FED. RD. DIV. NO.	FEDERAL PROJECT NO.		SHEET NO.
6	STP 2021(190)HES		1
STATE	STATE DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	HIGHWAY NO.
0379	03	026, ETC.	SH136

DESIGN SPEED = 60
2019 ADT = 3,000
2042 ADT = 4,200
MINOR ARTERIAL

INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

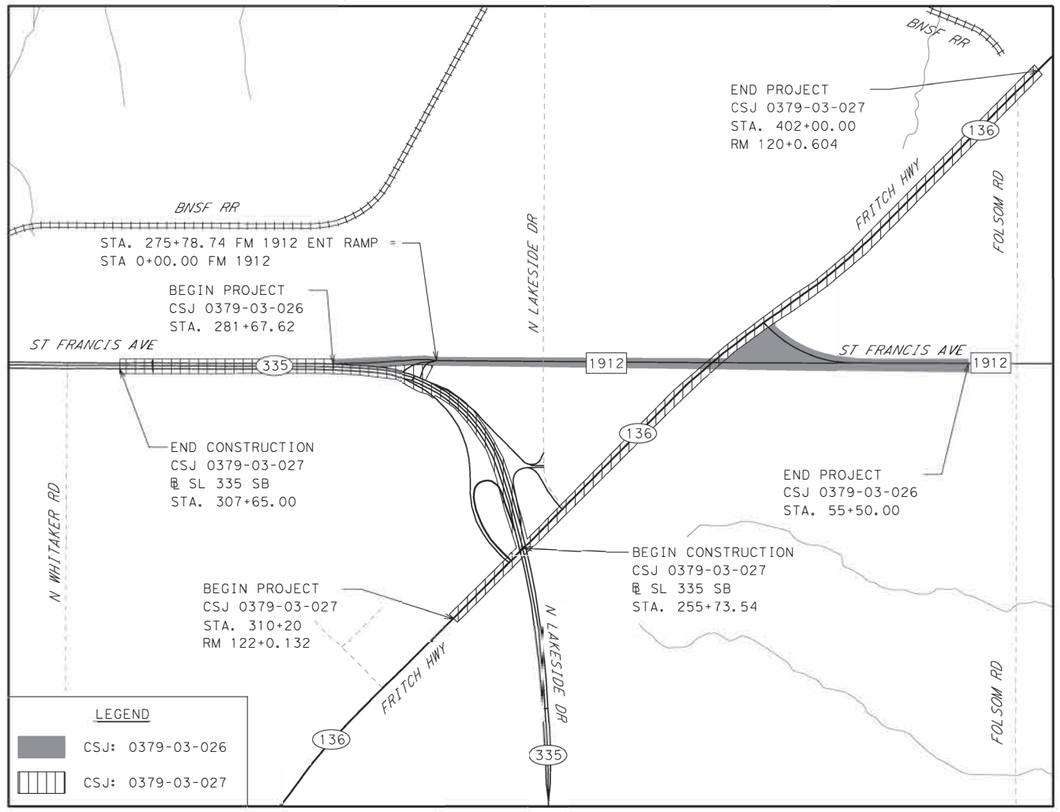
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
FEDERAL PROJECT: STP 2021(190)HES
HIGHWAY - SH136
POTTER COUNTY

CONTROL: 0379-03-026, ETC.

FOR THE CONSTRUCTION OF SAFETY IMPROVEMENTS ALONG SH 136. CONSISTING OF GRADING, PAVEMENTS, DRAINAGE, SAFETY ILLUMINATION, SIGNS, AND PAVEMENT MARKINGS.

CSJ: 0379-03-026
PROJECT LIMITS FROM: SH136
TO: FM 1912 AT SH 136
ROADWAY LENGTH = 6,138.88 FT. = 1.163 MILES
BRIDGE LENGTH = 00.00 FT. = 0.000 MILES
TOTAL LENGTH = 6,1388.88 FT. = 1.163 MILES

CSJ: 0379-03-027
PROJECT LIMITS FROM: FOLSOM ROAD
TO: 0.2 MILES SOUTH OF SL 335
ROADWAY LENGTH = 9,180.00 FT. = 1.739 MILES
BRIDGE LENGTH = 00.00 FT. = 0.000 MILES
TOTAL LENGTH = 9,180.00 FT. = 1.739 MILES



EXCEPTIONS:
NONE

RAILROADS:
NONE

EQUATIONS:
FM 1912 ENT RAMP STA 275+78.74 BK =
FM 1912 STA 0+00.00 AH

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

2021 Texas Department of Transportation

RECOMMENDED FOR LETTING:
DocuSigned by: Corky Meukam
1D152781DAD9462...
DATE: 6/30/2021

DocuSigned by: Kit Black
9B5A6EA6AE8B46E...
DATE: 7/1/2021
...R OF TRANSPORTATION
...ELOPMENT

APPROVED FOR LETTING:
DocuSigned by: Blair Johnson
8B80E3AEB2BC43A...
DATE: 7/1/2021

INDEX OF SHEETS

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "*" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.

07/01/2020

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A "**" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

NO.	DATE	REVISION	APPROVED

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Wood Environment & Infrastructure Solutions, Inc.
4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		2
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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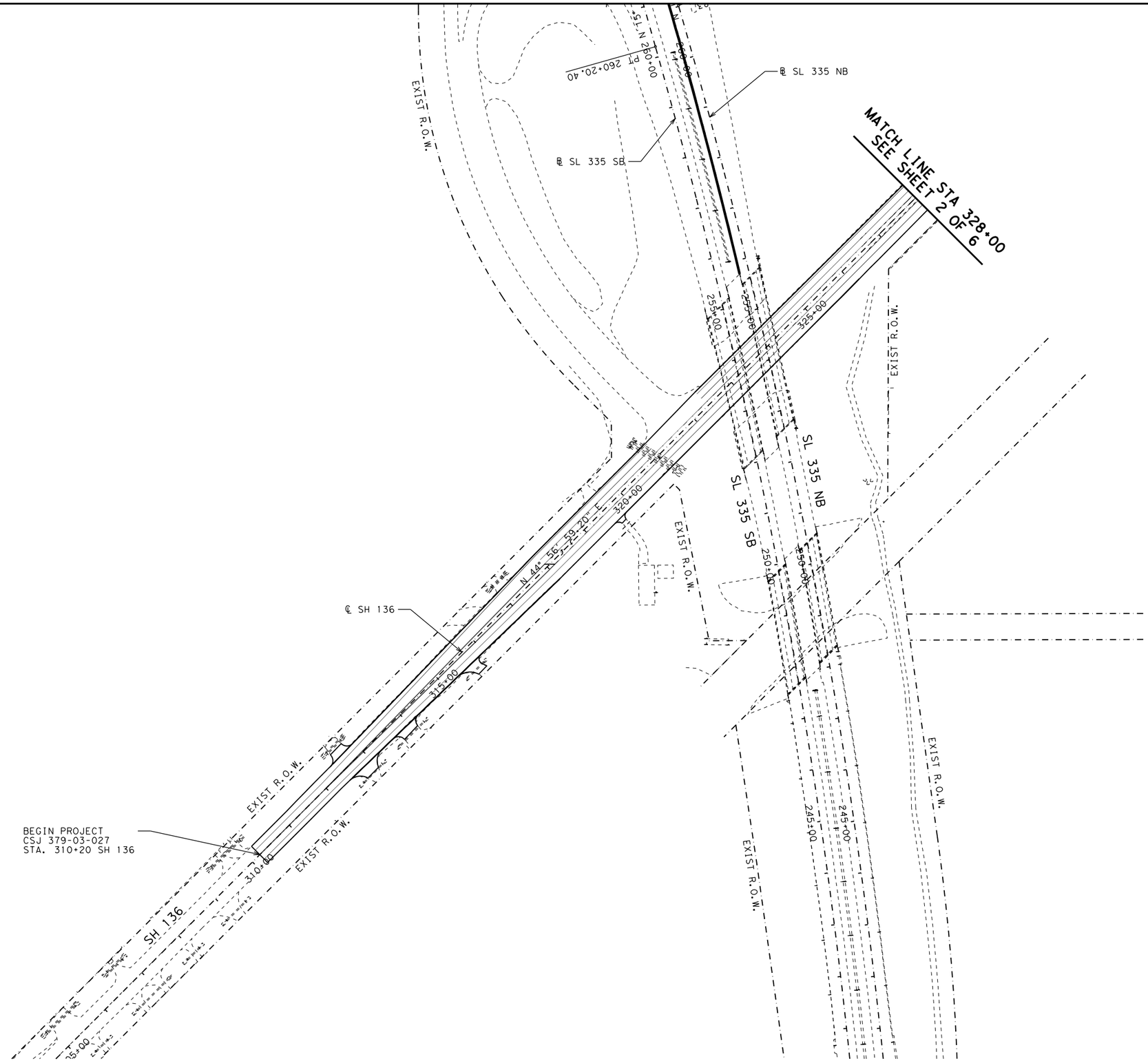

N

0 50 100 200 400

SCALE: 1"=200'

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GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

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SH 136

PROJECT LAYOUT
BEGIN TO STA. 328+00

SHEET 1 OF 6

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	3

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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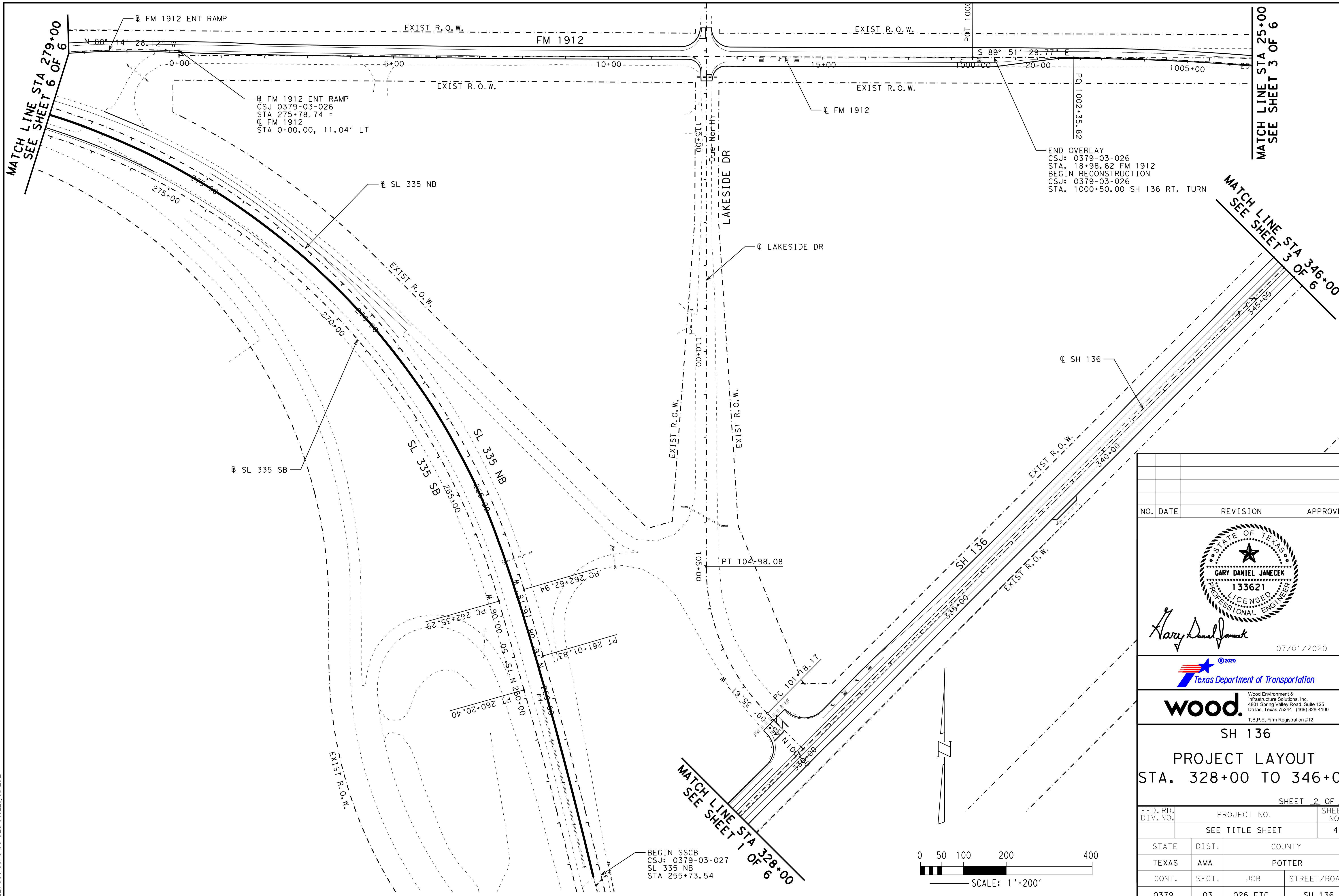

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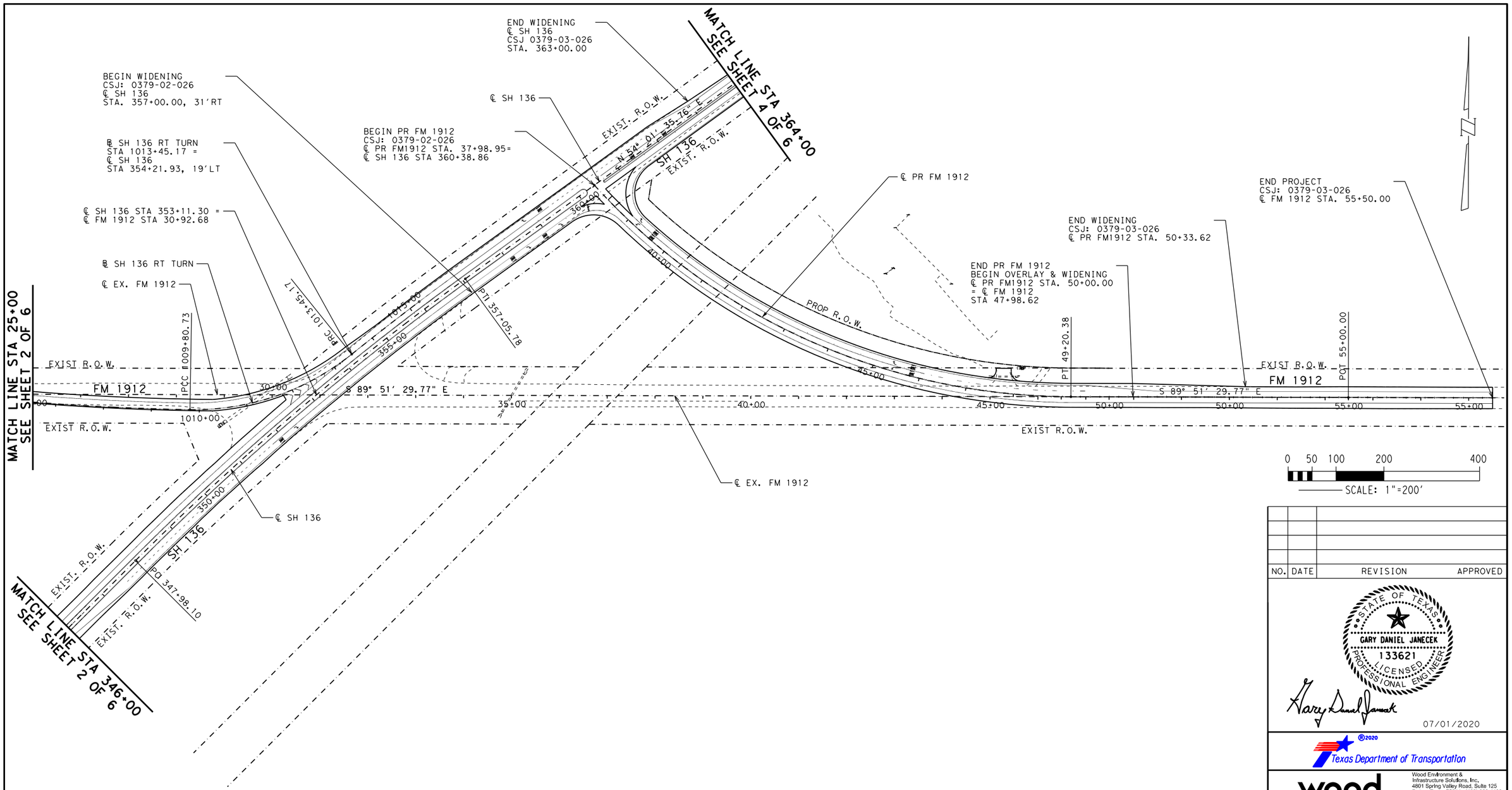
SH 136

PROJECT LAYOUT
STA. 328+00 TO 346+00

SHEET 2 OF 6

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	4

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136



0 50 100 200 400

SCALE: 1"=200'

NO.	DATE	REVISION	APPROVED

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133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

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SH 136

PROJECT LAYOUT
STA. 346+00 TO 364+00

SHEET 3 OF 6

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		5
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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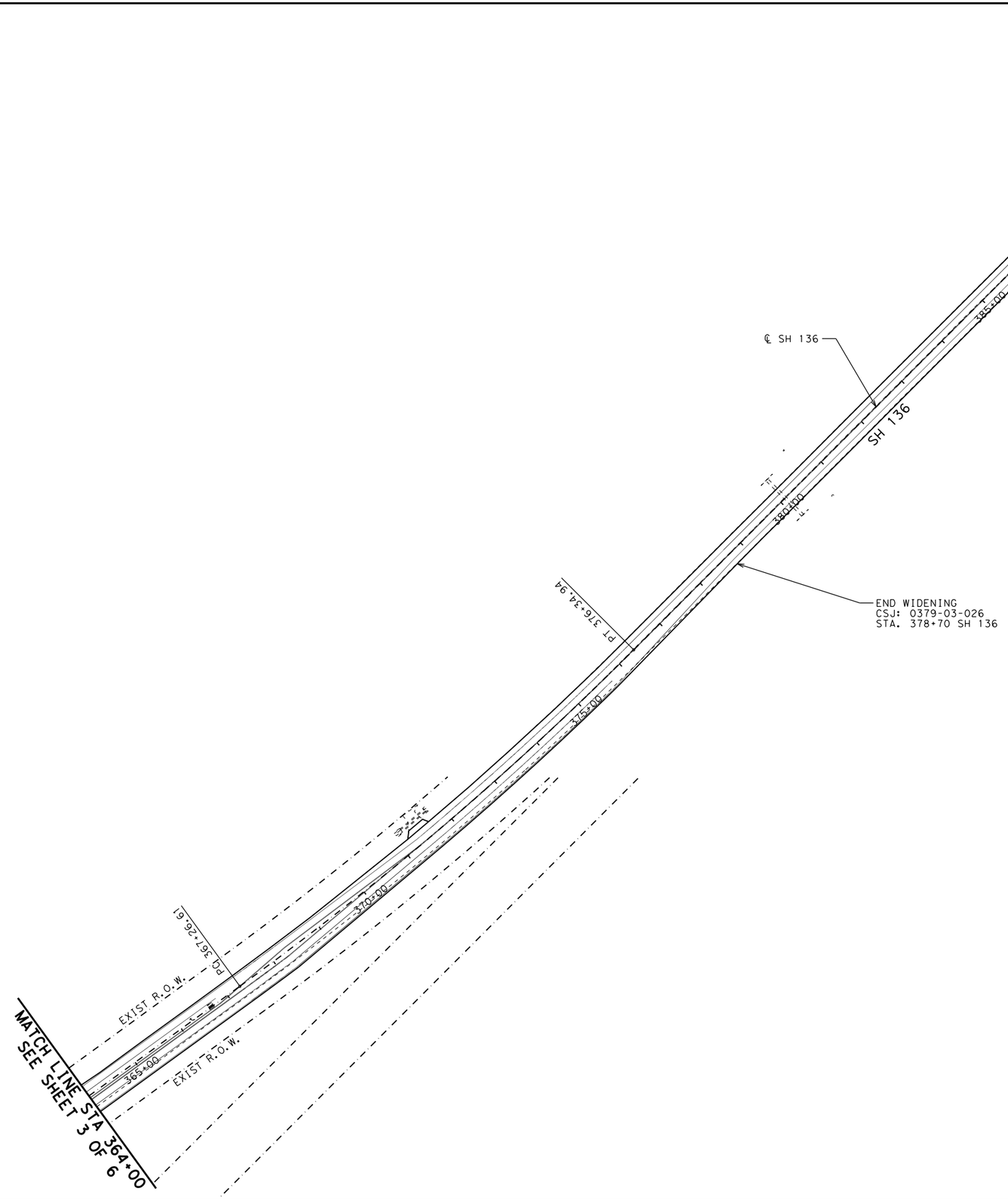

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SH 136
PROJECT LAYOUT
STA. 364+00 TO 390+00

SHEET 4 OF 6

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	6

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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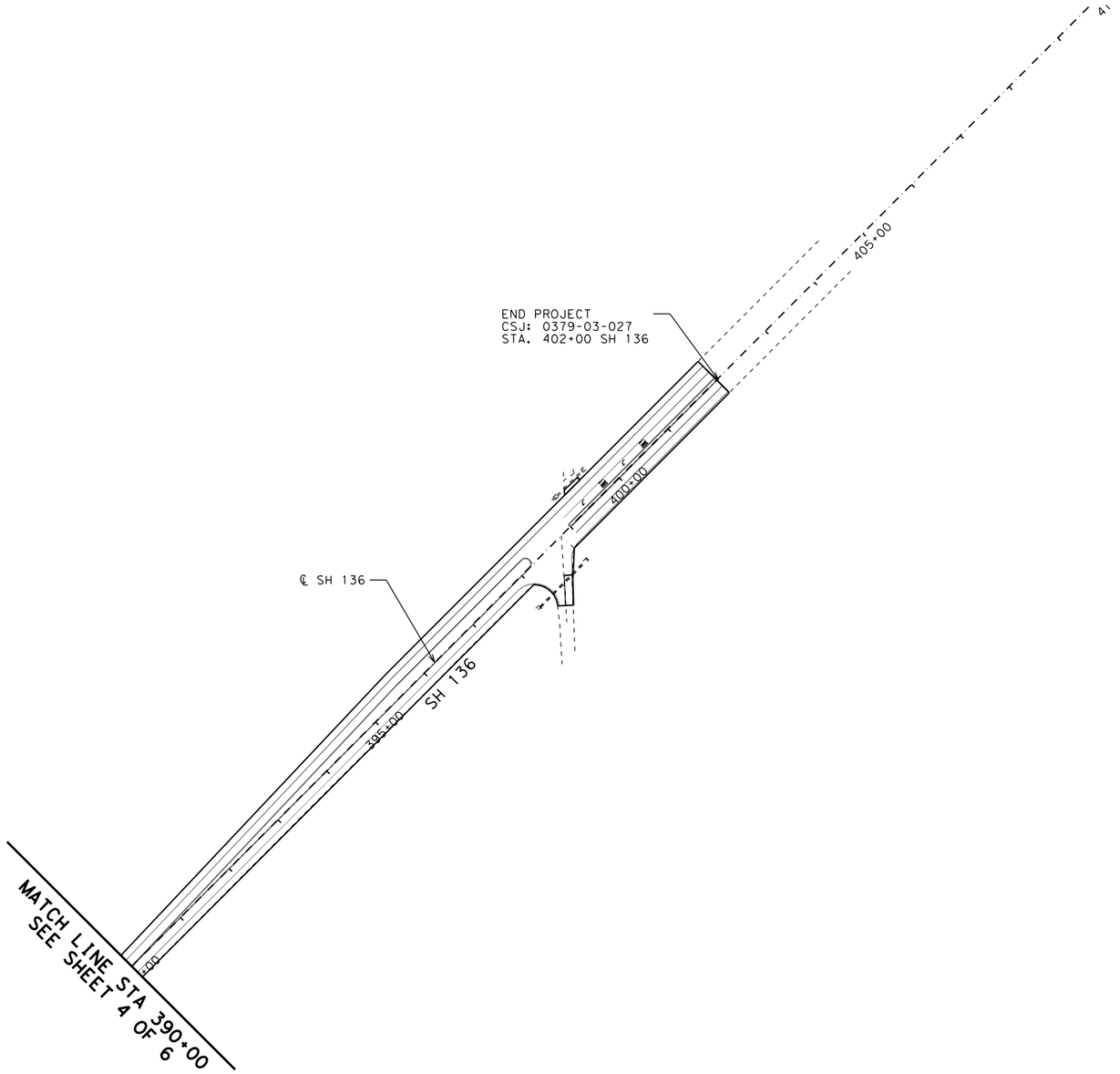

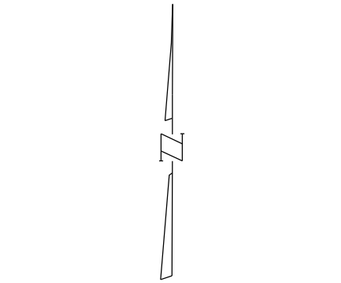

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SH 136

PROJECT LAYOUT
STA. 390+00 TO END

SHEET 5 OF 6

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		7
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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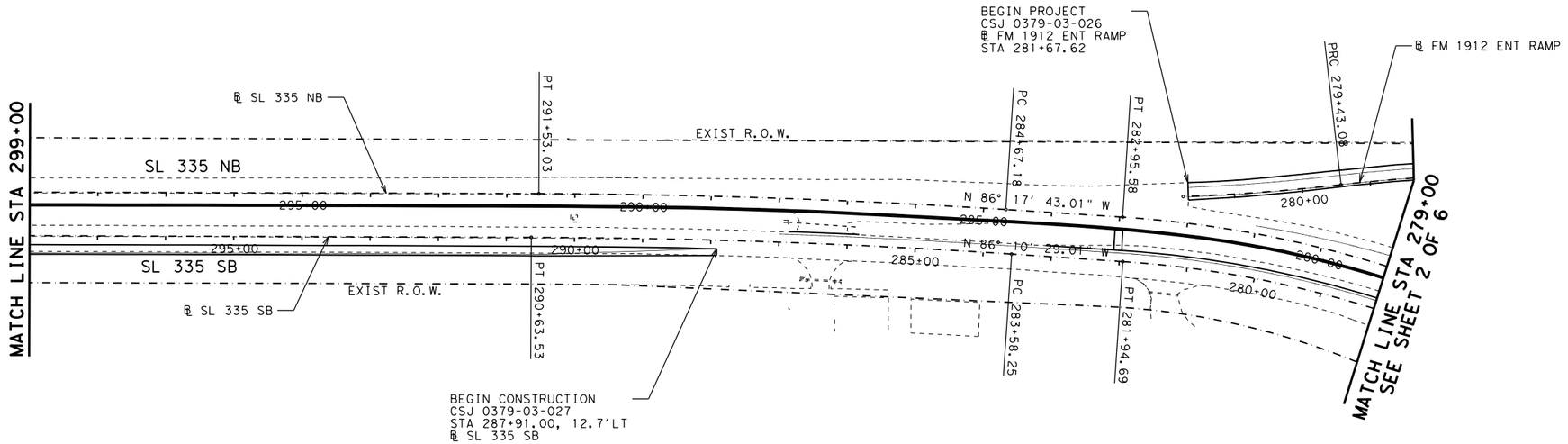

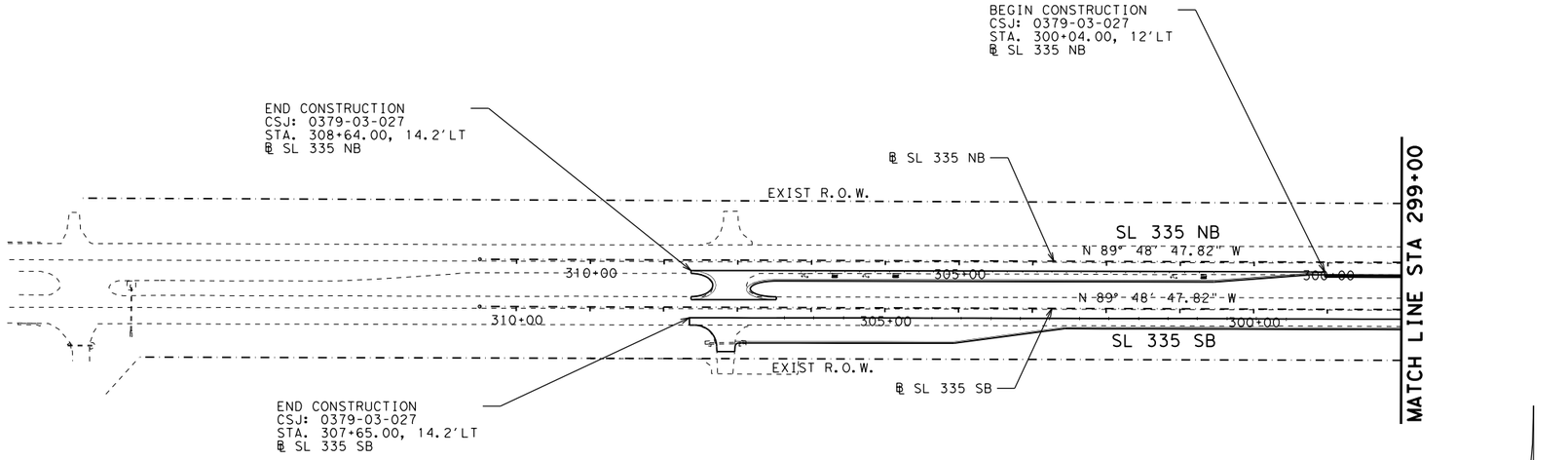

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SH 136
PROJECT LAYOUT
SL 335
STA. 279+00 TO END

SHEET 6 OF 6

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	8

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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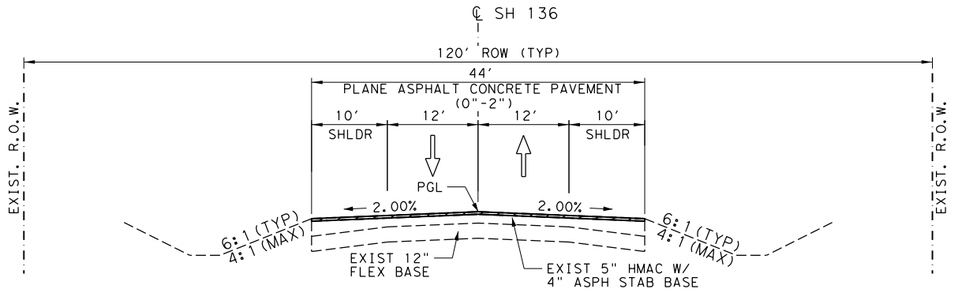
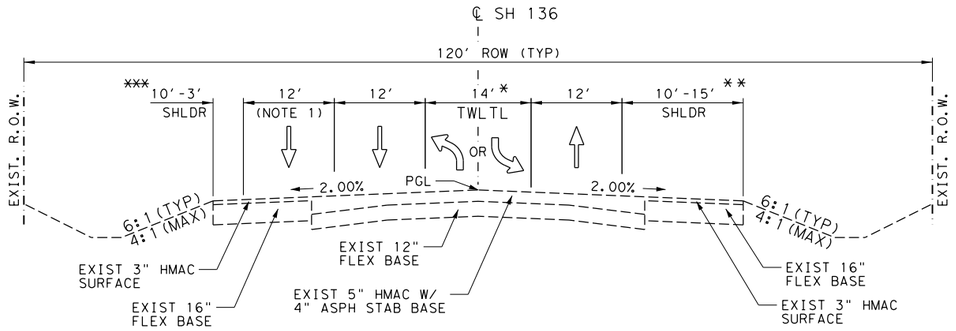


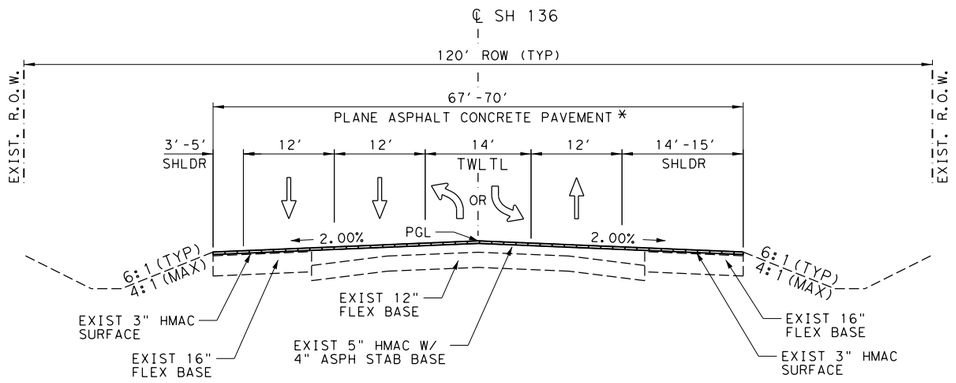
EXIST TYPICAL SECTION
SH 136 STA 310+20 TO STA 312+20 (A)



EXIST TYPICAL SECTION
SH 136 STA 312+20 TO STA 319+00 (B)

NOTE:
1. LANE WIDTH VARIES (0'-12') FROM APPROX. STA 312+20 TO 318+00.

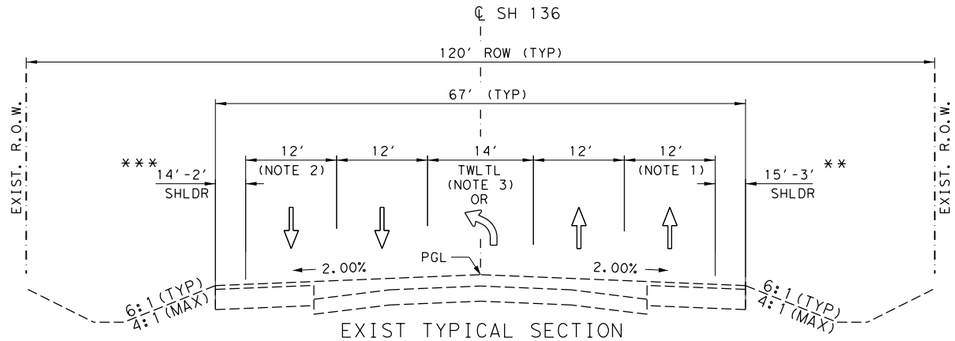
* TWLTL WIDTH VARIES (0' TO 14') FROM APPROX. STA 312+20 TO 318+00.
** SHOULDER WIDTH VARIES (10' TO 15') FROM APPROX. STA 312+20 TO 318+00.
*** SHOULDER WIDTH VARIES (10' TO 3') FROM APPROX. STA 312+20 TO 318+00.



EXIST TYPICAL SECTION
SH 136 STA 319+00 TO STA 327+00 (C)

NOTE:

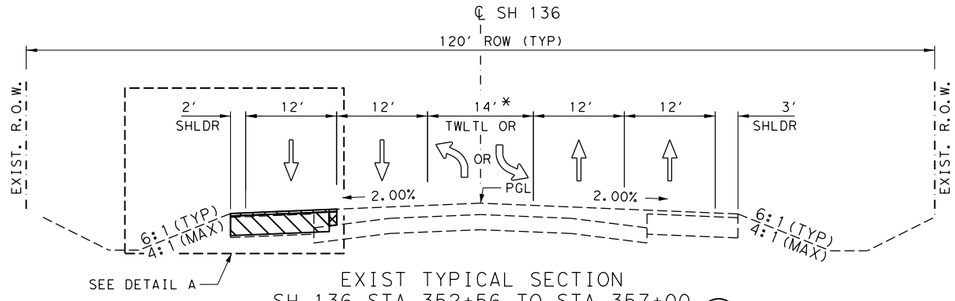
* STA 319+00 TO STA 321+00 - PLANE ASPHALT CONCRETE PAVEMENT (2"-0")
STA 321+00 TO STA 325+00 - PLANE ASPHALT CONCRETE PAVEMENT (2")
STA 325+00 TO STA 327+00 - PLANE ASPHALT CONCRETE PAVEMENT (0"-2")



EXIST TYPICAL SECTION
SH 136 STA 327+00 TO STA 352+56 (D1)

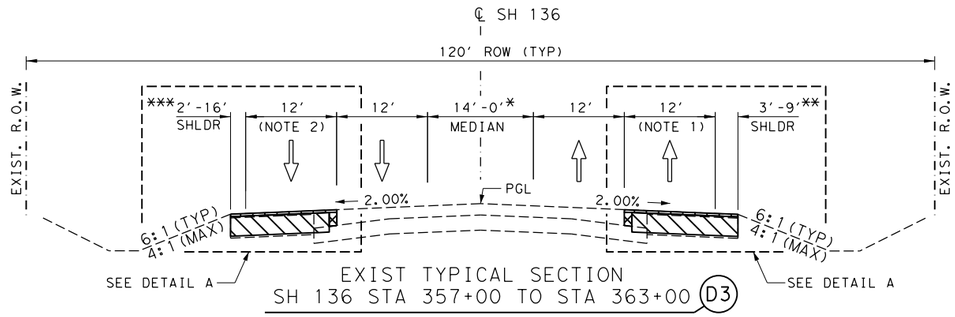
NOTE:
1. LANE WIDTH VARIES (0' TO 12') FROM STA 346+00 TO 347+50.
2. LANE WIDTH VARIES (12' TO 0') FROM STA 333+00 TO 335+00.
3. TWLTL FROM STA 327+00 TO 349+50
FLUSH CENTER MEDIAN FROM STA 349+50 TO 352+56

** SHOULDER WIDTH VARIES (13' TO 3') FROM STA 344+70 TO 347+50.
*** SHOULDER WIDTH VARIES (2' TO 12') FROM STA 332+60 TO 335+30.
SHOULDER WIDTH VARIES (14' TO 2') FROM STA 343+00 TO 347+70.



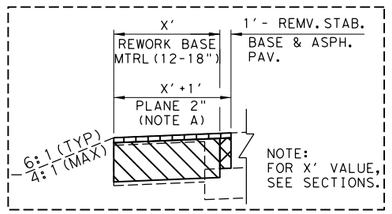
EXIST TYPICAL SECTION
SH 136 STA 352+56 TO STA 357+00 (D2)

NOTE:
* LEFT TURN ENDS AND FLUSH CENTER MEDIAN BEGINS AT STA 356+25.



EXIST TYPICAL SECTION
SH 136 STA 357+00 TO STA 363+00 (D3)

NOTE:
1. LANE WIDTH VARIES (12'-0') FROM STA 359+00 TO STA 363+00
2. LANE WIDTH VARIES (12'-0') FROM STA 357+00 TO STA 359+00
* MEDIAN WIDTH VARIES (14' TO 0') FROM STA 357+00 TO STA 363+00
** SHOULDER WIDTH VARIES (3' TO 9') FROM STA 359+00 TO STA 364+50
*** SHOULDER WIDTH VARIES (2' TO 16') FROM STA 357+00 TO STA 359+00



NOTE: A. PLANING IS PAID UNDER ITEM 354.

DETAIL A
N.T.S

LEGEND:
- PLANE EXIST PAVEMENT
- BASE REWORK
- REMV STAB BASE & ASPH PAVEMENT

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

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Wood Environment & Infrastructure Solutions, Inc.
4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
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SH 136
EXISTING TYPICAL SECTIONS

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	9

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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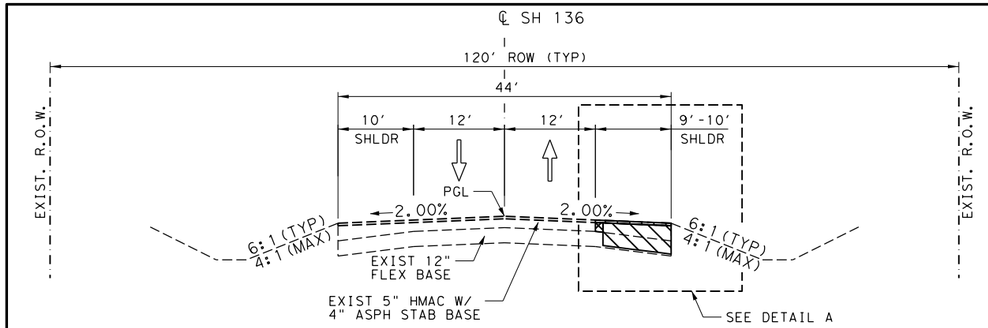
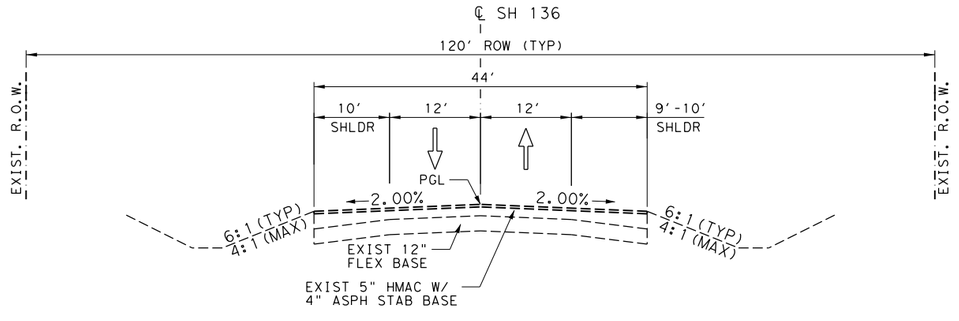
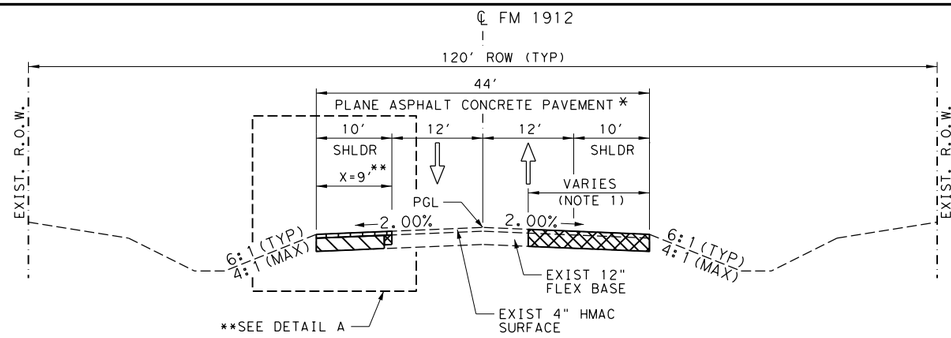


EXIST TYPICAL SECTION
SH 136 STA 363+00 TO STA 378+70 (E1)



EXIST TYPICAL SECTION
SH 136 STA 378+70 TO STA 390+00 (E2)

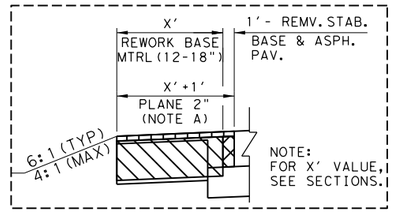


EXIST TYPICAL SECTION
FM 1912 STA 0+00 TO STA 55+50 (F)

NOTE:
1. REMOVE STAB BASE & ASPH PAVEMENT FROM STA 0+00 TO STA 12+00 WIDTH VARIES FROM (31'-16').
* STA 53+50 TO STA 55+50 - PLANING ASPHALT CONCRETE PAVEMENT (0"-2")
** STA 47+98.62 TO STA 50+33.62 DETAIL A (BELOW) APPLIES

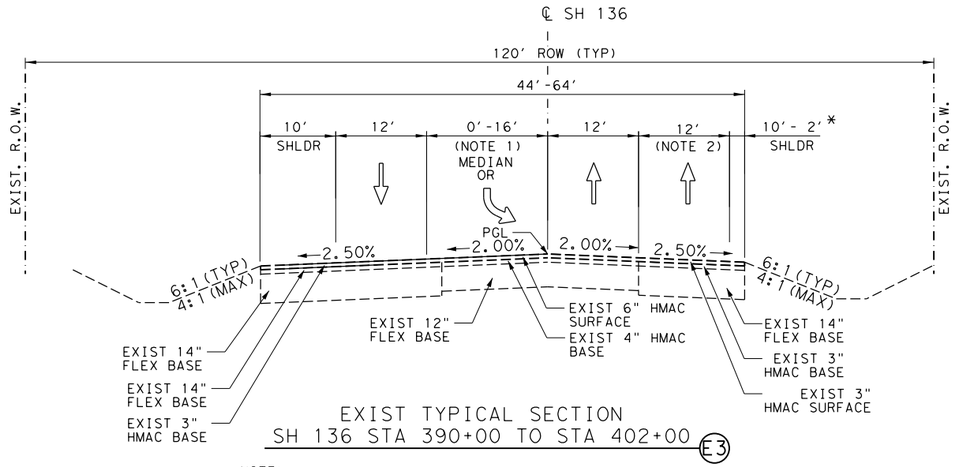
LEGEND:

- PLANE EXIST PAVEMENT
- BASE REWORK
- REMV STAB BASE & ASPH PAVEMENT



NOTE: A. PLANING IS PAID UNDER ITEM 354.

DETAIL A
N.T.S

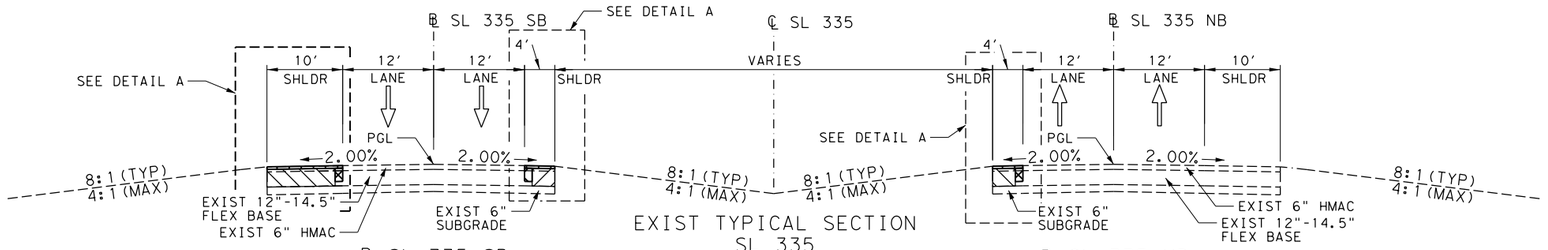


EXIST TYPICAL SECTION
SH 136 STA 390+00 TO STA 402+00 (E3)

NOTE:
1. MEDIAN WIDTH VARIES (0' TO 16') FROM STA 390+00 TO 398+82.
LEFT TURN LANE (12') W/ 4' MEDIAN FROM STA 398+82 TO 402+00.

2. ADDITIONAL (12') LANE FROM STA 398+82 TO 402+00.

* SHOULDER WIDTH (10') FROM STA 390+00 TO 398+82.
SHOULDER WIDTH (2') FROM STA 398+82 TO 402+00.



℄ SL 335 SB
STA 287+91 TO 307+65

EXIST TYPICAL SECTION
SL 335 (I)

℄ SL 335 NB
STA 255+73 TO 308+64

NOTE:
* EXIST MBGF LIMIT IS APPROXIMATELY FROM STA 255+00 TO 258+75.

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
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SH 136
EXISTING TYPICAL SECTIONS

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	10

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 6/25/2021 4:25:34 PM
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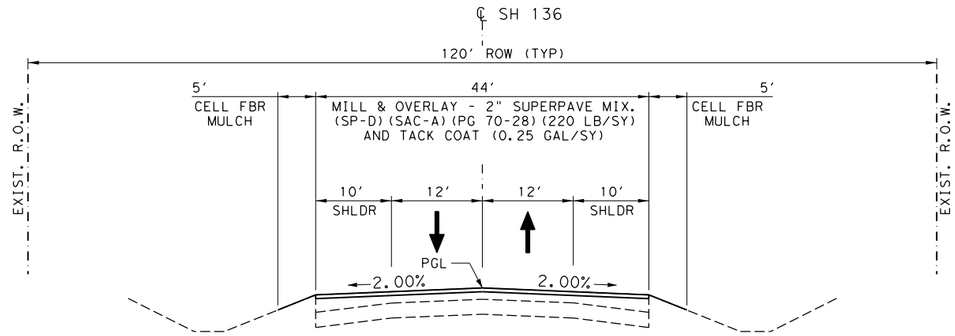
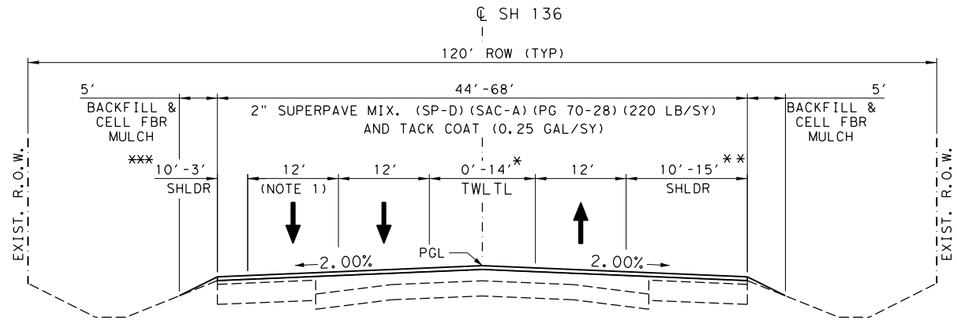


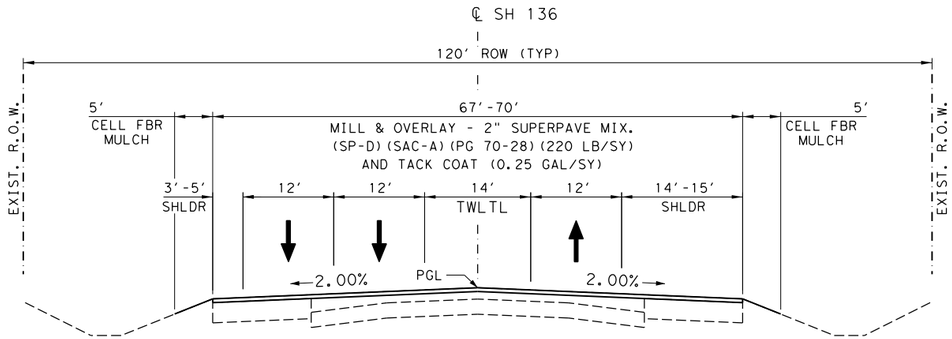
PROPOSED TYPICAL SECTION
SH 136 STA 310+20 TO STA 312+20 (A)



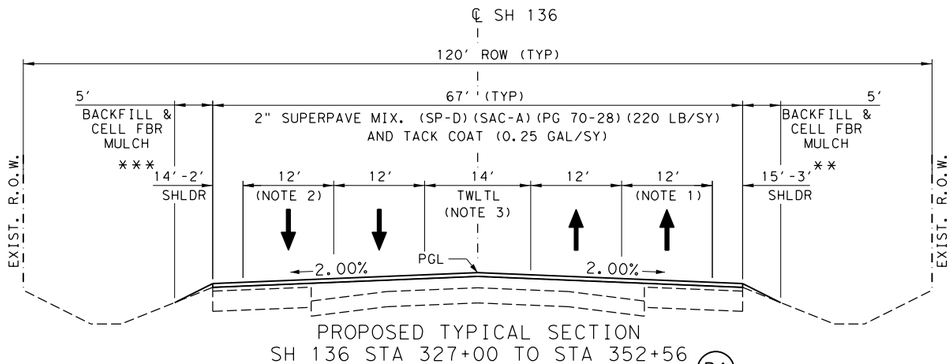
PROPOSED TYPICAL SECTION
SH 136 STA 312+20 TO STA 319+00 (B)

NOTE:
1. LANE WIDTH VARIES (0'-12') FROM STA 312+00 TO 318+00.

* TWLTL WIDTH VARIES (0' TO 14') FROM STA 312+00 TO 318+00.
** SHOULDER WIDTH VARIES (10' TO 15') FROM STA 312+00 TO 318+00.
*** SHOULDER WIDTH VARIES (10' TO 3') FROM STA 312+00 TO 318+00.



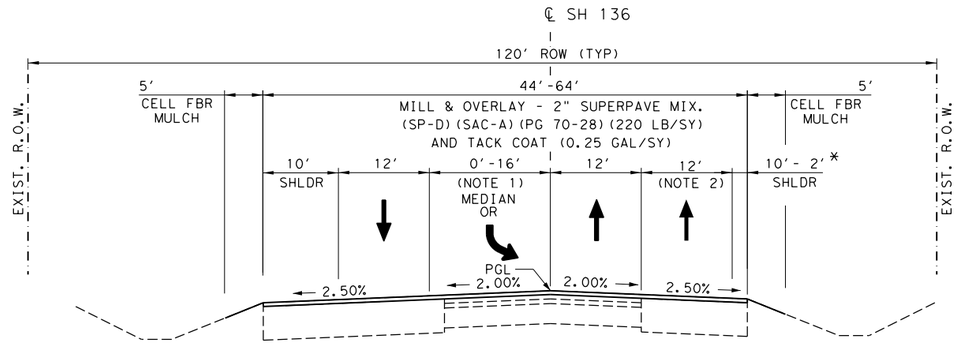
PROPOSED TYPICAL SECTION
SH 136 STA 319+00 TO STA 327+00 (C)



PROPOSED TYPICAL SECTION
SH 136 STA 327+00 TO STA 352+56 (D1)

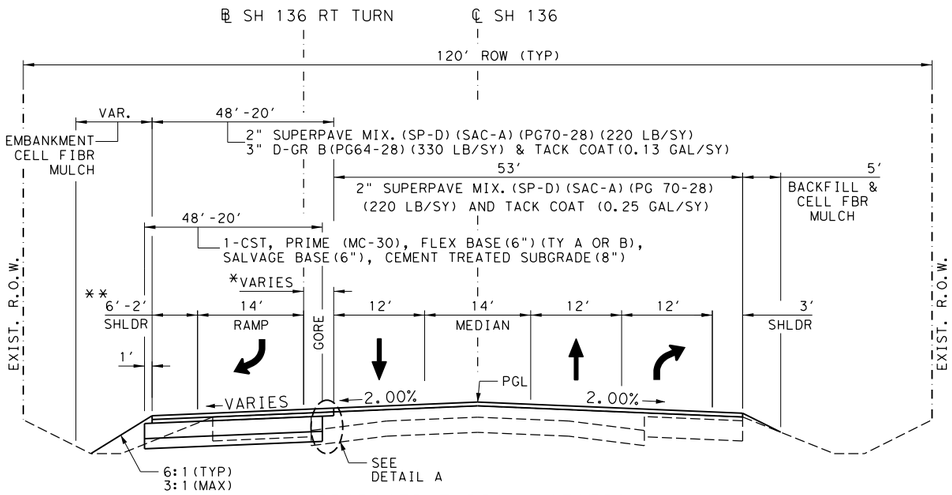
NOTE:
1. LANE WIDTH VARIES (0' TO 12') FROM STA 346+00 TO 347+50.
2. LANE WIDTH VARIES (12' TO 0') FROM STA 333+00 TO 335+00.
3. TWLTL FROM STA. 327+00 TO 345+00 CENTER MEDIAN FLUSH.

** SHOULDER WIDTH VARIES (15' TO 13') FROM STA 333+00 TO 335+00.
SHOULDER WIDTH VARIES (13' TO 3') FROM STA 346+00 TO 347+50.
*** SHOULDER WIDTH VARIES (2' TO 12') FROM STA 333+00 TO 335+00.
SHOULDER WIDTH VARIES (12' TO 14') FROM STA 340+00 TO 343+00.



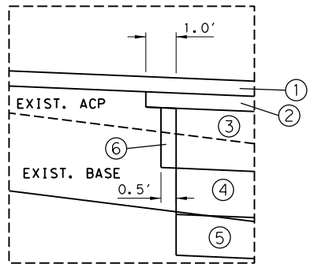
PROPOSED TYPICAL SECTION
SH 136 STA 390+00 TO STA 402+00 (E3)

NOTE:
1. MEDIAN WIDTH VARIES (0' TO 16') FROM STA 390+00 TO 398+82.
LEFT TURN LANE (12') W/ 4' MEDIAN FROM STA 398+82 TO 402+00.



PROPOSED TYPICAL SECTION
SH 136 STA 352+56 TO STA 357+00 (D2)

NOTE:
* GORE WIDTH VARIES (28' TO 0') FROM STA 352+56 TO 354+22.
** SHOULDER WIDTH VARIES (6' TO 2') FROM STA 354+22 TO 355+00.



DETAIL A

NOTE:
1. PROP. 2" SUPERPAVE MIX. (SP-D)
2. PROP. 3" D-GR(TY B)(PG64-28)
3. PROP. 6" FLEX BASE (TY A OR B)(GR 4)
4. PROP. 6" SALVAGE BASE
5. PROP. 8" CEMENT TREATED SUBGRADE (2%)
6. BLEND EXIST BASE WITH NEW FLEX BASE

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

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T.B.P.E. Firm Registration #12

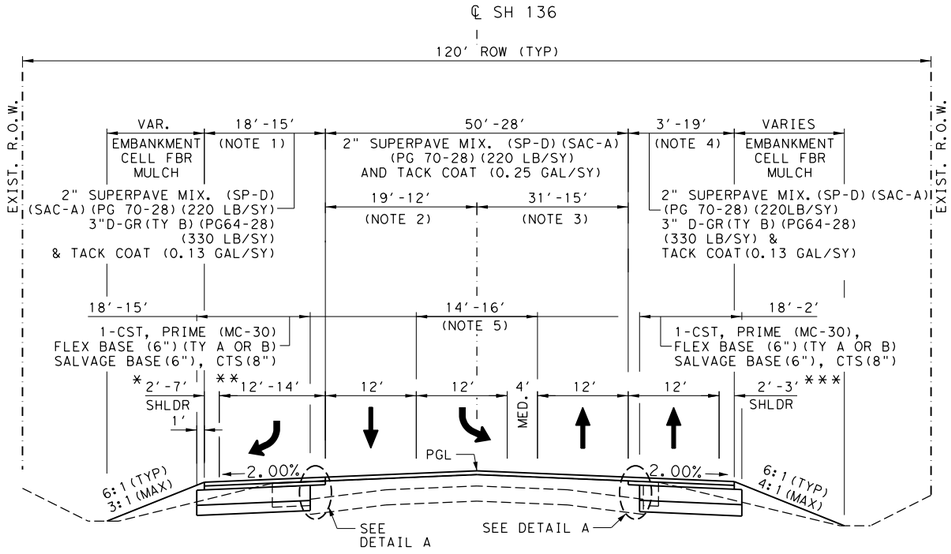
SH 136
PROPOSED TYPICAL SECTIONS

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	11

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 5/26/2021 10:46:06 AM
FILE: CSJ-0379-03-026-Proposed Typical Sections_03.dgn



PROPOSED TYPICAL SECTION
SH 136 STA 357+00 TO STA 363+00 (D3)

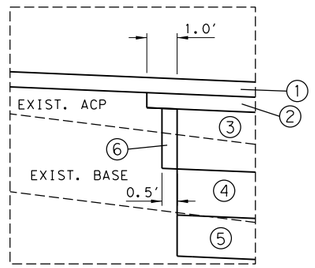
NOTE:

1. VARIES (15' TO 18') FROM STA 357+00 TO 360+00.
   VARIES (18' TO 0') FROM STA 362+00 TO 363+00.
2. VARIES (19' TO 12') FROM STA 357+00 TO 363+00.
3. VARIES (31' TO 26') FROM STA 357+00 TO 360+00.
   VARIES (26' TO 15') FROM STA 360+00 TO 363+00.
4. VARIES (3' TO 19') FROM STA 357+00 TO 363+00.
5. MEDIAN ENDS AT STA 360+20.
   WIDTH VARIES (14'-16') FROM STA 357+00 TO 360+00.
   LEFT TURN LANE BEGINS AT STA 360+60.

* SHOULDER WIDTH VARIES (2' TO 7') FROM STA 362+00 TO 363+00.

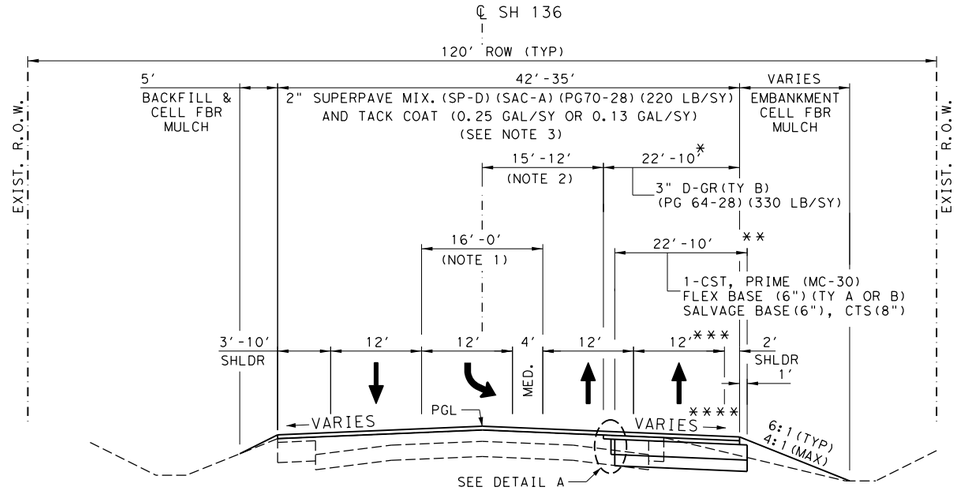
** LANE WIDTH VARIES (14' TO 12') FROM STA 357+00 TO 360+00.
   LANE WIDTH VARIES (12' TO 0') FROM STA 362+00 TO 363+00.

*** 3' SHOULDER WIDTH FROM STA 357+00 TO 360+38.
   2' SHOULDER WIDTH FROM STA 360+38 TO 363+00.



DETAIL A

NOTE:
1. PROP. 2" SUPERPAVE MIX. (SP-D)
2. PROP. 3" D-GR(TY B)(PG64-28)
3. PROP. 6" FLEX BASE (TY A OR B)(GR 4)
4. PROP. 6" SALVAGE BASE
5. PROP. 8" CEMENT TREATED SUBGRADE (2%)
6. BLEND EXIST BASE WITH NEW FLEX BASE



PROPOSED TYPICAL SECTION
SH 136 STA 363+00 TO STA 378+70 (E1)

NOTE:

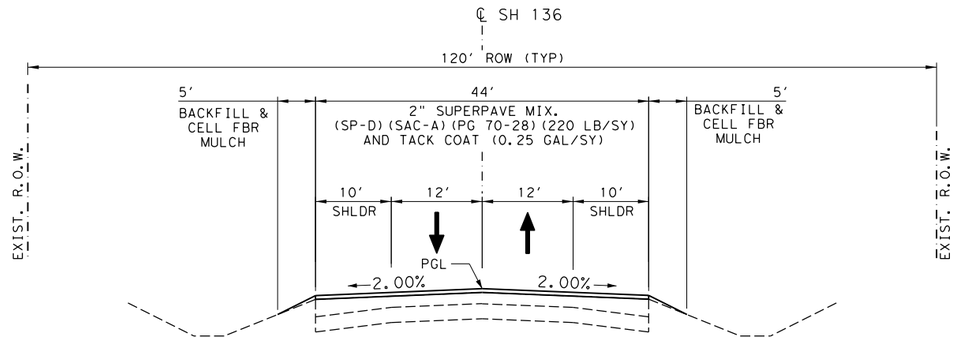
1. LEFT TURN LANE ENDS AT STA 366+80.
   MEDIAN WIDTH VARIES (16' TO 0') FROM STA 368+30 TO 371+30.
2. VARIES (15' TO 12') FROM STA 363+00 TO 364+50.
3. TACK COAT APPLICATION RATE VARIES.
   FOR OVERLAY ON EXISTING PAVEMENT, USE 0.25 GAL/SY
   FOR WIDENING AREA, USE 0.13 GAL/SY.

* VARIES (19' TO 22') FROM STA 363+00 TO 364+50.
   VARIES (22' TO 14') FROM STA 368+30 TO 371+30.
   VARIES (14' TO 10') FROM STA 371+30 TO 378+70.

** VARIES (19' TO 22') FROM STA 363+00 TO 364+50.
   VARIES (22' TO 14') FROM STA 368+30 TO 371+30.
   VARIES (14' TO 10') FROM STA 375+70 TO 378+70.

*** LANE WIDTH VARIES (12' TO 0') FROM STA 375+70 TO 378+70.

**** CROSS SLOPE FOR PAVEMENT WIDENING SHALL MATCH ADJACENT LANE.



PROPOSED TYPICAL SECTION
SH 136 STA 378+70 TO STA 390+00 (E2)

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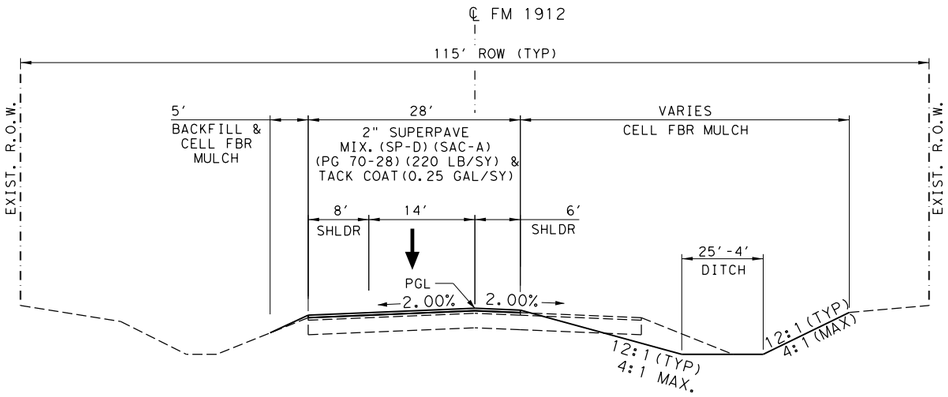
SH 136
PROPOSED TYPICAL SECTIONS

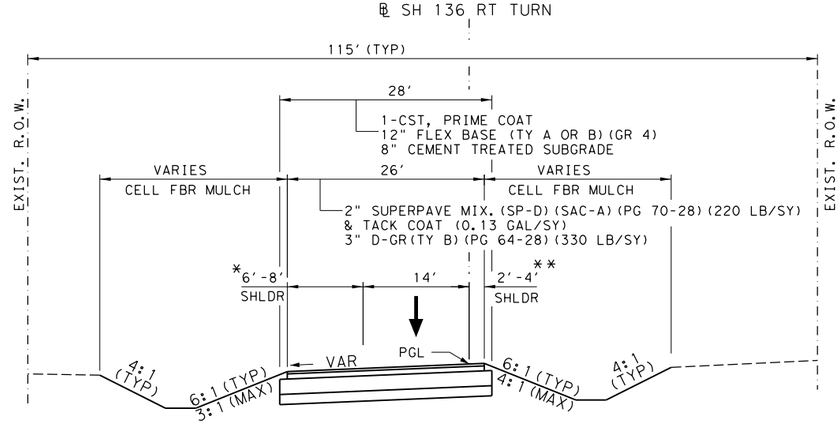
SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		12
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 9:23:05 PM
FILE: CSJ-0379-03-026-Proposed Typical Sections_04.dgn

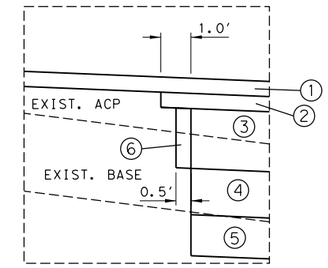


PROPOSED TYPICAL SECTION
℄ FM 1912 STA 0+00 TO STA 12+00 (F)



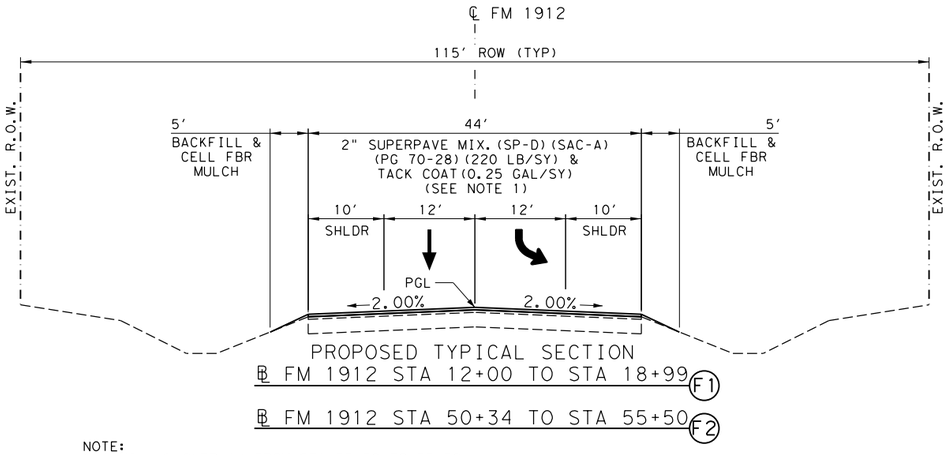
NOTE: * SHOULDER WIDTH VARIES (8'-6') FROM STA 1009+81 TO 1010+30.
** SHOULDER WIDTH VARIES (2'-4') FROM STA 1009+81 TO 1010+29.

PROPOSED TYPICAL SECTION
SH136 RT TURN STA 1000+50 TO STA 1013+45 (H)



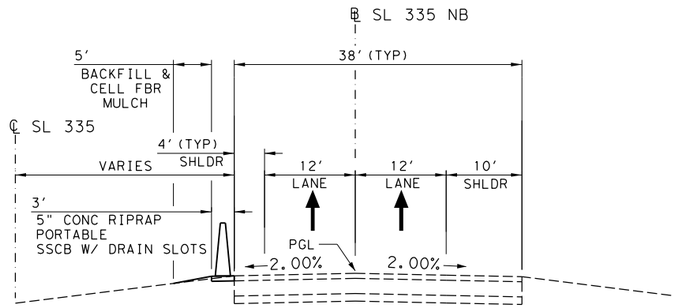
DETAIL A

NOTE:
1. PROP. 2" SUPERPAVE MIX. (SP-D)
2. PROP. 3" D-GR (TY B) (PG64-28)
3. PROP. 6" FLEX BASE (TY A OR B) (GR 4)
4. PROP. 6" SALVAGE BASE
5. PROP. 8" CEMENT TREATED SUBGRADE (2%)
6. BLEND EXIST BASE WITH NEW FLEX BASE

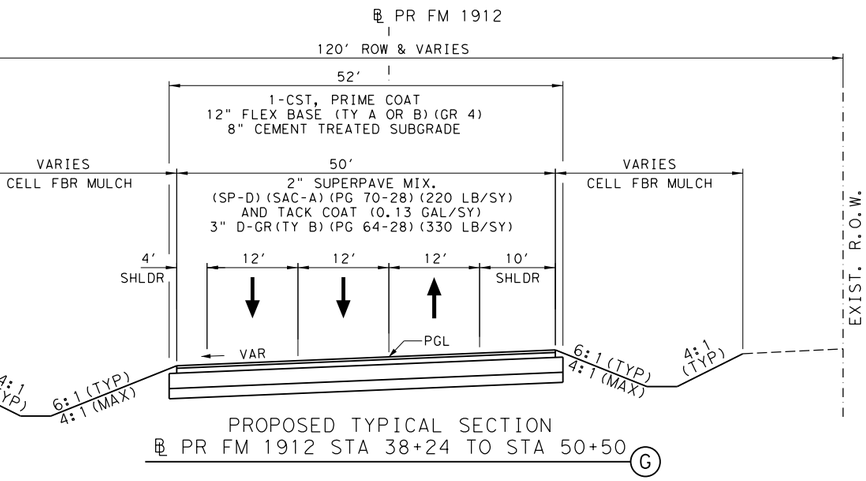


PROPOSED TYPICAL SECTION
℄ FM 1912 STA 12+00 TO STA 18+99 (F1)
℄ FM 1912 STA 50+34 TO STA 55+50 (F2)

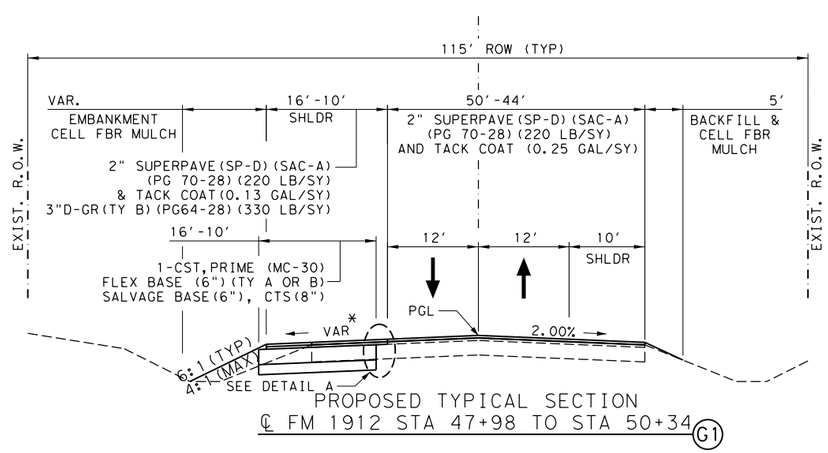
NOTE:
1. MILL & OVERLAY FROM STA 53+50 TO 55+50



℄ SL 335 NB
STA 255+73 TO 288+90 (I1)



PROPOSED TYPICAL SECTION
℄ PR FM 1912 STA 38+24 TO STA 50+50 (G)



PROPOSED TYPICAL SECTION
℄ FM 1912 STA 47+98 TO STA 50+34 (G1)

NOTE:
* CROSS SLOPE FOR PAVEMENT WIDENING SHALL MATCH ADJACENT LANE.

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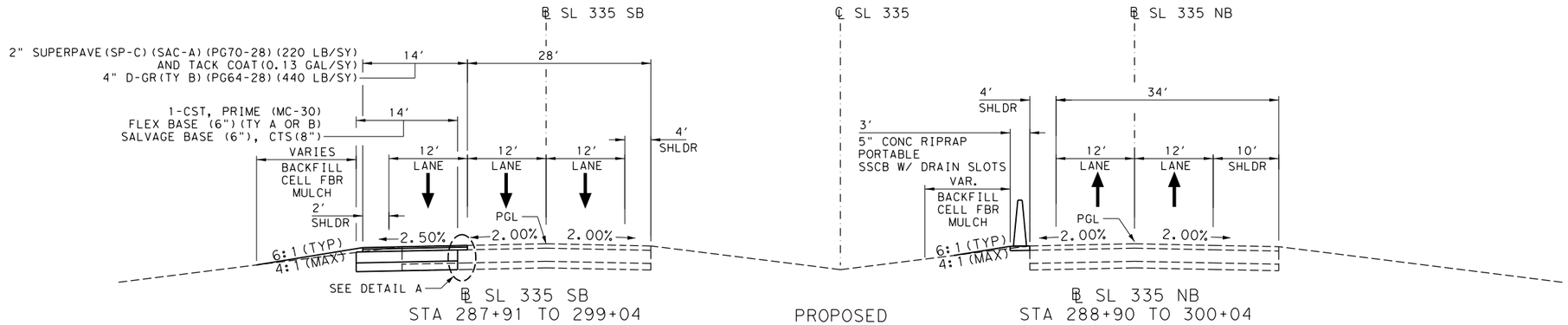
SH 136
PROPOSED TYPICAL SECTIONS

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	13

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

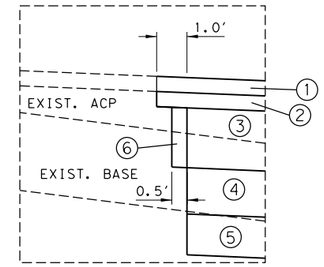
DATE: 7/1/2020 9:23:13 PM
FILE: CSJ-0379-03-026-Proposed Typical Sections_05.dgn



℄ SL 335 SB
STA 287+91 TO 299+04

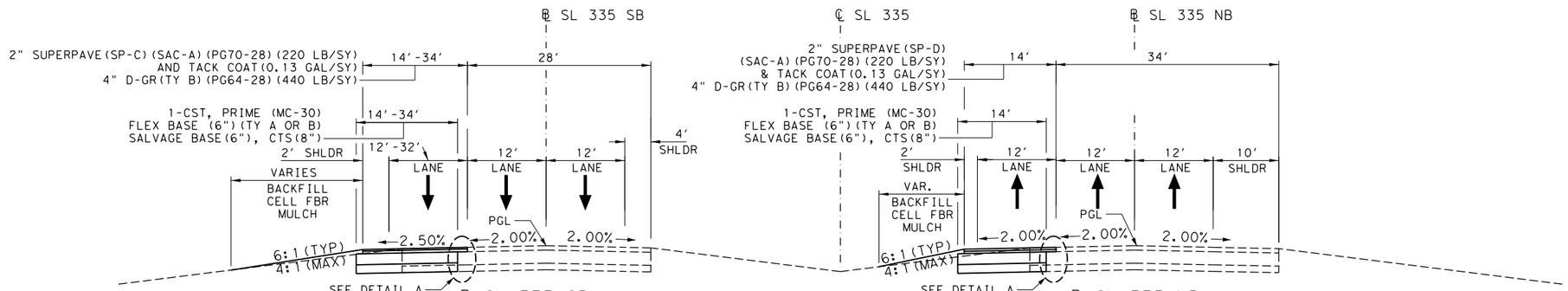
℄ SL 335 NB
STA 288+90 TO 300+04

PROPOSED
TYPICAL SECTION
SL 335
(12)



DETAIL A

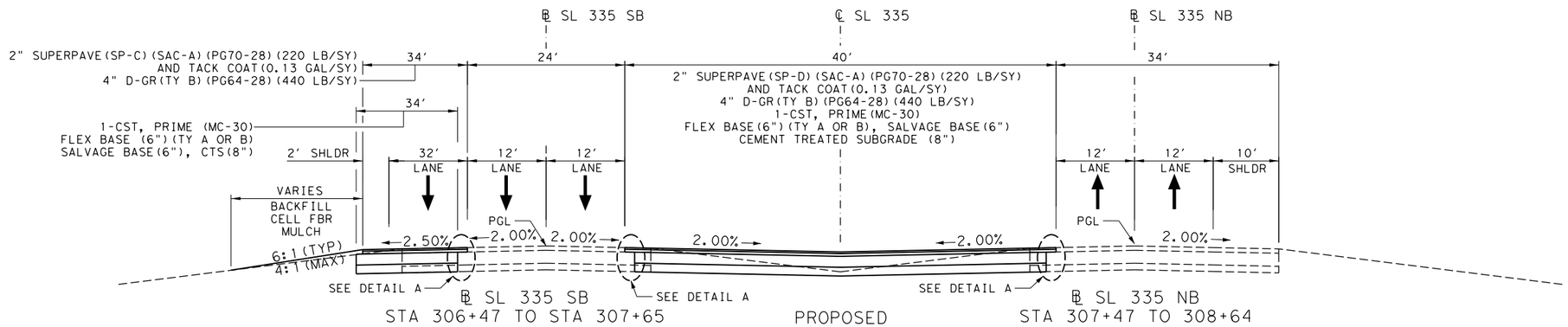
NOTE:
1. PROP. 2" SUPERPAVE MIX. (SP-D)
2. PROP. 4" D-GR (TY B) (PG64-28)
3. PROP. 6" FLEX BASE (TY A OR B) (GR 4)
4. PROP. 6" SALVAGE BASE
5. PROP. 8" CEMENT TREATED SUBGRADE (2%)
6. BLEND EXIST BASE WITH NEW FLEX BASE



℄ SL 335 SB
STA 299+04 TO STA 306+47

PROPOSED
TYPICAL SECTION
SL 335
(13)

℄ SL 335 NB
STA 300+04 TO 307+47



℄ SL 335 SB
STA 306+47 TO STA 307+65

PROPOSED
TYPICAL SECTION
SL 335
(14)

℄ SL 335 NB
STA 307+47 TO 308+64

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SH 136

PROPOSED
TYPICAL SECTIONS

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	14

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 9:23:21 PM
FILE: CSJ-0379-03-026-Proposed Typical Sections_06.dgn

SUMMARY OF QUANTITIES

SUMMARY OF ROADWAY QUANTITIES

LOCATION	0134 6004 BACKFILL (TY A OR B)	0247 6258 FL BS (CMP IN PLC)(TY A OR B GR4)(12")	0247 6237 FL BS (CMP IN PLC)(TY A OR B GR 4)(6")	0275 6001 CEMENT (2% CEMENT)	0275 6011 CEMENT TREAT(EXIST MATL)(8")	0310 6009 PRIME COAT (MC-30) (0.25 GAL/SY)	0316 6001 ASPH (MULTI OPTION) (0.38 GAL/SY)	0316 6175 AGGR(TY-B GR-4 SAC-B) 110 SY/CY	0420 6002 CL A CONC (MISC)	0432 6002 RIPRAP (CONC)(5 IN)	0512 6001 PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	0545 6013 CRASH CUSH ATTEN (INSTL)(R)(N)(TL3)	3077 6058 SP MIXES SP-D SAC-A PG70-28 (SURFACE)	3076 6005 D-GR HMA TY-B PG64-28 (110 LB/SY-IN)	3077 6075 TACK COAT (0.13 GAL/SY)	3077 6075 TACK COAT * (0.25 GAL/SY)
	STA	SY	SY	TON	SY	GAL	GAL	CY	CY	CY	LF	EA	TON	TON	GAL	GAL
CSJ: 0379-03-026																
TYPICAL SECTIONS																
TYPICAL SECTION D2	-		653	7	653	164	248	6					72	108	85	
TYPICAL SECTION D3	-		1,813	18	1,813	454	689	17					200	300	236	
TYPICAL SECTION E1	-		2,893	28	2,893	724	1,100	27					319	478	377	
TYPICAL SECTION F	12.00												398			905
TYPICAL SECTION F1	6.99												379			860
TYPICAL SECTION F2	2.00												284			646
TYPICAL SECTION G	-	7,265		70	7,265	1,817	2,761	67	21				771	1,157	911	
TYPICAL SECTION G1	2.36		336	4	336	84	128	4					136	56	44	224
TYPICAL SECTION H	-	3,839		37	3,839	960	1,459	35					394	590	465	
FM 1912 ENTRANCE RAMP	5.89												175			398
CSJ: 0379-03-026 TOTAL	**29.24**	**11,104**	**5,695**	**164**	**16,799**	**4,203**	**6,385**	**156**	**21**				**3,128**	**2,689**	**2,118**	**3,033**
CSJ: 0379-03-027																
TYPICAL SECTION A	2.00												108			246
TYPICAL SECTION B	6.80												479			1,088
TYPICAL SECTION C	8.00												670			1,522
TYPICAL SECTION D1	25.56												2,040			4,636
TYPICAL SECTION D2	4.44												287			653
TYPICAL SECTION D3	-												300			681
TYPICAL SECTION E1	15.70												669			1,519
TYPICAL SECTION E2	11.30												608			1,382
TYPICAL SECTION E3	12.00												844			1,917
TYPICAL SECTION I1	33.17									155	3,317					
TYPICAL SECTION I2	11.14		1,685	17	1,685	422	640	16		52	1,114	1	186	371	219	
TYPICAL SECTION I3	-		2,918	29	2,918	730	1,109	27					321	642	380	
TYPICAL SECTION I4	-		748	8	748	187	284	7					84	167	99	
CSJ: 0379-03-027 TOTAL	**130.11**		**5,351**	**54**	**5,351**	**1,339**	**2,033**	**50**		**207**	**4,431**	**1**	**6,596**	**1,180**	**698**	**13,644**
TOTAL	**159.35**	**11,104**	**11,046**	**218**	**22,150**	**5,542**	**8,418**	**206**	**21**	**207**	**4,431**	**1**	**9,724**	**3,869**	**2,816**	**16,677**

NOTE:

* TACK COAT QUANTITY IS SHOWN FOR THE OVERLAY LOCATION.

NO.	DATE	REVISION	APPROVED

07/01/2020

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SH 136

SUMMARY OF QUANTITIES

SHEET 1 OF 5

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	15

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/6/2020 3:51:02 PM
FILE: CSJ-0379-03-026-SOD-I.dgn

SUMMARY OF QUANTITIES

SUMMARY OF REMOVAL ITEMS

LOCATION		0104 6009	0105 6026	0251 6132	0354 6021	0354 6045	0496 6004	0496 6007	0496 6008	0680 6004
		REMOVING CONC (RIPRAP)	REMOVE STAB BASE & ASPH PAV (13"-18")	REWORK BS MTL(TY B)(12"-18")(DENS CONT)	PLANE ASPH CONC PAV(0" TO 2")	PLANE ASPH CONC PAV (2")	REMOV STR (SET)	REMOV STR (PIPE)	REMOV STR (BOX CULVERT)	REMOVING TRAFFIC SIGNALS
		SY	SY	SY	SY	SY	EA	LF	LF	EA
CSJ: 0379-03-026:										
SH 136 REMOVAL PLAN										
BEGIN	332+00									
332+00	356+00			544		544				1
356+00	380+00			3,100		3,100				
380+00	END									
FM 1912 REMOVAL PLAN										
00+00	21+50		4,536				2	45		
21+50	45+50		13,170				6	142	164	
45+50	END		1,222	259	998	259				
FM 1912 ENTRANCE RAMP					550					
SL 335 REMOVAL PLAN										
BEGIN	279+00									
279+00	303+00		804							
303+00	END									
CSJ: 0379-03-026 TOTAL			**19,732**	**3,903**	**1,548**	**3,903**	**8**	**187**	**164**	**1**
CSJ: 0379-03-027:										
SH 136 REMOVAL PLAN										
BEGIN	332+00				4,053	3,128				
332+00	356+00									
356+00	380+00									
380+00	END				1,423					
FM 1912 REMOVAL PLAN										
00+00	21+50									
21+50	45+50									
45+50	END									
SL 335 REMOVAL PLAN										
BEGIN	279+00									
279+00	303+00	33	550	1,683		1,683	2	100		
303+00	END			1,113		1,113	2	42		
CSJ: 0379-03-027 TOTAL		**33**	**550**	**2,796**	**5,476**	**5,924**	**4**	**142**		
TOTAL		**33**	**20,282**	**6,699**	**7,024**	**9,827**	**12**	**329**	**164**	**1**

SUMMARY OF TCP ITEMS

LOCATION	0351 6013	0508 6001	0662 6063	0662 6071	0662 6095	0677 6001	0677 6003	0677 6005
	FLEXIBLE PAVEMENT STRUCTURE REPAIR(4")	CONSTRUCTING DETOURS	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (W)8"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")
	SY	SY	LF	LF	LF	LF	LF	LF
TCP PHASE 1								
SHEET 1 OF 2	306		1,350		550	3,267	675	
SHEET 2 OF 2	1,630	428	2,350		2,350	2,650	50	
TCP PHASE 2								
SHEET 1 OF 4			1,150					
SHEET 2 OF 4			2,360	1,000	1,154	350	100	
SHEET 3 OF 4			2,352		2,352			
SHEET 4 OF 4			1,070					
TCP PHASE 3								
SHEET 1 OF 2			1,272		2,544	2,544		
SHEET 2 OF 2			744		700	1,050		
DETOUR - PH3 ST 1								
SHEET 1 OF 1						1,149	1,410	220
CSJ 0379-03-026 TOTAL	**1,936**	**428**	**12,648**	**1,000**	**9,650**	**11,010**	**2,235**	**220**

SUMMARY OF DRIVEWAY ITEMS

LOCATION			WIDTH	LENGTH	R1	R2	AREA	0530 6002	0530 6005	3077 6058	3077 6075
STA	ALIGNMENT	LT / RT						INTERSECTIONS (ACP)	DRIVEWAYS (ACP)	SP MIXES SP-D SAC-A PG70-28 (110 LB/SY-IN)	TACK COAT (0.25 GAL/SY)
			FT	FT	FT	FT	SY	SY	SY	TON	GAL
CSJ 0379-03-026											
47+73.71	PR FM 1912	LT	31.5	23.4	20.0	15.0	98		98		
CSJ 0379-03-026 TOTAL							**98**		**98**		
CSJ 0379-03-027											
312+65.66	SH 136	LT	29.9	15.6	15.0	15.0	64			7	16
312+85.74	SH 136	RT	28.6	20.3	30.0	30.0	100			11	25
313+90.76	SH 136	RT	36.7	15.0	15.0	15.0	72		72		
315+45.49	SH 136	RT	22.3	27.2	35.0	10.0	78			9	20
319+66.20	SH 136	RT	11.3	8.6	10.0	10.0	15			2	4
338+42.11	SH 136	RT	65.3	8.4	N/A	N/A	68			8	17
371+44.52	SH 136	LT	31.9	10.0	N/A	N/A	44			5	11
399+42.19	SH 136	LT	27.5	5.2	N/A	N/A	18			2	5
307+15.60	SL 335 SB	LT	24.2	11.8	30.0	5.0	33			4	9
SH 136 @ LAKESIDE		LT	69.7	62.6	50	60	633	633			
FM 1912 @ LAKESIDE (N)		RT	25.95	44.5	45	45	226	226			
FM 1912 @ LAKESIDE (S)		LT	25.55	34.38	30	30	127	127			
SH 136 @ FOLSOM RD		RT	23	69.39	N/A	33.81	269	269			
CSJ 0379-03-027 TOTAL							**1,747**	**1,255**	**72**	**48**	**107**
							TOTAL	**1,255**	**170**	**48**	**107**

NOTE:
SEE DRIVEWAY DETAIL SHEET FOR ADDITIONAL INFORMATION.

NO.	DATE	REVISION	APPROVED

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SH 136

SUMMARY OF QUANTITIES

SHEET 2 OF 5

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	16

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 6/25/2021 5:03:37 PM
FILE: CSJ-0379-03-026-SQ00-2.dgn

SUMMARY OF QUANTITIES

SUMMARY OF EARTHWORK QUANTITIES

LOCATION		0110 6001 EXCAVATION (ROADWAY) CY	0132 6004 EMBANKMENT (FINAL)(DENS CONT)(TY B) CY
CSJ: 0379-03-026			
PR FM 1912			
FROM STA	TO STA		
38+33.69	39+00.00	148	378
39+00.00	39+50.00		559
39+50.00	40+00.00	1	541
40+00.00	41+00.00	22	627
41+00.00	42+00.00	36	283
42+00.00	43+00.00	37	269
43+00.00	44+00.00	88	214
44+00.00	45+00.00	163	174
45+00.00	46+00.00	194	154
46+00.00	47+00.00	169	124
47+00.00	48+00.00	130	116
48+00.00	49+00.00	89	146
49+00.00	50+00.00	46	137
50+00.00	50+50.00	12	52
PR FM 1912 TOTAL		**1135**	**3774**
PR FM 1912 WIDENING			
FROM STA	TO STA		
47+98.62	48+00.00	1	1
48+00.00	49+00.00	13	79
49+00.00	50+00.00	9	47
50+00.00	50+33.62	10	5
PR FM 1912 WIDENING TOTAL		**33**	**132**
SH 136 RT TURN			
FROM STA	TO STA		
1000+51.00	1001+00.00	7	30
1001+00.00	1002+00.00	68	57
1002+00.00	1003+00.00	117	37
1003+00.00	1004+00.00	126	43
1004+00.00	1005+00.00	153	49
1005+00.00	1006+00.00	189	46
1006+00.00	1007+00.00	227	28
1007+00.00	1008+00.00	292	17
1008+00.00	1009+00.00	373	28
1009+00.00	1010+00.00	478	27
1010+00.00	1011+00.00	434	33
1011+00.00	1012+00.00	212	24
1012+00.00	1013+00.00	64	6
1013+00.00	1013+45.17	13	13
SH 136 RT TURN TOTAL		**2753**	**438**

LOCATION		0110 6001 EXCAVATION (ROADWAY) CY	0132 6004 EMBANKMENT (FINAL)(DENS CONT)(TY B) CY
SH 136 WIDENING			
FROM STA	TO STA		
349+13.00	350+00.00	4	5
350+00.00	351+00.00	30	40
351+00.00	352+00.00	51	40
352+00.00	352+56.51	16	5
352+56.51	353+00.00	1	6
353+00.00	354+00.00		8
354+00.00	354+21.93	3	6
354+22.06	355+00.00	14	27
355+00.00	356+00.00	12	21
356+00.00	357+00.00	18	22
357+00.00	358+00.00	21	22
358+00.00	359+00.00	26	24
359+00.00	360+00.00	33	28
360+00.00	361+00.00	38	37
361+00.00	362+00.00	48	51
362+00.00	363+00.00	50	60
363+00.00	364+00.00	32	62
364+00.00	365+00.00	21	62
365+00.00	366+00.00	20	67
366+00.00	367+00.00	17	75
367+00.00	368+00.00	20	64
368+00.00	369+00.00	27	43
369+00.00	370+00.00	23	39
370+00.00	371+00.00	15	48
371+00.00	372+00.00	12	51
372+00.00	373+00.00	11	62
373+00.00	374+00.00	14	51
374+00.00	375+00.00	16	31
375+00.00	376+00.00	14	36
376+00.00	377+00.00	11	32
377+00.00	378+00.00	9	28
378+00.00	378+70.00	3	17
SH 136 WIDENING TOTAL		**630**	**1170**
FM 1912 REMOVAL AREA (EAST OF SH 136)		**784**	**1224**
SL 335 MEDIAN GRADING (276+17 TO 288+50)		**181**	**550**
SL 335 & FM 1912 INFIELD GRADING TOTAL		**876**	**1469**
CSJ 0379-03-026 TOTAL		**6392**	**8757**

LOCATION		0110 6001 EXCAVATION (ROADWAY) CY	0132 6004 EMBANKMENT (FINAL)(DENS CONT)(TY B) CY
SL 335 U-TURN (NB)			
FROM STA	TO STA		
300+04.00	300+24.00	1	1
300+24.00	301+00.00	11	10
301+00.00	301+54.00	20	12
301+54.00	302+00.00	20	10
302+00.00	303+00.00	45	24
303+00.00	304+00.00	47	25
304+00.00	305+00.00	46	25
305+00.00	306+00.00	44	24
306+00.00	307+00.00	43	21
307+00.00	308+00.00	21	29
308+00.00	308+64.00	1	13
SL 335 U-TURN (NB) TOTAL		**299**	**194**
SL 335 U-TURN (SB)			
FROM STA	TO STA		
287+91.00	288+00.00	1	1
288+00.00	289+00.00	6	9
289+00.00	290+00.00	13	15
290+00.00	290+56.00	10	10
290+56.00	291+00.00	9	6
291+00.00	292+00.00	19	13
292+00.00	293+00.00	20	12
293+00.00	294+00.00	21	10
294+00.00	295+00.00	21	9
295+00.00	296+00.00	21	9
296+00.00	297+00.00	21	9
297+00.00	298+00.00	21	10
298+00.00	299+00.00	21	11
299+00.00	300+00.00	21	11
300+00.00	301+00.00	21	11
301+00.00	302+00.00	21	10
302+00.00	302+56.00	12	6
302+56.00	303+00.00	14	10
303+00.00	304+00.00	52	38
304+00.00	304+06.00	4	2
304+06.00	305+00.00	59	37
305+00.00	306+00.00	58	43
306+00.00	307+00.00	90	29
307+00.00	307+15.76	22	2
307+15.76	307+65.00	42	4
SL 335 U-TURN (NB) TOTAL		**620**	**327**
CSJ 0379-03-027 TOTAL		**919**	**521**

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SH 136

SUMMARY OF QUANTITIES

SHEET 3 OF 5

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	17

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 5/27/2021 10:54:41 AM
FILE: CSJ-0379-03-026-S00-3.dgn

SUMMARY OF QUANTITIES

SUMMARY OF SW3P ITEMS

LOCATION	0164 6023	0164 6031	0506 6020	0506 6024	0506 6040	0506 6043
	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	CELL FBR MLCH SEED(TEMP)(COOL)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	SY	LF	LF
CSJ 0379-03-026						
SH 136 SHEET 3 OF 4	6,121	6,121			265	265
FM 1912 SHEET 1 OF 3	15,881	15,881	111	111	125	125
FM 1912 SHEET 2 OF 3	42,502	42,502	222	222	443	443
FM 1912 SHEET 3 OF 3	704	704			96	96
SL 335 SHEET 1 OF 3					25	25
SL 335 SHEET 2 OF 3	3,985	3,985			66	66
CSJ 0379-03-026 TOTAL	**69,193**	**69,193**	**333**	**333**	**1,020**	**1,020**
CSJ 0379-03-027						
SH 136 SHEET 1 OF 4	2,554	2,554				
SH 136 SHEET 2 OF 4	1,891	1,891				
SH 136 SHEET 3 OF 4	545	545				
SH 136 SHEET 4 OF 4	2,974	2,974				
SL 335 SHEET 1 OF 3	1,127	1,127				
SL 335 SHEET 2 OF 3	4,120	4,120			100	100
SL 335 SHEET 3 OF 3	2,163	2,163			67	67
CSJ 0379-03-027 TOTAL	**15,374**	**15,374**			**167**	**167**
TOTAL	**84,567**	**84,567**	**333**	**333**	**1,187**	**1,187**

SUMMARY OF DRAINAGE ITEMS

LOCATION	0462 6003	0462 6006	0464 6017	0464 6018	0467 6173	0467 6139	0467 6141	0467 6363	0467 6394
	CONC BOX CULV (4 FT X 2 FT)	CONC BOX CULV (5 FT X 2 FT)	RC PIPE (CL IV)(18 IN)	RC PIPE (CL IV)(24 IN)	SET (TY I)(S=5 FT)(HW=3 FT)(6:1) (C)	SET (TY I)(S=4 FT)(HW=3 FT)(4:1) (C)	SET (TY I)(S=4 FT)(HW=3 FT)(6:1) (C)	SET (TY II) (18 IN) (RCP) (6: 1) (P)	SET (TY II) (24 IN) (RCP) (6: 1) (C)
	LF	LF	LF	LF	EA	EA	EA	EA	EA
CSJ: 0379-03-026									
CULVERT 1 LAYOUT	80					1	1		
CULVERT 2 LAYOUT		73			2				
DRIVEWAY CULVERT (PR FM 1912 47+73.71)			96					4	
CSJ: 0379-03-026 TOTAL	**80**	**73**	**96**		**2**	**1**	**1**	**4**	
CSJ: 0379-03-027									
DRIVEWAY CULVERT (SB SL 335 STA 307+15)				36					2
CSJ: 0379-03-026 TOTAL				**36**					**2**

SUMMARY OF ILLUMINATION ITEMS

ILLUMINATION LAYOUT SHEET LIMIT		0416 6029	0432 6001	0610 6009	0610 6214	0610 6318	0618 6023	0618 6047	0620 6007	0620 6008	0624 6002	0624 6008	0628 6045
		DRILL SHAFT (RDWY ILL POLE) (30 IN)	RIPRAP (CONC)(4 IN)	REMOVE RD IL ASM (TRANS-BASE)	IN RD IL (TY SA) 40T-8 (250W EQ) LED	IN RD IL (TY ST) 50T-8 (400W EQ) LED	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 80) (2") (BORE)	ELEC CONDR (NO.8) BARE	ELEC CONDR (NO.8) INSULATED	GROUND BOX TY A (122311)W/APRON	GROUND BOX TY C (162911)W/APRON	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)
		LF	CY	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA
SH 136													
BEGIN	332+00	90	4	2		9	2,187		2,241	4,482			
332+00	356+00	110	4			11	2,742	174	3,024	6,048	7	1	1
356+00	380+00	130	5			13	2,813	411	3,356	6,712	8		
380+00	END	40	2			4	810		828	1,656			
FM 1912													
BEGIN	21+50	110	4	2	11		1,866	110	2,042	4,084	2		
21+50	48+00	70	3		4	3	1,487	182	1,717	3,434	2		
48+00	END	40	2			4	1,089		1,113	2,226			
						2	470		482	964			
FM 1912 ENT RAMP ILLUMINATION													
278+50	END	20	1										
CSJ: 0379-03-027 TOTAL		**610**	**25**	**4**	**15**	**46**	**13,464**	**877**	**14,803**	**29,606**	**19**	**1**	**1**

NO.	DATE	REVISION	APPROVED

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SH 136

SUMMARY OF QUANTITIES

SHEET 4 OF 5

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	18

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 5/27/2021 11:48:51 AM
FILE: CSJ-0379-03-026-S00-4.dgn

SUMMARY OF QUANTITIES

SUMMARY OF PAVEMENT MARKING & SIGNING ITEMS

LOCATION			0644 6001 IN SM RD SN SUP&AM TY10BWG (1)SA(P)	0644 6004 IN SM RD SN SUP&AM TY10BWG (1)SA(T)	0644 6040 IN SM RD SN SUP&AM TYS80(1)SB(P-BM)	0644 6076 REMOVE SM RD SN SUP&AM	0658 6027 * INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BI)	0658 6100 ** INSTL OM ASSM (OM-2Z) (WFLX) GND (BI)	0666 6029 REFL PAV MRK TY I (W)8"(DOT)(090MIL)	0666 6035 REFL PAV MRK TY I (W)8"(SLD)(090MIL)	0666 6041 REFL PAV MRK TY I (W)12"(SLD)(090MIL)	0666 6047 REFL PAV MRK TY I (W)24"(SLD)(090MIL)	0666 6053 REFL PAV MRK TY I (W)(ARROW)(090MIL)	0666 6056 REFL PAV MRK TY I(W)(DBL ARROW)(090MIL)	0666 6071 REFL PAV MRK TY I(W)(LNDP ARW)(090MIL)	0666 6077 REFL PAV MRK TY I (W)(WORD)(090MIL)	0666 6101 REF PAV MRK TY I(W)36"(YLD TRI)(090MIL)	0666 6140 REFL PAV MRK TY I (Y)12"(SLD)(090MIL)	0666 6299 RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	0666 6302 RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	0666 6311 RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)	0666 6314 RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	0672 6007 REFL PAV MRKR TY I-C	0672 6009 REFL PAV MRKR TY II-A-A	0672 6010 REFL PAV MRKR TY II-C-R
			EA	EA	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA
CSJ: 0379-03-027																									
SH 136 SIGNING & PAVEMENT MARKINGS																									
SHT 1 OF 4	BEGIN	320+00								200				1	2					1,960	100	3,160	10	130	
	320+00	332+00								937		32	3			1		40		2,277	600	2,560	47	68	
SHT 2 OF 4	332+00	344+00								100			1			1				2,400	600	2,400	5	60	
	344+00	356+00	2	1		9			108	926	120		1	1		1				2,057	60	4,600	30	226	18
SHT 3 OF 4	356+00	368+00	5	3		4		1	72	2,409		12	6			6	5			2,436		4,660	121	236	
	368+00	380+00	1	1						770										2,400		3,720	39	98	
SHT 4 OF 4	380+00	392+00																		2,400		2,800		66	
	392+00	402+00										12	2			2				2,060		3,700		188	
FM 1912 SIGNING & PAVEMENT MARKINGS																									
SHT 1 OF 3	FM 1912 ENT RAMP																								
	275+78.74	281+67.62				5														589		589			
	FM 1912																								
	00+00.00	09+50.00				2														950		950			
	09+50.00	18+98.62		5	2	1				599		30	3			3				1,149		659	30		
	SH 136 RT TURN																								
	1000+50.00	1003+01.38				1														252		252			
SHT 2 OF 3	1003+01.38	1011+80.32				1		2												879		879			
	PR FM 1912																								
	39+00.00	41+00.00								200			2			2				415		520	10	8	
	41+00.00	48+00.00		1		3				500			2			2			50	1,400		1,400	28	18	
SHT 3 OF 3	48+00.00	50+50.00	1	1															40	500		500	2	8	
	47+98.62	55+50.00																		1,504		1,504		20	
SL 335 SIGNING & PAVEMENT MARKINGS																									
SHT 1 OF 3	255+73	267+00					6																		
	267+00	279+00					6			661	300											536			50
SHT 2 OF 3	279+00	291+00					6													200					
	291+00	303+00					5			146	400		1			1				1,200					38
SHT 3 OF 3	303+00	END								447	346		2			2				408					18
CSJ 0379-03-027 TOTAL			**9**	**12**	**2**	**26**	**23**	**3**	**180**	**7,895**	**1,166**	**86**	**23**	**2**	**2**	**21**	**5**	**40**	**90**	**27,436**	**1,360**	**35,389**	**322**	**1,126**	**124**

NOTE:

* QUANTITY IS BASED ON 200' SPACING.

** OBJECT MARKER QUANTITIES ARE FOR PROPOSED CULVERT LOCATIONS.

NO.	DATE	REVISION	APPROVED

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SH 136

SUMMARY OF QUANTITIES

SHEET 5 OF 5

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	19

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 6/25/2021 4:25:41 PM
FILE: CSJ-0379-03-026-S00-5.dgn

GENERAL NOTES

CSJ: *0379-03-026, ETC*

BASIS OF ESTIMATE FOR CONSTRUCTION

Item	Description	Unit	Rate
164	SEEDING		SEE PLAN SHEETS
275	CEMENT TREAT (8")	SY	2.0% Cement at 120LBS/CF
310	PRIME COAT (MC-30)	GAL	0.25 GAL/SY
314	EMULSION ASPHALT (MULTI) (MS-2 OR SS-1)	GAL	SEE NOTE 2
316	ASPH (MULTI)	GAL	0.38 GAL/SY
	AGGR (TY-B GR-4 SAC-B)	CY	110 SY/CY
3077(3)	TACK COAT (TRAIL)	GAL	.13 GAL / SY
3076(1)	D-GR HMA	TON	3" 330 LB/SY/2000
		TON	4" 440 LB/SY/2000
3077(1)	SUPERPAVE MIXTURES	TON	2" 220 LB/SY/2000

NOTE:

(1)	D-GR HMA & Superpave Mixtures Weight Based On 110Lbs/SY/In
(2)	40% Emulsified Asphalt 60% Water Mixture Applied At 0.25 Gal/Sy. Paid using 0.1 Gal/Sy.
(3)	The TRAIL hot asphalt type options will only be allowed

General

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

TO:	Amarillo Area Engineer	Roy.Neukam@txdot.gov
CC:	Assistant Area Engineer	CC.Sysombath@txdot.gov
	Director of Construction	Kenneth.Petr@txdot.gov
	Construction Manager	Thomas.Nagel@txdot.gov

Contractor questions will be accepted through email, phone, or 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 responses will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Verify all survey control prior to beginning construction. Notify Engineer of any discrepancies in control prior to beginning construction.

There are approximately *2* "reference markers" within the project limits. If a marker needs to be moved for any reason during construction operations, the Contractor is to remove it, install it in a temporary location and then reinstall it in its correct permanent location. Both the temporary and permanent locations are to be on a line that is perpendicular to the original "station" along the roadway. The temporary location is to be at or near the right-of-way. The permanent location is to be directed by the Engineer.

The following Standard Detail Sheets have been modified:

TSR (3)-13 (MOD)
TSR (4)-13 (MOD)

The Contractor is advised that a *50* mph construction speed zone will be applicable for work on SH136 and a *60* mph construction speed zone will be applicable for work on FM1912 during this project. The construction speed zone is to be limited to the actual work areas under construction.

If portions of the right-of-way is used to store materials, equipment, and other uses with the approval of the Engineer, materials, equipment, etc., must either be located outside the *30* feet traffic safety clearance zone or be adequately protected.

Contractor facilities, such as asphalt plants, concrete plants, rock crushers, etc. are not allowed to be located within Department right of way.

The slopes indicated on the typical sections may be varied when fixed features required slopes are re-established as directed by the Engineer.

Dust caused by construction operations is to be controlled by applying water in conformance with the requirements of Item 204, "Sprinkling". Sprinkling for dust control will not be paid for directly, but will be considered as subsidiary work to the various bid items.

Any work necessary to provide temporary ingress and egress during construction (such as building gravel ramps, etc.) Will not be paid for directly, but will be considered as subsidiary work to the various bid items.

Verify all existing grades, elevations, and cross slopes that will connect to any proposed grades and elevations. If adjustments are warranted, the Contractor is to submit proposed changes to the Engineer for verification.

Contractor will be required to coordinate with nearby project 0379-02-032.

Item 5 Control of the Work

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "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

No significant traffic generator events identified.

The total area disturbed for this project is approximately *18* 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 ROW. 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 ROW to the Engineer and to the local government that operates a separate storm sewer system.

Item 8 Prosecution and Progress

Create, maintain, and submit for approval, a Critical Path Method (CPM) project schedule and a Project Schedule Summary Report (PSSR) using computer software that is fully compatible with the latest version of Primavera Systems, Inc. or Primavera P6.

Item 110 Excavation

Before grading begins, the vegetative cover within the areas to be graded are to be bladed into a windrow outside the limits of the slopes. After all grading is complete; the vegetative cover is to be spread over the adjacent disturbed areas. This work is not to be paid for directly, but will be considered subsidiary work to the various bid items.

Prior to excavation and placement of embankment, the top-soil (6-inch depth) within the areas to be disturbed will be bladed into a windrow, or stockpiled, outside the limits of the fill slope. After all grading is completed; the top soil (6-inch depth) will be spread over the disturbed areas that will not receive concrete riprap. This work is not paid for directly, but will be considered as subsidiary work to the various bid items.

Item 132 Embankment

The plasticity index for TY B will not exceed 25.

Materials excavated from the project will be allowed to be used on the project as directed by the Engineer.

Item 134 Backfilling Pavement Edges

Mow according to Item 100 just prior to backfill pavement edge operations.

Do not overlay any roadway unless the pavement edges can be backfilled within 24 hours. Preferably, both edges of all roadways should be completely backfilled at the end of each day's overlay operations. Damage to delineators, signs, or other roadside features will be repaired or replaced at the expense of the Contractor.

The backfill material used for this item can either be obtained from adjacent ditches or from areas outside the right-of-way. If material is used from adjacent ditches, the vegetative cover is to first be bladed into a windrow. After the pavement edges have been backfilled and the slopes and ditches have been graded, the vegetative cover is to be spread over the disturbed ditches and side slopes to within five feet of the pavement. If backfill material is provided by the Contractor from areas outside the right-of-way, it is not to be obtained from any area that contains perennial plants (such as "bindweed" or "jointgrass") that would be detrimental to agricultural land.

Item 164 Seeding for Erosion Control

Perform planting operations in accordance with the recommendations contained in the latest version of the TxDOT manual "A Guide to Roadside Vegetation Establishment" developed by the Vegetation Management Section of the Maintenance Division.

Seeding may require more than one mobilization, depending upon the Contractor's sequence of work.

Item 166 Fertilizer

Fertilize all areas of project to be seeded or sodded in accordance with the Amarillo District Vegetation Specification Sheet.

Item 247 Flexible Base

GRADING REQUIREMENTS PERCENT RETAINED – SIEVES SIEVE SIZES INCHES					*SOIL CONSTANTS*		*MAX WET BALL* *	*MAX % INCREASE IN PASSING # 40* *
1 3/4	*7/8*	*3/8*	*# 4*	*# 40*	*L.L. MAX*	*P.I. MAX*		
0	*17-32*	*40-60*	*50-70*	*70-85*	*40*	*12*	*45*	*20*

*Applies to TY A material only.

Ride quality is required for this project.

Item 275 Cement Treatment (Road-Mixed)

The intent of this item is to pulverize existing ACP and blend with the existing flexible base. Consider the existing ACP and flexible base as existing material, and payment made under this item includes pulverizing the existing materials.

All required moisture added for the mixing and compaction operation is to be injected through the mixing process. Sprinkle the base material to prevent excessive loss of moisture as directed by the Engineer.

Backfill any vertical edge nightly with a material approved by the Engineer and at a minimum slope of 3:1.

Item 300 Asphalts, Oils, and Emulsions

Asphalt from different sources is not to be blended.

The "Open" seasons for applying asphaltic materials and mixtures for the listed items are to be as follows, unless authorized otherwise in writing by the Engineer:

ITEMS	OPEN SEASON
310	All Year
316	From May 1st through August 31st
351, 3076, 3077	From April 15th through October 31st

Item 316 Seal Coat

Place one course surface treatment on finished base course as soon as practical, but no later than 7 calendar days after completion of the base treatment process.

For items of work that include both summer and winter materials or the Asphalt (Multi Option), the Engineer will determine which asphalt to apply based on timing and prevailing weather conditions. The Asphalt (Multi Option) is to consist of the following choices and rates:

ASPH (*AC-10*) @ 0.*38* GAL/SY
ASPH (*CRS-1P*) @ 0. *38* GAL/SY

The rates shown are for estimating purposes and that the Engineer can dictate higher or lower rates based on roadway conditions

Item 320 Equipment for Asphalt Concrete Pavement

A self-propelled, wheel mounted material transfer vehicle (MTV) capable of receiving hot mix from the haul trucks separate from the paver is required on all courses and all types of hot mix for this project. The MTV is to have a minimum storage capacity of approximately 25 tons, and equipped with a pivoting discharge conveyor and a means of completely remixing the hot mix prior to placement. The paver hopper is to be equipped with a separate surge storage insert with a minimum capacity of approximately 20 tons.

If used, the IR bar read out screen must be visible at all times to the Engineer.

When performing any scheduled work during night time hours (sunset to sunrise) all work areas will be fully illuminated using devices designed to not incumber or distract oncoming traffic. All illumination equipment must be approved by the Engineer in writing 48 hours before any scheduled night time work can begin. All associated equipment and labor is considered subsidiary to the item of work and will not be paid for directly.

Item 351 Flexible Pavement Structure Repair

Contractor is not to remove more pavement than can be replaced that same day.

All flexible pavement structure repairs must be overlaid within the same asphalt season.

Item 354 Planing and Texturing Pavement

The material planed from existing roadway is estimated at *725* CY for this project.

The Contractor will retain ownership of planed materials.

Item 416 Drilled Shaft Foundations

A stabilization method is to be used to prevent caving of the material and is to be submitted as part of the Contractor's Safety Plan.

Item 432 Riprap

24” tie bars (#3 bars at 18” c-c) are to be used across all construction joints. Tie bars should be 12’’ into each side of the construction joint. When tying new riprap into existing riprap drill and epoxy grout 8” minimum into existing concrete. This is to be considered subsidiary to the payment for riprap.

Provide an intermediate toe wall when rip rap exceeds 25’ vertically.

Use of #3 rebar for reinforcing is required.

Item 462 Concrete Box Culverts and Storm Drains

Joint material for reinforced concrete pipe is to be either cold applied preformed plastic gaskets or cold applied plastic asphalt sewer joint compound.

Backfill pipe up to the springline with granular material. The ponding method of backfilling will be allowed for the granular material only.

Item 464 Reinforced Concrete Pipe

Joint material for all pipes will be cold applied plastic asphalt sewer joint compound.

Bedding for pipe culverts is to be 6 inches of sand. The excavation required to place the sand will not be paid for directly but will be considered subsidiary to this item.

Backfill pipe up to the springline with granular material. The ponding method of backfilling will be allowed for the granular material only.

Item 467 Safety End Treatment

Pre-cast Safety End Treatments are allowed; however, a cast-in-place concrete apron will be required as shown on the plans & will be subsidiary to the Safety End Treatment.

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 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.

Temporary rumble strips will be required as shown on WZ(RS)-16 regardless of loose gravel, and/or soft or bleeding asphalt. Adjust the traffic control setup such that rumble strips are not placed in areas of heavily rutted pavements, unpaved surfaces, or horizontal curves. Temporary rumble strips will not be allowed on interstate highway.

The Contractor is to have the option of using either plastic drums, vertical panels, grabber cones or a combination where drums are shown as channelizing devices, as approved by the Engineer. Plastic drums are to be used in all transition areas in accordance with BC(8)-21 and WZ(TD)-17.

Furnish and install "soft shoulder" signs as directed by the Engineer. This work will not be paid for directly, but will be considered as subsidiary to item 502, "Barricades, Signs and Traffic Handling".

Provide a 3:1 backfill “safety slope” at the end of the day for any drop off exceeding 2” that is adjacent to a travel lane.

Notify the Engineer 24 hours prior to any lane closure.

Item 504 Field Office and Laboratory

The following buildings will be required for this project:

One Type (D) structure, asphalt mix control laboratory

Each building is to be provided before work is begun on the pertinent construction items for which it is needed.

Any laboratory furnished is to be a minimum of 10 ft in width.

Chain link security fence will be required to be placed around the perimeter of all field offices. The dimensions of the fence will be as directed by the Engineer.

The Type D structures are to be equipped with the following in addition to requirements specified under item 504:

a. Safety equipment
   (1) One eye wash station
   (2) One fire extinguisher
   (3) One first aid kit

Furnish a Type D structure for the asphalt mix control laboratory for the Engineer's exclusive use. In addition to requirements of item 504, this structure is to have a minimum height of 8 feet and provide a minimum 400 square feet gross floor area for permanently located plants or 200 square feet for temporary located plants serving one project. The floor area will be partitioned into a minimum of two interconnected rooms, each room furnished with an exterior door and a minimum of two windows. The floor is to have sufficient strength to support the testing equipment and have an impervious covering.

The Type D structures are to be adequately air conditioned and be furnished with a minimum of one desk, three chairs, one file cabinet, a telephone and one built-in equipment storage cabinet for the storage of nuclear equipment. The cabinet is to be a minimum of 3 feet wide by 2 feet deep by 3 feet high and have provisions for locking security. The structure is to be provided with a 240-volt electrical service entrance. The service is to consist of a minimum of 4 - 120 volt circuits with 20 amp breakers and no more than two grounded convenience outlets per circuit and provisions for a minimum of two 220-volt ovens with vents to the outside. The structure is to have a minimum of 2 convenience outlets per wall, and a utility sink with an adequate clean potable water supply for testing. The state building is to be equipped with at minimum a hot water dispenser or hot water heater capable of generating 1 gallon of water per use at 140º F with adequate water pressure. Space heaters for heating the structure are unacceptable. Portable structures are to be support blocked for stability and are to be tied down.

For this project, asphalt content will be determined utilizing the ignition method so the structure is to provide for the following in lieu of the item 504 requirements for asphalt content by extraction. The room to contain the ignition oven is to be adequately power ventilated and contain a NEMA 6-50r (208/240 v, 50 a) outlet within 2.5 feet of the ignition oven location and an independent exhaust outlet to the outside no further than 8 feet from the oven. The surface for the ignition oven location is to be level, sturdy, and fireproof with at least 6-inch clearance between the furnace and other vertical surfaces.

If needed, each building is to be moved to a new location as directed by the Engineer. Any building that is no longer required on the job after completion of the pertinent construction items may be released to the Contractor upon consent of the Engineer.

Item 506 Temporary Erosion, Sedimentation, and Environmental Controls

Erosion control devices are to be installed as needed in coordination with the work progress, or as directed by the Engineer.

Item 585 Ride Quality for Pavement Surfaces

Use Surface Test Type B pay adjustment schedule 2 to evaluate ride quality of the travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.”

Item 610 Roadway Illumination Assemblies

Fabricate roadway illumination assemblies in accordance with shop drawings approved by the department. Submit shop drawings for each project, or use pre-approved standard shop drawings.

For project specific shop drawings, furnish seven sets of drawings of the complete assembly in accordance with item 441, “steel structures”. Deliver shop drawings to the Engineer at the project address.

To be eligible to use pre-approved standard shop drawings, the shop drawing must be submitted and approved by the department prior to use on the project. Deviation from the pre-approved standard shop drawing will require resubmission of the shop drawings. The Engineer may approve, in writing, the use of updated standard drawings in cases where the standard drawings have been updated and the updated version has been approved by the department.

