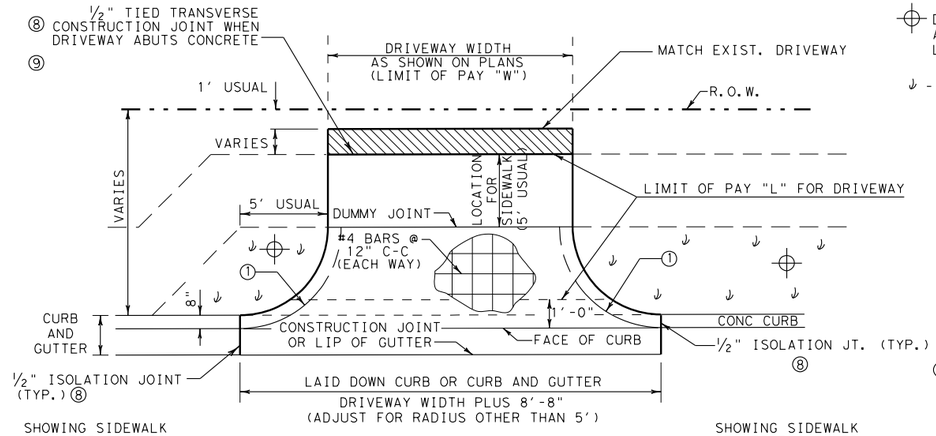


SHOWING SIDEWALK ADJACENT TO CURB

SHOWING SIDEWALK REMOTE FROM CURB

PLAN VIEW

⊕ DO NOT PAVE AREA BETWEEN SIDEWALK AND DRIVEWAY CURB. SEED, SOD, OR LANDSCAPE AS DIRECTED.

↓ - SEEDING OR OTHER SURFACE NOT SUITABLE AS PEDESTRIAN WALKWAY.

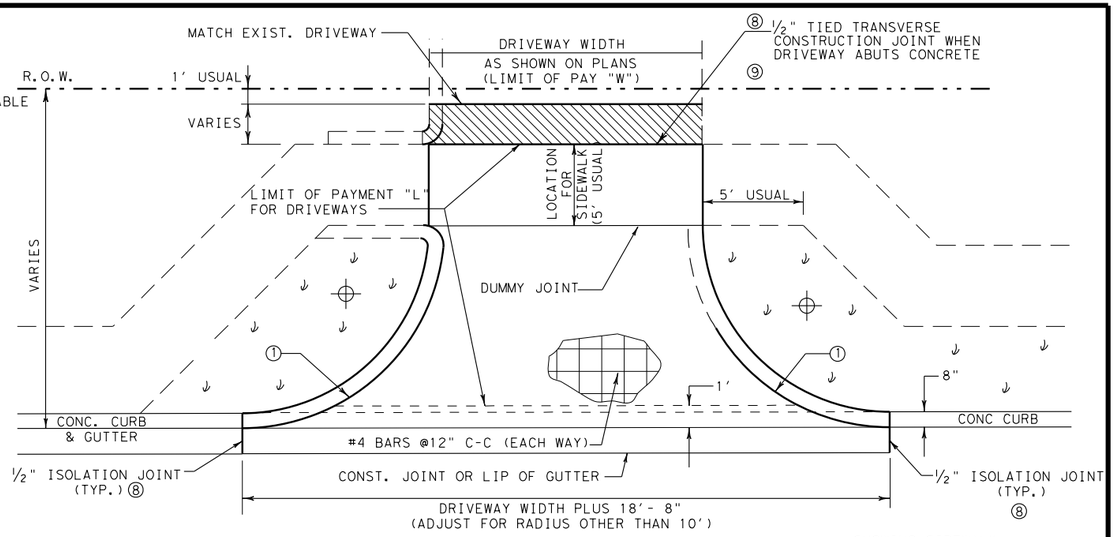
PAY AREA FOR DRIVEWAY SHALL BE THE PRODUCT OF "L" x "W"

S.Y. NON-PAY CONCRETE IN DRIVEWAY RADIUS	
2-90° RADII (FT)	NON-PAY CONC. (S.Y.)
5	0.42
10	3.04
15	10.73
20	15.36
25	29.81
30	37.19

① RADII AS SHOWN ON PLANS

SEE ROADWAY DESIGN MANUAL, APPENDIX C FOR RECOMMENDED RADII.

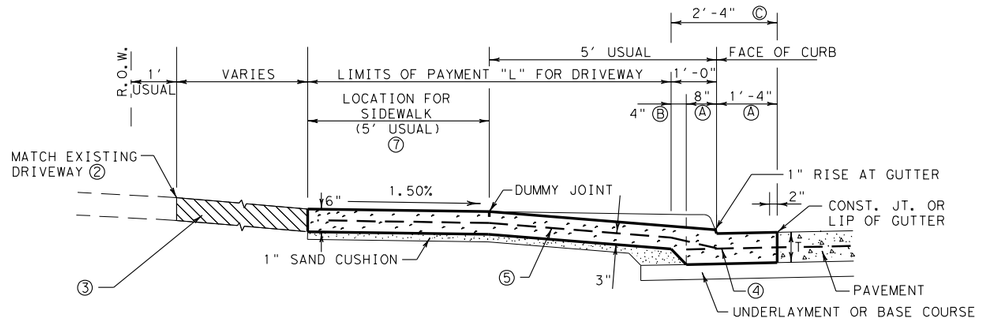
② FULL DEPTH SAW CUT IF CONCRETE



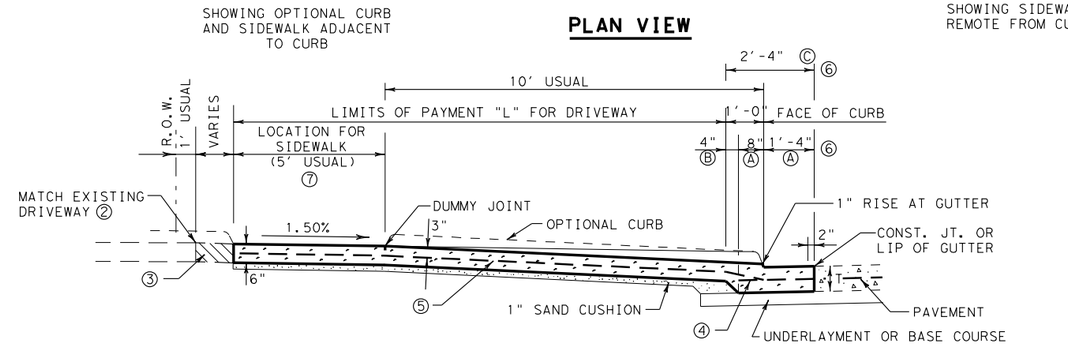
SHOWING OPTIONAL CURB AND SIDEWALK ADJACENT TO CURB

SHOWING SIDEWALK REMOTE FROM CURB

PLAN VIEW



SECTION VIEW
CONCRETE RESIDENTIAL DRIVEWAY



SECTION VIEW
CONCRETE COMMERCIAL DRIVEWAY

③ REPLACE EXISTING DRIVEWAY WITH EQUAL OR BETTER MATERIAL:

IF CONCRETE, PAY FOR AS CONCRETE DRIVEWAY.

IF HOT MIX OR OTHER MATERIAL, PAY FOR IN ACCORDANCE WITH APPROPRIATE BID ITEMS.

④ WHERE DRIVEWAY IS ADJACENT TO CONCRETE PAVEMENT, 36" - #4 TIE BAR, 12" EMBEDMENT INTO PAVEMENT (CAST-IN-PLACE OR DRILLED AND GROUTED). SPACING TO MATCH TRANSVERSE STEEL IN CONCRETE PAVEMENT.

MULTIPLE-PIECE TIE BARS OR 24" EXTENSION OF TRANSVERSE PAVING STEEL MAY BE USED IN LIEU OF TIE BARS.

LONGITUDINAL STEEL IN GUTTER PORTION TO MATCH CONCRETE PAVEMENT OR CONCRETE CURB AND GUTTER DETAILS.

⑤ #4 BARS @ 12" C-C EACH WAY (EXTEND TO FACE OF CURB) BEND AS REQ'D TO TIE TO PAVING STEEL OR TIE BARS.

⑥ IF ADJACENT TO CONCRETE PAVEMENT:
Ⓐ PAID FOR AS CONCRETE PAVEMENT,
Ⓑ PAID FOR AS CONCRETE CURB.

IF ADJACENT TO HOT MIX OR FLEXIBLE PAVEMENT:
Ⓒ PAID FOR AS CONCRETE CURB AND GUTTER.

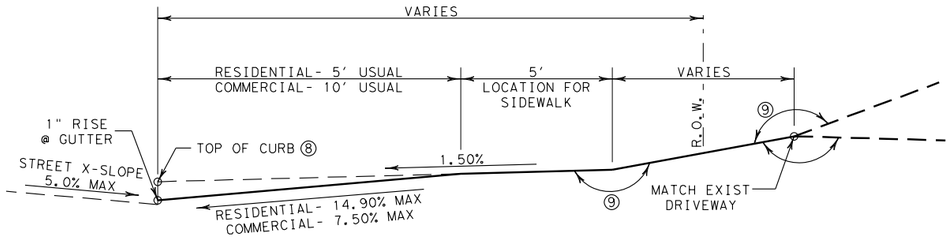
T = THICKNESS OF CONCRETE PAVEMENT OR CONCRETE CURB AND GUTTER

⑦ LOCATION FOR SIDEWALK TO BE PROVIDED ON ALL DRIVEWAYS

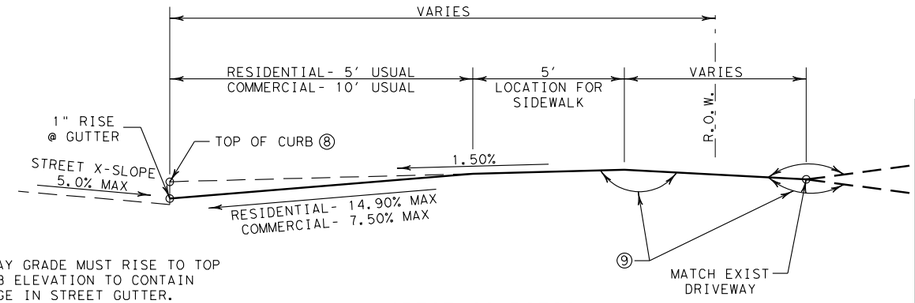
FOR SIDEWALK DETAILS, SEE STANDARD CSWD(FTW)

⑧ SEE STANDARD JS (FTW) FOR JOINT DETAILS.

⑨ IF, IN THE OPINION OF THE ENGINEER, ADJACENT CONCRETE IS NOT SOUND, 1/2" ISOLATION JOINT MAY BE USED IN LIEU OF TIED JOINT.



SAG CONDITION



CREST CONDITION

⑧ DRIVEWAY GRADE MUST RISE TO TOP OF CURB ELEVATION TO CONTAIN DRAINAGE IN STREET GUTTER.

⑨ 8% MAX CHANGE IN GRADE

ALLOWABLE DRIVEWAY GRADES

Texas Department of Transportation

Fort Worth District Standard

CONCRETE DRIVEWAY DETAILS
CDD (FTW)

ORIGINAL DRAWING: 05/2019	cdd-ftw.dgn	PROJECT NO.			SHEET NO.
DATE	REVISIONS				109
05/2019	NEW STANDARD	STATE	STATE DIST. NO.	COUNTY	
11/2020	REVISED JOINT NOMENCLATURE REVISED NOTE 4 ADD NOTE 9	TEXAS	FTW	WISE	
		CONT.	SECT.	JOB	HIGHWAY NO.
		0134	07	069	US 380

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
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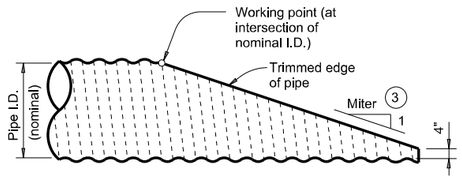
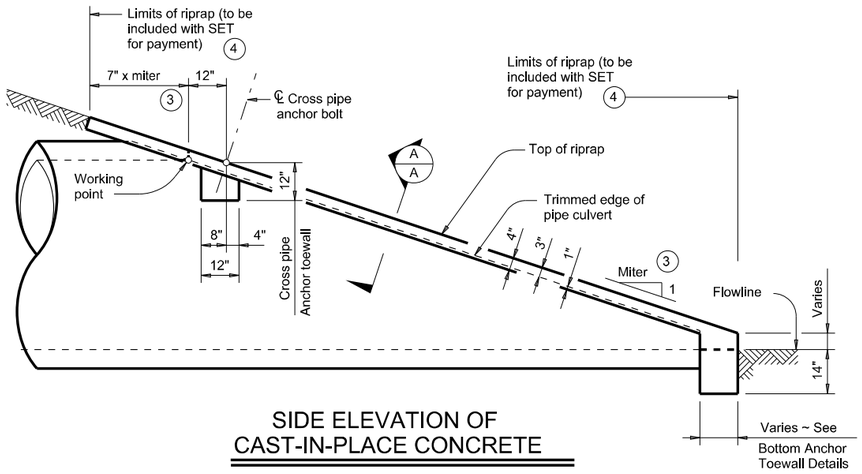


NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

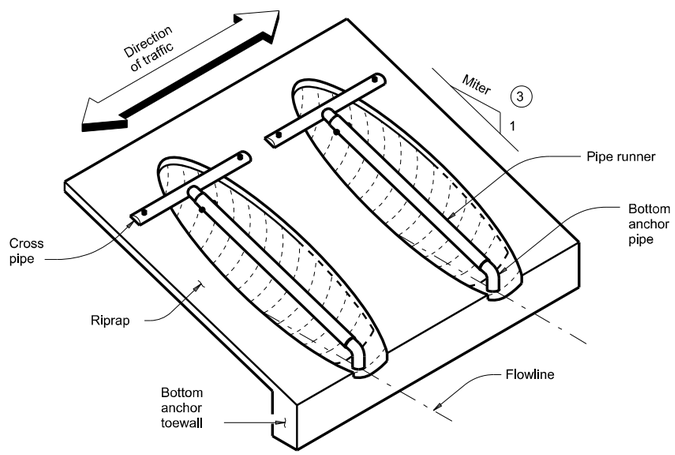
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' - 0"
4" STD	4.500"	4.026"	19' - 8"
5" STD	5.563"	5.047"	34' - 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

DATE:
FILE:

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

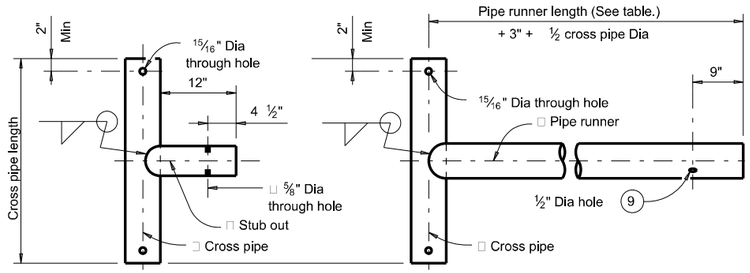
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

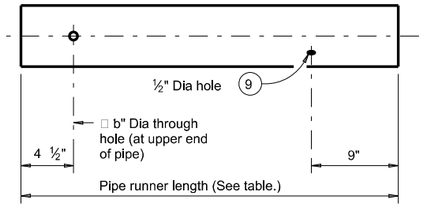
FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		110

DATE:
FILE:



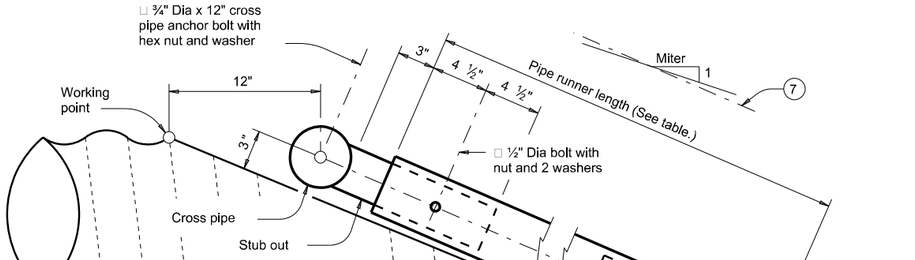
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



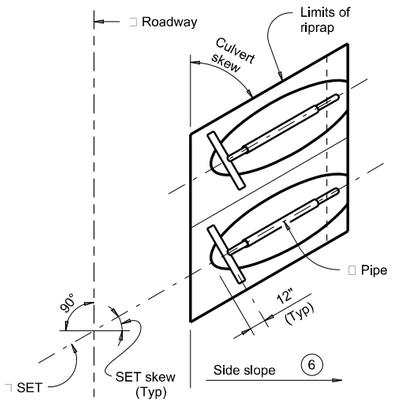
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

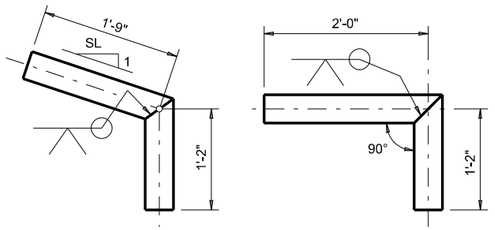


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

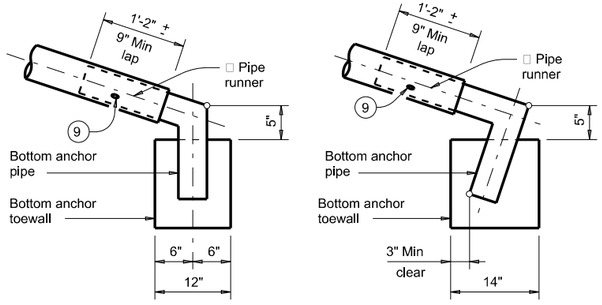


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

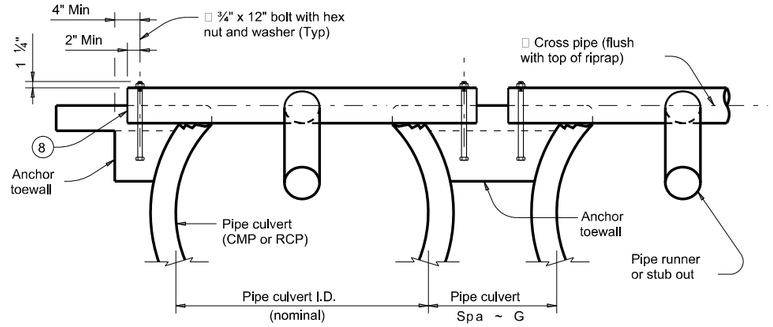
BOTTOM ANCHOR PIPE DETAILS (10)



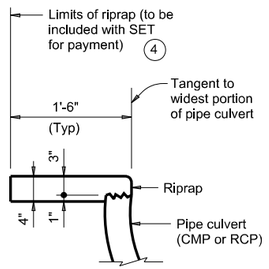
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Texas Department of Transportation

Bridge Division Standard

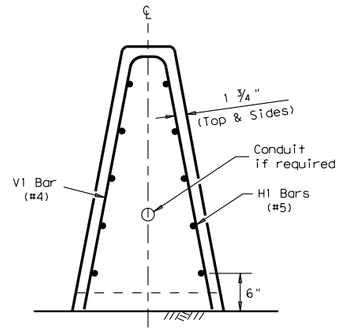
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		111

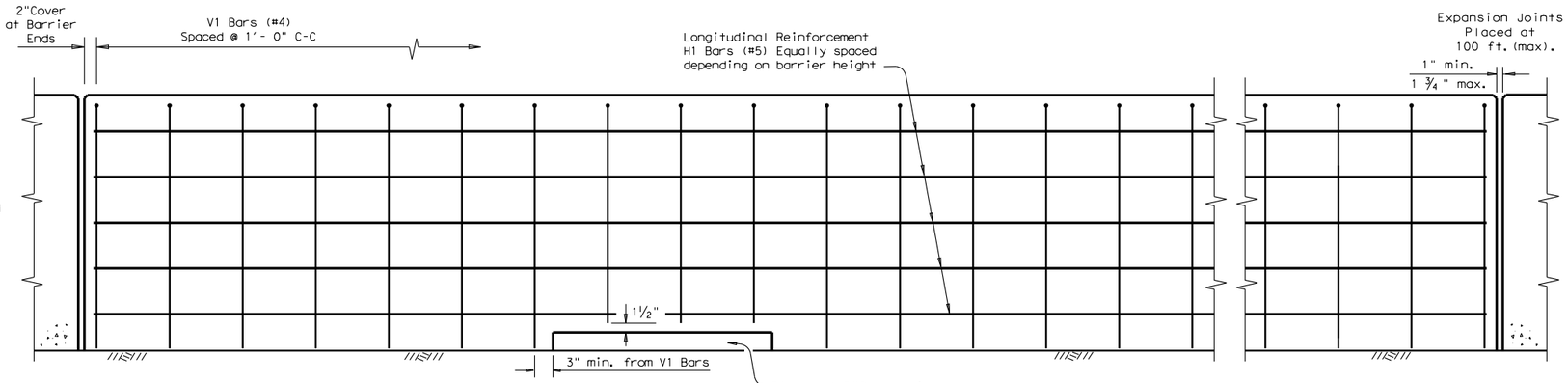
DATE:
FILE:



END VIEW

CAST-IN-PLACE (CIP) BARRIER

Barrier is Symmetrical About the Center Line

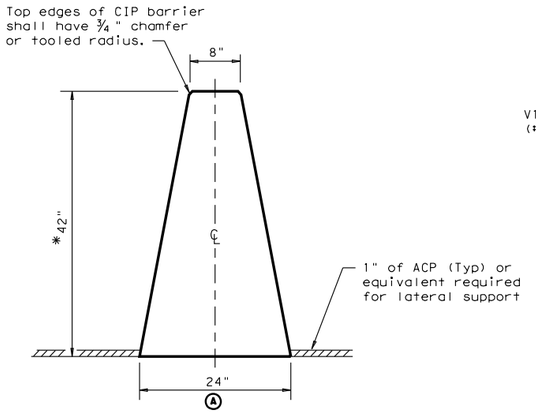


Note:
Bottom of reinforcement cage may rest on top of the finished grade.

Reinforcement around the drainage slots may be cut or bent to accommodate the edge and top clearances.

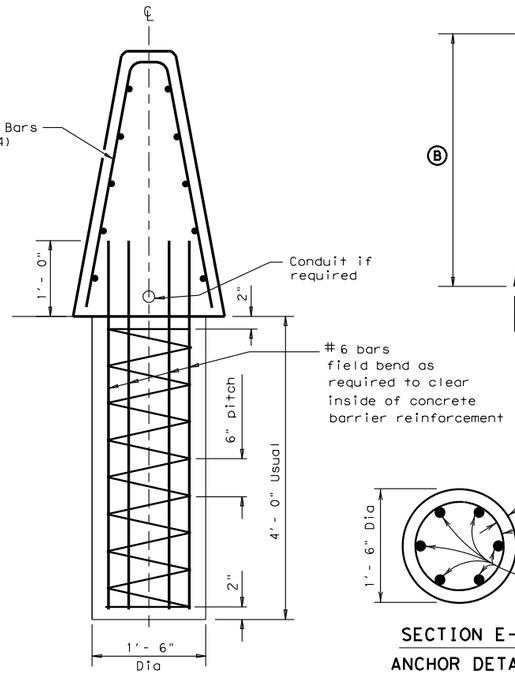
ELEVATION VIEW

Cast-in-Place (SSCB)(Type 2)on Roadway



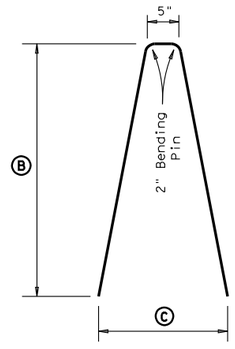
SINGLE SLOPE CONCRETE BARRIER

(SSCB)(42")



SECTION D-D

ANCHOR DETAIL

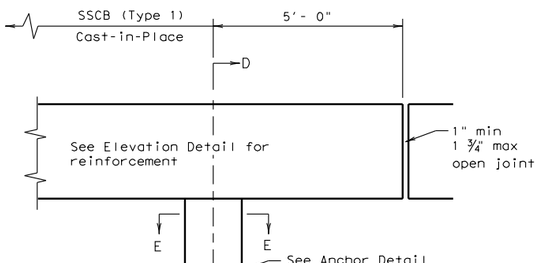


V1 Bar

#4 Rebar

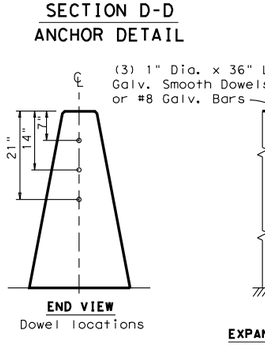
BARRIER HEIGHT (IN.)	* DIMENSIONS (IN.)		
	Ⓐ	Ⓑ	Ⓒ
42	24	40 ¼	20 ½
48	26 ¼	46 ¼	22 ¾
54	28 ½	52 ¼	25 ⁱ⁄₁₆

*(SSCB)(42") Barrier height may be increased to 48" or 54". This would increase the barrier and reinforcement dimensions accordingly.



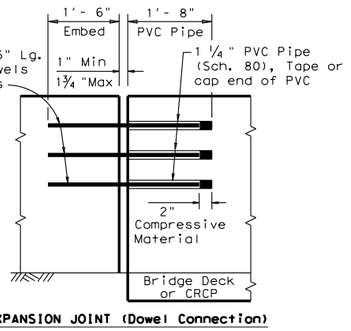
ELEVATION

ANCHOR LOCATION



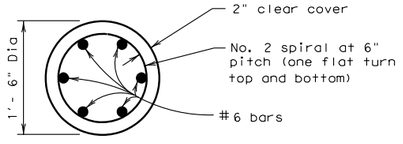
END VIEW

Dowel locations



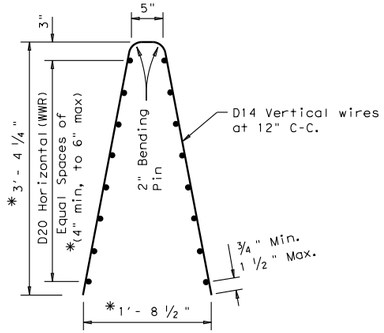
EXPANSION JOINT (Dowel Connection)

Dowels may be used, as directed by the Engineer, in locations where the barrier could be laterally displaced.



SECTION E-E

ANCHOR DETAIL



Welded Wire Reinforcement (WWR) Option for Bars V1 and H1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut and bent to accommodate the drainage slots, as directed by the Engineer.
3. Weled wire spilce locations shall have a "minimum" splice lap length of 12".
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".

GENERAL NOTES

1. Concrete shall be Class C. Unless otherwise specified in the plans.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. These details cover barrier per Item 514, "Permanent Concrete Traffic Barrier".
4. The Anchorage shown is considered subsidiary to the bid item.
5. Top edges of CIP barrier shall have a ¾" chamfer or tooled radius.
6. Drainage slot locations (12'- 0", C-C Min. Spacing) are shown elsewhere, or as directed by the Engineer. Drainage slot heights on the SSCB may be increased to a maximum of 5 inches, without geometric changes to the barrier face.
7. Cast-in-place barrier may be slip formed. Bracing may be tied or tack welded to the reinforcement cage to provide cage stability. Do not weld to anchorage.
8. For locations where lighting is required, see the SSCB(4) sheet for the proper reinforcement and anchorage.

Cast-In-Place (CIP) or Slip-Formed (SSCB)

Cast-in-Place barrier may be connected to precast SSCB. Joint connection "Types" may be used in Cast-in-Place barrier, to match the precast barrier connection. (See required connection "Type" elsewhere in the plans)

The weight of Cast-in-Place (SSCB)42" is approx. 717 lbs per ft.

Texas Department of Transportation

Design Division Standard

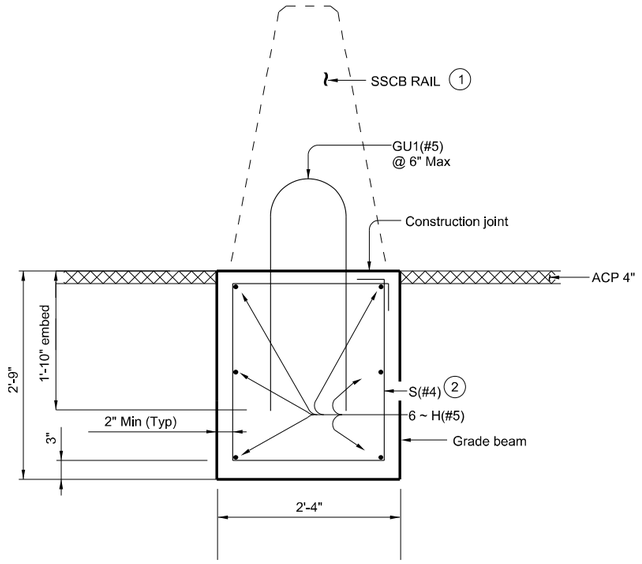
SINGLE SLOPE CONCRETE BARRIER

CAST-IN-PLACE
(TYPE 1)
(FLEXIBLE PAVEMENT)

SSCB(1F)-10

FILE: sscb1f10.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		112

DATE:
FILE:



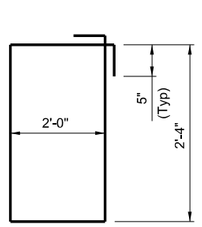
SECTION OF TRAFFIC RAIL ON TYPICAL GRADE BEAM (SSCB)

(Showing SSCB rail anchorage, other rails are similar. Rail reinforcing not shown for clarity.)

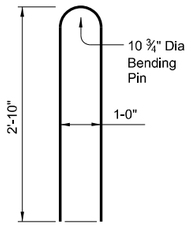
(1) See SSCB (1F)-10 rail standard for details and notes not shown.

(2) S(#4) space longitudinally along grade beam at 8" Max.

(3) Approximate grade beam concrete = 0.24 CY/LF and reinforcement = 30 LB/LF.



BARS S(#4)



BARS GU1(#5)

CONSTRUCTION NOTES:

Align moment slab (SSCB) or grade beam (SSCB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (SSCB) or grade beam (SSCB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars S(#4), H(#5), GU1(#5), unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"
Uncoated or galvanized ~ #6 = 2'-5"
Epoxy coated ~ #6 = 3'-7"

GENERAL NOTES:

Use of these details will result in a moment slab (SSCB) or grade beam (SSCB) foundation that is acceptable for traffic rails.

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab and/or grade beam will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Aug 29, 2022

Weixiong Chen, PE

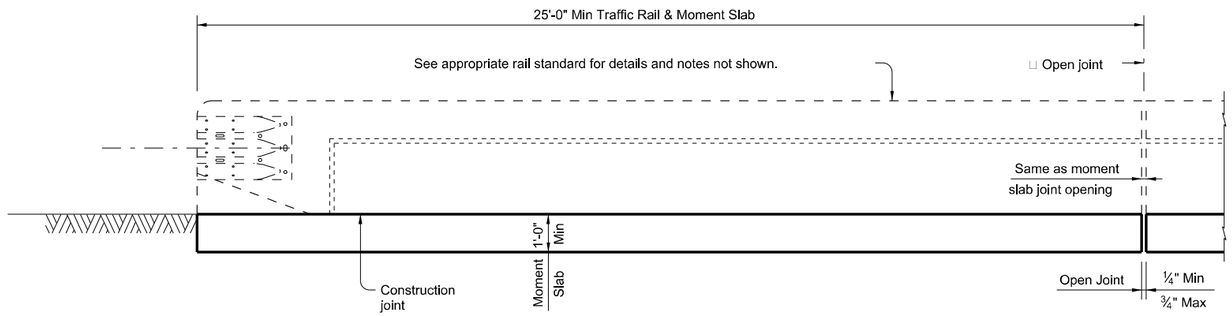
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS

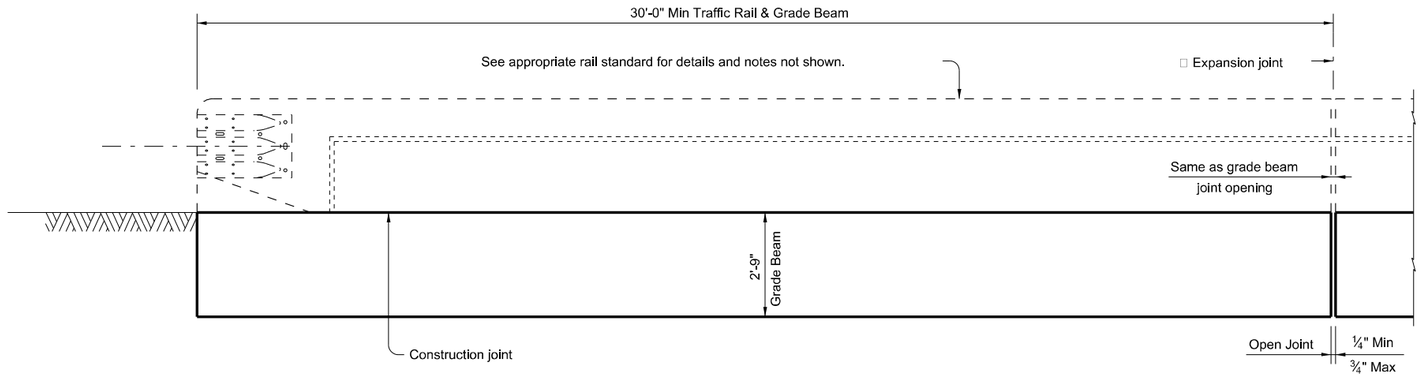
FILE: rlstd049-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT July 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		113

DATE:
FILE:



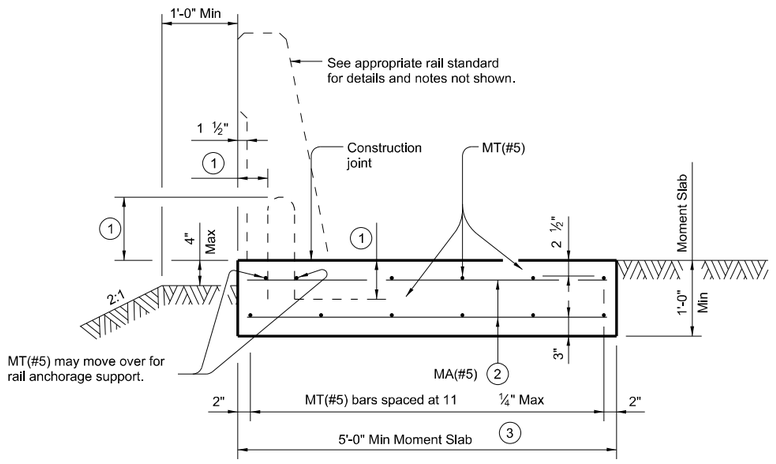
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



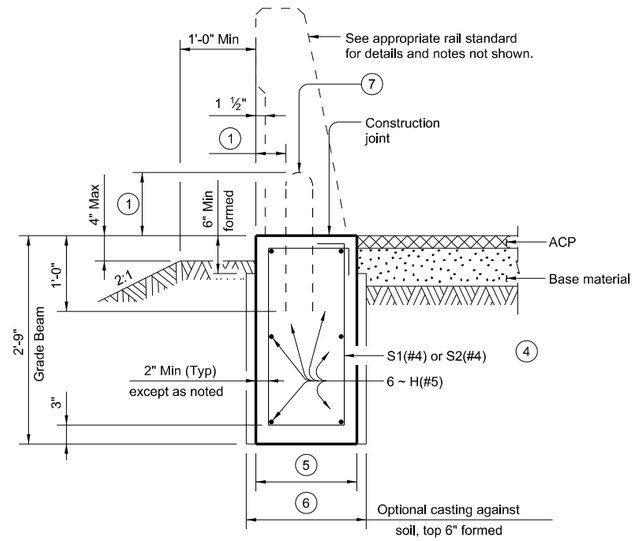
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



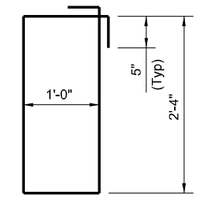
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

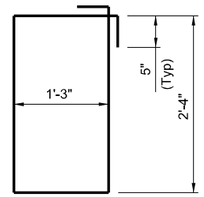
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.
   Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66.
   Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

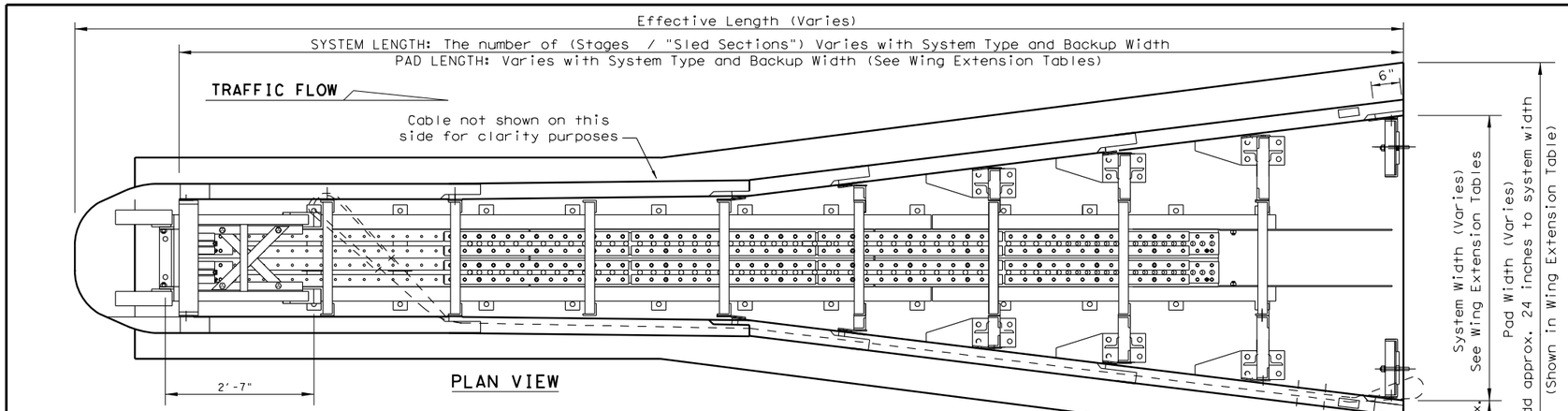
TRAFFIC RAIL FOUNDATIONS

FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

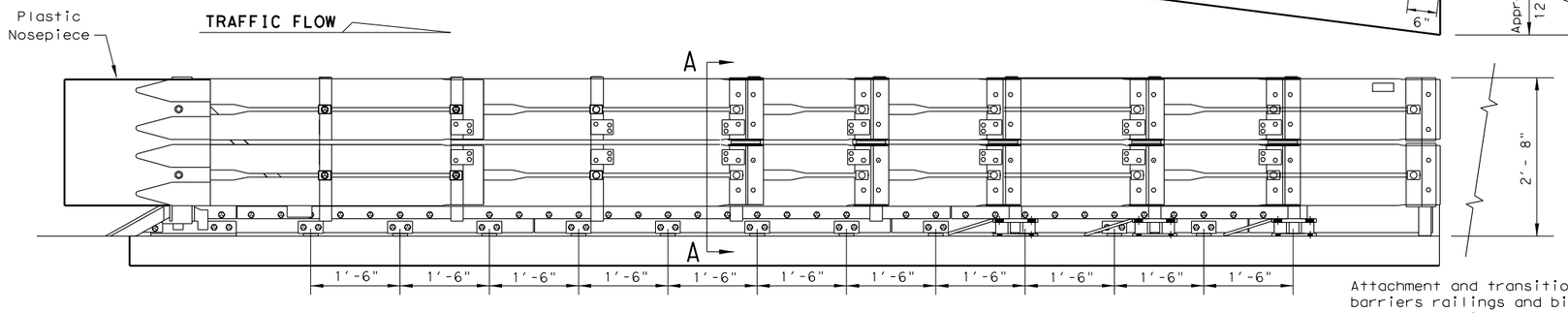
TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 07-20: Added moment slab with rail foundation lengths.	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		114

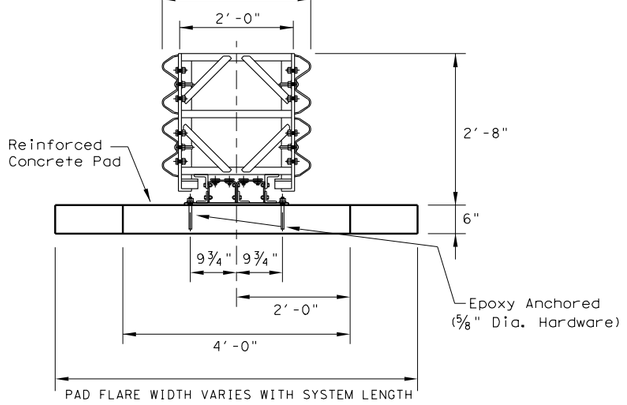
DATE:
FILE:



PLAN VIEW



ELEVATION VIEW



SECTION A-A

TYPE (WIDE)	TEST LEVEL
FASTRACC (4 Stage System)	70
TRACC (3 Stage System)	TL-3
SHORTRACC (2 Stage System)	TL-2

NOTE: The Stage System refers to number of replaceable "sled sections" that could be replaced independently.

Wide-FASTRACC WING EXTENSIONS

NUMBER OF WING EXTENSIONS	WIDTH	SYSTEM LENGTH	EFFECTIVE LENGTH	Wide-FASTRACC EXTENSION PART NUMBER (LEFT# / RIGHT#)
0 (BASE UNIT)	71"	25'-11"	27'-11"	
1	78"	28'-3"	30'-3"	33940
2	85"	30'-7"	32'-7"	33941 / 33942
3	92"	32'-11"	34'-11"	33943 / 33944
4	99"	35'-2"	37'-2"	33945 / 33946
5	106"	37'-6"	39'-6"	33947 / 33948
6	113"	39'-10"	41'-10"	33949 / 33950
7	120"	42'-2"	44'-2"	33951 / 33952
8	127"	44'-5"	46'-5"	33953 / 33954
9	134"	46'-9"	48'-9"	33955 / 33956
10	141"	49'-1"	51'-1"	33957 / 33958
10+				CONSULT TRINITY SALES PERSON

Wide-TRACC WING EXTENSIONS

NUMBER OF WING EXTENSIONS	WIDTH	SYSTEM LENGTH	EFFECTIVE LENGTH	Wide-TRACC EXTENSION PART NUMBER (LEFT# / RIGHT#)
0 (BASE UNIT)	58"	21'	23'	
1	65"	23'-4"	25'-4"	33940
2	72"	25'-8"	27'-8"	33941 / 33942
3	79"	28'	30'	33943 / 33944
4	86"	30'-4"	32'-4"	33945 / 33946
5	92"	32'-8"	34'-8"	33947 / 33948
6	99"	35'	37'	33949 / 33950
7	106"	37'-4"	39'-4"	33951 / 33952
8	113"	39'-8"	41'-8"	33953 / 33954
9	120"	42'	44'	33955 / 33956
10	127"	44'-4"	46'-4"	33957 / 33958
10+				CONSULT TRINITY SALES PERSON

Wide-SHORTRACC WING EXTENSIONS

NUMBER OF WING EXTENSIONS	WIDTH	SYSTEM LENGTH	EFFECTIVE LENGTH	Wide-SHORTRACC EXTENSION PART NUMBER (LEFT# / RIGHT#)
0 (BASE UNIT)	39"	15'	17'	
1	46"	17'-4"	19'-4"	33940
2	53"	18'-9"	20'-9"	33941 / 33942
3	60"	21'-1"	23'-1"	33943 / 33944
4	66"	23'-5"	25'-5"	33945 / 33946
5	73"	25'-8"	27'-8"	33947 / 33948
6	80"	28'-1"	30'-1"	33949 / 33950
7	87"	30'-4"	32'-4"	33951 / 33952
8	94"	32'-7"	34'-7"	33953 / 33954
9	101"	34'-11"	36'-11"	33955 / 33956
10	108"	37'-3"	39'-3"	33957 / 33958
10+				CONSULT TRINITY SALES PERSON

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Trinity Highway at 1(888)323-6374. 2525 N. Stemmons Freeway - Dallas, TX 75207
2. Contact the company for: Custom widths from 31" up to 57" wide, and transition panels for bi-directional traffic applications.
3. Details of components for the WideTRACC, Backups and re-inforcing details will be shown on the manufacturer's shop drawings furnished to the Engineer.
4. Concrete shall be class "S" with a min. compressive strength 4,000 p.s.i.
5. If the cross-slope varies more than 2% over the length of the system, the concrete pad will require leveling. Maximum permissible cross-slope 8%.
6. The installation area should be free from curbs, elevated objects, or depressions.
7. The WideTRACC system should be approximately parallel with the barrier or ℄ of merging barriers.
8. The Unit shown is flared on both sides, but can be flared on a single side ether left or right. The flares will effect the length and width of the system. (See Wing Extension Tables)

Attachment and transitions to other shapes, barriers railings and bi-directional traffic flows are available. (See manufacturer's product manual).

BACKUP SUPPORT OPTIONS
SQUARE CONCRETE BACKUP
CONCRETE BARRIER (CTB) BACKUP
SINGLE SLOPE CONCRETE BARRIER(SSCB)
GUARDRAIL BACKUP (BASE-PLATED POST)
GUARDRAIL BACKUP (DRIVEN POST)
TRANSITION OPTIONS
VERTICAL WALL
MODIFIED (CTB) TO VERTICAL WALL
CONCRETE BARRIER (CTB)
GUARDRAIL (W-BEAM)
GUARDRAIL (THRIE-BEAM)

FOR BI-DIRECTIONAL TRANSITION PANEL DETAILS (SEE MANUFACTORER'S PRODUCT MANUAL).

BACKUP AND TRANSITION TYPES ARE SHOWN ELSEWHERE ON THE PLANS, (I.E. ATTENUATOR LOCATION DETAILS OR IN THE GENERAL NOTES).

FOUNDATION OPTIONS
6" REINFORCED CONCRETE
8" UNREINFORCED CONCRETE
3" MIN. ASPHALT OVER 3" MIN. CONCRETE
6" ASPHALT OVER 6" COMPACT SUBBASE
8" MINIMUM ASPHALT

FOR STEEL PLACEMENT IN CONCRETE FOUNDATIONS, (SEE MANUFACTURER'S PRODUCT MANUAL).

