SEE SHEET 2 FOR INDEX OF SHEETS

STATE OF TEXAS TEXAS DEPARTMENT OF TRANSPORTATION

CONTRACTOR:
DATE OF LETTING:
DATE WORK BEGAN:
DATE WORK COMPLETED:
DATE WORK ACCEPTED:
FINAL CONTRACT COST:

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FOR THE CONSTRUCTION OF NEW LOCATION NON-FREEWAY CONSISTING OF GRADING, BASE, ASPHALT PAVEMENT, DRAINAGE, STRUCTURES, TRAFFIC SIGNALS, SIGNING AND PAVEMENT MARKINGS.

> WHARTON COUNTY FM 1301 EXTENSION CSJ: 1412-03-038

FEDERAL AID PROJECT NO.

LIMITS: FROM US 59 TO 0.09 MILES EAST OF SH 60



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, REV. MAY 2012).

EXCEPTIONS: NONE EQUATIONS: YES, (STA 251+00.00 = STA 51+00.00) RAILROAD CROSSINGS: KCSRR STA 55+11.09 TO STA 56+11.09

LIST OF APPROVED FIELD CHANGES

CONTRACT AND LISTED FIELD CHANGES.

AREA ENGINEER

_, P.E.

	FEDERAL AID PROJECT NO.									
CONT	SECT	JOB		HIGHWAY						
1412	03	038		FM 1301						
DIST		COUNTY		SHEET NO.						
YKM		WHARTON		1						

HWY FUNCTIONAL CLASS: URBAN MINOR ARTERIAL DESIGN SPEED: 40 MPH ADT: 3,400 VPD (2016) 5,500 VPD (2046)

PROJECT LENGTH

 ROADWAY
 =
 8610.90
 FT.
 =
 1.630
 MI.

 BRIDGE
 =
 875.00
 FT.
 =
 0.166
 MI.

 TOTAL
 =
 9485.90
 FT.
 =
 1.796
 MI.

NBI# 13-241-0-1412-03-027

60% PLAN REVIEW

THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

ROLANDO ESCAMILLA 10/23/2020 TYPE OR PRINT NAME PE # 90128 DATE

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED TDLR NO. EABPRJ __

SUBMITTED FOR LETTING

CONSULTANT ENGINEER

APPROVED FOR LETTING

DISTRICT ENGINEER

CONCURRENCE

CITY OF WHARTON

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			beschiftfick
	GENERAL		RETAINING WALL
1 2 - 3 4 5 - 8	TITLE SHEET INDEX OF SHEETS EXISTING TYPICAL SECTIONS PROPOSED TYPICAL SECTIONS	129 130 131 132	RETAINING WALL "RW-A" PLAN AND PROFILE RETAINING WALL "RW-B" PLAN AND PROFILE MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA RW(MS BORE LOG RETAINING WALL
9 10	BASIS OF ESTIMATE		RETAINING WALL STANDARDS
11 2 - 17 8 - 19 20	ESTIMATE & QUANTITY SHEETS SUMMARY OF QUANTITIES SUMMARY OF SMALL SIGNS OVERALL PROJECT LAYOUT	133 - 134 135 136	RW (MSE) RW (TRF) RW (EM)
	TRAFFIC CONTROL		DRAINAGE DETAILS
21 22 - 23 24 25 - 37 38 39	TRAFFIC CONTROL PLAN SEQUENCE OF WORK TRAFFIC CONTROL PLAN TYPICAL SECTIONS TCP DETAIL LAYOUT AT CR 231 FOR NON-WORKING HOURS TRAFFIC CONTROL PLAN PHASE I TRAFFIC CONTROL PLAN PHASE III TRAFFIC CONTROL PLAN PHASE III	137 138 - 146 147 148 149 150 151 - 152	OVERALL DRAINAGE AREA MAP DRAINAGE AREA MAP GEOPAK DRAINAGE OUTPUT STORM SEWER LAYOUT DETENTION POND #1 LAYOUT DETENTION POND #2 LAYOUT DETENTION POND #3 LAYOUT
	IRAFFIC CONTROL STANDARDS	153 154 - 157	DETENTION POND CURVE AND CONTROL POINT DATA CULVERT LAYOUTS
0 - 51 52	BC(1-)-14 THRU BC(12)-14 TCP(1-4)-18		DRAINAGE STANDARDS
53 54 55 56 57 58 59 - 60 61 62	TCP (2-4) - 18 TCP (2-5) - 18 TCP (2-5) - 18 TCP (7-1) - 13 WZ (STS-1) - 13 WZ (BTS-2) - 13 LPCB-13 WZ (RS) - 16 CCSS ROADWAY	158 159 160 161 162 163 - 164 165 - 166 167 168 169 170	MC-MD SCP-MD ECD HIL-C1 GD E&BD SETP-CD SETP-PD PSET-SP PSET-RP MINOR OUTFALL DETAILS
63 - 66 67 - 73	REMOVAL LAYOUT SURVEY CONTROL		BRIDGES
4 - 76 7 - 78 9 - 107 108 109 110 111	HORIZONTAL ALIGNMENT HORIZONTAL ALIGNMENT DATA ROADWAY PLAN AND PROFILE ROADWAY PLAN US 59 INTERSECTION LAYOUT ROADWAY PLAN CR 231 INTERSECTION LAYOUT ROADWAY PLAN BERNSTEIN DRIVE INTERSECTION LAYOUT ROADWAY PLAN FM 60 INTERSECTION LAYOUT	171 - 173 174 - 177 178 179 - 180 181 182 123	BRIDGE LAYOUT SOIL BORING DATA ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS ABUTMENT NO. 1 ABUTMENT NO. 8 INTERIOR BENTS NO. 2-7 CUDED LAYOUT (CENNS 1.0.2)
	ROADWAY STANDARDS	184	GIRDER LAYOUT (SPANS 3 - 5)
112 113 114 5 - 116 117 118 119 120 21 - 124 125 126 27 - 128	GF (31) DAT-19 GF (31) MS-19 GF (31) MS-19 GF (31) TRTL3-19 BED (28) -19 SGT (10S) 31-16 SGT (12S) 31-18 SGT (15) 31-20 PED-18 CCCG-12 TE (HMAC) -11 SSCB (2) -10	185 186 187 188 189 190 - 192	GIRDER LAYOUT (SPANS 6 & 7) 250.00 PRESTRESSED CONCRETE GIRDER UNIT 1 375.00 PRESTRESSED CONCRETE GIRDER UNIT 2 250.00 PRESTRESSED I-GORCRETE GIRDER UNIT 3 IGND PRESTRESSED I-GIRDER DESIGN RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SURERVISION AS BEING APPLICABLE TO THIS PROJECT.

pmo

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W (MSE) DD



DATE

ROLANDO	ESCAMILLA,	Ρ.Ε.	(NO	90128)

SHEET NO.	DESCRIPTION
	BRIDGE STANDARDS
193 - 194 195 - 196 197 198 199 - 200 201 202 - 203 204 - 206 207 - 208 209 210 - 211 212 - 213 214 - 217 218 219 - 220 221 222 - 223	CSAB CLF-RO CP CRR FD IGCS IGD IGEB IGMS IGTS MEBR (C) PBC-RC PCP- PCP-FAB PMDF SEJ-M TYPE SSTR SIGNALS/ILLUMINATION
224	EXISTING TRAFFIC SIGNAL LAYOUT
225 226 227	PROPOSED TRAFFIC SIGNAL LAYOUT TRAFFIC SIGNAL ELECTRICAL SCHEDULES TRAFFIC SIGNAL EQUIPMENT SCHEDULES
	SIGNALS/ILLUMINATION STANDARDS
228 229 230 231 - 238 239 240 241 242 - 243 244 245 - 249	CFA-12 TS-FD-12 ED(1)-14 ED(3)-14 THRU ED(10)-14 LUM-A-12 MA-DPD-20 MA-C-12 SMA-100(1)-12 THRU SMA-100(2)-12 TS-BP-20 LMA(1)-12 THRU LMA(5)-12
	TRAFFIC SIGNING & PAVEMENT MARKING
250 251 - 256	EXISTING SIGN SUMMARY PAVEMENT MARKING & SIGNING LAYOUTS
	TRAFFIC SIGNING & PAVEMENT MARKING STANDARDS
257 - 260 261 - 263 264 - 268 269 270 - 272 273 274 - 275 276 277 278	PM(1)-20 THRU PM(4)-20 TSR(3)-13 THRU TSR(5)-13 D&OM(1)-20 THRU D&OM(5)-20 SMD(GEN)-08 SMD(SLIP-1)-08 THRU SMD(SLIP-3)-08 BARRIERGUARD-19 CSB(1)-10 SLED-19 ABORB(M)-19 ZONEGUARD-19
	ENVIRONMENTAL
279 - 283 284	SWPPP LAYOUT EPIC
	ENVIRONMENTAL STANDARDS
285 - 287 288 - 290 291	EC(1)-16 THRU EC(3)-16 EC(9)-16 SW3P SIGN PALL POAD
292	RAILROAD SCOPE OF WORK

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		+				
REV. NO.	DATE			DESCRIPTION		BY
Ι	D Planners 159 TBPE FIF	<u>s-Eng</u> 15 Ka Hous RM RE	ineers ty Fre ton, T EGIST	Program I eway, Suite exas 77094 RATION N	Managers a 300 4 IO. F-682	5
C I departm	TY C ent of pub)F BLIC W	WH orks a	ARTOI nd engineer	ING LA	WHARTON TEXA
SUBMITI SCALE: DATE:	TED:			DESIGNED DRAWN BY	BY:	
SURVEYE	ED BY:			CITY DWG	NO:	
	*				(c) 2021 TxD0
—	Техаз	; Dep	oartm	ent of Tra	ansporta	tion
	IN	NDE	Fм X O	1301 F SHEE	TS	
FED.F	RD.		PRO	JECT NO.	JHEEL Z	SHEET
6		S	EE T	ITLE SHEE	T	3
STAT	E D	IST.		CO	UNTY	
TEXA	S Y	κM		WH	ARTON	
CONT	. si	ECT.		JOB	HIGHW	AY NO.
1412		03		038	FM	1301

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SURERVISION AS BEING APPLICABLE TO THIS PROJECT.

DATE









SCALE: NTS





						SUMMAF	RY OF ROA	DWAY QUANTIT	IES								
ITEM	100	110	132	162	164	164	164	168	247	275	275	310	316	316	340	3076	3076
DESC. CODE	6002	6001	6006	6002	6009	6011	6023	6001	6057	6001	6010	6009	6246	6400	6272	6002	6042
SHEET STATION TO STATION	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C)	BLOCK SODDING	BROADCAST SEED (TEMP) (WARM)	BROADCAST SEED (TEMP) (COOL)	CELL FBR MLCH SEED (PERM) (RURAL) (CLAY)	VEGETATIVE WATERING	FL BS (CMP IN PLC) (TYE GR1-2) (FNAL POS)	CEMENT	CEMENT TREAT (SUBGRADE) (8")	PRIME COAT (MC-30)	AGGR(TY-PE GR-3 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	ТАСК СОАТ	D-GR HMA TY-B SAC-B PG64-22	D-GR HMA TY-D SAC-B PG70-22
	STA	CY	CY	SY	SY	SY	SY	MG	CY	TON	SY	GAL	CY	GAL	GAL	TON	TON
FM 1301																	
1 BEGIN PROJECT to STA 178+00	3.0	181	894		2199	2199	8797	49	1288	62.8	5167	831	42	1455	170	846	343
2 STA 178+00 to STA 182+00	4.0	1330	1286		6448	6448	25793	145	741	33.5	2755	516	26	902	124	557	269
3 STA 182+00 to STA 187+00	5.0	2338	494		2633	2633	10533	59	926	41.8	3444	644	32	1128	156	697	336
4 STA 187+00 to STA 192+00	5.0	2169	825		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
5 STA 192+00 to STA 197+00	5.0	3512	64		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
6 STA 197+00 to STA 202+00	5.0	2131	906		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
7 STA 202+00 to STA 207+00	5.0	2460	299		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
8 STA 207+00 to STA 212+00	5.0	2373	361		1513	1513	6053	34	1072	48.5	3996	744	37	1302	178	803	387
9 STA 212+00 to STA 217+00	5.0	1852	1553		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
10 STA 217+00 to STA 222+00	5.0	2148	1387		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
11 STA 222+00 to STA 227+00	5.0	1150	2849		1380	1380	5520	31	926	41.8	3444	644	32	1128	156	697	336
12 STA 227+00 to STA 232+00	5.0	1014	3488		1472	1472	5889	33	926	41.8	3444	644	32	1128	156	697	336
13 STA 232+00 to STA 237+00	5.0	1009	4534		1531	1531	6126	34	926	41.8	3444	644	32	1128	156	697	336
14 STA 237+00 to STA 242+00	5.0	1096	5774		1818	1818	7273	41	926	41.8	3444	644	32	1128	156	697	336
15 STA 242+00 to STA 247+00	5.0	771	7898		2628	2628	10510	59	926	41.8	3444	644	32	1128	193	697	419
16 STA 247+00 to STA 251+00	5.0	2468	25165		3212	3212	12848	72	721	32.7	2692	501	25	876	120	540	259
18 STA 52+00 to STA 57+00	5.0	0	0		3935	3935	15739	88									
20 STA 57+00 to STA 62+00	5.0	312	10046		2256	2256	9025	51	422	18.5	1520	304	15	532	76	334	167
22 STA 62+00 to 66+00	4.0	389	4737		479	479	1914	11	1383	61.6	5072	973	49	1703	236	1059	515
23 STA 66+00 TO END PROJECT	5.5	645	29	597				3	189	8.4	695	130	7	228	33	143	72
PROJECT TOTAL	91	29348	72589	597	40338	40338	161353	910	16927	768.2	63228	11732	587	20532	2842	12644	6128

	APPLICATION RATES:	
CEMENT: CEMENT	135 LBS/CF / 20	000 LBS/TON × 3%
HMA: D-GR HMA		110 LBS/SY-IN
PRIME: PRIME COAT (MULTI AGGR(TY-PE GR-3 SA	OPTION) C-B)	0.20 GAL/SY 1 CY/100 SY
SEAL COAT: ASPH(AC-15P OR AC-	10-2TR OR CRS-2P)	0.35 GAL/SY
FERTILIZER:		500 LBS/SY
VEGETATIVE WATERIN	G:	13.6 MG/AC/MO

					SUMMARY	OF ROAD	WAY QUA	NTITIE	S					
	ITEM	354	432	432	514	529	531	531	536	540	540	540	544	545
SHEET	STATION TO STATION	PLANE ASPH CONC PAV (0"TO 2")	RIPRAP (CONC) (CL B) (RR8&RR9)	RIPRAP (MOW STRIP) (4 IN)	PERM CTB (SGL SLOPE) (TY 1) (42)	CONC CURB & GUTTER (TY II)	CURB RAMPS (TY 1)	CURB RAMPS (TY 21)	CONC DIRECTIONAL ISLAND	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (TL2)	DOWNSTREAM ANCHOR TERMINAL SECTION	GUARDRAIL END TREATMENT (INSTALL)	CRASH CUSH ATTEN (INSTL)(R) (N) (TL2)
		SY	CY	CY	LF	LF	EA	EA	SY	LF	EA	EA	EA	EA
	FM 1301													
1	BEGIN PROJECT to STA 177+00													
2	STA 177+00 to STA 182+00													
3	STA 182+00 to STA 187+00													
4	STA 187+00 to STA 192+00													1
5	STA 192+00 to STA 197+00													<u> </u>
6	STA 197+00 to STA 202+00													
7	STA 202+00 to STA 207+00													
8	STA 207+00 to STA 212+00													
9	STA 212+00 to STA 217+00									-				
10	STA 217+00 +6 STA 222+00						-							
12	STA 222+00 +8 STA 227+00						-							
13	STA 232+00 to STA 232+00													
14	STA 237+00 to STA 242+00													
15	STA 242+00 to STA 247+00													
16	STA 247+00 to STA 251+00		129	22						250	2		2	
18	STA 52+00 to STA 57+00		125							230	2		2	
20	STA 57+00 to STA 62+00		32		380									
22	STA 62+00 to 66+00			2							2	1	1	1
23	STA 66+00 TO END PROJECT	51945				604	5	1	161					
		51045	1.61		700	60.1			1.61	25.0			7	
1		1 51945	1 161	1 24	1 580	1 604	1 5	1 1	1 161	1 250	1 4	1 1	1 5	1 1

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BASEL INE	ITEM 110	ITEM 132
	EXCAVATION	EMBANKMENT
STATION	CY	CY
177+00.00	0	386
178+00.00	181	508
179+00.00	327	332
180+00,00	287	439
181+00,00	317	356
183+00.00	480	50
184+00.00	502	49
185+00,00	481	77
186+00.00	464	109
187+00.00	411	209
188+00.00	361	286
189+00.00	354	256
190+00,00	359	187
191+00.00	448	82
192+00.00	770	6
194+00-00	763	8
195+00.00	722	11
196+00.00	662	16
197+00.00	595	23
198+00.00	519	48
199+00.00	453	114
200+00.00	406	214
201+00.00	375	282
202+00,00	378	248
203+00,00	401	156
205+00-00	428	37
206+00.00	543	16
207+00,00	621	8
208+00.00	644	5
209+00.00	378	36
210+00.00	305	121
211+00.00	538	106
212+00.00	508	93
213+00.00	378	251
214+00.00	299	439
215+00,00	271	500
217+00-00	542	67
218+00.00	673	17
219+00.00	577	51
220+00.00	384	207
221+00.00	289	453
222+00.00	225	659
223+00.00	210	679
224+00.00	239	561
225+00.00	252	467
220+00.00	230	642
228+00.00	202	740
229+00.00	192	768
230+00.00	198	688
231+00.00	216	606
232+00.00	206	686
233+00.00	182	830
234+00.00	152	1007
235+00.00	271	968
237+00-00	251	870
238+00.00	267	822
239+00.00	226	921
240+00.00	213	1108
241+00.00	204	1350
242+00.00	186	1573
243+00.00	181	1570
244+00.00	153	1511
245+00.00	83	1567
246+00.00	16	1649
248+00.00	576	1001
249+00-00	594	3354
250+00,00	589	5420

JUNIMARY OF LARTHWORK	SUMMARY	OF	EARTHWORK
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BASELINE	ITEM 110	ITEM 132
STATION	EXCAVATION	EMBANKMENT
STATION	CY	CY
52+00.00	235	6570
53+00.00	0	0
54+00.00	0	0
55+00.00	0	0
56+00.00	0	0
57+00.00	0	0
58+00.00	0	0
59+00.00	0	0
60+00.00	83	2262
61+00.00	1 3 5	4227
62+00.00	94	3557
63+00.00	83	2575
64+00.00	41	1490
65+00.00	47	558
66+00.00	218	114
67+00.00	0	0
68+00.00	492	8
69+00.00	88	6
70+00,00	46	5
71+00.00	19	10
		•
ΤΟΤΑΙ	29348	72589

omar a

tation/City of Whorton/CaDD/GENERAL\FM1301*SUMMARY OF QUANTITIES-02.dgn

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*DRIVEWAYS (ACP) DETAILS

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) ACP (GR 3) AND PRIME COAT EX BASE	NOTE: FOR MO AND SP "SPECI ENERGY	RE DRIVE ECIFICAT	WAY DESIGN D IONS, REFER NS FOR CENTER	DETAILS TO RPOINT						
		100310								
	REV. NO. DA	те	DESCRIPTION		BY					
		DC iners-Engi 15915 Ka House	ty Freeway, Suit	Managers e 300 4						
_			GISTRATION	NO. F-062						
ILL DEPTH	CITY department o	OF F PUBLIC W	WHARTO orks and engineef		TRAG					
	SUBMITTED: SCALE: DATE:		DESIGNEI DRAWN BY) BY: 7:						
	SURVEYED B	Y:	CITY DWG	CITY DWG NO:						
	Te	exas Dep	partment of Tr	(ansporta	е) 2021 тхрот tion					
	_		FM 1301							
	SUN	MARY	OF QUANT	TITIES	S up .					
	FED.RD.	1		SHEET	SHEET					
	DIV.NO.	s	EE TITLE SHE	ET	NO. LI LIVE					
	STATE	DIST.	CC	DUNTY	or au					
	TEXAS	YKM	₩Н	ARTON	MARY					
	CONT.	SECT.	JOB	HIGHW	AY NO.					
	1412	03	038	FM	1301					

COMMENT
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						SUMM	ARY OF TCP ITE	MS							
	ITEM	512	512	512	512	512	512	662	662	662	662	662	662	6001	6185
SHEET NO.	STATION TO STATION	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	PORT CTB (MOVE)(LOW PROF)(TY 1)	PORT CTB (MOVE)(LOW PROF)(TY 2)	PORT CTB (REMOVE) (LOW PROF) (TY 1)	PORT CTB (REMOVE) (LOW PROF) (TY 2)	WK ZN PAV MRK NON-REMOV (W) 4" (DOT)	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	WK ZN PAV MRK NON-REMOV (W)8" (SLD)	WK ZN PAV MRK NON-REMOV (W) (ARROW)	WK ZN PAV MRK NON-REMOV (W) (WORD)	WK ZN PAV MRK NON-REMOV (Y)4" (SLD)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)
		LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	LF	DAY	DAY
PHASE 1															
SHEET 10	STA 66+00 TO END PROJECT	530	80			430	40	30	950	200	5	5	945	20	10
PHASE 2															
SHEET 8	STA 62+00 TO END PROJECT	60	20	100	40	160	60	26	1067	507			1242	20	10
PHASE 3															
SHEET 2	STA 62+00 TO END PROJECT														
	TOTAL	590	100	100	40	590	100	56	2017	707	5	5	2187	40	20

SUMMARY OF RRIDE QUANTITIES												
	400	409	420	420	420	420	422	425	432	450	454	550
STATION TO STATION	CEM STABIL BKFL	PRESTR CONC PIL (18 IN SQ)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	CL C CONC (FOOTING)	REINF CONC SLAB	PRESTR CONC GIRDER (TX54)	RIPRAP (CONC) (4 IN)	RAIL (TY SSTR)	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	CHAIN L FENC (INSTA (8')
	CY	LF	CY	CY	CY	CY	SF	LF	CY	LF	LF	LF
51+23.49 - 59+98.49	170	5550	75.6	120.6	155	151.2	40614	6104.56	234	1786	182	200
TOTAL	170	5550	75.6	120.6	155	151.2	40614	6104.56	234	1786	182	200

SU	MMARY OF REM	OVAL QUANTITIES		
ITEM	104	104	105	496
STATION TO STATION	REMOVING CONC (SIDEWALKS)	REMOVING CONC (CURB AND GUTTER)	REMOVING STAB BASE & ASPH PAV (0"-10")	REMOV STR (INLET)
	SY	LF	SY	EA
BEGIN PROJECT to END PROJECT	206	995	943	1
PROJECT TOTALS	206	995	943	1

	SUMMARY OF RETAININ	NG WALLS		
	ITEM	423	432	450
SHEET NO.	BEG TO END STA	RETAINING WALL (MSE)	RIPRAP (MOW STRIP) (4IN)	RAIL (TY SSTR)
		SF	CY	LF
1	RET WALL A STA 10+00 TO 14+42.06	5945	11	406
2	RET WALL B STA 20+00 TO 24+32.85	5787.25	10	399
	TOTAL	11732.25	21	805

					5	SUMMARY OF D	RAINAGE ITE	MS						
		ITEM	164	166	168	432	464	464	464	465	467	467	467	467
SHEET NO.	BASE LINE	STRUCTURE DISCRIPTION	DRILL SEEDING (PERM) (RURAL) (CLAY)	FERTILIZER	VEGETATIVE WATERING	RIPRAP (CONC) (4 IN)	RC PIPE (CL III) (18 IN)	RC PIPE (CL III) (24 IN)	RC PIPE (CL III) (36 IN)	INLET (COMPL) (CURB) (TY C1)	SET (TY II) (24 IN) (RCP) (6: 1) (C)	SET (TY II) (24 IN) (RCP) (6: 1) (P)	SET (TY II) (36 IN) (RCP) (6: 1) (C)	SET (T II) (3 IN) (RC (6: 1)
			SY	AC	MG	CY	LF	LF	LF	EA	EA	EA	EA	EA
					-			-		-				-
1 OF 1	FM 1301	STORM SEWER						185		2				
1 OF 9	FM 1301	CULV # 1 - STA 179+45							148				4	
2 OF 9	FM 1301	CULV # 2 - STA 195+00						128			4			
4 OF 9	FM 1301	DRWY CULV1 STA 222+45.68						72				4		
5 OF 9	FM 1301	DRWY CULV2 STA 224+45.47						68				4		
5 OF 9	FM 1301	CULV # 3 - STA 230+00							152				4	
6 OF 9	FM 1301	CULV # 4 - STA 246+60							182				4	
6 OF 9	FM 1301	DRWY CULV1 STA 246+00							101					4
6 OF 9	FM 1301	DRWY CULV2 STA 246+00							100					4
	FM 1301	DETENTION POND #1	5342	1	30	70	48							
	FM 1301	DETENTION POND #2	13623	3	77	127		40						
	FM 1301	DETENTION POND #3	21283			159		84						
		ΤΟΤΑΙ	40248	4	107	356	48	577	683	2	4	8	12	8

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REV. NO.	DA1	E		DESCRIPTION		BY				
Ι	<u>Plan</u>	ners-Engi 15915 Ka Hous FIRM RE	ineers ty Fre ton, T EGIST	Program I eway, Suite exas 77094 RATION N	Managers 300 4 O. F-682	5				
C I departe	ΤY MENT OF	OF PUBLIC W	WH orks a	ARTO1 nd engineer		TIHAR TOP				
SUBMIT SCALE:	JBMITTED: DESIGNED BY: CALE: DRAWN BY: ATE:									
SURVEY NBI NO	ED BI	(:		CITY DWG	NO:					
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			FM	1301						
	SUM	JMMARY OF QUANTITIES								
					SHEET	4 OF 6				
FED. DIV.	RD. NO.		PRO	JECT NO.		SHEET NO.				
6		S	EE T	ITLE SHEE	т	15				
STA	TE	DIST. COUNTY								
TEX	AS	YKM		WHA	ARTON					
CON	т.	SECT.	JOB HIGH			AY NO.				
141;	2	03 038 FM 1301								

	SUMMARY OF SIGNING AND PAVEMENT MARKINGS														
	ITEM	644	644	644	644	644	658	666	666	666	666	666	666	666	668
SHEET	STATION TO STATION	IN SM RD SN SUP&AM TYS80(1)SA(P)	IN SM RD SN SUP&AM TYS80(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U)	IN SM RD SN SUP&AM TYS80(1)SA(U-2EXT)	REMOVE SM RD SN SUP&AM	INSTL OM ASSM (OM-2Y)(WC) GND	REFL PAV MRK TY I (W)8"(BRK)(090MIL)	REFL PAV MRK TY I (W)8"(SLD) (090MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(100MI L)	RE PM W/RET REQ TY I (W)4"(BRK) (090MIL)	RE PM W/RET REQ TY I (W)4"(SLD) (090MIL)	RE PM W/RET REQ TY I (Y)4"(BRK) (090MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (090MIL)	PREFAB PAV MRK TY C (W) (24") (SLD)
		EA	EA	EA	EA	EA	EA	LF	LF	EA	LF	LF	LF	LF	LF
1	BEGIN PROJECT to STA 197+00	4			1		4	300		1	237.0	6650	964	4442	
2	STA 197+00 to 217+00	2	2	2							32.0	3842	962	3843	20
3	STA 217+00 to 237+00	2					2					4000	1000	4000	
4	STA 237+00 to 57+00	1	3				6			1		3850	540	4340	
5	STA 57+00 to 65+00	2				1	2		265		76	678		2306	
6	STA 65+00 to END OF PROJECT	7	1	1	2				365	1	325	2087		1381	418
	PROJECT TOTAL	18	6	3	3	1	14	300	630	3	670	21107	3466	20312	438

		SUMMARY OF SIG	NING AND PAVE	MENT MARKINGS			
	ITEM	668	668	668	668	672	672
SHEET	STATION TO STATION	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (Y) (24") (SLD)	PREFAB PAV MRK TY C (W) (LNDP ARROW)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
		EA	ΕA	LF	ΕA	EA	ΕA
1	BEGIN PROJECT to STA 197+00	6		169		12	129
2	STA 197+00 to 217+00	4				3	98
3	STA 217+00 to 237+00						100
4	STA 237+00 to 57+00	6		100			189
5	STA 57+00 to 65+00			110	1	21	41
6	6 STA 65+00 to END OF PROJECT		5			51	122
	PROJECT TOTAL	23	5	379	1	87	679

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301*SUMMARY OF QUANTITIES-05.dgn

		S	UMMARY OF SW3	P ITEMS				
	ITEM	506	506	506	506	506	506	506
SHEET NO.	STATION TO STATION	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	SANDBAGS FOR EROSION CONTROL (6")	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
		LF	LF	SY	SY	LF	LF	LF
1	BEGIN PROJECT to STA 197+00	152	152	156	156		3879	3879
2	STA 197+00 to 217+00	152	152				4044	4044
3	STA 217+00 to 237+00	76	76				4000	4000
4	STA 237+00 to STA 57+00	152	152				5439	5439
5	STA 57+00 to END OF PROJECT			156	156	40	2554	2554
	TOTAL	532	532	312	312	40	19916	19916

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							SUMMARY (OF TRAFFIC IT	EMS							
	ITEM	416	416	416	618	618	618	618	620	621	624	628	680	680	682	682
SHEET NO.	STATION TO STATION	DRILL SHAFT (TRF SIG POLE) (24 IN)	DRILL SHAFT (TRF SIG POLE) (36 IN)	DRILL SHAFT (TRF SIG POLE) (48 IN)	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (3")	CONDT (PVC) (SCH 80) (4")	CONDT (PVC) (SCH 80) (4") (BORE)	ELEC CONDR (NO.4) BARE	TRAY CABLE (3 CONDR) (8 AWG)	GROUND BOX TY D (162922)W/AP RON	ELC SRV TY D 120/240 070 (NS) SS (E) SP (O)	INSTALL HWY TRF SIG (SYSTEM)	REMOVING TRAFFIC SIGNALS	VEH SIG SEC (12")LED(GRN)	VEH SIG SEC (12")LED(GRN ARW)
		LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
236	66+00 TO 68+00	29	29	66	20	195	95	400	715	785	5	1	1	1	10	4
	TOTAL	29	29	66	20	195	95	400	715	785	5	1	1	1	10	4

								SUMMAI	RY OF TRAFFIC	ITEMS						
	ITEM	682	682	682	682	682	682	682	684	684	686	686	686	687	688	688
SHEET NO.	STATION TO STATION	VEH SIG SEC (12")LED(YEL)	VEH SIG SEC (12")LED(YEL ARW)	VEH SIG SEC (12")LED(RED)	VEH SIG SEC (12")LED(RED ARW)	PED SIG SEC (LED) (COUNTD OWN)	BACKPLATE (12") (3 SEC)	BACKPLATE (12") (4 SEC)	TRF SIG CBL (TY A)(12 AWG)(2 CONDR)	TRF SIG CBL (TY A)(12 AWG)(12 CONDR)	INS TRF SIG PL AM (S)1 ARM(24')	INS TRF SIG PL AM(S)1 ARM(40')LUM	INS TRF SIG PL AM(S)1 ARM(50')LUM	PED POLE ASSEMBLY	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT
		EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	EA	EA	EA	EA
236	66+00 TO 68+00	10	8	10	4	10	10	4	1515	2515	1	1	3	5	9	1
	TOTAL	10	8	10	4	10	10	4	1515	2515	1	1	3	5	9	1

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		SUMMAF	RY OF TRAFFIC	ITEMS
	ITEM	6025	6057	6058
SHEET NO.	STATION TO STATION	RADAR PRESENCE DETECTOR	RADAR ADVANCED DETECTION DEVICE	BBU SYSTEM (EXTERNAL BATT CABINET)
		EA	ΕA	ΕA
236	66+00 TO 68+00	4	2	1
	TOTAL	4	2	1



DATE FILE	üü			Ξ.0 Ξ.0	nd is mad on of thi	de by is star	TxD01 tor any pu ndard to other f	rpose , ormats	vhatsoever. Ixuu or for incorrec	t assumes no res t results or dam	ponsibility tor the conver- ages resulting from its use.
		MMARY	OF SMALL SIGNS				SMR		N ASSM TY	(X) XXXXX	(XXXX-X) XX
SHE SHE	AN SI D.	IGN SIGN 10. NOMENCLATURI	E SIGN TEXT	DIMENSIONS	ALUMINUM TYPE A		Post Type RP = Fiberglass WT = Thin-Wall 0BWG = 10 BWG 80 = Sch 80	Posts (1 or 2)	Anchor Type UA=Univer-Conc UB=Univer-Bolt SA=SLip-Conc SB=SLip-Bolt WS=Wedge Steel	P = Prefab. P = Prefab. T = Prefab. "T" U = Prefab. "U"	Designotion 1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam WC = 1.12 #/ft Wing Chan. EXAL= Extruded Aluminum
	0	01 W4-2	LANE ENDS MERGE LEFT SYMBOL SIGN	36X36	8	\square	S80	-	SA	۵.	
	0	32 R3-9d P3-9d	END CENTED I ANE TWI TI ADDOWS ONLY	30X12 24X36	>		S80	-	SA	۵	
	0)3 M3-30	VENTER LANE THELE ARNOWS UNET	24X12	>		S80	-	SA	D	2EXT
		M1-4 (2dgt M6-1) US HIGHTWAY ROUTE SHIELD (US 59) ARROW-HORZ STRGHT AUXILIARY	24X24 21X15							
		M3-5	EAST-AUXILARY SIGN	24X12							
		M1 - 6F M6 - 6L	FARM ROAD 1301 ARROW-HRZNTL RIGHT AUXILARY	24X24 21X15							
	0	04 R3-9c R3-9b	BEGIN CENTER LANE TWLTL ARROWS ONLY	30X12 24X36	>		S80	-	SA	۵.	
	0)5 R2-1	SPEED LIMIT (35 MPH)	30X36	>		S80	-	SA	٩	
	0)6	CR 231		>	+	S80	-	SA	Т	
	0)7 M3-4	WEST-AUXILARY SIGN	24X12	>		082	-	SA	5	
		M1 - 6F M6 - 6I	FARM ROAD 1301 ARROW-HRZNTI RIGHT AIXII ARY	24X24 21X15							
		2 C C		2							
		M3-5 M1-6F	EAST-AUXILARY SIGN FARM ROAD 1301	24X12 24X24							
		M6-6L	ARROW-HRZNTL LEFT AUXILARY	21X15							
	0	38 R1-1	STOP	36X36	>		S80	-	SA	۵.	
	0)9 R1-1	STOP	36X36	>		S80	-	SA	۵.	
	-	0 - FM	WEST-AIIVII APV STGN	61266			Can	-	¢ U	=	
	-	M1-6F	FARM ROAD 1301	24X24	8		280	-	SA	D	
		M6-6L	ARROW-HRZNTL LEFT AUXILARY	21X15							
		M3-4 M1-6F	EAST-AUXILARY SIGN FARM ROAD 1301	24X12 24X24							
		M6 - 6L	ARROW-HRZNTL RIGHT AUXILARY	21X15							
	-		CR 231		>		S80	-	SA	T	
4	-	5	HARRISON LN SIGN		8	+	S80	-	SA	F	
	-	3	HARRISON LN SIGN		Þ		S80	-	SA	F	
	-	14 W3-3	TRAFFIC SIGNAL AHEAD	36X36	>		S80	-	SA	۵.	
	0	27 W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48X48	>		S80	-	SA	щ	
	-	R2-1	SPEED I IMIT (35 MPH)	95 XUE	>		082	-	SA	٩	
		R1-1	CTDD	36X36	, ,				SA	. <u>с</u>	
				92792						c	
		12-6M 71	LANE ENDS MERGE LEFT	مديمد	8		280	-	SA	τ	
	-	18 M3-3 M4-3	SOUTH - AUXILIARY SIGN BUSINESS - AUXILIARY SIGN	24X12 24X12	>		S80	-	SA	D	2EXT
		M1-4 (2dg+ M1-6T) US HIGHTWAY ROUTE SHIELD (US 59) (SH 60) TEYAS	24X24 24X24							
	++	M6-1	ARROW-HORZ STRGHT AUXILIARY	21X15	<u> </u>						
	+	M3-4	WEST-AUXILARY SIGN	24X12							
	+	M1 - 6F M6 - 6L	FARM ROAD 1301 ARROW-HRZNTL LEFT AUXILARY	24X24 21X15							
		M3-5	EAST-AUXILARY SIGN	24X12							

(XXXX-X)XX	besignation 1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam WC = 1.12 #/ft Wing Chan. EXAL= Extruded Aluminum	2EXT																									
	P = Prefab. P = Prefab. Plain. T = Prefab. "U" U = Prefab. "U"	5							٩	۵.		۵.	۵.	۵.	0	-	F										
N ASSM TY	Anchor Type UA=Univer-Conc UB=Univer-Bolt SA=Slip-Conc SB=Slip-Bolt WS=Wedge Plastic	SA							SA	SA		SA	SA	SA	v	£ ^ ^	SA										
	Posts (1 or 2)	-							-	-		-	-	-	-	-	-										
SMR	Post Type FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	S80							S80	580		S80	S80	S80		280	S80										
	ALUMINUM TYPE G																										
	ALUMINUM TYPE A	8							₽	5	,	>	>	>		Þ	>										ļ
	DIMENSIONS	24X12 24X12	24X24 24X24	21X15	24X12 24X24	21X15	24X12 24X24	21X15	30X12 30X30	30X12	30X30	30X12 30X30	30X12 24X36	30X12 30X30	51205	24X36	48X48										
OF SMALL SIGNS	RE SIGN TEXT	NORTH - AUXILIARY SIGN BUSINESS - AUXILIARY SIGN	<pre>(+) US HIGHTWAY ROUTE SHIELD (US 59) (SH 60) TFXAS</pre>	ARROW-HORZ STRGHT AUXILIARY	WEST-AUXILARY SIGN	ARROW-HRZNTL LEFT AUXILARY	EAST-AUXILARY SIGN FARM ROAD 1301	ARROW-HRZNTL LEFT AUXILARY	BEGIN <symbol bike=""> MAY LISE FULLE ANE</symbol>		<pre><code con<="" control="" th=""><th>END <symbol bike=""> MAY USE FULL LANE</symbol></th><th>BEGIN CENTER LANE TWLTL ARROWS ONLY</th><th>BEGIN <symbol bike=""> MAY USE FULL LANE</symbol></th><th></th><th>CENTER LANE TWLTL ARROWS ONLΥ</th><th>BRIDGE MAY ICE IN COLD WEATHER</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></code></pre>	END <symbol bike=""> MAY USE FULL LANE</symbol>	BEGIN CENTER LANE TWLTL ARROWS ONLY	BEGIN <symbol bike=""> MAY USE FULL LANE</symbol>		CENTER LANE TWLTL ARROWS ONLΥ	BRIDGE MAY ICE IN COLD WEATHER										
ΛΑΓΥ	SIGN	M3 - 1 M4 - 3	M1-4 (2dg: M1-6T	M6 - 1	M3-4 M1-6F	M6-6L	M3-5 M1-6F	M6-6R	R3-9c R4-11	- 5A	R4-11	R3-9d R4-11	R3-9c R3-9b	R3-9c R4-11		R3-9b	W8-13aT										
	si gn NO.	20							21	22		23	54	25		07	28										F
SI	PL AN SHEET NO.	و																									

					 	 _	
							ALUMINUM SIGN BLANKS (TYPE A)
							Square Ft. Min. Thickness
							7.5 to 15 0.100" Greater than 15 0.125"
							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.
							SUSS © TxDOT May 1987
							DN. t- TXDOT CK. t- TXDOT DW. t- TXDOT B - 95 2 - 07
							CK.I-TXDOT 1-02 9-08
							1412 03 038 FM 1301 DIST COUNTY SHEET NO.
						_	18 WHARTON 19



I. GENERAL

THE CONTRACTOR SHALL PERFORM ALL CONSTRUCTION OPERATIONS ON THE ROADWAYS AND INTERSECTIONS DURING REGULAR DAYLIGHT HOURS EXCEPT FOR WORK DEFINED BY THE PLANS OR THE ENGINEER TO REQUIRE ROAD CLOSURES WILL BE DONE DURING OFF PEAK HOURS

OFF PEAK HOURS WILL BE FROM MONDAY THROUGH FRIDAY 9:00 PM TO 5:00 AM, SATURDAY AND SUNDAY.

THE CONTRACTOR'S PARTICULAR ATTENTION IS DIRECTED TO REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES", OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, 2014.

IT IS THE CONTRACTORS RESPONSIBILITY TO IDENTIFY AND LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION OF EACH PHASE.

AT LOCATIONS WHERE BARRIER IS NOT INDICATED AT THE EDGE OF EXCAVATION, ADJACENT TO THE TRAVELED ROADWAY, A MINIMUM 3:1 SIDE SLOPE SHALL BE PLACED AT THE END OF EACH WORKDAY. THE MATERIAL USED SHALL BE TEMPORARY AND SHALL BE SUITABLY COMPACTED FOR A VEHICLE RECOVERY SLOPE

PRIOR TO THE BEGINNING OF EACH PHASE AND STAGE, PLACE ALL TRAFFIC CONTROL DEVICES AND/OR WORK ZONE PAVEMENT MARKINGS AS SHOWN AND/OR AS DIRECTED BY THE ENGINEER. PROJECT BARICADES WILL BE INSTALLED REFERENCING TXDOT STANDARD BC SHEETS. CONSTRUCTION WILL NOT BEGIN UNTIL APPROVAL IS GIVEN BY THE ENGINEER.

PORTABLE MESSAGE BOARDS WILL BE USED AS DIRECTED BY THE ENGINEER TO NOTIFY THE PUBLIC OF UPCOMING CONSTRUCTION ACTIVITES.

DRAINAGE MUST BE MAINTAINED AT ALL TIMES THROUGH THE CONSTRUCTION SEQUENCING.

REFER TO THE BARRICADES, SIGNS & TRAFFIC HANDLING SHEET FOR APPLICABLE QUANTITIES, NOTES, AND OTHER INFORMATION

REFER TO BARRICADE DETAILS SHEET FOR SIGN MOUNTING REQUIREMENTS.