For pre-approval and updates to previously approved standard shop drawings, furnish seven sets of drawings of the complete assembly in accordance with item 441, “steel structures” to the director of traffic operations division, Texas department of transportation, 125 east 11th street, Austin, Texas 78701-2483.

Copies of the standard shop drawings are on file with traffic operations division, bridge division, and the materials section of construction division. Additional shop drawings for roadway illumination assemblies built in accordance with these drawings are not required. Pre-approved shop drawing manufacturers and assembly model numbers can be found at http://www.dot.state.tx.us/business/materialproducerlist.htm. Category is roadway illumination and electrical supplies

The Roadway Illumination Pole (RIP-11) standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25’ above the elevation of surrounding terrain, in accordance with the “AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals,” 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25’ above the surrounding terrain, the Contractor is to provide poles meeting the following requirements:

A. **Submittals.** Following the electronic shop drawing submittal process (see ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf), the Contractor is to submit to the Engineer, for approval, fabrication drawings and calculations for the poles. The drawings and calculations will be sealed by a Texas registered or licensed professional Engineer (P.E.).

B. **Luminaire Structural Support Requirements**. Lighting poles, arms, and anchor bolt assemblies are to have a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the current edition of the AASHTO Design Specifications. For transformer base poles, the fabricator is to include transformer base and connecting hardware in calculations and shop drawing submittals. All transformer bases are to have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished is to be submitted with the shop drawings. Shop drawings are to show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings are to include the ASTM designations for all materials to be used.

Item 618 Conduit

The locations of conduit as shown are for diagrammatic purposed only and may be varied to meet local conditions, subject to approval. Backfill all open trenches before the end of the workday and do not leave any trench open overnight.

Item 620 Electrical Conductors

Provide breakaway electrical connectors for breakaway poles. Use Bussman HEBW, Littlefuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For grounded conductors, use Bussman HET, Littlefuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral. See the latest RID (2) standard for additional details.

Item 628 Electrical Services

Notify the utility company as soon as possible in order to minimize delay and coordinate the work necessary for the utility company to provide power.

Cost for utility-owned power line extensions, connection charges, meter charges, consumption charges, and other charges will be paid for by the Department. The Department will reimburse the Contractor the amount billed by the utility plus an additional 5% of the invoice cost will be paid for labor, equipment, administrative costs, superintendence, and profit. The contractor will consult with the appropriate utility company to determine costs and requirements and will coordinate the utility company's work as approved by the Engineer. The contractor will submit to the Engineer a utility company invoice indicating it has been paid in full by the contractor and the reimbursement will be paid for under Force Account work.

When requesting new electric service activation, set up monthly billing accounts for power as "Texas Department of Transportation (TxDOT)" unless otherwise shown on the plans or as directed by the Engineer.

Provide the Electric Utility providers name, meter number, location account number and location address to the Engineer after the utility company sets the meter and connects power. The Engineer will submit this information to the TxDOT district point of contact for electric billing accounts.

Item 644 Small Roadside Sign Supports and Assemblies

All slip base signs will have a triangular slip base with a 2-bolt clamp to prevent rotation of signpost. Set screw type slip base will not be allowed.

A 7" x 1/2" diameter galvanized rod or #4 rebar is to be installed in the sign stub as shown on SMD(SLIP-1)-08 to prevent rotation of the sign stub in the concrete footing.

The exact locations of the large and small roadside signs are to be as designated by the Engineer.

The existing riprap aprons are to be removed and disposed of as approved by the Engineer. This work is not to be paid for directly, but will be considered subsidiary to the removal of foundations under this item.

Probe before drilling for foundations to determine the location of all utilities and structures. This work will not be paid for directly, but will be considered subsidiary to bid items involved.

Details for standard signs not shown on the signing standards of the signing detail plan sheets are to be in conformance with the department's "standard Highway Sign Designs for Texas" Manual, Latest Edition.

Install a wrap of retroreflective sheeting conforming to DMS-8300 on all posts for small road sign assemblies. Sign post wraps will not be paid for directly, but are considered subsidiary to Item 644.

Install red sheeting on the posts containing the following signs:
Stop, Yield, Wrong Way & Do Not Enter

Install yellow sheeting on all other small sign post.

Install all retroreflective wraps at a height of 4 ft. from bottom of the wrap to the edge of the travel lane surface. All retroreflective wraps will cover the full circumference of the sign post for a vertical width of 12 inches.

Item 658 Delineator and Object Marker Assemblies

For all ground mount applications provide hollow or tubular posts embedded in concrete using plastic wedged anchor system.

For all concrete barrier, bridge rail, and guard fence post mounted applications provide hollow or tubular posts with approved anchorage.

Item 662 Work Zone Pavement Markings

The adhesive used for temporary flexible-reflective roadway marker tabs is to be butyl rubber pads.

Item 666 Reflectorized Pavement Markings

Retroreflectivity Requirements:

All Type I markings must meet the minimum retroreflectivity values for edgeline markings, centerline or no passing barrier-line, and lane lines when measured any time after 3 days, but not later than 10 days after application:

- White markings: 250 millicandelas per square meter per lux (mcd/m^2/lx)
- Yellow markings: 175 mcd/m^2/lx

Retroreflectivity Measurements: Mobile or portable retroreflectometers may be used at the Contractor's discretion.

All Type I markings must meet the minimum retroreflectivity values for edgeline markings, centerline or no passing barrier-line, and lane lines when measured any time after 3 days, but not later than 10 days after application.

Retroreflectivity Measurements: Mobile or portable retroreflectometers may be used at the Contractor's discretion.

Item 677 Eliminating Existing Pavement Markings and Markers

Do not remove any existing pavement markings in any area in which the contractor is not able to place work zone pavement markings at the proper location within the same day.

Item 3076 Dense Graded Hot Mix Asphalt

Use aggregate that meets the SAC requirement of class A.

Use of RAS is not allowed.

Only fractionated RAP is allowed.

Provide a laboratory mixture design with the minimum target asphalt binder content shown below:

D-GR HMA TY B 4.6%

When laying ACP on a roadway that has two or more lanes and the work is being done under traffic, then the adjacent lane or lanes are to be overlaid by the end of the following day.

The District Lab will perform a maximum of 2(two) design verification tests. If additional verification tests are needed, the Contractor will be billed $3,500.00 per each additional verification test required to obtain an approved asphaltic concrete pavement mix design.

If lime is not used as an antistrip agent, then the production and placement testing frequency for the Boil test (TEX-530-C) shown in the table below.

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency
Boil test	Tex-530-C	1 per lot	1 per 12 sublots

If used, the IR bar read out screen must be visible at all times to the Engineer.

Item 3077 Superpave Mixtures

Use aggregate that meets the SAC requirement of class A.
Only fractionated RAP is allowed.

Use of RAS is not allowed.

All SP-D on this project is considered surface mix. A substitution PG binder is not allowed, as shown in Table 5.

When laying ACP on a roadway that has two or more lanes and the work is being done under traffic, then the adjacent lane or lanes are to be overlaid by the end of the following day.

Make a smooth, clean, minimum 1 inch deep butt joint where each end of the new pavement joins the existing pavement. Any method approved by the Engineer can be used to make the joint.

The District Lab will perform a maximum of 2(two) design verification tests. If additional verification tests are needed, the Contractor will be billed $3,500.00 per each additional verification test required to obtain an approved asphaltic concrete pavement mix design.

Provide a Hot Asphalt type Tracking Resistant Asphalt Interlayer (TRAIL) for tack coat found on the TxDOT Material Producer List. The Emulsified Asphalt options will not be allowed.

If lime is not used as an antistrip agent, then the production and placement testing frequency for the Boil test (TEX-530-C) shown in the table below.

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency
Boil test	Tex-530-C	1 per lot	1 per 12 sublots

If used, the IR bar read out screen must be visible at all times to the Engineer.

Item 6001 Portable Changeable Message Sign

Supply *2* Portable Changeable Message Signs (Type II – Lamp Matrix) for this project. This work will be paid at the unit price bid for each unit, which will include any moving, maintenance, and removing of the PCMS. No payment will be made for removing and replacing damaged PCMS. The Portable Changeable Message Signs will become property of the Contractor at the completion of the project.

If the Contractor chooses to have more than one lane closure set-up at a time, provide additional PCMS in accordance with TCP at no additional charge to the department.

Highway: SH 136 **Sheet:** 20G

County: POTTER **Control:** 0379-03-026, ETC

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 0 additional shadow vehicle(s) with TMA for TCP (2-1)-18, TCP (2-3)-18, TCP (3-1)-13, TCP (3-3)-14, TCP (3-5)-18 & TCP (5-1)-18 as detailed on the General Notes of these standard sheets.

Therefore, 2 total shadow vehicles with TMA will be required for this type of work. The Contractor will be responsible for determining 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.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0379-03-026 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY SH 136

									TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0379-03-026**		**0379-03-027**			
			PROJECT ID		**A00128060**		**A00128069**			
			COUNTY		**Potter**		**Potter**			
			HIGHWAY		**SH 136**		**SH 136**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)		SY			33.000		33.000	
	105-6026	REMOVE STAB BASE & ASPH PAV (13"-18")		SY	19,732.000		550.000		20,282.000	
	110-6001	EXCAVATION (ROADWAY)		CY	6,392.000		919.000		7,311.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)		CY	8,757.000		521.000		9,278.000	
	134-6004	BACKFILL (TY A OR B)		STA	29.240		130.110		159.350	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)		SY	69,193.000		15,374.000		84,567.000	
	164-6031	CELL FBR MLCH SEED(TEMP)(COOL)		SY	69,193.000		15,374.000		84,567.000	
	247-6237	FL BS (CMP IN PLC)(TY A OR B GR 4)(6")		SY	5,695.000		5,351.000		11,046.000	
	247-6258	FL BS (CMP IN PLC)(TY A OR B GR4)(12")		SY	11,104.000				11,104.000	
	251-6132	REWORK BS MTL(TY B)(12"-18")(DENS CONT)		SY	3,903.000		2,796.000		6,699.000	
	275-6001	CEMENT		TON	164.000		54.000		218.000	
	275-6011	CEMENT TREAT(EXIST MATL)(8")		SY	16,799.000		5,351.000		22,150.000	
	310-6009	PRIME COAT (MC-30)		GAL	4,203.000		1,339.000		5,542.000	
	316-6001	ASPH (MULTI OPTION)		GAL	6,385.000		2,033.000		8,418.000	
	316-6175	AGGR(TY-B GR-4 SAC-B)		CY	156.000		50.000		206.000	
	351-6013	FLEXIBLE PAVEMENT STRUCTURE REPAIR(4")		SY	1,936.000				1,936.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")		SY	1,548.000		5,476.000		7,024.000	
	354-6045	PLANE ASPH CONC PAV (2")		SY	3,903.000		5,924.000		9,827.000	
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)		LF			610.000		610.000	
	420-6002	CL A CONC (MISC)		CY	21.000				21.000	
	432-6001	RIPRAP (CONC)(4 IN)		CY			25.000		25.000	
	432-6002	RIPRAP (CONC)(5 IN)		CY			207.000		207.000	
	462-6003	CONC BOX CULV (4 FT X 2 FT)		LF	80.000				80.000	
	462-6006	CONC BOX CULV (5 FT X 2 FT)		LF	73.000				73.000	
	464-6017	RC PIPE (CL IV)(18 IN)		LF	96.000				96.000	
	464-6018	RC PIPE (CL IV)(24 IN)		LF			36.000		36.000	
	467-6139	SET (TY I)(S= 4 FT)(HW= 3 FT)(4:1) (C)		EA	1.000				1.000	
	467-6141	SET (TY I)(S= 4 FT)(HW= 3 FT)(6:1) (C)		EA	1.000				1.000	
	467-6173	SET (TY I)(S= 5 FT)(HW= 3 FT)(6:1) (C)		EA	2.000				2.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)		EA	4.000				4.000	
	467-6394	SET (TY II) (24 IN) (RCP) (6: 1) (C)		EA			2.000		2.000	
	496-6004	REMOV STR (SET)		EA	8.000		4.000		12.000	
	496-6007	REMOV STR (PIPE)		LF	187.000		142.000		329.000	
	496-6008	REMOV STR (BOX CULVERT)		LF	164.000				164.000	
	500-6001	MOBILIZATION		LS			1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	6.000		6.000		12.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY	333.000				333.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0379-03-026 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY SH 136

				CONTROL SECTION JOB	0379-03-026		0379-03-027		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00128060		A00128069			
				COUNTY	Potter		Potter			
				HIGHWAY	SH 136		SH 136			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY		333.000				333.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF		1,020.000		167.000		1,187.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF		1,020.000		167.000		1,187.000	
	508-6001	CONSTRUCTING DETOURS	SY		428.000				428.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF				4,431.000		4,431.000	
	530-6002	INTERSECTIONS (ACP)	SY				1,255.000		1,255.000	
	530-6005	DRIVEWAYS (ACP)	SY		98.000		72.000		170.000	
	545-6013	CRASH CUSH ATTEN (INSTL)(R)(N)(TL3)	EA				1.000		1.000	
	610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA				4.000		4.000	
	610-6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA				15.000		15.000	
	610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA				46.000		46.000	
	618-6023	CONDT (PVC) (SCH 40) (2")	LF				13,464.000		13,464.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF				877.000		877.000	
	620-6007	ELEC CONDR (NO.8) BARE	LF				14,803.000		14,803.000	
	620-6008	ELEC CONDR (NO.8) INSULATED	LF				29,606.000		29,606.000	
	624-6002	GROUND BOX TY A (122311)W/APRON	EA				19.000		19.000	
	624-6008	GROUND BOX TY C (162911)W/APRON	EA				1.000		1.000	
	628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA				1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA				9.000		9.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA				12.000		12.000	
	644-6040	IN SM RD SN SUP&AM TYS80(1)SB(P-BM)	EA				2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA				26.000		26.000	
	658-6027	INSTL DEL ASSM (D-SY)SZ (BRF)CTB (BI)	EA				23.000		23.000	
	658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)	EA				3.000		3.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF		12,648.000				12,648.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)	LF		1,000.000				1,000.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF		9,650.000				9,650.000	
	666-6029	REFL PAV MRK TY I (W)8"(DOT)(090MIL)	LF				180.000		180.000	
	666-6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF				7,895.000		7,895.000	
	666-6041	REFL PAV MRK TY I (W)12"(SLD)(090MIL)	LF				1,166.000		1,166.000	
	666-6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF				86.000		86.000	
	666-6053	REFL PAV MRK TY I (W)(ARROW)(090MIL)	EA				23.000		23.000	
	666-6056	REFL PAV MRK TY I(W)(DBL ARROW)(090MIL)	EA				2.000		2.000	
	666-6071	REFL PAV MRK TY I(W)(LNDP ARW)(090MIL)	EA				2.000		2.000	
	666-6077	REFL PAV MRK TY I (W)(WORD)(090MIL)	EA				21.000		21.000	
	666-6101	REF PAV MRK TY I(W)36"(YLD TRI)(090MIL)	EA				5.000		5.000	
	666-6140	REFL PAV MRK TY I (Y)12"(SLD)(090MIL)	LF				40.000		40.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0379-03-026 **DISTRICT** Amarillo **COUNTY** Potter
HIGHWAY SH 136

				CONTROL SECTION JOB	0379-03-026		0379-03-027		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00128060		A00128069			
				COUNTY	Potter		Potter			
				HIGHWAY	SH 136		SH 136			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	666-6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF				90.000		90.000	
	666-6302	RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)	LF				27,436.000		27,436.000	
	666-6311	RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)	LF				1,360.000		1,360.000	
	666-6314	RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)	LF				35,389.000		35,389.000	
	672-6007	REFL PAV MRKR TY I-C	EA				322.000		322.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA				1,126.000		1,126.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA				124.000		124.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF		11,010.000				11,010.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF		2,235.000				2,235.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF		220.000				220.000	
	680-6004	REMOVING TRAFFIC SIGNALS	EA		1.000				1.000	
	3076-6005	D-GR HMA TY-B PG64-28	TON		2,689.000		1,180.000		3,869.000	
	3077-6058	SP MIXESSP-DSAC-A PG70-28	TON		3,128.000		6,644.000		9,772.000	
	3077-6075	TACK COAT	GAL		5,151.000		14,449.000		19,600.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA				2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY				195.000		195.000	
	6185-6003	TMA (MOBILE OPERATION)	HR				80.000		80.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS				1.000		1.000	
		ELECTRICAL: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS				1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS				1.000		1.000	

SUGGESTED CONSTRUCTION SEQUENCE OF WORK FOR SH 136 & FM 1912 WORK

PHASE 1 CONSTRUCT PR FM 1912 & SH 136 WIDENING

1. INSTALL BARRICADES, WARNING SIGNS, TEMPORARY BARRIERS, AND OTHER TRAFFIC CONTROL APPURTENANCES, AS SHOWN IN THE PLANS AND PER BC, WZ, AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. INSTALL EROSION CONTROL DEVICES, AS SHOWN ON THE PLANS.

3. CLOSE EB FM 1912 OUTSIDE SHOULDER AND CONSTRUCT TEMPORARY PAVEMENT AS SHOWN IN THE PLANS USING TCP (2-1)-18. PERFORM FLEXIBLE PAVEMENT REPAIR FROM STA 38+75 TO STA. 53+25. CONSTRUCT TEMPORARY PAVEMENT AS SHOWN IN PLANS.

4. CLOSE WB FM 1912 OUTSIDE SHOULDER AND NB SH 136 SHOULDER, AS SHOWN IN THE PLANS USING TCP (2-1)-18.

5. CONSTRUCT PR FM 1912 AND SH 136 WIDENING, AS SHOWN IN THE PLANS. PERFORM FLEXIBLE STRUCTURE REPAIR FROM STA 50+33 TO 53+25.

PHASE 2 CONSTRUCT PR FM 1912 & REMOVE EXISTING FM 1912

1. INSTALL BARRICADES, WARNING SIGNS, TEMPORARY BARRIERS, AND OTHER TRAFFIC CONTROL APPURTENANCES, AS SHOWN IN THE PLANS AND PER BC, WZ, AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. INSTALL EROSION CONTROL DEVICES, AS SHOWN ON THE PLANS.

3. CLOSE THE NB SH 136 OUTSIDE LANE AT SH 136 & FM 1912 INTERSECTION AS SHOWN IN THE PLANS. SWITCH TRAFFIC TO THE NEWLY CONSTRUCTED PR FM 1912. DETOUR TRAFFIC ON FM 1912 AS SHOWN IN THE PHASE 2 DETOUR PLAN.

4. REMOVE THE PORTION OF FM 1912, AS SHOWN IN THE PLANS.

PHASE 3 CONSTRUCT SH 136 WIDENING, RT. TURN RAMP, AND CONVERT FM 1912 INTO A ONE-WAY CONFIGURATION WEST OF SH 136.

1. INSTALL BARRICADES, WARNING SIGNS, TEMPORARY BARRIERS, AND OTHER TRAFFIC CONTROL APPURTENANCES, AS SHOWN IN THE PLANS AND PER BC, WZ, AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. INSTALL EROSION CONTROL DEVICES, AS SHOWN ON THE PLANS.

3. STEP1: CLOSE NB ENTRANCE RAMP AND OUTSIDE LANE OF NB SL 335 AT LAKESIDE AS SHOWN ON TxDOT TCP(6-1)-12 STANDARD. REMOVE EXISTING PAVEMENT MARKINGS AND INSTALL PROPOSED MARKINGS FOR THE ENTRANCE RAMP FROM LAKESIDE AS SHOWN IN THE PLANS. DETOUR TRAFFIC AS SHOWN IN PHASE 3 STEP 1 DETOUR LAYOUT. FOR OTHER WORK ON SL 335, SEE TCP NARRATIVE & TCP TYPICAL SECTIONS SHEET 2 OF 2 FOR ADDITIONAL INFORMATION.

   STEP 2: MAINTAIN TCP FROM PHASE 2 ON NB SH 136 AND CLOSE SB SH 136 OUTSIDE LANE AT SH 136 & FM 1912 INTERSECTION AS SHOWN IN THE PLANS. CLOSE LEFT TURN LANES AT LAKESIDE & SB SL 335 AND DETOUR TRAFFIC PER DETOUR TRAFFIC ON FM 1912 AS SHOWN IN THE DETOUR LAYOUT.

4. REMOVE FM 1912 WEST OF SH 136 & FM 1912 INTERSECTION. CONSTRUCT SH 136 SB WIDENING AND SB-WB RIGHT-TURN RAMP AT SH 136 & FM 1912 INTERSECTION, AS SHOWN IN THE PLANS.

PHASE 4 PERFORM OVERLAY (OR MILL & OVERLAY) OPERATIONS AS SHOWN IN PLANS.

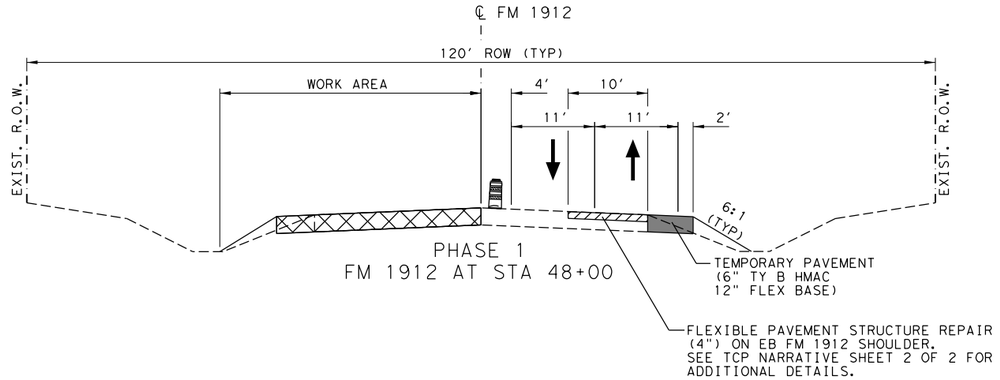
1. INSTALL BARRICADES, WARNING SIGNS, TEMPORARY BARRIERS, AND OTHER TRAFFIC CONTROL APPURTENANCES, AS SHOWN IN THE PLANS AND PER BC, WZ, AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. INSTALL EROSION CONTROL DEVICES, AS SHOWN ON THE PLANS.

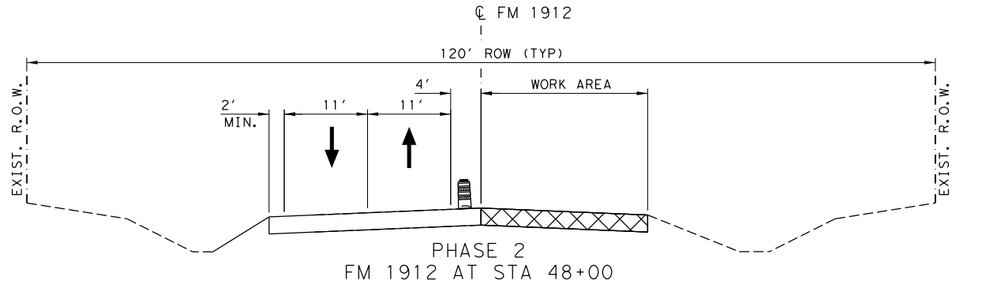
3. CONSTRUCT (MILL AND) OVERLAY USING TCP(7-1)-13 STANDARD, AND AS SHOWN IN PLANS.

4. INSTALL FINAL PAVEMENT MARKINGS AND SIGNS.

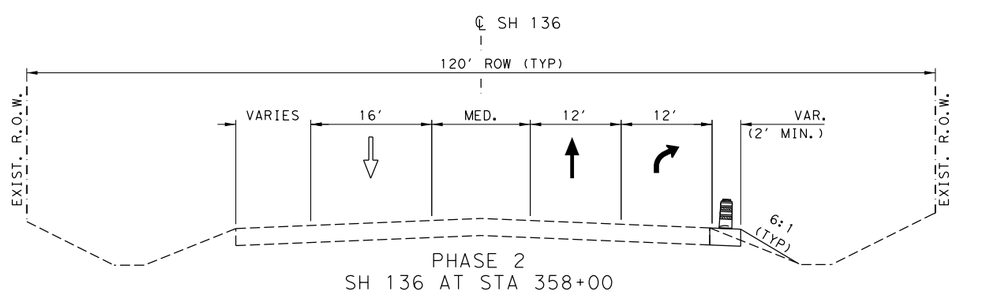
5. REMOVE EROSION CONTROL DEVICES AND PERFORM FINAL CLEAN UP.



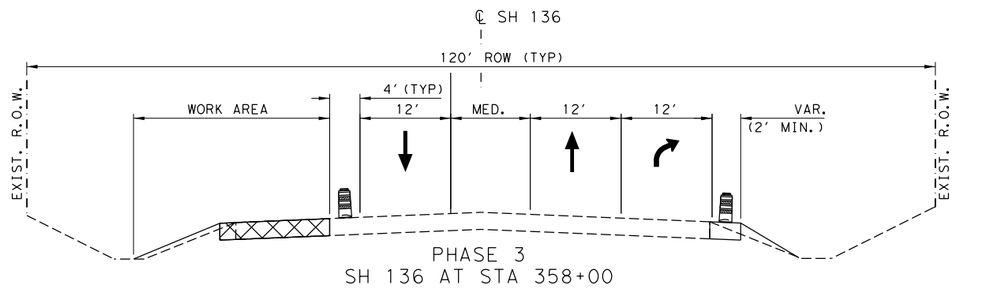
PHASE 1
FM 1912 AT STA 48+00



PHASE 2
FM 1912 AT STA 48+00



PHASE 2
SH 136 AT STA 358+00



PHASE 3
SH 136 AT STA 358+00

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

Gary Daniel Janecek

07/01/2020

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Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136
TCP NARRATIVE & TCP TYPICAL SECTIONS

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	22

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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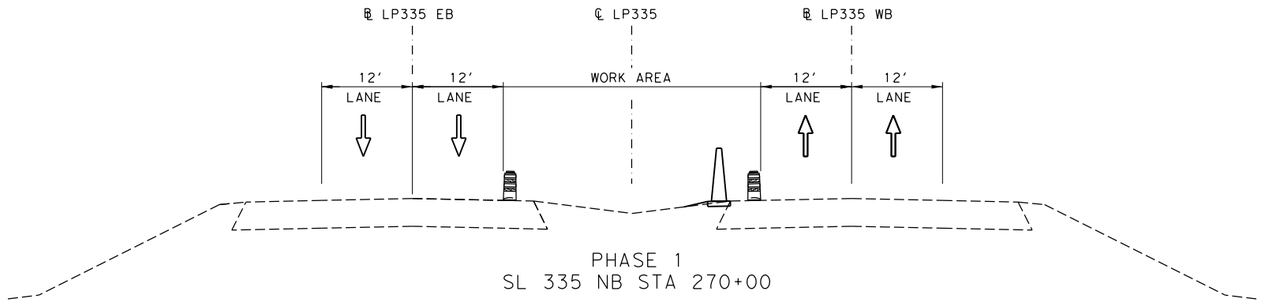
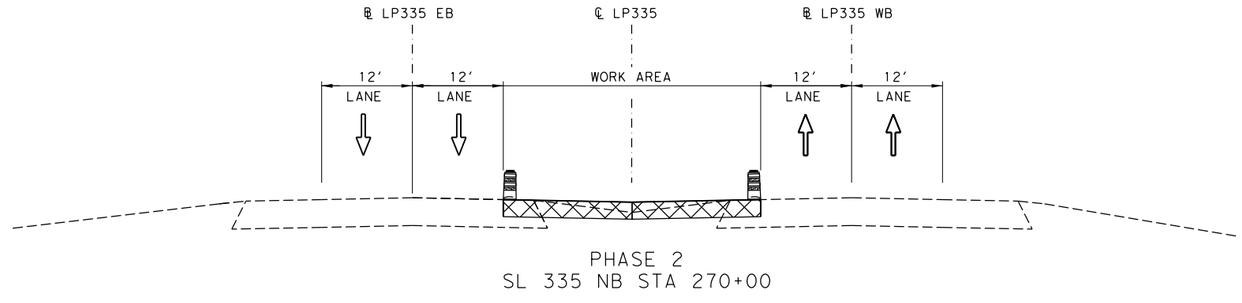
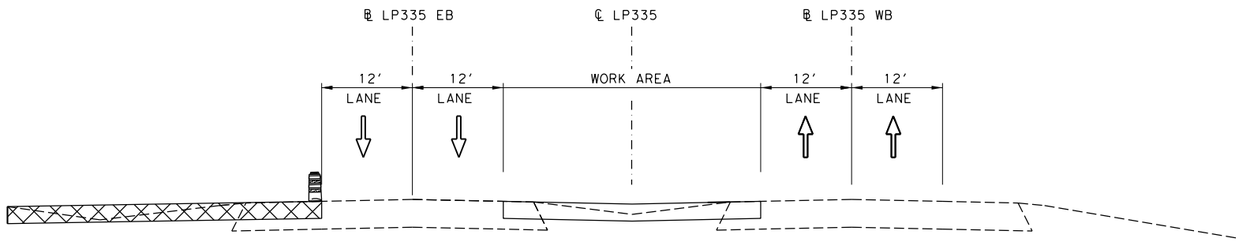


PHASE 1
SL 335 NB STA 270+00



PHASE 2
SL 335 NB STA 270+00



PHASE 2
SL 335 NB STA 307+00

GENERAL NOTES FOR UNEVEN LANES / DROP- OFF CONDITIONS:

1. ANY VERTICAL OR NEAR VERTICAL LONGITUDINAL FACE EXCEEDING 2 INCHES IN HEIGHT ON THE PAVEMENT AND/ OR ADJACENT TO THE TRAVELED WAY SHALL BE SLOPED AT 3:1 OR FLATTER AT THE END OF EACH WORK DAY. TRANSVERSE FACES THAT ARE PRESENT AT THE END OF THE WORK DAY SHALL BE TAPERED IN AN MANNER ACCEPTABLE TO THE ENGINEER.

2. INSTALL UNEVEN LANES SIGN (CW8-11) IN ADVANCE TO THE CONDITION AND REPEAT AS NECESSARY OR AS APPROVED BY THE ENGINEER. SUPPLEMENT UNEVEN LANES SIGN WITH CW21-16 ("NEXT XX MILES") OR WITH SCW13-11 (ADVISORY SPEED SIGN) AS APPROVED BY THE ENGINEER. SEE WZ(UL)-13 FOR ADDITIONAL INFORMATION

FLEX. PAVEMENT DETAIL NOTES:

1. SEE TRAFFIC CONTROL PLANS FOR FLEX. PAVEMENT REPAIR LOCATIONS.

2. LOCATIONS AND DIMENSIONS OF FLEXIBLE PAVEMENT STRUCTURE REPAIR ARE APPROXIMATE. EXACT LOCATIONS MUST BE VERIFIED WITH THE ENGINEER. THE ENGINEER MAY ADD ADDITIONAL LOCATIONS AS NEEDED AND QUANTITIES WILL BE ADJUSTED.

3. FLEXIBLE PAVEMENT REPAIR WILL BE PAID UNDER ITEM 351. MILLING, PROOF ROLLING, TY B HMAC, AND TACK COAT WILL NOT BE PAID DIRECTLY BUT WILL BE SUBSIDIARY TO THIS PAY ITEM. PROVIDE MATERIALS OF THE TYPE AND GRADE AS SHOWN BELOW AND IN ACCORDANCE WITH ITEM 3076, "DENSE-GRADED HOT-MIX ASPHALT". PLACE THE HMAC MATERIAL IN TWO EQUAL LIFTS. TACK COAT IN BETWEEN LIFTS IS SUBSIDIARY TO ITEM 351 AND WILL NOT BE PAID DIRECTLY.

4. THE FOLLOWING DATA IS FOR CONTRACTOR'S INFORMATION ONLY AND WILL BE SUBSIDIARY TO ITEM 351, FLEXIBLE PAVEMENT STRUCTURE REPAIR."

SUGGESTED CONSTRUCTION SEQUENCE OF WORK FOR SL 335 U-TURN & BARRIER CONSTRUCTION

PHASE 1 CONSTRUCT PORTABLE SSCB

1. INSTALL BARRICADES, WARNING SIGNS, TEMPORARY BARRIERS, AND OTHER TRAFFIC CONTROL APPURTENANCES, AS SHOWN IN THE PLANS AND PER BC, WZ, AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. INSTALL EROSION CONTROL DEVICES, AS SHOWN ON THE PLANS.

3. CLOSE NB SL 335 INSIDE SHOULDER AND CONSTRUCT CONCRETE PAD(RIPRAP) AND INSTALL PORTABLE SSCB USING TxDOT TCP(5-1)-18 AND AS APPROVED BY THE ENGINEER.

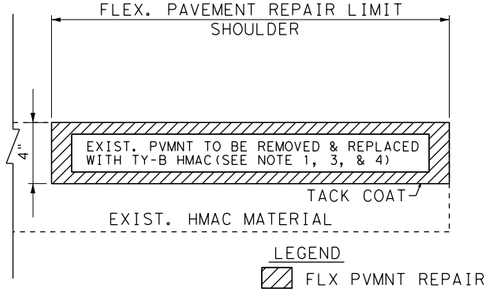
PHASE 2 CONSTRUCT SL 335 U-TURN

1. INSTALL BARRICADES, WARNING SIGNS, TEMPORARY BARRIERS, AND OTHER TRAFFIC CONTROL APPURTENANCES, AS SHOWN IN THE PLANS AND PER BC, WZ, AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. INSTALL EROSION CONTROL DEVICES, AS SHOWN ON THE PLANS.

3. CLOSE WB SL 335 INSIDE SHOULDER AND EB SL 335 INSIDE SHOULDER USING TxDOT TCP(5-1)-18. CONSTRUCT SL 335 WIDENING IN THE MEDIAN AS SHOWN IN PLANS.

4. UPON COMPLETION OF MEIDAN WIDENING, CLOSE EB SL 335 OUTSIDE SHOULDER USING TxDOT TCP(5-1)-18 STANDARD. CONSTRUCT WIDENING AS SHOWN IN PLANS.



FLEXIBLE PAVEMENT REPAIR
(SEE FLEX. PAVEMENT NOTES 1~4)
(N.T.S.)

HOT-MIX & TACK COAT
(4") HMAC (TY B) PG 64-28---------(4" X 110) LBS/SY
TACK COAT--------- 0.25 GAL/SY

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
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07/01/2020

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T.B.P.E. Firm Registration #12

SH 136

TCP NARRATIVE & TCP TYPICAL SECTIONS

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		23
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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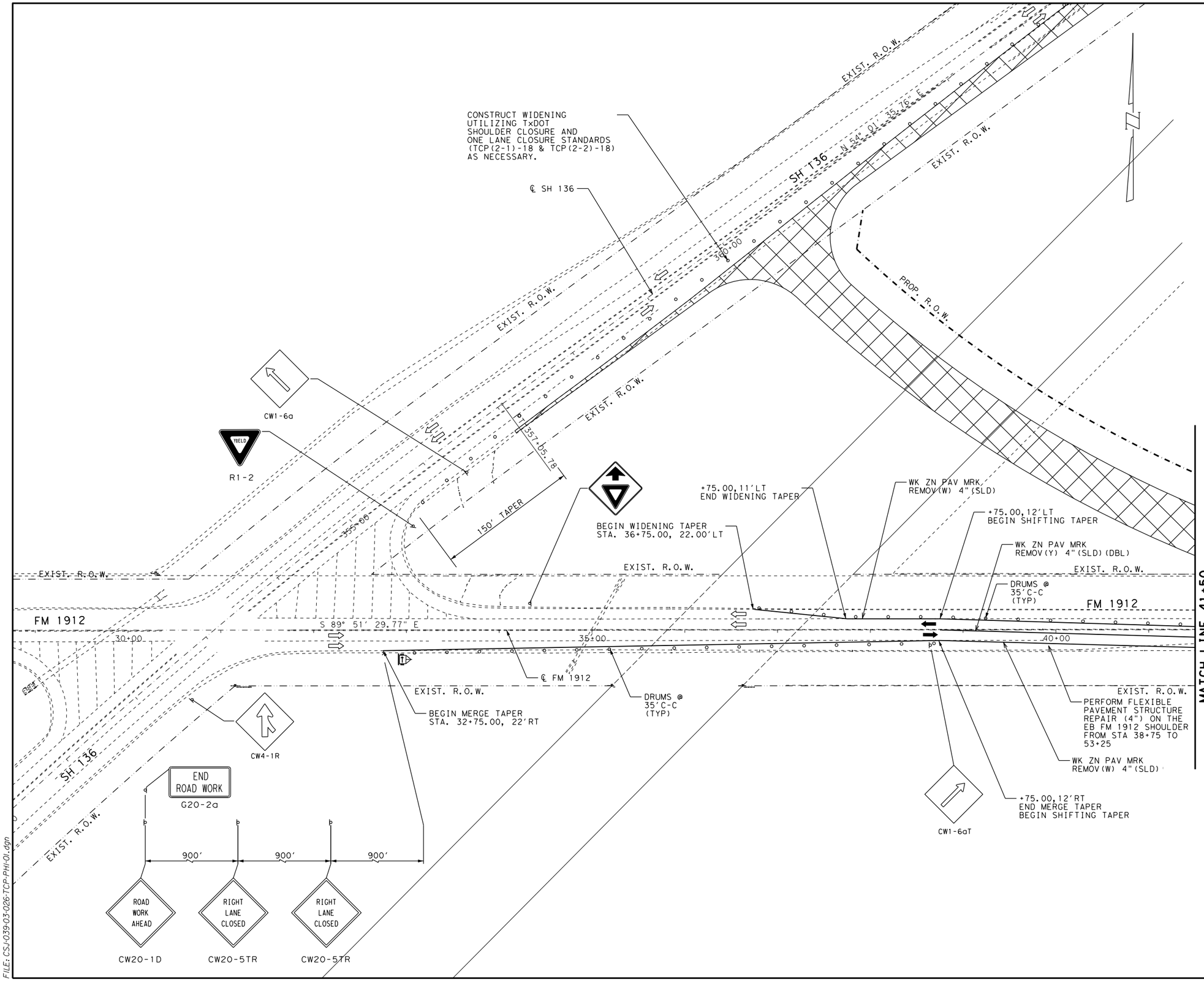

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- EXISTING DIRECTION OF TRAFFIC
- PORTABLE SIGN/ARROW BOARD
- DRUMS
- TYPE 3 BARRICADE
- PCTB

NOTE:
1. SIGNS ARE SHOWN AT APPROX. LOCATION. CONTRACTOR TO ADJUST SIGNS AS NECESSARY TO BETTER MATCH FIELD CONDITIONS.
2. COVER ALL SIGNS THAT CONFLICTS WITH THE PROPOSED TRAFFIC CONTROL PLANS AT NO ADDITIONAL COST.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION.

0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER
07/01/2020

Texas Department of Transportation

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Wood Environment & Infrastructure Solutions, Inc.
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Dallas, Texas 75244 (469) 828-4100
T,B,P,E, Firm Registration #12

SH 136
TRAFFIC CONTROL PLAN
PHASE 01
BEGIN TO STA 41+50

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		24
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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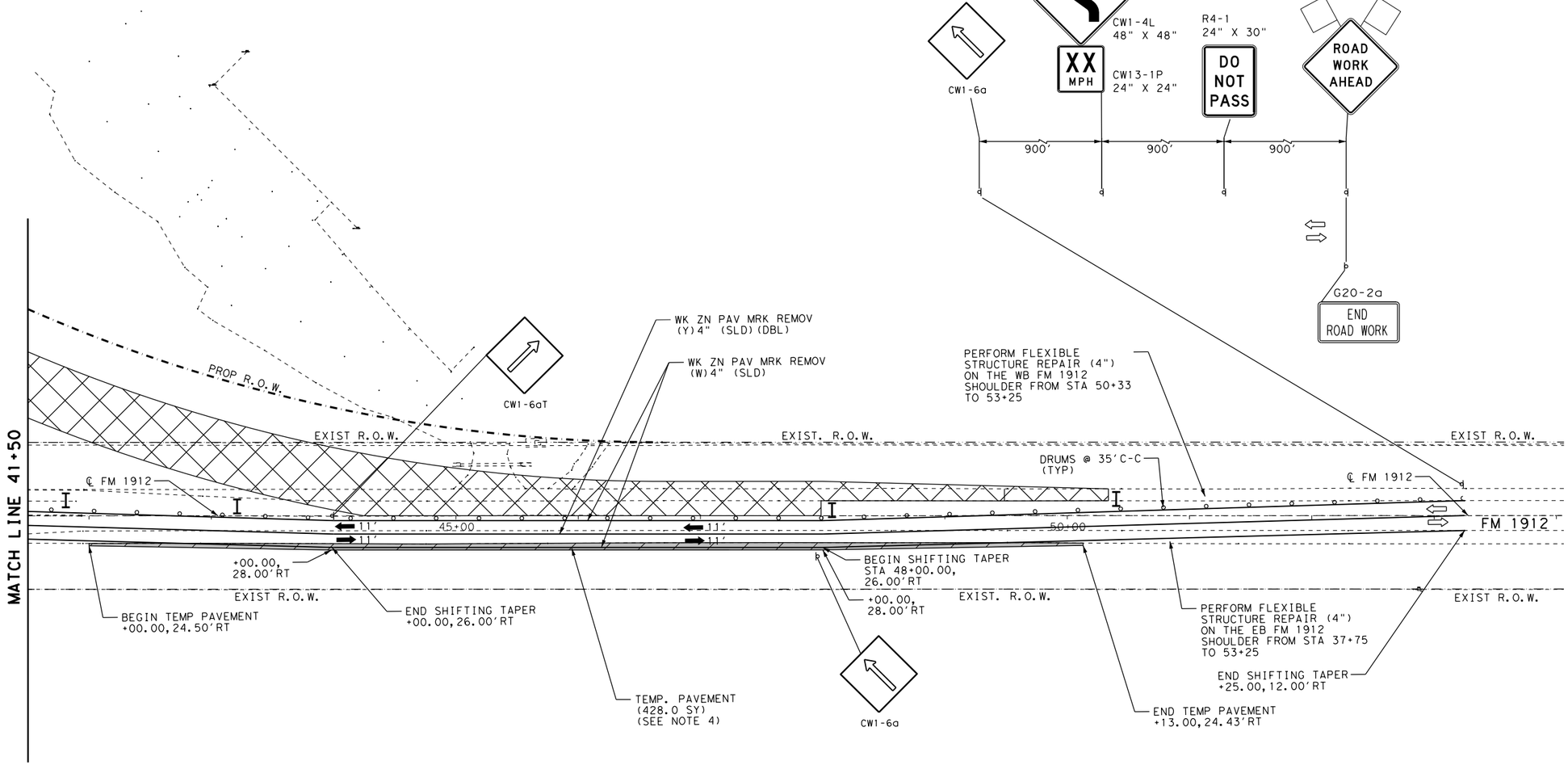

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- EXISTING DIRECTION OF TRAFFIC
- PORTABLE SIGN/ARROW BOARD
- DRUMS
- TYPE 3 BARRICADE
- PCTB

NOTE:

1. SIGNS ARE SHOWN AT APPROX. LOCATION. CONTRACTOR TO ADJUST SIGNS AS NECESSARY TO BETTER MATCH FIELD CONDITIONS.
2. COVER ALL SIGNS THAT CONFLICTS WITH THE PROPOSED TRAFFIC CONTROL PLANS AT NO ADDITIONAL COST.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION.
4. CONSTRUCT TEMPORARY PAVEMENT PRIOR TO BEGINNING THIS PHASE USING TCP(2-1)-18 STANDARD. TEMPORARY PAVEMENT CONSTRUCTION, MAINTENANCE, AND REMOVAL TO BE PAID UNDER ITEM 0508 6001 - CONSTRUCTING DETOURS.

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

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Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136
TRAFFIC CONTROL PLAN
PHASE 01
STA 41+50 TO END

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	25

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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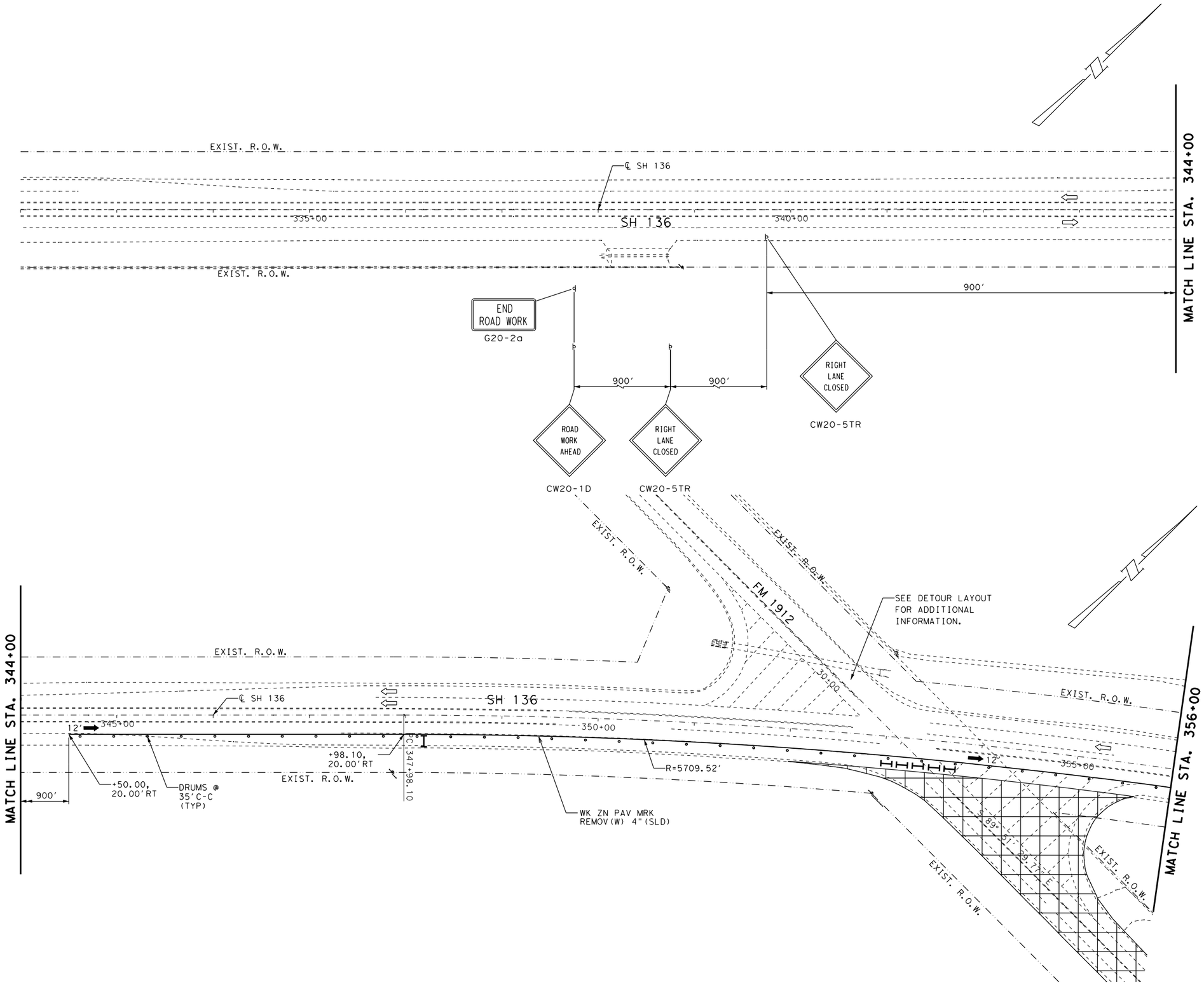

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- EXISTING DIRECTION OF TRAFFIC
- PORTABLE SIGN/ARROW BOARD
- DRUMS
- TYPE 3 BARRICADE
- PCTB

NOTE:
1. SIGNS ARE SHOWN AT APPROX. LOCATION. CONTRACTOR TO ADJUST SIGNS AS NECESSARY TO BETTER MATCH FIELD CONDITIONS.
2. COVER ALL SIGNS THAT CONFLICTS WITH THE PROPOSED TRAFFIC CONTROL PLANS AT NO ADDITIONAL COST.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION.

0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
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LICENSED
PROFESSIONAL ENGINEER

07/01/2020

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4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136
TRAFFIC CONTROL PLAN PHASE 2 BEGIN TO STA 356+00

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	26

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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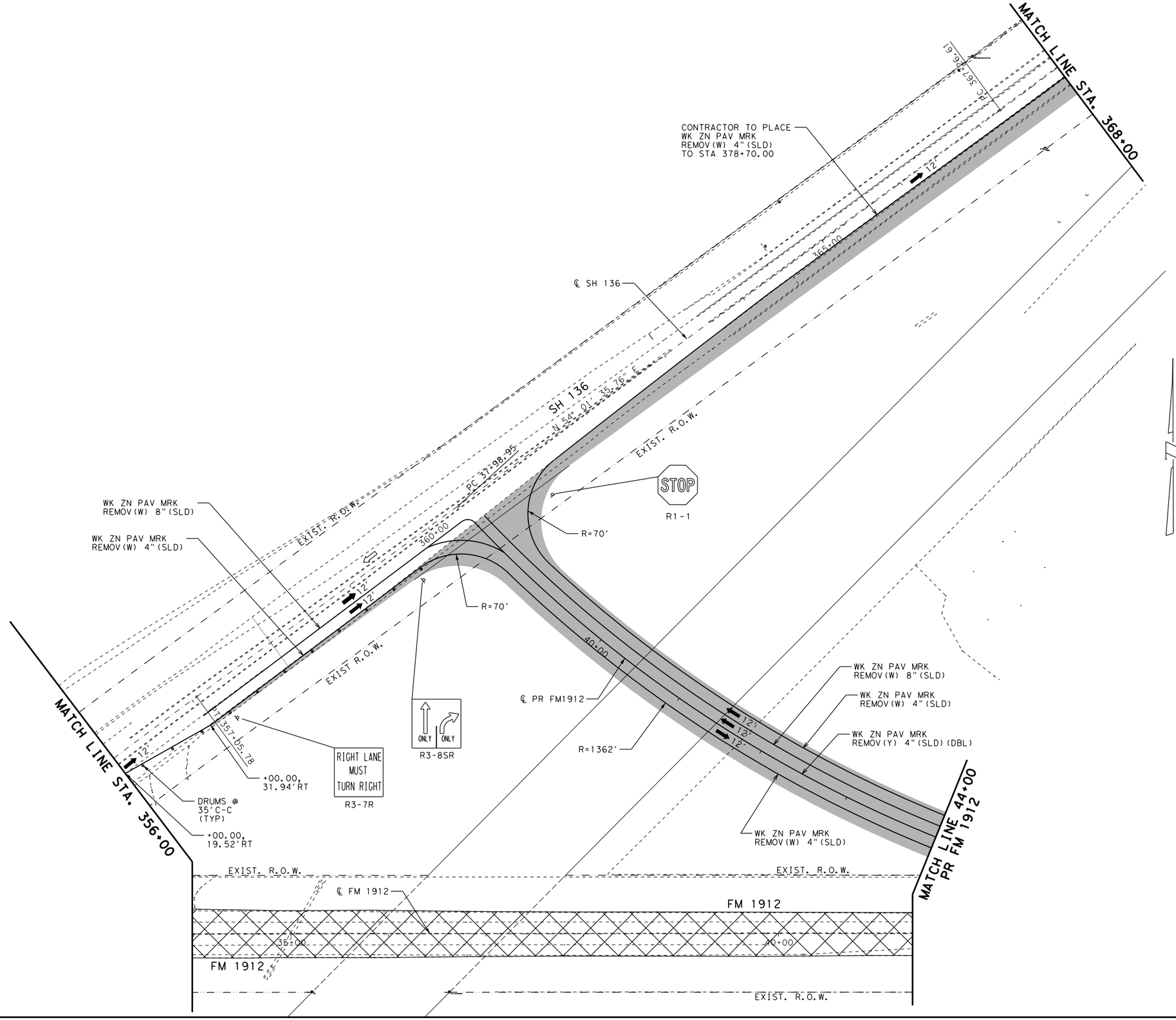

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- EXISTING DIRECTION OF TRAFFIC
- PORTABLE SIGN/ARROW BOARD
- DRUMS
- TYPE 3 BARRICADE
- PCTB

NOTE:
1. SIGNS ARE SHOWN AT APPROX. LOCATION. CONTRACTOR TO ADJUST SIGNS AS NECESSARY TO BETTER MATCH FIELD CONDITIONS.
2. COVER ALL SIGNS THAT CONFLICTS WITH THE PROPOSED TRAFFIC CONTROL PLANS AT NO ADDITIONAL COST.
3. CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES DURING CONSTRUCTION.

0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

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SH 136
TRAFFIC CONTROL PLAN
PHASE 2 STA 356+00 (SH 136) TO STA 44+00 (FM 1912)

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	27

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:02:23 PM
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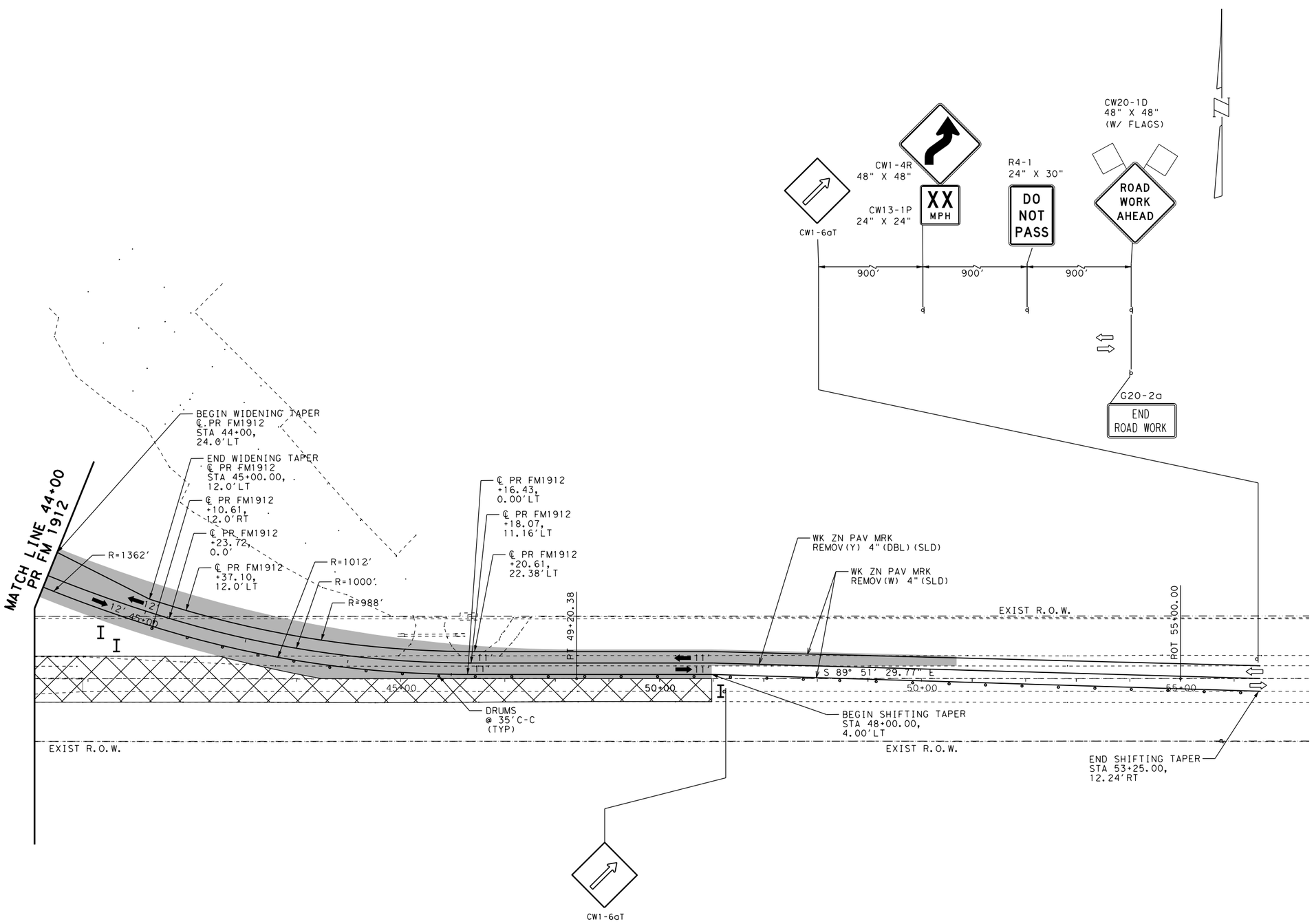

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
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- PORTABLE SIGN/ARROW BOARD
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0 25 50 100 200
SCALE: 1"=100'

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SH 136
TRAFFIC CONTROL PLAN
PHASE 2
STA 44+00 TO END

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	28

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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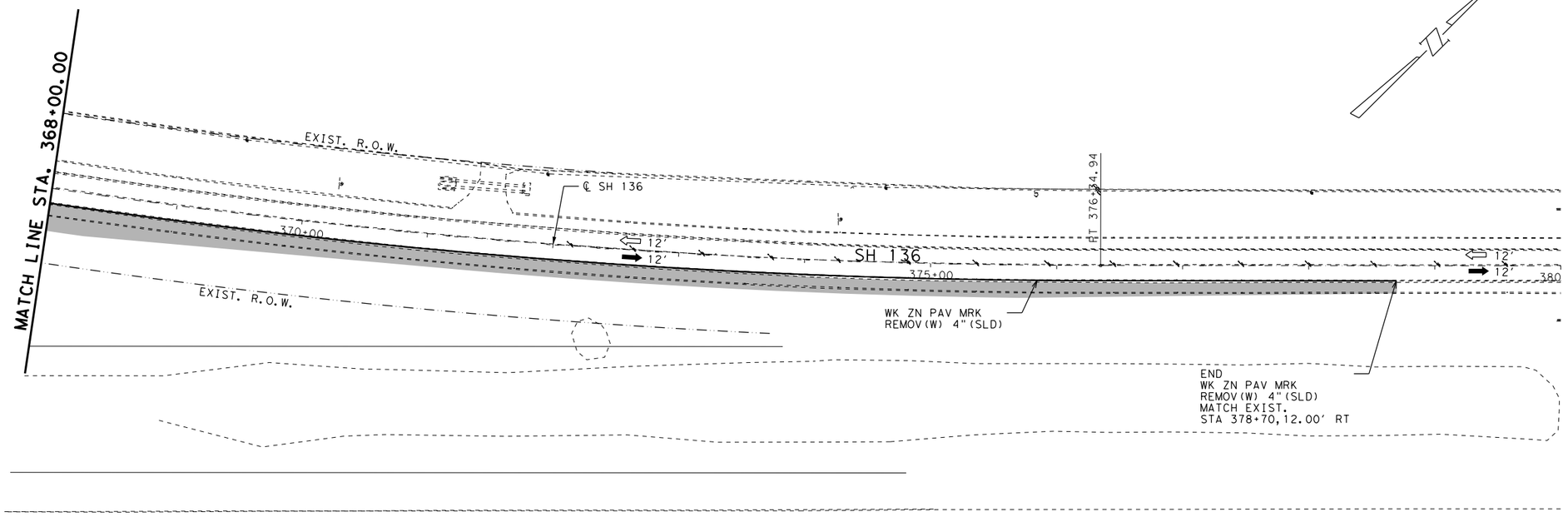

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- EXISTING DIRECTION OF TRAFFIC
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0 25 50 100 200
SCALE: 1"=100'

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SH 136
TRAFFIC CONTROL PLAN
PHASE 2
STA 368+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	29

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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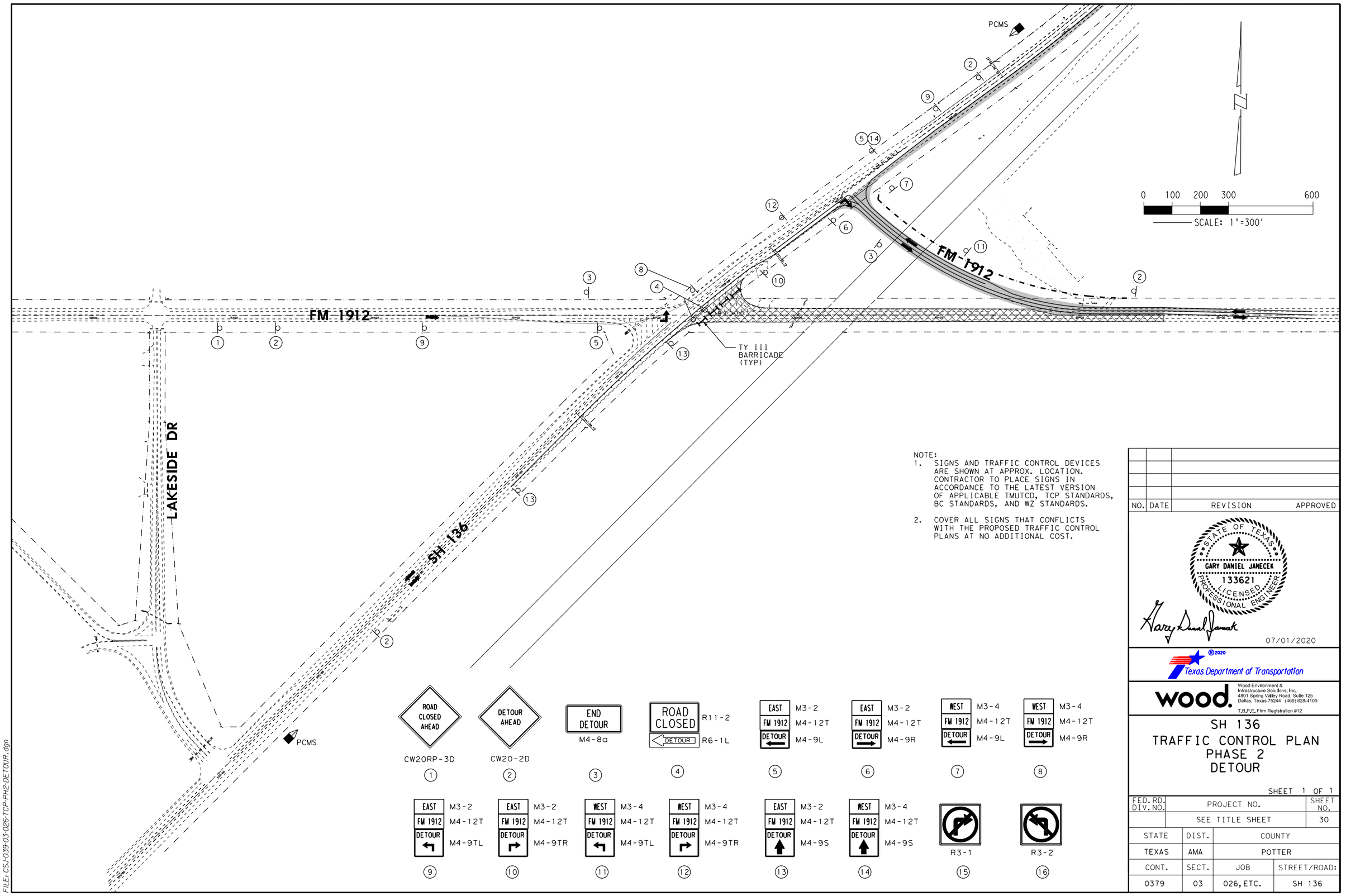

NOTE:
1. SIGNS AND TRAFFIC CONTROL DEVICES ARE SHOWN AT APPROX. LOCATION. CONTRACTOR TO PLACE SIGNS IN ACCORDANCE TO THE LATEST VERSION OF APPLICABLE TMUTCD, TCP STANDARDS, BC STANDARDS, AND WZ STANDARDS.

2. COVER ALL SIGNS THAT CONFLICTS WITH THE PROPOSED TRAFFIC CONTROL PLANS AT NO ADDITIONAL COST.

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SH 136
TRAFFIC CONTROL PLAN
PHASE 2
DETOUR

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	30

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

ROAD CLOSED AHEAD
CW20RP-3D ①

DETOUR AHEAD
CW20-2D ②

END DETOUR
M4-8a ③

ROAD CLOSED R11-2
DETOUR R6-1L ④

EAST M3-2
FM 1912 M4-12T
DETOUR M4-9L ⑤

EAST M3-2
FM 1912 M4-12T
DETOUR M4-9R ⑥

WEST M3-4
FM 1912 M4-12T
DETOUR M4-9L ⑦

WEST M3-4
FM 1912 M4-12T
DETOUR M4-9R ⑧

EAST M3-2
FM 1912 M4-12T
DETOUR M4-9TL ⑨

EAST M3-2
FM 1912 M4-12T
DETOUR M4-9TR ⑩

WEST M3-4
FM 1912 M4-12T
DETOUR M4-9TL ⑪

WEST M3-4
FM 1912 M4-12T
DETOUR M4-9TR ⑫

EAST M3-2
FM 1912 M4-12T
DETOUR M4-9S ⑬

WEST M3-4
FM 1912 M4-12T
DETOUR M4-9S ⑭

R3-1 ⑮

R3-2 ⑯

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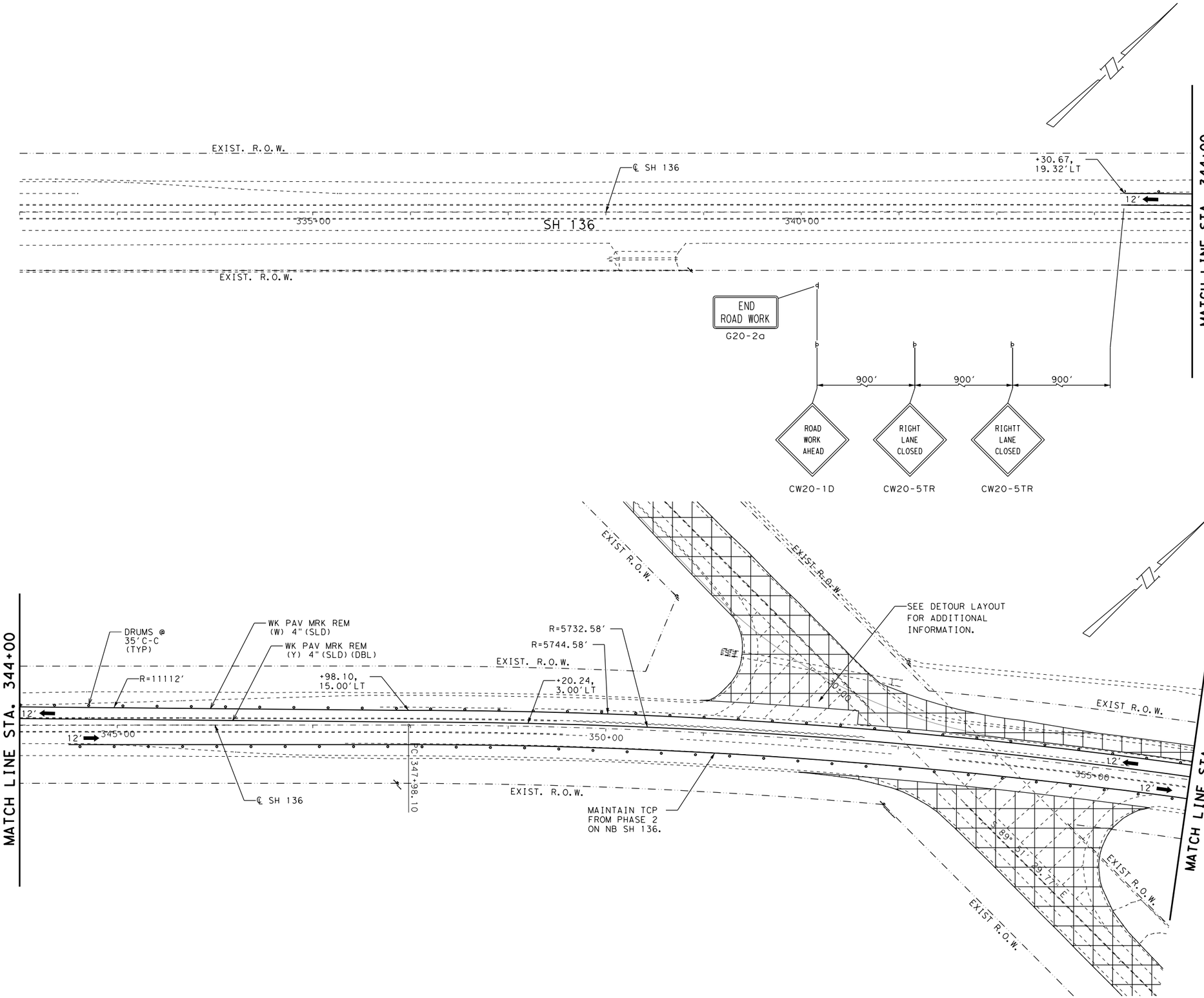

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
- EXISTING DIRECTION OF TRAFFIC
- PORTABLE SIGN/ARROW BOARD
- DRUMS
- TYPE 3 BARRICADE
- PCTB

NOTE:
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0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
TRAFFIC CONTROL PLAN PHASE 3 BEGIN TO STA 356+00

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		31
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7//2020 10:03:07 PM
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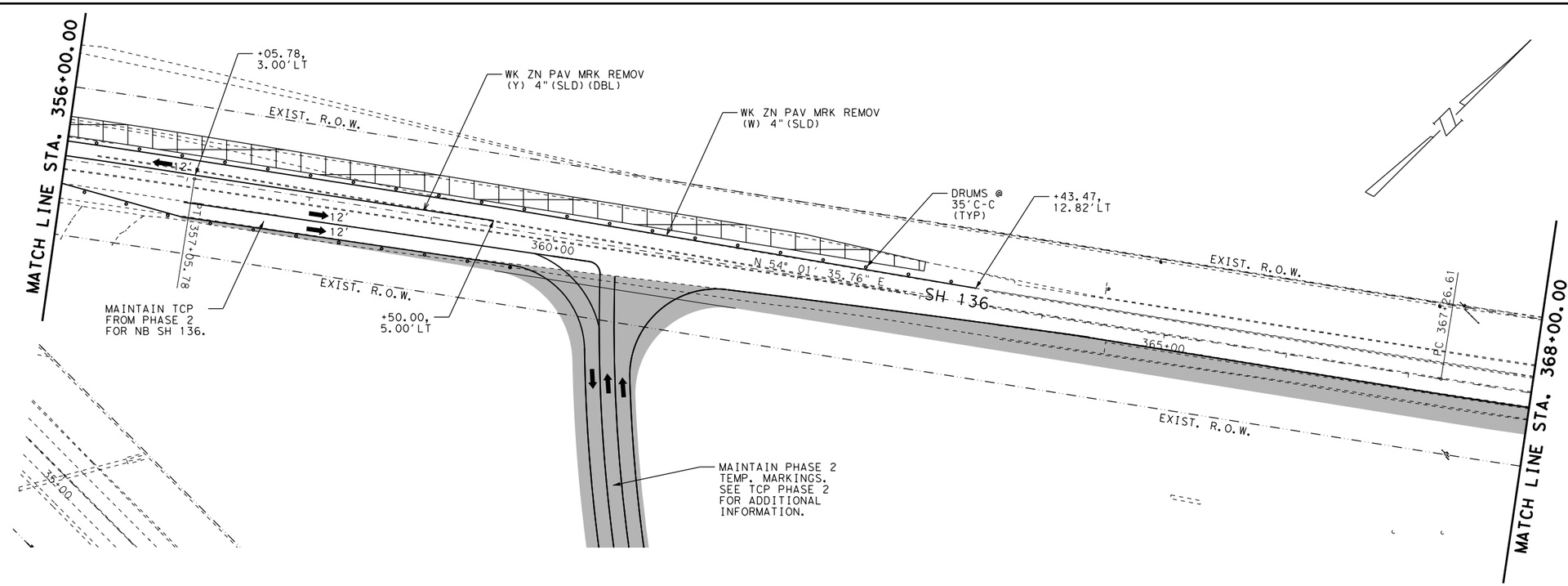

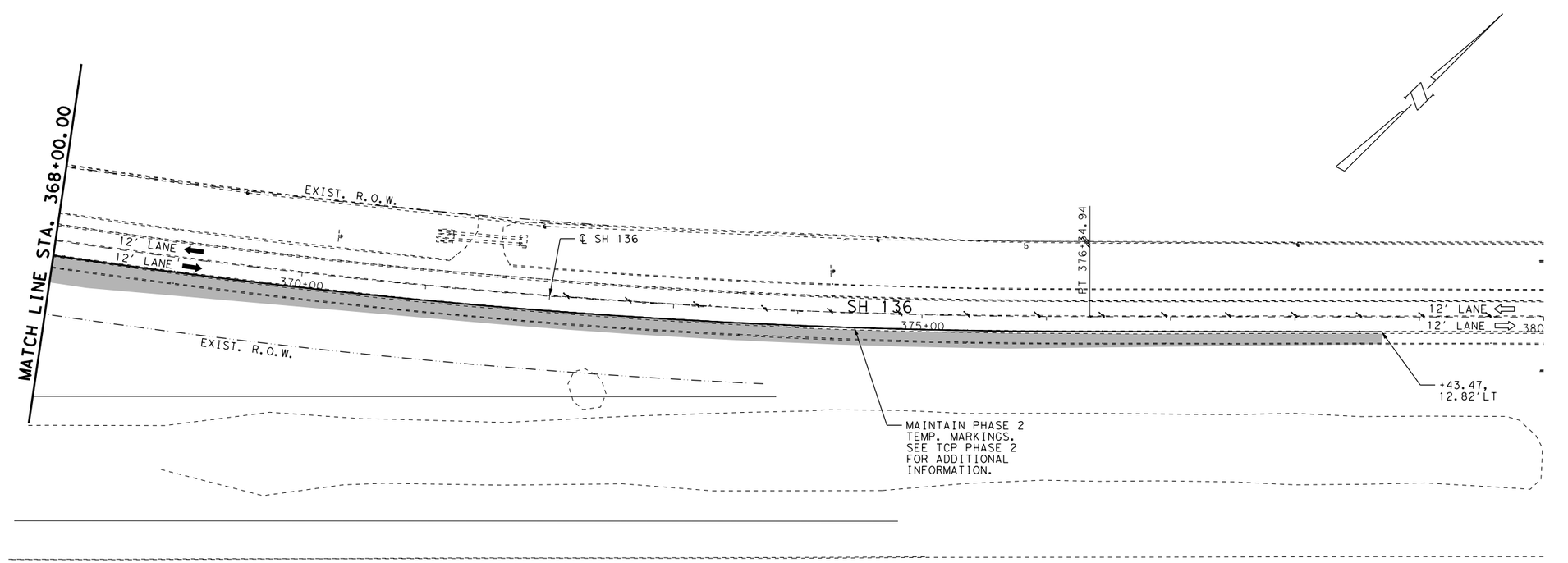

LEGEND

- PERMANENT CONSTRUCTION THIS PHASE
- TEMP CONSTRUCTION THIS PHASE
- NEW PAVEMENT / TEMP PAVEMENT OPEN TO TRAFFIC
- PROPOSED DIRECTION OF TRAFFIC
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0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
TRAFFIC CONTROL PLAN PHASE 3 STA 356+00 TO END

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	32

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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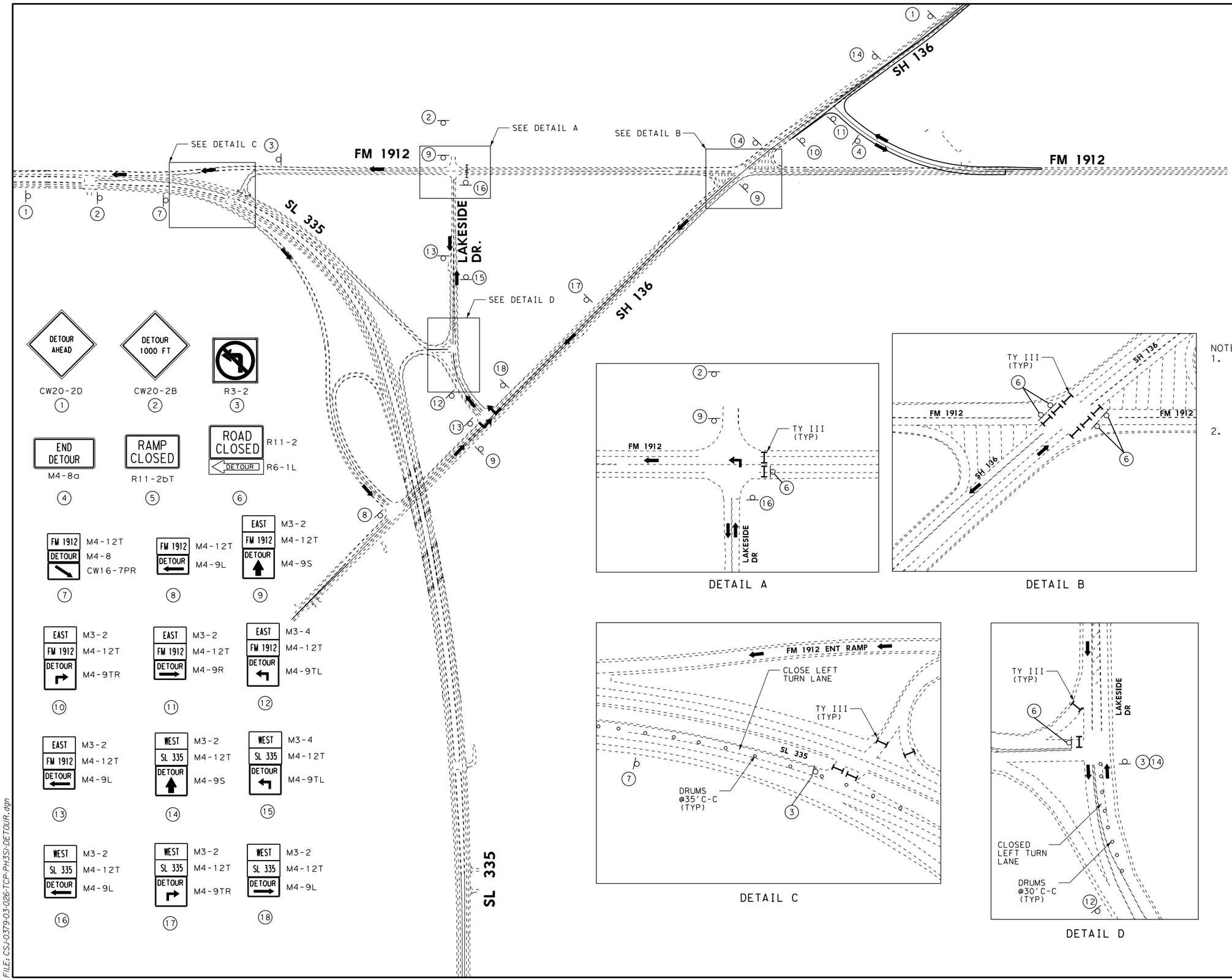

N.T.S.

DETAIL A

DETAIL B

DETAIL C

DETAIL D

NOTE:
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2. COVER ALL SIGNS THAT CONFLICTS WITH THE PROPOSED TRAFFIC CONTROL PLANS AT NO ADDITIONAL COST.

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SH 136
TRAFFIC CONTROL PLAN
PHASE 3 STEP 1
DETOUR

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	33

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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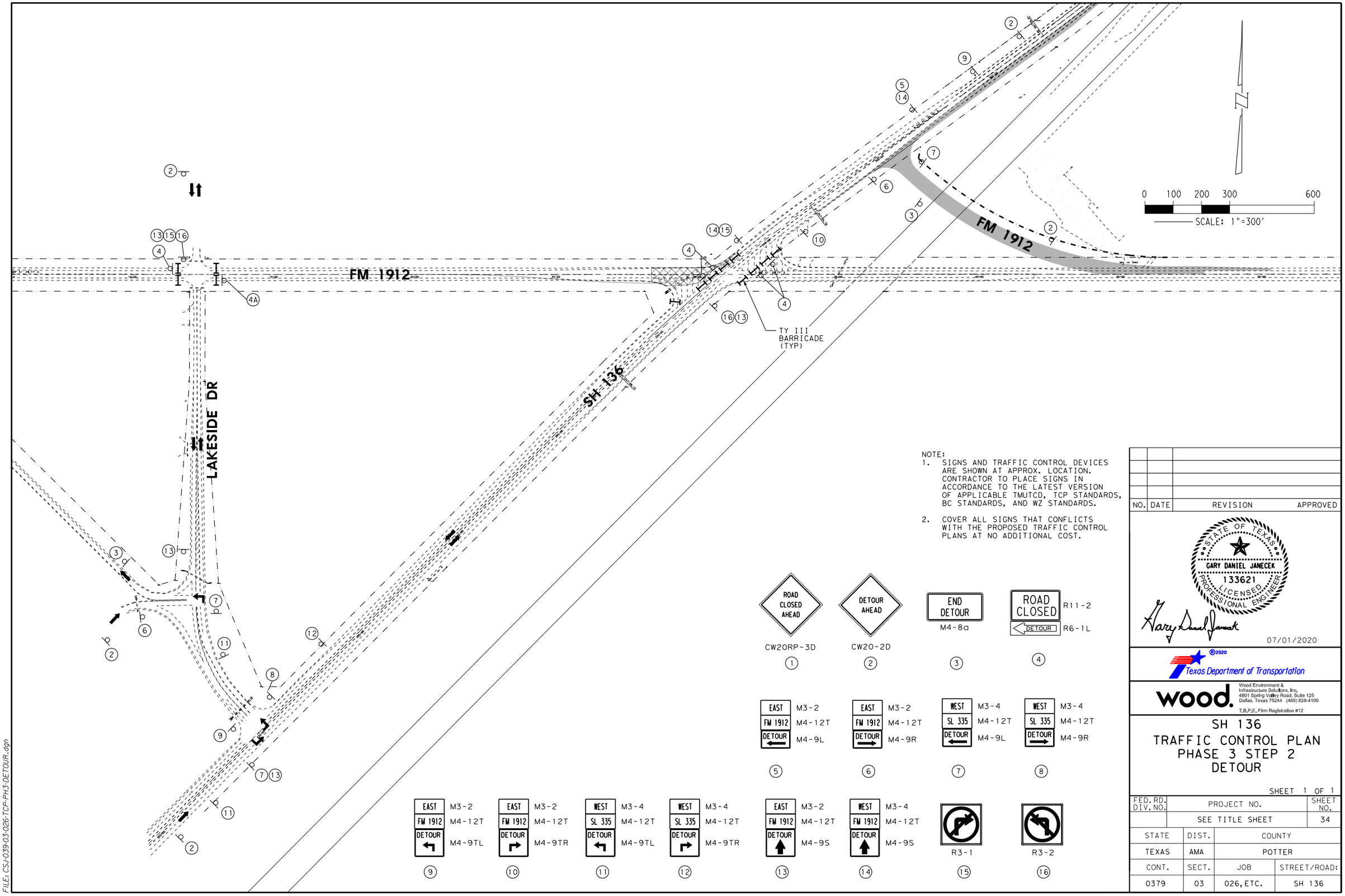

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NO.	DATE	REVISION	APPROVED

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SH 136
TRAFFIC CONTROL PLAN
PHASE 3 STEP 2
DETOUR

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	34

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

ROAD CLOSED AHEAD — CW20RP-3D — ① | DETOUR AHEAD — CW20-2D — ② | END DETOUR — M4-8a — ③ | ROAD CLOSED / DETOUR — R11-2 / R6-1L — ④

⑤	EAST / FM 1912 / DETOUR	M3-2 / M4-12T / M4-9L		
⑥	EAST / FM 1912 / DETOUR	M3-2 / M4-12T / M4-9R		
⑦	WEST / SL 335 / DETOUR	M3-4 / M4-12T / M4-9L		
⑧	WEST / SL 335 / DETOUR	M3-4 / M4-12T / M4-9R		
⑨	EAST / FM 1912 / DETOUR	M3-2 / M4-12T / M4-9TL		
⑩	EAST / FM 1912 / DETOUR	M3-2 / M4-12T / M4-9TR		
⑪	WEST / SL 335 / DETOUR	M3-4 / M4-12T / M4-9TL		
⑫	WEST / SL 335 / DETOUR	M3-4 / M4-12T / M4-9TR		
⑬	EAST / FM 1912 / DETOUR	M3-2 / M4-12T / M4-9S		
⑭	EAST / FM 1912 / DETOUR	M3-2 / M4-12T / M4-9S		
⑮	R3-1			
⑯	R3-2			

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FILE:

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

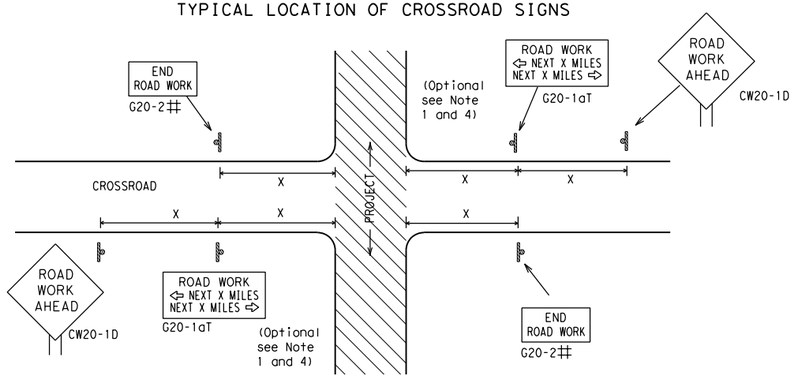
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

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	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		35

DATE:
FILE:

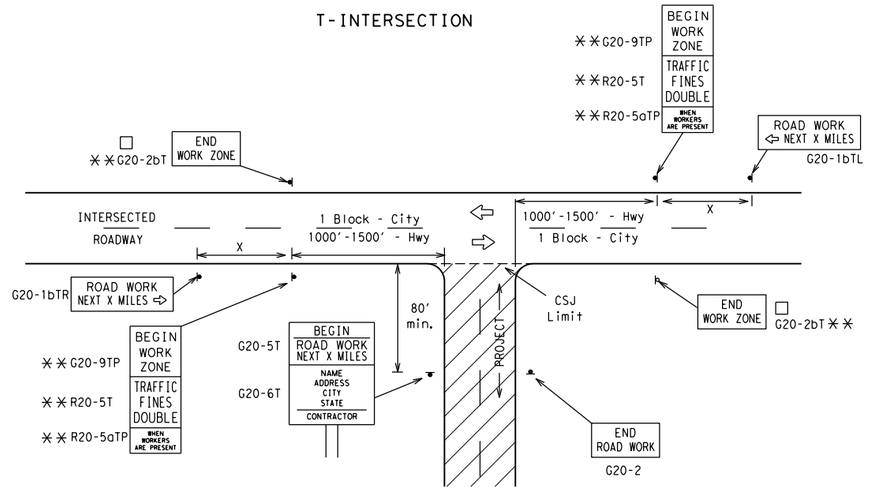
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

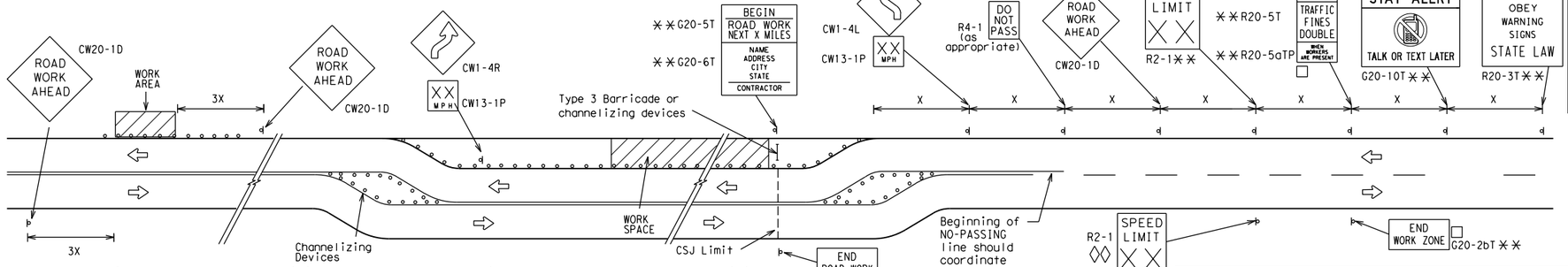
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

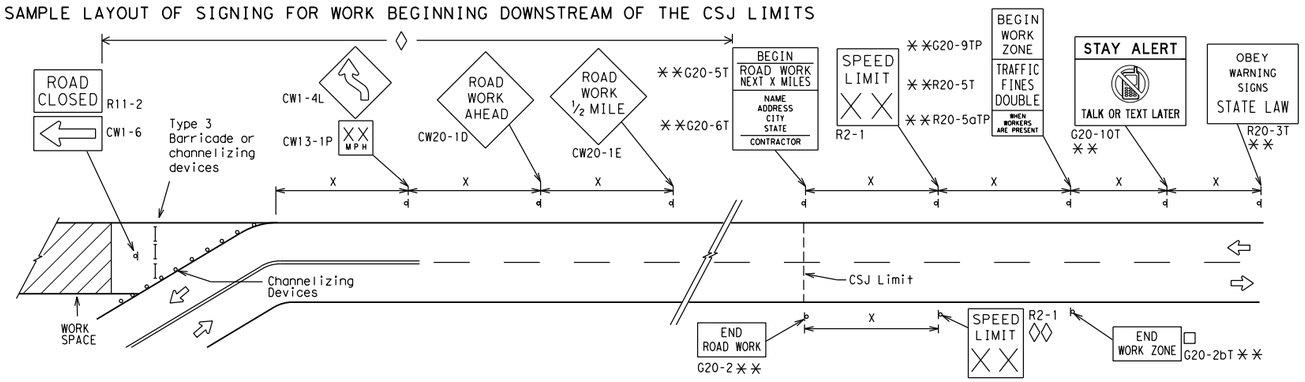
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 DOWNSTREAM OF THE CSJ LIMITS



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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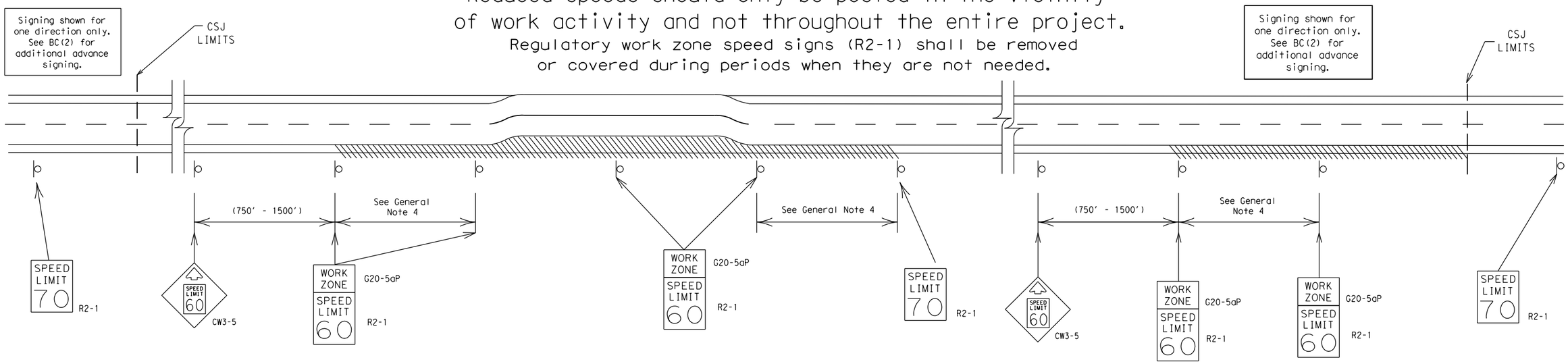
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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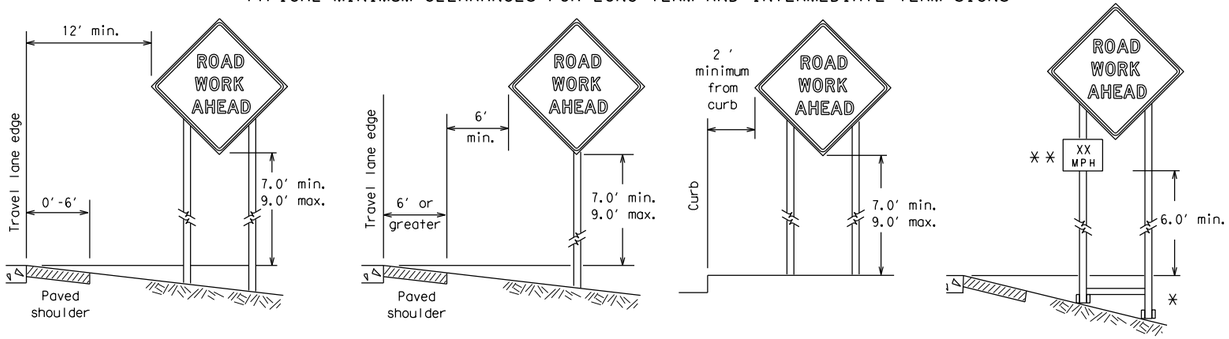
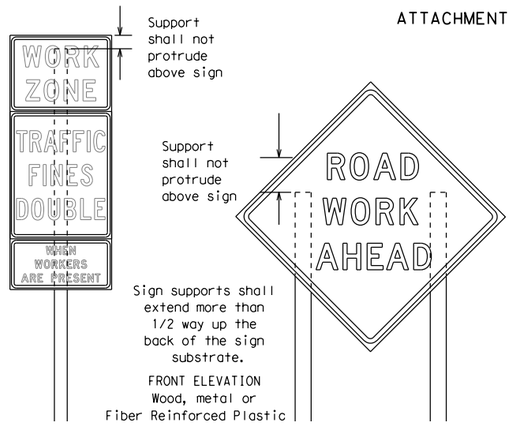
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

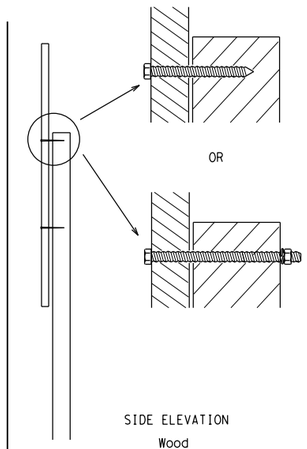


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





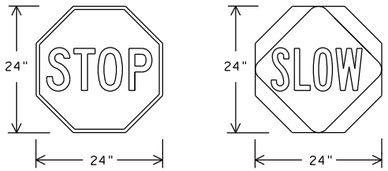
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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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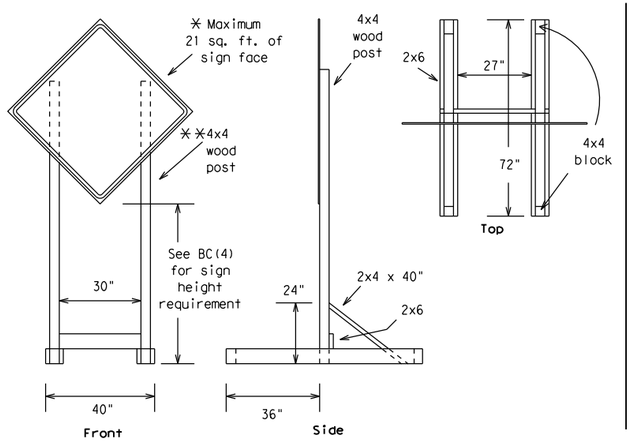
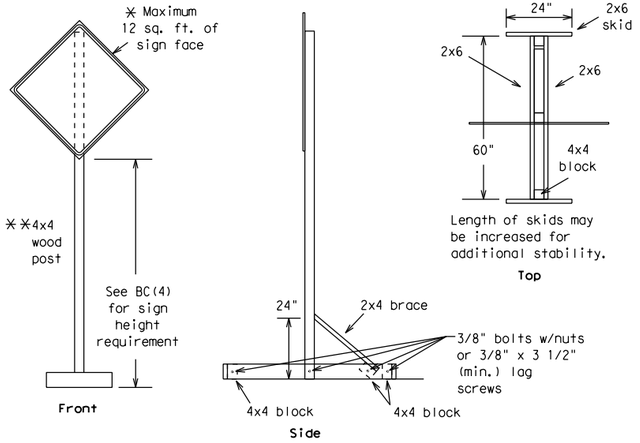
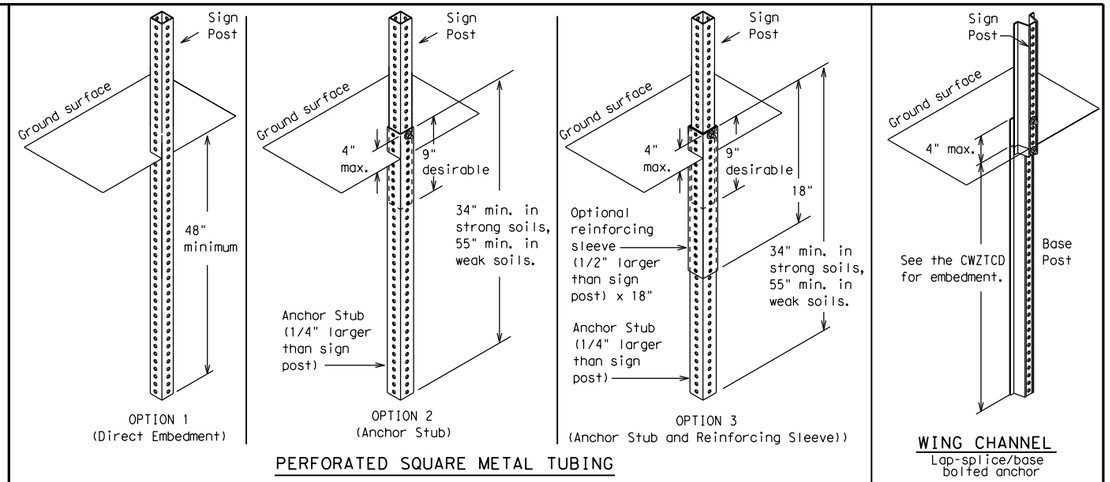




SKID MOUNTED WOOD SIGN SUPPORTS

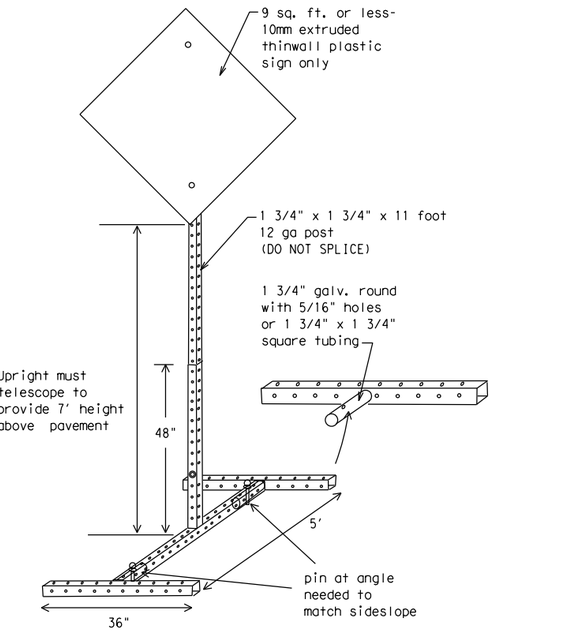
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

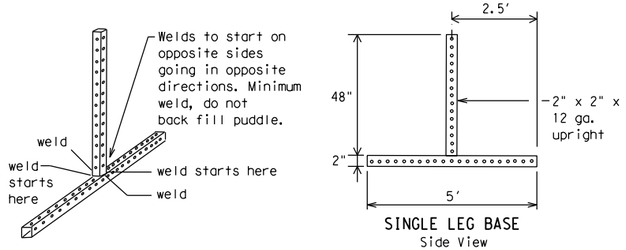


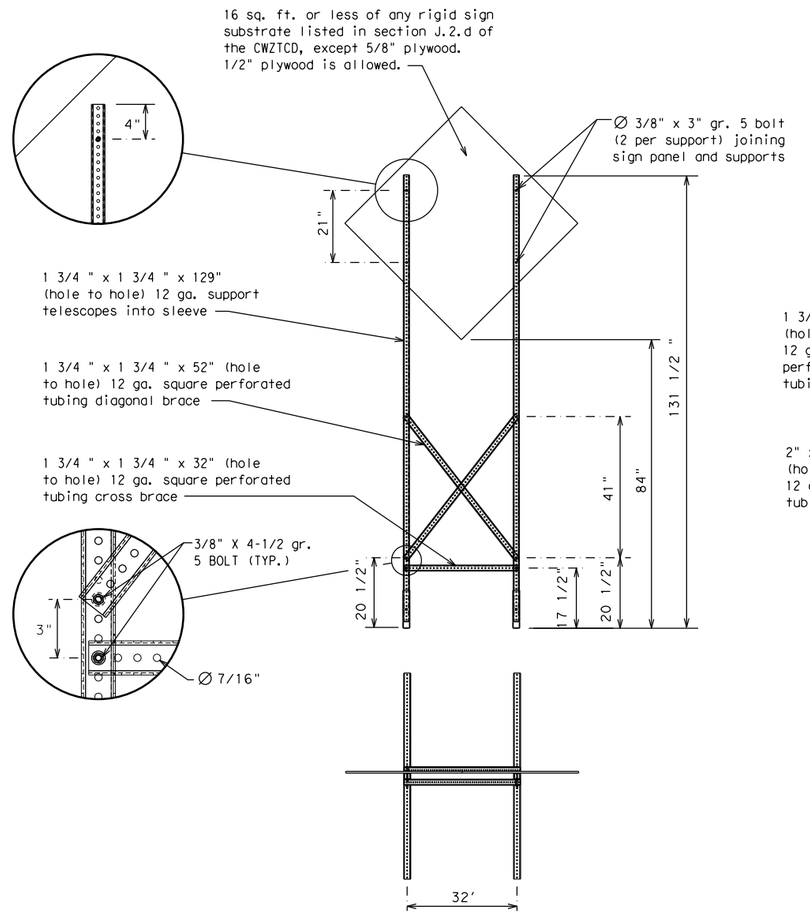
PERFORATED SQUARE METAL TUBING

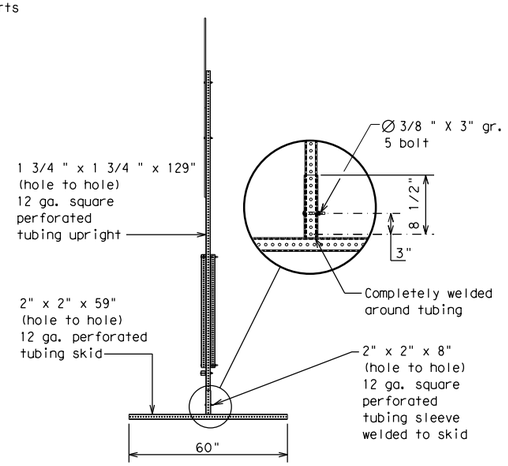
GROUND MOUNTED SIGN SUPPORTS

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)

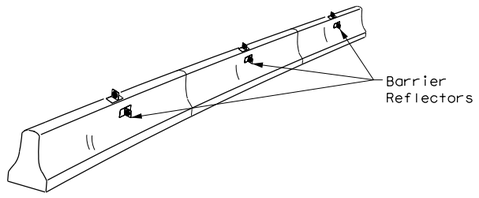
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		40

100

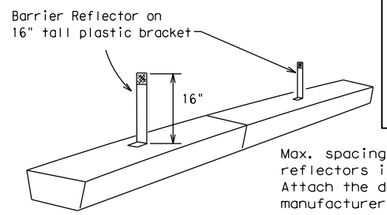
DATE:
FILE:

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



CONCRETE TRAFFIC BARRIER (CTB)

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

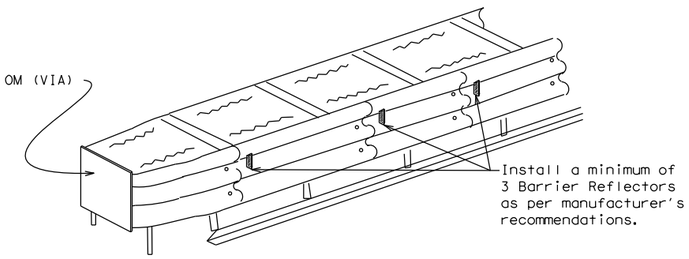


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

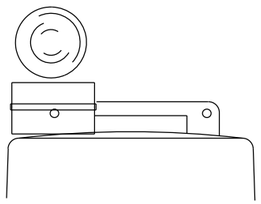


DELINEATION OF END TREATMENTS

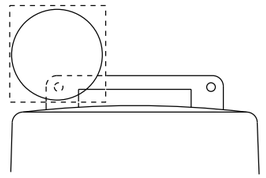
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

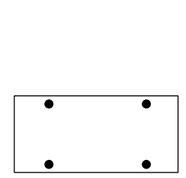
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

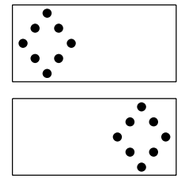
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

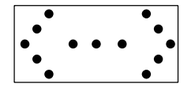


4 CORNER CAUTION

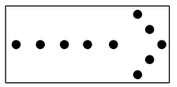
OR



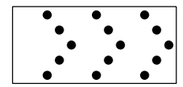
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AMA	POTTER		41

101

DATE:
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

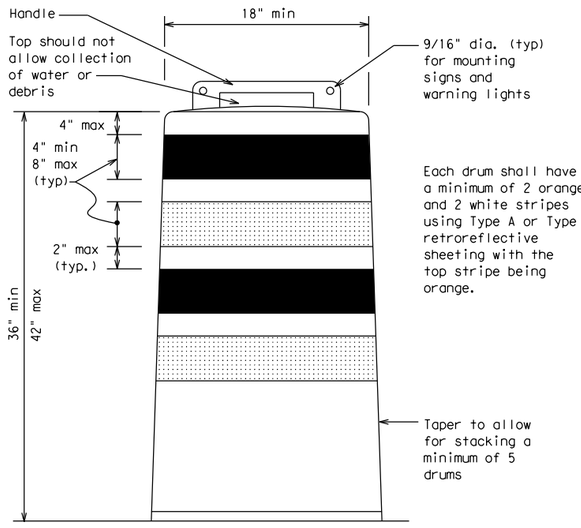
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

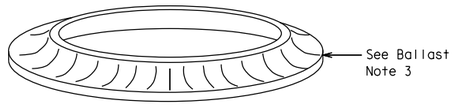
RETROREFLECTIVE SHEETING

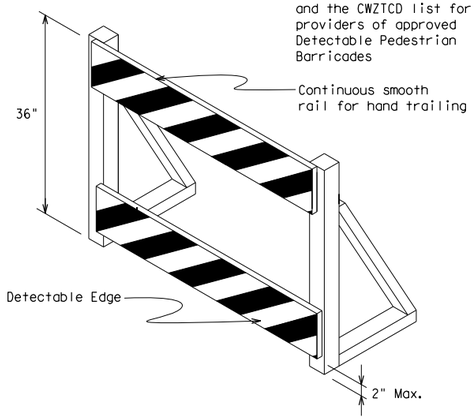
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

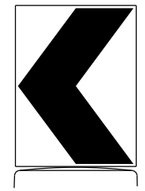




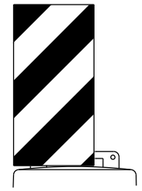


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

.

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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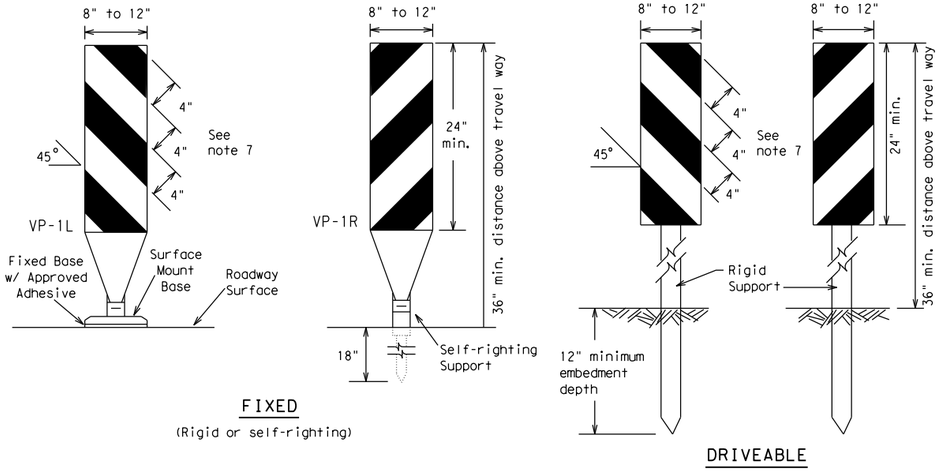
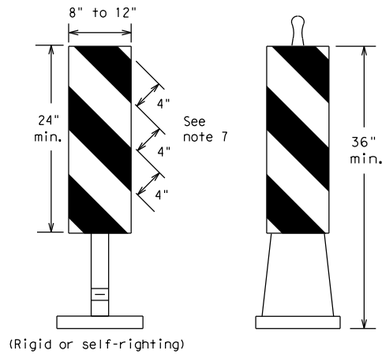


FIXED
(Rigid or self-righting)

DRIVEABLE

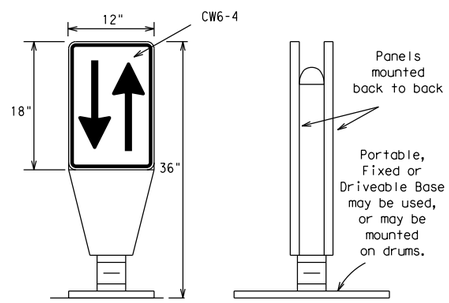


(Rigid or self-righting)

PORTABLE

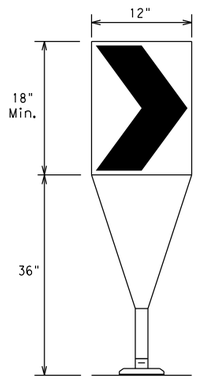
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



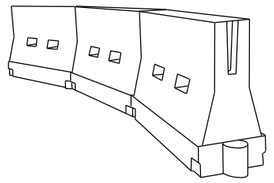
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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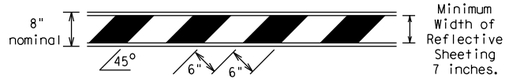
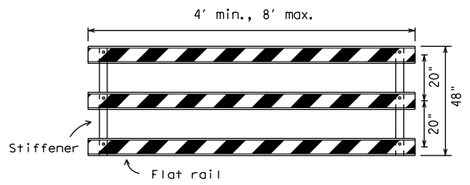
TYPE 3 BARRICADES

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.



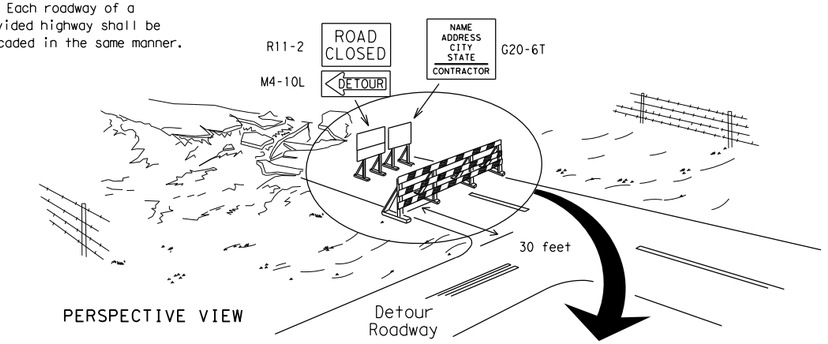
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

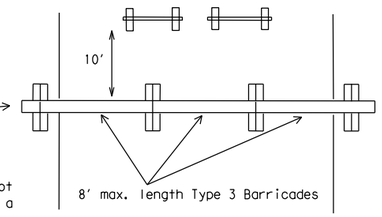
Each roadway of a divided highway shall be barricaded in the same manner.



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.

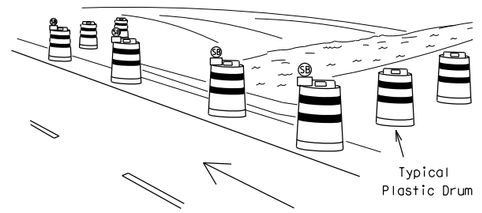
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

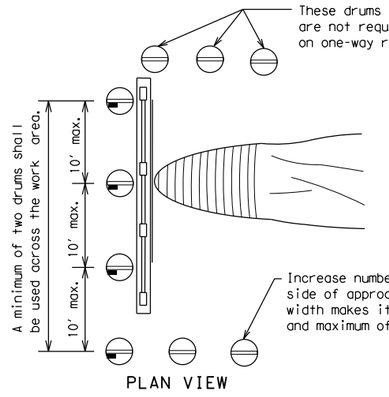
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

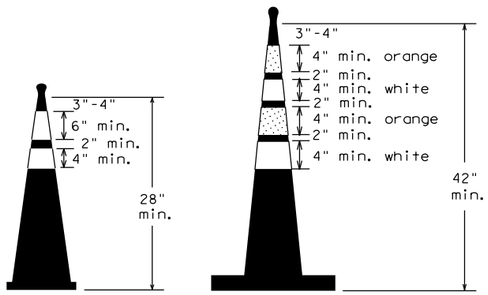
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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

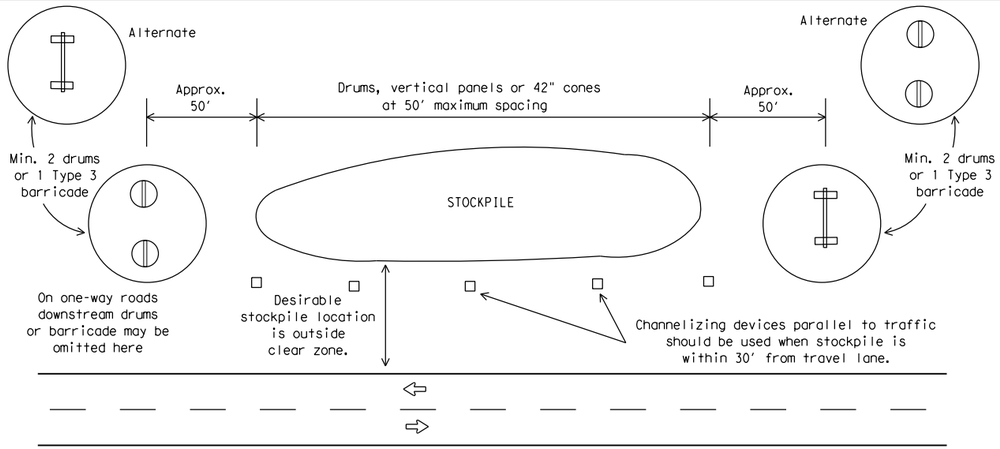
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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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.

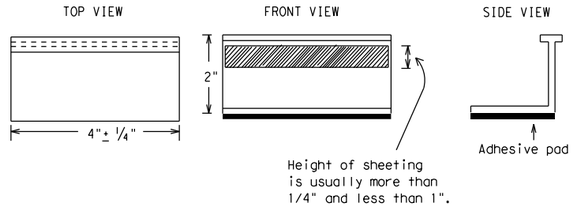
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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).