Wide-TRACC - BILL OF MATERIAL

PART #	FAST TRACC QTY	TRACC QTY	SHORT TRACC QTY	DESCRIPTION
25937A	1			WIDEFASTRACC UNIT ASSEMBLY
25939A		1		WIDETRACC UNIT ASSEMBLY
25997A			1	WIDESHORTRACC UNIT ASSEMBLY
3310G	4	4	4	⅝" LOCKWASHER
4372G	4	4	4	⅝" FLATWASHER
4451G	4	4	4	⅝" DIA X 6" EXP. WEDGE ANCHOR
6531B	1	1	1	PLASTIC NOSEPIECE
6668B	4	4	4	REFLECTIVE SHEETING
ANCHOR HARDWARE (CONCRETE BASE)				
5204B	72	50	18	⅝" DIA X 7-1/16" THD ANCHOR STUD
4372G	72	50	18	⅝" FLATWASHER
3310G	72	50	18	⅝" LOCKWASHER
3361G	72	50	18	⅝" HEX NUT
5206B	6	4	2	Adhesive, Hilti Hit HY-150
ANCHOR HARDWARE (ASPHALT BASE)				
6380G	72	50	18	⅝"Dia x 18" Thd Anchor Stud
4372G	72	50	18	⅝" Flatwasher
3310G	72	50	18	⅝" Lockwasher
3361G	72	50	18	⅝" HEX NUT
5206B	15	11	4	ADHESIVE, HILTI HIT HY-150
ANCHOR HARDWARE (OPTIONAL ITEMS, AS NEEDED)				
5207B	A/R	A/R	A/R	NOZZLE, MIXER, HILTI HIT HY-150
5208B	A/R	A/R	A/R	EXT. TUBE, MIXER, HILTI HIT HY-150
5205B	A/R	A/R	A/R	DISPENSER GUN, HILTI HIT HY-150
5209B	A/R	A/R	A/R	DRILL BIT, 11/16", HILTI SDS

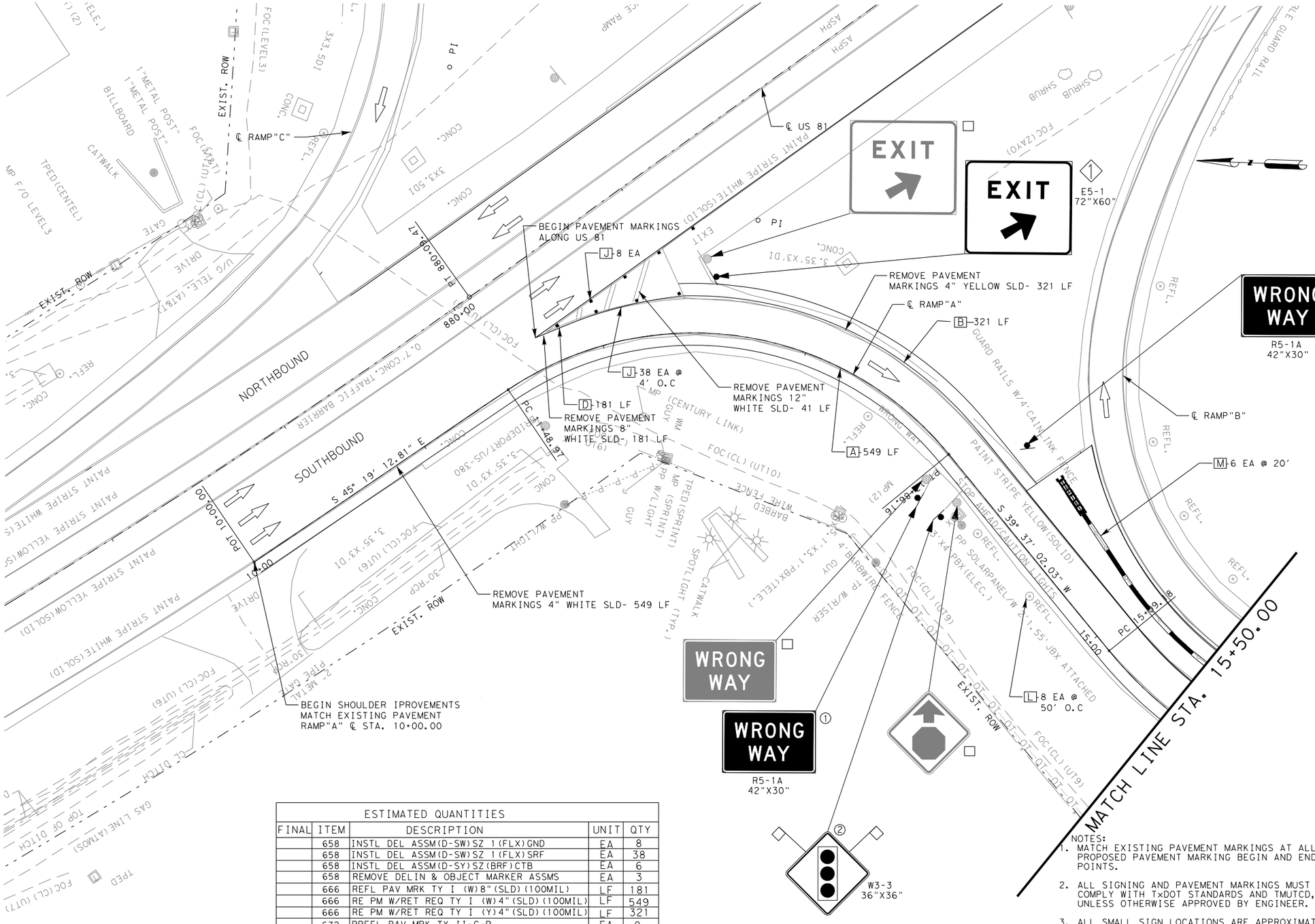
Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
CRASH CUSHION (WIDE UNIT)
TRACC(W)-16

FILE: traccw16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	013407	069		US 380
REVISED 06, 2013 (VP)	DIST	COUNTY		SHEET NO.
REVISED 03, 2016 (VP)	FTW	WISE		115

REUSABLE



PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by PHILLIP J. PAWELEK P.E. 82739, on 7.20, 2022

Phillip J. Pawelek, P.E.

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)GND	EA	8
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)SRF	EA	38
	658	INSTL DEL ASSM(D-SY)SZ(BRF)CTB	EA	6
	658	REMOVE DELIN & OBJECT MARKER ASSMS	EA	3
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	181
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	549
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	321
	672	RREFL PAV MRK TY II-C-R	EA	8

SUMMARY OF LARGE SIGNS

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	636	ALUMINUM SIGN (TY G)	SY	40
	644	TYS80(2) SA(P)	EA	1

SUMMARY OF SMALL SIGNS

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	636	REPLACE EXISTING ALUMINUM SIGN (TY A)	SY	9
	644	10 BWG(1) SA(P)	EA	2

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (RAMP A)

SCALE: 1"=50' SHEET 1 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	116

STATE	DIST.	COUNTY
TEXAS	FTW	WISE

CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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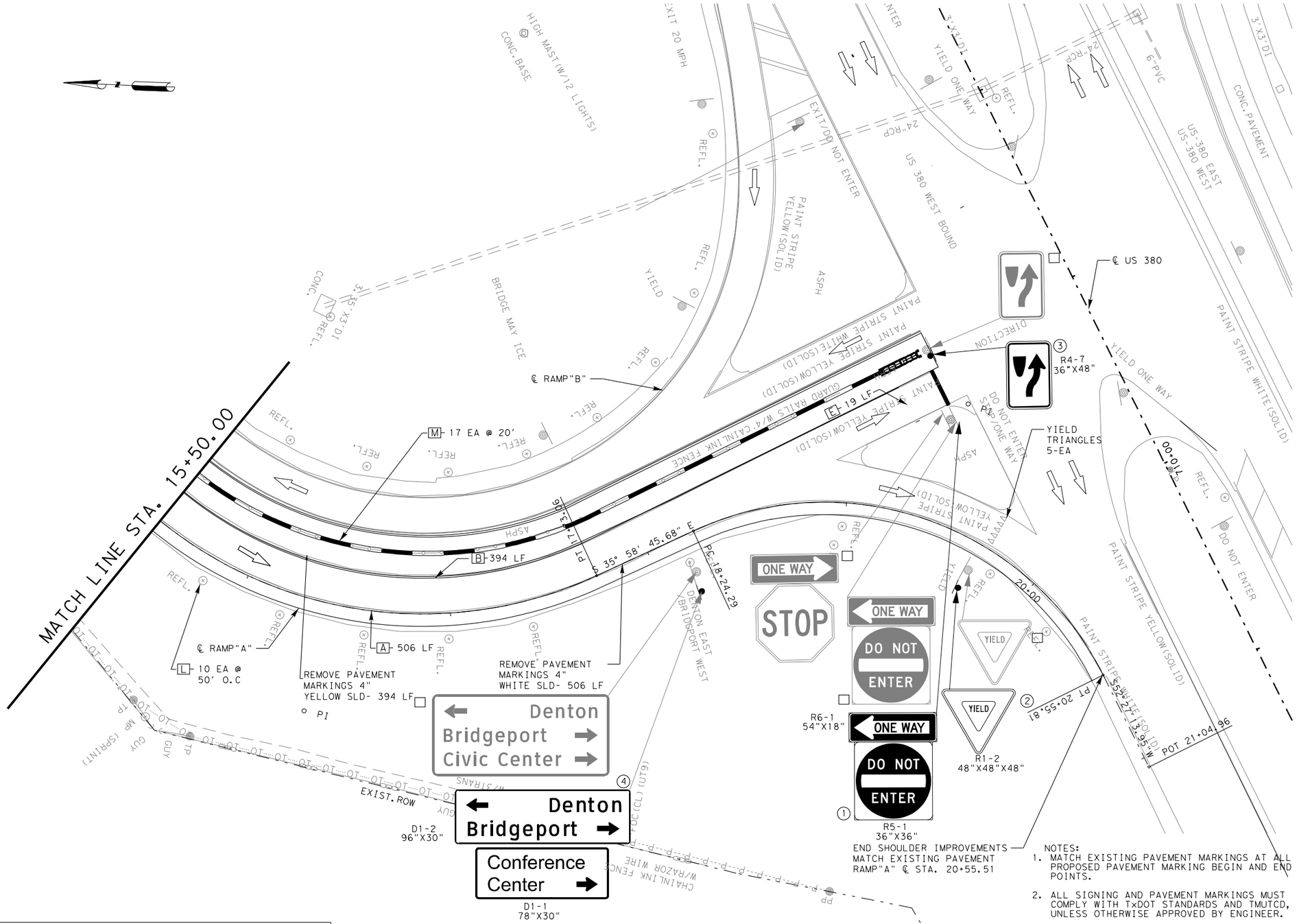

PLAN LEGEND

PAVEMENT MARKINGS

- [A] (W) (4") (SLD)
- [B] (Y) (4") (SLD)
- [C] (W) (4") (BRK)
- [D] (W) (8") (SLD)
- [E] (W) (PREFAB 24") (SLD)
- [F] (W) (PREFAB WORD)
- [G] (W) (PREFAB ARROW)
- [H] (W) (12") (SLD)
- [I] (W) (12") (DOT)

RAISED PAVEMENT MARKERS

- [J] REFL PAV MRK TY II-CR

DELINEATORS

- [K] INSTL DEL ASSM(D-SW)S21(FLX)SRF
- [L] INSTL DEL ASSM(D-SW)S21(FLX)GND
- [M] INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)GND	EA	10
	658	INSTL DEL ASSM(D-SY)SZ (BRF)CTB	EA	17
	658	REMOVE DELIN & OBJECT MARKER ASSMS	EA	10
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	506
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	394
	668	PREFAB PAV MRK TY B (W)24"(SLD)	LF	19

SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	644	10 BWG(1) SA(P)	EA	3
	644	TYS80(1) SA(U)	EA	1

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (RAMP A)

SCALE: 1"=50' SHEET 2 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	117

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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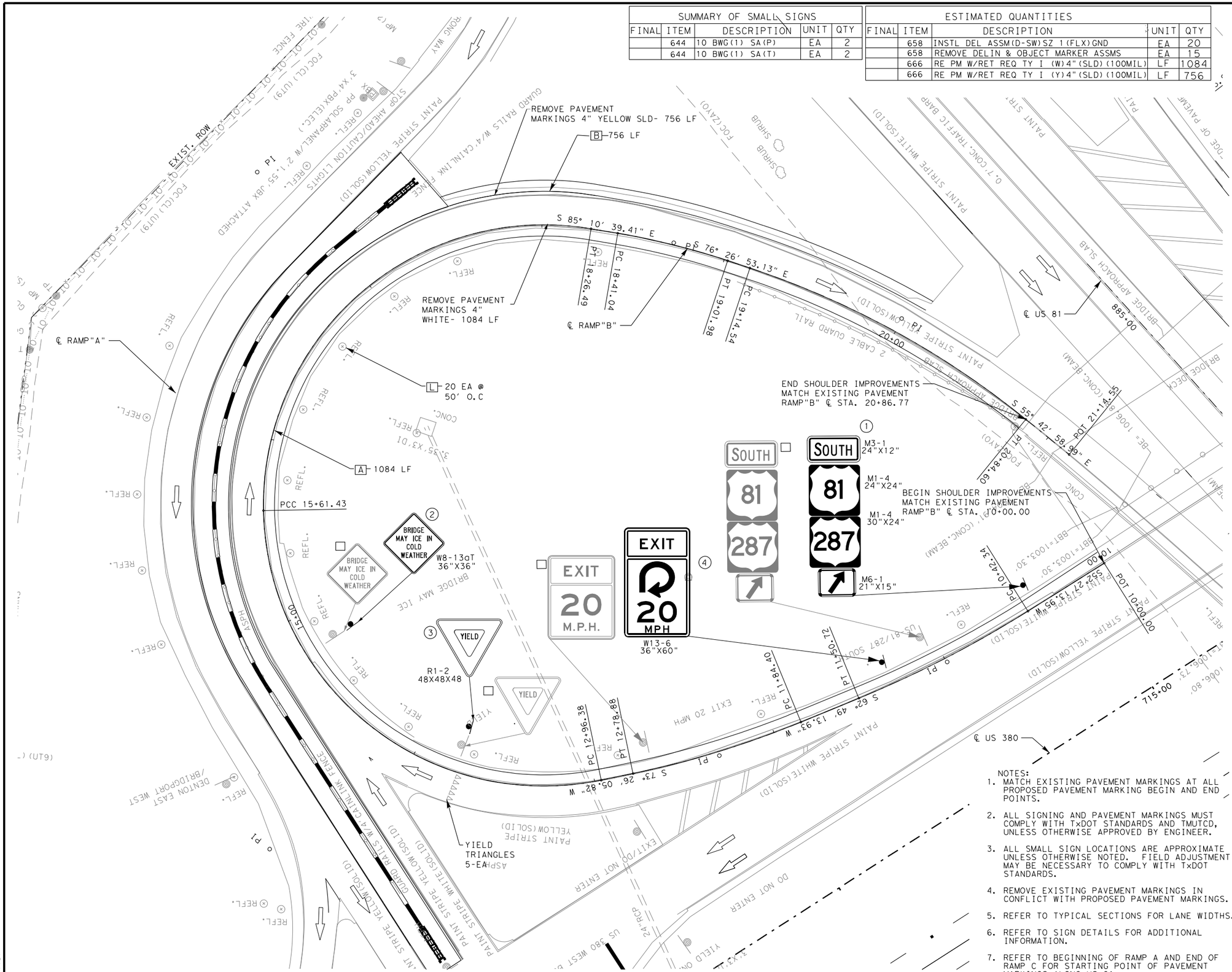
SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	644	10 BWG(1) SA(P)	EA	2
	644	10 BWG(1) SA(T)	EA	2

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)GND	EA	20
	658	REMOVE DELIN & OBJECT MARKER ASSMS	EA	15
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1084
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	756



PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

NOTES:
1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
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4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (RAMP B)

SCALE: 1"=50' SHEET 3 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		118
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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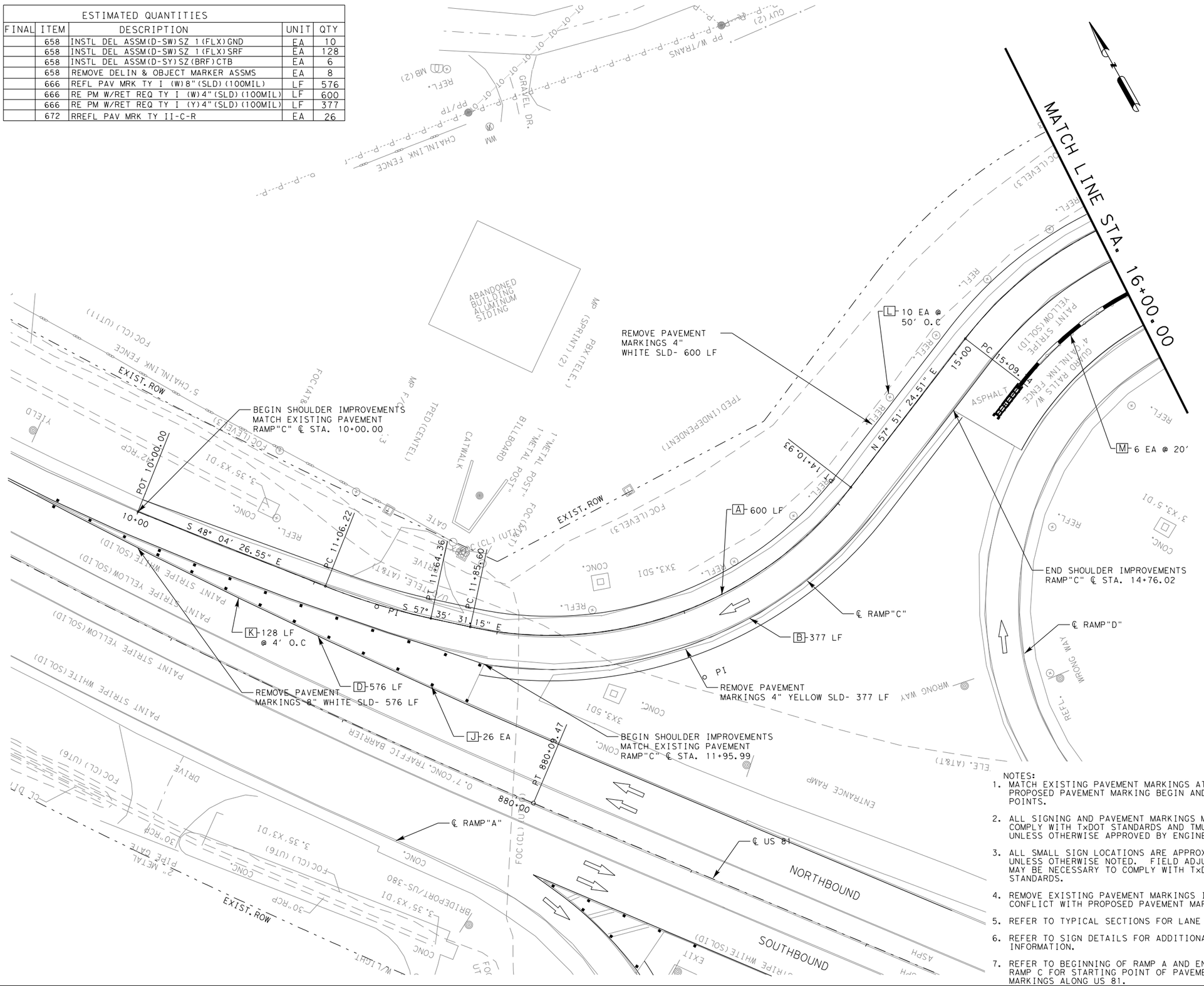
ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)GND	EA	10
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)SRF	EA	128
	658	INSTL DEL ASSM(D-SY)SZ(BRF)CTB	EA	6
	658	REMOVE DELIN & OBJECT MARKER ASSMS	EA	8
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	576
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	600
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	377
	672	RREFL PAV MRK TY II-C-R	EA	26



PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (RAMP C)

SCALE: 1"=50' SHEET 4 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		119
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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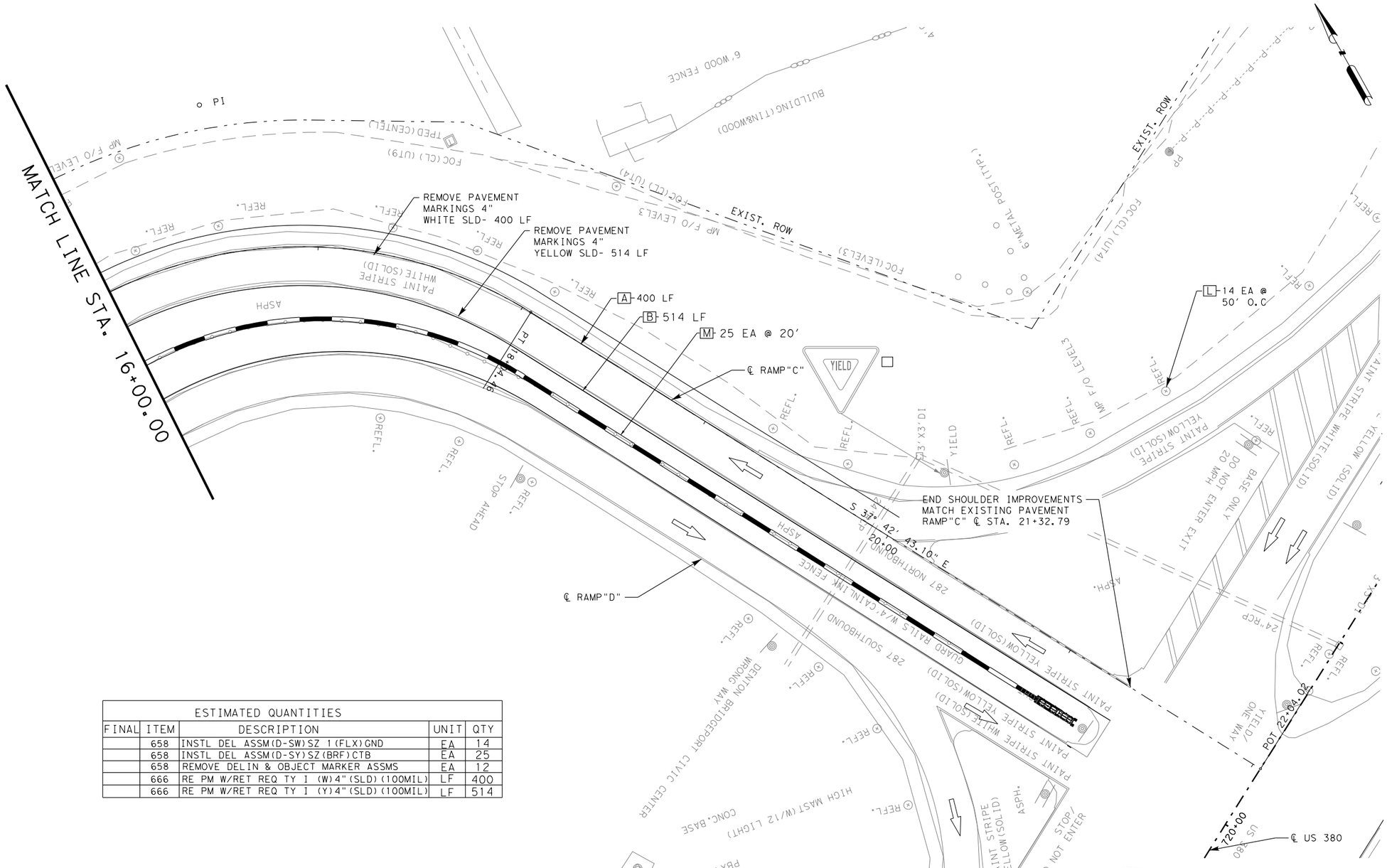

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)GND	EA	14
	658	INSTL DEL ASSM(D-SY)SZ(BRF)CTB	EA	25
	658	REMOVE DELIN & OBJECT MARKER ASSMS	EA	12
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	400
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	514

PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (RAMP C)

SCALE: 1"=50' SHEET 5 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		120
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	644	10 BWG(1) SA(P)	EA	5
	644	10 BWG(1) SA(T)	EA	3
	644	TYS80(1) SA(U)	EA	2

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)GND	EA	22
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)SRF	EA	150
	658	REMOVE DELIN & OBJECT MARKER ASSMS	EA	13
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	277
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1,241
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	932
	668	PREFAB PAV MRK TY B (W)24"(SLD)	LF	16
	672	RREFL PAV MRK TY II-C-R	EA	13

PLAN LEGEND

PAVEMENT MARKINGS

- [A] (W)(4")(SLD)
- [B] (Y)(4")(SLD)
- [C] (W)(4")(BRK)
- [D] (W)(8")(SLD)
- [E] (W)(PREFAB 24")(SLD)
- [F] (W)(PREFAB WORD)
- [G] (W)(PREFAB ARROW)
- [H] (W)(12")(SLD)
- [I] (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- [J] REFL PAV MRK TY II-CR

DELINEATORS

- [K] INSTL DEL ASSM(D-SW)S21(FLX)SRF
- [L] INSTL DEL ASSM(D-SW)S21(FLX)GND
- [M] INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- (#) SMALL SIGNS TO BE INSTALLED
- ◇(#) LARGE SIGNS TO BE INSTALLED
- □ SIGNS TO BE REMOVED
- △ SIGNS TO REMAIN IN PLACE
- ⇦ TRAFFIC FLOW ARROW

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (RAMP D)

SCALE: 1"=50' SHEET 6 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	121

STATE	DIST.	COUNTY
TEXAS	FTW	WISE

CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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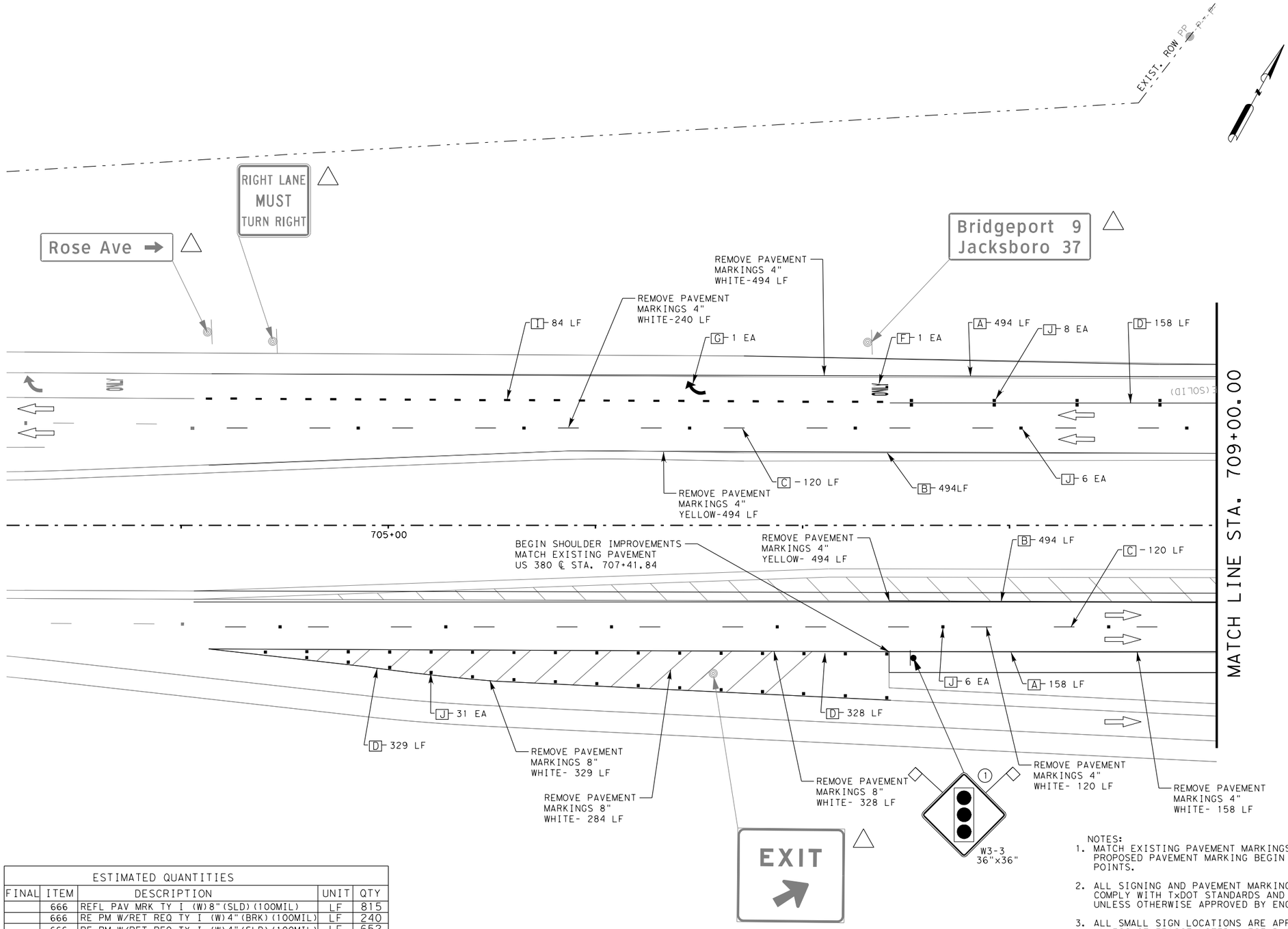

PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

STATE OF TEXAS
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Phillip J. Pawelek, P.E.

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	815
	666	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	240
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	652
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	988
	666	REFL PAV MRK TY I (W)12"(DOT)(100MIL)	LF	84
	668	PREFAB PAV MRK TY B (W)ARROW	LF	1
	668	PREFAB PAV MRK TY B (W)WORD	LF	1
	672	RREFL PAV MRK TY II-C-R	EA	51

SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	644	10 BWG(1) SA(P)	EA	1

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
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3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (US 380)

SCALE: 1"=50' SHEET 7 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	122

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	644	10 BWG(1) SA(P)	EA	4
	644	TYS80(1) SA(U)	EA	1

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)SRF	EA	183
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	662
	666	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	180
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	762
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	839
	668	PREFAB PAV MRK TY B (W)24"(SLD)	LF	60
	672	REFL PAV MRK TY II-C-R	EA	40

SUMMARY OF LARGE SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	636	ALUMINUM SIGN (TY G)	SY	40
	644	TYS80(2) SA(P)	EA	1

PLAN LEGEND

PAVEMENT MARKINGS

- [A] (W)(4")(SLD)
- [B] (Y)(4")(SLD)
- [C] (W)(4")(BRK)
- [D] (W)(8")(SLD)
- [E] (W)(PREFAB 24")(SLD)
- [F] (W)(PREFAB WORD)
- [G] (W)(PREFAB ARROW)
- [H] (W)(12")(SLD)
- [I] (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- [J] REFL PAV MRK TY II-CR

DELINEATORS

- [K] INSTL DEL ASSM(D-SW)S21(FLX)SRF
- [L] INSTL DEL ASSM(D-SY)SZ(BRF)CTB
- [M] INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- (#) SMALL SIGNS TO BE INSTALLED
- ◇(#) LARGE SIGNS TO BE INSTALLED
- □ SIGNS TO BE REMOVED
- △ SIGNS TO REMAIN IN PLACE
- ⇦ TRAFFIC FLOW ARROW

MATCH LINE STA. 709+00.00

MATCH LINE STA. 714+00.00

EXIST. ROW

℄ RAMP"A"

℄ RAMP"B"

℄ US 380

710+00

REMOVE PAVEMENT MARKINGS 4" YELLOW- 72 LF

[B] 63 LF

[D] 77 LF

[B] 73 LF

[D] 173 LF

REMOVE PAVEMENT MARKINGS 4" YELLOW- 77 LF

REMOVE PAVEMENT MARKINGS 4" WHITE- 260 LF

REMOVE PAVEMENT MARKINGS 8" WHITE- 177 LF

REMOVE PAVEMENT MARKINGS 24" WHITE- 19 LF

[A] 95 LF

[J] 12 EA

[D] 276 LF

[J] 20 EA

[A] 167 LF

[K] 156 LF @ 4' O.C

[B] 156 LF

REMOVE PAVEMENT MARKINGS 4" YELLOW- 156 LF

[D] 136 LF

REMOVE PAVEMENT MARKINGS 12" WHITE- 64 LF

[E] 24 LF

REMOVE PAVEMENT MARKINGS 4" YELLOW- 175 LF

[J] 4 EA

[C] 100 LF

[B] 220 LF

REMOVE PAVEMENT MARKINGS 8" WHITE- 481 LF

REMOVE PAVEMENT MARKINGS WITHIN THIS BOX 36" YIELD TRIANGLES= 16 EA

[B] 79 LF

REMOVE PAVEMENT MARKINGS WITHIN THIS BOX 36" YIELD TRIANGLES= 16 EA

REMOVE PAVEMENT MARKINGS 4" YELLOW- 175 LF

[B] 176 LF

[J] 4 EA

[C] 80 LF

[B] 72 LF

[E] 36 LF

REMOVE PAVEMENT MARKINGS 4" YELLOW-166 LF

REMOVE PAVEMENT MARKINGS 4" WHITE- 500 LF

[A] 500 LF

REMOVE PAVEMENT MARKINGS 4" WHITE- 130 LF

(1) R5-1 36"X36"

(2) R5-1 36"X36"

(3) M3-1 24"X12" EAST; M3-1 24"X12" WEST; M1-4 30"X24"; M1-4 30"X24"; M6-1 21"X15"; M6-1 21"X15"

(4) R5-1 36"X36"

(5) R5-1 36"X36"

E5-1bT 72"X60"

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (US 380)

SCALE: 1"=50' SHEET 8 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	123

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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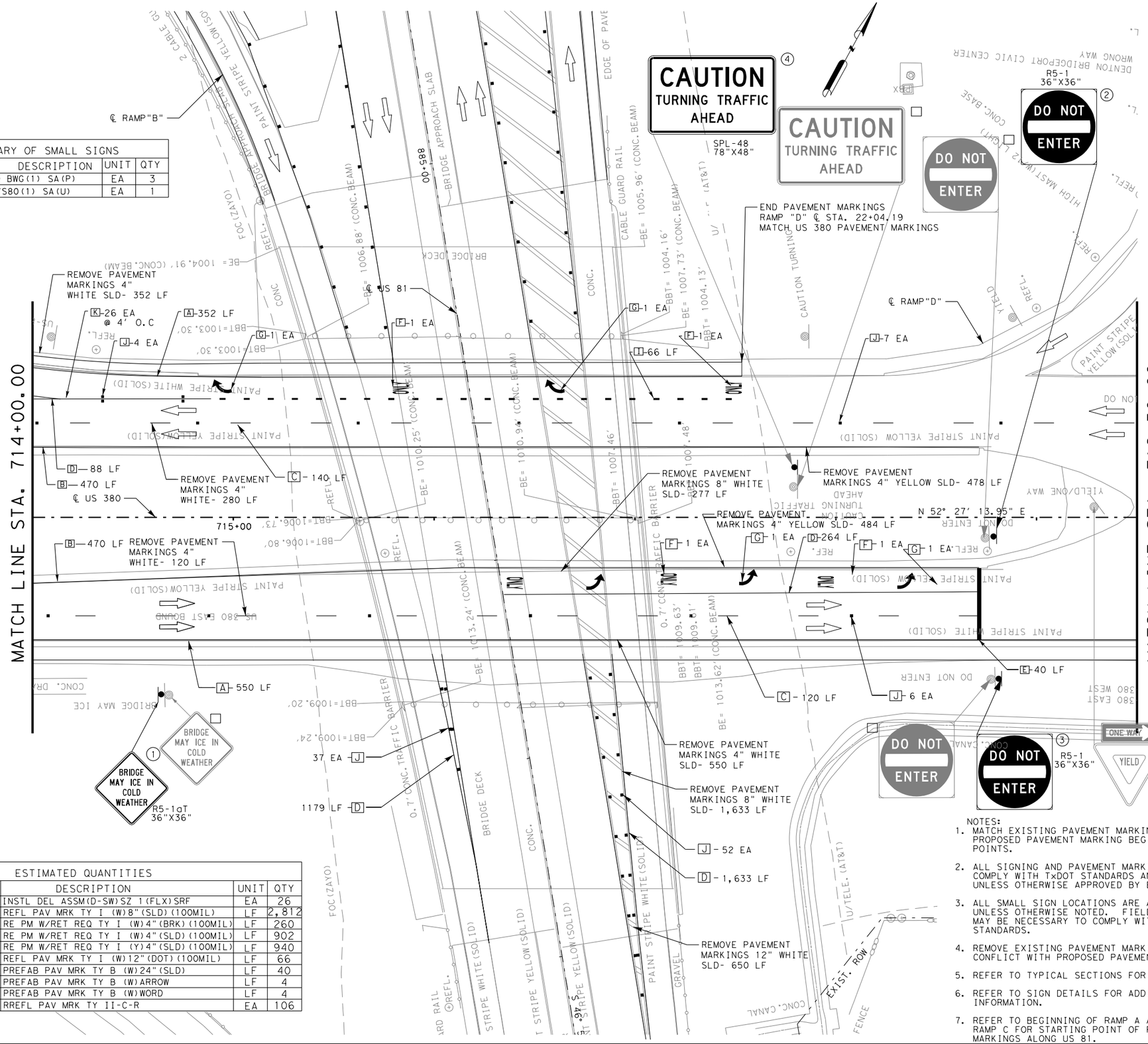
SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	644	10 BWG(1) SA(P)	EA	3
	644	TYS80(1) SA(U)	EA	1



ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)SRF	EA	26
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	2,812
	666	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	260
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	902
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	940
	666	REFL PAV MRK TY I (W)12"(DOT)(100MIL)	LF	66
	668	PREFAB PAV MRK TY B (W)24"(SLD)	LF	40
	668	PREFAB PAV MRK TY B (W)ARROW	LF	4
	668	PREFAB PAV MRK TY B (W)WORD	LF	4
	672	RREFL PAV MRK TY II-C-R	EA	106

NOTES:
1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
3. ALL SMALL SIGN LOCATIONS ARE APPROXIMATE UNLESS OTHERWISE NOTED. FIELD ADJUSTMENT MAY BE NECESSARY TO COMPLY WITH TxDOT STANDARDS.
4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED
PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

SB INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (US 380)

SCALE: 1"=50' SHEET 9 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	124

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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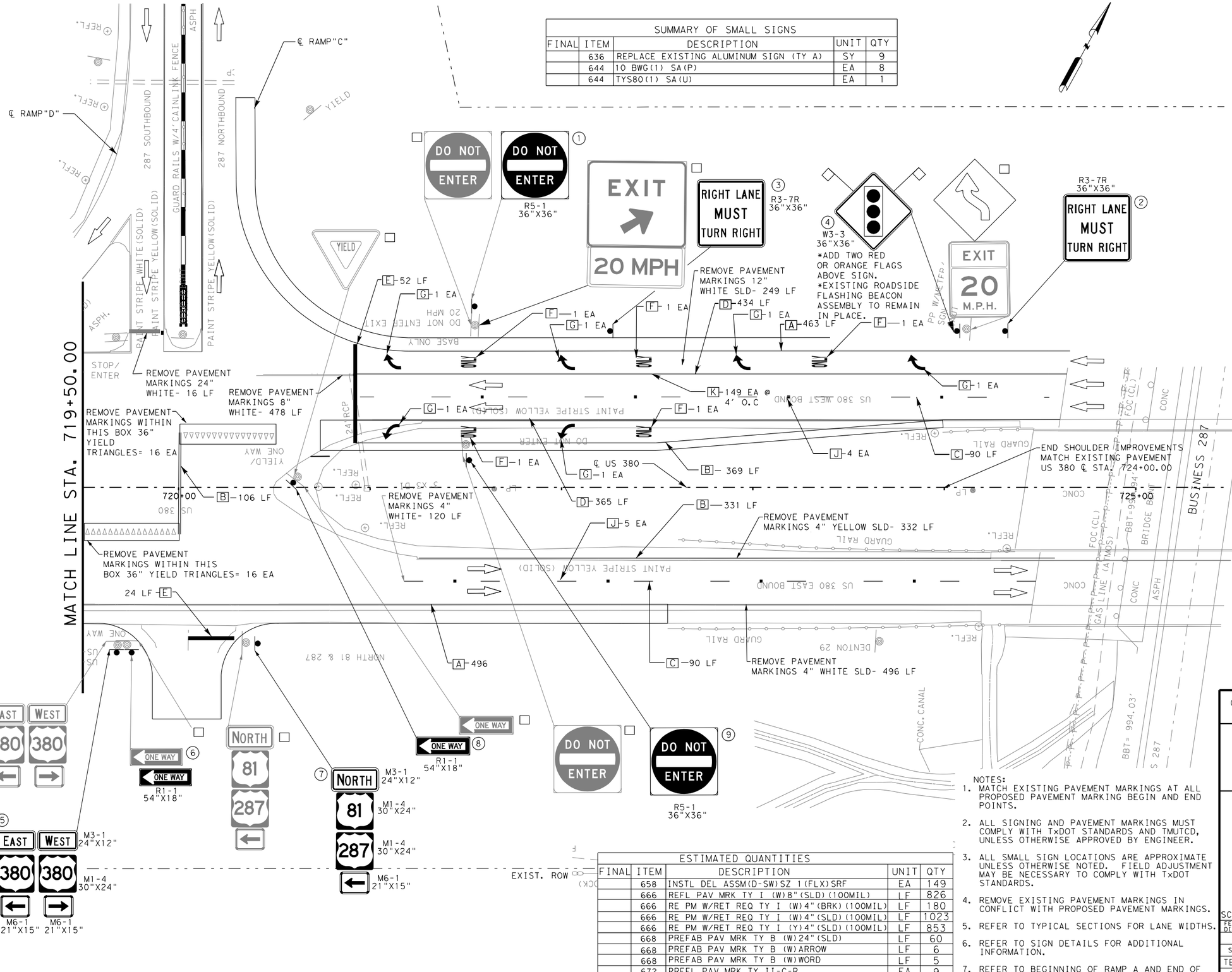
SUMMARY OF SMALL SIGNS				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	636	REPLACE EXISTING ALUMINUM SIGN (TY A)	SY	9
	644	10 BWG(1) SA(P)	EA	8
	644	TYS80(1) SA(U)	EA	1



PLAN LEGEND

PAVEMENT MARKINGS

- A (W)(4")(SLD)
- B (Y)(4")(SLD)
- C (W)(4")(BRK)
- D (W)(8")(SLD)
- E (W)(PREFAB 24")(SLD)
- F (W)(PREFAB WORD)
- G (W)(PREFAB ARROW)
- H (W)(12")(SLD)
- I (W)(12")(DOT)

RAISED PAVEMENT MARKERS

- J REFL PAV MRK TY II-CR

DELINEATORS

- K INSTL DEL ASSM(D-SW)S21(FLX)SRF
- L INSTL DEL ASSM(D-SW)S21(FLX)GND
- M INSTL DEL ASSM(D-SY)SZ(BRF)CTB

SIGNING

- PROPOSED SIGN POST
- EXISTING SIGN POST
- SMALL SIGNS TO BE INSTALLED
- LARGE SIGNS TO BE INSTALLED
- SIGNS TO BE REMOVED
- SIGNS TO REMAIN IN PLACE
- TRAFFIC FLOW ARROW

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	658	INSTL DEL ASSM(D-SW)SZ 1(FLX)SRF	EA	149
	666	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	826
	666	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	180
	666	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1023
	666	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	853
	668	PREFAB PAV MRK TY B (W)24"(SLD)	LF	60
	668	PREFAB PAV MRK TY B (W)ARROW	LF	6
	668	PREFAB PAV MRK TY B (W)WORD	LF	5
	672	RREFL PAV MRK TY II-C-R	EA	9

NOTES:

1. MATCH EXISTING PAVEMENT MARKINGS AT ALL PROPOSED PAVEMENT MARKING BEGIN AND END POINTS.
2. ALL SIGNING AND PAVEMENT MARKINGS MUST COMPLY WITH TxDOT STANDARDS AND TMUTCD, UNLESS OTHERWISE APPROVED BY ENGINEER.
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4. REMOVE EXISTING PAVEMENT MARKINGS IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS.
5. REFER TO TYPICAL SECTIONS FOR LANE WIDTHS.
6. REFER TO SIGN DETAILS FOR ADDITIONAL INFORMATION.
7. REFER TO BEGINNING OF RAMP A AND END OF RAMP C FOR STARTING POINT OF PAVEMENT MARKINGS ALONG US 81.

STATE OF TEXAS
PHILLIP J. PAWELEK
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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380
SIGNING & PAVEMENT MARKING LAYOUT (US 380)

SCALE: 1"=50' SHEET 10 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	125

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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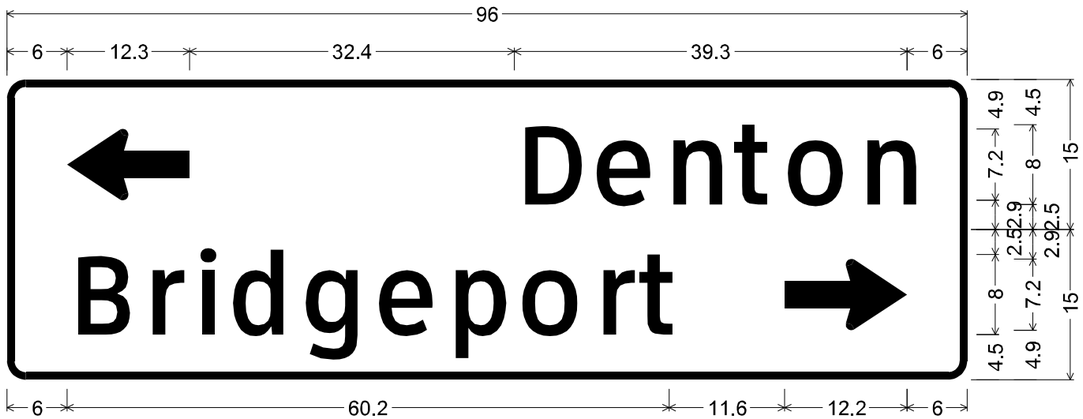
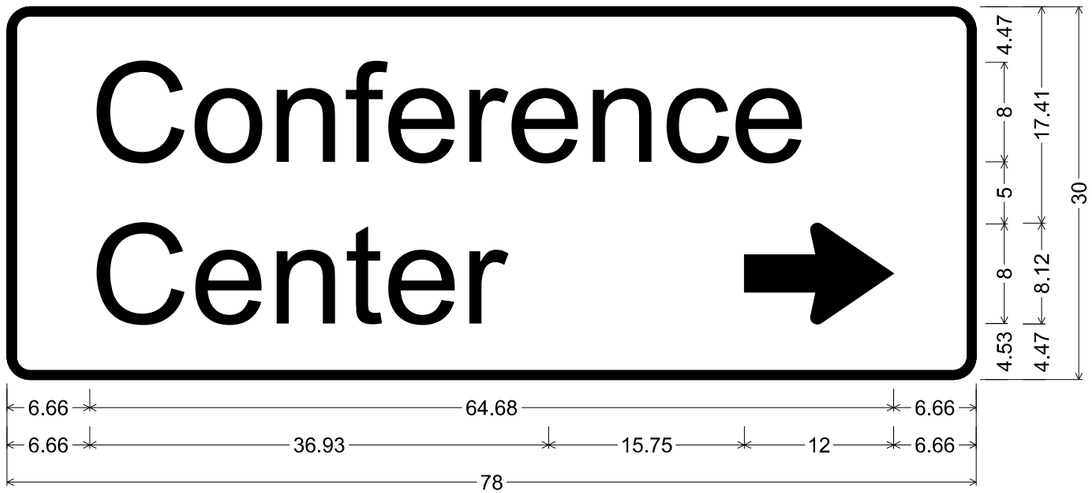


D1-2 8in LT-RT;

1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.3" X 7.1" 180'; "Denton", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on, Green;
"Bridgeport", ClearviewHwy-3-W; Standard Arrow Custom 12.3" X 7.1" 0';



D1-2;
1.88" Radius, 0.75" Border, White on, Green;
"Conference", ClearviewHwy-3-W; "Center", ClearviewHwy-3-W;
Standard Arrow Custom 12.00" X 8.13" 0';

78x48;
3.00" Radius, 1.25" Border, 0.75" Indent, Black on, Yellow;
"CAUTION", D 80% spacing;
"TURNING TRAFFIC", D 85% spacing; "AHEAD", D;

STATE OF TEXAS
PHILLIP J. PAWELEK
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REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SIGN DETAILS

SHEET 1 OF 1 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		126
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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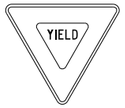
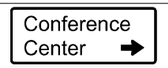
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	1	R5-1A		42"x 30"	X		10BWG	1	SA	P		
	2	W3-3		36"x 36"	X							
	3	R5-1A		42"x 30"	X		10BWG	1	SA	P		
2	1	R6-1		54"x 18"	X		10BWG	1	SA	P		
		R5-1		36"x 36"	X							
	2	R1-2		48"x48"X48"	X		10BWG	1	SA	P		
	3	R4-7		36"x 48"	X		10BWG	1	SA	P		
	4	D1-2		96"x 30"	X		S80	1	SA	U	BM	
		D1-1		78"x 30"								
3	1	M3-1		24"x 12"	X		10BWG	1	SA	P		
		M1-4		24"x 24"	X							
		M1-4		30"x 24"	X							
		M6-1		21"x 15"	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SHEET 1 OF 5

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
4-16	DIST	COUNTY		SHEET NO.
8-16	FTW	WISE		127

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DATE:
FILE:

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
	2	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36"x 36"	X		10BWG	1	SA	T		
	3	R1-2	YIELD	48"x48"X48"	X		10BWG	1	SA	P		
	4	W13-6	EXIT 20 MPH	36"x 60"	X		10BWG	1	SA	T		
6	1	W13-6	EXIT 20 MPH	36"x 60"	X		10BWG	1	SA	T		
	2	R5-1A	WRONG WAY	42"x 30"	X		10BWG	1	SA	P		
	3	W3-3		36"x 36"	X		10BWG	1	SA	P		
	4	R6-1	ONE WAY	54"x 18"	X		10BWG	1	SA	T		
	4	R5-1	DO NOT ENTER	36"x 36"	X							
	5	R1-2	YIELD	48"x48"X48"	X		10BWG	1	SA	P		
	6	SPL-48	CAUTION TURNING TRAFFIC AHEAD	78"x48"	X		S80	1	SA	U		
	7	R5-1A	WRONG WAY	42"x 30"	X		10BWG	1	SA	P		
	8	D1-2	← Denton Bridgeport →	96"x 30"	X		S80	1	SA	U	BM	
		D1-1	Conference Center →	78"x 30"								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SHEET 2 OF 5

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
4-16 8-16	DIST	COUNTY		SHEET NO.
	FTW	WISE		128

18

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DATE:
FILE:

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
	9	R5-1A	WRONG WAY	42"x 30"	X		10BWG	1	SA	P	BM	
	10	R4-1b	KEEP RIGHT	36"x 48"	X		10BWG	1	SA	T		
7	1	W3-3		36"x 36"	X		10BWG	1	SA	P		
8	1	R5-1	DO NOT ENTER	36"x 36"	X		10BWG	1	SA	P		
	2	R5-1	DO NOT ENTER	36"x 36"	X		10BWG	1	SA	P		
	3	M3-1	EAST	24"x 12"	X		S80	1	SA	U		
		M1-4	380	30"x 24"	X							
		M6-1		21"x 15"	X							
		M3-1	WEST	24"x 12"	X							
		M1-4	380	30"x 24"	X							
		M6-1		21"x 15"	X							
	4	R5-1	DO NOT ENTER	36"x 36"	X		10BWG	1	SA	P		
	5	R5-1	DO NOT ENTER	36"x 36"	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SHEET 3 OF 5

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
4-16 8-16	DIST	COUNTY		SHEET NO.
	FTW	WISE		129

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
9	1	R5-1aT		36"x 36"	X		10BWG	1	SA	P		
	2	R5-1		36"x 36"	X		10BWG	1	SA	P		
	3	R5-1		36"x 36"	X		10BWG	1	SA	P		
	4	SPL-48		78"x48"	X		S80	1	SA	U		
10	1	R5-1		36"x 36"	X		10BWG	1	SA	P		
	2	R3-7R		36"x 36"	X		10BWG	1	SA	P		
	3	R3-7R		36"x 36"	X		10BWG	1	SA	P		
	4	W3-3		36"x 36"	X							
	5	M3-1		24"x 12"	X		S80	1	SA	U		
		M1-4		30"x 24"	X							
		M6-1		21"x 15"	X							
		M3-1		24"x 12"	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SHEET 4 OF 5

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0134	07	069	US 380
4-16	DIST	COUNTY		SHEET NO.
8-16	FTW	WISE		130

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
		M1-4		30"x 24"	X							
		M6-1		21"x 15"	X							
	6	R1-1		54"x 18"	X		10BWG	1	SA	P		
	7	M3-1		24"x 12"	X		10BWG	1	SA	P		
		M1-4		24"x 24"	X							
		M1-4		30"x 24"	X							
		M6-1		21"x 15"	X							
	8	R1-1		54"x 18"	X		10BWG	1	SA	P		
	9	R5-1		36"x 36"	X		10BWG	1	SA	P		
	10	R1-2		48"x48"X48"	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SHEET 5 OF 5

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0134	07	069	US 380
4-16		DIST	COUNTY		SHEET NO.
8-16		FTW	WISE		131

DATE:
FILE:

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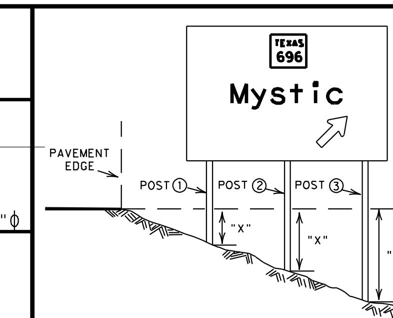
SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN BACK-GROUND COLOR	SIGN TEXT	SIGN DIMENSIONS	PLAQUES, & OTHER ATTACHMENTS: DIRECT APPLY	PLAQUES, & OTHER ATTACHMENTS: * ALUMINUM (TYPE A)	BACKGROUND SUBSTRATE (SQ FT): GROUND MOUNT (TYPE G)	BACKGROUND SUBSTRATE (SQ FT): OVERHEAD (TYPE O)	TYPE OF MOUNT	"X" DIMENSION ◒: post (1)	"X" DIMENSION ◒: post (2)	"X" DIMENSION ◒: post (3)	GALVANIZED STRUCTURAL STEEL: SIZE	GALVANIZED STRUCTURAL STEEL: LINEAR FEET post (1)	GALVANIZED STRUCTURAL STEEL: LINEAR FEET post (2)	GALVANIZED STRUCTURAL STEEL: LINEAR FEET post (3)	GALVANIZED STRUCTURAL STEEL: TOTAL WEIGHT LBS.	DRILLED SHAFT: LINEAR FEET NON-REINF 12"φ	DRILLED SHAFT: LINEAR FEET REINFORCED 24"φ	DRILLED SHAFT: LINEAR FEET REINFORCED 30"φ	DRILLED SHAFT: LINEAR FEET REINFORCED 36"φ
1	1	GREEN		72"X60"			30		320	7	7		S3X5.7	13	13		211.4	7			
8	1	GREEN		72"X60"			30		320	7	7		S3X5.7	13	13		211.4	7			
			PAGE TOTALS												PAGE TOTALS						



◒ The "X" dimension is the elevation difference at the post between the ground and the edge of pavement or top of curb.

