STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

FUNCTIONAL CLAFFIFICATION = URBAN ARTERIAL
DESIGN SPEED = 30MPH
A.D.T. (2020) = 20,793
A.D.T. (2040) = 29,110

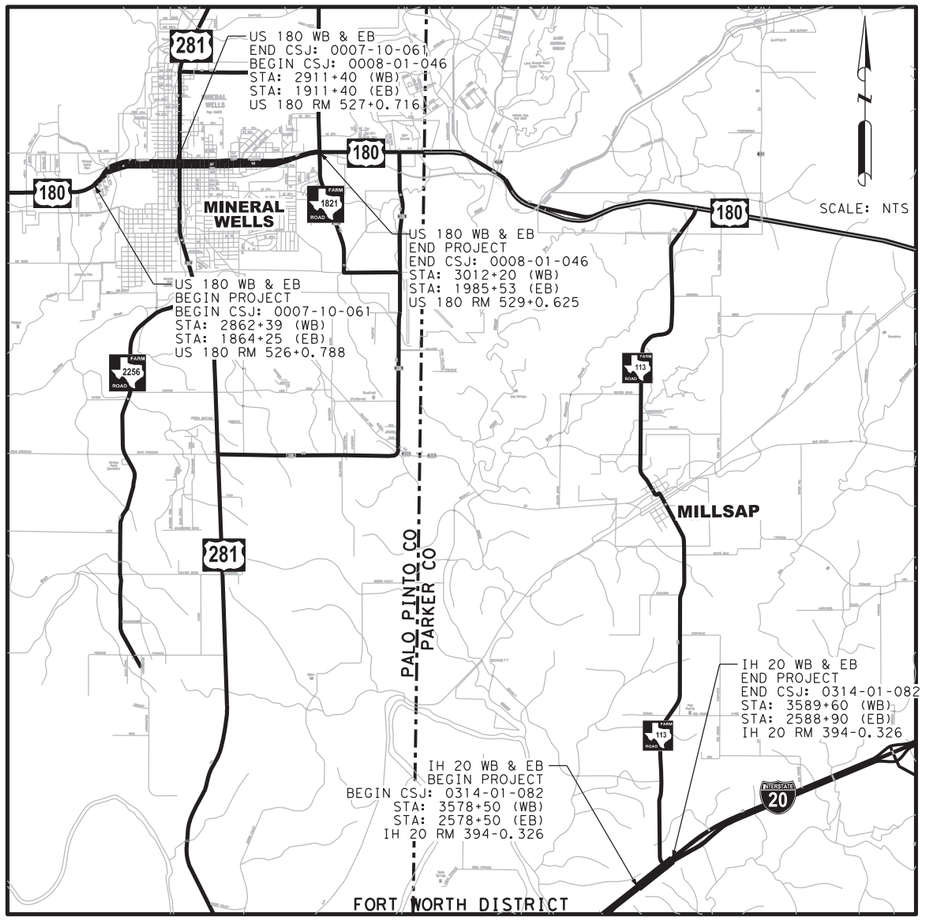
FED RD. DIV NO.	STATE PROJECT NO.		SHEET NO.
6	C 8-1-46, ETC		1
STATE	STATE DIST.		COUNTY
TX	FORT WORTH		PALO PINTO, ETC
CONT.	SECT.	JOB	HWY NO.
0008	01	046, ETC	US 180, ETC

INDEX OF SHEETS
LOCATED ON SHEET 2 AND 3 OF PLANS

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
STATE PROJECT # C 8-1-46
US 180, ETC
PALO PINTO COUNTY & PARKER COUNTY

CSJ	ROAD/HWY	LIMITS	PROJECT LENGTH	
			FEET	MILES
0008-01-046	US 180 WB	FROM SW FIRST AVE TO 400' E OF FM 1821/GARRET MORRIS PKWY	10,080	1.909
0008-01-046	US 180 EB	FROM SW FIRST AVE TO 400' E OF LINCOLN AVE	7,413	1.404
0007-10-061	US 180 WB	FROM 525' W OF POLLARD CREEK CROSSING TO SW FIRST AVE	4,901	0.928
0007-10-061	US 180 EB	FROM 420' W OF POLLARD CREEK CROSSING TO SW FIRST AVE	4,715	0.893
0314-01-082	IH 20 WBFR	FROM 100' E OF FM 113 TO W END OF GORES EAST OF FM 113	1,265	0.240
0314-01-082	IH 20 EBFR	FROM 100' E OF FM 113 TO W END OF GORES EAST OF FM 113	1,306	0.247
0314-01-082	FM 113	AT IH 20 OVERPASS	318	0.060
		TOTAL PROJECT LENGTH	29,593	5.604

FOR THE CONSTRUCTION OF OVERLAY WORK
CONSISTING OF: MILL, CURB REMOVAL, BASE REPAIR, HMAC OVERLAY, CURB REPAIR, SIGNALS & PAVEMENT MARKINGS.



EQUATIONS: NONE
RAILROAD: NONE
EXCEPTIONS: US 180 WB FROM STA 2914+04.51 TO STA 2914+84.52
US 180 EB FROM STA 1913+94.10 TO STA 1914+84.20

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

100% SUBMITTAL

STATE OF TEXAS
ROBERT DOTY
97218
LICENSED
PROFESSIONAL ENGINEER

Robert S. Doty

ROBERT DOTY, P.E. 97218 11/2/2021
PROJECT MANAGER P.E. # DATE

REGISTERED ACCESSIBILITY SPECIALIST (RAS)
INSPECTION REQUIRED TDLR NO. TABS2022000901

COUNTY: PALO PINTO PROJ. NO. NH XXXX(XXX)
HWY NO.: US 180 LETTING DATE:
DATE ACCEPTED:

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS, (000-008)

LETTING DATE:
CONTRACTOR:
WORK BEGAN:
WORK COMPLETED:
WORK ACCEPTED:
CHANGE ORDER:

Texas Department of Transportation®
©2021
FORT WORTH DISTRICT

SUBMITTED FOR LETTING: 11/4/2021
DocuSigned by: Robert S. Doty, P.E.
086C6EB5217D412...
AREA ENGINEER

RECOMMENDED FOR LETTING: 11/10/2021
DocuSigned by:
7879B0B92E5D403...
DIRECTOR, TP&D

APPROVED FOR LETTING: 11/16/2021
DocuSigned by: Carl L. Johnson, PE
2FE36139F0614C3...
DIRECTOR

SHEET NO.		DESCRIPTION
		GENERAL
1		TITLE SHEET
2 - 3		INDEX OF SHEETS
4 - 6		US 180 WB (HUBBARD ST) - EXIST TYPICAL SECTIONS
7 - 8		US 180 - EXIST TYPICAL SECTIONS
9 - 10		US 180 EB (FIRST ST) - EXIST TYPICAL SECTIONS
11 - 13		US 180 WB (HUBBARD ST) - PROP TYPICAL SECTIONS
14 - 15		US 180 - PROP TYPICAL SECTIONS
16 - 17		US 180 EB (FIRST ST) - PROP TYPICAL SECTIONS
18		IH 20 EB & WB FR - EXIST TYPICAL SECTIONS
19		IH 20 FM 113 AT IH 20 OVERPASS - EXIST TYPICAL SECTIONS
20		IH 20 EB & WB FR - PROP TYPICAL SECTIONS
21		IH 20 FM 113 AT IH 20 OVERPASS - PROP TYPICAL SECTIONS
22		CORING DATA
23, 23A-23J		GENERAL NOTES
24, 24A-24C		ESTIMATE AND QUANTITY
25 - 30		SUMMARY OF QUANTITIES
31 - 41		SUMMARY OF SMALL SIGNS
		TRAFFIC CONTROL SHEETS
42		TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION
43 - 45		US 180 WB (HUBBARD ST) - TCP PHASE 1 TYPICAL SECTIONS
46 - 48		US 180 WB (HUBBARD ST) - TCP PHASE 2 TYPICAL SECTIONS
49 - 50		US 180 WB (HUBBARD ST) - TCP PHASE 3 TYPICAL SECTIONS
51		US 180 WB (HUBBARD ST) - TCP BRIDGE TYPICAL SECTIONS
52 - 54		US 180 - TCP PHASE 1 TYPICAL SECTIONS
55 - 57		US 180 - TCP PHASE 2 TYPICAL SECTIONS
58 - 60		US 180 - TCP PHASE 3 TYPICAL SECTIONS
61 - 62		US 180 EB (FIRST ST) - TCP PHASE 1 TYPICAL SECTIONS
63 - 64		US 180 EB (FIRST ST) - TCP PHASE 2 TYPICAL SECTIONS
65 - 66		US 180 EB (FIRST ST) - TCP PHASE 3 TYPICAL SECTIONS
67		US 180 EB (FIRST ST) - TCP BRIDGE TYPICAL SECTIONS
68		IH 20 EB FR - TCP PHASE 1 & 2 TYPICAL SECTIONS
69		IH 20 WB FR - TCP PHASE 1 & 2 TYPICAL SECTIONS
70		IH 20 FM 113 AT IH 20 OVERPASS - TCP PHASE 1 & 2 TYPICAL SECTIONS
71		IH 20 DETOUR LAYOUT
		TRAFFIC CONTROL STANDARDS
72 - 83	*	BC(1)-21 THRU BC(12)-21
84	*	TCP(1-2)-18
85	*	TCP(1-5)-18
86	*	TCP(2-1)-18
87	*	TCP(2-4)-18
88	*	TCP(2-6)-18
89	*	TCP(3-1)-13
90	*	TCP(3-2)-13
91	*	TCP(3-3)-14

SHEET NO.		DESCRIPTION
		TRAFFIC CONTROL STANDARDS (CONTINUED)
92	*	TCP(3-4)-13
93	*	TCP(6-2)-12
94	*	TCP(6-3)-12
95	*	TCP(7-1)-13
96	*	WZ(RS)-16
97	*	WZ(BTS-1)-13
98	*	WZ(BTS-2)-13
99	*	WZ(STPM)-13
100	*	WZ(UL)-13
101	*	WZ(BRK)
102 - 103	*	CSB(1)-10
104	*	CSB(7)-10
105	*	ABSORB(M)-19
106	*	SLEDMINI-19
107	*	CCSS
108	*	WORKSHEET FOR EDGE CONDITION TREATMENT TYPES
		ROADWAY SHEETS
109		US 180 - HORIZONTAL ALIGNMENT DATA
110		IH 20 - HORIZONTAL ALIGNMENT DATA
111 - 124		US 180 - ROADWAY LAYOUT WB & EB
125		IH 20 - ROADWAY LAYOUT EB & WB FR AT FM 113
126		ROADWAY DETAILS
		ROADWAY STANDARDS
127	$	TE(HMAC)-11
128	$	GF(31)-19
129	$	GF(31)DAT-19
130 - 131	$	GF(31)TRTL3-20
132	$	GF(31)MS-19
133	$	SGT(12S)31-18
134	$	SGT(15)31-20
135	$	BED-14
136	$	CCCG(FTW)
137 - 140	$	MB-15(1)
141 - 143	$	MB-14(2)
144 - 147	$	PED-18
		BRIDGE SHEETS
148		WB PR11 & SSTR RAIL RETROFIT LAYOUT
149 - 150		WB PR11 & SSTR RAIL RETROFIT DETAILS
151		EB SSTR RAIL RETROFIT LAYOUT
152		EB SSTR RAIL RETROFIT DETAILS

STATE OF TEXAS
CHAD WOOD
92822
LICENSED
PROFESSIONAL ENGINEER

CHAD WOOD, PE — P.E. 10/27/2021 DATE
ALLIANCE TRANSPORTATION GROUP, INC FIRM - #812

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

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

PAUL R. HAHN, PE — P.E. 10/27/2021 DATE
AGUIRRE & FIELDS, LP FIRM - #739

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

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

ARTURO A. TERRAZAS, PE — P.E. 10/27/2021 DATE
AGUIRRE & FIELDS, LP FIRM - #739

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

STATE OF TEXAS
Y. GANJANATHAVAT
124183
LICENSED
PROFESSIONAL ENGINEER

UTE GANJANATHAVAT, PE — P.E. 10/27/2021 DATE
PACHECO KOCH, INC FIRM - #739

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

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

MARK ZOELLNER, PE — P.E. 10/27/2021 DATE
PACHECO KOCH, INC FIRM - #469

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

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

INDEX OF SHEETS

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	2
0008	01	046,ETC	

SHEET NO.		DESCRIPTION
		BRIDGE STANDARDS
153 - 154	@	TYPE PR11
155 - 156	@	TYPE SSTR
		TRAFFIC SHEETS
157		US 180 WB (HUBBARD ST) AT S OAK AVE (US 281) EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT
158 - 159		US 180 WB (HUBBARD ST) AT S OAK AVE (US 281) PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT
160 - 161		US 180 WB (HUBBARD ST) AT S OAK AVE (US 281) TRAFFIC SIGNAL DETAIL/SUMMARY SHEET
162		US 180 WB (HUBBARD ST) AT S OAK AVE (US 281) TRAFFIC SIGNAL TERMINATION AND PHASING
163		US 180 EB (FIRST ST) AT S OAK AVE (US 281) EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT
164 - 165		US 180 EB (FIRST ST) AT S OAK AVE (US 281) PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT
166 - 167		US 180 EB (FIRST ST) AT S OAK AVE (US 281) TRAFFIC SIGNAL DETAIL/SUMMARY SHEET
168		US 180 EB (FIRST ST) AT S OAK AVE (US 281) TRAFFIC SIGNAL TERMINATION AND PHASING
169		US 180 EB (FIRST ST) AT SE 1ST AVE EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT
170 - 171		US 180 EB (FIRST ST) AT SE 1ST AVE PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT
172 - 173		US 180 EB (FIRST ST) AT SE 1ST AVE TRAFFIC SIGNAL DETAIL/SUMMARY SHEET
174		US 180 EB (FIRST ST) AT SE 1ST AVE TRAFFIC SIGNAL TERMINATION AND PHASING
175		US 180 WB (HUBBARD ST) AT SE 6TH AVE EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT
176 - 177		US 180 WB (HUBBARD ST) AT SE 6TH AVE PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT
178 - 179		US 180 WB (HUBBARD ST) AT SE 6TH AVE TRAFFIC SIGNAL DETAIL/SUMMARY SHEET
180		US 180 WB (HUBBARD ST) AT SE 6TH AVE TRAFFIC SIGNAL TERMINATION AND PHASING
181		US 180 EB (FIRST ST) AT SE 6TH AVE EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT
182 - 183		US 180 EB (FIRST ST) AT SE 6TH AVE PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT
184 - 185		US 180 EB (FIRST ST) AT SE 6TH AVE TRAFFIC SIGNAL DETAIL/SUMMARY SHEET
186		US 180 EB (FIRST ST) AT SE 6TH AVE TRAFFIC SIGNAL TERMINATION AND PHASING
187		US 180 AT SE 25TH AVE EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT
188 - 189		US 180 AT SE 25TH AVE PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT
190 - 191		US 180 AT SE 25TH AVE TRAFFIC SIGNAL DETAIL/SUMMARY SHEET
192		US 180 AT SE 25TH AVE TRAFFIC SIGNAL TERMINATION AND PHASING
193 - 206		US 180 - SIGNING & PAVEMENT MARKING LAYOUT
207 - 210		US 180 - PAVEMENT MARKING DETAIL LAYOUT
211 - 217		US 180 - SIGN DETAILS
218		IH 20 - SIGNING & PAVEMENT MARKING LAYOUT
219		IH 20 - SIGN DETAILS
		TRAFFIC STANDARDS
220	+	ED(1)-14
221 - 226	+	ED(3)-14 THRU ED(8)-14
227	+	TS-FD-12
228 - 229	+	SMA-80-12
230	+	MA-C-12
231	+	MA-D-12
232	+	LUM-A-12
233	+	CFA-12
234	+	MA-DPD-20
235	+	TS-CF-21

SHEET NO.		DESCRIPTION
		TRAFFIC STANDARDS (CONTINUED)
236	+	TS-BP-20
237	+	WV & IZ-14 (windice)
238 - 241	#	PM(1)-20 THRU PM(4)-20
242 - 243	#	RS(3)-13 THRU RS(4)-13
244 - 246	#	TSR(3)-13 THRU TSR(5)-13
247	#	SMD(2-1)-08
248 - 250	#	SMD(SLIP-1)-08 THRU SMD(SLIP-3)-08
251	#	SMD(GEN)-08
252	#	SMD(FRP)-08
253	#	SMD(TWT)-08
254 - 256	#	D&OM(1)-20 THRU D&OM(3)-20
257	#	D&OM(VIA)-20
		ENVIRONMENTAL ISSUES SHEETS
258 - 259		SW3P(FTW)
260		EPIC
		ENVIRONMENTAL ISSUES STANDARDS
261	$	EC(1)-16
262	$	EC(2)-16
263 - 265	$	EC(9)-16

STATE OF TEXAS
CHAD WOOD
92822
LICENSED
PROFESSIONAL ENGINEER

CHAD WOOD, PE, P.E. 10/27/2021 DATE
ALLIANCE TRANSPORTATION GROUP, INC FIRM - #812

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

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

PAUL R. HAHN, PE, P.E. 10/27/2021 DATE
AGUIRRE & FIELDS, LP FIRM - #739

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

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

ARTURO A. TERRAZAS, PE, P.E. 10/27/2021 DATE
AGUIRRE & FIELDS, LP FIRM - #739

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

STATE OF TEXAS
Y. GANJANATHAVAT
124183
LICENSED
PROFESSIONAL ENGINEER

UTE GANJANATHAVAT, PE, P.E. 10/27/2021 DATE
PACHECO KOCH, INC FIRM - #739

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STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

MARK ZOELLNER, PE, P.E. 10/27/2021 DATE
PACHECO KOCH, INC FIRM - #469

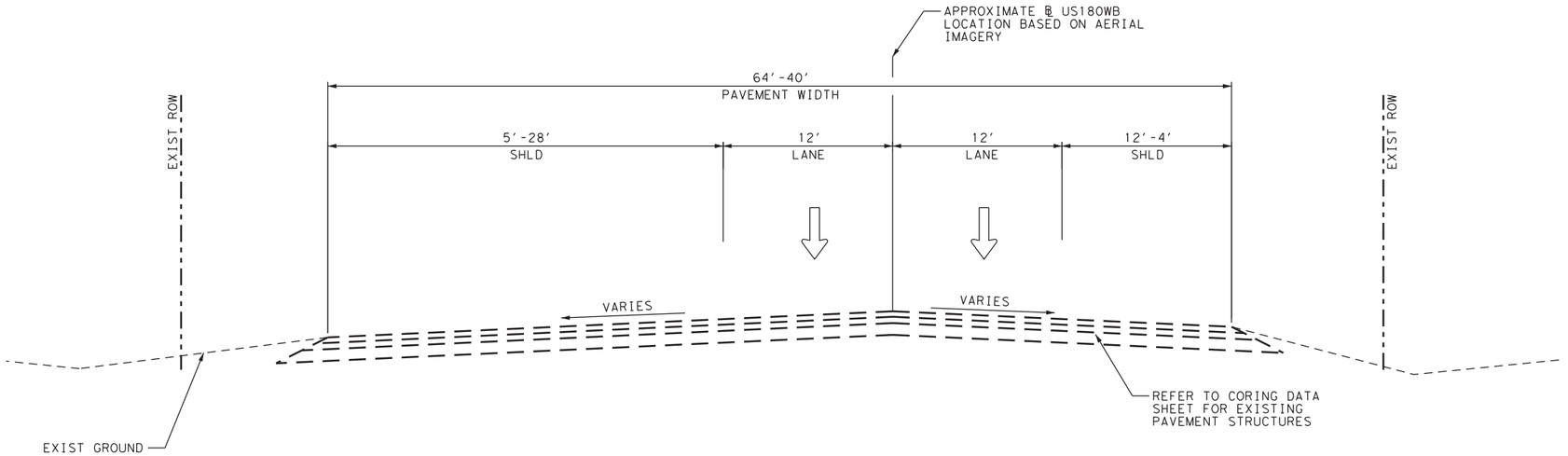
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

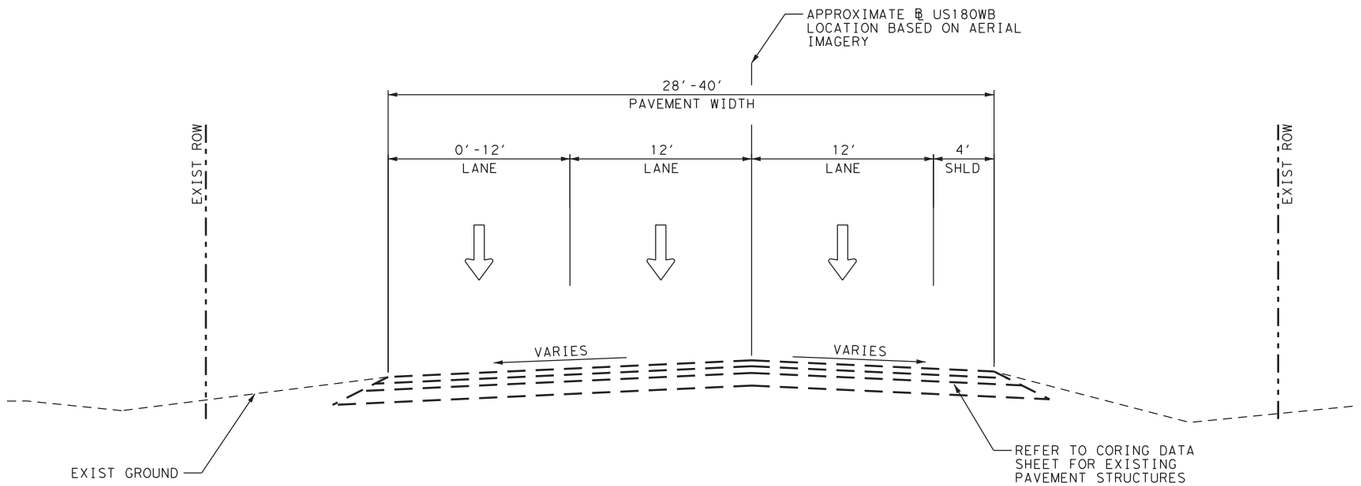
INDEX OF SHEETS

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	3
0008	01	046,ETC	



EXIST TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0007-10-061
BEGIN PROJECT TO STA 2885+10



EXIST TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 2885+10 TO STA 2886+10

LEGEND

EXIST PAVEMENT

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTH DIMENSIONS RELATIVE TO CURB/EDGE OF PAVEMENT SHALL CONTROL STRIPING LOCATIONS WHEREVER THEY CONFLICT WITH ALIGNMENT OFFSET DATA.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB ON "ROADWAY DETAILS" SHEET.
5. REFERENCE ALL EXISTING PAVEMENT MARKINGS PRIOR TO PLANING OPERATION.
6. LEAVE A UNIFORM SURFACE OF PLANED PAVEMENT FREE OF ASPHALTIC MATERIAL AND FABRIC UNDERSEAL.
7. CONTRACTOR TO ENSURE THAT EXISTING FEATURES/ELEMENTS ARE NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. DAMAGED PORTIONS ARE TO BE REPAIRED AT CONTRACTOR'S EXPENSE.

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

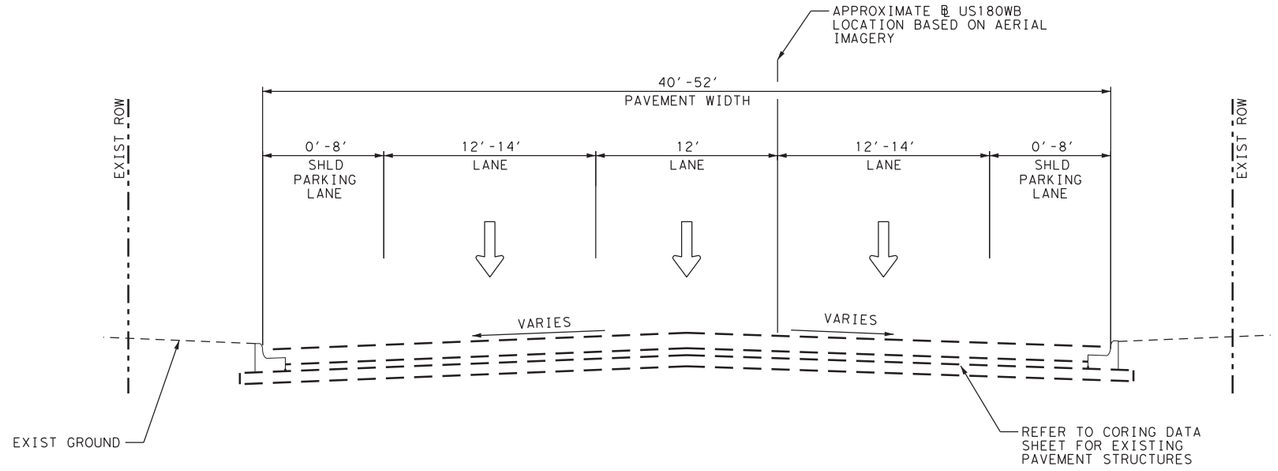
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) EXIST TYPICAL SECTIONS

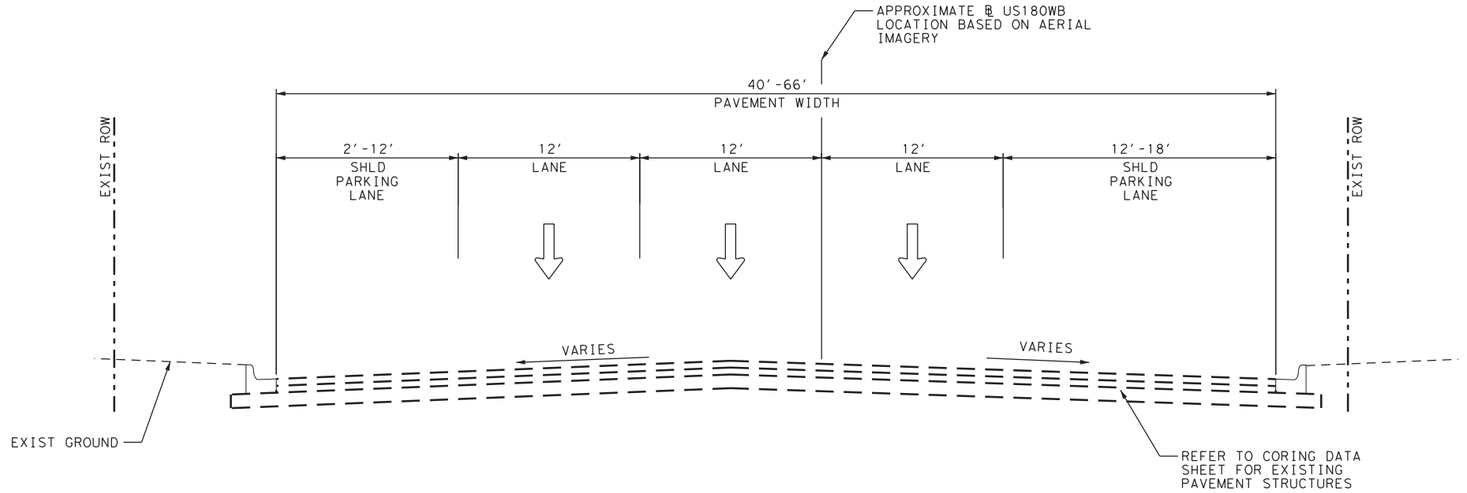
SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	4
0008	01	046,ETC	



EXIST TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 2886+10 TO STA 2911+40
CSJ: 0008-01-046
STA 2911+40 TO STA 2953+30
NOTE: LANES ARE 12' WHEN SHOULDER IS PRESENT



EXIST TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2953+30 TO STA 2982+70

LEGEND

EXIST PAVEMENT

NOTES:

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2. LANE AND SHOULDER WIDTH DIMENSIONS RELATIVE TO CURB/EDGE OF PAVEMENT SHALL CONTROL STRIPING LOCATIONS WHEREVER THEY CONFLICT WITH ALIGNMENT OFFSET DATA.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB ON "ROADWAY DETAILS" SHEET.
5. REFERENCE ALL EXISTING PAVEMENT MARKINGS PRIOR TO PLANING OPERATION.
6. LEAVE A UNIFORM SURFACE OF PLANED PAVEMENT FREE OF ASPHALTIC MATERIAL AND FABRIC UNDERSEAL.
7. CONTRACTOR TO ENSURE THAT EXISTING FEATURES/ELEMENTS ARE NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. DAMAGED PORTIONS ARE TO BE REPAIRED AT CONTRACTOR'S EXPENSE.

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER

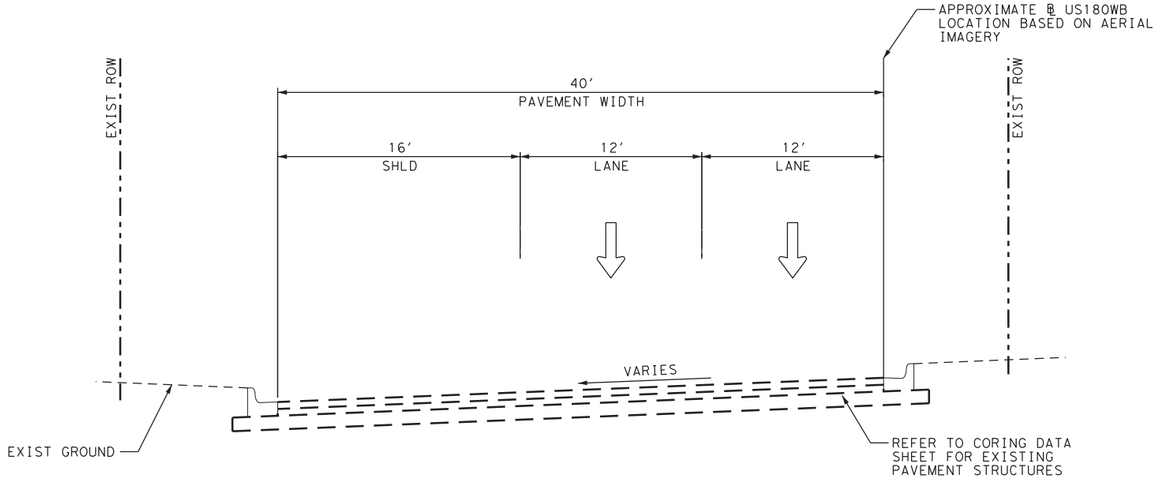
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) EXIST TYPICAL SECTIONS

SHEET 2 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	5
CONTROL	SECTION	JOB	
0008	01	046, ETC	



EXIST TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2982+70 TO STA 2987+40

LEGEND

EXIST PAVEMENT

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
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10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

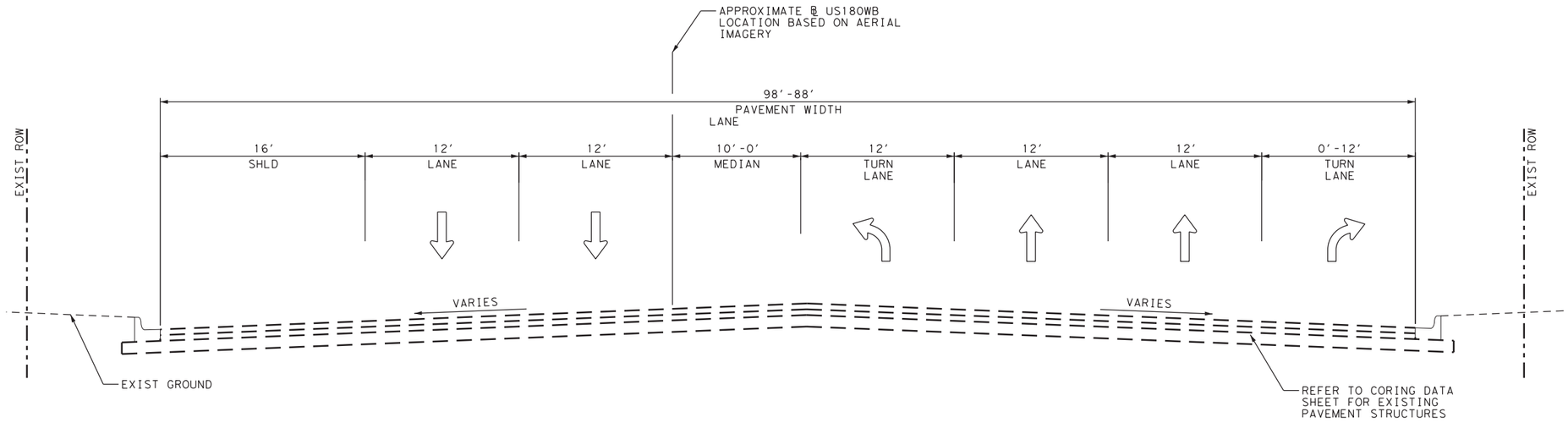
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) EXIST TYPICAL SECTIONS

SHEET 3 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	6
0008	01	046, ETC	



EXIST TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 2987+40 TO STA 2990+71

LEGEND

EXIST PAVEMENT

NOTES:

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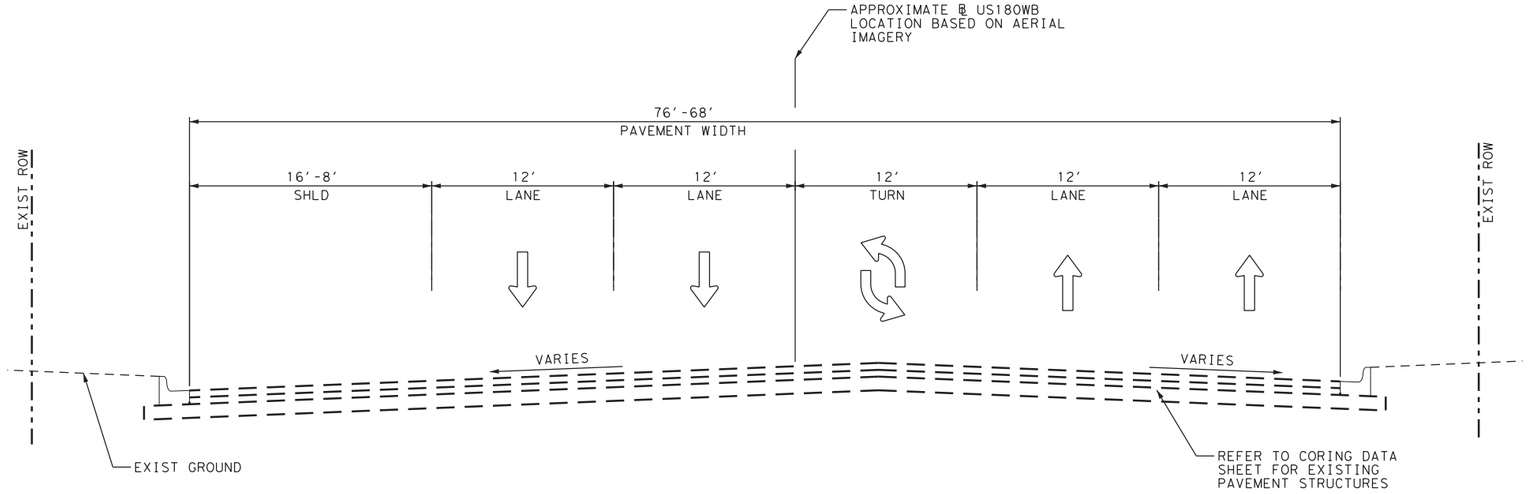

EXIST TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 2990+71 TO STA 3003+00

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

US 180
EXIST TYPICAL SECTIONS

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	7
0008	01	046, ETC	

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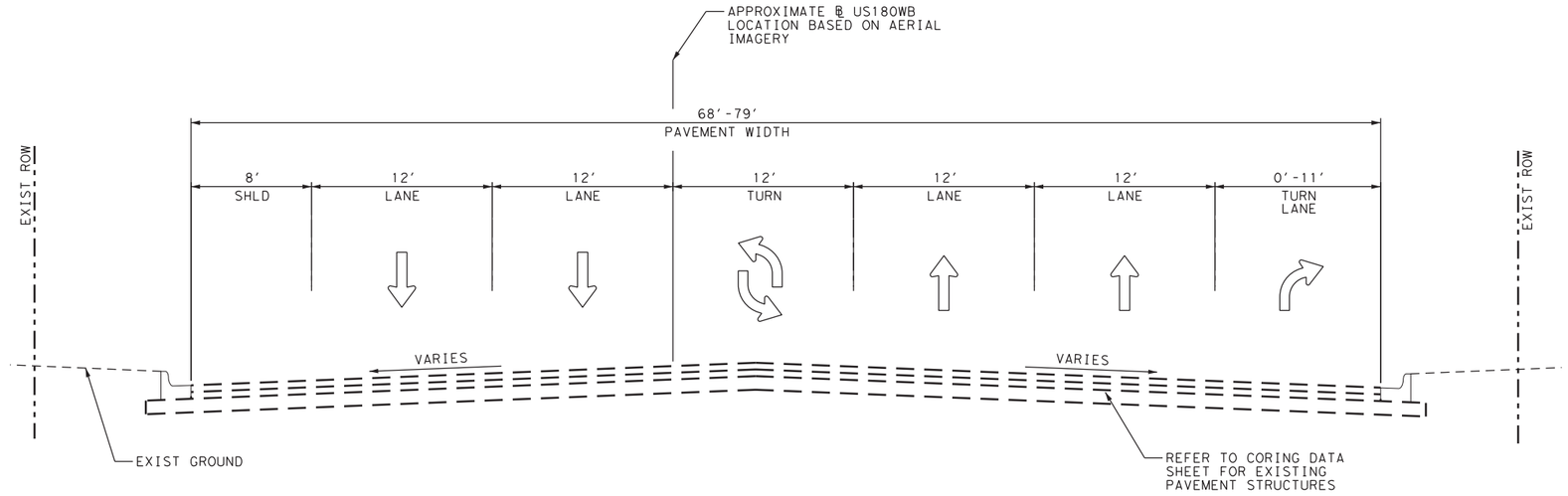

EXIST TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 3003+00 TO STA 3007+60

LEGEND

EXIST PAVEMENT

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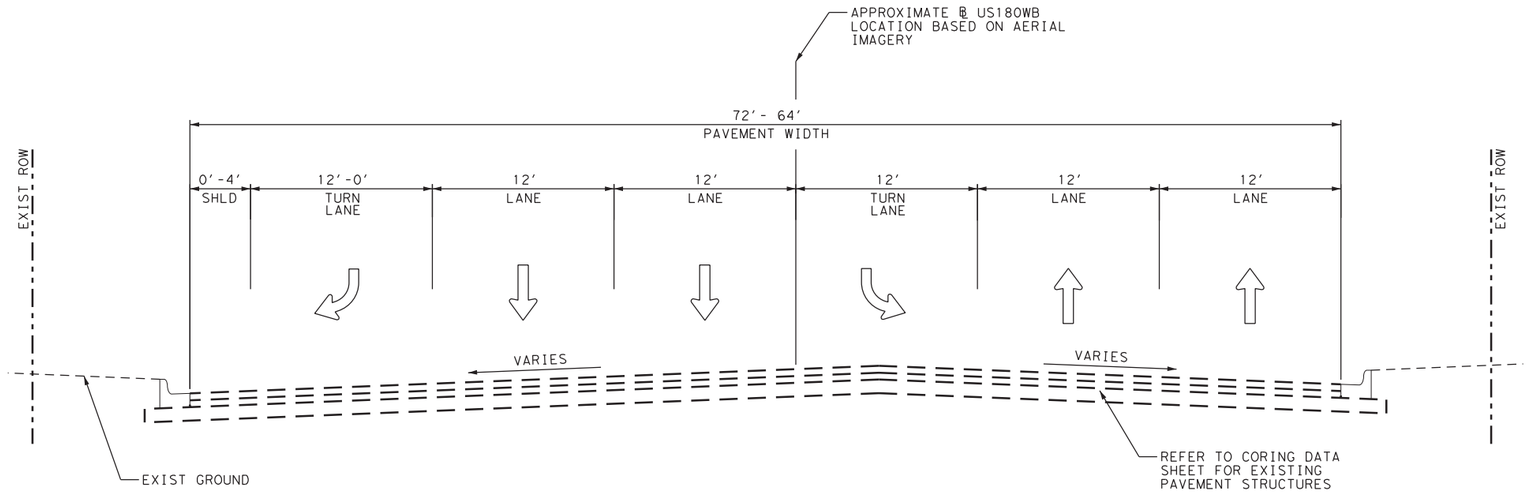

EXIST TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 3007+60 TO END PROJECT

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
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AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
EXIST TYPICAL SECTIONS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	8
0008	01	046, ETC	

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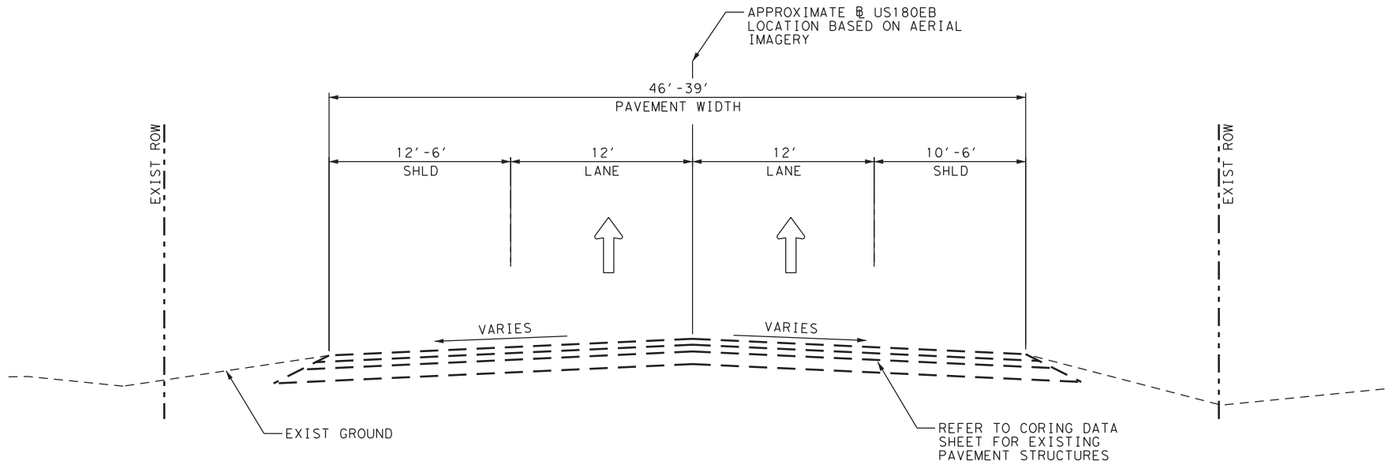

EXIST TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0007-10-061
BEGIN PROJECT TO STA 1880+00

LEGEND

EXIST PAVEMENT

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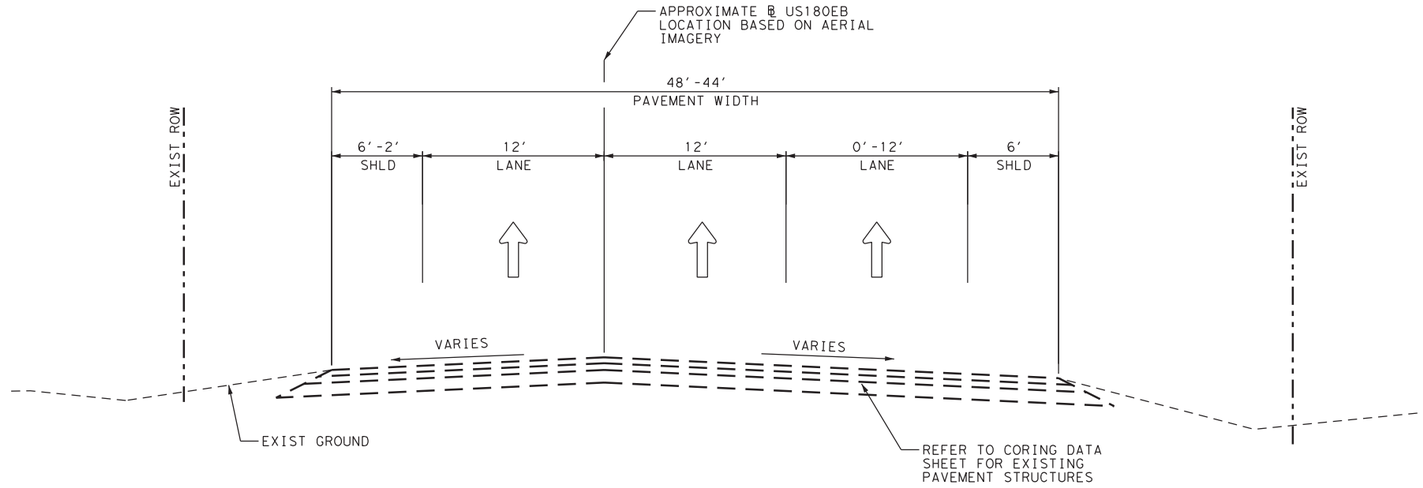

EXIST TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 1880+00 TO STA 1882+80

10/29/21

STATE OF TEXAS
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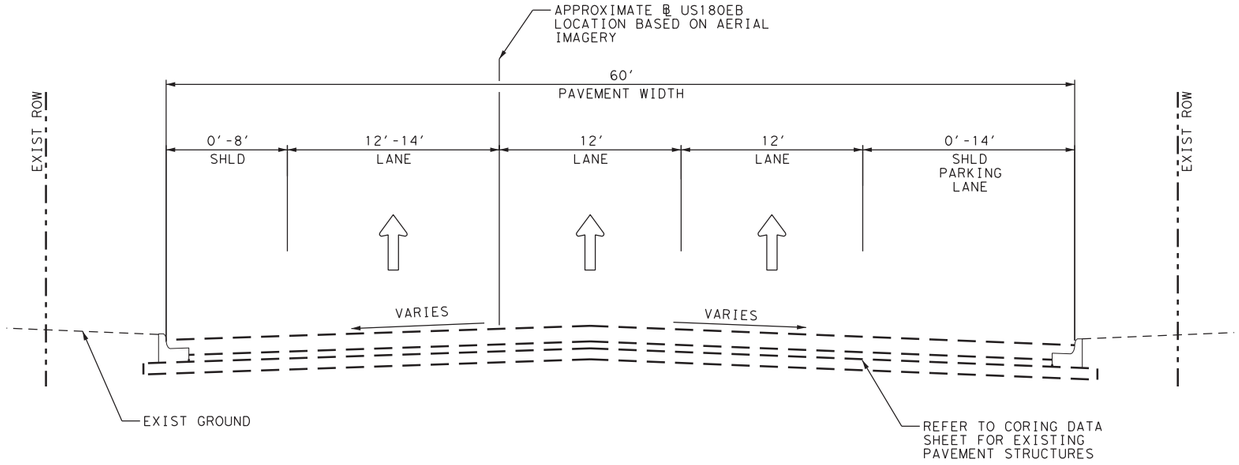
US 180 EB (FIRST ST) EXIST TYPICAL SECTIONS

SHEET 1 OF 2

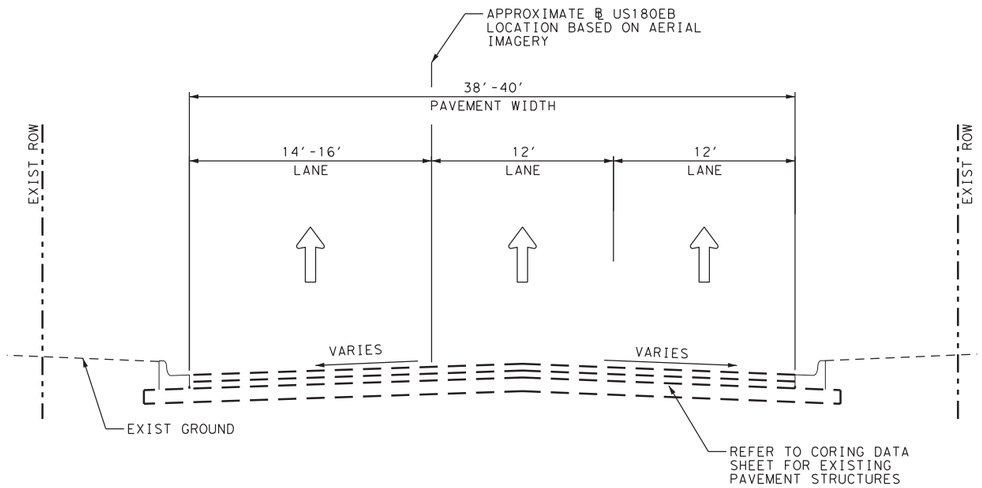
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	9
0008	01	046,ETC	



EXIST TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1882+80 TO STA 1911+40
CSJ: 0008-01-046
STA 1911+40 TO STA 1954+30
NOTE: LANES ARE 12' WHEN SHOULDER IS PRESENT



EXIST TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 1954+30 TO STA 1988+00

LEGEND

EXIST PAVEMENT

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TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST) EXIST TYPICAL SECTIONS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	10
0008	01	046, ETC	

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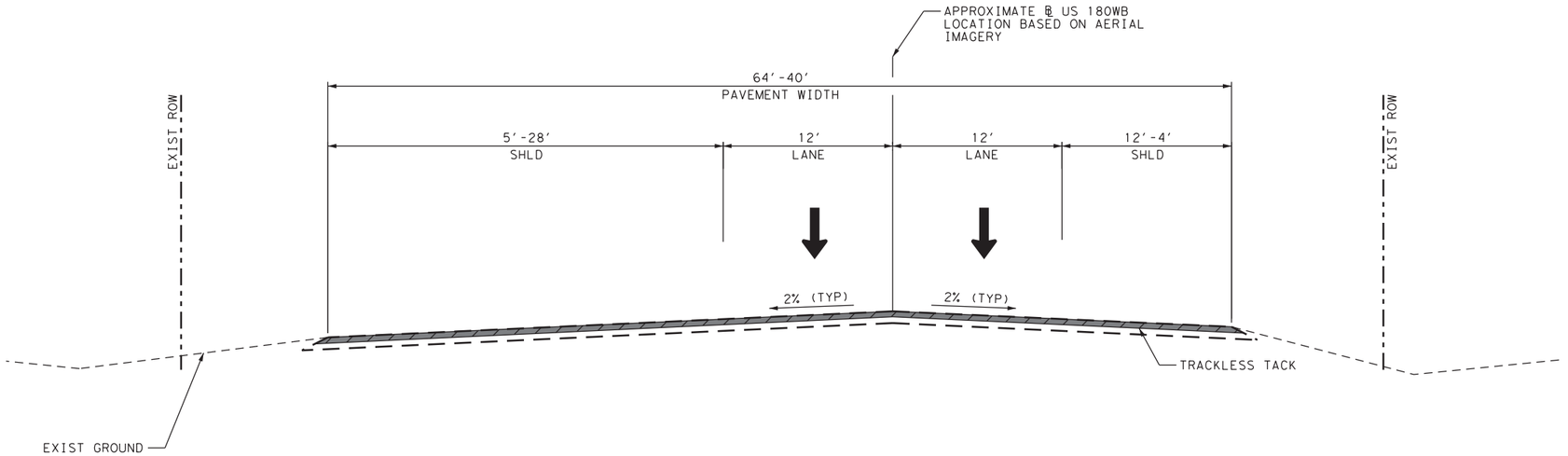

PROP TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0007-10-061
BEGIN PROJECT TO STA 2885+10

LEGEND

EXIST PAVEMENT

PLANE ASPH CONC PAV (0" TO 4") (SEE NOTE 4)

2" SP MIXES SP-C SAC-A PG 70-28 AND TRACKLESS TACK COAT

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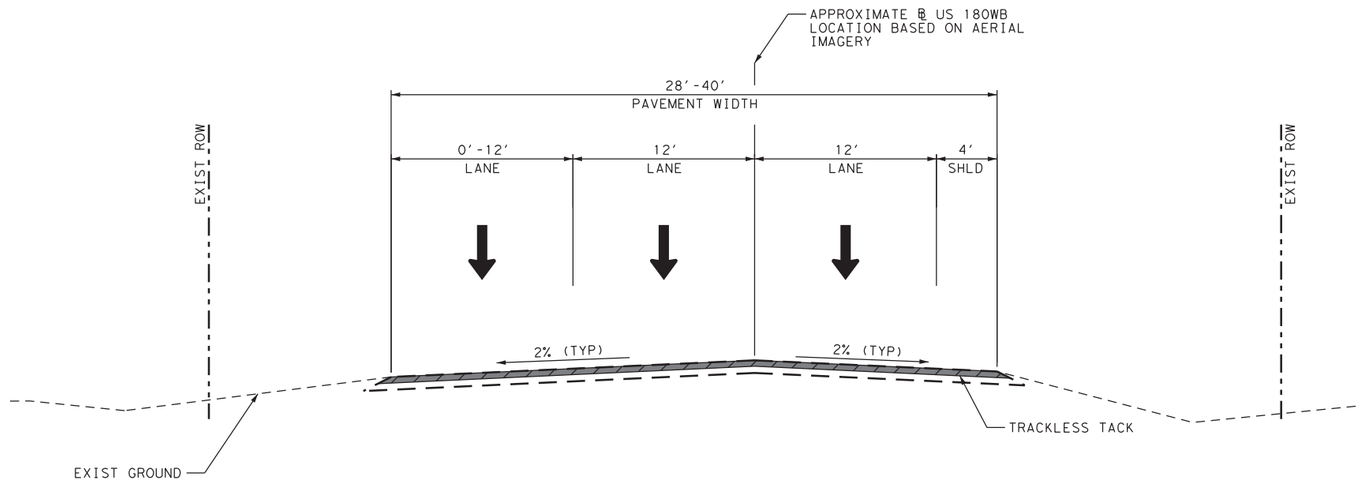

PROP TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 2885+10 TO STA 2886+10

10/29/21

STATE OF TEXAS
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TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) PROP TYPICAL SECTIONS

SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	11
0008	01	046,ETC	

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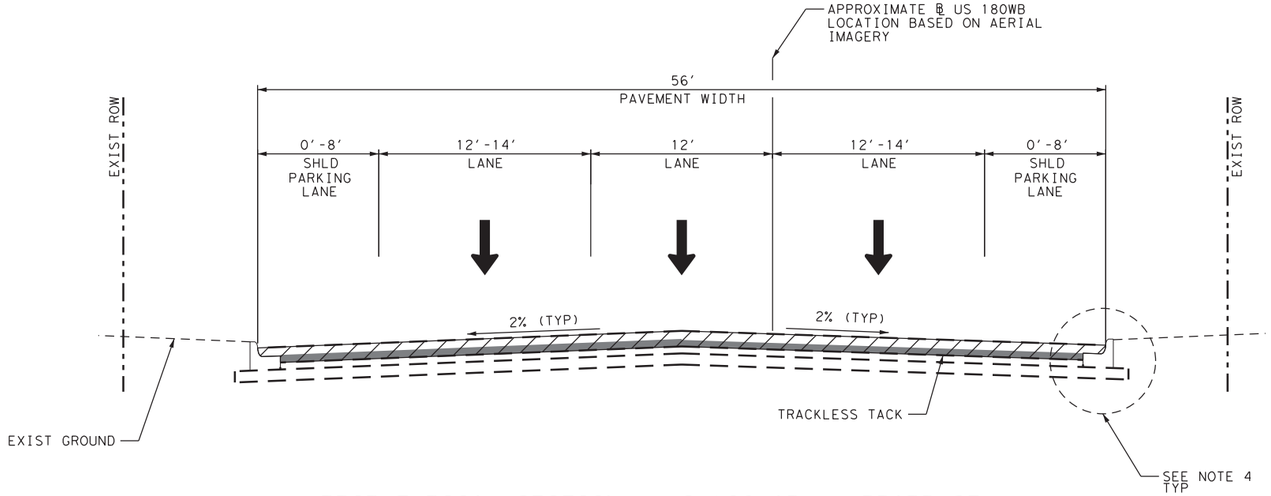
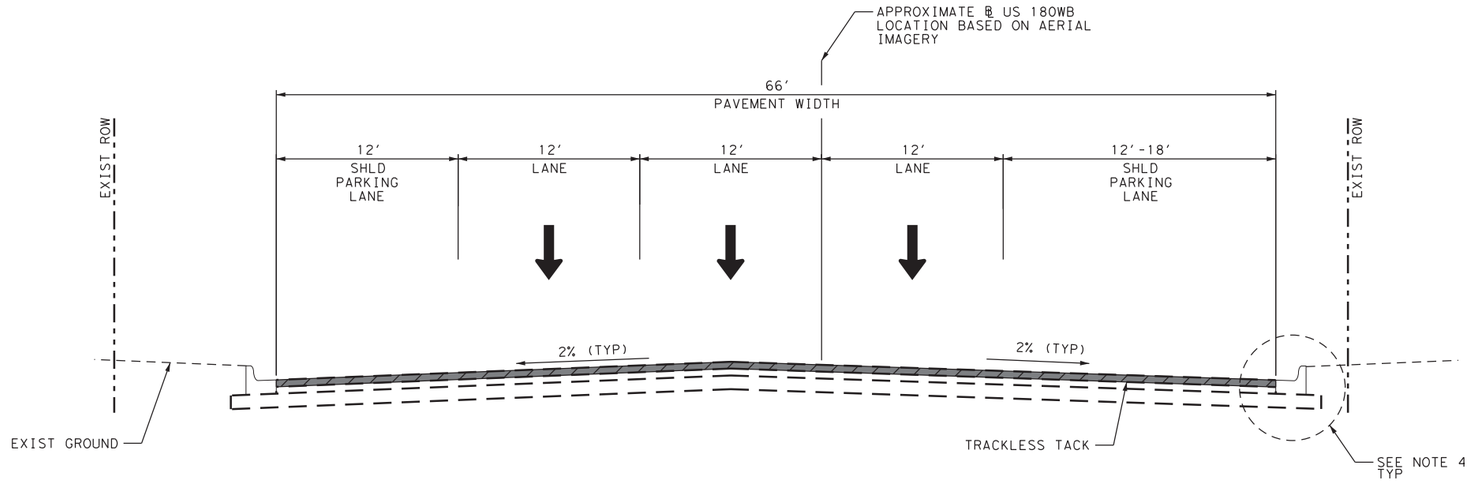


PROP TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 2886+10 TO STA 2911+40
CSJ: 0008-01-046
STA 2911+40 TO STA 2953+30
NOTE: LANES ARE 12' WHEN SHOULDER IS PRESENT



PROP TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2953+30 TO STA 2982+70

LEGEND

- EXIST PAVEMENT
- PLANE ASPH CONC PAV (0" TO 4") (SEE NOTE 4)
- 2" SP MIXES SP-C SAC-A PG 70-28 AND TRACKLESS TACK COAT

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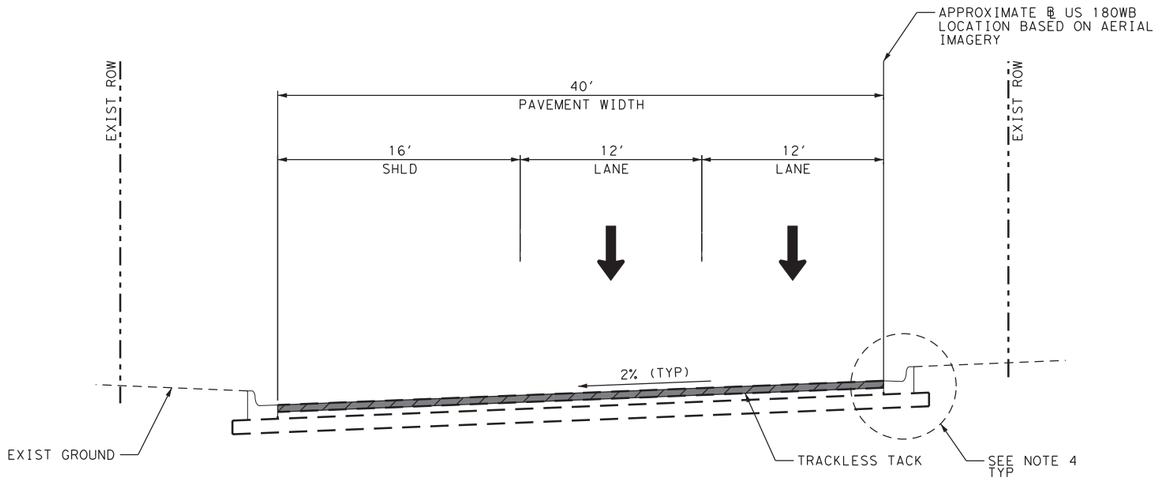
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) PROP TYPICAL SECTIONS

SHEET 2 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	12
0008	01	046, ETC	



PROP TYPICAL SECTION - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2982+70 TO STA 2987+40

LEGEND

- EXIST PAVEMENT
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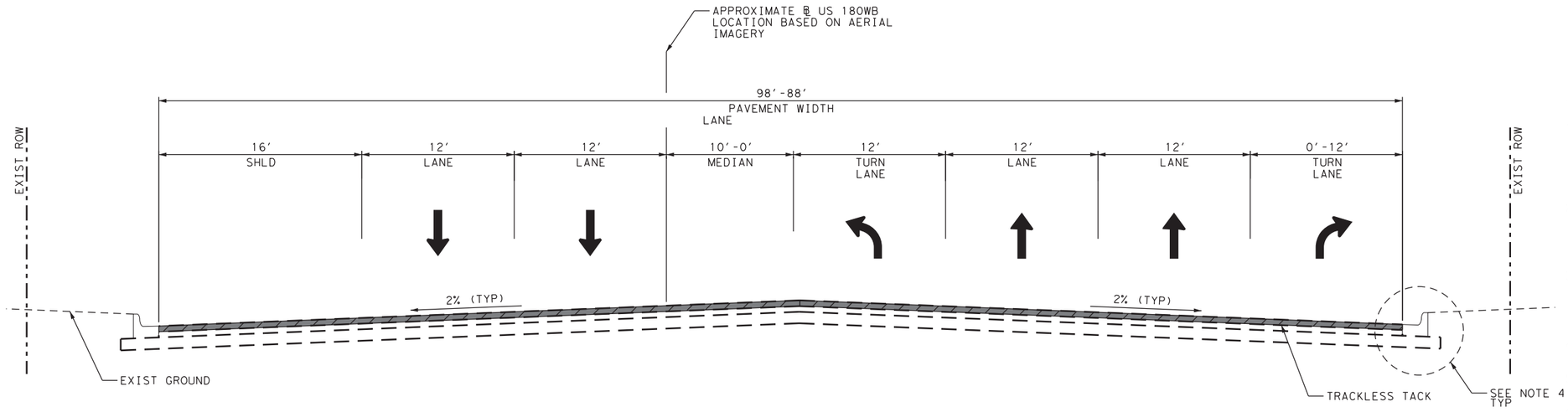
Texas Department of Transportation

US 180 WB (HUBBARD ST) PROP TYPICAL SECTIONS

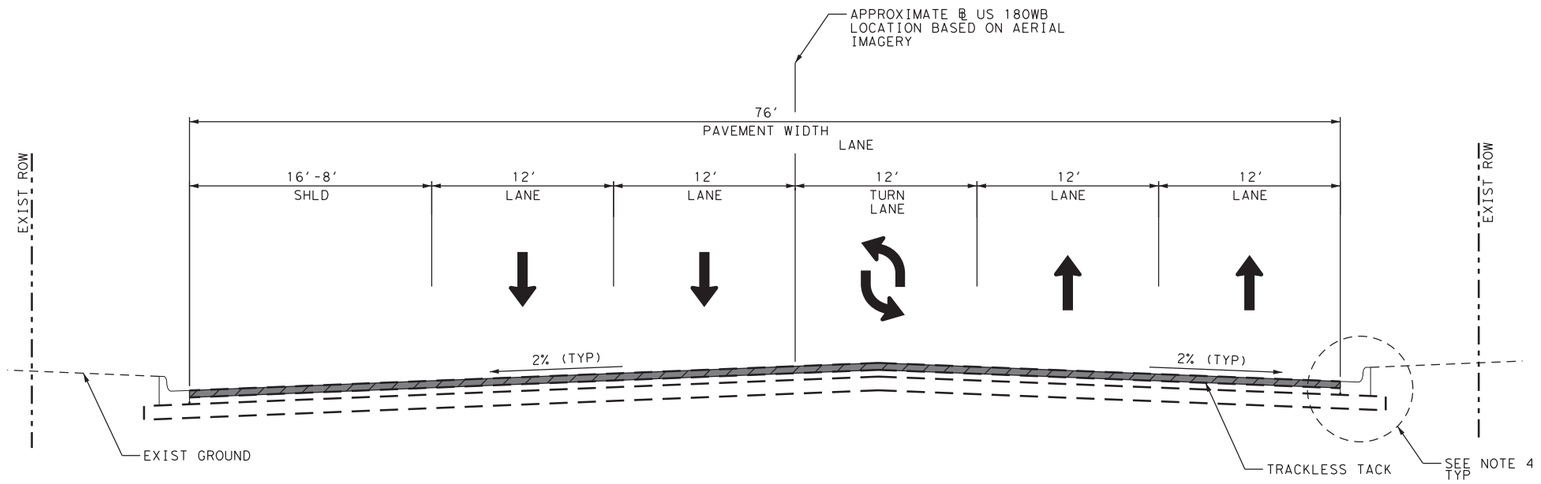
SHEET 3 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	13
0008	01	046, ETC	



PROP TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 2987+40 TO STA 2990+71



PROP TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 2990+71 TO STA 3003+00

LEGEND

- EXIST PAVEMENT
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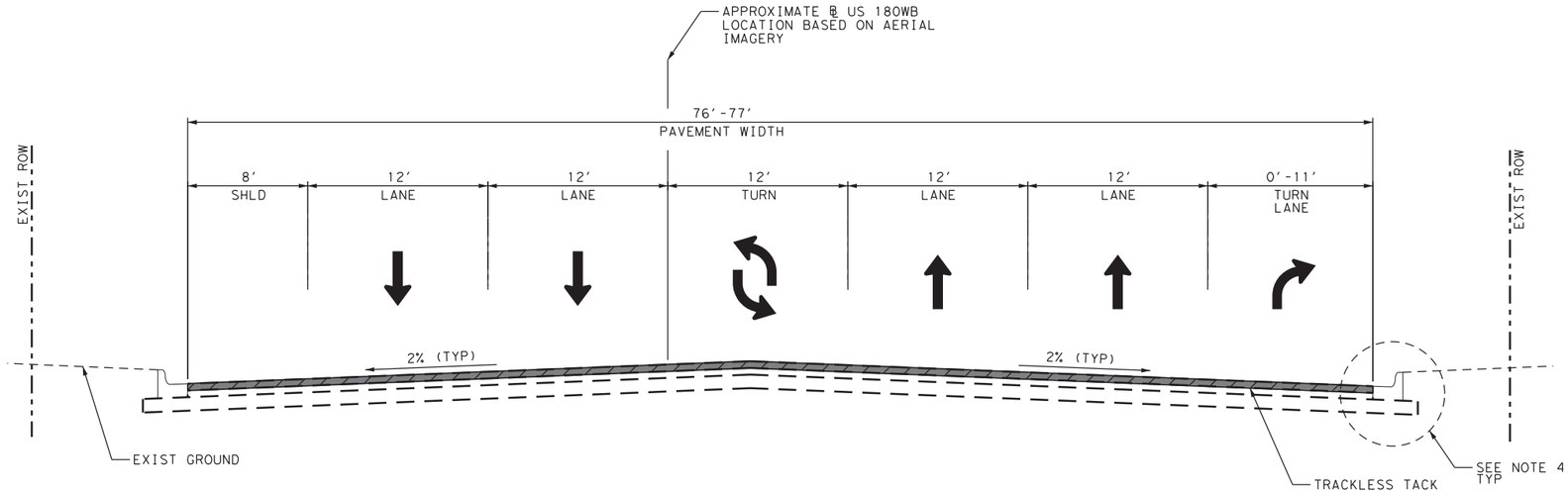
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
PROP TYPICAL SECTIONS

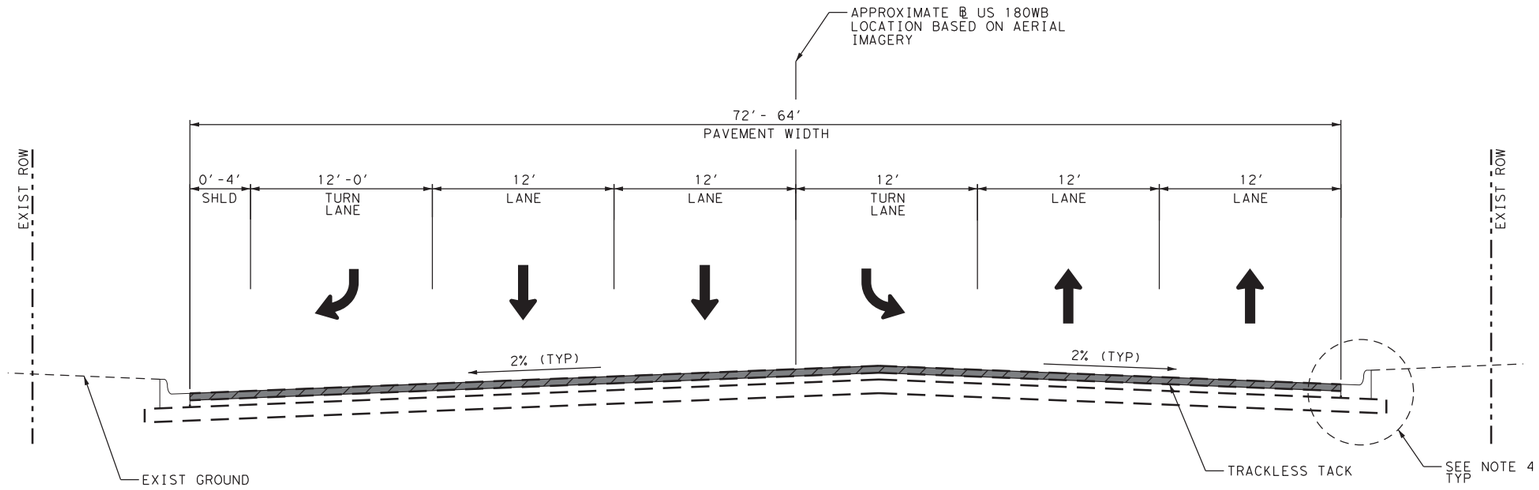
SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	14
0008	01	046, ETC	



PROP TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 3003+00 TO STA 3007+60



PROP TYPICAL SECTION - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 3007+60 TO END PROJECT

LEGEND

- EXIST PAVEMENT
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US 180
PROP TYPICAL SECTIONS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	15
0008	01	046, ETC	

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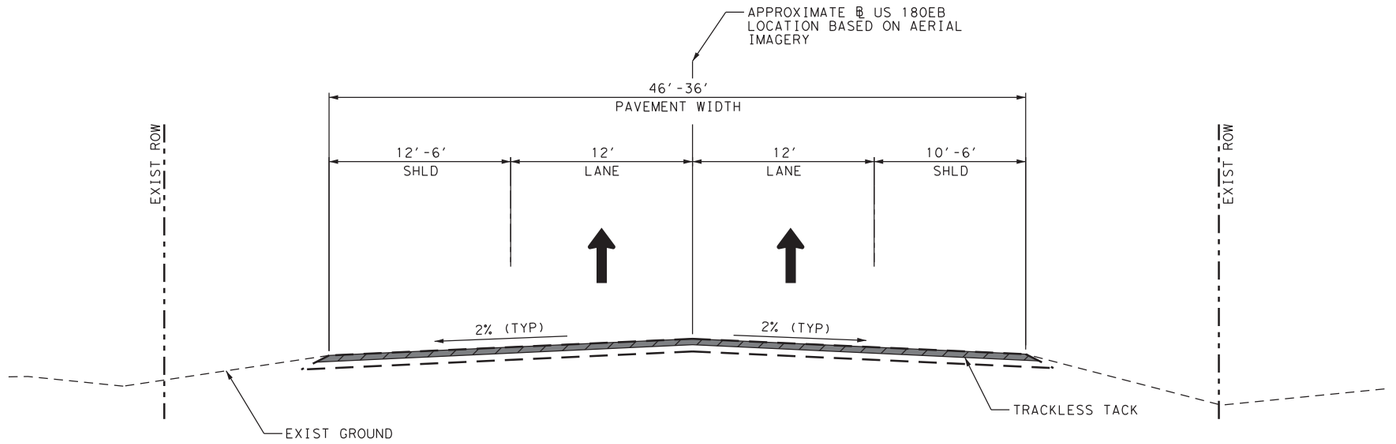
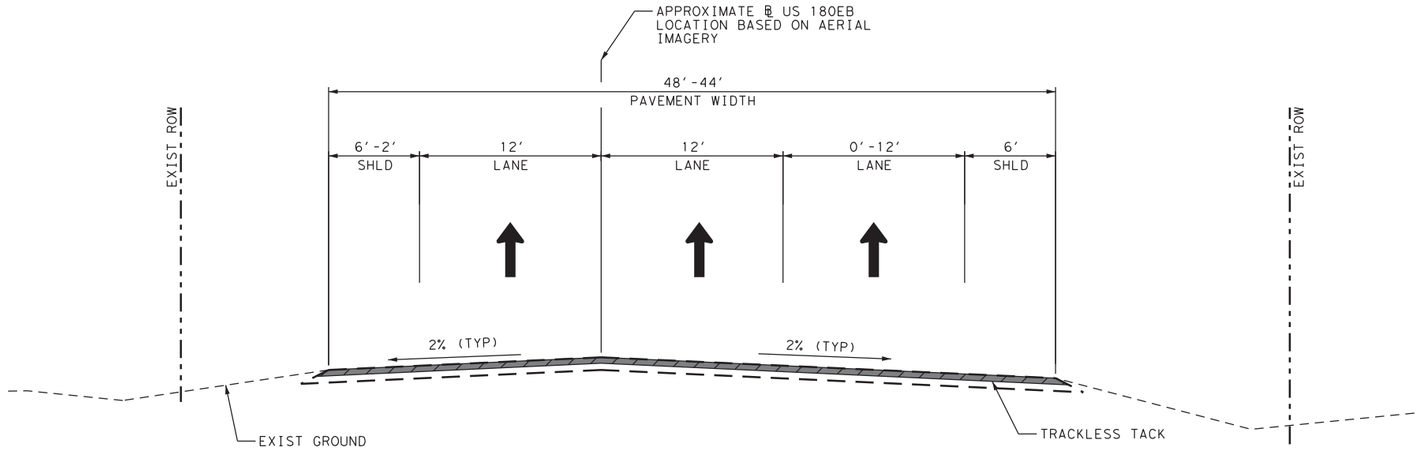


PROP TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0007-10-061
BEGIN PROJECT TO STA 1880+00



PROP TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 1880+00 TO STA 1882+80

LEGEND

- EXIST PAVEMENT
- PLANE ASPH CONC PAV (0" TO 4") (SEE NOTE 4)
- 2" SP MIXES SP-C SAC-A PG 70-28 AND TRACKLESS TACK COAT

NOTES:

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2. LANE AND SHOULDER WIDTH DIMENSIONS RELATIVE TO CURB/EDGE OF PAVEMENT SHALL CONTROL STRIPING LOCATIONS WHEREVER THEY CONFLICT WITH ALIGNMENT OFFSET DATA.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB ON "ROADWAY DETAILS" SHEET.
5. REFERENCE ALL EXISTING PAVEMENT MARKINGS PRIOR TO PLANING OPERATION.
6. LEAVE A UNIFORM SURFACE OF PLANED PAVEMENT FREE OF ASPHALTIC MATERIAL AND FABRIC UNDERSEAL.
7. CONTRACTOR TO ENSURE THAT EXISTING FEATURES/ELEMENTS ARE NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. DAMAGED PORTIONS ARE TO BE REPAIRED AT CONTRACTOR'S EXPENSE.

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

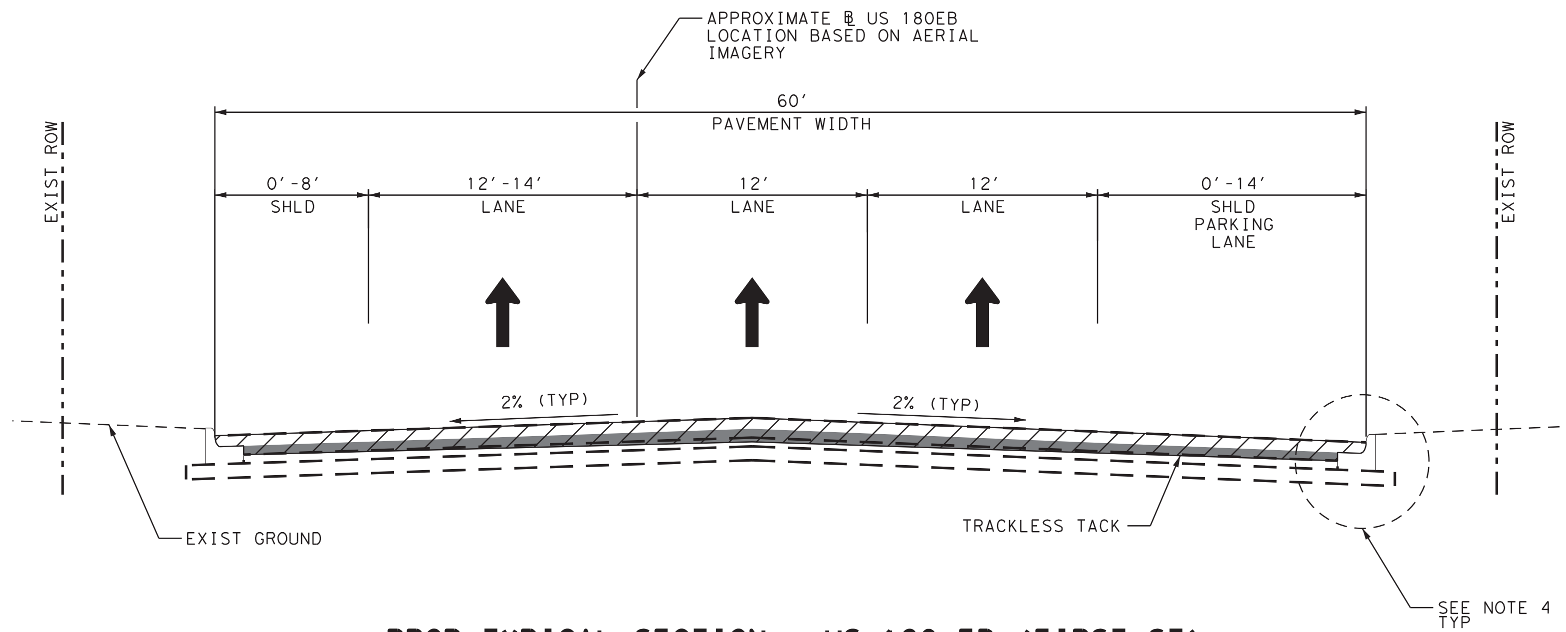
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST) PROP TYPICAL SECTIONS

SHEET 1 OF 2

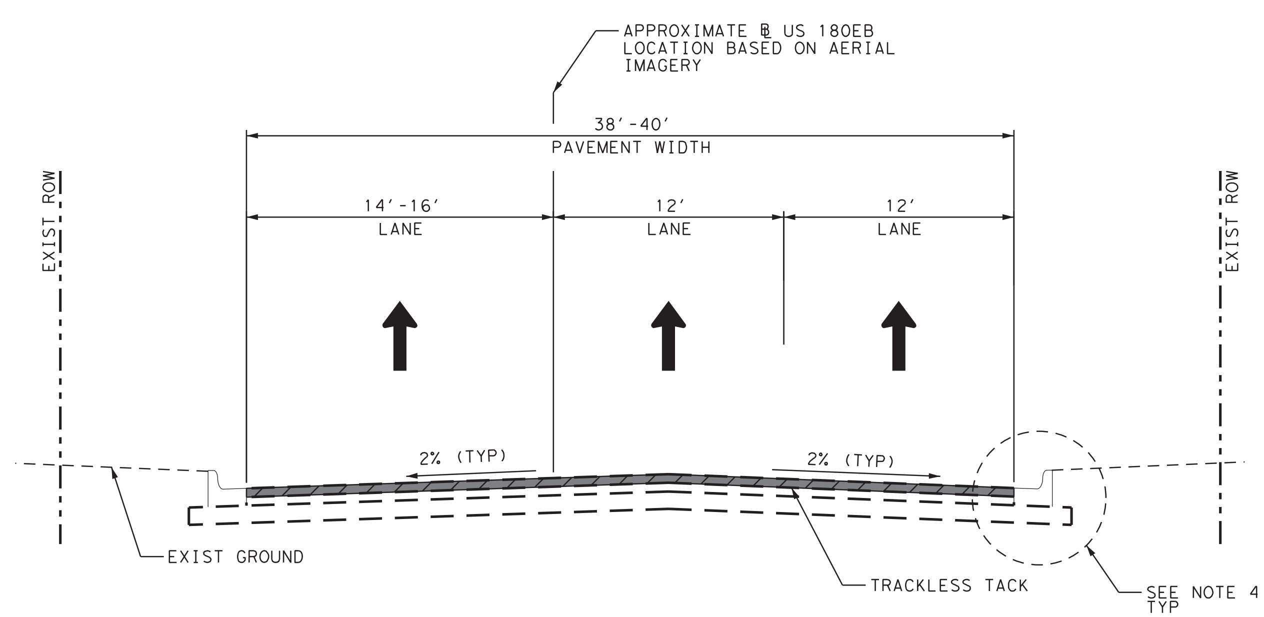
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	16
0008	01	046,ETC	



PROP TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1882+80 TO STA 1911+40
CSJ: 0008-01-046
STA 1911+40 TO STA 1954+30
NOTE: LANES ARE 12' WHEN SHOULDER IS PRESENT



PROP TYPICAL SECTION - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 1954+30 TO STA 1988+00

LEGEND

- EXIST PAVEMENT
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TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST) PROP TYPICAL SECTIONS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	17
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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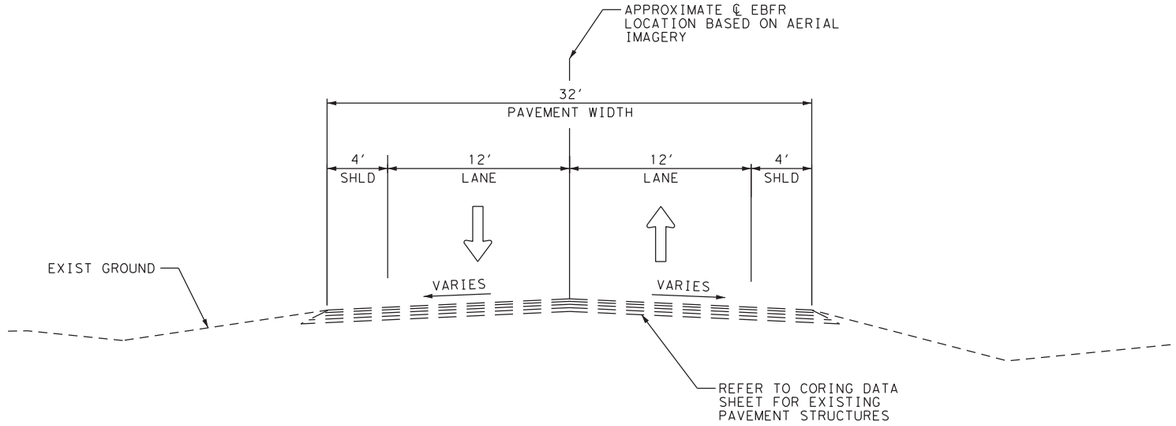
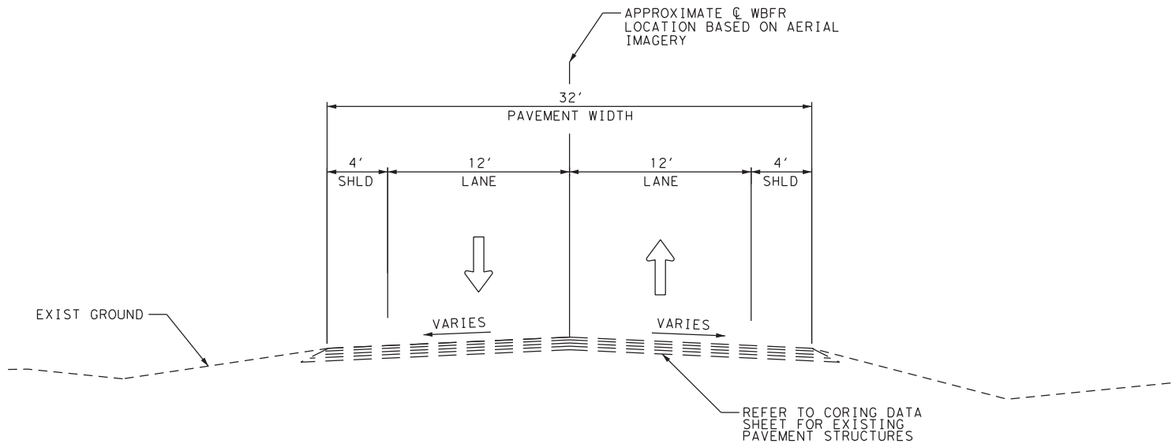


EXIST TYPICAL SECTION - IH 20 EB FR

NOT TO SCALE

CSJ: 0314-01-082
STA 2578+50 TO STA 2588+90



EXIST TYPICAL SECTION - IH 20 WB FR

NOT TO SCALE

CSJ: 0314-01-082
STA 3578+50 TO STA 3589+60

LEGEND

EXIST PAVEMENT
3/8" SEAL COAT
4-1/4" - 5-5/8" TY D HMAC
0" - 1-7/8" TY B HMAC
PRIME COAT
FLEXBASE

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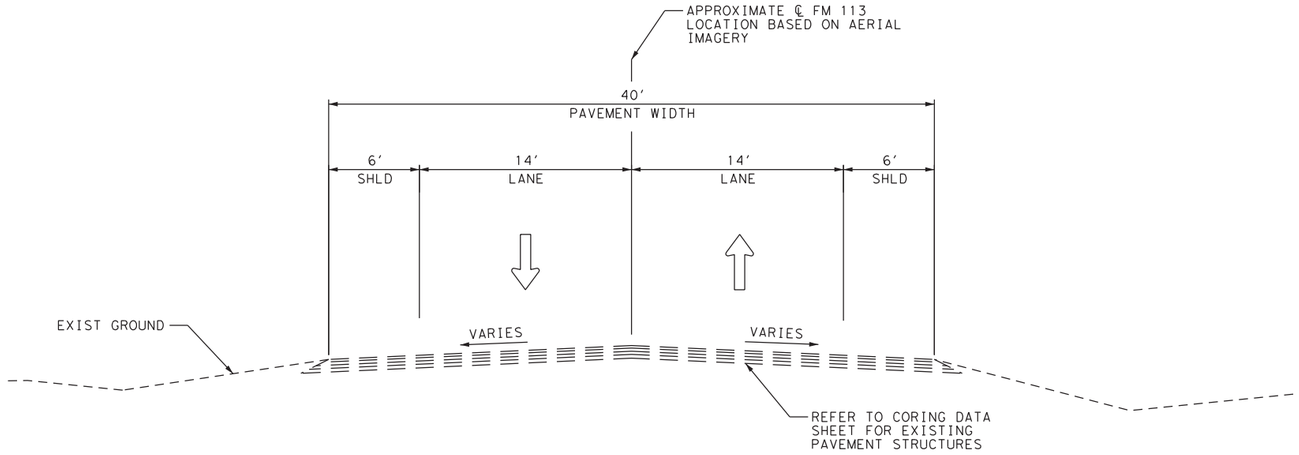
Texas Department of Transportation

IH 20 EB & WB FR
EXIST TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	18
0008	01	046, ETC	



EXIST TYPICAL SECTION - FM 113 AT IH 20 OVERPASS

NOT TO SCALE
CSJ: 0314-01-082
STA 13+25 TO STA 17+69

LEGEND

EXIST PAVEMENT
3/8" SEAL COAT
4-1/4" - 5-5/8" TY D HMAC
0" - 1-7/8" TY B HMAC
PRIME COAT
FLEXBASE

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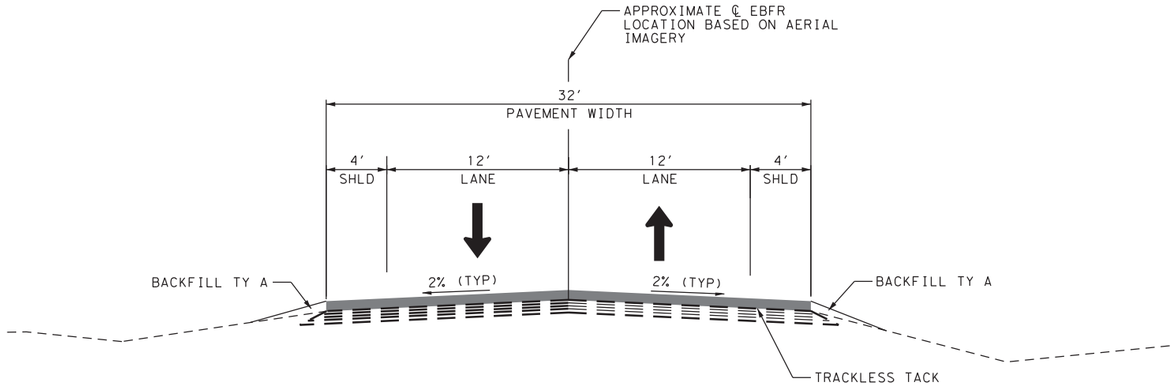
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH20 FM 113 AT IH 20 OVERPASS EXIST TYPICAL SECTIONS

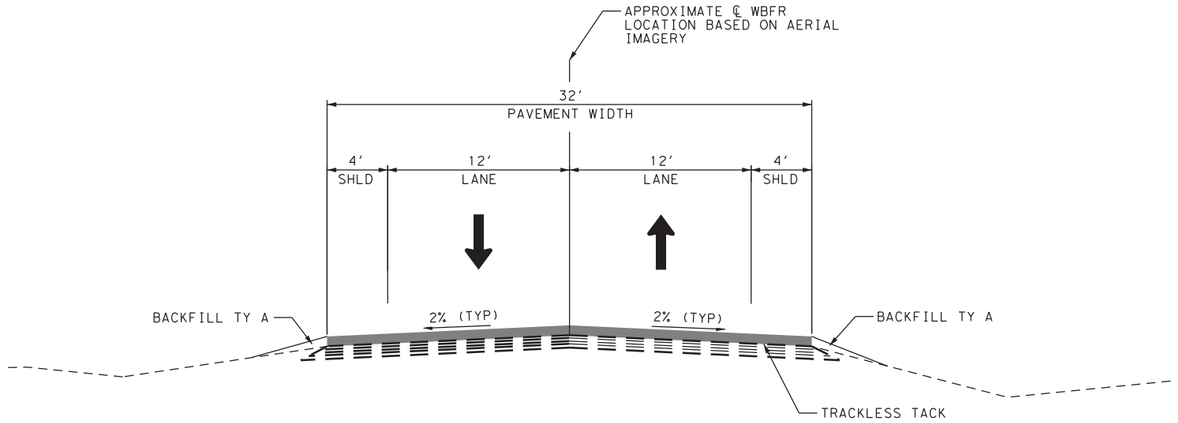
SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	19
CONTROL	SECTION	JOB	
0008	01	046, ETC	



PROP TYPICAL SECTION - IH 20 EB FR

NOT TO SCALE
CSJ: 0314-01-082
STA 2578+50 TO STA 2588+90



PROP TYPICAL SECTION - IH 20 WB FR

NOT TO SCALE
CSJ: 0314-01-082
STA 3578+50 TO STA 3589+60

LEGEND

EXIST PAVEMENT
3/8" SEAL COAT
4-1/4" - 5-5/8" TY D HMAC
0" - 1-7/8" TY B HMAC
PRIME COAT
FLEXBASE

2" SP MIXES SP-C
SAC-A PG 70-28
AND TRACKLESS
TACK COAT

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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH 20 EB & WB FR
PROP TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	20
0008	01	046,ETC	

LEGEND

EXIST PAVEMENT
3/8" SEAL COAT
4-1/4" - 5-5/8" TY D HMAC
0" - 1-7/8" TY B HMAC
PRIME COAT
FLEXBASE

2" SP MIXES SP-C
SAC-A PG 70-28
AND TRACKLESS
TACK COAT

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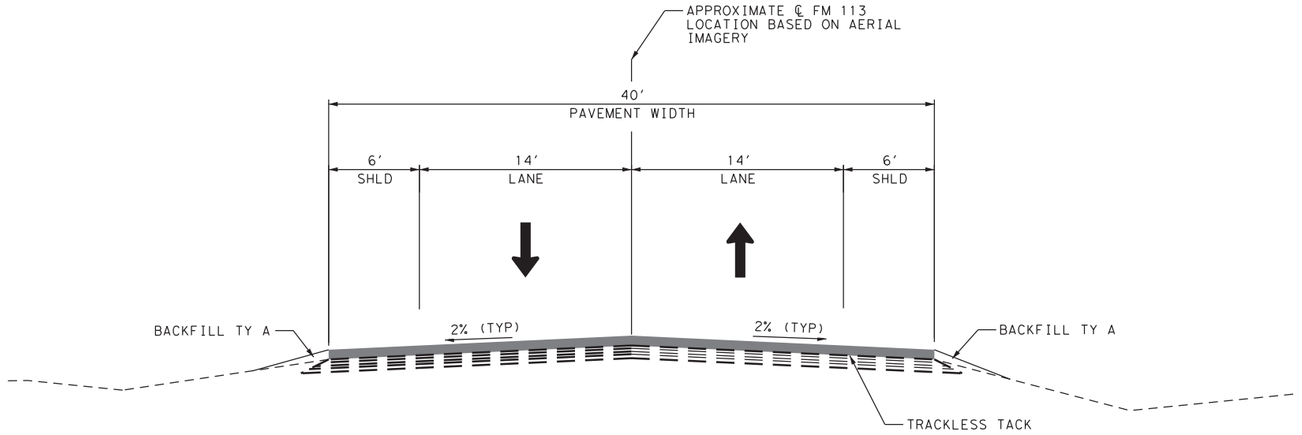

PROP TYPICAL SECTION - FM 113 AT IH 20 OVERPASS

NOT TO SCALE
CSJ: 0314-01-082
STA 13+25 TO STA 17+69

10/29/21

STATE OF TEXAS
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Texas Department of Transportation

IH 20 FM 113 AT IH 20 OVERPASS PROP TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	21
CONTROL	SECTION	JOB	
0008	01	046,ETC	

US 180 CSJ 0007-10-061

CORE #	LOCATION	DESCRIPTION
1	~STA 2861+00 Center WB Outside Lane	1/4" Microsurfacing 3- 3/8" Limestone Type D HMAC 2- 1/8" SAC A Type D HMAC 3- 5/8" Limestone Type D HMAC Prime Coat 9- 3/8" Total Length Core Recovered Intact
2	~STA 2867+00 Center WB Outside Shoulder	2- 1/2" Limestone Type D HMAC 1" SAC A Type D HMAC 3/4" Limestone Type D HMAC 4- 1/4" Total Length Core Broken, Couldn't Retrieve Bottom of Sample
3	~STA 1867+50 Center EB Outside Shoulder	3- 1/8" Limestone Type D HMAC 1- 1/4" SAC A Type D HMAC 3/8" Limestone Type D HMAC 1- 1/2" SAC A Type D HMAC 1/4" Limestone Type D Seal Coat Prime Coat Flex Base 6- 3/8" Total Length, Core Recovered Intact
4	~STA 2875+00 Center WB Outside Shoulder	4- 3/8" Limestone Type D HMAC 4- 3/8" Total Length Core Broke, Couldn't Retrieve Bottom of Sample
5	~STA 1875+00 Center EB Outside Shoulder	2- 1/4" Limestone Type D HMAC 1/8" SAC Type D HMAC 1/4" Limestone Type F Seal Coat Flex Base 3- 5/8" Total Length Core Recovered Intact
6	~STA 2897+00 Center WB Outside Lane	4- 1/4" Limestone Type D HMAC 4- 1/4" Total Length Core Broke, Couldn't Retrieve Bottom of Sample
7	~STA 1897+00 Center EB Outside Lane	3- 1/8" Limestone Type D HMAC 5- 5/8" ConcreteFlex Base 8- 3/4" Total Length Core Separated at 3- 1/8" (between the HMAC and Concrete)

US 180 CSJ 0008-01-046

CORE #	LOCATION	DESCRIPTION
8	~STA 2921+00 Center WB Outside Lane	5" Limestone Type D HMAC Prime Coat Flex Base 5" Total Length Core separated at 2- 7/8"
9	~STA 1921+00 Center EB Outside Lane	2- 1/2" Limestone Type F HMAC Petromat 4- 1/4" Limestone Type F HMAC Flex Base 6- 3/4" Total Length Core Recovered Intact
10	~STA 2946+00 Center WB Outside Lane	2" Limestone Type D HMAC Petromat 4" Limestone Type D HMAC Flex Base 6" Total Length Core Recovered Intact
11	~STA 1946+00 Center EB Outside Lane	2- 1/2" Limestone Type D HMAC Petromat 1- 3/8" Limestone Type D HMAC 2" Limestone Type C HMAC Flex Base 5- 7/8" Total Length Core Recovered Intact
12	~STA 2973+00 Center WB Outside Lane	2" Limestone Type D HMAC Petromat 1/4" Limestone Type D HMAC 8- 3/4" Limestone Type B HMAC 11" Total Length Core Separated at 5- 1/8"
13	~STA 1973+00 Center EB Outside Lane	2- 5/8" Limestone Type F HMAC Petromat 1/2" Limestone Type F HMAC Petromat 9" Limestone Type B HMAC Flex Base 12- 1/8" Total Length Core Recovered Intact
14	~STA 2996+00 Center WB Outside Lane	2- 1/4" Limestone Type D HMAC Petromat 1- 1/8" Limestone Type D HMAC 1- 3/4" Limestone Type F HMAC 1- 3/4" Limestone Type C HMAC Prime Coat Flex Base 7- 1/8" Total Length Core Recovered Intact- Some cracking below the Petromat in the Type D and Type F HMAC
15	~STA 3011+00 Center WB Outside Shoulder	2- 3/8" Limestone Type D HMAC Petromat 2" Limestone Type D HMAC Prime Coat Flex Base 4- 3/8" Total Length Core Recovered Intact

IH 20 CSJ 0314-01-082

CORE #	LOCATION	DESCRIPTION
1	~STA 3578+50 North Frontage Road EB Lane	3/8" Seal Coat 5- 5/8" Limestone Type D HMAC 1- 7/8" Limestone Type B HMAC Prime Coat Flexbase 7- 7/8" Total Length Core Recovered Intact
2	~STA 2578+50 South Frontage Road WB Lane	3/8" Seal Coat 4- 1/4" Limestone Type D HMAC Prime Coat Flexbase 4- 5/8" Total Length Core Recovered Intact
3	~STA 3583+00 North Frontage Road WB Lane	3/8" Seal Coat 5- 1/2" Limestone Type D HMAC 1- 1/2" Limestone Type B HMAC Flexbase 7- 3/8" Total Length Core Recovered Intact
4	~STA 2583+00 South Frontage Road EB Lane	3/8" Seal Coat 5- 1/4" Limestone Type D HMAC Prime Coat Flexbase 5- 5/8" Total Length Core Recovered Intact
5	~STA 3587+00 North Frontage Road WB Shoulder	3/8" Seal Coat 1" Limestone Type D HMAC 1- 3/8" Total Length Core Broken into Three Pieces
6	~STA 2586+00 South Frontage Road EB Shoulder	3/8" Seal Coat 4- 1/4" Limestone Type D HMAC Prime Coat Flexbase 4- 5/8" Total Length Core Recovered Intact

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TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

CORING DATA

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	22
CONTROL	SECTION	JOB	
0008	01	046, ETC	

Project Number: C 8-1-46

County: PALO PINTO, ETC **Control:** 0008-01-046, ETC

Highway: US 180, ETC

Specification Data

Basis of Estimate

Item	Description	Rate	Unit
166	Fertilizer (16-8-8)	600 lb./acre**	ton
168	Vegetative Watering	169,400 gal./acre	1,000 gal.
310	Asph Mat'l (MC-30, EC-30) (Subgrade)(Priming)	0.20 gal./sq. yd.*	gal.
3077	SP Mixes (SP-C)	115 lb./sq. yd.-in.	ton
3085	Tack Coat - Trackless Tack	0.15-0.22 gal./sq. yd.	gal.

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

Special Notes

Electronic files containing answered pre-letting questions and other project related design information will be placed in the following FTP site periodically.

Check this site for new information. Notices of new postings will not be sent out by the Engineer.

The data located in these files is for non-construction purposes only and can be found at

TxDOT's public FTP site at https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting Responses/.

Access is read-only.

All files in the FTP site are subject to the License Agreement shown on the FTP site.

To obtain a copy of the project plans free of charge, submit a request from the following site: http://www.txdot.gov/business/letting-bids/plans-online.html

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

Project Number: C 8-1-46

County: PALO PINTO, ETC **Control:** 0008-01-046, ETC

Highway: US 180, ETC

Area Engineer's Email: Klinton.Kuntz@txdot.gov
Assistant Area Engineer's Email: Gary.Beck@txdot.gov

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Single lane closures, except as otherwise shown in the plans, will be restricted to off-peak hours as defined in the following table:

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

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

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

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

Modifications to Lane Closure / Work Restrictions:

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

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

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

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

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

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

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

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

All driveway openings will be determined by the Engineer and will conform with Texas Department of Transportation "Regulations for Access Driveways to State Highways" adopted September 1953, and revised June 2004.

Locations and lengths of all private entrances are approximate only. The actual locations, lengths, lines, and grades are to be established in the field.

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

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

Plugging of pipes or culverts will not be paid for directly, but will be subsidiary to the various bid items, unless otherwise shown on the plans.

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

Item 4. Scope of Work

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

Project Number: C 8-1-46

County: PALO PINTO, ETC **Control:** 0008-01-046, ETC

Highway: US 180, ETC

Item 5. Control of the Work

The locations of all signal related items, pavement markings, signing, etc. are diagrammatic only and may be adjusted to accommodate field conditions or as directed by the Engineer or Engineers designee.

When supplementary bridge plans, shop drawings, shop details, erection drawings, working drawings, forming plans, or other drawings are required, prepare and submit drawings on sheets 8-1/2 by 11 inches, 17 by 22 inches, or full size drawings reduced to half scale if completely legible. If, in the opinion of the Engineer, the drawings are not completely legible, prepare and submit on sheets 22 by 34 inches, with a 1-1/2 inch left margin, and 1/2 inch top, right, and bottom margins.

Submit all sheets with a title in the lower right hand corner. The title must include the sheet index data shown on the lower right corner of the project plans, name of the structure or element or stream, sheet numbering for the shop drawings, name of the fabricator and the name of the Contractor.

Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 7. Legal Relations and Responsibilities

Do not initiate activities in a project specific location (PSL) associated with a U.S. Army Corps of Engineers (USACE) permit area that has not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to haul roads, equipment staging areas, borrow and disposal sites. "Associated" as defined here means materials are delivered to or from the PSL. The permit area includes all waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. The contractor will be responsible for all consultations with the USACE regarding activities, including project specific locations (PSLs) that have not been previously evaluated by the USACE. Provide the Department with a copy of all consultations or approvals from the USACE prior to initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The contractor is solely responsible for documenting any determinations that their activities do not affect a USACE permit area. Maintain copies of these determinations for review by the Department or any regulatory agency.

Document and coordinate with the USACE, if required, prior to any excavation hauled from or embankment hauled into a USACE permit area by either (1) or (2) below.

(1) **Restricted Use of Materials for Previously Evaluated Permit Areas.** Document both the project specific location (PSL) and its authorization. Maintain copies for review by the Department or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
   a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in Item 110 is used for permanent or temporary fill (Item 132, Embankment) within a USACE permit area;
   b. Suitable embankment (Item 132) from within the USACE permit area is used as fill within a USACE evaluated area; and,
   c. Unsuitable excavation or excess excavation ["Waste"] (Item 110) that is disposed of at a location approved by the Engineer within a USACE evaluated area.

(2) **Contractor Materials from Areas Other than Previously Evaluated Areas.** Provide the Department with a copy of all USACE coordination or approvals prior to initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to haul roads, equipment staging areas, borrow and disposal sites:
   a. Item 132, Embankment, used for temporary or permanent fill within a USACE permit area; and,
   b. Unsuitable excavation or excess excavation ["Waste"] (Item 110, Excavation) that is disposed of outside a USACE evaluated area.

The total area disturbed for this project is 0.34 acres. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the right of way. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the right of way to the Engineer and to the local government that operates a separate storm sewer system.

When a bridge deck is milled, seal coated and overlaid, remove excess material. Do not just broom to the sides of the bridge, under guardrail, etc. Cover or protect all sealed expansion joints and rails on bridges and all railroad tracks encountered as approved. Clean and repair all of these features if they weren't properly protected at contractor's expense. This work is subsidiary work to applicable bid items.

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

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

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

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

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

The following Holiday/Event lane closure restriction requirements apply to this project:
No work that restricts or interferes with traffic shall be allowed between 3 PM on the day preceding a Holiday or Event and 9 AM on the day after the Holiday or Event.

Holiday Lane Closure Restrictions	
New Year's Eve and New Year's Day (December 31 through January 1)	3 PM December 30 through 9 AM January 2
Easter Holiday Weekend (Friday through Sunday)	3PM Thursday through 9 AM Monday
Memorial Day Weekend (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
Independence Day (July 3 through July 5)	3 PM July 1 through 9 AM July 6

Labor Day Weekend (Friday through Monday)	3 PM Thursday through 9 AM Tuesday
Thanksgiving Holiday (Wednesday through Sunday)	3 PM Tuesday through 9 AM Monday
Christmas Holiday (December 23 through December 26)	3 PM December 22 through 9 AM December 27

Plan work schedules around the appropriate dates above to ensure productive work is performed without lane closures.

Roadway closures during the following key dates and/or special events are prohibited:

Event Lane Closure Restrictions 3 PM the day before Event to 9 AM the day after the Event
Annual PRCA Rodeo (Second Saturday in May)
Crazy Water Festival (Second Saturday in October)
Within one mile radius of major retail traffic generators i.e. malls (Thanksgiving Day through January 2)

Item 8. Prosecution and Progress

Working days will be computed and charged in accordance with Section 8.3.1.1, 'Five-Day Workweek.'

Only nighttime work will be allowed for planning and overlay, unless written permission from the Engineer is provided.

The road-user cost liquidated damages is $42,256 per day.

Item 8.9. Worker and Equipment

If nighttime work is allowed/required, provide Multi-Directional Lighting Device with the following quality requirements:

Provide a 2,000 watt (minimum) SIROCCO lighting balloon, Airstar lighting or equivalent.

It is the intent of the MDLD lighting to supplement the Portable Road Light and Power Unit used to illuminate work hours.

Provide MDLD units which can self-inflate and are capable of illuminating approximately 15,000 sq. ft.

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Provide MDLD units of 1.1 meter horizontal diameter and capable of withstanding 60 mph winds when fully inflated and operating.

Provide MDLD units with two (2) 1,000 watt halogen bulbs recommended by the manufacturer.

Item 104. Removing Concrete

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

Item 110. Excavation

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

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

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

Items 110, 112, and 132. Excavation, Subgrade Widening, and Embankment

Sulfate-laden subgrade material that is to be treated with either lime or cement, including material up to one foot outside the proposed treatment limits, is susceptible to sulfate heave. It has been determined that an excessive concentration of sulfate in the soils (>3,000 PPM by dry weight of the soil) exists for given areas of excavation and/or proposed treated subgrade within the project limits.

Moderate sulfate levels are those defined from 3,001 PPM to 7,000 PPM. Treat these soils with lime at the full 150 lb./cu. yd. rate or cement at the full 125 lb./cu. yd. rate. Do not split the rates to ensure complete reaction and mitigation of sulfate heaves. Allow the mixture to mellow for 7 days to provide for complete reaction.

High sulfate levels are not allowed within the treatment and surrounding areas as defined above.

Test soils for soluble sulfates in accordance with Test Method Tex-145 and Tex-146-E.

Treat moderate sulfate or excavate high sulfate areas identified above and other subgrade areas that may be identified during construction as having moderate to high sulfate concentrations to a depth of one foot below and laterally to one foot outside the proposed treatment limits.

Treatment of the moderate level material will be paid for under Item 260, "Lime Treatment (Road Mixed)" or Item 275, "Cement Treatment (Road Mixed)." Removal of the high level material will be measured and paid for in accordance with Item 110, "Excavation" and replacement with suitable material will be measured and paid for in accordance with Item 132, "Embankment."

Any excavated sulfate-laden material will be acceptable for use in fill areas. Do not place within previously specified section boundaries of subgrade to be treated with either lime or cement.

Off-Site Borrow Sources. In addition to meeting pertinent specification requirements, test off-site borrow sources for sulfate content. Test soils for soluble sulfates in accordance with Test Method Tex-145 and Tex-146-E and provide documentation that supports compliance with previously stated requirements. The Engineer will perform additional testing for sulfates of this material upon delivery to the project. Only material that is placed within one foot vertically or laterally of subgrade treatment will require testing for sulfates. Remove and replace failing material (sulfate concentrations >7,000 PPM by dry weight).

Item 164. Seeding for Erosion Control

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

Item 166. Fertilizer

Fertilize all areas of project to be seeded or sodded.

Item 168. Vegetative Watering

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

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

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Average weekly rainfall rates for the District are:

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

Item 310. Prime Coat

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

Item 354. Planing and Texturing Pavement

Intent is to remove all HMAC from existing concrete in one pass. Repair damaged concrete paving caused by Contractor's operations at the expense of the Contractor as directed by the Engineer.

Stockpile any millings at the City of Mineral Wells stockpile located at 2700 S. US 281, Mineral Wells, TX. Contact Scott McKennon at 940-328-7777 or 940-682-1608 with at least 48 hours advance notice prior to stockpiling millings.

Take precaution to avoid damage to existing bridge decks and bridge joints including but not limited to armor joints, header joints, relieve joints, etc. Repair any damage to the bridge decks and/or joints as approved. This work will not be paid directly, but will be performed at the Contractor's expense.

Item 432. Riprap

Provide weep holes as directed.

The quantities for riprap at the location indicated may be varied to the extent necessary to ensure proper functioning for the purpose intended.

All concrete riprap will be 4" (.33') in thickness, unless otherwise shown on the plans, and must be reinforced.

An 8 inch (.67 ft.) by 18 inch (1.5 ft.) toe wall is required at the exposed edges of all concrete riprap, unless otherwise directed.

Provide a toe wall at all exposed edges of all protection stone riprap, unless otherwise directed.

Locations and lengths of riprap flumes shown on the plans are approximate. Actual lengths and locations are to be determined in the field.

When synthetic fiber reinforcement concrete option is chosen provide the following:

- At all construction joints (vertical or horizontal) provide #3 bars 24 in. long and placed on 18 in. centers along joint length. Bars should be centered in concrete cross section.
- At all toe wall locations #3 L-bars will be required on 18 in. centers with a length 2 times the depth of the toe wall. Place three #3 bars the length of the toe wall and equally spaced on the L-bars.

Welded Wire Reinforcement (WWR) may be used for construction joint and toe wall reinforcing with the approval of the Engineer.

Item 502. Barricades, Signs, and Traffic Handling

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

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

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

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

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

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

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

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Item 504. Field Office and Laboratory

Furnish the following structures for this project:

Type	No.
Field Office and Lab (Ty. B)	1
Field Lab (Ty. D)	1

Field office will require at least a 3' by 3' landing on the outside of each exit door and a concrete landing at the bottom of exit stairs. The concrete landing will be the width of the stairs and extend at least 4' in front of the bottom step.

Furnish the following for the Field Office structure:

Item	No.
Laptop Computer	1
Printer	1
Internet Service	1

Provide Laptop computers with an Intel i5 (2.8 GHz) processor, or greater.

Integrated printer/copier/scanner/fax units will be permitted.

Item 506. Temporary Erosion, Sedimentation, and Environmental Controls

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

Item 512. Portable Concrete Traffic Barrier

Use barrier from the stockpile that has been inspected and approved by the Engineer prior to using.

"*Furnish and Install*" barrier in compliance with Concrete Safety Barrier (CSB), Single-Slope Concrete Barrier (SSCB), or Low Profile Concrete Barrier (LPCB) standards as shown on the plans.

Furnish Class H Concrete with a minimum 28 day compressive strength of 3,600 psi.

Provide the hardware assemblies to join barrier sections, including barrier from stockpile.

For permanent installations, grout the joints with an approved non-shrink grout material when using slotted-end PCTB.

Provide (2) 1-1/4" x 2'2" threaded rods, (4) standard USS washers, grade 5, (4) 1-1/4" hex nuts, and (2) 5" x 10" x 3/8" plate washers for each section of LPCB.

Connection hardware will remain the property of the State upon completion of the project and will not be paid for directly but will be subsidiary to Item 512,"Portable Concrete Traffic Barrier". Deliver hardware to the location specified by the Engineer.

Delineate all barriers in accordance with Barricade and Construction (BC) Standard sheets. Barrier delineation will not be paid for directly, but will be subsidiary to Item 512,"Portable Concrete Traffic Barrier".

Remove and replace traffic barrier damaged by the traveling public and no longer serviceable as directed. Replace traffic barrier with Department-furnished barrier from designated stockpile as directed. Additional payment will be provided as compensation to remove and replace the traffic barrier damaged by the traveling public in accordance with Item 512. Return the damaged traffic barrier to the stockpile site as directed.

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

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

Item 540. Metal Beam Guard Fence

The locations and lengths of guard fence shown on the plans are approximate. Actual lengths and locations are to be determined in the field.

The tops of timber posts will be domed. Beveled tops will not be permitted for timber or steel posts.

When holes for timber posts are drilled below bottom of proposed grade, backfill the excessive depth with an acceptable sand. The furnishing and installation of the sand backfill will not be paid for directly but will be subsidiary to this Item.

When guardrail posts are placed in a finished surface, backfill the top 4 inches with an asphaltic material, domed to carry water away from the posts or as shown on the plans. The furnishing and installation of the asphaltic material backfill will not be paid for directly but will be subsidiary to this Item.

When connecting a Thrie-Beam to a concrete wingwall, bridge rail, CTB, etc., drill the holes for bolt placement using rotary or core type equipment. Use a core type drill when reinforcing steel is encountered. Do not use percussion or impact drilling. Repair damage to the concrete and spalls exceeding ½" from the edge of the hole.

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Item 542. Removing Metal Beam Guard Fence

Remove existing metal beam guard fence only when authorized.

Item 666. Reflectorized Pavement Markings with Retroreflective Requirements

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

Notify Engineer 48 hours prior to installation of pavement markings.

All testing is waived from Type I Pavement Markings for locations with less than 1000 LF per bid item.

Item 3077. Superpave Mixtures

RAP aggregate must meet the requirements of Table 1.

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

No blending, of the material retained on the No. 4 sieve, to meet SAC A will be allowed for surface mixes.

Natural (field) sands are not allowed.

Provide a PG 70-28 asphalt for the surface course, if applicable.

Provide a PG 64-22 asphalt for the levelup course, if applicable.

Furnish a trackless tack in accordance with Item 3085 for the tack coat on this project.

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

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

Grade substitution per Table 5 is not allowed.

Provide a mix design with the gradation curve below the restricted zone.

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

Include the approved mix design number on each delivery ticket.

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

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

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

Temporary detours are subject to in-place air void determination for this project.

Use Surface Test Type B Schedule 3 for this project.

Item 3085. Underseal Course

Material to be Tracking-Resistant Asphalt Interlay (TRAIL).

The Engineer will set the rate at time of application.

Item 6001. Portable Changeable Message Signs

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

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

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

1. Exit Closed Ahead
2. Use Other Routes
3. Right Lane
4. Left Lane
5. Closed Ahead
6. Two Lane
7. Detour Ahead

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8. Thru Traffic
9. Prepare To Stop
10. Merging Traffic
11. Expect 15 Minute Delay
12. Max Speed ** MPH
13. Merge Right
14. Merge Left
15. No Exit Next ** Miles

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

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for this project, provide 1 additional shadow vehicle(s) with TMA for TCP (3-2)-13 and TCP (3-3)-14 as detailed on General Note of this standard sheet.

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

Traffic Signal Items

Special Notes:

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

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

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

The contractor is responsible for notifying TxDOT project manager for picking up and dropping off materials furnished by the State. Contact the TxDOT Signal Shop 48 hours in advance of picking up to make arrangements.

Item 400. Excavation and Backfill for Structures

Drilling, boring, and trenching through rock is subsidiary to the various bid items. No additional compensation will be paid to the contractor for the removal of rock or any other obstruction

during excavation, trenching, jacking, boring, or drilling and for any additional equipment, materials, labor, tools, or incidentals required to complete the work.

Item 416. Drilled Shaft Foundations

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

Obtain Engineer's approval of location before installing foundation.

Item 421. Hydraulic Cement Concrete

Notify the TxDOT Signal Shop 48 hours in advance of placing concrete. Do not place concrete without an inspector present unless approved.

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

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

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

Item 618. Conduit

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

Item 620. Electrical Conductors

Clearly and permanently mark each illumination conductor installed in a signal pole as "ILLUMINATION" where it can be clearly seen from the hand hole. Use plastic zip ties with labeling plate to mark conductor.

Item 624. Ground Boxes

Slack conductors required by Standard Sheet ED(3) will be subsidiary to Item 624.

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Concrete removal required for installation of ground boxes will be subsidiary to Item 624. Ground all junction boxes mounted on bridges and underpasses with a ground rod in the nearest ground box.

Item 628. Electrical Services

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

Contractor shall obtain 911 address and EISD from electric utility company then contact the TXDOT Signal Shop to receive the Contract Request for Electrical Service Meter form to complete and return. TXDOT will make application to the Electric Utility Company for service, unless otherwise maintained by the following Cities: Arlington, Bedford, Colleyville, Euless, Fort Worth, Grand Prairie, Grapevine, Hurst, Mansfield, North Richland Hills, and Weatherford.

Item 656. Foundations for Traffic Control Devices

Contractor shall stake foundation as shown on plans. Engineer or Engineer's designee will verify and approve staked locations before installing foundations.

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

Item 680. Installation of Highway Traffic Signals

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

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

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

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

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

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

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

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

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

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

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

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

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Item 682. Vehicle and Pedestrian Signal Heads

Vehicle signal heads shall be yellow aluminum with 5 inch, black, aluminum, vented back plates unless otherwise shown on plans,

Signal heads shall be installed level and plumb and aimed as directed. Cover all signal faces until placed in operation.

All new mast arm mounted signal heads to be mounted horizontally unless otherwise shown on the plans.

Pedestrian signal heads shall be yellow aluminum with LED pedestrian hand/man module with LED countdown.

Item 684. Traffic Signal Cables

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

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

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

Item 686. Traffic Signal Pole Assemblies (Steel)

Provide all signal poles from the same manufacturer.

Dampers for LMA poles may be required as directed by the Engineer.

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

Item 688. Pedestrian Detectors and Vehicle Loop Detectors

For Accessible Pedestrian Signals. Provide a completed final system operational check list, completed schematic diagram for pushbutton station locations, and a completed default and field settings sheet as provided in the APS manufacturer's manual. Provide a qualified personnel for testing and set up of the equipment at the time of signal flash and turn on.

Project Number: C 8-1-46

County: PALO PINTO, ETC **Control:** 0008-01-046, ETC

Highway: US 180, ETC

Item 6046. Radar Presence Detection Devices (RPD) (Installation Only)

Mount detector as shown in plans or as directed by the engineer or engineer designee.

Adjust heights and locations of sensors to achieve the best possible detection.

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

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

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0008-01-046 **DISTRICT** Fort Worth **COUNTY** Palo Pinto, Parker
HIGHWAY IH 20, US 180

			CONTROL SECTION JOB	**0007-10-061**		**0008-01-046**		**0314-01-082**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00059631**		**A00059632**		**A00061428**			
			COUNTY	**Palo Pinto**		**Palo Pinto**		**Parker**			
			HIGHWAY	**US 180**		**US 180**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	1,041.000		1,683.000		240.000		2,964.000	
	110-6002	EXCAVATION (CHANNEL)	CY	20.000						20.000	
	134-6001	BACKFILL (TY A)	STA					25.000		25.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	579.000		935.000		133.000		1,647.000	
	168-6001	VEGETATIVE WATERING	MG	20.300		32.700		4.700		57.700	
	310-6001	PRIME COAT (MULTI OPTION)	GAL	352.000		802.000		91.000		1,245.000	
	351-6025	FLEX PAVEMENT STRUCTURE REPAIR (8"-15")	SY	1,761.000		4,009.000		453.000		6,223.000	
	354-6004	PLAN & TEXT ASPH CONC PAV(0" TO 4")	SY	45,770.000		102,997.000				148,767.000	
	416-6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF			99.000				99.000	
	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF			130.000				130.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	50.000						50.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF	338.000						338.000	
	451-6066	RETROFIT RAIL (TY PR11)	LF	66.100						66.100	
	479-6001	ADJUSTING MANHOLES	EA			25.000				25.000	
	500-6001	MOBILIZATION	LS			1.000				1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO			16.000				16.000	
	506-6001	ROCK FILTER DAMS (INSTALL) (TY 1)	LF	100.000				20.000		120.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	100.000				20.000		120.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,090.000				410.000		1,500.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,090.000				410.000		1,500.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	510.000		580.000		40.000		1,130.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	510.000		580.000		40.000		1,130.000	
	512-6089	PTB(FRN&INSTL)(SSCB OR CSB)(TY1)OR(STL)	LF	525.000						525.000	
	512-6090	PTB(MOVE)(SSCB OR CSB)(TY1)OR(STL)	LF	890.000						890.000	
	512-6091	PTB(REMOVE)(SSCB OR CSB)(TY1)OR(STL)	LF	525.000						525.000	
	529-6008	CONC CURB & GUTTER (TY II)	LF	1,041.000		1,683.000				2,724.000	
	531-6004	CURB RAMPS (TY 1)	EA			5.000				5.000	
	531-6005	CURB RAMPS (TY 2)	EA			1.000				1.000	
	531-6006	CURB RAMPS (TY 3)	EA			2.000				2.000	
	531-6009	CURB RAMPS (TY 6)	EA			1.000				1.000	
	531-6010	CURB RAMPS (TY 7)	EA			3.000				3.000	
	531-6013	CURB RAMPS (TY 10)	EA			1.000				1.000	
	531-6016	CURB RAMPS (TY 21)	EA			1.000				1.000	
	533-6003	RUMBLE STRIPS (SHOULDER) ASPHALT	LF					3,445.000		3,445.000	
	533-6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF					1,928.000		1,928.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	675.000						675.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	8.000						8.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0008-01-046 **DISTRICT** Fort Worth **COUNTY** Palo Pinto, Parker
HIGHWAY IH 20, US 180

			CONTROL SECTION JOB	**0007-10-061**		**0008-01-046**		**0314-01-082**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00059631**		**A00059632**		**A00061428**			
			COUNTY	**Palo Pinto**		**Palo Pinto**		**Parker**			
			HIGHWAY	**US 180**		**US 180**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4.000						4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	475.000						475.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	5.000						5.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	1.000						1.000	
	542-6005	RM MTL BM GD FEN TRANS (T101)	EA	8.000						8.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000						4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000						2.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	3.000						3.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	1.000						1.000	
	545-6007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	1.000						1.000	
	560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4	EA					2.000		2.000	
	618-6033	CONDT (PVC) (SCH 40) (4")	LF			930.000				930.000	
	618-6034	CONDT (PVC) (SCH 40) (4") (BORE)	LF			670.000				670.000	
	620-6009	ELEC CONDR (NO.6) BARE	LF			2,420.000				2,420.000	
	620-6010	ELEC CONDR (NO.6) INSULATED	LF			660.000				660.000	
	621-6005	TRAY CABLE (4 CONDR) (12 AWG)	LF			2,250.000				2,250.000	
	624-6010	GROUND BOX TY D (162922)W/APRON	EA			18.000				18.000	
	628-6145	ELC SRV TY D 120/240 060(NS)SS(E)SP(O)	EA			6.000				6.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	63.000		175.000		14.000		252.000	
	644-6002	IN SM RD SN SUP&AM TY10BWG(1)SA(P-BM)	EA			2.000				2.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	24.000		62.000		4.000		90.000	
	644-6005	IN SM RD SN SUP&AM TY10BWG(1)SA(T-2EXT)	EA					1.000		1.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA			1.000		2.000		3.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	23.000		48.000				71.000	
	644-6031	IN SM RD SN SUP&AM TYS80(1)SA(T-2EXT)	EA			1.000				1.000	
	644-6037	IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	EA			2.000				2.000	
	644-6064	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA					2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	110.000		291.000		21.000		422.000	
	658-6015	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	EA	9.000						9.000	
	658-6028	INSTL DEL ASSM (D-SY)SZ (BRF)GF1	EA	10.000						10.000	
	658-6053	INSTL OM ASSM (OM-3L)(TWT)GND	EA	2.000						2.000	
	658-6057	INSTL OM ASSM (OM-3R)(TWT)GND	EA	2.000						2.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	26.000						26.000	
	658-6096	INSTL DEL ASSM (D-DY)SZ 1(YFLX)SRF	EA			111.000				111.000	
	662-6060	WK ZN PAV MRK REMOV (W)4"(BRK)	LF	3,446.000		7,865.000				11,311.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	5,029.000		7,485.000		4,678.000		17,192.000	
	662-6069	WK ZN PAV MRK REMOV (W)8"(DOT)	LF	40.000		98.000				138.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0008-01-046 **DISTRICT** Fort Worth **COUNTY** Palo Pinto, Parker
HIGHWAY IH 20, US 180

			CONTROL SECTION JOB	**0007-10-061**		**0008-01-046**		**0314-01-082**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00059631**		**A00059632**		**A00061428**			
			COUNTY	**Palo Pinto**		**Palo Pinto**		**Parker**			
			HIGHWAY	**US 180**		**US 180**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF	297.000		3,465.000				3,762.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF			3,150.000		48.000		3,198.000	
	662-6092	WK ZN PAV MRK REMOV (W)36"(YLD TRI)	EA					4.000		4.000	
	662-6093	WK ZN PAV MRK REMOV (Y)4"(BRK)	LF			439.000				439.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	5,157.000		7,963.000		4,657.000		17,777.000	
	662-6102	WK ZN PAV MRK REMOV (Y)24"(SLD)	LF			58.000				58.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	1,125.000		2,666.000				3,791.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA			356.000		208.000		564.000	
	666-6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	40.000		98.000				138.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	297.000		3,465.000				3,762.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF			3,150.000		48.000		3,198.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	2.000		19.000				21.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA			4.000				4.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	3.000		13.000				16.000	
	666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA					4.000		4.000	
	666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF			58.000				58.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	3,446.000		7,865.000				11,311.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	5,029.000		7,485.000		4,678.000		17,192.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF			439.000				439.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	5,157.000		7,963.000		4,657.000		17,777.000	
	672-6007	REFL PAV MRKR TY I-C	EA	19.000		80.000				99.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA			93.000		51.000		144.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	173.000		394.000				567.000	
	680-6002	INSTALL HWY TRF SIG (ISOLATED)	EA			1.000				1.000	
	680-6003	INSTALL HWY TRF SIG (SYSTEM)	EA			5.000				5.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA			6.000				6.000	
	682-6001	VEH SIG SEC (12")LED(GRN)	EA			40.000				40.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)	EA			5.000				5.000	
	682-6003	VEH SIG SEC (12")LED(YEL)	EA			40.000				40.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)	EA			10.000				10.000	
	682-6005	VEH SIG SEC (12")LED(RED)	EA			40.000				40.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)	EA			5.000				5.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)	EA			37.000				37.000	
	682-6054	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	EA			40.000				40.000	
	682-6055	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	EA			5.000				5.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF			1,855.000				1,855.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF			4,940.000				4,940.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0008-01-046 **DISTRICT** Fort Worth **COUNTY** Palo Pinto, Parker
HIGHWAY IH 20, US 180

			CONTROL SECTION JOB	**0007-10-061**		**0008-01-046**		**0314-01-082**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00059631**		**A00059632**		**A00061428**			
			COUNTY	**Palo Pinto**		**Palo Pinto**		**Parker**			
			HIGHWAY	**US 180**		**US 180**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	684-6042	TRF SIG CBL (TY A)(14 AWG)(16 CONDR)	LF			2,290.000				2,290.000	
	684-6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF			5,285.000				5,285.000	
	686-6025	INS TRF SIG PL AM (S)1 ARM(24')	EA			1.000				1.000	
	686-6027	INS TRF SIG PL AM(S)1 ARM(24')LUM	EA			2.000				2.000	
	686-6031	INS TRF SIG PL AM(S)1 ARM(28')LUM	EA			4.000				4.000	
	686-6035	INS TRF SIG PL AM(S)1 ARM(32')LUM	EA			2.000				2.000	
	686-6037	INS TRF SIG PL AM(S)1 ARM(36')	EA			2.000				2.000	
	686-6043	INS TRF SIG PL AM(S)1 ARM(40')LUM	EA			2.000				2.000	
	686-6045	INS TRF SIG PL AM(S)1 ARM(44')	EA			2.000				2.000	
	686-6047	INS TRF SIG PL AM(S)1 ARM(44')LUM	EA			2.000				2.000	
	686-6049	INS TRF SIG PL AM(S)1 ARM(48')	EA			1.000				1.000	
	686-6051	INS TRF SIG PL AM(S)1 ARM(48')LUM	EA			1.000				1.000	
	687-6001	PED POLE ASSEMBLY	EA			18.000				18.000	
	688-6001	PED DETECT PUSH BUTTON (APS)	EA			44.000				44.000	
	688-6003	PED DETECTOR CONTROLLER UNIT	EA			6.000				6.000	
	3077-6027	SP MIXESSP-CSAC-A PG70-28	TON	5,064.000		11,525.000		1,301.000		17,890.000	
	3077-6044	SP MIXESSP-DPG64-22 (LEVEL-UP)	TON			375.000				375.000	
	3085-6001	UNDERSEAL COURSE	GAL	8,807.000		20,044.000		2,262.000		31,113.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	126.000		340.000		52.000		518.000	
	6010-6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA			6.000				6.000	
	6010-6004	CCTV MOUNT (POLE)	EA			6.000				6.000	
	6046-6001	INSTALL OF (RPD) VEHICLE DETECTORS	EA			19.000				19.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA			6.000				6.000	
	6185-6002	TMA (STATIONARY)	DAY	15.000		30.000				45.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	16.000		32.000		4.000		52.000	
	06	MATERIAL FURNISHED BY STATE (PARTICIPATING)	LS			1.000				1.000	
	08	CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS			1.000				1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS			1.000				1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS			1.000				1.000	
		CONTRACTOR FORCE ACCOUNT WORK (NON-PARTICIPATING)	LS			1.000				1.000	

SUMMARY OF ROADWAY ITEMS

LOCATION	104 6022 *	110 6002 *	134 6001 *	164 6003 *	166 6002 **	168 6001 *	310 6001 *	351 6025 *	354 6004 ***	432 6045	479 6001	506 6001 *	506 6011 *	506 6038 *	506 6039 *
	REMOVING CONC (CURB AND GUTTER)	EXCAVATION (CHANNEL)	BACKFILL (TY A)	BROADCAST SEED (PERM) (RURAL) (CLAY)	FERTILIZER	VEGETATIVE WATERING	PRIME COAT (MULTI OPTION)	FLEX PAVEMENT STRUCTURE REPAIR (8"-15")	PLAN & TEXT ASPH CONC PAV(0" TO 4")	RIPRAP (MOW STRIP)(4 IN)	ADJUSTING MANHOLES	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
	LF	CY	STA	SY	TON	MG	GAL	SY	SY	CY	EA	LF	LF	LF	LF
					600 LB/AC	169.4 MG/AC	0.20 GAL/SY								
CSJ 0007-10-061															
EB US 180	419			233	0.01	8.2	172	862	22463	31		50	50	645	645
WB US 180	622	20		346	0.02	12.1	180	899	23307	19		50	50	445	445
CSJ Total:	**1041**	**20**		**579**	**0.04**	**20.3**	352	**1761**	**45770**	**50**		**100**	**100**	**1090**	**1090**
CSJ 0008-01-046															
EB US 180	776			431	0.03	15.1	287	1437	37335		15				
WB US 180	907			504	0.03	17.6	339	1694	43711		10				
US 180							176	878	21951						
CSJ Total:	**1683**			**935**	**0.06**	**32.7**	802	**4009**	**102997**		**25**				
0314-01-082															
IH 20 EB FRONTAGE RD			11				38	188				20	20		
IH 20 WB FRONTAGE RD			11				37	185						60	60
FM 113	240		3	133	0.01	4.7	16	80						350	350
CSJ Total:	**240**		**25**	**133**	**0.01**	**4.7**	91	**453**				**20**	**20**	**410**	**410**
PROJECT TOTALS	**2964**	**20**	**25**	**1647**	**0.10**	**57.7**	**1245**	**6223**	**148767**	**50**	**25**	**120**	**120**	**1500**	**1500**

* APPROXIMATE QUANTITY IF NECESSARY, LOCATION, LIMITS AND QUANTITY TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
** FOR CONTRACTORS INFORMATION ONLY
*** STOCKPILE ANY MILLINGS AT THE CITY OF MINERAL WELLS STOCKPILE LOCATED AT 2700 S. US 281, MINERAL WELLS, TX.
CONTACT SCOTT MCKNENNON AT 940-328-7777 OR 940-682-1608 WITH AT LEAST 48 HOURS PRIOR TO STOCKPILING MILLINGS.

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

SUMMARY OF QUANTITIES

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	25
CONTROL	SECTION	JOB	
0008	01	046, ETC	

SUMMARY OF ROADWAY ITEMS

LOCATION	506 6040 *	506 6043 *	512 6089	512 6090	512 6091	529 6008 *	531 6004 *	531 6005 *	531 6006 *	531 6009 *	531 6010 *	531 6013 *	531 6016 *	540 6001	540 6006
	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)	PTB(FRN&INSTL)(SSCB OR CSB)(TY1)OR(STL)	PTB(MOVE)(SSCB OR CSB)(TY1)OR(STL)	PTB(REMOVE)(SSCB OR CSB)(TY1)OR(STL)	CONC CURB & GUTTER (TY II)	CURB RAMPS (TY 1)	CURB RAMPS (TY 2)	CURB RAMPS (TY 3)	CURB RAMPS (TY 6)	CURB RAMPS (TY 7)	CURB RAMPS (TY 10)	CURB RAMPS (TY 21)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)
	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	EA
CSJ 0007-10-061															
EB US 180	280	280	525	355	525	419								475	4
WB US 180	230	230		535		622								200	4
CSJ Total:	**510**	**510**	**525**	**890**	**525**	**1041**								**675**	**8**
CSJ 0008-01-046							5	1	2	1	3	1	1		
EB US 180	170	170				776									
WB US 180	400	400				907									
US 180	10	10													
CSJ Total:	**580**	**580**				**1683**	**5**	**1**	**2**	**1**	**3**	**1**	**1**		
0314-01-082															
IH 20 EB FRONTAGE RD	40	40													
IH 20 WB FRONTAGE RD															
FM 113															
CSJ Total:	**40**	**40**													
PROJECT TOTALS	**1130**	**1130**	**525**	**890**	**525**	**2724**	**5**	**1**	**2**	**1**	**3**	**1**	**1**	**675**	**8**

* APPROXIMATE QUANTITY IF NECESSARY, LOCATION, LIMITS AND QUANTITY TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
** FOR CONTRACTORS INFORMATION ONLY
*** STOCKPILE ANY MILLINGS AT THE CITY OF MINERAL WELLS STOCKPILE LOCATED AT 2700 S. US 281, MINERAL WELLS, TX.
CONTACT SCOTT MCKNENNON AT 940-328-7777 OR 940-682-1608 WITH AT LEAST 48 HOURS PRIOR TO STOCKPILING MILLINGS.

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

SUMMARY OF QUANTITIES

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	26
CONTROL	SECTION	JOB	
0008	01	046, ETC	

SUMMARY OF ROADWAY ITEMS

LOCATION	540 6016	542 6001	542 6002	542 6003	542 6005	544 6001	544 6003	545 6007	545 6003	545 6005	560 6011	658 6062	3077 6027	3077 * 6044	3085 6001
	DOWNSTREAM ANCHOR TERMINAL SECTION	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE DOWNSTREAM ANCHOR TERMINAL	RM MTL BM GD FEN TRANS (T101)	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	CRASH CUSH ATTEN (INSTL)(L)(N) (TL3)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	MAILBOX INSTALL-S (TWW-POST) TY 4	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	SP MIXES SP-C SAC-A PG70-28	SP MIXES SP-D PG64-22 (LEVEL-UP)	UNDERSEAL COURSE
	EA	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	TON	TON	GAL
													115 LB/SY-IN	115 LB/SY-IN	0.20 GAL/SY
CSJ 0007-10-061															
EB US 180	2	300	4		4	2		1	1			12	2479		4311
WB US 180	2	175	1	1	4	2	2		2	1		14	2585		4496
CSJ Total:	**4**	**475**	**5**	**1**	**8**	**4**	**2**	**1**	**3**	**1**		**26**	**5064**		**8807**
CSJ 0008-01-046														375	
EB US 180													4130		7183
WB US 180													4871		8471
US 180													2524		4390
CSJ Total:													**11525**	**375**	**20044**
0314-01-082															
IH 20 EB FRONTAGE RD											2		540		939
IH 20 WB FRONTAGE RD													532		925
FM 113													229		398
CSJ Total:											**2**		**1301**		**2262**
PROJECT TOTALS	**4**	**475**	**5**	**1**	**8**	**4**	**2**	**1**	**3**	**1**	**2**	**26**	**17890**	**375**	**31113**

* APPROXIMATE QUANTITY IF NECESSARY, LOCATION, LIMITS AND QUANTITY TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
** FOR CONTRACTORS INFORMATION ONLY

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

SUMMARY OF QUANTITIES

SHEET 3 OF 4

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	27
CONTROL	SECTION	JOB	
0008	01	046,ETC	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	502 6001	662 6060 *	662 6063 *	662 6069 *	662 6071 *	662 6075 *	662 6092 *	662 6093 *	662 6095 *	662 6102 *	662 6109 *	662 6111 *	6001 6001	6185 6002	6185 6005
	BARRICADES, SIGNS AND TRAFFIC HANDLING	WK ZN PAV MRK REMOV (W)4" (BRK)	WK ZN PAV MRK REMOV (W)4" (SLD)	WK ZN PAV MRK REMOV (W)8" (DOT)	WK ZN PAV MRK REMOV (W)8" (SLD)	WK ZN PAV MRK REMOV (W)24" (SLD)	WK ZN PAV MRK REMOV (W)36" (YLD TRI)	WK ZN PAV MRK REMOV (Y)4" (BRK)	WK ZN PAV MRK REMOV (Y)4" (SLD)	WK ZN PAV MRK REMOV (Y)24" (SLD)	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	MO	LF	LF	LF	LF	LF	EA	LF	LF	LF	EA	EA	DAY	DAY	DAY
0007-10-061	7												126	15	16
EB US 180		1717	2724	40	79				2640		569				
WB US 180		1729	2305		218				2517		556				
CSJ Total:	**7**	**3446**	**5029**	**40**	**297**				**5157**		**1125**		**126**	**15**	**16**
0008-01-046	8												340	30	32
EB US 180		4045	1272	63	1884	1701		220	2803		1084				
WB US 180		3820	6213	35	1581	1449		219	5160	58	1064				
US 180											518	356			
CSJ Total:	**8**	**7865**	**7485**	**98**	**3465**	**3150**		**439**	**7963**	**58**	**2666**	**356**	**340**	**30**	**32**
0314-01-082															
IH 20 EB FRONTAGE RD	1		2077			24			2058			95	52		2
IH 20 WB FRONTAGE RD			2077			24	4		2075			87			2
FM 113			524						524			26			
CSJ Total:	**1**		**4678**			**48**	**4**		**4657**			**208**	**52**		**4**
PROJECT TOTALS	**16**	**11311**	**17192**	**138**	**3762**	**3198**	**4**	**439**	**17777**	**58**	**3791**	**564**	**518**	**45**	**52**

SUMMARY OF BRIDGE ITEMS

LOCATION	451 6024	451 6066
	RETROFIT RAIL (TY SSTR)	RETROFIT RAIL (TY PR11)
	LF	LF
0007-10-061		
US 180 WB OVER POLLARD CK	132.0	66.1
US 180 EB OVER POLLARD CK	206.0	
PROJECT TOTALS	**338.0**	**66.1**

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AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

SUMMARY OF QUANTITIES

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	28
CONTROL	SECTION	JOB	
0008	01	046, ETC	

SUMMARY OF TRAFFIC SIGNAL ITEMS

LOCATION	416 6031 DRILL SHAFT (TRF SIG POLE)(30 IN)	416 6032 DRILL SHAFT (TRF SIG POLE)(36 IN)	618 6033 CONDT (PVC) (SCH 40)(4")	618 6034 CONDT (PVC) (SCH 40)(4") (BORE)	620 6009 ELEC CONDR (NO.6) BARE	620 6010 ELEC CONDR (NO.6) INSULATED	621 6005 TRAY CABLE (4 CONDR) (12 AWG)	624 6010 GROUND BOX TY D (162922) W/APRON	628 6145 ELC SRV TY D 120/240 060(NS)SS (E)SP(O)	680 6002 INSTALL HWY TRF SIG (ISOLATED)	680 6003 INSTALL HWY TRF SIG (SYSTEM)	680 6004 REMOVING TRAFFIC SIGNALS	682 6001 VEH SIG SEC (12")LED (GRN)	682 6002 VEH SIG SEC (12")LED (GRN ARW)	682 6003 VEH SIG SEC (12")LED (YEL)	682 6004 VEH SIG SEC (12")LED (YEL ARW)	682 6005 VEH SIG SEC (12")LED (RED)	682 6006 VEH SIG SEC (12")LED (RED ARW)	682 6018 PED SIG SEC (LED) (COUNTDOWN)
CSJ: 0008-01-046	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
WB US 180																			
WB US 180 AT S OAK AVE (US 281)	22	13	100		345	30	265		1		1	1	6	1	6	2	6	1	5
WB US 180 AT SE 6TH AVE	11	26	60		345	150	200		1		1	1	7		7		7		8
EB US 180																			
EB US 180 AT S OAK AVE (US 281)	22	13	140		430	230	430	1	1		1	1	6	1	6	2	6	1	4
EB US 180 AT SE 1ST AVE	11	26	170	230	400	80	210	5	1		1	1	6		6		6		8
EB US 180 AT SE 6TH AVE	22	13	230	155	385	150	360	5	1		1	1	7		7		7		8
US 180																			
US 180 AT SE 25TH AVE	11	39	230	285	515	20	785	7	1	1		1	8	3	8	6	8	3	4
PROJECT TOTALS	99	130	930	670	2420	660	2250	18	6	1	5	6	40	5	40	10	40	5	37

SUMMARY OF TRAFFIC SIGNAL ITEMS

LOCATION	682 6054 BACKPLATE W/REF BRDR(3 SEC)(VENT) ALUM	682 6055 BACKPLATE W/REF BRDR(4 SEC)(VENT) ALUM	684 6031 TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	684 6033 TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	684 6042 TRF SIG CBL (TY A)(14 AWG)(16 CONDR)	684 6079 TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	686 6025 INS TRF SIG PL AM (S)1 ARM(24')	686 6027 INS TRF SIG PL AM(S)1 ARM(24')LUM	686 6031 INS TRF SIG PL AM(S)1 ARM(28')LUM	686 6035 INS TRF SIG PL AM(S)1 ARM(32')LUM	686 6037 INS TRF SIG PL AM(S)1 ARM(36')	686 6043 INS TRF SIG PL AM(S)1 ARM(40')LUM	686 6045 INS TRF SIG PL AM(S)1 ARM(44')	686 6047 INS TRF SIG PL AM(S)1 ARM(44')LUM	686 6049 INS TRF SIG PL AM(S)1 ARM(48')	686 6051 INS TRF SIG PL AM(S)1 ARM(48')LUM	687 6001 PED POLE ASSEMBLY	688 6001 PED DETECT PUSH BUTTON (APS)
CSJ: 0008-01-046	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
WB US 180																		
WB US 180 AT S OAK AVE (US 281)	6	1	245	805	320	830		1	1				1				4	8
WB US 180 AT SE 6TH AVE	7		355	680	440	810			1		1				1			8
EB US 180																		
EB US 180 AT S OAK AVE (US 281)	6	1	250	800	245	815			2					1			3	8
EB US 180 AT SE 1ST AVE	6		305	650	415	1000				1	1		1				6	8
EB US 180 AT SE 6TH AVE	7		315	970	245	1010	1	1				1					5	8
US 180																		
US 180 AT SE 25TH AVE	8	3	385	1035	625	820				1		1		1		1		4
PROJECT TOTALS	40	5	1855	4940	2290	5285	1	2	4	2	2	2	2	2	1	1	18	44

SUMMARY OF TRAFFIC SIGNAL ITEMS

LOCATION	688 6003 PED DETECTOR CONTROLLER UNIT	6010 6002 CCTV FIELD EQUIPMENT (DIGITAL)	6010 6004 CCTV MOUNT (POLE)	6046 6001 INSTALL OF (RPD) VEHICLE DETECTORS	6058 6001 BBU SYSTEM (EXTERNAL BATT CABINET)
CSJ: 0008-01-046	EA	EA	EA	EA	EA
WB US 180					
WB US 180 AT S OAK AVE (US 281)	1	1	1	3	1
WB US 180 AT SE 6TH AVE	1	1	1	3	1
EB US 180					
EB US 180 AT S OAK AVE (US 281)	1	1	1	3	1
EB US 180 AT SE 1ST AVE	1	1	1	3	1
EB US 180 AT SE 6TH AVE	1	1	1	3	1
US 180					
US 180 AT SE 25TH AVE	1	1	1	4	1
PROJECT TOTALS	6	6	6	19	6

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F - 612
11701 Stonehollow Dr, Ste 100 • Austin, TX • 78758
Phone 512-821-2081 • Fax 512-821-2085

Texas Department of Transportation

TRAFFIC SIGNAL QUANTITIES

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	29
CONTROL	SECTION	JOB	
0008	01	046, ETC	

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	533 6003 RUMBLE STRIPS (SHOULDER) ASPHALT	533 6004 RUMBLE STRIPS (CENTERLINE) ASPHALT	658 6015 INSTL DEL ASSM (D-SW)SZ (BRF)GF1	658 6028 INSTL DEL ASSM (D-SY)SZ (BRF)GF1	658 6096 INSTL DEL ASSM (D-DY)SZ 1(YFLX)SRF	658 6053 INSTL OM ASSM (OM-3L)(TWT) GND	658 6057 INSTL OM ASSM (OM-3R)(TWT) GND	666 6030 REFL PAV MRK TY I (W)8"(DOT)(100MIL)	666 6036 REFL PAV MRK TY I (W)8"(SLD)(100MIL)	666 6048 REFL PAV MRK TY I (W)24"(SLD)(100MIL)	666 6054 REFL PAV MRK TY I (W)(ARROW)(100MIL)
	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	EA
CSJ: 0007-10-061											
EB US 180			3	3		1	1	40	79		
WB US 180			6	7		1	1		218		2
CSJ Totals			**9**	**10**		**2**	**2**	**40**	**297**		**2**
CSJ: 0008-01-046											
EB US 180								63	1884	1701	12
WB US 180					111			35	1581	1449	7
CSJ Totals					**111**			**98**	**3465**	**3150**	**19**
CSJ: 0314-01-082											
IH 20 EB FRONTAGE RD	1590	795								24	
IH 20 WB FRONTAGE RD	1855	871								24	
FM 113		262									
CSJ Totals	**3445**	**1928**								**48**	
PROJECT TOTALS	**3445**	**1928**	**9**	**10**	**111**	**2**	**2**	**138**	**3762**	**3198**	**21**

SUMMARY OF PAVEMENT MARKING ITEMS (CONT'D)

LOCATION	666 6057 REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	666 6078 REFL PAV MRK TY I (W)(WORD)(100MIL)	666 6102 REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	666 6147 REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	666 6300 RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	666 6303 RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	666 6312 RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	666 6315 RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	672 6007 REFL PAV MRKR TY I-C	672 6009 REFL PAV MRKR TY II-A-A	672 6010 REFL PAV MRKR TY II-C-R
	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA
CSJ: 0007-10-061											
EB US 180		1			1717	2724		2640	8		86
WB US 180		2			1729	2305		2517	11		87
CSJ Totals		**3**			**3446**	**5029**		**5157**	**19**		**173**
CSJ: 0008-01-046											
EB US 180	2	9			4045	1272	220	2803	45	49	203
WB US 180	2	4		58	3820	6213	219	5160	35	44	191
CSJ Totals	**4**	**13**		**58**	**7865**	**7485**	**439**	**7963**	**80**	**93**	**394**
CSJ: 0314-01-082											
IH 20 EB FRONTAGE RD						2077		2058		21	
IH 20 WB FRONTAGE RD			4			2077		2075		23	
FM 113						524		524		7	
CSJ Totals			**4**			**4678**		**4657**		**51**	
PROJECT TOTALS	**4**	**16**	**4**	**58**	**11311**	**17192**	**439**	**17777**	**99**	**144**	**567**

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001 IN SM RD SN SUP&AM TY10BWG(1)SA(P)	644 6002 IN SM RD SN SUP&AM TY10BWG(1)SA(P-BM)	644 6004 IN SM RD SN SUP&AM TY10BWG(1)SA(T)	644 6005 IN SM RD SN SUP&AM TY10BWG(1)SA(T-2EXT)	644 6007 IN SM RD SN SUP&AM TY10BWG(1)SA(U)	644 6027 IN SM RD SN SUP&AM TYS80(1)SA(P)	644 6031 IN SM RD SN SUP&AM TYS80(1)SA(T-2EXT)	644 6037 IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	644 6064 IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	644 6076 REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
CSJ: 0007-10-061										
EB US 180	31		13			9				53
WB US 180	32		11			14				57
CSJ Totals	**63**		**24**			**23**				**110**
CSJ: 0008-01-046										
EB US 180	90	1	37		1	20	1	1		151
WB US 180	85	1	25			28		1		140
CSJ Totals	**175**	**2**	**62**		**1**	**48**	**1**	**2**		**291**
CSJ: 0314-01-082										
IH 20 EB FRONTAGE RD	4		1							5
IH 20 WB FRONTAGE RD	5		2							7
FM 113	5		1	1	2				2	9
CSJ Totals	**14**		**4**	**1**	**2**				**2**	**21**
PROJECT TOTALS	**252**	**2**	**90**	**1**	**3**	**71**	**1**	**2**	**2**	**422**

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGNING AND PAVEMENT MARKING QUANTITY

SHEET 1 OF 1

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	30
CONTROL	SECTION	JOB	
0008	01	046, ETC	

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE (FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80)	POSTS (1 or 2)	ANCHOR TYPE (UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic)	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain" T = "T" U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
CSJ 0007-10-061 BEGINS	1	R2-1	SPEED LIMIT 40 MPH	30" X 36"	X		10BWG	1	SA	P			
	2	R4-7	KEEP RIGHT	24" X 30"	X		10BWG	1	SA	P			
	3	R4-7b	KEEP RIGHT	24" X 30"	X		10BWG	1	SA	P			
	4	W6-2	DIVIDED HIGHWAY ENDS	36" X 36"	X		10BWG	1	SA	P			
	5	R1-1	STOP	36" X 36"	X								
1	6	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	7	D3-1G	AMER. LEGION DR	66" X 12"	X								
	8	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	P			
	9	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	10	I-3	POLLARD CREEK	36" X 18"	X		10BWG	1	SA	P			
	11	D9-2	HOSPITAL	24" X 24"	X		10BWG	1	SA	T			
	12	R2-1	SPEED LIMIT 15 MPH	30" X 36"	X		10BWG	1	SA	P			
	13	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	P			
	14	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	1	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	2	R1-1	STOP	36" X 36"	X								
	3	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	4	D3-1G	NW 11TH AVE	54" X 12"	X								
	5	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	6	R1-1	STOP	36" X 36"	X								
	7	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	8	D3-1G	SW 11TH AVE	54" X 12"	X								
	9	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
2	10	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36" X 36"	X		10BWG	1	SA	P			
	11	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	12	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	13	R1-1	STOP	36" X 36"	X								
	14	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	15	D3-1G	SW 11TH AVE	54" X 12"	X								
	16	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	17	W1-2R	HORIZONTAL ALIGNMENT RIGHT BEND	36" X 36"	X		10BWG	1	SA	P			
	18	W1-2R	HORIZONTAL ALIGNMENT RIGHT BEND	36" X 36"	X		10BWG	1	SA	P			
	19	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	20	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	1	R2-1	SPEED LIMIT 40 MPH	30" X 36"	X		10BWG	1	SA	P			
	2	R1-1	STOP	36" X 36"	X								
	3	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	4	D3-1G	PINTO RD	42" X 12"	X								
	5	R2-1	SPEED LIMIT 40 MPH	30" X 36"	X		10BWG	1	SA	P			
	6	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	7	R1-1	STOP	36" X 36"	X								
	8	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	9	D3-1G	SW 8TH AVE	48" X 12"	X								
	10	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	11	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	12	R1-1	STOP	36" X 36"	X								
	13	D3-1G	W HUBBARD ST	66" X 12"	X		S80	1	SA	P			
3	14	D3-1G	SW 7TH AVE	48" X 12"	X								
	15	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	16	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	17	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	18	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	19	R1-1	STOP	36" X 36"	X								
	20	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	21	D3-1G	SW 8TH AVE	48" X 12"	X								
	22	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	23	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	24	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		31

DATE: 10/27/2021 11:02:47 AM
FILE: c:\pw-df\pw-df-prod\pk user 2\dms18866\SOSS-01.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
CSJ 0007-10-061 (CONT)	25	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	26	D3-1G	SW 1ST ST	42" X 12"	X								
	27	D3-1G	SW 7TH AVE	48" X 12"	X								
	28	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
3 (CONT)	29	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	30	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	31	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	32	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	1	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	2	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	3	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	4	R1-1	STOP	36" X 36"	X								
	5	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	6	D3-1G	NW 6TH AVE	48" X 12"	X								
	7	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	8	R1-1	STOP	36" X 36"	X								
	9	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	10	D3-1G	SW 6TH AVE	48" X 12"	X								
	11	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	12	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	13	R6-1R	ONE WAY (RIGHT)	54" X 18"	X								
	14	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	15	D3-1G	SW 5TH AVE	48" X 12"	X								
	16	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	17	R1-1	STOP	36" X 36"	X								
	18	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	19	D3-1G	NW 5TH AVE	48" X 12"	X								
	20	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	21	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	22	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	23	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	24	R1-1	STOP	36" X 36"	X								
	25	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
4	26	D3-1G	NW 4TH AVE	48" X 12"	X								
	27	R1-1	STOP	36" X 36"	X								
	28	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	29	D3-1G	SW 4TH AVE	48" X 12"	X								
	30	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	31	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	32	EXIST	CHURCH				EXISTING SIGN TO REMAIN						
	33	EXIST	CHURCH				EXISTING SIGN TO REMAIN						
	34	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	35	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	36	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	37	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	38	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	39	R1-1	STOP	36" X 36"	X								
	40	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	41	D3-1G	SW 6TH AVE	48" X 12"	X								
	42	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	43	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	44	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	45	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	46	R1-1	STOP	36" X 36"	X								
	47	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	48	D3-1G	SW 5TH AVE	48" X 12"	X								
	49	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	50	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	51	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	52	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 2 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		32

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DATE: 10/27/2021 11:02:50 AM
FILE: c:\pw-df\pw-df-prod\pk_user_2\dms18866\SOSS-02.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE (FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80)	POSTS (1 or 2)	ANCHOR TYPE (UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic)	MOUNTING DESIGNATION PREFABRICATED (P = "Plain" T = "T" U = "U")	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
CSJ 0007-10-061 (CONT)	53	R1-1	STOP	36" X 36"	X								
	54	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	55	D3-1G	SW 4TH AVE	48" X 12"	X								
4 (CONT)	56	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	57	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	58	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	59	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
5	1	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	2	R1-1	STOP	36" X 36"	X								
	3	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	4	D3-1G	NW 3RD AVE	48" X 12"	X								
	5	R1-1	STOP	36" X 36"	X								
	6	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	7	D3-1G	SW 3RD AVE	48" X 12"	X								
	8	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	9	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	10	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	11	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	12	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	13	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
CSJ 0007-10-061 ENDS	14	R6-2L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
	15	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
CSJ 0008-01-046 BEGINS	16	R6-2L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
	17	R1-1	STOP	36" X 36"	X								
	18	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	19	D3-1G	SW 2ND AVE	54" X 12"	X								
	20	R6-2R	ONE WAY (RIGHT)	30" X 36"	X		10BWG	1	SA	P			
	21	R1-1	STOP	36" X 36"	X								
	22	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	23	D3-1G	NW 2ND AVE	54" X 12"	X								
	24	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	25	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
5 (CONT)	26	R6-2R	ONE WAY (RIGHT)	36" X 36"	X								
	27	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	28	D3-1G	NW 1ST AVE	48" X 12"	X								
	29	R1-1	STOP	36" X 36"	X								
	30	D3-1G	W HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	31	D3-1G	SW 1ST AVE	48" X 12"	X								
	32	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	33	D71-TP	ARROW (UP)	24" X 24"	X		10BWG	1	SA	T			
	34	D71-FT	TEXAS FORT TRAILS	42" X 24"	X								
	35	M1-4	US 180	45" X 36"	X		10BWG	1	SA	P			
	36	M3-4	WEST	36" X 18"	X								
CSJ 0008-01-046 ENDS	37	M1-4	US 180	45" X 36"	X		10BWG	1	SA	P			
	38	M3-4	WEST	36" X 18"	X								
CSJ 0007-10-061 BEGINS	39	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	40	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	41	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	42	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	43	R1-1	STOP	36" X 36"	X								
	44	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	45	D3-1G	SW 3RD AVE	48" X 12"	X								
5 (CONT)	46	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	47	M1-4	US 180	45" X 36"	X								
	48	M3-2	EAST	36" X 18"	X		S80	1	SA	P			
	49	M1-4	US 281	45" X 36"	X								
	50	M2-1	JCT	21" X 15"	X								
	51	M2-1	JCT	21" X 15"	X								
	52	M1-4	US 281	45" X 36"	X		S80	1	SA	P			
	53	M3-2	EAST	36" X 18"	X								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 3 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		33

18

DATE: 10/27/2021 11:02:54 AM
FILE: c:\pw-of\pw-of-prod\pk user 2\dms18866\SOSS-03.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
5 (CONT)	54	M1-4	US 180	45" X 36"	X								
	55	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	56	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
CSJ 0007-10-061 ENDS	57	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	58	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
CSJ 0008-01-046 BEGINS	59	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	60	R1-1	STOP	36" X 36"	X								
	61	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	62	D3-1G	SW 2ND AVE	54" X 12"	X								
	63	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	64	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	65	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	66	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	67	R6-2L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
	68	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	69	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
5 (CONT)	70	R1-1	STOP	36" X 36"	X								
	71	D3-1G	SW 1ST ST	42" X 12"	X		S80	1	SA	P			
	72	D3-1G	SW 1ST AVE	48" X 12"	X								
	73	D71-TP	ARROW	24" X 24"	X		10BWG	1	SA	P			
	74	D71-FT	TEXAS FORT TRAILS	42" X 24"	X								
	75	M1-4	US 180	45" X 36"	X		10BWG	1	SA	P			
	76	M3-2	EAST	36" X 18"	X								
	77	M1-4	US 180	45" X 36"	X		10BWG	1	SA	P			
	78	M3-2	EAST	36" X 18"	X								
	79	R6-2R	ONE WAY (RIGHT)	30" X 36"	X		10BWG	1	SA	P			
	80	R6-2R	ONE WAY (RIGHT)	30" X 36"	X		10BWG	1	SA	P			
	81	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	82	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	83	R3-7R	RIGHT LANE MUST TURN RIGHT	36" X 36"	X		10BWG	1	SA	P			
	84	R6-2L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
	85	R6-2R	ONE WAY (RIGHT)	30" X 36"	X		10BWG	1	SA	P			
	86	R6-2L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
6	1	R6-1L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
	2	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	3	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	4	D3-1G	W HUBBARD ST	60" X 12"	X		10BWG	1	SA	P			
	5	D3-1G	SE 2ND AVE	48" X 12"	X								
	6	R6-1L	ONE WAY (LEFT)	30" X 36"	X		10BWG	1	SA	P			
	7	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	8	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	9	M2-1	JCT	21" X 15"	X		10BWG	1	SA	P			
	10	M1-4	US 281	45" X 36"	X								
	11	M2-1	JCT	21" X 15"	X		10BWG	1	SA	P			
	12	M1-4	US 281	45" X 36"	X								
	13	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	14	R1-1	STOP	36" X 36"	X								
	15	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	16	D3-1G	NE 3RD AVE	48" X 12"	X								
	17	R1-1	STOP	36" X 36"	X								
	18	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	19	D3-1G	SE 3RD AVE	48" X 12"	X								
	20	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	21	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	22	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	23	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	24	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	25	R1-1	STOP	36" X 36"	X								
	26	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	27	D3-1G	NE 4TH AVE	48" X 12"	X								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 4 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0008	01	046,ETC	US 180
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		34

DATE: 10/27/2021 11:02:57 AM
FILE: c:\pw-of\pw-of-prod\pk user 2\dms18866\SOSS-04.dgn

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
CSJ 0008-01-046 (CONT)	28	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	29	D3-1G	E HUBBARD ST	60" X 12"	X								
	30	D3-1G	SE 4TH AVE	48" X 12"	X								
	31	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	32	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	33	R7-5DBL	TWO HOUR PARKING	12" X 18"	X		10BWG	1	SA	P			
	34	R7-2	NO PARKING 2-5AM	12" X 18"	X								
	35	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	36	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	37	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	P			
	38	D3-1G	SE 1ST ST	42" X 12"	X								
	39	D3-1G	SE 1ST AVE	48" X 12"	X								
	40	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	41	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	42	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	43	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	44	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	45	D3-1G	SE 1ST ST	42" X 12"	X								
	46	D3-1G	SE 2ND AVE	48" X 12"	X								
6 (CONT)	47	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	48	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	49	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	50	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	51	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	52	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	53	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	54	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	55	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	56	D3-1G	SE 1ST ST	42" X 12"	X								
	57	D3-1G	SE 3RD AVE	48" X 12"	X								
	58	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	59	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	60	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	61	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	62	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	63	D3-1G	SE 1ST ST	42" X 12"	X								
	64	D3-1G	SE 4TH AVE	48" X 12"	X								
	65	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	66	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	67	R3-7R	RIGHT LANE MUST TURN RIGHT	36" X 36"	X		10BWG	1	SA	P			
7	1	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	2	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	3	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	4	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	5	D3-1G	SE 1ST ST	42" X 12"	X								
	6	D3-1G	SE 5TH AVE	48" X 12"	X								
	7	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	8	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	9	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	10	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	11	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	12	D3-1G	E HUBBARD ST	60" X 12"	X								
	13	D3-1G	NE 5TH AVE	48" X 12"	X								
	14	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	15	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	16	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	17	D3-1G	E HUBBARD ST	60" X 12"	X								
	18	D3-1G	SE 6TH AVE	48" X 12"	X								
	19	D9-10	CHAMBER VISITOR CENTER	24" X 30"	X		10BWG	1	SA	P			
	20	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 5 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		35

DATE: 10/27/2021 11:03:00 AM
FILE: c:\pw-df\pw-df-prod\pk user 2\dms18866\SOSS-05.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"			
CSJ 0008-01-046 (CONT)	21	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	22	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	23	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	24	R1-1	STOP	36" X 36"	X								
	25	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	26	D3-1G	NE 7TH AVE	48" X 12"	X								
	27	R1-1	STOP	36" X 36"	X								
	28	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	29	D3-1G	SE 7TH AVE	48" X 12"	X								
	30	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	31	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	32	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	33	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	34	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	35	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
7 (CONT)	36	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	37	R1-1	STOP	36" X 36"	X								
	38	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	39	D3-1G	SE 6TH AVE	48" X 12"	X								
	40	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	41	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	42	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	43	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	44	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	45	R1-1	STOP	36" X 36"	X								
	46	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	47	D3-1G	SE 7TH AVE	48" X 12"	X								
	48	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	49	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	50	S1-1	SCHOOL	36" X 36"	X		10BWG	1	SA	P			
	51	S1-1	SCHOOL	36" X 36"	X		10BWG	1	SA	P			
8	1	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	2	R1-1	STOP	36" X 36"	X								
	3	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	4	D3-1G	NE 9TH AVE	48" X 12"	X								
	5	R1-1	STOP	36" X 36"	X								
	6	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	7	D3-1G	SE 9TH AVE	48" X 12"	X								
	8	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	9	S1-1	SCHOOL	36" X 36"	X		10BWG	1	SA	P			
	10	S1-1	SCHOOL	36" X 36"	X		10BWG	1	SA	P			
	11	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	12	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	13	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	14	R1-1	STOP	36" X 36"	X								
	15	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	16	D3-1G	SE 10TH AVE	54" X 12"	X								
	17	S1-1	SCHOOL	36" X 36"	X		10BWG	1	SA	P			
	18	S1-1	SCHOOL	36" X 36"	X		10BWG	1	SA	P			
	19	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	20	R1-1	STOP	36" X 36"	X								
	21	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	22	D3-1G	SE 11TH AVE	48" X 12"	X								
	23	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	24	D9-2	HOSPITAL	24" X 24"	X		10BWG	1	SA	P			
	25	M6-3B	ARROW UP	21" X 15"	X								
	26	R6-1L	ONE WAY (LEFT)	36" X 36"	X		10BWG	1	SA	P			
	27	R1-1	STOP	36" X 36"	X								
	28	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	29	D3-1G	SE 12TH AVE	48" X 12"	X								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 6 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		36

DATE: 10/27/2021 11:03:04 AM
FILE: c:\pw-df\pw-df-prod\pk user 2\dms18866\SOSS-06.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"			
CSJ 0008-01-046 (CONT)	30	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	31	W11-2	PEDESTRIAN	36" X 36"	X		10BWG	1	SA	P			
	32	W11-2	PEDESTRIAN	36" X 36"	X		10BWG	1	SA	P			
	33	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	34	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	35	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	36	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	37	R1-1	STOP	36" X 36"	X								
	38	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	39	D3-1G	SE 9TH AVE	48" X 12"	X								
	40	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	41	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	42	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	43	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	44	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	45	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	46	R1-1	STOP	36" X 36"	X								
	47	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	48	D3-1G	SE 10TH AVE	54" X 12"	X								
8 (CONT)	49	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	50	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	51	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	52	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	53	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	54	R1-1	STOP	36" X 36"	X								
	55	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	56	D3-1G	SE 11TH AVE	48" X 12"	X								
	57	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	58	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	59	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	60	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	61	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	62	R1-1	STOP	36" X 36"	X								
	63	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	64	D3-1G	SE 12TH AVE	48" X 12"	X								
	65	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	66	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	67	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	68	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	69	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	70	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
9	1	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	2	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	3	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	4	R1-1	STOP	36" X 36"	X								
	5	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	6	D3-1G	SE 13TH AVE	48" X 12"	X								
	7	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	8	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	9	R1-1	STOP	36" X 36"	X								
	10	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	11	D3-1G	SE 13TH AVE	48" X 12"	X								
	12	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	13	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	14	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	15	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	16	R1-1	STOP	36" X 36"	X								
	17	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	18	D3-1G	SE 14TH AVE	54" X 12"	X								

ALUMINUM SIGN BLANKS THICKNESS	
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 7 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0008	01	046,ETC	US 180
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		37

18

DATE: 10/27/2021 11:03:07 AM
FILE: c:\pw-of\pw-of-prod\pk_user_2\dms18866\SOSS-07.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
CSJ 0008-01-046 (CONT)	19	M3-2	EAST	21" X 12"	X		10BWG	1	SA	P			
	20	M1-4	US 180	45" X 36"	X								
	21	M3-2	EAST	21" X 12"	X		10BWG	1	SA	P			
	22	M1-4	US 180	45" X 36"	X								
	23	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	24	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	25	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	26	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	27	D3-1G	E HUBBARD ST	60" X 12"	X								
	28	D3-1G	SE 14TH AVE	54" X 12"	X								
	29	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	30	D3-1G	E HUBBARD ST	60" X 12"	X								
	31	D3-1G	PASADENA BLVD	66" X 12"	X								
	32	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	33	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	34	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	35	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
9 (CONT)	36	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	37	D3-1G	E HUBBARD ST	60" X 12"	X								
	38	D3-1G	PASADENA BLVD	66" X 12"	X								
	39	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	40	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	41	D3-1G	E HUBBARD ST	60" X 12"	X								
	42	D3-1G	SE 15TH AVE	48" X 12"	X								
	43	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	44	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	45	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	46	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	47	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	48	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	49	D3-1G	SE 1ST ST	42" X 12"	X								
	50	D3-1G	SE 15TH AVE	54" X 12"	X								
	51	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	52	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	53	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	54	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	55	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
10	1	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	2	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	3	D3-1G	SE 1ST ST	42" X 12"	X								
	4	D3-1G	SE 16TH AVE	48" X 12"	X								
	5	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	6	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	7	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	8	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	9	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	10	D3-1G	SE 1ST ST	42" X 12"	X								
	11	D3-1G	SE 17TH AVE	48" X 12"	X								
	12	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	13	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	14	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	15	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	16	D3-1G	E HUBBARD ST	60" X 12"	X		10BWG	1	SA	P			
	17	D3-1G	NE 17TH AVE	54" X 12"	X								
	18	R1-1	STOP	36" X 36"	X		S80	1	SA	P			
	19	D3-1G	E HUBBARD ST	60" X 12"	X								
	20	D3-1G	SE 17TH AVE	48" X 12"	X								
	21	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	22	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	23	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 8 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		38

DATE: 10/27/2021 11:03:10 AM
FILE: c:\pw-df\pw-df-prod\pk user 2\dms18866\SOSS-08.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	TYPE S
CSJ 0008-01-046 (CONT)	24	R2-1	SPEED LIMIT 30 MPH	30" X 36"	X		10BWG	1	SA	P			
	25	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	26	R1-1	STOP	36" X 36"	X								
	27	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	28	D3-1G	NE 21ST AVE	48" X 12"	X								
	29	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	30	R1-1	STOP	36" X 36"	X								
	31	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	32	D3-1G	SE 18TH AVE	54" X 12"	X								
	33	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	34	R1-1	STOP	36" X 36"	X								
	35	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
10 (CONT)	36	D3-1G	NE 22ND AVE	54" X 12"	X								
	37	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	38	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	39	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	40	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	41	R1-1	STOP	36" X 36"	X								
	42	D3-1G	SE 1ST ST	42" X 12"	X		S80	1	SA	P			
	43	D3-1G	SE 18TH AVE	48" X 12"	X								
	44	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	45	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	46	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	47	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	48	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	49	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
11	1	R2-1	SPEED LIMIT 35 MPH	30" X 36"	X		10BWG	1	SA	P			
	2	R2-1	SPEED LIMIT 35 MPH	30" X 36"	X		10BWG	1	SA	P			
	3	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	4	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	5	R1-1	STOP	36" X 36"	X								
	6	D3-1G	SE 20TH AVE	48" X 12"	X		S80	1	SA	P			
	7	D3-1G	SE 1ST ST	42" X 12"	X								
	8	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	9	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	10	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	11	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	12	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	13	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	14	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	15	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
12	1	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	2	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	3	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	P	BM		
	4	R1-1	STOP	36" X 36"	X								
	5	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	6	R1-1	STOP	36" X 36"	X								
	7	D3-1G	E HUBBARD ST	60" X 12"	X		S80	1	SA	P			
	8	D3-1G	NE 27TH AVE	54" X 12"	X								
	9	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	10	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	11	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	12	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	13	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	T			
	14	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	15	R1-1	STOP	36" X 36"	X								
	16	R6-1R	ONE WAY (RIGHT)	54" X 18"	X		10BWG	1	SA	P	BM		
	17	R3-7	LEFT LANE MUST TURN LEFT	36" X 36"	X		10BWG	1	SA	P			
	18	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	19	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 9 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		39

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DATE: 10/27/2021 11:03:13 AM
FILE: c:\pw-df\pw-df-prod\pk user 2\dms18866\SOSS-09.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels		
CSJ 0008-01-046 (CONT)	20	R4-7	KEEP RIGHT	24" X 30"	X		10BWG	1	SA	P			
	21	R3-7R	RIGHT LANE MUST TURN RIGHT	36" X 36"	X		10BWG	1	SA	P			
	22	R1-1	STOP	36" X 36"	X								
	23	D3-1G	LINCOLN AVE	54" X 12"	X		S80	1	SA	P			
	24	D3-1G	HWY 180 E	54" X 12"	X								
12 (CONT)	25	R6-1L	ONE WAY (LEFT)	54" X 18"	X		10BWG	1	SA	T			
	26	W3-3	SIGNAL AHEAD	36" X 36"	X		10BWG	1	SA	P			
	27	D3-1G	HWY 180 E	54" X 12"	X		10BWG	1	SA	P			
	28	D3-1G	SE 25TH AVE	48" X 12"	X		10BWG	1	SA	P			
	29	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
	30	R5-1	DO NOT ENTER	36" X 36"	X		10BWG	1	SA	P			
13	1	R2-1	SPEED LIMIT 35 MPH	30" X 36"	X		10BWG	1	SA	P			
	2	R14-1	TRUCK ROUTE	24" X 18"	X								
	3	M6-3	ARROW UP	21" X 15"	X		10BWG	1	SA	P			
	4	M6-4	ARROW BOTH WAYS	21" X 15"	X								
	5	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	6	D3-1G	NE 2ND ST	48" X 12"	X		10BWG	1	SA	P			
	7	D3-1G	HWY 180 E	54" X 12"	X								
	8	D1-3	DESTINATION SIGN	126" X 42"	X		S80	1	SA	T	2EXT		
	9	R3-9b	CENTER LANE ONLY	24" X 36"	X		10BWG	1	SA	P			
	10	R3-9cP	BEGIN	30" X 12"	X								
	11	R3-9b	CENTER LANE ONLY	24" X 36"	X		10BWG	1	SA	P			
	12	R3-9dP	END	30" X 12"	X								
	13	M2-1	JCT	21" X 15"	X		10BWG	1	SA	P			
	14	M1-6F	FARM ROAD 1821	24" X 24"	X								
	15	W3-3	SIGNAL AHEAD	36" X 36"	X		10BWG	1	SA	P			
14	1	M3-1	NORTH	24" X 12"	X		S80	1	SA	U	WC		
	2	M1-6F	FARM ROAD 1821	24" X 24"	X								
	3	M6-1	ARROW LEFT	21" X 15"	X								
	4	M3-2	EAST	24" X 12"	X								
	5	M1-4	US 180	30" X 24"	X								
	6	M6-3	ARROW UP	21" X 15"	X								
	7	M3-3	SOUTH	24" X 12"	X								
	8	M1-6F	FARM ROAD 1821	24" X 24"	X								
	9	M6-1	ARROW RIGHT	21" X 15"	X								
	10	W10-2R	GRADE CROSSING ADVANCE WARNING	30" X 30"	X		10BWG	1	SA	P			
	11	W10-14P	TRAIN CROSSING	30" X 24"	X								
	12	D3-1G	HWY 180	54" X 12"	X		10BWG	1	SA	P			
	13	D3-1G	FM 1821	48" X 12"	X								
	14	D26-2TR	TEXAS DEPT OF PUBLIC SAFETY DRIVER LICENSE	84" X 36"		X	S80	1	SA	P			
	15	M3-2	EAST	24" X 12"	X		10BWG	1	SA	P			
	16	M1-4	US 180	30" X 24"	X								
	17	M3-3	SOUTH	24" X 12"	X								
	18	M1-6F	FARM ROAD 1821	24" X 24"	X								
	19	M6-1	ARROW LEFT	21" X 15"	X								
	20	M3-2	EAST	24" X 12"	X								
	21	M1-4	US 180	30" X 24"	X		S80	1	SA	U	WC		
	22	M6-3	ARROW UP	21" X 15"	X								
	23	M3-1	NORTH	24" X 12"	X								
	24	M1-6F	FARM ROAD 1821	24" X 24"	X								
	25	M6-1	ARROW RIGHT	21" X 15"	X								
CSJ 0008-01-046 ENDS	26	D14-4T	ADOPT A HIGHWAY	48" X 48"	X		10BWG	1	SA	U			
	27	D26-2TR	TEXAS DEPT OF PUBLIC SAFETY DRIVER LICENSE	84" X 36"		X	S80	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
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7.5 to 15	0.100"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 10 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		40

DATE: 10/27/2021 11:03:16 AM
FILE: c:\pw-of\pw-of-prod\pk user 2\dms18866\SOSS-10.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
CSJ 0314-01-082 BEGINS	1	W1-7T	TWO DIRECTION LARGE ARROW	96" X 36"	X		S80	1	SA	T			
	2	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	3	W4-4P	CROSS TRAFFIC DOES NOT STOP	24" X 12"	X								
	4	D1-1	DESTINATION (EASTLAND)	96" X 18"	X		10BWG	1	SA	T			
	5	M3-2	CARDINAL DIRECTION (EAST)	24" X 12"	X								
	6	M1-1	INTERSTATE 20	24" X 24"	X		10BWG	1	SA	P			
	7	M6-1	DIRECTIONAL ARROW	21" X 15"	X								
	8	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	9	W4-4P	CROSS TRAFFIC DOES NOT STOP	24" X 12"	X								
	10	M6-1	DIRECTIONAL ARROW	21" X 15"	X		10BWG	1	SA	P			
	11	M1-6F	FARM ROAD 113	24" X 24"	X								
	12	D1-1	DESTINATION (FORT WORTH)	108" X 18"	X		10BWG	1	SA	T	2EXT		
	13	M3-4	CARDINAL DIRECTION (WEST)	24" X 12"	X								
	14	M1-1	INTERSTATE 20	24" X 24"	X								
	15	M6-1	DIRECTIONAL ARROW	21" X 15"	X		10BWG	1	SA	U			
	16	M1-6F	FARM ROAD 113	24" X 24"	X								
	17	M6-3	DIRECTIONAL ARROW	21" X 15"	X								
	18	R1-1	STOP	36" X 36"	X		10BWG	1	SA	P			
	19	W4-4P	CROSS TRAFFIC DOES NOT STOP	24" X 12"	X								
	20	D1-1	DESTINATION (MILLSAP)	66" X 18"	X		10BWG	1	SA	T			
1	21	R2-1	55 MPH SPEED LIMIT	30" X 36"	X		10BWG	1	SA	P			
	22	R2-1	YIELD	48" X 48" X 48"	X		10BWG	1	SA	T			
	23	W6-3	TWO WAY TRAFFIC	36" X 36"	X		10BWG	1	SA	P			
	24	R4-1	DO NOT PASS	24" X 30"	X		10BWG	1	SA	P			
	25	R12-1T	WEIGHT LIMIT 58420 LBS	24" X 36"	X		10BWG	1	SA	P			
	26	R12-1T	WEIGHT LIMIT 58420 LBS	24" X 36"	X		10BWG	1	SA	P			
	27	M6-2	DIRECTIONAL ARROW	21" X 15"	X								
	28	M1-1	INTERSTATE 20	24" X 24"	X								
	29	M3-4	CARDINAL DIRECTION (WEST)	24" X 12"	X		10BWG	1	SA	U			
	30	M6-3	DIRECTIONAL ARROW	21" X 15"	X								
	31	M1-1	INTERSTATE 20	24" X 24"	X								
	32	M3-2	CARDINAL DIRECTION (EAST)	24" X 12"	X								
	33	M6-2	DIRECTIONAL ARROW	21" X 15"	X		10BWG	1	SA	P			
	34	M1-6F	FARM ROAD 113	24" X 24"	X								
	35	W4-4P	CROSS TRAFFIC DOES NOT STOP	24" X 12"	X		10BWG	1	SA	P			
	36	R1-1	STOP	36" X 36"	X								
	37	D1-1	DESTINATION (MILLSAP)	66" X 18"	X		10BWG	1	SA	T			
	38	R2-1	55 MPH SPEED LIMIT	30" X 36"	X		10BWG	1	SA	P			
	39	W12-2A	LOW CLEARANCE	84" X 24"	X		10BWG					X	
	40	W12-2A	LOW CLEARANCE	84" X 24"	X		10BWG					X	
CSJ 0314-01-082 ENDS	41	W12-2	LOW CLEARANCE (WITH ARROWS)	36" X 36"	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 11 OF 11

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180
		DIST	COUNTY		SHEET NO.
		FTW	PARKER		41

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TCP GENERAL NOTES:

1. THE CONTRACTOR SHALL PLACE AND MAINTAIN ALL SIGNS, BARRICADES, PAVEMENT MARKINGS, AND OTHER WARNING DEVICES AS SHOWN IN THESE PLANS FOR US 180, IH 20 FRONTAGE ROADS, FM 113, AND ALL CROSS STREETS ACCORDING TO THE LATEST EDITION OF THE "TEXAS MUTCD" AND TxDOT APPLICABLE STANDARDS. THE SIGNS, BARRICADES OR OTHER WARNING DEVICES SHOWN SHALL BE CONSIDERED A MINIMUM AND ADDITIONAL SIGNS, BARRICADES OR WARNING DEVICES DEEMED NECESSARY BY THE ENGINEER OR DICTATED BY FIELD CONDITIONS SHALL BE PROVIDED ACCORDING TO TxDOT APPLICABLE STANDARDS. ADDITIONAL SIGNS OR BARRICADES WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE BID ITEM "BARRICADES, SIGNS, AND TRAFFIC HANDLING".

2. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7 "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC", OF THE GENERAL REQUIREMENTS AND COVENANTS OF THE STANDARD SPECIFICATIONS.

3. THE CONTRACTOR SHALL KEEP THE ROADWAY CLEAN AND FREE OF DIRT OR OTHER MATERIALS DURING HAULING OPERATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN A CLEAN ROADWAY, THEY SHALL CEASE ALL CONSTRUCTION OPERATIONS, WHEN DIRECTED BY THE ENGINEER. CONSTRUCTION OPERATIONS SHALL NOT RESUME UNTIL THE ROADWAY IS CLEANED TO THE SATISFACTION OF THE ENGINEER.

4. DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER THE PUBLIC.

5. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) PER TMUTCD, WHEN REQUIRED, MUST BE PLACED 72 HOURS IN ADVANCE OF THE BEGINNING CONTRACTOR SURFACING OPERATION. THE ENGINEER SHALL APPROVE THE LOCATION OF THE PCMS PRIOR TO RELOCATING THE PCMS. THE WORDING OF THE PCMS SHALL BE APPROVED BY THE ENGINEER.

6. THE CONTRACTOR MAY USE A DIFFERENT CONSTRUCTION PHASING AND TRAFFIC CONTROL PLAN. ANY VARIATION FROM THE PLAN SHALL BE FORMALLY SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL AS OUTLINE IN ITEM 5 OF THE GENERAL NOTES. ANY CHANGES PROPOSED BY THE CONTRACTOR SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER.

7. PROVIDE AND MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES. THIS WORK WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

8. THE CONTRACTOR SHALL REFERENCE ALL EXISTING PAVEMENT MARKINGS BEFORE PLANNING OR OVERLAY.

9. THE CONTRACTOR SHALL COORDINATE WITH TXDOT TO SEE IF THEY WANT TO KEEP THE PCTB AND/OR CRASH CUSHION ATTENUATOR OTHERWISE THEY WILL BE CONTRACTOR'S PROPERTY. IF TXDOT DECIDES TO KEEP, DELIVER PCTB AND/OR CRASH CUSHION ATTENUATOR TO STOCKPILE. THERE WILL BE NO ADDITIONAL PAYMENT MADE AND THEY SHALL BE SUBSIDIARY TO ITEMS 512 AND 514 RESPECTIVELY.

SEQUENCE OF CONSTRUCTION FOR SIGNAL UPGRADES

1. INSTALL ADVANCE WARNING SIGNS FOR US 180 AND ALL CROSS STREETS IN ACCORDANCE WITH TxDOT STANDARD BC(2)-21 AND WZ(BTS-1)-13.

2. CONTRACTOR MAY WORK ON ALL INTERSECTIONS CONCURRENTLY IF EXISTING SIGNALS ARE TO REMAIN IN NORMAL OPERATING MODE.

3. CONTRACTOR TO LIMIT WORK ON ONE INTERSECTION IF WORK REQUIRES REMOVAL OF POWER FROM CONTROLLER AND CABINET ASSEMBLY. ERRECT TEMPORARY STOPS SIGNS UNTIL NEW TRAFFIC SIGNALS ARE IN OPERATION. ONCE COMPLETED, WORK ON ANOTHER INTERSECTION CAN BEGIN.

4. CONTRACTOR SHALL COORDINATE WITH THE TXDOT WEATHERFORD AREA OFFICE TO MINIMIZE DISRUPTIONS TO NORMAL TRAFFIC SIGNAL OPERATIONS DURING CONSTRUCTION.

PHASE 1

1. CONSTRUCT THE NEW TRAFFIC SIGNAL CONDUIT, GROUNDBOXES, POLE FOUNDATIONS, SIGNAL CONTROLLER FOUNDATION, AND ELECTRICAL SERVICE FOUNDATIONS.

2. THIS PHASE CAN BE DONE CONCURRENTLY WITH MILL AND OVERLAY IF THE EXISTING SIGNALS ARE TO REMAIN IN NORMAL OPERATING MODE. THE SIGNAL HEADS SHOULD REMAIN DIM AND COVERED/TURNED UNTIL THE NEW TRAFFIC SIGNAL IS OPERATIONAL.

3. IF WORK REQUIRES REMOVAL OF POWER FROM CONTROLLER AND CABINET ASSEMBLY, ERRECT TEMPORARY STOP SIGNS. REMOVE THE STOP SIGNS AFTER THE NEW TRAFFIC SIGNALS ARE IN OPERATION.

PHASE 2

1. CONSTRUCT POLE ASSEMBLIES, SIGNAL CONTROLLER CABINET, ELECTRICAL SERVICE POLE, AND ANY REMAINING ANCILLARY SIGNAL EQUIPMENT.

2. WIRE TRAFFIC SIGNAL.

3. TURN THE NEW TRAFFIC SIGNAL INTO NORMAL OPERATING MODE.

4. WHEN WORK REQUIRES REMOVAL OF POWER FROM CONTROLLER AND CABINET ASSEMBLY, ERRECT TEMPORARY STOP SIGNS, REMOVE THE STOP SIGNS AFTER THE NEW TRAFFIC SIGNALS ARE IN OPERATION.

SEQUENCE OF CONSTRUCTION US 180 EB, US 180 WB, AND US 180:

1. INSTALL ADVANCE WARNING SIGNS FOR US 180 AND ALL CROSS STREETS IN ACCORDANCE WITH TxDOT STANDARD BC(2)-21.

2. INSTALL TEMPORARY EROSION CONTROL DEVICES PER ROADWAY LAYOUTS AND TxDOT STANDARDS OR AS DIRECTED BY THE ENGINEER.

3. INSTALL ALL SIGNING, AND CHANNELIZING DEVICES PER TxDOT STANDARDS, TCP TYPICAL SECTIONS AND AS APPROVED/DIRECTED BY THE ENGINEER.

4. ONLY NIGHTTIME WORK WILL BE ALLOWED FOR PLANING AND OVERLAY, UNLESS WRITTEN PERMISSION FROM THE ENGINEER IS PROVIDED. US 180 WB AND US 180 EB MAY BE CONSTRUCTED CONURRENTLY WITH ENGINEER'S APPROVAL.

5. CONTRACTOR SHALL COORDINATE MILL AND OVERLAY OF ALL PARKING SPACES WITH AFFECTED BUSINESS PRIOR TO BEGINNING ANY CONSTRUCTION IN THE AFFECTED AREA. CONTRACTOR SHALL MAINTAIN CROSS STREET ACCESS AT ALL TIMES.

6. PLANE ASPHALT CONCRETE PAVEMENT AS SHOWN IN PHASE 1, 2, AND 3 FOR A LENGTH (AS APPROVED BY THE ENGINEER) THAT CAN BE COMPLETED AND OPENED FOR TRAFFIC DURING SAME DAY OR AS DIRECTED BY THE ENGINEER. PHASE SHALL BE COMPLETED (MILL AND OVERLAY) PRIOR TO BEGINNING WORK ON SUBSEQUENT PHASES.

7. MILL TO REMOVE ASPHALT PAVEMENT FROM INLET OPENINGS PER "ROADWAY DETAILS" SHEET. CLEAN OUT INLETS.

8. INSTALL ROADWAY MARKER TABS AFTER EACH PLANE OPERATION AND PRIOR TO OPENING TO TRAFFIC.

9. PERFORM FULL DEPTH REPAIR IN AREAS AS DIRECTED BY THE ENGINEER

10. PLACE TRACKLESS TACK AND OVERLAY AS SHOWN IN PHASE 1, 2, AND 3 FOR A LENGTH THAT CAN BE COMPLETED AND OPENED FOR TRAFFIC DURING SAME DAY OR AS DIRECTED BY THE ENGINEER. PHASE SHALL BE COMPLETED (MILL AND OVERLAY) PRIOR TO BEGINNING WORK ON SUBSEQUENT PHASES.

11. INSTALL ROADWAY MARKER TABS AFTER EACH OVERLAY OPERATION AND PRIOR TO OPENING TO TRAFFIC.

12. IF NECESSARY OR AS DIRECTED BY THE ENGINEER, DUE TO LENGTH OF TIME TABS HAVE BEEN IN OPERATION, INSTALL WORK ZONE PAVEMENT MARKINGS UPON COMPLETION OF EACH PHASE.

13. REMOVE AND RECONSTRUCT DAMAGED CURB/CURB & GUTTER USING TXDOT STANDARDS AND AS DIRECTED BY THE ENGINEER.

14. PLACE PCTB & CRASH CUSHION ATTENUATOR BEFORE THE CONSTRUCTION OF RAILS AND/OR INSTALLATION OF MBGF. MOVE TO OTHER LOCATIONS OF RAIL/MBGF WHEN DONE WITH ONE LOCATION. THE LOCATION OF PCTB/CCA SHALL BE DETERMINED IN THE FIELD OR AS DIRECTED BY THE ENGINEER.

15. INSTALL ROADSIDE SAFETY ELEMENTS, MOW STRIPS, AND DELINEATORS.

16. INSTALL SIGNS AND PLACE PERMANENT PAVEMENT MARKINGS & MARKERS IN ACCORDANCE WITH PAVEMENT MARKING STARNDARDS PRIOR TO OPENING TO TRAFFIC.

17. ADD SEED TO DISTURBED AREAS AS DIRECTED BY THE ENGINEER.

18. PERFORM FINAL CLEAN UP.

19. REMOVE TRAFFIC CONTROL DEVICES, SIGNS, CONSTRUCTION DEBRIS & EROSION CONTROL DEVICES.

SEQUENCE OF CONSTRUCTION IH 20 EB FR, IH 20 WB FR AND FM 113:

1. INSTALL ADVANCE WARNING SIGNS FOR IH 20 FRONTAGE ROADS AND RAMPS IN ACCORDANCE WITH TxDOT STANDARD BC(2)-21, TCP(6-3)-12 FOR EXIT RAMP AND TCP(6-3)-12 FOR ENTRANCE RAMP. RAMPS ARE TO REMAIN CLOSED FOR THE DURATION OF THE WORK BEING DONE ON EACH FRONTAGE ROAD.

2. INSTALL TEMPORARY EROSION CONTROL DEVICES PER ROADWAY LAYOUTS AND TxDOT STANDARDS OR AS DIRECTED BY THE ENGINEER.

3. INSTALL ALL SIGNING AND CHANNELIZING DEVICES PER TxDOT STANDARDS, TCP TYPICAL SECTIONS AND AS APPROVED/DIRECTED BY THE ENGINEER.

4. IMPLEMENT DETOUR.

5. ONLY NIGHTTIME WORK WILL BE ALLOWED FOR OVERLAY, UNLESS WRITTEN PERMISSION FROM THE ENGINEER IS PROVIDED. IH 20 EB FRONTAGE ROAD AND IH 20 WB FRONTAGE ROAD MAY BE CONSTRUCTED CONCURRENTLY WITH ENGINEER'S APPROVAL.

6. REMOVE EXISTING CURB AT LOCATIONS SHOWN ON PLAN SHEETS.

7. PERFORM FULL DEPTH REPAIR AT LOCATIONS DETERMINED IN THE FIELD BY THE ENGINEER.

8. PLACE TRACKLESS TACK AND OVERLAY EXISTING PAVEMENT AS SHOWN IN PHASE 1 AND 2 FOR A LENGTH (AS APPROVED BY THE ENGINEER) THAT CAN BE COMPLETED DURING SAME DAY AND OPENED FOR TRAFFIC OR AS DIRECTED BY THE ENGINEER. USE ONE LANE TWO WAY TRAFFIC CONTROL STANDARD TCP(1-2)-18 WITH FLAGGERS DURING CONSTRUCTION ON IH 20 FRONTAGE ROADS AND FM 113. BACKFILL PAVEMENT EDGES.

9. INSTALL ROADWAY MARKER TABS AFTER EACH OVERLAY OPERATION AND PRIOR TO OPENING TO TRAFFIC.

10. IF NECESSARY OR AS DIRECTED BY THE ENGINEER, DUE TO LENGTH OF TIME TABS HAVE BEEN IN OPERATION, INSTALL WORK ZONE PAVEMENT MARKINGS UPON COMPLETION OF EACH PHASE.

11. INSTALL SIGNS AND PLACE PERMANENT PAVEMENT MARKINGS & MARKERS IN ACCORDANCE WITH PAVEMENT MARKING STARNDARDS PRIOR TO OPENING TO TRAFFIC.

12. ADD SEED TO DISTURBED AREAS AS DIRECTED BY THE ENGINEER.

13. PERFORM FINAL CLEAN UP.

14. REMOVE TRAFFIC CONTROL DEVICES, SIGNS, CONSTRUCTION DEBRIS & EROSION CONTROL DEVICES.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER
11/02/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
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CONTROL	SECTION	JOB	42
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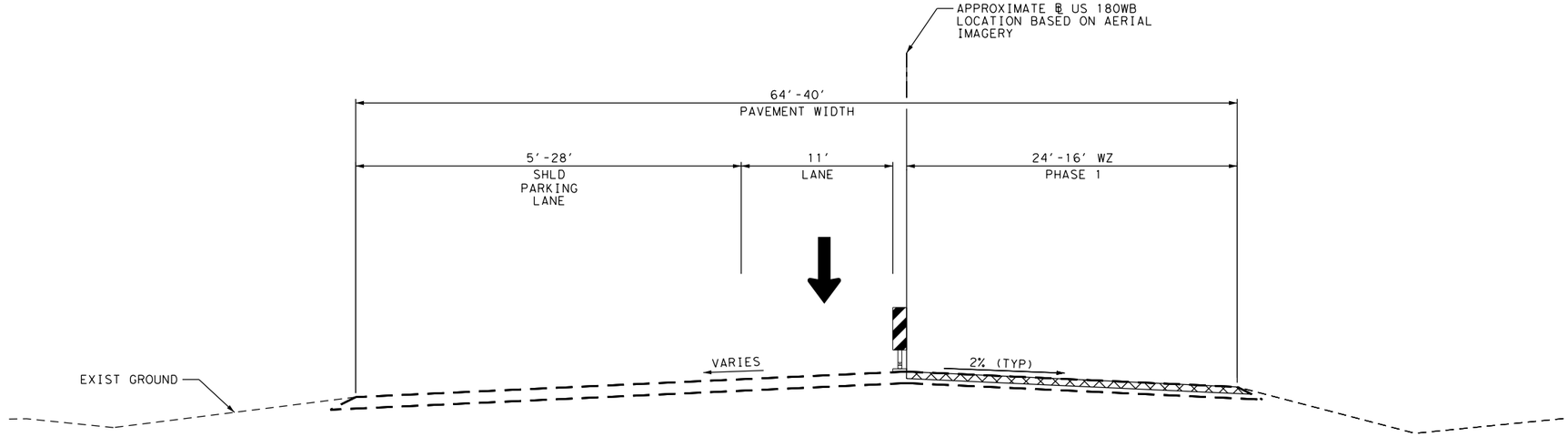


TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
BEGIN PROJECT TO STA 2867+85
STA 2868+10 TO STA 2885+10

LEGEND

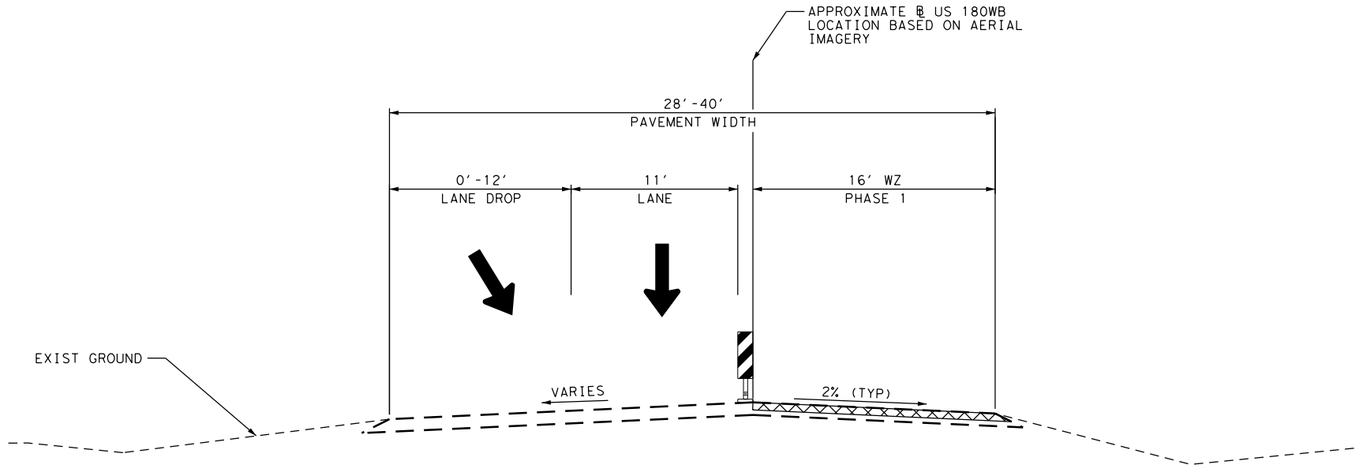
PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTHS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND COORDINATE ANY DISCREPANCIES WITH THE ENGINEER.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.



TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
BEGIN PROJECT TO STA 2867+85
STA 2868+10 TO STA 2885+10

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) TCP PHASE 1 TYPICAL SECTIONS

SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
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STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	43
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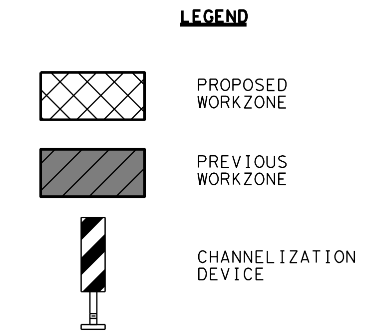

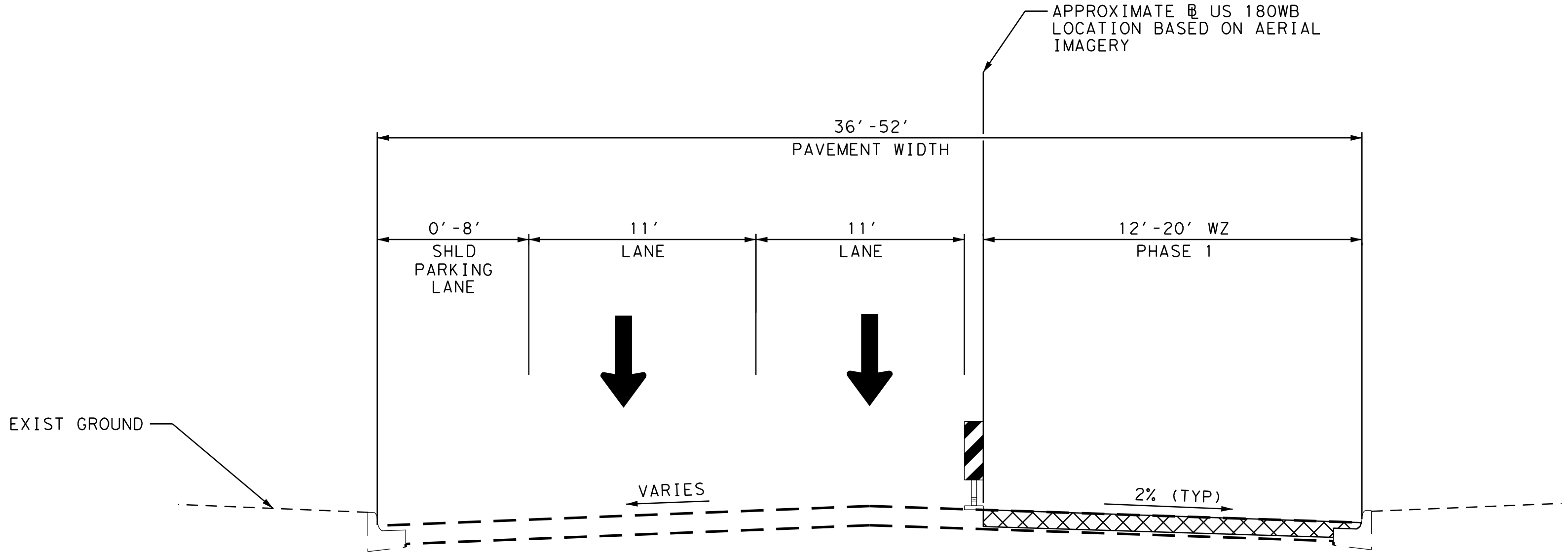

TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

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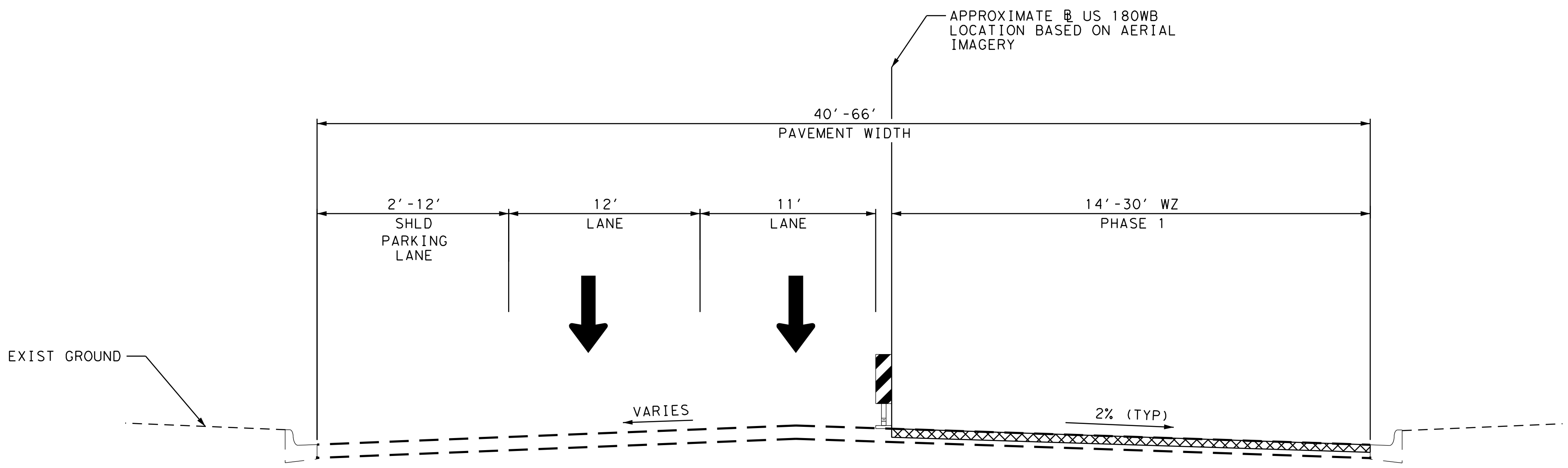

TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

NOT TO SCALE
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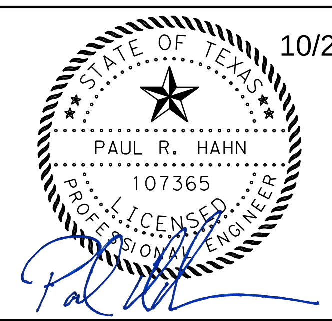
STA 2953+30 TO STA 2979+85

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTHS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND COORDINATE ANY DISCREPANCIES WITH THE ENGINEER.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.



10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST)
TCP PHASE 1
TYPICAL SECTIONS

SHEET 2 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
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CONTROL	SECTION	JOB	
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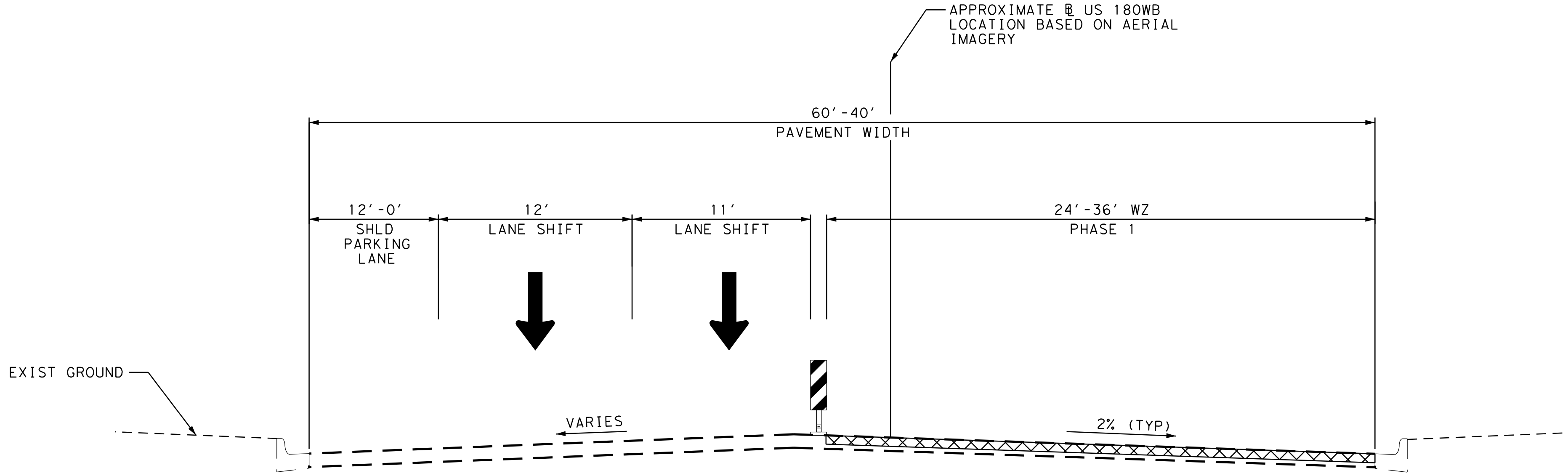
LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE



TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

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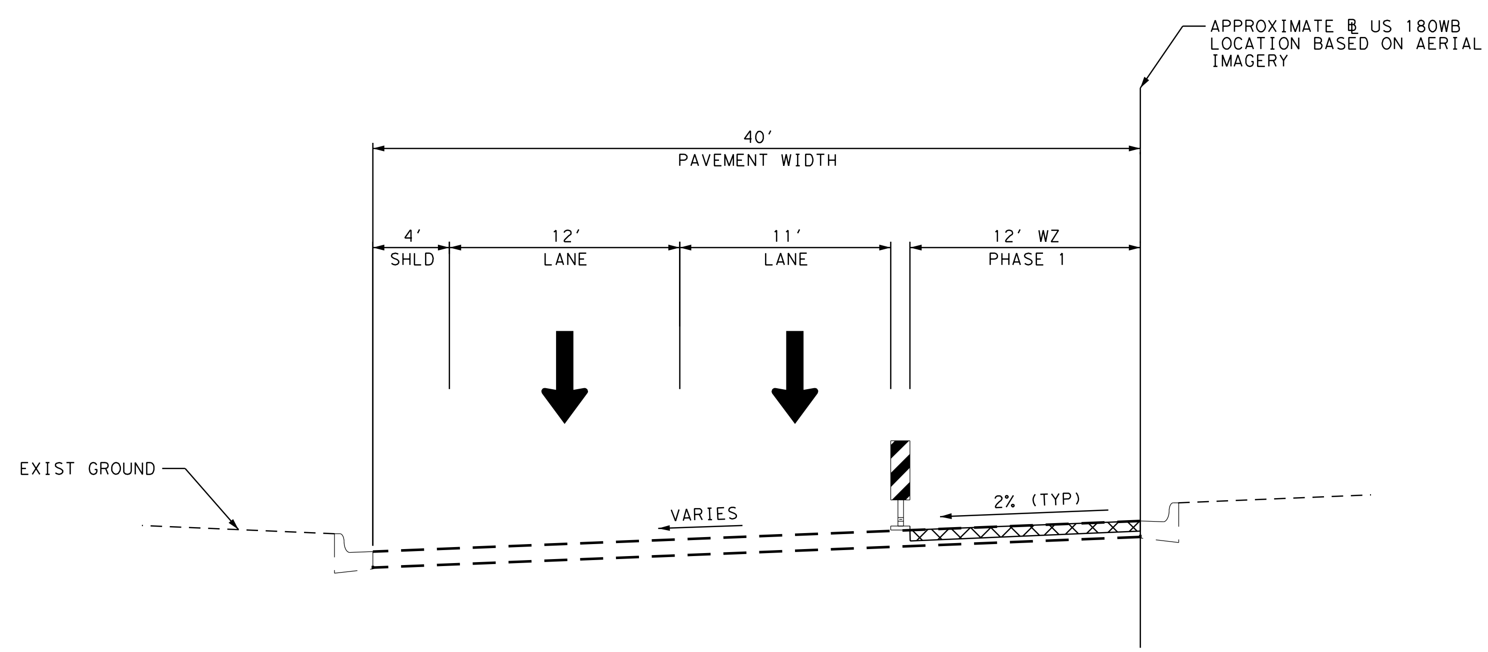
STA 2979+85 TO STA 2982+70



TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2982+70 TO STA 2987+40

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTHS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND COORDINATE ANY DISCREPANCIES WITH THE ENGINEER.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED PROFESSIONAL ENGINEER
10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST)
TCP PHASE 1
TYPICAL SECTIONS

SHEET 3 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
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TEXAS	FTW	PALO PINTO	45
CONTROL	SECTION	JOB	
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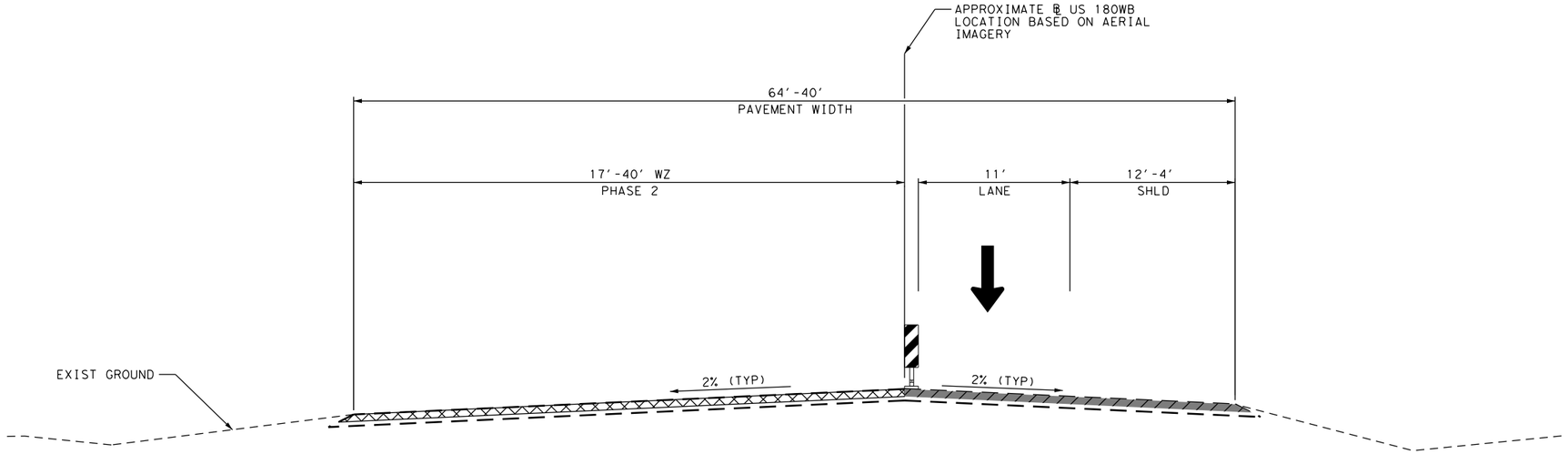


TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
BEGIN PROJECT TO STA 2885+10

LEGEND

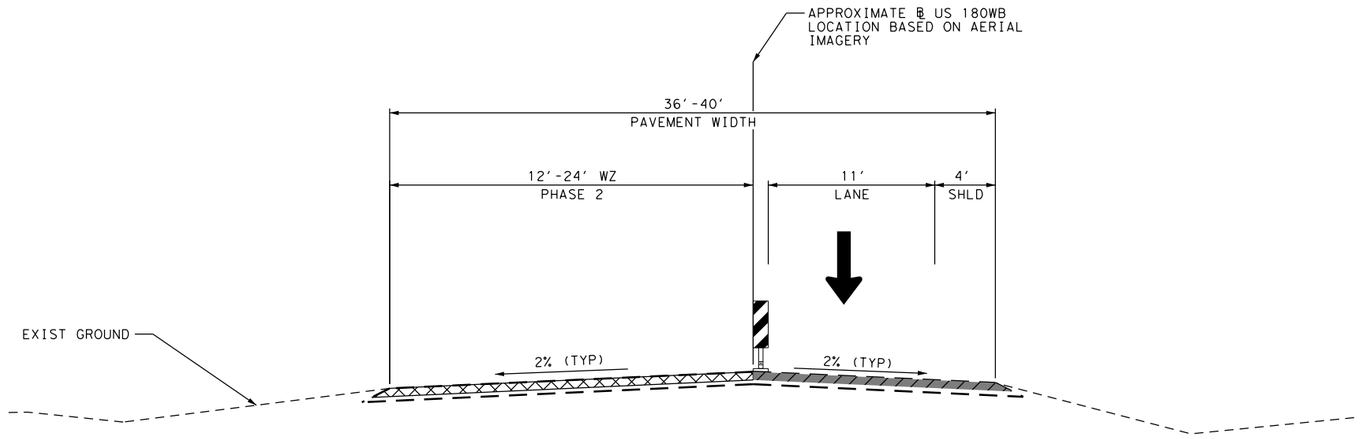
PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTHS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND COORDINATE ANY DISCREPANCIES WITH THE ENGINEER.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.



TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 2885+10 TO STA 2886+10

STATE OF TEXAS
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10/29/21

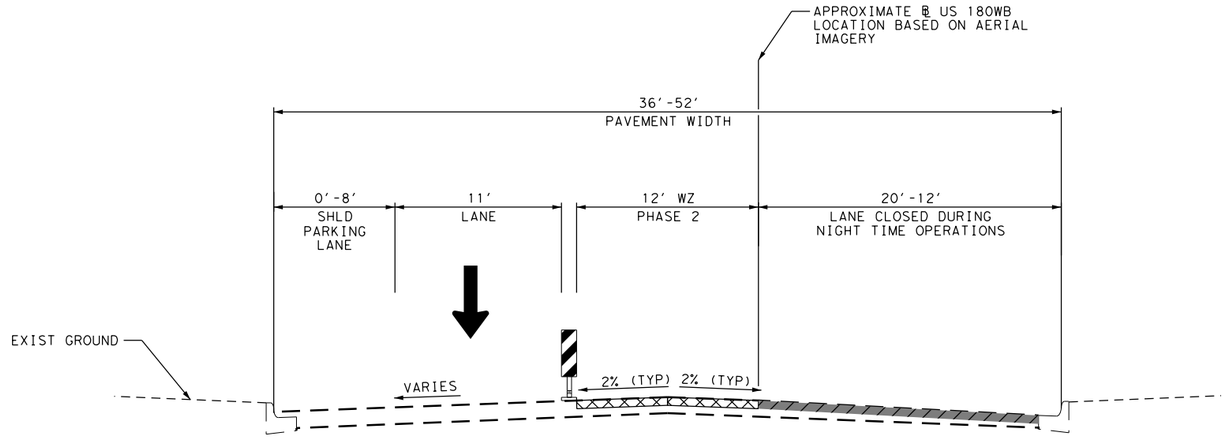
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) TCP PHASE 2 TYPICAL SECTIONS

SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	46
0008	01	046,ETC	



TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 2886+10 TO STA 2911+40
CSJ: 0008-01-046
STA 2911+40 TO STA 2953+30

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
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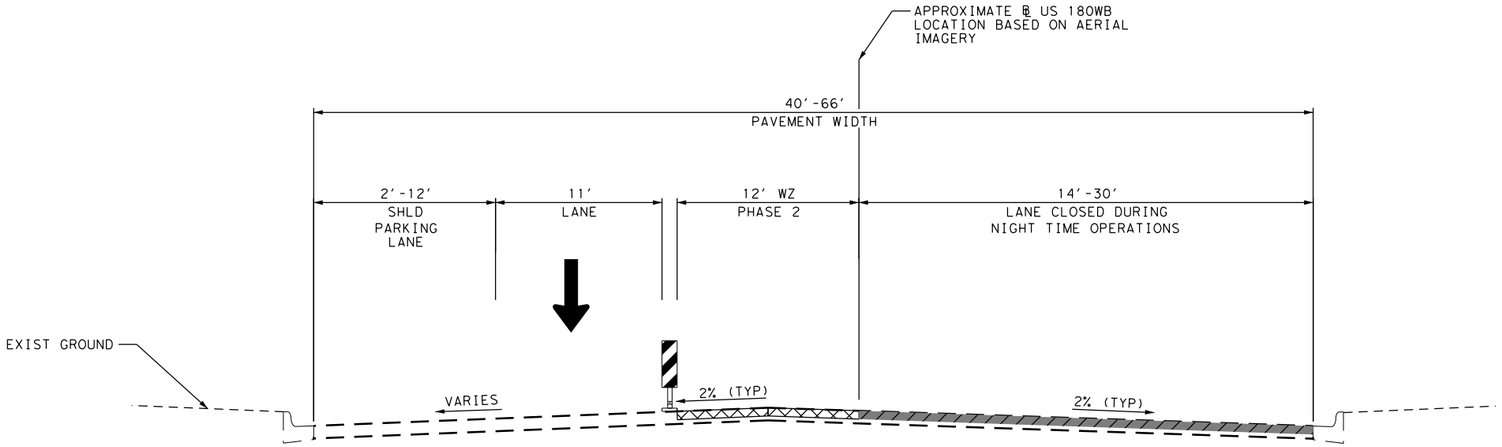
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.



TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2953+30 TO STA 2979+85

10/29/21

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

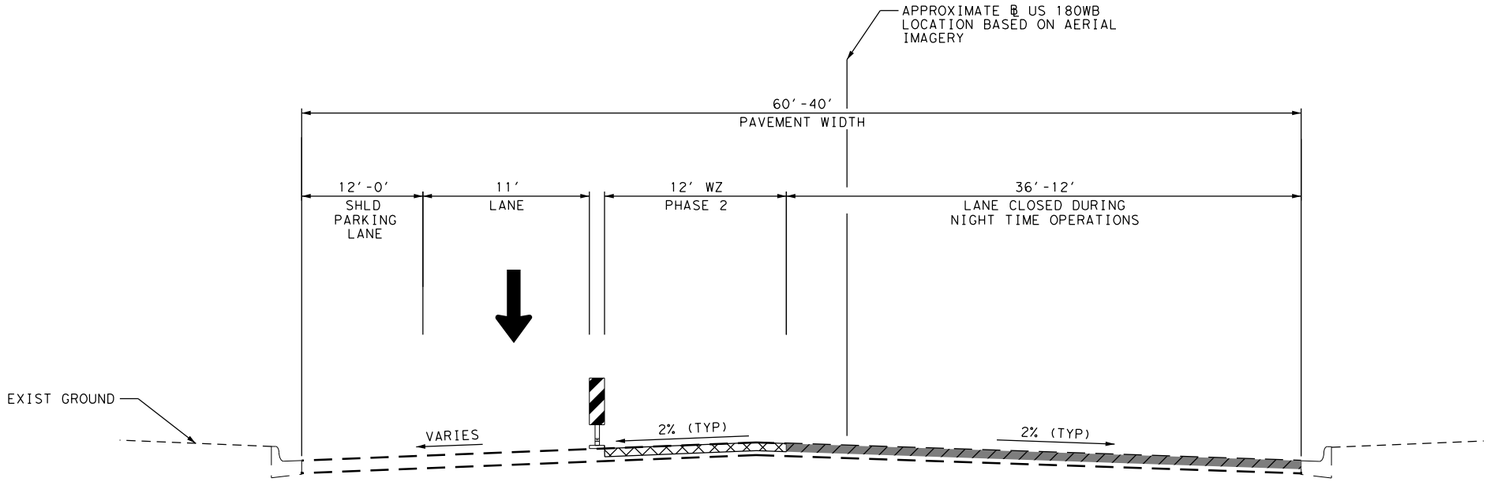
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST) TCP PHASE 2 TYPICAL SECTIONS

SHEET 2 OF 3

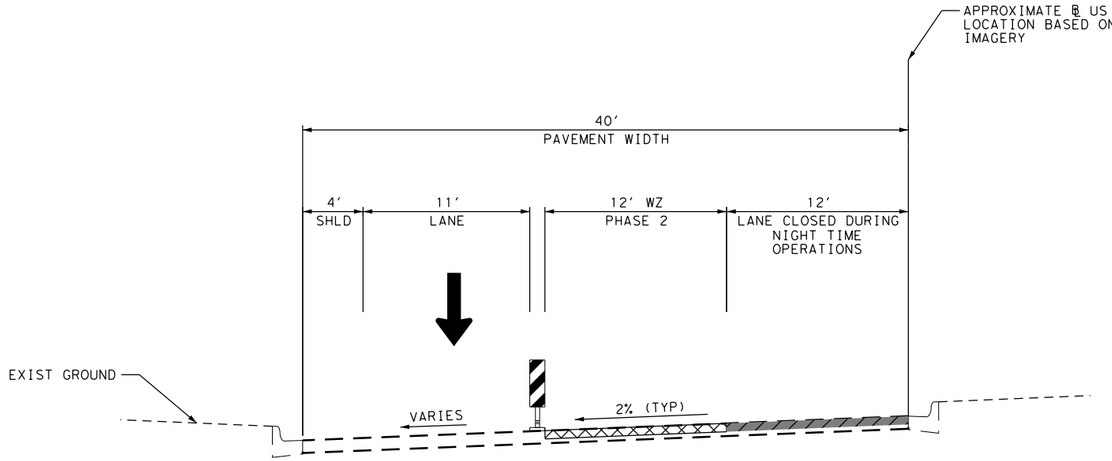
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	47
CONTROL	SECTION	JOB	
0008	01	046, ETC	



TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 2979+85 TO STA 2982+70



TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 2982+70 TO STA 2987+40

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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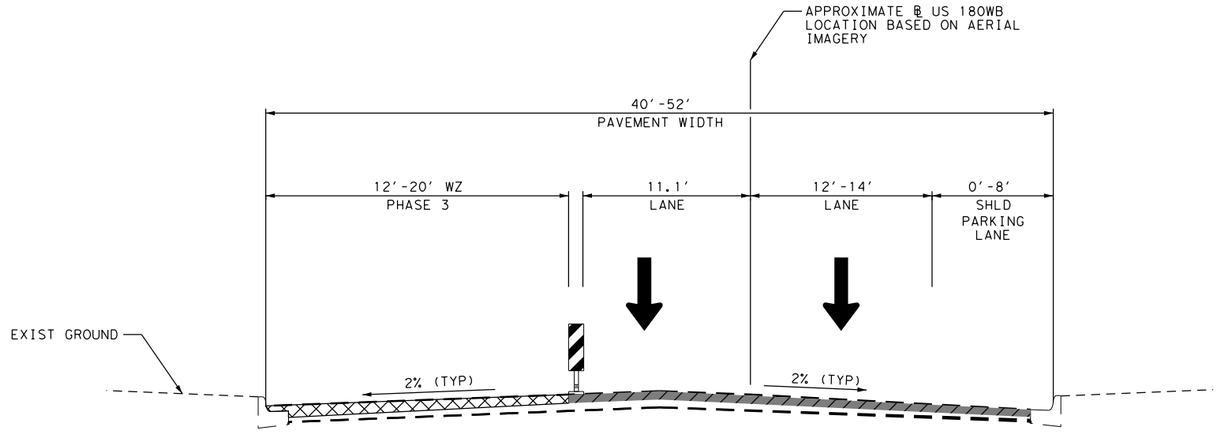
Texas Department of Transportation

US 180 WB (HUBBARD ST) TCP PHASE 2 TYPICAL SECTIONS

SHEET 3 OF 3

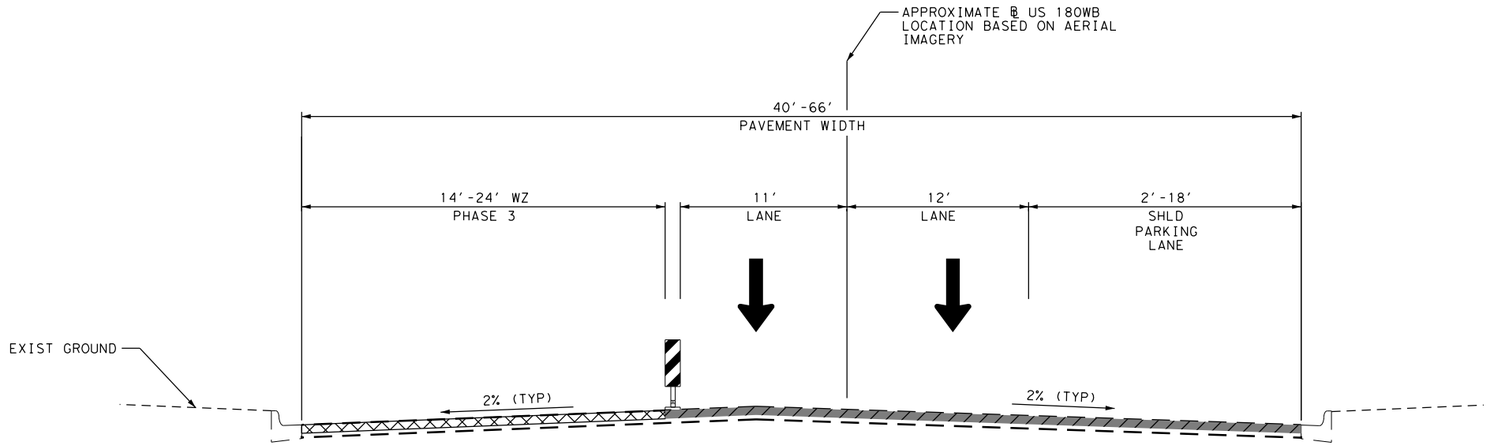
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	48
0008	01	046,ETC	



TCP TYPICAL SECTION PHASE 3 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 2889+90 TO STA 2911+40
CSJ: 0008-01-046
STA 2911+40 TO STA 2953+30



TCP TYPICAL SECTION PHASE 3 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 2953+30 TO STA 2979+85

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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Texas Department of Transportation

US 180 WB (HUBBARD ST) TCP PHASE 3 TYPICAL SECTIONS

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	49
0008	01	046, ETC	

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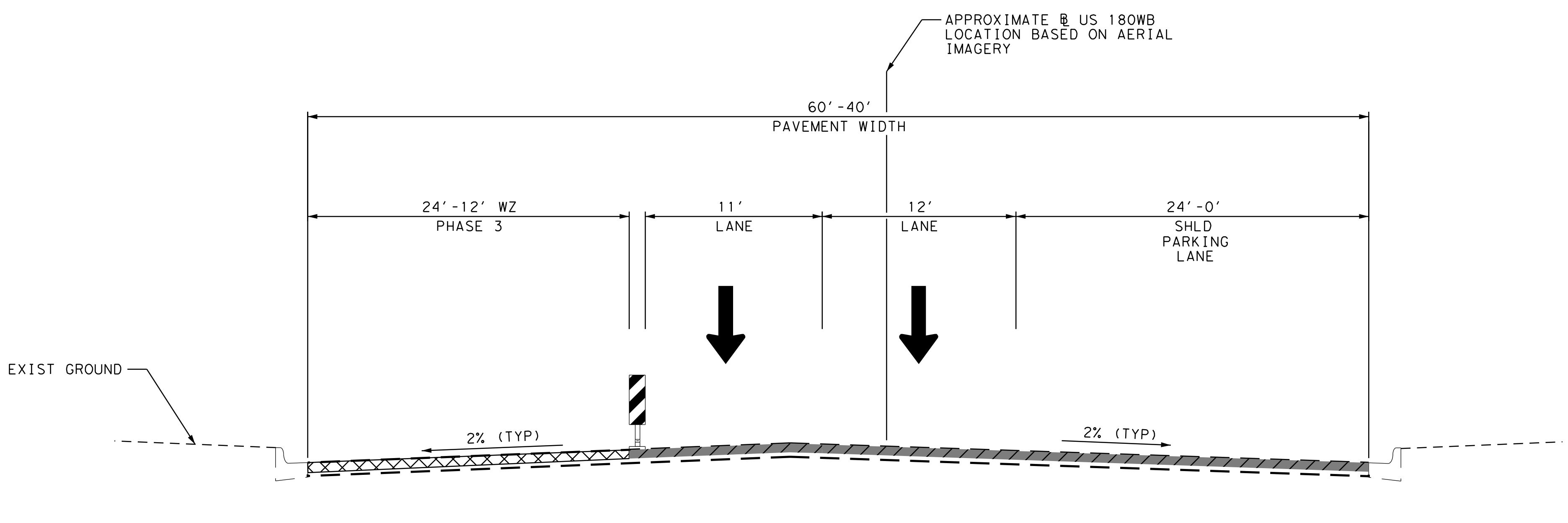
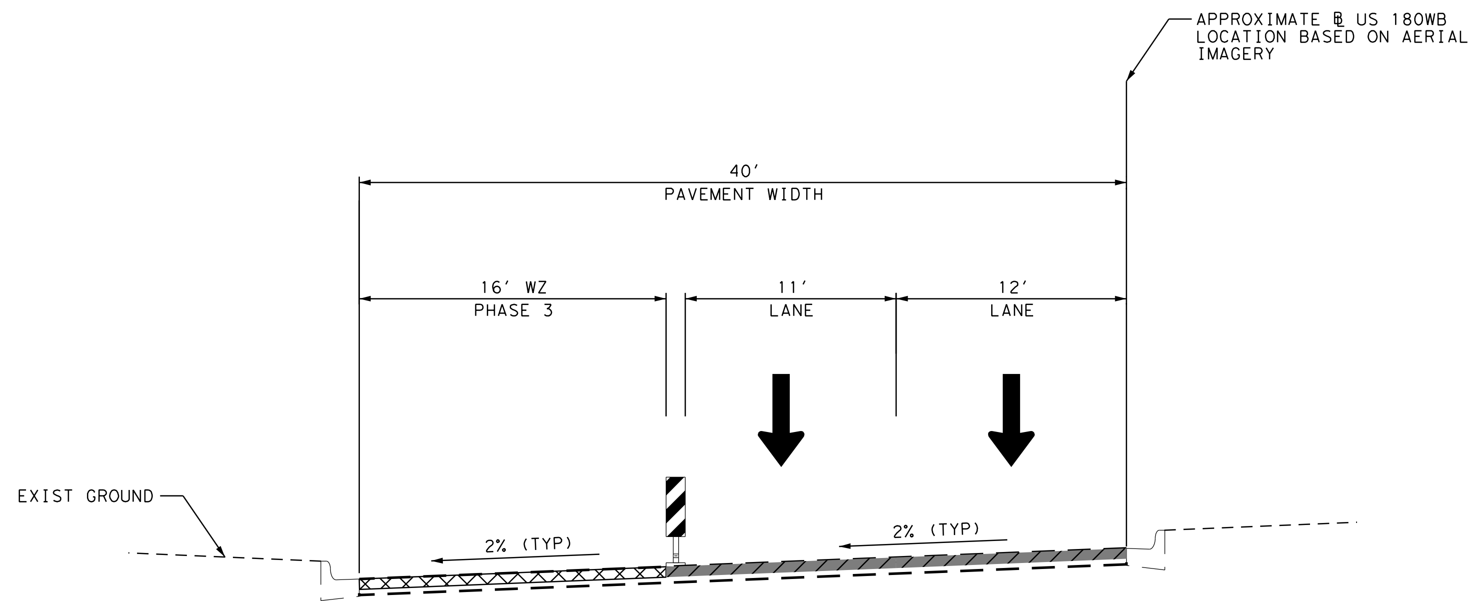


TCP TYPICAL SECTION PHASE 3 - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2979+85 TO STA 2982+70



TCP TYPICAL SECTION PHASE 3 - US 180 WB (HUBBARD ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 2982+70 TO STA 2987+40

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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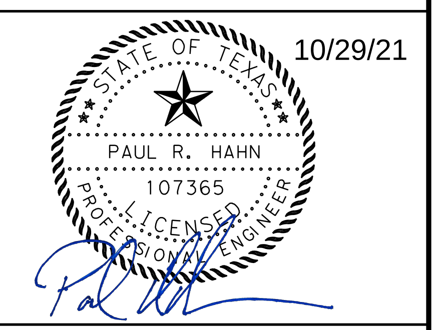


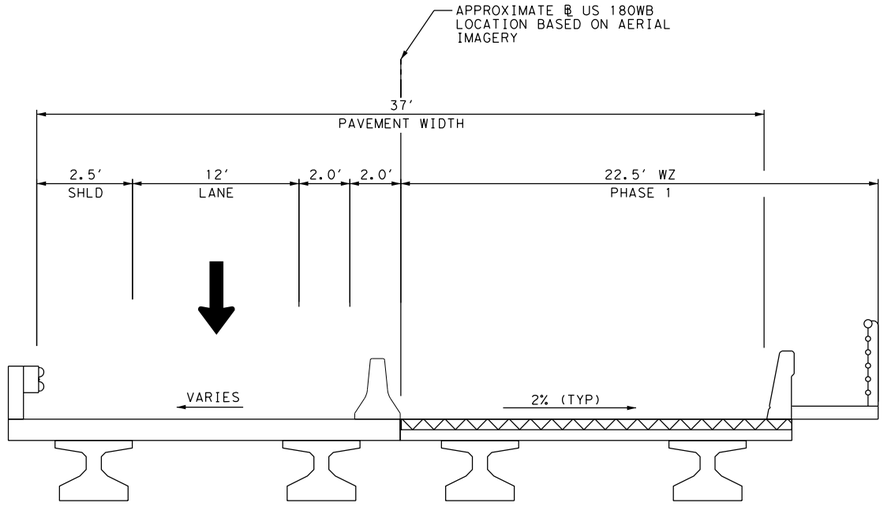
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB (HUBBARD ST)
TCP PHASE 3
TYPICAL SECTIONS

SHEET 2 OF 2

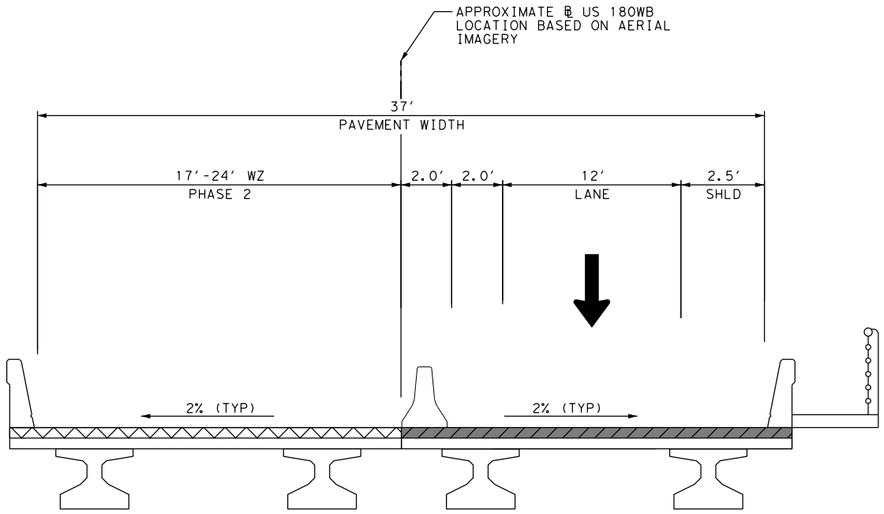
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	50
CONTROL	SECTION	JOB	
0008	01	046,ETC	



TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 2867+58 TO STA 2868+10



TCP TYPICAL SECTION PHASE 2 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 2867+58 TO STA 2868+10

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.
6. REFERENCE ALL EXISTING PAVEMENT MARKINGS PRIOR TO PLANING OPERATION.
7. LEAVE A UNIFORM SURFACE OF PLANED PAVEMENT FREE OF ASPHALTIC MATERIAL AND FABRIC UNDERSEAL.
8. CONTRACTOR TO ENSURE THAT EXISTING FEATURES/ELEMENTS ARE NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. DAMAGED PORTIONS ARE TO BE REPAIRED AT CONTRACTOR'S EXPENSE.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

US 180 WB (HUBBARD ST) TCP BRIDGE TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	51
0008	01	046,ETC	

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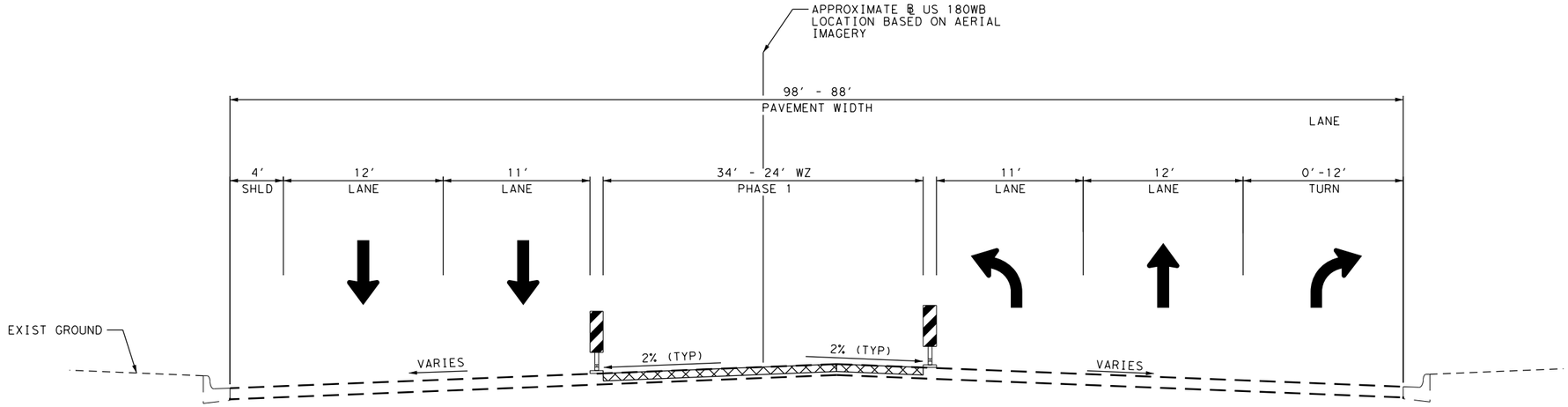
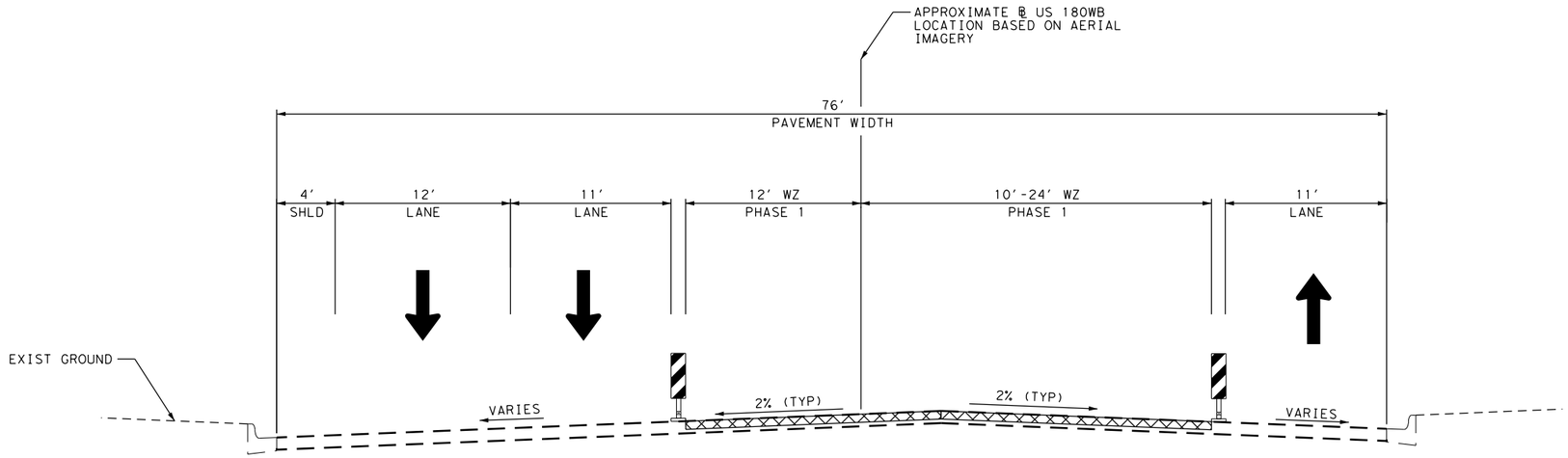


TCP TYPICAL SECTION PHASE 1 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2987+40 TO STA 2990+71



TCP TYPICAL SECTION PHASE 1 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2990+71 TO STA 2997+90

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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Texas Department of Transportation

US 180
TCP PHASE 1
TYPICAL SECTIONS

SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	52
0008	01	046,ETC	

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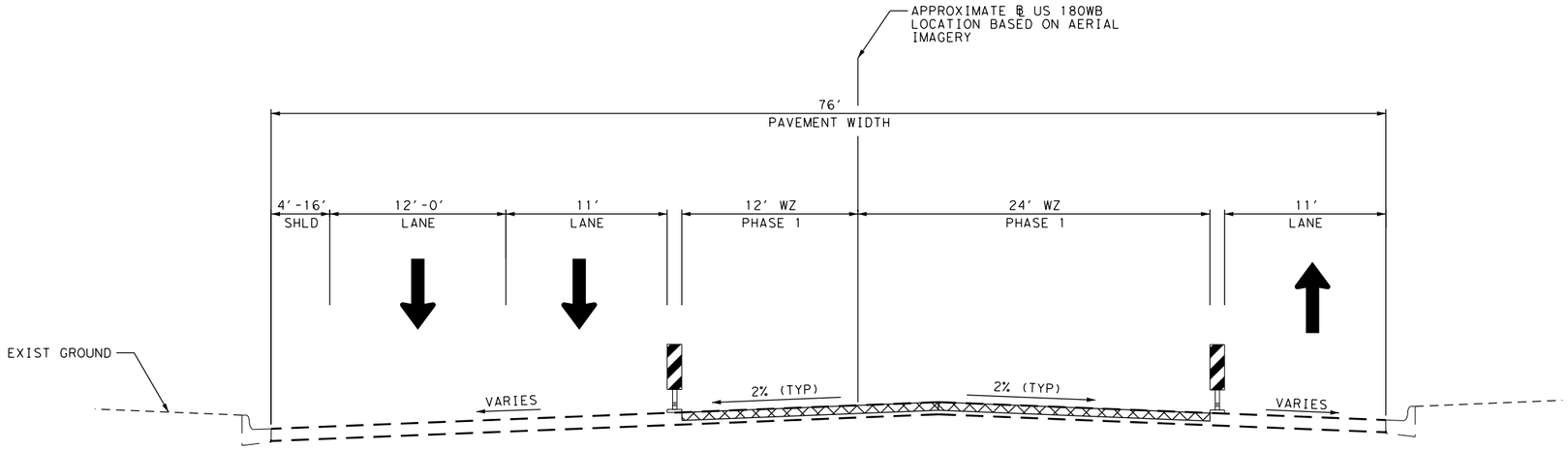

TCP TYPICAL SECTION PHASE 1 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2997+90 TO STA 3000+30

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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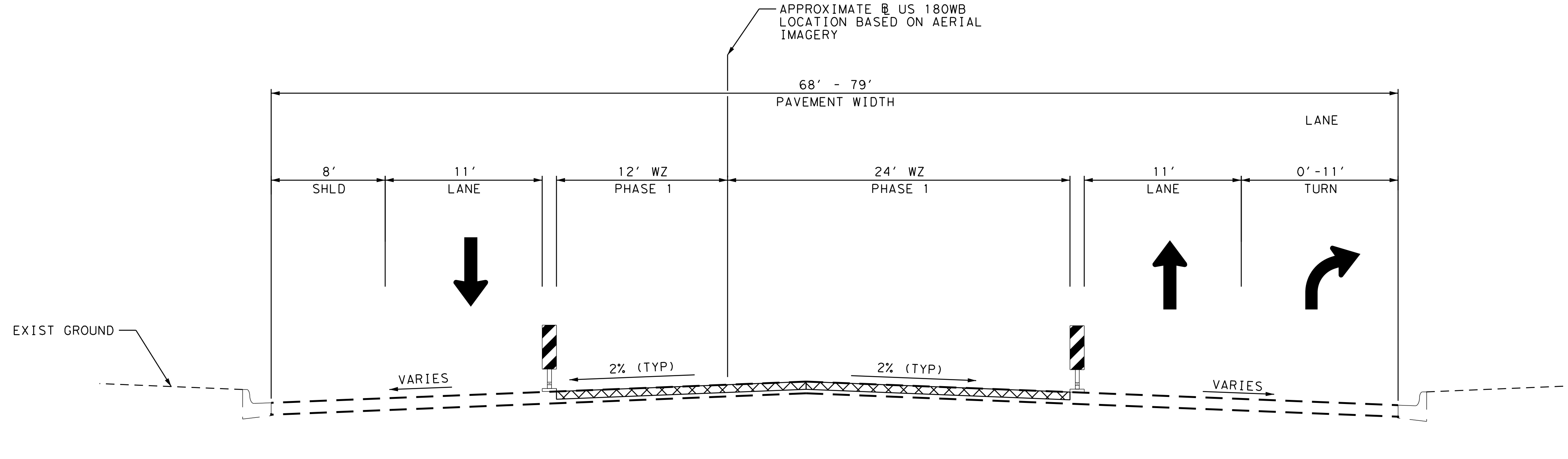
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 1
TYPICAL SECTIONS

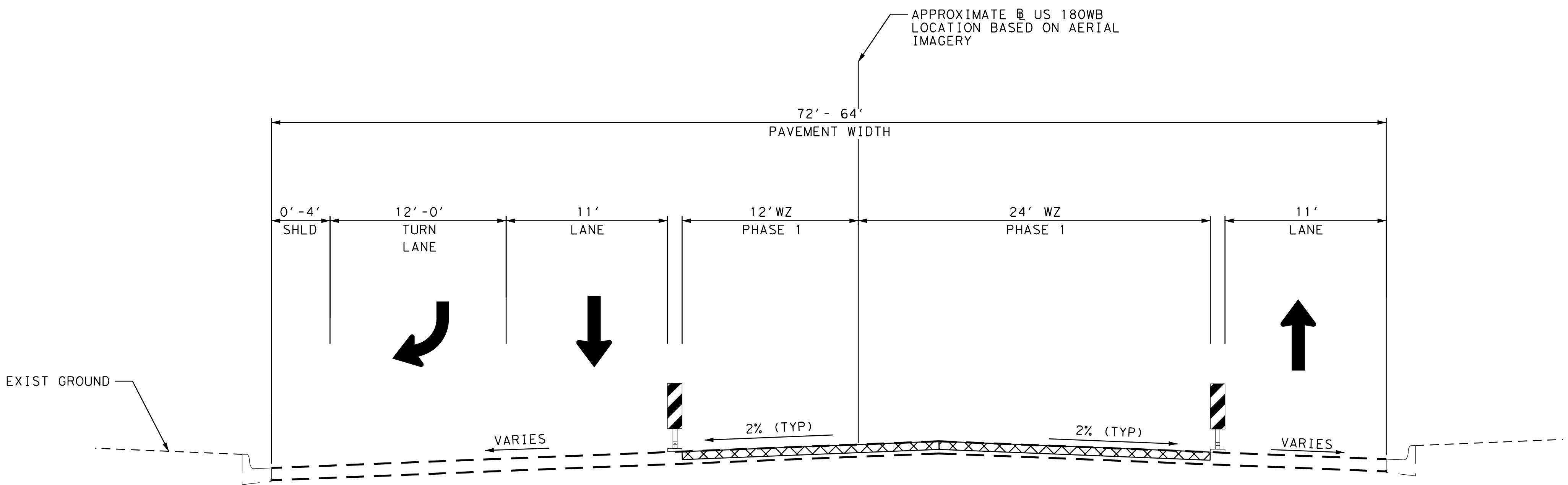
SHEET 2 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	53
CONTROL	SECTION	JOB	
0008	01	046,ETC	



TCP TYPICAL SECTION PHASE 1 - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 3000+30 TO STA 3007+60



TCP TYPICAL SECTION PHASE 1 - US 180

NOT TO SCALE
CSJ: 0008-01-046
STA 3007+60 TO END PROJECT

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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Texas Department of Transportation

US 180
TCP PHASE 1
TYPICAL SECTIONS

SHEET 3 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	54
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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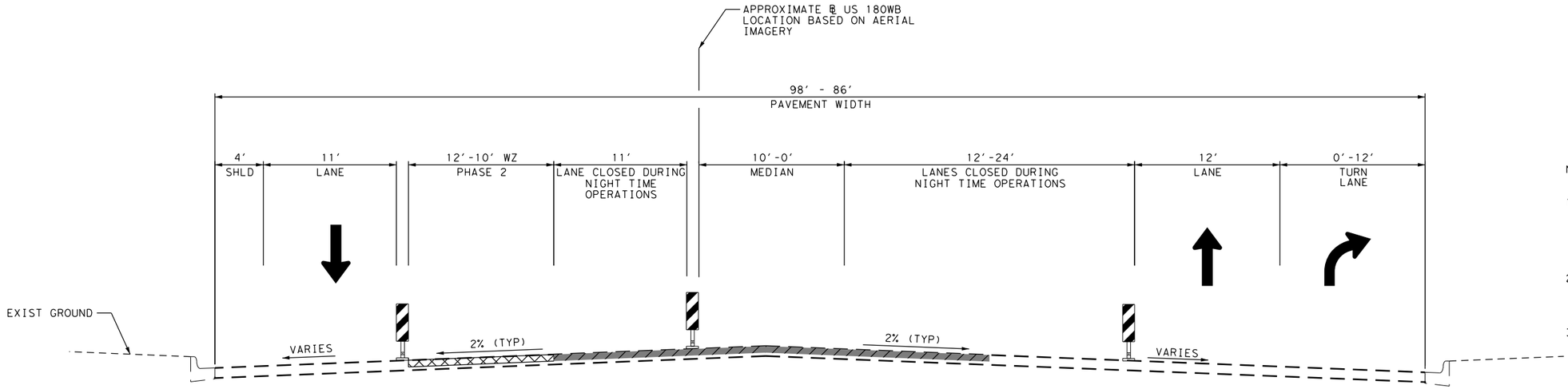

TCP TYPICAL SECTION PHASE 2 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2987+40 TO STA 2990+71

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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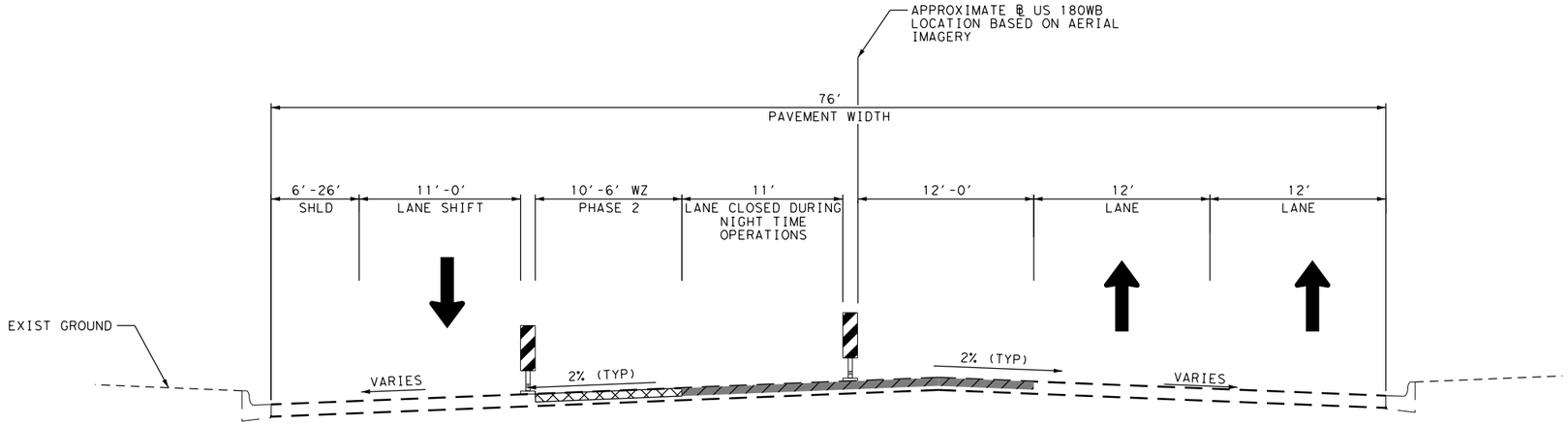

TCP TYPICAL SECTION PHASE 2 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2990+71 TO STA 2997+90

10/29/21

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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 2
TYPICAL SECTIONS

SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	55
0008	01	046, ETC	

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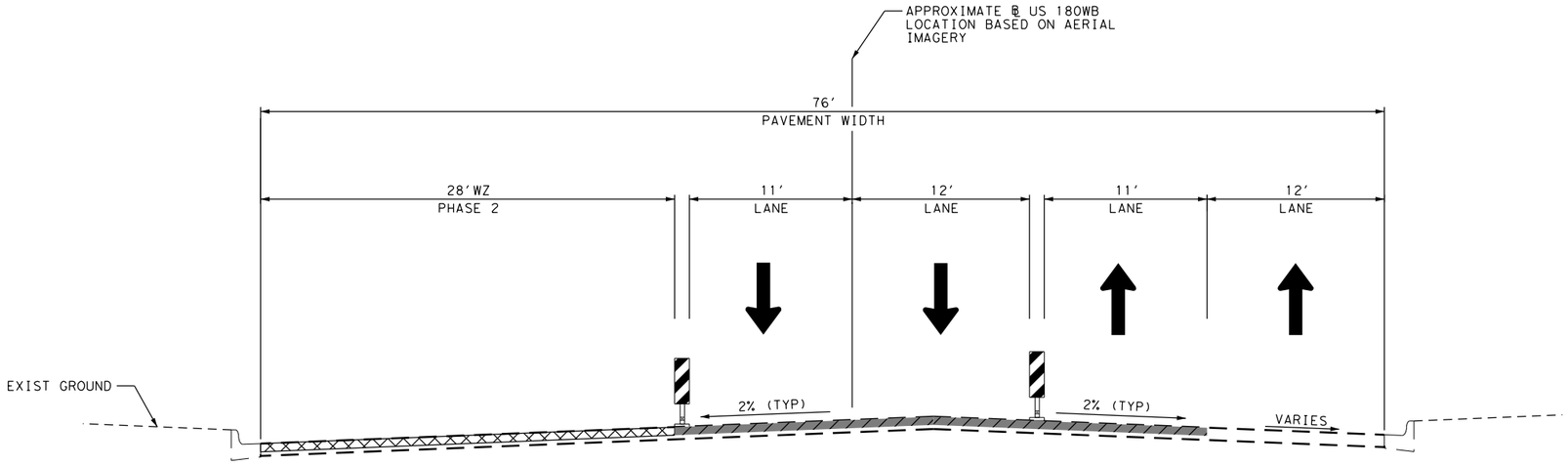

TCP TYPICAL SECTION PHASE 2 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2997+90 TO STA 3000+30

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

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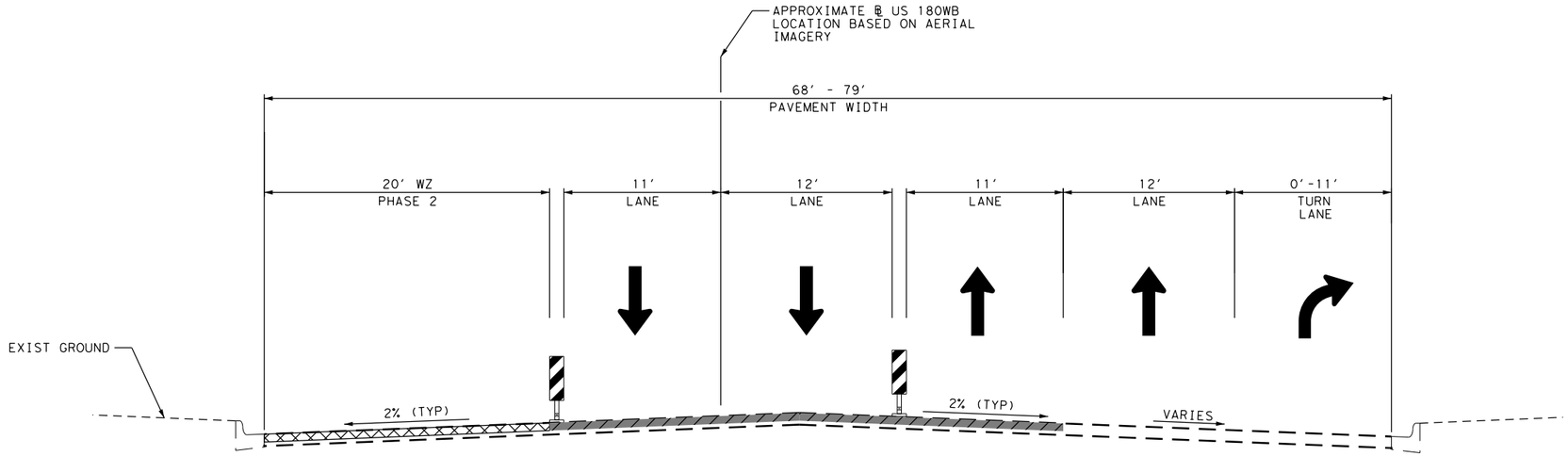
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 2
TYPICAL SECTIONS

SHEET 2 OF 3

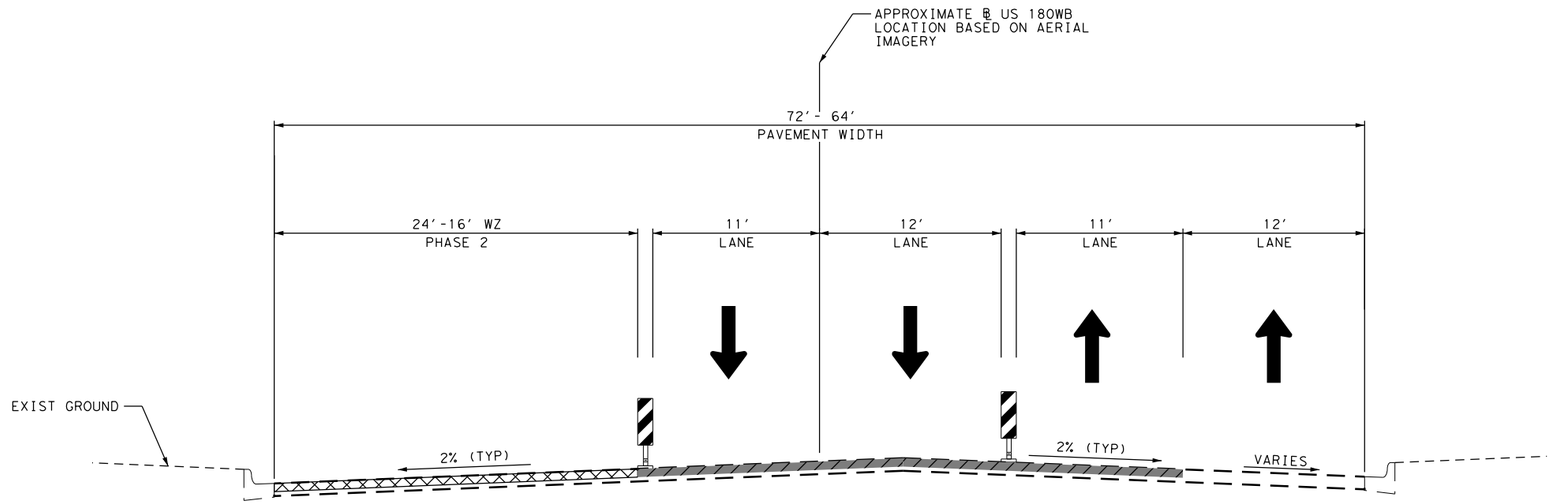
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	56
CONTROL	SECTION	JOB	
0008	01	046, ETC	



TCP TYPICAL SECTION PHASE 2 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 3000+30 TO STA 3007+60



TCP TYPICAL SECTION PHASE 2 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 3007+60 TO END PROJECT

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

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5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER
10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 2
TYPICAL SECTIONS

SHEET 3 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	57
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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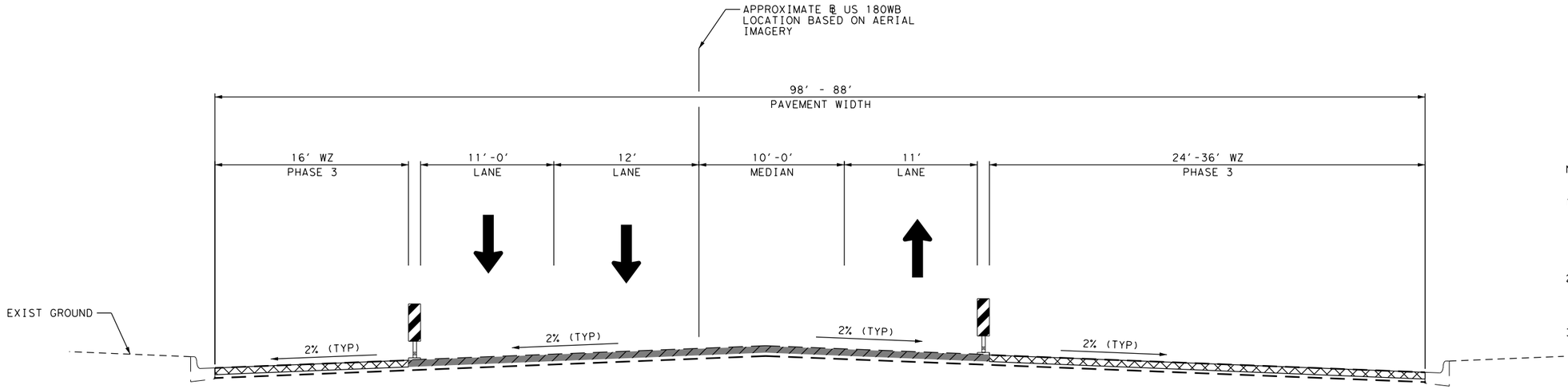

TCP TYPICAL SECTION PHASE 3 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2987+40 TO STA 2990+71

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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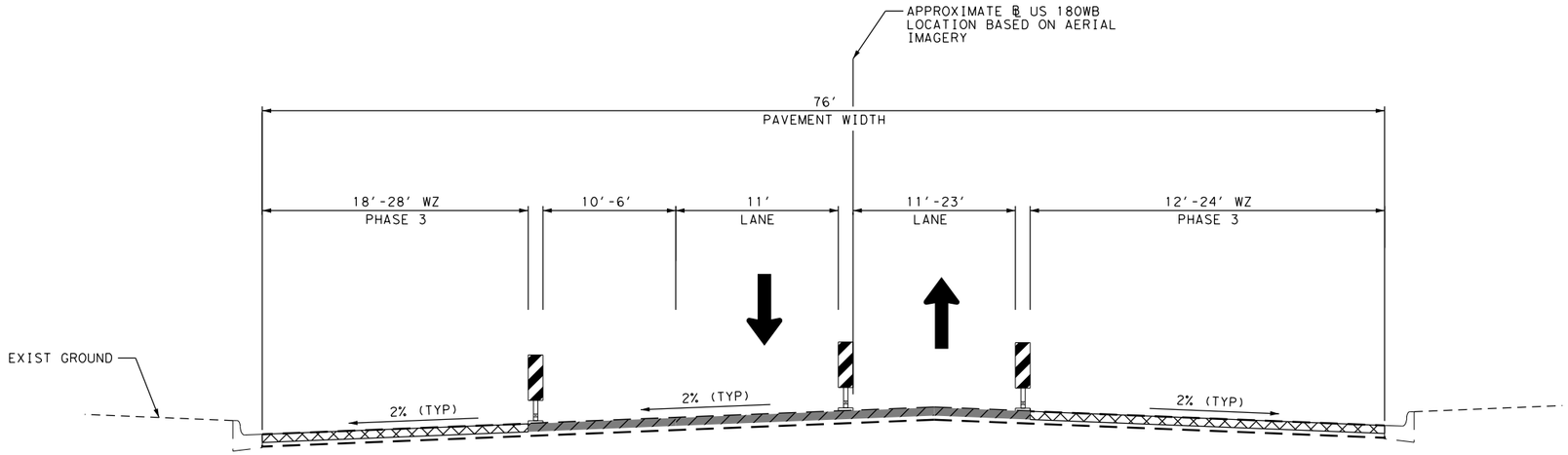

TCP TYPICAL SECTION PHASE 3 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2990+71 TO STA 2993+13

STATE OF TEXAS
PAUL R. HAHN
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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 3
TYPICAL SECTIONS

SHEET 1 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	58
0008	01	046,ETC	

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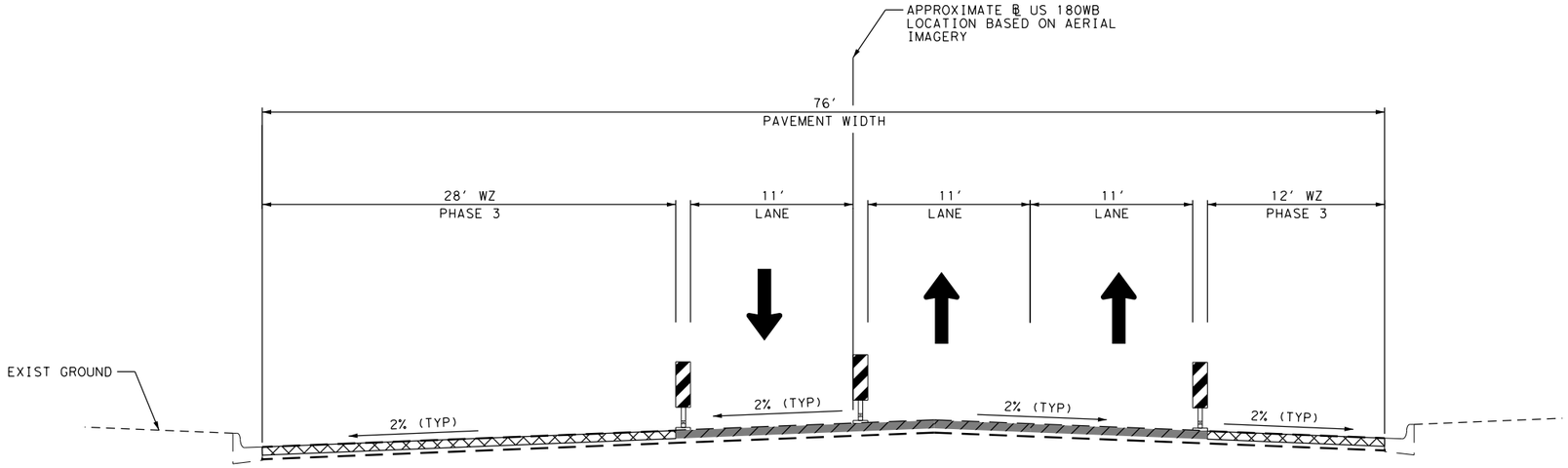

TCP TYPICAL SECTION PHASE 3 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2993+13 TO STA 2997+90

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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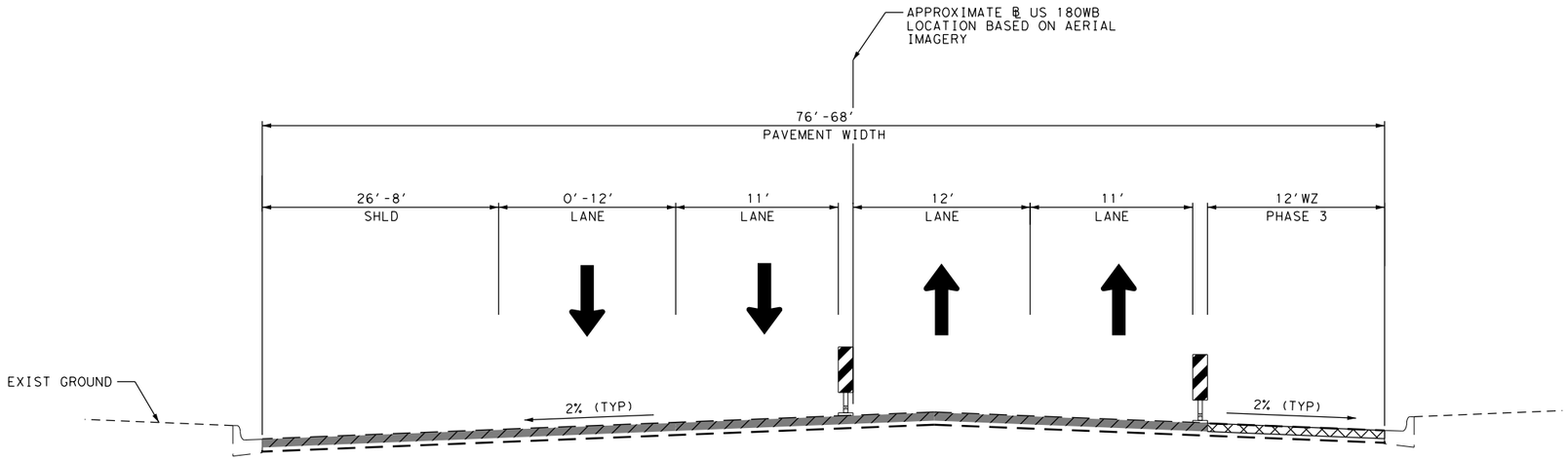

TCP TYPICAL SECTION PHASE 3 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 2997+90 TO STA 3002+73

STATE OF TEXAS
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TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 3
TYPICAL SECTIONS

SHEET 2 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	59
0008	01	046,ETC	

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LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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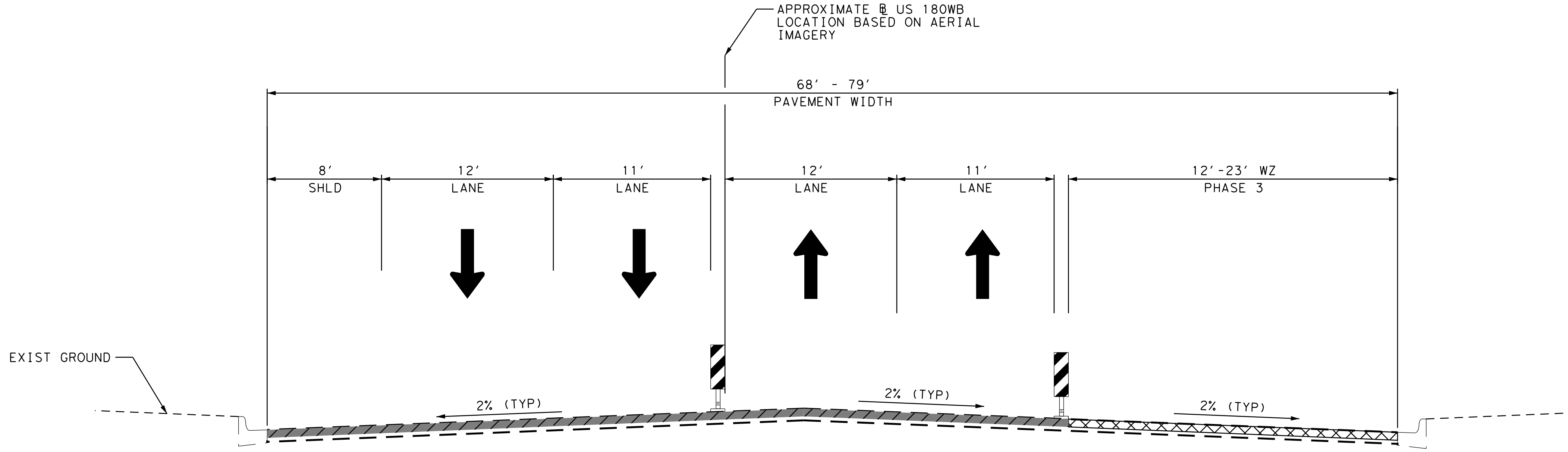
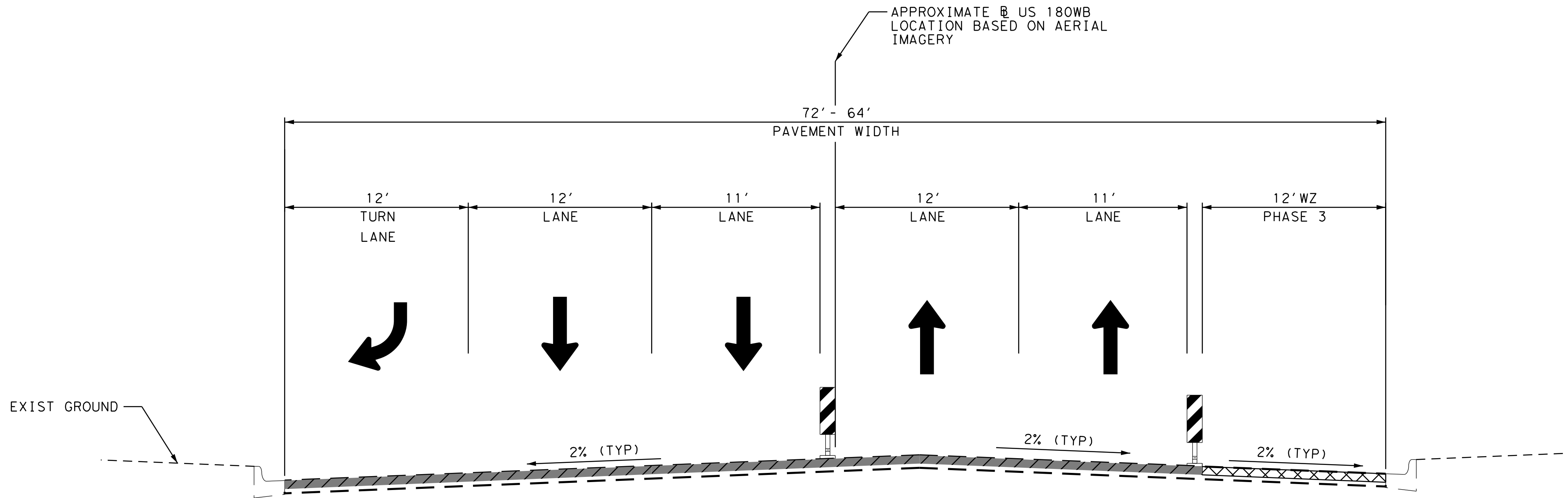


TCP TYPICAL SECTION PHASE 3 - US 180

NOT TO SCALE

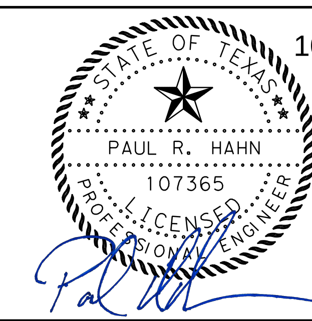
CSJ: 0008-01-046
STA 3000+30 TO STA 3007+60



TCP TYPICAL SECTION PHASE 3 - US 180

NOT TO SCALE

CSJ: 0008-01-046
STA 3007+60 TO END PROJECT



10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
TCP PHASE 3
TYPICAL SECTIONS

SHEET 3 OF 3

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	60
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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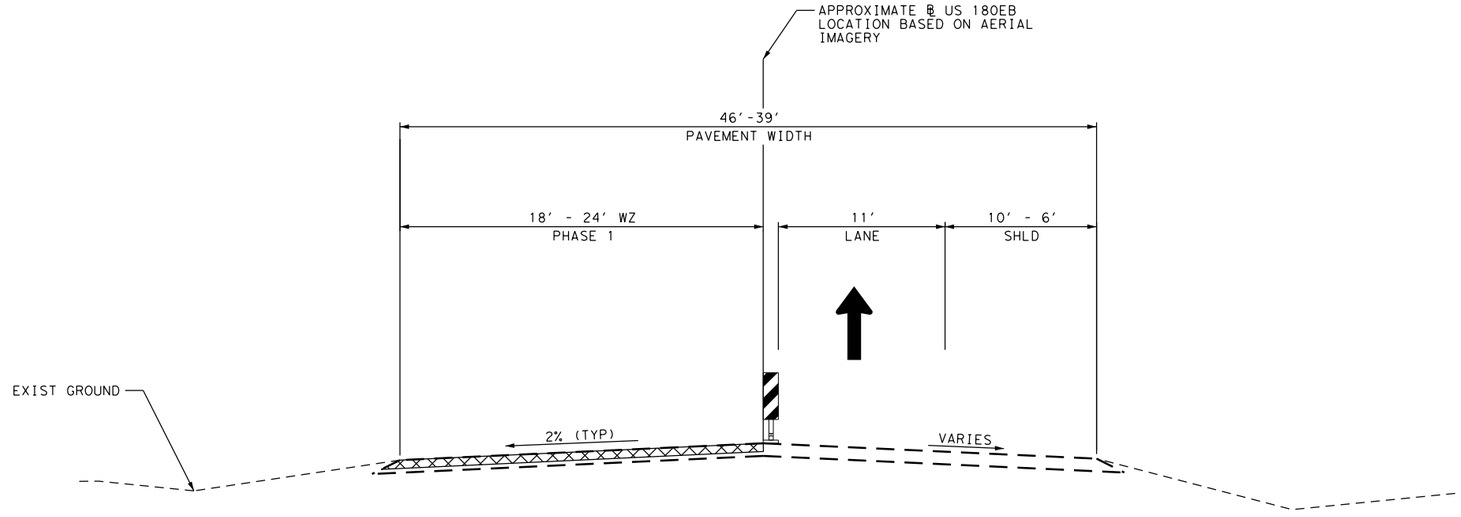

TCP TYPICAL SECTION PHASE 1 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
BEGIN PROJECT TO STA 1868+36
STA 1869+27 TO STA 1880+00

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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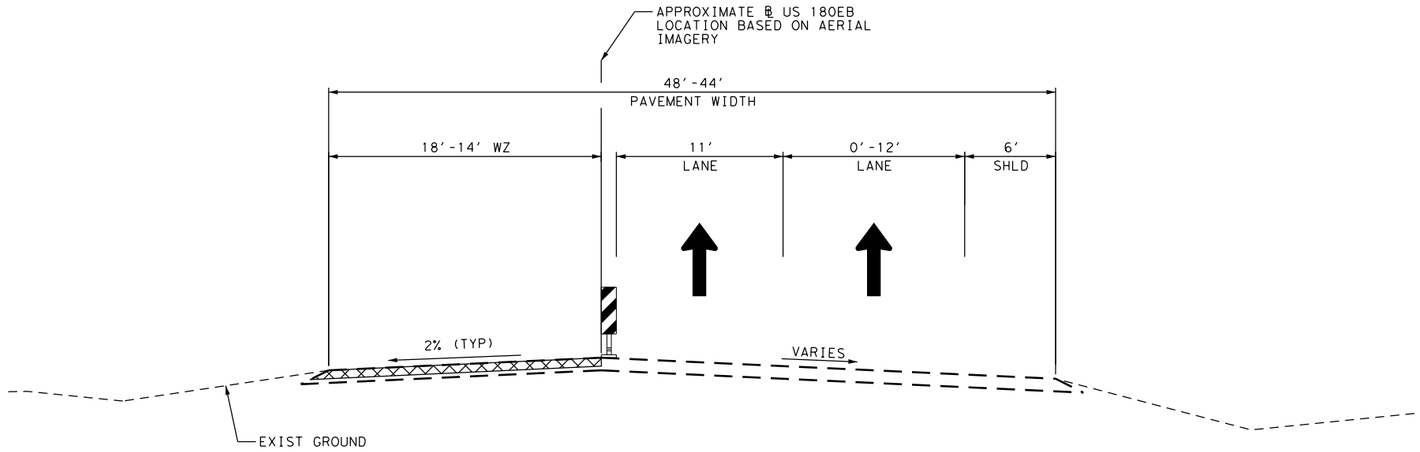

TCP TYPICAL SECTION PHASE 1 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1880+00 TO STA 1882+80

STATE OF TEXAS
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Texas Department of Transportation

US 180 EB (FIRST ST) TCP PHASE 1 TYPICAL SECTIONS

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	61
0008	01	046, ETC	

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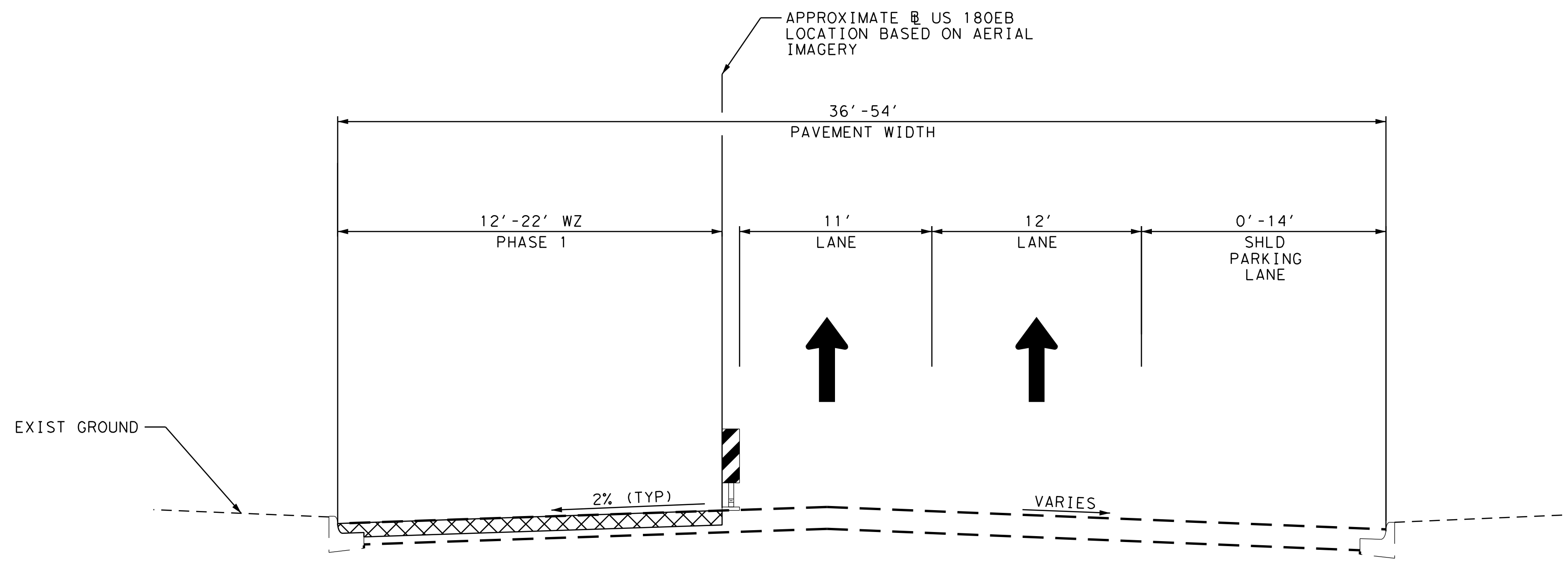
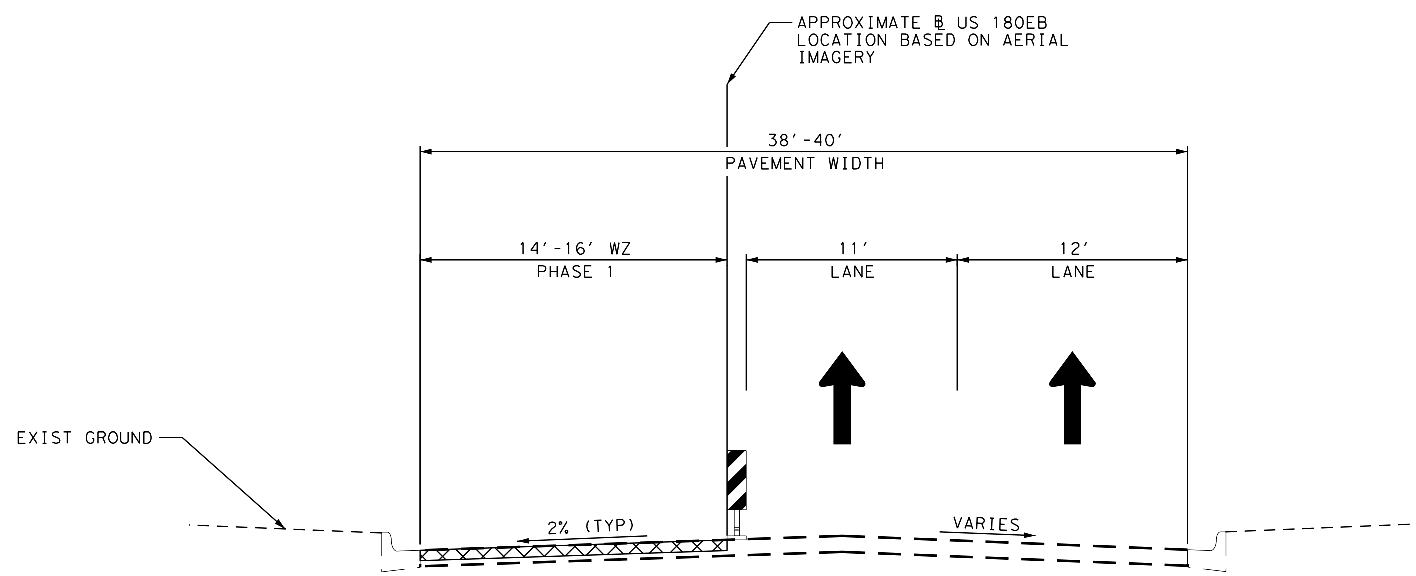


TCP TYPICAL SECTION PHASE 1 - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0007-10-061
STA 1882+80 TO STA 1911+40
CSJ: 0008-01-046
STA 1911+40 TO STA 1954+30



TCP TYPICAL SECTION PHASE 1 - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 1954+30 TO STA 1988+00

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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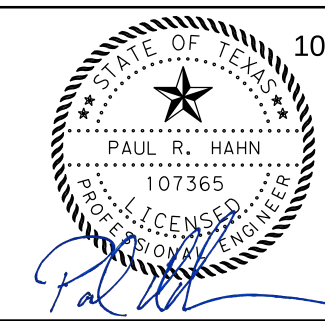


10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

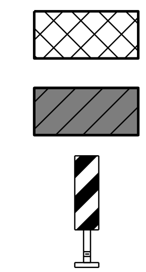
Texas Department of Transportation

US 180 EB (FIRST ST)
TCP PHASE 1
TYPICAL SECTIONS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	62
CONTROL	SECTION	JOB	
0008	01	046,ETC	

LEGEND



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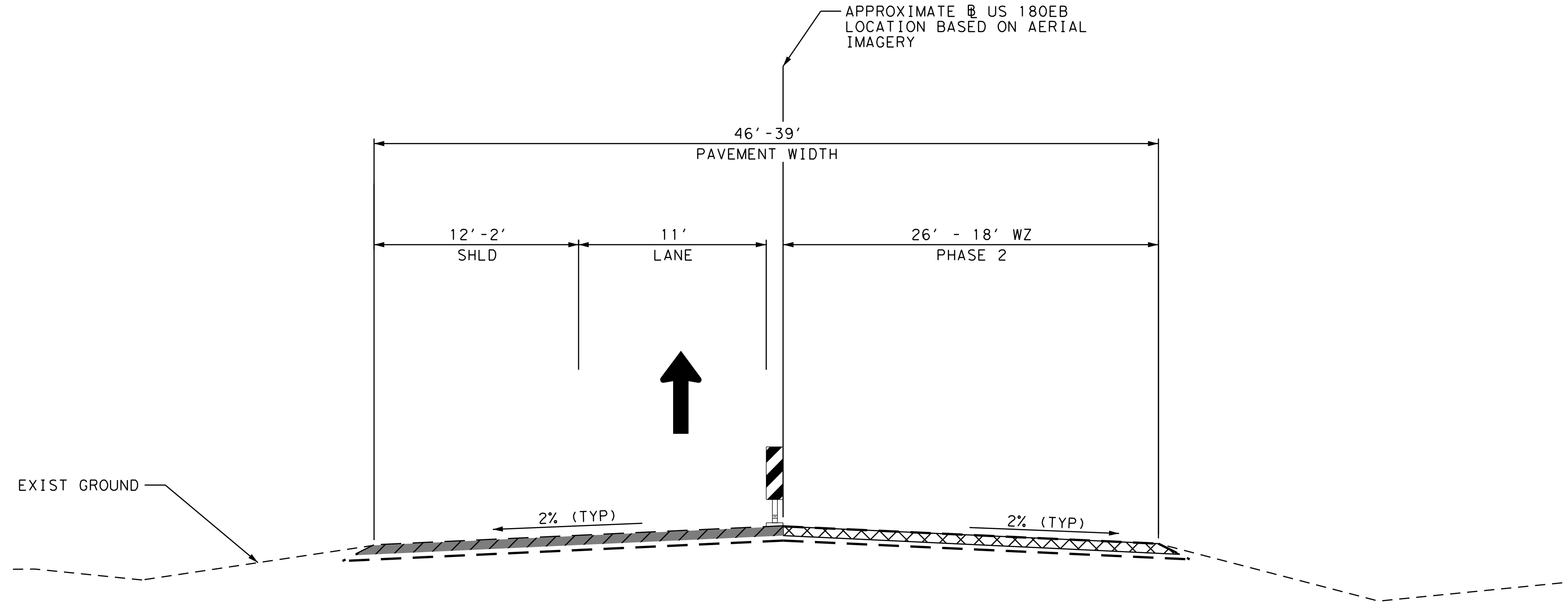
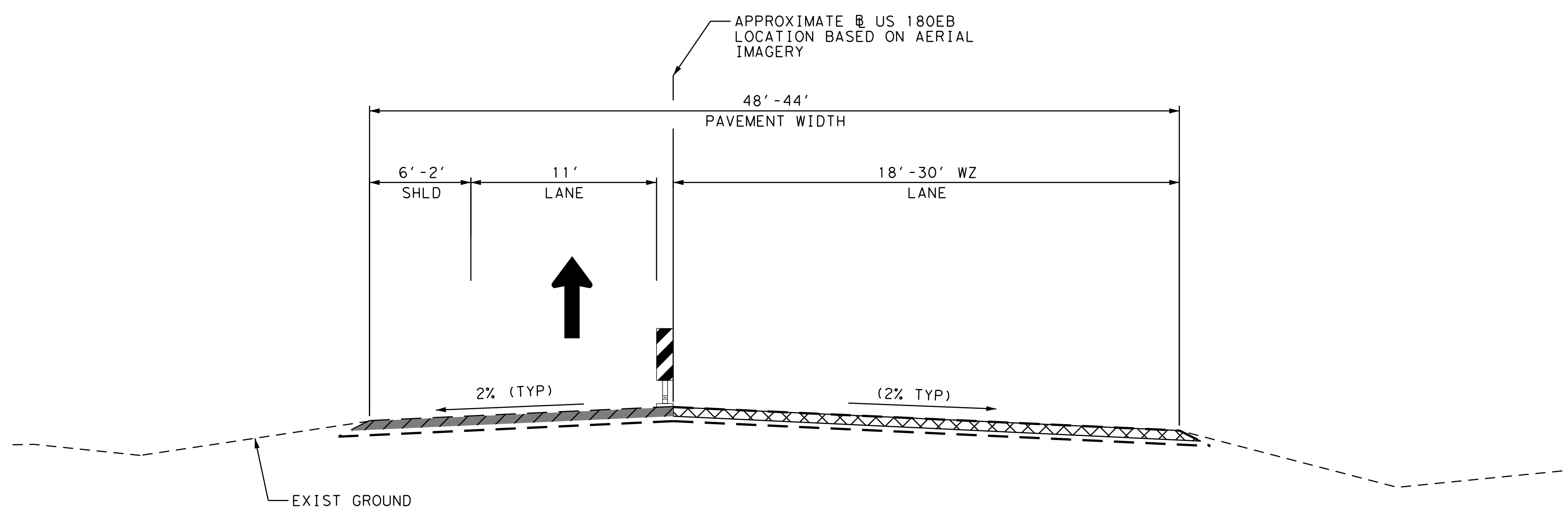


TCP TYPICAL SECTION PHASE 2 - US 180 EB (FIRST ST)

NOT TO SCALE

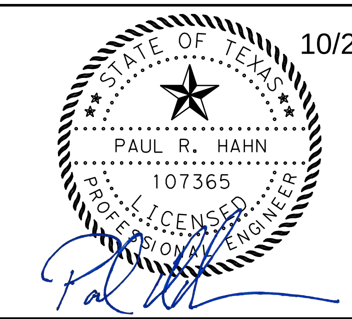
CSJ: 0007-10-061
BEGIN PROJECT TO STA 1868+36
STA 1869+27 TO STA 1880+00



TCP TYPICAL SECTION PHASE 2 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1880+00 TO STA 1882+80



10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST)
TCP PHASE 2
TYPICAL SECTIONS

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	63
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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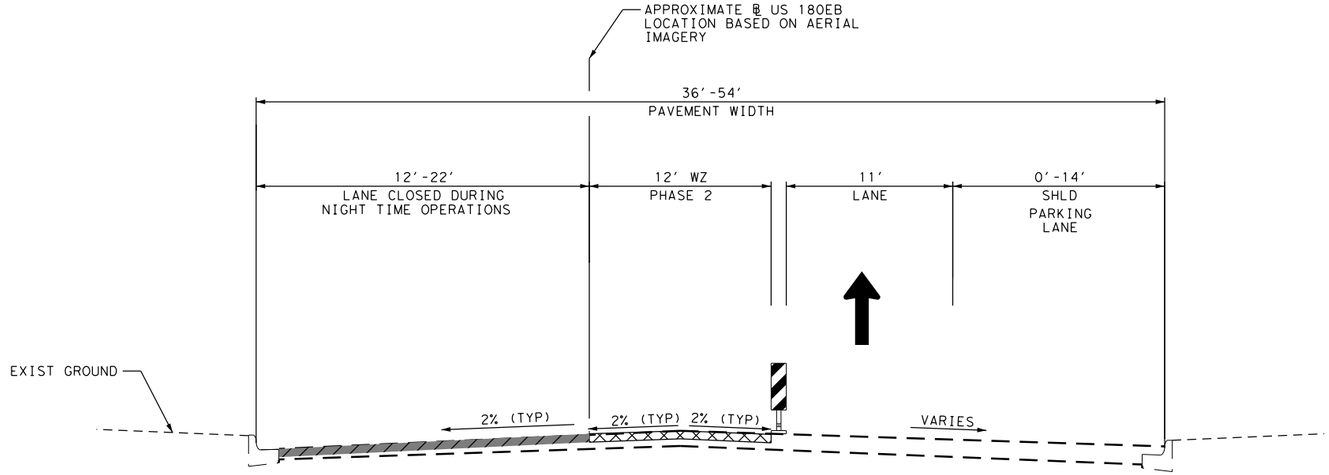
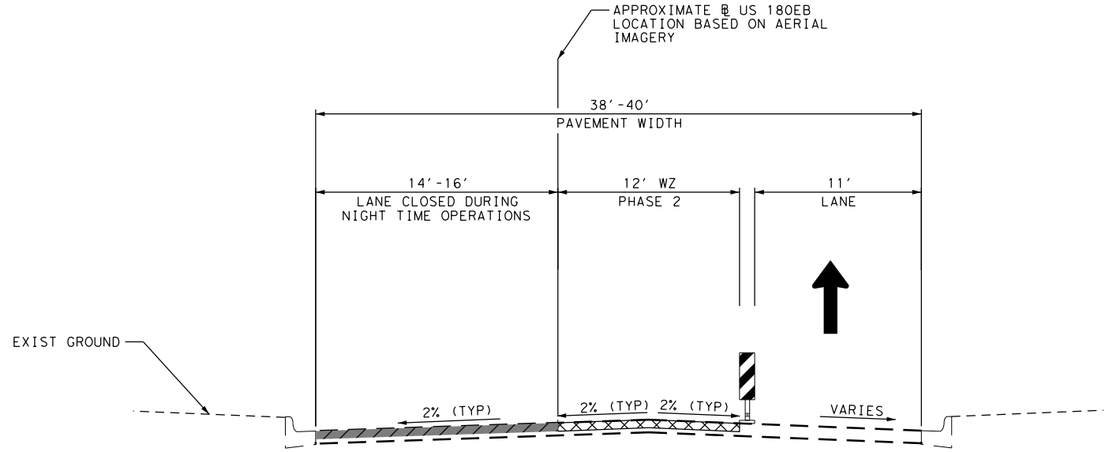


TCP TYPICAL SECTION PHASE 2 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1882+80 TO STA 1911+40
CSJ: 0008-01-046
STA 1911+40 TO STA 1954+30



TCP TYPICAL SECTION PHASE 2 - US 180 EB (FIRST ST)

NOT TO SCALE
CSJ: 0008-01-046
STA 1954+30 TO STA 1988+00

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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STATE OF TEXAS
PAUL R. HAHN
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10/29/21

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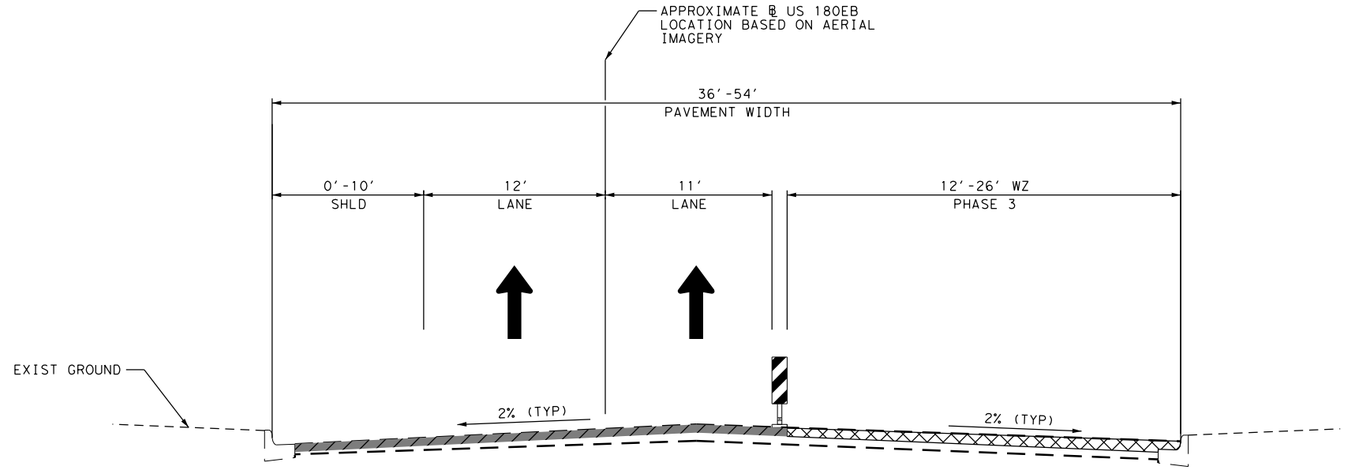
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST) TCP PHASE 2 TYPICAL SECTIONS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	64
0008	01	046, ETC	



TCP TYPICAL SECTION PHASE 3 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1882+80 TO STA 1911+40
CSJ: 0008-01-046
STA 1911+40 TO STA 1954+30

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

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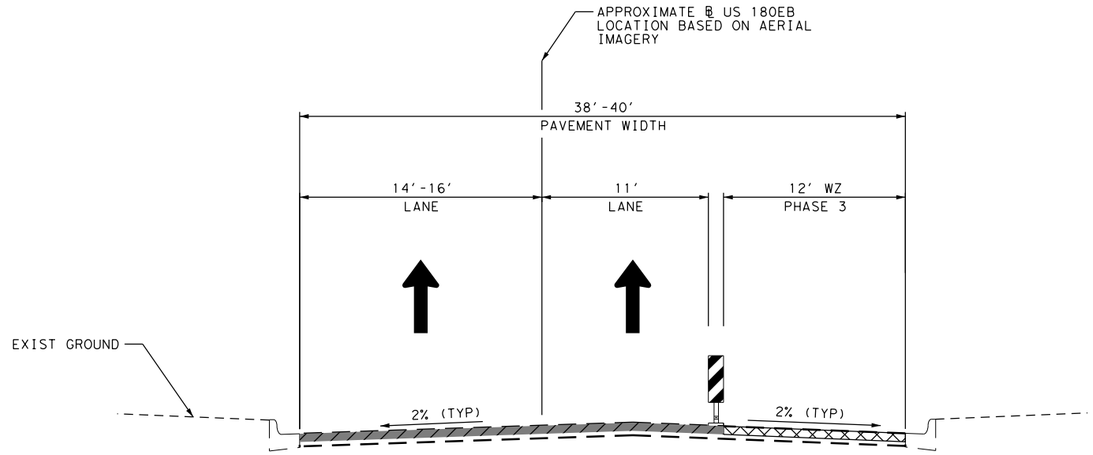
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST) TCP PHASE 3 TYPICAL SECTIONS

SHEET 1 OF 2

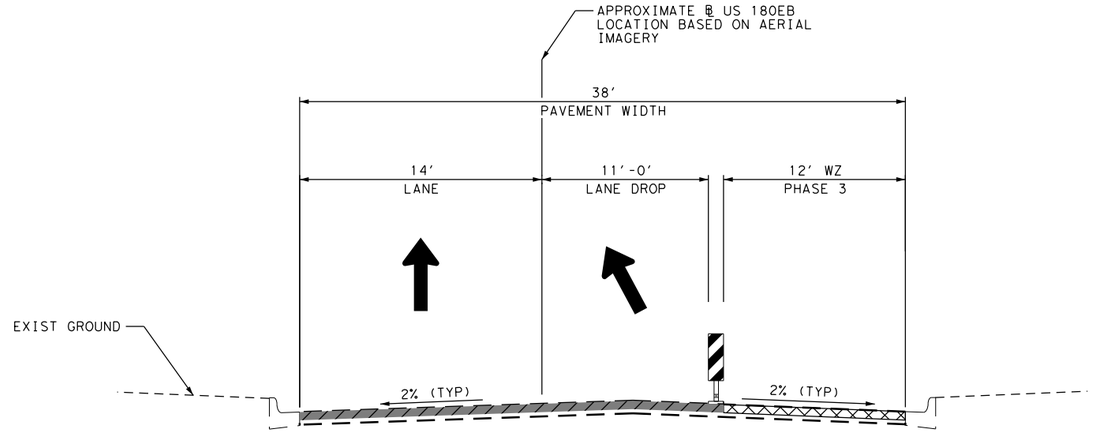
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	65
CONTROL	SECTION	JOB	
0008	01	046, ETC	



TCP TYPICAL SECTION PHASE 3 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 1954+30 TO STA 1983+20



TCP TYPICAL SECTION PHASE 3 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0008-01-046
STA 1983+20 TO STA 1988+00

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTHS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND COORDINATE ANY DISCREPANCIES WITH THE ENGINEER.
3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

10/29/21

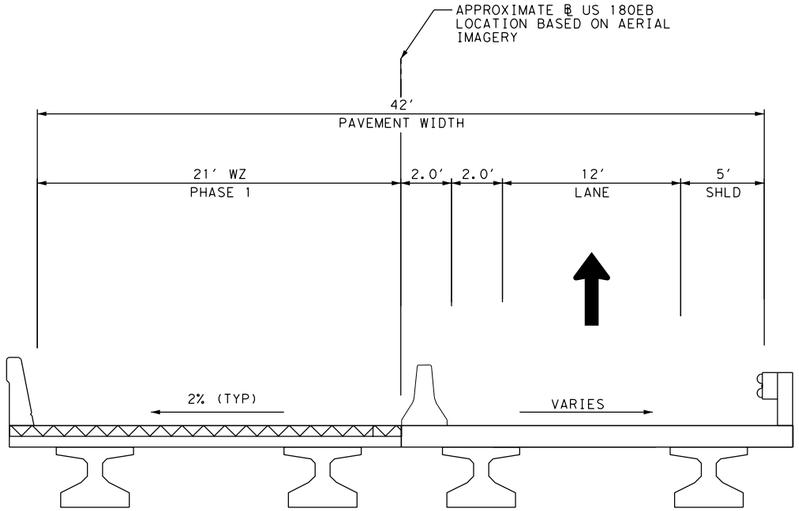
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST)
TCP PHASE 3
TYPICAL SECTIONS

SHEET 2 OF 2

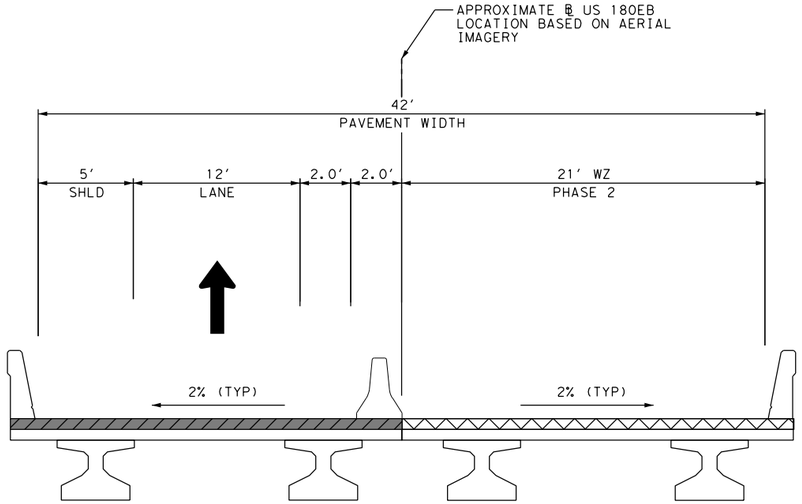
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	66
0008	01	046, ETC	



TCP TYPICAL SECTION PHASE 1 - US 180 WB (HUBBARD ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1868+36 TO STA 1869+27



TCP TYPICAL SECTION PHASE 2 - US 180 EB (FIRST ST)

NOT TO SCALE

CSJ: 0007-10-061
STA 1868+36 TO STA 1869+27

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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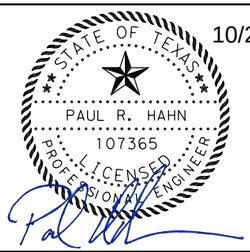
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.
6. REFERENCE ALL EXISTING PAVEMENT MARKINGS PRIOR TO PLANING OPERATION.
7. LEAVE A UNIFORM SURFACE OF PLANED PAVEMENT FREE OF ASPHALTIC MATERIAL AND FABRIC UNDERSEAL.
8. CONTRACTOR TO ENSURE THAT EXISTING FEATURES/ELEMENTS ARE NOT DAMAGED DURING CONSTRUCTION ACTIVITIES. DAMAGED PORTIONS ARE TO BE REPAIRED AT CONTRACTOR'S EXPENSE.



10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB (FIRST ST) TCP BRIDGE TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	67
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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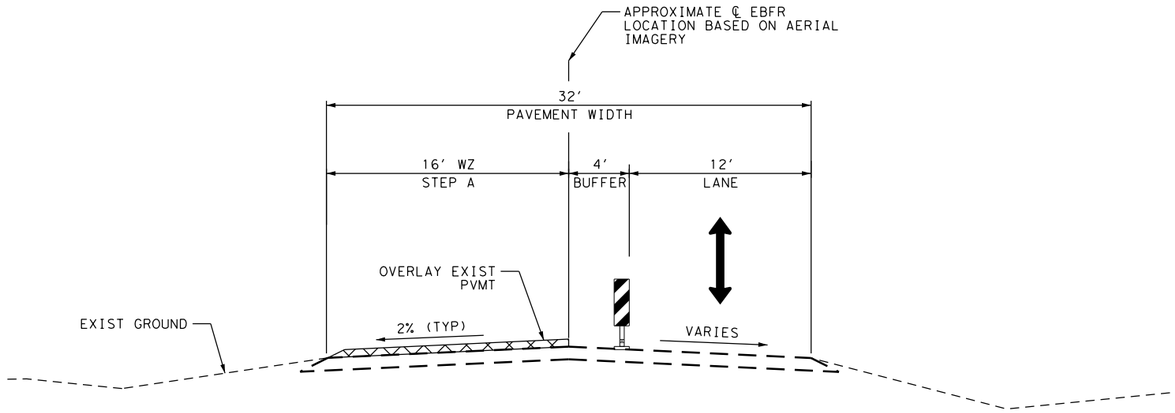

TCP TYPICAL SECTION PHASE 1 - IH 20 EB FRONTAGE ROAD

NOT TO SCALE
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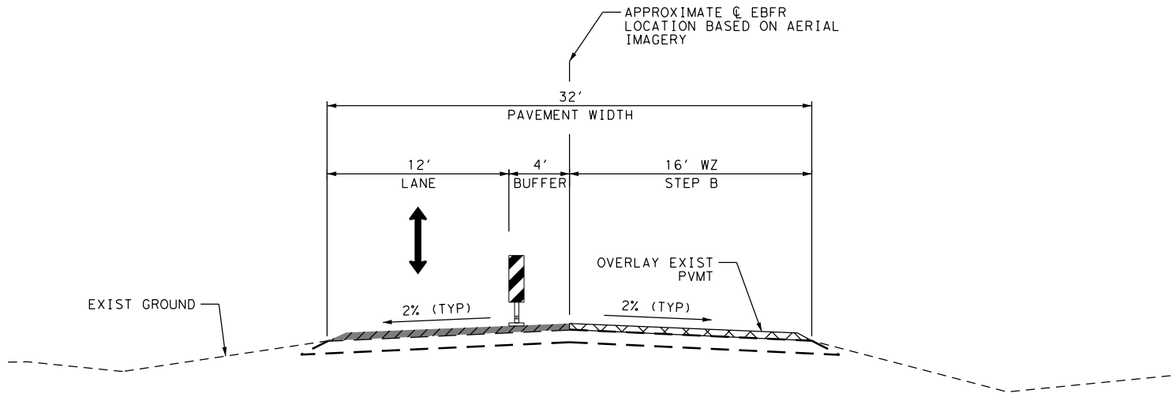

TCP TYPICAL SECTION PHASE 2 - IH 20 EB FRONTAGE ROAD

NOT TO SCALE
CSJ: 0314-01-082
STA 2578+50 TO STA 2588+90

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

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3. EXISTING CROWN POINT LOCATION IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY. TARGET 2% CROSS SLOPE UNLESS EXISTING FIELD CONDITIONS INDICATE OTHERWISE.
4. SEE MILLING DETAIL NEAR CURB AND CURB INLET ON "ROADWAY DETAILS" SHEET.
5. LEVEL MILLED EDGE FOR SAFETY SLOPE. MUST BE IN PLACE IN BETWEEN MILLING OPERATIONS.