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BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	0379	03	026, ETC.	SH 136
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	AMA	POTTER		45

105

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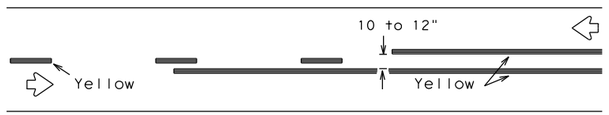
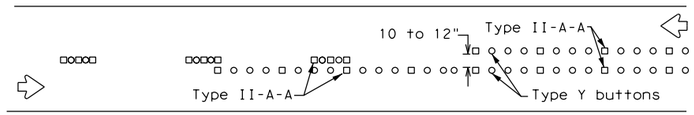
DATE:
FILE:

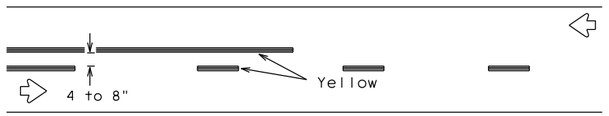
PAVEMENT MARKING PATTERNS



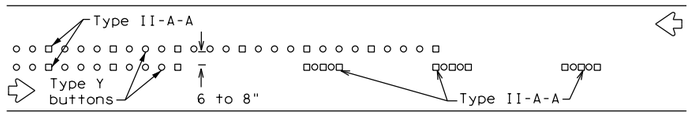
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



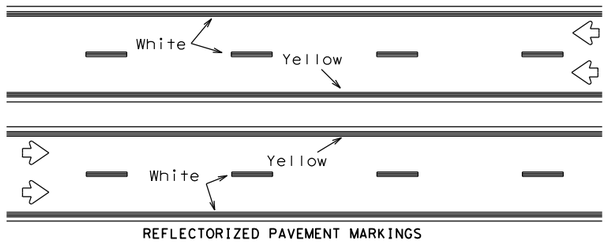
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



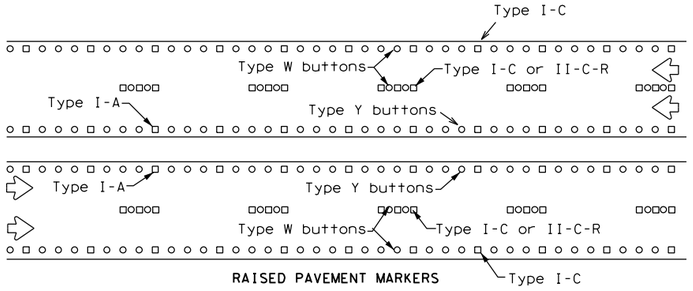
RAISED PAVEMENT MARKERS - PATTERN B

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



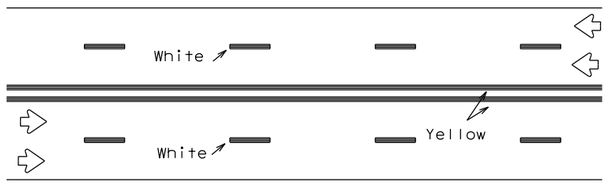
REFLECTORIZED PAVEMENT MARKINGS



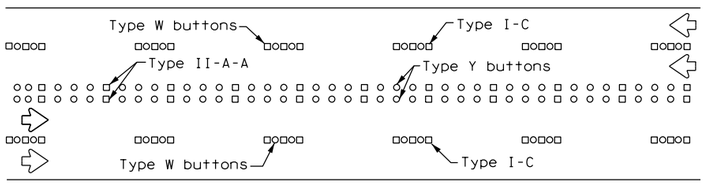
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



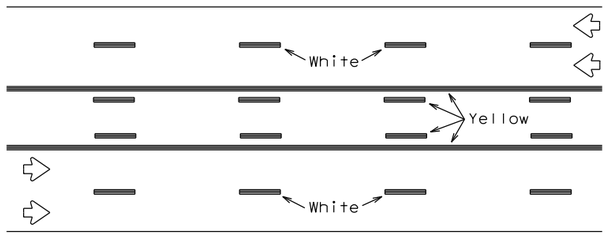
REFLECTORIZED PAVEMENT MARKINGS



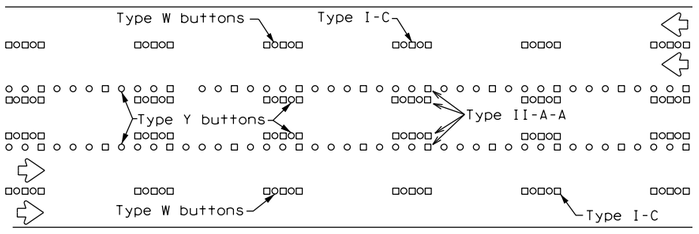
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

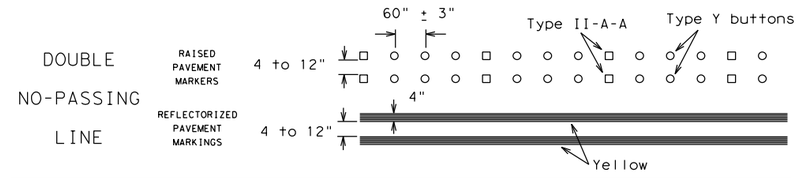
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

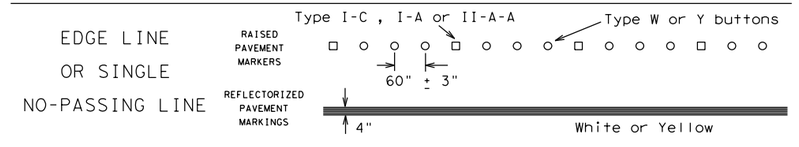
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

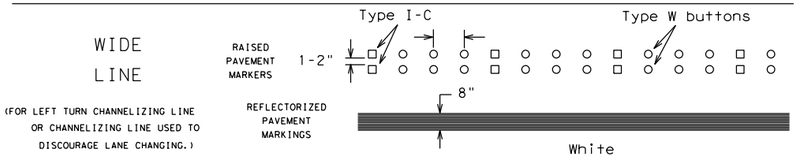


EDGE LINE OR SINGLE NO-PASSING LINE



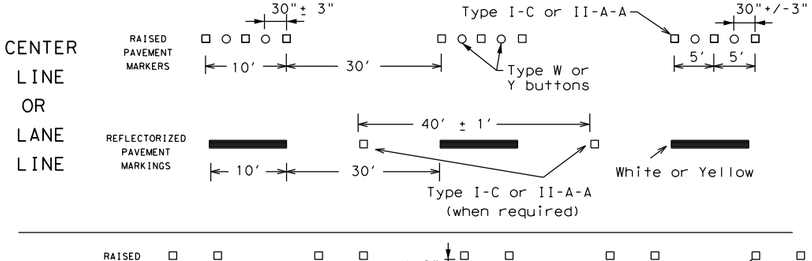
WIDE LINE

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

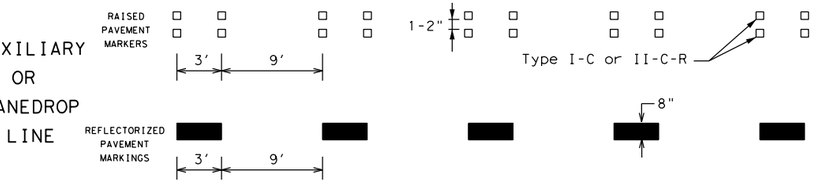


BROKEN LINES

CENTER LINE OR LANE LINE

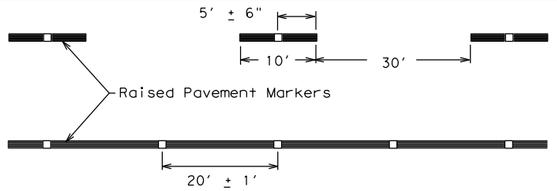


AUXILIARY OR LANEDROP LINE



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

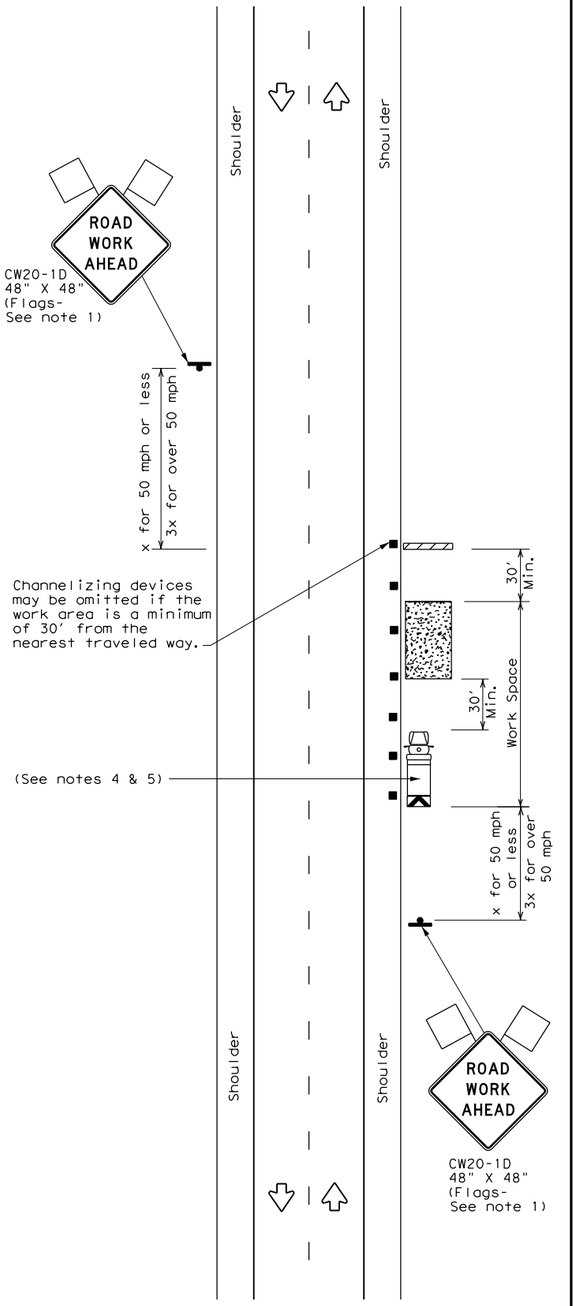
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

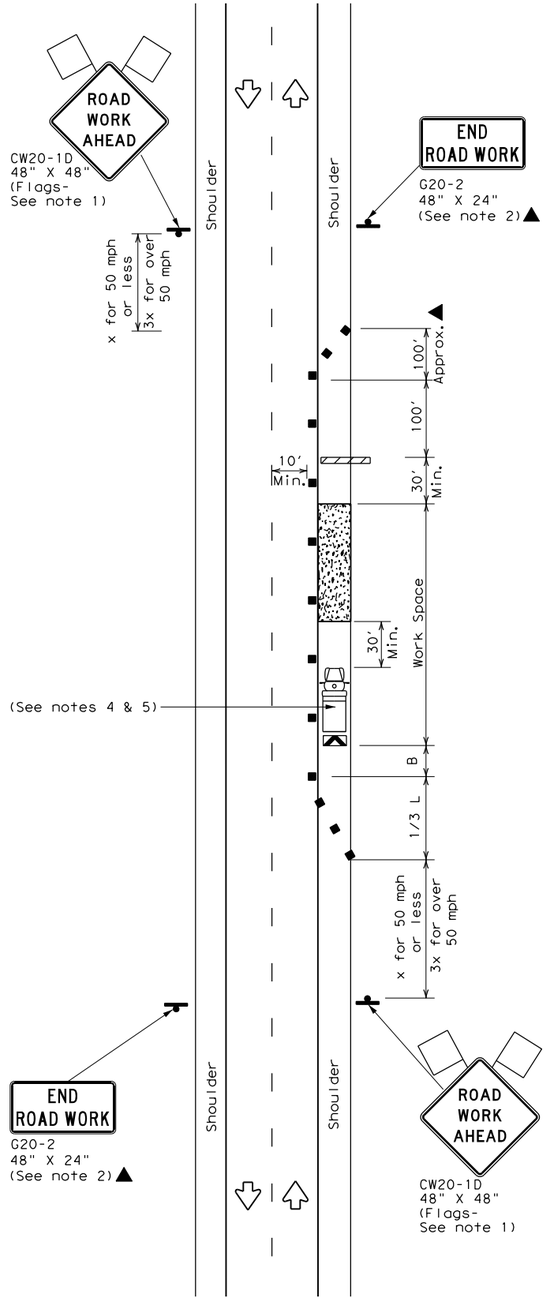
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		46

DATE:
FILE:



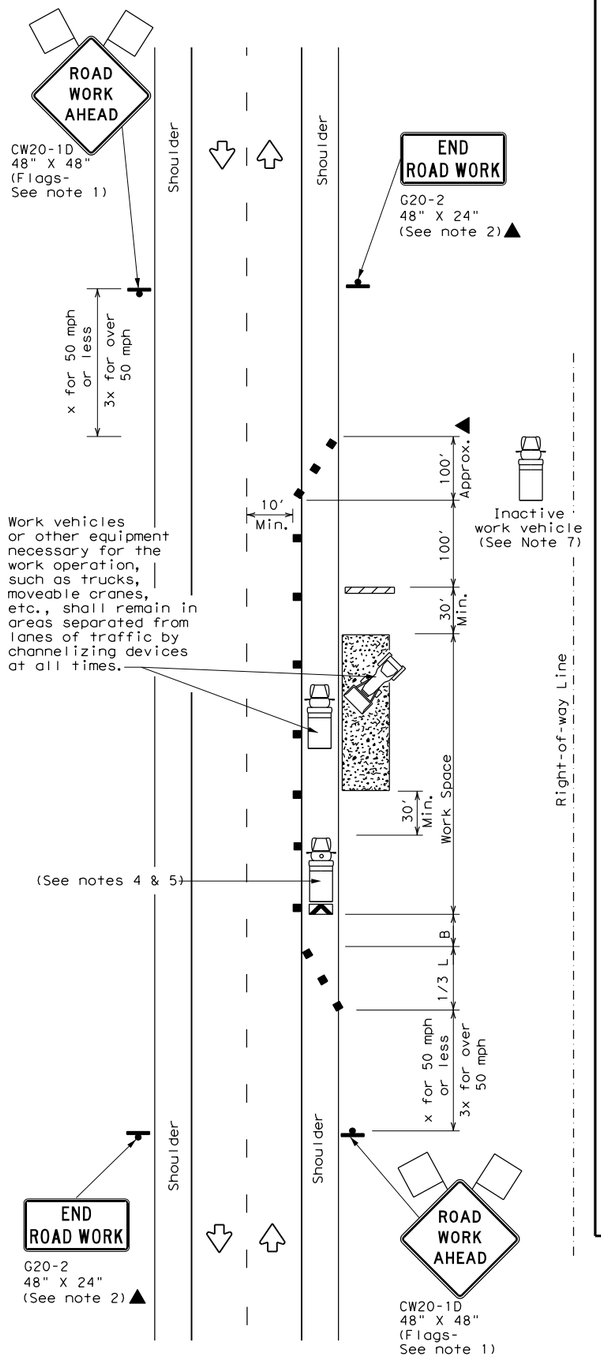
TCP (2-1a)

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

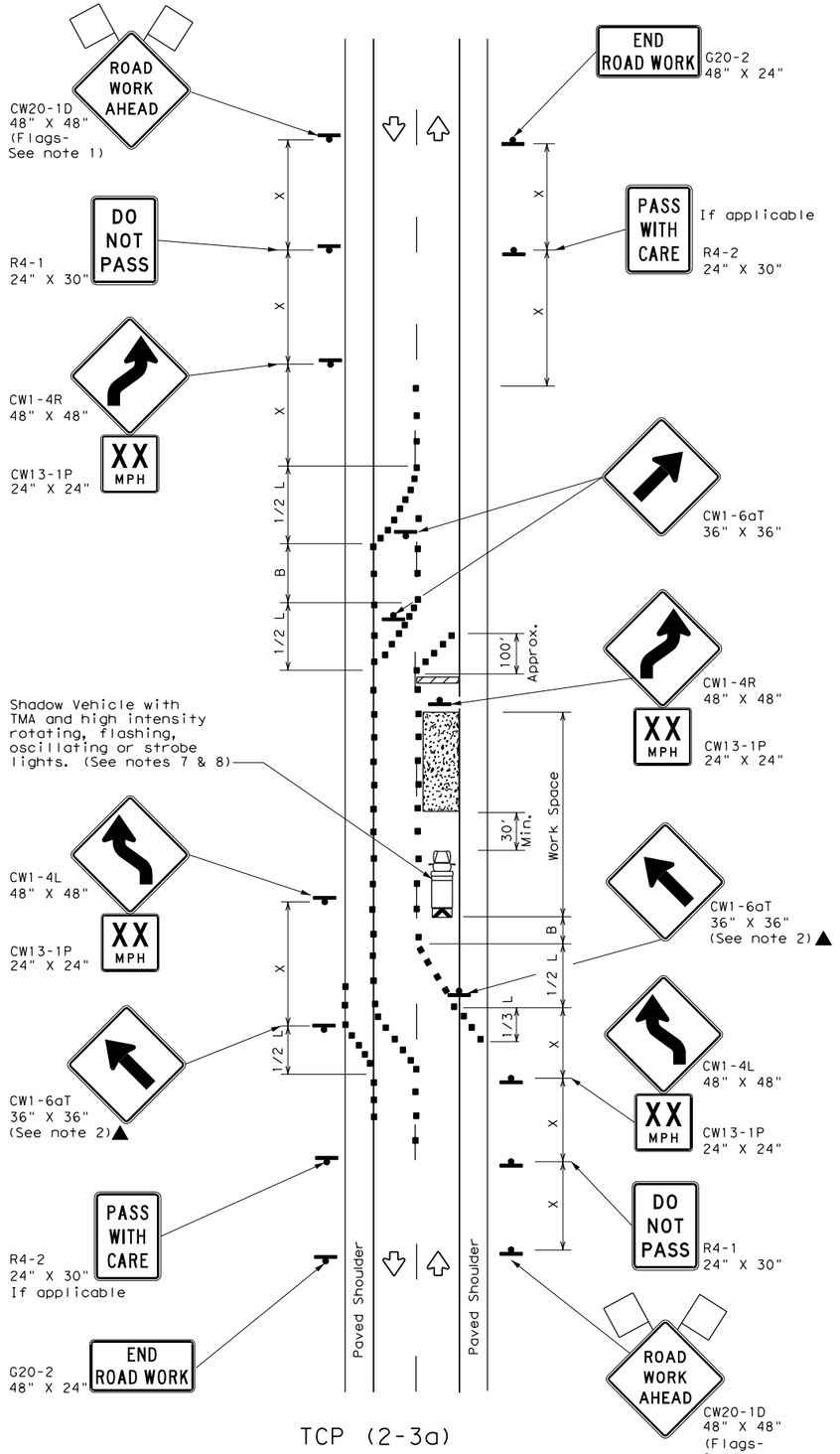
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

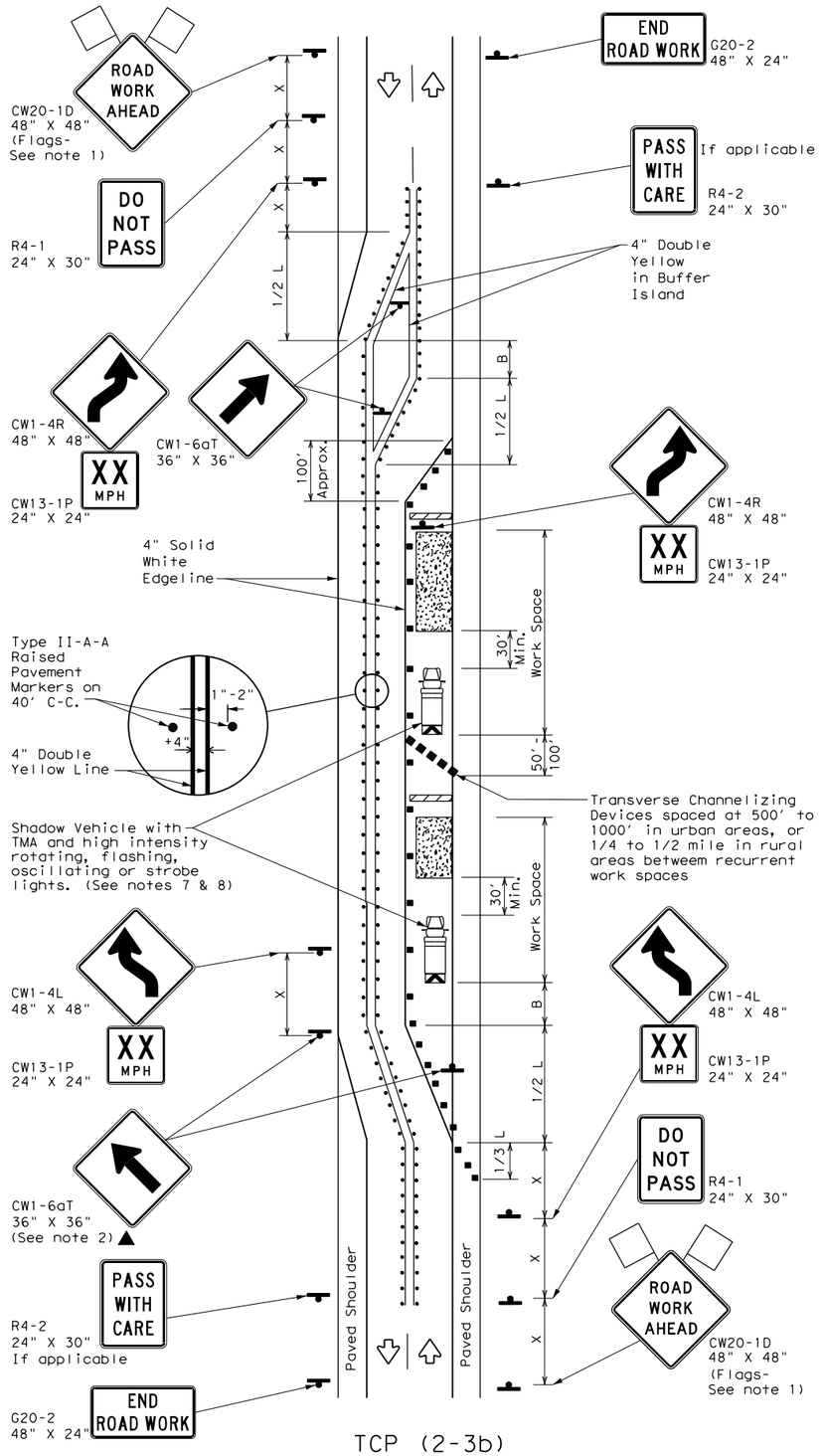
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AMA	POTTER		47
1-97 2-18				

DATE:
FILE:



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	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
				TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. 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 device spacing is intended for the area of the conflicting markings, not the entire work zone.

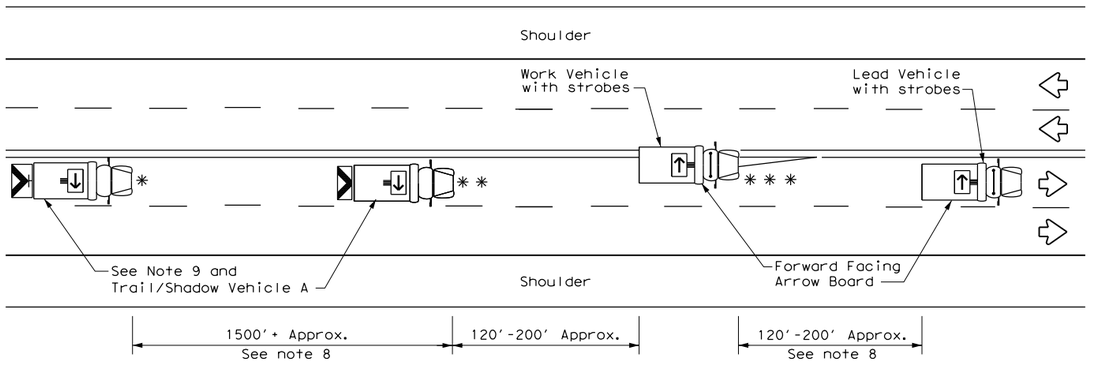
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

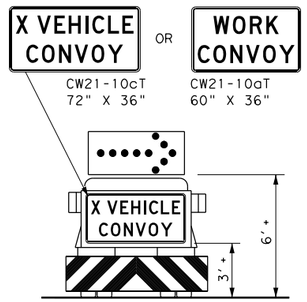
TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	AMA	POTTER		48
4-98 2-18				



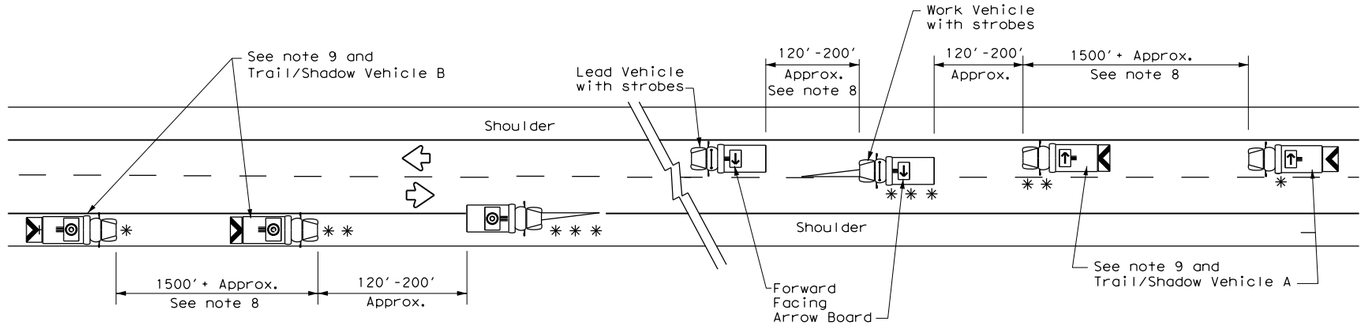
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

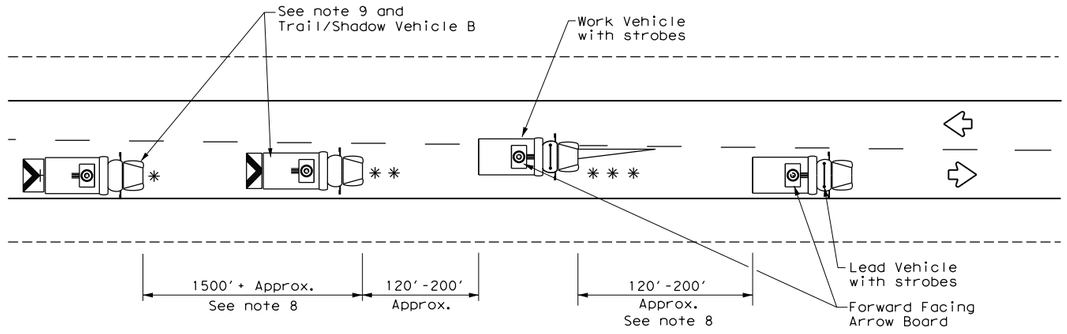


WORK ON SHOULDER

WORK ON TRAVEL LANE

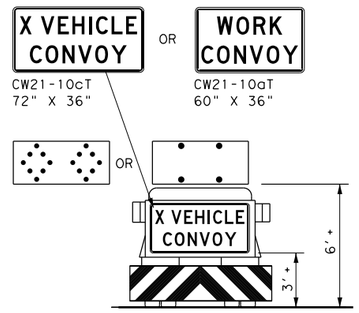
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

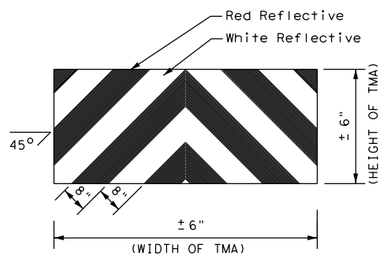
with Flashing Arrow Board in CAUTION display

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

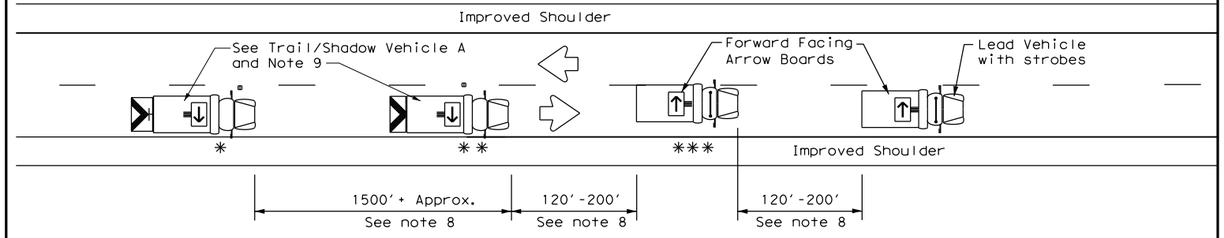
TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	AMA	POTTER		49
1-97				

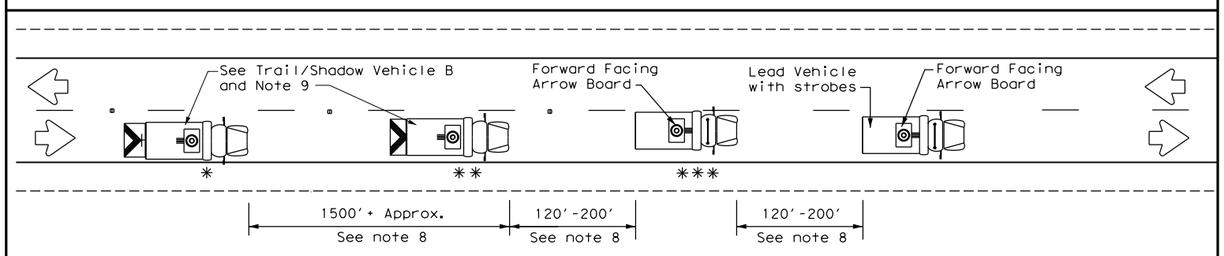
DATE:
FILE:

DATE:
FILE:



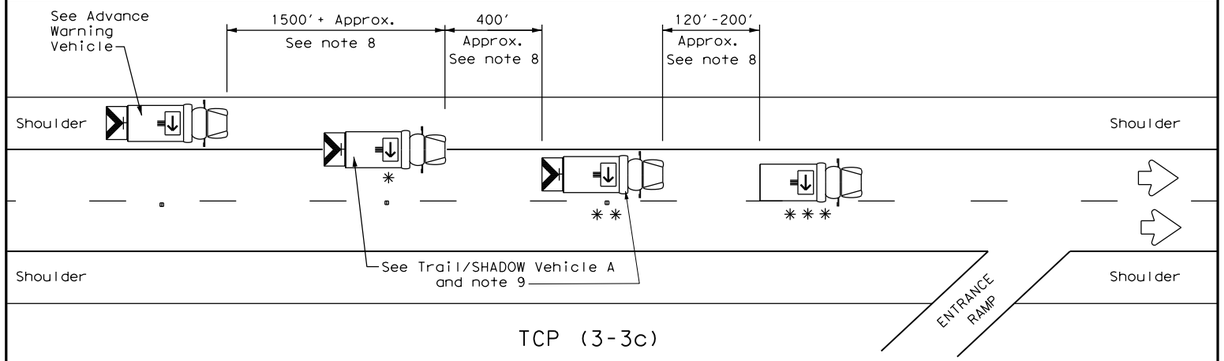
TCP (3-3a)

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



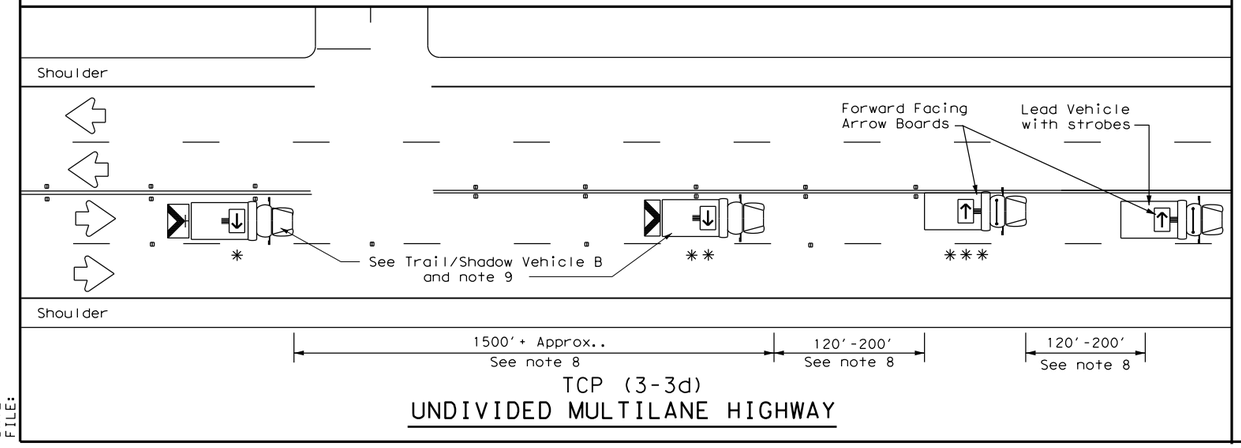
TCP (3-3b)

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



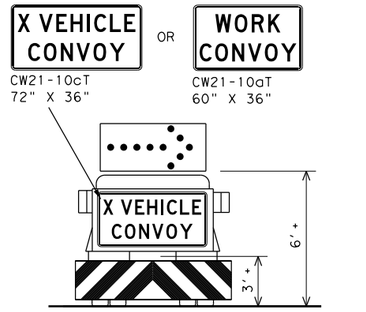
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



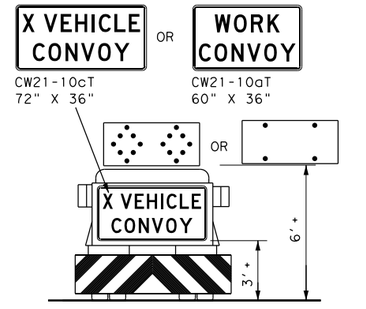
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



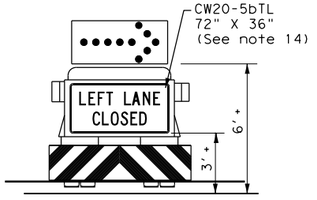
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

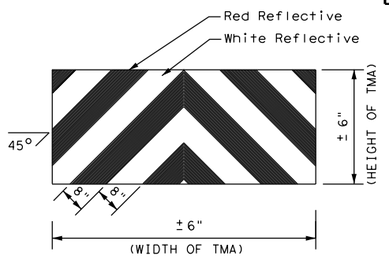


TRAIL/SHADOW VEHICLE B

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

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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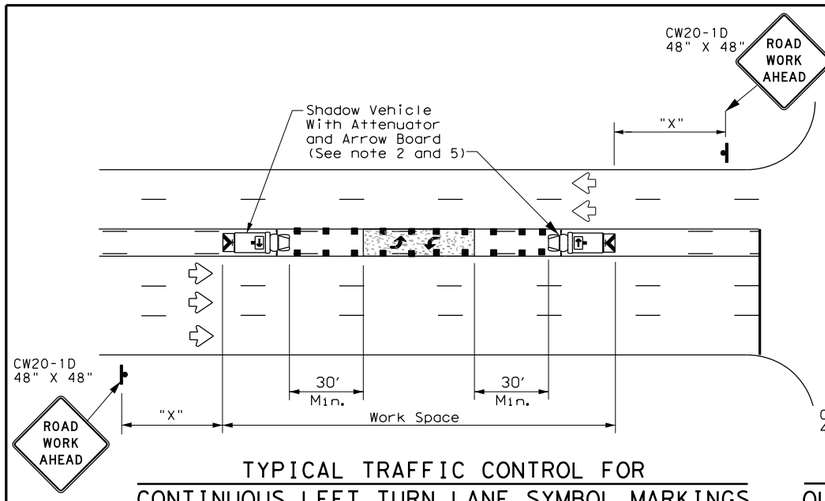
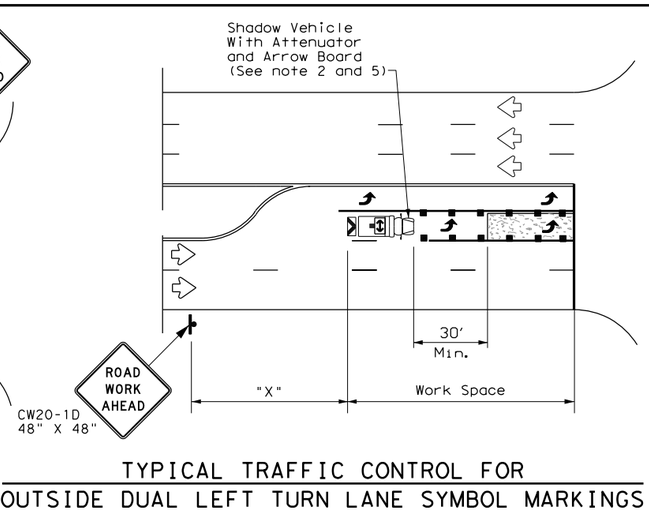
8-95 7-13	AMA	POTTER		50
1-97 7-14				

177

DATE:
FILE:



TYPICAL TRAFFIC CONTROL FOR
CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR
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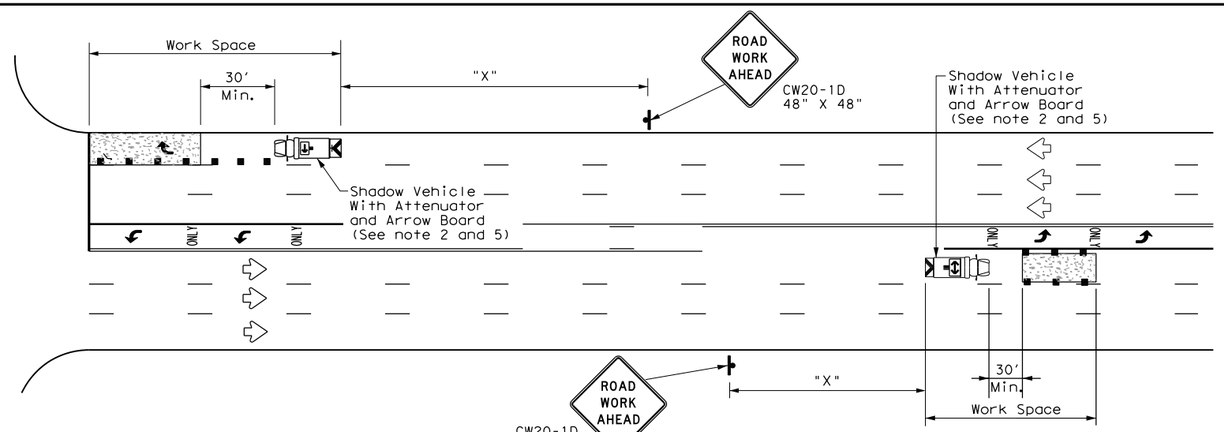
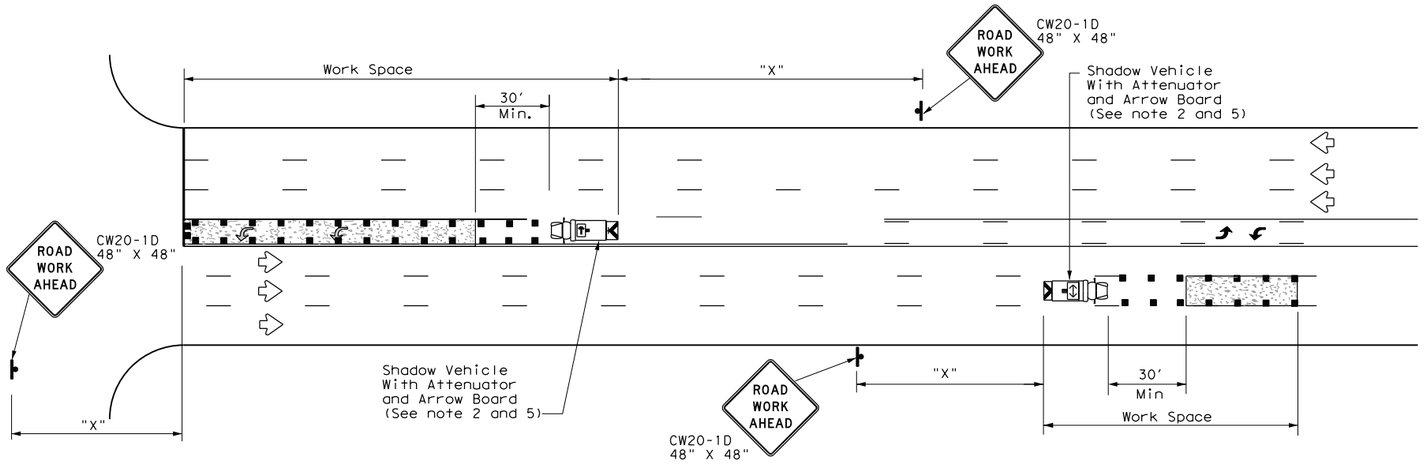


TYPICAL TRAFFIC CONTROL FOR
OUTSIDE LANE MARKINGS

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 ✳✳ 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

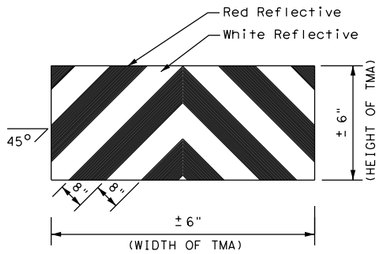
1. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take 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

FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
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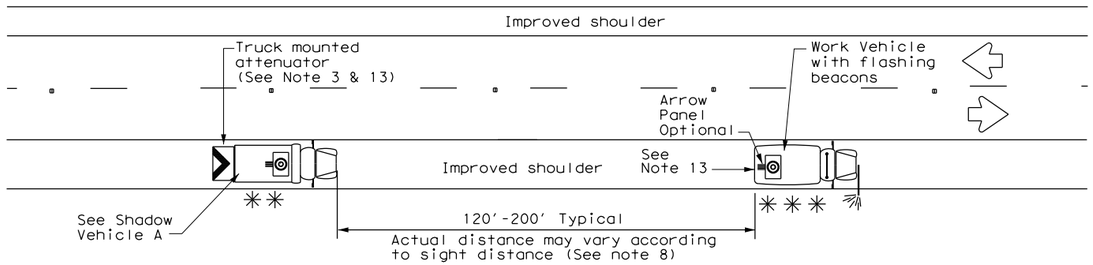
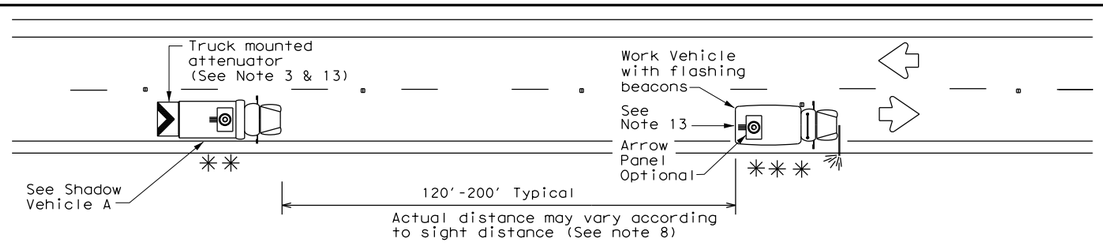
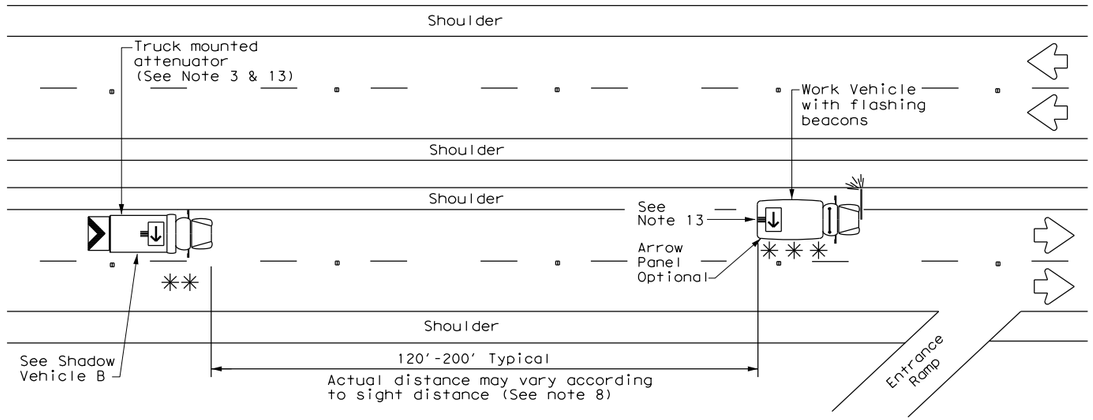
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		51



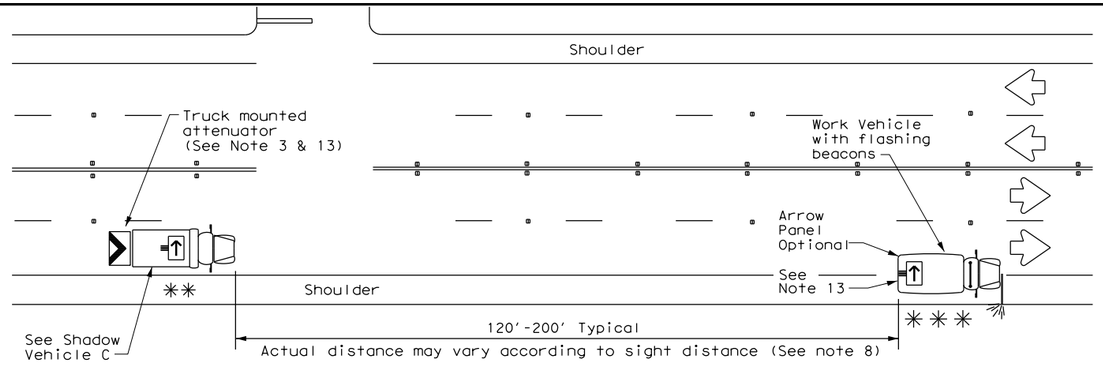
TWO LANE HIGHWAY WITH PAVED SHOULDERS MINIMUM 8'



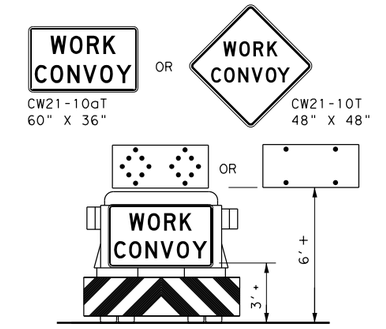
TWO LANE HIGHWAY WITH NO SHOULDER OR NARROW SHOULDER



MULTILANE HIGHWAY

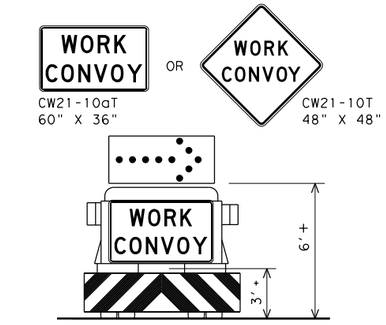


MULTILANE HIGHWAY



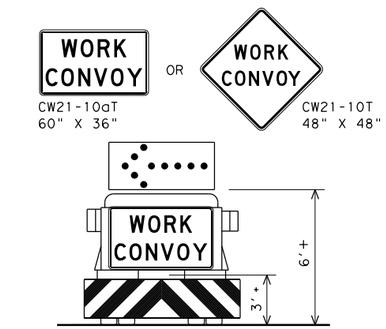
SHADOW VEHICLE A

with Flashing Arrow Board in Caution Mode



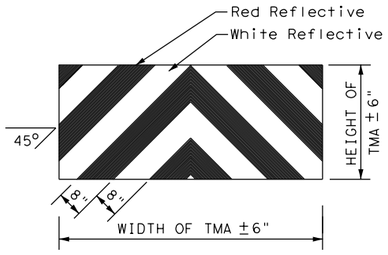
TYPICAL SHADOW VEHICLE B

with RIGHT Directional display Flashing Arrow Board



TYPICAL SHADOW VEHICLE C

with LEFT Directional display Flashing Arrow Board



STRIPING FOR TMA

LEGEND

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

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

GENERAL NOTES

1. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
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 is required.
4. Striping on the back panel of all TMAs shall be 8" red reflective sheeting with white background, 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.
5. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When the work convoy must change lanes, the Shadow Vehicle should change lanes first to protect the Work Vehicle.
8. Spacing between Shadow and Work Vehicle will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the Shadow Vehicle in time to slow down and/or change lanes as they approach the Work Convoy.
9. Use of an arrow panel on the Work Vehicle is optional except as provided in note 13, but may be required by the Engineer. If an arrow panel is not used, dual flashing beacons, mounted as high and as widely separated as practicable at the rear of the Work Vehicle shall be required.
10. On two-lane two-way roadways, the Work and Shadow Vehicles should pull over periodically to allow motor vehicle traffic to pass.
11. Work and Shadow Vehicles should stay on the shoulder of highways having 8' or wider shoulders when possible.
12. A Trail Vehicle may be added to the operation when approved by the Engineer. See TCP(3) series standards.
13. The shadow vehicle may be omitted on conventional roadways when a TMA or TA and arrow panel is mounted to the herbicide vehicle. A separate shadow vehicle will be required on expressways and Freeways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS HERBICIDE TRUCK OPERATIONS

TCP(3-5)-18

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©TxDOT July 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
4-18	DIST	COUNTY		SHEET NO.
	AMA	POTTER		52

DATE:
FILE:

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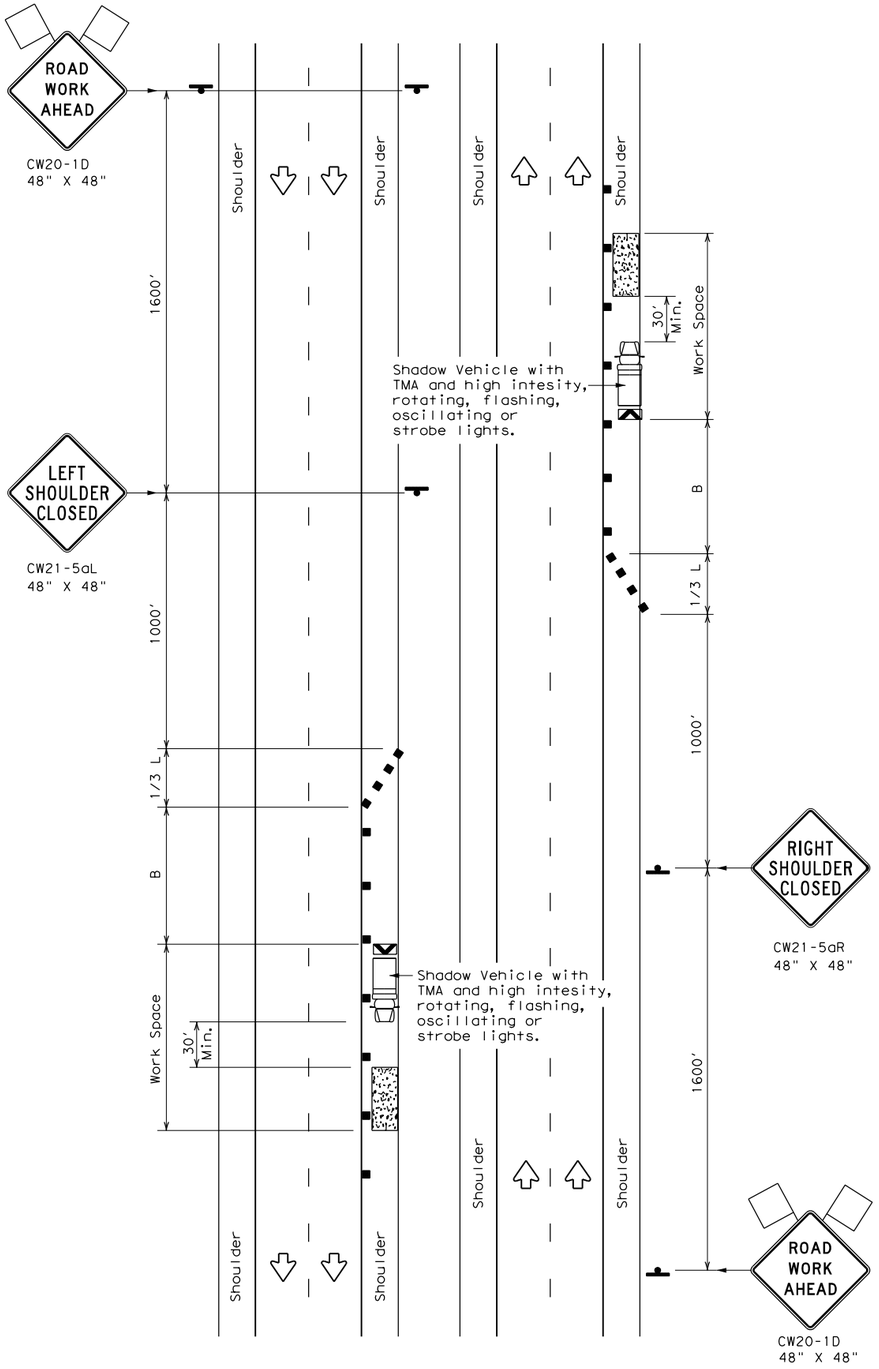
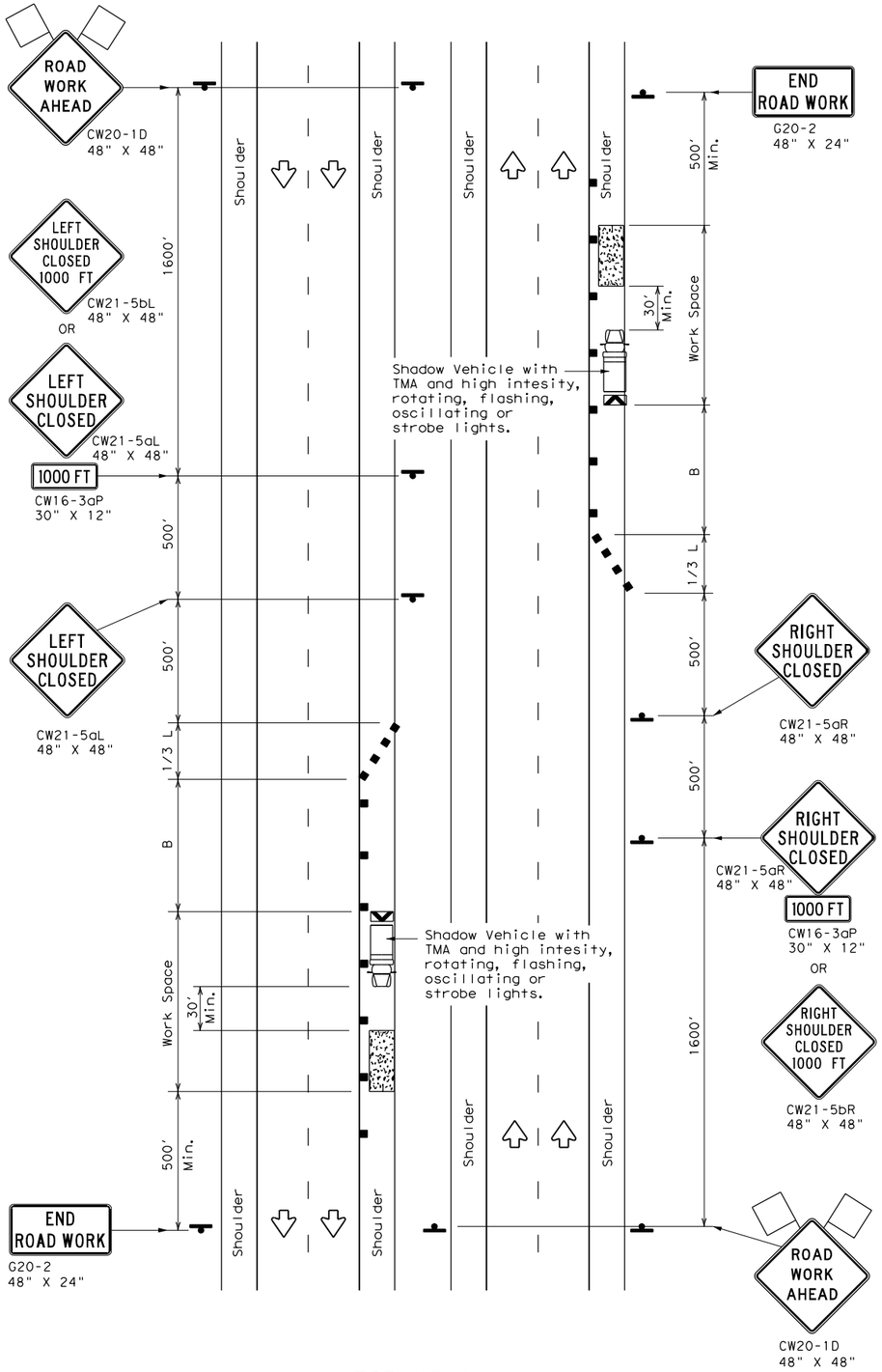


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
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'

* 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
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

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©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0379	03	026, ETC.	SH 136
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	AMA	POTTER		53

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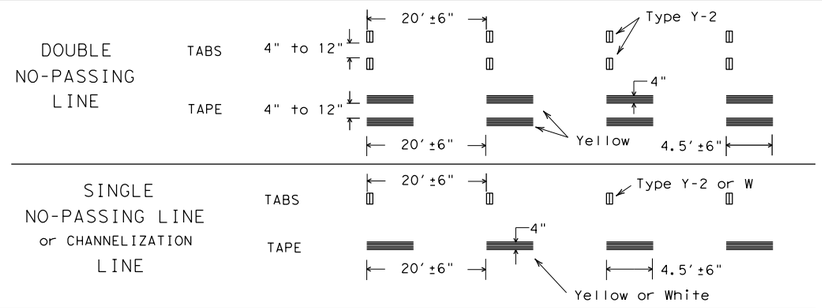
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



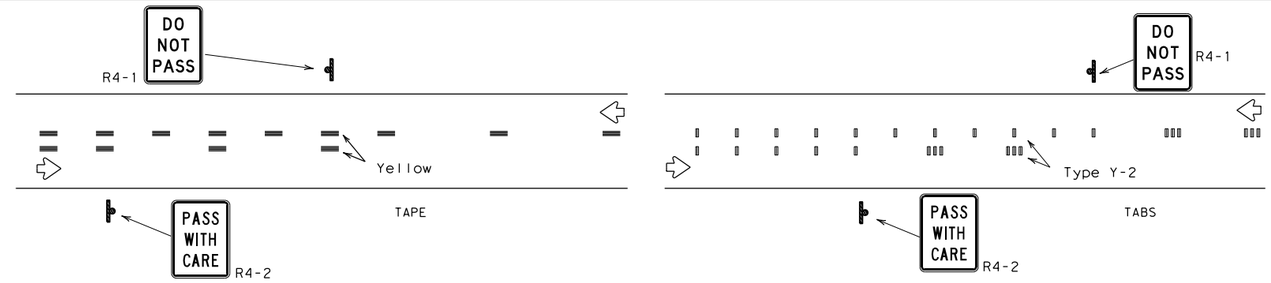
NOTES:

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.

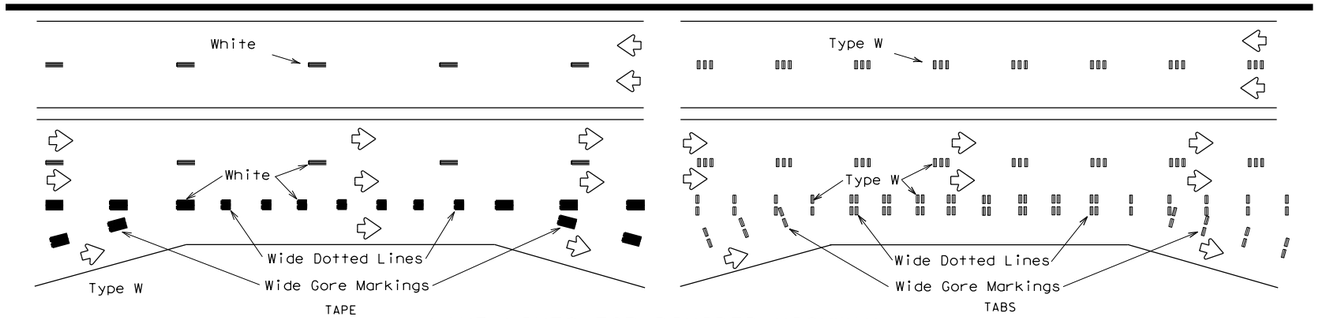
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

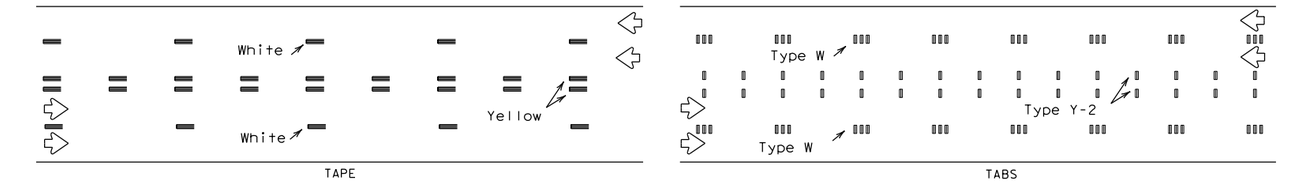
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



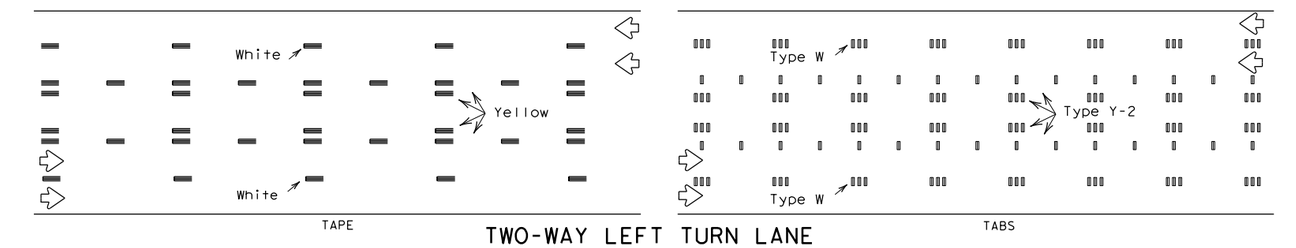
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



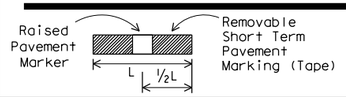
LANE LINES FOR DIVIDED HIGHWAY



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

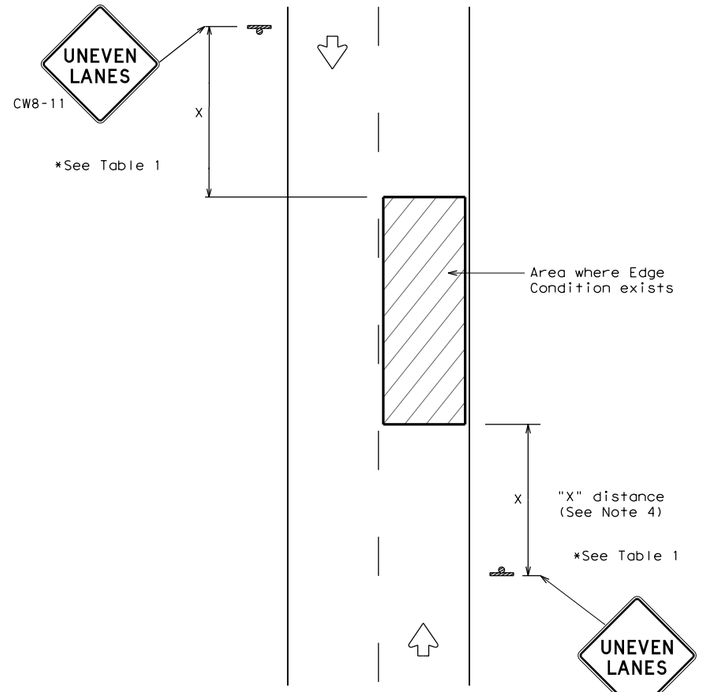
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

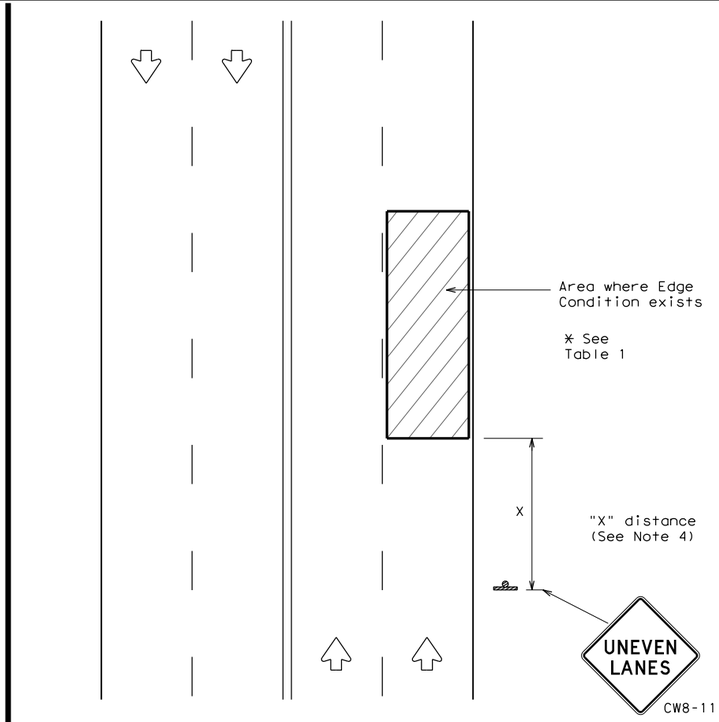
FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0379	03	026, ETC.	SH 136
1-97		DIST	COUNTY		SHEET NO.
3-03		AMA	POTTER		54
7-13					

111

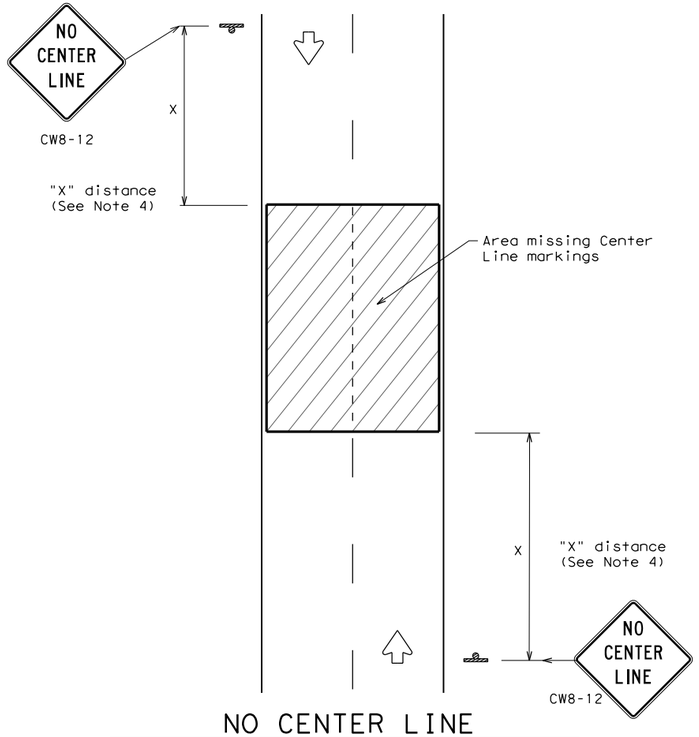
DATE:
FILE:



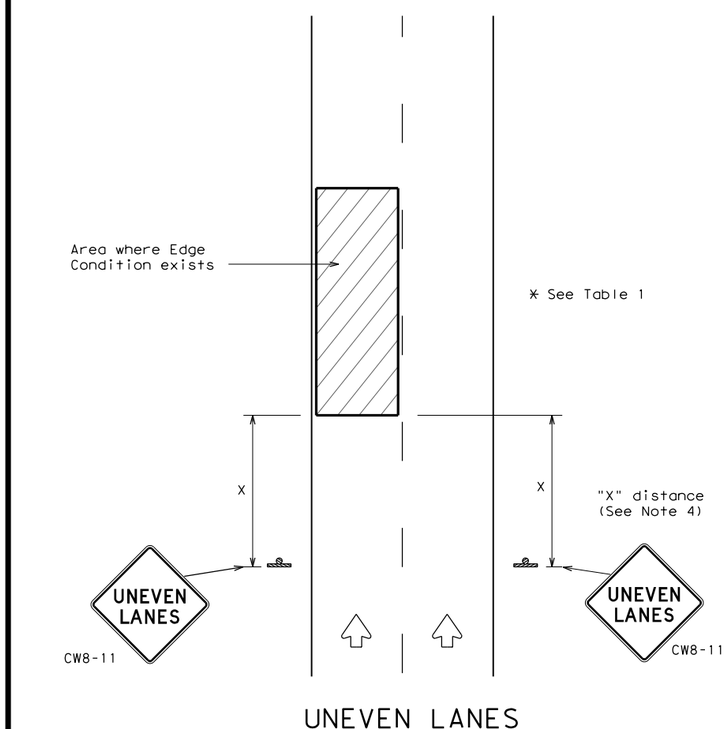
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

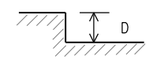
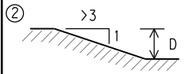
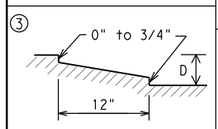
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

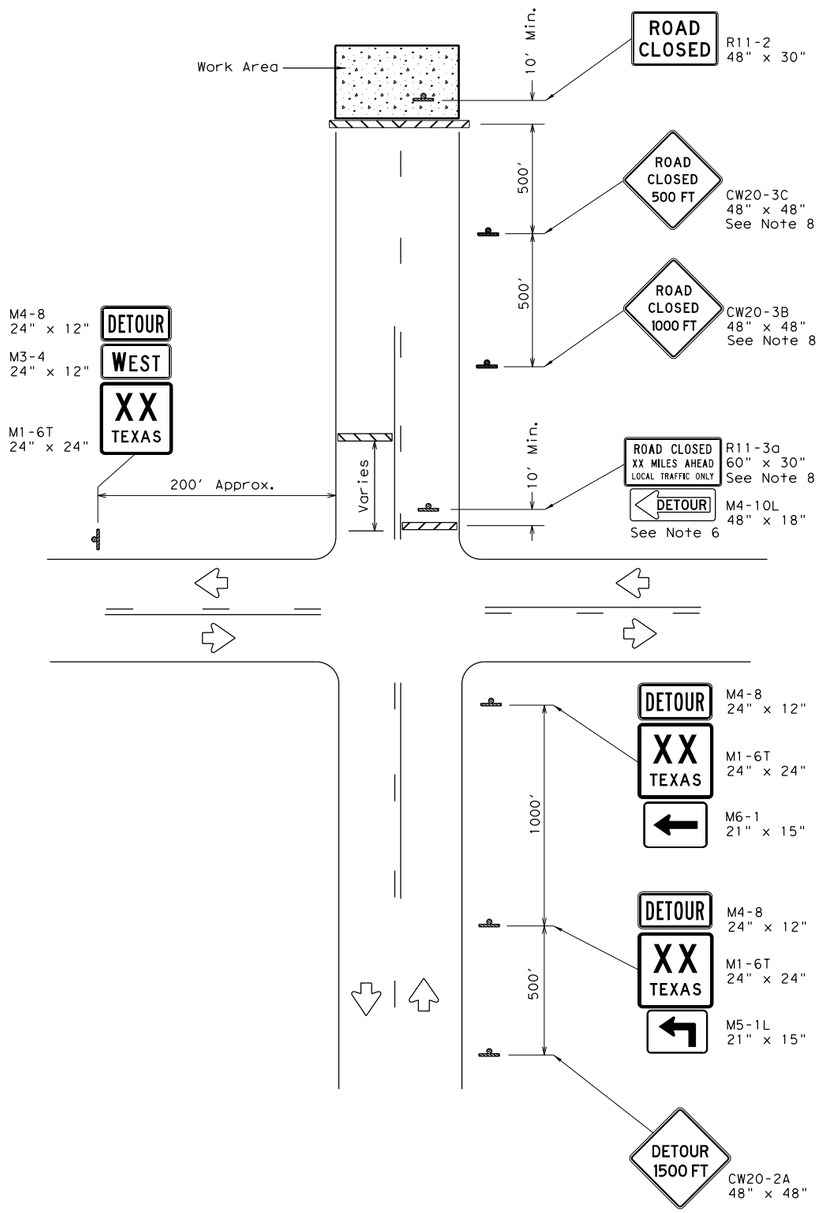
SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	AMA	POTTER		55

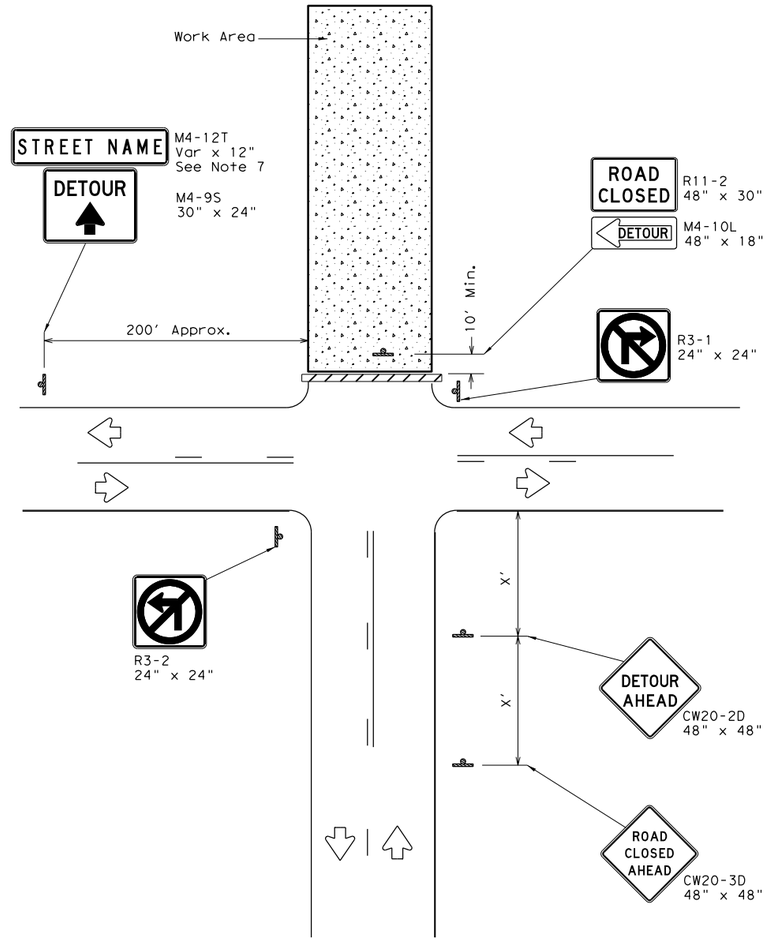
112

DATE:
FILE:



ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

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

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

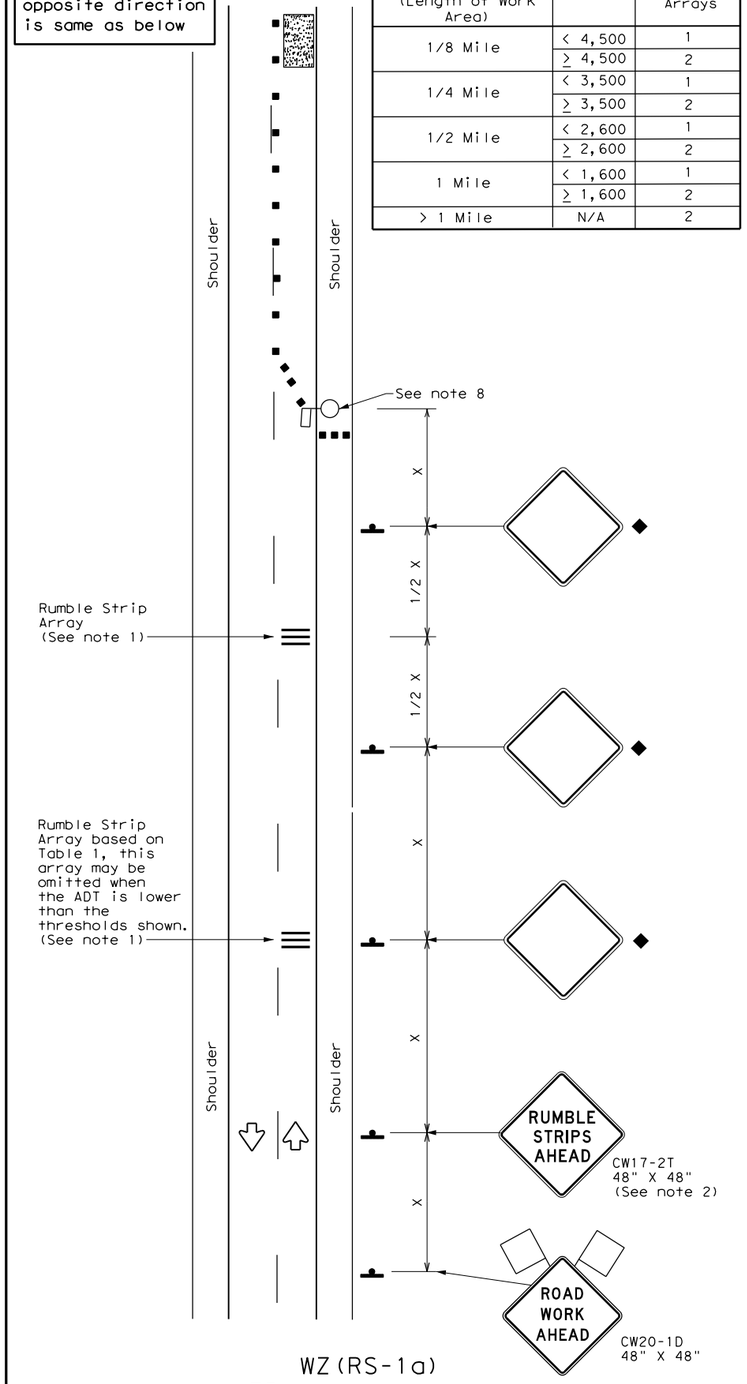
WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
1-97 4-98 7-13	DIST	COUNTY		SHEET NO.
2-98 3-03	AMA	POTTER		56

DATE:
FILE:

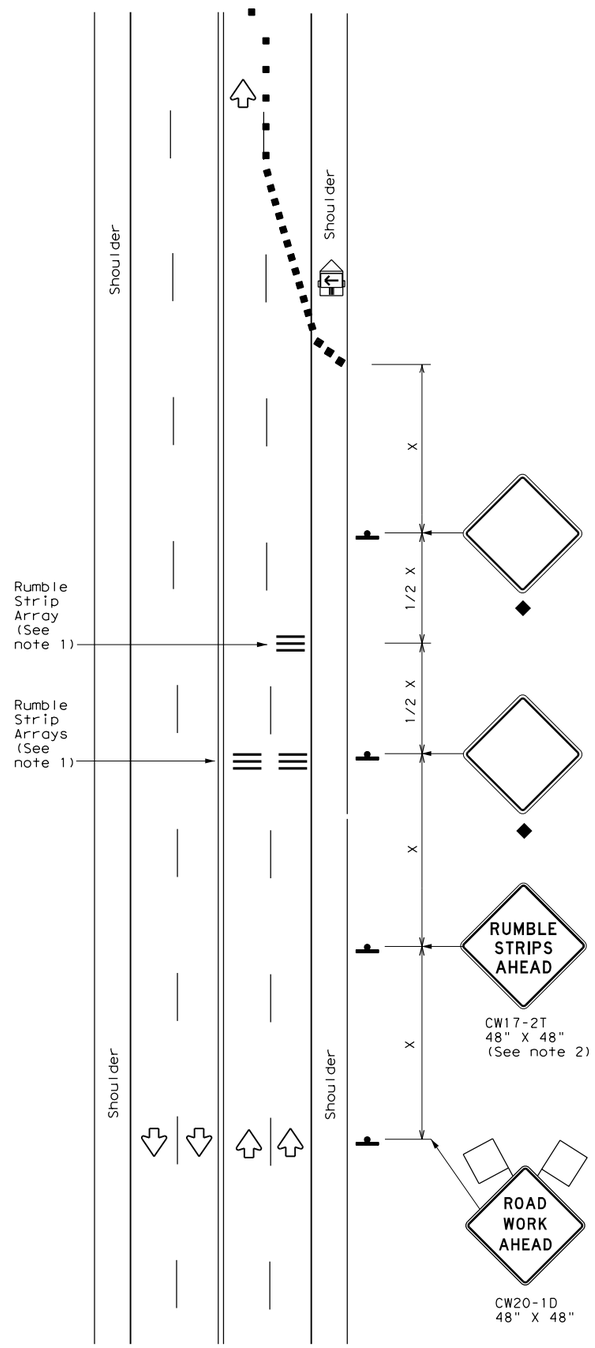
Warning sign and rumble strip sequence in opposite direction is same as below

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

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
2-14	DIST	COUNTY		SHEET NO.
4-16	AMA	POTTER		57

DATE:
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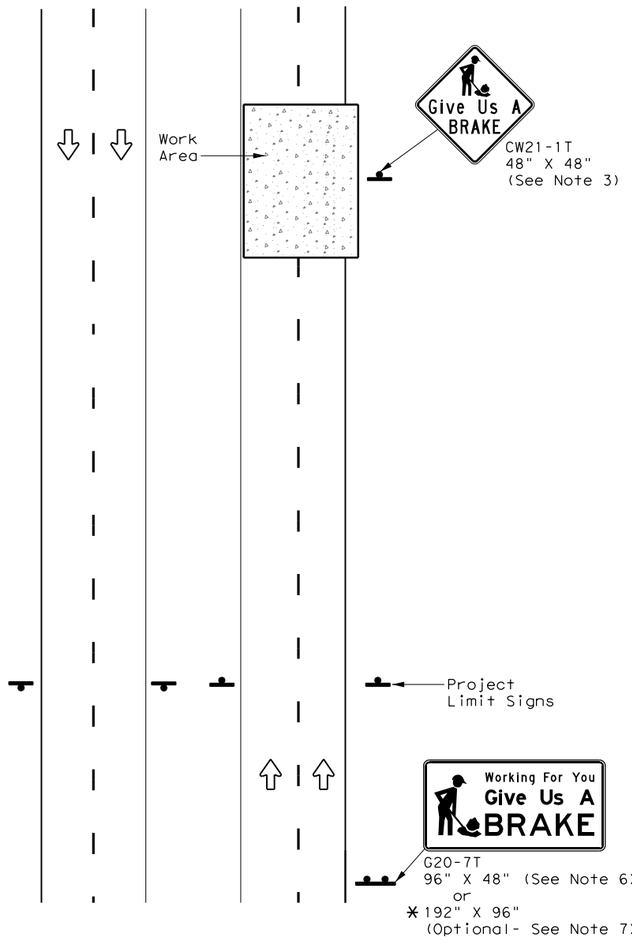
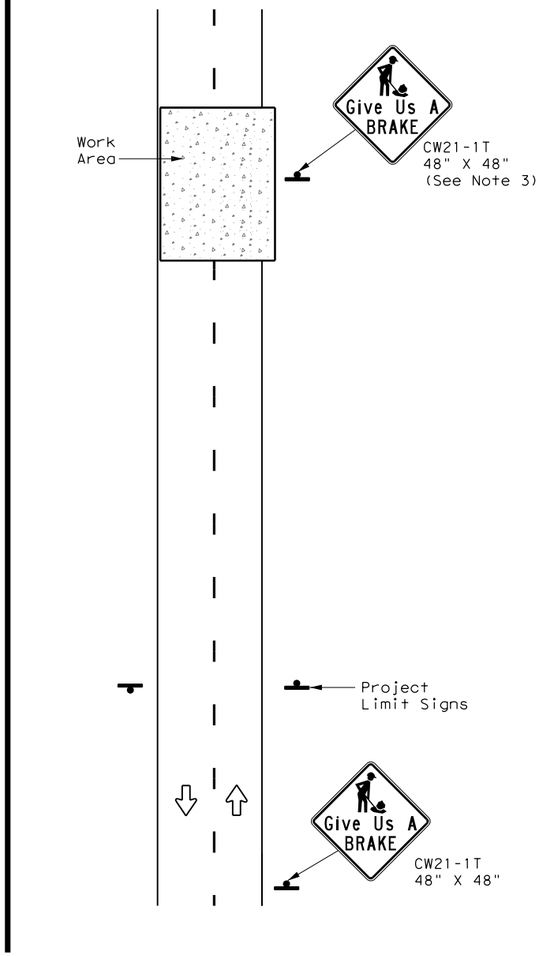


DIVIDED HIGHWAY



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.

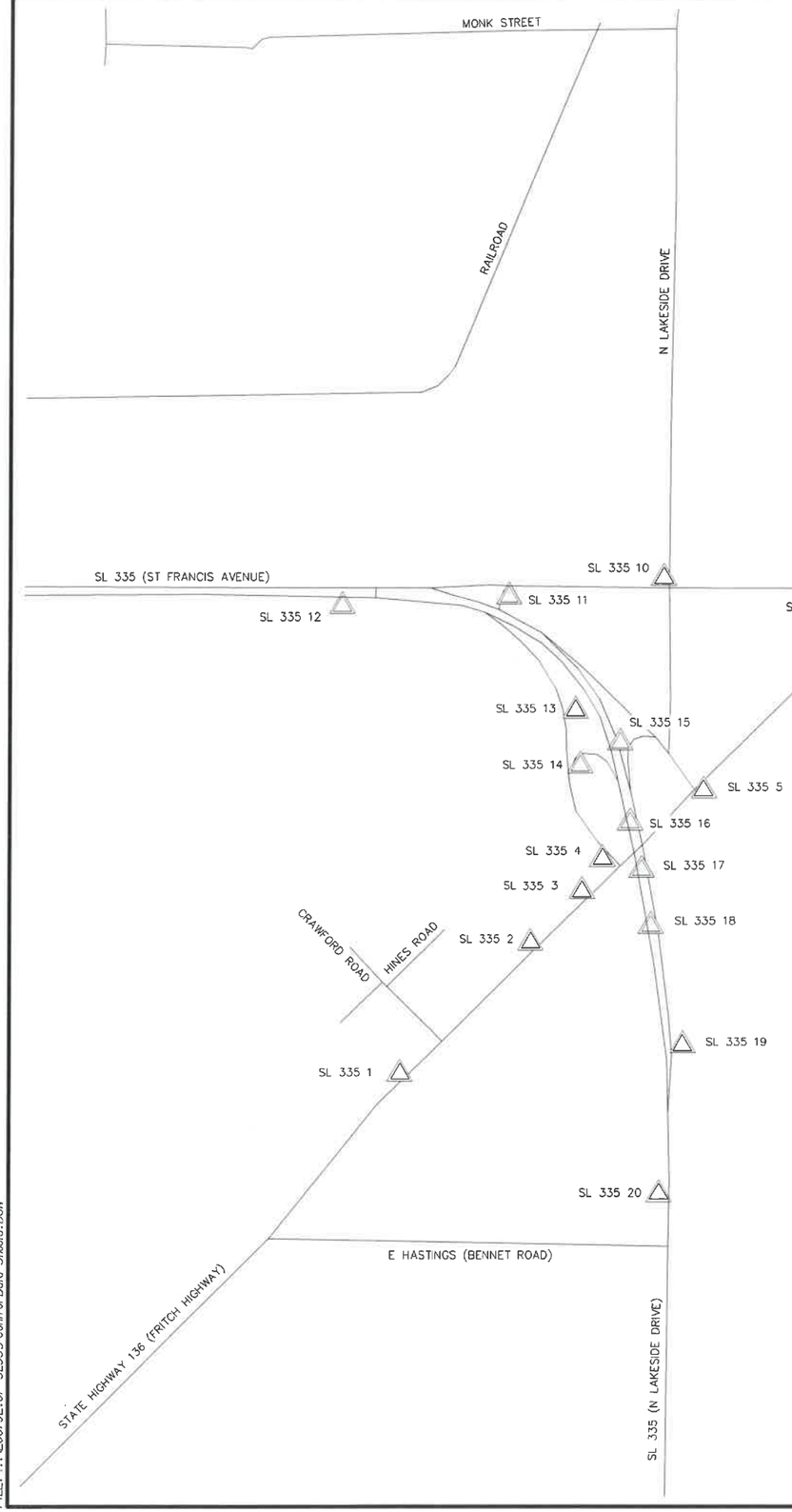
Texas Department of Transportation

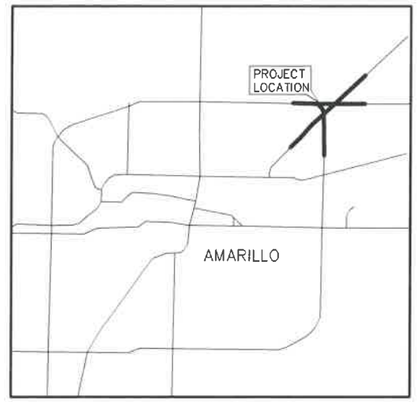
Traffic Operations Division Standard

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
REVISIONS	0379	03	026, ETC.	SH 136
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	AMA	POTTER		58





VICINITY MAP
NOT TO SCALE

N

PRIMARY CONTROL POINTS

POINTS	NORTHING	EASTING	ELEVATION	DESCRIPTION
SL 335 1	3738501.9966	581891.3327	3643.1266	ALCS 2-IN TXDOT CTRL
SL 335 2	3739557.0131	582951.2140	3639.4716	ALCS 2-IN TXDOT CTRL
SL 335 3	3739975.4099	583365.8910	3637.3886	ALCS 2-IN TXDOT CTRL
SL 335 4	3740233.0129	583527.7191	3636.8656	ALCS 2-IN TXDOT CTRL
SL 335 5	3740784.6808	584340.2079	3633.4006	ALCS 2-IN TXDOT CTRL
SL 335 6	3742302.3997	585681.1552	3626.0076	ALCS 2-IN TXDOT CTRL
SL 335 7	3743759.1957	587576.8767	3607.6216	ALCS 2-IN TXDOT CTRL
SL 335 8	3742339.3278	589064.7099	3611.5276	ALCS 2-IN TXDOT CTRL
SL 335 9	3742346.2432	586481.0843	3623.0686	ALCS 2-IN TXDOT CTRL
SL 335 10	3742499.5826	584012.7644	3638.8086	ALCS 2-IN TXDOT CTRL
SL 335 11	3742347.1799	582767.9251	3643.7586	ALCS 2-IN TXDOT CTRL
SL 335 12	3742271.9696	581419.0678	3646.2856	ALCS 2-IN TXDOT CTRL
SL 335 13	3741427.7747	583309.9750	3639.1156	ALCS 2-IN TXDOT CTRL
SL 335 14	3740985.8280	583349.7692	3638.0316	ALCS 2-IN TXDOT CTRL
SL 335 15	3741171.1791	583668.9947	3639.7666	ALCS 2-IN TXDOT CTRL
SL 335 16	3740526.9261	583748.1717	3655.4656	ALCS 2-IN TXDOT CTRL
SL 335 17	3740145.4246	583841.3772	3662.9046	ALCS 2-IN TXDOT CTRL
SL 335 18	3739693.7279	583917.1094	3662.1116	ALCS 2-IN TXDOT CTRL
SL 335 19	3738731.4208	584177.7356	3633.9096	ALCS 2-IN TXDOT CTRL
SL 335 20	3737528.5862	583988.7811	3629.5996	ALCS 2-IN TXDOT CTRL

NOTES:

HORIZONTAL COORDINATES SHOWN HEREON ARE IN U.S. SURVEY FEET, AND ARE BASED ON THE TEXAS COORDINATE SYSTEM OF (NAD83), TEXAS NORTH ZONE 4201 WITH THE POTTER COUNTY SCALE FACTOR. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID VALUES BY MULTIPLYING THE SURFACE VALUES BY A COMBINED SCALE FACTOR OF 0.999749649690972, OR BY DIVIDING THOSE SURFACE VALUES BY A SURFACE ADJUSTMENT FACTOR OF 1.000250413. VALUES DERIVED FROM UTILIZING THE TXDOT VIRTUAL REFERENCE STATION NETWORK IN DECEMBER, 2019.

ELEVATIONS ARE BASED ON TxDOT VRS GEOID 12A.

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY IN THE MONTH OF DECEMBER, 2019 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTCM NETWORK AND IS CORRECTLY SHOWN HEREON.

DETAIL SKETCHES ARE NOT TO SCALE

Scott M. Posey
Registered Professional Land Surveyor
No. 5350

Lamb-Star Engineering, L.P.
TBPLS # 10048300

NO.	DATE	REVISION	APPROVED

05/15/2020

Texas Department of Transportation

5700 W. Plano Parkway
Suite #1000
Plano, Texas 75093
(214) 440-3600
TBPLS Register #10048300

SL 335 & SH 136

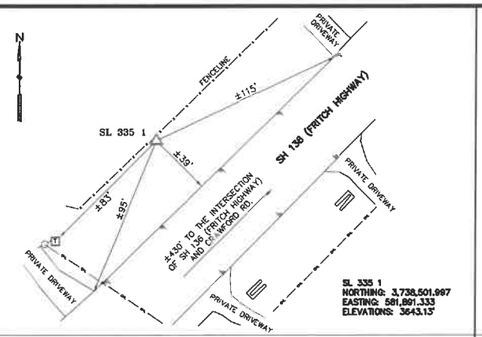
CONTROL INDEX SHEET

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
		59

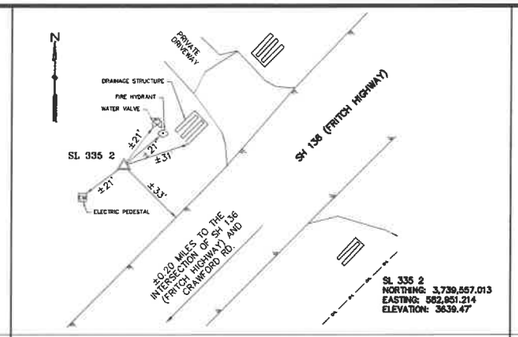
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136
2635	01	042	SL 335

DATE: 6/24/2020 $TIME$
FILE: ...\200792.01- SL335-Control Data Sheets.DGN



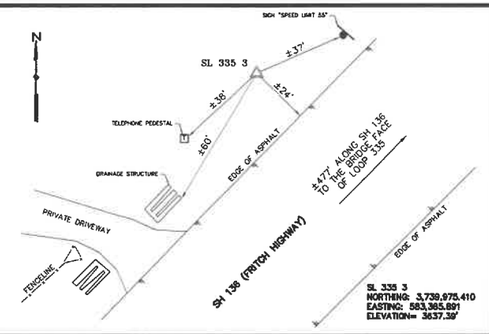
SL 335 1
NORTHING: 3,738,501.997
EASTING: 581,891.333
ELEVATION= 3643.13'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE NORTHWEST SIDE OF STATE HIGHWAY 136 (FRITCH HIGHWAY), ±430' SOUTH FROM THE INTERSECTION OF SH 136 AND CRAWFORD ROAD, ±115' SOUTHWEST OF A PRIVATE DRIVEWAY, ±39' WEST OF THE EDGE OF ASPHALT (SH 136), ±83' NORTH OF A PRIVATE DRIVEWAY (4400 TX-136) AND ±83' NORTHEAST OF A TELEPHONE PEDESTAL.



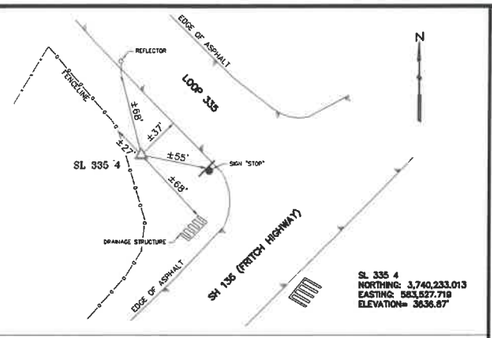
SL 335 2
NORTHING: 3,739,557.013
EASTING: 582,951.214
ELEVATION: 3639.47'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE NORTHWEST SIDE OF STATE HIGHWAY 136 (FRITCH HIGHWAY), ±0.20 MILES NORTH FROM THE INTERSECTION OF SH 136 AND CRAWFORD ROAD, ±21' SOUTH OF A WATER VALVE, ±21' SOUTHWEST OF A FIRE HYDRANT, ±21' SOUTHWEST OF THE FAR SOUTH CORNER OF A DRAINAGE CULVERT, ±33' WEST OF THE EDGE OF ASPHALT (SH 136), AND ±21' NORTHEAST OF AN ELECTRIC PEDESTAL.



SL 335 3
NORTHING: 3,739,975.410
EASTING: 583,365.891
ELEVATION= 3637.39'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE NORTHWEST SIDE OF STATE HIGHWAY 136 (FRITCH HIGHWAY), ±477' SOUTH FROM THE BRIDGE FACE OF LOOP 335, ±37' SOUTHWEST OF A SIGN (SPEED LIMIT 55), ±24' WEST OF THE EDGE OF ASPHALT (SH 136), ±60' NORTHEAST OF THE FAR EAST CORNER OF A DRAINAGE CULVERT, AND ±38' NORTHEAST OF A TELEPHONE PEDESTAL.



SL 335 4
NORTHING: 3,740,233.013
EASTING: 583,527.718
ELEVATION= 3636.87'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE NORTHWEST CORNER OF STATE HIGHWAY 136 (FRITCH HIGHWAY) AND LOOP 335, ±27' SOUTHEAST OF A FENCE POST, ±68' SOUTH OF A REFLECTOR, ±37' SOUTHWEST OF THE EDGE OF ASPHALT (LOOP 335), ±55' WEST OF A SIGN (STOP) AND ±68' NORTHWEST OF THE FAR NORTH CORNER OF A DRAINAGE CULVERT.

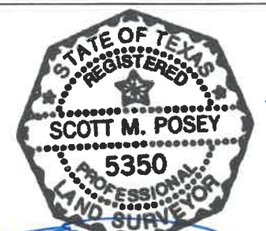
NOTES:

HORIZONTAL COORDINATES SHOWN HEREON ARE IN U.S. SURVEY FEET, AND ARE BASED ON THE TEXAS COORDINATE SYSTEM OF (NAD83), TEXAS NORTH ZONE 4201 WITH THE POTTER COUNTY SCALE FACTOR. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID VALUES BY MULTIPLYING THE SURFACE VALUES BY A COMBINED SCALE FACTOR OF 0.999749649690972, OR BY DIVIDING THOSE SURFACE VALUES BY A SURFACE ADJUSTMENT FACTOR OF 1.000250413. VALUES DERIVED FROM UTILIZING THE TXDOT VIRTUAL REFERENCE STATION NETWORK IN DECEMBER, 2019.

ELEVATIONS ARE BASED ON TxDOT VRS GEOID 12A.

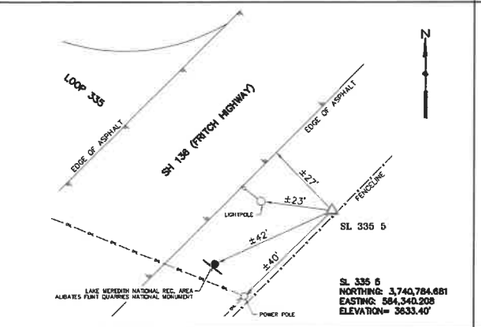
I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY IN THE MONTH OF DECEMBER, 2019 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTCM NETWORK AND IS CORRECTLY SHOWN HEREON.

DETAIL SKETCHES ARE NOT TO SCALE



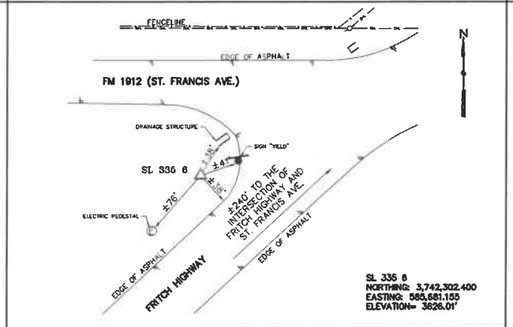
Scott M. Posey
Registered Professional Land Surveyor
No. 5350

Lamb-Star Engineering, L.P.
TBPLS # 10048300



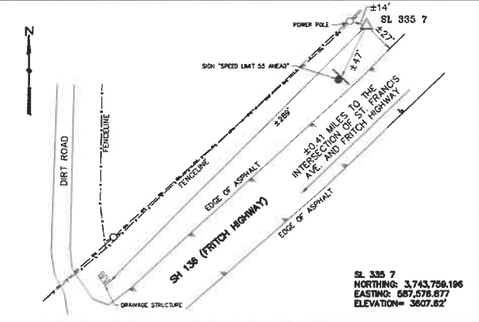
SL 335 5
NORTHING: 3,740,784.681
EASTING: 584,340.208
ELEVATION= 3633.40'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF THE INTERSECTION OF STATE HIGHWAY 136 (FRITCH HIGHWAY) AND LOOP 335, ±27' EAST OF THE EDGE OF ASPHALT (SH 136), ±23' EAST OF A LIGHTPOLE, ±42' NORTHEAST OF A SIGN (LAKE MEREDITH NATIONAL REC. AREA – ALIBATES FLINT QUARRIES NATIONAL MONUMENT) AND ±40' NORTHEAST OF A POWER POLE.



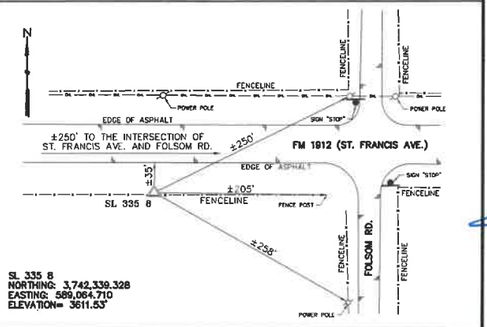
SL 335 6
NORTHING: 3,742,302.400
EASTING: 585,681.155
ELEVATION= 3626.01'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE SOUTHWEST CORNER OF THE INTERSECTION OF FRITCH HIGHWAY AND FARM-TO-MARKET 1912 (ST. FRANCIS AVE.), ±35' SOUTHWEST OF THE FAR SOUTH CORNER OF A DRAINAGE CULVERT, ±41' WEST OF A SIGN (YIELD), ±35' NORTH OF THE EDGE OF ASPHALT (FRITCH HIGHWAY) AND ±76' NORTHEAST A ELECTRIC PEDESTAL.



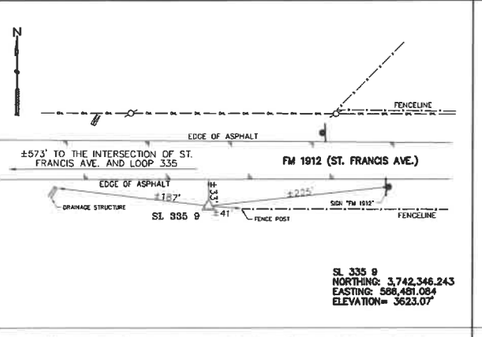
SL 335 7
NORTHING: 3,743,759.196
EASTING: 587,578.877
ELEVATION= 3607.82'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE WEST SIDE OF STATE HIGHWAY 136 (FRITCH HIGHWAY), ±0.41 MILES NORTH FROM THE INTERSECTION OF ST. FRANCIS AVE. AND FRITCH HIGHWAY, ±27' WEST OF THE EDGE OF ASPHALT (FRITCH HIGHWAY), ±47' NORTH OF A SIGN (SPEED LIMIT 55 AHEAD), ±289' NORTHEAST OF THE FAR EAST CORNER OF A DRAINAGE CULVERT AND ±14' EAST A POWER POLE.



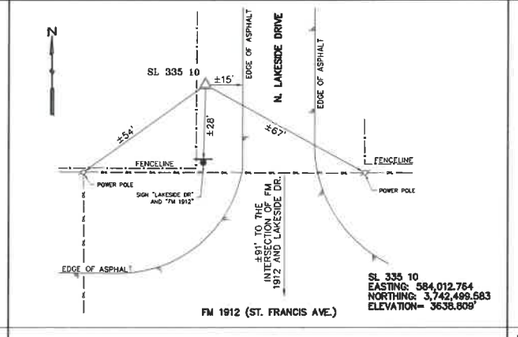
SL 335 8
NORTHING: 3,742,339.328
EASTING: 589,064.710
ELEVATION= 3611.53'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE SOUTH SIDE OF FARM-TO-MARKET ROAD 1912 (ST. FRANCIS AVE.), ±35' SOUTH OF THE EDGE OF ASPHALT (ST. FRANCIS AVE.), ±250' SOUTHWEST OF A POWER POLE, ±205' WEST OF A FENCE POST AND ±258' NORTHWEST A POWER POLE.



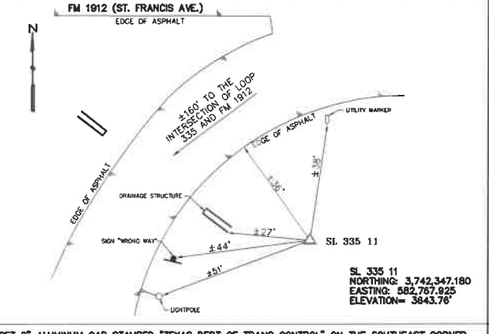
SL 335 9
NORTHING: 3,742,346.243
EASTING: 588,481.084
ELEVATION= 3623.07'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE SOUTH SIDE OF FARM-TO-MARKET ROAD 1912 (ST. FRANCIS AVE.), ±573' EAST TO THE INTERSECTION OF ST. FRANCIS AVE. AND LOOP 335, ±225' WEST OF A SIGN (FM 1912), ±41' WEST OF A FENCE POST, ±187' EAST OF THE FAR EAST CORNER OF A DRAINAGE CULVERT, AND ±33' SOUTH OF THE EDGE OF ASPHALT (ST. FRANCIS AVE.).



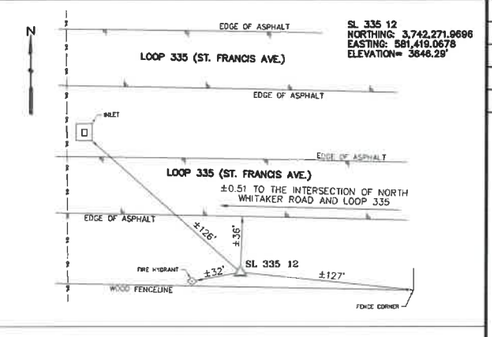
SL 335 10
EASTING: 584,012.764
NORTHING: 3,742,499.583
ELEVATION= 3638.809'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE NORTHWEST CORNER OF LAKESIDE DRIVE AND FARM-TO-MARKET 1912 (ST. FRANCIS AVE.), ±15' WEST OF THE EDGE OF ASPHALT (LAKESIDE DR.), ±62' NORTHWEST OF A POWER POLE, ±28' NORTH OF A SIGN (LAKESIDE DR. AND FM 1912) AND ±54' NORTHEAST OF A POWER POLE.



SL 335 11
NORTHING: 3,742,347.180
EASTING: 582,767.925
ELEVATION= 3643.76'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE SOUTHEAST CORNER OF THE INTERSECTION OF FARM-TO-MARKET 1912 (ST. FRANCIS AVE.) AND THE LOOP 335 ACCESS ROAD, ±180' TO THE INTERSECTION OF LOOP 335 AND LOOP 335/FM 1912 ACCESS ROAD, ±38' SOUTH OF A UTILITY MARKER, ±36' SOUTH OF THE EDGE OF ASPHALT (LOOP 335 ACCESS ROAD), ±27' EAST OF THE FAR SOUTH CORNER OF A DRAINAGE CULVERT, ±44' EAST OF A SIGN (WRONG WAY) AND ±51' NORTHEAST OF A LIGHT POLE.



SL 335 12
NORTHING: 3,742,271.9696
EASTING: 581,419.0678
ELEVATION= 3646.29'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE SOUTH SIDE OF LOOP 335 (ST. FRANCIS AVE.), ±0.51 MILES EAST OF THE INTERSECTION OF LOOP 335 AND WHITAKER ROAD, ±127' WEST OF A FENCE CORNER, ±32' EAST OF A FIRE HYDRANT, ±126' SOUTHEAST OF A DRAINAGE INLET AND ±36' SOUTH OF THE EDGE OF ASPHALT (LOOP 335).

NO.	DATE	REVISION	APPROVED

01/15/2020

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LAMB-STAR
5700 W. Plano Parkway
Suite #1000
Plano, Texas 75093
(214) 440-3600
TBPLS Register #10048300

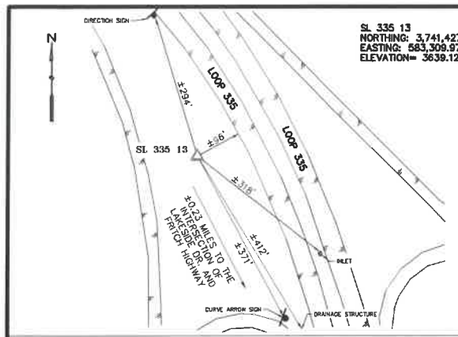
SH 136

CONTROL SHEET

SHEET 1 OF 2

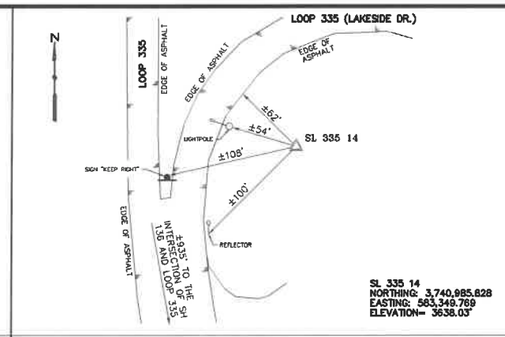
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			60
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 6/24/2020 $TIME$
FILE: ...\200792.01-SL335-Control Data Sheets.DGN



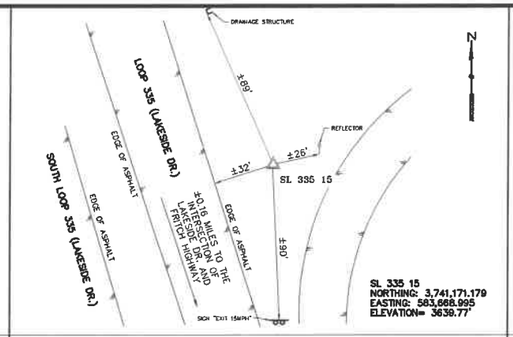
SL 335 13
NORTHING: 3,741,427.7747
EASTING: 583,309.9750
ELEVATION= 3639.12'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE WEST SIDE OF LOOP 335, ±0.23 MILES NORTH OF THE INTERSECTION OF LAKESIDE DRIVE AND FRITCH HIGHWAY, ±294' SOUTH OF A SIGN (DIRECTION ARROW), ±96' WEST OF THE EDGE OF ASPHALT (LOOP 335), ±318' NORTHWEST OF A DRAINAGE INLET, ±412' NORTHWEST OF A DRAINAGE CULVERT AND ±371' NORTH OF A SIGN (CURVE ARROW).



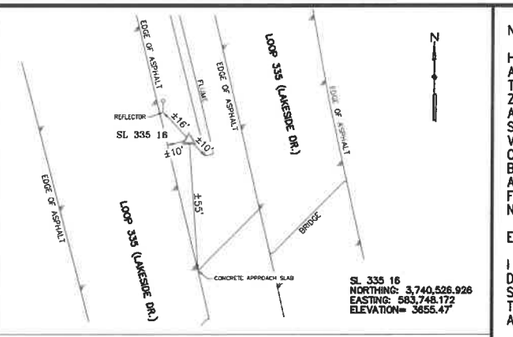
SL 335 14
NORTHING: 3,740,985.828
EASTING: 583,349.769
ELEVATION= 3638.03'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF LOOP 335 (LAKESIDE DR.), ±935' NORTH OF THE INTERSECTION OF SH 136 AND LOOP 335, ±62' EAST OF THE EDGE OF ASPHALT (LOOP 335), ±54' EAST OF A LIGHT POLE, ±108' EAST OF A SIGN (KEEP RIGHT) AND ±100' NORTHEAST OF A REFLECTOR.



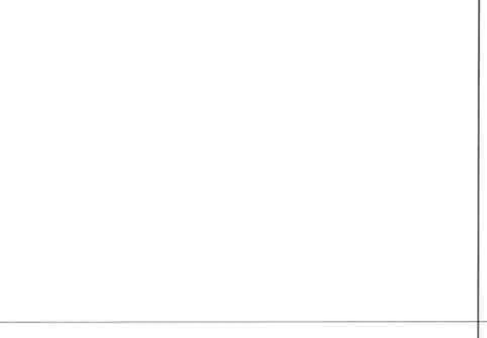
SL 335 15
NORTHING: 3,741,171.179
EASTING: 583,668.995
ELEVATION= 3639.77'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF LOOP 335 (LAKESIDE DR.), ±0.16 MILES NORTH FROM THE INTERSECTION OF LAKESIDE DR. AND FRITCH HIGHWAY, ±26' WEST OF A REFLECTOR, ±90' NORTH OF A SIGN (EXIT 15MPH), ±32' NORTH OF THE EDGE OF ASPHALT (LOOP 335) AND ±89' SOUTH OF THE FAR SOUTH CORNER OF A DRAINAGE CULVERT.



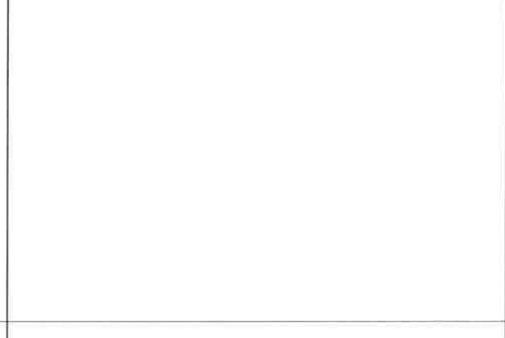
SL 335 16
NORTHING: 3,740,526.926
EASTING: 583,748.172
ELEVATION= 3655.47'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF SOUTHBOUND LOOP 335 (LAKESIDE DR.), ON THE NORTH SIDE OF LAKESIDE DRIVE BRIDGE, ±10' WEST OF A FAR SOUTH CORNER OF A DRAINAGE FLUME, ±55' NORTH OF THE BRIDGE CONCRETE APPROACH SLAB, ±10' EAST OF THE EDGE OF ASPHALT (LOOP 335) AND ±16' SOUTHEAST OF A REFLECTOR.



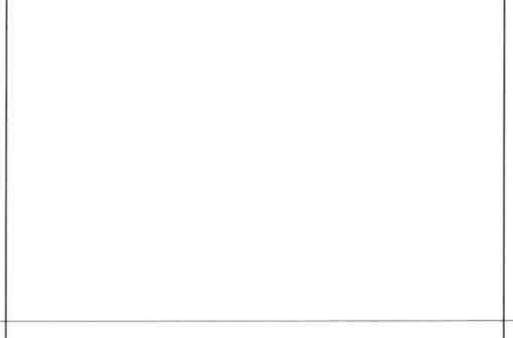
SL 335 17
NORTHING: 3,740,145.425
EASTING: 583,841.377
ELEVATION= 3662.91

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF SOUTHBOUND LOOP 335 (LAKESIDE DR.), ±22' SOUTH OF THE BRIDGE CONCRETE APPROACH SLAB ALONG NORTHBOUND LOOP 335, ±16' WEST OF THE EDGE OF ASPHALT (NORTHBOUND LOOP 335), ±78' NORTHWEST OF A SIGN (SH 136-FM 1912-BORGER) AND ±16' SOUTH OF THE BRIDGE CONCRETE APPROACH SLAB ALONG SOUTHBOUND LOOP 335.



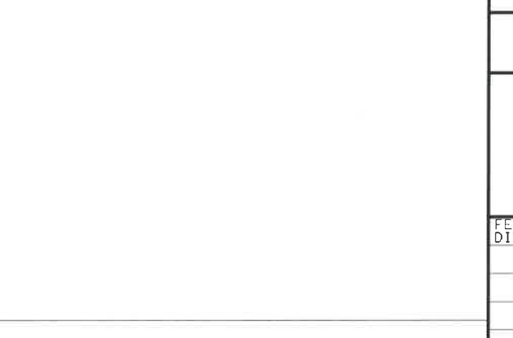
SL 335 18
NORTHING: 3,739,693.7278
EASTING: 583,917.1094
ELEVATION= 3662.11'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF SOUTHBOUND LOOP 335 (LAKESIDE DR.), ON THE SOUTH SIDE OF LAKESIDE DRIVE BRIDGE, ±53' SOUTH OF THE BRIDGE CONCRETE APPROACH SLAB ALONG NORTHBOUND LOOP 335, ±6' WEST OF A FAR WEST CORNER OF A DRAINAGE FLUME, ±24' WEST OF A REFLECTOR, ±8' EAST OF THE EDGE OF ASPHALT (SOUTHBOUND LOOP 335) AND ±27' SOUTH OF THE BRIDGE CONCRETE APPROACH SLAB ALONG SOUTHBOUND LOOP 335.



SL 335 19
NORTHING: 3,738,731.4208
EASTING: 584,177.7356
ELEVATION= 3633.91'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE EAST SIDE OF LOOP 335 (LAKESIDE DR.), ±0.30 MILES SOUTH OF THE INTERSECTION OF LOOP 335 AND SH 136, ±37' SOUTHWEST OF A FENCE POST, ±21' SOUTHWEST OF A POWER POLE, ±31' NORTH OF A SIGN (DEAD END) AND ±79' EAST OF THE EDGE OF ASPHALT (LOOP 335).



SL 335 20
NORTHING: 3,737,528.586
EASTING: 583,988.781
ELEVATION= 3629.80'

SET 2" ALUMINUM CAP STAMPED "TEXAS DEPT OF TRANS CONTROL" ON THE WEST SIDE OF LOOP 335 (LAKESIDE DR.), ±125' NORTH OF THE INTERSECTION OF LOOP 335 AND BENNET ROAD, ±18' WEST OF THE EDGE OF ASPHALT (LOOP 335), ±14' NORTHWEST OF A SIGN (HASTINGS AVE.), ±118' SOUTHWEST OF THE FAR SOUTH CORNER OF A DRAINAGE CULVERT AND ±98' NORTH OF A POWER POLE.

NOTES:

HORIZONTAL COORDINATES SHOWN HEREON ARE IN U.S. SURVEY FEET, AND ARE BASED ON THE TEXAS COORDINATE SYSTEM OF (NAD83), TEXAS NORTH ZONE 4201 WITH THE POTTER COUNTY SCALE FACTOR. ALL DISTANCES AND COORDINATES SHOWN HEREON ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID VALUES BY MULTIPLYING THE SURFACE VALUES BY A COMBINED SCALE FACTOR OF 0.999749649690972, OR BY DIVIDING THOSE SURFACE VALUES BY A SURFACE ADJUSTMENT FACTOR OF 1.000250413. VALUES DERIVED FROM UTILIZING THE TXDOT VIRTUAL REFERENCE STATION NETWORK IN DECEMBER, 2019.

ELEVATIONS ARE BASED ON TxDOT VRS GEOID 12A.

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY IN THE MONTH OF DECEMBER, 2019 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTCM NETWORK AND IS CORRECTLY SHOWN HEREON.