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

The post lengths listed here are approximations, The corrected post lengths will be furnished by the Contractor after the stud posts are placed.

Tower heights shall be verified with the Engineer before fabrication.

* This column is for aluminum Type A and not direct apply. Direct apply is subsidiary to the sign.

SIGN TYPE

SIGN TYPE 1 3 0

- 1 — Wind Design Zone
- 3 — No. of Posts
- 0 — Series No.: 0 Aluminum/Fiberglass, 1 Aluminum, 2 Fiberglass

See sheet SMD(8W1)

DATE:
FILE:

SUMMARY OF LARGE SIGNS

SOLS

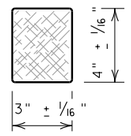
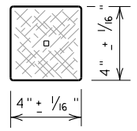
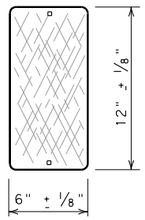
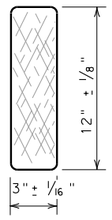
DN.: TxDOT	CK.: TxDOT	DW.: TxDOT	CK.: TxDOT

REVISIONS: 11-93, 8-95, 5-01, 1-04, 9-08

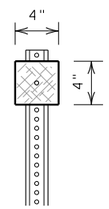
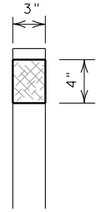
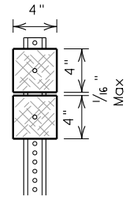
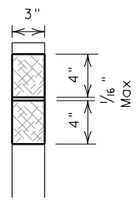
CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		132

DATE:
FILE:

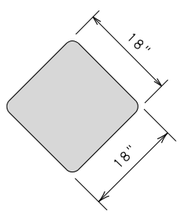
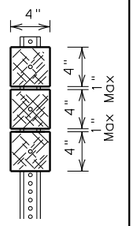
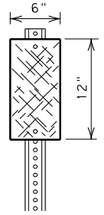
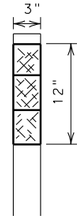
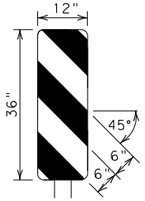
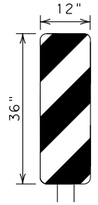
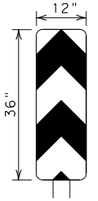
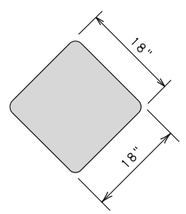
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

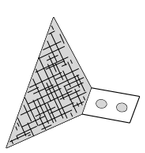
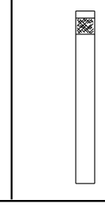
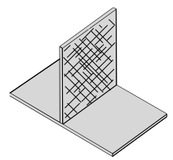
DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

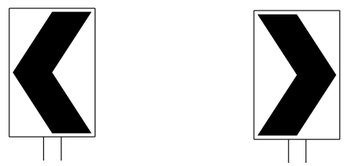
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

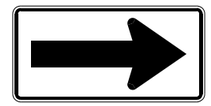
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- YFLX = Yellow Flexible Post
- WFLX = White Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
- If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
- 1, 2, 3, or 4

NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker only)

TYPE OF POST
- WC = Wing Channel Post
- WFLX = White Flexible Post
- TWT = Thin Walled Tubing

TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

DIRECTION
- If Required
- BI = Bi-Directional

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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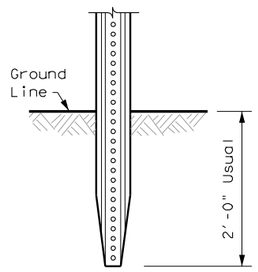
REVISIONS	0134	07	069	US 380
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	FTW	WISE		133

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

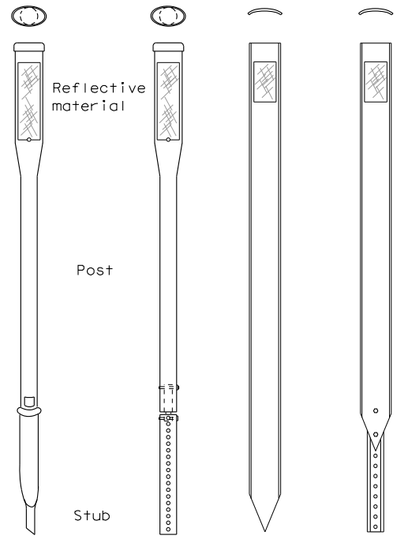


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

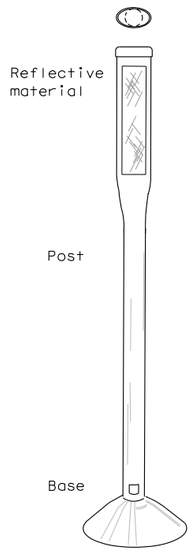
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



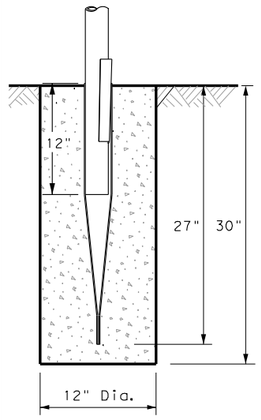
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

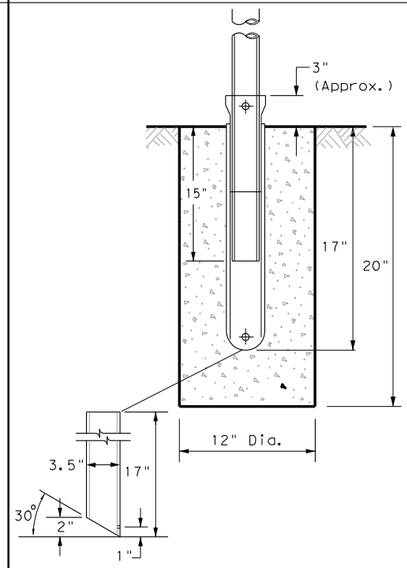
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

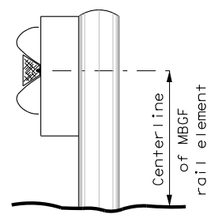
NOTE

1. Install per manufacturer's recommendations.

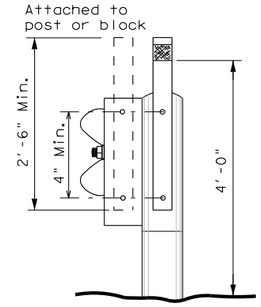
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

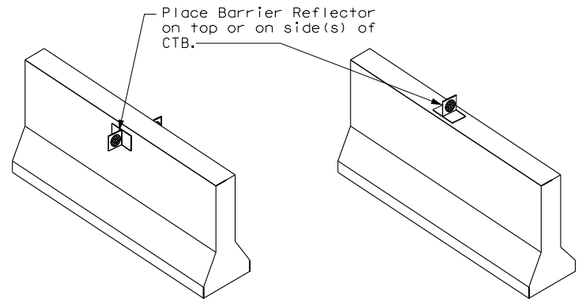
GF1



GF2



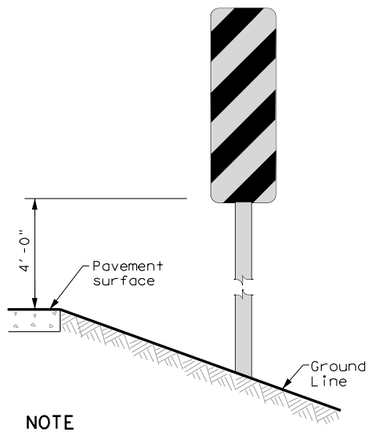
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

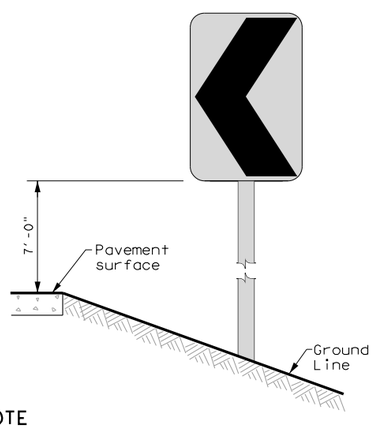
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

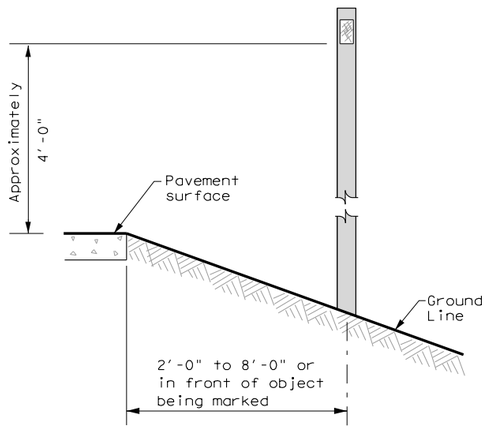
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

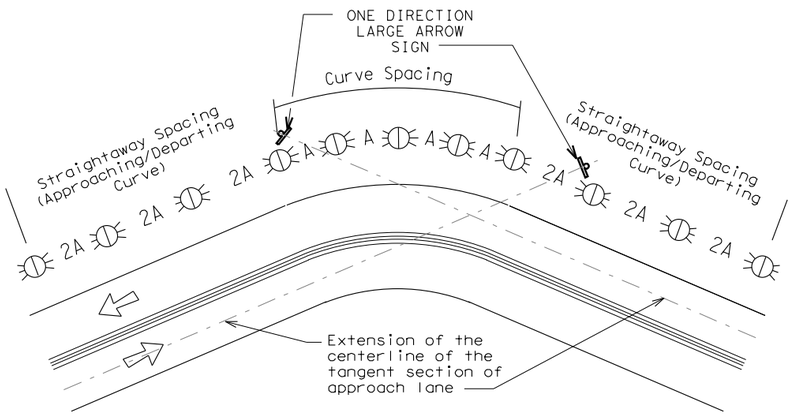
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	FTW	WISE		134
20B				

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

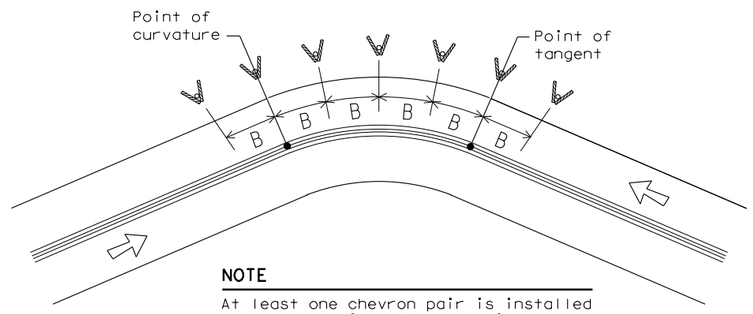
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

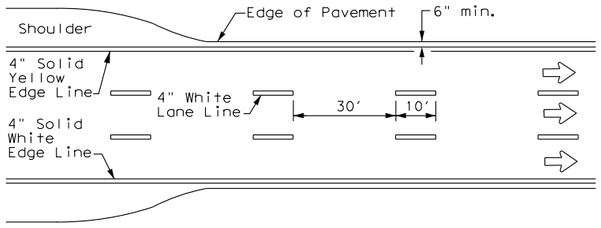
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

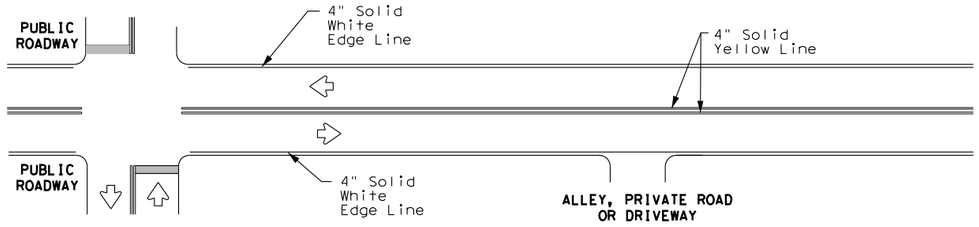
FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	FTW	WISE		135

DATE:
FILE:

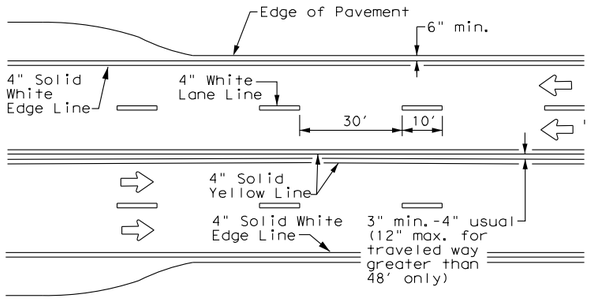
20C



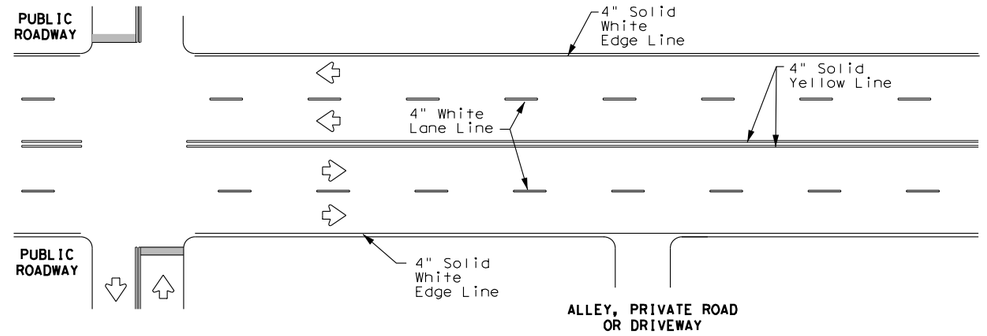
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



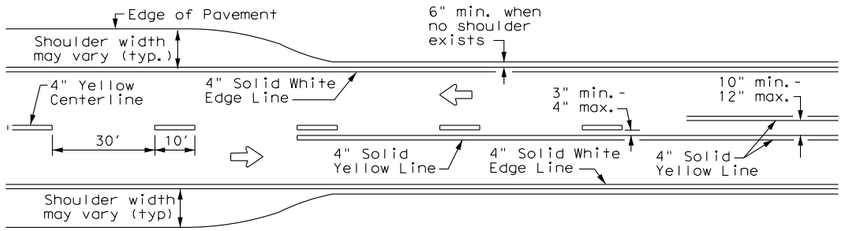
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



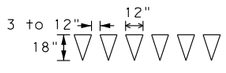
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



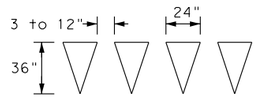
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

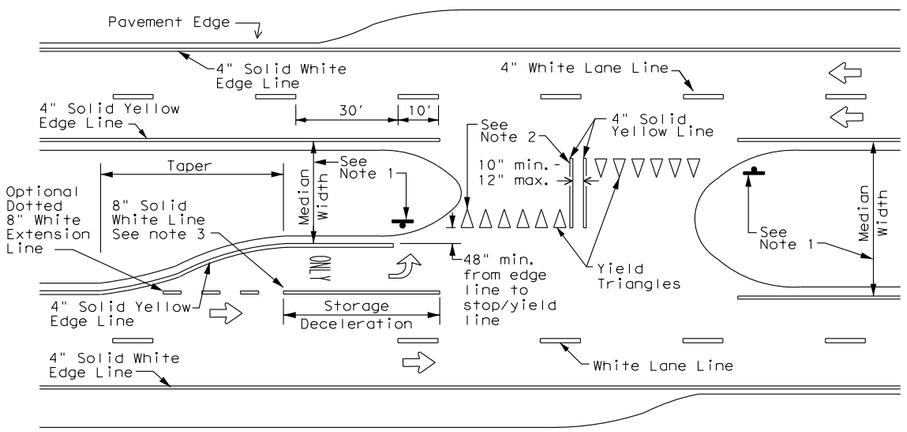


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

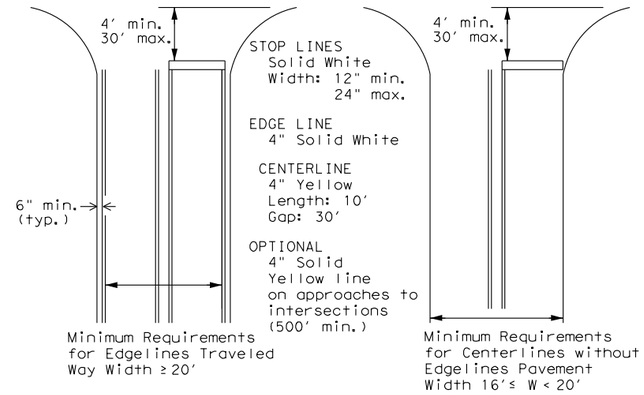
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

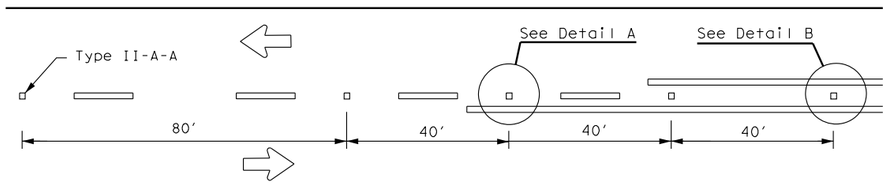
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0134	07	069	US 380
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	FTW	WISE		136

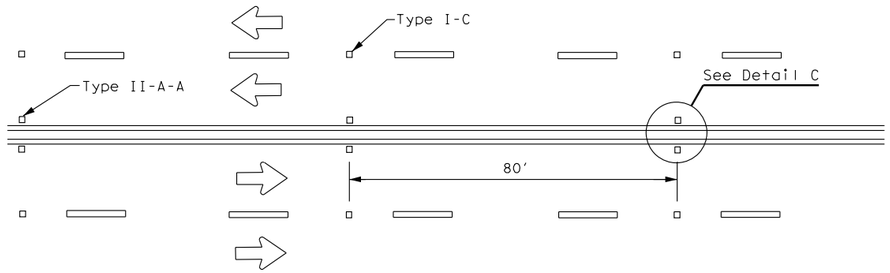
22A

DATE:
FILE:

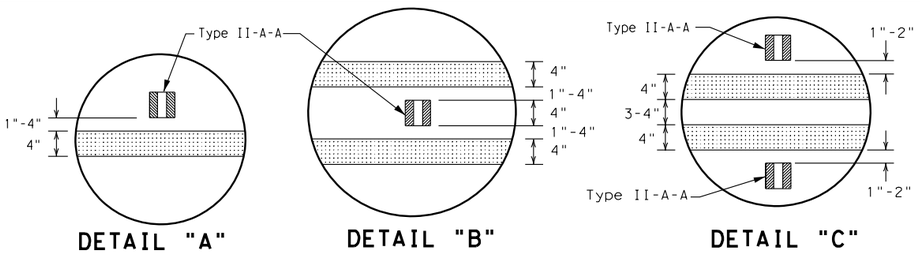
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



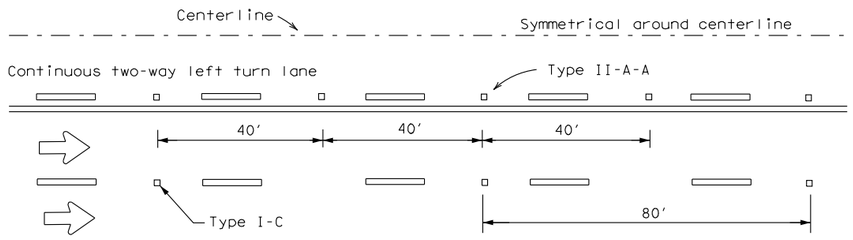
CENTERLINE FOR ALL TWO LANE ROADWAYS



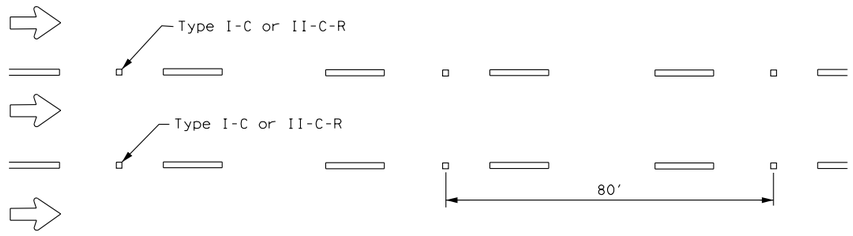
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

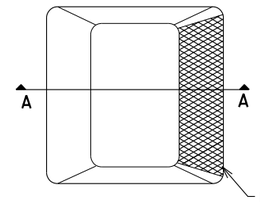


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

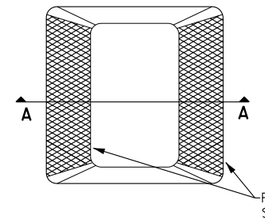
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

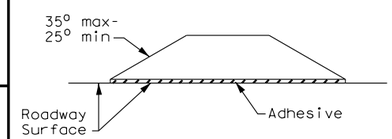
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

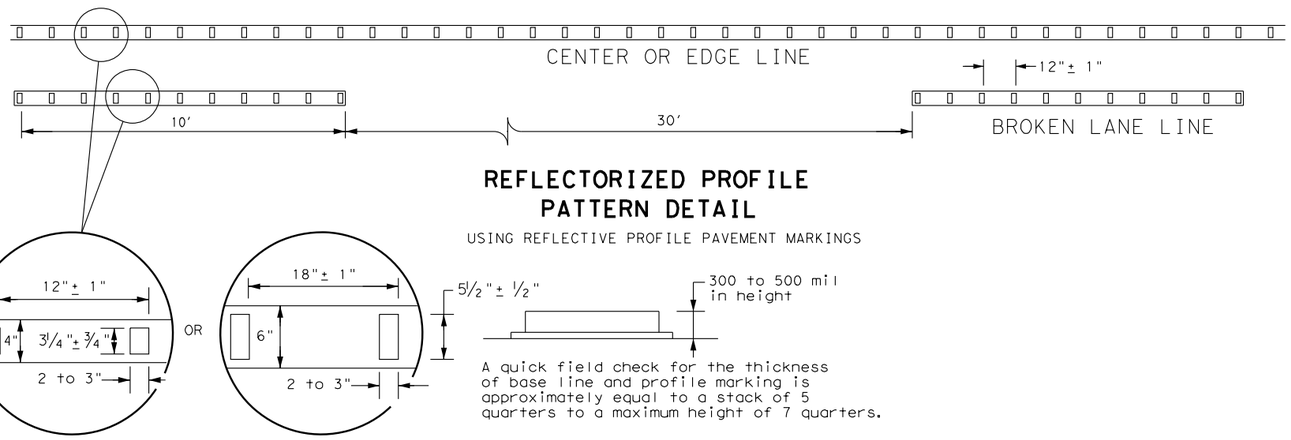


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

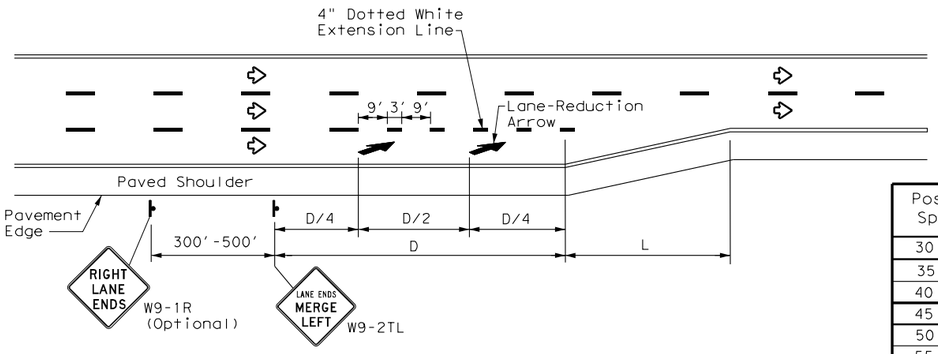
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10 REVISIONS	0134	07	069	US 380
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	FTW	WISE		137

22B

DATE:
FILE:

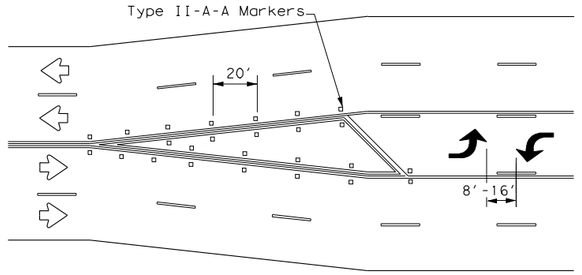


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

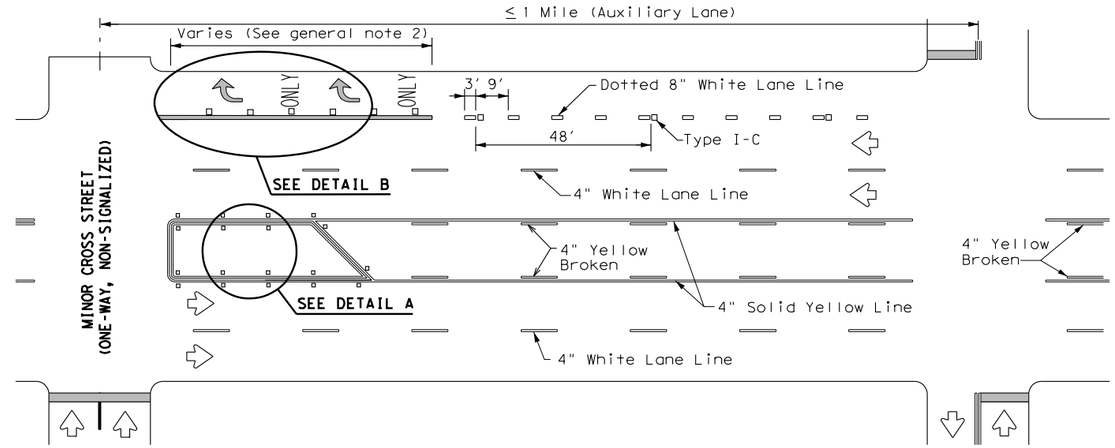
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

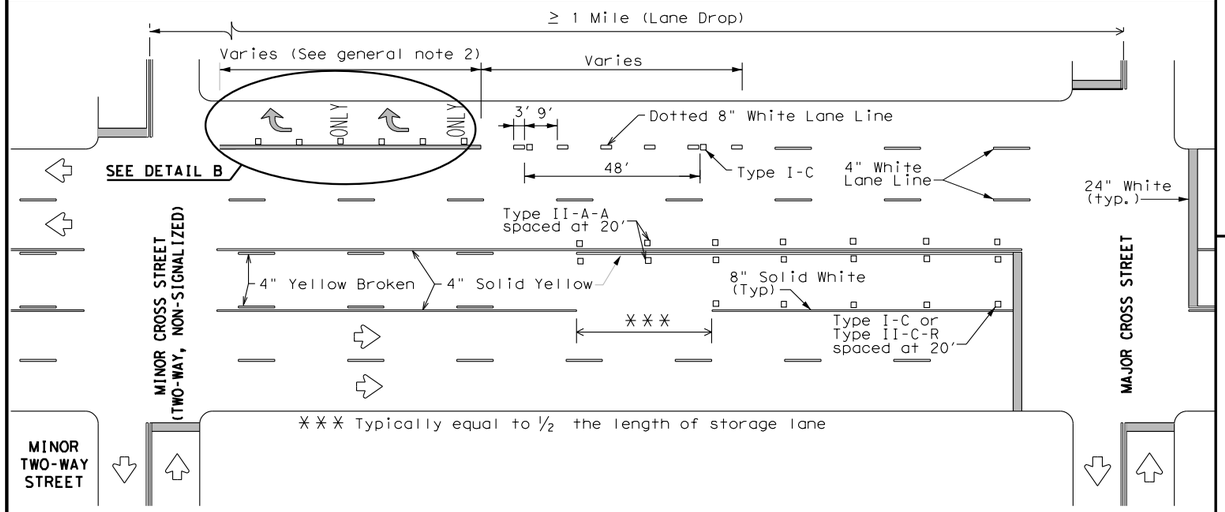
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

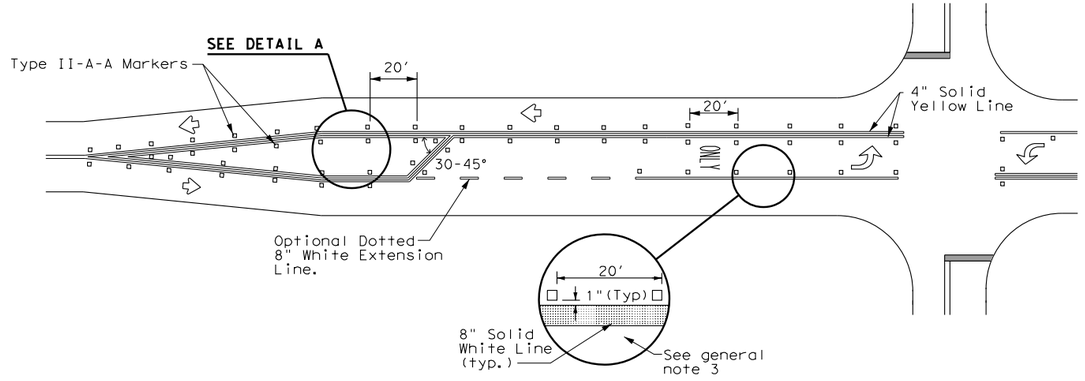
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



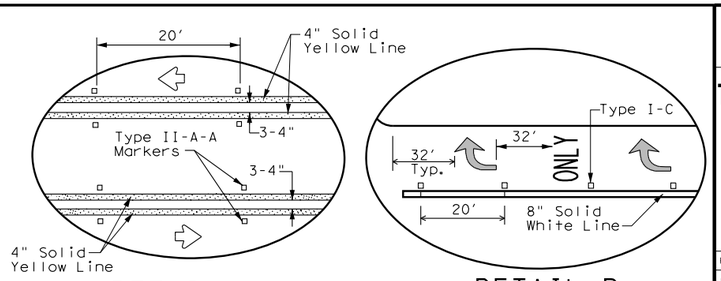
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A

DETAIL B

Texas Department of Transportation

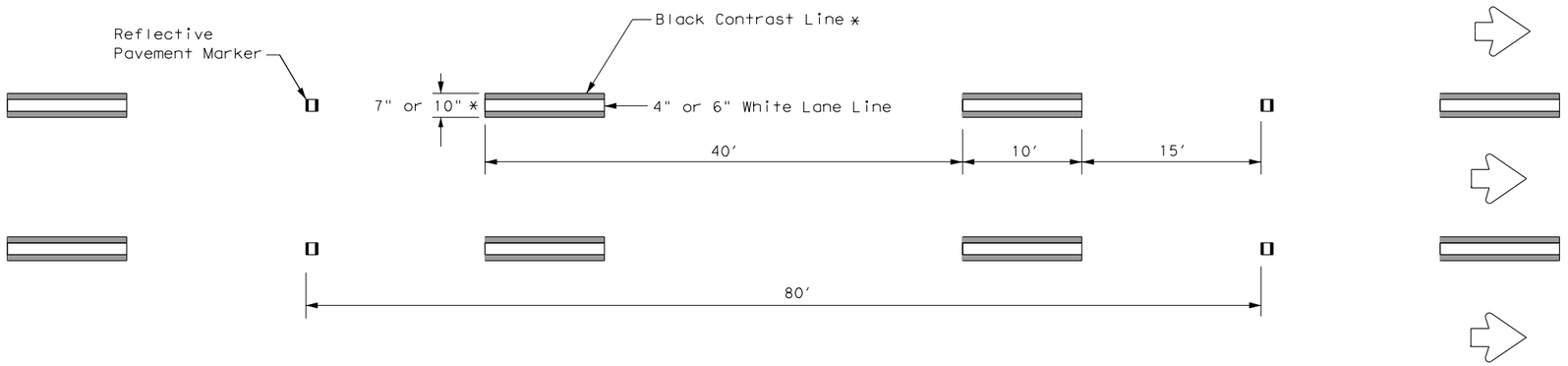
Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	FTW	WISE		138
3-03 6-20				

22C

DATE:
FILE:



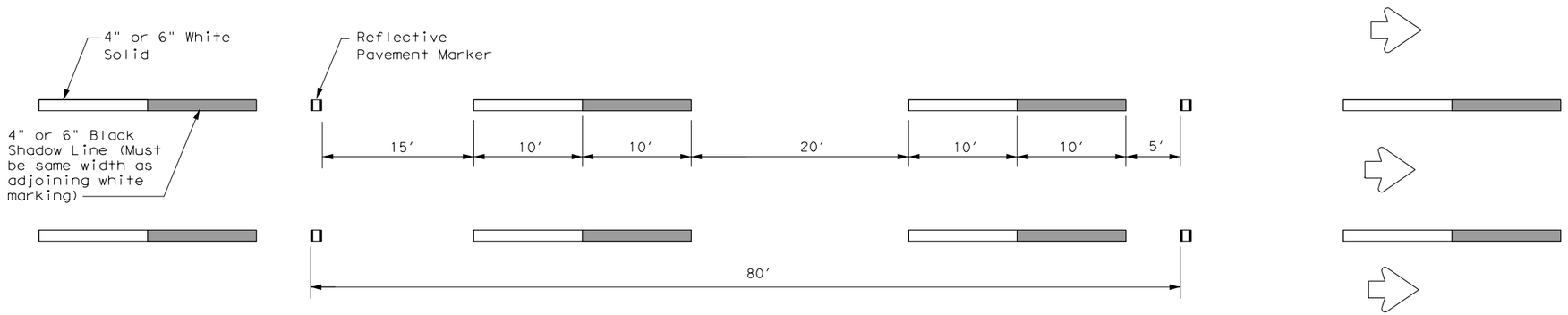
CONTRAST LANE LINE DESIGN

* 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

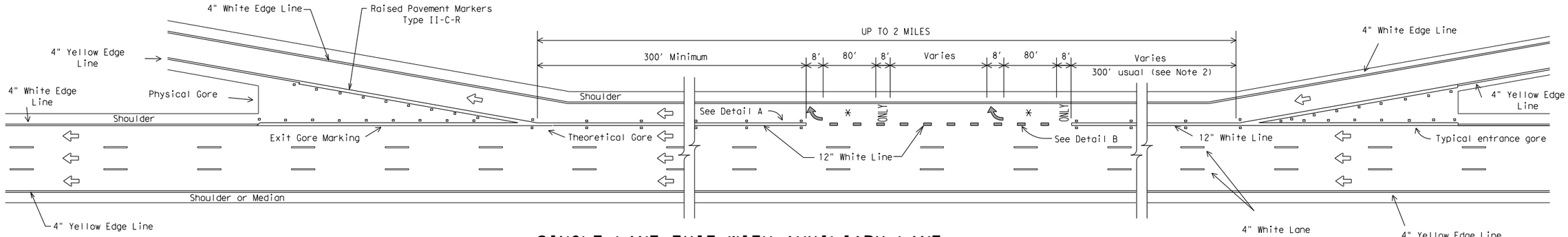
CPM(1)-14

FILE: CPM(1)14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		139

DATE:
FILE:

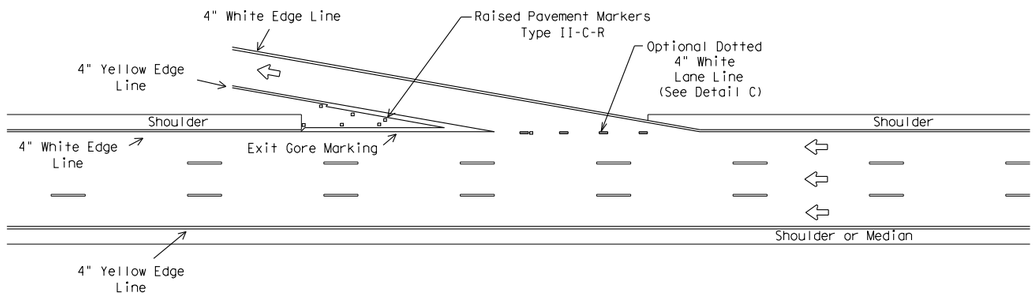
22N

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

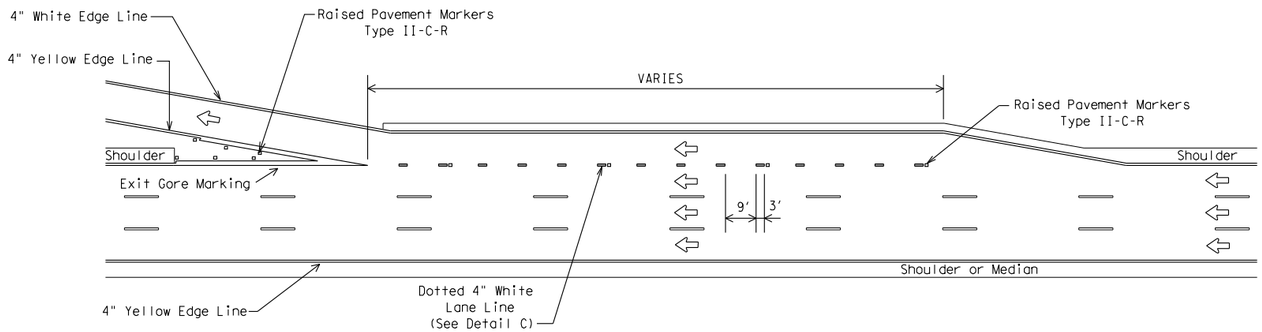


SINGLE LANE EXIT WITH AUXILIARY LANE

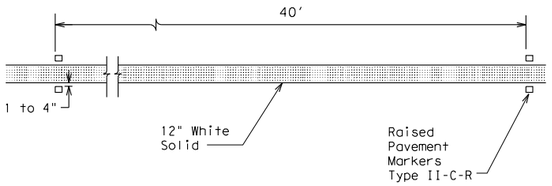
(See Note 2)



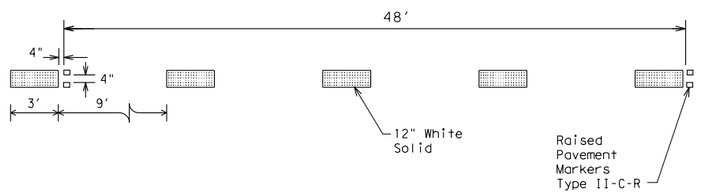
TAPERED DECELERATION LANE



PARALLEL DECELERATION LANE

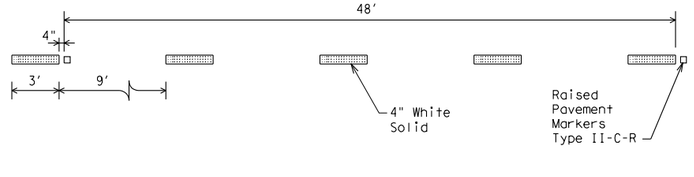


DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)



DETAIL C

Normal (4") Dotted Lane Line (See Note 4)

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.
4. Normal (4") Dotted Lane Line (See Detail C) is used at parallel acceleration and deceleration lanes.

