FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C 521-2-42, ETC		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0521	02	042,ETC.	SL 13

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE AID NO.: C 521-2-42, ETC
HIGHWAY: SL 13
COUNTY: BEXAR

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS

FUNCTIONAL CLASSIFICATION: PRINCIPAL ARTERIAL

DESIGN SPEED = 30 MPH

AREA OF DISTURBED SOIL= 2.50 AC

ADT= 2021: 23,900
2041: 33,000

% TRUCKS = 5%

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

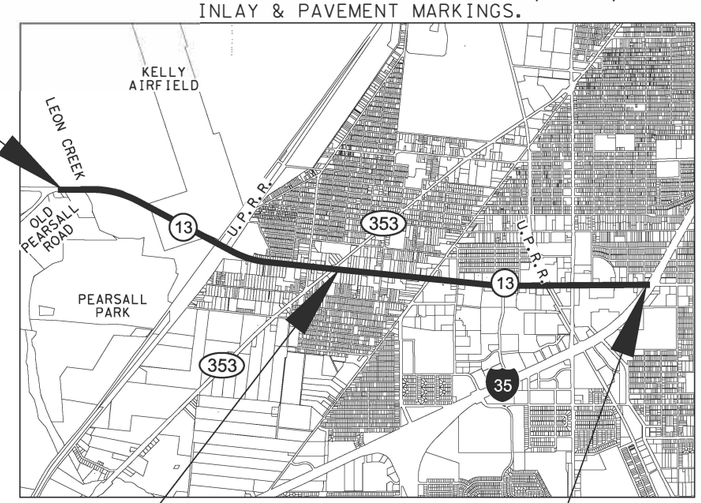
CONTRACTOR: _____

Project # C 521-2-42,ETC
CCSJ: 0521-02-042, ETC.
LIMITS FROM: LEON CREEK
TO: IH 35
ROADWAY LENGTH = 18,210.00 FT = 3.449 MI
BRIDGE LENGTH = 1,790.00 FT = 0.339 MI
NET LENGTH OF PROJECT = 20,000.00 FT = 3.788 MI

Project # C 521-3-61
CSJ: 0521-03-061
LIMITS FROM: LEON CREEK
TO: SL 353
ROADWAY LENGTH = 7,834.00 FT = 1.483 MI
BRIDGE LENGTH = 1,716.00 FT = 0.325 MI
NET LENGTH OF PROJECT = 9,550.00 FT = 1.808 MI

Project # C 521-2-42
CSJ: 0521-02-042
LIMITS FROM: SL 353
TO: IH 35
ROADWAY LENGTH = 10,376.06 FT = 1.965 MI
BRIDGE LENGTH = 73.94 FT = 0.014 MI
NET LENGTH OF PROJECT = 10,450.00 FT = 1.979 MI

FOR WORK CONSISTING OF BASE REPAIR, MILL, INLAY & PAVEMENT MARKINGS.



BEGIN PROJECT
BEGIN CSJ: 0521-03-061
STA 105+00.00
REF MKR: 486+1.995

END SCJ 0521-03-061
BEGIN CSJ 0521-02-042
STA 200+50.00
REF MKR: 486+1.302

END PROJECT
END CSJ: 0521-02-042
STA 305+00.00
REF MKR: 490+1.336

EXCEPTIONS: NONE
EQUATIONS: NONE
RR X-ING'S: 160+10.00
271+67.00

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

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

P.E.
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING 11/30/2021
DocuSigned by: Lizette Colbert, P.E.
DF7D99155134A5A...
DIRECTOR, DESIGN SUPPORT

RECOMMENDED FOR LETTING 11/30/2021
DocuSigned by: Clayton Ripps, P.E.
74F59ACB883D4EB...
DIRECTOR, TRANSPORTATION PLANNING & DEVELOPMENT

APPROVAL FOR LETTING 12/1/2021
DocuSigned by: Gina Gallegos, P.E.
124372CCDF604F5...
DISTRICT ENGINEER

HALFF
TBPE FIRM REGISTRATION #312
100 NE INTERSTATE 410 LOOP, SUIT 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1595
FAX (210) 798-1896

COUNTY BEXAR PROJ. NO.
HWY. NO. SL13 LETTING DATE
DATE ACCEPTED

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/17/2021

THE SEAL ORIGINALLY APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOHNNY L. CLAYTON, P.E. #107215 ON 11/17/2021 . ALTERATION OF A PREVIOUSLY SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC., 100 N.E. LOOP 410, SUITE 200, SAN ANTONIO, TEXAS 78216-4741. TBPE FIRM #F-312

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

NO.	REVISION	BY	DATE

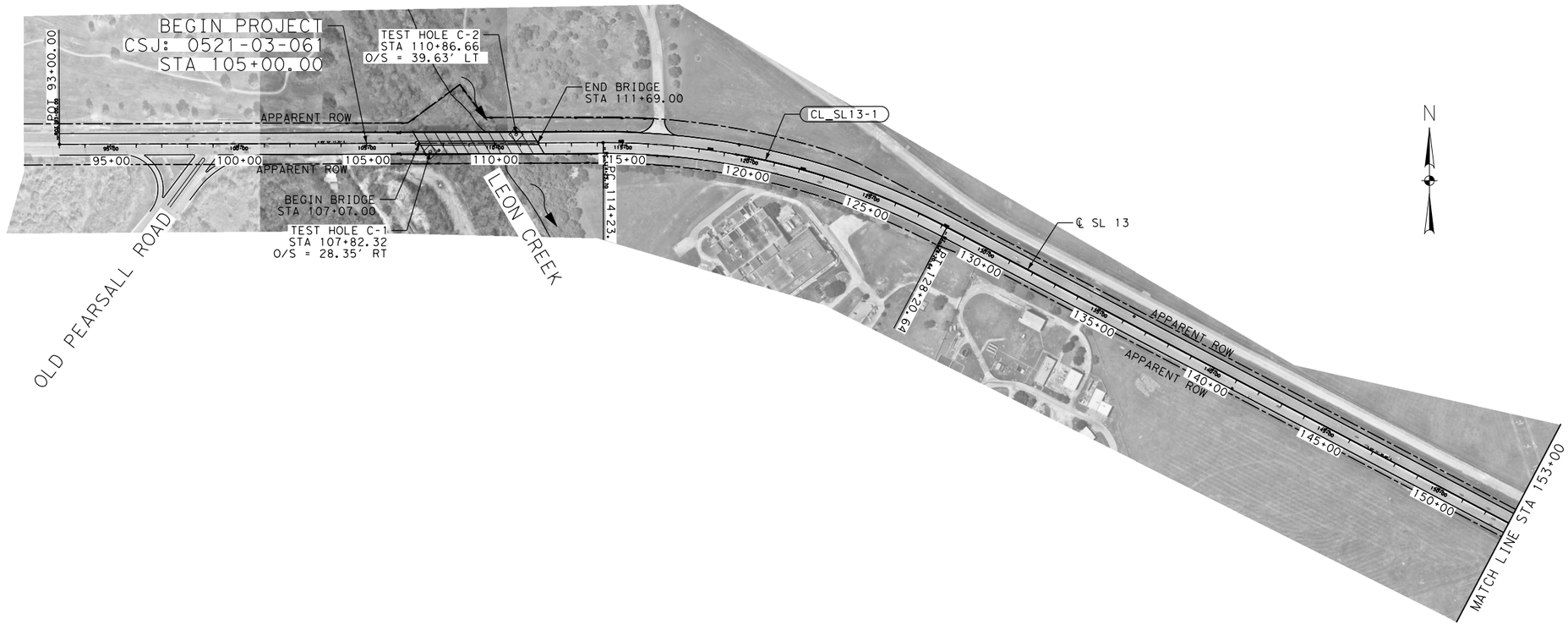
HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SL 13

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		2
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



0 250 500 750

SCALE: 1"=500'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

11/17/2021

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NO.	REVISION	BY	DATE

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100 NE INTERSTATE 410 LOOP
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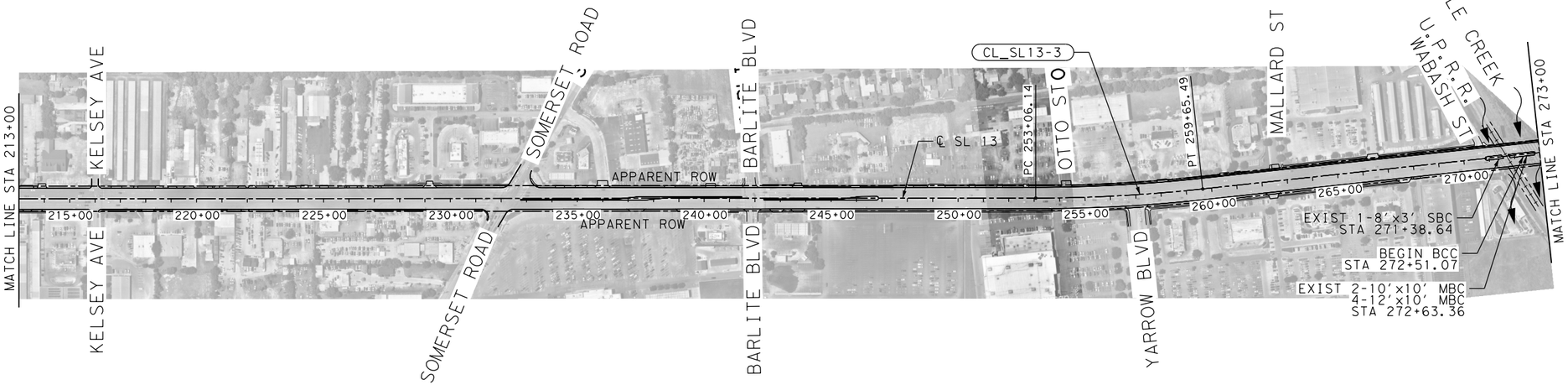
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

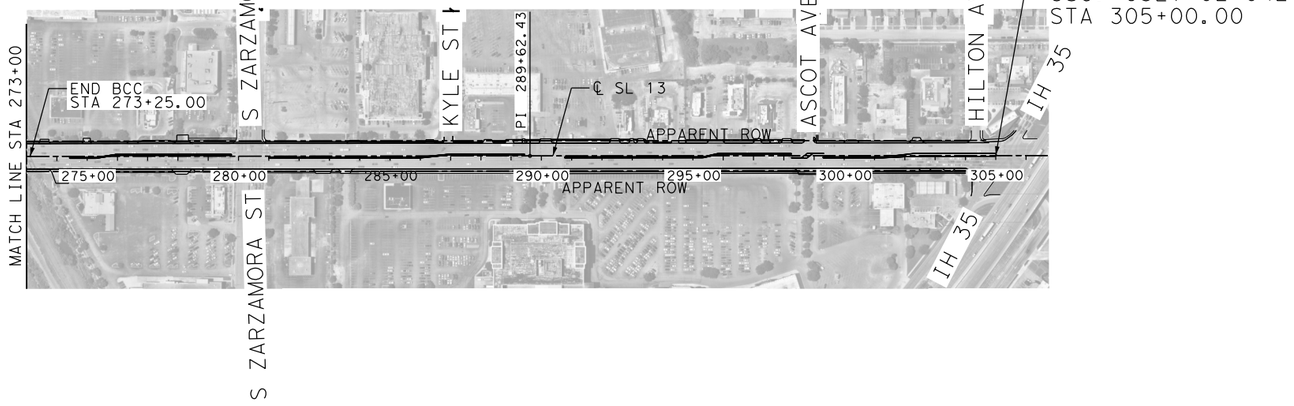
SL 13

PROJECT LAYOUT

SCALE: 1"=500' SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		3
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13





0 250 500 750

SCALE: 1"=500'

11/17/2021

JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

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SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SL 13

PROJECT LAYOUT

SCALE: 1"=500' SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		4
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

TXDOT*MON*PENTABLE - COMBINED*95%.tbl
DATE:11/17/2021 TIME:12:22:03 PMOFFICE:SAN
dn3891
PDF*2D*MON*HW*MR*300.plt
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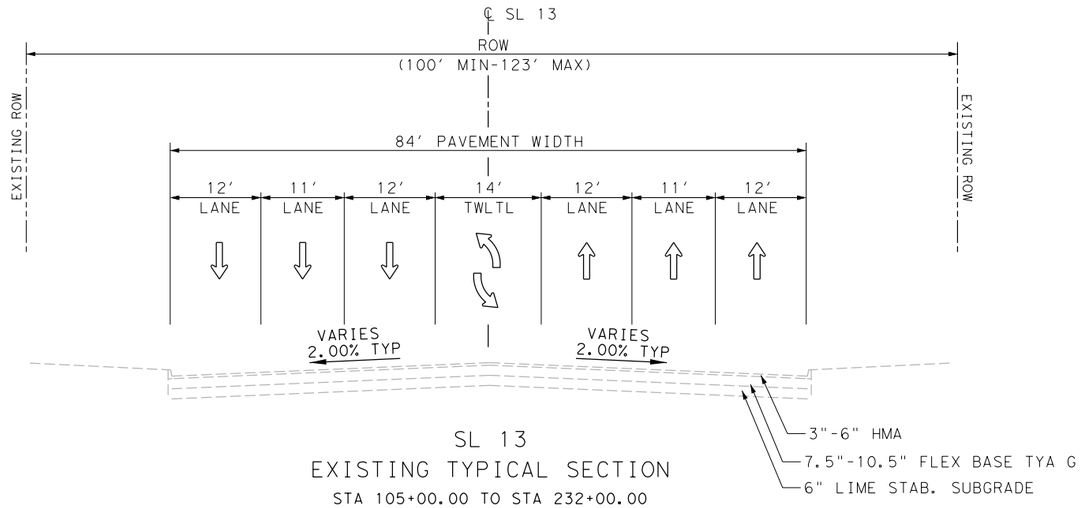
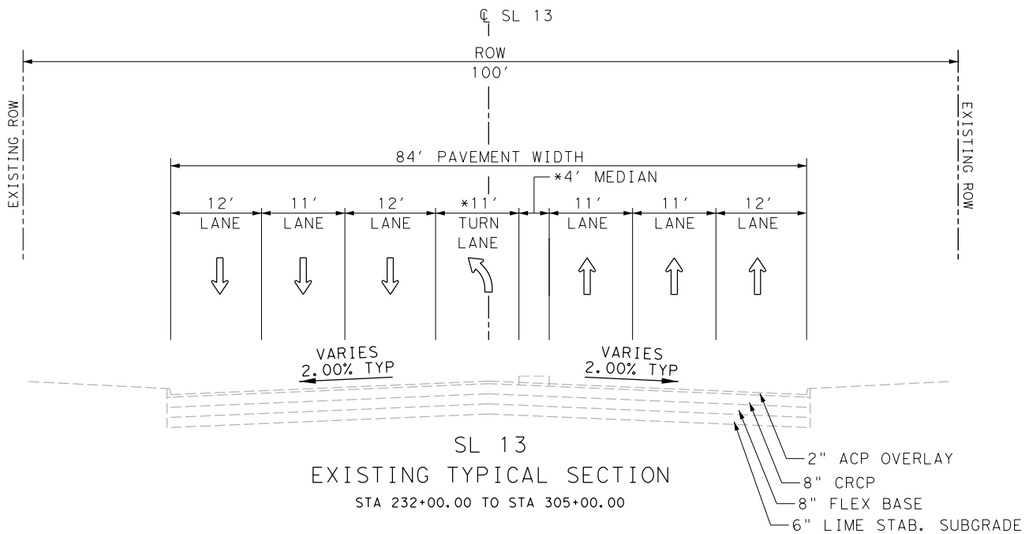


SL 13
EXISTING TYPICAL SECTION
STA 105+00.00 TO STA 232+00.00



SL 13
EXISTING TYPICAL SECTION
STA 232+00.00 TO STA 305+00.00

NOTES:

1. EXISTING TYPICAL SECTIONS WERE DEVELOPED USING RECORD PLANS.

2. CROSS SLOPE SHOWN ON TYPICAL SECTIONS IS USUAL. ACTUAL SLOPE VARIES AT LOCATIONS.

3. GEOMETRY OF ROADWAY SECTIONS IS APPROXIMATE AND IS SHOWN FOR INFORMATION ONLY.

4. THE EXISTING PAVEMENT THICKNESS SHOWN ON THE PLANS ARE AVERAGE THICKNESSES AND ARE SHOWN FOR THE CONTRACTOR'S INFORMATION ONLY. THE ACTUAL PAVEMENT THICKNESSES MAY VARY AT SECTIONS.

* MIRRORED FOR OPPOSITE DIRECTION

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/17/2021

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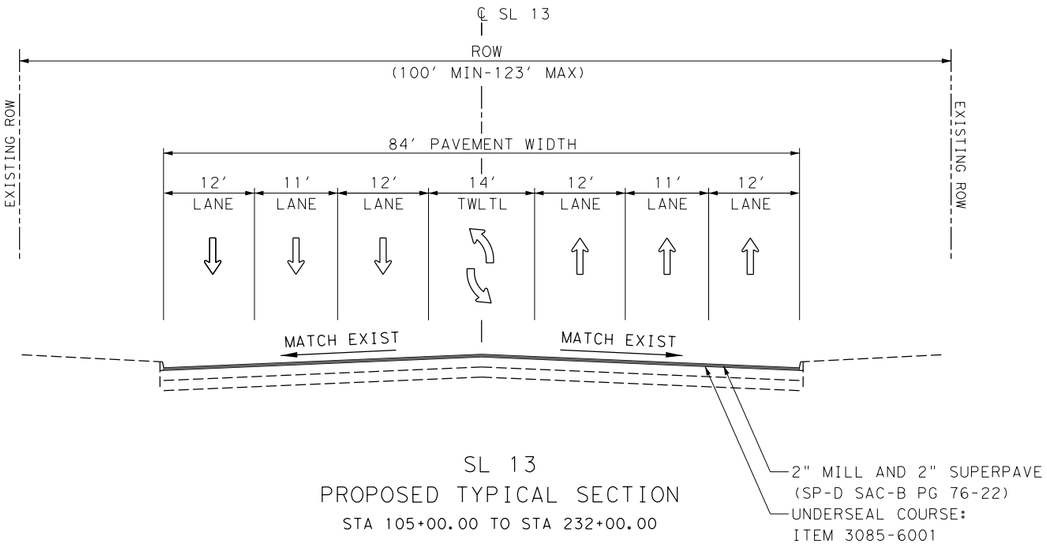
SL 13

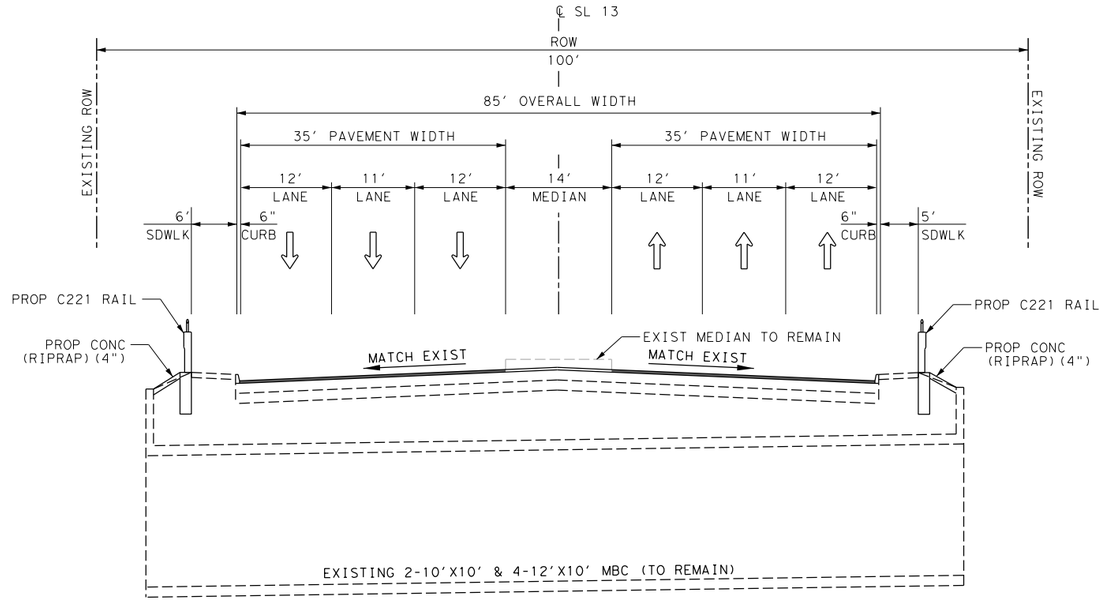
EXISTING TYPICAL SECTIONS

SHEET 1 OF 1

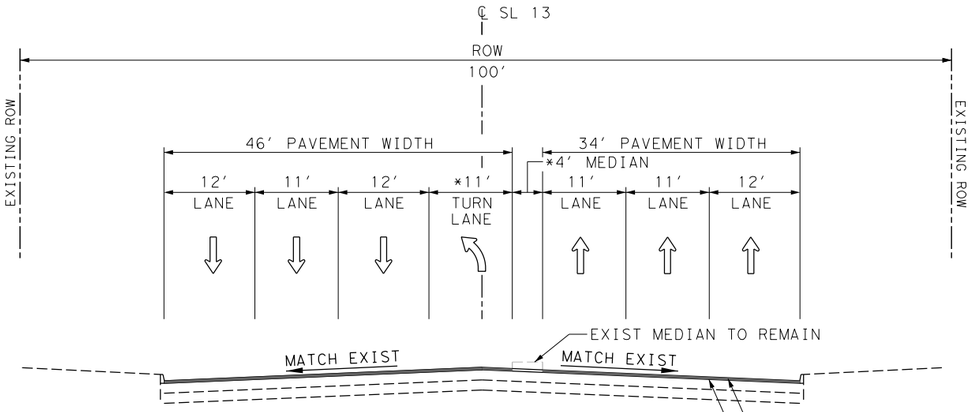
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		5
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



SL 13
PROPOSED TYPICAL SECTION
STA 105+00.00 TO STA 232+00.00



SL 13
PROPOSED TYPICAL SECTION
SIXMILE CREEK BRIDGE CLASS CULVERT
STA 273+00



SL 13
PROPOSED TYPICAL SECTION
STA 232+00.00 TO STA 305+00.00

NOTES:

1. REFER TO PAVEMENT MARKING LAYOUT SHEETS FOR LANE TRANSITIONS AT INTERSECTIONS.

2. SEE SIXMILE CREEK CULVERT DETAIL FOR ADDITIONAL INFORMATION.

* MIRRORED FOR OPPOSITE DIRECTION

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/17/2021

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NO.	REVISION	BY	DATE

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TEL (210) 798-1895 FIRM #F-312

SL 13

PROPOSED TYPICAL SECTIONS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		6
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C- 1	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/23/20
CSJ	0521-03-061	Station	107+82.32	Grnd. Elev.	635.00 ft
		Offset	28.35	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
634.5			PAVEMENT, 2.25" HMA							
634.			BRIDGE DECK, boring terminated atop of bridge deck							
5										
10										

Remarks: Cored at SL 13 EBML atop existing bridge deck. GPS Coordinates - Latitude: 29.365556°, Longitude: -98.586389°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

W:\GEO\Open\2019\2019-731 15-8IDP5012_WA2_SL13 Project\Temporary\gINT and Wincore\CSJ 0521-03-061 Borings.clg

DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C- 2	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/23/20
CSJ	0521-03-061	Station	110+86.63	Grnd. Elev.	632.00 ft
		Offset	42.76	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
631.5			PAVEMENT, 2.625" HMA							
631.			BRIDGE DECK, boring terminated atop of bridge deck							
5										
10										

Remarks: Cored at SL 13 WBML atop existing bridge deck. GPS Coordinates - Latitude: 29.365750°, Longitude: -98.585417°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C- 3	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	2/19/20
CSJ	0521-03-061	Station	140+98.86	Grnd. Elev.	650.00 ft
		Offset	38.41	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
648.6			PAVEMENT, 6.375" HMA over 10.5" Base							
647.			SUBGRADE							
5										
10										

Remarks: Cored at SL 13 EBML. GPS Coordinates - Latitude: 29.362972°, Longitude: -98.576694°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

Texas Department of Transportation®

SL 13

PAVEMENT CORE LOGS

SHEET 1 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		7
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C- 4	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/24/20
CSJ	0521-03-061	Station	136+30.05	Grnd. Elev.	651.00 ft
		Offset	32.53	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
649.8			PAVEMENT, 5.75" HMA over 9" Base							
			SUBGRADE							
648.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.363750°, Longitude: -98.577889°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C- 5	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/24/20
CSJ	0521-03-061	Station	153+70.97	Grnd. Elev.	651.00 ft
		Offset	36.63	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
649.6			PAVEMENT, 5.5" HMA over 11.5" Base							
			SUBGRADE							
648.										
5										
10										

Remarks: Cored at SL 13 EBML. GPS Coordinates - Latitude: 29.361333°, Longitude: -98.573167°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C- 6	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/23/20
CSJ	0521-03-061	Station	155+77.55	Grnd. Elev.	648.00 ft
		Offset	36.68	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
647.5			PAVEMENT, 2.75" HMA							
647.			BRIDGE DECK, boring terminated atop of bridge deck							
5										
10										

Remarks: Cored at SL 13 WBML atop existing bridge deck. GPS Coordinates - Latitude: 29.361250°, Longitude: -98.572500°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

Texas Department of Transportation®

SL 13

PAVEMENT CORE LOGS

SHEET 2 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		8
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C- 7	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/23/20
CSJ	0521-03-061	Station	160+81.89	Grnd. Elev.	649.00 ft
		Offset	31.35	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
648.5			PAVEMENT, 3.5" HMA							
648.			BRIDGE DECK, boring terminated atop of bridge deck							
5										
10										

Remarks: Cored at SL 13 EBML atop existing bridge deck. GPS Coordinates - Latitude: 29.360417°, Longitude: -98.571194°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C- 8	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/23/20
CSJ	0521-03-061	Station	166+74.28	Grnd. Elev.	650.00 ft
		Offset	37.29	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
649.5			PAVEMENT, 2.875" HMA							
649.			BRIDGE DECK, boring terminated atop of bridge deck							
5										
10										

Remarks: Cored at SL 13 WBML atop existing bridge deck. GPS Coordinates - Latitude: 29.359833°, Longitude: -98.569472°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C- 9	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/24/20
CSJ	0521-03-061	Station	179+85.86	Grnd. Elev.	653.00 ft
		Offset	32.62	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Properties: Wet Den. (pcf)	Additional Remarks
651.8			PAVEMENT, 5.5" HMA over 8.75" Base							
650.			SUBGRADE							
5										
10										

Remarks: Cored at SL 13 EBML. GPS Coordinates - Latitude: 29.358750°, Longitude: -98.565556°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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NO.	REVISION	BY	DATE

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PAVEMENT CORE LOGS

SHEET 3 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		9
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C-10	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	2/19/20
CSJ	0521-03-061	Station	172+28.75	Grnd. Elev.	652.00 ft
		Offset	35.76	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
650.9			PAVEMENT, 3.5" HMA over 9.75" Base							
			SUBGRADE							
649.										
5										
10										

Remarks: Cored at SL 13 EBML. GPS Coordinates - Latitude: 29.359083°, Longitude: -98.567917°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger:** J. Ramos **Organization:** Arias Geoprofessionals

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DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C-11	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/24/20
CSJ	0521-02-042	Station	214+84.05	Grnd. Elev.	654.00 ft
		Offset	41.9	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
652.9			PAVEMENT, 4.5" HMA over 9" Base							
			SUBGRADE							
651.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.357944°, Longitude: -98.554611°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger:** J. Ramos **Organization:** Arias Geoprofessionals

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DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C-12	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	2/18/20
CSJ	0521-03-061	Station	182+35.37	Grnd. Elev.	653.00 ft
		Offset	36.66	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
652.1			PAVEMENT, 10.5" HMA							
			SUBGRADE							
650.										
5										
10										

Remarks: Cored at SL 13 EBML. GPS Coordinates - Latitude: 29.358667°, Longitude: -98.564778°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger:** J. Ramos **Organization:** Arias Geoprofessionals

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PAVEMENT CORE LOGS

SHEET 4 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		10
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C-13	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/24/20
CSJ	0521-02-042	Station	251+32.64	Grnd. Elev.	652.00 ft
		Offset	51.22	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
651.2			PAVEMENT, 1.75" HMA over 8.5" Concrete							
			SUBGRADE							
649.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.356889°, Longitude: -98.543222°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C-14	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	2/19/20
CSJ	0521-02-042	Station	222+57.88	Grnd. Elev.	654.00 ft
		Offset	38.93	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
653.			PAVEMENT, 4.5" HMA over 8" Base							
			SUBGRADE							
651.										
5										
10										

Remarks: Cored at SL 13 EBML. GPS Coordinates - Latitude: 29.357500°, Longitude: -98.552222°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

1 of 1

WinCore Version 3.3

County	Bexar	Hole	C-15	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	1/24/20
CSJ	0521-02-042	Station	287+58.71	Grnd. Elev.	645.00 ft
		Offset	38.22	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
644.1			PAVEMENT, 2" HMA over 8.5" Concrete							
			SUBGRADE							
642.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.356750°, Longitude: -98.531861°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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PAVEMENT CORE LOGS

SHEET 5 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		11
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

WinCore Version 3.3

County Bexar
Highway SL 13
CSJ 0521-02-042

Hole C-16
Structure Pavement
Station 259+62.19
Offset 32.73

District San Antonio
Date 2/18/20
Grnd. Elev. 649.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
648.1			PAVEMENT, 2.875" HMA over 8.25" Concrete							
			SUBGRADE							
646.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.356722°, Longitude: -98.540639°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

WinCore Version 3.3

County Bexar
Highway SL 13
CSJ 0521-02-042

Hole C-17
Structure Pavement
Station 221+16.33
Offset 37.55

District San Antonio
Date 2/18/20
Grnd. Elev. 652.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
651.			PAVEMENT, 5" HMA over 7.5" Base							
			SUBGRADE							
649.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.357750°, Longitude: -98.552639°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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DRILLING LOG

WinCore Version 3.3

County Bexar
Highway SL 13
CSJ 0521-03-061

Hole C-18
Structure Pavement
Station 185+02.98
Offset 42.23

District San Antonio
Date 2/18/20
Grnd. Elev. 654.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
652.7			PAVEMENT, 5.75" HMA over 10" Base							
			SUBGRADE							
651.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.358806°, Longitude: -98.563917°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Arias Geoprofessionals **Logger: J. Ramos** **Organization: Arias Geoprofessionals**

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PAVEMENT CORE LOGS

SHEET 6 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		12
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DRILLING LOG

WinCore Version 3.3

County	Bexar	Hole	C-19	District	San Antonio
Highway	SL 13	Structure	Pavement	Date	2/18/20
CSJ	0521-03-061	Station	119+51.47	Grnd. Elev.	643.00 ft
		Offset	39.46	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
642.4			PAVEMENT, 7" HMA							
			SUBGRADE							
640.										
5										
10										

Remarks: Cored at SL 13 WBML. GPS Coordinates - Latitude: 29.365611°, Longitude: -98.582722°. Surface elevation estimated from Google Earth.

The ground water elevation was not determined during the course of this boring.

Driller: Eagle Drilling, Inc. **Logger: D. Soules** **Organization: Arias Geoprofessionals**

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PAVEMENT CORE LOGS

SHEET 7 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		13
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

**********GENERAL NOTES**********
2014 Specification Book

========== **Basis of Estimate** ==========

Item	Description	Area	Rate/Area	Quant-Unit
0168-6001	Vegetative Watering	1,008 SY	15.6 GAL/SY	16 MG

Item	Description	Duration	Rate/Duration	Quant-Unit
730-6107	Full Width Mowing	18 MO	1 CY/3 MO	6 CYC
734-6002	Litter Removal	18 MO	1 CY/1 MO	18 CYC
738-6003	Cleaning & Sweeping Hwys	18 MO	1 CY/1 MO	18 CYC

========== **Asphalt Concrete Pavement** ==========

Type	Location	Depth	Rate/Area	Quant-Unit
SP D (SAC-B PG76-22)	Main Rdwy	2”	115 LB/182,783 SY-IN	21,020 TONS
- The Following Is For Information Only - Non Pay-				
D-GR HMA TY B PG 64-22	Main Rdwy	5”	110 LB/15,918 SY-IN	4,378 TONS
D-GR HMA TY B PG 64-22	Main Rdwy	8”	110 LB/53,889 SY-IN	23.712 TONS
TACK COAT	5” REPAIR	x1	0.2 GAL/15,918 SY	3,184 GAL
TACK COAT	8” REPAIR	x2	0.2 GAL/53,889 SY	21,556 GAL

========== **Surface Treatment Data** ==========

Item	Description	Area	Rate	Quant-Unit
316-6009	Asph (A-R TYPE II or III)	67,666 SY	0.44 GAL/SY	29,773 GAL
316-6431	Aggr (TY-PB GR-4)	67,616 SY	1 CY/125 SY	543 CY
3085-6001	Membrane Underseal	115,085 SY	0.20 GAL/SY	23,017 GAL

--General--
Contact the Engineer or the City when construction operations are within 400 feet of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Repair or replace any signal equipment damaged by construction operations. The method of repair or replacement shall be pre-approved and inspected. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for this work.

City of San Antonio: (210) 207-8642

Remove existing raised pavement markings as the work progresses or as approved. This work is subsidiary to the various bid items. Properly dispose materials removed.

To better fit field conditions, the cross sections may be varied when approved.

If there are waste areas or material source areas, follow the Texas Aggregate Quarry and Pit Safety Act requirements.

Any materials removed and not reused and determined to be salvageable shall be stored within the project limits at an approved location or delivered undamaged to the storage yard as directed. Properly dispose unsalvageable materials in accordance with local, state, and federal regulations. Deface traffic signs so that they will not reappear in public as signs.

Any sign panels that are adjusted or removed and replaced, shall be done the same workday unless otherwise approved. This work shall be considered subsidiary to Item 502.

Notify the Engineer at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals.

Locate and reference all manholes and valves within the construction area with station and offset. Each manhole and valve shall be identified by its owner (SAWS, CPS, etc.). No roadwork will begin until this list has been submitted. All valves and manhole covers have to be accessible at all times, therefore; temp. CTB, material stock piles, etc. cannot be placed over these valves or covers.

Adjust or construct all manholes and valves to final pavement elevations prior to the final mat of ACP. If, between the final elevation adjustment and the final mat of ACP, the manholes and valves are going to be exposed to traffic, place temporary asphalt around the manhole and valve to provide a +/- 50:1 taper. The cost of elevation adjustment and the concrete apron around the manhole and valve will be part of the manhole and valve work. The asphalt tapers are part of the ACP work.

Hurricane Evacuation

Hurricane Season is from June 1 thru November 30. As the closest metropolitan city inland from the Texas Coast, the City of San Antonio is a major shelter destination during mandatory hurricane evacuations. As such, planned work zone lane or road closures may be restricted and/or suspended during mandatory hurricane evacuation operations. The District will coordinate these restrictions at a minimum H-120 from any projected impact to the Texas Coast.

No time charges will be made if the Engineer determines that work on the project was impacted by the hurricane.

The Engineer may order changes in the Traffic Control Plan to accommodate evacuation traffic, and may suspend the work, all or in part, to ensure timely completion of this work. All work to implement changes in the Traffic Control Plan will be paid through existing bid prices or through Item 9.5, Force Account. However, the Department will not entertain any request for delay damages, loss of efficiency that may be attributed to the restriction or suspension of road or lane closures, or to changes in the Traffic Control Plan.

The Contractor should be aware that the "City Public Service" (CPS) will be consulted by the Engineer in matters concerning the execution of the work, materials and testing related to the CPS work. As such; a CPS employee may be observing the construction and related operations as they progress.

If a sanitary sewer overflow (SSO) occurs:

1. Attempt to eliminate the source of the SSO.
2. Contain sewage from the SSO to the extent possible to prevent contamination of waterways.
3. Call SAWS at (210) 233-2015.

Submit locate request for SAWS water and sewer to TXDOTlocates@saws.org.

Contractor questions on this project are to be addressed to the following individual(s):
Sergio Garcia, Sergio.garcia@txdot.gov
Danny Gallegos, danny.gallegos@txdot.gov

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

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/
All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

The Contractor must measure the vertical clearance at each structure after the final surface of the roadway is completed and provide the vertical clearance measurement to the Engineer.

--Item 5--
Reference all existing striping and other pavement markings to allow these markings to be re-established. Ensure the markings (lane lines, edge lines, ramp gores, etc.) are in line with signs, TMS arrows, etc. located on overhead sign supports.

Taper ACP placed at curb inlets, traffic inlets and slotted drains.

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

The earthwork information was not developed with computers; therefore, a CD cannot be provided. Prior to letting, earthwork cross-sections will be available at the Engineer's office for review by the bidder or for borrowing by copying companies to make copies at the bidder's expense.

When working near aerial electrical lines or utility poles, comply with Federal, State and local regulations. A horizontal boom or equivalent equipment is required for construction in the vicinity of the CPS Energy electric lines in order to provide vertical clearance of equipment during construction. Contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of pole bracing. The estimated duration for pole bracing is 6 to 10 weeks (or longer if temporary construction easements are required) after invoice is paid. For de-energizing or sleeving of the overhead electrical lines depicted on the plans, please contact CPS Energy Utility Coordination Group sixteen (16) week in anticipation of needed de-energization. The estimated duration for de-energizing is approximately 4 to 6 weeks (after invoice is paid) but could vary on system scenario and backfeed requirements. De-energizing may not be possible in all instances or may be restricted during specific periods of time due to load demand. Contractor will be reimbursed for the invoice cost for pole bracing and/or de-energizing or sleeving through force account.

Prevention of Migratory Bird Nesting

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

Structures

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

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

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

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

Provide a non-intrusive back-up alarm system on all heavy equipment used in close proximity to residential areas. This item is subsidiary to various bid items.

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 6--
Show the stockpile lot and/or sub lot numbers on all tickets for all materials.

--Item 7--
The project's total disturbed area is 2.50 Acres. The disturbed area in all project locations and Contractor project specific locations (PSL's), within 1/4 mile of the project limits, 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. Obtain any required authorization from the TCEQ for any PSL's on or off the ROW. When the total area disturbed on the project and PSL's within 1/4 mile of the project exceeds 5 acres, provide a copy of the Contractor NOI for PSL's to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

Notify the Engineer of the disturbed acreage within one (1) mile of the project limits. Obtain authorization from the TCEQ for Contractor PSL's for construction support activities on or off ROW.

Roadway closures during the following key dates and/or special event are prohibited.
See the TCP Narrative for these dates.

--Item 8--
Working days will be computed and charged in accordance with Article 8.3.1.4: Standard work week.

Create and maintain a Bar Chart schedule.

--Item 9--
When approved, provide uniformed, off-duty law enforcement officers with marked vehicles during work that requires a lane closure. The officer in marked vehicles shall be located as approved to monitor or direct traffic during the closure. The method used to direct traffic at signalized intersections shall be as approved. Additional officers and vehicles may be provided when approved or directed.

Complete the daily tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

All law enforcement personnel used in Work Zone Traffic Control shall be trained for performing duties in work zones and are required to take "Safe and Effective Use of Law Enforcement Personnel in Work Zones" (Course #133119) which can be found online at the following site: www.nhi.fhwa.dot.gov

Certificates of completion should be available to all who finish the course. These should be kept by the officers in order to substantiate completion when reporting to the work site.

Minimums, scheduling fees, etc. will not be paid; TxDOT will consider paying cancellation fees on a case by case basis.

--Item 100--
Begin clearing operations after trees and other areas of vegetation to be protected have been identified and approved. Install fencing around features to be protected as shown in the plans or directed. Coordinate all right of way clearing operations with the SW3P.

Trim and remove brush and trees within the stations noted in the plans and as needed for construction operations. Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas to the ROW limits. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 12 ft. vertical clearance under all trees. This work is subsidiary.

Obtain approval for proposed method of tree and brush trimming and removal. Vertical flailing equipment is not allowed. Treat damaged or cut branches, roots and/or stumps of all oak trees

with a commercial tree wound dressing. Disinfect all pruning tools with a solution of 70% alcohol before moving from one tree to another. Unless otherwise approved remove all resulting vegetative debris from the ROW within 24 hours. The Engineer can stop all construction operations if the dressing, cut and removal requirements are not followed.

--Item 110--
Where excavation extends beyond a right of way fence, remove and replace the fence to a comparable condition. This work shall be considered subsidiary to the bid item.

--Item 162--
Furnish and place bermuda grass sod.

--Item 168--
Apply vegetative watering as needed to supplement natural rainfall during the vegetation establishment period. Plan quantity of irrigation water is based on the application of a total of 1.3 gal of water each week for each sq. yd. of area that is sodded or seeded. Establishment time is estimated to be 12 weeks for both sod and permanent seed mixes. Temporary seeding will require less time for establishment. Provide a schedule and coordinate watering cycles and rates per cycle with the Engineer. Obtain approval if the quantity of water to be applied is expected to exceed the plan quantity. Adjust the amount of water applied with each cycle and the number of cycles each wk. according to actual site conditions. Drought or other conditions, as determined by the Engineer, may require the application of supplemental irrigation during hours other than normal working hours.

--Item 302--
Previously tested aggregates found to contain excessive quantities of dust (more than 0.5 percent passing the No. 40 sieve) during precoating, stockpiling or hauling operations, may be rejected. Use Test Method Tex-200-F, Part I for testing.

Precoated Aggregate Type PE shall consist of crushed slag, crushed stone or natural limestone rock asphalt.

The Engineer will utilize the Ignition Oven Method (Tex 236-F) for aggregate gradation, with the option of utilizing belt or vacuum extraction gradation in the event the ignition oven malfunctions.

--Item 316--
When using latex asphalt, avoid drifting of asphalt onto traffic and adjacent properties.

Asphalt season will be year around, but meet sections 316.4.4.1 through 4.4.3.

Ensure that the asphalt for precoating the aggregate and the asphalt used for the surface treatment will not result in a reaction that may adversely affect the bonding of the aggregate and asphalt during the surface treatment operation.

Do not add bag house fines in the production of precoated material.

Clean all concrete curbs, islands, medians, etc. that get coated with asphalt.

--Item 320--
Construct all longitudinal ACP joints adjacent to a travel lane with a joint maker device that will create a 3:1 to 6:1 taper. For placement of 2 inches or more, the device shall provide a maximum ½ inch vertical edge. Taper outside edges (next to the grass) or backfill (shoulder-up) the same day.

Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.

--Item 3077--
Table 10, in Item 340, Table 10 in Item 3076 and Table 11in Item 3077, Hamburg Wheel Test Requirements tested in accordance with Tex-242-F are changed for PG 64-22 or lower and PG 70-22. Minimum number of passes at 12.55 mm Rut Depth, Tested at 50 degrees C will be 5,000 and 10,000 respectively.

The asphalt plant shall have truck scales as defined in Item 520. Give three weight tickets bearing the date, ticket number, the truck number, the gross, net & tare weights to the truck driver for the State inspector at the spreading and finishing operation. Trucks may be required to weigh on public scales or portable platform scales to verify the weight of the ticket.

Submit a copy of the Tex 233-F production charts on a weekly basis. At the end of the ACP work, provide all originals.

Crushing of aggregate for hot mix and immediate use for production of the mix is not allowed. Stockpile the aggregate until enough material is available for five days of production unless prior approval is provided

Hold a pre-placement meeting one month prior to the placement of the hot mix.

Do not use diesel or solvents as asphalt release agents in production, transportation, or construction. A list of approved asphalt release agents is available from the District Laboratory.

No more than one hot mix lot will be open for any specific type of hot mix, unless authorized. After a lot is open and the Contractor gets approval to change plants, the previous lot will be closed and a new lot will be opened. The numbering for the lots produced at the new plant will

start with No. 1. If allowed to switch back to the original or previous plant, the next lot from that plant will resume numbering sequentially from the last lot produced by that plant.

--Item 354--
Retain planed material.

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

--Item 420--
Mass concrete will be measured in place.

Restrict large aggregate size to ¾" maximum for class "C" concrete used in aesthetic details requiring form liners.

--Item 432--
In all riprap slopes, provide 3 inch diameter weep holes at 10 foot maximum spacing and backed with loose graded gravel or crushed stone and galvanized hardware cloth.

In areas where guard fence posts are to be placed in riprap, the riprap shall have an 18 inch +/- blocked out area (round or square). After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

Match the slope of the Riprap (Mow Strip) to the slope of the adjacent roadway.

--Item 500--
"Materials on Hand" payments will not be considered in determining percentages for mobilization payments.

--Item 502--
Place standard markings no later than 14 days after surface treatment operations are completed.

When advanced warning flashing arrow panels and/or changeable message sign is specified, have one standby unit in good condition at the job site. Standby time shall be considered subsidiary to the bid item.

Treat the pavement drop-offs as shown in the TCP.

After written notification, the time frame is provided on the Form 599 to provide properly maintained signs and barricades before considered in non-compliance. Failure to make corrections as noted may result in payment for this item being withheld.

There are traffic signals at the intersection of Bynum Ave., New Laredo Hwy., Kelsey Ave., Somerset Rd., Barlite Blvd., Yarrow Blvd., S. Zarzamora St., Entrance to South Park Mall, and IH 35 Southbound Access Rd. Keep the signals in operation at all times except when necessary for specific installation operations, including any modifications to existing signal heads to maintain clear visibility at all times. Adjustment of any signal head will be subsidiary to Item 502. When it is necessary for a signal to be turned off, hire off duty police officers to control the traffic until the signals are back in satisfactory condition.

Moving an existing sign to a temporary location is subsidiary to this Item. Installations with permanent supports at permanent locations will be paid for under the applicable bid item (s).

Mount temporary mailboxes on plastic drum in accordance with Compliant Work Zone Traffic Control Devices, Section K. Mounting and moving the mailbox as needed for the various construction phases is subsidiary to this Item.

Notify the Engineer in writing 10 business days in advance of any temporary or permanent lane, ramp, connector, etc. closures/detours, restrictions to lane widths, alterations to vertical clearances, or modifications to radii. Any other modifications to the roadway that may adversely affect the mobility of oversized/overweight trucks also require 10 business days advance written notice to the Engineer. Unless shown in the TCP, no lane, ramp, connector, etc. closures are allowed during special events. At least one lane has to remain open at all times. Lane closures will not be allowed if this reporting requirement is not met.

For closures not listed in the TCP; the lane closures are limited to between the hours of 9:00 pm and 5:00 am Sunday through Thursday, and at least one lane has to remain open at all times.

Avoid placing stockpiles within the roadway's horizontal clear zone. If a stockpile is placed within the clear zone, address in accordance with the TMUTCD.

Do not place barricades, signs, or any other traffic control devices where they interfere with sight distance at driveways or side streets.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee available to respond on the project for emergencies and for taking corrective measures within 2 hours or within a reasonable time frame as specified by the Engineer.

If Nighttime work is required and work is not behind positive barrier then full TY 3 reflective gear is required to be worn by all workers, hard hat halos are required to be worn by the flaggers at flagging stations, TY III barricades are required to be spaced at 500 ft, and a mandatory night work meeting is required.

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.

Moving or adjustment of traffic signal heads, VIVDS, and radar detection for the purpose of alignment with the shifting of lanes in conjunction with the traffic control plan will be subsidiary to various bid items.

--Item 504--
A Type D Structure (Asphalt Mix Control Laboratory) is required for all projects that do not have a previously approved laboratory structure for TxDOT's exclusive use.

--Item 506--
An Inspector will perform a regularly scheduled SWP3 inspection every 7 calendar days.

Failure to address items noted on the SW3P inspection report within two report cycles may result in the Department stopping all construction operations, exclusive of time charges, or withholding that month's estimate until the SW3P deficiencies are corrected unless the Engineer determines that the area is too wet to correct SW3P deficiencies.

Failure to correctly maintain daily monitoring reports and submitting to TxDOT on a daily/weekly basis may result in the monthly estimate being withheld.

--Item 512--
Portable traffic barrier manufactured after December 31, 2019 must have been successfully tested to the 2016 edition of MASH and will be manufactured in accordance with the Standard Sheets in the plans. Portable traffic barrier manufactured on or before this date, and successfully tested to NCHRP Report 350 or the 2009 edition of MASH may continue to be used throughout their normal service lives, but must be the same shape type as shown in the plans.

More than one shape type of CTB may be furnished on a project, although no mixing of CTB shape types will be permitted along a continuous segment of CTB.

--Item 531--
The curb ramp locations shown in the plans have taken into account the geometric features of the intersection, traffic signals, and the pavement markings. If anything changes during construction, the location of curb ramps must be adjusted to ensure they meet TAS requirements.

--Item 540--
MBGF posts shall be round with domed tops, and not painted. If 10 or less timber posts are needed, they may be purchased locally and will be accepted by visual inspection.

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or other concrete shall have an 18 inch +/- (square or round) block out in the concrete. After the posts are installed, the blocked out area shall be topped off with 4 inches of low strength grout/mortar consisting of about 1 sack of cement per cubic yard of mix.

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

--Item 542--
Salvage all undamaged/acceptable radius guardrail and deliver to the TxDOT maintenance section yard.

--Item 545--
See the Crash Cushion Summary Sheet.

--Item 585--
Use Surface Test Type B, pay adjustment schedule 3 to evaluate ride quality of travel lanes.

--Item 644--
The wedge anchor system shown on State Standard Sheet SMD (TWT) is not allowed.