STATE OF TEXAS
PAUL R. HAHN
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LICENSED PROFESSIONAL ENGINEER
10/29/21

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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH 20 EB FR TCP PHASE 1 & 2 TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	68
0008	01	046,ETC	

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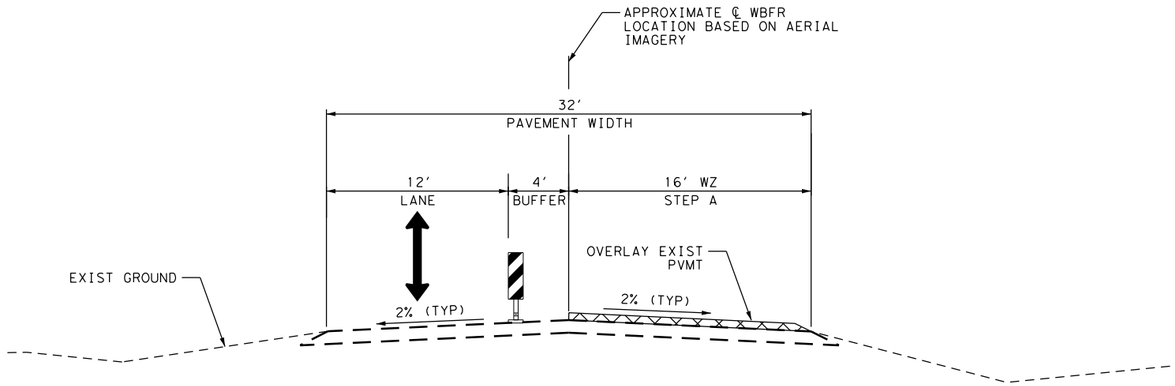

TCP TYPICAL SECTION PHASE 1 - IH 20 WB FRONTAGE ROAD

NOT TO SCALE
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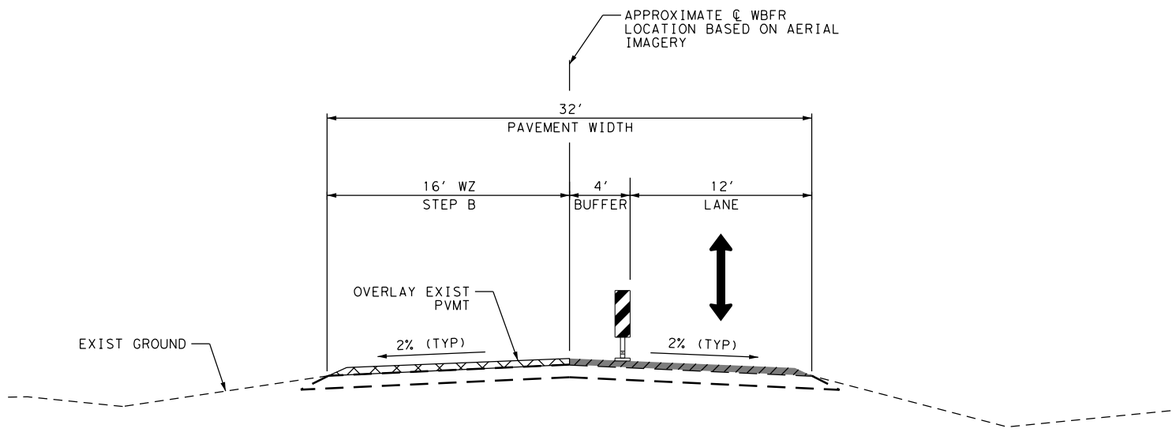
STA 3578+50 TO STA 3589+60



TCP TYPICAL SECTION PHASE 2 - IH 20 WB FRONTAGE ROAD

NOT TO SCALE
CSJ: 0314-01-082
STA 3578+50 TO STA 3589+60

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

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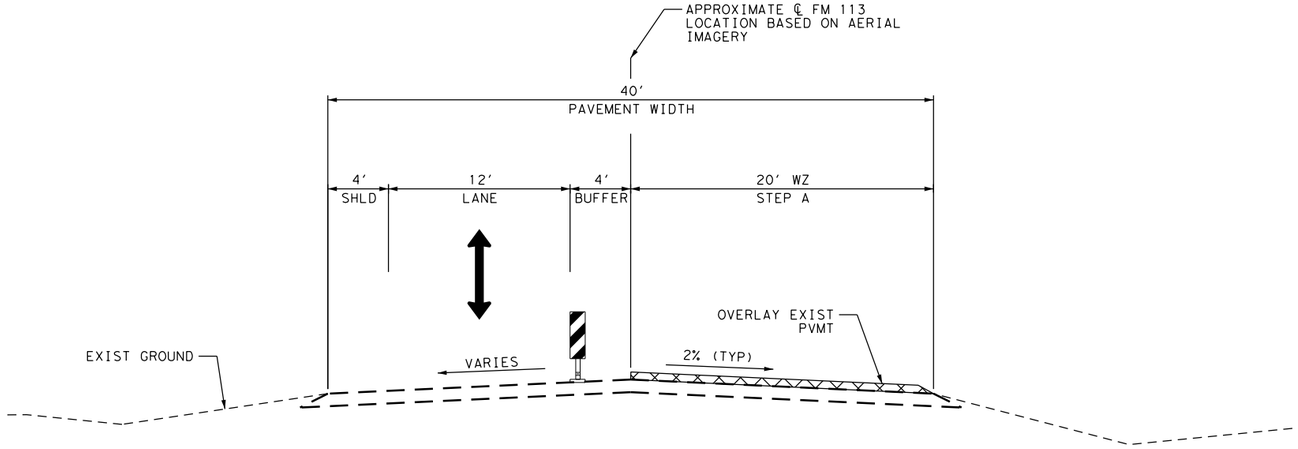
Texas Department of Transportation

IH 20 WB FR TCP PHASE 1 & 2 TYPICAL SECTIONS

SHEET 1 OF 1

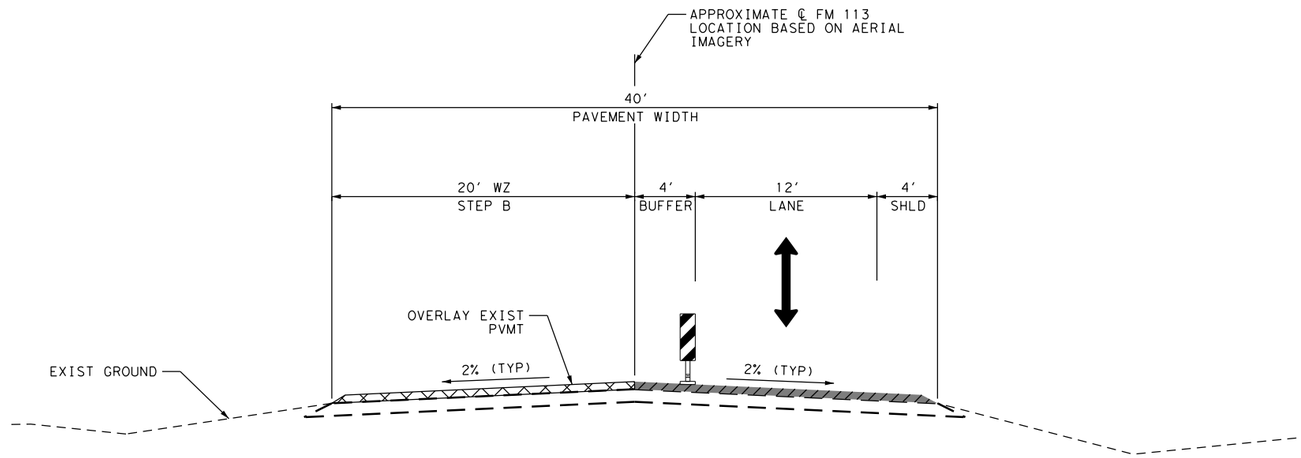
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	69
0008	01	046,ETC	



TCP TYPICAL SECTION PHASE 1 - FM 113 AT IH 20 OVERPASS

NOT TO SCALE

CSJ: 0314-01-082
STA 13+25 TO STA 17+69



TCP TYPICAL SECTION PHASE 2 - FM 113 AT IH 20 OVERPASS

NOT TO SCALE

CSJ: 0314-01-082
STA 13+25 TO STA 17+69

LEGEND

PROPOSED WORKZONE

PREVIOUS WORKZONE

CHANNELIZATION DEVICE

NOTES:

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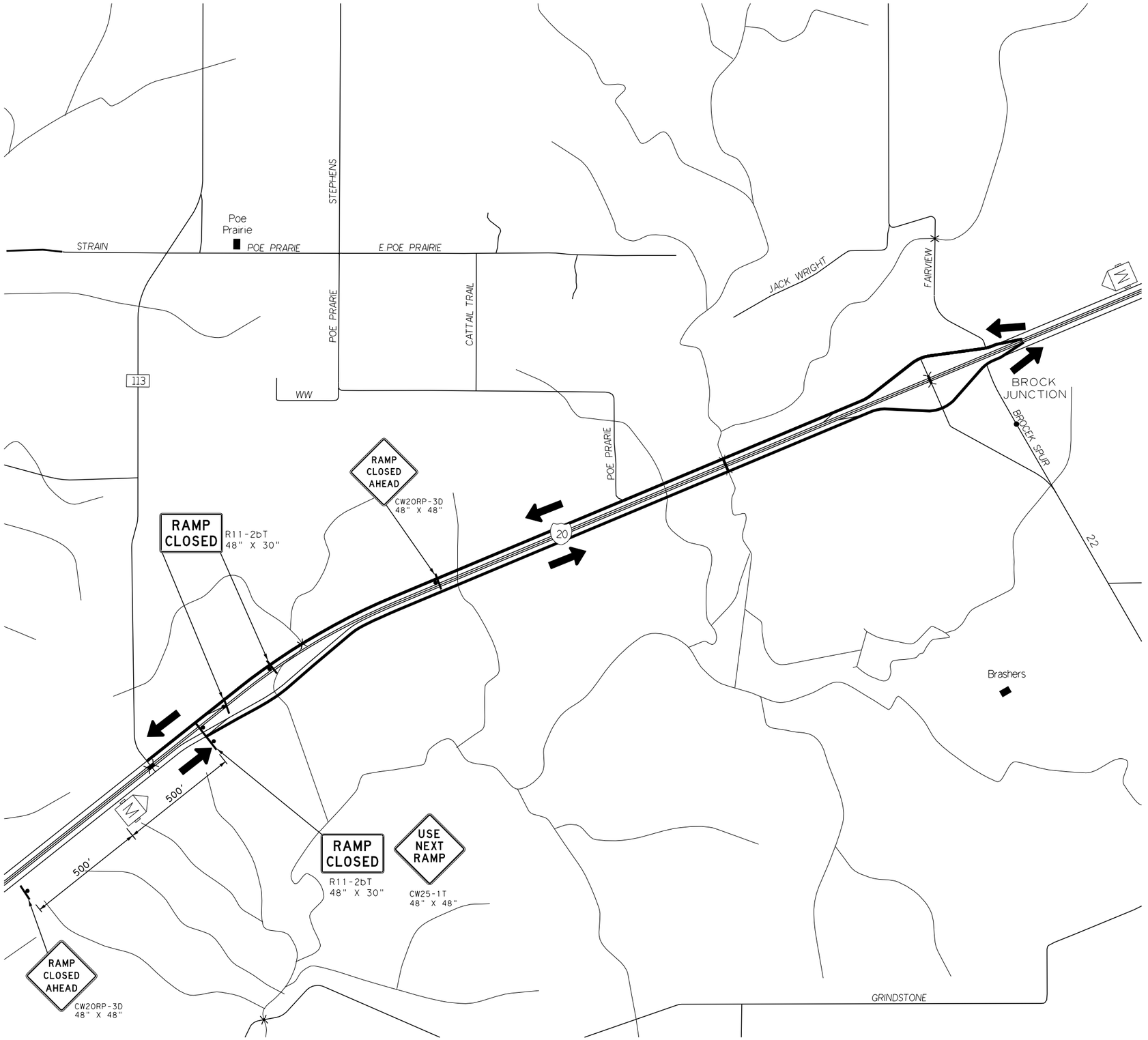
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH 20 FM 113 AT IH 20 OVERPASS
TCP PHASE 1 & 2
TYPICAL SECTIONS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	70
0008	01	046,ETC	



LEGEND

- DETOUR DIRECTION
- PORTABLE CHANGEABLE MESSAGE SIGN
- DETOUR SIGN

NOTES:

1. REFER TO TRAFFIC STANDARDS TCP(6-2)-12 AND TCP(6-3)-12 FOR ADDITIONAL INFORMATION

0 1000' 2000'

SCALE: 1" = 2000'

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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH 20
DETOUR LAYOUT

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	71
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		72

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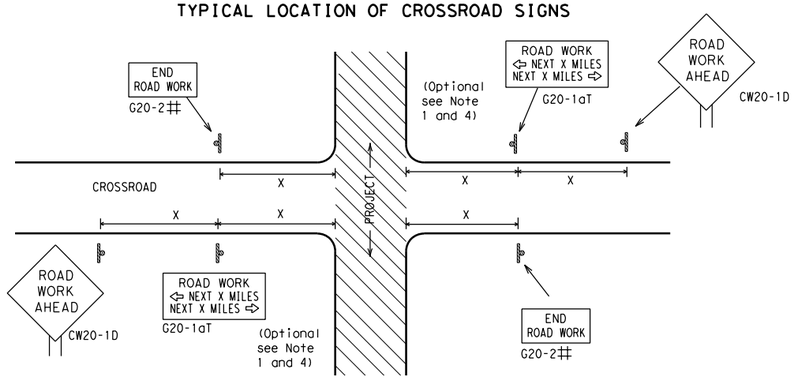
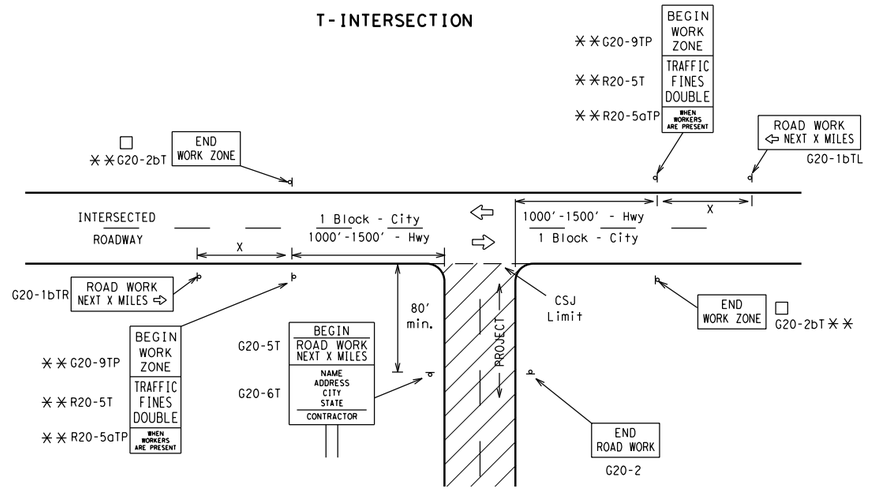
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

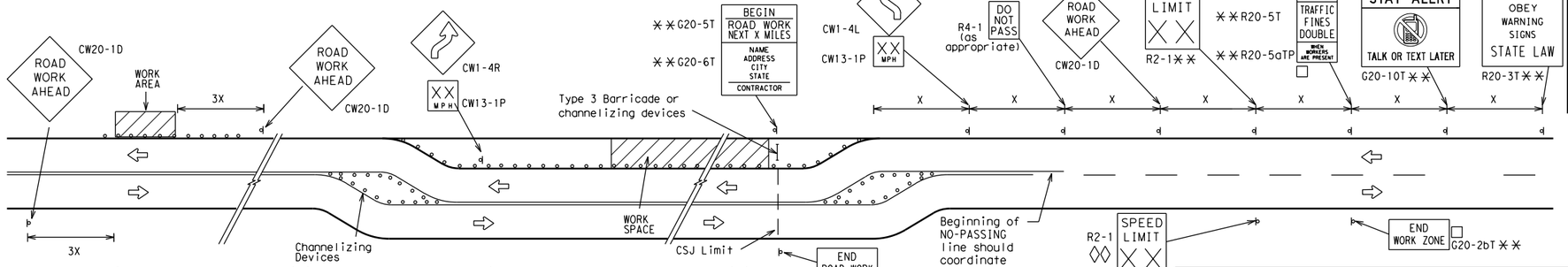
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

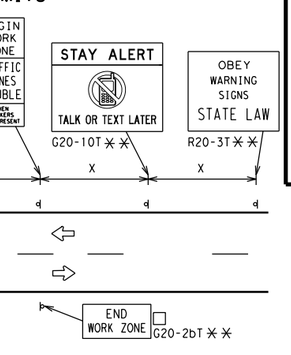
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

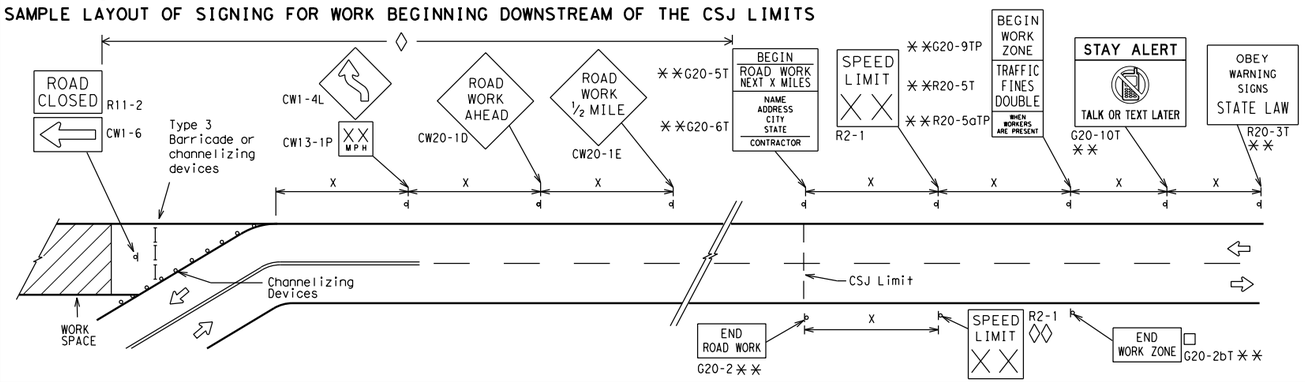


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PALO PINTO		73

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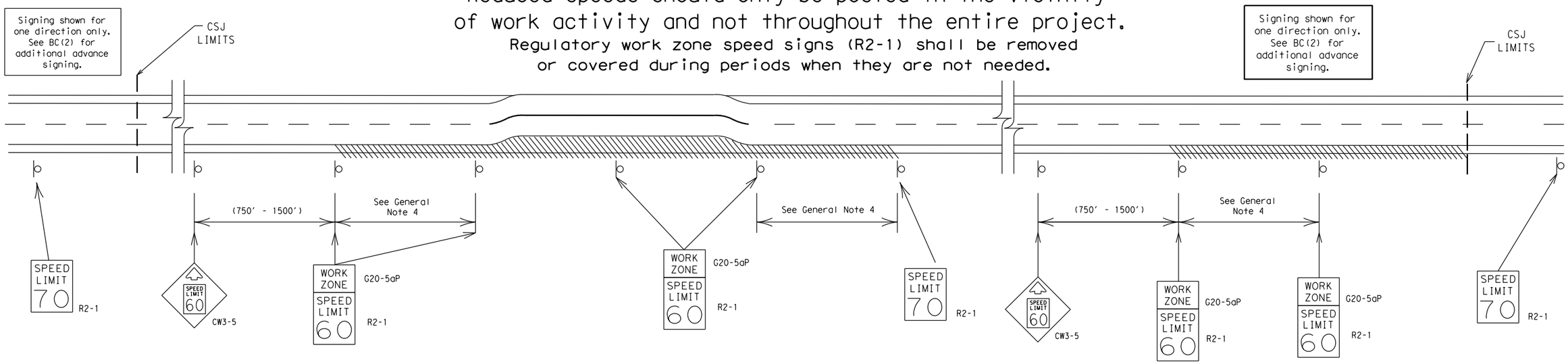
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
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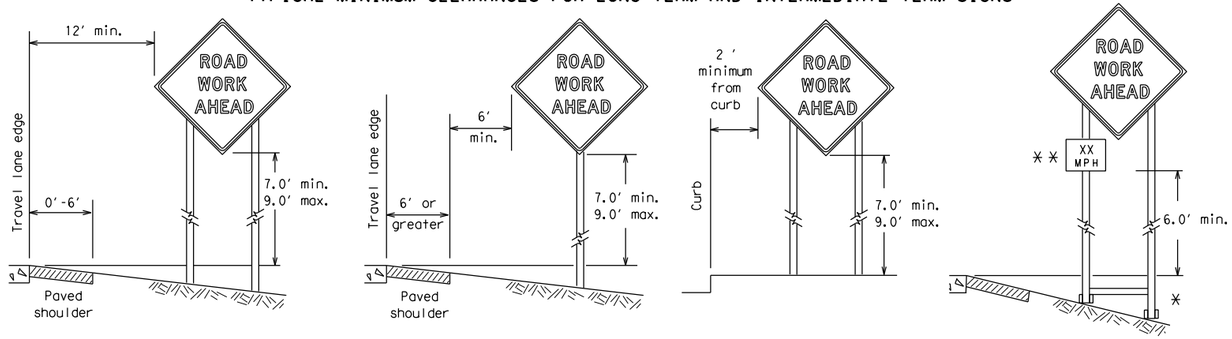
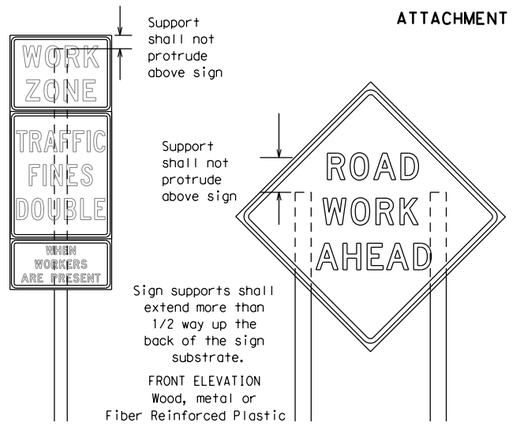
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



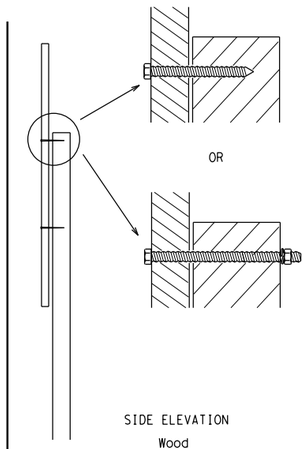
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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

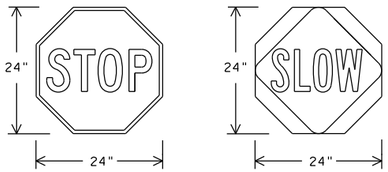


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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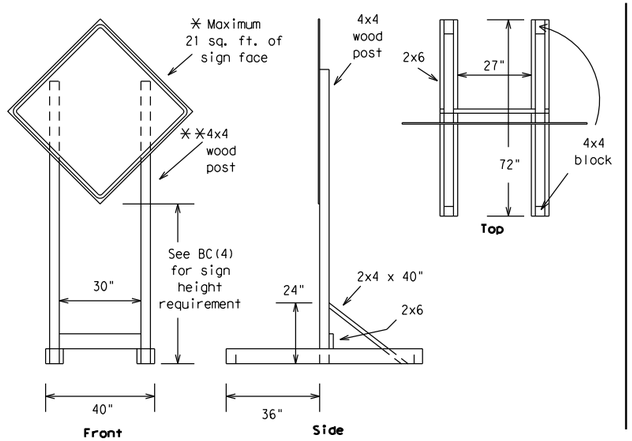
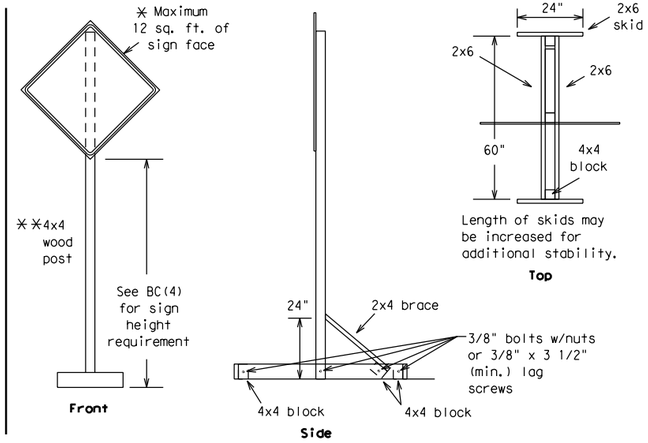
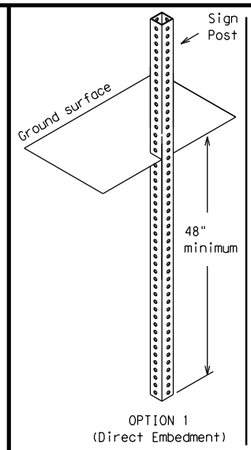
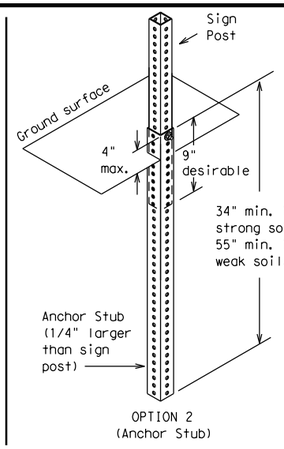


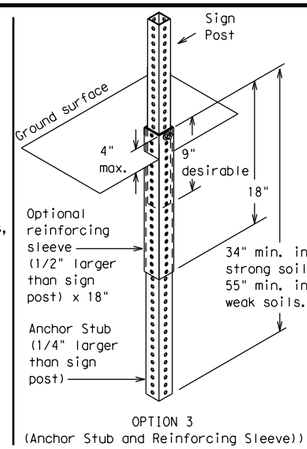


SKID MOUNTED WOOD SIGN SUPPORTS

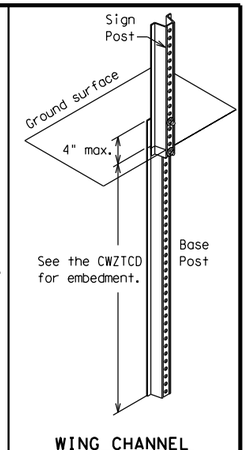
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







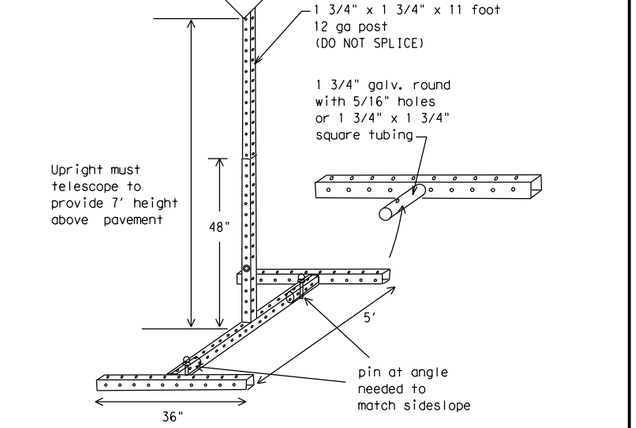
PERFORATED SQUARE METAL TUBING

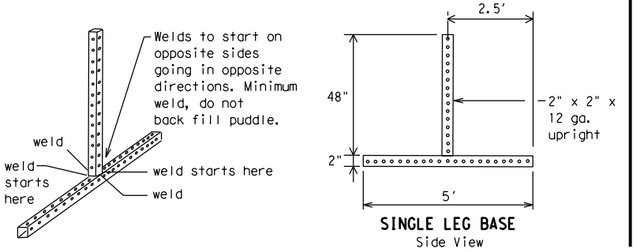


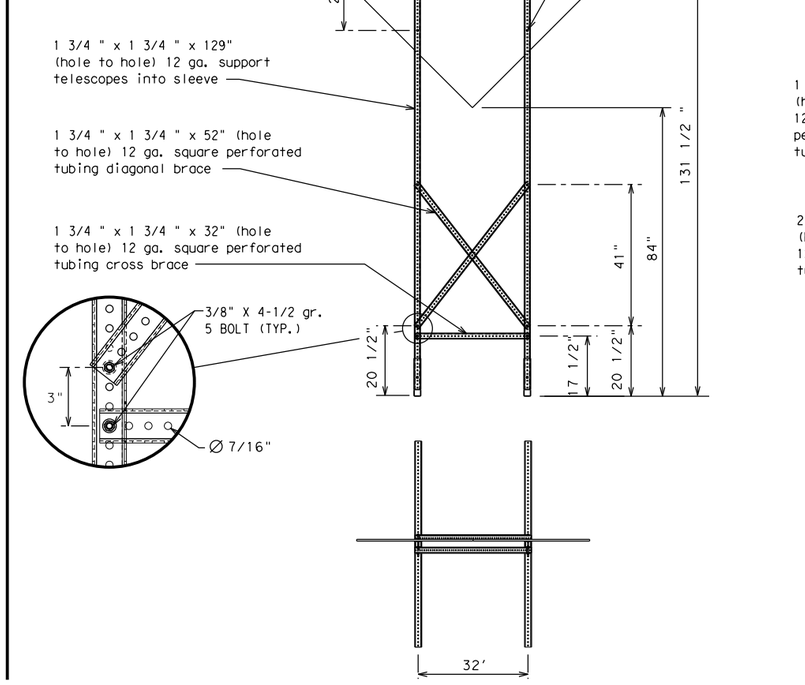
WING CHANNEL
Lap-splice/base bolted anchor

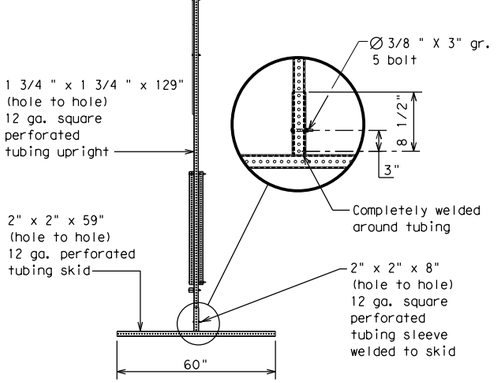
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

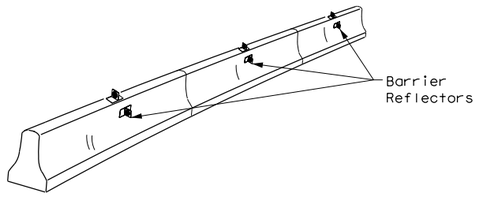
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

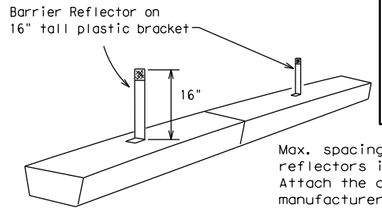
FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180,ETC
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		FTW	PALO PINTO		77

1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



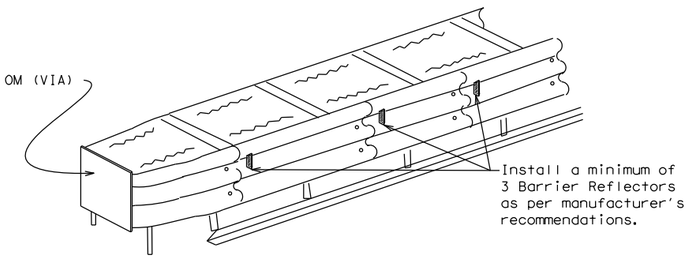
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

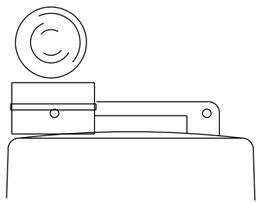
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

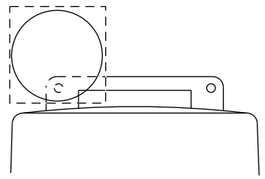
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

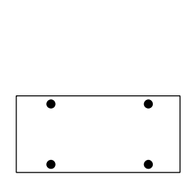
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

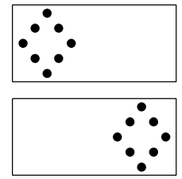
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

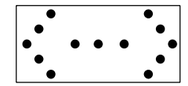


4 CORNER CAUTION

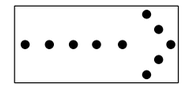
OR



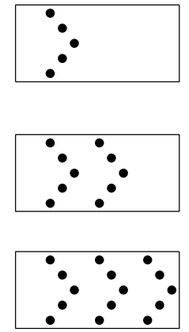
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	FTW	PALO PINTO		78

101

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

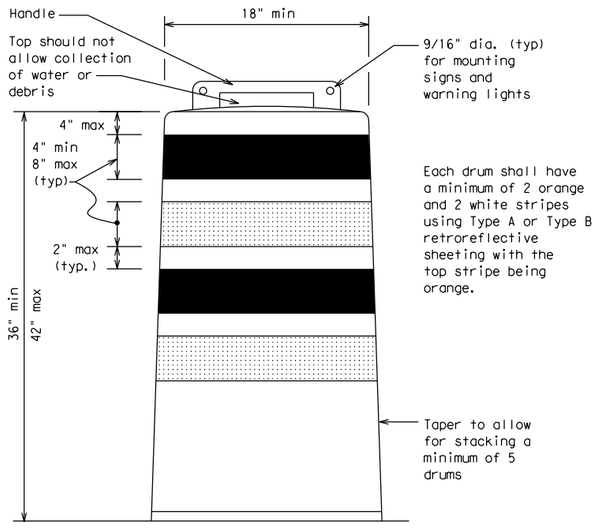
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

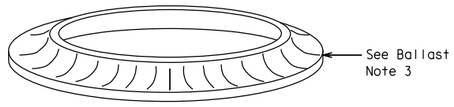
RETROREFLECTIVE SHEETING

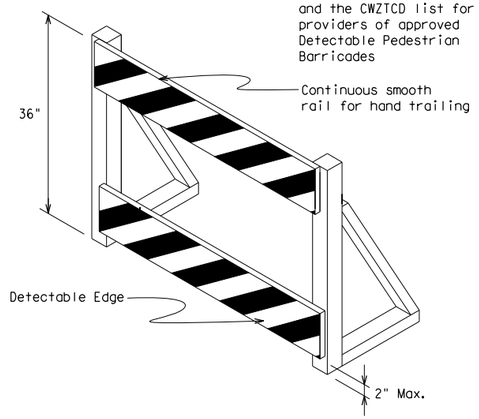
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

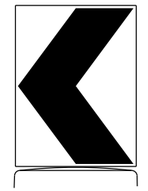




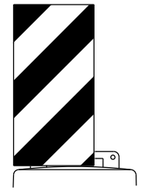


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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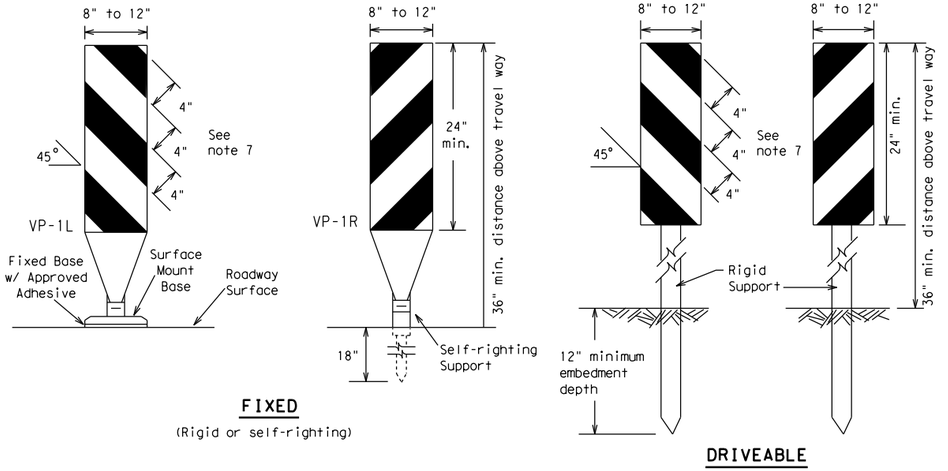
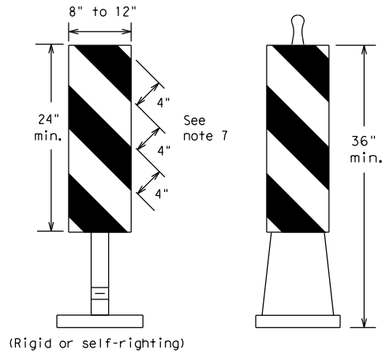


FIXED
(Rigid or self-righting)

DRIVEABLE

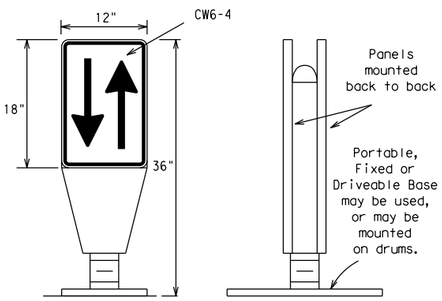


(Rigid or self-righting)

PORTABLE

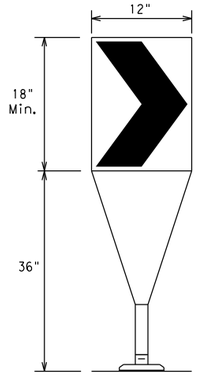
VERTICAL PANELS (VPs)

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



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



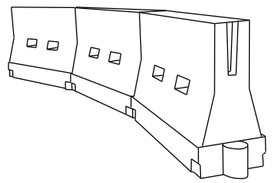
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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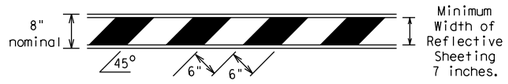
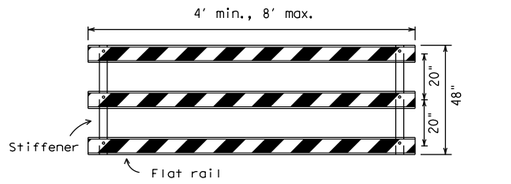
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



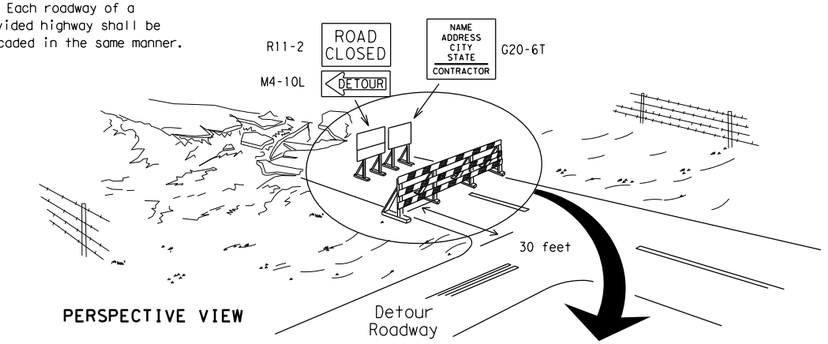
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

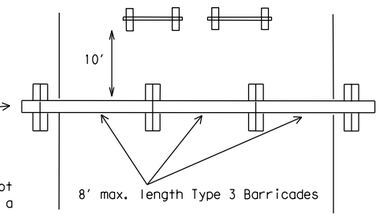
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

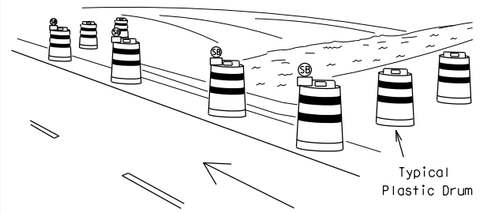
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

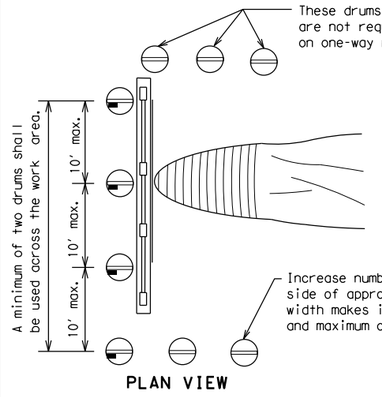
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

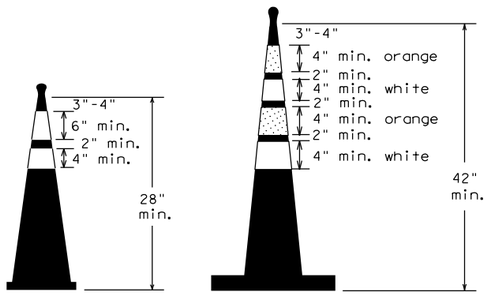
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



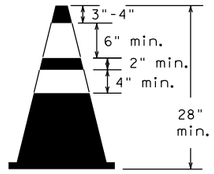
PLAN VIEW

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

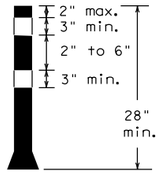
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

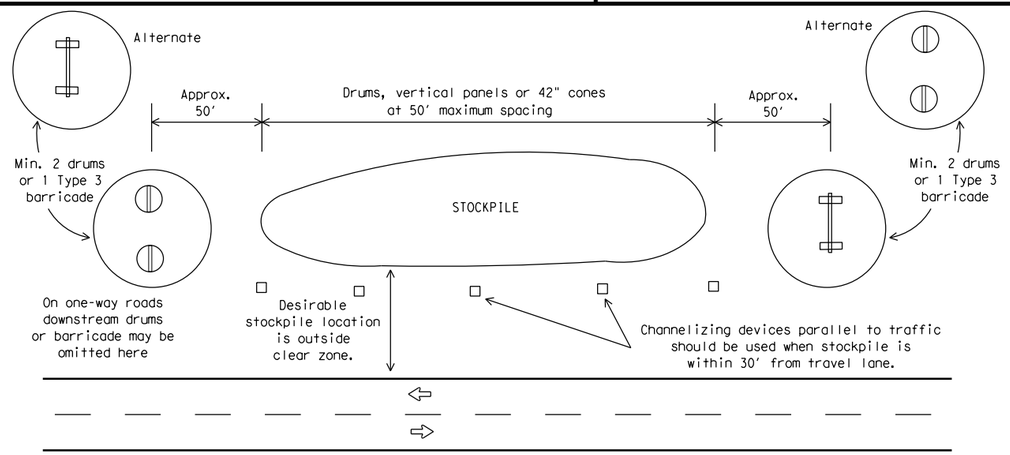


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

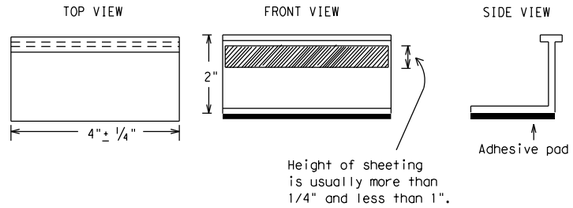
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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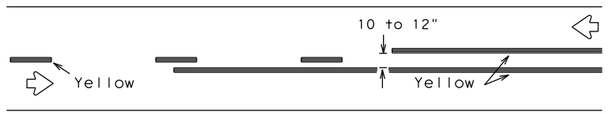
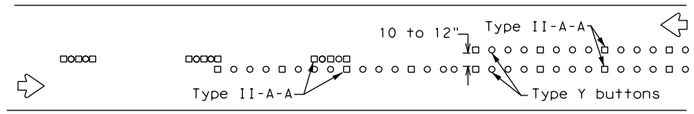
FILE: c:\pw-af\pw-af-prod\andrea.flores@aguirre-fields.com\dms18855\bc-21.dgn

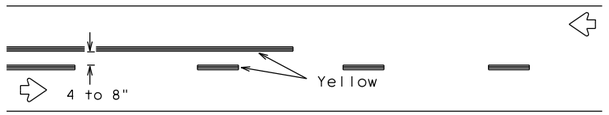
PAVEMENT MARKING PATTERNS



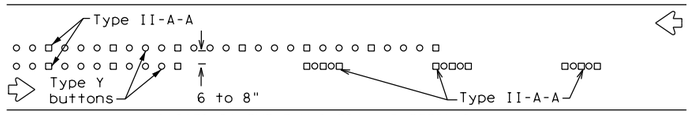
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



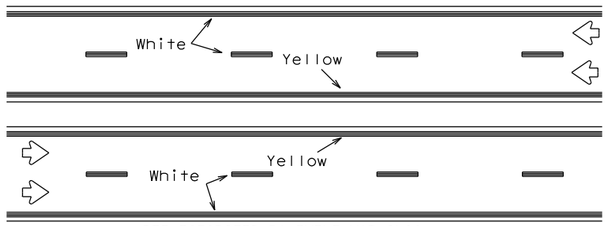
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



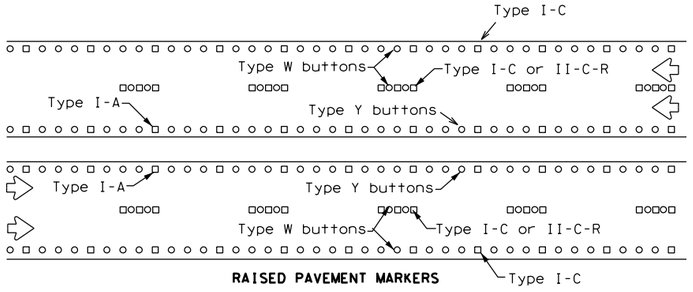
RAISED PAVEMENT MARKERS - PATTERN B

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

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



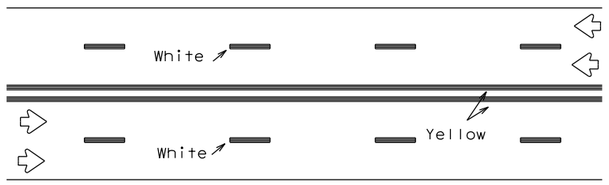
REFLECTORIZED PAVEMENT MARKINGS



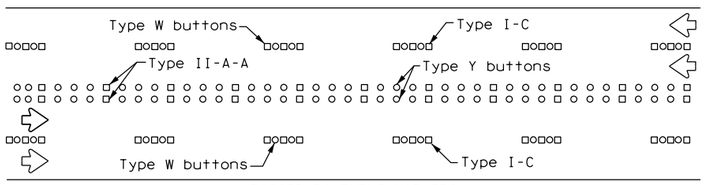
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



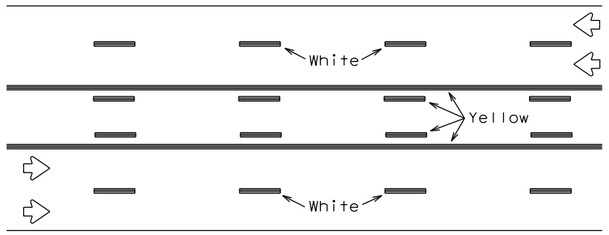
REFLECTORIZED PAVEMENT MARKINGS



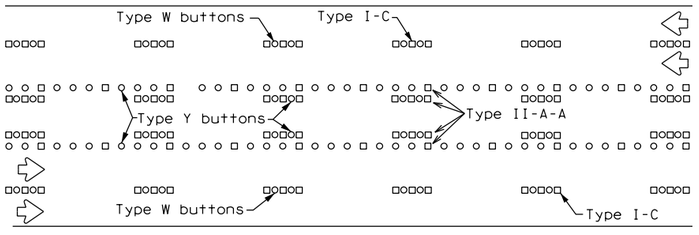
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

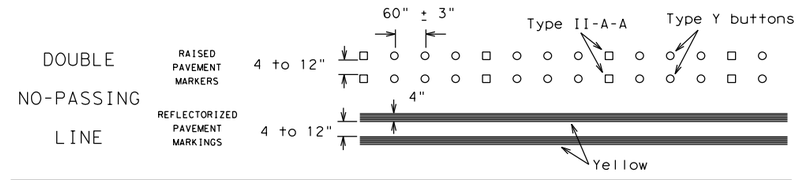
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

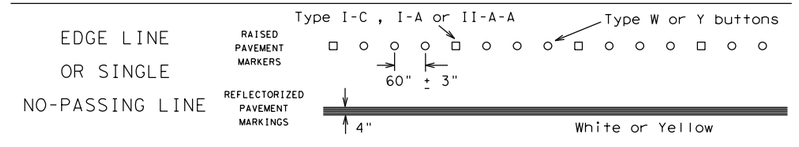
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

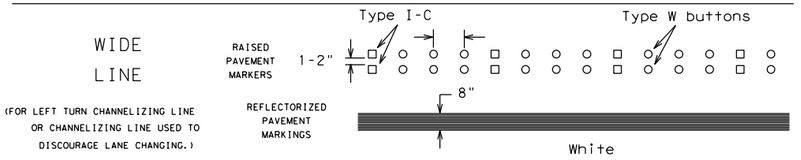


EDGE LINE OR SINGLE NO-PASSING LINE



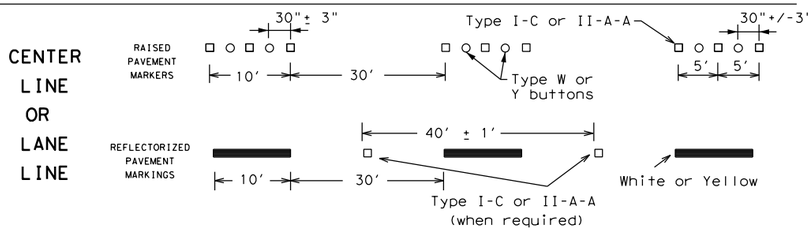
WIDE LINE

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

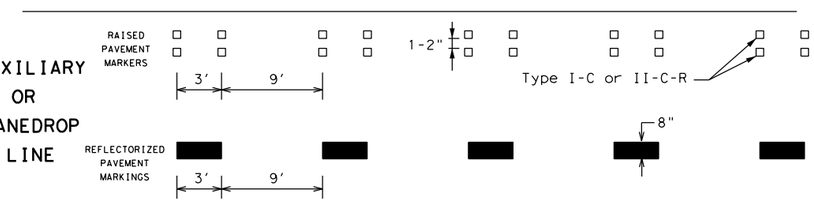


BROKEN LINES

CENTER LINE OR LANE LINE

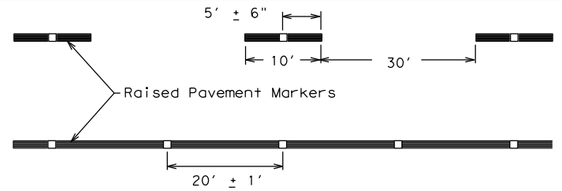


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	FTW	PALO PINTO		83
11-02 8-14				

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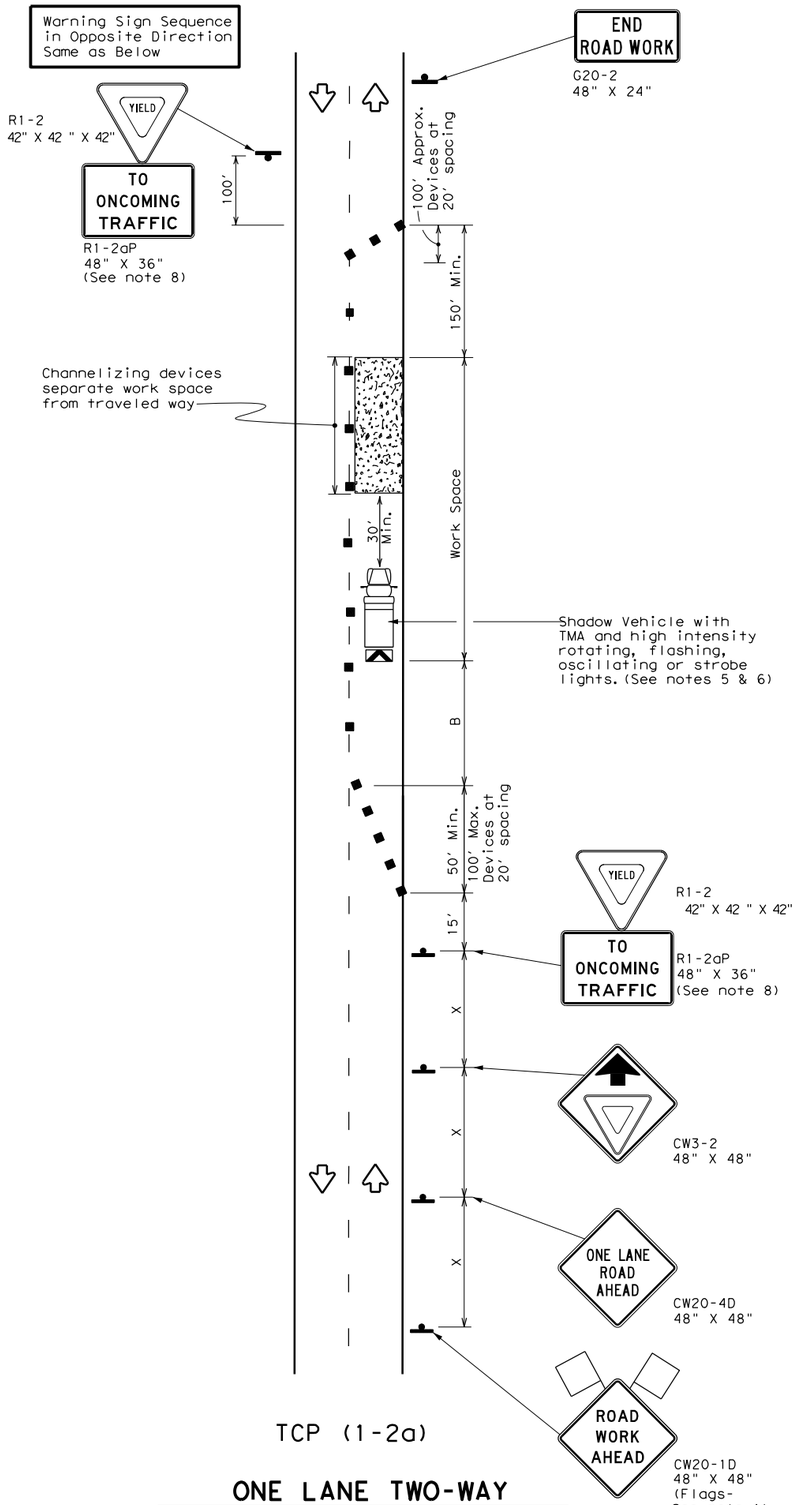
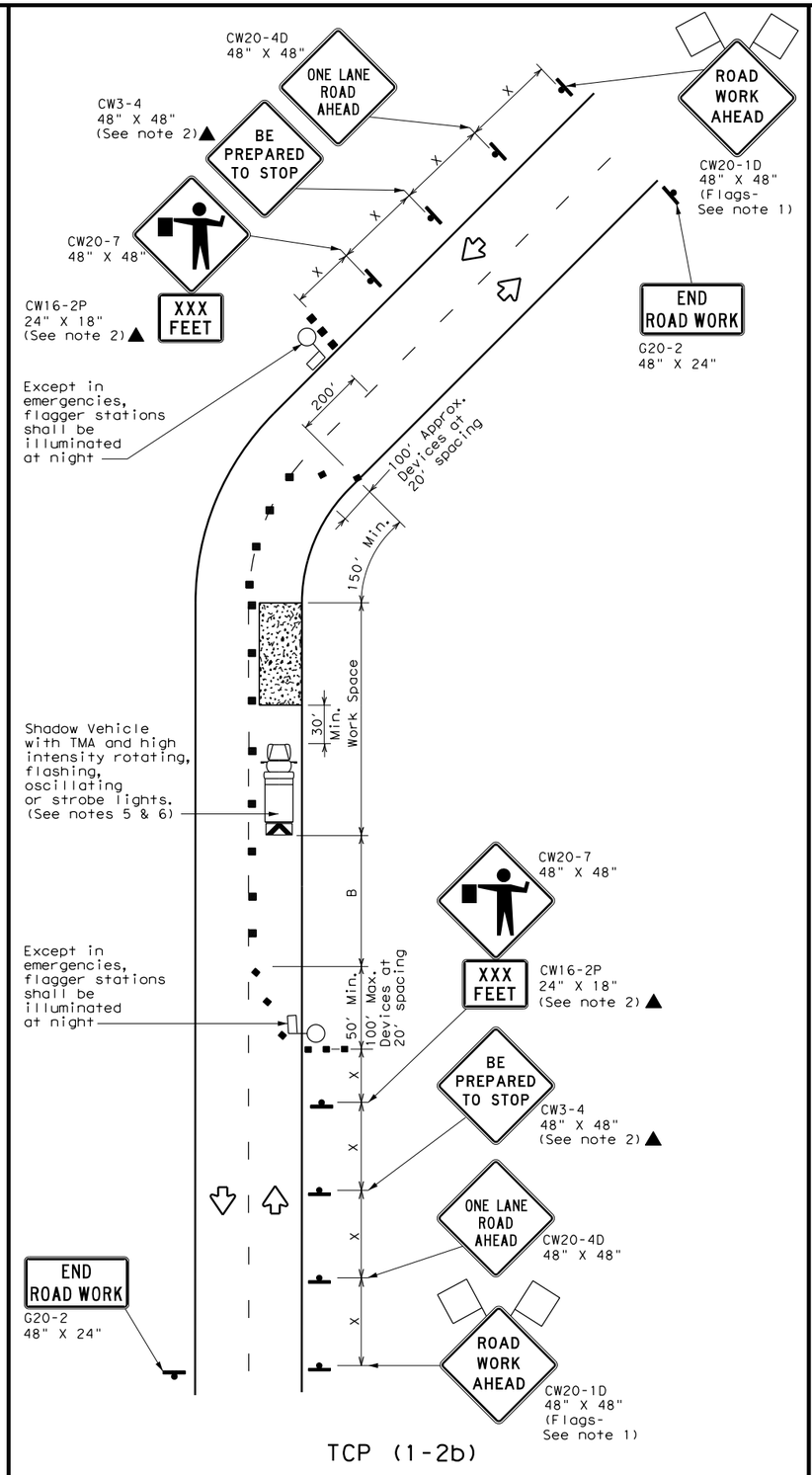


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
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 off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		84

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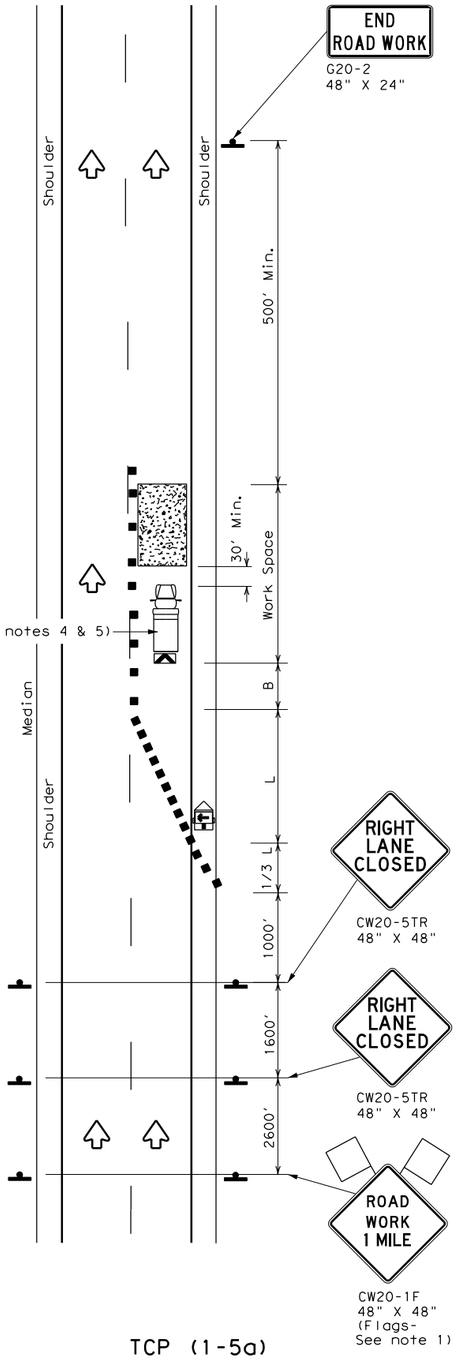
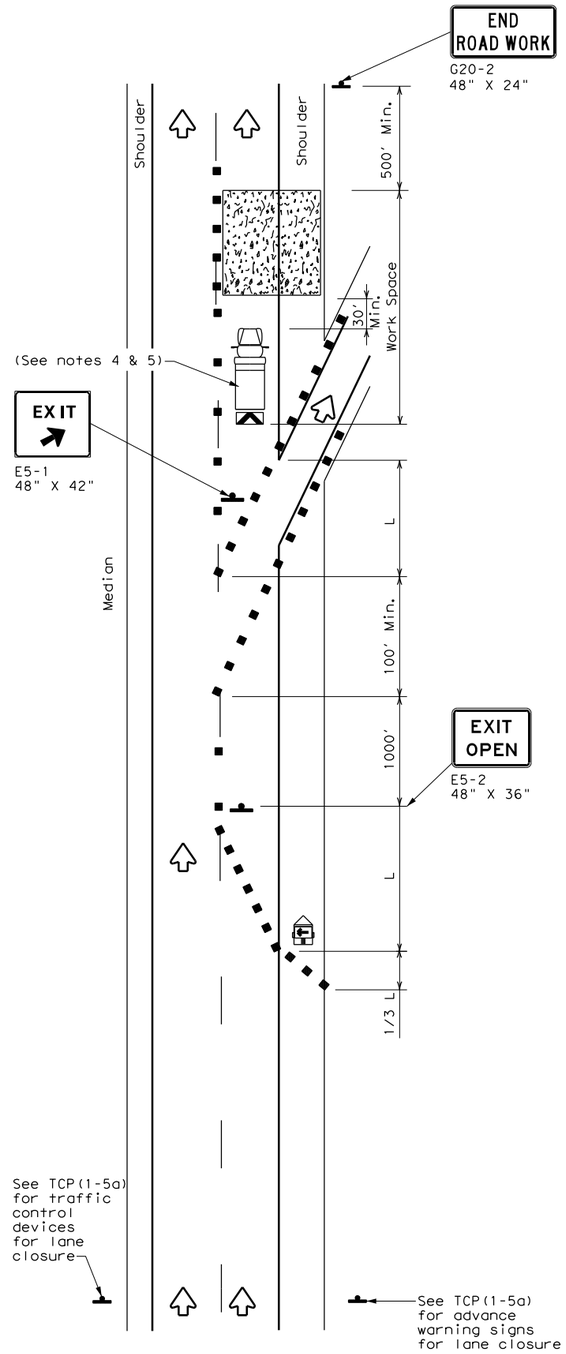


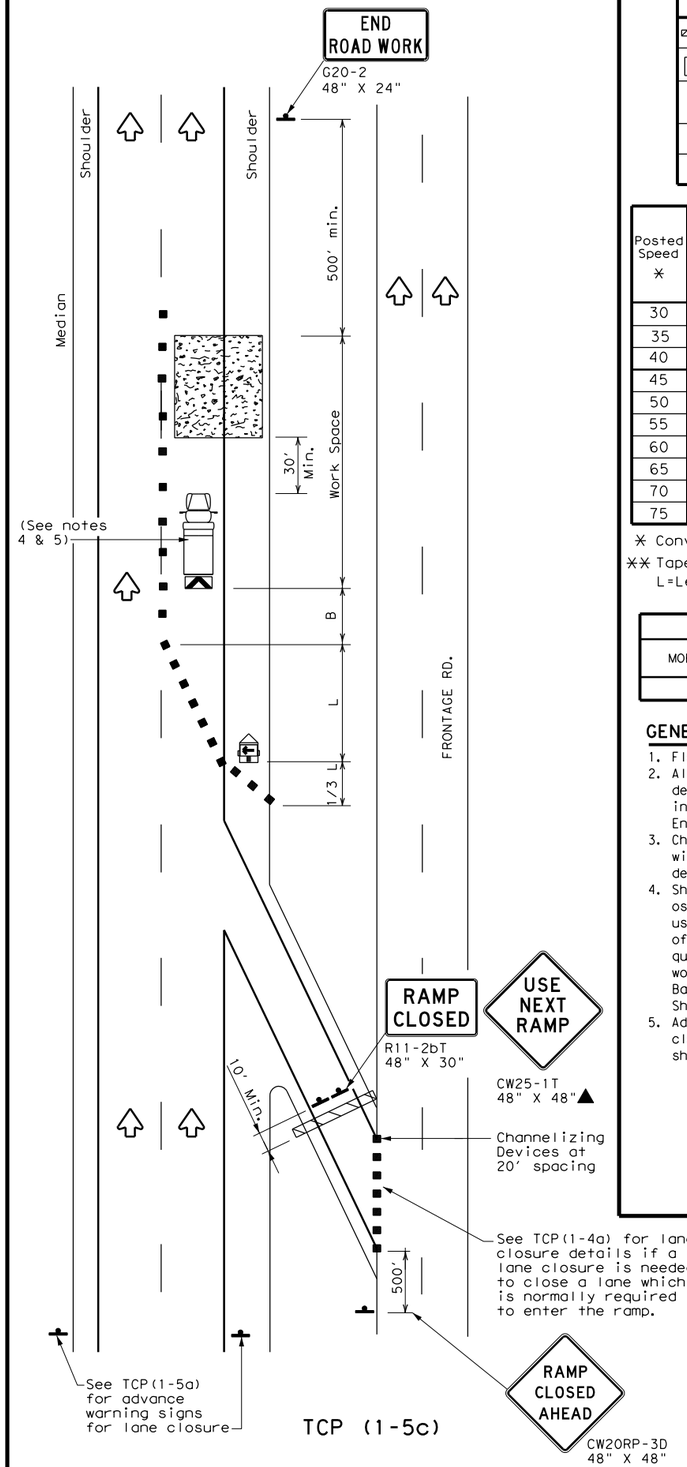
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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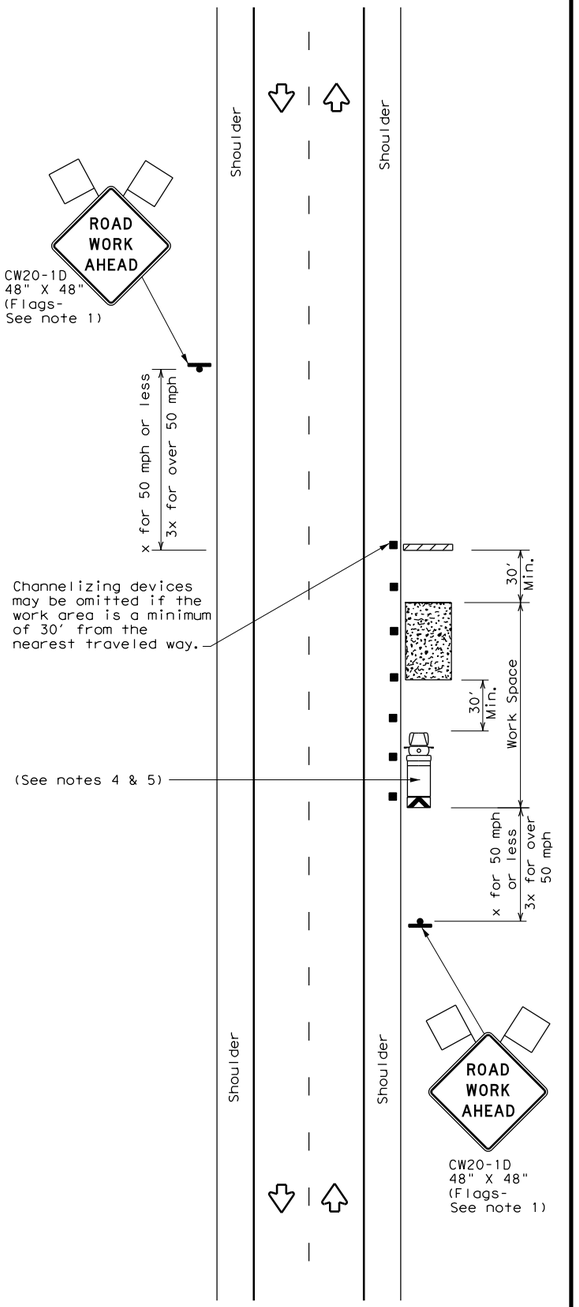
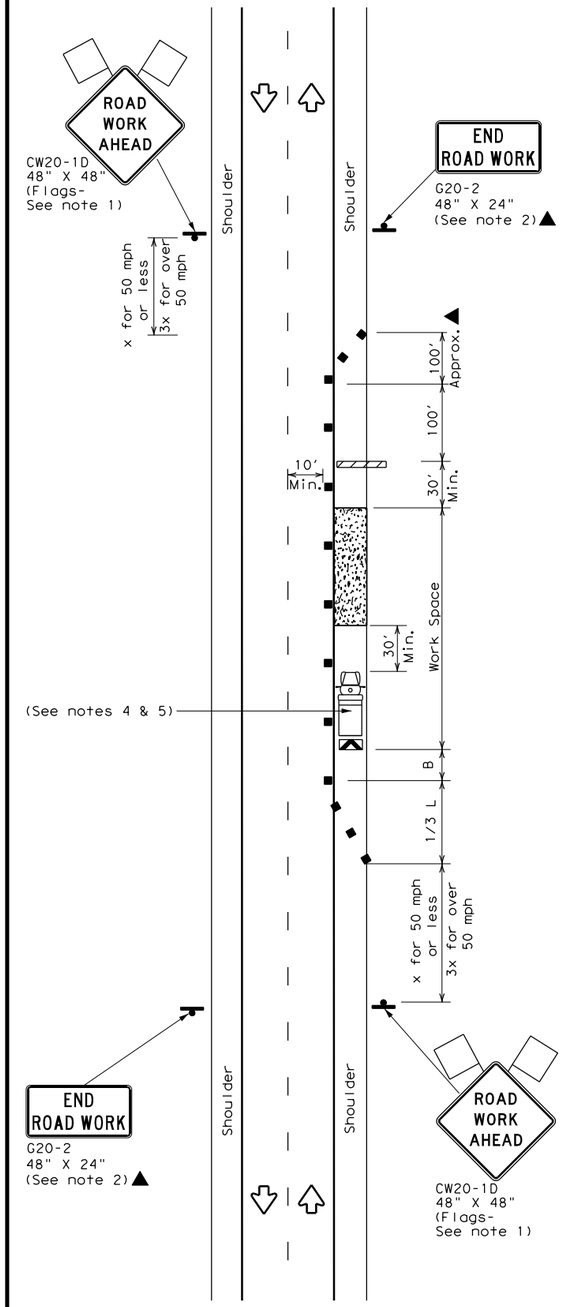
	FTW	PALO PINTO		85



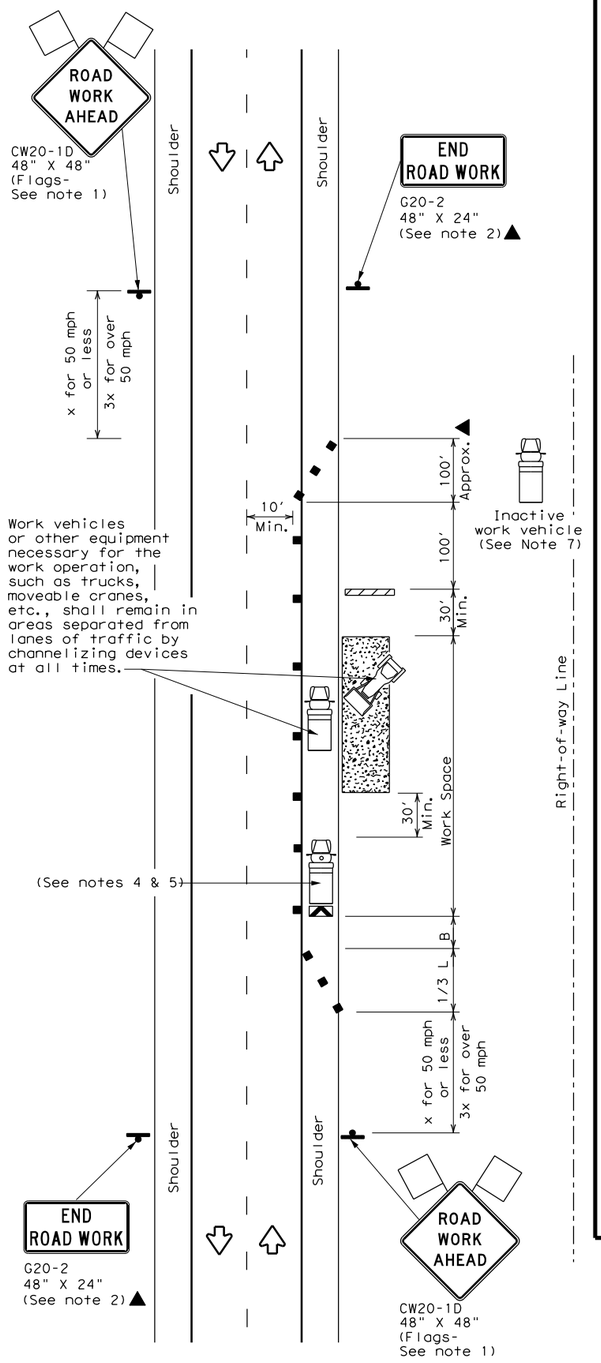
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	FTW	PALO PINTO		86
1-97 2-18				

161

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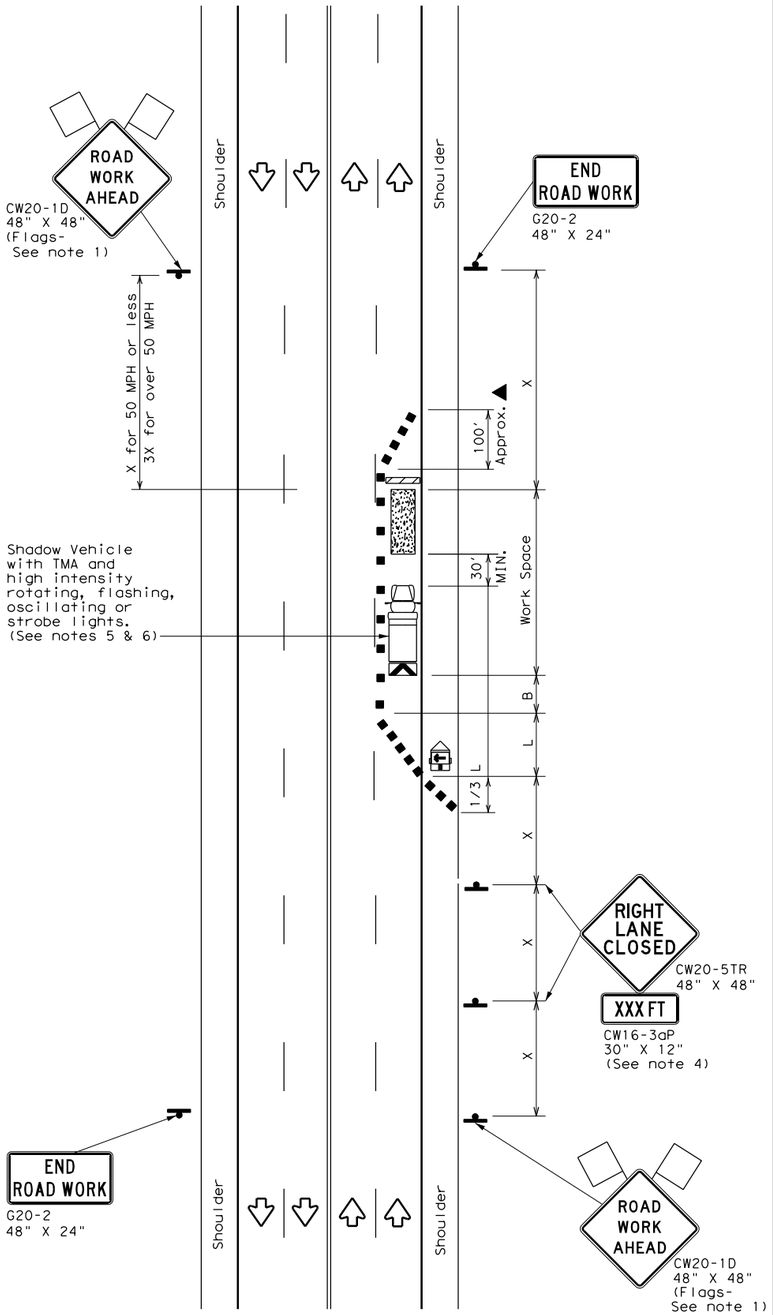
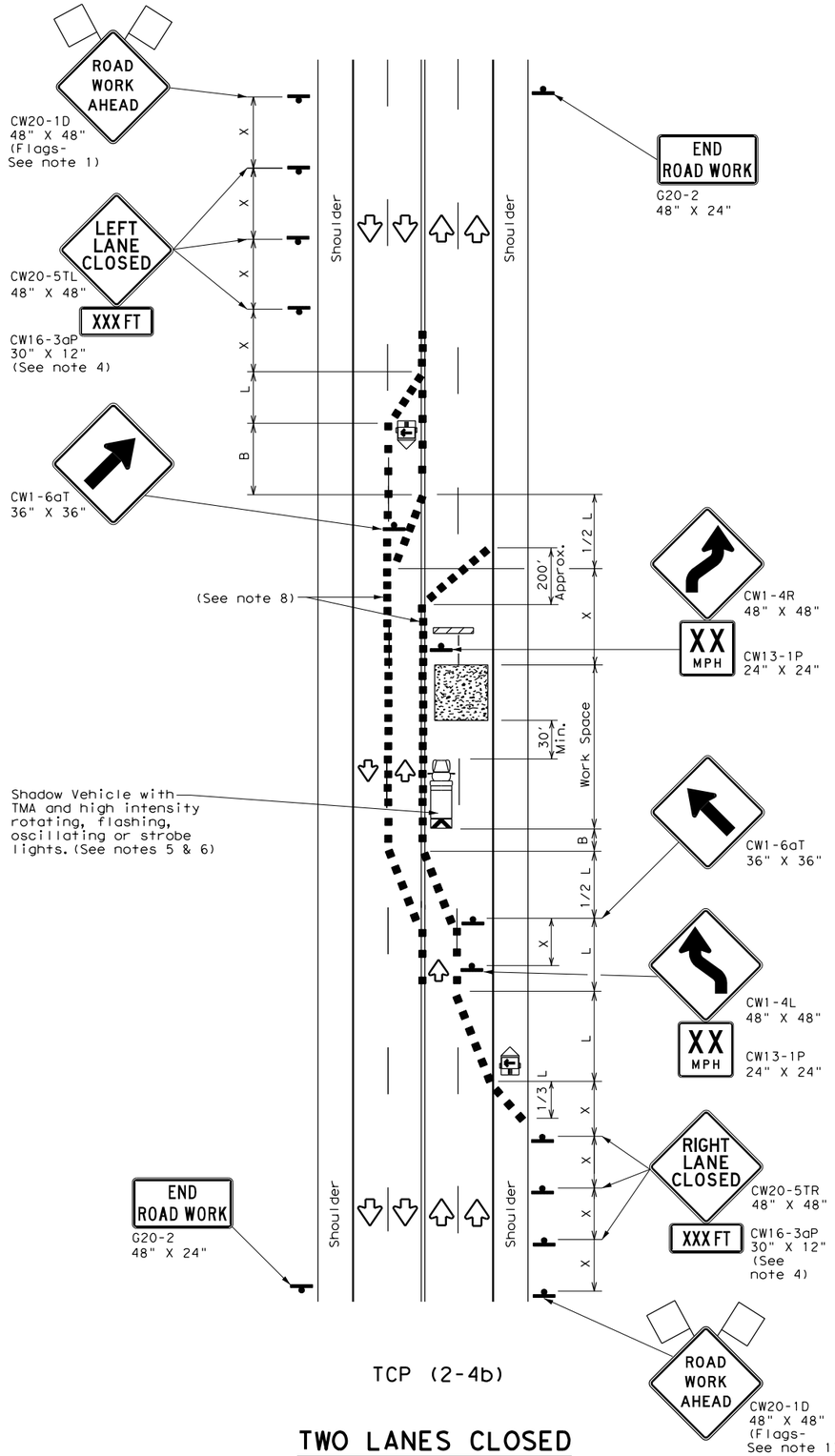


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0008	01	046,ETC	US 180,ETC
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	FTW	PALO PINTO		87

DATE: 10/27/2021 5:13:20 PM
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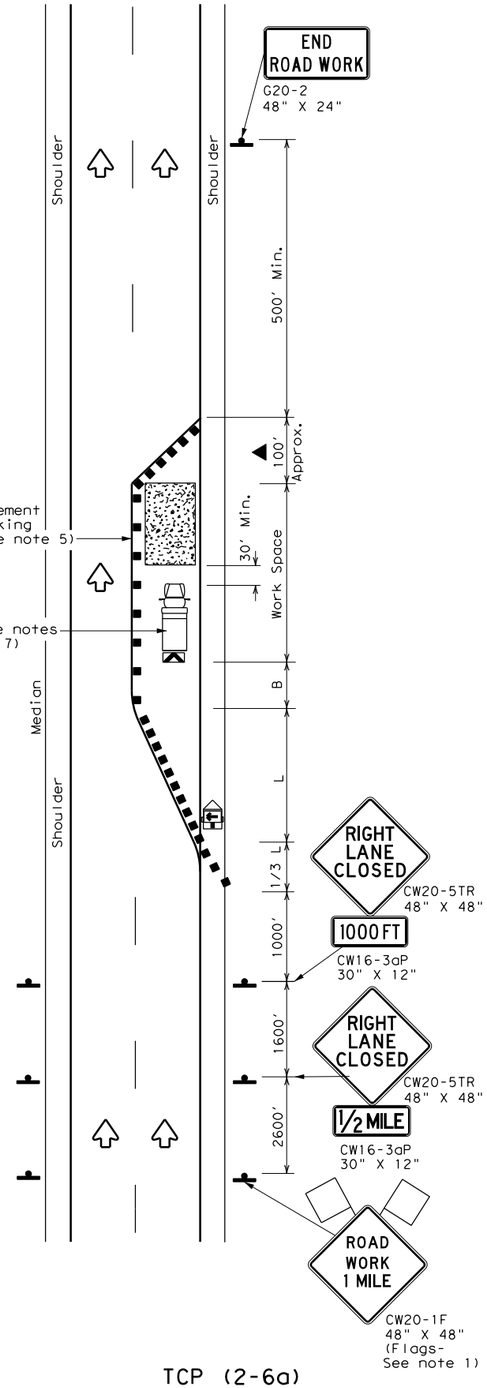
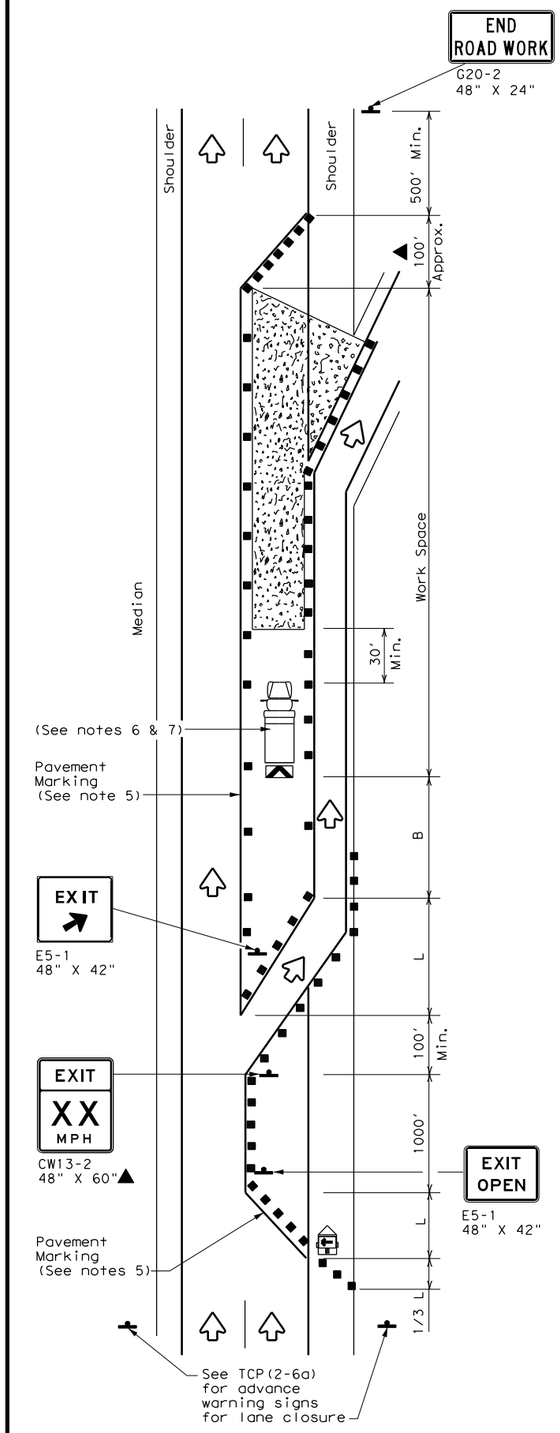


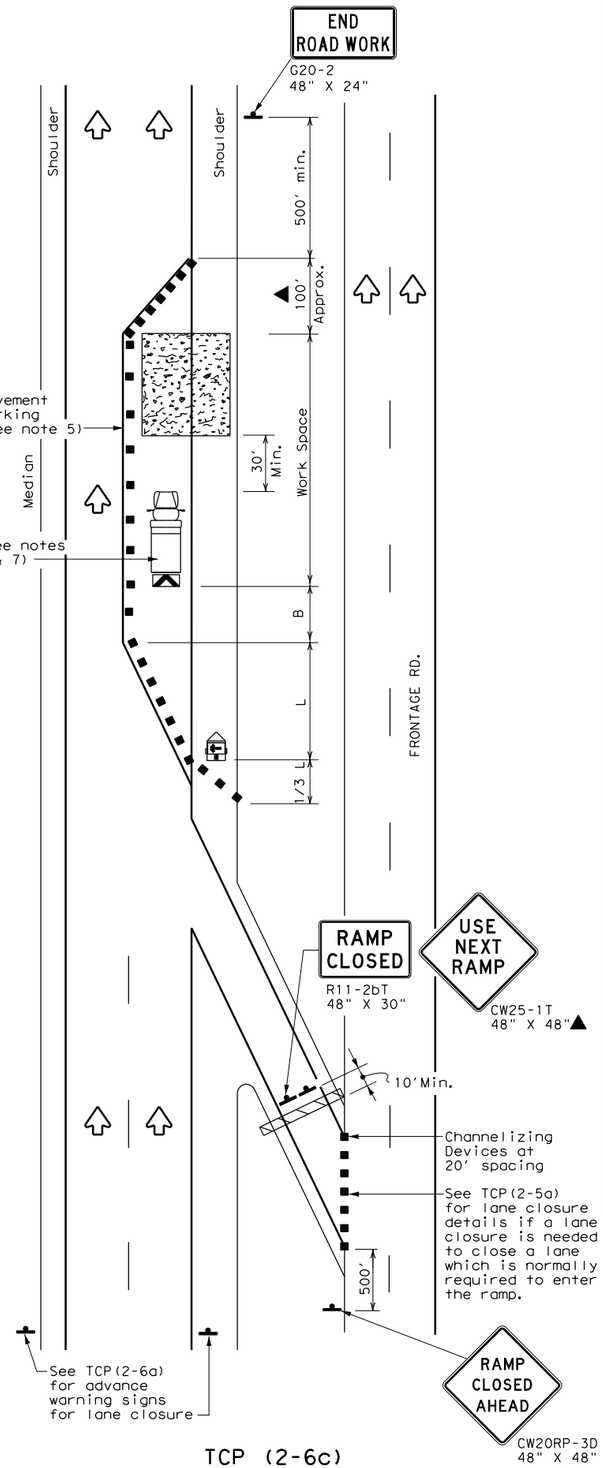
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

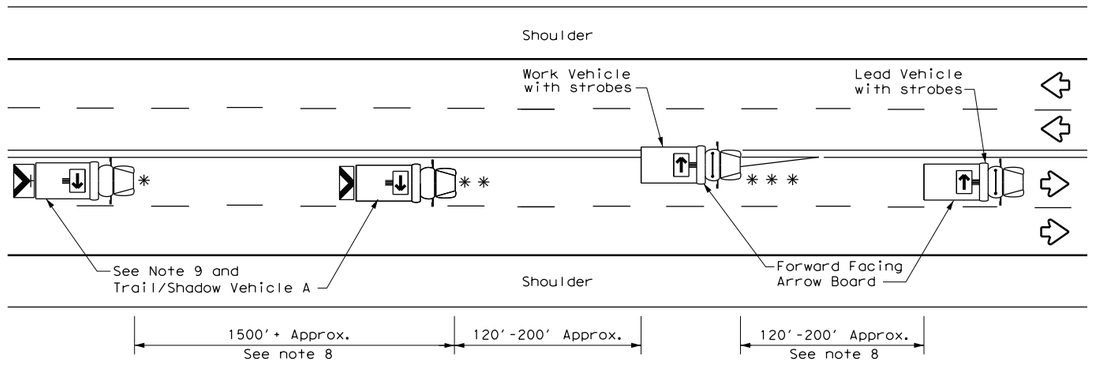
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

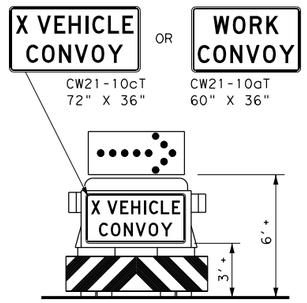
TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		88



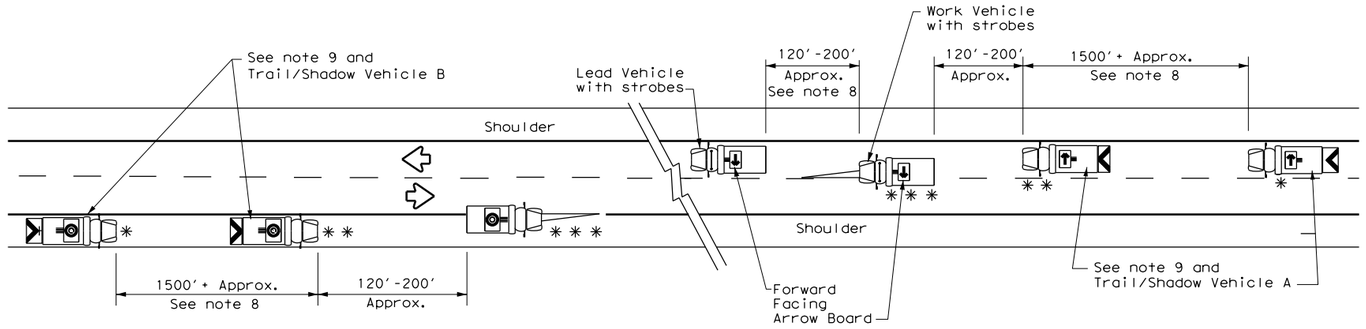
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

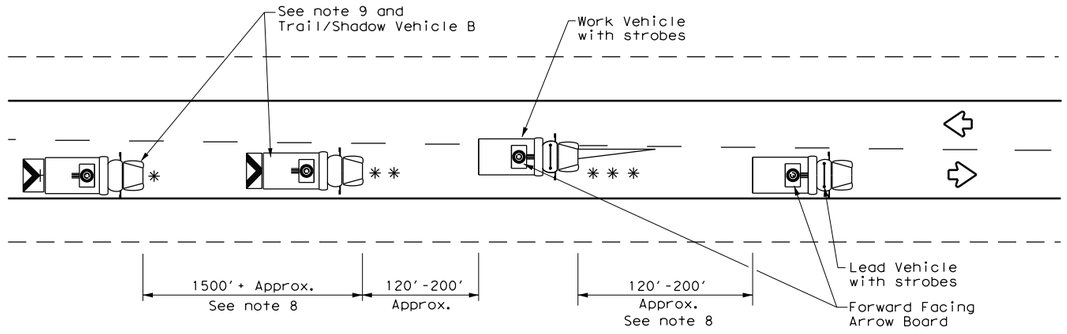


WORK ON SHOULDER

WORK ON TRAVEL LANE

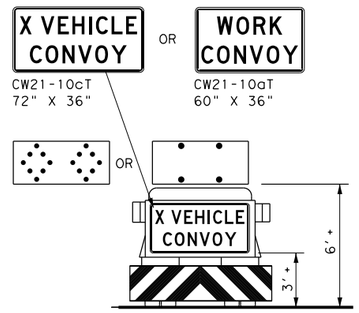
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

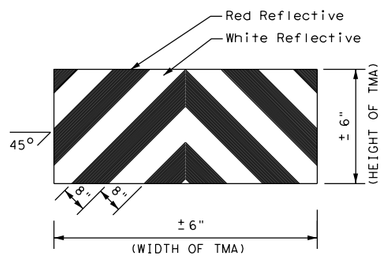
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0008	01	046,ETC	US 180,ETC
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	FTW	PALO PINTO		89

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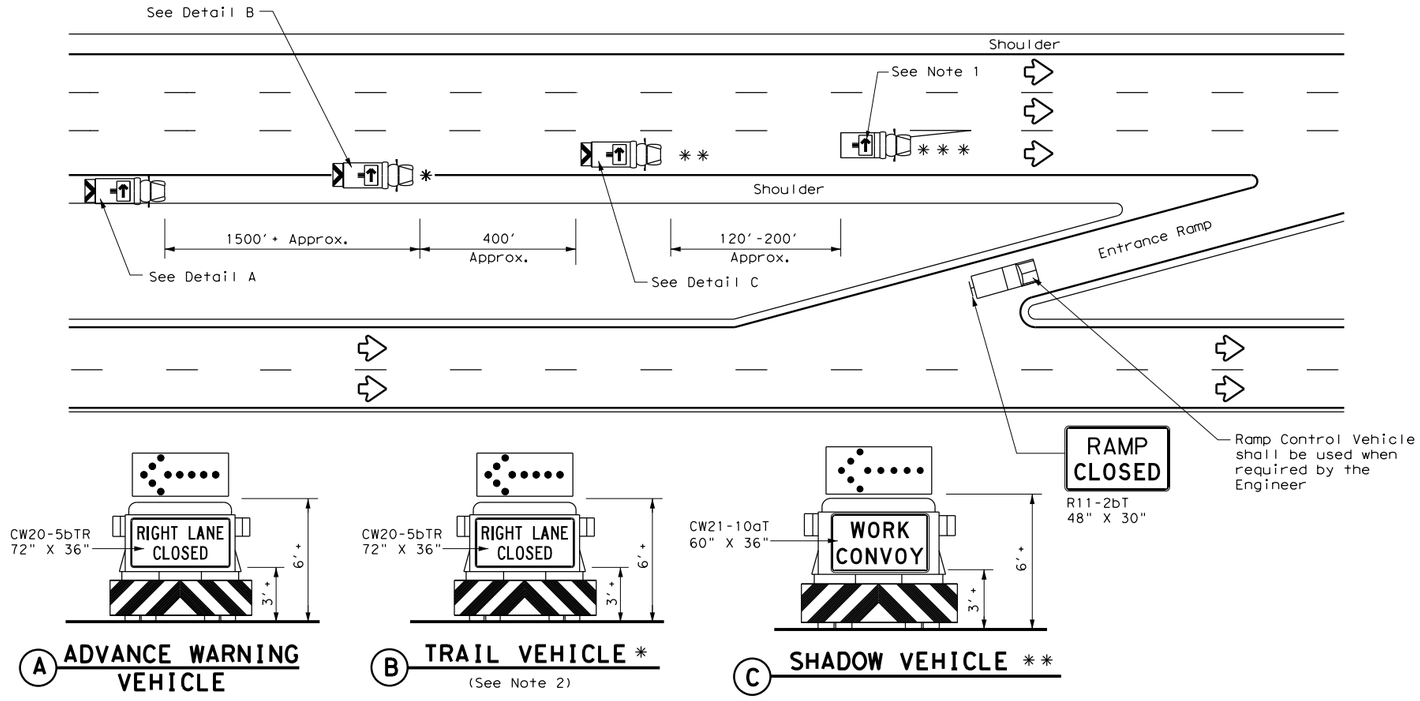
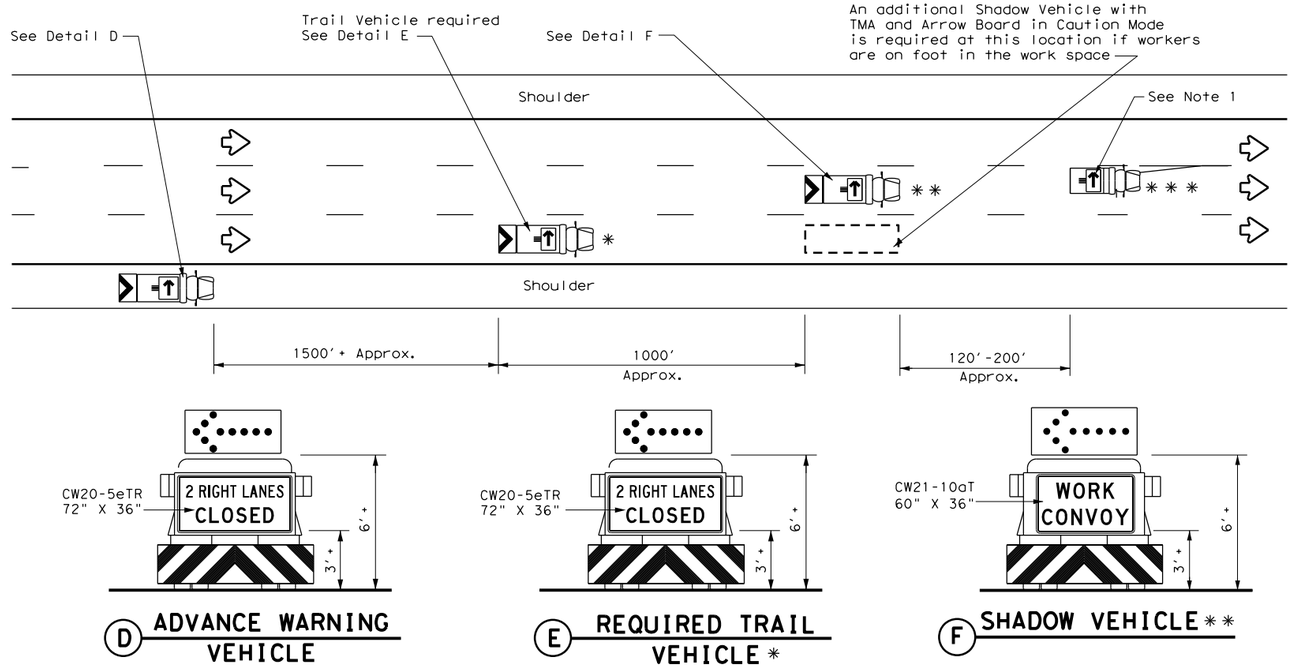


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



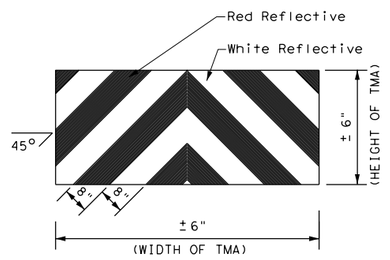
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0008	01	046, ETC	US 180, ETC
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176

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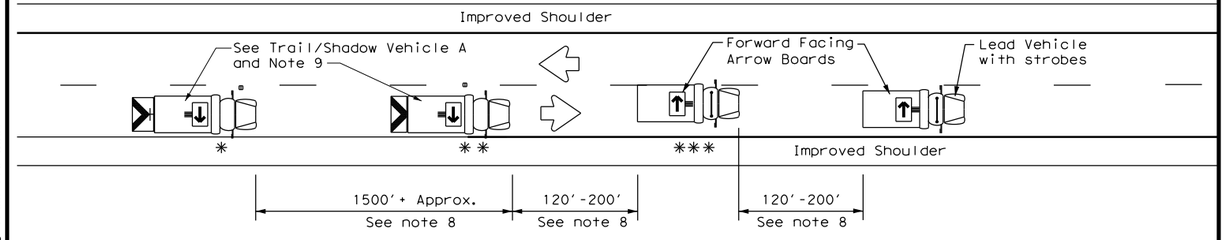
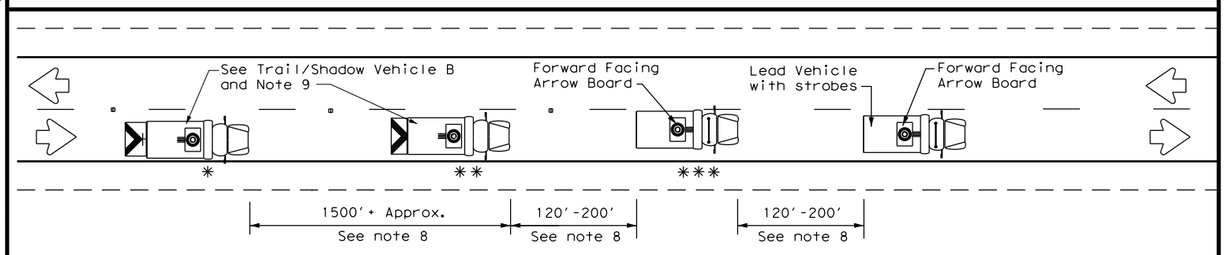


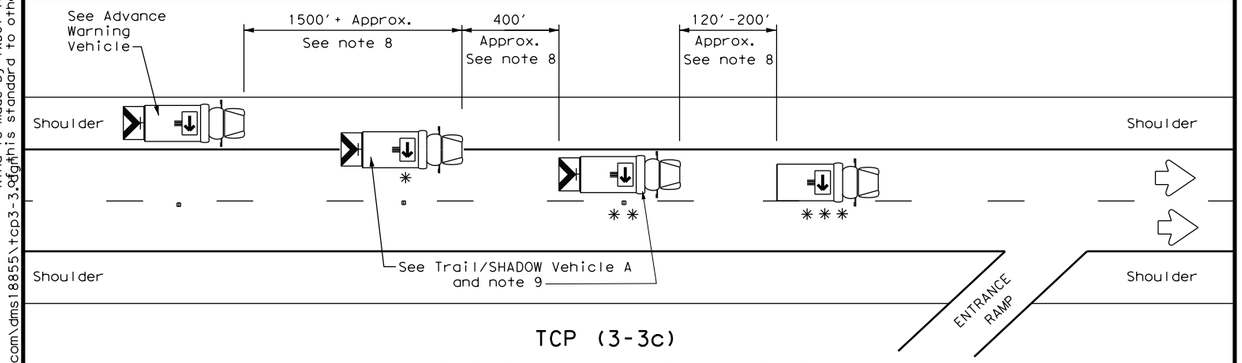
TCP (3-3a)

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



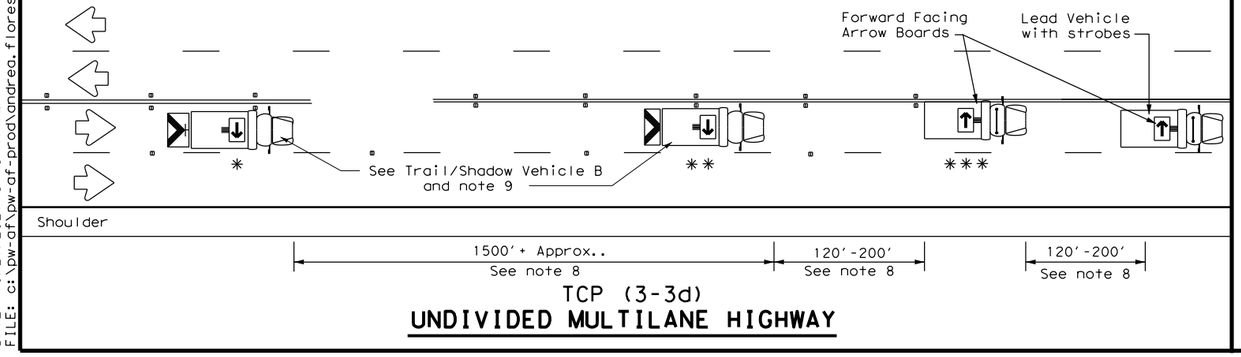
TCP (3-3b)

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



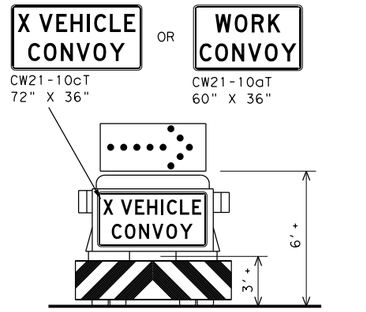
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



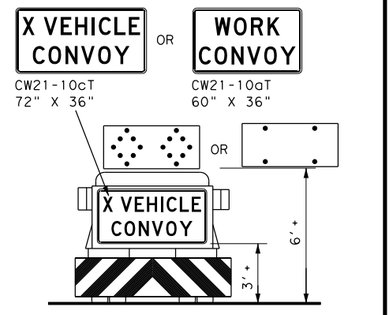
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



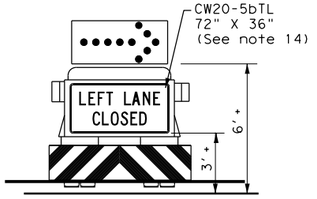
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

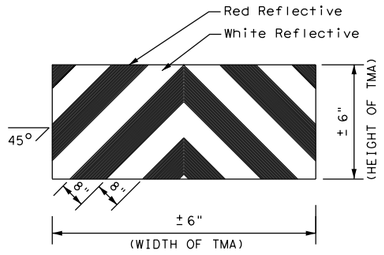


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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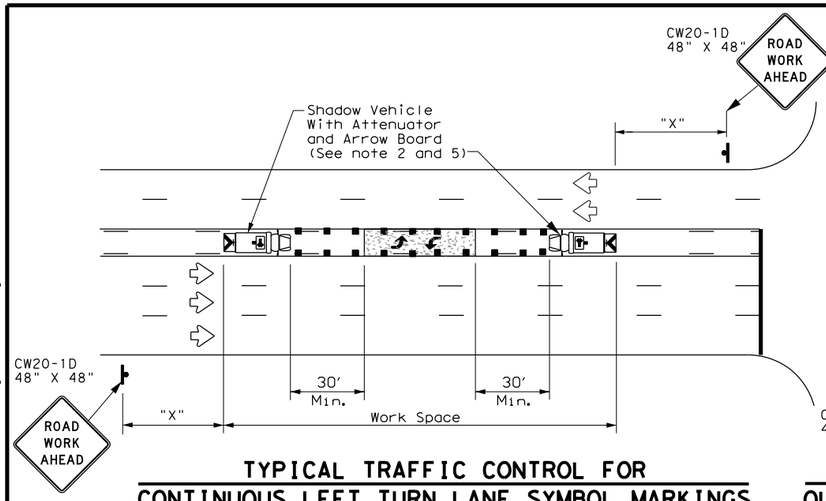
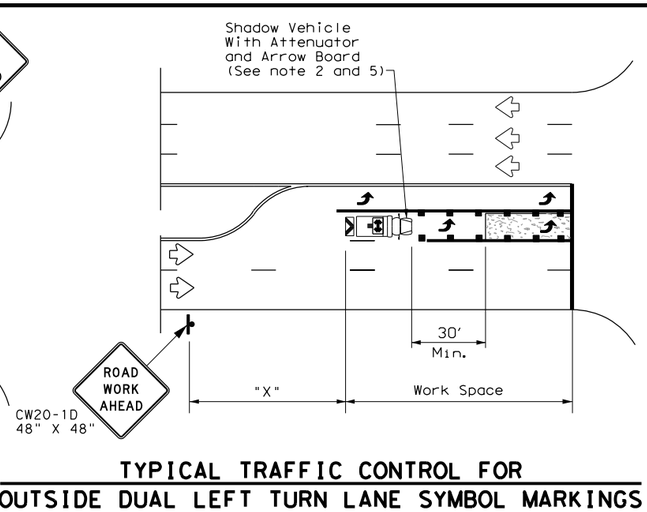
8-95 7-13	FTW	PALO PINTO		91
1-97 7-14				



TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
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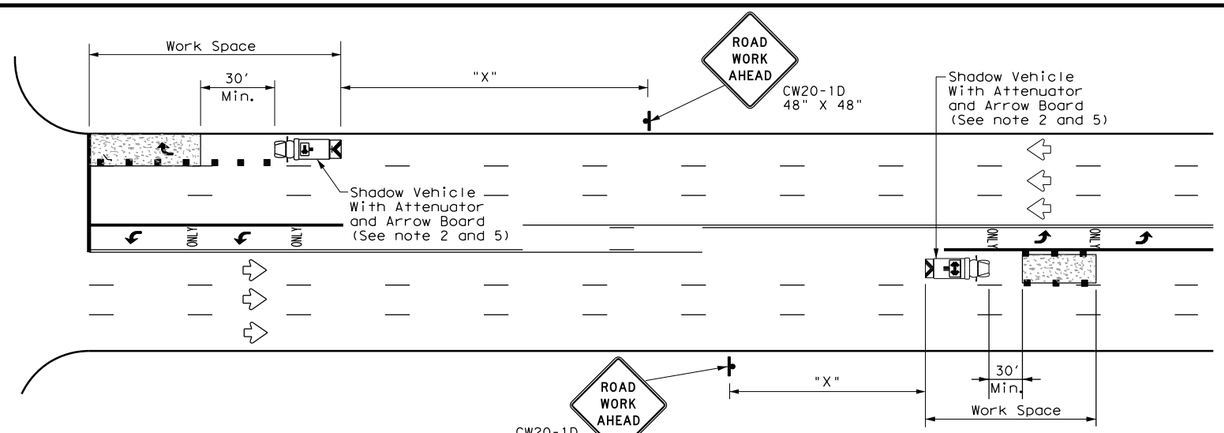
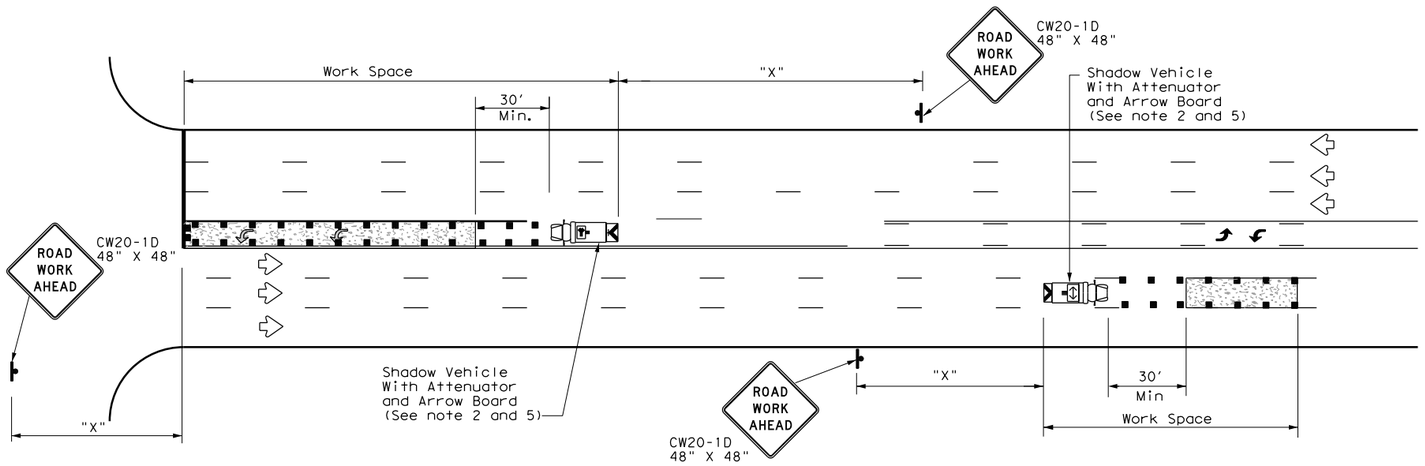


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR
LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR
CENTER LANE MARKINGS

LEGEND			
✳	Trail Vehicle	ARROW BOARD DISPLAY	
✳✳	Shadow Vehicle		
✳✳✳	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow	■ ■ ■	Channelizing Devices

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

✳ Conventional Roads Only

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

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

GENERAL NOTES

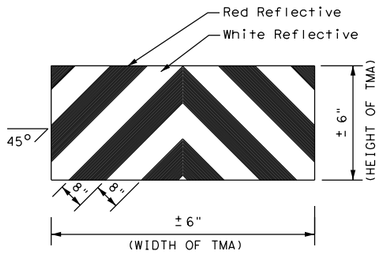
1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.

2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.

3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.

4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.

5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

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©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		92

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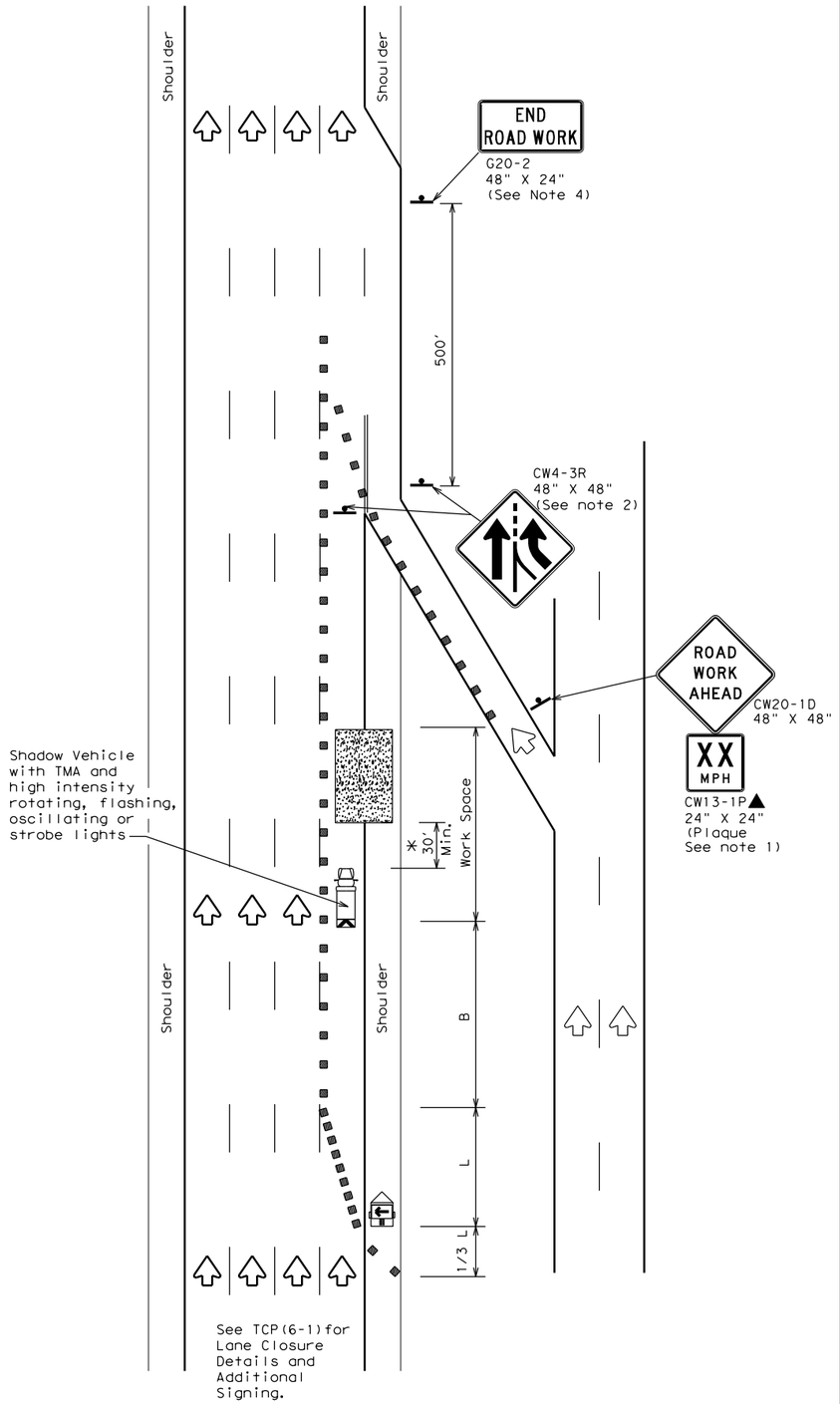
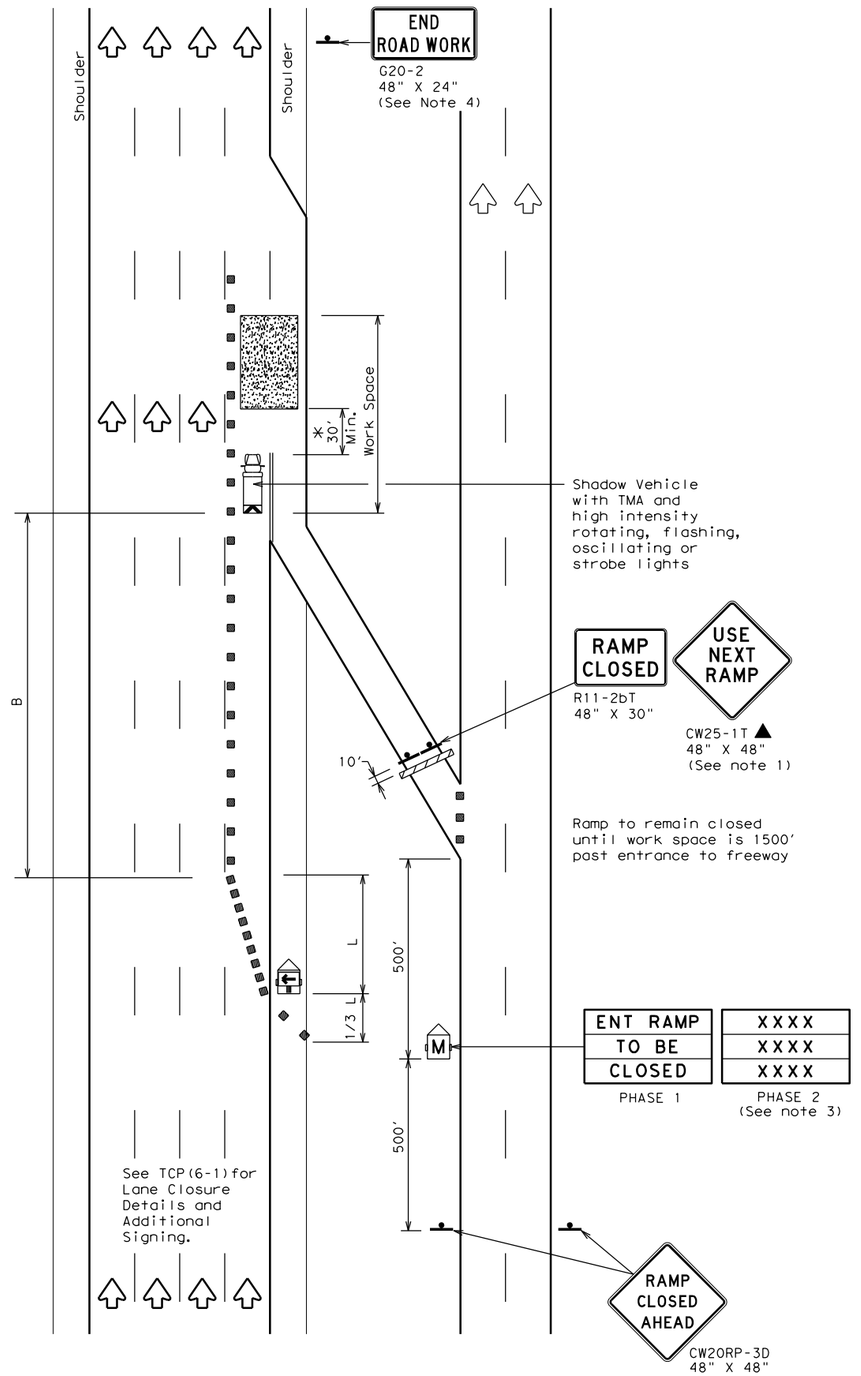


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
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1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	PALO PINTO		93

202

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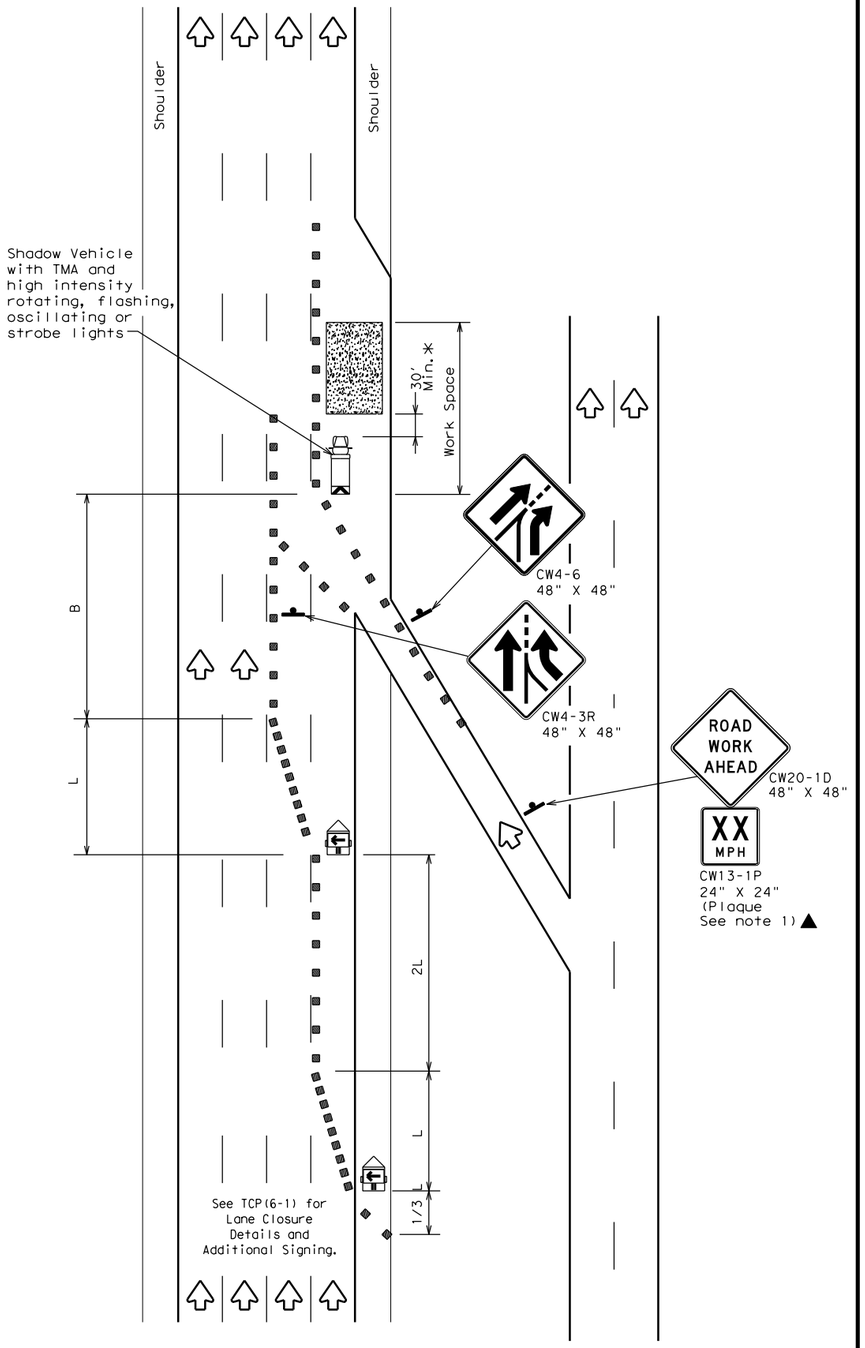
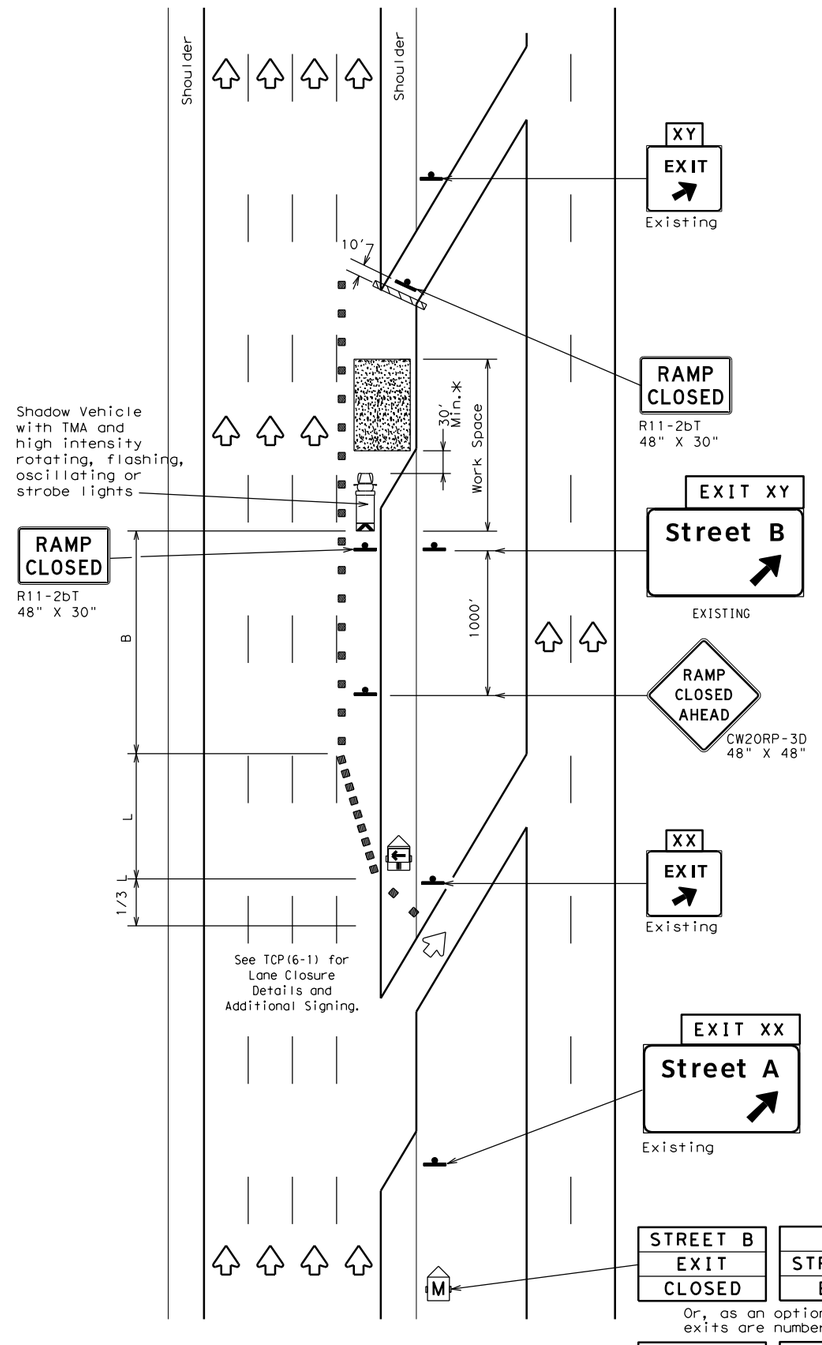


TCP (6-3a)

ENTRANCE RAMP OPEN



TCP (6-3b)

EXIT RAMP CLOSED

TRAFFIC EXITS PRIOR TO CLOSED RAMP

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

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

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

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

GENERAL NOTES:

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
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1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	FTW	PALO PINTO		94

203

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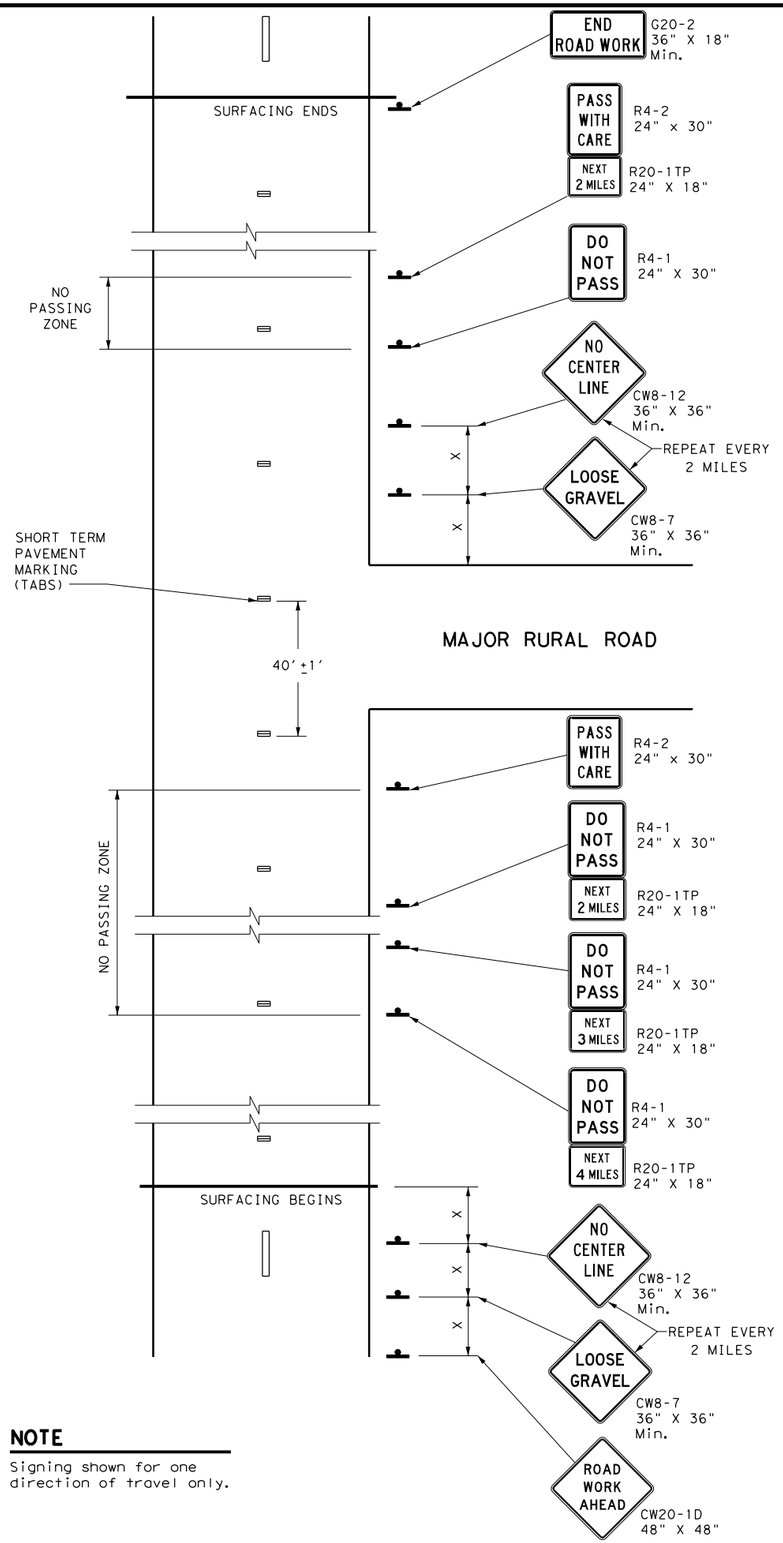
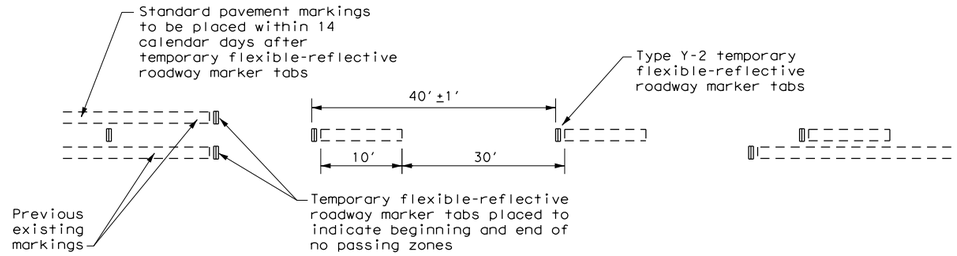


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

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

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

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

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

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

COORDINATION OF SIGN LOCATIONS

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

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

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

* Conventional Roads Only

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	FTW	PALO PINTO		95

210

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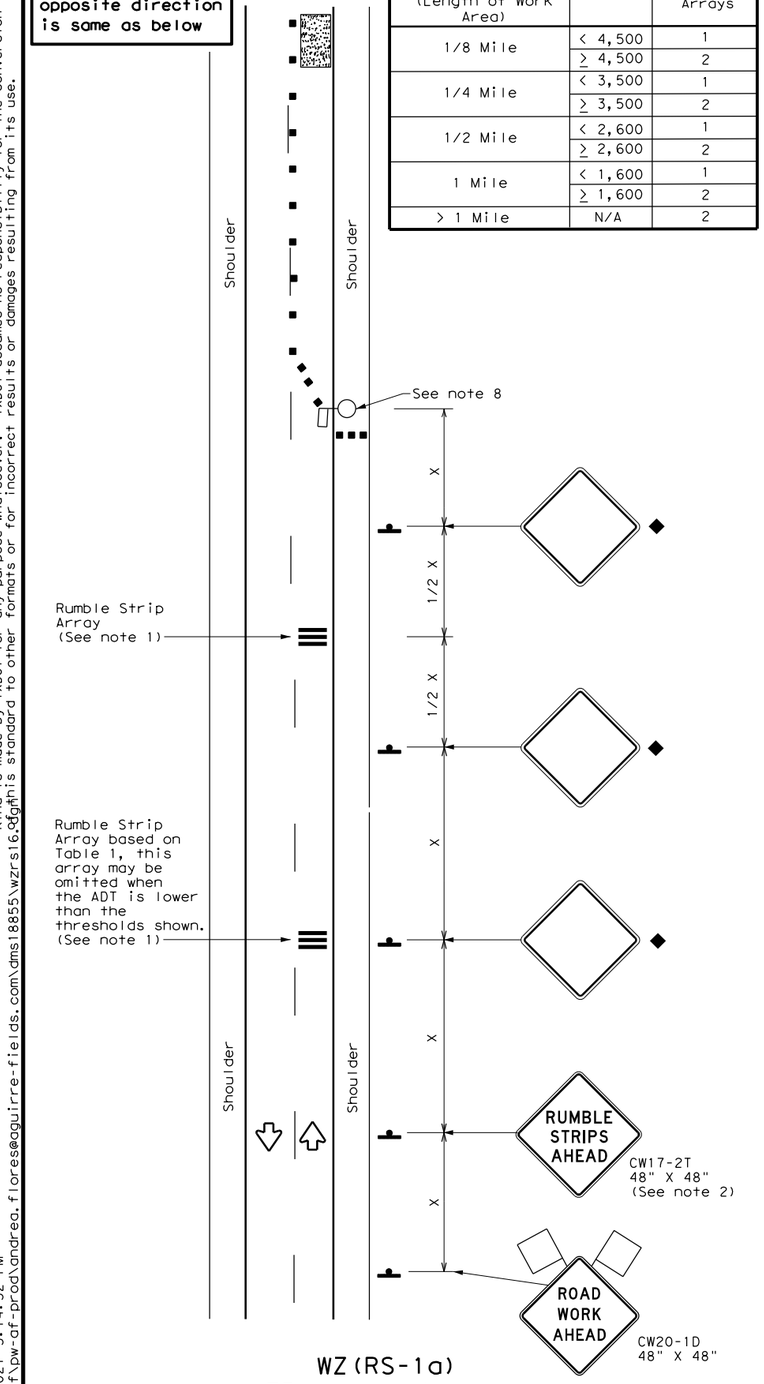
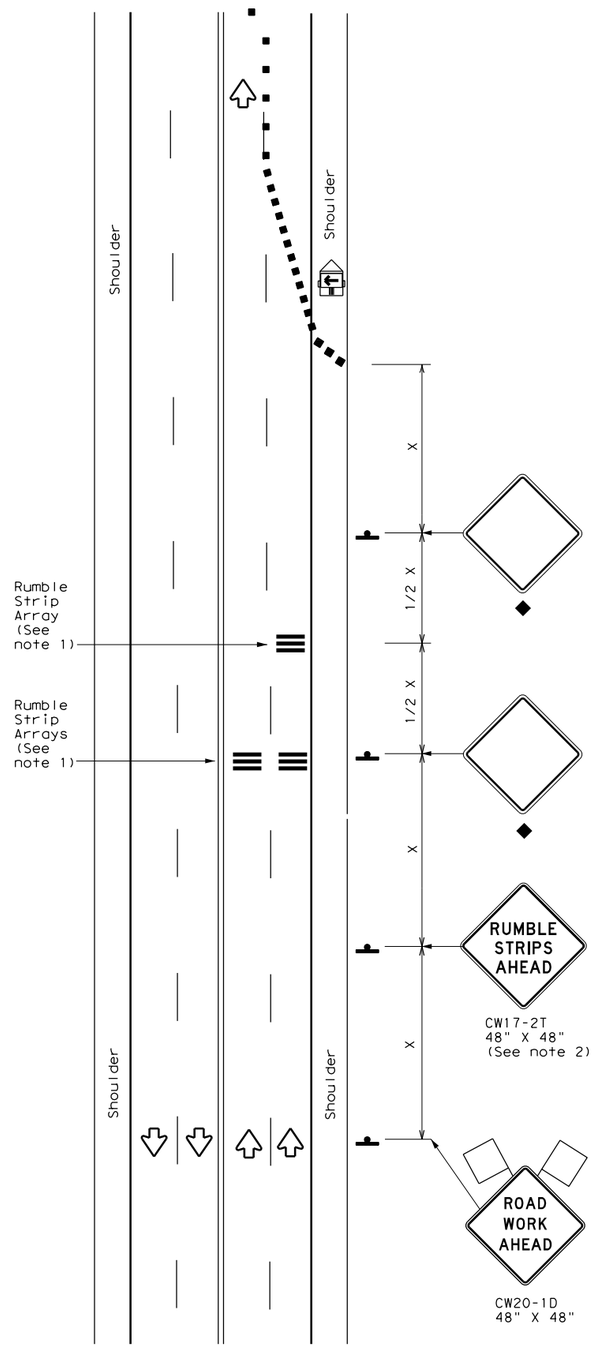
Warning sign and rumble strip sequence in opposite direction is same as below

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Removal of the Temporary Rumble Strips should be accomplished before removing the advance warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an AFAD or a portable traffic signal.
9. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment.

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

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©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
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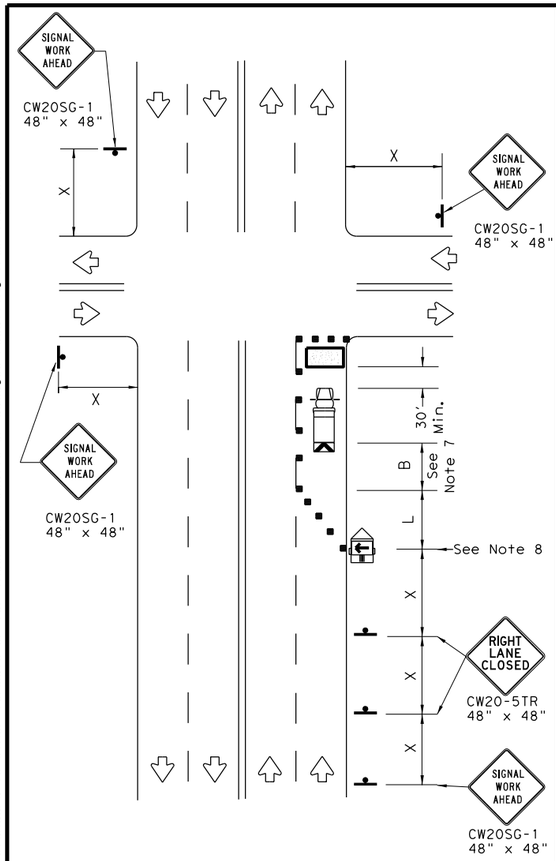
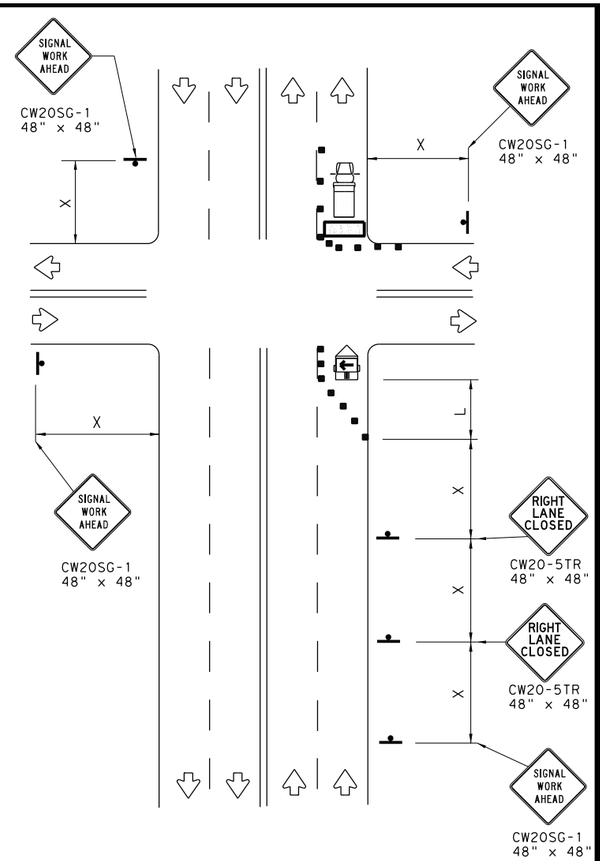


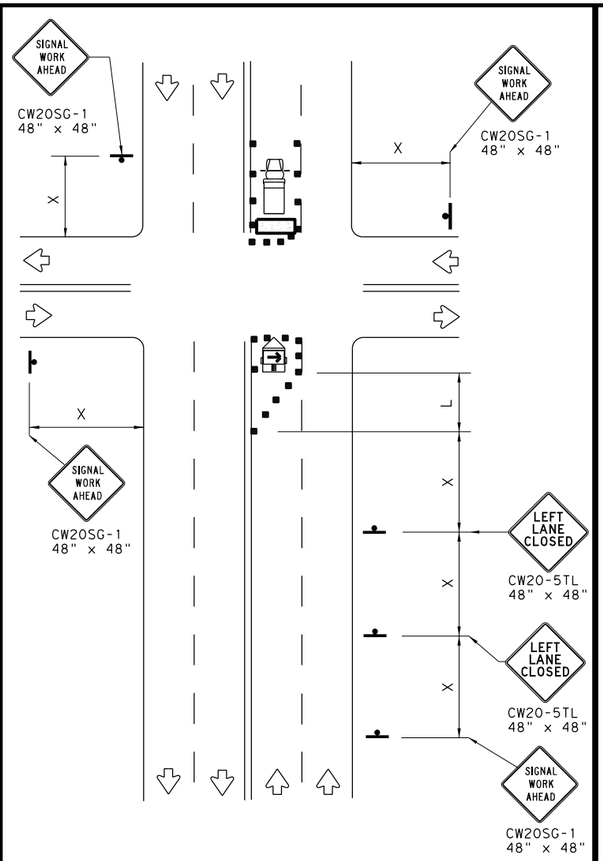
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



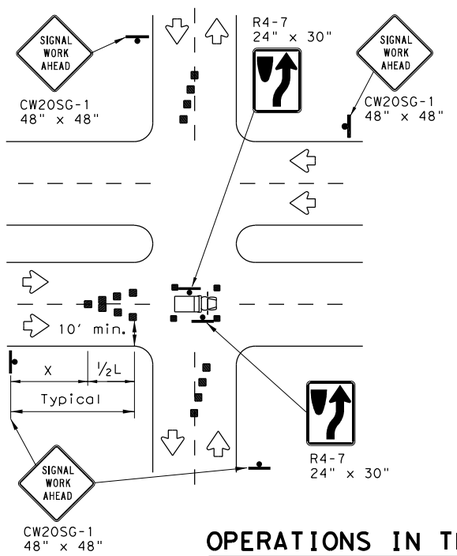
FAR SIDE RIGHT LANE CLOSURE

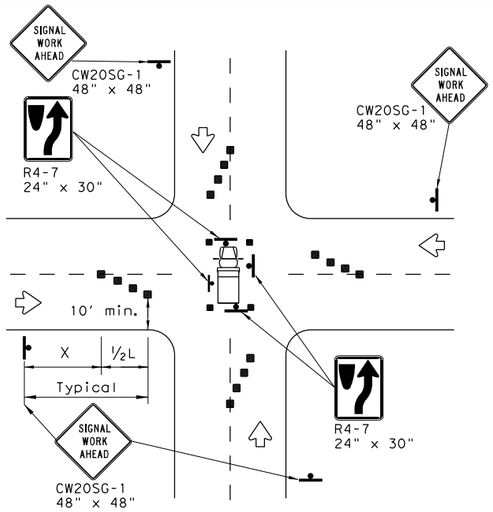
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

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

LEGEND

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

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

* Conventional Roads Only

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

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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4-98 3-03	FTW	PALO PINTO		97

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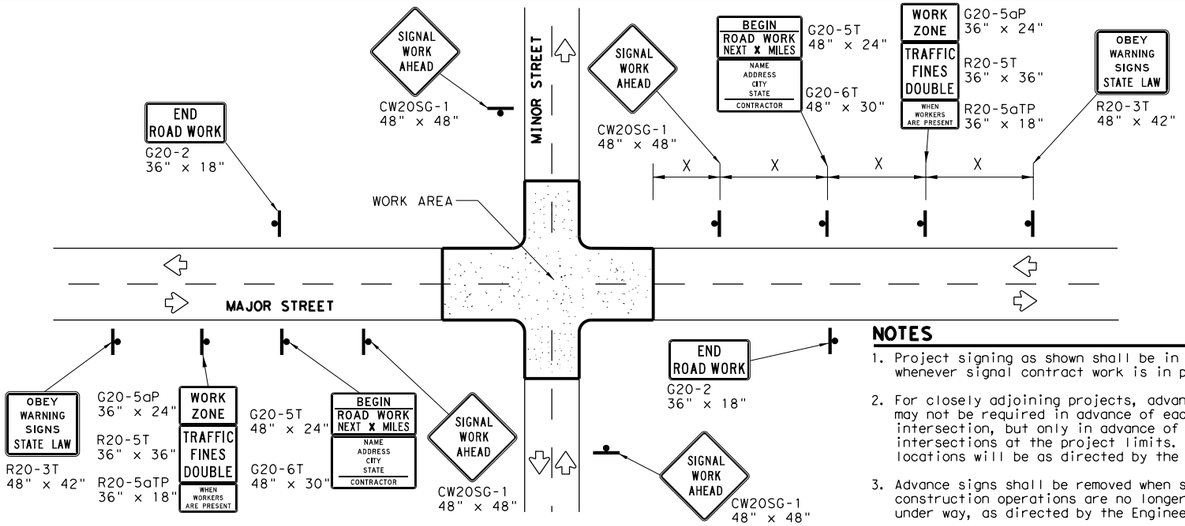


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

DURATION OF WORK

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

SIGN MOUNTING HEIGHT

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

REMOVING OR COVERING

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

REFLECTIVE SHEETING

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

SIGN SUPPORT WEIGHTS

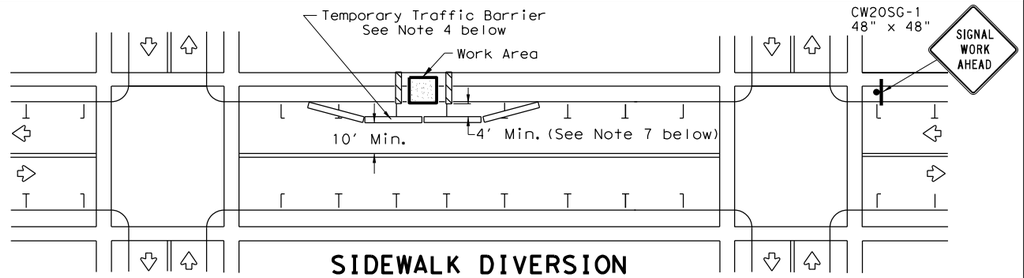
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

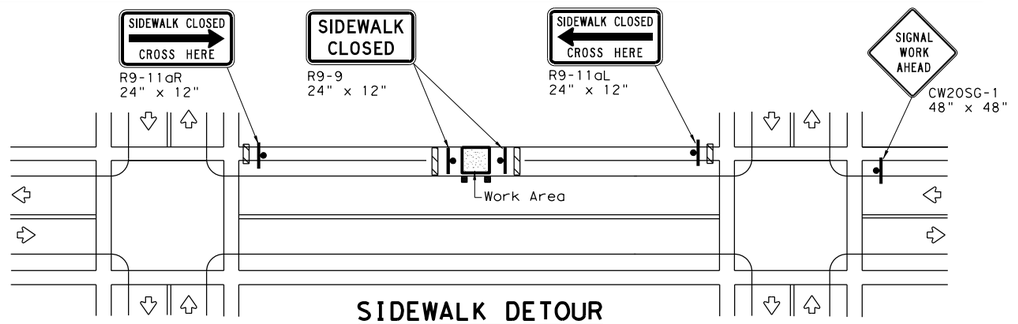
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

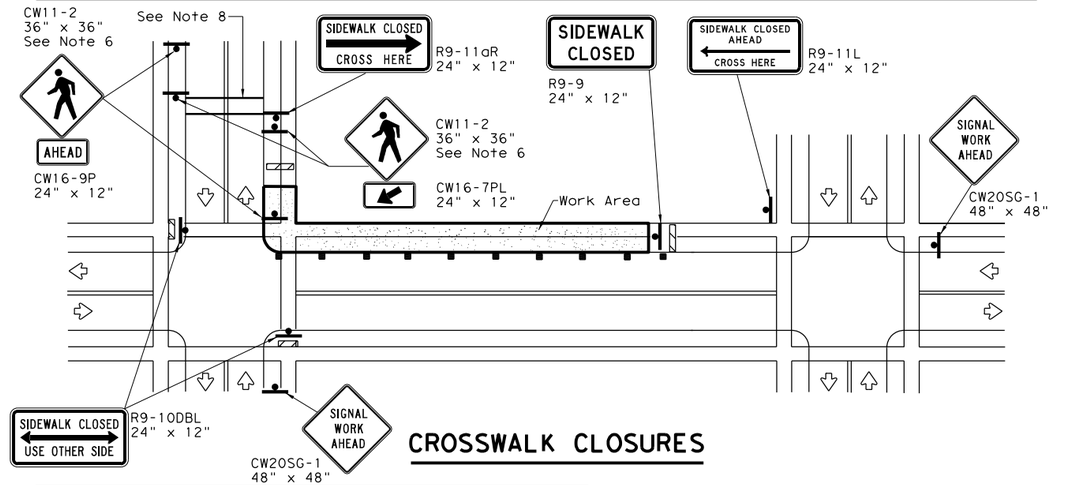
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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4-98 3-03	FTW	PALO PINTO		98

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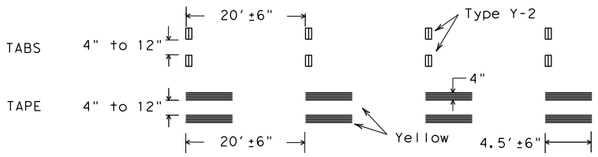
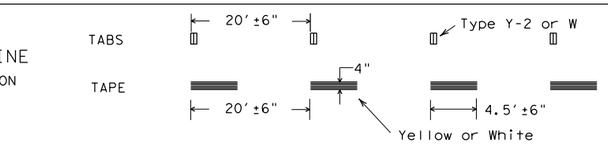
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

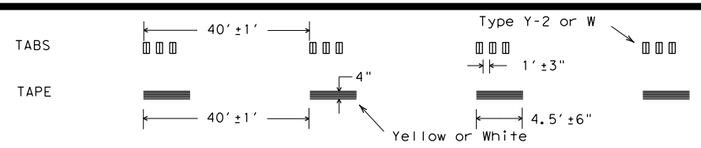


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



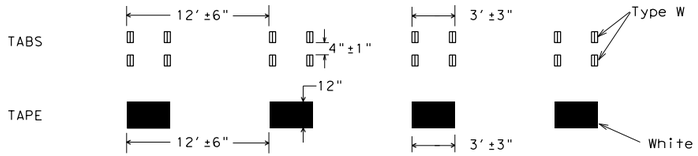
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

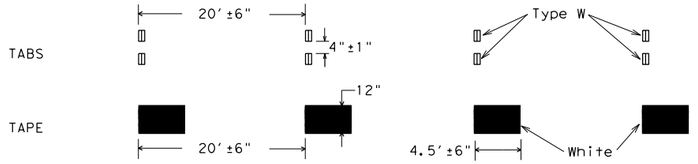


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



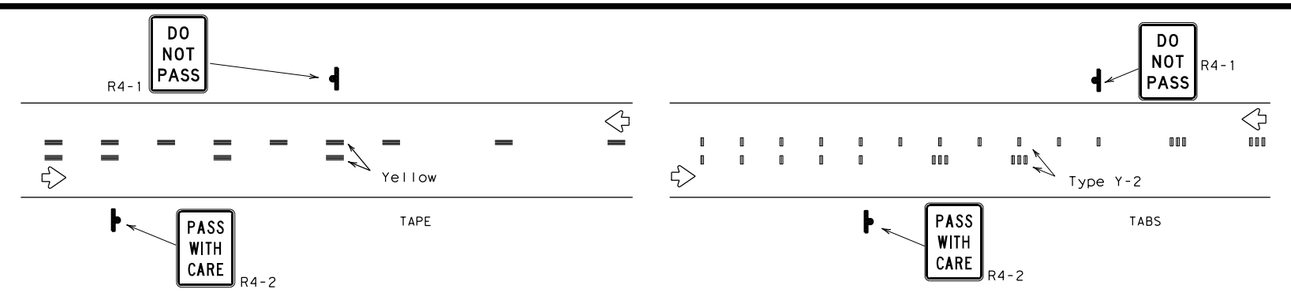
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

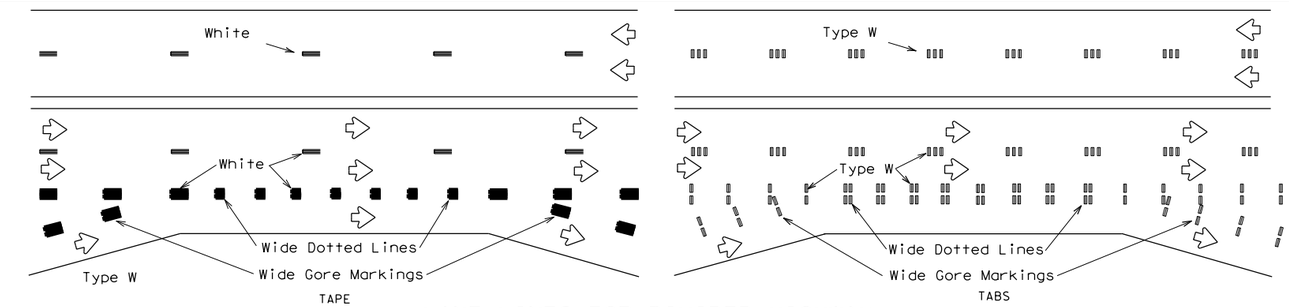
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. 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).
2. 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 geometrics.
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.

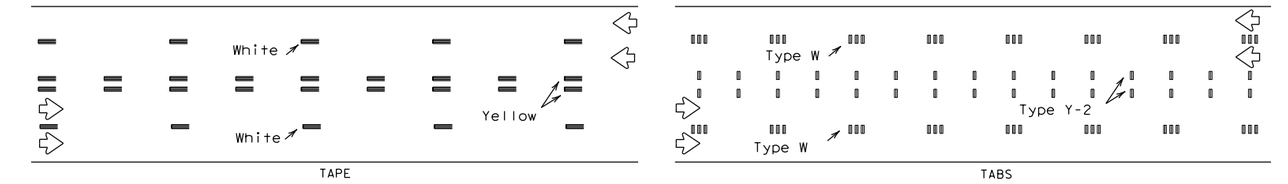
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



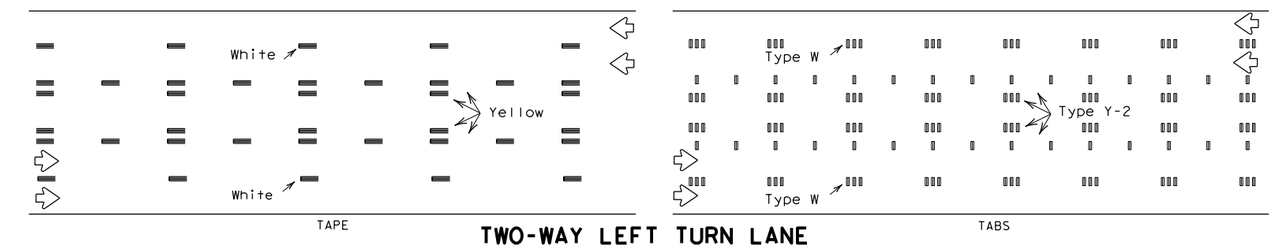
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



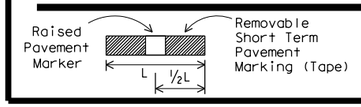
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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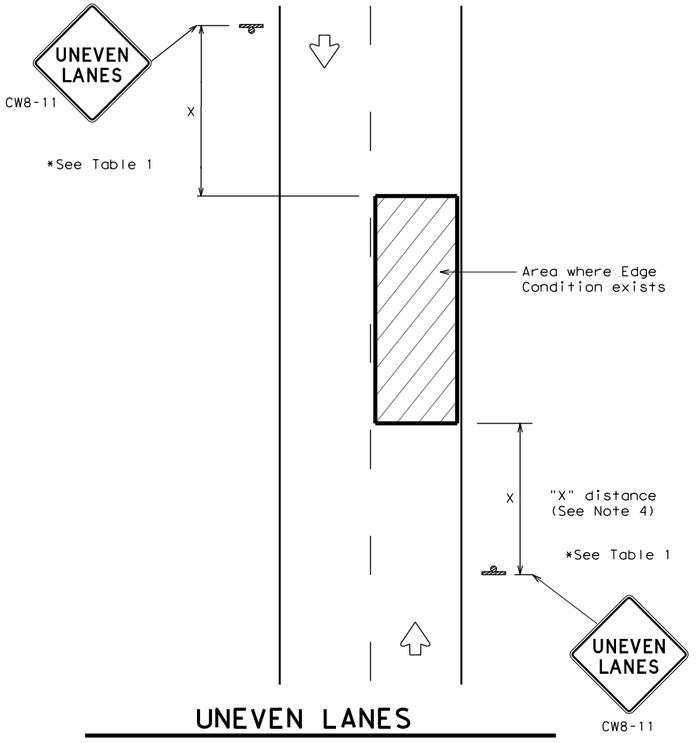
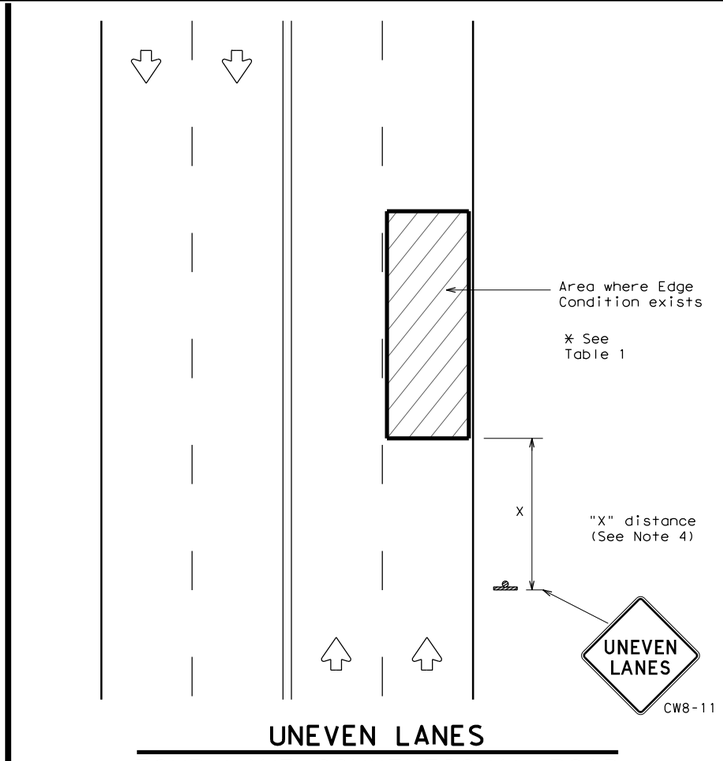
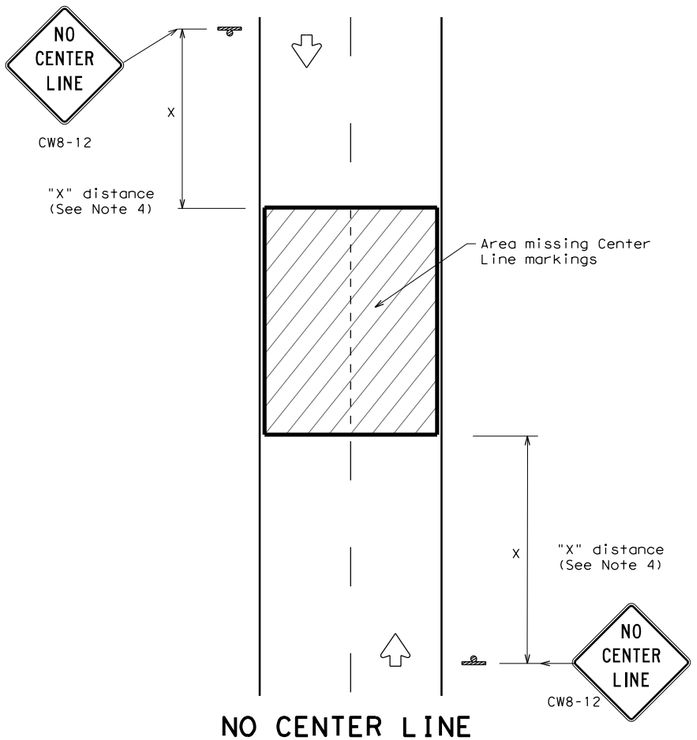


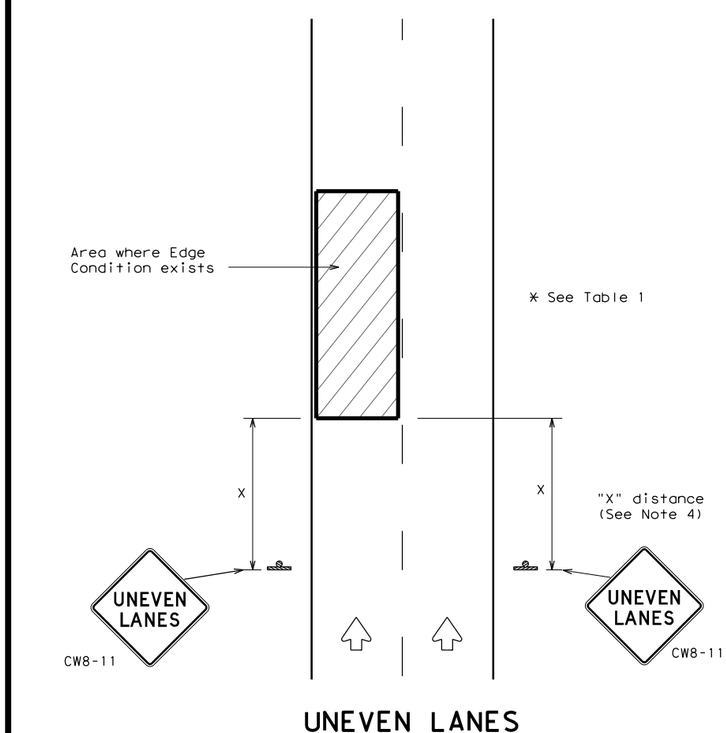
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

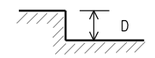
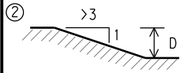
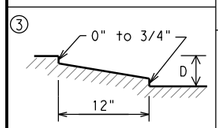
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

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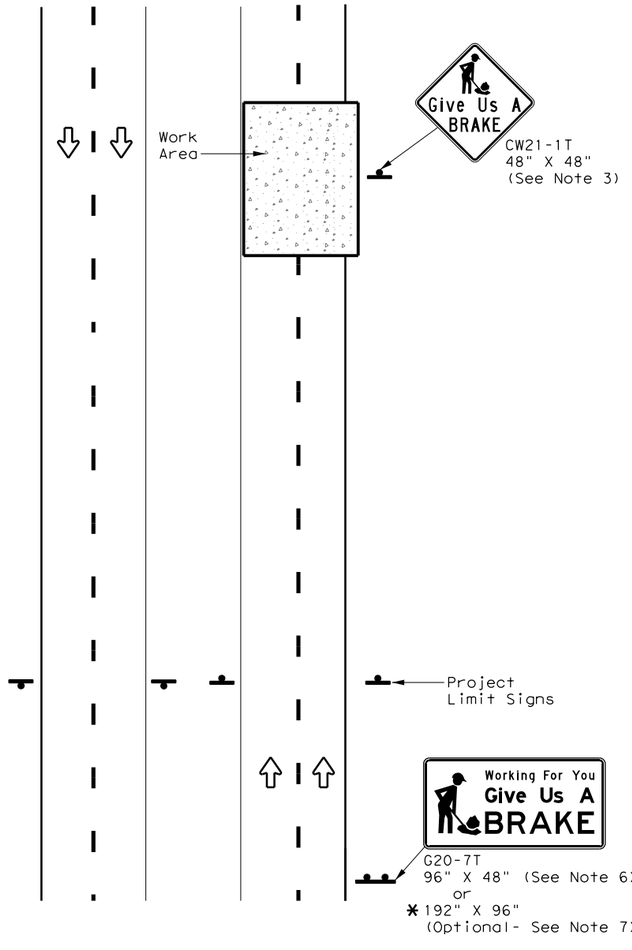
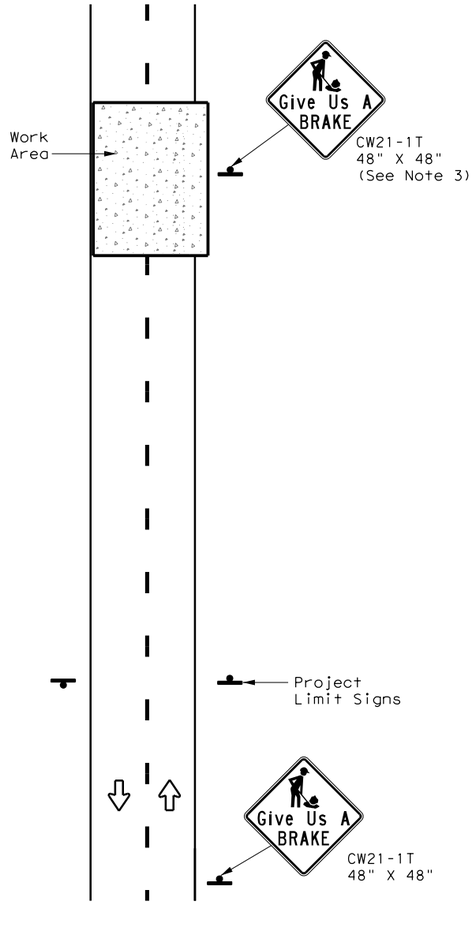


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	FTW	PALO PINTO		101

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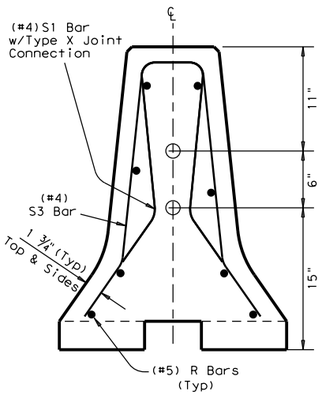
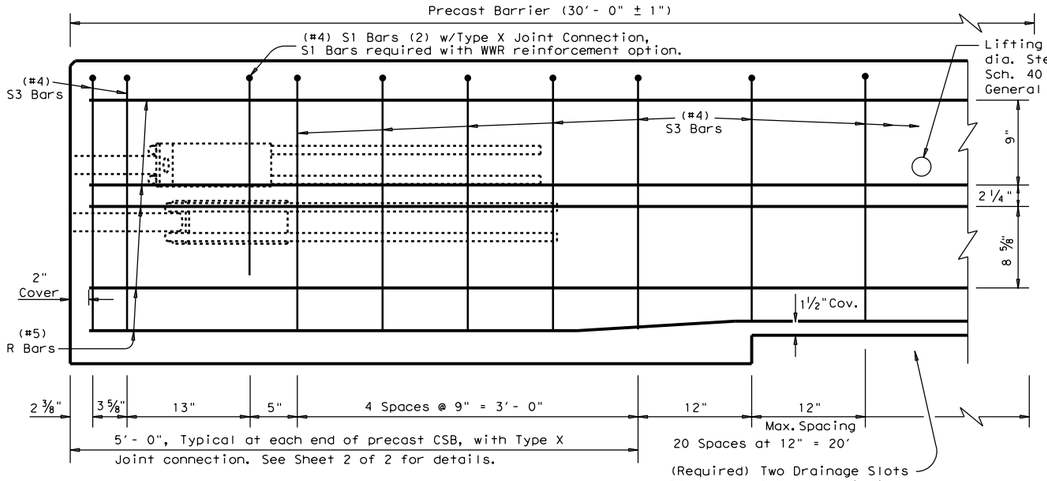


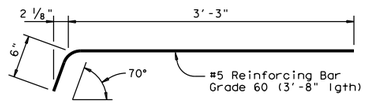
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



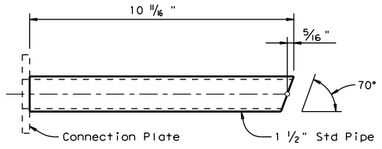
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



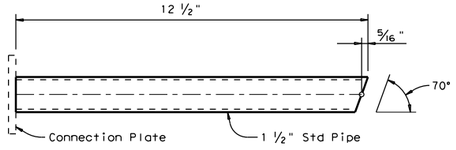
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



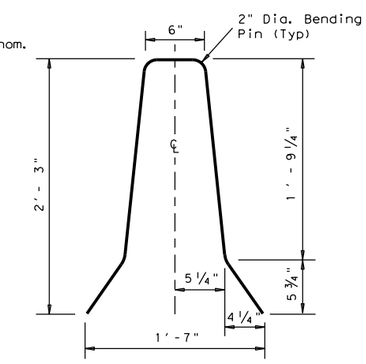
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



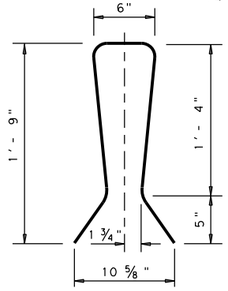
LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



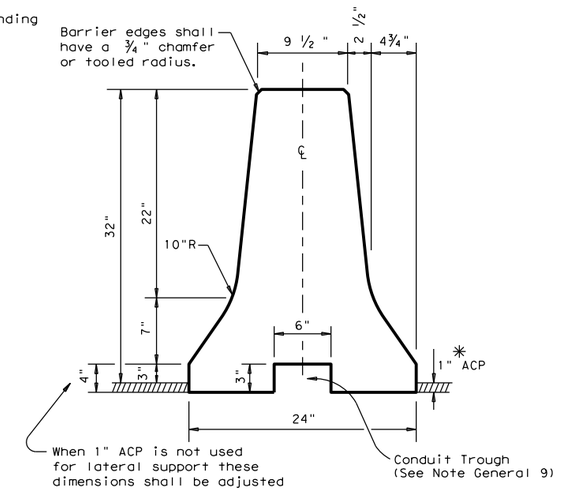
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

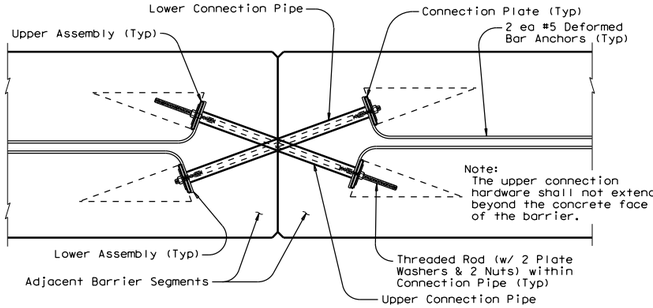


Concrete Safety Barrier

✳ When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

GENERAL NOTES

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾ " chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

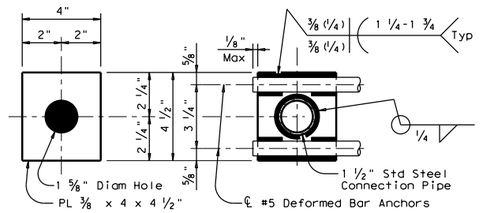
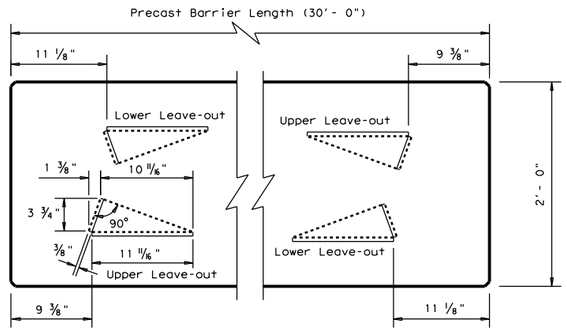


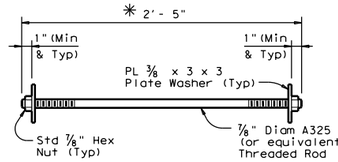
PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



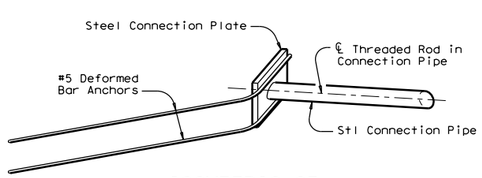
BARRIER PLAN AT END JOINTS



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

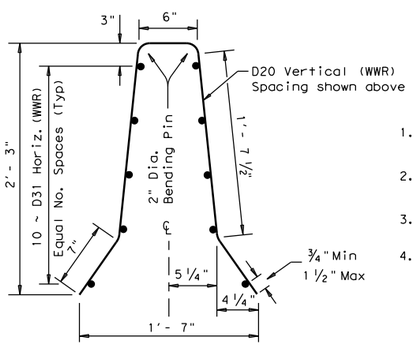
✳ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.