DETAIL SKETCHES ARE NOT TO SCALE

STATE OF TEXAS
REGISTERED
SCOTT M. POSEY
5350
PROFESSIONAL
LAND SURVEYOR

6/24/2020

Scott M. Posey
Registered Professional Land Surveyor
No. 5350

Lamb-Star Engineering, L.P.
TBPLS # 10048300

NO.	DATE	REVISION	APPROVED

01/15/2020

Texas Department of Transportation

LAMB-STAR
5700 W. Plano Parkway
Suite #1000
Plano, Texas 75093
(214) 440-3500
TBPLS Register #10048300

SL 335

CONTROL SHEET

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
		61

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 6/24/2020 $TIME$
FILE: ...\200792.01 SL335-Control Data Sheets.DGN

ALIGNMENT DATA FM 1912

<* 1 DESCRIBE CHAIN EX_FM1912_CL

Chain EX_FM1912_CL contains:
FM01 FM02

Beginning chain EX_FM1912_CL description

Point FM01 N 3,742,411.8139 E 582,812.4682 Sta 0+00.00

Course from FM01 to FM02 S 89° 51′ 29.77" E Dist 6,519.0000

Point FM02 N 3,742,395.6882 E 589,331.4482 Sta 65+19.00

Ending chain EX_FM1912_CL description

ALIGNMENT DATA SH 136

<* 2 DESCRIBE CHAIN EX_SH136_CL_REV

Chain EX_SH136_CL_REV contains:
SH13601 CUR SH13602 CUR SH13603 SH13604

Beginning chain EX_SH136_CL_REV description

Point SH13601 N 3,737,883.4278 E 581,359.8635 Sta 289+00.00

Course from SH13601 to PC SH13602 N 44° 56′ 59.20" E Dist 5,898.0994

Curve Data

Curve SH13602
P.I. Station 352+52.89 N 3,742,379.5368 E 585,848.0973
Delta = 9° 04′ 36.56" (RT)
Degree = 1° 00′ 00.00"
Tangent = 454.7927
Length = 907.6823
Radius = 5,729.5780
External = 18.0215
Long Chord = 906.7334
Mid. Ord. = 17.9650
P.C. Station 347+98.10 N 3,742,057.6680 E 585,526.7923
P.T. Station 357+05.78 N 3,742,646.6864 E 586,216.1564
C.C. N 3,738,009.7974 E 589,581.7655
Back = N 44° 56′ 59.20" E
Ahead = N 54° 01′ 35.76" E
Chord Bear = N 49° 29′ 17.48" E

Course from PT SH13602 to PC SH13603 N 54° 01′ 35.76" E Dist 1,020.8317

Curve Data

Curve SH13603
P.I. Station 371+81.73 N 3,743,513.6717 E 587,410.6252
Delta = 9° 04′ 59.64" (LT)
Degree = 1° 00′ 00.00"
Tangent = 455.1152
Length = 908.3232
Radius = 5,729.5780
External = 18.0471
Long Chord = 907.3723
Mid. Ord. = 17.9904
P.C. Station 367+26.61 N 3,743,246.3327 E 587,042.3051
P.T. Station 376+34.94 N 3,743,835.8047 E 587,732.1220
C.C. N 3,747,883.2217 E 583,676.6960
Back = N 54° 01′ 35.76" E
Ahead = N 44° 56′ 36.13" E
Chord Bear = N 49° 29′ 05.94" E

Course from PT SH13603 to SH13604 N 44° 56′ 36.13" E Dist 22,865.0634

Point SH13604 N 3,760,019.8188 E 603,884.1748 Sta 605+00.00

Ending chain EX_SH136_CL_REV description

ALIGNMENT DATA SL 335 NB

<* 3 DESCRIBE CHAIN EX_BL_335_WB

Chain EX_BL_335_WB contains:
17 CUR EX_BL_335_WB_3 CUR EX_BL_335_WB_6 CUR EX_BL_335_WB_9 18

Beginning chain EX_BL_335_WB description
Feature: Geom_Secondary

Point 17 N 3,735,314.6210 E 584,104.5978 Sta 203+61.37

Course from 17 to PC EX_BL_335_WB_3 N 0° 11′ 42.77" E Dist 2,466.7712

Curve Data

Curve EX_BL_335_WB_3
P.I. Station 244+76.16 N 3,739,429.3888 E 584,118.6174
Delta = 16° 19′ 58.95" (LT)
Degree = 0° 29′ 56.11"
Tangent = 1,648.0205
Length = 3,273.6905
Radius = 11,484.0000
External = 117.6476
Long Chord = 3,262.6173
Mid. Ord. = 116.4546
P.C. Station 228+28.14 N 3,737,781.3778 E 584,113.0024
P.T. Station 261+01.83 N 3,741,012.4705 E 583,660.5519
C.C. N 3,737,820.5054 E 572,629.0690
Back = N 0° 11′ 42.77" E
Ahead = N 16° 08′ 16.18" W
Chord Bear = N 7° 58′ 16.70" W

Course from PT EX_BL_335_WB_3 to PC EX_BL_335_WB_6 N 16° 08′ 16.18" W Dist 161.1118

Curve Data

Curve EX_BL_335_WB_6
P.I. Station 274+28.69 N 3,742,287.0456 E 583,291.7529
Delta = 70° 09′ 26.83" (LT)
Degree = 3° 27′ 05.59"
Tangent = 1,165.7470
Length = 2,032.6344
Radius = 1,660.0000
External = 368.4393
Long Chord = 1,908.0088
Mid. Ord. = 301.5172
P.C. Station 262+62.94 N 3,741,167.2339 E 583,615.7710
P.T. Station 282+95.58 N 3,742,362.3698 E 582,128.4420
C.C. N 3,740,705.8387 E 582,021.1819
Back = N 16° 08′ 16.18" W
Ahead = N 86° 17′ 43.01" W
Chord Bear = N 51° 12′ 59.59" W

Course from PT EX_BL_335_WB_6 to PC EX_BL_335_WB_9 N 86° 17′ 43.01" W Dist 171.6040

Curve Data

Curve EX_BL_335_WB_9
P.I. Station 288+10.21 N 3,742,395.6227 E 581,614.8825
Delta = 3° 31′ 04.81" (LT)
Degree = 0° 30′ 46.60"
Tangent = 343.0309
Length = 685.8463
Radius = 11,170.0000
External = 5.2660
Long Chord = 685.7386
Mid. Ord. = 5.2635
P.C. Station 284+67.18 N 3,742,373.4579 E 581,957.1966
P.T. Station 291+53.03 N 3,742,396.7405 E 581,271.8534
C.C. N 3,731,226.7999 E 581,235.4526
Back = N 86° 17′ 43.01" W
Ahead = N 89° 48′ 47.82" W
Chord Bear = N 88° 03′ 15.42" W

Course from PT EX_BL_335_WB_9 to 18 N 89° 48′ 47.82" W Dist 1,996.7651

Point 18 N 3,742,403.2476 E 579,275.0988 Sta 311+49.79

Ending chain EX_BL_335_WB description

NO.	DATE	REVISION	APPROVED

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07/01/2020

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SH 136

ALIGNMENT DATA

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	62

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:15:15 PM
FILE: CSJ-0379-03-026-Ex_Align_Data_01.dgn

ALIGNMENT DATA SL 335 SB

```
<*       1   DESCRIBE CHAIN EX_BL_335_EB

Chain EX_BL_335_EB contains:
 15 CUR EX_BL_335_EB_3 CUR EX_BL_335_EB_6 CUR EX_BL_335_EB_9 CUR EX_BL_335_EB_1-
2 16

Beginning chain EX_BL_335_EB description
Feature: Geom_Secondary
================================================================================

Point 15              N    3,735,314.5656 E     584,072.5171 Sta     203+60.83

Course from 15 to PC EX_BL_335_EB_3 N 0° 01′ 30.55" W Dist 2,183.9040

                                    Curve Data
                                   *----------*
Curve EX_BL_335_EB_3
P.I.  Station            228+20.33  N      3,737,774.0664  E        584,071.4374
Delta        =       3° 18′ 21.61" (LT)
Degree       =       0° 35′ 59.84"
Tangent      =             275.5970
Length       =             551.0410
Radius       =           9,550.0000
External     =               3.9758
Long Chord   =             550.9646
Mid. Ord.    =               3.9742
P.C.  Station            225+44.73  N      3,737,498.4694  E        584,071.5583
P.T.  Station            230+95.77  N      3,738,049.1977  E        584,055.4233
C.C.                                N      3,737,494.2770  E        574,521.5593
Back         = N   0° 01′ 30.55" W
Ahead        = N   3° 19′ 52.16" W
Chord Bear   = N   1° 40′ 41.35" W

Course from PT EX_BL_335_EB_3 to PC EX_BL_335_EB_6 N 3° 19′ 52.16" W Dist 432.3001

                                    Curve Data
                                   *----------*
Curve EX_BL_335_EB_6
P.I.  Station            247+79.21  N      3,739,729.7872  E        583,957.6042
Delta        =      12° 30′ 07.90" (LT)
Degree       =       0° 30′ 05.86"
Tangent      =           1,251.1338
Length       =           2,492.3313
Radius       =          11,422.0000
External     =              68.3185
Long Chord   =           2,487.3897
Mid. Ord.    =              67.9123
P.C.  Station            235+28.07  N      3,738,480.7673  E        584,030.3037
P.T.  Station            260+20.40  N      3,740,933.4521  E        583,616.2445
C.C.                                N      3,737,817.0705  E        572,627.6027
Back         = N   3° 19′ 52.16" W
Ahead        = N  15° 50′ 00.06" W
Chord Bear   = N   9° 34′ 56.11" W

Course from PT EX_BL_335_EB_6 to PC EX_BL_335_EB_9 N 15° 50′ 00.06" W Dist 214.8905

                                    Curve Data
                                   *----------*
Curve EX_BL_335_EB_9
P.I.  Station            273+59.93  N      3,742,222.1521  E        583,250.7689
Delta        =      70° 20′ 28.95" (LT)
Degree       =       3° 35′ 23.86"
Tangent      =           1,124.6318
Length       =           1,959.3910
Radius       =           1,596.0000
External     =             356.4376
Long Chord   =           1,838.6373
Mid. Ord.    =             291.3663
P.C.  Station            262+35.29  N      3,741,140.1895  E        583,557.6137
P.T.  Station            281+94.69  N      3,742,297.1808  E        582,128.6426
C.C.                                N      3,740,704.7365  E        582,022.1670
Back         = N  15° 50′ 00.06" W
Ahead        = N  86° 10′ 29.01" W
Chord Bear   = N  51° 00′ 14.54" W

Course from PT EX_BL_335_EB_9 to PC EX_BL_335_EB_12 N 86° 10′ 29.01" W Dist 163.5645
```

ALIGNMENT DATA SL 335 SB CONTD.

```
                                    Curve Data
                                   *----------*
Curve EX_BL_335_EB_12
P.I.  Station            287+11.01  N      3,742,331.6269  E        581,613.4675
Delta        =       3° 38′ 18.81" (LT)
Degree       =       0° 30′ 57.24"
Tangent      =             352.7608
Length       =             705.2846
Radius       =          11,106.0000
External     =               5.6010
Long Chord   =             705.1661
Mid. Ord.    =               5.5982
P.C.  Station            283+58.25  N      3,742,308.0928  E        581,965.4425
P.T.  Station            290+63.53  N      3,742,332.7765  E        581,260.7086
C.C.                                N      3,731,226.8355  E        581,224.5163
Back         = N  86° 10′ 29.01" W
Ahead        = N  89° 48′ 47.82" W
Chord Bear   = N  87° 59′ 38.42" W

Course from PT EX_BL_335_EB_12 to 16 N 89° 48′ 47.82" W Dist 1,985.8288

Point 16              N    3,742,339.2479 E     579,274.8903 Sta     310+49.36

================================================================================
Ending chain EX_BL_335_EB description
```

FM 1912 ENTRANCE RAMP

```
<*       1   DESCRIBE CHAIN WBL_ENT

Chain WBL_ENT contains:
 39 CUR WBL_ENT_3 CUR WBL_ENT_4

Beginning chain WBL_ENT description
Feature: Geom_Ramp
================================================================================

Point 39              N    3,742,422.8527 E     582,812.4955 Sta     275+78.74

Course from 39 to PC WBL_ENT_3 N 88° 14′ 28.12" W Dist 31.2989

                                    Curve Data
                                   *----------*
Curve WBL_ENT_3
P.I.  Station            277+76.85  N      3,742,428.9334  E        582,614.4742
Delta        =       8° 18′ 54.95" (LT)
Degree       =       2° 29′ 48.24"
Tangent      =             166.8158
Length       =             333.0457
Radius       =           2,294.8300
External     =               6.0551
Long Chord   =             332.7535
Mid. Ord.    =               6.0392
P.C.  Station            276+10.04  N      3,742,423.8133  E        582,781.2114
P.T.  Station            279+43.08  N      3,742,409.8861  E        582,448.7494
C.C.                                N      3,740,130.0645  E        582,710.7762
Back         = N  88° 14′ 28.12" W
Ahead        = S  83° 26′ 36.93" W
Chord Bear   = S  87° 36′ 04.40" W

                                    Curve Data
                                   *----------*
Curve WBL_ENT_4
P.I.  Station            280+59.22  N      3,742,396.6254  E        582,333.3719
Delta        =       4° 37′ 24.94" (RT)
Degree       =       1° 59′ 29.96"
Tangent      =             116.1371
Length       =             232.1481
Radius       =           2,876.7900
External     =               2.3433
Long Chord   =             232.0851
Mid. Ord.    =               2.3414
P.C.  Station            279+43.08  N      3,742,409.8861  E        582,448.7494
P.T.  Station            281+75.23  N      3,742,392.7084  E        582,217.3008
C.C.                                N      3,745,267.8617  E        582,120.2736
Back         = S  83° 26′ 36.93" W
Ahead        = S  88° 04′ 01.87" W
Chord Bear   = S  85° 45′ 19.40" W

================================================================================
Ending chain WBL_ENT description
```

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SH 136

ALIGNMENT DATA

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	63

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:15:24 PM
FILE: CS:\0379-03-026-Ex_Align_Data_02

ALIGNMENT DATA SH 136 RT TURN

```
<*       2   DESCRIBE CHAIN PR_RT_BL_REV

Chain PR_RT_BL_REV contains:
 PRRT01 CUR PR_RT_BL_REV1 CUR PR_RT_BL_REV2 CUR PR_RT_BL_REV3 CUR PR_RT_BL_REV4

Beginning chain PR_RT_BL_REV description
================================================================================

Point PRRT01          N   3,742,407.2411 E     584,661.0843 Sta    1000+00.00

Course from PRRT01 to PC PR_RT_BL_REV1 S 89° 51′ 29.77" E Dist 235.8169

                                  Curve Data
                                 *----------*
Curve PR_RT_BL_REV1
P.I.  Station          1004+40.52  N      3,742,406.1514  E        585,101.6077
Delta       =       4° 28′ 58.62" (RT)
Degree      =       1° 05′ 43.88"
Tangent     =            204.7079
Length      =            409.2068
Radius      =          5,230.0000
External    =              4.0047
Long Chord  =            409.1025
Mid. Ord.   =              4.0016
P.C.  Station          1002+35.82  N      3,742,406.6577  E        584,896.9005
P.T.  Station          1006+45.02  N      3,742,389.6461  E        585,305.6491
C.C.                               N      3,737,176.6737  E        584,883.9633
Back        = S  89° 51′ 29.77" E
Ahead       = S  85° 22′ 31.16" E
Chord Bear  = S  87° 37′ 00.46" E

                                  Curve Data
                                 *----------*
Curve PR_RT_BL_REV2
P.I.  Station          1008+12.93  N      3,742,376.1079  E        585,473.0114
Delta       =       3° 39′ 49.30" (LT)
Degree      =       1° 05′ 28.85"
Tangent     =            167.9089
Length      =            335.7034
Radius      =          5,250.0000
External    =              2.6844
Long Chord  =            335.6462
Mid. Ord.   =              2.6830
P.C.  Station          1006+45.02  N      3,742,389.6461  E        585,305.6491
P.T.  Station          1009+80.73  N      3,742,373.2918  E        585,640.8967
C.C.                               N      3,747,622.5534  E        585,728.9475
Back        = S  85° 22′ 31.16" E
Ahead       = S  89° 02′ 20.45" E
Chord Bear  = S  87° 12′ 25.80" E

                                  Curve Data
                                 *----------*
Curve PR_RT_BL_REV3
P.I.  Station          1011+70.63  N      3,742,370.1068  E        585,830.7769
Delta       =      39° 46′ 22.41" (LT)
Degree      =      10° 54′ 48.53"
Tangent     =            189.9069
Length      =            364.4381
Radius      =            525.0000
External    =             33.2917
Long Chord  =            357.1649
Mid. Ord.   =             31.3065
P.C.  Station          1009+80.73  N      3,742,373.2918  E        585,640.8967
P.T.  Station          1013+45.17  N      3,742,489.1339  E        585,978.7538
C.C.                               N      3,742,898.2180  E        585,649.7018
Back        = S  89° 02′ 20.45" E
Ahead       = N  51° 11′ 17.14" E
Chord Bear  = N  71° 04′ 28.35" E
```

ALIGNMENT DATA SH 136 RT TURN CONTD.

```
                                  Curve Data
                                 *----------*
Curve PR_RT_BL_REV4
P.I.  Station          1014+34.50  N      3,742,545.1272  E        586,048.3657
Delta       =       1° 46′ 50.48" (RT)
Degree      =       0° 59′ 48.10"
Tangent     =             89.3369
Length      =            178.6593
Radius      =          5,748.5780
External    =              0.6941
Long Chord  =            178.6521
Mid. Ord.   =              0.6941
P.C.  Station          1013+45.17  N      3,742,489.1339  E        585,978.7538
P.T.  Station          1015+23.82  N      3,742,598.9303  E        586,119.6840
C.C.                               N      3,738,009.7974  E        589,581.7655
Back        = N  51° 11′ 17.14" E
Ahead       = N  52° 58′ 07.62" E
Chord Bear  = N  52° 04′ 42.38" E

================================================================================
Ending chain PR_RT_BL_REV description
```

ALIGNMENT DATA PR FM1912

```
<*       1   DESCRIBE CHAIN PR_FM1912_CL_R

Chain PR_FM1912_CL_R contains:
 PR191203 CUR FM191202 PR191201

Beginning chain PR_FM1912_CL_R description
================================================================================

Point PR191203        N   3,742,842.3371 E     586,485.7096 Sta      37+98.95

                                  Curve Data
                                 *----------*
Curve FM191202
P.I.  Station           43+94.30  N      3,742,401.7371  E        586,886.1060
Delta       =      47° 35′ 42.71" (LT)
Degree      =       4° 14′ 38.87"
Tangent     =            595.3534
Length      =          1,121.4354
Radius      =          1,350.0000
External    =            125.4476
Long Chord  =          1,089.4688
Mid. Ord.   =            114.7816
P.C.  Station           37+98.95  N      3,742,842.3371  E        586,485.7096
P.T.  Station           49+20.38  N      3,742,400.2644  E        587,481.4575
C.C.                              N      3,743,750.2603  E        587,484.7970
Back        = S  42° 15′ 47.06" E
Ahead       = S  89° 51′ 29.77" E
Chord Bear  = S  66° 03′ 38.42" E

Course from PT FM191202 to PR191201 S 89° 51′ 29.77" E Dist 579.6181

Point PR191201        N   3,742,398.8307 E     588,061.0739 Sta      55+00.00

================================================================================
Ending chain PR_FM1912_CL_R description
```

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SH 136

ALIGNMENT DATA

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	64

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:5:32 PM
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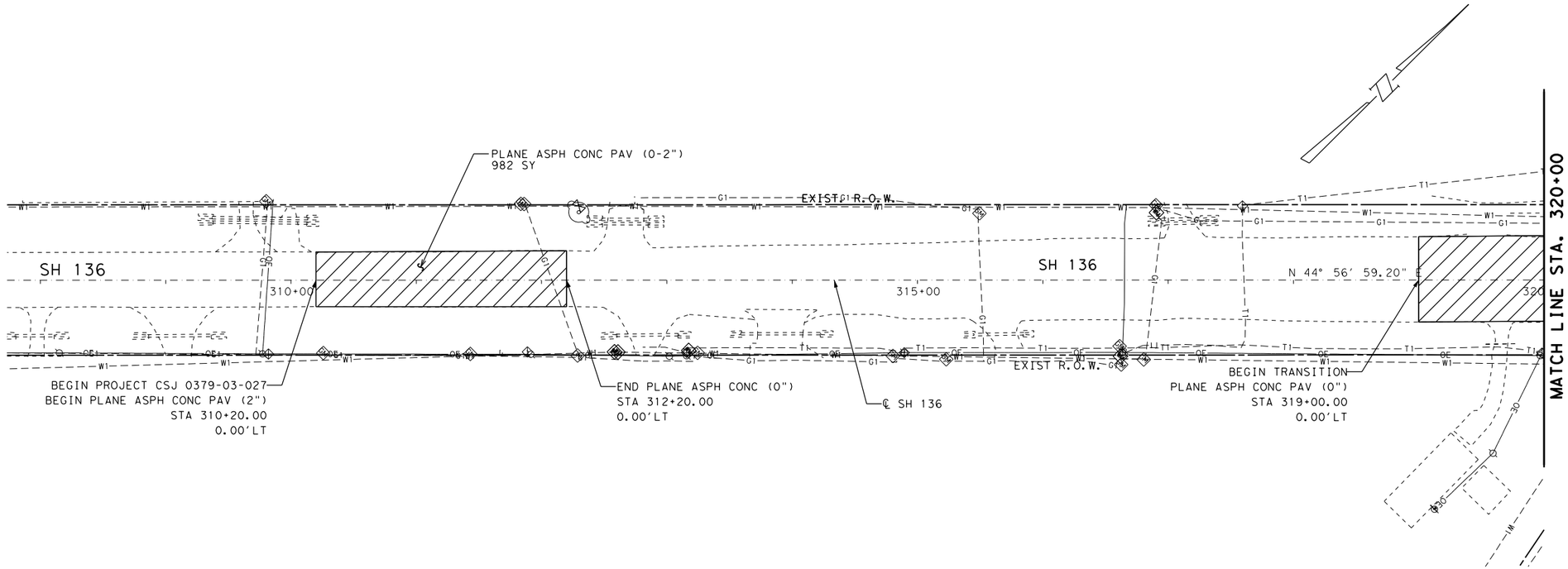

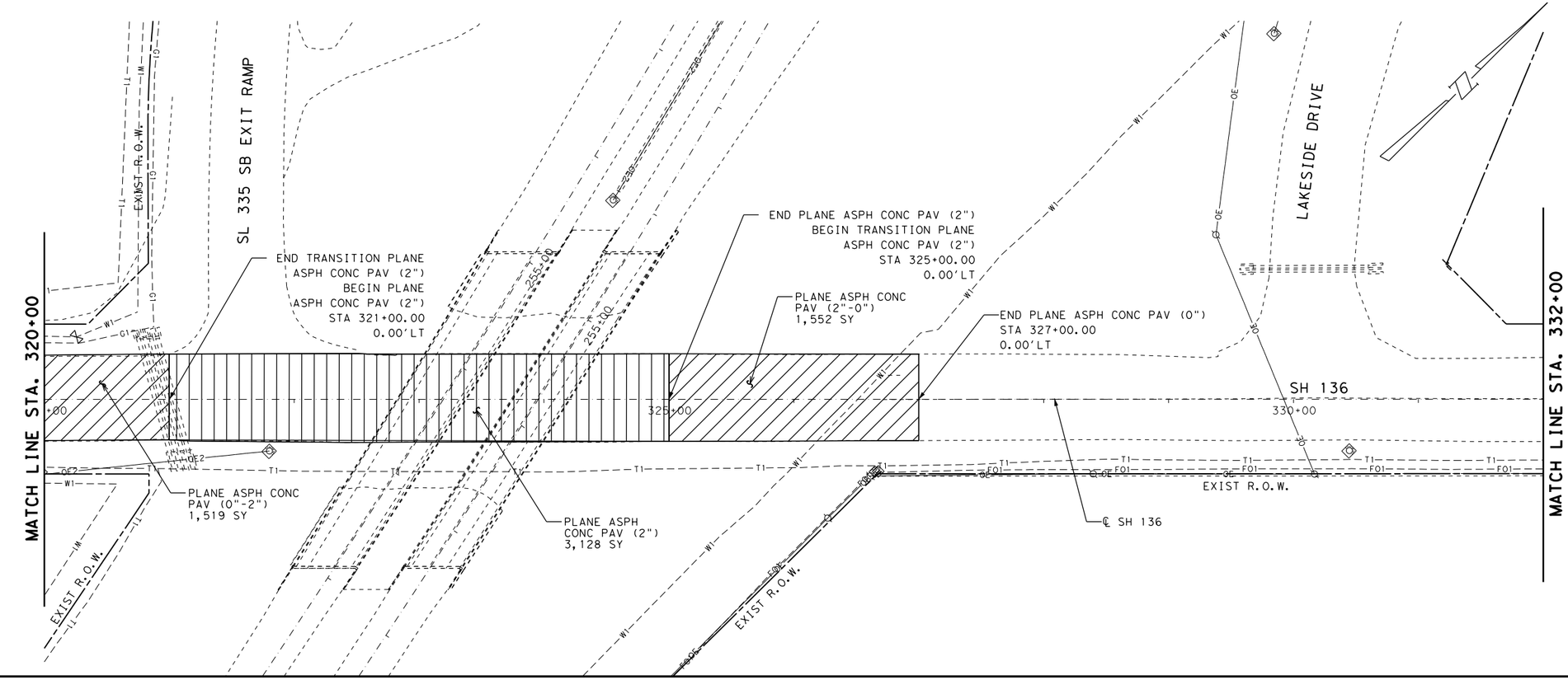

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136

SH 136
REMOVAL PLAN
BEGIN TO STA 332+00

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		65
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:16:09 PM
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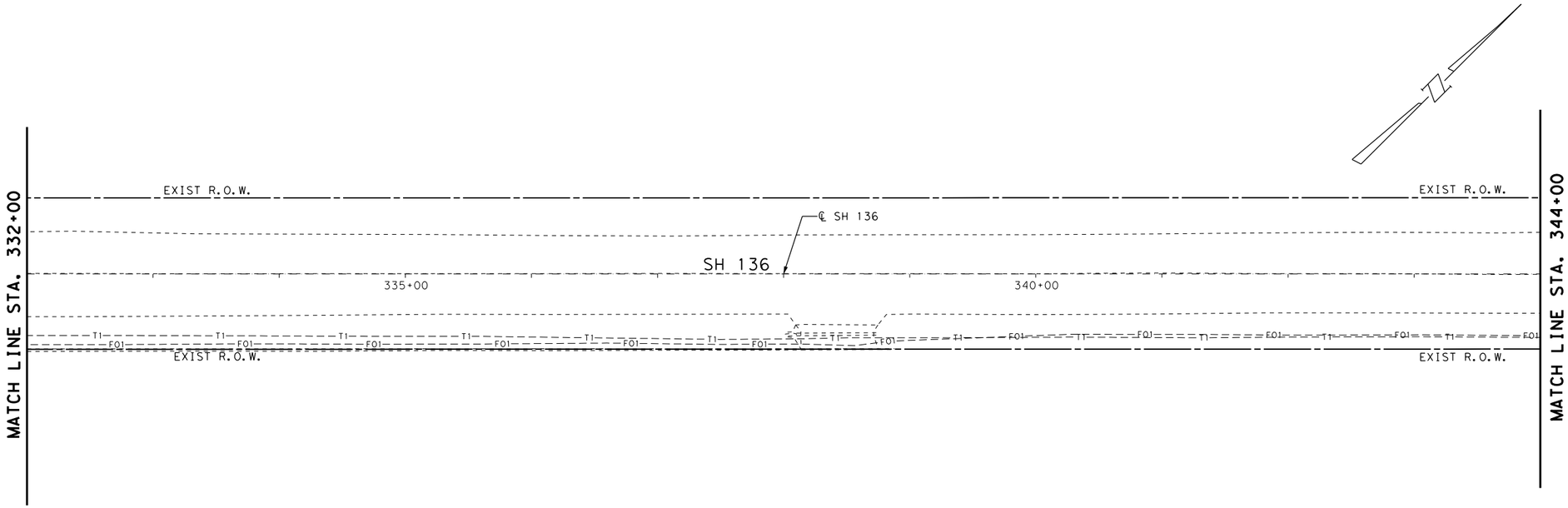


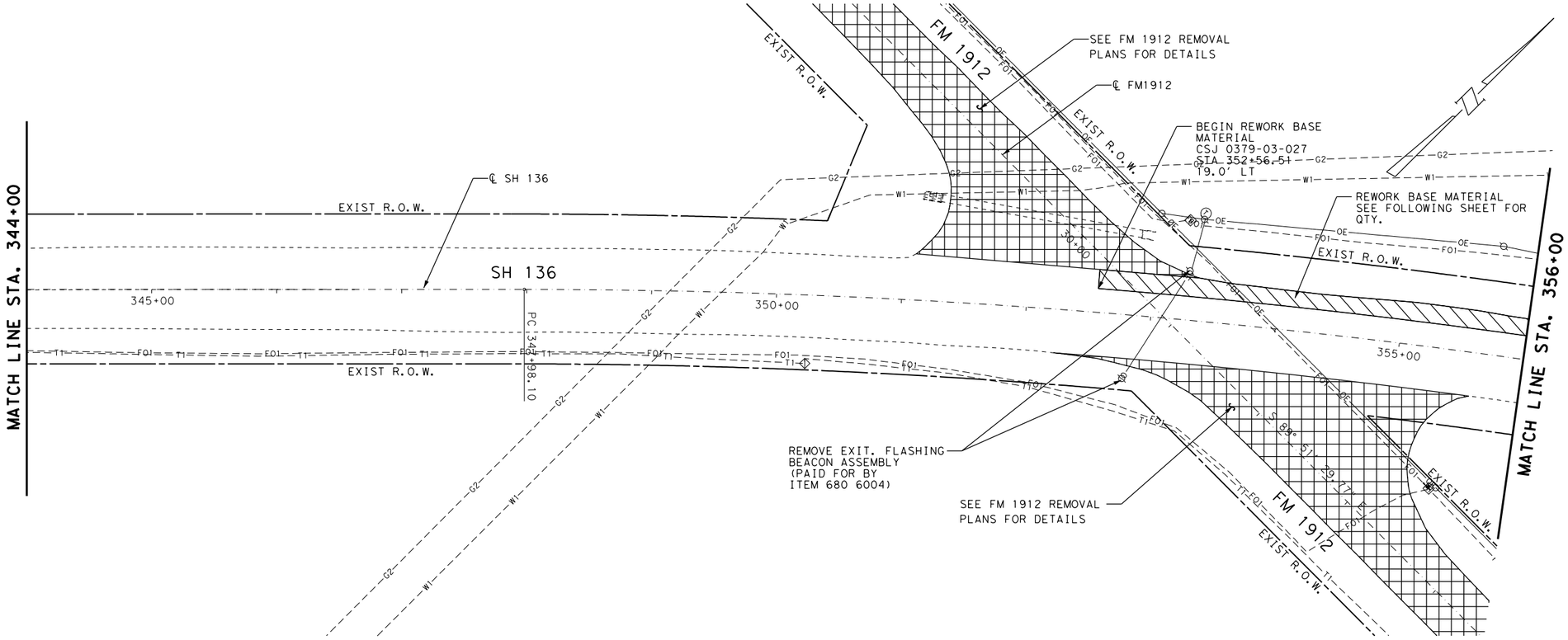
LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'



NO.	DATE	REVISION	APPROVED

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SH 136

SH 136
REMOVAL PLAN
STA 332+00 TO 356+00

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		66
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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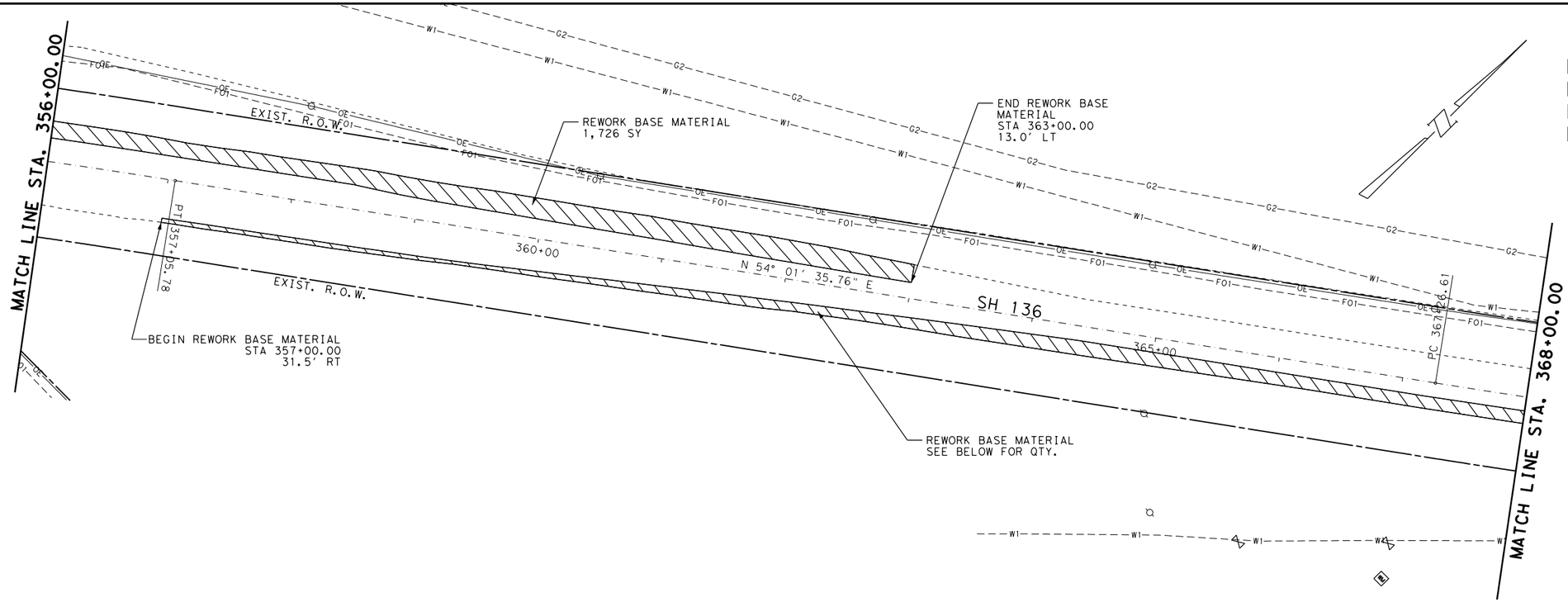

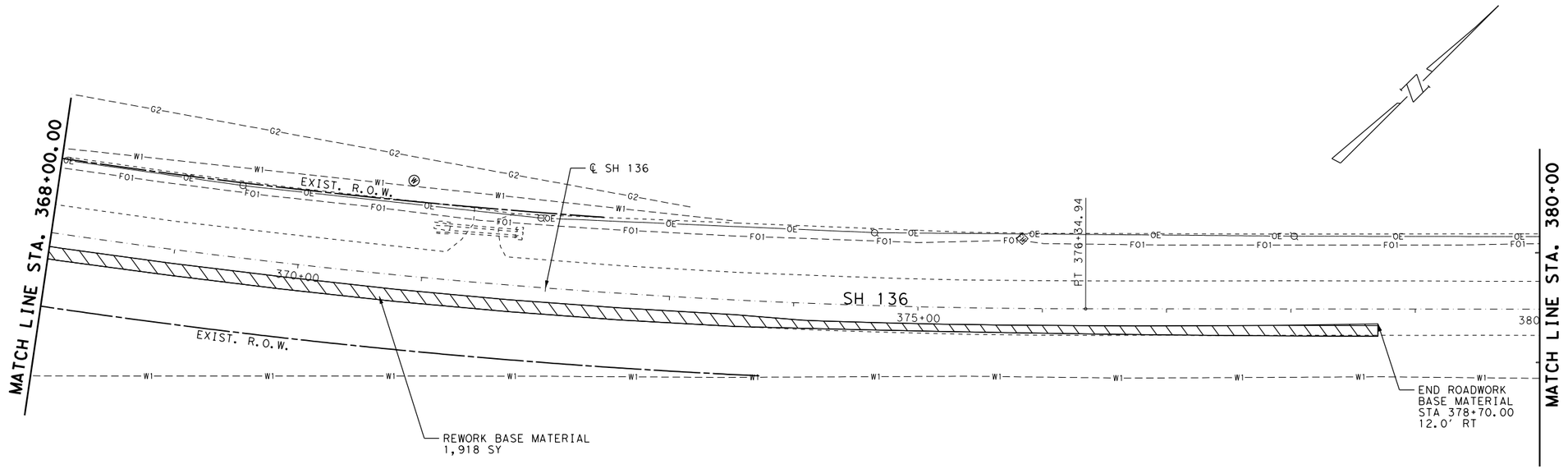

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
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PROFESSIONAL ENGINEER

07/01/2020

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SH 136
SH 136
REMOVAL PLAN
STA 356+00 TO 380+00

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		67
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7//2020 10:16:31 PM
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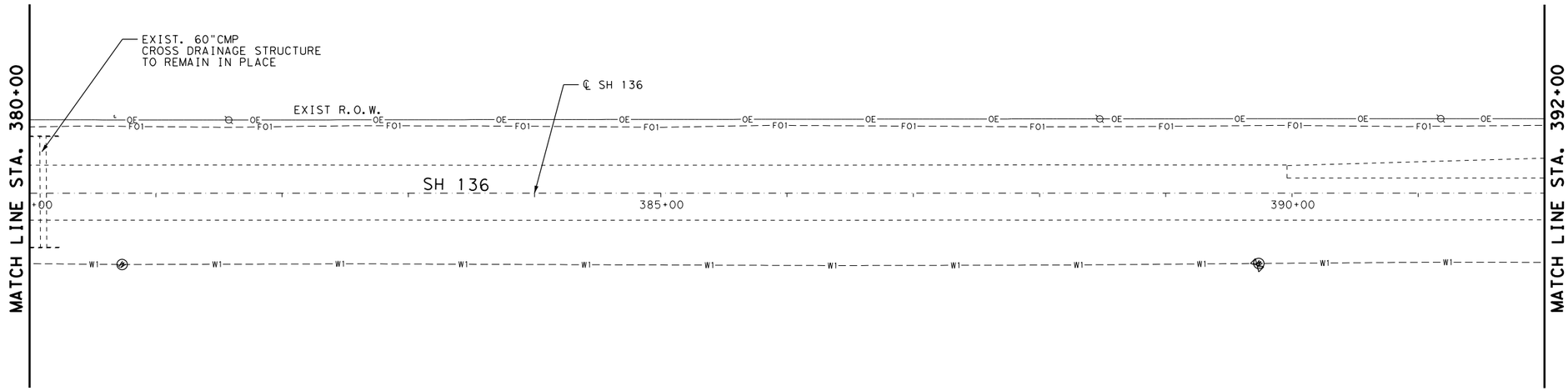

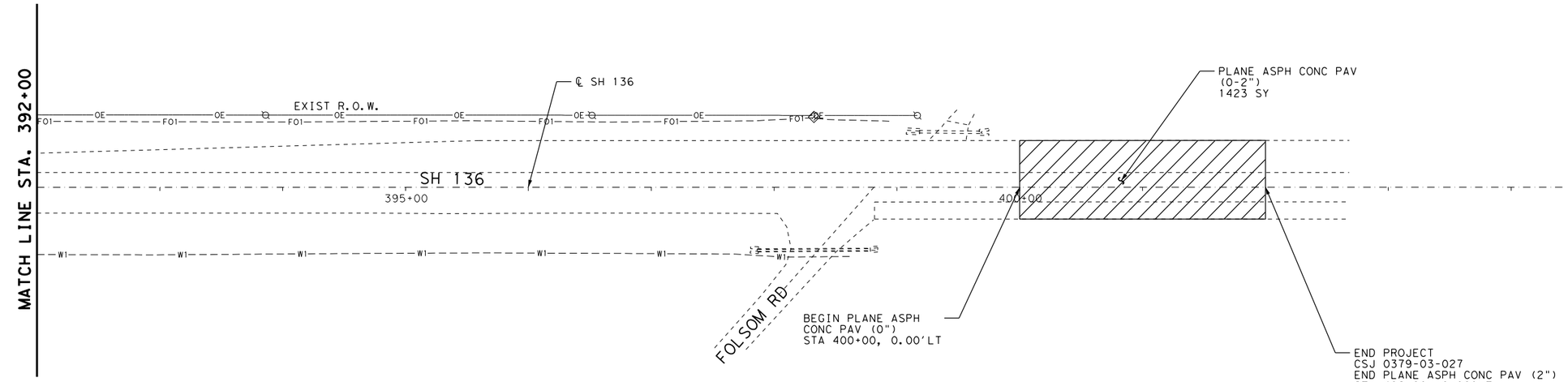

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136

SH 136
REMOVAL PLAN
STA 380+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	68

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:16:44 PM
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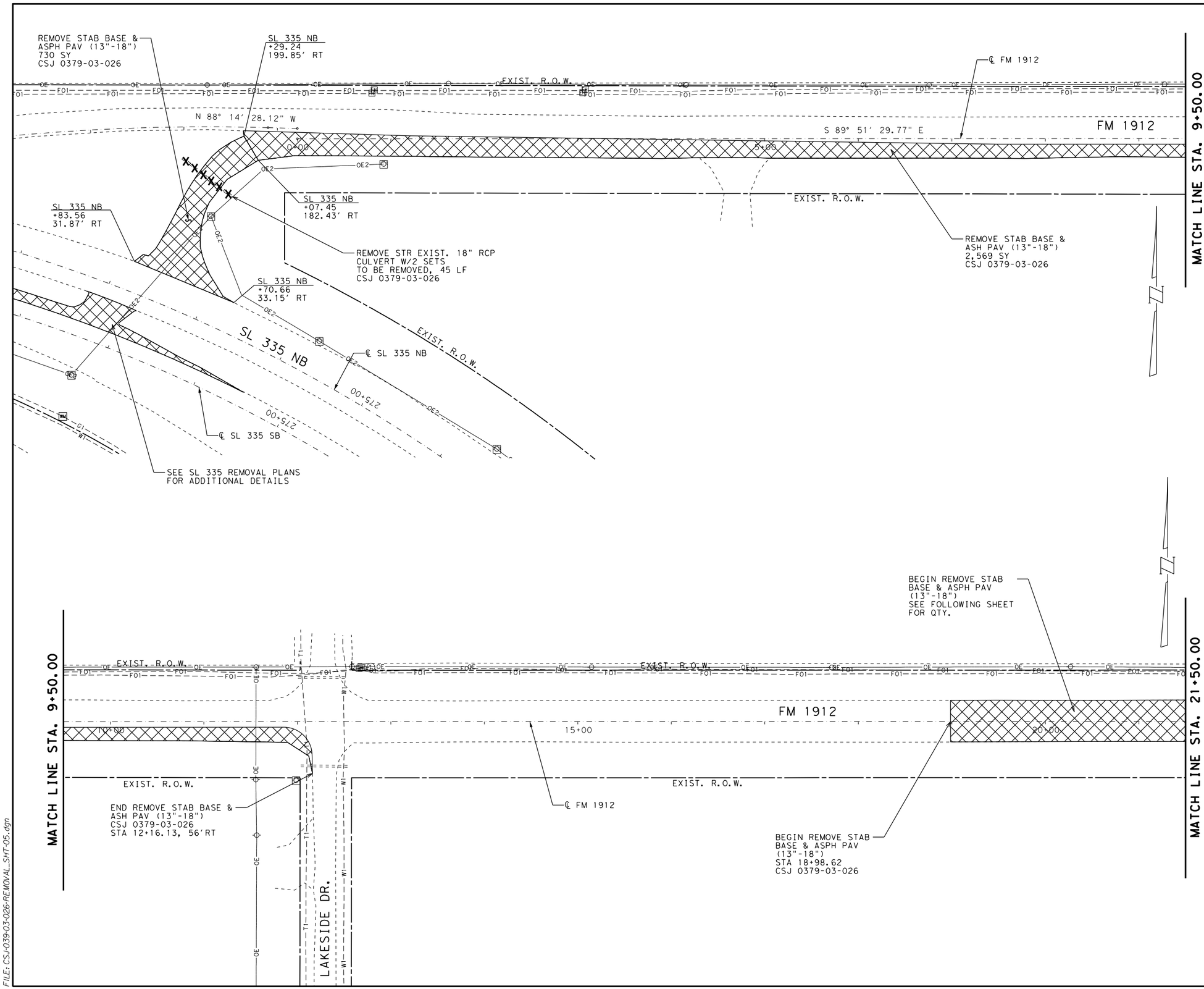

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
FM 1912
REMOVAL PLAN
STA 0+00 TO STA 21+50

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		69
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7//2020 10:16:55 PM
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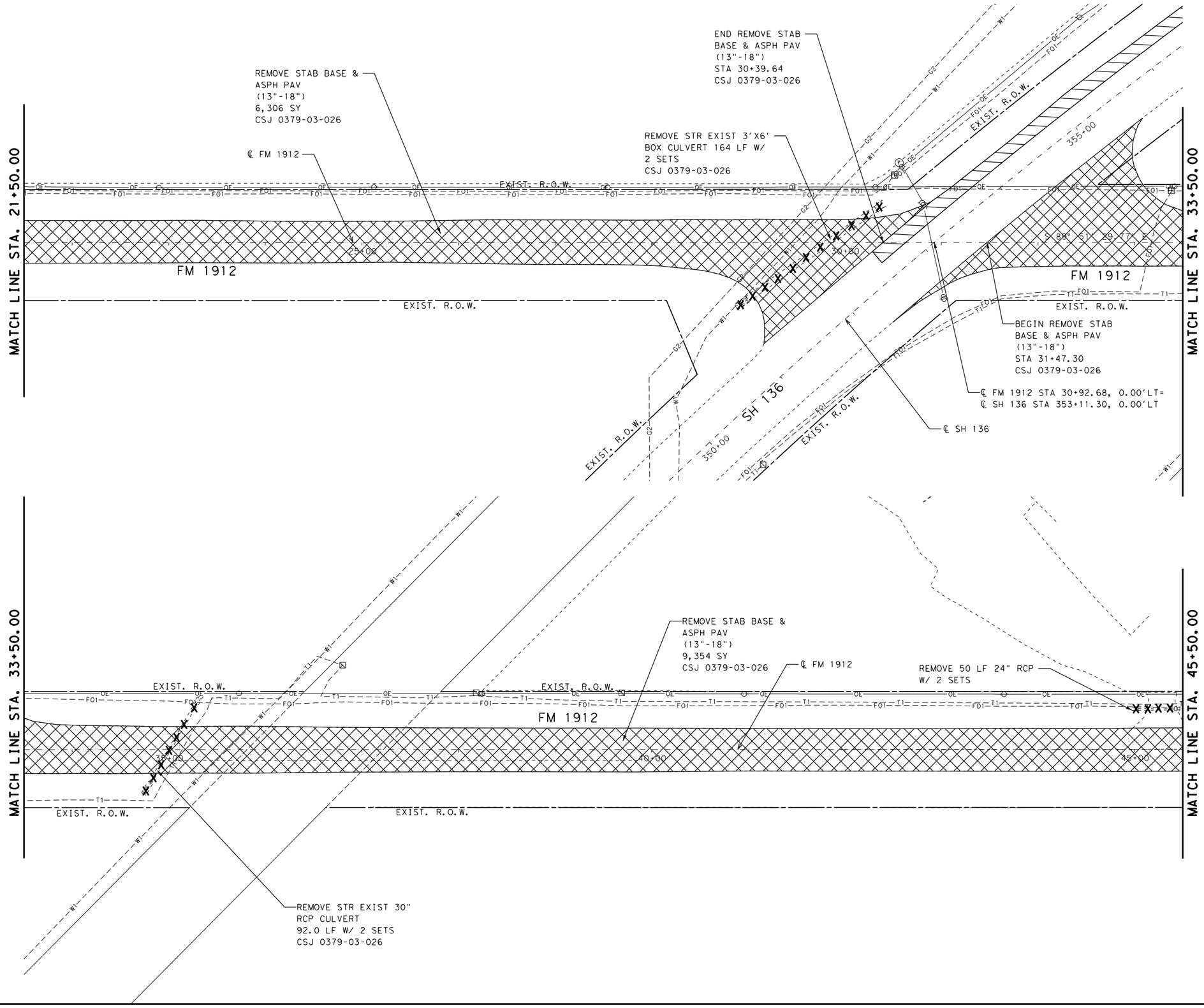

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
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0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
FM 1912
REMOVAL PLAN
STA 21+50 TO STA 45+50

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	70

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 10:17:03 PM
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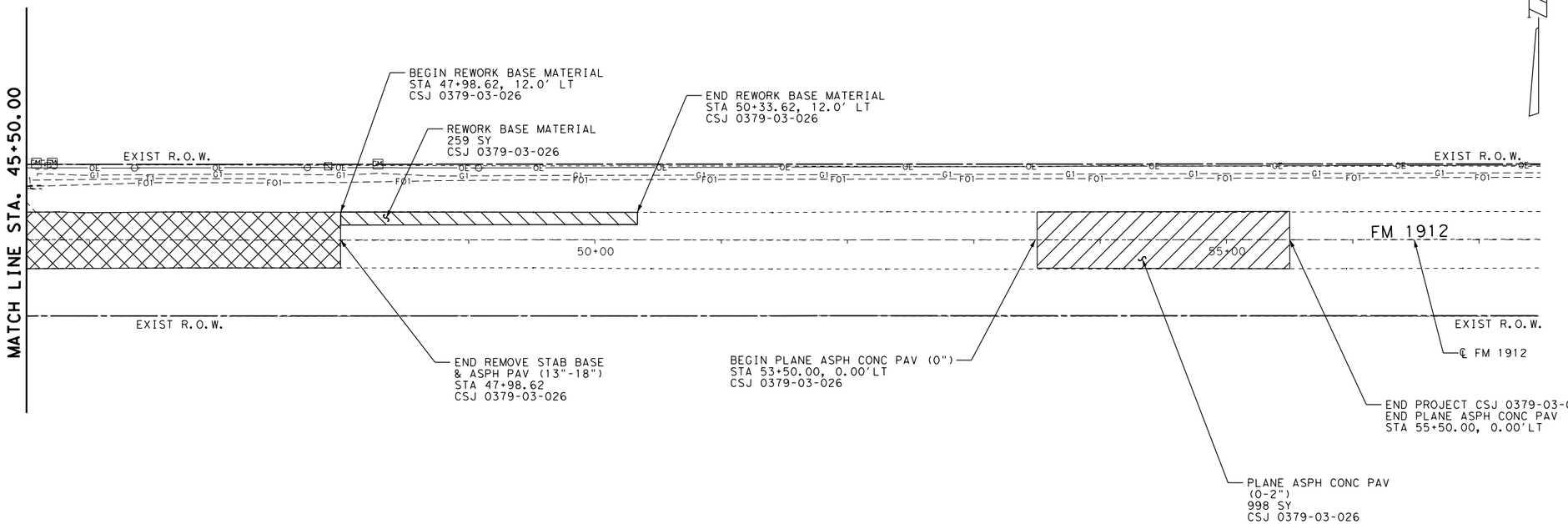

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
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0 25 50 100 200

SCALE: 1"=100'

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SH 136

FM 1912
REMOVAL PLAN
STA 45+50 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		71
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:17:11 PM
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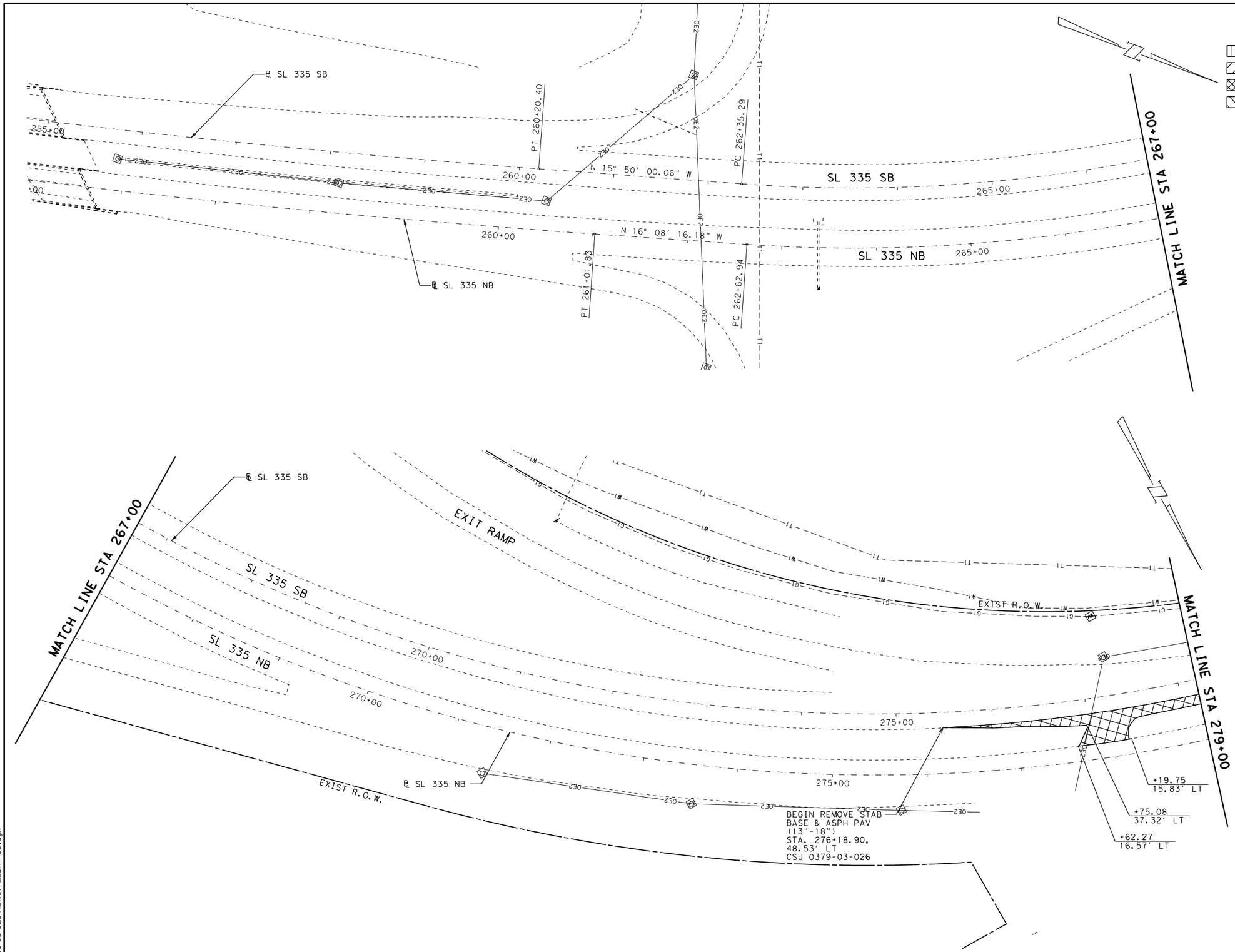

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. ALL STATIONING IS BASED ON ℄ SL 335 NB ALIGNMENT UNLESS OTHERWISE NOTED.
2. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'

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SH 136
SL 335
REMOVAL PLAN
BEGIN TO STA 279+00

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		72
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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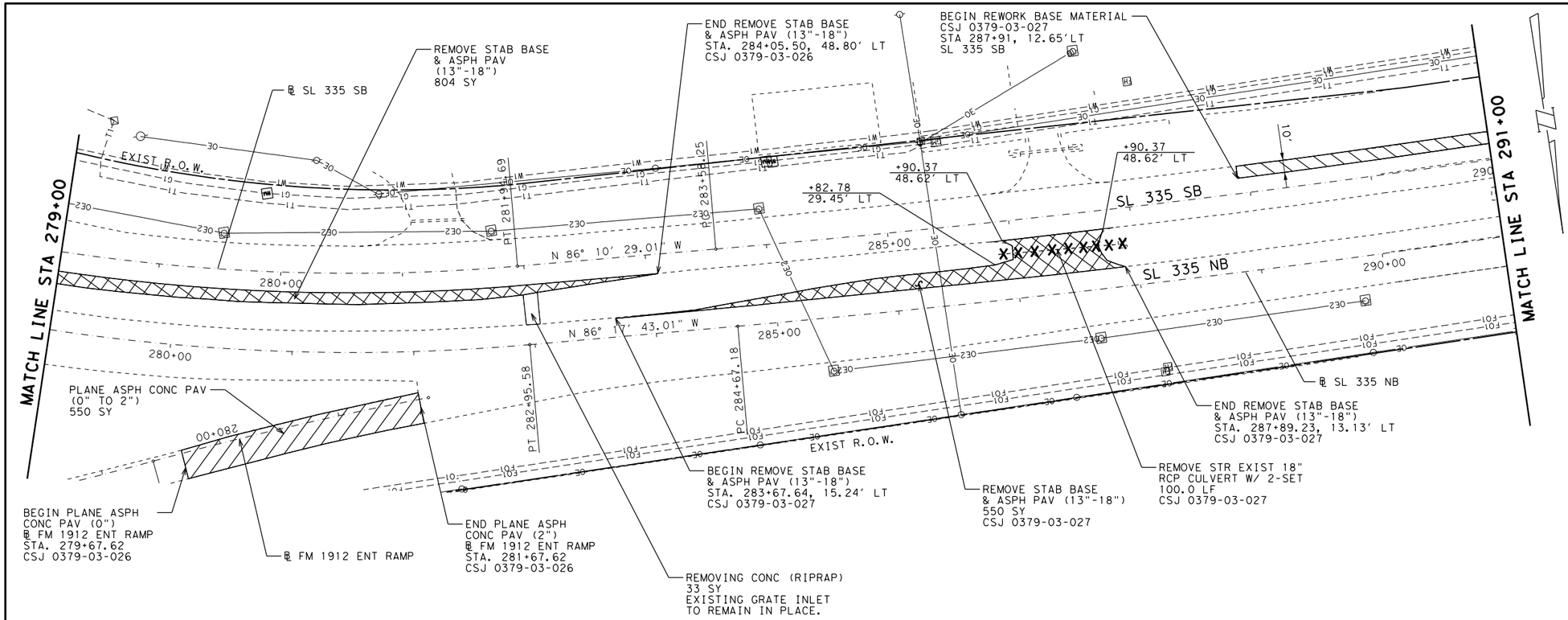

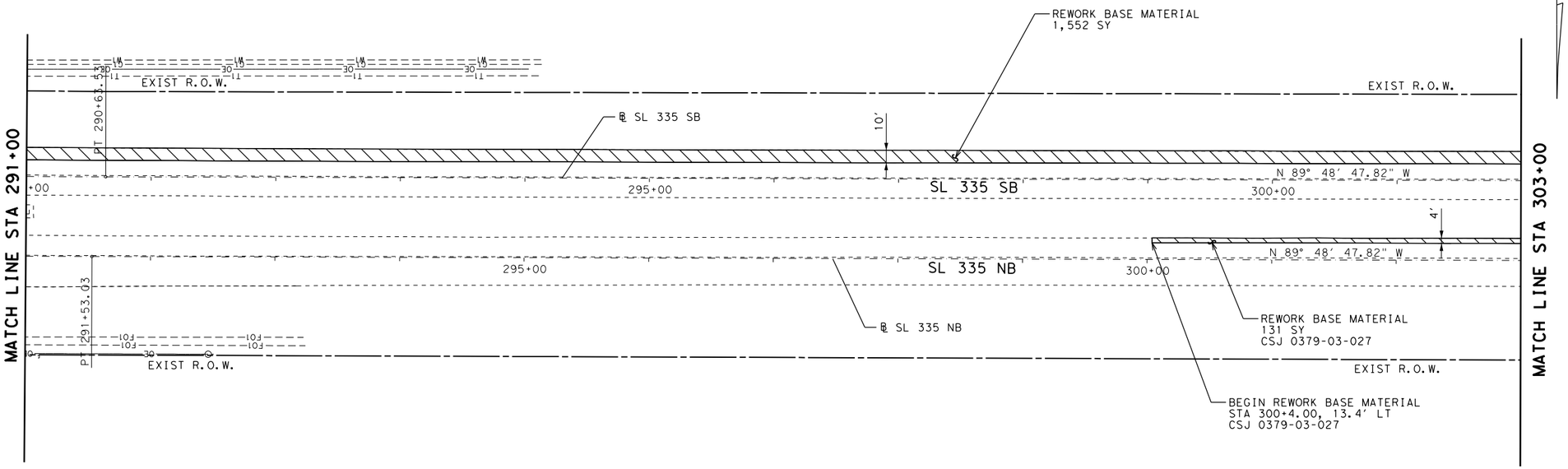

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
1. ALL STATIONING IS BASED ON ℄ SL 335 NB ALIGNMENT UNLESS OTHERWISE NOTED.
2. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200

SCALE: 1"=100'

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SH 136
SL 335
REMOVAL PLAN
STA 279+00 TO 303+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		73
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

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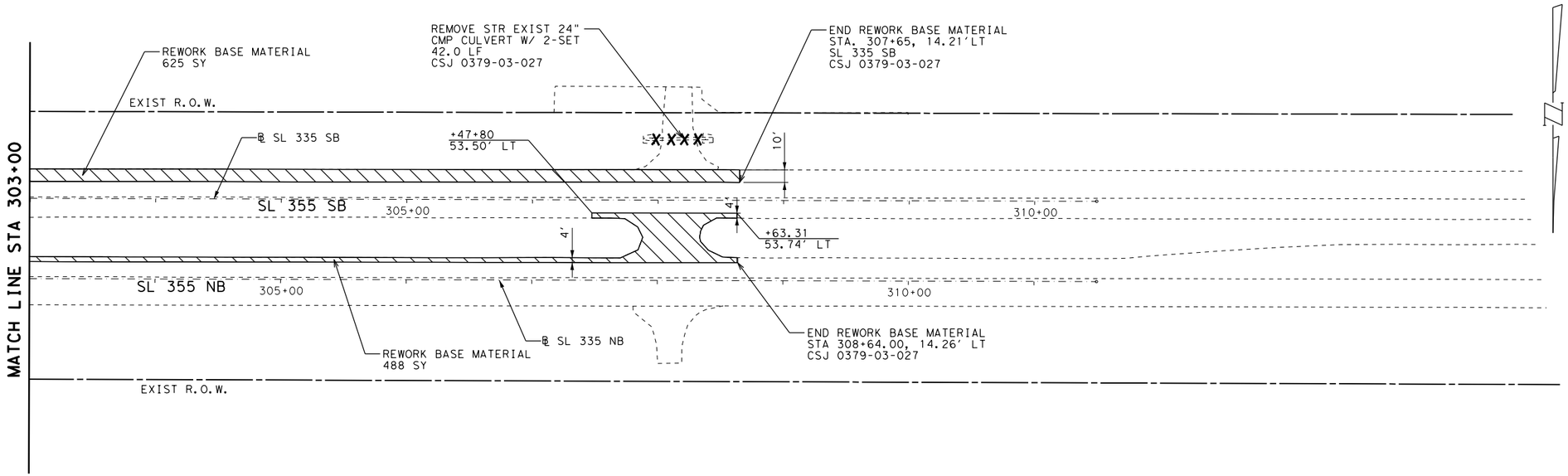

LEGEND:

- PLANE ASPHALT CONCRETE PAVEMENT (2")
- PLANE ASPHALT CONCRETE PAVEMENT (0"-2")
- FULL DEPTH PAVEMENT REMOVAL
- REWORK BASE MATERIAL

NOTE:
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0 25 50 100 200

SCALE: 1"=100'

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SH 136
SL 335
REMOVAL PLAN
STA 303+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		74
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7//2020 10:17:37 PM
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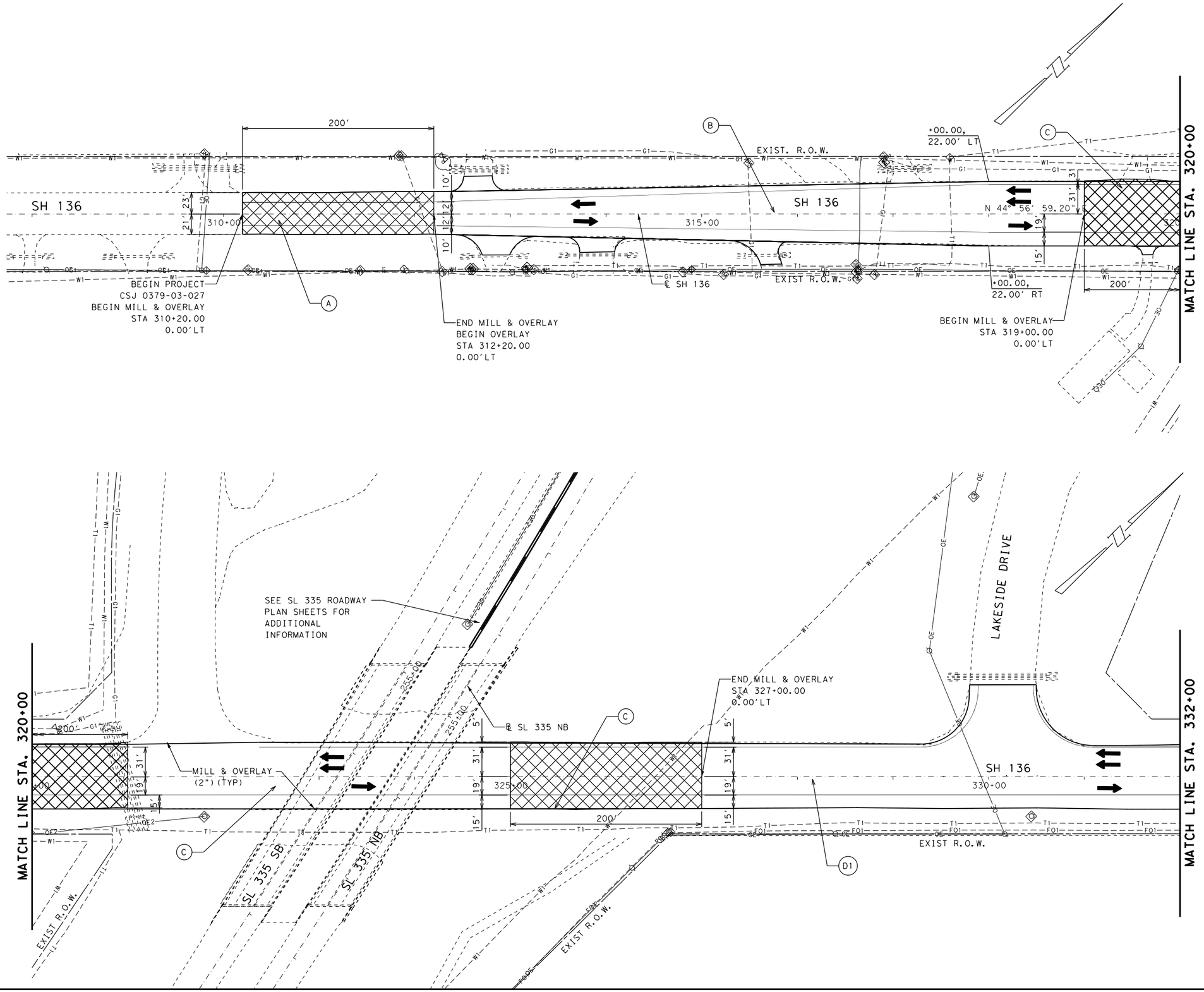

LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL STATIONING IS BASED ON ℄ SH 136 ALIGNMENT UNLESS OTHERWISE NOTED.
3. SEE SIGNING AND PAVEMENT MARKING SHEETS FOR ADDITIONAL INFORMATION.
4. SEE CULVERT LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
5. SEE DRIVEWAY DETAIL SHEETS FOR ADDITIONAL INFORMATION FOR DRIVEWAY CONSTRUCTION.
6. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136

SH 136
ROADWAY PLAN
BEGIN TO STA 332+00

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	75

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:9:27 PM
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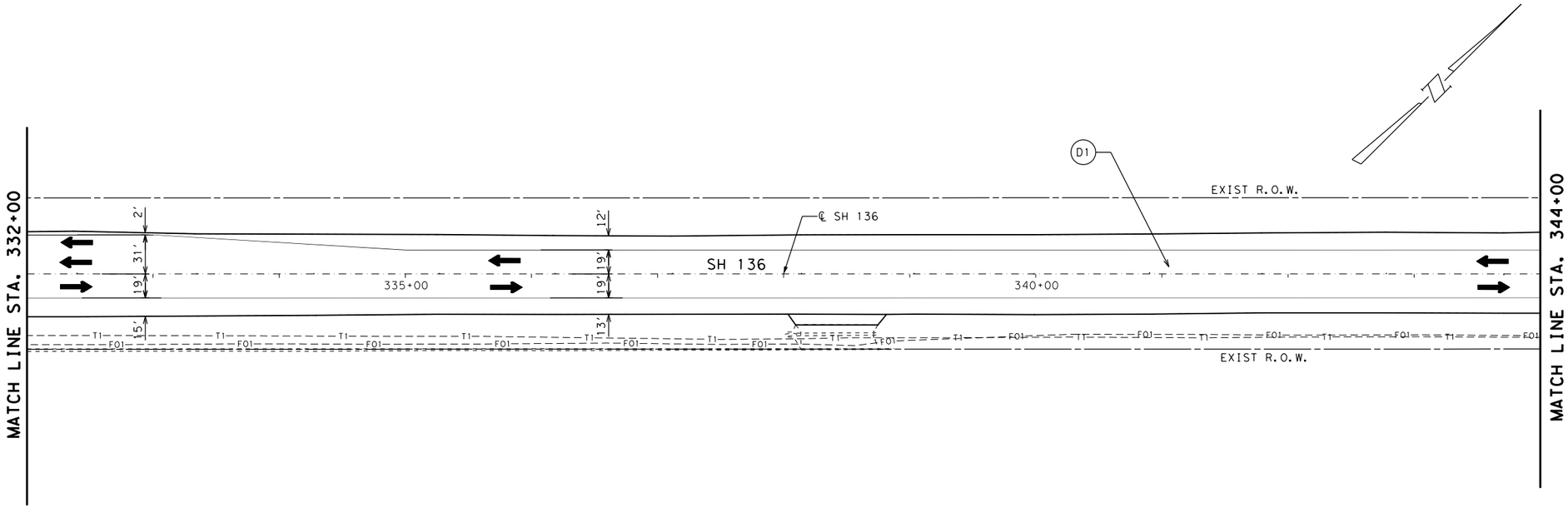
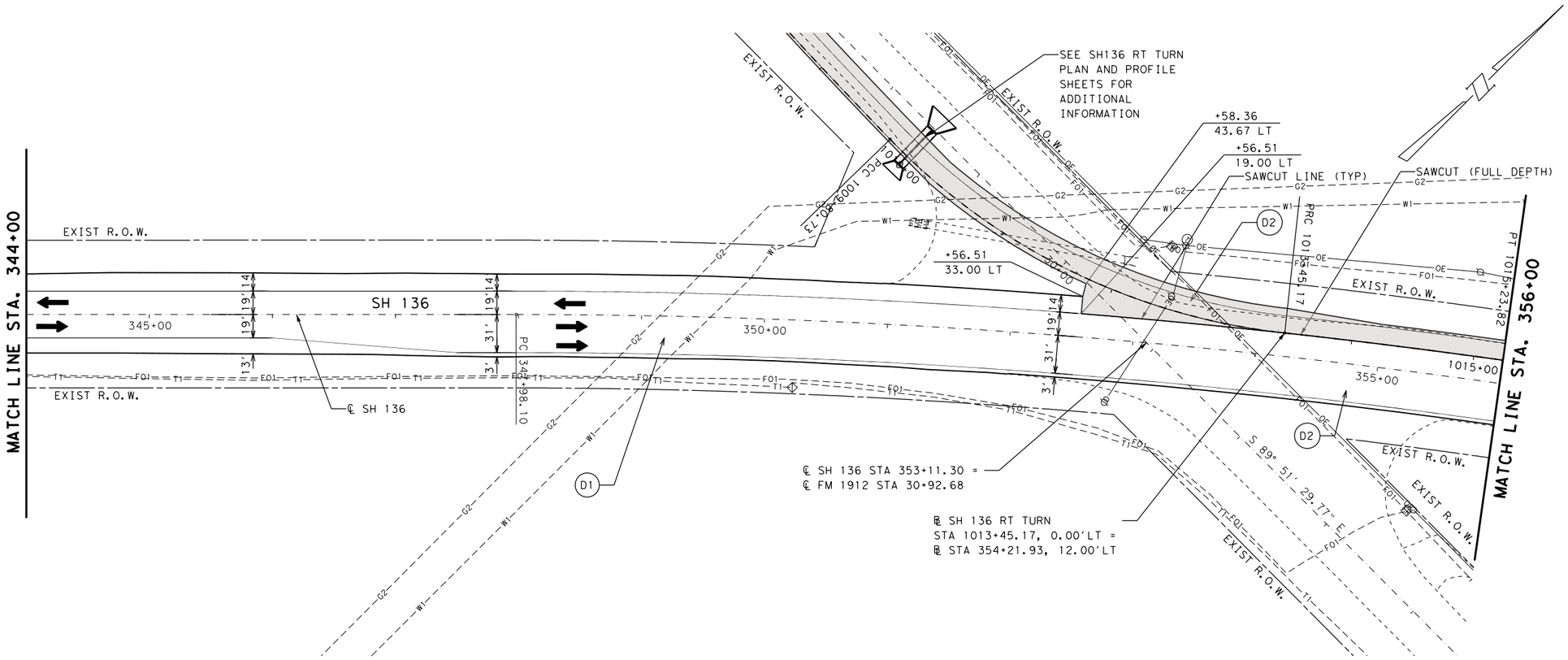


LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL STATIONING IS BASED ON ℄ SH 136 ALIGNMENT UNLESS OTHERWISE NOTED.
3. SEE SIGNING AND PAVEMENT MARKING SHEETS FOR ADDITIONAL INFORMATION.
4. SEE CULVERT LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
5. SEE DRIVEWAY DETAIL SHEETS FOR ADDITIONAL INFORMATION FOR DRIVEWAY CONSTRUCTION.
6. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200
SCALE: 1"=100'



NO.	DATE	REVISION	APPROVED

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SH 136
SH 136
ROADWAY PLAN
STA 332+00 TO 356+00

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	76

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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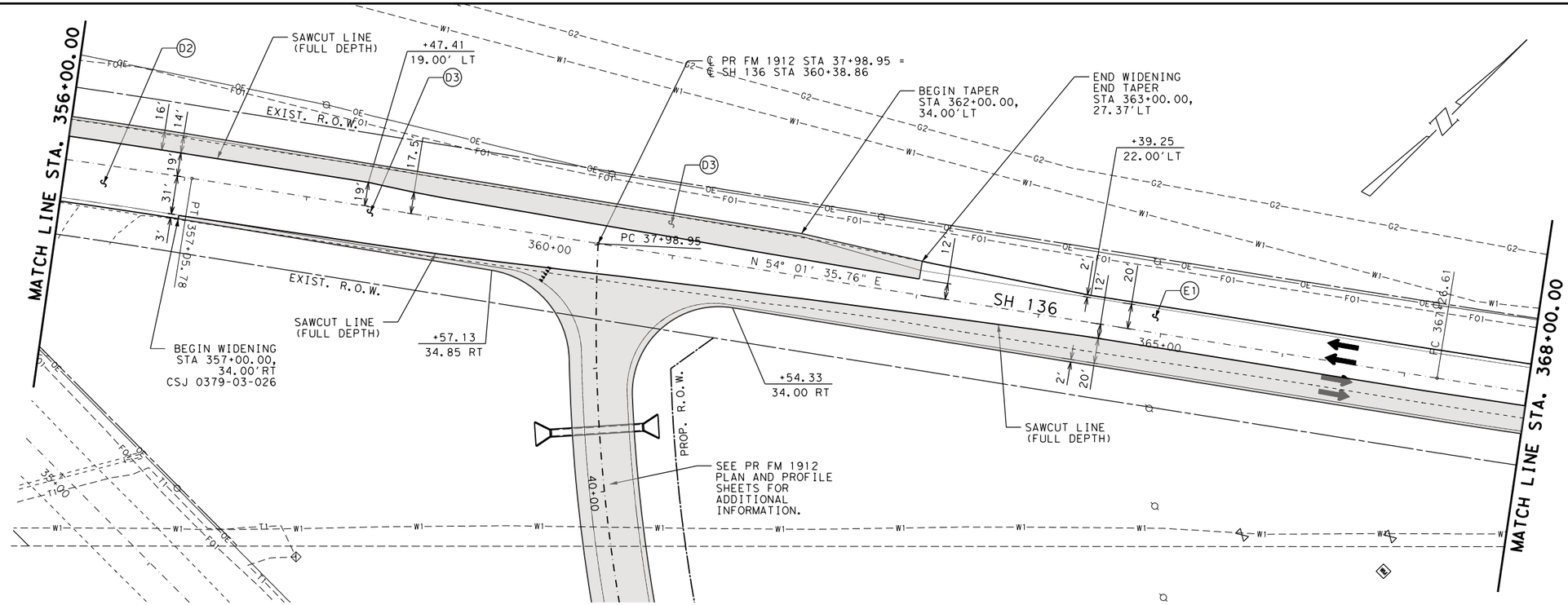

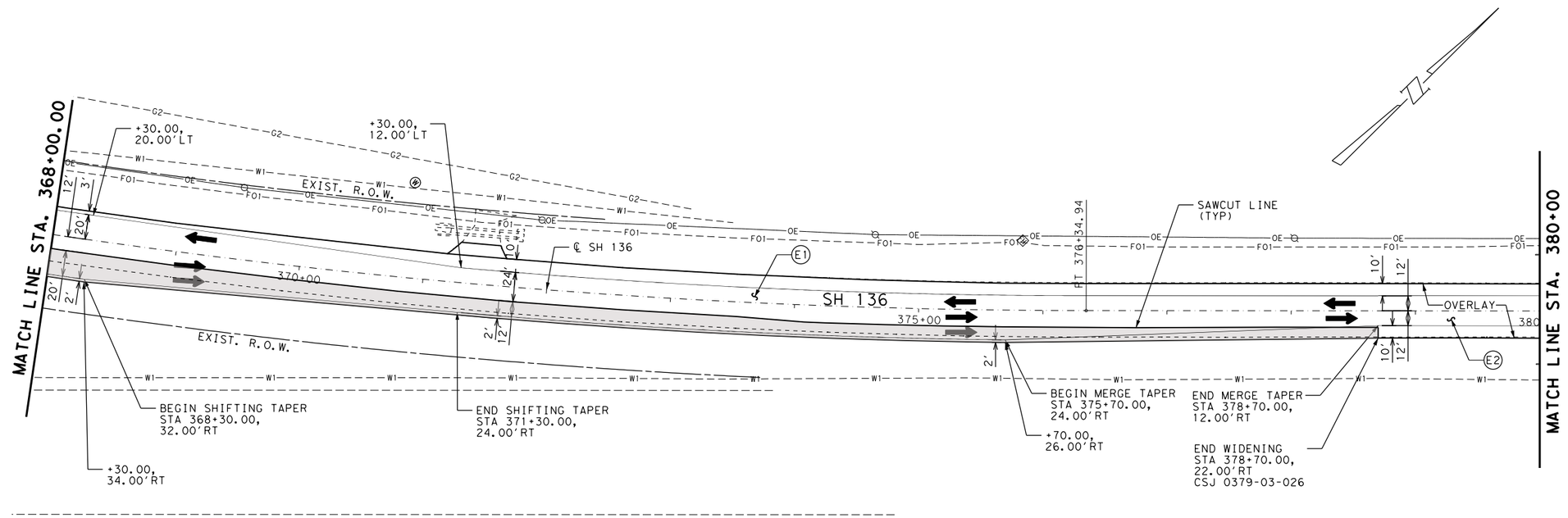

LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL STATIONING IS BASED ON ℄ SH 136 ALIGNMENT UNLESS OTHERWISE NOTED.
3. SEE SIGNING AND PAVEMENT MARKING SHEETS FOR ADDITIONAL INFORMATION.
4. SEE CULVERT LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
5. SEE DRIVEWAY DETAIL SHEETS FOR ADDITIONAL INFORMATION FOR DRIVEWAY CONSTRUCTION.
6. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
SH 136
ROADWAY PLAN
STA 356+00 TO 380+00

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		77
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:19:52 PM
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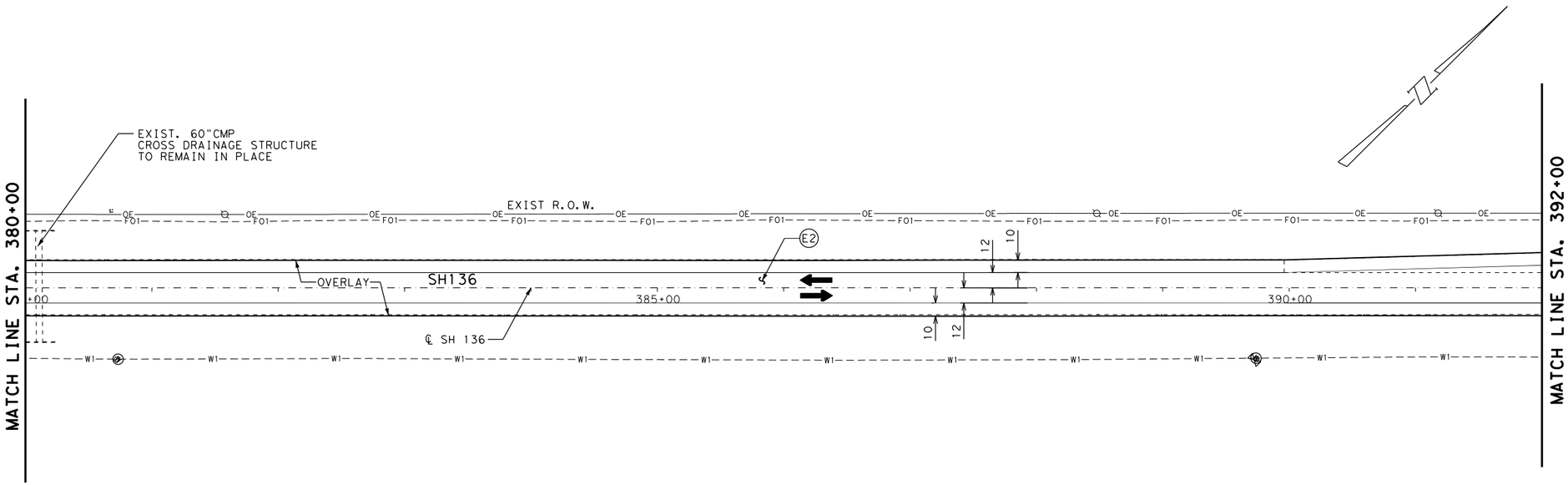

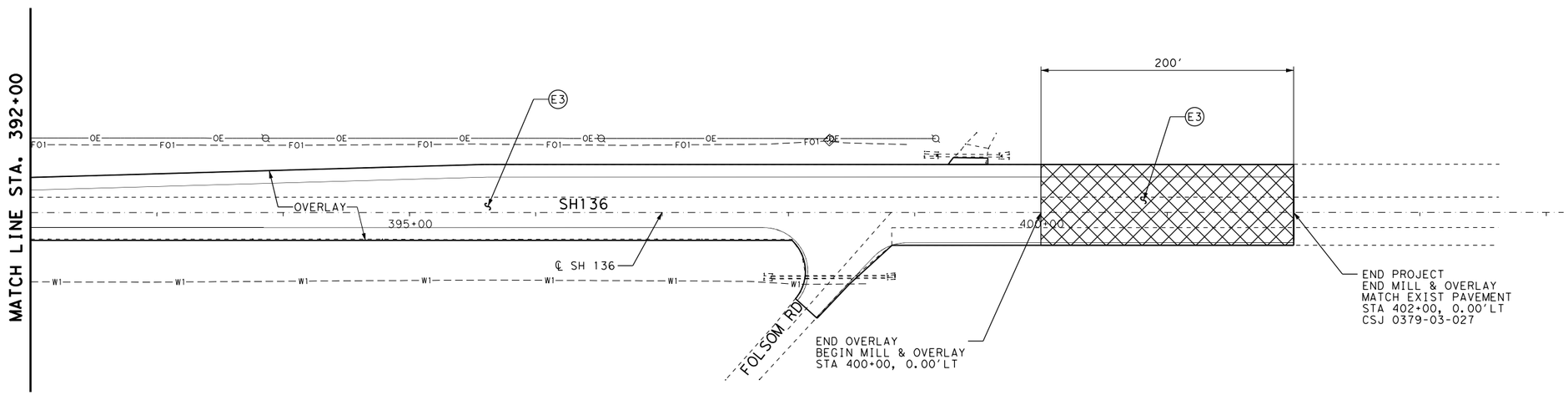

LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL STATIONING IS BASED ON ℄ SH 136 ALIGNMENT UNLESS OTHERWISE NOTED.
3. SEE SIGNING AND PAVEMENT MARKING SHEETS FOR ADDITIONAL INFORMATION.
4. SEE CULVERT LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
5. SEE DRIVEWAY DETAIL SHEETS FOR ADDITIONAL INFORMATION FOR DRIVEWAY CONSTRUCTION.
6. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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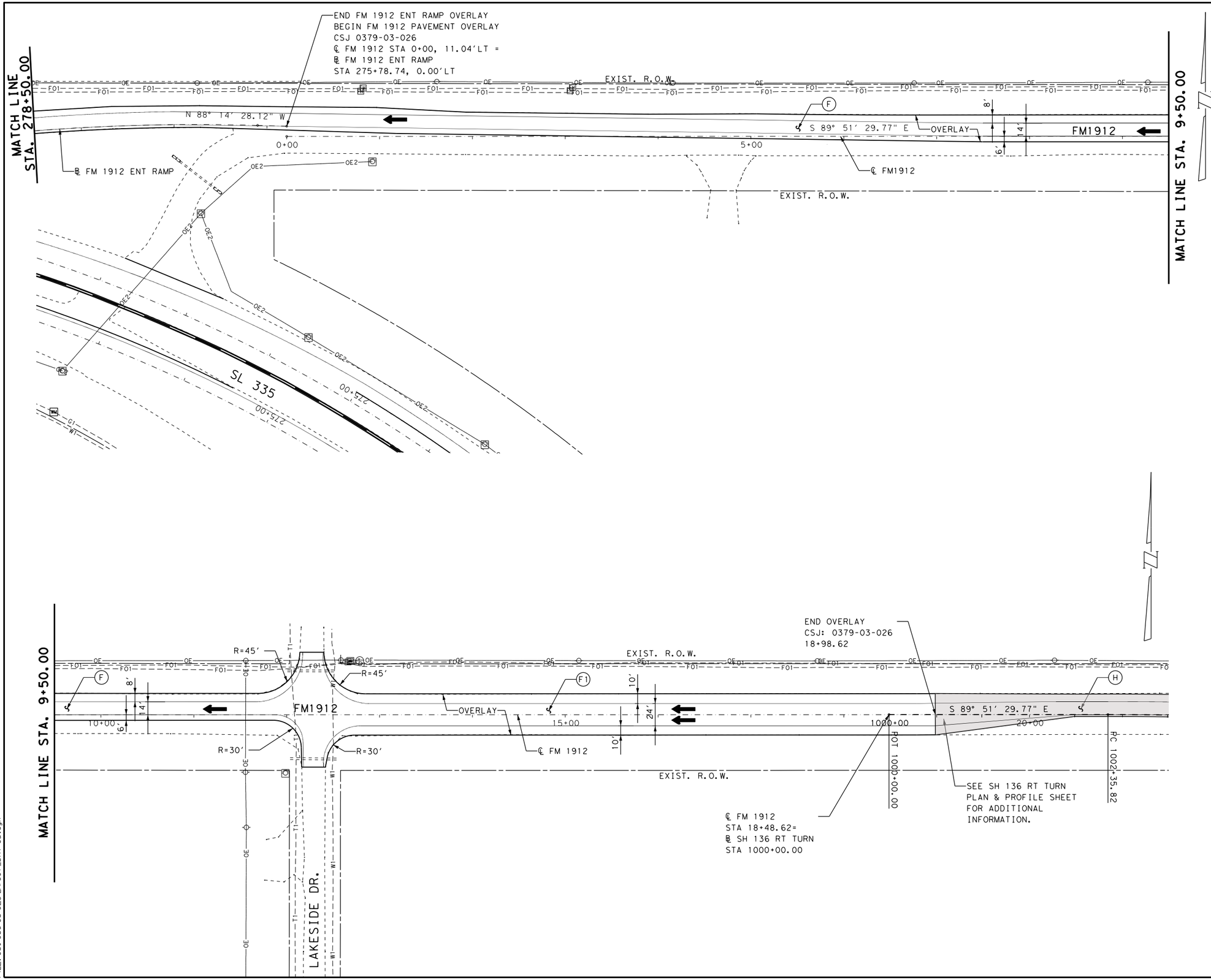
SH 136

SH 136
ROADWAY PLAN
STA 380+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		78
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:20:03 PM
FILE: CSJ-039-03-026-LAYOUT_SHT-04.dgn



LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- TYPICAL SECTION NO.

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL STATIONING IS BASED ON ℄ FM 1912 ALIGNMENT UNLESS OTHERWISE NOTED.
3. SEE SIGNING AND PAVEMENT MARKING SHEETS FOR ADDITIONAL INFORMATION.
4. SEE CULVERT LAYOUT SHEETS FOR ADDITIONAL INFORMATION.
5. SEE DRIVEWAY DETAIL SHEETS FOR ADDITIONAL INFORMATION FOR DRIVEWAY CONSTRUCTION.
6. UTILITY INFORMATION HAS BEEN PROVIDED BY TXDOT FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY TYPE, SIZES, AND LOCATIONS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS.

0 25 50 100 200
SCALE: 1"=100'

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STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

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T.B.P.E. Firm Registration #12

SH 136
FM 1912
ROADWAY PLAN
STA 0+00 TO STA 21+50

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	79

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:20:15 PM
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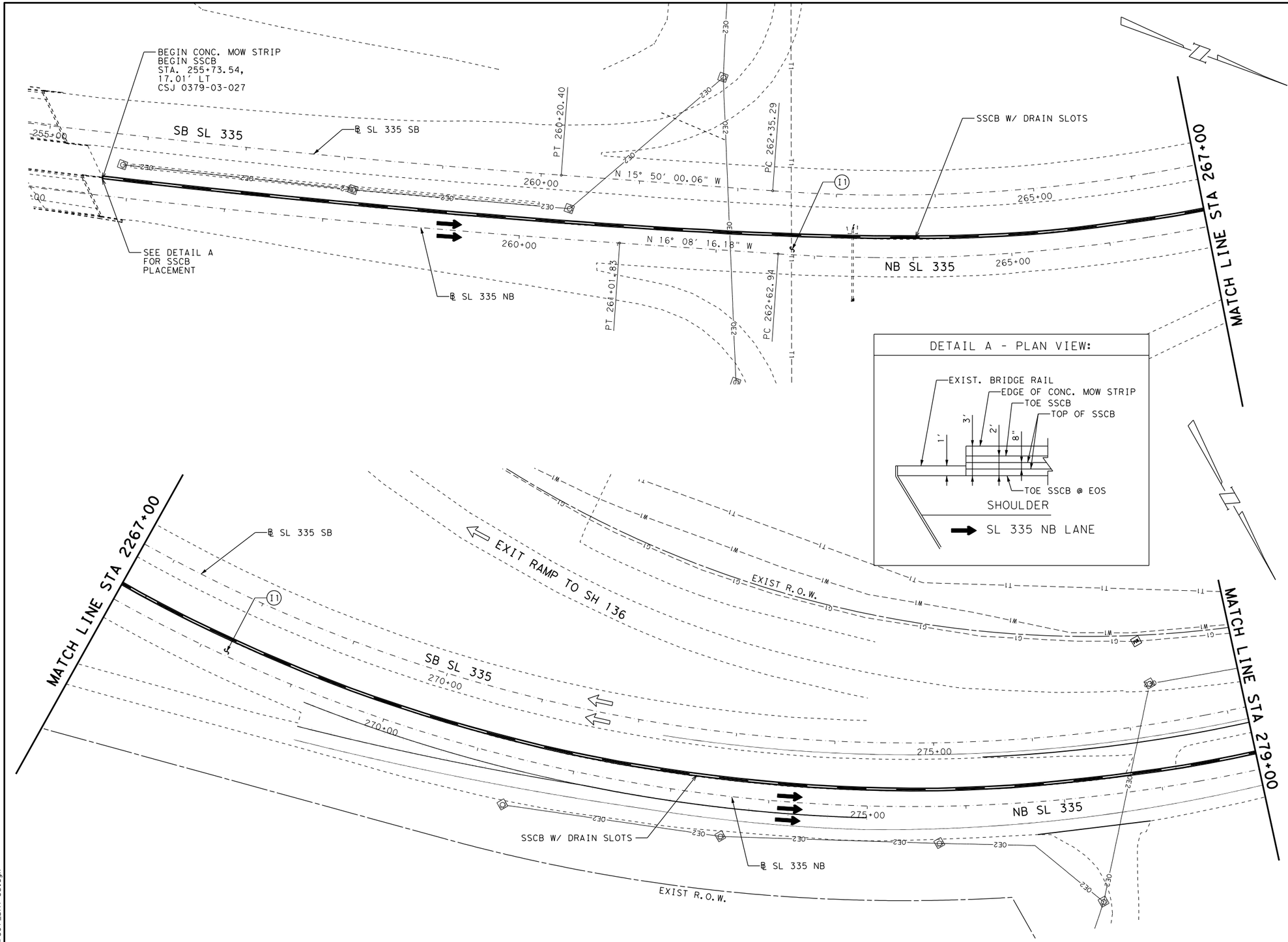

DETAIL A - PLAN VIEW:

LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL STATIONING IS BASED ON ℄ SL 335 NB ALIGNMENT UNLESS OTHERWISE NOTED.
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0 25 50 100 200
SCALE: 1"=100'

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SH 136
SL 335
ROADWAY PLAN
BEGIN TO STA 279+00

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		80
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

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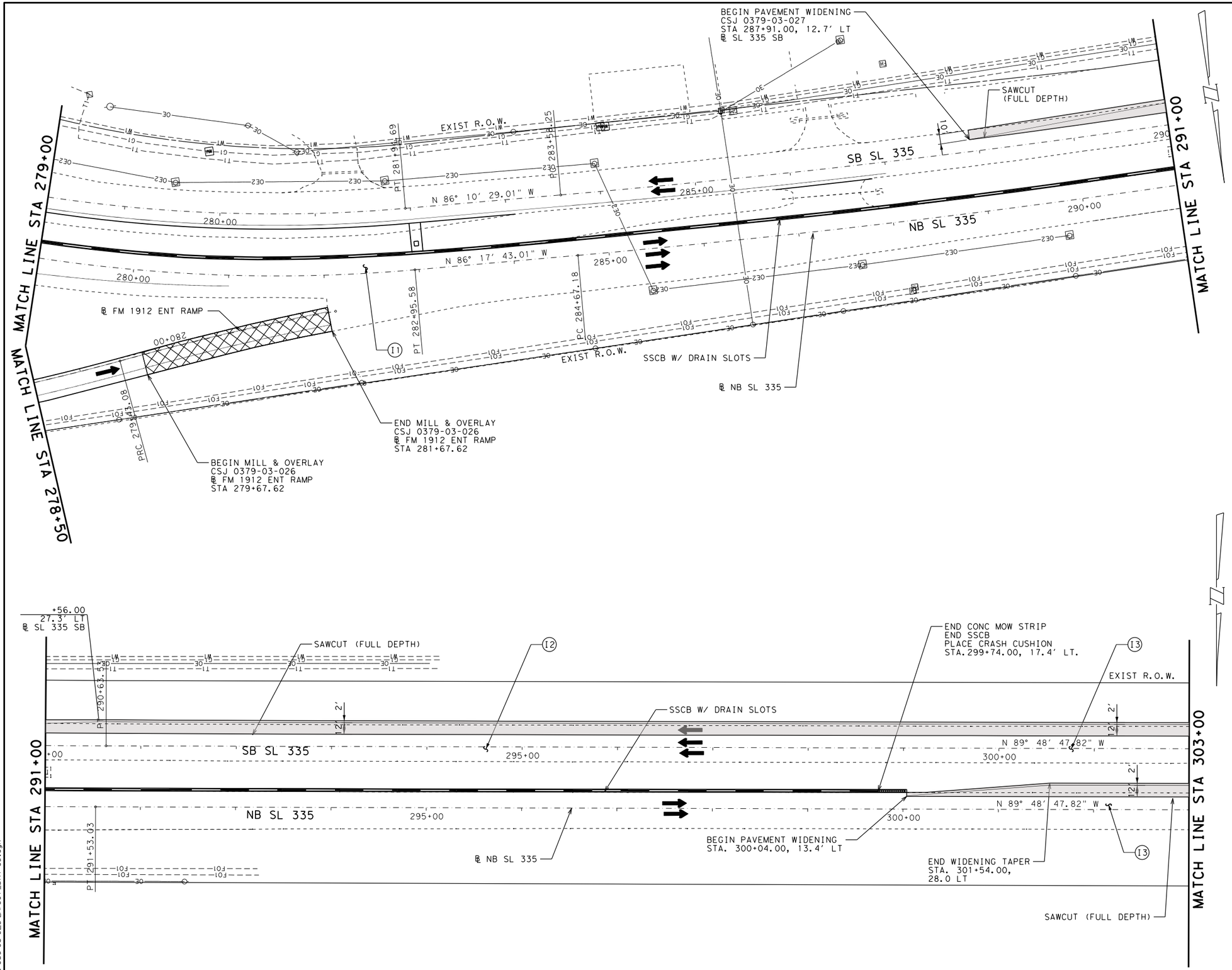

LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

NOTE:
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0 25 50 100 200
SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
SL 335
ROADWAY PLAN
STA 279+00 TO 303+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	81

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:20:38 PM
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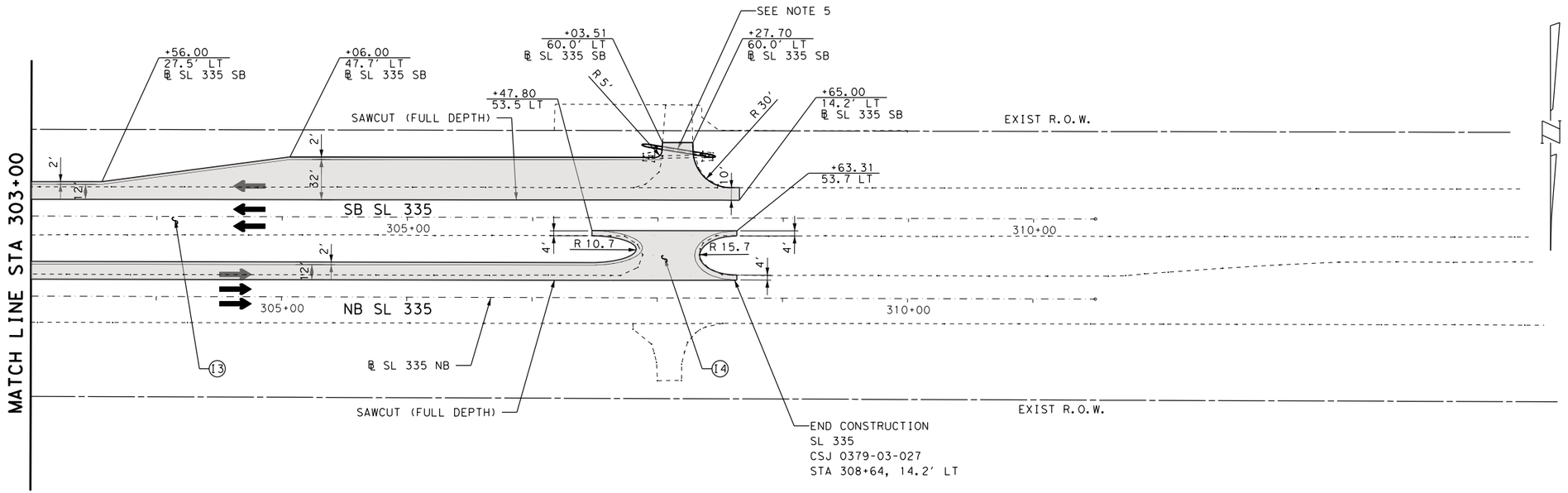

LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- PROPOSED TIE-IN PAVEMENT
- (#) TYPICAL SECTION NO.

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0 25 50 100 200

SCALE: 1"=100'

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SH 136
SL 335
ROADWAY PLAN
STA 303+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		82
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7//2020 10:20:49 PM
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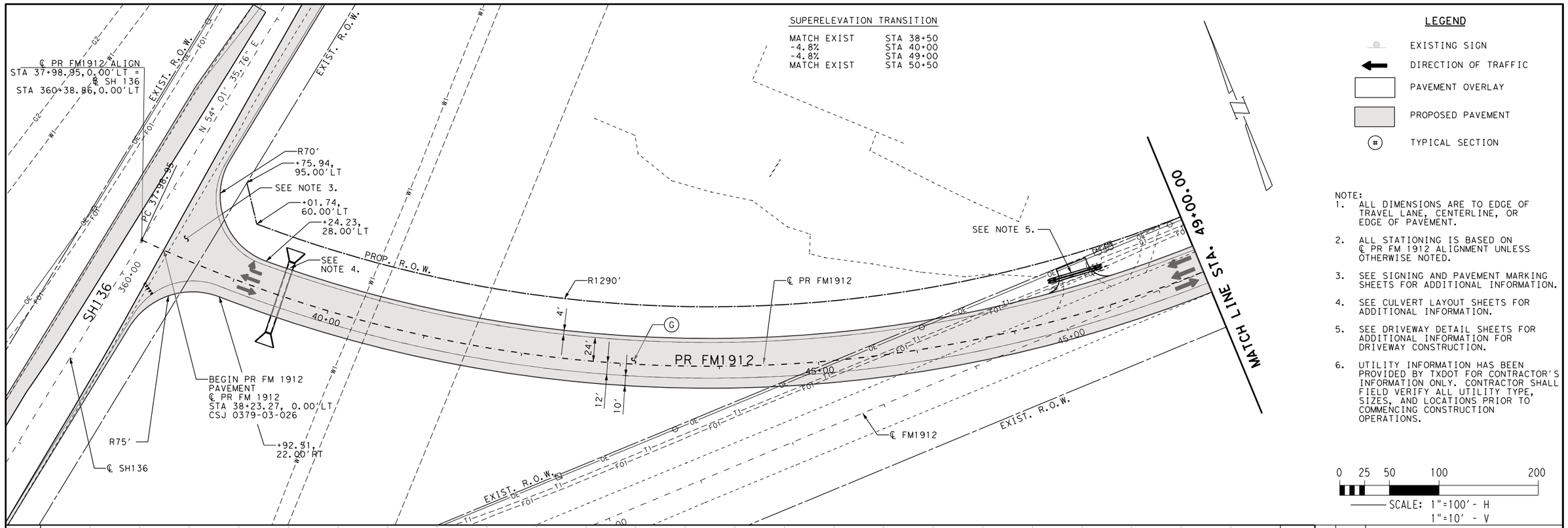

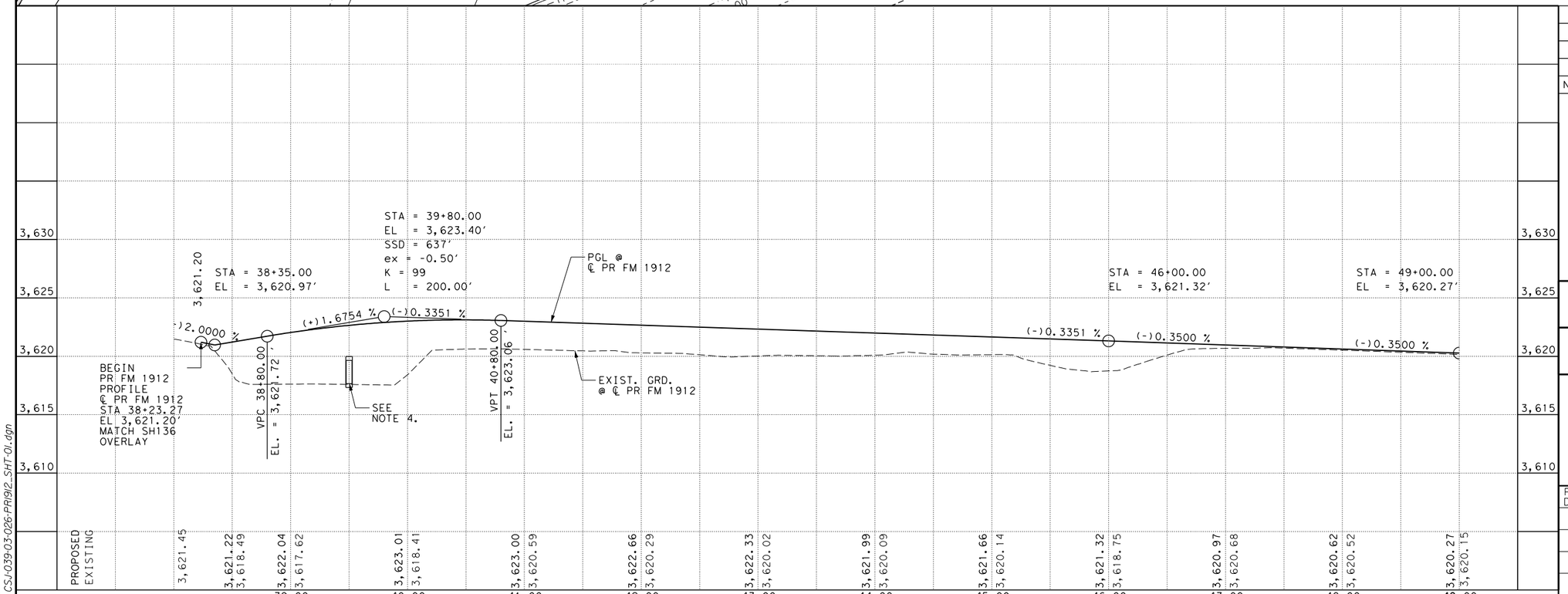

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SH 136
PR FM 1912
PLAN & PROFILE
STA 38+23.27 TO STA 49+00

SHEET 1 OF 2

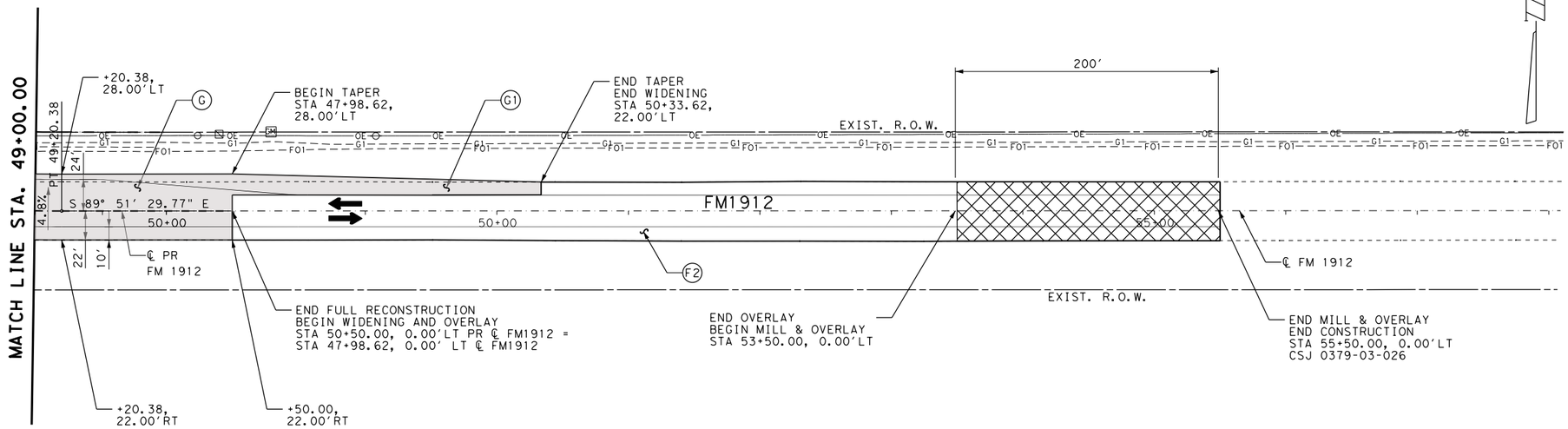
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	83

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 10:20:58 PM
FILE: CSJ-039-03-026-PR1912_SHT-01.dgn

SUPERELEVATION TRANSITION

MATCH EXIST	STA 38+50
-4.8%	STA 40+00
-4.8%	STA 49+00
MATCH EXIST	STA 50+50



LEGEND

- EXISTING SIGN
- DIRECTION OF TRAFFIC
- PAVEMENT OVERLAY
- PROPOSED PAVEMENT
- (#) TYPICAL SECTION

NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
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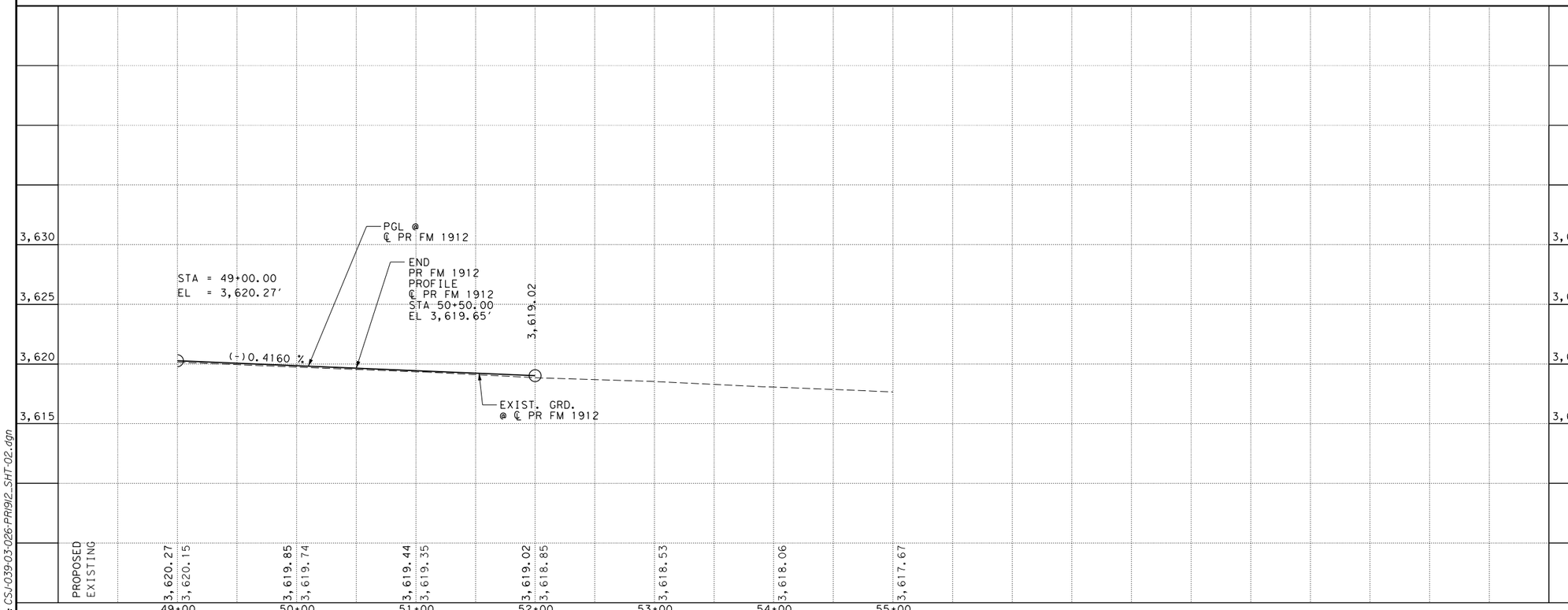
0 25 50 100 200

SCALE: 1"=100' - H
1"=10' - V



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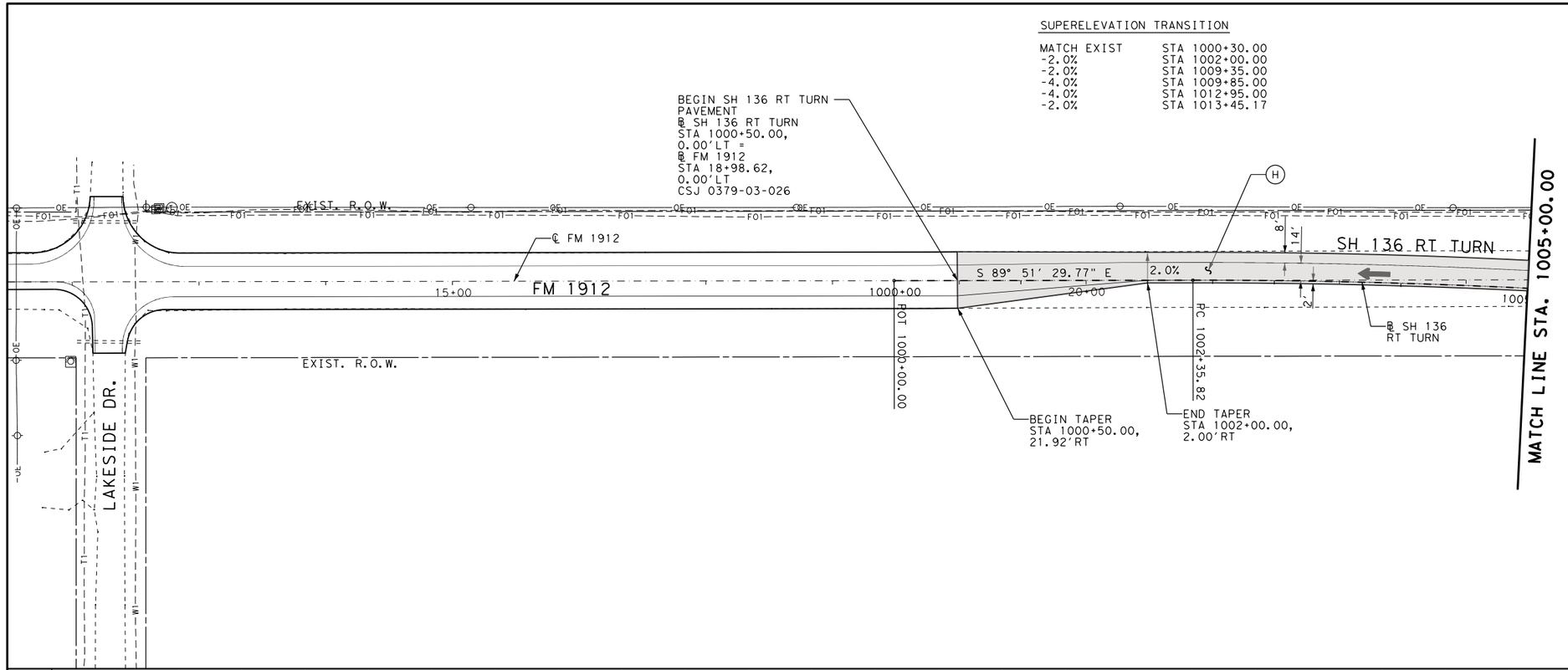
SH 136
PR FM1912
PLAN & PROFILE
STA 49+00 TO END

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	84

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7//2020 10:21:06 PM
FILE: CSJ-039-03-026-PR1912_SHT-02.dgn



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SH 136
SH 136 RT TURN PLAN & PROFILE BEGIN TO STA 1005+00

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	85

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:21:5 PM
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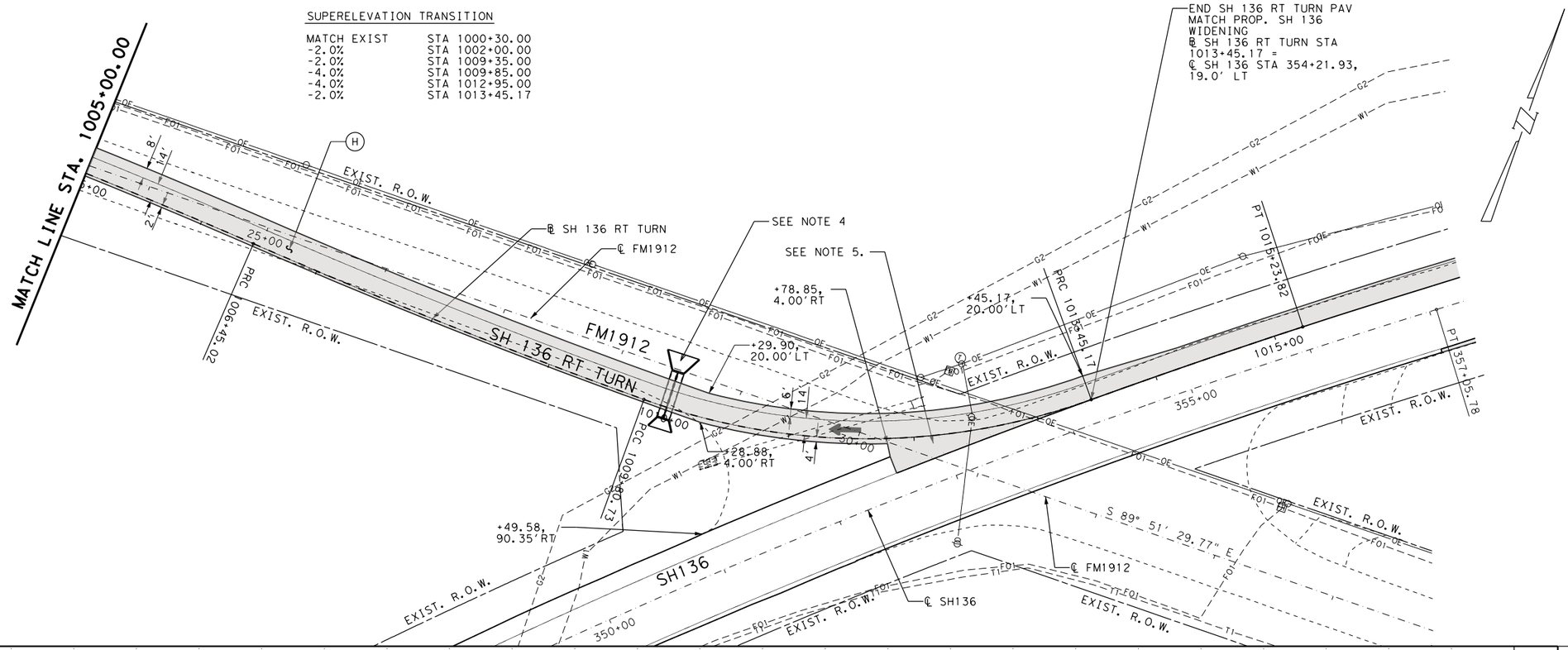

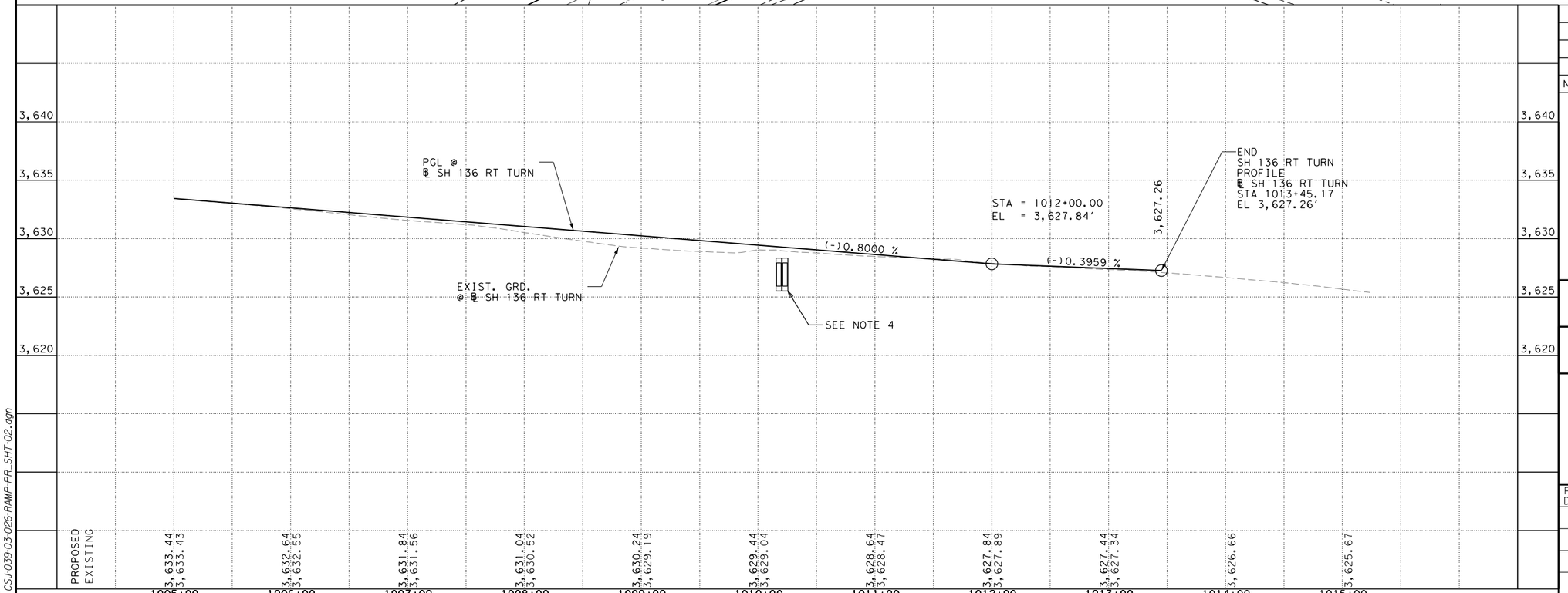

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SH 136
SH 136 RT TURN PLAN & PROFILE STA 1005+00 TO END

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	86

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:21:23 PM
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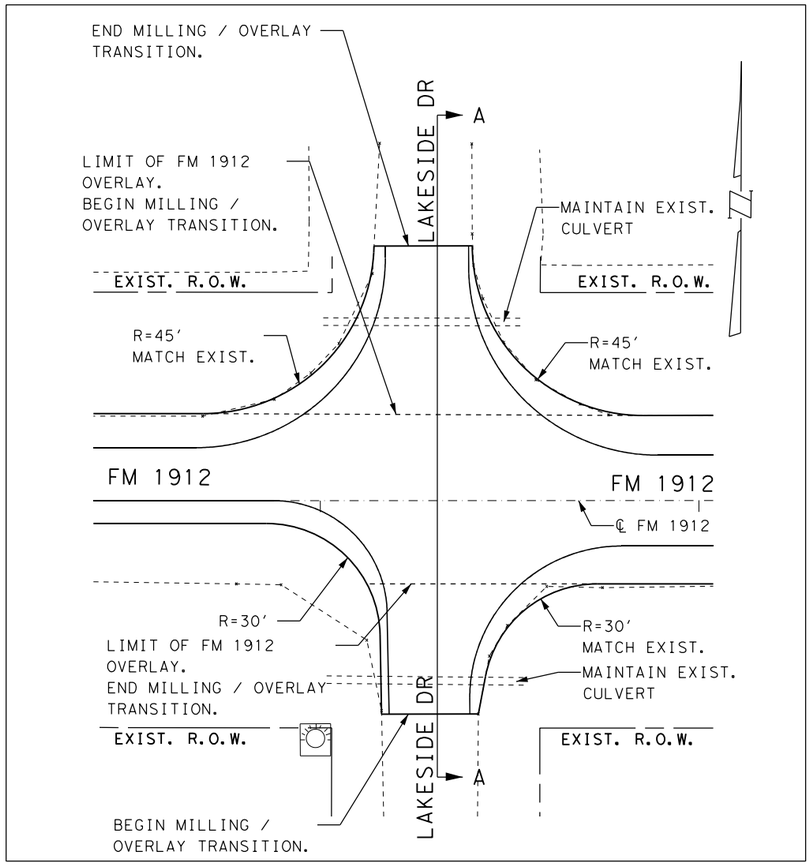
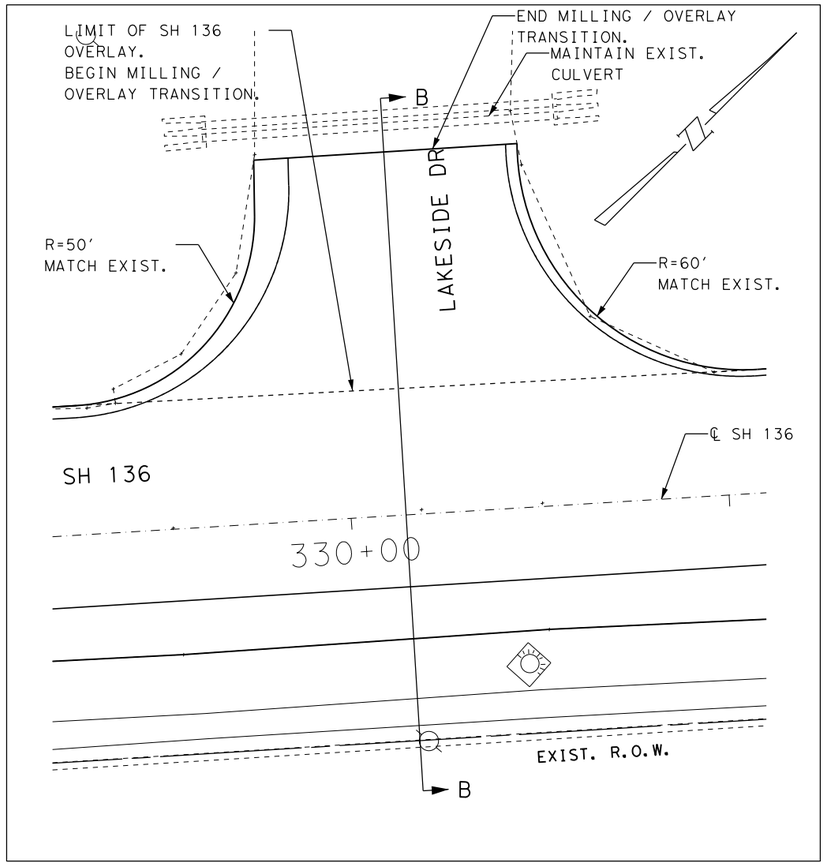
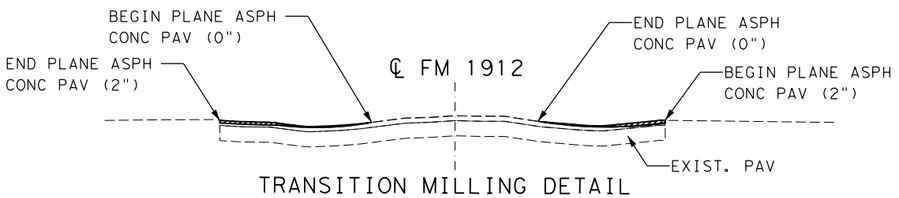


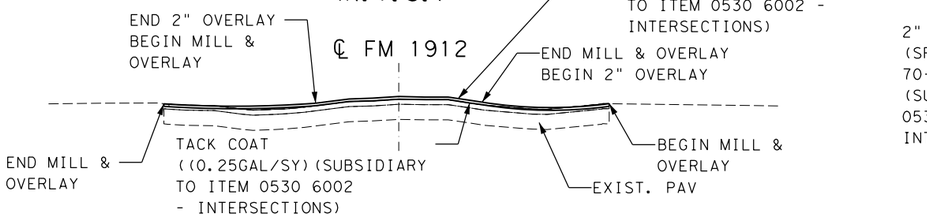


NOTE:

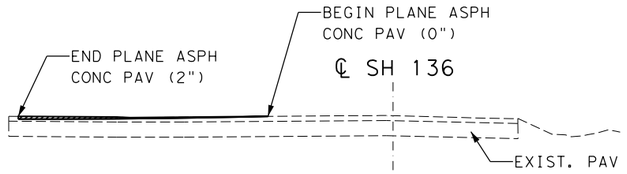
1. CONTRACTOR SHALL REGRADE PAVEMENT TRANSITIONS AS NECESSARY TO ENSURE THAT WATER IS NOT TRAPPED ON PAVEMENT.
2. FOR QUANTITIES, SEE DRIVEWAY/INTERSECTION QUANTITY TABLE.
3. ALL LABOR AND MATERIALS NEEDED FOR INTERSECTION IMPROVMENTS WILL BE PAID UNDER ITEM 0530 6002 - INTERSECTIONS.