The set screw type for Triangular Slipbase Systems is not allowed. Use the following products for the Triangular Slipbase System.

Triangular Slip Base Systems
(For use with 10 BWG and Schedule 80 Round Posts)

Southern Plains Fabrication	SPF Triangular Slipbase Housing	Info@SouthernPlainsFabrication.com http://SouthernPlainsFabrication.com (806) 241-0060
Structural and Steel Products	Triangular Slipbase Breakaway Support	CustServ@s-steel.com http://s-steelcom (800) 782-5804

--Item 658--
CTB reflectors will not be paid for directly but will be considered subsidiary to the barrier.

--Item 662--
Raised reflective pavement markings are required when using work zone reflective pavement markings for lane lines as shown in the standards. The raised reflective pavement markings must be placed during the same operation for installation of the work zone reflective pavement markings and placed before the roadway is open to traffic. These raised reflective pavement markings will be subsidiary to work zone pavement markings.

--Item 666--
Use TY II material (vs. an acrylic or epoxy) as the sealer for the TY I markings, place the TY II a minimum of 14 calendar days (to provide adequate curing) before placing the TY I markings.

Failure to provide the retroreflectometer testing data within the time specified in the specifications will result in non-payment of the bid item.

--Item 672--
Place all adhesive material directly from the heated dispenser to the pavement. Do not use portable or non-heated containers. Use adhesive of sufficient thickness so that when the marker is pressed into the adhesive, 1/8" or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 1/2" but not more than 1 1/2" beyond the perimeter of the marker.

--Item 677--
Obtain approval before using the mechanical method for the elimination of existing thermoplastic pavement markings.

--Item 730--
Mow full-width and hand trim the right of way, including newly seeded or sodded areas, when vegetation reaches a height of 16” or when directed. Removal of brush sprouts growing within guardrail, concrete barriers or at other locations where mowing or hand trimming is done within the limits of construction is required and subsidiary to this item. Mowing may be required more often in newly sodded or seeded areas than in other parts of the project because of the supplemental irrigation these areas receive and the resulting weed growth. Coordinate mowing to avoid rutting or compaction of the soil when mowing where supplemental irrigation is being used. Use mowing equipment that will not adversely affect soil retention blankets or mulches that have been applied. Work performed under this item does not replace the mowing required when placing permanent seeding in an area that has established temporary seeding as described in Article 164.3, Construction.

--Item 734 & 738--
Perform Litter Removal and Cleaning and Sweeping Highways once a month or as directed.

--Item 3085--
The minimum application rates are listed in Table UC. The Engineer may adjust the application rates taking into consideration the existing pavement surface conditions.

Table UC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Hot Asphalt	0.15
Spray Applied Underseal Membrane	0.20
Seal Coat – Emulsion (CHFRS-2P, CRS-2P)	0.25
Seal Coat – Asphalt (AC-15P, AC-20-5TR, AC-20XP, AC10-2TR)	0.23
Aggregate for Seal Coat Options TY PB GR 4(AC) or TY B GR 4(Emulsion)	1 CY:120 SY

--Item 4171--
Install bridge identification numbers shown below for each of the following listed bridges in accordance to the special specification and San Antonio District Standard. Install the bridge identification number on two locations as shown on the plans, or as directed. For bridges in a two-way condition, install the bridge identification number on each outside beam on the upstream side of traffic. For bridges in a one-way condition, install the bridge identification number on each side, opposite corners on each outside beam. For culverts less than 5 ft. in height, install the bridge identification number on the headwall on upstream and downstream location. For culverts greater than 5 ft. in height, install the bridge identification number inside the first barrel on the upstream side of traffic and inside the last barrel on the opposite corner in the direction of traffic.

--Item 6185--
2 shadow vehicle with TMA will be required for this project. The TMA’s will be measured and paid for by the DAY for each TMA/TA set up and operational on the worksite. 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 TMA’s needed for the project. See TMA and TA Summary sheet in the plans.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0521-02-042 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY SL 13

			CONTROL SECTION JOB		**0521-02-042**		**0521-03-061**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00061217**		**A00061215**			
			COUNTY		**Bexar**		**Bexar**			
			HIGHWAY		**SL 13**		**SL 13**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	100-6001	PREPARING ROW		AC			2.000		2.000	
	104-6009	REMOVING CONC (RIPRAP)		SY	66.000		259.000		325.000	
	104-6054	REMOVING CONCRETE(MOW STRIP)		LF	130.000				130.000	
	161-6017	COMPOST MANUF TOPSOIL (4")		SY	74.000		934.000		1,008.000	
	162-6002	BLOCK SODDING		SY	74.000		934.000		1,008.000	
	168-6001	VEGETATIVE WATERING		MG	2.000		14.000		16.000	
	316-6009	ASPH (A-R TYPE II OR III)		GAL	29,773.000				29,773.000	
	316-6431	AGGR (TY-PB GR-4)		CY	543.000				543.000	
	351-6001	FLEXIBLE PAVEMENT STRUCTURE REPAIR(5")		SY			15,918.000		15,918.000	
	351-6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")		SY	9,839.000		44,050.000		53,889.000	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")		SY	1,595.000		4,598.000		6,193.000	
	354-6045	PLANE ASPH CONC PAV (2")		SY	95,469.000		81,079.000		176,548.000	
	420-6066	CL C CONC (RAIL FOUNDATION)		CY	40.000				40.000	
	432-6001	RIPRAP (CONC)(4 IN)		CY	15.000		57.000		72.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)		CY			98.000		98.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS		LF			3,720.000		3,720.000	
	450-6030	RAIL (TY C221)		LF	256.000				256.000	
	451-6024	RETROFIT RAIL (TY SSTR)		LF			924.000		924.000	
	454-6008	HEADER TYPE EXPANSION JOINT		CF			33.000		33.000	
	454-6009	JOINT SEALANT		LF			3,720.000		3,720.000	
	480-6001	CLEAN EXIST CULVERTS		EA	2.000				2.000	
	500-6001	MOBILIZATION		LS	0.500		0.500		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	6.000		8.000		14.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)		SY			223.000		223.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)		SY			223.000		223.000	
	506-6037	SANDBAGS FOR EROSION CONTROL (12")		LF	1,485.000		330.000		1,815.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	152.000		3,471.000		3,623.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	152.000		3,471.000		3,623.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)		LF			1,400.000		1,400.000	
	512-6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)		LF	240.000				240.000	
	512-6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)		LF	40.000				40.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)		LF			1,400.000		1,400.000	
	512-6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)		LF	240.000				240.000	
	512-6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)		LF	40.000				40.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)		LF			1,652.000		1,652.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)		EA			4.000		4.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION		EA			4.000		4.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0521-02-042 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY SL 13

				CONTROL SECTION JOB	0521-02-042		0521-03-061		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00061217		A00061215			
				COUNTY	Bexar		Bexar			
				HIGHWAY	SL 13		SL 13			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF		290.000		1,652.000		1,942.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA		2.000		9.000		11.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA				2.000		2.000	
	542-6005	RM MTL BM GD FEN TRANS (T101)	EA				4.000		4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA				8.000		8.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA				1.000		1.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA				2.000		2.000	
	545-6012	CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	EA				2.000		2.000	
	636-6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF		128.000		30.000		158.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA		40.000		17.000		57.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA		12.000		6.000		18.000	
	644-6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA		6.000		5.000		11.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA		58.000		28.000		86.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA		3,000.000		3,000.000		6,000.000	
	662-6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA		1,000.000		1,000.000		2,000.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF		7,784.000		1,158.000		8,942.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF		5,700.000		1,811.000		7,511.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA		75.000		18.000		93.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA		39.000		8.000		47.000	
	666-6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA		12.000				12.000	
	666-6156	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	EA		8.000		3.000		11.000	
	666-6224	PAVEMENT SEALER 4"	LF		102,710.000		51,034.000		153,744.000	
	666-6226	PAVEMENT SEALER 8"	LF		7,784.000		1,158.000		8,942.000	
	666-6230	PAVEMENT SEALER 24"	LF		5,700.000		1,811.000		7,511.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA		75.000		18.000		93.000	
	666-6232	PAVEMENT SEALER (WORD)	EA		39.000		8.000		47.000	
	666-6233	PAVEMENT SEALER (MED NOSE)	EA		8.000		3.000		11.000	
	666-6242	PAVEMENT SEALER (RR XING)	EA		12.000				12.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF		18,570.000		9,760.000		28,330.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF		38,775.000		19,569.000		58,344.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF		2,740.000		860.000		3,600.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF		42,625.000		20,845.000		63,470.000	
	672-6007	REFL PAV MRKR TY I-C	EA		601.000		289.000		890.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA		970.000		533.000		1,503.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA		894.000		268.000		1,162.000	
	730-6107	FULL - WIDTH MOWING	CYC		2.000		4.000		6.000	
	734-6002	LITTER REMOVAL	CYC		6.000		12.000		18.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0521-02-042 **DISTRICT** San Antonio **COUNTY** Bexar
HIGHWAY SL 13

			CONTROL SECTION JOB	**0521-02-042**		**0521-03-061**		TOTAL EST.	TOTAL FINAL
			PROJECT ID	**A00061217**		**A00061215**			
			COUNTY	**Bexar**		**Bexar**			
			HIGHWAY	**SL 13**		**SL 13**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL		
	738-6003	CLEANING / SWEEPING (OUTSIDE MAIN LANE)	CYC	6.000		12.000		18.000	
	3077-6066	SP MIXESSP-DSAC-B PG76-22	TON	11,165.000		9,855.000		21,020.000	
	3085-6001	UNDERSEAL COURSE	GAL	5,880.000		17,137.000		23,017.000	
	4171-6001	INSTALL BRIDGE IDENTIFICATION NUMBERS	EA			2.000		2.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1.000		1.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	201.000		100.000		301.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	8.000		7.000		15.000	
	08	SAFETY CONTINGENCY (NON-PART)	LS	1.000				1.000	
		EROSION CONTROL MAINTENANCE (NON-PART)	LS	1.000				1.000	
		LAW ENFORCEMENT	LS	1.000				1.000	

SHEET	LOCATION	502 6001	506 6020	506 6024	512 6001	512 6009	512 6010	512 6049	512 6057	512 6058	545 6005	545 6012	662 6109	662 6110	6001 6002	6185 6002	6185 6005
		BARRICADES, SIGNS AND TRAFFIC HANDLING	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	PORT CTB (FUR & INST) (SGL SLOPE) (TY 1)	PORT CTB (FUR & INST) (LOW PROF) (TY 1)	PORT CTB (FUR & INST) (LOW PROF) (TY 2)	PORT CTB (REMOVE) (SGL SLP) (TY 1)	PORT CTB (REMOVE) (LOW PROF) (TY 1)	PORT CTB (REMOVE) (LOW PROF) (TY 2)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (R) (N) (TL2)	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		MO	SY	SY	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	DAY	DAY
	CSJ 0521-03-061	8	223	223	1,400			1,400			2	2	3,000	1,000	1	100	7
	CSJ 0521-02-042	6				240	40		240	40			3,000	1,000	1	201	8
PROJECT TOTALS		14	223	223	1,400	240	40	1,400	240	40	2	2	6,000	2,000	2	301	15

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100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SUMMARY OF TCP

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		16
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

TXDOT*MON*PENTABLE - COMBINED*95%.tbl
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gn3891
PDF*2D*MON*HW*MR*300.plt
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SHEET	LOCATION	100 6001 PREPARING ROW	104 6009 REMOVING CONC (RIPRAP)	161 6017 COMPOST MANUF TOPSOIL (4")	162 6002 BLOCK SODDING	168 6001 VEGETATIVE WATERING	351 6001 FLEXIBLE PAVEMENT STRUCTURE REPAIR(5")	351 6004 FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	354 6021 PLANE ASPH CONC PAV(0" TO 2")	354 6045 PLANE ASPH CONC PAV (2")	432 6001 RIPRAP (CONC)(4 IN)	432 6045 RIPRAP (MOW STRIP)(4 IN)	438 6001 CLEANING AND SEALING EXISTING JOINTS	451 6024 RETROFIT RAIL (TY SSTR)	454 6008 HEADER TYPE EXPANSION JOINT	454 6009 JOINT SEALANT	506 6037 SANDBAGS FOR EROSION CONTROL (12")	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	540 6001 MTL W-BEAM GD FEN (TIM POST)	540 6007 MTL BEAM GD FEN TRANS (TL2)
		AC	SY	SY	SY	MG	SY	SY	SY	SY	CY	CY	LF	LF	CF	LF	LF	LF	LF	LF	EA
	CSJ 0521-03-061																				
70	ROADWAY PLAN LAYOUTS	2	228	460	460	7	2,921	8,990	4,598	13,901	49	59	1,200	924	11	1,200	135	2,525	2,525	1,163	4
71	ROADWAY PLAN LAYOUTS						12,268	6,400		22,400											
72	ROADWAY PLAN LAYOUTS		31	474	474	7	729	8,185		20,337	8	39	2,520		22	2,520		946	946	489	
73	ROADWAY PLAN LAYOUTS							18,939		22,671							195				
74	ROADWAY PLAN LAYOUTS							1,536		1,770											
	PROJECT SUB TOTALS	2	259	934	934	14	15,918	44,050	4,598	81,079	57	98	3,720	924	33	3,720	330	3,471	3,471	1,652	4

SHEET	LOCATION	540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	542 6001 REMOVE METAL BEAM GUARD FENCE	542 6002 REMOVE TERMINAL ANCHOR SECTION	542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL	542 6005 RM MTL BM GD FEN TRANS (T101)	544 6001 GUARDRAIL END TREATMENT (INSTALL)	544 6003 GUARDRAIL END TREATMENT (REMOVE)	545 6005 CRASH CUSH ATTEN (REMOVE)	545 6012 CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	3077 6066 SP MIXES SP-D SAC-B PG76-22	3085 6001 UNDERSEAL COURSE	4171 6001 STENCILING PERMANENT STRUCTURE NUMBERS
		EA	LF	EA	EA	EA	EA	EA	EA	EA	TON	GAL	EA
	CSJ 0521-03-061												
70	ROADWAY PLAN LAYOUTS	2	1,163	2	2	4	2		1	1	2,128	3,700	1
71	ROADWAY PLAN LAYOUTS										2,576	4,480	
72	ROADWAY PLAN LAYOUTS	2	489	7			6	1	1	1	2,339	4,068	1
73	ROADWAY PLAN LAYOUTS										2,608	4,535	
74	ROADWAY PLAN LAYOUTS										204	354	
	PROJECT SUB TOTALS	4	1,652	9	2	4	8	1	2	2	9,855	17,137	2

SHEET	LOCATION	104 6009 REMOVING CONC (RIPRAP)	104 6054 REMOVING CONCRETE (MOW STRIP)	161 6017 COMPOST MANUF TOPSOIL (4")	162 6002 BLOCK SODDING	168 6001 VEGETATIVE WATERING	316 6009 ASPH (A-R TYPE II OR III)	316 6431 AGGR (TY-PB GR-4)	351 6004 FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	354 6021 PLANE ASPH CONC PAV(0" TO 2")	354 6045 PLANE ASPH CONC PAV (2")	420 6066 CL C CONC (RAIL FOUNDATION)	432 6001 RIPRAP (CONC)(4 IN)	450 6030 RAIL (TY C221)	480 6001 CLEAN EXIST CULVERTS	506 6037 SANDBAGS FOR EROSION CONTROL (12")	506 6038 TEMP SEDMT CONT FENCE (INSTALL)
		SY	LF	SY	SY	MG	GAL	CY	SY	SY	SY	CY	CY	LF	EA	LF	LF
	CSJ 0521-02-042																
74	ROADWAY PLAN LAYOUTS								7,585		21,000					285	
75	ROADWAY PLAN LAYOUTS						5,876	107	2,254		21,754					330	
76	ROADWAY PLAN LAYOUTS						9,846	180			22,376					315	
77	ROADWAY PLAN LAYOUTS	66	130	74	74	2	9,398	171			21,359	40	15	256	2	400	152
78	ROADWAY PLAN LAYOUTS						4,653	85		1,595	8,980					155	
	PROJECT SUB TOTALS	66	130	74	74	2	29,773	543	9,839	1,595	95,469	40	15	256	2	1,485	152

SHEET	LOCATION	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	542 6001 REMOVE METAL BEAM GUARD FENCE	542 6002 REMOVE TERMINAL ANCHOR SECTION	3077 6066 SP MIXES SP-D SAC-B PG76-22	3085 6001 UNDERSEAL COURSE
		LF	LF	EA	TON	GAL
	CSJ 0521-02-042					
74	ROADWAY PLAN LAYOUTS				2,415	4,200
75	ROADWAY PLAN LAYOUTS				2,502	1,680
76	ROADWAY PLAN LAYOUTS				2,574	
77	ROADWAY PLAN LAYOUTS	152	290	2	2,457	
78	ROADWAY PLAN LAYOUTS				1,217	
	PROJECT SUB TOTALS	152	290	2	11,165	5,880

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100 NE INTERSTATE 410 LOOP
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SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SUMMARY OF ROADWAY AND BRIDGE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		17
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

SHEET	LOCATION	100 6001 PREPARING ROW	104 6009 REMOVING CONC (RIPRAP)	104 6054 REMOVING CONCRETE(MOW STRIP)	161 6017 COMPOST MANUF TOPSOIL (4")	162 6002 BLOCK SODDING	168 6001 VEGETATIVE WATERING	316 6009 ASPH (A-R TYPE II OR III)	316 6431 AGGR (TY-PB GR-4)	351 6001 FLEXIBLE PAVEMENT STRUCTURE REPAIR(5")	351 6004 FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	354 6021 PLANE ASPH CONC PAV(0" TO 2")	354 6045 PLANE ASPH CONC PAV (2")	420 6066 CL C CONC (RAIL FOUNDATION)	432 6001 RIPRAP (CONC)(4 IN)	432 6045 RIPRAP (MOW STRIP)(4 IN)	438 6001 CLEANING AND SEALING EXISTING JOINTS	450 6030 RAIL (TY C221)	451 6024 RETROFIT RAIL (TY SSTR)	454 6008 HEADER TYPE EXPANSION JOINT	454 6009 JOINT SEALANT
		AC	SY	LF	SY	SY	MG	GAL	CY	SY	SY	SY	SY	CY	CY	CY	LF	LF	LF	CF	LF
PROJECT TOTALS		2	325	130	1,008	1,008	16	29,773	543	15,918	53,889	6,193	176,548	40	72	98	3,720	256	924	33	3,720

SHEET	LOCATION	480 6001 CLEAN EXIST CULVERTS	506 6037 SANDBAGS FOR EROSION CONTROL (12")	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	540 6001 MTL W-BEAM GD FEN (TIM POST)	540 6007 MTL BEAM GD FEN TRANS (TL2)	540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	542 6001 REMOVE METAL BEAM GUARD FENCE	542 6002 REMOVE TERMINAL ANCHOR SECTION	542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL	542 6005 RM MTL BM GD FEN TRANS (T101)	544 6001 GUARDRAIL END TREATMENT (INSTALL)	544 6003 GUARDRAIL END TREATMENT (REMOVE)	545 6005 CRASH CUSH ATTEN (REMOVE)	545 6012 CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	3077 6066 SP MIXES SP-D SAC-B PG76-22	3085 6001 UNDERSEAL COURSE	4161 6001 STENCILING PERMANENT STRUCTURE NUMBERS
		EA	LF	LF	LF	LF	EA	EA	LF	EA	EA	EA	EA	EA	EA	EA	TON	GAL	EA
PROJECT TOTALS		2	1,815	3,623	3,623	1,652	4	4	1,942	11	2	4	8	1	2	2	21,020	23,017	2

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TEL (210) 798-1895 FIRM #F-312

SUMMARY OF ROADWAY AND BRIDGE

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		18
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

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PAVEMENT MARKINGS & SIGNS SUMMARY

PLAN SHEET NO.	CSJ: 0521-03-061 STATION TO STATION	0636 6007	0644 6001	0644 6004	0644 6044	0644 6076	0666 6036	0666 6048	0666 6054	0666 6078	0666 6093	0666 6156	0666 6224	0666 6226	0666 6230
		REPLACE EXISTING ALUMINUM SIGNS(TY A)	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TYS80(1) SB(U)	REMOVE SM RD SN SUP&AM	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W)(ARROW) (100MIL)	REFL PAV MRK TY I (W)(WORD) (100MIL)	REFL PAV MRK TY I (W)(RR XING)(100MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"
		SF	EA	EA	EA	EA	LF	LF	EA	EA	EA	EA	LF	LF	LF
	SL 13														
104	100+83 TO 119+00		3	1	3	7	690		4	4		1	9898	690	
105	119+00 TO 143+00		1	1		2							12112		
106	143+00 TO 167+00	9	1	2		3							12096		
107	167+00 TO 191+00		6	1		7	288	28	10	2		2	13175	288	28
108	191+00 TO 200+50	21	6	1	2	9	180	1783	4	2			3753	180	1783
	CSJ TOTALS	30	17	6	5	28	1158	1811	18	8		3	51034	1158	1811

PLAN SHEET NO.	CSJ: 0521-02-042 STATION TO STATION	0636 6007	0644 6001	0644 6004	0644 6044	0644 6076	0666 6036	0666 6048	0666 6054	0666 6078	0666 6093	0666 6156	0666 6224	0666 6226	0666 6230
		REPLACE EXISTING ALUMINUM SIGNS(TY A)	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	IN SM RD SN SUP&AM TYS80(1) SB(U)	REMOVE SM RD SN SUP&AM	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W)(ARROW) (100MIL)	REFL PAV MRK TY I (W)(WORD) (100MIL)	REFL PAV MRK TY I (W)(RR XING)(100MIL)	REFL PAV MRK TY I(Y)(MED NOSE)(100MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"
		SF	EA	EA	EA	EA	LF	LF	EA	EA	EA	EA	LF	LF	LF
	SL 13														
108	200+50 TO 215+00		4	1		5	289		7	2			7142	289	
109	215+00 TO 239+00		7	3		10	813	1046	16	6			11599	813	1046
110	239+00 TO 263+00	9.5	5			5	788	954	12	5		4	13515	788	954
111	263+00 TO 287+00	59	5			5	3365	1116	11	7	12	1	11033	3365	1116
112	287+00 TO 305+00	29	2	2	1	5	1371	773	11	11			8387	1371	773
	CSJ TOTALS	97.5	23	6	1	30	6626	3889	57	31	12	5	51676	6626	3889

PROJECT TOTALS	128	40	12	6	58	7784	5700	75	39	12	8	102710	7784	5700

CONT.

PLAN SHEET NO.	CSJ: 0521-03-061 STATION TO STATION	0666 6231	0666 6232	0666 6233	0666 6242	0666 6300	0666 6303	0666 6312	0666 6315	0672 6007	0672 6009	0672 6010
		PAVEMENT SEALER (ARROW)	PAVEMENT SEALER (WORD)	PAVEMENT SEALER (MED NOSE)	PAVEMENT SEALER (RR XING)	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
		EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA
	SL 13											
104	100+83 TO 119+00	4	4	1		1840	3636		4422	103	190	24
105	119+00 TO 143+00					2400	4800		4912		12	120
106	143+00 TO 167+00					2400	4800		4896		12	120
107	167+00 TO 191+00	10	2	2		2400	4814	740	5221	131	260	4
108	191+00 TO 200+50	4	2			720	1519	120	1394	55	59	
	CSJ TOTALS	18	8	3		9760	19569	860	20845	289	533	268

PLAN SHEET NO.	CSJ: 0521-02-042 STATION TO STATION	0666 6231	0666 6232	0666 6233	0666 6242	0666 6300	0666 6303	0666 6312	0666 6315	0672 6007	0672 6009	0672 6010
		PAVEMENT SEALER (ARROW)	PAVEMENT SEALER (WORD)	PAVEMENT SEALER (MED NOSE)	PAVEMENT SEALER (RR XING)	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK) (100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
		EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA
	SL 13											
108	200+50 TO 215+00	7	2			860	2900	500	2882	88	95	
109	215+00 TO 239+00	16	6			2270	4323	540	4466	104	84	58
110	239+00 TO 263+00	12	5	4		2280	4348	440	6447	92	186	63
111	263+00 TO 287+00	11	7	1	12	1680	4332	400	4621	28	72	352
112	287+00 TO 305+00	11	11			1720	3303		3364			153
	CSJ TOTALS	57	31	5	12	8810	19206	1880	21780	312	437	626

PROJECT TOTALS	75	39	8	12	18570	38775	2740	42625	601	970	894

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100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TEDSI TBPE F-1640

SL 13
PAVEMENT MARKINGS & SIGNS SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		19
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:11/17/2021 TIME:10:52:25 AM
FILE:...\SL-13-PVMK SUMMARY 08262021.dgn

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.

SUMMARY OF SMALL SIGNS$FILEA$

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE		SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE$FILEA$ (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)
104													
		M3-4		WEST	24"x12"	✓							
	①	M1-6F	M1-6L	FARM 2536 ROAD / LOOP 13	2 x 24"x24"	✓		10BWG	1	SA	U		
		M6-1	M6-3	← ↑	2 x 21"x15"	✓							
	②	R2-1		SPEED LIMIT 45	36"x48"	✓		10BWG	1	SA	T		
	③	W8-13aT		BRIDGE MAY ICE IN COLD WEATHER	36"X36"	✓		10BWG	1	SA	P		
		M2-1		JCT	21"x15"	✓							
	④							10BWG	1	SA	P		
		M1-6F		FARM 2536 ROAD	24"X24"	✓							
	⑤	I-3		LEON CREEK	48"X30"	✓		10BWG	1	SA	U		
	⑥	I-3		LEON CREEK	48"X30"	✓		10BWG	1	SA	U		
	⑦	W8-13aT		BRIDGE MAY ICE IN COLD WEATHER	36"x36"	✓		10BWG	1	SA	P		
105													
		M3-2		EAST	24"x12"	✓							
	①	M1-6L		LOOP 13	24"x24"	✓		10BWG	1	SA	P		

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SL 13 SUMMARY OF SMALL SIGNS

SOSS SHEET 1 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	BEXAR		20

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DATE:11/17/2021
FILE:...\SL 13-SIGNS SUMS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
105												
CONT.	②	R2-1	SPEED LIMIT 45	36"X48"	✓		S80	1	SA	T		
106												
	①	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36"x36"	✓		10BWG	1	SA	P		
	②	R2-1	SPEED LIMIT 45	36"X48"	✓		10BWG	1	SA	T		
	③	R2-1	SPEED LIMIT 40	36"X48"	✓		10BWG	1	SA	T		
	⚠1	W2-2L		36"x36"	✓		REPLACE SIGN ONLY					
107												
	①	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36"x36"	✓		10BWG	1	SA	P		
	②	R1-1	STOP	36"x36"	✓		10BWG	1	SA	P		
	③	R2-1	SPEED LIMIT 40	36"X48"	✓		10BWG	1	SA	T		
		S1-1		36"x36"	✓							
	④		AHEAD				10BWG	1	SA	P		
		SW16-9P		24"x12"	✓							

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

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

http://www.txdot.gov/

NOTE:

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

REVISION

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

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SUMMARY OF SMALL SIGNS

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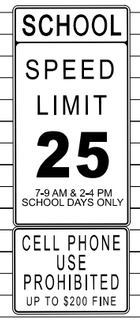
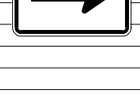
REVISIONS 4-16 8-16	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		21

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
107												
CONT.		S4-3		24"X8"	✓							
	⑤	S5-1		24"x48"	✓		10BWG	1	SA	P		
		S7-1T		24"x18"	✓							
		S4-3P		24"X8"	✓							
	⑥	S7-1T		24"x18"	✓		10BWG	1	SA	P		
		SW16-5PL		24"x18"	✓							
		S1-1		36"x36"	✓							
	⑦						S80	1	SA	P		
		SW16-9P		24"x12"	✓							
108												
		S1-1		36"x36"	✓							
	①						10BWG	1	SA	P		
		SW16-7PL		24"x12"	✓							
		S4-3		24"X8"	✓							
	②	S7-1T		24"x18"	✓		10BWG	1	SA	P		
		SW16-5PR		24"x18"	✓							

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

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SUMMARY OF SMALL SIGNS

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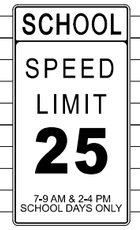
REVISIONS	0521	02	042	SL 13
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	BEXAR		22

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)
108												
CONT.												
		S1-1		36"x36"	✓							
	③	SW16-7PL		24"x12"	✓		10BWG	1	SA	P		
		S5-2aTP		30"X15"	✓							
	④						10BWG	1	SA	T		
		R2-1		36"X48"	✓							
		S4-3		24"X8"	✓								
	⑤						10BWG	1	SA	P		
		S5-1		24"x48"	✓							
		S1-1		36"x36"	✓							
	⑥						10BWG	1	SA	P		
		SW16-9PR		24"x12"	✓							
		M3-2		24"x12"	✓							
		M1-6L		24"x24"	✓							
	⚠	M6-3		21"x15"	✓		REPLACE SIGN ONLY					
		M1-6L M1-6L		2 x 24"x24"	✓							
		M6-1L M6-1R		2 x 21"x15"	✓							
		R5-1		36"x36"	✓							
	⑦						10BWG	1	SA	U		
		R1-2		48"x48"x48"	✓							

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

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SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 4-16 8-16	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
108												
CONT.												
	⑧	W4-2L		36'x36"	✓		10BWG	1	SA	P		
		R5-1	DO NOT ENTER	36"x36"	✓							
	⑨						10BWG	1	SA	U		
		R1-2	YIELD	48"x48"x48"	✓							
		M2-1	JCT	21"x15"	✓							
	⑩		LOOP 353				10BWG	1	SA	P		
		M1-6L		24"x24"	✓							
	⑪	R2-1	SPEED LIMIT 40	36"X48"	✓		10BWG	1	SA	P		
		S1-1		36"x36"	✓							
	⑫						10BWG	1	SA	P		
		SW16-9P	AHEAD	24"X12"	✓							
		S4-3	SCHOOL SPEED LIMIT 20 7-9 AM & 2-4 PM SCHOOL DAYS ONLY	24"X8"	✓							
	⑬	S5-1		24"x48"	✓		10BWG	1	SA	P		
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	24"x18"	✓							
		S5-2aTP	END SCHOOL ZONE	36"X18"	✓							
	⑭						10BWG	1	SA	T		
		R2-1	SPEED LIMIT 40	36"X48"	✓							

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

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REVISIONS	0521	02	042	SL 13
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		24

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
109												
		S4-3	SCHOOL	24"X8"	✓							
	①	S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	24"x18"	✓		10BWG	1	SA	P		
		SW16-5P(SPL)		24"X18"	✓							
		S4-3	SCHOOL	24"X8"	✓							
	②	S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	24"x18"	✓		10BWG	1	SA	P		
		SW16-5P(SPL)		24"X18"	✓							
		S1-1		36"x36"	✓							
	③						10BWG	1	SA	P		
		SW16-7PL		24"x12"	✓							
		S1-1		36"x36"	✓							
	④						10BWG	1	SA	P		
		SW16-7PL		24"X12"	✓							
		S4-3	SCHOOL	24"X8"	✓							
	⑤	S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	24"x18"	✓		10BWG	1	SA	P		
		SW16-5P(SPL)		24"X18"	✓							
		S4-3	SCHOOL	24"X12"	✓							
	⑥						10BWG	1	SA	P		
		S5-1	SPEED LIMIT 20 7-9 AM & 2-4 PM SCHOOL DAYS ONLY	24"x48"	✓							

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

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REVISIONS	0521	02	042	SL 13
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	SAT	BEXAR		25

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
109												
CONT.		S5-2aTP	END SCHOOL ZONE	36"X18"	✓							
	⑦		SPEED LIMIT 40				10BWG	1	SA	T		
		R2-1		36"X48"	✓							
		S1-1		36"x36"	✓							
	⑧						10BWG	1	SA	P		
		SW16-9P	AHEAD	24"X12"	✓							
	⑨	R2-1	SPEED LIMIT 40	36"X48"	✓		10BWG	1	SA	T		
	⑩	R6-IR	ONE WAY	54"X18"	✓		10BWG	1	SA	T		
110												
		D9-2		24"x24"	✓							
	①						10BWG	1	SA	P		
		D9-1dP		24"X6"	✓							
	②	R4-7		24"x30"	✓		10BWG	1	SA	P		
	③	R4-7		24"x30"	✓		10BWG	1	SA	P		
	④	R9-3bPL	USE CROSSWALK	18'x12"	✓		10BWG	1	SA	P		

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

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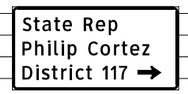
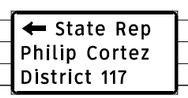
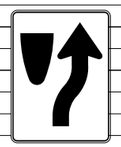
SUMMARY OF SMALL SIGNS

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
110												
CONT.		D9-2		24"x24"	✓							
	⑤						10BWG	1	SA	P		
		D9-1dP		24"X6"	✓							
	1	R4-7		24"x30"	✓			REPLACE SIGN ONLY				
	2	R9-3		18"x18"	✓			REPLACE SIGN ONLY				
	3	R9-3		18"x18"	✓			REPLACE SIGN ONLY				
111												
		W10-1		36"X36"	✓							
	1							REPLACE SIGN ONLY				
		W10-9P		36"X36"	✓							
	2	D23-1TR		48"X24"	✓			REPLACE SIGN ONLY				
	3	D23-1TL		48"X24"	✓			REPLACE SIGN ONLY				
		R4-7		24"x30"	✓							
	4							REPLACE SIGN ONLY				
		OM-3L		12"x36"	✓							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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SUMMARY OF SMALL SIGNS

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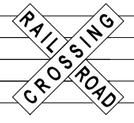
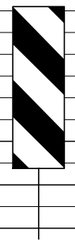
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
111												
CONT.												
	①	R1-1		36"X36"	✓		10BWG	1	SA	P		
	⑤	R15-1			✓			REPLACE SIGN ONLY				
	⑥	R15-1		48"x9"	✓			REPLACE SIGN ONLY				
	⑦	R15-1		48"x9"	✓			REPLACE SIGN ONLY				
	⑧	R15-1		48"x9"	✓			REPLACE SIGN ONLY				
	②	R4-7		24"X30"	✓		10BWG	1	SA	P		
		OM-3L		12"x36"	✓							
	⑨	R4-7		24"x30"	✓			REPLACE SIGN ONLY				

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

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

http://www.txdot.gov/

NOTE:

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

DATE:11/17/2021
FILE:...\SL 13-SIGNS SUMS.dgn

Texas Department of Transportation

Traffic Operations Division Standard

SL 13
SUMMARY OF SMALL SIGNS

SOSS SHEET 9 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0521	02	042	SL 13
4-16 8-16	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		28

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
111												
CONT.		W10-1		36"x36"	✓							
	③						10BWG	1	SA	P		
		W10-9P	NO TRAIN HORN	36"x36"	✓							
		M4-5B	TO	24"x12"	✓							
	④	M1-1	INTERSTATE 35	36"x36"	✓		10BWG	1	SA	P		
		M6-3B		21"x15"	✓							
	⑤	R2-1	SPEED LIMIT 40	36"X48"	✓		10BWG	1	SA	P		
112												
	⚠1	R4-7		24"x30"	✓			REPLACE SIGN ONLY				
	⚠2	R4-7		24"x30"	✓			REPLACE SIGN ONLY				
		M2-1B	JCT	21"x15"	✓							
	①						10BWG	1	SA	P		
		M1-1	INTERSTATE 35	24"x24"	✓							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
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FILE:...\SL 13-SIGNS SUMS.dgn

Texas Department of Transportation

Traffic Operations Division Standard

SL 13
SUMMARY OF SMALL SIGNS

SOSS SHEET 10 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0521	02	042	SL 13
4-16	DIST	COUNTY		SHEET NO.
8-16	SAT	BEXAR		29

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE		SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
112													
CONT.		M3-1B	M3-3B		24"x12" 24"x12"	✓							
	②	M1-1	M1-1		24"x24" 24"x24"	✓		10BWG	1	SA	U		
		M5-4B	M5-6B		24"x18" 24"x18"	✓							
	③	R4-7			24"x30"	✓			REPLACE SIGN ONLY				
	④	W12-2			36"x36"	✓			REPLACE SIGN ONLY				
	⑤	R6-1R			54"x18"	✓		10BWG	1	SA	T		
	⑥	R4-7			24"x30"	✓		10BWG	1	SA	P		
	⑦	R6-1R			54"x18"	✓		10BWG	1	SA	T		
	⑧	R4-7			24"x30"	✓			REPLACE SIGN ONLY				

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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DATE:11/17/2021
FILE:...\SL 13-SIGNS SUMS.dgn

Texas Department of Transportation

Traffic Operations Division Standard

SL 13
SUMMARY OF SMALL SIGNS

SOSS SHEET 11 OF 11

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0521	02	042	SL 13
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8-16	SAT	BEXAR		30

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	59	SL 13	119+56.30	TL2	UNI			SSCB	24"	42"	50'	X						X			
2	N/A	61	SL 13	154+85.68	TL2	UNI			SSCB	24"	42"	50'	X						X			
												TOTALS	2									

LEGEND:

L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

(1) SEE ROADWAY PLAN LAYOUT SHEET 1 OF 9

(2) SEE ROADWAY PLAN LAYOUT SHEET 3 OF 9

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
PERMANENT

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		
	SAN	BEXAR		
	FEDERAL AID PROJECT			SHEET NO.
				31

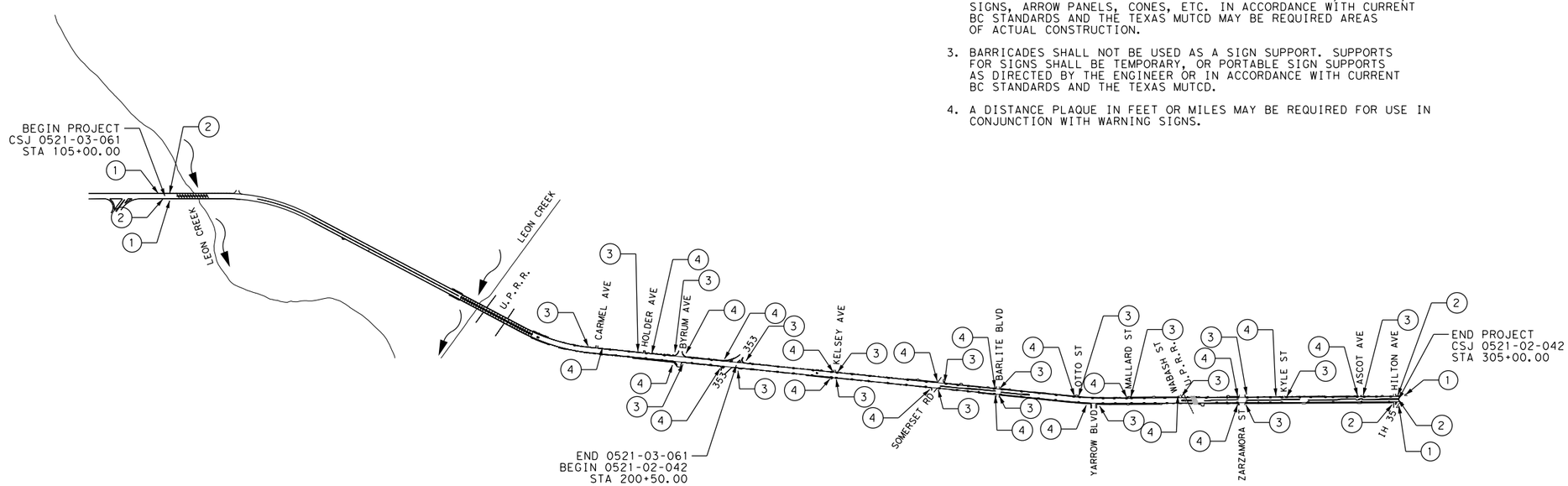
LOCATION	ROAD WORK NEXT XX MILES	ROAD WORK ← NEXT XX MILES	ROAD WORK NEXT XX MILES →	END ROAD WORK	WORK ZONE	BEGIN ROAD WORK NEXT XX MILES	NAME ADDRESS CITY STATE CONTRACTOR	STAY ALERT TALK OR TEXT LATER	DO NOT PASS	OBEY WARNING SIGNS STATE LAW	WHEN WORKERS ARE PRESENT	TRAFFIC FINES DOUBLE	RIGHT LANE CLOSED	CENTER LANE CLOSED	ONE LANE ROAD AHEAD	LOOSE GRAVEL	SPEED LIMIT XX	ONE WAY		
	G20-1aT	G20-1bTL	G20-1bTR	G20-2	G20-5aP	G20-5T	G20-6T	G20-10T	R4-1	R20-3T	R20-5aTP	R20-5T	CW20-5bTR(L)	CW20-5dT	CW20-4D	CW8-7	CW3-5	R6-1R/L	R3-1	R3-2
(1)					X	X	X	X		X	X	X								
(2)				X																
(3)	X	X	X			X														
(4)																				
(5)									X				X	X	X	X	X	X	X	X

LOCATION	BE PREPARED TO STOP	ROUGH ROAD	UNEVEN LANES	NO CENTER LINE		XX MPH	XXX FEET	XXXXX WORK AHEAD	ONE LANE ROAD 500 FT		NARROW LANES AHEAD	FRESH OIL	ROAD MACHINERY AHEAD	Give Us A BRAKE	WORK CONVOY	DRIVEWAY	DRIVEWAY			
	CW3-4	CW8-8	CW8-11	CW8-12	CW12-1	CW13-1P	CW16-2P	CW20-1D	CW20-4A	CW20-7	CW20-8T	CW21-2	CW21-3D	CW21-1T	CW21-10aT	D70A	D70	TY III BARRICADE	VERTICAL PANEL	PLASTIC DRUM
(1)								X						X						
(2)																				
(3)																				
(4)								X												
(5)	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X

(1) LOCATION 1 TO BE PLACED AT BEGINNING OF PROJECT
(2) LOCATION 2 TO BE PLACED AT THE END OF THE PROJECT
(3) LOCATION 3 TO BE PLACED AT THE BEGINNING OF THE SIDE STREETS
(4) LOCATION 4 TO BE PLACED AT THE END OF THE SIDE STREETS
(5) LOCATION 5 TO BE USED THROUGHOUT AS DIRECTED BY THE ENGINEER

NOTES:

1. CERTAIN SIGNS MUST BE USED IN CONJUNCTION WITH OTHER SIGNS. EXAMPLE: "FLAGGER AHEAD" MUST HAVE A "BE PREPARED TO STOP".
2. BARRICADES AND WARNING SIGNS ON THIS SHEET ARE MINIMAL CONSTRUCTION ZONE SIGNING. ADDITIONAL BARRICADES, WARNING, SIGNS, ARROW PANELS, CONES, ETC. IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD MAY BE REQUIRED AREAS OF ACTUAL CONSTRUCTION.
3. BARRICADES SHALL NOT BE USED AS A SIGN SUPPORT. SUPPORTS FOR SIGNS SHALL BE TEMPORARY, OR PORTABLE SIGN SUPPORTS AS DIRECTED BY THE ENGINEER OR IN ACCORDANCE WITH CURRENT BC STANDARDS AND THE TEXAS MUTCD.
4. A DISTANCE PLAQUE IN FEET OR MILES MAY BE REQUIRED FOR USE IN CONJUNCTION WITH WARNING SIGNS.



STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

11/17/2021

THE SEAL ORIGINALLY APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOHNNY L. CLAYTON, P.E. #107215 ON 11/17/2021 . ALTERATION OF A PREVIOUSLY SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC., 100 N.E. LOOP 410, SUITE 200, SAN ANTONIO, TEXAS 78216-4741, TBPE FIRM #F-312

NO.	REVISION	BY	DATE

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SL 13
SCHEDULE OF BARRICADES & ADVANCED WARNING DEVICES

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		32
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7 "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC," OF THE STANDARD SPECIFICATIONS. IN ADDITION TO THESE REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

I. GENERAL

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC AS SHOWN IN THE PLANS OR AS DIRECTED/APPROVED BY THE ENGINEER.
2. THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATIONS BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE/SEQUENCE UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT OF TRAFFIC, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.
3. DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD AND WILL ENDANGER THE TRAVELING PUBLIC.
4. THE CONTRACTOR WILL PROVIDE ADVANCE NOTIFICATION TO THE ENGINEER OF IMPENDING/UPCOMING LANE CLOSURES FOR ALL TEMPORARY AND/OR PERMANENT LANE, SHOULDER, ETC. CLOSURES OR DETOURS. SEE GENERAL NOTES FOR NOTIFICATION REQUIREMENTS.
5. ACCESS TO ADJOINING PROPERTY MUST BE MAINTAINED AT ALL TIMES.
6. TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.
7. AT NO TIME SHALL TWO CONSECUTIVE INTERSECTING ROADWAYS BE CLOSED AT ONE TIME DURING CONSTRUCTION.
8. UNLESS OTHERWISE NOTED IN THE PLANS AND/OR AS DIRECTED BY THE ENGINEER, DAILY LANE CLOSURES SHALL BE LIMITED ACCORDING TO THE FOLLOWING RESTRICTIONS: NIGHTTIME: SUNDAY THRU THURSDAY 9:00 PM TO 5:00 AM. WEEKEND CLOSURES (WITH UNIFORMED OFF DUTY POLICE ENFORCEMENT OFFICERS) WHEN APPROVED BY THE ENGINEER: FRIDAY FROM 9:00 PM TO MONDAY 5:00 AM. NO LANE CLOSURES WILL BE PERMITTED FOR THE FOLLOWING DATES AND/OR SPECIAL EVENTS:
   A. BETWEEN DECEMBER 15 AND JANUARY 1.
   B. FIESTA WEEK AND TAX FREE WEEKEND.
   C. WEDNESDAY BEFORE THANKSGIVING THRU THE SUNDAY AFTER THANKSGIVING
   D. SATURDAY AND SUNDAY BEFORE MEMORIAL DAY AND LABOR DAY.
   E. SATURDAY OR SUNDAY WHEN JULY 4 FALLS ON A FRIDAY OR MONDAY.
   F. ELECTION DAYS
   G. DURING MAJOR EVENTS AT THE AT&T CENTER (SPURS HOME GAMES, RODEO, CONCERTS, ETC.), ALAMODOME AND OR CONVENTION CENTER
   H. EASTER WEEKEND: APRIL 16, 2022 - APRIL 17, 2022 AND APRIL 8, 2023 - APRIL 9, 2023
9. COORDINATE WITH ADJACENT PROJECTS SO AS NOT TO AFFECT THE CONTINUOUS MOVEMENT OF TRAFFIC.
10. COVER EXISTING PERMANENT SIGNS IF NOT USED. THIS IS SUBSIDIARY TO ITEM 502.
11. EXCAVATION WITHIN 5 FEET OF AN EXISTING CPS ENERGY POLE WILL REQUIRE POLE BRACING. CONTACT CPS ENERGY UTILITY COORDINATION TO REQUEST POLE BRACING (JOHN OFFER, JEOFFER@CPSENERGY.COM). THE ESTIMATED DURATION FOR THE POLE BRACING PROCESS IS APPROXIMATELY 6 TO 8 WEEKS.
12. ALL PCTB PLACED SHALL BE SLOTTED TO FACILITATE DRAINAGE.
13. THE CONTRACTOR SHALL INSTALL AND MAINTAIN AN ADEQUATE NUMBER OF BARRICADES, WARNING AND DIRECTIONAL SIGNS TO DELINEATE TRAFFIC FOR ANY DETOURS OR CLOSURES. THE CONTRACTOR MAY, WITH THE APPROVAL AND/OR AS DIRECTED BY THE ENGINEER, BE REQUIRED TO VARY THE NUMBER AND LOCATION OF SIGNS AND BARRICADES FROM THAT INDICATED ON THE PLANS. ADDITIONAL SIGNS WILL BE SUBSIDIARY TO ITEM 502.
14. ALL REFERENCED LOCATIONS SHALL HAVE TEMPORARY PAVEMENT MARKERS (TABS) OR WORK ZONE PAVEMENT MARKINGS FOR LANE DELINEATION.
15. THE ROADWAY SHALL BE EVALUATED BY THE ENGINEER PRIOR TO ANY OVERLAY OPERATION. IF ANY ROADWAY CONDITIONS HAVE CHANGED, THE ENGINEER RETAINS THE RIGHT TO ADJUST WORK AREAS AND RATES. AFTER OVERLAY OPERATIONS ARE COMPLETE, IF ANY AREAS ARE DETERMINED TO BE UNACCEPTABLE, THE AREA SHALL BE REPAIRED BEFORE PROCEEDING TO OTHER REFERENCED LOCATIONS. REPAIR METHODS MUST BE APPROVED BY THE ENGINEER. REPAIR OF UNACCEPTABLE AREAS WILL BE AT CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL SUBMIT THE REPAIR PROCEDURES AT THE PRE-CONSTRUCTION MEETING.
16. REMOVAL AND DISPOSAL OF EXISTING UTILITIES (EITHER PREVIOUSLY OR ABANDONED DURING THIS PROJECT) REQUIRED TO SUPPORT THIS PROJECTS CONSTRUCTION SHALL BE PERFORMED UNDER THE OVERALL PREPARE RIGHT OF WAY (ITEM 100).
17. COORDINATE WITH THE CITY OF SAN ANTONIO OR TXDOT FOR SIGNAL TIMING REVISIONS AS NECESSARY.