Welded Wire Reinforcement (WWR) Option for Bars R and S3

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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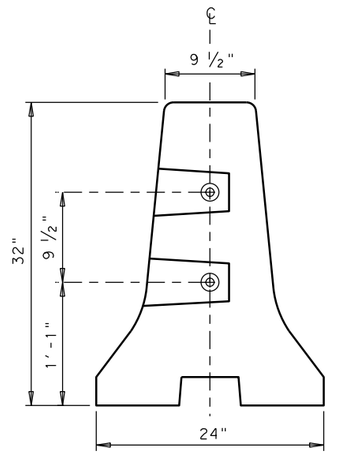
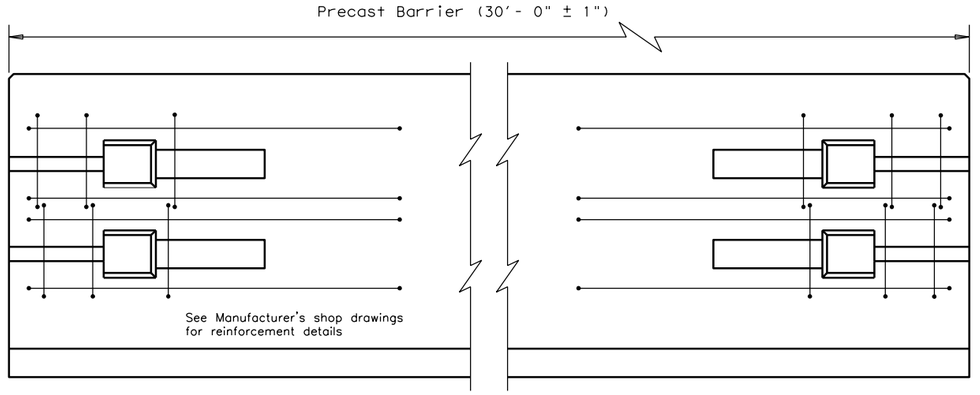
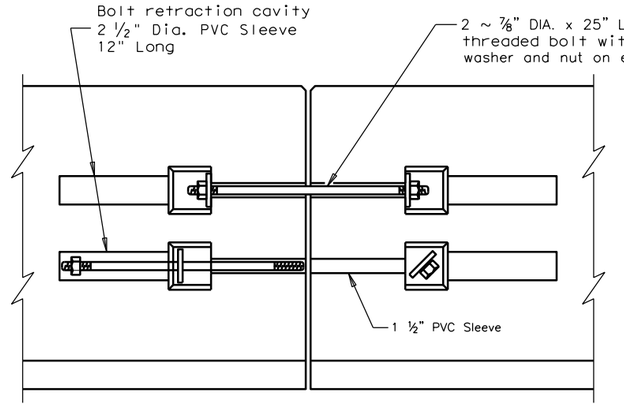


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

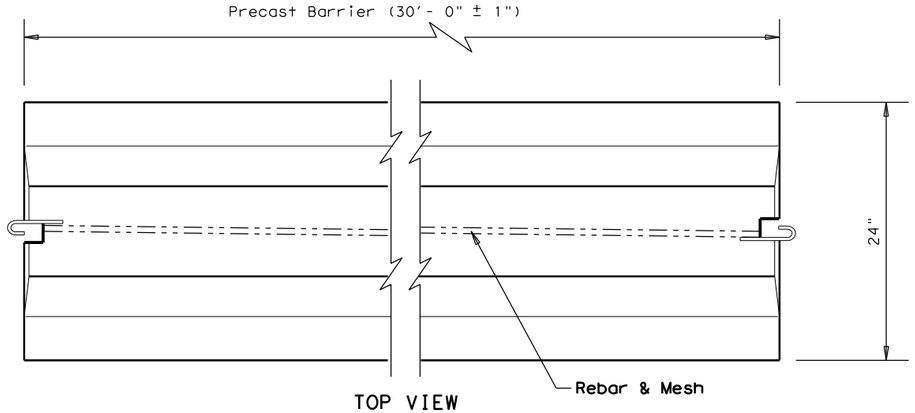


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

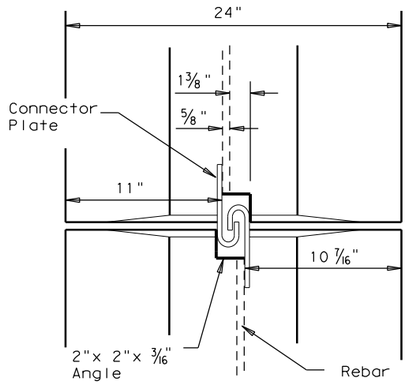


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

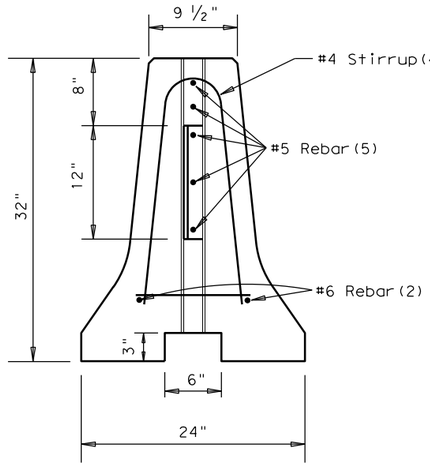
Joint Connection (Type Q)



TOP VIEW
PRECAST (CSB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)

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 Transportation | Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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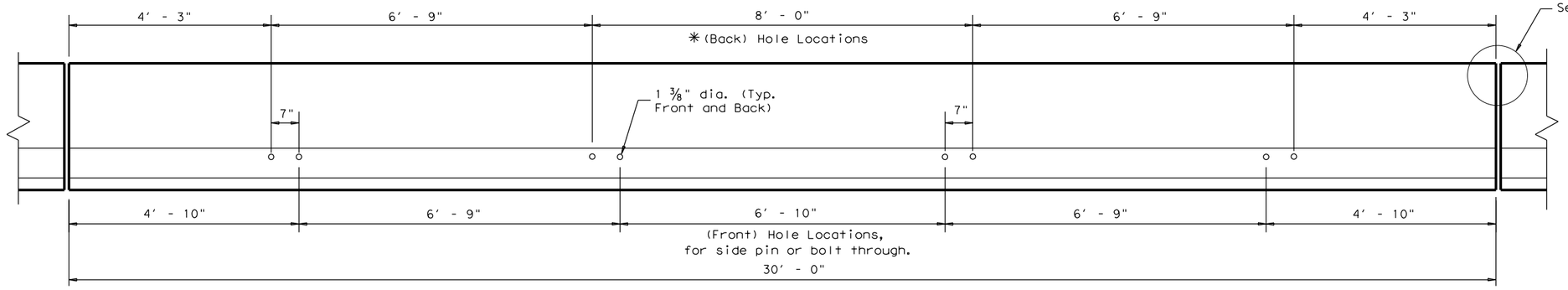
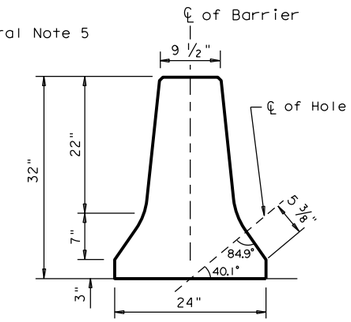
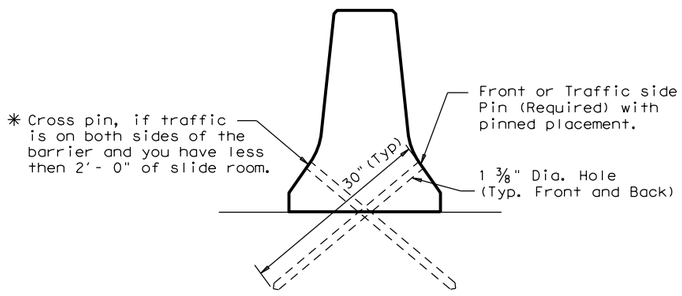


DETAIL 1

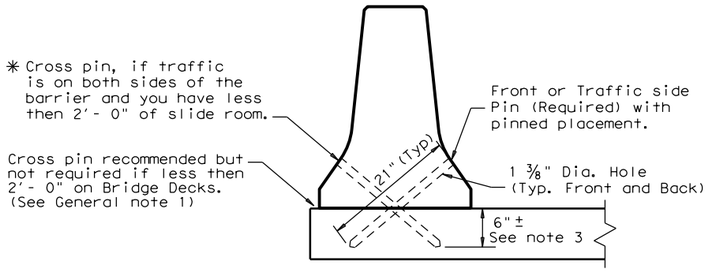


HOLE LOCATION DETAIL



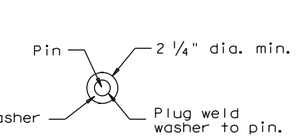
DETAIL 2

Placement on (ACP)
Asphalt Concete Pavement
or Treated Base Material
(30" Pin required)

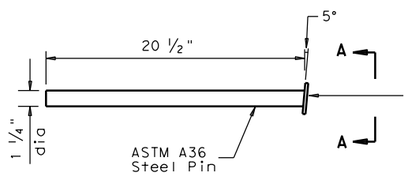


DETAIL 3

Bridge Deck or CRCP
(21" pin required)



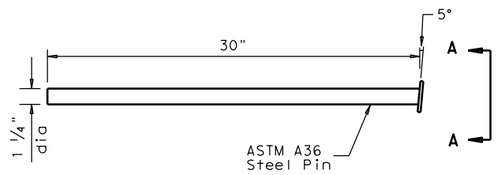
VIEW A-A



Steel washer welded to pin at 5° angle so that the washer is flush to the barrier surface. (See View A-A)

(21") PIN DETAIL

See Detail 3

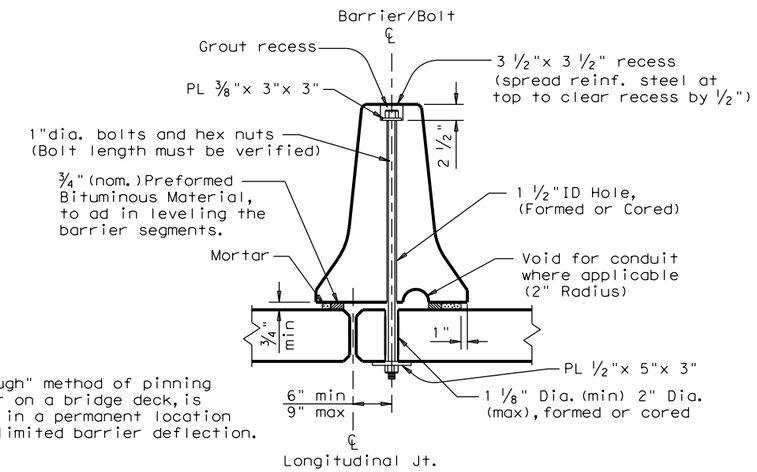


(30") PIN DETAIL

See Detail 2

CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding ½" shall be patched.



Note:
The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

PRECAST CSB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

GENERAL NOTES

1. These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less then 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
2. Each precast concrete barrier section shall have a minimum of four or total of eight 1 ⅜" ID, holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
3. The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing though the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
4. Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
5. See CSB(1) standard sheets for reinforcement requirements and joint connection types.
6. The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 ¼" pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
7. The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
8. Provide galvanized bolts, nuts, and plate washers. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
9. Weight of barrier is approx. 440 lbs per foot.

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)
PINNED PLACEMENT

CSB(7)-10

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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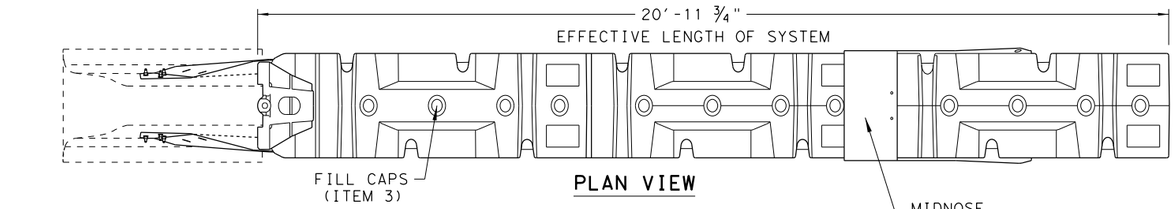
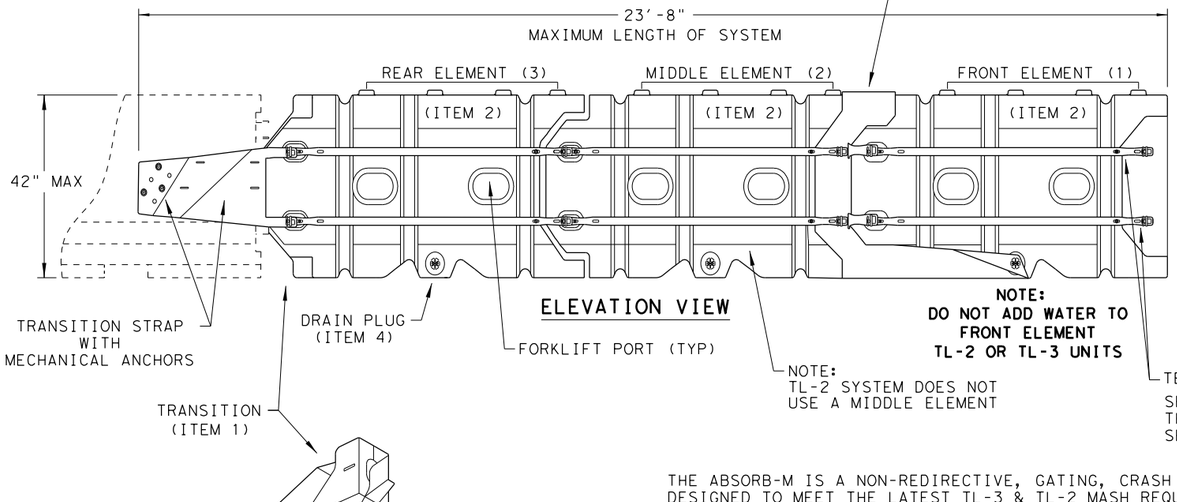
SYSTEM SHOWN - ABSORB-M TL-3



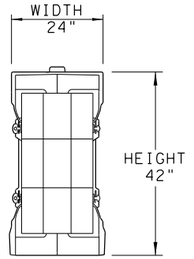
PLAN VIEW

TRAFFIC FLOW

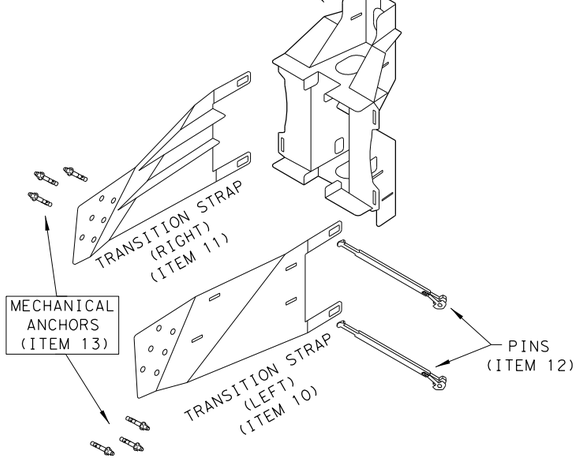


ELEVATION VIEW

TRAFFIC FLOW



SECTION A-A



THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

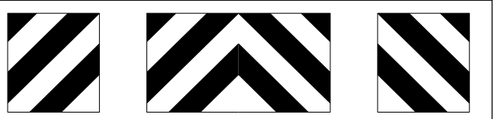
GENERAL NOTES

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.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
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).

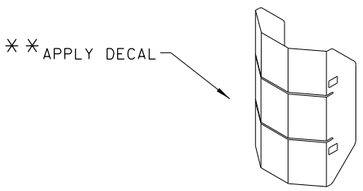
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
* 6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
* 7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE



TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER



NOSE PLATE

** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

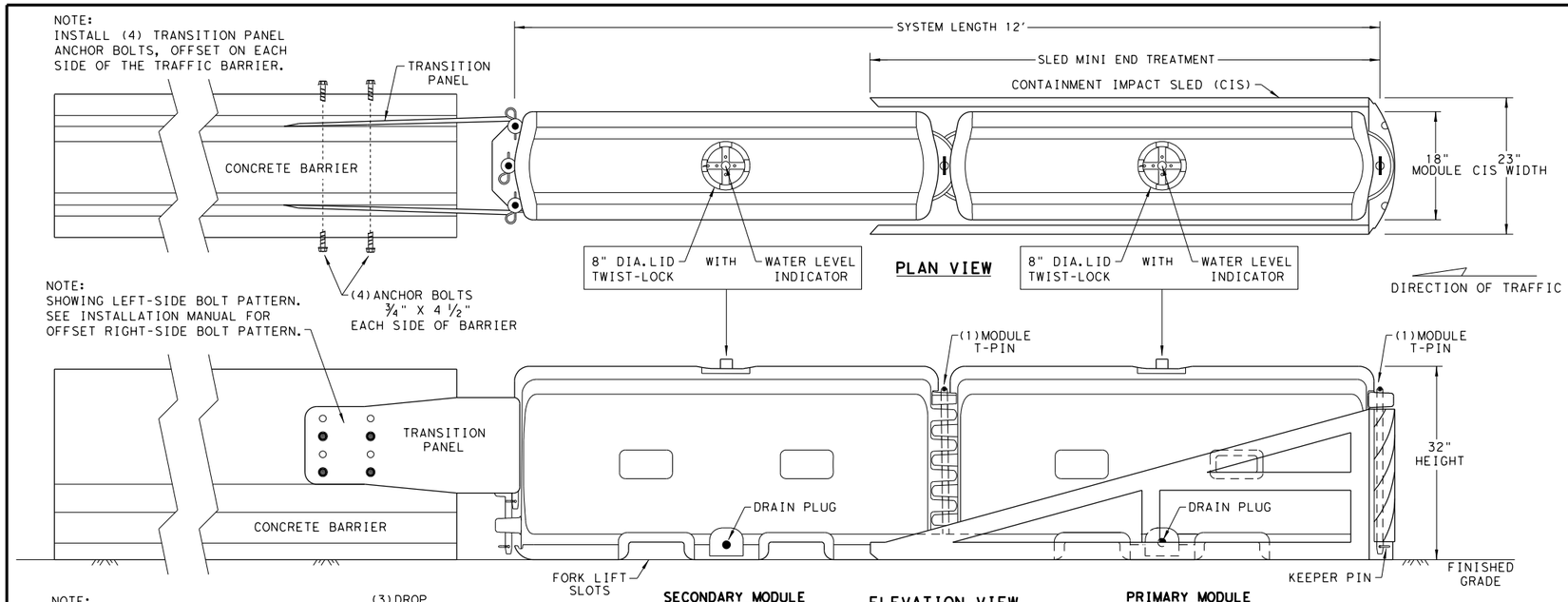
SACRIFICIAL

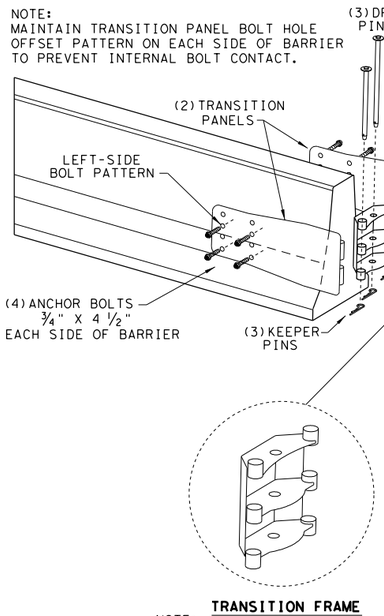
Texas Department of Transportation — Design Division Standard

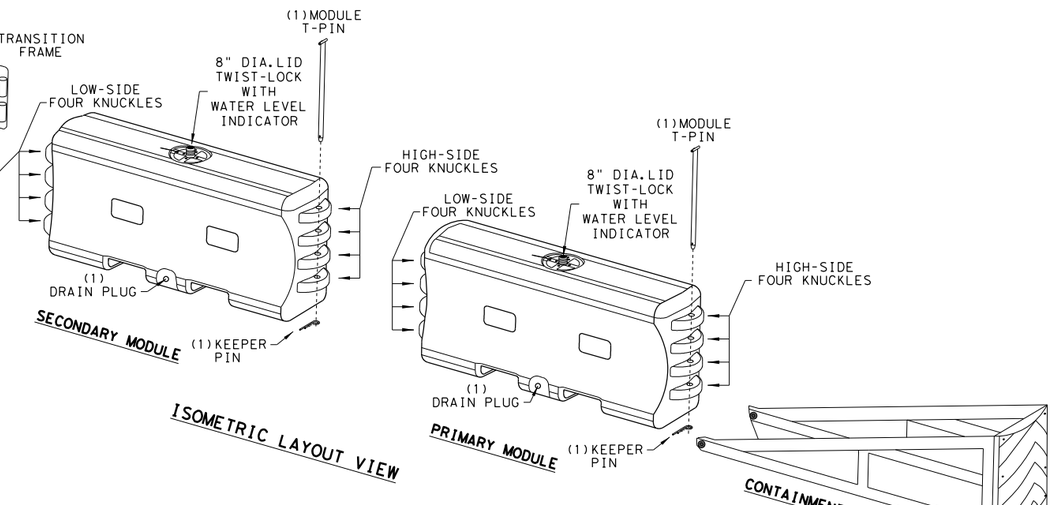
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

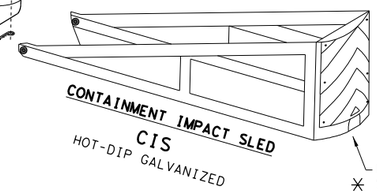
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
REVISIONS	CONT	SECT	JOB	HIGHWAY
	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		105

DATE: 10/27/2021
FILE: c:\pw-af\pw-af-prod\andrea.flores@aguirre-fields.com\dms18855\sledmini19.dgn









NOSE PLATE

NOTES:
⚹ SEE DELINEATION GUIDE FOR DECAL PLACEMENT.
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT TrafFix Devices, Inc. AT 1(949)361-5663
2. THE SLED MINI IS A MASH APPROVED TEST LEVEL 2 (TL-2) CRASH CUSHION APPROVED FOR USE WITHIN TEMPORARY WORK ZONE LOCATIONS. TL-2 IS APPROVED FOR SPEEDS OF 45 MPH OR LESS.
3. THE SLED MINI IS A GATING, NON-REDIRECTIVE CRASH CUSHION THAT DOES NOT NEED TO BE BOLTED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, AND DEPRESSIONS.
5. THE SLED MINI CAN BE ATTACHED TO CONCRETE BRIDGE ABUTMENTS, CONCRETE BARRIER, STEEL BARRIER AND PLASTIC BARRIER.

SLED MINI TL-2 - BILL OF MATERIALS

QTY:	PART #	PART DESCRIPTIONS
2	45332-MY	WATER FILLED MODULE
2	45032-CPGAL	T-PINS - LENGTH 26" WITH KEEPER PINS - FOR MODULES
2	18009-B-I	WATER LEVEL INDICATOR FLOAT LID
1	45032-S	CONTAINMENT IMPACT SLED (CIS)
2	45151	UNIVERSAL TRANSITION PANELS
1	45132	TRANSITION FRAME
1	45141	DROP PIN - LENGTH 26.50" WITH KEEPER PIN
2	45142	DROP PINS - LENGTH 18.50" WITH KEEPER PINS
8	45050	TRANSITION PANEL ANCHOR BOLTS 3/4" X 4 1/2" (4 EA. SIDE)

MODULE SPECIFICATIONS	(CIS) SPECIFICATIONS
LENGTH: 73" (PIN TO PIN)	LENGTH: 87 7/8"
HEIGHT: 32"	HEIGHT: 32"
WIDTH: 18"	WIDTH: 23"
EMPTY WEIGHT: 110 lbs.	APPROX. WEIGHT: 1250 lbs.
FILLED WEIGHT: 1100 lbs.	
FILL CAPACITY: 118.5 Gal	

DELINEATION DECAL PLACEMENT GUIDE

TRAFFIC FLOW ON LEFT-SIDE OF BARRIER

TRAFFIC FLOW ON BOTH-SIDES OF BARRIER

TRAFFIC FLOW ON RIGHT-SIDE OF BARRIER

⚹ NOTE:
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR TRAFFIC CONTROL DEVICES. DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE. THE ORIENTATION BETWEEN THE LEFT-SIDE AND RIGHT-SIDE TRAFFIC IS CHANGED BY ROTATING THE DECAL 90 DEGREES AND REINSTALLING.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED MINI, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Texas Department of Transportation

Design Division Standard

SLED MINI END TREATMENT TL-2 MASH COMPLIANT (TEMPORARY, WORK ZONE)

SLEDMINI-19

FILE: sledmini19	DN: TxDOT	CK: KM	DW: VP	CK:	
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0008	01	046,ETC	US 180,ETC	
	DIST	COUNTY		SHEET NO.	
	FTW	PALO PINTO		106	

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC. #	N	W	N	W	N	W
1	PHASE 1	**111**	US 180 WB - POLLARD CREEK		TL-2	UNI	EXIST ASPH PVMT	EXISTING	CSB(F-SHAPE)TY 1	24"	32"		X								X	
2	PHASE 1	**111**	US 180 WB - POLLARD CREEK		TL-2	UNI	EXIST ASPH PVMT	EXISTING	CSB(F-SHAPE)TY 1	24"	32"				X	1					X	
3	PHASE 1	**111**	US 180 EB - POLLARD CREEK		TL-2	UNI	EXIST ASPH PVMT	EXISTING	CSB(F-SHAPE)TY 1	24"	32"				X	2					X	
4	PHASE 1	**111**	US 180 EB - POLLARD CREEK		TL-2	UNI	EXIST ASPH PVMT	EXISTING	CSB(F-SHAPE)TY 1	24"	32"			X	X	3					X	
												TOTALS	1	1	3							

LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

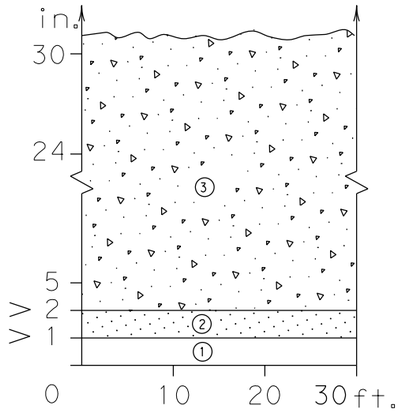
FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

CRASH CUSHION SUMMARY SHEET

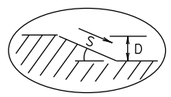
FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		
	FTW	PALO PINTO		
	STATE PROJECT NO.		SHEET NO.	
	C 8-1-46		107	

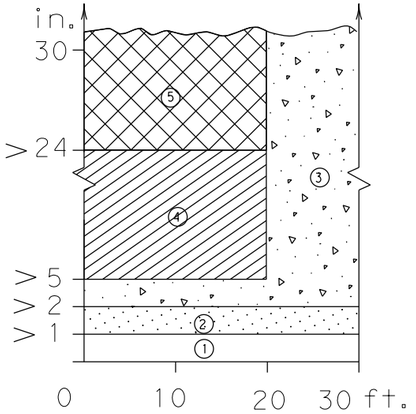
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

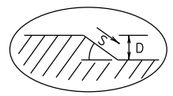


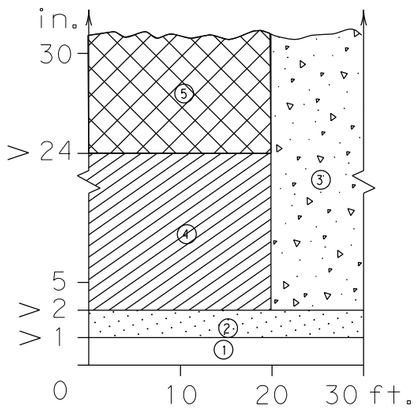
Edge Condition I
S = (3:1) (or flatter)



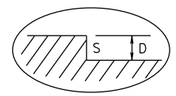


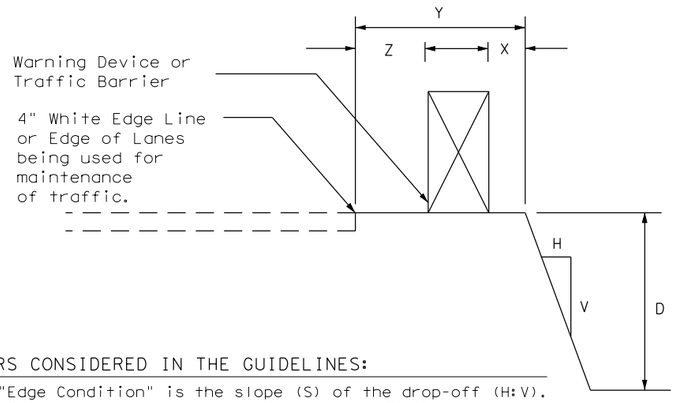
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

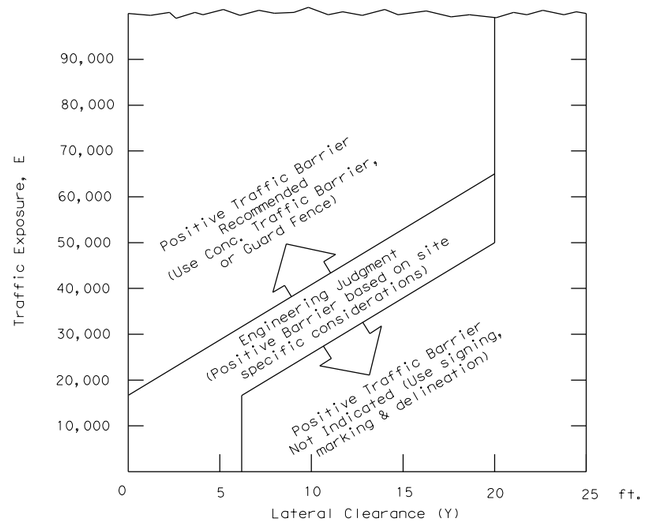
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

Date 10/29/21

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		108

US 180 WB ℄ ALI DATA

CHAIN US180WB CONTAINS:
12 CUR US180WB_3 CUR US180WB_6 13 14 15 16 CUR US180WB_17 CUR US180WB_20 17

BEGINNING CHAIN US180WB DESCRIPTION
FEATURE: GEOM_CENTERLINE_02

POINT 12 N 6,977,417.1500 E 2,082,578.0492 STA 2859+99.16

COURSE FROM 12 TO PC US180WB_3 N 33° 06′ 00.00" E DIST 421.2448

CURVE US180WB_3		CURVE DATA				
P.I. STATION		2867+05.82	N	6,978,009.1313	E	2,082,963.9571
DELTA	=	37° 32′ 00.00"	(RT)			
DEGREE	=	6° 49′ 15.33"				
TANGENT	=	285.4141				
LENGTH	=	550.2674				
RADIUS	=	840.0000				
EXTERNAL	=	47.1647				
LONG CHORD	=	540.4810				
MID. ORD.	=	44.6573				
P.C. STATION		2864+20.41	N	6,977,770.0346	E	2,082,808.0918
P.T. STATION		2869+70.68	N	6,978,103.7782	E	2,083,233.2212
C.C.			N	6,977,311.3090	E	2,083,511.7756
BACK	= N	33° 06′ 00.00" E				
AHEAD	= N	70° 38′ 00.00" E				
CHORD BEAR	= N	51° 52′ 00.00" E				

COURSE FROM PT US180WB_3 TO PC US180WB_6 N 70° 38′ 00.00" E DIST 610.0856

CURVE US180WB_6		CURVE DATA				
P.I. STATION		2877+33.71	N	6,978,356.8097	E	2,083,953.0795
DELTA	=	18° 29′ 00.00"	(RT)			
DEGREE	=	6° 05′ 43.06"				
TANGENT	=	152.9484				
LENGTH	=	303.2393				
RADIUS	=	940.0000				
EXTERNAL	=	12.3619				
LONG CHORD	=	301.9261				
MID. ORD.	=	12.2014				
P.C. STATION		2875+80.76	N	6,978,306.0901	E	2,083,808.7856
P.T. STATION		2878+84.00	N	6,978,359.1676	E	2,084,106.0097
C.C.			N	6,977,419.2793	E	2,084,120.5012
BACK	= N	70° 38′ 00.00" E				
AHEAD	= N	89° 07′ 00.00" E				
CHORD BEAR	= N	79° 52′ 30.00" E				

COURSE FROM PT US180WB_6 TO 13 N 89° 07′ 00.00" E DIST 357.6615

POINT 13 N 6,978,364.6815 E 2,084,463.6287 STA 2882+41.66

COURSE FROM 13 TO 14 N 89° 49′ 00.00" E DIST 2,159.2270

POINT 14 N 6,978,371.5905 E 2,086,622.8447 STA 2904+00.89

COURSE FROM 14 TO 15 N 89° 56′ 00.00" E DIST 3,453.9733

POINT 15 N 6,978,375.6094 E 2,090,076.8156 STA 2938+54.86

COURSE FROM 15 TO 16 N 89° 49′ 00.00" E DIST 1,514.6824

POINT 16 N 6,978,380.4560 E 2,091,591.4902 STA 2953+69.54

COURSE FROM 16 TO PC US180WB_17 N 89° 53′ 00.00" E DIST 2,359.4349

CURVE US180WB_17		CURVE DATA				
P.I. STATION		2984+00.96	N	6,978,386.6286	E	2,094,622.8996
DELTA	=	18° 56′ 00.00"	(LT)			
DEGREE	=	1° 25′ 18.23"				
TANGENT	=	671.9807				
LENGTH	=	1,331.7095				
RADIUS	=	4,030.0000				
EXTERNAL	=	55.6405				
LONG CHORD	=	1,325.6587				
MID. ORD.	=	54.8827				
P.C. STATION		2977+28.98	N	6,978,385.2603	E	2,093,950.9202
P.T. STATION		2990+60.69	N	6,978,605.9585	E	2,095,258.0787
C.C.			N	6,982,415.2519	E	2,093,942.7143
BACK	= N	89° 53′ 00.00" E				
AHEAD	= N	70° 57′ 00.00" E				
CHORD BEAR	= N	80° 25′ 00.00" E				

COURSE FROM PT US180WB_17 TO PC US180WB_20 N 70° 57′ 00.00" E DIST 752.7685

CURVE US180WB_20		CURVE DATA				
P.I. STATION		3002+79.44	N	6,979,003.7520	E	2,096,410.0882
DELTA	=	18° 44′ 00.00"	(RT)			
DEGREE	=	2° 01′ 41.41"				
TANGENT	=	465.9873				
LENGTH	=	923.6573				
RADIUS	=	2,825.0000				
EXTERNAL	=	38.1747				
LONG CHORD	=	919.5486				
MID. ORD.	=	37.1657				
P.C. STATION		2998+13.46	N	6,978,851.6570	E	2,095,969.6211
P.T. STATION		3007+37.11	N	6,979,006.3275	E	2,096,876.0684
C.C.			N	6,976,181.3706	E	2,096,891.6818
BACK	= N	70° 57′ 00.00" E				
AHEAD	= N	89° 41′ 00.00" E				
CHORD BEAR	= N	80° 19′ 00.00" E				

COURSE FROM PT US180WB_20 TO 17 N 89° 41′ 00.00" E DIST 585.4915

POINT 17 N 6,979,009.5634 E 2,097,461.5510 STA 3013+22.61

ENDING CHAIN US180WB DESCRIPTION

US 180 EB ℄ ALI DATA

CHAIN US180EB CONTAINS:
18 CUR US180EB 3 CUR US180EB 6 CUR US180EB 9 19 20 21 CUR US180EB 18 22

BEGINNING CHAIN US180EB DESCRIPTION
FEATURE: GEOM CENTERLINE 01

POINT 18 N 6,977,381.6303 E 2,082,580.7307 STA 1861+69.72

COURSE FROM 18 TO PC US180EB 3 N 34° 25′ 00.00" E DIST 30.0000

CURVE US180EB 3		CURVE DATA				
P.I. STATION		1864+86.46	N	6,977,642.9287	E	2,082,759.7571
DELTA	=	37° 17′ 00.00"	(RT)			
DEGREE	=	6° 44′ 26.45"				
TANGENT	=	286.7449				
LENGTH	=	553.1094				
RADIUS	=	850.0000				
EXTERNAL	=	47.0633				
LONG CHORD	=	543.4024				
MID. ORD.	=	44.5942				
P.C. STATION		1861+99.72	N	6,977,406.3787	E	2,082,597.6869
P.T. STATION		1867+52.83	N	6,977,732.9645	E	2,083,032.0001
C.C.			N	6,976,925.9528	E	2,083,298.8937
BACK	= N	34° 25′ 00.00" E				
AHEAD	= N	71° 42′ 00.00" E				
CHORD BEAR	= N	53° 03′ 30.00" E				

COURSE FROM PT US180EB 3 TO PC US180EB 6 N 71° 42′ 00.00" E DIST 1,022.4693

CURVE US180EB 6		CURVE DATA				
P.I. STATION		1879+18.12	N	6,978,098.8584	E	2,084,138.3613
DELTA	=	17° 06′ 00.00"	(RT)			
DEGREE	=	6° 01′ 52.08"				
TANGENT	=	142.8261				
LENGTH	=	283.5287				
RADIUS	=	950.0000				
EXTERNAL	=	10.6765				
LONG CHORD	=	282.4776				
MID. ORD.	=	10.5578				
P.C. STATION		1877+75.30	N	6,978,054.0121	E	2,084,002.7585
P.T. STATION		1880+58.83	N	6,978,101.8496	E	2,084,281.1560
C.C.			N	6,977,152.0579	E	2,084,301.0513
BACK	= N	71° 42′ 00.00" E				
AHEAD	= N	88° 48′ 00.00" E				
CHORD BEAR	= N	80° 15′ 00.00" E				

COURSE FROM PT US180EB 6 TO PC US180EB 9 N 88° 48′ 00.00" E DIST 144.6065

CURVE US180EB_9		CURVE DATA				
P.I. STATION		1882+63.75	N	6,978,106.1412	E	2,084,486.0379
DELTA	=	1° 04′ 00.00"	(RT)			
DEGREE	=	0° 53′ 03.10"				
TANGENT	=	60.3203				
LENGTH	=	120.6372				
RADIUS	=	6,480.0000				
EXTERNAL	=	0.2807				
LONG CHORD	=	120.6354				
MID. ORD.	=	0.2807				
P.C. STATION		1882+03.43	N	6,978,104.8780	E	2,084,425.7309
P.T. STATION		1883+24.07	N	6,978,106.2816	E	2,084,546.3581
C.C.			N	6,971,626.2991	E	2,084,561.4377
BACK	= N	88° 48′ 00.00" E				
AHEAD	= N	89° 52′ 00.00" E				
CHORD BEAR	= N	89° 20′ 00.00" E				

COURSE FROM PT US180EB_9 TO 19 N 89° 52′ 00.00" E DIST 343.4093

POINT 19 N 6,978,107.0807 E 2,084,889.7665 STA 1886+67.48

COURSE FROM 19 TO 20 S 89° 32′ 00.00" E DIST 591.6201

POINT 20 N 6,978,102.2621 E 2,085,481.3669 STA 1892+59.10

COURSE FROM 20 TO 21 N 89° 56′ 00.00" E DIST 4,596.0364

POINT 21 N 6,978,107.6099 E 2,090,077.4003 STA 1938+55.13

COURSE FROM 21 TO PC US180EB_18 N 89° 49′ 00.00" E DIST 3,497.3660

CURVE US180EB_18		CURVE DATA				
P.I. STATION		1976+72.70	N	6,978,119.8252	E	2,093,894.9422
DELTA	=	19° 02′ 00.00"	(LT)			
DEGREE	=	2° 59′ 59.20"				
TANGENT	=	320.1956				
LENGTH	=	634.4912				
RADIUS	=	1,910.0000				
EXTERNAL	=	26.6531				
LONG CHORD	=	631.5778				
MID. ORD.	=	26.2863				
P.C. STATION		1973+52.50	N	6,978,118.8006	E	2,093,574.7483
P.T. STATION		1979+86.99	N	6,978,225.2148	E	2,094,197.2967
C.C.			N	6,980,028.7908	E	2,093,568.6368
BACK	= N	89° 49′ 00.00" E				
AHEAD	= N	70° 47′ 00.00" E				
CHORD BEAR	= N	80° 18′ 00.00" E				

COURSE FROM PT US180EB_18 TO 22 N 70° 47′ 00.00" E DIST 1,157.3581

POINT 22 N 6,978,606.1491 E 2,095,290.1676 STA 1991+44.35

ENDING CHAIN US180EB DESCRIPTION

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. CONTRACTOR TO NOTIFY PROJECT ENGINEER REGARDING DISCREPANCIES BETWEEN PLANS AND FIELD CONDITIONS.

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL LICENSED ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	109
CONTROL	SECTION	JOB	
0008	01	046,ETC	

IH 20 ℄ ALI DATA

CHAIN IH20 CONTAINS:
IH2001 IH2002

BEGINNING CHAIN IH20 DESCRIPTION
FEATURE: GEOM_CENTERLINE_03

POINT IH2001 N 6,930,052.9379 E 2,117,463.2457 STA 1551+24.19

COURSE FROM IH2001 TO IH2002 N 51°22′ 36.87" E DIST 5,582.0632

POINT IH2002 N 6,933,537.2312 E 2,121,824.3385 STA 1607+06.25

ENDING CHAIN IH20 DESCRIPTION

FM 113 ℄ ALI DATA

CHAIN FM113 CONTAINS:
FM11301 CUR FM113-01 FM11302

BEGINNING CHAIN FM113 DESCRIPTION
FEATURE: GEOM_CENTERLINE_04

POINT FM11301 N 6,931,670.2341 E 2,119,788.0562 STA 13+12.41

COURSE FROM FM11301 TO PC FM113-01 N 38°37′ 23.13" W DIST 315.3815

CURVE DATA

CURVE FM113-01						
P.I. STATION		20+65.82	N	6,932,258.8485	E	2,119,317.7830
DELTA	=	38°37′ 23.13" (RT)				
DEGREE	=	4°35′ 01.18"				
TANGENT	=	438.0266				
LENGTH	=	842.6252				
RADIUS	=	1,250.0000				
EXTERNAL	=	74.5253				
LONG CHORD	=	826.7615				
MID. ORD.	=	70.3321				
P.C. STATION		16+27.79	N	6,931,916.6319	E	2,119,591.1968
P.T. STATION		24+70.42	N	6,932,696.8751	E	2,119,317.7830
C.C.			N	6,932,696.8751	E	2,120,567.7830
BACK	= N 38°37′ 23.13" W					
AHEAD	= DUE NORTH					
CHORD BEAR	= N 19°18′ 41.57" W					

COURSE FROM PT FM113-01 TO FM11302 DUE NORTH DIST 101.3480

POINT FM11302 N 6,932,798.2231 E 2,119,317.7830 STA 25+71.76

ENDING CHAIN FM113 DESCRIPTION

EBFR ℄ ALI DATA

CHAIN EBFR CONTAINS:
EBFR01 CUR EBFR-01 EBFR02

BEGINNING CHAIN EBFR DESCRIPTION
FEATURE: GEOM_CENTERLINE_05

POINT EBFR01 N 6,930,171.9369 E 2,117,892.5514 STA 2555+33.87

COURSE FROM EBFR01 TO PC EBFR-01 N 51°22′ 36.87" E DIST 3,187.0152

CURVE DATA

CURVE EBFR-01						
P.I. STATION		2591+75.63	N	6,932,445.1030	E	2,120,737.7448
DELTA	=	8°57′ 57.99" (RT)				
DEGREE	=	0°59′ 16.29"				
TANGENT	=	454.7438				
LENGTH	=	907.6309				
RADIUS	=	5,800.0000				
EXTERNAL	=	17.7996				
LONG CHORD	=	906.7051				
MID. ORD.	=	17.7451				
P.C. STATION		2587+20.89	N	6,932,161.2544	E	2,120,382.4675
P.T. STATION		2596+28.52	N	6,932,670.1132	E	2,121,132.9186
C.C.			N	6,927,629.8945	E	2,124,002.7958
BACK	= N 51°22′ 36.87" E					
AHEAD	= N 60°20′ 34.85" E					
CHORD BEAR	= N 55°51′ 35.86" E					

COURSE FROM PT EBFR-01 TO EBFR02 N 60°20′ 34.85" E DIST 439.1181

POINT EBFR02 N 6,932,887.3916 E 2,121,514.5136 STA 2600+67.64

ENDING CHAIN EBFR DESCRIPTION

WBFR ℄ ALI DATA

CHAIN WBFR CONTAINS:
WBFR01 WBFR02

BEGINNING CHAIN WBFR DESCRIPTION
FEATURE: GEOM_CENTERLINE_06

POINT WBFR01 N 6,930,189.6600 E 2,117,354.0117 STA 3551+24.19

COURSE FROM WBFR01 TO WBFR02 N 51°22′ 36.87" E DIST 5,266.5916

POINT WBFR02 N 6,933,477.0376 E 2,121,468.6362 STA 3603+90.78

ENDING CHAIN WBFR DESCRIPTION

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
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STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL ENGINEER
LICENSED
10/29/21

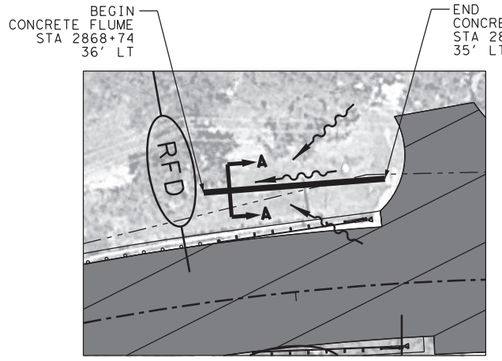
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH 20 HORIZONTAL ALIGNMENT DATA

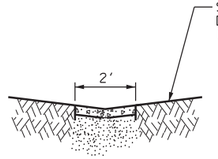
SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	110
CONTROL	SECTION	JOB	
0008	01	046, ETC	



CONCRETE FLUME DETAIL

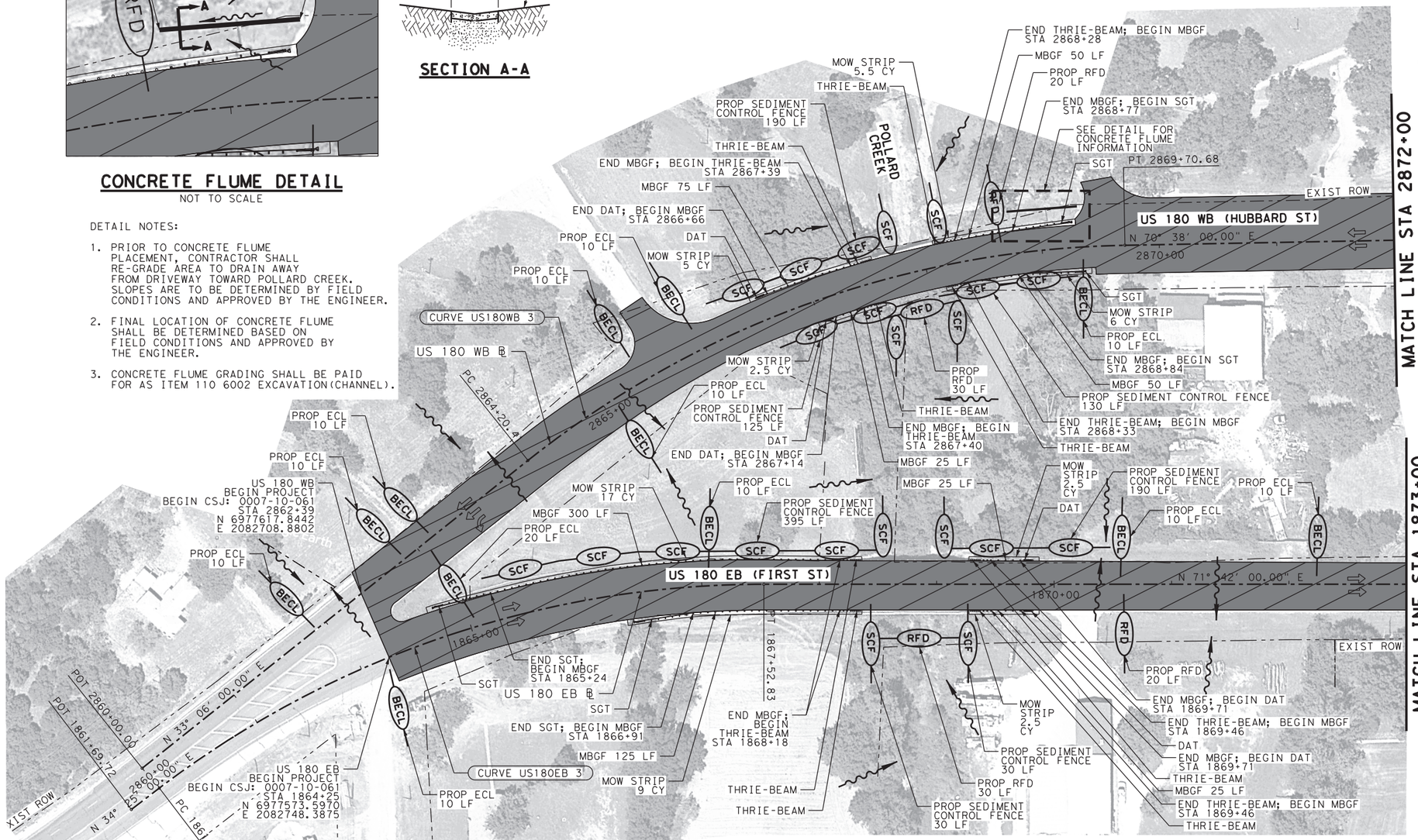
NOT TO SCALE



SECTION A-A

DETAIL NOTES:

1. PRIOR TO CONCRETE FLUME PLACEMENT, CONTRACTOR SHALL RE-GRADE AREA TO DRAIN AWAY FROM DRIVEWAY TOWARD POLLARD CREEK. SLOPES ARE TO BE DETERMINED BY FIELD CONDITIONS AND APPROVED BY THE ENGINEER.
2. FINAL LOCATION OF CONCRETE FLUME SHALL BE DETERMINED BASED ON FIELD CONDITIONS AND APPROVED BY THE ENGINEER.
3. CONCRETE FLUME GRADING SHALL BE PAID FOR AS ITEM 110 6002 EXCAVATION(CHANNEL).



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

NOTES:

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2. MILLING AND OVERLAY LIMITS ARE BASED ON AERIAL IMAGERY.
3. CONTRACTOR SHALL MAINTAIN EXISTING GRADES AND SLOPES EXCEPT AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
4. CURB AND GUTTER REPLACEMENT LIMITS ARE APPROXIMATE. CONTRACTOR TO COORDINATE WITH ENGINEER FOR ACTUAL LIMITS PRIOR TO CONSTRUCTION.
5. SEE "ROADWAY DETAILS" SHEET FOR ADDITIONAL INFORMATION.
6. LIMITS OF SIDESTREET MILL AND OVERLAY ARE THE RADIUS RETURN UNLESS OTHERWISE SPECIFIED.
7. FLEXIBLE PAVEMENT STRUCTURE REPAIR TO BE DETERMINED IN THE FIELD.

0 50' 100'

SCALE: 1" = 100'

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL ENGINEER
LICENSED
10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(BEGIN TO STA 2872+00)
(BEGIN TO STA 1873+00)

SHEET 1 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	111
0008	01	046, ETC	

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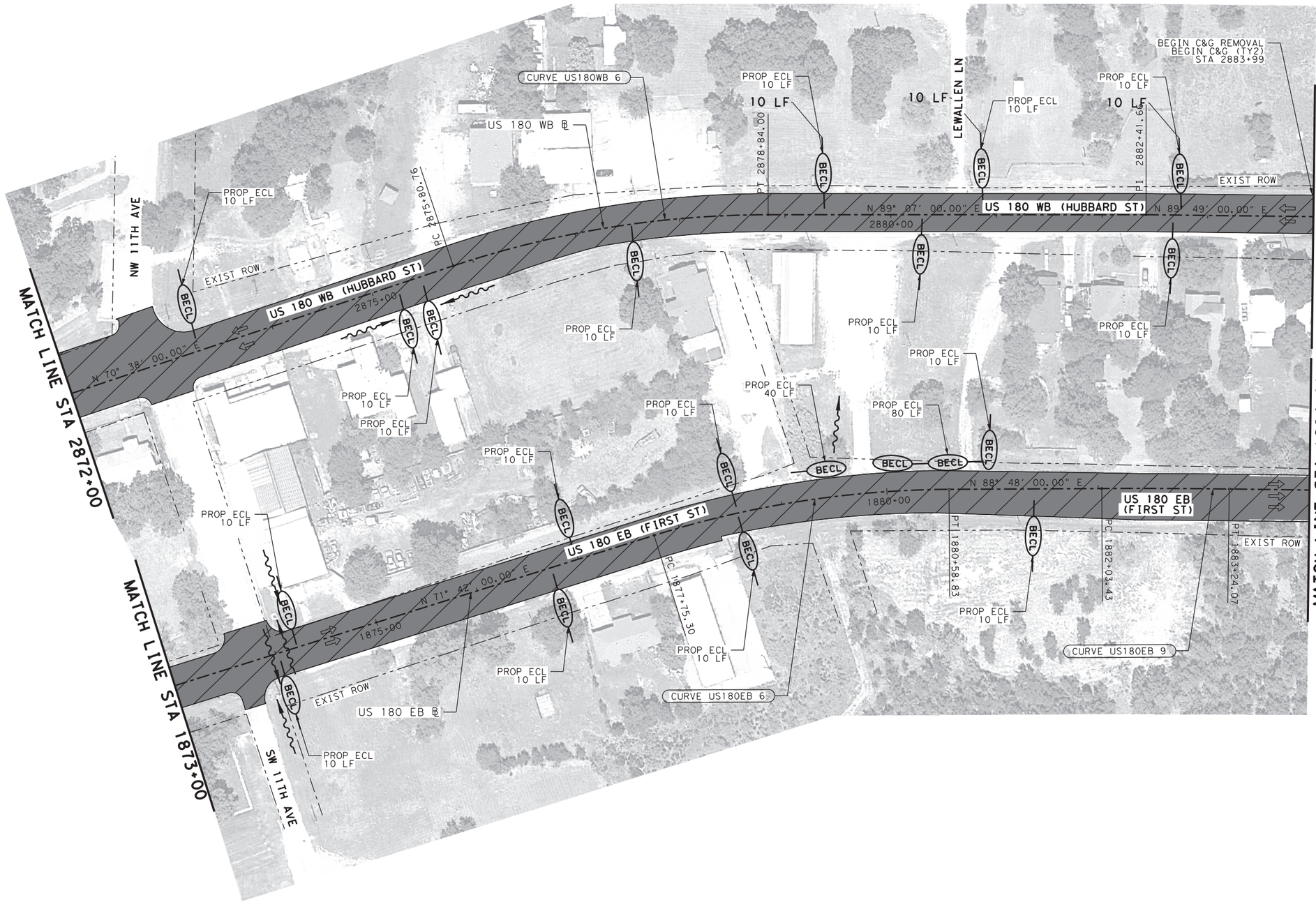

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
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0 50′ 100′

SCALE: 1" = 100′

10/29/21

STATE OF TEXAS
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131708
PROFESSIONAL LICENSED ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

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US 180
ROADWAY LAYOUT
WB AND EB

(STA 2872+00 TO STA 2884+00)
(STA 1873+00 TO STA 1884+00)

SHEET 2 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	112
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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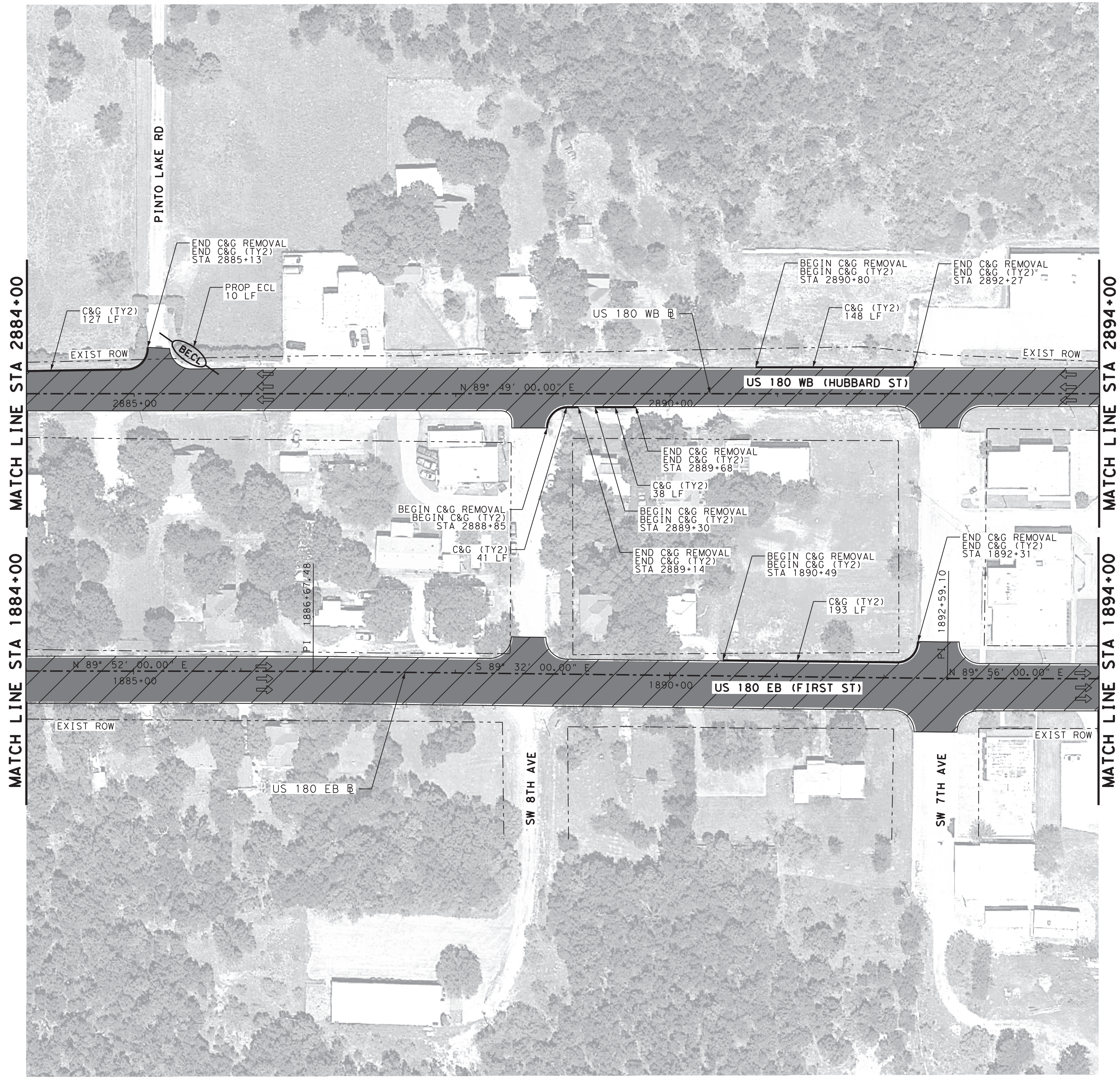

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

NOTES:

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6. LIMITS OF SIDESTREET MILL AND OVERLAY ARE THE RADIUS RETURN UNLESS OTHERWISE SPECIFIED.
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0 50' 100'

SCALE: 1" = 100'

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
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PROFESSIONAL ENGINEER

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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

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Texas Department of Transportation

US 180 ROADWAY LAYOUT WB & EB

(STA 2884+00 TO STA 2894+00)
(STA 1884+00 TO STA 1894+00)
SHEET 3 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	113
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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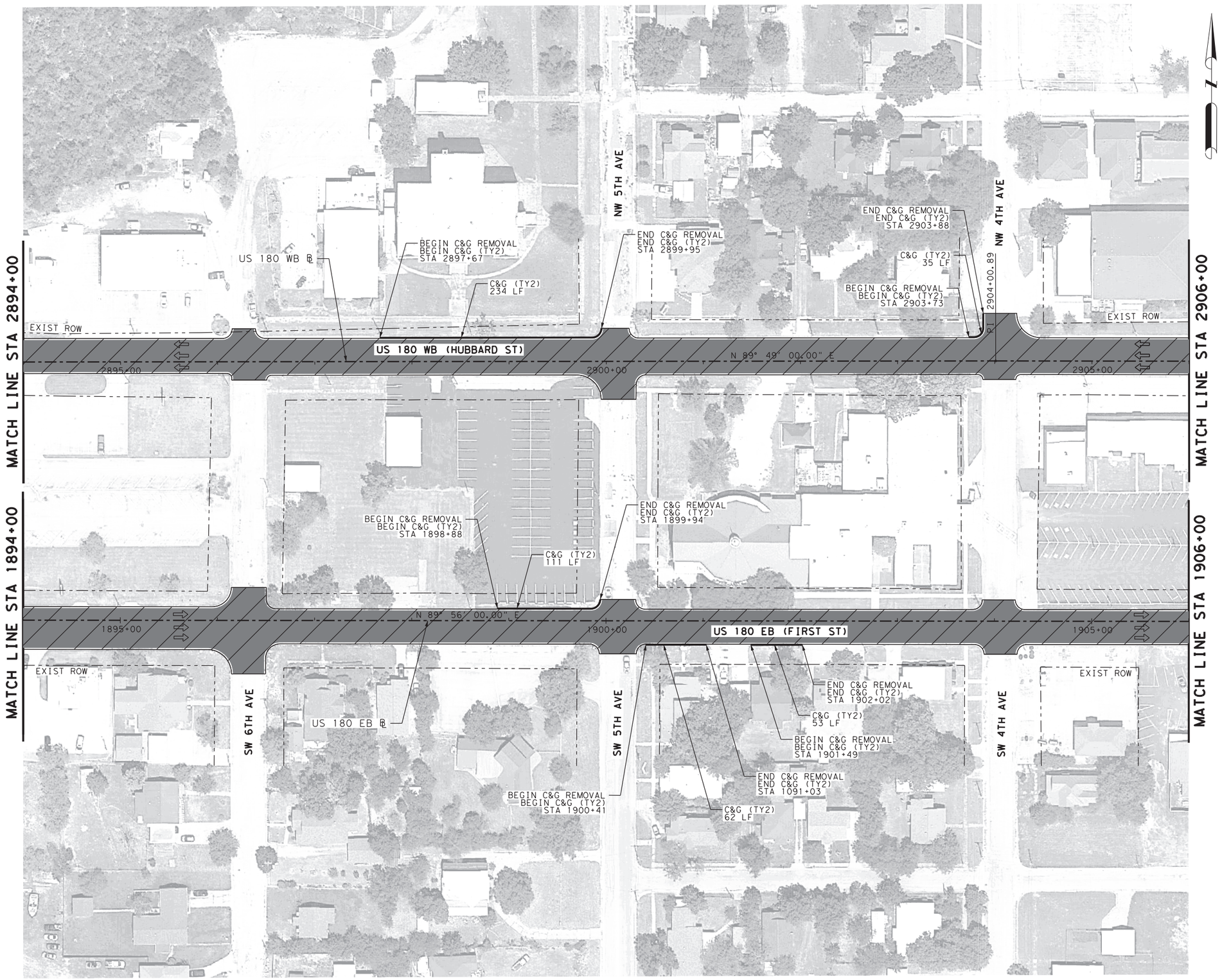

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

NOTES:

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5. SEE "ROADWAY DETAILS" SHEET FOR ADDITIONAL INFORMATION.
6. LIMITS OF SIDESTREET MILL AND OVERLAY ARE THE RADIUS RETURN UNLESS OTHERWISE SPECIFIED.
7. FLEXIBLE PAVEMENT STRUCTURE REPAIR TO BE DETERMINED IN THE FIELD.

0 50' 100'

SCALE: 1" = 100'

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL ENGINEER
LICENSED

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2894+00 TO STA 2906+00)
(STA 1894+00 TO STA 1906+00)

SHEET 4 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	114
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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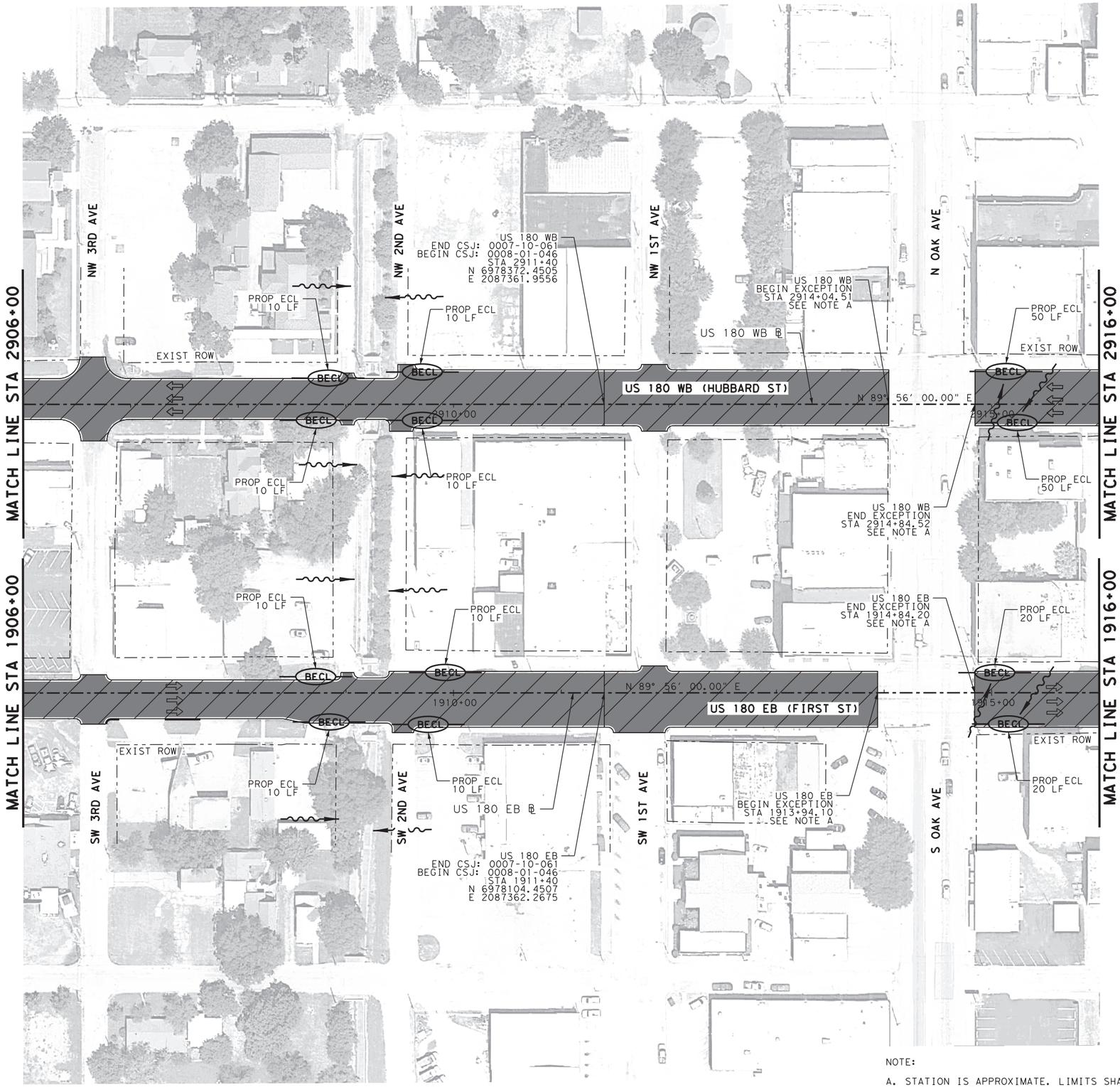

NOTE:

A. STATION IS APPROXIMATE. LIMITS SHALL BE AT THE BEGIN AND END OF THE STAMPED CONCRETE. CONTRACTOR TO FIELD VERIFY.

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
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- FLOW ARROW

NOTES:

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5. SEE "ROADWAY DETAILS" SHEET FOR ADDITIONAL INFORMATION.
6. LIMITS OF SIDESTREET MILL AND OVERLAY ARE THE RADIUS RETURN UNLESS OTHERWISE SPECIFIED.
7. FLEXIBLE PAVEMENT STRUCTURE REPAIR TO BE DETERMINED IN THE FIELD.

0 50' 100'

SCALE: 1" = 100'

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AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGISTRATION # 739

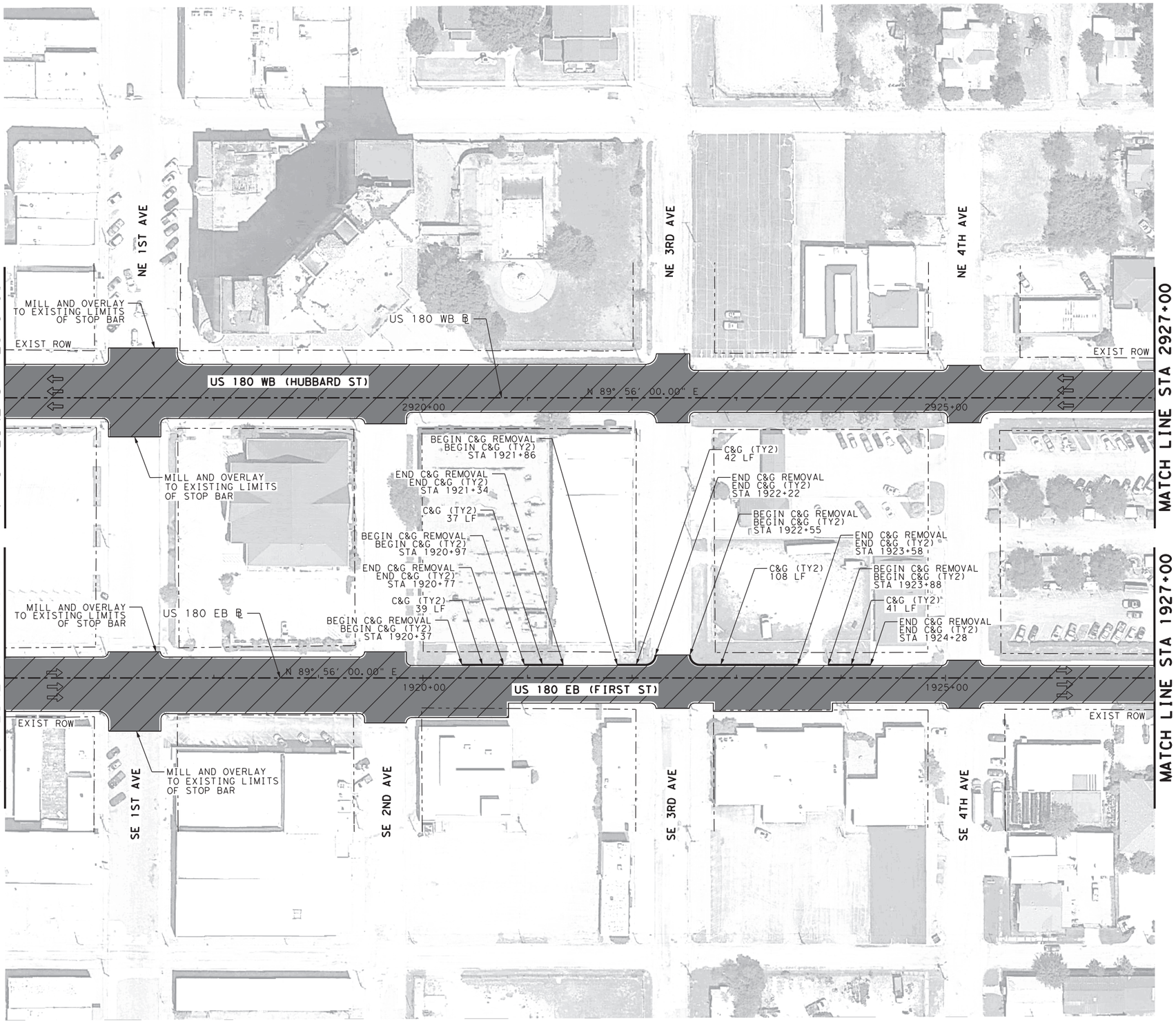
Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2906+00 TO STA 2916+00)
(STA 1906+00 TO STA 1916+00)

SHEET 5 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	115
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/ INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. MILLING AND OVERLAY LIMITS ARE BASED ON AERIAL IMAGERY.
3. CONTRACTOR SHALL MAINTAIN EXISTING GRADES AND SLOPES EXCEPT AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
4. CURB AND GUTTER REPLACEMENT LIMITS ARE APPROXIMATE. CONTRACTOR TO COORDINATE WITH ENGINEER FOR ACTUAL LIMITS PRIOR TO CONSTRUCTION.
5. SEE "ROADWAY DETAILS" SHEET FOR ADDITIONAL INFORMATION.
6. LIMITS OF SIDESTREET MILL AND OVERLAY ARE THE RADIUS RETURN UNLESS OTHERWISE SPECIFIED.
7. FLEXIBLE PAVEMENT STRUCTURE REPAIR TO BE DETERMINED IN THE FIELD.

0 50' 100'

SCALE: 1" = 100'

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL ENGINEER
LICENSED
10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

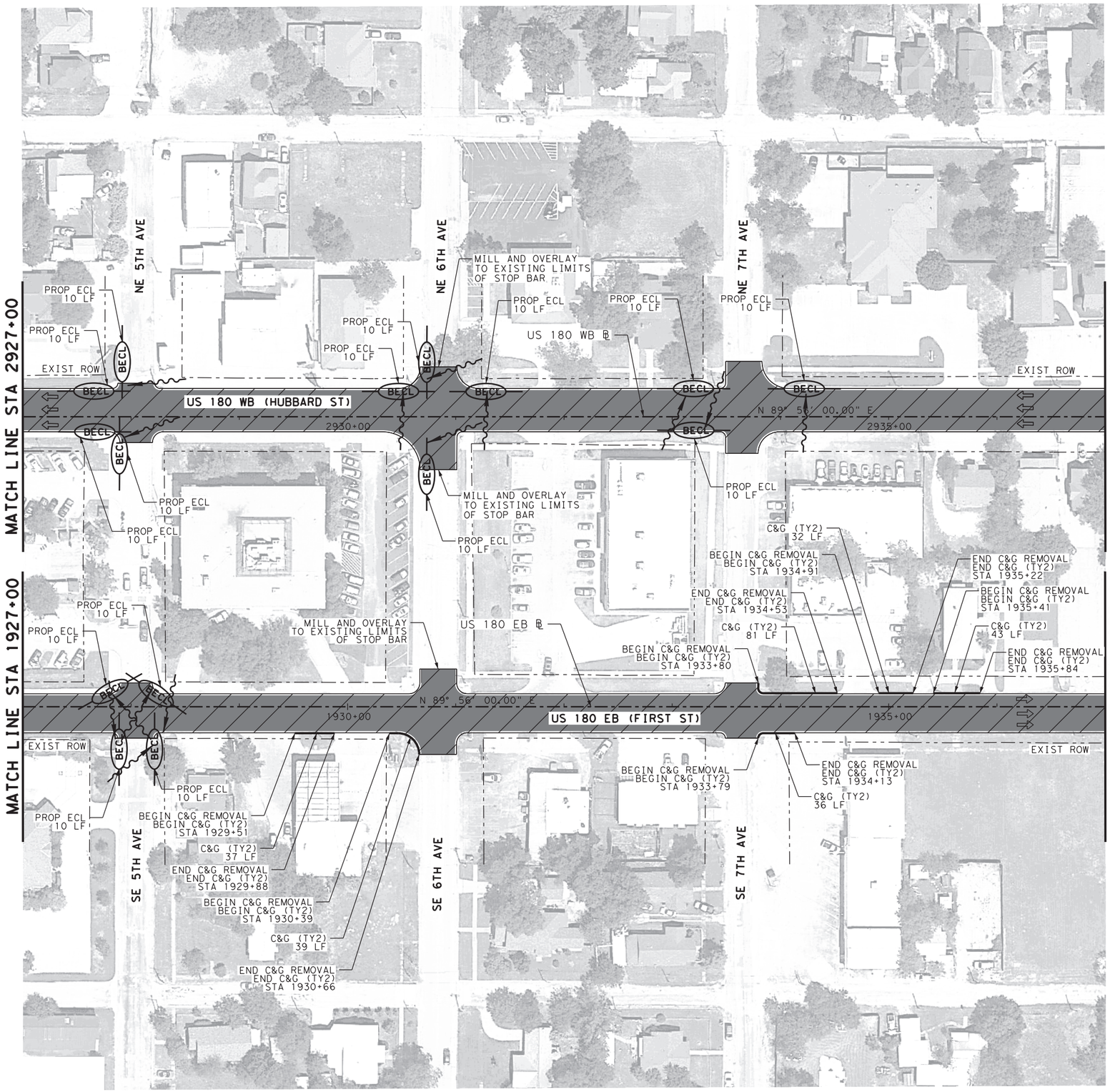
Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2916+00 TO STA 2927+00)
(STA 1916+00 TO STA 1927+00)

SHEET 6 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	116
0008	01	046,ETC	



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

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5. SEE "ROADWAY DETAILS" SHEET FOR ADDITIONAL INFORMATION.
6. LIMITS OF SIDESTREET MILL AND OVERLAY ARE THE RADIUS RETURN UNLESS OTHERWISE SPECIFIED.
7. FLEXIBLE PAVEMENT STRUCTURE REPAIR TO BE DETERMINED IN THE FIELD.

0 50' 100'

SCALE: 1" = 100'

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

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US 180
ROADWAY LAYOUT
WB & EB

(STA 2927+00 TO STA 2937+00)
(STA 1927+00 TO STA 1937+00)

SHEET 7 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	117
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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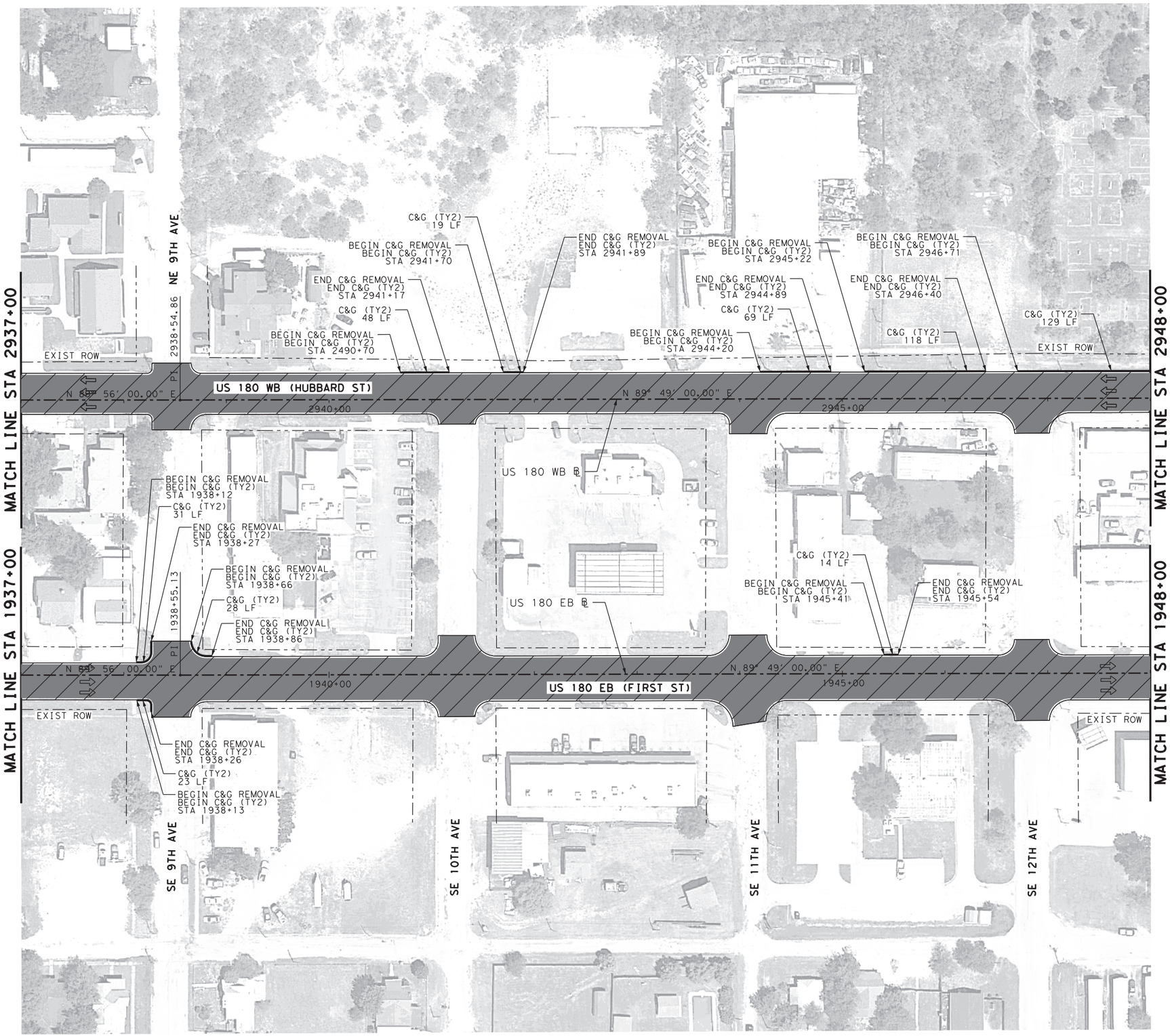

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

NOTES:

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0 50' 100'

SCALE: 1" = 100'

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER
10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

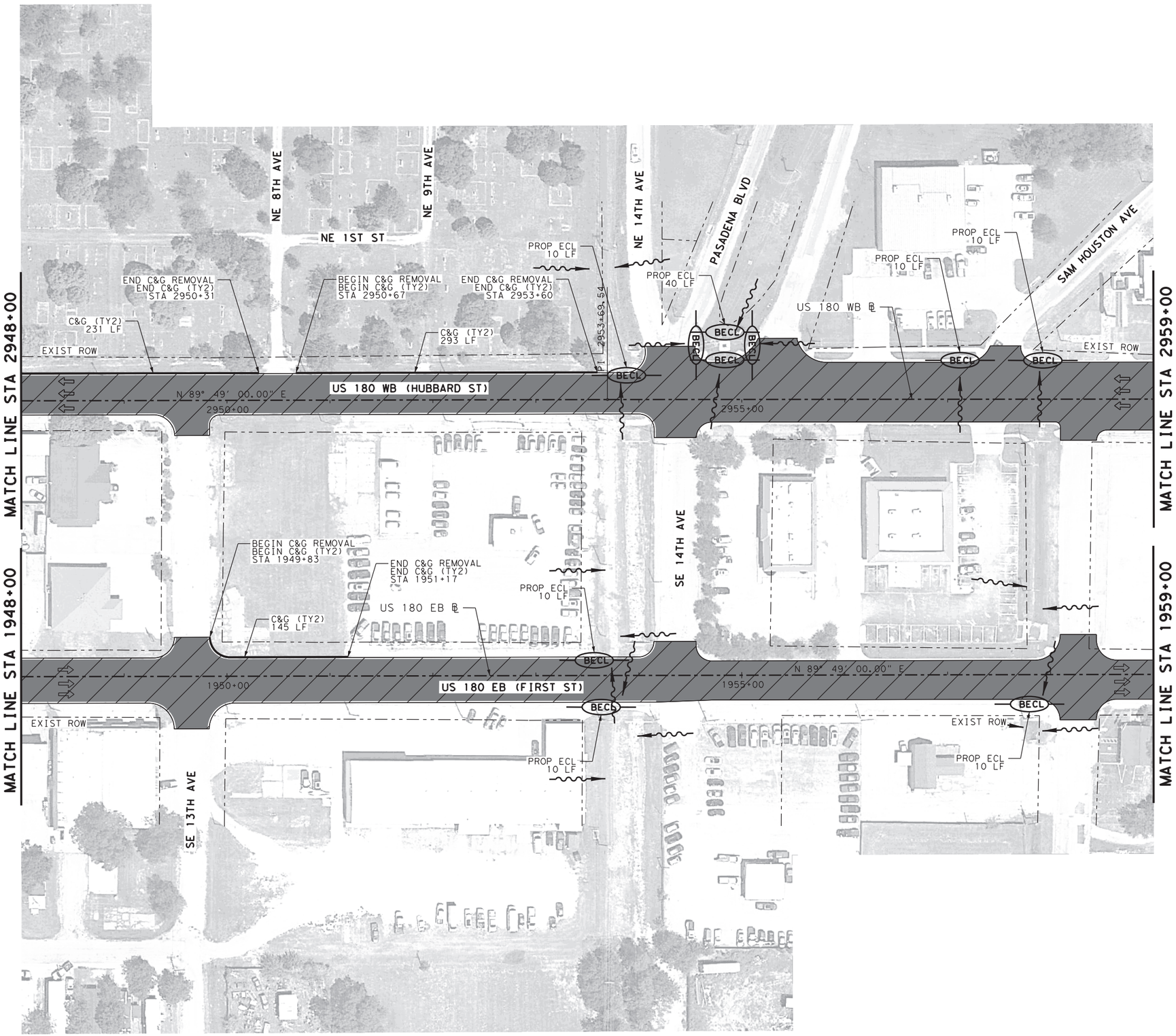
Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2937+00 TO STA 2948+00)
(STA 1937+00 TO STA 1948+00)

SHEET 8 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	118
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

NOTES:

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7. FLEXIBLE PAVEMENT STRUCTURE REPAIR TO BE DETERMINED IN THE FIELD.

0 50′ 100′

SCALE: 1" = 100′

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2948+00 TO STA 2959+00)
(STA 1948+00 TO STA 1959+00)

SHEET 9 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	119
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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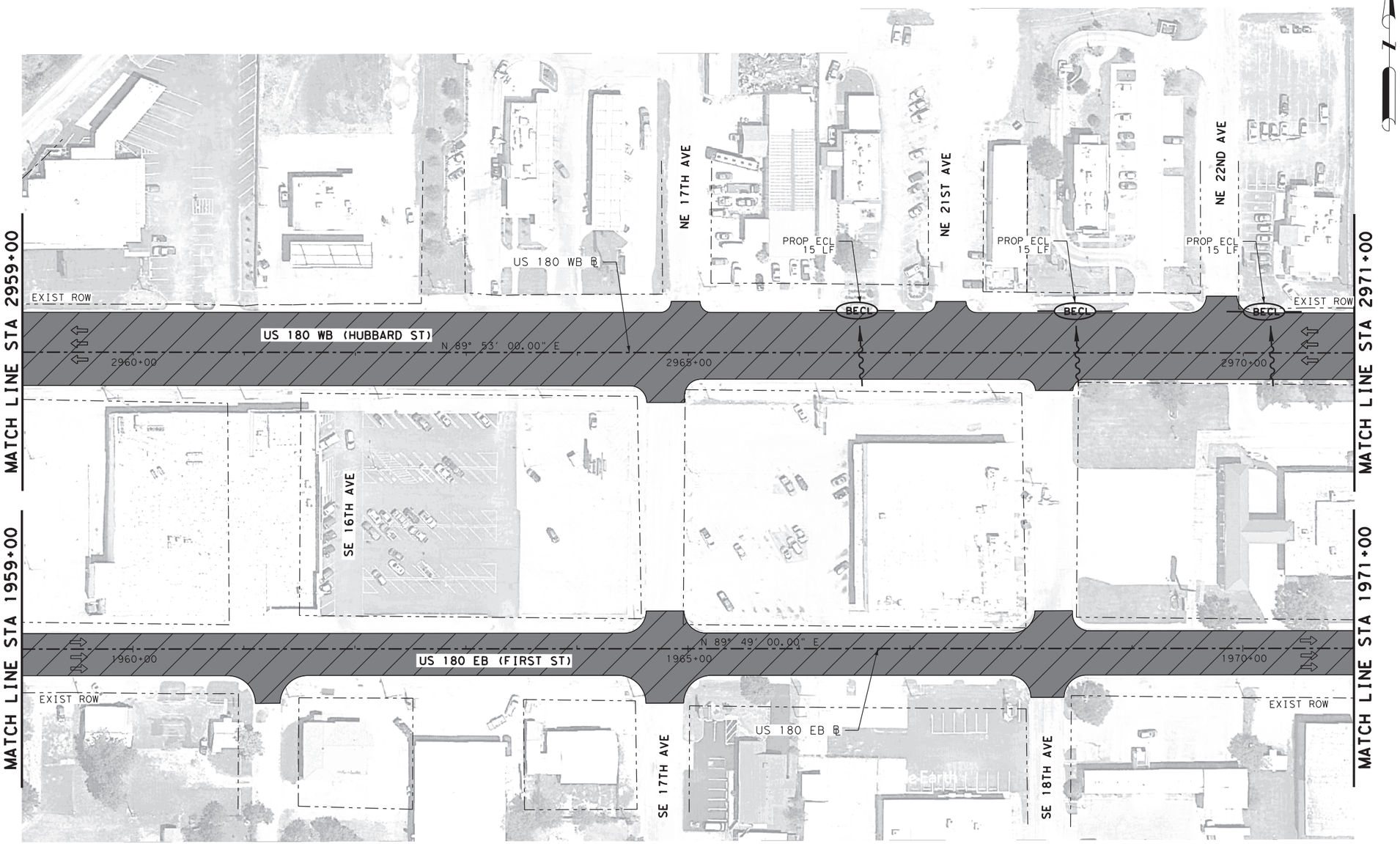

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

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0 50′ 100′

SCALE: 1" = 100′

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER
10/29/21

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2959+00 TO STA 2971+00)
(STA 1959+00 TO STA 1971+00)

SHEET 10 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	120
0008	01	046, ETC	

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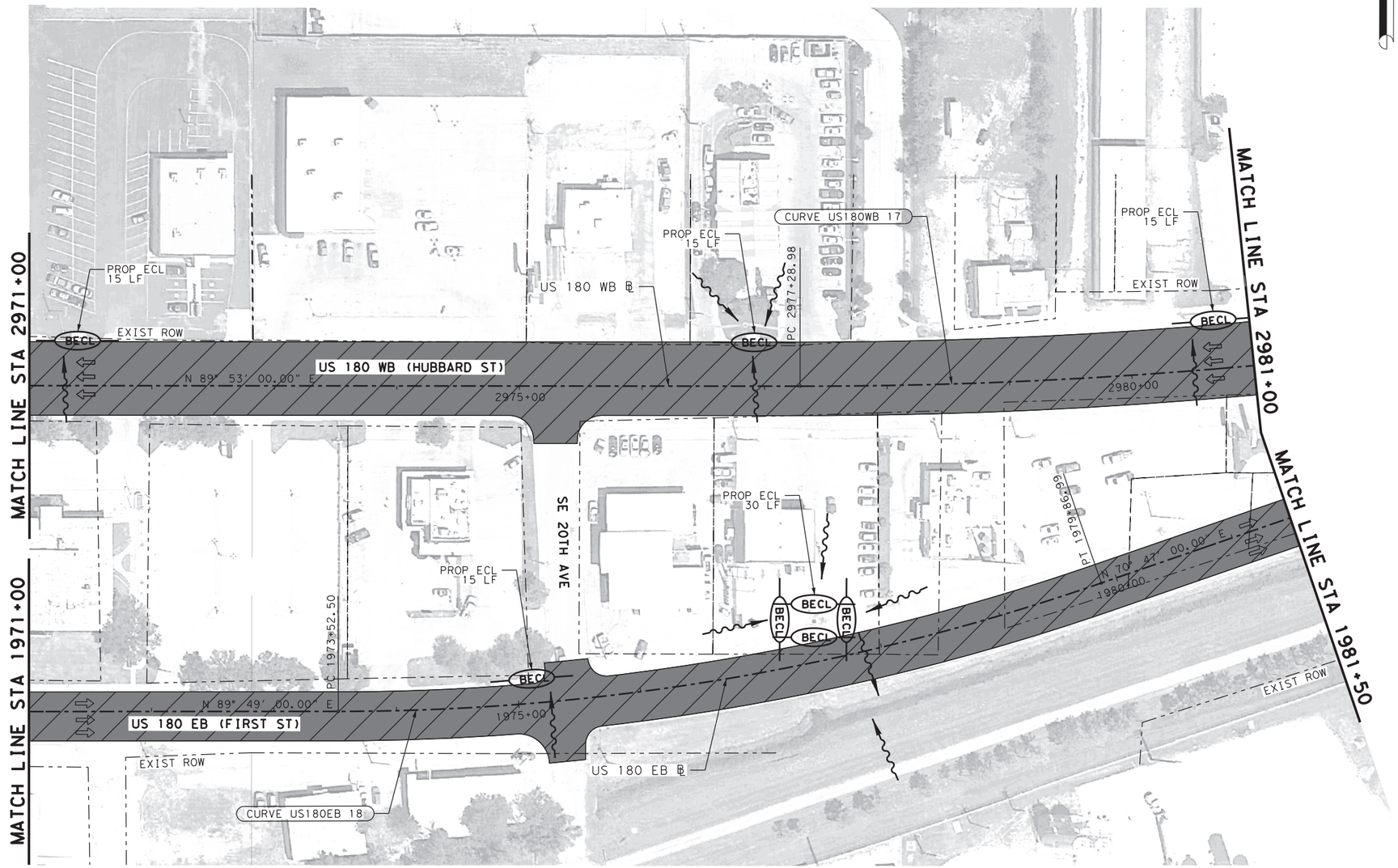

LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
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0 50' 100'

SCALE: 1" = 100'

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

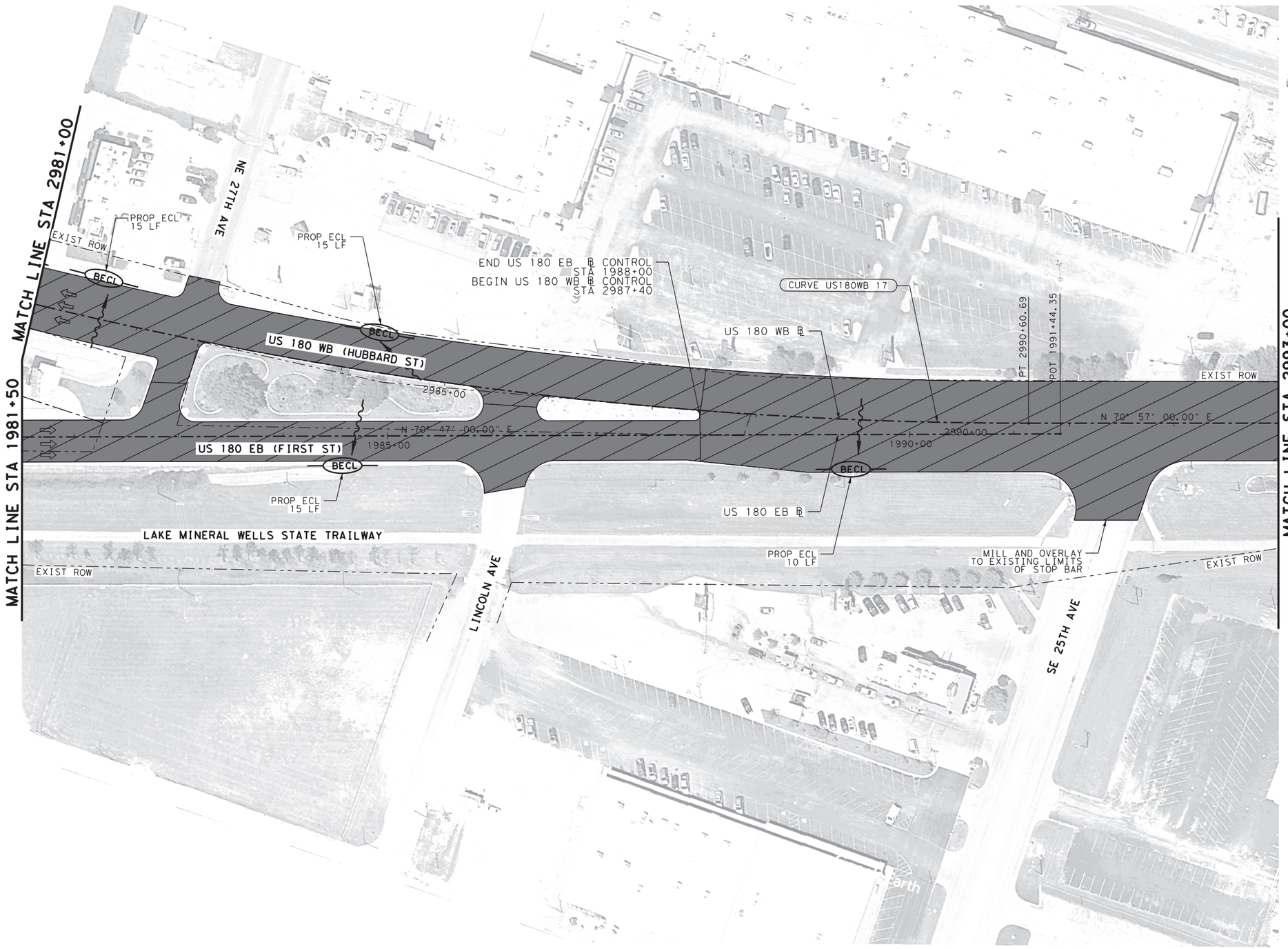
Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2971+00 TO STA 2981+00)
(STA 1971+00 TO STA 1981+50)

SHEET 11 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	121
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
- SCF — SEDIMENT CONTROL FENCE
- FLOW ARROW

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0 50′ 100′

SCALE: 1" = 100′

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL LICENSED ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

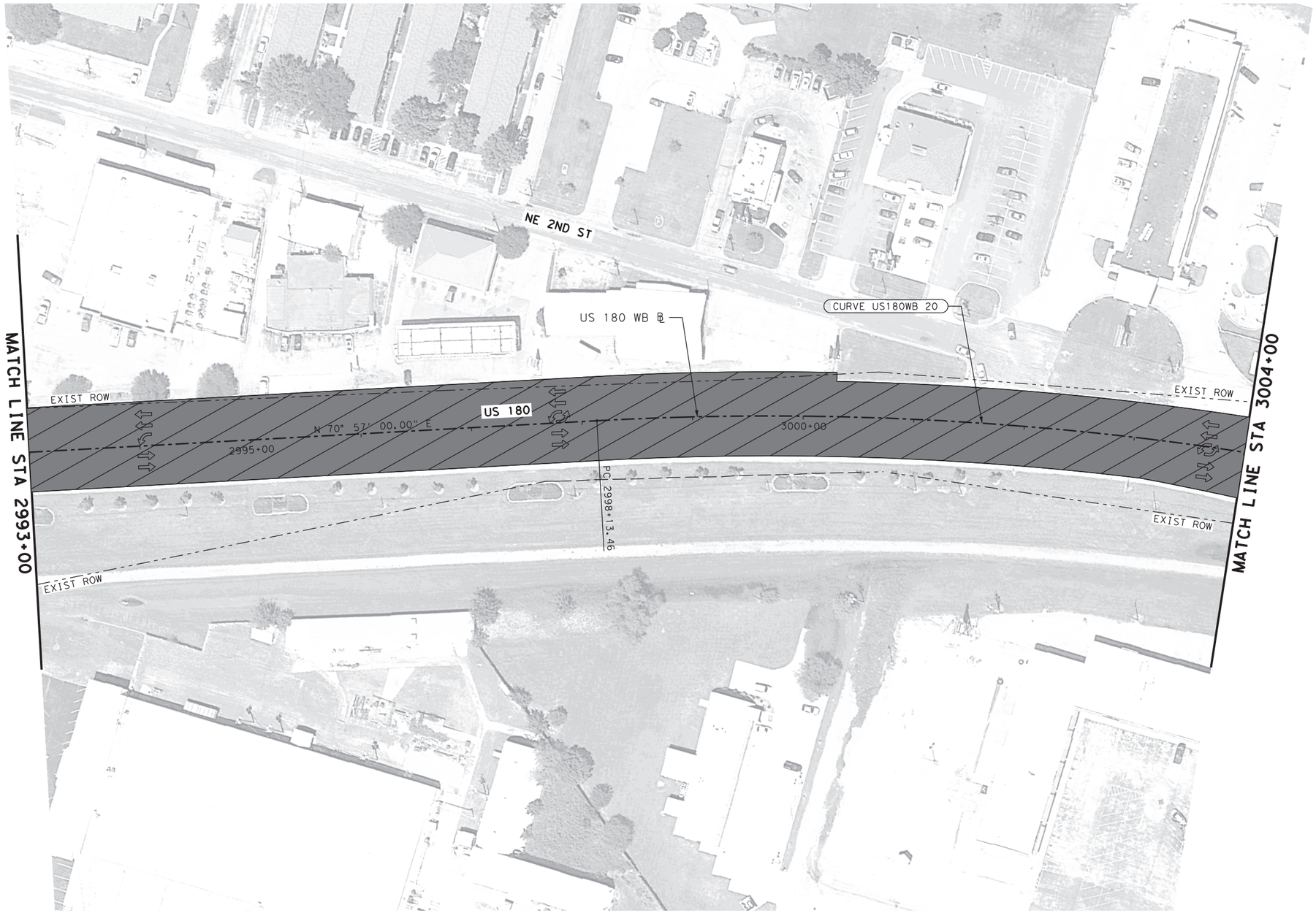
Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2981+00 TO STA 2993)
(STA 1981+50 TO STA 2993)

SHEET 12 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	122
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
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0 50′ 100′

SCALE: 1" = 100′

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

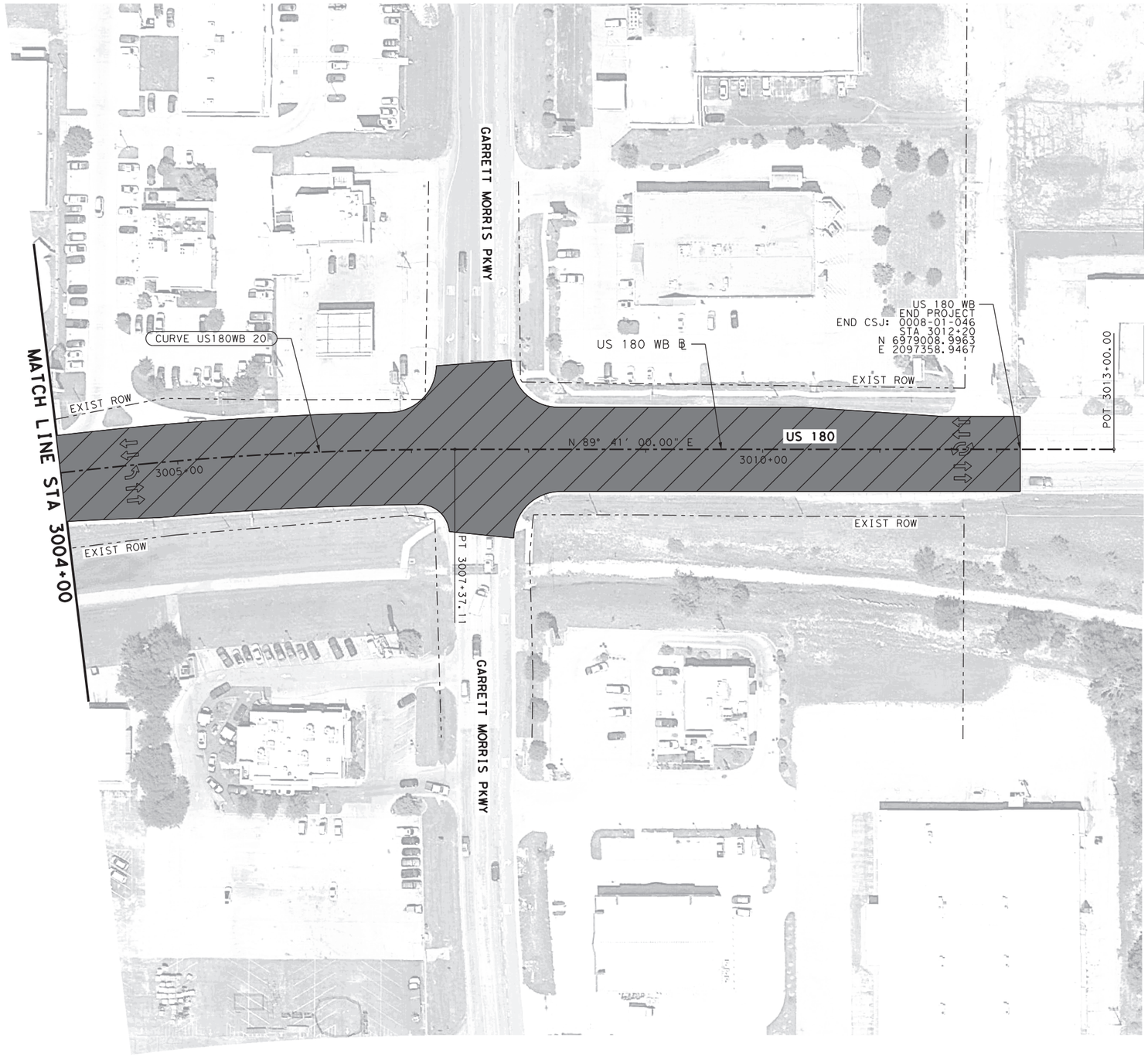
Texas Department of Transportation

US 180
ROADWAY LAYOUT
WB & EB

(STA 2993+00 TO STA 3004+00)

SHEET 13 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	123
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- PLANE ASPH CONC PAV (2" TO 4")
- 2" D-GR HMA TY-D SAC-B PG 70-22
- EXIST ROW
- BECL — EROSION CONTROL LOG
- RFD — ROCK FILTER DAM
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0 50' 100'

SCALE: 1" = 100'

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED PROFESSIONAL ENGINEER

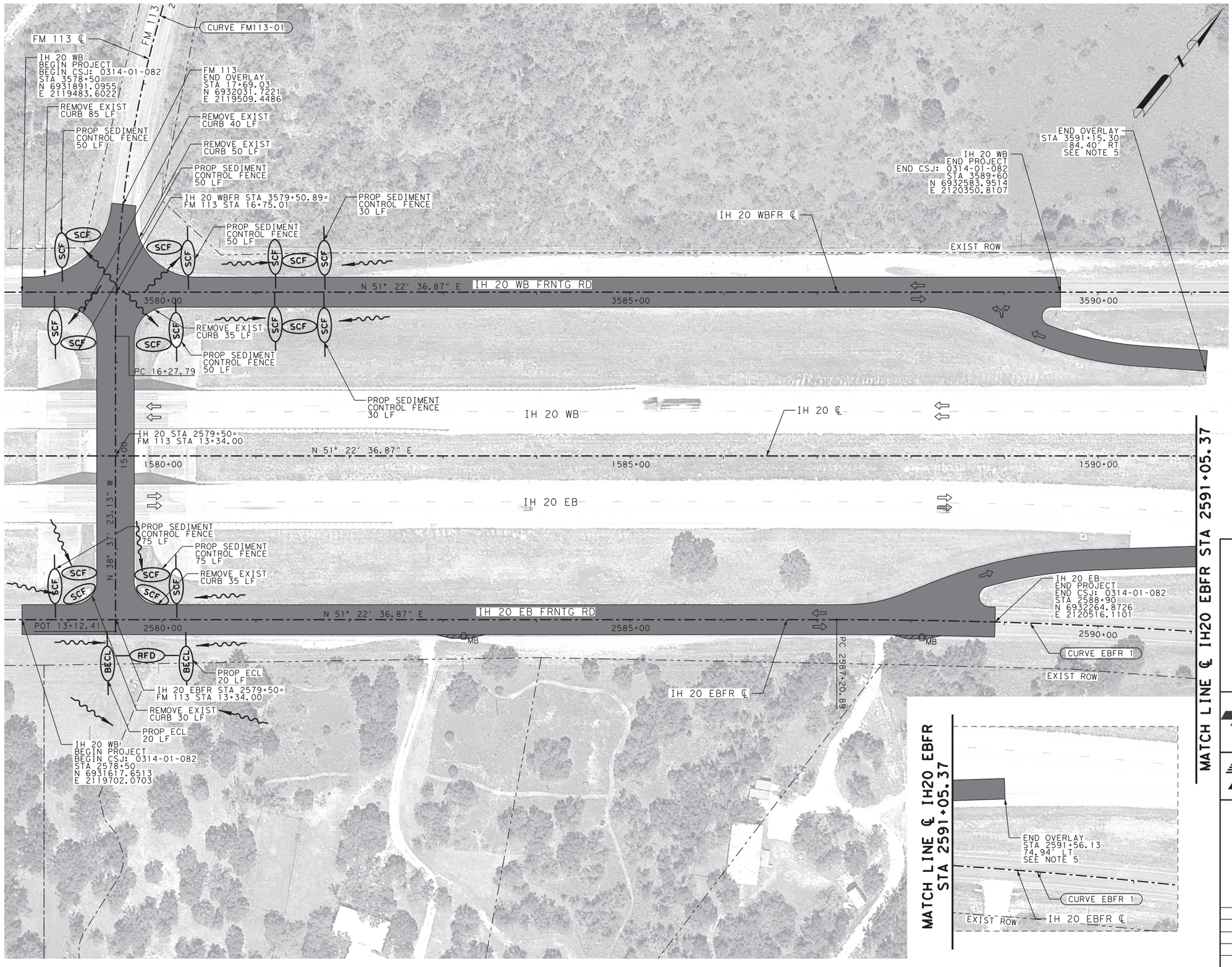
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

US 180
ROADWAY LAYOUT
WB & EB

(STA 3004+00 TO END PROJECT)

SHEET 14 OF 14

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	124
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- 2" D-GR HMA TY-D SAC-B PG 70-22
- MAILBOX TURNOUT LIMITS
- Ω_{MB} REMOVE AND REPLACE MAILBOX
- EXIST ROW
- BECL EROSION CONTROL LOG
- RFD ROCK FILTER DAM
- SCF SEDIMENT CONTROL FENCE

NOTES:

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3. CONTRACTOR SHALL MAINTAIN EXISTING GRADES AND SLOPES EXCEPT AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
4. BMPS SHOWN ARE MINIMUM REQUIREMENTS. ADDITIONAL BMPS MIGHT BE REQUIRED BASE ON FIELD CONDITION OR AS DIRECTED BY THE ENGINEER.
5. LIMITS OF OVERLAY SHOWN ARE APPROXIMATE. CONTRACTOR SHALL ADJUST TO MATCH LIMITS OF ASPHALT PAVING AS NEEED OR DIRECTED BY THE ENGINEER.

0 50' 100'

SCALE: 1" = 100'

11/02/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
LICENSED
PROFESSIONAL ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

IH20 ROADWAY LAYOUT EB & WB FRONTAGE RD AT FM 113

(STA 1573+00 TO STA 1584+00)

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
X	SEE TITLE SHEET		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	125
0008	01	046,ETC	

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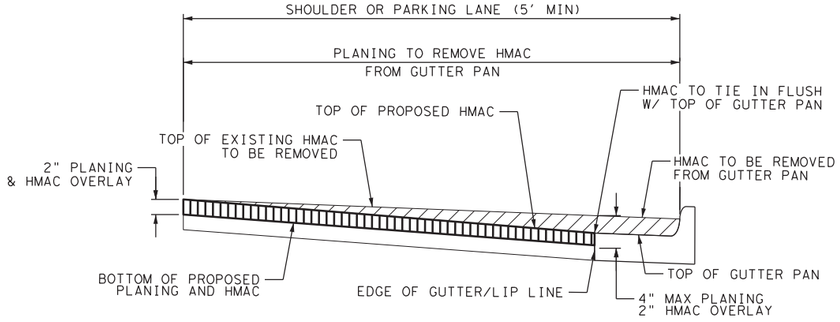
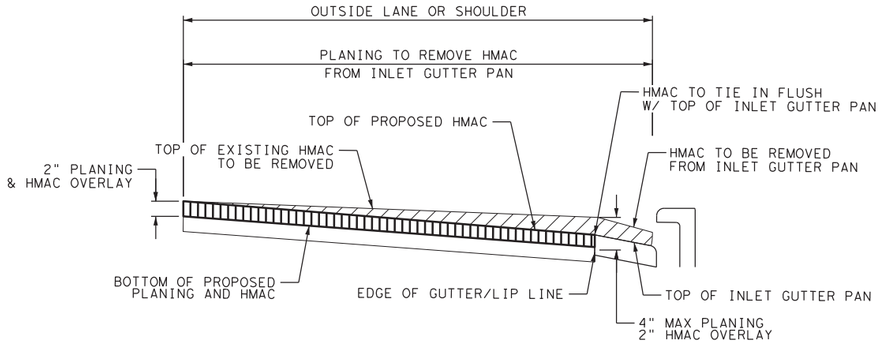


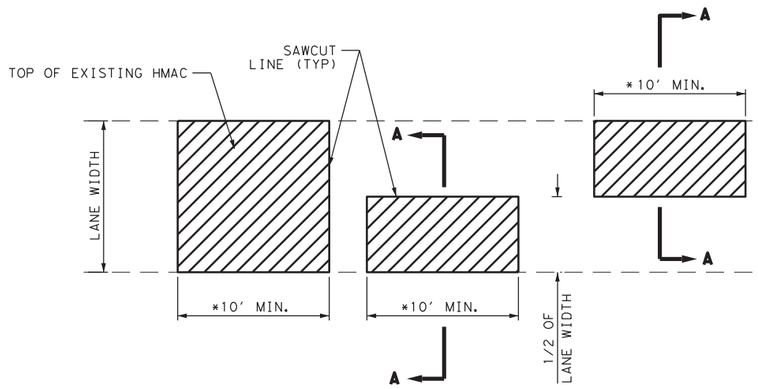
MILLING DETAIL NEAR CURB

NOT TO SCALE
SEE NOTES 3 AND 5



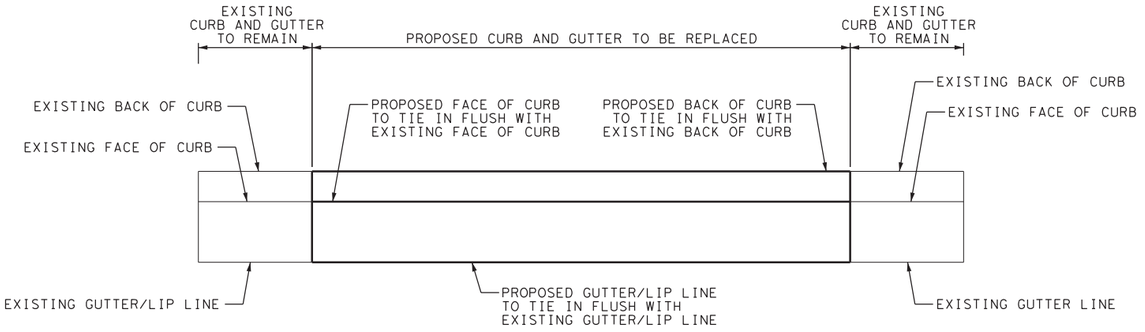
MILLING DETAIL NEAR INLET

NOT TO SCALE
SEE NOTES 4 AND 5



FLEXIBLE PAVEMENT REPAIR DETAIL

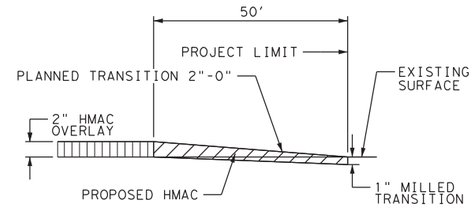
* ACTUAL DIMENSION TO BE DETERMINED IN THE FIELD BY THE ENGINEER
NOT TO SCALE



CURB AND GUTTER REPLACEMENT DETAIL

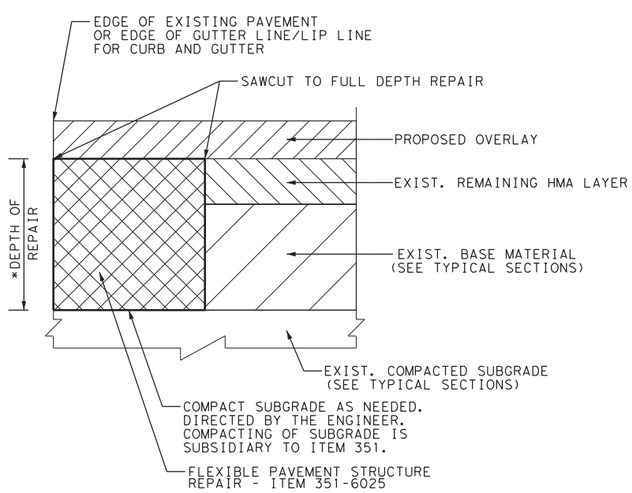
NOT TO SCALE

LIMITS OF CURB AND GUTTER REPLACEMENT TO BE FIELD VERIFIED SUBJECT TO ENGINEER'S APPROVAL.



IH 20 LIMITS OF PROJECT TRANSITION DETAIL

NOT TO SCALE
HMAC OVERLAY TAPER DETAIL AT BEGIN AND END OF PROJECT AND FM 113 N INTERSECTION



SECTION A-A

NOTES:

1. CONTRACTOR TO PROPOSE METHOD TO REMOVE HMAC FROM GUTTER PAN, SUBJECT TO APPROVAL BY THE ENGINEER.
2. FLEXIBLE PAVEMENT STRUCTURE REPAIR IS CONSIDERED TO BE SUBSIDIARY TO ITEM 351 6025.
3. CONTRACTOR TO PROVIDE A 30' CROSS SLOPE TRANSITION PRIOR TO RADIUS RETURN AT CROSS STREETS TO MATCH EXISTING PAVEMENT.
4. CONTRACTOR TO PROVIDE A 30' CROSS SLOPE TRANSITION ON LOCATIONS WHERE INLETS ARE PRESENT WITHOUT SHOULDERS.
5. WITH APPROVAL OF THE ENGINEER, CONTRACTOR MAY ADJUST LENGTH OF TRANSITION BY 10' OR SHIFT TRANSITION ALONG SIDE STREETS TO ENSURE POSITIVE DRAINAGE.
6. PLANING WITHIN THE MAINLANES SHALL BE 2" MAX, EXCEPT WHERE OTHERWISE SPECIFIED WITHIN "MILLING DETAIL NEAR INLET" DETAIL.
7. WHERE SHOULDER OR PARKING LANE WIDTH IS LESS THAN 5', PLANING AND HMAC OVERLAY SHALL BE 2".

10/29/21

STATE OF TEXAS
ARTURO A. TERRAZAS
131708
PROFESSIONAL LICENSED ENGINEER

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

ROADWAY DETAILS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	126
0008	01	046,ETC	

DATE: 10/27/2021
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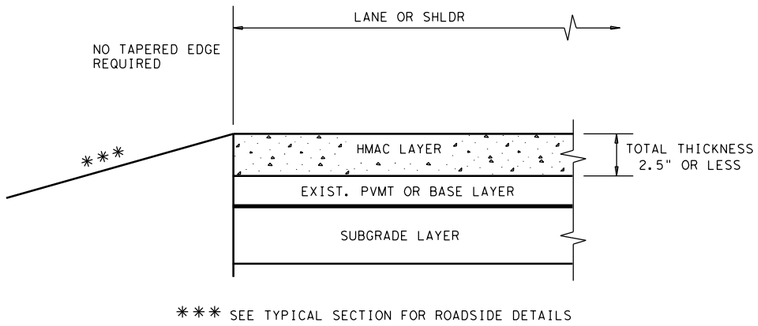
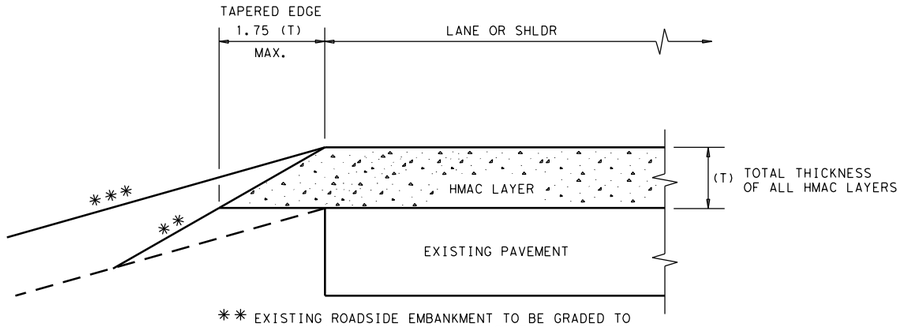


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

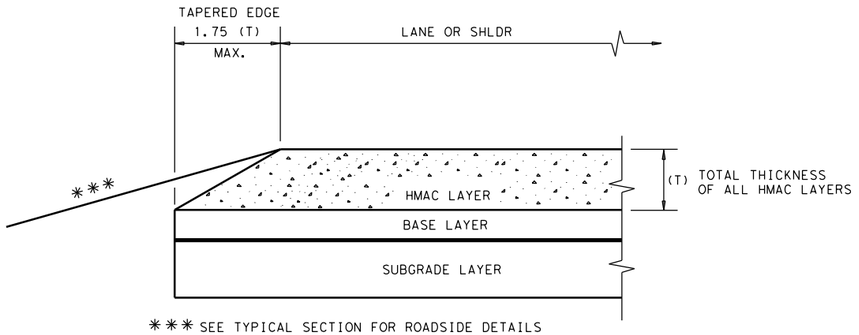
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

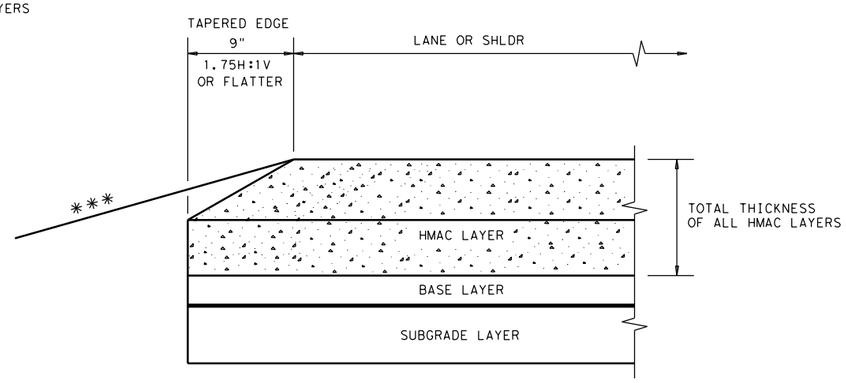
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

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.

Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

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©TxDOT January 2011	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0008	01	046,ETC		US 180,ETC		
	DIST	COUNTY			SHEET NO.		
	FTW	PALO PINTO			127		

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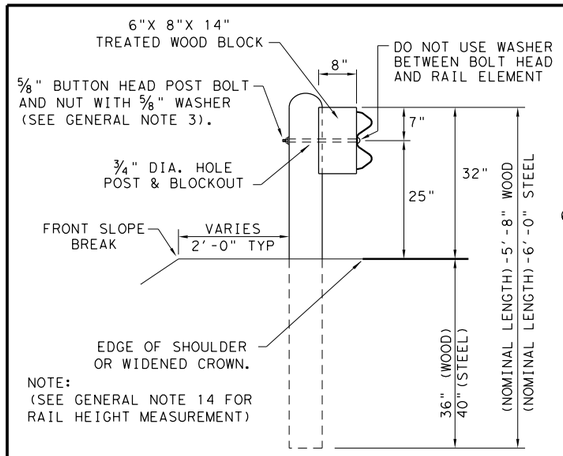
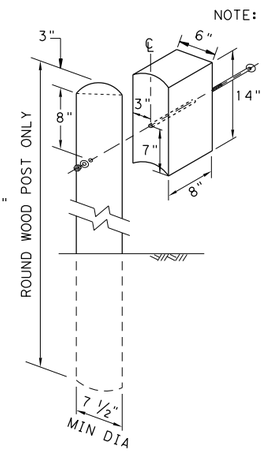
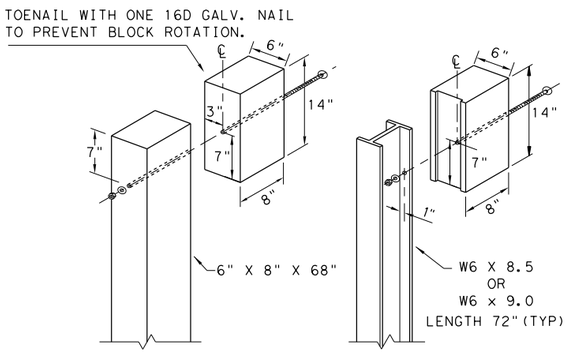


TYPICAL POST PLACEMENT



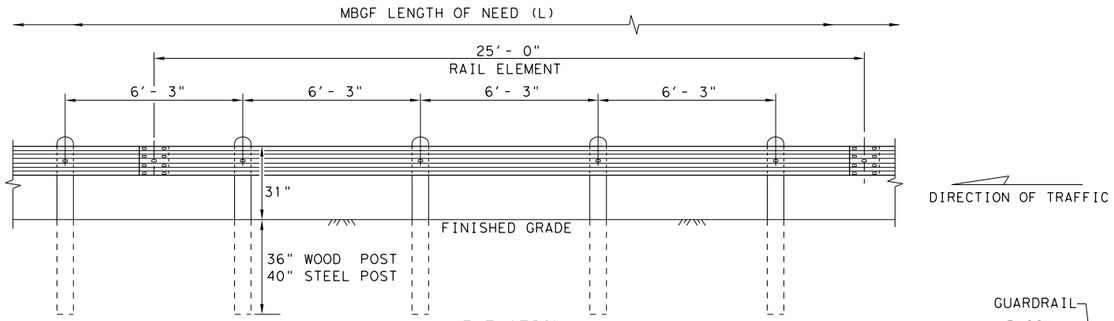
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

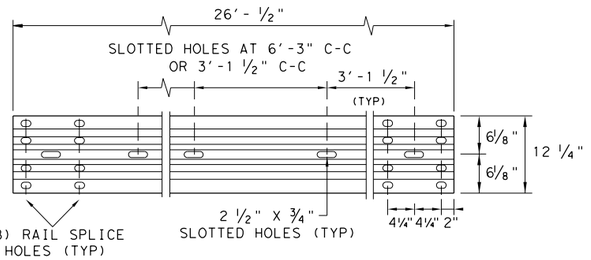
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ✳✳ "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



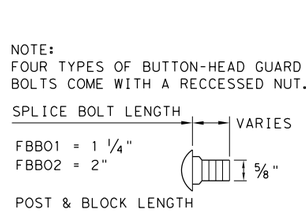
ELEVATION
MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



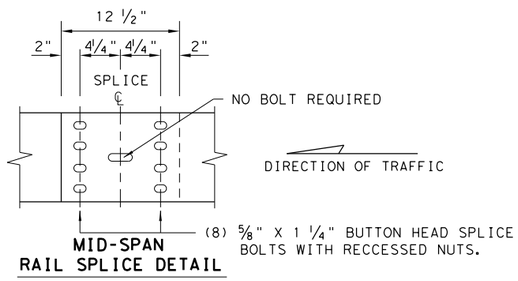
ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



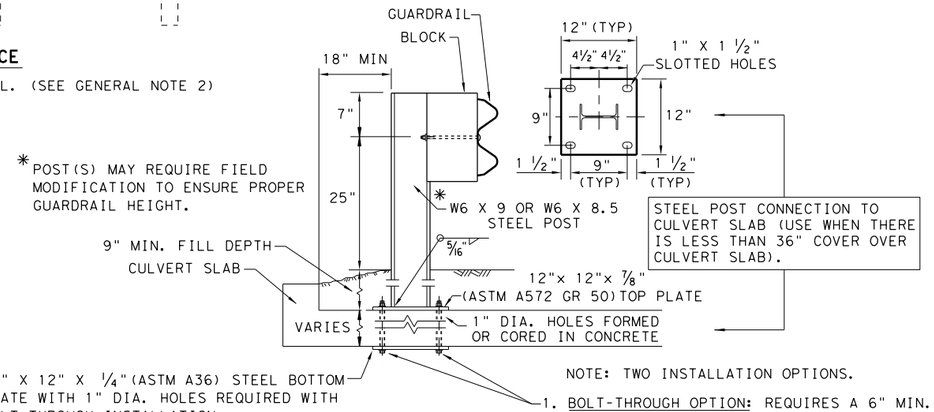
BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

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.

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."
2. 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 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
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 ⅝" WASHER (FWC16a) 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.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
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 AT A RATE OF 25:1 OR FLATTER.
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 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 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.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
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 ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13.

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

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©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
	FTW	PALO PINTO		128	

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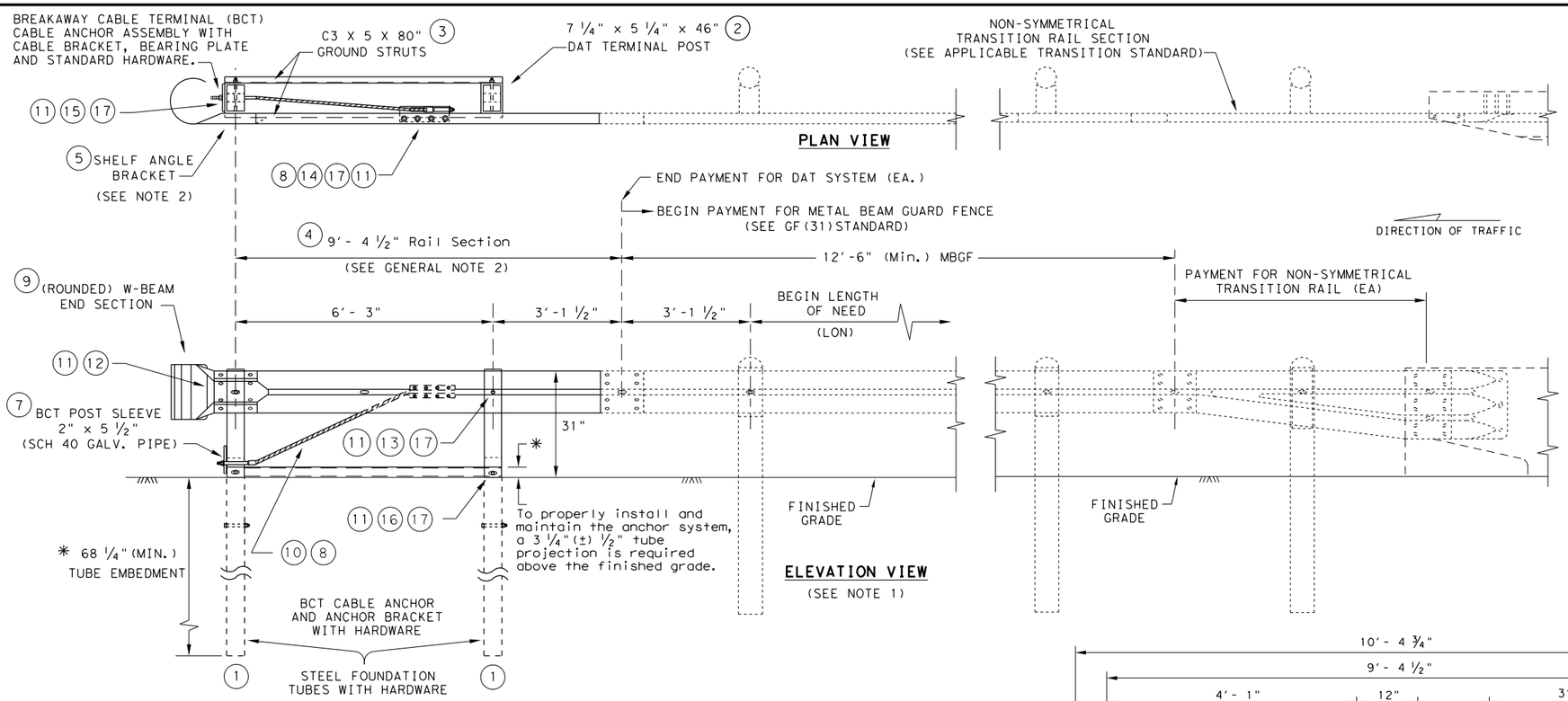


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

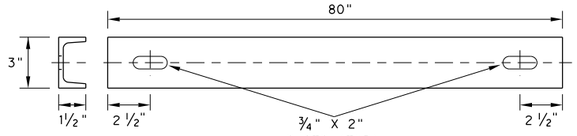
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

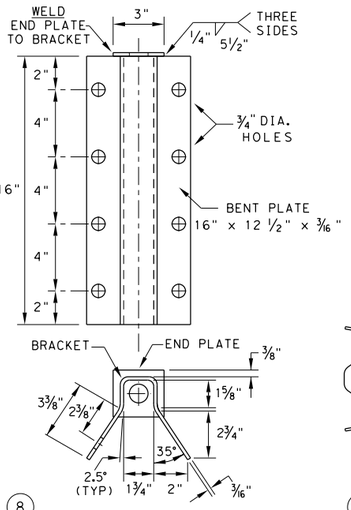
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

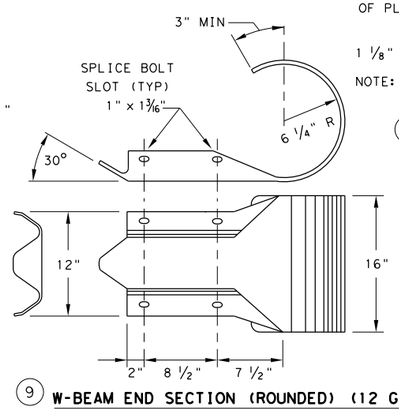
(4) TERMINAL RAIL ELEMENT FOR DAT



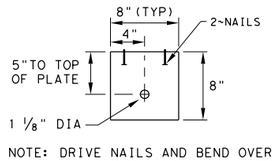
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

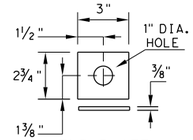


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

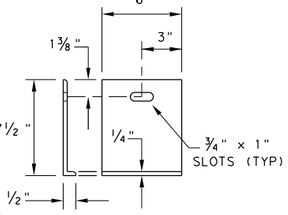


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

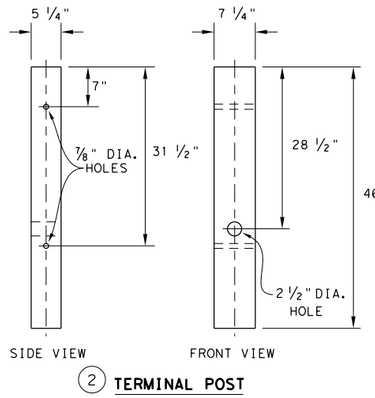
(6) BEARING PLATE
8"x 8"x 5/8" R



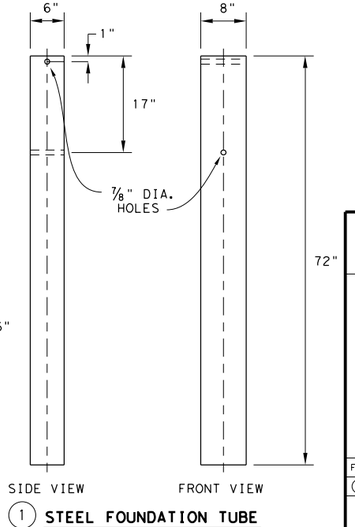
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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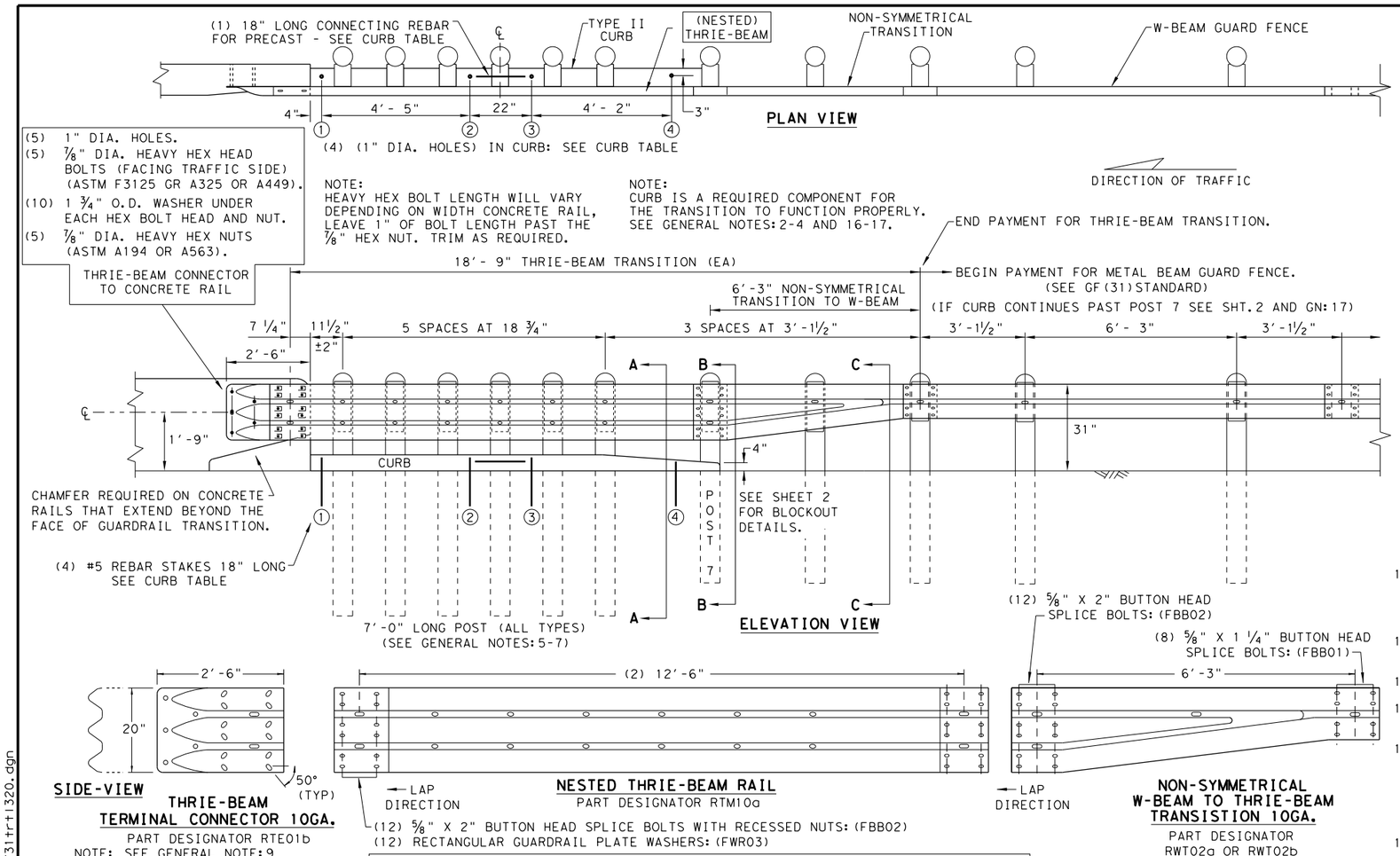


GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. 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- 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 1/2" 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.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 5/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. 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 5/8" 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 MATERIALS AND TESTS 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 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT. 2 FOR ADDITIONAL INFORMATION.

THRIE-BEAM TERMINAL - CURB TABLE

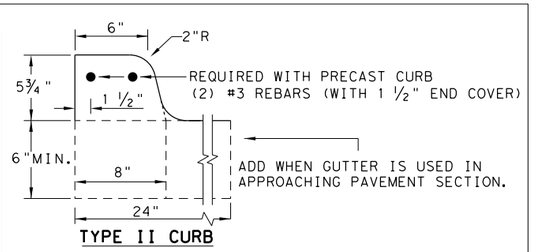
PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR. 60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR. 60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31tr-tl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
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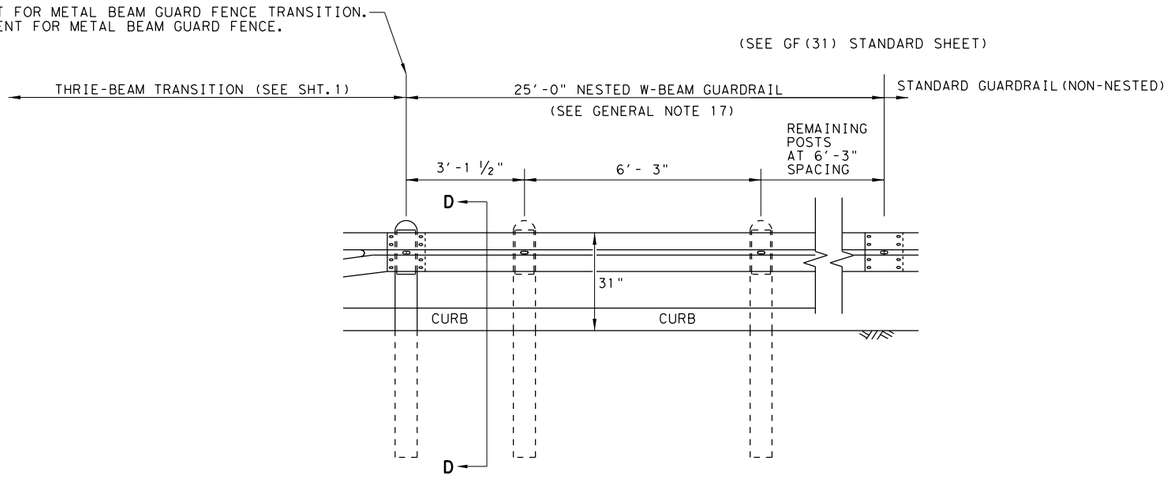
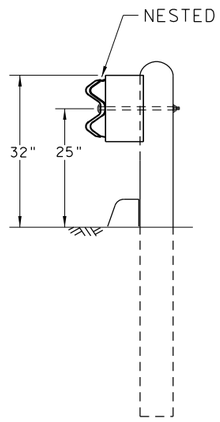
	DIST	COUNTY		SHEET NO.	
	FTW	PALO PINTO		130	

DATE: 10/27/2021
FILE: c:\pw-gf\pw-gf-prod\andrea.flores@aguirre-fields.com\dms18857\gf31trt1320.dgn

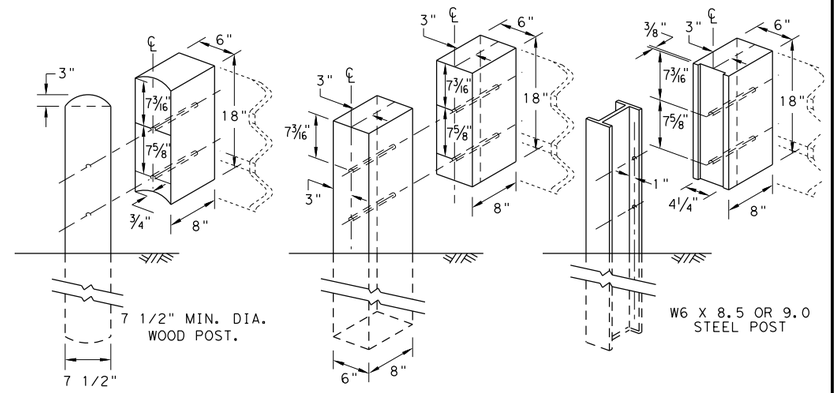
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
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	FTW	PALO PINTO		131	

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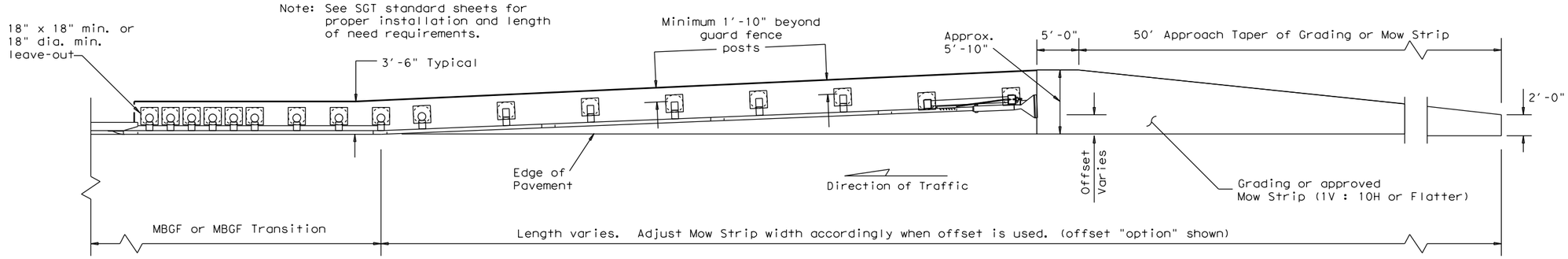
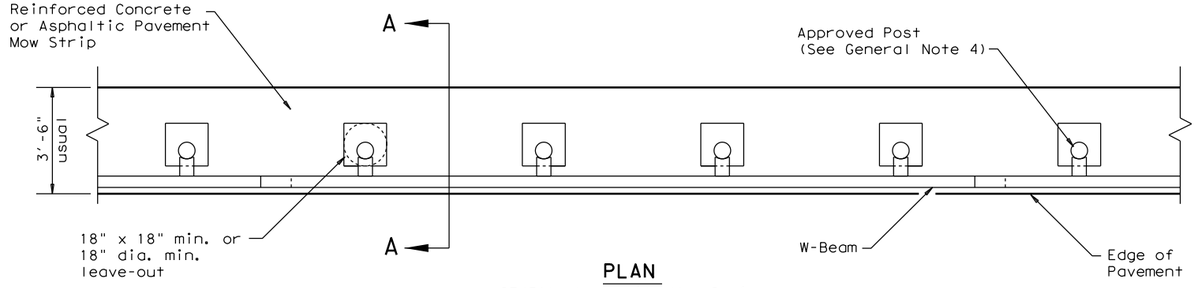
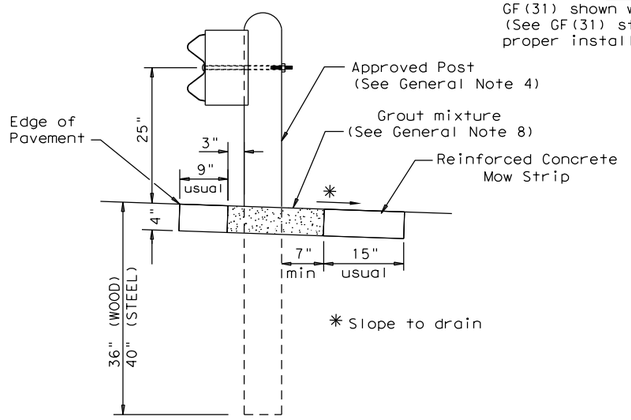


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



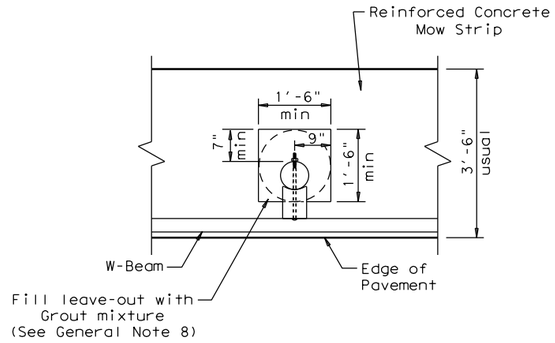
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



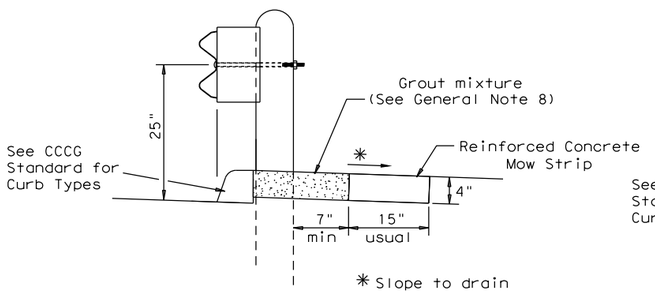
SECTION A-A

Typical



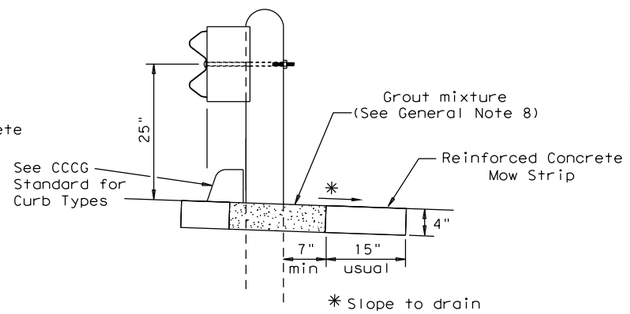
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



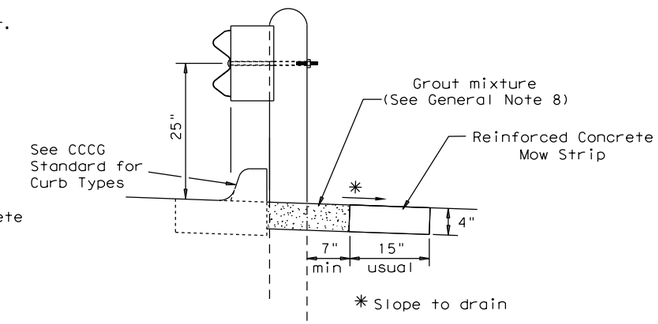
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		132

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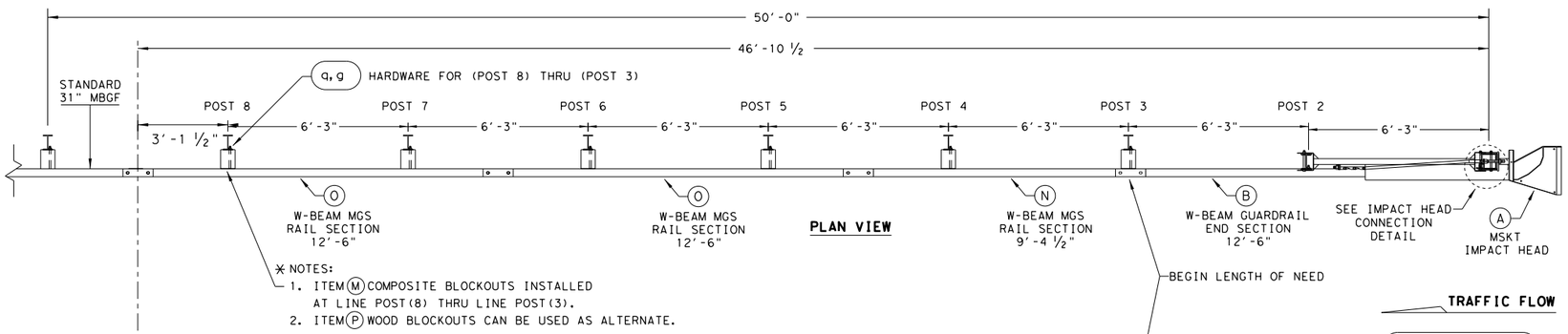
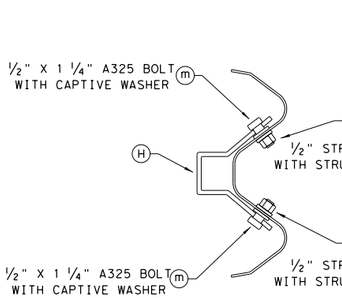
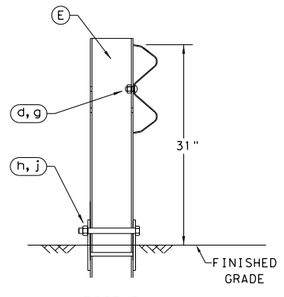


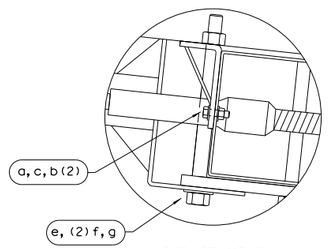
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



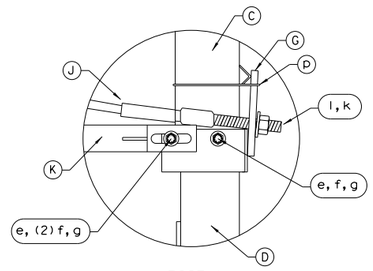
SECTION B-B
ANCHOR BRACKET



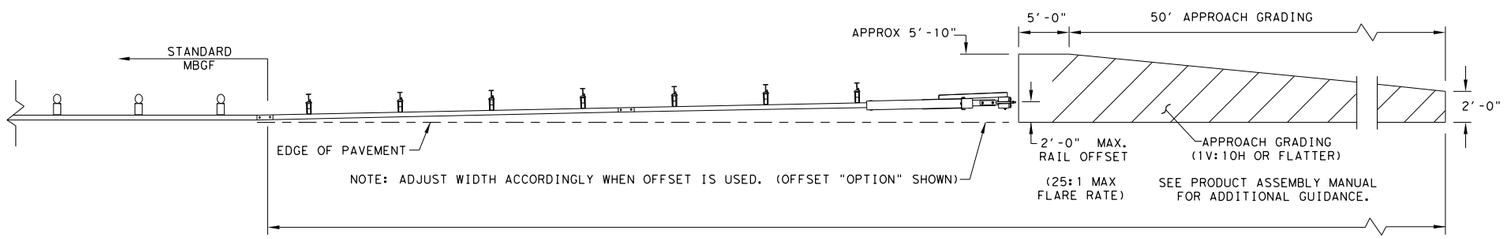
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

TRAFFIC FLOW

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

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.
4. 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.
14. 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	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	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
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 3/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: ✳

ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25'GUARD FENCE PANEL

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
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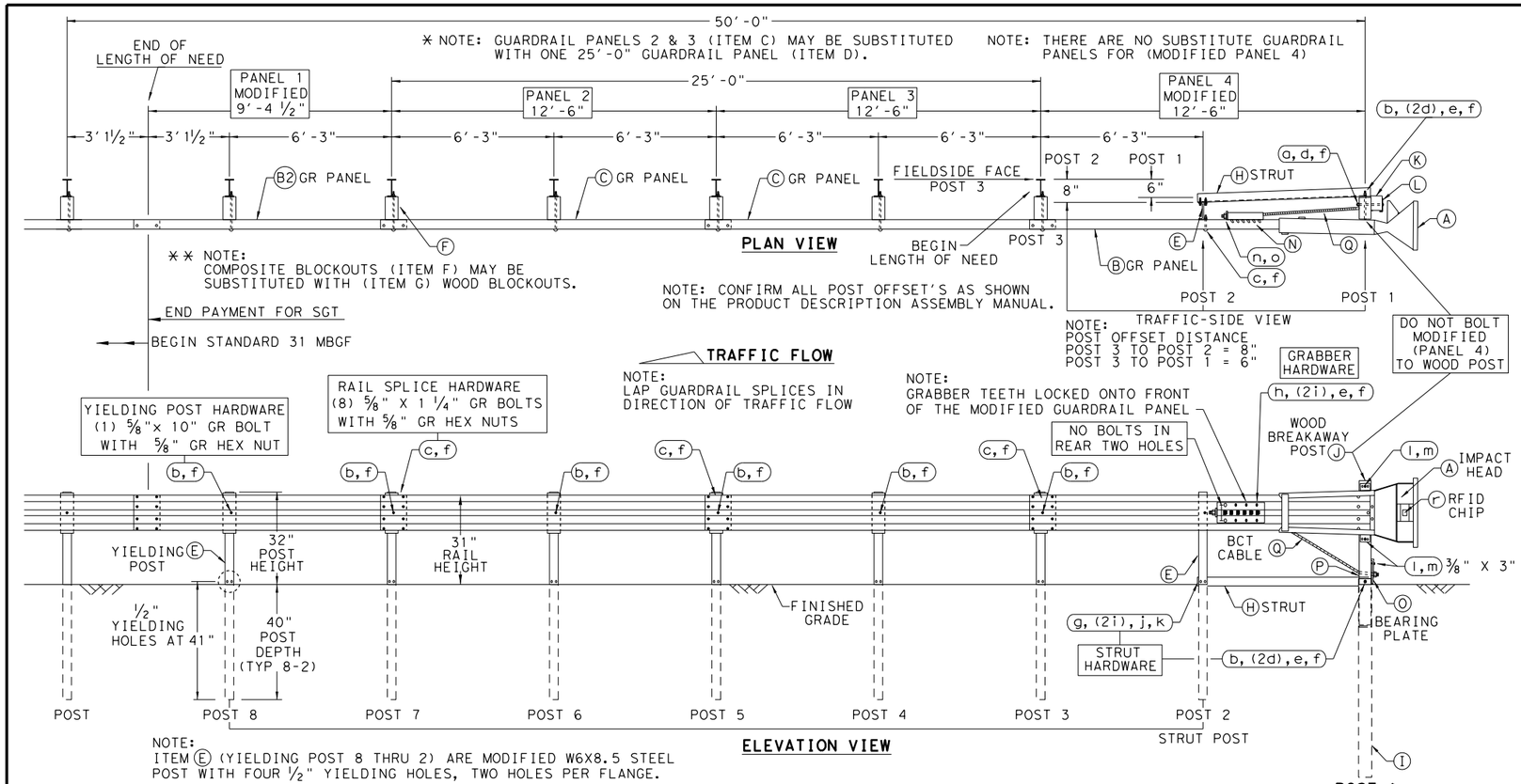
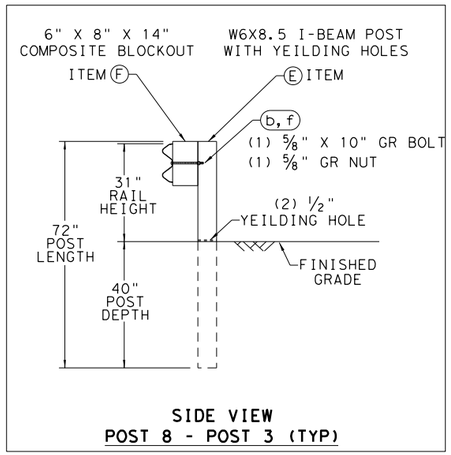


GENERAL NOTES

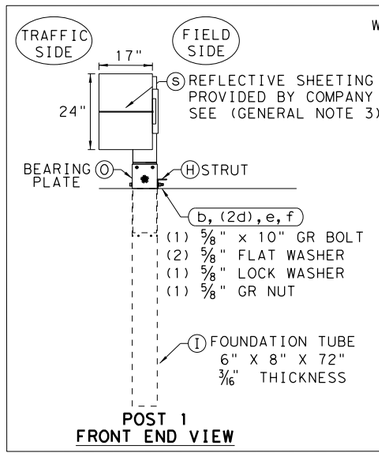
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY 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.
9. 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.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 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"	CBO8
G **	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
SMALL HARDWARE			
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" 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 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

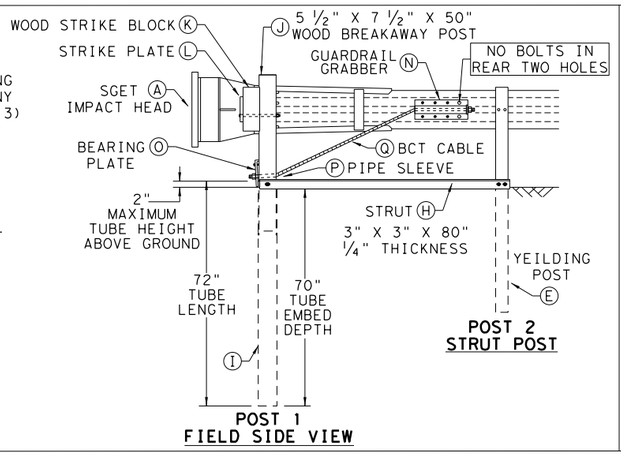
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

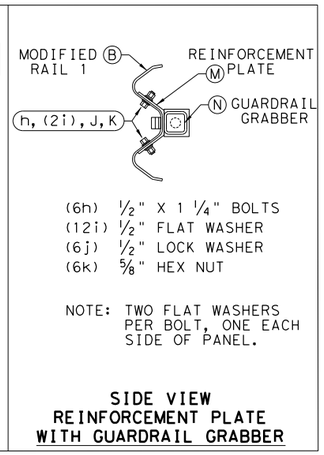


POST 1
FRONT END VIEW

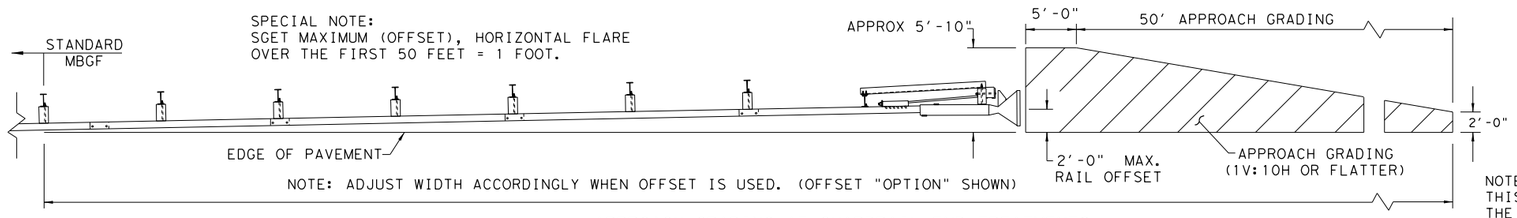


POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046, ETC	US 180, ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		134

DATE: 10/27/2021 5:08:35 PM
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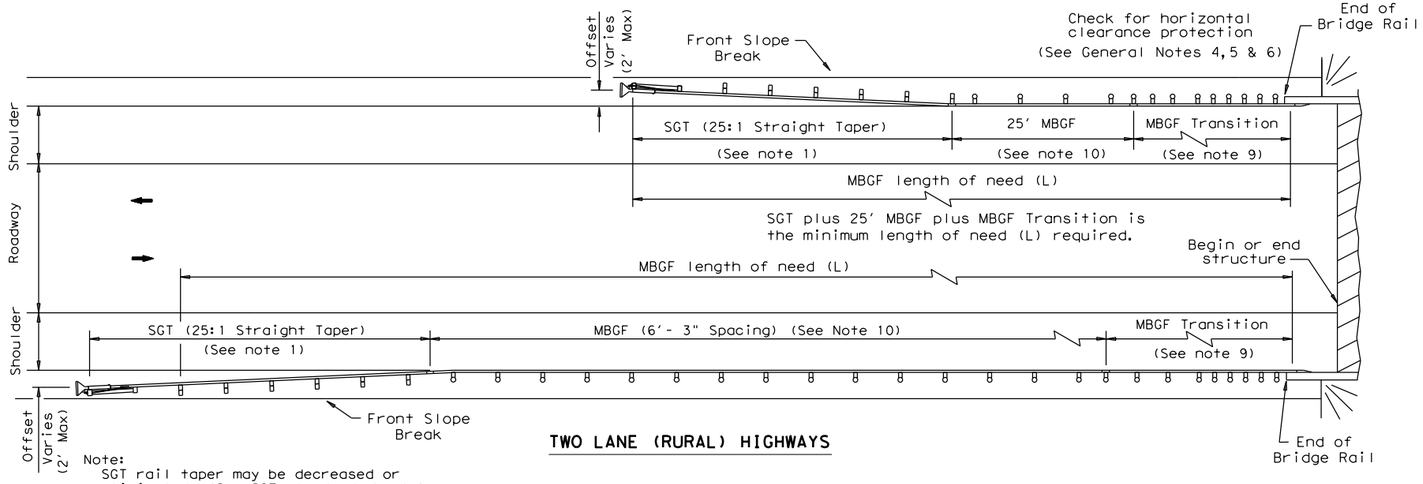
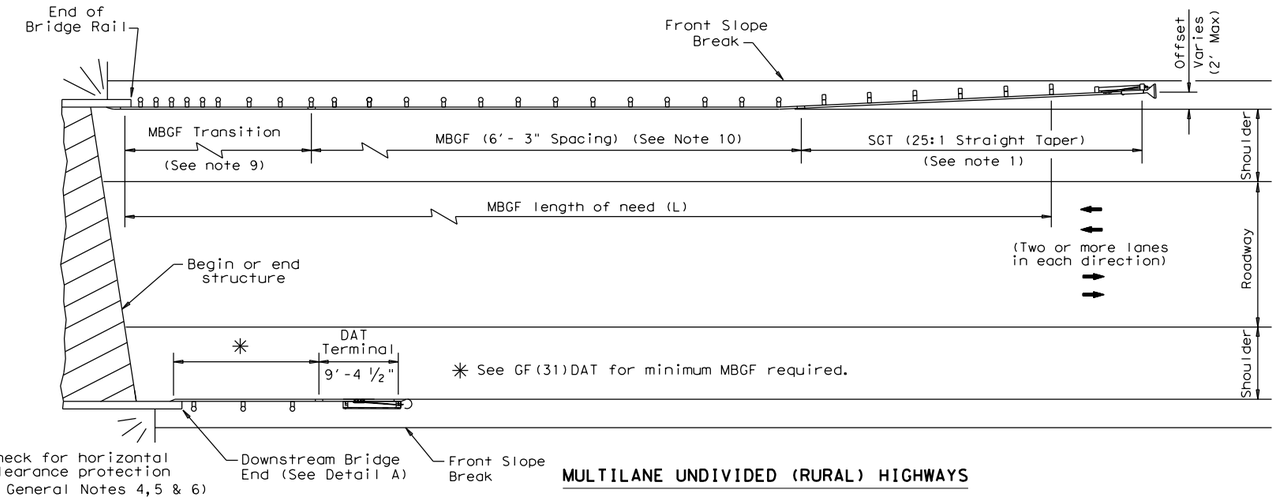
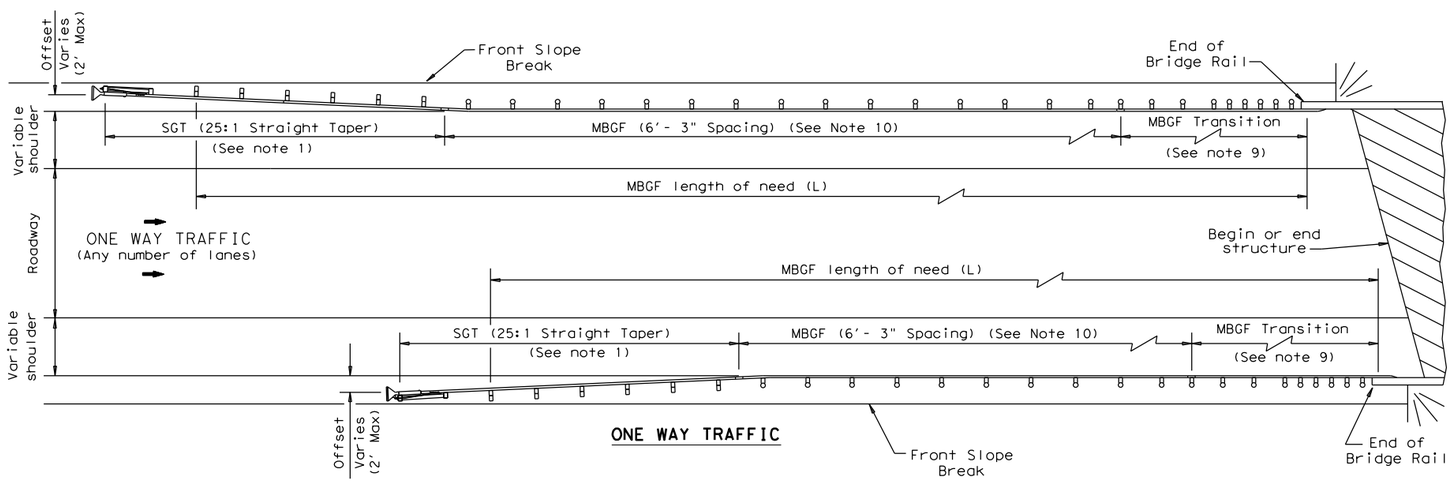


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



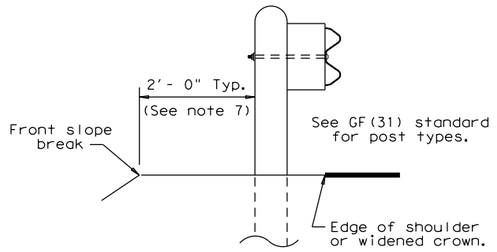
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



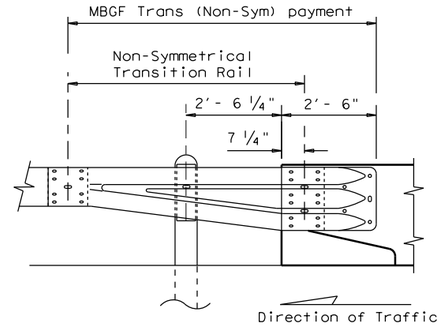
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft."maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

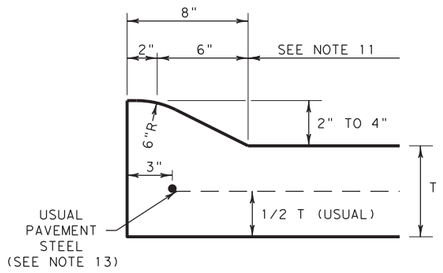
Design Division Standard

BRIDGE END DETAILS

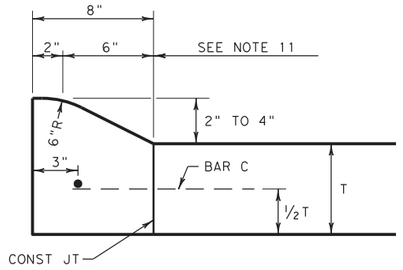
(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

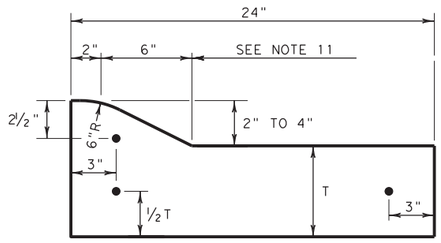
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0008	01	046, ETC	US 180, ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		135



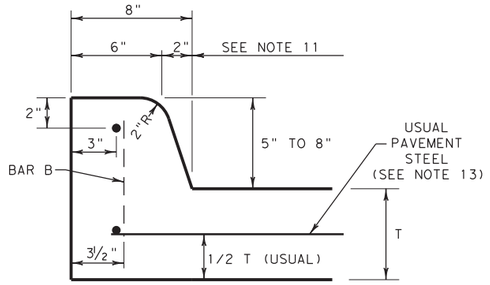
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



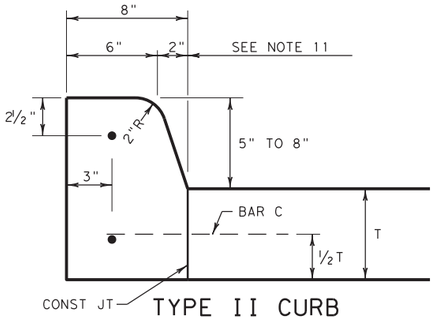
TYPE I CURB
2" - 4" HEIGHT



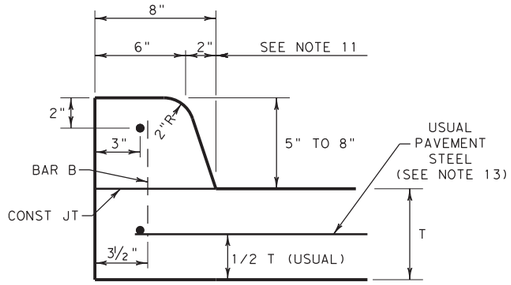
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



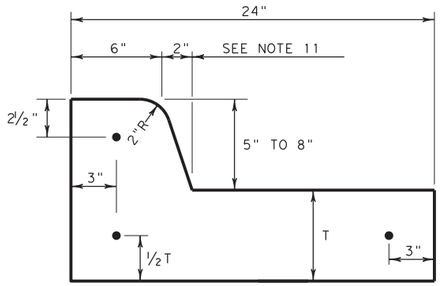
TYPE II CURB (MONOLITHIC)
5" - 8" HEIGHT



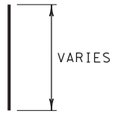
TYPE II CURB
5" - 8" HEIGHT
DOWELED VERTICAL JOINT



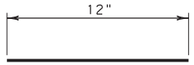
TYPE II CURB
5" - 8" HEIGHT
DOWELED HORIZONTAL JOINT



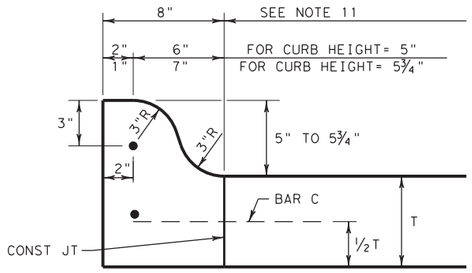
TYPE II CURB AND GUTTER
5" - 8" HEIGHT



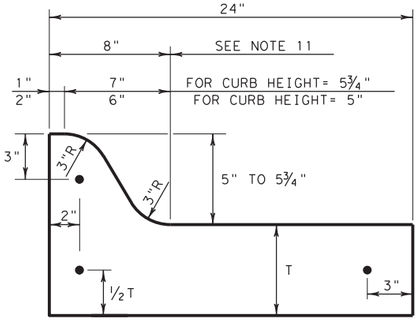
BAR B
L = (T/2) + (H- 1½")
WHERE "H" = CURB HEIGHT
FOR NEW PAVEMENT, EMBED T/2 INTO FRESH CONCRETE.
FOR EXISTING PAVEMENT, DRILL 3/8" DIAM HOLE T/2 + 1/4" INTO PAVEMENT.
SECURE WITH TY III EPOXY, CLASS "E" OR "F".