LEGEND	
⇦	Denotes direction of traffic.
↱	Pavement marking arrows (white)
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

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

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
4-92 2-10
8-95 2-12
5-00
8-00

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		140

23B

DATE:
FILE:

DATE:
FILE:

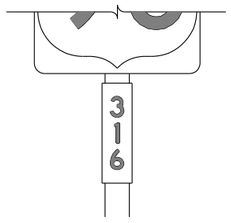
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

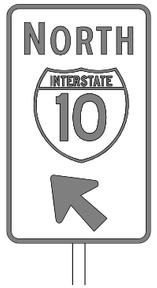
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING





TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

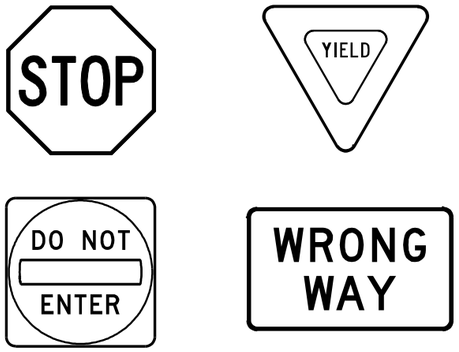
FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	FTW	WISE		141

3

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

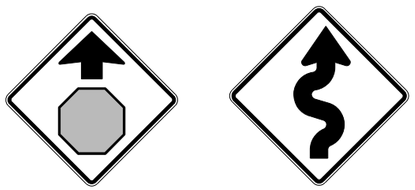
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

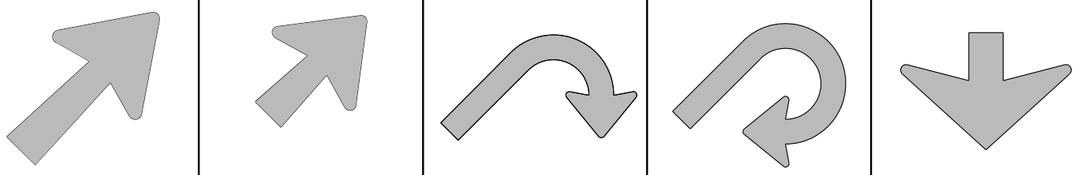
FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	013	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		142

4

DATE:
FILE:

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

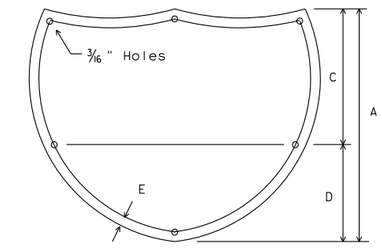
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

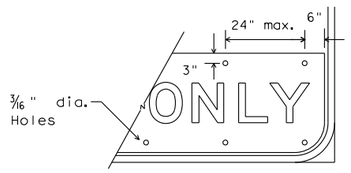
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

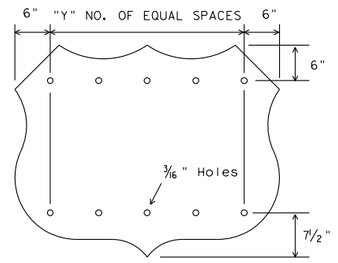


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

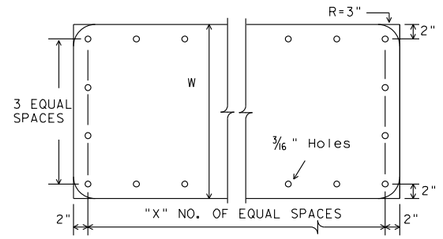


EXIT ONLY PANEL



U.S. ROUTE MARKERS

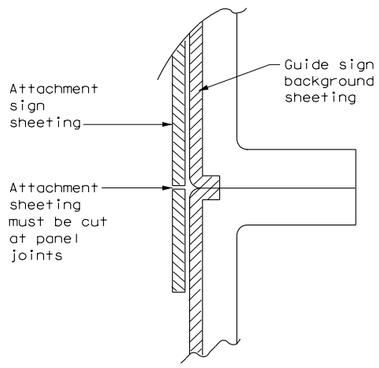
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

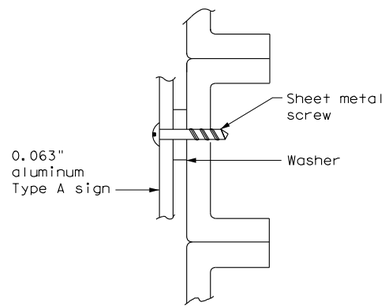
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



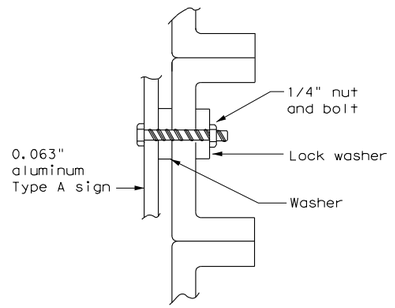
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



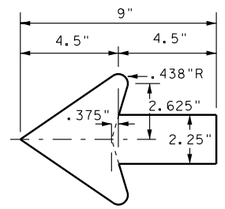
NUT/BOLT ATTACHMENT

NOTE:

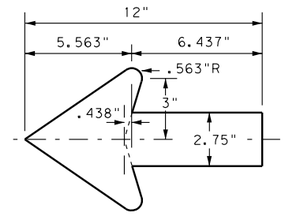
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	FTW	WISE		143

5

DATE:
FILE:

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

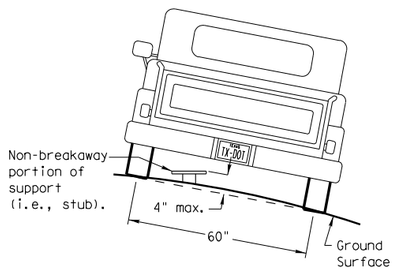
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

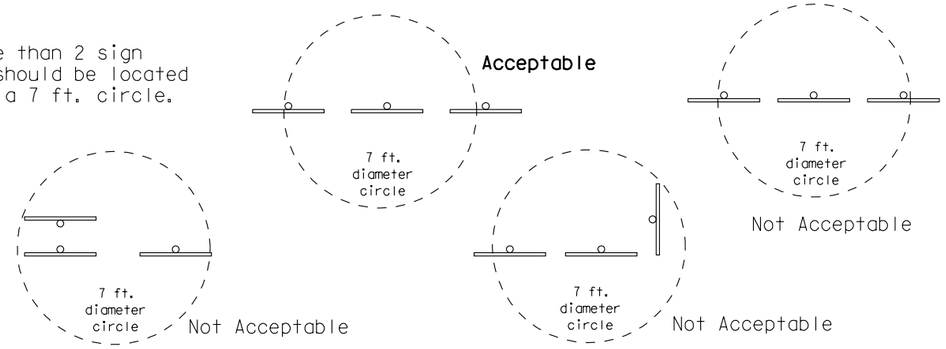
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



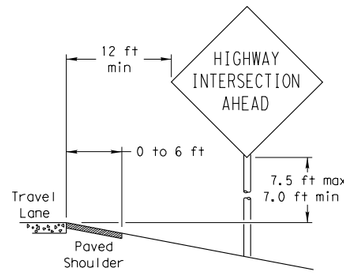
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



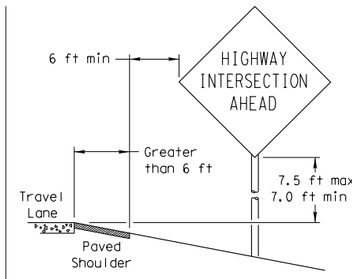
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

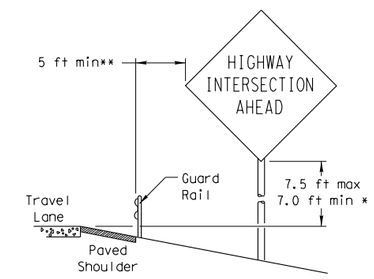
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



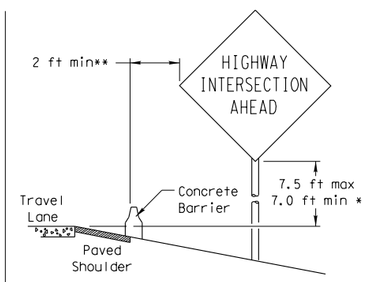
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



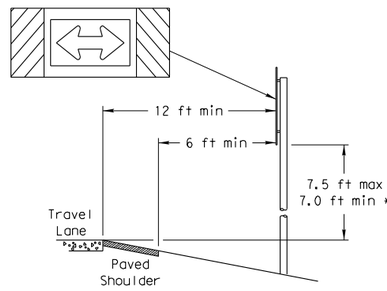
BEHIND GUARDRAIL



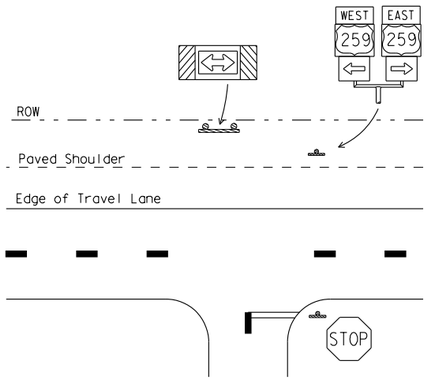
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

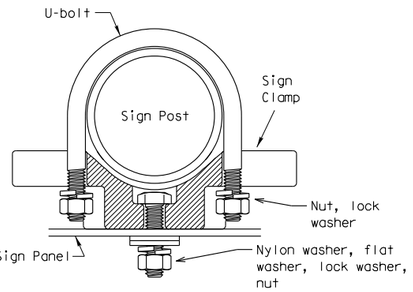
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

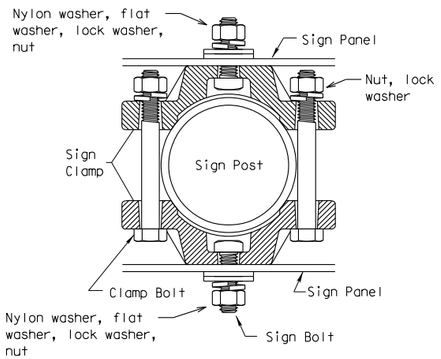
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



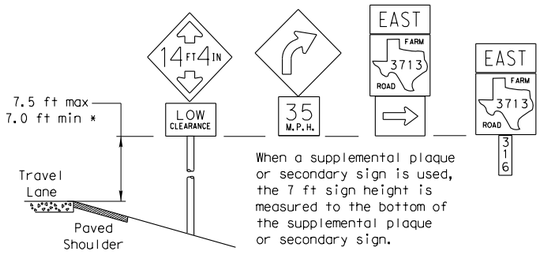
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

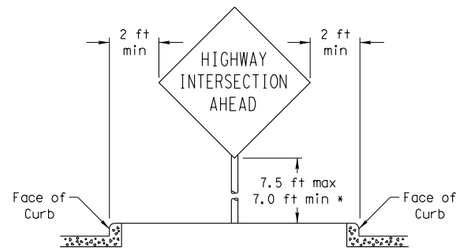
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



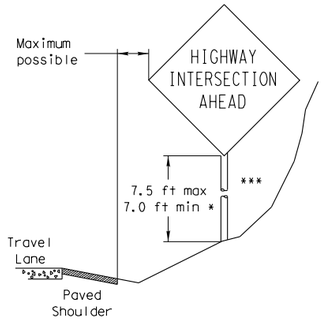
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

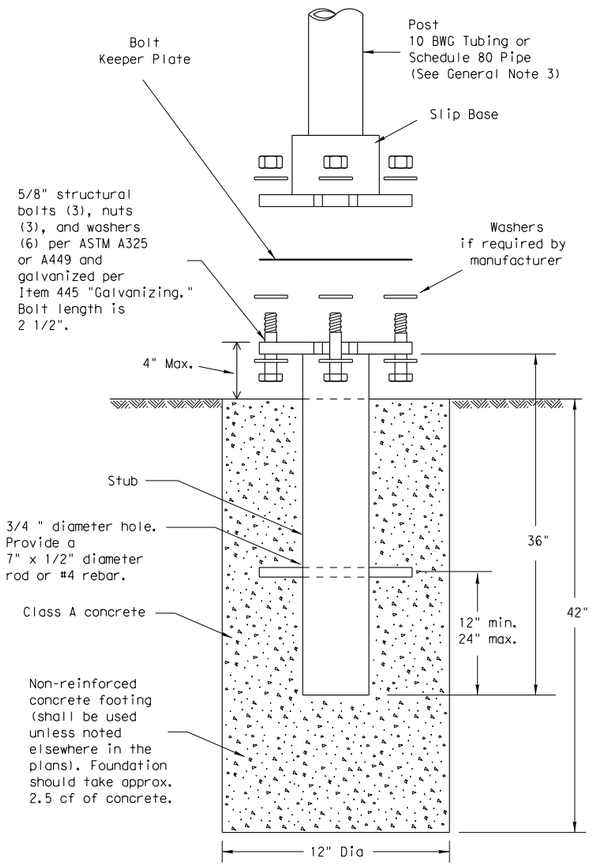
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		144

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

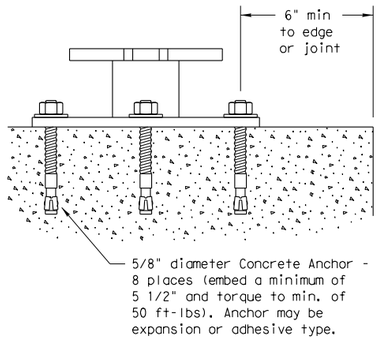
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

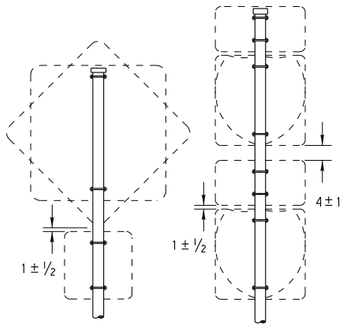
REVISIONS 9-08

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380

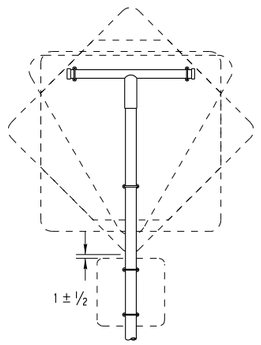
DIST	COUNTY	SHEET NO.
FTW	WISE	145

DATE:
FILE:

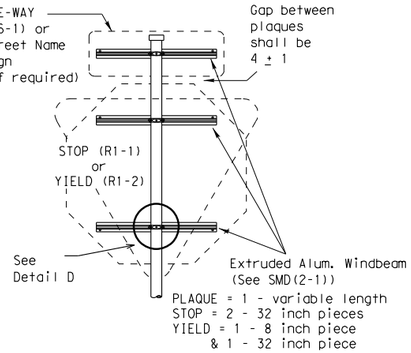
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



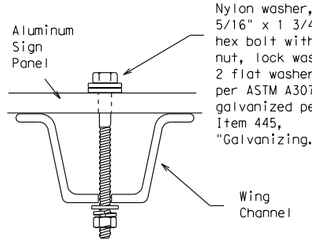
SM RD SGN ASSM TY XXXXX(1)XX(P)



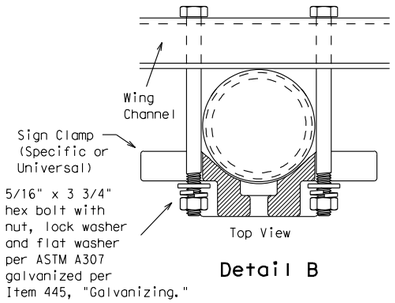
SM RD SGN ASSM TY XXXXX(1)XX(T)



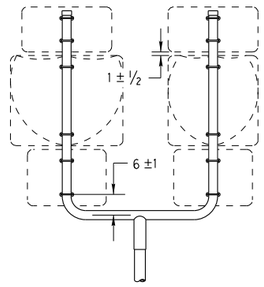
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



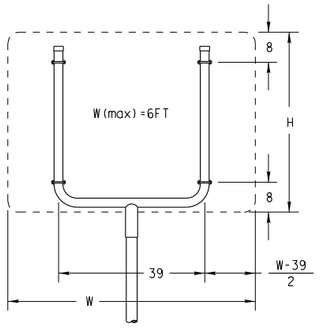
Detail A



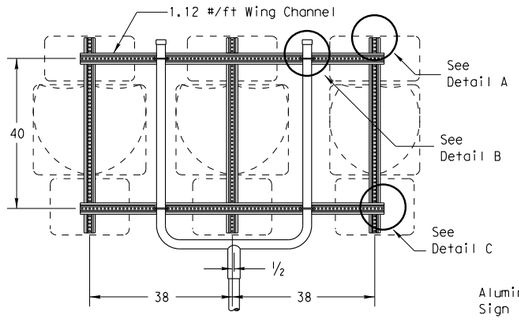
Detail B



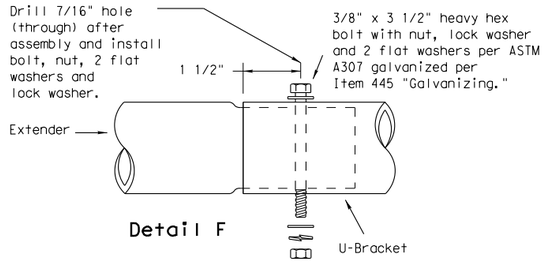
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

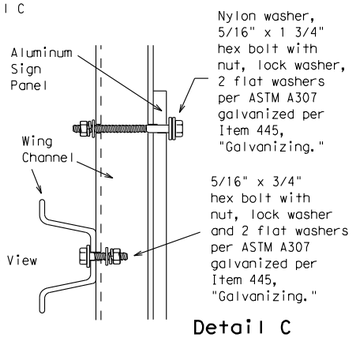


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

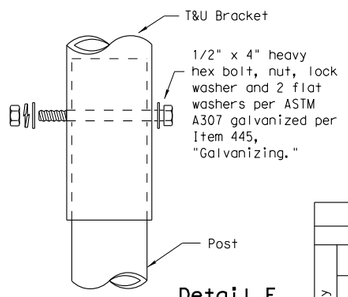


Detail F

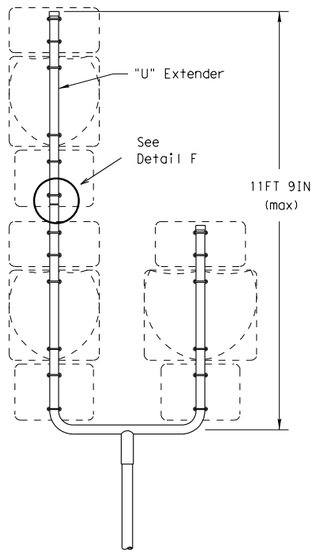
Splices shall only be allowed behind the sign substrate.



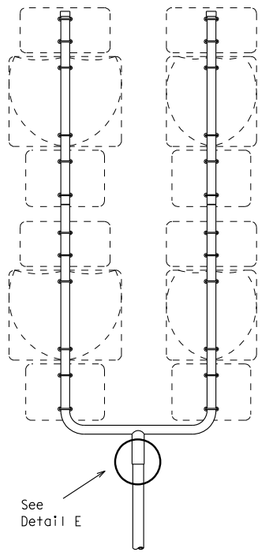
Detail C



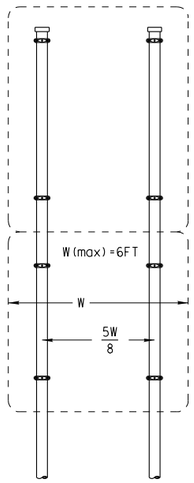
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

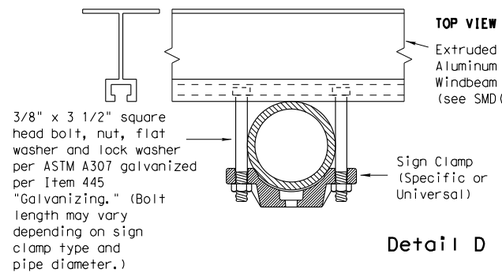


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

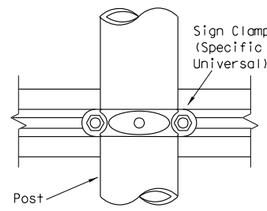


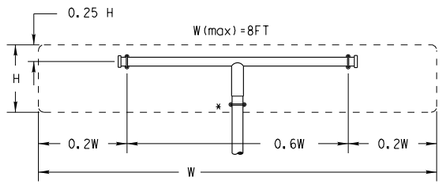
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

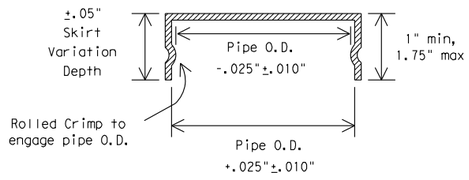




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

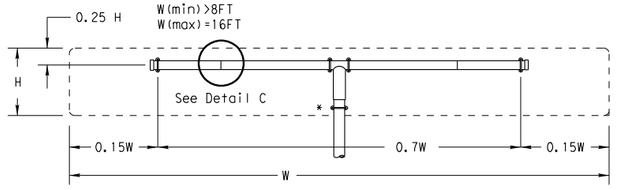
CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380

DIST	COUNTY	SHEET NO.
FTW	WISE	146

9-08 REVISIONS

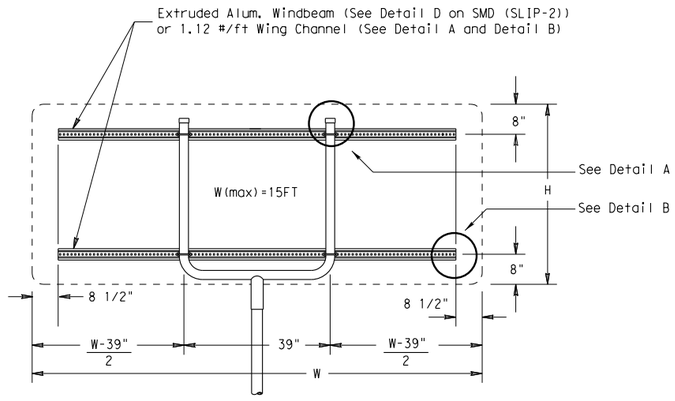
DATE:
FILE:

26C



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

(* - See Note 12)



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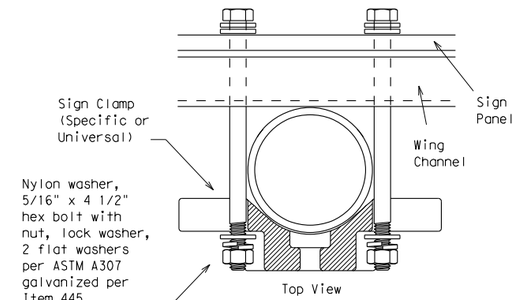
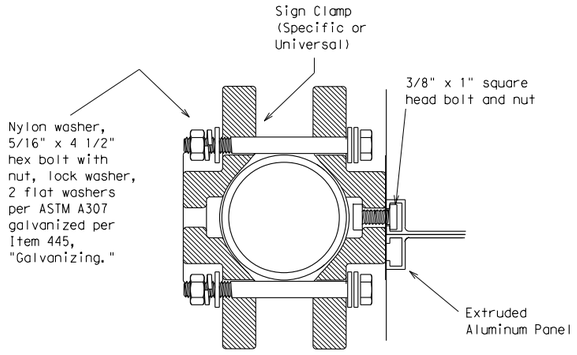
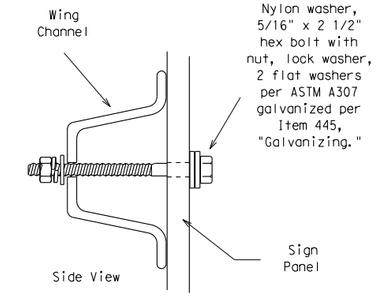


Detail A

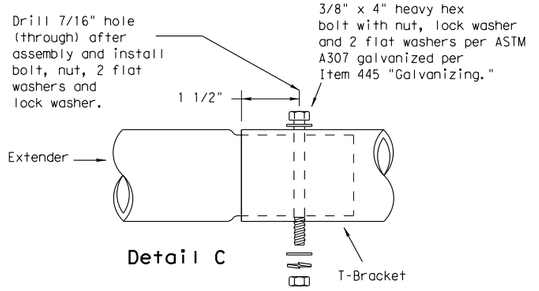


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

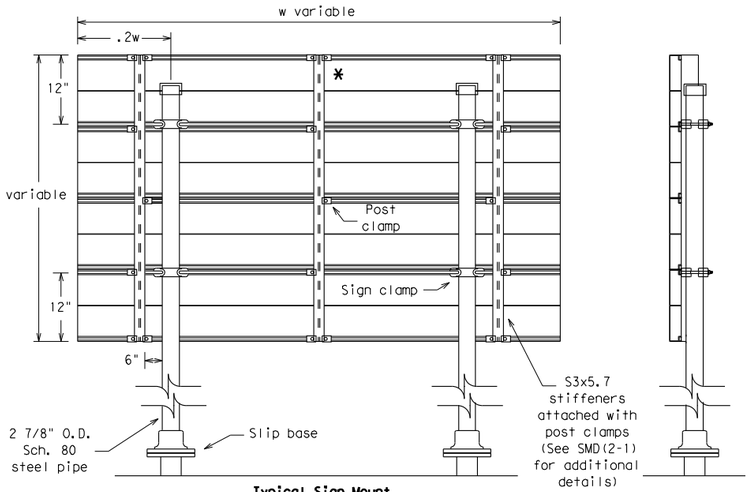


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

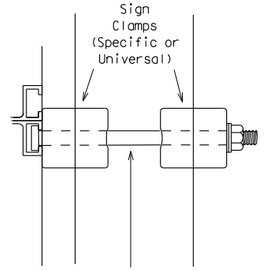


Typical Sign Mount

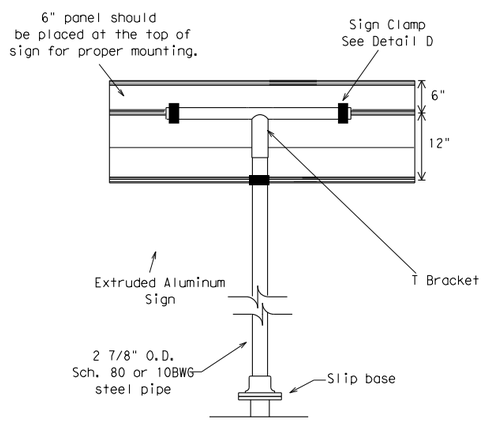
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

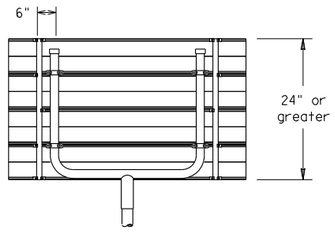
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

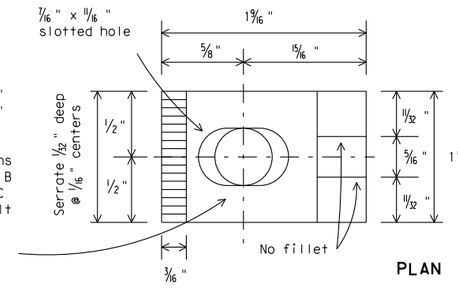
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		147

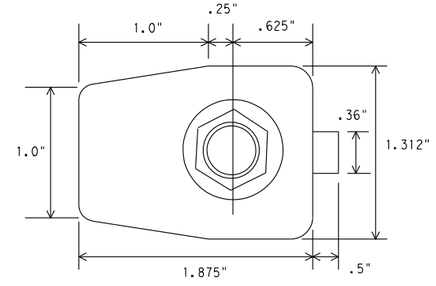
DATE:
FILE:

DATE:
FILE:

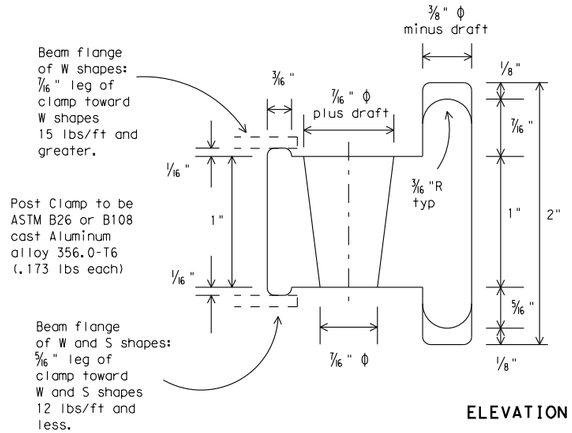
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.



PLAN

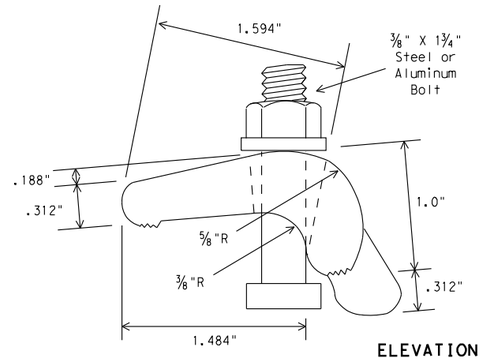


PLAN



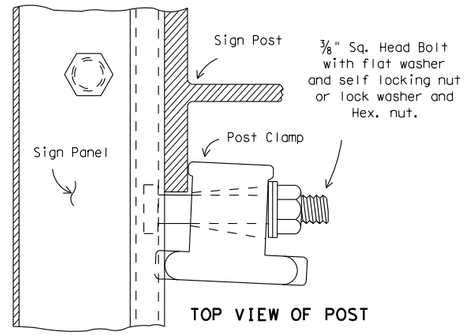
ELEVATION

POST CLAMP DETAIL

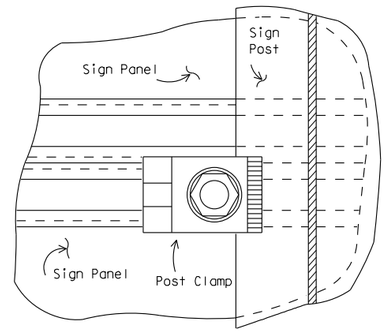


ELEVATION

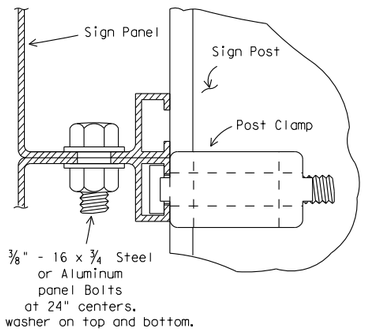
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

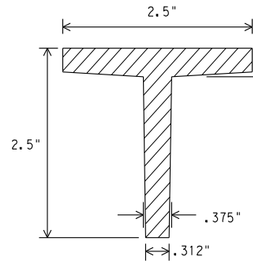
CONNECTION DETAILS

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE — DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

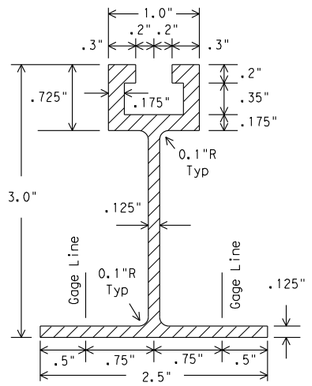


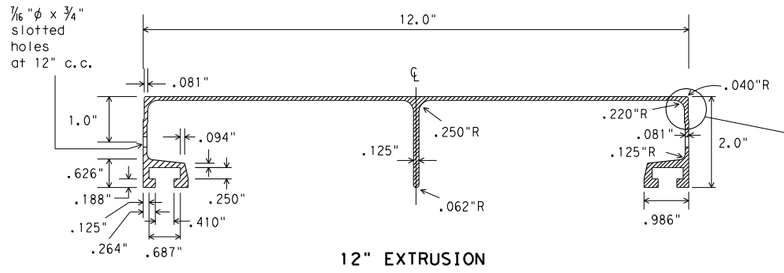
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

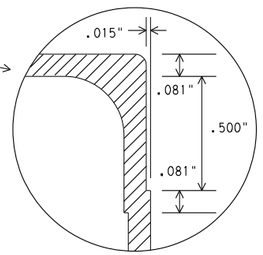
WINDBEAM CROSS SECTION

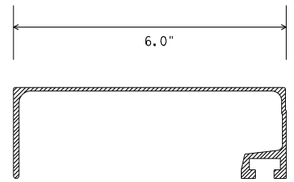
Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative





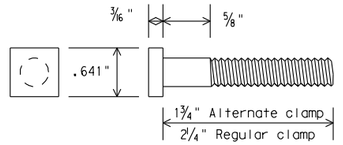
12" EXTRUSION





6" EXTRUSION

ALUMINUM SIGN PANEL EXTRUSION DETAILS



POST CLAMP BOLT DETAIL

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

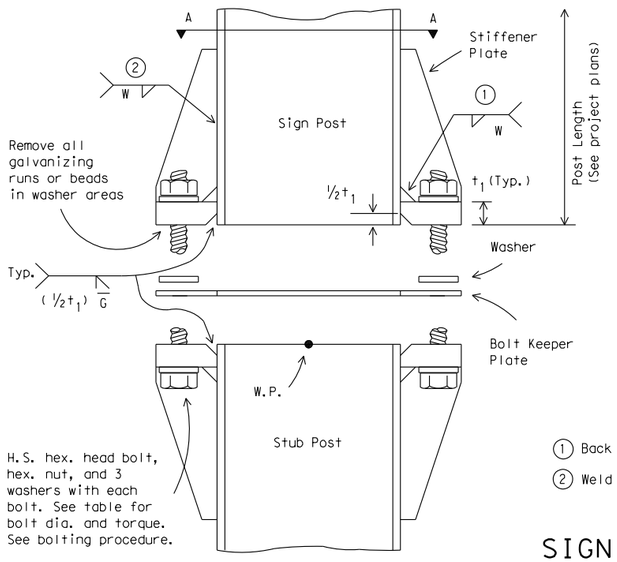
SMD(2-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

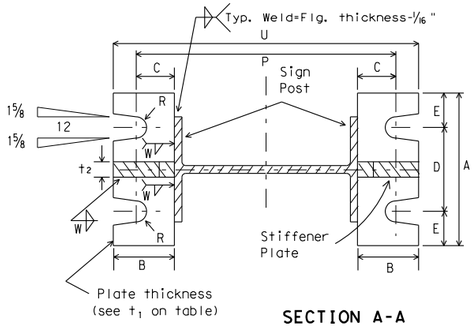
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		148

27A

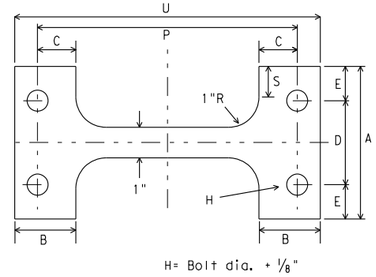
DATE:
FILE:



ELEVATION

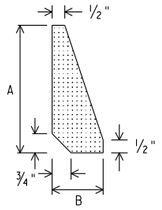


SECTION A-A



H= Bolt dia. + ⅛"

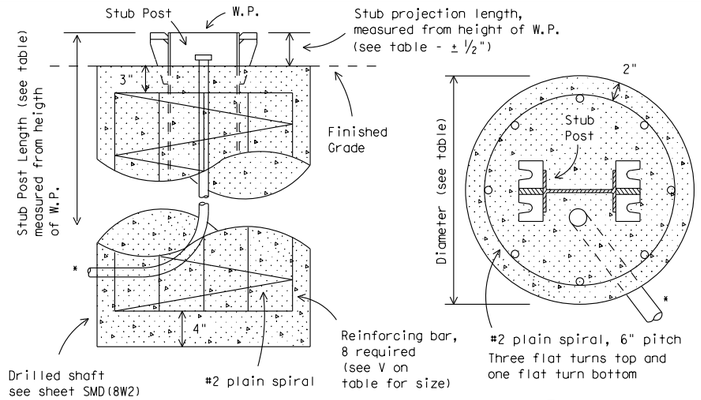
BOLT KEEPER PLATE
30 Ga galv. sheet steel



STIFFENER PLATE DETAIL

Steel Plate (thickness = t_2)

(See table for dimensions)

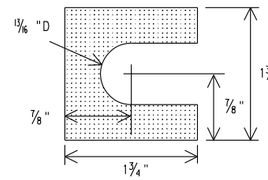


ELEVATION

PLAN

FOUNDATION DETAIL

*Note: For signs with electrical apparatus, see ED(10) for conduit required in founation.



SHIM DETAIL

Furnish two .012"+ thick and two .032"+ thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. Assemble sign post, BOLT KEEPER PLATE and stub post with bolts and three flat washers per bolt as shown.
2. Shim as required to plumb post.
3. Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.
4. Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque. Do not overtighten.
5. To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

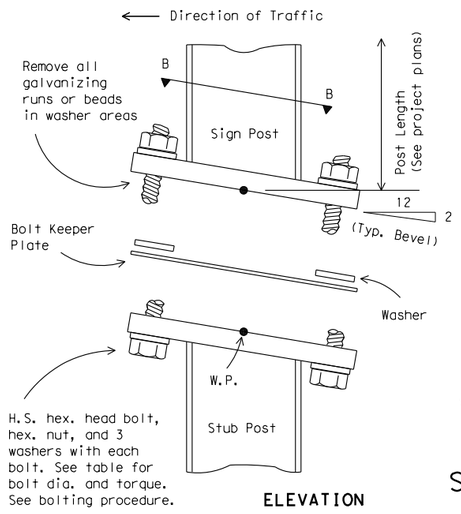
Dimensions / Post Size	Base Connection Data Table: Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R
W6x9	⅝"ϕ x 2¾" 440-450 inch pounds 36-38 foot pounds	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"
W6x12										
W6x15										
W8x18										
W8x21	¾"ϕ x 3½" 740-750 inch pounds 62-63 foot pounds	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"
W10x22										
W10x26										
W12x26										
S3x5.7	½"ϕ x 2½" 440-450 inch pounds 36-38 foot pounds	See Detail Below								
S4x7.7										

Perforated Fuse Plate Data Table												Bolt Keeper Data			Foundation Data			
F	G	J	K	M	d_1	d_2	t_3	Bolt Dia.	Wt. (ea.) (lbs.)	Bolt length	P	S	U	Stub length	Stub projection	Dr. Shaft diameter	Bar V Size
4¼"	2"	4"	2¼"	1"	9/16"	¾"	¼"	½"	1.01	1½"	8⅜"	1"	9⅞"	2'-0"	3"	24"	#5
											8½"		10"				#5
5"	2½"	6"	3½"	1½"	11/16"	1¼"	⅜"	⅝"	2.51	2¼"	8½"		10"	2'-6"	3"		#6
5"	2½"	5¼"	2¾"	1¼"	11/16"	1 1/16"	⅜"	⅝"	2.26	2¼"	10⅝"		12⅛"	2'-6"	3"		#7
5½"	2½"	5¼"	2¾"	1¼"	13/16"	1"	½"	¾"	3.35	2¼"	11"	1½"	12¾"	3'-0"	2½"		#8
6"	3"	5¾"	2¾"	1⅜"	13/16"	1⅛"	½"	¾"	4.03	2¼"	12⅞"		14⅝"	3'-0"	2½"		#9
											13⅜"		14⅞"	3'-0"	2½"		#10
6"	3"	6½"	3½"	1⅝"	13/16"	1 5/16"	½"	¾"	4.47	2¼"	15"		16¾"	3'-0"	2½"		#11
3¾"	1½"	2⅝"	1½"	⅝"	9/16"	⅜"	¼"	½"	0.60	1½"	See Detail Below			3'-3½"	3½"	12"	Non-reinforced ③

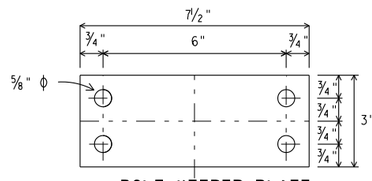
③ Foundation design shall be Type G Mount, see SMD (TY G).

PERFORATED FUSE PLATE DETAIL

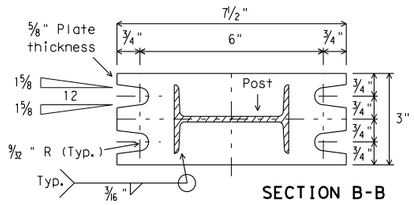
Use H.S. hex head bolts, hex head nut and bevel or flat washer (where req'd) under nut. All holes shall be drilled, sub-punched and reamed. All plate cuts shall preferably be saw cuts. However, flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be permitted. Steel fuse plates shall conform to the requirements of ASTM A36. ASTM A572 Grade 50 or ASTM A588 may be substituted for A36 at the option of the fabricator. Mill test reports shall be submitted for Fuse Plates. Steel used shall have an ultimate tensile strength not to exceed 80 KSI. For alternative Fuse Plate contact Traffic Operations Division.



ELEVATION



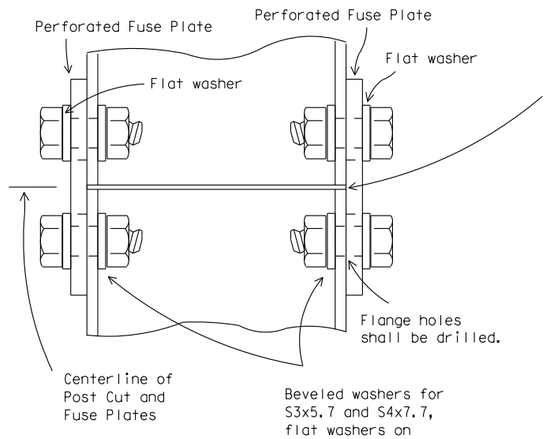
BOLT KEEPER PLATE
30 Ga galv. sheet steel



SECTION B-B

SIGN POST AND STUB POST

(For S4x7.7 and S3x5.7)



Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface repaired per Item 445, "Galvanizing."

DETAIL "A"

① Back up weld to be made before installing stiffener plate

② Weld W may be continued across clips to seal joint

SIGN POST AND STUB POST

(For W Shapes)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-2)-08

REVISIONS
4-98
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380

DIST	COUNTY	SHEET NO.
FTW	WISE	149

27B

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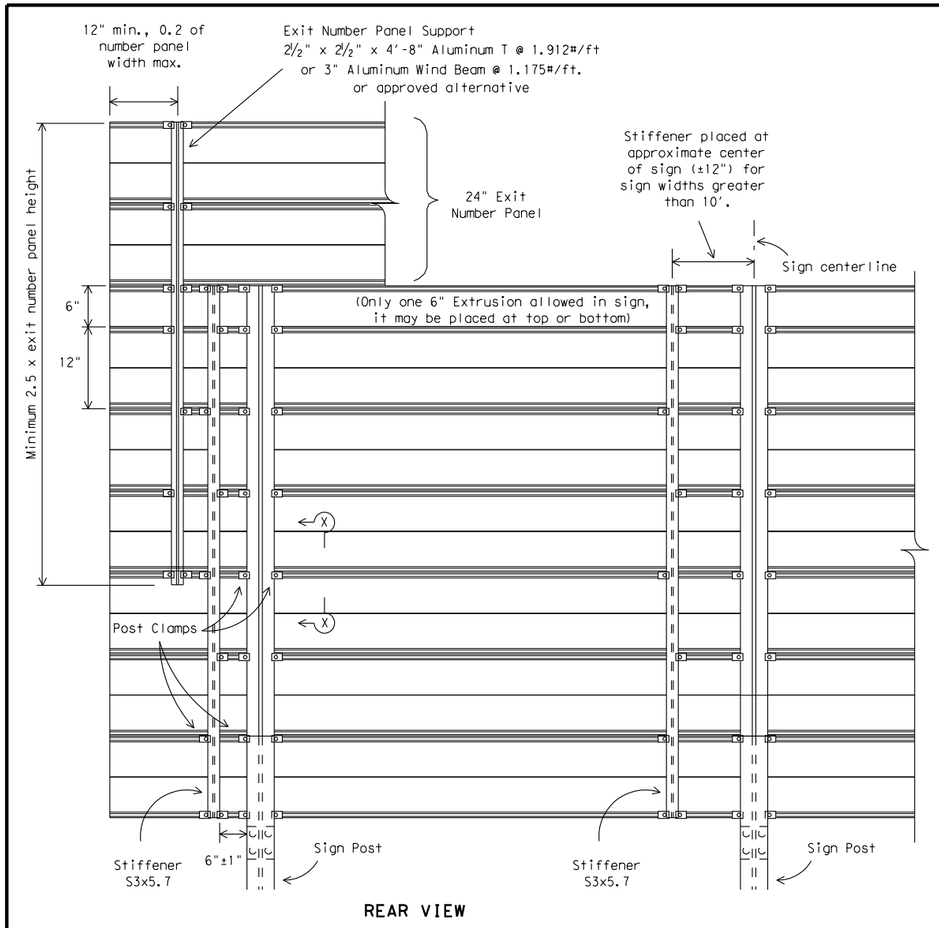
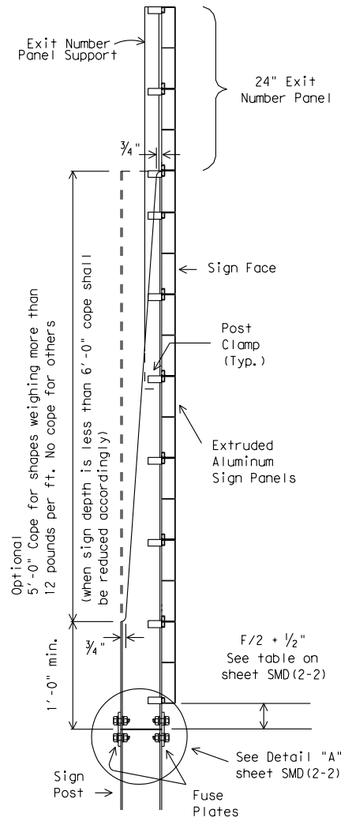
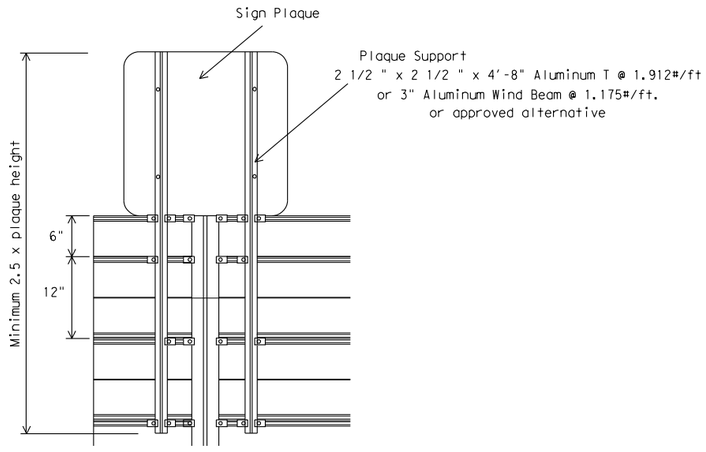


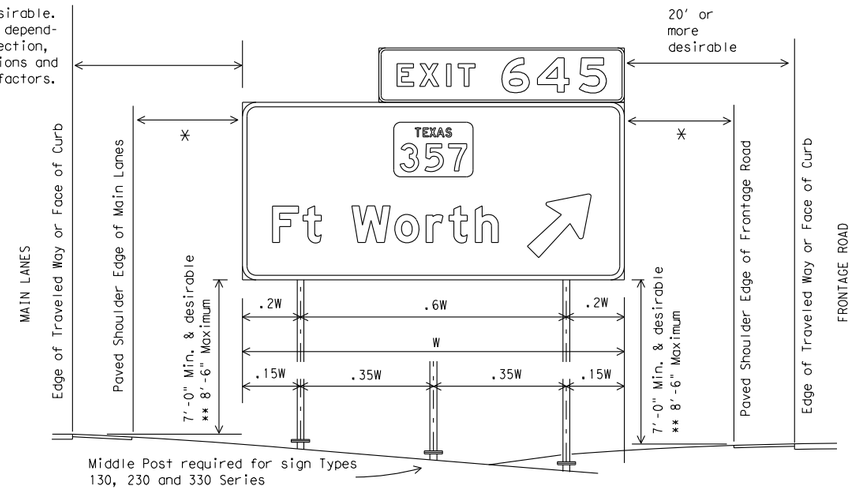


ALUMINUM PARENT SIGN & EXIT NUMBER PANEL MOUNTING DETAILS



SIGN PLAQUE MOUNTING DETAIL TO ALUMINUM PARENT SIGN

30' or more desirable. May be reduced depending on cross section, viewing conditions and other related factors.



TYPICAL SIGN INSTALLATION AND LOCATION

LATERAL CLEARANCE NOTES:

Lateral clearances of signs mounted on median side of main lanes are the same as shown above where space will permit.

Where a sign is to be located behind guardrail, an allowable minimum clearance of five feet may be used, measured from the face of the guardrail to the near edge of sign.

✳ - 6' minimum and desirable may be used only in areas of limited lateral clearance and when approved by the Engineer.

POST SPACING NOTES:

Post spacing on a two post sign may vary a maximum of plus or minus 10% of total sign width to fit field conditions.

Post spacing on a three post sign may vary a maximum of plus or minus 5% of total sign width to fit field conditions.

SIGN HEIGHT NOTES:

** The 8' 6" maximum may be exceeded when placing signs on extreme slopes. In these conditions, a 7' minimum from natural ground to bottom of sign must be maintained.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN HARDWARE	DMS-7120

GENERAL NOTES:

1. Exit number panel shall be mounted to the right hand side of the parent sign for right exits and to the left hand side for left exits. The number panel shall be mounted with two uprights so its right edge is even with the right edge of the parent sign or vice-versa for left hand exits.
2. Exit number panel support shall be symmetrical about number panel centerline.
3. Exit number panel support shall be ASTM A36 structural steel galvanized after fabrication, or ASTM B221 aluminum alloy 6061-T6 or approved alternative.
4. All bolts, nuts and washers shall be galvanized per ASTM Designation: B695 Class 50, or A153 Class C or D.
5. Posts, parent sign panels, and exit number panels shall comply with notes on sheets SMD(2-1) and SMD(2-2).
6. Signs (such as exit number panels) attached above a parent sign shall be made of the same type material as the parent sign. General Service and Routing signs may be fabricated from flat sheet aluminum.
7. Exit number panel support and other connection hardware required to fasten exit number panel to parent sign shall be subsidiary to "Aluminum Signs" or "Fiberglass Signs."
8. For fiberglass sign installation details, see manufacturer's recommendations.

Texas Department of Transportation
Traffic Operations Division

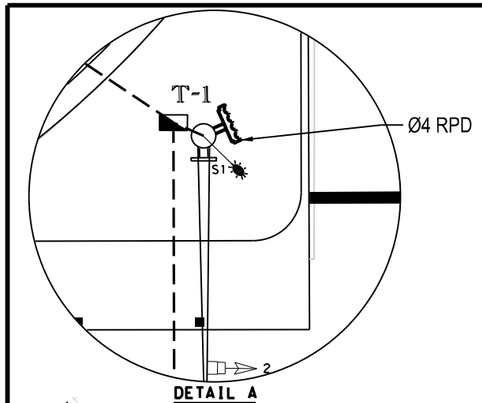
SIGN MOUNTING DETAILS-LARGE ROADSIDE SIGNS

SMD(2-3)-08

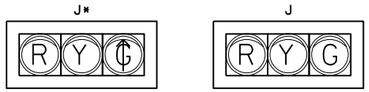
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

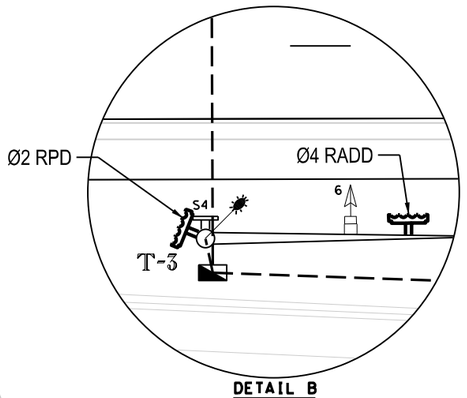
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	013407		069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		150

DATE:
FILE:



DETAIL A
WEST CORNER
NTS

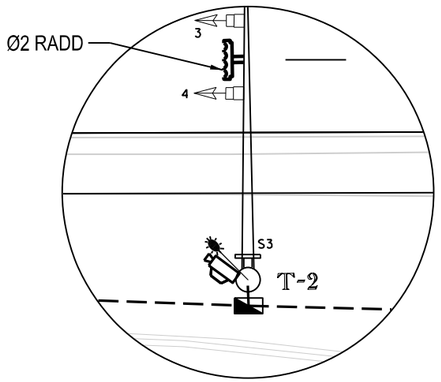




DETAIL B
SOUTH CORNER
NTS

NOTES:

1. ALL HEIGHTS AND LOCATIONS OF ALL SIGNAL RELATED ITEMS, PAVEMENT MARKINGS, SIGNING, ETC. ARE DIAGRAMMATIC ONLY AND MAY BE ADJUSTED IN THE FIELD IN ORDER TO ACCOMMODATE FIELD CONDITIONS AND TO ACHIEVE THE BEST POSSIBLE CONFIGURATION AS DIRECTED BY THE TXDOT INSPECTOR.
2. UTILITIES MAY BE FOUND IN THE AREA. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD LOCATE UNDERGROUND UTILITIES. IF A UTILITY IS FOUND WITH A PROPOSED POLE FOUNDATION, THE CONTRACTOR SHALL CONTACT THE ENGINEER ON RECORD FOR A POSSIBLE SOLUTION.
3. THE LOCATION OF THE RPD AND RADD DETECTORS SHOWN IN THE LAYOUT ARE DIAGRAMMATICAL AND SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE TXDOT INSPECTOR BEFORE THEY ARE INSTALLED. THE CONTRACTOR SHALL INSTALL THE DETECTORS ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
4. INSTALL EXTERNAL BBU UNIT TO CONTROLLER CABINET.
5. ALL SIGNAL HEAD ASSEMBLIES SHALL BE INSTALLED WITH VENTED BACK PLATES. ALL SIGNAL HEADS SHALL BE MOUNTED HORIZONTALLY.
6. CONTRACTOR SHALL CONTACT AARON RAMOS (682-308-6214) WITH ONCOR TO COORDINATE SERVICE CONNECTION.