SIGNS CANNOT BE MOUNTED ON BARRICADES.

ALL EXISTING TRAFFIC CONTROL SIGNS SHOULD BE MOUNTED ON PORTABLE STANDS AND ADJUSTED AS NECESSARY DURING THE PROJECT AND SHOULD BE SUBSIDIARY TO ITEM 502 - BARRICADES.

ALL TRAFFIC CONTROL WORK SHOULD BE IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC

REFERENCE TXDOT TCP (2-3) AND TCP (2-5) FOR WORK ZONE SIGN AND DELINEATION.

FOR PROJECT LIMIT SIGNS REFER TO BC (2) STANDARD

II. SEQUENCE OF CONSTRUCTION

PHASE 1 (TRAFFIC CONFIGURATION):

INSTALL WORKZONE PAVEMENT MARKINGS, SIGNS, PCTB, LPCB, AND CHANNELIZING DEVICES AS SHOWN ON PHASE 1 TRAFFIC CONTROL LAYOUT SHEETS FOR US 59 AND SH 60 INTERSECTIONS.

SWITCH TRAFFIC AS SHOWN ON THE PHASE 1 TRAFFIC CONTROL LAYOUT SHEETS.

PHASE 1 (CONSTRUCTION):

CONSTRUCT PROPOSED DRAINAGE STRUCTURES, DETENTION BASINS, ROADWAY PAVEMENT (EXCEPT FOR FINAL HMA SURFACE), BRIDGE, AND RETAINING WALL ON FM 1301 FROM US 59 AND BERNSTEIN DR. TRAFFIC LANE CONFIGURATION WILL REMAIN UNCHANGED ON US 59, BERNSTEIN DR. AND SH 60 PER THIS PHASE.

CONSTRUCT CR 231 INTERSECTION USING ONE LANE TWO-WAY FLAGGING OPERATIONS DURING THE DAY. CONTRACTOR TO MAINTAIN TEMPORARY TWO-WAY TWO-I ANE ACCESS AT ALL TIMES WHEN WORK IS NOT BEING PERFORMED. TEMPORARY ACCESS MATERIAL WILL BE SUITABLE COMPACTED MATERIAL. REFER TO TCP PLAN DETAIL FOR NON-WORKING HOURS SHEET FOR ADDITIONAL INFORMATION REGARDING CR 231.

CONSTRUCT HARRISON LN USING DAILY ROAD CLOSURES. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNERS PRIOR TO ANY CLOSURES AND SHALL RESTABLISH A SUITABLE DRIVEABLE SURFACE AT THE END OF EACH WORKDAY.

WIDEN THE ROADWAY AND CONSTRUCT THE PROPOSED STORM SEWER FEATURES AS DEPICTED IN THE PHASE 1 TRAFFIC CONTROL SHEETS FOR SH 60. PAVEMENT WIDENING WILL INCLUDE AN ADDITIONAL 2" OF TY B HMA FOR A TOTAL 6" THICKNES TO MATCH EXISTING GRADE; 2 INCHES OF THE HMA TY B WILL BE MILLED DURING PHASE 3 TO RECEIVE OCST AND 2 IN HMA TY D OVERLAY

BEGIN INSTALLATION OF PERMANENT TRAFFIC SIGNALS AND ILLUMINATION AT FM 1301/SH 60 INTERSECTION USING TEMPORARY LANE CLOSURES. MAINTAIN EXISTING TRAFFIC SIGNALS OPERATIONAL DURING PHASE 1.

PLACE WORKZONE PAVEMENT MARKINGS, MARKERS, AND SIGNS FROM US 59 TO BERNSTEIN DR.

PHASE 2 (TRAFFIC CONFIGURATION):

USING PERMANENT TRAFFIC SIGNALS TEMPORARILY RECONFIGURE SIGNAL HEADS AND MAKE OPERATIONAL

INSTALL WORKZONE PAVEMENT MARKINGS, SIGNS, LPCB, AND CHANNELIZING DEVICES AS SHOWN ON PHASE 2 TRAFFIC CONTROL LAYOUT SHEETS FOR SH 60 AND FM 1301 INTERSECTION.

DETOUR BERNSTEIN DR TO NEWLY CONSTRUCTED FM 1301 EB LANES AS SHOWN ON THE PHASE 2 TRAFFIC CONTROL LAYOUT SHEETS.

PHASE 2 (CONSTRUCTION):

REMOVE EXISTING PAVEMENT AT BERNSTEIN DR AND CONSTRUCT REMAINING FM1301 ROADWAY AS SHOWN IN THE PHASE 2 TRAFFIC CONTROL LAYOUT SHEETS.

PHASE 3 (TRAFFIC CONFIGURATION);

ADJUST SIGNAL HEADS TO PROPOSED LANE CONFIGURATION USING TEMPORARY MARKINGS AT FM 1301 INTERSECTIONS WITH BERNSTEIN DR. AND SH 60.

REFER TO STANDARDS TCP (2-4) AND TCP (2-5) FOR SHORT TERM STATIONARY LANE CLOSURE, BARRICADES, SIGNS AND CHANNELIZING DEVICES, AND REFER TO STANDARDS TCP (7-1), TCP (3-2) AND TCP (3-3) FOR SURFACING OPERATIONS AND MOBILE OPERATIONS.

PHASE 3 (CONSTRUCTION):

MILL AND CONSTRUCT RAISED CONCRETE DIRECTIONAL ISLAND. PLACE FINAL OVERLAY, PERMANENT MARKINGS, MARKERS, AND SIGNS FOR THE ENTIRE LIMITS OF THE PROJECT.

II. FINAL CLEAN UP

UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE IS MADE, THE PROJECT WILL BE THOROUGHLY CLEANED OF ALL CONSTRUCTION MATERIALS AND ALL STOCKPILE LOCATIONS.

UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE IS MADE, SHAPE AND FINISH SUCH PORTIONS OF THE RIGHT-OF-WAY WHICH MAY HAVE BEEN DISTRIBUTED IN MAKING THE PROVISION FOR TRAFFIC. LEAVE THE ENTIRE RIGHT-OF-WAY IN A SMOOTH, NEAT AND SIGHTLY CONDITION.

III. PAYMENT

ALL BARRICADES, SIGNS, AS DEPICTED IN THE TCP SHEETS OR AS DIRECTED BY THE ENGINEER WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS, AND TRAFFIC HANDLING."

ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE PAID FOR UNDER ITEM 506 "TEMPORARY EROSION, SEDIMENT, AND ENVIRONMENTAL CONTROLS."

ALL NECESSARY FLAGGERS AND APPROPRIATE SIGNING TO SAFELY GUIDE TRAFFIC WILL NOT BE PAID FOR DIRECTLY BUT BE SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."

ALL WORK AND MATERIALS REQUIRED FOR WORK ZONE PAVEMENT MARKINGS WILL BE PAID FOR UNDER ITEM 662 'WORK ZONE PAVEMENT MARKINGS."

ALL OTHER WORK AND MATERIALS REQUIRED BY THESE PROVISIONS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED. SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTACT, UNLESS OTHERWISE INDICATED IN THE PLANS OF SPECIFICATIONS.

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TCP PHASE 2 TYPICAL SECTION

(CONSTRUCT 8" CEMENT TREATED SUBGRADE, 10" FLEX BASE, PRIME COAT, 4" HMA TY B, & OCST) STA 65+15.38 TO STA 66+59.39



TCP PHASE 2 TYPICAL SECTION

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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.
- The Contractor may propose changes to the TCP that are signed and sealed 3. 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.
- The temporary traffic control devices shown in the illustrations of the 9. BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- 10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign. STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
- 11. Except for devices required by Note 10, 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 APPAREL NOTES:

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.



Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation Traffic Operations Division - TE Phone (512) 416-3118

	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
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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" × 48"	48" × 48"		
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" × 36"	48" × 48"		
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" × 48"	48" × 48"		

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

SPACING

- 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

OBEY

WARNING

SIGNS

- 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. 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.

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- 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 travelled 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)).

- 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.

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GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- quide the traveling public safely through the work zone.
- the Inspector's TXDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- verify the correct procedures are being followed.
- damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- 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.

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) regard to crashworthiness and duration of work requirements. a. Long-term stationary - work that occupies a location more than 3 days.
- more than one hour.
- Short-term stationary daytime work that occupies a location for more than 1 hour in a single daylight period. Short, duration - work that occupies a location up to 1 hour.
- Mobile work that moves continuously or intermittently (stopping for up to approximately 15 minutes,)

SIGN MOUNTING HEIGHT

- as shown for supplemental plaques mounted below other signs.
- the around.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- appropriate Long-term/Intermediate sign height.
- SIZE OF SIGNS

SIGN SUBSTRATES

- centers. The Engineer may approve other methods of splicing the sign face. REFLECTIVE SHEETING

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.

SIGN LETTERS

first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered. intersections where the sign may be seen from approaching traffic.
- 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,
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face. 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. The sandbaas will be tied shut to keep the sand from spilling and to
- maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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. 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 alona the lenath of the skids to weigh down the sign support. 8. Sandbaas shall NOT be placed under the skid and shall not be used to level
- sign supports placed on slopes.

FLAGS ON SIGNS

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.

All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and

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 Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZICD). 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

The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or

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

Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting

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

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

Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to

Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

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

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. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave. 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"

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.

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

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

entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.

SHEET 4 OF 12

* Texas Department of Transportation

Traffic Operation Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

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PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable 1. 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."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- 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.
- 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 beight 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	WORD OR PHRASE	ABBREVIATION	
Access Road	ACCS RD	Major	MAJ	
Alternate	ALT	Miles	MI	
Avenue	AVE	Miles Per Hour	MPH	
Best Route	BEST RTE	Minor	MNR	
Boulevard	BLVD	Monday	MON	
Bridge	BRDG	Normal	NORM	
Cannot	CANT	North	N	
Center	CTR	Northbound	(route) N	
Construction Abead	CONST AHD	Parking	PKING	
CROSSING	YING	Rodd		
Detour Boute		Right Lane		
Do Not		Saturday	SAT	
East	E	Service Rodd	SERV RD	
Eastbound	(route) E	Shoulder	SHLDR	
Edstbodild		Slippery	SLIP	
Emergency Vehicle		South	S (route) S	
Entrance Enter		Southbound		
		Speed	SPD	
Expression		Street	51	
	YYYY ET	Sunday	SUN	
Fog Abead	FOG AHD		PHONE	
Freewoy		Temporary	TEMP	
Freeway Blocked	EWY BLKD	Inursaay	THURS	
Friday	FRI			
Hazardous Driving	HAZ DRIVING	Irattic	IRAF	
Hazardous Material		Travelers	TRVLRS	
	HOV	Tuesday	IUES	
Vehicle		Lime Minutes	I IME MIN	
Highway	HWY	Upper Level	UPR LEVEL	
Hour (s)	HR. HRS	Vehicles (s)	VEH, VEHS	
Information	INFO	Warning	WARN	
It Is	ITS	Wednesday	WED	
		Weight Limit		
	IFT	West	W	
		Westbound	(route) W	
		Wet Pavement	WET PVMT	
		Will Not	WONT	
Maintenance	MAINT			
marrienance	1 100 1111	J		

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

ROAD

REPAIRS

XXXX FT

I ANF

NARROWS

XXXX FT

TWO-WAY

TRAFFIC

XX MILE

CONST

TRAFFIC

XXX FT

UNEVEN

LANES

XXXX FT

ROUGH

ROAD

XXXX FT

ROADWORK

NFXT

FRI-SUN

US XXX

EXIT

X MILES

LANES

SHIFT

Other Condition List

(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	ROADWORK XXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT
XXXXXXXX BLVD CLOSED	¥ LANES SHIFT in Phase	e 1 must be used v

ed with STAY IN LANE in Phase 2.

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.

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

List

FORM

MERGE

STAY ĪΝ LANE

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. 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. 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 und 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 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 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 same size arrow

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Roadway

Phase 2: Possible Component Lists



X X See Application Guidelines Note 6.

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	SHEET 6 OF 12							
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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.
- 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:
- 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.
- 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 group of the 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.
- 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

- 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 reflective sheeting shall be supplied unless otherwise specified in the plans.
- 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

- 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.
- 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.
- 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.





DIRECTION INDICATOR BARRICADE

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional auidance to drivers is necessary.
- guidance to drivers is necessary.If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- 3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CWI-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
- 4. Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZICD List. Ballast shall be as approved by the manufacturers instructions.



DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, cl relocated in a TTC zone, the temporary facilities sha detectable and include accessibility features consist the features present in the existing pedestrian facil
- 2. Where pedestrians with visual disabilities normally a closed sidewalk, a device that is detectable by a per with a visual disability traveling with the aid of a shall be placed across the full width of the closed
- Detectable pedestrian barricades similar to the one above, longitudinal channelizing devices, some concr barriers, and wood or chain link fencing with a cont detectable edging can satisfactorily delineate a ped path.
- 4. Tape, rope, or plastic chain strung between devices detectable, do not comply with the design standards "Americans with Disabilities Act Accessibility Guide for Buildings and Facilities (ADAAG)" and should not as a control for pedestrian movements.
- 5. Warning lights shall not be attached to detectable p barricades.
- 6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the rail provides a smooth continuous rail suitable for t trailing with no splinters, burrs, or sharp edges.

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t intended See note 3 st for oved rian	 Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD. 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.
ı i∣ing	 Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane. 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.
	 Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts. 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)
llosed, or hall be stent with lity. use the erson	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. SHEET 8 OF 12 Traffic
a long cane sidewalk. pictured ete inuous Jestrian are not in the elines be used	Texas Department of Transportation Operations Division Standard BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES
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- 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 out side 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 BFL or Type CFL 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



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.
- 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) placed 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 NCHRP 350 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. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated

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

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 else where 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.

Posted Speed	Formula	Minimum Desirable Taper Lengths X X			Suggested Maximum Spacing of Channelizing Devices				
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30		150′	165′	180′	30′	60′			
35	$\frac{5}{0} L = \frac{WS^2}{60}$	205′	225′	245′	35′	70′			
40		265′	295′	320'	40′	80′			
45		450 <i>'</i>	495′	540′	45 <i>'</i>	90′			
50		500′	550'	600′	50 <i>'</i>	100′			
55	1 = WS	550′	605 <i>'</i>	660′	55′	110′			
60		600 <i>'</i>	660'	720′	60′	120′			
65		650'	715′	780'	65 <i>′</i>	130′			
70		700′	770′	840′	70'	140′			
75		750'	825′	900′	75′	150′			
80		8001	880′	960′	80′	160′			

 $X \times$ 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

SHEET 9 OF 12	
Texas Department of Transportation	Traffic Operation Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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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 Markinas 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).

₩2

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DEPARTMENTAL MATERIAL SPECIFICAT	IONS
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 pregualified reflective raised payement 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).



SHEET 11 OF 12								
Traffic Operations Division Standard								
BARRICADE AN PAVEMEN BC	NDC ITM (11	CONSTR ARKIN()-14	UC SS	TION				
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© TxDOT February 1998	CONT SEC	T JOB		HIGHWAY				
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1-02 7-13	DIST	COUNTY		SHEET NO.				
11-02 8-14	YKM	WHARTON		50				





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	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	$\langle \mathcal{P} \rangle$	Traffic Flow							
\bigtriangleup	Flag	LO	Flagger							

Posted Speed X	Formula	Minimum Desirable Taper Lengths X X			Suggested Spacin Channe Dev	d Maximum ng of lizing ices	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space
~		10' Offset	0ffset	Offset	Un a Taper	On a Tangent	Distance	В
30		150′	165′	180′	30'	60 <i>′</i>	120′	90′
35	$L = \frac{WS}{60}$	205′	225′	245′	35'	70′	160′	120′
40	80	265′	295′	320′	40′	80'	240′	155′
45		450′	495 <i>'</i>	540′	45′	90′	320′	195′
50		500'	550'	600′	50′	100′	400′	240′
55	I=WS	550'	605′	660′	55′	110′	500 <i>′</i>	295′
60	L - # 5	600 <i>'</i>	660′	720′	60′	120′	600 <i>'</i>	350′
65		650'	715′	780′	65′	130′	700′	410′
70		700′	770′	840′	70′	140′	800 <i>′</i>	475′
75		750′	825′	9001	75'	150'	900′	540′

X Conventional Roads Only

 \times 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							
	1	1									

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								
ILANE CLOSUR	ES	O	N MI	JĽ	TIL			
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[LEGEND												
			Ту	ype 3 Barricade						Channe	evices		
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osto Spee	ed :d	Formu	۱a	D Tap	Minimum esirab er Leng X X	n le gths	Suç	uggested Max Spacing of Channelizin Devices		Maximum g of izing ces Spacing		Suggested Longitudinal Buffer Space	
★				10' Offset	11' Offset	12' Offset	T T)n a aper	т	On a angent	Distance	"В"	
30			. 2	150′	165′	180′		30′		60 <i>′</i>	120′	90′	
35		$L = \frac{W_2}{60}$	5	205′	225′	245′		35′		70'	160′	120	'
40		00	,	265′	295′	320′		40′		80 <i>'</i>	240′	155	'
45				450′	495′	540′		45′		90 <i>'</i>	320′	195	'
50				500'	550'	600 <i>'</i>		50′		100′	400 <i>′</i>	240	'
55			s	550'	605′	660 <i>′</i>		55′		110′	500′	295	'
60		600		600′	660 <i>′</i>	720′		60 <i>'</i>		120′	600 <i>′</i>	350	'
65				650′	7151	780′		65′		130′	700′	410	'
70				700′	770′	840'		70′		140′	800′	475	'
75				750′	8251	900'		75′		150′	900′	540	'

* Conventional Roads Only

XX 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							
		1	1								

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.

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.
 The downstream taper is optional. When used, it should be 100 feet minimum

Ine downstream taper is optional. When used, it should be 100 teet 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.

Traffic Operations Division Standard							
TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS							
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	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	$\langle \cdot \rangle$	Traffic Flow							
\bigtriangleup	Flag		Flagger							

Posted Formula Speed		Minimum Desirable Taper Lengths X X		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space	
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	B
30		150′	165′	180′	30′	60′	120′	90′
35	$L = \frac{WS}{60}$	205'	225′	245'	35′	70′	160′	120′
40	60	265′	295′	320'	40′	80′	240′	155′
45		450′	495′	540′	45′	90′	320′	195′
50		500'	550′	600′	50′	100′	400′	240′
55	= ws	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

XX 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			
			1	1			

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. 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 eposure 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 substitutued for the Shadow Vehicle and TMA. 4. 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. 5. The downstream taper is optional. When used, it should be 100 feet
- approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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 to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging toper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.







For seal coat, micro-surface or similar operations

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

- Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the Α. 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 markinas.
- At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined Β. 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)

- Center line markings are yellow pavement markings that delineate the separation of travel lanes that Α. have opposite directions of travel on a roadway. Divided highways do not typically have center line markinas.
- At the time construction activity obliterates the existing center line markings(low volume roads may Β. 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)

- When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area Α. 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

- Α. 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.
- 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.

210

Posted Speed X	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		
			1	1		

GENERAL NOTES

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



Traffic Operation Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

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TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- 3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway aeometrics.
- 4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.



- 1. DMSs referenced above can be found along with embedded links to their

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LEGEND						
	Type 3 Barricade		Channelizing Devices			
þ	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)			
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)			
•	Sign	\heartsuit	Traffic Flow			
$\langle \lambda \rangle$	Flag		Flagger			

Posted Speed	Formula	Minimum Desirable O Taper Lengths X X		Suggester Spacin Channe Dev	d Maximum ng of lizing ices	Minimum Sign Spacing "x"	Suggested Longitudinal Buffer Space	
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30		150′	165′	180′	30′	60′	120′	90′
35	$L = \frac{WS}{60}$	205′	225'	245'	35′	70'	160′	120′
40	60	265′	295′	320'	40′	80′	240′	155′
45		450′	495′	540'	45′	90′	320′	195′
50		500′	550′	600′	50′	100′	400′	240′
55	1 = W S	550'	605′	660′	55′	110'	500′	295′
60	L 113	600′	660′	720′	60′	1201	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′

X Conventional Roads Only

XX 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.

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- in temporary work zone locations, where the posted speed

	SHEET 1 OF 2							
	Texas Department	of Tra	nsp	ortation		Des Divi Star	ign sion ndard	
	LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 1)							
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LEGEND							
	Type 3 Barricade		Channelizing Devices				
	Heavy Work Vehicle	X	Truck Mounted Attenuator (TMA)				
F	Trailer Mounted Flashing Arrow Panel	M	Portable Changeable Message Sign (PCMS)				
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Posted Speed	Formula	D Tap	esirab er Len X X	n le gths	Suggestee Spacin Channe Dev	d Maximum ng of lizing ices	Minimum Sign Spacing "Y"	Suggested Longitudinal Buffer Space
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"B"
30		150′	165′	180′	30′	60′	120′	90′
35	$L = \frac{WS}{60}$	205′	225′	245'	35′	70′	160′	120′
40	60	265′	295′	320′	40′	80′	240′	155′
45		450 <i>'</i>	495′	540'	45′	90′	320′	1957
50		500'	550'	600′	50 <i>'</i>	100′	400′	240′
55	1 = W S	550′	605′	660′	55′	110′	500 <i>'</i>	295′
60	L 113	600′	660′	720'	60′	120′	600 <i>'</i>	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

XX 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				
	1	1						

Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

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 © TxDOT	November 2012	CONT	SECT	JOB		HIGHWAY
	REVISIONS	1412	03	038	F	M 1301
2-14		DIST		COUNTY		SHEET NO.
- 10		YKM		WHARTON		61
1117						

1.00	TCP	PLAN		DIRECTION OF TRAFFIC			BACKUP SUPPORT					
NO.	PHASE	NUMBER	LOCATION	STA	LEVEL	(UNI/BI)	PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT	LENG
1	PHASE 1	25	US 59	101+83, 19.46'RT	TL-3	UN I	ACP+BASE	24"	PTB	21 "	32"	100
												TOTAL

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.

http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

10/23/2020 7: \Transnor

			CR	ASH CUSH	[ON					
BLE			MOVE /	RESET	L	L	R	R	s	s
н	INSTALL	REMOVE	MOVE∕ RESET	FROM LOC.#	N	w	N	w	N	w
	1	1							1	
c	1	1								
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CRASH CUSHION SUMMARY SHEET

FILE: CCSS. dgn	DN: T×DOT		СК	:	CK:	
© T×DOT	CONT SECT JOB		JOB	HIGHWAY		
REVISIONS	1412	0	3	038	FM 1	301
	DIST	0		COUNTY		
	YKN	1	WH	HARTON		
	FEDERA	AL A	ID	PROJECT	SHEET	NO.
					63	2







120+50.00 STA LINE MATCH

115+50.00 STA LINE MATCH





125+50.00 STA LINE MATCH





STATE OF TEXAS DEPARTMENT OF TRANSPORTATION \longrightarrow SURVEY CONTROL POINT DATA SHEETS FM 1301

WHARTON COUNTY RCSJ NO. 1412-03-038



PRIMARY CONTROL POINT TABLE (GRID)							
POINT #	NORTHING	EASTING	ELEV.				
61	13,677,194.95	2,894,234.17	99.69				
68	13,680,061.60	2,890,832.71	100.85				
70	13,683,046.37	2,887,612.37	101.51				

99.69

100.85

100.97 100.57 98.91

100.16 102.44

102.86

103.04

SECOND	ARY CONTROL	POINT TABLE	(GRID)
POINT #	NORTHING	EASTING	ELEV.
62	13,677,344.65	2,893,616.76	100.97
63	13,677,610.70	2,892,446.06	100.57
64	13,677,864.22	2,891,337.77	98.91
65	13,678,984.92	2,891,039.42	100.16
66	13,680,461.52	2,889,728.68	102.44
67	13,680,927.99	2,889,530.70	104.61
69	13,682,149.34	2,888,399.89	102.86
97	13,679,332.05	2,889,029.15	103.04

NOTES: 1. BEARINGS AND COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), CORS2011, EPOCH2010. DISTANCES AND COORDINATE VALUES ARE IN U.S. SURVEY FEET. GRID-TO-GROUND COMBINED SCALE FACTOR=1.00013. 2. ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), USING GEOID 12B. 3. THIS MAP IS AN INTERNAL TXDOT DOCUMENT. ITS CONTENTS SHALL NOT BE USED FOR ANY OTHER PURPOSES. LEGEND: PURPOSES. LEGEND: PURPOSES. CONTROL STAMPED TAMPED TAMPED TO CONTROL PT. 5/8" RB. W/ CAP STAMPED TAMPE					
▲ STAMPED "HUITT-ZOLLARS CONTROL" SET ▲ SECONDARY CONTROL PT. 5/8" RB. W/ ALUMINUM CAP STAMPED "TXDOT CONTROL MARK" SET IN CONCRETE ● Texas Department of Transportation © 2020 ■ SURVEY CONTROL ■ DESIGN EDURAL AID PROJECT NO. ■ DESIGN EDURAL AID PROJECT	<u>NOTE</u> 1. 2. <u>3.</u>	S: BEARI ARE E COORI CENTF AMERI (NAD8 EPOCH COORI U.S. S GRID- SCALE ELEVA ARE E AMERI 1988 12B. THIS M TxDOT CONTE USED PURPO	NGS A BASED DINATE CAN D 33), CC 42010. DINATE SURVEY TO-GR FACT TIONS CAN V (NAVD CAN V (NAVD SASED CAN V (NAVD SASED CAN S FOR A DSES.	ND COORDINA ON THE TEXA SYSTEM, SOU NE, NORTH ATUM OF 198 DISTANCES A VALUES ARE FEET. COUND COMBIN OR=1.00013. SHOWN HERE ON THE NOR ERTICAL DATU 88), USING GI AN INTERNA MENT. ITS HALL NOT BE NY OTHER	TES AS JTH 33 AND IN VED ON TH JM OF EOID L : :
CONTROL "SET SECONDARY CONTROL PT. 5/8" RB. W/ ALUMINUM CAP STAMPED "TXDOT CONTROL MARK" SET IN CONCRETE ***********************************			STAMP "HUITT	ED – ZOLLARS	
▲ SLCONDART CONTROL FILL ▲ S/8" RB. W/ ALUMINUM CAP STAMPED "TxDOT CONTROL MARK" SET IN CONCRETE ●			CONTR	OL" SET	
DESIGN FED.RD. FEDERAL AID PROJECT NO. HIGHWAY NO. GRAPHICS 6 F.M. 1301 J.Z. STATE DISTRICT COUNTY CHECK TEXAS YOAKUM WHARTON D.R. CONTROL SECTION JOB CHECK CONTROL SECTION JOB CHECK 1412 0.3 0.38) Texas [) 2020	SECON 5/8" I CAP S CONTR CONCR	PART CONTR RB. W/ ALUM TAMPED "TxD OL MARK" SE ETE	DL PT. INUM OT T IN
DESIGN FED.RD. DIV.NO. FEDERAL AID PROJECT NO. HIGHWAY NO. GRAPHICS 6 F.M. 1301 J.Z. STATE DISTRICT COUNTY CHECK TEXAS YOAKUM WHARTON D.R. CONTROL SECTION JOB CHECK 1412 03 038		SURV	νeγ (CONTROL	
GRAPHICS 6 F.M. 1301 J.Z. STATE DISTRICT COUNTY OHECK TEXAS YOAKUM WHARTON D.R. CHECK CONTROL SECTION CHECK 1412 0.3 0.38	DESIGN	FED.RD.	FEDED		HIGHWAY
J.Z. STATE DISTRICT COUNTY SHEET NO. CHECK TEXAS YOAKUM WHARTON D.R. CONTROL SECTION JOB CHECK CONTROL SECTION JOB C.ML.WW. 1412 0.3 0.38	CRADUICO	6 DIV.NO.		LE FILD I NOVEDT NO.	NO. F.M. 1301
CHECK D.R.TEXAS TEXAS CONTROLYOAKUM VHARTONWHARTON JOB1000000000000000000000000000000000000	J.Z.	STATE	DISTRICT	COUNTY	SHEET NO.
D.N. CONTROL SECTION JOB 1 CHECK CONTROL SECTION JOB 1 C.MLWW. 1412 03 038 1		TEXAS	YOAKUM	WHARTON	
C.M.W. 1412 03 038	CHECK	CONTROL	SECTION	JOB	1 1
	C.M.W.	1412	03	038	

NOT TO SCALE SER'S GRILL SE. BOLING HWY (FM-1301) AUTO ZONE SE SOLING HWY (FM-1301) MON. #61 VACANT LOT	CVS PHARMACY NOT TO S O'Reilly E. BOLING HWY (FM-130) TO N. RICHMOND RD. 95' + ''' MON. #62 OPEN AREA OPEN AREA BILLBOARD
MONUMENT NO. 61 APPROXIMATE LOCATION: 5/8" REBAR WITH ALUMINUM CAP STAMPED "TxDOT CONTROLL" SET IN CONCRETE ON THE SOUTHEAST QUADRANT OF W. BOLING HWY. (FM-1301) AND N. FULTON ST., APPROXIMATELY 7' SOUTH OF THE BACK OF CURB OF W. BOLING HWY AND 3' SOUTHEAST FROM STORM DRAIN MAN-HOLE CONCRETE CORNER ON W. BOLING HWY. US SURVEY FEET NAVD 88 ELEVATION = 99.69' DATE SET: SEPTEMBER 17, 2020 MONUMENT: 5/8" I.R./AL. CAP IN CONC. "TxDOT CONTROL" WHARTON COUNTY SCALE FACTOR: 1.00013 SURFACE (ADJUSTED) COORDINATES NORTHING: 13,678,972.99 EASTING: 2,894,610.42 STATE PLANE (GRID) COORDINATES NORTHING: 13,677,194.95 EASTING: 2,894,234.17 ELEVATIONS ARE NAVD 88 BASED UPON VRS-RTK GPS AND DIGITAL LEVEL LOOPS	MONUMENT NO. 62 APPROXIMATE LOCATION: 5/8" REBAR WITH CAP STAMPED "HUITT-ZOLLARS CONTROL" SET 265'± EAST 53'± SOUTH FROM THE CENTER LINE INTERSECTION OF W. BOLING HWY. (FM-1 AND N. RICHMOND RD. (TX 60), APPROXIMATELY 20' SOUTH OF THE BACK OF CURB, 88' SOUTHWEST FROM A STORM DRAIN MAN-HOLE & 95' SOUTHEAST F ANOTHER STORM DRAIN MAN-HOLE. US SURVEY FEET NAVD 88 ELEVATION = 100.97' DATE SET: SEPTEMBER 17, 2020 MONUMENT: 5/8" IRON ROD/CAP "HUITT-ZOLLARS CONTROL" WHARTON COUNTY SCALE FACTOR: 1.00013 SURFACE (ADJUSTED) COORDINATES NORTHING: 13,679,122.70 EASTING: 2,893,992.93 STATE PLANE (GRID) COORDINATES NORTHING: 13,677,344.65 EASTING: 2,893,616.76 ELEVATIONS ARE NAVD 88 BASED UPON WDO













$B_{ARBED WIRE FNC.} \times \begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	HACKBERRY 24" TRUNK 24" TRUNK 24" TRUNK 30, 48'+ 48'+ MON. #70
NOT TO SCALE	
MONUMENT NO. 69 APPROXIMATE LOCATION: 5/8" REBAR WITH CAP STAMPED "HUITT-ZOLLARS CONTROL" SET IN FIELD 5,400'± NORTH OF THE CENTER LINE OF OGDEN ST. (FM-102), 1,460'± WEST OF WILKE. RD., 178'± SOUTHEAST FROM A BARBED WIRE FNC. POST (T-INTERSECTION) AND 132'± SOUTH FROM A BARBED WIRE FENCE. US SURVEY FEET NAVD 88 ELEVATION = 102.86' DATE SET: SEPTEMBER 17, 2020 MONUMENT: 5/8" IRON ROD/CAP "HUITT-ZOLLARS CONTROL" WHARTON COUNTY SCALE FACTOR: 1.00013 SURFACE (ADJUSTED) COORDINATES NORTHING: 13,682,149.34 EASTING: 2,888,399.89 ELEVATIONS ARE NAVD 88 BASED UPON VRS-RTK GPS AND DIGITAL LEVEL LOOPS	MONUMENT NO. 70 APPROXIMATE LOCATION: 5/8" REBAR WITH ALUMINUM CAP STAMPED "TxDOT CONTROL" SET IN CONCRETE 5950'± NORTH OF OGDEN ST. (FM-102), 48'± EAST OF A BARBED WRE FNC., 50' SOUTHEAST FROM A 18" HACKBERRY TREE, AND 206'± SOUTHEAST FROM A 24" HACKBERRY TREE. US SURVEY FEET NAVD 88 ELEVATION = 101.51' DATE SET: SEPTEMBER 17, 2020 MONUMENT: 5/8" IRON ROD/CAP "HUITT-ZOLLARS CONTROL" WHARTON COUNTY SCALE FACTOR: 1.00013 SURFACE (ADJUSTED) COORDINATES NORTHING: 13,684,825.17 EASTING: 2,887,987.76 STATE PLANE (GRID) COORDINATES NORTHING: 13,683,046.37 ELEVATIONS ARE NAVD 88 BASED UPON VRS-RTK GPS AND DIGITAL LEVEL LOOPS




















(C6)

FM 1301 ALIGNMENT, CONT. N 13,679,569.3852 E 2,892,190.6253 Sta 51+00.00 Currue Data 377.1028 50.8192 506.7313 769.9972 54.0476 34.4461 90.3058 ROLANDO ESCAMILLA 1.1802 70.00 REV, NO, DATE US 59 ALIGNMENT

Beginning chain FM1301_B description Point FM03 Course from FM03 to PC FM1301_B-1 S 74° 57' 15.56" E Dist 1,097.8284 Course from PT FM1301_B-1 to PC FM1301_B-2 S 82° 26' 09.73" E Dist 431.4693 Ending chain FM1301_B description

					turve *	e Data *		
Curve FM130	1_B-1				n	Ň		
P.I. Stati	on			63+28.59	Ν	13,679,250.4555	E	2,893,3
Delta	=		7° 28	3′ 54 . 16"	(LT)			
Degree	=	â	2° 51	1′ 53.24"				
Tangent	=			130.7664				
Length	=			261.1610				
Radius	=		2,	000.0000				
External	=			4.2704				
Long Chord	=			260.9755				
Mid. Ord.	=			4.2613				
P.C. Stati	on			61+97.83	Ν	13,679,284.4010	E	2,893,2
P.T. Stati	on			64+58.99	Ν	13,679,233.2423	E	2,893,5
С.С.					N	13,681,215.8394	E	2,893,7
Back	= S	74°	57′	15.56" E				
Ahead	= S	82°	26′	09.73" E				
Chord Bear	= S	78°	41′	42.64″E				
	Curve FM130 P.I. Stati Degree Tangent Length Radius External Long Chord Mid. Ord. P.C. Stati P.T. Stati C.C. Back Ahead Chord Bear	Curve FM1301_B-1 P.I. Station Delta = Degree = Tangent = Length = Radius = External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = S Ahead = S Chord Bear = S	Curve FM1301_B-1 P.I. Station Delta = 2 Tangent = 2 Tangent = 2 Radius = 2 External = 2 Long Chord = 3 Mid. Ord. = 2 P.C. Station P.I. Station C.C. Back = 5 74° Ahead = 5 82° Chord Bear = 5 78°	Curve FM1301_B-1 P.I. Station Delta = 7° 28 Degree = 2° 5° Tangent = Length = Radius = 2, External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = S 74° 57' Ahead = S 82° 26' Chord Bear = S 78° 41'	Curve FM1301_B-1 P. I. Station 63+28.59 Delta = 7° 28' 54.16" Degree = 2° 51' 53.24" Tangent = 130.7664 Length = 261.1610 Radius = 2,000.0000 External = 4.2704 Long Chord = 260.9755 Mid. Ord. = 4.2613 P. C. Station 61+97.83 P. T. Station 64+58.99 C. C. Back = S 74° 57' 15.56" E Ahead = S 82° 26' 09.73" E Chord Bear = S 78° 41' 42.64" E	Curve FM1301_B-1 P. I. Station 63+28.59 N Delta = 7° 28' 54.16" (LT) Degree = 2° 51' 53.24" Tangent = 130.7664 Length = 261.1610 Radius = 2,000.0000 External = 4.2704 Long Chord = 260.9755 Mid. Ord. = 4.2613 P. C. Station 61+97.83 N P. T. Station 64+58.99 N C. C. Back = S 74° 57' 15.56" E Ahead = S 82° 26' 09.73" E Chord Bear = S 78° 41' 42.64" E	Curve FM1301_B-1 P. I. Station 63+28.59 N 13,679,250.4555 Delta = 7° 28' 54.16" (LT) Degree = 2° 51' 53.24" Tangent = 130.7664 Length = 261.1610 Radius = 2,000.0000 External = 4.2704 Long Chord = 260.9755 Mid. Ord. = 4.2613 P. C. Station 61+97.83 N 13,679,284.4010 P. T. Station 64+58.99 N 13,679,284.4010 P. T. Station 64+58.99 N 13,679,233.2423 C. N 13,681,215.8394 Back = S 74° 57' 15.56" E Ahead = S 82° 26' 09.73" E Chord Bear = S 78° 41' 42.64" E	$\begin{array}{rrrr} & & & & & & & & & & & & & & & & & $

					,	Curv	e Da	1ta *								
Curve FM130	1_B-2															
P.I. Stati	on			70+21.2	20	N	13	.679	. 15	59.	237	2	E	2.	894	. 06
Delta	-	-	7° 2	8' 48.56	5" (RT)		,	, -					-,		,
Dearee	=	2	2° 5	1' 53.24	1"											
Tangent	=			130.739	91											
Length	=			261.106	57											
Radius	=		2	.000.000	00											
External	=			4.268	36											
Long Chord	=			260.921	3											
Mid. Ord.	=			4.259	95											
P.C. Stati	on			68+90.4	16	N	13	,679	, 17	6.	446	8	E	2,	893	, 93
P.T. Stati	on			71+51.5	57	N	13	, 679	i , 12	25.	302	2	E	2,	894	, 19
С.С.						N	13	,677	,19	93.	849	7	E	2,	893	, 67
Back	= S	82°	26′	09.73"	Е											-
Ahead	= S	74°	57′	21.17"	Е											
Chord Bear	= S	78°	41′	45.45"	Е											
Course from	PT FI	v1 30	I_B-:	2 to FMC)4 S	74°	57′	21.	17"	E	Di	st	318.434	17		
Point FM04			Ν	13,679,	042	. 6484	4 E	2,	894	1,4	97.	826	5 Sta		7	4+7
														. = =		

Beginning chain U	S59 desc	cription		
Point US59	N	13,684,011.8019 E	2,887,556.2849 S	ta 100+
Course from US59	to US60	N 17° 21′ 53.08" E	Dist 3,000.0000	
Point US60	Ν	13,686,875.0743 E	2,888,451.6456 S	ta 130+
Ending chain US59	descrip	otion		

CR 231 ALIGNMENT

Beginning chain CR	231 de:	scription			
Point CR01	Ν	13,682,666.0265 E	2,889,909.1366	Sta	10+
Course from CR01 to	o CRO2	S 17° 25′ 15.94" W	Dist 350.0000		
Point CR02	Ν	13,682,332.0809 E	2,889,804.3494	S†a	13+
Ending chain CR231	descr	iption			

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THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF: 10/23/2020 TYPE OR PRINT NAME PE # 90128 DATE DESCRIPTIO Planners-Engineers-Program Managers 15915 Katy Freeway, Suite 300 Houston, Texas 77094 TBPE FIRM REGISTRATION NO. F-6825 CITY OF WHARTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING SUBMITTED: DESIGNED BY: SCALE: DRAWN BY: DATE: CITY DWG NO: SURVEYED BY: NBI NO: © 2021 TxD0T Texas Department of Transportation FM 1301 HORIZONTAL ALIGNMENT DATA SHEET 1 OF 2 FED.RD. DIV.NO. SHEET PROJECT NO. NO. 6 SEE TITLE SHEET 77 STATE DIST. COUNTY TEXAS YKM WHARTON SECT. HIGHWAY NO. CONT. JOB 1412 03 038 FM 1301

BERNSTEIN ALIGNMENT

Beginning chain BERNSTEIN description	
Point BE01 N 13,679,400.4106 E 2,893,474.7849 Sta 10+00.00	
Course from BE01 to PC BERNSTEIN-1 S 76° 27′ 23.27" E Dist 7.0231	
Curve Data **	
Curve BERNSTEIN-1 P.I. Station 10+62.34 N 13,679,385.8115 E 2,893,535.3914 Delta = 85° 20' 55.99" (RT) Degree = 95° 29' 34.68" Tangent = 55.3169 Length = 89.3771 Radius = 60.0000 External = 21.6086 Long Chord = 15.8870	
P.C. Station 10+07.02 N 13,679,398.7659 E 2,893,481.6128 P.T. Station 10+96.40 N 13,679,331.1595 E 2,893,526.8406 C.C. N 13,679,340.4343 E 2,893,467.5617 Back = S 76° 27' 23.27" E Ahead = S 8° 53' 32.73" W Chord Bear = S 33° 46' 55.27" F	
Course from PT BERNSTEIN-1 to BE02 S 8° 53′ 32.73" W Dist 99.7390	
Point BE02 N 13,679,232.6194 E 2,893,511.4229 Sta 11+96.14	
Ending chain BERNSTEIN description	

SH 60 ALIGNMENT

Beginning chain SH60 description

Point 70	N 13,679,679.2258 E	2,893,888.8632 Sta	10+00.00
Course from 70 to 71	S 17° 33′ 50.28" W Dist	1,000.0000	
Point 71	N 13,678,725.8451 E	2,893,587.0928 Sta	20+00.00
Ending chain SH60 des	scription		

RETAINING WALL A ALIGNMENT

Beginning chain RETWALL_A description	
Point RA01 N 13,679,310.6742 E 2,893,014.3972 Stc	10+00.00
Course from RA01 to RA02 S 74° 57′ 15.56" E Dist 76.4696	
Point RA02 N 13,679,290.8236 E 2,893,088.2454 Sto	10+76.47
Course from RA02 to RA03 S 72° 16′ 56.85" E Dist 149.3664	
Point RA03 N 13,679,245.3677 E 2,893,230.5271 Stc	12+25.84
Course from RA03 to PC RETWALL_A-1 S 74° 43' 46.00" E Dist 9.46	540
Curve Data	
* *	
Curve RETWALL_A-1	
P.I. Station 13+20.73 N 13,679,220.6977 E	2,893,322.1608
Delta = 4° 47′ 20.81″ (LT)	
Degree = 2°48′16.17″	
Tangent = 85,4327	
Length = 170.7658	
Radius = 2,043.0000	
External = 1.7855	

Long Chord	=			170.7161				
Mid. Ord.	=			1.7839				
P.C. Static	n			12+35.30	Ν	13,679,242.8751	Е	2,893,239.6569
P.T. Static	n			14+06.07	Ν	13,679,205.4859	Е	2,893,406.2283
С.С.					Ν	13,681,215.8394	Е	2,893,769.9972
Back	= S	74°	57′	15.56" E				
Ahead	= S	79°	44′	36.38" E				
Chord Bear	= S	77°	20′	55.97" E				
	= = =							

Ending chain RETWALL_A description

RETAINING WALL B ALIGNMENT

Beginning chain RETW	ALL_E	description	
Point RB01	Ν	13,679,380.2060 E 2,893,033.0876 Sta	20+00.00
Course from RB01 to	RB02	S 74° 57′ 15.56" E Dis+ 76.4696	
Point RB02	Ν	13,679,360.3554 E 2,893,106.9358 Sta	20+76.47
Course from RB02 to	RB03	S 77° 37′ 34.28" E Dist 149.3664	
Point RB03	Ν	13,679,328.3478 E 2,893,252.8324 Sta	22+25.84
Course from RB03 to	PC RE	TWALL_B-1 S 75° 10′ 45.14" E Dist 9.4639	

Curve Data									
						*	· *		
Curve RETWA	LL_	.B-1							
P.I. Stati	on			2	3+17.14	N	13,679,304.6831	Е	2,893,341.0125
Delta	=		4°	47′	20.81"	(LT)			
Degree	=		2°	55′	39.85"				
Tangent	=				81.8364				
Length	=			1	63.5774				
Radius	=			1,9	57.0000				
External	=				1.7103				
Long Chord	=			1	63.5298				
Mid. Ord.	=				1.7088				
P.C. Stati	on			2	2+35.30	N	13,679,325.9270	E	2,893,261.9815
P.T. Stati	on			2	3+98.88	N	13,679,290.1117	E	2,893,421.5411
С.С.						N	13,681,215.8394	Е	2,893,769.9972
Back	=	S 74	° 5'	7′1	5.56" E				
Ahead	=	S 79	° 44	4′3	6.38" E				
Chord Bear	=	S 77	° 20	D′5	5.97" E				
	= = =		= = = :						

Ending chain RETWALL_B description

10/23/2020 10:16:11 AM Z:\Transport





					LEGEND EXIST RIGHT O) F WAY	
					PROPOSED RIGH	I OF WAY	
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DOW					PROPOSED PAVE	MENI	
<u></u>					DIRECTION OF	TRAFFIC	FLOW
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	-87			-x	EXISTING FENC	Ł	
			L	<u>^</u>	DRIVEWAY		
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	IAI			·G— —	EXIST GAS		
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			25	0	25	50	
			2.5	0	2,5	5.0	
				VER	T: 1"=5'		
ROW							
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			OR PERMI		SES. THEY WE	RE PREPA	RED
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	-		DEPARTMENT	OF FOBLIC	NORRS AND ENGINEER		1848
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SPLICE & POST BOLT DETAILS.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING.

RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE

3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC160) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.

4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING. FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.

6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.

7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED

8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25

9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN O TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.

11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS

12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS

13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION.

1" X 1 1/2" 14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT LOTTED HOLES FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

> NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS. SEE GF (31) TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS. SEE GF (31) TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.





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	TL-3 MASH COMPLIANT						
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DATE: 10/23/2020

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678

CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- $\frac{3}{4}$ ") HEIGHT; SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE:17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.

3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.

4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.

5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 $^{\prime\prime}\!_{2}$ " DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.

6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.

THE POST LENGTH SHALL BE MARKED ON ALL 7'- O" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST $\frac{5}{8}$ " IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.

POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.

9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.

10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND %" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.

11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.

12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.

13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678

14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S CONSTRUCTION DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.

15. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.

16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.

17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 GXXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 GXXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

ST CURB 1 1 1/2" END COVER)	HIGH-SPEI	ED TI T I	RANSITIC OF 2				
ER IS USED IN AVEMENT SECTION.	Texas Department	of Tra	nsportatior	ן ג ג	Design Division Standard		
	METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT						
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REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)





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HIGH-SPEED TRANSITION

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1. F	FOR SPECI	FIC INF STEM, C	GENERAL NOTES DRMATION REGARDING INSTALLATION AND TECHNIC. DNTACT: TRINITY HIGHWAY AT 1(888)323-6374. EPEEWAY DALLAS IX 75207	AL GUIDANCE
2. [OR INSTA	LLATION	REPAIR AND MAINTENANCE REFER TO THE;	DNI 620277D
3.	APPLY HIG	H INTEN	SITY REFLECTIVE SHEETING, "OBJECT MARKER" O	N THE
• •	BJECT MA	E OF TH RKER SH	L DEVICE PER MANUFACTURER'S RECOMMENDATIONS. ALL CONFORM TO THE STANDARDS REQUIRED IN TE	KAS MUTCD.
— 4. F	FOR POST ROADWAY M	(LEAVE- IOW STRI	DUT) INSTALLATION AND GUIDANCE SEE TXDOT'S I P STANDARD.	ATEST
5.1	HARDWARE ITEM 445,	(BOLTS, "GALVAN	NUTS, & WASHERS) SHALL BE GALVANIZED IN ACC IZING". FITTINGS SHALL BE SUBSIDIARY TO THE	CORDANCE WITH BID ITEM.
6. <i>/</i>	A COMPOSI MAY BE SU DIVISION	TE MATE BSTITUT MATERIA	RIAL BLOCKOUT THAT MEETS THE REQUIREMENTS O ED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE _ PRODUCER LIST (MPL) FOR CERTIFIED PRODUCEI	TOMS-7210, CONSTRUCTION RS.
7. (IF SOLID AND REFER	ROCK IS	ENCOUNTERED SEE THE MANUFACTURER'S INSTALL LATEST ROADWAY MBGF STANDARD FOR INSTALLAT	ATION MANUAL ION GUIDANCE.
8. F 9. 1	POSTS SHA IT IS ACC	LL NOT EPTABLE	3E SET IN CONCRETE. TO INSTALL THE SoftStop IMPACT HEAD PARALLI	EL TO THE
(10. [GRADE LIN DO NOT AT	E OR WI TACH TH	TH AN UPWARD TILT. - SoftStop System directly to a rigid barri	FR.
L 11. U	JNDER NO BE CURVED	CIRCUMS	TANCES SHALL THE GUARDRAIL WITHIN THE SOFTS	top SYSTEM
12.	A FLARE R FROM ENCR ELIMINATE	ATE OF OACHING D FOR S	JP TO 25:1 MAY BE USED TO PREVENT THE TERMI ON THE SHOULDER. THE FLARE MAY BE DECREASE PECIFIC INSTALLATIONS, IF DIRECTED BY THE EI	NAL HEAD D OR NGINEER.
	NOTE: A	THE INS	TALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR I	POST WILL
	NOTE: B	PART PN	5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE	SHEETING)
	NOTE: C	W-BEAM	SUBLE LEFT-SIDE (HIGH INTENSITY REFLECTIVE SPLICE LOCATED BETWEEN LINE POST (4) AND LINE	POST (5)
		GUARDRA ANCHOR	IL PANEL 25'-0" PN:61G RAIL 25'-0" PN:15215G	
		LAP GUA	RURAIL IN DIRECTION OF TRAFFIC FLOW.	
	PARI 6202378		MAIN SYSTEM COMPONENTS	ST REV.)
	15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT	APPROACH)
	152156	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT	SLOTS
ASHER	15205A	1	POST #0 - ANCHOR POST (6'- 5 %")	25'- 0")
HFR	15203G	1	POST #1 - (SYTP) (4' - 9 1/2")	
26	15000G	1	POST #2 - (SYTP) (6'- 0")	
	533G	6	POST #3 THRU #8 - I-BEAM (W6 × 8.5) (6'-	0")
	4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")	
	152044	1	BLOCKOUT - COMPOSITE $(4^{\circ} \times 7^{\circ})^{\circ}$ × 14 ^o)	
AL NUTE:0	152044	1	ANCHOR KEEPER PLATE (24 GA)	
	15206G	1	ANCHOR PLATE WASHER ($\frac{1}{2}$ " THICK)	
	15201G	2	ANCHOR POST ANGLE (10" LONG)	
	15202G	1		
D8G SHALL TIGHTENED	40000			
ASSEMBLY,	39026	1	1" ROUND WASHER F436	
MING THE	37176	2	$\frac{3}{4}$ " x 2 $\frac{1}{2}$ " HEX BOLT A325	
	3701G	4	¾ " ROUND WASHER F436	
Α.	3704G	2	¾" HEAVY HEX NUT A563 GR.DH	
~//	3360G	16	% × 1 ¼ W-BEAM RAIL SPLICE BOLTS HGR	
	3500G	7	% x 10" HGR POST BOLT A307	
	3391G	1	5/8" × 1 3/4" HEX HD BOLT A325	
	4489G	1	5/8" × 9" HEX HD BOLT A325	
	43726	4	%" WASHER F436	
	105286G	1	$\frac{1}{16}$ x 2 $\frac{7}{2}$ HEX HD BOLT GR-5	
POST	3240G	6	5/16 " ROUND WASHER (WIDE)	
	32456	3	% " HEX NUT A563 GR.DH	
	B	╧╧┍	HIGH INTENSITI REFLECTIVE SHEETING - SEE	
			Texas Department of Transportation	Design Division Standard
			TRINITY HIGHWAY	(
			SOFISTOP END TERM	ΙΝΔΙ
			MACH - TI - 3	
W				
			SGT (10S) 31-16	
		F	LE: Sg†10s3116 DN: TxDOT CK: KM DW:	VP CK: MB/VP
		(TXDOT: JULY 2016 CONT SECT JOB	HIGHWAY
NOT INTEN	NDED TO		REVISIONS 1412 03 038	FM 1301
ION ASSEME	BLY MANUA	∟.		119



ITS USE. FOR ANY PURPOSE RESULTING FROM MADE BY TXDOT TS OR DAMAGES OF ANY KIND IS INCORRECT RESUL . NO WARRANTY FORMATS OR FOR THE "TEXAS ENGINEERING PRACTICE ACT" CONVERSIONOF THIS STANDARD TO OTHER GOVERNED BY ITY FOR THE DISCLAIMER: THE USE OF THIS STANDARD IS I TXDOT ASSUMES NO RESPONSIBIL

10/23/2020 DATE:

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720

2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).

3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.

FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.

5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM. 6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.

7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.

8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE 9. POSTS SHALL NOT BE SET IN CONCRETE.

10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.

11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.

12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.

A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

	ITEM	QTY	MAIN SYSTEM COMPONENTS	I TEM NUMBERS				
	Α	1	MSKT IMPACT HEAD	MS3000				
	В	1	W-BEAM GUARDRAIL END SECTION, 12 Go.	SF1303				
	С	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A				
	D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B				
	E	1	POST 2 - ASSEMBLY TOP	UHP2A				
	F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B				
	G	1	BEARING PLATE	E750				
	н	1	CABLE ANCHOR BOX	S760				
	J	1	BCT CABLE ANCHOR ASSEMBLY	E770				
	к	1	GROUND STRUT	MS785				
	L	6	W6×9 OR W6×8.5 STEEL POST	P621				
NOTES: 🗙 —	М	6	COMPOSITE BLOCKOUTS	CBSP-14				
	N	1	W-BEAM MGS RAIL SECTION (9'-4 $\frac{1}{2}$ ")	G12025				
	0	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A				
	Р	6	WOOD BLOCKOUT 6" X 8" X 14"	P675				
"", **	Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209				
	SMALL HARDWARE							
PANEL	a	2	%6" × 1" HEX BOLT (GRD 5)	B5160104A				
	b	4	‰ " WASHER	W0516				
	С	2	‰ " HEX NUT	N0516				
	d	25	5⁄8" Dia. × 1 ¼" SPLICE BOLT (POST 2)	B580122				
	е	2	5%∥ Dia. × 9″ HEX BOLT (GRD A449)	B580904A				
	f	3	5% " WASHER	W050				
	g	33	5∕8" Dia. H.G.R NUT	N050				
	h	1	¾" Dia. × 8 ½" HEX BOLT (GRD A449)	B340854A				
	j	1	¾" Dia. HEX NUT	N030				
	k	2	1 ANCHOR CABLE HEX NUT	N100				
	I	2	1 ANCHOR CABLE WASHER	W100				
	m	8	½" × 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A				
	n	8	½" STRUCTURAL NUTS	N012A				
	0	8	1 1/16 " O.D. × 9/6 " I.D. STRUCTURAL WASHERS	WO12A				
	P	1	BEARING PLATE RETAINER TIE	CT-100ST				
	0	6	5% " × 10" H.G.R. BOLT	B581002				
	Ч							

Division Standard Texas Department of Transportation SINGLE GUARDRAIL TERMINAL MSKT-MASH-TL-3 SGT (12S) 31-18

FILE: sg+12s3118.dgn	DN:T×	DOT	СК:КМ	DW	DW:VP		CK:CL
C TxDOT: APRIL 2018	CONT	SECT	JOB			ΗIC	GHWAY
REVISIONS	1412	03	038		FM		1301
	DIST		COUNTY			Sł	HEET NO.
	YKM		WHARTO)N			119



10/23/2020

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202

2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.

3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER' TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD. 4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.

5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.

6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS. 7. POSTS SHALL NOT BE SET IN CONCRETE.

8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.

HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM. 10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.

11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

A 1 SGET IMPACT HEAD SIH1A B 1 MODIFIED GUARDRAIL PANEL 12'-6" 12GA 126SP20 B2 1 MODIFIED GUARDRAIL PANEL 12'-6" 12GA GP94 C 2 STANDARD GUARDRAIL PANEL 12'-6" 12GA GP25 E 7 MODIFIED VIELDING I-BEAM POST W6x8.5 YP6MOD F 6 GWOD BLOCKOUT 6" x 8" x 14" WB08 H 1 STRUE STRUE SUCKOUT 6" x 8" x 14" WB08 H 1 STRUE STRUE SUCKOUT 6" x 8" x 14" WB08 H 1 STRUE STRUE SUCKOUT 6" x 8" x 14" WB08 H 1 STRUE STRUE SUCKOUT 6" x 8" x 14" WB08 H NOOD STRUE BLOCK WSBLK14 STRUE STRUE SUCKOUT 6" x 8" x 14" WB08 L 1 STRUE PLATE 12 GA. GR55 STRUE SPLT8 MERK50 M RELINFORCEMENT PLATE 12 GA. GR55 STRUE SPLT8 SPLT8 P 1 PIPE SLEEVE 4 1/4" x 2 3/6" 0.0. (2 1/6" 1.0.) PSLV4 Q 1 BEARING PLATE 9" x 15%" x 30" AHDG 12GRBLT D 1 BEARING PLATE 9" x 15%"	ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #	
B 1 MODIFIED GUARDRAIL PANEL 12'-6" 12GA 126572G B2 1 MODIFIED GUARDRAIL PANEL 12'-6" 12GA GP94 C 2 STANDARD GUARDRAIL PANEL 12'-6" 12GA GP126 D 1 STANDARD GUARDRAIL PANEL 25'-0" 12GA GP25 E 7 MODIFIED YIELDING I-BEAM POST W6x8.5 YP6MOD F 6 COMPOSITE BLOCKOUT 6" x 8" x 14" WB08 H 1 STRUT 3" x 3" x 80" x ¼" A36 ANCLE STR00 I FOUNDATION TUBE 6" x 8" x 14" WB08 WB08 H 1 STRUT 3" x 3" x 80" x ¼" A36 ANCLE WB08 J WOOD BREAKAWAY POST 5 ½" x 7 ½" x 50" WBR50 WBR50 J WOOD BREAKAWAY POST 5 ½" x 7 ½" x 50" WBR50 GG17 O 1 BEARING PLATE 8" X 8 ½" x ½" a36 BPL18 M REING PLATE 8" X 8 ½" x ½" a36 BPL18 P 1 PIPE SLEEVE 4 ¼" x 2 ½" 0.0. C (2 ½" 1.D.) PSLV4 Q 1 BEARING PLATE 8" LOR X 2½" X 16 ½" 1.D.) PSLV4 Q 1 BEC ABLE ½" x 12" GUARDRAIL BOLT 307A HDG	A	1	SGET IMPACT HEAD	SIH1A	
B2 1 MODIFIED GUARDRAIL PANEL 9'-4'/2" 12CA GP94 C 2 STANDARD GUARDRAIL PANEL 12'-6" 12CA GP126 D 1 STANDARD GUARDRAIL PANEL 12'-6" 12CA GP126 E 7 MODIFIED YIELDING I-BEAM POST W6x8.5 YP6MOD F 6 COMPOSITE BLOCKOUT 6" x 8" x 14" WB08 H 1 STRUT 3" x 3" x 80" x 1/4" A36 ANCLE STR80 J WOOD BLOCKOUT 6" x 8" x 14" WB08 WB08 H 1 STRUT 3" x 3" x 80" x 1/4" A36 ANCLE STR80 J WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" WBR50 WBR50 K 1 WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" WBR50 K 1 WOOD STRIKE BLOCK WSBLK14 L L 1 STRIKE PLATE 12 CA, GR55 REPL17 N 1 GUARDRAIL GRABER 2 /2" x 2 /2" x 16 1/2" CR817 CR817 Q 1 BEARING PLATE 8" x 8 ½" x 5½" A36 BPL18 P 1 PIPE SLEEVE 4 1/4" x 2 ½" x 5½" A36 DELT8 S 1 MA1/4" GR SPLICE BOLT3 307A HDC <t< td=""><td>В</td><td>1</td><td>MODIFIED GUARDRAIL PANEL 12'-6" 12GA</td><td>126SPZGP</td></t<>	В	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP	
C 2 STANDARD GUARDRAIL PANEL 12'-6" 12GA GP126 D 1 STANDARD GUARDRAIL PANEL 25'-6" 12GA GP25 E 7 MODIFIED VIELDING 1-BEAM POST W6x8.5 YP6MOD F 6 COMPOSITE BLOCKOUT 6" x 8" x 14" CB08 G 6 WOOD BLOCKOUT 6" x 8" x 14" WB08 H 1 STRUT 3" X 3" x 80" x 14" WB08 I FOUNDATION TUBE 6" x 8" x 12" x 3/6" FNDT6 J 1 WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" WBRK50 K WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" WBRK50 K WOOD STRIKE BLOCK WSBLK14 L 1 STRIKE PLATE 1/4" A36 BENT PLATE SPLT8 M 1 REINFORCEMENT PLATE 12 CA. CR55 REPLT17 N 1 GUARDRAIL BADKT 307A HDG 1/2" GGR17 Q 1 BCT CABLE 3/4" x 81" LENGTH CBL81 SMALL HARDWARE Q 1 BCT CABLE 3/4" x 81" LENGTH CBL81 SMALL HARDWARE Q 1 BCT CABLE 3/4" x 81" LENCTH CBL81	B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94	
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G 6 WOOD BLOCKOUT 6" X 8" X 14" WBO8 H 1 STRUT 3" X 3" X 80" × ¼" A36 ANGLE STR80 I 1 FOUNDATION TUBE 6" X 8" X 72" × ¾" ("FNDT6 J 1 WOOD BREAKAWAY POST 5 ½" x 7 ½" x 50" WBRK50 K 1 WOOD STRIKE BLOCK WSBLK14 L 1 STRIKE BLOCK WSBLK14 L 1 STRIKE BLOCK WSBLK14 M 1 REINFORCEMENT PLATE ¼" A36 BENT PLATE SPLT8 M 1 REINFORCEMENT PLATE ½" A36 BENT PLATE SPLT8 P 1 PIER SLEEVE 4 ¼" X 2 ½" C 2 ½" X 16 ½" I.D.) PSLV4 Q 1 BEARING PLATE 8" X 8 ½" A36 BPLT8 P 1 PIPE SLEEVE 4 ¼" X 2 ½" O.D. (2 ½" I.D.) PSLV4 Q 1 BEARING PLATE 8" X 8 ½" A36 BPLT8 M 1 REPLT17 CBL81 MBUR Q 1 BEARING PLATE 8" X 8 ½" A36 SERET PLATE Q 1 BEARING PLATE 8" X 8 %" K14" CBL81 Q 1 B'X" X 12" GUARDRAIL BOLT 307A HDG ICRBLT	F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CB08	
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K 1 WOOD STRIKE BLOCK WSBLK14 L 1 STRIKE PLATE 1/4" A36 BENT PLATE SPLT8 M 1 REINFORCEMENT PLATE 12 GA. GR55 REPL17 N 1 GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2" GGR17 O 1 BEARING PLATE 8" X 8 5/4" X 2/4" O.D. (2 1/6" I.D.) PSUV4 Q 1 BCT CABLE 3/4" X 13" LENGTH CBL81 SMALL HARDWARE a 1 5/6" X 12" GUARDRAIL BOLT 307A HDG 10 GRBLT c 3 5/4" X 12" GUARDRAIL BOLT 307A HDG 10 GRBLT d 3 5/4" FLAT WASHER F436 A325 HDG 58FW436 e 1 5/4" CCK WASHER HDG 58LW f 39 5/4" GUARDRAIL HEX NUT HDC 58HN563 g 2 1/2" X 2" STRUT BOLT A325 HDG 125BLT i 16 1/2" X 2" STRUT BOLT A325 HDG 12FW1436 j 8 1/2" K 2" STRUT BOLT A325 HDG 12FW1436 j 8 1/2" HEX NUT A563 HDG 12LW K k 8/2" HEX NUT A563 HDG 12LW14563 38LS <	J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50	
L 1 STRIKE PLATE '/4" A36 BENT PLATE SPLT8 M 1 REINFORCEMENT PLATE 12 GA. GR55 REPLT17 N 1 GUARDRAIL GRABBER 2 '/2" X 2 '/2" X 16 '/2" GGR17 O 1 BEARING PLATE 8" X 8 '/8" X 5 '/8" A36 PPLT8 P 1 PIPE SLEEVE 4 '/4" X 2 '/8" O.D. (2 '/8" I.D.) PSLV4 Q 1 BCT CABLE '/4" X 81" LENGTH CBL81 CBL81 CBL81 CBL81 CBL81 O 1 5/8" X 12" GUARDRAIL BOLT 307A HDG 12GRBLT C 33 5/8" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT C 33 5/8" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT G 1 5/8" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT C 33 5/8" FLAT WASHER F436 A325 HDG 58FW436 e 1 5/8" LOCK WASHER HDG 58LW f 39 5/8" GUARDRAIL HEX NUT HDC 58HW46 g 2 '/2" X 2" STRUT BOLT A325 HDG 125BLT n 6 1/2" X 1 '/4" PLATE BOLT A325 HDG 125BLT i 16 '/2" FLAT WASHER F436 A325 HDG 125BLT i 6 '/2" FLAT WASHER F436 A325 HDG 125BLT i 16 '/2" FLAT WASHER F436 A325 HDG 125BLT i 16 '/2" FLAT WASHER F436 A325 HDG 122HVF436 J 8 1/2" LOCK WASHER HDG 12LW K 8 1/2" HEX NUT A563 HDG 12LW563 I 4 3/8" X 3" HEX LAG SCREW GR5 HDG 38LS m 4 3/8" FLAT WASHER F436 A325 HDG 152HN663 P 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 G 1 1 1/2" X 4" SCH-40 PVC PIPE PSP64 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M ENTATION OF NOT INTENDED SSEMBLY MANUAL. ENTATION OF NOT INTERNED SEMBLY MANUAL.	K	1	WOOD STRIKE BLOCK	WSBLK14	
M 1 REINFORCEMENT PLATE 12 GA. GR55 REPLT17 N 1 GUARDRAIL GRABBER 2 //2 " X 2 //2 " X 16 //2 " GOR17 O 1 BEARING PLATE 8" X 8 //8 " X 5 //8 " A 36 BPLT8 P 1 PIPE SLEEVE 4 //4 " X 2 //8 " O.D. (2 //8 " I.D.) PSLV4 Q 1 BCT CABLE //4 " X 81" LENGTH CBL81 SMALL HARDWARE a 1 1/2 " GUARDRAIL BOLT 307A HDG 10GRBLT b 7 //6 " X 10" GUARDRAIL BOLT 307A HDG 10GRBLT c 33 1/6 " X 12" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 1/6 " X 14" GR SPLICE BOLTS 307A HDG 10GRBLT d 3 1/6 " X 14" GR SPLICE BOLT 307A HDG 10GRBLT d 3 1/6 " K 14" WASHER F436 A325 HDG 188H%363 g 2 //2 " X 12 //4 " PLATE BOLT A325 HDG 125BLT n 6 1/2 " X 1 //4 " PLATE BOLT A325 HDG 125WF36 j 8 //2 " LOCK WASHER HDG 121W K k 8 //2 " LOCK WASHER HDG 121W X i 16 //2 " X 1 //4 " PLATE AGS CREW GR5 HDG 38F W844 n	L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8	
N 1 GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2" GGR17 O 1 BEARING PLATE 8" X 8 5/4" X 5/6" A36 BPLT8 P 1 PIPE SLEEVE 4 1/4" X 2 3/6" O.D. (2 1/6" I.D.) PSLV4 Q 1 BCT CABLE 3/4" X 8 1" LENGTH CBL81 SMALL HARDWARE a 1 5/6" X 12" GUARDRAIL BOLT 307A HDG 12GRBLT b 7 5/6" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT c 33 5/6" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 5/6" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 5/6" X 10" GUARDRAIL HEX NUT HDG 58FW436 e 1 5/6" CUARDRAIL HEX NUT HDG 58FW436 g 2 1/2" X 2" STRUT BOLT A325 HDG 125BLT n 6 1/2" X 2" STRUT BOLT A325 HDG 12FW5436 j 8 1/2" LOCK WASHER HDG 12LW k 8 1/2" LOCK WASHER HDG 12LW k 8 1/2" LOCK WASHER F436 A325 HDG 12LW k 8 1/2" K 436 A325 HDG 12LW k	М	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17	
0 1 BEARING PLATE 8" X 8 % x 5% a A36 BPLT8 P 1 PIPE SLEEVE 4 1/4" X 2 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 BCT CABLE % X 8 % 0.D. (2 % I.D.) PSLV4 Q 1 FLAT WASHER F436 A325 HDG 128 H % 58 HN563 Q 2 % FLAT WASHER F436 A325 HDG 121 W K 8 % 7 % X 3" HEX LAG SCREW GR5 HDG 38 LS M 4 % FLAT WASHER F436 A325 HDG 12 HN563 12 HN563 M 4 % 1 FLAT WASHER F436 A325 HDG 14 1 1 1 HS 63 14 1 1 1 HS 63 M 1 % 1 % 1 % 1 % 1 % 1 % 1 % 1 % 1 % 1 %	N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17	
P 1 PIPE SLEEVE 4 ¼ " X 2 % " O.D. (2 ½ " I.D.) PSLV4 Q 1 BCT CABLE ¾ " X 81" LENGTH CBL81 SMALL HARDWARE a 1 5% " X 12" GUARDRAIL BOLT 307A HDG 12GRBLT b 7 5% " X 10" GUARDRAIL BOLT 307A HDG 10GRBLT c 33 5% " X 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 5% " GUARDRAIL HEX NUT HDG 58FW436 e 1 ½ " LOCK WASHER F436 A325 HDG 58FW436 g 2 ½ " X 2" STRUT BOLT A325 HDG 12FWF436 g 2 ½ " CCK WASHER HDG 12FWF436 h 6 ½ " LAT WASHER F436 A325 HDG 12FWF436 j 8 ½ " LOCK WASHER HDG 12LW k 8 ½ " HEX NUT A563 HDG 12FWF436 j 8 ½ " HEX NUT A563 HDG 12FWF436 i 4 ¾ " FLAT WASHER F436 A325 HDG 18FWF436 o 2 1 " FLAT WASHER F436 A325 HDG 18FWF436 j 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 119C CHIP RATED MIL-STD-810F RF10810F	0	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8	
Q 1 BCT CABLE ¼ " X 81" LENGTH CBL81 SMALL HARDWARE a 1 5%" X 12" GUARDRAIL BOLT 307A HDG 12GRBLT b 7 5%" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT c 33 5%" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 5%" X 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 5%" CUARDRAIL HEX NUT HDG 58FW436 e 1 5%" CUARDRAIL HEX NUT HDG 58HN563 g 2 1/2" X 2" STRUT BOLT A325 HDG 125BLT i 16 1/2" X 1 1/4" PLATE BOLT A325 HDG 125BLT i 16 1/2" X 1 1/4" PLATE BOLT A325 HDG 125BLT i 16 1/2" K NUT A563 HDG 12LW k 8 1/2" HEX NUT A563 HDG 12LW k 8 1/2" HEX NUT A563 HDG 12HN563 l 4 3%" X 1" WASHER F436 A325 HDG 18FW844 n 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" TO 24" LONG ZIP TIE RATED	P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4	
SMALL HARDWARE a 1 5% " X 12" GUARDRAIL BOLT 307A HDG 12GRBLT b 7 5% " X 10" GUARDRAIL BOLT 307A HDG 10GRBLT c 33 5% " X 1 1/4" GR SPLICE BOLTS 307A HDG 10GRBLT d 3 5% " FLAT WASHER F436 A325 HDG 58FW436 e 1 % " LOCK WASHER HDG 58LW f 39 5% " GUARDRAIL HEX NUT HDG 58HN563 g 2 1/2 " X 2" STRUT BOLT A325 HDG 125BLT h 6 1/2 " X 1 1/4" PLATE BOLT A325 HDG 12FWF436 j 8 1/2 " LOCK WASHER HDG 12LW k 8 1/2 " LOCK WASHER HDG 12LW k 8 1/2 " HEX NUT A563 HDG 12LW k 8 1/2 " HEX NUT A563 DH HDG 38LS m 4 3% " FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" FLAT WASHER	Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81	
a 1 %" × 12" GUARDRAIL BOLT 307A HDG 12GRBLT b 7 %" × 10" GUARDRAIL BOLT 307A HDG 10GRBLT c 33 %" × 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 %" × 10" GUARDRAIL BOLT 307A HDG 10GRBLT d 3 %" × 11"/4" GR SPLICE BOLTS 307A HDG 10GRBLT d 3 %" × 10" GUARDRAIL HEX NUT HDG 58FW436 e 1 %" CUARDRAIL HEX NUT HDG 58HN563 g 2 /2" × 2" STRUT BOLT A325 HDG 12EWF f 39 %" GUARDRAIL HEX NUT HDG 58HN563 g 2 /2" × 2" STRUT BOLT A325 HDG 12EWF i 16 /2" × 1/4" PLATE BOLT A325 HDG 12EWF j 8 /2" HEX NUT A563 HDG 12HN563 i 16 /2" × 1 WASHER F436 A325 HDG 12HN563 i 1 4%" FLAT WASHER F436 A325 HDG 18HN643 o 2 1" HEX NUT A563DH HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1FWF436		1	SMALL HARDWARE		
b 7	a	1	54" X 12" GUARDRATI BOLT 3074 HDG	12GRBL T	
C 33 5% " X 1 1/4" GR SPLICE BOLT SOTA HDG 10GRBLT d 3 5% " FLAT WASHER F436 A325 HDG 58FW436 e 1 5% " COCK WASHER HDG 58LW f 39 5% " COCK WASHER HDG 28LT h 6 1/2" X 1'/4" PLATE BOLT A325 HDG 125BLT h 16 1/2" X 1'/4" PLATE BOLT A325 HDG 12FWF436 j 8 1/2" LOCK WASHER F436 A325 HDG 12LW k 8 1/2" HEX NUT A563 HDG 12LW k 8 1/2" HEX NUT A563 HDG 12LW k 8 1/2" HEX NUT A563 HDG 12LW m 4 3% " FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" CAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" CH-40 PVC PI	b	7	%" X 10" GUARDRAIL BOLT 307A HDG	10GRBL T	
d 3 5% FLAT WASHER F436 A325 HDG 58FW436 e 1 5% FLAT WASHER F436 A325 HDG 58FW436 f 39 5% GUARDRAIL HEX NUT HDG 58HN563 g 2 1/2 X 2 STRUT BOLT A325 HDG 28LT n 6 1/2 X 1 1/4 PLATE BOLT A325 HDG 125BLT i 16 1/2 EAT WASHER F436 A325 HDG 125BLT 125BLT i 16 1/2 LOCK WASHER HDG 122W 124W k 8 1/2 LOCK WASHER HDG 122W k 8 1/2 HEX NUT A563 HDG 12HN563 m 4 3% X 3 HEX LAG SCREW GR5 HDG 38LS m 4 3% X 3 HEX LAG SCREW GR5 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 P 1HN563 p 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 Q 1HN563 g 1 1% CHIP RATED MIL-STD-810F RFID810H SGET - TL - 3 - MA	c	, , ,	5/ X 1 1/4" GR SPLICE BOLTS 3074 HDG	1 GRBL T	
E 1 1/2 </td <td>d</td> <td>3</td> <td>56" FLAT WASHER F436 A325 HDG</td> <td>58EW436</td>	d	3	56" FLAT WASHER F436 A325 HDG	58EW436	
f 39 5% EQUARDRATIL HEX NUT HDG 58HN563 g 2 1/2" X 2" STRUT BOLT A325 HDG 28LT h 6 1/2" X 1 1/4" PLATE BOLT A325 HDG 125BLT i 16 1/2" K 2" STRUT BOLT A325 HDG 125BLT i 16 1/2" K 2" STRUT WASHER F436 A325 HDG 12FWF436 j 8 1/2" LOCK WASHER HDG 12LW k 8 1/2" HEX NUT A563 HDG 12HN563 i 4 3% T STAT WASHER F436 A325 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M SENGL MOUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL - 3 - MASH SGET (15) 31 - 20 FILE: sg+153120. dgn	e	1	56" LOCK WASHER HDG	581 W	
9 2 1/2" × 2" STRUT BOLT A325 HDG 2BLT h 6 1/2" × 1 1/4" PLATE BOLT A325 HDG 125BLT i 16 1/2" × 2" STRUT BOLT A325 HDG 125BLT i 16 1/2" × 2" STRUT BOLT A325 HDG 125BLT i 16 1/2" × 2" STRUT BOLT A325 HDG 125BLT i 16 1/2" × 1 1/4" PLATE BOLT A325 HDG 125BLT i 16 1/2" × 1 1/4" PLATE BOLT A325 HDG 125BLT j 8 1/2" LOCK WASHER F436 A325 HDG 121W k 8 1/2" HEX NUT A563 HDG 38FW844 n 2 1" HEX NUT A563DH HDG 11HN563 p 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1/2" × 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M SENGL MDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SEGT (15) 31 - 20 FILE: sgt153120. dgn OB HIGHWAY <td col<="" td=""><td>f</td><td>30</td><td>% GUARDRATI HEX NUT HDG</td><td>58HN563</td></td>	<td>f</td> <td>30</td> <td>% GUARDRATI HEX NUT HDG</td> <td>58HN563</td>	f	30	% GUARDRATI HEX NUT HDG	58HN563
b 1 1 1 1 1 1 1 2 FLAT WASHER F436 A325 HDG 125BLT 1 16 1/2" FLAT WASHER F436 A325 HDG 125BLT 125BLT 1 8 1/2" LOCK WASHER HDG 12LW 12FWF436 k 8 1/2" LOCK WASHER HDG 12LW 12FWF436 k 8 1/2" LOCK WASHER F436 A325 HDG 12HN563 12HN563 m 4 3/6" FLAT WASHER F436 A325 HDG 38FW844 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 1HN563 Q 1 1 HZ" NUT A563DH HDG 1HN563 1HN563 P 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING Standard SGET - TL - 3 MASH		2	1/2" X 2" STRUT BOLT A325 HDG	28LT	
i 16 1/2 N 1 / 2 N 1 /	h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT	
i 10 1/2 1 EAT MADE 1 100 ADD 1100 121W j 8 1/2 1 EX MUT A563 HDG 12LW k 8 1/2 HEX NUT A563 HDG 12LW ii 4 3/6 X 3" HEX LAG SCREW GR5 HDG 38LS m 4 3/6 FLAT WASHER F436 A325 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL - 3 - MASH SGET (15) 31 - 20 FILE: sg+153120. dgn DN:TXDOT CK:KM DW:VP CK:V r I/2 D 038 FM 130 SEMBLY MANUAL.	;	16	1/2" FLAT WASHER F436 A325 HDG	1250L1	
k 8 1/2 EXENT MEDICITIES 121W k 8 1/2 HEX NUT A563 HDG 121N563 I 4 3/6" X 3" HEX LAG SCREW GR5 HDG 38LS m 4 3/6" FLAT WASHER F436 A325 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 P 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGET (15) 31 - 20 FILE: sg+153120. dgn DN:TXDOT CK:KM DW:VP CK:V r IVDT: APRIL 2020 CONT SECT JOB HIGHMAY SCHALDY MANUAL. REVISIONS 1412 03 038 FM 1300	, ;	л 0 - р	1/2" LOCK WASHER HDG	121 W	
I 4 36 " X 3" HEX LAG SCREW GR5 HDG 12 HN363 II 4 36 " X 3" HEX LAG SCREW GR5 HDG 38LS m 4 36 " X 1" HEX NUT ASGENEW GR5 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" TO 24" LONG ZIP TIE RATED 175-200LB 2PT18 q 1 1/2 " X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL - 3 - MASH SGET (15) 31 - 20 FILE: sg+153120. dgn DN:TXDOT CK:KM DW:VP CK:V r 1412 03 038 FM 130 DIST COUNTY SHET VKM HICHWAY	1	Q Q	1/2" HEX NUT 4563 HDG	1240563	
m 4 3% FLAT WASHER F436 A325 HDG 38FW844 n 2 1" FLAT WASHER F436 A325 HDG 1FWF436 o 2 1" HEX NUT A563DH HDG 1HN563 p 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL - 3 - MASH SGET (15) 31 - 20 FILE: sgt153120. dgn DN: TADOT CK:KM DW:VP CK:V SINGLE SUBLY MANUAL. REVISIONS 1412 03 038 FM 1300		1	36" X 3" HEX LAG SCREW CR5 HDG	381 5	
n 2 1" FLAT WASHER F436 A325 HDG JOP W644 n 2 1" FLAT WASHER F436 A325 HDG IFWF436 o 2 1" HEX NUT A563DH HDG IHN563 P 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1 ½" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGET (15) 31 - 20 FILE: sgt153120. don DNITXDOT CKIKM DW:VP CKIV REVISIONS 1412 03 08 FM 1300 DIST COUNTY SHEET	m	4	36" FLAT WASHER F436 A325 HDG	38EW844	
0 2 1" HEX NUT A563DH HDG IHNF63 P 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 q 1 1 ½" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL - 3 - MASH SGT (15) 31 - 20 FILE: sgt153120. don DN:TXDOT CK:KM WITATION OF NOT INTENDED SEMBLY MANUAL. FILE: sgt153120. don DN:TXDOT	n	2	1" FLAT WASHER F436 A325 HDG	1EWE436	
P 1 18" TO 24" LONG ZIP TIE RATED 175-200LB ZPT18 Q 1 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M	0	2	1" HEX NUT 4563DH HDG	1HN563	
q 1 1/2" X 4" SCH-40 PVC PIPE PSPCR4 r 1 RFID CHIP RATED MIL-STD-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGT (15) 31 - 20 FILE: sgt153120. dgn DN:TxDOT CK:KM DW:VP CK:V CNTATION OF NOT INTENDED SEMBLY MANUAL.	p	1	18" TO 24" LONG ZIP TIE RATED 175-2001 B	7PT18	
r 1 RFID CHIP RATED MIL-STO-810F RFID810F s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Impact HEAD REFLECTIVE SHEETING RS30M Impact HEAD REFLECTIVE SHEETING Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGET - TL-3 - MASH SGT (15) 31 - 20 FILE: sg+153120. dgn DN:TXDOT CK:KM FILE: sg+153120. dgn DN:TXDOT CK:KM DW:VP CK:V © TXDOT: APRIL 2020 CONT SECT JOB HICHMAY SSEMBLY MANUAL. REVISIONS 1412 03 038 FM 130	0	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCPA	
s 1 IMPACT HEAD REFLECTIVE SHEETING IM IDUITION s 1 IMPACT HEAD REFLECTIVE SHEETING RS30M Texas Department of Transportation Design Division Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGET (15) 31 - 20 FILE: sgt153120. dgn DN:TXDOT CK:KM DW:VP CK:V FILE: sgt153120. dgn DN:TXDOT CK:KM DW:VP CK:V CIADOT: APRIL 2020 CONT SECT JOB HIGHWAY SSEMBLY MANUAL. VKM WHAPTON 1200	۳ ۲	1	REID CHIP RATED MIL-STD-810F	REIDRIOF	
Image: A contract of the point of the p	s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M	
ENTATION OF NOT INTENDED SSEMBLY MANUAL.		<u> </u>	TWE ACT THEAD NET LECTIVE SHELLING		
ENTATION OF NOT INTENDED SSEMBLY MANUAL.				Decion	
Texas Department of Transportation Standard SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGET (15) 31-20 FILE: SQT 153120. dgn DN: TXDOT CK: KM DW: VP CK: V © TXDOT: APRIL 2020 CONT SECT JOB HICHWAY REVISIONS 1412 03 03 FM 130 DIST COUNTY SHEET VKM WHAPTON 120				Division	
SPIG INDUSTRY, LLC SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGT (15) 31-20 FILE: SGT 153120. dgn PN: TXDOT CK: KM DW: VP CK: V CTXDOT: APRIL 2020 CONT SECT JOB HIGHWAY REVISIONS 1412 03 038 FM 130 DIST COUNTY SHEET VKM WHAPTON 120			Texas Department of Transportation	Standard	
SINGLE GUARDRAIL TERMINAL SGET - TL-3 - MASH SGT (15) 31-20 FILE: SGT 153120. dgn DN: TXDOT CK:KM DW:VP CK:V © TXDOT: APRIL 2020 CONT SECT JOB HIGHWAY REVISIONS 1412 03 038 FM 130 DIST COUNTY SHEET VKM WHAPTON 120			SPIG INDUSTRY I	C	
ENTATION OF NOT INTENDED SSEMBLY MANUAL.					
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GENERAL NOTES

CURB RAMPS

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

DETECTABLE WARNING MATERIAL

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

DETECTABLE WARNING PAVERS (IF USED)

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

SIDEWALKS

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



SECTION VIEW DETAIL CURB RAMP AT DETECTIBLE WARNINGS

10/23/2020

DATE:















OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.