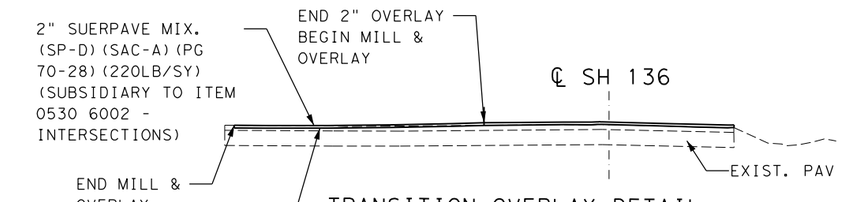
TRANSITION MILLING DETAIL
SUBSIDIARY TO ITEM
530 6002 - INTERSECTIONS
SECTION A-A
(N.T.S.)



TRANSITION OVERLAY DETAIL
SECTION A-A
(N.T.S.)



TRANSITION MILLING DETAIL
SUBSIDIARY TO ITEM
530 6002 - INTERSECTIONS
SECTION B-B
(N.T.S.)



TRANSITION OVERLAY DETAIL
SECTION B-B
(N.T.S.)

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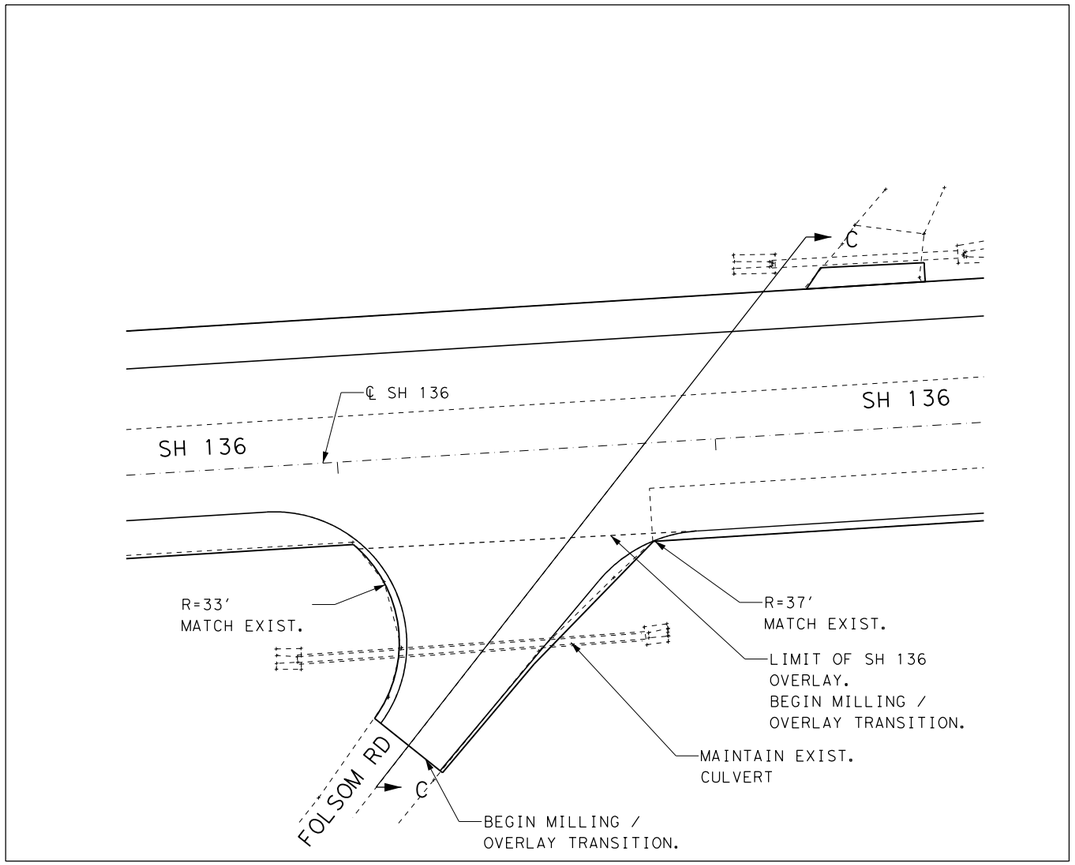
SH 136

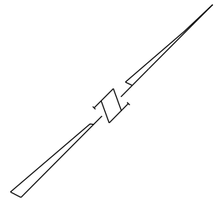
INTERSECTION DETAILS

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		87
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:21:31 PM
FILE: CSJ-0379-03-026-ADDITIONAL AREA 01.dgn





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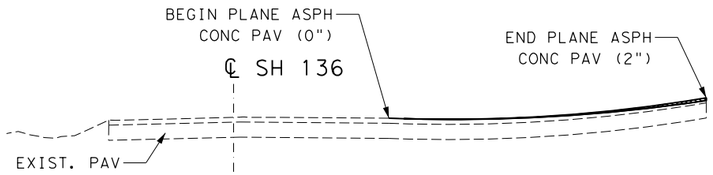
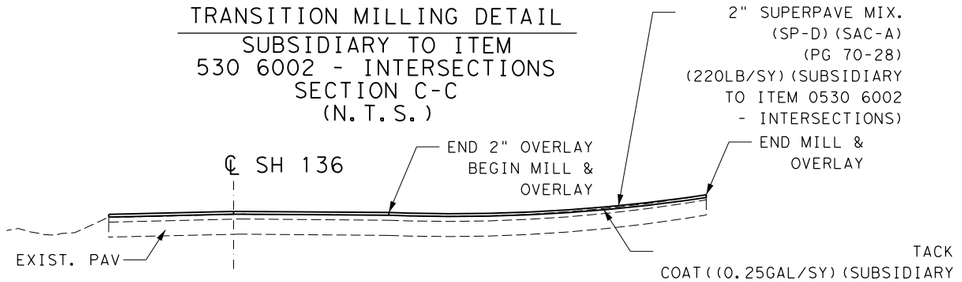


TRANSITION MILLING DETAIL
SUBSIDIARY TO ITEM
530 6002 - INTERSECTIONS
SECTION C-C
(N.T.S.)



TRANSITION OVERLAY DETAIL
SECTION C-C
(N.T.S.)

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SH 136
INTERSECTION DETAILS

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		88
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:21:39 PM
FILE: CSJ-0379-03-026-ADDITIONAL AREA 02.dgn

DRIVEWAY TABLE

LOCATION			WIDTH	LENGTH	R1	R2	AREA
STA	ALIGNMENT	LT / RT	FT	FT	FT	FT	SY
CSJ 0379-03-026							
47+73.71 *	PR FM 1912	LT	31.5	23.4	20.0	15.0	98
CSJ 0379-03-026 TOTAL							**98**
CSJ 0379-03-027							
319+66.20	SH 136	RT	11.3	8.6	10.0	10.0	15
315+45.49	SH 136	RT	22.3	27.2	35.0	10.0	78
313+90.76 **	SH 136	RT	36.7	15.0	15.0	15.0	72
312+85.74	SH 136	RT	28.6	20.3	30.0	30.0	100
312+65.66	SH 136	LT	29.9	15.6	15.0	15.0	64
338+42.11	SH 136	RT	65.3	8.4	N/A	N/A	68
371+44.52	SH 136	LT	31.9	10.0	N/A	N/A	44
399+42.19	SH 136	LT	27.5	5.2	N/A	N/A	18
307+15.60 **	SL 335 SB	LT	24.2	11.8	30.0	5.0	33
CSJ 0379-03-027 TOTAL							**492**

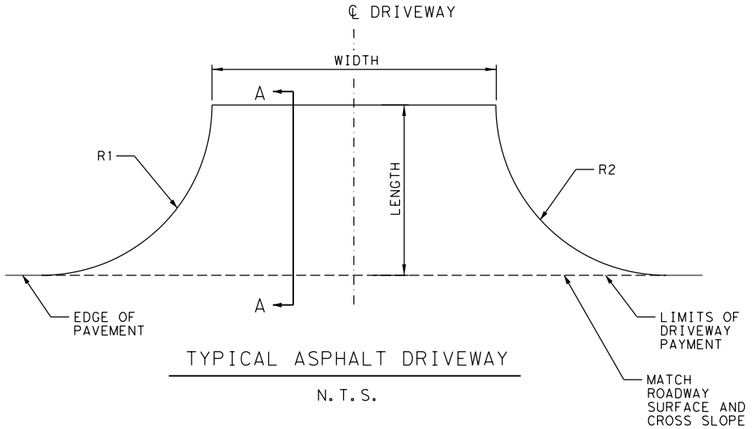
NOTE:

* CONTRACTOR SHALL USE "DRIVEWAY RECONSTRUCTION" DETAIL.

SEE DETAIL B FOR PROPOSED DRIVEWAY CULVERT INFORMATION.

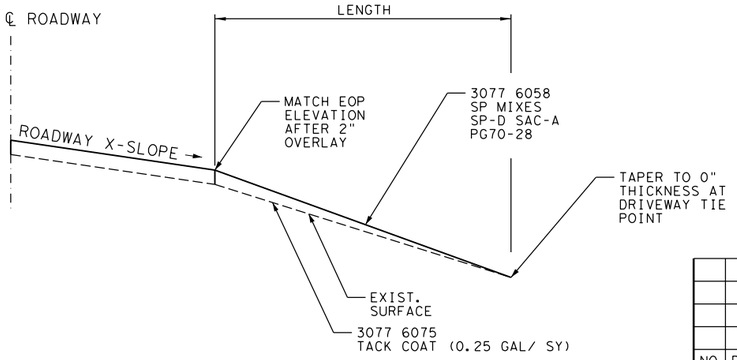
** CONTRACTOR SHALL USE "DRIVEWAY RECONSTRUCTION" DETAIL.

SEE DETAIL C FOR PROPOSED DRIVEWAY CULVERT INFORMATION.



TYPICAL ASPHALT DRIVEWAY

N.T.S.

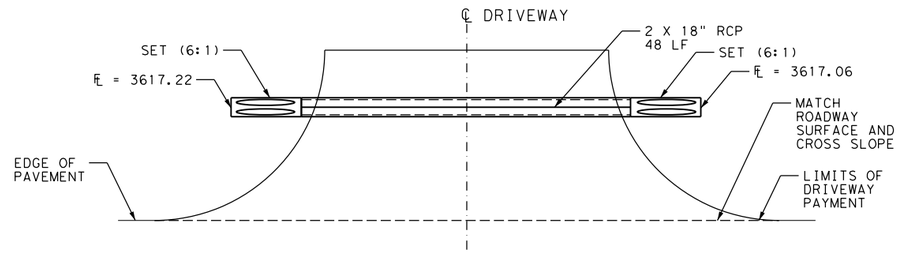


SECTION A-A

DRIVEWAY OVERLAY

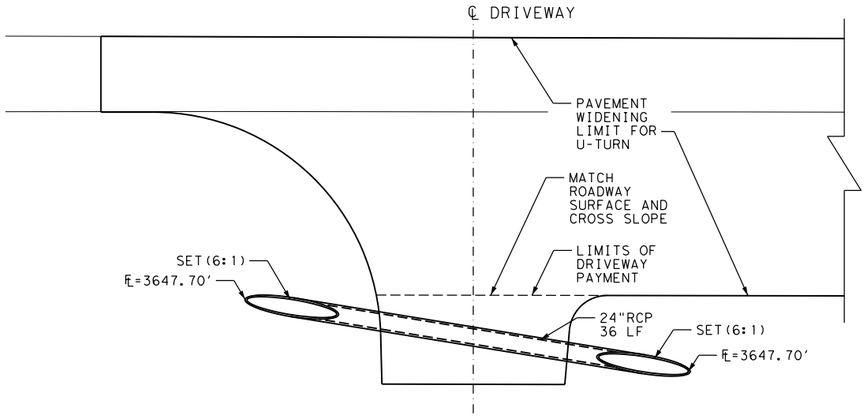
TO BE PAID BY ITEMS: 3077 6058 AND 3077 6075

N.T.S.



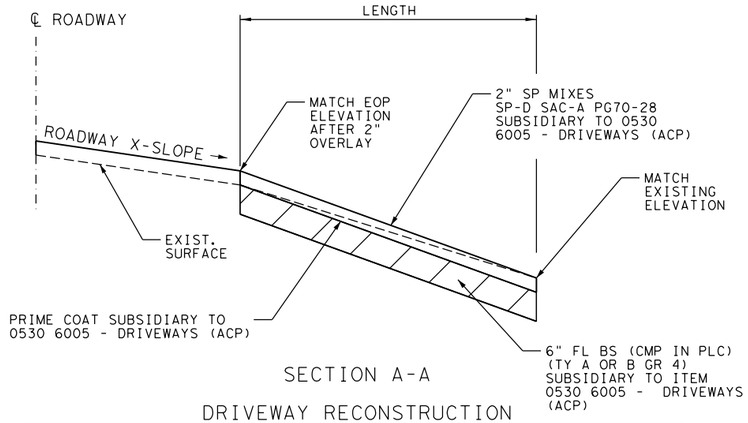
DETAIL B - STA. 47+73.71 DIVEWAY CULVERT

N.T.S.



DETAIL C - STA. 307+15.60 DIVEWAY CULVERT

N.T.S.



SECTION A-A

DRIVEWAY RECONSTRUCTION

TO BE PAID BY ITEM 0530 6005 - DRIVEWAYS (ACP)

N.T.S.

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DRIVEWAY DETAILS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		89
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 10:21:47 PM
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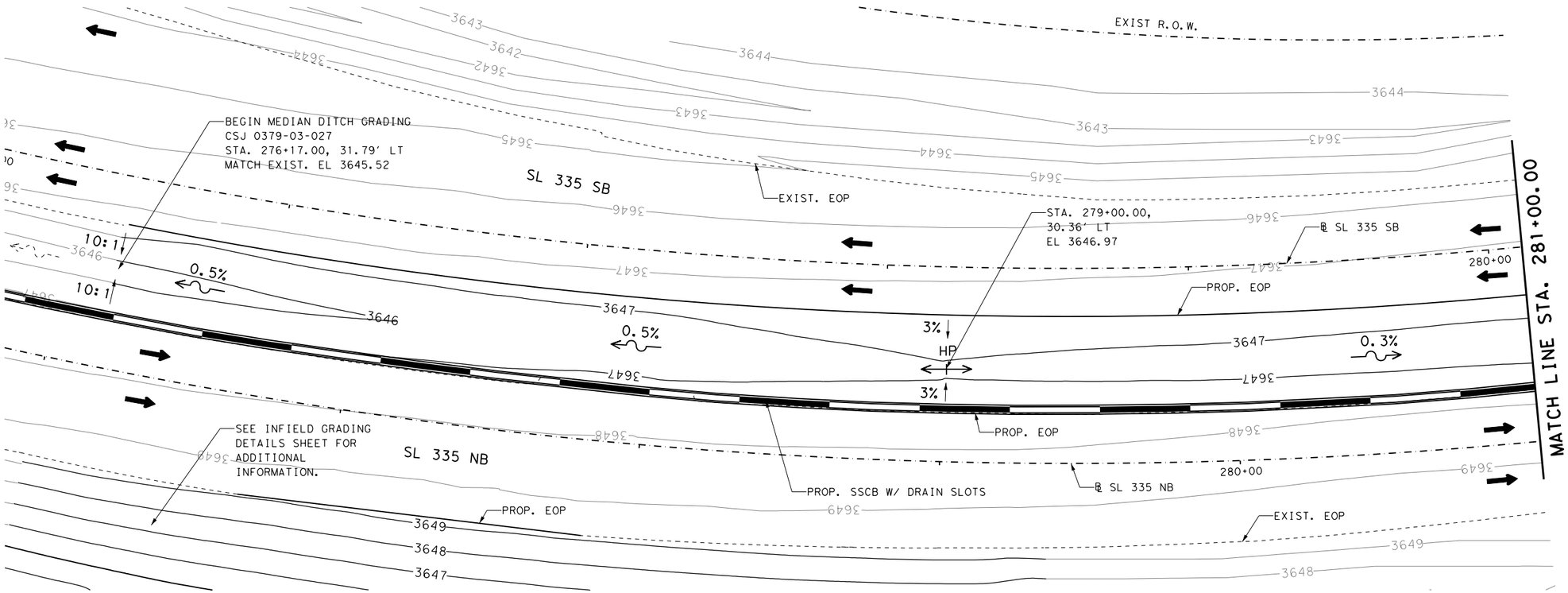
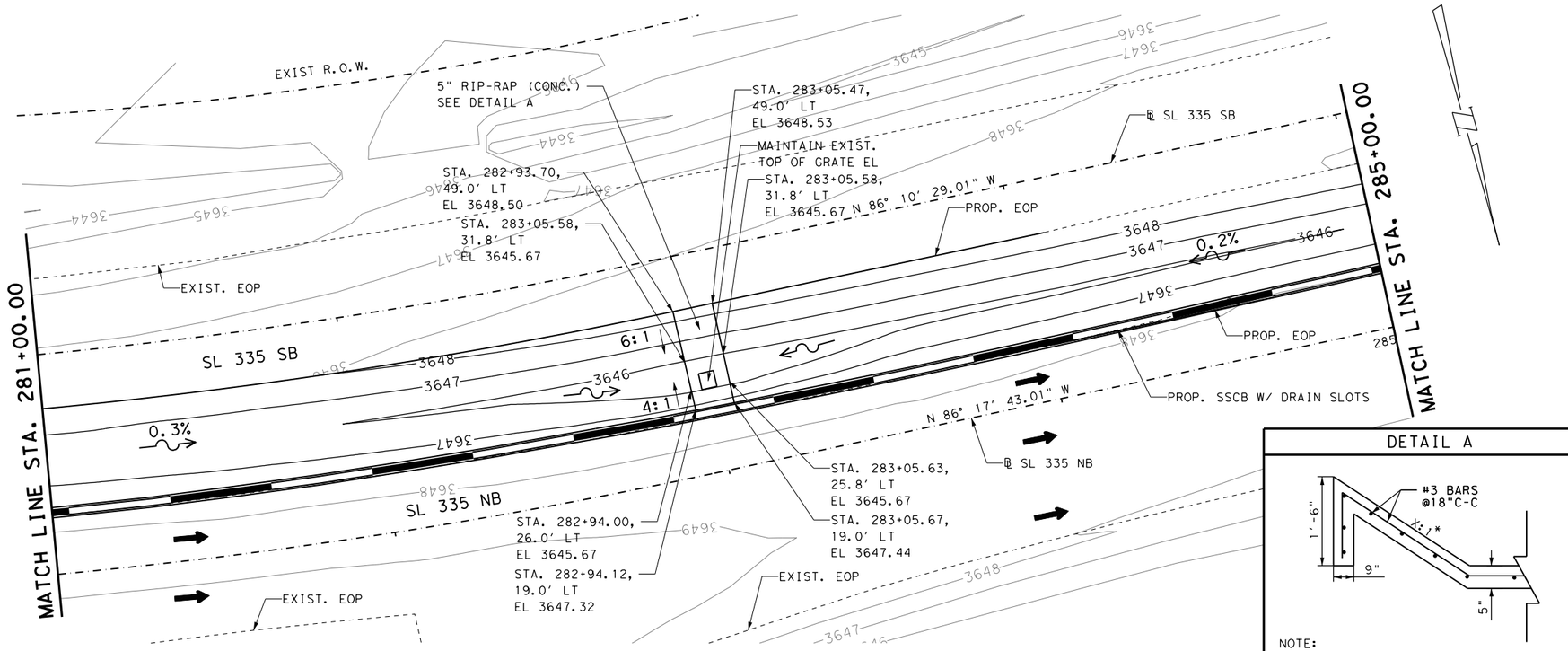


LEGEND

- DIRECTION OF TRAFFIC
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- HP — PROPOSED HIGH POINT

NOTE:
UNLESS OTHERWISE NOTED, ALL STATION CALL OUTS ARE BASED ON NB SL 335 ALIGNMENT

0 5 10 20 40
SCALE: 1"=20'



DETAIL A

NOTE:
* SEE GRADING PLAN FOR ADDITIONAL INFORMATION.

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SL 335

MEDIAN GRADING DETAILS

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		90
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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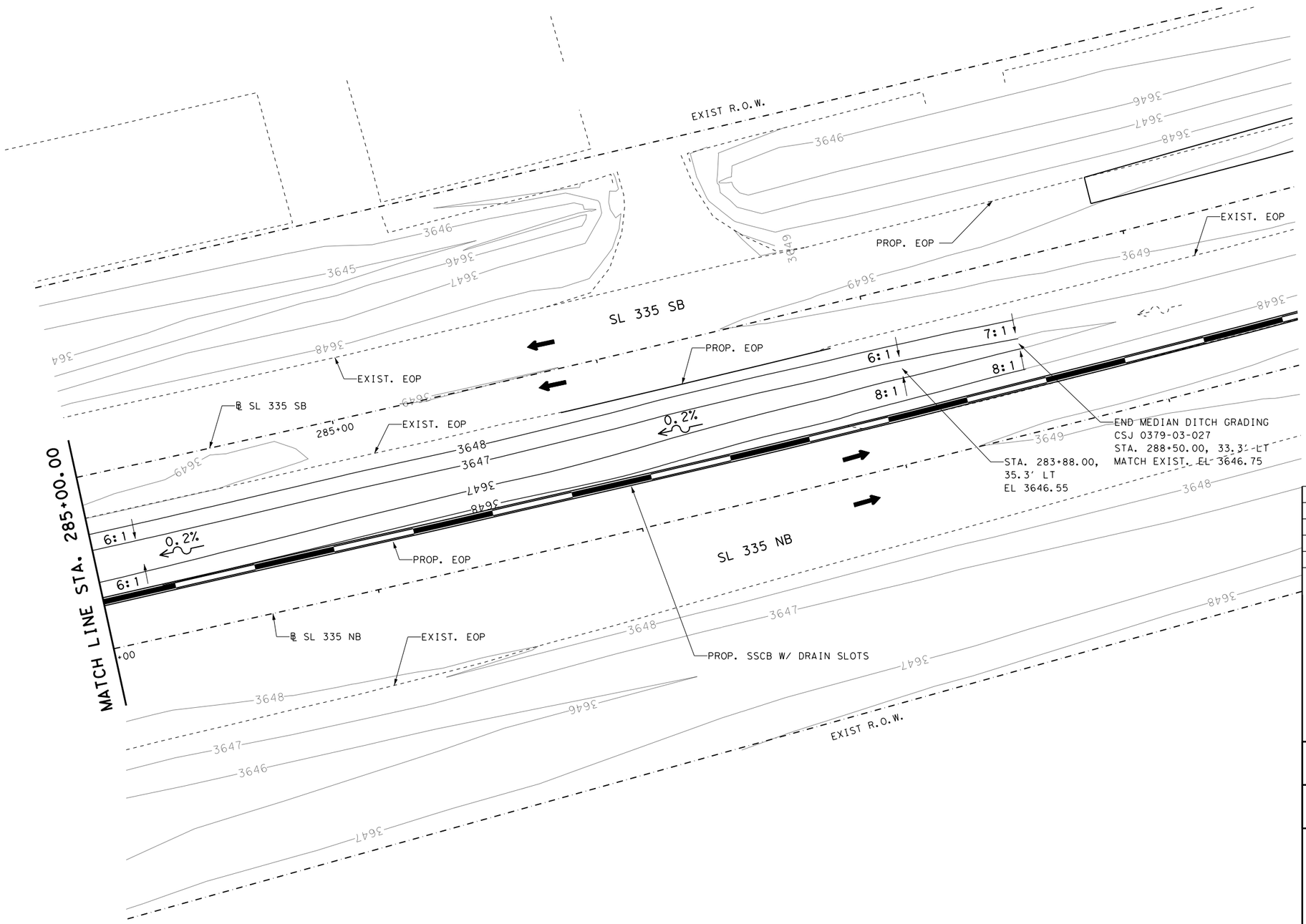

LEGEND

- DIRECTION OF TRAFFIC
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- HP — PROPOSED HIGH POINT

NOTE:
UNLESS OTHERWISE NOTED, ALL STATION CALL OUTS ARE BASED ON NB SL 335 ALIGNMENT

0 5 10 20 40
SCALE: 1"=20'

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SL 335

MEDIAN GRADING DETAILS

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		91
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

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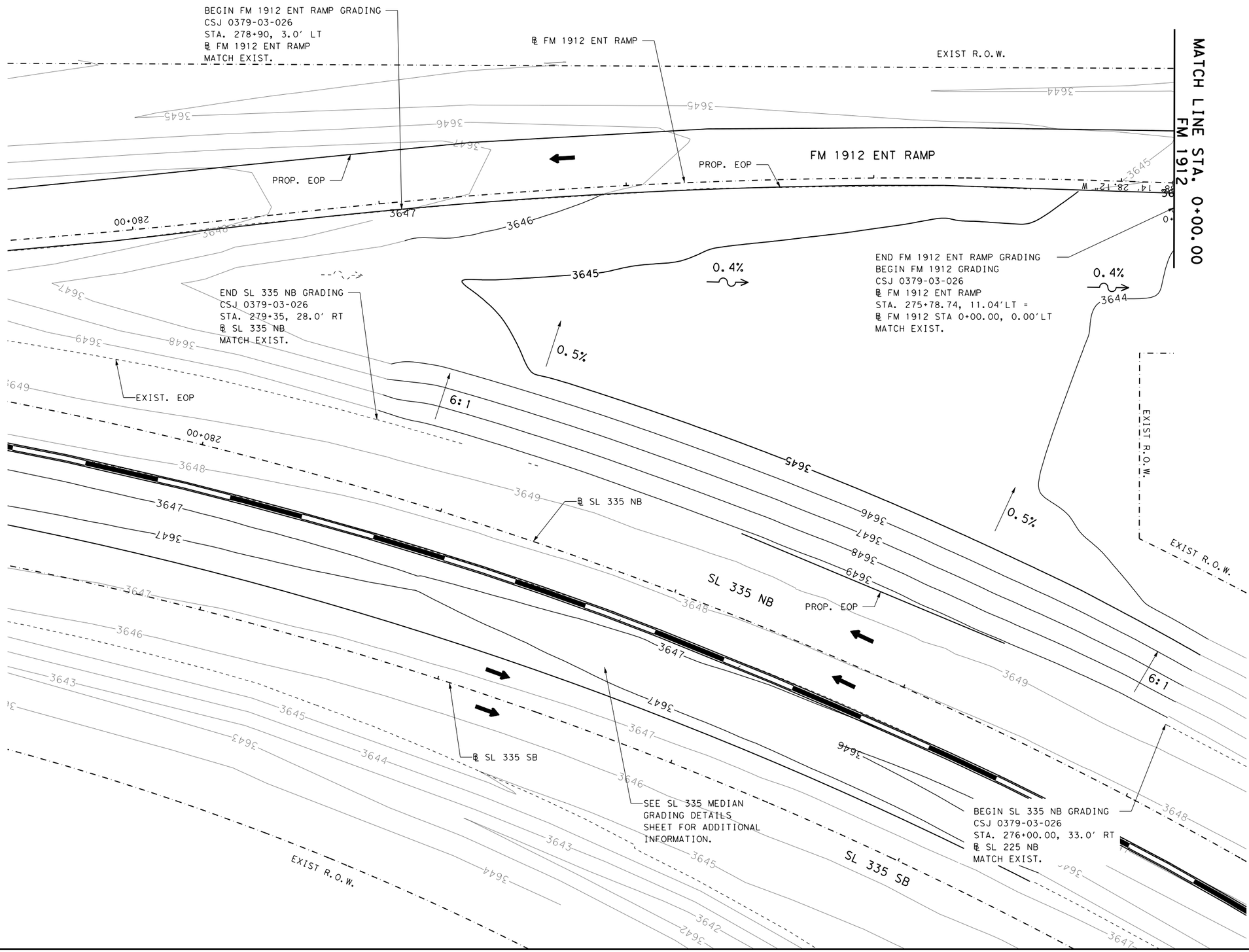

LEGEND

DIRECTION OF TRAFFIC

PROPOSED FLOW ARROWS

EXISTING FLOW ARROWS

HP PROPOSED HIGH POINT

N

0 5 10 20 40

SCALE: 1"=20'

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INFIELD GRADING DETAILS

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		92
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:22:4 PM
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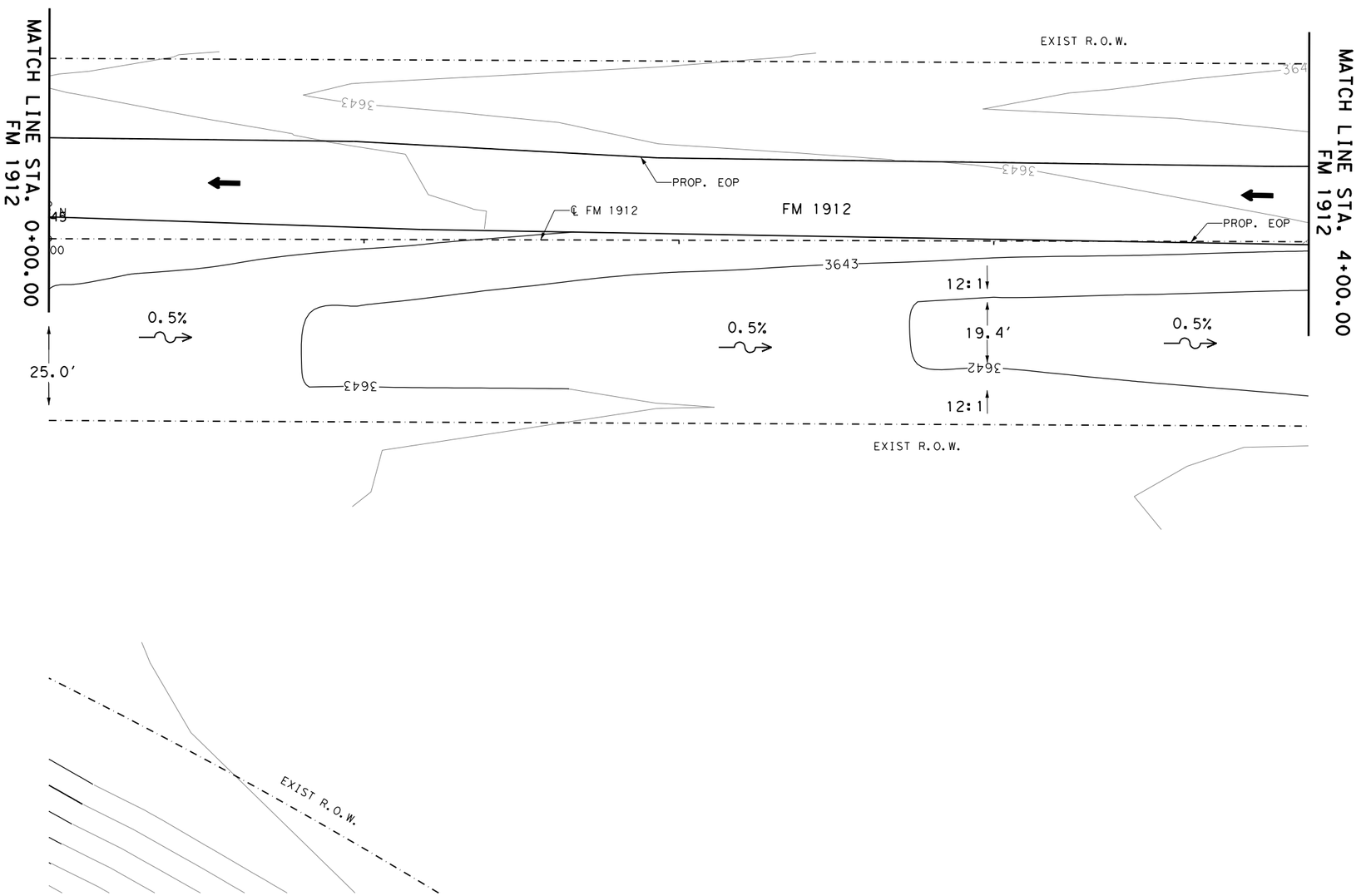

LEGEND

- DIRECTION OF TRAFFIC
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- HP PROPOSED HIGH POINT

N

0 5 10 20 40

SCALE: 1"=20'

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FM 1912
INFIELD GRADING DETAILS
STA 0+00 TO STA 4+00

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		93
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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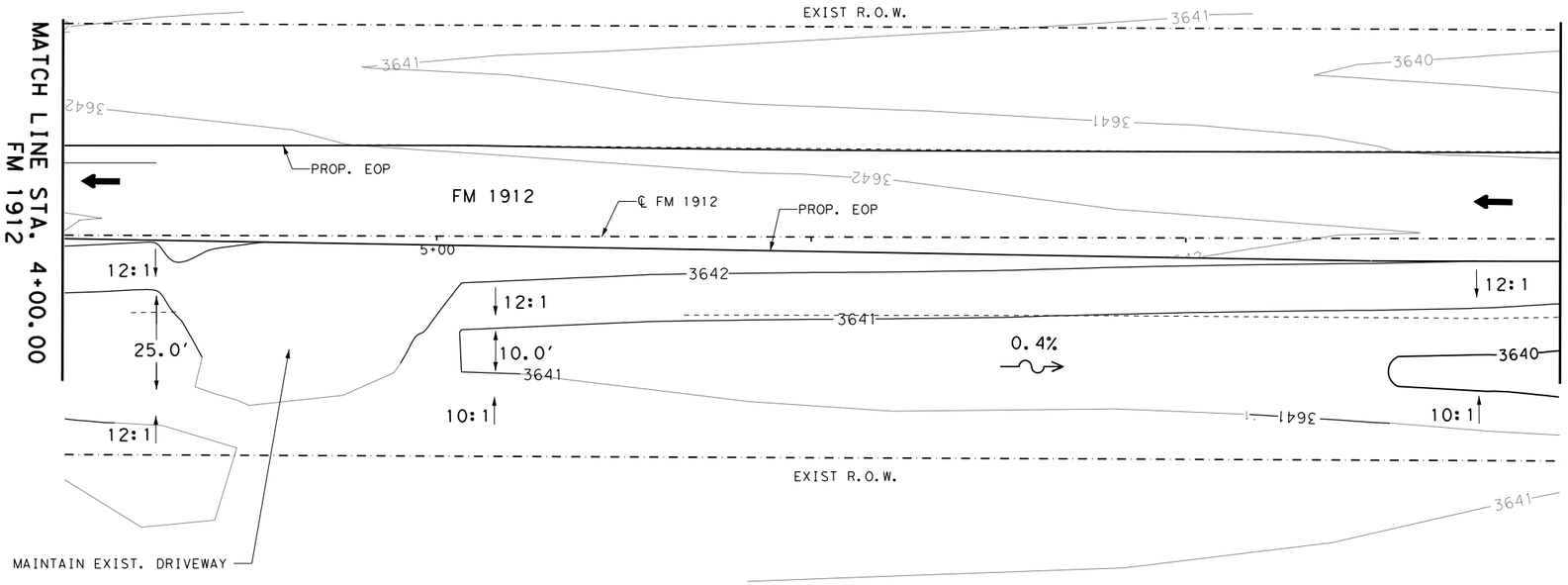

LEGEND

DIRECTION OF TRAFFIC

PROPOSED FLOW ARROWS

EXISTING FLOW ARROWS

HP
PROPOSED HIGH POINT

0 5 10 20 40
SCALE: 1"=20′

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FM 1912
INFIELD GRADING DETAILS
STA 4+00 TO 8+00

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		94
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:22:31 PM
FILE: CSJ-0379-03-026_PR_GRADE_05.dgn

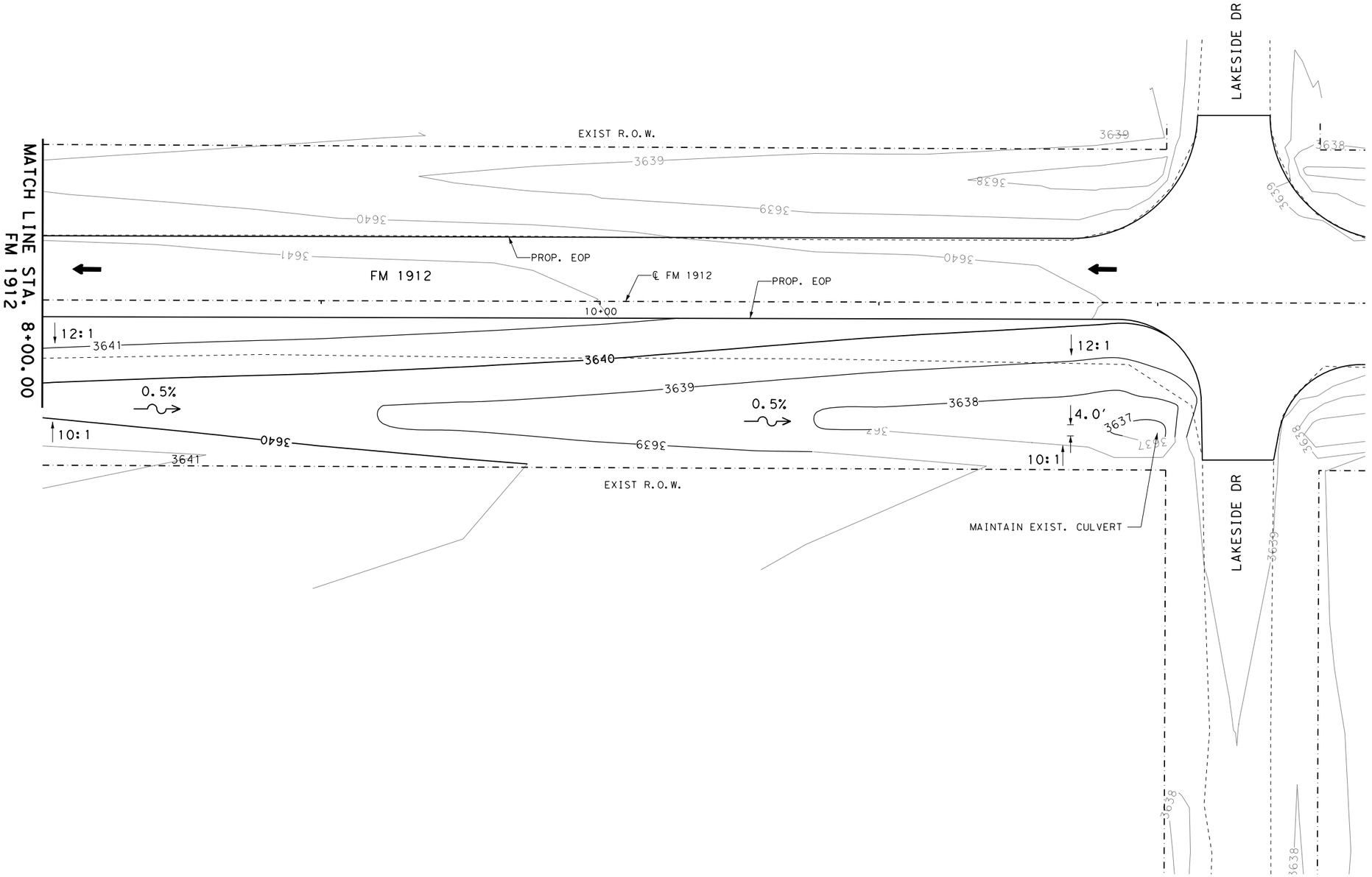
LEGEND

DIRECTION OF TRAFFIC

PROPOSED FLOW ARROWS

EXISTING FLOW ARROWS

HP
PROPOSED HIGH POINT



0 5 10 20 40

SCALE: 1"=20'

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FM 1912
INFIELD GRADING DETAILS
STA 8+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		95
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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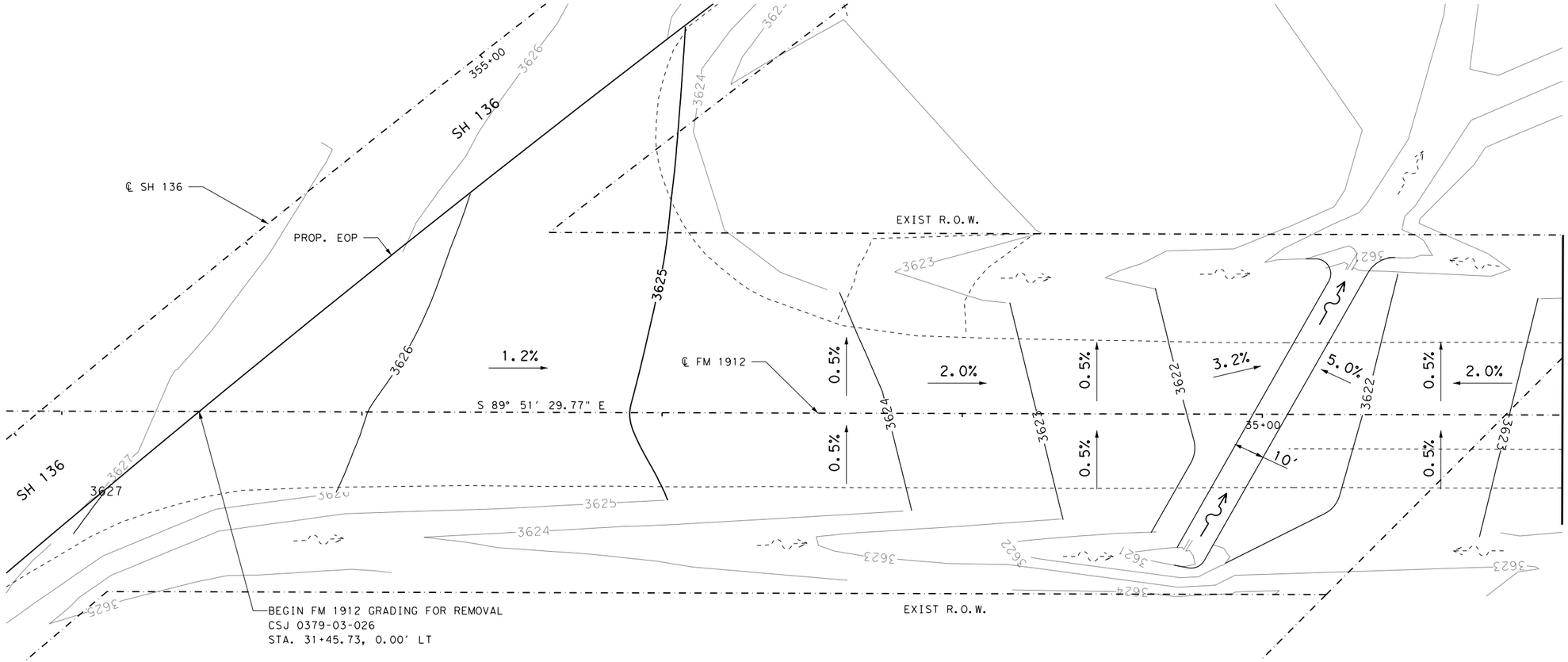

LEGEND

- DIRECTION OF TRAFFIC
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- HP PROPOSED HIGH POINT

0 5 10 20 40

SCALE: 1"=20'

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FM 1912
PVMT REMOVAL GRADING
BEGIN TO STA 36+00

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		96
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7//2020 10:22:48 PM
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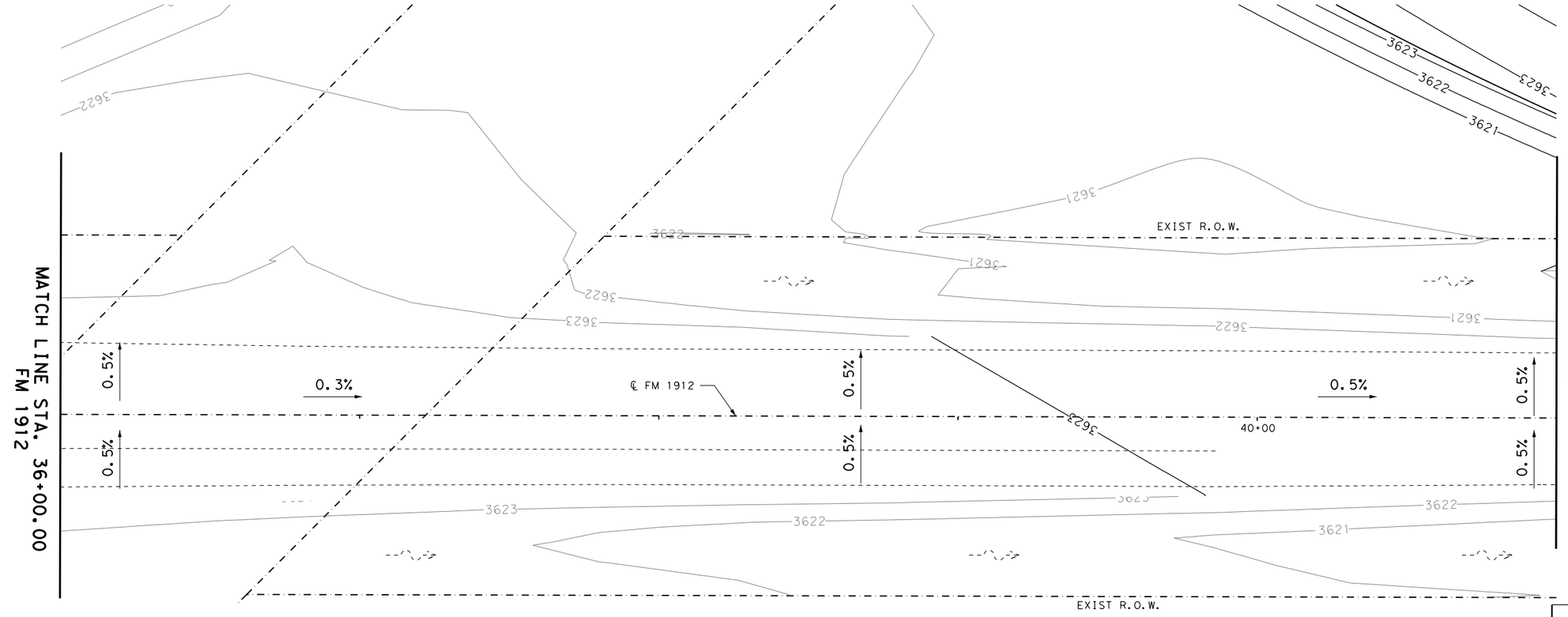

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FM 1912
PVMT REMOVAL GRADING
STA 36+00 TO STA 41+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		97
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

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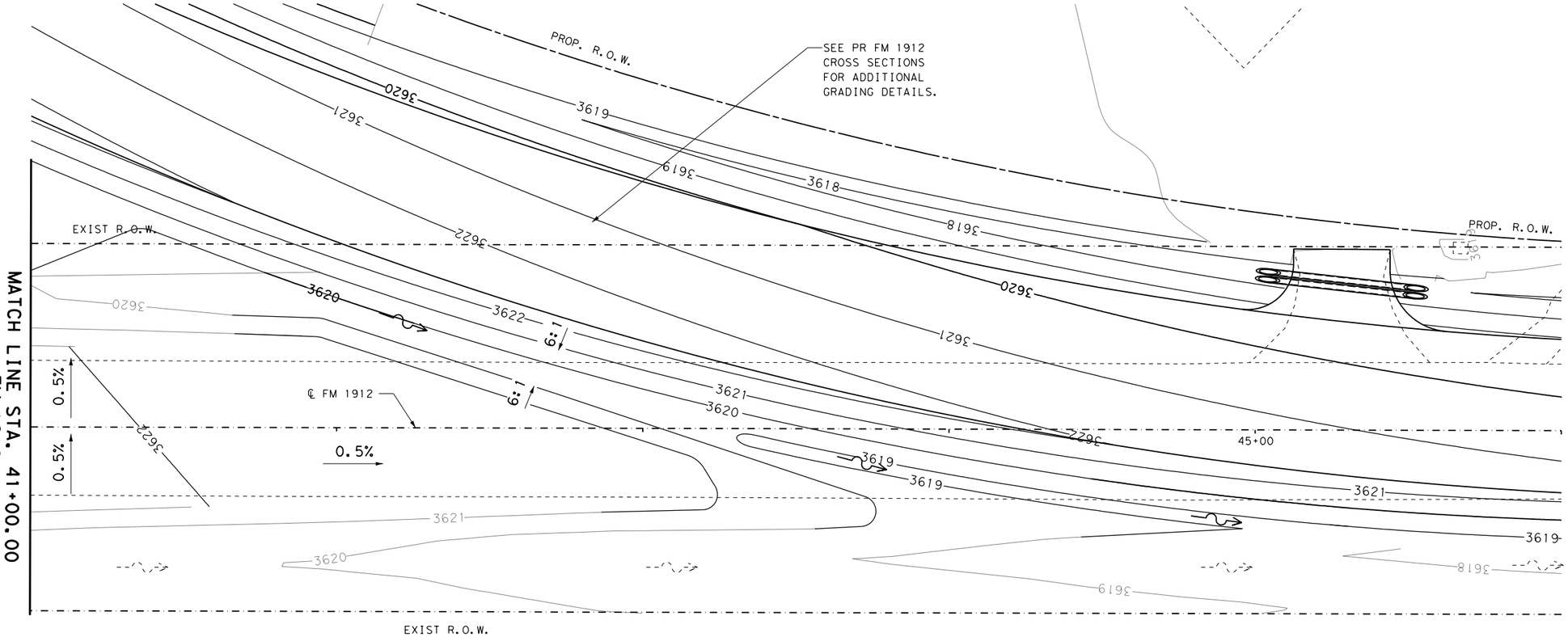

LEGEND

- DIRECTION OF TRAFFIC
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- HP PROPOSED HIGH POINT

0 5 10 20 40

SCALE: 1"=20'

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FM 1912
PVMT REMOVAL GRADING
STA 41+00 TO STA END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		98
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7//2020 10:23:03 PM
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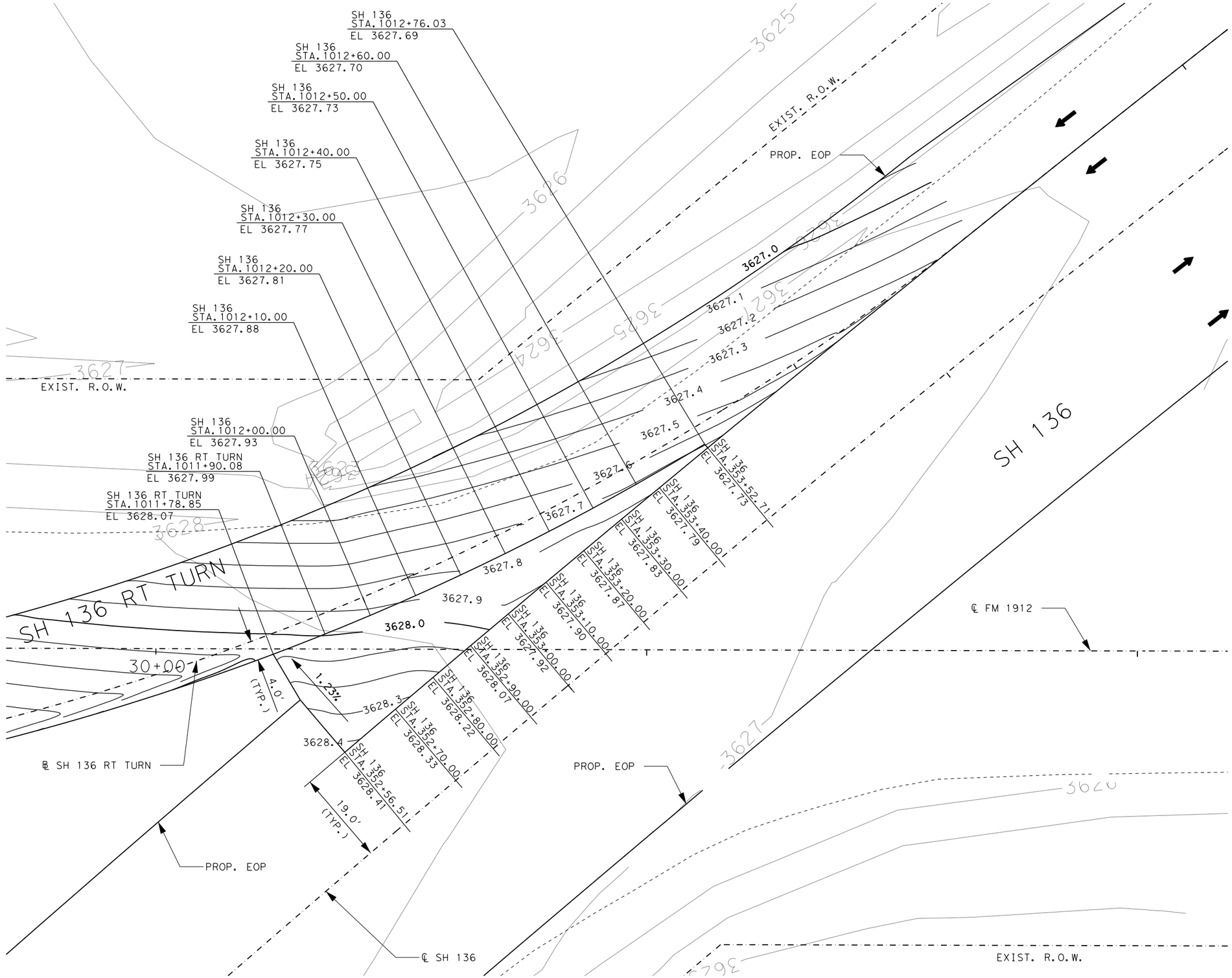

LEGEND

- DIRECTION OF TRAFFIC
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- HP — PROPOSED HIGH POINT

N

0 5 10 20

SCALE: 1"=10'

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GORE GRADING DETAILS

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		99
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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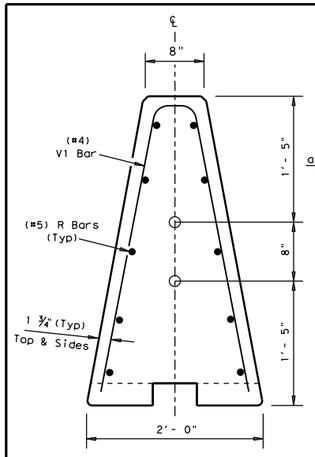
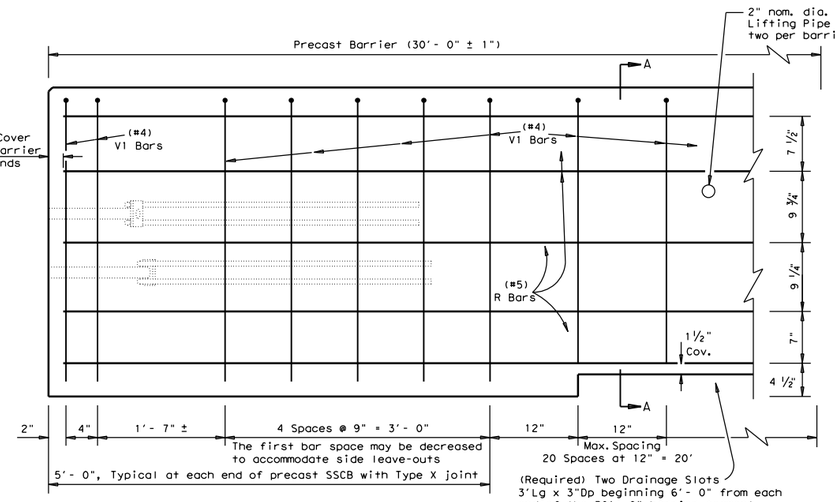


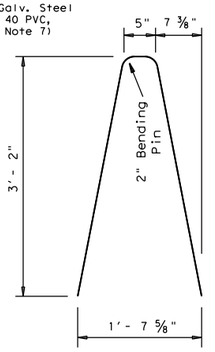
End View
Precast Barrier

Pipe locations for Joint Type X connection



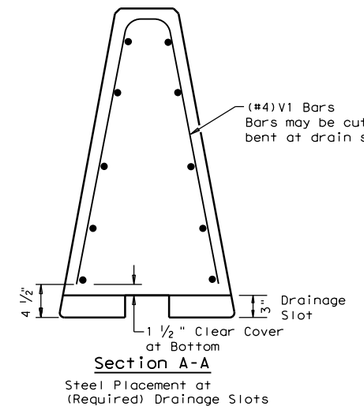
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)

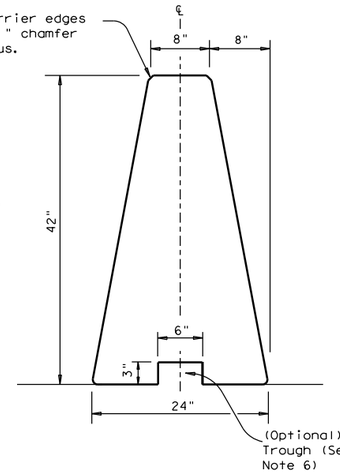


V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.

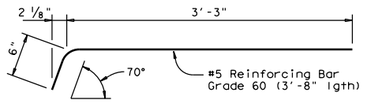


Section A-A
Steel Placement at (Required) Drainage Slots



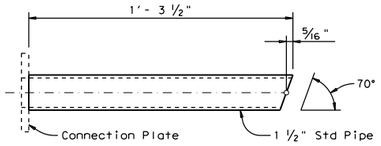
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



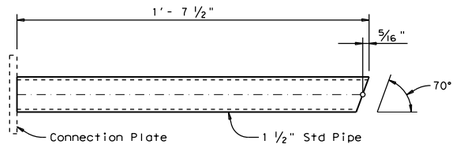
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



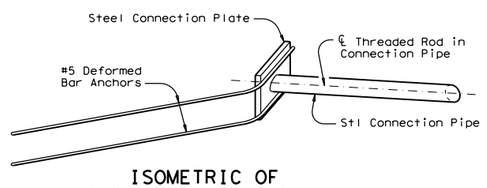
UPPER CONNECTION PIPE DETAILS

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.

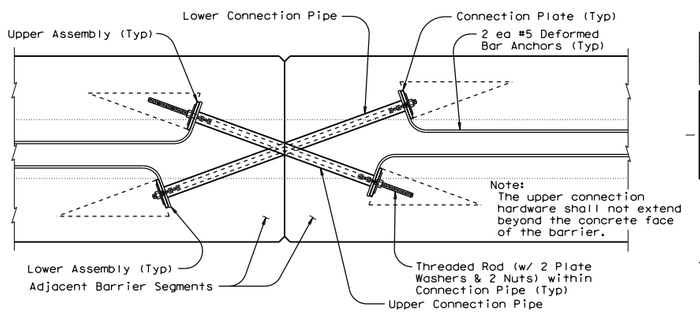


ISOMETRIC OF
TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

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 a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
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.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

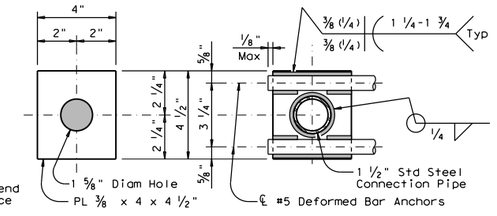
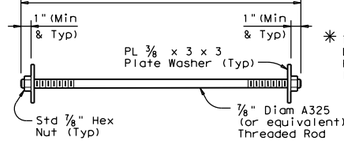


PLATE DIMENSIONS WELDING DETAILS

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.

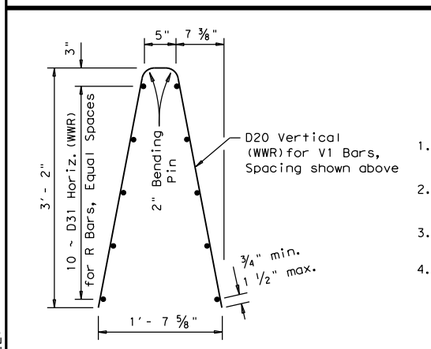


* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

CONNECTION BOLT OR
THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts) (w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

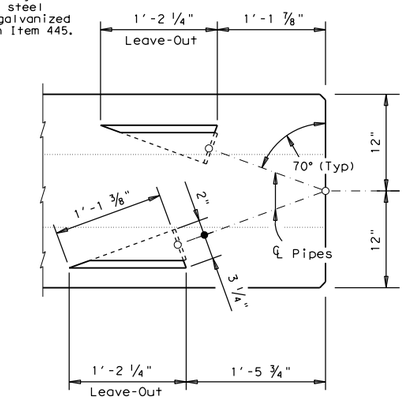
Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.



Welded Wire Reinforcement
(WWR) Option for Bars R and V1

(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".



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

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	DIST	COUNTY		SHEET NO.
	AMA	POTTER		100

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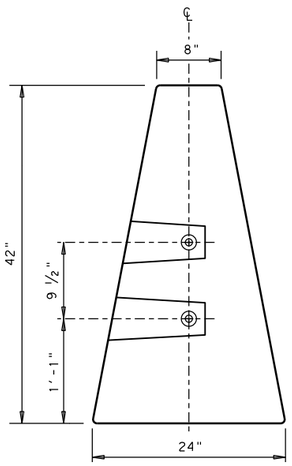
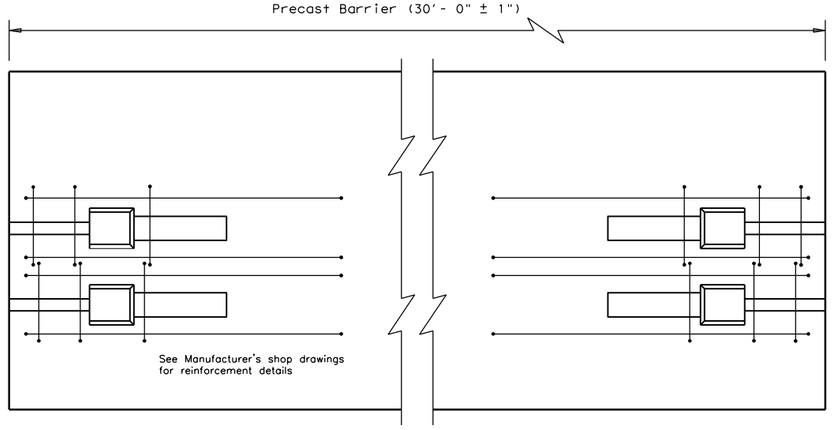
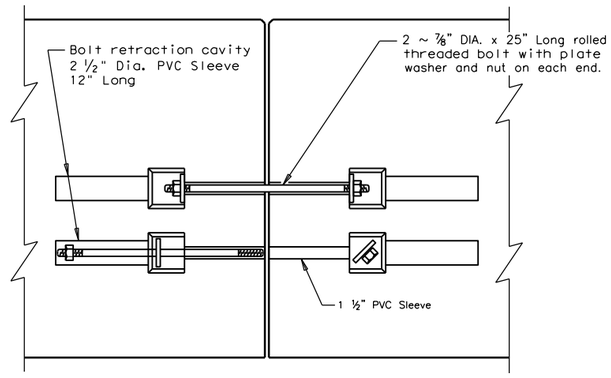


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

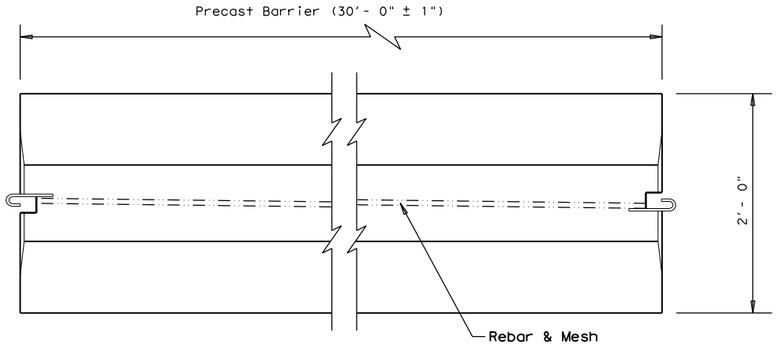


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

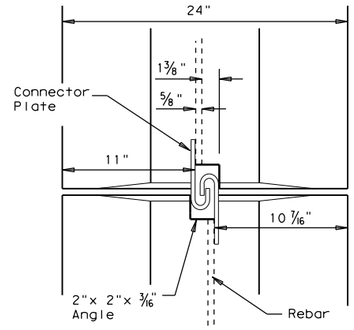


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

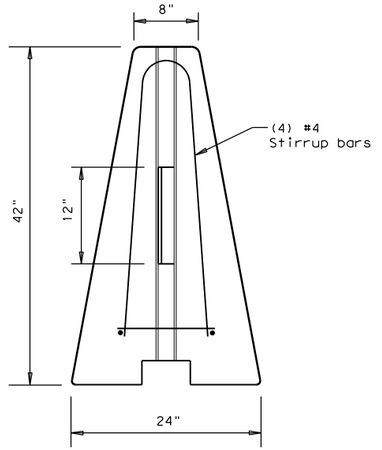
Joint Connection (Type Q)



TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION



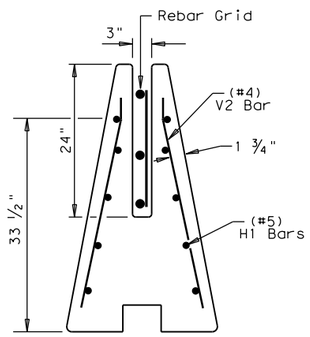
END VIEW

Proprietary Joint Connections (SSCB)

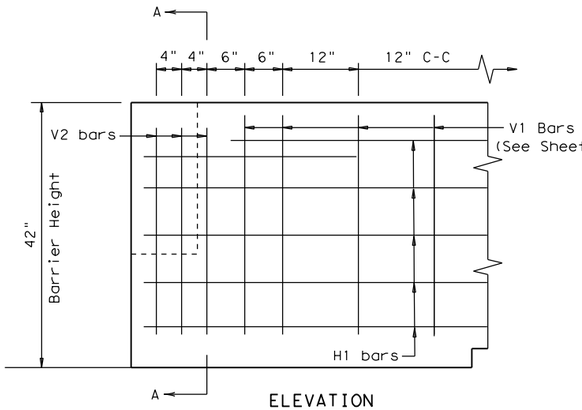
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

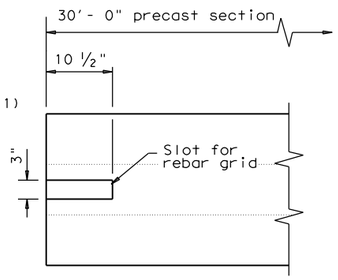
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



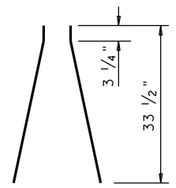
SECTION A-A
Showing (Type R) Rebar Grid



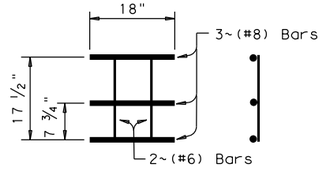
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:	
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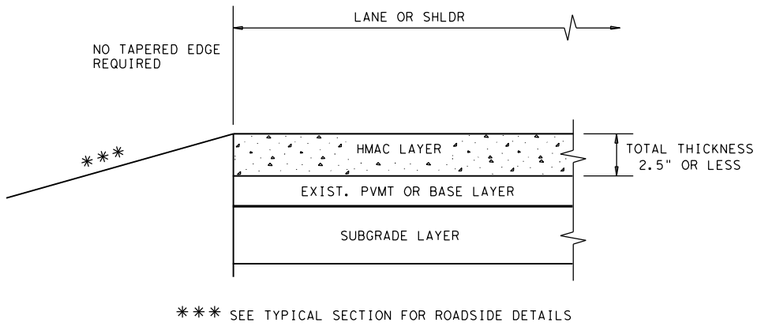
	AMA	POTTER		101	

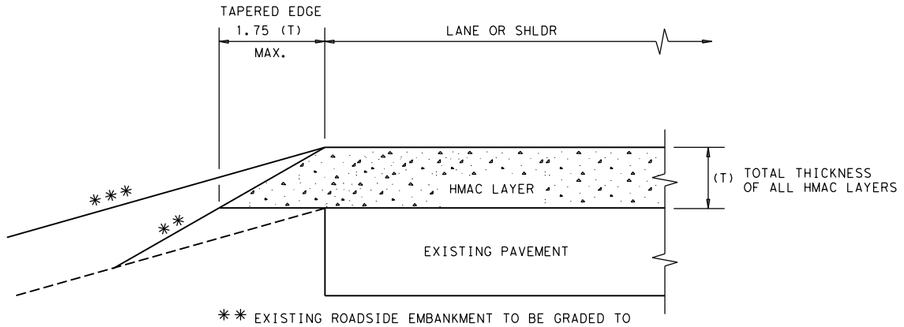
DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 1

THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS

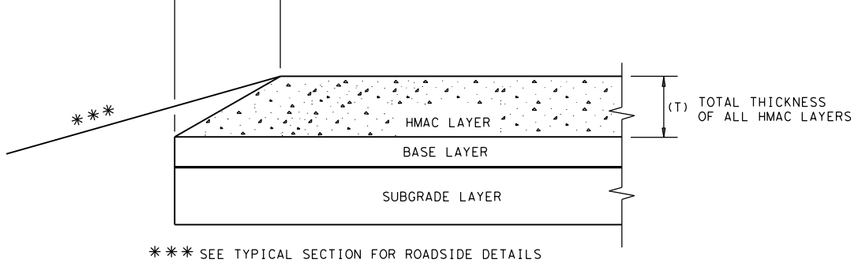


** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2

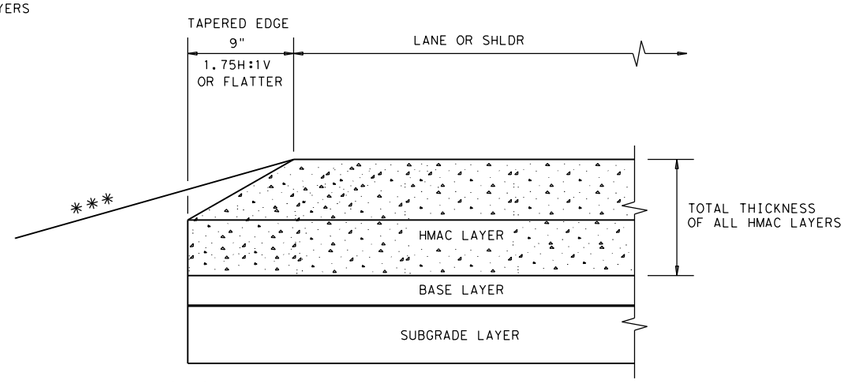
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** 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

FILE: tehmac11.dgn		DN: TxDOT	CK: RL	DW: KB		CK:	
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		DIST	COUNTY			SHEET NO.	
		AMA	POTTER			102	

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	N/A		SL 335 INSIDE NB LANE	300+04.00	TL-3	UNI	CONC.	6"	SSCB	24"	42"	25′	1						1			
												TOTALS	1				1					

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:
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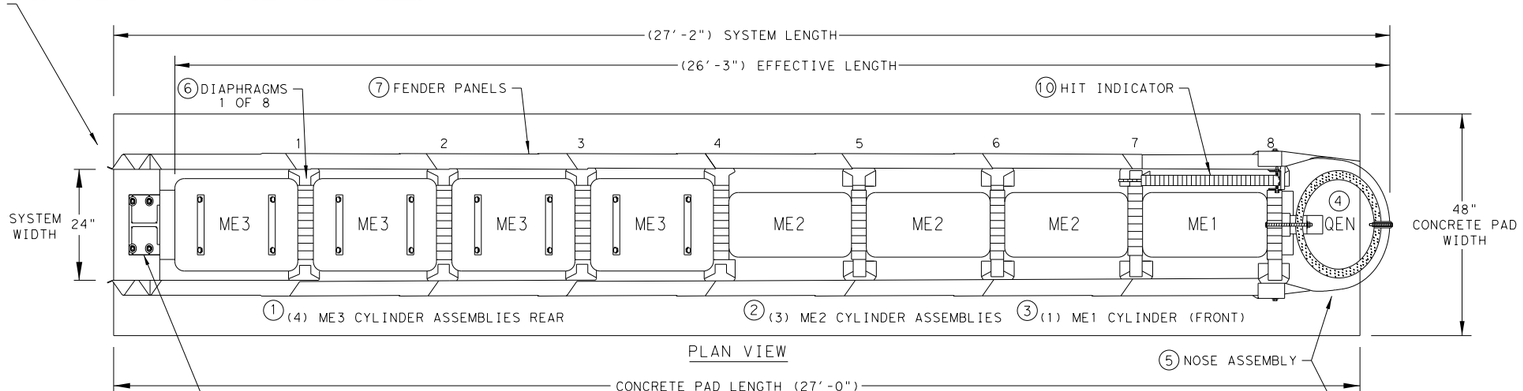
REVISIONS	0379	03	026,ETC.	SH 136
	DIST	COUNTY		
	AMA	POTTER		
	FEDERAL AID PROJECT			SHEET NO.
				103

DATE:
FILE:

NOTE:
A TRANSITION MAY BE REQUIRED TO INSTALL THE QUADGUARD ELITE M10 TO THE OBJECT BEING SHIELDED.

QUADGUARD EITE M10 24" WIDE (8 BAY) SYSTEM



PLAN VIEW

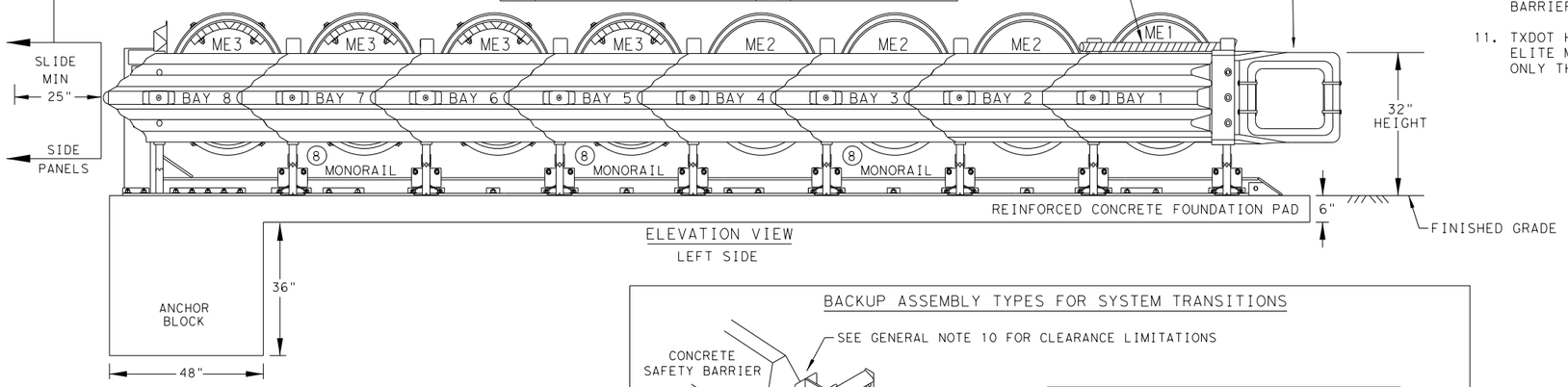
KEY		KEY	
1	ME3 CYLINDER ASSEMBLIES	6	DIAPHRAGMS
2	ME2 CYLINDER ASSEMBLIES	7	FENDER PANELS
3	ME1 CYLINDER ASSEMBLY	8	MONORAILS
4	QEN CYLINDER	9	TYPE OF BACKUP
5	NOSE BELT ASSEMBLY	10	HIT INDICATOR

9 SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

4 QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY 5

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 25" MIN.

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.
10 HIT INDICATOR



ELEVATION VIEW
LEFT SIDE

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR CONCRETE PAD AND ANCHOR BLOCK INSTALLATION REQUIREMENTS.

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD ELITE M10 FIELD INSTALATION AND INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY REQUIRED FOR THE TRANSITION WILL BE PROVIDED BY THE MANUFACTURER TO THE ENGINEER AND INSTALLER.

6" REINFORCED CONCRETE PAD REQUIRES THE INSTALLATION OF AN ANCHOR BLOCK AS SHOWN ON THE MANUFACTURER'S DRAWING PACKAGE.

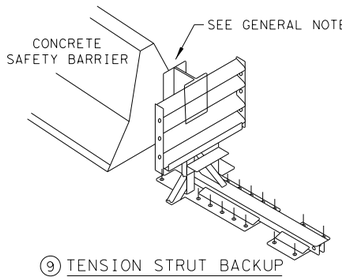
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

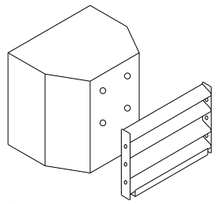
NOTE:
THE QUADGUARD ELITE M10 8-BAY, 24" WIDE - NARROW SYSTEM TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024E	CYLINDER TYPES IN BAYS			
BAYS	8	TYPE-ME3	TYPE-ME2	TYPE-ME1	TYPE-QEN
DIAPHRAGMS	8	4	3	1	1
WIDTH	24"	REAR	FRONT		NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS



9 TENSION STRUT BACKUP



9 CONCRETE BACKUP

SYSTEM TRANSITIONS TYPES	
1	QUAD-BEAM TO CONCRETE SAFETY BARRIER
2	QUAD-BEAM TO CONCRETE BRIDGE RAIL
3	QUAD-BEAM TO CONCRETE END SHOE
4	QUAD-BEAM TO THRIE-BEAM RAIL
5	QUAD-BEAM TO W-BEAM RAIL

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD ELITE M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

10 (W6X9) I-BEAM POSTS.
POST 1 THRU 4 (84" LONG)
POST 5 THRU 10 (72" LONG)

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE QUADGUARD ELITE M10 SYSTEM AND 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: TRINITY HIGHWAY - ENERGY ABSORPTION INC. AT 1(888)323-6374.
2. SEE THE RECENT QUADGUARD ELITE M10 PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS AND THE DRAWING PACKAGE FOR THE NARROW 24" SYSTEM BEFORE INSTALLING THE QUADGUARD ELITE M10 AT ANY GIVEN LOCATION.
3. FOR BI-DIRECTIONAL TRAFFIC: THE LOCATION AND OR WIDTH OF THE QUADGUARD ELITE M10 IS RESTRICTED. AS BI-DIRECTIONAL TRAFFIC APPROACHES THE REAR OF THE QUADGUARD ELITE M10, THE QUADGUARD ELITE M10 SHOULD NOT EXTEND FURTHER INTO THE TRAFFIC-SIDE OF THE BARRIER THAN THE OBSTACLE. ANY TRANSITION INSTALLED MUST EITHER BE TANGENT TO BOTH QUADGUARD ELITE M10 AND OBSTACLE OR MUST ANGLE TOWARD FIELD SIDE OF THE BARRIER.
4. SYSTEM TRANSITION: APPROPRIATE TRANSITION PANELS OR SIDE PANELS WILL BE REQUIRED FOR PROPER IMPACT PERFORMANCE. THE CORRECT PANEL(S) TO USE WILL DEPEND ON THE DIRECTION OF TRAFFIC FLOW AND WHAT TYPE OF BARRIER OR ROAD FEATURE THE QUADGUARD ELITE M10 SYSTEM IS SHIELDING. SEE THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL FOR FURTHER DETAILS.
5. COMPONENTS FOR THE QUADGUARD ELITE (M10) BACKUP AND REINFORCING DETAILS ARE SHOWN ON THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION & ASSEMBLY MANUAL.
6. CONCRETE PAD SHALL BE 6" MIN. REINFORCED 28MPa [4,000 PSI] (P.C.) OR 8" MIN. NON-REINFORCED 28MPa [4,000 PSI] CONCRETE ROADWAY MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG. ANCHOR BLOCK IS NOT REQUIRED WHEN USING 8" CONCRETE PAD INSTALLED AGAINST AN IMMOVABLE STRUCTURE, E.G. CONCRETE WALL.
7. IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
8. THE INSTALLATION AREA SHOULD BE FREE OF CURBS, ELEVATED OBJECTS,OR DEPRESSIONS.
9. THE QUADGUARD ELITE M10 SYSTEM SHOULD BE INSTALLED APPROXIMATELY PARALLEL WITH THE BARRIER.
10. FOR THE TENSION STRUT BACKUP THE DISTANCE BETWEEN THE BACK OF BACKUP AND THE BARRIER WALL SHOULD NOT EXCEED 7" IN ANY CASE.
11. TXDOT HAS ONLY APPROVED THE 24" WIDE QUADGUARD ELITE M10 SYSTEM. THE QUADGUARD ELITE M10 PRODUCT DESCRIPTION AND ASSEMBLY MANUAL INCLUDES SYSTEM WIDTH OF 24". ONLY THE 24" SYSTEM IS ALLOWED TO BE INSTALLED ON TEXAS ROADWAYS.

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½"
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

KEY:
ASPHALT CONCRETE (A.C.)
COMPACTED SUBBASE (C.S.)
PORTLAND CEMENT CONCRETE (P.C.C.)

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

TENSION STRUT BACKUP MAY BE USED IN CONSTRUCTION ZONES ON ASPHALT CONCRETE (A.C.) FOR TEMPORARY USE ONLY.

LOW MAINTENANCE

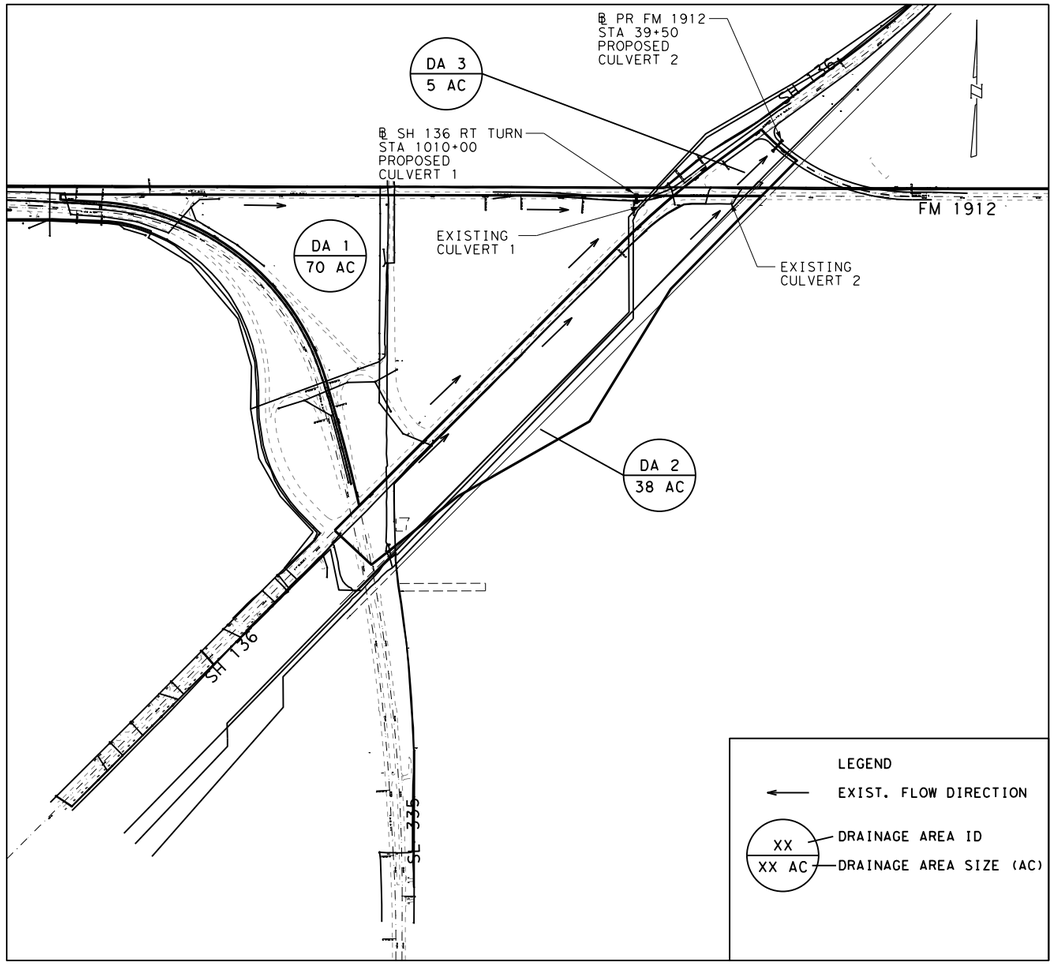
Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD ELITE M10 (MASH TL-3)

QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026,ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		104



DRAINAGE AREA MAPS
N. T. S.

DA RUNOFF CALCULATION

AREA ID	AREA (SF)	AREA (AC.)	C	Tc (MIN)	I (IN/HR)	RUNOFF (CFS)
1	3,030,802	70.00	0.32	32	3.95	89
2	1,643,296	38.00	0.32	24	4.74	58
3	180,424	5.00	0.32	10	7.48	12

NOTE:
BASED ON TxDOT HYDRAULIC DESIGN MANUAL TABLE 4-2,
4% DESIGN AEP (25-YR DESIGN ARI) IS USED.

EXIST CULVERT HYDRAULIC INFORMATION

CULVERT NAME	DESIGN * DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	SIZE	INLET		OUTLET			TOP OF ROADWAY ELEVATION
				INVERT ELEV	HEADWATER ELEV	INVERT ELEV	TAILWATER ELEV	OUTLET VELOCITY (FT / S)	
EXIST CULVERT 01	89	89	6 X 3 RCB	3622.96	3626.53	3624.02	3625.90	7.82	3628.00
EXIST CULVERT 02	58	39 **	30" RCP	3620.24	3624.56	3620.05	3620.51	8.86	3624.00

NOTE:

* DESIGN DISCHARGE IS BASED ON THE DRAINAGE AREAS.

** EXIST CULVERT ANALYSIS SHOWS OVERTOPPING OF FM 1912 AT 41 CFS.

PROP CULVERT HYDRAULIC INFORMATION

CULVERT NAME	DESIGN * DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	SIZE	INLET		OUTLET			TOP OF ROADWAY ELEVATION
				INVERT ELEV	HEADWATER ELEV	INVERT ELEV	TAILWATER ELEV	OUTLET VELOCITY (FT / S)	
PROP CULVERT 01	89	89	2-4X2 RCB	3624.90	3627.70	3624.68	3626.56	7.82	3629.01
PROP CULVERT 02	70	70	5X2 RCB	3617.69	3621.22	3617.59	3619.14	7.67	3622.38

NOTE:

* DESIGN DISCHARGE IS BASED ON THE DRAINAGE AREAS. SINCE THE PROPOSED CULVERT 02 WILL CONVEY THE FLOW FROM BOTH DRAINAGE AREAs 2 & 3, DESIGN DISCHARGE IS ASSUMED TO BE THE SUM OF THE RUNOFFS FROM THE DRAINAGE AREAs 2 & 3.

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

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wood.
Wood Environment & Infrastructure Solutions, Inc.
4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136
DRAINAGE AREA MAP & COMPUTATION

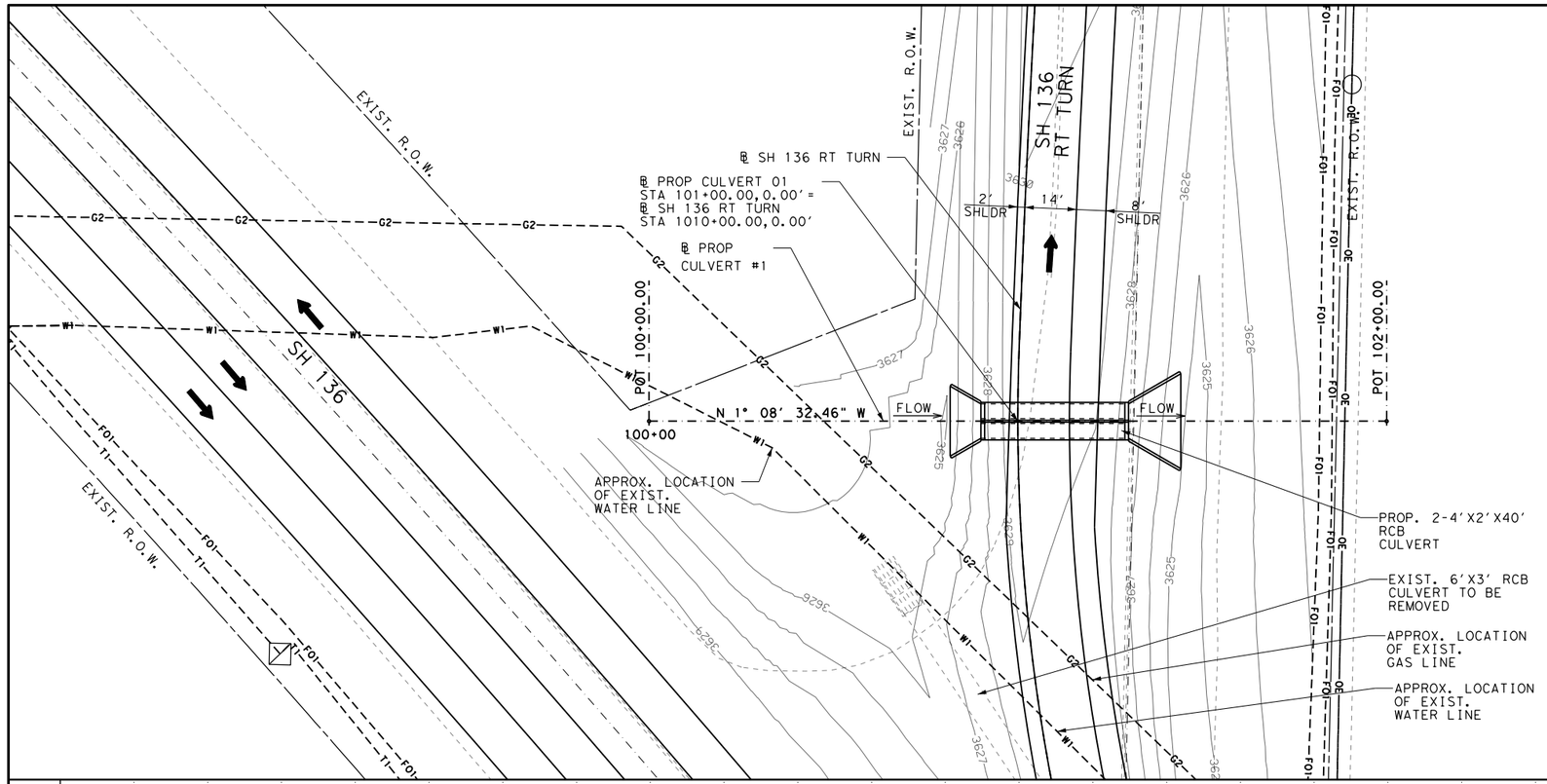
SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	105

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 10:29:12 PM
FILE: CSJ-0379-03-026-DA COMP.dgn

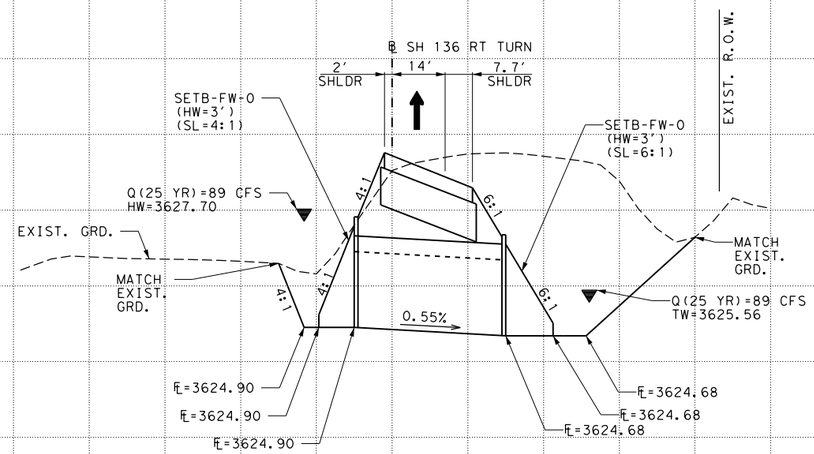
NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL EXISTING UTILITIES ARE SHOWN AT APPROXIMATE LOCATION. CONTRACTOR SHALL FIELD VERIFY THE LOCATION PRIOR TO BEGINNING CONSTRUCTION.



0 10 20 40 80
SCALE: 1"=40' - H
1"=4' - V

0462-6003 CONC BOX CULV(4 FT X 2 FT) - 80 LF
0467-6139 SET(TY I)(HW=3 FT)(4:1)(C) - 1 EA
0467-6141 SET(TY I)(HW=3 FT)(6:1)(C) - 1 EA

PROP. CULVERT #1
℄ SH 136 RT TURN STA 1010+00
CONSTRUCT 2-4'X2'X40' RCB W/
1-SETB-FW-0 (HW=3')(SL=6:1)
1-SETB-FW-0 (HW=3')(SL=4:1)



3,632 3,630 3,628 3,626 3,624

100+00 101+00 102+00

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

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wood.
Wood Environment & Infrastructure Solutions, Inc.
4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

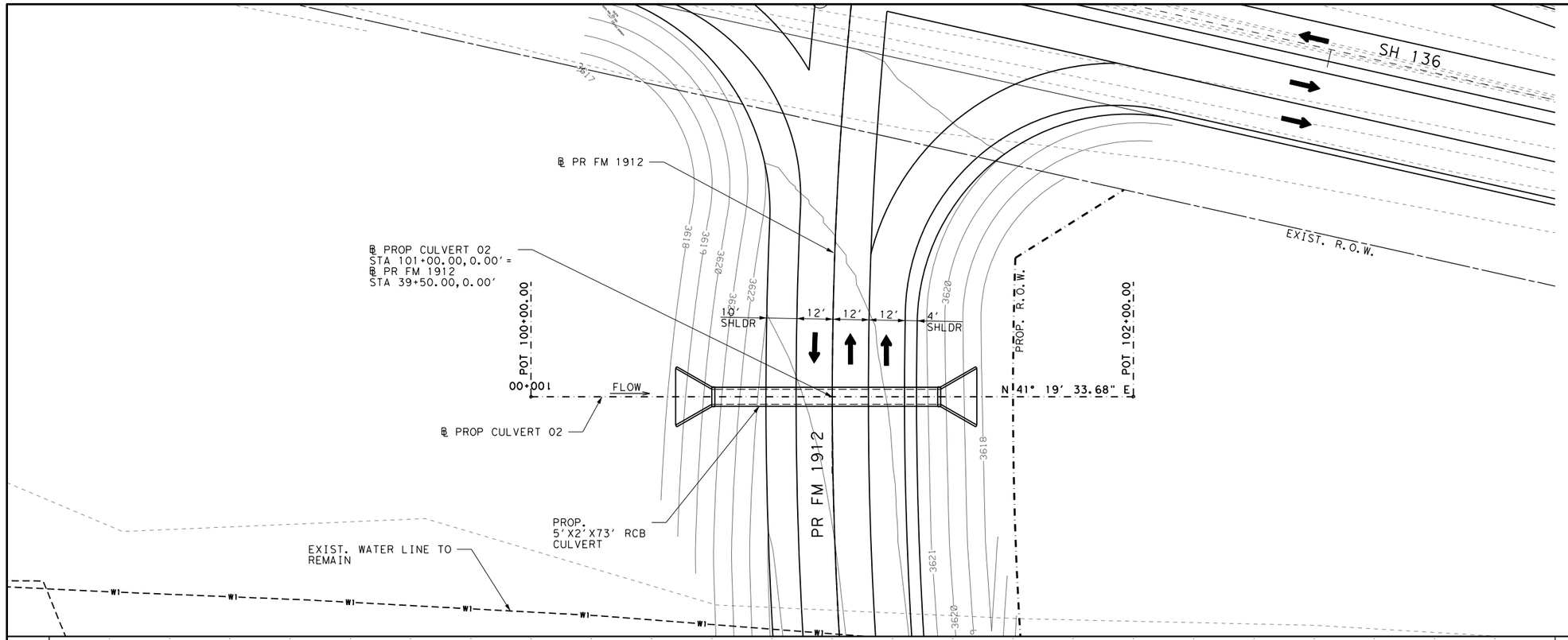
SH 136
CULVERT PLAN AND PROFILE PROP CULVERT 1

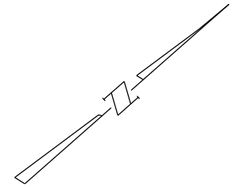
SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	106

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 10:29:21 PM
FILE: CSJ-0379-03-026-PROP CULVERT 01.dgn





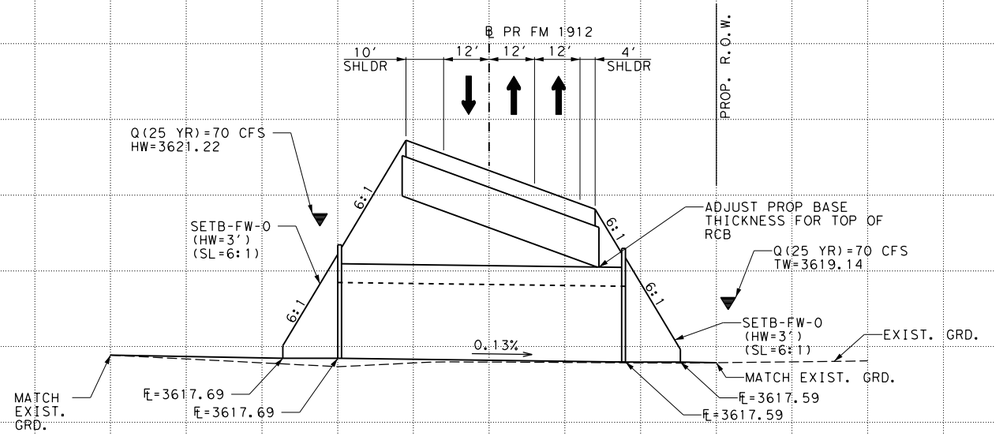
NOTE:
1. ALL DIMENSIONS ARE TO EDGE OF TRAVEL LANE, CENTERLINE, OR EDGE OF PAVEMENT.
2. ALL EXISTING UTILITIES ARE SHOWN AT APPROXIMATE LOCATION. CONTRACTOR SHALL FIELD VERIFY THE LOCATION PRIOR TO BEGINNING CONSTRUCTION.

0 10 20 40 80

SCALE: 1"=40' - H
1"=4' - V

0462 6006 CONC BOX CULV(5 FT X 2 FT) - 73 LF
0467 6173 SET(TY I)(S=5 FT)(HW=3 FT)(6:1)(C) - 2 EA

PROP. CULVERT #2
℄ PR FM 1912 STA 39+50
CONSTRUCT 5'X2'X76' RBC W/
2-SETB-FW-0 (HW=3')(SL=6:1)



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

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T.B.P.E. Firm Registration #12

SH 136
CULVERT PLAN AND PROFILE PROP CULVERT 2

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	107

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:29:30 PM
FILE: CSJ-0379-03-026-PROP CULVERT 02.dgn

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (1) (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
1010+00 (Lt)	2 ~ 4' X 2'	2'	SCP-4	SETB-FW-0	0	4:1	5"	5"	0.500	2.667	9.333	5.389	10.777	N/A	20.111	1.6	0.2	4.2	N/A
1010+00 (Rt)	2 ~ 4' X 2'	2'	SCP-4	SETB-FW-0	0	6:1	5"	5"	0.250	2.417	12.500	7.217	14.434	N/A	23.767	2.5	0.1	5.2	N/A
39+50 (Both)	1 ~ 5' X 2'	2'	SCP-5	SETB-FW-0	0	6:1	6"	6"	0.500	2.750	14.500	8.372	16.743	N/A	21.743	4.6	0.2	11.8	N/A

DATE:
FILE:

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
· Side slope at culvert for flared or straight wingwalls.
· Channel slope for parallel wingwalls.
· Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		108

DATE:
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for One Structure End)

Dimensions					Variable Reinforcing				Estimated Quantities (3) per ft of wing length (Two~Wings)	
Maximum Wingwall Height Hw (9)	W	X	Y	Z	Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'- 5"	1'- 0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'- 2"	1'- 6"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'- 8"	1'- 9"	1'- 3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'- 2"	2'- 0"	1'- 6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'- 8"	2'- 3"	1'- 9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'- 2"	2'- 6"	2'- 0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'- 8"	2'- 9"	2'- 3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'- 2"	3'- 0"	2'- 6"	9"	#7	6"	#5	6"	162.29	0.721

TABLE OF WING WALL REINFORCING
(Two~Wings)

Bar	Size	No.	Spa
D	#5 ~	1'-0"	
E	#4 ~	1'-0"	
F	#4 ~	1'-0"	
G	#6 4 ~		
M	#4 4 ~		
P	#4 ~	1'-0"	
R	#5 6 ~		
V	#4 ~	1'-0"	

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4 ~	1'-6"	
Q	#4 1 ~		
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4 ~	1'-0"	
N	#5 6 ~		
OL	#4 6 ~		
Reinf (Lb/Ft)			9.82
Conc (CY/Ft)			0.074

(1) Extend Bars P 3'-0" Min into bottom slab of box culvert.

(2) Adjust to fit as necessary to maintain 1 1#2" clear cover and 4" Min between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.

(4) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.

(6) At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.

(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.

(8) For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

Side Slope	Hw Max
3:1	11'- 5"
4:1	8'-10"
6:1	6'- 1"

WING DIMENSION CALCULATIONS:

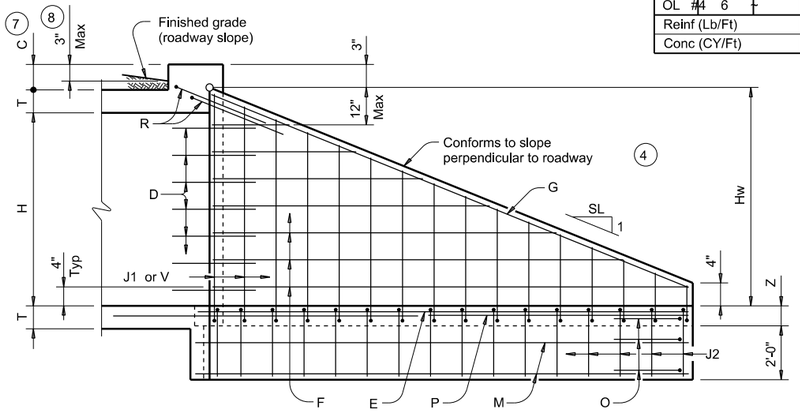
Hw = H + T + C - 0.250' (9)
A = (Hw - 0.333') (SL)
B = (A) (tan (30°))
Lw = (A) ÷ cos (30°))

For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)
For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.500')

Lc = (Ltw) - (2U)
Atw = (Lc) + (2B)
Total Wingwall Area (two wings ~ SF)
= (Hw + 0.333') (Lw)

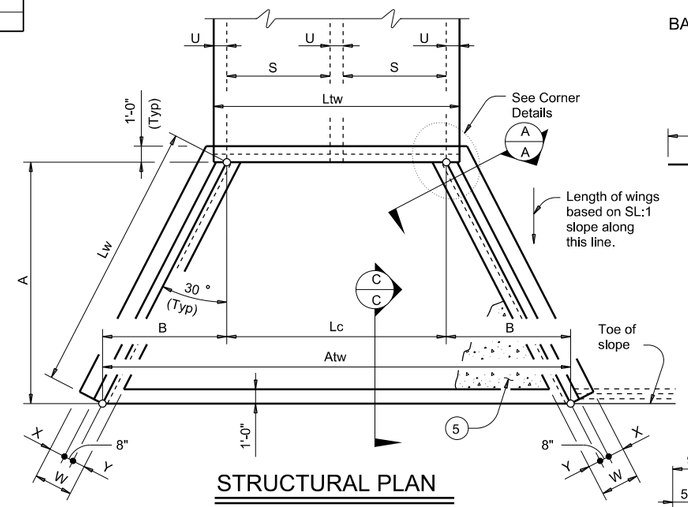
Hw = Height of wingwall (feet)
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)
Ltw = Culvert toewall length (feet)
Lc = Culvert curb between wings (feet)

See applicable box culvert standard for H, S, T, and U values.
See Table of Maximum Wall Heights for limits on Hw.



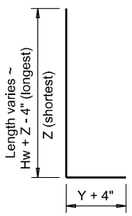
INSIDE ELEVATION OF WINGWALL

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

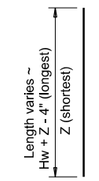


STRUCTURAL PLAN

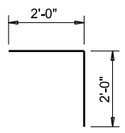
(Showing dimensions.)



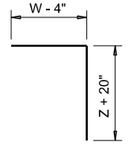
BARS J1



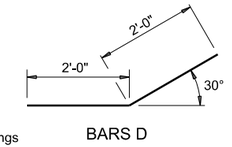
BARS V



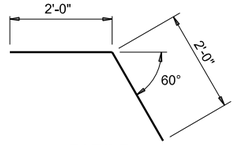
BARS L



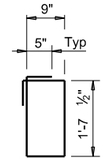
BARS J2



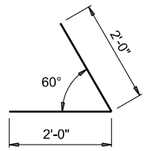
BARS D



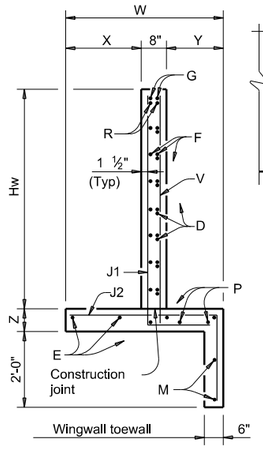
BARS R



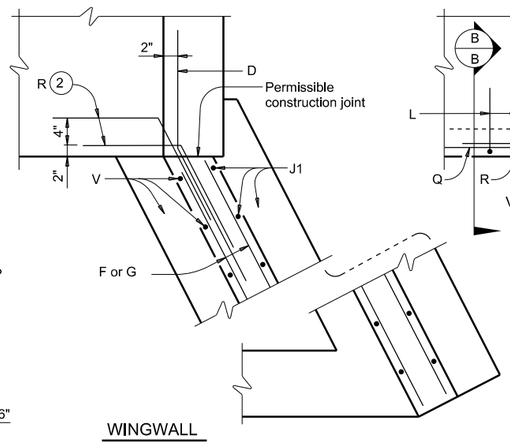
BARS K
(Length = 5'-5")



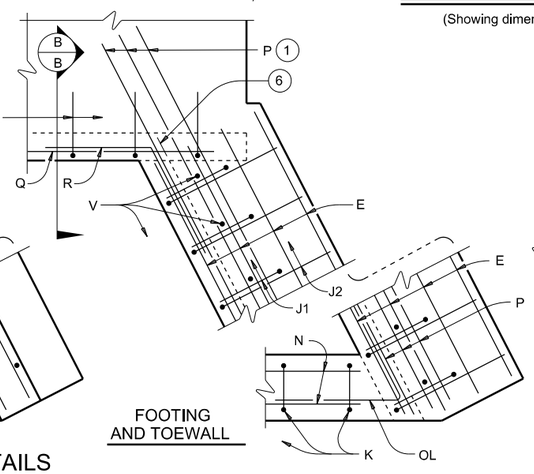
BARS OL



SECTION A-A



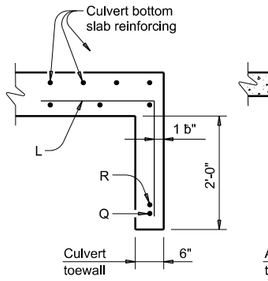
WINGWALL



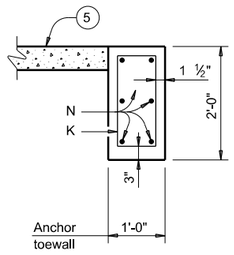
FOOTING AND TOEWALL

CORNER DETAILS

(Culvert and culvert toewall reinforcing not shown for clarity.)



SECTION B-B (5)



SECTION C-C

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Provide Class "C" concrete (f'c = 3,600 psi).
Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".
Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts and nuts.
Provide ASTM A36 steel plates.
Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

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

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

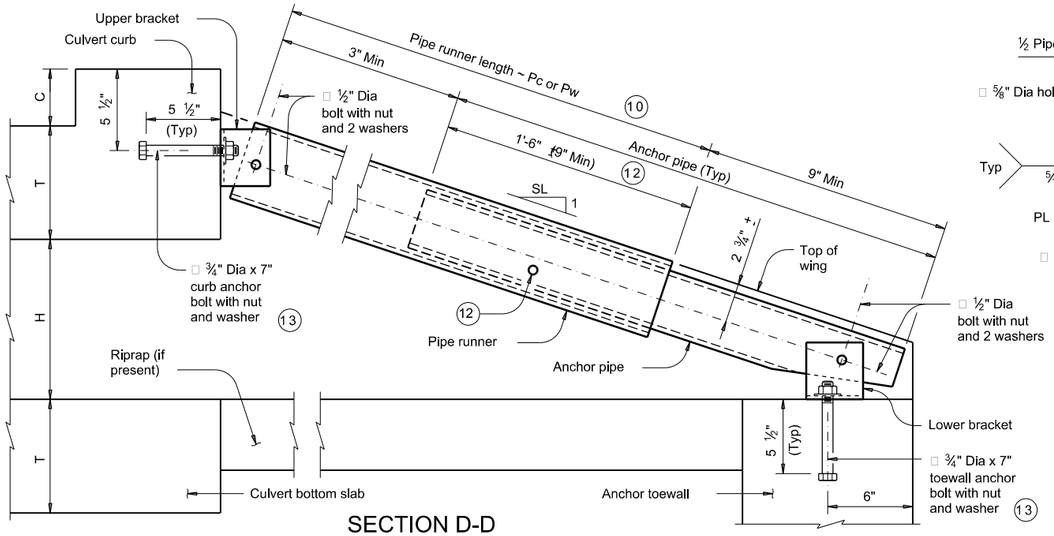
SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

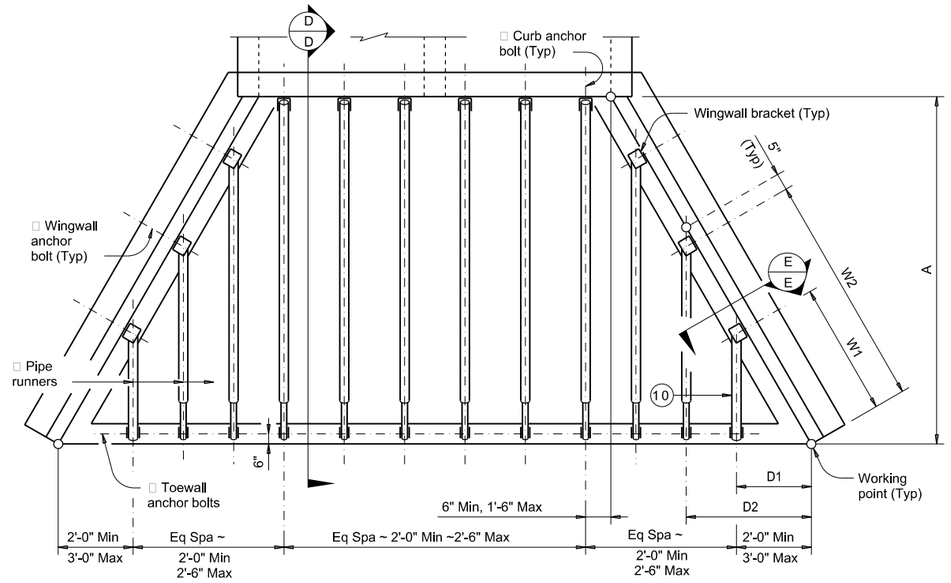
FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		109

DATE:
FILE:

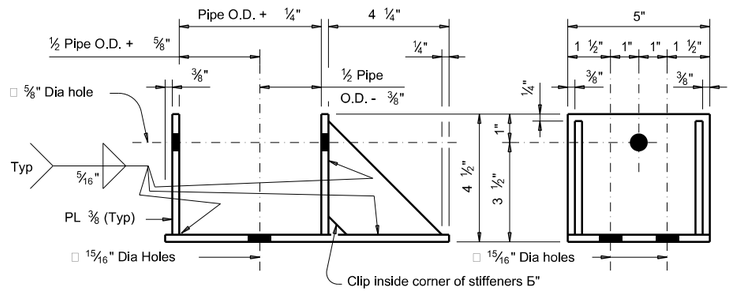


SECTION D-D

(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)

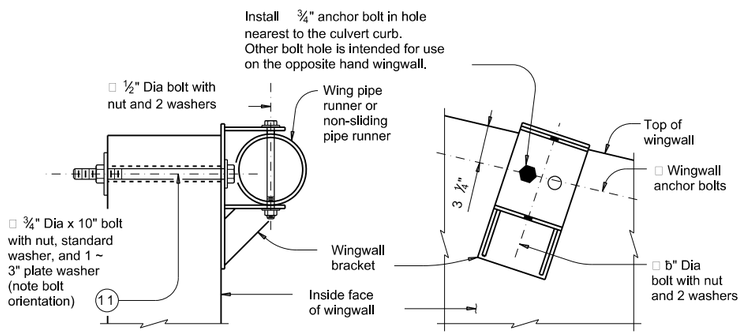


PIPE RUNNER PLAN



ELEVATION

SIDE VIEW

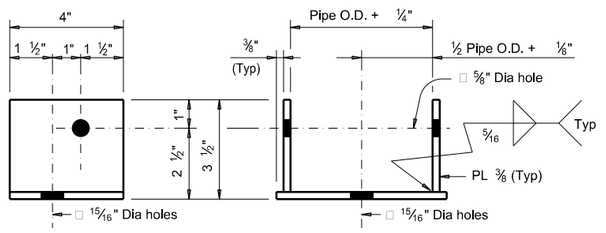


SECTION E-E
(Showing installed bracket.)