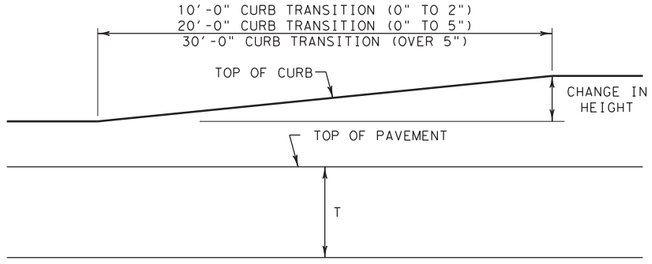
BAR C
EMBED 6" INTO EXISTING CONCRETE PAVEMENT.
DRILL 3/8" X 6 1/4" HOLE SECURE WITH TY III EPOXY, CLASS "E" OR "F".



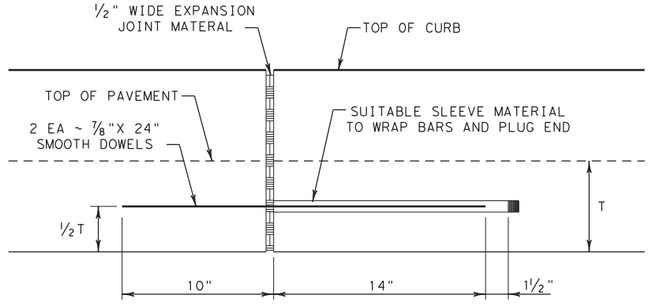
TYPE IIA CURB
5" - 5 3/4" HEIGHT



TYPE IIA CURB AND GUTTER
5" - 5 3/4" HEIGHT



CURB TRANSITION
NOTE: TO BE PAID FOR AS HIGHEST CURB



EXPANSION JOINT DETAIL

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ITEM 529, "CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER".
2. ALL CONCRETE SHALL BE CLASS "A".
3. ALL REINFORCING BARS SHALL BE #4, UNLESS OTHERWISE SHOWN.
4. CURB HEIGHT SHALL BE AS SHOWN ON TYPICAL SECTIONS OR PLAN-PROFILE SHEETS.
5. ROUND EXPOSED SHARP EDGES WITH A ROUNDING TOOL, TO A MINIMUM RADIUS OF 1/4".
6. ALL EXISTING CURBS AND DRIVEWAYS TO BE REMOVED SHALL BE SAW CUT FULL DEPTH OR REMOVED AT EXISTING JOINTS.
7. WHERE CONCRETE CURB IS PLACED ON EXISTING CONCRETE PAVEMENT, THE PAVEMENT SHALL BE DRILLED AND THE REINFORCING BARS GROUTED OR EPOXIED IN PLACE.
8. EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED TO MATCH PAVEMENT JOINTS IN ALL CURBS OR 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 OR DRIVEWAYS, AND AT LOCATIONS DIRECTED BY THE ENGINEER.
9. VERTICAL AND HORIZONTAL DOWELS BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4' C-C.
10. DIMENSION "T" SHOWN IS THE THICKNESS OF ADJACENT CONCRETE PAVEMENT, OR, WHEN CURB IS INSTALLED ADJACENT TO FLEXIBLE PAVEMENT, "T" IS 6" MINIMUM, 8" MAXIMUM.
11. USUAL PROFILE GRADE LINE. REFER TO TYPICAL SECTIONS AND PLAN-PROFILE SHEETS FOR EXACT LOCATIONS.
12. A SEALED, 1/2" EXPANSION JOINT SHALL BE PROVIDED WHERE CURB AND GUTTER IS ADJACENT TO SIDEWALK OR RIPRAP.
13. LONGITUDINAL AND TRANSVERSE PAVEMENT STEEL SHALL BE PLACED IN ACCORDANCE WITH PAVEMENT DETAILS SHOWN ELSEWHERE IN THE PLANS.

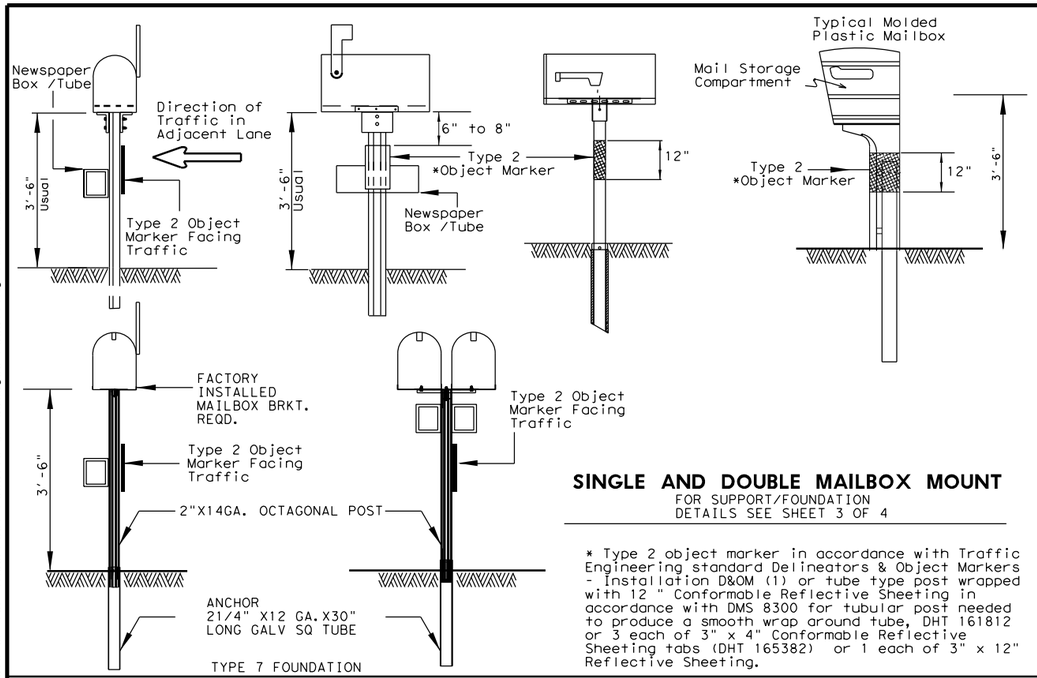
Texas Department of Transportation

Fort Worth District Standard

CONCRETE CURB AND CURB AND GUTTER DETAILS

CCCG (FTW)

ORIGINAL DRAWING: 05/2019	cccg-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6	SEE TITLE SHEET	136
05/2019	REPLACES CC-CG(FW)	STATE	STATE DIST. NO. / COUNTY	
		TEXAS	FTW / PALO PINTO	
		CONT.	SECT. / JOB / HIGHWAY NO.	
		0008	01 046, ETC / US 180, ETC	



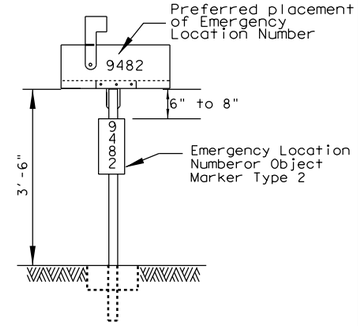
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	MAXIMUM WEIGHT (POUNDS)	
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

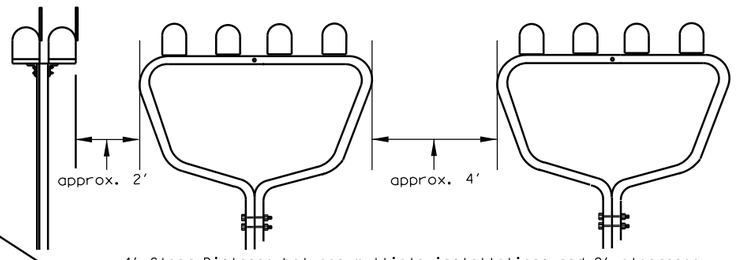
LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	22.4
BACK	11 1/2	11 1/2		15	

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES

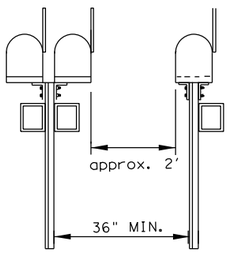
Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



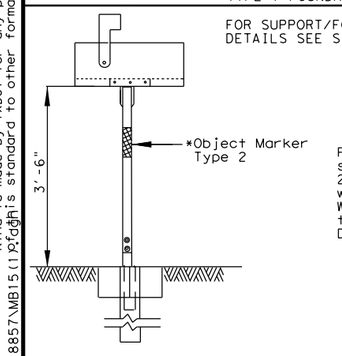
4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT #'s 164116 or 149339.

MULTIPLE MAILBOX PLACEMENT

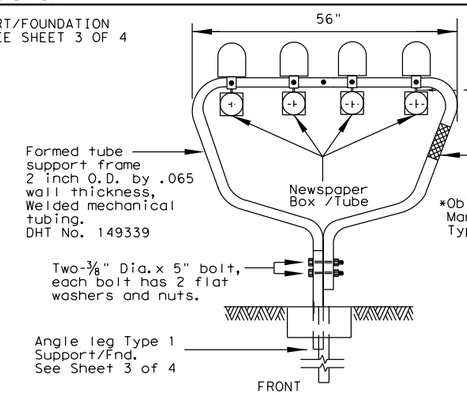


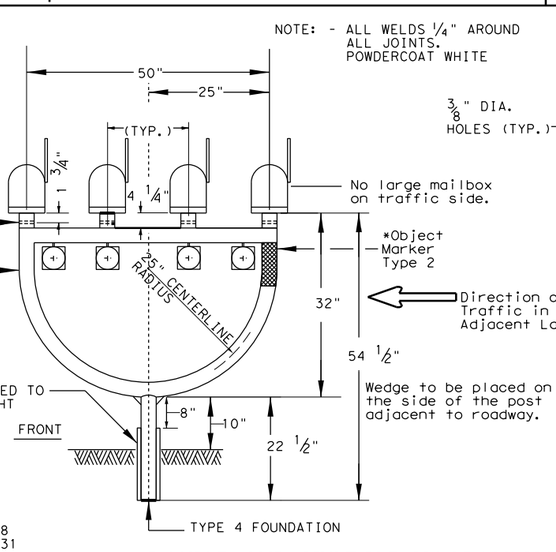
Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

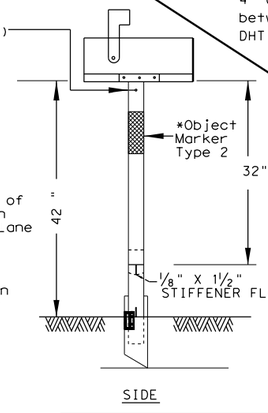
SINGLE & DOUBLE MAILBOX PLACEMENT

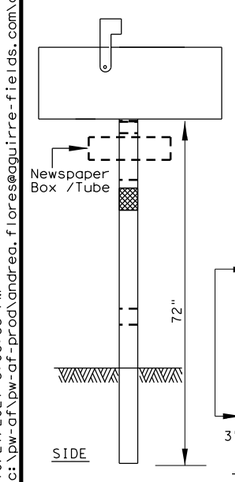


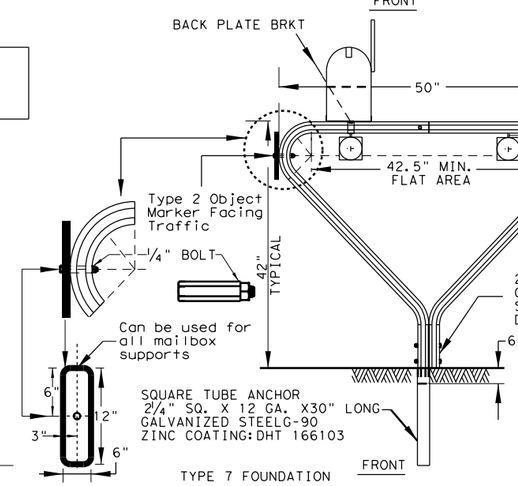
FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4











DOUBLE AND MULTIPLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4
FOR DHT NUMBERS SEE SHEET 4 OF 4

MULTIPLE MAILBOX MOUNT

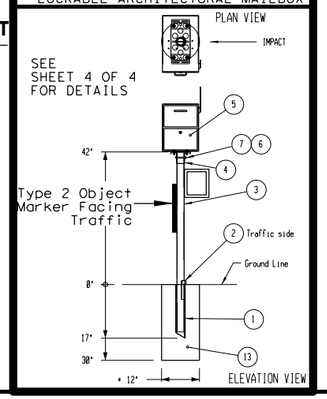
INDEX OF MAILBOX DETAIL SHEETS

NEWSPAPER RECEPTACLE

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

LOCKABLE ARCHITECTURAL MAILBOX



SHEET 1 OF 4

Texas Department of Transportation — Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK: JEO	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		137

DATE: 10/27/2021 5:08:55 PM
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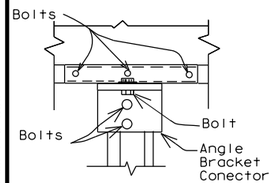
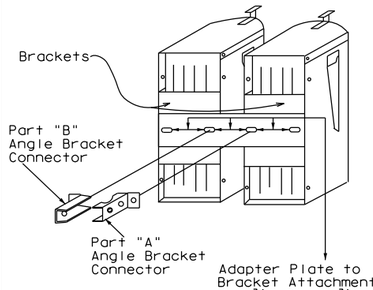


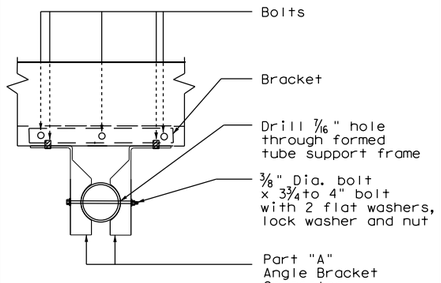
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

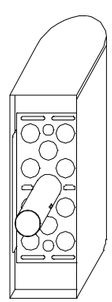


(Not permitted for Large Mailboxes)

DOUBLE MAILBOX

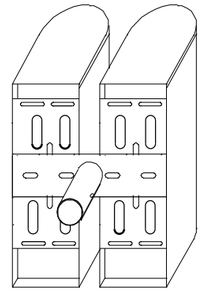


MULTIPLE MAILBOX



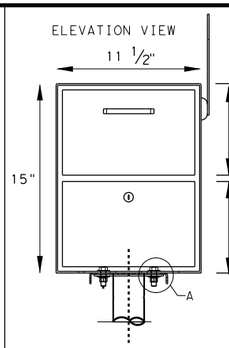
To be used with 2 3/8" OD RR or thinwall Steel posts.

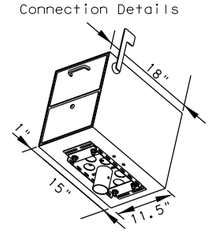
WELDED SINGLE MAILBOXBRACKET

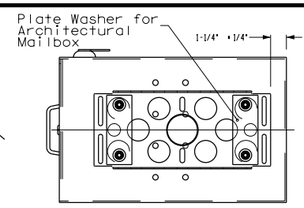


To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE

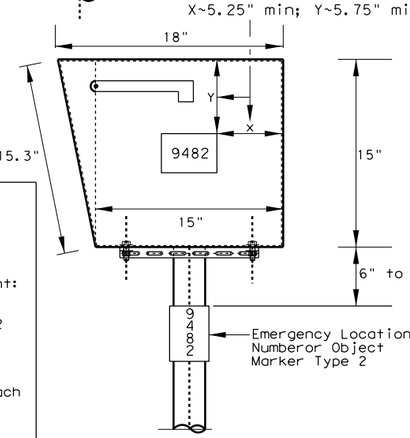






Preferred placement of Emergency Location Number

X~5.25" min; Y~5.75" min



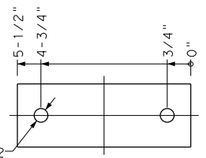
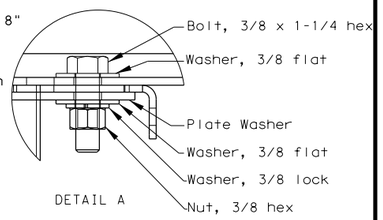
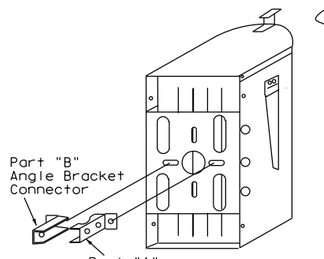
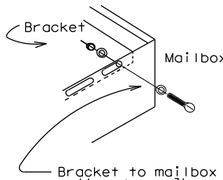


Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



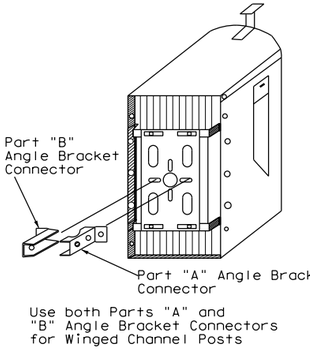


Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/ 2 flat washers and nut per each bolt.

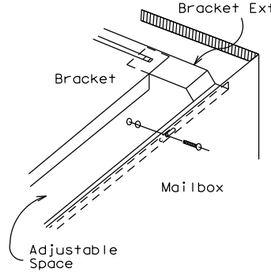
Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to 2 - 3/8" Dia. x 2 1/2" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/2 flat washers and nut per each bolt.

Bracket to bracket extension attachment: 2 - 1/4" Dia. x 3/4" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt w/2 flat washers, lock washer and nut per each bolt.

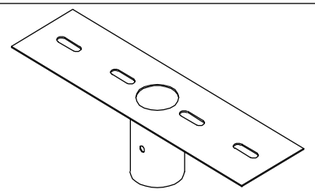
Angle to mailbox support attachment: 2 - 3/8" Dia. x 2 1/2" bolt w/2 flat washers, lock washer, and nut per each bolt.

Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES

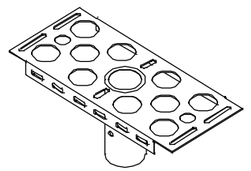
GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



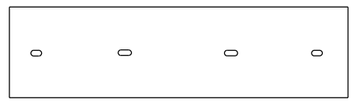
DHT 162323

For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.



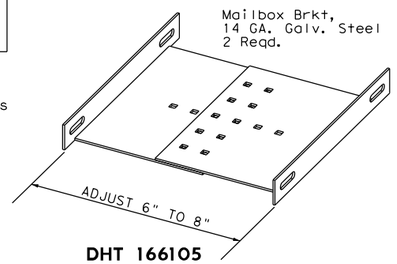
DHT 161443

For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

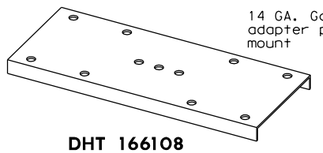


DHT #3789

Used for mounting two Mailboxes on the same post.

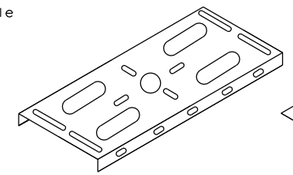


DHT 166105



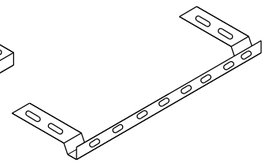
14 GA. Galv. Steel adapter plate for double mount

DHT 166108



DHT 148939

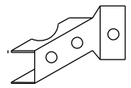
Mailbox Bracket



DHT 148938

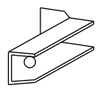
Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



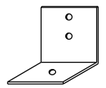
DHT 159489

Part "A" Angle Bracket Connector



DHT 159490

Part "B" Angle Bracket Connector



DHT 2917

Angle Bracket For Temporary Mailbox

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

Texas Department of Transportation | Maintenance Division Standard

MAILBOX BRACKET CONNECTING DETAILS

MB-15(1)

FILE:MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS ADDED DHT 163730	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		138

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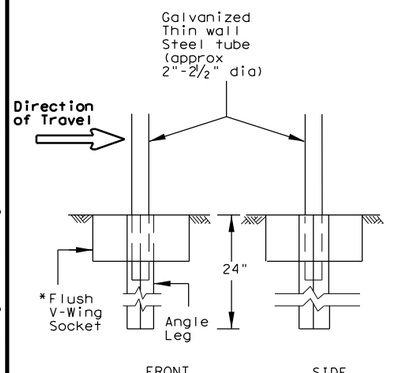
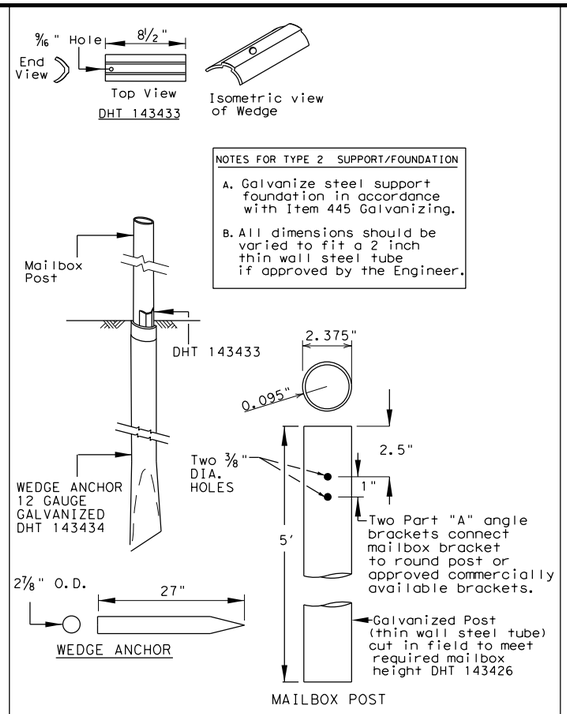


TYPE 1 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



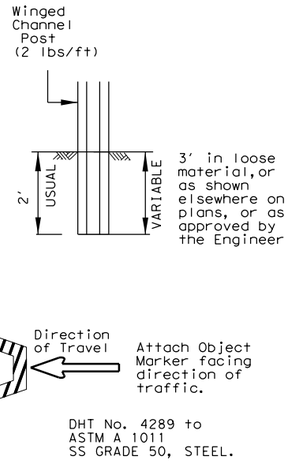
NOTES FOR TYPE 2 SUPPORT/FOUNDATION

A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.

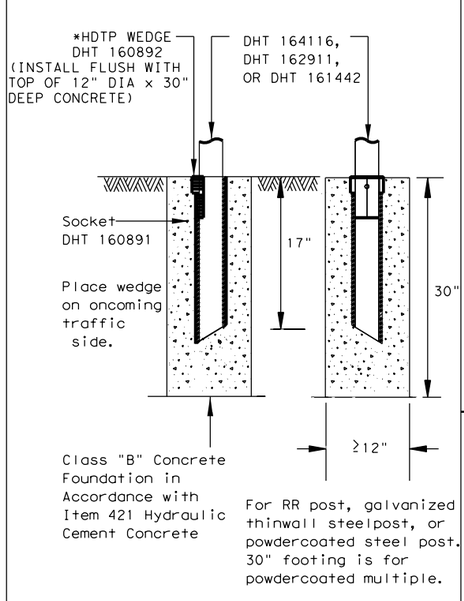
TYPE 2 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



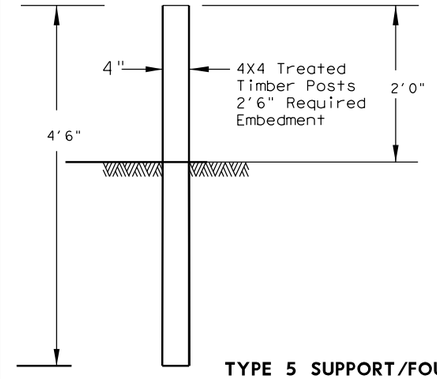
TYPE 3 SUPPORT/FOUNDATION

WINGED CHANNEL POST



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

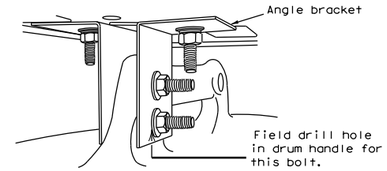


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



Placed on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).

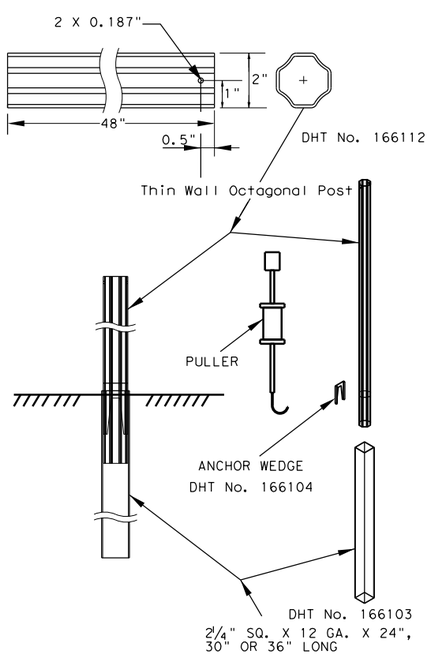
Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

MB-(X) ASSM TY (XXX) (X) (XX) (OPTIONAL)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

Texas Department of Transportation — Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046, ETC	US 180, ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		139

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

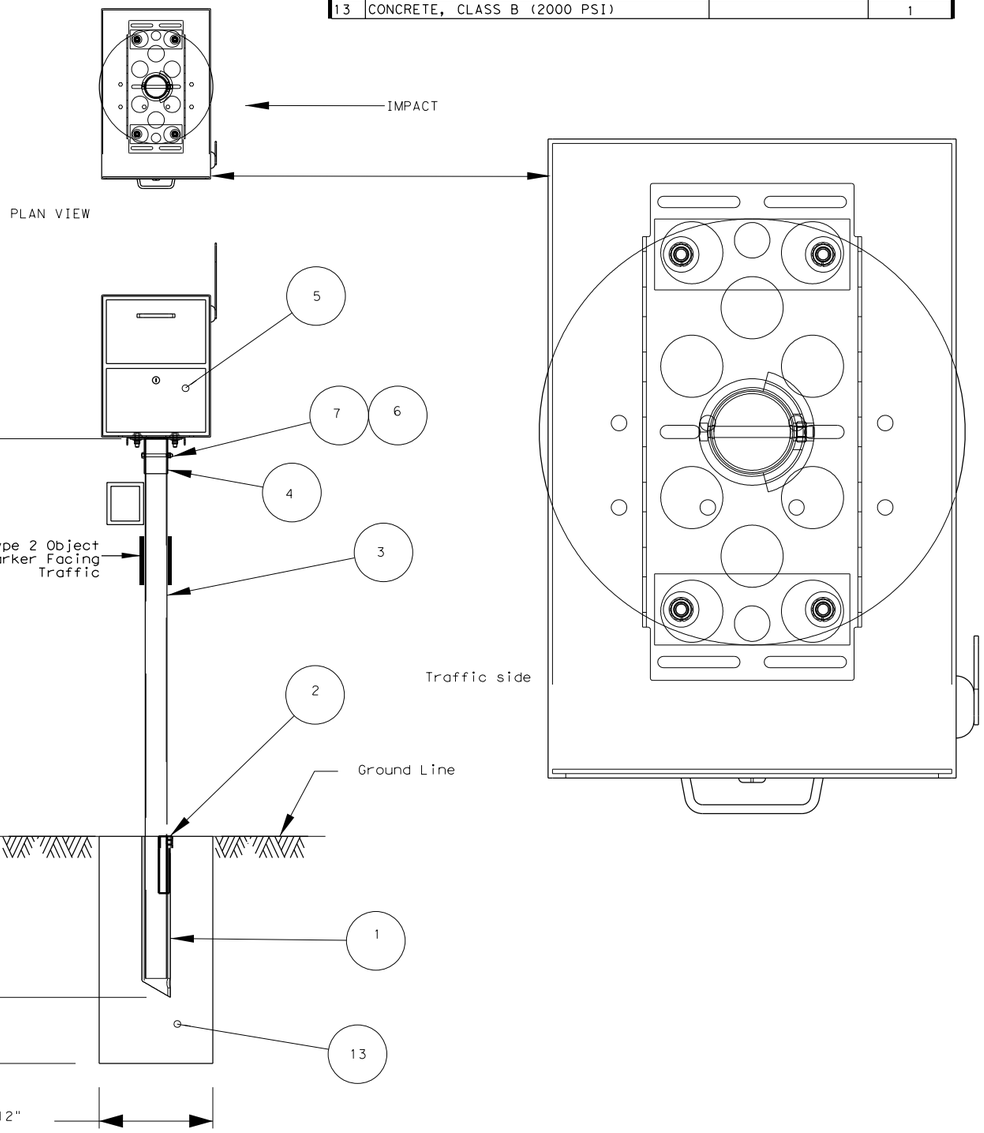


TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

DATE: 10/27/2021 5:08:56 PM
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SHEET 4 OF 4

Texas Department of Transportation

Maintenance Division Standard

DHT NUMBERS TABLE

MB-15(1)

FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
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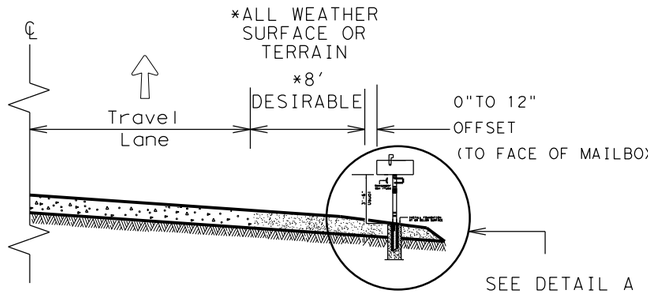
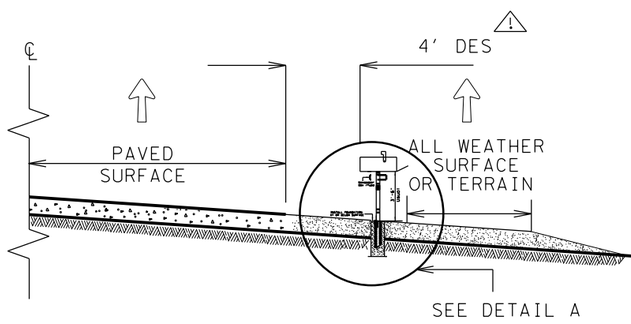
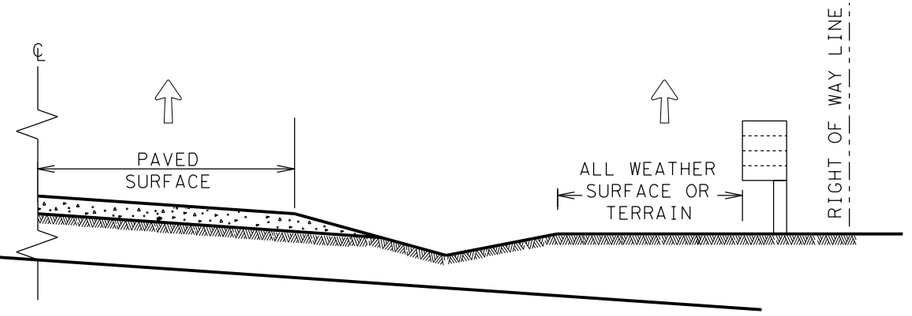
	FTW	PALO PINTO		140



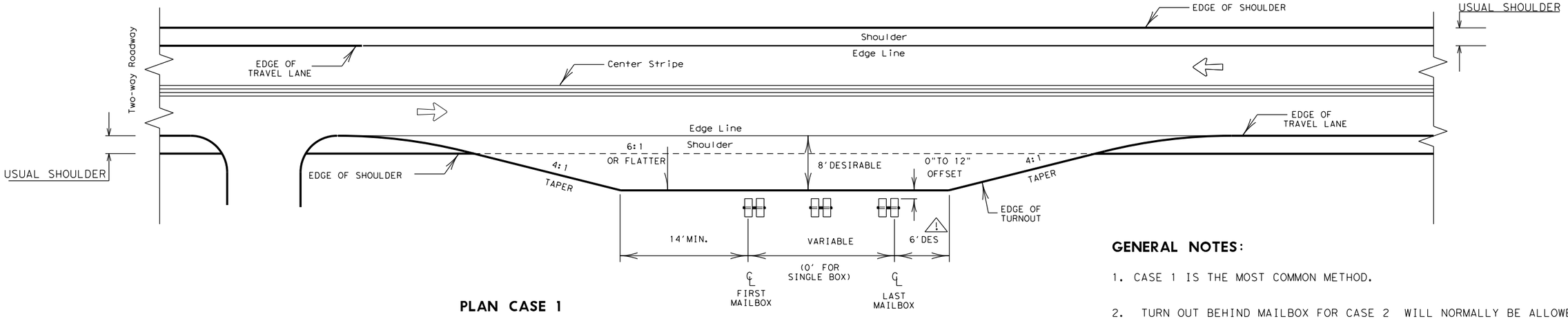
CASE 1. OFF TRAVEL WAY DELIVERY



CASE 2. BACK SIDE DELIVERY



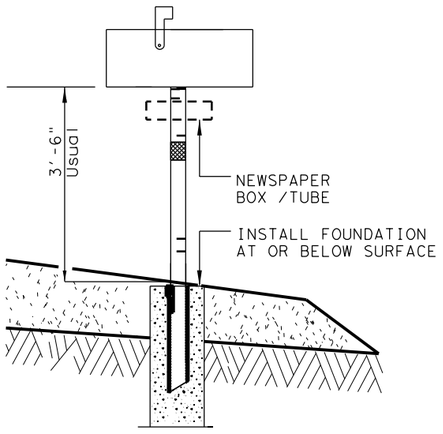
CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



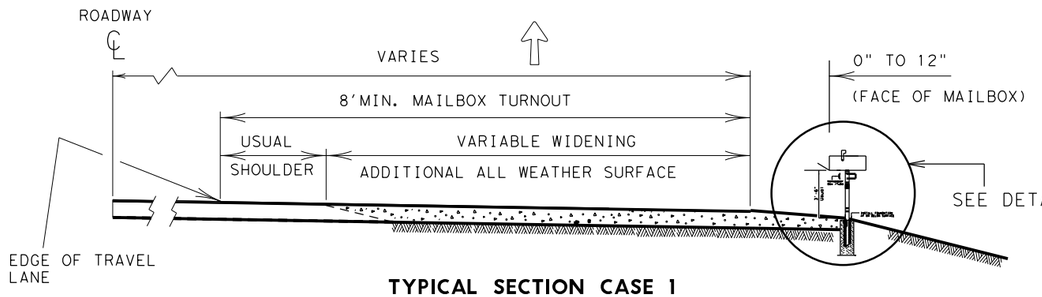
PLAN CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. IF THE NUMBER OF MAILBOXES EXCEEDS FOUR, A COMMUNITY MAIL BOX SHOULD BE ENCOURAGED AT THESE LOCATIONS.



DETAIL A



TYPICAL SECTION CASE 1

MAIL DELIVERY VEHICLE TRAVEL DIRECTION

SHEET 1 OF 3

Texas Department of Transportation

Maintenance Division Standard

Guideline

MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS
MB-14(2)

FILE: MB14(2).DGN	DN: JEO		CK:	DW: JEO		CK:
© TxDOT MAY 2014	CONT	SECT	JOB		HIGHWAY	
REVISIONS DECEMBER 2012-NEW TXDOT TITLE BLOCK	0008	01	046, ETC		US 180, ETC	
	DIST	COUNTY			SHEET NO.	
	FTW	PALO PINTO			141	

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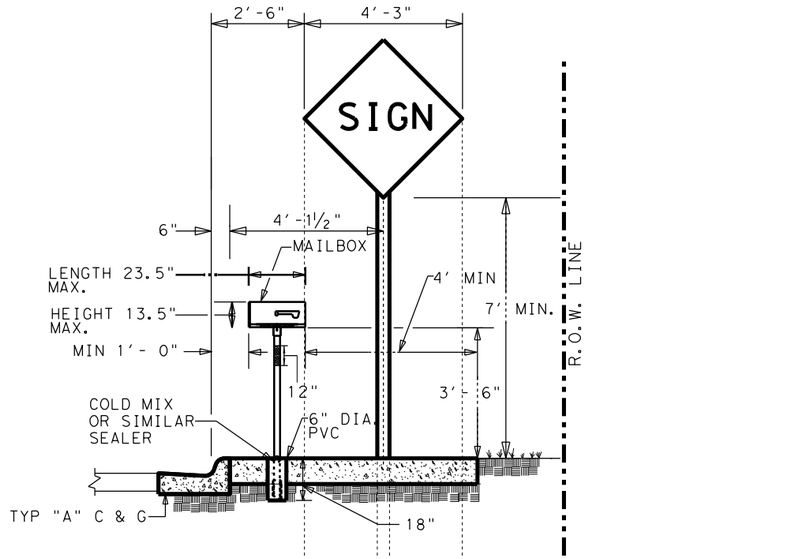
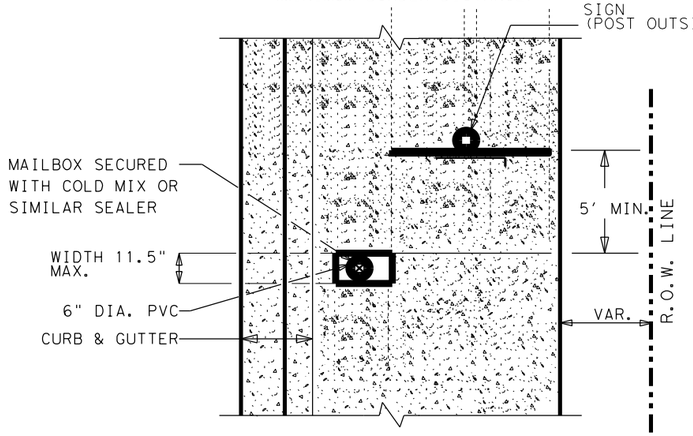
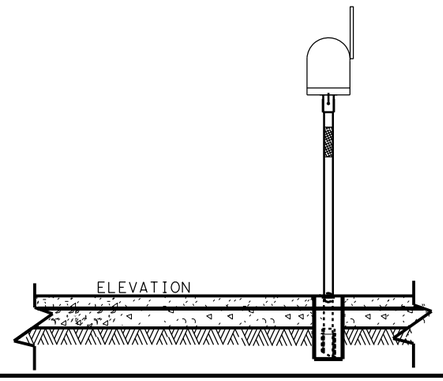
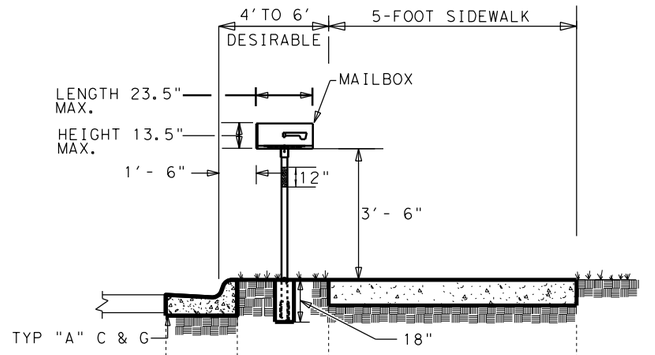


MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN
(MINIMUM BORDER DISTANCE)

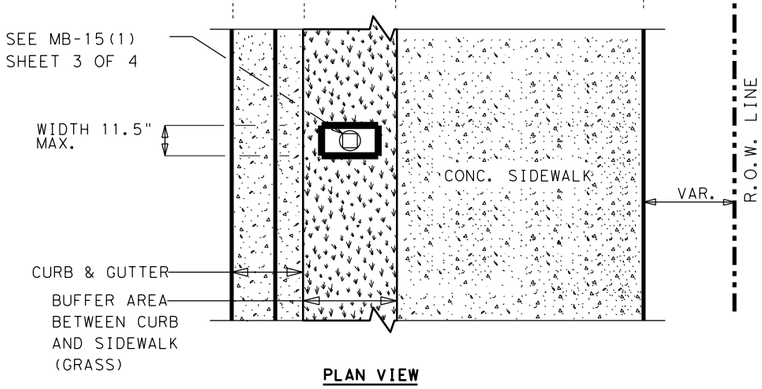


PLAN VIEW





MAILBOX SIDEWALK INSTALLATION
(DESIRABLE BORDER DISTANCE)



PLAN VIEW

Texas Department of Transportation | Maintenance Division Standard

SINGLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

MB-14(2A)

FILE:MB-14(2A)	DN:	CK:	DW:	CK:
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		142

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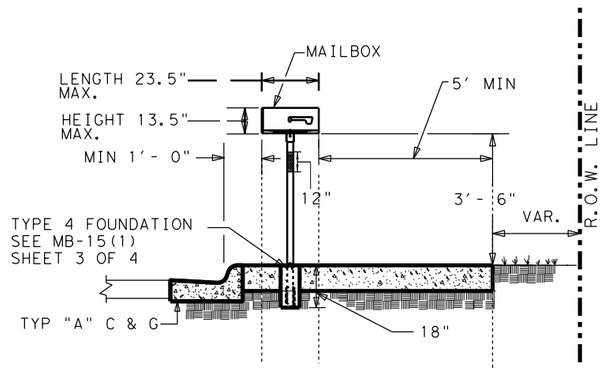
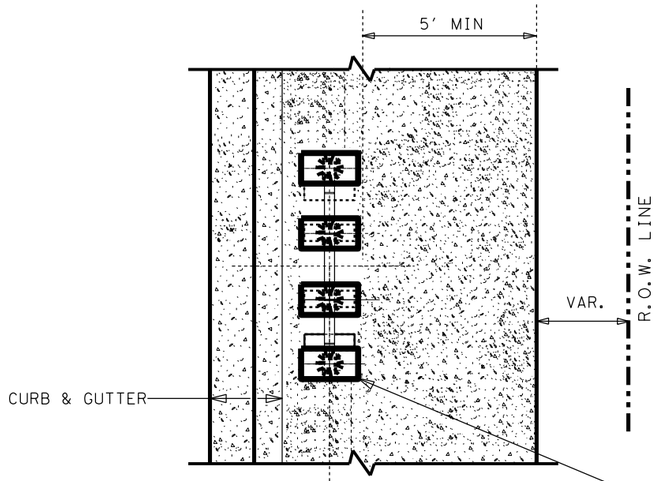
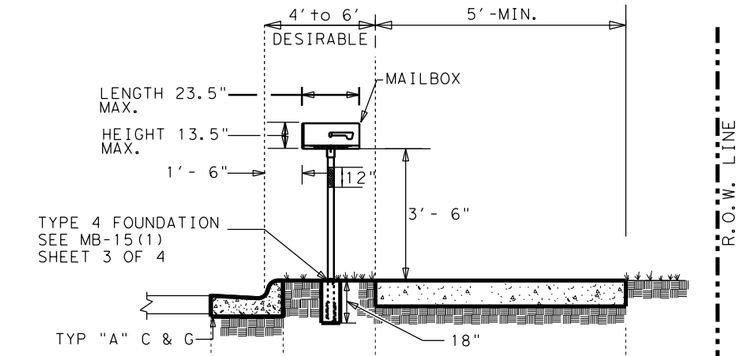


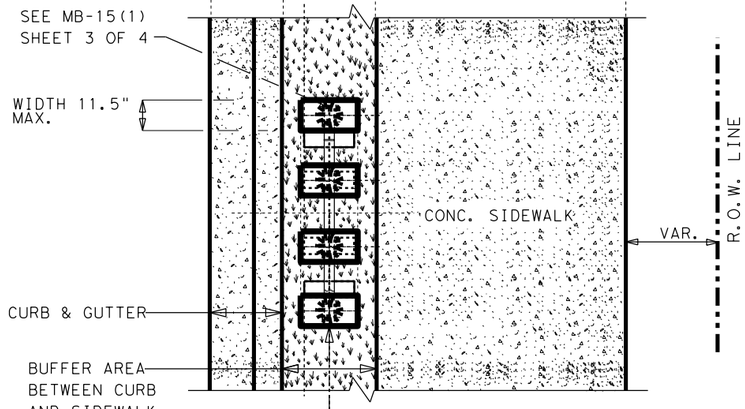
MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN
(MINIMUM BORDER DISTANCE)



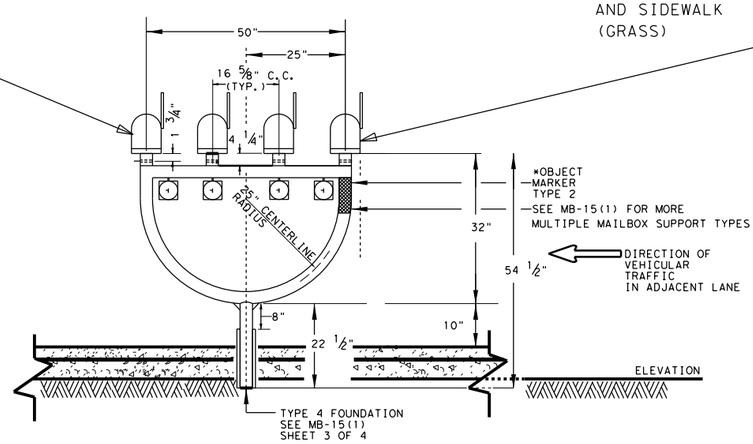
PLAN VIEW



MAILBOX SIDEWALK INSTALLATION
(DESIRABLE BORDER DISTANCE)



PLAN VIEW



SHEET 3 OF 3

Texas Department of Transportation

Maintenance Division Standard

MULTIPLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

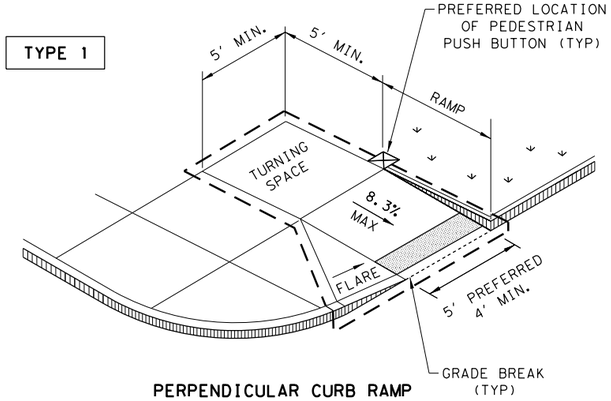
MB-14(2B)

REVISIONS

FILE: MB-14(2A)	DN:	CK:	DW:	CK:
	CONT	SECT	JOB	HIGHWAY
	0008	01	046, ETC	US 180, ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		143

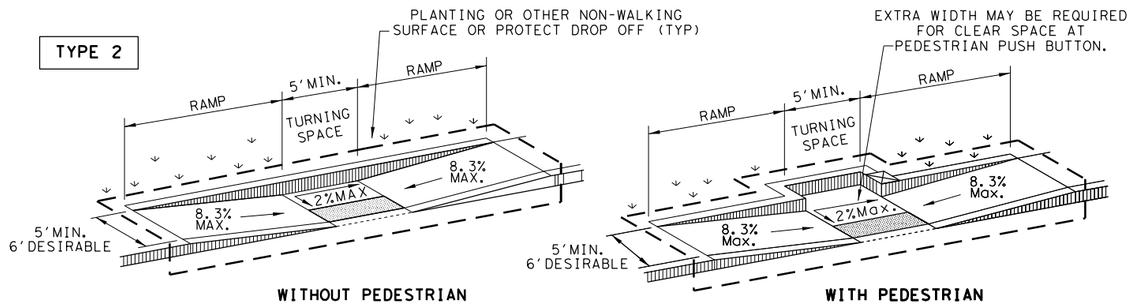
DATE: 10/27/2021
FILE: c:\pw-df\pw-af-prod\andrea.flores@aguirre-fields.com\dms18857\ped18 (1).dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

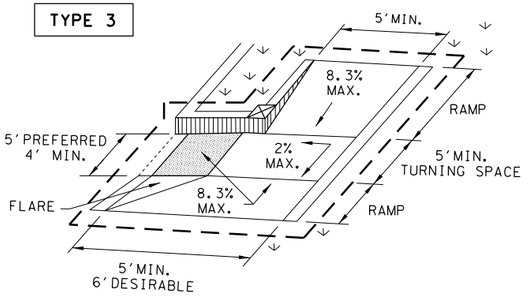


WITHOUT PEDESTRIAN PUSH BUTTON

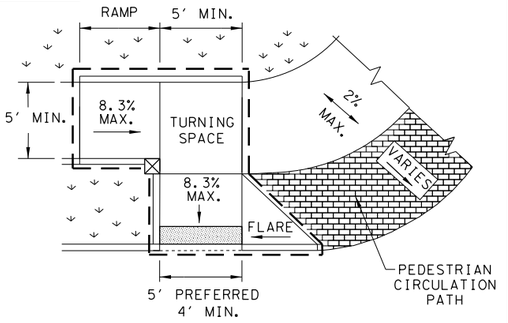
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

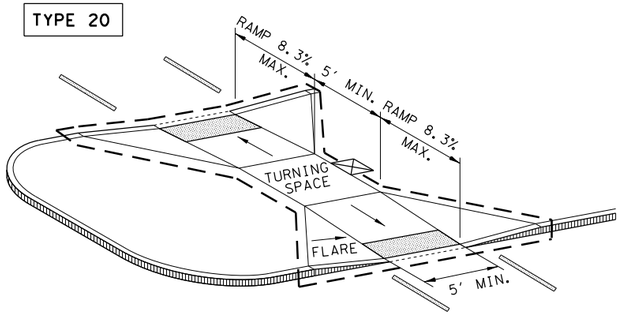


TYPE 6



COMBINATION CURB RAMPS

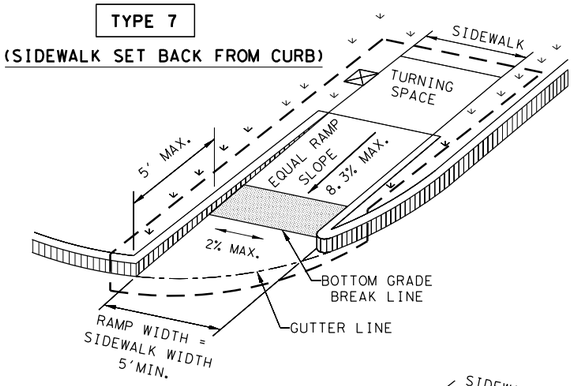
TYPE 20



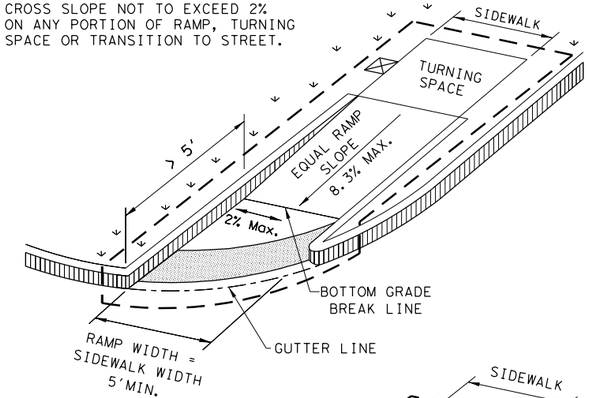
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

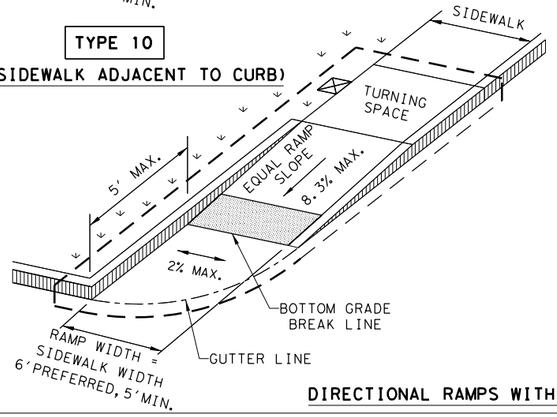


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10

(SIDEWALK ADJACENT TO CURB)



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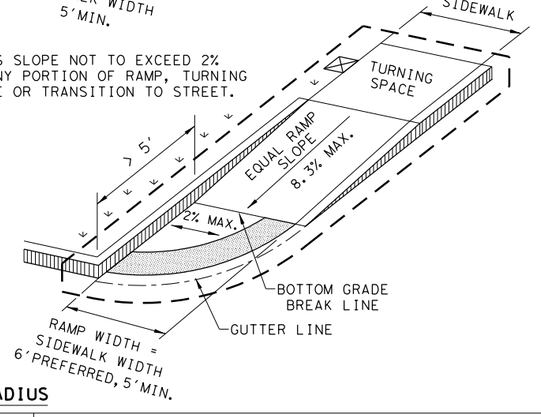
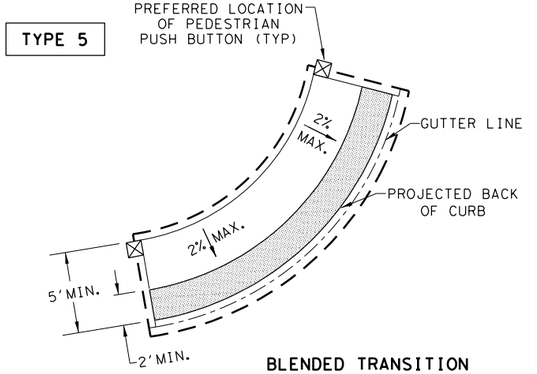


DIRECTIONAL RAMPS WITHIN RADIUS

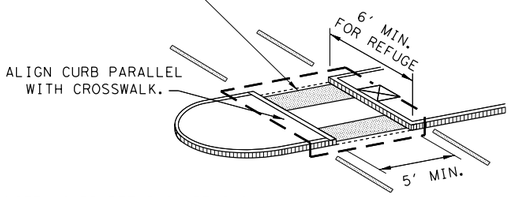
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

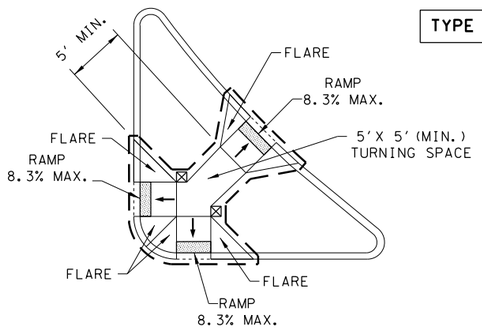
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



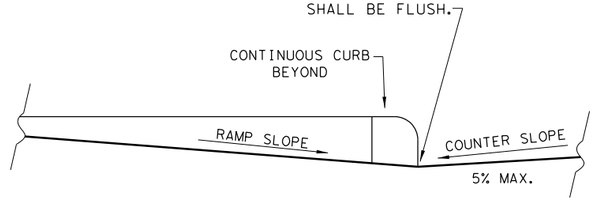
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		144

DATE: 10/27/2021
FILE: c:\pw-of\pw-af-prod\andrea.flores@aguirre-fields.com\dms18857\ped18 (1).dgn

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 applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

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

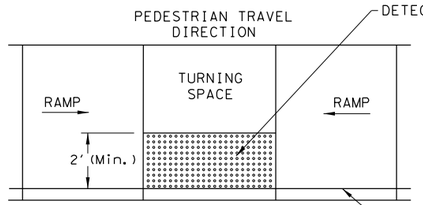
DETECTABLE WARNING PAVERS (IF USED)

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

SIDEWALKS

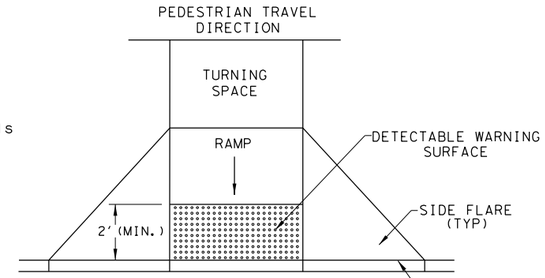
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items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

DETECTABLE WARNING SURFACE DETAILS



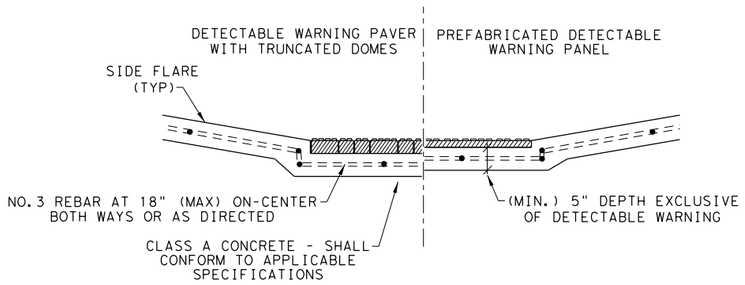
PARALLEL CURB RAMP

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

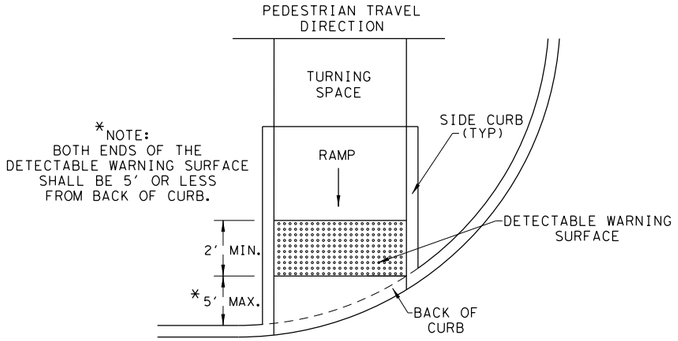


PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

SHEET 2 OF 4

Texas Department of Transportation

Design Division Standard

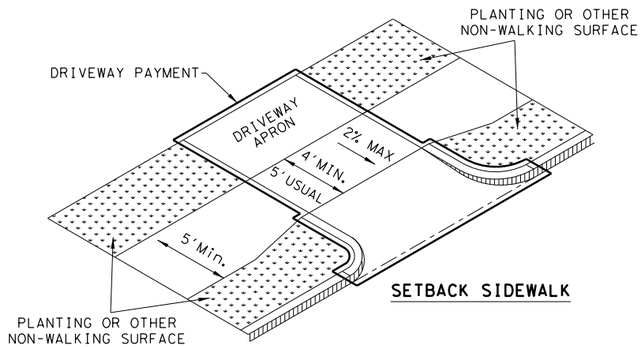
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

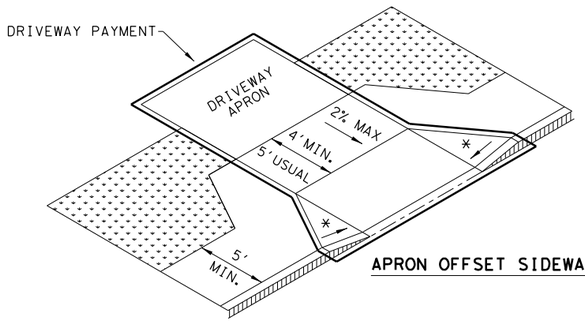
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046, ETC	US 180, ETC
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		145

DATE: 10/27/2021
FILE: c:\pw-of\pw-of-prod\andrea.flores@aguirre-fields.com\dms18857\ped18 (1).dgn

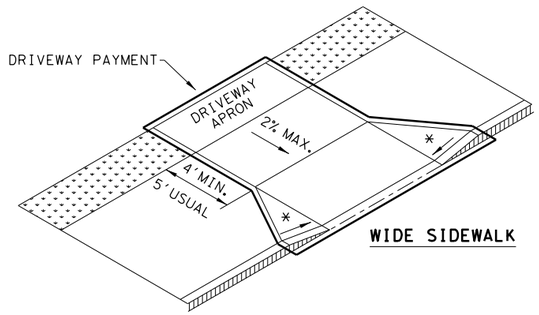
SIDEWALK TREATMENT AT DRIVEWAYS



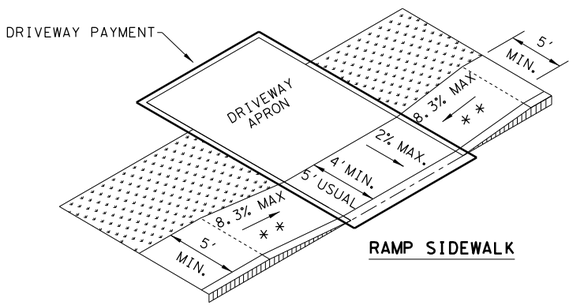
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

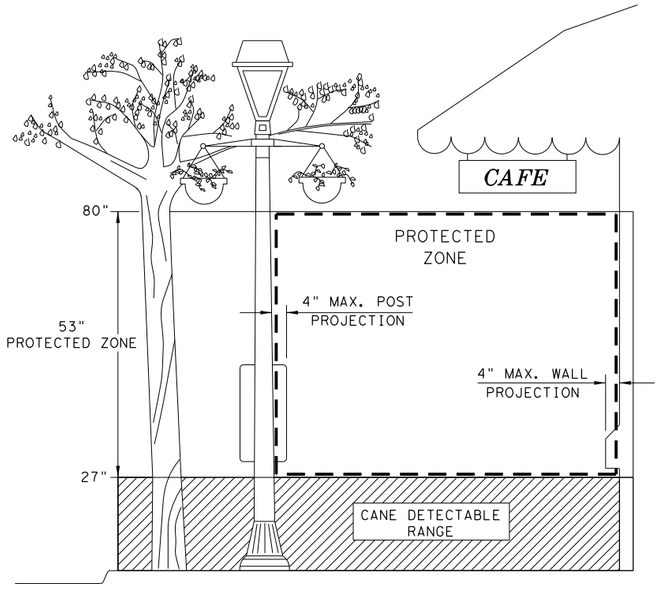


RAMP SIDEWALK

NOTES:

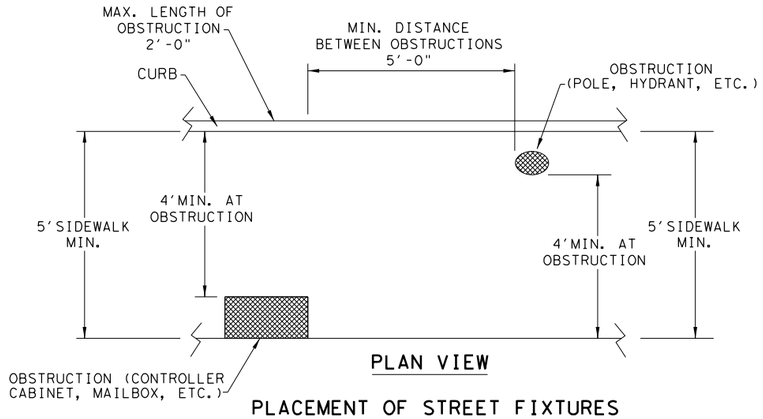
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



PROTECTED ZONE

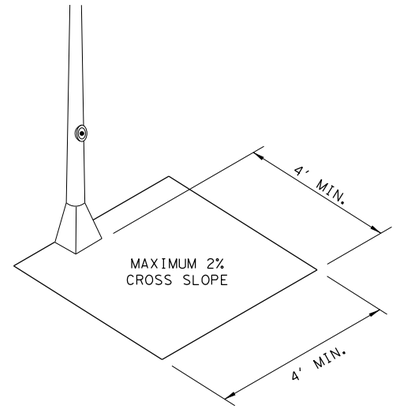
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



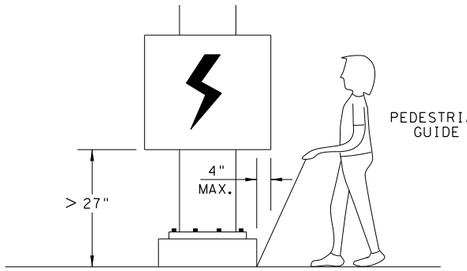
PLAN VIEW

PLACEMENT OF STREET FIXTURES

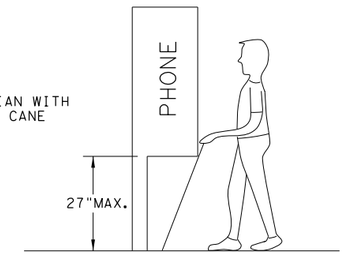
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION 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 ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

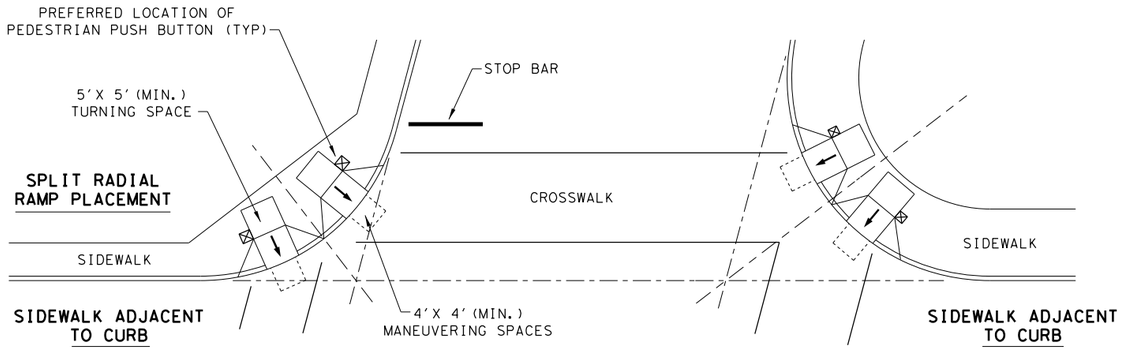
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046, ETC	US 180, ETC
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		146

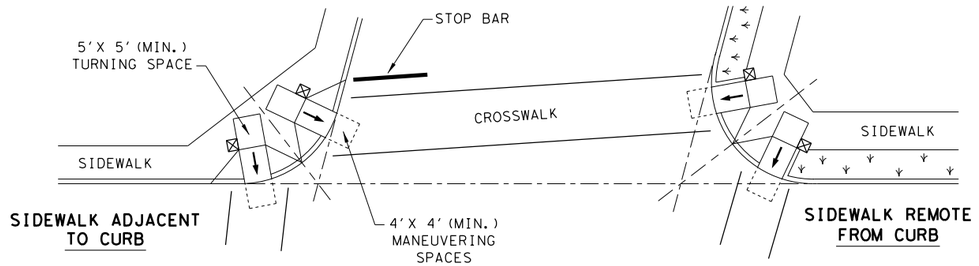
DATE: 10/27/2021
FILE: c:\pw-of\pw-of-prod\andrea.flores@aguirre-fields.com\dms18857\ped18 (1).dgn

TYPICAL CROSSING LAYOUTS

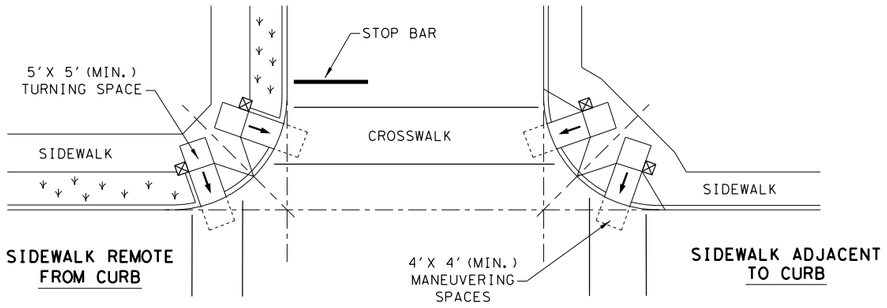
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



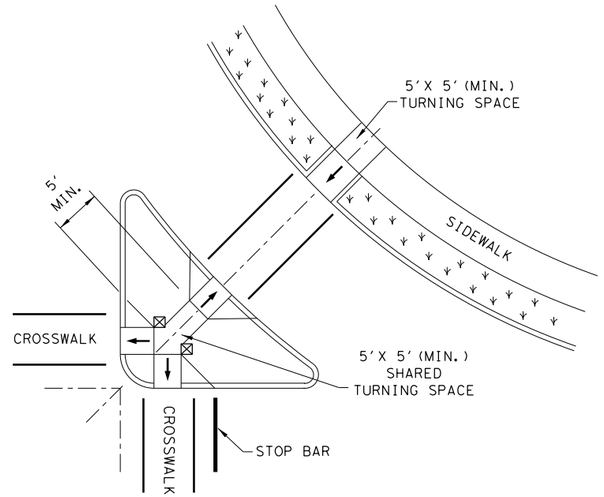
SKEWED INTERSECTION WITH "LARGE" RADIUS



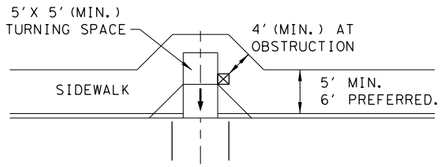
SKEWED INTERSECTION WITH "SMALL" RADIUS

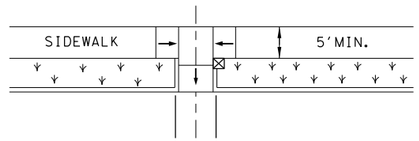


NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND





MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

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

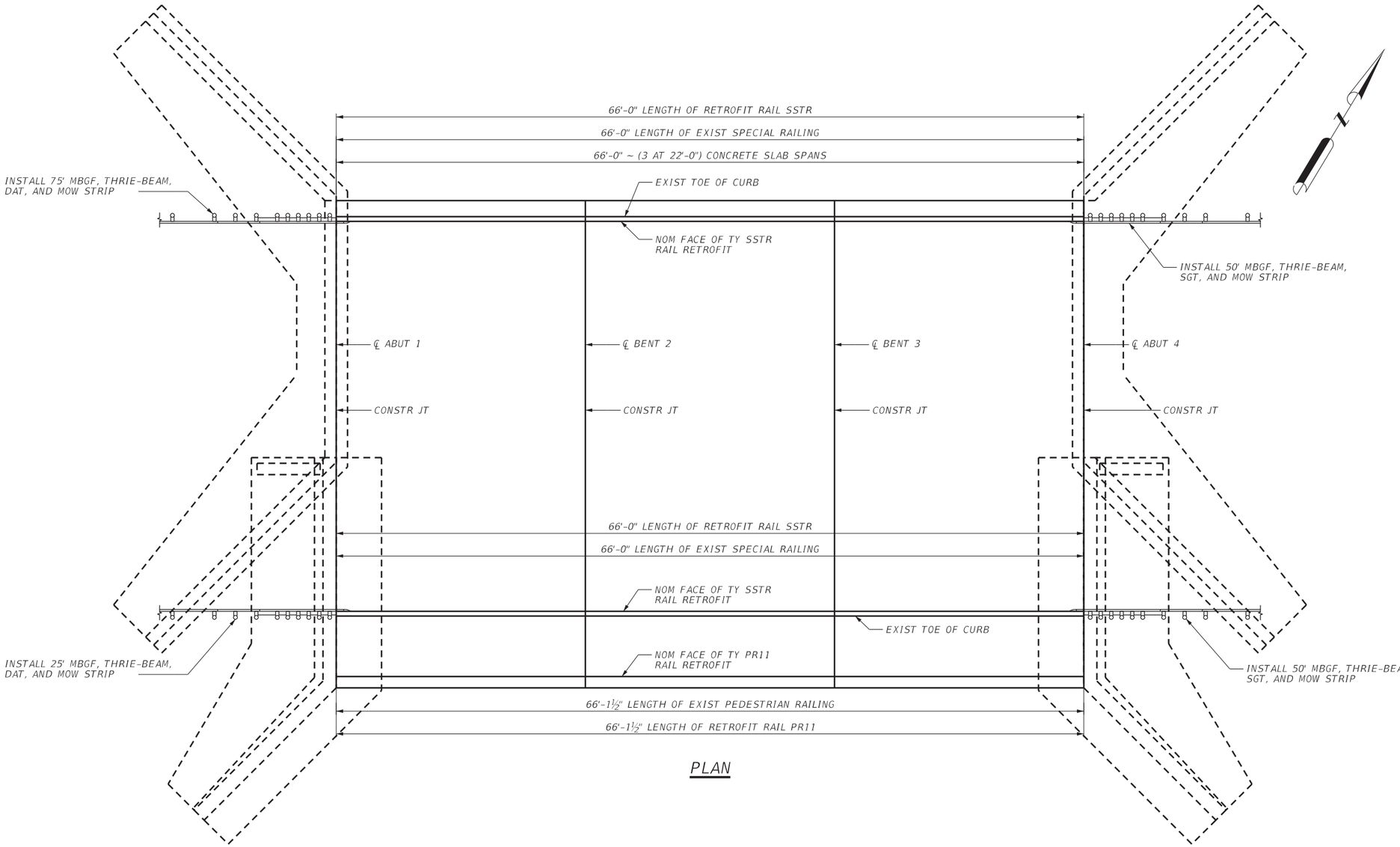
DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0008	01	046, ETC		US 180, ETC
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	FTW	PALO PINTO			147



PLAN

GENERAL NOTES:

1. SHOWING LOCATIONS OF ANCHOR BARS IN A RETROFITTED RAIL CONDITION. SEE TYPE PR11 & SSTR RAIL STANDARDS FOR NOTES AND DETAILS NOT SHOWN.
2. USE CLASS "C" CONCRETE.
3. ALL REINFORCING MUST BE GRADE 60.
4. REMOVE EXISTING RAIL, CUT AND GRIND ANCHOR BOLTS AND PAINT ENDS WITH TWO COATS OF ZINC-RICH PAINT CONFORMING TO THE ITEM "GALVANIZING".
6. PAYMENT FOR REMOVAL OF EXISTING BRIDGE RAIL COMPONENTS IS SUBSIDIARY TO ITEM 451 "RETROFIT RAILING".
7. LAYOUT BASED ON AS-BUILT DRAWINGS. CONTRACTOR TO VERIFY AND ADJUST AS REQ'D FOR FIELD CONDITIONS.
8. SEE WB PR11 & SSTR RAIL RETROFIT DETAILS FOR ANCHORAGE DETAILS.

ESTIMATED QUANTITIES

ITEM	451	451	
BID CODE	6024	6066	EXISTING RAIL (REMOVAL) *
DESCRIPTION	RETROFIT RAIL (TY SSTR)	RETROFIT RAIL (TY PR11)	
UNIT	LF	LF	LF
US 180 WB OVER POLLARD CK (NBI #: 14-227-0-0113-13-079)	132.0	66.1	198.1
TOTAL	132.0	66.1	198.1

* FOR CONTRACTORS INFORMATION ONLY

STATE OF TEXAS
Y. GANJANATHAVAT
124183
LICENSED PROFESSIONAL ENGINEER
10/29/21

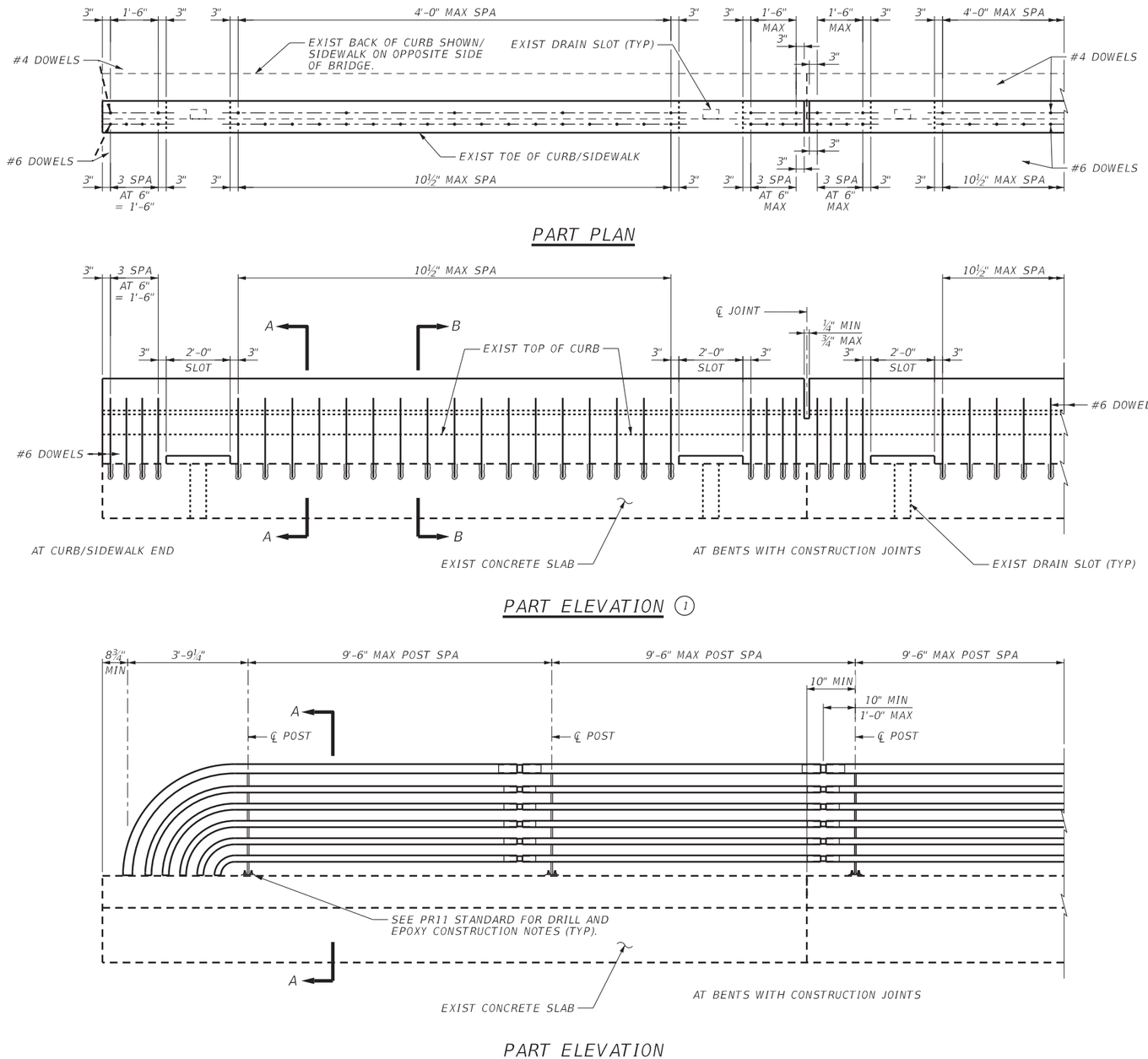
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB OVER POLLARD CREEK PR11 & SSTR RAIL RETROFIT LAYOUT

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	148
0008	01	046,ETC	



GENERAL NOTES:

1. SHOWING LOCATIONS OF ANCHOR BARS AND RAIL POSTS IN A RETROFITTED RAIL CONDITION. SEE TYPE PR11 AND SSTR RAIL STANDARDS FOR NOTES AND DETAILS NOT SHOWN.
2. USE CLASS "C" CONCRETE.
3. ALL REINFORCING MUST BE GRADE 60.
4. BAR DIMENSIONS AS SHOWN ARE TO CENTER OF BAR.
5. REMOVE EXISTING RAIL, CUT AND GRIND EXISTING REINFORCING STEEL AND PAINT ENDS WITH TWO COATS OF ZINC-RICH PAINT CONFORMING TO THE ITEM "GALVANIZING".
6. PAYMENT FOR REMOVAL OF EXISTING BRIDGE RAIL COMPONENTS IS SUBSIDIARY TO ITEM 451 "RETROFIT RAILING".
7. DETAILS BASED ON AS-BUILT DRAWINGS. CONTRACTOR TO VERIFY AND ADJUST AS REQ'D FOR FIELD CONDITIONS.

(1) SHOWING SPACING OF (#6) ANCHOR BAR EPOXY ANCHORED IN A RAIL RETROFIT CONDITION. SECONDARY (#4) ANCHOR BAR EPOXY ANCHORED IN A RAIL RETROFIT NOT SHOWN FOR CLARITY. REINFORCING STEEL AND TERMINAL CONNECTIONS NOT SHOWN FOR CLARITY. SEE TYPE SSTR RAIL STANDARD FOR DETAILS AND NOTES NOT SHOWN.

STATE OF TEXAS
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124183
LICENSED
PROFESSIONAL ENGINEER
10/29/21

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ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB OVER POLLARD CREEK PR11 & SSTR RAIL RETROFIT DETAILS

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	149
CONTROL	SECTION	JOB	
0008	01	046, ETC	

5:09:37 PM
10/27/2021
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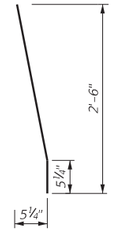
USER: default

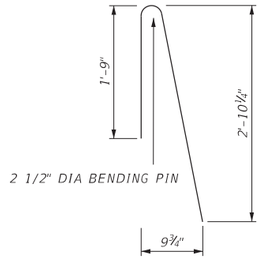
(2) EMBED (#4) ANCHOR BARS 4" WITH HILTI HIT RE500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE500 WITH THE SAME EMBEDMENT DEPTH AND ANCHOR BAR SIZE AND SPACING. FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.

(3) EMBED (#6) ANCHOR BARS 5¼" WITH HILTI HIT RE500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE500 WITH THE SAME EMBEDMENT DEPTH AND ANCHOR BAR SIZE AND SPACING. FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.



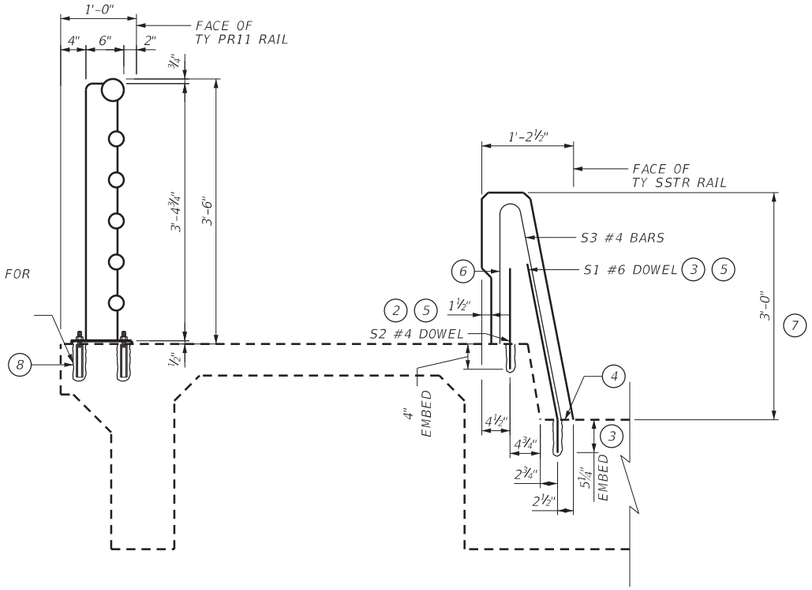
BARS S1 (#6)

BARS S2 (#4)

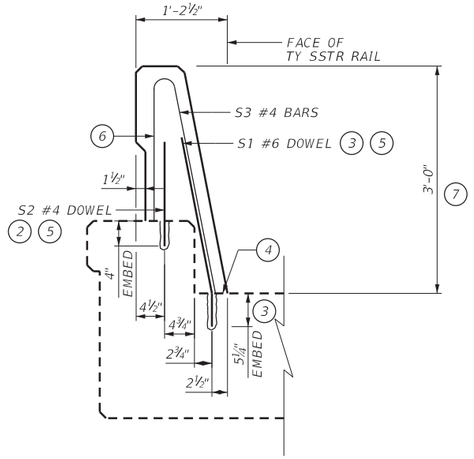


BARS S3 (#4)

SEE PR11 STANDARD FOR DRILL AND EPOXY CONSTRUCTION NOTES (TYP).



RETROFIT SECTION A-A (SIDEWALK SIDE)



RETROFIT SECTION B-B (CURB SIDE)

(4) DO NOT CAST RAIL ON TOP OF OVERLAYS/SEAL COATS. CLEAN CONCRETE SURFACE WITH ABRASIVE OR SHOT BLASTING. PROVIDE SURFACE FREE OF LOOSE DEBRIS PRIOR TO CONCRETE PLACEMENT.

(5) DOWELS REPLACE BARS U AND WU AS SHOWN IN SSTR STANDARD.

(6) SEE SSTR STANDARD FOR REINFORCING STEEL.

(7) INCREASE 2" FOR STRUCTURES WITH OVERLAY.

(8) SEE PR11 STANDARD FOR DRILL AND EPOXY CONSTRUCTION NOTES.

STATE OF TEXAS
Y. GANJANATHAVAT
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10/29/21

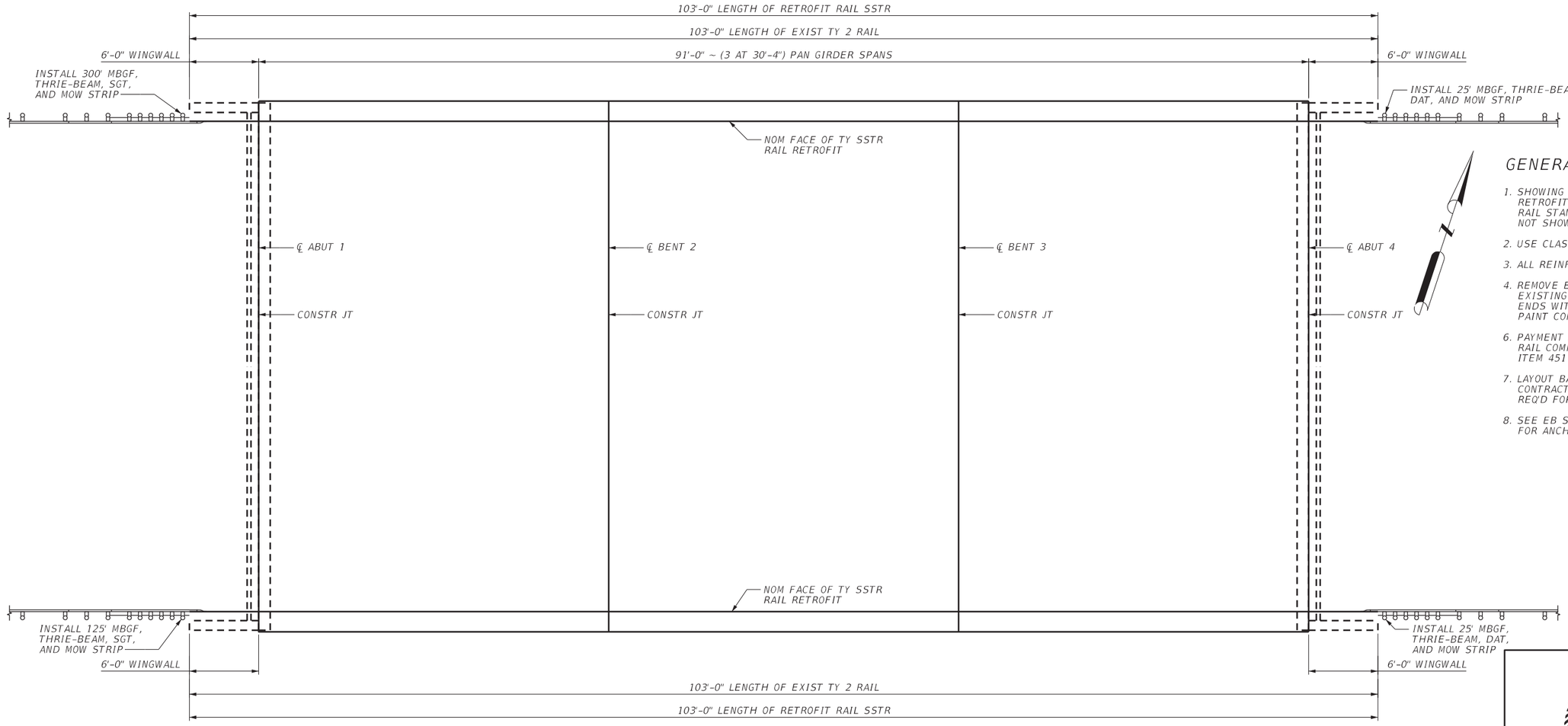
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 WB OVER POLLARD CREEK PR11 & SSTR RAIL RETROFIT DETAILS

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	150
CONTROL	SECTION	JOB	
0008	01	046, ETC	



PLAN

GENERAL NOTES:

1. SHOWING LOCATIONS OF ANCHOR BARS IN A RETROFITTED RAIL CONDITION. SEE TYPE SSTR RAIL STANDARDS FOR NOTES AND DETAILS NOT SHOWN.
2. USE CLASS "C" CONCRETE.
3. ALL REINFORCING MUST BE GRADE 60.
4. REMOVE EXISTING RAIL, CUT AND GRIND EXISTING REINFORCING STEEL AND PAINT ENDS WITH TWO COATS OF ZINC-RICH PAINT CONFORMING TO THE ITEM "GALVANIZING".
6. PAYMENT FOR REMOVAL OF EXISTING BRIDGE RAIL COMPONENTS IS SUBSIDIARY TO ITEM 451 "RETROFIT RAILING".
7. LAYOUT BASED ON AS-BUILT DRAWINGS. CONTRACTOR TO VERIFY AND ADJUST AS REQ'D FOR FIELD CONDITIONS.
8. SEE EB SSTR RAIL RETROFIT DETAILS FOR ANCHORAGE DETAILS.

ESTIMATED QUANTITIES

ITEM	451	
BID CODE	6024	EXISTING RAIL (REMOVAL) *
DESCRIPTION	RETROFIT RAIL (TY SSTR)	
UNIT	LF	LF
US 180 EB OVER POLLARD CK (NBI #: 02-182-0-0007-10-079)	206.0	206.0
TOTAL	206.0	206.0

* FOR CONTRACTORS INFORMATION ONLY

STATE OF TEXAS
Y. GANJANATHAVAT
124183
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10/29/21

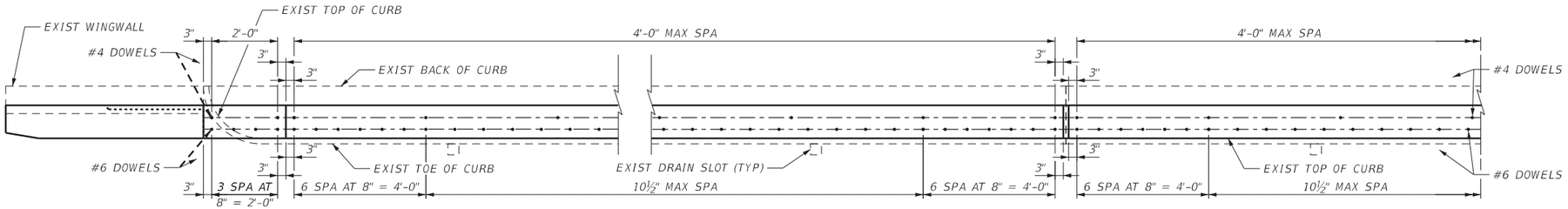
AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

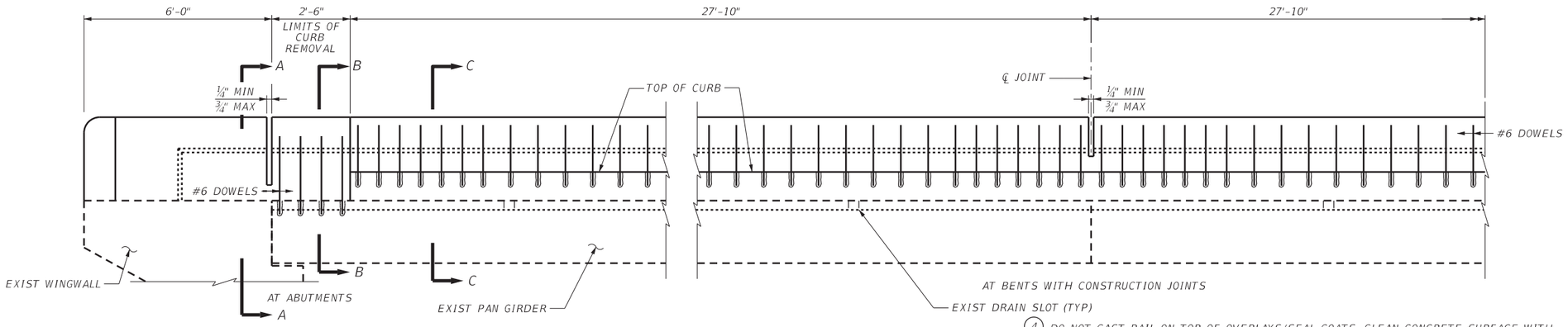
US 180 EB OVER POLLARD CREEK SSTR RAIL RETROFIT LAYOUT

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	151
CONTROL	SECTION	JOB	
0008	01	046,ETC	



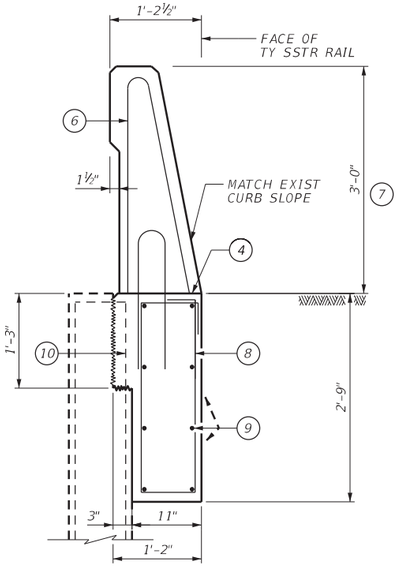
PART PLAN



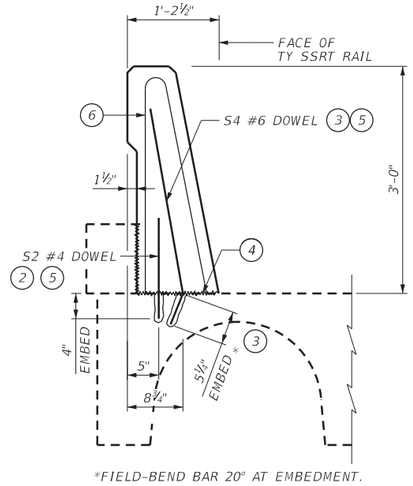
PART ELEVATION (1)

(2) EMBED (#4) ANCHOR BARS 4" WITH HILTI HIT RE500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE500 WITH THE SAME EMBEDMENT DEPTH AND ANCHOR BAR SIZE AND SPACING. FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.

(3) EMBED (#6) ANCHOR BARS 5½" WITH HILTI HIT RE500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE500 WITH THE SAME EMBEDMENT DEPTH AND ANCHOR BAR SIZE AND SPACING. FOLLOW MANUFACTURER'S DIRECTIONS FOR INSTALLING THE EPOXIED ANCHOR BARS.

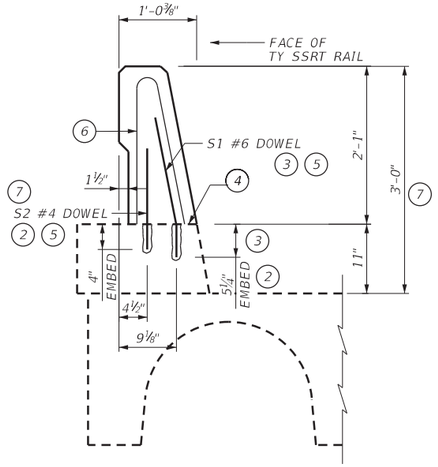


RETROFIT SECTION A-A



*FIELD-BEND BAR 20° AT EMBEDMENT.

RETROFIT SECTION B-B



RETROFIT SECTION C-C

(4) DO NOT CAST RAIL ON TOP OF OVERLAYS/SEAL COATS. CLEAN CONCRETE SURFACE WITH ABRASIVE OR SHOT BLASTING. PROVIDE SURFACE FREE OF LOOSE DEBRIS PRIOR TO CONCRETE PLACEMENT.

(5) DOWELS REPLACE BARS U AND WU AS SHOWN IN SSTR STANDARD.

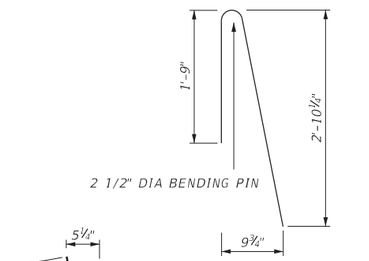
(6) SEE SSTR STANDARD FOR REINFORCING STEEL.

(7) INCREASE 2" FOR STRUCTURES WITH OVERLAY.

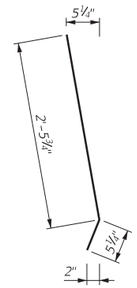
(8) SPACE BARS SF (#4) AT 8" MAX (SPACED 3 ¼" LONGITUDINALLY FROM RETROFITTED ENDS OF WINGWALL).

(9) 8 ~ (#5) BARS WITH 3" END COVER.

(10) CLEAN EXPOSED EXISTING STIRRUPS FOR NEW CONSTRUCTION.



BARS S3 (#4)

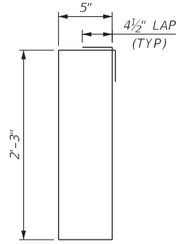


BARS S4 (#6)

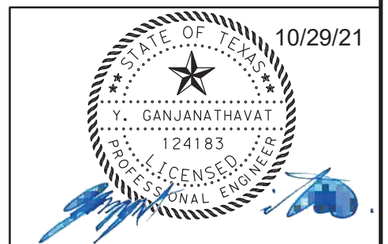
GENERAL NOTES:

1. SHOWING LOCATIONS OF ANCHOR BARS IN A RETROFITTED RAIL CONDITION. SEE TYPE SSTR RAIL STANDARD FOR NOTES AND DETAILS NOT SHOWN.
2. USE CLASS "C" CONCRETE.
3. ALL REINFORCING MUST BE GRADE 60.
4. BAR DIMENSIONS AS SHOWN ARE TO CENTER OF BAR.
5. REMOVE EXISTING RAIL, CUT AND GRIND EXISTING REINFORCING STEEL AND PAINT ENDS WITH TWO COATS OF ZINC-RICH PAINT CONFORMING TO THE ITEM "GALVANIZING".
6. PAYMENT FOR REMOVAL OF EXISTING BRIDGE RAIL COMPONENTS IS SUBSIDIARY TO ITEM 451 "RETROFIT RAILING".
7. DETAILS BASED ON AS-BUILT DRAWINGS. CONTRACTOR TO VERIFY AND ADJUST AS REQ'D FOR FIELD CONDITIONS.

(1) SHOWING SPACING OF (#6) ANCHOR BAR EPOXY ANCHORED IN A RAIL RETROFIT CONDITION. SECONDARY (#4) ANCHOR BAR EPOXY ANCHORED IN A RAIL RETROFIT NOT SHOWN FOR CLARITY. REINFORCING STEEL AND TERMINAL CONNECTIONS NOT SHOWN FOR CLARITY. SEE TYPE SSTR RAIL STANDARD FOR DETAILS AND NOTES NOT SHOWN.



BARS SF (#4)



AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

US 180 EB OVER POLLARD CREEK SSTR RAIL RETROFIT DETAILS

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	SEE TITLE SHEET		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	152
CONTROL	SECTION	JOB	
0008	01	046,ETC	

DATE: 10/27/2021 5:10:17 PM
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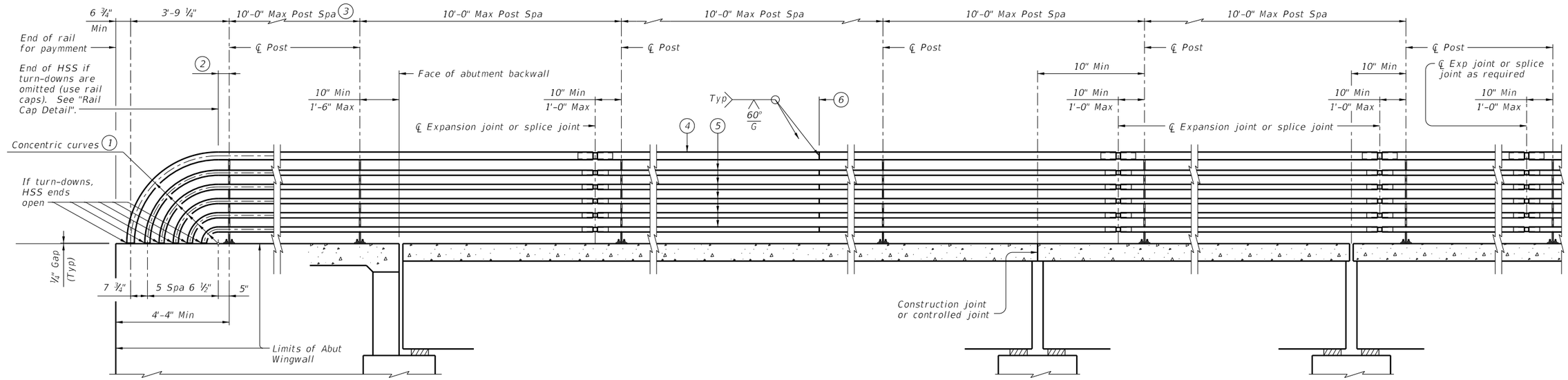
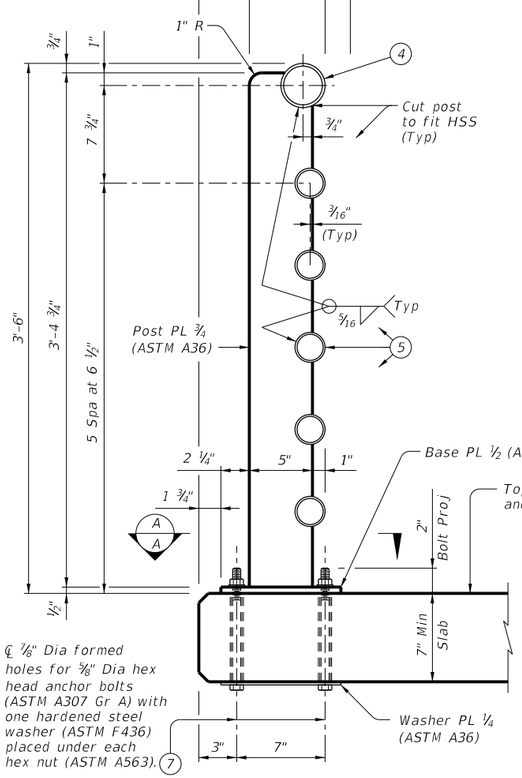


AT ABUTMENTS

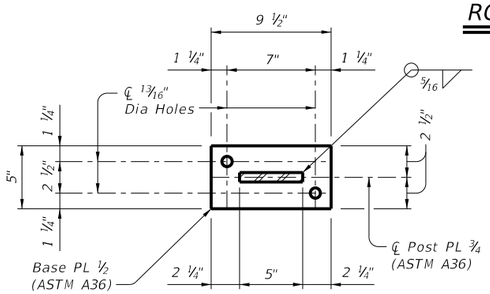
AT BENTS WITHOUT SLAB EXP JOINTS

AT BENTS WITH SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

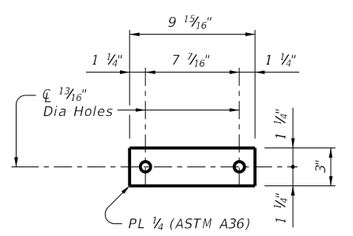


ON BRIDGE SLAB

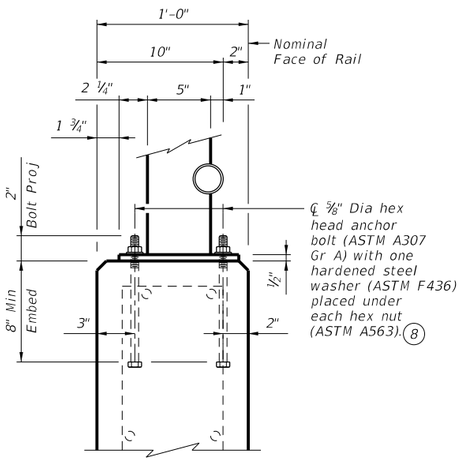


SECTION A-A

Showing base plate detail.

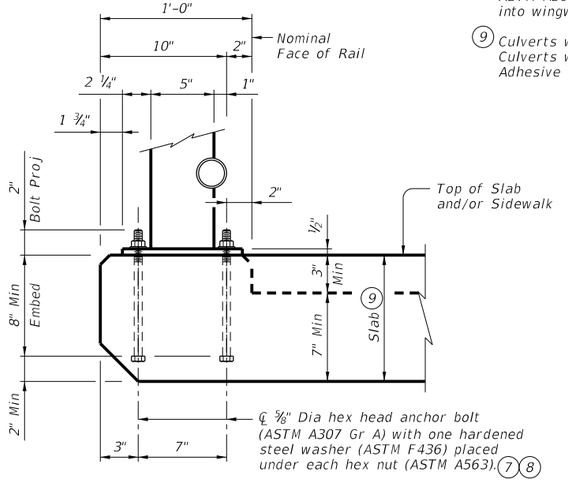


WASHER PLATE DETAIL



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

SECTIONS THRU RAIL



ON CULVERTS WITH OR WITHOUT CURBS

Used with 1'-0" Min thick parallel wings on culverts.

(1) Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.

(2) 10" Min ~ 1'-6" Max if turn-downs are omitted.

(3) Min of 2 posts required on wingwall.

(4) HSS 3.500 x 0.216 (Rail Member)

(5) HSS 2.375 x 0.154 (Rail Member)

(6) One shop splice per panel is permitted (with minimum 85 percent penetration). The weld may be square groove or single vee groove. Grind smooth.

(7) At Contractor's option, adhesive anchors may be used. Adhesive anchors must be ⅝" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 5" into slabs or culverts without curbs. See "Material Notes" for adhesive anchor requirements.

(8) At Contractor's option, adhesive anchors may be used. Adhesive anchors must be ⅝" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 7" into wingwalls or culverts with curbs. See "Material Notes" for adhesive anchor requirements.

(9) Culverts without curbs for cast-in-place anchor bolts require a 10" Min slab thickness. Culverts with curbs for cast-in-place anchor bolts require a curb plus slab thickness of 10" Min. Adhesive anchors may be used with a 7" Min slab thickness or culverts with curbs.

Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR11

FILE: rlstd028-19.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046, ETC	US 180, ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		153

DATE: 10/27/2021 5:10:17 PM
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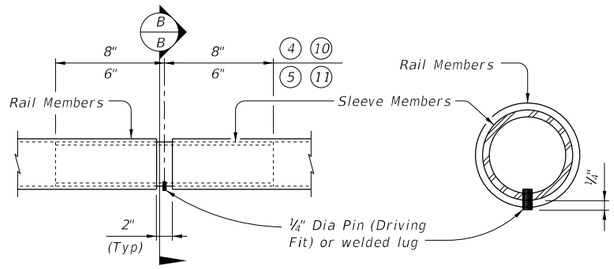
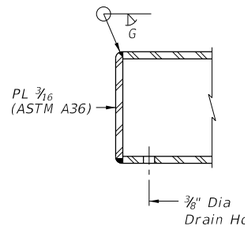


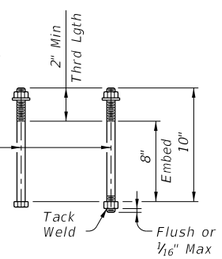
AT SPLICES OR EXP JTS SECTION B-B

PIPE SPLICE DETAIL



RAIL CAP DETAIL

℄ ⅝" Dia hex head anchor bolt or threaded rod (ASTM A307 Gr A) with one hardened steel washer (ASTM F436) placed under each hex nut (ASTM A563). One additional hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

④ HSS 3.500 x 0.216 (Rail Member)
⑤ HSS 2.375 x 0.154 (Rail Member)
⑩ HSS 2.875 x 0.203 (Sleeve Member)
⑪ HSS 1.900 x 0.145 (Sleeve Member)

CONSTRUCTION NOTES:

Panel lengths of railing must be attached to a minimum of three posts except at abutment wingwalls.

At the Contractor's option anchor bolts may be an adhesive anchorage system. See "Material Notes".

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.

Face of rail and posts must be vertical transversely unless otherwise approved. Posts must be perpendicular to adjacent roadway grade. Use Type VIII epoxy mortar under post base plates if gaps larger than $\frac{1}{16}$" exist.

For curved railing applications, fabricate the HSS rail to the radius when the radius is 600' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval.

Round or chamfer all exposed edges of steel components $\frac{1}{16}$" by grinding prior to galvanizing.

MATERIAL NOTES:

Provide ASTM A500 Gr B, A1085 or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A with one hardened steel washer (ASTM F436) placed under each hex nut or ASTM A307 Gr A threaded rods with one tack welded hex nut each and with one hex nut with one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436). Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into slab, wingwalls, or culvert curbs using a Type III, Class C, D, E, or F anchor adhesive. Anchor adhesive chosen must be able to achieve a nominal bond strength in tension, Na, of a single anchor of 10 kips (edge distance 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".

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

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.

For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval.

Average weight of railing is 30 plf.

Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR11

FILE: r1std028-19.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		154

DATE: 10/27/2021 5:10:26 PM
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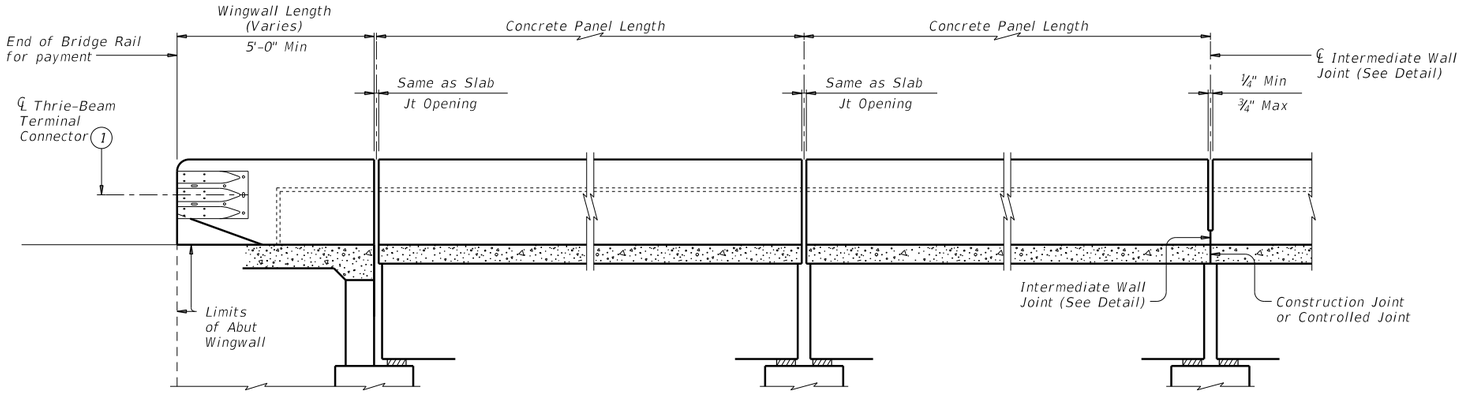
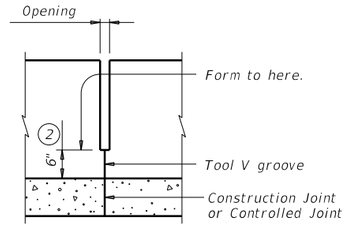


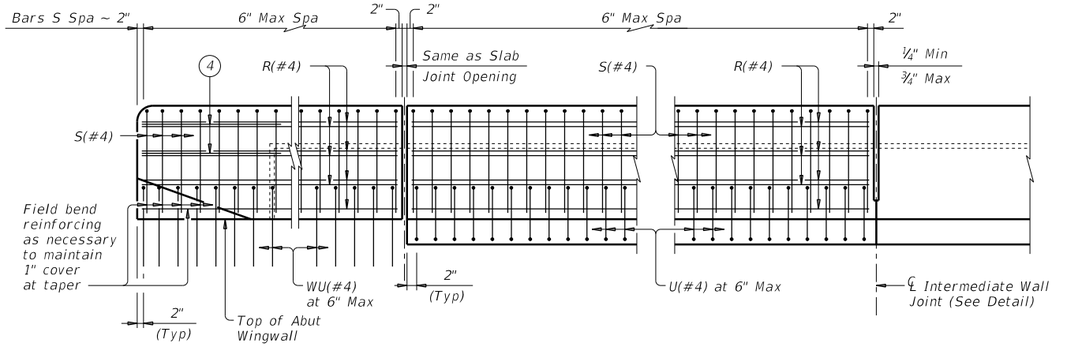
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

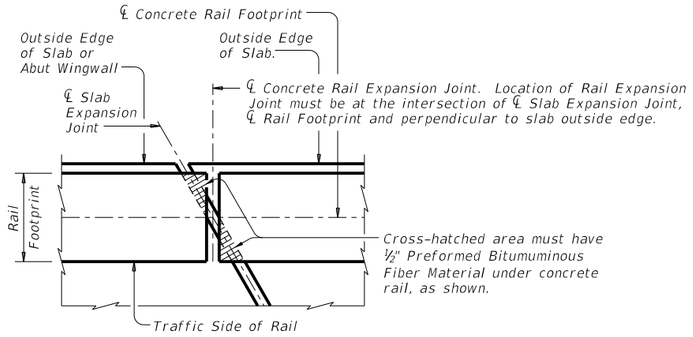


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



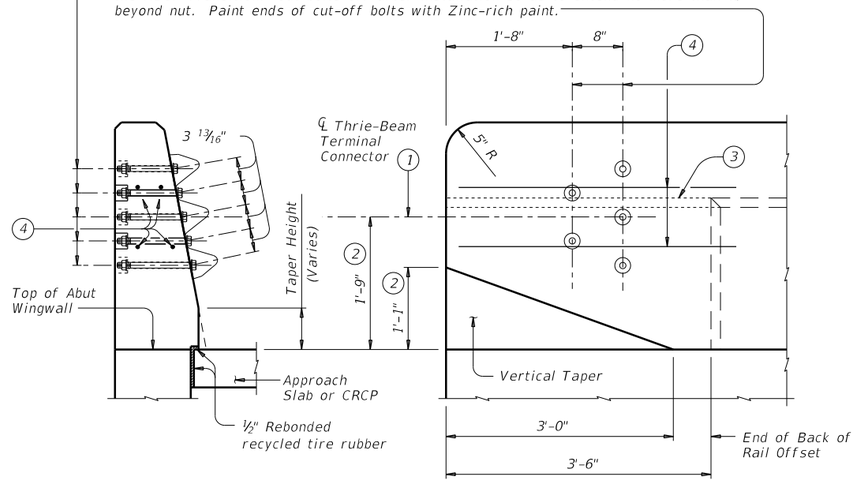
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		155

DATE: 10/27/2021 5:10:27 PM
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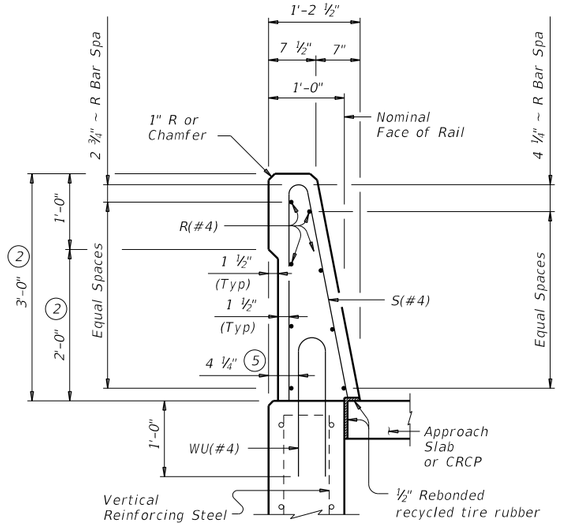
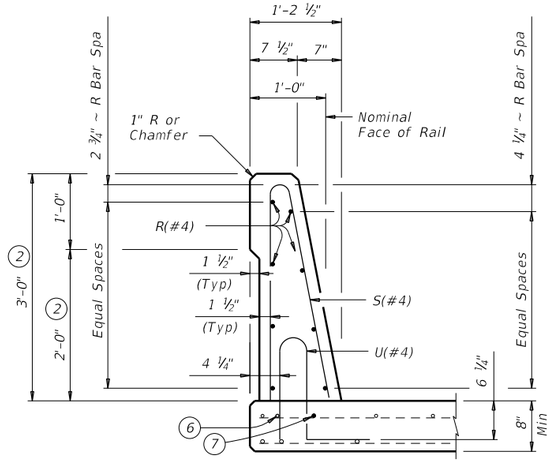


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greator to side slot drain.

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 ⅜" width x ¼" 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 ~ #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.

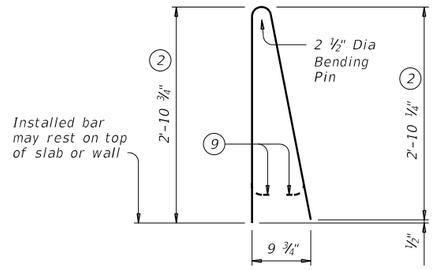
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

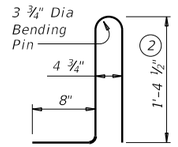
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

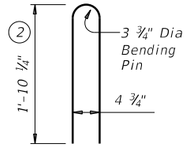
Reinforcing bar dimensions shown are out-to-out of bar.



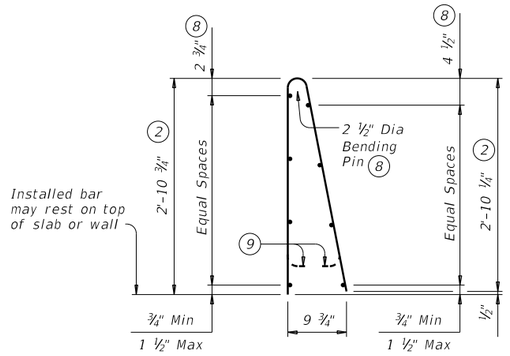
BARS S (#4)



BARS U (#4)

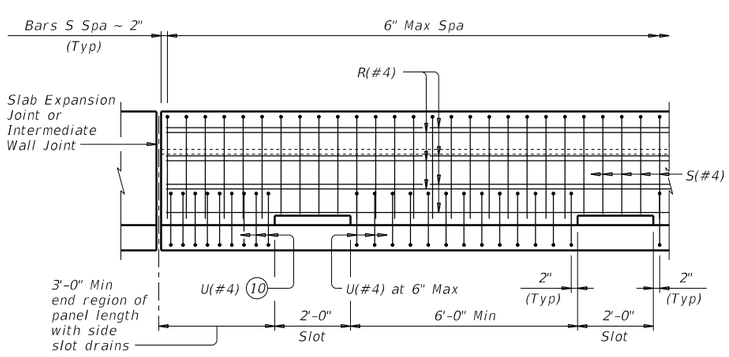


BARS WU (#4)

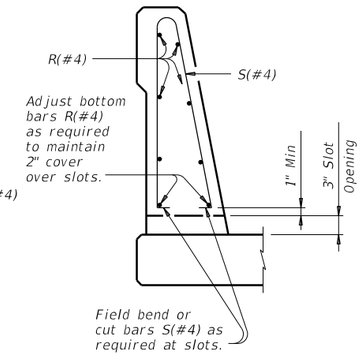


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

SHEET 2 OF 2

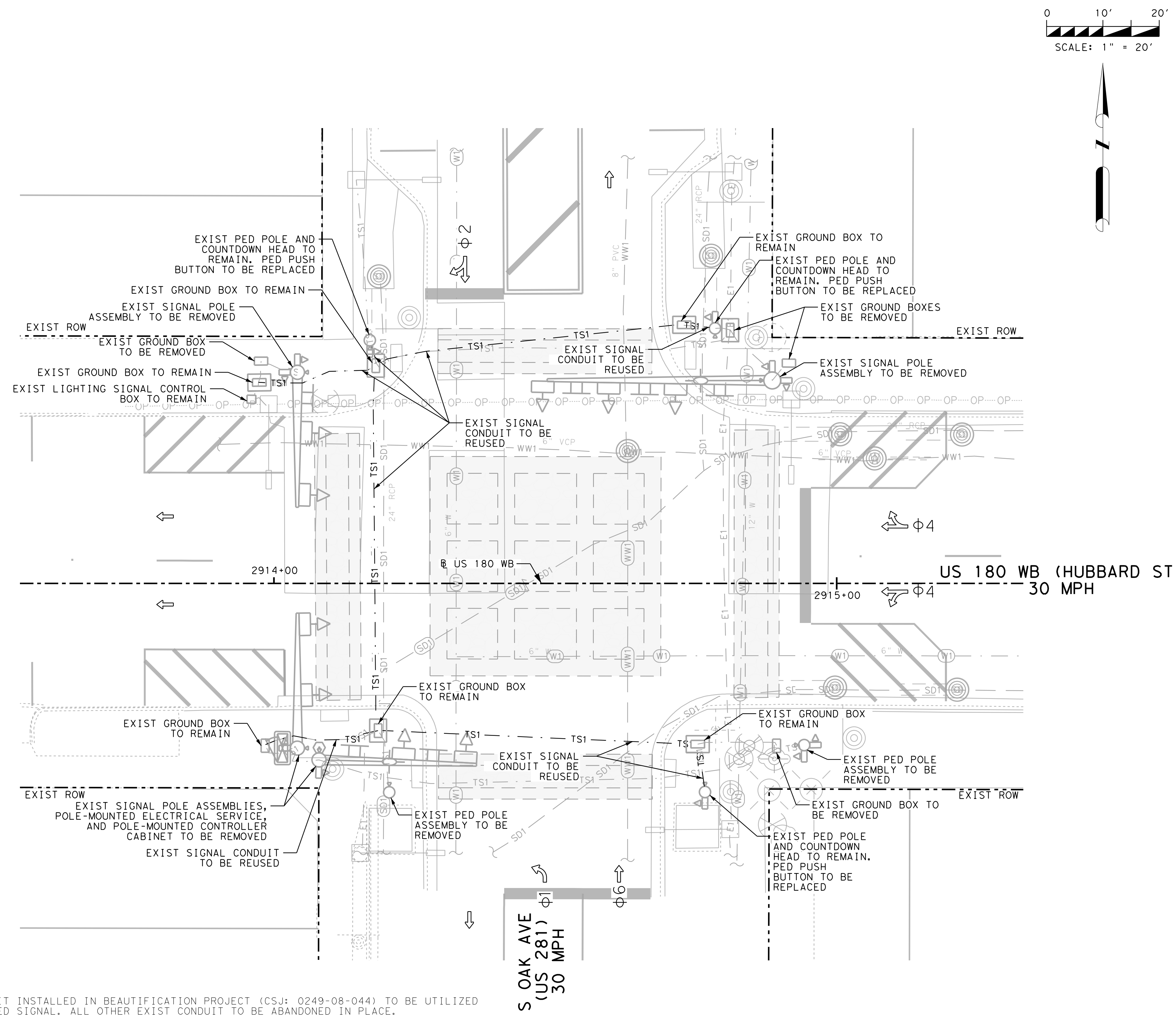
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		156



LEGEND

- EXIST CONTROLLER CABINET
- EXIST ELECTRICAL SERVICE
- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST GROUND BOX TYPE D
- EXIST HORIZONTAL TRAFFIC SIGNAL HEAD
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST MAST ARM AND POLE
- EXIST LUMINAIRE
- EXIST PEDESTRIAN PUSH BUTTON
- EXIST MAST ARM MOUNTED SIGN
- EXIST VIVDS DETECTOR
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- OP EXIST OH POWER LINE
- XX EXIST UG QLC/QLD LINE
- XX EXIST UG QLB LINE
- TS1 EXIST UG SIGNAL CABLE (TXDOT)
- TS1 EXIST UG SIGNAL BORE TO BE REUSED
- W1 EXIST UG WATER (MINERAL WELLS)
- WW1 EXIST UG SANITARY SEWER (MINERAL WELLS)
- SD1 EXIST UG STORM DRAIN (TXDOT)
- E1 EXIST UG ELECTRIC (TXDOT)
- G1 EXIST UG GAS (TX GAS)
- C1 EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])

NOTES:

1. NEW CONDUIT INSTALLED IN BEAUTIFICATION PROJECT (CSJ: 0249-08-044) TO BE UTILIZED IN PROPOSED SIGNAL. ALL OTHER EXIST CONDUIT TO BE ABANDONED IN PLACE.
2. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
3. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
4. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED
PROFESSIONAL ENGINEER

November 1, 2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr, Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

Texas Department of Transportation

EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 WB (HUBBARD ST) AT S OAK AVE(US 281)

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	157
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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10/28/2021
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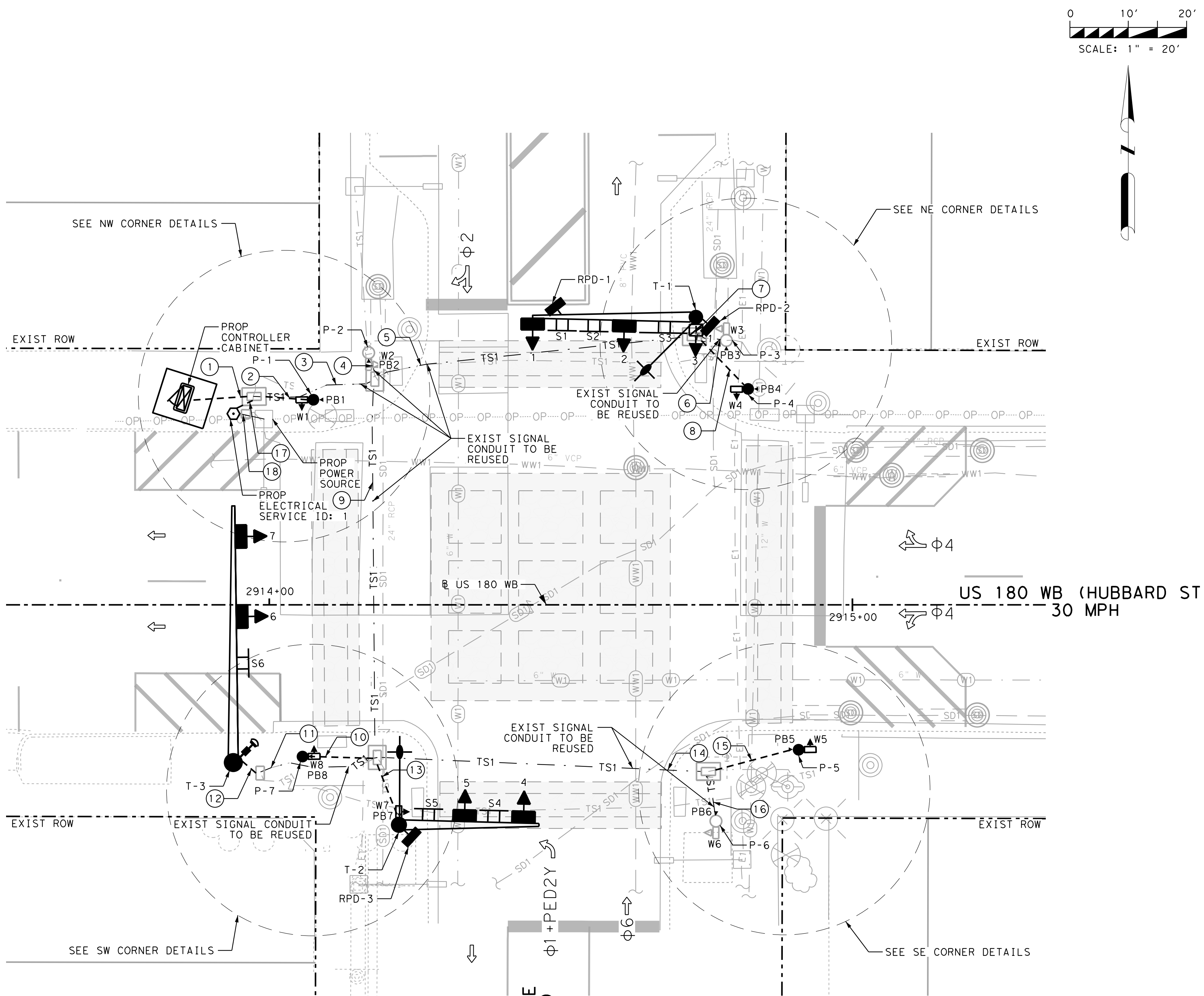

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- OP — OP — EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- XX — EXIST UG QLB LINE
- TS1 — EXIST UG SIGNAL CABLE (TXDOT)
- TS1 — EXIST UG SIGNAL CONDUIT TO BE REUSED
- W1 — EXIST UG WATER (MINERAL WELLS)
- WW1 — EXIST UG SANITARY SEWER (MINERAL WELLS)
- SD1 — EXIST UG STORM DRAIN (TXDOT)
- E1 — EXIST UG ELECTRIC (TXDOT)
- G1 — EXIST UG GAS (TX GAS)
- C1 — EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOTES:

1. LOCATION OF EXIST SIGNAL EQUIPMENT IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY LOCATIONS AND CONNECTIONS.
2. EXISTING CONDUIT RUNS TO BE EVALUATED FOR REUSE BY CONTRACTOR.
3. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr, Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

Texas Department of Transportation

PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 WB (HUBBARD ST)
AT S OAK AVE(US 281)

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	158
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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11/2/2021
c:\pw-af\pw-af-prod\kristopher holder\dms18864\WB US180_SG_N Oak Ave_Prop Layout.dgn
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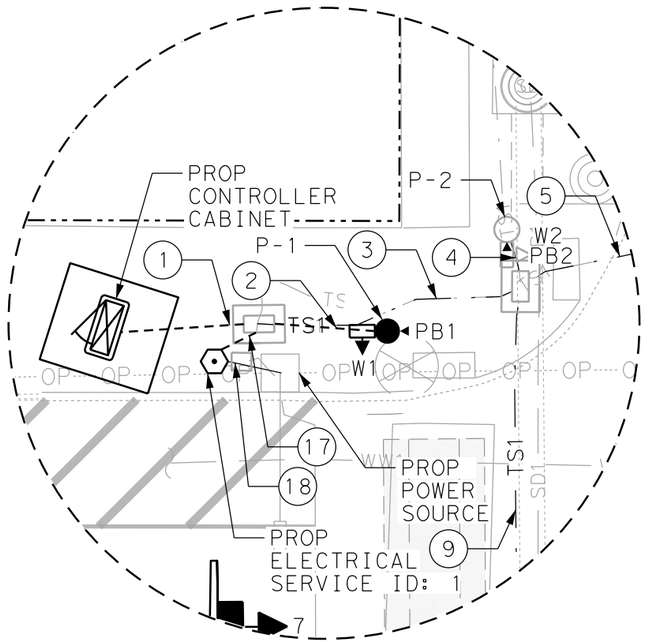
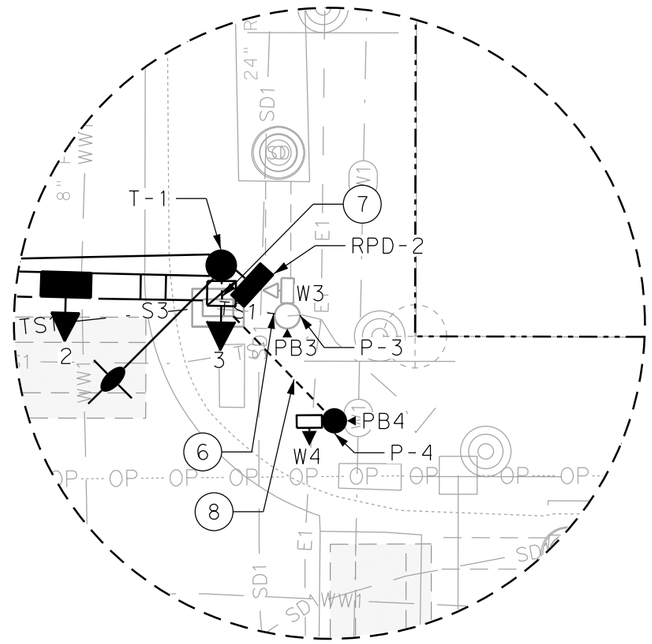
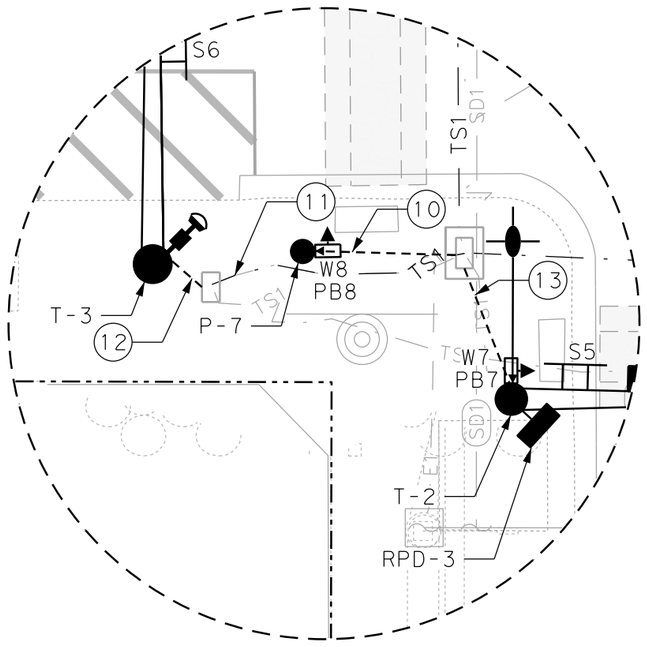


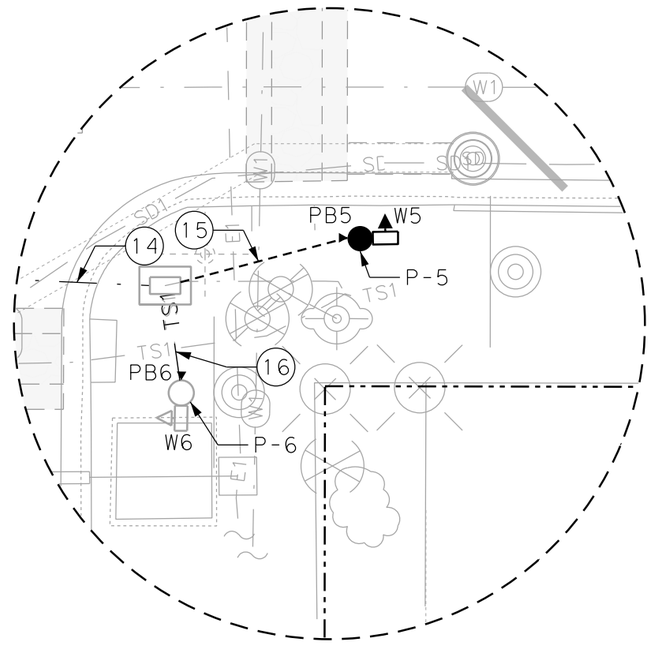
NW CORNER DETAILS



NE CORNER DETAILS



SW CORNER DETAILS



SE CORNER DETAILS

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED
PROFESSIONAL ENGINEER
11/2/2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr. Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

PROPOSED TRAFFIC SIGNAL LAYOUT DETAILS

US 180 WB (HUBBARD ST)
AT S OAK AVE(US 281)

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	159
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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11/2/2021
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CONDUIT SCHEDULE													
RUN NO.	NO. OF CONDUIT BY SIZE 2 (IN)	3 (IN)	4 (IN)	LENGTH (LF)	BORE(B) TRENCH(T) EXIST(E) OVERHEAD(OH)	1C#6 AWG XHHW	1C#6 AWG BARE	2C#12 AWG APS	4C#12 AWG LUMINAIRE	7C#14 AWG PED HEAD	16C#14 AWG SIGNAL	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
1			2	10	T	2	2	8		7	3	3	1
2			1	10	T		1	1		1			
3	1			20	E		1	7	2	6	3	3	1
4	1			5	E		1	1		1			
5		1		55	E		1	2	1	2	1	2	
6	1			10	E		1	1		1			
7			1	5	T		1		1		1	2	
8			1	15	T		1	1		1			
9		1		65	E		1	4	1	3	2	1	1
10			1	15	T		1	1		1			
11	1			25	E		1				1		1
12			1	5	T		1				1		1
13			1	10	T		1	1	1		1	1	
14		1		55	E		1	2		2			
15			1	15	T		1	1		1			
16	1			10	E		1	1		1			
17			1	5	T	2	1		2				
18		OVERHEAD		5	OH								
NET ADDITIONAL CABLE TOTALS (LF)						30	345	790	185	685	320	285	125

CONDUIT TOTALS (LF)	
4" TRENCH	100
4" BORE	

NOTE:
1. THIS CONDUIT SCHEDULE DOES NOT REFLECT THE QUANTITIES OF CABLE INSIDE THE POLES (I.E. 5C#14 & 7C#14 FOR SIGNAL HEADS AND 4C#12 TRAY CABLE FOR LUMINAIRES). THE CONTRACTOR SHALL INSTALL A MULE TAPE IN ALL CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).

POLE AND ARM WIRING						
POLE NO.	2C#12 AWG APS	4C#12 AWG LUMINAIRE	5C#14 AWG SIGNAL (3-SEC)	7C#14 AWG SIGNAL (4-SEC & PED HEAD)	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
T-1		40	55	50	65	
T-2	5	40	80		20	
T-3			110			25
P-1	5			10		
P-2	5			10		
P-3	5			10		
P-4	5			10		
P-5	5			10		
P-6	5			10		
P-7	5			10		
TOTAL (LF)	40	80	245	120	85	25

NOTES:
**RPD CABLE TO BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6046.