DETAIL C
EAST CORNER
NTS

N

0 25 50
SCALE: 1" = 50'

LEGEND OF SYMBOLS

	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
(23)	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	ELECTRICAL SERVICE
	RPD & RADD DETECTION DEVICES
	CCTV
	SIGNING
	MAST ARM MOUNTED SIGN
	SIGNAL HEAD

STATE OF TEXAS
ABHISHEK ACHARYA
124094
LICENSED PROFESSIONAL ENGINEER
7/19/2022

Kimley»Horn F-928

Texas Department of Transportation
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SIGNAL IMPROVEMENTS AT US 380 AND US 287

PROPOSED SIGNAL LAYOUT
US 380 AT US 287
SOUTHBOUND EXIT RAMP

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			US 380
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	FTW	WISE	151
CONT.	SECT.	JOB	
0134	07	069	

FILENAME: K:\FTW_TPTO\064564802-TXDOT WA #2\CADD\SHEETS\TxDOT_SignalPlan_US380_US287SBFR_ProposedSignal.dgn
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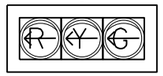
NOTES:

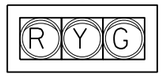
1. ALL HEIGHTS AND LOCATIONS OF ALL SIGNAL RELATED ITEMS, PAVEMENT MARKINGS, SIGNING, ETC. ARE DIAGRAMMATIC ONLY AND MAY BE ADJUSTED IN THE FIELD IN ORDER TO ACCOMMODATE FIELD CONDITIONS AND TO ACHIEVE THE BEST POSSIBLE CONFIGURATION AS DIRECTED BY THE TXDOT INSPECTOR.
2. UTILITIES MAY BE FOUND IN THE AREA. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD LOCATE UNDERGROUND UTILITIES. IF A UTILITY IS FOUND WITH A PROPOSED POLE FOUNDATION, THE CONTRACTOR SHALL CONTACT THE ENGINEER ON RECORD FOR A POSSIBLE SOLUTION.
3. THE LOCATION OF THE RPD AND RADD DETECTORS SHOWN IN THE LAYOUT ARE DIAGRAMMATICAL AND SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE TXDOT INSPECTOR BEFORE THEY ARE INSTALLED. THE CONTRACTOR SHALL INSTALL THE DETECTORS ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
4. INSTALL EXTERNAL BBU UNIT TO CONTROLLER CABINET.
5. ALL SIGNAL HEAD ASSEMBLIES SHALL BE INSTALLED WITH VENTED BACK PLATES. ALL SIGNAL HEADS SHALL BE MOUNTED HORIZONTALLY.
6. CONTRACTOR SHALL CONTACT AARON RAMOS (682-308-6214) WITH ONCOR TO COORDINATE SERVICE CONNECTION.

I



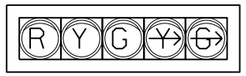
SH 7, 13

J

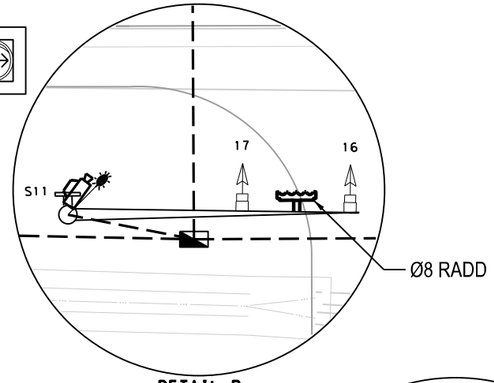


SH 8, 9, 11, 12, 14, 15, 16, 17

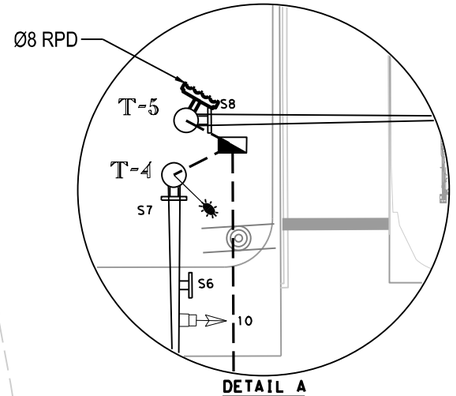
M



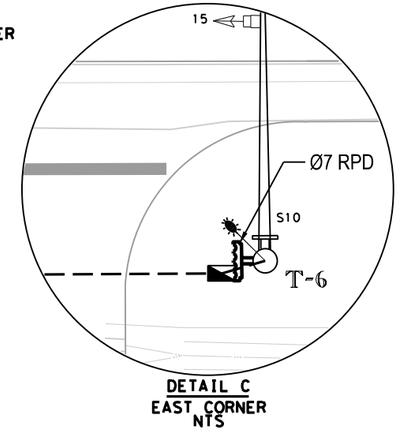
SH 10



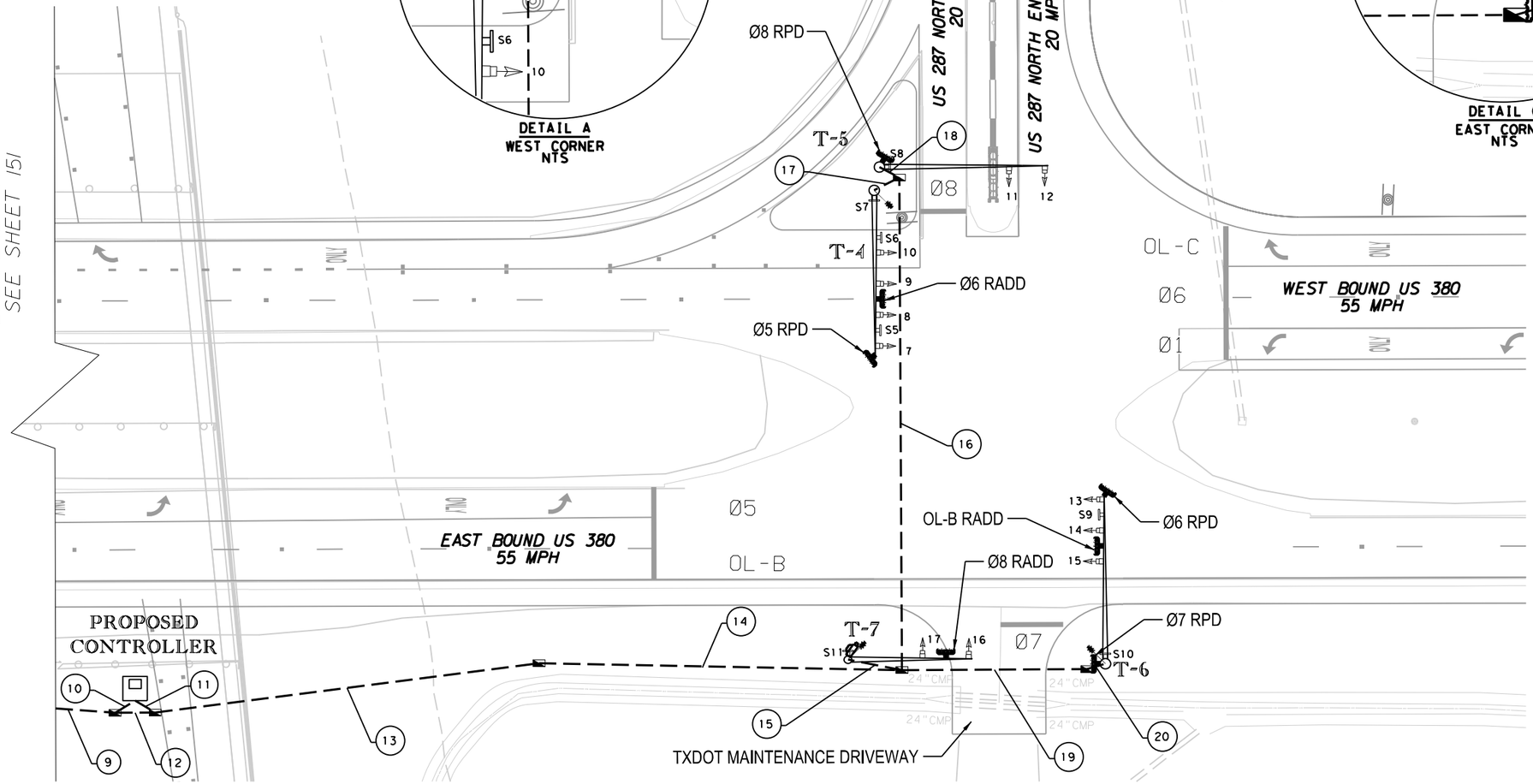
DETAIL B
SOUTH CORNER
NTS



DETAIL A
WEST CORNER
NTS



DETAIL C
EAST CORNER
NTS



0 25 50
SCALE: 1" = 50'

LEGEND OF SYMBOLS

	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
(22)	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	ELECTRICAL SERVICE
	RPD & RADD DETECTION DEVICES
	CCTV
	SIGNING
	MAST ARM MOUNTED SIGN
	SIGNAL HEAD

STATE OF TEXAS
ABHISHEK ACHARYA
124094
LICENSED
PROFESSIONAL ENGINEER
7/19/2022

Kimley»Horn F-928

Texas Department of Transportation
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SIGNAL IMPROVEMENTS AT US 380 AND US 287

PROPOSED SIGNAL LAYOUT
US 380 AT US 287
NORTHBOUND EXIT RAMP

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		US 380

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	FTW	WISE	152
CONT.	SECT.	JOB	
0134	07	069	

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LEGEND OF CONDUIT

RUN NO.	SIZE	LENGTH IN FT	INSTALL CABLE & CONDUIT (T=TRENCH, B=BORE)						
			16C#14 AWG SIGNAL	3C#8 TRAY LUM	1C#2 AWG SERV	1C#2 AWG (BARE) GROUND	1C#6 AWG (BARE) GROUND	RPD/RADD CABLE DETECTION*	CCTV CABLE ‡ **
1	2-B	50			2	1			
	2-B	50		1			1		
2	3-T	10	1	2			1	2	
3	2-B	180			2	1			
	2-B	180		1			1		
	3-B	180	1				1	2	
4	3-T	10	1	2			1	2	
5	2-T	90			2	1			
	2-T	90		1			1		
	3-T	90	2				1	4	
6	3-T	10	1	2			1	2	1
7	2-T	190			2	1			
	2-T	190		1			1		
	3-T	190	3				1	6	1
8	2-T	180			2	1			
	2-T	180		1			1		
	3-T	180	3				1	6	1
9	2-T	170			2	1			
	2-T	170		1			1		
	3-T	170	3				1	6	1
10	2-T	10			2	1			
	3-T	10	3				1	6	1
11	4-T	10	4				1	7	1
12	3-T	20		1			1		
13	3-T	150	4	1			1	7	1
14	3-T	140	4	1			1	7	1
15	3-T	25	1	2			1	1	1
16	3-B	190	2	1			1	3	
17	3-T	15	1	1			1	2	
18	3-T	10	1				1	1	
19	3-T	75	1	2			1	3	
20	3-T	10	1	2			1	3	
TOTAL (LF)			3755	1655	1740	870	2355	7070	885

‡COHU CAMERA COMPATIBLE POE EXTENDER DEVICE MIDSPAN SHALL BE SUBSIDIARY TO ITEM 6010

CABLE IN POLE AND ARM

SIGNAL POLE	CABLE			
	7/C#14 AWG	3C#8 TRAY LUM	RPD/RADD CABLE DETECTION*	CCTV CABLE**
T-1	140	80	90	-
T-2	115	80	140	30
T-3	110	80	80	-
T-4	250	80	150	-
T-5	155	-	25	-
T-6	215	80	175	-
T-7	120	80	60	30
TOTAL(LF)	1105	480	720	60

GROUND BOX SUMMARY		
TYPE	EACH	STATUS
D W/ APRON	11	I

STATUS: I = INSTALL

SUMMARY OF SIGNS

SIGN	SIGN TYPE	STATUS	SIZE	MOUNT TYPE	SIGN LEGEND
S1	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING
S2	R3-2	F/I	24"x24"	MAST ARM	NO LEFT TURN
S3	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING
S4	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING
S5	R10-5L	F/I	30"X36"	MAST ARM	LEFT ON GREEN ARROW ONLY
S6	R10-11A	F/I	30"X36"	MAST ARM	NO TURN ON RED
S7	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING
S8	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING
S9	R10-5L	F/I	30"X36"	MAST ARM	LEFT ON GREEN ARROW ONLY
S10	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING
S11	R9-3	F/I	18"x18"	MAST ARM	NO PED CROSSING

STATUS INDICATORS: F/I = FURNISH/INSTALL
MAST ARM SIGNS ARE SUBSIDIARY TO ITEM 680

NOTES:

1. MAST ARM MOUNTED SIGNS AND MOUNTING HARDWARE (ASTRO-BRAC TYPE) SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH ITEM 644, EXCEPT FOR MEASUREMENT AND PAYMENT, WHICH SHALL BE SUBSIDIARY TO ITEM 680, "INSTALLATION OF HIGHWAY TRAFFIC SIGNALS." THESE SIGNS SHALL BE IN ACCORDANCE WITH ITEM 636, EXCEPT FOR MEASUREMENT AND PAYMENT, AND SHALL BE 0.100 INCHES IN THICKNESS.
2. INCISE ALL FOUNDATIONS WHERE THE CONDUIT LEAVES THE FOUNDATION.

* RPD & RADD CABLES WILL BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR PAYMENTS SHALL BE SUBSIDIARY TO ITEMS 6045/6046.

** CCTV CABLES WILL BE SUBSIDIARY TO ITEM 6010.

SIGNAL POLE CHART

POLE NUMBER	T-1		T-2		T-3		T-4				T-5		T-6				T-7	
MAST ARM LENGTH	55'		60'		48'		65'				65'		65'				48'	
FOUNDATION TYPE	48-A		48-A		36-A		48-A				48-A		48-A				36-A	
WITH LUMINAIRES	YES		YES		YES		YES				NO		YES				YES	
WITH SIGNS	R9-3		R3-2; R9-3		R9-3		R9-3; R10-5L; R10-11A				R9-3		R9-3; R10-5L				R9-3	
SIZE OF LENS	12"		12"		12"		12"				12"		12"				12"	
SIGNAL TYPE	J	J	J*	J	J	J	I	J	J	M	J	J	I	J	J	J	J	
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
LED SIGNAL INDICATIONS	R	R	R	R	R	R	< R	R	R	R	R	R	< R	R	R	R	R	
	Y	Y	Y	Y	Y	Y	< Y	Y	Y	Y	Y	Y	< Y	Y	Y	Y	Y	
	G	G	G ^	G	G	G	< G	G	G	G	G	G	< G	G	G	G	G	
										Y >								
										G >								

< DENOTES SIGNAL HEADS WITH ARROWS.
* DENOTES MODIFIED SIGNAL HEAD

ELECTRICAL SERVICE 2014 DATA SHEET

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 CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
1	151 & 152	ELC SRV TY D 120/240 060 (NS)SS(E)SP(O)	1 1/2"	3/#2	N/A	2P/60	2P/ 30	100	TS	1P/30	24	3.90
									LUM	2P/15	4.26	

R9-3
18"X18"
S1, S3, S4, S7, S8, S10, S11

R3-2
24"X24"
S2

R10-5L
30"X36"
S5, S9

R10-11A
30"X36"
S6

7/19/2022

Kimley»Horn F-928

®Texas Department of Transportation
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SIGNAL IMPROVEMENTS AT US 380 AND US 287

SUMMARY DETAIL SHEET
US 380 AND US 287

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			US 380
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	FTW	WISE	153
CONT.	SECT.	JOB	
0134	07	069	

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RPD & RADD PRESENSE DETECTION

Click 656 (1) (BIU9)			Click 656 (2) (BIU 10 & 11)		
SENSOR 1	Ø1, OLA	RPD	SENSOR 1	Ø6	RAD
SENSOR 2	Ø2	RPD	SENSOR 2	Ø2	RAD
SENSOR 3	Ø8	RPD	SENSOR 3	Ø8	RAD
SENSOR 4	Ø4	RPD	SENSOR 4	Ø4	RAD
SENSOR 5	Ø5, OLB	RPD	SENSOR 5	X	
SENSOR 6	Ø6, OLC	RPD	SENSOR 6	Ø7	RPD

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT	Ø1				Ø5			
MATRIX OUTPUT CHANNEL	1				5			
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT	Ø1, OLA	Ø1, OLA	Ø2	Ø4	Ø5, OLB	OLA	Ø6, OLC	Ø8
MATRIX OUTPUT CHANNEL	9	10	11	12	13	14	15	16

CONTROLLER (BIU 10)

DETECTOR CHANNEL	17	18	19	20	21	22	23	24
HIGH SPEED 150' TO 700'		Ø7						
ADVANCE OUTPUT CHANNEL		18						
DETECTOR CHANNEL	25	26	27	28	29	30	31	32
LOW SPEED 50' TO 150'								
ADVANCE OUTPUT CHANNEL								

CONTROLLER (BIU 11)

DETECTOR CHANNEL	33	34	35	36	37	38	39	40
HIGH SPEED 150' TO 700'		Ø2		Ø4		Ø6		Ø8
ADVANCE OUTPUT CHANNEL		34		36		38		40
DETECTOR CHANNEL	41	42	43	44	45	46	47	48
LOW SPEED 50' TO 150'		Ø2		Ø4		Ø6		Ø8
ADVANCE OUTPUT CHANNEL		42		44		46		48

CABLE TERMINATION CHART

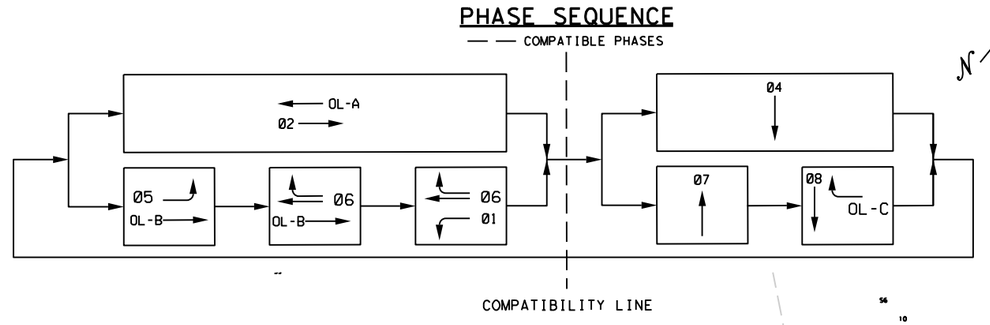
CONDR. NUM.	CONDUCTOR COLOR	CABLE 1 FROM T-1 TO CONTROLLER 16 CONDUCTOR	CABLE 2 FROM T-2 TO CONTROLLER 16 CONDUCTOR	CABLE 3 FROM T-3 TO CONTROLLER 16 CONDUCTOR	CABLE 4 FROM T-4 TO CONTROLLER 16 CONDUCTOR	CABLE 5 FROM T-5 TO CONTROLLER 16 CONDUCTOR	CABLE 6 FROM T-6 TO CONTROLLER 16 CONDUCTOR	CABLE 7 FROM T-7 TO CONTROLLER 16 CONDUCTOR
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
3	RED	SH 1, 2 OLA R	SH 3, 4 Ø2 R	SH 5, 6 Ø4 R	SH 8, 9, 10 Ø6 R	SH 11, 12 Ø7 R	SH 14, 15 OLB R	SH 16, 17 Ø8 R
4	GREEN	SH 1, 2 OLA G	SH 4 Ø2 G	SH 5, 6 Ø4 G	SH 8, 9, 10 Ø6 G	SH 11, 12 Ø7 G	SH 14, 15 OLB G	SH 16, 17 Ø8 G
5	ORANGE	SH 1, 2 OLA Y	SH 3, 4 Ø2 Y	SH 5, 6 Ø4 Y	SH 8, 9, 10 Ø6 Y	SH 11, 12 Ø7 Y	SH 14, 15 OLB Y	SH 16, 17 Ø8 Y
6	BLUE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/BLACK	SPARE	SPARE	SPARE	SH 7 Ø1 R<	SPARE	SH 13 Ø5 R<	SPARE
9	GREEN/BLACK	SPARE	SH 3 Ø2 G^	SPARE	SH 7 Ø1 G<	SPARE	SH 13 Ø5 G<	SPARE
10	ORANGE/BLACK	SPARE	SPARE	SPARE	SH 7 Ø1 Y<	SPARE	SH 13 Ø5 Y<	SPARE
11	BLUE/BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
12	BLACK/WHITE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
13	RED/WHITE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
14	GREEN/WHITE	SPARE	SPARE	SPARE	SH 10 OLC G>	SPARE	SPARE	SPARE
15	BLUE/WHITE	SPARE	SPARE	SPARE	SH 10 OLC Y>	SPARE	SPARE	SPARE
16	BLACK/RED	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE

NOTES:

1. MAST ARM MOUNTED SIGNS AND MOUNTING HARDWARE (ASTRO-BRAC TYPE) SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH ITEM 644, EXCEPT FOR MEASUREMENT AND PAYMENT, WHICH SHALL BE SUBSIDIARY TO ITEM 680, "INSTALLATION OF HIGHWAY TRAFFIC SIGNALS." THESE SIGNS SHALL BE IN ACCORDANCE WITH ITEM 636, EXCEPT FOR MEASUREMENT AND PAYMENT, AND SHALL BE 0.100 INCHES IN THICKNESS.
2. INCISE ALL FOUNDATIONS WHERE THE CONDUIT LEAVES THE FOUNDATION.
3. RPD & RADD CABLES WILL BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR PAYMENTS SHALL BE SUBSIDIARY TO ITEMS 6045/6046.
4. CCTV CABLES WILL BE SUBSIDIARY TO ITEM 6010.

OVERLAP PHASING	
OL-A	Ø2
OL-B	Ø5 & Ø6
OL-c	Ø8

PHASE SEQUENCE



7/19/2022

STATE OF TEXAS
ABHISHEK ACHARYA
124094
LICENSED PROFESSIONAL ENGINEER

Kimley»Horn F-928

Texas Department of Transportation

SIGNAL IMPROVEMENTS AT US 380 AND US 287

TERMINATION AND PHASING SHEET
US 380 AND US 287

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6		US 380

STATE	DIST.	COUNTY	SHEET NO.
TEXAS	FTW	WISE	154
CONT.	SECT.	JOB	
0134	07	069	

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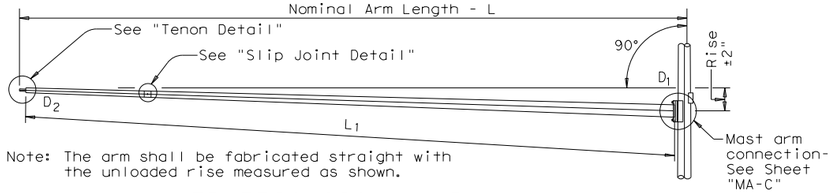
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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)

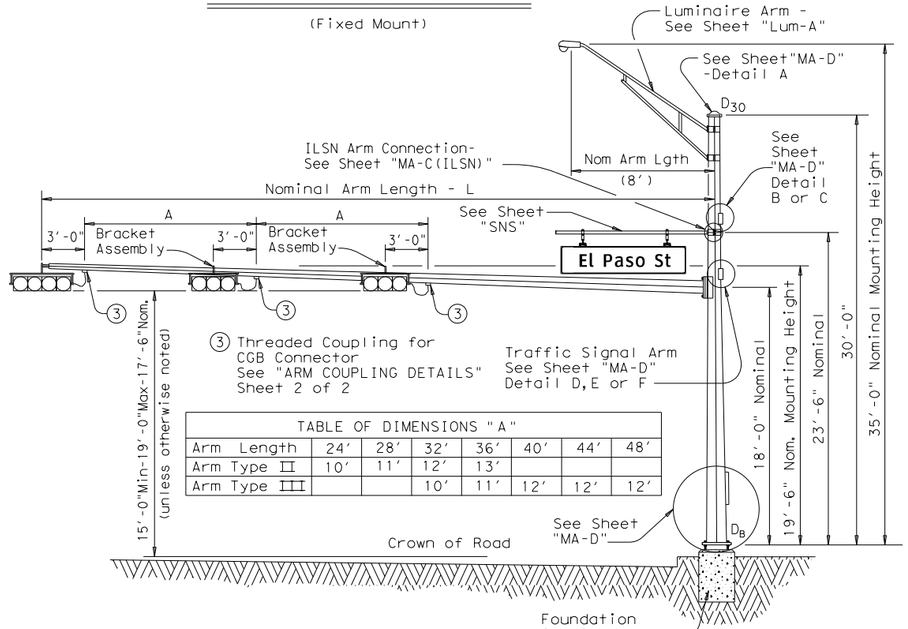


TABLE OF DIMENSIONS "A"							
Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

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	2	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	2

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	2

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"	2

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.

STATE OF TEXAS
ABHISHEK ACHARYA
124094
LICENSED PROFESSIONAL ENGINEER
7/19/2022

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
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		155

122A

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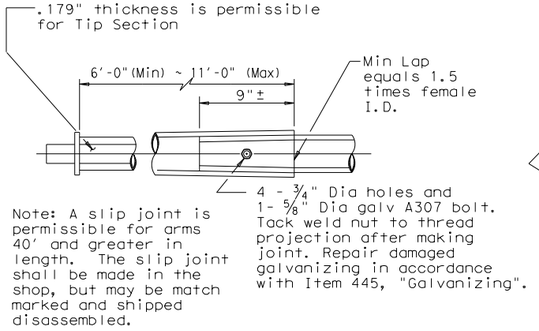
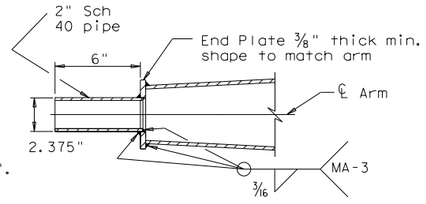


SLIP JOINT DETAIL



TENON DETAIL

VIBRATION WARNING

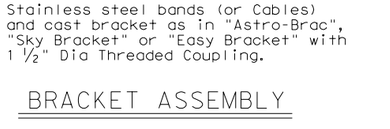
Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights 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.

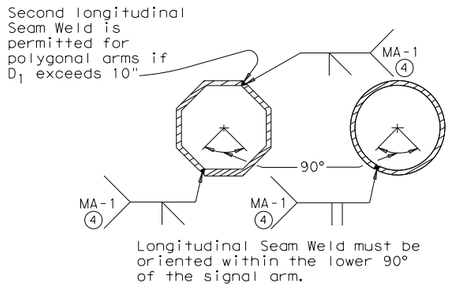
If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

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 backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

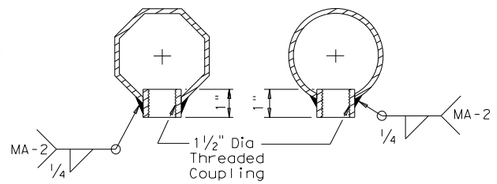
This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.



BRACKET ASSEMBLY



ARM WELD DETAIL



ARM COUPLING DETAILS

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

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: MWF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		156

122B

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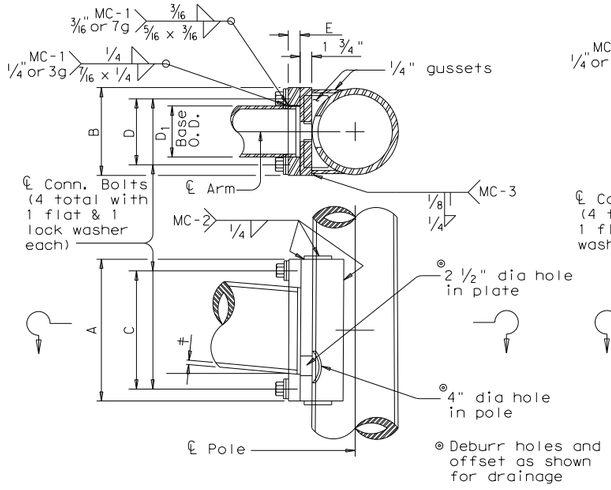
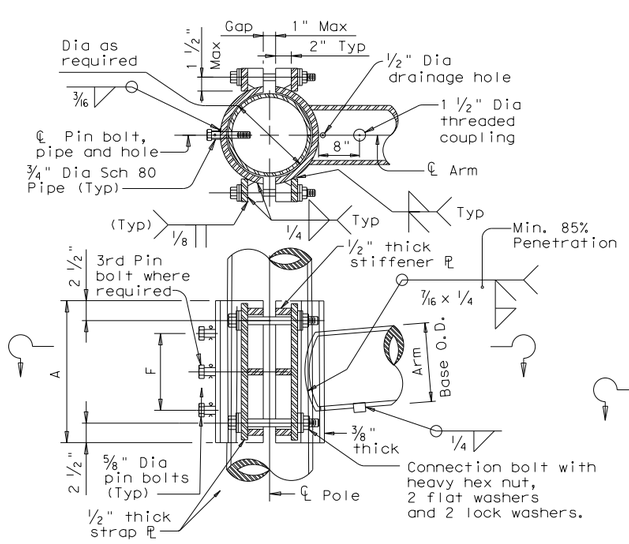
ARM SIZE D_1 in.	ARM SIZE ŧ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18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



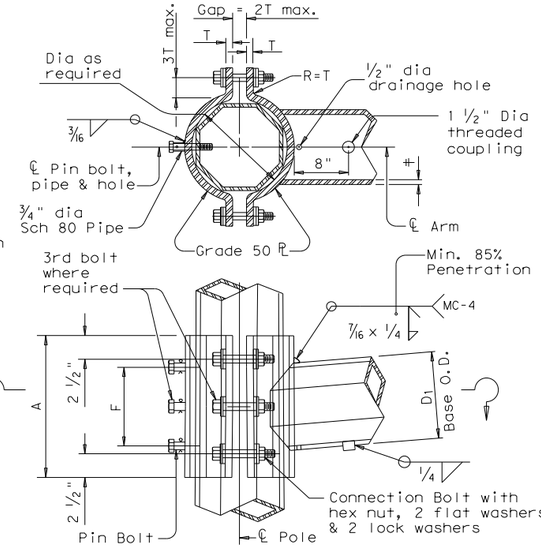
FIXED MOUNT DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ŧ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8



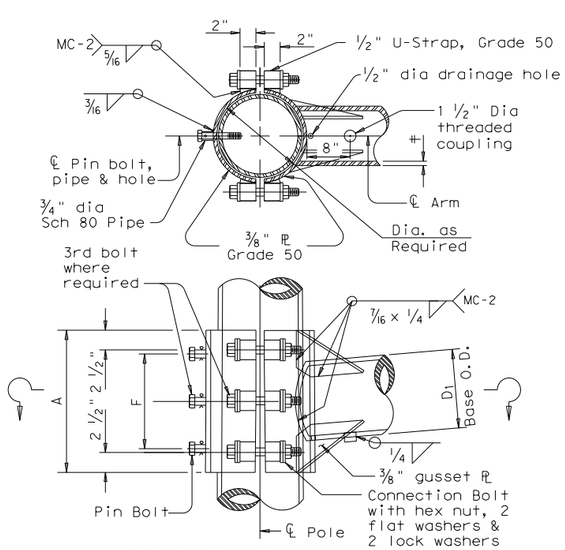
CLAMP-ON DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ŧ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	6	¾	4	¾	2	5/8
7.5	.179	14	8	¾	4	¾	2	5/8
8.0	.179	14	8	¾	4	¾	2	5/8
9.0	.179	16	10	⅞	4	1	2	5/8
10.0	.179	18	10	⅞	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

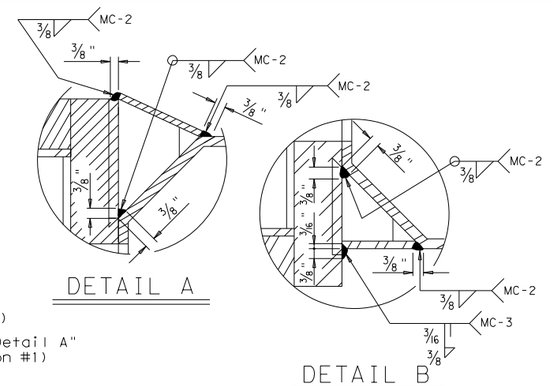


CLAMP-ON DETAIL 2

ARM SIZE D_1 in.	ARM SIZE ŧ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

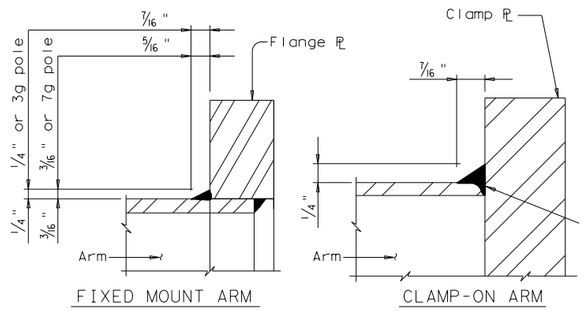


CLAMP-ON DETAIL 3



DETAIL A

DETAIL B



ARM BASE WELD DETAILS

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 5/16" dia holes for a 1/8" 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

REVISIONS
5-96
5-09
1-12

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		157

126A

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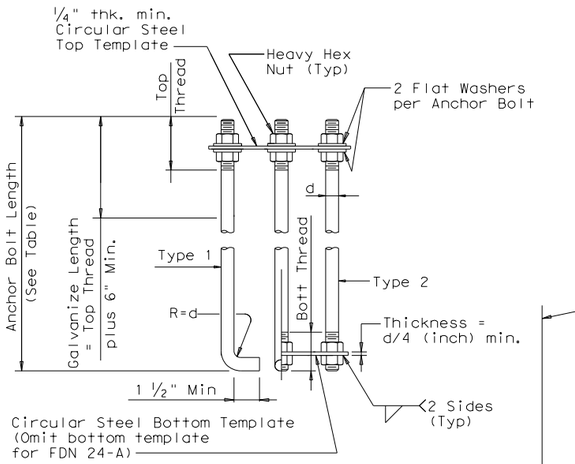
FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	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)

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'

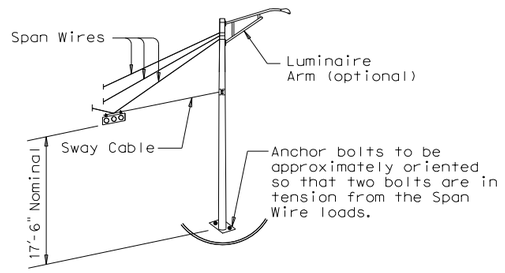
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



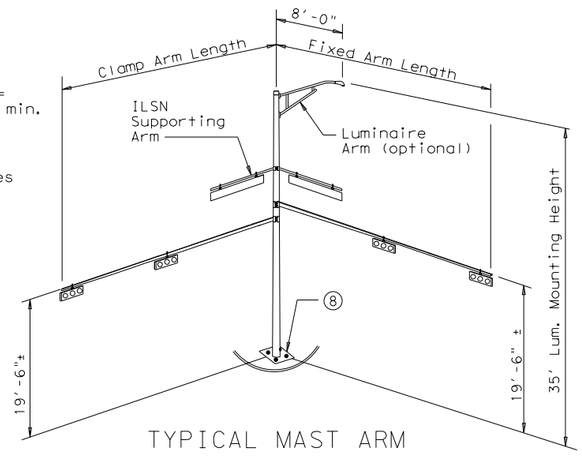
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

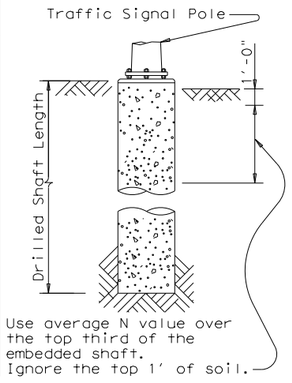
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



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.

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.

FOUNDATION DETAILS

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
US 380 AT US 287								
T-3	10	36-A	1			13		
T-7	10	36-A	1			13		
TOTAL DRILLED SHAFT LENGTHS						26		

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".

STATE OF TEXAS
ABHISHEK ACHARYA
124094
LICENSED
PROFESSIONAL ENGINEER
7/19/2022

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS 5-96 11-99 1-12

CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		158

DATE: 7/19/2022 4:00:50 PM
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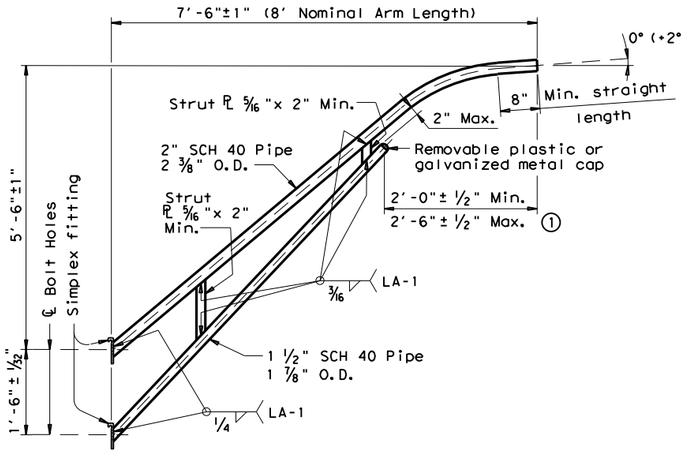
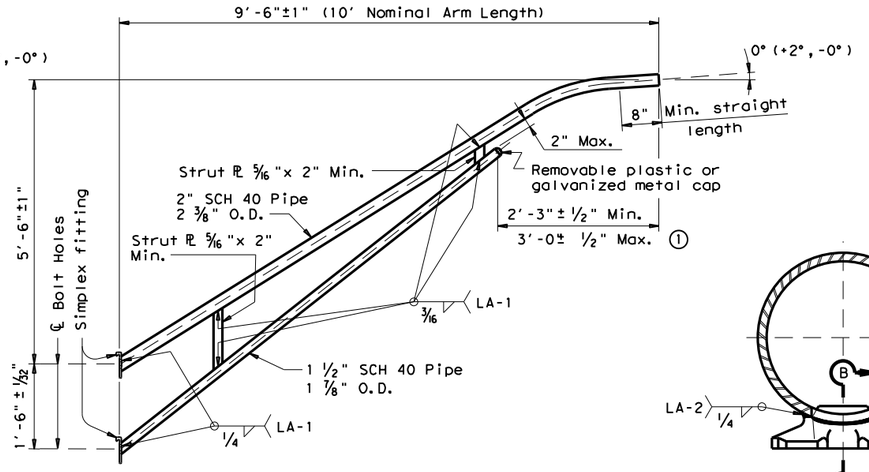


8-FOOT LUMINAIRE ARM



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.

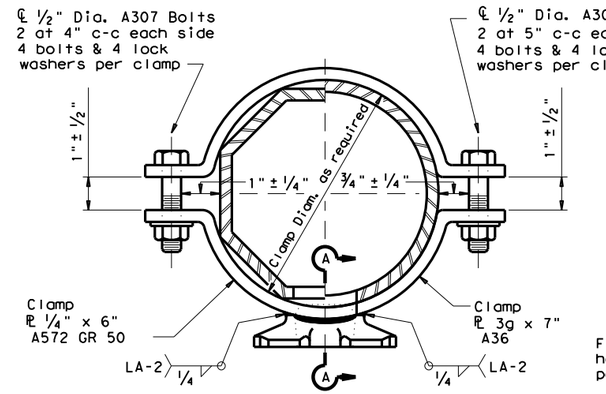
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified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

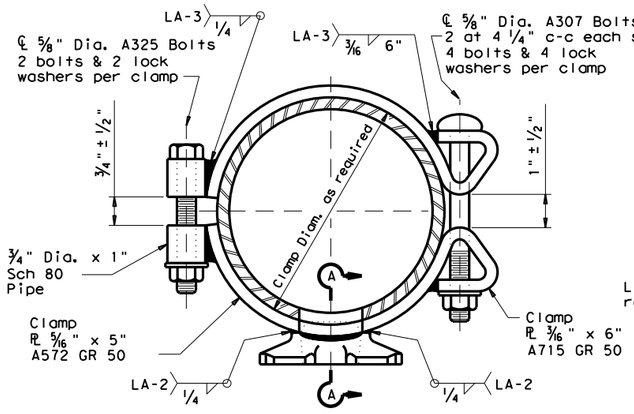
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly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



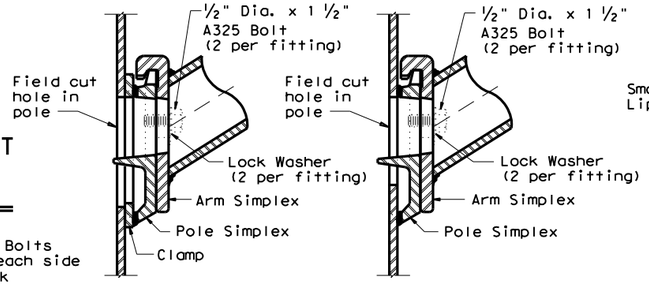
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



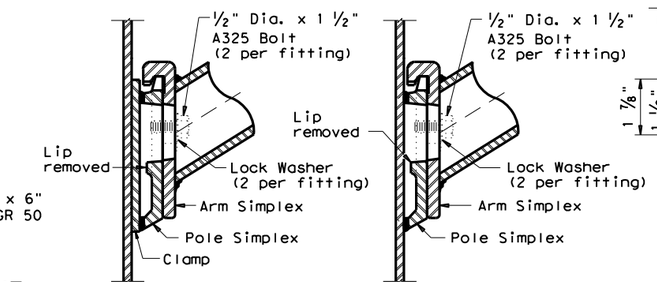
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING

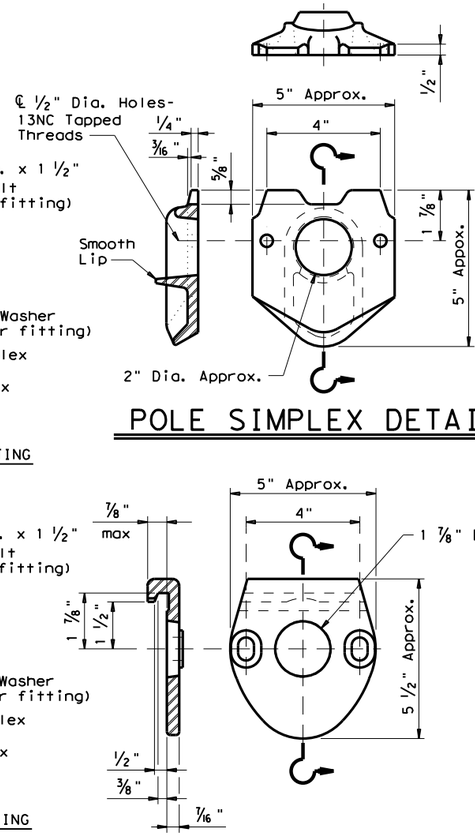


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



POLE SIMPLEX DETAIL

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
0134	07	069	US 380

DIST	COUNTY	SHEET NO.
FTW	WISE	159

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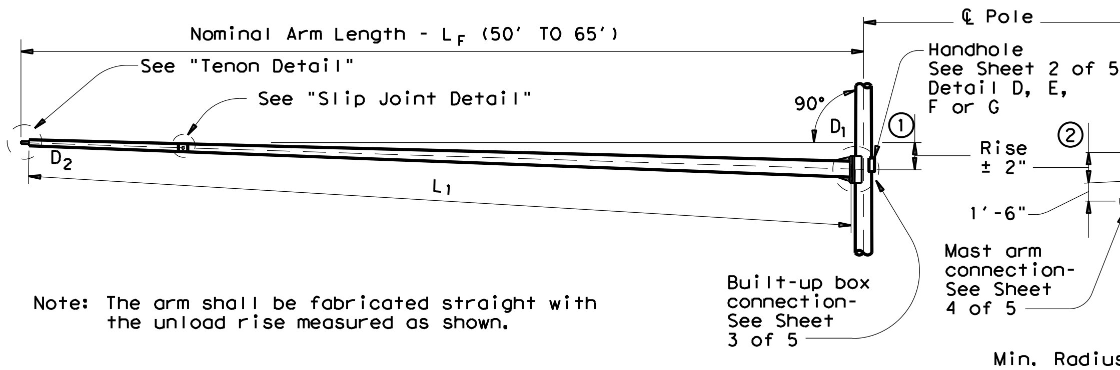
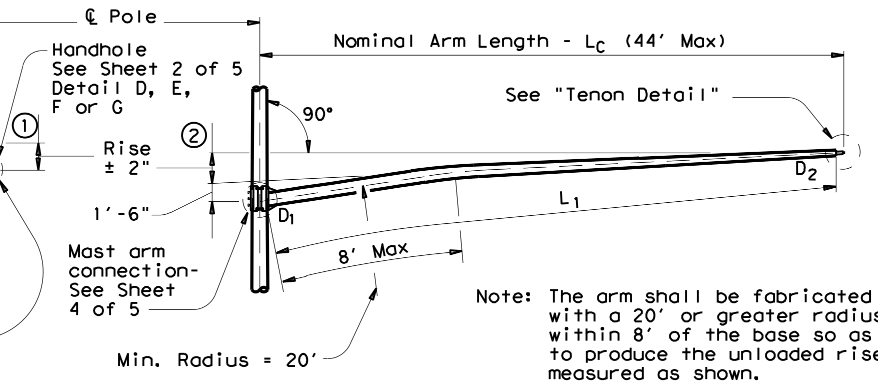


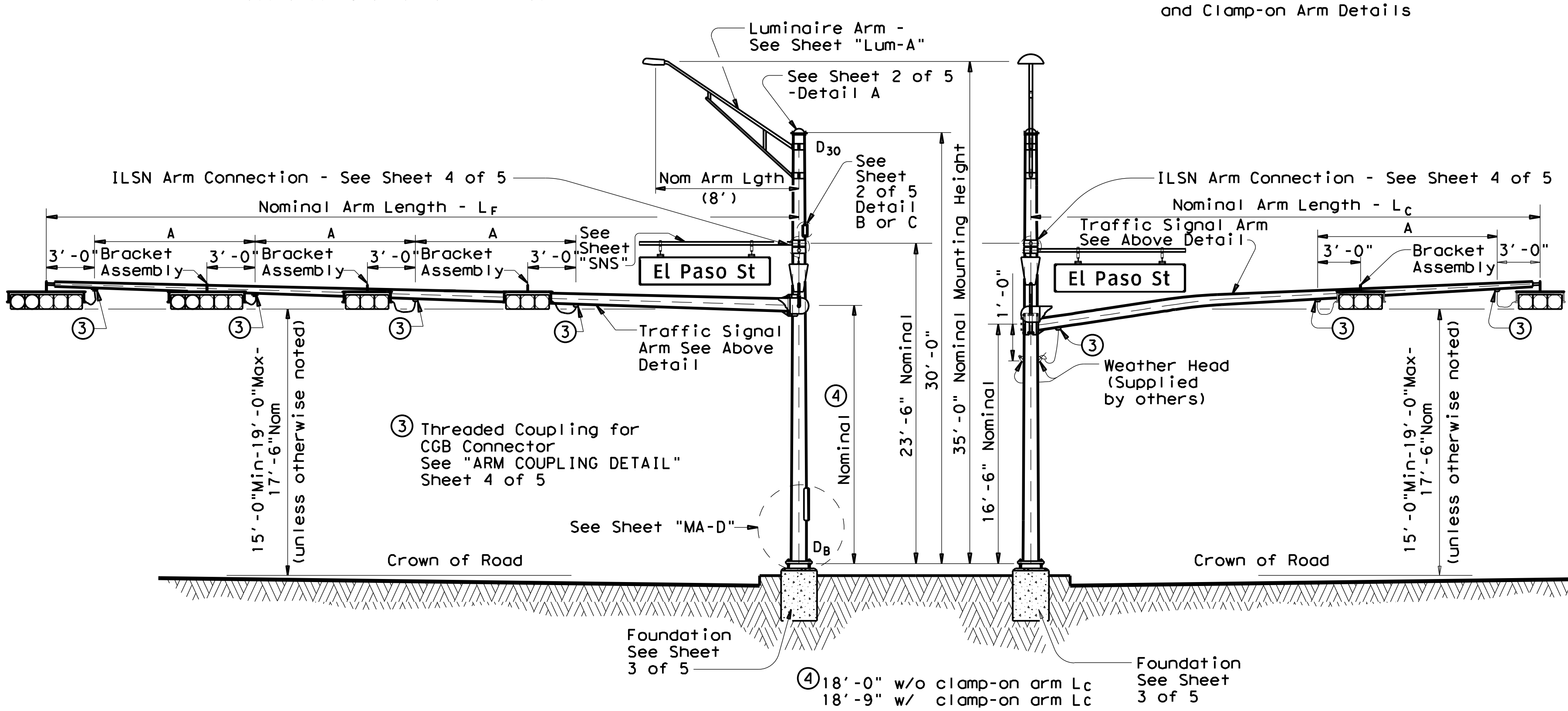
FIXED MOUNT TRAFFIC SIGNAL ARM

(1) See Sheet 3 of 5 for Arm Rise



CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

(2) See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



ELEVATION

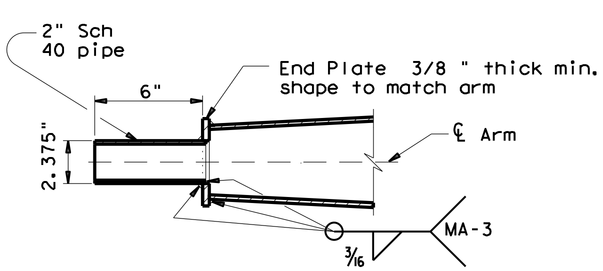
(Showing fixed mount arm)

STRUCTURE ASSEMBLY

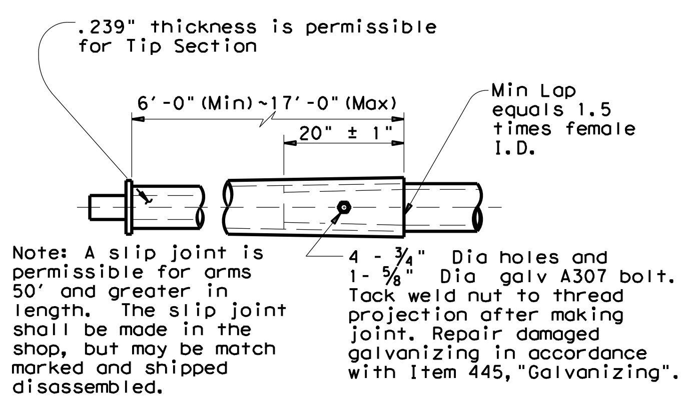
ELEVATION

(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"										
Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



SLIP JOINT DETAIL (FIXED MOUNT ARM)

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 can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL (5)	WL EPA (5)(6)
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

(5) Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

(6) Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole 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.