PROTRUDING OBJECTS OF A HEIGHT \leq 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4								
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PEDESTRIAN FACILITIES CURB RAMPS								
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Note: To be paid for as Highest Curb

______.

General Notes

- 1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter.
- 2. Concrete shall be Class A.
- 3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (MPL), maintained by TxDOT, Construction Division.
- 4. Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
- 5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
- 6. Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
- 7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
- 8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
- 9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
- 10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
- 11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprop.
- 12. When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.



* Design Division Standard Texas Department of Transportation CONCRETE CURB AND Change in Height CURB AND GUTTER CCCG-12 DN:TxDOT CK:AM DW:VP ILE: CCCg12.dgn ск: VP C TxDOT: 1995 CONT SECT JOB HIGHWAY REVISIONS JPDATED 2012 - VP 1412 03 038 FM 1301 DIST SHEET NO. YKM WHARTON 125



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GENERAL NOTES

- 1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
- 2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
- 3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
- 4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
- 5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.





10/23/2020 DATE:



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					WALL SUM	MARY				
1	MSE Retaining Wall	Begin Station	End Station	Retained Soil Friction Angle	Foundation Soil Friction Angle 2	Ground Improvement	Min Earth Reinforcement Length 4	Min Wall Embedment	Underdrain Required 5	Drav Anal (
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wdown Iysis 6	Bench Width (8)	
EQUIRED	2 feet 2 feet	

SPECIAL NOTES: This sheet is to be filled out by the wall designer of record at time of plan preparation to provide soil strength parameters for the design of the specified walls. The completed sheet shall be signed, sealed, and dated by a licensed Professional Engineer.

	Texas Department	of Transj	portation	Bridge Division Standard				
	MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA							
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(2) Map of Texas emblem shall be formed into a wall panel next to each bridge abutment. The exact location of each emblem shall be approved by the Engineer. The cost of forming the emblems will not be paid for directly, but shall be incidental to the Item "Retaining Wall". The map of Texas shall be inset a minimum of ¼" into the face of the panel, and shall receive a smooth finish. The inset area shall be finished in a contrasting color as approved by the Engineer.

SHEET 1 OF 2									
Texas Department	Bi Di Si	Bridge Division Standard							
MECHANICALLY									
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RETAINING WALL									
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retained fill, soil strength.	YKM		WHARTO	DN		133			



LEVEL UP DETAIL⁵ Provide Grade 60 (#4) Reinforcement

(3) Precast coping shall be anchored to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Details shall include coping reinforcement. Concrete flume (if required) shall be paid for separately from Item 423. (4) Soil design parameter must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard. (5) Cast vertical bars into the top of panels. At contractor's option vertical bars may be embedded 4" with a Type III Clac C epoxy anchorage system. Follow manufacturer's directions for installing the epoxied vertical bars.

SELECT BACKFILL UNIT WEIGHT											
Туре	Unit Weight	Inernal Stability	External Stability								
AS, 105 PCF		Pullout	Sliding, Overturning, Eccentricity								
DS	125 PCF	Rupture	Bearing								



Retained Soil	Unit Weight = 125 pcf $\emptyset = 4$ C = 0 psf
Foundation Soil	$\emptyset = 4$ C = 0 psf
Select Backfill	Unit Weight = See Table(6) Ø = 34 C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf Ø = 45 C = 0 psf
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Stress in steel and concrete shall be in accordance with current AASHTO Standard and Interim Specifications. The minimum length of earth reinforcements are as shown on the RW(MSE)DD standard.

STABILITY CRITERIA:

Stability criteria applies to both dry and drawdown analysis. Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5. Factor of safety in overturning shall be greater than or equal to 2.0. The base pressure resultant shall fall within the middle third of the retaining wall. The factor of safety against pullout of the earth reinforcements shall be greater than or equal to 1.5 at each level. Pullout resistance shall be determined from test data evaluated at $\frac{3}{4}$ inch strain.

CORROSION CRITERIA:

The earth reinforcement elements shall be designed to have a minimum design life of 75 years, using current AASHTO corrosion rates.

Stress calculations (rupture) shall be done on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Precast coping is to be provided in 10' minimum lengths (typical). To optimize coping lengths at radiuses, end of runs or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALER:

The joints between coping segments must be sealed in accordance with the DMS-6310 "Joint Sealant's and Fillers", joint sealing material, Class 4. The joint must be sealed 3" below and 6" above the adjoining pavement surface, or as directed by the Engineer. The purpose of the joint sealing is to contain surface drainage and prevent infiltration into the retaining wall backfill.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information. The select backfill specified for use within the mechanically stabilized earth volume shall extend horizontally from the back of the panels to a minimum 2' beyond the end of the earth reinforcements. The select backfill shall extend vertically from the top of the leveling pad or 4" below the lowest earth reinforcement, whichever is lower, to the top of panels.

The uppermost earth reinforcements shall be no more than 3.0' below the top of wall. The lowest level of earth reinforcements shall be no more than 2.0' above the top of the leveling pad. Minimum wire size for earth reinforcements shall be W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire shall have at least 50% of the cross sectional area of the larger wire.

A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Each mesh configuration shall have a unique transverse bar spacing, differing from other configurations by a minimum of 3". Earth reinforcement lengths shall be stepped in increments no finer than 12".

Standard precast concrete panels shall have a maximum height of 6', and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel shall be 7'-6". Minimum panel thickness shall be 5". Panels shall be arranged to provide offset horizontal joints.

An open joint shall be provided around the perimeter of the concrete panels. The joint configuration shall be such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between $\frac{3}{4}$ ".

A one-piece corner panel shall be provided for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less. Concrete coping shall be provided along the top of wall, at the vertical steps at bridge backwalls, and at

other vertical steps along the top of wall. The joints between all coping segments shall be sealed to prevent infiltration of water into the retaining wall backfill. Sealing shall be in accordance with the DMS-6310

"Joint Sealants and Fillers", using Class 4 joint sealant. When obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcements in their normal locations, provide details and calculations that establish support for the affected panels. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcements no adjustment in length is needed for skew angles between 1 and 10 degrees. For skew angles greater than 10 degrees adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall. Provide calculations that justify any alterations made to the soil reinforcements or modifications to their normal placement. Do not use panels without any soil reinforcements connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting Soil reinforcements attached to them and as approved by the Engineer. SHEET 2 OF 2

Reinforced concrete must be Class "C", Precast concrete Class "H", Unreinforced concrete Class "A". All reinforcing steel must be Grade 60.

Coping and anchor slabs are considered subsidiary to the Item "Retaining Wall".

These details are to be used in conjunction with the retaining wall layout, standard RW(MSE)DD and other applicable standards.

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DESIGN PARAMETERS: Design of retaining walls shall be based on the following design parameters unless stated elsewhere in the

Bridge Division Texas Department of Transportation Standard MECHANICALLY STABILIZED EARTH RETAINING WALL RW(MSE) DN: TxDOT CK: TxDOT DW: JGD _____CK: MJG rwstde01.dg CTxDOT March 2010 JOB 1412 03 038 FM 1301 REVISIONS 04-11: Added Table & Corrosion 01-13: Wall embed, (WS) table 134 үкм WHARTON



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Rail Type (5)	Detail	Precasting Rail with Coping Allowed
T1F/T1W/C1W/T2P/C2P	NARROW	NO
T221/C221/T222	NARROW	YES
T223/C223	NARROW	NO
T401/T402/C402	NARROW	NO
T411/C411	NARROW	NO
T551/T552	WIDE	YES
T66	NARROW	NO
SSTR	WIDE	YES

CAST-IN-PLACE COPINGS:

Provide compressible material to isolate precast panel from cast-in-place coping to prevent cracking. Attach compressible material to both sides of precast panel prior to casting concrete for coping. When cast-in-place coping is anchored to reinforced concrete pavement, a

smooth level-up strip must be provided on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.

Align coping and railing joints with precast panel joints. Optional rail joints are allowed as approved by Engineer. Provide railing construction joints or expansion joints at no greater than 100' spacing.

PRECAST COPINGS:

Provide a smooth level-up strip on top of the precast panels prior to installation of the coping. Shims may be used on top of the level-up strip to facilitate alignment. Total shim thickness not to exceed 1". Provide precast coping in 10' minimum lengths.

JOINTED CONCRETE PAVEMENT:

When coping is adjacent to and anchored into jointed concrete pavement, the coping joints must coincide with the pavement joints.

JOINT SEALER:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints". Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

GENERAL NOTES: Details on this sheet are to be used in development of specific details for mounting traffic railing on mechanically stabilized earth (MSE) walls.

The specific details proposed must have strengths equivalent to those shown on this sheet. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.

Submit shop drawings for the traffic railing foundations to the Engineer in accordance with Item 423 "Retaining Wall". The shop drawings must include bar bending details

Precasting of railing with the coping will be allowed as noted in the table on this sheet.

The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The contractor must provide for use of these systems in accordance with Article 7.3.

Provide Class C concrete (f'c=3,600 psi). Provide Grade 60 reinforcing steel.

Provide (#4) longitudinal bars, unless otherwise shown.

Coping and anchor slabs are considered subsidiary to Item 423 "Retaining Wall". Payment for traffic railing is per the linear foot for the appropriate railing type.

Texas Department	Texas Department of Transportation										
RETAINING WALL TRAFFIC RAILING											
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REVISIONS 01-13: Precast option with Rails.	1412	03	038		FM	1301					
03-18: Cast-In-Place Copings, railing construction and expansion joints.	DIST		COUNTY			SHEET NO.					
02–20: Note 5 added for precast rail option.	YKM		WHARTO	DN		135					



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STA	TE	DIST.		со	UNTY					
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141:	2	03		038	FM	1301				



DRAINAGE ID	DRAINAGE AREA (AC)	C =0.35 GRASS BY AREA (AC)	C =0.9 PAVEMENT BY AREA (AC)	C =0.65 COMMERCIAL BY AREA (AC)	С	CA	TCalacul ated (min)	Tused (min)	110 (in/hr)	125 (in/hr)	Q10 (CFS)	Q25 (CFS)
B01	25.8	7.7	2.8	15.3	0.6	15.2	69.7	69.7	2.9	3.3	43.7	50.5
B02	25.5	7.0	2.8	15.7	0.6	15.2	71.1	71.1	2.8	3.3	43.2	49.9



















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Driainage Area

	Area - Composite	Area - Composite	TC Calaculated	TC used		Area - Discharge
Area - ID	C Value	Area	(min)	(min)	Area - Intensity	(CFS)
D-1	0.9	0.3	3.9	10	7.7	2.08
D-2	0.9	0.3	3.9	10	7.7	2.08

Inlet

								Inlet -				Inlet -	Inlet -
Inlet -				Inlet -				Max	Node -			Computed	Computed
Profile			Inlet - Curb	Longitudinal		Inlet -	Inlet - Curb	Ponded	Reference	Inlet -	Inlet -	Ponded	Ponded
Type	Inlet - ID	Inlet - Type	Length	Slope	Inlet - Spread Slope 1	Spread N	Depression	Width	Elevation	Discharge	Capacity	Width	Depth
On Grade	D-1	Curb	10	0.35	4	0.035	0.25	12	101.21	2.08	3.434	10.056	0.402
On Grade	D-2	Curb	10	0.35	4	0.035	0.25	12	100.22	2.08	3.434	11.44	0.181

Link

	Link -	Link -		Link - Invert		Link -			Link -		Link - HGL	Link - HGL	Link -			Lin
	Upstream	Downstream	Link - Invert	Downstrea		Number		Link -	Hydraulic		Upstrea	Downstrea	Uniform	Link -	Link -	Cri
Link - ID	Node	Node	Upstream	m	Link - Library Item	of Barrels	Link - Span	Rise	Length	Link - Slope	m	m	Depth	Discharge	Capacity	/ De
D1-D2	D-1	D-2	97.75	96.66	24 Inch Dia. Circular	1	n/a	2	190.392	0.573	99.677	99.663	0.451	2.08	19.947	/
D2-DOUT	D-2	DOUT	97.67	97.66	24 Inch Dia. Circular	1	n/a	2	7.476	0.134	99.663	99.66	0.997	4.16	9.642	2

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THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:					
BAOXU ZHANG 10/13/2020					
TYPE OR PRINT NAME			PE # 93022 DATE		
REV. NO. DA	re	DESCRIPTION			
Planners-Engineers-Program Managers 15915 Katy Freeway, Suite 300 Houston, Texas 77094 TBPE FIRM REGISTRATION NO. F-6825					
SUBMITTED: DESIGNED BY: SCALE: DRAWN BY:					
DATE:					
NBI NO:	CI	CITY DWG NO:			
			(с) 2021 ТхДОТ	
Texas Department of Transportation					
FM 1301 GEOPAK DRAINAGE OUTPUT					
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	DETENTION	POND #1			DETENTION	N POND #3								
POINT #	Х	Y	ELEV.	POINT #	X	Y	FLEV.			DETENT	ION POND	#1		
<u>S1</u>	2892933.38	1.3679448-12	102.20		2888075 23	13685130 67	102 50			HYDR,	AULIC DAI			1 4 5
52	2892873.72	13679509-62	102.20		2888060 92	13685120 15	102.50		STORACE PR	OVIDED A	EQUIRED	(AC-FI)	Т	1.45
<u> </u>	2892807 07	13679623 25	102.20		2000000.92	17005120.15	102.50		WF 1	IR FLEVAT	ION (FFF	<u>z (ac i</u> T)	17	$\frac{1.13}{102.0}$
55 57	2892770 55	13679618 /9	102.20		2888035.85	13685040.06	102.50		RESTRIC	TOR PIPE	SIZE (II	nches)		18
57 55	2802711 55	13670406 55	102.20		2888045.35	13685021.37	102.50		PON	D SURFACE	E AREA (A	(C)		0.53
55	2092711.33	13670301 07	102.20	<u>S5</u>	2888585.67	13684697.48	102.50						I	
50	2092725.05	17670400 41	102.20	- <u>S6</u>	2888610.56	13684705.14	102.50			DETENT	ION POND	#2		
51	2892928.89	13679408.41	102.20	S7	2888701.76	13685112.39	102.50			HYDR	AULIC DAI	ГА		
58	2892923.02	13679428.92	98.95	S8	2888687.12	13685130.67	102.50		DESIGN S	STORAGE R	EQUIRED	(AC-FT)		4.97
59	2892803.60	13679497.97	98.90	S9	2888075.23	13685118.67	99.50		STORAGE PR	OVIDED A	F = 102.	0 (AC-F	T)	6.34
S10	2892790.31	13679605.08	98.85	S10	2888072.37	13685116.56	99.50	-	WE !	IR ELEVAI	ION (FEE			100.8
S11	2892725.63	13679381.87	98.95	S11	2888047.31	13685036.48	99.50	-		D SUDEACE	SIZE (II			$\frac{3-24}{205}$
S12	2892889.22	13679337.89	102.20	S12	2888049,20	13685032,74	99,50		I UN	D SUN ACL	_ ANLA (A			2.03
S13	2892913.73	13679352.02	102.20		2888593 87	13684706 23	99 50					<i>щ</i> 7		
		DOND #0		S1 /	2888508 85	13684707 77	99.50			UETENT	ION POND	+ S		
	DETENTION	POND #2		S14 C15	2000550.05	13695115 01	00 50	— Г	DESIGNIS	TORAGE R	FOLITE DAT	А (АС-ЕТ)		5 86
POINT #	X	Y	FLEV		2000090.03	17005110.07	99.50		STORAGE PR	OVIDED AT	$E_{\rm E} = 102$.	5 (AC-F)	T)	6.92
	2002342 73	13670720 07	1.02.00		2888687.12	13685118.67	99.50		WEI	R ELEVAT	ION (FEE)	Γ)		102
	2092342.73	17079720.07	102.00		2888064.61	13685075.03	99.00		RESTRIC	TOR PIPE	SIZE (Ir	nches)		2-18
	2892361.11	13679730.66	102.00	<u></u>	2888366.63	13684887.52	99.00		PONI) SURFACE	AREA (A	С)		4.44
53	2892578.05	13679672.34	102.00	<u> </u>	2888639.92	13684901.04	99.00							
54	2892588.69	13679654.15	102.00	<u>\$20</u>	2888410.34	13685012.93	98.85							
55	2892497.13	13679295.67	102.00	S21	2888422.25	13685047.11	98.80						ATE .	DESCRIPTIO
S6	2892478.72	13679284.89	102.00	S22	2888445.09	13685112.62	98.72							
S7	2892255.86	13679397.22	102.00	S23	2888200.62	13684985.38	99.00) (
S8	2892260.88	13679415.86	102.00	S24	2888237.38	13685061.54	98.90					Plan	nners-Engine	eers-Program
S9	2892270.33	13679404.64	98.34	S25	2888431.89	13685118.67	99.50						15915 Katy Houstor	Freeway, Su n, Texas 770
S10	2892478.71	13679309.28	98.50	S26	2888461.89	13685118.67	99.50					TBPE	E FIRM REG	SISTRATION
S11	2892562.70	13679654.31	98.40	DETEN	NTION POND #1	CURVE DATA		 Deten	TION POND #3	CURVE DAT	Ā			
S12	2892409.85	13679518.33	98.28							LENGTH	FLEVATI	CITY DEPARTMENT O	OF W	HARTC
S13	2892351.11	13679666.55	98.23	CURVE :	# RADIUS (FT) LENGTH EL	LEVATI	CURVE #	RADIUS (FT)	(FT)	ON (FT)			
S14	2892399.01	13679653.66	98.25	SC-1	20,00	46.79 1	02.20	C 1	15.00	19.01	102.50	SUBMITTED:		DESIGN
S15	2892257.14	13679344.15	102,00	SC-2	20.00	31.59 1	02.20	C2	15.00	23.21	102.50	SCALE: DATE:		DRAWN
S16	2892246.53	13679362.54	102.00	SC-3	20.00	31.42 1	02.20	C3	15.00	31.61	102.50	SURVEYED B	Y:	CITY D
<u> </u>	2892320 00	13679393 17	98 32					С4	35.00	62.69	102.50			
<u> </u>	2892343 68	13679677 40	99 00		NTION POND #2	CURVE DATA	_	С5	3.00	3.80	99.50	Te	exas Depar	rtment of T
<pre>\$10</pre>	2892342 52	13679673 00	99.00	CURVF #	RADIUS I	LENGTH ELEVATI		С6	3.00	4.64	99.50	-		
515 620	2002371 10	13670660 14	<u> </u>		(FT)	(FI) ON (FT)	┥ └	С7	3.00	6.31	99.50		TENTIO	N POND
S2U 521	2002710 10	13670665 20	99.00		15.00	23.56 102.00	┨ ┣	С8	3.00	5.37	99.50			<u> </u>
	2092340.40	17070000.20	99.00		15.00	25.51 102.00	┨ ┣	С9	1502.00	626.38	99.50	FED.RD. DIV.NO.	Р	PROJECT NC
522	136/9665.20	136/9660.25	99.00		15.00	23.13 102.00	1 L	C10	1490.00	621.26	102.50	6	SEE	TITLE SH
				SU-4	15.00	23.39 102.00						STATE	DIST.	(

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	15915 Kat	y Freeway, Suite	∍ 300 4		
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	NT OF PUBLIC WC	RKS AND ENGINEER			
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104 SUBMITTE	ED:	DESIGNED	BY:		
SCALE:		DRAWN BY	:		
SURVEYED) BY:	CITY DWG	NO:		
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DISCLAIMER: The use of this standard is go tind is made by TxDOT for any

HL9.	S LC	DAD	ING						
Texas Department	of Tra	insp	oortation	E L S	Bridge Division Standard				
MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS									
	I	MC	C-MD						
FILE: mc-mdste.dgn	DN: GAF		ск: LMW dw	BWH/Txl	DOT CK: GAF				
CTxDOT February 2010	CONT	SECT	JOB		HIGHWAY				
REVISIONS	1412	03	038	F	M 1301				
	DIST		COUNTY		SHEET NO.				
	YKM		WHARTON	1	158				



No warranty of any isibility for the conv JISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Acf". ind is made by TXDOT any purpose whatsever. TXDOT assumes no respon-tion to made a theore for any or for how whatsever. (1) 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 traffic rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

(2) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

Curb, Wingwall or Safety End Treatment reinforcing shall extend into concrete closure. Any reinforcing that does not fit into the closure shall be bent or trimmed as necessary.

(4) Cast-in-place concrete closure shall be 3'-0" min. Boxes shall be cast short or broken back in the field. All reinforcing in the closure shall be the same size and spacing as in the precast box section. Except where shown otherwise, the cast-in-place closure shall be flush with the inside and outside faces of the precast box section.

(5) For multiple unit placements the length of the closure for the interior walls may be adjusted as necessary. The length of the top slab, bottom slab, and exterior wall closure shall not be less than 3'-0". See Section B-B detail when interior walls are cast full length.

6 Precast box reinforcing shall extend a minimum of 1'-0" into concrete closure (Typ).

(7) Bands of reinforcing matching the inside and outside face reinforcing shall be placed in the gaps of the top and bottom slabs. A band matching the outside face reinforcing of the wall shall be placed in the gaps of the walls (placed in the outside) face only). The bands shall be tack welded to the exposed reinforcing at each point of contact.

8 For vehicle safety, the following requirements must be met: - For structures without bridge rail, curbs shall project no more than 3" above finished grade.

For structures with bridge rail, curbs shall be flush with finished grade.

Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

Cement Stabilized Backfill between boxes is considered part of the Box Culvert for payment.

All curb concrete and reinforcing is considered part of the Box Culvert for payment.

Any additional concrete and reinforcing required for the closures shall be considered as subsidiary to the Concrete Box Culvert.

1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.

(13) For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in DETAIL "A".

(14) This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the Item, "Concrete Structures".

Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert. Refer to the Single Box Culverts Precast standard for details

The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.

HL93 LOADING

Texas Department	of Tra	ansp	portation	E L S	Bridge Division Standard					
BOX C	UL	VE	RTS							
PRECAST										
MISCELLANEOUS DETAILS										
		S	CP-MD	1						
FILE: scpmdste.dgn	dn: GAF		ск: LMW DW: E	WH/TxE	ООТ ск: GAF					
CTxDOT February 2010	CONT	SECT	JOB		HIGHWAY					
REVISIONS	1412	03	038	F	M 1301					
	DIST		COUNTY		SHEET NO.					
	YKM		WHARTON		159					







Spaced at 12" Max

0



OPTIONAL BARS L (#5) 37 Spaced at 12" Max



- "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 7" thick, see SCP-MD standard for additional details.
- 2 Adjust normal culvert slab bars as necessary to clear obstructions.
- (3) Place bars L as shown. Tilt hook as necessary to maintain cover.
- Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
- 5 Additional bars H(#4) as required to maintain 12" Max spacing.
- 6 Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
- Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
- B Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)									
Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)							
1'-0"	0.037	8.9							
1'-6"	0.056	14.3							
2'-0"	0.074	15.4							
2'-6"	0.093	17.7							
3'-0"	0.111	18.8							
3'-6"	0.130	21.2							
4'-0"	0.148	22.2							
4'-6"	0.167	24.6							
5'-0"	0.185	25.6							

1/4" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade. MATERIAL NOTES: Provide Grade 60 reinforcing steel. Provide Class "C" concrete (fc = 3,600 psi) minimum for curbs. GENERAL NOTES: Designed according to AASHTO LRFD Bridge Design Specifications. These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR1, PR2 and PR3

CONSTRUCTION NOTES: Adjust reinforcing steel as necessary to provide 1

These details are suitable for use with PR1, PR2 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard. This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

T exas Department of Transportation									
EXTENDED C	UF	RB	DET	AIL	_S				
FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL									
ECD									
FILE: ecdstde1.dgn	dn: GA	۶F	ск: ТхDOT	DW: T	xDOT	ск: GAF			
CTxDOT February 2010	CONT	SECT	JOB		н	GHWAY			
REVISIONS	1412	03	038		FΜ	1301			
03-16: General Notes added T631-CM.	DIST		COUNTY			SHEET NO.			
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D G N STDD2













GENERAL NOTES:

Base Course under Concrete Pavement shall be full depth and shall conform to surface depression details.

Texas Department of Transportation Houston District											
GUTTER DEPRESSION DETAILS FOR CURB INLETS GD											
FILE: STDD12.DGN (n: TxDOT	ск:TxDOT	DW: TxDOT	ск:ТхDOT	STD:						
© TxDOT Mar 2004	DIST	FED REG	PROJ	ECT NO.		SHEET					
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		COUNTY	со	NTROL SECT	JOB	HIGHWAY					
		WHART	ON 1	412 03	038	FM130					



		REINFORCED CONCRI	ETE PIPE
		EXCAVATION AND BACKFILL	QUANTITIES
PIPE DIA.	Т	CULVERT OR SEWER EXCAVATION IN A PAVED OR GRADED AREA	CEMENT STABILIZED BACKFILL IN A PAVED OR GRADED AREA
IN.	FT.	C.Y.PER L.F.PER FT.OF DEPTH	C.Y.PER L.F. OF PIPE
18	0.19	0.144	0.383
24	0.23	0.165	0.478
30	0.29	0.188	0.586
36	0.33	0.210	0.692
42	0.38	0.231	0.808
48	0.42	0.327	1.394
54	0.46	0.349	1.560
60	0.50	0.370	1.731
66	0.54	0.392	1.907
72	0.58	0.414	2.088
78	0.62	0.435	2.275
84	0.67	0.457	2.474

€ Box Sewer or Box Culvert

NOTE:

Cement stabilized backfill may be omitted in private driveways as indicated elsewhere in the plans.

PIPE DIA.

IN.

36

42

48

60

66

MONOLITHIC PIPE

EXCAVATION QUANTITIES

FΤ.

0.417

0.458

0.583

0.458

0,583

54 0.500

72 0.625

78 0.625 84 0.625

EXCAVATION

C.Y.PER L.F.PER FT.OF DEPTH

0.142

0.164

0.182

0.204

0.228

0.247

0.269

0.287

0.306

Rubber gaskets shall be required for all joints on proposed cross drainage, pipe culverts and proposed storm sewer systems, unless otherwise shown in the plans.

* Backfill with cement stabilized material will be required for all structures under detours unless noted otherwise in the General Notes.

SHEET 1 OF 2

Texas Department of Transportation Houston District EXCAVATION AND BACKFILL DIAGRAMS E&BD

	FILE: STDE1.DGN	DN: Tx	Dot	ск: TxDot	DW: TxDot	CK: TxDot
	© TxDOT FEB 2010	DIST	FED RE	G P	ROJECT NO.	SHEET
s	REVISIONS REVISED 11/05	YKM				163
	REVISED 272010 Added note to Table 1, Sht 2 of 2.		COUN	TΥ	CONTROL SECT	JOB HIGHWAY
er	REVISED 6/12 REVISED 9/14		WHA	RTON	1412 03	038FM130

D = Depth H = Height T = Thickness R = Radius Dia = Diamet







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 Culvert. Details of Concrete Pipe Culvert are similar.)



Details of Corrugated Metal Pipe Culvert are similar. Pipe Runners not shown for clarity)



Showing installation with no skew	٧.)
-----------------------------------	----	--	---

	Pipe	Cross						Pipe Runn	er Length					
	Culvert	Pipe		3:1 Sid	de Slope			4:1 Sic	le Slope			6:1 Sic	le Slope	
	Spa ~ G	Length	0° Skew	15° Skew	30° Skev	w 45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
	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"
	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″
	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"
	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"
	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"
	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"
	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
	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
	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) CONDITIONS WHERE PIPE RUNNER ARE NOT REQUIRED										ERS 2	STA MAX	NDARD P PIPE RUN	IPE SIZE	S & 1 GTHS
	Side Slope	0° Skew	15° Skew	30° Skew	45° Skew	Nominal Culver† I.D.	S Pipe	ingle Culvert	Mulf Pipe C	tiple ulverts	Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
	3:1	3:1	3.106:1	3.464:1	4.243:1	12" thru 2	1" Skews	thru 45°	Skews	thru 45°	2" STD	2.375"	2.067"	N/A
	4:1	4:1	4.141:1	4.619:1	5.657:1	24"	Skews	thru 45°	Skews	thru 30°	3" STD	3.500"	3.068"	10'- 0"
	6:1	6:1	6.212:1	6.928:1	8.485:1	27"	Skews	thru 30°	Skews	thru 15°	4" STD	4.500"	4.026"	19'- 8"
						30"	Skews	thru 15°	Skews	thru 15°	5" STD	5.563"	5.047"	34'- 2"
						33"	Skews	thru 15°	Always	required				
						36"	Norma	(No Skew)	Always	required				
						42" to 60	" Always	s required	Always	required				
						ESTIMATED	CONCREI	E RIPRA	P QUANTI	TIES (CY) (5)			
		Nominal Culvert		3:1 Sid	de Slope			4:1 Sic	le Slope			6:1 Sic	le Slope	
		I.D.	0° Skew	15° Skew	30° Skev	w 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

(1)Size of Pipe Runner shall be as shown in the tables. Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out and Bottom Anchor Pipe shall be the next smaller size pipe as shown in the STANDARD PIPE SIZES table.

15"

18"

21"

24"

27"

30"

33"

36"

42"

48'

54"

60"

0.5

0.5

0.6

0.6

0.7

0.8

0.8

0.9

1.0

1.1

1.3

1.4

0.5

0.5

0.6

0.7

0.7

0.8

0.8

0.9

1.0

1.1

1.3

N/A

0.5

0.6

0.6

0.7

0.8

0.8

0.9

0.9

1.1

1.2

N/A

N/A

0.6

0.6

0.7

0.8

0.9

0.9

1.0

1.1

1.3

N/A

N/A

N/A

0.6

0.6

0.7

0.8

0.8

0.9

1.0

1.1

1.2

1.4

1.6

1.7

(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 Pipe Culvert End

Nominal

Culvert I.D.

24"

27" 30" 33" 36"

42" 48"

54"

60"

- (4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced Concrete Pipe (5)Culvert. For multiple Pipe Culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

(1)(2)

4:1 Sid	le Slope			6:1 Sic	le Slope	
15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
0.5	0.5	0.6	0.7	0.7	0.7	0.8
0.6	0.6	0.7	0.7	0.7	0.8	0.9
0.7	0.7	0.8	0.8	0.8	0.9	1.0
0.7	0.8	0.9	0.9	0.9	1.0	1.2
0.8	0.8	1.0	1.0	1.0	1.1	1.3
0.9	0.9	1.1	1.1	1.1	1.2	1.4
0.9	1.0	1.2	1.2	1.2	1.3	1.6
1.0	1.1	1.3	1.3	1.4	1.5	1.7
1.1	1.2	1.4	1.4	1.5	1.6	1.8
1.3	1.3	1.6	1.6	1.7	1.8	2.1
1.4	1.5	NZA	1.9	1.9	2.1	NZA
1.6	N/A	N/A	2.1	2.1	N/A	N/A
N/A	N/A	N/A	2.3	N/A	N/A	N/A





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LENG	THS, RE	EQUIRED) PIPE	SIZES, & RIPRAP QUAN	rities 🕗
ipe vert p ~ G	Single Barrel ~ Q1	Multi- Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
9"	N/A	2'-1"	1'- 9"		
11"	N/A	2'- 5"	2'- 2"		
- 2"	N/A	2'-10"	2'- 8"	3 or more Pipe Culverts	3" Std
- 4"	N/A	3'- 2"	3'-1"		
- 7"	N/A	3'- 6"	3'- 7"		
- 8"	N/A	3'-10"	3′-11″	3 or more Pipe Culverts	
-10"	N/A	4'- 2"	4'-4"	2 or more Pipe Culverts	$3 \frac{1}{2}$ " Std
-11"	4'- 2"	4'- 5"	4'-8"	All Pipe Culverts	(4.000 0.0.)
- 1"	4'- 5"	4'- 9"	5'-1"		4" S†d
- 4"	4′-11″	5'- 5"	5′-10"	ATT PIpe Curverts	(4.500" O.D.)
- 7"	5'- 5"	6'- 0"	6'- 7"		
- 0"	5'-11"	6'- 9"	7'- 6"		5" Std
- 3"	6'- 5"	7'- 4"	8'- 3"	All Pipe Culverts	(5.563" O.D.)
- 3"	6'-11"	7'-10"	8'- 9"		
- 4"	7'- 5"	8'- 5"	9'- 4"		

- (1) The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
- (2) Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be $3 \frac{1}{2}$ " Standard Pipe (4" 0.D.).
- (3) The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.
- (4) Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
- Slope of 6:1 or flatter is required for vehicle safety.
 Riprop placed beyond the limits shown will be paid as
- Concrete Riprap in accordance with Item 432, "Riprap".
- 6 Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap". 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. Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52. Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department	of Tra	ansp	ortation	,	Bridge Division Standard
SAFETY ENI FOR 12" DI PIPE TYPE II ~ PARA	D T A TC CUL	RE) 72 VEF L D	ATM " DIA RTS RAINA	EN ⁻ GE	Г
	S	SE.	TP-P	D	
FILE: setppdse.dgn	dn: GA	F	ск: САТ	ow: JRP	ск: GAF
CTxDOT February 2010	CONT	SECT	JOB		HIGHWAY
REVISIONS	1412	03	038		FM 1301
11-10: Add note for synthetic fibers.	DIST		COUNTY		SHEET NO.
-	YKM		WHARTO	ON	167



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"0"	MAXIMUM	MINIMUM LENGTH	PIPE RU REQU	NNERS IIRED	RE RU	QUIRED PIP INNER SIZE	E S
1	SLOPE	OF UNIT	SINGLE PIPE	MULTIPLE PIPE	NOMINAL DIA.	O.D.	I.D.
17"	6:1	4'-9"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
20.50"	6:1	6'-5"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
24"	6:1	8'-0"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
31"	6:1	11'-3"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
38.50"	6:1	14'-8"	No	Yes	4" STD	4.500"	4.026"
45.50"	6:1	17'-11"	Yes	Yes	4" STD	4.500"	4.026"
52.50"	6:1	21'-2"	Yes	Yes	4" STD	4.500"	4.026"

① Dimension "D" is based on Reinforced Concrete Pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For Thermoplastic Pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

3 Toewall to be used only when dimension is shown elsewhere in the plans.

4 Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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.

Manufacture this product in accordance with Item "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished, as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside

Parallel-Drainage Structures", Texas Transportation Institute, March 1981. Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance

with the specifications. Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See PBGC standard for grouted connections with TP and precast safety end treatment.

Texas Department	of Tra	ansp	ortation	1	B D S	Pridge Division Standard
PRECAST S	AF	ET	Y EN	ID)	
TREATM	1EN	IT				
TYPE II ~ PARA	LLE	LD	RAIN	A	ΞE	
	F	PS	ET-S	Ρ		
FILE: psetspss-18.dgn	DN: RL	V	ск: KLR	DW:	JTR	ск: GAF
CTxDOT February 2010	CONT	SECT	JOB			HIGHWAY
REVISIONS	1412	03	038		F	M 1301
11-10: Add note for synthetic fibers. 09-18: Added Thermoplastic Pipe in table.	DIST		COUNTY	r		SHEET NO
	YKM WHARTON				168	



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NF NTS	MAXIMUM	MINIMUM LENGTH	PIPE R REQU	UNNERS IRED	RE(RU	QUIRED PI NNER SIZ	IPE ES
f† ?)	SLOPE	OF UNIT	SINGLE PIPE	MULTIPLE PIPE	NOMINAL DIA.	0.D.	I.D.
RC.	6:1	4′-0"	No	Yes, for ≻2 pipes	3" STD	3.500"	3.068"
RC.	6:1	5'-8"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
۲C.	6:1	7'-3"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
₹C.	6:1	10'-6"	No	Yes, for >2 pipes	3" STD	3.500"	3.068"
.	6:1	12'-1"	No	Yes	4" STD	4.500"	4.026"
[P.	6:1	15'-4"	Yes	Yes	4" STD	4.500"	4.026"
P.	6:1	18′-7"	Yes	Yes	4" STD	4.500"	4.026"

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment". When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on

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.