***CCTV CABLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6010.

POLE SCHEDULE														
POLE NUMBER	T-1			T-2			T-3		P-1	P-2	P-3	P-4	P-5	P-6	P-7
POLE STATUS	PROP			PROP			PROP		PROP	EXIST	EXIST	PROP	PROP	EXIST	PROP
MAST ARM LENGTH (FT)	28			24			44		PED	PED	PED	PED	PED	PED	PED
FOUNDATION TYPE	30-A			30-A			36-A		24-A	24-A	24-A	24-A	24-A	24-A	24-A
LUMINAIRES	YES			YES			NO		NO	NO	NO	NO	NO	NO	NO
MAST ARM SIGNS	S1, S2, S3			S4, S5			S6		NO	NO	NO	NO	NO	NO	NO
SIGNAL/PED HEAD NO.	1	2	3	4	5	W7	6	7	W1	W2	W3	W4	W5	W6	W8
LED SIGNAL INDICATIONS	<-R <-Y <-FY <-G	R Y G	R Y G	R Y G	R Y G	DW W	R Y G	R Y G	DW W	DW W	DW W	DW W	DW W	DW W	DW W

NOTE: ALL PROPOSED SIGNAL LENS ARE 12 INCH IN SIZE

MINIMUM PEDESTRIAN TIMING				
PED PHASE	SIGNAL HEAD NO.	WALK TIME (SEC)	FLASHING DON'T WALK TIME (SEC)	TOTAL PED TIMING (SEC)
PHASE 2 W	W1, W8	7	14	21
PHASE 4 W	W2, W3, W6, W7	7	12	19
PHASE 6 W	W4, W5	7	13	20

ELECTRICAL SERVICE												
ELECTRICAL SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
1	158	ELC SRV TY D 120/240 060 (NS) SS (E) SP (O)	1 1/4"	3/#6	N/A	2P/60	N/A	100	TRAFFIC SIGNAL ILLUMINATION	1P/30 2P/15	24.0 1.42	3.2

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 WB (HUBBARD ST)
AT S OAK AVE(US 281)

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	160
0008	01	046, ETC	

PROPOSED SIGNS

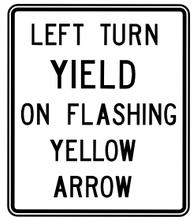
S2

R6-1L
54X18

S4

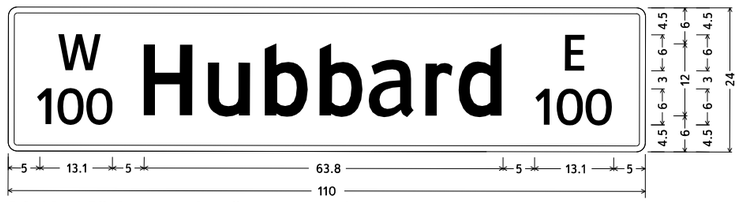
R6-1R
54X18

S1



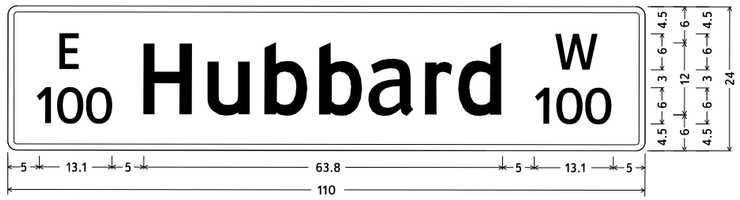
R10-17T
36X42

S3



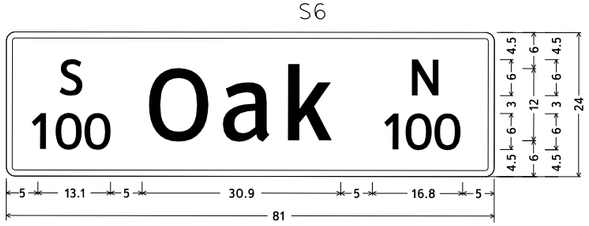
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[W] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[Hubbard] White ClearviewHwy-3-W; [E] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

S5



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[E] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[Hubbard] White ClearviewHwy-3-W; [W] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

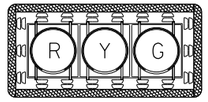
S6



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[S] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[Oak] White ClearviewHwy-3-W; [N] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

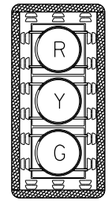
PROPOSED SIGNAL SCHEDULE

3-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



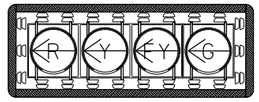
SIGNAL HEADS
2, 4, 5, 6, 7

3-SECTION, 12" VERTICAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEAD 3

4-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEAD 1

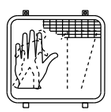
APS PUSH BUTTON
R10-3ER(9"X15")

PB2, PB6, PB8

APS PUSH BUTTON
R10-3EL(9"X15")

PB1, PB3, PB4, PB5, PB7

LED COUNTDOWN
PEDESTRIAN
SIGNAL HEAD



W1, W4, W5, W7, W8

NOT TO SCALE

November 1, 2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 WB (HUBBARD ST)
AT S OAK AVE(US 281)

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	161
0008	01	046, ETC	

CABLE TERMINATION CHART

CNDR. NO.	CONDR. COLOR	CABLE 1 FROM T-1 TO CNTRL. 16 CNDR.	CABLE 2 FROM T-2 TO CNTRL. 16 CNDR.	CABLE 3 FROM T-3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P-1 TO CNTRL. 7 CNDR.	CABLE 5 FROM P-2 TO CNTRL. 7 CNDR.	CABLE 6 FROM P-3 TO CNTRL. 7 CNDR.	CABLE 7 FROM P-4 TO CNTRL. 7 CNDR.	CABLE 8 FROM P-5 TO CNTRL. 7 CNDR.	CABLE 9 FROM P-6 TO CNTRL. 7 CNDR.	CABLE 10 FROM P-7 TO CNTRL. 7 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	S. COM	S. COM	S. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM
3	RED	SG 2,3 PH 6 R	SG 4,5 PH 2 R	SG 6,7 PH 4 R	W1 PH 2 DW	W2 PH 4 DW	W3 PH 4 DW	W4 PH 6 DW	W5 PH 6 DW	W6 PH 4 DW	W8 PH 2 DW
4	GREEN	SG 2,3 PH 6 G	SG 4,5 PH 2 G	SG 6,7 PH 4 G	W1 PH 2 W	W2 PH 4 W	W3 PH 4 W	W4 PH 6 W	W5 PH 6 W	W6 PH 4 W	W8 PH 2 W
5	ORANGE	SG 2,3 PH 6 Y	SG 4,5 PH 2 Y	SG 6,7 PH 4 Y	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
6	BLUE	SPARE	W7 PH 4 W	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/ BLACK	SPARE	W7 PH 4 DW	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/ BLACK	SG 1 PH 1 <-R	SPARE	SPARE							
9	GREEN/ BLACK	SG 1 PH 1 <-G	SPARE	SPARE							
10	ORANGE/ BLACK	SG 1 PH 1 <-Y	SPARE	SPARE							
11	BLUE/ BLACK	SG 1 PED2Y <-FY	SPARE	SPARE							
12	BLACK/ WHITE	SPARE	SPARE	SPARE							
13	RED/ WHITE	SPARE	SPARE	SPARE							
14	GREEN/ WHITE	SPARE	SPARE	SPARE							
15	BLUE/ WHITE	SPARE	SPARE	SPARE							
16	BLACK/ RED	SPARE	SPARE	SPARE							

CABLE TERMINATION CHART

CNDR. NO.	CONDR. COLOR		CABLE 11 FROM T-2 TO CNTRL. 2 CNDR.		CABLE 12 FROM P-1 TO CNTRL. 2 CNDR.	CABLE 13 FROM P-2 TO CNTRL. 2 CNDR.	CABLE 14 FROM P-3 TO CNTRL. 2 CNDR.	CABLE 15 FROM P-4 TO CNTRL. 2 CNDR.	CABLE 16 FROM P-5 TO CNTRL. 2 CNDR.	CABLE 17 FROM P-6 TO CNTRL. 2 CNDR.	CABLE 18 FROM P-7 TO CNTRL. 2 CNDR.
1	BLACK		PB7 PH 4 PED. CALL		PB1 PH 2 PED. CALL	PB2 PH 4 PED. CALL	PB3 PH 4 PED. CALL	PB4 PH 6 PED. CALL	PB5 PH 6 PED. CALL	PB6 PH 4 PED. CALL	PB8 PH 2 PED. CALL
2	WHITE		PED. COM		PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM

RPD PRESENSE DETECTION

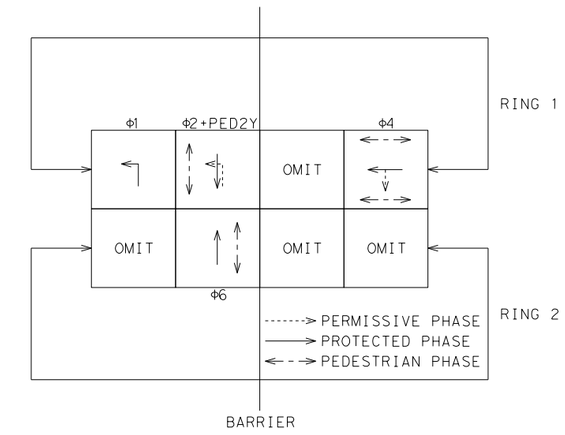
CLICK 656

SENSOR 1	PH2		RPD 1
SENSOR 2	PH4		RPD 2
SENSOR 3	PH1	PH6	RPD 3
SENSOR 4			
SENSOR 5			
SENSOR 6			

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT	PH1	PH2		PH4L		PH6		
MATRIX OUTPUT CHANNEL	1	2		4		6		
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT				PH4R				
MATRIX OUTPUT CHANNEL				12				

PHASING DIAGRAM



NOTES:
- SG = SIGNAL HEAD
- W = PEDESTRIAN WALK SIGNAL
- DW = PEDESTRIAN DON'T WALK SIGNAL
- PB = PEDESTRIAN PUSH BUTTON
- <-G = GREEN ARROW
- <-Y = YELLOW ARROW
- <-FY = FLASHING YELLOW ARROW
- <-R = RED ARROW

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED
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November 1, 2021

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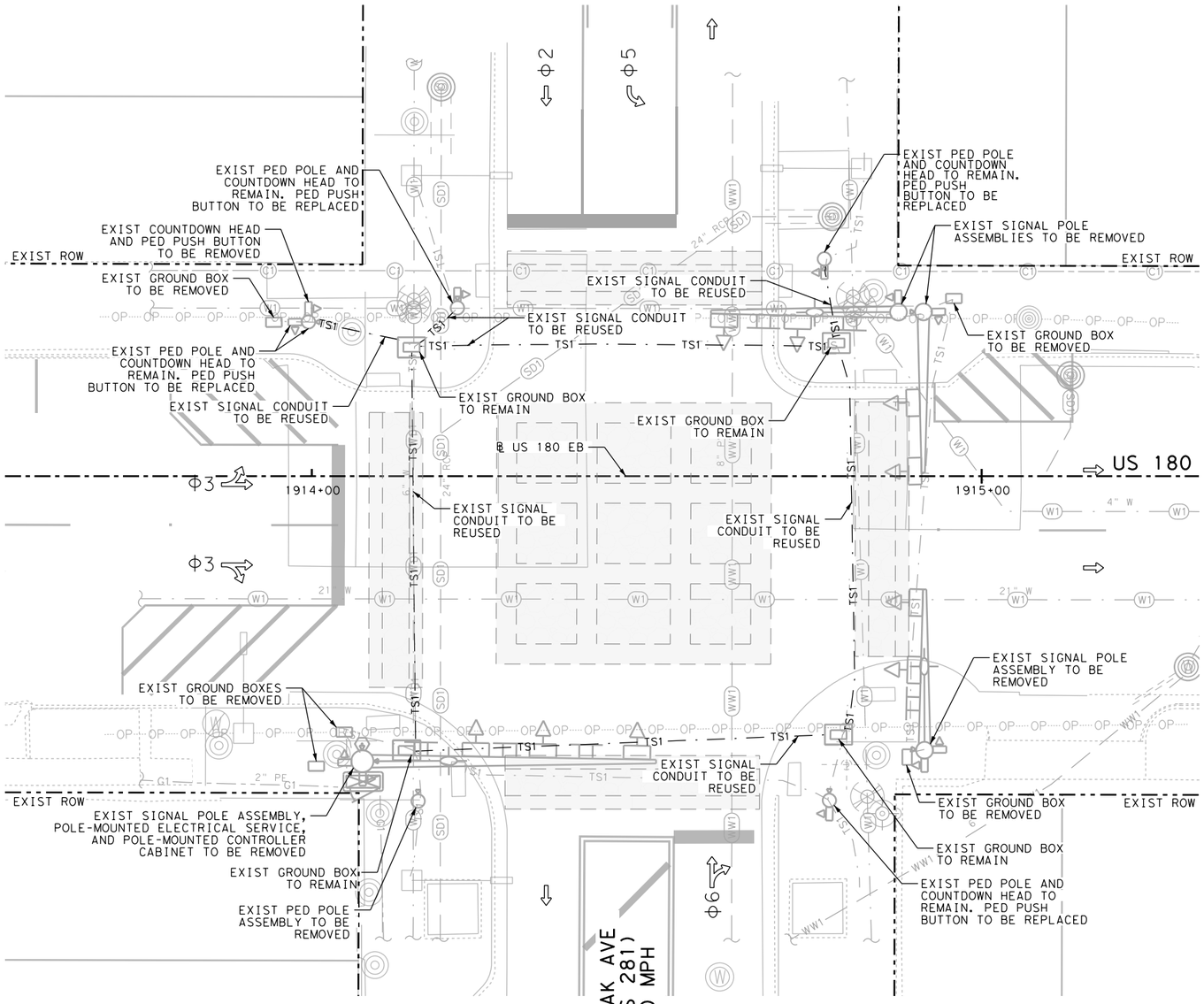
Texas Department of Transportation

TRAFFIC SIGNAL TERMINATION & PHASING

US 180 WB (HUBBARD ST)
AT S OAK AVE(US 281)

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	162
0008	01	046,ETC	



LEGEND

- EXIST CONTROLLER CABINET
- EXIST ELECTRICAL SERVICE
- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST GROUND BOX TYPE D
- EXIST HORIZONTAL TRAFFIC SIGNAL HEAD
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST MAST ARM AND POLE
- EXIST LUMINAIRE
- EXIST PEDESTRIAN PUSH BUTTON
- EXIST MAST ARM MOUNTED SIGN
- EXIST VIVDS DETECTOR
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- OP — EXIST OH POWER LINE
- XX — EXIST UG QLC/QLD LINE
- XX — EXIST UG QLB LINE
- TS1 — EXIST UG SIGNAL CABLE (TXDOT)
- TS1 — EXIST UG SIGNAL BORE TO BE REUSED
- W1 — EXIST UG WATER (MINERAL WELLS)
- WW1 — EXIST UG SANITARY SEWER (MINERAL WELLS)
- SD1 — EXIST UG STORM DRAIN (TXDOT)
- E1 — EXIST UG ELECTRIC (TXDOT)
- G1 — EXIST UG GAS (TX GAS)
- C1 — EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])

NOTES:

1. NEW CONDUIT INSTALLED IN BEAUTIFICATION PROJECT (CSJ: 0249-08-044) TO BE UTILIZED IN PROPOSED SIGNAL. ALL OTHER EXIST CONDUIT TO BE ABANDONED IN PLACE.
2. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
3. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
4. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
November 1, 2021

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Texas Department of Transportation

EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 EB (FIRST ST)
AT S OAK AVE(US 281)

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	163
0008	01	046,ETC	

USER: default
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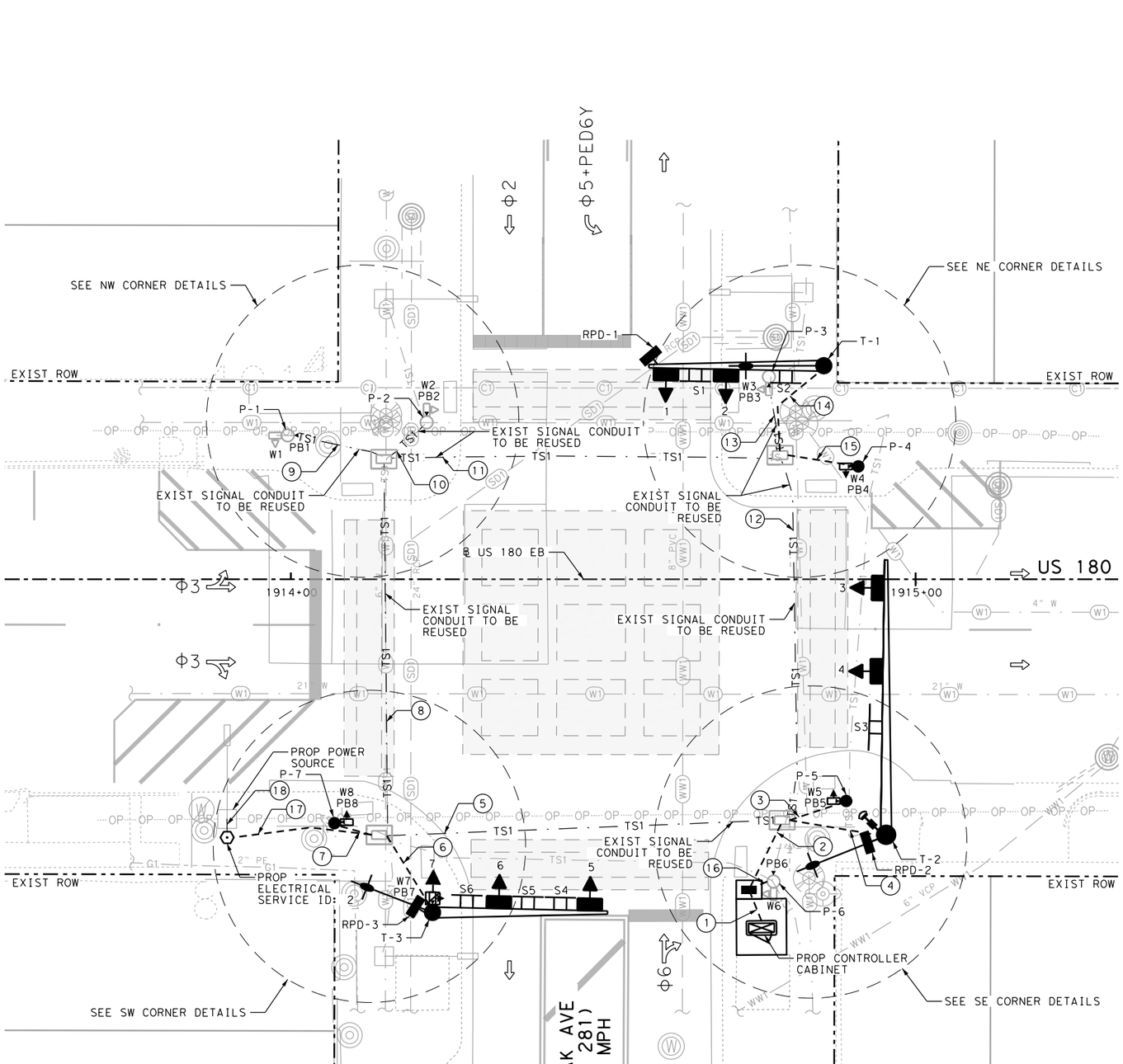

0 10′ 20′

SCALE: 1" = 20′

N

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION (PRESENCE) (RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOTES:

1. LOCATION OF EXIST SIGNAL EQUIPMENT IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY LOCATIONS AND CONNECTIONS.
2. EXISTING CONDUIT RUNS TO BE EVALUATED FOR REUSE BY CONTRACTOR.
3. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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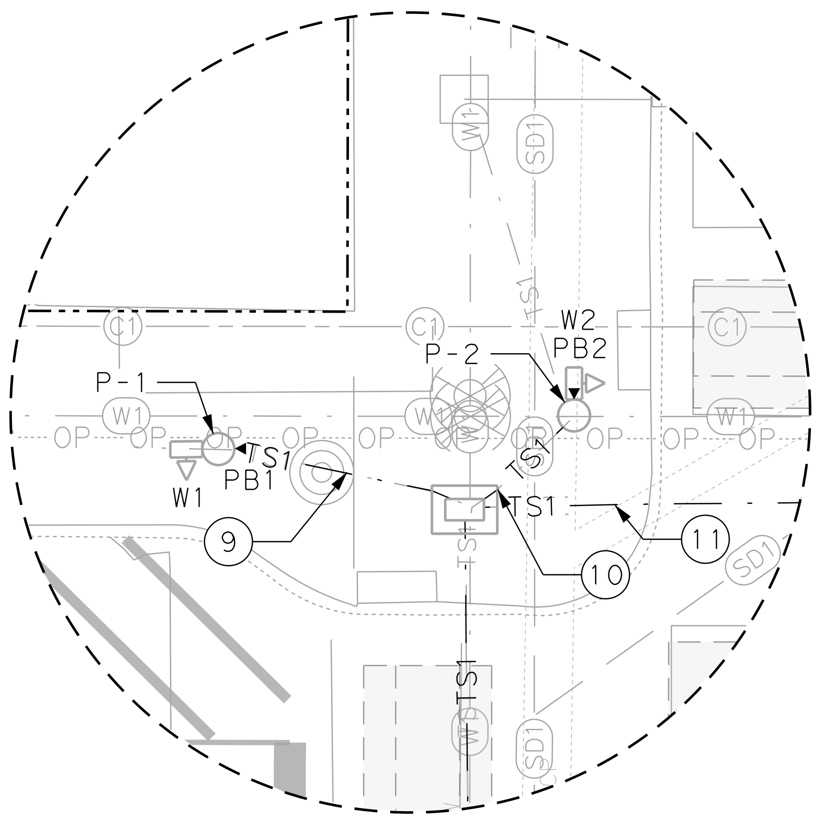
Texas Department of Transportation

PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT

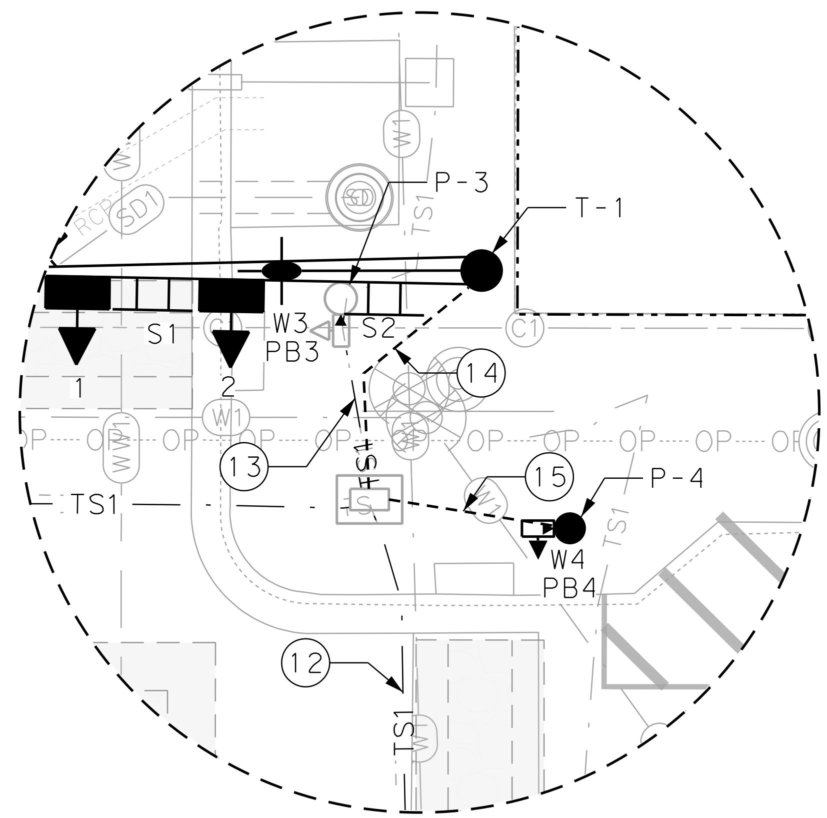
US 180 EB (FIRST ST)
AT S OAK AVE (US 281)

SHEET 1 OF 2

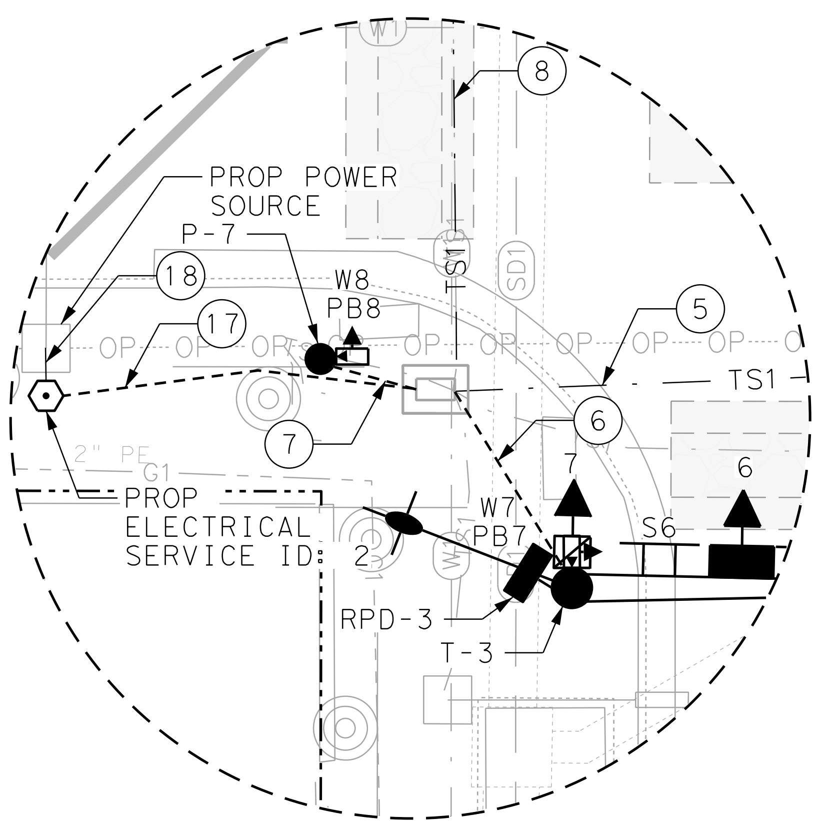
FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	164
CONTROL	SECTION	JOB	
0008	01	046, ETC	



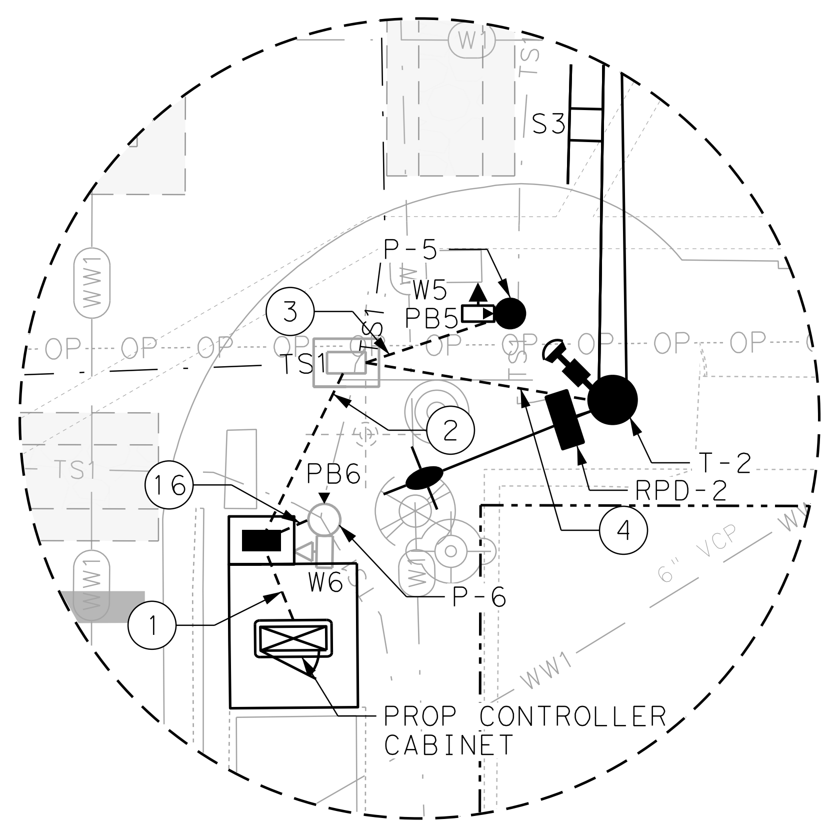
NW CORNER DETAILS



NE CORNER DETAILS



SW CORNER DETAILS



SE CORNER DETAILS

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- OP — OP — EXIST OH POWER LINE
- XX — EXIST UG QLC/QLD LINE
- XX — EXIST UG QLB LINE
- TS1 — EXIST UG SIGNAL CABLE (TXDOT)
- TS1 — EXIST UG SIGNAL CONDUIT TO BE REUSED
- W1 — EXIST UG WATER (MINERAL WELLS)
- WW1 — EXIST UG SANITARY SEWER (MINERAL WELLS)
- SD1 — EXIST UG STORM DRAIN (TXDOT)
- E1 — EXIST UG ELECTRIC (TXDOT)
- G1 — EXIST UG GAS (TX GAS)
- C1 — EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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Texas Department of Transportation

PROPOSED TRAFFIC SIGNAL LAYOUT DETAILS

US 180 EB (FIRST ST) AT S OAK AVE (US 281)

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	165
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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11/2/2021
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CONDUIT SCHEDULE													
RUN NO.	NO. OF CONDUIT BY SIZE 2 (IN)	3 (IN)	4 (IN)	LENGTH (LF)	BORE (B) TRENCH (T) EXIST (E) OVERHEAD (OH)	1C#6 AWG XHHW	1C#6 AWG BARE	2C#12 AWG APS	4C#12 AWG LUMINAIRE	7C#14 AWG PED HEAD	16C#14 AWG SIGNAL	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
1			2	10	T	2	2	8		7	3	3	1
2			1	15	T	2	1	7		6	3	3	1
3			1	10	T		1	1		1			
4			1	15	T		1		1		1	1	1
5		1		65	E	2	1	4	2	3	1	1	
6			1	15	T		1	1	1		1	1	
7			1	5	T		1	1		1			
8		1		60	E		1	2		2			
9	1			15	E		1	1		1			
10	1			10	E		1	1		1			
11		1		65	E		1						
12		1		60	E		1	2	1	2	1	1	
13	1			15	E		1	1		1			
14			1	15	T		1		1		1	1	
15			1	15	T		1	1		1			
16			1	5	T		1	1		1			
17			1	25	T	2	1		3				
18		OVERHEAD		5	OH								
NET ADDITIONAL CABLE TOTALS (LF)						230	430	775	310	670	245	245	40

CONDUIT TOTALS (LF)	
4" TRENCH	140
4" BORE	

NOTE:
1. THIS CONDUIT SCHEDULE DOES NOT REFLECT THE QUANTITIES OF CABLE INSIDE THE POLES (I.E. 5C#14 & 7C#14 FOR SIGNAL HEADS AND 4C#12 TRAY CABLE FOR LUMINAIRES). THE CONTRACTOR SHALL INSTALL A MULE TAPE IN ALL CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).

POLE AND ARM WIRING						
POLE NO.	2C#12 AWG APS	4C#12 AWG LUMINAIRE	5C#14 AWG SIGNAL (3-SEC)	7C#14 AWG SIGNAL (4-SEC & PED HEAD)	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
T-1		40	85		50	
T-2		40	110		20	30
T-3	5	40	55	60	20	
P-1	5			10		
P-2	5			10		
P-3	5			10		
P-4	5			10		
P-5	5			10		
P-6	5			10		
P-7	5			10		
TOTAL (LF)	40	120	250	130	90	30

NOTES:
**RPD CABLE TO BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6046.

***CCTV CABLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6010.

POLE SCHEDULE														
POLE NUMBER	T-1		T-2		T-3				P-1	P-2	P-3	P-4	P-5	P-6	P-7
POLE STATUS	PROP		PROP		PROP				EXIST	EXIST	EXIST	PROP	PROP	EXIST	PROP
MAST ARM LENGTH (FT)	28		44		28				PED	PED	PED	PED	PED	PED	PED
FOUNDATION TYPE	30-A		36-A		30-A				24-A	24-A	24-A	24-A	24-A	24-A	24-A
LUMINAIRES	YES		YES		YES				NO	NO	NO	NO	NO	NO	NO
MAST ARM SIGNS	S1, S2		S3		S4, S5, S6				NO	NO	NO	NO	NO	NO	NO
SIGNAL/PED HEAD NO.	1	2	3	4	5	6	7	W7	W1	W2	W3	W4	W5	W6	W8
LED SIGNAL INDICATIONS	R Y G	R Y G	R Y G	R Y G	<-R <-Y <-FY <-G	R Y G	R Y G	DW W	DW W	DW W	DW W	DW W	DW W	DW W	DW W

NOTE: ALL PROPOSED SIGNAL LENS ARE 12 INCH IN SIZE

MINIMUM PEDESTRIAN TIMING				
PED PHASE	SIGNAL HEAD NO.	WALK TIME (SEC)	FLASHING DON'T WALK TIME (SEC)	TOTAL PED TIMING (SEC)
PHASE 2 W	W1, W8	7	13	20
PHASE 3 W	W2, W3, W6, W7	7	12	19
PHASE 6 W	W4, W5	7	12	19

ELECTRICAL SERVICE												
ELECTRICAL SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
2	164	ELC SRV TY D 120/240 060 (NS) SS (E) SP (O)	1 1/4"	3/#6	N/A	2P/60	N/A	100	TRAFFIC SIGNAL ILLUMINATION	1P/30 2P/15	24.0 2.13	3.4

STATE OF TEXAS
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Texas Department of Transportation

TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 EB (FIRST ST)
AT S OAK AVE (US 281)

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	166
0908	59	0403BTC	

PROPOSED SIGNS

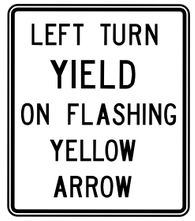
S5

R6-1L
54X18

S1

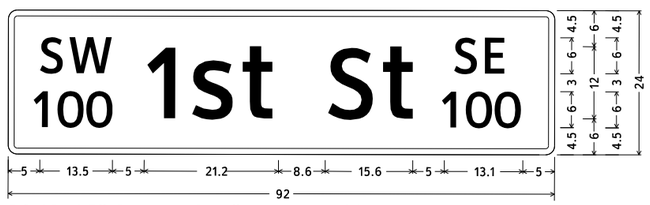
R6-1R
54X18

S4



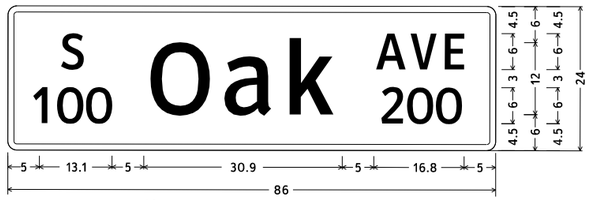
R10-17T
36X42

S2



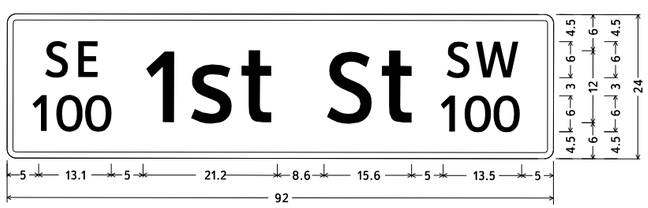
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SW] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[1st St] White ClearviewHwy-3-W; [SE] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

S3



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[S] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[Oak] White ClearviewHwy-3-W; [AVE] White ClearviewHwy-3-W;
[200] White ClearviewHwy-3-W;

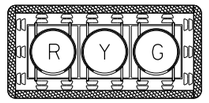
S6



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[1st St] White ClearviewHwy-3-W; [SW] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

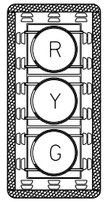
PROPOSED SIGNAL SCHEDULE

3-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



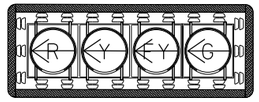
SIGNAL HEADS
1, 2, 3, 4, 6

3-SECTION, 12" VERTICAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEAD 7

4-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEAD 5

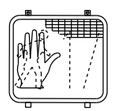
APS PUSH BUTTON
R10-3ER(9"X15")

PB4, PB6, PB8

APS PUSH BUTTON
R10-3EL(9"X15")

PB1, PB2, PB3, PB5, PB7

LED COUNTDOWN
PEDESTRIAN
SIGNAL HEAD



W4, W5, W7, W8

NOT TO SCALE

November 1, 2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 EB (FIRST ST)
AT S OAK AVE(US 281)

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	167
CONTROL	SECTION	JOB	
0008	01	046, ETC	

CABLE TERMINATION CHART											
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM T-1 TO CNTRL. 16 CNDR.	CABLE 2 FROM T-2 TO CNTRL. 16 CNDR.	CABLE 3 FROM T-3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P-1 TO CNTRL. 7 CNDR.	CABLE 5 FROM P-2 TO CNTRL. 7 CNDR.	CABLE 6 FROM P-3 TO CNTRL. 7 CNDR.	CABLE 7 FROM P-4 TO CNTRL. 7 CNDR.	CABLE 8 FROM P-5 TO CNTRL. 7 CNDR.	CABLE 9 FROM P-6 TO CNTRL. 7 CNDR.	CABLE 10 FROM P-7 TO CNTRL. 7 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	S. COM	S. COM	S. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM
3	RED	SG 1,2 PH 6 R	SG 3,4 PH 3 R	SG 6,7 PH 2 R	W1 PH 2 DW	W2 PH 3 DW	W3 PH 3 DW	W4 PH 6 DW	W5 PH 6 DW	W6 PH 3 DW	W8 PH 2 DW
4	GREEN	SG 1,2 PH 6 G	SG 3,4 PH 3 G	SG 6,7 PH 2 G	W1 PH 2 W	W2 PH 3 W	W3 PH 3 W	W4 PH 6 W	W5 PH 6 W	W6 PH 3 W	W8 PH 2 W
5	ORANGE	SG 1,2 PH 6 Y	SG 3,4 PH 3 Y	SG 6,7 PH 2 Y	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
6	BLUE	SPARE	SPARE	W7 PH 3 W	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/ BLACK	SPARE	SPARE	W7 PH 3 DW	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/ BLACK	SPARE	SPARE	SG 5 PH 5 <-R							
9	GREEN/ BLACK	SPARE	SPARE	SG 5 PH 5 <-G							
10	ORANGE/ BLACK	SPARE	SPARE	SG 5 PH 5 <-Y							
11	BLUE/ BLACK	SPARE	SPARE	SG 5 PED6Y <-FY							
12	BLACK/ WHITE	SPARE	SPARE	SPARE							
13	RED/ WHITE	SPARE	SPARE	SPARE							
14	GREEN/ WHITE	SPARE	SPARE	SPARE							
15	BLUE/ WHITE	SPARE	SPARE	SPARE							
16	BLACK/ RED	SPARE	SPARE	SPARE							

CABLE TERMINATION CHART											
CNDR. NO.	CONDR. COLOR			CABLE 11 FROM T-3 TO CNTRL. 2 CNDR.	CABLE 12 FROM P-1 TO CNTRL. 2 CNDR.	CABLE 13 FROM P-2 TO CNTRL. 2 CNDR.	CABLE 14 FROM P-3 TO CNTRL. 2 CNDR.	CABLE 15 FROM P-4 TO CNTRL. 2 CNDR.	CABLE 16 FROM P-5 TO CNTRL. 2 CNDR.	CABLE 17 FROM P-6 TO CNTRL. 2 CNDR.	CABLE 18 FROM P-7 TO CNTRL. 2 CNDR.
1	BLACK			PB7 PH 3 PED. CALL	PB1 PH 2 PED. CALL	PB2 PH 3 PED. CALL	PB3 PH 3 PED. CALL	PB4 PH 6 PED. CALL	PB5 PH 6 PED. CALL	PB6 PH 3 PED. CALL	PB8 PH 2 PED. CALL
2	WHITE			PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM

RPD PRESENSE DETECTION

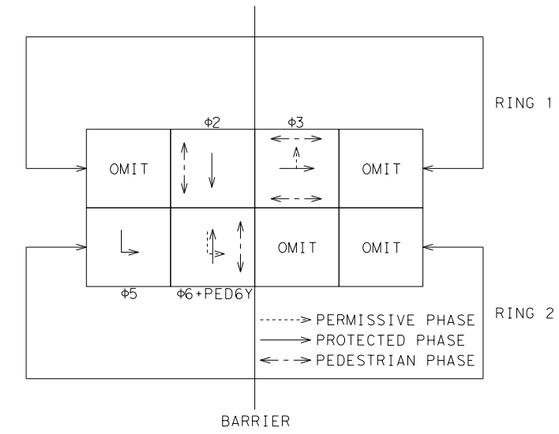
CLICK 656

SENSOR 1	PH2	PH5	RPD 1
SENSOR 2	PH6		RPD 2
SENSOR 3	PH3		RPD 3
SENSOR 4			
SENSOR 5			
SENSOR 6			

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT		PH2	PH3L		PH5	PH6		
MATRIX OUTPUT CHANNEL		2	3		5	6		
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT			PH3R					
MATRIX OUTPUT CHANNEL			11					

PHASING DIAGRAM



NOTES:
- SG = SIGNAL HEAD
- W = PEDESTRIAN WALK SIGNAL
- DW = PEDESTRIAN DON'T WALK SIGNAL
- PB = PEDESTRIAN PUSH BUTTON
- <-G = GREEN ARROW
- <-Y = YELLOW ARROW
- <-FY = FLASHING YELLOW ARROW
- <-R = RED ARROW

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER

November 1, 2021

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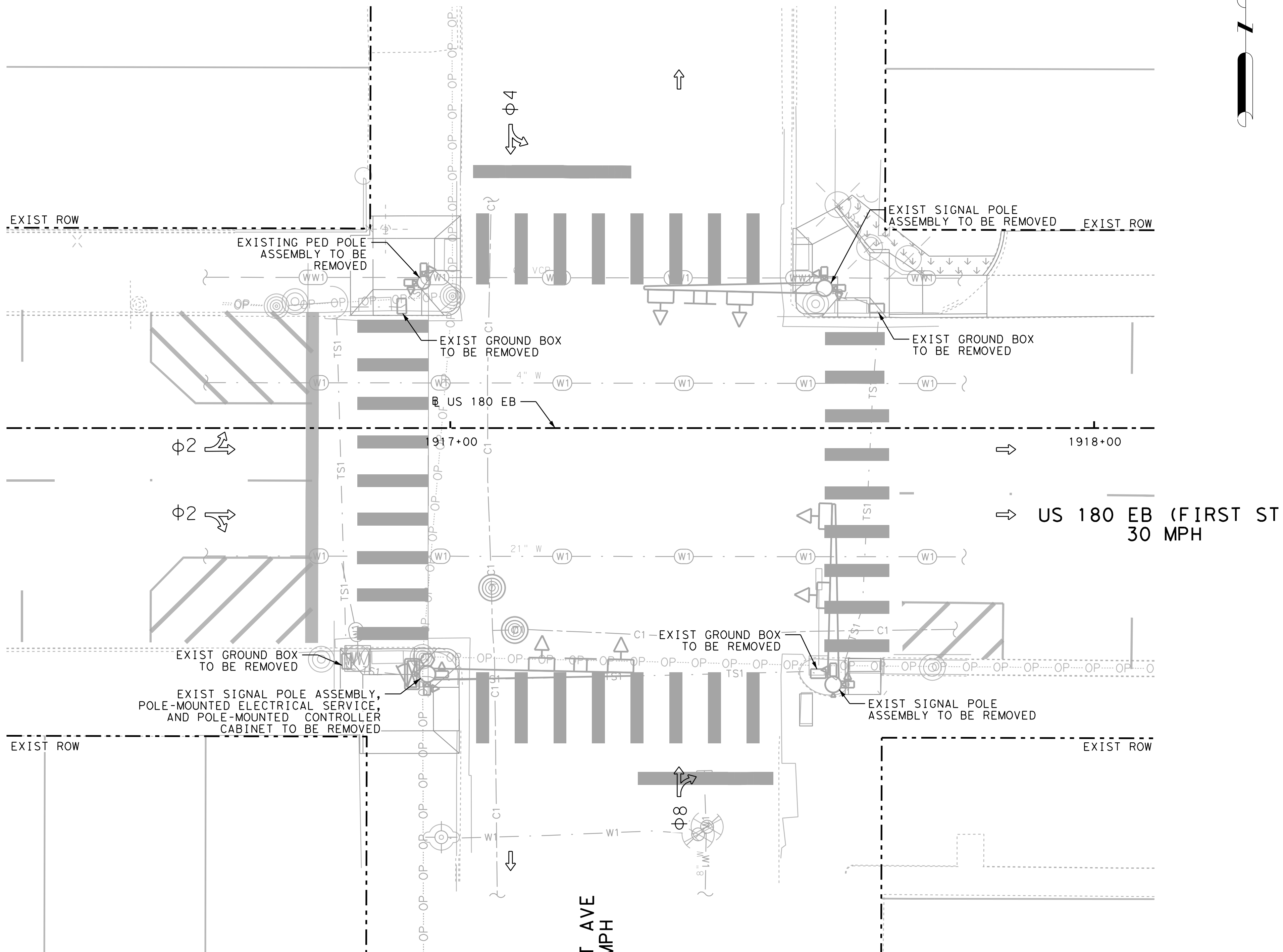
Texas Department of Transportation

TRAFFIC SIGNAL TERMINATION & PHASING

US 180 EB (FIRST ST)
AT S OAK AVE(US 281)

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	168
CONTROL	SECTION	JOB	
0008	01	046,ETC	



0 10' 20'
SCALE: 1" = 20'

LEGEND

- EXIST CONTROLLER CABINET
- EXIST ELECTRICAL SERVICE
- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST GROUND BOX TYPE D
- EXIST HORIZONTAL TRAFFIC SIGNAL HEAD
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST MAST ARM AND POLE
- EXIST LUMINAIRE
- EXIST PEDESTRIAN PUSH BUTTON
- EXIST MAST ARM MOUNTED SIGN
- EXIST VIVDS DETECTOR
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- OP····OP — EXIST OH POWER LINE
- XX — EXIST UG QLC/QLD LINE
- XX — EXIST UG QLB LINE
- TS1 — EXIST UG SIGNAL CABLE (TXDOT)
- TS1 — EXIST UG SIGNAL BORE TO BE REUSED
- W1 — EXIST UG WATER (MINERAL WELLS)
- WW1 — EXIST UG SANITARY SEWER (MINERAL WELLS)
- SD1 — EXIST UG STORM DRAIN (TXDOT)
- E1 — EXIST UG ELECTRIC (TXDOT)
- G1 — EXIST UG GAS (TX GAS)
- C1 — EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])

NOTES:

1. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
2. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
3. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
November 1, 2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr, Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

Texas Department of Transportation

EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 EB (FIRST ST) AT SE 1ST AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	169
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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10/28/2021
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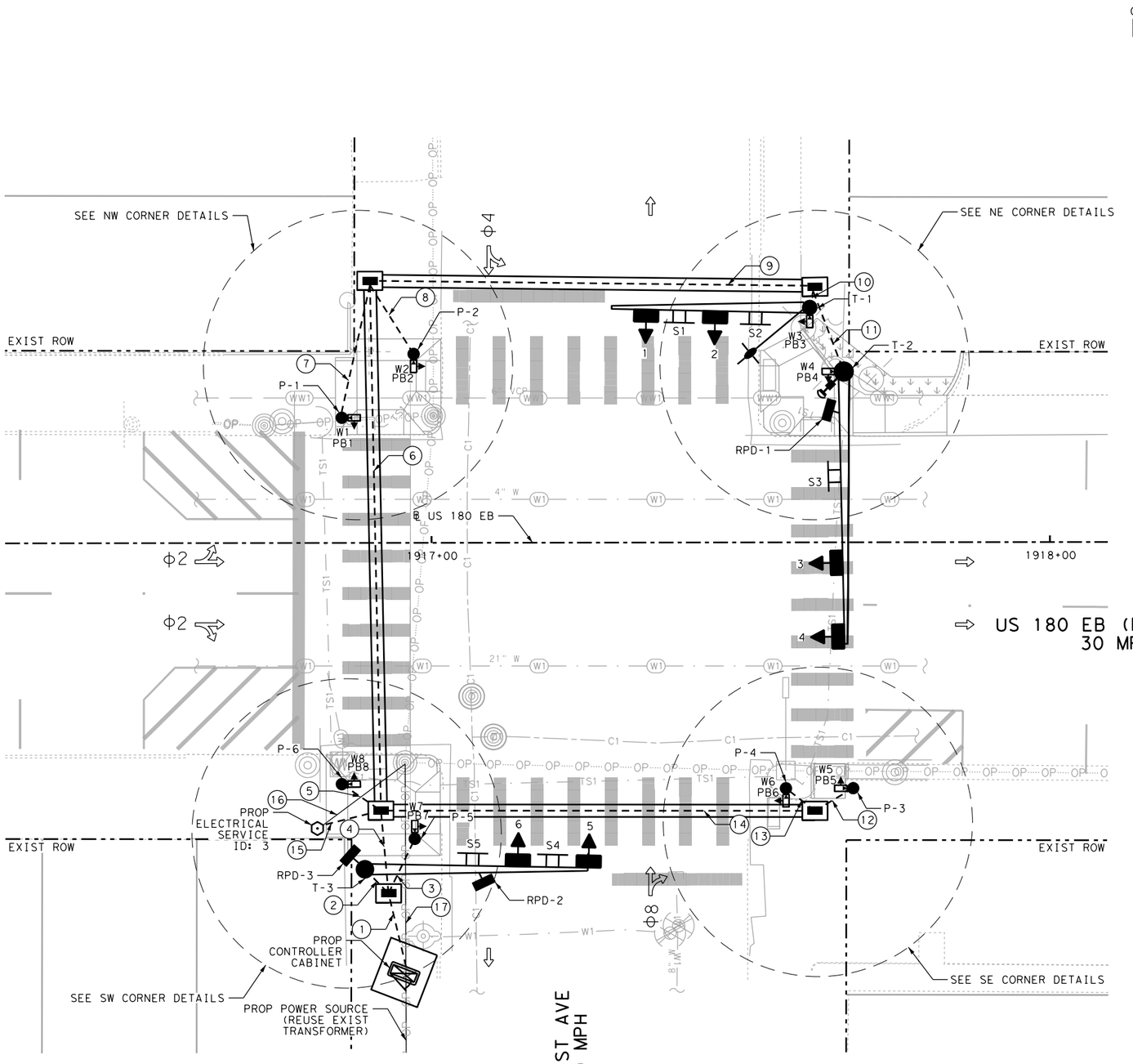

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOTES:

1. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
2. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
3. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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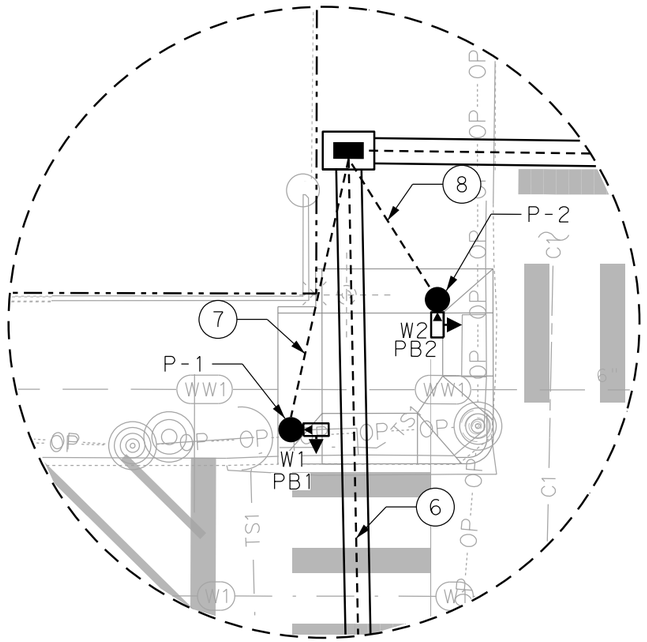
Texas Department of Transportation

PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT

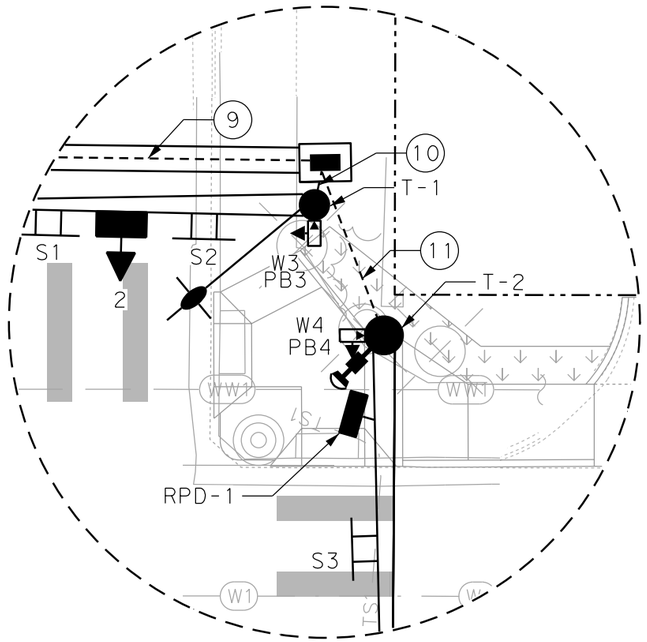
US 180 EB (FIRST ST)
AT SE 1ST AVE

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	170
CONTROL	SECTION	JOB	
0008	01	046,ETC	



NW CORNER DETAILS



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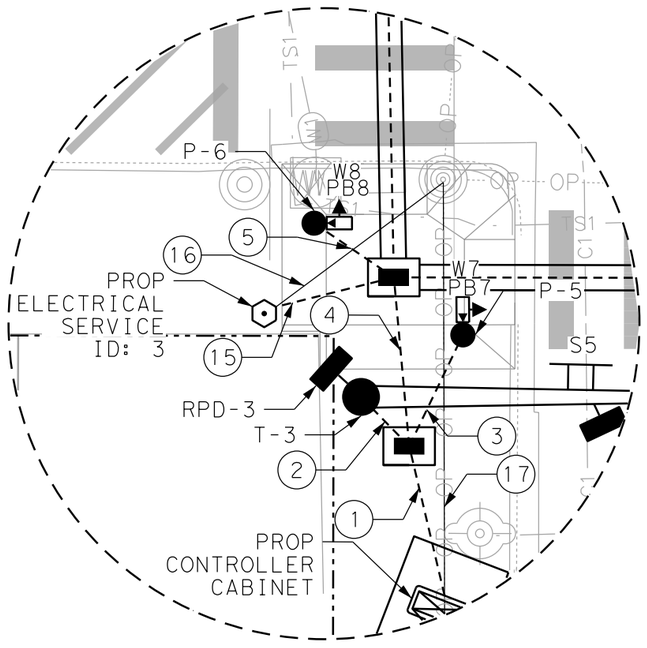
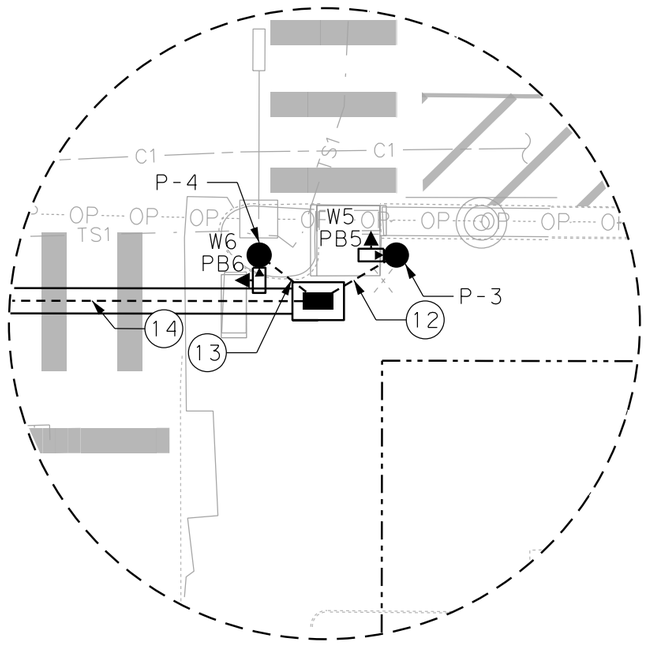


SW CORNER DETAILS



SE CORNER DETAILS

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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TBPE Firm Registration No. F-812
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PROPOSED TRAFFIC SIGNAL LAYOUT DETAILS

US 180 EB (FIRST ST)
AT SE 1ST AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	171
0008	01	046,ETC	

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CONDUIT SCHEDULE											
RUN NO.	NO. OF CONDUIT 4 (IN)	LENGTH (LF)	BORE(B) TRENCH(T) EXIST(E) OVERHEAD(OH)	1C#6 AWG XHHW	1C#6 AWG BARE	2C#12 AWG APS	4C#12 AWG LUMINAIRE	7C#14 AWG PED HEAD	16C#14 AWG SIGNAL	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
1	2	15	T	2	2	8		6	3	3	1
2	1	10	T		1				1	2	
3	1	10	T		1	1		1			
4	1	15	T	2	1	7		5	2	1	1
5	1	10	T		1	1		1			
6	1	85	B		1	4	1	2	2	1	1
7	1	25	T		1	1		1			
8	1	15	T		1	1		1			
9	1	70	B		1	2	1		2	1	1
10	1	5	T		1	1	1		1		
11	1	15	T		1	1			1	1	1
12	1	15	T		1	1		1			
13	1	10	T		1	1		1			
14	1	75	B		1	2		2			
15	1	10	T	2	1		1				
16	OVERHEAD	20	OH								
17	OVERHEAD	100	OH								
NET ADDITIONAL CABLE TOTALS (LF)				80	400	960	170	570	415	250	200

CONDUIT TOTALS (LF)	
4" TRENCH	170
4" BORE	230

NOTE:
1. THIS CONDUIT SCHEDULE DOES NOT REFLECT THE QUANTITIES OF CABLE INSIDE THE POLES (I.E. 5C#14 & 7C#14 FOR SIGNAL HEADS AND 4C#12 TRAY CABLE FOR LUMINAIRES). THE CONTRACTOR SHALL INSTALL A MULE TAPE IN ALL CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).

POLE AND ARM WIRING						
POLE NO.	2C#12 AWG APS	4C#12 AWG LUMINAIRE	5C#14 AWG SIGNAL (3-SEC)	7C#14 AWG SIGNAL (PED HEAD)	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
T-1	5	40	90	10		
T-2	5		115	10	30	25
T-3			100		60	
P-1	5			10		
P-2	5			10		
P-3	5			10		
P-4	5			10		
P-5	5			10		
P-6	5			10		
TOTAL (LF)	40	40	305	80	90	25

NOTES:
**RPD CABLE TO BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6046.

***CCTV CABLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6010.

POLE SCHEDULE														
POLE NUMBER	T-1			T-2			T-3		P-1	P-2	P-3	P-4	P-5	P-6
POLE STATUS	PROP			PROP			PROP		PROP	PROP	PROP	PROP	PROP	PROP
MAST ARM LENGTH (FT)	32			44			36		PED	PED	PED	PED	PED	PED
FOUNDATION TYPE	30-A			36-A			36-A		24-A	24-A	24-A	24-A	24-A	24-A
LUMINAIRES	YES			NO			NO		NO	NO	NO	NO	NO	NO
MAST ARM SIGNS	S1, S2			S3			S4, S5		NO	NO	NO	NO	NO	NO
SIGNAL/PED HEAD NO.	1	2	W3	3	4	W4	5	6	W1	W2	W5	W6	W7	W8
LED SIGNAL INDICATIONS	R Y G	R Y G	DW W	R Y G	R Y G	DW W	R Y G	R Y G	DW W	DW W	DW W	DW W	DW W	DW W

NOTE: ALL PROPOSED SIGNAL LENS ARE 12 INCH IN SIZE

MINIMUM PEDESTRIAN TIMING				
PED PHASE	SIGNAL HEAD NO.	WALK TIME (SEC)	FLASHING DON'T WALK TIME (SEC)	TOTAL PED TIMING (SEC)
PHASE 2 W	W2, W3, W6, W7	7	13	20
PHASE 4 W	W1, W8	7	13	20
PHASE 8 W	W4, W5	7	13	20

ELECTRICAL SERVICE												
ELECTRICAL SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
3	170	ELC SRV TY D 120/240 060 (NS) SS (E) SP (O)	1 1/4"	3/#6	N/A	2P/60	N/A	100	TRAFFIC SIGNAL ILLUMINATION	1P/30 2P/15	24.0 0.71	3.1

STATE OF TEXAS
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11/2/2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 EB (FIRST ST)
AT SE 1ST AVE

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	172
0008	01	046, ETC	

PROPOSED SIGNS

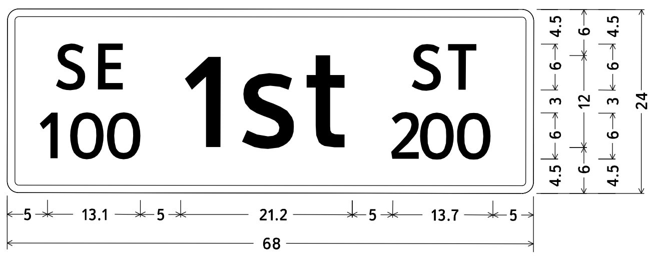
S4

R6-1L
54X18

S1

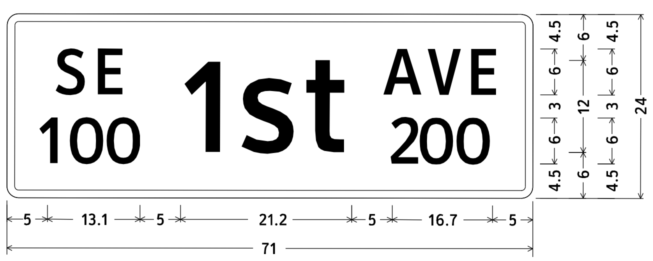
R6-1R
54X18

S2



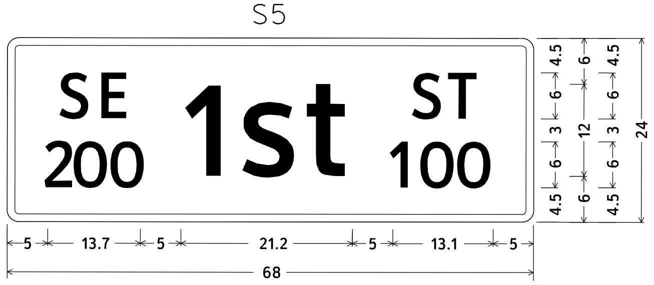
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SW] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[1st St] White ClearviewHwy-3-W; [SE] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

S3



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[1st] White ClearviewHwy-3-W; [AVE] White ClearviewHwy-3-W;
[200] White ClearviewHwy-3-W;

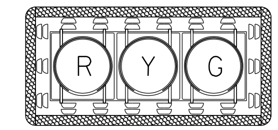
S5



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [200] White ClearviewHwy-3-W;
[1st] White ClearviewHwy-3-W; [ST] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

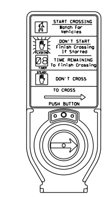
PROPOSED SIGNAL SCHEDULE

3-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



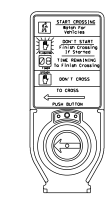
SIGNAL HEADS
1,2,3,4,5,6

APS PUSH BUTTON
R10-3ER(9"X15")



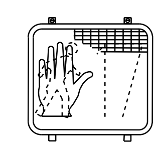
PB2,PB4,PB8

APS PUSH BUTTON
R10-3EL(9"X15")



PB1,PB3,PB5,PB6,PB7

LED COUNTDOWN
PEDESTRIAN
SIGNAL HEAD



W1,W2,W3,W4,
W5,W6,W7,W8

NOT TO SCALE

November 1, 2021

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Texas Department of Transportation

TRAFFIC SIGNAL
DETAIL/SUMMARY SHEET

US 180 EB (FIRST ST)
AT SE 1ST AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	173
CONTROL	SECTION	JOB	
0008	01	046,ETC	

USER: default
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10/28/2021
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CABLE TERMINATION CHART										
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM T-1 TO CNTRL. 16 CNDR.	CABLE 2 FROM T-2 TO CNTRL. 16 CNDR.	CABLE 3 FROM T-3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P-1 TO CNTRL. 7 CNDR.	CABLE 5 FROM P-2 TO CNTRL. 7 CNDR.	CABLE 6 FROM P-3 TO CNTRL. 7 CNDR.	CABLE 7 FROM P-4 TO CNTRL. 7 CNDR.	CABLE 8 FROM P-5 TO CNTRL. 7 CNDR.	CABLE 9 FROM P-6 TO CNTRL. 7 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	S. COM	S. COM	S. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM
3	RED	SG 1,2 PH 8 R	SG 3,4 PH 2 R	SG 5,6 PH 4 R	W1 PH 4 DW	W2 PH 2 DW	W5 PH 8 DW	W6 PH 2 DW	W7 PH 2 DW	W8 PH 4 DW
4	GREEN	SG 1,2 PH 8 G	SG 3,4 PH 2 G	SG 5,6 PH 4 G	W1 PH 4 W	W2 PH 2 W	W5 PH 8 W	W6 PH 2 W	W7 PH 2 W	W8 PH 4 W
5	ORANGE	SG 1,2 PH 8 Y	SG 3,4 PH 2 Y	SG 5,6 PH 4 Y	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
6	BLUE	W3 PH 2 W	W4 PH 8 W	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/ BLACK	W3 PH 2 DW	W4 PH 8 DW	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/ BLACK	SPARE	SPARE	SPARE						
9	GREEN/ BLACK	SPARE	SPARE	SPARE						
10	ORANGE/ BLACK	SPARE	SPARE	SPARE						
11	BLUE/ BLACK	SPARE	SPARE	SPARE						
12	BLACK/ WHITE	SPARE	SPARE	SPARE						
13	RED/ WHITE	SPARE	SPARE	SPARE						
14	GREEN/ WHITE	SPARE	SPARE	SPARE						
15	BLUE/ WHITE	SPARE	SPARE	SPARE						
16	BLACK/ RED	SPARE	SPARE	SPARE						

CABLE TERMINATION CHART										
CNDR. NO.	CONDR. COLOR	CABLE 10 FROM T-1 TO CNTRL. 2 CNDR.	CABLE 11 FROM T-2 TO CNTRL. 2 CNDR.		CABLE 12 FROM P-1 TO CNTRL. 2 CNDR.	CABLE 13 FROM P-2 TO CNTRL. 2 CNDR.	CABLE 14 FROM P-3 TO CNTRL. 2 CNDR.	CABLE 15 FROM P-4 TO CNTRL. 2 CNDR.	CABLE 16 FROM P-5 TO CNTRL. 2 CNDR.	CABLE 17 FROM P-6 TO CNTRL. 2 CNDR.
1	BLACK	PB3 PH 2 PED. CALL	PB4 PH 8 PED. CALL		PB1 PH 4 PED. CALL	PB2 PH 2 PED. CALL	PB5 PH 8 PED. CALL	PB6 PH 2 PED. CALL	PB7 PH 2 PED. CALL	PB8 PH 4 PED. CALL
2	WHITE	PED. COM	PED. COM		PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM

RPD PRESENSE DETECTION

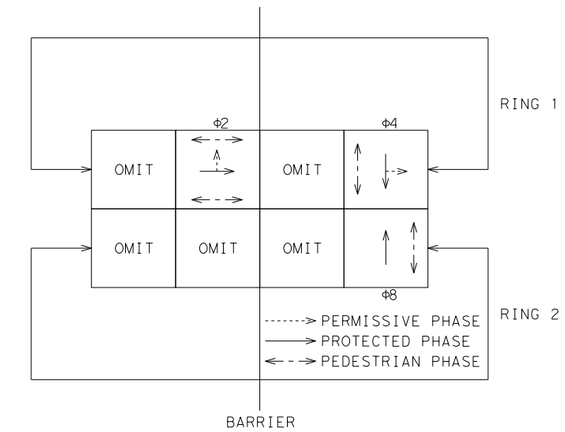
CLICK 656

SENSOR 1	PH4		RPD 1
SENSOR 2	PH8		RPD 2
SENSOR 3	PH2		RPD 3
SENSOR 4			
SENSOR 5			
SENSOR 6			

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT		PH2L		PH4				PH8
MATRIX OUTPUT CHANNEL		2		4				8
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT		PH2R						
MATRIX OUTPUT CHANNEL		10						

PHASING DIAGRAM



NOTES:
- SG = SIGNAL HEAD
- W = PEDESTRIAN WALK SIGNAL
- DW = PEDESTRIAN DON'T WALK SIGNAL
- PB = PEDESTRIAN PUSH BUTTON
- <-G = GREEN ARROW
- <-Y = YELLOW ARROW
- <-FY = FLASHING YELLOW ARROW
- <-R = RED ARROW

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED
PROFESSIONAL ENGINEER

November 1, 2021

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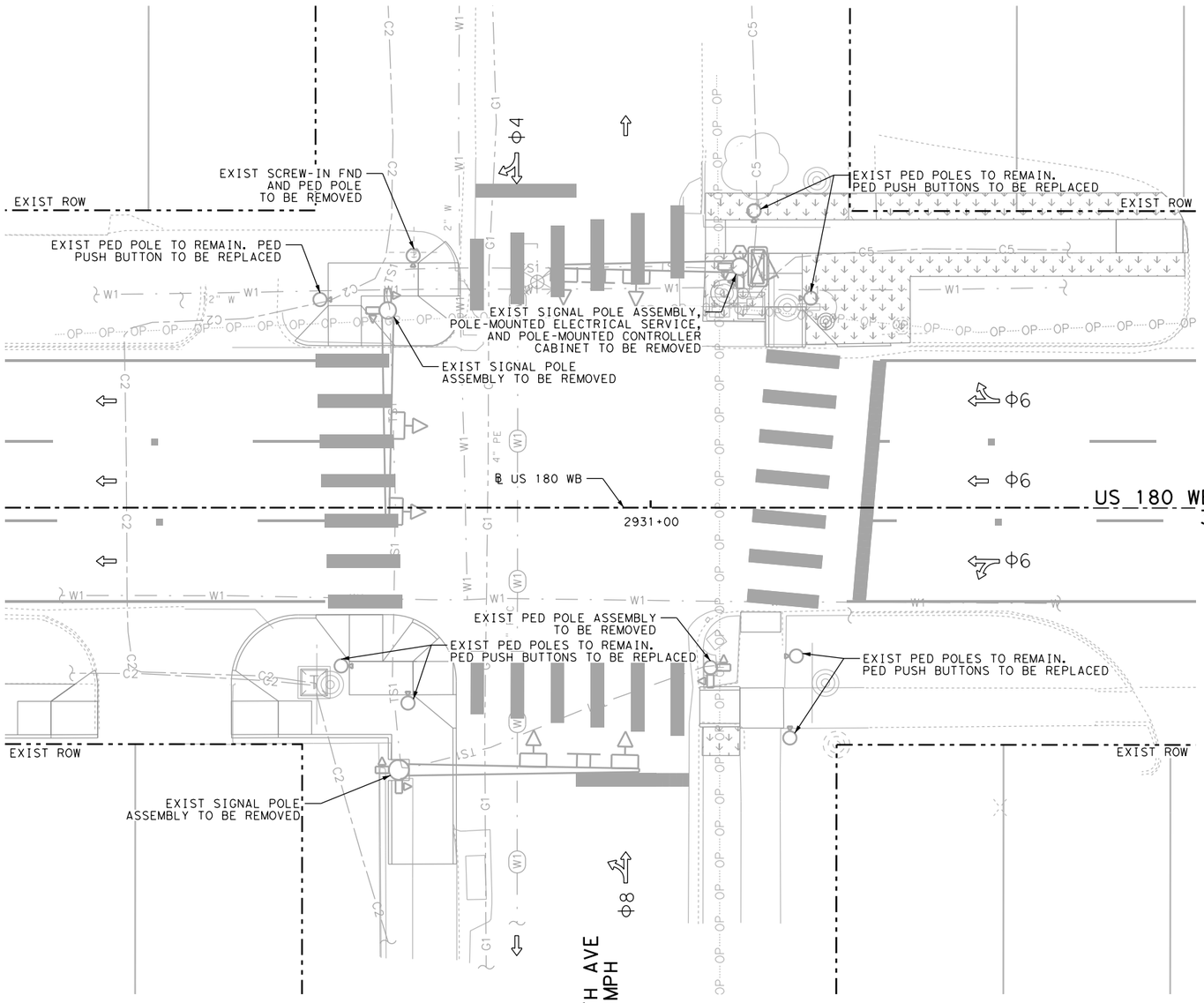
Texas Department of Transportation

TRAFFIC SIGNAL TERMINATION & PHASING

US 180 EB (FIRST ST) AT SE 1ST AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	174
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- EXIST CONTROLLER CABINET
- EXIST ELECTRICAL SERVICE
- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST GROUND BOX TYPE D
- EXIST HORIZONTAL TRAFFIC SIGNAL HEAD
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST MAST ARM AND POLE
- EXIST LUMINAIRE
- EXIST PEDESTRIAN PUSH BUTTON
- EXIST MAST ARM MOUNTED SIGN
- EXIST VIVDS DETECTOR
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL BORE TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])

NOTES:

1. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
2. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
3. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER

November 1, 2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F - 512
11701 Stonehollow Dr, Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

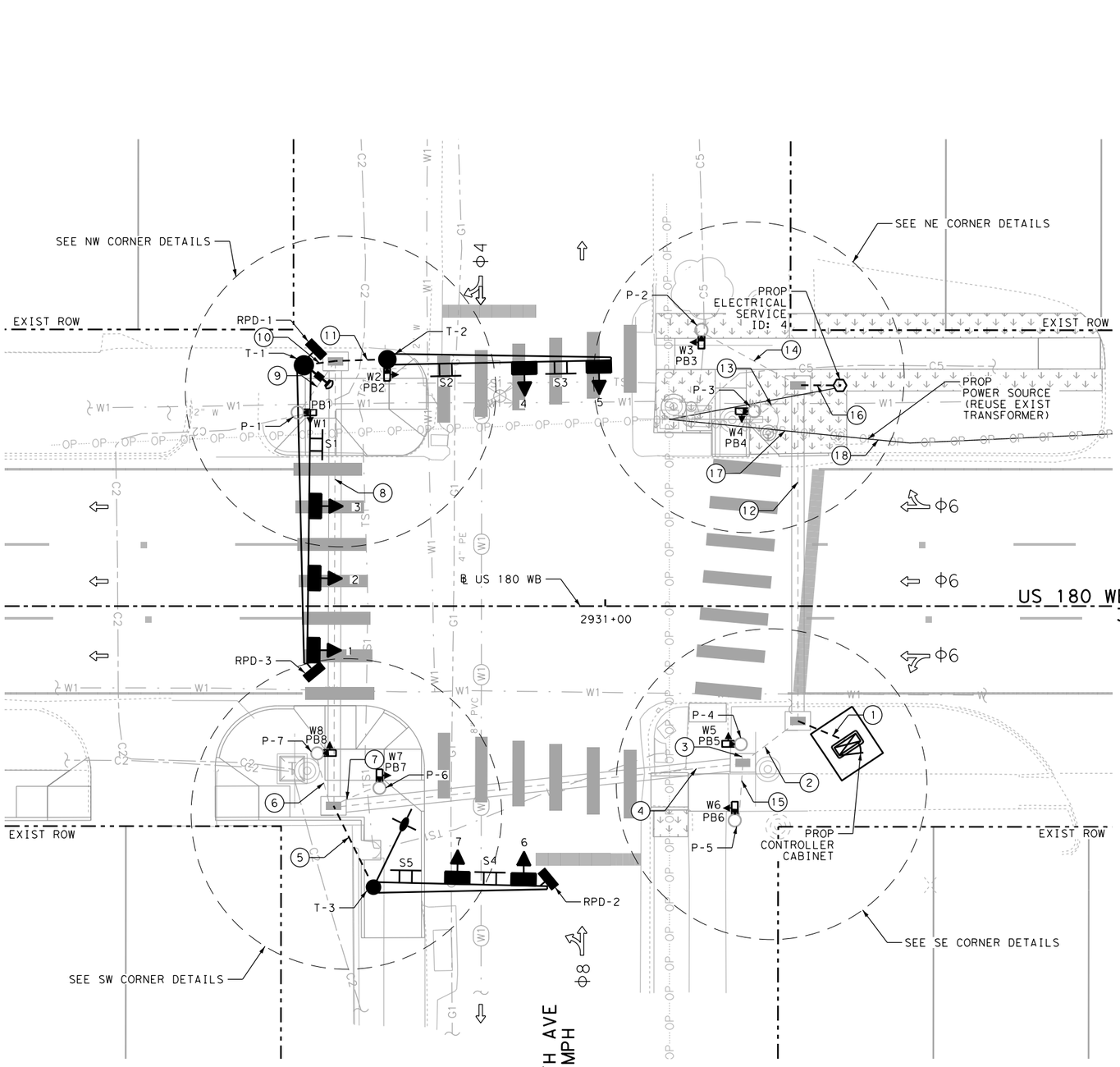
Texas Department of Transportation

EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 WB (HUBBARD ST)
AT SE 6TH AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	175
CONTROL	SECTION	JOB	
0008	01	046, ETC	



0 10′ 20′

SCALE: 1" = 20′

N

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOTES:

1. LOCATION OF EXIST SIGNAL EQUIPMENT IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY LOCATIONS AND CONNECTIONS.
2. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED
PROFESSIONAL ENGINEER
11/2/2021

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TBPE Firm Registration No. F - 812
11701 Stonehollow Dr, Ste 100 ♦ Austin, TX ♦ 78758
Phone: 512-821-2081 ♦ Fax: 512-821-2085

PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 WB (HUBBARD ST)
AT SE 6TH AVE

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	176
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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11/2/2021
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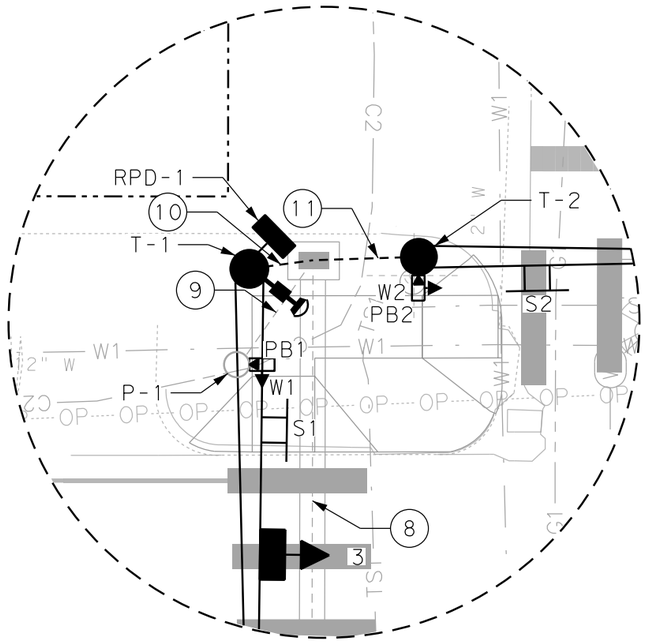
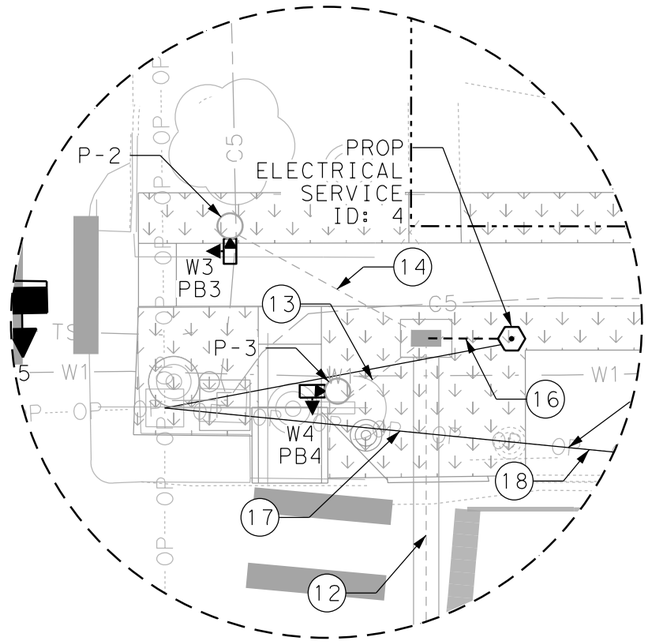
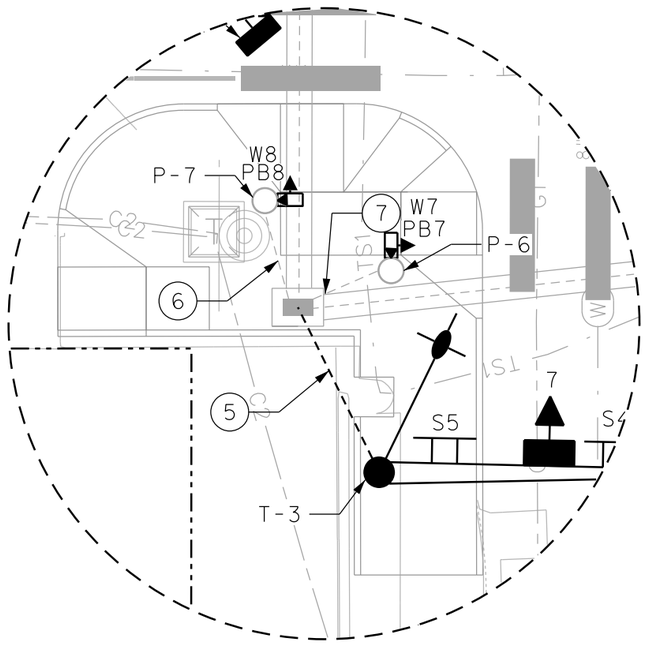


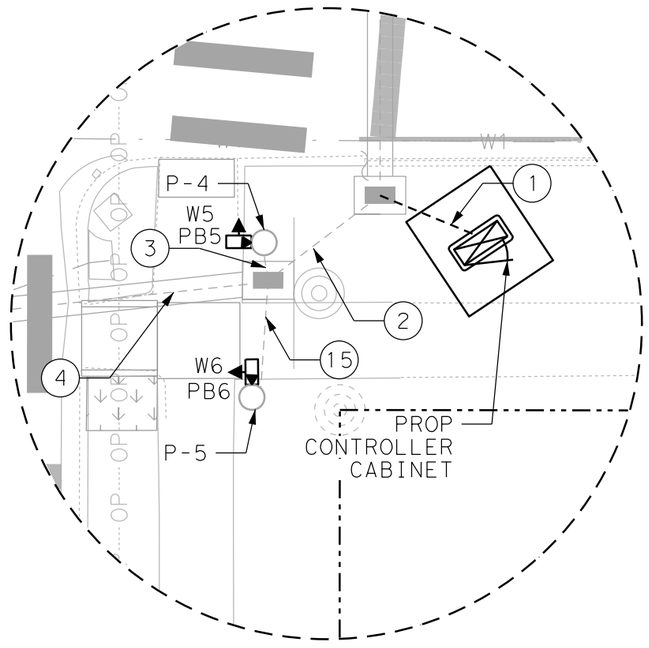
NW CORNER DETAILS



NE CORNER DETAILS



SW CORNER DETAILS



SE CORNER DETAILS

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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PROPOSED TRAFFIC SIGNAL LAYOUT DETAILS

US 180 WB (HUBBARD ST)
AT SE 6TH AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	177
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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CONDUIT SCHEDULE											
RUN NO.	NO. OF CONDUIT 4 (IN)	LENGTH (LF)	BORE(B) TRENCH(T) EXIST(E) OVERHEAD(OH)	1C#6 AWG XHHW	1C#6 AWG BARE	2C#12 AWG APS	4C#12 AWG LUMINAIRE	7C#14 AWG PED HEAD	16C#14 AWG SIGNAL	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
1	2	10	T	2	2	8		7	3	3	1
2	1	15	E		1	6	1	5	3	3	1
3	1	5	E		1	1		1			
4	1	65	E		1	4	1	3	3	3	1
5	1	15	T		1		1		1	1	
6	1	10	E		1	1		1			
7	1	10	E		1	1		1			
8	1	70	E		1	2		1	2	2	1
9	1	10	E		1	1		1			
10	1	5	T		1				1	2	1
11	1	10	T		1	1			1		
12	1	55	E	2	1	2	1	2			
13	1	10	E		1	1		1			
14	1	25	E		1	1		1			
15	1	10	E		1	1		1			
16	1	10	T	2	1		1				
17	OVERHEAD	30	OH								
18	OVERHEAD	120	OH								
NET ADDITIONAL CABLE TOTALS (LF)				150	345	770	160	600	440	435	165

CONDUIT TOTALS (LF)	
4" TRENCH	60
4" BORE	0

NOTE:
1. THIS CONDUIT SCHEDULE DOES NOT REFLECT THE QUANTITIES OF CABLE INSIDE THE POLES (I.E. 5C#14 & 7C#14 FOR SIGNAL HEADS AND 4C#12 TRAY CABLE FOR LUMINAIRES). THE CONTRACTOR SHALL INSTALL A MULE TAPE IN ALL CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).

POLE AND ARM WIRING						
POLE NO.	2C#12 AWG APS	4C#12 AWG LUMINAIRE	5C#14 AWG SIGNAL (3-SEC)	7C#14 AWG SIGNAL (PED HEAD)	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
T-1			170		95	25
T-2	5		100	10		
T-3		40	85		50	
P-1	5			10		
P-2	5			10		
P-3	5			10		
P-4	5			10		
P-5	5			10		
P-6	5			10		
P-7	5			10		
TOTAL (LF)	40	40	355	80	145	25

NOTES:
**RPD CABLE TO BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6046.

***CCTV CABLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6010.

POLE SCHEDULE														
POLE NUMBER	T-1			T-2			T-3		P-1	P-2	P-3	P-4	P-5	P-6	P-7
POLE STATUS	PROP			PROP			PROP		EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST
MAST ARM LENGTH (FT)	48			36			28		PED	PED	PED	PED	PED	PED	PED
FOUNDATION TYPE	36-A			36-A			30-A		24-A	24-A	24-A	24-A	24-A	24-A	24-A
LUMINAIRES	NO			NO			YES		NO	NO	NO	NO	NO	NO	NO
MAST ARM SIGNS	S1			S2, S3			S4, S5		NO	NO	NO	NO	NO	NO	NO
SIGNAL/PED HEAD NO.	1	2	3	4	5	W2	6	7	W1	W3	W4	W5	W6	W7	W8
LED SIGNAL INDICATIONS	R Y G	R Y G	R Y G	R Y G	R Y G	DW W	R Y G	R Y G	DW W	DW W	DW W	DW W	DW W	DW W	DW W

NOTE: ALL PROPOSED SIGNAL LENS ARE 12 INCH IN SIZE

MINIMUM PEDESTRIAN TIMING				
PED PHASE	SIGNAL HEAD NO.	WALK TIME (SEC)	FLASHING DON'T WALK TIME (SEC)	TOTAL PED TIMING (SEC)
PHASE 4 W	W1, W8	7	10	17
PHASE 6 W	W2, W3, W6, W7	7	9	16
PHASE 8 W	W4, W5	7	10	17

ELECTRICAL SERVICE											
ELECTRICAL SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
4	176	ELC SRV TY D 120/240 060 (NS) SS (E) SP (O)	1 1/4"	3/#6	N/A	2P/60	N/A	100	TRAFFIC SIGNAL ILLUMINATION	1P/30 2P/15	24.0 0.71	3.1

STATE OF TEXAS
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11/2/2021

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Texas Department of Transportation

TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 WB (HUBBARD ST)
AT SE 6TH AVE

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	178
0008	01	046, ETC	

PROPOSED SIGNS

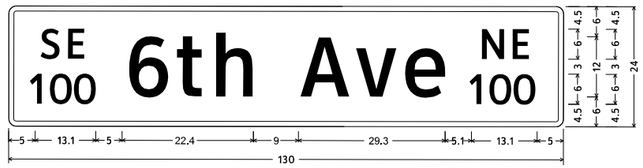
S3

R6-1L
54X18

S4

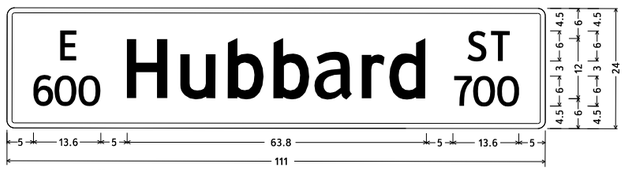
R6-1R
54X18

S1



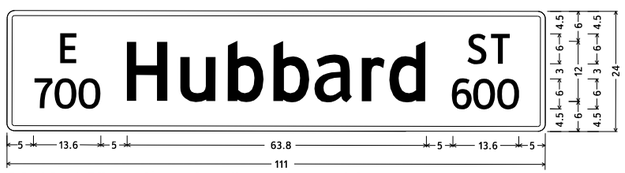
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[6th Ave] White ClearviewHwy-3-W; [NE] White ClearviewHwy-3-W;
[100] White ClearviewHwy-3-W;

S2



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[E] White ClearviewHwy-3-W; [600] White ClearviewHwy-3-W;
[Hubbard] White ClearviewHwy-3-W; [ST] White ClearviewHwy-3-W;
[700] White ClearviewHwy-3-W;

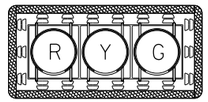
S5



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[E] White ClearviewHwy-3-W; [700] White ClearviewHwy-3-W;
[Hubbard] White ClearviewHwy-3-W; [ST] White ClearviewHwy-3-W;
[600] White ClearviewHwy-3-W;

PROPOSED SIGNAL SCHEDULE

3-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEADS
1, 2, 3, 4, 5, 6, 7

APS PUSH BUTTON
R10-3ER(9"X15")

PB2, PB4, PB6, PB8

APS PUSH BUTTON
R10-3EL(9"X15")

PB1, PB3, PB5, PB7

LED COUNTDOWN
PEDESTRIAN
SIGNAL HEAD

W1, W2, W3, W4,
W5, W6, W7, W8

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
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LICENSED
PROFESSIONAL ENGINEER

November 1, 2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 WB (HUBBARD ST)
AT SE 6TH AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	179
CONTROL	SECTION	JOB	
0008	01	046, ETC	

CABLE TERMINATION CHART											
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM T-1 TO CNTRL. 16 CNDR.	CABLE 2 FROM T-2 TO CNTRL. 16 CNDR.	CABLE 3 FROM T-3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P-1 TO CNTRL. 7 CNDR.	CABLE 5 FROM P-2 TO CNTRL. 7 CNDR.	CABLE 6 FROM P-3 TO CNTRL. 7 CNDR.	CABLE 7 FROM P-4 TO CNTRL. 7 CNDR.	CABLE 8 FROM P-5 TO CNTRL. 7 CNDR.	CABLE 9 FROM P-6 TO CNTRL. 7 CNDR.	CABLE 10 FROM P-7 TO CNTRL. 7 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	S. COM	S. COM	S. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM
3	RED	SG 1,2,3 PH 6 R	SG 4,5 PH 8 R	SG 6,7 PH 4 R	W1 PH 4 DW	W3 PH 6 DW	W4 PH 8 DW	W5 PH 8 DW	W6 PH 6 DW	W7 PH 6 DW	W8 PH 4 DW
4	GREEN	SG 1,2,3 PH 6 G	SG 4,5 PH 8 G	SG 6,7 PH 4 G	W1 PH 4 W	W3 PH 6 W	W4 PH 8 W	W5 PH 8 W	W6 PH 6 W	W7 PH 6 W	W8 PH 4 W
5	ORANGE	SG 1,2,3 PH 6 Y	SG 4,5 PH 8 Y	SG 6,7 PH 4 Y	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
6	BLUE	SPARE	W2 PH 6 W	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/ BLACK	SPARE	W2 PH 6 DW	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/ BLACK	SPARE	SPARE	SPARE							
9	GREEN/ BLACK	SPARE	SPARE	SPARE							
10	ORANGE/ BLACK	SPARE	SPARE	SPARE							
11	BLUE/ BLACK	SPARE	SPARE	SPARE							
12	BLACK/ WHITE	SPARE	SPARE	SPARE							
13	RED/ WHITE	SPARE	SPARE	SPARE							
14	GREEN/ WHITE	SPARE	SPARE	SPARE							
15	BLUE/ WHITE	SPARE	SPARE	SPARE							
16	BLACK/ RED	SPARE	SPARE	SPARE							

CABLE TERMINATION CHART											
CNDR. NO.	CONDR. COLOR		CABLE 11 FROM T-2 TO CNTRL. 2 CNDR.		CABLE 12 FROM P-1 TO CNTRL. 2 CNDR.	CABLE 13 FROM P-2 TO CNTRL. 2 CNDR.	CABLE 14 FROM P-3 TO CNTRL. 2 CNDR.	CABLE 15 FROM P-4 TO CNTRL. 2 CNDR.	CABLE 16 FROM P-5 TO CNTRL. 2 CNDR.	CABLE 17 FROM P-6 TO CNTRL. 2 CNDR.	CABLE 18 FROM P-7 TO CNTRL. 2 CNDR.
1	BLACK		PB2 PH 6 PED. CALL		PB1 PH 4 PED. CALL	PB3 PH 6 PED. CALL	PB4 PH 8 PED. CALL	PB5 PH 8 PED. CALL	PB6 PH 6 PED. CALL	PB7 PH 6 PED. CALL	PB8 PH 4 PED. CALL
2	WHITE		PED. COM		PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM

RPD PRESENSE DETECTION

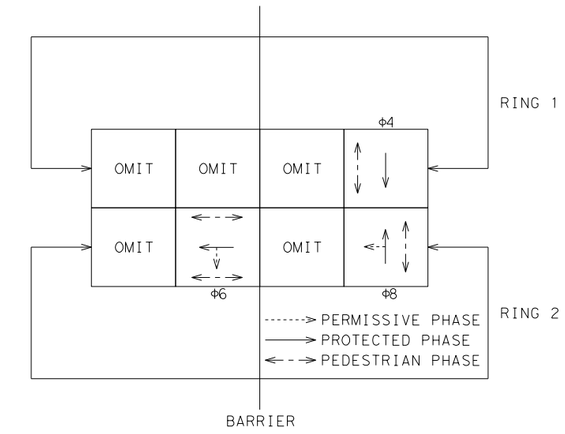
CLICK 656

SENSOR 1	PH4		RPD 1
SENSOR 2	PH6		RPD 2
SENSOR 3	PH8		RPD 3
SENSOR 4			
SENSOR 5			
SENSOR 6			

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT				PH4		PH6L, C		PH8
MATRIX OUTPUT CHANNEL				4		6		8
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT						PH6R		
MATRIX OUTPUT CHANNEL						14		

PHASING DIAGRAM



NOTES:
- SG = SIGNAL HEAD
- W = PEDESTRIAN WALK SIGNAL
- DW = PEDESTRIAN DON'T WALK SIGNAL
- PB = PEDESTRIAN PUSH BUTTON
- <-G = GREEN ARROW
- <-Y = YELLOW ARROW
- <-FY = FLASHING YELLOW ARROW
- <-R = RED ARROW

STATE OF TEXAS
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LICENSED
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November 1, 2021

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TRAFFIC SIGNAL TERMINATION & PHASING

US 180 WB (HUBBARD ST)
AT SE 6TH AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	180
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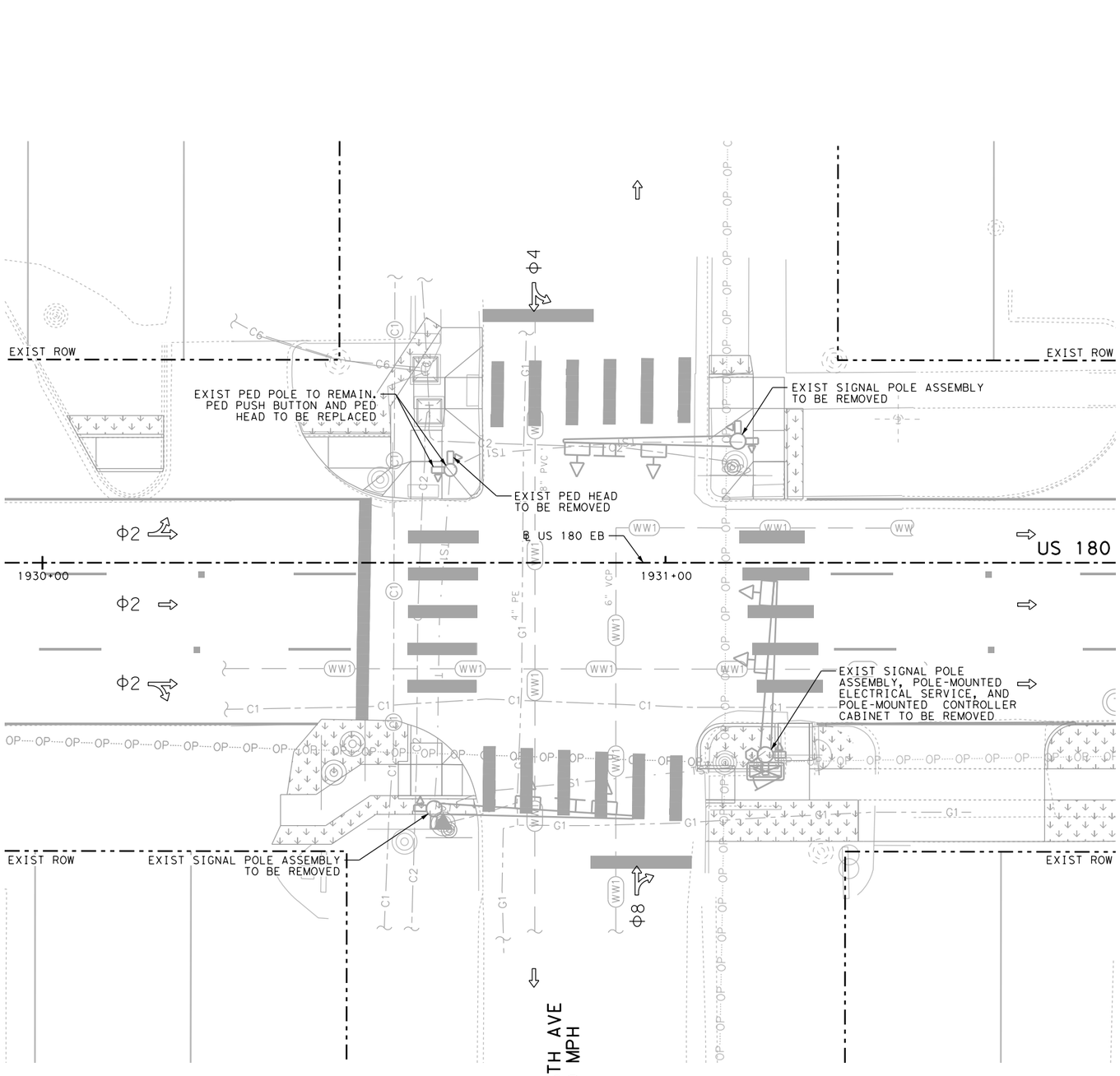

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SCALE: 1" = 20′

N

LEGEND

- EXIST CONTROLLER CABINET
- EXIST ELECTRICAL SERVICE
- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST GROUND BOX TYPE D
- EXIST HORIZONTAL TRAFFIC SIGNAL HEAD
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST MAST ARM AND POLE
- EXIST LUMINAIRE
- EXIST PEDESTRIAN PUSH BUTTON
- EXIST MAST ARM MOUNTED SIGN
- EXIST VIVDS DETECTOR
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL BORE TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])

NOTES:

1. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
2. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
3. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER

November 1, 2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-812
11701 Stonehollow Dr. Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

Texas Department of Transportation

EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 EB (FIRST ST)
AT SE 6TH AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	181
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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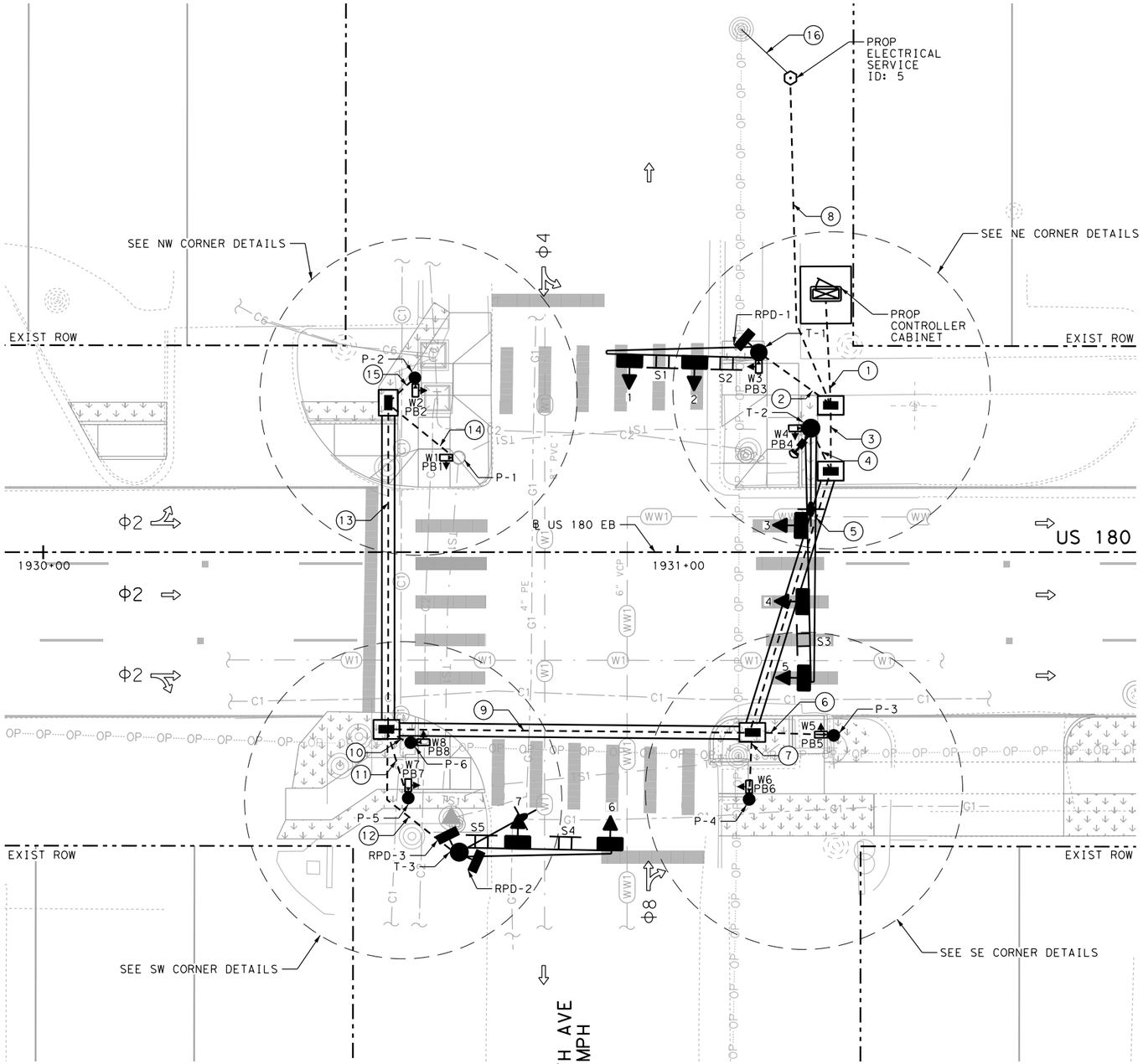

NOTES:

1. LOCATION OF EXIST SIGNAL EQUIPMENT IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY LOCATIONS AND CONNECTIONS.
2. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

0 10' 20'

SCALE: 1" = 20'

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- OP EXIST OH POWER LINE
- XX EXIST UG QLC/QLD LINE
- XX EXIST UG QLB LINE
- TS1 EXIST UG SIGNAL CABLE (TXDOT)
- TS1 EXIST UG SIGNAL CONDUIT TO BE REUSED
- W1 EXIST UG WATER (MINERAL WELLS)
- WW1 EXIST UG SANITARY SEWER (MINERAL WELLS)
- SD1 EXIST UG STORM DRAIN (TXDOT)
- E1 EXIST UG ELECTRIC (TXDOT)
- G1 EXIST UG GAS (TX GAS)
- C1 EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 EB (FIRST ST)
AT SE 6TH AVE

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	182
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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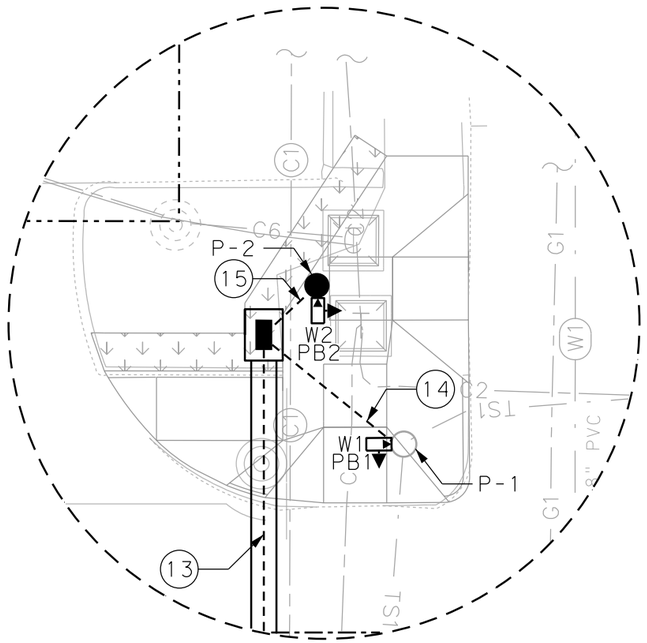
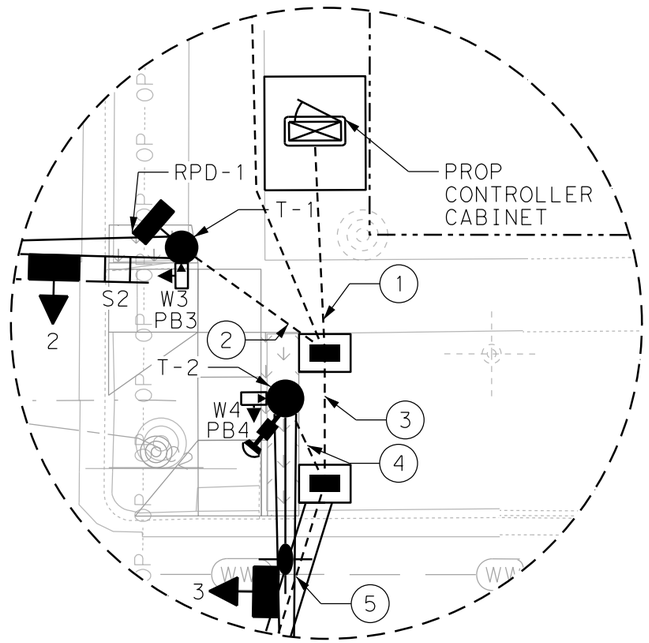


NW CORNER DETAILS



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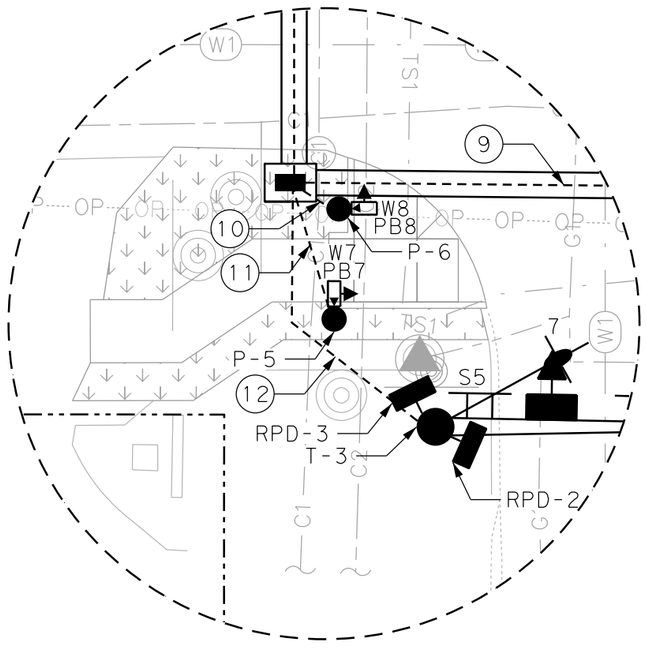
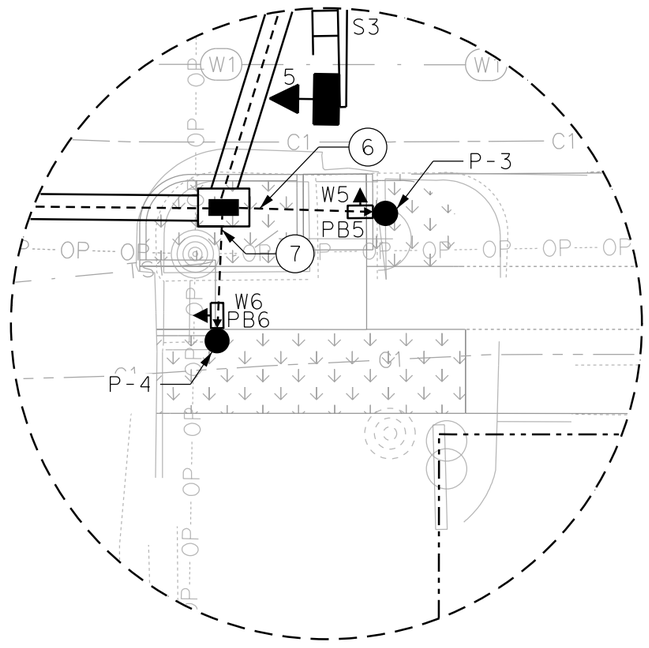


SW CORNER DETAILS



SE CORNER DETAILS

LEGEND

- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL CONDUIT TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP VERTICAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
11/2/2021

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PROPOSED TRAFFIC SIGNAL LAYOUT DETAILS

US 180 EB (FIRST ST)
AT SE 6TH AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	183
0008	01	046,ETC	

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CONDUIT SCHEDULE											
RUN NO.	NO. OF CONDUIT 4 (IN)	LENGTH (LF)	BORE(B) TRENCH(T) EXIST(E) OVERHEAD(OH)	1C#6 AWG XHHW	1C#6 AWG BARE	2C#12 AWG APS	4C#12 AWG LUMINAIRE	7C#14 AWG PED HEAD	16C#14 AWG SIGNAL	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
1	2	20	T	2	2	8		6	3	3	1
2	1	15	T		1	1			1	1	
3	1	15	T		1	7	2	6	2	2	1
4	1	10	T		1	1	1		1		1
5	1	45	B		1	6	1	6	1	2	
6	1	15	T		1	1		1			
7	1	10	T		1	1		1			
8	1	55	T	2	1		2				
9	1	60	B		1	4	1	4	1	2	
10	1	5	T		1	1		1			
11	1	15	T		1	1		1			
12	1	25	T		1		1		1	2	
13	1	50	B		1	2		2			
14	1	15	T		1	1		1			
15	1	10	T		1	1		1			
16	OVERHEAD	50	OH								
NET ADDITIONAL CABLE TOTALS (LF)				150	385	970	280	890	245	365	45

CONDUIT TOTALS (LF)	
4" TRENCH	230
4" BORE	155

NOTE:
1. THIS CONDUIT SCHEDULE DOES NOT REFLECT THE QUANTITIES OF CABLE INSIDE THE POLES (I.E. 5C#14 & 7C#14 FOR SIGNAL HEADS AND 4C#12 TRAY CABLE FOR LUMINAIRES). THE CONTRACTOR SHALL INSTALL A MULE TAPE IN ALL CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).

POLE AND ARM WIRING						
POLE NO.	2C#12 AWG APS	4C#12 AWG LUMINAIRE	5C#14 AWG SIGNAL (3-SEC)	7C#14 AWG SIGNAL (PED HEAD)	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
T-1	5		80	10	25	
T-2	5	40	155	10	25	25
T-3		40	80		25	
P-1	5			10		
P-2	5			10		
P-3	5			10		
P-4	5			10		
P-5	5			10		
P-6	5			10		
TOTAL (LF)	40	80	315	80	75	25

NOTES:
**RPD CABLE TO BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6046.

***CCTV CABLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6010.

POLE SCHEDULE														
POLE NUMBER	T-1			T-2				T-3		P-1	P-2	P-3	P-4	P-5	P-6
POLE STATUS	PROP			PROP				PROP		EXIST	PROP	PROP	PROP	PROP	PROP
MAST ARM LENGTH (FT)	24			40				24		PED	PED	PED	PED	PED	PED
FOUNDATION TYPE	30-A			36-A				30-A		24-A	24-A	24-A	24-A	24-A	24-A
LUMINAIRES	NO			YES				YES		NO	NO	NO	NO	NO	NO
MAST ARM SIGNS	S1, S2			S3				S4, S5		NO	NO	NO	NO	NO	NO
SIGNAL/PED HEAD NO.	1	2	W3	3	4	5	W4	6	7	W1	W2	W5	W6	W7	W8
LED SIGNAL INDICATIONS	R Y G	R Y G	DW W	R Y G	R Y G	R Y G	DW W	R Y G	R Y G	DW W	DW W	DW W	DW W	DW W	DW W

NOTE: ALL PROPOSED SIGNAL LENS ARE 12 INCH IN SIZE

MINIMUM PEDESTRIAN TIMING				
PED PHASE	SIGNAL HEAD NO.	WALK TIME (SEC)	FLASHING DON'T WALK TIME (SEC)	TOTAL PED TIMING (SEC)
PHASE 2 W	W2, W3, W6, W7	7	9	16
PHASE 4 W	W1, W8	7	10	17
PHASE 8 W	W4, W5	7	10	17

ELECTRICAL SERVICE												
ELECTRICAL SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
5	182	ELC SRV TY D 120/240 060 (NS) SS (E) SP (O)	1 1/4"	3/#6	N/A	2P/60	N/A	100	TRAFFIC SIGNAL ILLUMINATION	1P/30 2P/15	24.0 0.71	3.1

STATE OF TEXAS
CHAD ANDREW WOOD
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LICENSED PROFESSIONAL ENGINEER
11/2/2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 EB (FIRST ST)
AT SE 6TH AVE

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	184
0008	01	046, ETC	

PROPOSED SIGNS

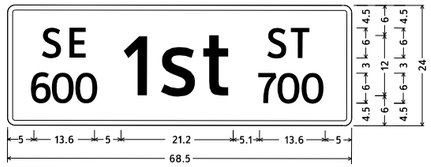
S4

R6-1L
54X18

S1

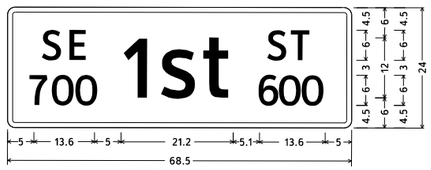
R6-1R
54X18

S2



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [600] White ClearviewHwy-3-W;
[1st] White ClearviewHwy-3-W; [ST] White ClearviewHwy-3-W;
[700] White ClearviewHwy-3-W;

S5



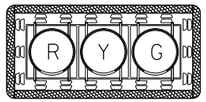
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [700] White ClearviewHwy-3-W;
[1st] White ClearviewHwy-3-W; [ST] White ClearviewHwy-3-W;
[600] White ClearviewHwy-3-W;

S3

D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[6th Ave] White ClearviewHwy-3-W; [200] White ClearviewHwy-3-W;

PROPOSED SIGNAL SCHEDULE

3-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEADS
1, 2, 3, 4, 5, 6, 7

APS PUSH BUTTON
R10-3ER(9"X15")

PB1, PB2, PB4,
PB6, PB8

APS PUSH BUTTON
R10-3EL(9"X15")

PB3, PB5, PB7

LED COUNTDOWN
PEDESTRIAN
SIGNAL HEAD

W1, W2, W3, W4,
W5, W6, W7, W8

NOT TO SCALE

STATE OF TEXAS
CHAD ANDREW WOOD
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LICENSED
PROFESSIONAL ENGINEER

November 1, 2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 EB (FIRST ST)
AT SE 6TH AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	185
CONTROL	SECTION	JOB	
0008	01	046, ETC	

CABLE TERMINATION CHART

CNDR. NO.	CONDR. COLOR	CABLE 1 FROM T-1 TO CNTRL. 16 CNDR.	CABLE 2 FROM T-2 TO CNTRL. 16 CNDR.	CABLE 3 FROM T-3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P-1 TO CNTRL. 7 CNDR.	CABLE 5 FROM P-2 TO CNTRL. 7 CNDR.	CABLE 6 FROM P-3 TO CNTRL. 7 CNDR.	CABLE 7 FROM P-4 TO CNTRL. 7 CNDR.	CABLE 8 FROM P-5 TO CNTRL. 7 CNDR.	CABLE 9 FROM P-6 TO CNTRL. 7 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	S. COM	S. COM	S. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM
3	RED	SG 1,2 PH 8 R	SG 3,4,5 PH 2 R	SG 6,7 PH 4 R	W1 PH 4 DW	W2 PH 2 DW	W5 PH 8 DW	W6 PH 2 DW	W7 PH 2 DW	W8 PH 4 DW
4	GREEN	SG 1,2 PH 8 G	SG 3,4,5 PH 2 G	SG 6,7 PH 4 G	W1 PH 4 W	W2 PH 2 W	W5 PH 8 W	W6 PH 2 W	W7 PH 2 W	W8 PH 4 W
5	ORANGE	SG 1,2 PH 8 Y	SG 3,4,5 PH 2 Y	SG 6,7 PH 4 Y	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
6	BLUE	W3 PH 2 W	W4 PH 8 W	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/ BLACK	W3 PH 2 DW	W4 PH 8 DW	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/ BLACK	SPARE	SPARE	SPARE						
9	GREEN/ BLACK	SPARE	SPARE	SPARE						
10	ORANGE/ BLACK	SPARE	SPARE	SPARE						
11	BLUE/ BLACK	SPARE	SPARE	SPARE						
12	BLACK/ WHITE	SPARE	SPARE	SPARE						
13	RED/ WHITE	SPARE	SPARE	SPARE						
14	GREEN/ WHITE	SPARE	SPARE	SPARE						
15	BLUE/ WHITE	SPARE	SPARE	SPARE						
16	BLACK/ RED	SPARE	SPARE	SPARE						

CABLE TERMINATION CHART

CNDR. NO.	CONDR. COLOR	CABLE 10 FROM T-1 TO CNTRL. 2 CNDR.	CABLE 11 FROM T-2 TO CNTRL. 2 CNDR.		CABLE 12 FROM P-1 TO CNTRL. 2 CNDR.	CABLE 13 FROM P-2 TO CNTRL. 2 CNDR.	CABLE 14 FROM P-3 TO CNTRL. 2 CNDR.	CABLE 15 FROM P-4 TO CNTRL. 2 CNDR.	CABLE 16 FROM P-5 TO CNTRL. 2 CNDR.	CABLE 17 FROM P-6 TO CNTRL. 2 CNDR.
1	BLACK	PB3 PH 2 PED. CALL	PB4 PH 8 PED. CALL		PB1 PH 4 PED. CALL	PB2 PH 2 PED. CALL	PB5 PH 8 PED. CALL	PB6 PH 2 PED. CALL	PB7 PH 2 PED. CALL	PB8 PH 4 PED. CALL
2	WHITE	PED. COM	PED. COM		PED. COM	PED. COM	PED. COM	PED. COM	PED. COM	PED. COM

NOTES:
SG = SIGNAL HEAD
W = PEDESTRIAN WALK SIGNAL
DW = PEDESTRIAN DON'T WALK SIGNAL
PB = PEDESTRIAN PUSH BUTTON
<-G = GREEN ARROW
<-Y = YELLOW ARROW
<-FY = FLASHING YELLOW ARROW
<-R = RED ARROW

RPD PRESENSE DETECTION

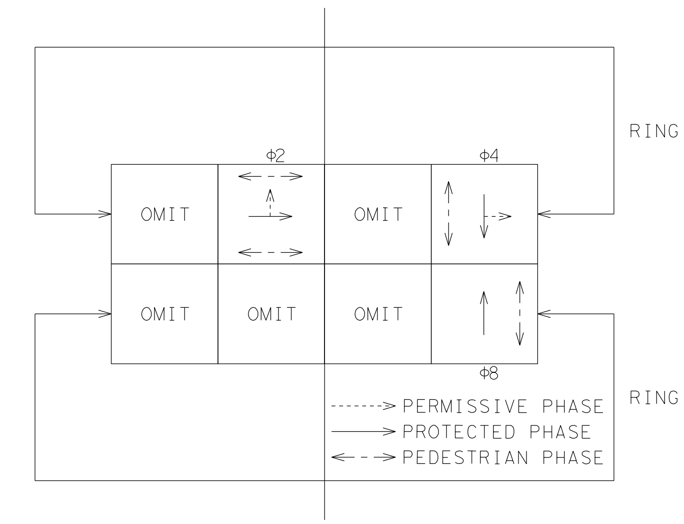
CLICK 656

SENSOR 1	PH4		RPD 1
SENSOR 2	PH8		RPD 2
SENSOR 3	PH2		RPD 3
SENSOR 4			
SENSOR 5			
SENSOR 6			

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT		PH2L		PH4				PH8
MATRIX OUTPUT CHANNEL		2		4				8
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT		PH2C,R						
MATRIX OUTPUT CHANNEL		10						

PHASING DIAGRAM



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LICENSED
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Texas Department of Transportation

TRAFFIC SIGNAL TERMINATION & PHASING

US 180 EB (FIRST ST) AT SE 6TH AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	186
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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10/28/2021
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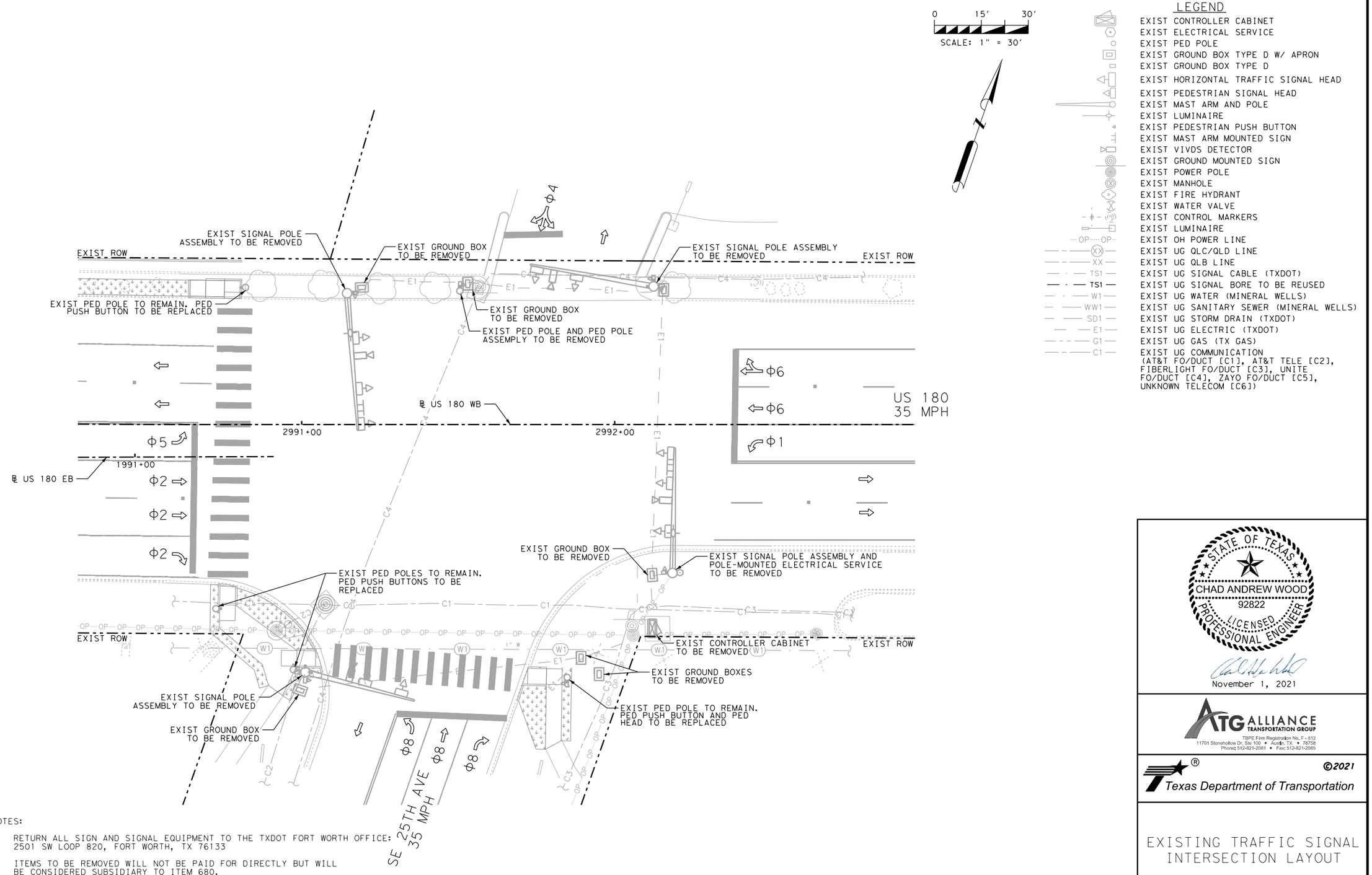

LEGEND

- EXIST CONTROLLER CABINET
- EXIST ELECTRICAL SERVICE
- EXIST PED POLE
- EXIST GROUND BOX TYPE D W/ APRON
- EXIST GROUND BOX TYPE D
- EXIST HORIZONTAL TRAFFIC SIGNAL HEAD
- EXIST PEDESTRIAN SIGNAL HEAD
- EXIST MAST ARM AND POLE
- EXIST LUMINAIRE
- EXIST PEDESTRIAN PUSH BUTTON
- EXIST MAST ARM MOUNTED SIGN
- EXIST VIVDS DETECTOR
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG SIGNAL BORE TO BE REUSED
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])

NOTES:

1. RETURN ALL SIGN AND SIGNAL EQUIPMENT TO THE TXDOT FORT WORTH OFFICE: 2501 SW LOOP 820, FORT WORTH, TX 76133
2. ITEMS TO BE REMOVED WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 680.
3. EXISTING PEDESTRIAN SIGNAL HEADS TO BE REMOVED AND REPLACED WITH LED COUNTDOWN PEDESTRIAN SIGNAL HEADS.
4. EXISTING PEDESTRIAN PUSH BUTTONS TO BE REMOVED AND REPLACED WITH APS PUSH BUTTONS.
5. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED
PROFESSIONAL ENGINEER
November 1, 2021

ATG ALLIANCE TRANSPORTATION GROUP
TBPE Firm Registration No. F-512
11701 Stonehollow Dr, Ste 100 • Austin, TX • 78758
Phone: 512-821-2081 • Fax: 512-821-2085

EXISTING TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 AT SE 25TH AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	187
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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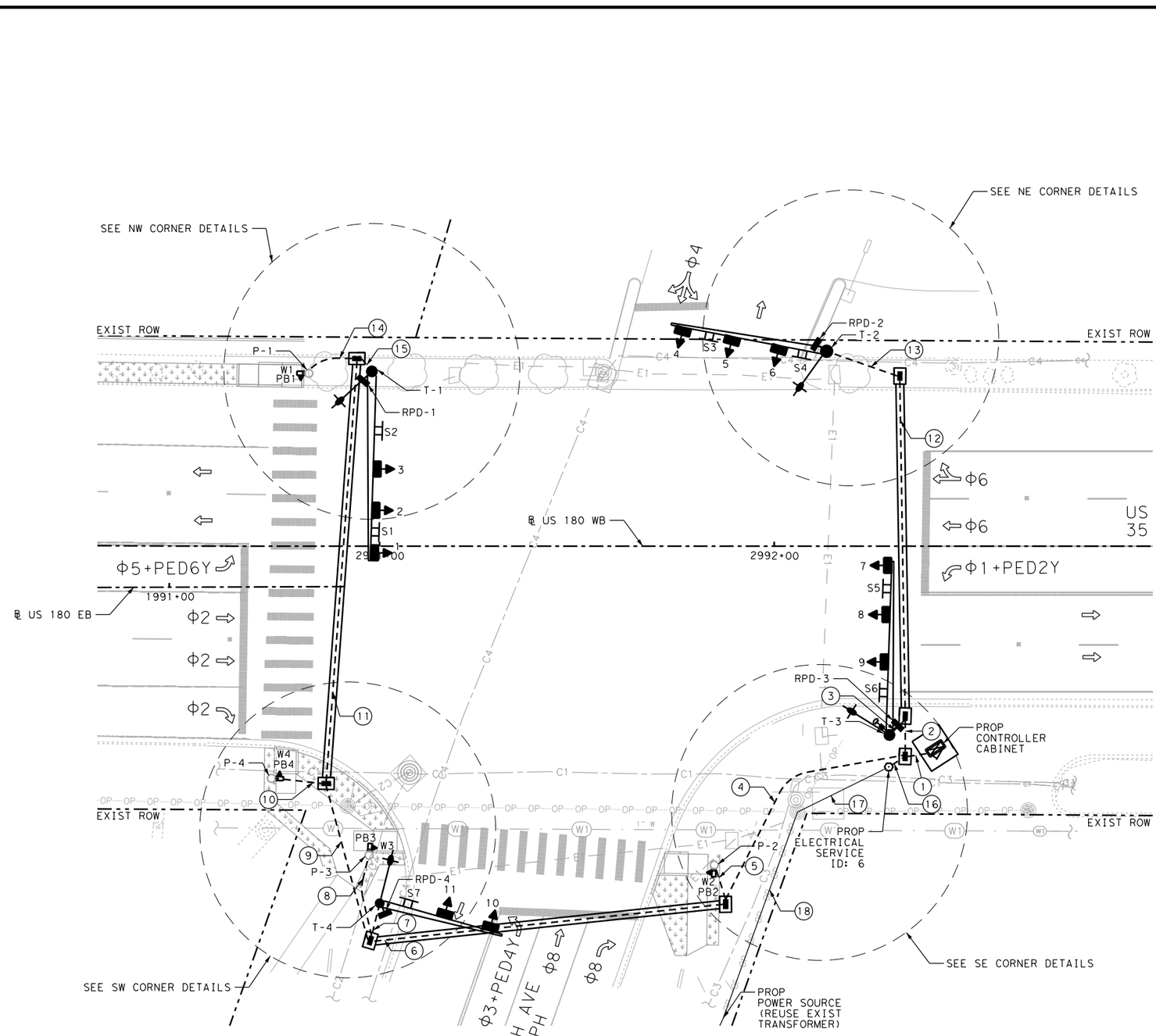

0 15′ 30′

SCALE: 1" = 30′

LEGEND

- EXIST PED POLE
- EXIST MAST ARM AND POLE
- EXIST MAST ARM MOUNTED SIGN
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION (PRESENCE) (RPD)
- PROP RADAR DETECTION (ADVANCED) (RADD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOTES:

1. EXISTING PEDESTRIAN SIGNAL HEADS TO BE REMOVED AND REPLACED WITH LED COUNTDOWN PEDESTRIAN SIGNAL HEADS.
2. EXISTING PEDESTRIAN PUSH BUTTONS TO BE REMOVED AND REPLACED WITH APS PUSH BUTTONS.
3. CONTRACTOR SHALL INSTALL THE RPD DETECTORS ACCORDING TO MANUFACTURER SPECIFICATIONS.
4. THE LOCATION OF THE RPD DETECTORS SHALL BE DETERMINED BY THE CONTRACTOR AND CONFIRMED BY THE ENGINEER PRIOR TO INSTALLATION.
5. ALL EXISTING CONDUIT TO BE ABANDONED IN PLACE.
6. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.

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PROPOSED TRAFFIC SIGNAL INTERSECTION LAYOUT

US 180 AT SE 25TH AVE

SHEET 1 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	188
0008	01	046, ETC	

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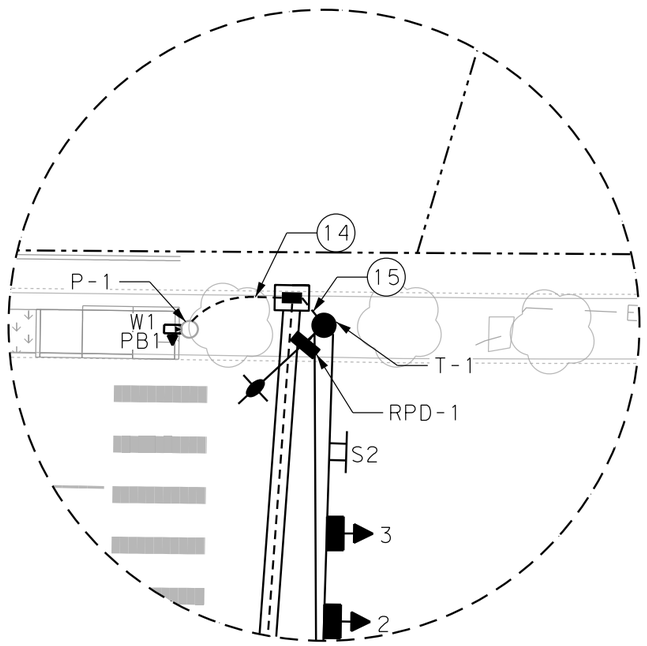
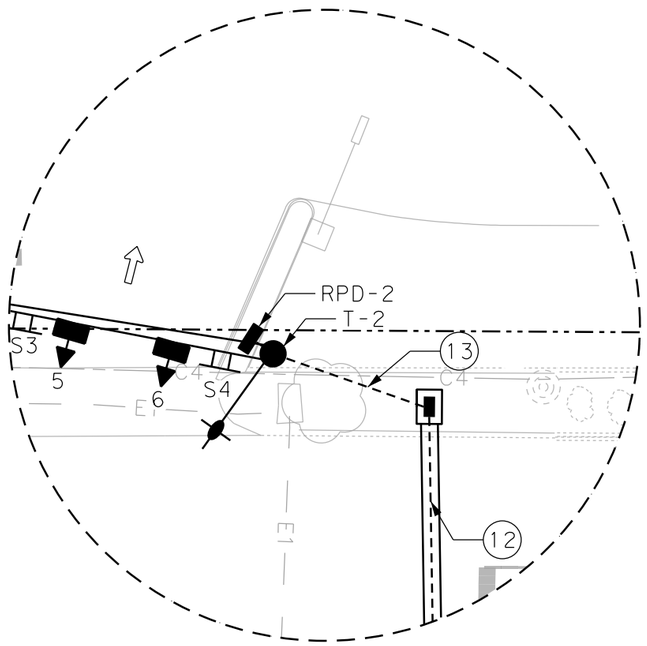


NW CORNER DETAILS



NE CORNER DETAILS

SW CORNER DETAILS

SE CORNER DETAILS

LEGEND

- EXIST PED POLE
- EXIST MAST ARM AND POLE
- EXIST MAST ARM MOUNTED SIGN
- EXIST GROUND MOUNTED SIGN
- EXIST POWER POLE
- EXIST MANHOLE
- EXIST FIRE HYDRANT
- EXIST WATER VALVE
- EXIST CONTROL MARKERS
- EXIST LUMINAIRE
- EXIST OH POWER LINE
- EXIST UG QLC/QLD LINE
- EXIST UG QLB LINE
- EXIST UG SIGNAL CABLE (TXDOT)
- EXIST UG WATER (MINERAL WELLS)
- EXIST UG SANITARY SEWER (MINERAL WELLS)
- EXIST UG STORM DRAIN (TXDOT)
- EXIST UG ELECTRIC (TXDOT)
- EXIST UG GAS (TX GAS)
- EXIST UG COMMUNICATION (AT&T FO/DUCT [C1], AT&T TELE [C2], FIBERLIGHT FO/DUCT [C3], UNITE FO/DUCT [C4], ZAYO FO/DUCT [C5], UNKNOWN TELECOM [C6])
- PROP CONTROLLER CABINET W/ BBU AND CELL ROUTER
- PROP ELECTRICAL SERVICE
- PROP GROUND BOX TYPE D W/ APRON
- PROP HORIZONTAL TRAFFIC SIGNAL HEAD
- PROP PEDESTRIAN SIGNAL HEAD
- PROP MAST ARM AND POLE
- PROP PED POLE
- PROP LUMINAIRE
- PROP PEDESTRIAN APS PUSH BUTTON
- PROP MAST ARM MOUNTED SIGN
- PROP RADAR DETECTION(PRESENCE)(RPD)
- PROP RADAR DETECTION(ADVANCED)(RADD)
- PROP CCTV CAMERA
- PROP CONDUIT (TRENCH)
- PROP CONDUIT (BORE)

NOT TO SCALE

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PROPOSED TRAFFIC SIGNAL LAYOUT DETAILS

US 180 AT SE 25TH AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	189
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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CONDUIT SCHEDULE											
RUN NO.	NO. OF CONDUIT 4 (IN)	LENGTH (LF)	BORE(B) TRENCH(T) EXIST(E) OVERHEAD(OH)	1C#6 AWG XHHW	1C#6 AWG BARE	2C#12 AWG APS	4C#12 AWG LUMINAIRE	7C#14 AWG PED HEAD	16C#14 AWG SIGNAL	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
1	2	5	T	2	2	4		4	4	4	1
2	1	10	T		1		2		2	2	1
3	1	5	T		1		1		1	1	1
4	1	65	T		1	4	2	4	2	2	
5	1	10	T		1	1		1			
6	1	90	B		1	3	2	3	2	2	
7	1	10	T		1		1		1	1	
8	1	20	T		1	1		1			
9	1	40	T		1	2	1	2	1	1	
10	1	15	T		1	1		1			
11	1	110	B		1	1	1	1	1	1	
12	1	85	B		1		1		1	1	
13	1	20	T		1		1		1	1	
14	1	15	T		1	1		1			
15	1	5	T		1		1		1	1	
16	1	5	T	2	1		4				
17	OVERHEAD	25	OH								
18	OVERHEAD	200	OH								
NET ADDITIONAL CABLE TOTALS (LF)				20	515	800	625	800	625	625	20

CONDUIT TOTALS (LF)	
4" TRENCH	230
4" BORE	285

NOTE:
1. THIS CONDUIT SCHEDULE DOES NOT REFLECT THE QUANTITIES OF CABLE INSIDE THE POLES (I.E. 5C#14 & 7C#14 FOR SIGNAL HEADS AND 4C#12 TRAY CABLE FOR LUMINAIRES). THE CONTRACTOR SHALL INSTALL A MULE TAPE IN ALL CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).

POLE AND ARM WIRING						
POLE NO.	2C#12 AWG APS	4C#12 AWG LUMINAIRE	5C#14 AWG SIGNAL (3-SEC)	7C#14 AWG SIGNAL (4-SEC & PED HEAD)	RPD CABLE DETECTION **	CCTV CAMERA CABLE ***
T-1		40	100	70	30	
T-2		40	100	60	30	
T-3		40	95	65	30	30
T-4		40	90		30	
P-1	5			10		
P-2	5			10		
P-3	5			10		
P-4	5			10		
TOTAL (LF)	20	160	385	235	120	30

NOTES:
**RPD CABLE TO BE SUPPLIED BY TXDOT AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEMS 6045 AND 6046.

***CCTV CABLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR. PAYMENTS SHALL BE SUBSIDIARY TO ITEM 6010.

POLE SCHEDULE															
POLE NUMBER	T-1			T-2			T-3			T-4		P-1	P-2	P-3	P-4
POLE STATUS	PROP			PROP			PROP			PROP		EXIST	EXIST	EXIST	EXIST
MAST ARM LENGTH (FT)	48			40			44			32		PED	PED	PED	PED
FOUNDATION TYPE	36-A			36-A			36-A			30-A		24-A	24-A	24-A	24-A
LUMINAIRES	YES			YES			YES			YES		NO	NO	NO	NO
MAST ARM SIGNS	S1, S2			S3, S4			S5, S6			S7		NO	NO	NO	NO
SIGNAL/PED HEAD NO.	1	2	3	4	5	6	7	8	9	10	11	W1	W2	W3	W4
LED SIGNAL INDICATIONS	<-R <-Y <-FY <-G	R Y G	R Y G	<-R <-Y <-FY <-G	R Y G	R Y G	<-R <-Y <-FY <-G	R Y G	R Y G	R Y G	R Y G	DW W	DW W	DW W	DW W

MINIMUM PEDESTRIAN TIMING				
PED PHASE	SIGNAL HEAD NO.	WALK TIME (SEC)	FLASHING DON'T WALK TIME (SEC)	TOTAL PED TIMING (SEC)
PHASE 2 W	W2, W3	7	16	23
PHASE 4 W	W1, W4	7	23	30

ELECTRICAL SERVICE												
ELECTRICAL SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	BRANCH CIRCUIT ID	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
6	188	ELC SRV TY D 120/240 060 (NS) SS (E) SP (O)	1 1/4"	3/#6	N/A	2P/60	N/A	100	TRAFFIC SIGNAL ILLUMINATION	1P/30 2P/15	24.0 2.84	3.6

STATE OF TEXAS
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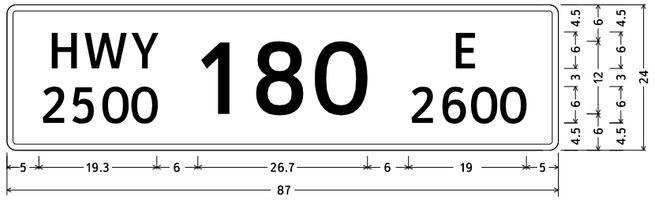
TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 AT SE 25TH AVE

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	190
0008	01	046, ETC	

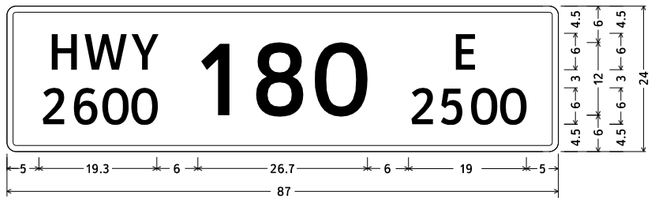
PROPOSED SIGNS

S4



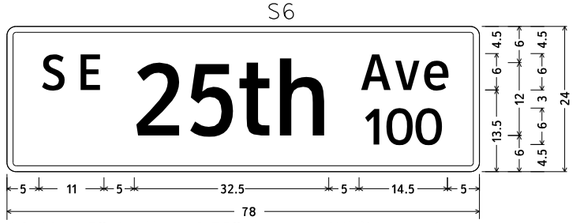
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[HWY] White ClearviewHwy-3-W; [2500] White ClearviewHwy-3-W;
[180] White ClearviewHwy-3-W; [E] White ClearviewHwy-3-W;
[2600] White ClearviewHwy-3-W;

S7



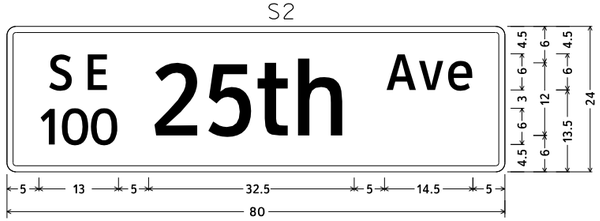
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[HWY] White ClearviewHwy-3-W; [2600] White ClearviewHwy-3-W;
[180] White ClearviewHwy-3-W; [E] White ClearviewHwy-3-W;
[2500] White ClearviewHwy-3-W;

S6



D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [25th] White ClearviewHwy-3-W;
[Ave] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;

S2



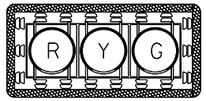
D3-1G; 1.5" Radius, 0.75" Border, White on, Green;
[SE] White ClearviewHwy-3-W; [100] White ClearviewHwy-3-W;
[25th] White ClearviewHwy-3-W; [Ave] White ClearviewHwy-3-W;

S1, S3, S5

R10-17T
36X42

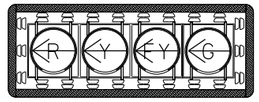
PROPOSED SIGNAL SCHEDULE

3-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEADS
2, 3, 5, 6, 8, 9, 10, 11

4-SECTION, 12" HORIZONTAL
SIGNAL HEAD WITH VENTED
ALUMINUM BACK PLATE



SIGNAL HEADS
1, 4, 7

APS PUSH BUTTON
R10-3ER(9"X15")

PB1, PB4

APS PUSH BUTTON
R10-3EL(9"X15")

PB2, PB3

LED COUNTDOWN
PEDESTRIAN
SIGNAL HEAD

W1, W2, W3, W4

NOT TO SCALE

November 1, 2021

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TRAFFIC SIGNAL DETAIL/SUMMARY SHEET

US 180 AT SE 25TH AVE

SHEET 2 OF 2

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	191
CONTROL	SECTION	JOB	
0008	01	046, ETC	

CABLE TERMINATION CHART									
CNDR. NO.	CONDR. COLOR	CABLE 1 FROM T-1 TO CNTRL. 16 CNDR.	CABLE 2 FROM T-2 TO CNTRL. 16 CNDR.	CABLE 3 FROM T-3 TO CNTRL. 16 CNDR.	CABLE 4 FROM T-4 TO CNTRL. 16 CNDR.	CABLE 5 FROM P-1 TO CNTRL. 7 CNDR.	CABLE 6 FROM P-2 TO CNTRL. 7 CNDR.	CABLE 7 FROM P-3 TO CNTRL. 7 CNDR.	CABLE 8 FROM P-4 TO CNTRL. 7 CNDR.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	S. COM	S. COM	S. COM	S. COM	PED. COM	PED. COM	PED. COM	PED. COM
3	RED	SG 2,3 PH 6 R	SG 5,6 PH 8 R	SG 8,9 PH 2 R	SG 10,11 PH 4 R	W1 PH 4 DW	W2 PH 2 DW	W3 PH 2 DW	W4 PH 4 DW
4	GREEN	SG 2,3 PH 6 G	SG 5,6 PH 8 G	SG 8,9 PH 2 G	SG 10,11 PH 4 G	W1 PH 4 W	W2 PH 2 W	W3 PH 2 W	W4 PH 4 W
5	ORANGE	SG 2,3 PH 6 Y	SG 5,6 PH 8 Y	SG 8,9 PH 2 Y	SG 10,11 PH 4 Y	SPARE	SPARE	SPARE	SPARE
6	BLUE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
7	WHITE/ BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
8	RED/ BLACK	SG 1 PH 1 <-R	SG 4 PH 3 <-R	SG 7 PH 5 <-R	SPARE				
9	GREEN/ BLACK	SG 1 PH 1 <-G	SG 4 PH 3 <-G	SG 7 PH 5 <-G	SPARE				
10	ORANGE/ BLACK	SG 1 PH 1 <-Y	SG 4 PH 3 <-Y	SG 7 PH 5 <-Y	SPARE				
11	BLUE/ BLACK	SG 1 PED2Y <-FY	SG 4 PED4Y <-FY	SG 7 PED6Y <-FY	SPARE				
12	BLACK/ WHITE	SPARE	SPARE	SPARE	SPARE				
13	RED/ WHITE	SPARE	SPARE	SPARE	SPARE				
14	GREEN/ WHITE	SPARE	SPARE	SPARE	SPARE				
15	BLUE/ WHITE	SPARE	SPARE	SPARE	SPARE				
16	BLACK/ RED	SPARE	SPARE	SPARE	SPARE				

CABLE TERMINATION CHART									
CNDR. NO.	CONDR. COLOR					CABLE 9 FROM P-1 TO CNTRL. 2 CNDR.	CABLE 10 FROM P-2 TO CNTRL. 2 CNDR.	CABLE 11 FROM P-3 TO CNTRL. 2 CNDR.	CABLE 12 FROM P-4 TO CNTRL. 2 CNDR.
1	BLACK					PB1 PH 4 PED. CALL	PB2 PH 2 PED. CALL	PB3 PH 2 PED. CALL	PB4 PH 4 PED. CALL
2	WHITE					PED. COM	PED. COM	PED. COM	PED. COM

NOTES:
- SG = SIGNAL HEAD
- W = PEDESTRIAN WALK SIGNAL
- DW = PEDESTRIAN DON'T WALK SIGNAL
- PB = PEDESTRIAN PUSH BUTTON
- <-G = GREEN ARROW
- <-Y = YELLOW ARROW
- <-FY = FLASHING YELLOW ARROW
- <-R = RED ARROW

RPD PRESENSE DETECTION

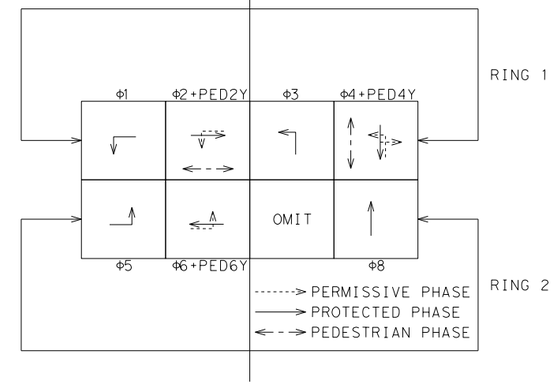
CLICK 656

SENSOR 1	PH2	PH5	RPD 1
SENSOR 2	PH4		RPD 2
SENSOR 3	PH1	PH6	RPD 3
SENSOR 4	PH3	PH8	RPD 4
SENSOR 5			
SENSOR 6			

CONTROLLER (BIU 9)

DETECTOR CHANNEL	1	2	3	4	5	6	7	8
PHASE ASSIGNMENT	PH1	PH2L, C	PH3	PH4	PH5	PH6L		PH8L
MATRIX OUTPUT CHANNEL	1	2	3	4	5	6		8
DETECTOR CHANNEL	9	10	11	12	13	14	15	16
PHASE ASSIGNMENT		PH2R				PH6R		PH8R
MATRIX OUTPUT CHANNEL		10				14		16

PHASING DIAGRAM



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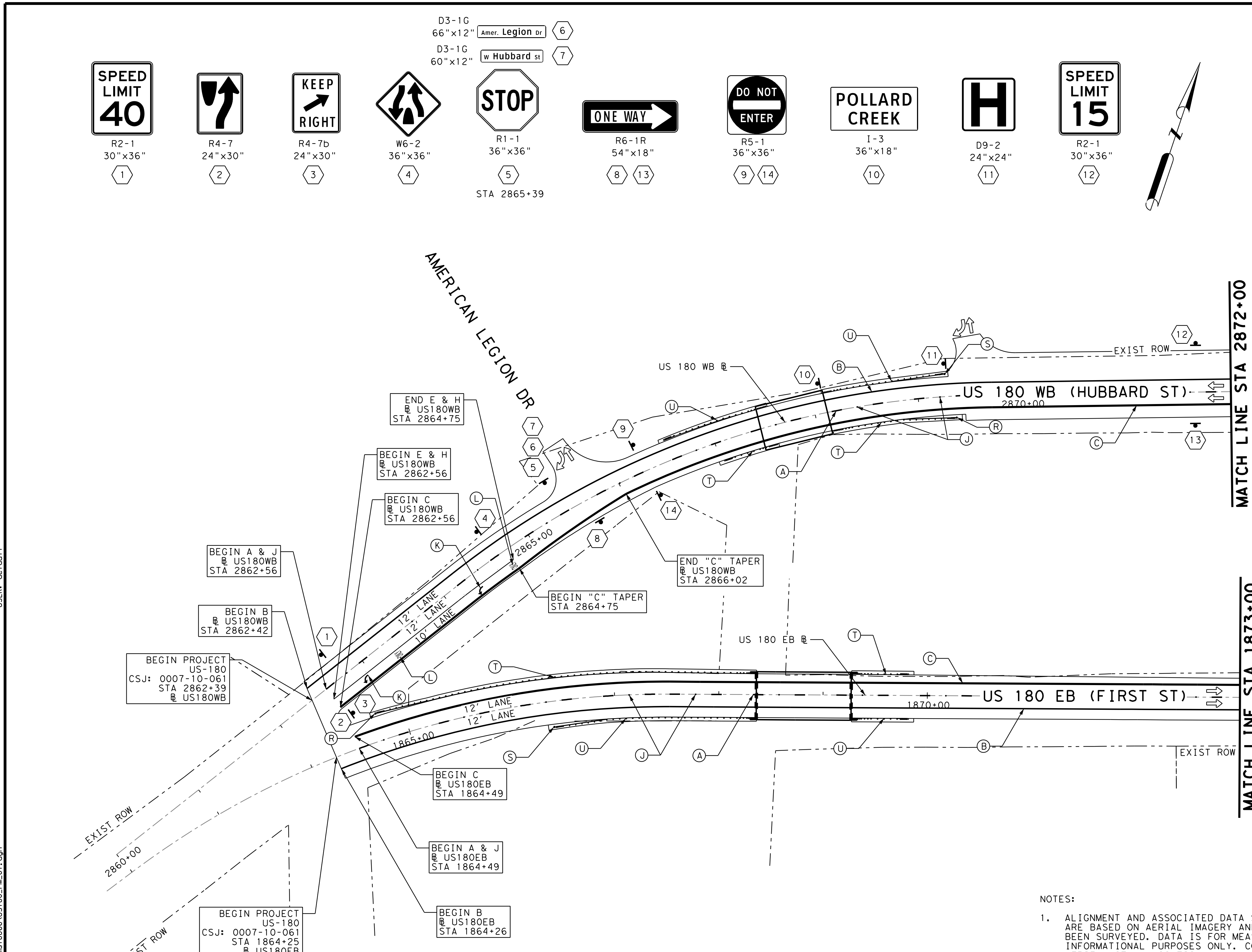
TRAFFIC SIGNAL TERMINATION & PHASING

US 180 AT SE 25TH AVE

SHEET 1 OF 1

FED RD DIV NO.	STATE PROJECT NO.		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	192
CONTROL	SECTION	JOB	
0008	01	046, ETC	



LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
- ⇦ TRAFFIC FLOW DIRECTION
- ⬡# EXIST SIGN TO BE REMOVED AND REPLACED
- △# EXIST SIGN TO REMAIN

0 50' 100'
SCALE: 1" = 100'

NOTES:

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3. EDGE STRIPING SHALL NOT BE INSTALLED ACROSS CROSS STREETS.
4. REFER TO TYPICAL SECTIONS FOR LANE WIDTH DIMENSIONS.
5. REFER TO PAVEMENT MARKING DETAIL LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 1 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	193
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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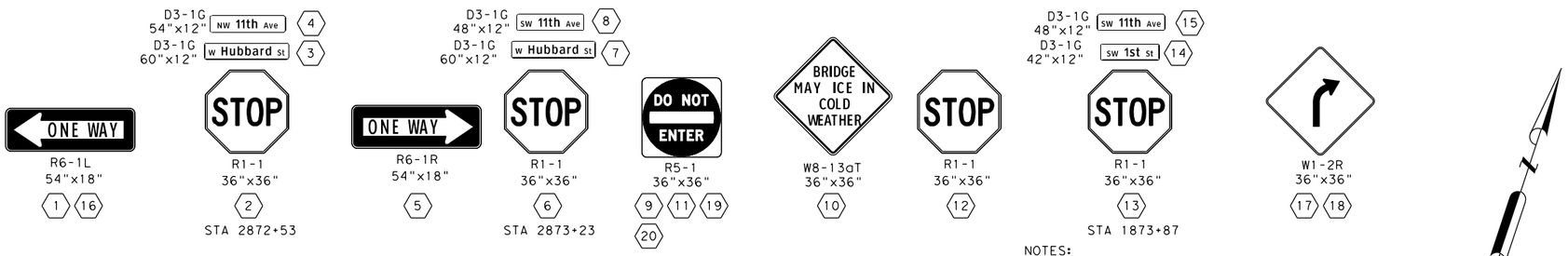

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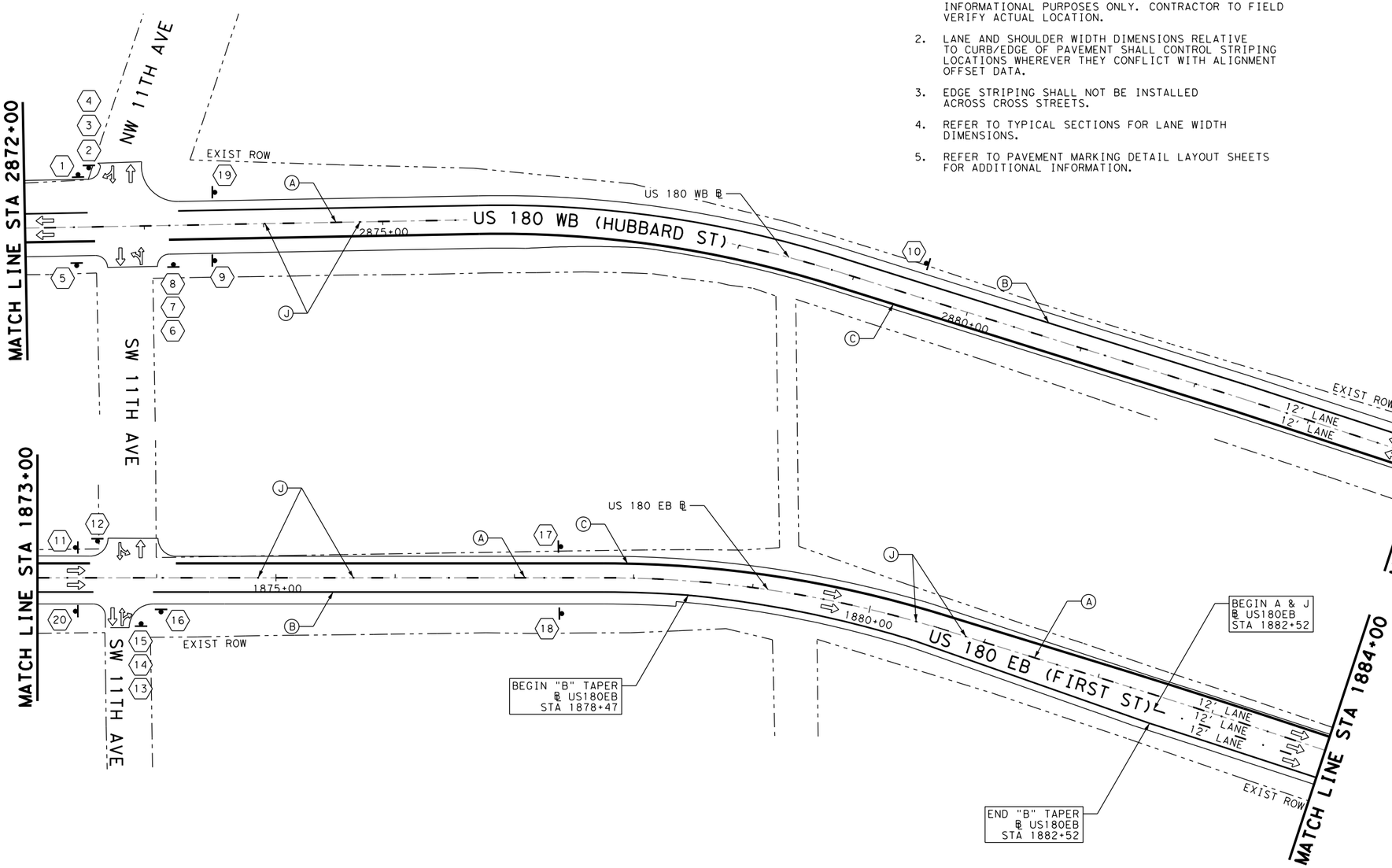

LEGEND

A	RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
B	RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
C	RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
D	RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
E	REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
F	REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
G	REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
H	REFL PAV MRKR TY I-C @ 20' C-C
I	REFL PAV MRKR TY II-A-A @ 20' C-C
J	REFL PAV MRKR TY II-C-R @ 80' C-C
K	REFL PAV MRK TY I (W)(ARROW)(100MIL)
L	REFL PAV MRK TY I (W)(WORD)(100MIL)
M	REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
N	REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
O	DEL ASSM (D-DY)SZ 1 (FLX) SRF
P	RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
Q	REFL PAV MRKR TY I-C @ 80' C-C
R	OM ASSM (OM-3L) (TWT)GND
S	OM ASSM (OM-3R) (TWT)GND
T	DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
U	DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
V	REFL PAV MRKR TY I-C @ 48' C-C
W	REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
⇦	TRAFFIC FLOW DIRECTION
⬡ #	EXIST SIGN TO BE REMOVED AND REPLACED
△ #	EXIST SIGN TO REMAIN

0 50' 100'
SCALE: 1" = 100'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER
11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	194
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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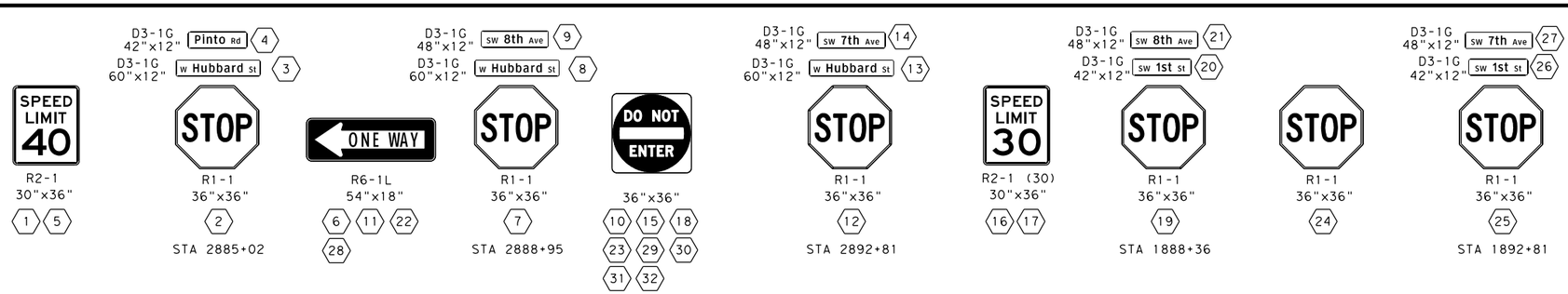

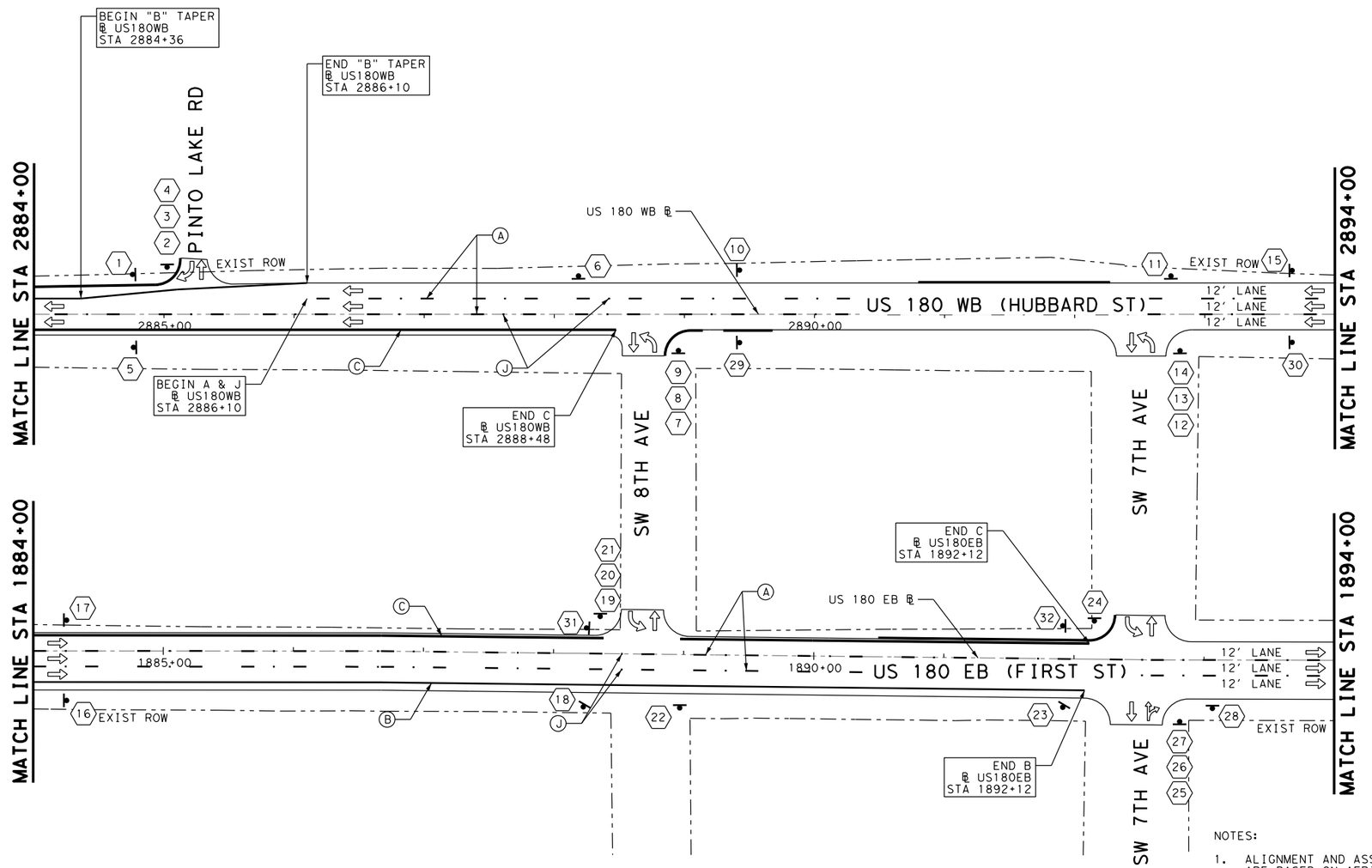

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
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- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
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- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)

TRAFFIC FLOW DIRECTION

(#) EXIST SIGN TO BE REMOVED AND REPLACED

△(#) EXIST SIGN TO REMAIN

0 50' 100'

SCALE: 1" = 100'

NOTES:

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STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	195
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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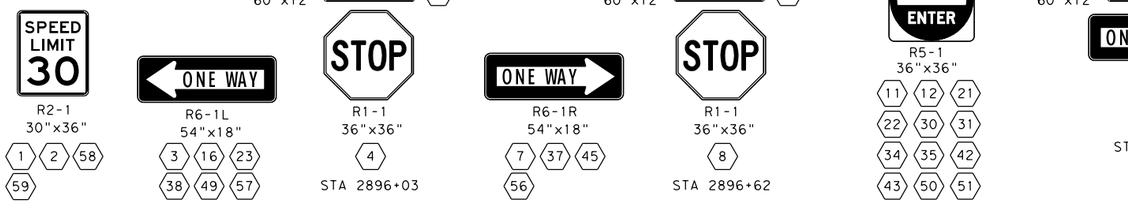

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LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
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- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
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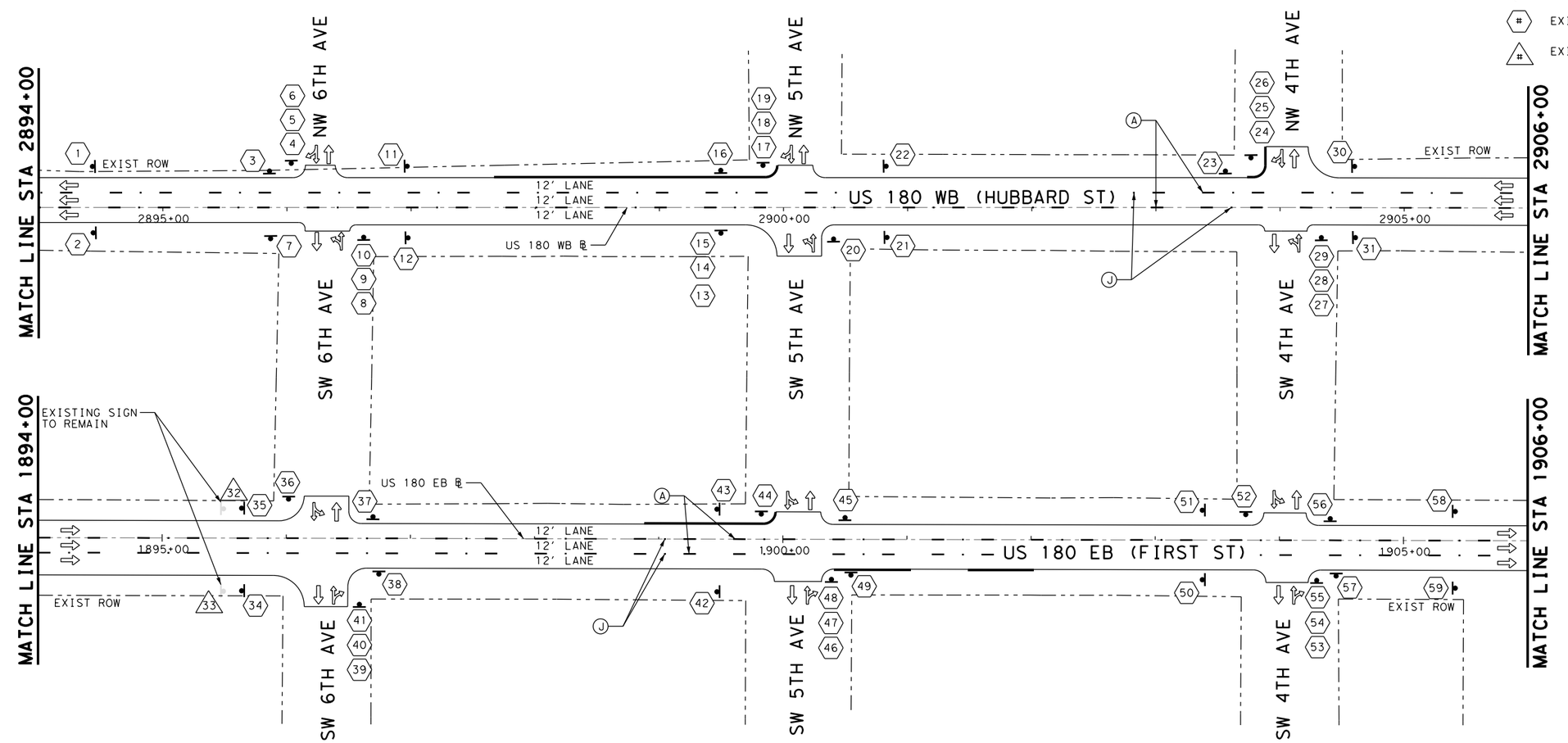
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
- ⇦ TRAFFIC FLOW DIRECTION
- (#) EXIST SIGN TO BE REMOVED AND REPLACED
- △# EXIST SIGN TO REMAIN



0 50' 100'
SCALE: 1" = 100'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	196
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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10/27/2021
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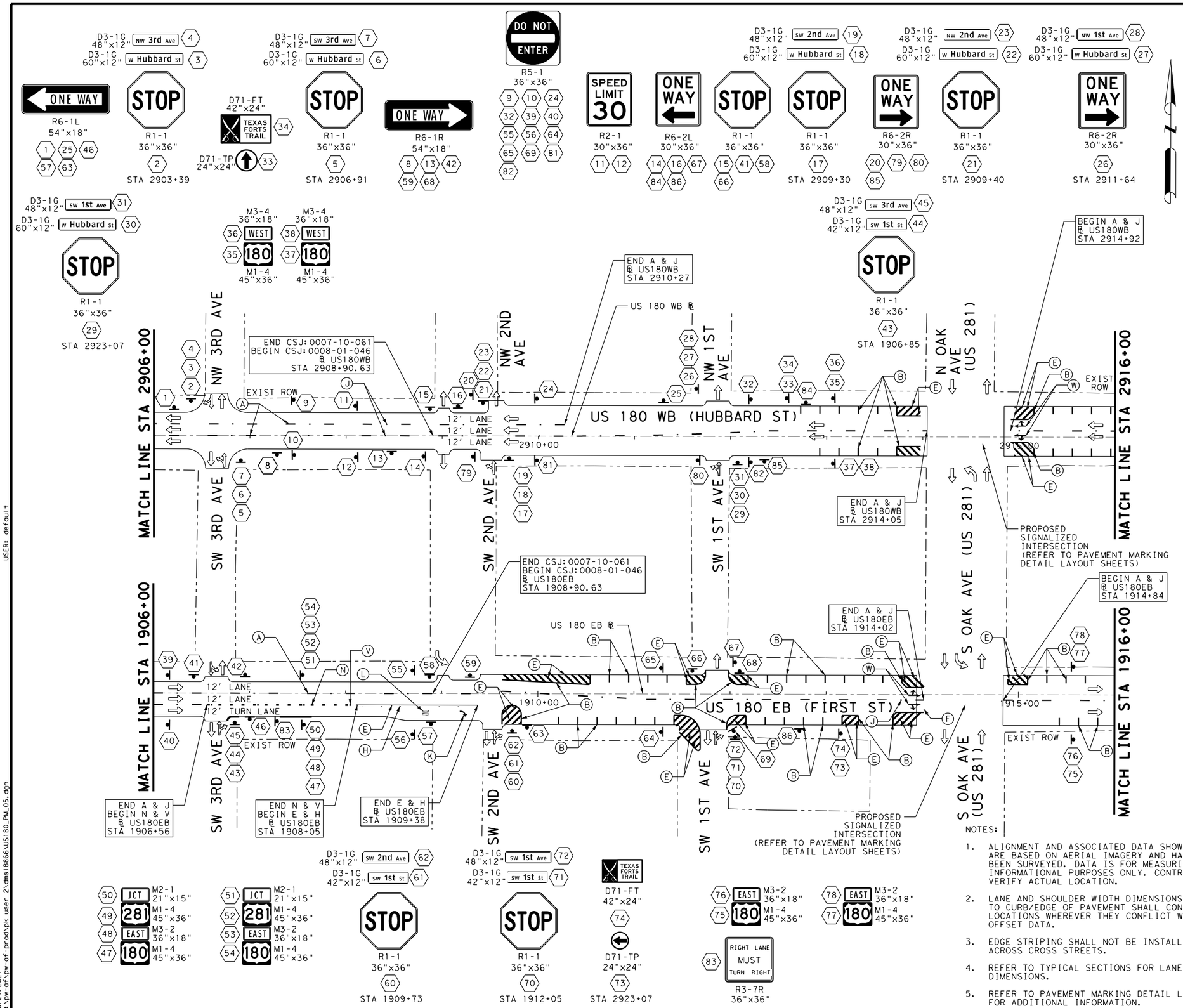

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
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0 50' 100'

SCALE: 1" = 100'

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STATE OF TEXAS
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11/01/2021