ELEVATION
(Showing installed bracket normal to wall. Pipe not shown for clarity.)

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS



SIDE VIEW

ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(11) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(12) After installation of pipe runner, use the b" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(13) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5 b". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. 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.

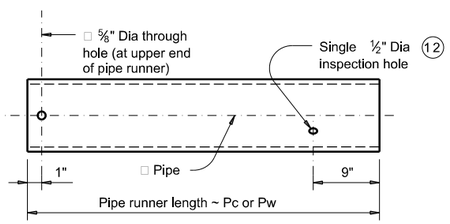
PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (2.000) (Dn) - (0.416')
Pwn = (Dn) (K2) - (2.063')
Pw1 Non-Sliding Pipe Runner (If required)
= (D1) (K2) - (0.563')
Pc = (A) (K1) - (1.688')

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

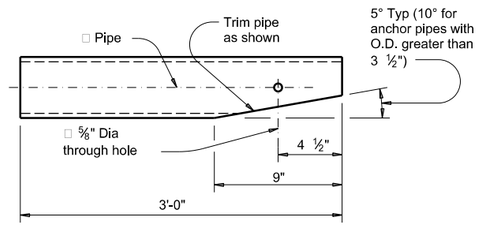
Slope SL:1	K1	K2
3:1	~ 1.054 ~	1.826
4:1	~ 1.031 ~	1.785
6:1	~ 1.014 ~	1.756

n = Wing pipe runner number

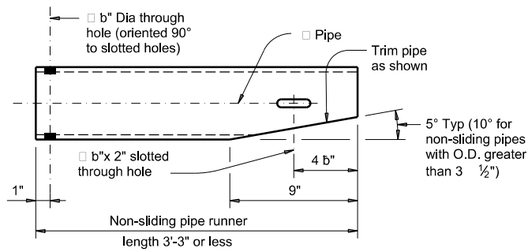


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS



ANCHOR PIPE DETAILS



Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

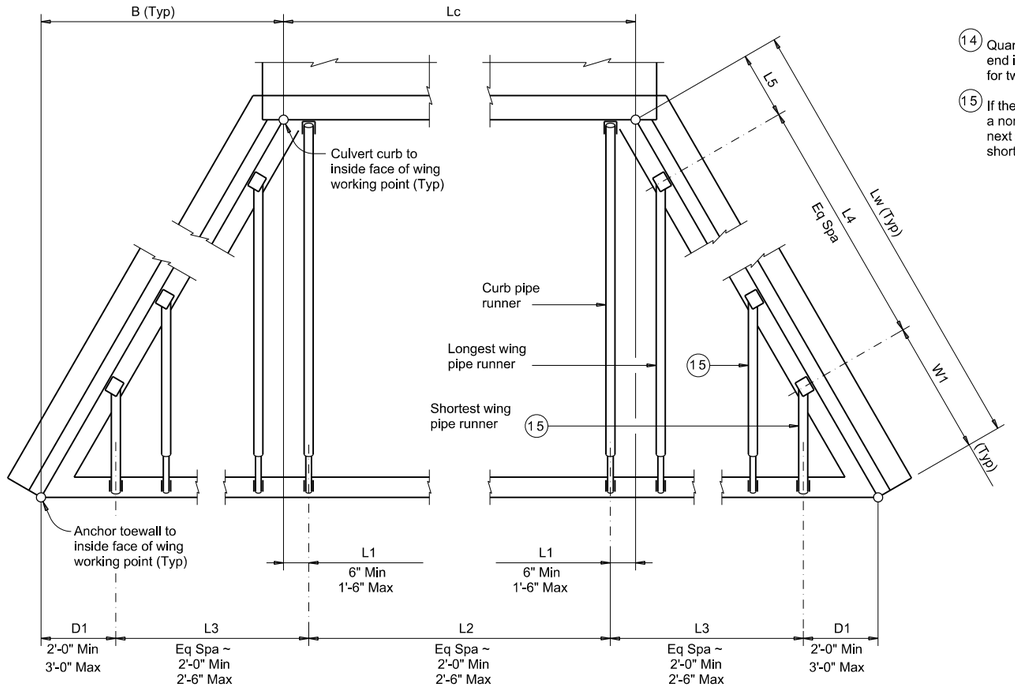
SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE:	setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		0379	03	026, ETC.	SH 136
		DIST	COUNTY		SHEET NO.
		AMA	POTTER		110

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Shortest Wing Pipe Runner (Pw)	Non-Sliding Wing Pipe Runner (if applicable)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No.	Length				Size (3",4" or 5")	Total Length (14)	Size (2",3" or 4")	Total Length (14)
	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)	(Ft)				
1010+00 (Lt)	9.333	1.500	3	2.111	6.333	2.000	2	2.444	4.889	3.583	1	4.889	4.889	2.305	4	7.938	5.875	N/A	3.000	3"	49.500	2"	18.000
1010+00 (Rt)	9.333	0.500	4	2.083	8.333	3.000	2	2.358	4.717	5.583	1	4.717	4.717	4.134	5	10.979	7.354	3.208	N/A	4"	76.021	3"	27.000
39+50 (Both)	5.000	0.500	2	2.000	4.000	2.000	3	2.291	6.872	3.583	2	4.581	9.162	3.998	3	13.021	9.500	5.479	2.958	4"	149.875	3"	42.000



PIPE RUNNER LAYOUT

(14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

DATE:
FILE:

CARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

07/01/2020

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		111

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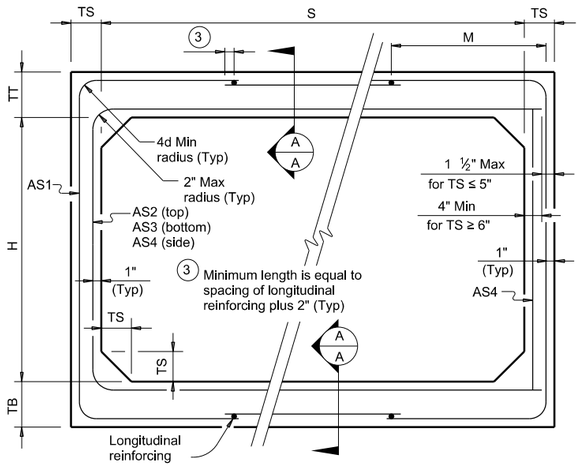
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
4	2	7.5	6	5	< 2	-	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	-	-	-	3.6
4	2	5	5	5	3 - 5	38	0.13	0.13	0.13	0.12	-	-	-	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	-	-	-	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	-	-	-	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	-	-	-	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	-	-	-	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	-	-	-	3.6
4	3	7.5	6	5	< 2	-	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	-	-	-	4.1
4	3	5	5	5	3 - 5	38	0.12	0.16	0.16	0.12	-	-	-	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	-	-	-	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	-	-	-	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	-	-	-	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	-	-	-	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	-	-	-	4.1
4	4	7.5	6	5	< 2	-	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	-	-	-	4.6
4	4	5	5	5	3 - 5	38	0.12	0.18	0.18	0.12	-	-	-	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	-	-	-	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	-	-	-	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	-	-	-	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	-	-	-	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	-	-	-	4.6

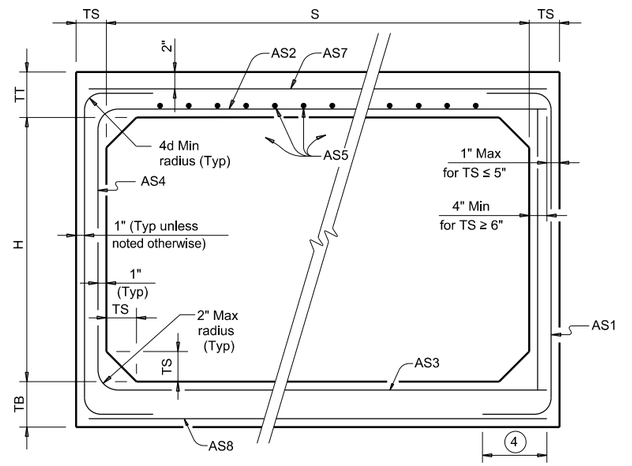
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

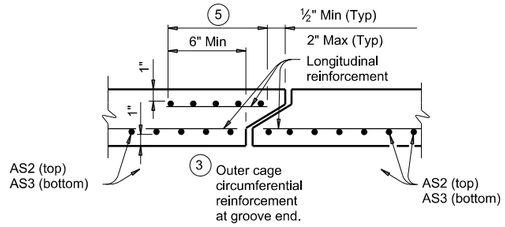
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:
Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:
Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

FILE: scp04sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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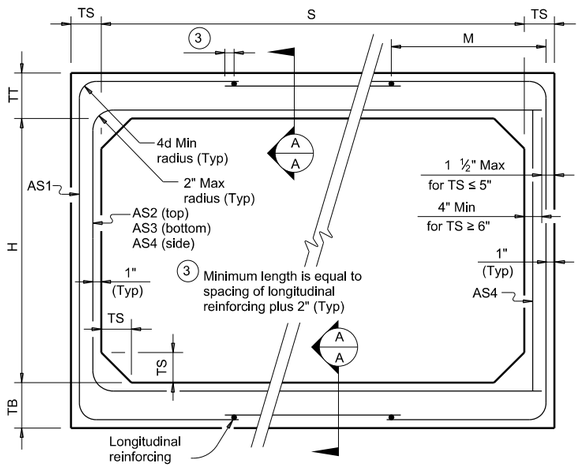
REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		112

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	-	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	-	-	-	5.1
5	2	6	6	6	3 - 5	44	0.16	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	-	-	-	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	-	-	-	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	-	-	-	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	-	-	-	5.1
5	3	8	7	6	< 2	-	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	-	-	-	5.7
5	3	6	6	6	3 - 5	36	0.14	0.17	0.16	0.14	-	-	-	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	-	-	-	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	-	-	-	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	-	-	-	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	-	-	-	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	-	-	-	5.7
5	4	8	7	6	< 2	-	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	-	-	-	6.3
5	4	6	6	6	3 - 5	45	0.14	0.19	0.18	0.14	-	-	-	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	-	-	-	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	-	-	-	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	-	-	-	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	-	-	-	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	-	-	-	6.3
5	5	8	7	6	< 2	-	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	-	-	-	6.9
5	5	6	6	6	3 - 5	45	0.14	0.21	0.20	0.14	-	-	-	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	-	-	-	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	-	-	-	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	-	-	-	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	-	-	-	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	-	-	-	6.9

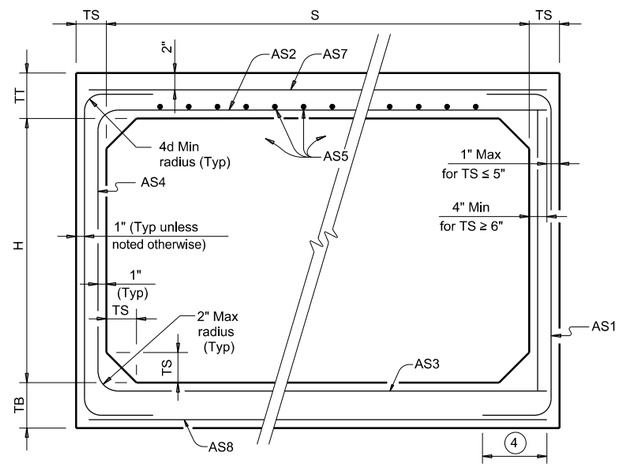
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

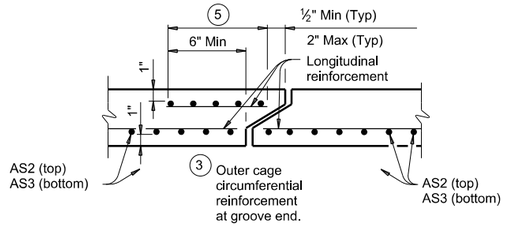
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f'c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05s5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		113

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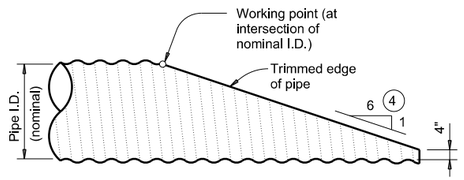
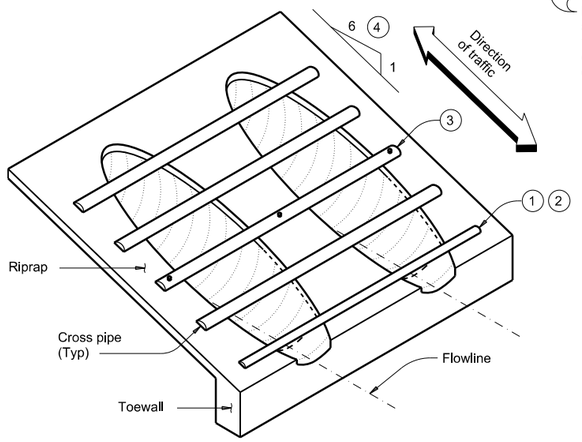


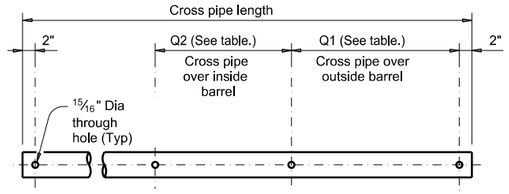
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

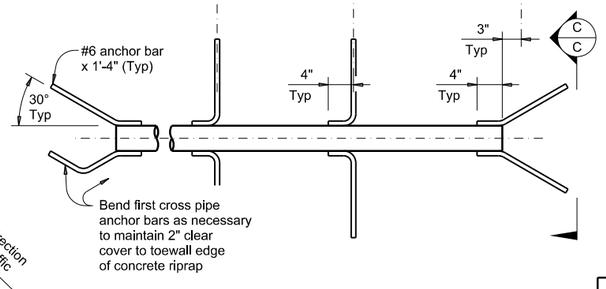
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



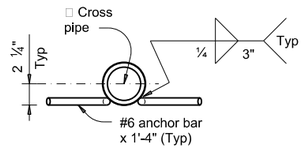
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

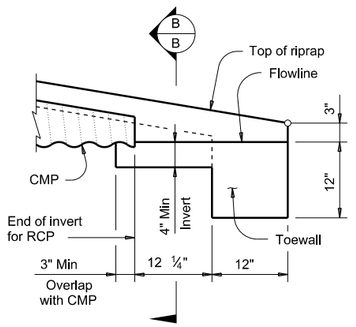


PIPE WITH ANCHOR BARS



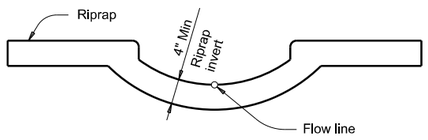
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 ½" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

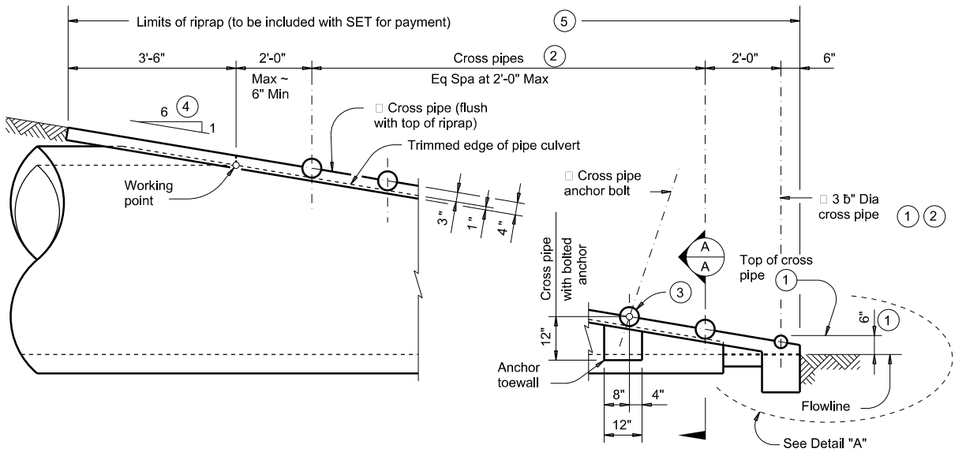
GENERAL NOTES:

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

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

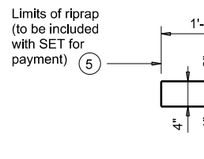
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

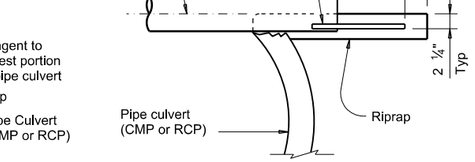


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

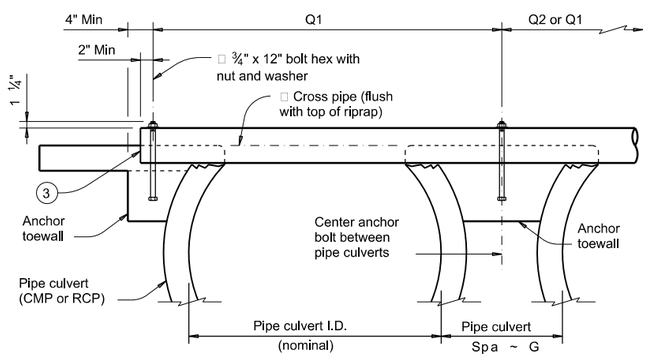
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

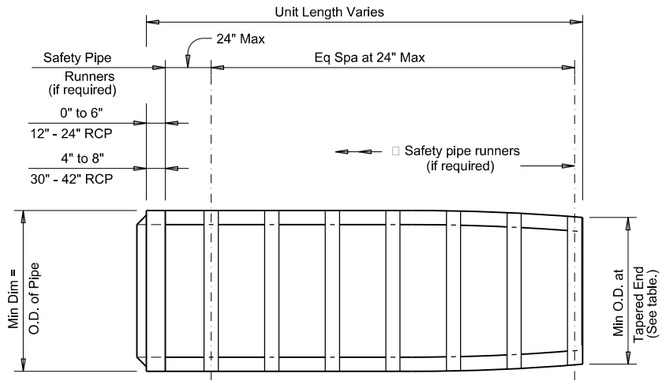
FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026,ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		114

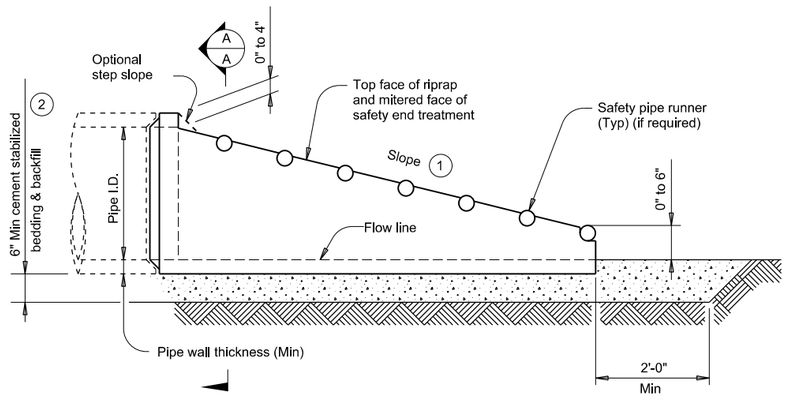
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



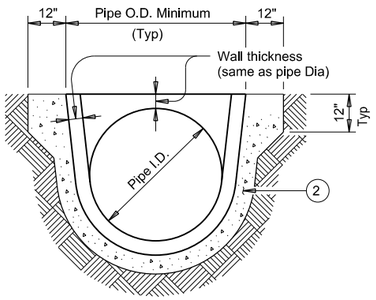
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

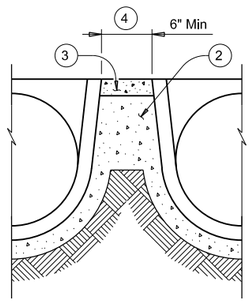


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)



SECTION A-A



MULTIPLE PIPE INSTALLATION

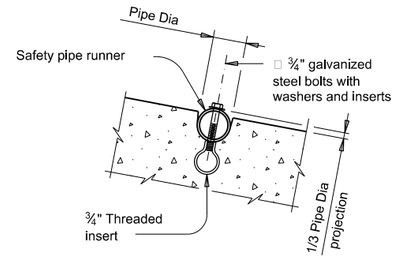
1. Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.

   Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

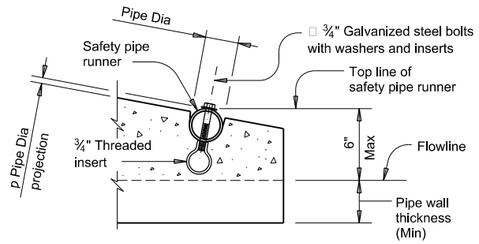
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

5. Safety pipe runners are required for multiple pipe culverts with more than two pipes.

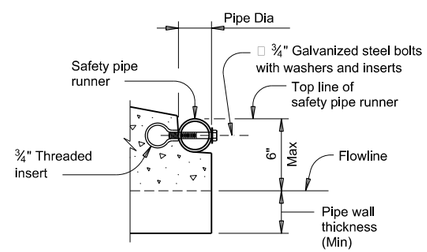


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	(5)	3" STD	3.500"	3.068"
15"	2 ¼"	19 ½"	19"	0.07 Circ.	6:1	5' - 8"	No	(5)	3" STD	3.500"	3.068"
18"	2 ½"	23"	21 ½"	0.07 Circ.	6:1	7' - 3"	No	(5)	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	(5)	3" STD	3.500"	3.068"
30"	3 ½"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	51"	41 ½"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

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

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

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

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

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

DATE:
FILE:

Texas Department of Transportation

Bridge Division Standard

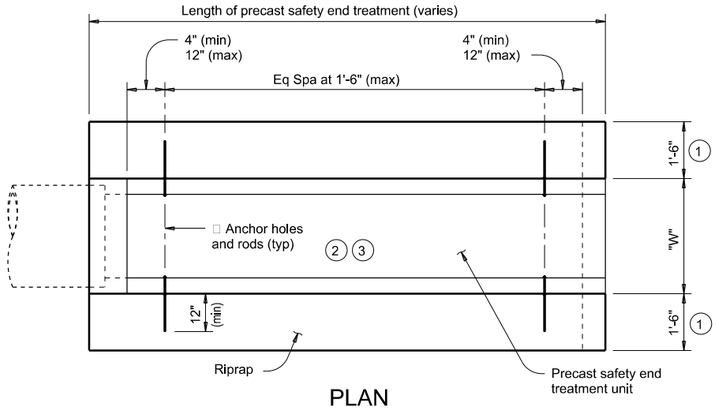
PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

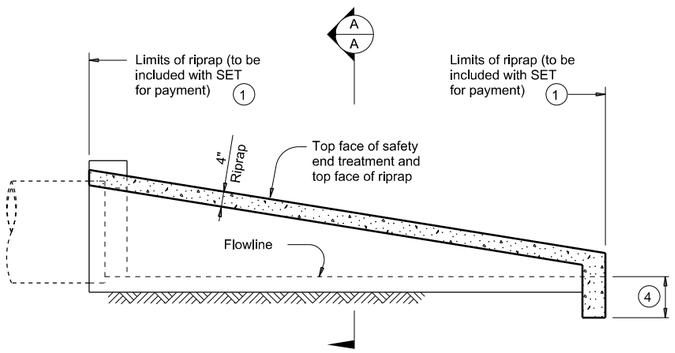
PSET-RP

FILE: psetrpss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		115

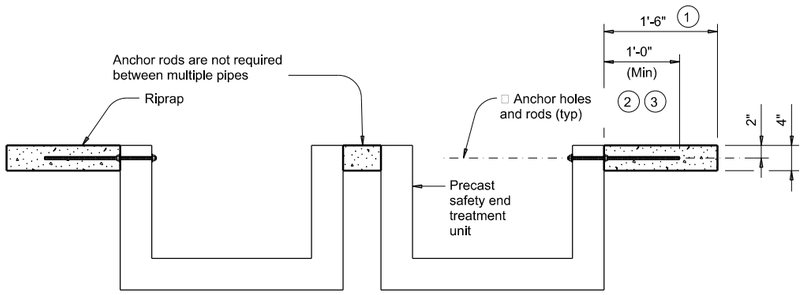
DATE:
FILE:



PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION

SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)

5

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.
For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.
Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		115A

EXIST. R.O.W.

EXIST FM 1912 PAVEMENT TO BE REMOVED. SEE REMOVAL / ROADWAY PLANS FOR ADDITIONAL DETAILS.

EXIST. OVERHEAD

EXIST. FIBER OPTIC

FM 1912

℄ FM 1912

EXIST. CULVERT

EXIST. AT&T

A

35+00

EXIST. R.O.W.

EXIST 45" WATER LINE

AT&T POT HOLE
X: 586,433.19
Y: 3,742,463.57
Z: 3,619.72 (TOP OF CASING)

45" WATER LINE POT HOLE
X: 586,433.45
Y: 3,742,463.11
Z: 3,618.56

EXIST 45" WATER LINE

EXIST. AT&T

EXIST. OVERHEAD

EXIST. FIBER OPTIC

TO PROPOSED FM 1912 AND SH 136 INTERSECTION. SEE ROADWAY PLANS FOR ADDITIONAL INFORMATION.

PROP. CULVERT

℄ PR FM 1912

PROPOSED REINFORCED CONCRETE (CLASS A) CAP.
(10'W X 6" THICK X 110' LONG) - TO BE PLACED 12" (MIN.) FROM TOP OF EXISTING WATERLINE AND CENTERED UNDER PROPOSED ROADWAY/DITCHES.
0420 6002 - CL A CONC (MISC) = 21 CY
REINFORCING SHALL BE
#4 BARS AT 18" C-C BOTH DIRECTIONS

STA 40+22.35
50.37' RT

40+00

PROP. R.O.W.

PR FM 1912

STA 40+28.97
0.00' RT

STA 40+37.34
58.61' LT

A

LEGEND:

PROPOSED CONCRETE CLASS A

PROPOSED PAVEMENT

NOTE:

1. ALL EXISTING UTILITY INFORMATION IS PROVIDED BY TxDOT AND IS NOT FIELD VERIFIED BY WOOD OR ITS SURVEYOR.
2. ALL EXISTING UTILITY INFORMATION IS SHOWN FOR INFORMATION ONLY AND NOT FOR CONSTRUCTION.
3. ALL STATION AND OFFSETS ARE PROVIDE FOR CONTRACTOR'S INFORMATION ONLY. CONTRACTOR TO FIELD VERIFY ALL LOCATIONS PRIOR TO COMMENCING WORK.
4. EXCAVATION AND EMBANKMENT REQUIRED TO CONSTRUCT THE CONCRETE CAP SHALL BE SUBSIDIARY TO ITEM 420.

0 10 25 50 100

SCALE: H: 1"=50'
V: 1"=5'

PROPOSED TXDOT R.O.W.

EXIST. TXDOT R.O.W.

EXIST. R.O.W.

EXIST. FM 1912

EXIST. R.O.W.

APPROX. 4.26'

AT&T
4" (ASSUMED SIZE)
TOP EL: 3,619.72

EXIST 45" WATER LINE
TOP EL: 3,168.56

NOTE:

EXISTING WATER LINE IS SHOWN AT APPROXIMATE ELEVATION BASED ON THE POT HOLE AND AS-BUILT INFORMATION. ACTUAL LOCATION MAY VARY AND FIELD VERIFICATION MAY BE REQUIRED.

℄ PR FM 1912

PROPOSED PR FM 1912

PROP. R.O.W.

PROPOSED REINFORCED CONCRETE (CLASS A) CAP.
(10'W X 6" THICK X 110' LONG)
REINFORCING SHALL BE
#4 BARS AT 18" C-C BOTH DIRECTIONS

EL: 3618.17

EL: 3617.38

12" MIN.

APPROX.
0.5% (SEE NOTE)

EXIST. 45" DIA.
CITY OF AMARILLO WATER LINE.
INSTALLED: 1955
WATERLINE MATERIAL: CONCRETE
PRESSURE PIPE-BAR WRAPPED-STEEL CYLINDER

SECTION A-A

3625 3620 3615 3610

0 100 200 300 400 500

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

Gary Daniel Janecek

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wood.
Wood Environment & Infrastructure Solutions, Inc.
4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136

PR FM 1912 UTILITY ACCOMMODATION

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	116

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/13/2020 10:0:55 AM
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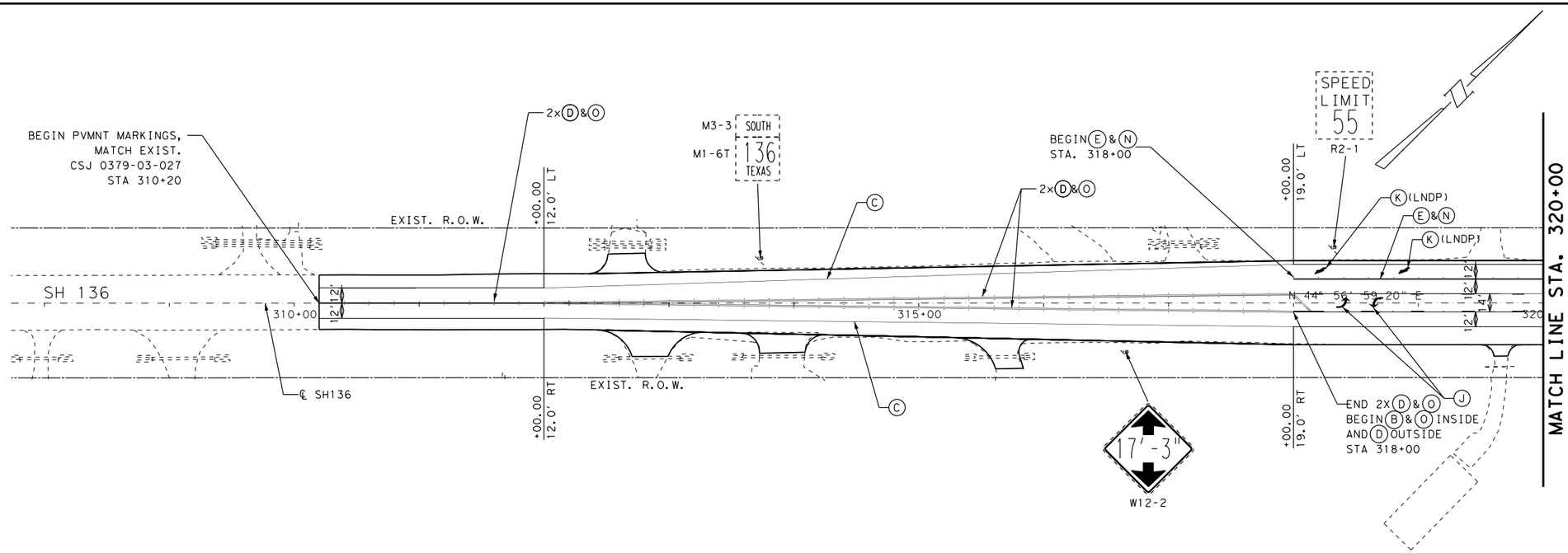
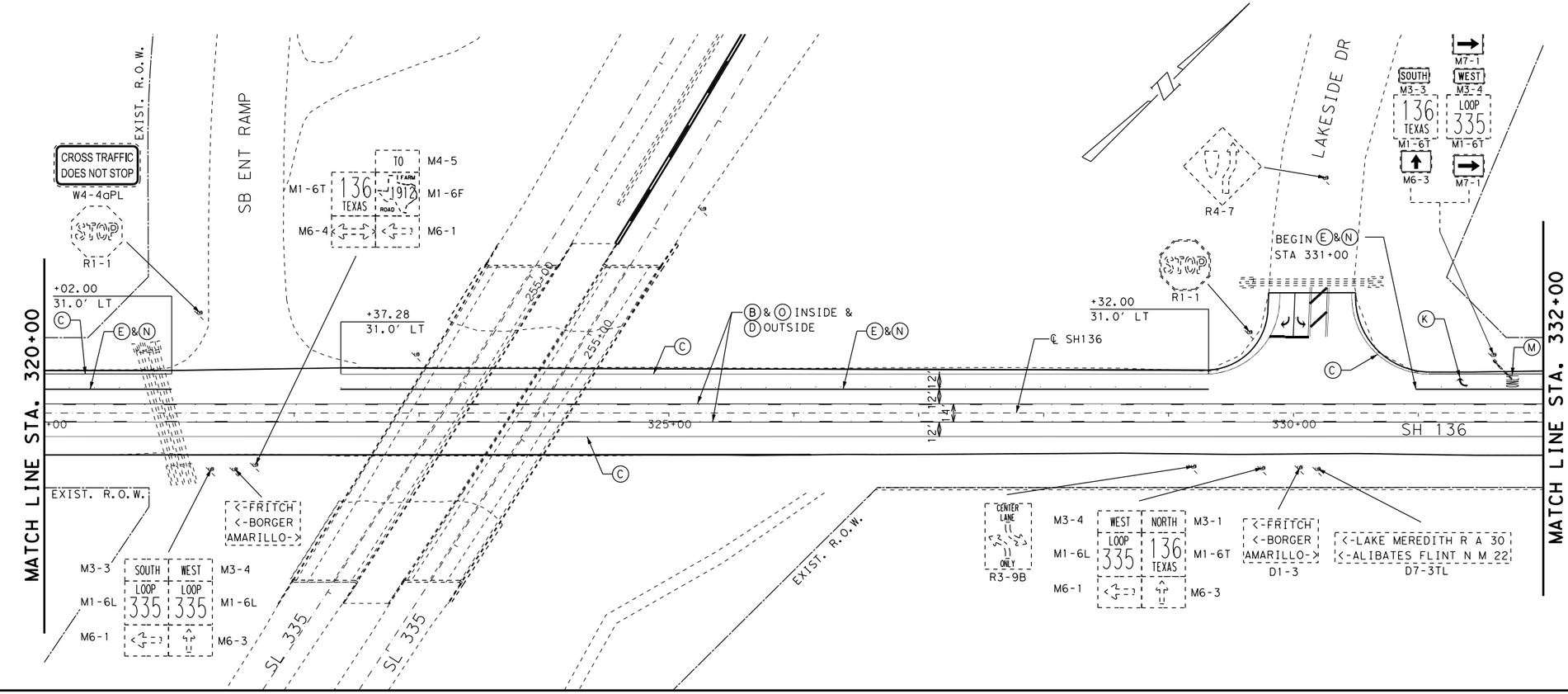


LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

Texas Department of Transportation

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Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136

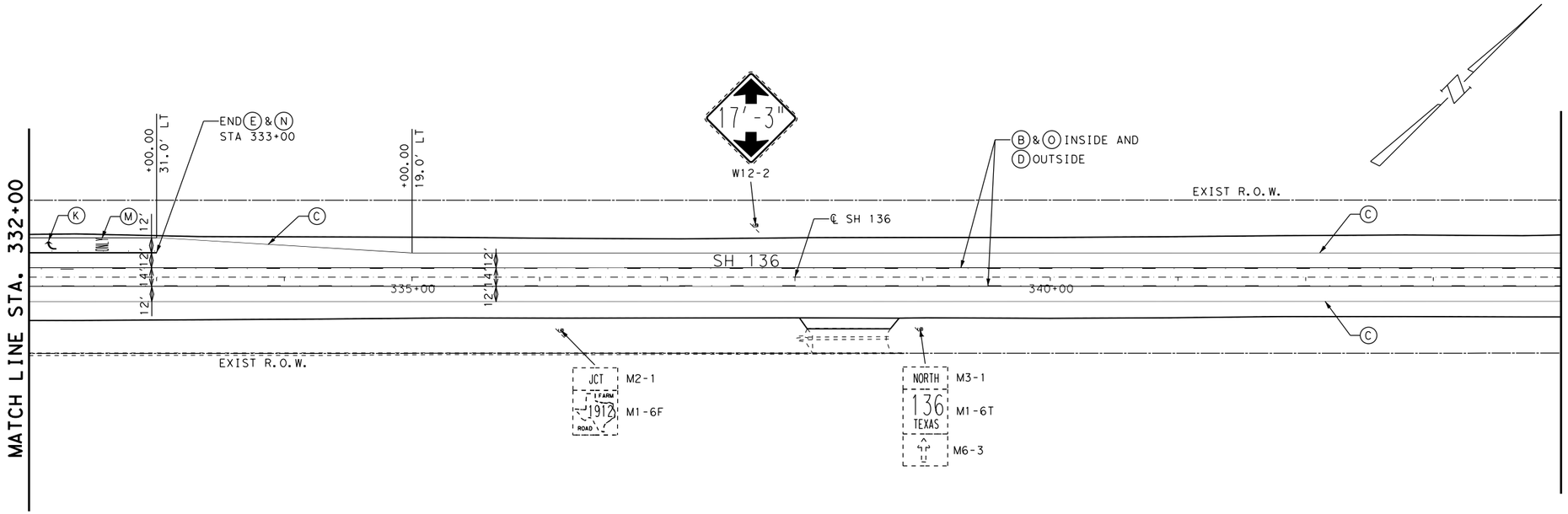
SIGNING AND PAVEMENT MARKING PLAN BEGIN TO STA 332+00

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	117

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 6/28/2021 10:52:40 AM
FILE: CSJ-0379-03-026-Sign_PVTMRK_SHT-01

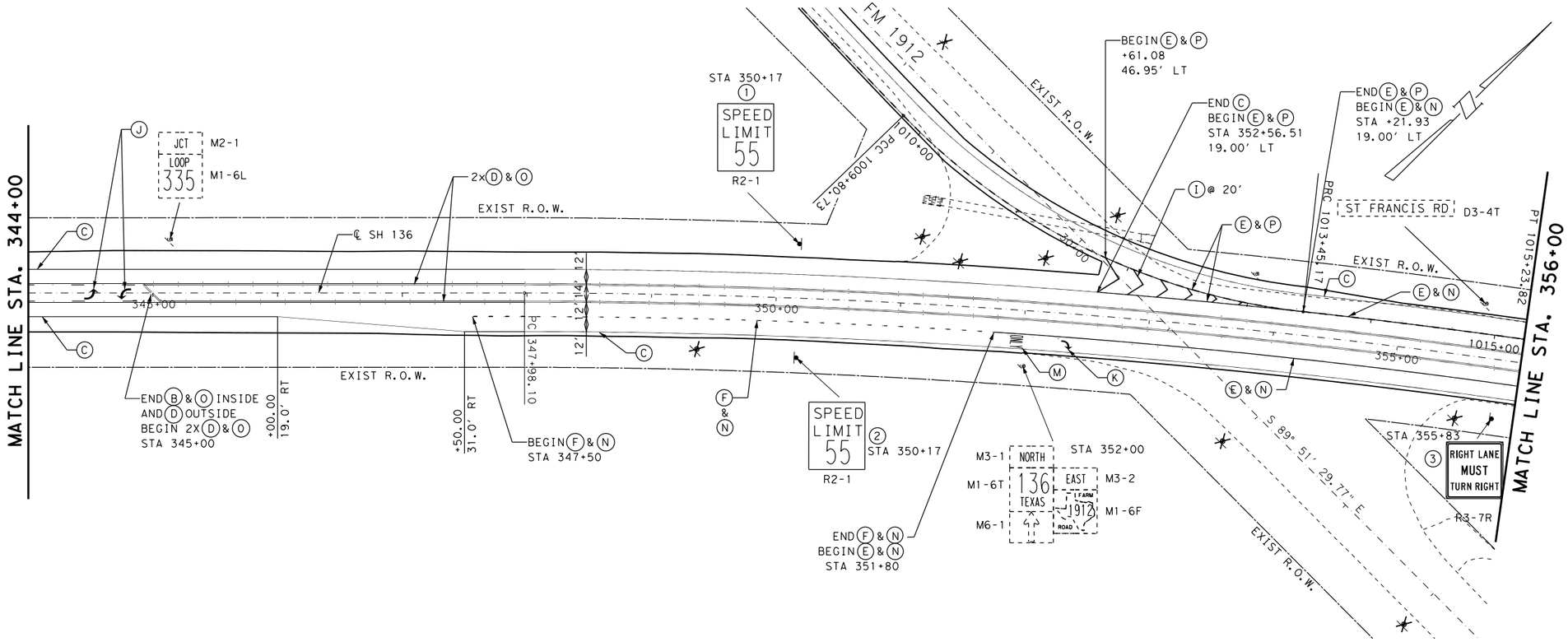


LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

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Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136
SIGNING AND PAVEMENT MARKING PLAN
STA 332+00 TO 356+00

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		118
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/10/2020 2:52 PM
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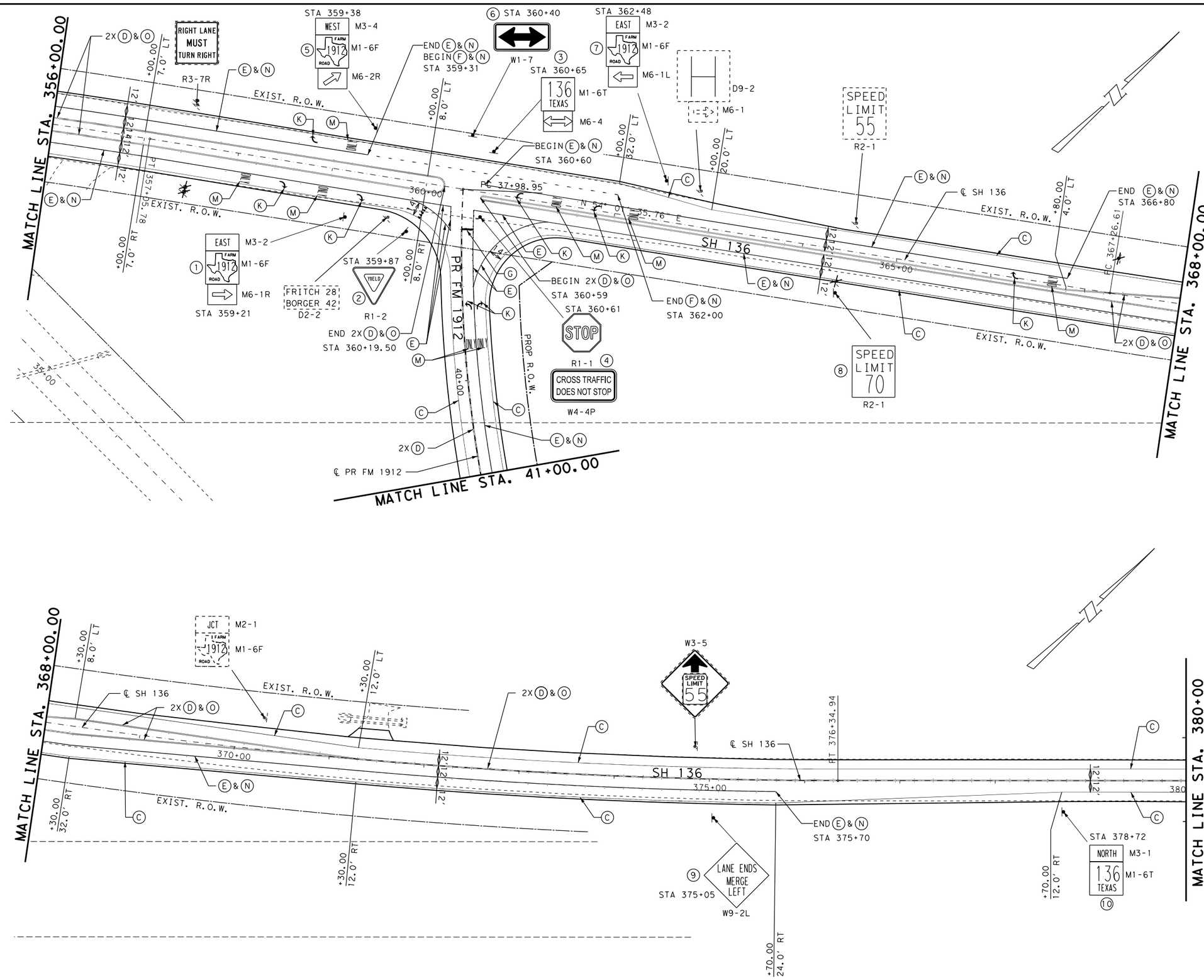

LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

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SH 136
SIGNING AND PAVEMENT MARKING PLAN
STA 356+00 TO 380+00

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	119

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:38:26 PM
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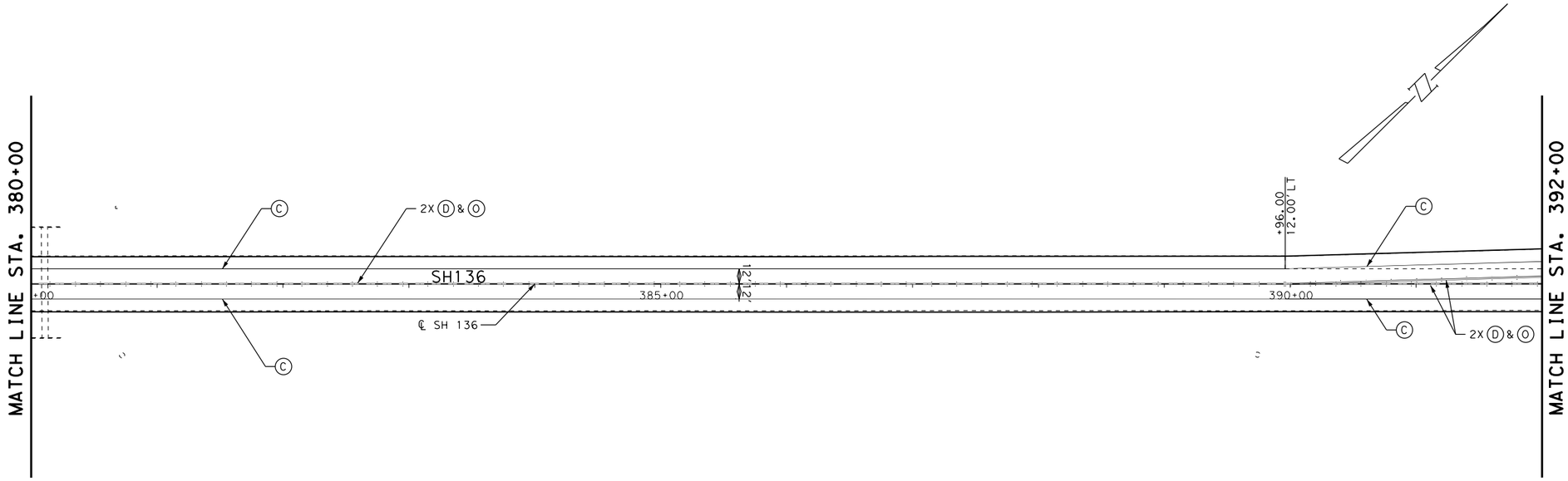

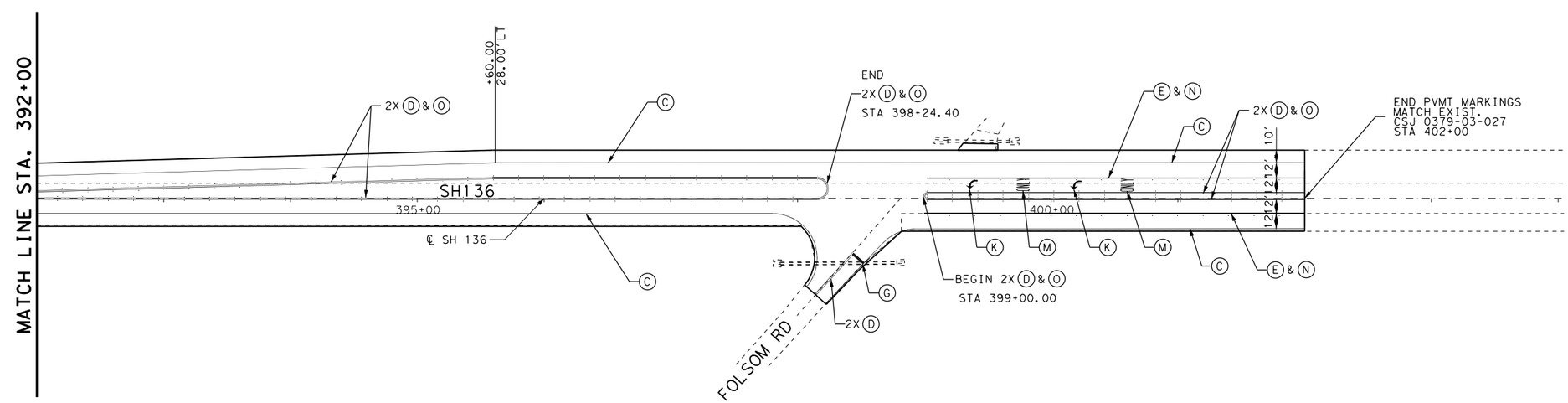

LEGEND:

- Ⓐ RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- Ⓑ RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- Ⓒ RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- Ⓓ RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- Ⓔ REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- Ⓕ REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- Ⓖ REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- Ⓗ REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- Ⓘ REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- Ⓙ REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- Ⓚ REFL PAV MRK TY I (W)(ARROW) (090MIL)
- Ⓛ REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- Ⓜ REFL PAV MRK TY I (W)(WORD) (090MIL)
- Ⓝ REFL PAV MRKR TY I-C
- Ⓞ REFL PAV MRKR TY II-A-A
- Ⓟ REFL PAV MRKR TY II-C-R
- ◎ EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

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STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

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SH 136

SIGNING AND PAVEMENT MARKING PLAN STA 380+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	120

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:38:39 PM
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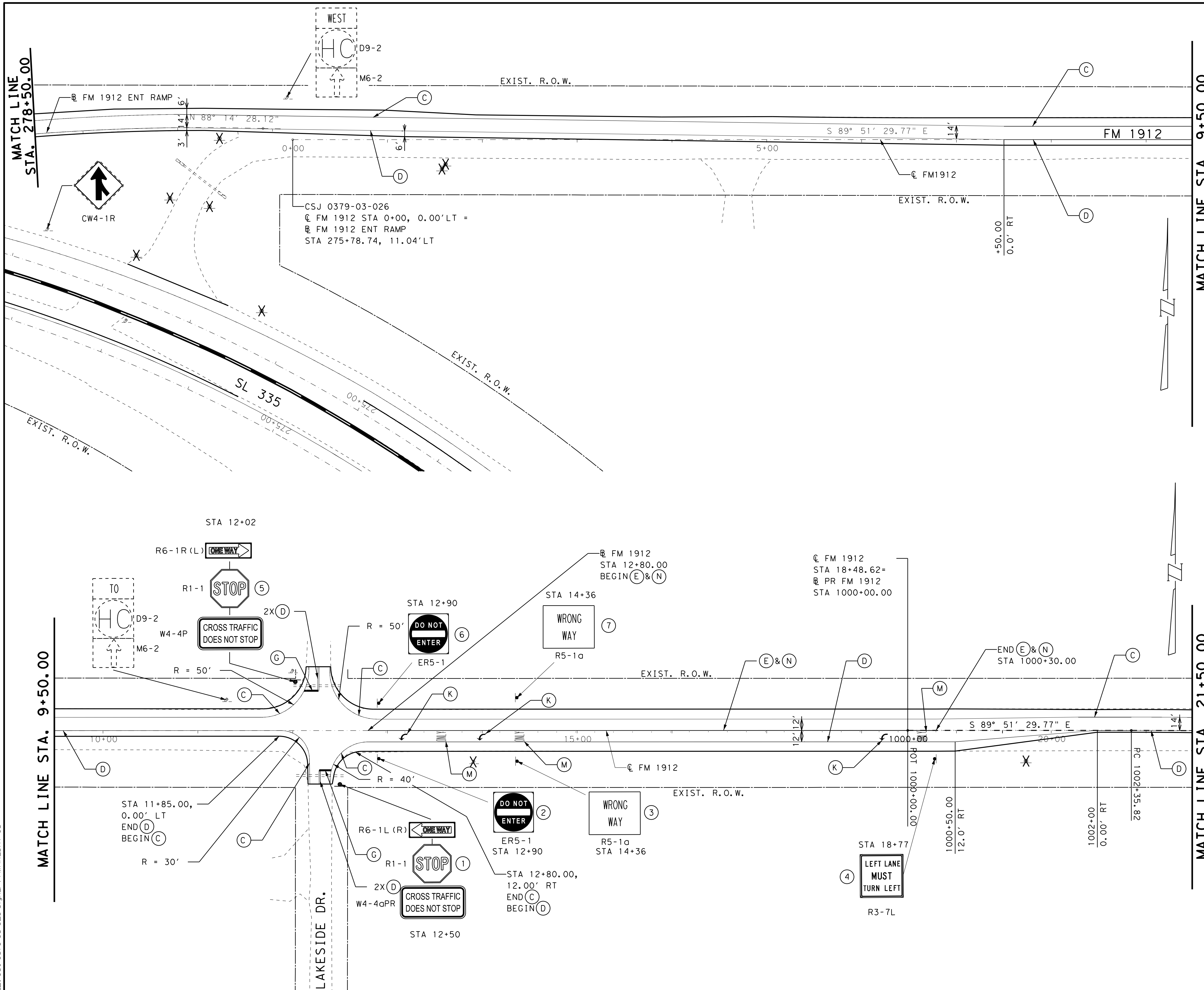

LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
FM 1912
SIGNING AND PAVEMENT MARKING PLAN
STA 0+00 TO STA 21+50

SHEET 1 OF 3

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		121
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:38:47 PM
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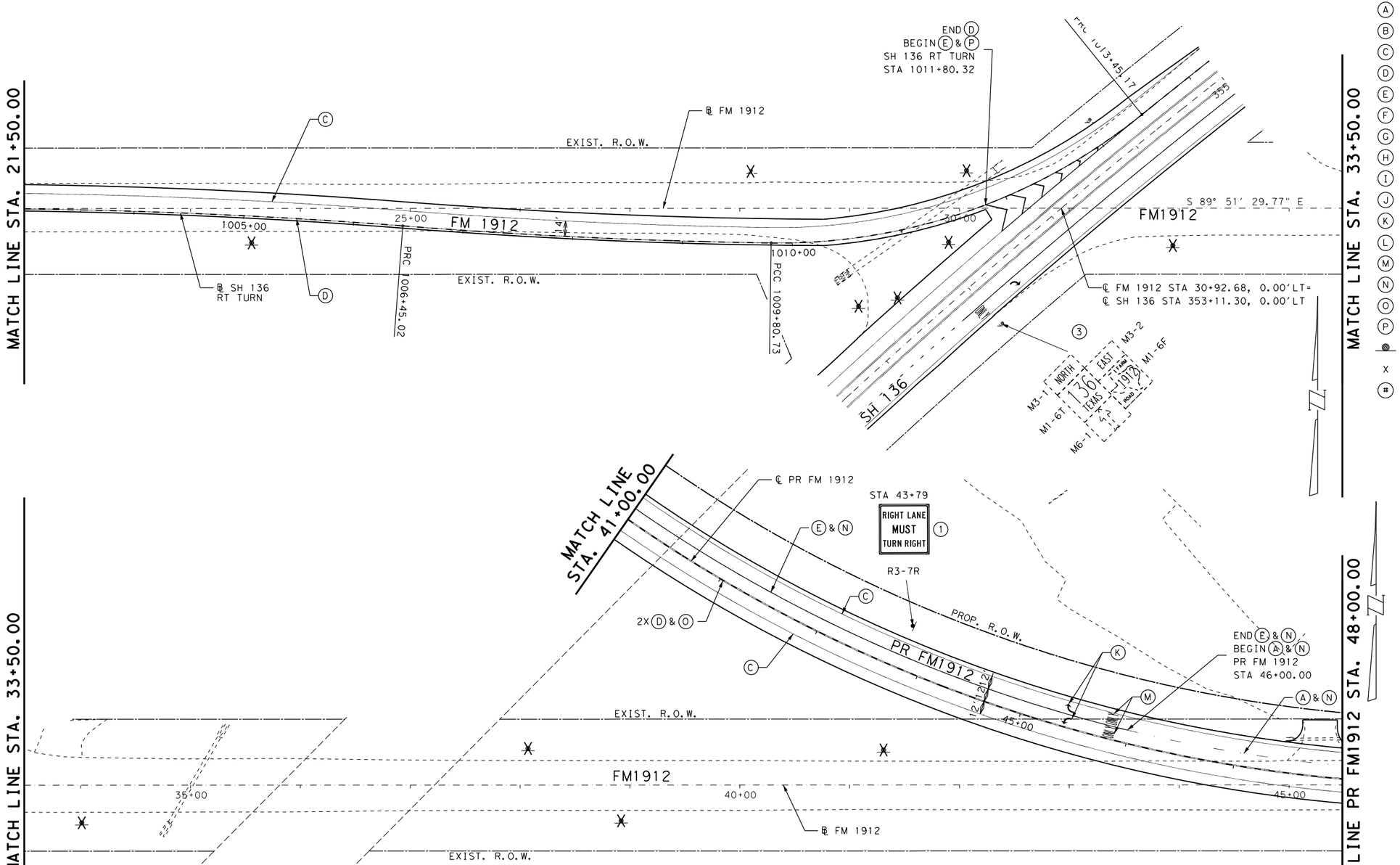

LEGEND:

- Ⓐ RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- Ⓑ RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- Ⓒ RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- Ⓓ RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- Ⓔ REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- Ⓕ REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- Ⓖ REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- Ⓗ REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- Ⓘ REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- Ⓙ REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- Ⓚ REFL PAV MRK TY I (W)(ARROW) (090MIL)
- Ⓛ REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- Ⓜ REFL PAV MRK TY I (W)(WORD) (090MIL)
- Ⓝ REFL PAV MRKR TY I-C
- Ⓞ REFL PAV MRKR TY II-A-A
- Ⓟ REFL PAV MRKR TY II-C-R
- ◎ EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
FM 1912
SIGNING AND PAVEMENT MARKING PLAN
STA 21+50 TO STA 48+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		122
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 10:38:54 PM
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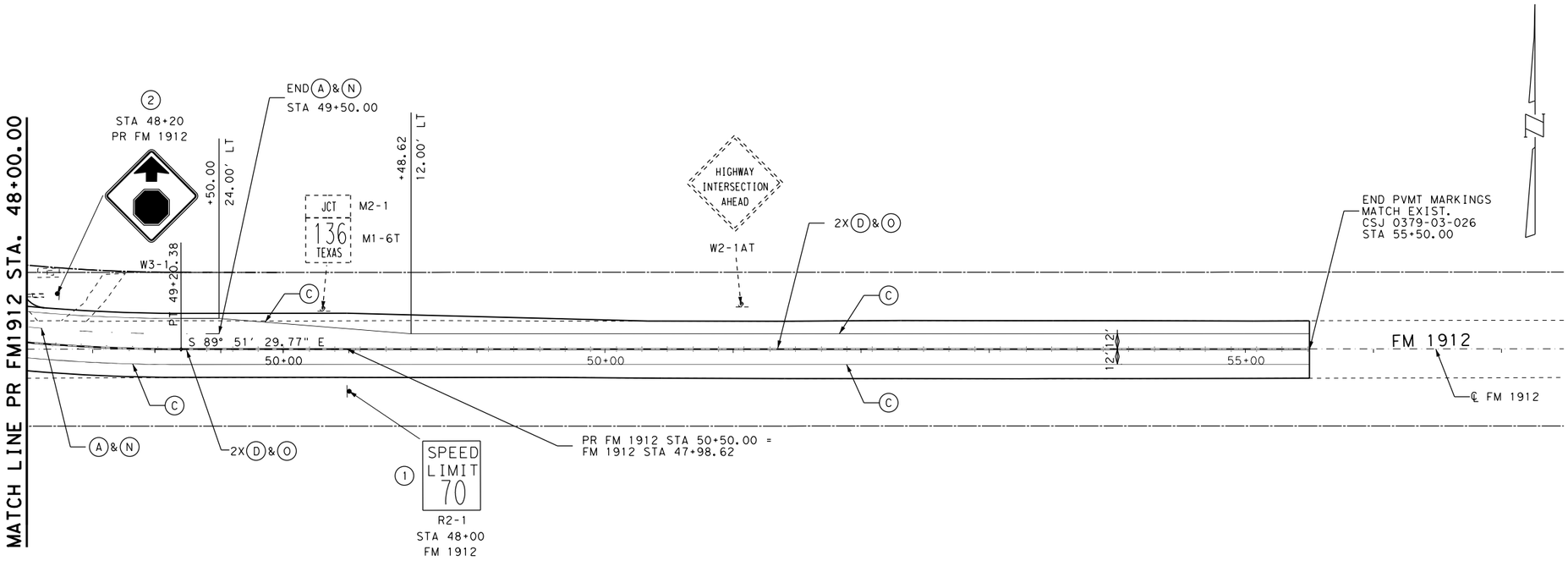

LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
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PROFESSIONAL ENGINEER

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SH 136
FM 1912
SIGNING AND PAVEMENT MARKINGS PLAN
STA 48+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		123
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7//2020 10:39:02 PM
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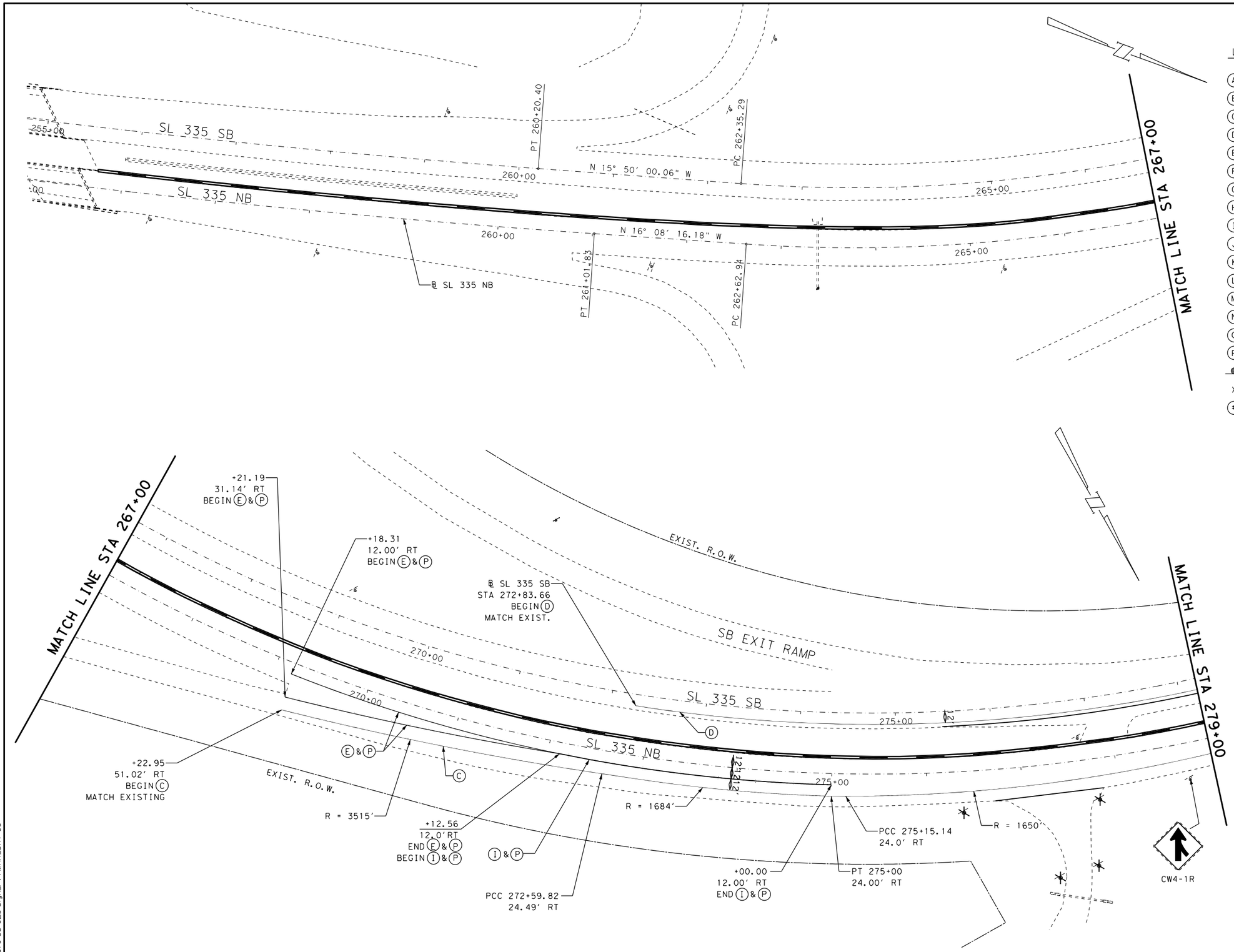

LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- ◎ EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

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T.B.P.E. Firm Registration #12

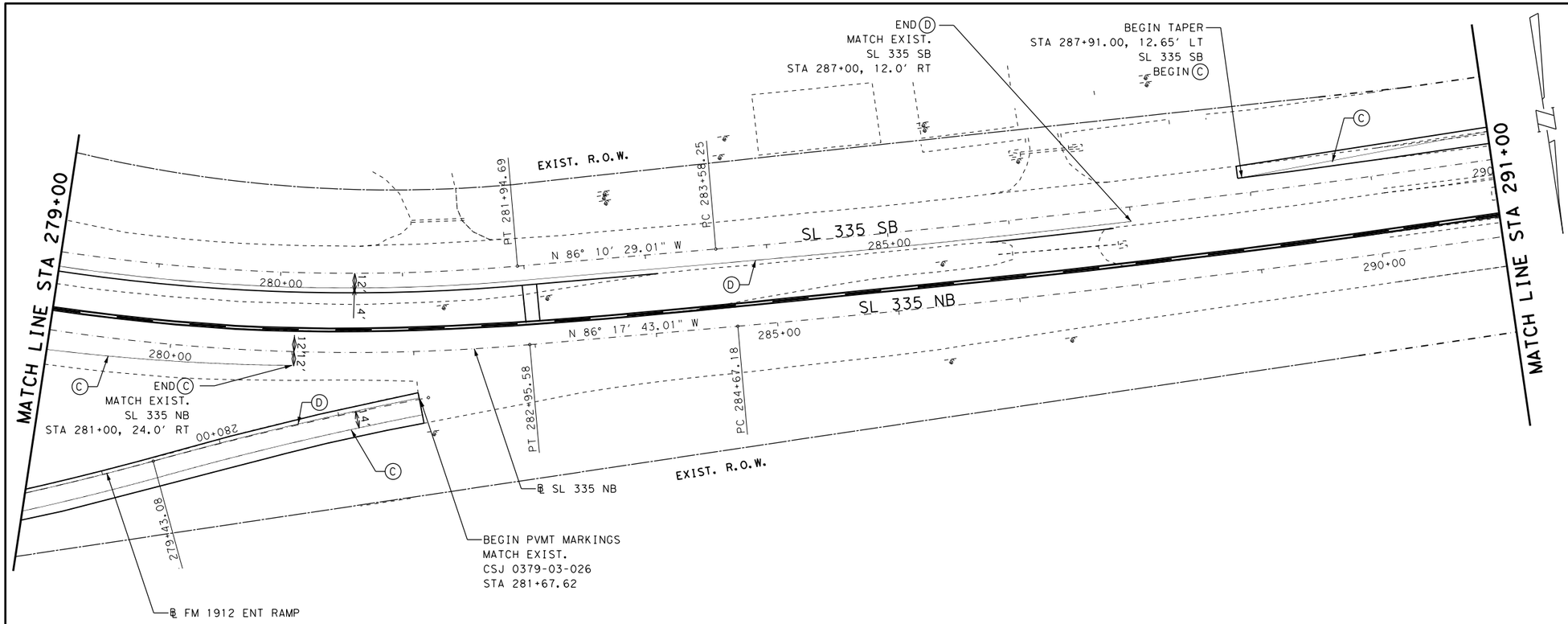
SH 136
SL 335
SIGNING AND PAVEMENT MARKING PLAN
BEGIN TO STA 279+00

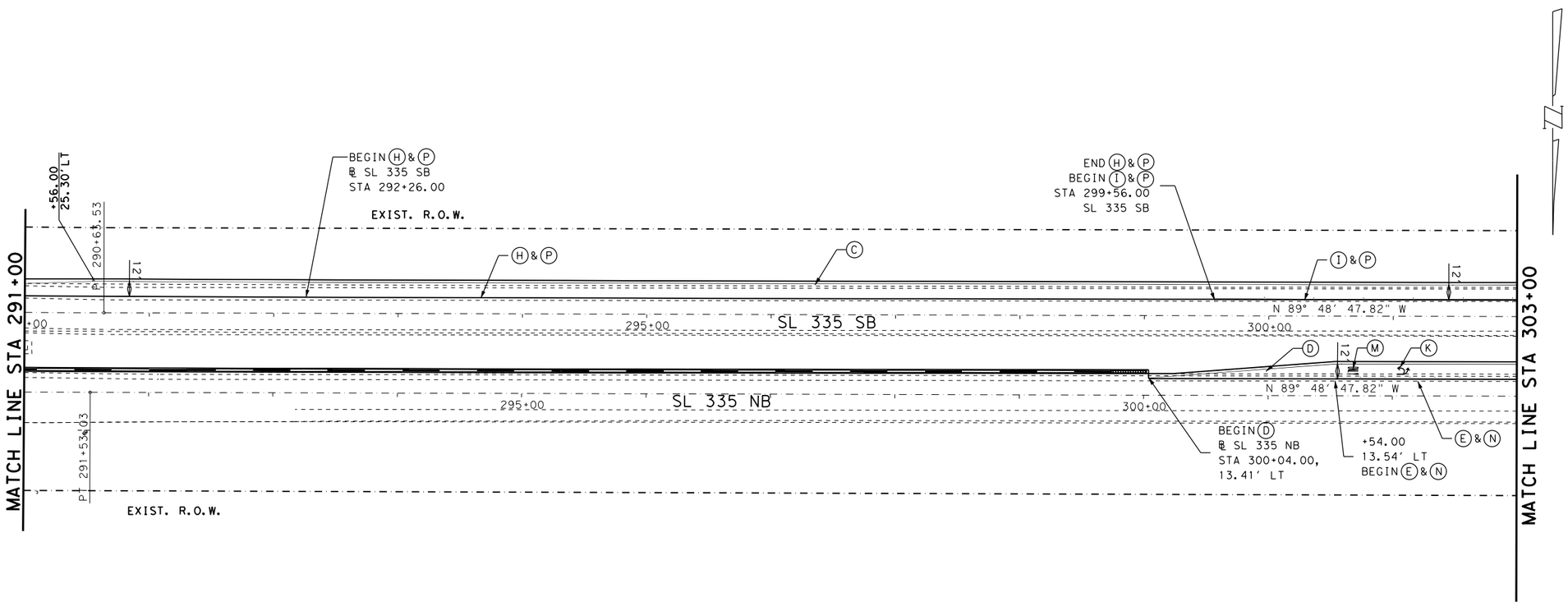
SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	124

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:39:10 PM
FILE: CSJ-0379-03-026-Sign_PVTMRK_SHT-08





LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
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- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
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- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

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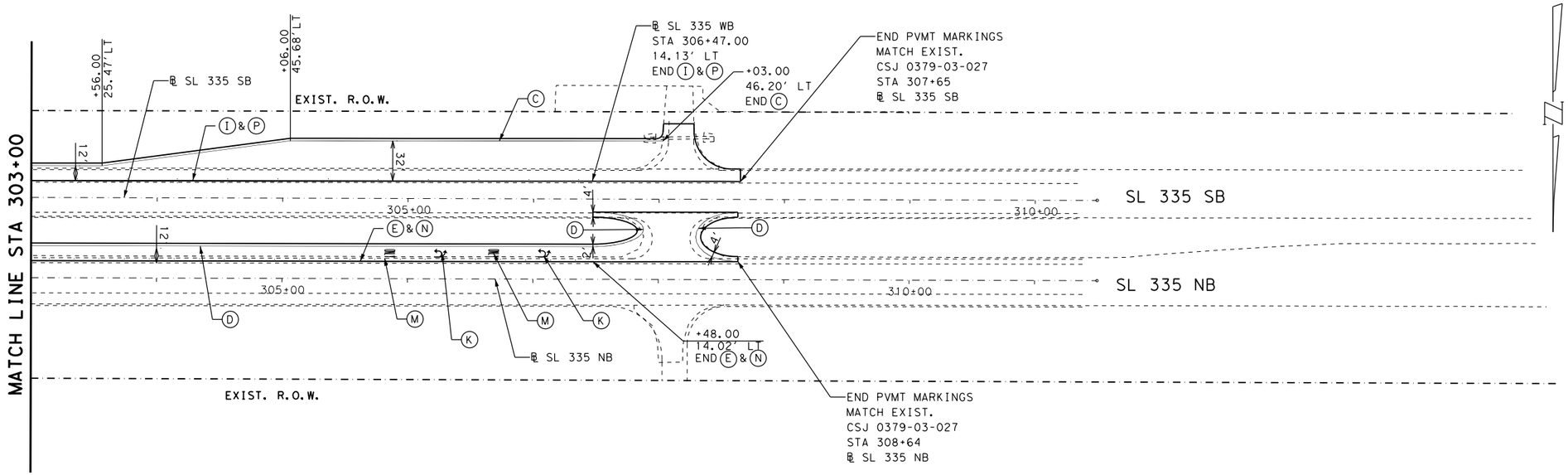
T.B.P.E. Firm Registration #12

SH 136
SL 335
SIGNING AND PAVEMENT MARKING PLAN
STA 279+00 TO 303+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		125
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:39:18 PM
FILE: CSJ-0379-03-026-Sign_PVTMRK_SHT-09



LEGEND:

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)
- (B) RE PM W/RET REQ TY I (Y)4"(BRK)(090MIL)
- (C) RE PM W/RET REQ TY I (W)4"(SLD)(090MIL)
- (D) RE PM W/RET REQ TY I (Y)4"(SLD)(090MIL)
- (E) REFL PAV MRK TY I (W)(8")(SLD)(090MIL)
- (F) REFL PAV MRK TY I (W)(8")(DOT)(090MIL)
- (G) REFL PAV MRK TY I (W)(24")(SLD)(090MIL)
- (H) REFL PAV MRK TY I (W)12"(LNDP)(090MIL)
- (I) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (J) REFL PAV MRK TY I (W)(DBL ARROW) (90MIL)
- (K) REFL PAV MRK TY I (W)(ARROW) (090MIL)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW) (090MIL)
- (M) REFL PAV MRK TY I (W)(WORD) (090MIL)
- (N) REFL PAV MRKR TY I-C
- (O) REFL PAV MRKR TY II-A-A
- (P) REFL PAV MRKR TY II-C-R
- EXISTING SIGN TO REMAIN
- X EXISTING SIGN TO BE REMOVED
- (#) PROPOSED SIGN

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

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wood.
Wood Environment & Infrastructure Solutions, Inc.
4801 Spring Valley Road, Suite 125
Dallas, Texas 75244 (469) 828-4100
T.B.P.E. Firm Registration #12

SH 136
SL 335
SIGNING AND PAVEMENT MARKING PLAN
STA 303+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	126

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7/1/2020 10:39:26 PM
FILE: CSJ-0379-03-026-Sign_PVTMRK_SHT-10

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) TY = TYPE
							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"		TY N TY S
2	1	R2-1	SPEED LIMIT 55	30 X 36	X		10BWG	1	SA	P		
2	2	R2-1	SPEED LIMIT 55	30 X 36	X		10BWG	1	SA	P		
2	3	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		10BWG	1	SA	T		
		M3-2	EAST (AUX SIGN)	24 X 12	X							
3	1	M1-6F	(FM SHIELD) FARM ROAD (1912)	24 X 24	X		10BWG	1	SA	P		
		M6-1R	(ARROW - HORIZ. STRGHT) (AUX SIGN)	21 X 15	X							
3	2	R1-2	YIELD	48 X 48 X 48	X		S80	1	SA	T		
		M1-6T	(SH SHIELD) STATE HIGHWAY (136)	24 X 24	X							
3	3	M6-4	(DBL ARROW - HORIZ. STRGHT) (AUX SIGN)	21 X 15	X		10BWG	1	SA	P		
		R1-1	STOP	36 X 36	X							
3	4	W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 X 12	X		10BWG	1	SA	T		
		M3-4	WEST (AUX SIGN)	24 X 12	X							
3	5	M1-6F	(FM SHIELD) FARM ROAD (1912)	24 X 24	X		10BWG	1	SA	P		
		M6-2R	(ARROW - UPWARD RIGHT) (AUX SIGN)	21 X 15	X							
3	6	W1-7	TWO DIRECTION LARGE ARROW	48 X 24	X		10BWG	1	SA	T		
		M3-2	EAST (AUX SIGN)	24 X 12	X							
3	7	M1-6F	(FM SHIELD) FARM ROAD (1912)	24 X 24	X		10BWG	1	SA	P		
		M6-1L	(ARROW - HORIZ. STRGHT) (AUX SIGN)	21 X 15	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.100"
7.5 or Greater	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

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0379	03	026, ETC	SH 136
4-16		DIST	COUNTY		SHEET NO.
8-16		AMA	POTTER		127

18

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
3	8	R2-1	SPEED LIMIT	30 X 36	X		10BWG	1	SA	P		
3	9	W9-2L	LANE ENDS (MERGE LEFT)	36 X 36	X		10BWG	1	SA	T		
		M3-1	NORTH (AUX SIGN)	21 X 15	X							
3	10						10BWG	1	SA	P		
		M1-6T	(SH SHIELD) STATE HIGHWAY (136)	24 X 24	X							
		R6-1L(R)	ONE WAY (ARROW LT AND RT, BACK TO BACK)	54 X 18	X							
5	1	R1-1	STOP	36 X 36	X		S80	1	SA	P	BM	
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 X 12	X							
5	2	R5-1	DO NOT ENTER	36 X 36	X		10BWG	1	SA	T		
5	3	R5-1A	WRONG WAY	42 X 30	X		10BWG	1	SA	T		
5	4	R3-7L	RIGHT LANE MUST TURN (LEFT)	36 X 36	X		10BWG	1	SA	T		
		R6-1R(L)	ONE WAY (ARROW RT AND LT, BACK TO BACK)	54 X 18	X							
5	5	R1-1	STOP	36 X 36	X		S80	1	SA	P	BM	
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 X 12	X							
5	6	R5-1	DO NOT ENTER	36 X 36	X		10BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.100"
7.5 or Greater	0.125"

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

http://www.txdot.gov/

NOTE:

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

DATE: DATE TIME
FILE: DOCUMENT NAME

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC	SH 136
4-16	DIST	COUNTY		SHEET NO.
8-16	AMA	POTTER		128

18

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
5	7	R5-1A	WRONG WAY	42 X 30	X		10BWG	1	SA	T		
6	1	R3-7R	RIGHT LANE MUST TURN (RIGHT)	36 X 36	X		10BWG	1	SA	T		
7	1	R2-1	SPEED LIMIT	30 X 36	X		10BWG	1	SA	P		
7	2	W3-1	STOP AHEAD	36 X 36	X		10BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.100"
7.5 or Greater	0.125"

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

http://www.txdot.gov/

NOTE:

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

DATE: DATE TIME
FILE: DOCUMENT NAME

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

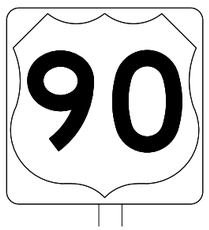
SOSS

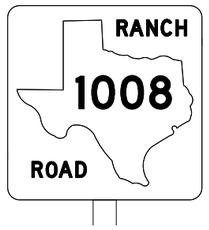
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC	SH 136
4-16 8-16	DIST	COUNTY		SHEET NO.
	AMA	POTTER		129

18

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

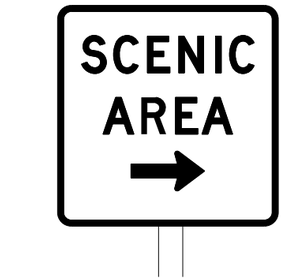


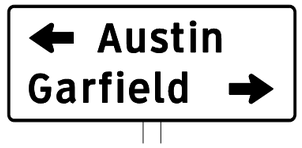


TYPICAL EXAMPLES

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~~ 0.100
~~7.5 to 15~~	~~0.100~~
~~7.5 or Greater Greater than 15~~	0.125

1

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

http://www.txdot.gov/

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

07/01/2020

SH136 TYPICAL SIGN REQUIREMENTS

TSR(3)-13 (MOD)

1 REVISED MINIMUM SIGN BLANK THICKNESS

Texas Department of Transportation

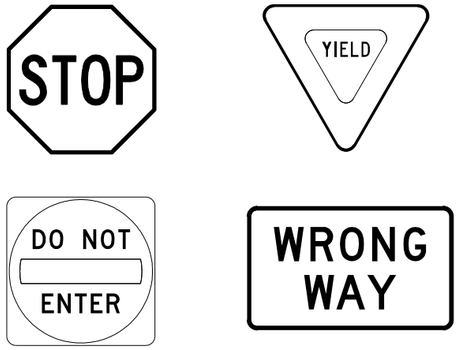
SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
		0379	03	026, ETC.	SH 136
DRWN	CK	DIST	COUNTY		SHEET NO.
		AMA	POTTER		130

DATE: 7/1/2020 10:40:28 PM
FILE: TSR (3)-13 (MOD).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

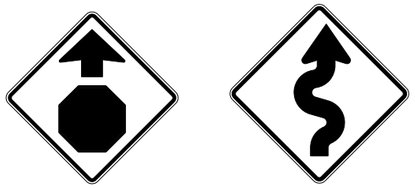
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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~~ 0.100
~~7.5 to 15~~	~~0.100~~
7.5 or Greater ~~Greater than 15~~	0.125

1

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/

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

Gary Daniel Janecek

SH 136 TYPICAL SIGN REQUIREMENTS

TSR(4)-13 (MOD)

2020 Texas Department of Transportation

SHEET 1 OF 1

DSN	CK	CONT	SECT	JOB	HIGHWAY
		0379	03	026, ETC.	SH 136
DRWN	CK	DIST	COUNTY		SHEET NO.
		AMA	POTTER		131

1 REVISED MINIMUM SIGN BLANK THICKNESS

DATE: 7/1/2020 10:40:36 PM
FILE: TSR (4)-13 (MOD).dgn

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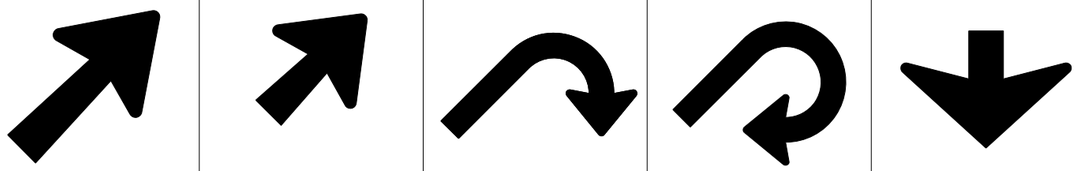
DATE:
FILE:

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

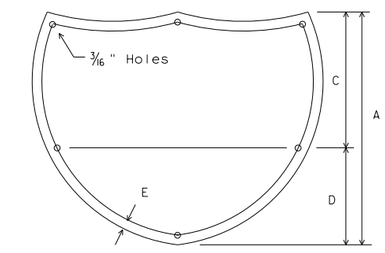
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

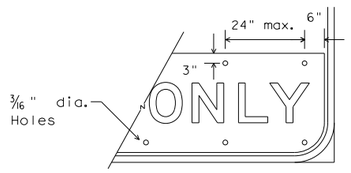
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

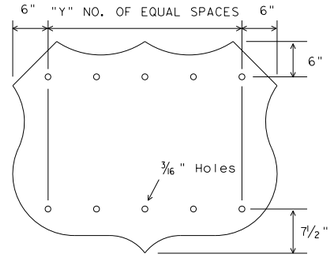


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

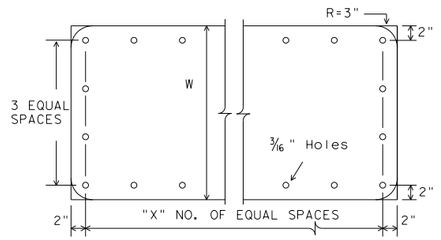


EXIT ONLY PANEL



U.S. ROUTE MARKERS

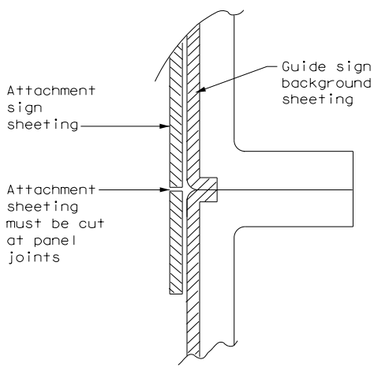
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



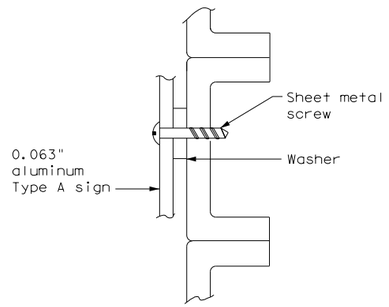
STATE ROUTE MARKERS

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

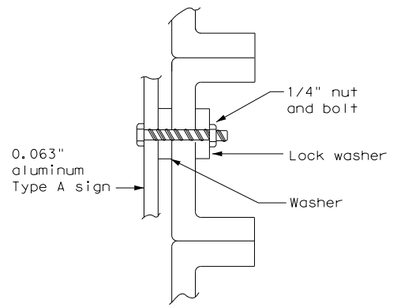
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

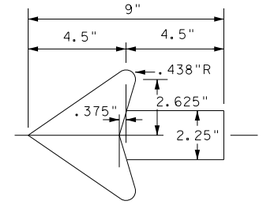
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

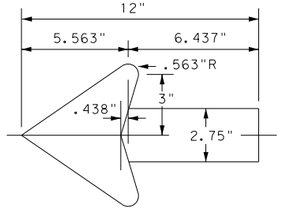
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

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

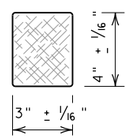
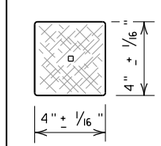
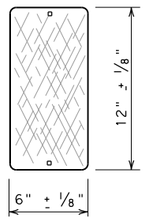
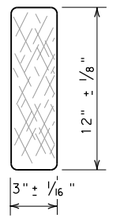
TYPICAL SIGN REQUIREMENTS

TSR(5)-13

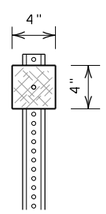
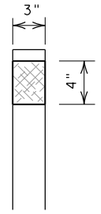
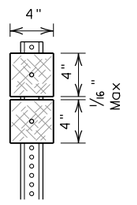
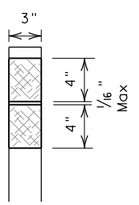
FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AMA	POTTER		132

5

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

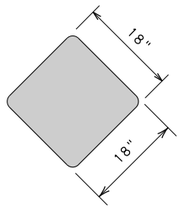
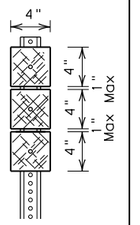
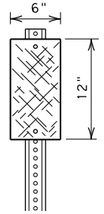
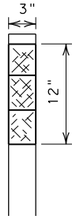
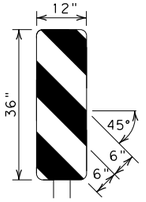
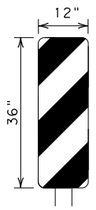
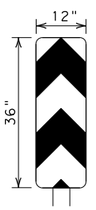
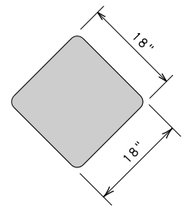
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker 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

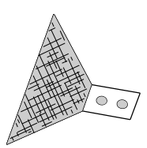
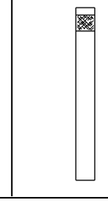
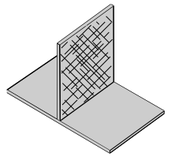
DIRECTION
- If Required
- BI = Bi-Directional

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

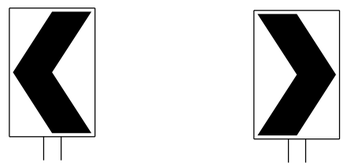
DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

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



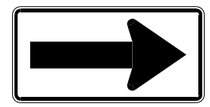
W1-8

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	0379	03	026, ETC.	SH 136
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	POTTER		133

DATE:
FILE:

20A

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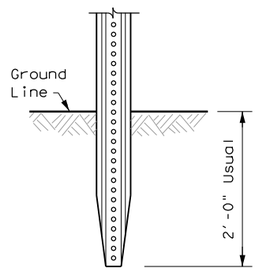
DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

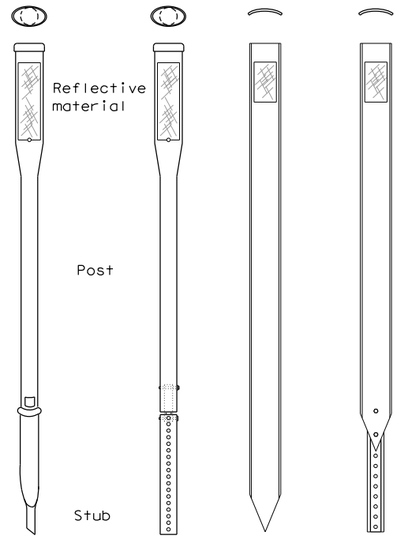


NOTES

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.

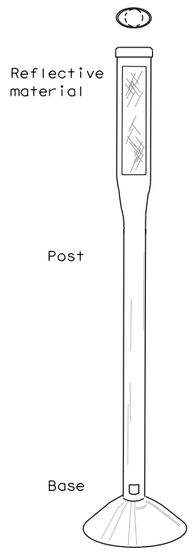
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



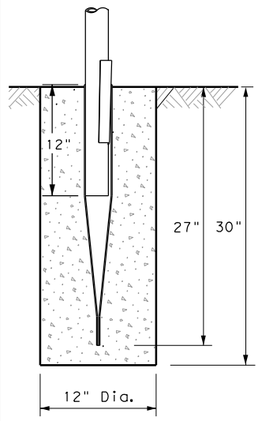
SURFACE MOUNT

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.

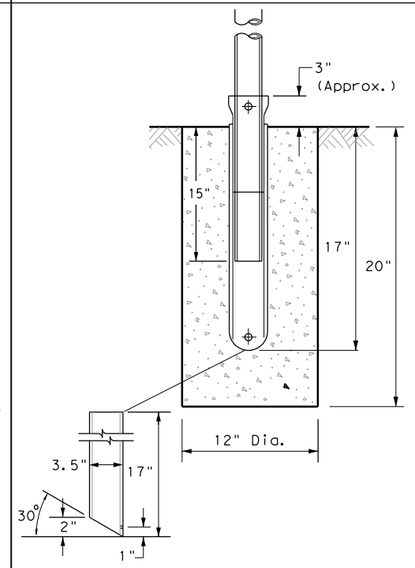
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

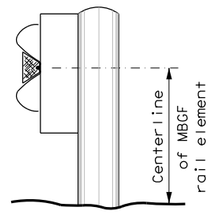
NOTE

1. Install per manufacturer's recommendations.

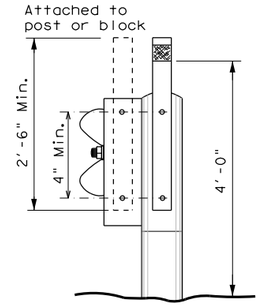
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

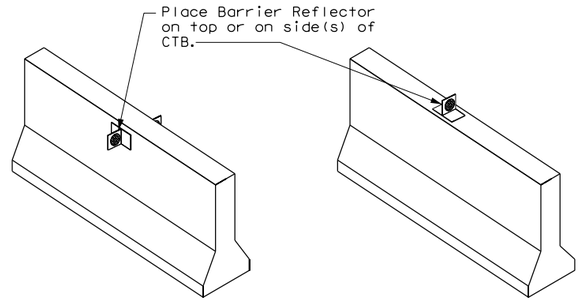
GF1



GF2



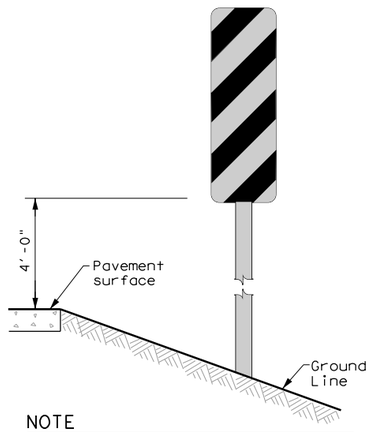
CONCRETE TRAFFIC BARRIER (CTB)



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.

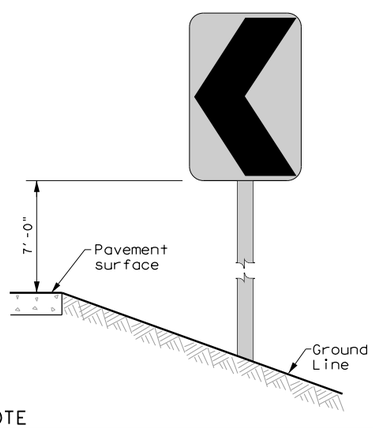
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

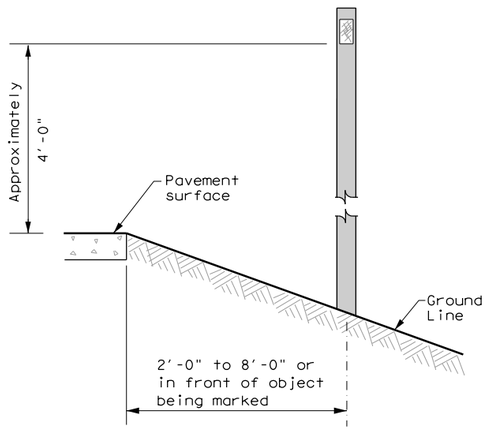
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	0379	03	026, ETC.	SH 136
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AMA	POTTER		134

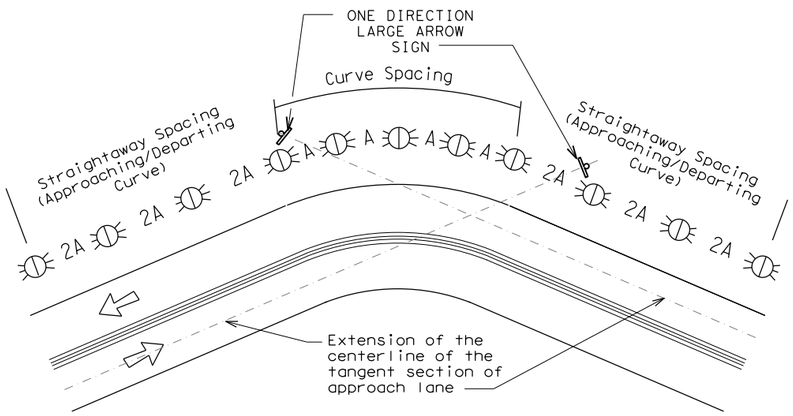
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

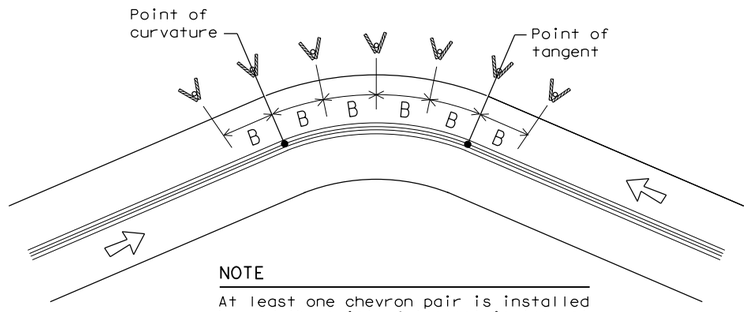
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

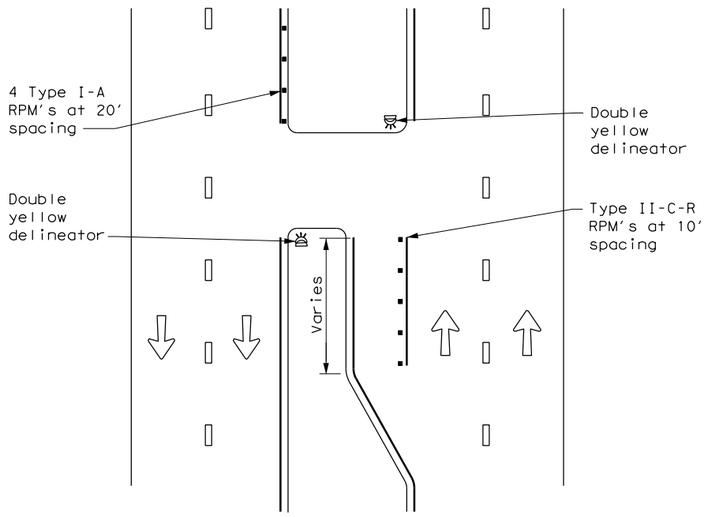
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	AMA	POTTER		135

20C

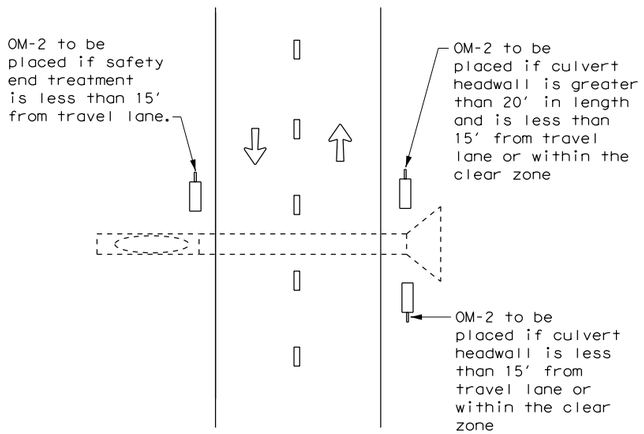
DATE:
FILE:

CROSSOVERS



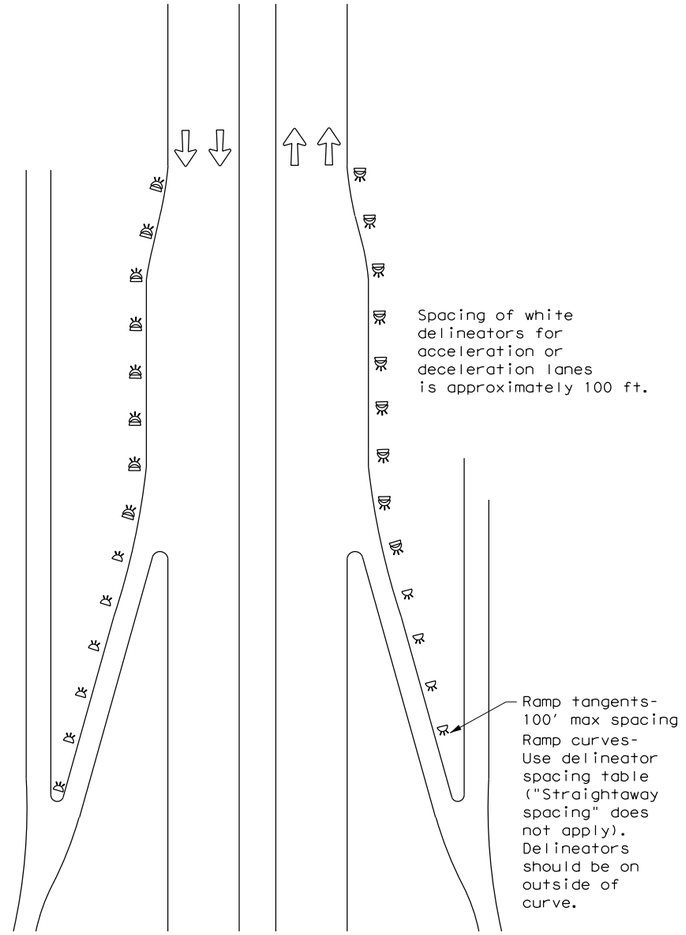
DETAIL 1

FOR CULVERTS WITHOUT MBGF



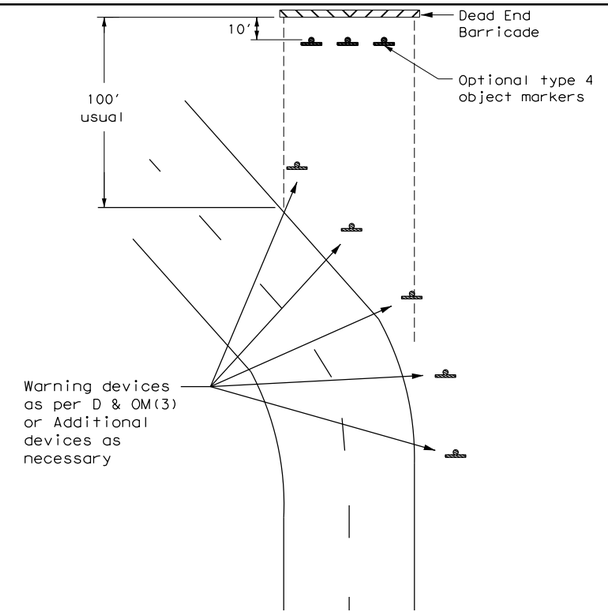
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



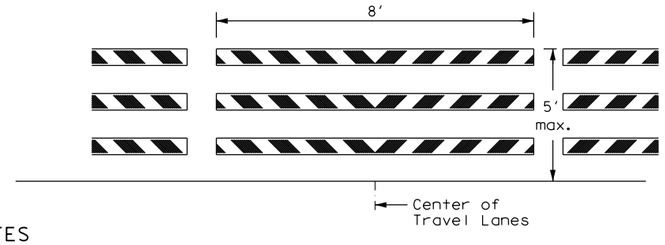
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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3-15 7-20	DIST	COUNTY		SHEET NO.
	AMA	POTTER		136

20D

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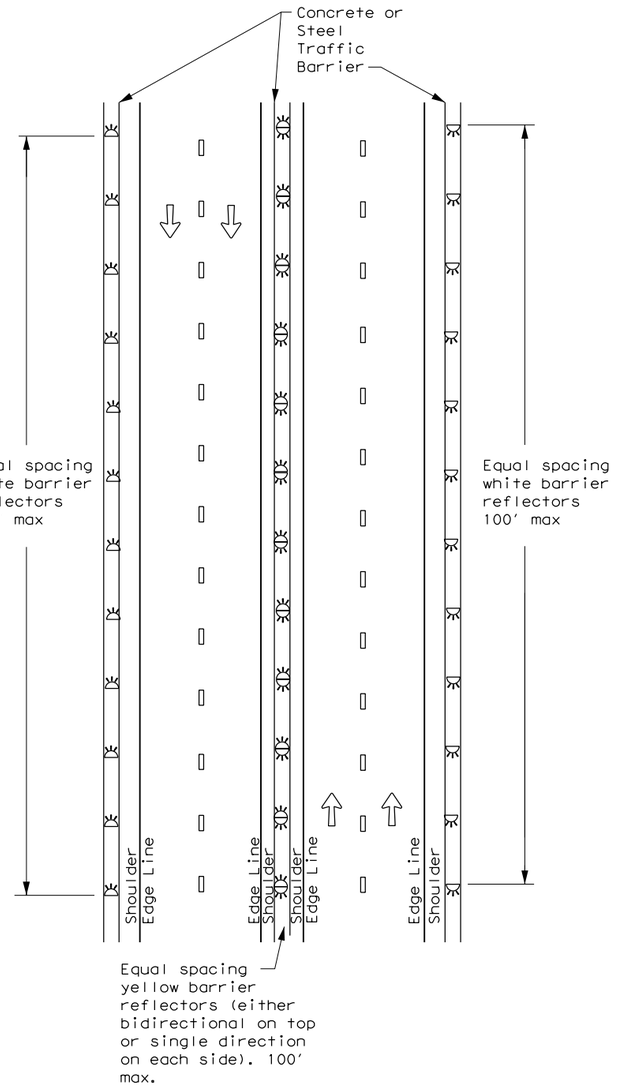
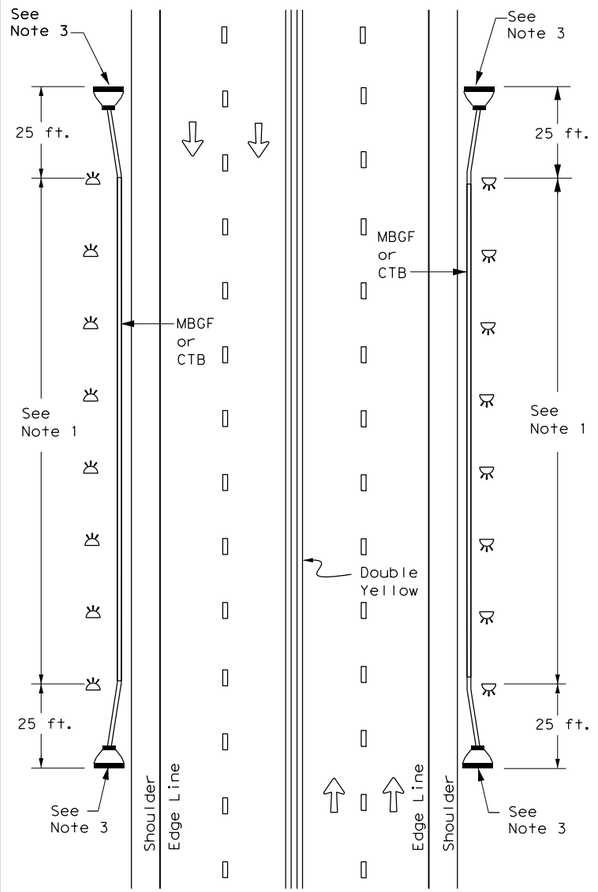
DATE:
FILE:

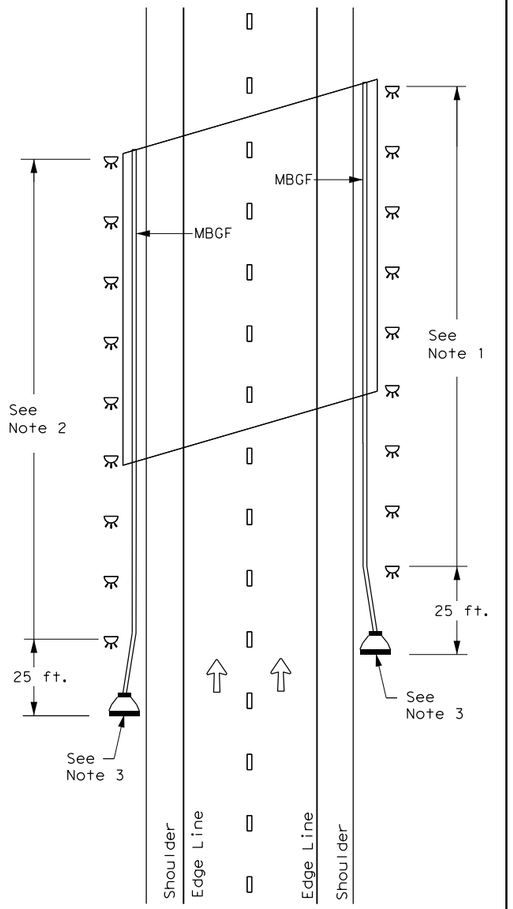
CONTINUOUS CONCRETE OR STEEL BARRIER



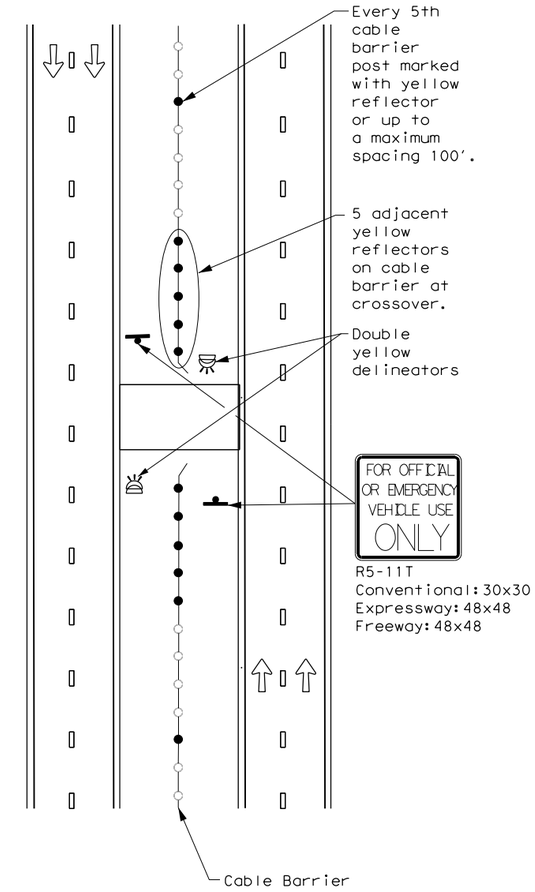
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100′ max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100′ max.)
2. Equal spacing (100′ max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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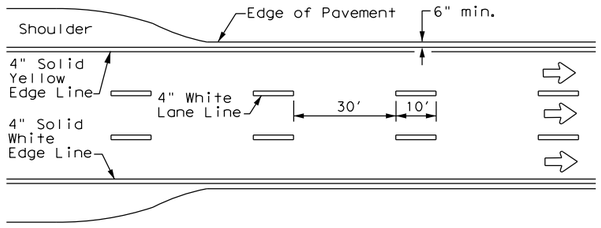
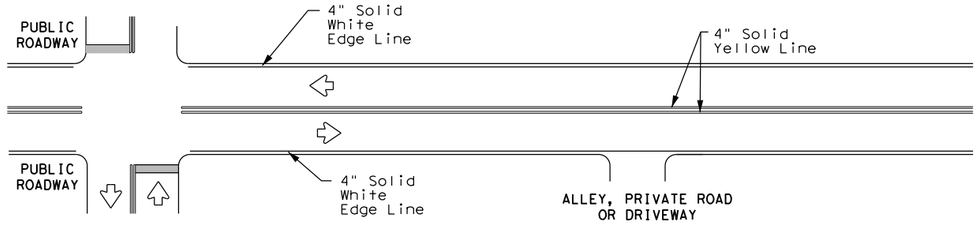
7-20	DIST	COUNTY		SHEET NO.
	AMA	POTTER		137

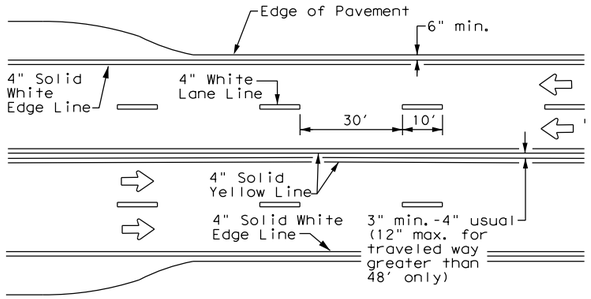
20F



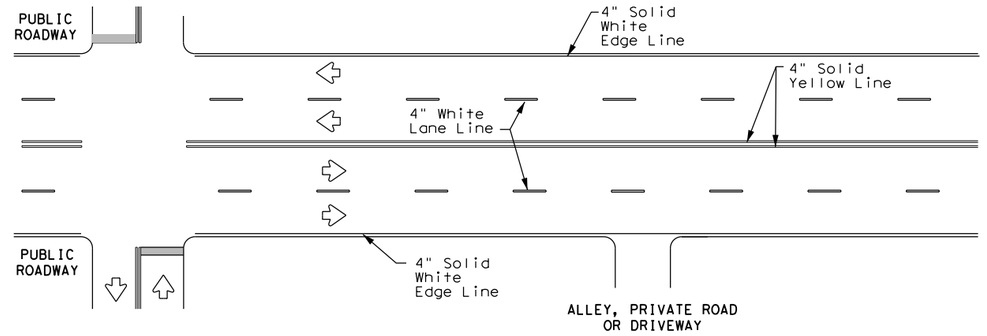
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



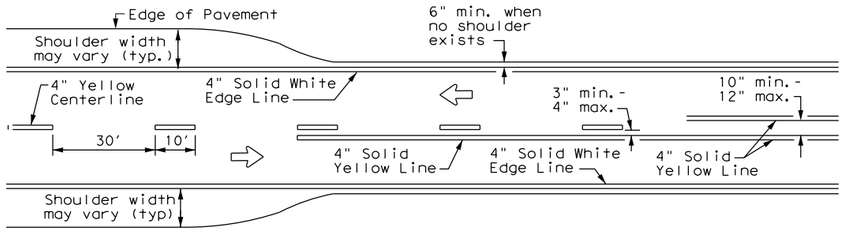
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



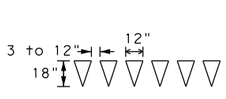
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



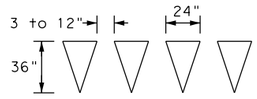
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

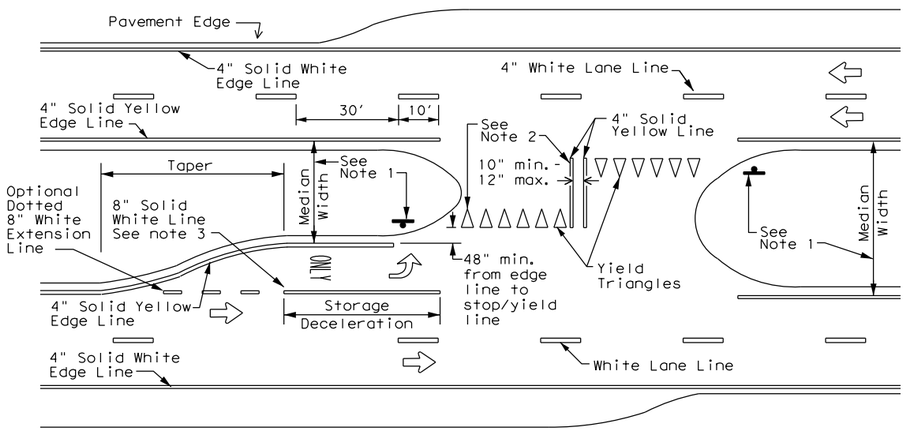


For posted speed on road being marked equal to or less than 40 MPH.



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.