II. SEQUENCE OF WORK

1. THIS PROJECT WILL BE CONSTRUCTED IN THREE (3) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE ENGINEER. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS USING TMA'S. DROP OFF CONDITIONS OF GREATER THAN 2-INCH MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY.
2. PREPARING ROW/REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURRING, AS PER THE PHASES NOTED BELOW.
3. PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. A LONGITUDINAL SAFETY TAPER SHALL BE REQUIRED ON MILLING AND OVERLAY OPERATIONS AT THE END OF EACH DAY. THE MILLING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE MILLED SEALED AND INLAYED IN ONE DAILY CLOSURE. THE LIMITS OF THE OPERATIONS MUST BE COMPLETED BY THE TIME SPECIFIED.
4. A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

GENERAL SEQUENCE OF WORK

1. SET UP SW3P ALONG THE WORK AREA OF SL 13 AND MAINTAIN BMP'S AT OUTFALLS.
2. REPLACE BRIDGE RAILS ON LEON CREEK BRIDGE AND INSTALL RAIL FOUNDATION AND BRIDGE RAILS AT SIXMILE CREEK.
3. PERFORM BASE REPAIR.
4. MILL EXISTING ASPHALT PAVEMENT UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
5. PLACE UNDERSEAL.
6. PLACE SUPERPAVE MIX.
7. PLACE FINAL PAVEMENT MARKINGS.
8. OPEN TO TRAFFIC.

PHASE 1

THE INTENT OF THIS PHASE IS TO REPLACE BRIDGE RAIL ON THE LEON CREEK BRIDGE IN BOTH DIRECTIONS (EB AND WB) AND INSTALL RAIL AT THE DRAINAGE STRUCTURE AT SIXMILE CREEK. EASTBOUND AND WESTBOUND WORK CAN BE DONE CONCURRENTLY AT BOTH LOCATIONS.

PHASE 1A (RAIL REPLACEMENT WORK EASTBOUND LEON CREEK BRIDGE)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. CLOSE OUTSIDE LANE IN EASTBOUND AND WESTBOUND DIRECTION. SHIFT TRAFFIC TO MIDDLE LANE.
3. INSTALL EASTBOUND AND WESTBOUND TEMPORARY PORTABLE TRAFFIC BARRIER AND CRASH CUSHION ATTENUATORS AS SHOWN ON THE TCP LAYOUTS.
4. REMOVE EXISTING EASTBOUND BRIDGE RAIL AT LEON CREEK BRIDGE.
5. RETROFIT EXISTING RAIL AT THE LEON CREEK BRIDGE WITH SSTR AS SHOWN ON THE BRIDGE DETAIL SHEETS.
6. INSTALL METAL BEAM GUARD FENCE AND MOWSTRIP FOR LEON CREEK BRIDGE EASTBOUND DIRECTION.
7. REMOVE TEMPORARY PORTABLE TRAFFIC BARRIER AND CRASH CUSHION ATTENUATORS FOR EASTBOUND DIRECTION.

PHASE 1B (RAIL REPLACEMENT WORK WESTBOUND LEON CREEK BRIDGE)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. REMOVE EXISTING WESTBOUND BRIDGE RAIL AT LEON CREEK BRIDGE.
3. RETROFIT EXISTING RAIL AT THE LEON CREEK BRIDGE WITH SSTR AS SHOWN ON THE BRIDGE DETAIL SHEETS.
4. INSTALL METAL BEAM GUARD FENCE AND MOWSTRIP FOR LEON CREEK BRIDGE WESTBOUND DIRECTION.
5. REMOVE TEMPORARY PORTABLE TRAFFIC BARRIER AND CRASH CUSHION ATTENUATORS FOR WESTBOUND DIRECTION.

PHASE 1C (SIXMILE CREEK EASTBOUND RAIL)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. CLOSE OUTSIDE LANE IN EASTBOUND AND WESTBOUND DIRECTION. SHIFT TRAFFIC TO MIDDLE LANE.
3. INSTALL EASTBOUND AND WESTBOUND LOW-PROFILE CONCRETE BARRIER AS SHOWN ON THE TCP LAYOUTS.
4. INSTALL RAIL FOUNDATION AND RAIL AT SIXMILE CREEK AS SHOWN ON THE PLANS.
5. REMOVE LOW-PROFILE CONCRETE BARRIER FOR EASTBOUND DIRECTION.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/17/2021

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SL 13

TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		33
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

PHASE 1D (SIXMILE CREEK WESTBOUND RAIL)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. INSTALL RAIL FOUNDATION AND RAIL AT SIXMILE CREEK AS SHOWN ON THE PLANS.
3. REMOVE LOW-PROFILE CONCRETE BARRIER FOR WESTBOUND DIRECTION.

PHASE 2 (BASE REPAIR)

THE INTENT OF THIS PHASE IS TO PERFORM BASE REPAIR IN THE EASTBOUND AND WESTBOUND DIRECTIONS. PHASE 2 CAN BE DONE CONCURRENTLY WITH PHASE 1.

PHASE 2A (EASTBOUND LANES)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN ONE NIGHTLY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE TIME SPECIFIED.

   A. USE MOBILE OPERATIONS, IN ACCORDANCE WITH STATE STANDARDS TCP (3-1)-13 AND TCP (3-3)-14, AND LANE CLOSURES MAINTAINING AT LEAST ONE LANE IN EACH DIRECTION, UTILITIZING STATE STANDARDS TCP (2-4)-18 AND TCP (2-5)-18.

   B. PERFORM BASE REPAIR.

   C. INSTALL TEMPORARY PAVEMENT MARKINGS.

   D. OPEN ALL LANES TO TRAFFIC.

PHASE 2B (WESTBOUND LANES)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN ONE NIGHTLY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE TIME SPECIFIED.

   A. USE MOBILE OPERATIONS, IN ACCORDANCE WITH STATE STANDARDS TCP (3-1)-13 AND TCP (3-3)-14, AND LANE CLOSURES MAINTAINING AT LEAST ONE LANE IN EACH DIRECTION, UTILITIZING STATE STANDARDS TCP (2-4)-18 AND TCP (2-5)-18.

   B. PERFORM BASE REPAIR.

   C. INSTALL TEMPORARY PAVEMENT MARKINGS.

   D. OPEN ALL LANES TO TRAFFIC.

PHASE 3 (MILL, SEAL AND OVERLAY)

THE INTENT OF THIS PHASE IS TO PERFORM MILL, SEAL AND OVERLAY ALONG THE SL 13 EASTBOUND AND WESTBOUND LANES.

PHASE 3A (EASTBOUND LANES)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN ONE NIGHTLY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE TIME SPECIFIED.

   A. USE MOBILE OPERATIONS, IN ACCORDANCE WITH STATE STANDARDS TCP (3-1)-13 AND TCP (3-3)-14, AND LANE CLOSURES MAINTAINING AT LEAST ONE LANE IN EACH DIRECTION, UTILITIZING STATE STANDARDS TCP (2-4)-18 AND TCP (2-5)-18.

   B. MILL 2-INCH ACP.

   C. PLACE UNDERSEAL.

   D. PLACE 2-INCH SUPERPAVE.

   E. INSTALL PAVEMENT SEALER.

   F. OPEN ALL LANES TO TRAFFIC.

3. INSTALL FINAL PAVEMENT MARKINGS.

PHASE 3B (WESTBOUND LANES)

1. INSTALL SW3P ITEMS, TRAFFIC CONTROL WARNING DEVICES AND/OR SIGNS.
2. THE FOLLOWING OPERATIONS MUST BE LIMITED TO ONLY WHAT CAN BE DONE IN ONE NIGHTLY LANE CLOSURE. THE LIMITS OF OPERATIONS MUST BE COMPLETED BY THE TIME SPECIFIED.

   A. USE MOBILE OPERATIONS, IN ACCORDANCE WITH STATE STANDARDS TCP (3-1)-13 AND TCP (3-3)-14, AND LANE CLOSURES MAINTAINING AT LEAST ONE LANE IN EACH DIRECTION, UTILITIZING STATE STANDARDS TCP (2-4)-18 AND TCP (2-5)-18.

   B. MILL 2-INCH ACP.

   C. PLACE UNDERSEAL.

   D. PLACE 2-INCH SUPERPAVE.

   E. INSTALL PAVEMENT SEALER.

   F. OPEN ALL LANES TO TRAFFIC.

3. INSTALL FINAL PAVEMENT MARKINGS.
4. REMOVE SW3P ITEMS AND PERFORM FINAL CLEAN UP.

III. SAFETY

1. THE CONTRACTOR SHALL PROVIDE, CONSTRUCT AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC (1-12)-21. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARD SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS."
2. BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS NEEDED DUE TO FIELD CONDITIONS TO PROVIDE FOR THE SAFE PASSAGE OF TRAFFIC AT ALL TIMES.
3. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS AND LOCATIONS, AND FOR SUCH PERIODS OF TIMES AS MAY BE REQUIRED TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND FOR THE CONTRACTOR'S PERSONNEL.
4. THE CONTRACTOR SHALL KEEP THE ROADWAY CLEAN AND FREE OF DIRT OR OTHER ROADWAY DEBRIS DURING HAULING OPERATIONS AT ALL TIMES. IF THE CONTRACTOR DOES NOT MAINTAIN A CLEAN ROADWAY, AS DETERMINED BY THE ENGINEER, THEY SHALL CEASE ALL CONSTRUCTION OPERATIONS WHEN DIRECTED BY THE ENGINEER AND CLEAN THE ROADWAY TO SATISFACTION OF THE ENGINEER. THIS SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

IV: HAULING EQUIPMENT

1. THE USE OF CONSTRUCTION VEHICLES EQUIPPED WITH RUBBER TIRES WILL BE REQUIRED FOR MOVING DIRT OR OTHER MATERIALS ALONG OR ACROSS PAVED SURFACES. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS PAVEMENT, THEY SHALL PROTECT THE PAVEMENT FROM DAMAGE AS DIRECTED/APPROVED BY THE ENGINEER.
2. THROUGHOUT CONSTRUCTION OPERATIONS, THE CONTRACTOR WILL BE REQUIRED TO CONDUCT THEIR HAULING OPERATIONS IN A MANNER SUCH THAT VEHICLES WILL NOT HAUL OVER PREVIOUSLY RECOMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

V: FINAL CLEAN UP

1. UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISCARDED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN A CLEAN, NEAT, AND SIGHTLY CONDITION.

VI: PAYMENT

1. ALL BARRICADES, SIGNS, AND FLAGGERS SHALL BE SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS, AND TRAFFIC HANDLING." ALL EROSION AND SEDIMENT CONTROL DEVICES WILL BE PAID FOR UNDER ITEM 506 "TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS." ALL WORK ZONE PAVEMENT MARKINGS WILL BE PAID FOR UNDER ITEM 662 "WORK ZONE PAVEMENT MARKINGS." ALL OTHER WORK AND MATERIALS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS UNLESS OTHERWISE INDICATED IN THE PLANS.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

11/17/2021

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NO.	REVISION	BY	DATE

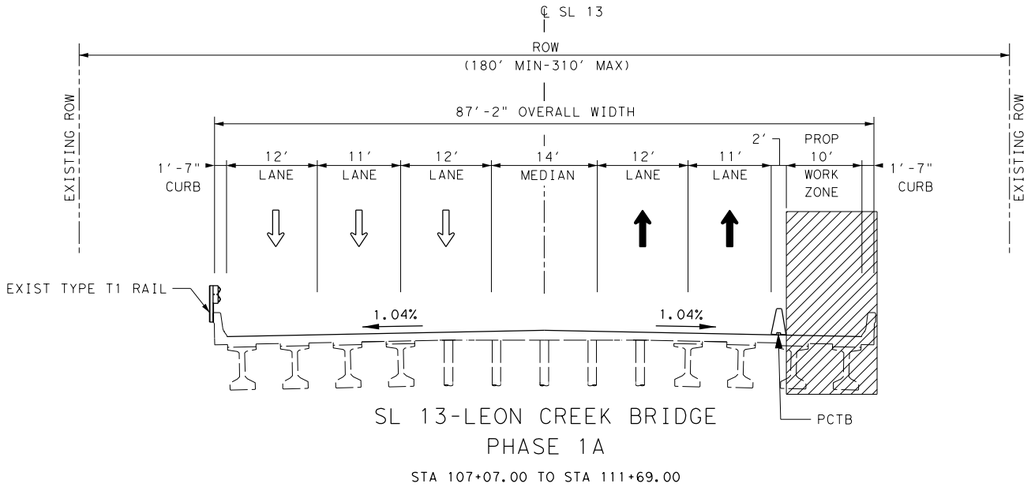
HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SL 13

TRAFFIC CONTROL PLAN NARRATIVE

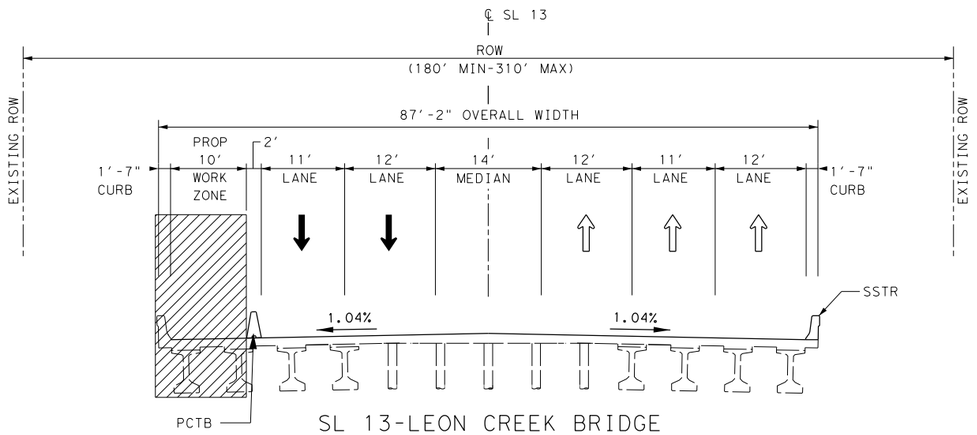
SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		34
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



SL 13-LEON CREEK BRIDGE
PHASE 1A

STA 107+07.00 TO STA 111+69.00



SL 13-LEON CREEK BRIDGE
PHASE 1B

STA 107+07.00 TO STA 111+69.00

LEGEND:

- TRAFFIC FLOW ARROW OR DETOUR ROUTE
- EXIST TRAFFIC FLOW DIRECTION
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- LOW PROFILE CONCRETE BARRIER (LPCB)

STATE OF TEXAS
JOHNNY L. CLAYTON
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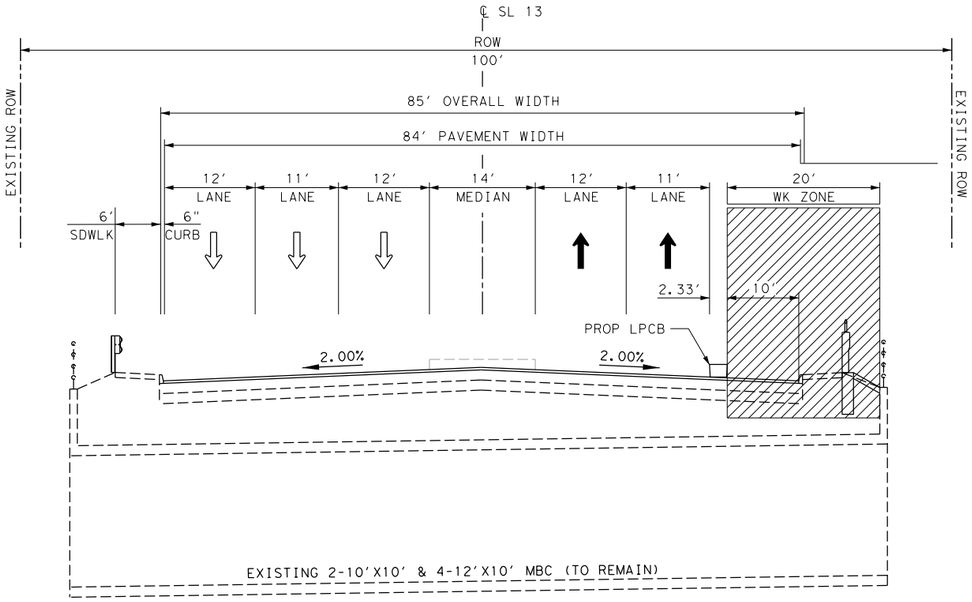
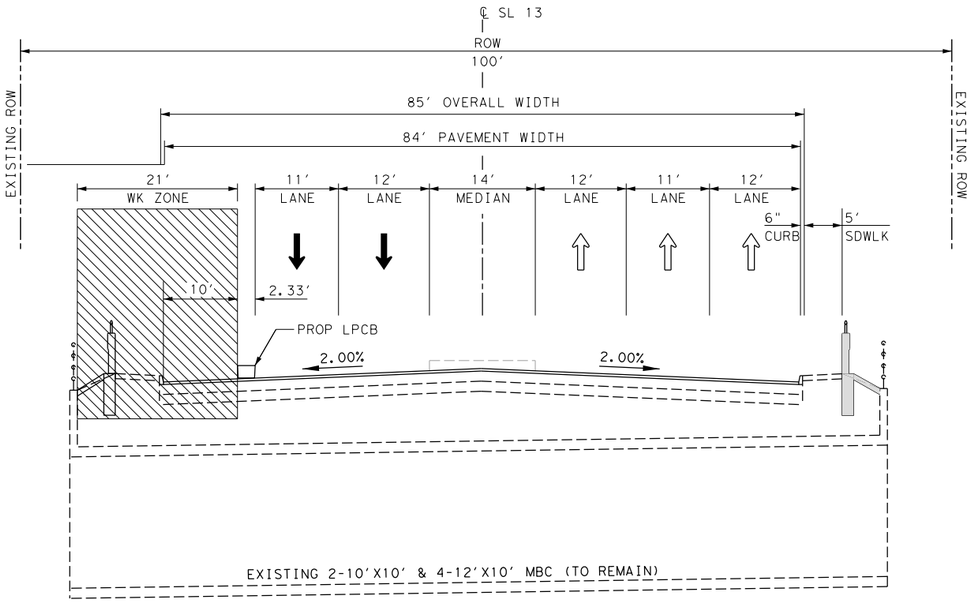
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		35
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



SL 13 - SIXMILE CREEK BRIDGE CLASS CULVERT
PHASE 1A
STA 271+84.00 TO STA 273+50.00



SL 13 - SIXMILE CREEK BRIDGE CLASS CULVERT
PHASE 1B
STA 271+84.00 TO STA 273+50.00

LEGEND:

- TRAFFIC FLOW ARROW OR DETOUR ROUTE
- EXIST TRAFFIC FLOW DIRECTION
- CONSTRUCTION THIS PHASE
- PERMANENT CONSTRUCTION PREVIOUS PHASE
- PORTABLE CONCRETE TRAFFIC BARRIER (PCTB)
- LOW PROFILE CONCRETE BARRIER (LPCB)

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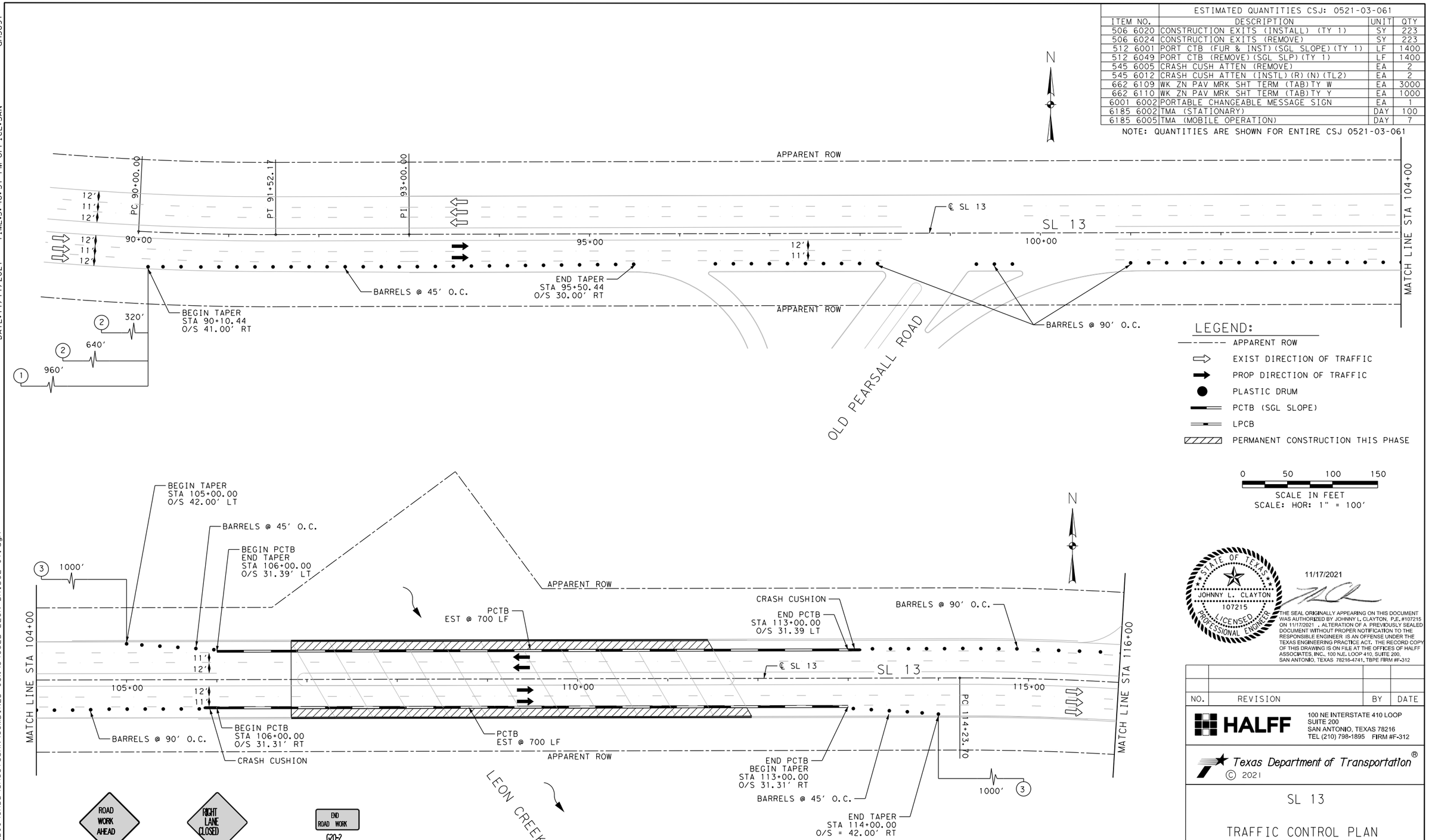
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		36
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

	ESTIMATED QUANTITIES CSJ: 0521-03-061		
ITEM NO.	DESCRIPTION	UNIT	QTY
506 6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	223
506 6024	CONSTRUCTION EXITS (REMOVE)	SY	223
512 6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	1400
512 6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF	1400
545 6005	CRASH CUSH ATTEN (REMOVE)	EA	2
545 6012	CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	EA	2
662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	3000
662 6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	1000
6001 6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1
6185 6002	TMA (STATIONARY)	DAY	100
6185 6005	TMA (MOBILE OPERATION)	DAY	7

NOTE: QUANTITIES ARE SHOWN FOR ENTIRE CSJ 0521-03-061



GENERAL NOTES:

1. REFER TO TCP (2-5)-18 FOR ADDITIONAL INFORMATION.
2. SEE TRAFFIC CONTROL PLAN TYPICAL SECTIONS FOR ADDTIONAL INFORMATION.
3. SEE TRAFFIC CONTROL NARRATIVE FOR SEQUENCE OF BRIDGE RAIL INSTALLATION.

STATE OF TEXAS
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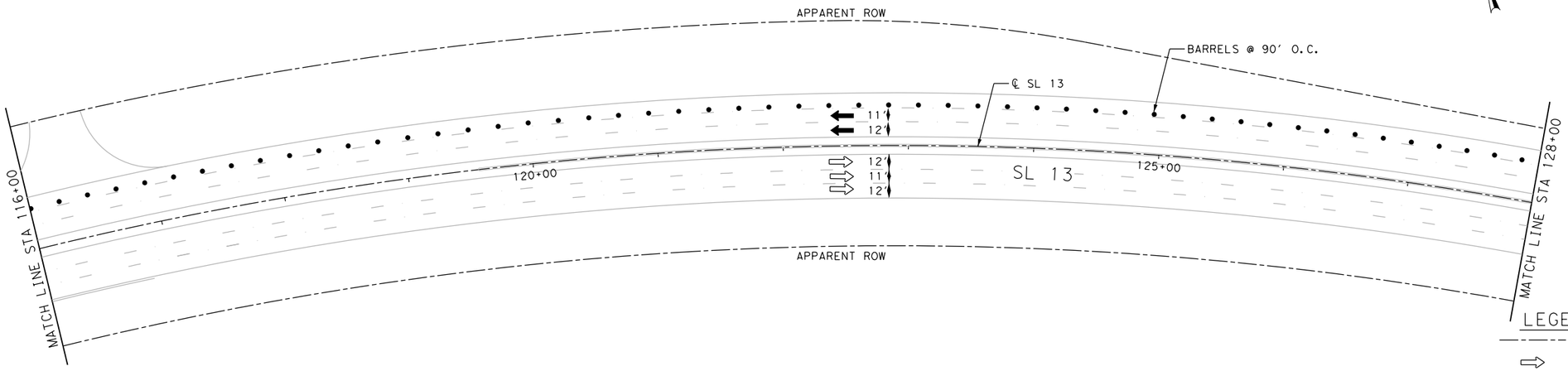
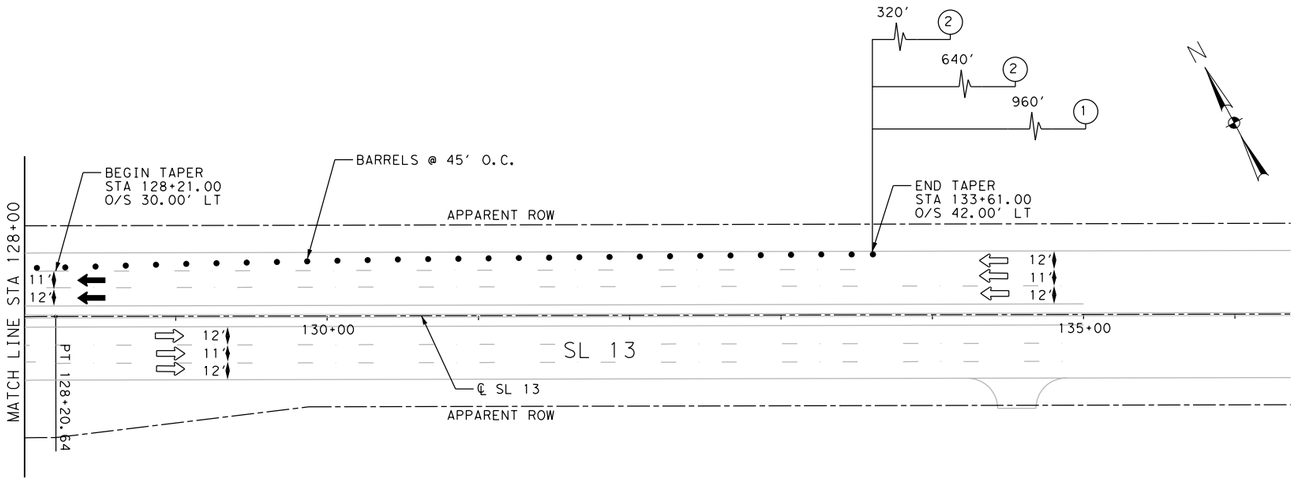
SL 13

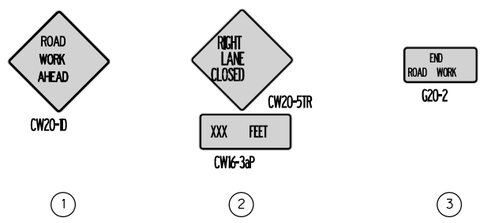
TRAFFIC CONTROL PLAN
LEON CREEK BRIDGE

SCALE: H: 1" = 100′ SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		37
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13







GENERAL NOTES:

1. REFER TO TCP (2-5)-18 FOR ADDITIONAL INFORMATION.
2. SEE TRAFFIC CONTROL PLAN TYPICAL SECTIONS FOR ADDTIONAL INFORMATION.
3. SEE TRAFFIC CONTROL NARRATIVE FOR SEQUENCE OF BRIDGE RAIL INSTALLATION.

LEGEND:

- APPARENT ROW
- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- PLASTIC DRUM
- PCTB (SGL SLOPE)
- LPCB
- PERMANENT CONSTRUCTION THIS PHASE

0 50 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

11/17/2021

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NO.	REVISION	BY	DATE

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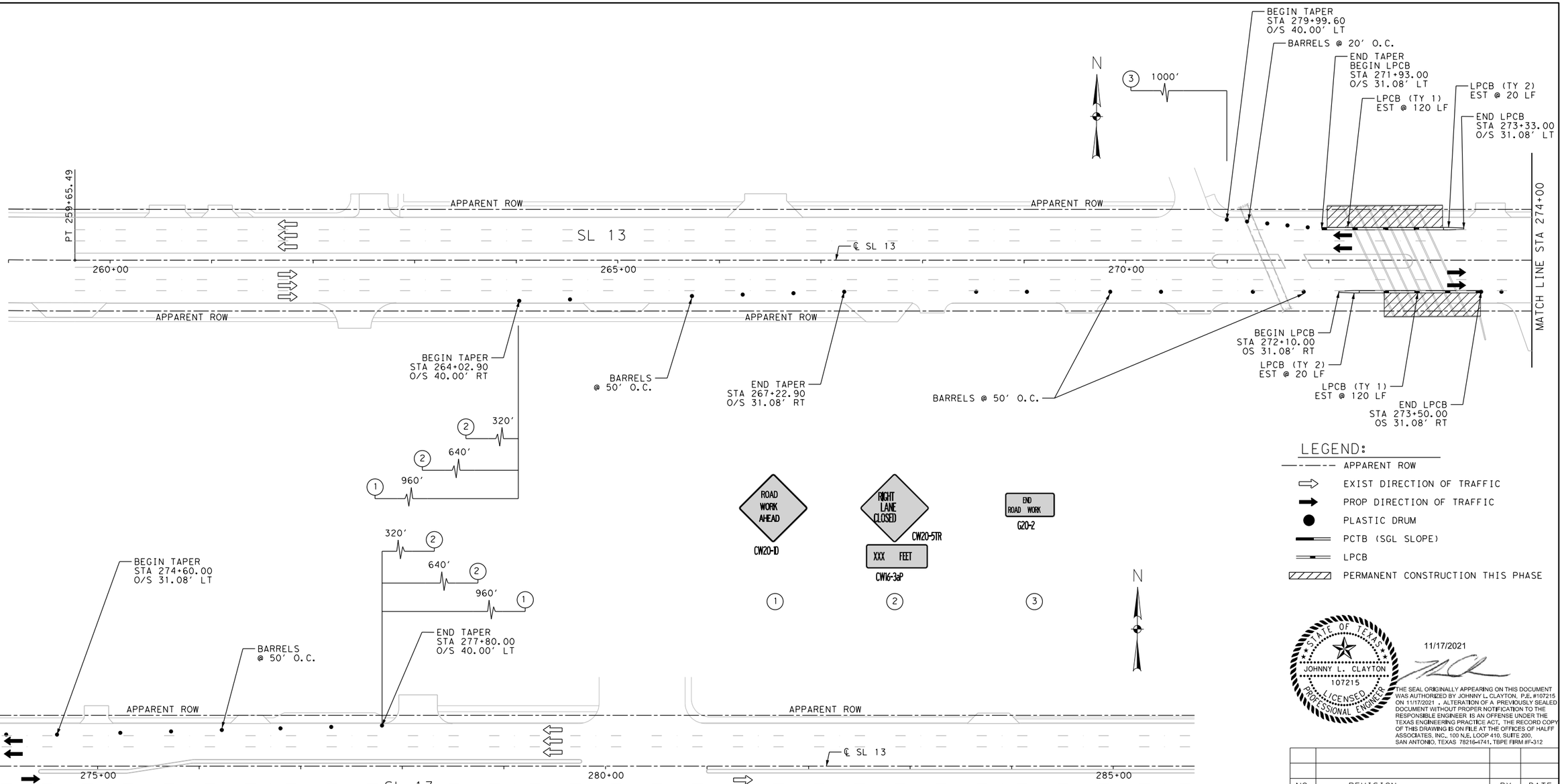
Texas Department of Transportation®

SL 13

TRAFFIC CONTROL PLAN
LEON CREEK BRIDGE

SCALE: H: 1" = 100' SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		38
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



LEGEND:

- APPARENT ROW
- EXIST DIRECTION OF TRAFFIC
- PROP DIRECTION OF TRAFFIC
- PLASTIC DRUM
- PCTB (SGL SLOPE)
- LPCB
- PERMANENT CONSTRUCTION THIS PHASE

	ESTIMATED QUANTITIES CSJ: 0521-02-042		
ITEM NO.	DESCRIPTION	UNIT	QTY
512 6009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF	240
512 6010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF	40
512 6057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF	240
512 6058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF	40
662 6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	3000
662 6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	1000
6001 6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	1
6185 6002	TMA (STATIONARY)	DAY	201
6185 6005	TMA (MOBILE OPERATION)	DAY	8

NOTE: QUANTITIES ARE SHOWN FOR ENTIRE CSJ 0521-02-042

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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NO.	REVISION	BY	DATE

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SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SL 13

TRAFFIC CONTROL PLAN
SIXMILE CREEK CULVERT

SCALE: 1"=100' SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		39
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

LOC NO.	TCP PHASE	SPECIFIC TCP PLAN SHEET OR TCP STANDARD SHEET					6185 6002	6185 6005
			FURNISH TMA/TA	RELOCATE/REUSE TMA/TA	TOTAL TMA/TA PER SET UP	DURATION OF TMA/TA SET UP	TMA (STATIONARY)	TMA (MOBILE OPERATION)
		SHEET NUMBER	EA	EA	EA	DAYS PER TMA/TA USE	DAY	DAY
1	1A	TCP (2-5)-18	1		1	31	31	
2	1B	TCP (2-5)-18		1	1	30	30	
3	1C	TCP (2-5)-18	1		1	21	21	
4	1D	TCP (2-5)-18		1	1	20	20	
5	2A	TCP (2-4)-18		1	1	46	46	
6	2A	TCP (3-1)-13		1	1	3		3
7	2B	TCP (2-4)-18		1	1	46	46	
8	2B	TCP (3-1)-13		1	1	3		3
9	3A	TCP (2-4)-18		1	1	53	53	
10	3A	TCP (3-1)-13		1	1	4		4
11	3B	TCP (2-4)-18		1	1	54	54	
12	3B	TCP (3-1)-13		1	1	5		5
		TOTALS	2				301	15

NOTE.
FURNISH TMA/TA - THE NUMBER OF ATTENUATORS BEING FURNISHED FOR THE SPECIFIC TCP.
RELOCATE/REUSE TMA/TA - THE NUMBER OF ATTENUATORS BEING REUSED FROM A PREVIOUS TCP FOR THE SPECIFIC TCP.
TOTAL TMA/TA PER SET UP = (FURNISH TMA/TA) + (RELOCATE/REUSE TMA/TA)
DURATION OF TMA/TA SET UP - THE NUMBER OF DAYS THE ATTENTUATORS WILL BE USED FOR THE SPECIFIC TCP.
TMA/TA (STATIONARY) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)
TMA/TA (MOBILE OPERATION) = (TOTAL TMA/TA PER SET UP) X (THE DURATION OF TMA/TA SET UP)

TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA) SUMMARY SHEET

FILE: tma.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS 3/2018	0521	02	042	SL 13
	DIST	COUNTY		
	SAN	BEXAR		
	FEDERAL AID PROJECT			SHEET NO.
				40

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
	PHASE 1A	29	SL 13 EB (OUTSIDE LANE)	106+00.00	TL2	UNI	NA	NA	SSCB	24"	42"		X	X					X			
	PHASE 1B	29	SL 13 WB (OUTSIDE LANE)	113+00.00	TL2	UNI	NA	NA	SSCB	24"	42"		X	X					X			
												TOTALS	2	2								

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 TEMPORARY

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		
	SAN	BEXAR		
	FEDERAL AID PROJECT			SHEET NO.
				41

DATE: 11/17/2021 12:22:56 PM
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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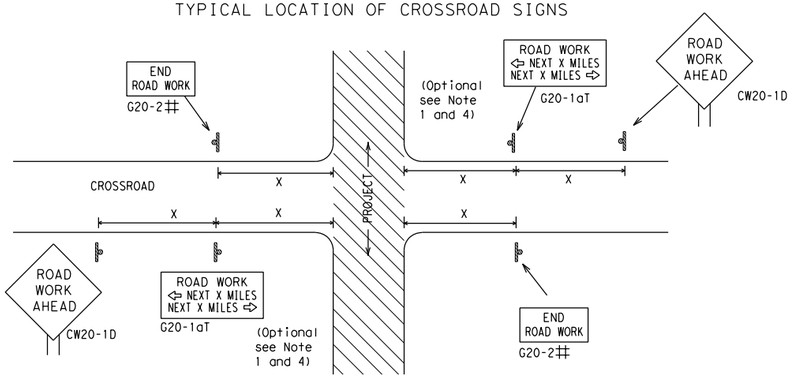
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	SAN	BEXAR		42

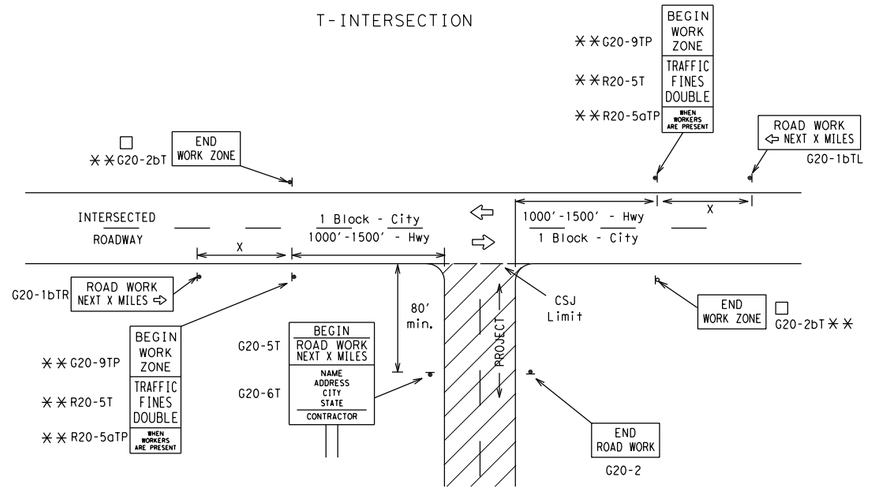
TYPICAL LOCATION OF CROSSROAD SIGNS



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.

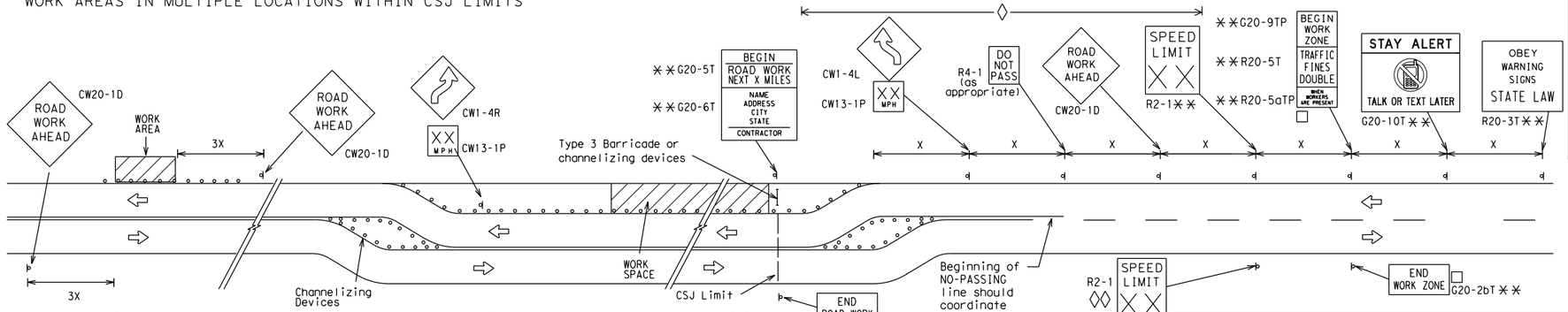
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

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.

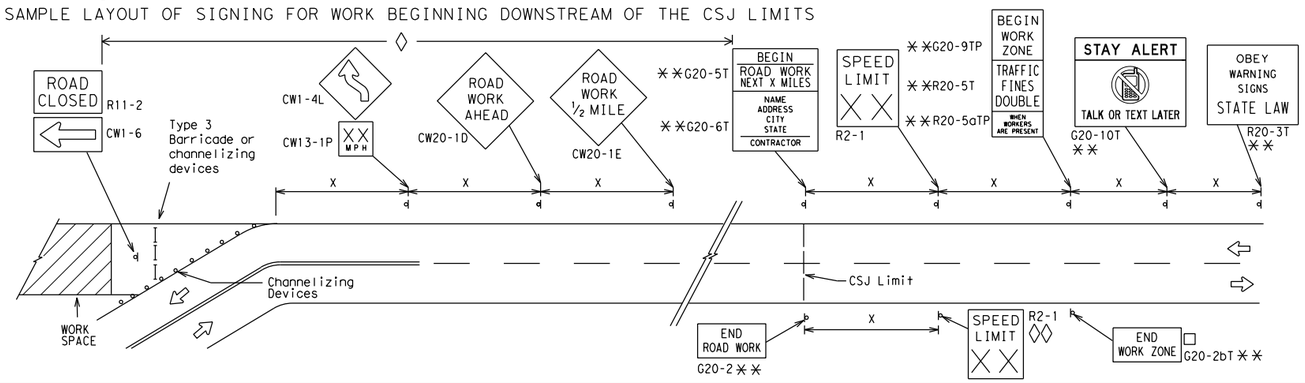
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE 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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REVISIONS	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	BEXAR		43

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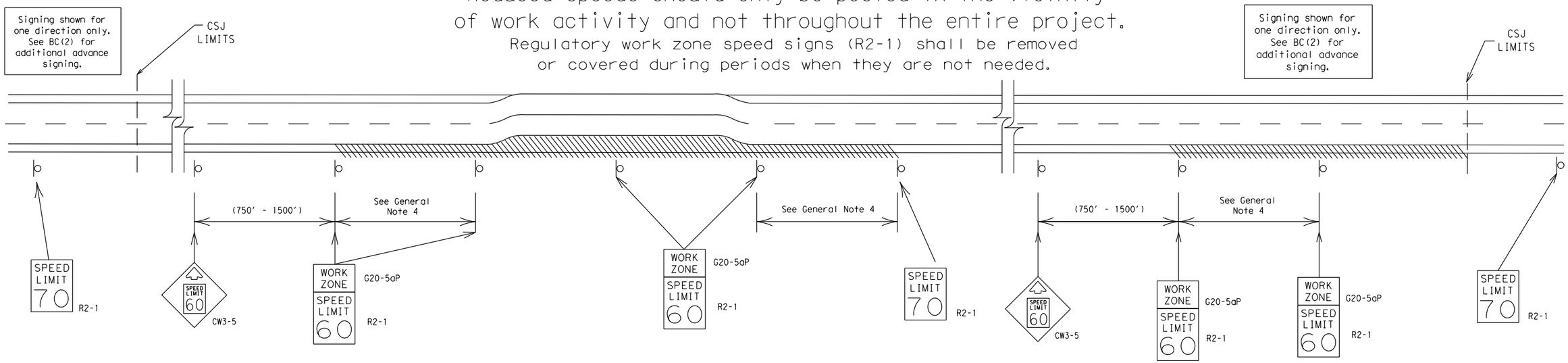
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	BEXAR		44

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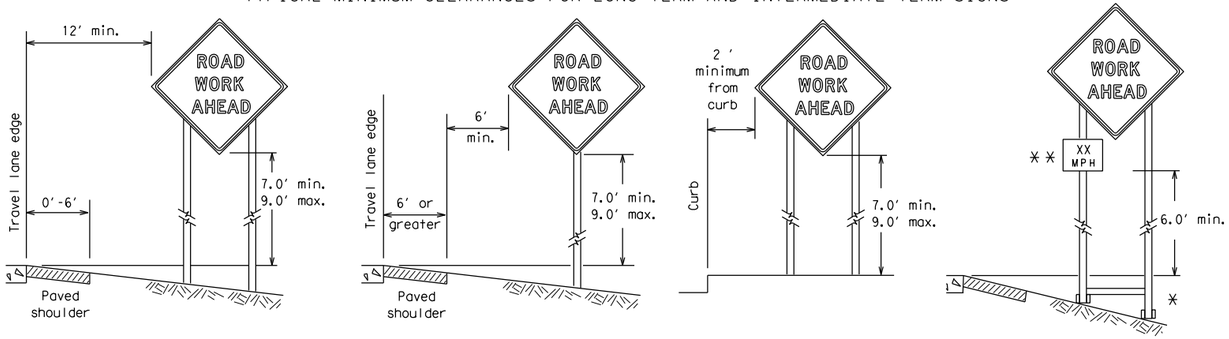
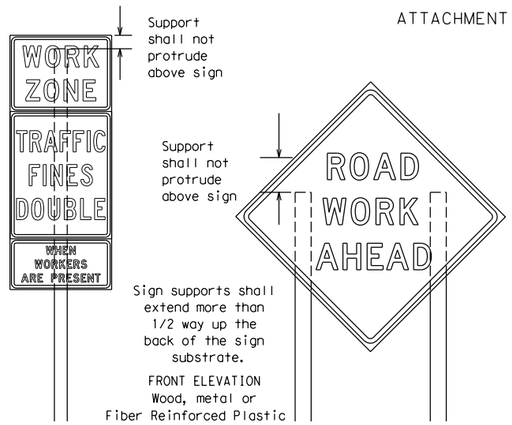
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

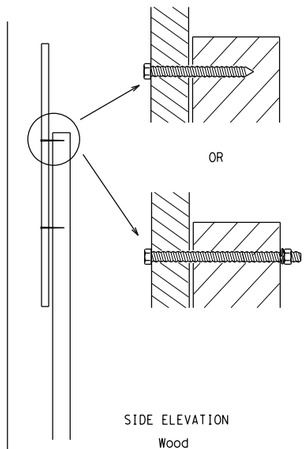


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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





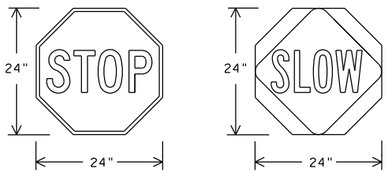
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	BEXAR		45

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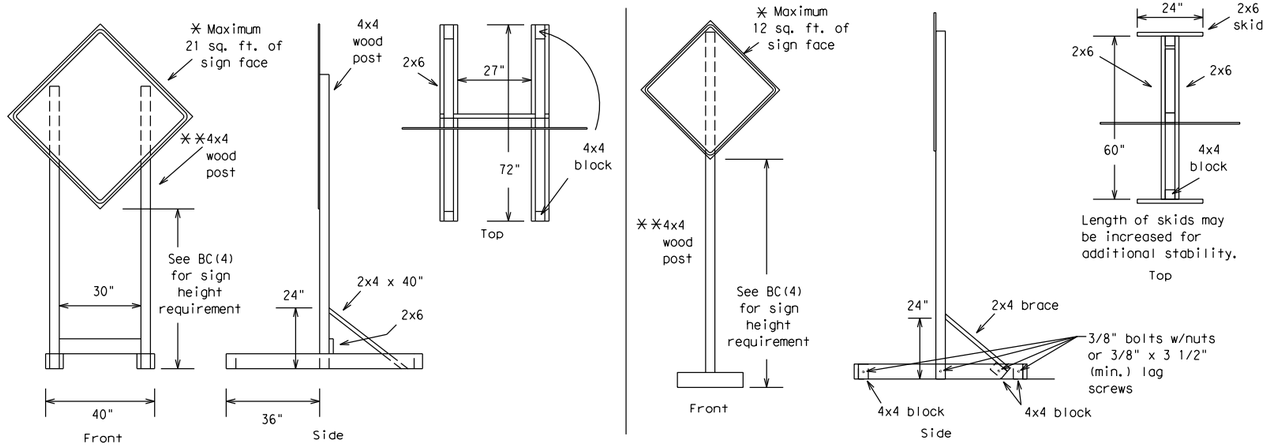
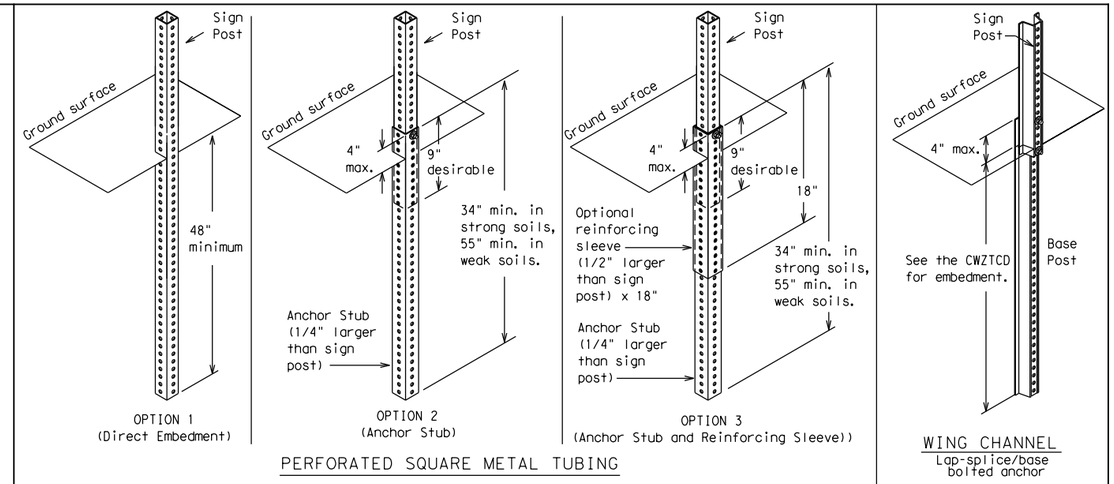