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4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 5 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	197
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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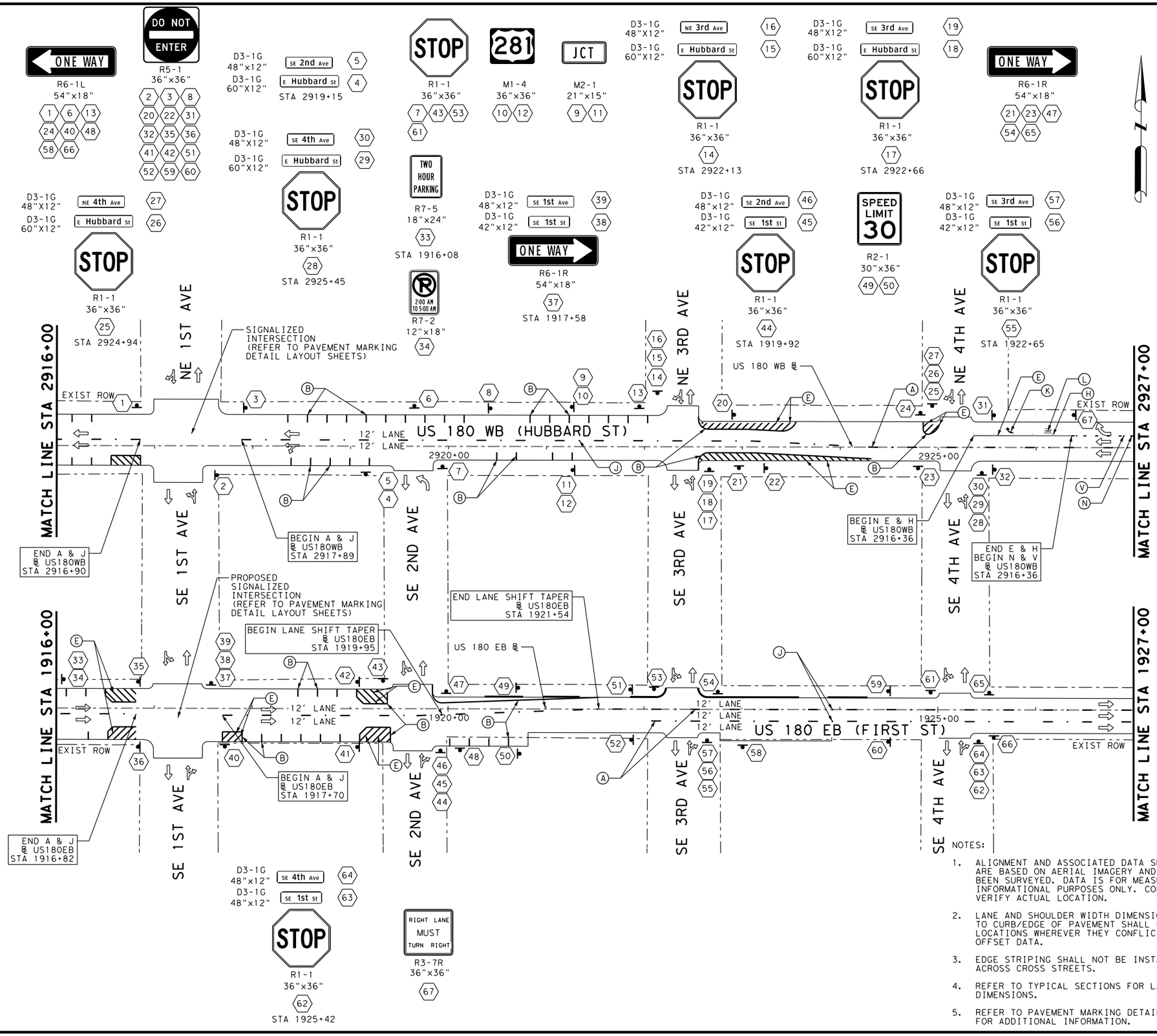

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
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0 50' 100'
SCALE: 1" = 100'

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STATE OF TEXAS
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11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 6 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	198
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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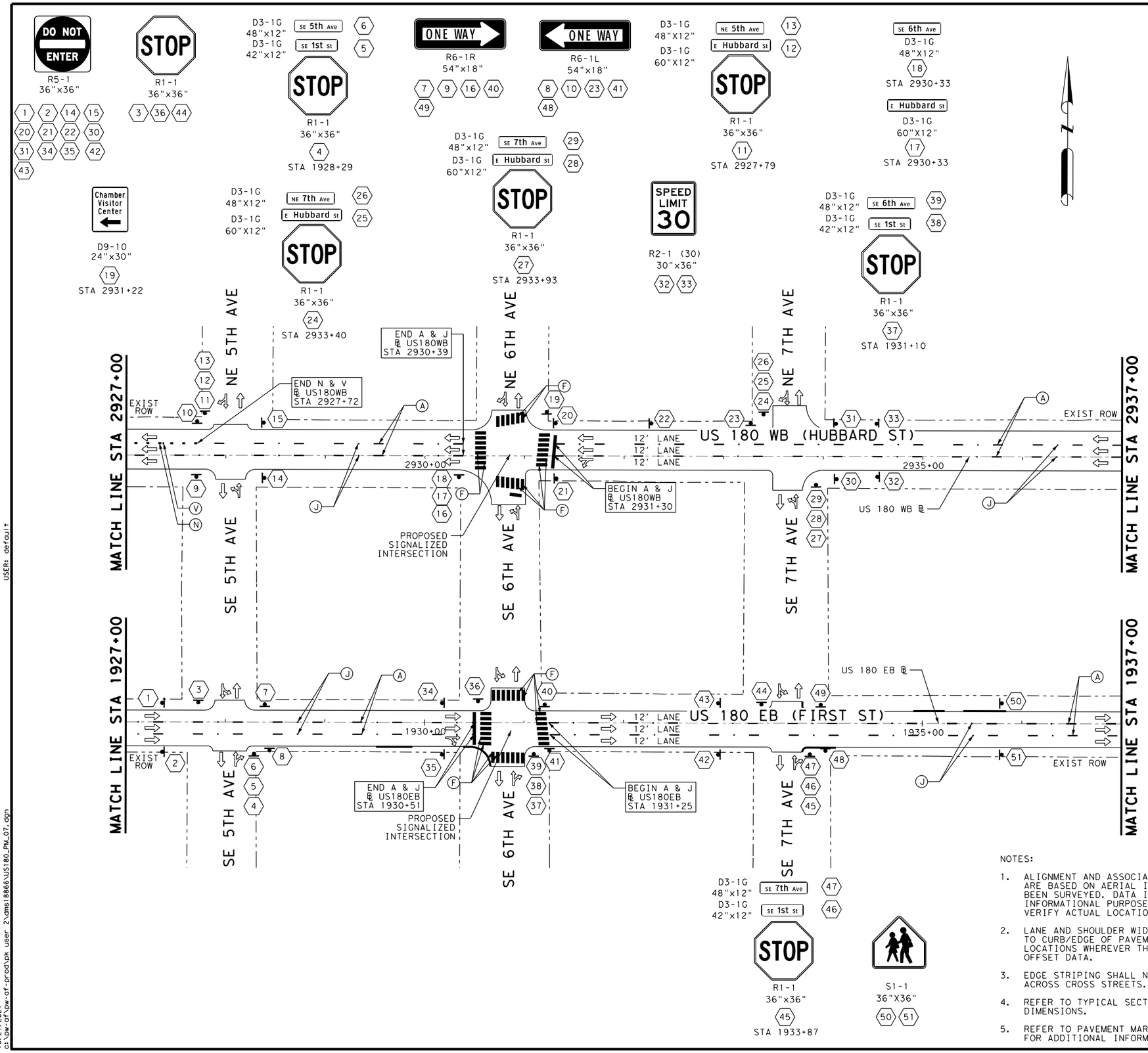

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
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- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)

⇦ TRAFFIC FLOW DIRECTION

(#) EXIST SIGN TO BE REMOVED AND REPLACED

△(#) EXIST SIGN TO REMAIN

0 50' 100'

SCALE: 1" = 100'

NOTES:

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3. EDGE STRIPING SHALL NOT BE INSTALLED ACROSS CROSS STREETS.
4. REFER TO TYPICAL SECTIONS FOR LANE WIDTH DIMENSIONS.
5. REFER TO PAVEMENT MARKING DETAIL LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	199
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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10/27/2021
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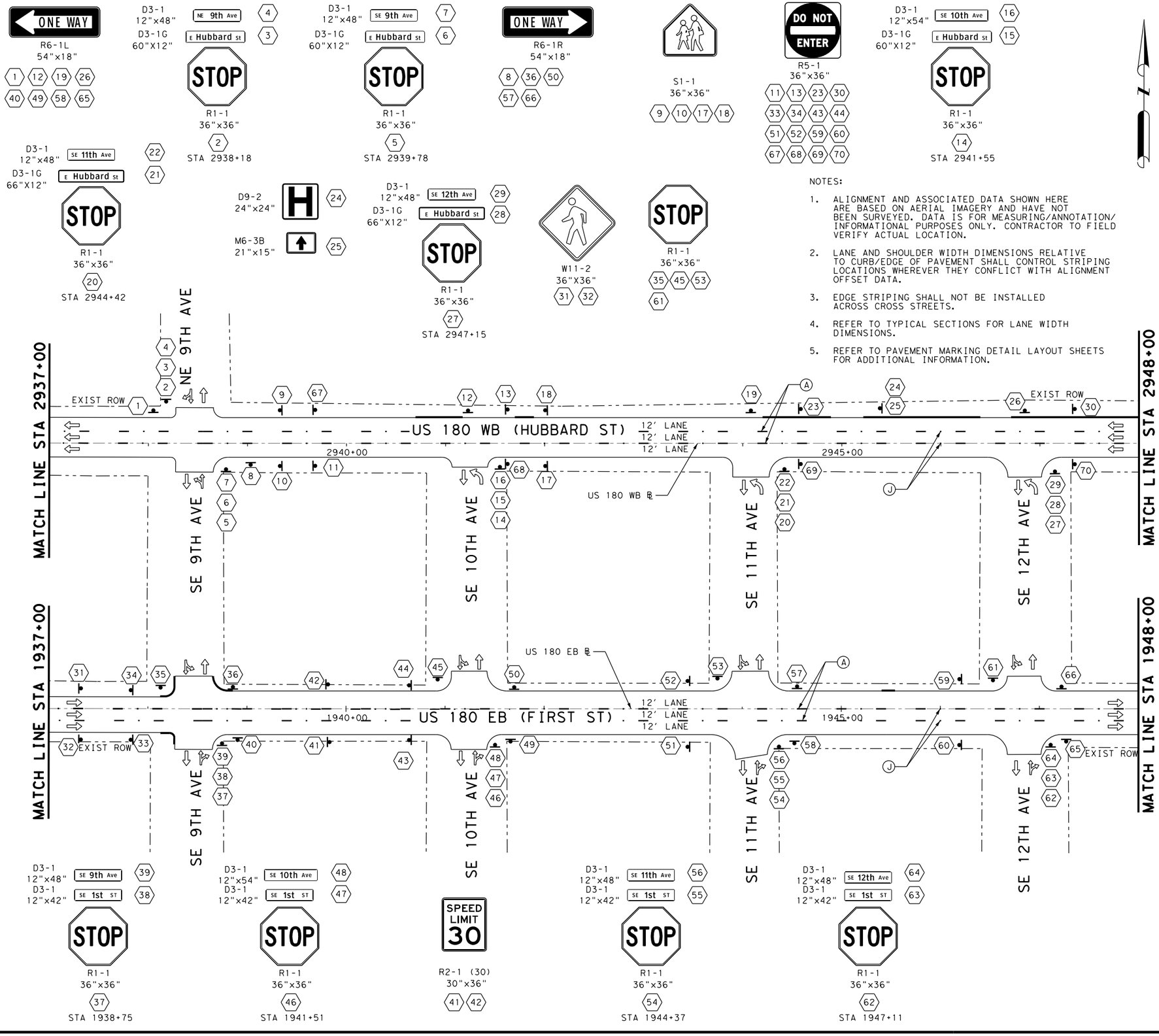

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)

⇦ TRAFFIC FLOW DIRECTION

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△ EXIST SIGN TO REMAIN

0 50' 100'

SCALE: 1" = 100'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	200
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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10/27/2021
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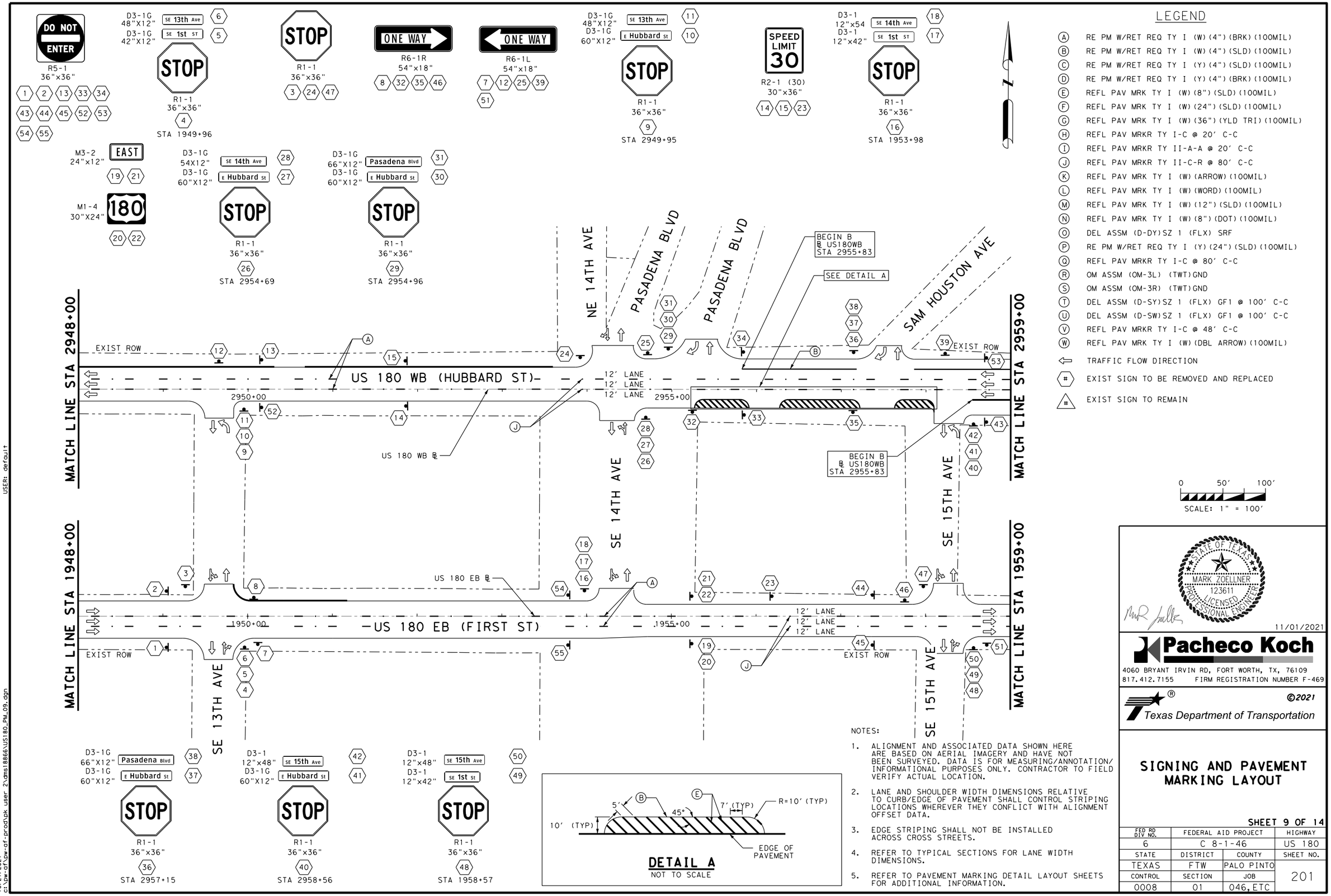

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
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- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)

⇦ TRAFFIC FLOW DIRECTION

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STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 9 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	201
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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10/27/2021
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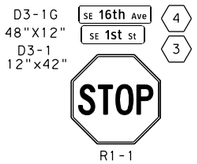
R5-1
36"x36"

1 6 7 22 29 37 38 45 46 47 48 49



4 3

R1-1
36"x36"

2

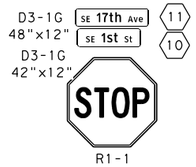
STA 1961+56

R6-1R
54"x18"

13 21 25

R1-1
36"x36"

8 15 39



11 10

R1-1
36"x36"

9

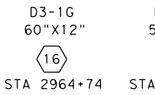
STA 1965+08

R6-1L
54"x18"

5 12 14 33 40 44

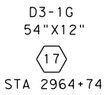
R2-1
30"X36"

23 24



16

STA 2964+74



17

STA 2964+74

20 19

R1-1
36"x36"

18

STA 2965+07

28 27

R1-1
36"x36"

26

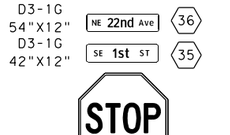
STA 2967+16

32 31

R1-1
36"x36"

30

STA 2968+58

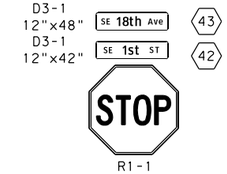


36 35

R1-1
36"x36"

34

STA 2969+59



43 42

R1-1
36"x36"

41

STA 1968+53

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LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
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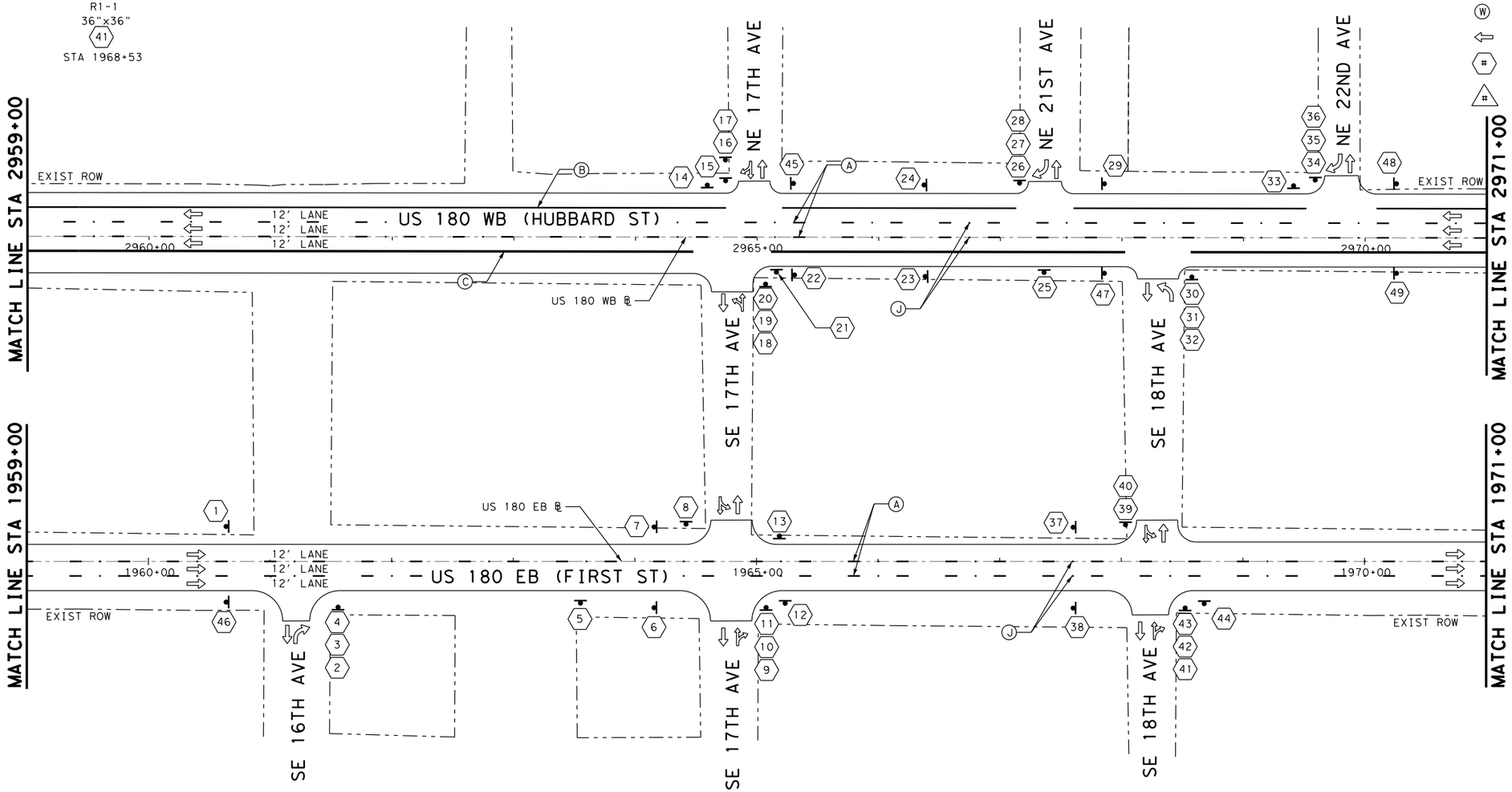
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
- TRAFFIC FLOW DIRECTION
- (#) EXIST SIGN TO BE REMOVED AND REPLACED
- (#) EXIST SIGN TO REMAIN



0 50' 100'

SCALE: 1" = 100'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 10 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	202
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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10/27/2021
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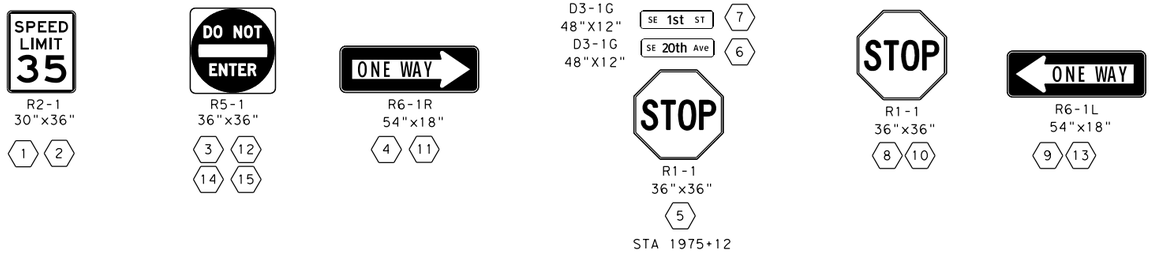

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
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- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
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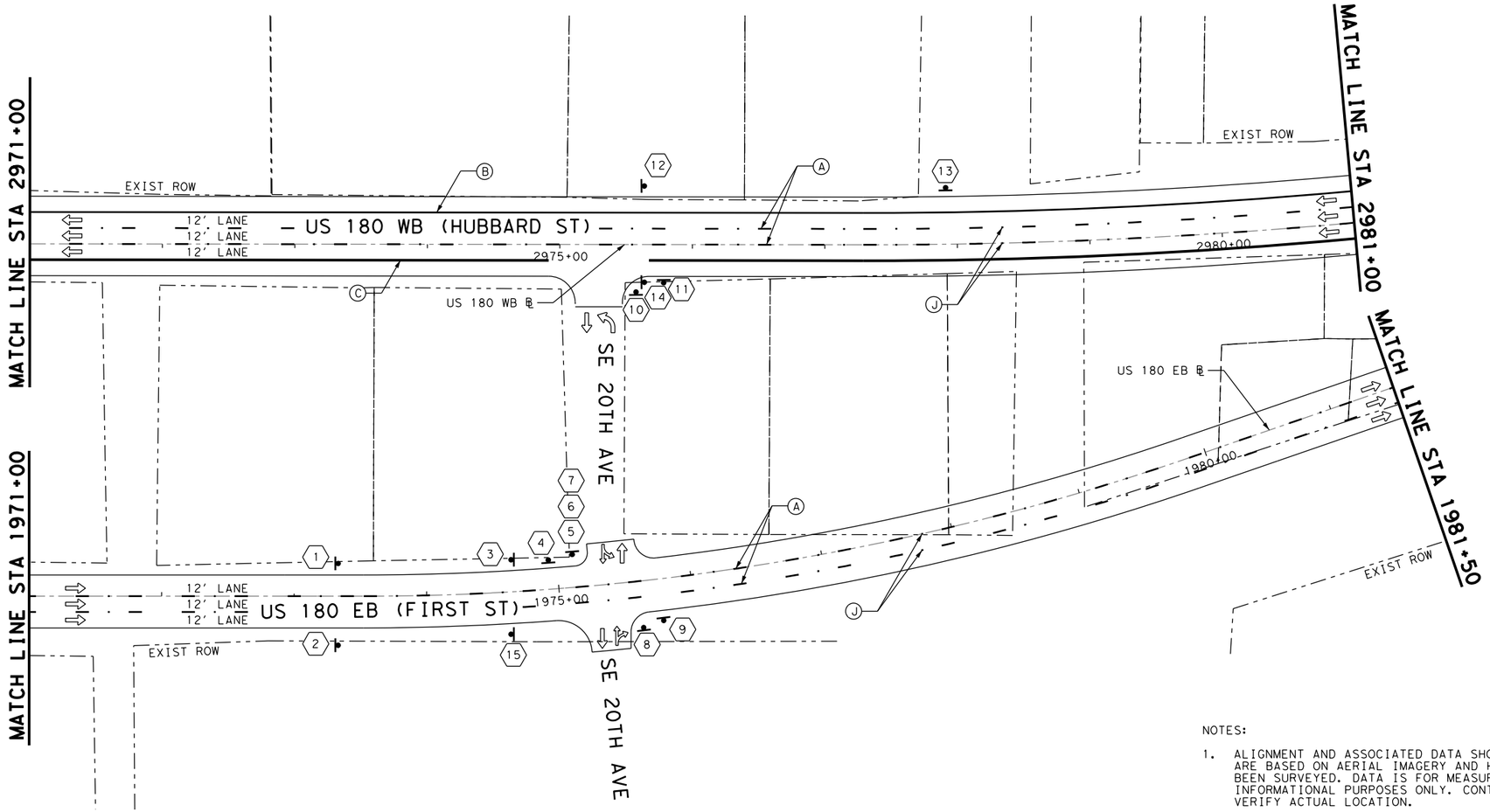

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STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 11 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	203
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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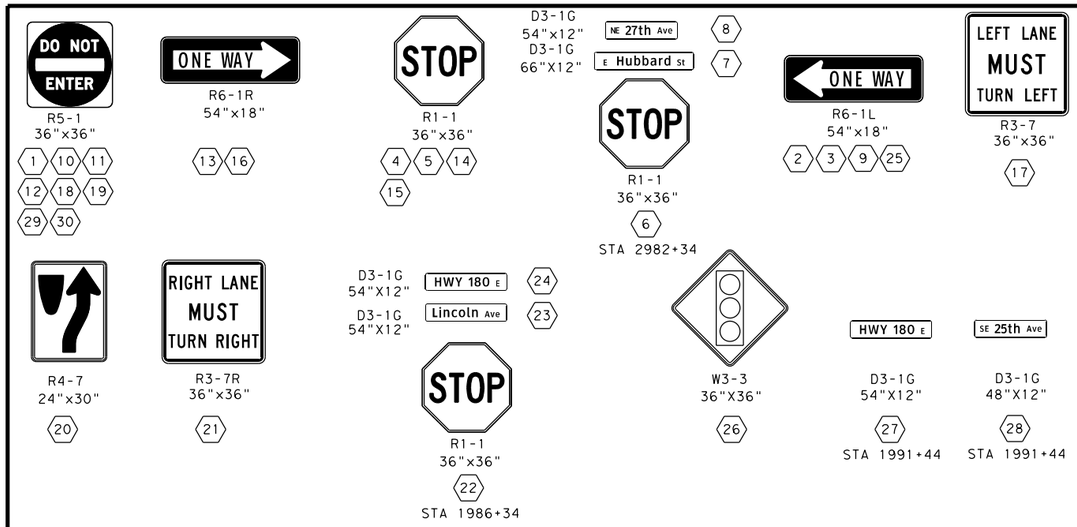

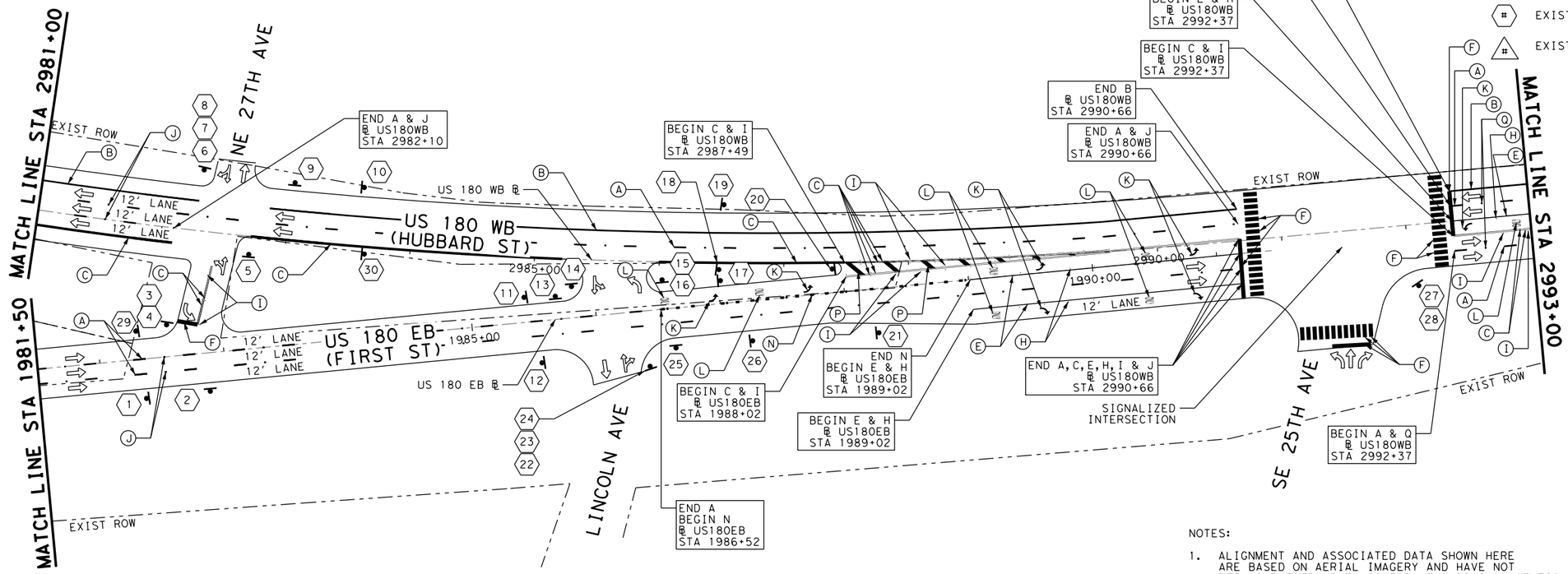

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
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11/01/2021

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817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 12 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	204
CONTROL	SECTION	JOB	
0008	01	046, ETC	

USER: default
11:04:21 AM
10/27/2021
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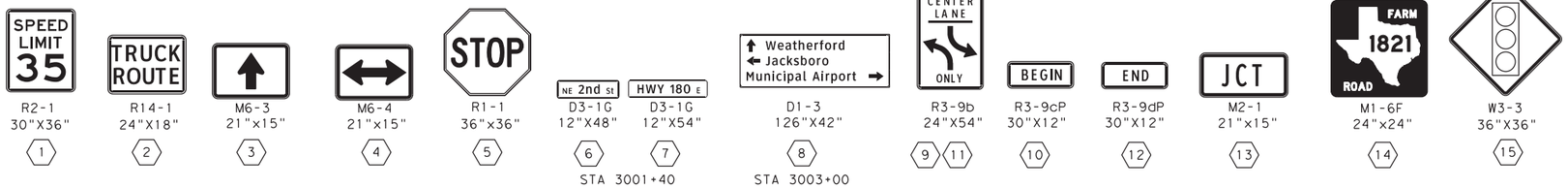
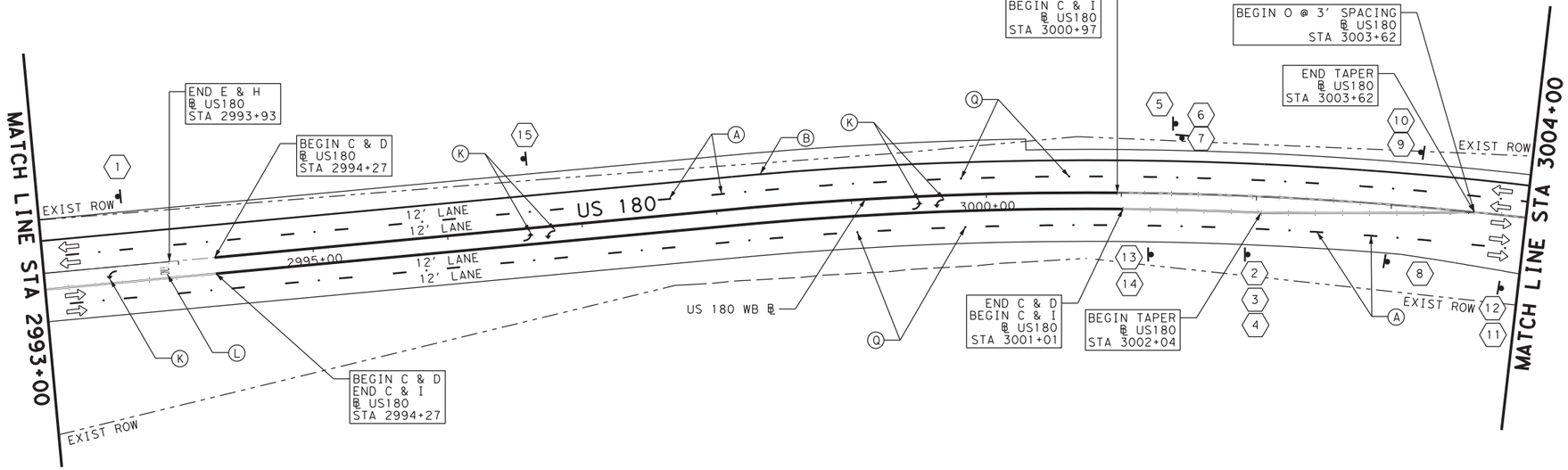




LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (YFLX)SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)

⇦ TRAFFIC FLOW DIRECTION

⬡ # EXIST SIGN TO BE REMOVED AND REPLACED

△ # EXIST SIGN TO REMAIN

0 50' 100'

SCALE: 1" = 100'

NOTES:

1. ALIGNMENT AND ASSOCIATED DATA SHOWN HERE ARE BASED ON AERIAL IMAGERY AND HAVE NOT BEEN SURVEYED. DATA IS FOR MEASURING/ANNOTATION/ INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION.
2. LANE AND SHOULDER WIDTH DIMENSIONS RELATIVE TO CURB/EDGE OF PAVEMENT SHALL CONTROL STRIPING LOCATIONS WHEREVER THEY CONFLICT WITH ALIGNMENT OFFSET DATA.
3. EDGE STRIPING SHALL NOT BE INSTALLED ACROSS CROSS STREETS.
4. REFER TO TYPICAL SECTIONS FOR LANE WIDTH DIMENSIONS.
5. REFER TO PAVEMENT MARKING DETAIL LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

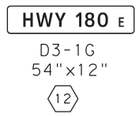
Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

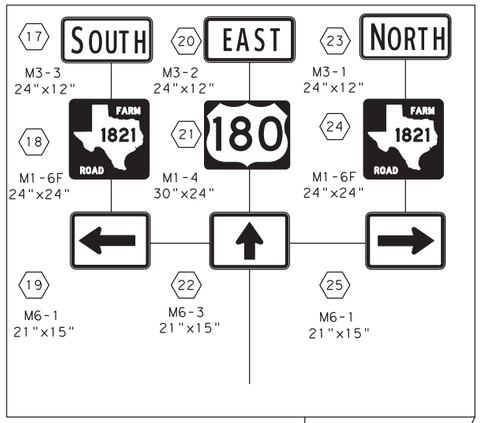
Texas Department of Transportation

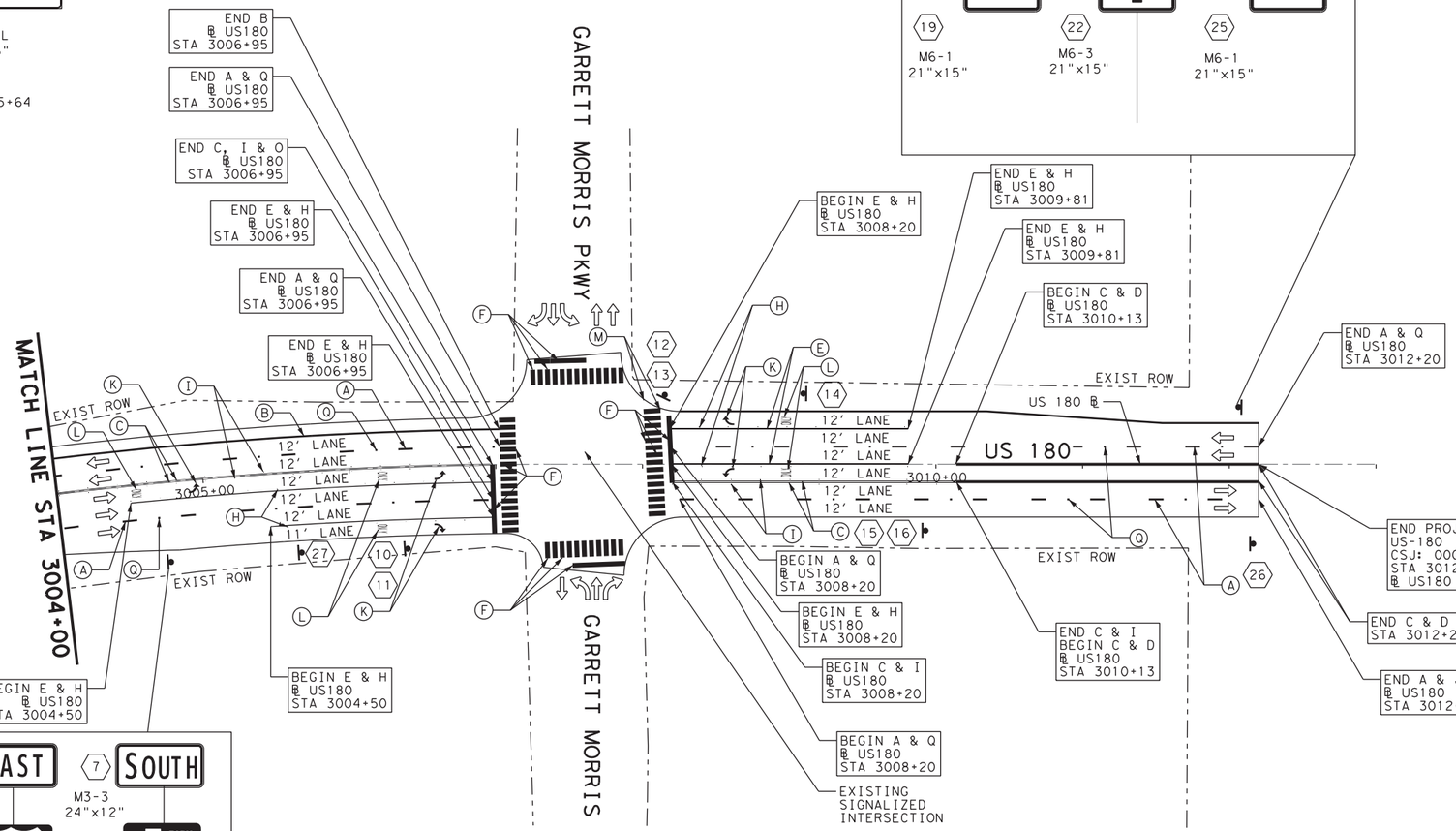
SIGNING AND PAVEMENT MARKING LAYOUT

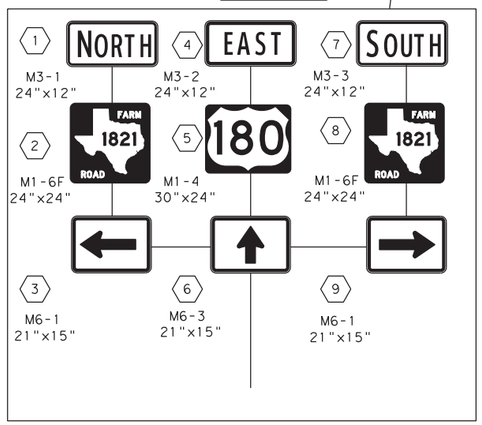
SHEET 13 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	205
CONTROL	SECTION	JOB	
0008	01	046,ETC	









LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1(YFLX)SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
- ⇦ TRAFFIC FLOW DIRECTION
- (#) EXIST SIGN TO BE REMOVED AND REPLACED
- △(#) EXIST SIGN TO REMAIN

0 50' 100'

SCALE: 1" = 100'

NOTES:

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5. REFER TO PAVEMENT MARKING DETAIL LAYOUT SHEETS FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGNING AND PAVEMENT MARKING LAYOUT

SHEET 14 OF 14

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	206
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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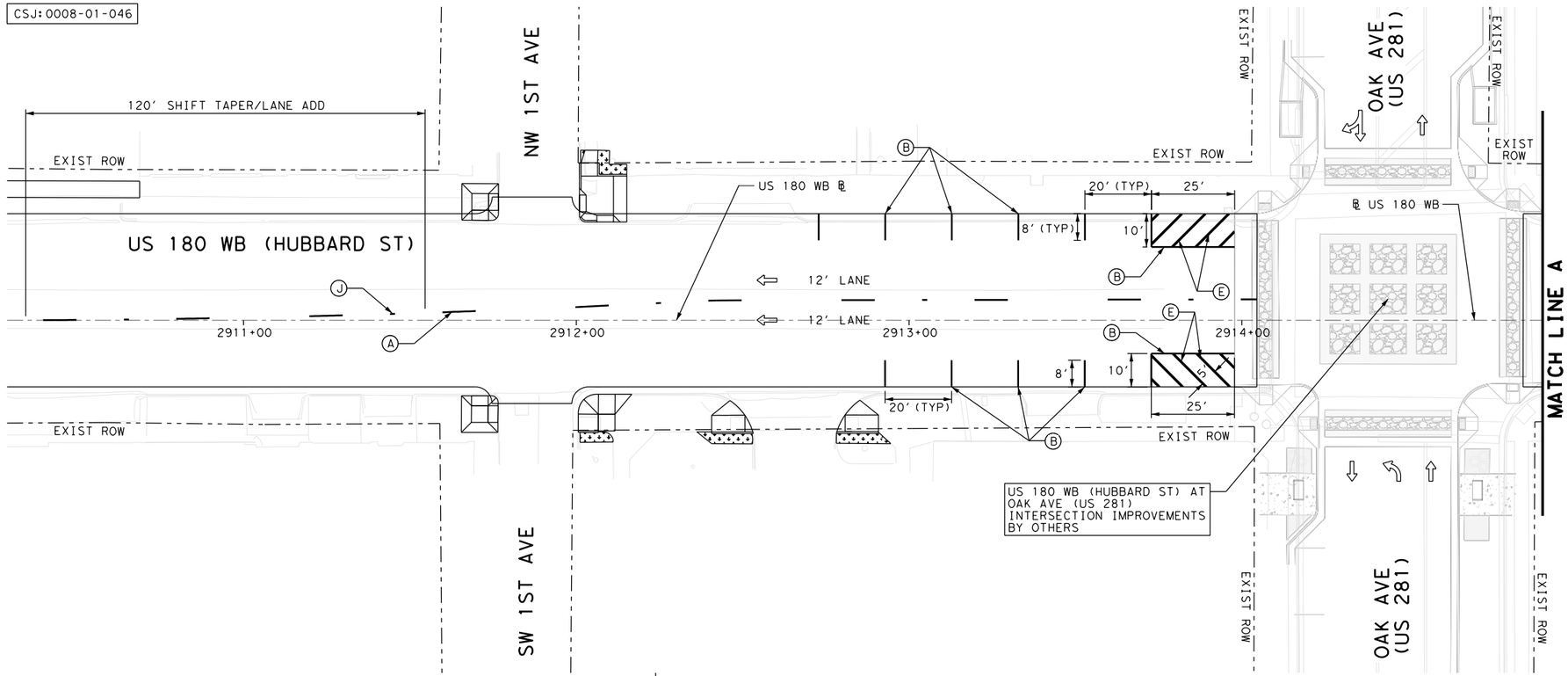

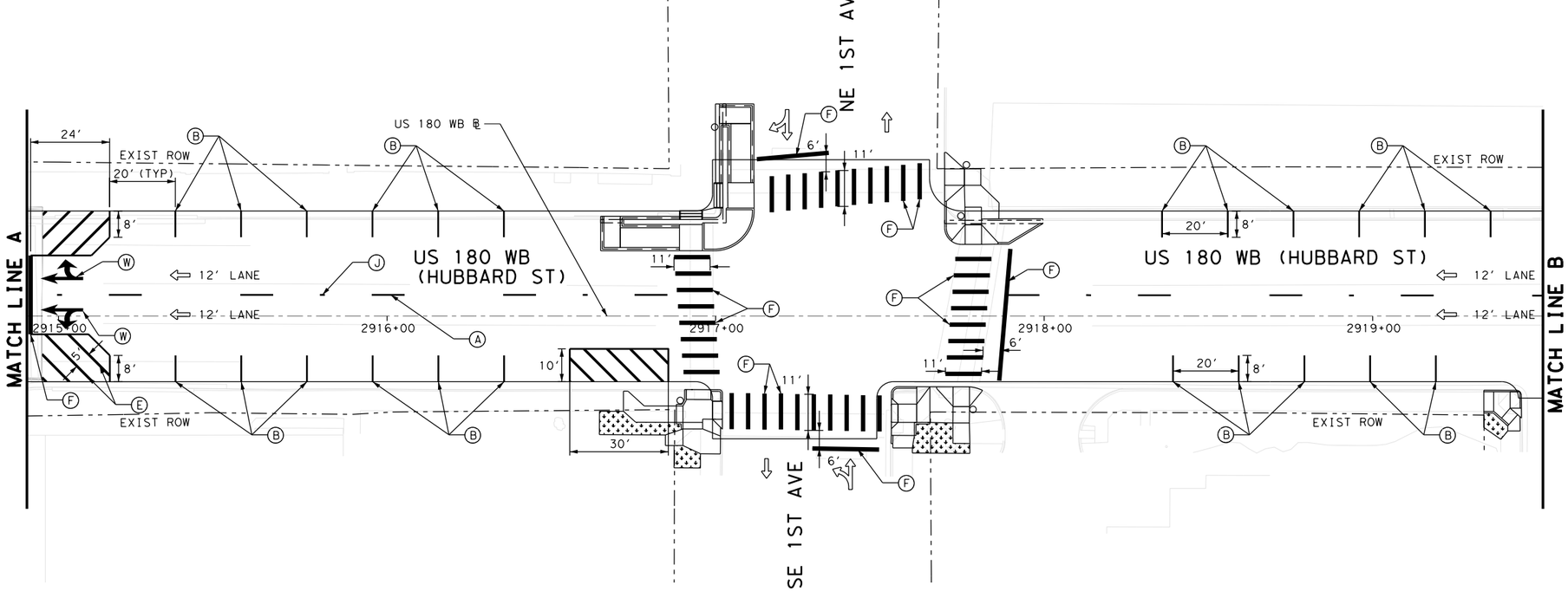

LEGEND

(A)	RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
(B)	RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
(C)	RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
(D)	RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
(E)	REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
(F)	REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
(G)	REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
(H)	REFL PAV MRKR TY I-C @ 20' C-C
(I)	REFL PAV MRKR TY II-A-A @ 20' C-C
(J)	REFL PAV MRKR TY II-C-R @ 80' C-C
(K)	REFL PAV MRK TY I (W)(ARROW)(100MIL)
(L)	REFL PAV MRK TY I (W)(WORD)(100MIL)
(M)	REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
(N)	REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
(O)	DEL ASSM (D-DY)SZ 1 (FLX) SRF
(P)	RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
(Q)	REFL PAV MRKR TY I-C @ 80' C-C
(R)	OM ASSM (OM-3L) (TWT)GND
(S)	OM ASSM (OM-3R) (TWT)GND
(T)	DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
(U)	DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
(V)	REFL PAV MRKR TY I-C @ 48' C-C
(W)	REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
⇦	TRAFFIC FLOW DIRECTION

NOTES:

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2. SEE SIGNING AND PAVEMENT MARKING LAYOUT/TRAFFIC SIGNAL LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
3. LANE AND SHOULDER WIDTH DIMENSIONS RELATIVE TO CURB/EDGE OF PAVEMENT SHALL CONTROL STRIPING LOCATIONS WHEREVER THEY CONFLICT WITH ALIGNMENT OFFSET DATA.
4. REFER TO TYPICAL SECTIONS FOR LANE WIDTH DIMENSIONS.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

PAVEMENT MARKING DETAIL LAYOUT

US 180 WB (HUBBARD ST.)

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	207
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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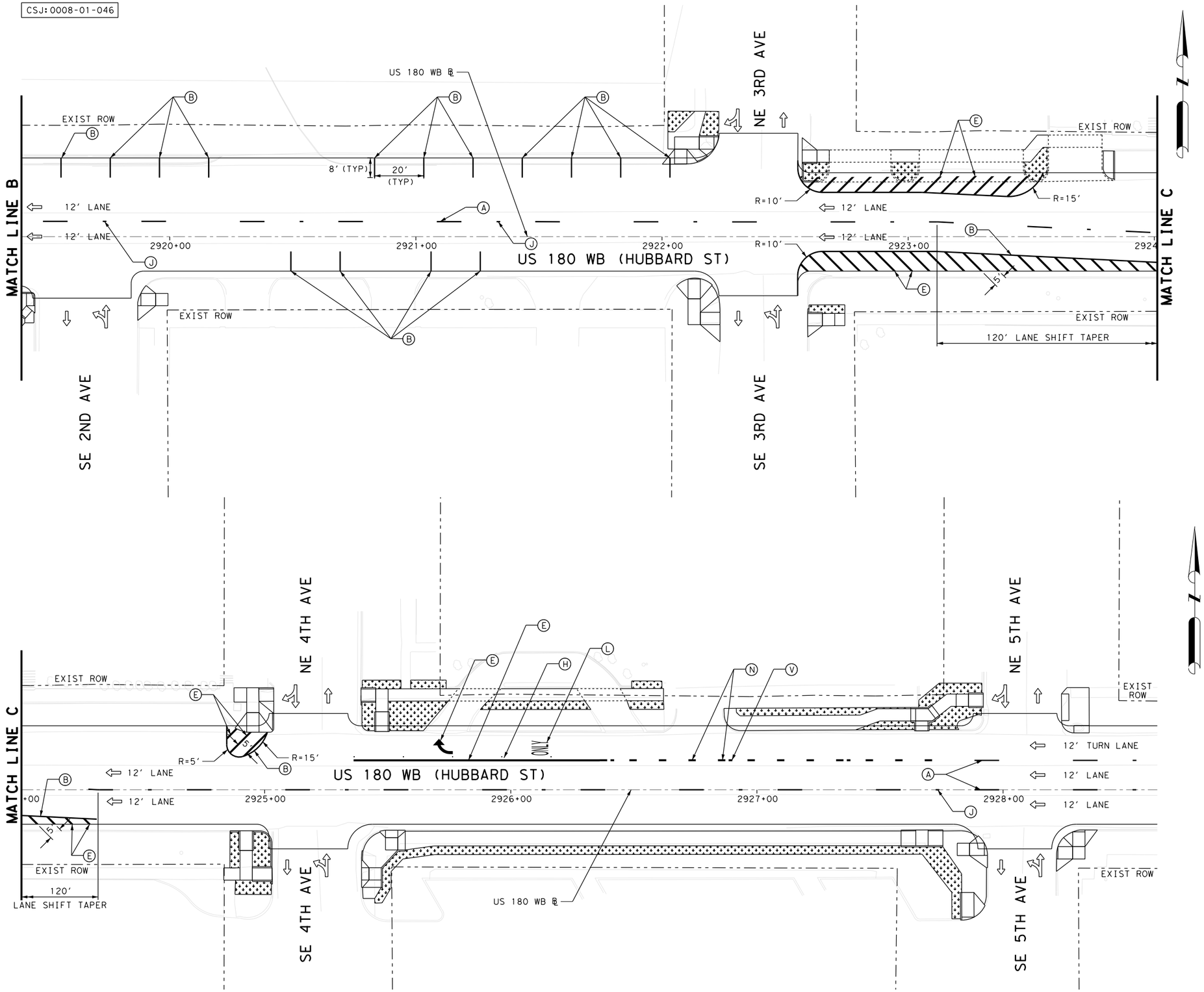

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
- ⇦ TRAFFIC FLOW DIRECTION

NOTES:

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4. REFER TO TYPICAL SECTIONS FOR LANE WIDTH DIMENSIONS.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

PAVEMENT MARKING DETAIL LAYOUT

US 180 WB (HUBBARD ST.)

SHEET 2 OF 4

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	208
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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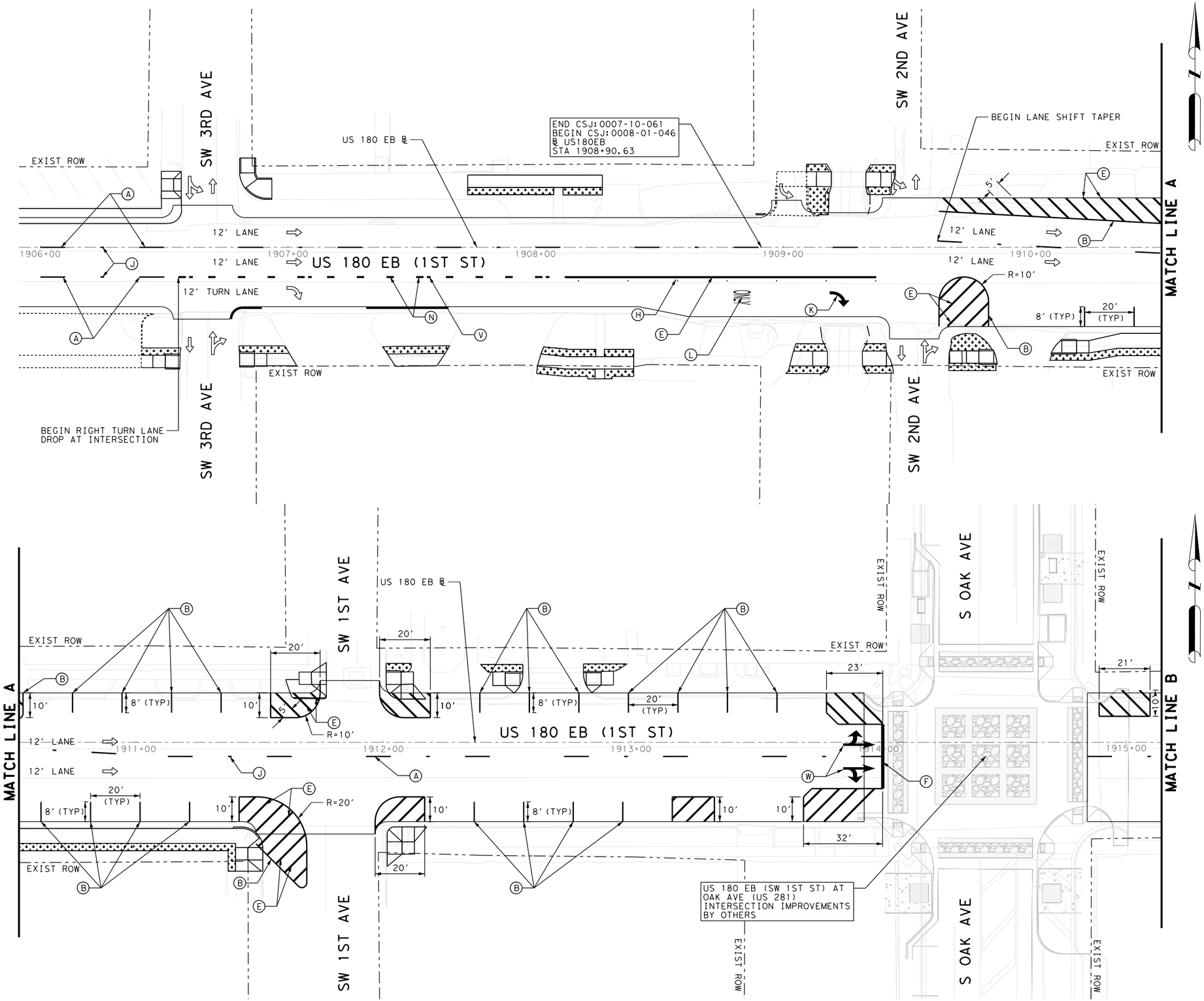

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
- (F) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
- (I) REFL PAV MRKR TY II-A-A @ 20' C-C
- (J) REFL PAV MRKR TY II-C-R @ 80' C-C
- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
- (T) DEL ASSM (D-SY)SZ 1 (FLX) GF1 @ 100' C-C
- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
- (V) REFL PAV MRKR TY I-C @ 48' C-C
- (W) REFL PAV MRK TY I (W)(DBL ARROW)(100MIL)
- ⇦ TRAFFIC FLOW DIRECTION

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4. REFER TO TYPICAL SECTIONS FOR LANE WIDTH DIMENSIONS.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

PAVEMENT MARKING DETAIL LAYOUT

US 180 EB (SW 1ST ST)

SHEET 3 OF 4

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	209
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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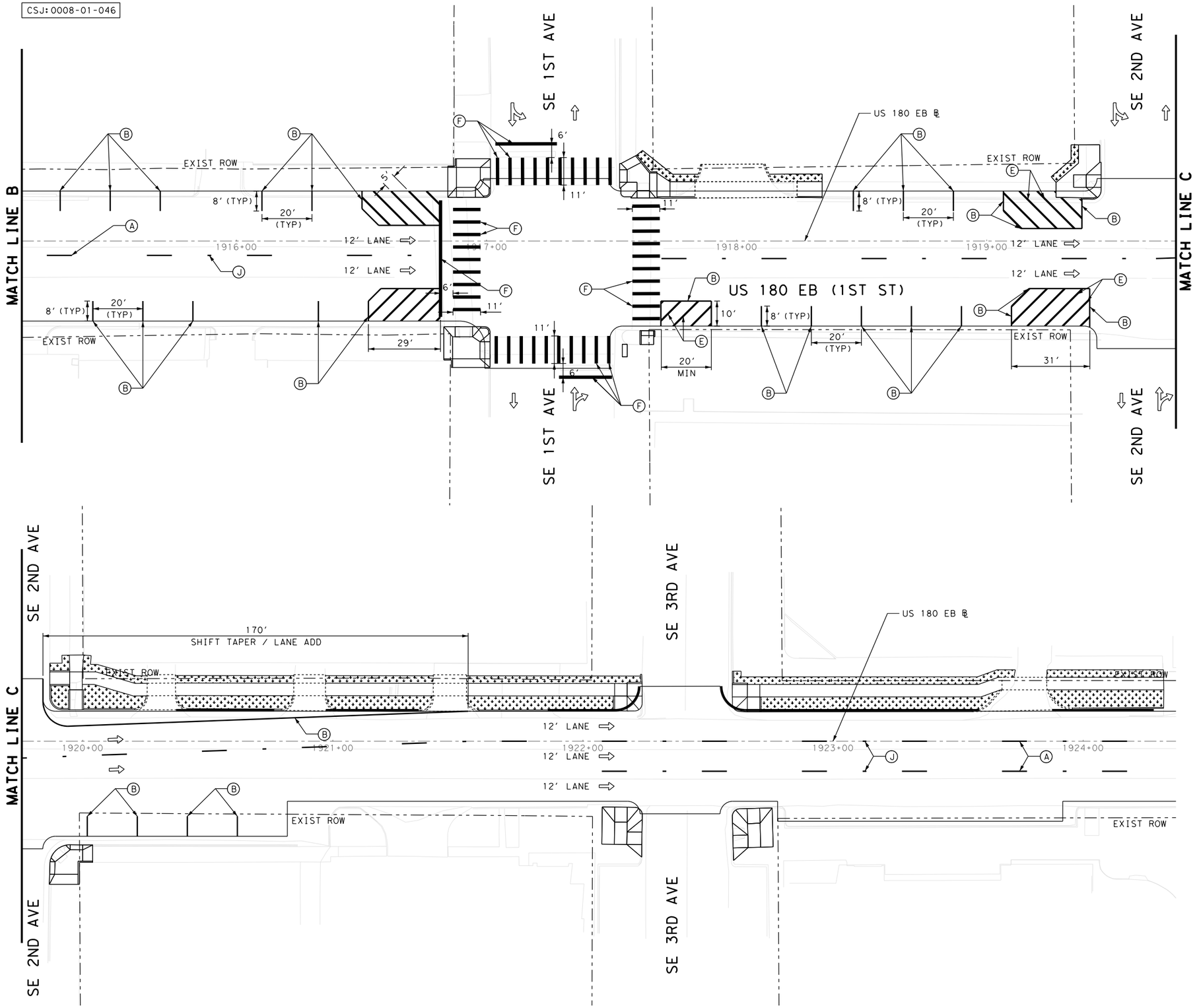

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(BRK)(100MIL)
- (B) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (C) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (D) RE PM W/RET REQ TY I (Y)(4")(BRK)(100MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(100MIL)
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- (G) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (H) REFL PAV MRKR TY I-C @ 20' C-C
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- (K) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (L) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (M) REFL PAV MRK TY I (W)(12")(SLD)(100MIL)
- (N) REFL PAV MRK TY I (W)(8")(DOT)(100MIL)
- (O) DEL ASSM (D-DY)SZ 1 (FLX) SRF
- (P) RE PM W/RET REQ TY I (Y)(24")(SLD)(100MIL)
- (Q) REFL PAV MRKR TY I-C @ 80' C-C
- (R) OM ASSM (OM-3L) (TWT)GND
- (S) OM ASSM (OM-3R) (TWT)GND
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- (U) DEL ASSM (D-SW)SZ 1 (FLX) GF1 @ 100' C-C
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- ⇦ TRAFFIC FLOW DIRECTION

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0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
MARK ZOELLNER
123611
PROFESSIONAL ENGINEER
LICENSED

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

PAVEMENT MARKING DETAIL LAYOUT

US 180 EB (SW 1ST ST)

SHEET 4 OF 4

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	210
CONTROL	SECTION	JOB	
0008	01	046, ETC	

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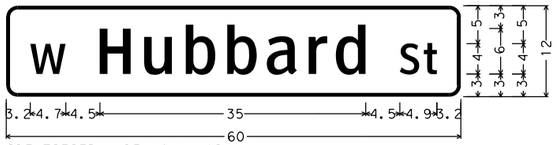


IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[W] CLEARVIEWHWY-3-W; [HUBBARD] CLEARVIEWHWY-3-W;
[ST] CLEARVIEWHWY-3-W;

SIGN NO. = 6
SHEET NO. = 1
STATION = ℄ US180WB 2865+39
MOUNT TYPE = GROUND

SIGN NO. = 3
SHEET NO. = 3
STATION = ℄ US180WB 2885+02
MOUNT TYPE = GROUND

SIGN NO. = 5
SHEET NO. = 4
STATION = ℄ US180WB 2896+03
MOUNT TYPE = GROUND

SIGN NO. = 18
SHEET NO. = 4
STATION = ℄ US180WB 2899+83
MOUNT TYPE = GROUND

SIGN NO. = 3
SHEET NO. = 5
STATION = ℄ US180WB 2903+39
MOUNT TYPE = GROUND

SIGN NO. = 22
SHEET NO. = 5
STATION = ℄ US180WB 2909+40
MOUNT TYPE = GROUND

SIGN NO. = 3
SHEET NO. = 2
STATION = ℄ US180WB 2872+53
MOUNT TYPE = GROUND

SIGN NO. = 8
SHEET NO. = 3
STATION = ℄ US180WB 2888+95
MOUNT TYPE = GROUND

SIGN NO. = 9
SHEET NO. = 4
STATION = ℄ US180WB 2896+62
MOUNT TYPE = GROUND

SIGN NO. = 25
SHEET NO. = 4
STATION = ℄ US180WB 2903+77
MOUNT TYPE = GROUND

SIGN NO. = 6
SHEET NO. = 5
STATION = ℄ US180WB 2906+91
MOUNT TYPE = GROUND

SIGN NO. =27
SHEET NO. = 5
STATION = ℄ US180WB 2911+64
MOUNT TYPE = GROUND

SIGN NO. = 7
SHEET NO. = 2
STATION = ℄ US180WB 2873+23
MOUNT TYPE = GROUND

SIGN NO. = 13
SHEET NO. = 3
STATION = ℄ US180WB 2892+81
MOUNT TYPE = GROUND

SIGN NO. = 14
SHEET NO. = 4
STATION = ℄ US180WB 2899+50
MOUNT TYPE = GROUND

SIGN NO. = 28
SHEET NO. = 4
STATION = ℄ US180WB 2904+33
MOUNT TYPE = GROUND

SIGN NO. = 18
SHEET NO. = 5
STATION = ℄ US180WB 2909+30
MOUNT TYPE = GROUND

SIGN NO. = 30
SHEET NO. = 5
STATION = ℄ US180WB 2923+07
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [1ST] CLEARVIEWHWY-3-W;
[ST] CLEARVIEWHWY-3-W;

SIGN NO. = 14
SHEET NO. = 2
STATION = ℄ US180EB 1873+87
MOUNT TYPE = GROUND

SIGN NO. = 40
SHEET NO. = 4
STATION = ℄ US180EB 1896+59
MOUNT TYPE = GROUND

SIGN NO. = 61
SHEET NO. = 5
STATION = ℄ US180EB 1909+73
MOUNT TYPE = GROUND

SIGN NO. = 20
SHEET NO. = 3
STATION = ℄ US180EB 1888+36
MOUNT TYPE = GROUND

SIGN NO. = 47
SHEET NO. = 4
STATION = ℄ US180EB 1900+39
MOUNT TYPE = GROUND

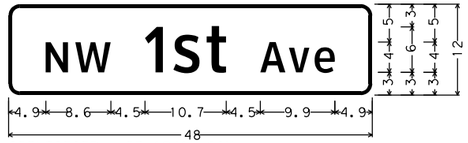
SIGN NO. = 71
SHEET NO. = 5
STATION = ℄ US180EB 1912+05
MOUNT TYPE = GROUND

SIGN NO. = 26
SHEET NO. = 3
STATION = ℄ US180EB 1892+81
MOUNT TYPE = GROUND

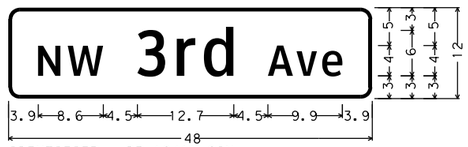
SIGN NO. = 44
SHEET NO. = 5
STATION = ℄ US180EB 1906+85
MOUNT TYPE = GROUND

SIGN NO. =
SHEET NO. =
STATION = ℄ US180EB 1906+85
MOUNT TYPE = GROUND

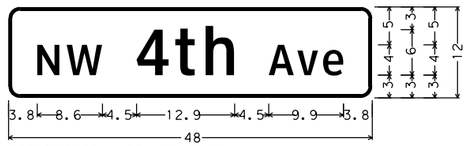
SIGN NO. = 6
SHEET NO. = 1
STATION = ℄ US180WB 2865+39
MOUNT TYPE = GROUND
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[AMER.] CLEARVIEWHWY-3-W; [LEGION] CLEARVIEWHWY-3-W; [DR] CLEARVIEWHWY-3-W;



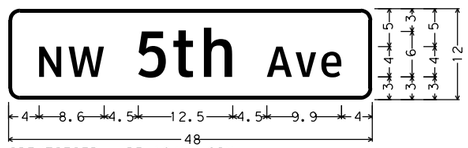
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [1ST] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 28
SHEET NO. = 5
STATION = ℄ US180WB 2911+64
MOUNT TYPE = GROUND



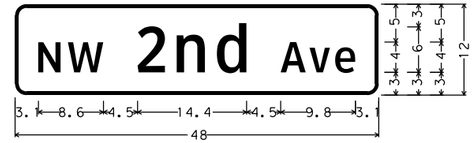
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [3RD] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 4
SHEET NO. = 5
STATION = ℄ US180WB 2903+39
MOUNT TYPE = GROUND



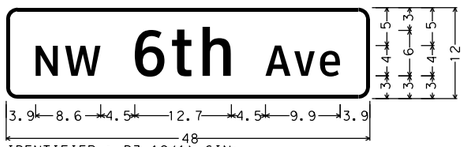
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [4TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 26
SHEET NO. = 4
STATION = ℄ US180WB 2903+77
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [5TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 19
SHEET NO. = 4
STATION = ℄ US180WB 2899+83
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [2ND] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 23
SHEET NO. = 5
STATION = ℄ US180WB 2909+40
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [6TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 6
SHEET NO. = 4
STATION = ℄ US180WB 2896+03
MOUNT TYPE = GROUND

N. T. S

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGN DETAILS

SHEET 1 OF 7

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	211
CONTROL	SECTION	JOB	
0008	01	046,ETC	

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [1ST] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 31
SHEET NO. = 5
STATION = ℄ US180WB 2923+07
MOUNT TYPE = GROUND

SIGN NO. = 72
SHEET NO. = 5
STATION = ℄ US180EB 1912+05
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [4TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 29
SHEET NO. = 4
STATION = ℄ US180WB 2904+33
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [7TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 14
SHEET NO. = 3
STATION = ℄ US180WB 2892+81
MOUNT TYPE = GROUND

SIGN NO. = 27
SHEET NO. = 3
STATION = ℄ US180EB 1892+81
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [2ND] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 19
SHEET NO. = 5
STATION = ℄ US180WB 2909+30
MOUNT TYPE = GROUND

SIGN NO. = 62
SHEET NO. = 5
STATION = ℄ US180EB 1909+73
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [5TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 15
SHEET NO. = 4
STATION = ℄ US180WB 2899+50
MOUNT TYPE = GROUND

SIGN NO. = 48
SHEET NO. = 4
STATION = ℄ US180WB 1900+39
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [8TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 9
SHEET NO. = 3
STATION = ℄ US180WB 2888+95
MOUNT TYPE = GROUND

SIGN NO. = 21
SHEET NO. = 3
STATION = ℄ US180EB 1888+36
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [3RD] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 7
SHEET NO. = 5
STATION = ℄ US180WB 2906+91
MOUNT TYPE = GROUND

SIGN NO. = 45
SHEET NO. = 5
STATION = ℄ US180EB 1906+85
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [6TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 10
SHEET NO. = 4
STATION = ℄ US180WB 2896+62
MOUNT TYPE = GROUND

SIGN NO. = 41
SHEET NO. = 4
STATION = ℄ US180EB 1896+59
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SW] CLEARVIEWHWY-3-W; [11TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 8
SHEET NO. = 2
STATION = ℄ US180WB 2873+23
MOUNT TYPE = GROUND

SIGN NO. = 15
SHEET NO. = 2
STATION = ℄ US180EB 1873+87
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NW] CLEARVIEWHWY-3-W; [11TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 4
SHEET NO. = 2
STATION = ℄ US180WB 2872+53
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(3) 6IN (PRINCIPAL LEGEND WITH DESCENDING STROKES);
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[PINTO] CLEARVIEWHWY-3-W;
[RD] CLEARVIEWHWY-3-W;
SIGN NO. = 4
SHEET NO. = 3
STATION = ℄ US180WB 2885+02
MOUNT TYPE = GROUND

N. T. S

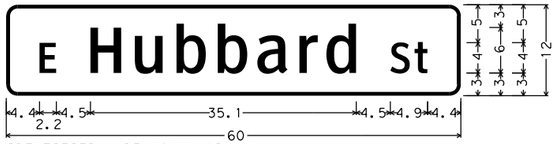
STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGN DETAILS

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	212
CONTROL	SECTION	JOB	
0008	01	046,ETC	



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[E] CLEARVIEWHWY-3-W; [HUBBARD] CLEARVIEWHWY-3-W;
[ST] CLEARVIEWHWY-3-W;

SIGN NO. = 4
SHEET NO. = 6
STATION = ℄ US180WB 2919+15
MOUNT TYPE = GROUND

SIGN NO. = 26
SHEET NO. = 6
STATION = ℄ US180WB 2924+94
MOUNT TYPE = GROUND

SIGN NO. = 17
SHEET NO. = 7
STATION = ℄ US180WB 2930+33
MOUNT TYPE = GROUND

SIGN NO. = 3
SHEET NO. = 8
STATION = ℄ US180WB 2938+18
MOUNT TYPE = GROUND

SIGN NO. = 21
SHEET NO. = 8
STATION = ℄ US180WB 2944+42
MOUNT TYPE = GROUND

SIGN NO. = 28
SHEET NO. = 9
STATION = ℄ US180WB 2954+69
MOUNT TYPE = GROUND

SIGN NO. = 42
SHEET NO. = 9
STATION = ℄ US180WB 2958+56
MOUNT TYPE = GROUND

SIGN NO. = 27
SHEET NO. = 10
STATION = ℄ US180WB 2967+16
MOUNT TYPE = GROUND

SIGN NO. = 15
SHEET NO. = 6
STATION = ℄ US180WB 2922+13
MOUNT TYPE = GROUND

SIGN NO. = 29
SHEET NO. = 6
STATION = ℄ US180WB 2925+45
MOUNT TYPE = GROUND

SIGN NO. = 25
SHEET NO. = 7
STATION = ℄ US180WB 2933+40
MOUNT TYPE = GROUND

SIGN NO. = 6
SHEET NO. = 8
STATION = ℄ US180WB 2939+78
MOUNT TYPE = GROUND

SIGN NO. = 28
SHEET NO. = 8
STATION = ℄ US180WB 2947+15
MOUNT TYPE = GROUND

SIGN NO. = 31
SHEET NO. = 9
STATION = ℄ US180WB 2954+96
MOUNT TYPE = GROUND

SIGN NO. = 16
SHEET NO. = 10
STATION = ℄ US180WB 2964+74
MOUNT TYPE = GROUND

SIGN NO. = 31
SHEET NO. = 10
STATION = ℄ US180WB 2968+58
MOUNT TYPE = GROUND

SIGN NO. = 18
SHEET NO. = 6
STATION = ℄ US180WB 2922+66
MOUNT TYPE = GROUND

SIGN NO. = 12
SHEET NO. = 7
STATION = ℄ US180WB 2927+79
MOUNT TYPE = GROUND

SIGN NO. = 28
SHEET NO. = 7
STATION = ℄ US180WB 2933+93
MOUNT TYPE = GROUND

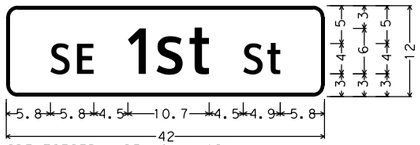
SIGN NO. = 15
SHEET NO. = 8
STATION = ℄ US180WB 2941+55
MOUNT TYPE = GROUND

SIGN NO. = 10
SHEET NO. = 9
STATION = ℄ US180WB 2949+95
MOUNT TYPE = GROUND

SIGN NO. = 38
SHEET NO. = 9
STATION = ℄ US180WB 2957+15
MOUNT TYPE = GROUND

SIGN NO. = 19
SHEET NO. = 10
STATION = ℄ US180WB 2965+07
MOUNT TYPE = GROUND

SIGN NO. = 7
SHEET NO. = 12
STATION = ℄ US180WB 2982+34
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [1ST] CLEARVIEWHWY-3-W;
[ST] CLEARVIEWHWY-3-W;

SIGN NO. = 38
SHEET NO. = 6
STATION = ℄ US180EB 1917+58
MOUNT TYPE = GROUND

SIGN NO. = 63
SHEET NO. = 6
STATION = ℄ US180EB 1925+42
MOUNT TYPE = GROUND

SIGN NO. = 46
SHEET NO. = 7
STATION = ℄ US180EB 1933+87
MOUNT TYPE = GROUND

SIGN NO. = 55
SHEET NO. = 8
STATION = ℄ US180EB 1944+37
MOUNT TYPE = GROUND

SIGN NO. = 17
SHEET NO. = 9
STATION = ℄ US180EB 1953+98
MOUNT TYPE = GROUND

SIGN NO. = 10
SHEET NO. = 10
STATION = ℄ US180EB 1965+08
MOUNT TYPE = GROUND

SIGN NO. = 7
SHEET NO. = 11
STATION = ℄ US180EB 1975+12
MOUNT TYPE = GROUND

SIGN NO. = 45
SHEET NO. = 6
STATION = ℄ US180EB 1919+92
MOUNT TYPE = GROUND

SIGN NO. = 5
SHEET NO. = 7
STATION = ℄ US180EB 1928+29
MOUNT TYPE = GROUND

SIGN NO. = 38
SHEET NO. = 8
STATION = ℄ US180EB 1938+75
MOUNT TYPE = GROUND

SIGN NO. = 63
SHEET NO. = 8
STATION = ℄ US180EB 1947+11
MOUNT TYPE = GROUND

SIGN NO. = 50
SHEET NO. = 9
STATION = ℄ US180EB 1958+57
MOUNT TYPE = GROUND

SIGN NO. = 35
SHEET NO. = 10
STATION = ℄ US180WB 2969+59
MOUNT TYPE = GROUND

SIGN NO. = 56
SHEET NO. = 6
STATION = ℄ US180EB 1922+65
MOUNT TYPE = GROUND

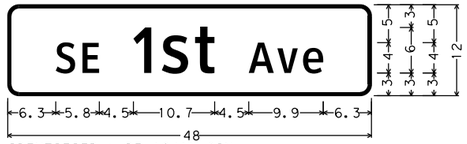
SIGN NO. = 38
SHEET NO. = 7
STATION = ℄ US180EB 1931+10
MOUNT TYPE = GROUND

SIGN NO. = 47
SHEET NO. = 8
STATION = ℄ US180EB 1941+51
MOUNT TYPE = GROUND

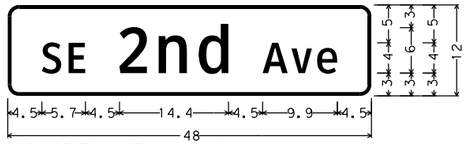
SIGN NO. = 5
SHEET NO. = 9
STATION = ℄ US180EB 1948+96
MOUNT TYPE = GROUND

SIGN NO. = 3
SHEET NO. = 9
STATION = ℄ US180EB 1961+56
MOUNT TYPE = GROUND

SIGN NO. = 42
SHEET NO. = 10
STATION = ℄ US180EB 1968+53
MOUNT TYPE = GROUND

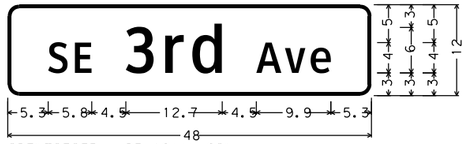


IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [1ST] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 39
SHEET NO. = 6
STATION = ℄ US180EB 1917+58
MOUNT TYPE = GROUND



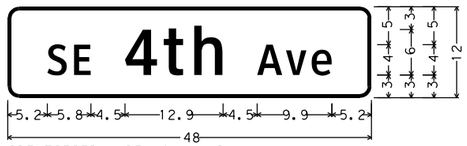
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [2ND] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 5
SHEET NO. = 6
STATION = ℄ US180WB 2919+15
MOUNT TYPE = GROUND

SIGN NO. = 46
SHEET NO. = 6
STATION = ℄ US180EB 1919+92
MOUNT TYPE = GROUND



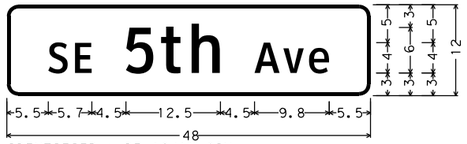
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [3RD] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 19
SHEET NO. = 6
STATION = ℄ US180WB 2922+66
MOUNT TYPE = GROUND

SIGN NO. = 57
SHEET NO. = 6
STATION = ℄ US180EB 1922+65
MOUNT TYPE = GROUND

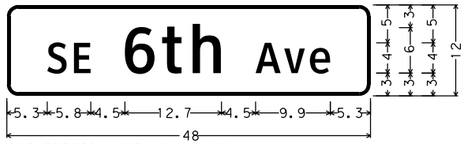


IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [4TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 30
SHEET NO. = 6
STATION = ℄ US180WB 2925+45
MOUNT TYPE = GROUND

SIGN NO. = 64
SHEET NO. = 6
STATION = ℄ US180EB 1925+42
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [5TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 6
SHEET NO. = 7
STATION = ℄ US180EB 1928+29
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [6TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 18
SHEET NO. = 7
STATION = ℄ US180WB 2930+33
MOUNT TYPE = GROUND

SIGN NO. = 39
SHEET NO. = 7
STATION = ℄ US180EB 1931+10
MOUNT TYPE = GROUND

N. T. S

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGN DETAILS

SHEET 3 OF 7

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	213
CONTROL	SECTION	JOB	
0008	01	046, ETC	

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [7TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 29
SHEET NO. = 7
STATION = ℄ US180WB 2933+93
MOUNT TYPE = GROUND

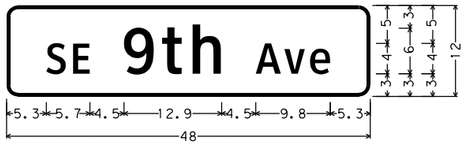
SIGN NO. = 47
SHEET NO. = 7
STATION = ℄ US180EB 1933+87
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [12TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 29
SHEET NO. = 8
STATION = ℄ US180WB 2947+15
MOUNT TYPE = GROUND

SIGN NO. = 64
SHEET NO. = 8
STATION = ℄ US180EB 1947+11
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [16TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 4
SHEET NO. = 10
STATION = ℄ US180EB 1961+56
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [9TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 7
SHEET NO. = 8
STATION = ℄ US180WB 2939+78
MOUNT TYPE = GROUND

SIGN NO. = 39
SHEET NO. = 8
STATION = ℄ US180EB 1938+75
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [13TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 6
SHEET NO. = 9
STATION = ℄ US180EB 1949+96
MOUNT TYPE = GROUND

SIGN NO. = 11
SHEET NO. = 9
STATION = ℄ US180WB 2949+95
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [17TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 11
SHEET NO. = 10
STATION = ℄ US180EB 1965+08
MOUNT TYPE = GROUND

SIGN NO. = 20
SHEET NO. = 10
STATION = ℄ US180WB 2965+07
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [10TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 16
SHEET NO. = 8
STATION = ℄ US180WB 2941+55
MOUNT TYPE = GROUND

SIGN NO. = 48
SHEET NO. = 8
STATION = ℄ US180EB 1941+51
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [14TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 18
SHEET NO. = 9
STATION = ℄ US180EB 1953+98
MOUNT TYPE = GROUND

SIGN NO. = 29
SHEET NO. = 9
STATION = ℄ US180WB 2954+69
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [18TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 32
SHEET NO. = 10
STATION = ℄ US180WB 2968+58
MOUNT TYPE = GROUND

SIGN NO. = 43
SHEET NO. = 10
STATION = ℄ US180EB 1968+53
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [11TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 22
SHEET NO. = 8
STATION = ℄ US180WB 2944+42
MOUNT TYPE = GROUND

SIGN NO. = 56
SHEET NO. = 8
STATION = ℄ US180EB 1944+37
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [15TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;

SIGN NO. = 43
SHEET NO. = 9
STATION = ℄ US180WB 2958+56
MOUNT TYPE = GROUND

SIGN NO. = 51
SHEET NO. = 9
STATION = ℄ US180EB 1958+57
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [20TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 3
SHEET NO. = 11
STATION = ℄ US180EB 1975+12
MOUNT TYPE = GROUND

N. T. S

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGN DETAILS

SHEET 4 OF 7

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	
CONTROL	SECTION	JOB	214
0008	01	046,ETC	

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[SE] CLEARVIEWHWY-3-W; [25TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 28
SHEET NO. = 12
STATION = ℄ US180EB 1991+44
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [5TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 13
SHEET NO. = 7
STATION = ℄ US180WB 2927+79
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [21ST] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 28
SHEET NO. = 10
STATION = ℄ US180WB 2967+16
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [1ST] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 6
SHEET NO. = 13
STATION = ℄ US180WB 3001+40
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [7TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 26
SHEET NO. = 7
STATION = ℄ US180WB 2933+40
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [22ND] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 36
SHEET NO. = 10
STATION = ℄ US180WB 2969+59
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] ClearviewHwy-3-W; [3rd] ClearviewHwy-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 16
SHEET NO. = 6
STATION = ℄ US180WB 2922+13
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [9TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 4
SHEET NO. = 8
STATION = ℄ US180WB 2938+18
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [27TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 8
SHEET NO. = 12
STATION = ℄ US180WB 2982+34
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [4TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 27
SHEET NO. = 6
STATION = ℄ US180WB 2924+94
MOUNT TYPE = GROUND

IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[NE] CLEARVIEWHWY-3-W; [17TH] CLEARVIEWHWY-3-W;
[AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 17
SHEET NO. = 10
STATION = ℄ US180WB 2964+74
MOUNT TYPE = GROUND

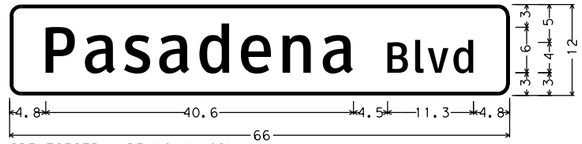
N. T. S

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGN DETAILS

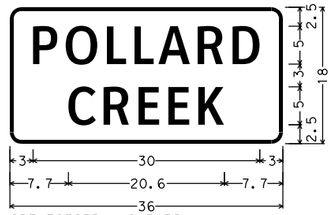
FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	215
CONTROL	SECTION	JOB	
0008	01	046, ETC	



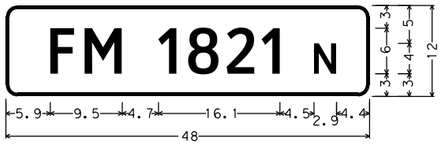
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[PASADENA] CLEARVIEWHWY-3-W; [BLVD] CLEARVIEWHWY-3-W;
SIGN NO. = 32
SHEET NO. = 9
STATION = ℄ US180WB 2954+96
MOUNT TYPE = GROUND

SIGN NO. = 39
SHEET NO. = 9
STATION = ℄ US180WB 2957+15
MOUNT TYPE = GROUND

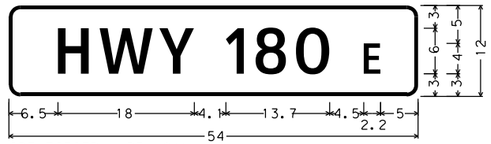
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[LINCOLN] CLEARVIEWHWY-3-W; [AVE] CLEARVIEWHWY-3-W;
SIGN NO. = 23
SHEET NO. = 12
STATION = ℄ US180EB 1986+34
MOUNT TYPE = GROUND



IDENTIFIER : I-3 5IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[POLLARD] CLEARVIEWHWY-3-W;
[CREEK] CLEARVIEWHWY-3-W;
SIGN NO. = 10
SHEET NO. = 1
STATION = ℄ US180WB 2868+08
MOUNT TYPE = GROUND



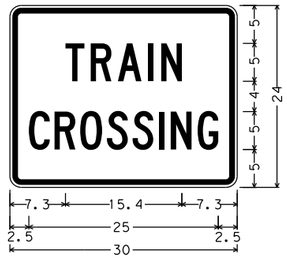
IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[FM 1821] CLEARVIEWHWY-3-W; [N] CLEARVIEWHWY-3-W;
SIGN NO. = 13
SHEET NO. = 14
STATION = ℄ US180WB 3008+15
MOUNT TYPE = GROUND



IDENTIFIER : D3-1G(1) 6IN;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
[HWY 180] CLEARVIEWHWY-3-W; [E] CLEARVIEWHWY-3-W;
SIGN NO. = 24
SHEET NO. = 12
STATION = ℄ US180EB 1986+34
MOUNT TYPE = GROUND

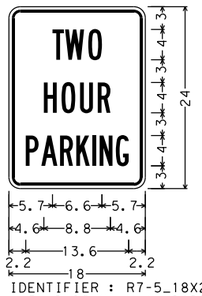
SIGN NO. = 27
SHEET NO. = 12
STATION = ℄ US180EB 1991+44
MOUNT TYPE = GROUND

SIGN NO. = 12
SHEET NO. = 14
STATION = ℄ US180WB 3008+15
MOUNT TYPE = GROUND



W10-14P_30X24; CUSTOM
1.5" RADIUS, 0.6" BORDER, 0.4" INDENT, BLACK ON, YELLOW;
"TRAIN", C 100% SPACING;
"CROSSING", C 76% SPACING;
SIGN NO. = 11
SHEET NO. = 14
STATION = ℄ US180WB 3006+31
MOUNT TYPE = GROUND

IDENTIFIER : D9-10T_24X30;
1.5" RADIUS, 0.5" BORDER, WHITE ON BLUE;
[CHAMBER] C 80% SPACING;
[VISITOR] C; [CENTER] C;
STANDARD ARROW CUSTOM 14.0" X 6.8" 180%;
SIGN NO. = 19
SHEET NO. = 7
STATION = ℄ US180WB 2931+22
MOUNT TYPE = GROUND



IDENTIFIER : R7-5_18X24;
1.5" RADIUS, 0.4" BORDER, 0.4" INDENT, GREEN ON WHITE;
[TWO] B 90% SPACING;
[HOUR] B 85% SPACING;
[PARKING] B 61% SPACING;
SIGN NO. = 33
SHEET NO. = 6
STATION = ℄ US180EB 1916+08
MOUNT TYPE = GROUND

N. T. S

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

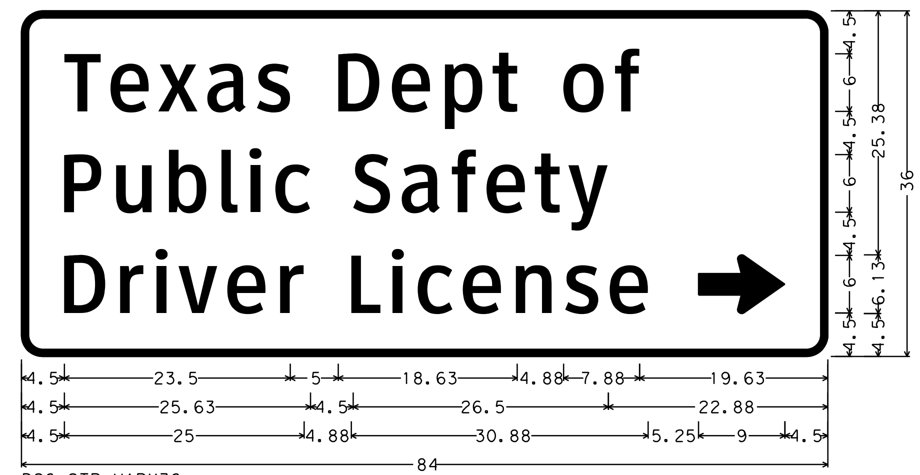
Texas Department of Transportation

SIGN DETAILS

SHEET 6 OF 7

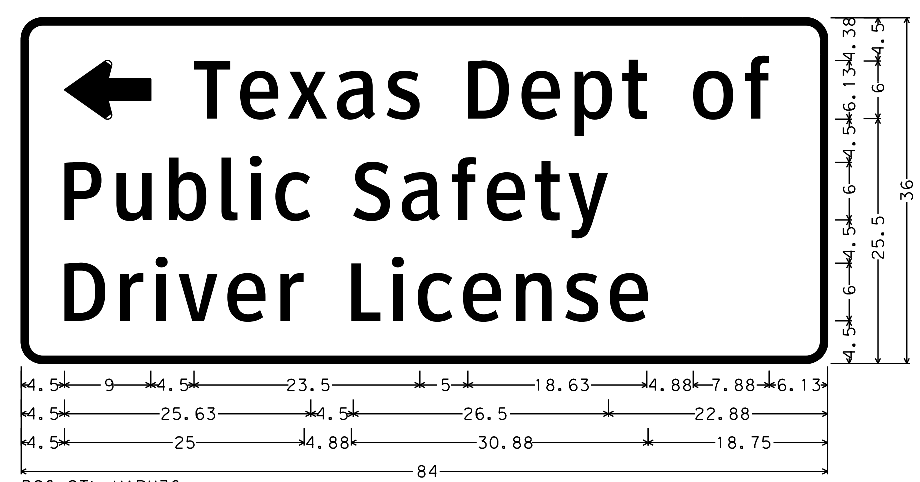
FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	216
CONTROL	SECTION	JOB	
0008	01	046,ETC	

IDENTIFIER : D1-3 8IN UP-LT-LT;
2.25" RADIUS, 0.75" BORDER, WHITE ON GREEN;
STANDARD ARROW CUSTOM 10.00" X 6.13" 90{; ℄WEATHERFORD℄ CLEARVIEWHWY-3-W;
2.25" RADIUS, 0.75" BORDER, WHITE ON GREEN;
STANDARD ARROW CUSTOM 12.00" X 6.13" 180{; ℄JACKSBORO℄ CLEARVIEWHWY-3-W;
2.25" RADIUS, 0.75" BORDER, WHITE ON GREEN;
[MUNICIPAL AIRPORT] CLEARVIEWHWY-3-W 87} SPACING; STANDARD ARROW CUSTOM 12.00" X 6.13" 0{;
SIGN NO. = 8
SHEET NO. = 13
STATION = ℄ US180WB 3003+00
MOUNT TYPE = GROUND



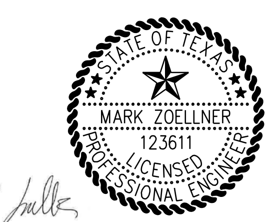
D26-2TR_VARX36;
2.25" RADIUS, 0.75" BORDER, WHITE ON, GREEN;
"TEXAS DEPT OF", CLEARVIEWHWY-3-W; "PUBLIC SAFETY", CLEARVIEWHWY-3-W;
"DRIVER LICENSE", CLEARVIEWHWY-3-W; STANDARD ARROW CUSTOM 9.00" X 6.13" 0';
SIGN NO. = 14
SHEET NO. = 14
STATION = ℄ US180WB 3009+07
MOUNT TYPE = GROUND

IDENTIFIER : D14-4T-2_48X48;
3.0" RADIUS, 1.0" BORDER, WHITE ON BLUE;
[ADOPT A] C; [HIGHWAY] C; [NEXT 2 MILES] C;
3.0" RADIUS, 1.0" BORDER, WHITE ON BLUE;
[MWHS] C; [MIGHTY RAM] C; [BAND] C;
SIGN NO. = 26
SHEET NO. = 14
STATION = ℄ US180WB 3012+16
MOUNT TYPE = GROUND



D26-2TL_VARX36;
2.25" RADIUS, 0.75" BORDER, WHITE ON, GREEN;
STANDARD ARROW CUSTOM 9.00" X 6.13" 180'; "TEXAS DEPT OF", CLEARVIEWHWY-3-W;
"PUBLIC SAFETY", CLEARVIEWHWY-3-W; "DRIVER LICENSE", CLEARVIEWHWY-3-W;
SIGN NO. = 27
SHEET NO. = 14
STATION = ℄ US180WB 3005+64
MOUNT TYPE = GROUND

N.T.S



11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGN DETAILS

SHEET 7 OF 7

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
X	SEE SHEET-1		US 180
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PALO PINTO	217
CONTROL	SECTION	JOB	
0008	01	046,ETC	

USER: default
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10/27/2021
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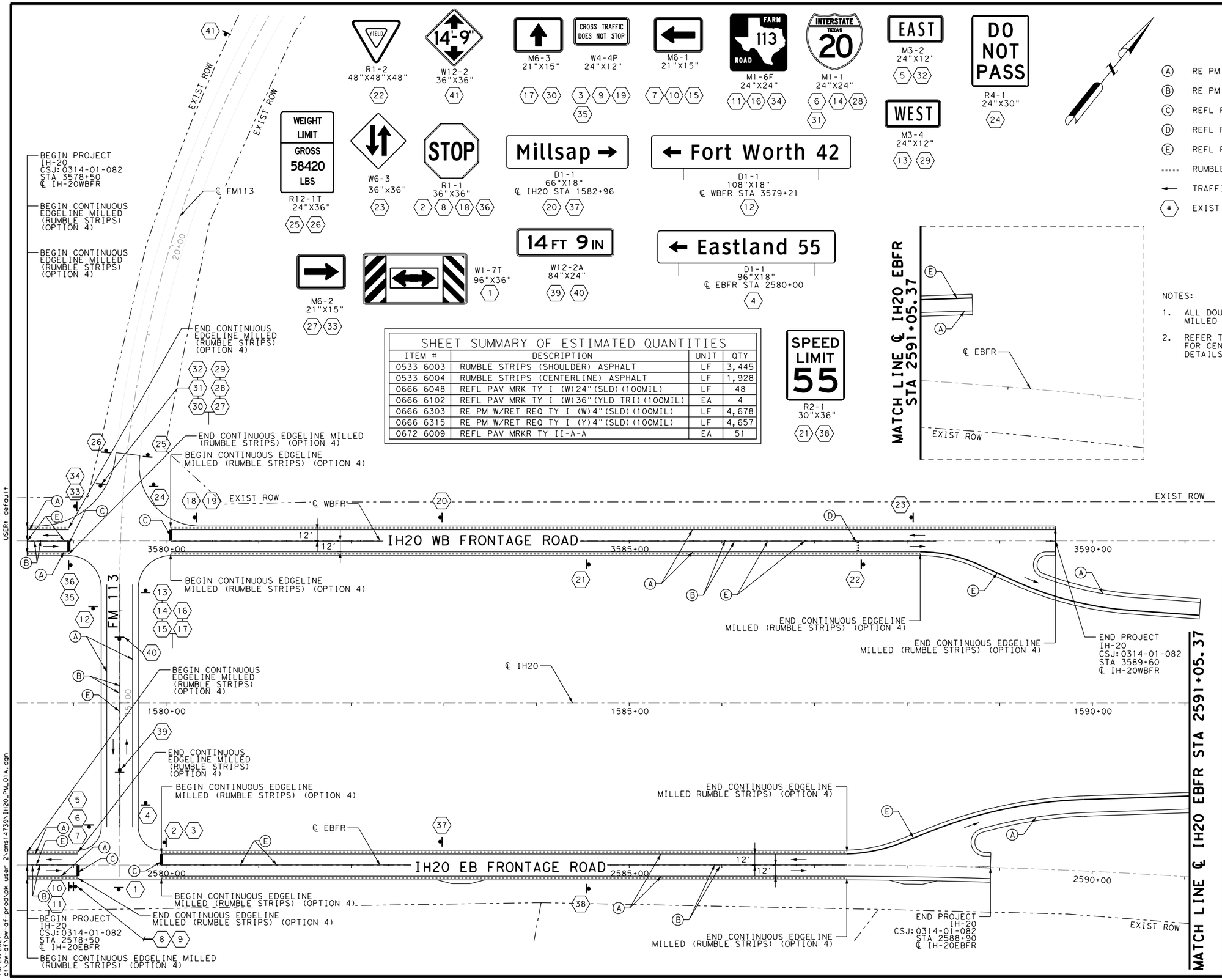

LEGEND

- (A) RE PM W/RET REQ TY I (W)(4")(SLD)(100MIL)
- (B) RE PM W/RET REQ TY I (Y)(4")(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)(24")(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)(36")(YLD TRI)(100MIL)
- (E) REFL PAV MRKR TY II-A-A @ 40′ C-C
- RUMBLE STRIPS
- TRAFFIC FLOW DIRECTION
- (#) EXIST SIGN TO BE REMOVED AND REPLACED

NOTES:

1. ALL DOUBLE YELLOW SOLID LINES ARE TO INCLUDE MILLED CENTERLINE RUMBLE STRIPS (OPTION 1).
2. REFER TO TXDOT STANDARD RS(3)-13 AND RS(4)-13 FOR CENTERLINE AND EDGELINE RUMBLE STRIPS DETAILS.

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM #	DESCRIPTION	UNIT	QTY
0533 6003	RUMBLE STRIPS (SHOULDER) ASPHALT	LF	3,445
0533 6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	1,928
0666 6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	48
0666 6102	REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)	EA	4
0666 6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	4,678
0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	4,657
0672 6009	REFL PAV MRKR TY II-A-A	EA	51

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER
11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

SIGNING AND PAVEMENT MARKING

SHEET 1 OF 1

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	218
CONTROL	SECTION	JOB	
0008	01	046,ETC	

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10/27/2021
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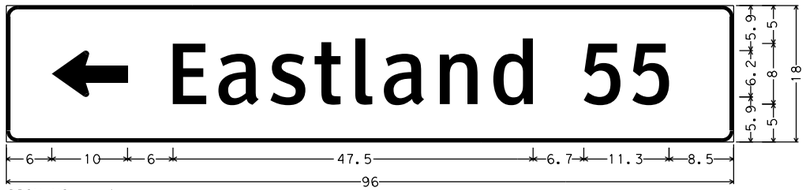
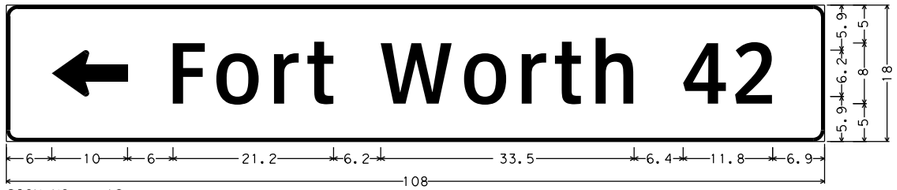
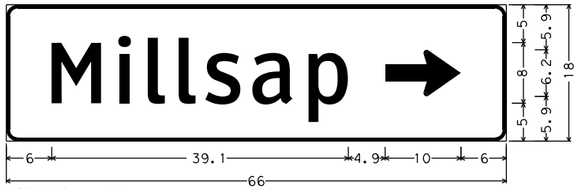


SIGN NO. = 4
SHEET NO. = 1
STATION = ℄EBFR 2580+00
MOUNT TYPE = GROUND
IDENTIFIER : D1-1 8IN LT;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
STANDARD ARROW CUSTOM 10.0" X 6.1" 180°; "EASTLAND 55" CLEARVIEWHWY-3-W;



SIGN NO. = 12
SHEET NO. = 1
STATION = ℄EBFR 3579+21
MOUNT TYPE = GROUND
IDENTIFIER : D1-1 8IN LT;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
STANDARD ARROW CUSTOM 10.0" X 6.1" 180°; "FORT WORTH 42" CLEARVIEWHWY-3-W;



SIGN NO. = 20
SIGN NO. =37
SHEET NO. = 1
STATION = ℄ IH20 1582+96
MOUNT TYPE = GROUND
IDENTIFIER : D1-1 8IN RT;
1.5" RADIUS, 0.5" BORDER, WHITE ON GREEN;
"MILLSAP" CLEARVIEWHWY-3-W; STANDARD ARROW CUSTOM 10.0" X 6.1" 0°;

N. T. S

STATE OF TEXAS
MARK ZOELLNER
123611
LICENSED
PROFESSIONAL ENGINEER

11/01/2021

Pacheco Koch
4060 BRYANT IRVIN RD, FORT WORTH, TX, 76109
817.412.7155 FIRM REGISTRATION NUMBER F-469

Texas Department of Transportation

SIGN DETAILS

SHEET 1 OF 1

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6	C 8-1-46		IH 20
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	FTW	PARKER	
CONTROL	SECTION	JOB	219
0008	01	046, ETC	

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

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

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0008	01	046,ETC	US 180,ETC
		DIST	COUNTY		SHEET NO.
		FTW	PALO PINTO		220

71A

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

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

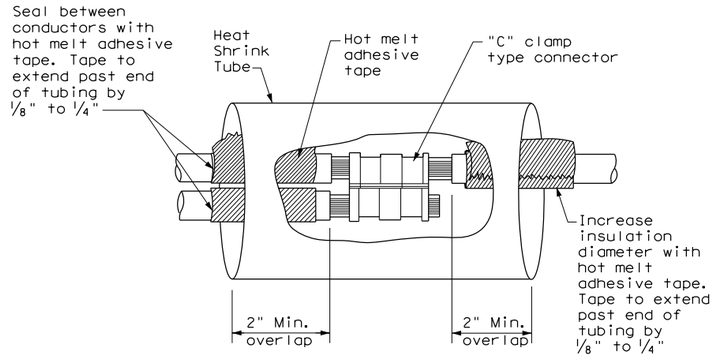
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

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

B. CONSTRUCTION METHODS

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



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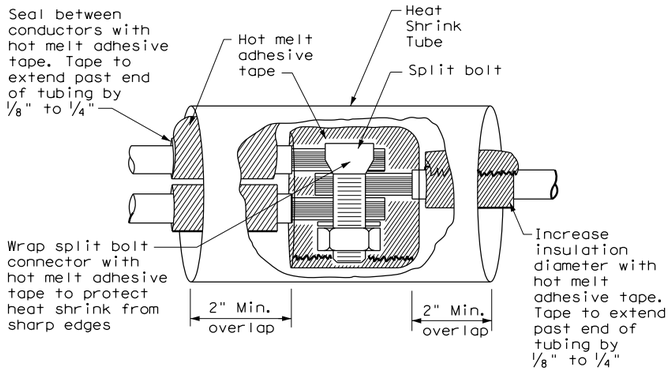
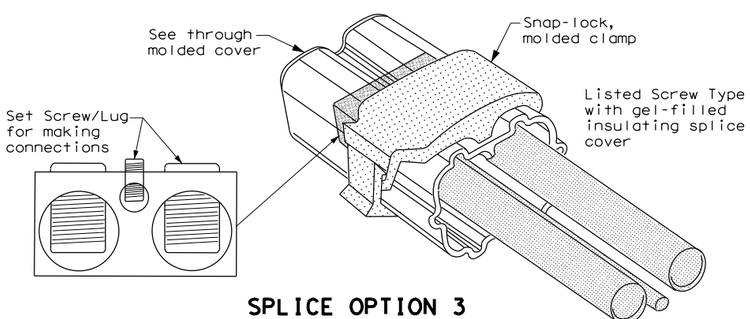
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		221

71C

DATE: 10/28/2021 3:44:01 PM
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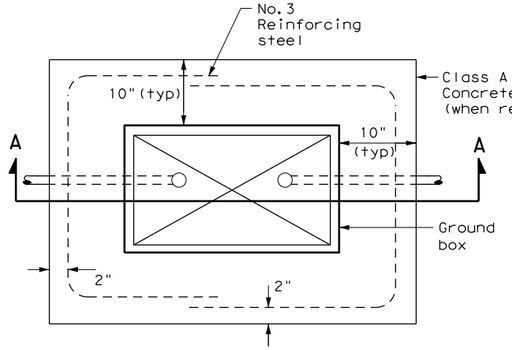
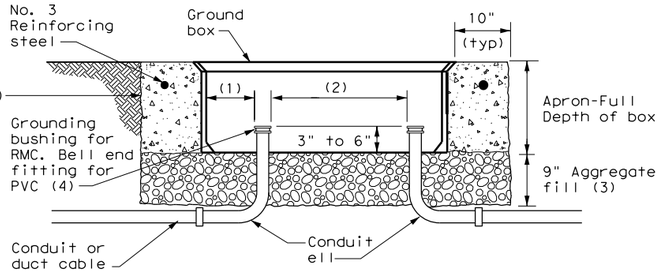


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

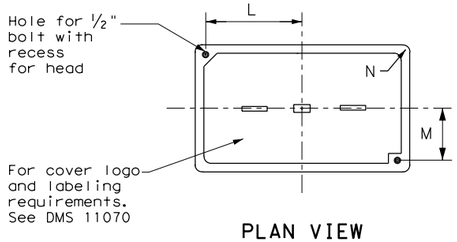
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

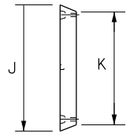
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

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



PLAN VIEW



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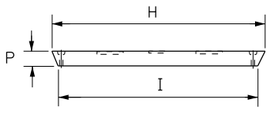

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

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

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		222

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

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

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

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

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

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

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

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

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

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

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

Schematic Type

Service Voltage V / V

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

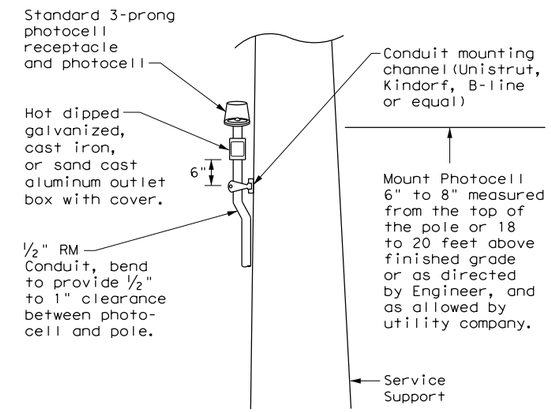
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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

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

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



TOP MOUNTED PHOTOCELL

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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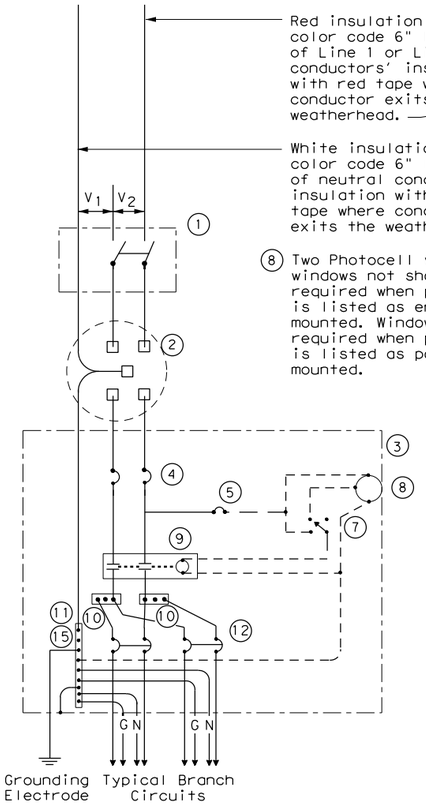
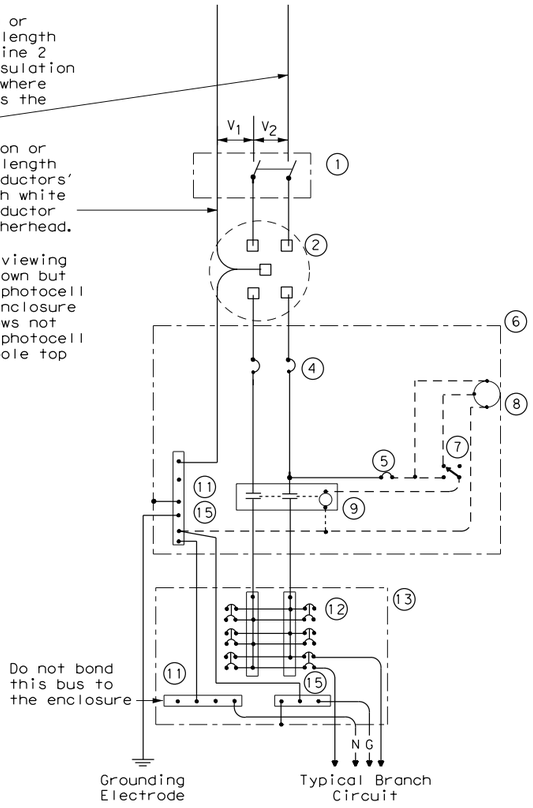
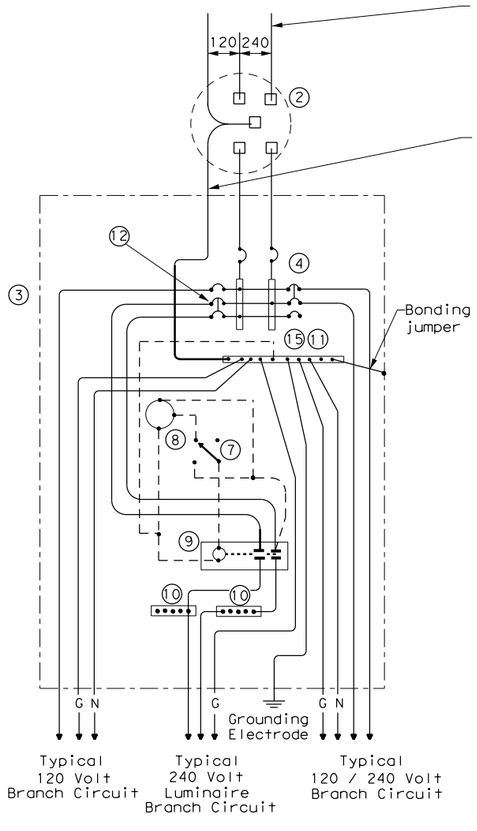


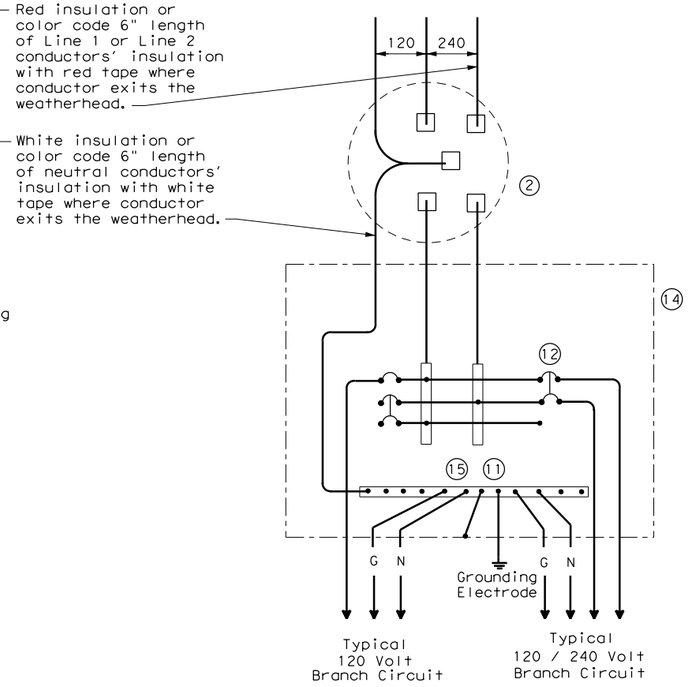
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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	FTW	PALO PINTO		224

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

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

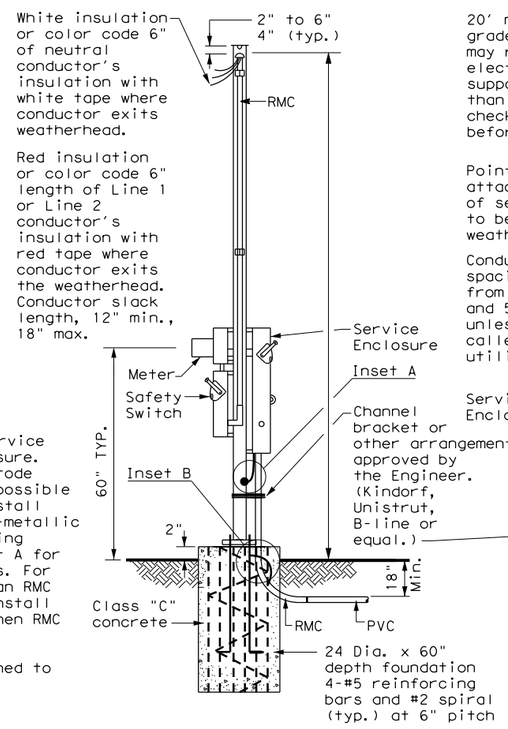
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

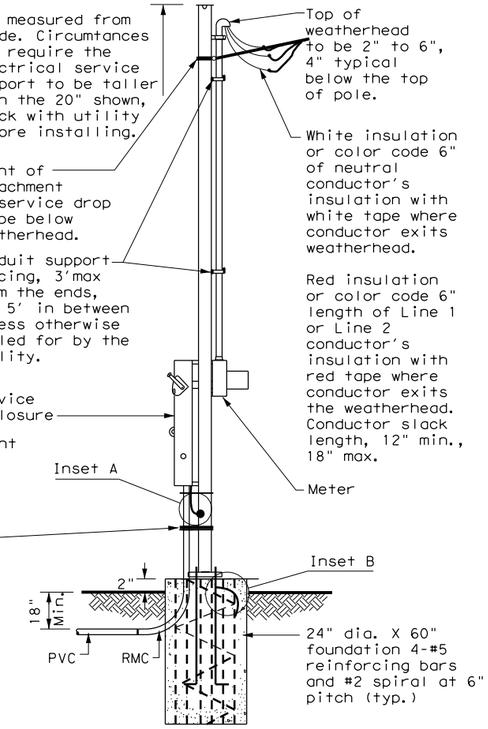
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

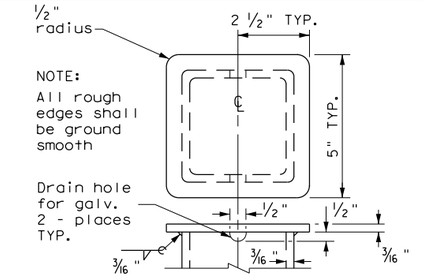


WITH SAFETY SWITCH

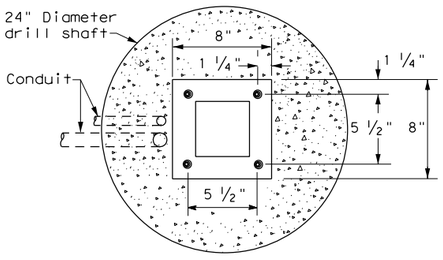


WITHOUT SAFETY SWITCH

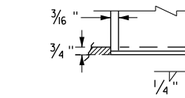
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

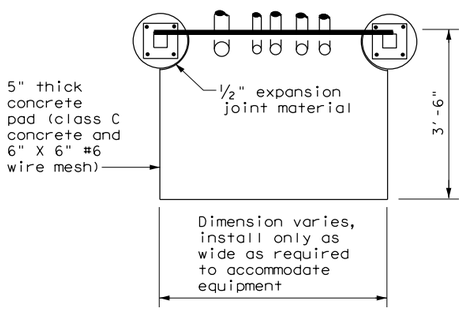


BASE PLATE DETAIL



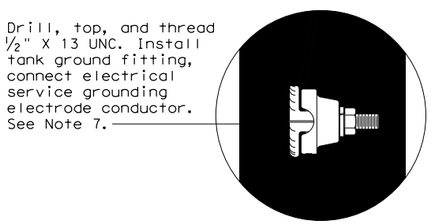
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



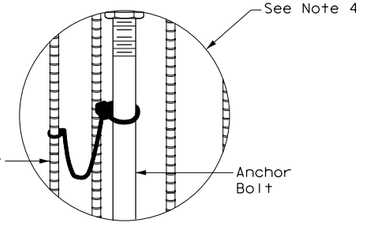
TOP VIEW

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

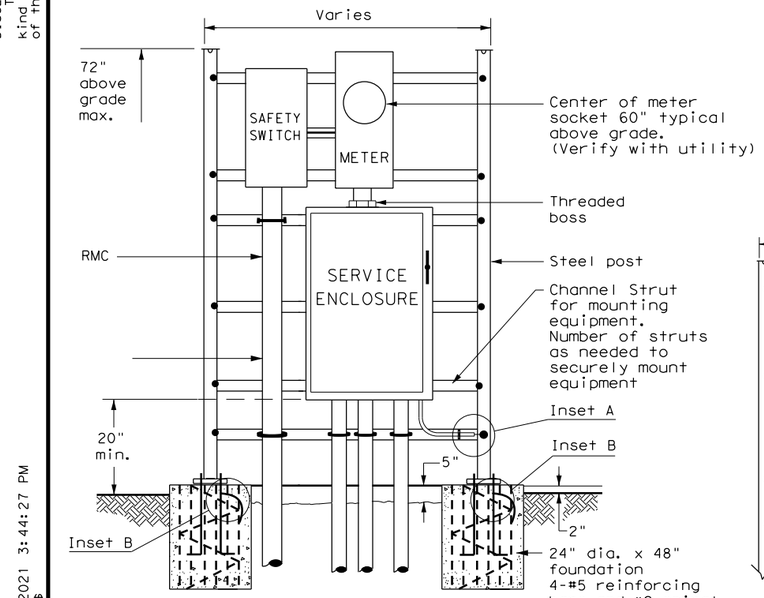


FRONT VIEW

INSET A

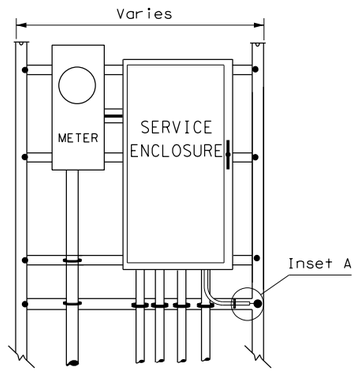


INSET B



WITH SAFETY SWITCH

FRONT VIEW



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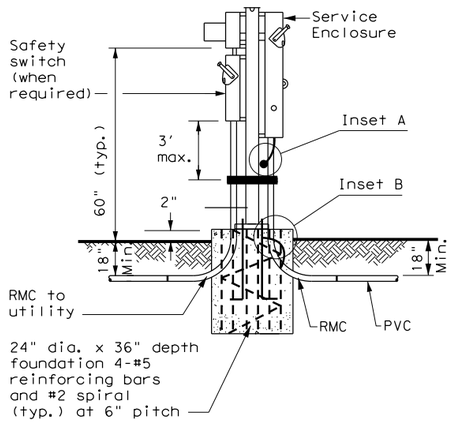
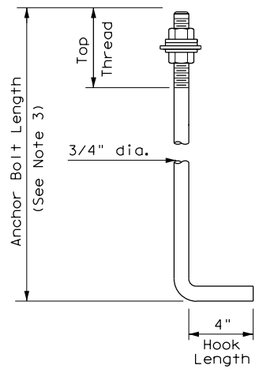


WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

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	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		225

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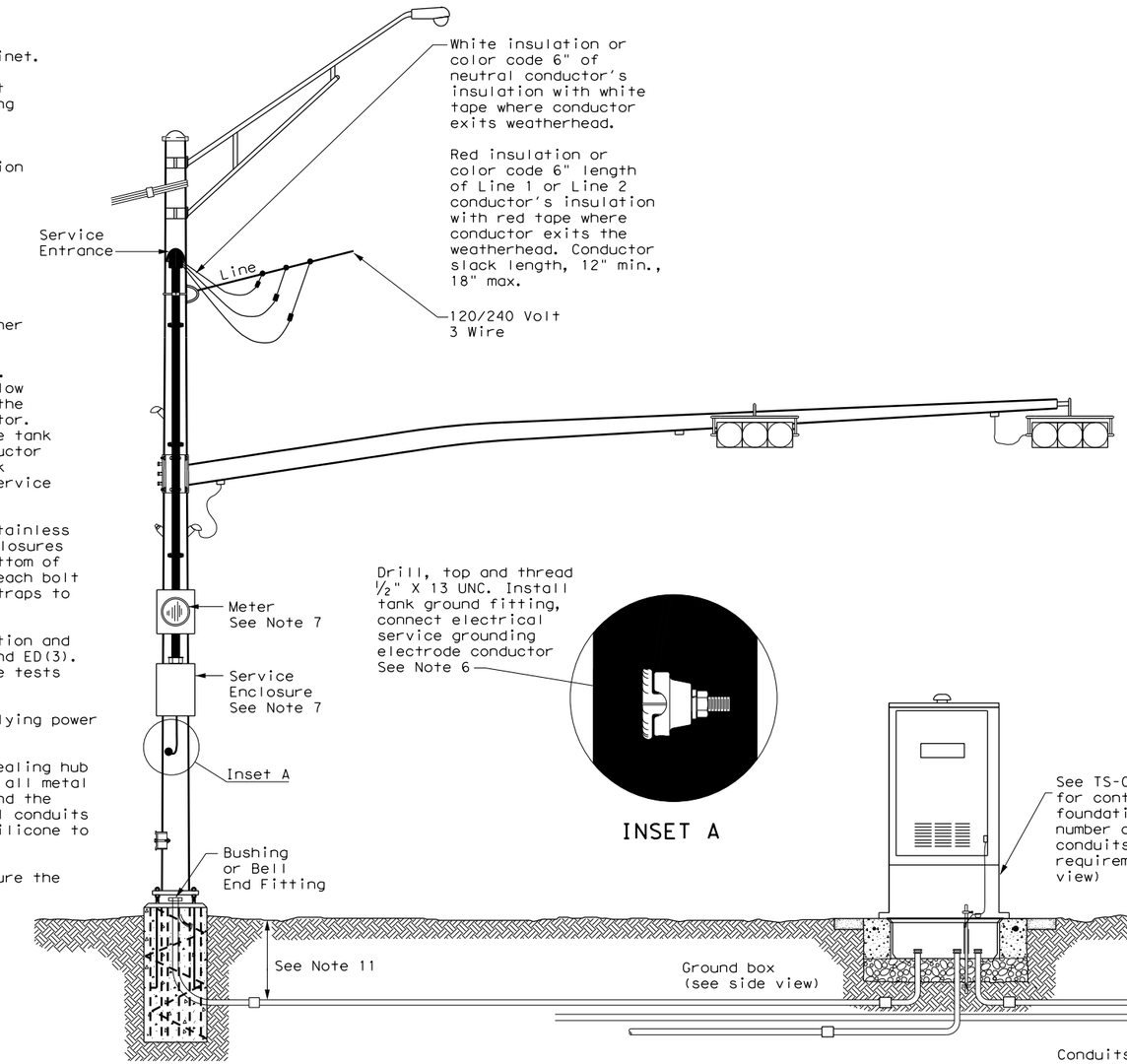
TRAFFIC SIGNAL NOTES

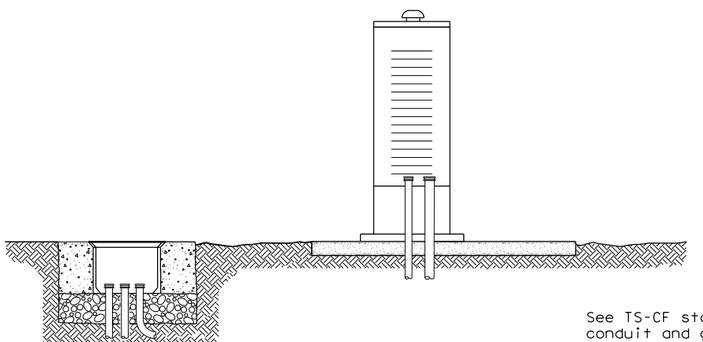
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

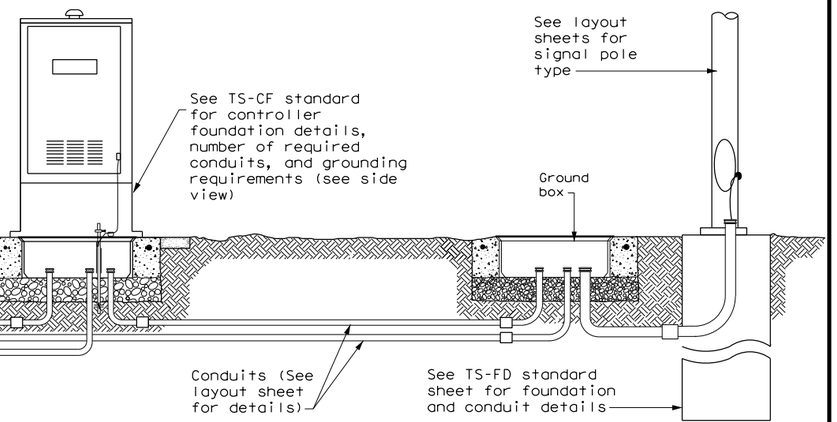
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A



SIGNAL CONTROLLER SIDE VIEW

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



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		226

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FOUNDATION DESIGN TABLE

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

NOTES:

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

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

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

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

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

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

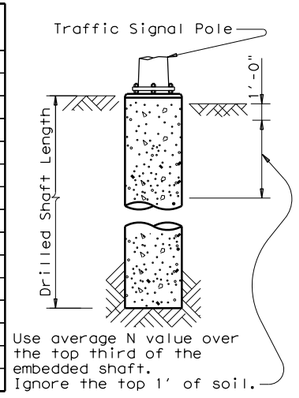
FOUNDATION SUMMARY TABLE

LOCATION IDENTIFICATION	AVG. N BLOW / ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (FEET)				
				24-A	30-A	36-A	36-B	42-A
P-1, P-4, P-5, P-7 (WB US 180 @ US 281)	10	24-A	4	6*				
P-4, P-5, P-7 (EB US 180 @ US 281)	10	24-A	3	6*				
P-1, P-2, P-3, P-4, P-5, P-6 (EB US 180 @ 1st Ave)	10	24-A	6	6*				
P-2, P-3, P-4, P-5, P-6 (EB US 180 @ 6th Ave)	10	24-A	5	6*				
T-1, T-2 (WB US 180 @ US 281)	10	30-A	2		11			
T-3 (WB US 180 @ US 281)	10	36-A	1			13		
T-1, T-3 (EB US 180 @ US 281)	10	30-A	2		11			
T-2 (EB US 180 @ US 281)	10	36-A	1			13		
T-1 (EB US 180 @ 1st Ave)	10	30-A	1		11			
T-2, T-3 (EB US 180 @ 1st Ave)	10	36-A	2			13		
T-1, T-2 (WB US 180 @ 6th Ave)	10	36-A	2			13		
T-3 (WB US 180 @ 6th Ave)	10	30-A	1		11			
T-1, T-3 (EB US 180 @ 6th Ave)	10	30-A	2		11			
T-2, (EB US 180 @ 6th Ave)	10	36-A	1			13		
T-1, T-2, T-3 (US 180 @ 25th Ave)	10	36-A	3			13		
T-4 (US 180 @ 25th Ave)	10	30-A	1		11			
TOTAL DRILLED SHAFT LENGTHS				108*	99	130		

Note: *Subsidiary to Item 687

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

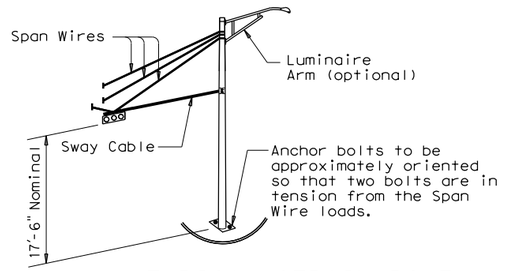


ANCHOR BOLT & TEMPLATE SIZES

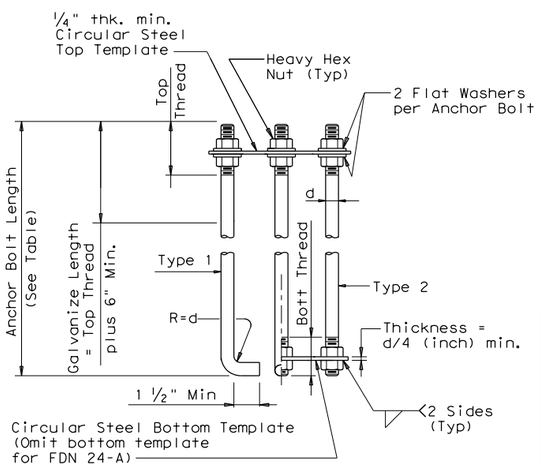
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

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

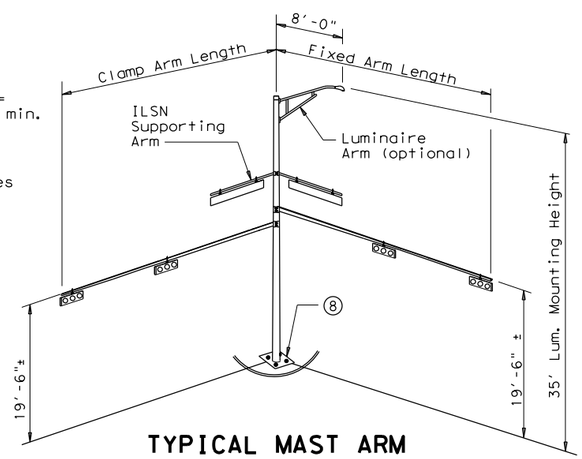


TYPICAL STRAIN POLE ASSEMBLY



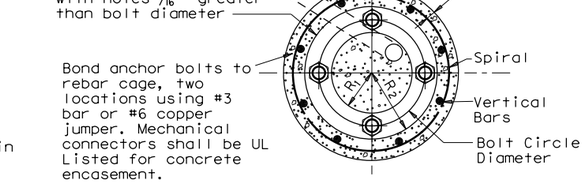
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

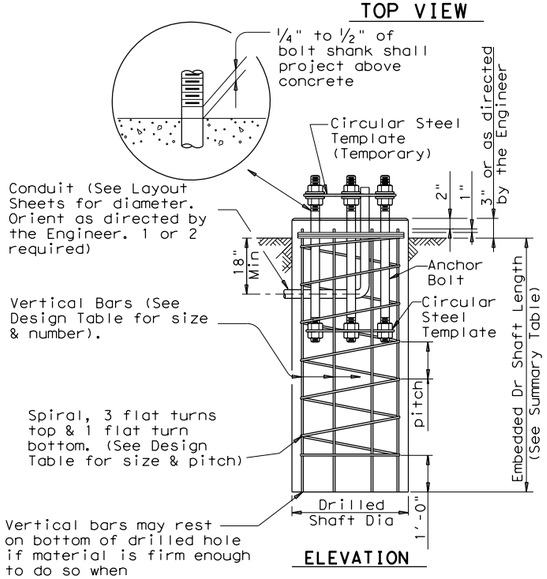


⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
November 1, 2021

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS 5-96 11-99 1-12

CONT	SECT	JOB	HIGHWAY
0008	01	046, ETC	US 180, ETC

DIST	COUNTY	SHEET NO.
FTW	PALO PINTO	227

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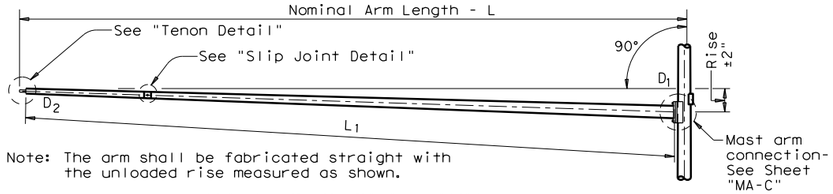
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179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

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

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

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



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

TRAFFIC SIGNAL ARM

(Fixed Mount)

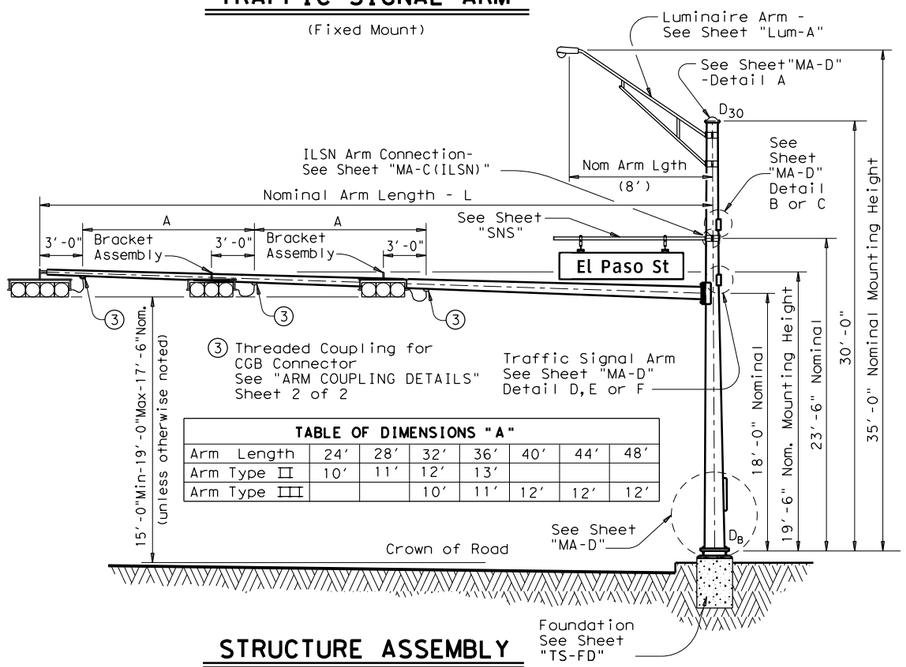


TABLE OF DIMENSIONS "A"							
Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

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

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80	2	24S-80		24-80	1
28	28L-80	4	28S-80		28-80	
32	32L-80	2	32S-80		32-80	
36	36L-80		36S-80		36-80	2
40	40L-80	2	40S-80		40-80	
44	44L-80	2	44S-80		44-80	2
48	48L-80	1	48S-80		48-80	1

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80	3		
28	28I-80		28II-80	4		
32			32II-80	2	32III-80	
36			36II-80	2	36III-80	
40			40II-80		40III-80	2
44					44III-80	4
48					48III-80	2

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
10′ Arm	13

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

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3′-4"	9
1 ¾"	3′-10"	10

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

STATE OF TEXAS
CHAD ANDREW WOOD
92822
LICENSED PROFESSIONAL ENGINEER
November 1, 2021

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-12

REVISIONS
5-96
11-99
1-12

DN: MS	CK: JSY	DW: MMF	CK: JSY
CONT	SECT	JOB	HIGHWAY
0008	01	046, ETC	US 180, ETC
DIST	COUNTY		SHEET NO.
FTW	PALO PINTO		228

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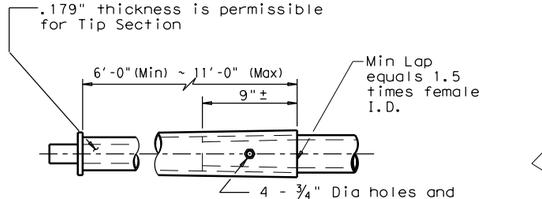
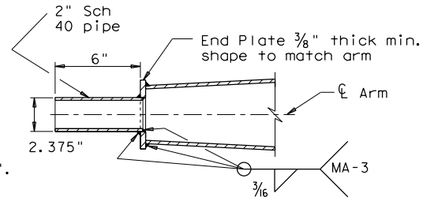


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL



TENON DETAIL

VIBRATION WARNING

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

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

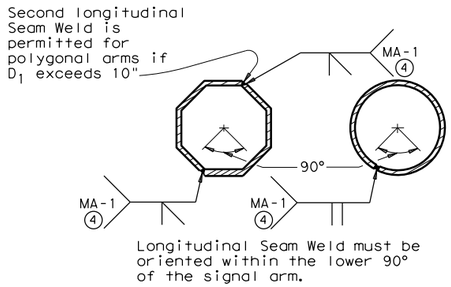
If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

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

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

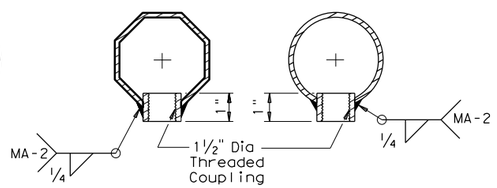
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

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



ARM COUPLING DETAILS

GENERAL NOTES:

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

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY
(80 MPH WIND ZONE)
SMA-80(2)-12

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

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0008	01	046,ETC	US 180,ETC
DIST	COUNTY		SHEET NO.
FTW	PALO PINTO		229

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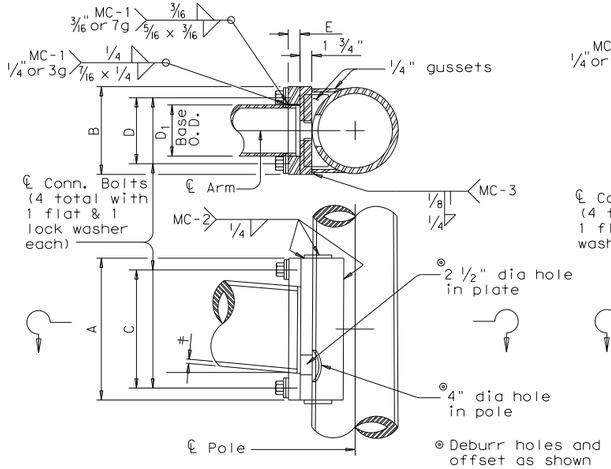
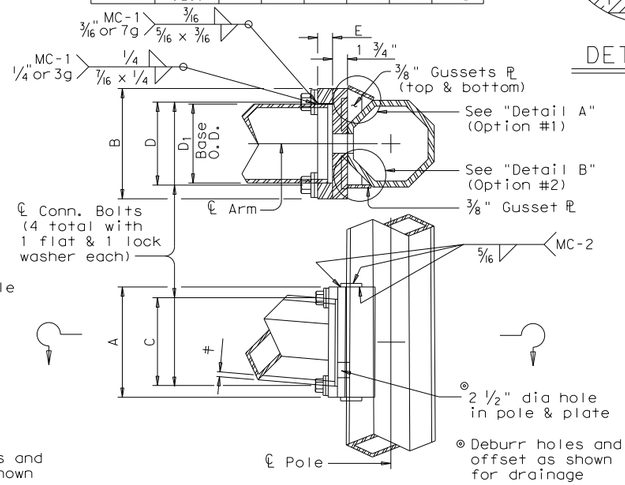
ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18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



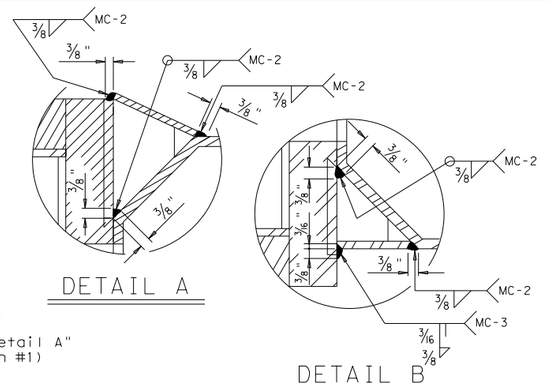
FIXED MOUNT DETAIL 1

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 ¼	3	5/8
9.5	.239	18	12	4	1 ¼	3	5/8
10.0	.239	18	12	4	1 ¼	3	5/8

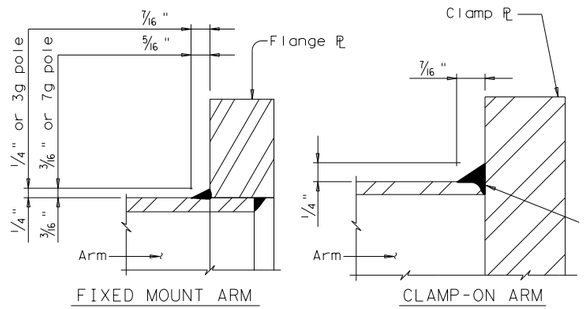
ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 ¾	1 ¼
7.5	.179	11	11	8	8	1 ¾	1 ¼
8.0	.179	11	11	8	8	2	1 ¼
9.0	.179	13	13	10	10	2	1 ¼
10.0	.179	13	13	10	10	2	1 ¼
9.5	.239	13	13	10	10	2	1 ¼
10.0	.239	14	14	11	11	2	1 ½
11.0	.239	14	14	11	11	3	1 ½
11.5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



FIXED MOUNT DETAIL 2



ARM SIZE D_1	ARM SIZE ǂ	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	¾	4	¾	2	5/8
7.5	.179	14	8	¾	4	¾	2	5/8
8.0	.179	14	8	¾	4	¾	2	5/8
9.0	.179	16	10	⅞	4	1	2	5/8
10.0	.179	18	10	⅞	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8



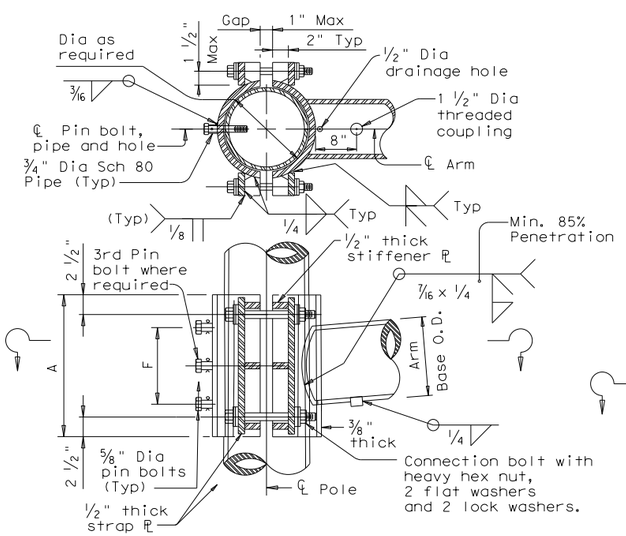
ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

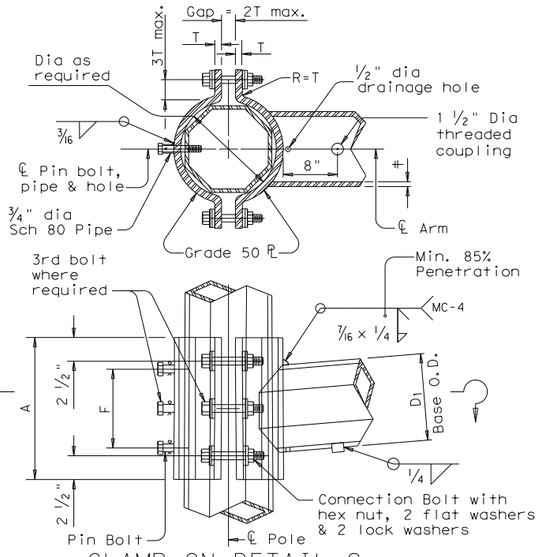
MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008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

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

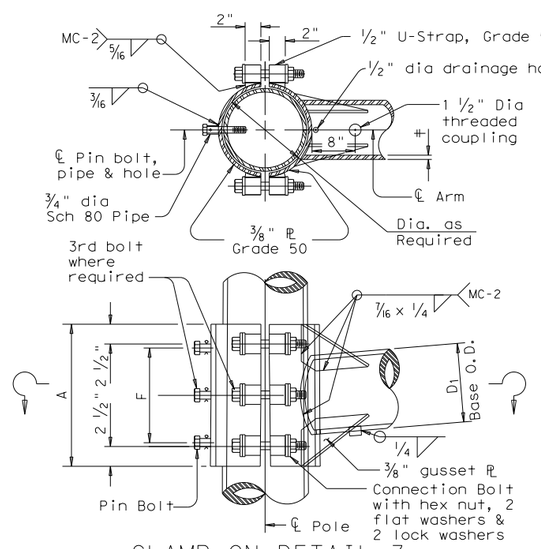
② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.



CLAMP-ON DETAIL 1



CLAMP-ON DETAIL 2



CLAMP-ON DETAIL 3

GENERAL NOTES:

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

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

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

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

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 5/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

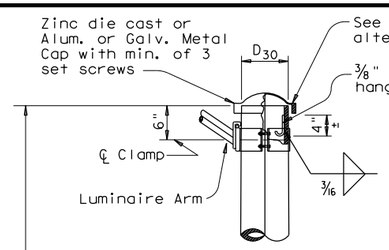
MA-C-12

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

REVISIONS
5-96
5-09
1-12

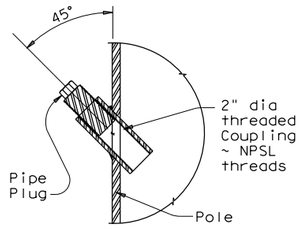
CONT	SECT	JOB	HIGHWAY
0008	01	046, ETC	US 180, ETC
DIST	COUNTY		SHEET NO.
FTW	PALO PINTO		230

126A

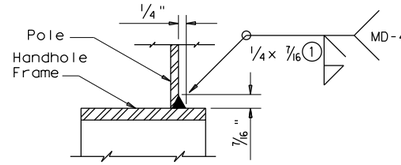


DETAIL A

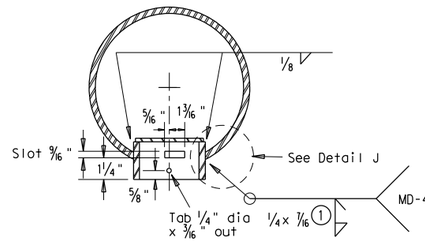
(for pole with luminaire)



POLE COUPLING DETAIL

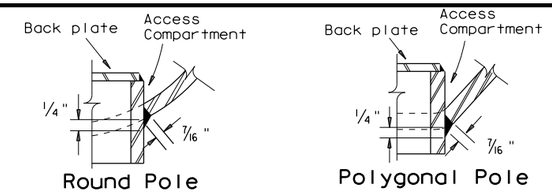


DETAIL G

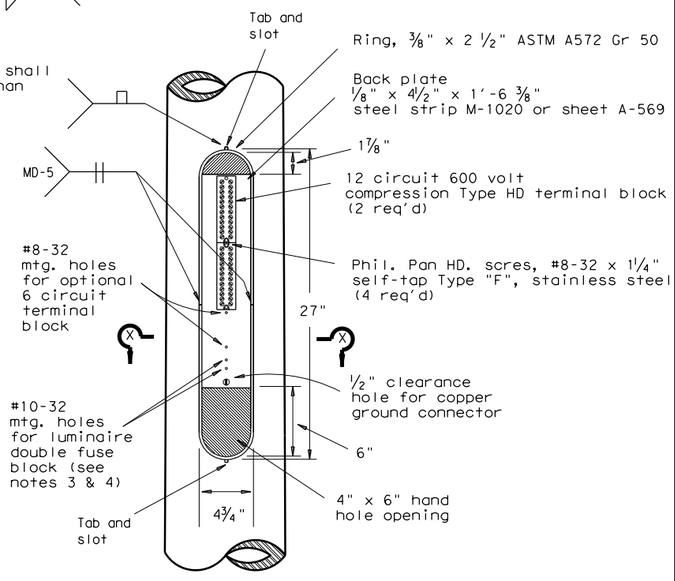


SECTION X-X

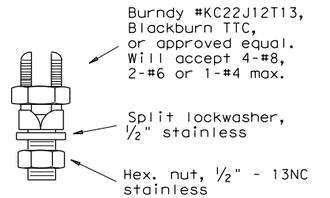
Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



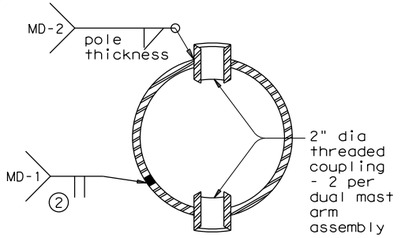
DETAIL J



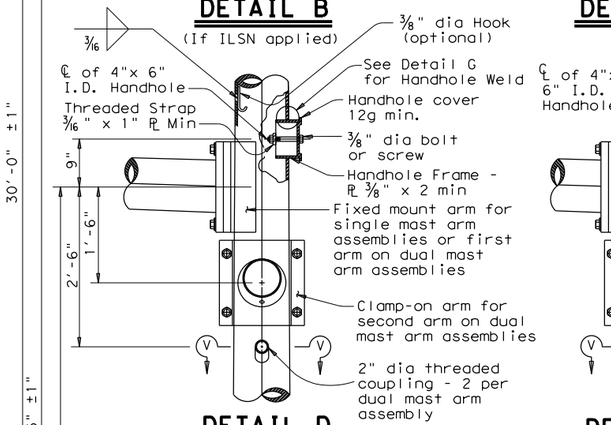
ACCESS COMPARTMENT



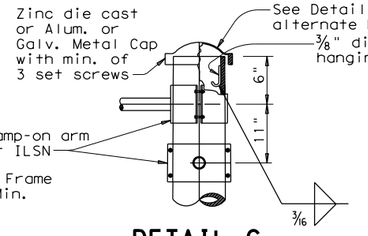
COPPER GROUND CONNECTOR



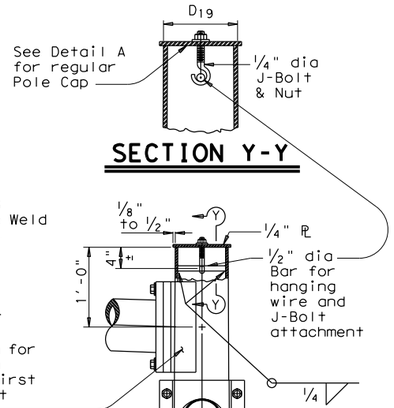
SECTION V-V



DETAIL B



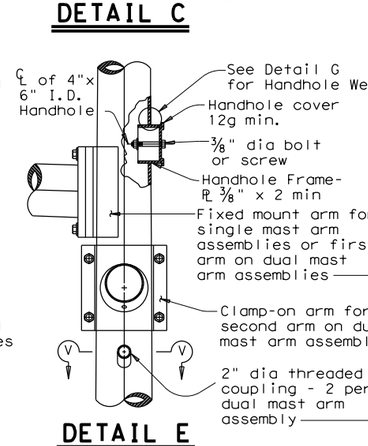
DETAIL C



SECTION Y-Y

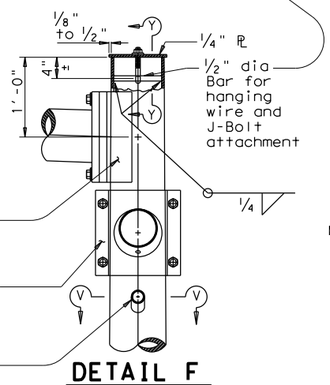
DETAIL D

(for 30' pole with luminaire and ILSN sign)



DETAIL E

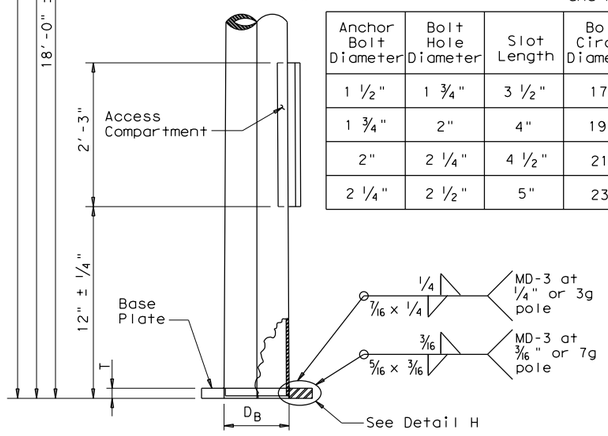
(for 24' pole with ILSN sign and no luminaire)



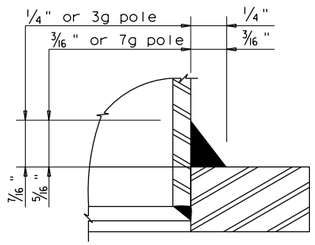
DETAIL F

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

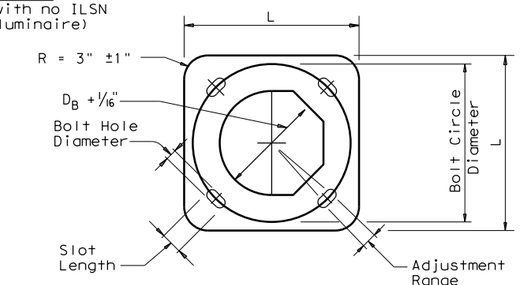
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base PL Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



POLE ELEVATION



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

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

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

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

REVISIONS 8-99 1-12

CONT	SECT	JOB	HIGHWAY
0008	01	046, ETC	US 180, ETC
DIST	COUNTY		SHEET NO.
FTW	PALO PINTO		231

DATE: 10/28/2021 3:44:59 PM
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DATE: 10/28/2021 3:45:06 PM
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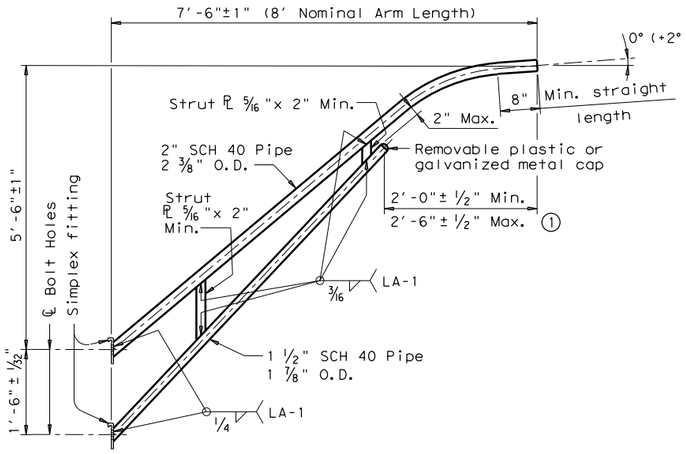
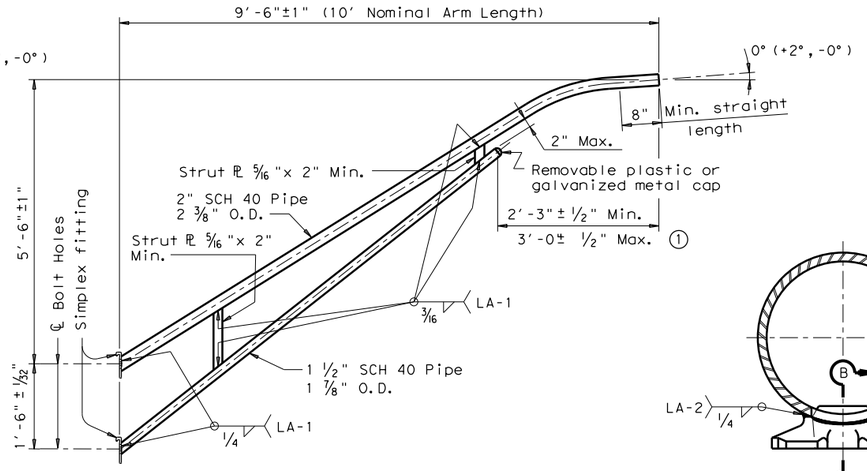
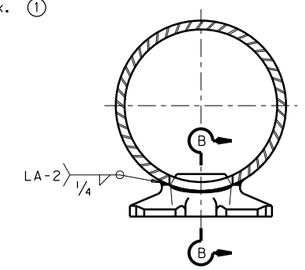


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

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

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

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

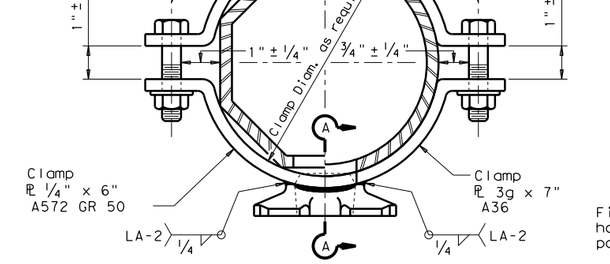
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified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

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

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

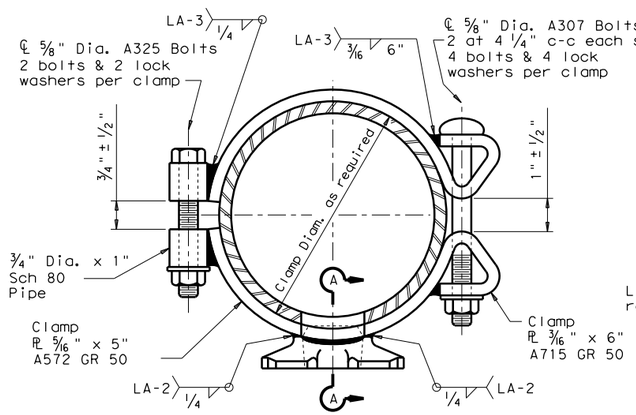
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly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

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



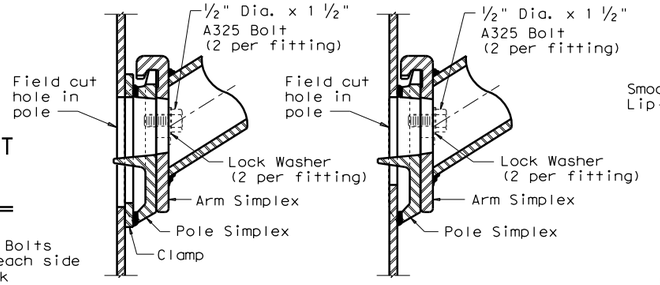
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



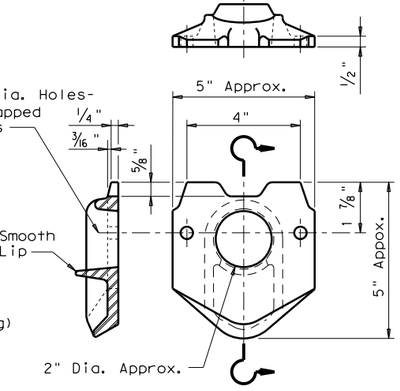
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

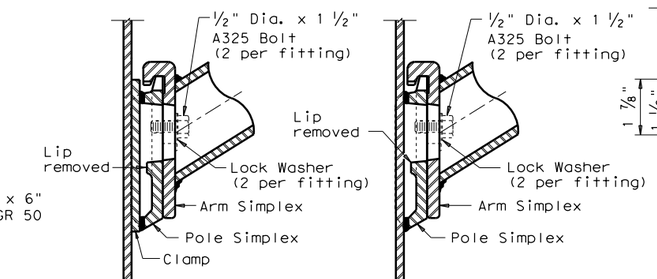


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

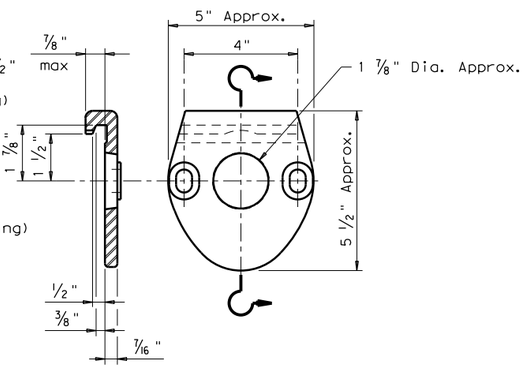


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

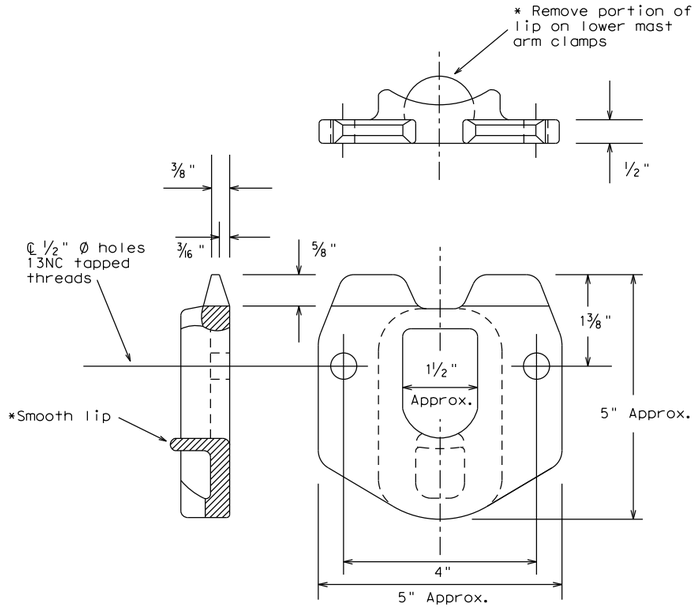
LUM-A-12

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

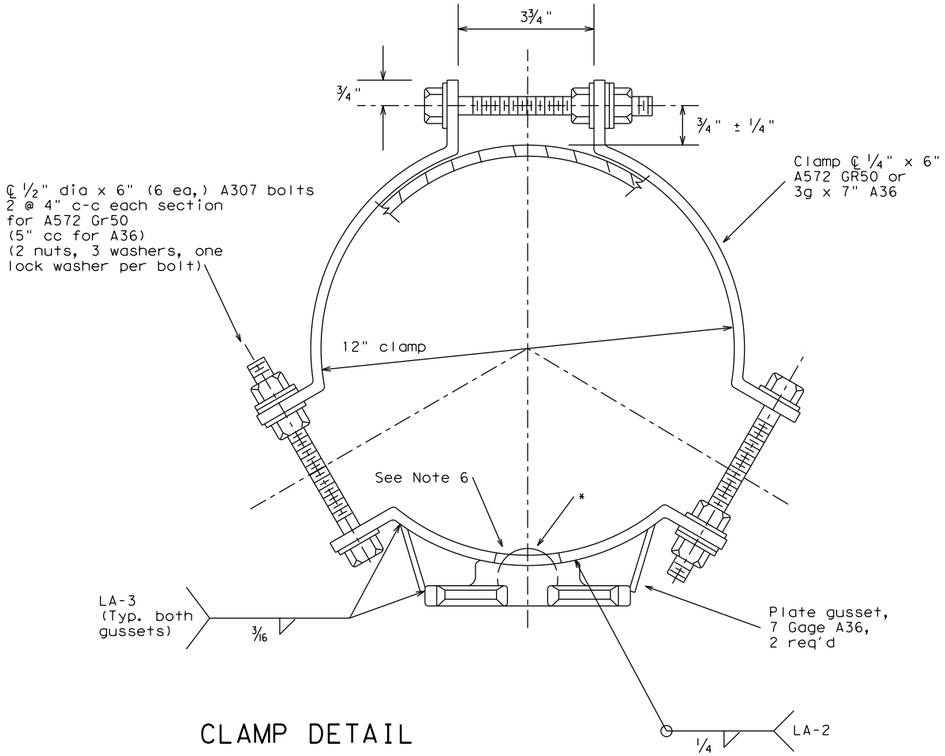
REVISIONS
5-96
1-99
1-12

CONT	SECT	JOB	HIGHWAY
0008	01	046,ETC	US 180,ETC

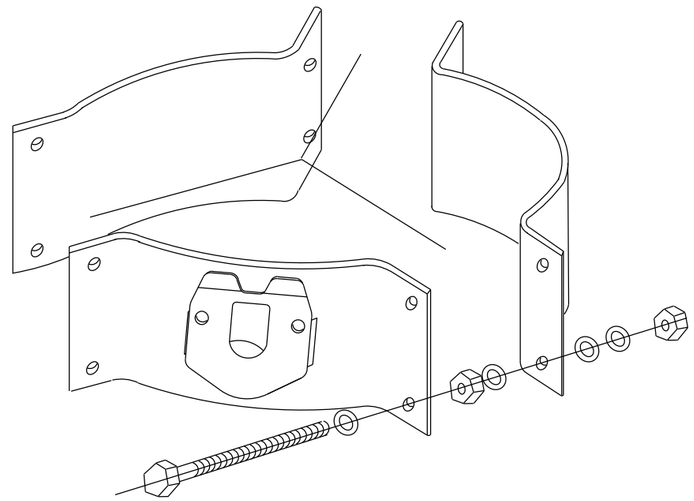
DIST	COUNTY	SHEET NO.
FTW	PALO PINTO	232



POLE SIMPLEX DETAILS



CLAMP DETAIL



PROJECTION

OTHER MATERIALS:

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

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, 1/2in. X 1 1/2in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.