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. Material, fabrication tolerances, and shipping practices shall also 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.

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

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)
LMA(1)-12

Sheet 1 of 5

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01 1-12	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		160

131A

DATE: 7/19/2022
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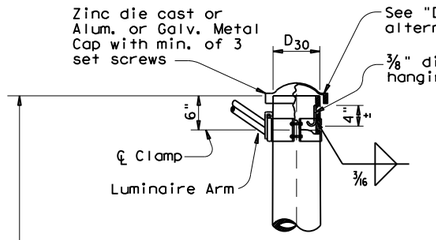
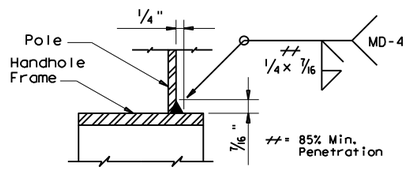
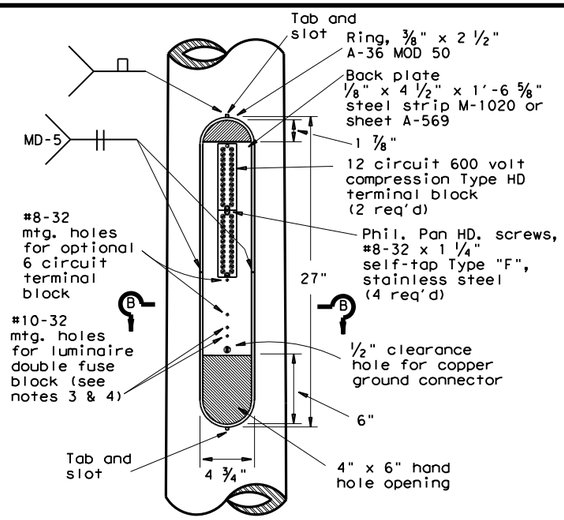


DETAIL A

(for pole with luminaire)



DETAIL H

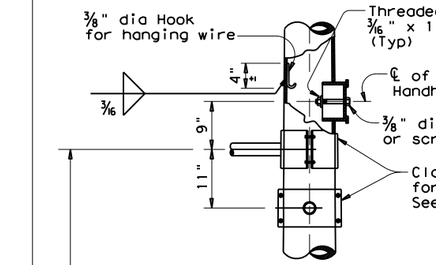


ACCESS COMPARTMENT

MATERIALS	
Round Shafts or Polygonal Shafts (7)	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 (8)
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	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

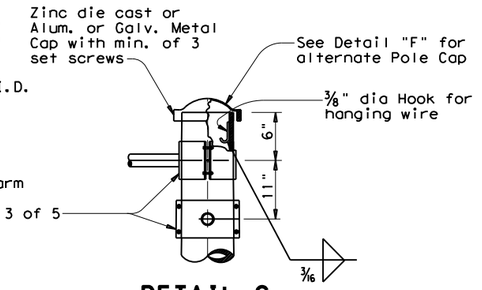
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 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.

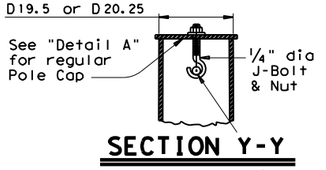


DETAIL B

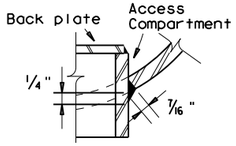
(If ILSN applied)



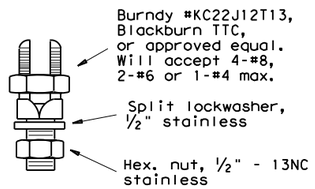
DETAIL C



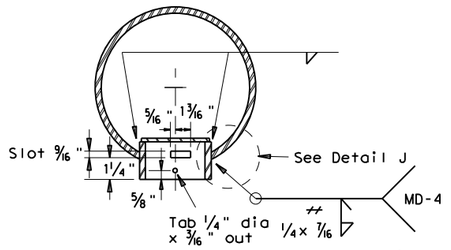
SECTION Y-Y



DETAIL J



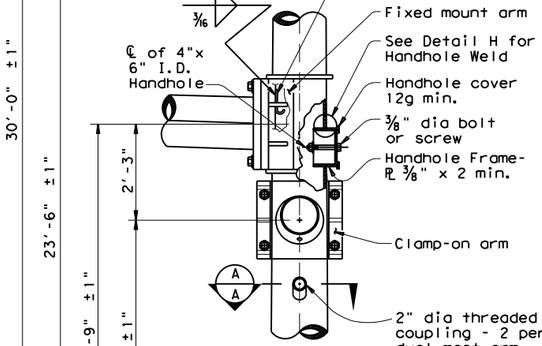
COPPER GROUND CONNECTOR



SECTION B-B

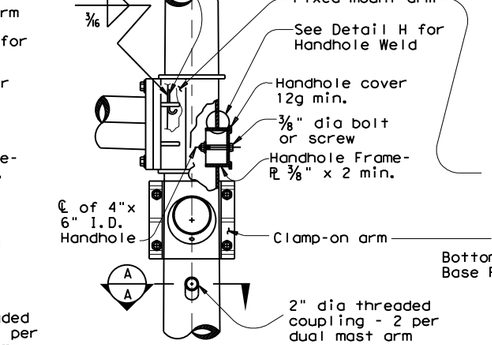
= 85% Min. Penetration

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



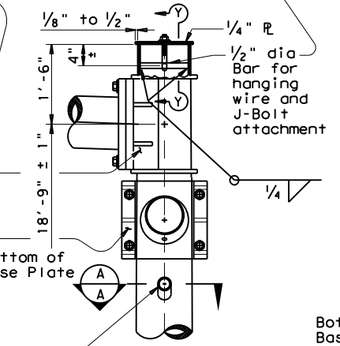
DETAIL D

(for 30' pole with luminaire and ILSN sign)



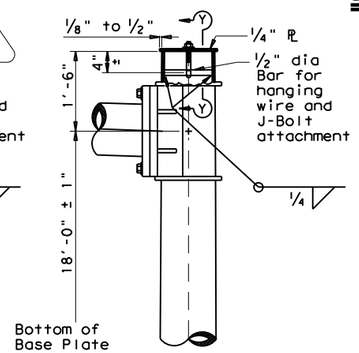
DETAIL E

(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



DETAIL F

(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)

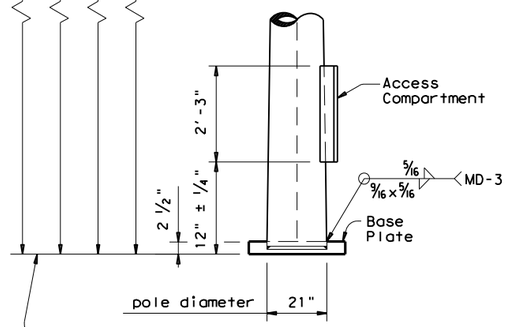


DETAIL G

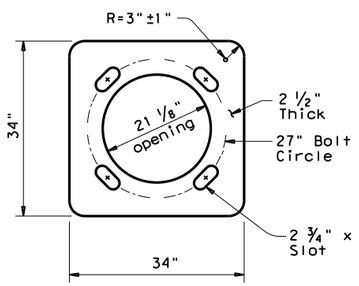
(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

ACCESS COMPARTMENT NOTES:

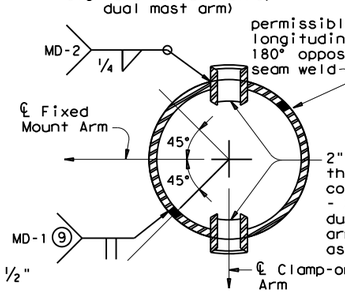
1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 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.



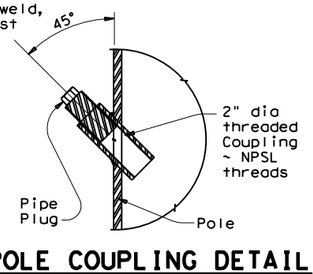
POLE ELEVATION



BASE PLATE



SECTION A-A



POLE COUPLING DETAIL

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

LMA(2)-12

Sheet 2 of 5

DN: JSY	CK: ARC	DW: TGG	CK: JSY

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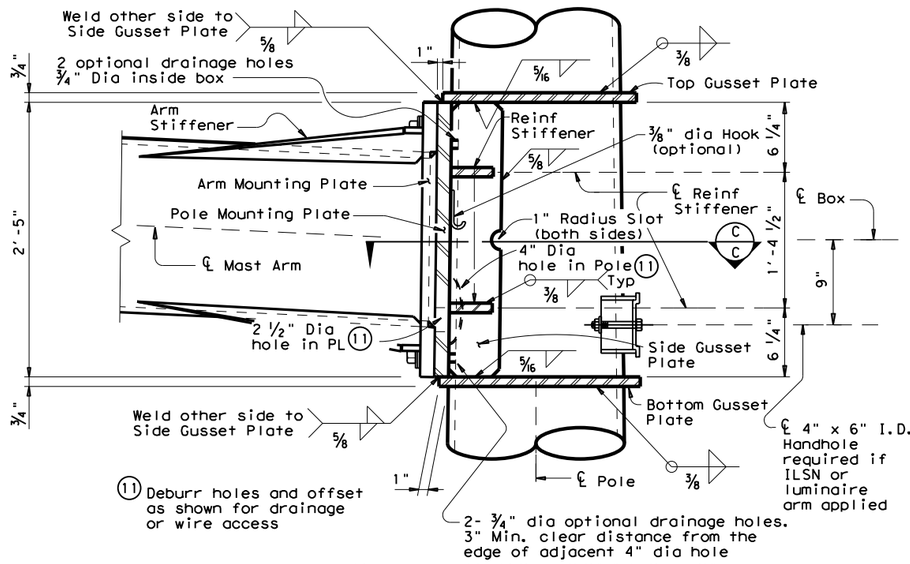
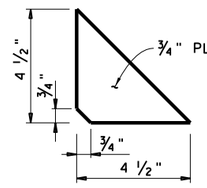
CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		161

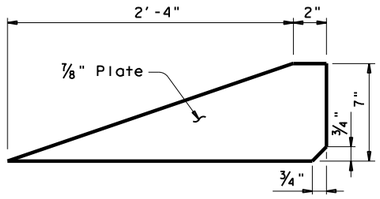
131B



BUILT-UP BOX CONNECTION

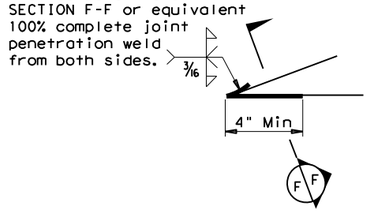


REINFORCING STIFFENER

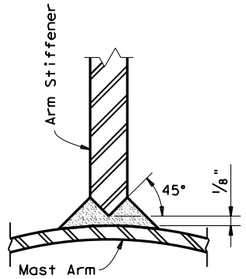


ARM STIFFENER

(Cut to match arm inclination and taper)



DETAIL "K"



SECTION F-F

Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
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_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

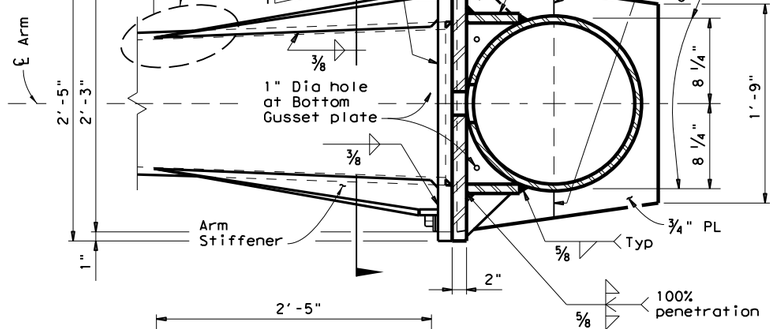
(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

GENERAL NOTES:

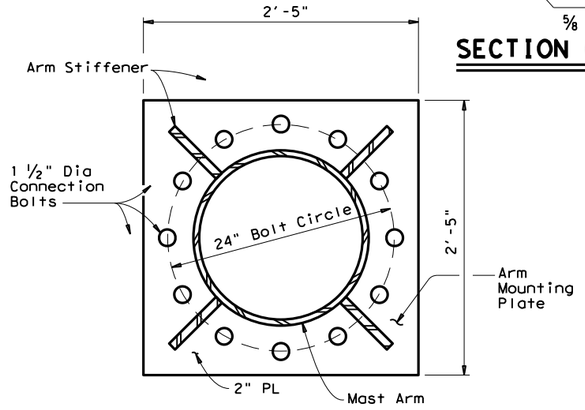
Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

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



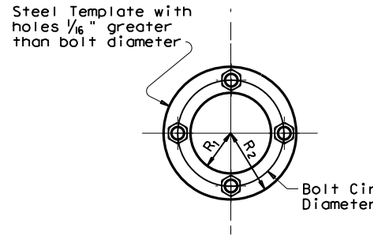
SECTION C-C



SECTION D-D

NUT ANCHOR
(TYPE 2)

ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length ‡	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

‡ Min dimension given, longer bolts are acceptable.

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		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							
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

(14) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(15) Foundation Design Loads are the allowable moments and shears at the base of the structure.

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

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 3 of 5 LMA(3)-12

DN: JSY	CK: ARC	DW: TGG	CK: JSY

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CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		162

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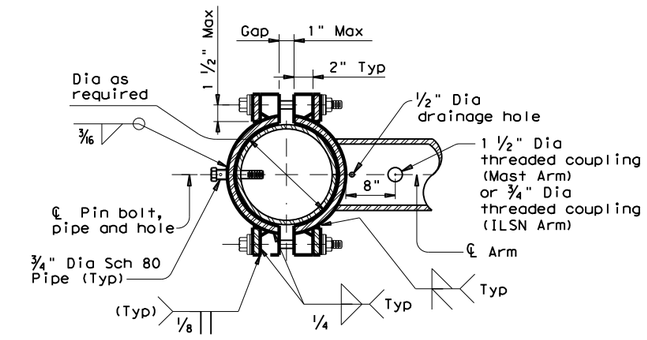
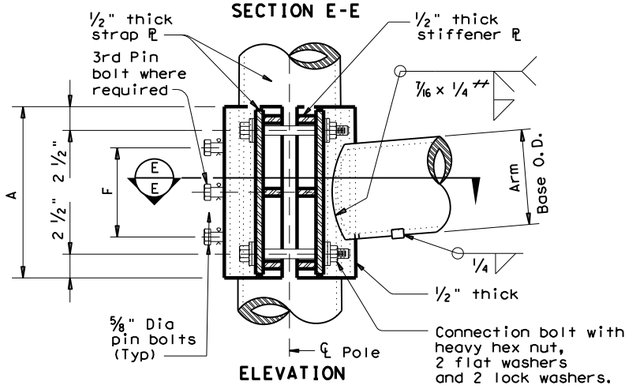


SECTION E-E



ELEVATION
(Mast Arm or ILSN Arm to pole)

⁄⁄ = 85% Min. Penetration

CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L1	D1	D2	thk (12)	Rise	L1	D1	D2	thk (12)	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"

100 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L1	D1	D2	thk (12)	Rise	L1	D1	D2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

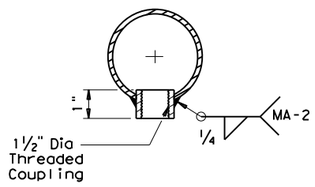
D1 = Arm Base O.D.
D2 = Arm End O.D.
L1 = Shaft Length
Lc = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

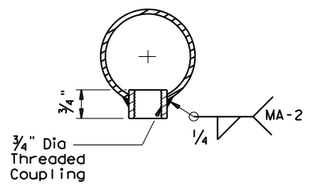
CLAMP-ON ARM CONNECTION

ILSN Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Sch 40 pipe Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	¾	2

Mast Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Base Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3



ARM COUPLING DETAIL



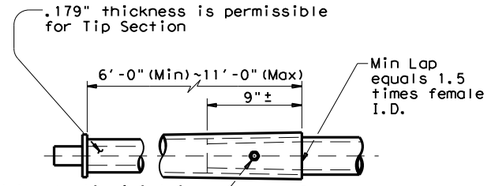
ILSN ARM COUPLING DETAIL

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may 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". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire 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 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. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have 3/16" diameter holes for a 1/8" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An 11/16" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

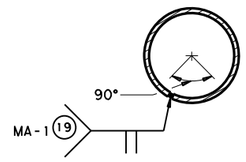


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL (CLAMP-ON ARM)

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

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.
60% Min penetration
100% penetration within 6" of circumferential base welds.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 4 of 5 — LMA(4)-12

DN: JK	CK: GRB	DW: FDN	CK: CAL

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CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		163

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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: See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		24' Poles with ILSN: See note above plus one small hand hole		19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN: See note above	
Single Mast Arm						
Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L		50S		50	
55	55L	1	55S		55	
60	60L	1	60S		60	
65	65L	2	65S		65	1
Dual Mast Arm						
Lf ft. / Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50 / 20	5020L		5020S		5020	
50 / 24	5024L		5024S		5024	
50 / 28	5028L		5028S		5028	
50 / 32	5032L		5032S		5032	
50 / 36	5036L		5036S		5036	
50 / 40	5040L		5040S		5040	
50 / 44	5044L		5044S		5044	
55 / 20	5520L		5520S		5520	
55 / 24	5524L		5524S		5524	
55 / 28	5528L		5528S		5528	
55 / 32	5532L		5532S		5532	
55 / 36	5536L		5536S		5536	
55 / 40	5540L		5540S		5540	
55 / 44	5544L		5544S		5544	
60 / 20	6020L		6020S		6020	
60 / 24	6024L		6024S		6024	
60 / 28	6028L		6028S		6028	
60 / 32	6032L		6032S		6032	
60 / 36	6036L		6036S		6036	
60 / 40	6040L		6040S		6040	
60 / 44	6044L		6044S		6044	
65 / 20	6520L		6520S		6520	
65 / 24	6524L		6524S		6524	
65 / 28	6528L		6528S		6528	
65 / 32	6532L		6532S		6532	
65 / 36	6536L		6536S		6536	
65 / 40	6540L		6540S		6540	
65 / 44	6544L		6544S		6544	

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet)
			48-A
T-1	10	1	22
T-2	10	1	22
T-4	10	1	22
T-5	10	1	22
T-6	10	1	22
Total Drill Shaft Length			110

Notes

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

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

Shipping Parts List

Traffic Signal Arms (Fixed Mount) (1 per pole)
Ship each arm with listed equipment attached

Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	
55	55IV	1
60	60IV	1
65	65IV	3

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	4

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

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
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	

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	5

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.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

STATE OF TEXAS
ABHISHEK ACHARYA
124094
LICENSED PROFESSIONAL ENGINEER
7/19/2022

Texas Department of Transportation
Traffic Operations Division

LONG MAST ARM ASSEMBLY PARTS LIST

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CONT	SECT	JOB	HIGHWAY
0134	07	069	US 380
DIST	COUNTY		SHEET NO.
FTW	WISE		164

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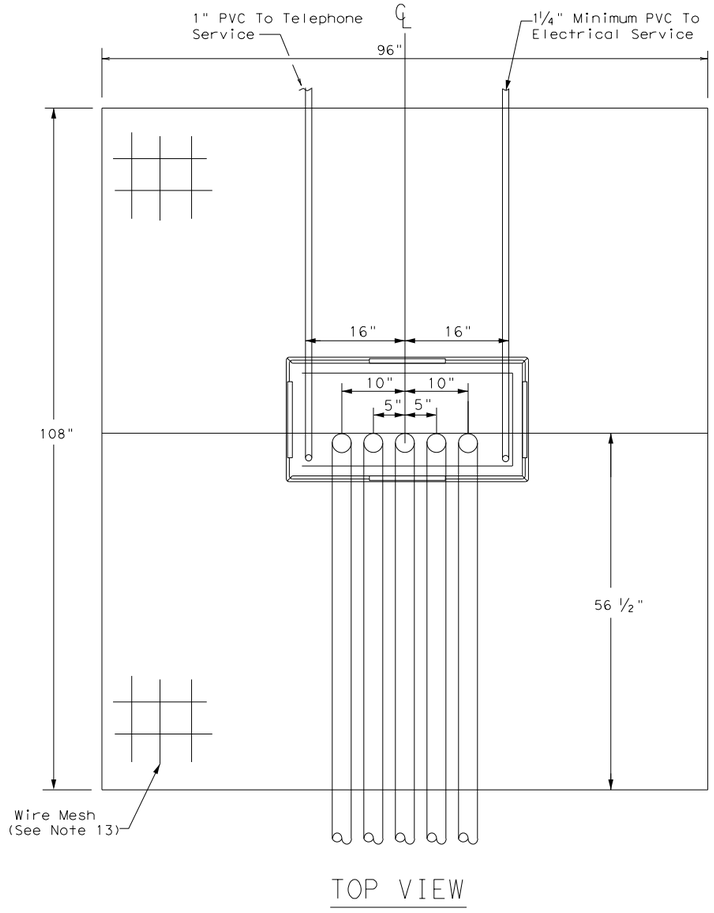
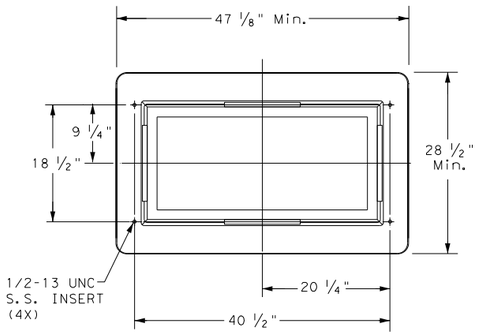
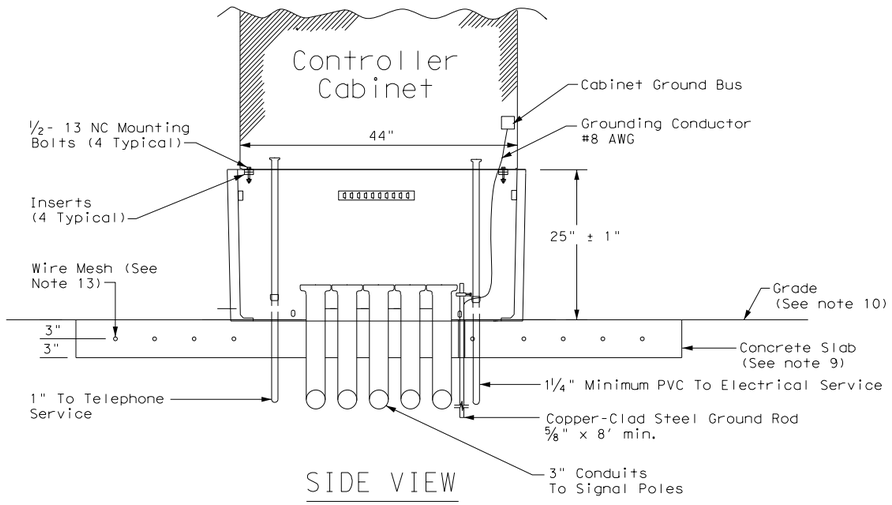


TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-21

FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
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12-04	DIST	COUNTY		SHEET NO.
2-21	FTW	WISE		165

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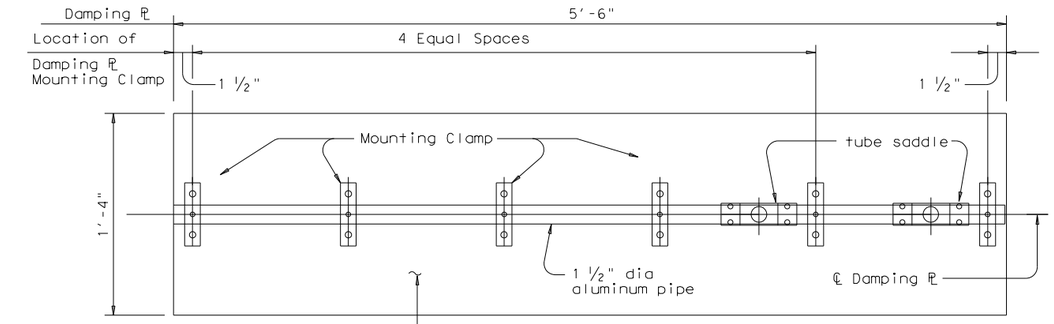
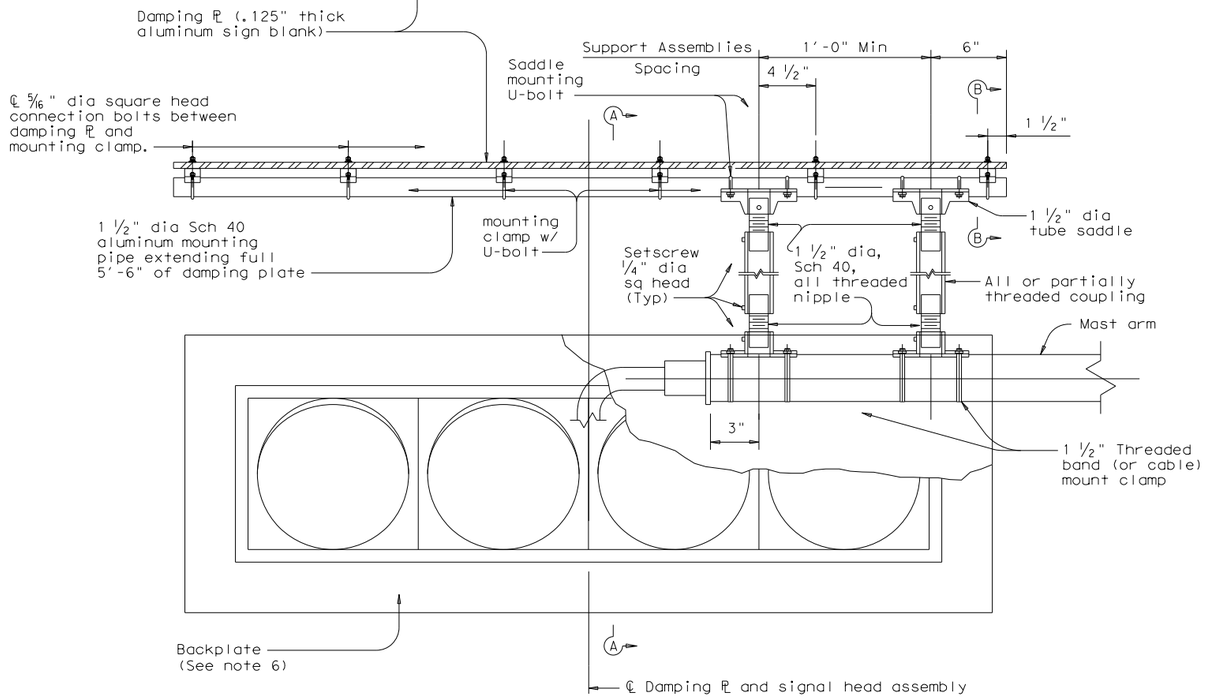


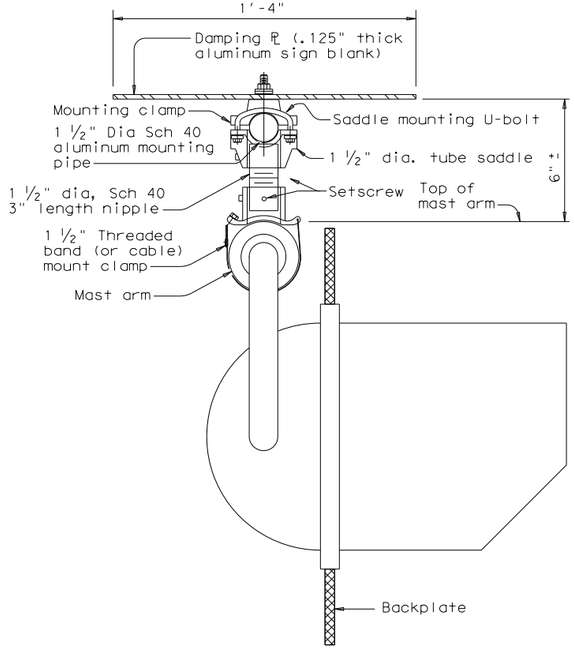
PLAN



ELEVATION

DAMPING PLATE MOUNTING DETAILS

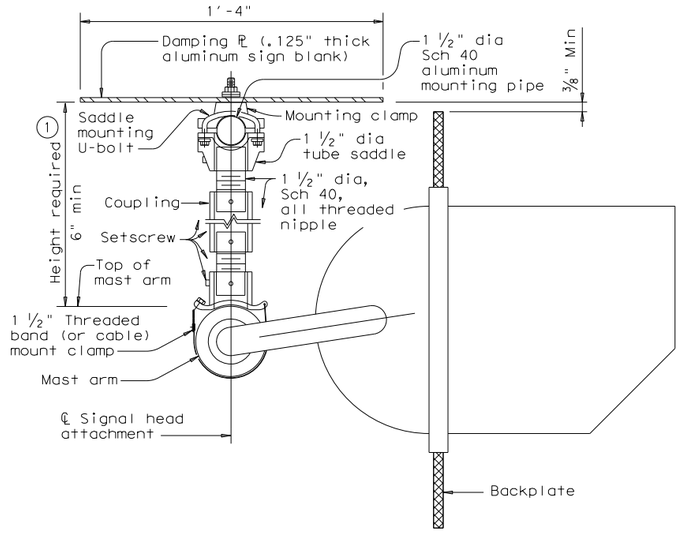
(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)

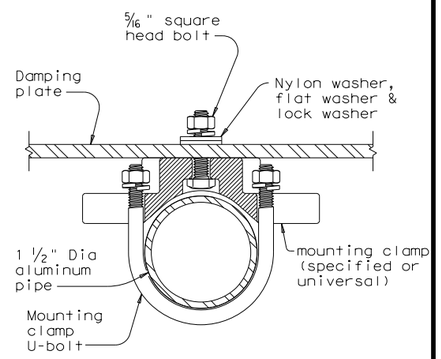


SECTION A-A

(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

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©TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
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6-20	DIST	COUNTY		SHEET NO.
	FTW	WISE		166

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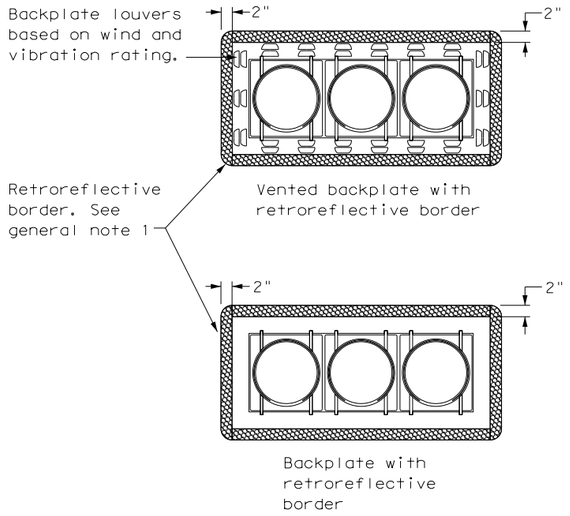
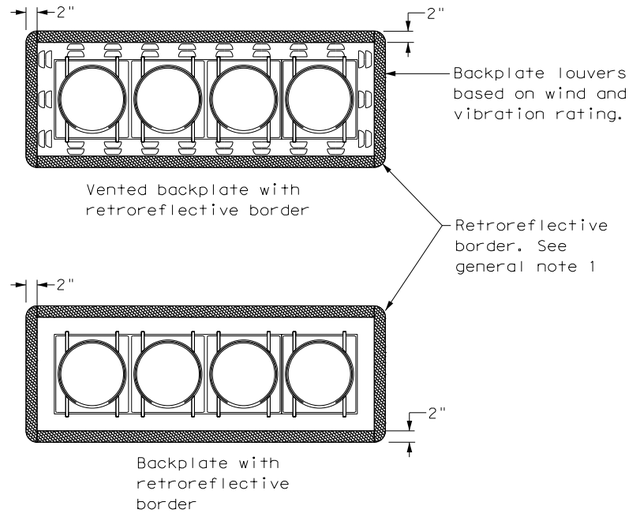
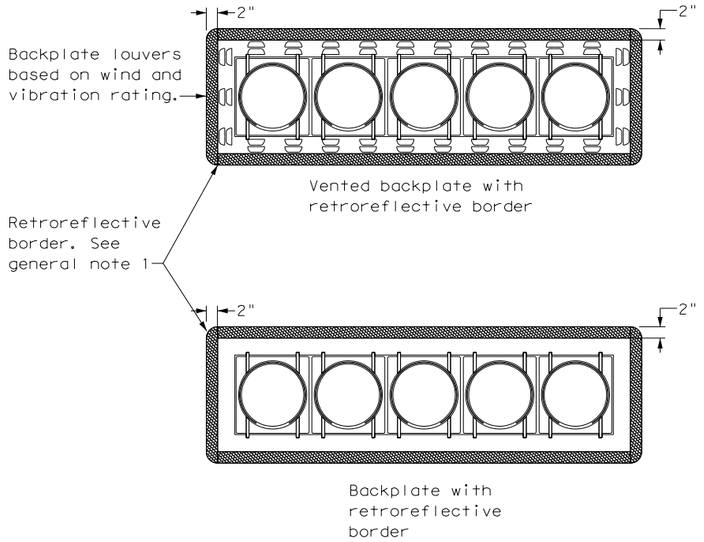


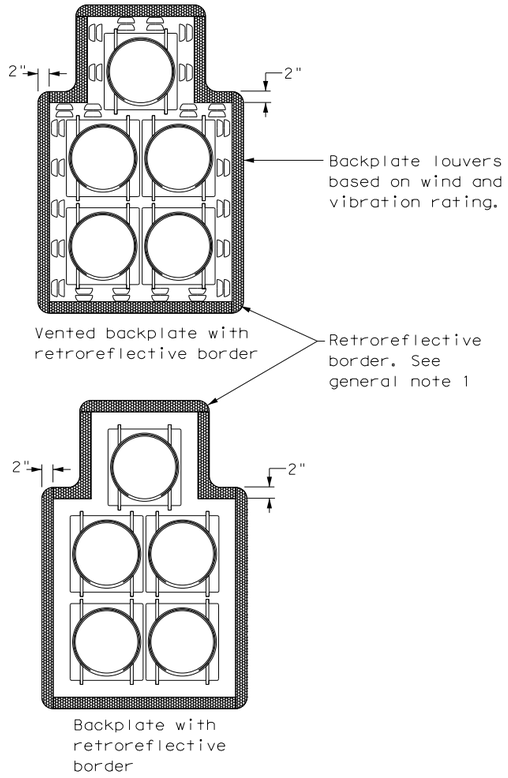
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



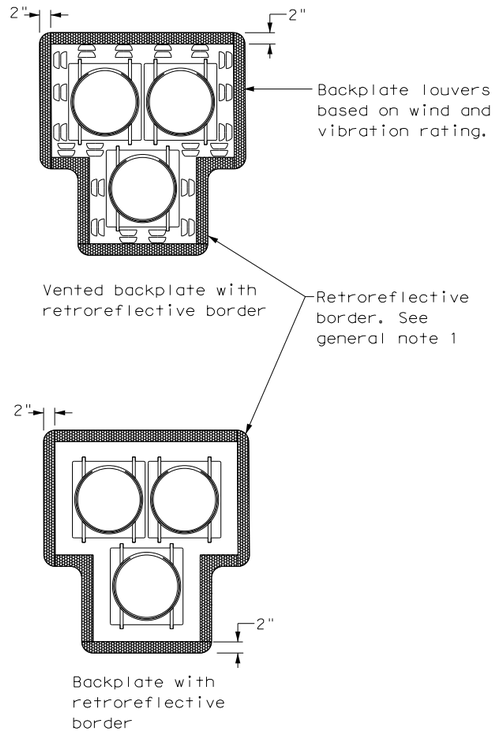
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



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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	FTW	WISE		167

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 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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DATE: 7/19/2022 4:00:59 PM
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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.

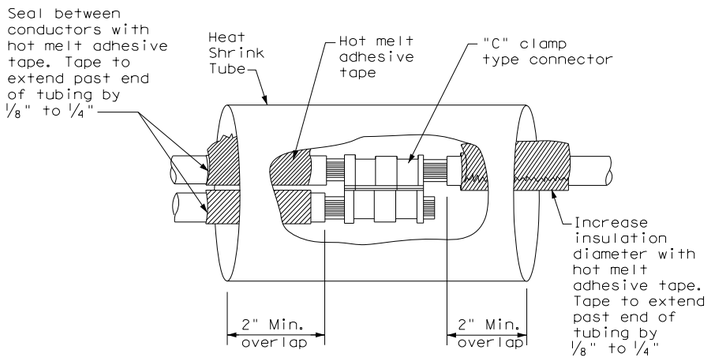
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

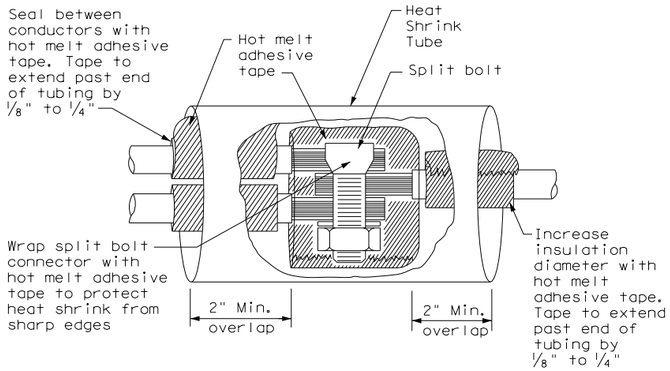
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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.

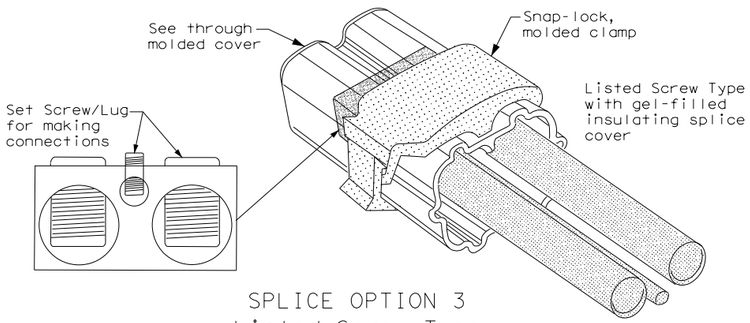
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



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

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	FTW	WISE		169

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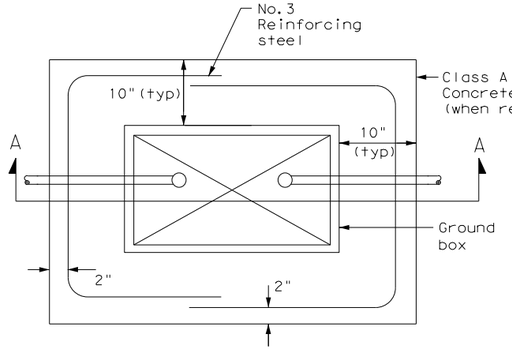
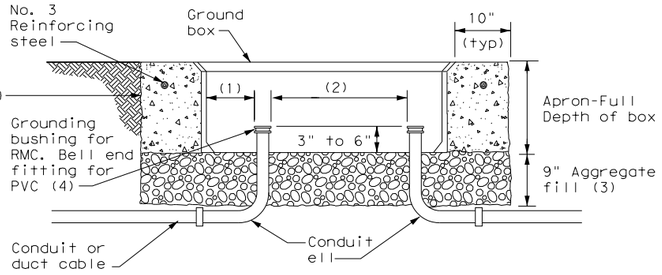


PLAN VIEW



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.

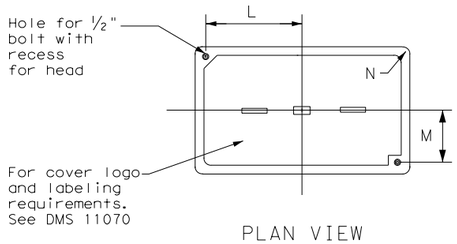
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

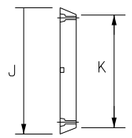
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

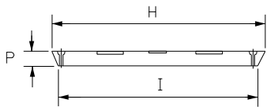
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



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

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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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

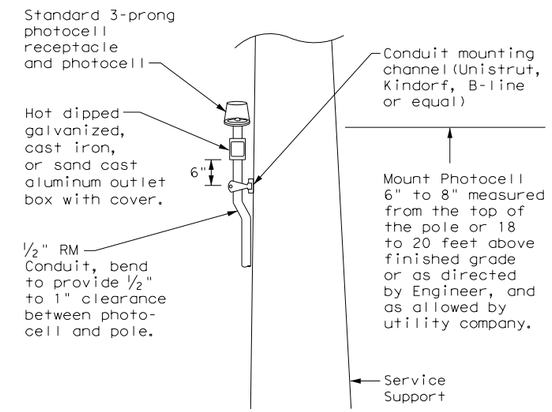
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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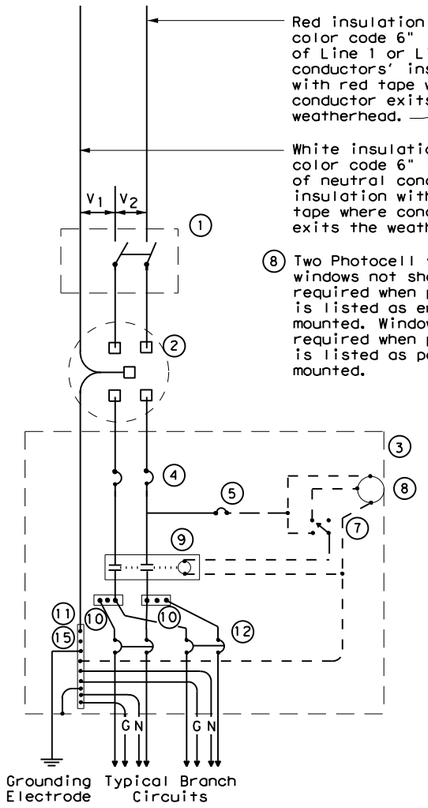
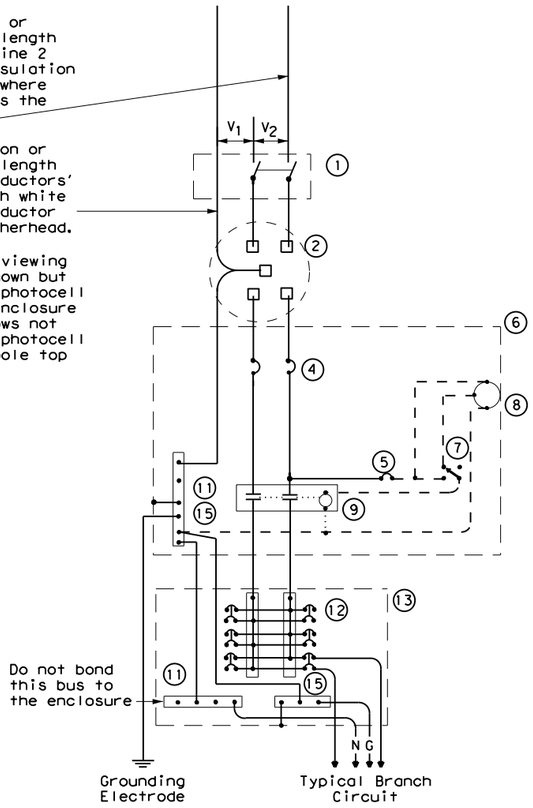
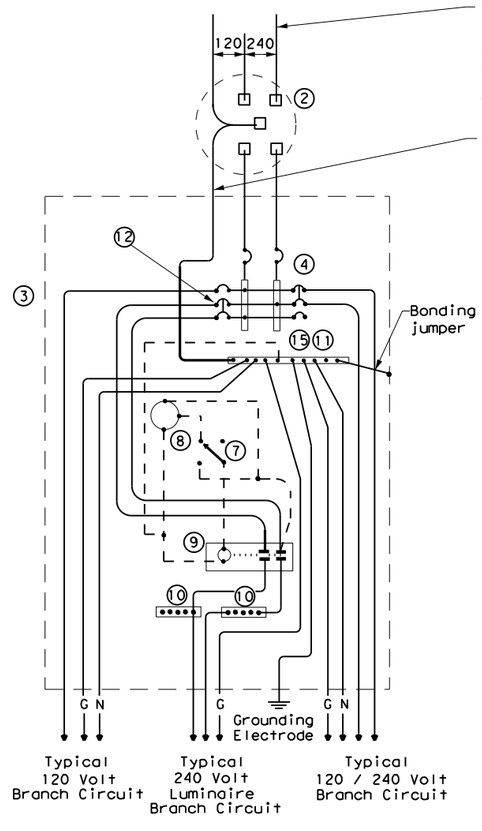


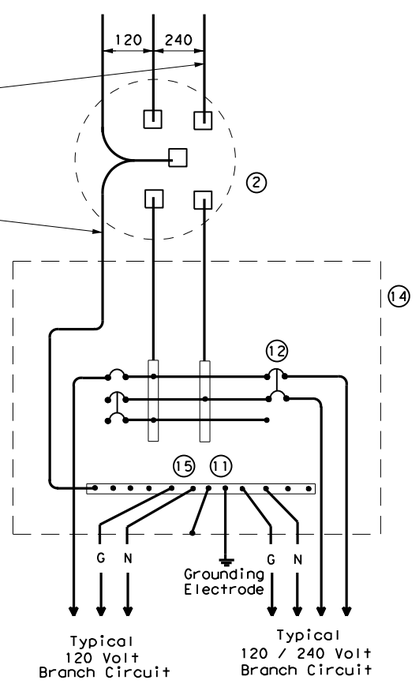
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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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.