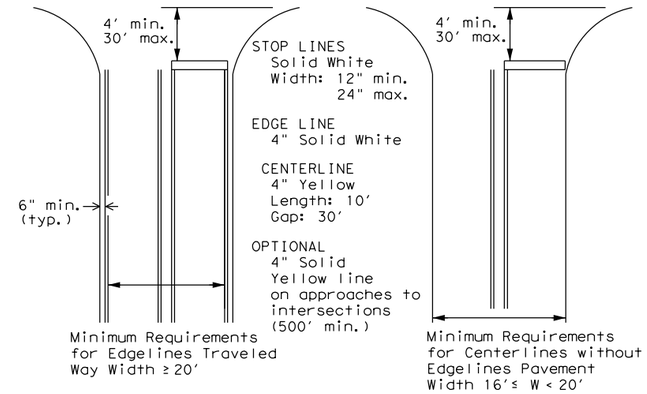
GENERAL NOTES

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:
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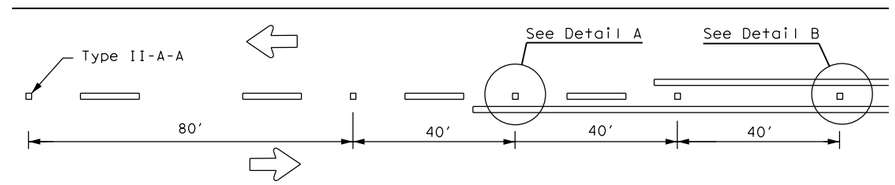
REVISIONS 8-95 3-03	0379	03	026, ETC.	SH 136
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	AMA	POTTER		138

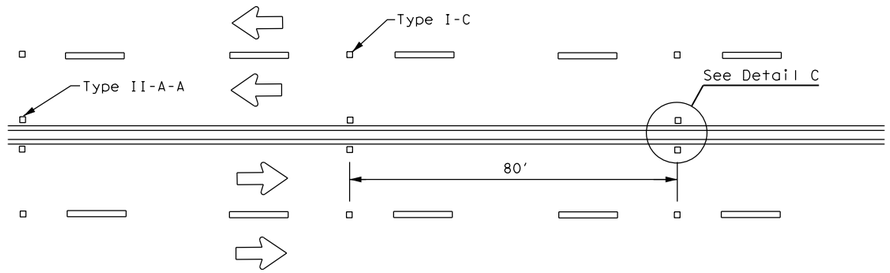
22A

DATE:
FILE:

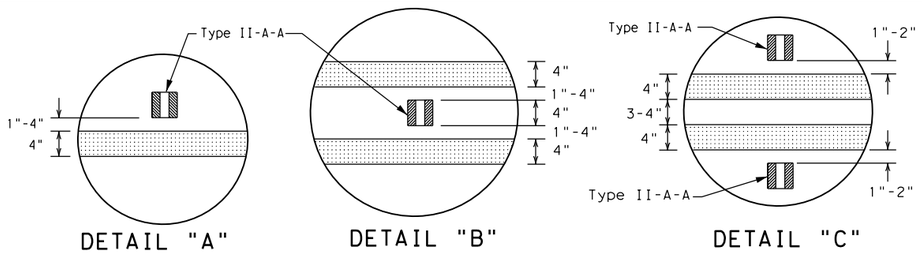
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



CENTERLINE FOR ALL TWO LANE ROADWAYS



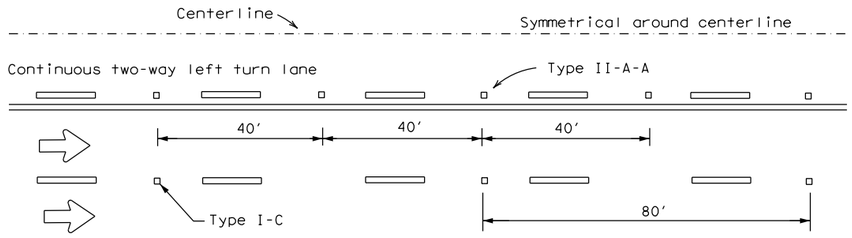
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



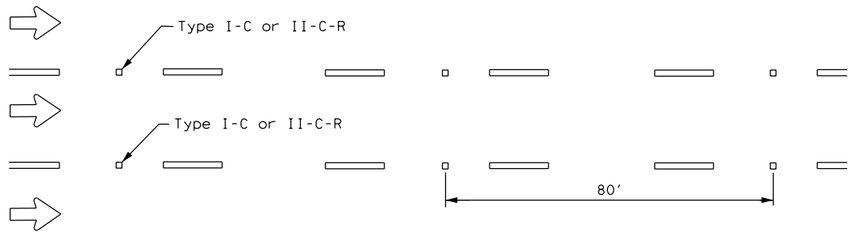
DETAIL "A"

DETAIL "B"

DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

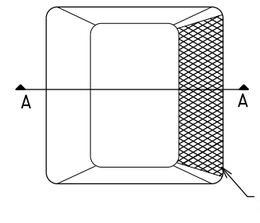


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

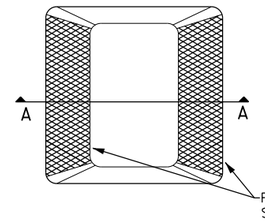
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

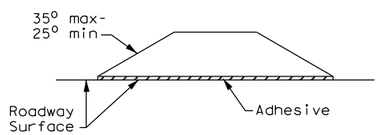
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

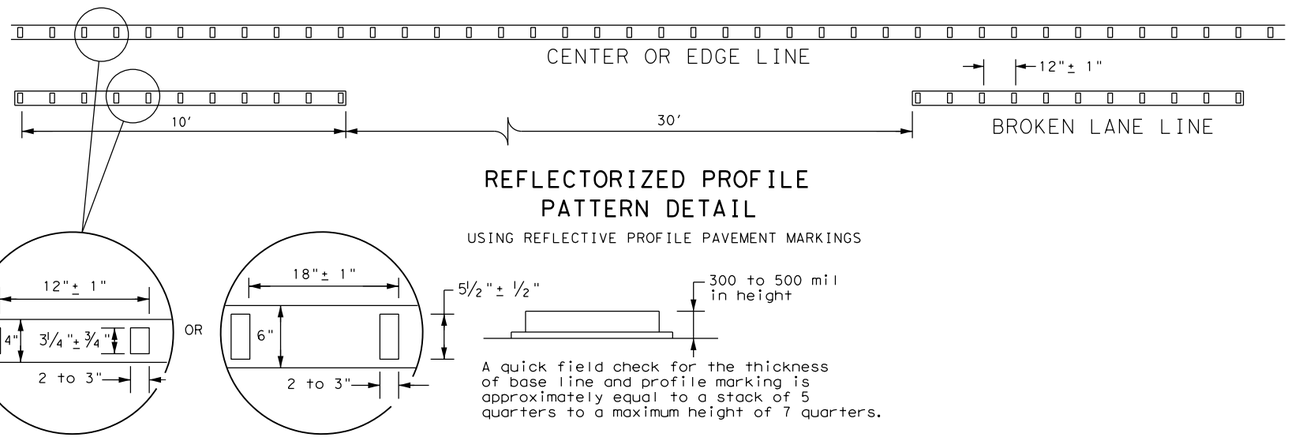


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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:
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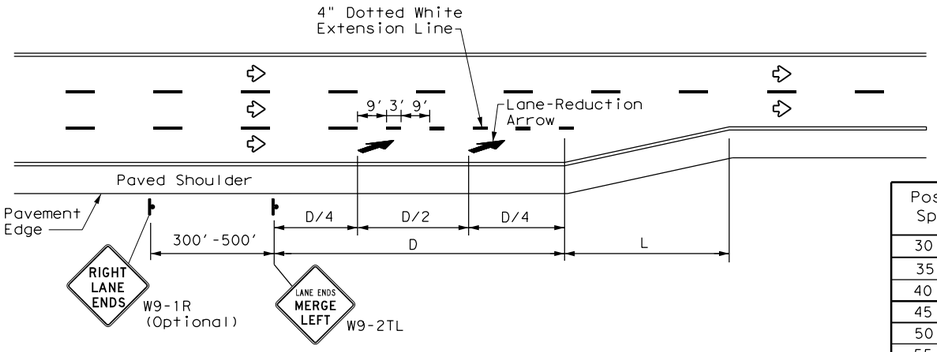
REVISIONS 4-92 2-10	0379	03	026, ETC.	SH 136
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	AMA	POTTER		139

22B

DATE:
FILE:

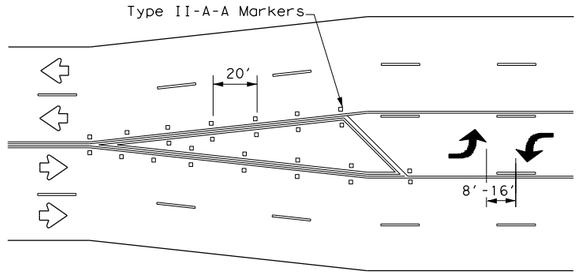


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

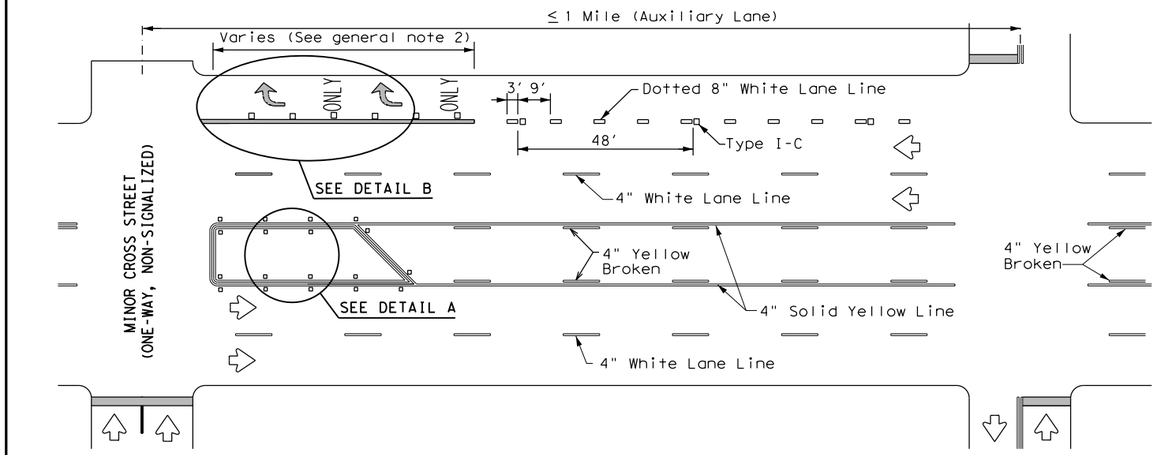
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

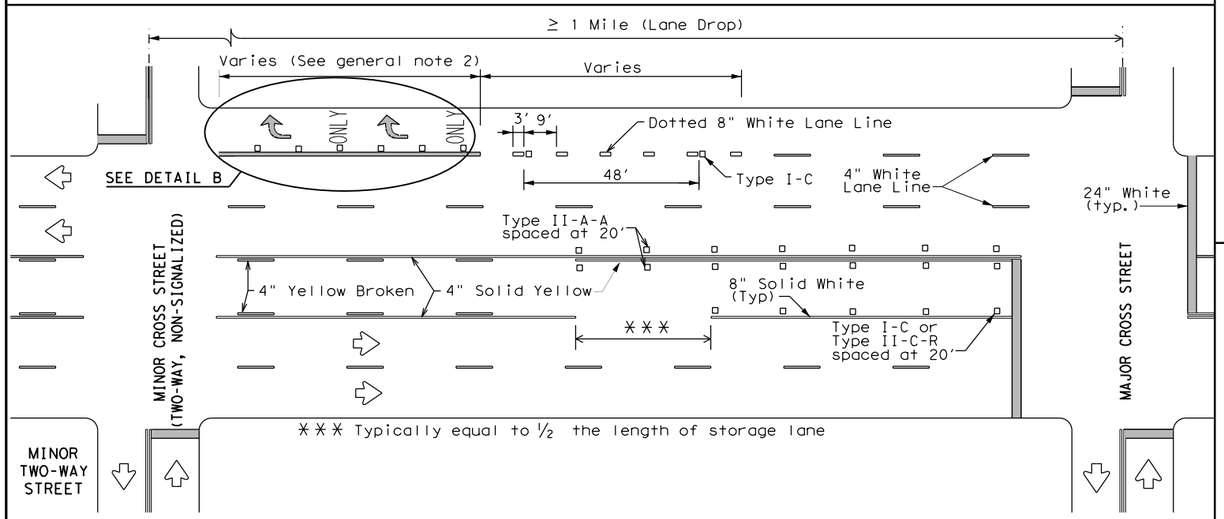
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

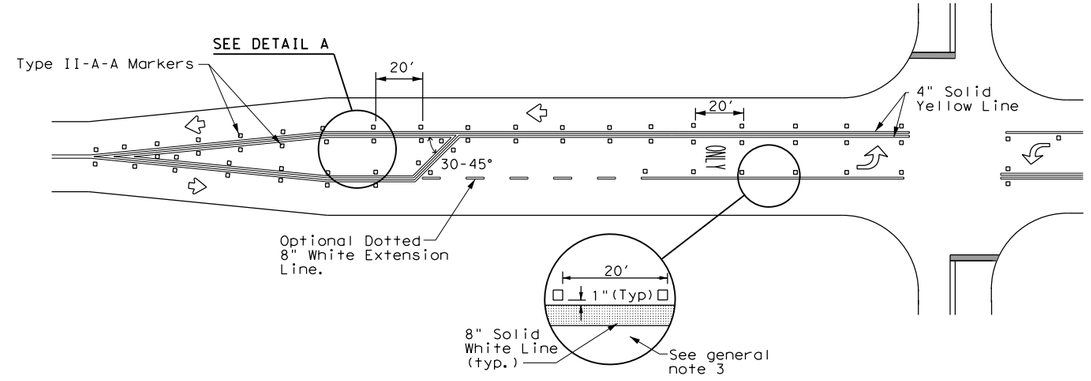
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



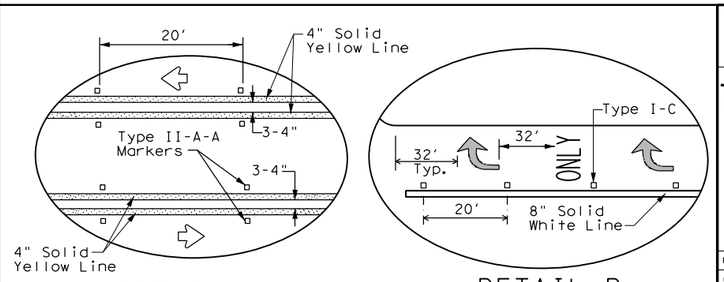
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A DETAIL B

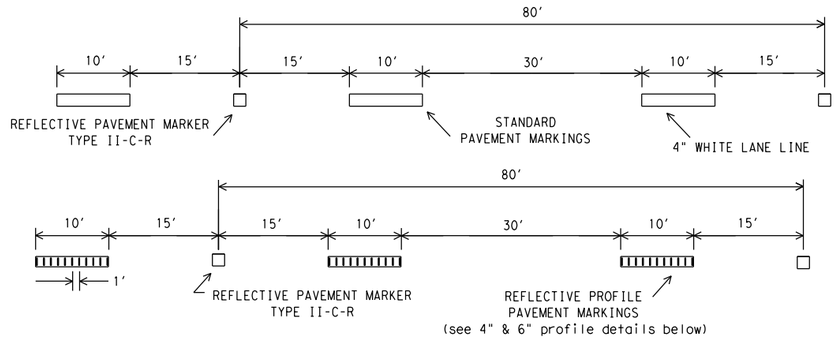
Texas Department of Transportation — Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-00 2-10 8-00 2-12 3-03 6-20	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		140

22C

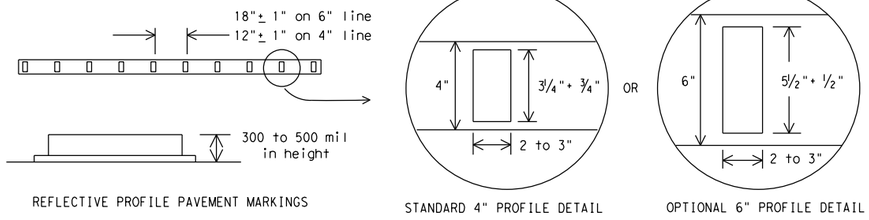
DATE:
FILE:



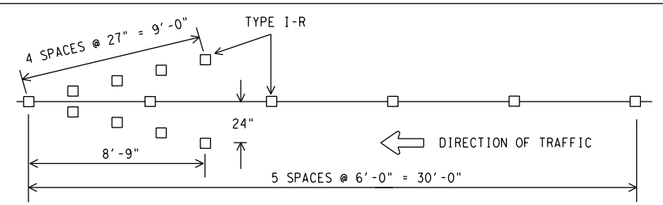
PAVEMENT MARKERS (REFL) TYPE II-C-R SHALL BE SPACED ON 80' CENTERS WITH THE CLEAR FACE TOWARD NORMAL TRAFFIC AND THE RED FACE TOWARD WRONG WAY TRAFFIC.

TRAFFIC LANE LINES PAVEMENT MARKING DETAILS

EDGELINES SHOULD TYPICALLY BE 4" WIDE AND THE MATERIALS SHALL BE AS SPECIFIED IN THE PLANS.
IF RAISED PROFILE PAVEMENT MARKINGS ARE USED SEE DETAILS BELOW.



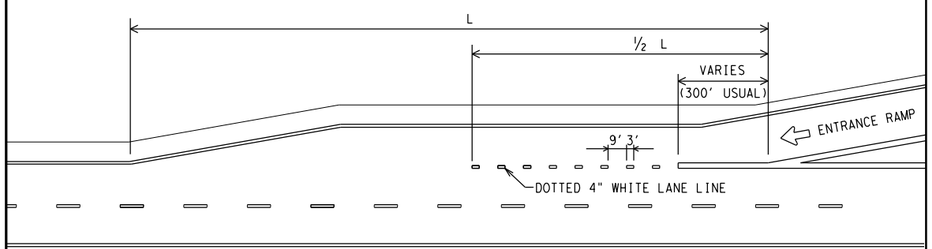
EDGELINE PAVEMENT MARKINGS



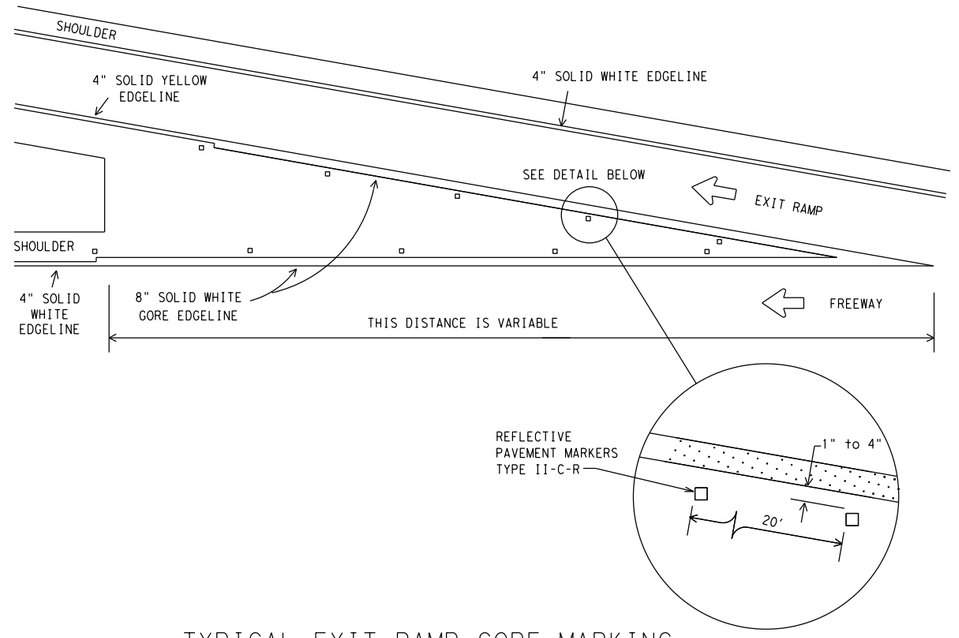
ALL RAISED MARKERS IN THE WRONG WAY ARROW SHALL BE TYPE I-R REFLECTORIZED PAVEMENT MARKERS WITH THE REFLECTORIZED SURFACE FACING THE WRONG WAY TRAFFIC. TYPE II-C-R SHALL NOT BE USED.

REFLECTORIZED WRONG WAY ARROWS, NOT TO EXCEED TWO, MAY BE PLACED ON EXIT RAMPS.
LOCATION OF THE ARROWS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

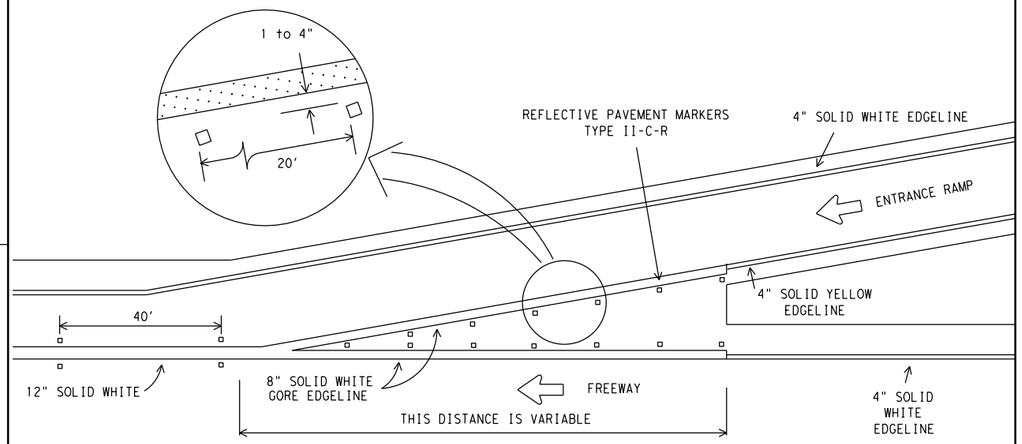
WRONG WAY ARROW DETAIL



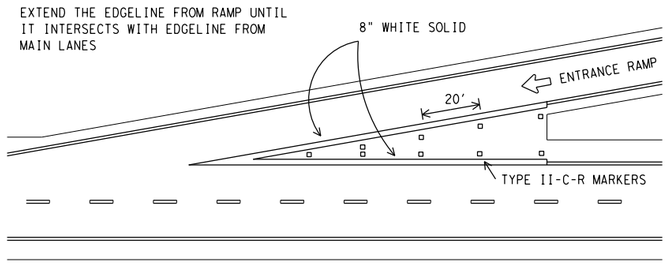
PARALLEL ACCELERATION LANE



TYPICAL EXIT RAMP GORE MARKING



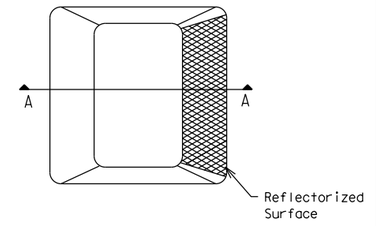
TYPICAL ENTRANCE RAMP GORE MARKING



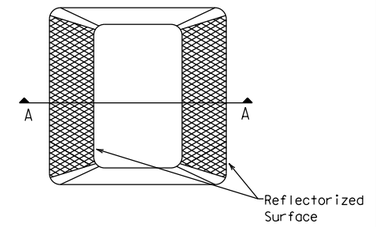
TAPERED ACCELERATION LANE

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

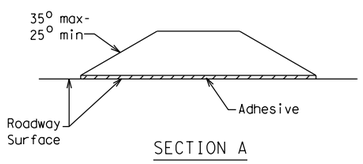
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

FPM(1)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
4-92 2-10
5-00 2-12
8-00
2-08

CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		141

23A

DATE:
FILE:

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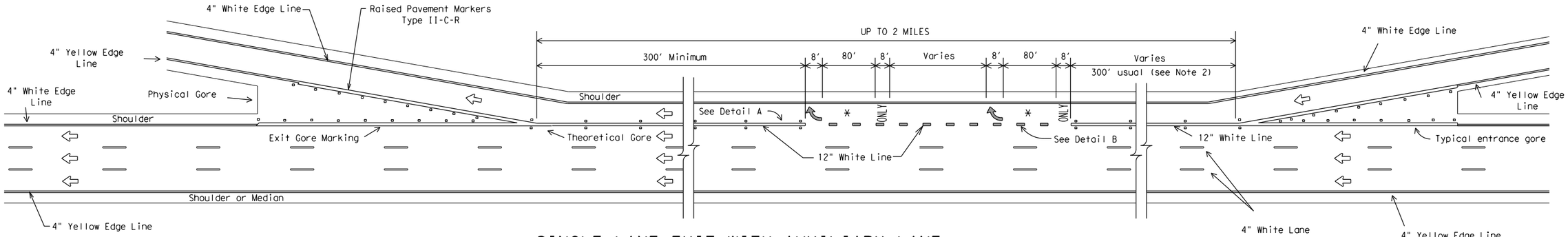
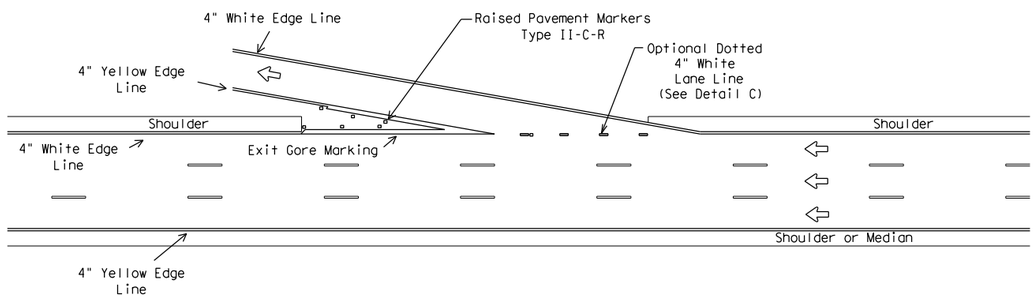
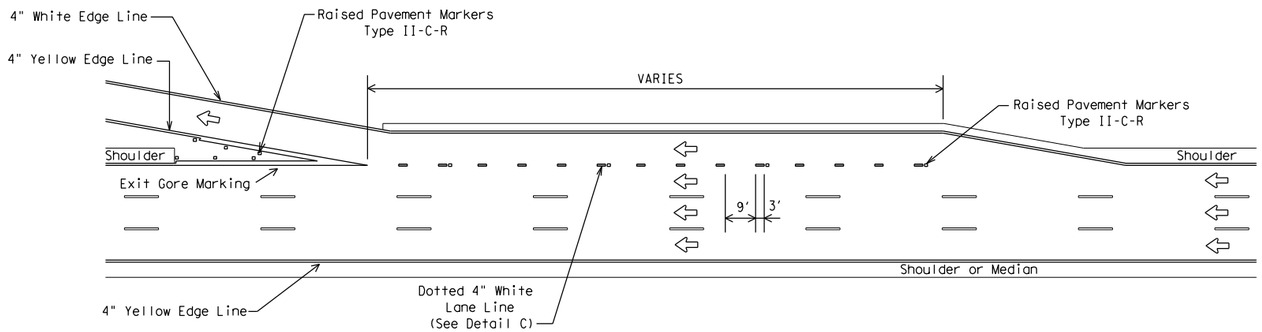


SINGLE LANE EXIT WITH AUXILIARY LANE

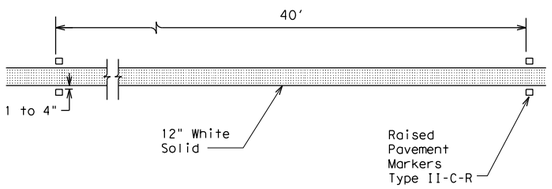
(See Note 2)



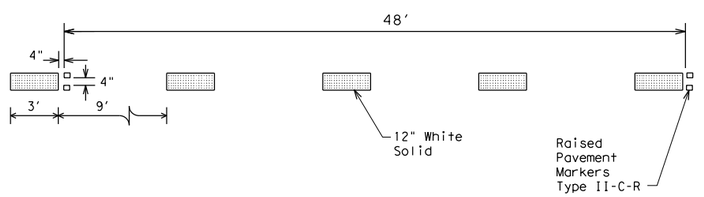
TAPERED DECELERATION LANE



PARALLEL DECELERATION LANE

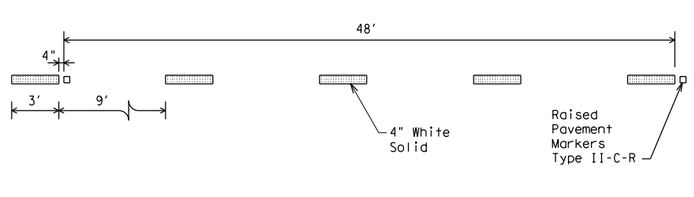


DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)



DETAIL C

Normal (4") Dotted Lane Line (See Note 4)

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.
4. Normal (4") Dotted Lane Line (See Detail C) is used at parallel acceleration and deceleration lanes.

LEGEND	
⇦	Denotes direction of traffic.
↱	Pavement marking arrows (white)
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

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

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

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMPS

FPM(2)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
4-92 2-10
8-95 2-12
5-00
8-00

CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		142

DATE:
FILE:

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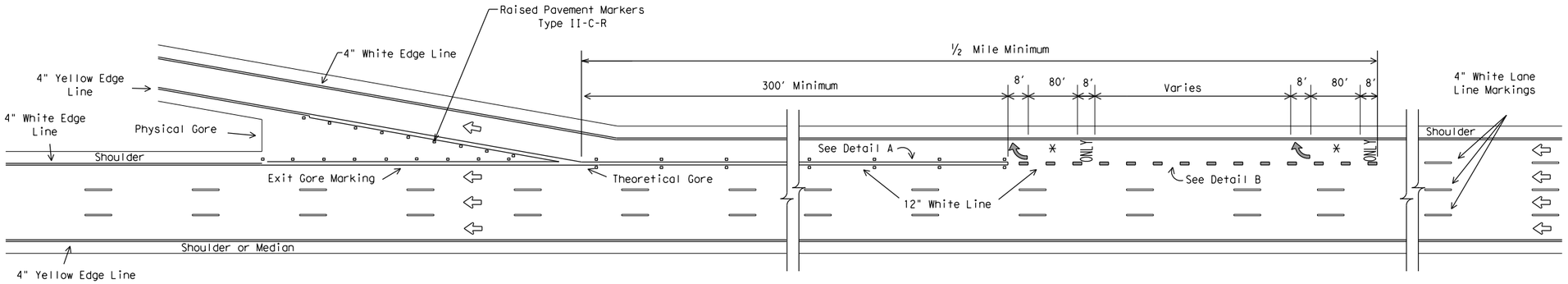
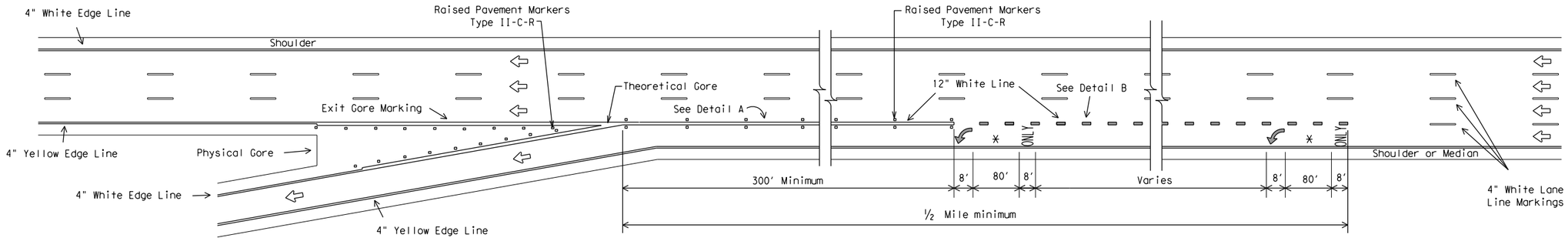


SINGLE LANE EXIT - LANE DROP OR EXIT ONLY

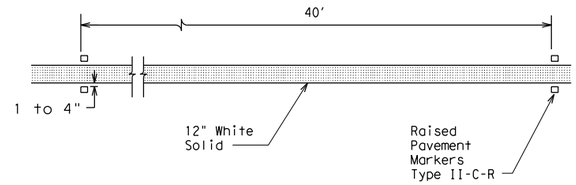


SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFTHAND)

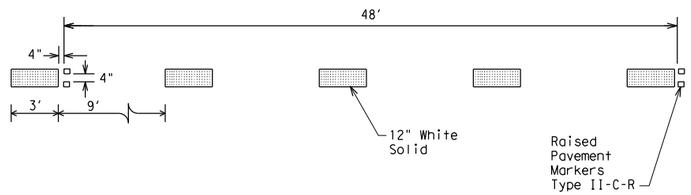
LEGEND	
⇦	Denotes direction of traffic.
↱	Pavement marking arrows (white)
✳	Arrow markings are optional, however "ONLY" is required if arrow is used

GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") Dotted Lane Line (See Detail B) is used to separate a through lane from a lane drop at normal exit ramp and from an auxiliary lane between an entrance and exit ramp.



DETAIL A



DETAIL B

Wide (12") Dotted Lane Line (See Note 3)

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

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

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS LANE DROP (EXIT ONLY) EXIT RAMPS

FPM(3)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
5-00
8-00
2-10
2-12

CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		143

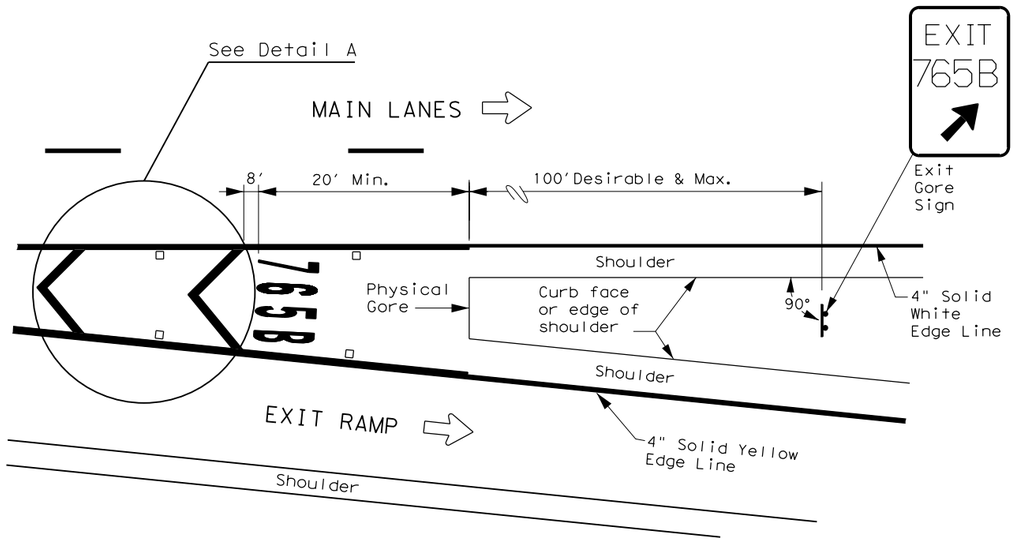
23C

DATE:
FILE:

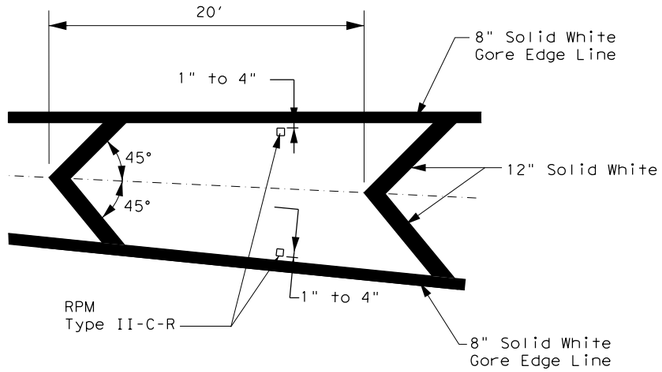
DATE:
FILE:

EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. All pavement marking materials shall meet the required Departmental Material Specifications or as specified in these plans.
5. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Chapter 12 at http://www.txdot.gov



MARKINGS WITH EXIT NUMBER



NOTES

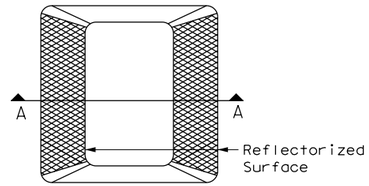
1. Raised pavement markers shall be centered between chevron or gore lines.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

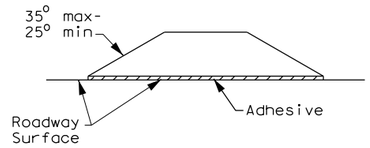
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

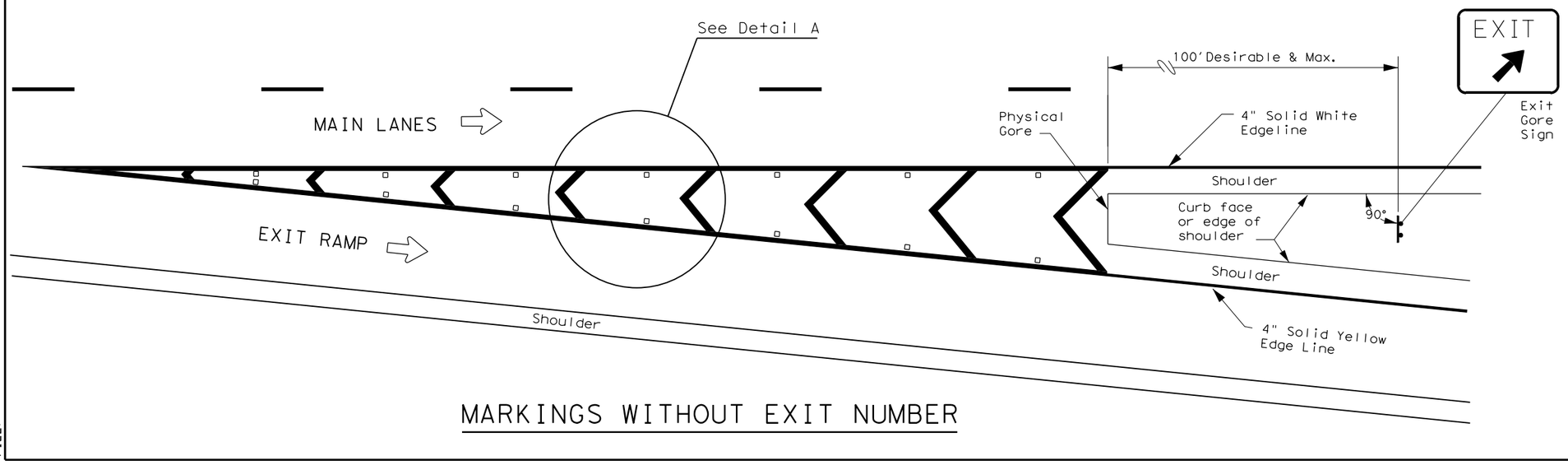
LEGEND	
⇦	Traffic flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R



Type II (Top View)



SECTION A



MARKINGS WITHOUT EXIT NUMBER

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation

Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

FPM(5)-19

FILE: fpm(5)-19.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		144

23F

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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)

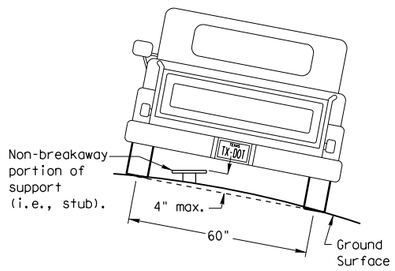
Anchor Type

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))

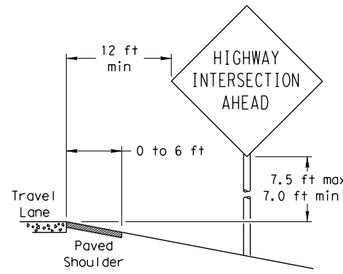
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

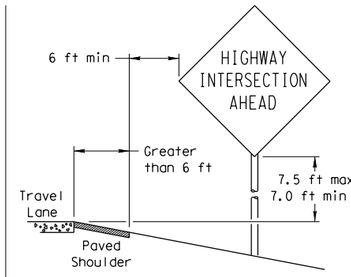
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

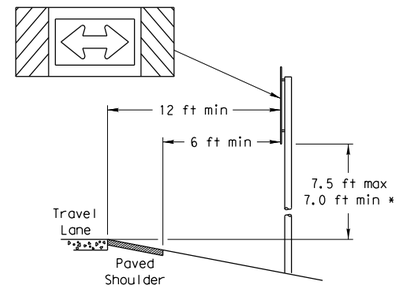
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



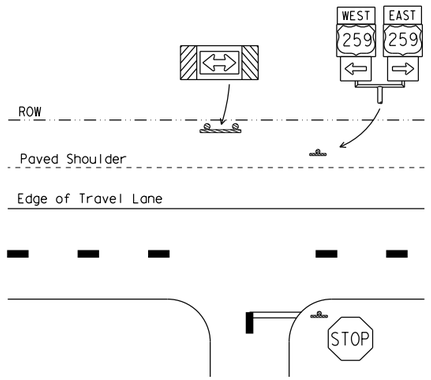
GREATER THAN 6 FT. WIDE

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.

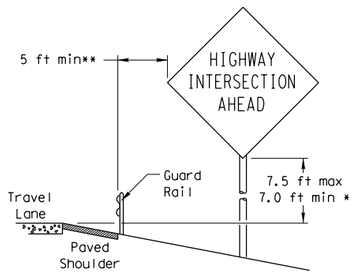
T-INTERSECTION



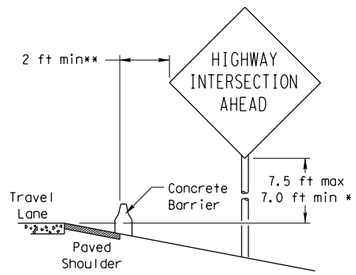
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



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

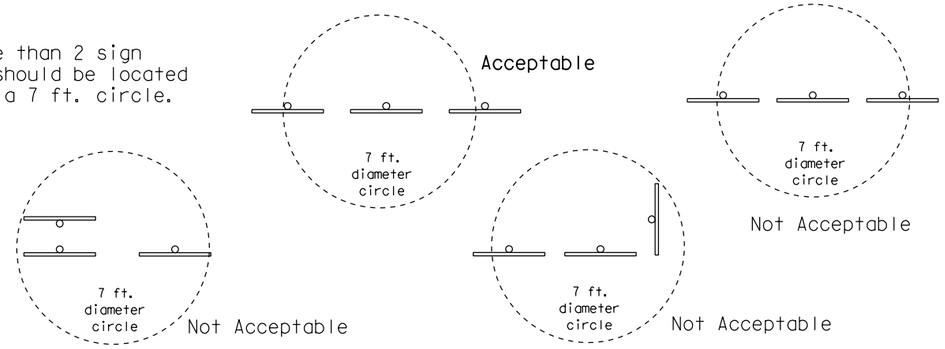
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

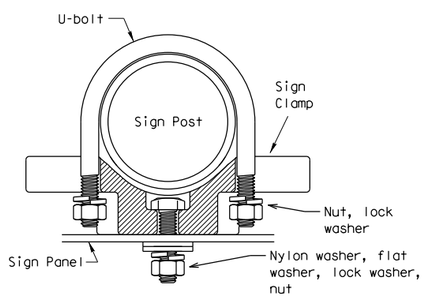
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

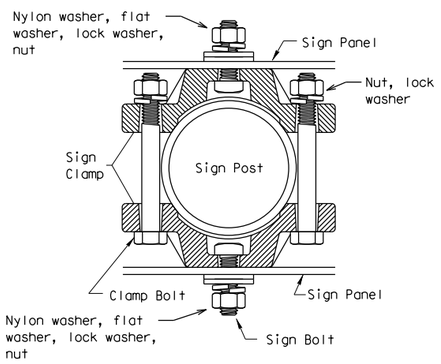


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

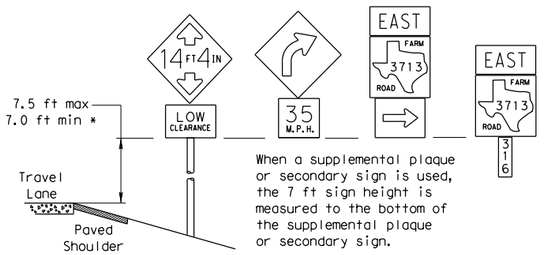
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



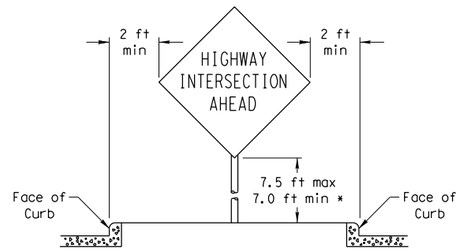
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



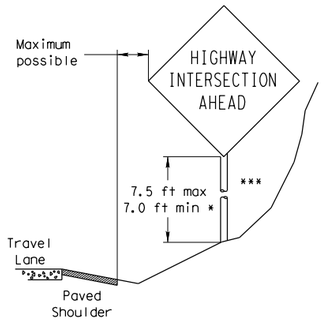
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

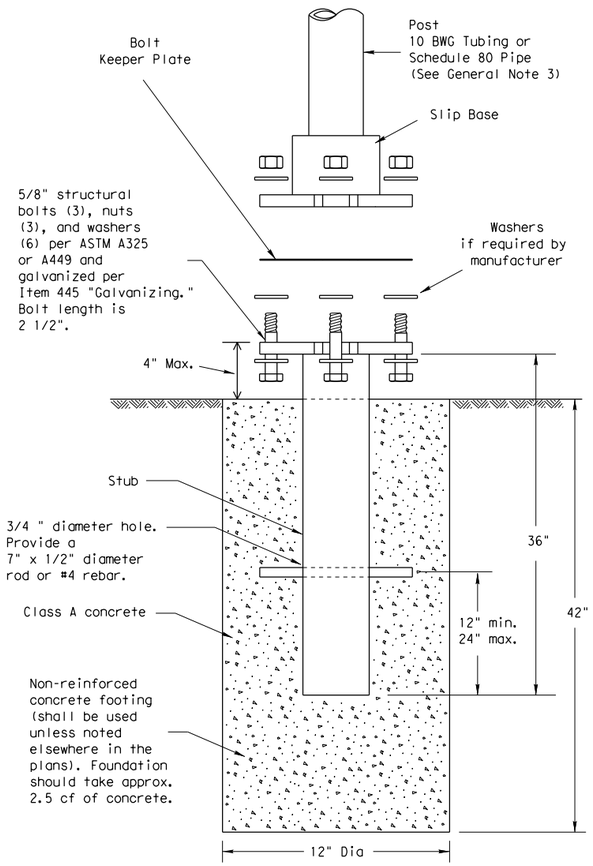
SMD(GEN)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		145

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

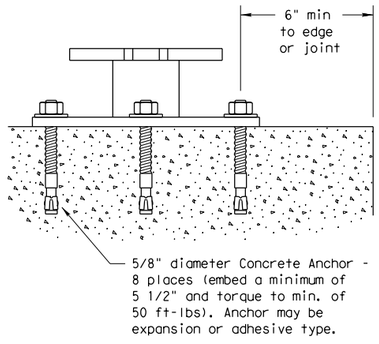
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

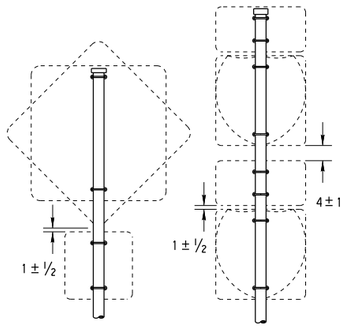
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

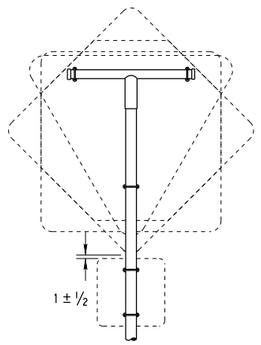
CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		146

DATE:
FILE:

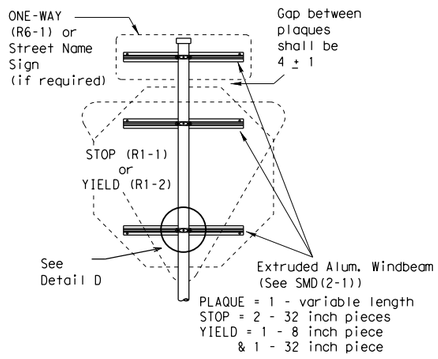
DATE:
FILE:



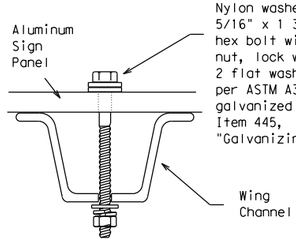
SM RD SGN ASSM TY XXXXX(1)XX(P)



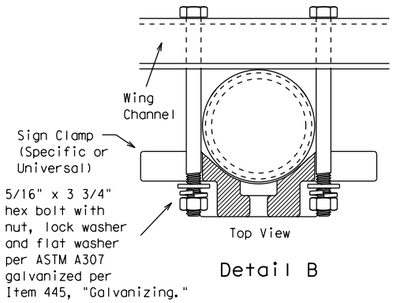
SM RD SGN ASSM TY XXXXX(1)XX(T)



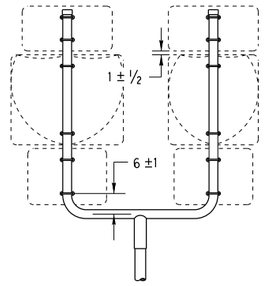
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



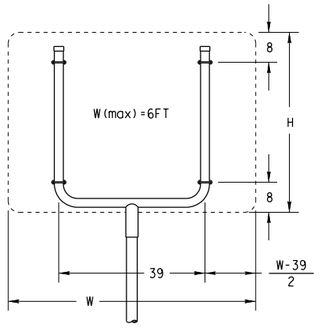
Detail A



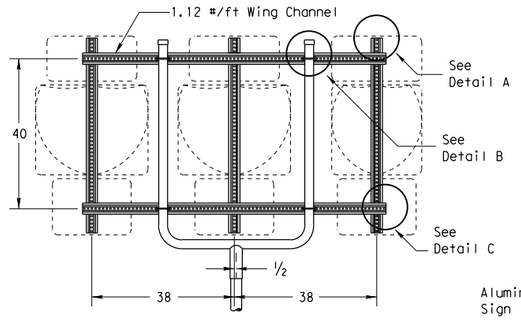
Detail B



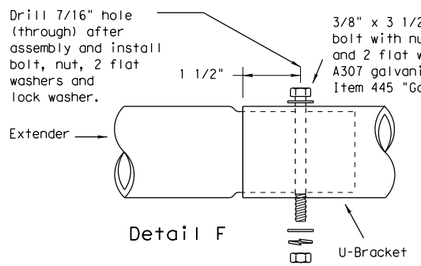
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

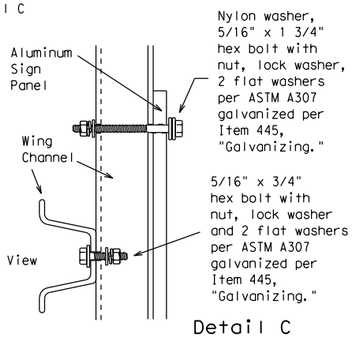


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)



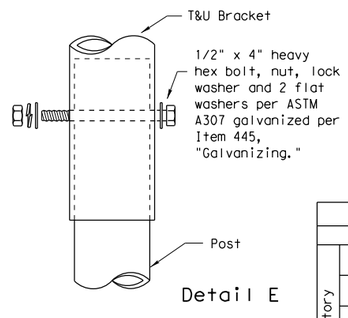
Detail F

Splices shall only be allowed behind the sign substrate.

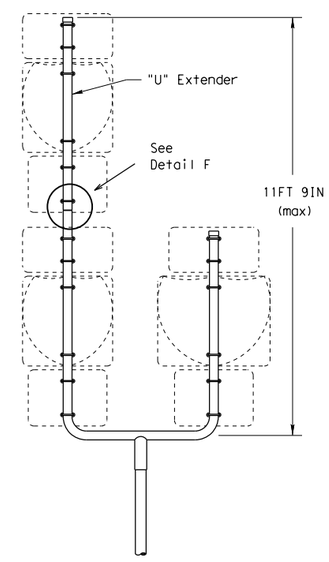


SIDE VIEW

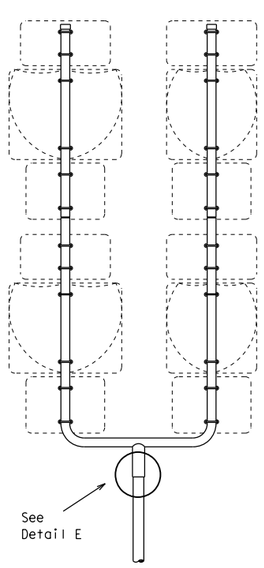
Detail C



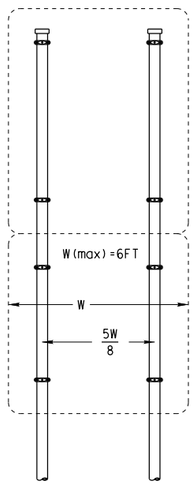
Detail E



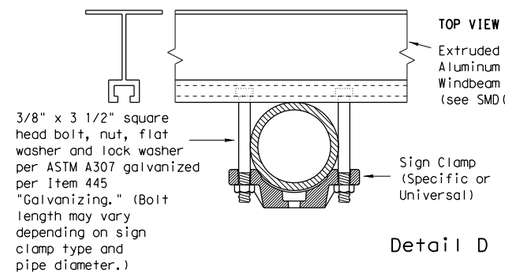
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



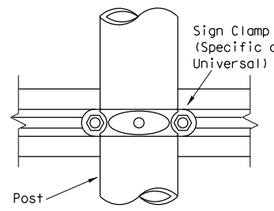
SM RD SGN ASSM TY S80(1)XX(U-2EXT)

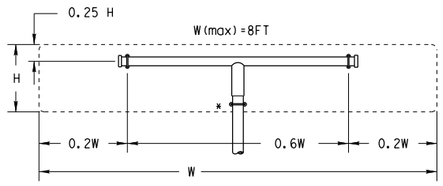


SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D

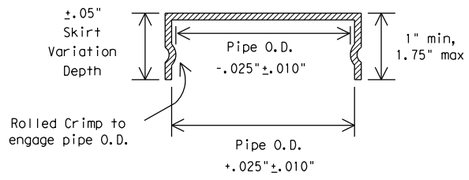




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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

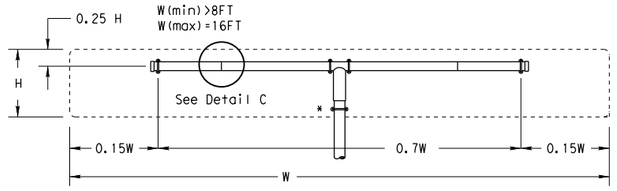
SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

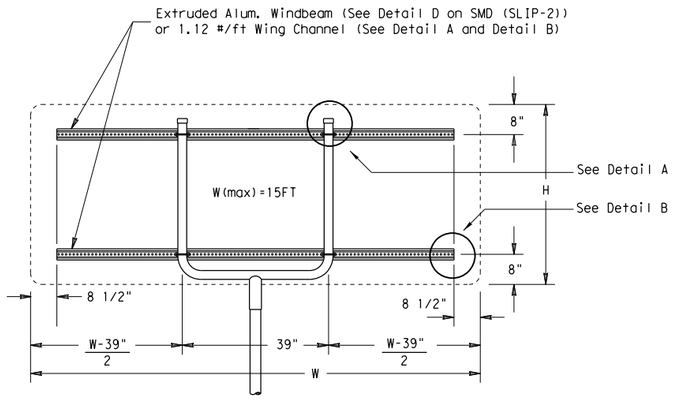
CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		147

REVISIONS
9-08

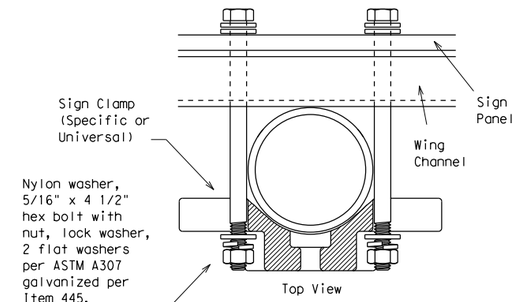
DATE:
FILE:



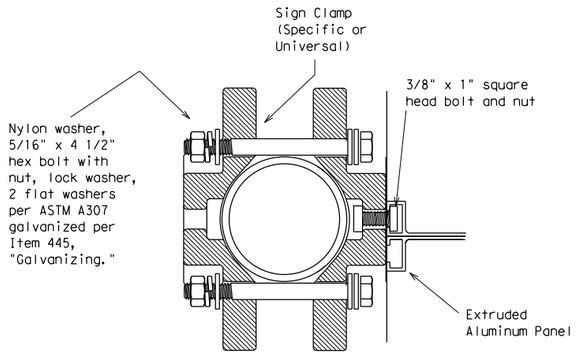
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



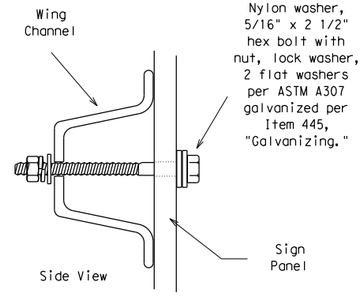
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



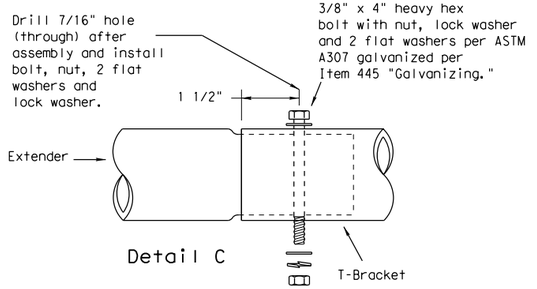
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

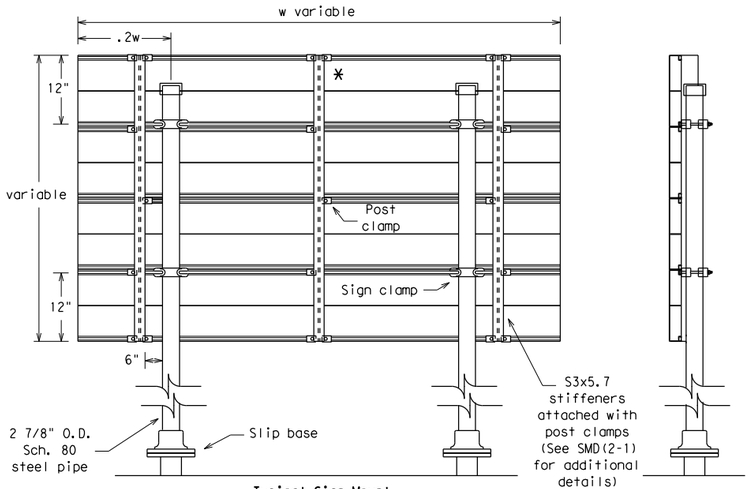


Detail B



Detail C

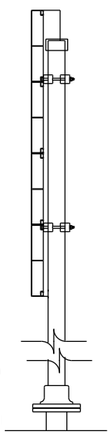
Splices shall only be allowed behind the sign substrate.



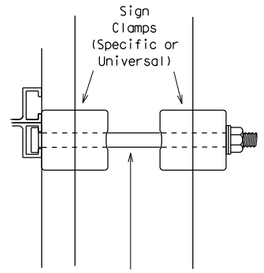
Typical Sign Mount

SM RD SGN ASSM TY S80(2)XX(P-EXAL)

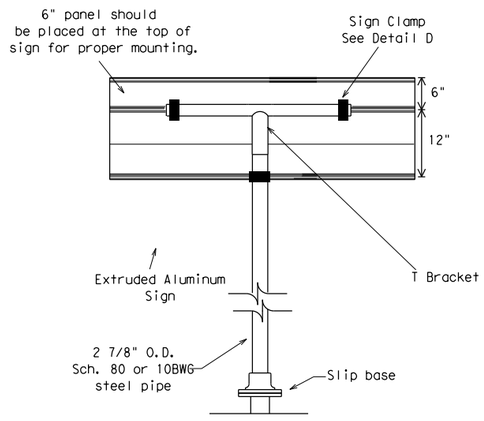
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



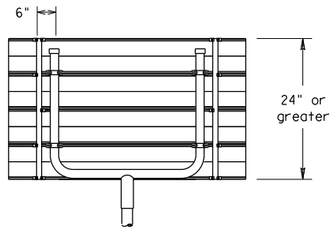
See Detail E
for clamp installation



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. See table above.
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. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

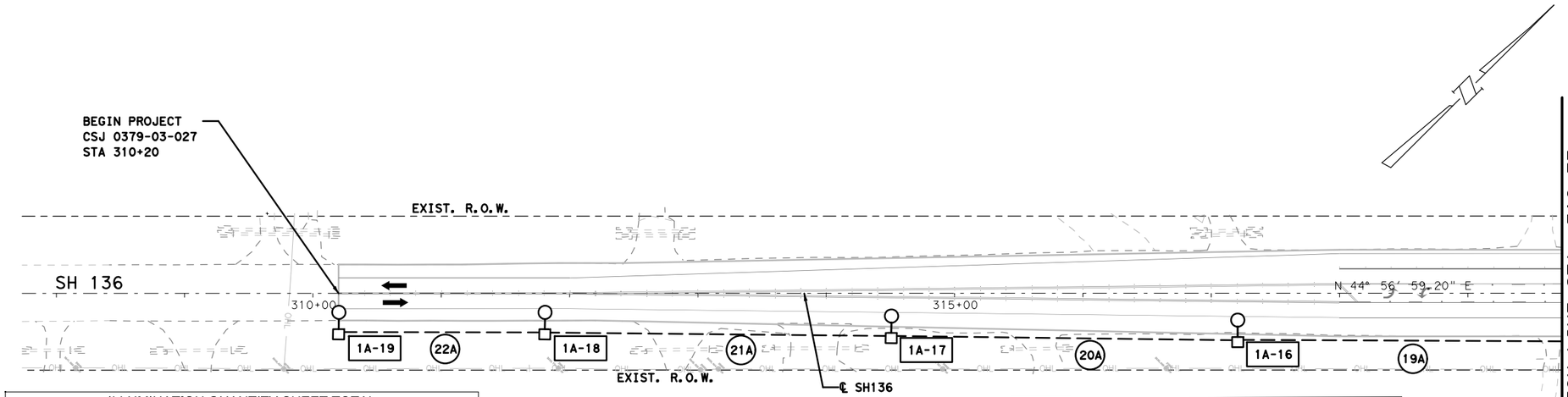
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0379	03	026, ETC.	SH 136
DIST	COUNTY		SHEET NO.
AMA	POTTER		148



ILLUMINATION LEGEND:

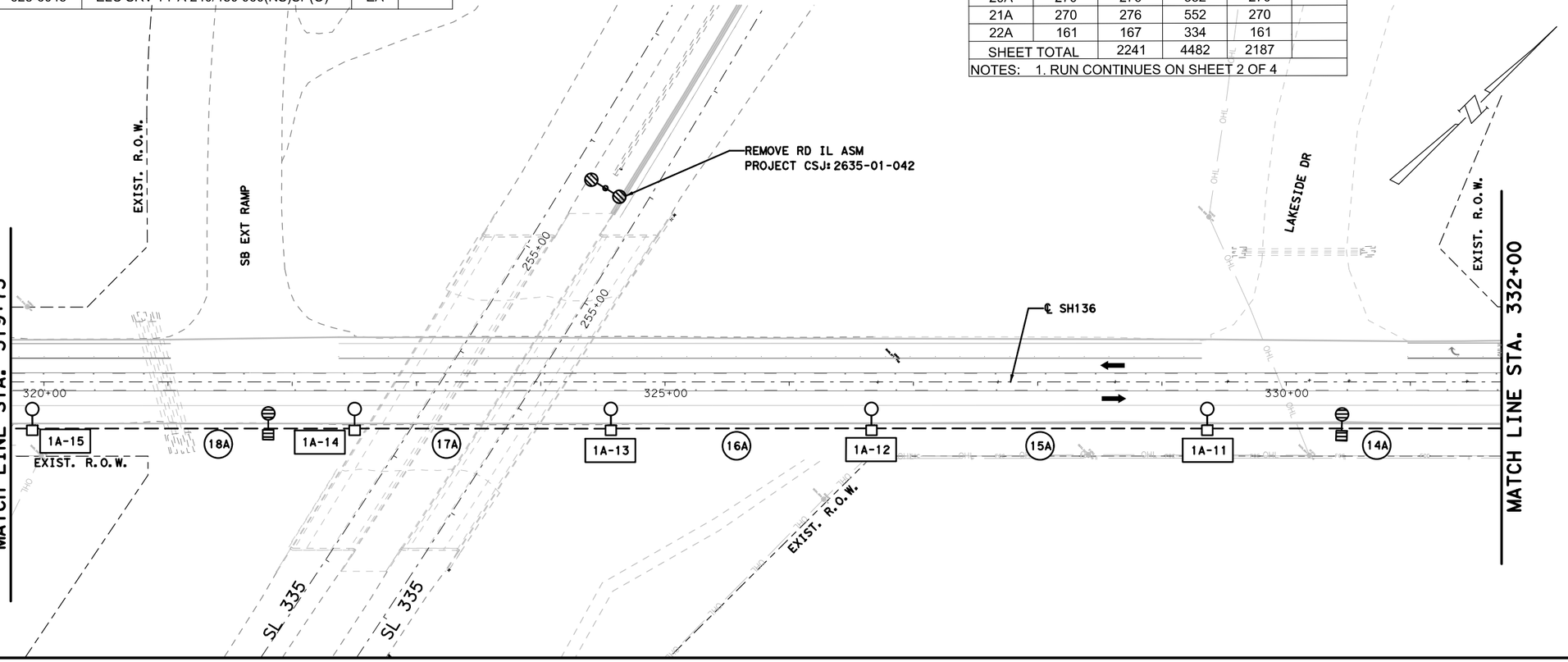
- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- #X — PROP CONDUIT RUN NO. & CIRCUIT
- #X-## — PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

ILLUMINATION QUANTITY SHEET TOTAL			
BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	90
432-6001	RIPRAP (CONC) (4-IN)	CY	3.15
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	2
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	9
618-6023	CONDT (PVC) (SCH 40) (2")	LF	2187
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	
620-6007	ELEC CONDR (NO.8) BARE	LF	2241
620-6008	ELEC CONDR (NO.8) INSULATED	LF	4482
624-6002	GROUND BOX TY A (122311)W/APRON	EA	
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SP(O)	EA	

ROADWAY ILLUMINATION ASSEMBLY SUMMARY		
FIXTURE NO.	STATION	STANDARD TYPE
1A-11	329+35 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-12	326+66 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-13	324+55 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-14	322+50 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-15	319+90 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-16	317+20 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-17	314+50 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-18	311+80 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-19	310+20 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED

CABLE AND CONDUIT RUNS					
RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	COND SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)	NOTES
		#8 BARE	#8 XHHW	2" PVC SCHD 40	
14A	270	276	552	270	1.
15A	270	276	552	270	
16A	210	216	432	210	
17A	206	212	424	206	
18A	260	266	532	260	
19A	270	276	552	270	
20A	270	276	552	270	
21A	270	276	552	270	
22A	161	167	334	161	
SHEET TOTAL		2241	4482	2187	

NOTES: 1. RUN CONTINUES ON SHEET 2 OF 4



0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.
07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136

SH 136
ILLUMINATION LAYOUT
BEGIN TO STA 332+00

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	149

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

DATE: 7/1/2020 8:33:49 AM
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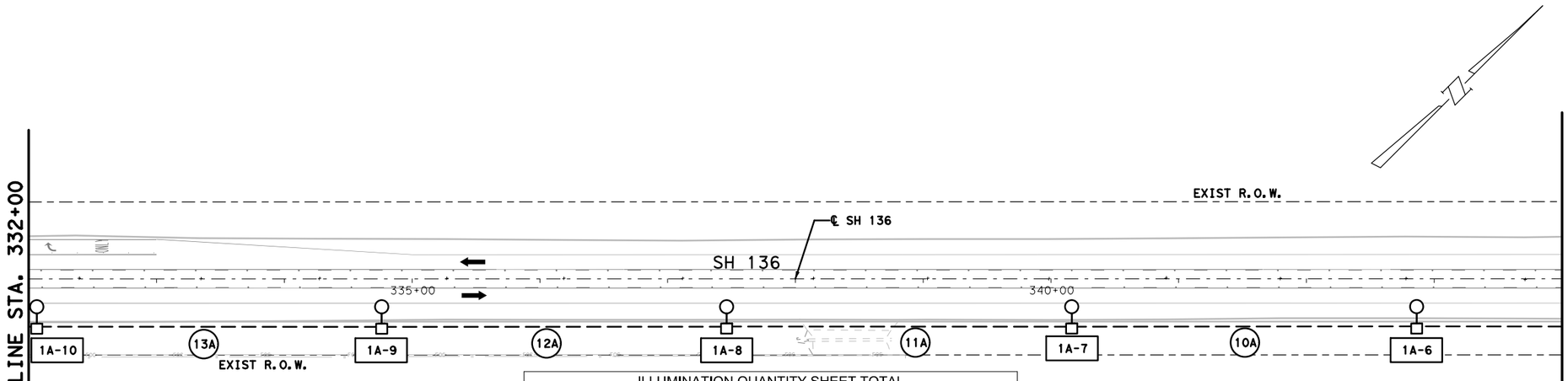


ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- #X — PROP CONDUIT RUN NO. & CIRCUIT
- #X-## — PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

0 25 50 100 200

SCALE: 1"=100'

CABLE AND CONDUIT RUNS

RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	COND SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)		NOTES
		#8 BARE	#8 XHHW	2" PVC SCHD 40	2" PVC SCHD 80 (BORE)	
1B	116	122	244	116		
2B	18	24	48	18		
3B	93	99	198		93	
4B	22	28	56	22		
5B	192	198	396	192		1.
1A	152	158	316	152		
2A	29	35	70	29		
3A	270	276	552	270		
4A	19	25	50	19		
5A	81	87	174		81	
6A	34	40	80	34		
7A	270	276	552	270		
8A	270	276	552	270		
9A	270	276	552	270		
10A	270	276	552	270		
11A	270	276	552	270		
12A	270	276	552	270		
13A	270	276	552	270		
SHEET TOTAL		3024	6048	2742	174	

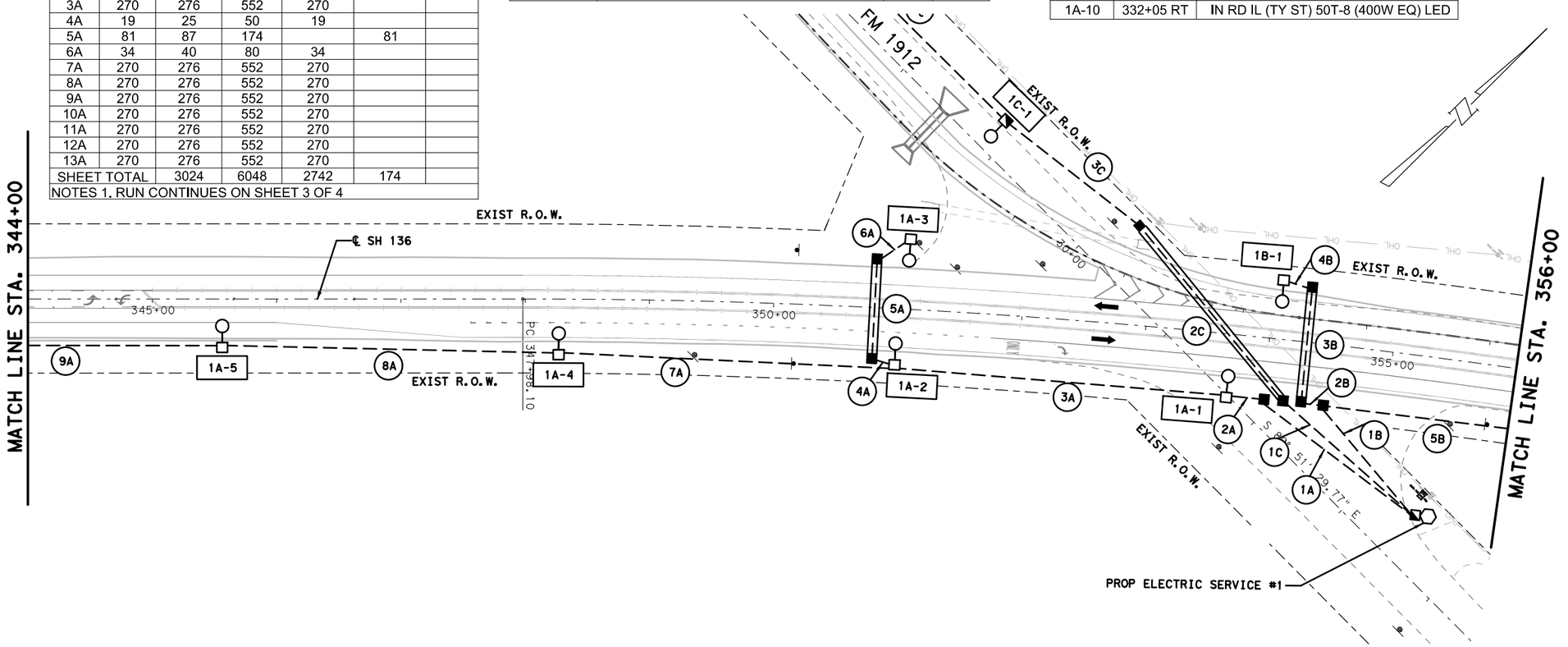
NOTES 1. RUN CONTINUES ON SHEET 3 OF 4

ILLUMINATION QUANTITY SHEET TOTAL

BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	110
432-6001	RIPRAP (CONC) (4-IN)	CY	3.85
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	11
618-6023	CONDT (PVC) (SCH 40) (2")	LF	2742
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	174
620-6007	ELEC CONDR (NO.8) BARE	LF	3024
620-6008	ELEC CONDR (NO.8) INSULATED	LF	6048
624-6002	GROUND BOX TY A (122311)W/APRON	EA	7
624-6008	GROUND BOX TY C (162911)W/APRON	EA	1
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	1

ROADWAY ILLUMINATION ASSEMBLY SUMMARY

FIXTURE NO.	STATION	STANDARD TYPE
1B-1	354+12 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-1	353+65 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-2	350+98 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-3	351+10 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-4	348+27 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-5	345+55 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-6	342+86 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-7	340+25 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-8	337+45 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-9	334+75 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1A-10	332+05 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.
07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136

SH 136
ILLUMINATION LAYOUT
STA 332+00 TO 356+00

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	150

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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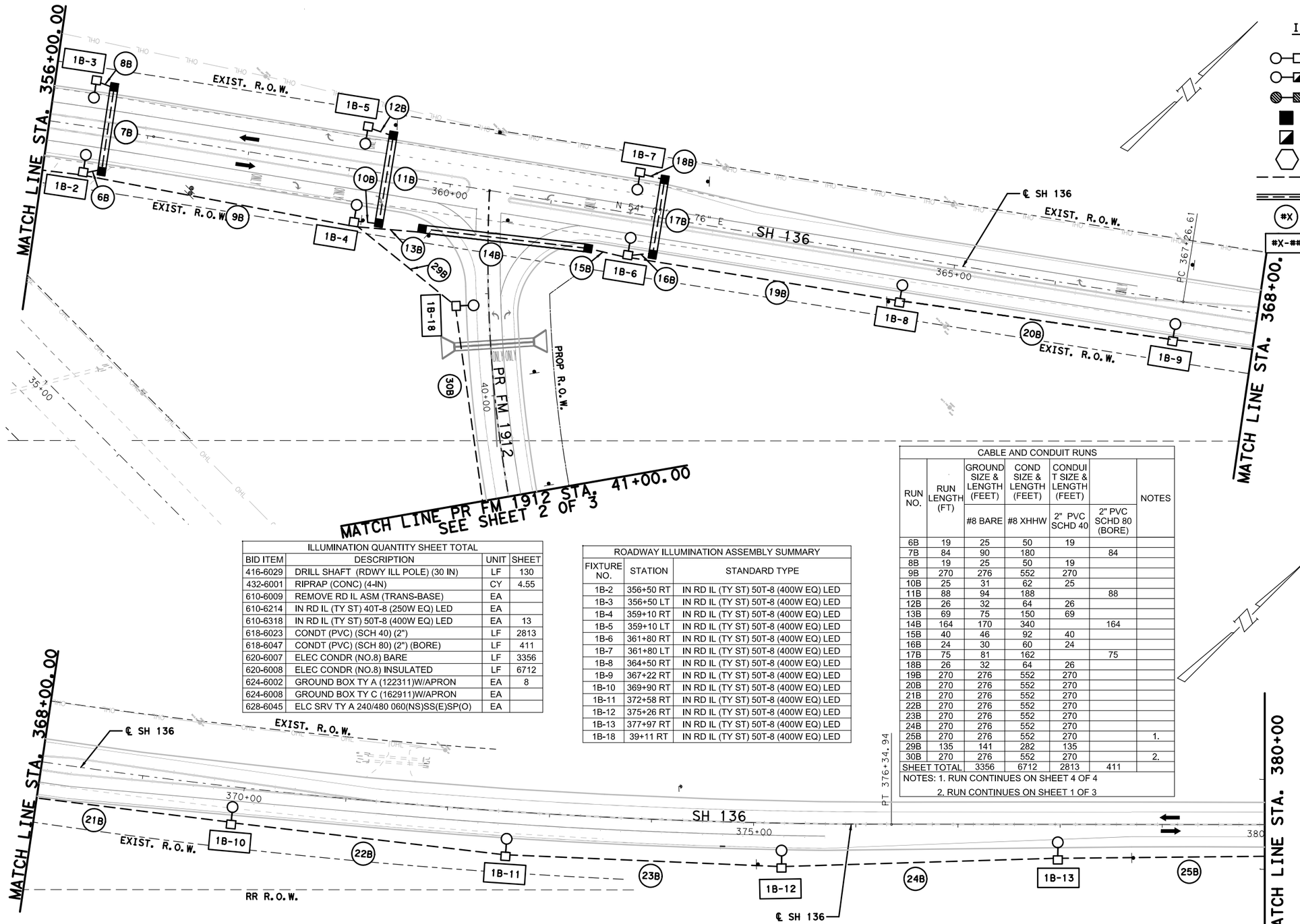


ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- (#X) PROP CONDUIT RUN NO. & CIRCUIT
- #X-## PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

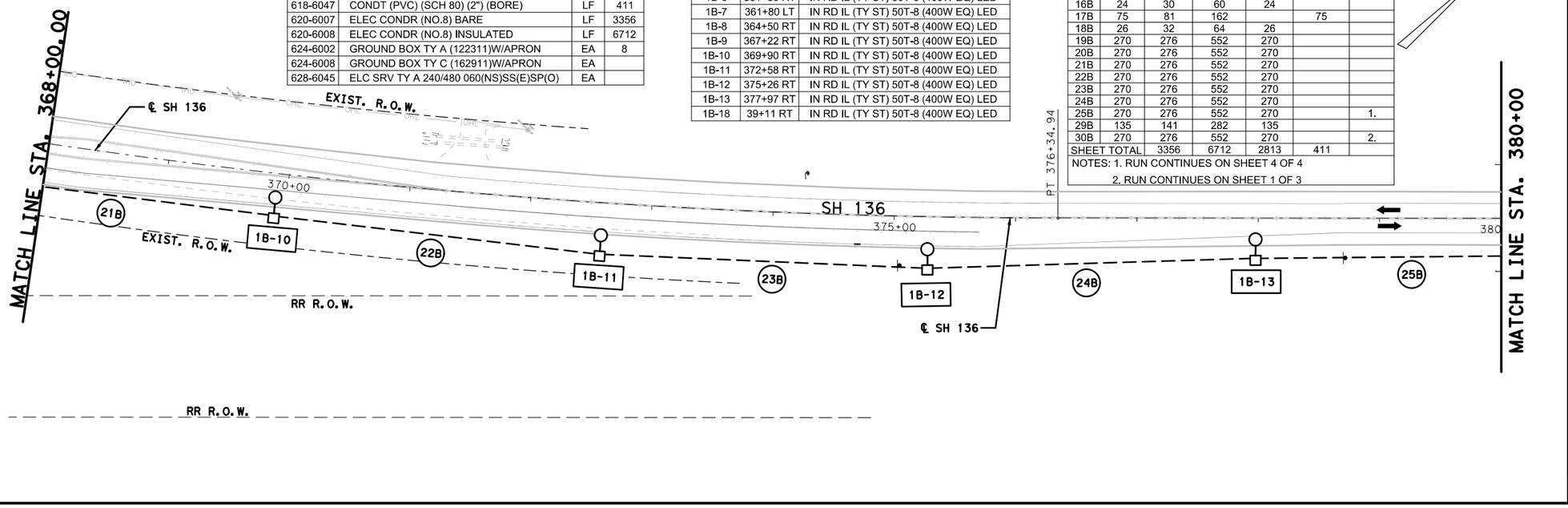
0 25 50 100 200
SCALE: 1"=100'

ILLUMINATION QUANTITY SHEET TOTAL			
BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	130
432-6001	RIPRAP (CONC) (4-IN)	CY	4.55
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	13
618-6023	CONDT (PVC) (SCH 40) (2")	LF	2813
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	411
620-6007	ELEC CONDR (NO.8) BARE	LF	3356
620-6008	ELEC CONDR (NO.8) INSULATED	LF	6712
624-6002	GROUND BOX TY A (122311)W/APRON	EA	8
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	

ROADWAY ILLUMINATION ASSEMBLY SUMMARY		
FIXTURE NO.	STATION	STANDARD TYPE
1B-2	356+50 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-3	356+50 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-4	359+10 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-5	359+10 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-6	361+80 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-7	361+80 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-8	364+50 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-9	367+22 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-10	369+90 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-11	372+58 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-12	375+26 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-13	377+97 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-18	39+11 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED

CABLE AND CONDUIT RUNS						
RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	COND SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)		NOTES
		#8 BARE	#8 XHHW	2" PVC SCHD 40	2" PVC SCHD 80 (BORE)	
6B	19	25	50	19		
7B	84	90	180		84	
8B	19	25	50	19		
9B	270	276	552	270		
10B	25	31	62	25		
11B	88	94	188		88	
12B	26	32	64	26		
13B	69	75	150	69		
14B	164	170	340		164	
15B	40	46	92	40		
16B	24	30	60	24		
17B	75	81	162		75	
18B	26	32	64	26		
19B	270	276	552	270		
20B	270	276	552	270		
21B	270	276	552	270		
22B	270	276	552	270		
23B	270	276	552	270		
24B	270	276	552	270		
25B	270	276	552	270		1.
29B	135	141	282	135		
30B	270	276	552	270		2.
SHEET TOTAL	3356	6712	2813		411	

NOTES: 1. RUN CONTINUES ON SHEET 4 OF 4
2. RUN CONTINUES ON SHEET 1 OF 3



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.
07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136
SH 136
ILLUMINATION LAYOUT
STA 356+00 TO 380+00

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		151
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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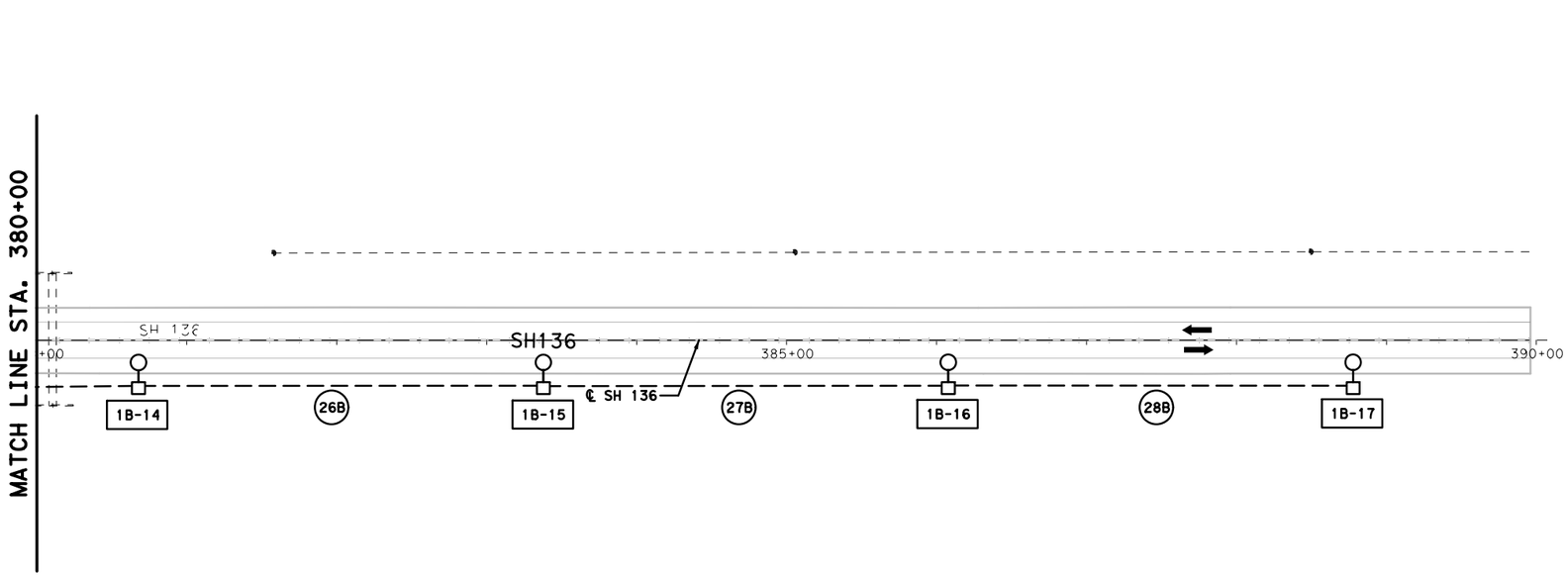
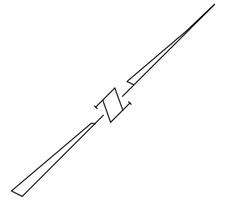




ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- #X — PROP CONDUIT RUN NO. & CIRCUIT
- #X-## — PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

ILLUMINATION QUANTITY SHEET TOTAL

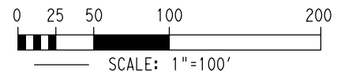
BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	40
432-6001	RIPRAP (CONC) (4-IN)	CY	1.4
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	4
618-6023	CONDT (PVC) (SCH 40) (2")	LF	810
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	
620-6007	ELEC CONDR (NO.8) BARE	LF	828
620-6008	ELEC CONDR (NO.8) INSULATED	LF	1656
624-6002	GROUND BOX TY A (122311)W/APRON	EA	
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	

ROADWAY ILLUMINATION ASSEMBLY SUMMARY

FIXTURE NO.	STATION	STANDARD TYPE
1B-14	380+68 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-15	383+38 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-16	386+07 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-17	388+78 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED

CABLE AND CONDUIT RUNS

RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	CONDUCTOR SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)
		#8 BARE	#8 XHHW	2" PVC SCHD 40
26B	270	276	552	270
27B	270	276	552	270
28B	270	276	552	270
SHEET TOTAL		828	1656	810



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.
07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136

SH 136
ILLUMINATON LAYOUT
STA 380+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	152

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

DATE: 7//2020 9:32:42 AM
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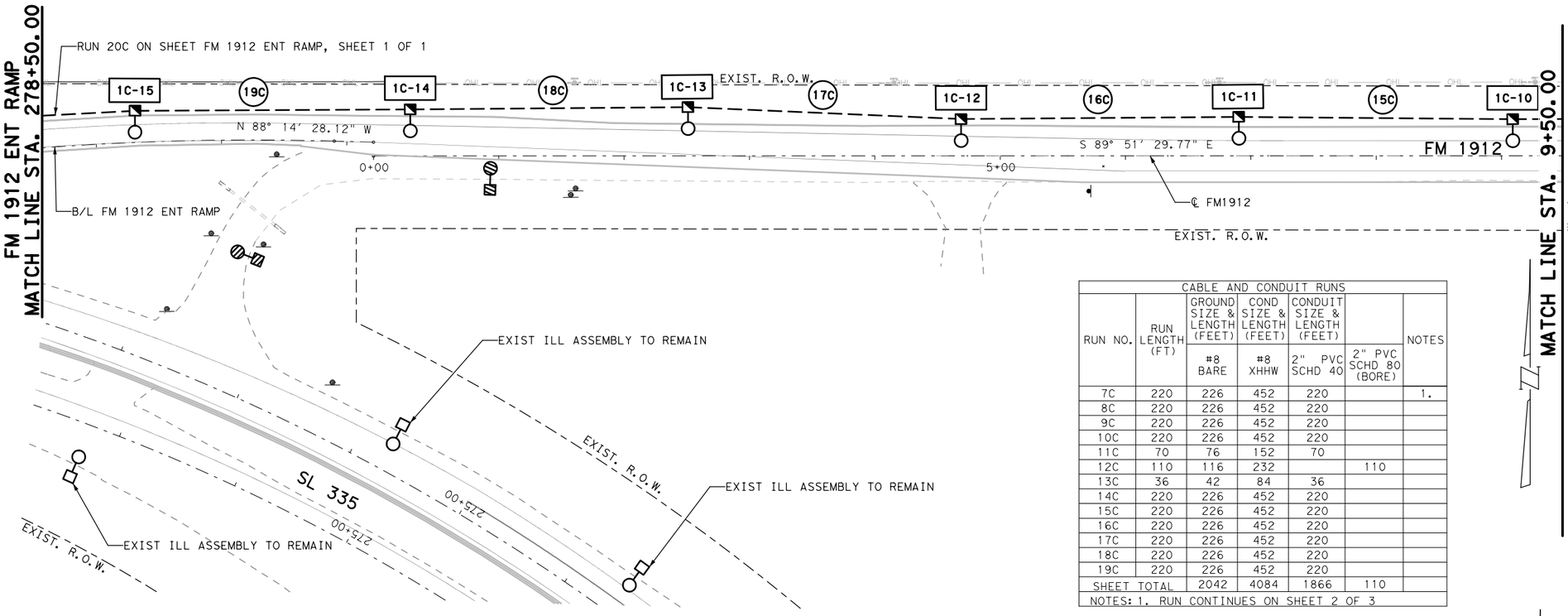


ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- #X PROP CONDUIT RUN NO. & CIRCUIT
- #X-## PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

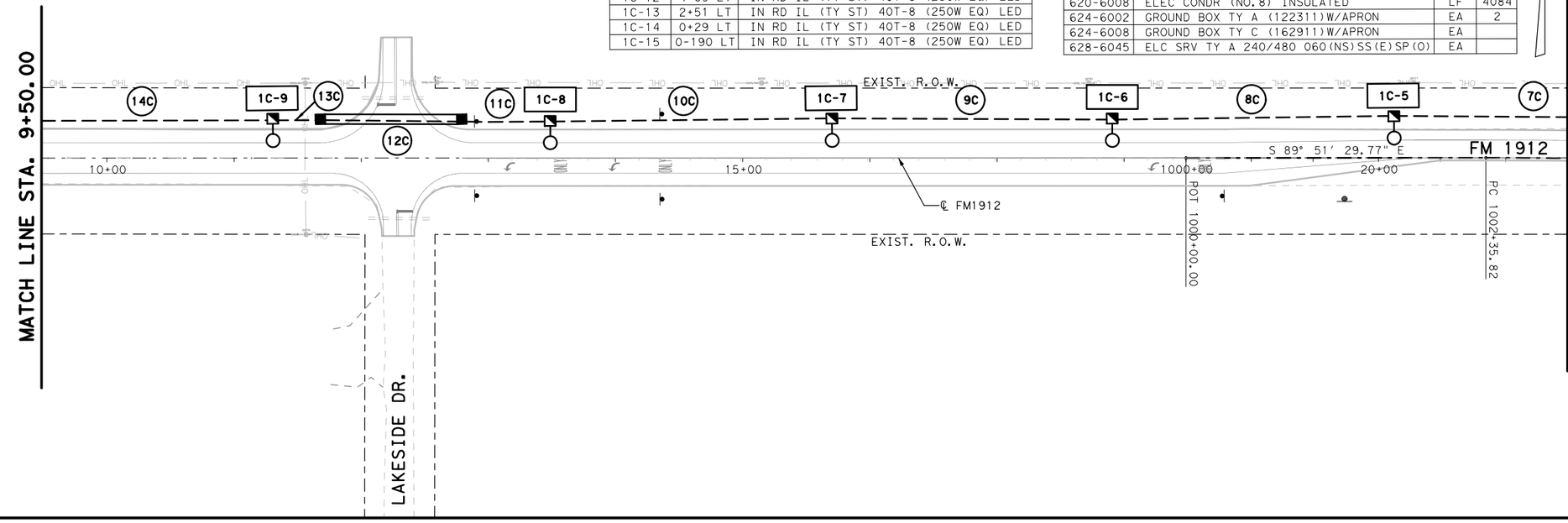
CABLE AND CONDUIT RUNS						
RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	COND SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)		NOTES
		#8 BARE	#8 XHHW	2" PVC SCHD 40	2" PVC SCHD 80 (BORE)	
7C	220	226	452	220		1.
8C	220	226	452	220		
9C	220	226	452	220		
10C	220	226	452	220		
11C	70	76	152	70		
12C	110	116	232		110	
13C	36	42	84	36		
14C	220	226	452	220		
15C	220	226	452	220		
16C	220	226	452	220		
17C	220	226	452	220		
18C	220	226	452	220		
19C	220	226	452	220		
SHEET TOTAL		2042	4084	1866	110	

NOTES: 1. RUN CONTINUES ON SHEET 2 OF 3

0 25 50 100 200
SCALE: 1"=100'

ROADWAY ILLUMINATION ASSEMBLY SUMMARY		
FIXTURE NO.	STATION	STANDARD TYPE
1C-5	20+12 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-6	17+91 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-7	15+69 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-8	13+49 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-9	11+31 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-10	9+10 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-11	6+91 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-12	4+69 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-13	2+51 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-14	0+29 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-15	0-190 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED

ILLUMINATION QUANTITY SHEET TOTAL			
BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	110
432-6001	RIPRAP (CONC) (4-IN)	CY	3.85
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	2
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	11
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	
618-6023	CONDT (PVC) (SCH 40) (2")	LF	1866
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	110
620-6007	ELEC CONDR (NO.8) BARE	LF	2042
620-6008	ELEC CONDR (NO.8) INSULATED	LF	4084
624-6002	GROUND BOX TY A (122311)W/APRON	EA	2
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	



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STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.
07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136
FM 1912
ILLUMINATION LAYOUT
STA 0+00 TO STA 21+50

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	153

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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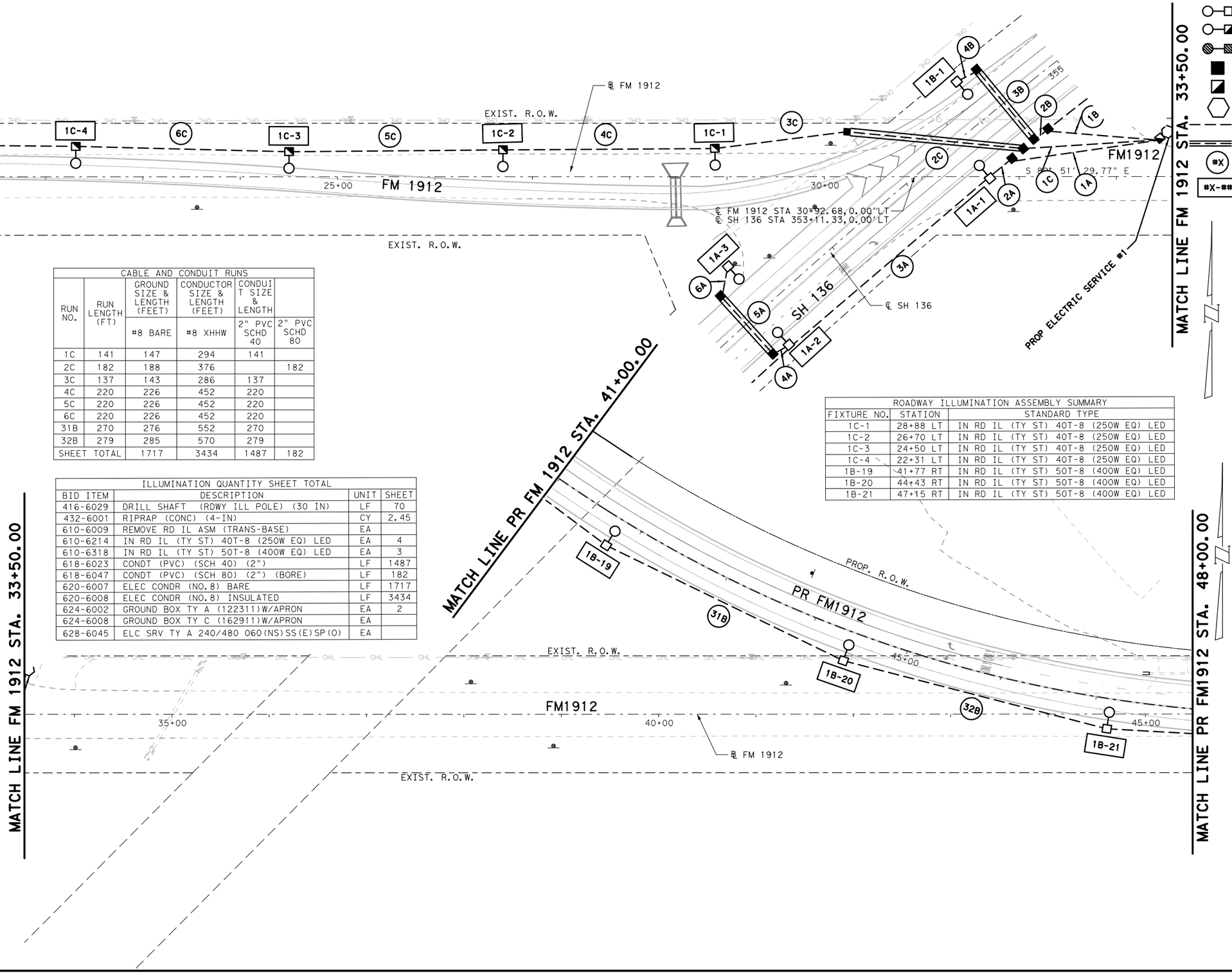

ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- (#X) PROP CONDUIT RUN NO. & CIRCUIT
- [#X-##] PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

CABLE AND CONDUIT RUNS					
RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	CONDUCTOR SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH	
		#8 BARE	#8 XHHW	2" PVC SCHD 40	2" PVC SCHD 80
1C	141	147	294	141	
2C	182	188	376		182
3C	137	143	286	137	
4C	220	226	452	220	
5C	220	226	452	220	
6C	220	226	452	220	
31B	270	276	552	270	
32B	279	285	570	279	
SHEET TOTAL		1717	3434	1487	182

ILLUMINATION QUANTITY SHEET TOTAL			
BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	70
432-6001	RIPRAP (CONC) (4-IN)	CY	2.45
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	4
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	3
618-6023	CONDT (PVC) (SCH 40) (2")	LF	1487
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	182
620-6007	ELEC CONDR (NO.8) BARE	LF	1717
620-6008	ELEC CONDR (NO.8) INSULATED	LF	3434
624-6002	GROUND BOX TY A (122311)W/APRON	EA	2
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	

ROADWAY ILLUMINATION ASSEMBLY SUMMARY		
FIXTURE NO.	STATION	STANDARD TYPE
1C-1	28+88 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-2	26+70 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-3	24+50 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1C-4	22+31 LT	IN RD IL (TY ST) 40T-8 (250W EQ) LED
1B-19	41+77 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-20	44+43 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-21	47+15 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
ROBERT H. SIEGFRIED
83401
LICENSED
PROFESSIONAL ENGINEER
P.E.
07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136
FM 1912
ILLUMINATION LAYOUT
STA 21+50 TO STA 48+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	154

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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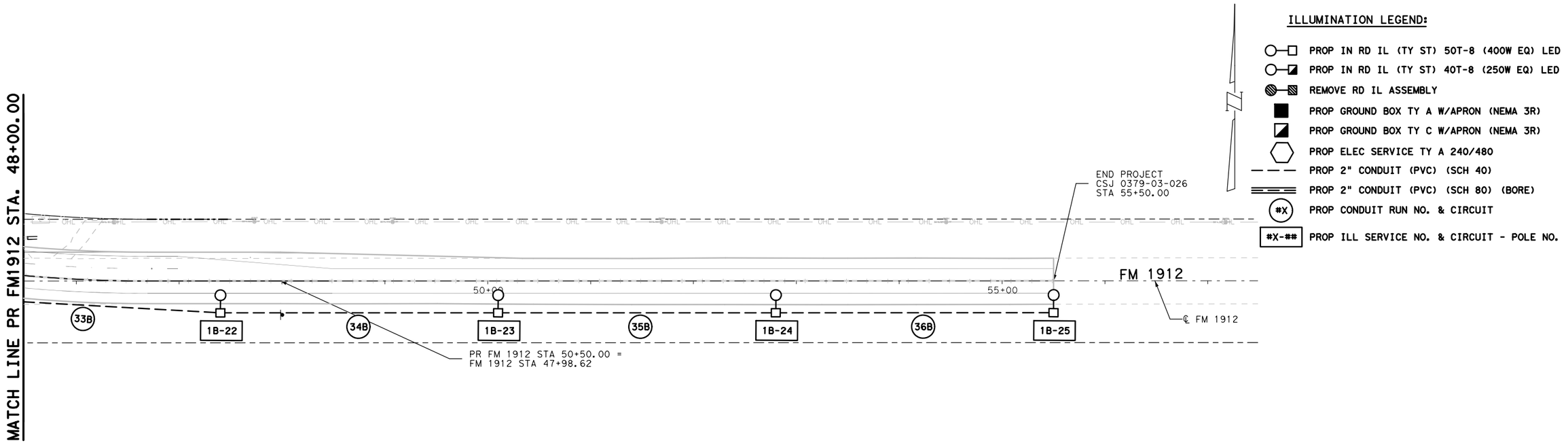

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SCALE: 1"=100'

CABLE AND CONDUIT RUNS					
RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	CONDUCTOR SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)	NOTES
		#8 BARE	#8 XHHW	2" PVC SCHD 40	
33B	279	285	570	279	1.
34B	270	276	552	270	
35B	270	276	552	270	
36B	270	276	552	270	
SHEET TOTAL		1113	2226	1089	
NOTES:1. RUN CONTINUES ON SHEET 2 OF 3					

ILLUMINATION QUANTITY SHEET TOTAL			
BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	40
432-6001	RIPRAP (CONC) (4-IN)	CY	1.4
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	4
618-6023	CONDT (PVC) (SCH 40) (2")	LF	1089
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	
620-6007	ELEC CONDR (NO.8) BARE	LF	1113
620-6008	ELEC CONDR (NO.8) INSULATED	LF	2226
624-6002	GROUND BOX TY A (122311)W/APRON	EA	
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	

ROADWAY ILLUMINATION ASSEMBLY SUMMARY		
FIXTURE NO.	STATION	STANDARD TYPE
1B-22	47+41 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-23	50+10 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-24	52+80 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1B-25	55+50 RT	IN RD IL (TY ST) 50T-8 (400W EQ) LED

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83401
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PROFESSIONAL ENGINEER

P.E.

07/01/2020

Texas Department of Transportation

SIEGFRIED
ENGINEERING & CONSTRUCTION, LLC
TX PE Firm Reg. No. F-14029

SH 136

FM 1912
ILLUMINATION LAYOUT
STA 48+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	155

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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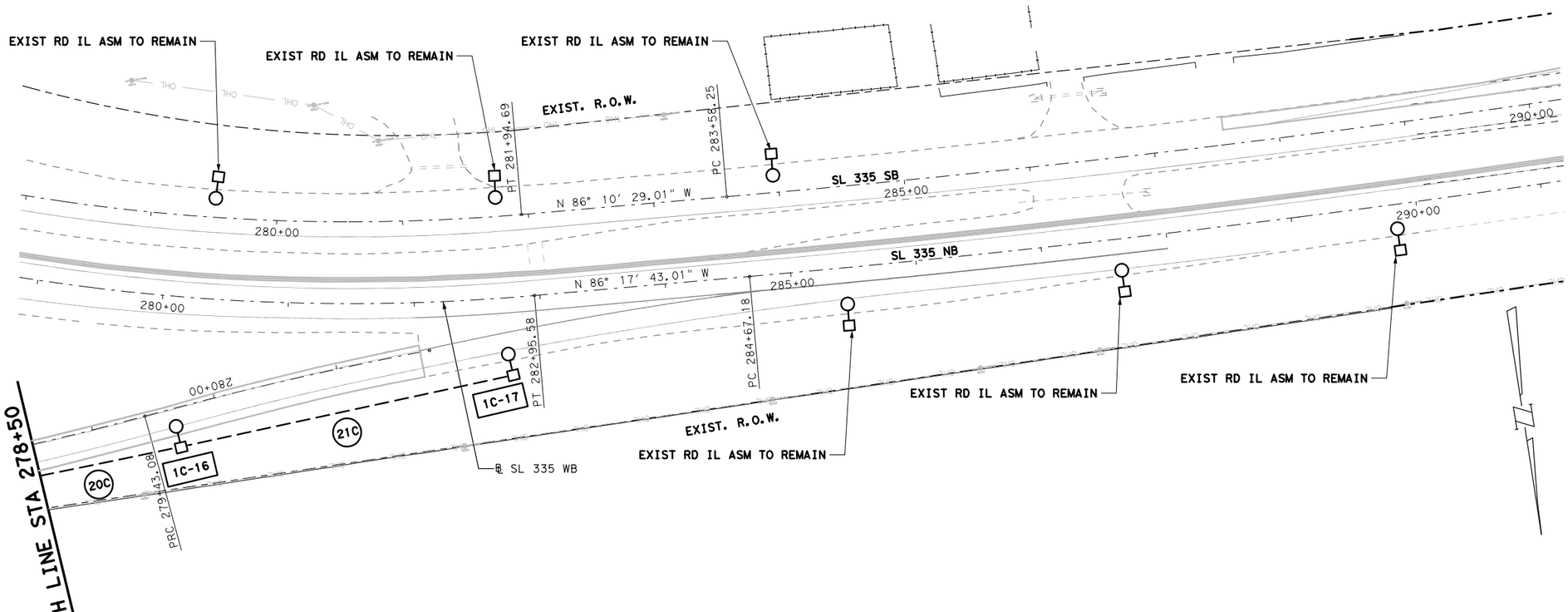

ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- #X PROP CONDUIT RUN NO. & CIRCUIT
- #X-## PROP ILL SERVICE NO. & CIRCUIT - POLE NO.

0 25 50 100 200

SCALE: 1"=100'

CABLE AND CONDUIT RUNS

RUN NO.	RUN LENGTH (FT)	GROUND SIZE & LENGTH (FEET)	COND SIZE & LENGTH (FEET)	CONDUIT SIZE & LENGTH (FEET)	NOTES
		#8 BARE	#8 XHHW	2" PVC SCHD 40	
20C	200	206	412	200	1.
21C	270	276	552	270	
SHEET TOTAL		482	964	470	
NOTES: 1. RUN CONTINUES ON SHEET 1 OF 3 OF FM 1912					

ILLUMINATION QUANTITY SHEET TOTAL

BID ITEM	DESCRIPTION	UNIT	SHEET
416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	20
432-6001	RIPRAP (CONC) (4-IN)	CY	0.7
610-6009	REMOVE RD IL ASM (TRANS-BASE)	EA	
610-6214	IN RD IL (TY ST) 40T-8 (250W EQ) LED	EA	
610-6318	IN RD IL (TY ST) 50T-8 (400W EQ) LED	EA	2
618-6023	CONDT (PVC) (SCH 40) (2")	LF	470
618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	
620-6007	ELEC CONDR (NO.8) BARE	LF	482
620-6008	ELEC CONDR (NO.8) INSULATED	LF	964
624-6002	GROUND BOX TY A (122311)W/APRON	EA	
624-6008	GROUND BOX TY C (162911)W/APRON	EA	
628-6045	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	EA	

ROADWAY ILLUMINATION ASSEMBLY SUMMARY

FIXTURE NO.	STATION	STANDARD TYPE
1C-16	279+75 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED
1C-17	282+25 LT	IN RD IL (TY ST) 50T-8 (400W EQ) LED

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SH 136

FM 1912 ENT RAMP ILLUMINATION LAYOUT STA 278+50 TO END

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	156

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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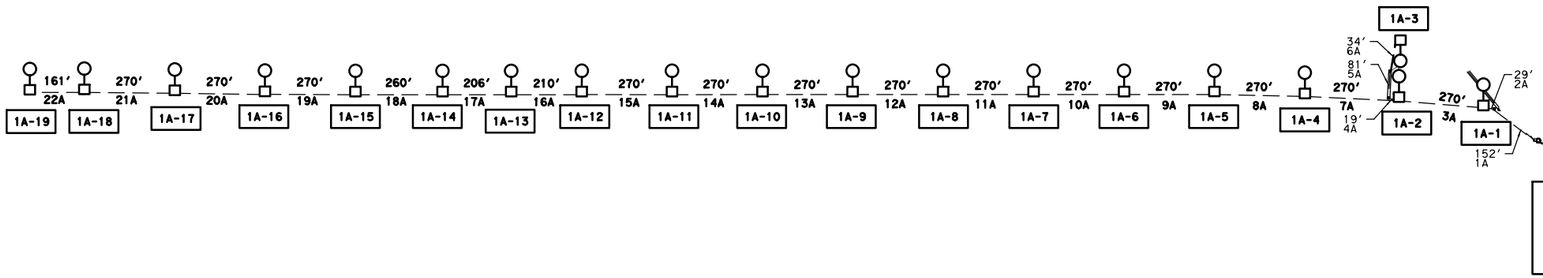
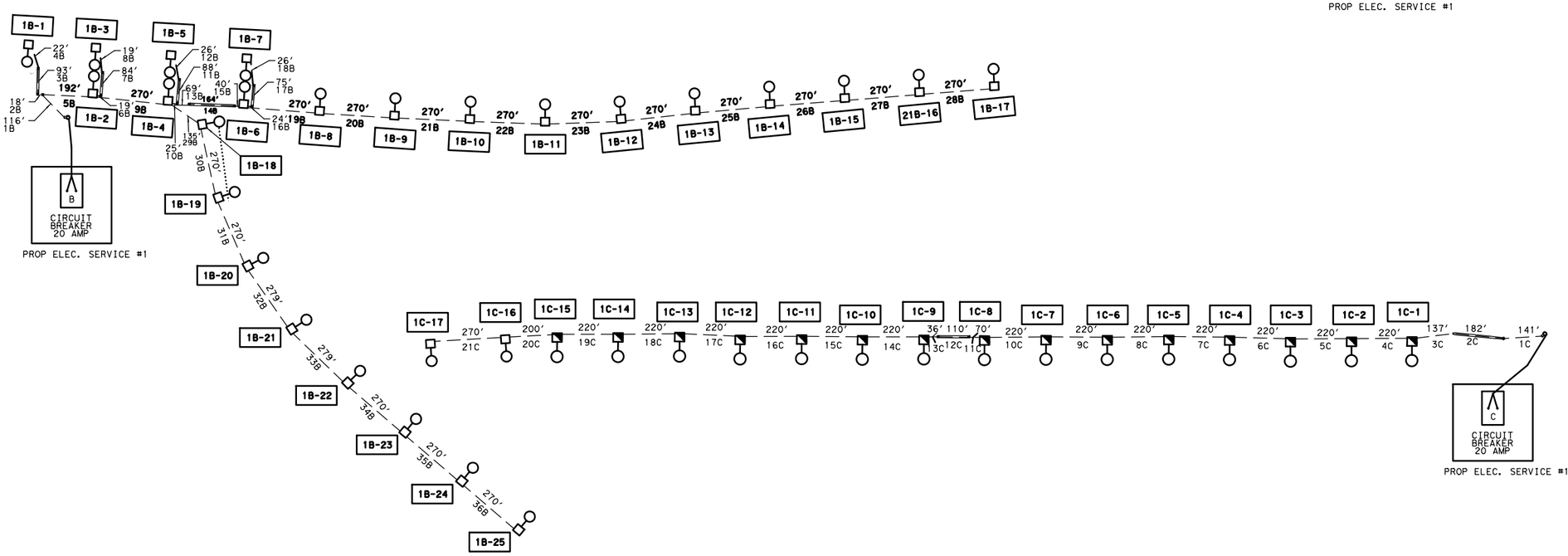
ELECTRICAL SERVICES DATA SHEET												
ELEC. SERVICE No.	SHEET No.	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5,6,7,9)-14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS No./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLR/A	TWO-POLE CONTACTOR AMPS	PANEL BD/ LOADCENTER AMP RATING	CIRCUIT No.	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
1	SHEET 2 OF 4, SOUTH SH 136	ELC SRV TY A 240/480 060(NS)SS(E)SP(O)	2"	3/#6	N/A	2P/60	60	N/A	A	2P/20	10	13.9
									B	2P/20	13	
									C	2P/20	6	

ILLUMINATION LEGEND:

- PROP IN RD IL (TY ST) 50T-8 (400W EQ) LED
- PROP IN RD IL (TY ST) 40T-8 (250W EQ) LED
- REMOVE RD IL ASSEMBLY
- PROP GROUND BOX TY A W/APRON (NEMA 3R)
- PROP GROUND BOX TY C W/APRON (NEMA 3R)
- PROP ELEC SERVICE TY A 240/480
- PROP 2" CONDUIT (PVC) (SCH 40)
- PROP 2" CONDUIT (PVC) (SCH 80) (BORE)
- #X — PROP CONDUIT RUN NO. & CIRCUIT
- #X-## — PROP ILL SERVICE NO. & CIRCUIT - POLE NO.





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SCALE: 1"=100′

NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
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83401
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PROFESSIONAL ENGINEER
P.E.
07/01/2020

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TX PE Firm Reg. No. F-14029

SH 136

SH 136 ILLUMINATION CIRCUIT DIAGRAM

SHEET 1 OF 1

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	157

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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DATE:
FILE:

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.

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Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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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.

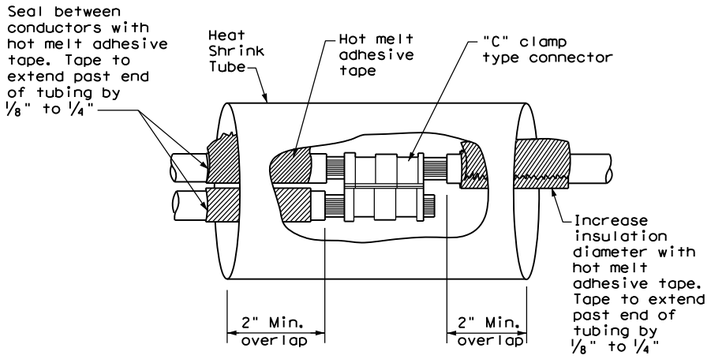
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

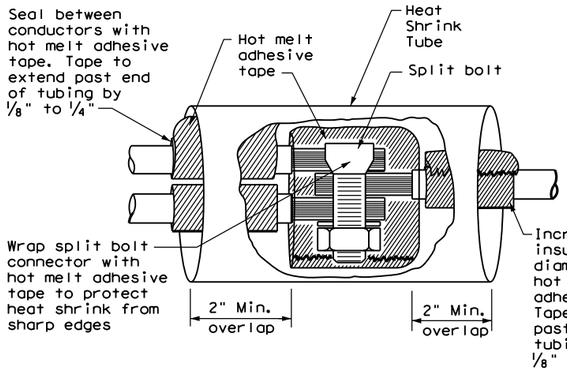
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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.