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

DN: KAB	CK: RES	DW: FDN	CK: CAL

REVISIONS
11-99
1-12

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.
FTW	PALO PINTO		233

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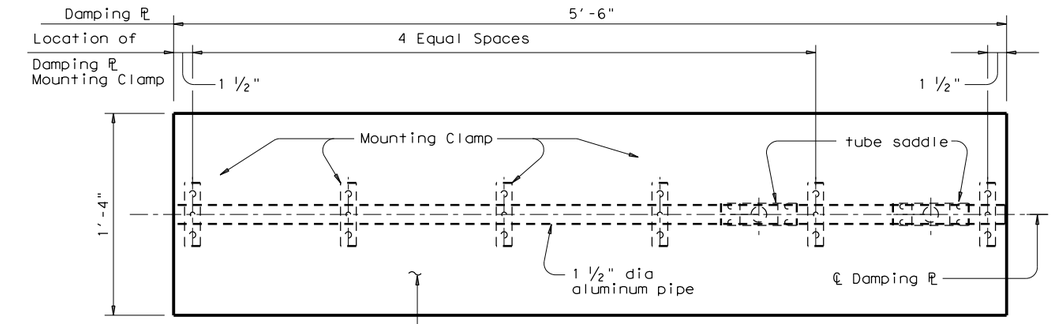
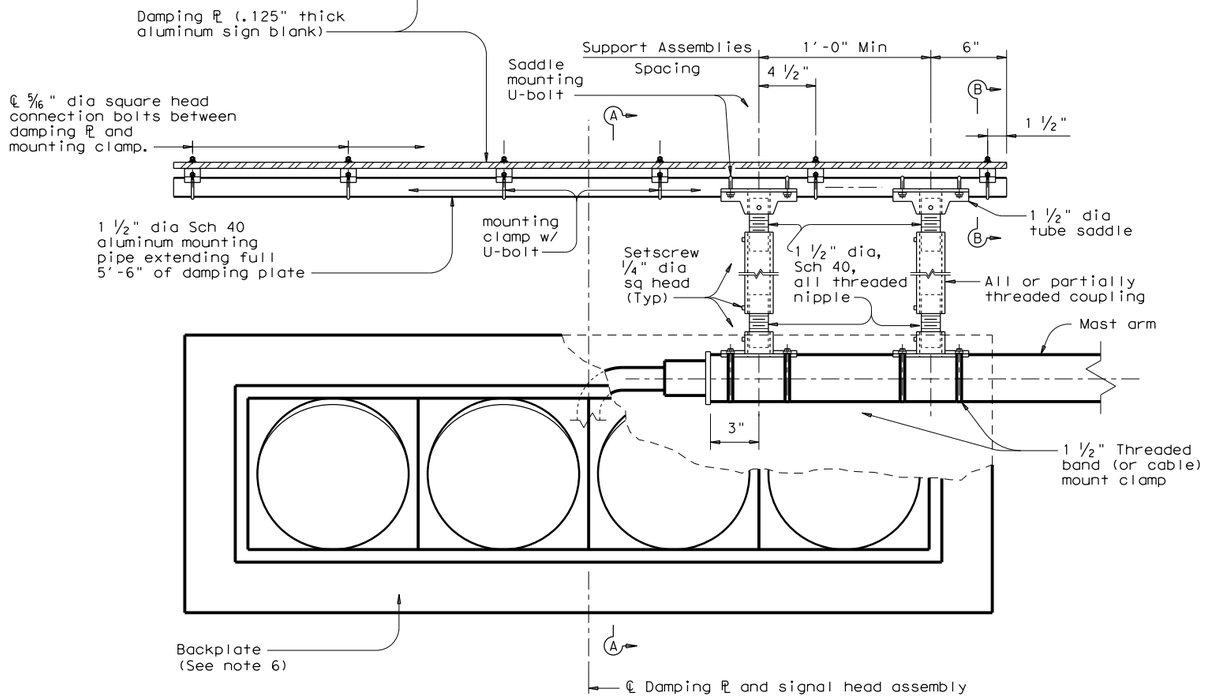


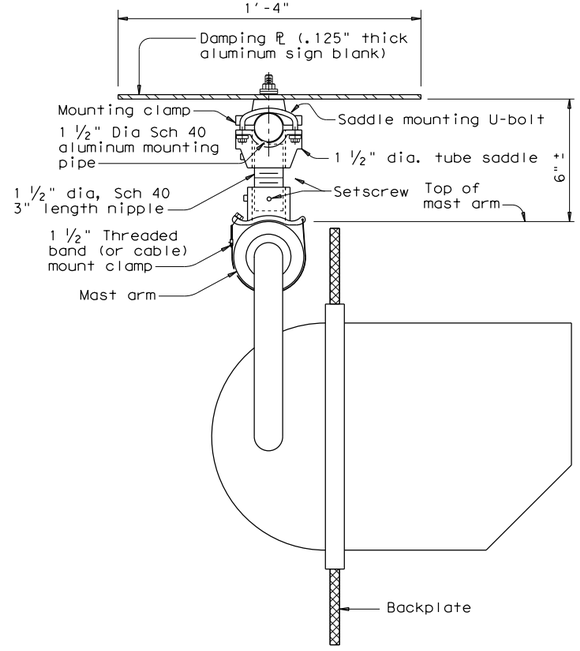
PLAN



ELEVATION

DAMPING PLATE MOUNTING DETAILS

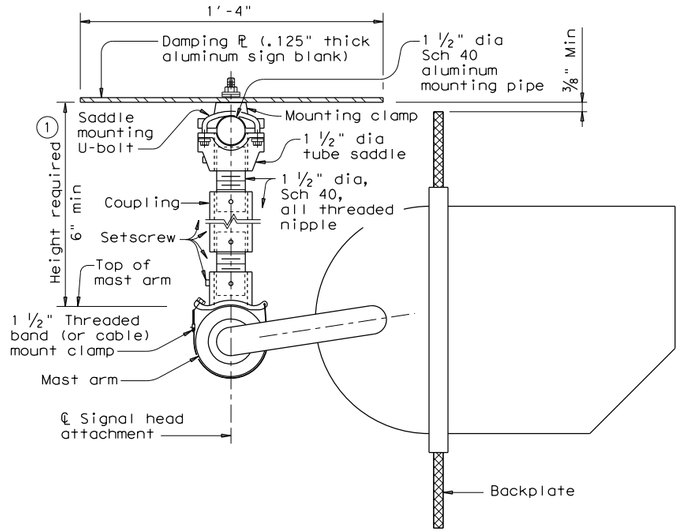
(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)

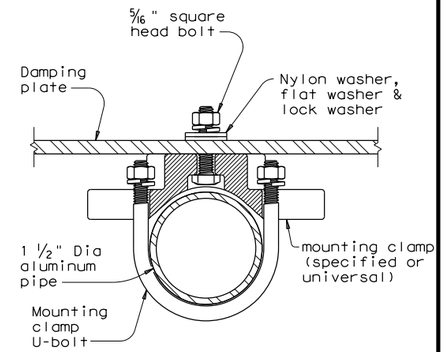


SECTION A-A

(Showing alternate placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)

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



SECTION B-B

(Showing damping plate attachment)

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.

3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate)and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

5. Contractor will verify applicable field dimensions before the installation.

6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

Texas Department of Transportation

Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2012	CONT	SECT	JOB	HIGHWAY
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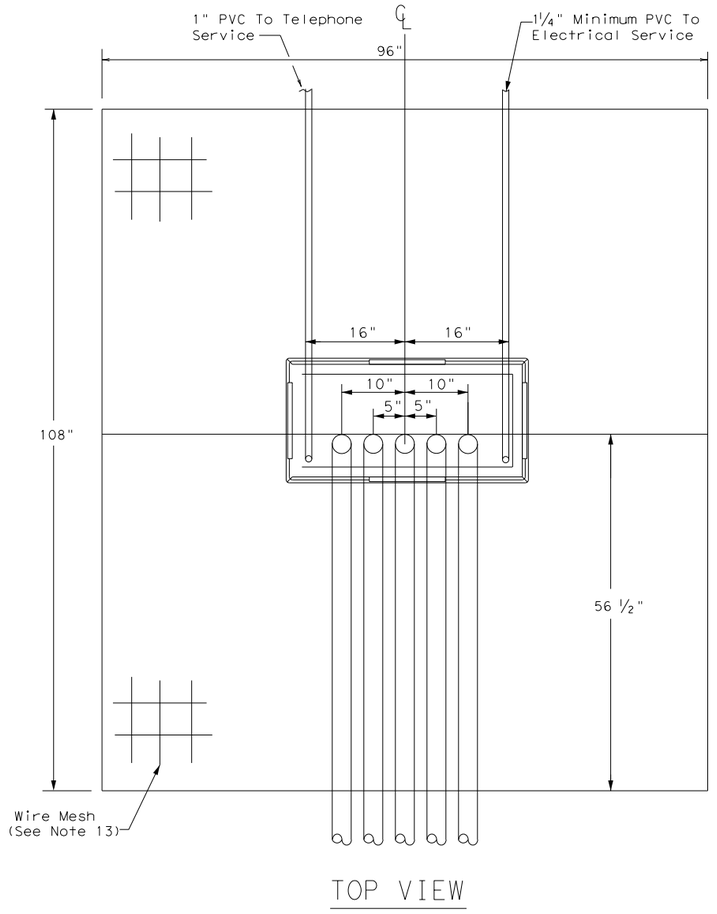
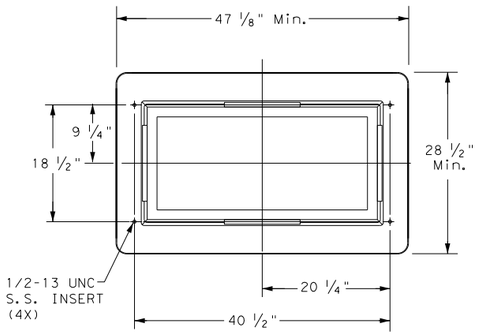
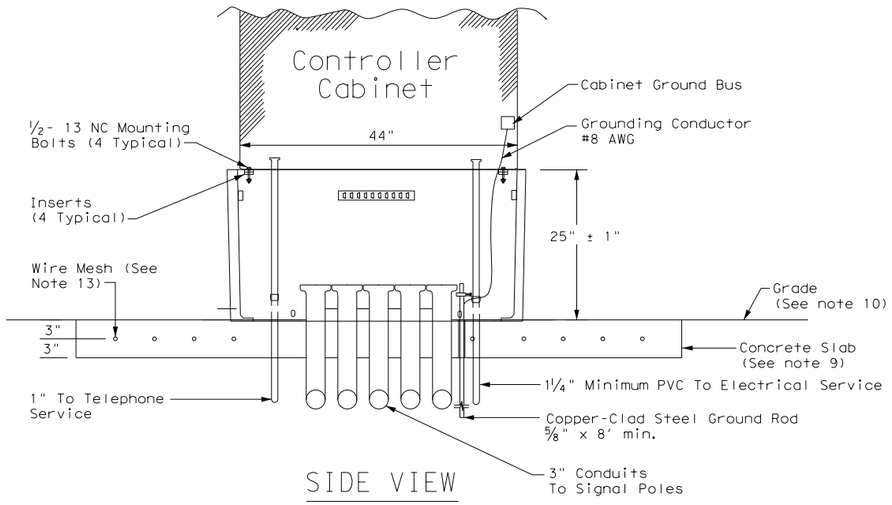
	FTW	PALO PINTO		234



TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-21

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© TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046, ETC	US 180, ETC
12-04	DIST	COUNTY		SHEET NO.
2-21	FTW	PALO PINTO		235

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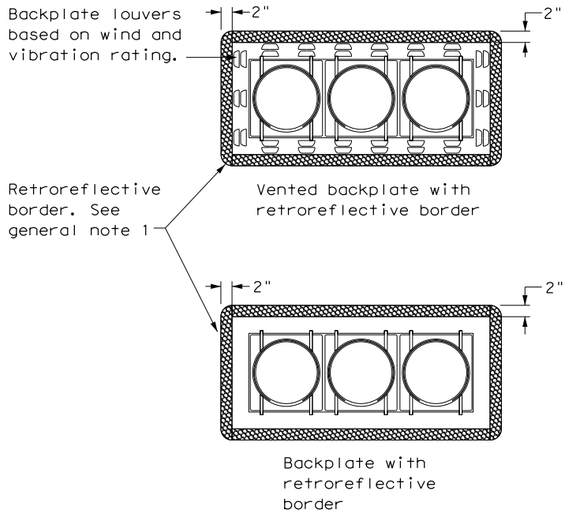
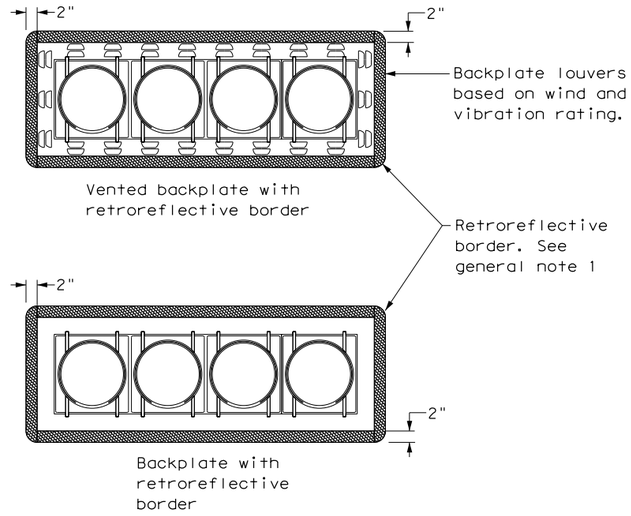
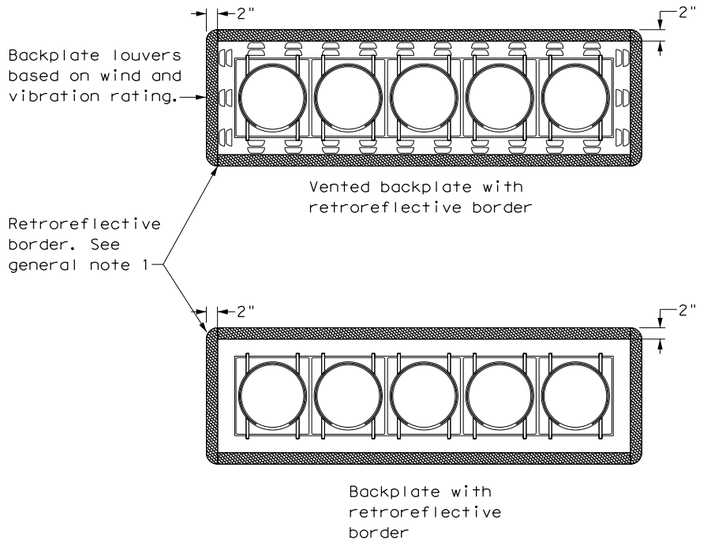


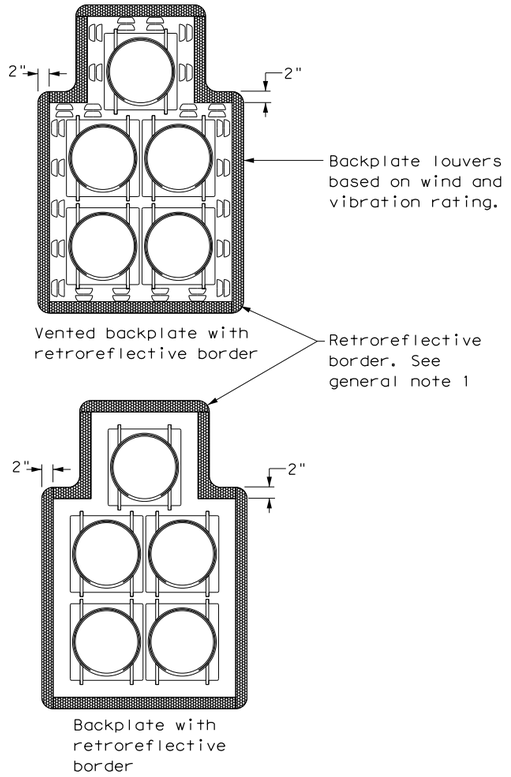
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



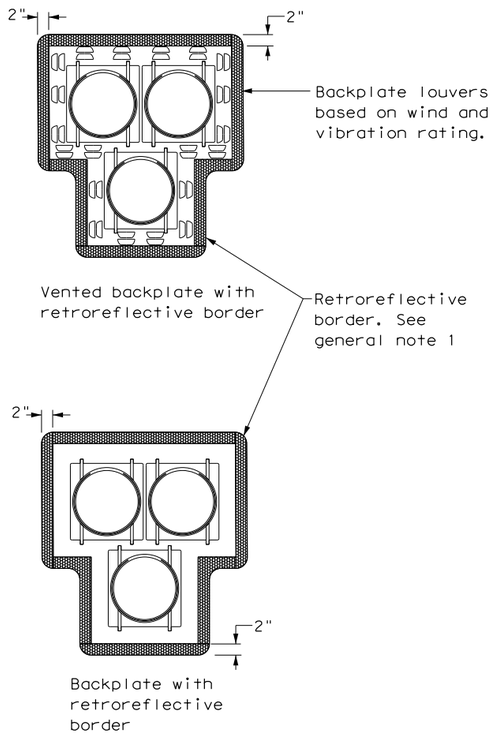
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

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

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		236

NOTE: Structures north of ice line to be designed for ice.

ICE LINE

ZONE 2
(90 MPH WIND)

ZONE 3
(80 MPH WIND)

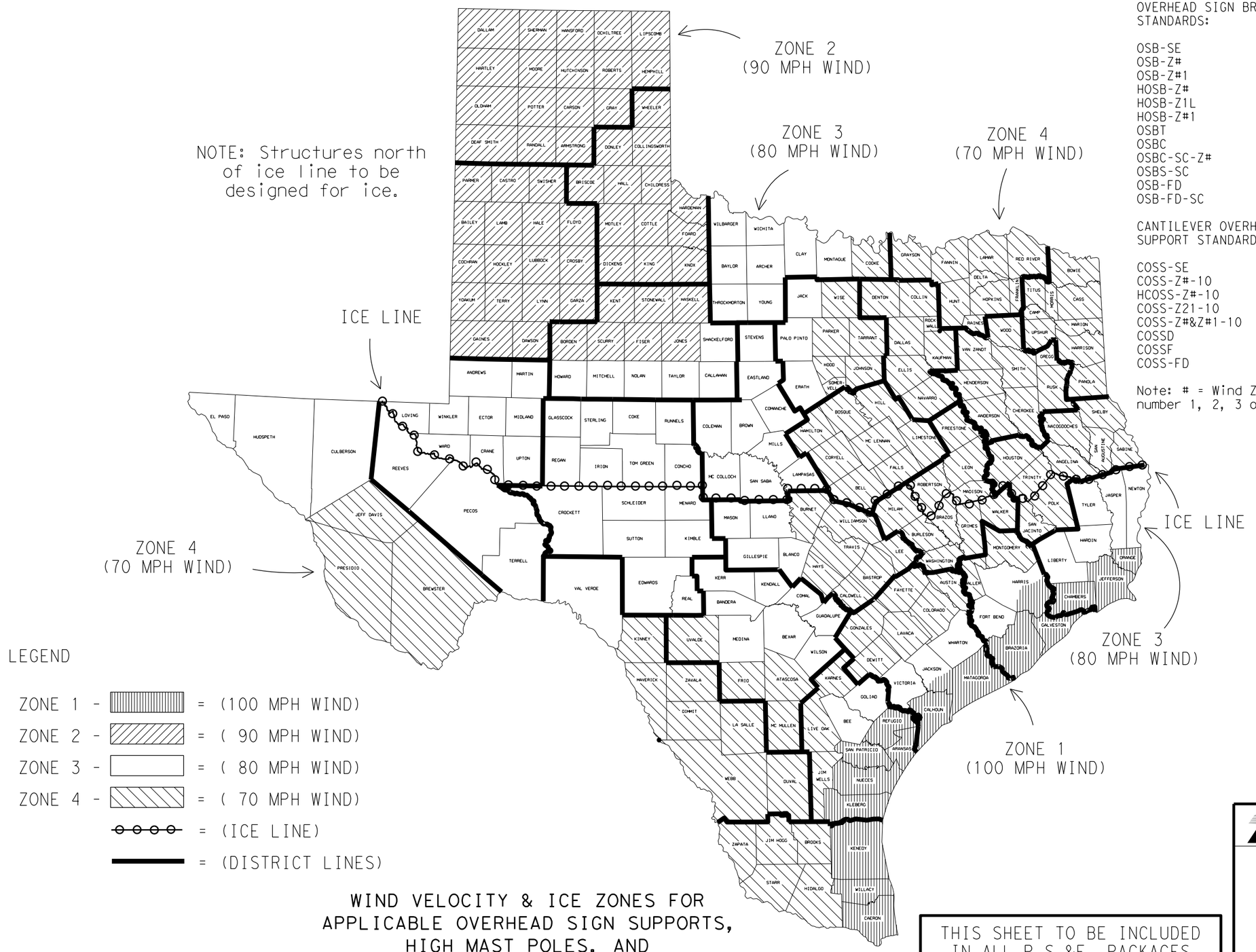
ZONE 4
(70 MPH WIND)

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 3
(80 MPH WIND)

ZONE 1
(100 MPH WIND)



LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation

Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

WV & IZ-14

FILE: windice.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		237

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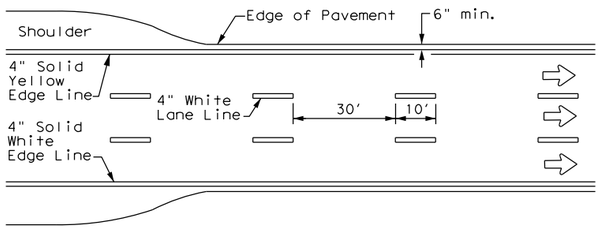
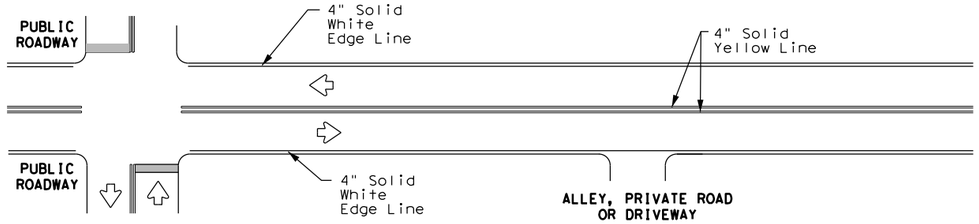
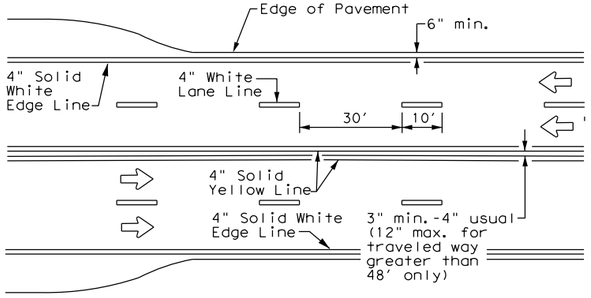


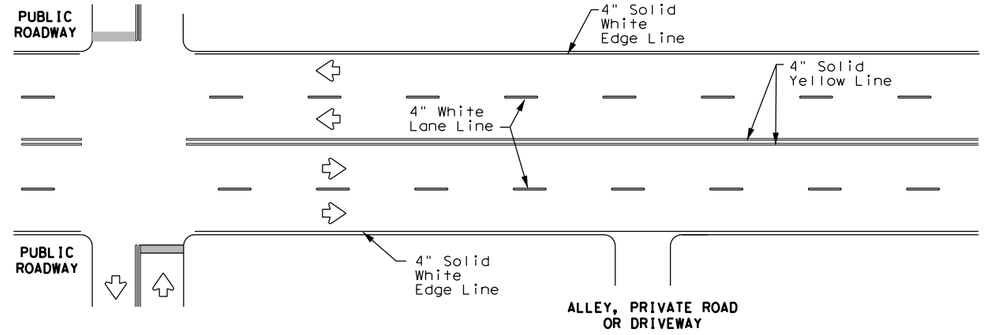
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



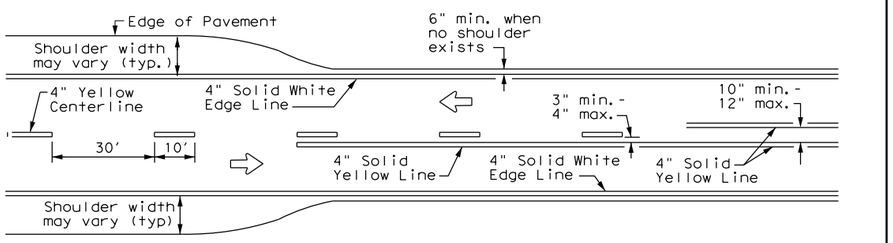
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



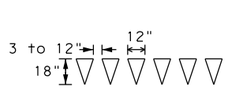
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



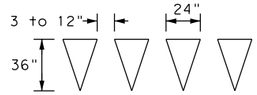
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

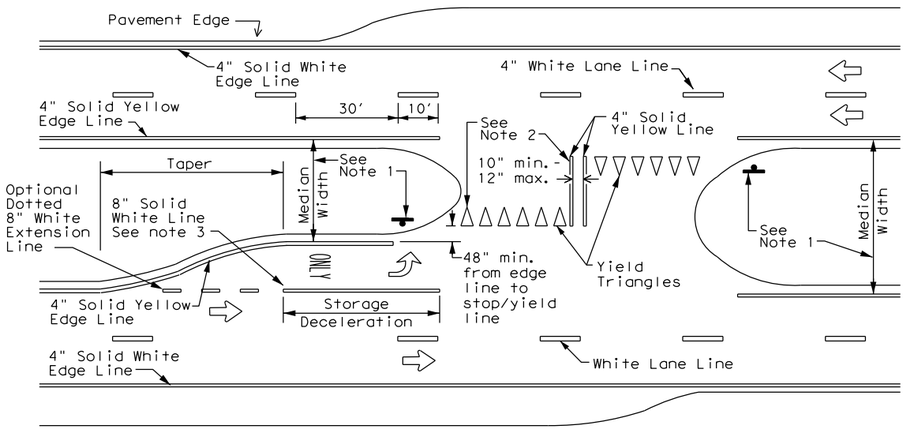


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

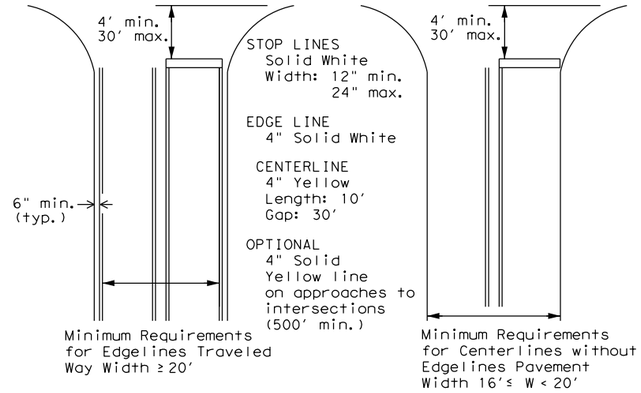
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0008	01	046,ETC	US 180,ETC
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	FTW	PALO PINTO		238

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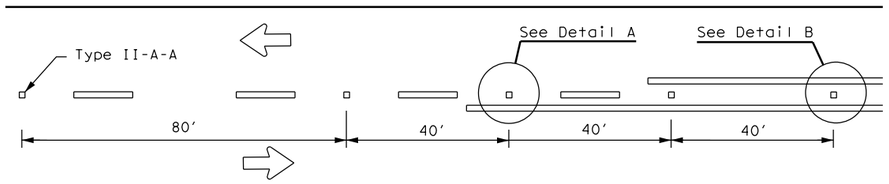
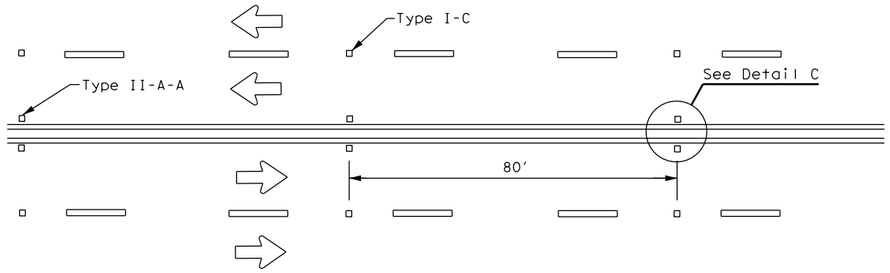
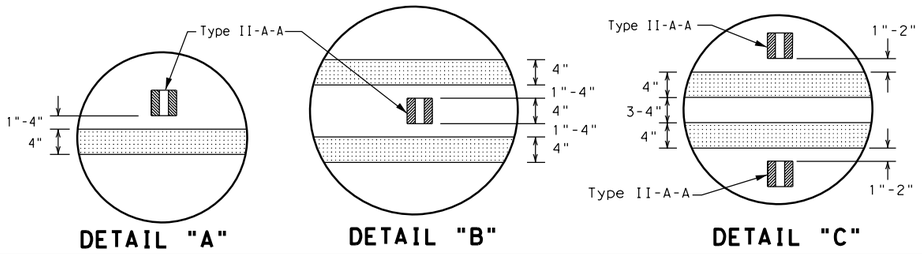
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



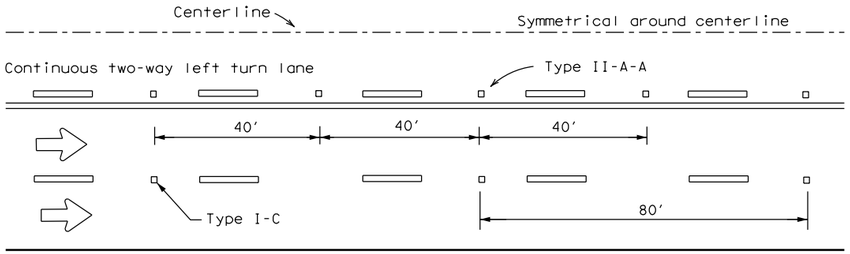
CENTERLINE FOR ALL TWO LANE ROADWAYS



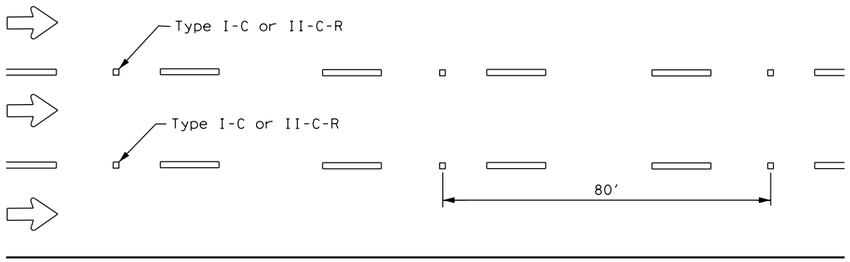
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

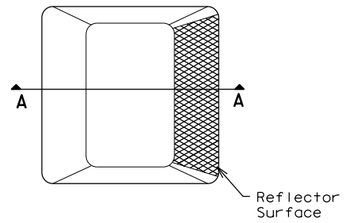


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

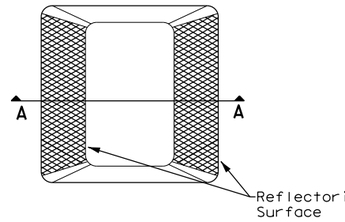
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

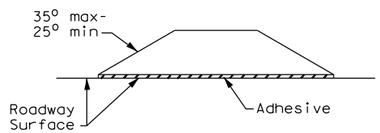
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

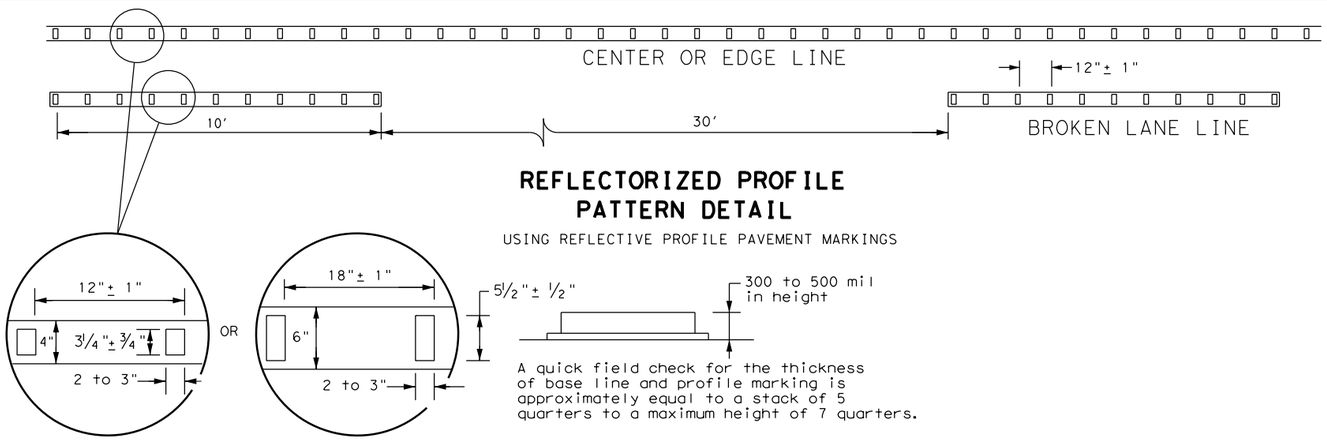


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0008	01	046,ETC	US 180,ETC
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	FTW	PALO PINTO		239

22B

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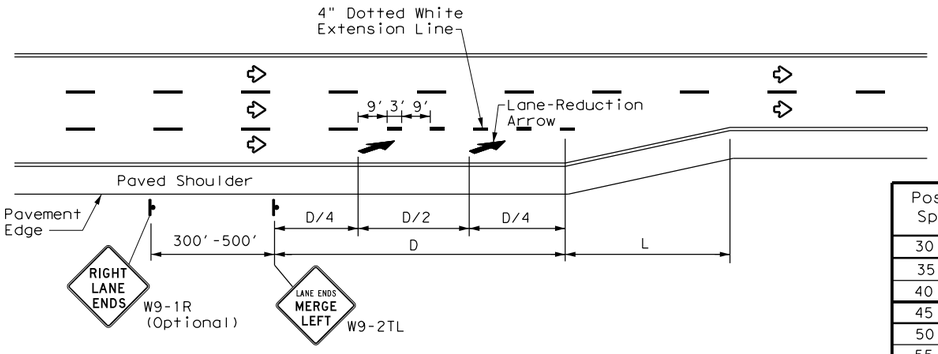
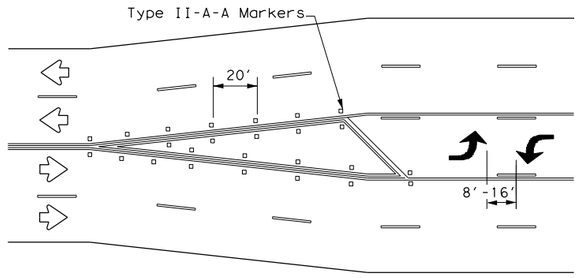


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

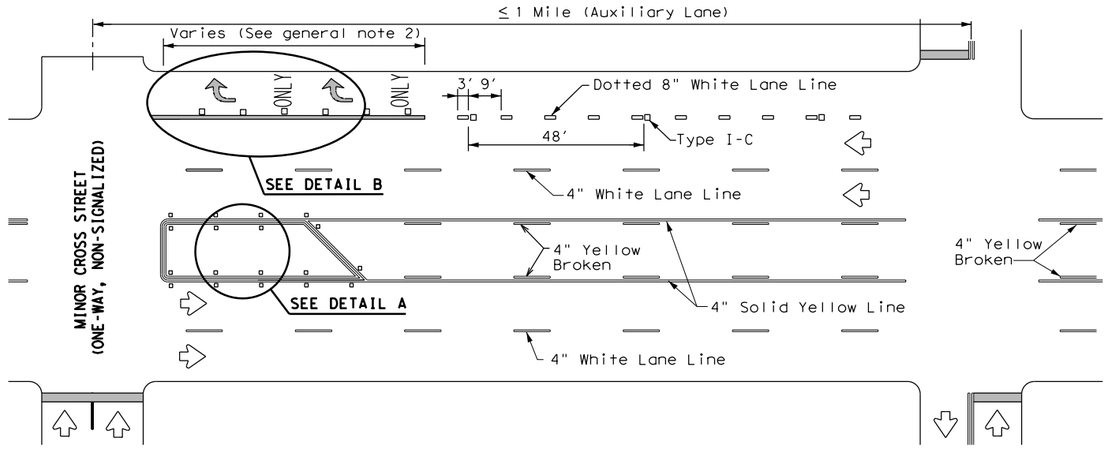
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

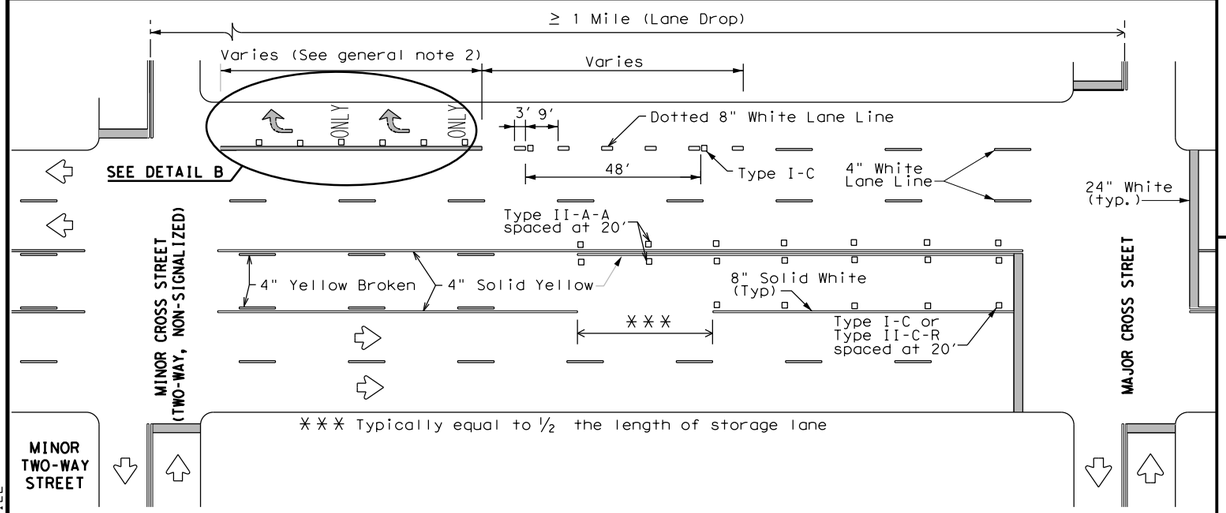
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

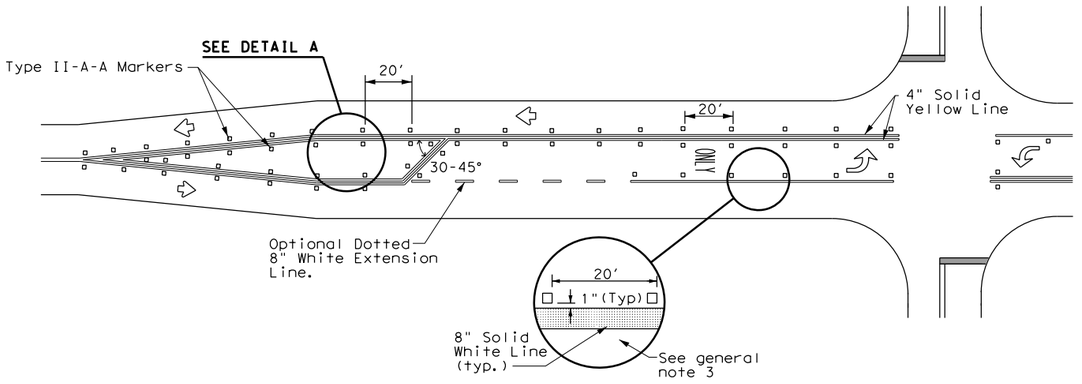
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



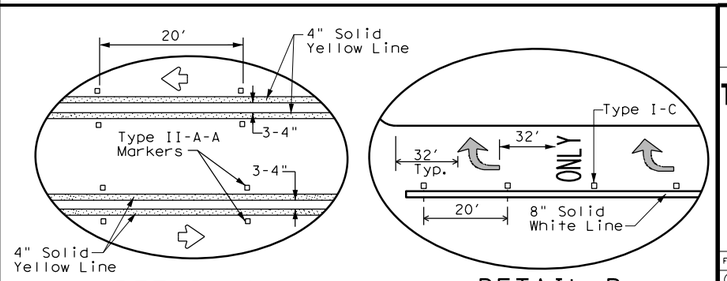
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A DETAIL B

Texas Department of Transportation — Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
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3-03 6-20				

22C

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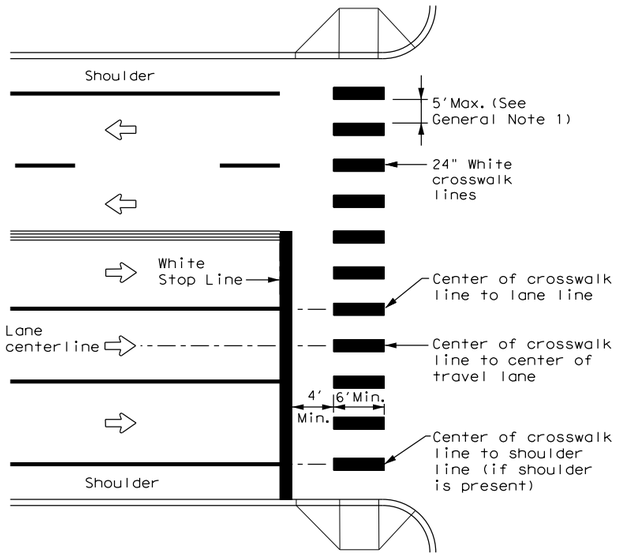


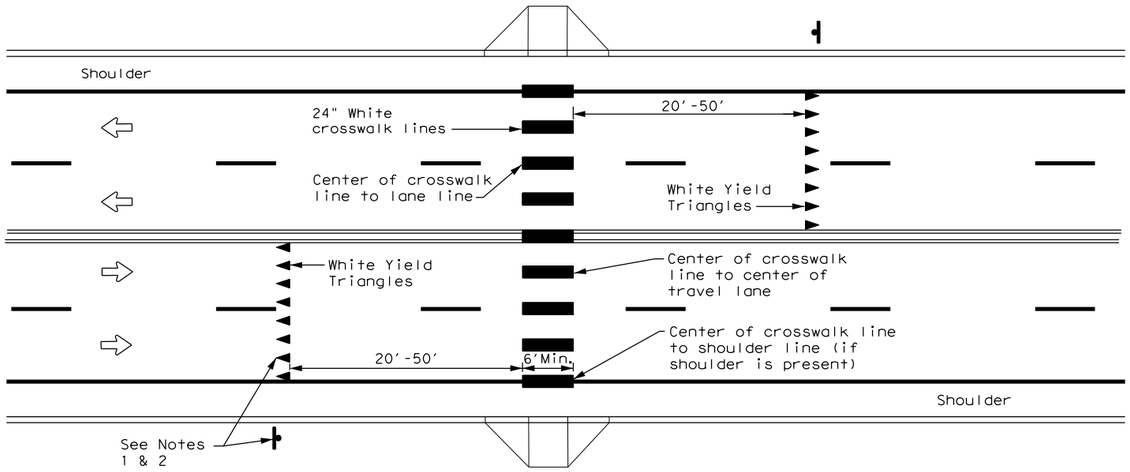
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

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

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



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES

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.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-20

FILE: pm4-20.dgn	DN:	CK:	DW:	CK:
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
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	FTW	PALO PINTO		241

220

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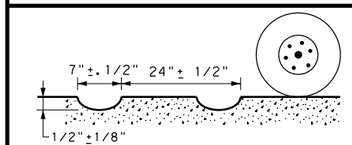
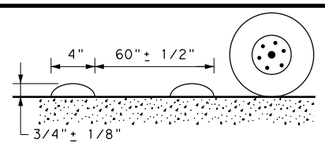
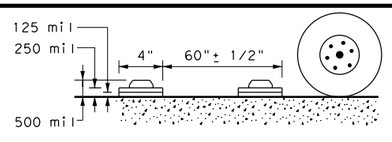
CENTERLINE RUMBLE STRIPS



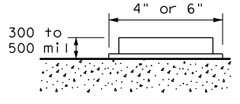
MILLED RUMBLE STRIPS



RAISED TRAFFIC BUTTONS

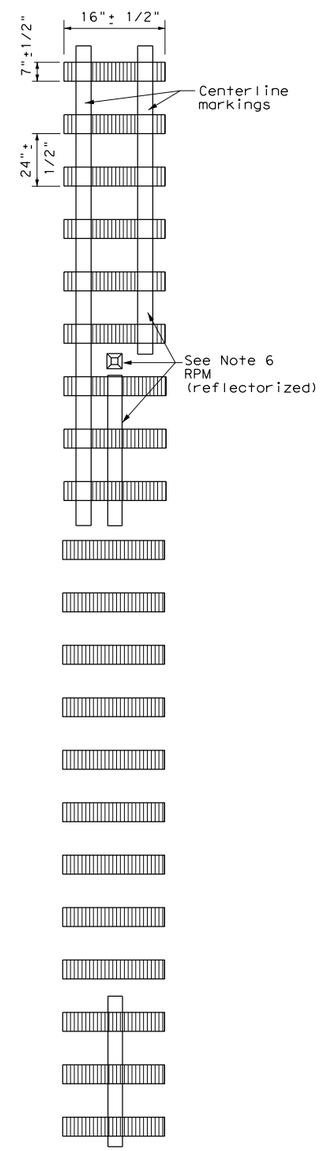


PREFORMED THERMOPLASTIC STRIPS



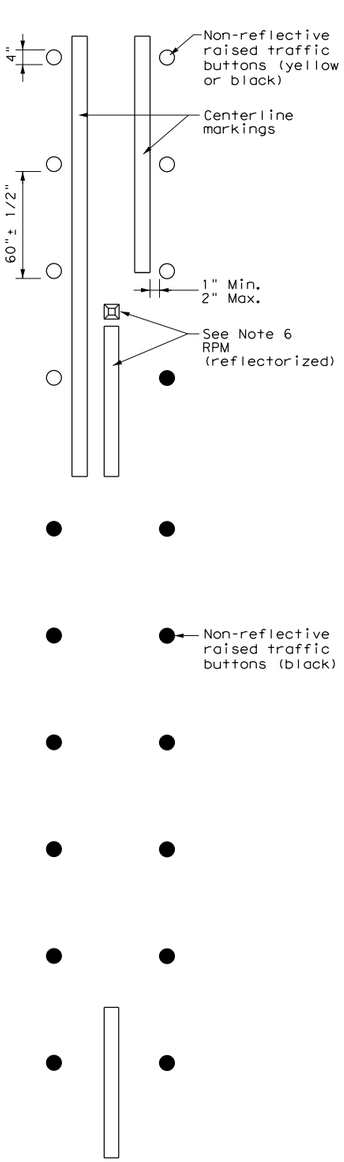
PROFILE MARKINGS

PROFILE VIEW



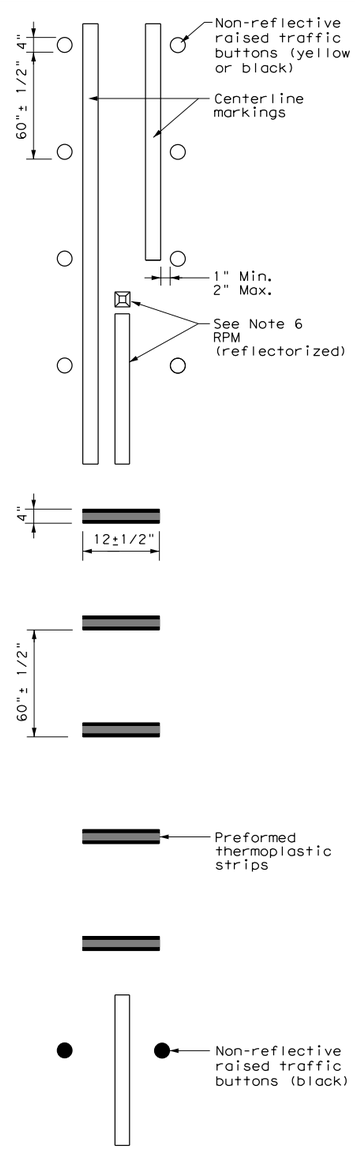
PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS



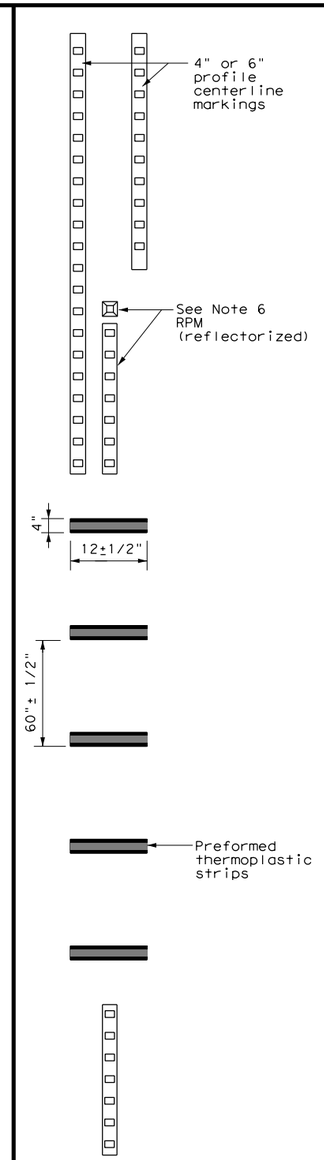
PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS



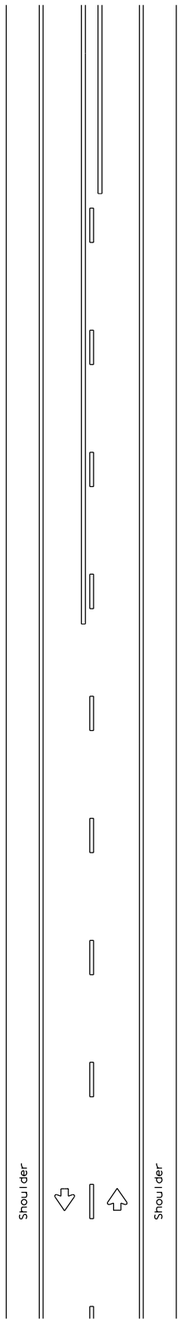
PLAN VIEW
OPTION 3

RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC STRIPS



TWO LANE TWO-WAY ROADWAYS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(4).

Texas Department of Transportation®

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3)-13

FILE: rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
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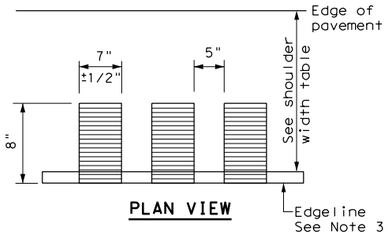
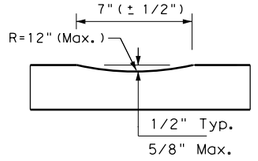
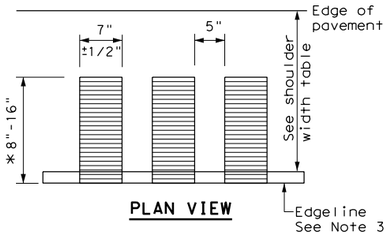


PLAN VIEW

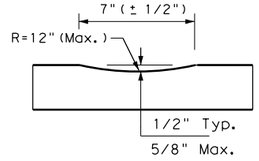


PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



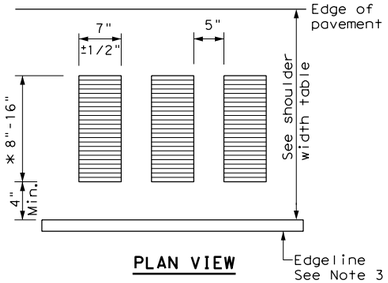
PLAN VIEW



* This distance may vary based on width of shoulder

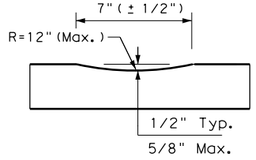
PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



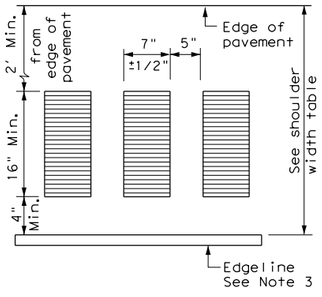
PLAN VIEW

* This distance may vary based on width of shoulder

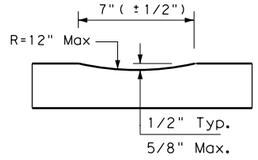


PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

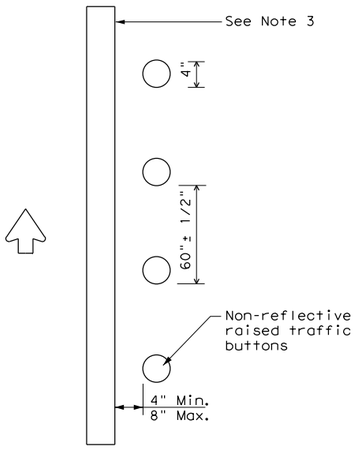


PLAN VIEW



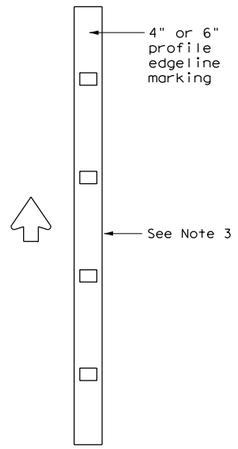
PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3 5 OR 6	Option 2, 4, 5 OR 6

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble stips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

Texas Department of Transportation

Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13

FILE: rs(4)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		243

DATE: 10/27/2021 11:05:55 AM
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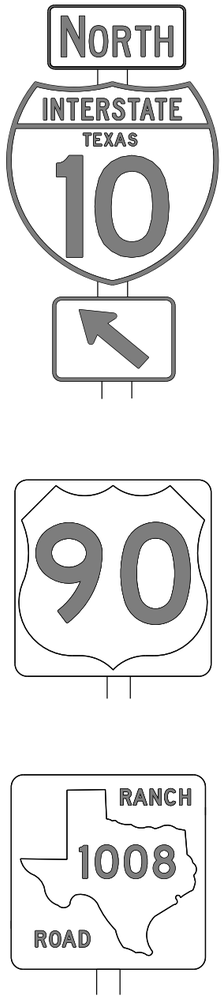
DATE: 10/27/2021 11:05:58 AM
FILE: c:\pw-gf\pw-gf-prod\pk user 2\dms18868\TSR(3)-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

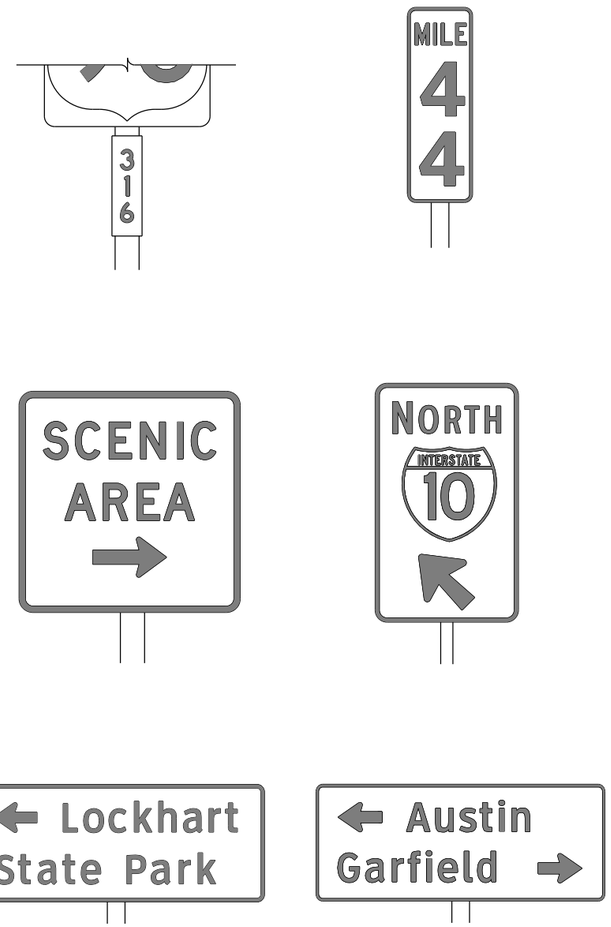
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

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

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

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

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

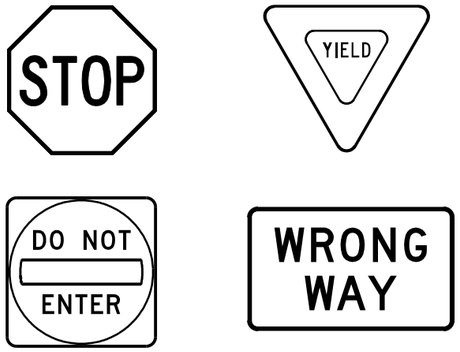
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	FTW	PALO PINTO		244

DATE: 10/27/2021 11:06:02 AM
FILE: c:\pw-of\pw-of-prod\pk_user_2\dms18868\TSR(4)-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

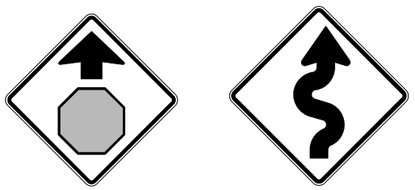
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

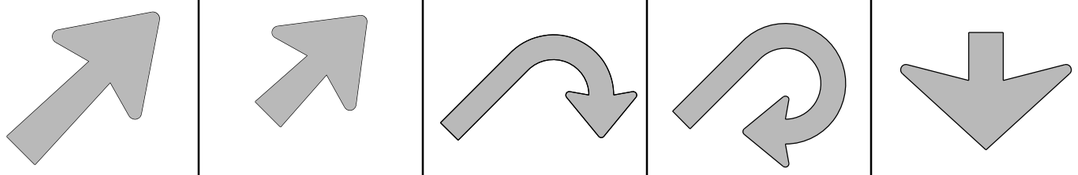
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		245

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

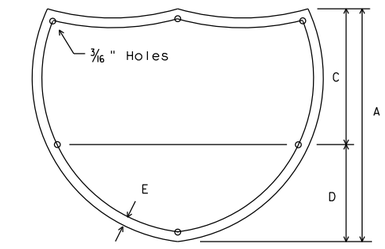
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

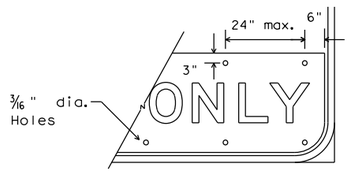
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

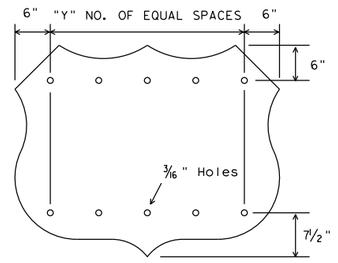


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

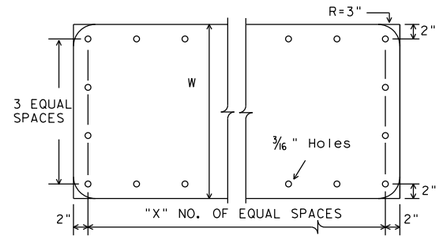


EXIT ONLY PANEL



U.S. ROUTE MARKERS

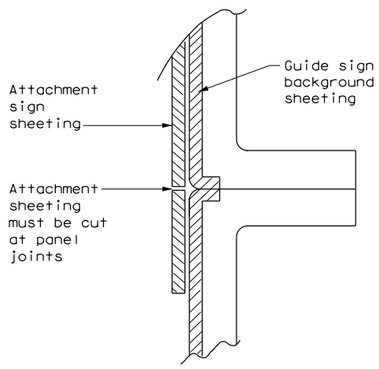
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



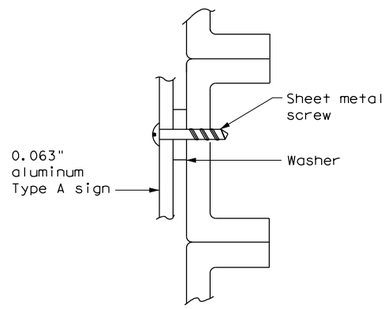
STATE ROUTE MARKERS

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

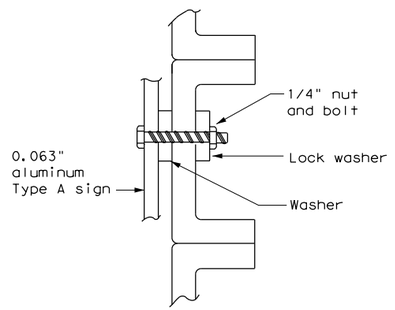
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

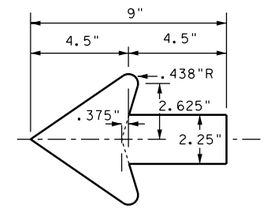
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

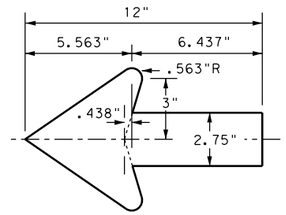
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
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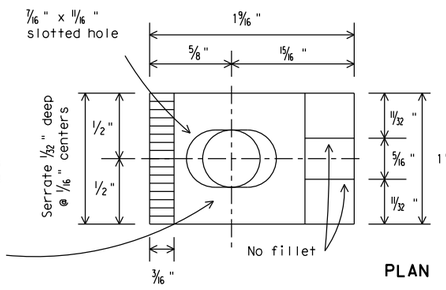
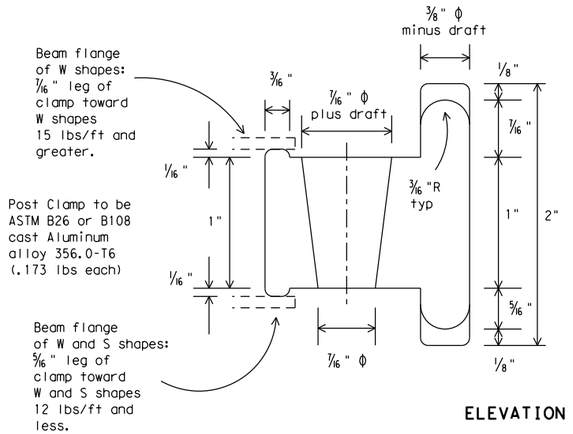
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	FTW	PALO PINTO		246

5



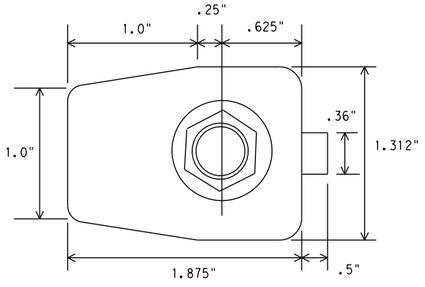
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.

PLAN

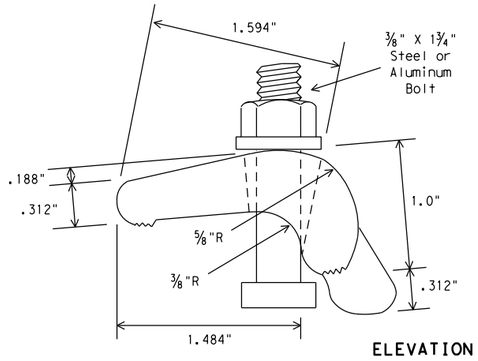


ELEVATION

POST CLAMP DETAIL

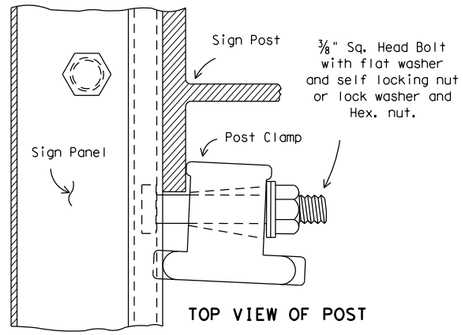


PLAN

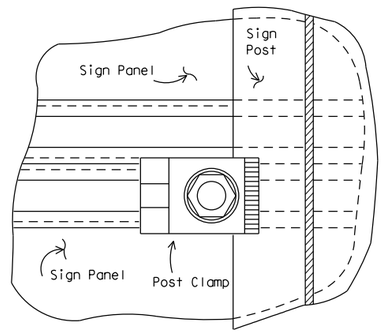


ELEVATION

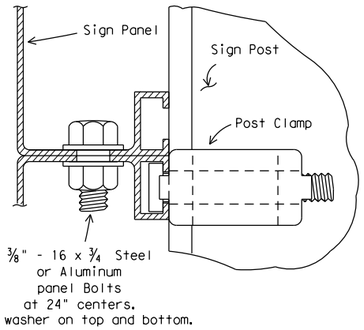
ALTERNATE POST CLAMP DETAIL



TOP VIEW OF POST



TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

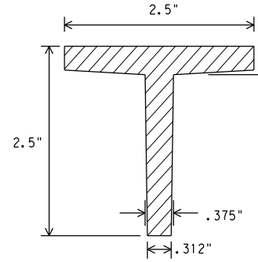
CONNECTION DETAILS

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE — DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

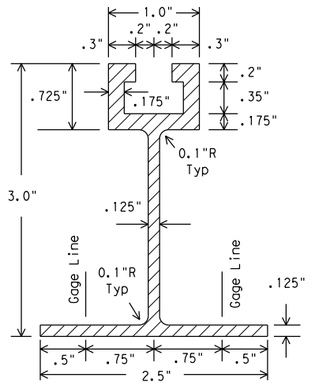


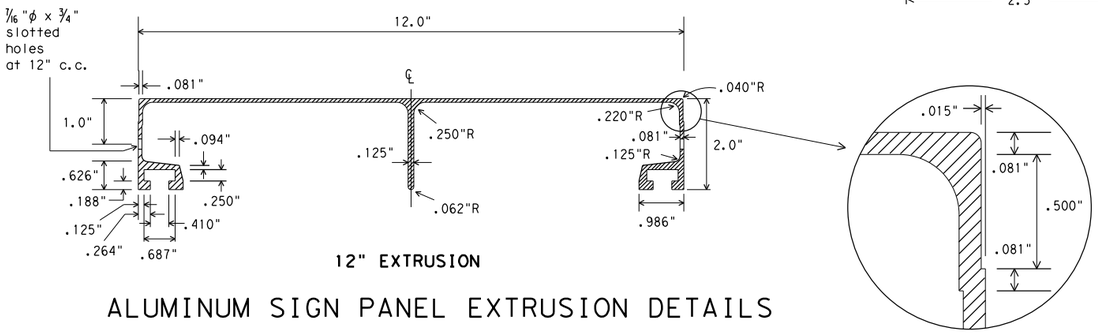
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

WINDBEAM CROSS SECTION

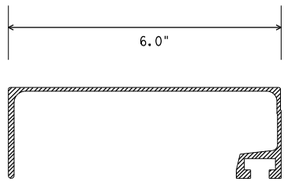
Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative



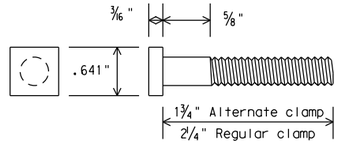


12" EXTRUSION

ALUMINUM SIGN PANEL EXTRUSION DETAILS



6" EXTRUSION



POST CLAMP BOLT DETAIL

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

SMD(2-1)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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DATE: 10/27/2021 11:06:09 AM
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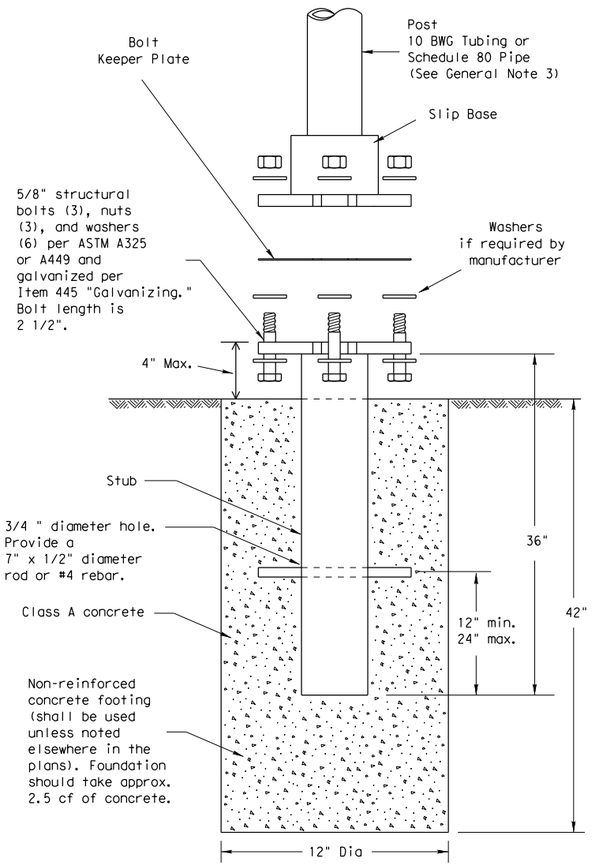
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

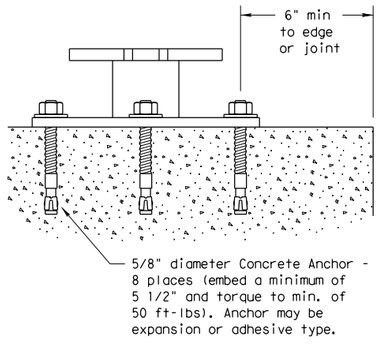
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

© TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		248

DATE: 10/27/2021 11:06:12 AM
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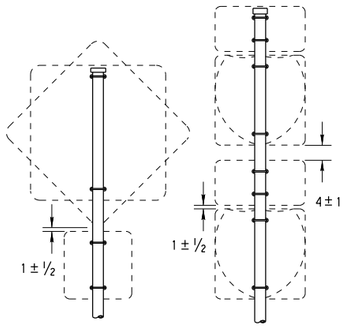
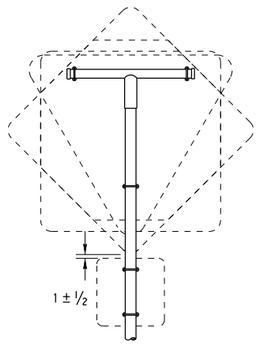


SM RD SGN ASSM TY XXXXX(1)XX(P)



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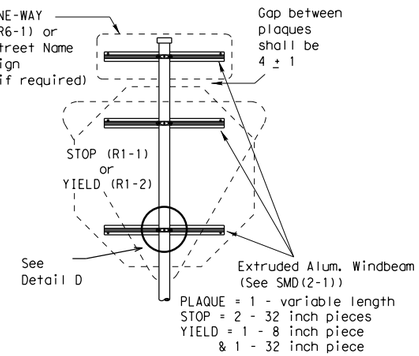

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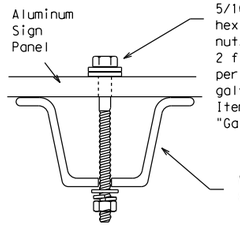
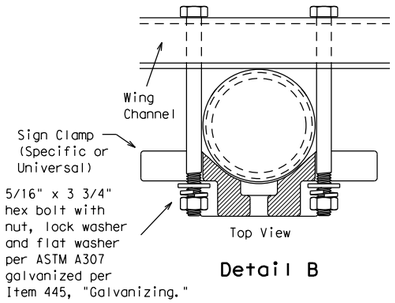


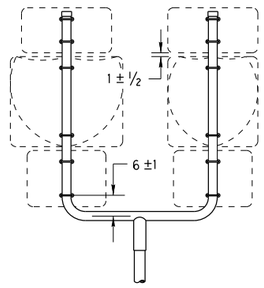
Top View

Detail A



Top View

Detail B



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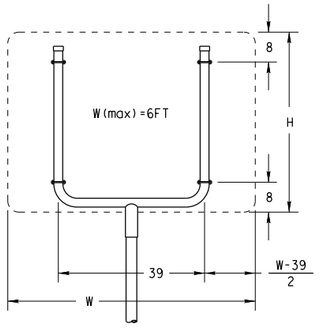

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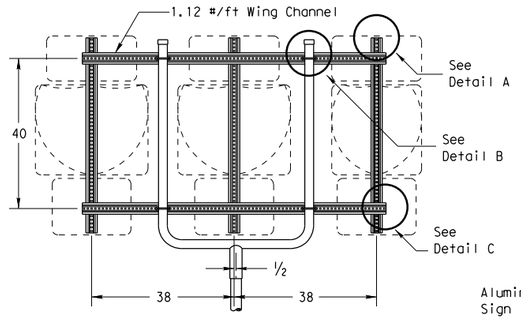
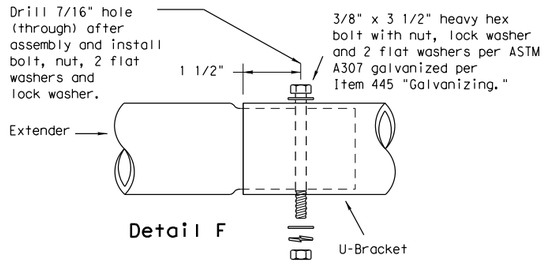
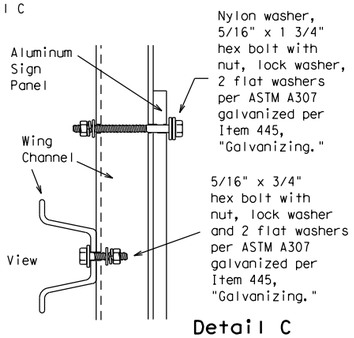


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

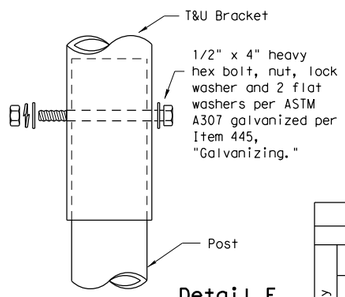


Detail F

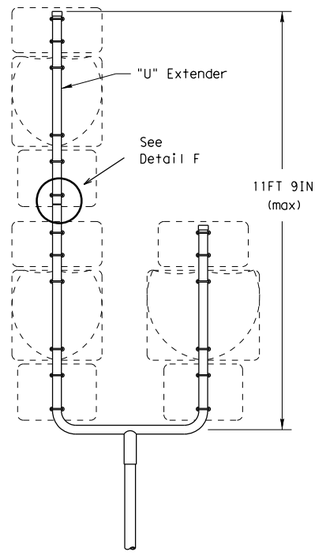
Splices shall only be allowed behind the sign substrate.



Detail C



Detail E



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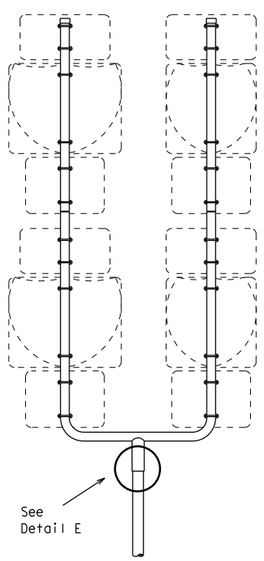

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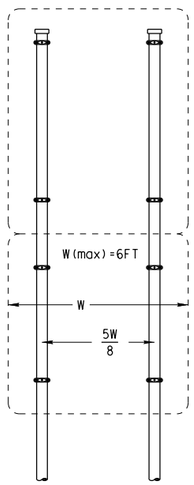
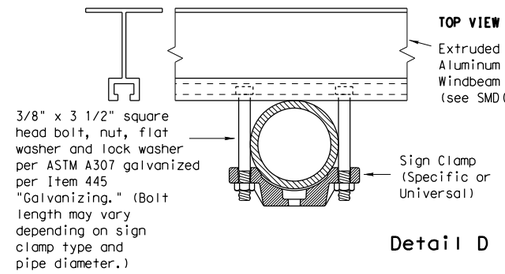
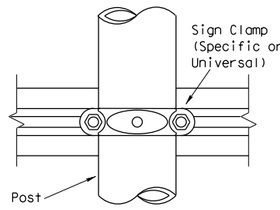


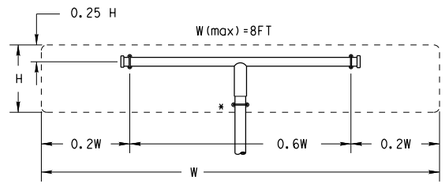
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

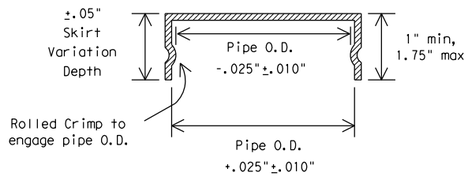




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0008	01	046,ETC	US 180,ETC

DIST	COUNTY	SHEET NO.
FTW	PALO PINTO	249

9-08 REVISIONS

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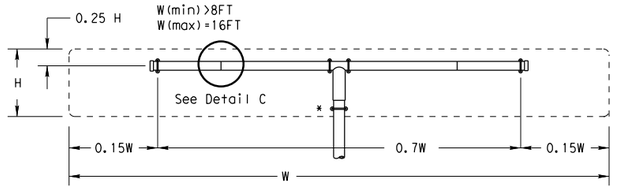
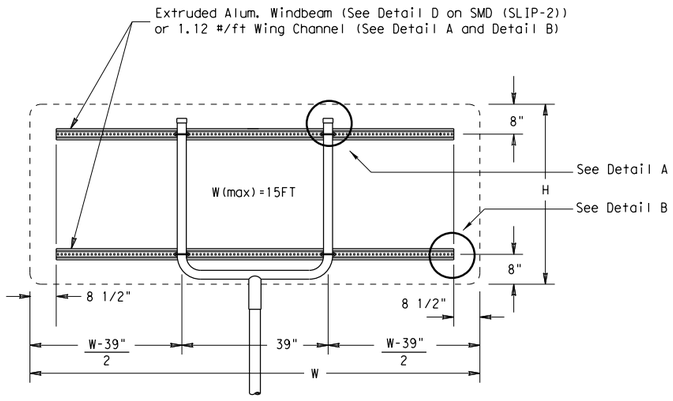


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

(* - See Note 12)



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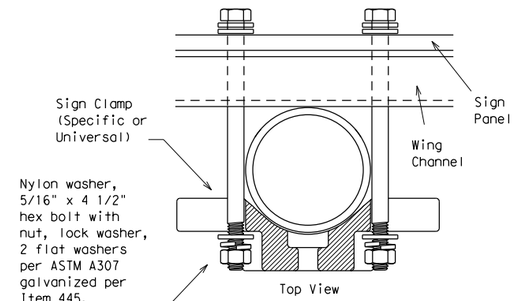
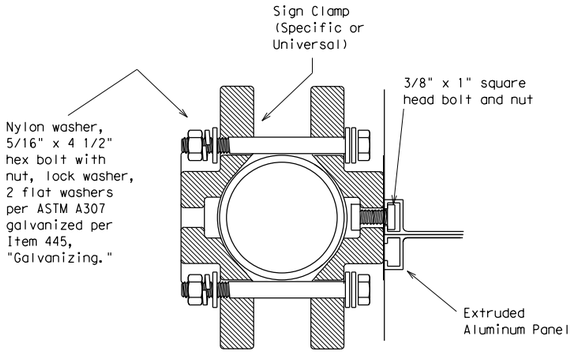
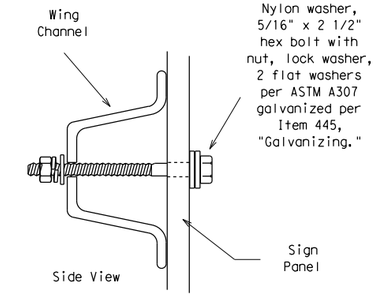


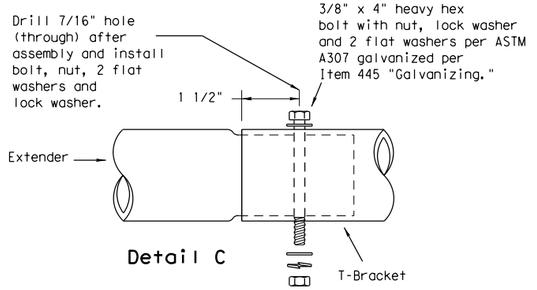
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

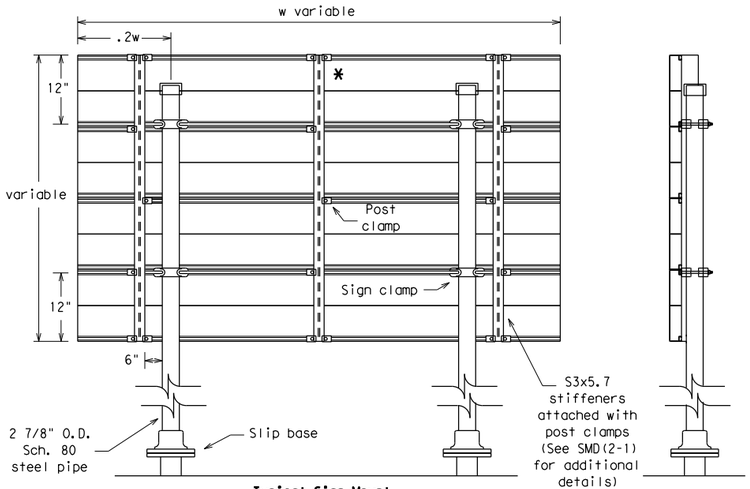


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

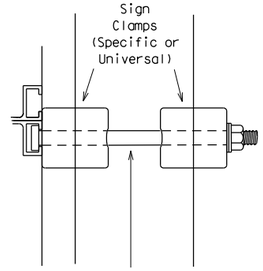


Typical Sign Mount

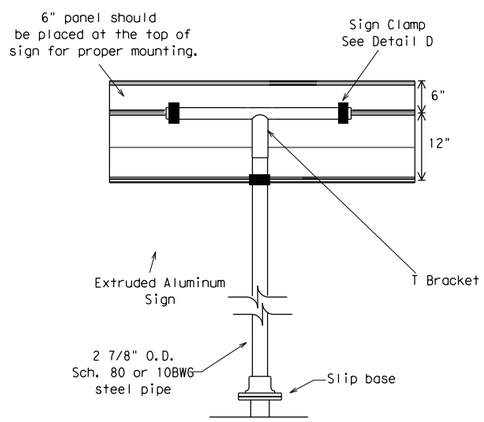
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

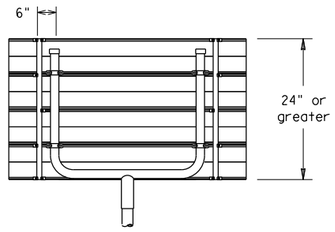
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

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DIST	COUNTY	SHEET NO.
FTW	PALO PINTO	250

DATE: 10/27/2021 11:06:18 AM
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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

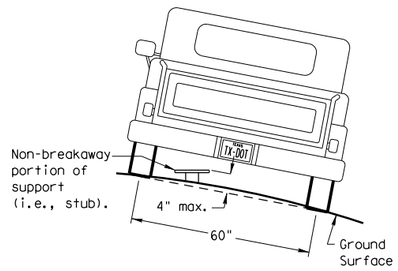
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

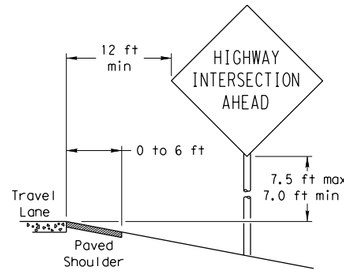
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

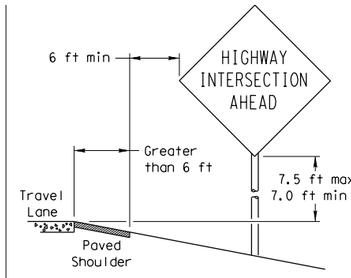
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

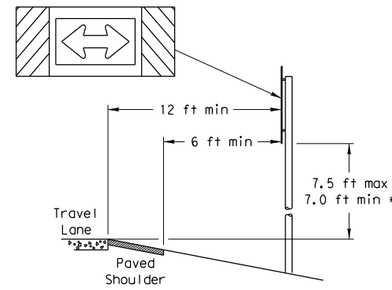
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



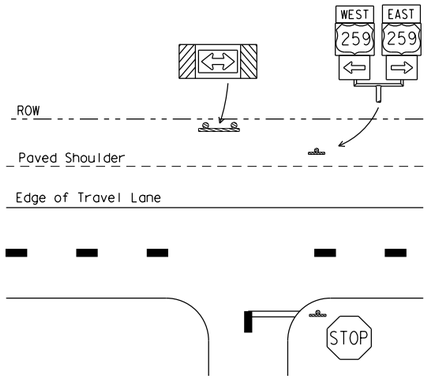
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

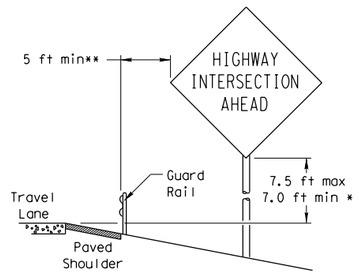
T-INTERSECTION



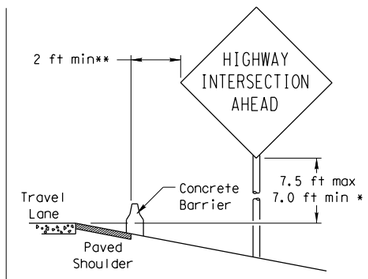
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

****Sign clearance based on distance required for proper guard rail or concrete barrier performance.**

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

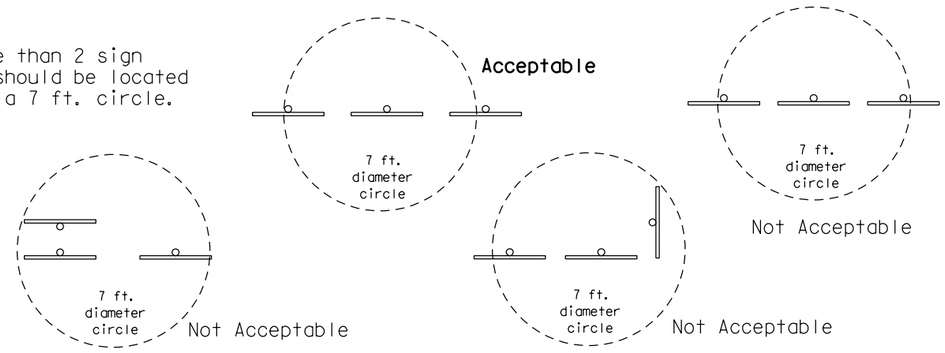
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

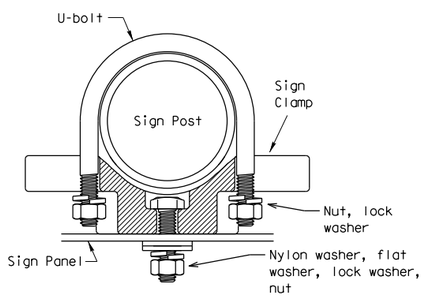
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

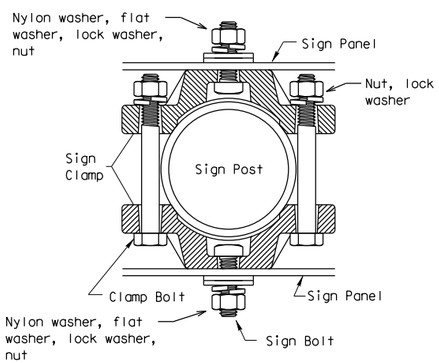


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

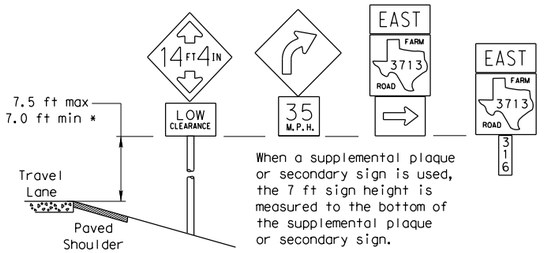
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



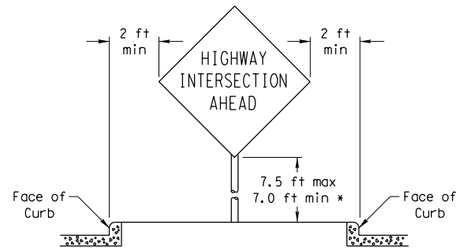
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



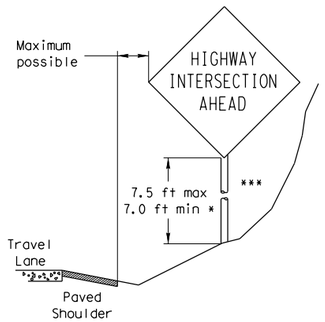
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0008	01	046,ETC	US 180,ETC

DIST	COUNTY	SHEET NO.
FTW	PALO PINTO	251

DATE: 10/27/2021 11:06:22 AM
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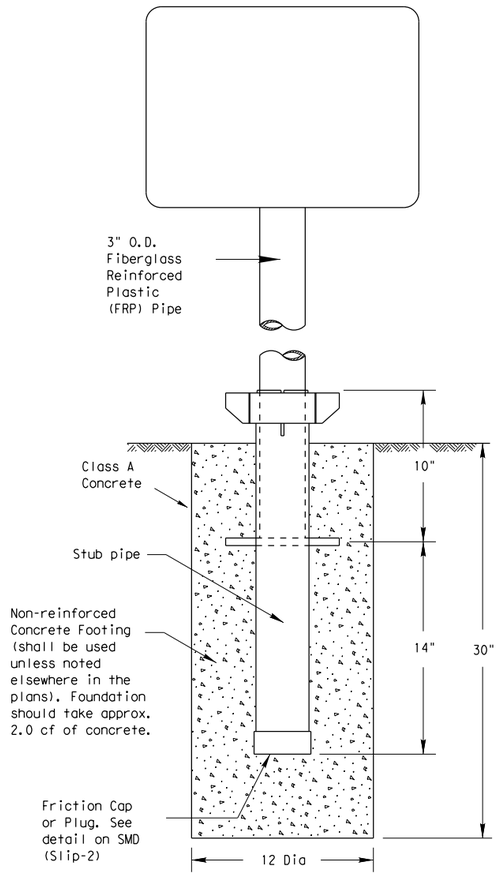
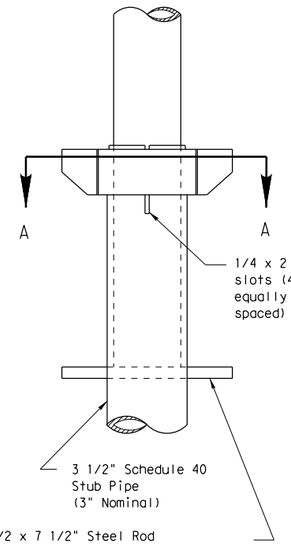
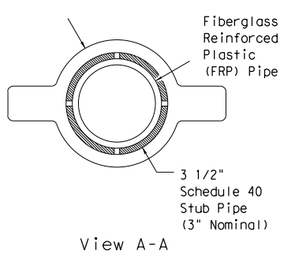
Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post



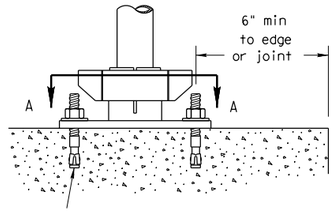


1/2 x 7 1/2" Steel Rod
Acts as a "stop" for the sign post and prevents stub from turning in the foundation.



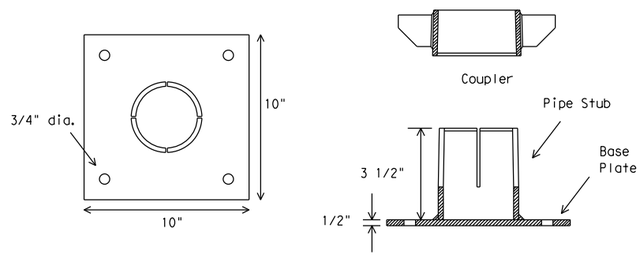
View A-A

SM RD SGN ASSM TY FRP(X)UA(P)



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.

BOLT-DOWN DETAILS



SM RD SGN ASSM TY FRP(X)UB(P)

GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

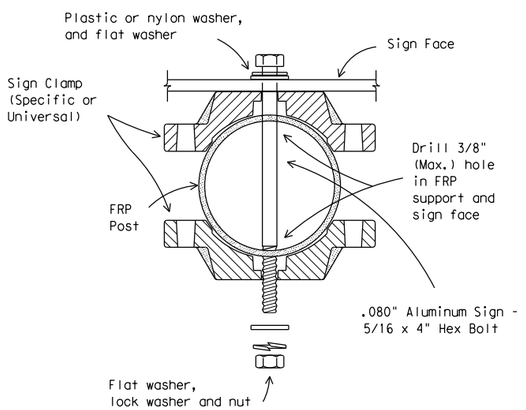
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

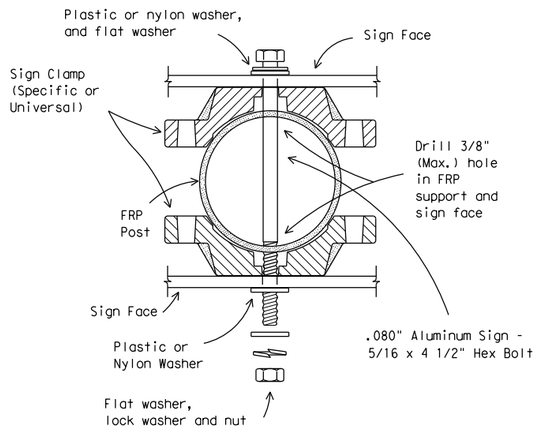
BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD(FRP)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0008	01	046,ETC	US 180,ETC

DIST	COUNTY	SHEET NO.
FTW	PALO PINTO	252

DATE: 10/27/2021 11:06:26 AM
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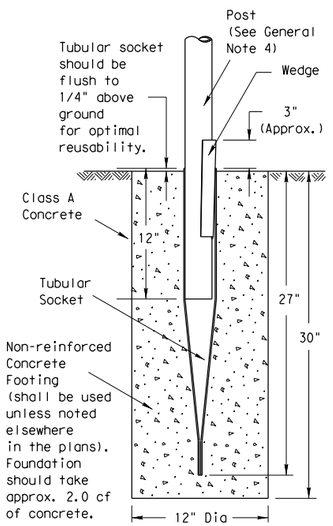
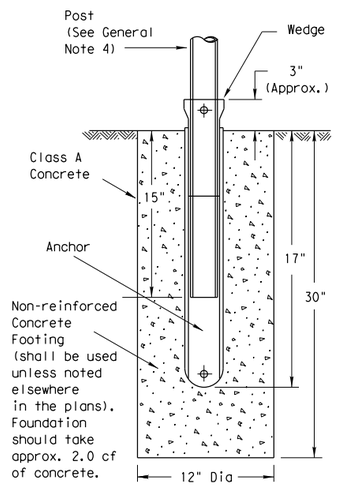
Wedge Anchor Steel System



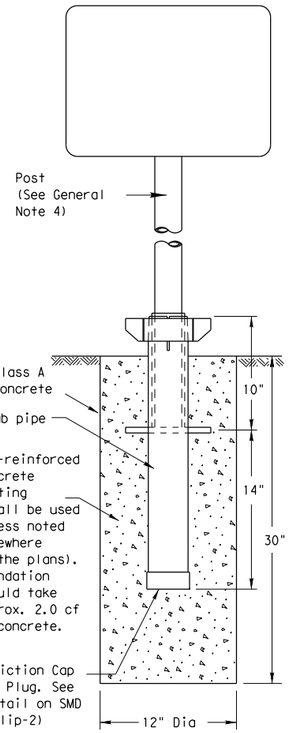
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

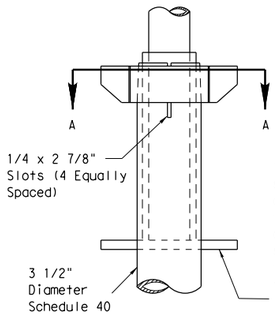


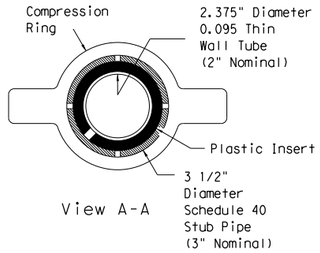
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



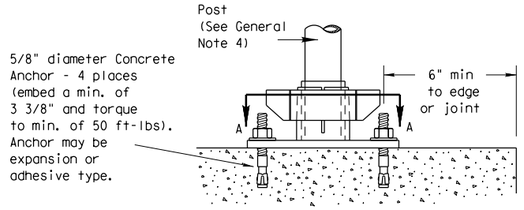
SM RD SGN ASSM TY TWT(X)UA(P)



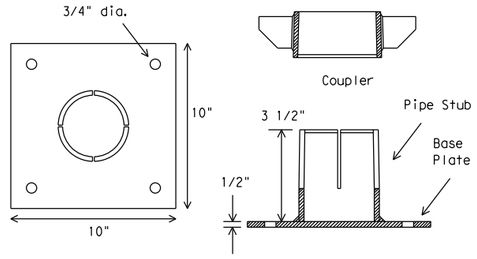


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

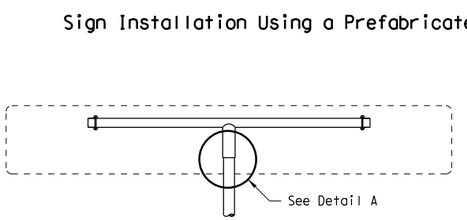


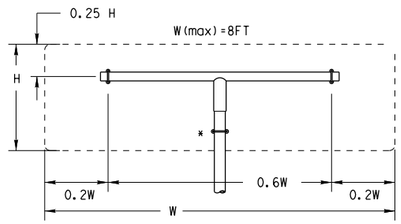
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.



SM RD SGN ASSM TY TWT(X)UB(P)

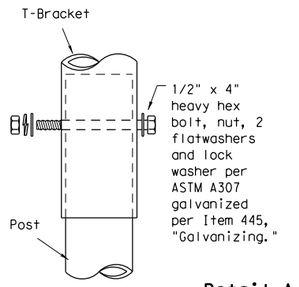
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)

(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations.
Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

9-08 REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

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0008	01	046,ETC	US 180,ETC
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FTW	PALO PINTO		253

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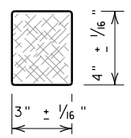
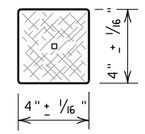
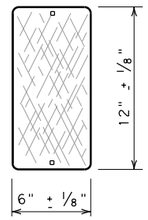
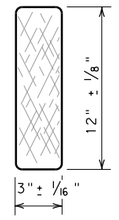
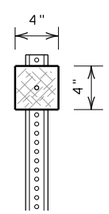
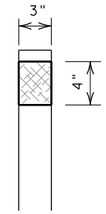
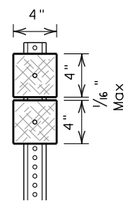
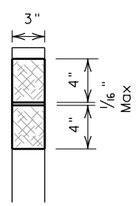
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

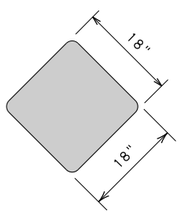
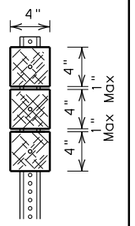
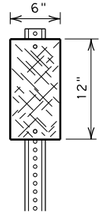
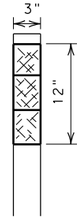
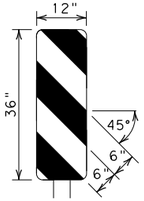
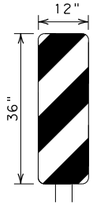
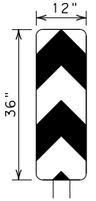
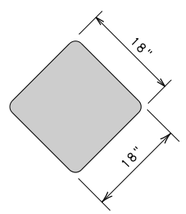
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

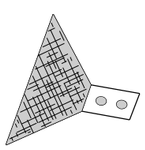
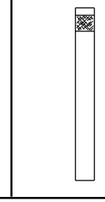
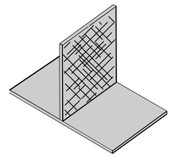
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

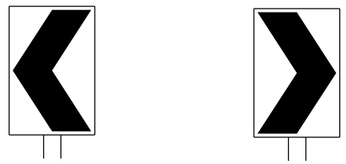
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



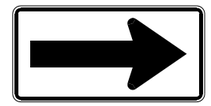
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	FTW	PALO PINTO		254

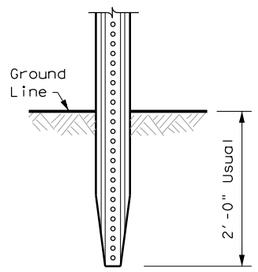
20A

DATE: 10/27/2021 11:06:33 AM
FILE: c:\pw-af\pw-af-prod\pk user 2\dms18868\DOM(1)-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

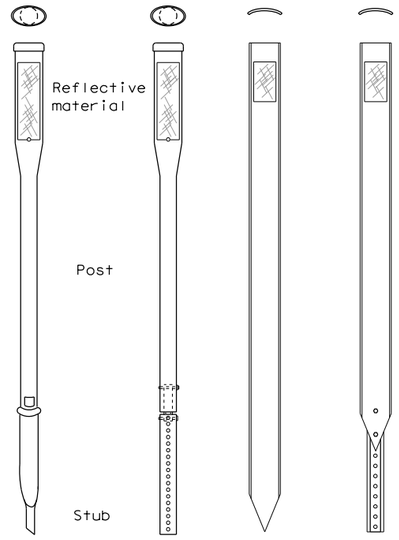


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

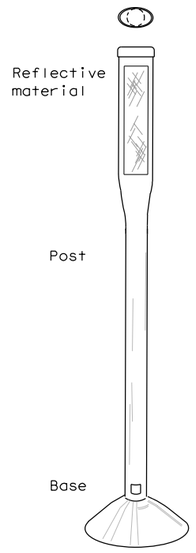
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



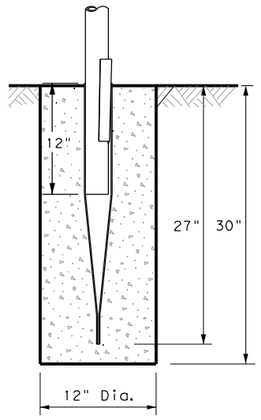
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

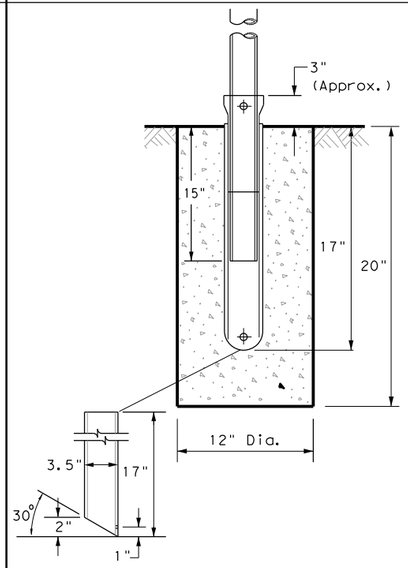
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

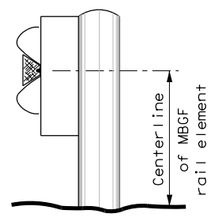
NOTE

1. Install per manufacturer's recommendations.

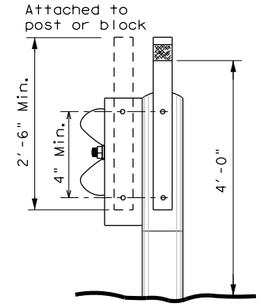
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

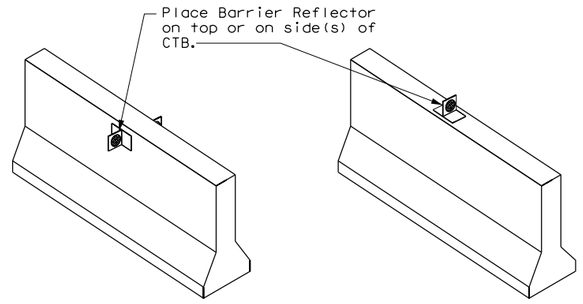
GF1



GF2



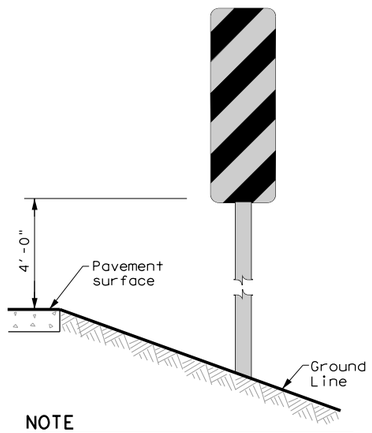
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

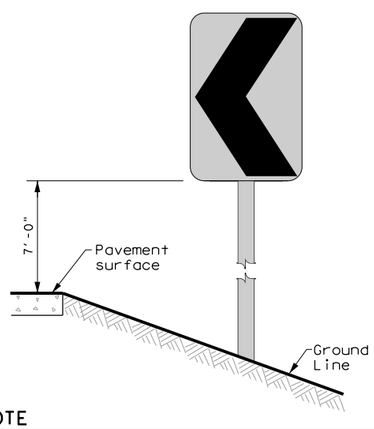
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

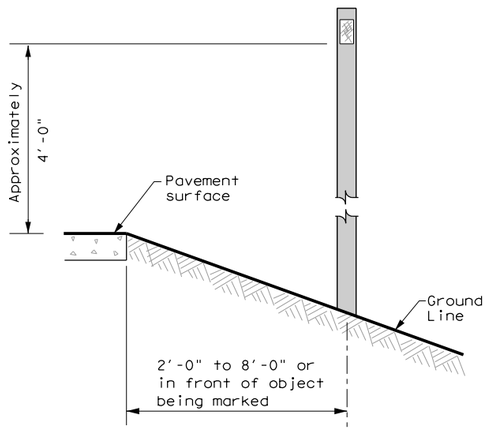
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	FTW	PALO PINTO		255

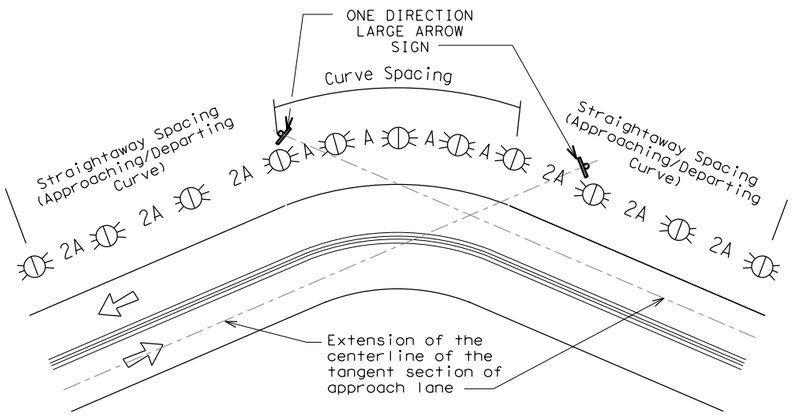
20B

DATE: 10/27/2021 11:06:37 AM
FILE: c:\pw-of\pw-of-prod\pk_user 2\dms18868\DOM(2)-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

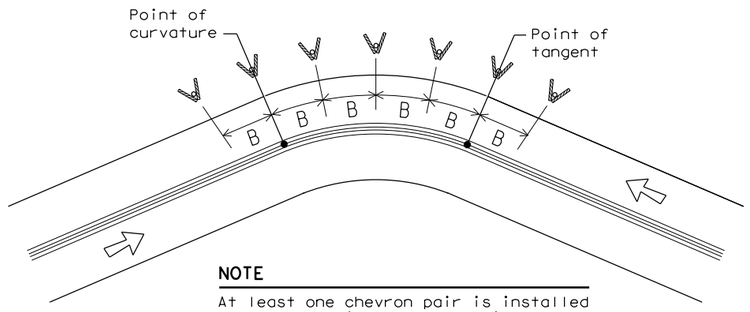
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	FTW	PALO PINTO		256

20C

DATE: 10/27/2021 11:06:42 AM
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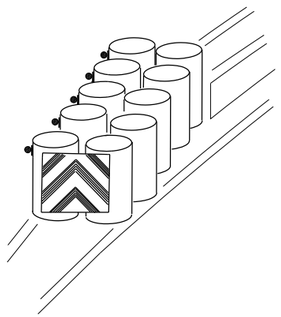
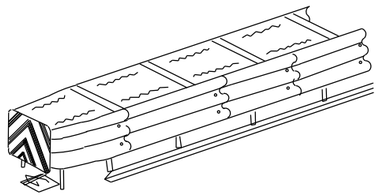
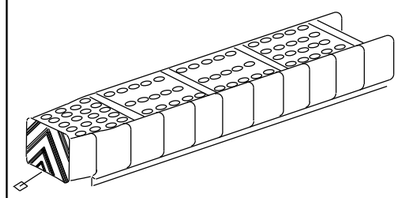
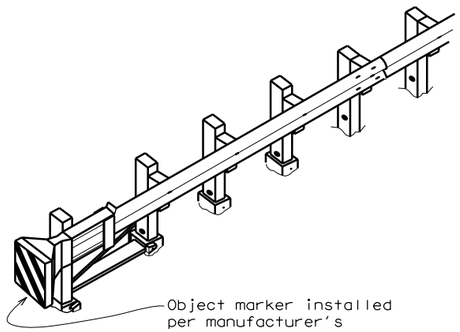
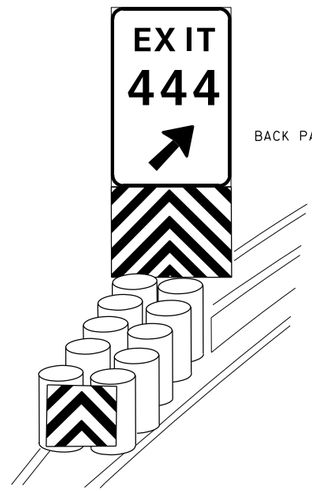
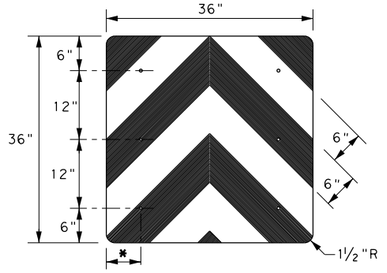


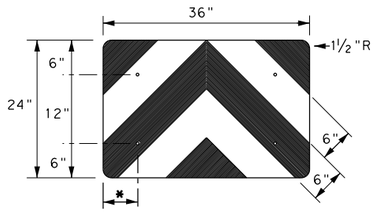




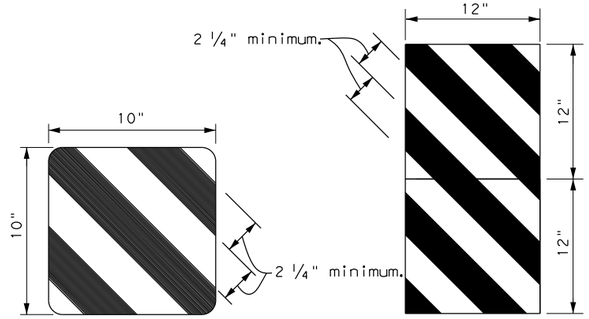




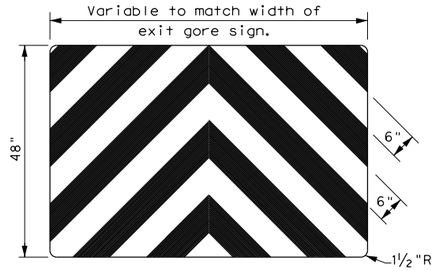


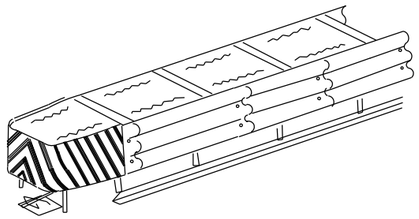


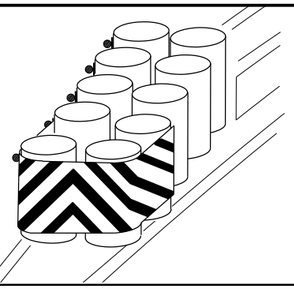
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

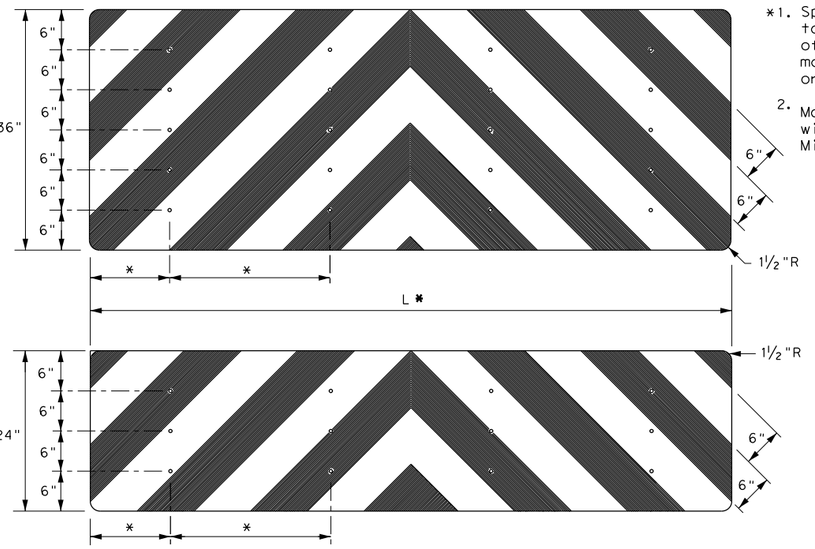


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	FTW	PALO PINTO		257
4-98 7-20				

20C

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A. GENERAL SITE DATA

1. PROJECT LIMITS: *Highway: US 180 (WB & EB).*
From: US 180 WB from 525 Feet West of POLLARD CREEK.
To: 400 Feet East of FM 1821/GARRET MORRIS PKWY.

LATTITUDE: 32° 48' 25.41" LONGITUDE: 98° 07' 44.47"

LATTITUDE: 32° 48' 38.84" LONGITUDE: 98° 04' 53.01"

Highway: IH 20 (EB & WB)
From: 100 Feet West of FM 113
To: West end of gores East of FM 113

LATTITUDE: 32° 40' 51.05" LONGITUDE: 98° 00' 34.12"

2. PROJECT SITE MAPS:

- *Project Location Map: Title Sheet (Sheet 1)*
- *Drainage Patterns: Drainage Area Maps (NA)*
- *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Typical Sections (Sheets 3-20)*
- *Major Controls and Locations of Stabilization Practices: (Sheets 105-119) SW3P Site Map Sheets*
- *Project Specific Locations:*

To be specified by Project Field Office and located in the Project SW3P File

- *Surface Waters and Discharge Locations: Drainage and Culvert Layout Sheets (Sheets N/A)*

3. PROJECT DESCRIPTION:
FOR THE CONSTRUCTION OF RESTORATION OF EXISTING ROADWAY CONSISTING OF: BASE REPAIR, MILL, HMAC OVERLAY, CURB REPAIR, SIGNALS & PAVEMENT MARKINGS.

4. MAJOR SOIL DISTURBING ACTIVITIES:
CURB AND MBGF REPLACEMENT AND EDGE BACKFILL

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:
(Provide description of soil condition, vegetative cover and percentage)

6. TOTAL PROJECT AREA: *31.82* Acres

7. TOTAL AREA TO BE DISTURBED: *0.34* Acres *(1.07% OF TOTAL PROJECT AREA)*

8. WEIGHTED RUNOFF COEFFICIENT
BEFORE CONSTRUCTION: *N/A*
AFTER CONSTRUCTION: *N/A*

9. NAME OF RECEIVING WATERS:
1. POLLARD CREEK
2. WHATLEY CREEK

10. ENDANGERED SPECIES, DESIGNATED CRITICAL HABITAT AND HISTORIC PROPERTY:
No Endangered Species, Designated Critical Habitat or Historic Property has been found on this project site.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES:

(Select T = Temporary or P = Permanent, as applicable)

___	TEMPORARY SEEDING	___	PRESERVATION OF NATURAL RESOURCES
___	MULCHING (Hay or Straw)	___	FLEXIBLE CHANNEL LINER
___	BUFFER ZONES	___	RIGID CHANNEL LINER
___	PLANTING	___	SOIL RETENTION BLANKET
_P_	SEEDING	___	COMPOST MANUFACTURED TOPSOIL
___	SODDING	___	OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES:

(Select T = Temporary or P = Permanent, as applicable)

_T_	SILT FENCES	___	DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
___	HAY BALES	_P_	DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
_T_	ROCK FILTER DAMS	___	DIVERSION DIKE AND SWALE COMBINATIONS
___	PIPE SLOPE DRAINS	___	ROCK BEDDING AT CONSTRUCTION EXIT
_P_	PAVED FLUMES	___	TIMBER MATTING AT CONSTRUCTION EXIT
___	CHANNEL LINERS	___	STONE OUTLET STRUCTURES
___	SEDIMENT TRAPS	___	VELOCITY CONTROL DEVICES
___	SEDIMENT BASINS	_P_	CURBS AND GUTTERS
___	STORM SEWERS	___	STORM INLET SEDIMENT TRAP
_T_	OTHER: *TEMPORARY EROSION CONTROL LOGS*		

3. STORM WATER MANAGEMENT:

1. Storm water drainage will be provided by the ditches, inlets and storm water systems that will carry drainage within the R.O.W. to the low points within the roadway and project site which drain to natural facilities.

2. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4:1 or flatter slopes with permanent vegetative cover.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

SEQUENCE OF CONSTRUCTION US 180 EB, US 180 WB, AND US 180:

PHASE 1 - MILLING

1. INSTALL ADVANCE WARNING SIGNS FOR US 180 AND ALL CROSS STREETS IN ACCORDANCE WITH TxDOT STANDARD BC(2)-14.

2. INSTALL TEMPORARY EROSION CONTROL DEVICES PER ROADWAY LAYOUTS AND TxDOT STANDARDS OR AS DIRECTED BY THE ENGINEER.

3. INSTALL ALL SIGNING, AND CHANNELIZING DEVICES PER TxDOT STANDARDS, TCP TYPICAL SECTIONS AND AS APPROVED/DIRECTED BY THE ENGINEER.

4. US 180 WB AND US 180 EB MAY BE CONSTRUCTED CONURRENTLY WITH ENGINEER'S APPROVAL.

5. CONTRACTOR SHALL COORDINATE MILL AND OVERLAY OF ALL PARKING SPACES WITH AFFECTED BUSINESS PRIOR TO BEGINNING ANY CONSTRUCTION IN THE AFFECTED AREA.

6. PLANE ASPHALT CONCRETE PAVEMENT AS SHOWN IN STEPS A, B AND, C FOR A LENGTH (AS APPROVED BY THE ENGINEER) THAT CAN BE COMPLETED AND OPENED FOR TRAFFIC DURING SAME DAY OR AS DIRECTED BY THE ENGINEER.

7. MILL TO REMOVE ASPHALT PAVEMENT FROM INLET OPENINGS PER "ROADWAY DETAILS" SHEET. CLEAN OUT INLETS.

8. INSTALL ROADWAY MARKER TABS AFTER EACH PLANE OPERATION AND PRIOR TO OPENING TO TRAFFIC.

9. PERFORM FULL DEPTH REPAIR IN AREAS AS DIRECTED BY THE ENGINEER

10. REMOVE AND RECONSTRUCT DAMAGED CURB/CURB & GUTTER USING PER TXDOT STANDARDS AND AS DIRECTED BY THE ENGINEER.

11. PLACE LEVEL UP AS NEEDED.

12. PLACE PCTB & CRASH CUSHION ATTENUATOR BEFORE THE CONSTRUCTION OF RAILS AND/OR INSTALLATION OF MBGF. MOVE TO OTHER LOCATIONS OF RAIL/MBGF WHEN DONE WITH ONE LOCATION. THE LOCATION OF PCTB/CCA SHALL BE DETERMINED IN THE FIELD OR AS DIRECTED BY THE ENGINEER.

13. INSTALL ROADSIDE SAFETY ELEMENTS AND MOW STRIPS.

14. CONTRACTOR SHALL MAINTAIN CROSS STREET ACCESS AT ALL TIMES.

PHASE 2 - OVERLAY

1. OVERLAY AS SHOWN IN STEPS A, B AND, C FOR A LENGTH (AS APPROVED BY THE ENGINEER) THAT CAN BE COMPLETED AND OPENED FOR TRAFFIC DURING SAME DAY OR AS DIRECTED BY THE ENGINEER.

2. INSTALL ROADWAY MARKER TABS AFTER EACH OVERLAY OPERATION AND PRIOR TO OPENING TO TRAFFIC.

3. INSTALL ROADSIDE SAFETY ELEMENTS, MOW STRIPS, AND DELINEATORS.

4. INSTALL SIGNS AND PLACE PERMANENT PAVEMENT MARKINGS & MARKERS IN ACCORDANCE WITH PAVEMENT MARKING STARNDARDS PRIOR TO OPENING TO TRAFFIC.

5. ADD SEED TO DISTURBED AREAS AS DIRECTED BY THE ENGINEER.

6. PERFORM FINAL CLEAN UP.

7. REMOVE TRAFFIC CONTROL DEVICES, SIGNS, CONSTRUCTION DEBRIS & EROSION CONTROL DEVICES.

SEQUENCE OF CONSTRUCTION IH 20 EB FR, IH 20 WB FR AND FM 113:

PHASE 1 - OVERLAY

1. INSTALL ADVANCE WARNING SIGNS FOR IH 20 FRONTAGE ROADS AND RAMPS IN ACCORDANCE WITH TxDOT STANDARD BC(2)-14, TCP(6-3)-12 FOR EXIT RAMP AND TCP(6-3)-12 FOR ENTRANCE RAMP. RAMPS ARE TO REMAIN CLOSED FOR THE DURATION OF THE WORK BEING DONE ON EACH FRONTAGE ROAD.

2. INSTALL TEMPORARY EROSION CONTROL DEVICES PER ROADWAY LAYOUTS AND TxDOT STANDARDS OR AS DIRECTED BY THE ENGINEER.

3. INSTALL ALL SIGNING AND CHANNELIZING DEVICES PER TxDOT STANDARDS, TCP TYPICAL SECTIONS AND AS APPROVED/DIRECTED BY THE ENGINEER.

4. IH 20 EB FRONTAGE ROAD AND IH 20 WB FRONTAGE ROAD MAY BE CONSTRUCTED CONCURRENTLY WITH ENGINEERS APPROVAL.

5. REMOVE EXISTING CURB AT LOCATIONS SHOWN ON PLAN SHEETS.

6. PERFORM FULL DEPTH REPAIR AT LOCATIONS DETERMINED IN THE FIELD BY THE ENGINEER.

7. OVERLAY EXISTING PAVEMENT AS SHOWN IN STEP A AND B FOR A LENGTH (AS APPROVED BY THE ENGINEER) THAT CAN BE COMPLETED DURING SAME DAY AND OPENED FOR TRAFFIC OR AS DIRECTED BY THE ENGINEER. USE ONE LANE TWO WAY TRAFFIC CONTROL STANDARD TCP(1-2)-18 WITH FLAGGERS DURING CONSTRUCTION ON IH 20 FRONTAGE ROADS AND FM 113. BACKFILL PAVEMENT EDGES.

8. INSTALL ROADWAY MARKER TABS AFTER EACH OVERLAY OPERATION AND PRIOR TO OPENING TO TRAFFIC.

9. INSTALL SIGNS AND PLACE PERMANENT PAVEMENT MARKINGS & MARKERS IN ACCORDANCE WITH PAVEMENT MARKING STARNDARDS PRIOR TO OPENING TO TRAFFIC.

10. ADD SEED TO DISTURBED AREAS AS DIRECTED BY THE ENGINEER.

11. PERFORM FINAL CLEAN UP.

12. REMOVE TRAFFIC CONTROL DEVICES, SIGNS, CONSTRUCTION DEBRIS & EROSION CONTROL DEVICES.

5. NON-STORM WATER DISCHARGES:

Non-storm water discharges should be filtered, or held in retention basins, before being allowed to mix with storm water. These discharges consist of non-polluted ground water, spring water, foundation and/or footing drain water, and water used for dust control, pavement washing and vehicle washwater containing no detergents.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

Signature , P.E. Date 10/29/21

Texas Department of Transportation

Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 1 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6	SEE TITLE SHEET	258
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	PALO PINTO
08/2013	ADDED SIGN	CONT.	SECT.	JOB / HIGHWAY NO.
05/2019	2-SHEET FORMAT	0008	01	046,ETC US 180,ETC

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed at the earliest date possible but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by devices protecting storm sewer inlets.

2. INSPECTION:

An inspection shall be performed by a TxDOT inspector every 14 calendar days as well as within 24 hours after any rainfall of one-half inch or more is recorded on a non-freezing rain gauge to be located at the project site, or every 7 calendar days. An Inspection and Maintenance Report shall be filed for each inspection. Based on the inspection results, the controls shall be revised in accordance with the inspection report.

3. WASTE MATERIALS:

Except as noted below, all waste materials shall be collected in a metal dumpster having a secure cover. The dumpster shall meet all state and local solid waste management regulations. All trash and debris from construction shall be deposited in the dumpster. The dumpster shall be emptied, as necessary or as required by local regulation, and hauled to a local approved land fill site. The burying of construction waste on the project site shall not be permitted.

Concrete washout areas shall be required and shall consist of a pit, lined with an impervious material, of sufficient size to contain, until evaporation, all water used and washout material produced during concrete washout operations. The concrete washout locations shall be as directed by the engineer.

Lime slaking tanks shall be surrounded by an earthen berm, capable of containing any overflow.

4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

As a minimum, any products in the following categories are considered to be hazardous: paints, acids, solvents, asphalt products, chemical additives for soil staibilization, and concrete curing compounds or additvives. In the event of a spill which may be hazardous, the spill coordinator shall be contacted immediately.

5. SANITARY WASTE:

All sanitary waste shall be collected from the portable units, as necessary or as required by local regulation, by a licensed sanitary waste management contractor.

6. OFFSITE VEHICLE TRACKING:

The Contractor shall be required, on a regular basis or as may be directed by the Engineer, to dampen haul roads for dust control, stabilize construction entrances and to remove excess dirt from the roadway.

7. MANAGEMENT PRACTICES:

1. Disposal areas, stockpiles and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, waterbody or streambed.

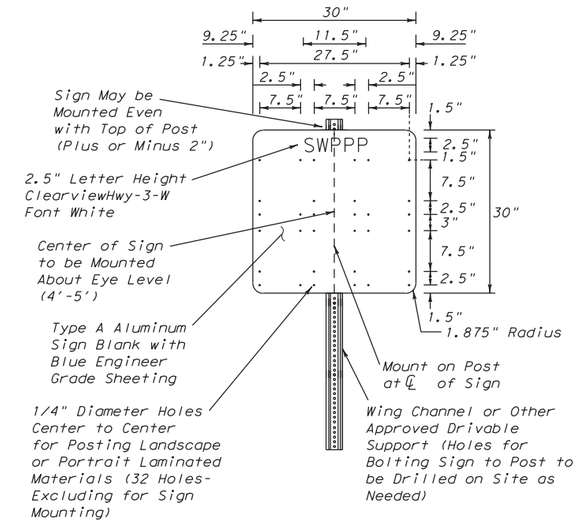
2. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants.

8. OTHER:

1. Listing of construction materials stored on site to be provided by Project Field Office.

2. The Project SW3P File located at the project field office shall contain the N.O.I., CGP Coverage Notice, TCEQ TPDES Form, Signature Authorization, Certification/Qualification Statements, Inspection Reports, Required Maps, and a copy of the TPDES General Permit No. TXR150000.

STORM WATER POLLUTION PREVENTION PLAN PERMIT POSTING



No Permanent Installation Allowed.
Sign to be Removed After Project Completion.

STATE OF TEXAS
PAUL R. HAHN
107365
LICENSED
PROFESSIONAL ENGINEER

, P.E. 10/29/21
Signature Date

AGUIRRE & FIELDS
ENGINEERING INNOVATORS
TBPE FIRM REGESTRATION # 739

Texas Department of Transportation

Fort Worth District Standard

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

SHEET 2 OF 2 SHEETS

ORIGINAL DRAWING: 09/2002	sw3p-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6	SEE TITLE SHEET	259
09/2008	NPDES TO TPDES	STATE	STATE DIST.NO.	COUNTY
01/2012	CLARIFY NOTE C.2.	TEXAS	FTW	PALO PINTO
08/2013	ADDED SIGN	CONT.	SECT.	JOB / HIGHWAY NO.
05/2019	2-SHEET FORMAT	0008	01	046,ETC US 180,ETC

DATE: 10/27/2021 5:10:46 PM
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.
1.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. During construction, efforts would be taken to avoid and minimize disturbance of vegetation and soils. Areas within the existing ROW, but outside the limits of construction, would not be disturbed. Every effort would be made to preserve trees where they would neither compromise safety nor substantially interfere with the proposed projects.
2. No landscaping would be a part of the proposed project activities. Re-vegetation of disturbed areas would be in compliance with the Executive Memorandum on Beneficial Landscaping (26Apr94) and the Executive Order on Invasive Species (EO 13112). Regionally native and non-invasive plants would be used to the extent practicable in landscaping and re-vegetation.

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

☐ No Action Required ☒ Required Action

Action No.

1. Between October 1 and February 15, the contractor would remove all old migratory bird nests from any structure that would be affected by the proposed project, and complete any bridge work/demolition and/or vegetation clearing. In addition, the contractor would be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repelling sprays and/or gels, between February 15 and October 1. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided.
2. The contractor and/or TxDOT personnel would be advised of the potential for Whooping Cranes to occur within the project limits. Construction personnel would be advised to avoid adverse impacts to this species and to report any sightings to TxDOT District Environmental staff. Drainage modifications would be limited to the extent practical to accommodate the additional paved surface needed to bring the roadway up to current TxDOT safety standards. The construction personnel would report all sightings to TxDOT Fort Worth District Environmental staff. Reports should include the time, date and location and any available photos.
3. No disturbing, destroying, or removing active nests of Bald Eagles, including ground nesting birds, during the nesting season. Avoid the removal of unoccupied, inactive nests as practicable. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. No collecting, capturing, relocating or transporting birds, eggs, young or active nests without a permit. The Eagle Protection Act prohibits the taking or possession of and commerce in eagles, parts, feathers, nests, or eggs with limited exceptions. The definition of take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. Eagles may not be taken for any purpose unless a permit is issued prior to the taking.

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

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0008	01	046,ETC	US 180,ETC
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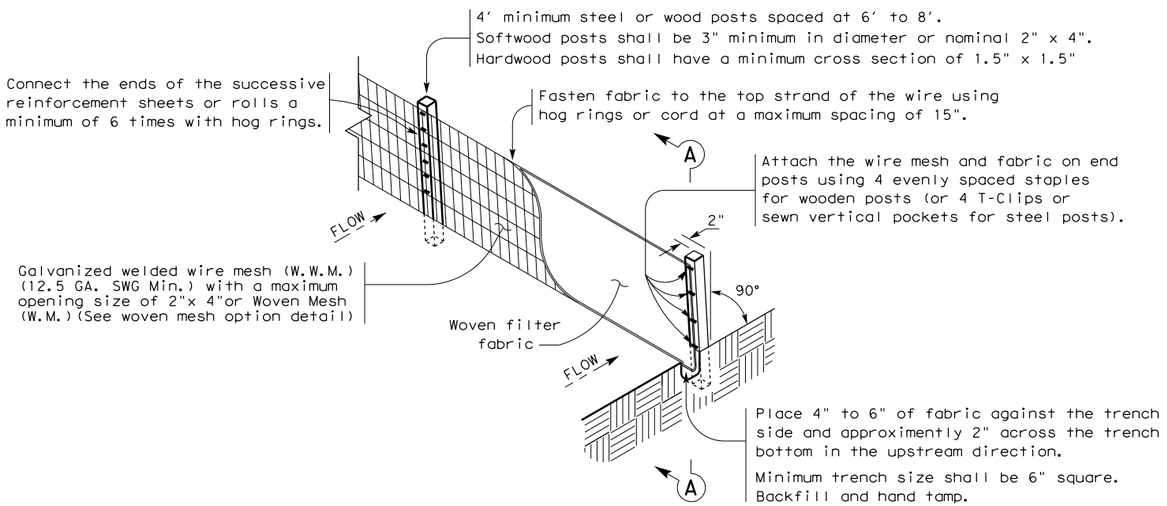
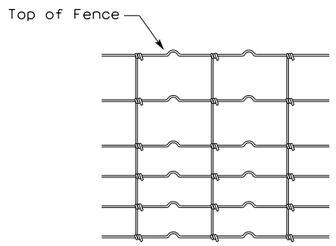
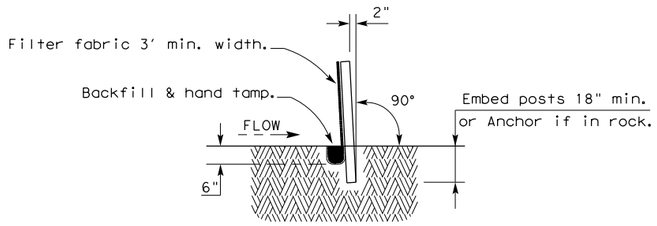
	FTW	PALO PINTO		260



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

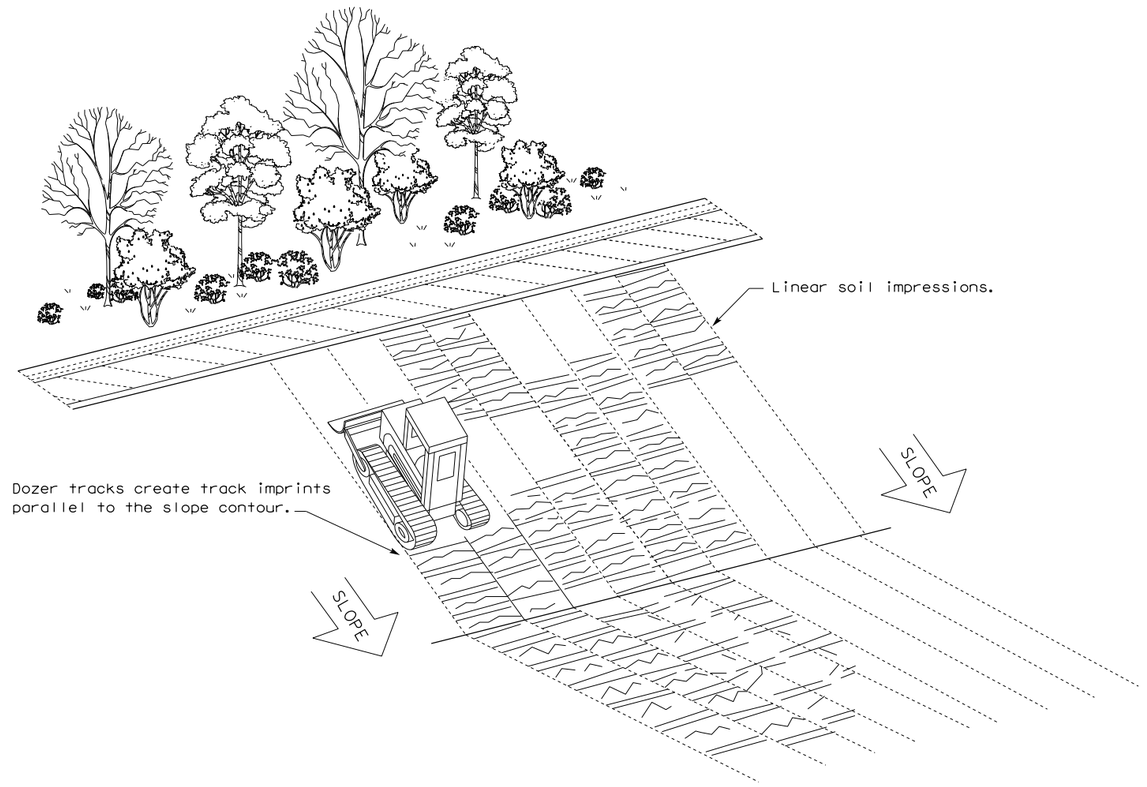
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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	DIST	COUNTY			SHEET NO.		
	FTW	PALO PINTO			261		

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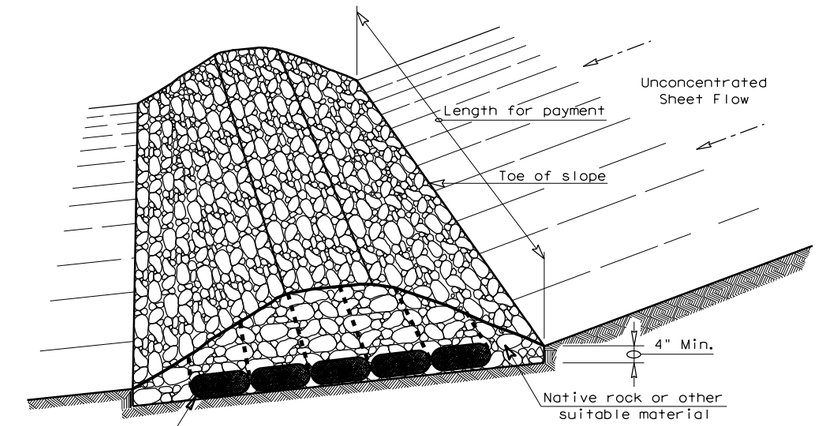
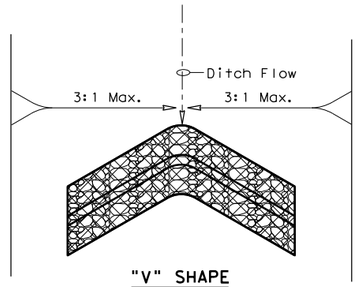
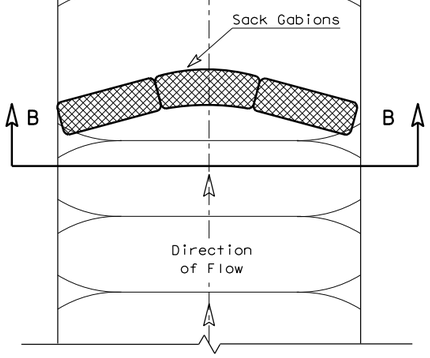


FILTER DAM AT TOE OF SLOPE

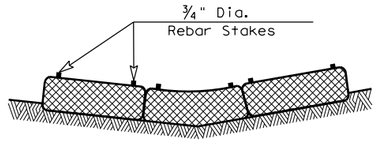
RFD1



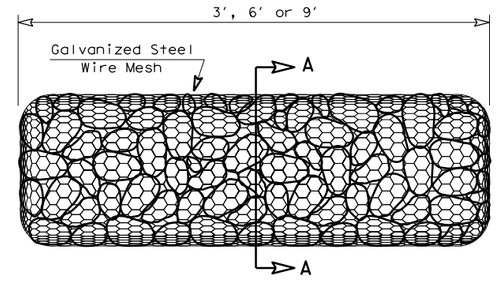
"V" SHAPE PLAN VIEW



PLAN VIEW

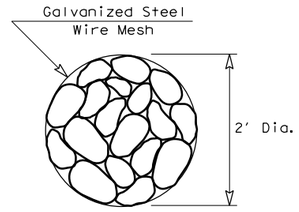


SECTION B-B

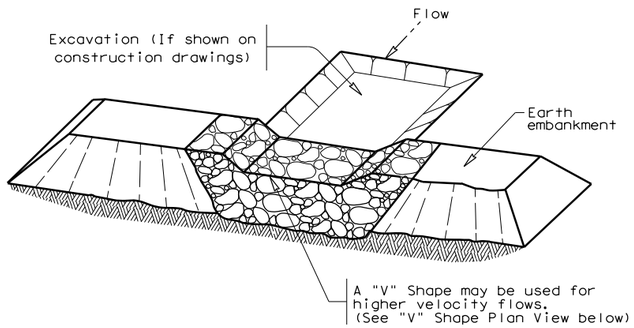


TYPE 4 (SACK GABIONS)

RFD4

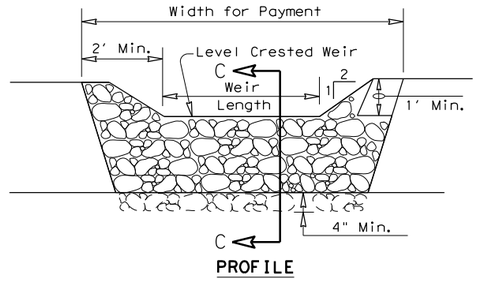


SECTION A-A

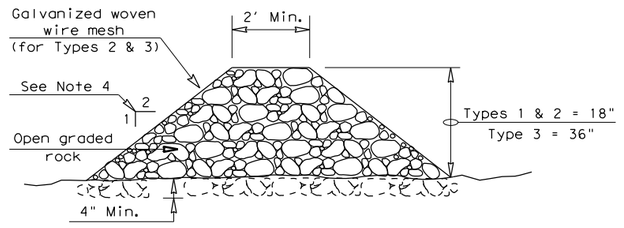


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

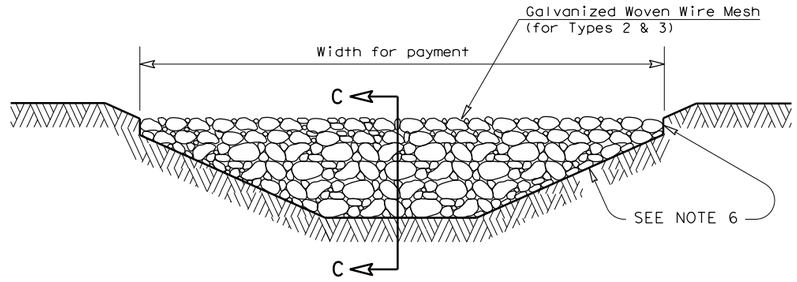
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3
Type 4 Rock Filter Dam — RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		262

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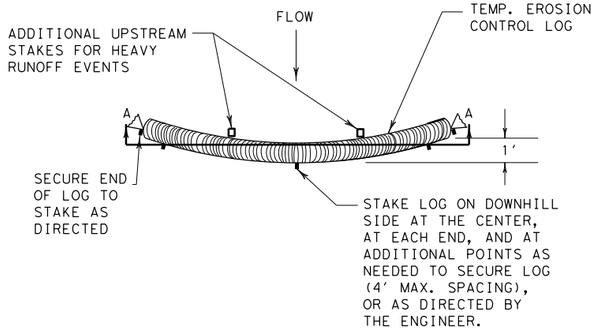
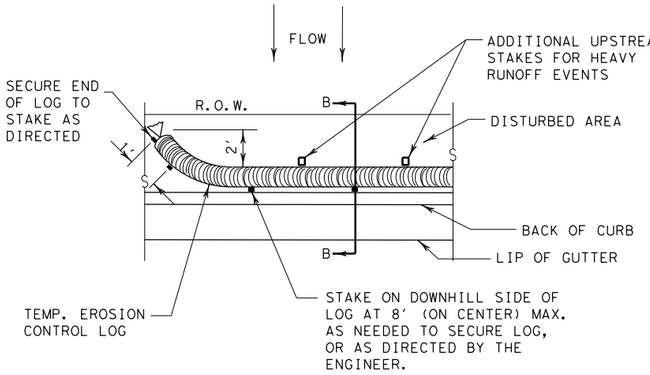


PLAN VIEW



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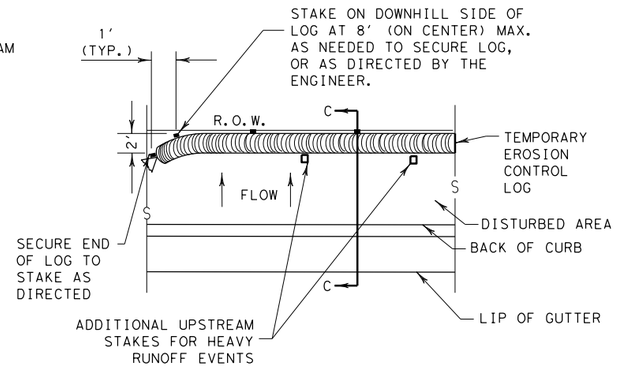

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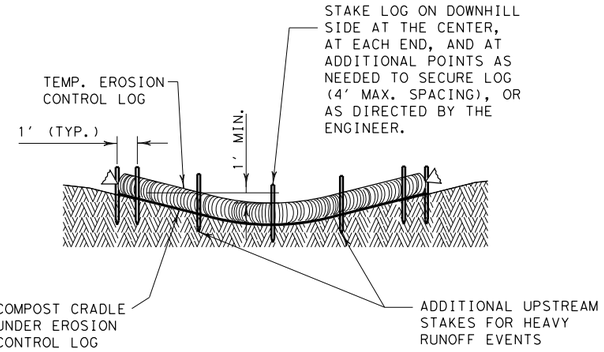
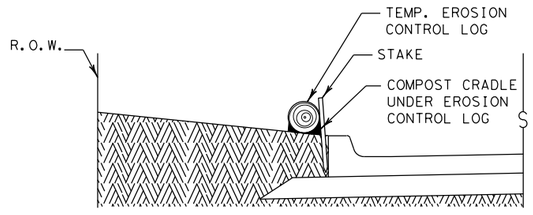


SECTION A-A

EROSION CONTROL LOG DAM

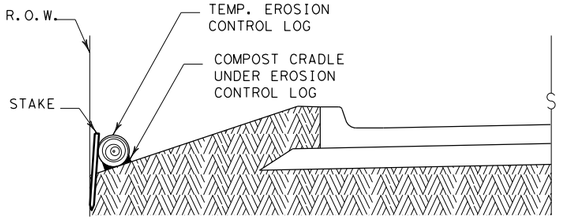
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

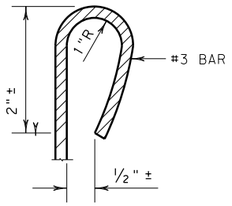
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

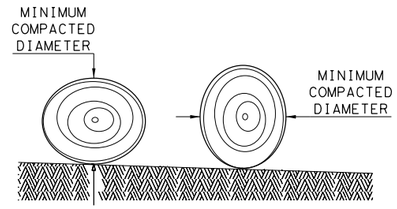
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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	FTW	PALO PINTO				263	

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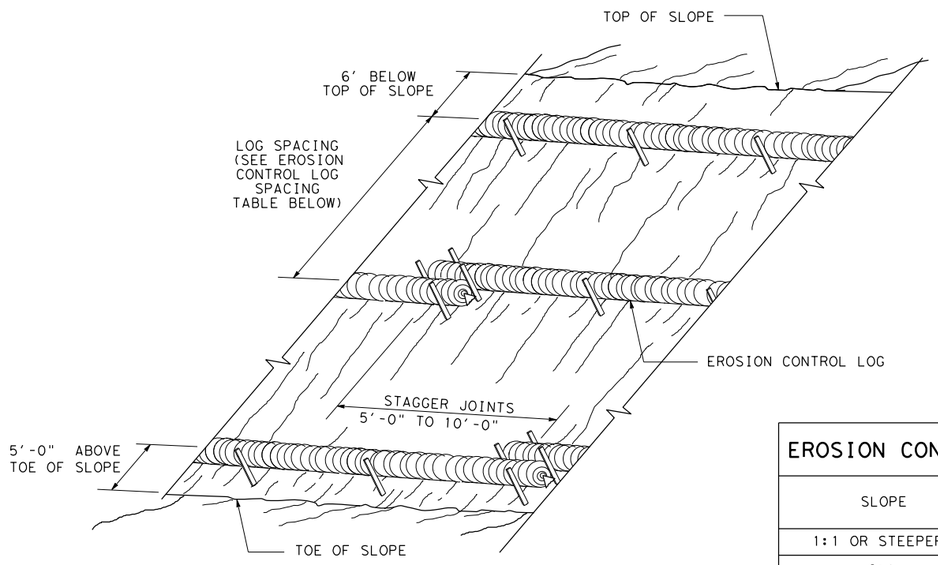
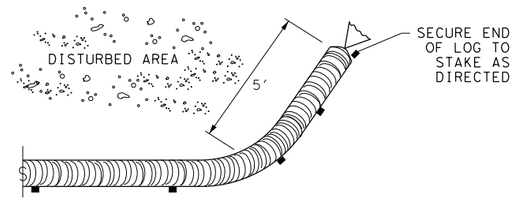


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

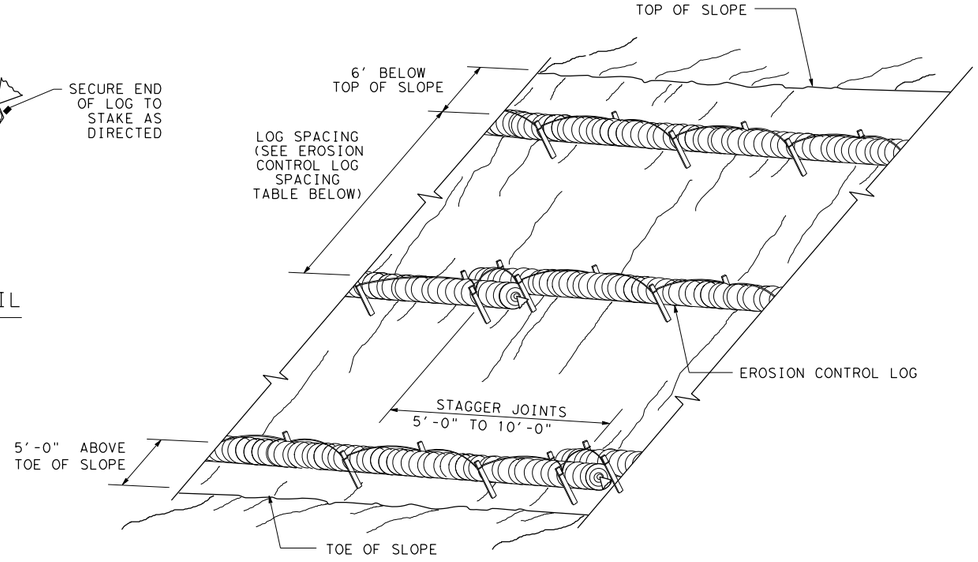
CL-SST



END SECTION RAP DETAIL

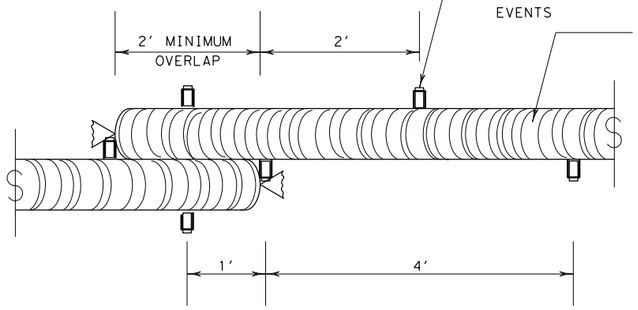
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5′	10′	15′	20′
2:1	10′	20′	30′	40′
3:1	15′	30′	45′	60′
4:1 OR FLATTER	20′	40′	60′	80′

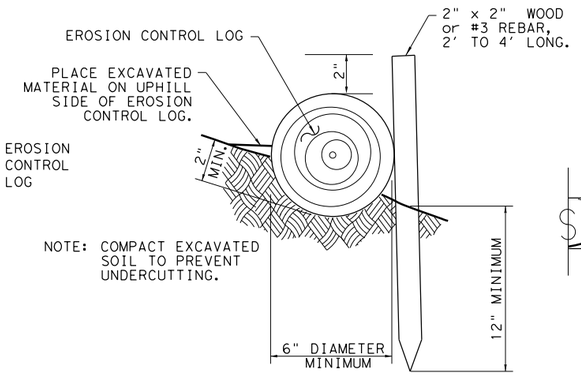
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

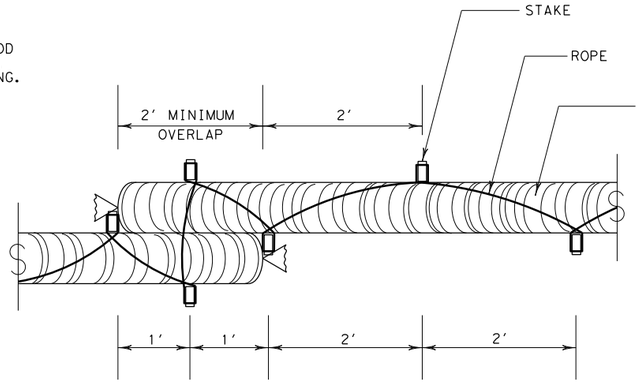


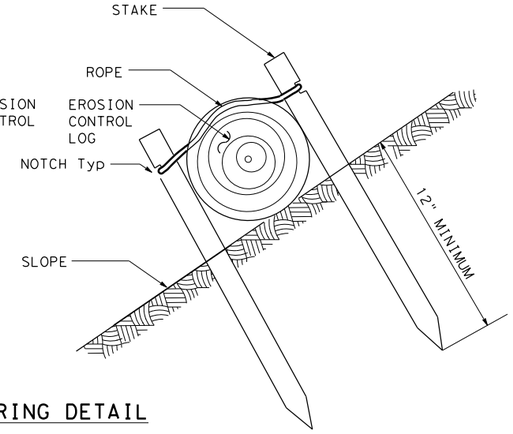


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

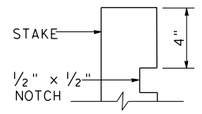
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL

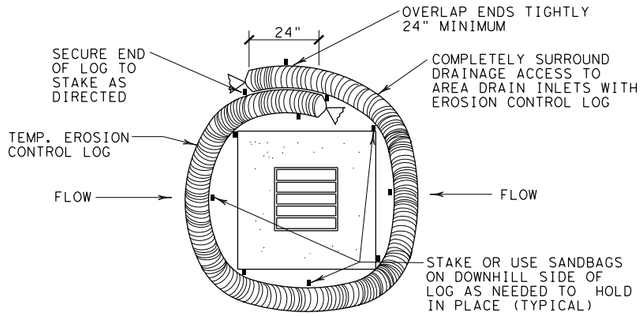


STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

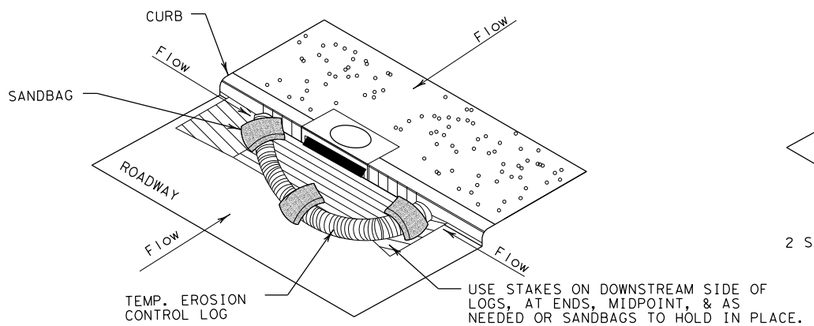
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0008	01	046,ETC		US 180,ETC	
	DIST	COUNTY			SHEET NO.	
	FTW	PALO PINTO			264	



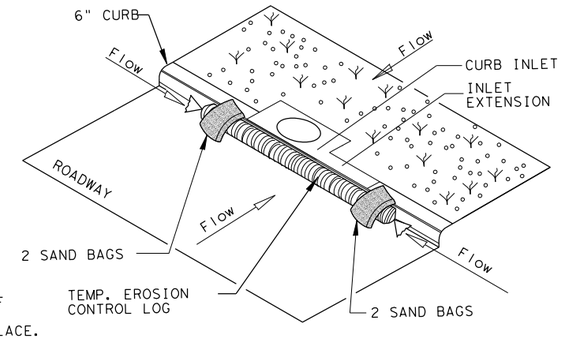
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

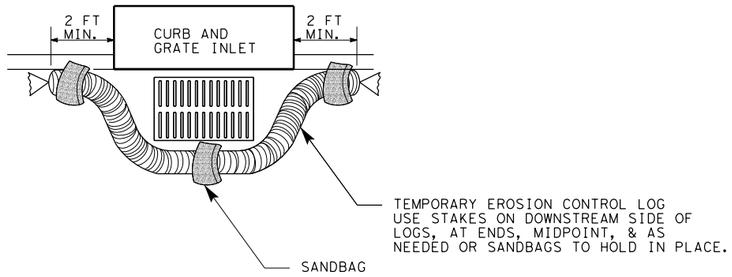
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

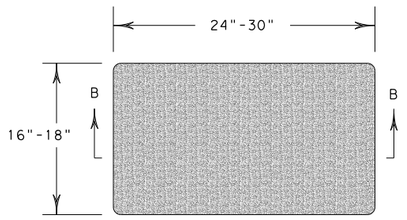
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0008	01	046,ETC	US 180,ETC
	DIST	COUNTY		SHEET NO.
	FTW	PALO PINTO		265

DATE: 10/27/2021
FILE: c:\pw-af\pw-af-prod\andrea.flores@aguirre-fields.com\dms18870\ec916.dgn