All precast concrete end sections shall be manufactured in accordance with Item "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe. Precast concrete end sections shall be provided with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of

loading, unloading and installation. Pipe Runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute,

Pipe Runners shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52. All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.













inCore ersion	° 3.1	Cou Higi CSJ	inty Wharton hway FM102 J 0709-02-048	Hole Structure Station Offset		BR-1 Bridge 53+23.4 LT 34.08	3			District N Date 9 Grnd. Elev. 1 GW Elev.	Yoakum)/10/2012 00.57 ft N/A
E 1	L	Texas Cone	State Description	T	riaxia	al Test Deviator		Propert	ies Wot		
elev. (ft)	G	Penetrometer	Strata Description	Pn (p	ess. si)	Stress (psi)	MC	LL PI	Den. (pcf)	Additi	onai Remarks
8.1			CLAY, Lean, brown (CL)				8			% passing #	200: 89
 Б		8 (6) 8 (6)	CLAY, Sandy, soft, brown (CL)				8	31 10		-	
5							12				
3.1	Ľ		CLAY, Fat, soft to very stiff,)	32.2	22		129		
10	'±	0 (0) 0 (0)	(CH)	uicə							
							30	66 42		_	
1	;≁	7 (6) 6 (6)									
	Y])	32.7	23		128		
2.1 2(,ŧ	6 (6) 5 (6)	CLAY, Sandy, soft, reddish brow	/n							
9.1	E		CLAY, Fat, soft to very stiff,				24	36 18		-	
	. 1	6 (6) 6 (6)	light brown (CH)	<u> </u> 1	6	29.3	30		126	-	
5.1 ^{Z:}	Έ		CLAY, Fat, soft to stiff, reddish	(CLD)							
			brown w/ calcareous nodules	(CH)	19	23	35		120		
30	Ľ	0 (0) 0 (0)									
	1						33	73 47	,	-	
3	51	7 (6) 7 (6)			94	21.2	31		121		
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40	之	7 (6) 7 (6)					22	co 25			
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-+. 3.6	Ľ	1									
	_	8 (6) 10 (6)	SAND, Clayey, loose, light brown (SC)	n			19	18 2		_% passing #	200: 35
).1 ⁵⁰)- (1)- (1)- (1)- (1)- (1)- (1)- (1)- (1		SAND, Silty, slightly compact								
			to compact, reddish brown w/ (SM)	gravel			14			% passing #	200: 24
55	; -	25 (6) 30 (6)									
	-						10			% passing #	200+ 23
6(14 (6) 16 (6)					19			_ ≫ passing #	200: 23
Rema	rks: V r	Vater was encount espectively.	ered at 24 feet below existing gra	de during	drillir	ng operat	ions;	at 18.9 a	and 15.5	feet after 5 an	d 10 minutes,
The g	round	water elevation was	not determined during the course	of this borin	g.						
Drille	r• Var	9 Sone	Logger EN					Oraa	nization		too Ino

≠		DRILL	ING LO	G	2 of 2						
Core on 3.1	Cou Higi CSJ	nty Wharton Hole Iway FM102 Struct 0709-02-048 Statio Offset	BR-1 ture Bridge n 53+23.4 t LT 34.03	3	District Yoakum Date 9/10/2012 Grnd. Elev. 100.57 ft GW Elev. N/A		DRILLING "FINAL GE FM 102 RE PHASE I 8	LOGS AR OTECHNI LOCATED	E REPRODUCED CAL INVESTIG AND GRADE S RTON, TEXAS"	FROM ATION EPARATI	on:
lev. O ft) G	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Deviator Press. Stress (nsi) (nsi)	Properties We MC LL PI Der	t Additional Remarks		REPORT NO PREPARED DATED MAF). HG111 BY HVJ RCH 6, 2	2220 ASSOCIATES, 2015.	INC.	
-		SAND, Silty, slightly compact to compact, reddish brown w/ gravel		15							
65 -	24 (6) 15 (6)	(SM)									
				14	% passing #200: 13						
70 -	29 (6) 32 (6)										
		SAND, w/ Silt, loose to compact, brown w/ gravel (SP-SM)									
75 -	20 (6) 25 (6)			7	% passing #200: 7						
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80	6 (6) 9 (6)		-				OR PERMIT BY OR UND	PURPOS	ES. THEY WEF SUPERVISION (KE PREP#)F:	1KE
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							SUBMITTED	9/3/202		۲ BY: RI	18
120			in a duittin		F 4	-	SCALE: N.T. DATE: 9/3/2	S. 020	DRAWN BY	: LTT	-
rnarks: W	ater was encount spectively.	ereu al 24 teet below existing grade dur	ing arilling opera	uons; at 18.9 and 15	5 leet after 5 and 10 minutes,		NBI NO: 13-241-0-1	412-03-	SURVEYED	BY: TT-ZOLL	AR
e ground v	vater elevation was	not determined during the course of this b	oring.							() z
riller: Van	& Sons	Logger: SN		Organizatio	n: HVJ Associates, Inc.		Te	xas Dep	artment of Tra	ansporta	tic
HOUSTONIH	IOU PS\GEO\PROJECTS	2011\HG1112220, FM 102 Relocation, IDC\WinCore Ph	ase 1\FM102 Bridge(Pha	se 1).CLG			FM	1301 0	VERPASS AT	KCSRR	
							SOIL	BOR	ING DATA	- BR	- 1
							FED. RD.		DDO IEGT NG	SHEET	
							DIV.NO.		PROJECT NO.		\vdash
							STATE	DIST.	со	UNTY	<u> </u>
							TEXAS	YKM	WHA		
							CONT.	SECT.	JOB	HIGHW	AY

VinC /ersid	ore on 3.1	1	Cou Higi CS	ınty Wharton hway FM102 J 0709-02-048	Hole Structure Station Offset	BR-2 Bridge 50+73.7 RT 36.2	76 19		vistrict Yoakum Vate 9/11/2012 Grnd. Elev. 100.47 ft GW Elev. N/A	
		L	Texas Cone		Tria	xial Test		Propertie	es Wot	· · · · · · · · ·
Ele (fi	e v. t)	0 G	Penetrometer	Strata Description	Press (psi)	a Deviator s. Stress (psi)	MC	ll pi	Den. (pcf)	Additional Remarks
98.	-			CLAT, Salidy, Drown w/ Tools (CL)	'		7	32 13		-
	5 -		13 (6) 14 (6)	CLAY, Lean, stiff to hard, brown and gray (CL)	0	183.8	18		128	-
	-						16			% Passing #200: 93
91.5	- 10 -	٢	5 (6) 7 (6)	CLAY, Fat, soft to stiff, reddish				F0 0 1		
	-	7		brown w/ calcareous nodules (C	:H)		26	59 34		
	- - 15 -	7	5 (6) 5 (6)				29			-
		Ι			0	25.5	31		121	-
	- - 20 -	7	7 (6) 7 (6)							
80.	-	7		CLAY, Silty, soft, reddish brown (CL-ML)	0	10.4	21 25		125	-
		1	6 (6) 7 (6)	(,						
75.	25 -	5		CLAY, Fat, soft to very stiff,	duloe		32	71 41		-
		1	7 (6) 7 (6)	(CH)	19	28.6	32		119	-
	30 -	7								
	-		6 (6) 8 (6)		23	25.2	35		118	-
	35 -	7	0 (0) 0 (0)							
	-	1	7 (6) 9 (6)				34	64 36		-
	40 - -	Ζ	7 (0) 8 (0)	-	27	20	33		120	-
	-	7	a (a) 4a (a)				33			-
	45 - -	И	9 (6) 10 (6)		34	34 7	20		124	
	-	1	0 (0) 44 (0)						147	
50.	50 - -		8 (6) 11 (6)	SAND, Clayey, compact, dark brow	wn					
	-			(SC)			22			% Passing #200: 34
45.	55 -		23 (6) 18 (6)	SAND, w/ Silt, slightly compact.			45			
	-			brown w/ gravel (SP-SM)			15			
Per	60 -	- M	18 (6) 14 (6)	ered at 22 feet below evicting great	la durina dri	lling opera	tioner	at 17 2 ~*	nd 15 0	foot after 5 and 10 minutes
The	e grou	s: w re und v	spectively. vater elevation was	s not determined during the course of	this boring.	ning opera	uons;	at 17.2 âl	iu 15.8	icet aiter 5 anu 10 minutes,
	iller	Van	& Sone	Logger: SN				Organi	ization	UV LAssociatos Inc

	DRI	ILLING LOG		2 of 2			
ore F on 3.1 C	ounty Wharton ighway FM102 SJ 0709-02-048	HoleBR-2StructureBridgeStation50+73.76OffsetRT 36.29	District Yo Date 9/1 Grnd. Elev. 10 GW Elev. N	akum 11/2012 0.47 ft A	DRILLING "FINAL GE FM 102 RE PHASE I 8	LOGS ARE REPR OTECHNICAL IN LOCATED AND G	ODUCED FROM VESTIGATION RADE SEPARATIO TEXAS".
ev. D G Penetromet	Strata Description	Triaxial Test Lateral Deviator Press. Stress (psi) (psi)	Properties Wet LL PI Den. (pcf)	nal Remarks	REPORT NO PREPARED DATED MAR). HG1112220 BY HVJ ASSOCI RCH 6, 2015.	ATES, INC.
	SAND, w/ Silt, slightly compact, brown w/ gravel (SP-SM)	9	% Passing #2	00: 6			
65 12 (6) 18 (6)	_						
70 <u>18 (6) 14 (6)</u>	_	15	% Passing #2	00: 11			
 12 (6) 16 (6)		7	% Passing #2	00: 5			
75 80 <u>13 (6) 15 (6) _</u>		12	% Passing #2	00: 10	THESE DOC NOT INTEN OR PERMIT BY OR UND	UMENTS ARE FO DED FOR CONST PURPOSES. TH ER THE SUPERV	R DESIGN REVIEW RUCTION, BIDDIN HEY WERE PREPAF ISION OF:
					BRIAN S.	KUEHL	97313 9/3/2
85					TYPE OR P	RINT NAME PI	E # DATE
90 -					HL93 LOADI	NG	
95 -					REV. NO. DA		
100-)()(
					Plan	ners-Engineers-Pr 15915 Katy Freew	rogram Managers
105					ТВРЕ	Houston, Texa	as 77094 ATION NO. F-6825
110					Jac		205 BEE CAVE RD, SUI JSTIN TX 78746 RM REGISTRATION F-2
					CITY	OF WHA	RTON
	1					9/3/2020	SIGNED BY: RIS
- - 115- - -							
115- 120- 120-	ntered at 22 feet below existing grad	le during drilling operations:	at 17.2 and 15.8 feet after 5 and	10 minutes,	DATE: 9/3/2	2020	RAWN BY: LTT
115- 120- marks: Water was encourrespectively.	ntered at 22 feet below existing grad	de during drilling operations	at 17.2 and 15.8 feet after 5 and	10 minutes,	DATE: 9/3/2 NBI NO: 13-241-0-1	412-03-027	RAWN BY: LTT JRVEYED BY: HUITT-ZOLLAN
115- 120- narks: Water was encourrespectively. ground water elevation v	ntered at 22 feet below existing grad	de during drilling operations; f this boring.	at 17.2 and 15.8 feet after 5 and	10 minutes,	DATE: 9/3/2 NBI NO: 13-241-0-1	412-03-027	RAWN BY: LTT JRVEYED BY: HUITT-ZOLLAN
115- 120- 120- narks: Water was encourse respectively. ground water elevation water ler: Van & Sons OUSTONIHOU PSIGEOUPROJEO	ntered at 22 feet below existing grad	de during drilling operations; f this boring. Core Phase 1\FM102 Bridge(Phase 1).C	at 17.2 and 15.8 feet after 5 and Organization: HVJ Associate	10 minutes, s, Inc.	SCALE: N.I. DATE: 9/3/2 NBI NO: 13-241-0-1 Te	xas Department	RAWN BY: LTT JRVEYED BY: HUITT-ZOLLAN of Transportati SS AT KCSRR
III5- III5- III5- III5- III5- III5- III5- III5- III5- II II5- II5- II5- II5- II5- II5- II5- II5- II II II II II II II II II II II II II	ntered at 22 feet below existing grad ras not determined during the course of Logger: SN 2TSI/2011/HG1112220, FM 102 Relocation, IDC/Win/	de during drilling operations; f this boring. Core Phase 1\FM102 Bridge(Phase 1).C	at 17.2 and 15.8 feet after 5 and Organization: HVJ Associate	10 minutes, s, Inc.	SUALE: N. I. DATE: 9/3/2 NBI NO: 13-241-0-1 Te FM SOIL	xas Department 1301 OVERPA	RAWN BY: LTT IRVEYED BY: HUITT-ZOLLAN © f of Transportation SS AT KCSRR DATA - BR-
III5- III5- III5- III5- III5- III15- III III	ntered at 22 feet below existing grad ras not determined during the course of Logger: SN CTSI/2011/HG1112220, FM 102 Relocation, IDC/Win	de during drilling operations; f this boring. Core Phase 1\FM102 Bridge(Phase 1).C	at 17.2 and 15.8 feet after 5 and Organization: HVJ Associate	10 minutes, s, Inc.	SCALE: N. I. DATE: 9/3/2 NBI NO: 13-241-0-1 Te FM SOIL	xas Department 1301 OVERPA BORING E	RAWN BY: LTT IRVEYED BY: HUITT-ZOLLAN of Transportation SS AT KCSRR DATA - BR- SHEET 2
III5- III5- III70- Iarks: Water was encourrespectively. ground water elevation v Ier: Van & Sons	ntered at 22 feet below existing grad ras not determined during the course of Logger: SN 2TSI20111HG1112220, FM 102 Relocation, IDCWin	de during drilling operations; f this boring. Core Phase 1\FM102 Bridge(Phase 1).C	at 17.2 and 15.8 feet after 5 and Organization: HVJ Associate	10 minutes, s, Inc.	SCALE: N. I. DATE: 9/3/2 NBI NO: 13-241-0-1 Te FED. RD. DIV. NO. 6	xas Department 1301 OVERPA BORING E	RAWN BY: LTT IRVEYED BY: HUITT-ZOLLAF of Transportati SS AT KCSRR DATA - BR- SHEET 2 CT NO.
120- 120- 120- 120- 120- 120- 120- respectively. ground water elevation v ler: Van & Sons DUSTONIHOU PSIGEOUPROJE	ntered at 22 feet below existing grad ras not determined during the course of Logger: SN 3TS120111HG1112220, FM 102 Relocation, IDCIWin	de during drilling operations, f this boring. Core Phase 11FM102 Bridge(Phase 1).C	at 17.2 and 15.8 feet after 5 and Organization: HVJ Associate	10 minutes, s, Inc.	SCALE: N. I. DATE: 9/3/2 NBI NO: 13-241-0-1 FED.RD. DIV.NO. 6 STATE	All2-03-027 All2-03-027 xas Department 1301 OVERPA BORING D PROJEC DIST.	RAWN BY: LTT IRVEYED BY: HUITT-ZOLLAN of Transportation SS AT KCSRR DATA - BR- SHEET 2 CT NO.
III5- III5- III5- III5- III5- III5- III5- III5- II II II II II II II II II II II II II	ntered at 22 feet below existing grad ras not determined during the course of Logger: SN 2TS/2011/HG1112220, FM 102 Relocation, IDC/Win	de during drilling operations; f this boring. Core Phase 11FM102 Bridge(Phase 1).C	at 17.2 and 15.8 feet after 5 and Organization: HVJ Associate	10 minutes, s, Inc.	SCALE: N. I. DATE: 9/3/2 NBI NO: 13-241-0-1 Te FM SOIL FED. RD. DIV. NO. 6 STATE TEXAS	N.S. DF 2020 SL 412-03-027 SL xas Department 1301 OVERPA BORING D PROJED DIST. YKM	RAWN BY: LTT IRVEYED BY: HUITT-ZOLLAN of Transportation SS AT KCSRR DATA - BR- SHEET 2 CT NO. COUNTY WHARTON



	*		DR	ILLING	LOG		2 of 2					
Bit Busic Code Statu Description Trickal Test Projection Projection 11 Bit Busic Code Statu Description Trickal Code Projection Mail Statu Description 11 Bit Busic Code Statu Description Statu Description Statu Description Statu Description 11 Bit Busic Code Statu Description Statu Description Statu Description Statu Description 11 Bit Busic Code Statu Description Statu Description Statu Description Statu Description 11 Bit Busic Code Statu Description Statu Description Statu Description Statu Description Statu Description 11 Bit Busic Code Statu Description Statu Description <t< th=""><th>Core sion 3.1</th><th>Cou High CSJ</th><th>nty Wharton way FM 1301 0709-02-048</th><th>Hole B Structure B Station 5 Offset R</th><th>NR-3 Gridge 6+23.57 NT 47.89</th><th></th><th>District Yoakum Date 1/6/2014 Grnd. Elev. 99.94 ft GW Elev. N/A</th><th></th><th>DRILLING "FINAL GE FM 102 RE PHASE I 8</th><th>LOGS ARE EOTECHNIC ELOCATED & II WHAF</th><th>E REPRODUCED Cal investig and grade S rton, texas"</th><th>FROM ATION EPARATION</th></t<>	Core sion 3.1	Cou High C S J	nty Wharton way FM 1301 0709-02-048	Hole B Structure B Station 5 Offset R	NR-3 Gridge 6+23.57 NT 47.89		District Yoakum Date 1/6/2014 Grnd. Elev. 99.94 ft GW Elev. N/A		DRILLING "FINAL GE FM 102 RE PHASE I 8	LOGS ARE EOTECHNIC ELOCATED & II WHAF	E REPRODUCED Cal investig and grade S rton, texas"	FROM ATION EPARATION
	lev. O ft) G	Texas Cone Penetrometer	Strata Description	Triaxial Lateral De Press. S (psi) (Test P eviator tress MC psi)	roperties We LL PI Den (pcl	Additional Remarks		REPORT NO PREPARED DATED MAR	D. HG1112 BY HVJ A RCH 6, 20	2220 ASSOCIATES, D15.	INC.
0 1 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 0 10 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24 10 24 24		3 (6) 15 (6)	CLAY, Fat, soft to stiff, brown and gray, w/ calcareous nodul 57'-58' (CH)	es45	22.1 29	56 36 124	_					
reg is 0.25 (0.9) is 0.05 (0.7)			SAND, Silty, compact to dense, light brown (SM)		14		% Passing #200 Sieve: 17.3					
79 450 26 (0) SAMU, will dense, light from, will grave the 77 (0) Skith in the supervise 77 (0	70 - 3	1 (6) 27 (6)			28		_					
ad (0) 50 /2 ad (0) 50 /2 bit downs, light brown, with great light of the second	75 - 4	5 (6) 50 (5)										
	80 4	0 (6) 50 (2)	SAND, w/ Silt, dense, light brow w/ gravel 66'-77' (SP-SM)	/n,	16		% Passing #200 Sieve: 11.6	L C	THESE DOC NOT INTEN DR PERMIT BY OR UND	UMENTS A DED FOR PURPOSE ER THE S	RE FOR DESI CONSTRUCTIO S. THEY WE UPERVISION	GN REVIEW N, BIDDIN RE PREPAR OF:
and and bit and b	85 -							E	RIAN S. TYPE OR P	KUEHL RINT NAM	97313 IE PE #	9/3/2 DATE
99 100 100 10									93 1 0401	NC		
99 100 10	90											
100 1	95 -							RE	/. NO. DA	TE	DESCRIPTION	
100 101 1	100-								$\prod_{\frac{Plan}{}}$	ners-Engir 15915 Katy Housto	Preeway, Suiton, Texas 7709	Managers e 300 4
Image: Signed during drilling operations; at 39 and 38.5 feet after 5 and 10 minutes, respectively E ground water elevation was not determined during the course of this boring. E SUBMITTED: 9/3/2020 SCALE: N. T.S. DRAWN BY: LIT Itile:: Van & Sons Logger: SN Organization: HVJ Associates, Inc. HOUSTONHOU PSGEOPROJECTS2011HHG111220, FM 102 Relocation. IDCWincore Phase 2Bridge (Phase 2).CLG Organization: HVJ Associates, Inc. FM 1301 OVERPASS AT KCSRR SOIL BOR ING DATA - BR-SHEET 3 SOIL BOR ING DATA - BR-SHEET 3	110-								Jac		2705 BEE C AUSTIN TX FIRM REGIS	O. F-6825 CAVE RD, SUI 78746 STRATION F-2
Image: State was encountered at 40 feet below existing grade during drilling operations; at 39 and 38.5 feet after 5 and 10 minutes, respectively SUBMITTED: 9/3/2020 SCALE: N.T.S. DATE: 9/3/2020 SCALE: N.T.S. DATE: 9/3/2020 NBI NO: 13-241-0-1412-03-027 DESIGNED BY: RLS DRAWN BY: LTT e ground water elevation was not determined during the course of this boring. Image: SN Organization: HVJ Associates, Inc. HOUSTONHOU PSIGEOPROJECTS2011H001112220, FM 102 Relocation, IDCWincore Phase 28bridge (Phase 2).0LG Organization: HVJ Associates, Inc. Image: SN Image: SN FM 1301 OVERPASS AT KCSRR SOIL BOR ING DATA - BR-SHEET 3 SHEET 3 FED. RD. PROJECT NO. Image: SN SHEET 3 FED. RD. PROJECT NO. Image: SN SHEET 3	- - 115-							D	CITY EPARTMENT OF	OF V	VHARTOI rks and engineer	
marks: Water was encountered at 40 feet below existing grade during drilling operations; at 39 and 38.5 feet after 5 and 10 minutes, respectively e ground water elevation was not determined during the course of this boring. iiller: Van & Sons Logger: SN Organization: HVJ Associates, Inc. HOUSTONHOU PSIGEOUPROJECTS20111HG1112220, FM 102 Relocation, IDCIWIncore Phase 21Bridge (Phase 2).CLG FM 1301 OVERPASS AT KCSRR SOIL BORING DATA - BR- SHEET 3 FED. RD. FM 0. FM 0. FM 0. STATE DIST. COUNTY	120							SU SC	BMITTED: ALE: N.T.	9/3/2020 .S.	DESIGNED DRAWN BY) BY: RLS (: LTT
e ground water elevation was not determined during the course of this boring. iiller: Van & Sons Logger: SN Organization: HVJ Associates, Inc. HOUSTONHOU PSIGEOIPROJECTSV2011HG1112220, FM 102 Relocation, IDCIWincore Phase 2/Bridge (Phase 2).CLG FM 1301 OVERPASS AT KCSRR SOIL BORING DATA - BR- SHEET 3 FED. RD. DIV. NO. FROJECT NO. 6 STATE DIST. COUNTY	marks: Wat resp	er was encounte pectively	red at 40 feet below existing gra	de during drilling	operations; at	39 and 38.5	feet after 5 and 10 minutes,	DA NB	TE: 9/3/2 I NO: 3-241-0-1	412-03-0) BY: TT-70114F
Image: SN Organization: HVJ Associates, Inc. HOUSTONHOU PSIGEOIPROJECTS/2011/HG1112220, FM 102 Relocation, IDC/Wincore Phase 2/Bridge (Phase 2).CLG FM 1301 OVERPASS AT KCSRR SOIL BORING DATA - BR- SHEET 3 FED. RD. PROJECT NO. 6 STATE STATE DIST.	e ground wa	ter elevation was	not determined during the course	of this boring.								©,
HOUSTONHHOU PSIGEOIPROJECTS20111HG1112220, FM 102 Relocation, IDC/Wincore Phase 2/Bridge (Phase 2).CLG FM 1301 OVERPASS AT KCSRR SOIL BORING DATA - BR- SHEET 3 FED. RD. DIV. NO. FROJECT NO. 6 STATE DIST. COUNTY	iller: Van &	Sons	Logger: SN			Organizatio	n: HVJ Associates, Inc.		Те	exas Depa	irtment of Tr	ansportati
SHEET 3 FED. RD. DIV. NO. FED. RD. DIV. NO. 6 STATE DIST. COUNTY	HOUSTON/HOU	J PS\GEO\PROJECTS\	2011\HG1112220, FM 102 Relocation, IDC\W	incore Phase 2\Bridge (Pf	nase 2)./CLG				fm SOIL	1301 O BOR I	verpass at NG DATA	kcsrr - BR-3
6 STATE DIST. COUNTY									FED.RD.		PROJECT NO.	SHEET 3
STATE DIST. COUNTY									6			
									STATE	DIST.	СС	DUNTY
									TEXAS	YKM	WH.	ARTON

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★		DRILL	ING LC	G	2 of 2					
Core sion 3.1	Cou Higi CSJ	nty Wharton Hole way FM 1301 Struc 0709-02-048 Statio Offse	BR-4 ture Bridge on 56+24,3 t 33.08	District Date I3 Grnd. Ele GW Elev.	Yoakum 1/8/2014 ev. 101.80 ft N/A	DRILLI "FINAL FM 102 PHASE	NG LOGS A GEOTECHN RELOCATE I & II WH	RE REPRODUCED NICAL INVESTIG D AND GRADE S MARTON, TEXAS"	FROM ATION EPARATI	ON:
lev. O ft) G	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Deviato Press. Stress (psi) (psi)	Properties Wet MC LL PI Den. (pcf)	Additional Remarks	REPORT PREPAF DATED	NO. HG11 ED BY HVJ MARCH 6,	12220 J ASSOCIATES, 2015.	INC.	
65	19 (6) 24 (6)	CLAY, Fat, soft to very stiff, reddish brown, w/ calcareous nodule: 61'-63' (CH)	s 40 19.4	45 83 52 114 % Pass 38	sing #200 Sieve: 94.8					
70	24 (6) 28 (6)		43 19.6	34 30 56 35 119 % Pass	sing #200 Sieve: 97.8					
75	30 (6) 35 (6)	CLAY, Lean, very stiff, reddish brown (CL)		<u>31 47 29</u> % Pass	sing #200 Sieve: 87.2					
80	25 (6) 35 (6)	SAND, Clayey, compact, brown and gray, w/ gravel at 78' (SC)	-	% Pass	sing #200 Sieve: 34.8	THESE NOT IN OR PER BY OR	DOCUMENTS FENDED FOI MIT PURPO JNDER THE	ARE FOR DESI R CONSTRUCTIO SES. THEY WEI SUPERVISION (GN REVIE N, BIDDI RE PREPA OF:	EW INC ARE
85 -						BRIAN TYPE O	, KUEHL R PRINT N	97313 AME PE #	9/3/ DA	/20 TE
90 - - - -						HL93 LO	ADING			
95						REV. NO.			1	
100- - - 105- -							lanners-Eng 15915 Ka Hou BPE FIRM R	gineers-Program aty Freeway, Suit ston, Texas 7709 REGISTRATION N	Managers e 300 4 IO. F-682	25
110_						Ja	cok	2705 BEE C AUSTIN TX FIRM REGIS	CAVE RD, S 78746 STRATION F	:-29
115-						C I T departmen	Y OF T OF PUBLIC	WHARTOI WORKS AND ENGINEER		
120- narks: Wa	ater was encounte	red at 32 feet below existing grade dur	ing drilling opera	tions; at 31 and 30.5 feet after 5	5 and 10 minutes,	SUBMITTE SCALE: N DATE: 9/ NBI NO:	D: 9/3/20 .T.S. 3/2020	20 DESIGNED DRAWN BY SURVEYED) BY: RL ': LTT) BY:	S
ground w	vater elevation was	not determined during the course of this b	ooring.			13-241-	0-1412-03	-027 HUI	TT-ZOLL.	AR © 2
iller: Van	& Sons	Logger: SN		Organization: HVJ Ass	sociates, Inc.		Texas De	partment of Tr	ansporta	itic
IOUSTON/H	OU PS\GEO\PROJECTS	2011\HG1112220, FM 102 Relocation, IDC\Wincore Ph	ase 2\Bridge (Phase 2).4	16		sc	тм 1301 IL BOR	overpass at ING DATA	kcsrr - BR·	- 4
						FED. RD		PROJECT NO.	SHEET 4	4
						DIV.NC	•			Ľ
						6	•	1		
						6 STATE	DIST.	CC		<u> </u>
						6 STATE TEXAS	DIST.	CC HW		

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BID ITEM	400 6005	409 6002	420 6013	420 6029	420 6037	420 6043	422 6001	425 6039	432 6008	450 6023	454 6018	550 6008
BID ITEM	CEM STABII	PRESTR	CL C CONC	CL C CONC	CL C CONC	CL C CONC	RE I NF CONC	PRESTR CONC	RIPRAP (CONC)	RAIL	SEALED FXP. JOINT	CHAIN I INK
DESCRIPTION	BKFL	PIL (18 IN SQ)	(ABUT)	(CAP)	(COLUMN)	(FOOTING)	SLAB	GIRDER (TX54)	(CL B) (RR9)	(TY SSTR)	(4 IN) (SEJ-M)	FENCE (INSTALL) (8'
	CY	LF	СҮ	CY	CY	CY	SF	LF	CY	LF	LF	LF
2 ~ ABUTMENTS	200	1,710	75.6						90		91	
6 ~ INTERIOR BENTS		3,840		120.6	155.0	151.2					91	
2 ~ 250.00' PRESTR CON I-GIRDER UNITS							23208	3489.36		1036.0		
1 ~ 375.00' PRESTR CON I-GIRDER UNIT							17406	2615.20		750.0		200
TOTAL	200	5,550	75.6	120.6	155.0	151.2	40614	6104.56	90	1786.0	182	200

SUMMARY OF ESTIMATED QUANTITIES

BEARING SEAT ELEVATIONS

BENT	1	(FWD)	GIRDER 1 115.489	GIRDER 2 115.624	GIRDER 3 115.759	GIRDER 4 115.893	GIRDER 5 115.759	GIRDER 6 115.624	GIRDER 7 115.489
BENT	2	(BK) (FWD)	GIRDER 1 120.778 120.864	GIRDER 2 120.913 120.999	GIRDER 3 121.047 121.133	GIRDER 4 121.182 121.268	GIRDER 5 121.047 121.133	GIRDER 6 120.913 120.999	GIRDER 7 120.778 120.864
BENT	3	(BK) (FWD)	GIRDER 1 126.152 126.404	GIRDER 2 126.287 126.539	GIRDER 3 126.422 126.674	GIRDER 4 126.557 126.808	GIRDER 5 126.422 126.674	GIRDER 6 126.287 126.539	GIRDER 7 126.152 126.404
BENT	4	(BK) (FWD)	GIRDER 1 129.884 129.912	GIRDER 2 130.019 130.047	GIRDER 3 130.153 130.182	GIRDER 4 130.288 130.316	GIRDER 5 130.153 130.182	GIRDER 6 130.019 130.047	GIRDER 7 129.884 129.912
BENT	5	(BK) (FWD)	GIRDER 1 129.913 129.884	GIRDER 2 130.047 130.019	GIRDER 3 130.182 130.154	GIRDER 4 130.317 130.288	GIRDER 5 130.182 130.154	GIRDER 6 130.047 130.019	GIRDER 7 129.913 129.884
BENT	6	(BK) (FWD)	GIRDER 1 126.405 126.154	GIRDER 2 126.540 126.288	GIRDER 3 126.675 126.423	GIRDER 4 126.810 126.558	GIRDER 5 126.675 126.423	GIRDER 6 126.540 126.288	GIRDER 7 126.405 126.154
BENT	7	(BK) (FWD)	GIRDER 1 120.866 120.780	GIRDER 2 121.001 120.915	GIRDER 3 121.135 121.049	GIRDER 4 121.270 121.184	GIRDER 5 121.135 121.049	GIRDER 6 121.001 120.915	GIRDER 7 120.866 120.780
BENT	8	(BK)	GIRDER 1 115.492	GIRDER 2 115.627	GIRDER 3 115.761	GIRDER 4 115.896	GIRDER 5 115.761	GIRDER 6 115.627	GIRDER 7 115.492

9/23/2020

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N E)	(8)	·)	

THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:											
BRIAN S.	KUEHL		97313	9/2	3/2020						
TYPE OR F	PRINT NA	ME	PE #	DA	TE						
L											
HL93 LOAD	ING										
REV. NO. DA	TE		DESCRIPTION		BY						
Planners-Engineers-Program Managers 15915 Katy Freeway, Suite 300 Houston, Texas 77094											
Jac	:ob	S.	2705 BEE C AUSTIN TX FIRM REGIS	AVE RD, S 78746 TRATION F	SUITE 300 -2966						
CITY DEPARTMENT O	OF F PUBLIC W	WH. orks a	ARTO		TRAP C						
SUBMITTED: SCALE: N.T DATE: 9/23	9/23/20 .S. /2020	20	DESIGNED DRAWN BY	BY: RL : LTT	S						
NBI NO: 13-241-0-	XXXX 1412-03-	027	SURVEYED	BY:	ARS						
					© 2020 TxD0T						
Te	exas Dep	artm	ent of Tra	ansporta	- ntion						
FM	1301 0	VER	PASS AT	KCSRR							
ES AND BE	T I MA T E AR I NO	ED G SI	QUANT EAT EL	ITIES	IONS						
	1			SHEFL							
DIV.NO.		PRO	JECT NO.		NO.						
6					160						
STATE	DIST.		CO	UNTY							
TEXAS	ҮКМ		WHA	ARTON							
CONT.	SECT.		JOB	HIGHW	VAY NO.						
1412	03		038	FM	1301						



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THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF: BRIAN S. KUEHL 97313 9/21/2020 TYPE OR PRINT NAME PE # DATE HL93 LOADING REV. NO. DESCRIPT Planners-Engineers-Program Managers 15915 Katy Freeway, Suite 300 Houston, Texas 77094 TBPE FIRM REGISTRATION NO. F-6825 2705 BEE CAVE RD, SUITE 300 Jacobs. Jacobs. 2/103 DEE CAVE ND, 30/11 3 AUSTIN TX 78746 FIRM REGISTRATION F-2966 CITY OF WHARTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING SUBMITTED: 9/21/2020 DESIGNED BY: JTH SCALE: N.T.S. DRAWN BY: JTH DATE: 9/21/2020 SURVEYED BY: NBI NO: HUITT-ZOLLARS 13-241-0-1412-03-027 © 2020 TxD01 Texas Department of Transportation FM 1301 OVERPASS AT KCSRR ABUTMENT NO. 1 SHEET 1 OF 2 FED.RD. DIV.NO. SHEET NO. PROJECT NO. 6 179 STATE DIST. COUNTY WHARTON TEXAS YKM CONT. SECT. JOB HIGHWAY NO. 03 1412 038 FM 1301

① ADJUST AS REQUIRED TO AVOID PILING ② FIELD BENDS AS NEEDED TO CLEAR PILES.



GENERAL NOTES: DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017). SEE BRIDGE LAYOUT FOR FOUNDATION TYPE, SIZE AND LENGTH. SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES. SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN. SEE CONCRETE RIPRAP (CRR) STANDARD SHEET FOR RIPRAP ATTACHMENT DETAILS. SEE SSTR STANDARD SHEET FOR RAIL ANCHORAGE IN WINGWALLS. SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH ABUTMENT. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR. CALCULATED FOUNDATION LOADS: 70 TONS/PILE MATERIAL NOTES: PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi). PROVIDE GRADE 60 REINFORCING STEEL.



9/18/2020 9:54:40 AM ...\SHT\BRG\WJXL

TABLE OF ESTIMATED QUANTITIES

BAR	NO.	SIZE	LENG	TH	WEIGHT
А	10	#11	45′-	5"	2,413
Н	16	#6	46′-	1 "	1107
L	18	#6	4′-	0"	108
S	41	#5	11′-	6"	492
U	4	#6	8′-	1 "	49
V	45	#5	15′-	8 "	735
wH ₁	14	#6	19′-	5"	408
wH2	28	#6	17'-	8 "	743
wS	38	#4	7′-10"		199
wV	38	#5	15′-	8"	621
REIN	FORCI	EEL	LB	6,875	
CLAS	S "C'	RETE	CY	38.5	

1) ADJUST AS REQUIRED TO AVOID PILING

② FIELD BEND AS NEEDED TO CLEAR PILES

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0:44:1

TABLE OF ESTIMATED QUANTITIES

BAR	NO.	SIZE	LENG	WEIGHT			
A 1	6	#11	74′-′	11"	2,388		
A ₂	4	#11	73′-	4"	1,558		
н	16	#6	70′-	4"	1,690		
S	62	#5	11′-	6"	744		
U	4	#6	8′-	49			
V	69	#5	15'- 8"		1,127		
REINFORCING STEEL LB 7,5							
CLASS "C" CONCRETE CY 37.1							



② FIELD BEND AS NEEDED TO CLEAR PILES.

THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

BRIAN	s.	KUEHL		97	7313	9/21/2020
TYPE	OR	PRINT	NAME	PE	#	DATE

HL93 LOADING





9/23/2020 2:46:18 PM

ASURED PARALLEL OPE.	TABLE OF CAP QUANTITIES							
ANTITIES SHOWN A TERIOR BENT CAP	ARE FO ONLY.	R ONE	BAR	NO.	SIZE	LEN	GTH	WEIGHT
IT DOWELS D AT B	RENTS	3 8 6	А	6	#11	43′	-11"	1,400
JUST REINFORCING	S STEE	L TOTAL	В	6	#11	42′	- 5"	1,352
LORDINGLY.		D (3) 4	#9	11	- 8"	28	
R EACH LINEAR FO	OT VA	RIATION	S	59	#5	13′	- 8"	841
JUSTMENT PER BEN	NT:	" OELONING	Т	10	#5	42′	- 5"	442
BARS V LENGTH, BARS Z LENGTH,	31'-	5"	U	2	#5	9′	- 8"	20
REINFORCING ST CLASS "C" CONC	TEEL,	220 LB						
0200 0 000		,						
			REINF	ORCING S	TEEL		LB	4,083
			CLASS	"C" CON	CRETE ((CAP)	CY	20.1
	~ -				<u></u>			
	(4)	ABLE OF	· CO	LUMN	QUAN		IES	
BENT	"H" EIGHT	BARS V 40 ~ #9	BARS Z 4 ~ #4 SPIRAL STEEL			CLASS "C" CONC (COL)		

FT LENGTH WEIGHT LENGTH WEIGHT

4,080

4,216

4,216

3,808

22'- 0" 2,992 620'- 6" 1,658

3,264 683' - 4" 1,826

809'- 0"

871'- 10" 2,330

903'- 3" 2,413

903'- 3" 2,413

2,162

NO.

2

3

4

5

6

7

21

27

28

28

25

19

DATE

24'- 0"

30'- 0"

31'- 0"

31'- 0"

28'- 0"

	HL93 L	.OAD I	NG					
	REV. NO.	DAT	F		DESCRIPTION		BY	
		Plan)(ners-Engi 15915 Ka	ineers ty Fre	Program Neway, Suite	Managers 300		
		TBPE	Hous FIRM RE	ton, T EGIST	exas 77094 RATION N	l O. F-682	5	
ASHTO LRFD BRIDGE 8TH EDITION (2017).	Ja	aC	ob	S.	2705 BEE C AUSTIN TX FIRM REGIS	AVE RD, S 78746 TRATION F	UITE 300 -2966	
FOUNDATION TYPE,		T \ /	05			. 6	WHARTON	
ETAILS (FD) FOUNDATION		IY ENT OF	OF PUBLIC W	WH. orks a	ARION ND ENGINEER		TEXA G	
EAR DIMENSIONS,	SUBMITTED: 9/23/2020 DESIGNED SCALE: N.T.S. DRAWN BY DATF: 9/23/2020					BY: JT : JTH	Н	
ONS SHOWN ARE	NBI NO: 13-241	: - 0 - 1	412-03-	027	SURVEYED HUI	BY: FT-ZOLL	ARS	
OADS: 80 TONS/PILE.		1				(с) 2020 ТхДОТ	
	_	Te	xas Dep	artme	ent of Tra	insporta	ition	
RETE (f'c=3,600 psi)		FM	1301 0	VER	ράςς άτ	KCSRR		
RCING STEEL.	,	 Г К I Т I					7	
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·•						SHEET	1 OF 1	
	FED.F	RD.		PRO	JECT NO.		SHEET NO.	
OR DESIGN REVIEW AND TRUCTION, BIDDING	6						182	
THEY WERE PREPARED	STAT	E	DIST.		CO	COUNTY		
	TEXA	s	YKM		WHA	RTON		
97313 9/23/2020	CON	г.	SECT.		JOB	HIGHW	AY NO.	

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CY

22.0

28.3

29.3

29.3

26.2

19.9

LΒ

5,090

6,410

6,629

6,629

5,970

4,650



8/19/2020 1:51:17 PM ...\SHT\BRG\W.U




8/19/2020 1:48:45 PM ...\SHT\BRG\WJ



			GIRDER REP	<u>DRT</u>	
208' L NGLE		HORIZONTAL C-C BENT	GIRDER RE DISTANCE C-C BRG	PORT SPAN 6 TRUE DISTANCE BOT BM. FLG	② GIRDE SLOPE
	GIRDER 1 GIRDER 2 GIRDER 3	125.000 125.000 125.000	123.000 123.000 123.000	124.62 124.62 124.62	-0.0430 -0.0430 -0.0430
	GIRDER 4 GIRDER 5 GIRDER 6	125.000 125.000 125.000	123.000 123.000 123.000	124.62 124.62 124.62	-0.0430 -0.0430 -0.0430
	GIRDER 7	125.000	123.000	124.62	-0.0430
		HORIZONTAL C-C BENT	GIRDER RE DISTANCE C-C BRG	PORT SPAN 7 TRUE DISTANCE BOT BM. FLG	② GIRDE SLOPE
208' L GLE	GIRDER 1 GIRDER 2 GIRDER 3	125.000 125.000 125.000	123.000 123.000 123.000	124.62 124.62 124.62	-0.0430 -0.0430 -0.0430
	GIRDER 4 GIRDER 5	125.000	123.000	124.62	-0.0430
	GIRDER 6 GIRDER 7	125.000	123.000	124.62	-0.0430

	<u>_B</u>	ENT REPC	RT			
DISTANCE BE	BENT NO. TWEEN STAT	6 (S 15 ION LINE GIRDER SP (Q BENT)	2 44.4 W AND GIRDI A	/) ER 1 2 GIRDEF D M	20.208' R ANGLE S	L
SPAN 6	GIRDER 1 GIRDER 2 GIRDER 3 GIRDER 4 GIRDER 5 GIRDER 6 GIRDER 7 TOTAL	0.000 6.736 6.736 6.736 6.736 6.736 6.736 6.736 40.417		90 0 90 0 90 0 90 0 90 0 90 0 90 0		
DISTANCE BE	BENT NO. TWEEN STAT	7 (S 15 ION LINE GIRDER SP	2 44.4 W AND GIRDI A G	/) ER 1 2 IRDER D M	20.208' ANGLE	l
SPAN 6	GIRDER 1 GIRDER 2 GIRDER 3 GIRDER 4 GIRDER 5 GIRDER 6 GIRDER 7 TOTAL	0.000 6.736 6.736 6.736 6.736 6.736 6.736 6.736 40.417		90 0 90 0 90 0 90 0 90 0 90 0 90 0 90 0	000000000000000000000000000000000000000	
SPAN 7	GIRDER 1 GIRDER 2 GIRDER 3 GIRDER 4 GIRDER 5 GIRDER 6 GIRDER 7 TOTAL	0.000 6.736 6.736 6.736 6.736 6.736 6.736 40.417		90 0 90 0 90 0 90 0 90 0 90 0 90 0	0 0 0 0 0 0	
DISTANCE BE	BUIMENI NG TWEEN STAT	J. 8 (S): ION LINE GIRDER SP (ABUT BKW	5 2 44.4 AND GIRDE A GI	W) ER 12 IRDER DM	0.208' ANGLE S	L
SPAN 7	GIRDER 1 GIRDER 2 GIRDER 3 GIRDER 4 GIRDER 5 GIRDER 6 GIRDER 7 TOTAL	0.000 6.736 6.736 6.736 6.736 6.736 6.736 6.736 40.417		30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0 30 0	0 0 0 0 0 0	

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2.

ESTIMATED Itities			
Ξ	PRESTR CONCRETE GIRDERS	(3) REINF STEEL	
	(TX54) (2)		
	LF	LB	
	872.34	13,345	
	872.34	13,345	
	1,744.68	26,690	

ECTIONS		
	"B"	
	FT	
	0.213	
	0,224	

	HL93 LOADI	NG			
DEPTHS					
	REV. NO. DA	те	DESCRIPTION		BY
5 1/2" 9 1/2"	<u>Plan</u> TBPE	ners-Engi 15915 Kat Houst	ineers-Program M ty Freeway, Suite ton, Texas 77094 EGISTRATION N	Managers = 300 + O. F-6825	
	Jac	ob	2705 BEE C AUSTIN TX FIRM REGIS	AVE RD, SU 78746 TRATION F	JITE 300 -2966
AL DIMENSION.	CITY DEPARTMENT OF	OF PUBLIC WO	WHARTON orks and engineer		T B A B
HOWN ARE BOTTOM FLANGE ITH ADJUSTMENTS MADE FOR OPE. SEE GIRDER LAYOUT	SUBMITTED: SCALE: N.T. DATE: 8/17/	8/17/20 S. (2020	20 DESIGNED DRAWN BY	BY: JTH : JTH	4
R LENGTHS. NG STEEL WEIGHT IS	NBI NO: 13-241-0-1	412-03-	SURVEYED	BY: TT-ZOLLA	ARS
) USING AN APPROXIMATE 2.3 LBS/SF.	© 2020 T+001 Texas Department of Transportation				
	FM 25 CON	1301 C 50.00' CRETE (S	DVERPASS AT PRESTRE GIRDER PANS 1 & 2)	KCSRR SSED UNIT SHEET	1 I OF 1
RE EOR DESIGN REVIEW AND	FED.RD. DIV.NO.		PROJECT NO.		SHEET NO.
CONSTRUCTION, BIDDING	6				186
UPERVISION OF:	STATE	DIST.	CO	UNTY	
97313 8/17/2020		YKM SECT	IOB WHA		
E PE # DATE	1412	03	038	FM	1301

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS. SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN. SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS NOT SHOWN. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED. SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB. SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. MATERIAL NOTES: PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi PROVIDE GRADE 60 REINFORCING STEEL PROVIDE 1'-7" BAR LAPS (UNCOATED #4 BARS), WHERE REQUIRED. DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

GENERAL NOTES:



:53:

ESTIMATED Ities			
PRESTR CONCRETE GIRDERS	(3) REINF STEEL		
(TX54) (2)			
LF	LB		
871.85	13,345		
871.50	13,345		
871.85	13,345		
2,615.20	40,035		

BAR -	TABLE
BAR	SIZE
А	#4
D	#4
G	#4
Н	#4
J	#4
М	#4
OA	#5
Р	#4
Т	#4

"A"	"B"	
FT	FT	
0.168	0.236	
0.177	0.248	

CTION DEPTHS			
AT BRG	"Y" AT € BRG	"Z" AT ^① ⊈ SPAN	
/2 "	5′-3 ½"	12 7/8"	
DIMEN	ISTON		
N ARE ADJU SEE ENGTH	E BOTTOM F JSTMENTS M E GIRDER L HS.	LANGE ADE FOR AYOUT	
STEEL SING 3 LBS	. WEIGHT I AN APPROX S/SF.	S IMATE	
RE FO CONS S. UPER	OR DESIGN TRUCTION, THEY WERE VISION OF:	REVIEW AN BIDDING PREPARED	
	97313	8/17/202	

GENERAL NOTES: DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017). SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS. SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS. SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN. SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS NOT SHOWN. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED. SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB. SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. MATERIAL NOTES: PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi PROVIDE GRADE 60 REINFORCING STEEL PROVIDE 1'-7" BAR LAPS (UNCOATED #4 BARS), WHERE REQUIRED. DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.