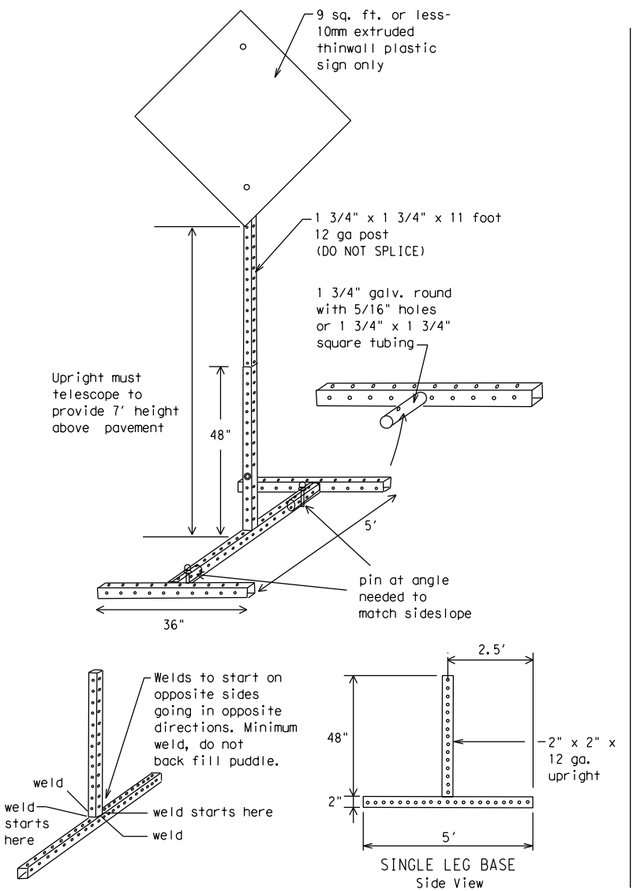
SKID MOUNTED WOOD SIGN SUPPORTS

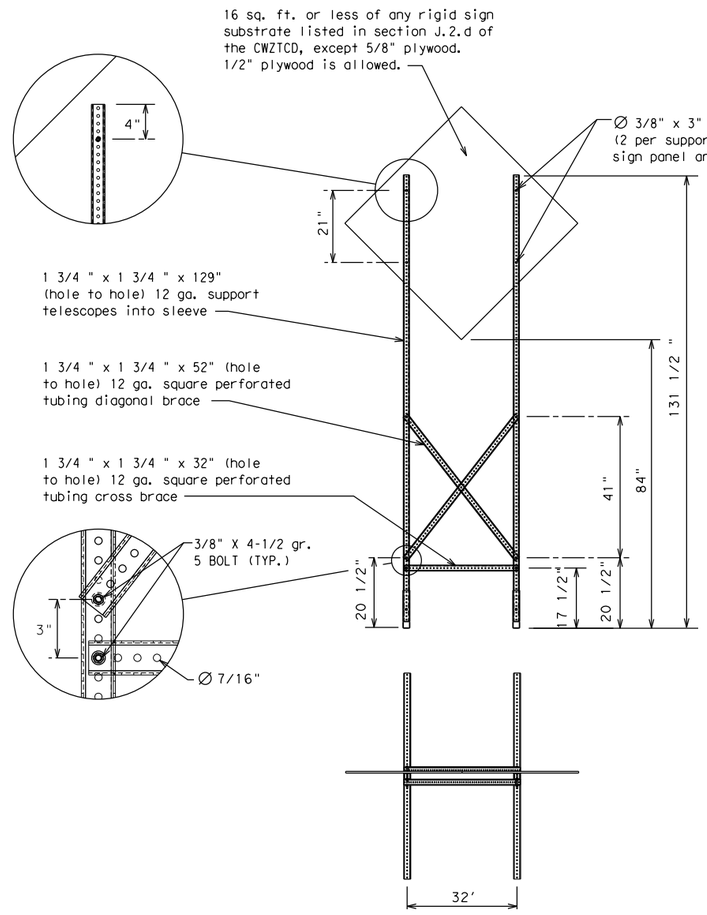
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

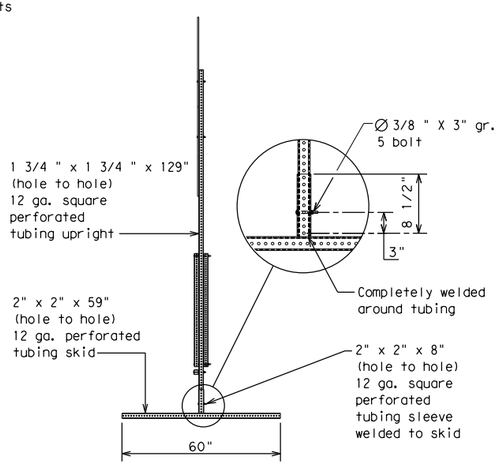


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	BEXAR		46

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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 *	

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

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

** 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	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	BEXAR		47

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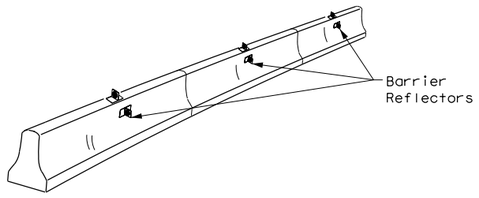
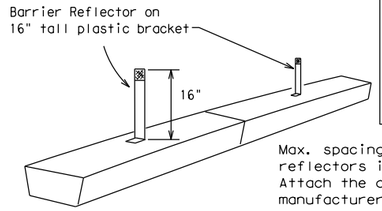
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

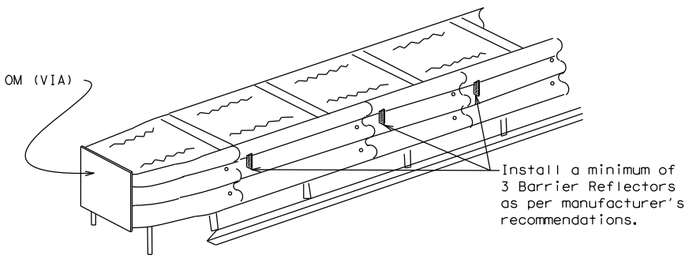


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

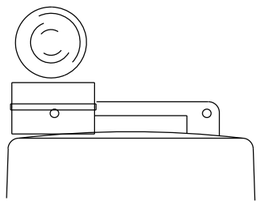


DELINEATION OF END TREATMENTS

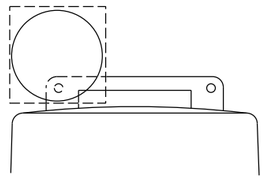
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

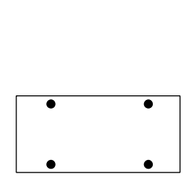
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

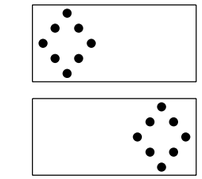
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

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

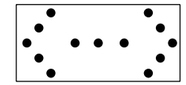


4 CORNER CAUTION

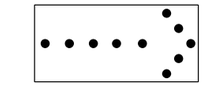
OR



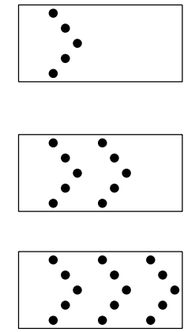
ALTERNATING DIAMOND CAUTION



DOUBLE ARROW



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



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

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

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

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0521	02	042	SL 13
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

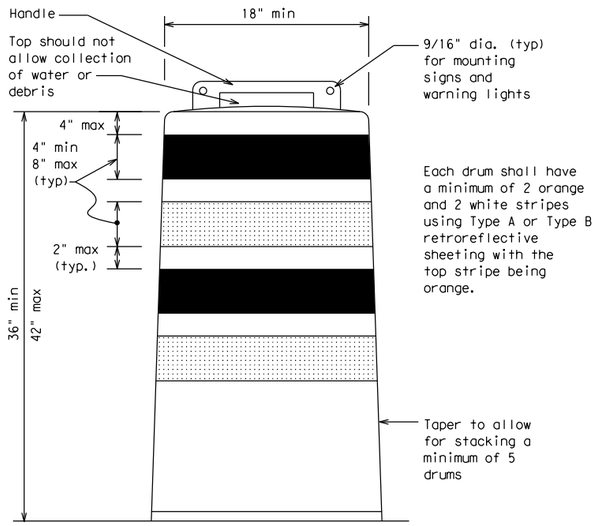
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

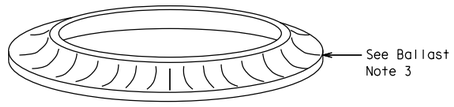
RETROREFLECTIVE SHEETING

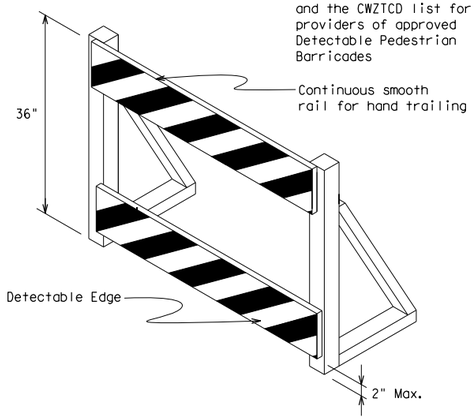
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

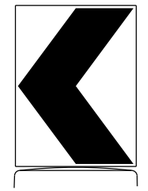




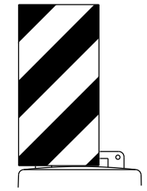


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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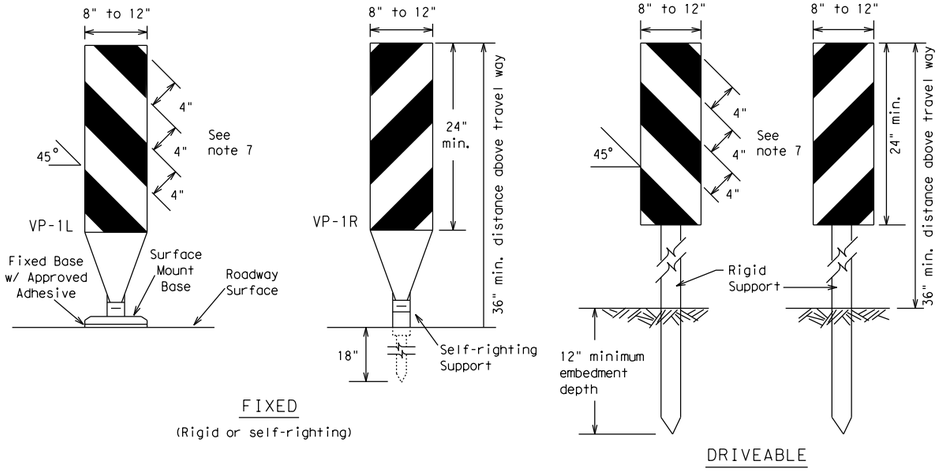
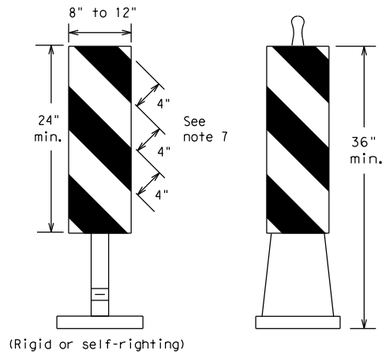


FIXED

(Rigid or self-righting)

DRIVEABLE

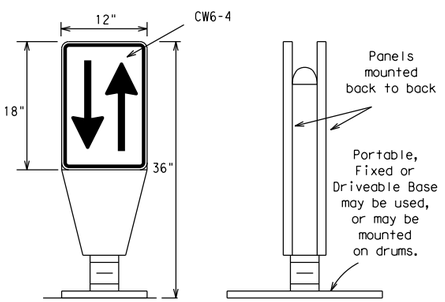


(Rigid or self-righting)

PORTABLE

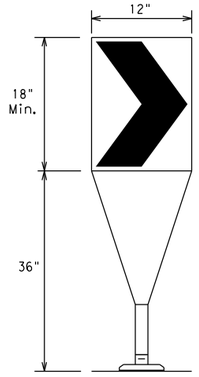
VERTICAL PANELS (VPs)

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



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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.



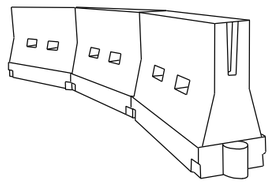
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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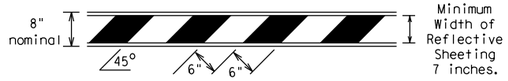
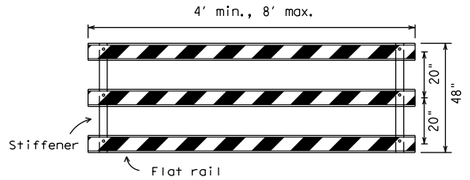
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



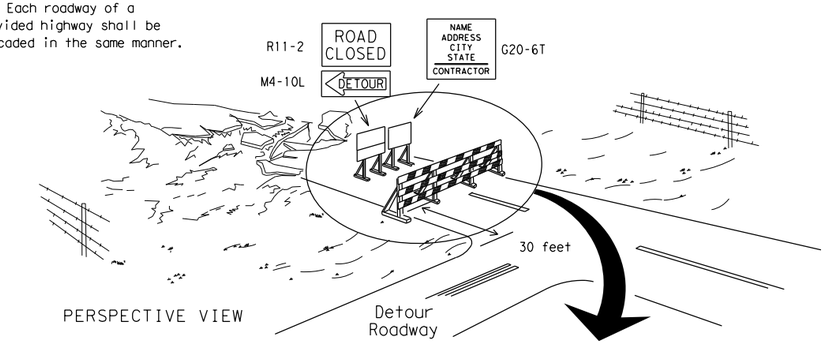
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

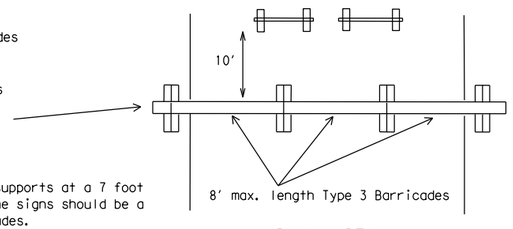
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

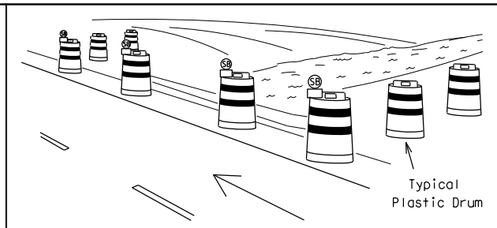
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

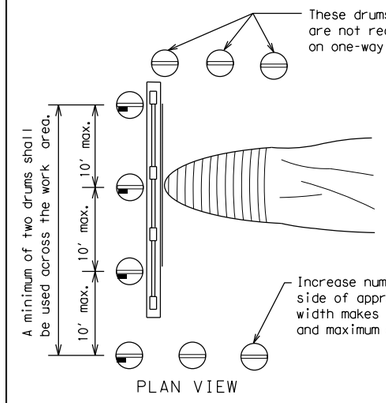
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

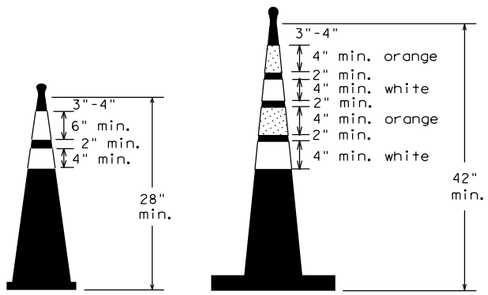
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

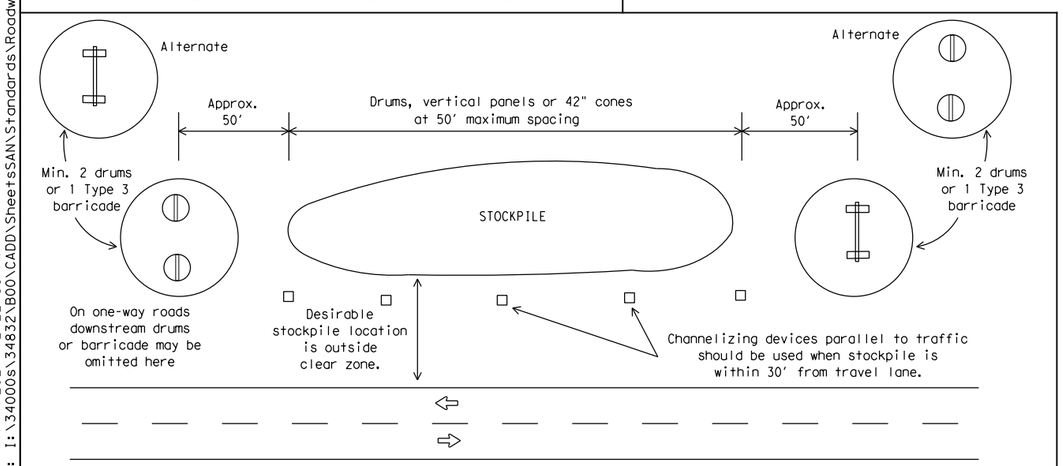
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	SAN	BEXAR		51

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

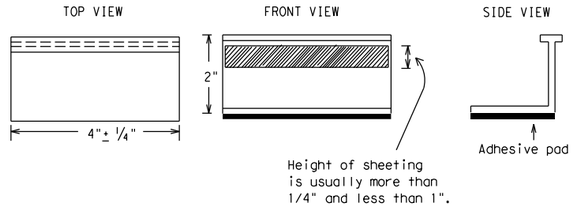
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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 1-02 7-13 11-02 8-14	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		52

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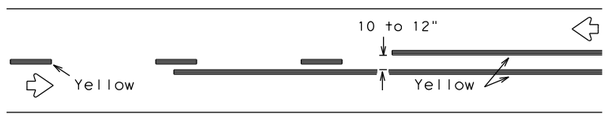
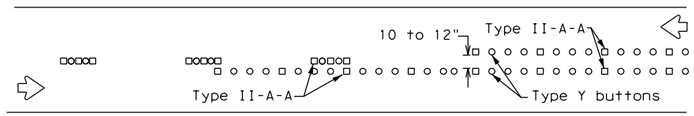
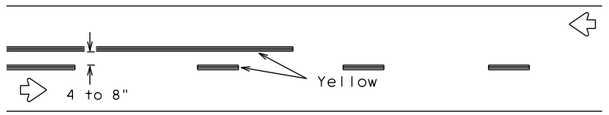
PAVEMENT MARKING PATTERNS



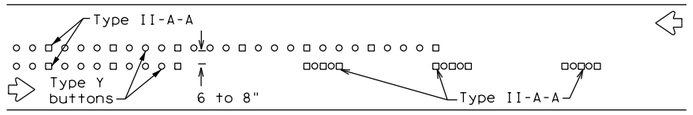
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



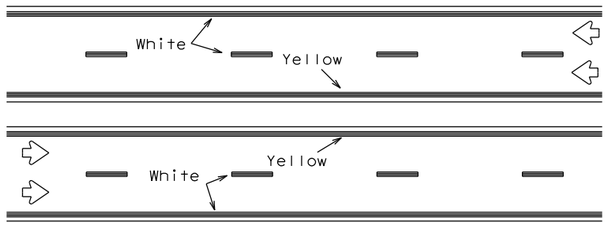
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



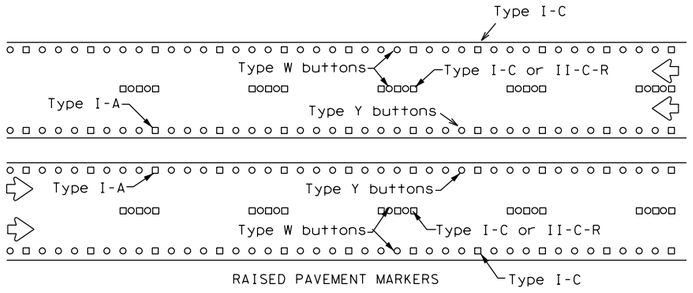
RAISED PAVEMENT MARKERS - PATTERN B

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

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



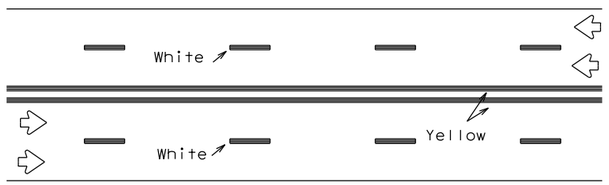
REFLECTORIZED PAVEMENT MARKINGS



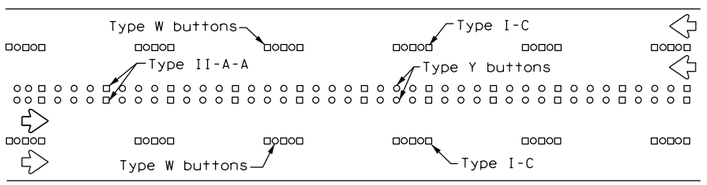
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



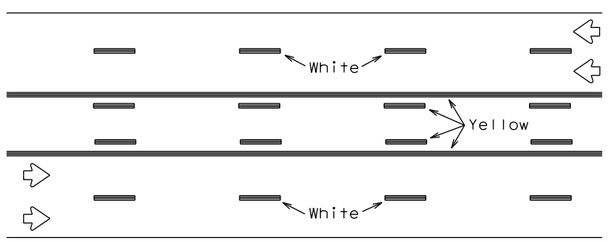
REFLECTORIZED PAVEMENT MARKINGS



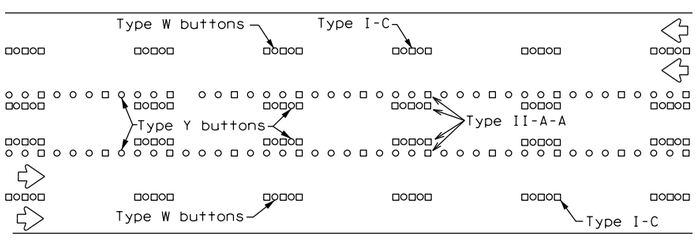
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

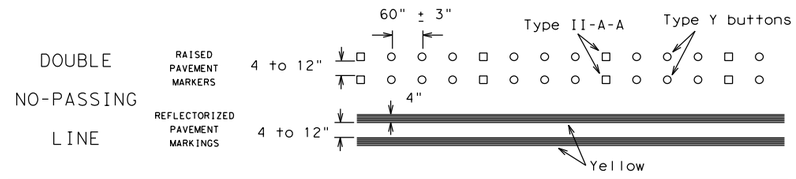
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

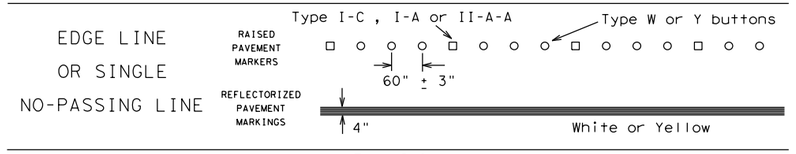
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

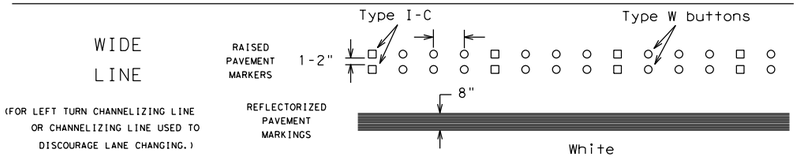


EDGE LINE OR SINGLE NO-PASSING LINE



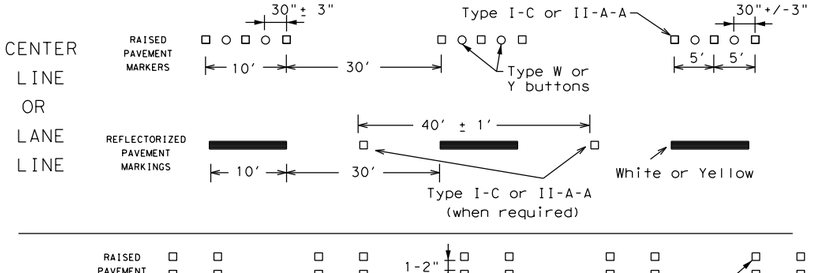
WIDE LINE

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

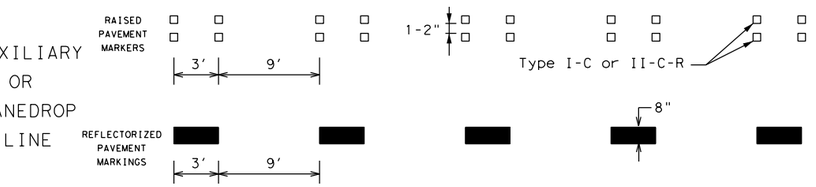


BROKEN LINES

CENTER LINE OR LANE LINE

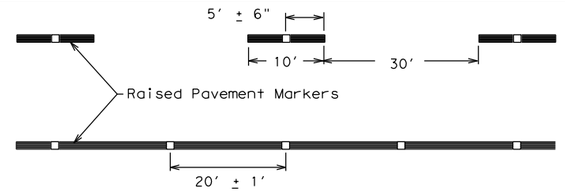


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

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
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2-98 7-13	SAN	BEXAR		53
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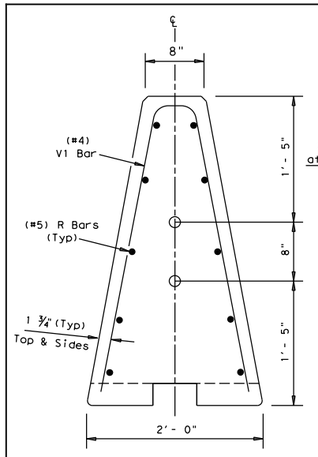
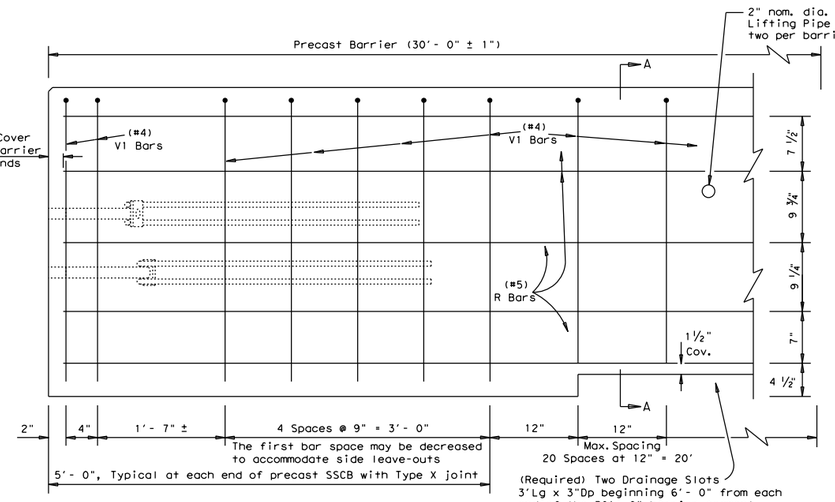


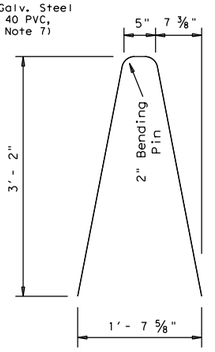
End View
Precast Barrier

Pipe locations for Joint
Type X connection



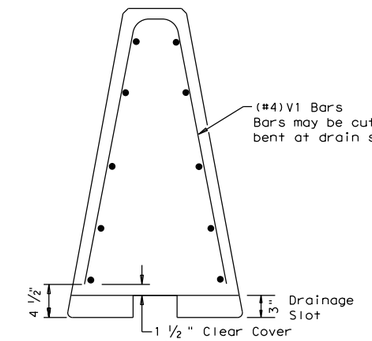
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



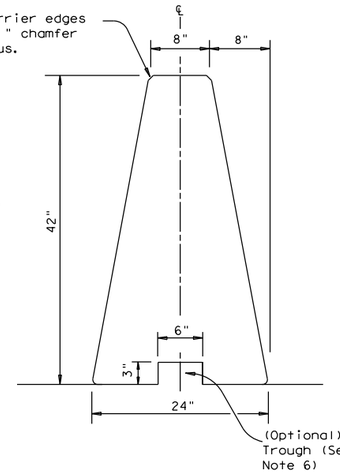
V1 Bar
#4 Rebar

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



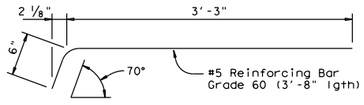
Section A-A
Steel Placement at
(Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



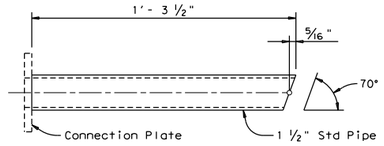
Single Slope Concrete Traffic Barrier

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.



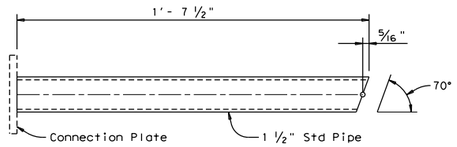
DEFORMED BAR ANCHOR DETAILS

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



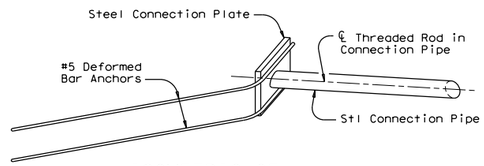
UPPER CONNECTION PIPE DETAILS

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.

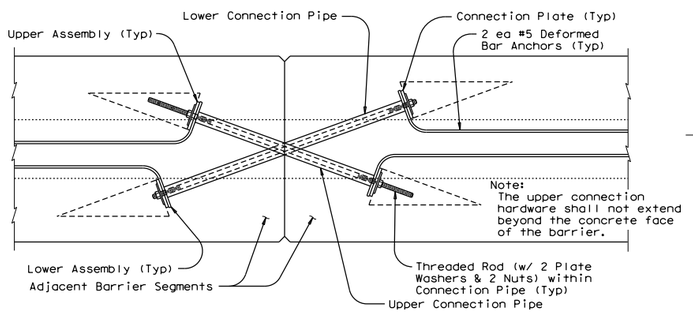


ISOMETRIC OF
TYPICAL WELDED ASSEMBLY

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.

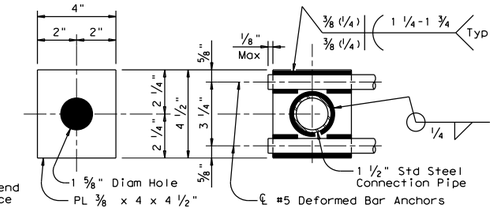
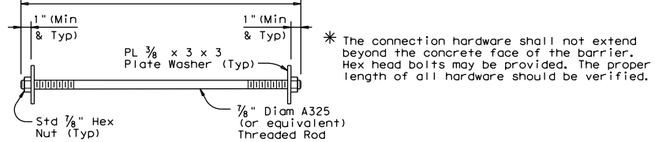


PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

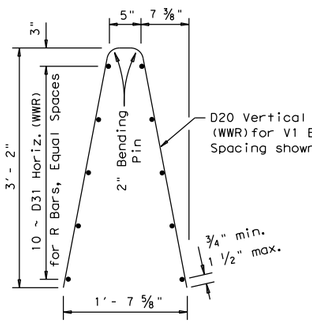
One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



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.

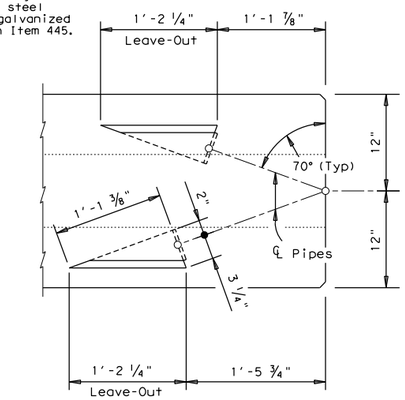
Weight of one precast 30 ft.
(SSCB) segment = Approx. 10.5 Tons
or 717 lbs per ft.



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

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		54

DATE: 11/17/2021
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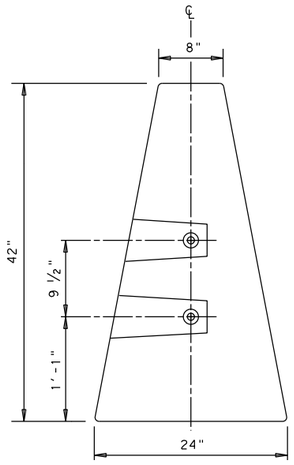
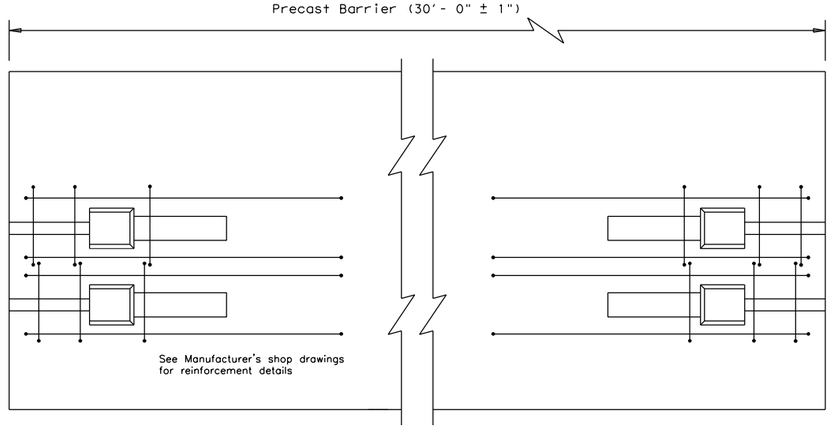
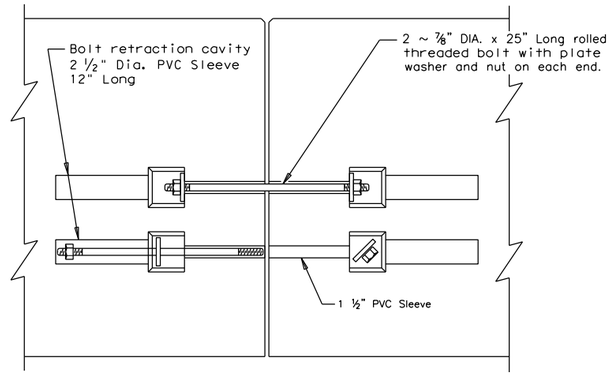


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

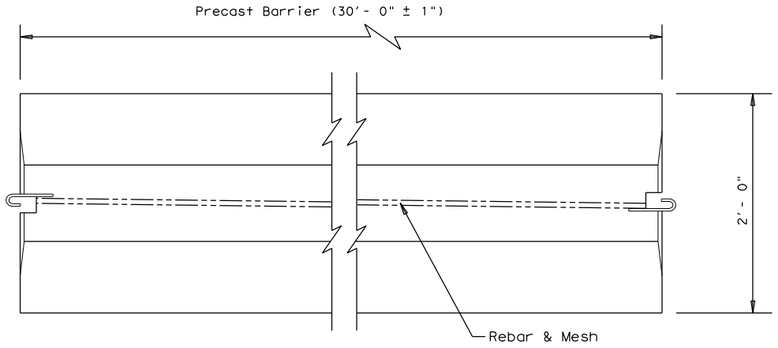


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

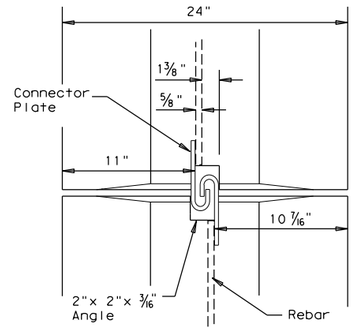


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

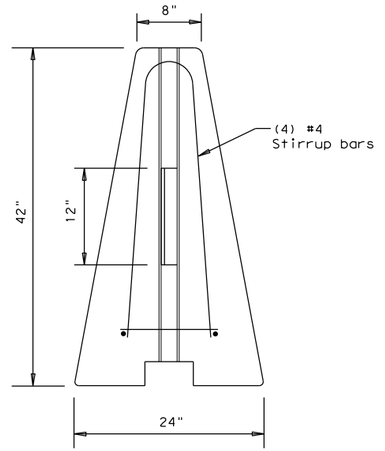
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



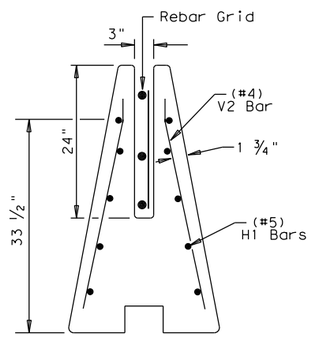
END VIEW

Proprietary Joint Connections (SSCB)

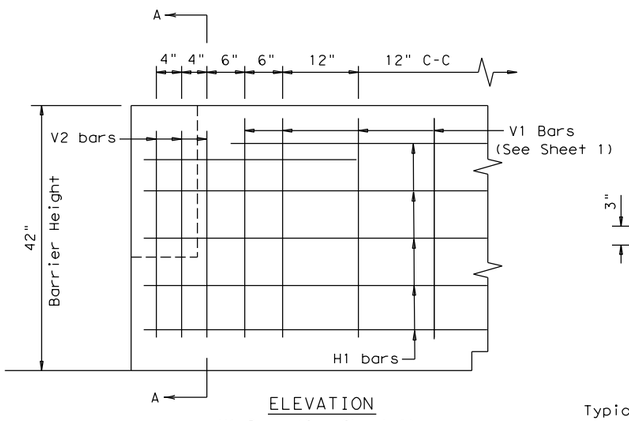
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

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

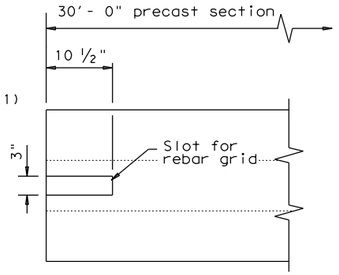
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



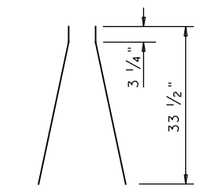
SECTION A-A
Showing (Type R) Rebar Grid



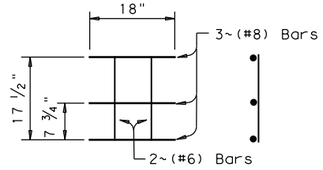
ELEVATION
V1 Bars (See Sheet 1)



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:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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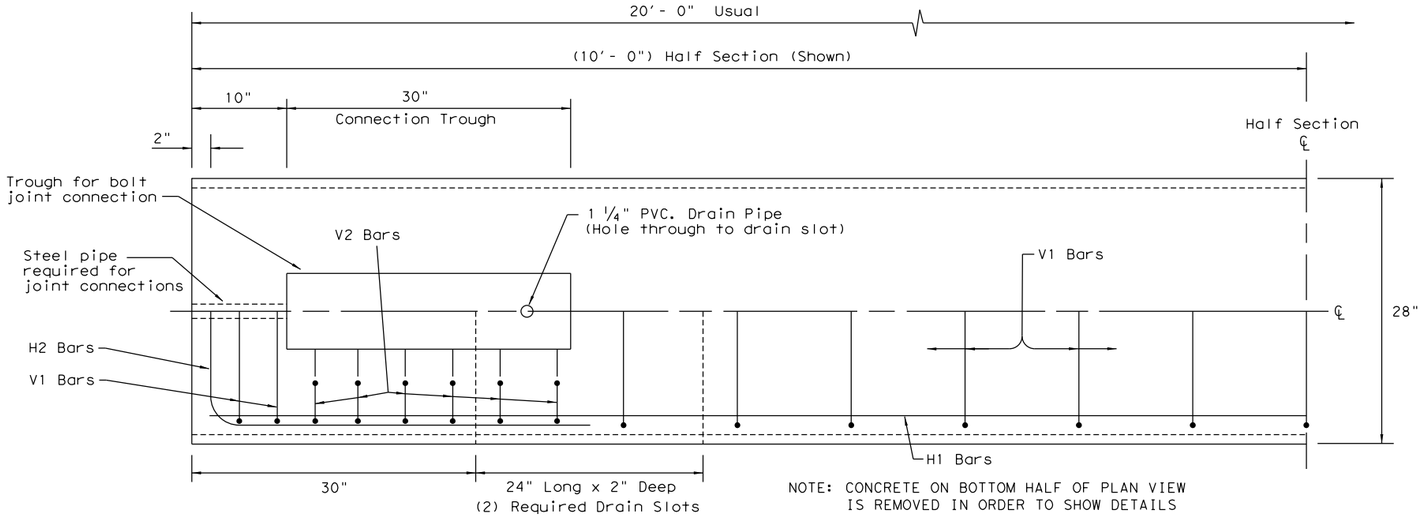
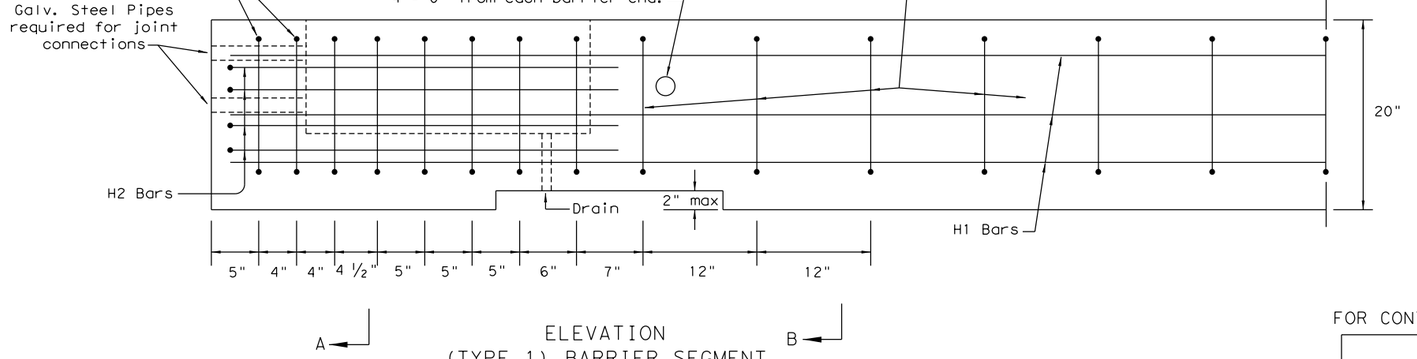
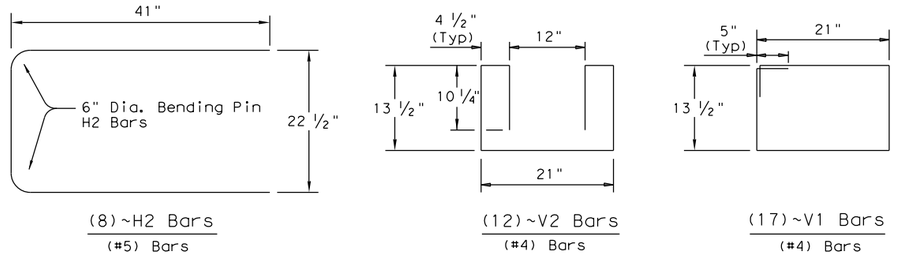


NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



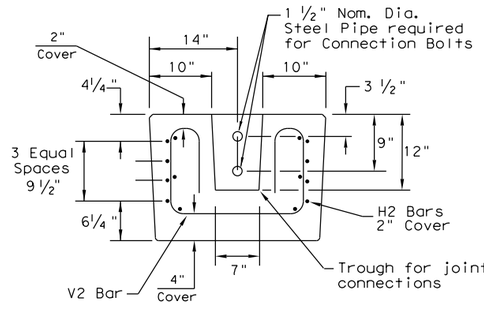
(8)~H2 Bars
(#5) Bars

(12)~V2 Bars
(#4) Bars

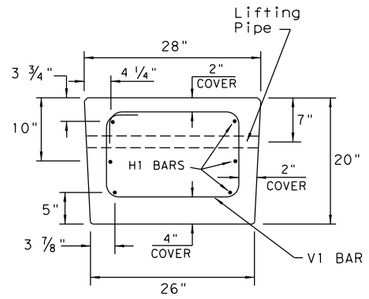
(17)~V1 Bars
(#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



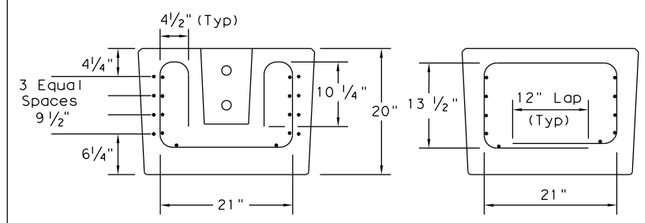
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A SECTION B-B

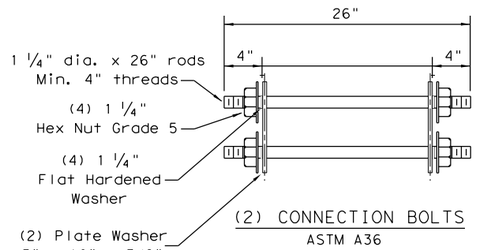
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

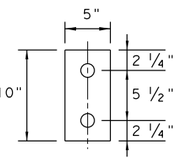


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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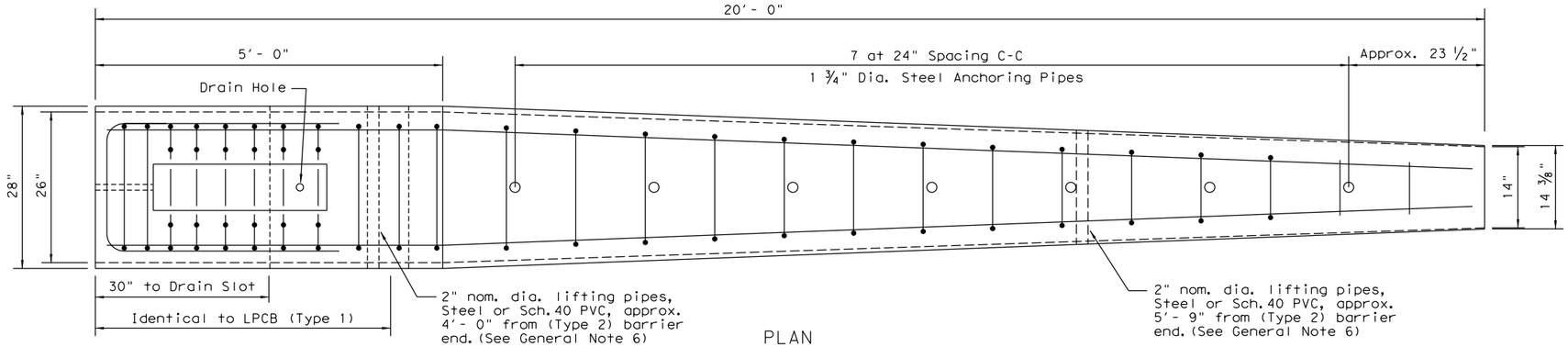
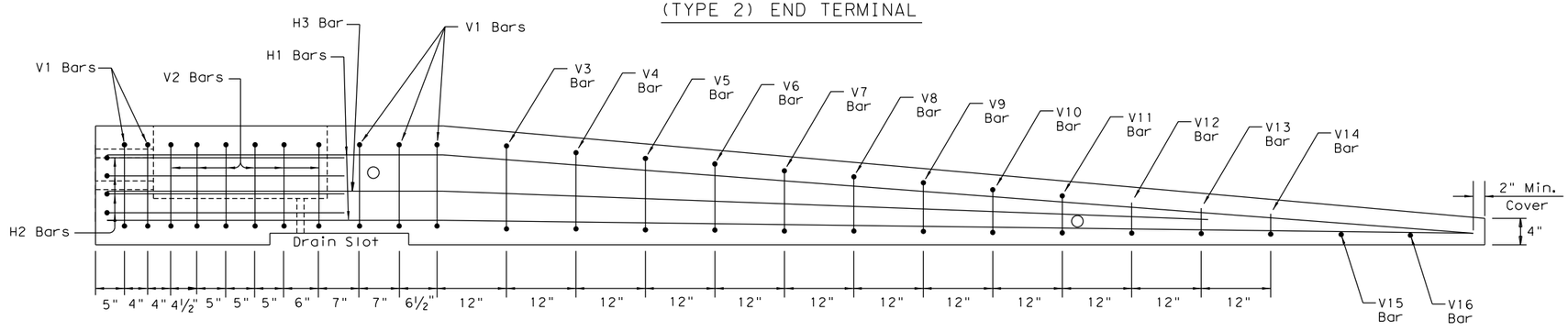
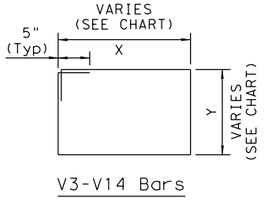


PLAN
(TYPE 2) END TERMINAL

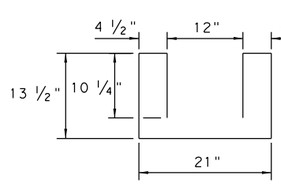


ELEVATION
(TYPE 2) END TERMINAL

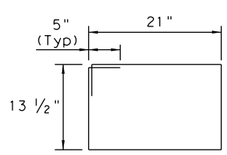


V3-V14 Bars

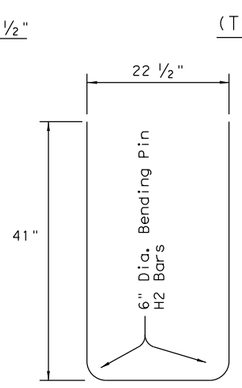
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6



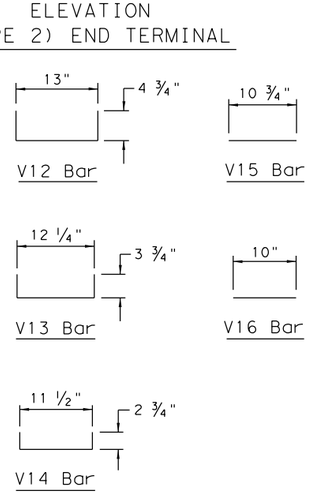
(6) ~V2 Bars



(5) ~V1 Bars



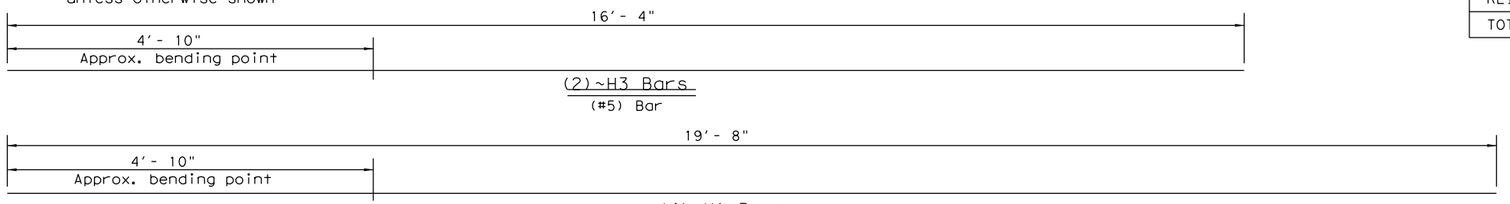
(4) ~H2 Bars
(#5) Bars



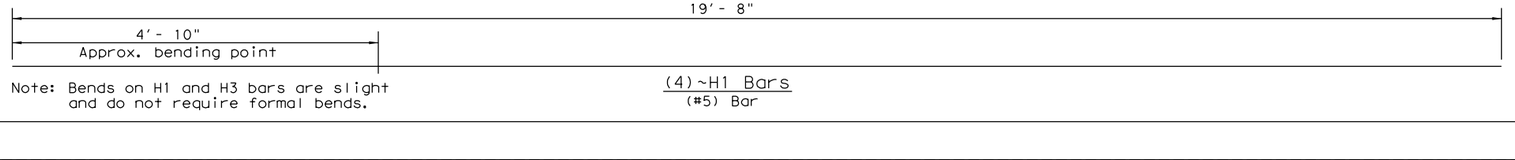
Note: All V Bars are (#4)

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL

Note: Use 2" Dia. Bending Pin, unless otherwise shown



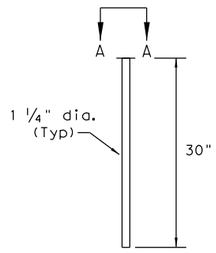
(2) ~H3 Bars
(#5) Bar



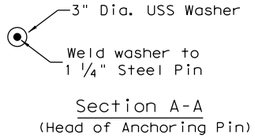
Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4) ~H1 Bars
(#5) Bar

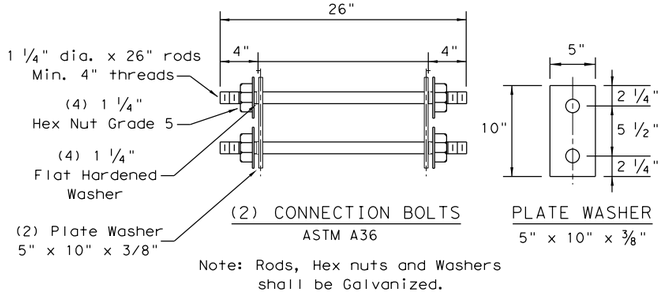
Note: Anchoring pipes not shown in Elevation View



(7) Anchor Pins
ASTM A36 Steel
(See Note 3)



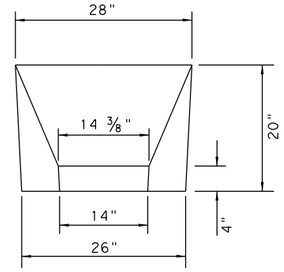
Section A-A
(Head of Anchoring Pin)



(2) CONNECTION BOLTS
ASTM A36

PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.