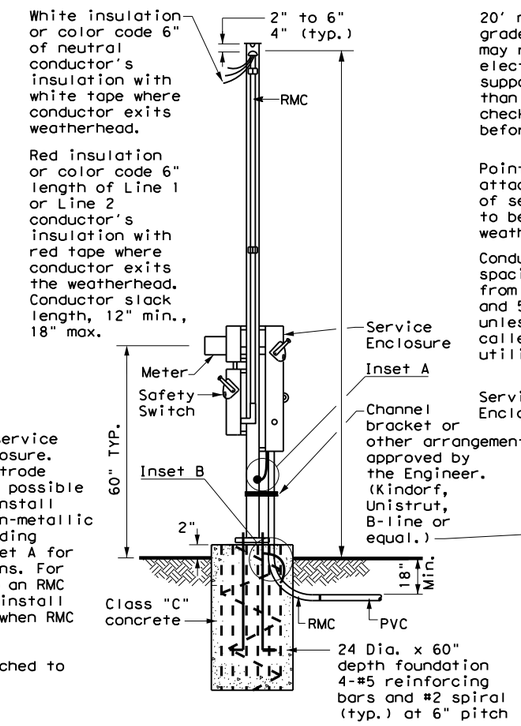
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode 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.

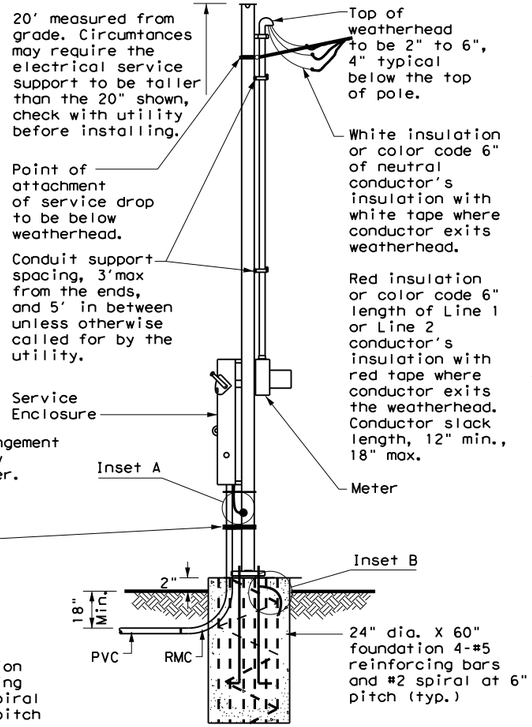
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

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.

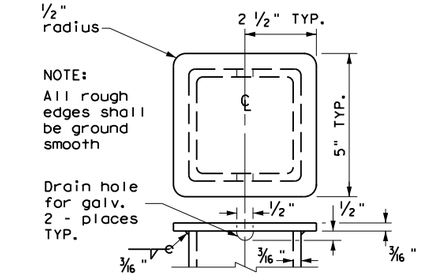


WITH SAFETY SWITCH

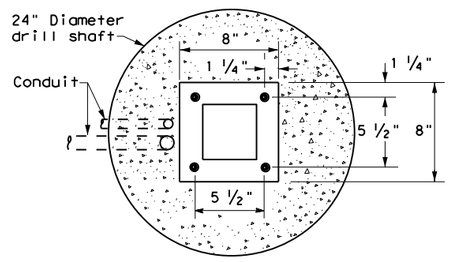


WITHOUT SAFETY SWITCH

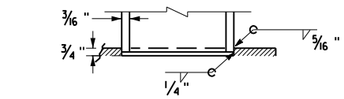
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

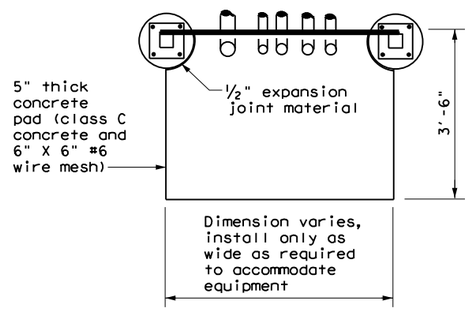


BASE PLATE DETAIL



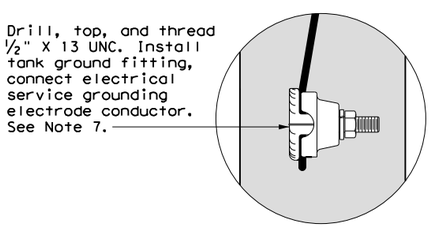
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



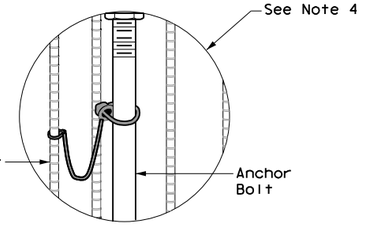
TOP VIEW

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

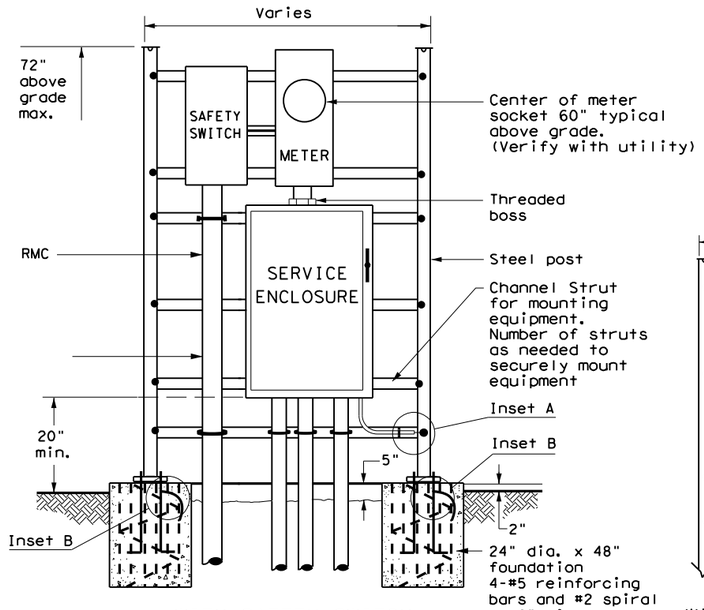


FRONT VIEW

INSET A

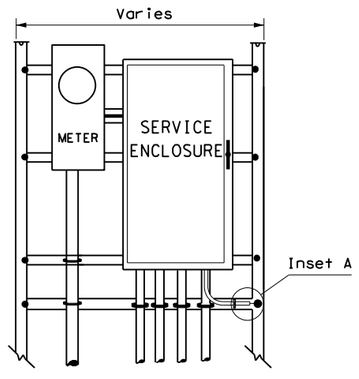


INSET B



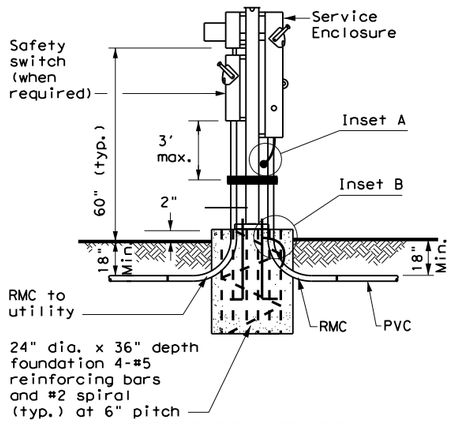
WITH SAFETY SWITCH

FRONT VIEW

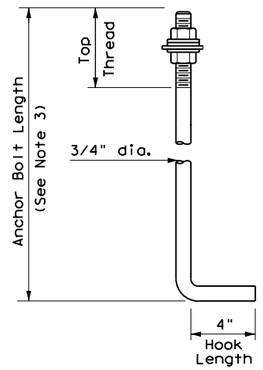


WITHOUT SAFETY SWITCH

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

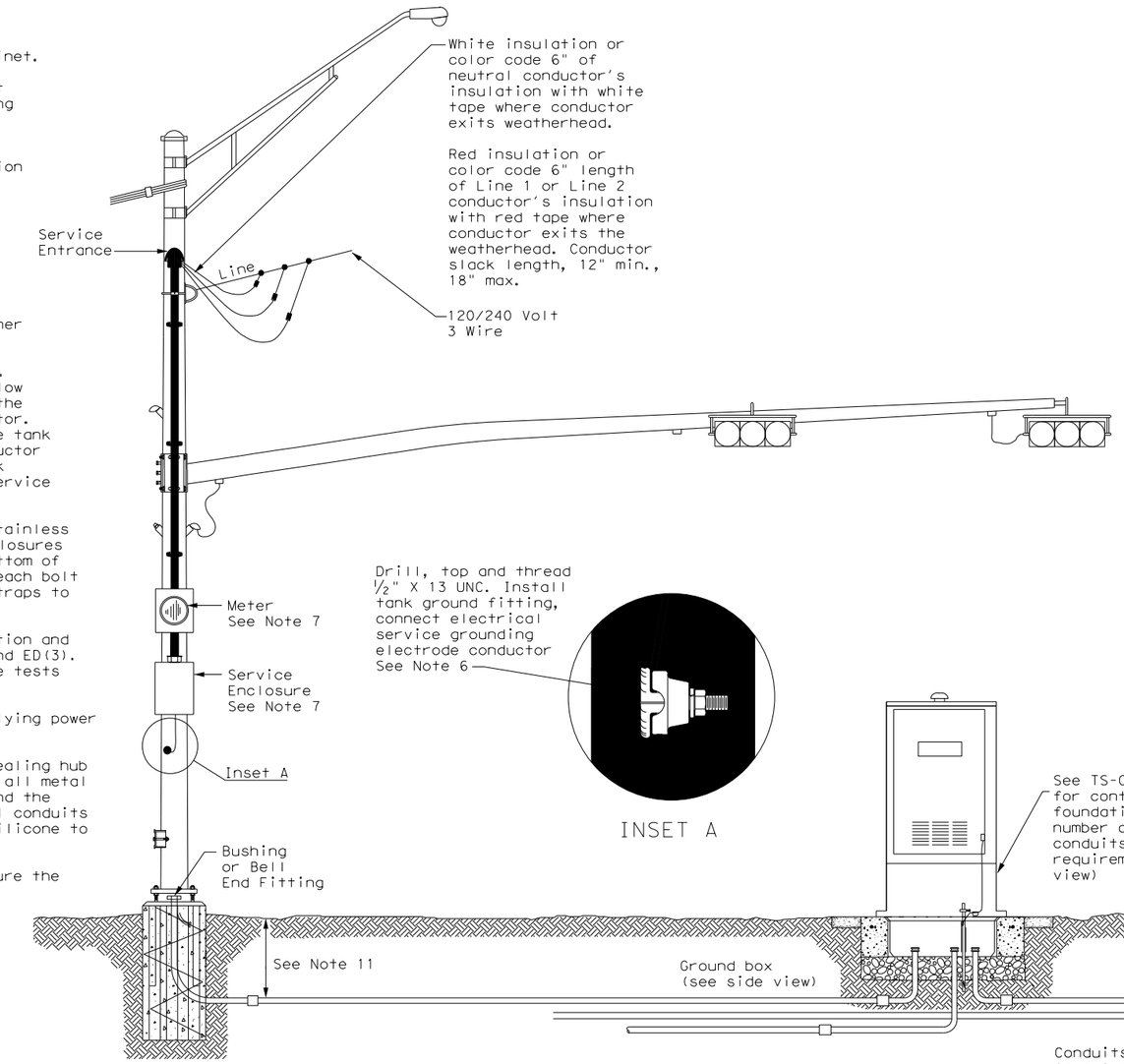
ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		173

71G

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".

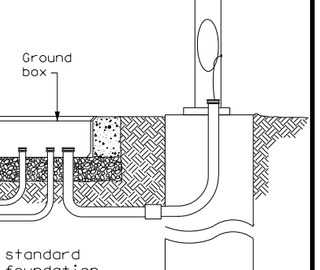


SIGNAL POLE WITH SERVICE

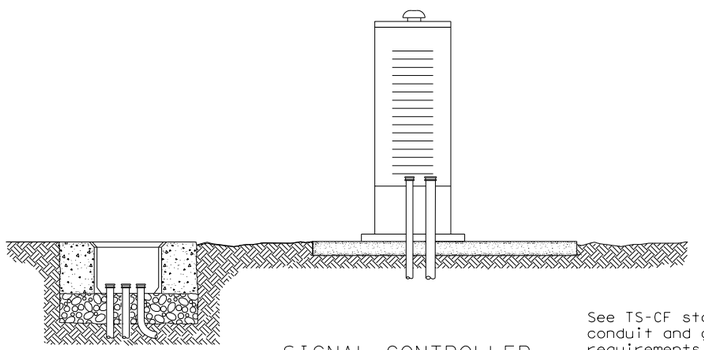
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A

SIGNAL CONTROLLER FRONT VIEW



SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		174

71H

DATE: 7/19/2022 4:01:04 PM
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DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 7/19/2022 4:01:04 PM
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NOTE: Structures north of ice line to be designed for ice.

ICE LINE

ZONE 2
(90 MPH WIND)

ZONE 3
(80 MPH WIND)

ZONE 4
(70 MPH WIND)

ZONE 4
(70 MPH WIND)

ZONE 3
(80 MPH WIND)

ICE LINE

ZONE 1
(100 MPH WIND)

LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation

Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

WV & IZ-14

FILE: windice.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	DIST	COUNTY		SHEET NO.
	FTW	WISE		175

A. GENERAL SITE DATA

1. PROJECT LIMITS: *Highway:* US 380 at US 81/287
From: Westbound US 380 Northbound US 81/287 Ramp
To: Northbound US 81/287 Ramp

LATTITUDE: _____ LONGITUDE: _____

2. PROJECT SITE MAPS:

- *Project Location Map: Title Sheet (Sheet 1)*
- *Drainage Patterns: Drainage Area Maps N/A*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Typical Sections (Sheets 6-7)*
- *Major Controls and Locations of Stabilization Practices: (Sheets 6-7) SW3P Site Map Sheets*
- *Project Specific Locations:*
  To be specified by Project Field Office and located in the Project SW3P File
- *Surface Waters and Discharge Locations: Drainage and Culvert Layout Sheets N/A*

3. PROJECT DESCRIPTION:
(Same description as stated on Title Sheet)

4. MAJOR SOIL DISTURBING ACTIVITIES:
23 inches of excavation to be done on all concrete ramps,
4 inches of excavation to be done on islands as per plans.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
Weatherford-Duffau complex, 3 to 8 percent slopes and Brackett-Aledo complex, 5 to 20 percent slopes with 80 percent of existing vegetative cover

6. TOTAL PROJECT AREA: *17.80* Acres

7. TOTAL AREA TO BE DISTURBED: *3.16* Acres (*18* % OF TOTAL PROJECT AREA)

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: *0.40*
AFTER CONSTRUCTION: *Same as Before*

9. NAME OF RECEIVING WATERS:
N/A

10. ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORIC PROPERTY:

No Endangered Species, Designated Critical Habitat or Historic Property has been found on this project site.

or

(Statement of What) has been found on this project site.

Note: Designer shall supply applicable statement.

The documentation satisfying TPDES Construction General Permit eligibility pertaining to the existence or of any protective action taken with regards to endangered species or designated critical habitat or historical property in this project area is contained in the project's Enviromental document (EA or EIS) and can be viewed under the State Open Records Act at the address shown below:

TEXAS DEPARTMENT OF TRANSPORTATION
FORT WORTH DISTRICT HEADQUARTERS
DISTRICT DESIGN SECTION
2501 SW LOOP
FORT WORTH, TX 76133
PHONE: 817-370-6500

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

(Select T = Temporary or P = Permanent, as applicable)

____	TEMPORARY SEEDING	____	PRESERVATION OF NATURAL RESOURCES
____	MULCHING (Hay or Straw)	____	FLEXIBLE CHANNEL LINER
____	BUFFER ZONES	____	RIGID CHANNEL LINER
____	PLANTING	____	SOIL RETENTION BLANKET
P	SEEDING	____	COMPOST MANUFACTURED TOPSOIL
____	SODDING	____	OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES:

(Select T = Temporary or P = Permanent, as applicable)

T	SILT FENCES	____	DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
____	HAY BALES	____	DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
T	ROCK FILTER DAMS	____	DIVERSION DIKE AND SWALE COMBINATIONS
____	PIPE SLOPE DRAINS	T	ROCK BEDDING AT CONSTRUCTION EXIT
____	PAVED FLUMES	____	TIMBER MATTING AT CONSTRUCTION EXIT
____	CHANNEL LINERS	____	STONE OUTLET STRUCTURES
____	SEDIMENT TRAPS	____	VELOCITY CONTROL DEVICES
____	SEDIMENT BASINS	____	CURBS AND GUTTERS
____	STORM SEWERS	____	STORM INLET SEDIMENT TRAP
T	OTHER: *(Bio-Erosion Control Log)*		
____			
____			
____			
____			
____			

3. STORM WATER MANAGEMENT: *(Example Below - May be used as applicable, revised or expanded)*

1. Storm water drainage will be provided by the ditches, inlets and storm water systems that will carry drainage within the R.O.W. to the low points within the roadway and project site which drain to natural facilities.

2. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4:1 or flatter slopes with permanent vegetative cover.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

(Describe Storm Water Management Activities by Phases)

5. NON-STORM WATER DISCHARGES:
Non-storm water discharges should be filtered, or held in retention basins, before being allowed to mix with storm water. These discharges consist of non-polluted ground water, spring water, foundation and/or footing drain water, and water used for dust control, pavement washing and vehicle washwater containing no detergents.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by PHILLIP J. PAWELEK P.E. 82739, on

September 2 , 2022.

Phillip J. Pawelek, P.E

Design Consultant Logo here - delete block if not applicable

Texas Department of Transportation

Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 1 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		176
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	WISE
08/2013	ADDED SIGN	CONT.	SECT.	JOB / HIGHWAY NO.
05/2019	2-SHEET FORMAT	0134	07	069 / US 380

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed at the earliest date possible but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

2. INSPECTION:

An inspection shall be performed by a TxDOT inspector every 14 calendar days as well as within 24 hours after any rainfall of one-half inch or more is recorded on a non-freezing rain gauge to be located at the project site, or every 7 calendar days. An Inspection and Maintenance Report shall be filed for each inspection. Based on the inspection results, the controls shall be revised in accordance with the inspection report.

3. WASTE MATERIALS:

Except as noted below, all waste materials shall be collected in a metal dumpster having a secure cover. The dumpster shall meet all state and local solid waste management regulations. All trash and debris from construction shall be deposited in the dumpster. The dumpster shall be emptied, as necessary or as required by local regulation, and hauled to a local approved land fill site. The burying of construction waste on the project site shall not be permitted.

Concrete washout areas shall be required and shall consist of a pit, lined with an impervious material, of sufficient size to contain, until evaporation, all water used and washout material produced during concrete washout operations. The concrete washout locations shall be as directed by the engineer.

Lime slaking tanks shall be surrounded by an earthen berm, capable of containing any overflow.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

As a minimum, any products in the following categories are considered to be hazardous: paints, acids, solvents, asphalt products, chemical additives for soil stabilization, and concrete curing compounds or additives. In the event of a spill which may be hazardous, the spill coordinator shall be contacted immediately.

5. SANITARY WASTE:

All sanitary waste shall be collected from the portable units, as necessary or as required by local regulation, by a licensed sanitary waste management contractor.

6. OFFSITE VEHICLE TRACKING:

The Contractor shall be required, on a regular basis or as may be directed by the Engineer, to dampen haul roads for dust control, stabilize construction entrances and to remove excess dirt from the roadway.

7. MANAGEMENT PRACTICES: *(Example Below - May be used as applicable, revised or expanded)*

1. Disposal areas, stockpiles and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed.

2. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.

3. All temporary fills placed in waterways shall be built of erosion resistant material. (NWP 14)

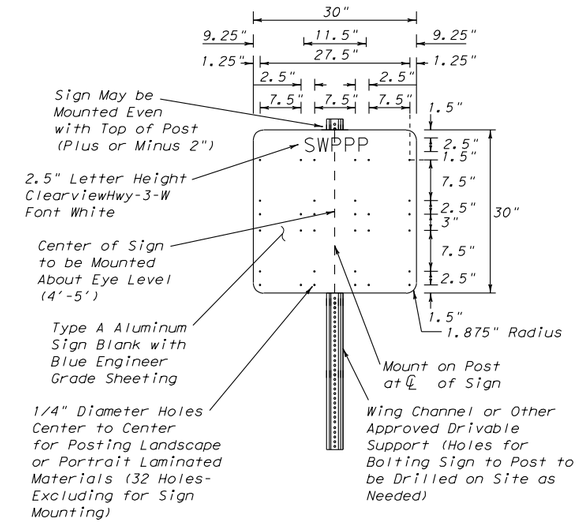
4. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

8. OTHER:

1. Listing of construction materials stored on site to be provided by Project Field Office.

2. The Project SW3P File located at the project field office shall contain the N.O.I., CGP Coverage Notice, TCEQ TPDES Form, Signature Authorization, Certification/Qualification Statements, Inspection Reports, Required Maps, and a copy of the TPDES General Permit No. TXR150000.

STORM WATER POLLUTION PREVENTION PLAN PERMIT POSTING



No Permanent Installation Allowed.
Sign to be Removed After Project Completion.

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by PHILLIP J. PAWELEK P.E. 82739, on 7.20, 2022

Phillip J. Pawelek, P.E.

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Texas Department of Transportation

Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 2 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
DATE	REVISIONS	6			177
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY	
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	WISE	
08/2013	ADDED SIGN	CONT.	SECT.	JOB	HIGHWAY NO.
05/2019	2-SHEET FORMAT	0134	07	069	US 380

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. N/A

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required

☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

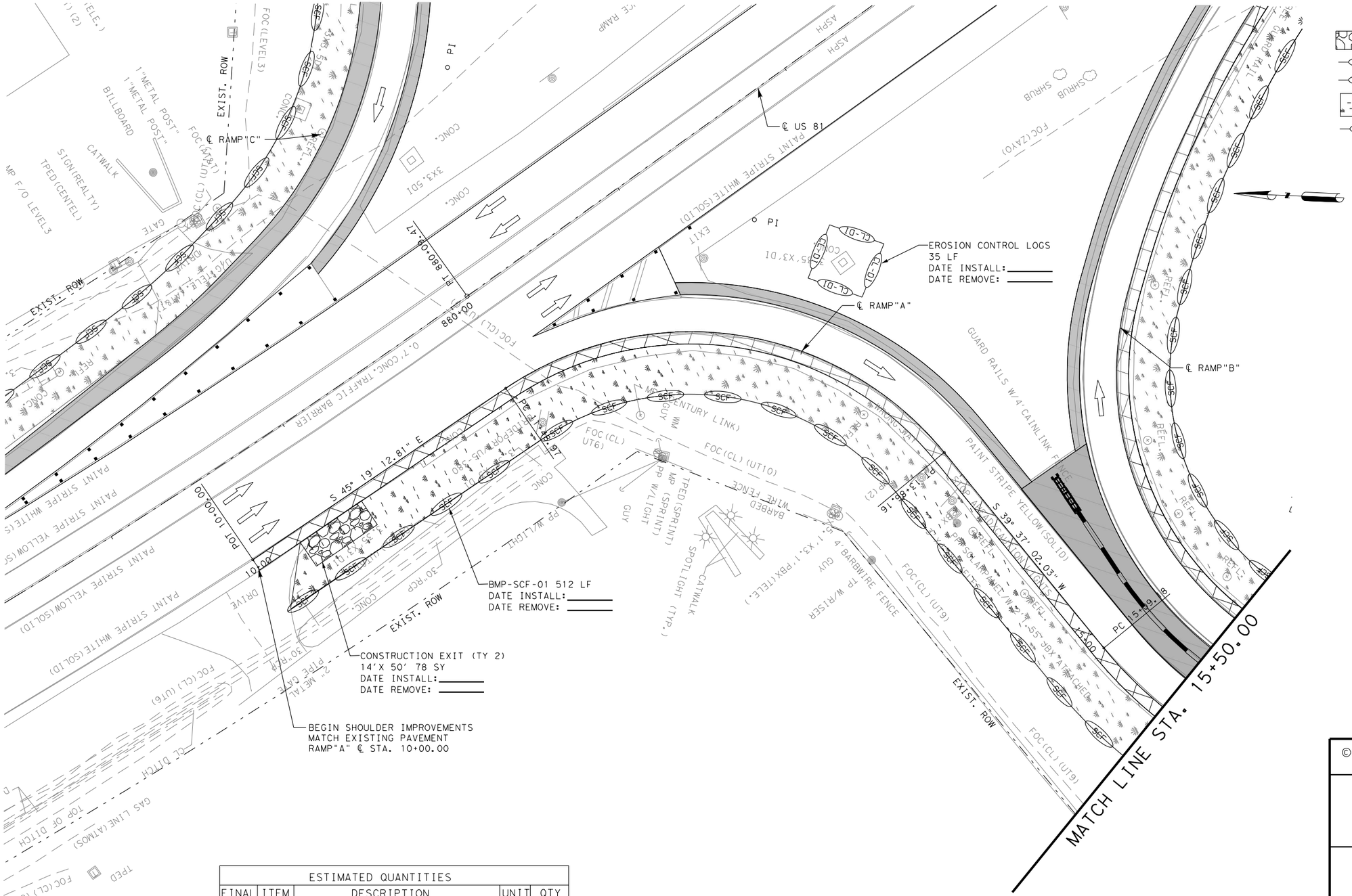
Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
© TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		178



PLAN LEGEND

- CONSTRUCTION EXITS (TY 2)
- RFDI — ROCK FILTER DAM (TYPE 2)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING AREA
- CL-DI — EROSION CONTROL LOGS

NOTES:

1. EROSION CONTROL DEVICES MAY BE MODIFIED TO MEET FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER
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STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

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Phillip J. Pawelek, P.E.

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	1,307
	164	HYDROMULCH SEEDING	AC	0.27
	168	VEGETATIVE WATERING	MG	14
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	512
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	512
	506	BIODEG EROSN CONT LOGS (INSTALL)	LF	35
	506	BIODEG EROSN CONT LOGS (REMOVE)	LF	35
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	78
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	78

INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P LAYOUT

SCALE: 1"=50' SHEET 1 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		179
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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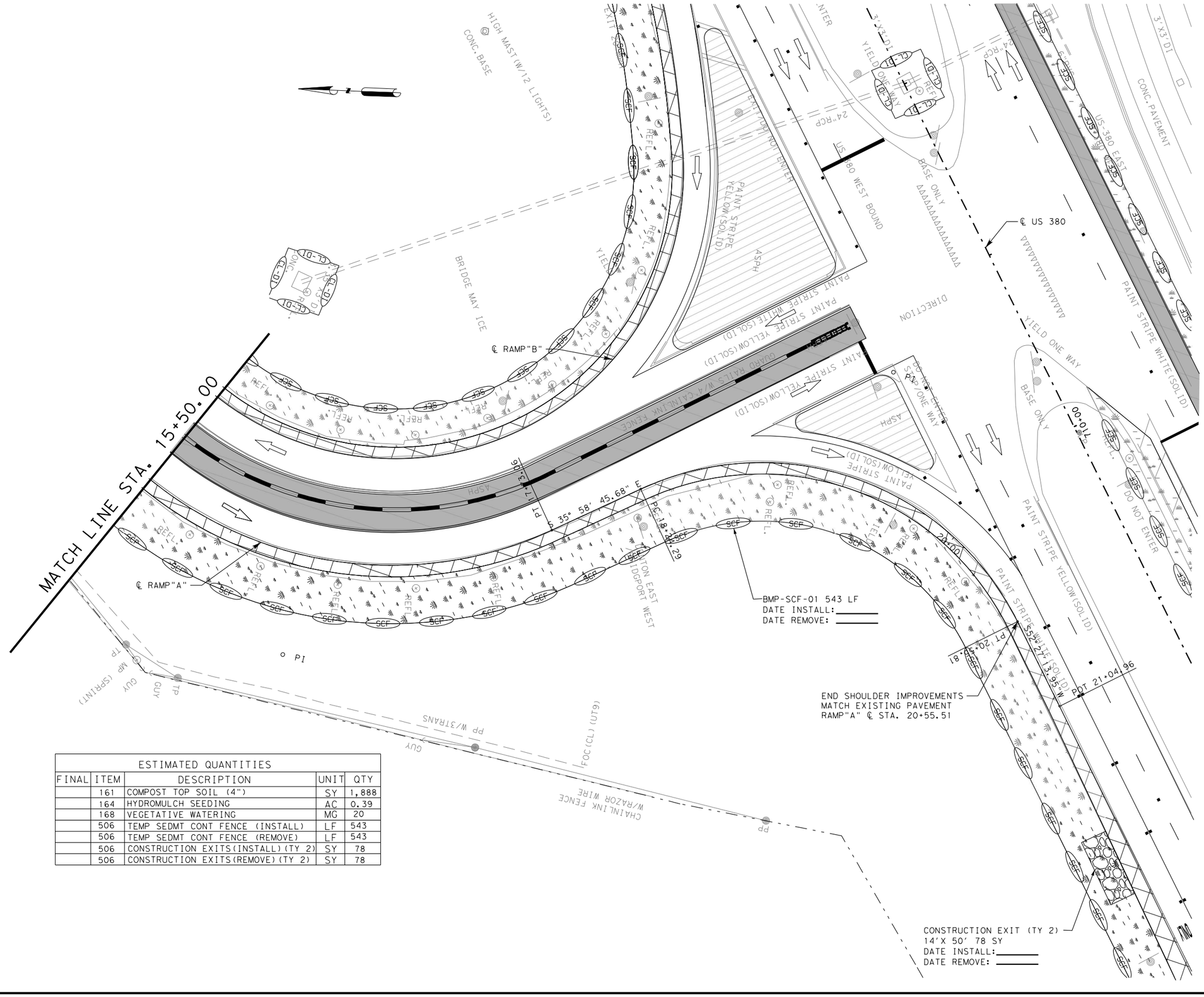

PLAN LEGEND

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ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	1,888
	164	HYDROMULCH SEEDING	AC	0.39
	168	VEGETATIVE WATERING	MG	20
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	543
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	543
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	78
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	78

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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P LAYOUT

SCALE: 1"=50' SHEET 2 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		180
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
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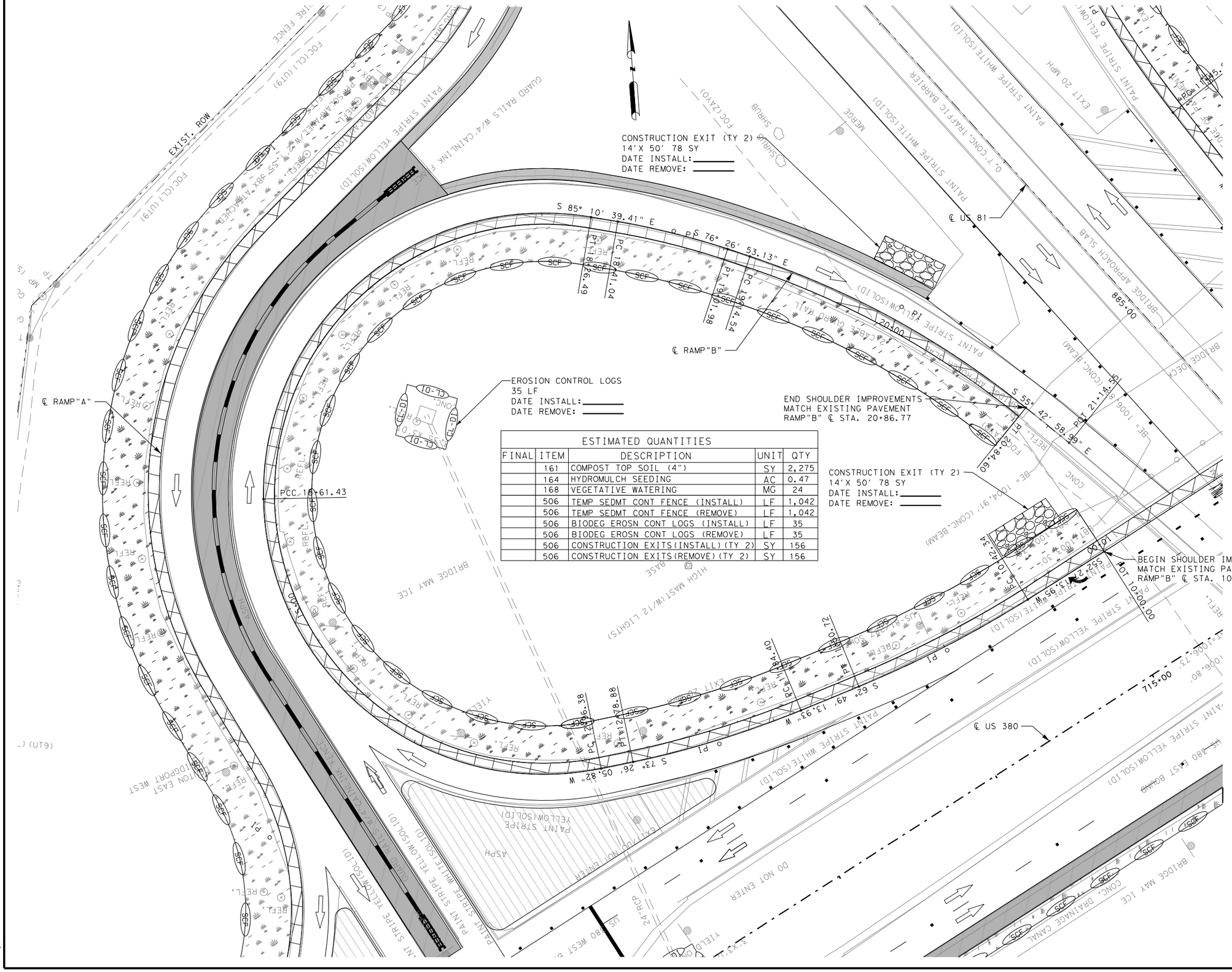

PLAN LEGEND

- CONSTRUCTION EXITS (TY 2)
- RFDI — ROCK FILTER DAM (TYPE 2)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING AREA
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ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	2,275
	164	HYDROMULCH SEEDING	AC	0.47
	168	VEGETATIVE WATERING	MG	24
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,042
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,042
	506	BIODEG EROSN CONT LOGS (INSTALL)	LF	35
	506	BIODEG EROSN CONT LOGS (REMOVE)	LF	35
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	156
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	156

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INFRASTRUCTURE
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US 380

SW3P LAYOUT

SCALE: 1"=50' SHEET 3 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		181
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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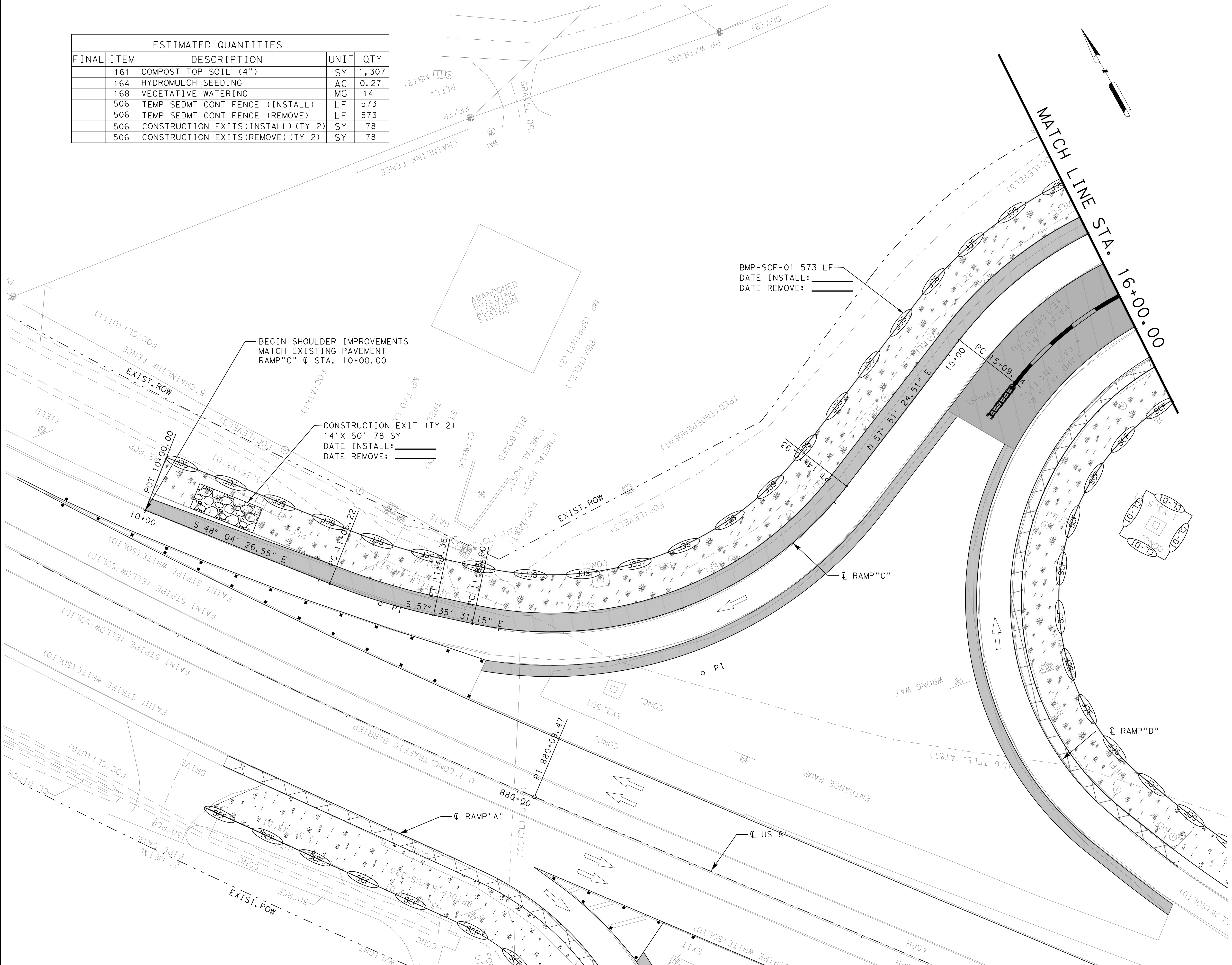
ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	1,307
	164	HYDROMULCH SEEDING	AC	0.27
	168	VEGETATIVE WATERING	MG	14
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	573
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	573
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	78
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	78



PLAN LEGEND

- CONSTRUCTION EXITS (TY 2)
- RFD1 — ROCK FILTER DAM (TYPE 2)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING AREA
- CL-D1 — EROSION CONTROL LOGS

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Phillip J. Pawelek, P.E.

 Texas Department of Transportation

S&B INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P LAYOUT

SCALE: 1"=50'   SHEET 4 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		182
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
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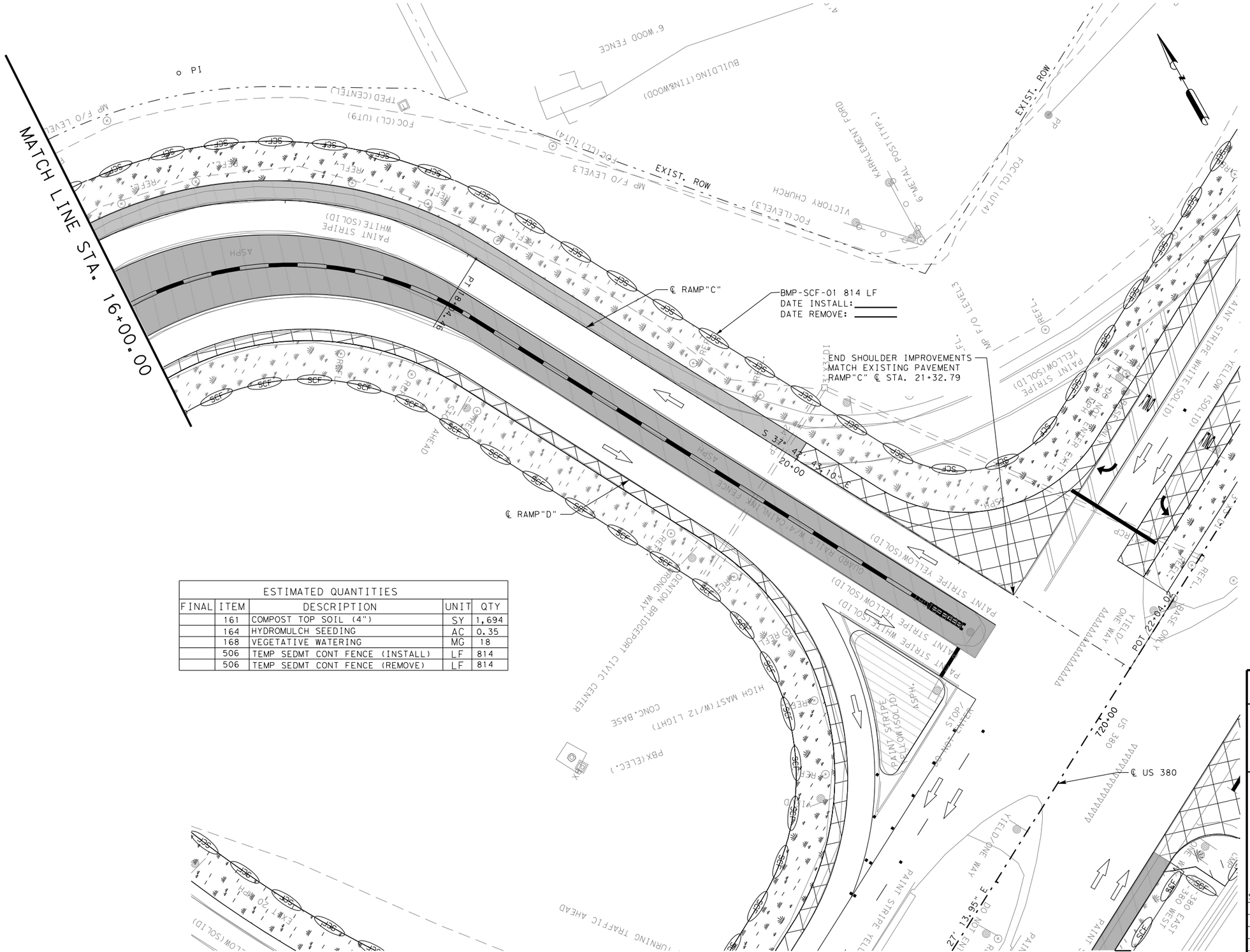

PLAN LEGEND

- CONSTRUCTION EXITS (TY 2)
- RFDI — ROCK FILTER DAM (TYPE 2)
- SCF — TEMP SEDIMENT CONTROL FENCE
- SEEDING AREA
- CL-DI — EROSION CONTROL LOGS

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ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	1,694
	164	HYDROMULCH SEEDING	AC	0.35
	168	VEGETATIVE WATERING	MG	18
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	814
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	814

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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P LAYOUT

SCALE: 1"=50' SHEET 5 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		183
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
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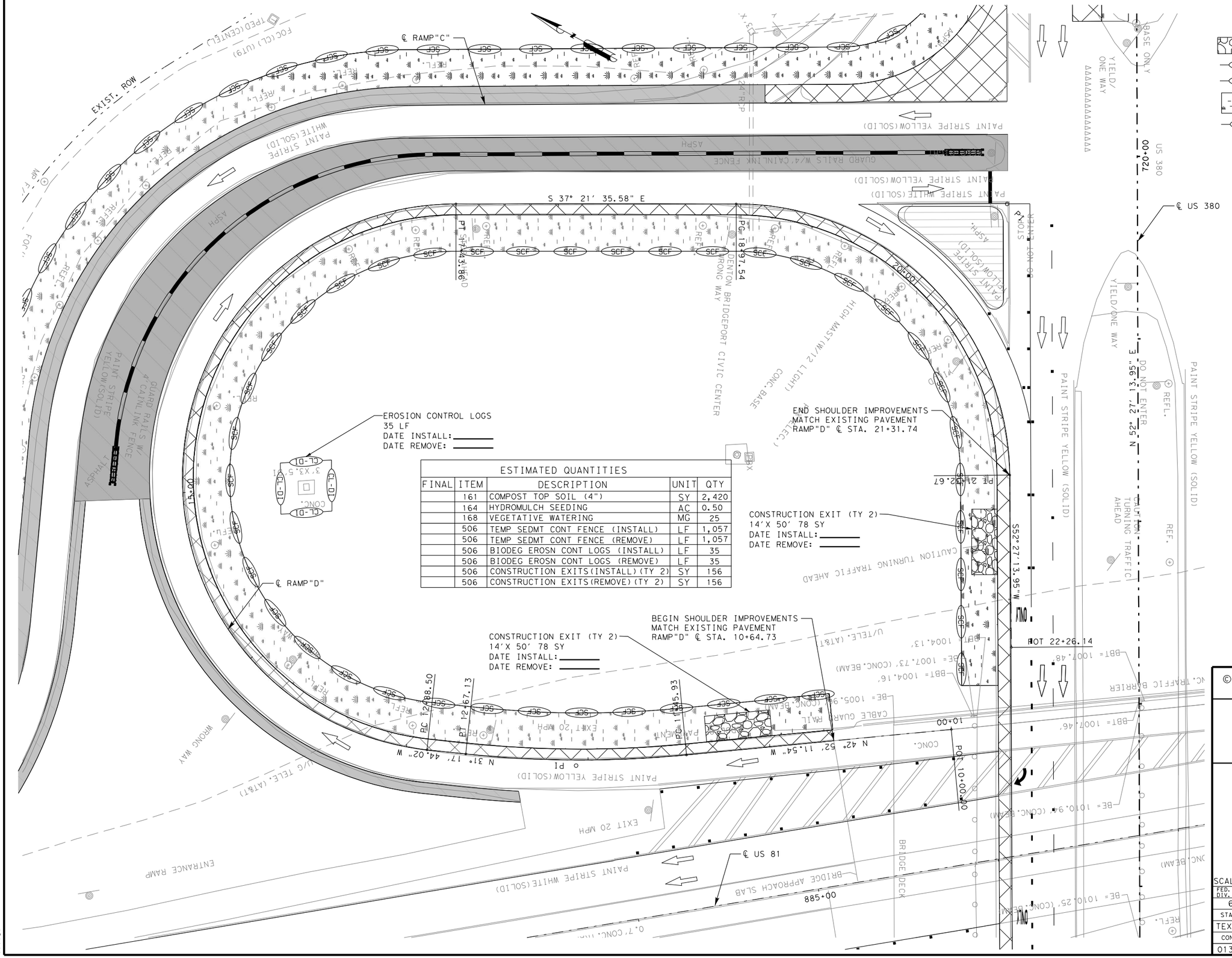

PLAN LEGEND

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ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	2,420
	164	HYDROMULCH SEEDING	AC	0.50
	168	VEGETATIVE WATERING	MG	25
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,057
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,057
	506	BIODEG EROSN CONT LOGS (INSTALL)	LF	35
	506	BIODEG EROSN CONT LOGS (REMOVE)	LF	35
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	156
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	156

STATE OF TEXAS
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SEB INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P LAYOUT

SCALE: 1"=50'		SHEET 6 OF 10 SHEETS
FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	184

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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PLAN LEGEND