8/17/202

ESTIMATED Itities			
Ξ	PRESTR CONCRETE GIRDERS	(3) REINF STEEL	
	(TX54) (2)		
	LF	LB	
	872.34	13,345	
	872.34	13,345	
	1,744.68	26,690	

ECTIONS			
	"B"		
	FT		
	0.213		
	0,224		

1 ABT SPAN	
	"B"

	HL93 LOADI	NG			
DEPTHS					
AT "Z" AT BRG (SPAN	REV. NO. DA	те	DESCRIPTION		BY
<u>5 //2" 9 //2"</u>	<u>Plan</u> TBPE	ners-Engi 15915 Ka Hous FIRM RE	ty Freeway, Suite ton, Texas 77094 EGISTRATION N	Managers = 300 4 O. F-6825	5
	Jac	ob	2705 BEE C AUSTIN TX FIRM REGIS	AVE RD, SU 78746 TRATION F	UITE 300 -2966
AL DIMENSION.	CITY DEPARTMENT OF	OF PUBLIC W	WHARTON DRKS AND ENGINEER		NHAR TOP
HOWN ARE BOTTOM FLANGE ITH ADJUSTMENTS MADE FOR DPE, SEE GIRDER LAYOUT	SUBMITTED: SCALE: N.T. DATE: 8/17/	8/17/20 .S. /2020	20 DESIGNED DRAWN BY	BY: JTI : JTH	Н
NG STEEL WEIGHT IS	NBI NO: 13-241-0-1	412-03-	SURVEYED 027 HUI	BY: TT-ZOLL	ARS
2.3 LBS/SF.	Te	exas Dep	artment of Tro	e ansporta) 2020 тхоот tion
	FM 25 CON	1301 0 50.00' CRETE (S	DVERPASS AT PRESTRE GIRDER U PANS 6 & 7)	KCSRR SSED JNIT SHEET	3 1 OF 1
RE FOR DESIGN REVIEW AND	FED.RD. DIV.NO.		PROJECT NO.		SHEET NO.
CONSTRUCTION, BIDDING	6				188
UPERVISION OF:	STATE	DIST.	CO	UNTY	
97313 8/17/2020	TEXAS	YKM	WHA	ARTON	
E PE # DATE	CONT.	SECT.	JOB	HIGHW	AY NO.
	1412	03	038	FM	1301

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS. SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS. SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN. SEE IGMS STANDARD FOR MISCELLANEOUS DETAILS NOT SHOWN. SEE PMDF STANDARD FOR DETAILS AND QUANTITY ADJUSTMENTS IF THIS OPTION IS USED. SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB. SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB. COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE. MATERIAL NOTES: PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION (2017).

GENERAL NOTES:

PROVIDE GRADE 60 REINFORCING STEEL

PROVIDE 1'-7" BAR LAPS (UNCOATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

ſ				D	ESIGNE	D GIR	DERS				DEPR	ESSED	СОМ	RETE		OPTIONAL DESIGN			
	CTRUCTURE	SDAN	GIRDER	GIRDER		PR	ESTRES 	SING ST	RANDS	1			RELEASE	MINIMUM	DESIGN LOAD	DESIGN LOAD	REQUIRED MINIMUM	LIVE DISTRI	LOAD BUTION
	STRUCTURE	NO.	NO.	TYPE	NON- STD STRAND	TOTAL NO.	SIZE	STRGTH	"e" €	"e" END		TO	STRGTH	28 DAY COMP	COMP STRESS	TENSILE STRESS	ULTIMATE MOMENT	FAC	TOR
					PATTERN		(in)	fpu (ksi)	(in)	(in)	NO.	END (in)	f'ci (ksi)	STRGTH f'c (ksi)	(SERVICE I)	(BUIT 4) (SERVICE III) fcb(ksi)	(STRENGTH I)	Moment	Shear
ł	FM 1301	ALL	ALL	T x 54		44	0.6	270	18.83	11.19	8	50.5	5.500	7.500	4.523	-4.267	8013	0.555	0.724
	UVERFASS																		
use.																			
m its																			
g rro																			
surtin																			
es re																			
amag																			
or a																			
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ther I																			
to ot																			

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TXDDT for any purpose whatsover. TXDDT assumes to responsibility for the conversion of this standard to other formator for incorrect results or channoas resultion from its use







NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT € OF GIRDER

1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars. Use low relaxation strands, each pretensioned to 75 percent of fpu.

Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked . Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

> THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF:

BRIAN S. KUEHL		9/23/2020
TYPE OR PRINT NAME	PE #	DATE

HL93 LOADING

Texas Department	of Tra	nsp	ortation		B D S	ridge ivision tandard
PRESTRESSED CONCRET I-GIRDER DESIGNS				ΤE		
(NON-STA	ND.	AR	D SP	Ϋ́Α	NS)
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	TABLE (STATIONS I	OF TOP RANCREASE WITH	AIL PROFILE	ASE)				
MAIN LINE								
	ALIGNMENT: 100' STATIONS	LEFT RAIL ELEVATION	ALIGNMENT: 100' STATIONS	RIGHT RAIL ELEVATION				
	1289+40.80	103.90	1289+40.80	103.88				
	1290+00.00	104.01	1290+00.00	103.95				
	1291+00.00	104.17	1291+00.00	104.13				
GT OR	1292+00.00	104.45	1292+00.00	104.56				
ЧЧ ЧЧ	1293+00.00	104.72	1293+00.00	104.59				
, e	1294+00.00	104.80	1294+00.00	104.70				
00	1295+00.00	104.96	1295+00.00	104.83				
ēΡ	1296+00.00	105.17	1296+00.00	105.06				
	1297+00.00	105.41	1297+00.00	105.31				
	1298+00.00	105.54	1298+00.00	105.51				
	1299+00.00	105.69	1299+00.00	105.57				
ΖĽ	1299+05.59	105.70	1299+05.59	105.58				
ΞΞ	1299+40.80	105.57	1299+40.80	105.50				
PR(1299+76.01	105.61	1299+76.01	105.58				
	1300+00.00	105.71	1300+00.00	105.72				
	1301+00.00	105.84	1301+00.00	105.82				
	1302+00.00	105.98	1302+00.00	105.95				
Ч	1303+00.00	106.13	1303+00.00	106.11				
CT	1304+00.00	106.26	1304+00.00	106.24				
AU	1305+00.00	106.38	1305+00.00	106.35				
, OR	1306+00.00	106.47	1306+00.00	106.47				
о <u>п</u>	1307+00.00	106.67	1307+00.00	106.68				
-	1308+00.00	106.97	1308+00.00	106.98				
	1309+00.00	107.27	1309+00.00	107.27				
	1 309+40.80	107.39	1 309+40.80	107.37				

- 10. Verify all permanent clearances before project closing.
- 11. For Railroad coordination please refer to Sheets 2 and 3 and the TxDOT Standard Specifications.

FOR THE FOLLOWING INFORMATION PLEASE REFER TO THE PLAN AND ELEVATION DRAWINGS OF THE BRIDGE PLANS. THE PLAN AND ELEVATION DRAWINGS SHALL SHOW ALL REQUIRED INFORMATION PER KCS GUIDELINES FOR THE DESIGN AND CONSTRUCTION OF RAILROAD

- 3. Future tracks, access roadways and existing tracks as main line, siding,
- 4. Point of minumum vertical clearance and distance, measured perpendicular, from the centerline of nearest track.
- 5. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of obstruction such as substructure above grade.
- 6. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of nearest foundation below grade.
- 7. Horizontal spacing at right angle between centerlines of existing and/or
- 8. Limits of shoring and minimum distance at right angle from centerline of
- 9. All existing facilities and utilities and their proposed relocation, if required.
- 10. Toe of riprop or earth slope and/or limits of retaining wall.
- 11. Existing and proposed contours. (not required if the existing groundlines or drainage characteristics in Railroad ROW will not be altered).
- Railroad Milepost and direction of increasing Milepost.
- 13. Direction of flow for all drainage systems within project limits.
- 14. Limits of barrier rail and fence with respect to centerline of track.
- 15. Depth of foundation below bottom of tie. (for footings only)
- 16. Top and bottom of pier protection wall elevation relative to top of rail elevation.
- Controlling dimensions of drainage ditches and/or drainage structures.
- 19. Minimum permanent vertical clearance above top of high rail to the lowest
- Existing and proposed groundline & roadway profile.
- 22. Location of deck drains.
- 23. Total width of superstructure. 24. Width of shoulder and/or sidewalk.



Construction and Maintenance of Highways, Streets and Bridges AS APPLICABLE TO THE RAILROAD COMPANY INVOLVED. See KCS guidelines for the design and construction of railroad overpasses and underpasses drawing No. 005104 and TxDOT Railroad Fence Details Sheet for additional information. A curved top fence extending 8'-0" above top of sidewalk is acceptable only where there is a traffic rail between roadway and sidewalk.



PRELIMINARY SUBJECT TO REVISION

This document is released for informational purposes under the authority of Brian S. Kuehl P.E. 97313 on 8/28/2020.

It is not to be used for regulatory approval, permit, bidding, or construction purposes.

SHEET 1 OF 3

Texas Department of Transportation Bridge Division

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION (MOD)

FILE:	dn: TxDOT	ск: TxDOT	DW∶ T×D	OT	CK:	TxDOT
C TxDOT FEBRUARY 2008	DISTRICT	DISTRICT FEDERAL AID PROJECT				SHEET
REVISIONS	YKM					190
AUGUSI 2020: ALL GENERAL NOTES PER KCS RR	co	DUNTY	CONTROL	SECT	JOB	HIGHWAY
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PART 1 - GENERAL

DESCRIPTION 1.01

This project includes construction work within the Right-of-Way and/or properties of the Railroad Company and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right-of-Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines, Federal Railroad Administration (FRA) Requirements, and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

Railroad Designated Representative: Mark Lindenmeyer, PLS 427 West 12th Street Kansas City, MO 64105 Mlindenmever@kcsouthern.com (816) 983-1540 C: (816)289-7735

At Grade Crossing: Chris Ashley 4601 Hilry Huckaby Drive Shreveport, LA 71107 Cashley@kcsouthern.com W: (318)676-6269 T: (318)218-7207

KCS Railroad (the Railroad Company) is also referred to as: -KCS -KCSR

-KCS RR

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right-Of-Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right-Of-Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

PLANS / SPECIFICATIONS 1.03

TxDOT has received written Railroad approval of the plans and specifications for the project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

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- A. Perform all work in compliance with all applicable Railroad, FRA (Federal Railway Administration) and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of Railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.
- B. Construction activities within 12 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 12 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Designated Representative is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.
- C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.
- D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.
- E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.
- F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment, may be pursued as outlined 3.02 and 3.03.
- G. All permanent clearances shall be verified before project closing.

H. Prior to any excavation within KCS Right-Of-Way, all utilities owned by KCS Railroad must be located. Contact Chris Ashley to identify Railroad specific utilities.

Chris Ashley 4601 Hilry Huckaby Drive Shreveport, LA 71107 cashley@kcsouthern.com W: (318)676-6269 T: (318)218-7207

RAILROAD OPERATIONS 3.02

- A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.
- B. All railroad tracks within and adjacent to the Contract Site are active (unless shown otherwise on the plans), and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.
- C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:
 - 1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a Railroad flag person will be required. At the direction of the Railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.
 - 2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and May be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

- A. Contact Railroad Designated Representative for Railroad Right-Of-Way Requirements (See GENERAL note 1.01). Do not perform any work within Railroad Right-Of-Way without a valid executed Right of Entry Agreement if required on this project.
 - Right of Entry: Denise Case (JLL) 4200 Buckingham, Suite 110 Fort Worth, TX 76155 Tel: (817)230-2614 Email: Denise.Case@am.JLL.com On-Line Application: https://KCSPermit.JLLrpg.com
- B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right-of-Way and observe the Railroad's rules and regulations with respect thereto.
- C. Perform all work upon Railroad Right-of-Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from Liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.11 for railroad flagging requirements.
- D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request: Exactly what the work entails.
 - The days and hours that work will be performed.
 - The exact location of work, and proximity to the tracks. 3.
 - The type of window requested and the amount of time requested.
 - 5. The designated contact person.

- work plans.

3.04 INSURANCE

Do not begin work upon or over Railroad Right-of-Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right-of-Entry Agreement' and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the Railroad Contractor's Safety orientation and maintain current registration prior to working on Railroad property. Contact Railroad Designated Represenative to arrange. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

3.06 COOPERATION

MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER 3.07 TEMPORARY STRUCTURES

of construction: A. 14' - 0" horizontal from centerline of track B. 22' - O" vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Designated Representative review and approval.

APPROVAL OF REDUCED CLEARANCES 3.08

- Designated Representative.

3.09 MAINTENANCE OF RAILROAD FACILITIES



E. Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is either within 25 feet of nearest rail or when equipment or material could foul the railroad track(s). Perform all work in accordance with previously approved

F. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

KCS will not accept on-track safety training certificates from other railroads. Contractor's employees entering KCS railroad shall hold current certificates at all times.

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right-of-Way in performing the work.

Abide by the following minimum temporary clearances during the course

A. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right-Of-Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractor's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the Project Site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

SHEET 2 OF 3

Bridge Division

RAILROAD REQUIREMENTS

FOR BRIDGE CONSTRUCTION

(MOD)

Texas Department of Transportation

purposes.

FILE:	DN: TxDOT	CK: TxDOT	DW: TxC	OT	CK:	TxDOT
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3.10 SITE INSPECTIONS BY RAILROAD'S DESIGNATED REPRESENTATIVE

- A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable: 1. Pre-construction meetings.
 - 2. Pile driving/drilling of caissons or drilled shafts.
 - 3. Other work as applicable.

For bridge construction, 1. Bridge demolition.

- 2. Reinforcement and concrete placement for railroad bridge
- substructure and/or superstructure.
- Erection of precast concrete or steel bridge superstructure.
 Placement of waterproofing (prior to placing ballast on bridge deck). Completion of the bridge structure.
- B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.
- C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD FLAGGING

Railroad flagging (from KCS RR approved flagging companies) is required whenever the below listed conditions exist. The Contractor shall contact the Railroad Designated Representative for the list of approved flagging companies. The Contractor shall hire and pay the flagging company at their own expense.

- A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, Track or other Railroad facilities may be subject to settlement or movement.
- C. During any clearing, grubbing, excavation or grading in proximity to Railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger Railroad facilities or operations.
- D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, Railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons, as required by KCS, to accomplish the work.
- F. Per the RIGHT OF ENTRY agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor work and at least 30 working days in advance of any Contractor work in which any person or equipment will be within 25 feet of nearest rail.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of the Contractor thru Aareement with TxDOT.

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3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

- A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring" and general shoring requirements.
- B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

KCS Critical Incident Desk: 1(877-527-9464) Texas One Call, a 24 hour number 48 hrs notice required, excluding weekends and holidays

Dia Test: (811) One call, a 24 hour number 48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near Railroad property, coordinate with the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near Railroad property.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of $\frac{1}{4}$ " vertical or horizontal is detected in the tracks. Immediately contact the Railroad Designated Representative.

3.15 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right-of-Way and leave the Right-of-Way in a clean and presentable condition to the satisfaction of TxDOT and KCS.

3.16 WALKWAYS REQUIRED

Maintain along the outer side of each exterior track of multiple operated space suitable for trainman's use in walking along trains, extending to a line not less than fourteen feet (14') from centerline of track. Remove any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours before the close of each work day. Construct walkways with railings over open excavation areas when in close proximity of track. Do not violate allowable clearances for railroad use unless approved by KCS.

3.17 APPROVAL OF DETAILS

Submit details of the construction affecting Railroad tracks and property not already included in the Contract Plans to the Railroad Designated Representative and TxDOT for the Railroad's review and written approval before such work is undertaken. Allow a total six (6) weeks for review and approval of these submittals, which includes the KCS's four (4) week review time.

3.18 CONSTRUCTION AND AS-BUILT SUBMITTALS

- A. Provide TxDOT and KCS submittals for construction materials and procedures as outlined below and indicated in TxDOT Standard Specifications.
- B. The tables below provide the Railroad's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in these bid documents. The review times indicated below represent the total time, including the Railroad's minimum four (4) weeks.
- C. The Contractor will forward relevant submittals to the Railroad Designated Representative. TxDOT and the Engineer of Record will review and include comments prior to forwarding to the Railroad. Submit items in Table 1 for both railroad overpass and underpass projects, as applicable. Submit items in Table 2 for railroad underpass projects only.

TABLE	1 - RAILROAD	SUBMITTAL	REQUIREMENTS	FOR
	OVERPASS & UI	NDERPASS PR	ROJECTS	

ITEM	DESCRIPTION	REVIEW TIME
1	Shoring design and details	6 weeks
2	Falsework design and details	6 weeks
3	Drainage design provisions	6 weeks
4	Erection diagrams and sequence	6 weeks
5	Demolition diagram and sequence	6 weeks

TEM	DESCRIPTION	NOTES	REVIEW TIME
1	Shop drawings	Steel and Concrete members	6 weeks
2	Bearings	For all structures	6 weeks
3	Concrete Mix Designs	For all structures	6 weeks
4	Rebar & Strand certifications	For superstructure only	6 weeks
5	28 day concrete strength	For superstructure only	6 weeks
6	Waterproofing material certifications and installation procedure	Waterproofing & protective boards	6 weeks
7	Structural steel certifications	All fracture critical members & other members requiring improved notch toughness	6 weeks
8	Fabrication and Test reports	All fracture critical members & other members requiring improved notch toughness	6 weeks
9	Welding Procedures and Welder Certification	AWS requirements	6 weeks
10	Foundation Construction Reports or Notes	Pile driving, drilled shaft construction, bearing pressure test reports for spread footings	6 weeks
11	Compaction testing reports for backfill at abutments	Must meet 95% maximum dry density, Modified Procter ASTM D1557	6 weeks

D. TxDOT shall submit As-Built Records to the Railroad when TxDOT has processed the final project plans. These records shall consist of the following items: Overpass Projects 1. Electronic files of all structure design drawings with as-constructed modifications shown, in Microstation and Acrobat .PDF format.

 Hard copies of all structure design drawings with as-constructed modifications shown.
 Final approved copies of shop drawings for concrete and steel members. 4. Foundation Construction Reports.

purposes

TABLE 2 - RAILROAD SUBMITTAL REQUIREMENTS FOR UNDERPASS PROJECTS

Underpass Projects

1. Electronic files of all structure design drawings with as-constructed modifications shown, in Microstation and Acrobat .PDF format.

5. Compaction testing reports for backfill at abutments.





RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION (MOD)

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under the authority of
Brian S. Kuehl P.E. 9731
on 8/28/2020.
It is not to be used for
regulatory approval, permit,
bidding, or construction

P.E. SEAL

REQUIRED

PRELIMINARY

SUBJECT TO REVISION

This document is released for informational purposes

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C TxDOT NOVEMBER 2007	DISTRICT	FEDERAL AID PROJECT				SHEET
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AUGUST 2020: ALL GENERAL NOTES PER KCS RR	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	WHARTON		1412	03	038	FM1301



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- (1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.
- (2) Bench backfill as shown with 12" (approximate) bench depths.
- (3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.
- (4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.
- (5) If shown in the plans flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:

constraints: a). If flowable backfill is to be placed over MSE backfill then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and b). Place flowable fill in lifts not exceeding 2 feet in height, place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 2 is intended for new construction requiring high plasticity embankment fill with a plasticity index (PI) greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays. Option 1 is intended for construction only requiring PI controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Provide Cement Stabilized Backfill (CSB) meeting the

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments. If required elsewhere in the plans, provide Flowable

Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments. Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.

SHEET 1 OF 2							
Texas Department of Transportation Standard						lge sion ndard	
CEMENT	CEMENT STABILIZED						
ABUTMENT BACKFILL							
BRIDGE ABUTMENT							
CSAB							
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- 1/2" 2 7/8" Dia Holes 1/2" € HSS Support Rail Clamp for HSS 3.500 x 0.216 PL 3/8 (ASTM A36) Top of Terminal Posts 5" 5" Malleable Iron Terminal Post Cap PIPE SUPPORT RAIL CLAMP ELEVATION -Top of Fabric Chain Link 5'' Fabric (5)Terminal Hex Nut Post (1) (ASTM A563) € HSS Support Link 8'-3' Rail Clamp for Hardened steel " Threaded Projection HSS 3.500 x 0.216 Chain washer (ASTM F436) Post °, la/ of 1 ½" Rod £ %" Dia Threaded Anchor Rods (ASTM A307) Ter 肁 ₽ BO 10'-10" See "Upper HSS Connection Detail". -T221 Rail £ ¾" Dia See "Lower HSS Threaded Anchor Rods Connection Detail" (ASTM A307)(10)ě, HSS Support 1 3⁄8" 7 1/4" 1 3/8" – T551 Rail Rail Clamp 10" HSS SUPPORT 9 RAIL CLAMP ASSEMBLY Slab UPPER HSS CHAIN LINK FENCE SECTION CONNECTION DETAIL (Showing Terminal Post on a T551 or T221 Rail, Line Post, T222 Rail and SSTR Rail similar.) (Dimensions may vary according to Manufacturer's specifications.)

- (1) HSS 3.500 x 0.216 ASTM A1085 or A500 Gr B.
- (5) 9 gauge steel Chain Link Fabric, 2" Mesh, knuckle selvage top and bottom.
- Dimension varies on rail types and superstructure type. T551, T221 and C221 Rails = 1" with no overlay, T222 Rail and SSTR Rail = 5" with no overlay, increased 2" for overlay. On bridges with significant beam camber variable length in dimension may be anticipated.

10"

7 1/4"

4 ¼"

1 3/8"

PL ⅔ (ASTM A36)

- Concrete Rail

10 See "Material Notes" for threaded anchor rod information.

1 ¾"

CONSTRUCTION NOTES:

Chain link fence post must be plumb unless otherwise approved. Test adhesive anchors in accordance with Item 450.3.3,

"Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

All Chain Link Fence materials must conform to standard specifications, Item "Chain Link Fence" unless shown otherwise.

Galvanize all steel components unless noted otherwise. Provide ASTM A1085, A500 Gr B for HSS 3.500 x 0.216. Provide ASTM A500 Gr B or A53 Gr B for HSS 1.660 x 0.140. Provide ASTM A36 for steel plates.

Anchor bolts must be 5/8" Dia ASTM A307 Gr A fully threaded rods. Hex nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 6 kips each anchor (edge distance and anchor spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

6 1/2"

 \bigcirc

Slab -

⅔" Dia Threaded Anchor Rod (ASTM A307) (10)—

LOWER HSS

CONNECTION DETAIL

(Showing Terminal Post or Line Post)

1 1/2"

Concrete

Rail

Threaded Rod

Projection

HSS(1)

1 Hex Jam Nut

or Hex Nut (ASTM A563)

2 Hardened steel washers (ASTM F436)

2 Hex Nuts

(ASTM A563)

€ ¾" Dia

Hole in HSS

3.500 x 0.216

GENERAL NOTES: This sheet must be used with a concrete Traffic or Combination Rail. Rails that can be used with this sheet are T551, SSTR, T221, T222, and C221 Rails. Chain link fence details shown on this standard are adequate for all speeds. If used, optional side slot drains shown on rail standards must not be any closer than 6" from chain link post to edge of side slot drains.

This railing cannot be used on bridges with expansion joints providing more than 5" movement.

Payment for materials, fabrication, and installation of this assembly are to be included in unit price bid in accordance with Item 450, "Rail (CLF-RO)".

Approximate weight of fence = 20 plf.

SHEET 2 OF 2						
Texas Department	B D S	ridge ivision tandard				
8 FT CHAIN LINK FENCE						
FOR RAILR	FOR RAILROAD OVERPASS					
		~ '				
		CL	.F-RC)		
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anchor plates for other pile sizes are similar

TABLE OF PROPERTIES

	FOR PRESTRESSED CONCRETE PILES								
	Area				Prestressing (5)				
1	Pile Size "D"	of Pile Section	Ι	Weight	No.	Initial Prestress Force	Concrete Final Prestress (15% Loss)		
/		Sq In	n In ⁴ Lb/Ft		Kips	psi			
	16"	254	5,340	265	8	231	774		
	18"	322	8,600	336	10	289	763		
	20"	398	13,150	415	14	405	864		
	24"	574	27,380	598	18	520	770		

- (1) Locate strands symmetrically about the axis of the pile, with no more than one strand difference between any two adjacent sides.
- (2) Provide Class S concrete (f'c = 4,000 psi) for pile build-ups.
- (3) Use typical pile embedment details unless shown otherwise elsewhere in the plans. Payment for piles will be in accordance with the details shown. Strip back piling and extend prestressing strands into substructure when piling conflicts with substructure reinforcing or when the side cover from pile edge to substructure edge is less than 4" after driving.
- (4) When stripped back piles are required, strip back piling after driving or cast short with strands protruding from top of piling as shown.
- (5) Provide $\frac{1}{2}$ 270 ksi low relaxation strands tensioned to 28.9 kips each. If an optional design is used, provide a minimum concrete final prestress of 750 psi. Submit optional designs for approval.
- $\stackrel{(6)}{=}$ Saw cut $\frac{1}{2}$ " deep around perimeter of pile at the breakback line.
- (7) Unless shown otherwise.
- (8) $\mathcal{Y}_{4''}$ deformed bar anchors (DBA), electric arc-welded to stinger anchor plate with complete fusion
- (9) Place center of stinger within $\frac{1}{2}$ " of center of piling.

FABRICATION NOTES:

Provide Class H concrete. Provide sulfate resistant concrete when required.

Minimum release strength, f'ci = 4,000 psi. Minimum 28-day strength, f'c = 5,000 psi.

All dimensions relating to prestressing steel are to centers of strands.

Provide Grade 60 reinforcing steel. Provide deformed wire reinforcement meeting ASTM A1064.

GENERAL NOTES:

See Bridge Layout for size, number, and length of piling. See Bridge Layout or elsewhere in the plans for stinger assembly requirements. Stinger assembly is subsidiary to the nile

Shop drawing submittal and approval is not required if fabrication is in accordance with the details shown on this standard.

For treatment of damaged pile and the lifting loops, see the Concrete Repair Manual.

Cover dimensions are clear dimensions, unless noted otherwise.

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18 ~ #9

#C





30" D.S.



1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

- ② Min extension into supported element: #6 Bars = 1'-11" #7 Bars = 2'-0" #9 Bars = 2'-3"
- ③ Min lap with column reinf. #7 Bars = 2'-11" #9 Bars = 3'-9" #11 Bars = 4'-8"
- (4) Min extension into supported element: #6 Bars = 1'-11"
- #7 Bars = 2'-3" #9 Bars = 2'-9''

DRILLED SHAFT SECTIONS

- 5 Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.
- 6 1'-0" Min, unless shown otherwise on plans.
- 🗇 Or as shown on plans.

SHEET 1 OF 2						
Texas Department of Transportation					Brie Div Sta	dge ision ndard
COMMON FOUNDATION DETAILS						
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01-20: Added #11 bars to the FD bars.	DIST		COUNTY			SHEET NO.
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If unable to avoid conflict with wingwall piling at exterior pile group regardless of which pile would be battered back, one pile in group may be



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TABLE OF FOOTING
QUANTITIES FOR
<i>30" COLUMNS</i>

ONE 3 PILE FOOTING						
Bar	No.	Size	Lengt	h	Weight	
F 1	11	#4	3'- 2	"	23	
F2	6	#4	8'- 2	"	33	
F3	6	#4	6'- 11	l″	28	
F4	8	#9	3'- 2	"	86	
F5	4	#9	6'- 11	!"	94	
F6	4	#9	8'- 2	n	111	
FC	12	#4	3'- 6	"	28	
FD [] Ø	8	#9	8'- 1	"	220	
Reinf	orcing	Steel		Lb	623	
Class	"С" Сс	ncrete	crete CY 4.8			
ONE 4 PILE FOOTING						
Bar	No.	Size	Lengt	Weight		
F 1	20	#4	7'- 2	96		
F2	16	#8	7'- 2	306		
FC	16	#4	3'- 6	"	37	
FD 1 Ø	8	#9	8'- 1	n	220	
Reinf	orcing	Steel		Lb	659	
Class	"С" Сс	ncrete		СҮ	6.3	
		ONE 5	PILE FOOT	TING		
Bar	No.	Size	Lengt	h	Weight	
F 1	20	#4	8'- 2		109	
F2	16	#9	8'- 2	"	444	
FC	24	#4	3'- 6	n	56	
FD 🔟	8	#9	8'- 1	n	220	
Reinf	orcing	Steel		Lb	829	
Class	"С" Сс	ncrete		СҮ	8.0	

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise. Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile

unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise. Provide Grade 60 reinforcing steel. Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows: Uncoated or galvanized (#6) ~ 2'-6" Uncoated or galvanized (#7) ~ 2'-11" Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES: Designed according to AASHTO LRFD Bridge Design Specifications.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

DESIGNER NOTES: Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation. Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray. Maximum allowable pile loads for the footings shown are:

Shown are.				
72 Tons/Pile	with	24"	Dia	Columns
80 Tons/Pile	with	30"	Dia	Columns
100 Tons/Pile	with	36"	Dia	Columns
120 Tons/Pile	with	42"	Dia	Columns

SHEET 2 OF 2						
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COMMON FOUNDATION DETAILS						
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TABLE	E OF 6
ALLOW	ABLE
UNIT LE	ENGTH
Max Rdwv	Unit

Grade, Percent	Length Factor
0.00	4.1
1.00	3.9
2.00	3.7
3.00	3.5
4.00	3.3
5.00	3.1

Unit length must not exceed the length of the shortest end span times the Unit Length Factor shown in table or 400', whichever is less.

BAR 1	<i>ABLE</i>
BAR	SIZE
А	#4
В	#4
D	#4
Т	#4
0A	#5

The details shown on this sheet are applicable for two and three span units comprised of the same girder type. Units may be comprised of different span lengths. See "Table of Allowable Unit Length".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

[']This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.

CONSTRUCTION NOTES:

Where multi-span units are indicated on the Bridge Layout, the thickened slab end details and reinforcement shown on IGTS standard (Bars AA, G, H, J, K, and M) and on the Span Details will be omitted where slabs are continuous over interior bents. At these locations, the slab details and reinforcement will be as shown on this sheet or on PCP standard (if using this option).

Thickened slab end reinforcement and details still apply at expansion joint locations (ends of units).

See Span Details for remainder of slab reinforcement and details.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel. Provide Class "S" concrete (f'c = 4,000 psi). Provide Class "S" (HPC) if shown elsewhere on the

provide class "S" (HPC) it shown elsewhere on the plans. Provide bar laps, where required, as follows:

Uncoated ~ #4 = 1'-7"Epoxy Coated ~ #4 = 2'-5"

The details shown on this sheet are applicable for use only with the Prestressed Concrete I-Girder Standard Designs shown on standards IGSD-24, IGSD-28, IGSD-30, IGSD-32, IGSD-38, IGSD-40 and IGSD-44.

HL93 LOADING





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Girder	"D"	"B"	"Yt"	"Y b"	Area	"I x"	"Iy"	Weight (10)
Туре	(in.)	(in.)	(in.)	(in.)	(in.²)	(in.4)	(in. ⁴)	(plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	<i>33.72</i>	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

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full length for VC<= 20'	DIST		COUNTY	TO		SHEET NO.	
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- 1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.
- (2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.
- ③ For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.
- When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.
- 5 See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.

GENERAL NOTES:

These details accommodate skew angles up to 60°. Shop drawings for approval are required. A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer. Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

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ELASTOMERIC BEARING							
AND GIRDER END DETAILS							
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Dent Cirder		Bearing	Girder End		Pad Clip	
Bent Type	Girder Type	Type	Skew Angle	Pad Size Lath x Wdth	Dimensions	
r)pc	, ypc	(13)	Range	Egen x mach	"A"	"B"
		G-1-"N"	0° thru 21°	8" x 21"		
ITMENTS.	T x 28,T x 34, T x 40 T x 46	G-2-"N"	21°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
ERTED-T	& Tx54	G-3-"N"	30°+ thru 45°	9" x 21"	4 ¹ / ₂ "	4 ½"
AND		G-4-"N"	45°+ thru 60°	15" Dia		
BENTS		G-5-"N"	0° thru 21°	9" x 21"		
WITH	Tx62	G-6-"N"	21°+ thru 30°	9" x 21"	1 1/2"	2 1/2"
CKWALLS	т x70	G-7-"N"	30°+ thru 45°	10" x 21"	4 ¹ / ₂ "	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼″	4 1⁄4"
	Tx28,Tx34,					
ENTIONAL	Tx40,Tx46					
BENTS	& 1x54	G-1-"N"	0° thru 60°	8" x 21"		
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"		
ENTIONAL		G-1-"N"	0° thru 18°	8" x 21"		
ITERIOR	T x 28,T x 34,	G-2-"N"	18°+ thru 30°	8" x 21"	1 1/2"	2 1/2"
WITH	& Tx54	G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
KEWED		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 1/2"
IRDER ENDS		G-5-"N"	0° thru 18°	9" x 21"		
GIRDER	Tx62	G-5-"N"	18°+ thru 30°	9" x 21"		
NFLICTS)	Т х 70	G-11-"N"	30°+ thru 45°	9" x 21"	1 1/2"	1 1/2"
(16)		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 3⁄4"

2 For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

6 3" for inverted-T.

 $\fbox{7}$ Place centerline pad as near nominal centerline bearing as possible between limits shown.

 (\pounds) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(1) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ½" increments) in this mark. Examples: N=0, (for 0" taper)

N=1,(for ¼" taper) N=2,(for ¼" taper)

(etc.)

Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\begin{array}{c} 0.0625^{\circ}\\ Length \ or \ Dia\end{array}\right)$ IN/IN.

14 Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

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deep enough to accommodate the screws, but not less than $\frac{1}{2}$ " deep or

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ELASTOMERIC BEARING								
AND GIRDER END DETAILS								
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HAUNCH REINFORCING DETAIL







TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP

Top reinforcing steel not shown for clarity.



TREATMENT AT GIRDER END FOR SKEWED SPANS



- (1) Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 $\frac{1}{2}$ ".
- 2 Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.
- 3 Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.
- (4) Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows: Uncoated ~ #4 = 1'-7" Epoxy coated ~ #4 = 2'-5"
- (5) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.
- (6) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.
- (8) Drain entrance formed in rail or sidewalk.

9 Water may not be discharged onto girders.

(10) All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.



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 10-19: Modified Note 7. Type A now a pay Item.
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 $\widehat{11}$ See Layout for joint type.

12 Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

- 13 Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.
- (14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

15 See Span details for type of joint and joint locations.





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HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



- (1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.
- (2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).
- (3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.
- $(\underbrace{4})_{Use}$ wedges as necessary to obtain tight fit. Nail wedges to timbers.
- 5 Pressure treated landscape timbers can not be used.
- 6 All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.
- (7) It is acceptable to tie anchor bolts to cap reinforcement.
- (8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- (9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

SHEET 1 OF 2								
Texas Department	B D Si	ridge ivision tandard						
MINIMUM	ERE	ΞC	TION	A	ND			
BRACING F	BRACING REQUIREMENTS							
PRESTRES	SED) (CONCR	ETE	Ē			
I-GIRDERS	5 Al	٧D	I-BEA	MS				
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	TABLE A									
OPTION 1-RI	GID BRACING (ST	EEL STRAP)	OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)							
	Maximum Bra	acing Spacing		Maximum Bra	acing Spacing					
Girder or Beam Type	Slab Overhang less than 4'-0" [1]	Slab Overhang 4'-0" and greater (11)	Girder or Beam Type	Slab Overhang less than 4'-0" [1]	Slab Overhang 4'-0" and greater (11)					
Тх28	¼ points	1/4 points	T x 28	1/4 points	¹∕8 points					
Tx34	¼ points	1/4 points	T x 34	¼ points	¹∕ ₈ points					
T x 40	¼ points	½ points	T x 40	¼ points	¼ points					
Tx46	¼ points	¹⁄8 points	Tx46	¼ points	¼ points					
Tx54	¼ points	¹⁄8 points	Tx54	¼ points	¼ points					
Tx62	¼ points	¹⁄8 points	Tx62	¼ points	¼ points					
Tx70	¼ points	¼ points	T x 7 0	¼ points	½ points					
А	¼ points	¹⁄8 points	А	2.0 ft	1.5 ft					
В	$\frac{1}{8}$ points	¹⁄8 points	В	3.0 ft	2.0 ft					
С	½ points	½ points	С	4.5 ft	2.0 ft					
IV	¼ points	½ points	IV	¼ points	4.0 ft					
VI	¼ points	½ points	VI	¼ points	4.0 ft					



(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

- 4 Use wedges as necessary to obtain tight fit. Nail wedges to timbers.
- (5) Pressure treated landscape timbers can not be used.
- 8 Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.
- and last typical brace location.

(1) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425. Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

SHEET 2 OF 2								
Texas Department	of Tra	nsp	ortation	Bi Di Si	ridge ivision tandard			
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BRACING REQUIREMENTS								
PRESTRES	PRESTRESSED CONCRETE							
I-GIRDERS	5 Al	٧D	I-BEA	MS				
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(3) Provide at least 4 grout/air outlet tubes equally spaced around the perimeter of the column. Install at bottom of cap to avoid air entrapment. Seal off tubes sequentially when a steady flow of grout without air occurs. Secondary tubes to help drain water, located at top of column, may also be installed.

 $^{(4)}$ Continuous gravity-flow grouting through a tremie tube is recommended. With this method, lower a flexible tremie tube through one of the vertical ducts to the bottom of the bedding layer and fill the connection from the bottom upward with a continuous flow of grout. This method requires a sufficient amount of grout to be mixed prior to grouting and that the funnel connected to the tremie tube have adequate volume capacity (4 quarts Min is recommended). A valve may be used to stop the flow during grouting to allow refilling the funnel or to tamp the grout. The tube should remain within the grout and gradually withdraw as the level of the grout rises in the ducts. It is critical to ensure a continuous flow of grout to avoid air entrapment Alternative methods, including pressure grouting with low pressure pumps, may be used provided they are proved effective in providing void-free connections during the mock-up phase.

(5) Unless otherwise shown.

Reinforce bearing seats over 3" tall and slope top of cap between bearing seats in accordance with Item 420.4.9 "Treatment and Finishing of Horizontal Surfaces", unless directed otherwise by the



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Construct and cure cap in accordance with Item 420, "Concrete Substructures". Secure ducts to prevent their movement during concrete placement. Location tolerance of ducts is $V_4^{\prime\prime}$ from plan location, transversely and longitudinally. Seal ducts to prevent intrusion of concrete. Bearing seats may be precast with the cap. Bearing seats over 3" in height must be reinforced as per Item 420.4.9. Do not locate lift points at bearing seats if bearing seats are precast. Cap concrete must achieve a compressive strength of 2,500 psi prior to lifting. Limit flexural stress in cap to 250 psi during handling and storage. Store and handle caps in accordance with Item 424, "Precast Concrete Structural Members (Fabrication)". Do not stack caps. Caps that become cracked or otherwise damaged may be rejected. Cap-to-Column Connection:

Reinforcing bar dimensions shown are out-to-out of bar.

CONSTRUCTION NOTES:

Cap Fabrication

Make a trial batch of grout using the same material, equipment and personnel to be used for actual grouting operations and grout a mock-up of the connection at least one week before grouting and in the presence of the Engineer. This mock-up test must demonstrate the reliability of the Contractor's grouting procedures to provide a connection free of voids. Field

test the trial batch grout to the same level required for the actual grouting. Caps may be placed on columns/drilled shafts after column/drilled shaft concrete has achieved a flexural stress of 355 psi (or 2,500 psi compressive strength). Use plastic shims or friction collars to support the cap at the proper elevation prior to grouting. Total area of plastic shims used on top of each column may not exceed 6 percent of the column area. Column/drilled shaft curing may be interrupted a maximum of 2 hours for placement of plastic shims or friction collars and cap placement

Surfaces in contact with grout must be clean and in a saturated, surface-dry condition, immediately prior to grouting. Provide water tight forms. Fill the forms with water and drain just prior to grouting. Ponding or free-standing water is not permitted. Use compressed air to blow out excess water.

Mix grout in accordance with the manufacturer's directions. Evidence of frothing, foaming, or segregation is cause for rejection. Transport grout from mixer to final location by wheel barrow, bucket or pumping.

Perform sampling and testing of grout by trained personnel at the Contractor's expense and while witnessed by the Engineer. Grouted connections must be free of voids. Trowel finish top surface of cap anchorage ducts flush with top of cap. Wet mat cure these

locations for at least 48 hours. Recess lifting loops 1-inch minimum using exothermic cutting rods. Do not overheat or damage the surrounding concrete. Abrade the concrete surfaces of excavation and end of the lifting loop to remove all slag with a needle gun, steel brush, or other suitable means. Coat the inside of the recessed area, including the lifting loops, with 10 mils (minimum) of neat, Type VIII epoxy and patch the recess with epoxy mortar.

Friction collars may be removed, if used, and beams placed on the cap after the grout obtains a compressive strength of 2,500 psi. Subsequent loading can occur when the grout reaches its final required 28 day compressive strength.

MATERIAL NOTES:

Provide a pre-gualified grout from TxDOT's Material Producer List "Cementitious Grouts and Mortars for Miscellaneous Applications", conforming to DMS-4675. Provide semi-rigid spirally crimped, corrugated duct of galvanized, cold rolled steel conforming

to ASTM A653. Corrugations must have a minimum amplitude of 0.094". Grout tubes and forms must be approved prior to grouting.

Provide Grade 60 reinforcing steel. Epoxy coat or galvanize all reinforcement if column reinforcement is epoxy coated or galvanized.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

The Contractor has the option to provide precast bent caps in accordance with the details shown. No additional payment will be made if the Contractor uses precast caps. Submit shop drawing's of precast caps for approval prior to construction. Indicate lifting

attachments and locations on the shop drawings. Precast Concrete Bent Cap Option shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. See Interior Bent sheet for details and notes not shown.

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PRECAST CONCRETE								
BENT CAP OPTION								
FOR ROL	IND	С	OLUM	INS				
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ight)$ To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in $\frac{1}{4}$ increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is $\frac{\eta_{4}}{\eta_{4}}$. Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

- $\binom{6}{6}$ See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover
- (7) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 1/2" with I-girders, and 3" for all other beam types. Epoxy coating

(8) Do not locate construction joints on top of a panel.