APPROACH VIEW

TYPE 2 - NOTES

1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES	20 FT. SECTION	
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

Texas Department of Transportation
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
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	SAN	BEXAR		57

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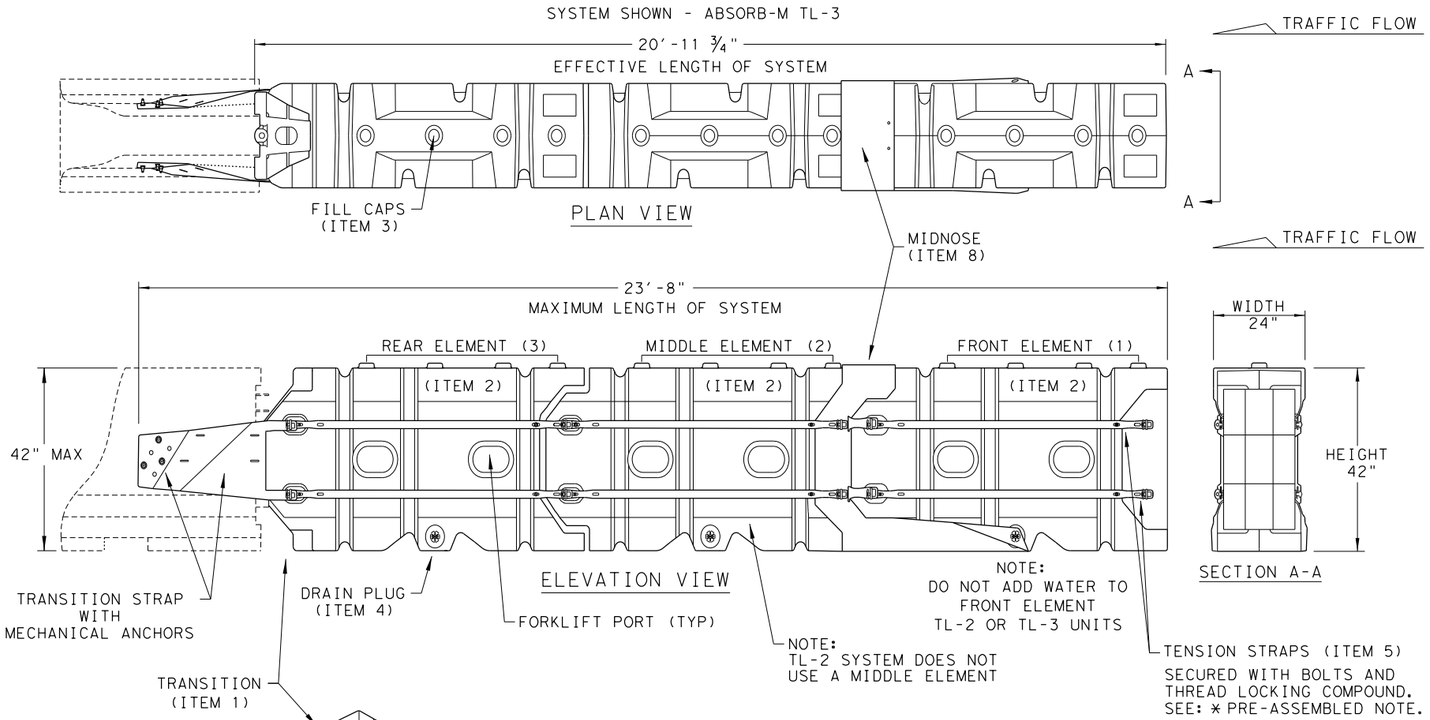
SYSTEM SHOWN - ABSORB-M TL-3



THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

NOTE:
CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.

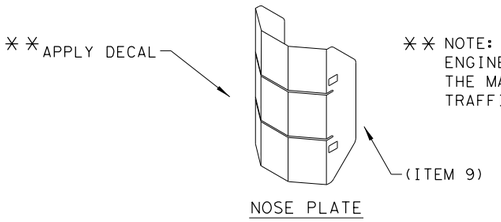
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
* 6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
* 7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE



** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALs ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

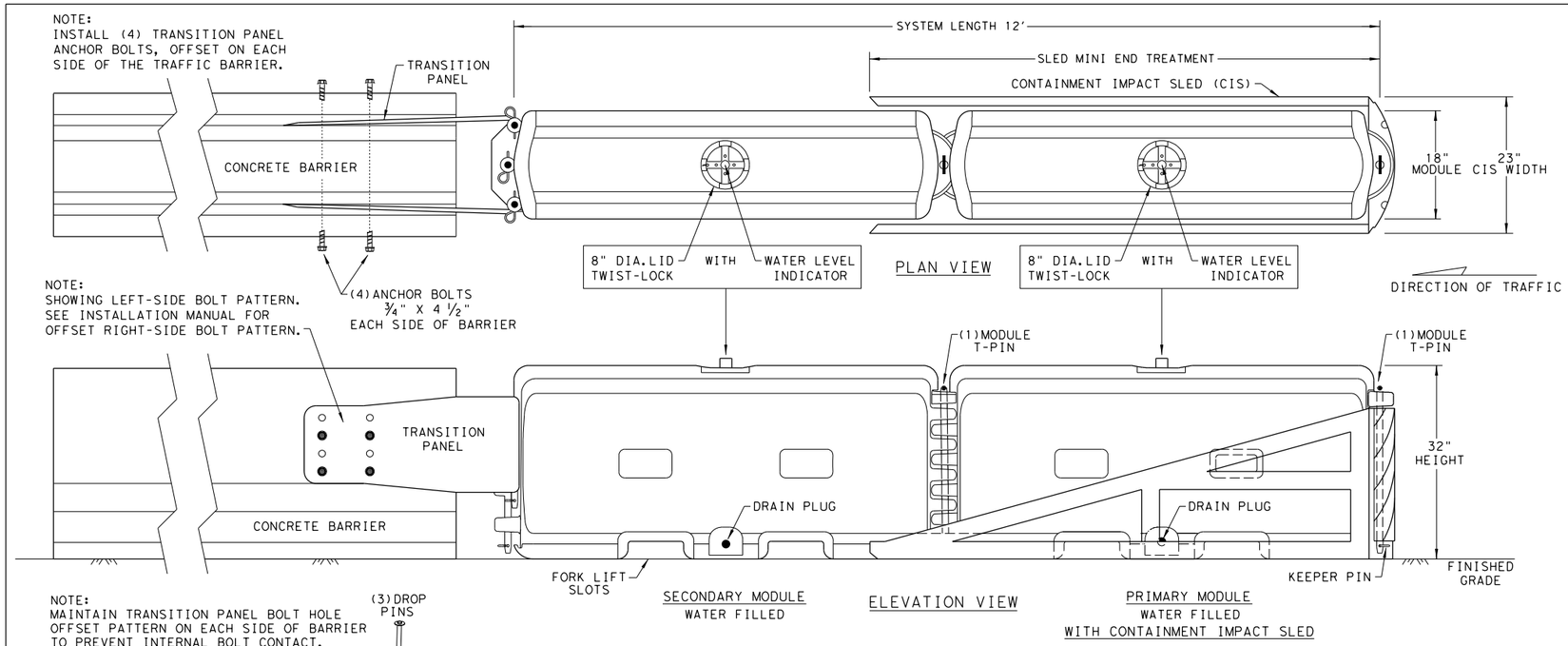
SACRIFICIAL

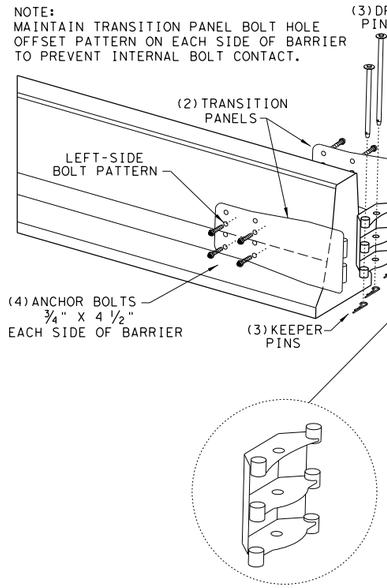
Texas Department of Transportation — Design Division Standard

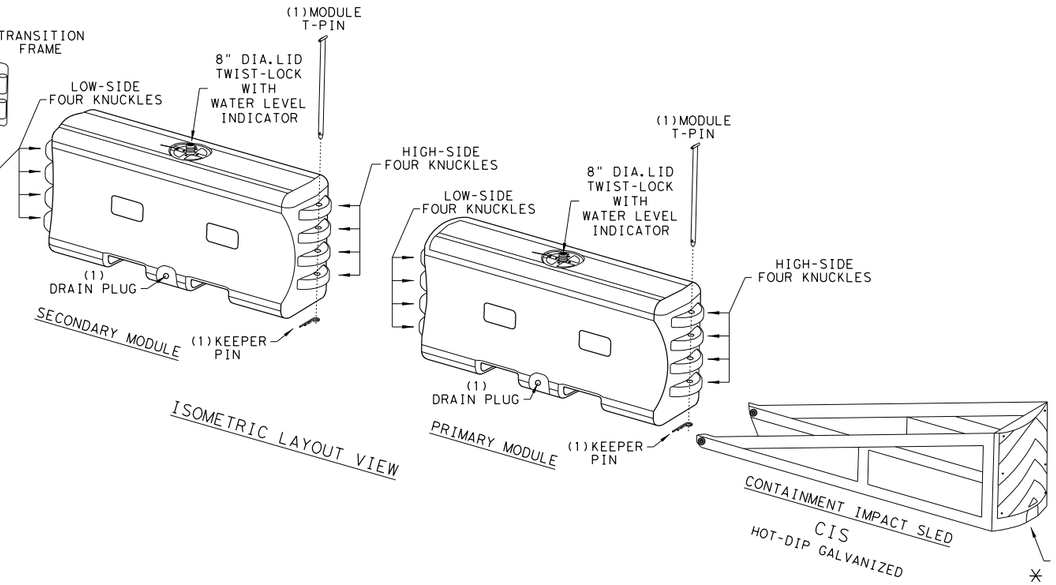
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

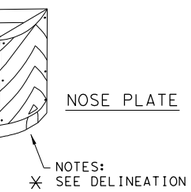
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		58

DATE: 11/17/2021
FILE: I:\3400Os\34832\B00\CADD\Sheets\SAN\Standards\TCP\sledmini19.dgn









GENERAL NOTES

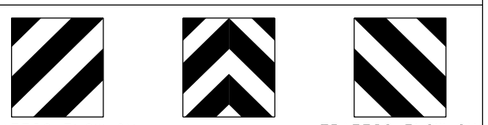
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT TrafFix Devices, Inc. AT 1(949)361-5663
2. THE SLED MINI IS A MASH APPROVED TEST LEVEL 2 (TL-2) CRASH CUSHION APPROVED FOR USE WITHIN TEMPORARY WORK ZONE LOCATIONS. TL-2 IS APPROVED FOR SPEEDS OF 45 MPH OR LESS.
3. THE SLED MINI IS A GATING, NON-REDIRECTIVE CRASH CUSHION THAT DOES NOT NEED TO BE BOLTED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, AND DEPRESSIONS.
5. THE SLED MINI CAN BE ATTACHED TO CONCRETE BRIDGE ABUTMENTS, CONCRETE BARRIER, STEEL BARRIER AND PLASTIC BARRIER.

SLED MINI TL-2 - BILL OF MATERIALS

QTY:	PART #	PART DESCRIPTIONS
2	45332-MY	WATER FILLED MODULE
2	45032-CPGAL	T-PINS - LENGTH 26" WITH KEEPER PINS - FOR MODULES
2	18009-B-I	WATER LEVEL INDICATOR FLOAT LID
1	45032-S	CONTAINMENT IMPACT SLED (CIS)
2	45151	UNIVERSAL TRANSITION PANELS
1	45132	TRANSITION FRAME
1	45141	DROP PIN - LENGTH 26.50" WITH KEEPER PIN
2	45142	DROP PINS - LENGTH 18.50" WITH KEEPER PINS
8	45050	TRANSITION PANEL ANCHOR BOLTS ¾" X 4 ½" (4 EA. SIDE)

MODULE SPECIFICATIONS	(CIS) SPECIFICATIONS
LENGTH: 73" (PIN TO PIN)	LENGTH: 87 ⅞"
HEIGHT: 32"	HEIGHT: 32"
WIDTH: 18"	WIDTH: 23"
EMPTY WEIGHT: 110 lbs.	APPROX. WEIGHT: 1250 lbs.
FILLED WEIGHT: 1100 lbs.	
FILL CAPACITY: 118.5 Gal	

DELINEATION DECAL PLACEMENT GUIDE



TRAFFIC FLOW ON LEFT-SIDE OF BARRIER

TRAFFIC FLOW ON BOTH-SIDES OF BARRIER

TRAFFIC FLOW ON RIGHT-SIDE OF BARRIER

✳ NOTE:
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR TRAFFIC CONTROL DEVICES. DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE. THE ORIENTATION BETWEEN THE LEFT-SIDE AND RIGHT-SIDE TRAFFIC IS CHANGED BY ROTATING THE DECAL 90 DEGREES AND REINSTALLING.

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED MINI, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

✳ NOTES:
SEE DELINEATION GUIDE FOR DECAL PLACEMENT.
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

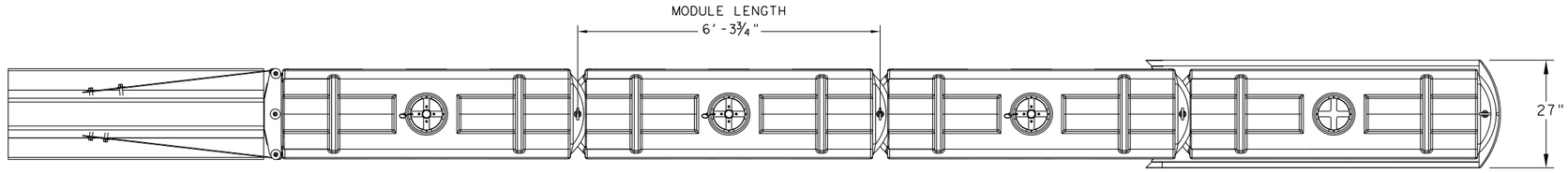
Texas Department of Transportation

Design Division Standard

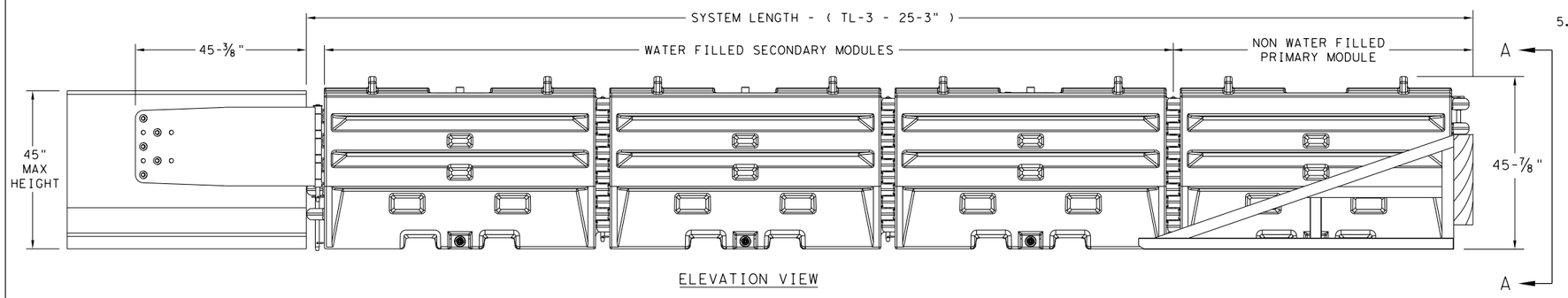
SLED MINI END TREATMENT TL-2 MASH COMPLIANT (TEMPORARY, WORK ZONE)

SLEDMINI-19

FILE: sledmini19	DN: TxDOT	CK: KM	DN: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		59



PLAN VIEW



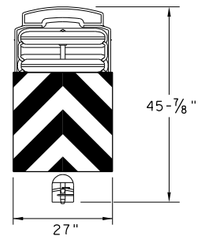
ELEVATION VIEW

GENERAL NOTES

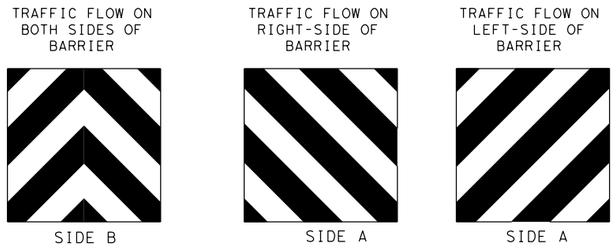
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE,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

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25′ 3"

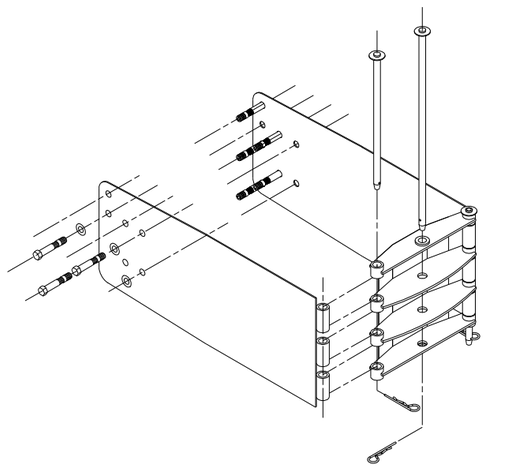


SECTION A-A



NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

BILL OF MATERIAL

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

Texas Department of Transportation

Design Division Standard

SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
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	SAN	BEXAR		60

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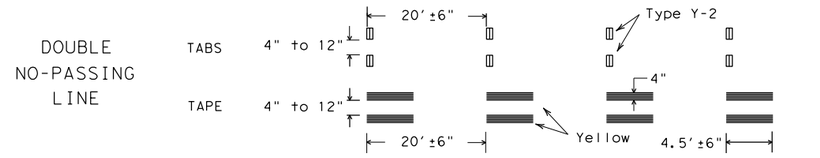
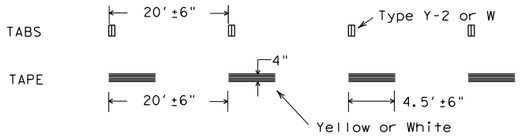
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

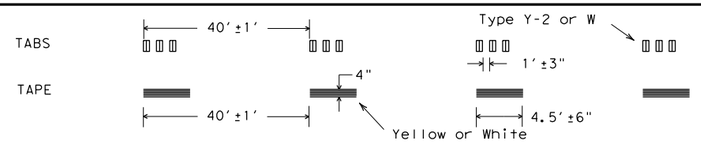


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



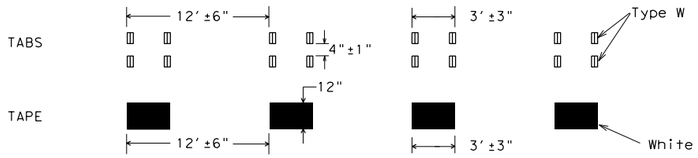
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

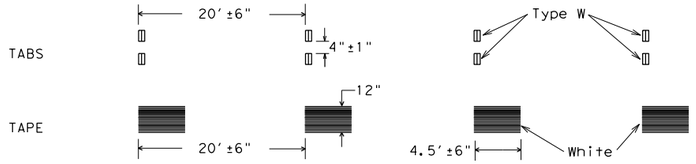


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



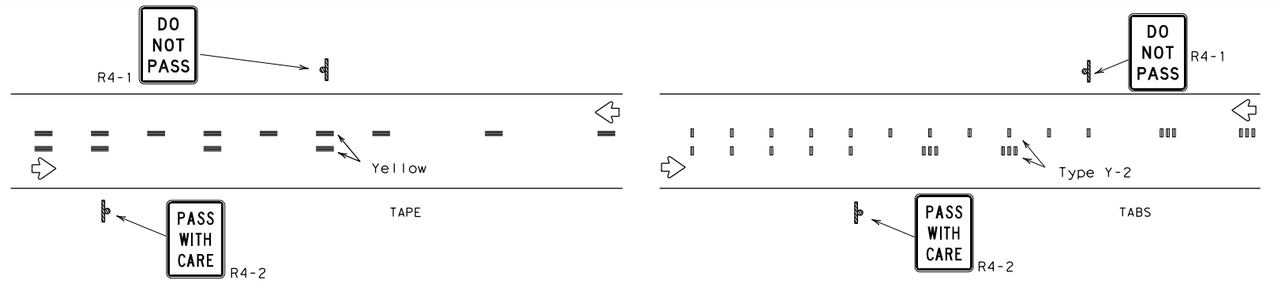
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

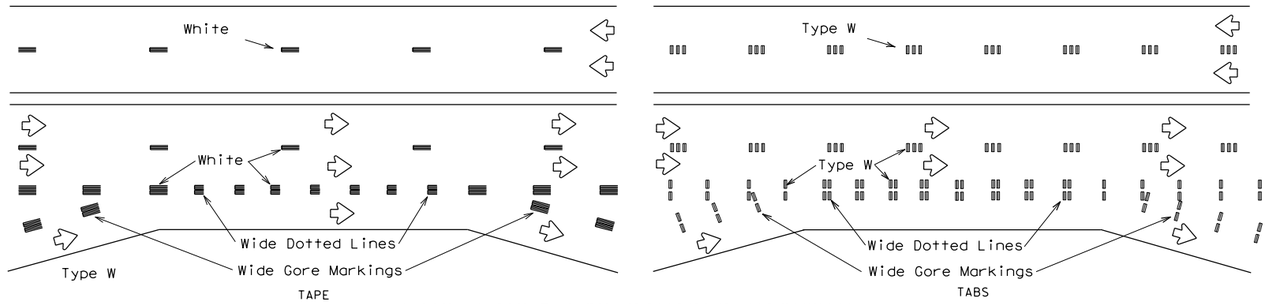
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

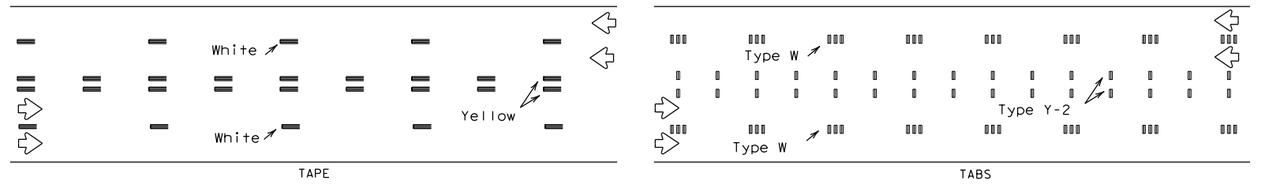
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



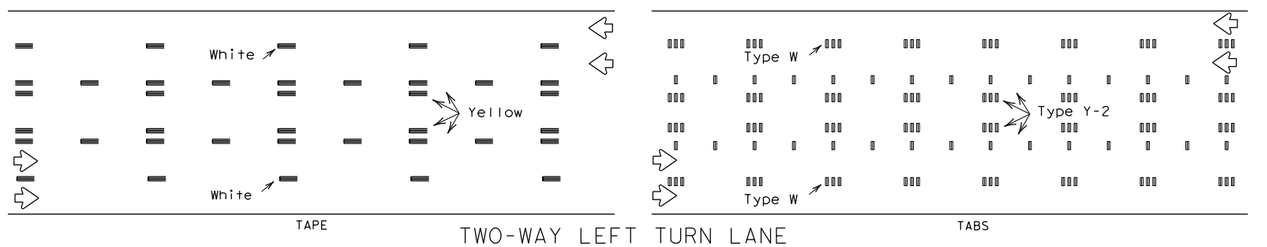
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



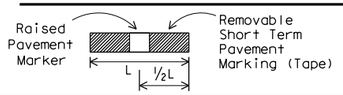
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
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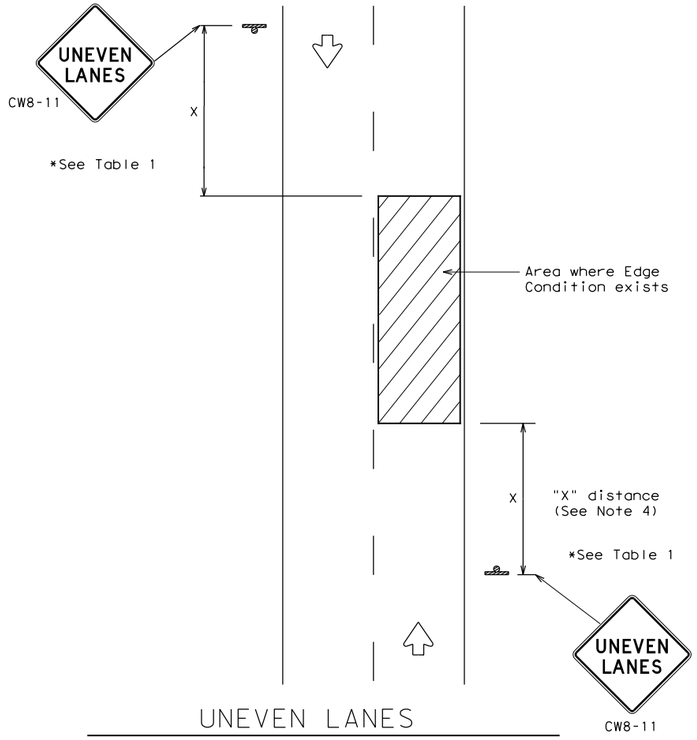
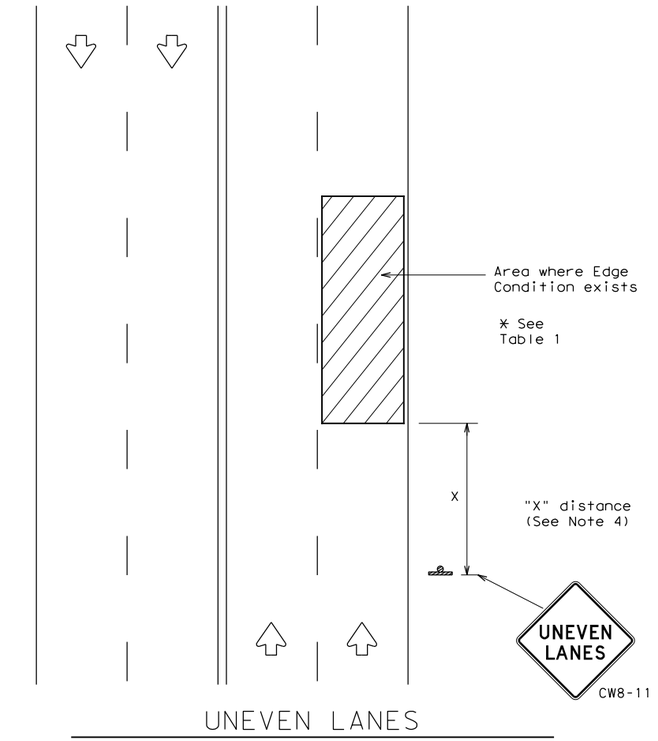
1-97		DIST	COUNTY		SHEET NO.
3-03		SAN	BEXAR		61
7-13					

111



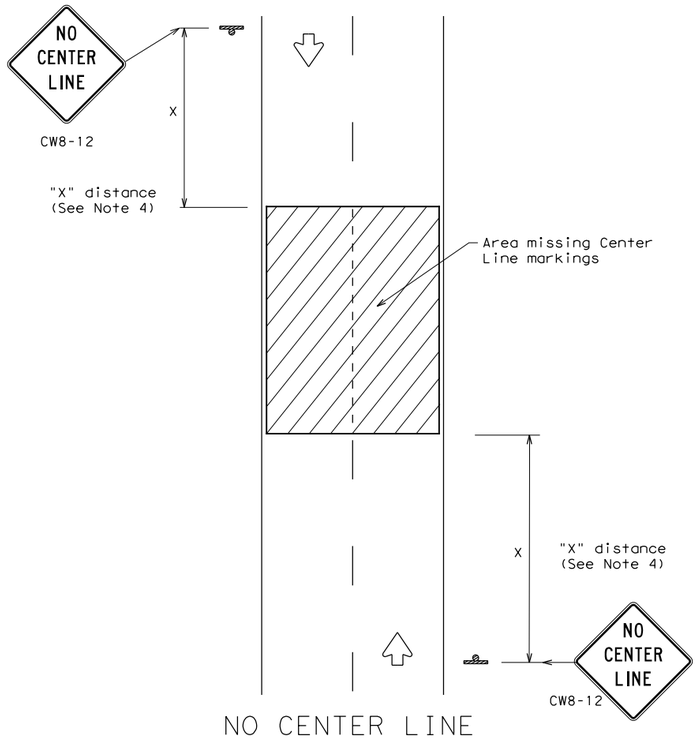
UNEVEN LANES

TWO LANE CONVENTIONAL ROAD



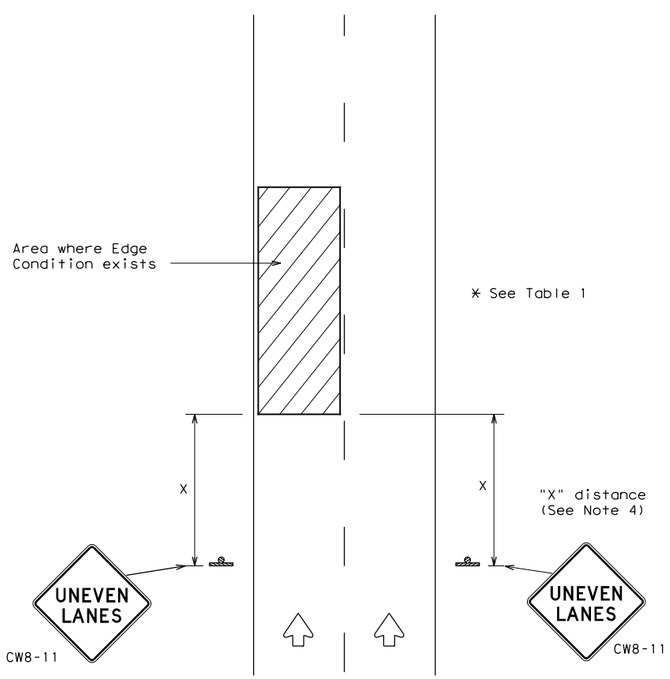
UNEVEN LANES

FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE

TWO LANE CONVENTIONAL ROAD



UNEVEN LANES

DIVIDED ROADWAY

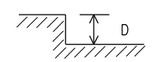
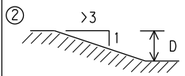
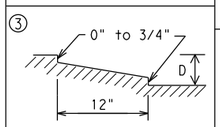
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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	0521	02	042	SL 13
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	SAN	BEXAR		62

112

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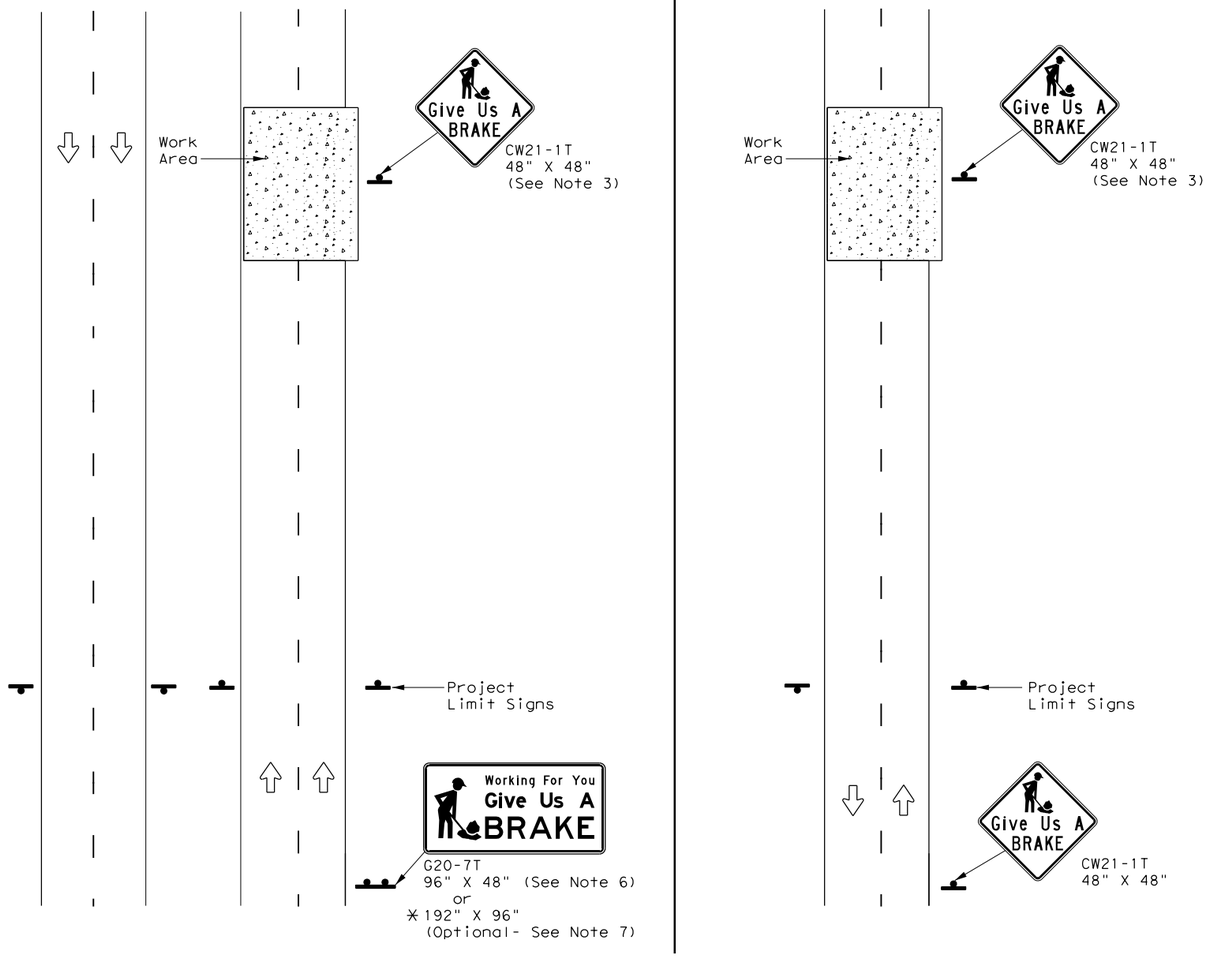

DIVIDED HIGHWAY

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	0521	02	042	SL 13
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	SAN	BEXAR		63

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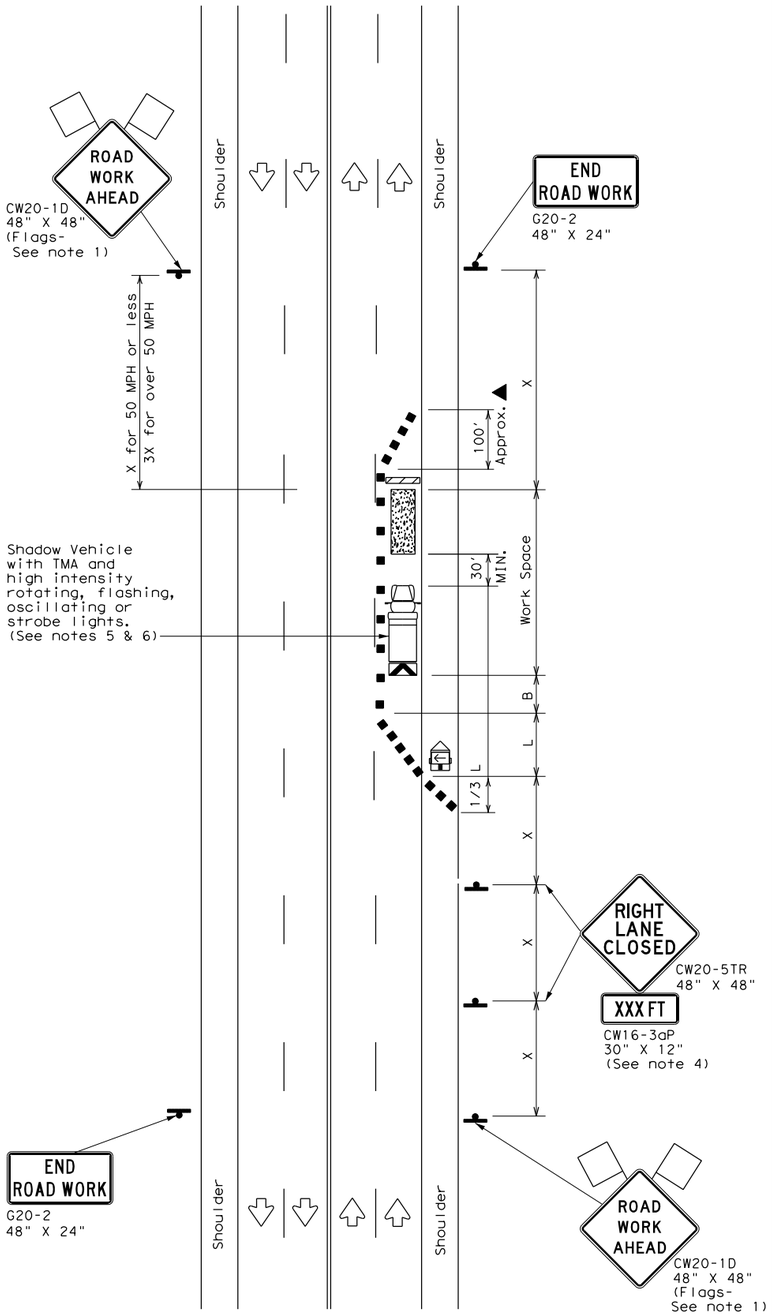
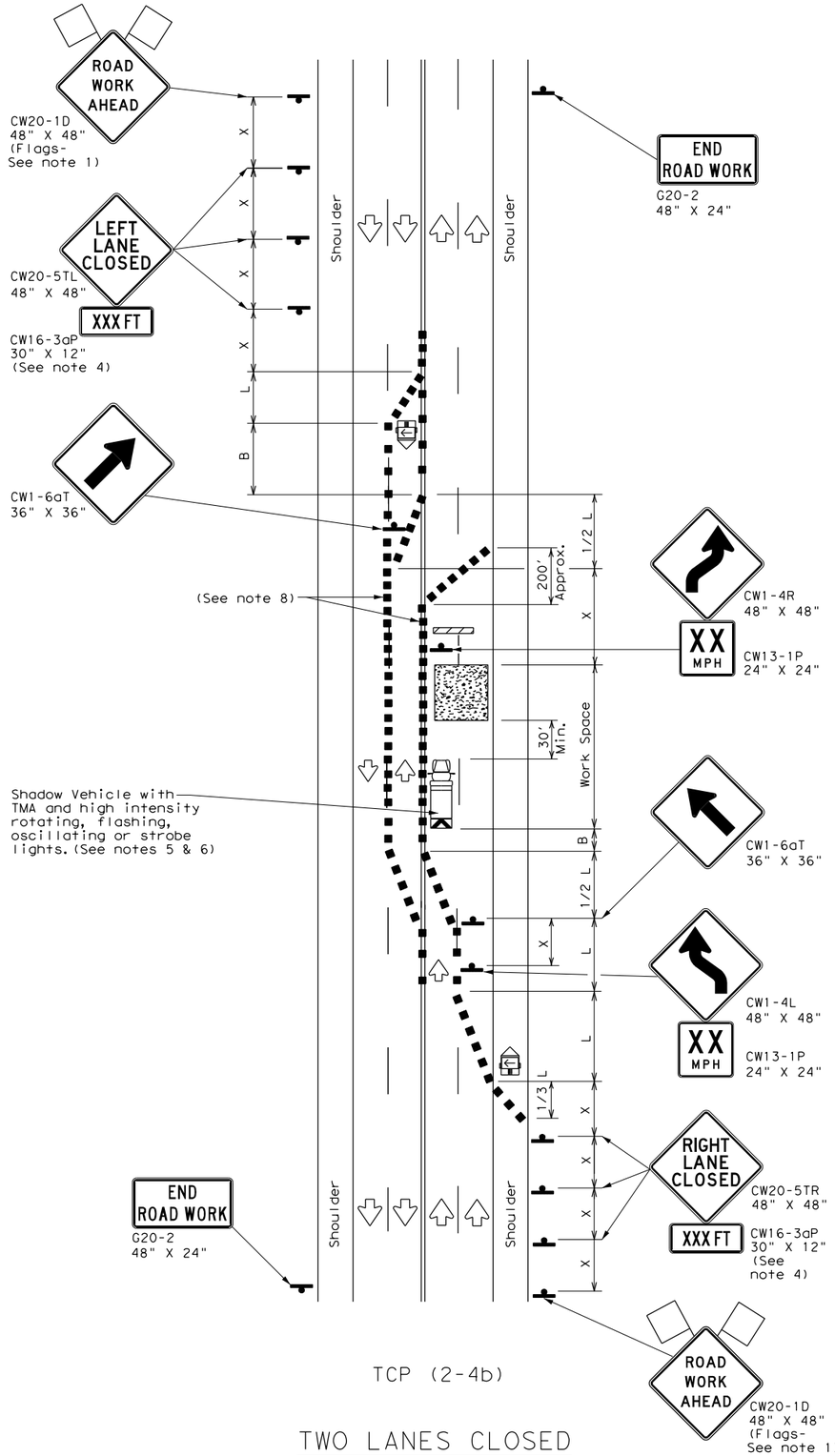