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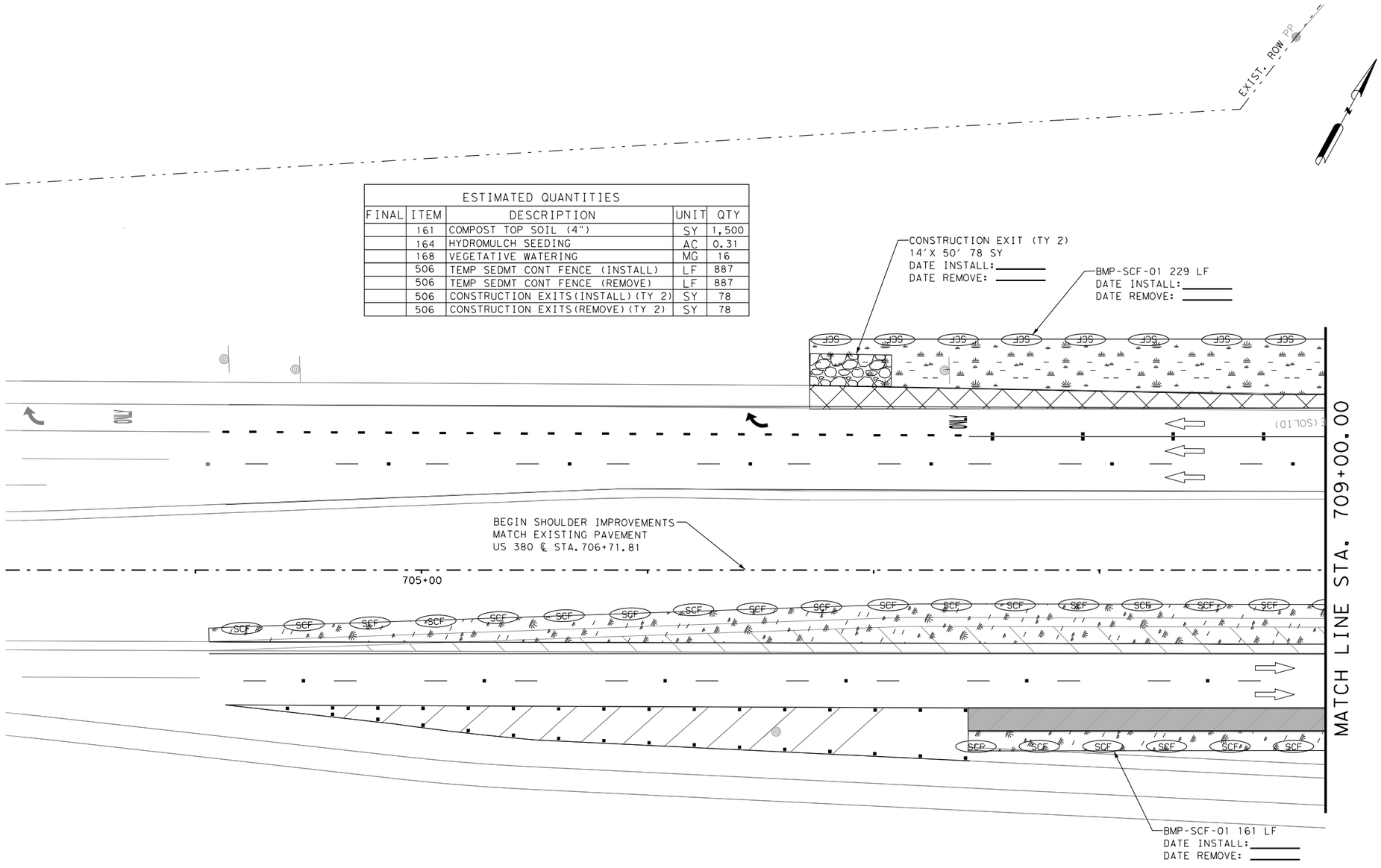
ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	1,500
	164	HYDROMULCH SEEDING	AC	0.31
	168	VEGETATIVE WATERING	MG	16
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	887
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	887
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	78
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	78



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INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P
LAYOUT

SCALE: 1"=50' SHEET 7 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		185
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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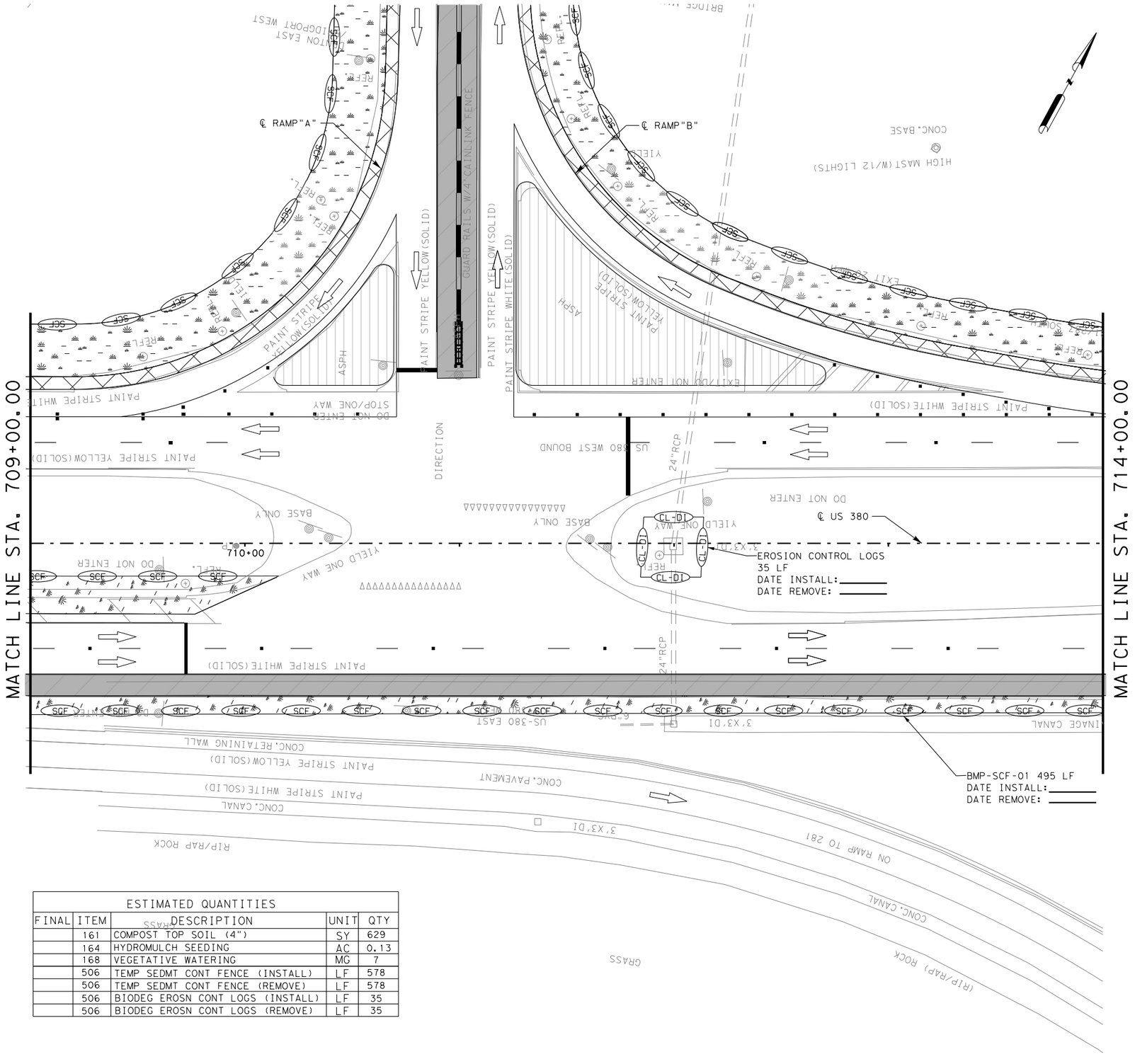

ESTIMATED QUANTITIES				
FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	629
	164	HYDROMULCH SEEDING	AC	0.13
	168	VEGETATIVE WATERING	MG	7
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	578
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	578
	506	BIODEG EROSN CONT LOGS (INSTALL)	LF	35
	506	BIODEG EROSN CONT LOGS (REMOVE)	LF	35

PLAN LEGEND

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SCB INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P
LAYOUT

SCALE: 1"=50' SHEET 8 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.		SHEET NO.
6	F 2023(039)		186
STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
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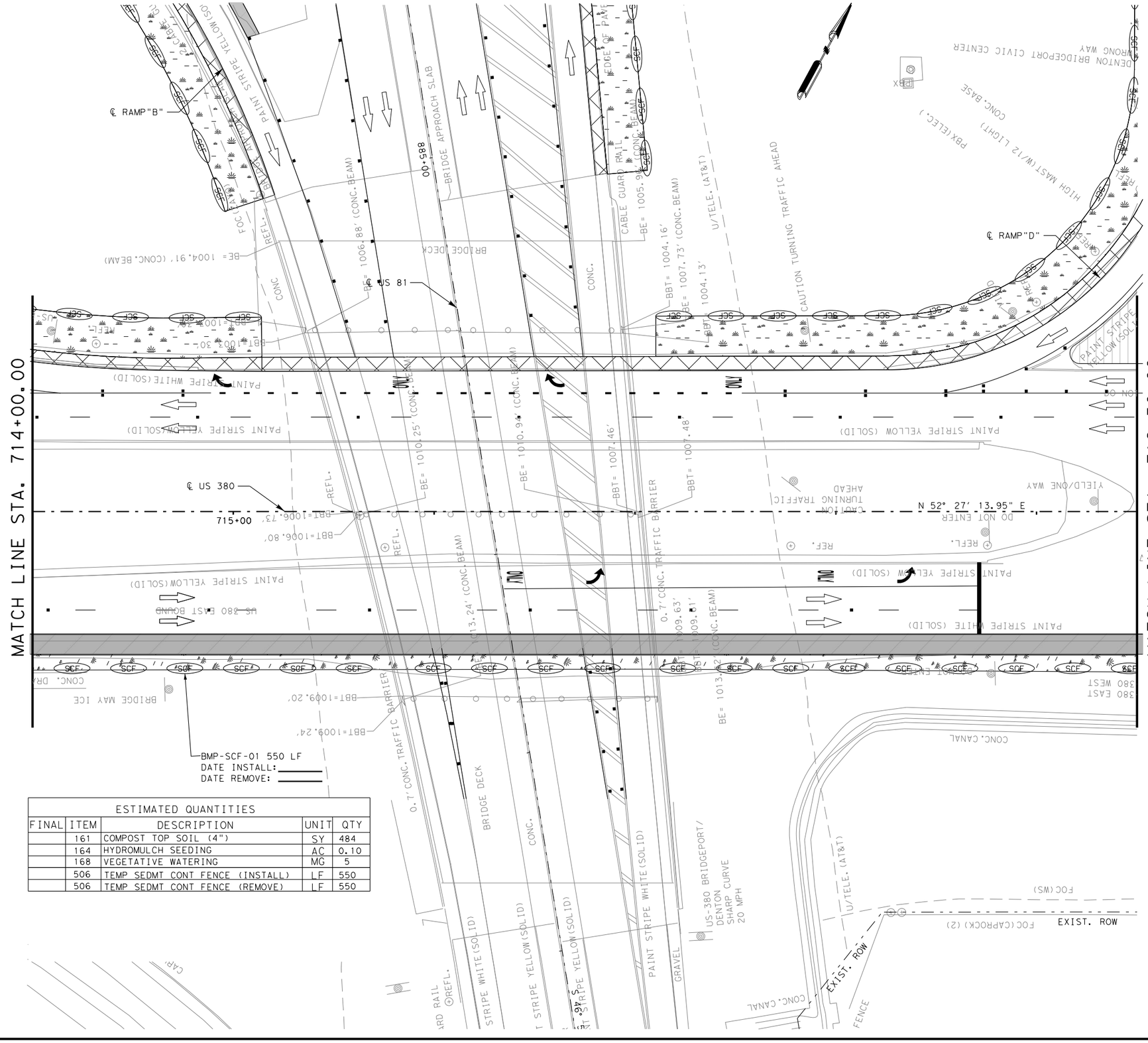

BMP-SCF-01 550 LF
DATE INSTALL: _____
DATE REMOVE: _____

ESTIMATED QUANTITIES

FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	484
	164	HYDROMULCH SEEDING	AC	0.10
	168	VEGETATIVE WATERING	MG	5
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	550
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	550

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S&B INFRASTRUCTURE
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US 380

SW3P LAYOUT

SCALE: 1"=50' SHEET 9 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	187

STATE	DIST.	COUNTY	
TEXAS	FTW	WISE	
CONT.	SECT.	JOB	HIGHWAY NO.
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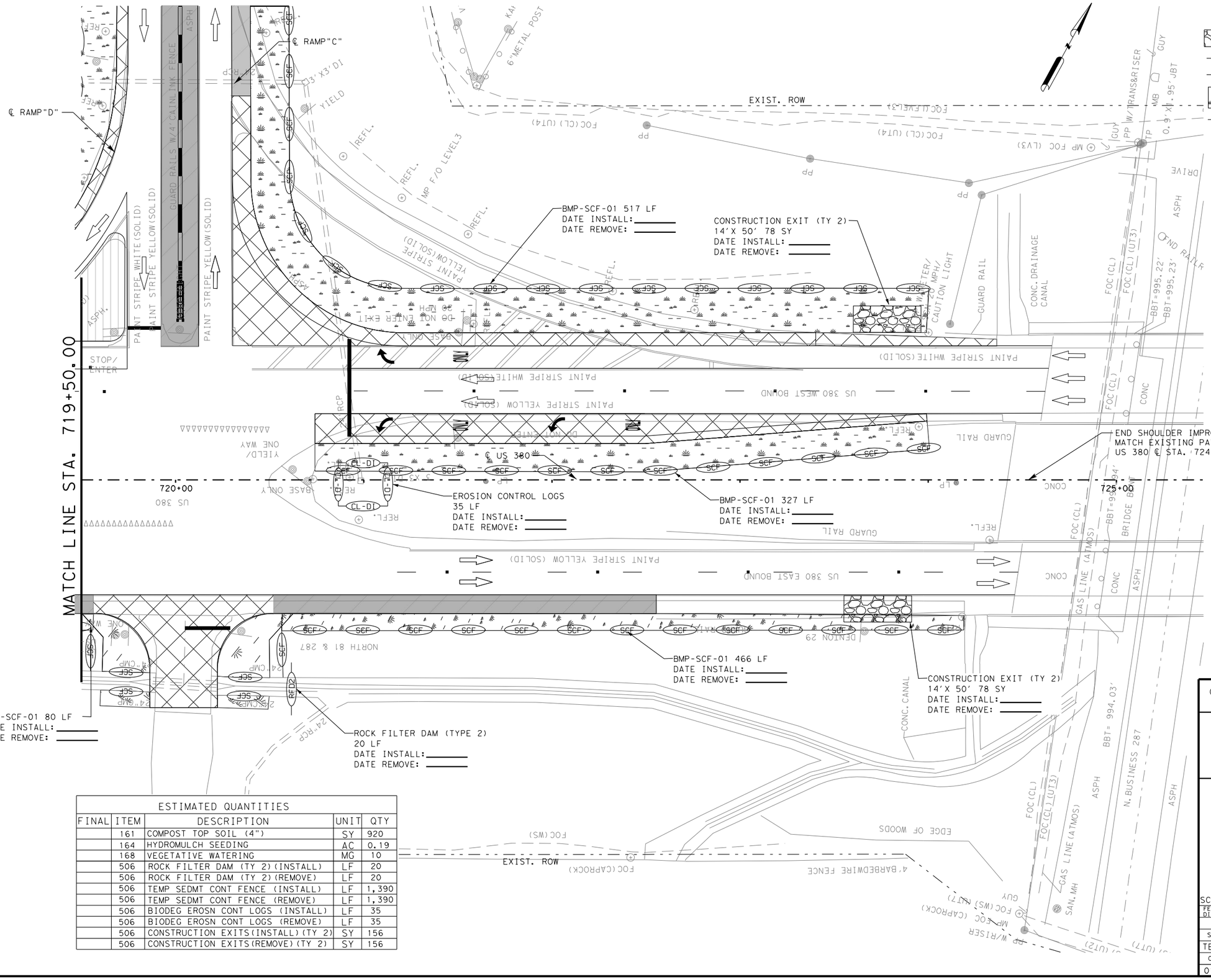

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FINAL	ITEM	DESCRIPTION	UNIT	QTY
	161	COMPOST TOP SOIL (4")	SY	920
	164	HYDROMULCH SEEDING	AC	0.19
	168	VEGETATIVE WATERING	MG	10
	506	ROCK FILTER DAM (TY 2)(INSTALL)	LF	20
	506	ROCK FILTER DAM (TY 2)(REMOVE)	LF	20
	506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,390
	506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,390
	506	BIODEG EROSN CONT LOGS (INSTALL)	LF	35
	506	BIODEG EROSN CONT LOGS (REMOVE)	LF	35
	506	CONSTRUCTION EXITS(INSTALL)(TY 2)	SY	156
	506	CONSTRUCTION EXITS(REMOVE)(TY 2)	SY	156

STATE OF TEXAS
PHILLIP J. PAWELEK
82739
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by PHILLIP J. PAWELEK P.E. 82739, on 7.20, 2022.

Phillip J. Pawelek, P.E.

SB INFRASTRUCTURE
TEXAS BOARD OF PROFESSIONAL ENGINEERS #: F-1582

US 380

SW3P LAYOUT

SCALE: 1"=50' SHEET 10 OF 10 SHEETS

FED. RD. DIV. NO.	STATE PROJECT NO.	SHEET NO.
6	F 2023(039)	188

STATE	DIST.	COUNTY
TEXAS	FTW	WISE

CONT.	SECT.	JOB	HIGHWAY NO.
0134	07	069	US 380

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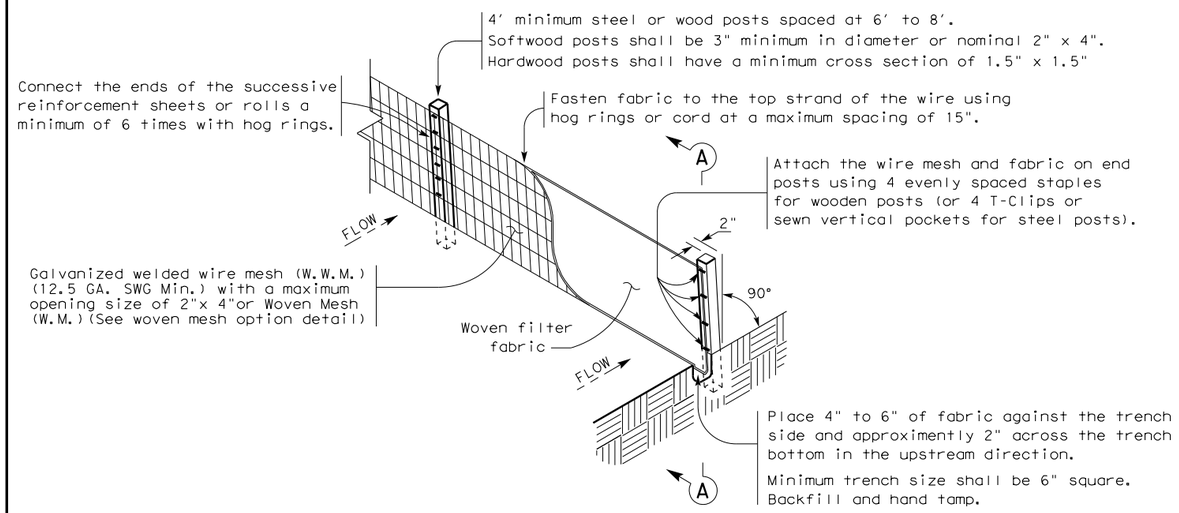
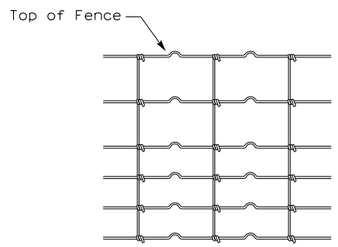
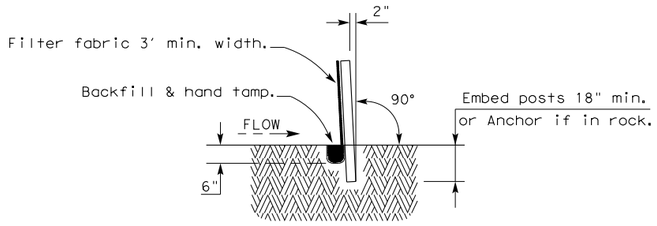


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

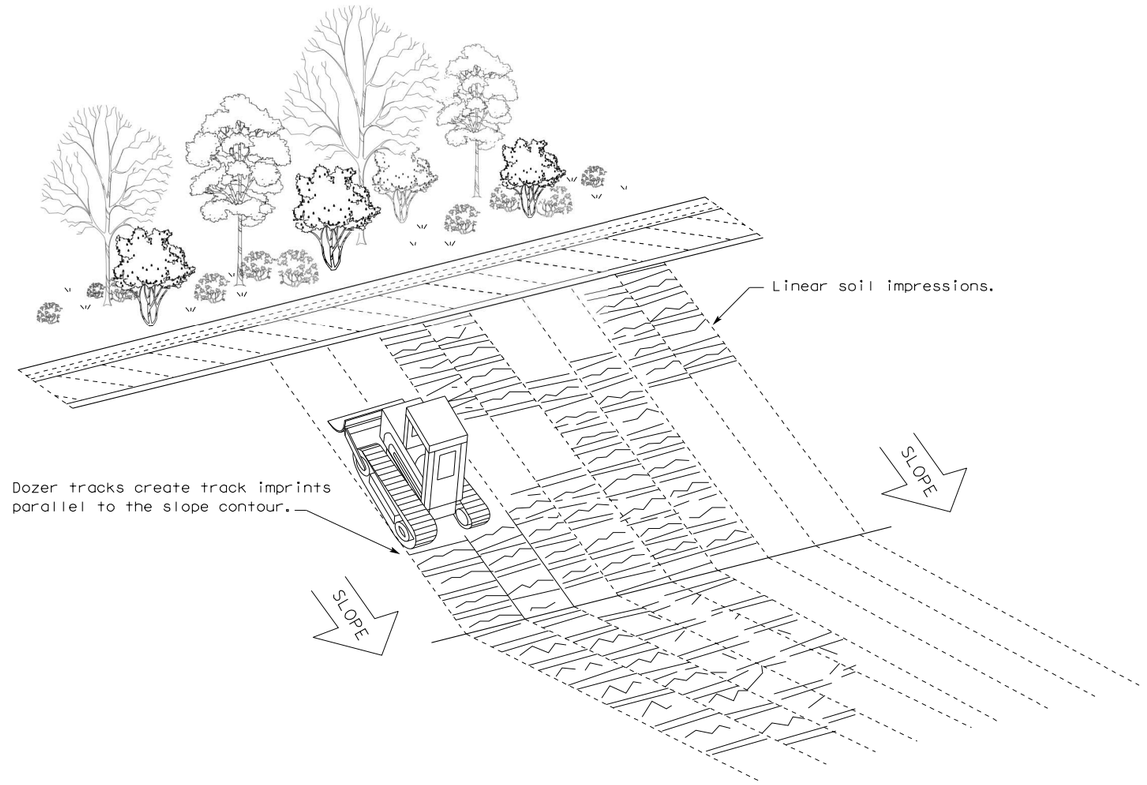
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		189

DATE
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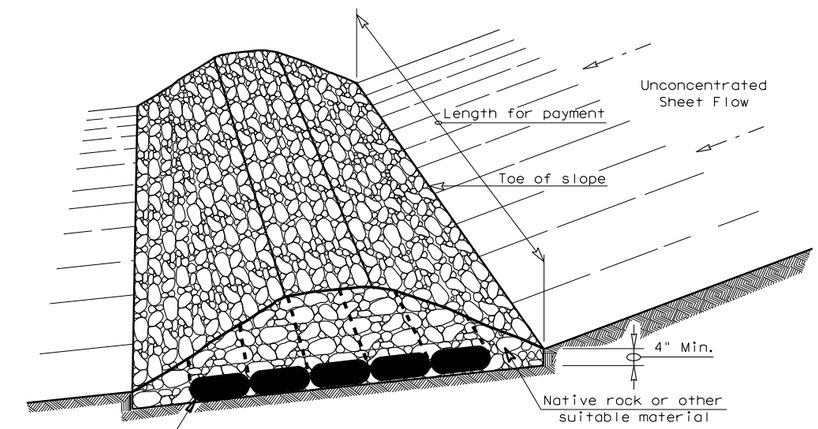
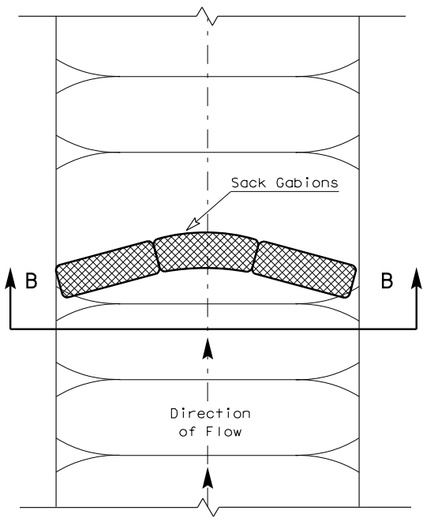
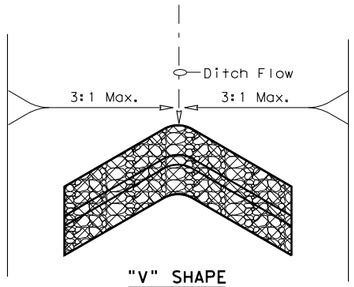


FILTER DAM AT TOE OF SLOPE

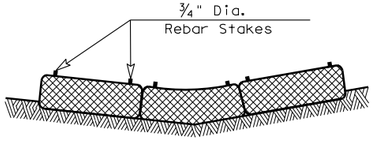
RFD1



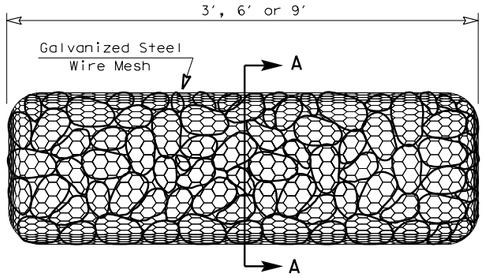
PLAN VIEW



"V" SHAPE PLAN VIEW

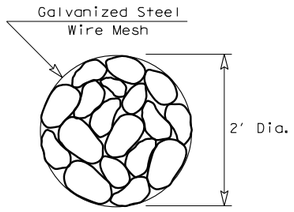


SECTION B-B

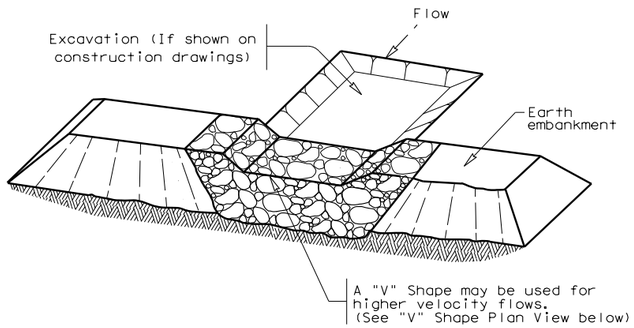


TYPE 4 (SACK GABIONS)

RFD4

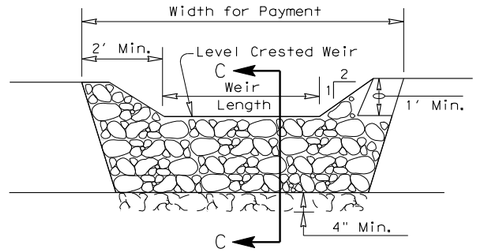


SECTION A-A

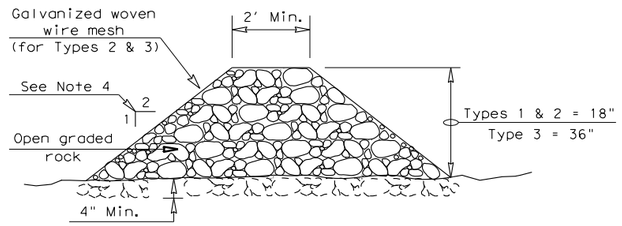


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

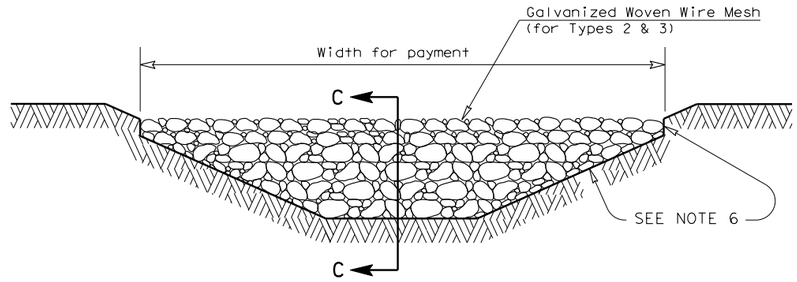
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3
Type 4 Rock Filter Dam — RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0134	07	069	US 380
	DIST	COUNTY		SHEET NO.
	FTW	WISE		190

DATE: 7/20/2022
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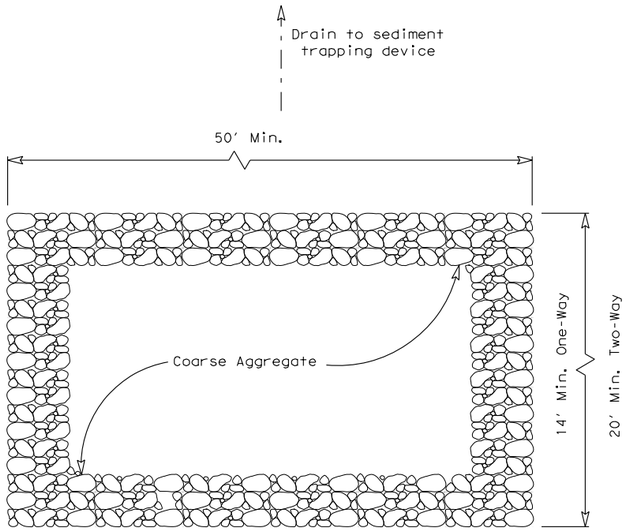
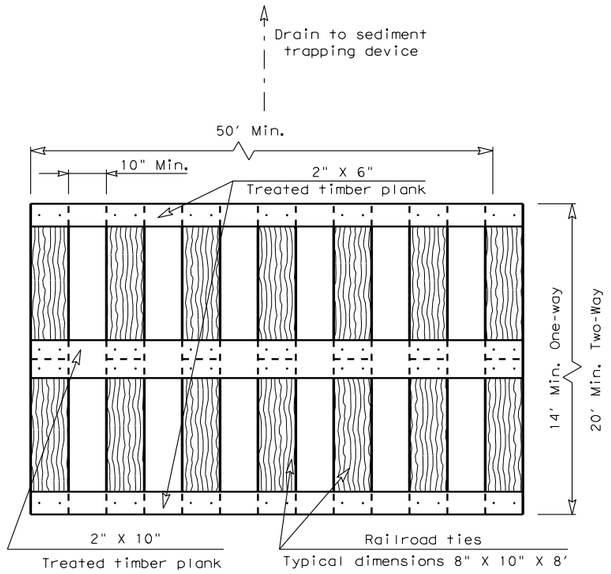


PLAN VIEW



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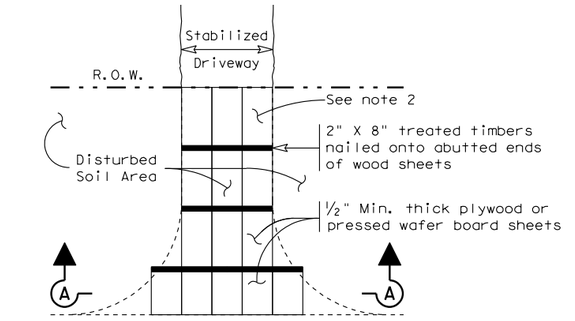

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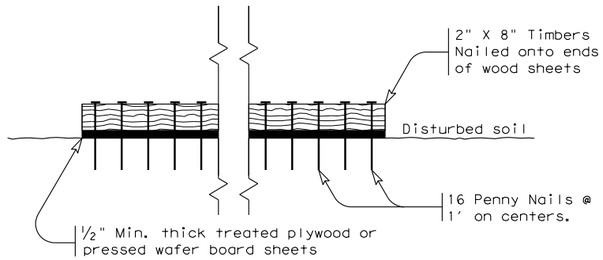
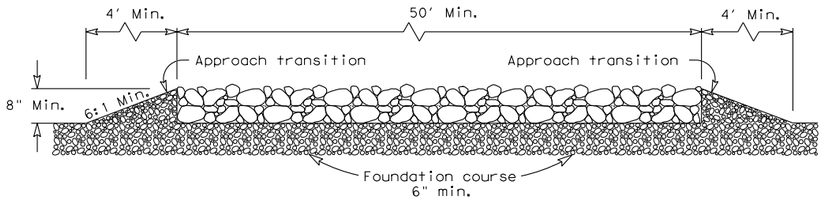


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

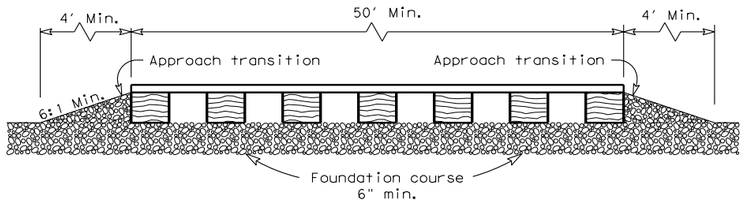
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	FTW	WISE		191

DATE:
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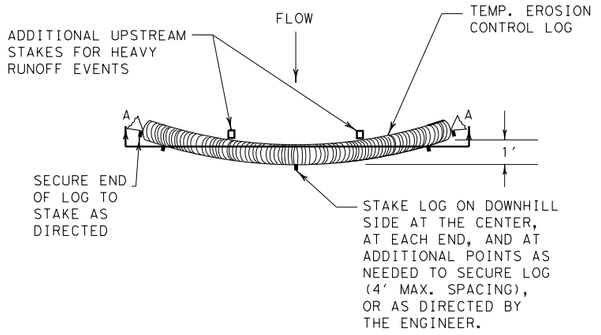
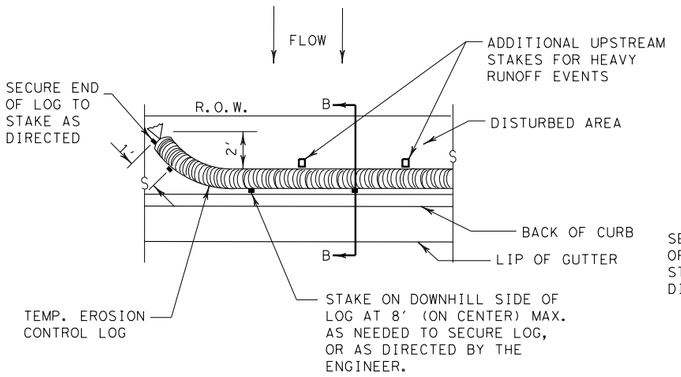


PLAN VIEW



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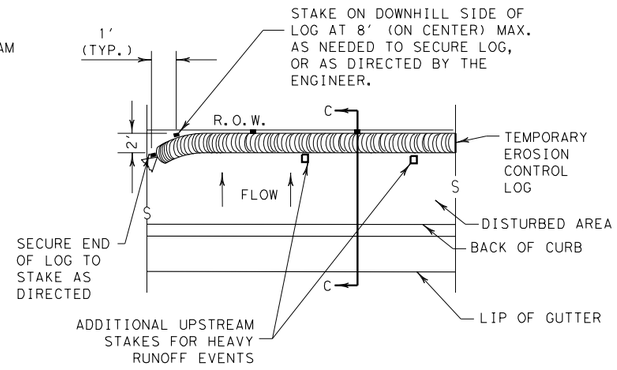

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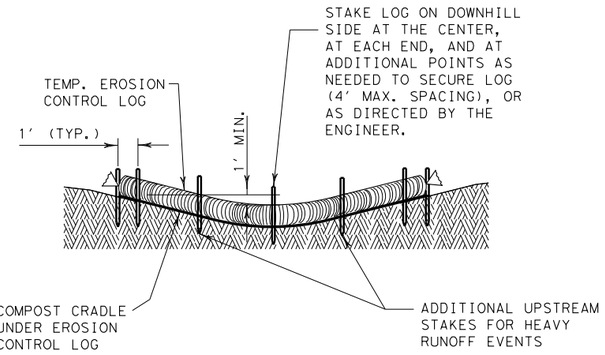
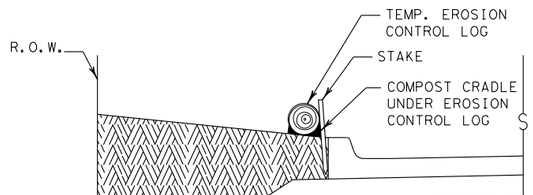


SECTION A-A

EROSION CONTROL LOG DAM

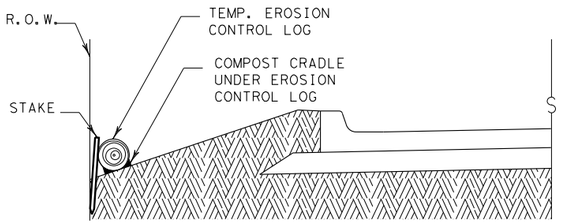
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

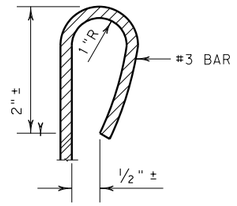
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

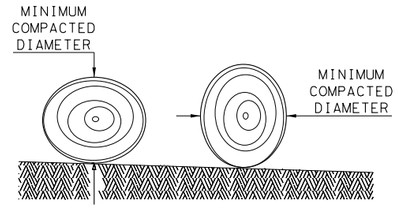
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
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	DIST	COUNTY			SHEET NO.	
	FTW	WISE			192	

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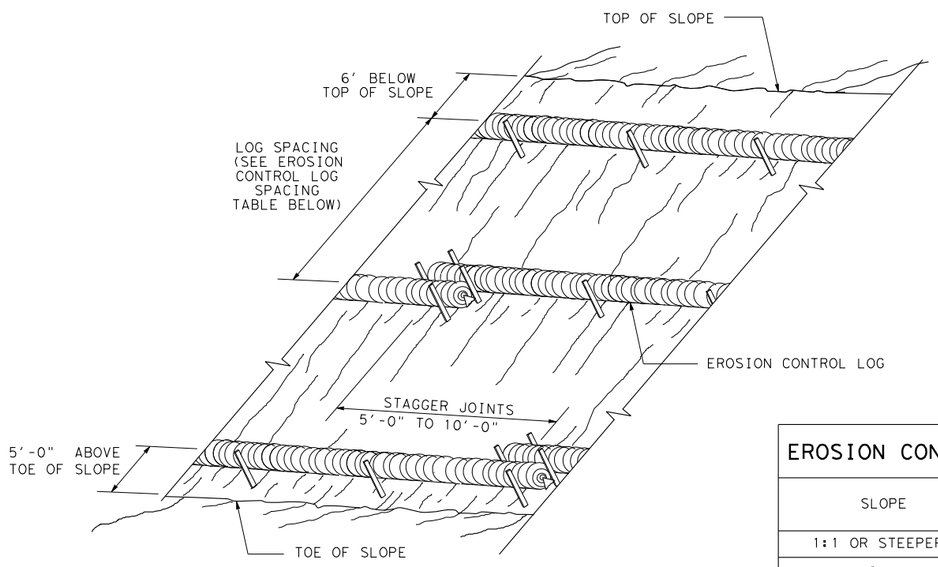
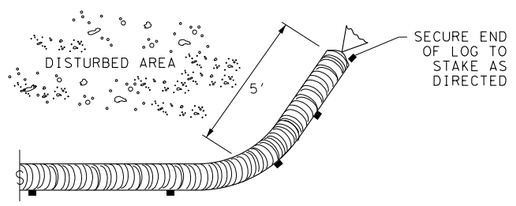


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

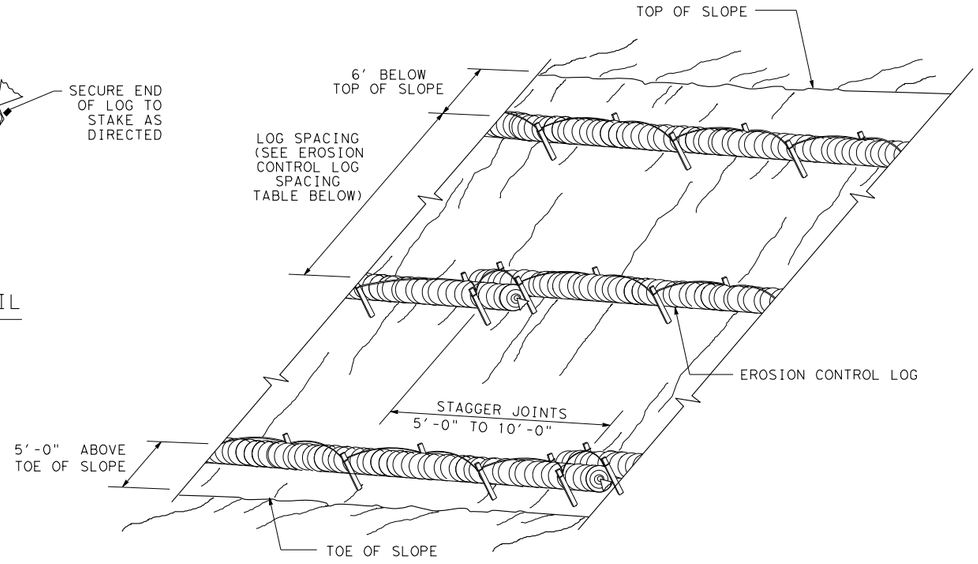
CL-SST



END SECTION RAP DETAIL

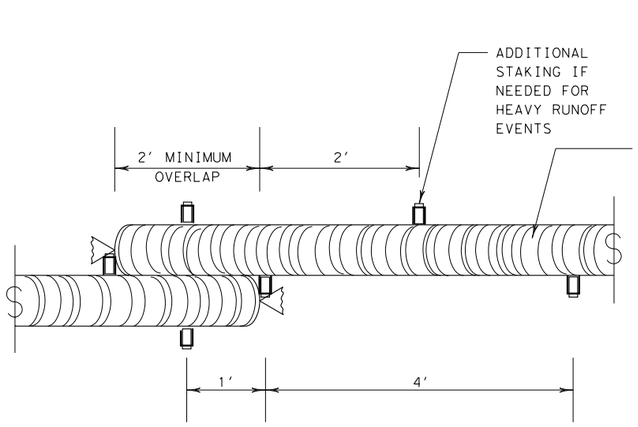
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

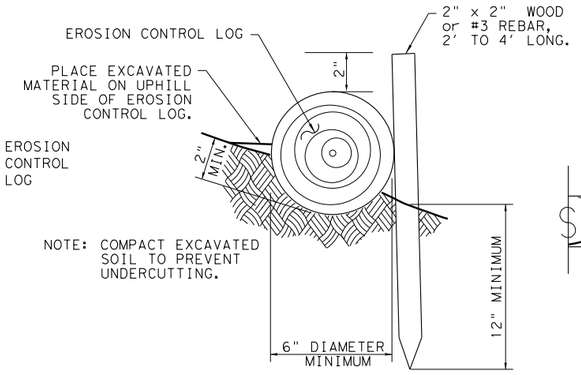
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

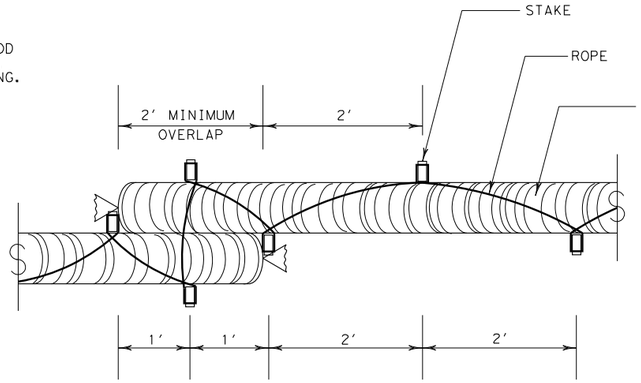


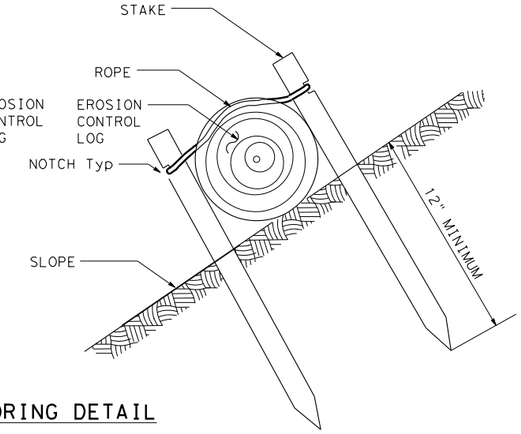


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

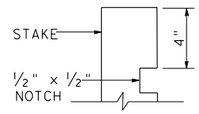
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



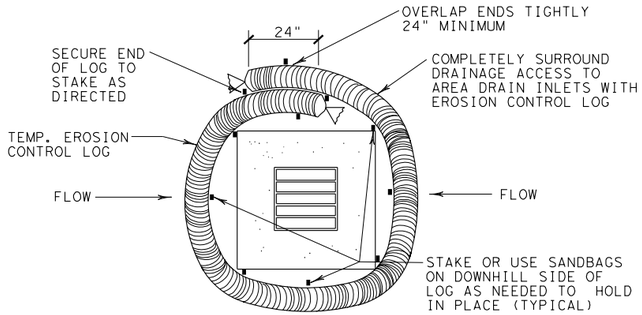
STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

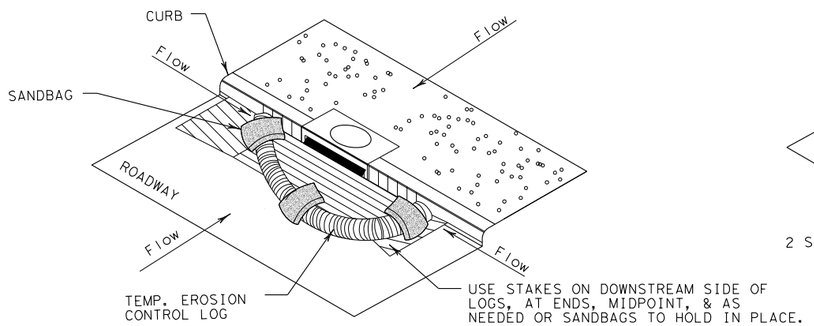
FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0134	07	069		US 380	
	DIST	COUNTY			SHEET NO.	
	FTW	WISE			193	

DATE:
FILE:



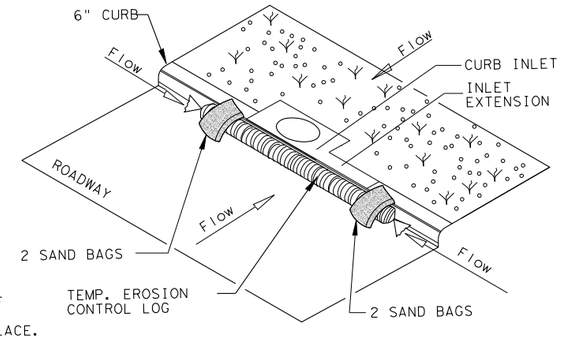
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

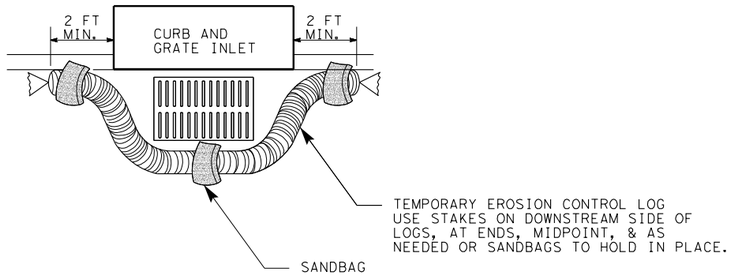
CL-CI



EROSION CONTROL LOG AT CURB INLET

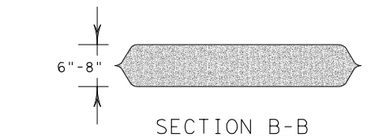
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

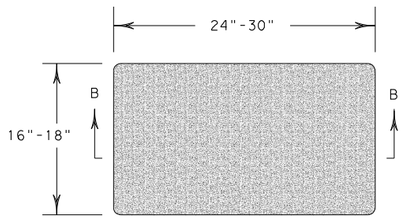


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0134	07	069		US 380		
	DIST	COUNTY			SHEET NO.		
	FTW	WISE			194		