 $^{(9)}$ Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ½" deep, in the top of the bedding strips at 8' o.c..





(Panel reinforcing not shown for clarity. The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)

> Glued butt joint BEDDING STRIP DETAIL 9

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

Placing panels to minimize joint openings is recommended. If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary. Care must be taken to ensure proper cleaning of

construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 $\frac{1}{2}$ under the panels as the slab concrete is placed. To allow the proper amount of mortar to flow between

beam and panel, the minimum vertical opening must be at least 1/2". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows: Uncoated $\sim #4 = 1'-7"$

Epoxy Coated $\sim #4 = 2'-5''$

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrées.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings.

When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

Cover dimensions are clear dimensions, unless noted otherwise

Reinforcing bar dimensions shown are out-to-out of har

HL93 LOADING SHEET 1 OF 4 Bridge Division Standard Texas Department of Transportation PRESTRESSED CONCRETE PANELS DECK DETAILS PCPpcpstde1-19.dqn N: TXDOT CK: TXDOT DW: JTR CK: JMH OTxDOT April 2019 JOB HIGHWA 1412 03 038 FM 1301 YKM WHARTON 214



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34" pyramid shape

top of redwood

timber board.

chamfer place along

TOP FLANGE FOR SKEWS OVER 5° Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.

reinforcement and clear cover. Transverse top slab reinforcement

board placed flush with top of panel or within $\frac{1}{4}$ Max above panel. Place $\frac{3}{4}$ " pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight,

Spi

Dei

SPECIAL OPTION 2 CONSTRUCTION NOTES: When Option 2 is chosen bottom mat of thickened end

slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet. Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 $\frac{1}{2}$ ". Do not extend the longitudinal panel reinforcement

into the cast-in-place slab. Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor study of expansion joints shown on standards AJ, SEJ-A and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi. Provide Bars AA, G, K and OA from standard IGTS in the slab.

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PRESTRESSED						
CONCRETE PANELS						
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TABLE A (4)(5)					
Beam Type	Normal (In.)	Min (In.)	Max (In.)		
A	3	2 1/2	3 1/2		
В	3	2 ½	3 1/2		
С	4	3	4 ½		
IV	6	4	7 ½		
VI	6 ½	4 ¹ /2"	8 ½		
U40 - 54	5 ½	5 ½	7		
Tx28-70	6	5	7 1/2		
XB20 - 40	4	3	4 ½		
XSB12 - 15	4	3	4 ¹ / ₂		

TABLE B (4)(5)							
op Flange Width	Normal (In.)	Min (In.)	Max (In.)				
11" to 12"	2 ¾	2 ½	2 3/4				
Over 12" to 15"	3 1/4	3	3 ¼				
Over 15" to 18"	4	3	4 ³ ⁄4				
Over 18"	5	3 ½	6 ¼				

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3,500 psi. Minimum 28 day strength f'c=5,000 psi.

Provide ¾" chamfer along bottom edge of panel on beam side.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface. Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use %" or %" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use $\frac{3}{6}$ " or $\frac{1}{2}$ " Dia

(270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands. For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed

strands alone are not allowed). Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed. 2. ⅔" Dia prestressing strands at 4 ½" Max Spacing

(unstressed). No splices allowed.

3. 1/2" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.

4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

No combination of longitudinal reinforcement options in a panel is allowed. Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

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¾" Min

-Construction joint or controlled joint



Plate

DESIGN NOTES: As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi. Maximum deflection under the weight of forms reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

> 1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2"

CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448. All permanently exposed form metal, where

the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing" Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab. A sequence for uniform vibration of concrete

must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

SHEET 1 OF 2								
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PERMANENT METAL								
DECK FORMS								
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TABLE OF SEALED EXPANSION JOINT INFORMATION

		STRIP	SEAL			
STEEL SECTION	4" J	OINT	5" JOINT			
STELE SECTION (2)	Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)		
Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"		
Type R	SE-400	1 3⁄4"	SE-500	2"		

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine

> Weld top and back. Grind top smooth



- $^{(2)}$ Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.
- (3) These openings are also the recommended minimum installation openings.
- $\binom{4}{4}$ Reduce for sidewalk or parapet heights less than 6".
- (5) Other conditions affecting the joint profile should be noted elsewhere.
- (6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.
- 7 See Span details for location of break point.
- 8 Align shipping angle perpendicular to joint.

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts. The seal must be continuous and included in the price bid for sealed

expansion joint.

Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Feild Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint. Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 1/2".

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of this standard is governed by the "Texas Engineering Practice Act". No warranty of any by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the convers ard to other formats or for incorrect results or damages resulting from its use. he he is

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing"

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a $\frac{3}{8}$ " width x $\frac{1}{4}$ " tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in 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 slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars. Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7" Epoxy coated $\sim #4 = 2'-5''$

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement. Rail anchorage details shown on this standard may require

modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail. Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise

Reinforcing bar dimensions shown are out-to-out of bar.

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SING	LE	S	LOPE		
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					CABLE TI	ERMINATION CHA	RT				
	CONDUCTOR	T – 1	T-2	T-3	T – 4	T-5	T-6	T - 7	T-8	T-9	T-10
I NO.	COLOR	12 COND	12 COND	12 COND	12 COND	12 COND	12 COND	12 COND	12 COND	12 COND	12 CON
1	BLK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHT	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRA
3	RED	SH 20-21 R	SPARE	SH 2-3 R	SPARE	SH 7-8 R	SH 10 R	SH 13-14 R	SPARE	SPARE	SH 10,24
4	GRN	SH 20-21 G	SPARE	SH 2-3 G	SPARE	SH 7-8 G	SH 10 G	SH 13-14 G	SPARE	SPARE	SH 10,24
5	YEL	SH 20-21 Y	SPARE	SH 2-3 Y	SPARE	SH 7-8 Y	SH 10 Y	SH 13-14 Y	SPARE	SPARE	SH 10,24
6	BLU	SH 19 G ARW	SH 23 W	SH 1 G ARW	SH 5 W	SH 6 G ARW	SH 11 W	SH 12 G ARW	SH 16 W	SH 17 W	SPARE
7	WHT/BLK	SH 19 Y ARW	SH 23 DW	SH 1 Y ARW	SH 5 DW	SH 6 Y ARW	SH 11 DW	SH 12 Y ARW	SH 16 DW	SH 17 DW	SPARE
8	RED/BLK	SH 19 R ARW	SPARE	SH 1 R ARW	SPARE	SH 6 R ARW	SPARE	SH 12 R ARW	SPARE	SPARE	SPARE
9	GRN/BLK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
10	YEL/BLK	SH 19 Y ARW	SPARE	SH 1 Y ARW	SPARE	SH 6 Y ARW	SPARE	SH 12 Y ARW	SPARE	SPARE	SPARE
11	BLU/BLK	SH 22 W	SPARE	SH 4 W	SPARE	SH 9 W	SPARE	SH 15 W	SPARE	SPARE	SPARE
12	BLK/WHT	SH 22 DW	SPARE	SH 4 DW	SPARE	SH 9 DW	SPARE	SH 15 DW	SPARE	SPARE	SPARE

				ELECT	RICAL	SCHEDULE							
RUN NO.	NO./SIZE/TYPE	LENGTH	RADAR	CABLE	CABLE	PUSH BUTTON 2C#12 TY C	12C #14 TY A	LUMINAIRE 2C#8 XHHW	#4 XHHW POWFR	#4 BARF			
			60	90									
А	1-4'' PVC (B)	110	1	1		3	3	1		1			
В	1-3'' PVC	20	2	2		1	1	1		1			
С	2-2'' PVC	10	6	6		9	10	4		1			
D	1-2'' PVC	15			1			1	1	1			
E	1-3'' PVC	30				1	1			1			
F	1-4'' PVC (B)	120	3	3		4	5	2		1			
G	1-3'' PVC	20	1	1		1	1	1		1			
Н	1-3'' PVC	15				1	1			1			
Ι	1-4'' PVC (B)	120	2	2		2	3	1		1			
J	1-3'' PVC	25	1	1		1	1	1		1			
K	1-4'' PVC	70				1	1			1			
L	1-4'' PVC	25	1	1		1	1	1		1			
М	1-3'' PVC	15				1	1			1			
N	1-4'' PVC (B)	50	1	1		2	2	1		1			
0	1-3'' PVC	15				1	2			1			
P	P 1-3'' PVC 55 1 1 1 1 1												
		(B) =	BORED		(RMC)	= RIGID META	L CONDUIT						
	THIS CHART DO	ES NOT :	INCLUDE	QUANT	ITIES (OF CONDUIT/C	ABLE ALONO	SIDE THE PO	DLES				

				ELECTRICA	L SERVICE DATA					
ELEC SERVICE NO	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO/SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANEL BOARD LOADCENTER	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	
1	ELC SRV TY D 120/240	2 "	3/#4	NZA	2P/070	30	100	TRF SIGNAL LUMINAIRE	1P/50 2P/20	



			90	% SUE	BMITTAL				
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Texas Department of Transportation

ELI	FM TRAF ECTRI	1301/SH 60 FIC SIGN CAL SCHEI	AL DULES Sheet	1 OF 1							
FED.RD. DIV.NO.		PROJECT NO.		SHEET NO.							
6				226							
STATE	DIST.	со	UNTY								
TEXAS	YKM	WH,	ARTON								
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	ELI FED. RD. DIV. NO. 6 STATE TEXAS CONT. 1412	FED. RD. DIV. NO.6STATEDIST.TEXASYKMCONT.141203	FM 1301/SH 60 TRAFFIC SIGN SIGN ELECTRICAL SCHEIFED. RD. DIV. NO.PROJECT NO.6	FM 1301/SH 60 TRAFFIC SIGNAL SCHEDULES SHEET FED.RD. DIV.NO. PROJECT NO. 6 STATE STATE DIST. CONT. SECT. JOB HIGHWA 1412 03 038							

			1				5	SIGNAL	POLE CI	HART			1					
							N	IAST ARI	M LENG	ТН	POLE	HEIGHT		CABLE INSI	DE POLE & A	RM		COMMENTS
POLE NO.	FDN TYPE	STATION	OFFSET	LUM-A	HEADS	APS UNIT	(A)	(B)	(C)	(D)	(E)	(F)	PED PUSH BUTTON	SIGNAL	LUMINAIRE	RA	DAR	
													2 COND	12 COND	#12 XHHW	6C	90	
T - 1	48-A	15+37.96	70.3542 LT	1	4	1	50	23	14	12	18	30	4	151	30	36	36	
T-2	24-A	15+72.04	35.0636 LT		1	1					10		4	10				PEDESTAL POLE
T-3	48-A	15+85.49	49.3210 RT	1	4	1	50	22	14	13	18	30	4	153	30	18	18	
T - 4	24-A	15+58.08	60.7250 RT		1	1					10		4	10				PEDESTAL POLE
T-5	48-A	14+66.08	74.4092 RT	1	4	1	50	23	13	13	18	30	4	152	30	18	18	
T-6	24-A	14+01.41	37.6240 RT		1	1					10		4	10				PEDESTAL POLE
T - 7	36-B	13+94.48	39.8146 LT	1	4	1	40	13	14	12	18	30	4	141	30	18	18	
T - 8	24-A	14+11.65	58.8583 LT		1	1					10		4	10				PEDESTAL POLE
T-9	24-A	14+45.73	61.6773 LT		1	1					10		4	20				PEDESTAL POLE
T-10	36-A	14+14.43	37.3412 RT		2		24	1	4	9	18			59		18	18	

			SIG	NAL HEAD							
		12''	SIGNAL INDICA	TION		VEHI	CLE SIG	SNAL SEC	TIONS		
SIGNAL HEAD			BACKPLATE			YELLOW	GREEN	RED	YELLOW	GREEN	THEL
NO.	TYPE	3 (SEC) (EA)	4 (SEC) (EA)	5 (SEC) (EA)	TRED BALL	BALL	BALL	ARROW	ARROW	ARROW	
2, 3, 7, 8, 10, 13, 14, 20, 21, 24	Н3	10			10	10	10				
1,6,12,19	H4LF		4					4	8	4	
4, 5, 9, 11, 15, 16, 17, 18, 22, 23	PED										
TOTAL		10	4		10	10	10	4	8	4	

GROUN SUM	ND BOX MARY
TYPE	EACH
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#-APPROXIMATE DIMENSIONS PROVIDED BY STATION AND OFFSET FROM CORRESPONDING HORIZONTAL CONTROL LINE TO CENTER OF POLE.

1. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.





* Remove portion of

1/2

5" Approx.

3⁄4" ± 1⁄4"

Clamp @ 1/4" × 6" A572 GR50 or 3g × 7" A36

Plate gusset,

7 Gage A36,

2 req'd

1/1

lip on lower mast arm clamps

1 3/8 '



OTHER MATERIALS:

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PROJECTION

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.

2. Welded tabs and backplates shall be ASTM A-36 steel or better.

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the

3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, 1/2 in. X 11/2 in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.

4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of

5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.



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

Texas Department of Transportation Traffic Operations Division										
CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM CFA-12										
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	FOUNDATION SUMMARY TABLE $^{(3)}$										
		AVG. N BLOW	FDN	NO.	DRILLED SHAFT LENGTH (6) (FEET)						
	IDENTIFICATION	/ft.	TYPE	ΕA	24-A	30-A	36-A	36-B	42-A		
	T-2	10	24-A	1	5.7						
	T - 4	10	24-A	1	5.7						
	T-6	10	24-A	1	5.7						
	T - 7	10	36-B	1				15.2			
	T - 8	10	24-A	1	5.7						
	T - 9	10	24-A	1	5.7						
	T-10	10	36-A	1			13.2				
ו											
1											
1											
-											
	TOTAL DRILLED S	SHAFT	LENGT	HS	28.5		13.2	15.2			

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

	Texas Department of Transportation Traffic Operations Division										
% SUBMITTAL	TRAFF	TRAFFIC SIGNAL									
M REVIEW ONLY COMPLETE: NOT INTENDED BIDDING OR CONSTRUCTION. MICHAEL T TRUEBLOOD	POLE FOUNDATION										
No.: 109199 10/7/2020				TS-	F	D - 1	12				
	©TxDOT August 1995	DN: MS		CK: JSY	DW:	MA0/MMF	CK:JSY/TEB				
	S-96 REVISIONS	CONT	SECT	JOB		ніс	GHWAY				
	11-99 1-12	1412	03	038		FM	1301				
		DIST	COUNTY				SHEET NO.				
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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 $\frac{1}{2}$ in. or less in diameter.
- 4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- 5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- 6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

- 1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible conduit (RMC) systems. Provide liquidtight 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" × 10" × 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" × 8" × 4"	10" × 10" × 4"	12" x 12" x 4"
#4	8" × 8" × 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" × 8" × 4"	8" × 8" × 4"	10" x 10" x 4"
#8	8" × 8" × 4"	8" × 8" × 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.

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ELECTRICAL DETAILS CONDUITS & NOTES ED(1)-14										
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ELECTRICAL CONDUCTORS

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

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide around 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.



1/8" to 1/4

Seal between conductors with tape. Tape to extend past end of tubing by 1/8" to 1/4

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- 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.

GROU	ND BOX DIMENSIONS
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
А	12 X 23 X 11
В	12 X 23 X 22
С	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS										
TYDE	DIMENSIONS (INCHES)									
TIPE	н	Ι	J	К	L	М	N	Ρ		
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		



GROUND BOX COVER

GROUND BOXES

A. MATERIALS

- Item 624 "Ground Boxes."
- and Electrical Supplies," Item 624.

- B. CONSTRUCTION METHODS
- aaareaate.
- boxes.

- Do not use silicone caulk as a sealant.
- together and to the ground rod with listed connectors.
- below arade.
- fully describing the work required.

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and

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

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.

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

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

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.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors

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

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

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.

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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, 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, 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 $\frac{1}{2}$ 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.

.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.

2. Ensure all mounting hardware and installation details of services conform to utility company specifications.

3.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 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 $8 \frac{1}{2}$ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating. Σċ 6 v 0

4.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 $\frac{1}{2}$ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

5.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.

	* 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(0)	1 1/4 "	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(0)	1 1/4 "	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

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

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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.



TOP MOUNTED PHOTOCELL

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

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SCHEMATIC TYPE C THREE WIRE	



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

	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





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PEDESTAL SERVICE NOTES

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







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

SECTION A-A

ANCHOR BOLT DETAIL

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ELECTRICAL DETAILS ELECTRICAL SERVICE SUPPORT PEDESTAL SERVICE TYPE PS

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TIMBER POLE (TP) SERVICE SUPPORT NOTES

- 1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
- 2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
- 3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
- 4. Gain pole as required to provide flat surface for each channel. Gain timber pole to $\frac{1}{20}$ in. max. depth and 1 $\frac{1}{20}$ in. max. height. Gain pole in a neat and workmanlike manner.
- 5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to $3\frac{3}{4}$ in. maximum depth, and $1\frac{1}{2}$ in to $1\frac{5}{8}$ in maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, $\frac{1}{4}$ in. minimum diameter by $\frac{1}{2}$ in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
- 6. When excess length must be trimmed from poles, trim from the top end only.
- (1) Class 5 pole, height as required
- (2) Service drop from utility company (attached below weatherhead)
- (3) Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)
- (4) Safety switch (when required)
- (5) Meter (when required)
- 6 Service enclosure
- (7) 6 AWG bare grounding electrode conductor in $\frac{1}{2}$ in. PVC to ground rod - extend $\frac{1}{2}$ in. PVC 6 in. underground.
- (8) 5% in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.
- (9) RMC same size as branch circuit conduit.
- (10) See pole-top mounted photocell detail on ED(5).
- (1) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.
- (12) When required by utility, cut top of pole at an angle to enhance rain run off.

electric utility.

- 7. Furnish and install galvanized or stainless steel channel strut 1 $\frac{1}{2}$ in. or $1\frac{1}{3}$ in. wide by 1 in. up to $3\frac{3}{4}$ in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
- 8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT Overhead(0)



SERVICE SUPPORT TYPE TP (0)

2020

10/7

DATE:

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

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

- 1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services.
- 2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
- 3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
- 4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
- 5. Ensure all installation details of services are in accordance with utility company specifications.
- 6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the





of any conver-its use of this standard is governed by the "Texas Engineering Practice Act". No warranty made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the this standard to other formats or for incorrect results or damages resulting from The use kind is sion of **DISCLAIMER:**

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	MATERIALS
le or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 ③ , or A36 (Arm only)
n Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50④, or A1011 HSLAS-F Gr.50④
n Strut Plates (2)	ASTM A36, A572 Gr.50 ④, or A588
SC.	ASTM designations as noted

- () 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.

⅓" Dia. Approx.

Texas Department of Transportation Traffic Operations Division STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES ARM DETAILS LUM-A-12 CK: JSY DW: LTT © TxDOT August 1995 DN: LEH CK: TEB CONT SECT JOB 5-96 1-99 1-12 HIGHWAY 1412 03 038 FM 1301 SHEET NO YKM WHARTON 239

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	MATERIALS
ound Shafts or Nygonal Shafts()	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
lates 🛈	ASTM A36, A588, or A572 Gr.50
onnection Bolts	ASTM A325 or A449, except where noted
in Bolts	ASTM A325
ipe()	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
isc. Hardware	Galvanized steel or stainless steel or as noted

() 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.

Min. 85% Penetration except "Clamp-on Detail 3"

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 \prime_2 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 $\frac{3}{4}$ " dia pipe shall have $\frac{3}{16}$ " dia holes for a $\frac{1}{8}$ " dia galvanized cotter pin. Back clamp plate shall be furnished with a $\frac{3}{4}$ " dia hole for each pin bolt. An $\frac{1}{6}$ dia hole for each pin bolt shall be field drilled through the pole ofter arm arighting how become the pole after arm orientations have been approved by the Engineer.

Texas Depo Traffic O STANDAR FOR TRAF SUPPORT MAST ARM	D D FF ST CC		of Tra Division SSEN SI UCT NECT M	nsp AB GI UF I C A -	NA RE NA RE	ati Y S S	ion
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Arm	ROUN	D POLES		() + 5 ¹ /		POLYGO	NAL POLE	IS D	() + h +	Foundati	Г			SH	IPPING PAF	RTS LIST		
ft. in.	19 in.	^U 24 in.	¹ 30 in.	U ^{™K} in.	υ _в in.	Dı9 in.	⁰ 24 in.	^U 30 in.	U ^{TIK}	Туре	F	Ship e	ach pole with	the following (attached: enlar	rged hand hole,	, pole cap, fixe	ed-arm
20 12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A			tion bolts and	washers and ar	ny additional H	hardware listed	d in the table.	W 1 1 1
24 12.0	9.3	8.6	7.8	.239	13.0	10.0	9.2	8.3 8.8	.239	36-A 36-∆		Nomina	30' Poles Wi	th Luminaire	24' Poles	with ILSN	19′ Poles Luminaire	with No and No ILSN
32 13.0 36 13.5	0 10.3 5 10.8	9.6	8.8	.239	14.0	11.0	10.2	9.3	.239	36-A 36-A		Arm Length	(or two if I small hand h	LSN attached) ole, clamp-on	Above h plus or hand ho	nardware ne small ple	See note	e above
40 14.0) 11.3	10.6	9.8	.239	16.0	13.0	12.2	11.3	.239	36-B		f†	Designation	Quantity	Designation	Quantity	Designation	Quantity
44 14.5	5 11.8	11.1	10.3	.239	16.5	13.5	12.7	11.8	.239	36-B		20	20L-100		205-100		20-100	
	DOUN							JS .				24	24L-100		245-100		24-100	1
rm ngth L,			1) thk	D	L,		$(2) D_2$	(1) the	C Dias			32	32L-100	<u></u>	325-100		32-100	
†. f†.	in.	in.	in.	Rise	ft.	in.	in.	in.				36	36L-100		365-100		36-100	
20 19.	1 8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7'	·		40	40L-100	1	405-100		40-100	
4 23. 8 27.	<u> </u>	5.8	.179	1'-9"	23.1	9.0	3.5 3.5	.179	1'-8'		l	44	44L-100		445-100		44-100	
2 31.0	0 9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10)"		_						
ie 35. (0 10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11		l.	Traffi [c Signal Arms	(1 per pole)	Ship Ship	(2 Signals)	The listed equip	3 Signals)
0 39.0	0 10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1'	'		Nomina	iype i Arili (12 JI 91 91 97		
H 43.0 B = Pole	u 11.0 Base 0.D.	5,1	.239	<u> 28.</u> D ²	<u> 43.0</u> 2 = Arm E	1 11.5 nd 0.D.	4.0	.239	2'-3'			Arm Length	1 CGB con	nector	1 Bracket and 2 CGB	Assembly Connectors	2 Bracket and 3 CGB	Assemblies Connectors
D ₁₉ = Pole and r	Top O.D. no ILSN	with no	Luminaire	e Li	i = Shaft = Nomina	Length I Arm Ler	ngth					f+	Designation	0	Designation	Quantity	Designation	Quantity
24 = Pole w/our	Top O.D. t Luminair	with ILS e	in .	-			-					20	201-100	QUANTITY			Designation	QUUITITY
$D_{30} = Pole$ $D_1 = \Delta rm^2$	Top 0.D.	with Lun	inaire									24	241-100		24II-100	1		
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	be increas	ed by ur	to 1" fo	or polygo	nal arme							32			32 I I - 100		32 I I I - 100	
				, porygu								36			3611-100		36111-100	1
			-			Nom	inal Arm	<u>Lengt</u> h	1 - L			40					44 I I I - 100	I
			Note: Tr	he arm sha he un loadd	all be for ed rise n TRA	ILSN A See St Nominal A Bracket Assembly	L1 straigh as showr SIGN/ ed Mount Arm Conne neet "MA- rm Leng: <u>3'-0</u>	ection- -C(ILSN) th - L See	RM e	Nom Arm (8'	c-	Lumind Nomin 8' Ar ILSN / Nomin 7' Ar 9' Ar 9' Ar Anchor Anchor Diame	aire Arms (1 al Arm Length m Arm (Max. 2 per al Arm Length m m Bolt Assembli hor Anchor t Bolt Length 2" 3'-4" 4" 3'-10" 4'-3"	per 30' pole) r pole) Ship w es (1 per pole Quantity 1	Quantity 1 ith clamps, bo Quantity e) Each ancho Top and Bo 8 flat was per Stando Templo	or bolt assemble ottom templates shers, and 4 nu ard Drawing "TS	s ly consists of t s, 4 anchor bolt ut anchor device S-FD". noved for shipme	he following: s, 8 nuts, s (Type 2) nt.
		Ē		(w) 15'-0"Min-19'-0"Max-17'-6"Nom. (unless otherwise noted)	3 Three CGB See Shee Arm Len Arm Type Arm Type	Gaded Cou Connecto "ARM COU et 2 of 2 TABLE gth 24' II 10' III	OF DIME	32/31 NSIONS 32/31 12/1 10/1 wn of Re	Traffic See She Detail • A. 6' 40' 3' 1' 12' Se Dad "N Fou	2 Signal 2 Signal 2 D,E or F 44' 48 12' 12 2 Sheet 1A-D"	300" 35'-0" Nominal Mo	INT DOCUMEN FOR PEE ENGINEI P.E. SI DATE:	90% SUBMI ERIM REVIE IT INCOMPLETE: MIT, BIDDING OR R: <u>MICHAEL T T</u> RIAL No.: 1091 10/7/2020	TTAL W ONLY NOT INTENDED CONSTRUCTION. RUEBLOOD 99		Texas Tra TRAFI SUPPOR SINGLE MA (100 M	S Department of Tr ffIc Operations Division FIC SIGN T STRUCT AST ARM AS AST ARM AS IPH WIND Z SMA - 10	HEET 1 OF 2 ransportation IAL URES SEMBLY ONE) O(1) - 12 DW: MAF CK: JSY 3 HIGHMAY
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VIBRATION WARNING of this standard is governed by the "Texas Engineering Practice Act". No warranty made by TxD01 for any purpose whatsoever. TxD01 assumes no responsibility for the this standard to other formats or for incorrect results or damages resulting from .179" thickness is permissible for Tip Section -Min Lap 2" Sch 6'-0"(Min) ~ 11'-0" (Max) equals 1.5 40 pipe times female 9" ± I.D. End Plate 3/8" thick min shape to match arm € ∆rm Note: A slip joint is $\frac{3}{4}$ " Dia holes and permissible for arms Dia galv A307 bolt. mitigate vibrations. 40' and greater in length. The slip joint shall be made in the Tack weld nut to thread projection after making ́МА - З joint. Repair damaged galvanizing in accordance with Item 445, "Galvanizing". shop, but may be match marked and shipped disassembled. SLIP JOINT DETAIL TENON DETAIL than two days. Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac" "Sky Bracket" or "Easy Bracket" with $1\frac{1}{2}$ " Dia Threaded Coupling. BRACKET ASSEMBLY Second longitudinal Seam Weld is permitted for . МА – Т polygonal arms if D₁ exceeds 10" . (A (MA-2 MA -MA · 1/4 (A)/ 11/2" Dia MA - 2> Threaded 1/4 Longitudinal Seam Weld must be Coupling oriented within the lower 90 of the signal arm. Μ ARM WELD DETAIL ARM COUPLING DETAILS 4:12:25 sol\iCS*I (4)60% Min. penetration 100% pemetration within 6" of circumferential base welds. 12020 10/7/

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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

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

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

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 100 mph plus a 1.3 gust factor.

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

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

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

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

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

SHEET 2 OF 2

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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

> Backplate louvers based on wind and vibration rating.

Retroreflective border. See general note 1

Traffic Safety Division Standard										
TRAFFIC SIGNAL HEAD WITH BACKPLATE										
TS-	- BF	>_	20							
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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

	Equivalent DL (5)	WL EPA 56
rm	Luminaire 60 lbs	1.6 sq ft
	Sign 85 Ibs	11.5 sq ft
m	Signal Loads 310 Ibs	52 sq f†
	Signal Loads 180 Ibs	32.4 sq ft

 ${igidarrow}$ 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

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

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

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.

Desian 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 fátigue performance.

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MATERIALS							
ound Shafts or Diygonal 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)						
lates (7)	ASTM A36, A588, or A572 Gr.50						
onnection Bolts	ASTM A325, or A449 except where noted						
in Bolts	ASTM A325						
ipe(7)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50						
lisc. Hardware	Galvanized steel or stainless steel or as noted						

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										
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(80 AND 10 Sheet 2 of 5 © TXDOT July 2000	O M	PH		NC (2) Z 2)·	20 - 1	NE) 12 CK: JSY			
(80 AND 10 Sheet 2 of 5 © TxDOT July 2000 REVISIONS	DN: JSY CONT	SECT	CK: ARC JOB	NC (2) Z 2)·	20 - 1	CK: JSY			
(80 AND 10 Sheet 2 of 5 (C) TxDOT July 2000 REVISIONS 1-10	DN: JSY CONT 1412	SECT 03	CK: ARC JOB 038) Z 2) · ^{TGG}	СО - 1 нтсн м	NE) 12 ck: JSY HWAY 1301			
(80 AND 10 Sheet 2 of 5 © TxDOT July 2000 REVISIONS 4-20-01	DN: JSY CONT 1412 DIST	SECT 03	CK: ARC JOB O38 COUNTY	NC (2) Z 2)·	(0 - 1 HIGH M S	CK: JSY HWAY HEET NO.			



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Fixed		ROUND POLES (13)									
Mount Arm L F	DB	D19.5 D20.25	D 24	D 30	12 ^{thk}	Foundation Type					
f†.	in.	in.	in.	in.	in.	- JF -					
50′, 55′ 60′, 65′	21.0	18.2	17.6	16.8	.3125	48-A					

Fixed	ROUND ARMS (13)										
Arm LF	Lı	Dı	D 2	(12)†nk	D'						
ft.	ft.	in.	in.	in.	Rise						
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"						

= Pole Base O.D. Dв

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)

D24 Pole Top O.D. with ILSN

- w/out Luminaire Pole Top 0.D. with Luminaire D 30
- = Arm Base O.D. D 2 = Arm End O.D.
- = Shaft Length = Fixed Arm Length I F

(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. $2 \frac{1}{2}$ " 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 $\frac{1}{22}$ 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.

		ANCHOR	BOLT 8	& TEN	MPL	ATE S	SIZE	
	Bolt Dia in.	Length ŧ	Top Thread	Botto Three	m 1d	Bolt Circle	R2	Rı
	2 1/2 "	5′-2"	10"	6 ½		27"	16"	11"
LICATION	†Min d	dimension	given,	onger	bo	lts are	accep	table.
65' ssembly.		SU LONG (80 A Sheet 3	Texas De Traffic IPPORI G MAS (50 ND 10 of 5	partme Operati IC ST ST AF TO OO M	S S R R 65	of Tran Division IGNAL JCTUF ASSE FT) WIN LMA	sporta RES MBL D Z(3) -	t ^{ion} Y ONE) 12
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	4-20 1	C TXDOT Jul REVIS -12	I y 2000 Ions	DN: JSY CONT 1412 DIST YKM	SECT	CK: ARC I JOB 038 COUNTY WHARTOI	w = тос	CK: JSY IGHWAY 1 1301 SHEET NO. 247



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DISCLAIMER:

				8	30 MPH W	IND						CLAMP	-ON	ARM	CONNECTIO	N
lamp-on		ROUND	ARMS				P	OLYGONAL	ARMS		ILSN Ar	m Size			4 Conn.	5% " Dia.
Arm LC	Lı	Dı	D 2	thk (12)	D'	Lı	Dı	D ₂	+hk (12)	D'	Sch 40	-	A	F	Bolts	Pin Bolts
f†.	f†.	in.	in.	in.	Rise	ft.	in.	in.	in.	Rise	pipe Dia	Inick			Dia	No.
20	19.1	6.5	3.8	.179	1′-9″	19.1	7.0	3.5	.179	1′-8"	in.	in.	in.	in.	in.	ea
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"	3	.216	10	4	3/4	2
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"		•				54
32	31.0	9.0	4.7	.179	2′-1″	31.0	9.0	3.5	.179	2′-0"	Mast Ar	m Size		-	4 Conn. Bolts	¾" Dia. Pin Bolts
36	35.0	9.5	4.6	.179	2′-4″	35.0	10.0	3.5	.179	2′-1″	Base Dia	Thick	A			No
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"	buse bru			•		NO.
44	43.0	10.0	4.1	. 239	2'-11"	43.0	10.0	3.5	.239	2'-6"	in .	in.	10.	ın .	in.	ea
			-		_						6.5	.179	12	6	1	2
				1	OO MPH W	NIND					7.5	.179	14	8	1	2
		ROUND	ARMS					POLYGON	NAL ARMS		8.0	.179	14	8	1	2
Arm LC	Lı	Dı	D 2	thk (12)		L,	D	D ₂	thk (12)		9.0	.179	16	10	1	2
ft.	f†.	in.	in.	in.	Rise	ft.	in.	in.	in.	Rise	9.5	.179	18	12	1 1/4	3
20	19.1	8.0	5.3	.179	1′-8″	19.1	8.0	3.5	.179	1′-7"	9.5	.239	18	12	1 1⁄4	3
24	23.1	9.0	5.8	.179	1′-9"	23.1	9.0	3.5	.179	1′-8"	10.0	.239	18	12	1 1/4	3
28	27.1	9.5	5.7	.179	1′-10"	27.1	10.0	3.5	.179	1′-9"	10.5	.239	18	12	1 1/4	3
32	31.0	9.5	5.2	.239	1′-11″	31.0	9.5	3.5	.239	1′-10"	11.0	.239	18	12	1 1/4	3
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1′-11″	11.5	.239	18	12	1 1/4	3
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"						

D 1	=	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.



ARM COUPLING DETAIL



ILSN ARM COUPLING DETAIL

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with $1 \frac{1}{2}$ " 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.

½″ Dia drainage hole

Тур

½" Dia threaded coupling (Mast Arm) or ¾" Dia threaded coupling

(ILSN Arm)

ं

Connection bolt with

2 flat washers and 2 lock washers.

Penetration

1/4 ½" thick

heavy hex nut,

≁ = 85% Min.

-Min Lap equals 1.5

I.D.

times female

Arm

Тур

.½" thick stiffener ₧

1⁄16 × 1∕4 ≁

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 $^{\prime}\!/_2$ " 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 $\frac{1}{2}$ 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 $\frac{3}{4}$ " diameter pipe shall have $\frac{3}{16}$ " diameter holes for a $\frac{1}{8}$ " diameter galvanized cotter pin. Back clamp plate shall be furnished with a $\frac{3}{16}$ " diameter hole for each pin bolt. An $\frac{1}{16}$ " diameter a $\frac{3}{4}$ " diameter hole for each pin bolt. An $\frac{1}{16}$ " diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Dep Traffic TRAFF SUPPORT LONG MAST (50 (80 AND 100 Sheet 4 of 5	artma ^{Operati} IC SI AF TO ON	S RI RM 65	of Tra Division IGNA JCTU ASS FT I WII	IR IR ND (4	Dorta ES MBL) Z	ation _ Y (ONE) - 1 2	
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			Shinoin	a Parts List			
Ship	each	pole with the	following attach	ed: enlarged ha	nd hole, pol	e cap, fixed arm con	nection
bolt	sond	washers, and a	ny additional ha	rdware listed in	the table.		
Nomi	nal	30' Poles w	ith Luminaire	24' Poles	with ILSN	19.50' (Sin	ale Mast Arm)
Arm		See note abov	e plus: one (or	See note a	pove plus	20.25' (Dua	l Mast Arm)
Lena	th	two if ILSN a	ttached) small	one small	hand hole	Poles with no Lumin	aire and no ILSM
3		hand hole, cl	amp-on simplex			See note	above
			Sinale	Mast Arm			
Lff	t.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50		50L	3	50S		50	-
55		55L		55S		55	
60		60L		60S		60	
65		65L		655		65	
			Dual	Mast Arm			1
Lf	LC						
ft.	ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	20	5020L		5020S		5020	
	24	5024L		5024S		5024	
	28	5028L		50285		5028	
	32	5032L		5032S		5032	
	36	5036L		50365		5036	
	40	5040L		5040S		5040	
	44	5044L		5044S		5044	
55	20	5520L		55205		5520	
	24	5524L		5524S		5524	
	28	5528L		55285		5528	
	32	5532L		5532S		5532	
	36	5536L		55365		5536	
	40	5540L		5540S		5540	
	44	5544L		5544S		5544	
60	20	6020L		6020S		6020	
	24	6024L		6024S		6024	
	28	6028L		60285		6028	
	32	6032L		60325		6032	
	36	6036L		60365		6036	
	40	6040L		6040S		6040	
	44	6044L		6044S		6044	
65	20	6520L		65205		6520	
	24	6524L		65245		6524	
	28	6528L		65285		6528	
	32	6532L		6532S		6532	
	36	6536L		65365		6536	
	40	6540L		6540S		6540	
	44	6544L		6544S		6544	

		Sh	ipping Parts			
Traffic Signal Arms (Fixed Mount) (1 per pole)						
Ship eact	n <mark>arm with</mark> listed	d equipment atto	ched			
Nominal	Type IV Arm	(4 Signals)				
Arm	3 Brocket A	ssembly				
Length	and 4 CGB (Connectors				
ft.	Designation	Quantity				
50	5010	3				
55	55IV					
60	60IV					
65	65IV					
IFOTTIC :	Signal Arms (80 N	MPH LIOMP-UN MOL	Int) (i per			
	lype I Arm (1	l Signal)	lype II			
Nominal	2 CGB connector	1 Brocket				
Arm	w/bolts and washers		CGB conne			
Length			w/bolt			
ft.	Designation	Quantity	Designat			
20	201-80					

241-80

281-80

20

24

28

32

36

40

44			
Troffic S	Signal Arms (100	MPH Clamp-On Ma	punt) (1 per j
	Iype I Arm (Signal)	
Nominal	2 CGB connector	and 1 clamp	1 Brocket /
Arm	w/bolts and	l washers	CGB connect
ft.	Designation	Quantity	Designatio
20	201-100		
24	241-100		2411-1
28	281-100		2811-1
32			3211-10
36			3611-10
40			
44			
Anchor Bo	olt Assemblies	(1 per pole)	Each ancl
Anchor	Anchor		and botte
Bolt	Bolt		washers (
Diameter	Length	Quantity	per Stan
2 1/2 "	5' - 3"	3	Template

Foundation Summary Table **

Location	Avg. N	No.	Drill Shaft ***
I Idein.	DIOW/II.	EUCII	48-A
T-1	10	1	21.9
T-3	10	1	21.9
T-5	10	1	21.9
Total Dril	I Shaft Length		65.7

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.

Abbreviations

- Lf= Fixed Arm Length LC=
 - Clamp-on Arm
 - Length (44' Max.)

90% S

INTERIM R DOCUMENT INCOMPL FOR PERMIT, BID ENGINEER: MICH P.E. SERIAL No.: DATE: 10/

) Parts List			
	Luminaire A	rms (1	per 30' pole)
	Nominal Arm	Length	Quantity
	8' Arm		3
	ILSN Arm	(Max. 2 per pol	e) Ship with
	Nominal Ar	m Length	
	7' Δrm		woonny
	9' Arm		
	3 Al III		
1 per pole)	Ship each arm w	ith listed equip	nent attached
pe II Arm (2	? Signals)	Type III Arm	(3 Signals)
rocket Assem	ibly and 3	2 Brocket Assen	nbly and 4
connectors, and 1 clamp		CGB connectors,	and 1 clamp
w/bolts and washers		w/bolts and washers	
signation	Quantity	Designation	Quantity
2411-80			
2811-80			
3211-80		32111-80	
3611-80		36111-80	
		40111-80	
		44111-80	
(1 per pole)	Ship each arm	with listed equip	ment attached
pe II Arm (2 Signals)		Type III Arm	(3 Signals)
rocket Assem	nbly and 3	2 Bracket Assembly and 4	
connectors,	and 1 clamp	CGB connectors	s, and 1 clamp
signation	Quantity	Designation	Quantity
0411 100			
2411-100			
2011-100		70111 100	
3211-100		32111-100	
3611-100		56111-100	

hor bolt assembly consists of the following: Top tom templates, 4 anchor bolts, 8 nuts, 8 flat and 4 nut anchor devices (type 2) ndard Drawing "TS-FD". es may be removed for shipment.