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	SAN	BEXAR		64

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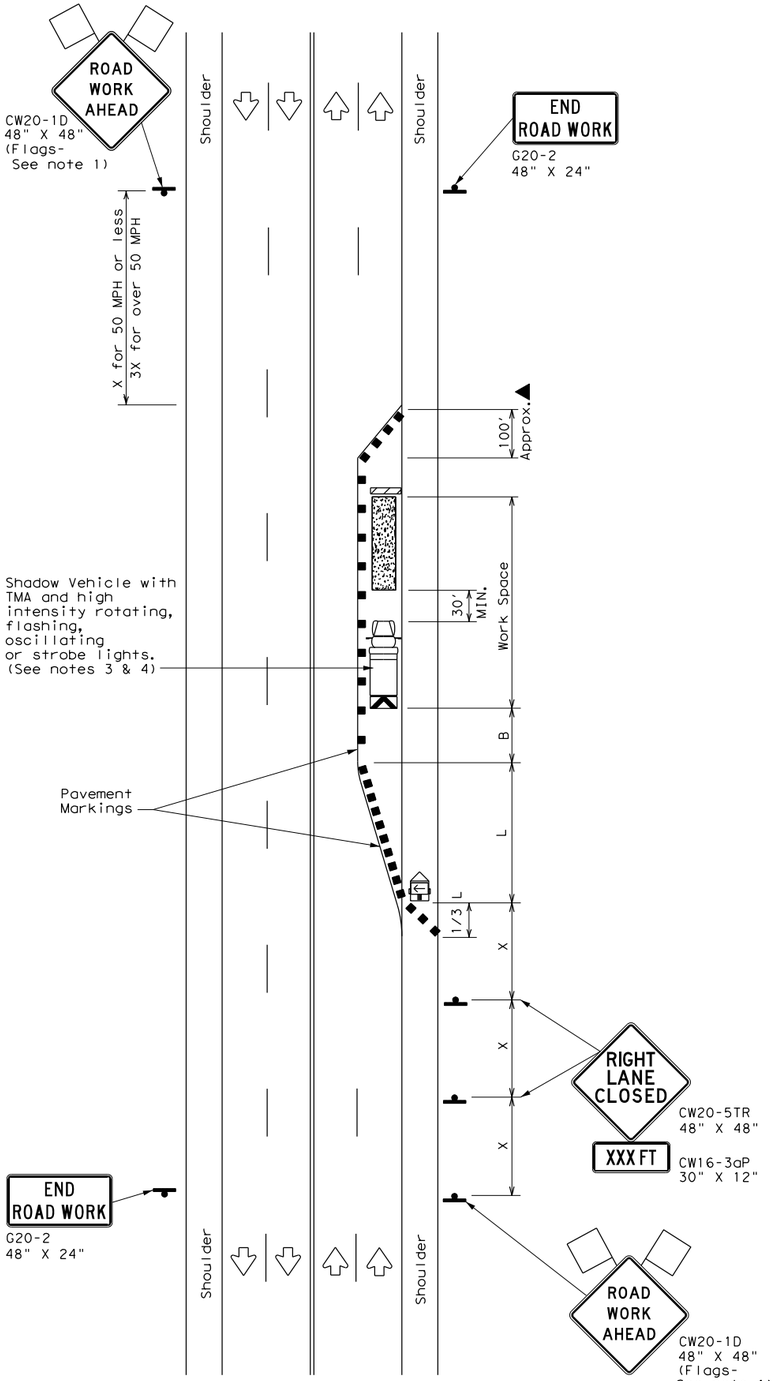
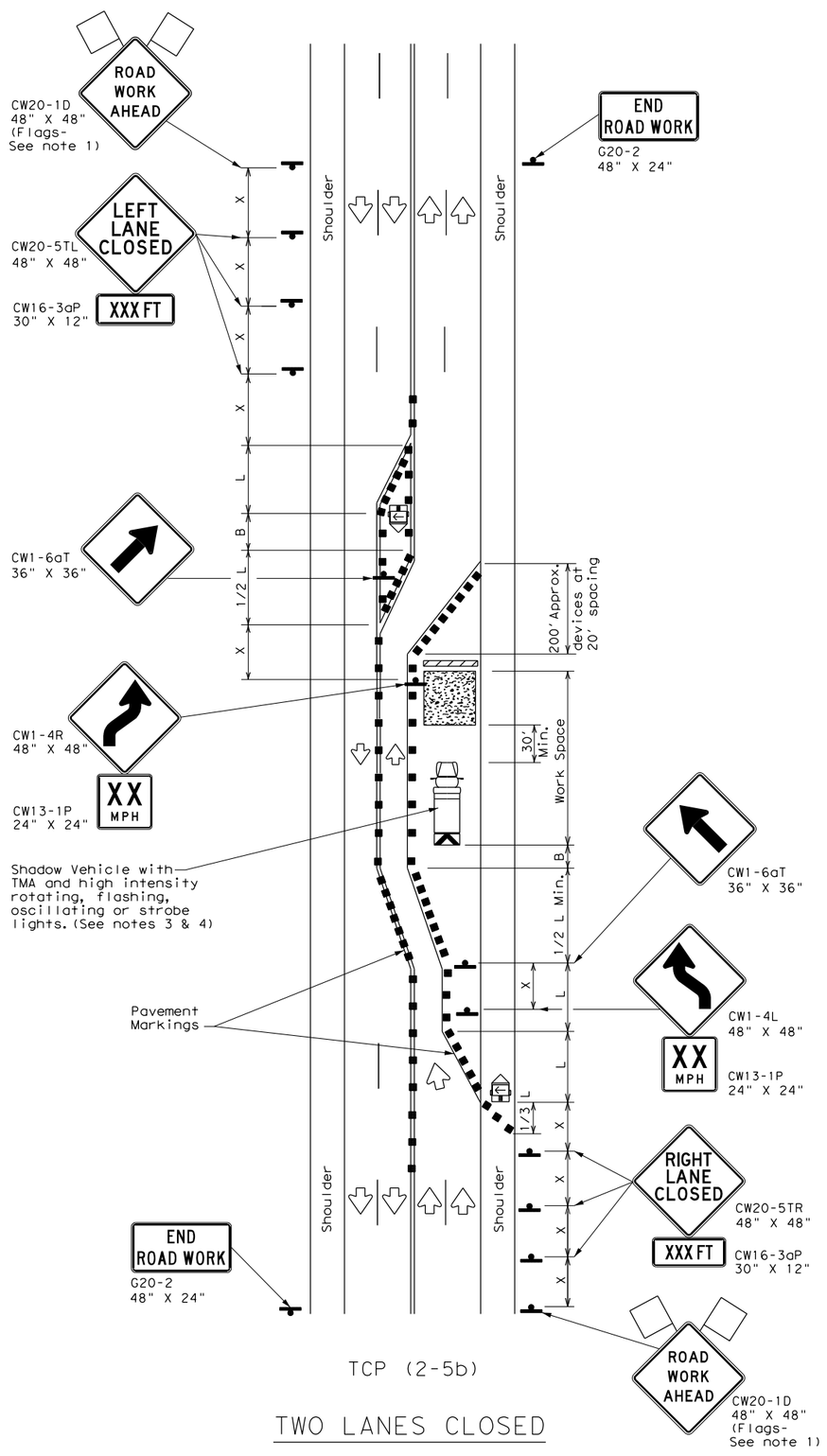


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. 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 substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LONG TERM LANE CLOSURES
MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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4-98 2-18	SAN	BEXAR		65

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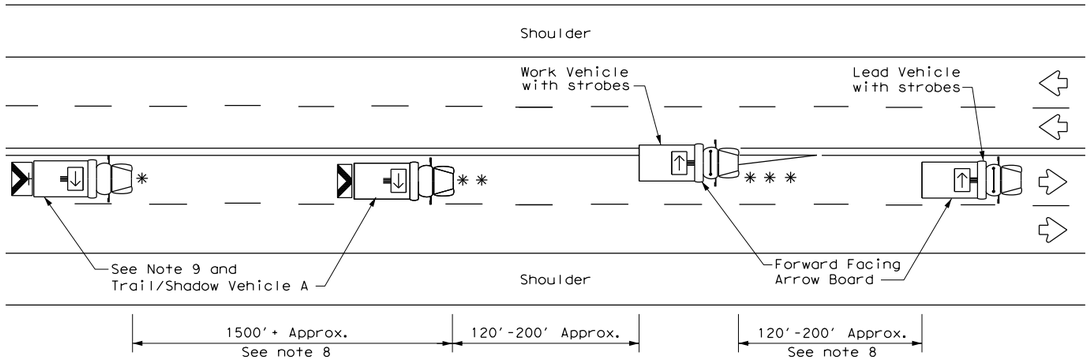
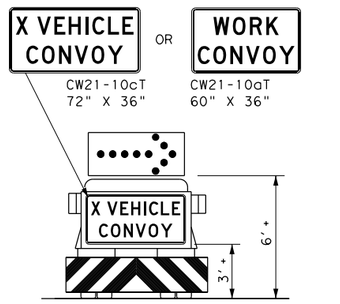


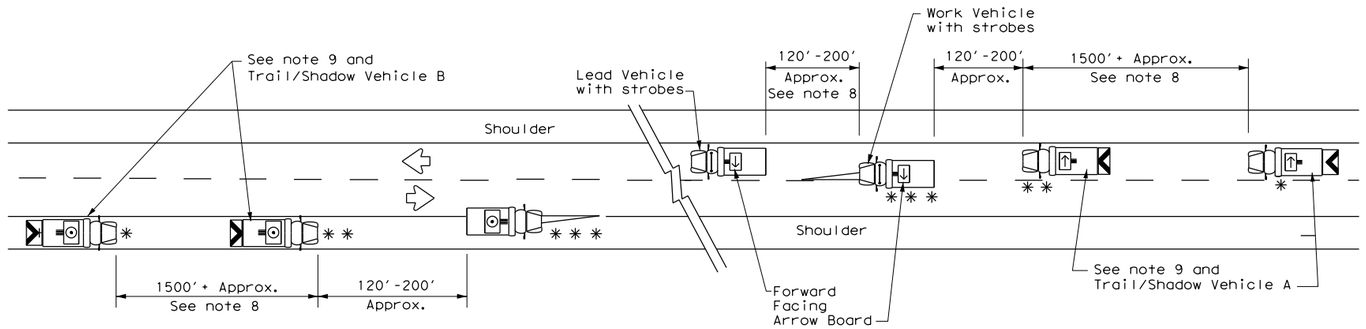
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

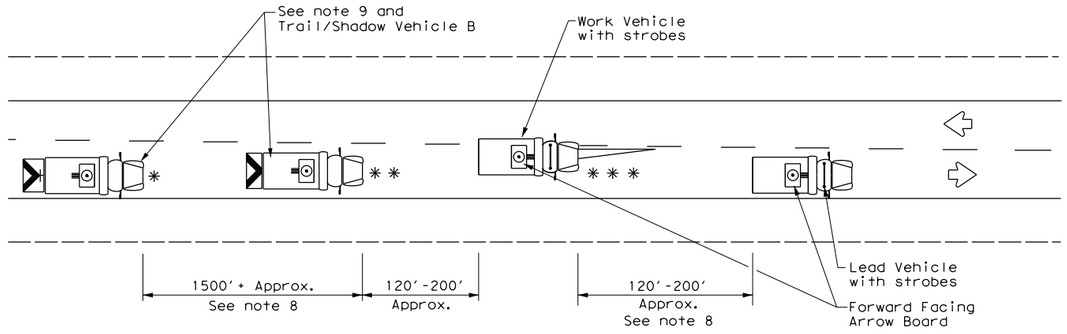


WORK ON SHOULDER

WORK ON TRAVEL LANE

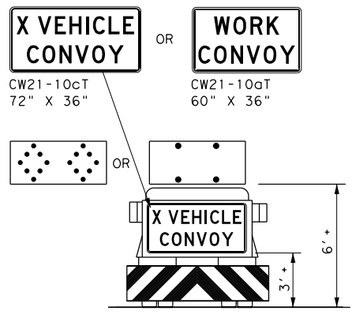
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

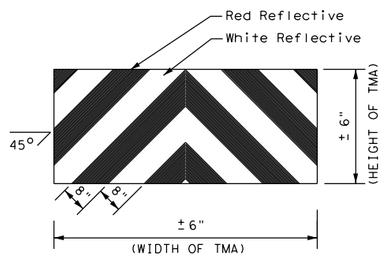
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

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	SAN	BEXAR		66

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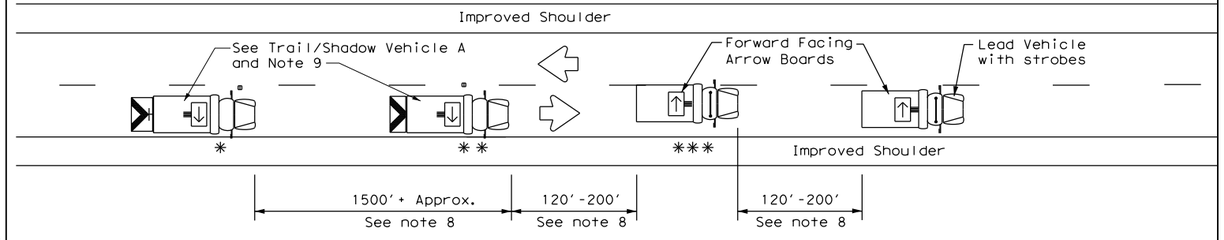
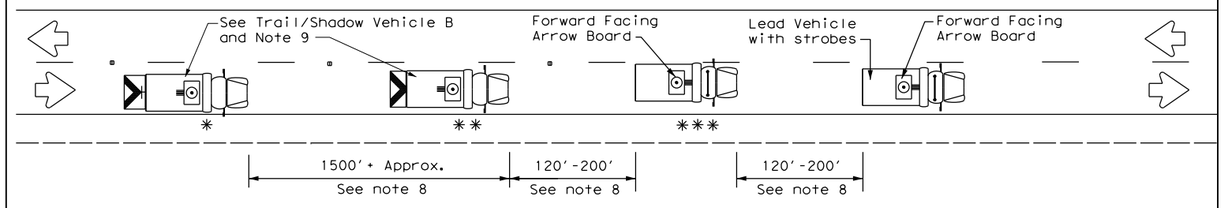


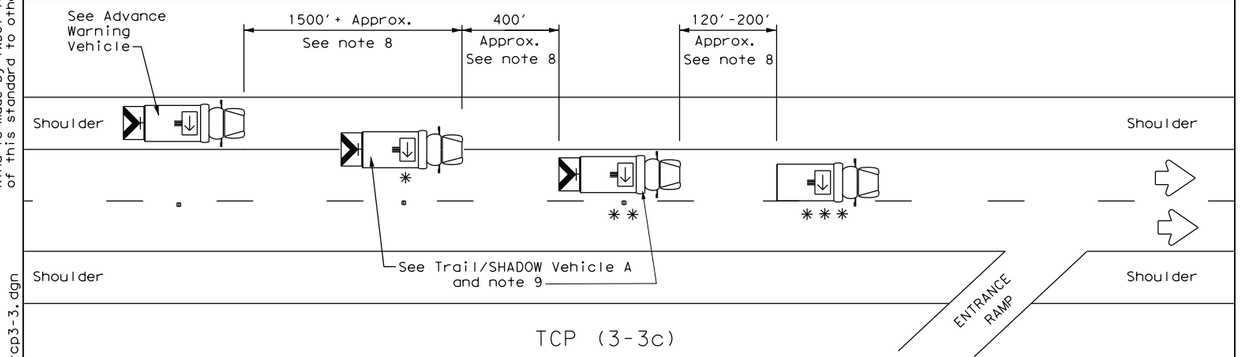
TCP (3-3a)

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



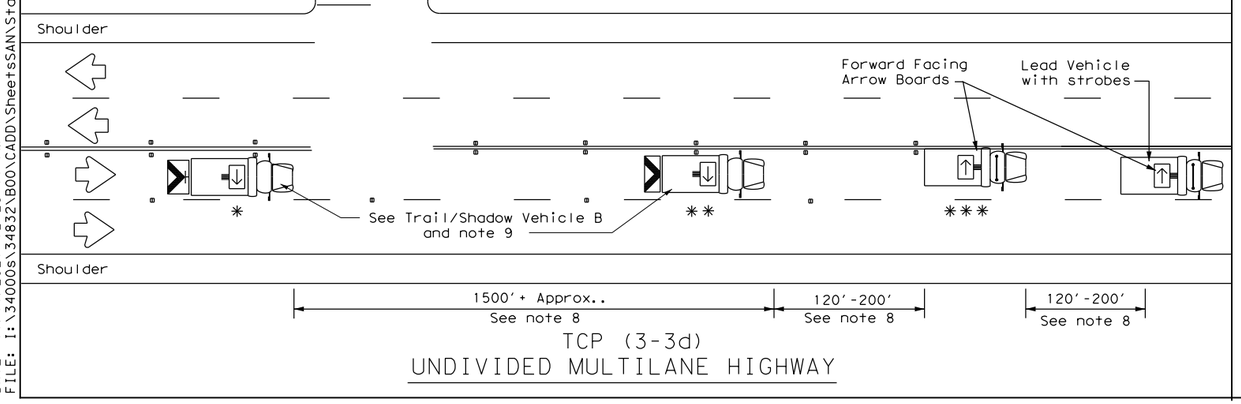
TCP (3-3b)

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



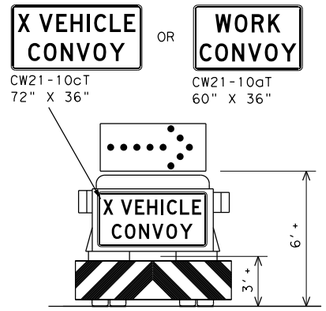
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



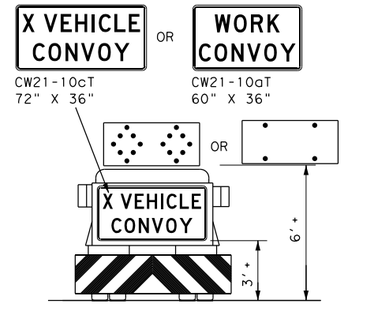
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



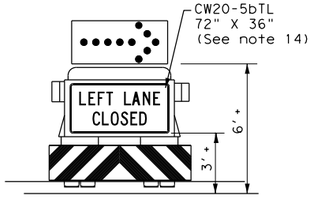
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

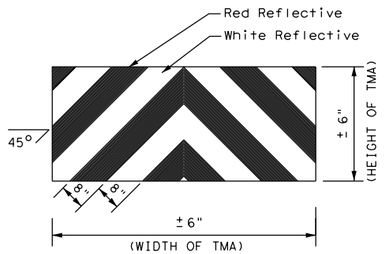


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	SAN	BEXAR		67
1-97 7-14				

177

DATE: 11/17/2021 12:23:11 PM
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DATE: 11/17/2021 12:23:12 PM
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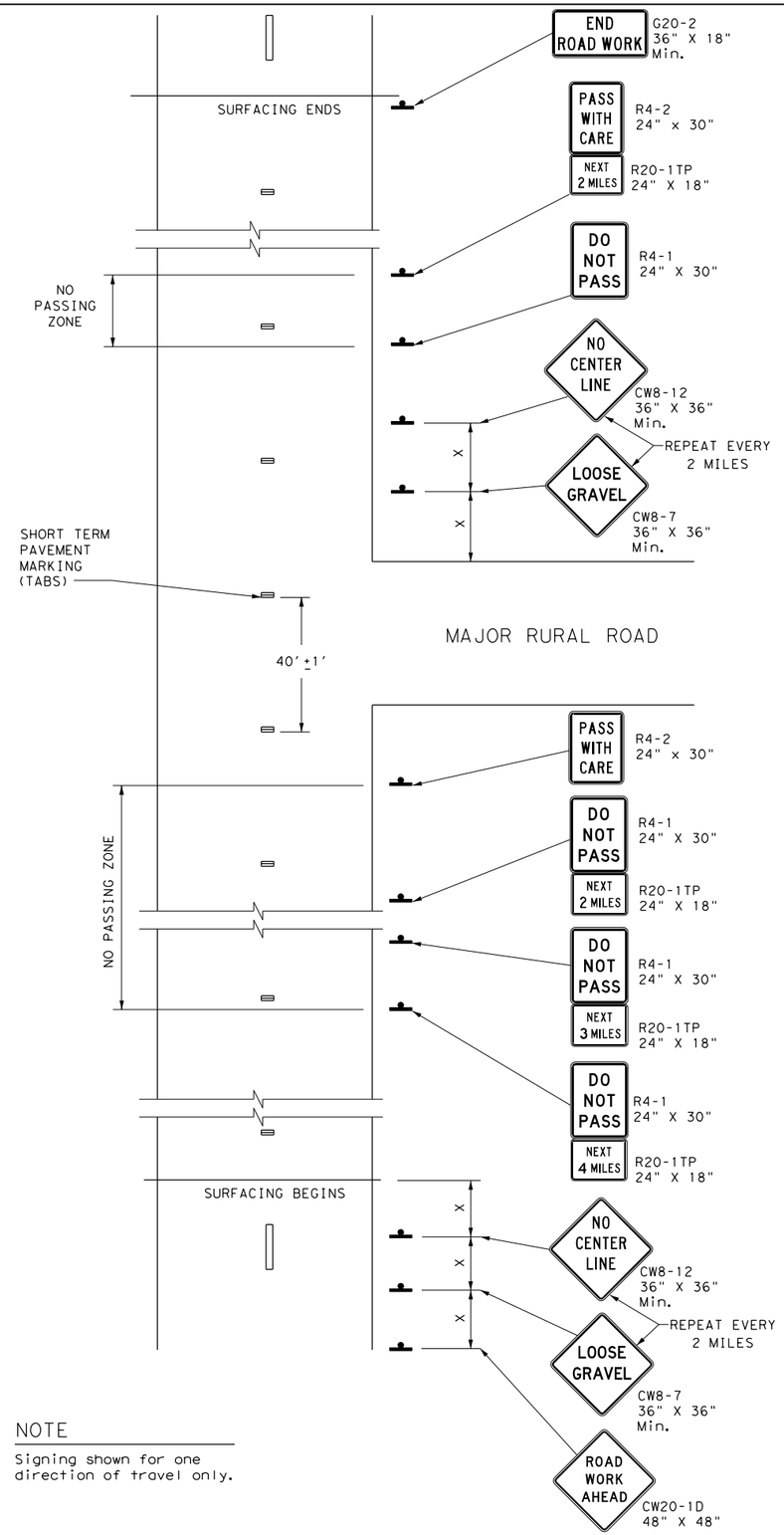
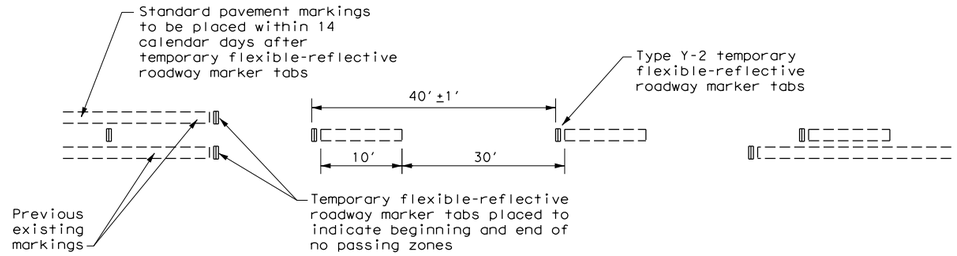


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

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

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

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

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

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

COORDINATION OF SIGN LOCATIONS

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

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

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

* Conventional Roads Only

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	SAN	BEXAR		68

210

Beginning chain CL_SL13 description

Point CLSL1301 N 13,683,040.484 E 2,099,106.705 Sta 93+00.00

Course from CLSL1301 to PC CL_SL13-1 N 89° 52′ 17.35" E Dist 2,123.700

		Curve Data
Curve	CL_SL13-1	
P.I. Station	121+36.35	N 13,683,046.846 E 2,101,943.047
Delta =	27° 56′ 19.97"	(RT)
Degree =	2° 00′ 00.00"	
Tangent =	712.649	
Length =	1,396.944	
Radius =	2,864.789	
External =	87.309	
Long Chord =	1,383.145	
Mid. Ord. =	84.727	
P.C. Station	114+23.70	N 13,683,045.248 E 2,101,230.399
P.T. Station	128+20.64	N 13,682,714.362 E 2,102,573.383
C.C.		N 13,680,180.466 E 2,101,236.825
Back =	N 89° 52′ 17.35" E	
Ahead =	S 62° 11′ 22.68" E	
Chord Bear =	S 76° 09′ 32.66" E	

Course from PT CL_SL13-1 to PC CL_SL13-2 S 62° 11′ 22.68" E Dist 3,812.129

		Curve Data
Curve	CL_SL13-2	
P.I. Station	171+89.70	N 13,680,675.992 E 2,106,437.801
Delta =	22° 00′ 10.01"	(LT)
Degree =	2° 00′ 00.00"	
Tangent =	556.931	
Length =	1,100.139	
Radius =	2,864.789	
External =	53.633	
Long Chord =	1,093.391	
Mid. Ord. =	52.648	
P.C. Station	166+32.77	N 13,680,935.826 E 2,105,945.198
P.T. Station	177+32.91	N 13,680,619.637 E 2,106,991.873
C.C.		N 13,683,469.722 E 2,107,281.756
Back =	S 62° 11′ 22.68" E	
Ahead =	S 84° 11′ 32.69" E	
Chord Bear =	S 73° 11′ 27.68" E	

Course from PT CL_SL13-2 to PC CL_SL13-3 S 84° 11′ 32.69" E Dist 7,573.231

		Curve Data
Curve	CL_SL13-3	
P.I. Station	256+36.13	N 13,679,819.926 E 2,114,854.528
Delta =	6° 07′ 45.12"	(LT)
Degree =	0° 55′ 46.51"	
Tangent =	329.988	
Length =	659.347	
Radius =	6,163.579	
External =	8.827	
Long Chord =	659.033	
Mid. Ord. =	8.815	
P.C. Station	253+06.14	N 13,679,853.317 E 2,114,526.234
P.T. Station	259+65.49	N 13,679,821.778 E 2,115,184.511
C.C.		N 13,685,985.260 E 2,115,149.914
Back =	S 84° 11′ 32.69" E	
Ahead =	N 89° 40′ 42.20" E	
Chord Bear =	S 87° 15′ 25.25" E	

Course from PT CL_SL13-3 to CLSL1302 N 89° 40′ 42.20" E Dist 2,996.942

Point CLSL1302 N 13,679,838.601 E 2,118,181.406 Sta 289+62.43

Course from CLSL1302 to CLSL1303 N 89° 39′ 34.09" E Dist 3,017.893

Point CLSL1303 N 13,679,856.537 E 2,121,199.246 Sta 319+80.32

Ending chain CL_SL13 description

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

11/17/2021

THE SEAL ORIGINALLY APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JOHNNY L. CLAYTON, P.E. #107215 ON 11/17/2021 . ALTERATION OF A PREVIOUSLY SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC., 100 N.E. LOOP 410, SUITE 200, SAN ANTONIO, TEXAS 78216-4741, TBPE FIRM #F-312

NO.	REVISION	BY	DATE

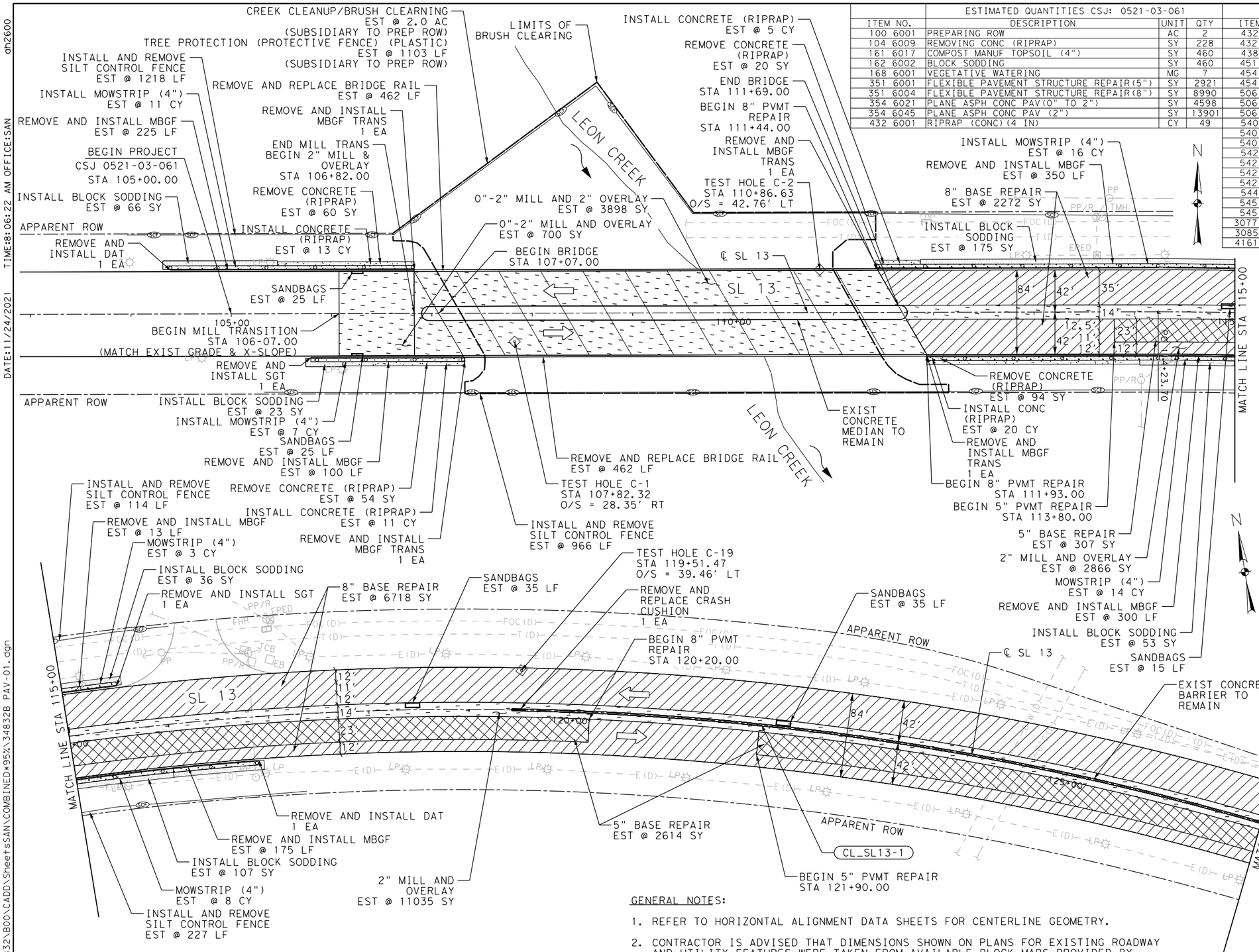
HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

SL 13

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		69
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



ESTIMATED QUANTITIES CSJ: 0521-03-061			
ITEM NO.	DESCRIPTION	UNIT	QTY
100 6001	PREPARING ROW	AC	2
104 6009	REMOVING CONC (RIPRAP)	SY	228
161 6017	COMPOST MANUF TOPSOIL (4")	SY	460
162 6002	BLOCK SODDING	SY	460
168 6001	VEGETATIVE WATERING	MG	7
351 6001	FLEXIBLE PAVEMENT STRUCTURE REPAIR(5")	SY	2921
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	8990
354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	4598
354 6045	PLANE ASPH CONC PAV (2")	SY	13901
432 6001	RIPRAP (CONC)(4 IN)	CY	49

ESTIMATED QUANTITIES CSJ: 0521-03-061			
ITEM NO.	DESCRIPTION	UNIT	QTY
432 6001	RIPRAP (CONC)(4 IN)	CY	49
432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	59
438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	1200
451 6024	RETROFIT RAIL (TY SSTR)	LF	924
454 6008	HEADER TYPE EXPANSION JOINT	CF	11
454 6009	JOINT SEALANT	LF	1200
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	135
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2525
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2525
540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	1163
540 6007	MTL BEAM GD FEN TRANS (TL2)	EA	4
540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
542 6001	REMOVE METAL BEAM GUARD FENCE	LF	1163
542 6002	REMOVE TERMINAL ANCHOR SECTION	EA	2
542 6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	2
542 6005	RM MTL BM GD FEN TRANS (T101)	EA	4
544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
545 6005	CRASH CUSH ATTEN (REMOVE)	EA	1
545 6012	CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	EA	1
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	2128
3085 6001	UNDERSEAL COURSE	GAL	3700
4161 6001	STENCILING PERMANENT STRUCTURE NUMBERS	EA	1

LEGEND:

- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- 2" MILL AND OVERLAY
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SILT CONTROL FENCE
- 5" BASE REPAIR (ITEM 351)
- 8" BASE REPAIR (ITEM 351)
- 4" CONC RIPRAP
- BRUSH CLEARNING
- SODDING AREA
- LIMITS OF BRUSH CLEARING

0 50 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

GENERAL NOTES:

1. REFER TO HORIZONTAL ALIGNMENT DATA SHEETS FOR CENTERLINE GEOMETRY.
2. CONTRACTOR IS ADVISED THAT DIMENSIONS SHOWN ON PLANS FOR EXISTING ROADWAY AND UTILITY FEATURES WERE TAKEN FROM AVAILABLE BLOCK MAPS PROVIDED BY OTHERS AND ARE NOT GUARANTEED IN ANY WAY TO BE ACCURATE. A TOPOGRAPHIC SURVEY WAS NOT PROVIDED AS PART OF DESIGN PLANS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS CONSTRUCTION OPERATIONS TO EXISTING UTILITIES. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL SUBMIT INVENTORY OF EXISTING UTILITY APPURTENANCES TO BE APPROVED BY THE ENGINEER.
3. CONTRACTOR TO MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/24/2021

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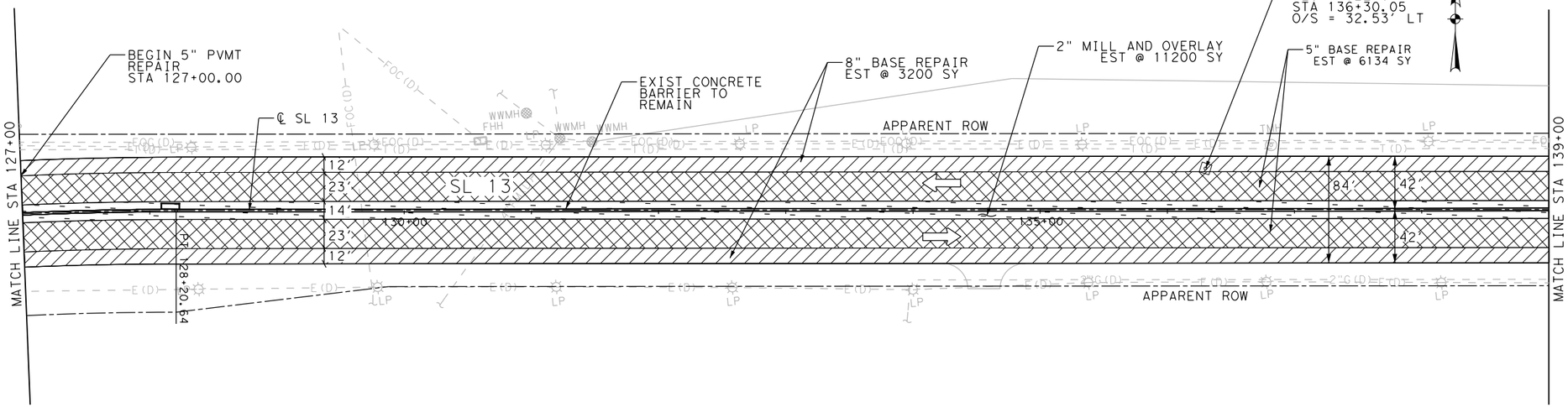
SL 13

ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 1 OF 9

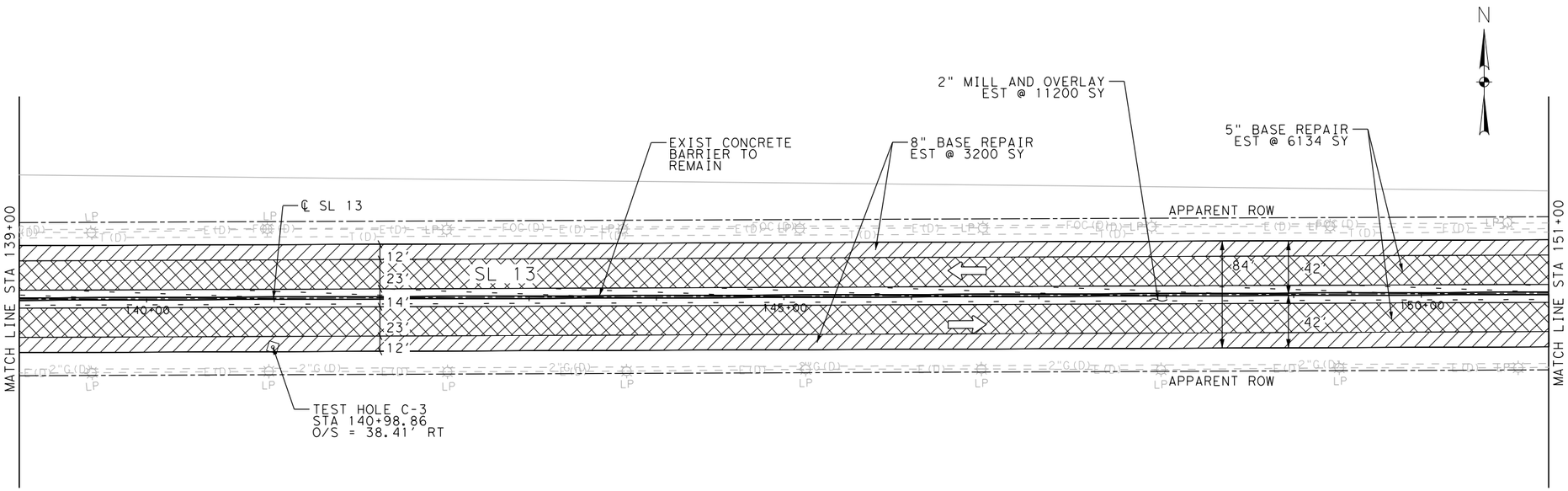
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		70
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

	ESTIMATED QUANTITIES CSJ: 0521-03-061		
ITEM NO.	DESCRIPTION	UNIT	QTY
351 6001	FLEXIBLE PAVEMENT STRUCTURE REPAIR(5")	SY	12268
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	6400
354 6045	PLANE ASPH CONC PAV (2")	SY	22400
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	2576
3085 6001	UNDERSEAL COURSE	GAL	4480



LEGEND:

- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- 2" MILL AND OVERLAY
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SCF — SILT CONTROL FENCE
- 5" BASE REPAIR (ITEM 351)
- 8" BASE REPAIR (ITEM 351)
- 4" CONC RIPRAP
- BRUSH CLEARNING
- SODDING AREA



0 50 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/17/2021

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SL 13

ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 2 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		71
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

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DATE:11/17/2021 TIME:12:23:16 PMOFFICE:SAN dn3891
PDF*2D*MON*HW*MR*300.plt
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ESTIMATED QUANTITIES CSJ: 0521-03-061			
ITEM NO.	DESCRIPTION	UNIT	QTY
104 6009	REMOVING CONC (RIPRAP)	SY	31
161 6017	COMPOST MANUF TOPSOIL (4")	SY	474
162 6002	BLOCK SODDING	SY	474
168 6001	VEGETATIVE WATERING	MG	7
351 6001	FLEXIBLE PAVEMENT STRUCTURE REPAIR(5")	SY	729
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	8185
354 6045	PLANE ASPH CONC PAV (2")	SY	20337
432 6001	RIPRAP (CONC)(4 IN)	CY	8
432 6045	RIPRAP (MOW STRIP)(4 IN)	CY	39
438 6001	CLEANING AND SEALING EXISTING JOINTS	LF	2520
454 6008	HEADER TYPE EXPANSION JOINT	CF	22

ESTIMATED QUANTITIES CSJ: 0521-03-061			
ITEM NO.	DESCRIPTION	UNIT	QTY
454 6009	JOINT SEALANT	LF	2520
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	946
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	946
540 6001	MTL W-BEAM GD FEN (TIM POST)	LF	489
540 6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
542 6001	REMOVE METAL BEAM GUARD FENCE	LF	489
542 6002	REMOVE TERMINAL ANCHOR SECTION	EA	7
544 6001	GUARDRAIL END TREATMENT (INSTALL)	EA	6
544 6003	GUARDRAIL END TREATMENT (REMOVE)	EA	1
545 6005	CRASH CUSH ATTEN (REMOVE)	EA	1
545 6012	CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	EA	1
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	2339
3085 6001	UNDERSEAL COURSE	GAL	4068
4161 6001	STENCILING PERMANENT STRUCTURE NUMBERS	EA	1

INSTALL BLOCK SODDING EST @ 98 SY
8" BASE REPAIR EST @ 2613 SY
MOWSTRIP (4") EST @ 8 CY
INSTALL AND REMOVE SILT CONTROL FENCE EST @ 198 LF
REMOVE AND INSTALL MBGF EST @ 88 LF
REMOVE TAS 1 EA
INSTALL DAT 1 EA
EXIST CONCRETE BARRIER TO REMAIN
BEGIN 8" PVMT REPAIR STA 152+10.00
APPARENT ROW
MATCH LINE STA 151+00
12' 23' 14' 23' 12'
84' 42' 42'
165+00
APPARENT ROW
5" BASE REPAIR EST @ 729 SY
BEGIN 8" PVMT REPAIR STA 152+75.00
REMOVE AND INSTALL SGT 1 EA
INSTALL BLOCK SODDING EST @ 98 SY
TEST HOLE C-5 STA 153+70.97 O/S = 36.63' RT
MOWSTRIP (4") EST @ 8 CY
INSTALL AND REMOVE SILT CONTROL FENCE EST @ 194 LF
REMOVE AND INSTALL MBGF EST @ 88 LF
INSTALL CONC (RIPRAP) EST @ 2 CY
REMOVE CONC (RIPRAP) EST @ 8 SY
REMOVE TAS 1 EA
INSTALL SGT 1 EA
2" MILL AND OVERLAY EST @ 4858 SY
EXIST CONCRETE MEDIAN TO REMAIN
REMOVE AND REPLACE CRASH CUSHION 1 EA
INSTALL CONCRETE (RIPRAP) EST @ 2 CY
REMOVE CONCRETE (RIPRAP) EST @ 7 SY
REMOVE TAS 1 EA
INSTALL SGT 1 EA
BEGIN BRIDGE STA 155+30.00
TEST HOLE C-6 STA 155+77.55 O/S = 36.68' LT
℄ SL 13
SL 13
EXIST CONCRETE MEDIAN TO REMAIN
2" MILL AND OVERLAY EST @ 9993 SY
REMOVE TAS 1 EA
INSTALL SGT 1 EA
REMOVE CONCRETE (RIPRAP) EST @ 8 SY
INSTALL CONCRETE (RIPRAP) EST @ 2 CY
END BRIDGE STA 167+84.00
INSTALL AND REMOVE SILT CONTROL FENCE EST @ 276 LF
TEST HOLE C-8 STA 166+74.28 O/S = 37.29 LT
PC 166+32.77
REMOVE AND INSTALL MBGF EST @ 163 LF
MOWSTRIP (4") EST @ 12 CY
INSTALL AND REMOVE SILT CONTROL FENCE EST @ 278 LF
INSTALL CONCRETE (RIPRAP) EST @ 2 CY
REMOVE CONCRETE (RIPRAP) EST @ 8 SY
REMOVE TAS 1 EA
INSTALL SGT 1 EA
MOWSTRIP (4") EST @ 11 CY
INSTALL BLOCK SODDING EST @ 137 SY
REMOVE AND INSTALL MBGF EST @ 150 LF
REMOVE TAS 1 EA
INSTALL SGT 1 EA
8" BASE REPAIR EST @ 5572 SY
℄ SL 13
WW MANHOLE TO REMAIN STA 173+22.70 O/S = 27.56' LT
MATCH LINE STA 175+00
35' 14' 35'
170+00
REMOVE TAS 1 EA
INSTALL DAT 1 EA
INSTALL BLOCK SODDING EST @ 141 SY
TEST HOLE C-10 STA 172+28.75 O/S = 35.76' RT
CL_SL13-2
MATCH LINE STA 163+00
APPARENT ROW
APPARENT UPRR ROW
U.P.R.R.
LEON CREEK TRIBUTARY C
160+00
TEST HOLE C-7 STA 160+81.89 O/S = 31.35' RT
MATCH LINE STA 163+00

LEGEND:
- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- 2" MILL AND OVERLAY
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SILT CONTROL FENCE
- 5" BASE REPAIR (ITEM 351)
- 8" BASE REPAIR (ITEM 351)
- 4" CONC RIPRAP
- BRUSH CLEARNING
- SODDING AREA

0 50 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER
11/17/2021

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NO.	REVISION	BY	DATE

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100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

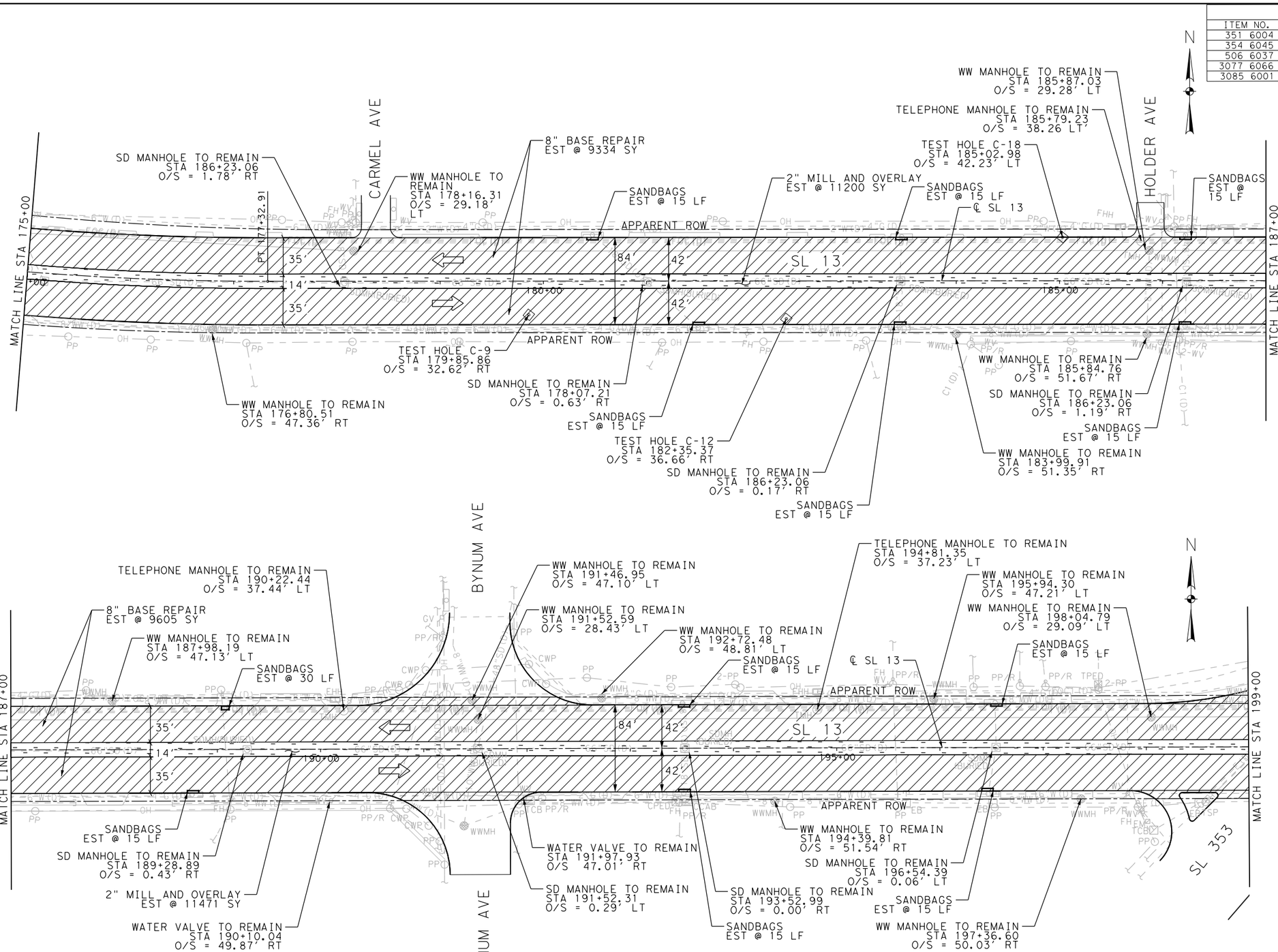
SL 13

ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 3 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		72
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

	ESTIMATED QUANTITIES CSJ: 0521-03-061		
ITEM NO.	DESCRIPTION	UNIT	QTY
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	18939
354 6045	PLANE ASPH CONC PAV (2")	SY	22671
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	195
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	2608
3085 6001	UNDERSEAL COURSE	GAL	4535



LEGEND:

- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- 2" MILL AND OVERLAY
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SCF SILT CONTROL FENCE
- 5" BASE REPAIR (ITEM 351)
- 8" BASE REPAIR (ITEM 351)
- 4" CONC RIPRAP
- BRUSH CLEARNING
- SODDING AREA

0 50 100 150

SCALE IN FEET

SCALE: HOR: 1" = 100'

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SL 13

ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 4 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		73
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

TXDOT*MON*PENTABLE - COMBINED*95%.tbl dn3891
DATE:11/17/2021 TIME:12:23:18 PMOFFICE:SAN
PDF*2D*MON*HW*MR*300.plt
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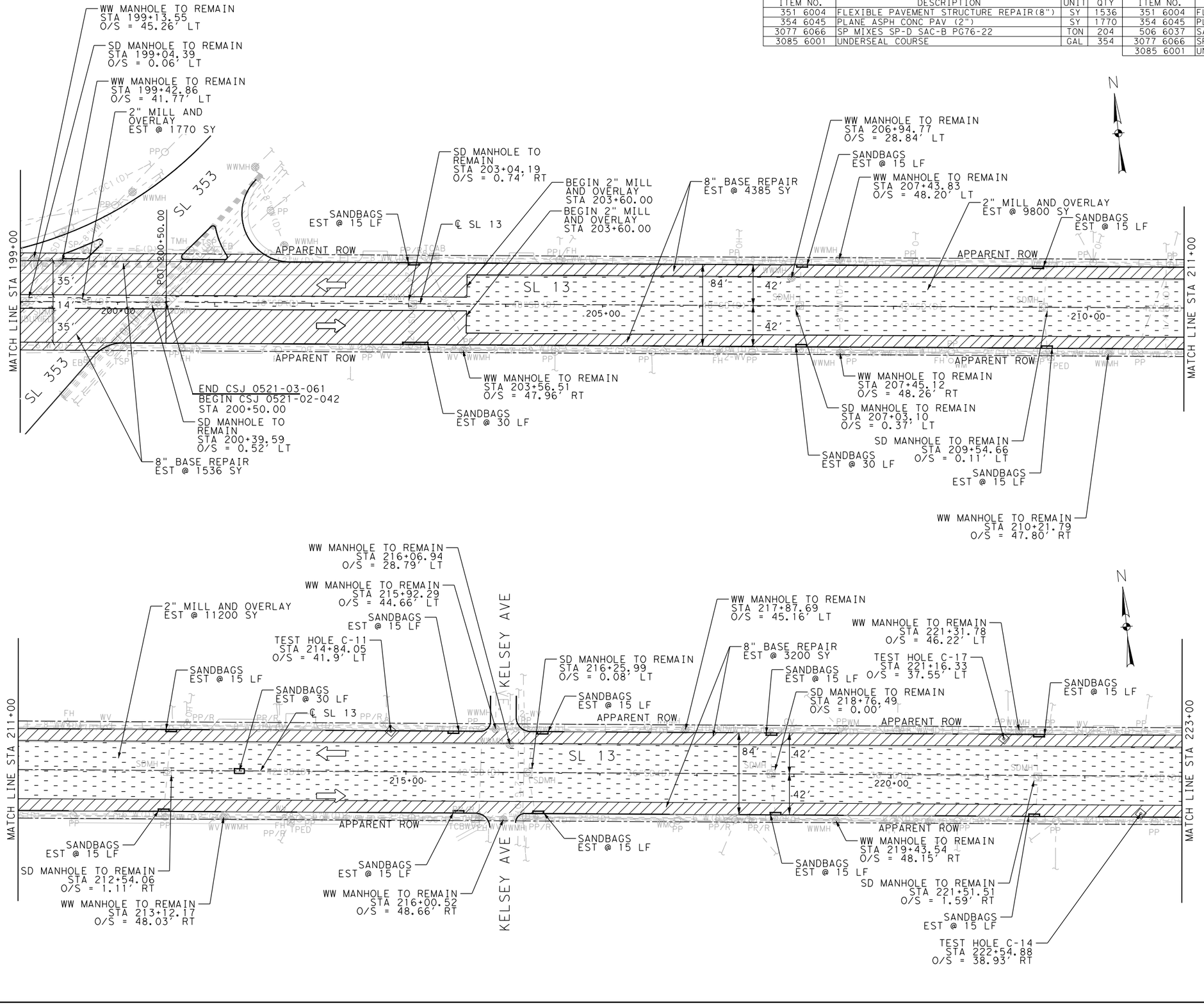
ESTIMATED QUANTITIES CSJ: 0521-03-061			
ITEM NO.	DESCRIPTION	UNIT	QTY
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	1536
354 6045	PLANE ASPH CONC PAV (2")	SY	1770
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	204
3085 6001	UNDERSEAL COURSE	GAL	354