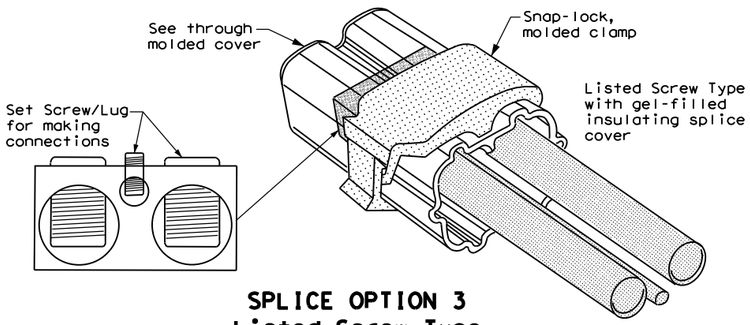
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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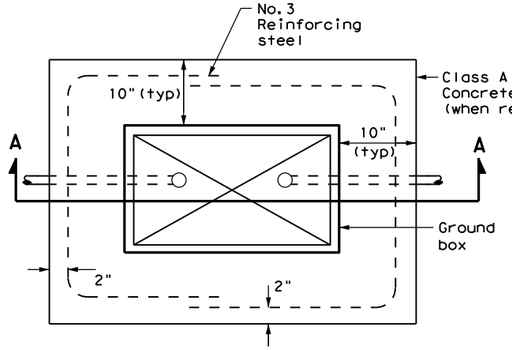
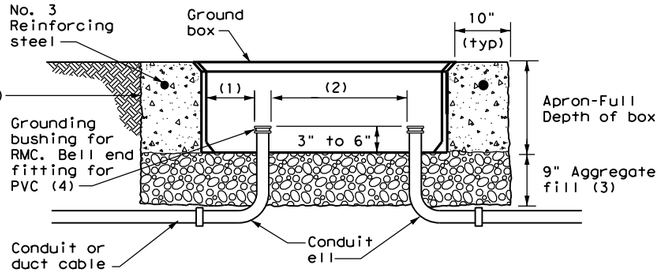


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

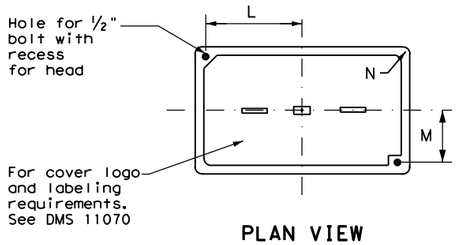
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

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

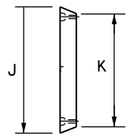
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

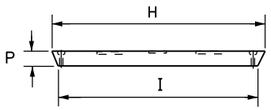
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

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

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

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Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

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

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

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

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

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

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

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

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

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

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

Schematic Type

Service Voltage V / V

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

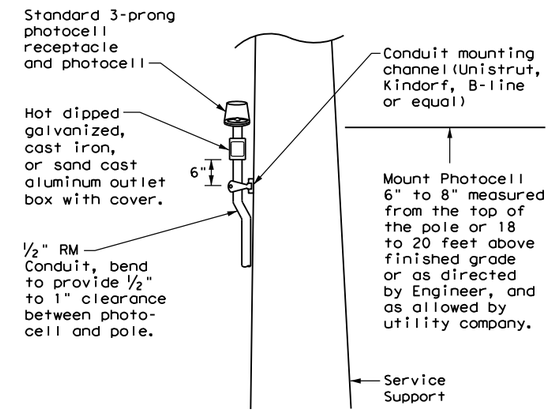
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

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

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

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



TOP MOUNTED PHOTOCELL

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

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ELECTRICAL DETAILS SERVICE NOTES & DATA

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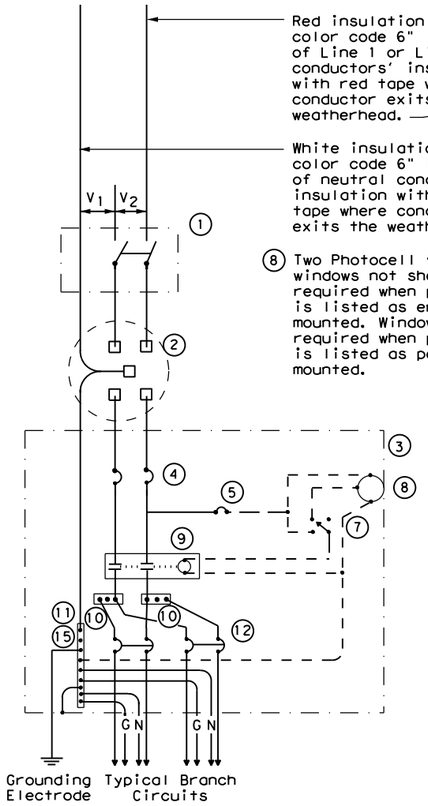
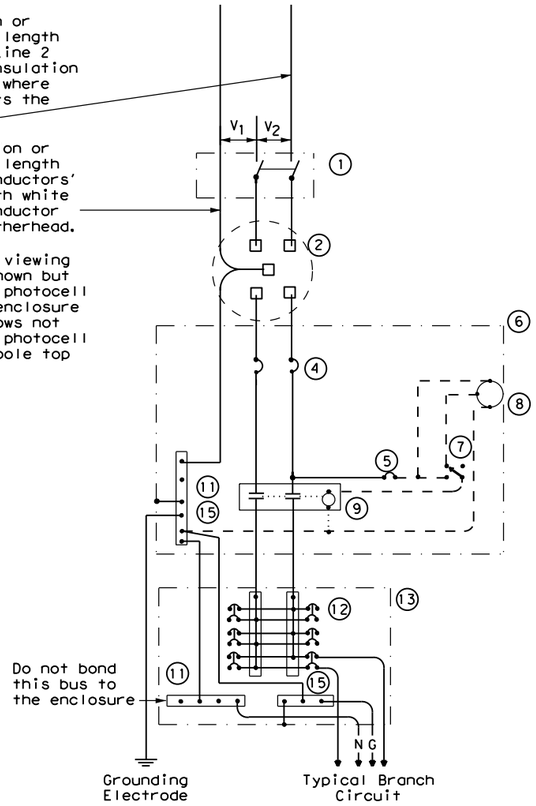


SCHEMATIC TYPE A
THREE WIRE



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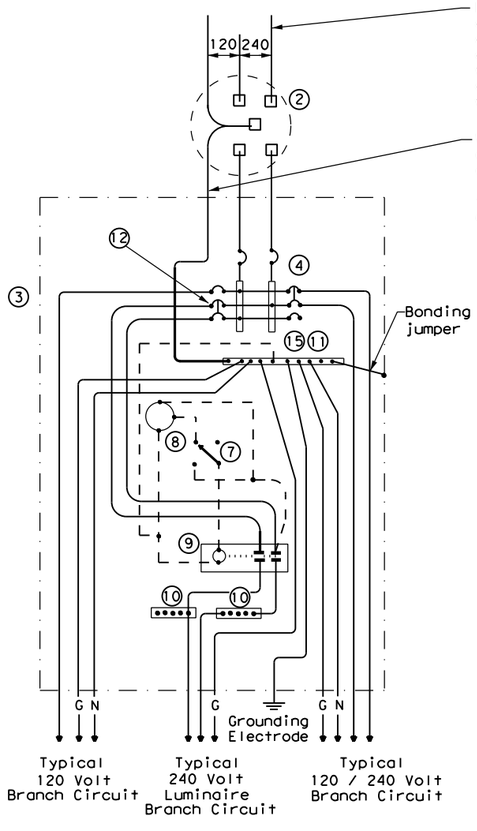
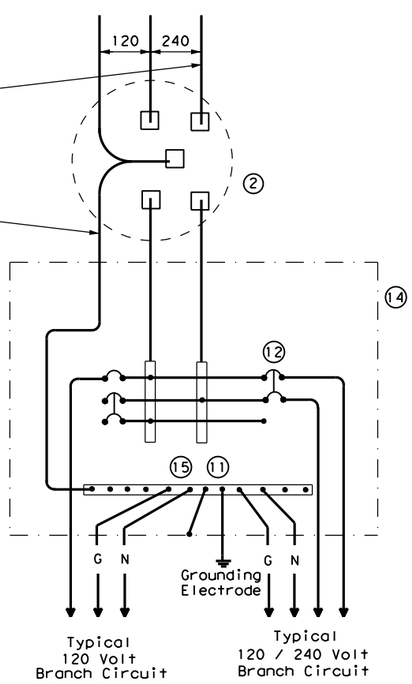
THREE WIRE



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



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

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

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

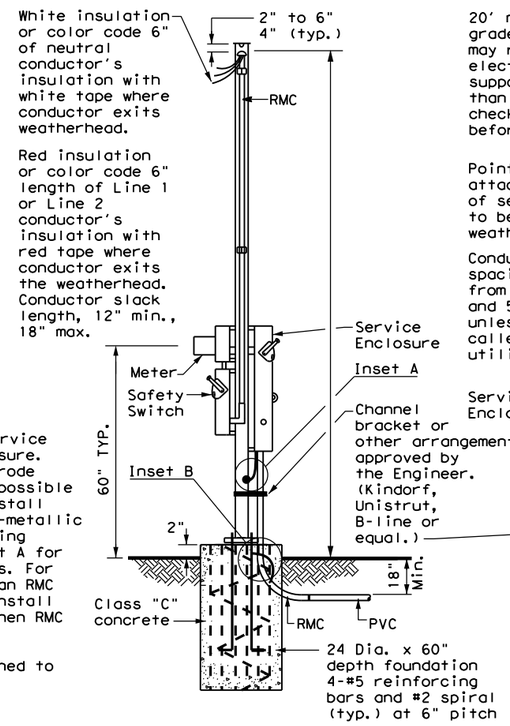
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

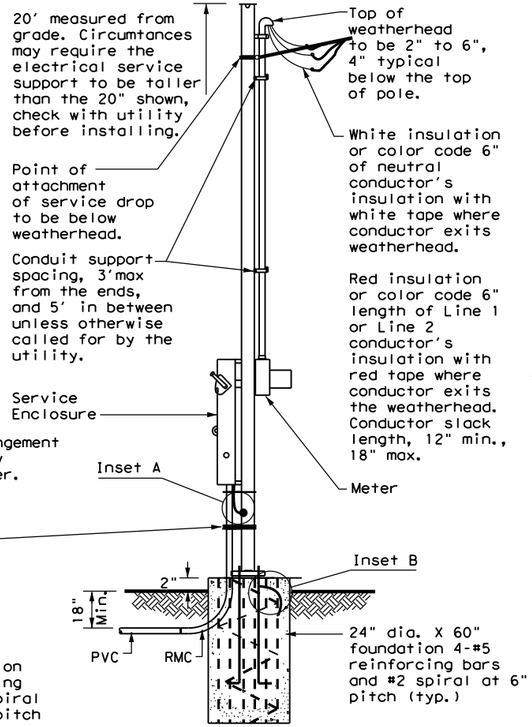
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

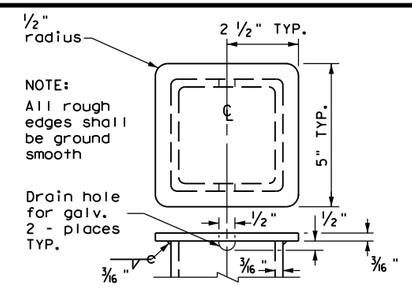


WITH SAFETY SWITCH

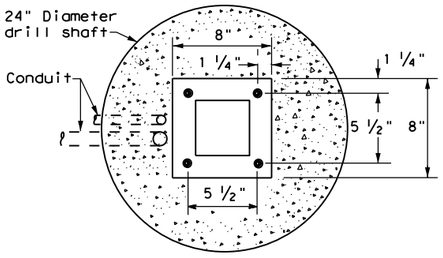


WITHOUT SAFETY SWITCH

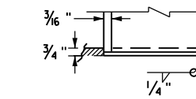
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

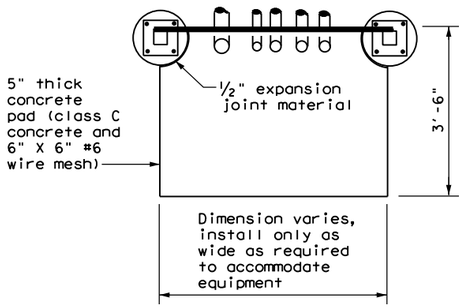


BASE PLATE DETAIL



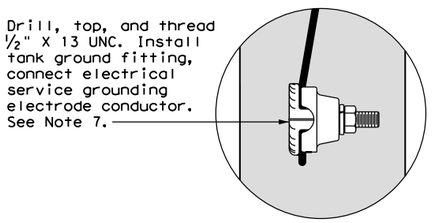
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



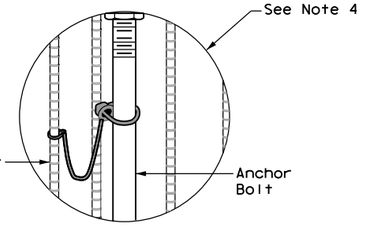
TOP VIEW

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

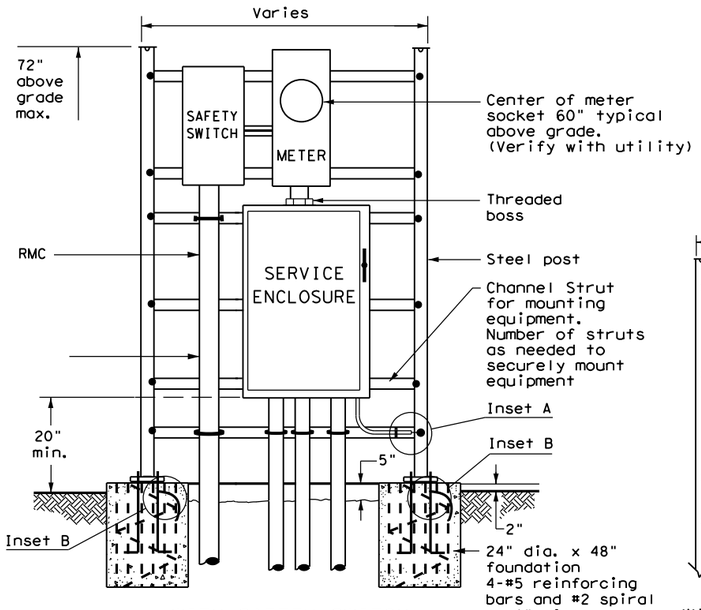


FRONT VIEW

INSET A

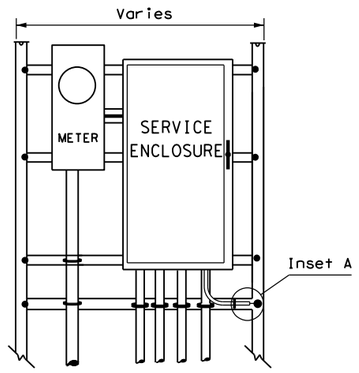


INSET B



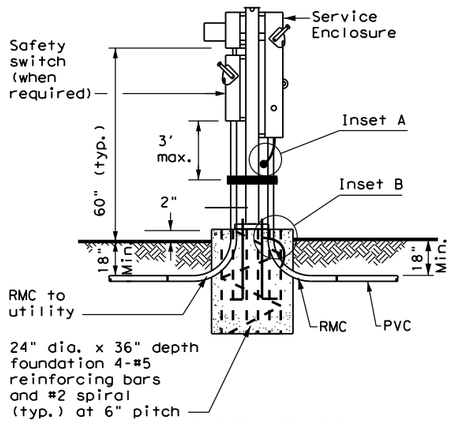
WITH SAFETY SWITCH

FRONT VIEW

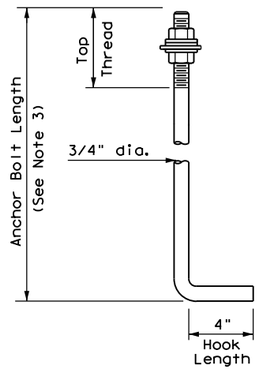


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

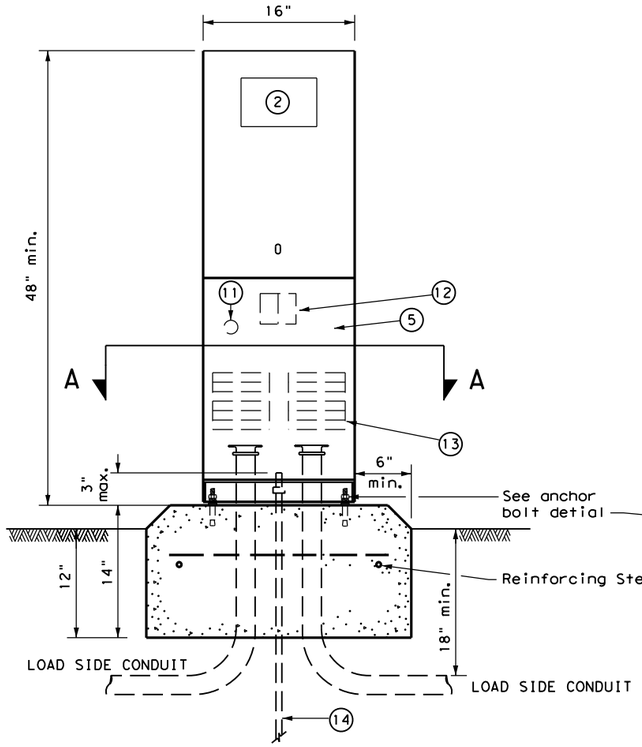
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 ⅛ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

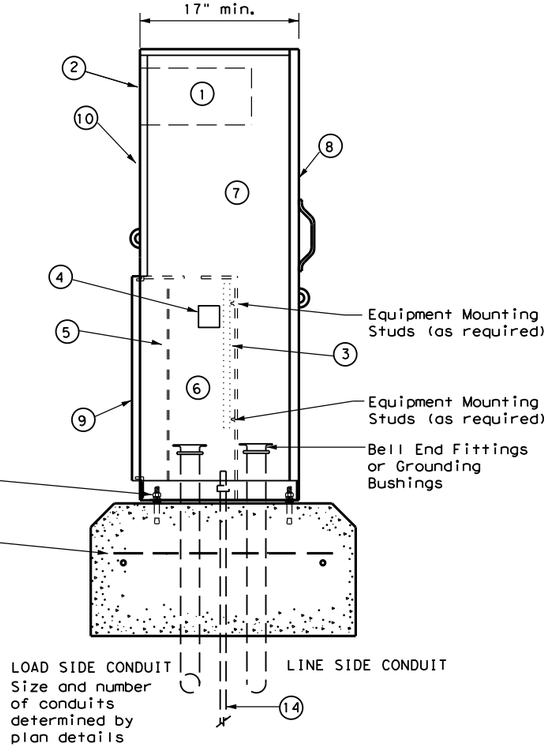
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to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

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

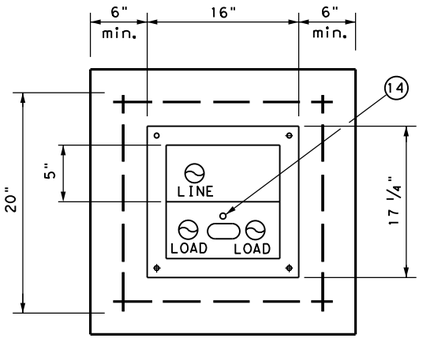


FRONT VIEW

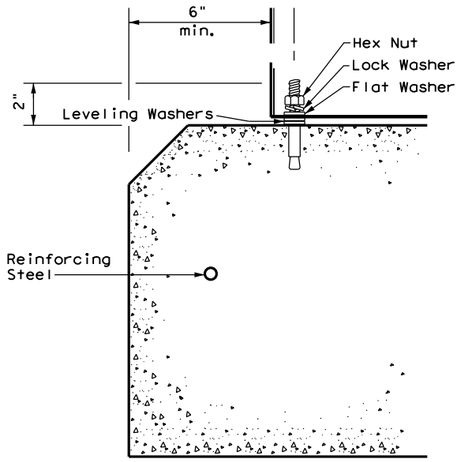


SIDE VIEW

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



SECTION A-A



ANCHOR BOLT DETAIL

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS
ED(9)-14

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ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. 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, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

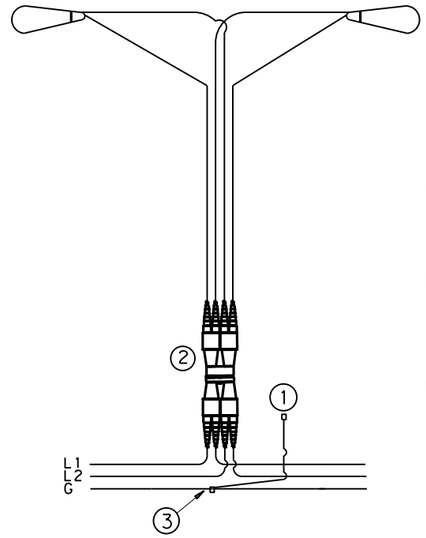
      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

NOTES:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.

Texas Department of Transportation

Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-17

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	AMA	POTTER		165

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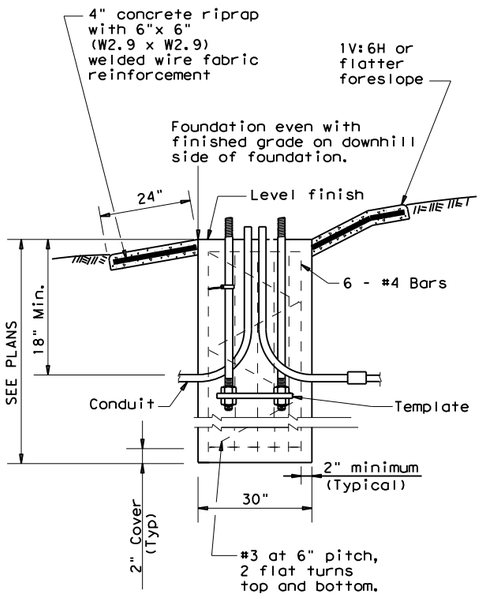
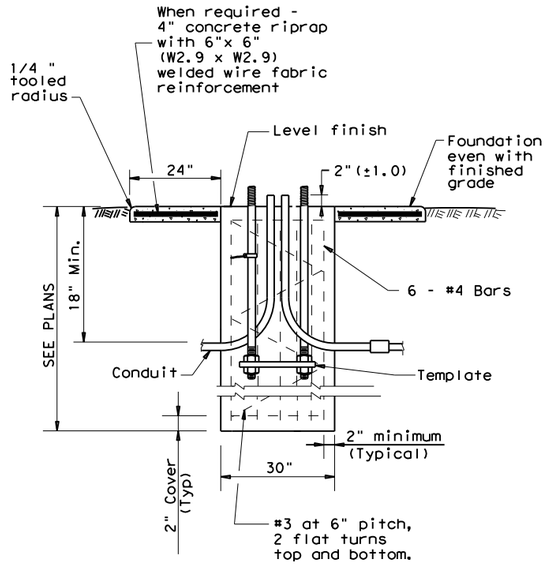


SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in.x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS
(See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Use riprap on T-base foundations that are located on sloped grades.

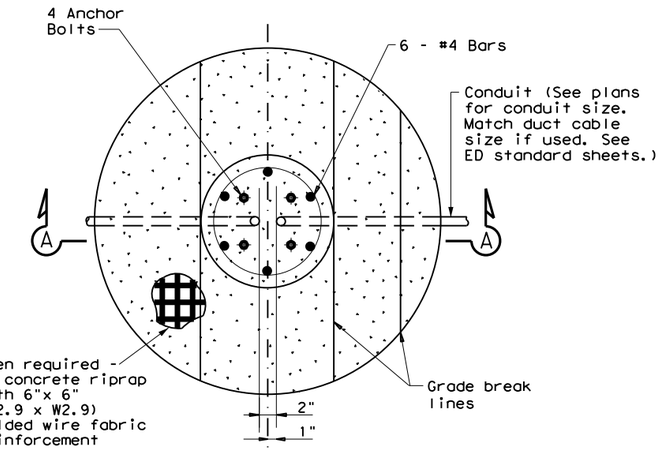
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

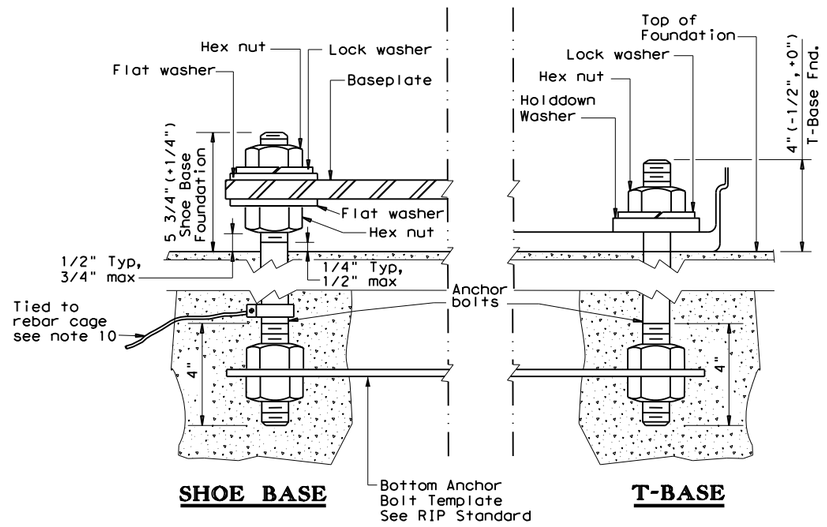
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS)

RID(2)-17

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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation				Quantity	T-Base Designation				Quantity	CSB/SSCB Mounted Designation				Quantity
	Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire	
20	(Type SA 20 S - 4)			(150W EQ) LED		(Type SA 20 T - 4)			(150W EQ) LED						
	(Type SA 20 S - 4 - 4)			(150W EQ) LED		(Type SA 20 T - 4 - 4)			(150W EQ) LED						
30	(Type SA 30 S - 4)			(250W EQ) LED		(Type SA 30 T - 4)			(250W EQ) LED		(Type SP 28 S - 4)			(250W EQ) LED	
	(Type SA 30 S - 4 - 4)			(250W EQ) LED		(Type SA 30 T - 4 - 4)			(250W EQ) LED		(Type SP 28 S - 4 - 4)			(250W EQ) LED	
	(Type SA 30 S - 8)			(250W EQ) LED		(Type SA 30 T - 8)			(250W EQ) LED		(Type SP 28 S - 8)			(250W EQ) LED	
	(Type SA 30 S - 8 - 8)			(250W EQ) LED		(Type SA 30 T - 8 - 8)			(250W EQ) LED		(Type SP 28 S - 8 - 8)			(250W EQ) LED	
40	(Type SA 40 S - 4)			(250W EQ) LED		(Type SA 40 T - 4)			(250W EQ) LED		(Type SP 38 S - 4)			(250W EQ) LED	
	(Type SA 40 S - 4 - 4)			(250W EQ) LED		(Type SA 40 T - 4 - 4)			(250W EQ) LED		(Type SP 38 S - 4 - 4)			(250W EQ) LED	
	(Type SA 40 S - 8)			(250W EQ) LED		(Type SA 40 T - 8)			(250W EQ) LED		(Type SP 38 S - 8)			(250W EQ) LED	
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED		(Type SP 38 S - 8 - 8)			(250W EQ) LED	
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED		(Type SP 38 S - 10)			(250W EQ) LED	
	(Type SA 40 S - 10 - 10)			(250W EQ) LED		(Type SA 40 T - 10 - 10)			(250W EQ) LED		(Type SP 38 S - 10 - 10)			(250W EQ) LED	
	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED		(Type SP 38 S - 12)			(250W EQ) LED	
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED		(Type SP 38 S - 12 - 12)			(250W EQ) LED	
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED		(Type SP 48 S - 4)			(400W EQ) LED	
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	(Type SA 50 S - 8)			(400W EQ) LED		(Type SA 50 T - 8)			(400W EQ) LED		(Type SP 48 S - 8)			(400W EQ) LED	
	(Type SA 50 S - 8 - 8)			(400W EQ) LED		(Type SA 50 T - 8 - 8)			(400W EQ) LED		(Type SP 48 S - 8 - 8)			(400W EQ) LED	
	(Type SA 50 S - 10)			(400W EQ) LED		(Type SA 50 T - 10)			(400W EQ) LED		(Type SP 48 S - 10)			(400W EQ) LED	
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	(Type SA 50 S - 12 - 12)			(400W EQ) LED		(Type SA 50 T - 12 - 12)			(400W EQ) LED		(Type SP 48 S - 12 - 12)			(400W EQ) LED	

OTHER Designation				Quantity
Pole	A1	A2	Luminaire	

GENERAL NOTES:

1. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.

2. The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.

4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.

   a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
   b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
   c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
   d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.

5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.

   a. Meet all of the requirements stated above for optional steel pole designs and the following:
      1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
      2. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
      3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
      4. Pole components shall be constructed using the following material:
         Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
         Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
         Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
         Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
         Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
         Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.

6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.

7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

- SA: Pole and mast arm may be steel or aluminum.
- ST: Pole and mast arm must be steel.
- AL: Pole and mast arm must be aluminum.
- SP: Special (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Bridge/Ret.Wall Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure Sodium; LED - LED luminaire)

SHEET 1 OF 4

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ROADWAY ILLUMINATION POLES

RIP(1)-19

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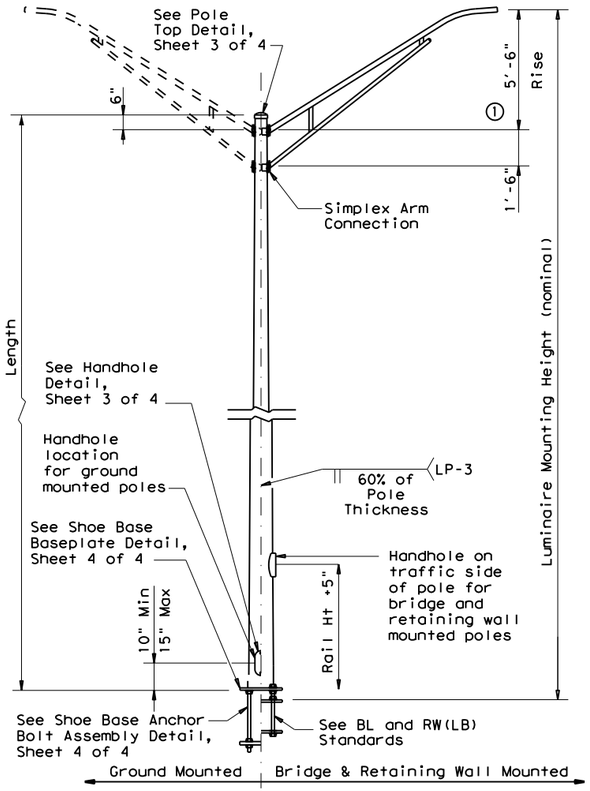
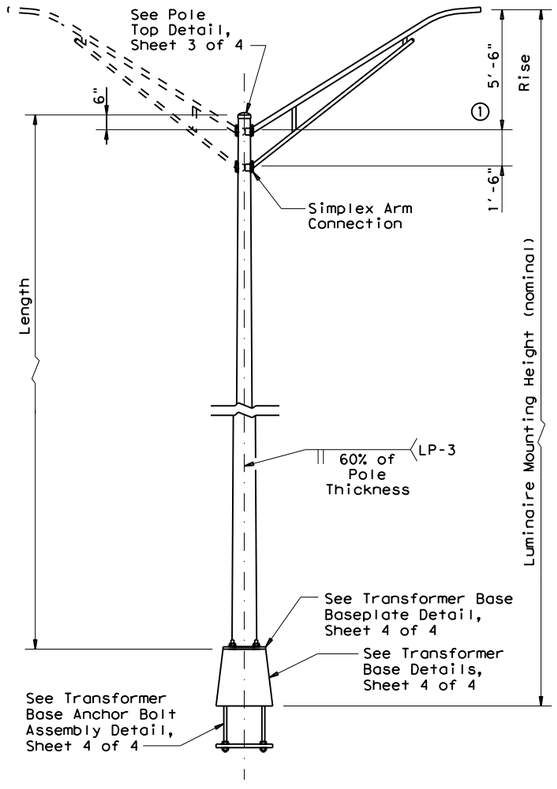


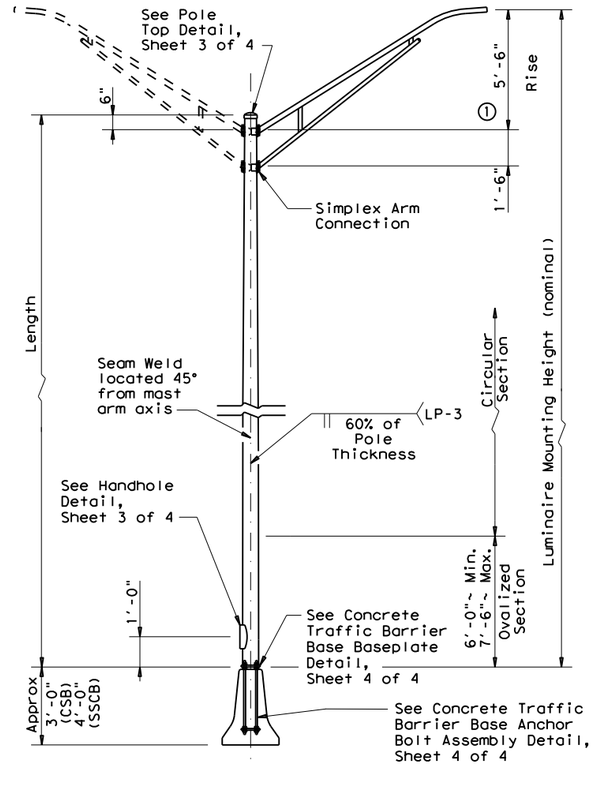
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About ℄ of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

① 2'-6" rise for 4 ft. luminaire arms.

② Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.

③ A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

GENERAL NOTES:

1. Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals , 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
2. Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
3. Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance 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 these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
4. For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
5. Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
6. Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
7. Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
8. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
9. Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
10. All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
11. The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
12. Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
13. Erect transformer base poles in accordance with sheet RID(1).

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ROADWAY ILLUMINATION POLES

RIP(2)-19

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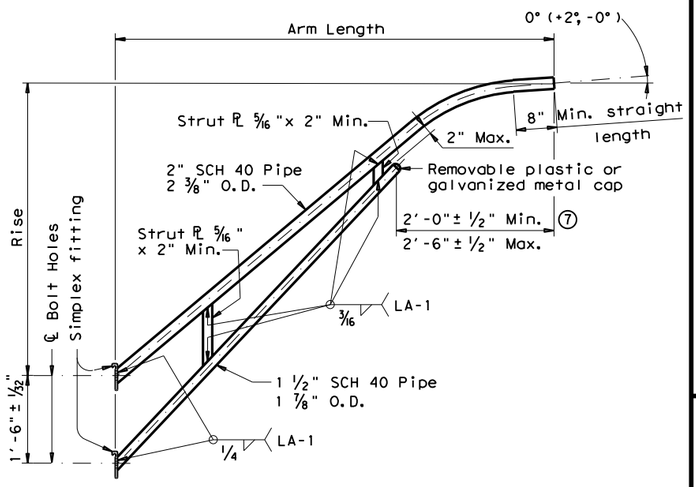
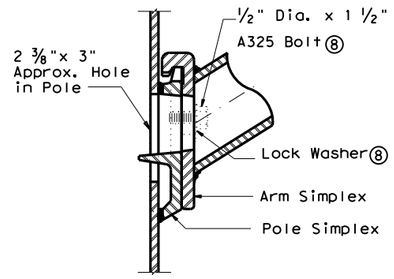


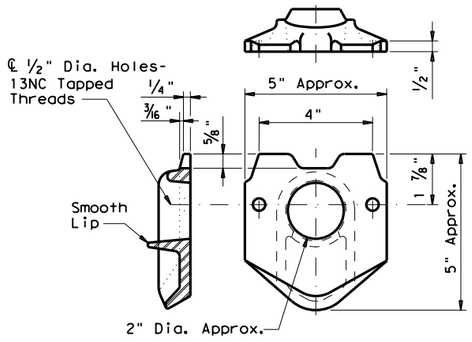
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

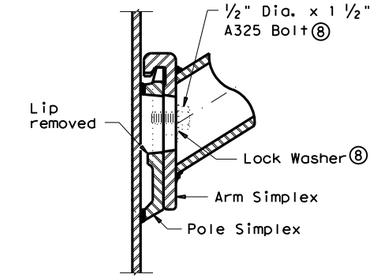
ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"



UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

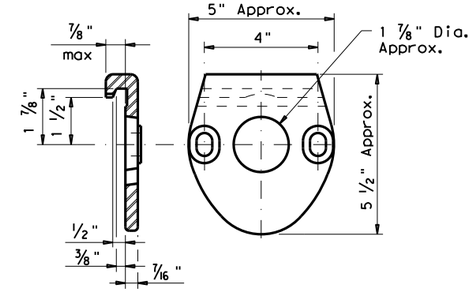


POLE SIMPLEX DETAIL ⑨



LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

SECTION B-B



ARM SIMPLEX DETAIL ⑨

NOTES:

④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

⑤ 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.

⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.

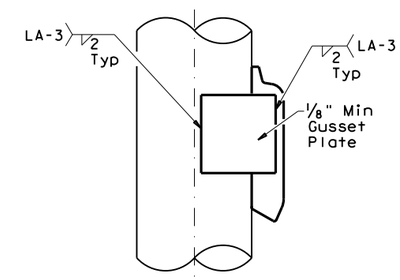
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

⑧ Each pole simplex fitting shall be supplied with 2 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.

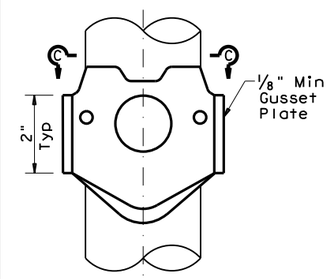
⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

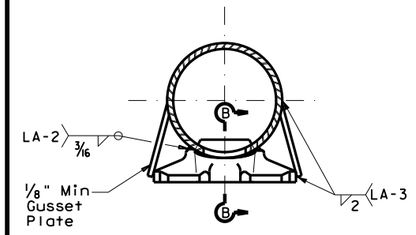
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted



SIDE

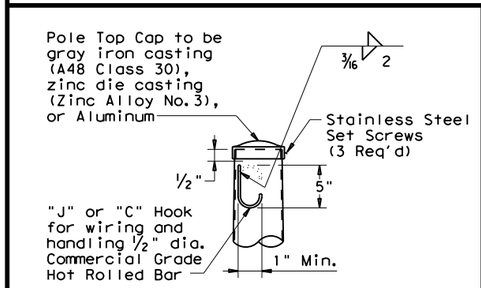


ELEVATION

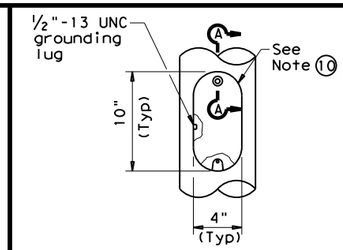


SECTION C-C

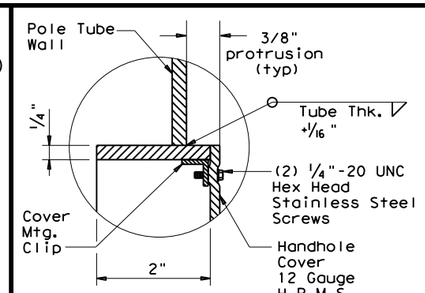
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(3)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
7-17	DIST	COUNTY		SHEET NO.
12-19	AMA	POTTER		169

73C

DATE:
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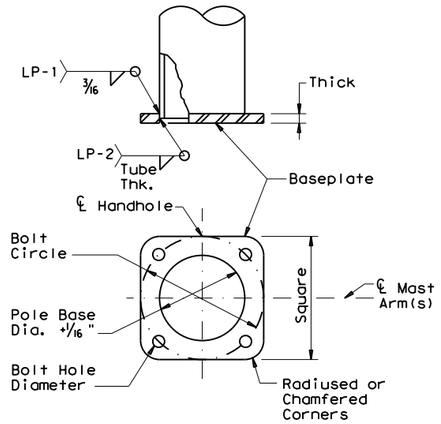
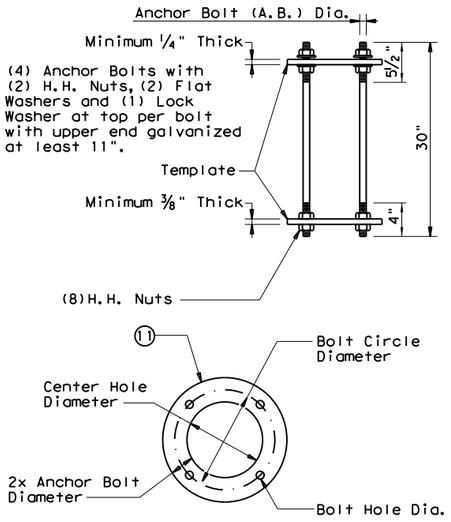


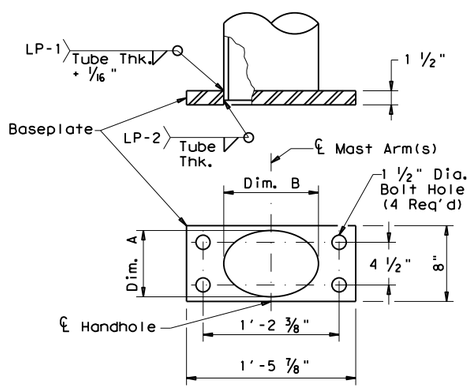
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



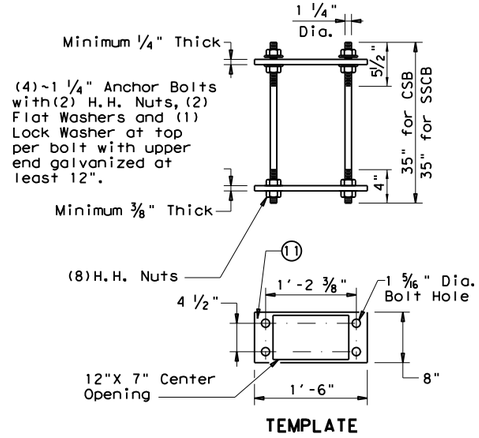
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20'-39'	1"	13"	11"	1 1/16"
40'-50'	1 1/4"	15"	12 1/2"	1 5/16"



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

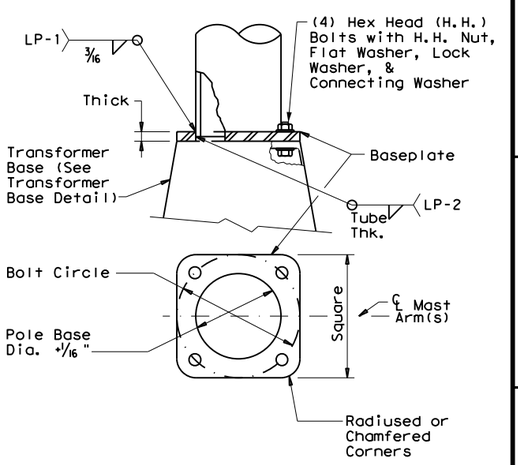
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



TEMPLATE

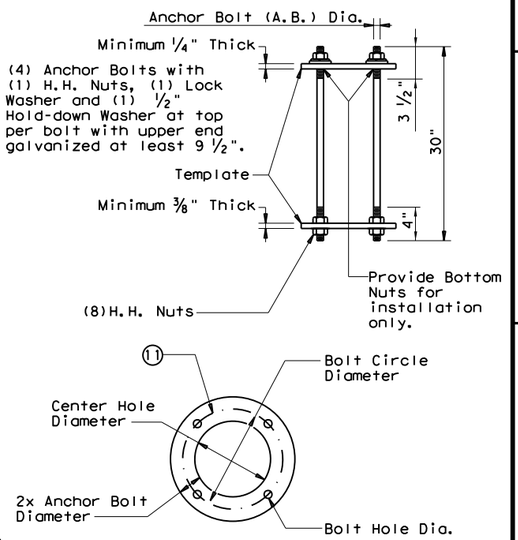
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



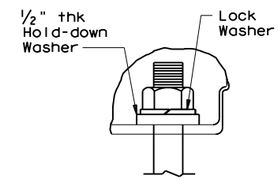
TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

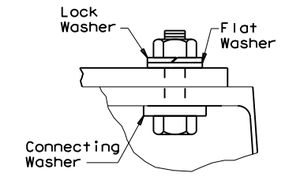


TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

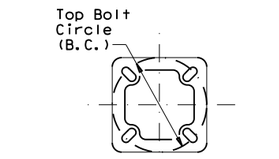
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



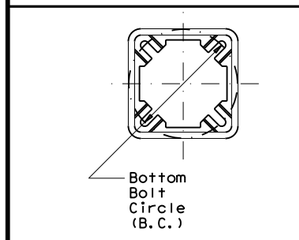
DETAIL A



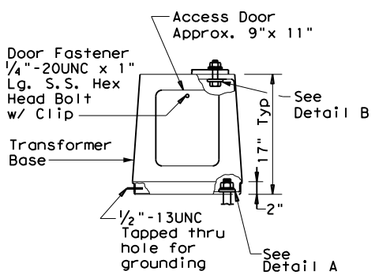
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
3. Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
4. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
5. Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

(11) Anchor Bolt Templates do not need to be galvanized.

(12) Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026, ETC.	SH 136
7-17	DIST	COUNTY		SHEET NO.
12-19	AMA	POTTER		170

730

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. CITY OF AMARILLO

☐ 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. Comply with Construction General Permit and implement project SW3P's. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. Submit NOI to TCEQ and the Engineer. Comply with City of Amarillo MS4 permit.

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. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area will cease and TxDOT archeological staff will be contacted to initiate post-review discovery procedures.

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. Comply with Executive Order 13112 on Invasive Species and the intent of the Executive Order Memorandum on Beneficial Landscapes for re-vegetating the project area. The proposed seed mixture (both grasses and forbs) would be in accordance with Item 164, Seeding for Erosion Control in TxDOT's Standard Specifications for the construction of Highways, Streets, and Bridges.

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. American Badger, Prairie Vole, Swift Fox, Thirteen-lined Ground Squirrel: Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.

2. Western Box Turtle, Texas Horned Lizard, Western Hognose Snake, Prairie Rattlesnake, Woodhouse's Toad: Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered. For the Texas Horned Lizard, avoidance should include avoiding harvester ant beds in the selection of Project Specific Locations (PSL's).

3. Bird BMP's:
   a) Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season;
   b) avoid the removal of unoccupied, inactive nests, as practicable;
   c) do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

4. The Migratory Bird Treaty Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, egg in part or in whole, without a Federal permit issued in accordance within the Act's policies and regulations. 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.

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.	0379	03	026, ETC.	SH 136	
	DIST	COUNTY		SHEET NO.	
	AMA	POTTER		171	

SITE DESCRIPTION

PROJECT LIMITS:
CSJ: 0379-03-026: SH 136 AT FM 1912
CSJ: 0379-03-027: SH 136 FROM FOLSOM ROAD TO 0.2 MILES SOUTH OF SL 335.

PROJECT DESCRIPTION:

For the construction of safety improvements along SH 136. Consisting of grading, pavements, drainage, safety illumination, signs, and pavement markings.

MAJOR SOIL DISTURBING ACTIVITIES:

Removing existing pavement, excavation, embankment, grading, drainage structure installation, and lightning foundation installation.

TOTAL PROJECT AREA: 92.56 AC

TOTAL AREA TO BE DISTURBED: 17.86 AC

WEIGHTED RUNOFF COEFFICIENT
(BEFORE CONSTRUCTION): 0.55
(AFTER CONSTRUCTION): 0.56

EXPLANATION OF THE TECHNICAL BASIS USED TO SELECT THE PRACTICES TO CONTROL POLLUTION WHERE FLOWS EXCEED PRE-DEVELOPMENT LEVELS

Considerations of hard scape due to development that will increase velocity.

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

The site is in a rural area with (approx.) 64% vegitative cover.

Pictures of the existing vegetative cover would be helpful in the determination of 70% cover.

NAME OF RECEIVING WATERS: *Various non-jurisdictional playa lakes.*

FILENAME 96SW3P.dgn

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [X] MULCHING
- [ ] SOIL RETENTION BLANKET
- [ ] BUFFER ZONES
- [X] PRESERVATION OF NATURAL RESOURCES

OTHER:

STRUCTURAL PRACTICES:

Permanent	Temporary	
		SILT FENCES
		HAY BALES
		ROCK BERMS
		DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
		DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
		DIVERSION DIKE AND SWALE COMBINATIONS
		PIPE SLOPE DRAINS
		PAVED FLUMES
	X	ROCK BEDDING AT CONSTRUCTION EXIT
		TIMBER MATTING AT CONSTRUCTION EXIT
		CHANNEL LINERS
		SEDIMENT TRAPS
		SEDIMENT BASINS
		STORM INLET SEDIMENT TRAP
		STONE OUTLET STRUCTURES
		CURBS AND GUTTERS
		STORM SEWERS
		VELOCITY CONTROL DEVICES

OTHER: EROSION CONTROL LOG

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

STORM WATER MANAGEMENT:

Existing natural area should be protected asmuch as possible.

Storm water drainage is provided through open ditches. Rock filter dam will be used at the downstream side of the proposed/existing culvert locations.

DESCRIPTION OF ANY MEASURES INSTALLED DURING THE CONSTRUCTION PROCESS TO CONTROL STORM WATER DISCHARGES AFTER CONSTRUCTION OPERATIONS HAVE BEEN COMPLETED:

All disturbed areas shall be seeded and watered prior to completion of the construction.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: *All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done 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.*

INSPECTION: *An inspection will be performed by a TxDOT inspector of the construction site at least once every 7 calendar days regardless of rainfall. An inspection and Maintenance Report will be made per each inspection. Based on the inspection results, the controls shall be revised per the inspection report.*

WASTE MATERIALS: *All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will meet all state and local city solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as necessary or as required by local regulation, and the trash will be hauled to a permitted landfill. No construction waste material will be buried on site.*

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): *At a minimum, any products in the following catagories are considered to be hazardous: Paints, Acids for cleaning masonry surfaces, Cleaning Solvents, Asphalt products, Chemical additives for soil stabilization, or Concrete curing compounds and additives. In the event of a spill which may be hazardous, the Spill Coordinator should be contacted immediately @ (806)356-3200.*

SANITARY WASTE: *All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor.*

OFF SITE VEHICLE TRACKING:

- [ ] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: *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. Construction staging areas and vehicle maintenance areas shall be constructed by the Contractor in a manner to minimize the runoff of pollutants. All waterways shall be cleared as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.*

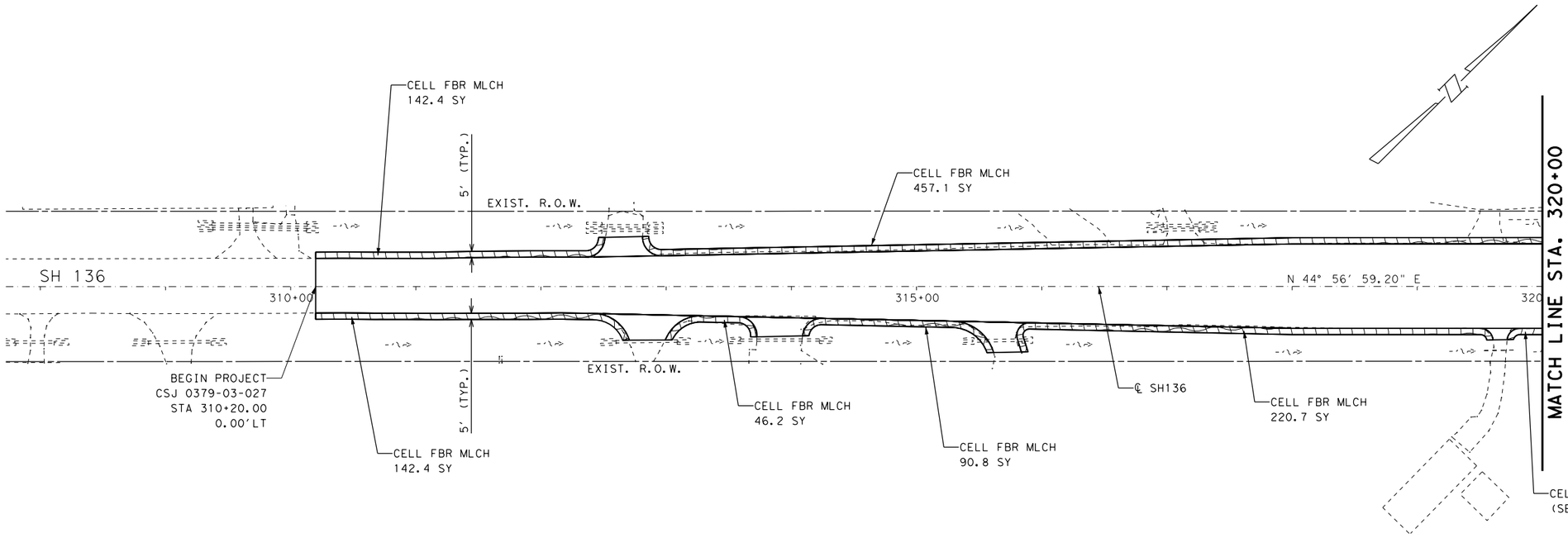
STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER
07/01/2020

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		172
STATE	DIST.	COUNTY	
TEXAS	AMA.	POTTER COUNTY	
CONT.	SECT.	JOB	HIGHWAY NO.
0379	03	026,ETC	SH 136

sw3p.dgn



LEGEND

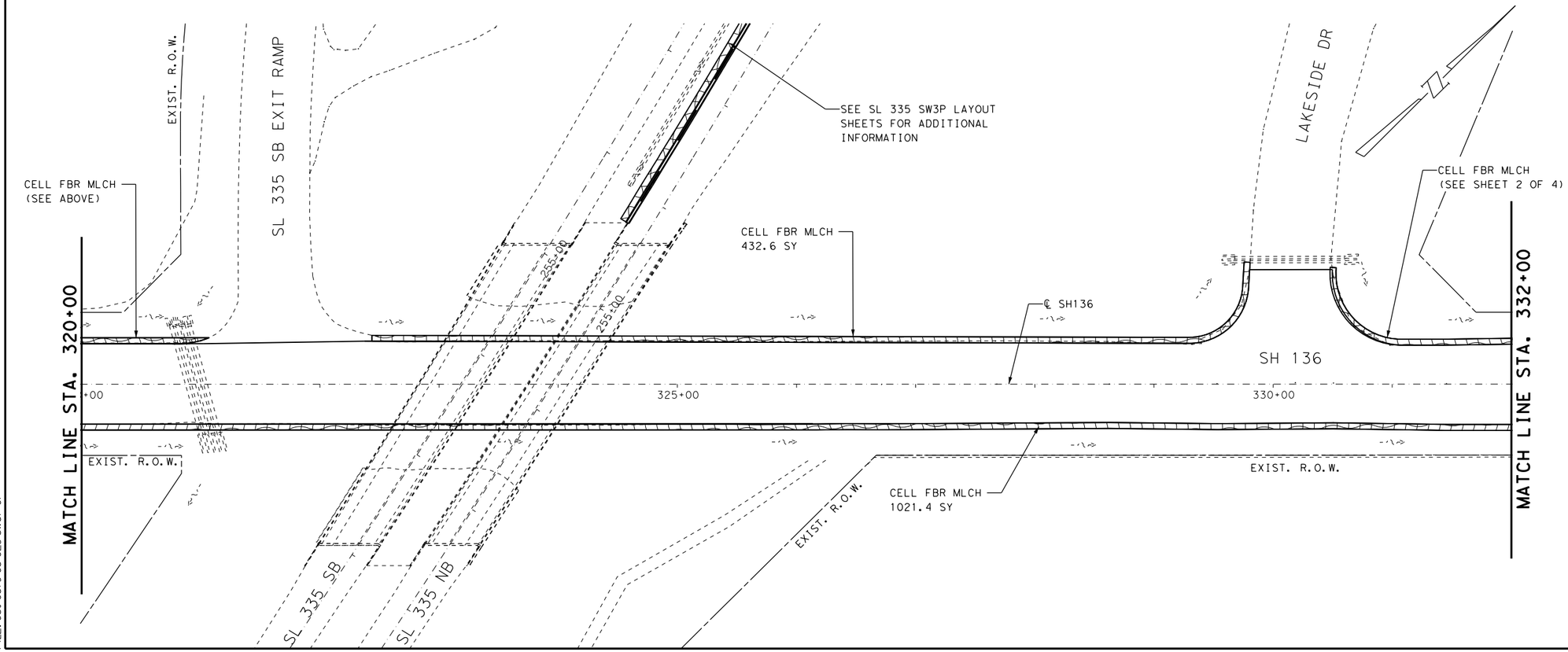
- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- EROSION CONTROL LOGS

NOTE:

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATE. ACTUAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE, AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS & SPECIFICATIONS FOR EROSION CONTROL.

0 25 50 100 200

SCALE: 1"=100'



NO.	DATE	REVISION	APPROVED

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED
PROFESSIONAL ENGINEER

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SH 136

SW3P LAYOUT
BEGIN TO STA 332+00

SHEET 1 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		173
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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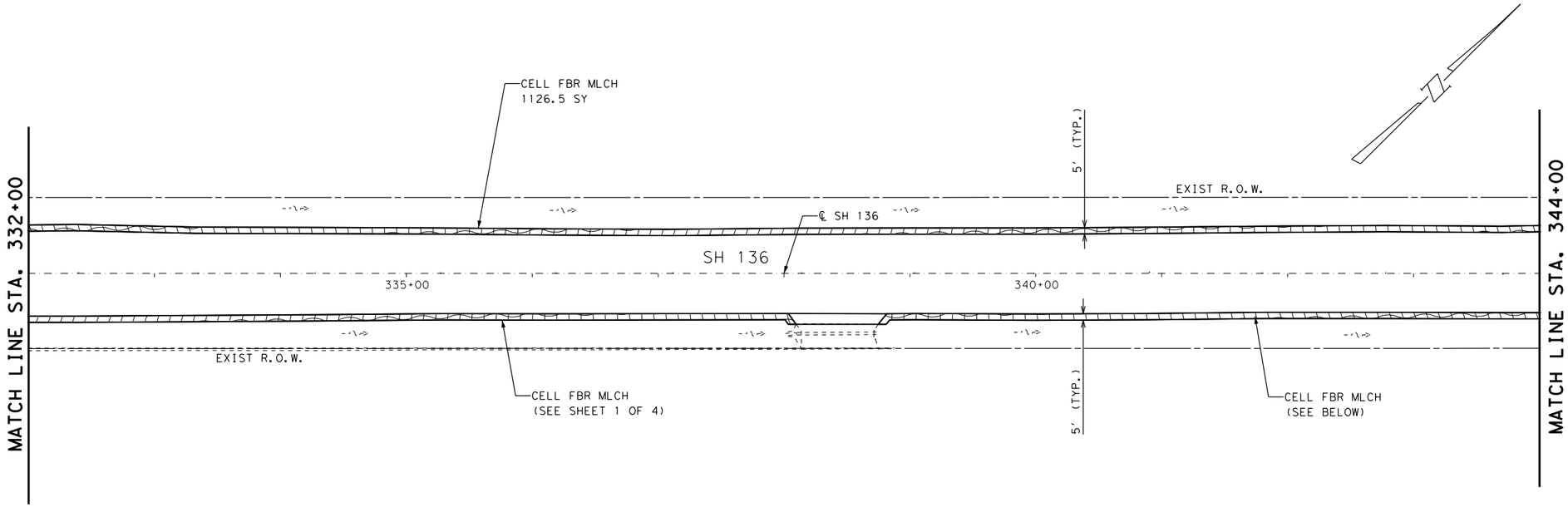
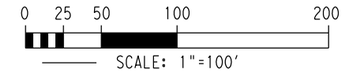


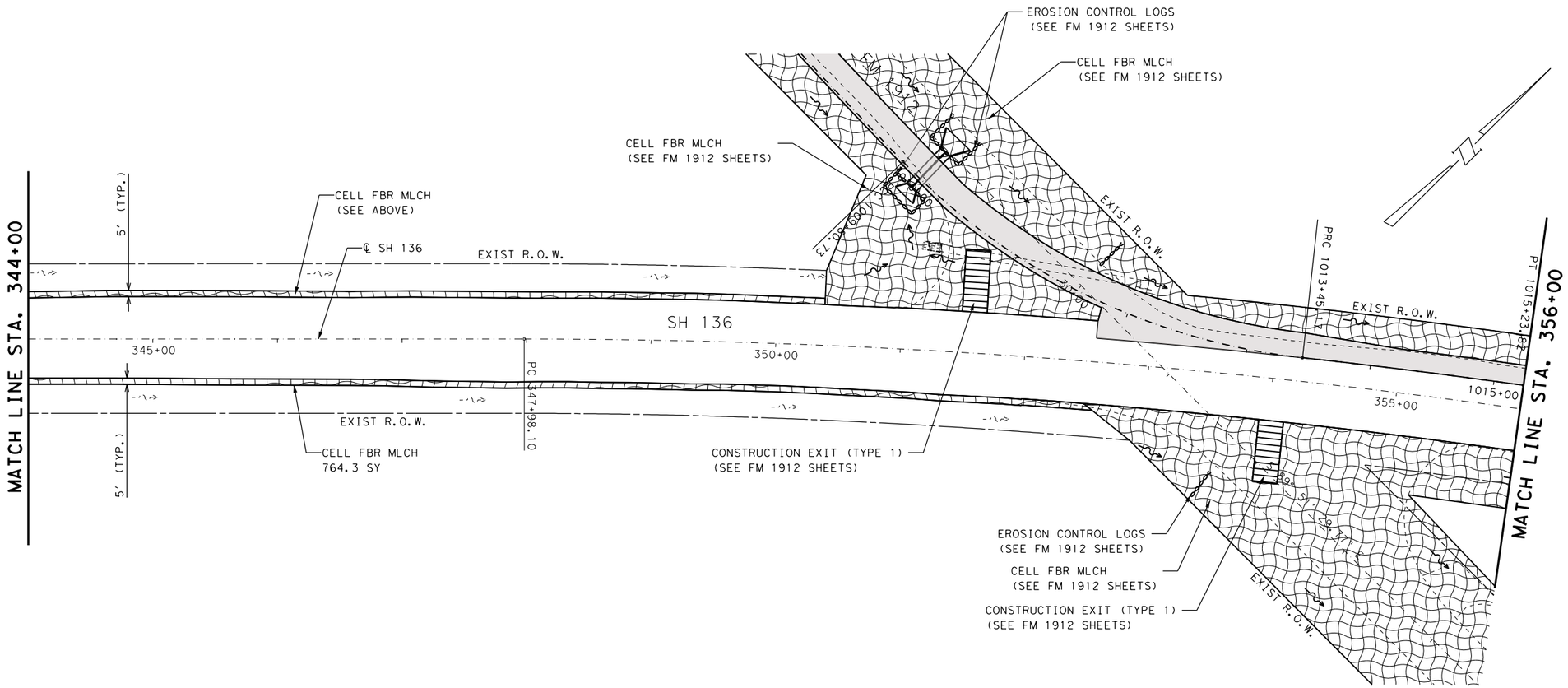
LEGEND

- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- EROSION CONTROL LOGS

NOTE:

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATE. ACTUAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE, AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS & SPECIFICATIONS FOR EROSION CONTROL.





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SW3P LAYOUT
STA 332+00 TO 356+00

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	174

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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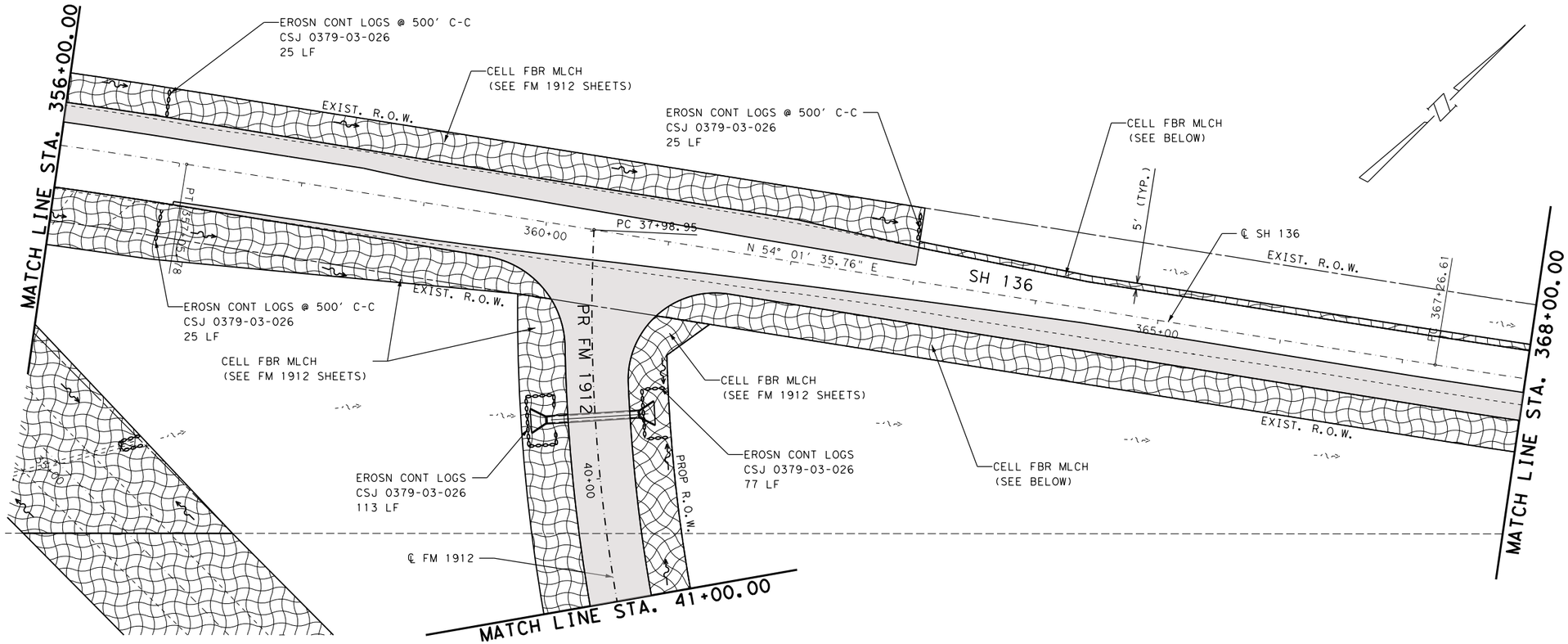

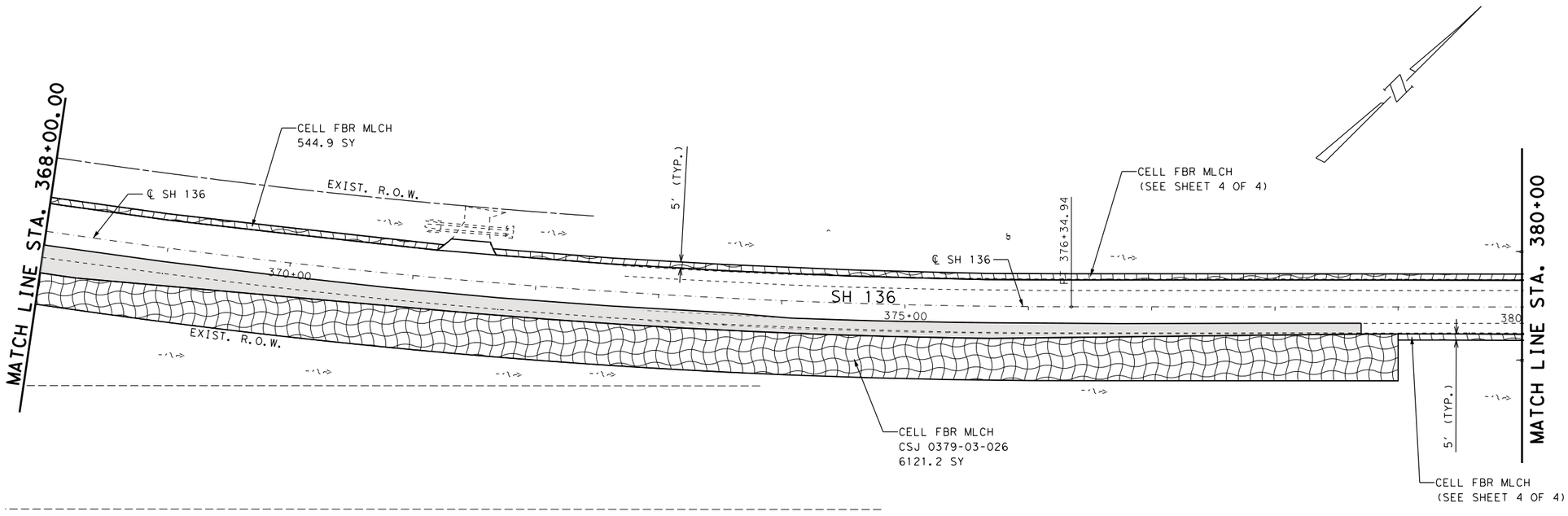

LEGEND

- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- EROSION CONTROL LOGS

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0 25 50 100 200

SCALE: 1"=100'

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SH 136

SW3P LAYOUT
STA 356+00 TO 380+00

SHEET 3 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		175
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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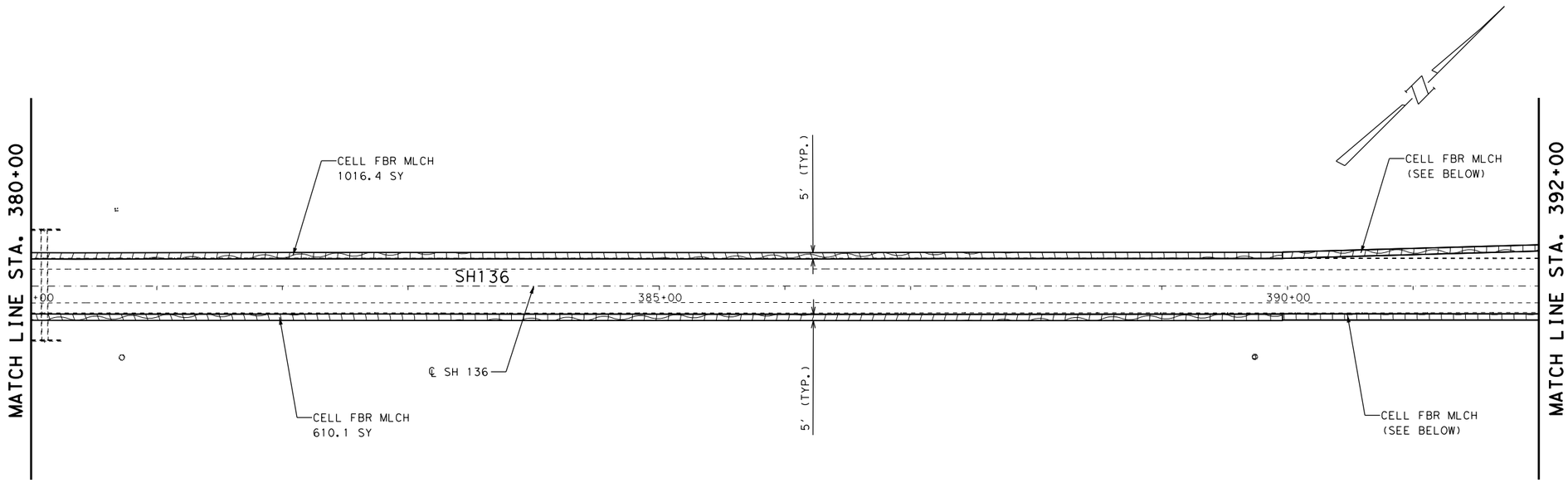

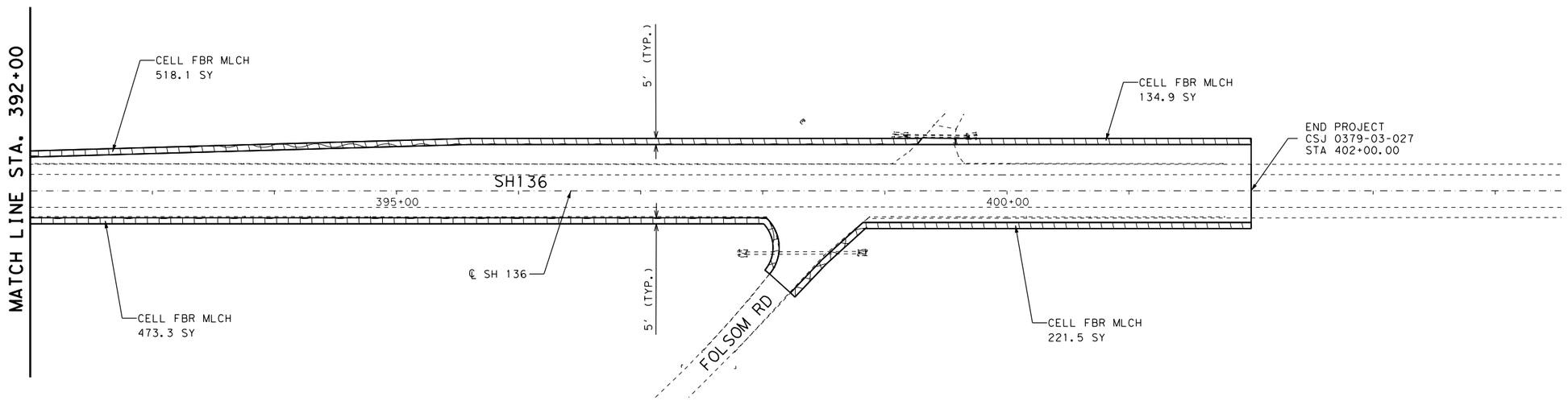

LEGEND

- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
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0 25 50 100 200

SCALE: 1"=100'

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SH 136
SW3P LAYOUT
STA 380+00 TO END

SHEET 4 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		176
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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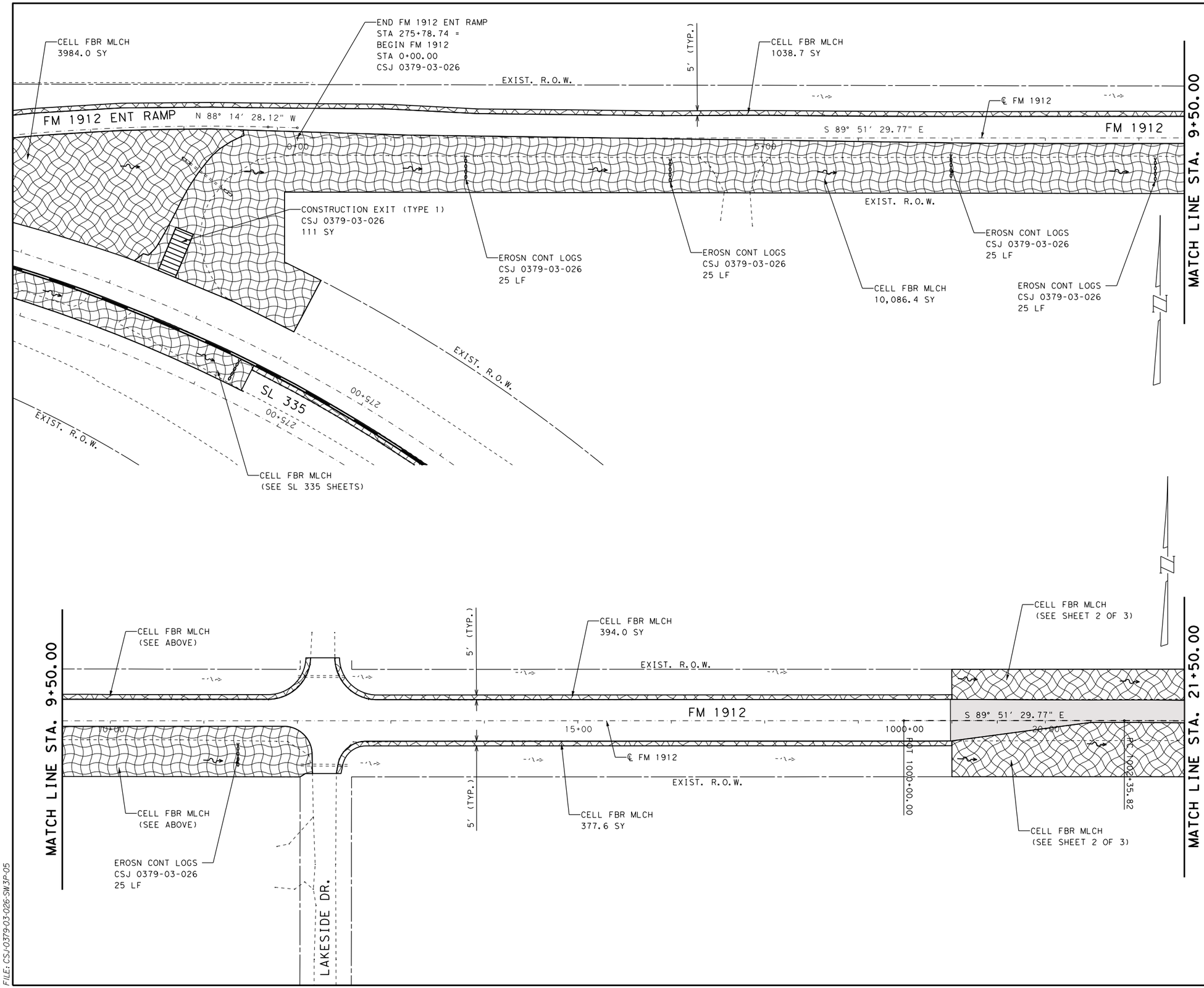

LEGEND

- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
- EROSION CONTROL LOGS

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4. LOCATIONS OF CONSTRUCTION EXITS ARE APPROXIMATE. ACTUAL LOCATIONS ARE TO BE DETERMINED IN THE FIELD.

0 25 50 100 200

SCALE: 1"=100'

NO.	DATE	REVISION	APPROVED

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SH 136
FM 1912
SW3P LAYOUT
STA 0+00 TO STA 21+50

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	177

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

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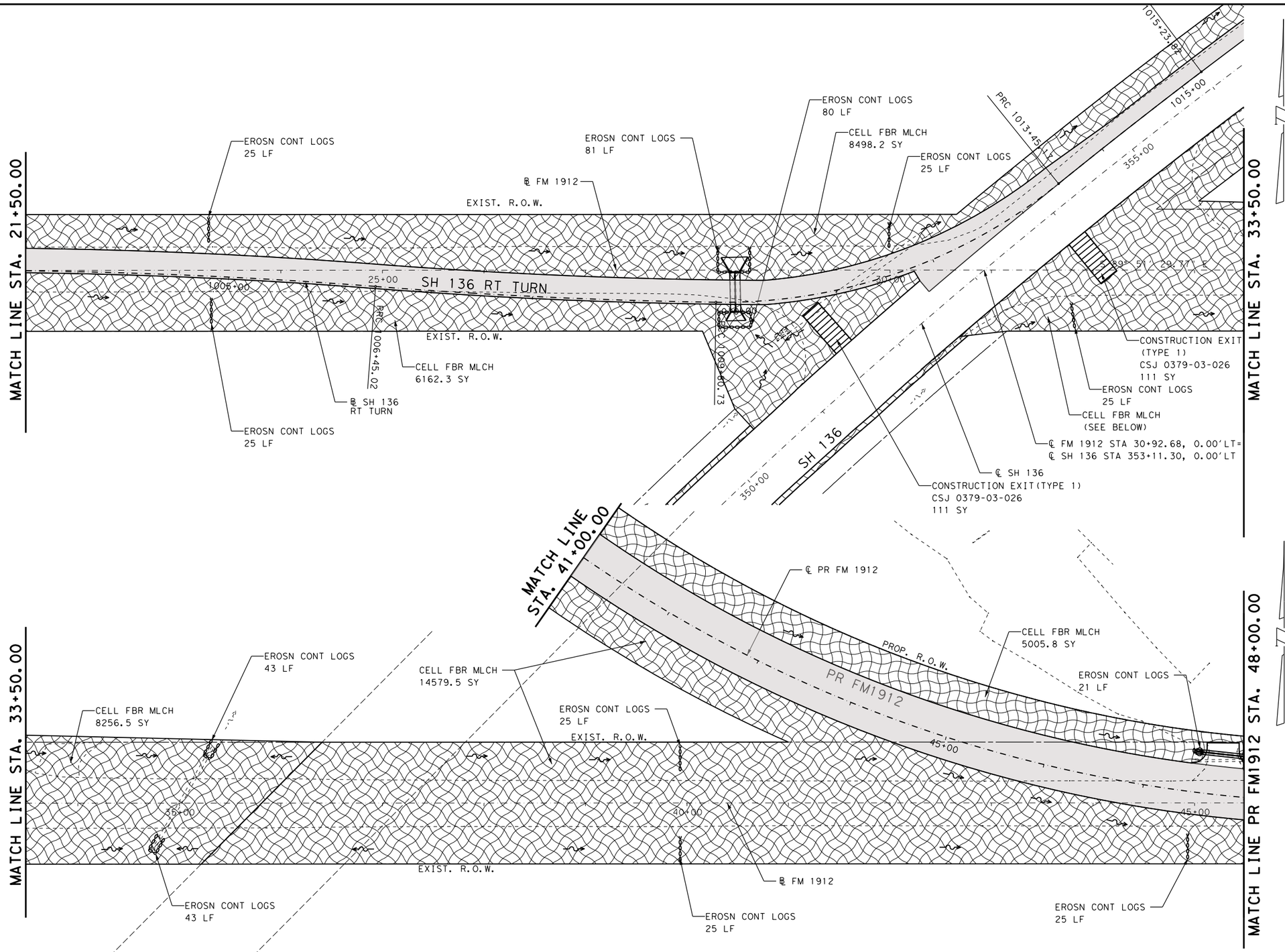

LEGEND

- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
- PROPOSED FLOW ARROWS
- EXISTING FLOW ARROWS
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0 25 50 100 200

SCALE: 1"=100'

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SH 136
FM 1912
SW3P LAYOUT
STA 21+50 TO STA 48+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		178
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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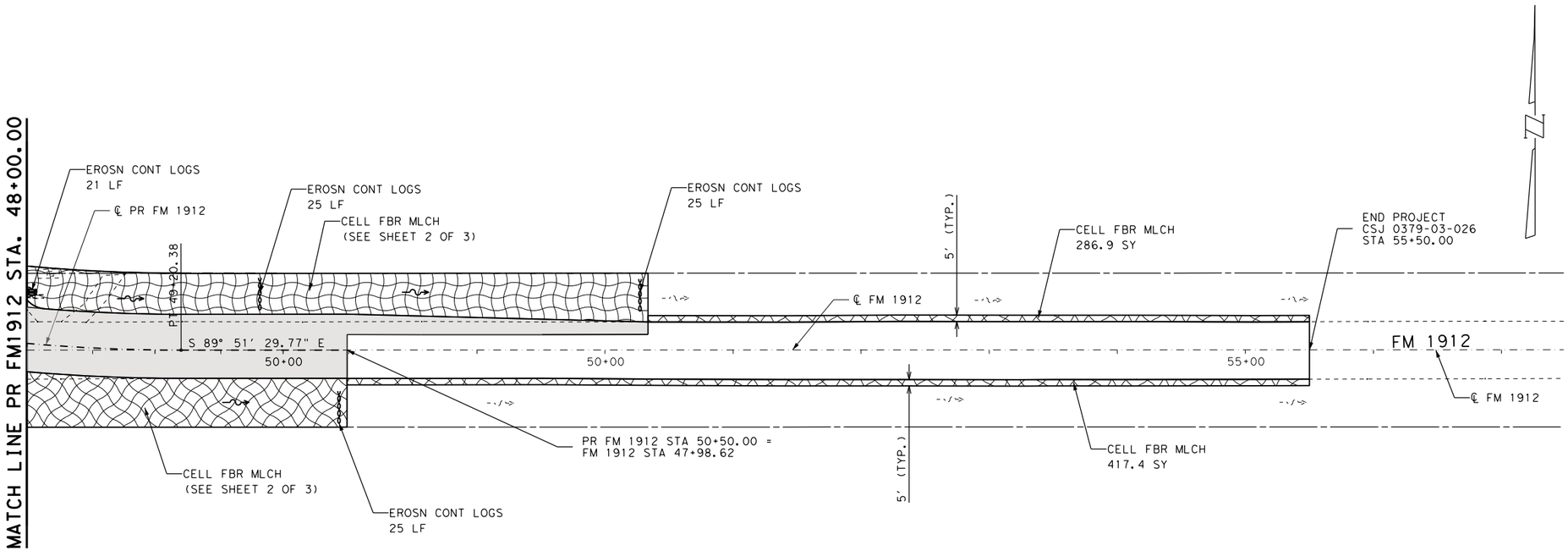

LEGEND

- DIRECTION OF TRAFFIC
- CELL FBR MLCH
- CONSTRUCTION EXIT (TYPE 1)
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0 25 50 100 200

SCALE: 1"=100'

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SH 136

FM 1912
SW3P LAYOUT
STA 48+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		179
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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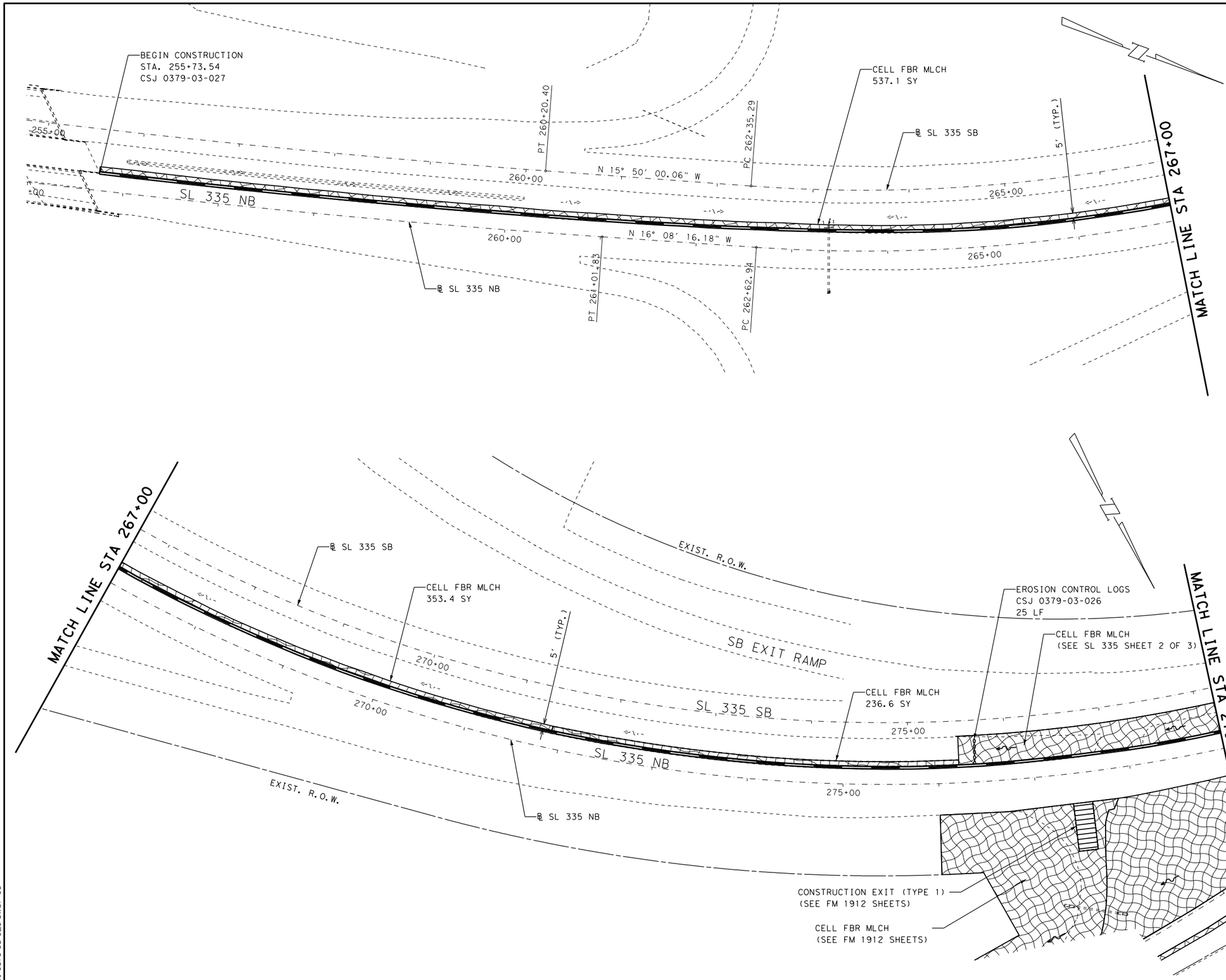

LEGEND

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SH 136

SL 335
SW3P LAYOUT
BEGIN TO STA 279+00

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
	SEE TITLE SHEET	180

STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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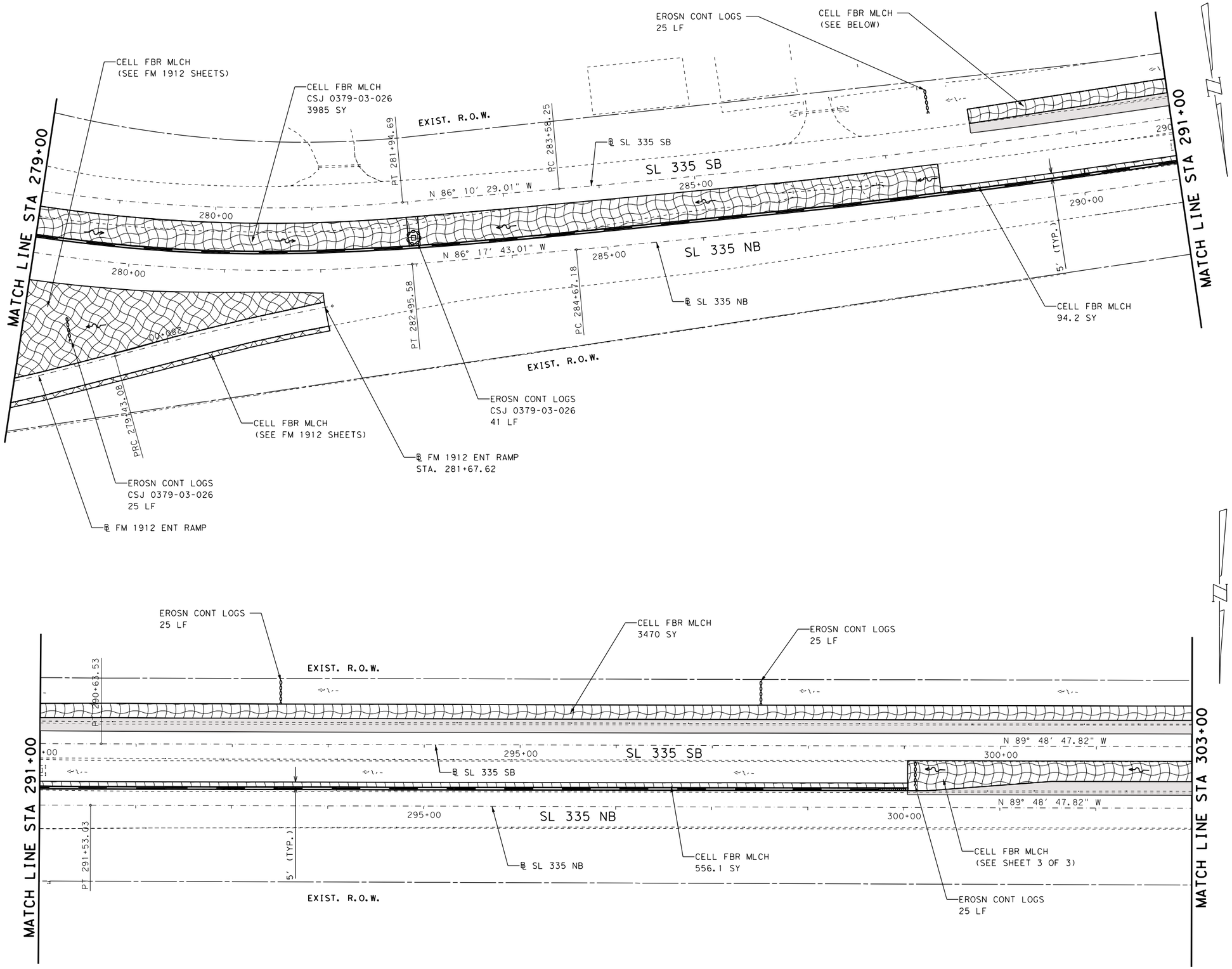

LEGEND

- DIRECTION OF TRAFFIC
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SH 136

SL 335
SW3P LAYOUT
STA 279+00 TO 303+00

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		181
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026, ETC.	SH 136

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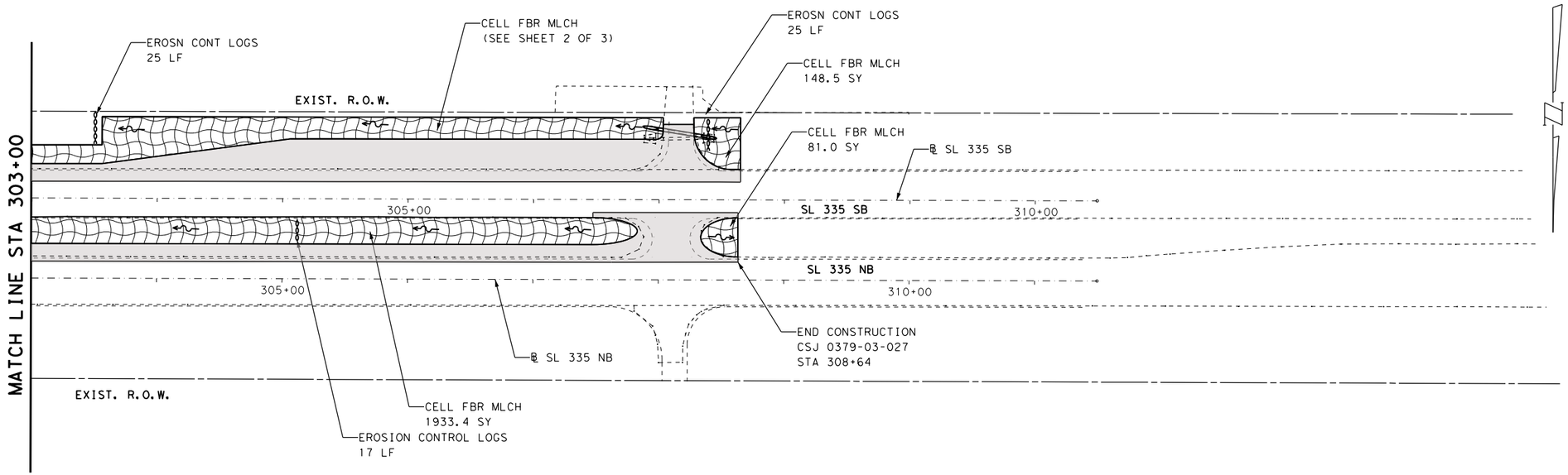

LEGEND

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SCALE: 1"=100'

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SH 136

SL 335
SW3P LAYOUT
STA 303+00 TO END

SHEET 3 OF 3

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	SEE TITLE SHEET		182
STATE	DIST.	COUNTY	
TEXAS	AMA	POTTER	
CONT.	SECT.	JOB	STREET/ROAD:
0379	03	026,ETC.	SH 136

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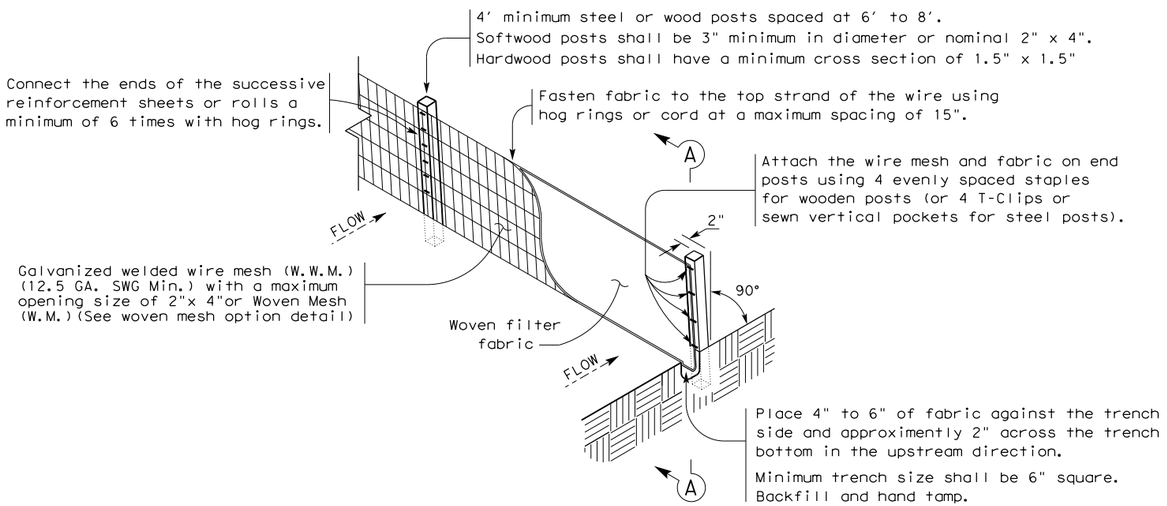
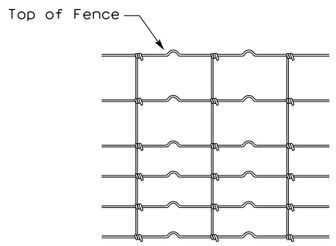
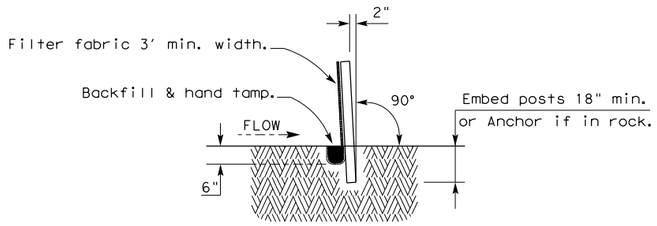


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

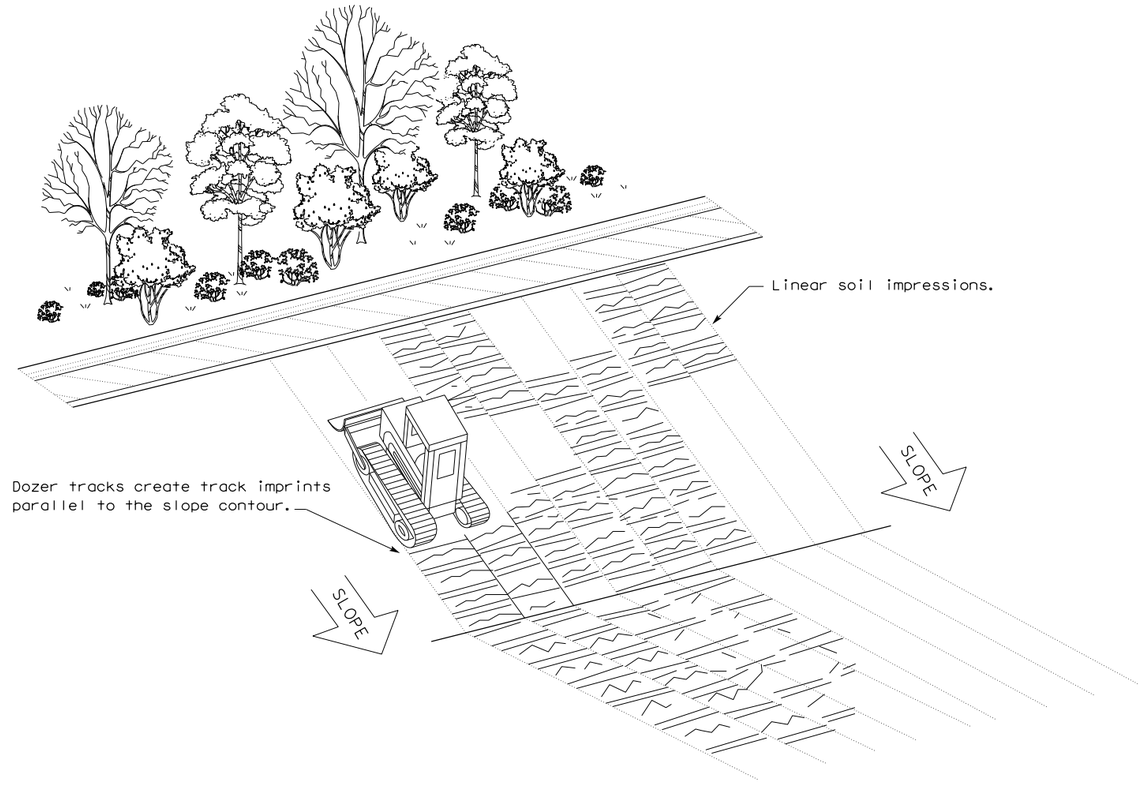
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

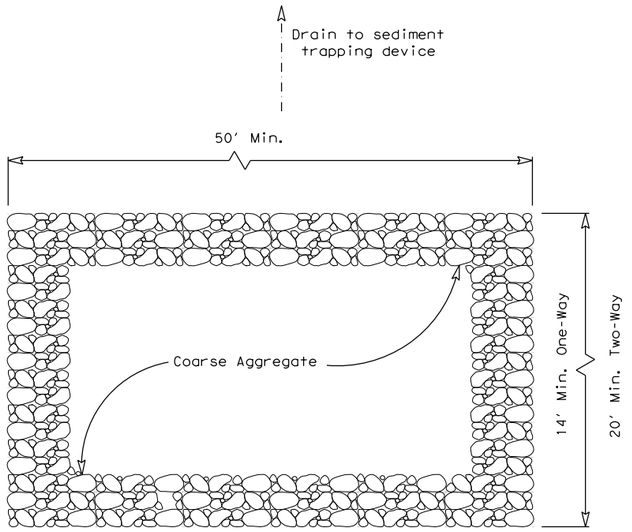
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

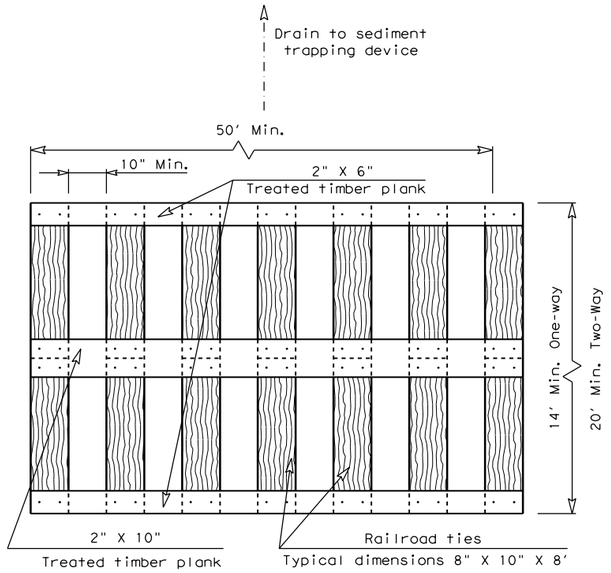
EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0379	03	026,ETC.		SH 136	
	DIST		COUNTY			SHEET NO.
	AMA		POTTER			183

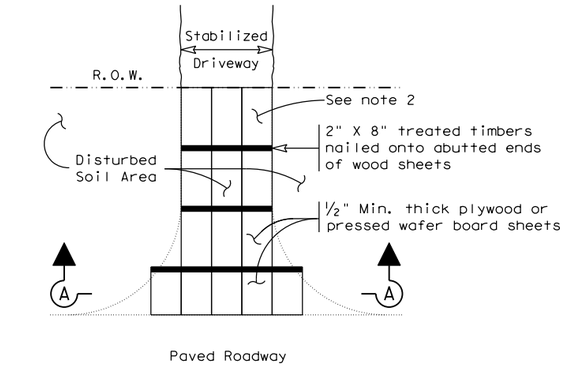
DATE
FILE



PLAN VIEW



PLAN VIEW



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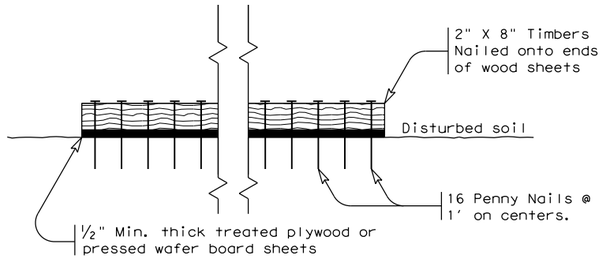
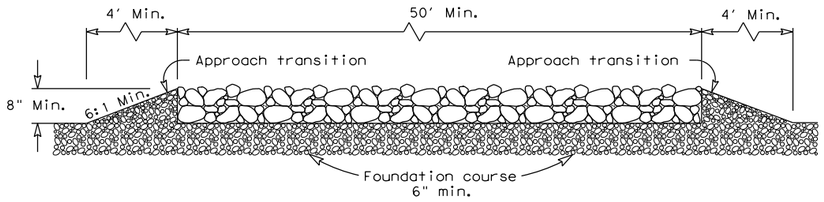


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

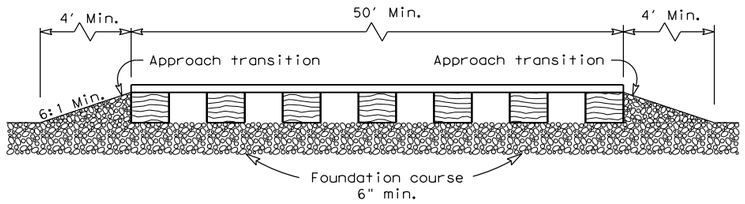
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

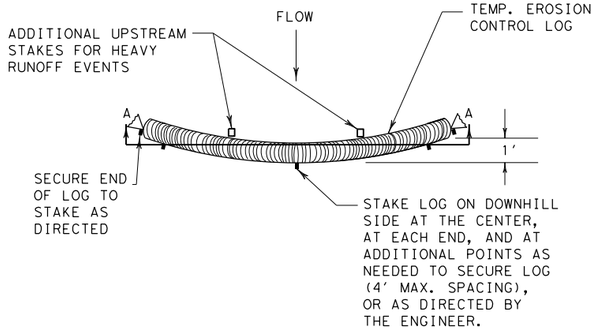
CONSTRUCTION EXITS

EC(3)-16

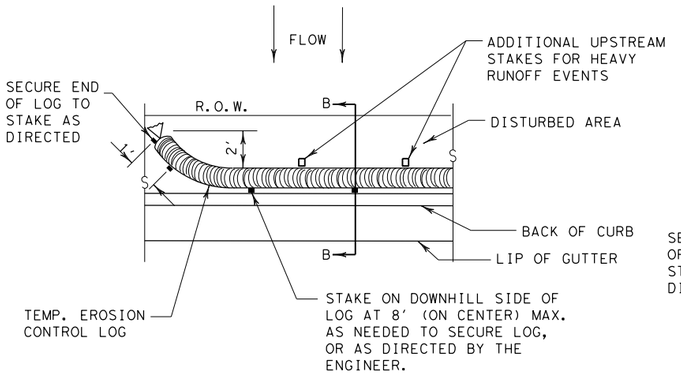
FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0379	03	026,ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		184

DATE: 6/25/2021
FILE: ec316.dgn

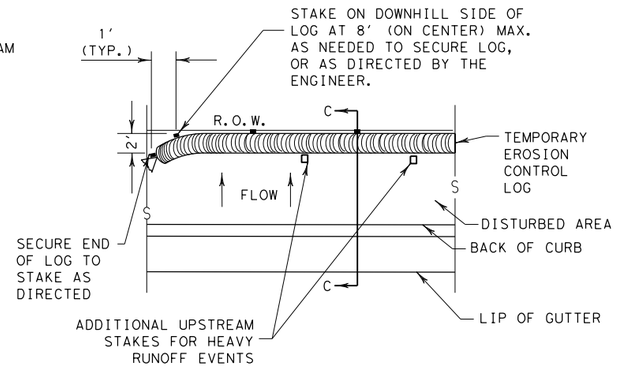
DATE:
FILE:



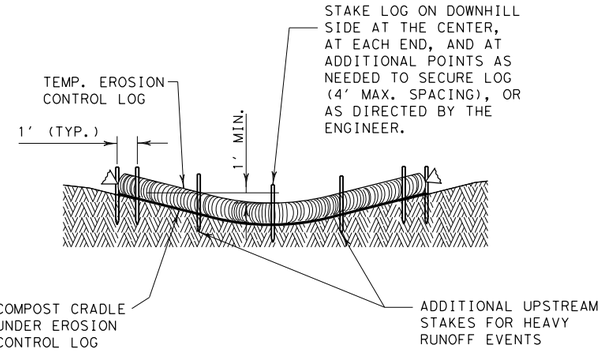
PLAN VIEW



PLAN VIEW



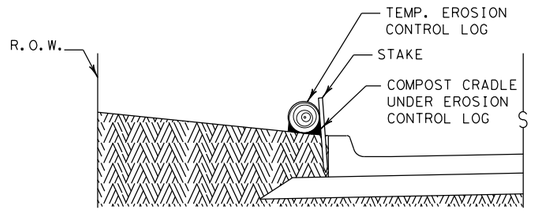
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

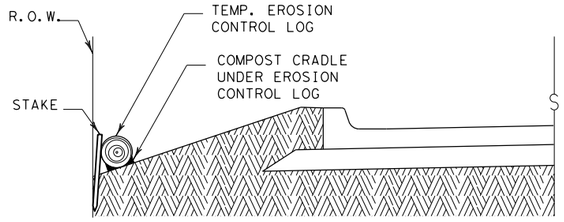
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

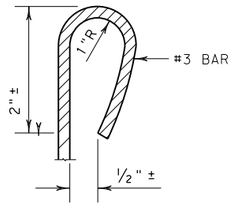
CL-BOC



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.

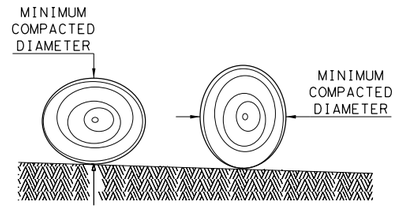
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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
	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0379	03	026,ETC.		SH 136		
	DIST	COUNTY				SHEET NO.	
	AMA	POTTER				185	

DATE:
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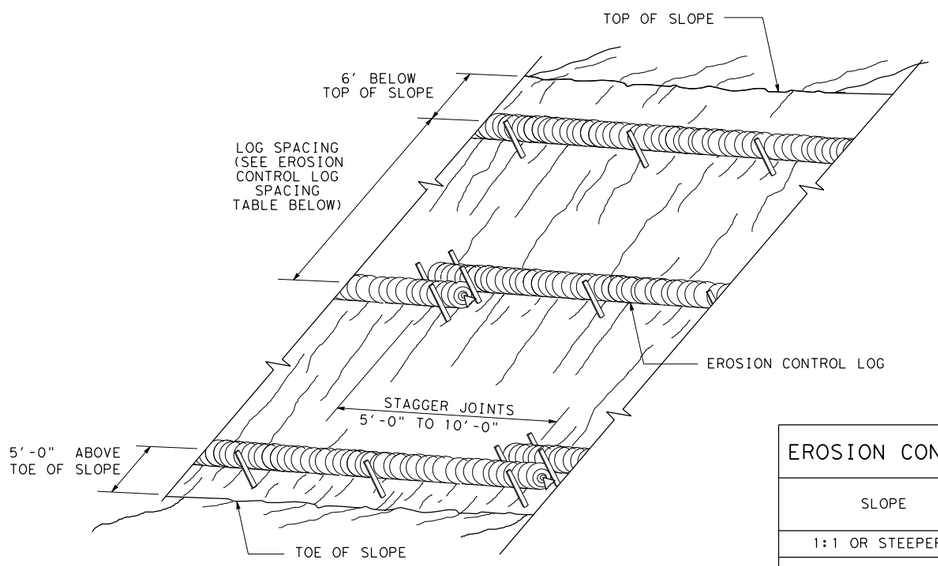
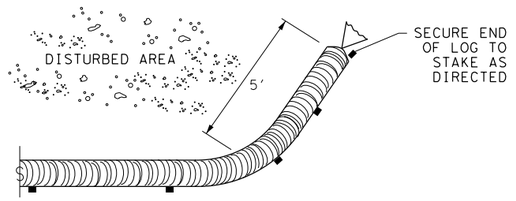


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

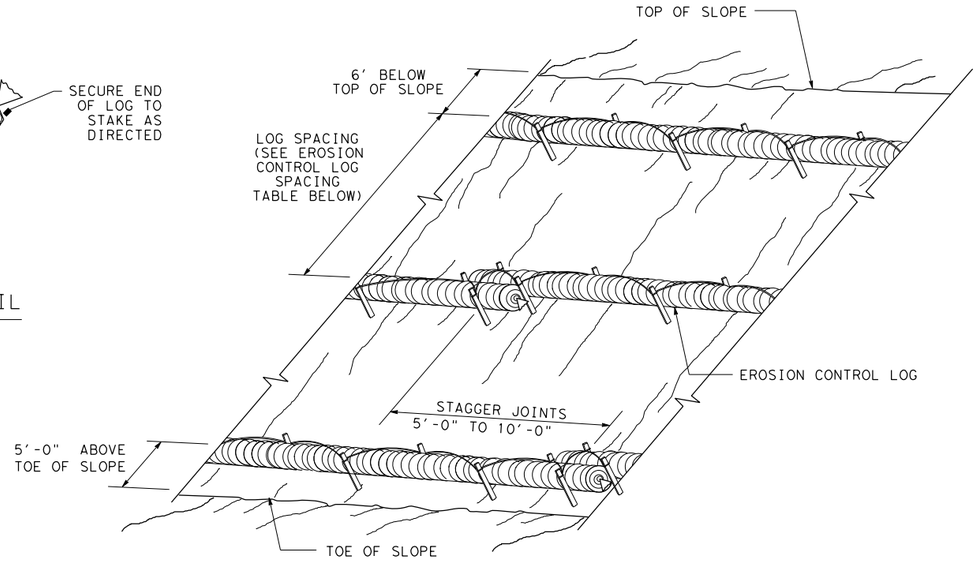
CL-SST



END SECTION RAP DETAIL

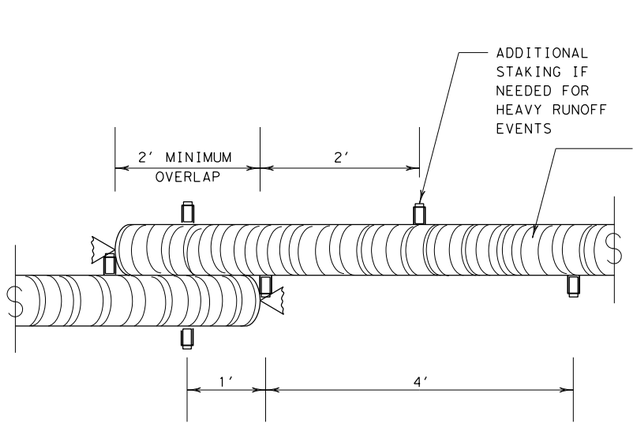
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

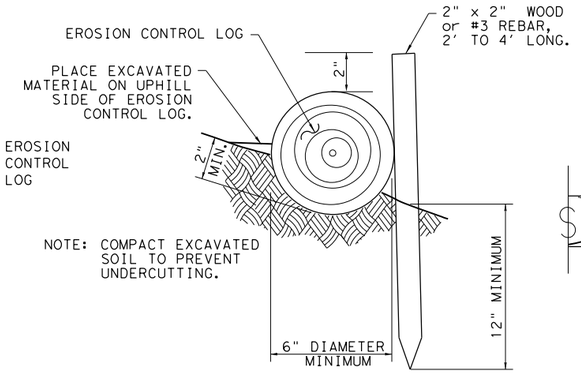
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

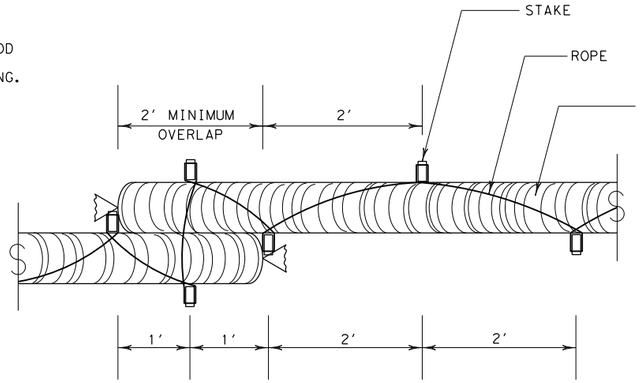


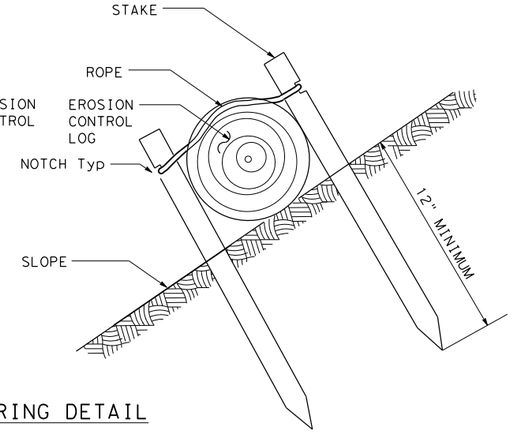


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

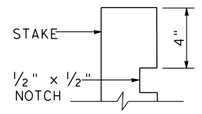
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





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	0379	03	026,ETC.		SH 136	
	DIST		COUNTY			SHEET NO.
	AMA		POTTER			186

DATE:
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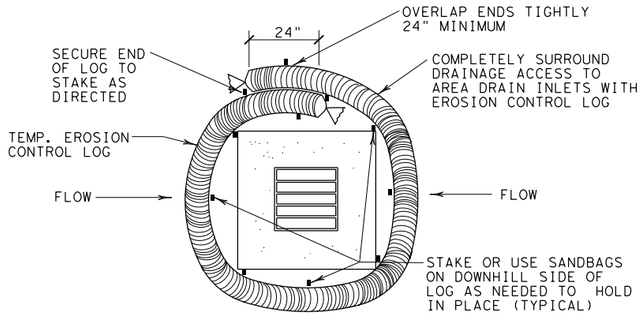
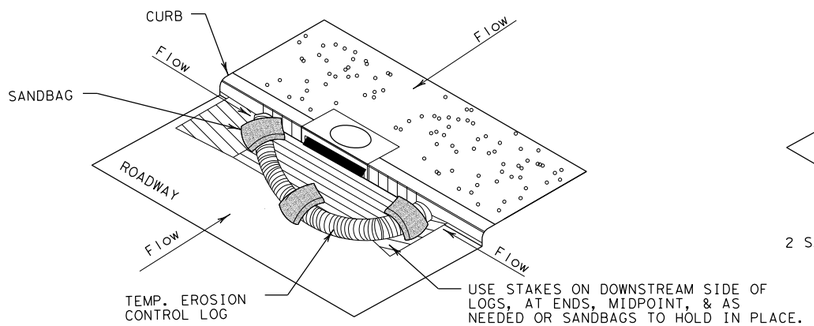


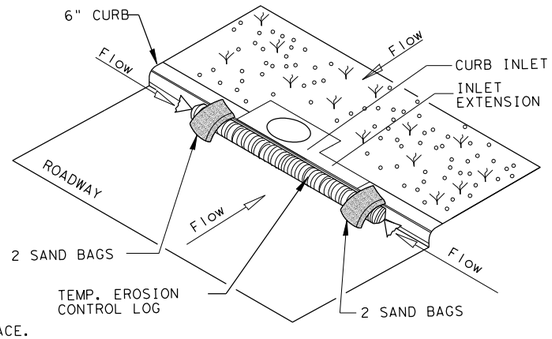
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

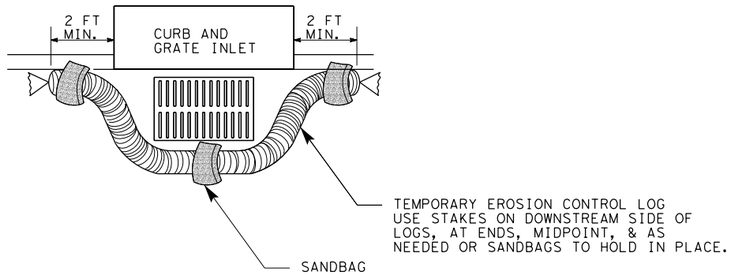
CL-CI



EROSION CONTROL LOG AT CURB INLET

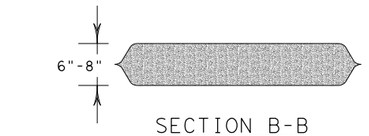
CL-CI

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.

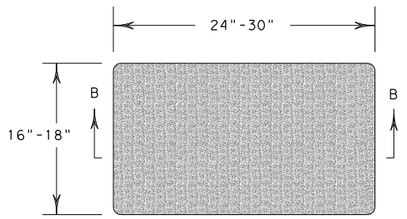


EROSION CONTROL LOG AT CURB & GRADE INLET

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	0379	03	026,ETC.		SH 136		
	DIST	COUNTY			SHEET NO.		
	AMA	POTTER			187		

DATE: 6/25/2021
FILE: AMARILLO DISTRICT GRASS SEEDING SPECIFICATION.DGN

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERM) (RURAL or URBAN) (SAND or CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 15th THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE: BUFFALO GRASS (Texoka) "Fluffy" WESTERN WHEATGRASS (ARRIBA) "Hard" BERMUDA GRASS (BLACK JACK) "Hard Tiny Seed" 100% "Unhulled"	 3.0 LBS PLS / ACRE 6.0 LBS PLS / ACRE 5.0 LBS PLS / ACRE @ 1/4"-1/2" SOIL DEPTH
PERMANENT and TEMP. LATE SPRING SEED FROM MAY 15th THROUGH AUGUST 1st AS AREAS OF THE ROW THAT ARE LAID BY BUT DETERMINED TO BE OUT OF SEASON FOR PERMANENT DRILL SEEDING.	TYPE: MILLET (BROWN TOP) "Hard Shell, "Small Seed" - Nurse crop BERMUDA GRASS (BLACK JACK) "Hard Tiny Seed" 100% "Unhulled"	30. LBS PLS / ACRE @ 1/4" SOIL DEPTH 5.0 LBS PLS / ACRE
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER.		

NOTES:

1. ALL SEED MIXTURE TYPES SHALL BE PURCHASED IN PRE- MIXED BAGS, "BY TYPE" BLENDED BY THE GROWER SHIPPER.
2. SOILS THAT ARE COMPACTED, HAVE CLODS, SHALL BE REWORKED UNTIL READY FOR SEEDING. AS DIRECTED.
3. ALL SOIL SURFACES SHALL BE LEVEL WITH NATURAL FLOWING SMOOTH GRADES. NO TIRE RUTS OR FURTHER TRAFFIC ALLOWED.
4. SOIL SURFACE SHALL BE FIRM BUT NOT COMPACTED, ALLOWING 1/4" DEPRESSION UNDER NORMAL FOOT TRAFFIC.
5. SEED 100% OF THE BED AREA. NO SKIPS OR VOID AREAS ALLOWED. EXAMPLE: AREAS AROUND SIGN POSTS AND INLETS.
6. SEED UP TO THE FIRST 6" OF THE EDGE OF PAVEMENT. AS DIRECTED, HAND RAKE ISOLATED SEEDED AREAS.
7. WEIGH ALL CALIBRATED SEED SAMPLES FOR ACCURACY AND PRESENT DOCUMENTATION TO ENGINEER.

FOR DRILL SEEDING

1. USE ONLY PROFESSIONAL NATIVE GRASS OR TURF GRASS (MULTI- 3 BIN) DRILL SEEDERS.
2. CALIBRATE DRILL SEEDER FOR SPECIFIED (PLS) PER ACRE BEFORE DRILL SEEDING.
3. DRILL SEEDER MUST BE EQUIPPED WITH THE LARGE FRONT CUTTING COULTERS DURING THE INSPECTION OF DRILL SEEDER.

FOR BROADCAST SEEDING

1. USE ONLY COMMERCIAL TYPE CYCLONE TYPE SPREADERS.
2. CALIBRATE CYCLONE SPREADER FOR 1000 Sq. Ft. (PLS) PER ACRE BEFORE SEEDING.
3. TO PREVENT SEED SEPARATION IN SPREADERS, SPREAD ALL SEED TYPES INDEPENDENTLY IN A SEPARATE APPLICATION.
4. IMMEDIATELY AFTER SEEDING, IN ONE OR TWO OPERATIONS, CULTI-PACK THE SEEDED SOILS AND FIRM SEED INTO SURFACE.
5. DISCONTINUE SEEDING IF WIND EXCEEDS 10 MPH.

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH
TEMPORARY: EARLY FALL SEED FROM AUGUST 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE: WESTERN WHEATGRASS "Hard Shell" RED WINTER WHEAT, VAR: TAM III "Hard Shell"	6.0 LBS PLS / ACRE 34. LBS PLS / ACRE @ 1" SOIL DEPTH
TEMPORARY: LATE FALL SEED FROM DECEMBER 1st THROUGH DECEMBER 31ST. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE: RED WINTER WHEAT, VAR: TAM III "Hard Shell"	34. LBS ACRE / PLS @ 1" SOIL DEPTH
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER.		

ITEM 314 EMULSIFIED ASPHALT TREATMENT

TIME SCHEDULE:

IMMEDIATELY AFTER SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.

FUNCTIONAL USE:
SOIL EROSION CONTROL, OR MOISTURE RETENTION BARRIER.

NOTES:

1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.
2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.
3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.

ITEM 166 FERTILIZER

TIME SCHEDULE:

AFTER TOPSOIL PLOWING PEPARATIONS ARE COMPLETED, FERTILIZE R.O.W. SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.

FUNCTIONAL USE:
PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.

FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 28 LBS OF NITROGEN PER ACRE.
THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM.
ANALYSIS OF THE (NPK) IS: 1-5-0 A HIGH PHOSPHATE BLEND.
AS DIRECTED BY THE VEGETATION MANAGER.

ITEM 166 NOTES:

1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.
2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE AN EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.
3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED, DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT VEGETATION MANAGER.

STATE OF TEXAS
GARY DANIEL JANECEK
133621
LICENSED PROFESSIONAL ENGINEER

07/01/2020

Texas Department of Transportation

AMARILLO DISTRICT STANDARD

VEGETATION SPECIFICATION SHEET

FEDERAL AID PROJECT	DN: ADD	CK: ADD	DW: ADD	CK: ADD
SEE TITLE SHEET	CONT	SECT	JOB	HIGHWAY
REVISIONS 03/27/20	0379	03	026, ETC.	SH 136
	DIST	COUNTY		SHEET NO.
	AMA	POTTER		188