40111-100 44111-100

	Texas Department of Transportation Traffic Operations Division						
	LONG MAST						
SUBMITTAL REVIEW ONLY	ARM ASSEMBLY						
PLETE: NOT INTENDED DDING OR CONSTRUCTION. HAEL T TRUEBLOOD	PARTS LIST						
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	131E						

					1
PLAN Sheet no.	SIGN NO.	APPROX. STATION	SIGN	REMOVE	RELOCATE
5	1	66+41	BERNSTEIN/RICHMOND STREET NAMES	Х	
5	2	66+79	SOUTH BUSINESS 59 60 TEXAS STRAIGHT ARROW/EAST FM 1301 LEFT ARROW	x	
5	3	66+38	SOUTH BUSINESS 59 60 TEXAS		Х
5	4	67+24	NORTH BUSINESS 59 60 TEXAS STRAIGHT ARROW/EAST FM 1301 RIGHT ARROW	x	
5	5	67+78	MASTER SGT MIKE C PENA MEMORIAL HIGHWAY		×
5	6	67+84	SOUTH BUSINESS 59 60 TEXAS LEFT ARROW/NORTH BUSINESS 59 60 TEXAS RIGHT ARROW		
5	7	68+26	DIRECTIONAL AROWS SIGN		Х
5	8	68+47	EAST FM 1301		Х
5	9	69+65	HURRICANE SYMBOL EVACUATION RIGHT ARROW		
5	10	70+79	SPEED LIMIT 30		Х
5	11	70+83	LEFT ARROW EL CAMPO 14 ROSENBERG RIGHT ARROW 24		
5	12	71+87	JCT BUSINESS 59 60 TEXAS		
5	13	73+82	DIRECTIONAL AROWS SIGN		X









<u>legend</u> (A) RE PM W/RET REQ TY I (W) (4") (SLD) (90MIL) (B) RE PM W/RET REQ TY I (Y) (4") (SLD) (90MIL) C RE PM W/RET REQ TY I (W) (4") (BRK) (90MIL) (D) RE PM W/RET REQ TY I (Y) (4") (BRK) (90MIL) (E) REFL PAV MRK TY I (W) (8") (SLD) (90MIL) (F) INTENTIONALLY REMOVED (G) PREFAB PAV MRK TY C (W) (24") (SLD) (H) PREFAB PAV MRK TY C (Y) (24") (SLD) (I) PREFAB PAV MRK TY C (W) (ARROW) (J) PREFAB PAV MRK TY C (W) (LNDP ARROW) (K) PREFAB PAV MRK TY C (W) (WORD) (L) REFL PAV MRK TY I (Y) (MED NOSE) (100MIL) (M) REFL PAV MRK TY I-C (N) REFL PAV MRK TY II-A-A (*) EXISTING TO REMAIN REMOVE & RELOCATE EXISTING SIGN ASSEMBLY À REMOVE EXISTING SIGN ▼ REMOVE EXISTING SIGN ASSEMBLY & INSTALL NEW SIGN ASSEMBLY (#) PROPOSED SIGN NO. (OM-2X) WC GND 자 (OM-2Y) WC GND ∽ ОМ-3 THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF: 10/23/2020 ROLANDO ESCAMILLA TYPE OR PRINT NAME PE # 90128 DATE REV. NO. DESCRIPT Planners-Engineers-Program Managers 15915 Katy Freeway, Suite 300 Houston, Texas 77094 TBPE FIRM REGISTRATION NO. F-6825 CITY OF WHARTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING SUBMITTED: DESIGNED BY: SCALE: DRAWN BY: DATE: HATCH SURVEYED BY: CITY DWG NO: NBI NO: © 2021 TxDOT Texas Department of Transportation FM 1301 PAVEMENT MARKING AND SIGNING LAYOUT STA 217+00.00 TO STA 237+00.00 SHEET 3 OF 6 FED.RD. DIV.NO. SHEET NO. PROJECT NO. SEE TITLE SHEET 253 6 STATE DIST. COUNTY YKM WHARTON TEXAS CONT. SECT. JOB HIGHWAY NO. HORIZ. - 1"=100' 1412 03 038 FM 1301



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<u>legend</u> (A) RE PM W/RET REQ TY I (W) (4") (SLD) (90MIL) (B) RE PM W/RET REQ TY I (Y) (4") (SLD) (90MIL) C RE PM W/RET REQ TY I (W) (4") (BRK) (90MIL) (D) RE PM W/RET REQ TY I (Y) (4") (BRK) (90MIL) (E) REFL PAV MRK TY I (W) (8") (SLD) (90MIL) (F) INTENTIONALLY REMOVED (G) PREFAB PAV MRK TY C (W) (24") (SLD) (H) PREFAB PAV MRK TY C (Y) (24") (SLD) (I) PREFAB PAV MRK TY C (W) (ARROW) (J) PREFAB PAV MRK TY C (W) (LNDP ARROW) (K) PREFAB PAV MRK TY C (W) (WORD) (L) REFL PAV MRK TY I (Y) (MED NOSE) (100MIL) (M) REFL PAV MRK TY I-C (N) REFL PAV MRK TY II-A-A (*) EXISTING TO REMAIN REMOVE & RELOCATE EXISTING SIGN ASSEMBLY REMOVE EXISTING SIGN ■ REMOVE EXISTING SIGN ASSEMBLY & INSTALL NEW SIGN ASSEMBLY (#) PROPOSED SIGN NO. (OM-2X) WC GND (OM-2Y) WC GND ∽ ОМ-3 THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF: ROLANDO ESCAMILLA 10/23/2020 TYPE OR PRINT NAME PE # 90128 DATE REV, NO, DESCRIPT Planners-Engineers-Program Managers 15915 Katy Freeway, Suite 300 Houston, Texas 77094 TBPE FIRM REGISTRATION NO. F-6825 CITY OF WHARTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ∢ SUBMITTED: DESIGNED BY: S SCALE: DRAWN BY: LINE DATE: CITY DWG NO: SURVEYED BY: NBI NO: MATCH © 2021 TxDOT Texas Department of Transportation FM 1301 PAVEMENT MARKING AND SIGNING LAYOUT STA 237+00.00 TO STA 57+00.00 SHEET 4 OF 6 FED.RD. DIV.NO. SHEET NO. PROJECT NO. SEE TITLE SHEET 6 254 STATE DIST. COUNTY WHARTON TEXAS YKM CONT. SECT. JOB HIGHWAY NO. HORIZ. - 1"=100' 1412 03 038 FM 1301



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<u>legend</u> (A) RE PM W/RET REQ TY I (W) (4") (SLD) (90MIL) (B) RE PM W/RET REQ TY I (Y) (4") (SLD) (90MIL) C) RE PM W/RET REQ TY I (W) (4") (BRK) (90MIL) (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(90MIL) (E) REFL PAV MRK TY I (W) (8") (SLD) (90MIL) (F) INTENTIONALLY REMOVED (G) PREFAB PAV MRK TY C (W) (24") (SLD) (H) PREFAB PAV MRK TY C (Y) (24") (SLD) (I) PREFAB PAV MRK TY C (W) (ARROW) (J) PREFAB PAV MRK TY C (W) (LNDP ARROW) (K) PREFAB PAV MRK TY C (W) (WORD) (L) REFL PAV MRK TY I (Y) (MED NOSE) (100MIL) (M) REFL PAV MRK TY I-C (N) REFL PAV MRK TY II-A-A (*) EXISTING TO REMAIN REMOVE & RELOCATE EXISTING SIGN ASSEMBLY REMOVE EXISTING SIGN ■ REMOVE EXISTING SIGN ASSEMBLY & INSTALL NEW SIGN ASSEMBLY (#) PROPOSED SIGN NO. (OM-2X) WC GND 다 (OM-2Y) WC GND ∽ ОМ-3 THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER THE SUPERVISION OF: ROLANDO ESCAMILLA 10/23/2020 TYPE OR PRINT NAME PE # 90128 DATE REV, NO, DATE DESCRIPTI Planners-Engineers-Program Managers

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CITY OF WHARTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

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FM 1301

Texas Department of Transportation

FM 1301 PAVEMENT MARKING AND SIGNING LAYOUT STA 57+00.00 TO END PROJECT SHEET 5 OF 6					
ED.RD. DIV.NO.		SHEET NO.			
6	S	SEE TITLE SHEET			
STATE	DIST.	COUNTY			
TEXAS	YKM	WHARTON			

JOB

038






AM 10: 19: 30 10/23/2020 DATE: FIIF:

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

	Texas Department	of Tra	nsp	ortation	Ś	Tra Saf Divis Stan	ffic ety sion dard
	TYPICAL PAVEMEN PM	_ S T (1	5 T . MA) -	AND/ RK I 20	ARD NGS	5	
FILE:	pm1-20.dgn	DN:		ск:	DW:		СК:
(C) T×DC	November 1978	CONT	SECT	JOB		HIGH	WAY
8-95	3-03 REVISIONS	1412	03	038	F	M	1301
5-00	2-12	DIST		COUNTY		Sł	EET NO.
8-00	6-20	YKM		WHART	N		257
22B							

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



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GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).

2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.

3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.

4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.

5. Each crosswalk shall be a minimum of 6' wide.

6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."

7. Final placement of Stop Bar/Yield Triangles and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS			
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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.

1. Use yield triangles with "Yield Here to Pedestrians" signs at unsignalized mid block crosswalks.

2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

					T
Texas Department of Transportation				s	Traffic Safety Division Standard
CROSSWALK PAVEMENT MARKINGS PM(4)-20					
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© TxDOT June 2020	CONT	SECT	JOB		HIGHWAY
REVISIONS	1412	03	038	F	M 1301
	DIST		COUNTY		SHEET NO.
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22D					

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

	SHEETING REQUIREMENTS				
	USAGE	COLOR	SIGN FACE MATERIAL		
BA	ACKGROUND	WHITE	TYPE A SHEETING		
BA	ACKGROUND	ALL OTHERS	TYPE B OR C SHEETING		
LE	EGEND & BORDERS	WHITE	TYPE A SHEETING		
LE	LEGEND & BORDERS BLACK		ACRYLIC NON-REFLECTIVE FILM		
LE	EGEND & 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	





8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.



TYPICAL EXAMPLES

GENERAL NOTES

plans.

or F).

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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

В	CV-1W
С	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

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.

DEPARTMENTAL MATERIAL SPEC	CIFICATIONS
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/

T Texas Department of Transportation				affic rations rision ndard
TYPICAL SIGN REQUIREMENTS TSR (3) - 13				
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12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	YKM	WHARTON		261
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R	REGULATOR	YSIGNS		ENTS FOR	RY SIGNS
(STOP	(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)		(EXCLUDIN	G STOP, YIE WRONG WA	LD, DO NOT ENTER AND Y SIGNS)
SI	TOP	YIELD	SI L	PEED IMIT	
DO	NOT	WRONG WAY		55	EXAMPLES
	REQUIREMENTS				
	SPECIFIC S			SHEETING R	QUIREMENTS
	SHEETING R	QUIREMENTS	USAGE	COLOR	SIGN FACE MATERIAL
USAGE	COLOR	SIGN FACE MATERIAL	BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	RED	TYPE B OR C SHEETING		ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDE	RS WHITE	TYPE B OR C SHEETING	AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND	RED	TYPE B OR C SHEETING	LEGEND, BORDERS AND SYMBOLS	5 ALL OTHER	TYPE B OR C SHEETING
REQUIRE	MENTS FO	R WARNING SIGNS	REQUIRE	MENTS FO	R SCHOOL SIGNS
	TYPICAL EXA	MPLES		SCHOOL SPEED LIMIT 20 WHEN FLASHING	EXAMPLES
	TYPICAL EXA	IMPLES		SCHOOL SPEED LIMIT 20 WHEN FLASHING TYPICAL	EXAMPLES
USAGE	TYPICAL EXA	MPLES	USAGE	SCHOOL SPEED LIMIT 20 WHEN FLASHING TYPICAL	EXAMPLES
USAGE BACKGROUND	TYPICAL EXA SHEETING REQU COLOR FLOURESCENT YELLOW	MPLES	USAGE BACKGROUND	SCHOOL SPEED LIMIT 20 WHEN FLASHING TYPICAL SHEETING REA COLOR WHITE	EXAMPLES
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USAGE BACKGROUND IGEND & BORDERS IGEND & SYMBOLS	TYPICAL EXA SHEETING REQU COLOR FLOURESCENT YELLOW BLACK ALL OTHER	ACRYLIC NON-REFLECTIVE FILM TYPE B OR C SHEETING	USAGE BACKGROUND BACKGROUND LEGEND, BORDERS AND SYMBOLS	SCHOOL SPEED UMIT 20 WHEN FLASHING TYPICAI SHEETING REC COLOR WHITE FLOURESCENT YELLOW GREEN BLACK	DUIREMENTS SIGN FACE MATERIAL TYPE A SHEETING TYPE B _{FL} OR C _{FL} SHEETING ACRYLIC NON-REFLECTIVE FILM

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NOTES

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gend shall use the Federal Highway Administration (FHWA) d Highway Alphabets (B, C, D, E, Emod or F).

spacing between letters and numerals shall conform with the SHSD, approved changes thereto. Lateral spacing of legend shall provide ced appearance when spacing is not shown.

egend and borders shall be applied by screening process or cut-out non-reflective black film to background sheeting, or combination

egend and borders shall be applied by screening process with transparent ink, transparent colored overlay film to white background sheeting or white sheeting to colored background sheeting, or combination thereof.

legend shall be applied by screening process with transparent colored ansparent colored overlay film or colored sheeting to background g, or combination thereof.

bstrate shall be any material that meets the Departmental Material cation requirements of DMS-7110 or approved alternative.

details for roadside mounted signs are shown in the "SMD series" |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 SPEC	IFICATIONS
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/





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STATE ROUTE MARKERS

No.of Digits	W	Х
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

ARROW DETAILS for Destination Signs (Type D)

Standard of to be used 6 inch let	4.5" 4.5" 4.625" 2.625" 4.2.25" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.5" 4.625" 4.2.25" 4.2.25" 4.5" 4.5" 4.625" 4.6		5.563" .438 .438 	12"	437" 3"R 2.75" ↓ 2.75" ↓	-+
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MINIMUM WARNING DEVICES AT CURVES

	WITH ADVISORY S	SPEEDS			
Amount by which Advisory Speed	Amount by which Advisory Speed				
is less than Posted 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			
SUGGES'	FED SPACING FOR ON HORIZONTAL (DELINEATORS CURVES			
straightaway space straightaway Joepa (Approaching/Jepa EDE 2A EDE 2A E ADE 2A EDE 2A E	ONE DIRECTION LARGE ARROW SIGN Curve Spacing Curve Spacing EXtension of th centerline of th tangent section approach lane -	e^{he}			
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.					



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	5770	A	2A	В	
1	5730	225	450		Acceleration/
- 2	2865	130	320	200	Lane
4	1433	110	220	160	Truck Escape
5	1146	100	200	160	
6	955	90) 180	160	
7	819	85	5 170	160	Bridge Rail (
8	716	75	5 150	160	Beam Guard Fe
9	637	75	150	120	
10	573	70) 140	120	
12	521	65		120	or Steel Traf
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14	441	55	5 110	80	Cable Barrier
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for each Advisory Speed (MPH).

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 _ane	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		

- or barrier reflectors are placed.

3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

	LEGEND				
Ķ	Bi-directio Delineator				
\overline{X}	Delineator				
-	Sign				

INEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

2. Barrier reflectors may be used to replace required delineators.

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

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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:

- 10 BWG Tubing (2.875" outside diameter)
- 0.134" nominal wall thickness
- - 55,000 PSI minimum yield strength
- 20% minimum elongation in 2"

- Schedule 80 Pipe (2.875" outside diameter) 0.276" nominal wall thickness
- Steel tubing per ASTM A500 Gr C
- 46,000 PSI minimum yield strength
- 62,000 PSI minimum tensile strength
- 21% minimum elongation in 2"
- Galvanization per ASTM A123

ASSEMBLY PROCEDURE

- Foundation

- direction.

Support

- straight.
- clearances based on sign types.

CONCRETE ANCHOR



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 normalweight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively. 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: 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: 70,000 PSI minimum tensile strength 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. 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: 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" 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.

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

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

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

Texas Department of Transportation Traffic Operations Division						
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1/2" x 4" heavy hex bolt, nut, lock washer and 2 flat washers per ASTM A307 galvanized per "Galvanizing.

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 areater 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 erront vehicle.
 8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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
		48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	2	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	l ato	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	Regu	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
		48x60-inch signs	TY \$80(1)XX(T)
or		48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	p	48x60-inch signs	TY \$80(1)XX(T)
	l'u	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	M	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

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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.
- 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. Sign blanks shall be the sizes and shapes shown on the plans. 11.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.
- 12. 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)
Regu	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY \$80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
ő	48x60-inch signs	TY \$80(1)XX(T)
rnin	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
WC	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)

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- 21'

VARIABLE LENGTH BARRIER

SIDE VIEW

EXTENDED POSITION

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ADDITIONAL ANGLE SECTION AVAILABLE 5° (RH) RIGHT HAND ANGLE SECTION 10° (LH) LEFT HAND ANGLE SECTION 10° (RH) RIGHT HAND ANGLE SECTION

5° (LH) LEFT HAND ANGLE SECTION

31

BG800 SECTION

M20-2.5 X 120mm

FULLY THREADED HEX BOLT

21

MALE END CROSS SECTION

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- EMBEDMENT DEPTH DRILL DIAMETER PULL OUT CAPACITY (MIN) SHEAR CAPACITY (MIN) 25000 Ib
- * * CONTACT: LAURA METAAL ROAD SAFETY INC. FOR SPECIFIC APPLICATION



GENERAL NOTES

THE SYSTEM SHOWN ON THIS DRAWING IS A PROPRIETARY BARRIER TRADED AS BARRIERGUARD 800 AND BARRIERGUARD 800 MDS AND HAS BEEN DESIGNED AND MANUFACTURED BY LAURA METAAL ROAD SAFETY INC. FOR TECHNICAL ASSISTANCE AND APPLICATION SUPPORT CONTACT LEE STUART AT LAURA METAAL ROAD SAFETY INC. AT (702) 664-2009 OR Istuart.laurametaal@outlook.com

THE BARRIERGUARD 800 SYSTEM HAS BEEN CRASH TESTED TO MASH AND HAS FHWA APPROVAL AS A TL-3 BARRIER. THE DEFLECTION TABLE OUTLINES BASIC SYSTEM PERFORMANCE AND COMPONENT ANCHORING REQUIREMENTS.

THIS DRAWING PACKAGE PROVIDES THE RELEVANT INFORMATION AND GENERAL GRAPHICS REQUIRED TO IDENTIFY THE COMPONENT PARTS OF BARRIERGUARD 800 AND THEIR INCORPORATION AS A WHOLE SYSTEM FOR DEPARTMENTAL STANDARD APPLICATIONS.

BARRIERGUARD 800 REQUIRES ANCHORING (PINNING) AT EACH END OF THE INSTALLED LENGTH. (INTERMEDIATE ANCHORS CAN BE USED TO REDUCE DEFLECTION).

INSTALLATION OF BARRIERGUARD 800 OR BARRIERGUARD 800 MDS, NORMALLY STARTS WITH A MALE TERMINAL SECTION AND IS FINISHED WITH A FEMALE TERMINAL SECTION. STANDARD SECTIONS ARE USED BETWEEN THE TERMINAL SECTIONS TO OBTAIN THE REQUIRED LENGTH OF POSITIVE BARRIER PROTECTION.

THE FULL HEIGHT TERMINAL (FHT) SECTIONS MAY BE CAPPED WITH A FHT COVER, HOWEVER IF EXPOSED TO ON-COMING TRAFFIC THE END SHOULD BE PROTECTED WITH A SUITABLE CRASH CUSHION. THE BARRIERGUARD 800 RANGE IS COMPATIBLE WITH MOST COMMONLY USED CRASH CUSHION END TREATMENTS. FOR DETAILS OF BARRIERGUARD 800 CRASH CUSHION CONNECTIONS THAT ARE NOT DETAILED WITHIN THESE DRAWINGS, PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR MORE DETAILS. THE FULL HEIGHT TERMINAL COVER IS SUITABLE FOR THE "DOWN STREAM" END OF A SYSTEM THAT DOES NOT HAVE EXPOSURE TO ON-COMING TRAFFIC.

WHEN INSTALLING THE MINIMUM DEFLECTION SYSTEM (MDS), THE SYSTEM CAN BE INSTALLED WITH ADDITIONAL INTERMEDIATE ANCHORS ALONG THE LENGTH OF THE BARRIER RUN AT INTERVALS SHOWN IN THE DEFLECTION TABLE. EACH BARRIER RUN CAN BE MADE UP OF ANY MIXTURE OF THE SYSTEMS BY THE INTRODUCTION OF INTERMEDIATE ANCHORS AND/OR T-TOP AS REQUIRED.

THERE ARE SEVERAL METHODS OF ACHIEVING RADIUS IN A LENGTH OF BARRIERGUARD 800. RADIUS CAN BE ACHIEVED USING VARIOUS METHODS AND THUS ALLOWING THE BARRIERGUARD TO FOLLOW THE DESIRED CURVATURE IN THE INSTALLATION, THESE METHODS ARE, THE MOVEMENT IN THE QUICKLINK, ADJUSTABLE 20FT. SECTIONS OR SHORT ANGLED SECTIONS WHICH ALLOW A RADIUS AS LOW AS 12FT. FOR FURTHER INFORMATION AND ADVICE CONTACT LAURA METAAL ROAD SAFETY INC.

A BARRIERGUARD 800 VARIABLE LENGTH BARRIER (VLB) SECTION SHOULD BE USED WHEN BARRIERGUARD 800 OR BARRIERGUARD 800 MDS IS ANCHORED ACROSS A BRIDGE EXPANSION JOINT. IF T-TOP IS TO BE USED IN CONJUNCTION WITH THE VLB, THE T-TOP SHOULD BE USED FOR MINIMUM 40FT ON EITHER SIDE OF THE VLB AND TERMINATED WITH TRANSITIONS. THE VLB SECTION PROVIDES APPROXIMATELY 71N OF EXTENSION AND 71N OF CONTRACTION. MULTIPLE VLB'S CAN BE LINKED TOGETHER TO PROVIDE MORE EXPANSION OR CONTRACTION. THE VLB'S SHOULD BE PLACED IN THE VICINITY OF THE EXPANSION JOINT. THE VLB DOES NOT NEED TO BE PLACED DIRECTLY OVER THE EXPANSION JOINT BUT MUST BE BETWEEN THE NEAREST ANCHORS ON EACH SIDE OF THE JOINT. IT IS RECOMMENDED THAT THE VLB IS PLACED WITHIN 40FT OF THE JOINT.

THE T-TOP CAN BE INSTALLED EITHER BEFORE OR AFTER THE BARRIERGUARD 800 HAS BEEN FULLY ASSEMBLED AND ANCHORED IN PLACE. T-TOP IS REQUIRED WHEN THE BARRIERGUARD 800 IS USED AS A MDS, ANCHORED EVERY 20FT, GATE SECTIONS AND VARIABLE LENGTH BARRIERS. THE T-TOP SHOULD EXTEND 40FT ON EITHER SIDE OF THESE CONDITIONS AND BE

11. THE BARRIERGUARD 800 RANGE HAS BEEN DESIGNED TO BE USED ON AND HAS BEEN TESTED ANCHORED ON ASPHALT, CONCRETE AND COMPACTED SUBBASE. CONTACT LAURA METAAL ROAD SAFETY INC. FOR FURTHER INFORMATION.

12. BARRIERGUARD 800 COMPONENTS ARE MANUFACTURED IN SI [METRIC] UNITS. ENGLISH UNITS SHOWN ARE APPROXIMATE.

13. BARRIERGUARD 800 SYSTEMS SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS DETAILED DRAWINGS, PROCEDURES AND SPECIFICATIONS. FOR ANY INSTALATIONS OUTSIDE OF THE SCOPE OF THESE DRAWINGS PLEASE CONTACT LAURA METAAL ROAD SAFETY INC. FOR DETAILS.

BARR	IERGUARD 800 DEFLECTION 1	ABLE
	STANDARD SYSTEM	MINIMUM DEFLECTION SYSTEMS (MDS)
ION	ONLY ANCHORED AT THE EXTREME ENDS OF THE BARRIER LENGTH	ANCHORED EVERY 20 FT.
N AT 3	5'-6"	18 ½ "
REMENTS	NONE REQUIRED	REQUIRED FOR MDS SECTIONS

STANDA	RD ANCHORIN	G REQUIREMEN	NTS (TABLE)	
RESIN STUD ANCHORS	5	DRIVEN	ANCHORS	Hilti HSL-3 SHALLOW MECHANICAL
UNRE INFORCED CONCRETE *	ASPHALT	ASPHALT	SUBBASE/SOIL	CONCRETE
1 in.	1 in.	1-3/16 in.	5-1/2 in.	* *
8 in.	16 in.	16 in.	32 in.	* *
1-1/8 in.	1-1/8 in.	1-3/16 in.	DRIVEN	* *
17500 Ib	N/A	NZA	N/A	* *
25000 Ib	N/A	N/A	N/A	* *

 \bigstar alternative anchors including mechanical anchors for concrete maybe used if they MEET THE STRENGTH REQUIREMENTS LISTED, DETAILS WILL BE MANUFACTURER SPECIFIC.

> * Design Division Standar Texas Department of Transportation BARRIERGUARD 800 BARRIERGUARD 800 SYSTEM END SEGMENT STEEL BARRIER MASH TL-3 **BARRIERGUARD-19** ILE: barrierguard19.dgn DN:TxDOT CK:KM DW:VP CK: C TXDOT: JULY 2019 CONT SECT JOB HIGHWAY ASPHALT LAYER REVISIONS (IF PRESENT) 1412 03 038 FM 1301 COUNT SHEET NO SEE ANCHORING TABLE 273 WHARTON YKM



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Proprietary Joint Connections (CSB)
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:
J-J Hooks by Easi-Set Industries, (800)547-4045 Quick-Bolt by Bexar Concrete, (210)497-3773
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

Texas Department of		Design Division Standard					
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1)							
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THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

GENERAL NOTES

- 1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
- 2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
- 3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
- 4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- 5. THE SLED SYSTEM CAN BE ATTACHED TO:
- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

	BILL OF MATERIAL						
PART NUMBER	DESCRIPTION	QTY: TL-3					
45131	TRANSITION FRAME, GALVANIZED	1					
45150	TRANSITION PANEL, GALVANIZED	2					
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2					
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1					
45050	ANCHOR BOLTS	9					
12060	WASHER, 3/4" ID X 2" OD	9					
45044-Y	SLED YELLOW WATER FILLED MODULE	3					
45044-YH	SLED YELLOW "NO FILL" MODULE	1					
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1					
45043-CP	T-PIN W/ KEEPER PIN	4					
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3					
45033-RC-B	DRAIN PLUG	3					
45032-DPT	DRAIN PLUG REMOVAL TOOL	1					

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GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571

2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.

3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.

5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.

6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.

7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.

8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BOM) ABSORB-M TL-3 & TL-2 SYSTEMS	QTY	QTY
PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
TRANSITION- (GALV)	1	1
PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
FILL CAPS	8	12
DRAIN PLUGS	2	3
TENSION STRAP-(GALV)	8	12
C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
MIDNOSE-(GALV)	1	1
NOSE PLATE	1	1
TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
PIN ASSEMBLY	8	10
ANC MECH 5/8-11X5 (GALV)	6	6
INSTALLATION AND INSTRUCTIONS MANUAL	1	1

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DATE: 10/23/2020 TxboT : FILE: 7:\Transnortation\City of Wharton\CADD\STANDARDS\]

GENERAL NOTES

1. FOR TECHNICAL AND APPLICATION SUPPORT PLEASE CONTACT HILL & SMITH INC. AT 614-340-6294.

2. ZONEGUARD HAS BEEN ACCEPTED BY FHWA AS A MASH TL-3 LONGITUDINAL BARRIER.

3. STANDARD INSTALLATIONS REQUIRE ANCHORING AT EACH END OF THE RUN. MINIMUM DEFLECTION INSTALLATIONS REQUIRE ANCHORING AT 33'-4 CENTERS. NO MODIFICATIONS ARE NECESSARY OTHER THAN INCREASED ANCHORING.

4. 50-0' UNITS CAN BE USED TO ACHIEVE DOWN TO AN 800' RADIUS CURVE. 16'-8" UNITS CAN BE USED TO ACHIEVE CURVES DOWN TO 250' RADIUS. SPECIAL SHORT UNITS (SHOWN) IN 2.5 DEGREE INCREMENTS CAN BE USED TO ACHIEVE DIRECTION CHANGES OR AT A FIXED RADIUS OF 47'-0".

5. HILL & SMITH OFFERS AN EXPANSION UNIT THAT CAN BE USED ACROSS A BRIDGE EXPANSION JOINT OR TO ACCOMMODATE THERMAL EXPANSION. THE UNIT IS ANCHORED IN THE MIDDLE, AND ADJUSTED ACCORDING TO THE TEMPERATURE AT THE TIME OF INSTALLATION. THE EXPANSION JOINT CAN BE USED WITH ENGINEER APPROVAL. THE EXPANSION UNIT HAS NOT BEEN ASSESSED TO MASH CRITERIA.

6. ANCHOR PINS ARE 1 $^{1}\!/_{4}$ " DIAMETER. LENGTH IS 1'-8" FOR ASPHALT AND 1'-0" FOR CONCRETE. SEE ANCHORING TABLE FOR ADDITIONAL DETAILS.

	STANDARD	MINIMUM DEFLECTION INSTALLATION	MINIMUM DEFLECTION INSTALLATION
		CONCRETE	ASPHALT
	FOUR ANCHORS AT END OF THE RUN	TWO ANCHORS (ONE EACH SIDE) EVERY 33'-4"	TWO ANCHORS (ONE EACH SIDE) EVERY 33'-4"
MASH TL-3 DEFLECTION (2270 KG TRUCK @ 25°& 100 KM/HR)	6′-10"	5"	2′-0"

EXPECTED DEFLECTION TABLE

DESCRIPTION	ASPHALT	CONCRETE
1 1/4" PIN ANCHOR	1'-8" LONG, MINIMUM ASPHALT COVER OF 3"	1'-0" LONG, MINIMUM CONCRETE COVER OF 6"
1 1/4" ALL THREAD ANCHOR	-	1'-0" LONG, MINIMUM EMBEDMENT OF 6"

ANCHORING TABLE

ALTERNATE ANCHORING METHODS CERTIFIED BY HILL & SMITH, INC. ARE AVAILABLE PER FHWA APPROVAL LETTER.

Texas Department of Transportation						Design Division Standard		
ZONEGUARD SYSTEM								
STEEL BARRIER								
MASH TL-3								
ZONEGUARD-19								
FILE: zoneguard19	DN: T×	DOT	СК:КМ	DW	:VP	CK: CGL		
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-	STORMWATER POLLUTION P	PREVENTION-CLEAN WATER	ACT SECTION 402	III.	CULTURAL RESOURCES	
r c J	IPDES TXR 150000: Stormwater required for projects with disturbed soil must protect [tem 506. List MS4 Operator(s) that m	r Discharge Permit or Constr 1 or more acres disturbed so for erosion and sedimentati	uction General Permit il. Projects with any on in accordance with this project.		Refer to TxDOT Standard Speci archeological artifacts are for archeological artifacts (bone work in the immediate area an	fications in the event historical issues or ound during construction. Upon discovery of s, burnt rock, flint, pottery, etc.) cease d contact the Engineer immediately.
	They may need to be notifie	d prior to construction acti	vities.		🗙 No Action Required	Required Action
	1.				Action No.	
	2.				1.	
	NO ACTION REQUIRED				2	
	Action No.				۷.	
	1. Prevent stormwater pollu accordance with TPDES Pe	tion by controlling erosion rmit TXR 150000	and sedimentation in		3.	
:	2. Comply with the SW3P and required by the Engineer	revise when necessary to cc	ontrol pollution or		4.	
	3. Post Construction Site N	otice (CSN) with SW3P inform	nation on or near	IV.	VEGETATION RESOURCES	
	the site, accessible to	the public and TCEQ, EPA or	other inspectors.		Preserve native vegetation to Contractor must adhere to Con	the extent practical. struction Specification Requirements Specs 162.
	4. When Contractor project area to 5 acres or more,	specific locations (PSL's) i submit NOI to TCEQ and the	increase disturbed soil Engineer.		164, 192, 193, 506, 730, 751, invasive species, beneficial	752 in order to comply with requirements for landscaping, and tree/brush removal commitments.
Π.	WORK IN OR NEAR STREA	AMS, WATERBODIES AND WE	TLANDS CLEAN WATER		🛛 No Action Required	Required Action
	USACE Permit required for	filling, dredging, excavatio	ng or other work in any		Action No.	
	water bodies, rivers, cree	eks, streams, wetlands or we	t areas.		1.	
	The Contractor must adhere the following permit(s):	e to all of the terms and cor	nditions associated with			
					2.	
	🗌 No Permit Required				3.	
	Nationwide Permit 14 - 1 wetlands affected)	PCN not Required (less than	1/10th acre waters or		4.	
	Nationwide Permit 14 - 1	PCN Required (1/10 to <1/2 c	acre, 1/3 in tidal waters)			
	🗌 Individual 404 Permit R	equired		v.	FEDERAL LISTED, PROPOSEI	D THREATENED, ENDANGERED SPECIES,
	Other Nationwide Permit	Required: NWP#			CRITICAL HABITAT, STATE AND MIGRATORY BIRDS.	LISTED SPECIES, CANDIDATE SPECIES
	Required Actions: List wate and check Best Management F and post-project TSS.	ers of the US permit applies Practices planned to control	to, location in project erosion, sedimentation		No Action Required	Required Action
	1.				Action No.	
					1	
	2.				1.	
	3.				2.	
	4.				3.	
	The elevation of the ordina	ary high water marks of any -	areas requiring work		4.	
	to be performed in the wate permit can be found on the	ers of the US requiring the Bridge Layouts.	use of a nationwide			
	Best Management Practic	ces:		If do	any of the listed species are not disturb species or habita	observed, cease work in the immediate area, t and contact the Engineer immediately. The
	Erosion	Sedimentation	Post-Construction TSS	wo	rk may not remove active nests	from bridges and other structures during
	🗙 Temporary Vegetation	🗙 Silt Fence	Vegetative Filter Strips	ar	e discovered, cease work in the	e immediate area, and contact the
	Blankets/Matting	🖂 Rock Berm		En	gineer immediately.	
	Mulch	🗌 Triangular Filter Dike	Extended Detention Basin			
	🗙 Sodding	Sand Bag Berm	Constructed Wetlands		LIST OF	ABBREVIATIONS
	Interceptor Swale	Straw Bale Dike	Wet Basin	BMP:	Best Management Practice	SPCC: Spill Prevention Control and Countermeasure
				CGP:	Construction General Permit	SW3P: Storm Water Pollution Provention Plan
	Diversion Dike	Brush Berms		DSHS:	Texas Department of State Health Serv	vices PCN: Pre-Construction Notification
	Diversion Dike Erosion Control Compost	Brush Berms Erosion Control Compost	Mulch Filter Berm and Socks	DSHS: FHWA: MOA:	Texas Department of State Health Serv Federal Highway Administration Memorandum of Aareement	vices PCN: Pre-Construction Notification PSL: Project Specific Location TCEQ: Texas Carmission on Environmental Quality
	Diversion Dike Erosion Control Compost Mulch Filter Berm and Socks Compost Filter Berm and Socks	Brush Berms Erosion Control Compost Mulch Filter Berm and Socks Compost Filter Berm and Socks	Lrosion Control Compost Mulch Filter Berm and Socks Compost Filter Berm and Socks Xegetation Lined Ditches	DSHS: FHWA: MOA: MOU: MS4:	Texas Department of State Health Serv Federal Highway Administration Memorandum of Agreement Memorandum of Understanding Municipal Separate Starmwater Sewer S	Vices PCN: Pre-Construction Notification PSL: Project Specific Location TCEQ: Texas Commission on Environmental Quality TPDES: Texas Pollutant Discharge Elimination System System TPWD: Texas Parks and Wildlife Deroctment
	 Diversion Dike Erosion Control Compost Mulch Filter Berm and Socks Compost Filter Berm and Socks 	Brush Berms Erosion Control Compost Mulch Filter Berm and Socks Compost Filter Berm and Socks Stone Outlet Sediment Trans	Erosion Control Compost Mulch Filter Berm and Socks Compost Filter Berm and Socks Vegetation Lined Ditches Sand Filter Systems	DSHS: FHWA: MOA: MOU: MS4: MBTA: NOT·	Texas Department of State Health Serv Federal Highway Administration Memorandum of Agreement Memorandum of Understanding Municipal Separate Stormwater Sewer S Migratory Bird Treaty Act Notice of Termination	Vices PCN: Pre-Construction Notification PSL: Project Specific Location TCEQ: Texas Commission on Environmental Quality TPDES: Texas Pollutant Discharge Elimination System TSWD: Texas Parks and Wildlife Department TxDDT: Texas Department of Transportation T8: Threatened and Endnoced Social

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)? No No If "No", then no further action is required. If "Yes", then $\mathsf{Tx}\mathsf{DOT}$ is responsible for completing asbestos assessment/inspection. Are the results of the asbestos inspection positive (is asbestos present)? No 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

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:

Required Action No Action Required

15 working days prior to scheduled demolition.

VII. OTHER ENVIRONMENTAL ISSUES

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

No Action Required

🗙 Yes

Yes

Action No.

Action No.

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Required Action

Texas Department of Transportation						Design Division Standard		
ENVIRONMENTAL PERMITS,								
ISSUES AND COMMITMENTS								
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05-07-14 ADDED NOTE SECTION IV.	DIST		COUNTY			SHEET NO.		
TO ITEM 506, ADDED GRASSY SWALES.	YKM		WHARTO)N		284		



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Texas Department of Transportation						esign ivision andard
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES						
FENCE & VEF	RTI	CA	L TR	XA	СК	ING
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FILTER DAM AT CHANNEL SECTIONS

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

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 $\frac{3}{4}$ " dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 $\frac{1}{2}$ x 3 $\frac{1}{4}$

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 Dom	(1	RFD2				
Type 3 Rock Filter Dam	(1	RFD3				
Type 4 Rock Filter Dam	(RFD4				
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TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES						
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DATE:



5. The construction exit shall be graded to allow drainage to a sediment trapping device.

by the Engineer.

- 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.

- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- 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.









(CL-CI) EROSION CONTROL LOG AT CURB INLET

(cl-gi)— EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

ADDITIONAL UPSTREAM

STAKES FOR HEAVY

RUNOFF EVENTS

(TYP.)

ENGINEER.

PLAN VIEW

CL-ROW

FLOW

FLOW

R. O. W

TEMP. EROSION

SECURE END

OF LOG TO

CONTROL LOG

(4' MAX. SPACING), OR

ADDITIONAL UPSTREAM

STAKES FOR HEAVY

RUNOFF EVENTS

SEDIMENT BASIN & TRAP USAGE GUIDEL
An erosion control log sediment trap may be used to filte sediment out of runoff draining from an unstabilized area
Log Traps: The drainage area for a sediment trap should 5 acres. The trap capacity should be 1800 Cf the drainage area).
Control logs should be placed in the following locations: 1. Within drainage ditches spaced as needed or min.

- 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.

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DEPARTMENT MATERIAL SPECIFICATIONS								
PLYWOOD SIGN BLANKS DMS-7100								
FLAT SURFACE	REFLECTIVE SHE	EETING	DMS-8300					
VINYL NON-RE	FLECTIVE DECAL	SHEETING	DMS-8320					
COLOR USAG BLUE BACKGR WHITE LEGEND	DUND TYP & BORDERS VIN	REFLECTIVE SHEE OTHER MATER E C (FLUORESCENT IYL NON-REFLECTIVE	TING OR IAL PRISMATIC) : DECAL SHEETING					

WICHITA FALLS DISTRICT STANDARD						
SW3P SIGN						
FILE:	DN: TxDOT	CK:	DW: CK:			
© TxDOT 2016	DISTRICT	FEDERAL AID PROJECT				SHEET
REVISION DATE: 10-16-15	YKM	291			291	
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	WHARTON		1412	03	038	FM 130
I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED) DOT #: <u>TBD</u> Crossing Type: <u>Highway Overpass</u> RR Company Owning Track at Crossing: <u>Kansas City Railway (KCS)</u> Operating RR Company at Track: <u>Texas Mexican Railway</u> RR MP: <u>RV916.91</u> RR Subdivision: <u>Rosenberg</u> City: <u>Wharton</u>	IV. CONSTRUCTION WORK TO BE PERF On this project, construction work f Required ∑ Not Required Coordinate with TxDOT for any work t TxDOT must issue a work order for an prior to the work being performed.	FORMED BY THE RAILROAD to be performed by a railroad company is: ro be performed by the Railroad Company. by work done by the Railroad Company	VI. <u>C</u> on			
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County: <u>Wharton</u> CSJ at this Crossing: <u>1412-03-038</u> Highway/Roadway name crossing the railroad: <u>FM 1301</u> # of regularly scheduled trains per day at this crossing: <u>10</u> # of switching movements per day at this crossing: <u>0</u> % of estimated contract cost of work within railroad ROW: <u>2%</u> Scope of Work at this Crossing to Be Performed by State Contractor: Construction of bridge overpass at new location. Scope of Work at this Crossing to Be Performed by Railroad Company:	V. RAILROAD INSURANCE REQUIREME Railroad reference number shall be The Contractor shall confirm the in the Railroad as the insurance limit Insurance policies must be issued f more than one Railroad Company is o where several Railroad Companies ar separate rights of way, provide sep each Railroad Company.	NTS provided by TxDOT CST or DO. asurance requirements with as are subject to change without notice. For and on behalf of the Railroad. Where operating on the same right of way or the involved and operate on their own barate insurance policies in the name of	To the htt App Con Con an on			
Review bridge construction plans. Provide flagging and inspection as required during construction.	No direct compensation will be made insurance coverages shown below or incidental to the various bid items	e to the Contractor for providing the any deductibles. These costs are 5.				
** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned	Type of Insurance	Amount of Coverage (Minimum)	VII.			
I. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)	Workers Compensation	\$500,000 / \$500,000 / \$500,000				
None	Commercial General Liability	\$2,000,000 / \$4,000,000				
None	Business Automobile	\$2,000,000 combined single limit	Se			
	Railroad Prot	tective Liability				
II. FLAGGING & INSPECTION			VIII.			
<pre>w of bdys of Kdinfodd Pfdgging Expected. <u></u> On this project, night or weekend flagging is:</pre>	 Non - Bridge Projects Bridge Projects Other 	\$2,000,000 / \$6,000,000 \$5,000,000 / \$10,000,000				
Contractor must incorporate Construction Inspection into anticipated construction schedule. Not Required Required: Contact Information for Construction Inspections: <u>KCS Railroad Designated Representative (See Railroad</u> <u>Requirement for Bridge Construction, Sheet 2 of 3)</u>						

NTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

his project, an ROE agreement is:

ot Required

equired: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)

equired: Contractor to obtain (see Item 5, Article 8.4)

ith the following railroad companies: Kansas City Southern Railway Rail Road Website: https://KCSPermit.JLLrpg.com

iew previously approved ROE Agreement templates agreed upon between State and Railroad, see:

://www.txdot.gov/inside-txdot/division/rail/samples.html

oved ROE Agreement templates are not to be modified by the Contractor.

ractor shall not operate within Railroad Right of Way without an executed truction & Maintenance Agreement between the State and the Railroad and xecuted ROE agreement between the Contractor and the Railroad if required

RAILROAD COORDINATION MEETING

this project, a Railroad Coordination Meeting is: Not Required

Item 5, Article 8.1 for more details.

SUBCONTRACTORS

tractor shall not subcontract work without written consent of TxDOT. contractors are required to maintain the same insurance coverage required of the Contractor.

MERGENCY NOTIFICATION

Case of Railroad Emergency II Kansas City Southern Railroad Emergency Line 877-527-9464 ocation: DOT (TBD) Milepost: RV916.91 ubdivision: Rosenberg