ESTIMATED QUANTITIES CSJ: 0521-02-042			
ITEM NO.	DESCRIPTION	UNIT	QTY
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	7585
354 6045	PLANE ASPH CONC PAV (2")	SY	21000
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	285
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	2415
3085 6001	UNDERSEAL COURSE	GAL	4200



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Texas Department of Transportation®

SL 13

ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 5 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		74
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

TXDOT*MON*PENTABLE - COMBINED*95%.tbl
DATE:11/17/2021 TIME:12:23:19 PMOFFICE:SAN
dn3891
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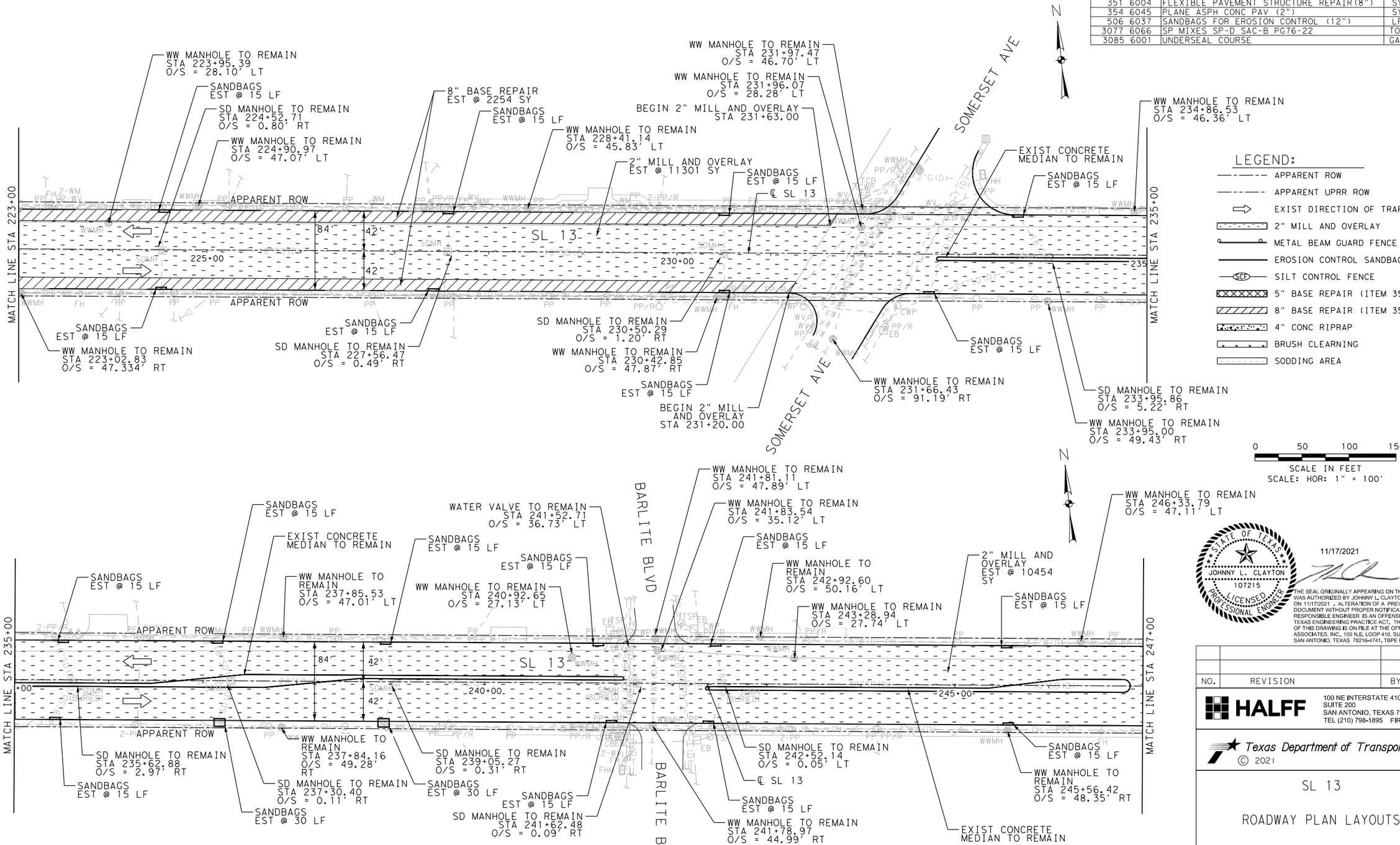
	ESTIMATED QUANTITIES CSJ: 0521-02-042		
ITEM NO.	DESCRIPTION	UNIT	QTY
316 6009	ASPH (A-R TYPE II OR III)	GAL	5876
316 6431	AGGR (TY-PB GR-4)	CY	107
351 6004	FLEXIBLE PAVEMENT STRUCTURE REPAIR(8")	SY	2254
354 6045	PLANE ASPH CONC PAV (2")	SY	21754
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	330
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	2502
3085 6001	UNDERSEAL COURSE	GAL	1680



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SAN ANTONIO, TEXAS 78216
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ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 6 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		75
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

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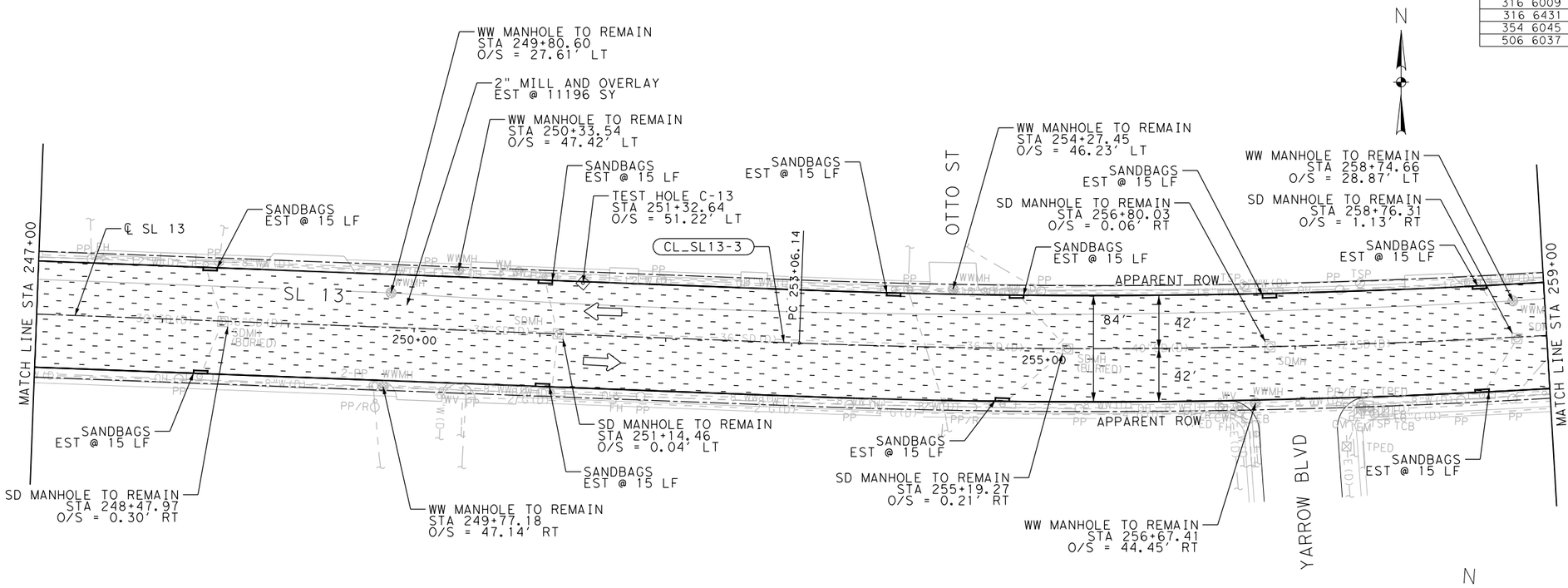
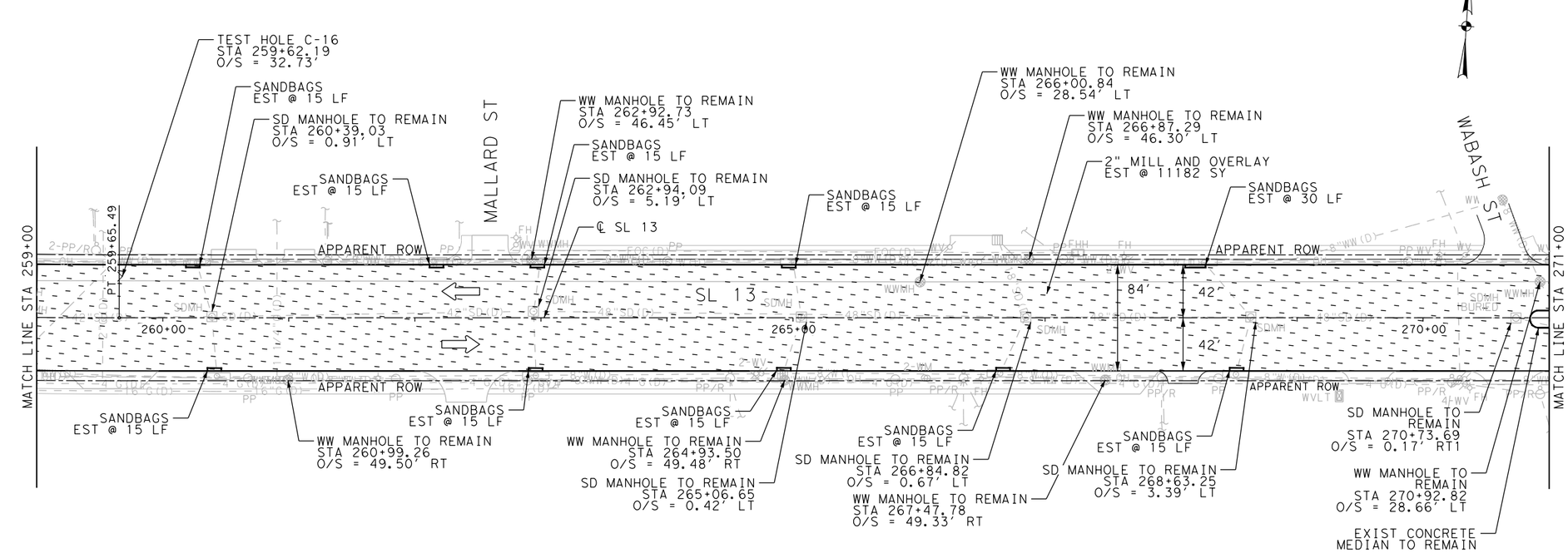
ESTIMATED QUANTITIES CSJ: 0521-02-042			
ITEM NO.	DESCRIPTION	UNIT	QTY
316 6009	ASPH (A-R TYPE II OR III)	GAL	9846
316 6431	AGGR (TY-PB GR-4)	CY	180
354 6045	PLANE ASPH CONC PAV (2")	SY	22376
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	315





LEGEND:

- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- 2" MILL AND OVERLAY
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SCF SILT CONTROL FENCE
- 5" BASE REPAIR (ITEM 351)
- 8" BASE REPAIR (ITEM 351)
- 4" CONC RIPRAP
- BRUSH CLEARNING
- SODDING AREA

0 50 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

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SL 13

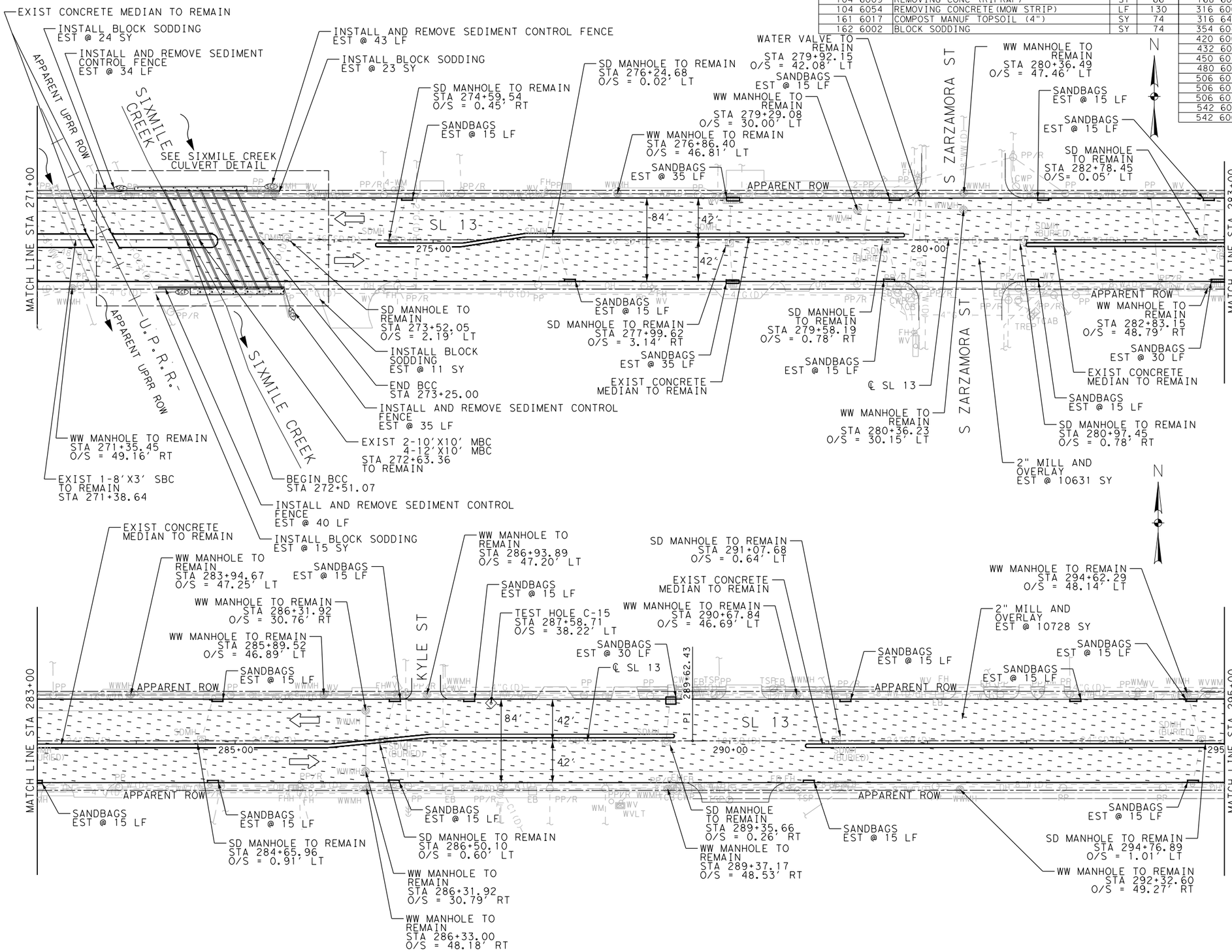
ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 7 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		76
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

ESTIMATED QUANTITIES CSJ: 0521-02-042			
ITEM NO.	DESCRIPTION	UNIT	QTY
104 6009	REMOVING CONC (RIPRAP)	SY	66
104 6054	REMOVING CONCRETE(MOW STRIP)	LF	130
161 6017	COMPOST MANUF TOPSOIL (4")	SY	74
162 6002	BLOCK SODDING	SY	74

ESTIMATED QUANTITIES CSJ: 0521-02-042			
ITEM NO.	DESCRIPTION	UNIT	QTY
168 6001	VEGETATIVE WATERING	MG	2
316 6009	ASPH (A-R TYPE II OR III)	GAL	9398
316 6431	AGGR (TY-PB GR-4)	CY	171
354 6045	PLANE ASPH CONC PAV (2")	SY	21359
420 6066	CL C CONC (RAIL FOUNDATION)	CY	40
432 6001	RIPRAP (CONC)(4 IN)	CY	15
450 6030	RAIL (TY C221)	LF	256
480 6001	CLEAN EXIST CULVERTS	EA	2
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	400
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	152
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	152
542 6001	REMOVE METAL BEAM GUARD FENCE	LF	290
542 6002	REMOVE TERMINAL ANCHOR SECTION	EA	2



LEGEND:

- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- 2" MILL AND OVERLAY
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SILT CONTROL FENCE
- 5" BASE REPAIR (ITEM 351)
- 8" BASE REPAIR (ITEM 351)
- 4" CONC RIPRAP
- BRUSH CLEARNING
- SODDING AREA

0 50 100 150
SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED
PROFESSIONAL ENGINEER

11/17/2021

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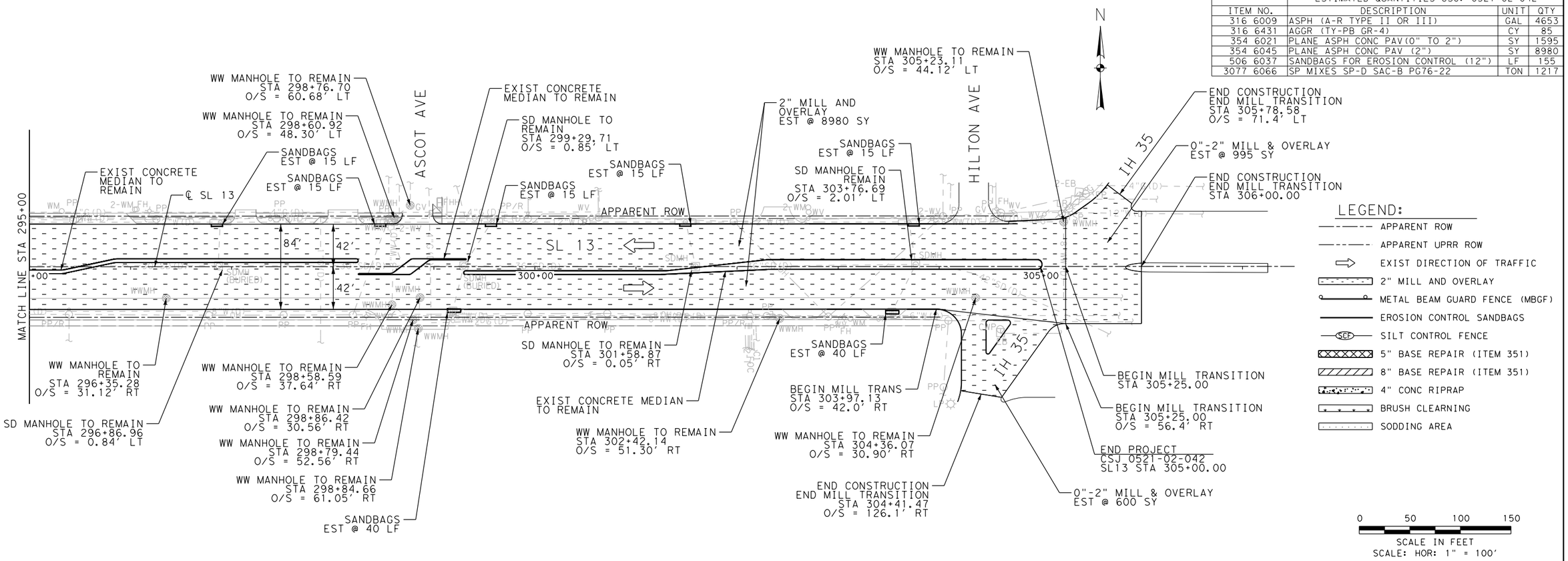
SL 13

ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 8 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		77
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

	ESTIMATED QUANTITIES CSJ: 0521-02-042		
ITEM NO.	DESCRIPTION	UNIT	QTY
316 6009	ASPH (A-R TYPE II OR III)	GAL	4653
316 6431	AGGR (TY-PB GR-4)	CY	85
354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	1595
354 6045	PLANE ASPH CONC PAV (2")	SY	8980
506 6037	SANDBAGS FOR EROSION CONTROL (12")	LF	155
3077 6066	SP MIXES SP-D SAC-B PG76-22	TON	1217



STATE OF TEXAS
JOHNNY L. CLAYTON
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11/24/2021

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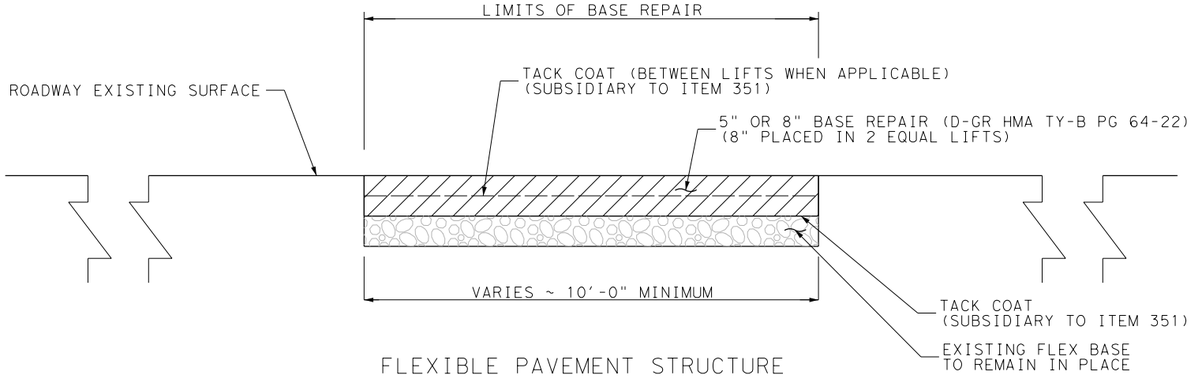
SL 13

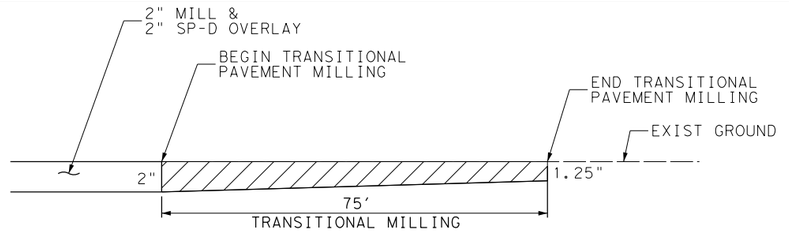
ROADWAY PLAN LAYOUTS

SCALE: H: 1"=100' SHEET 9 OF 9

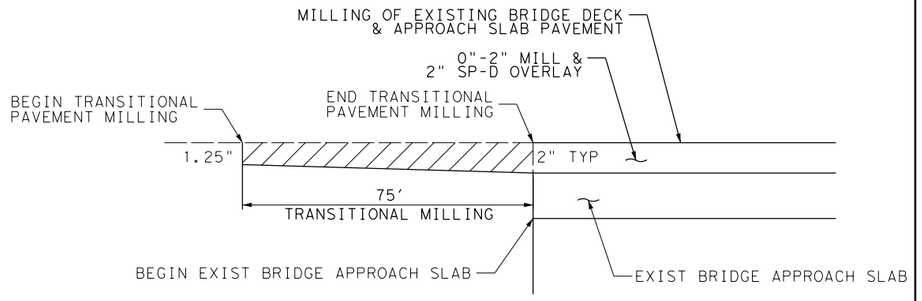
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		78
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



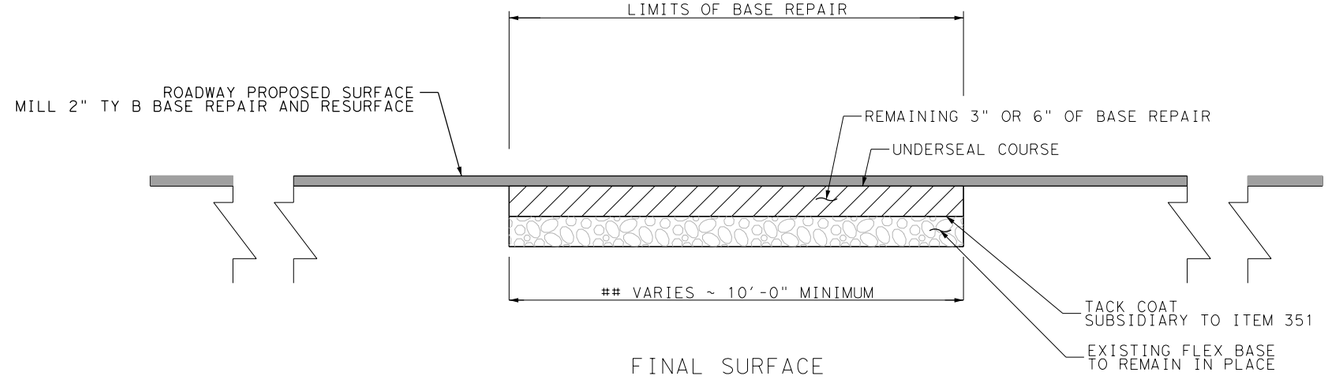
FLEXIBLE PAVEMENT STRUCTURE
REPAIR PRIOR TO FINAL SURFACE
TYPICAL SECTION



MILLING & OVERLAY
TRANSTION DETAIL



MILLING AND OVERLAY TRANSTION
TO EXIST. BRIDGE



FINAL SURFACE
OVER PAVEMENT REPAIR
TYPICAL SECTION

NOTES:

1. TACK COAT REQUIRED BETWEEN LIFTS OF HMA.
2. THE TYPICAL REPAIR DIMENSION SHALL BE A MINIMUM WIDTH OF 10 FT AND A MINIMUM LENGTH OF 20 FT. THESE DIMENSIONS MAY DIFFER BASED UPON THE AREA THAT IS IN NEED OF REPAIR.
3. THE USE OF A ROTOMILL WILL BE USED FOR THE REMOVAL OF THE EXISTING PAVEMENT STRUCTURE AND SHALL BE SUBSIDIARY TO ITEM 351, "FLEXIBLE PAVEMENT STRUCTURE REPAIR."
4. ACP (TY B) (BASE) SHALL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO ITEM 351.
5. THE REPAIR LOCATIONS AND THE SIZE OF EACH LOCATION IS SUBJECT TO CHANGE AS DIRECTED BY THE ENGINEER.
6. BLADE LAYING OF ASPHALT PAVEMENT NOT ALLOWED WITHOUT PRIOR APPROVAL FROM ENGINEER.

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SL 13

PAVEMENT REPAIR
DETAIL

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		79
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

TXDOT*MON*PENTABLE - COMBINED*95%.tbl
DATE:11/24/2021 TIME:8:06:24 AM OFFICE:SAN dn2600
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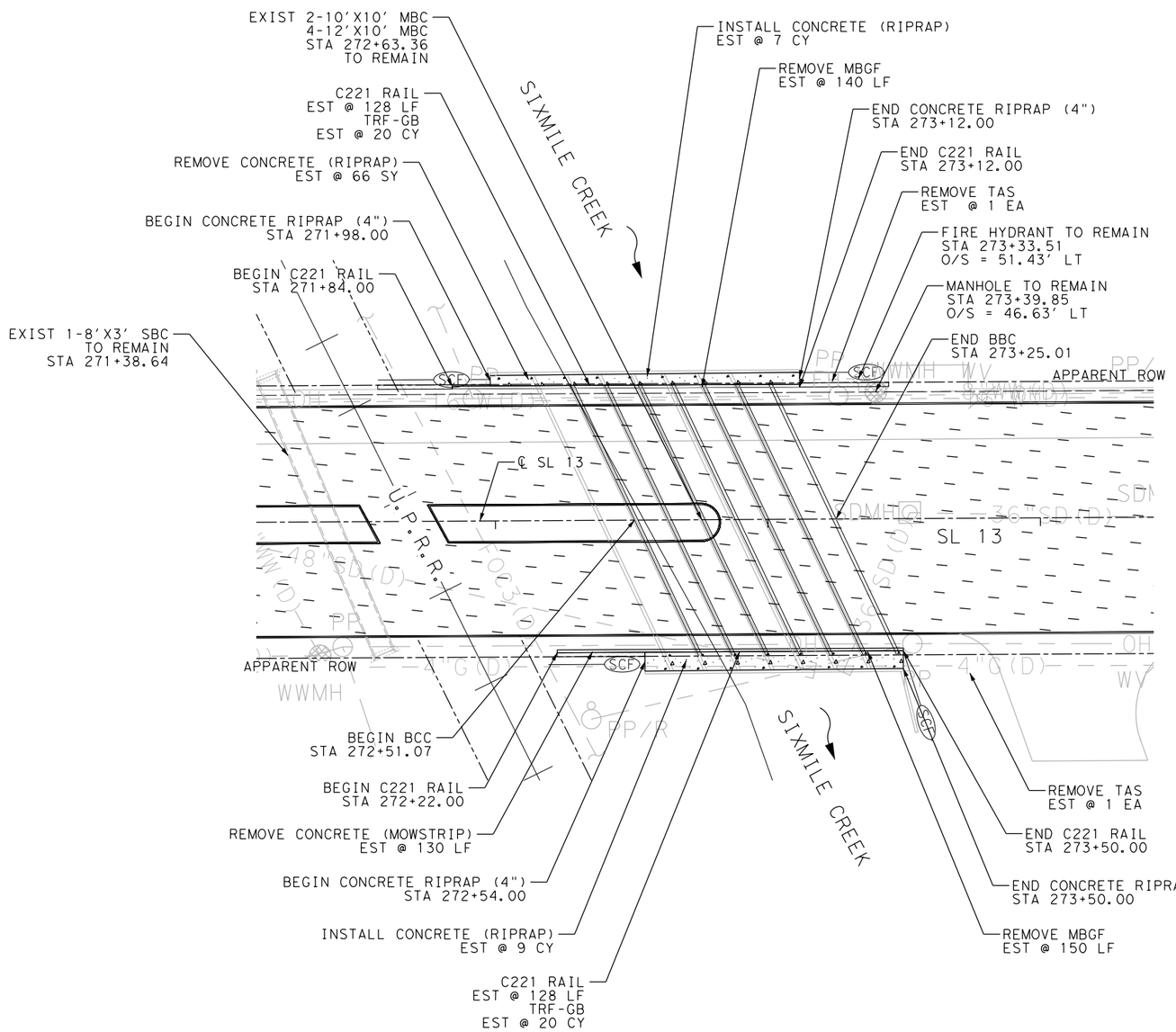

N

LEGEND:

- APPARENT ROW
- APPARENT UPRR ROW
- EXIST DIRECTION OF TRAFFIC
- MILL AND OVERLAY
- 8" BASE REPAIR
- METAL BEAM GUARD FENCE (MBGF)
- EROSION CONTROL SANDBAGS
- SODDING AREA
- SCF SEDIMENT CONTROL FENCE

NOTES:

1. ALL ITEMS PAID FOR ON ROADWAY PLAN LAYOUTS

0 25 50 75

SCALE IN FEET
SCALE: 1"=50'

STATE OF TEXAS
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SL 13

SIXMILE CREEK
CULVERT DETAIL

SCALE: 1"=50' SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		80
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

TXDOT*MON*PENTABLE - COMBINED*95%.tbl
DATE:11/17/2021 TIME:12:23:25 PMOFFICE:SAN
gn3891
PDF*2D*MON*HW*MR*300.plt
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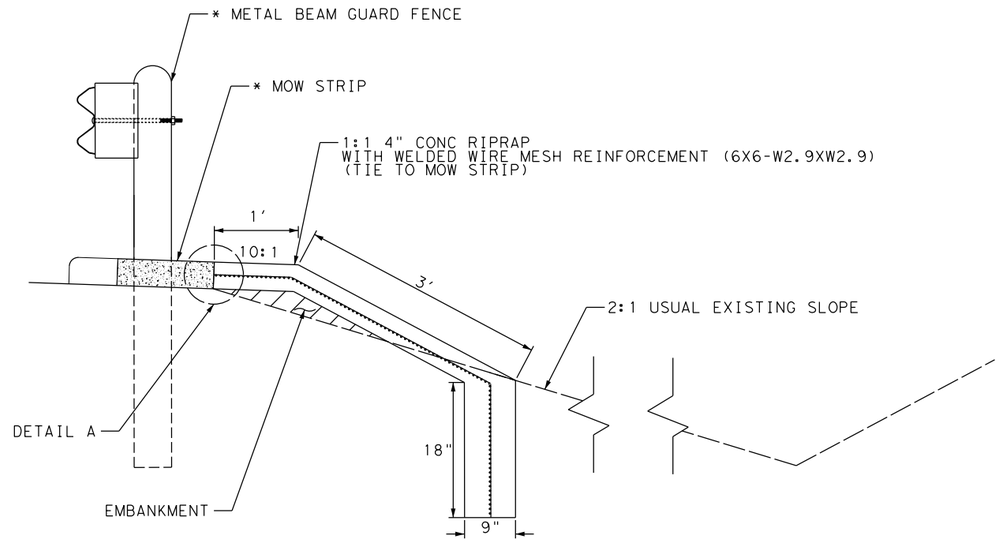
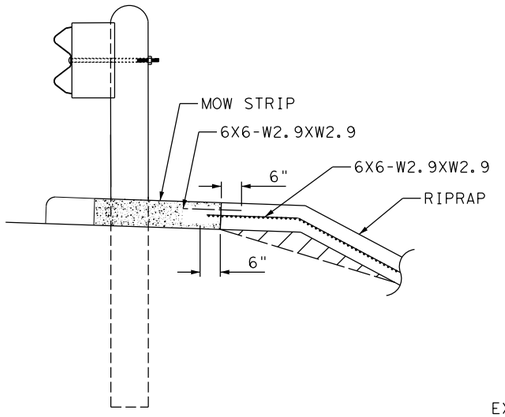
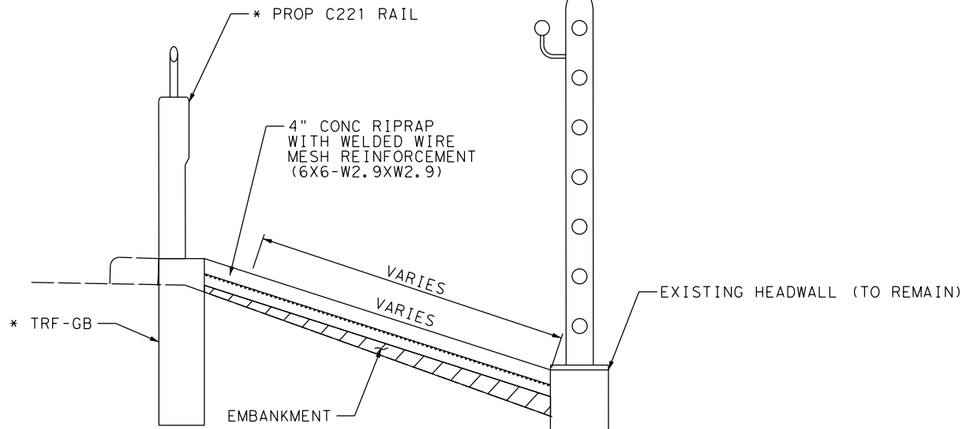
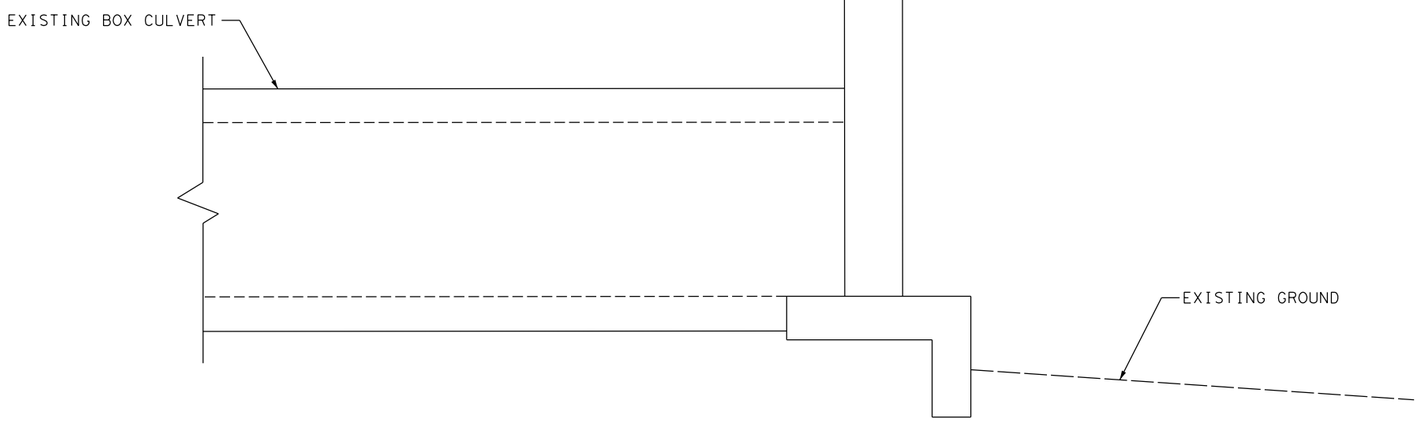




DETAIL A
N.T.S.





RIPRAP (MOW STRIP) DETAIL

LEGEND:

EMBANKMENT

NOTES:

* SEE APPLICABLE STANDARD FOR MORE DETAILS.
1. SEE PLAN LAYOUT SHEETS FOR QUANTITIES.
2. EMBANKMENT IS SUBSIDIARY TO CONCRETE RIPRAP.

STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

11/17/2021

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100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
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SL 13

RIPRAP (MOW STRIP)
REPAIR DETAIL

SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		81
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE: 11/17/2021
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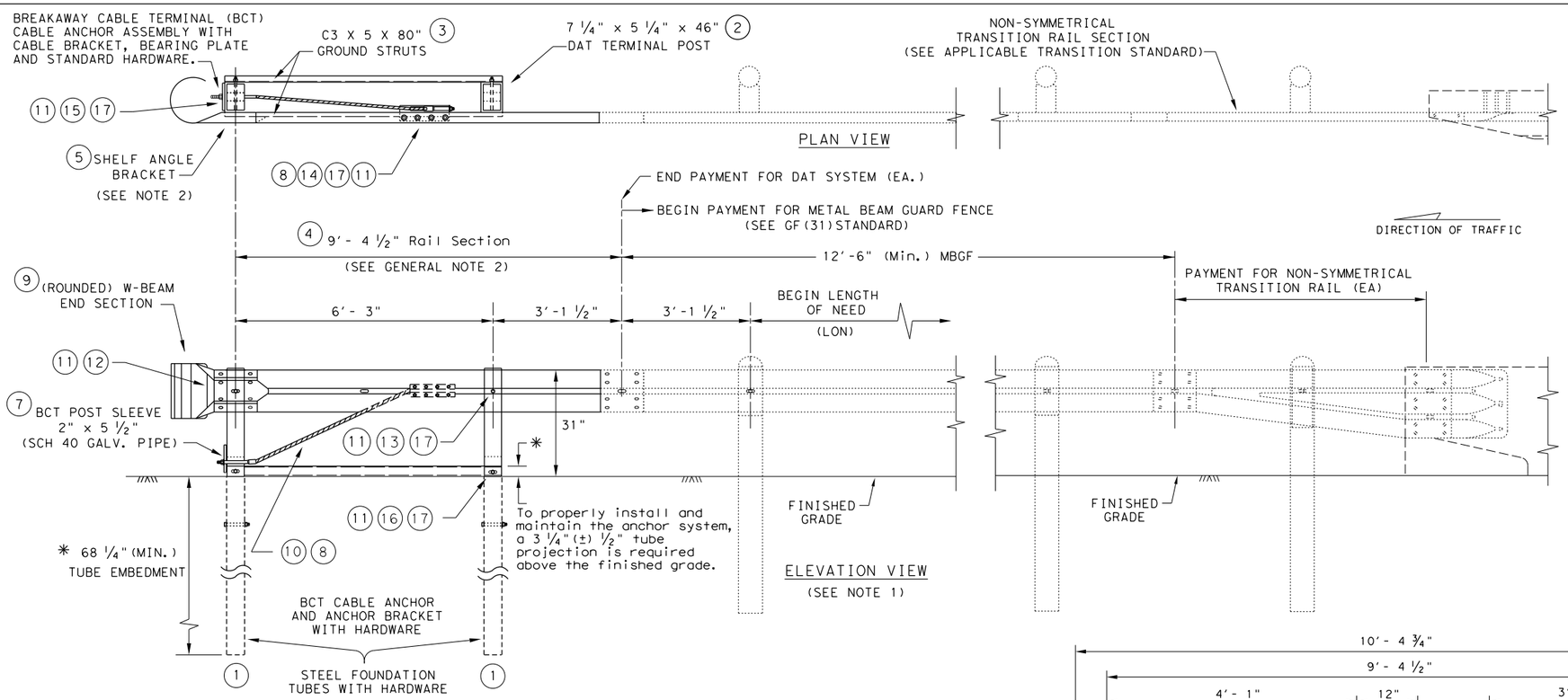


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

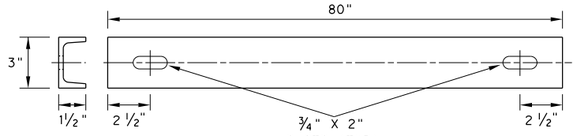
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

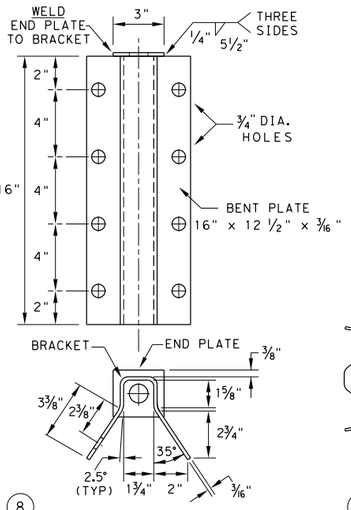
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

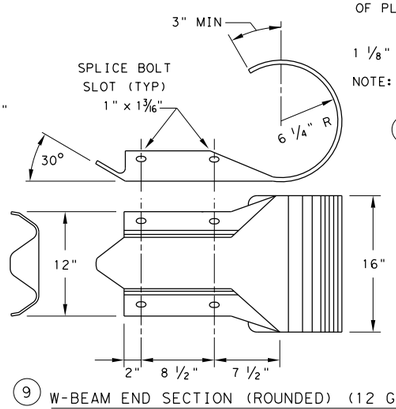
(4) TERMINAL RAIL ELEMENT FOR DAT



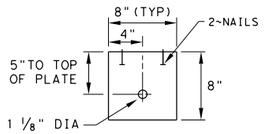
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

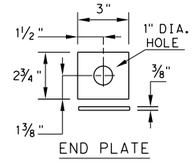


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

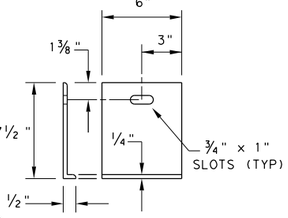


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

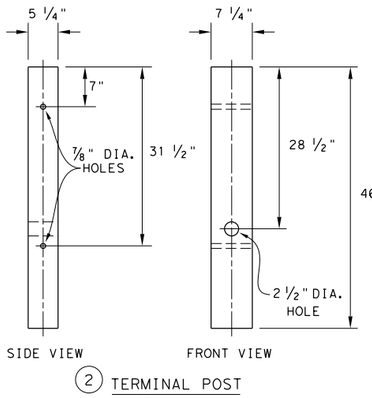
(6) BEARING PLATE
8"x 8"x 5/8" R



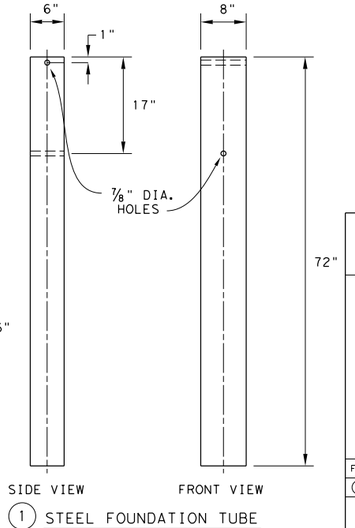
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY	
	0521	02	042	SL 13	
	DIST	COUNTY		SHEET NO.	
	SAN	BEXAR		82	

DATE: 11/17/2021
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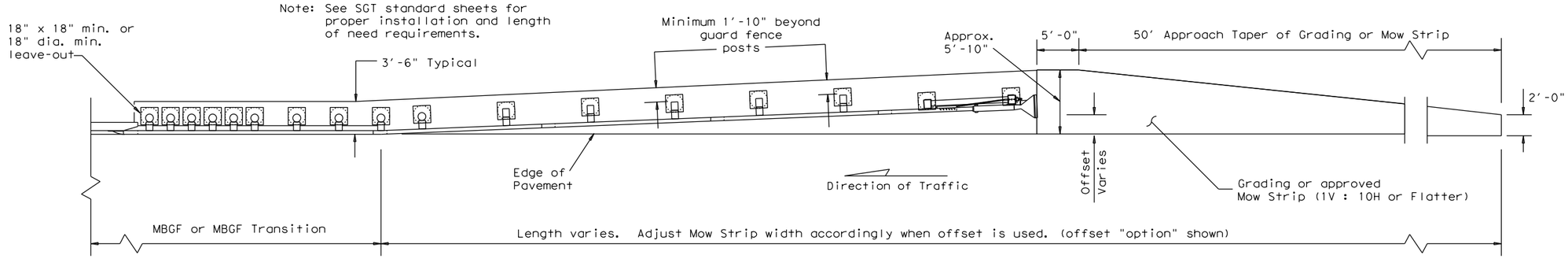
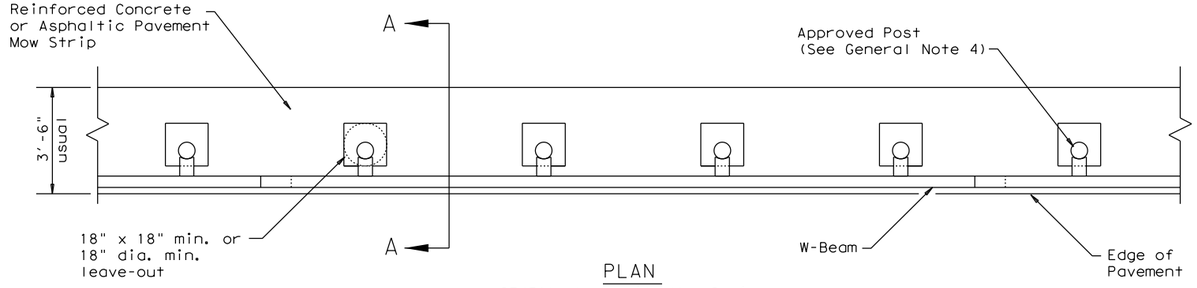
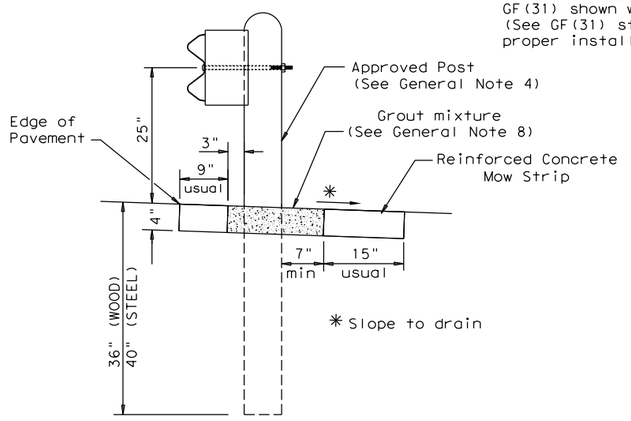


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



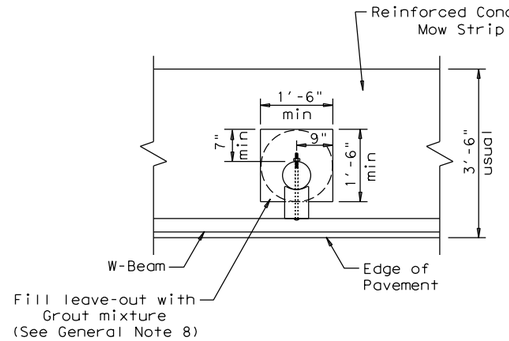
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



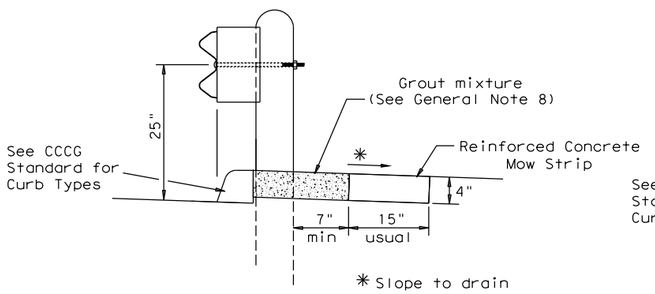
SECTION A-A

Typical



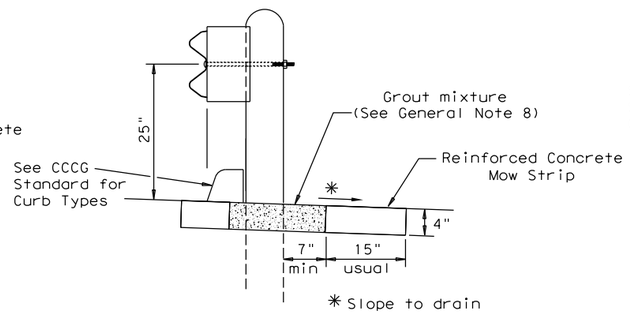
MOW STRIP DETAIL

Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.



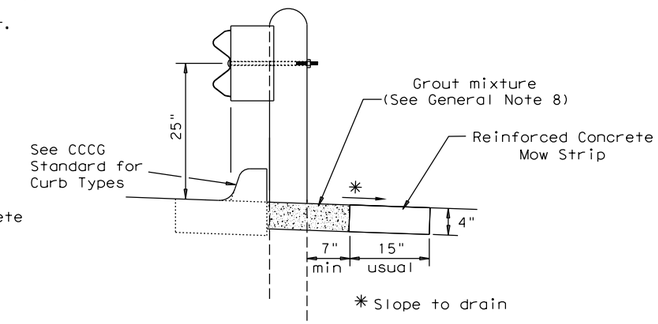
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0521	02	042	SL 13	
	DIST	COUNTY		SHEET NO.	
	SAN	BEXAR		83	

DATE: 11/17/2021
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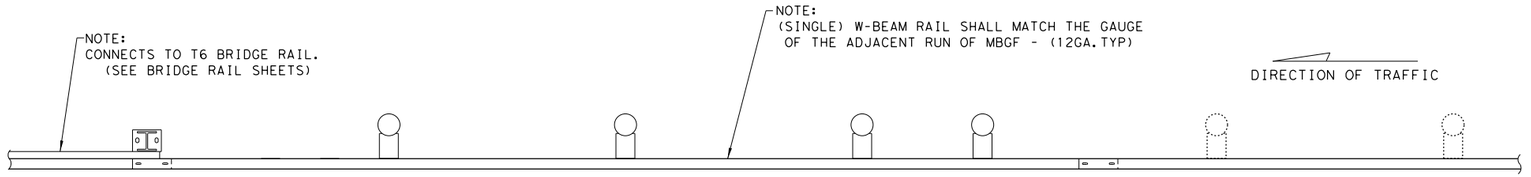
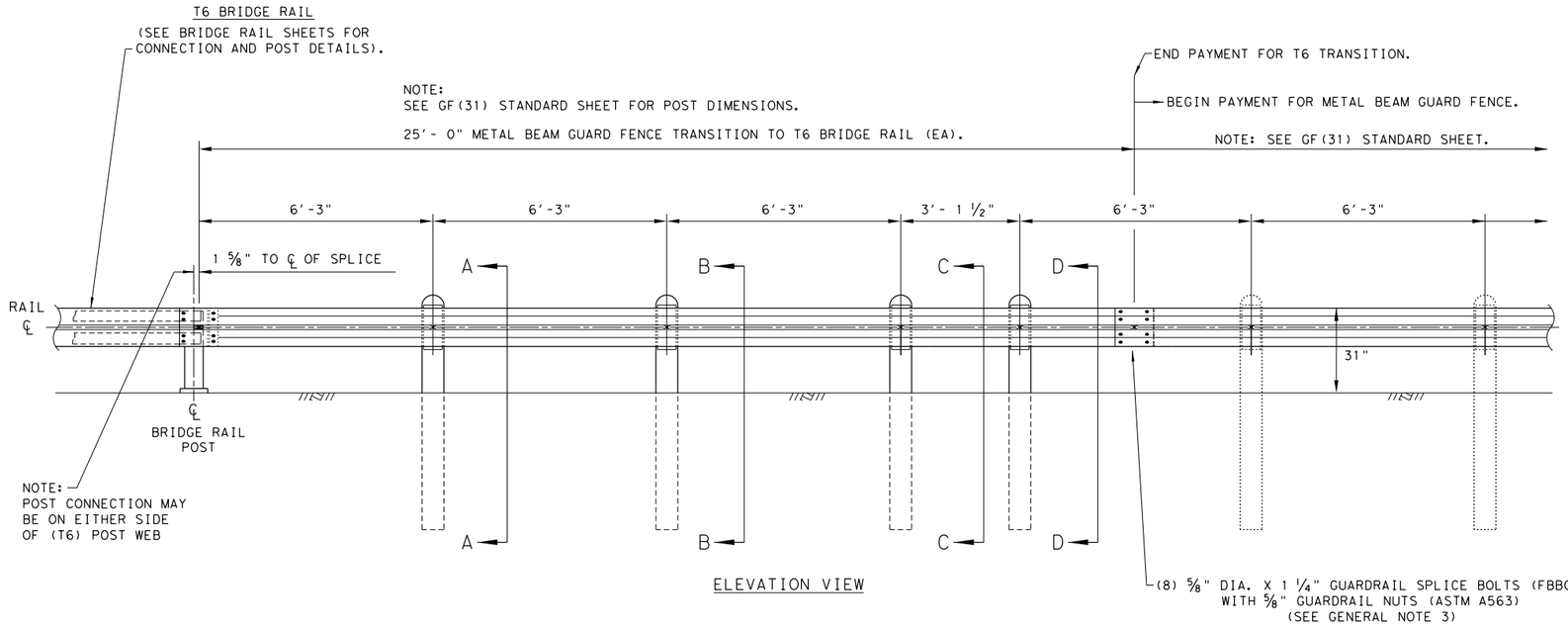


PLAN VIEW

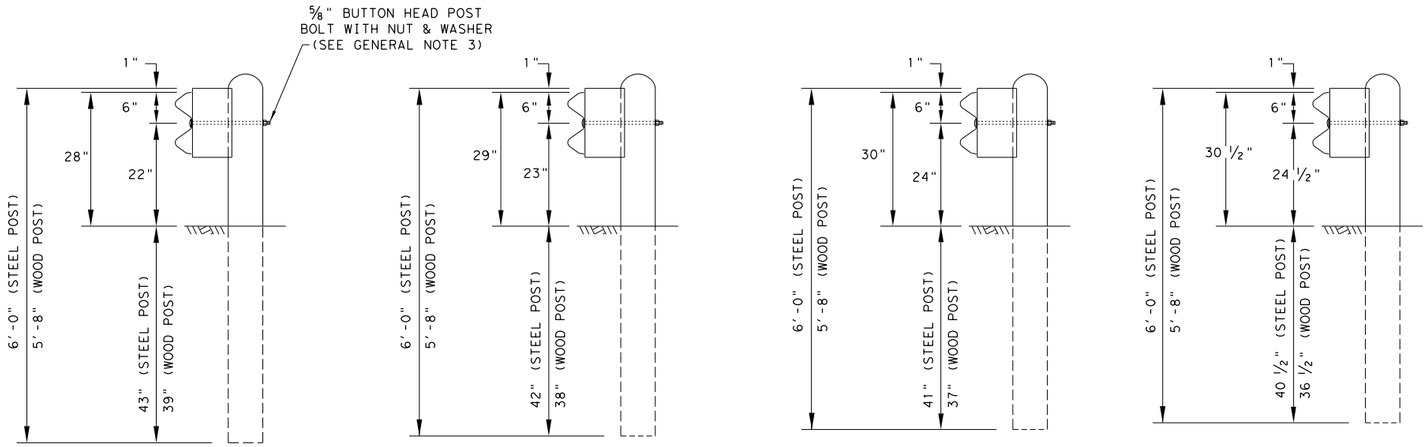


ELEVATION VIEW

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'- 1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307 GR.A) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1- 1/4" WITH 5/8" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. WHERE SOLID ROCK IS ENCOUNTERED. CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO STANDARD GF(31) & APPLICABLE BRIDGE RAILING STANDARD FOR ADDITIONAL DETAILS.

* "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



SECTION A-A | SECTION B-B | SECTION C-C | SECTION D-D

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE TRANSITION (T6)

GF(31)T6-19

FILE: gf31t619.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0521	02	042	SL 13	
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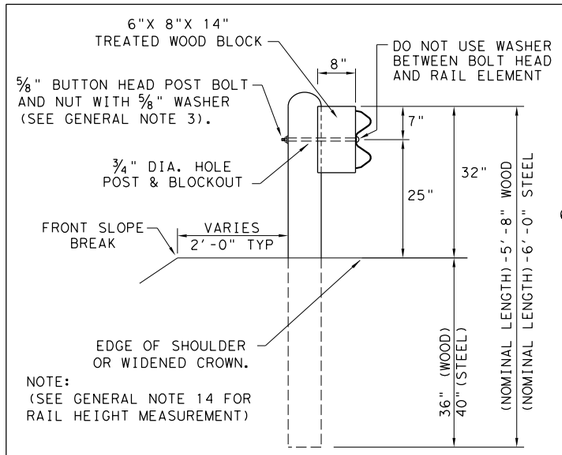
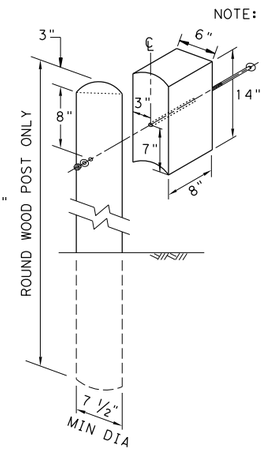
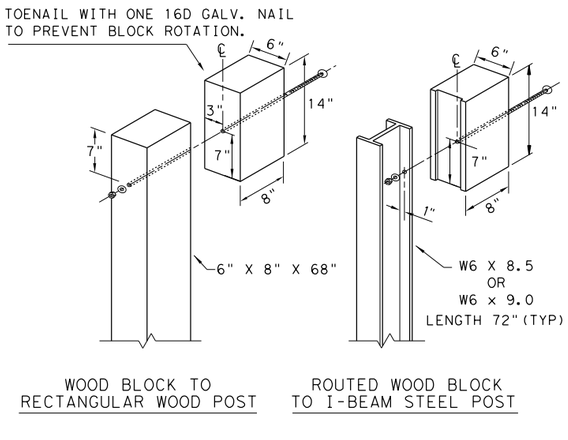


TYPICAL POST PLACEMENT



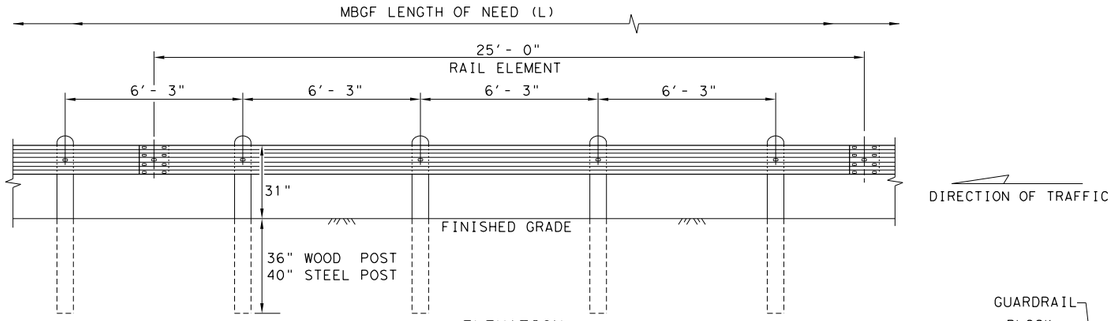
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

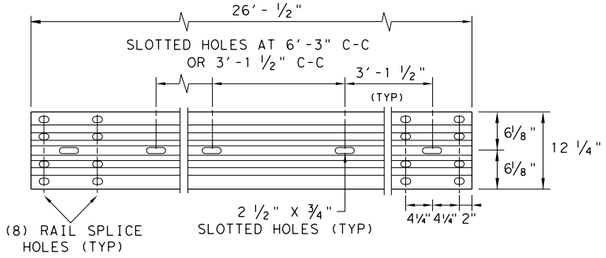
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



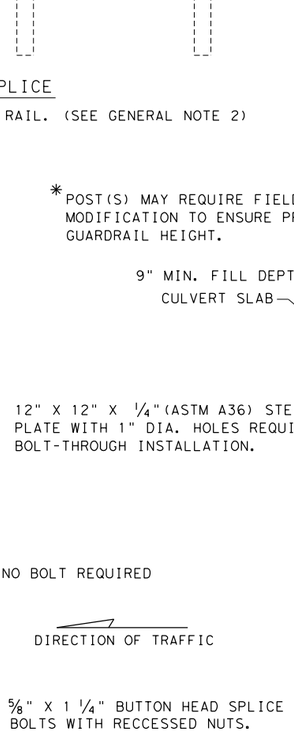
ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.



RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES

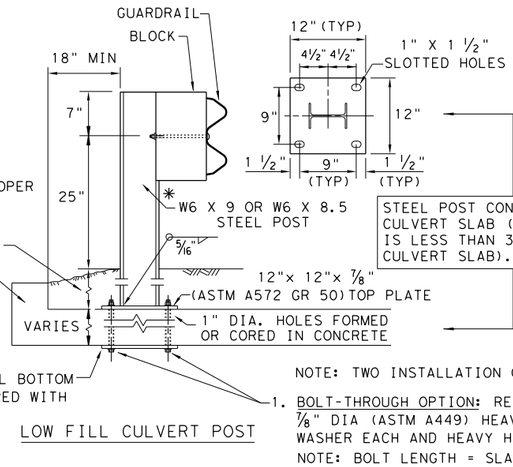
FBB01 = 1 ¼"
FBB02 = 2"
FBB03 = 10"
FBB04 = 18"

⅝"

POST & BLOCK LENGTH

BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



LOW FILL CULVERT POST

* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

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

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		85

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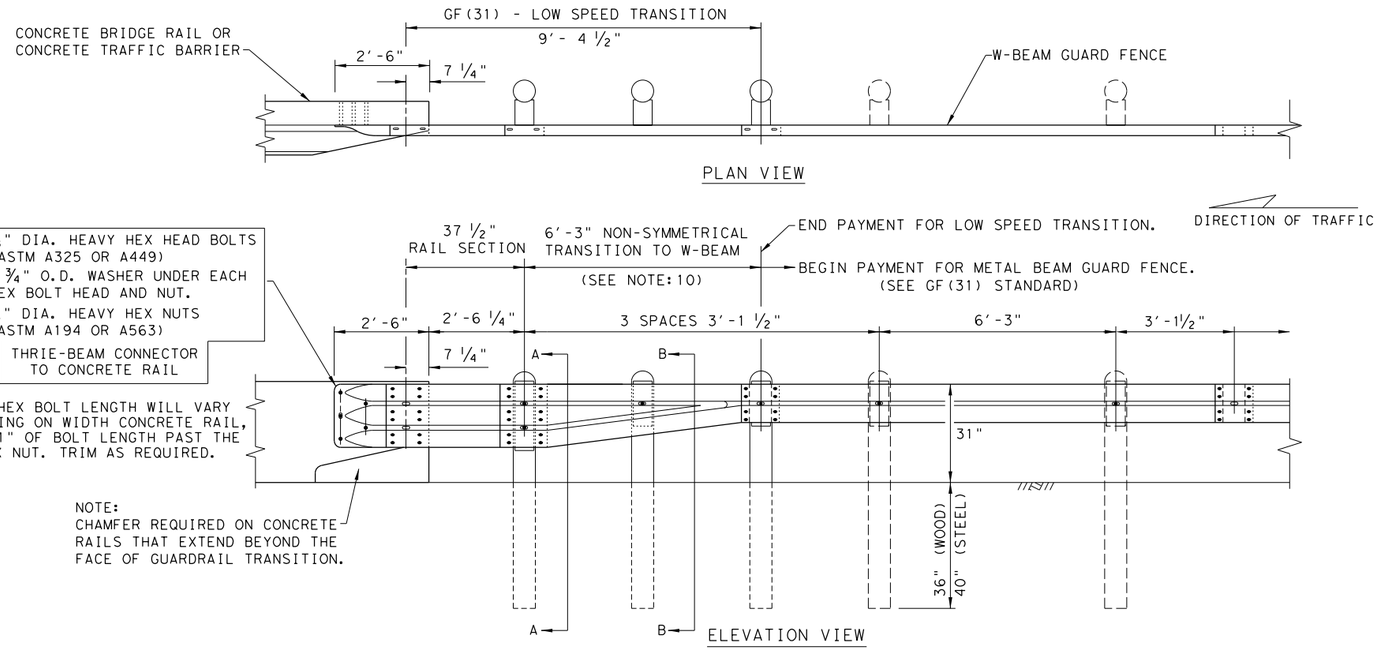
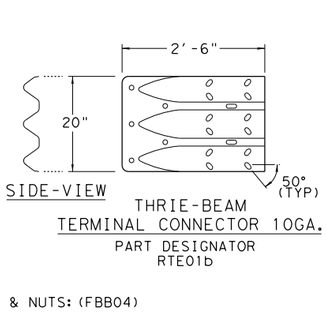
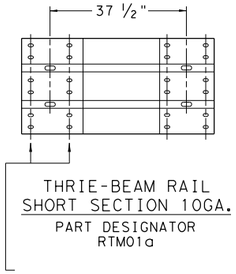
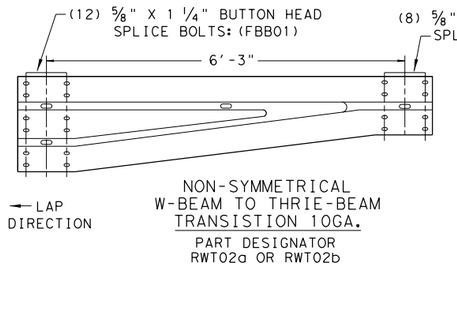


GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a)AND NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT, MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE TRANSITION.







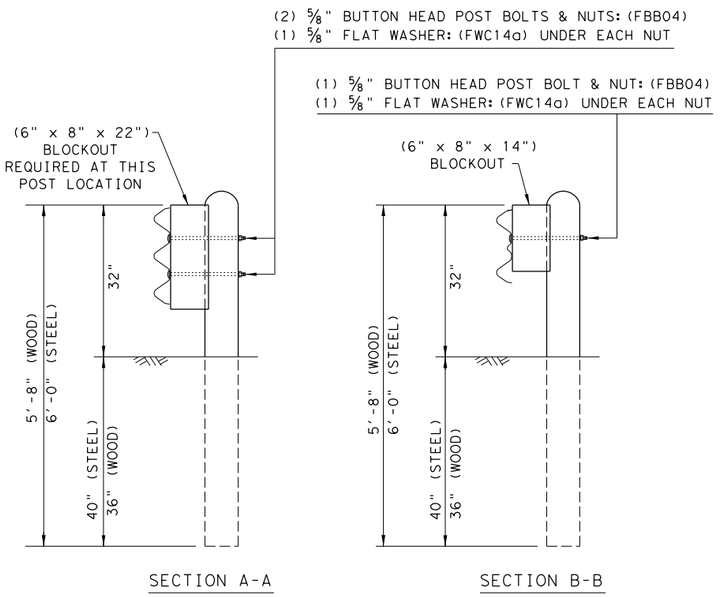
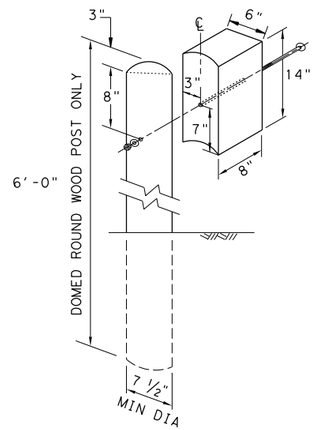
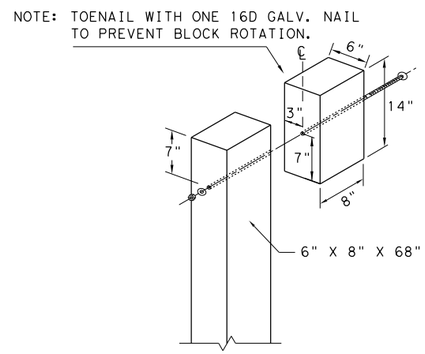
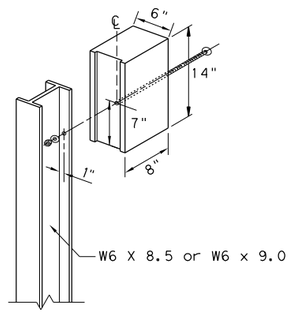


PLATE WASHER INSTRUCTIONS

BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.







NOTE: * "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

LOW-SPEED TRANSITION

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

GF(31)TR TL2-19

FILE: gf31tr-tl219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
	SAN	BEXAR		86	

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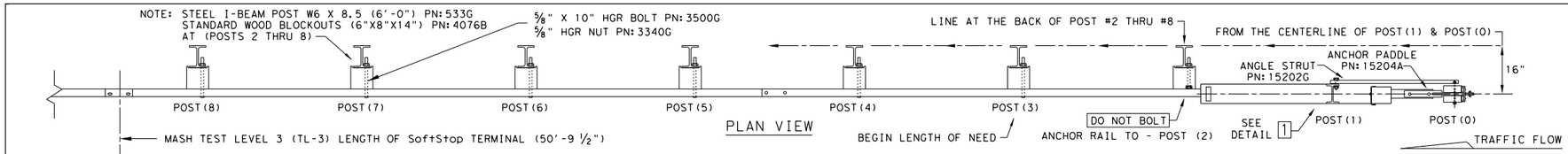
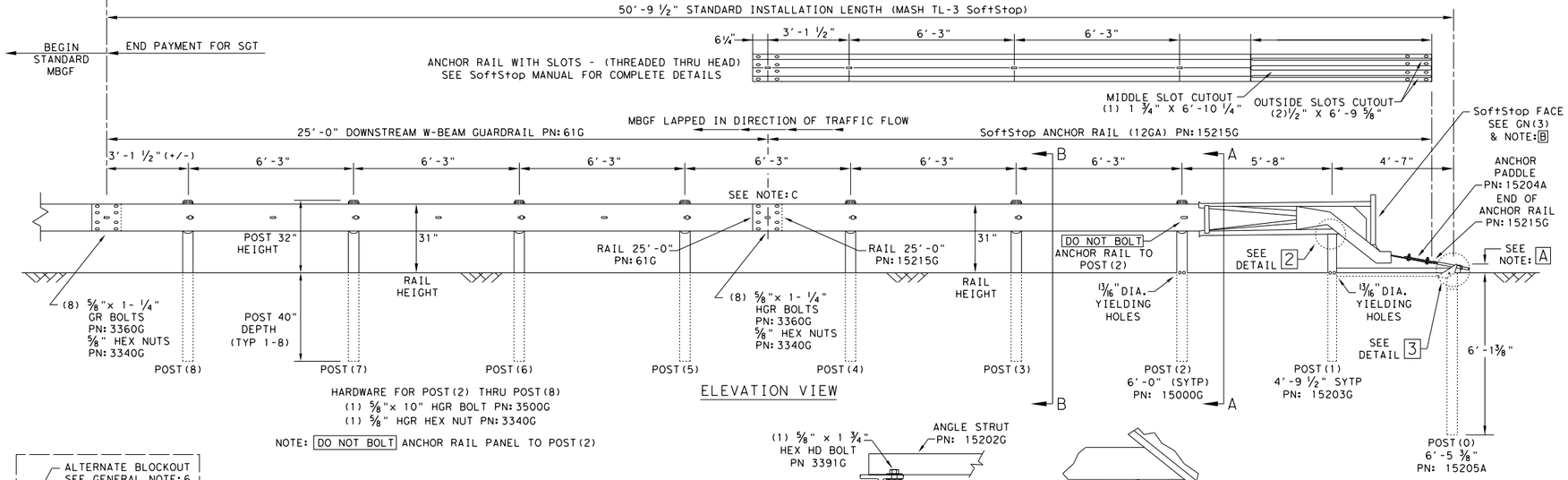
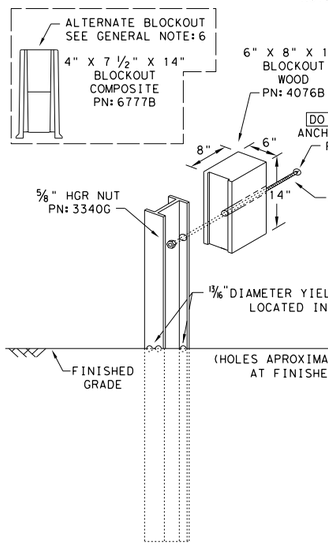
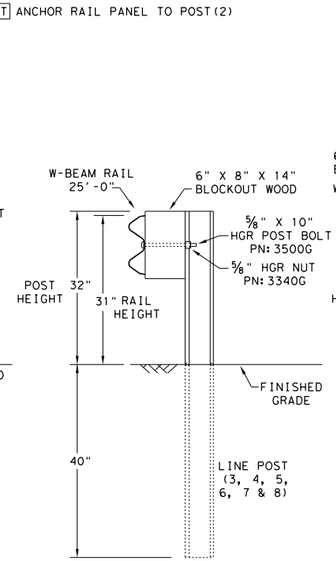


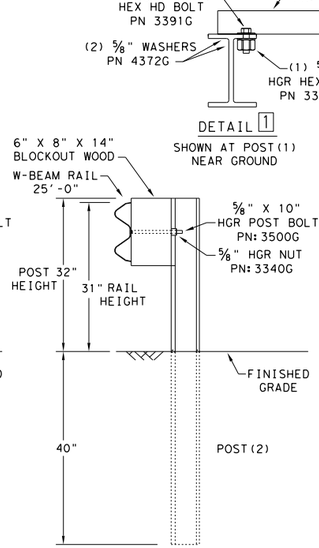




ISOMETRIC VIEW
POST(1 & 2)
W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT
NOTE: NO BLOCKOUT INSTALLED AT POST(1)

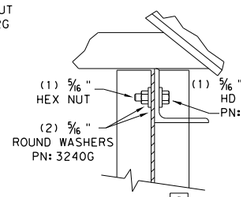


SECTION VIEW B-B
6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G



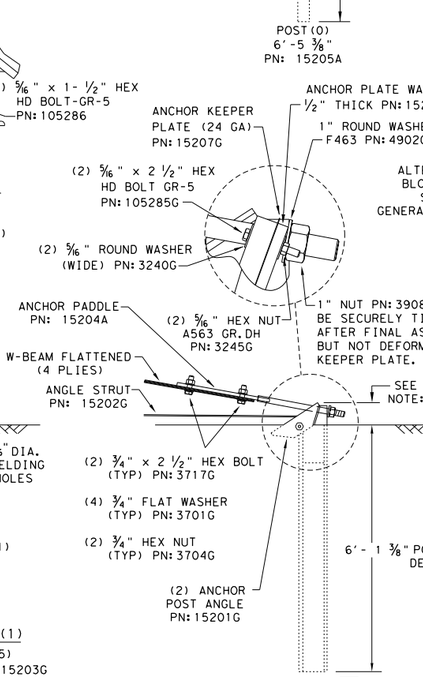
SECTION VIEW A-A
6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G
NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

DETAIL 1
SHOWN AT POST(1) NEAR GROUND



DETAIL 2
SHOWN AT POST(1)

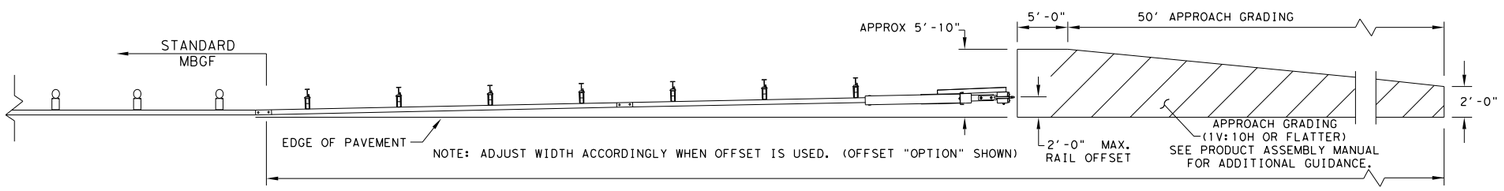
FRONT VIEW POST(1)
4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G
NOTE: NO BLOCKOUT INSTALLED AT POST(1)



DETAIL 3
AT POST(0)
6'-5 ⅜" (W6 X 15)
I-BEAM POST PN: 15205A

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

TRAFFIC FLOW



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SoftStop END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP		
©TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
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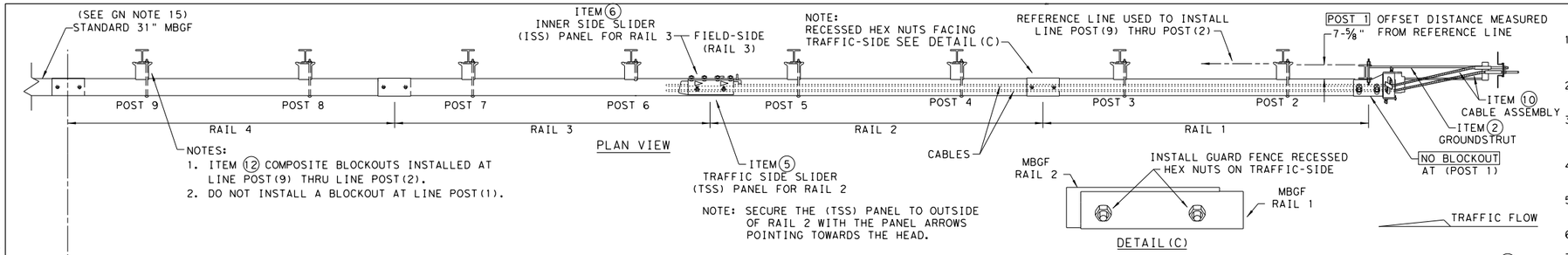
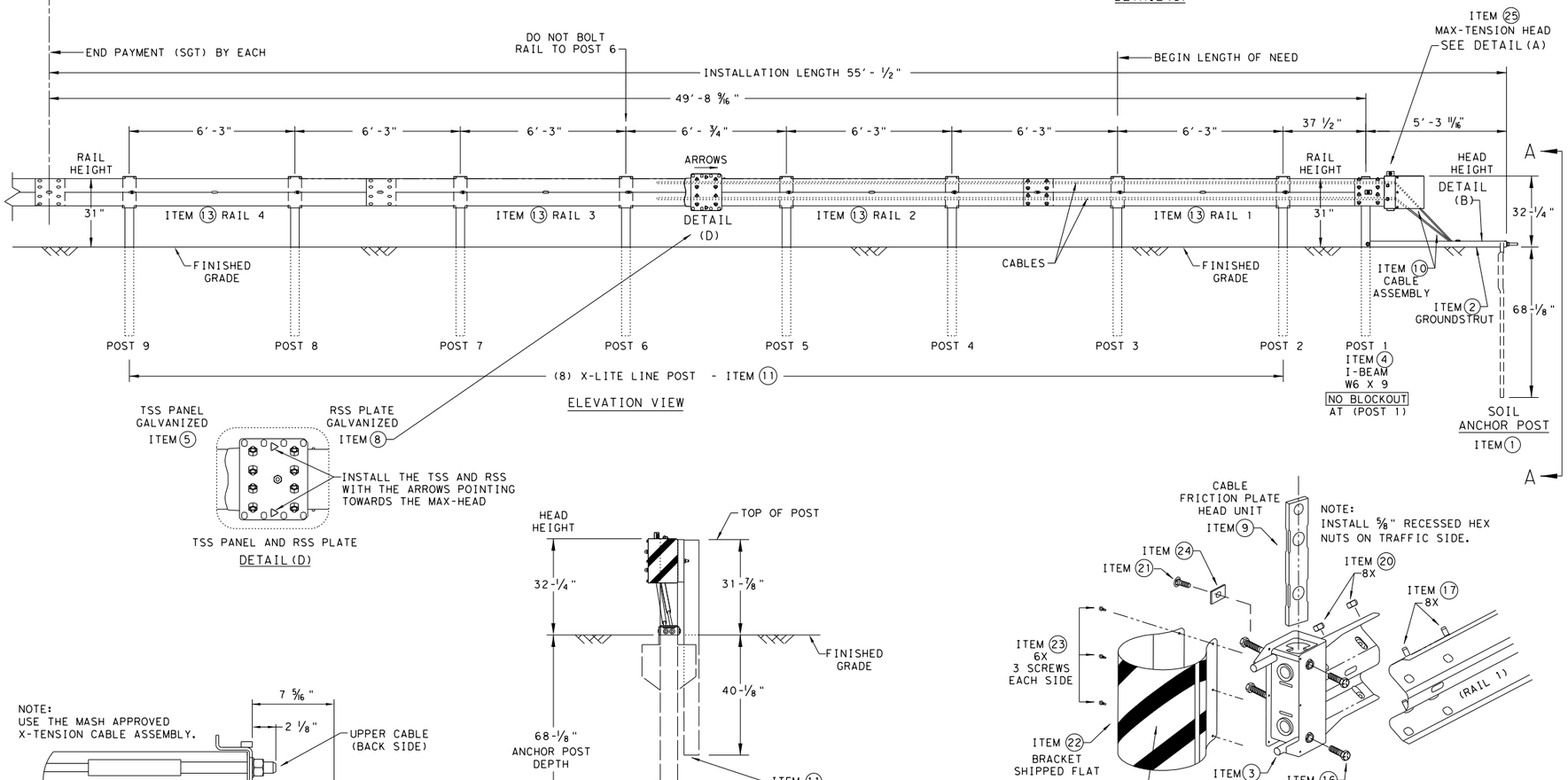
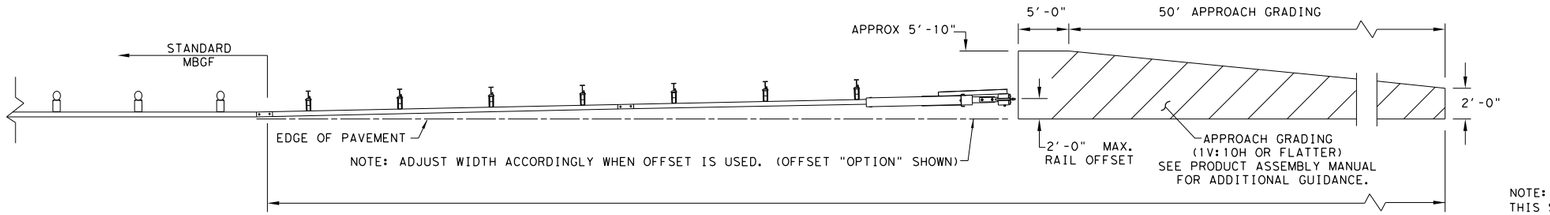
	SAN	BEXAR			87	







GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		88

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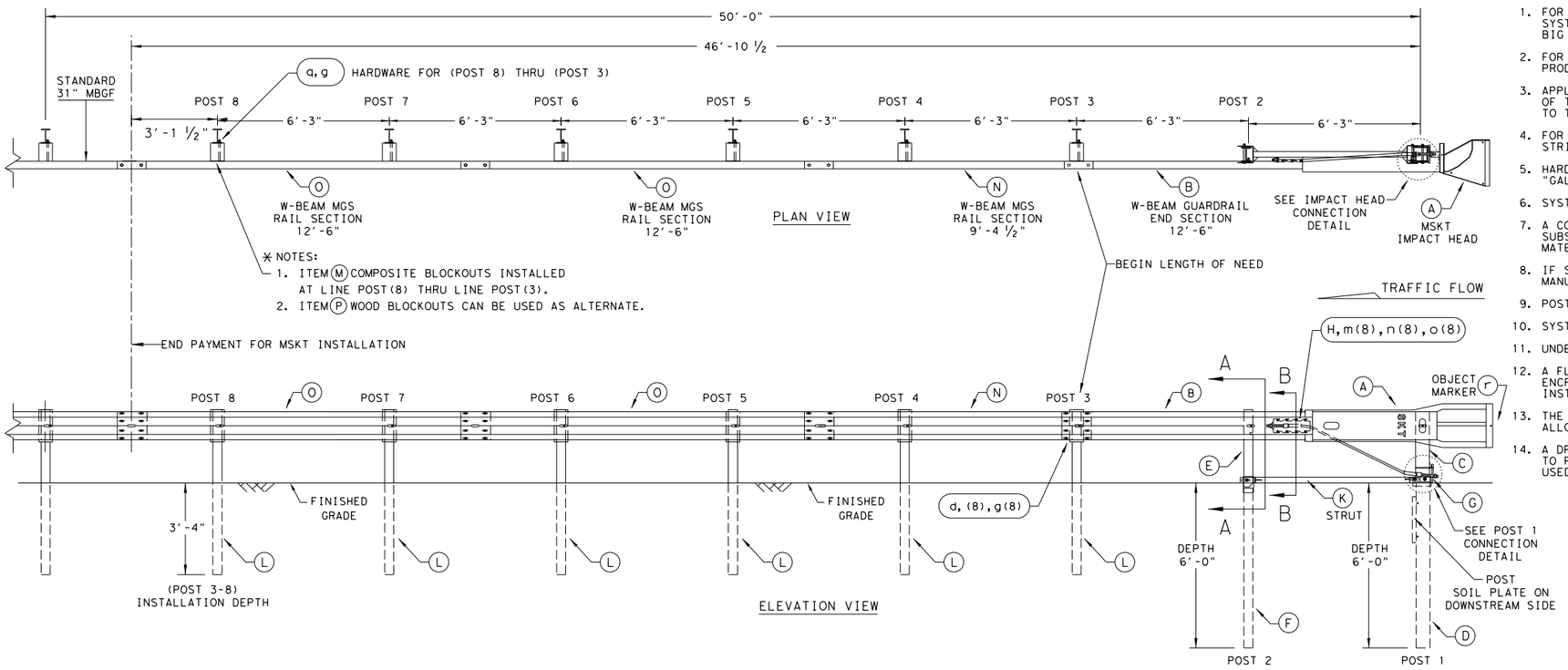


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

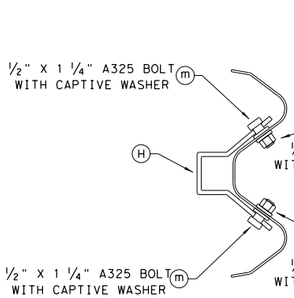
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

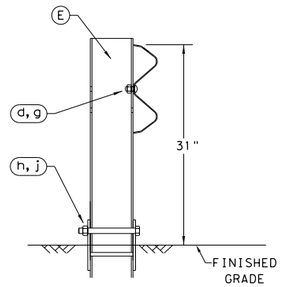
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 3/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: ✳

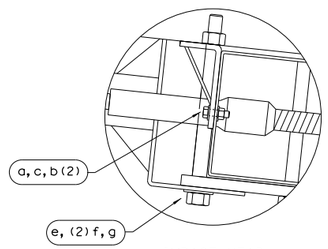
ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25'GUARD FENCE PANEL



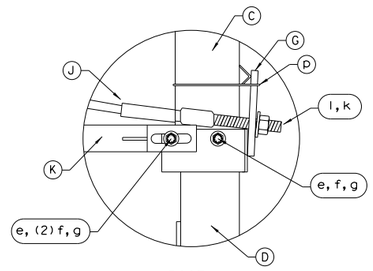
SECTION B-B
ANCHOR BRACKET



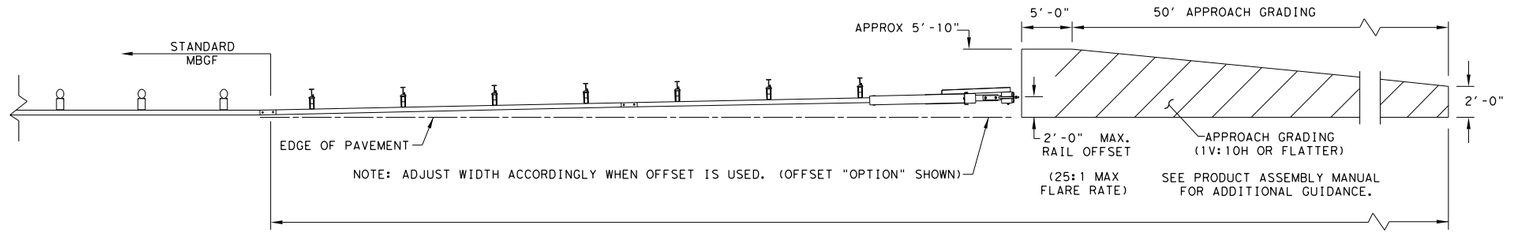
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP		CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB		HIGHWAY
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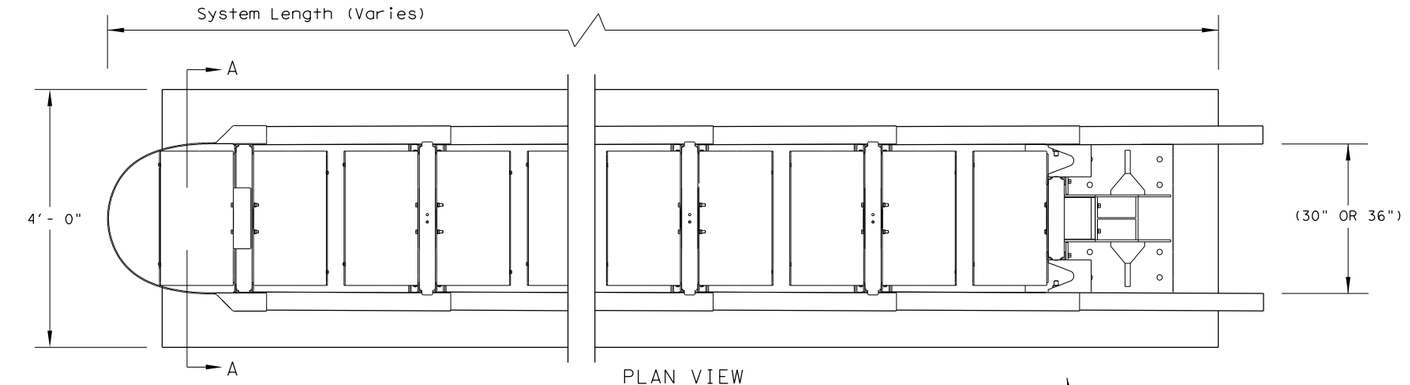
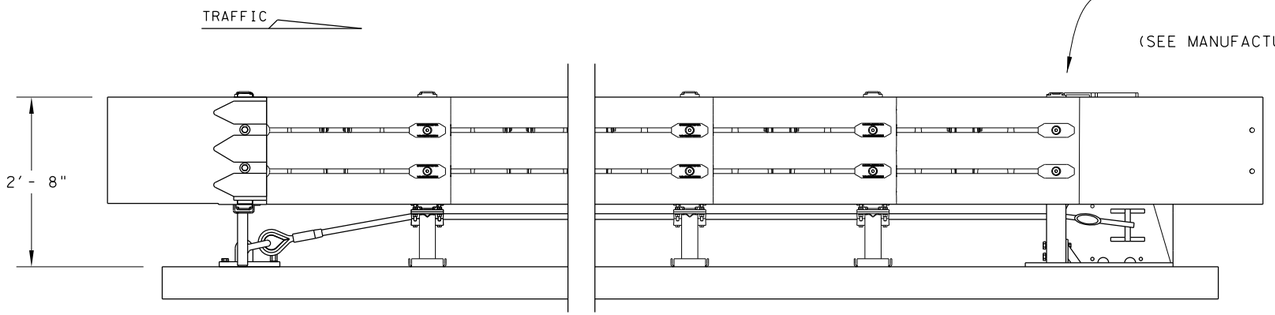


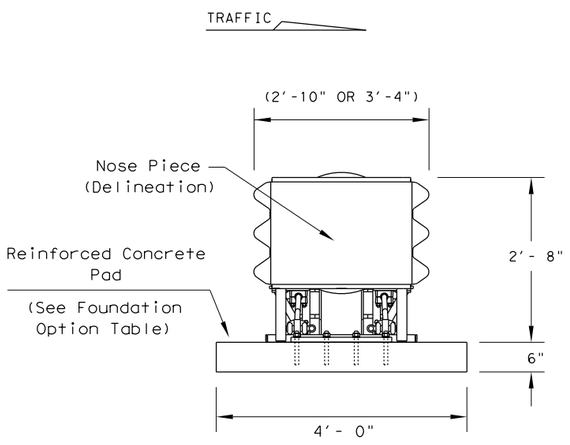
PLAN VIEW

Attachments and transitions to various barrier shapes, barrier railings and bi-directional traffic flows are available.

(SEE MANUFACTURER'S PRODUCT MANUAL)



ELEVATION VIEW



SECTION A-A

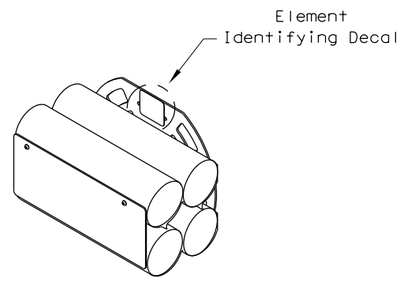
Nose Piece delineation orientation, is shown elsewhere on the plans.

TRANSITION OPTIONS
Vertical Wall
Concrete Traffic Barriers
W-Beam Guardrail
Thrie Beam Guardrail

For bi-directional transition panel and end shoe details. (See manufacturer's product manual.)

FOUNDATION OPTIONS
6" Reinforced Concrete
8" Unreinforced Concrete
Asphalt over Concrete with Minimum 6" Embedment in Concrete
6" Asphalt over 6" Compact Subbase
8" Minimum Asphalt

For steel placement in concrete foundations. (See manufacturer's product manual)



ENERGY ABSORBING ELEMENTS (EAE)

BACKUP SUPPORT OPTIONS
Compact (Stand Alone)
Flush Mount
PCB (Concrete Barrier)

TAU-II-R (NARROW) SYSTEM LENGTHS			
BACKSTOP	TL-2	TL-3	70 mph
PCB	13'-7"	27'-10"	30'-7"
Flush Mount	14'-0"	28'-3"	31'-0"
Compact	15'-3"	29'-6"	32'-3"

Backup and Transition types are shown elsewhere on the plans, (i.e. Attenuator location details or in the general notes).

Note: System lengths are ± 2"

GENERAL NOTES

1. For specific information regarding installation and technical guidance of the system, contact: Lindsay Transportation Solutions - Barrier Systems, Inc. at (707) 374-6800. 180 River Road, Rio Vista, CA 94571
2. For bi-directional traffic, appropriate transition panels will be required.
3. Additional details for the backup support option, transition options and foundation option will be shown on the manufacturer's shop drawings furnished to the Engineer.
4. Concrete shall be class "S" with a minimum compressive strength of 4,000 psi.
5. Maximum permissible cross-slope is 8%.
6. The installation area should be free from curbs, elevated objects, or depressions.
7. The TAU-II-R system should be approximately parallel with the barrier or center of merging barriers.
8. Refer to Universal TAU-II-R configuration chart for specific systems configuration number and location of each type of energy absorbing element.
9. 30-inch (30") model shown, also available in 36-inch (36") configuration.

BILL OF MATERIAL

PRODUCT CODE	QTY	DESCRIPTION
B030704	1	Front Support
B030703	TBD	Mid Support
TBD	1	Backstop Assembly (See Table)
TBD	1	Front Cable Anchor
TBD	1	Nose Assembly
B010202	TBD	Sliding Panel
B010659	2	End Panel
K001003	1	Slider Assembly Kit
BSI-1202006-KT	TBD	TAU-II-R Slider Kit
BSI-1107131-KT	TBD	TAU-II-R EAE Mounting Hw Kit
BSI-1012069-00	TBD	Energy Absorbing Element, Type 1
BSI-1012070-00	TBD	Energy Absorbing Element, Type 2
BSI-1012071-00	TBD	Energy Absorbing Element, Type 3
BSI-1110009-00	TBD	Energy Absorbing Element, Type 3N
TBD	TBD	Cable Assembly
K001004	TBD	Cable Guide Kit
K001005	2	Front Support Leg Kit
B010651	4	Pipe Panel Mount
TBD	1	Anchoring Package

(TBD) = To Be Determined, depending on Backup Type and System Length.

(See manufacturer's product manual for details)

LOW MAINTENANCE

Texas Department of Transportation

Design Division Standard

LTS-BARRIER SYSTEMS CRASH CUSHION (R-NARROW)

TAU-II-R(N)-16

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©TxDOT: January 2013	CONT	SECT	JOB	HIGHWAY
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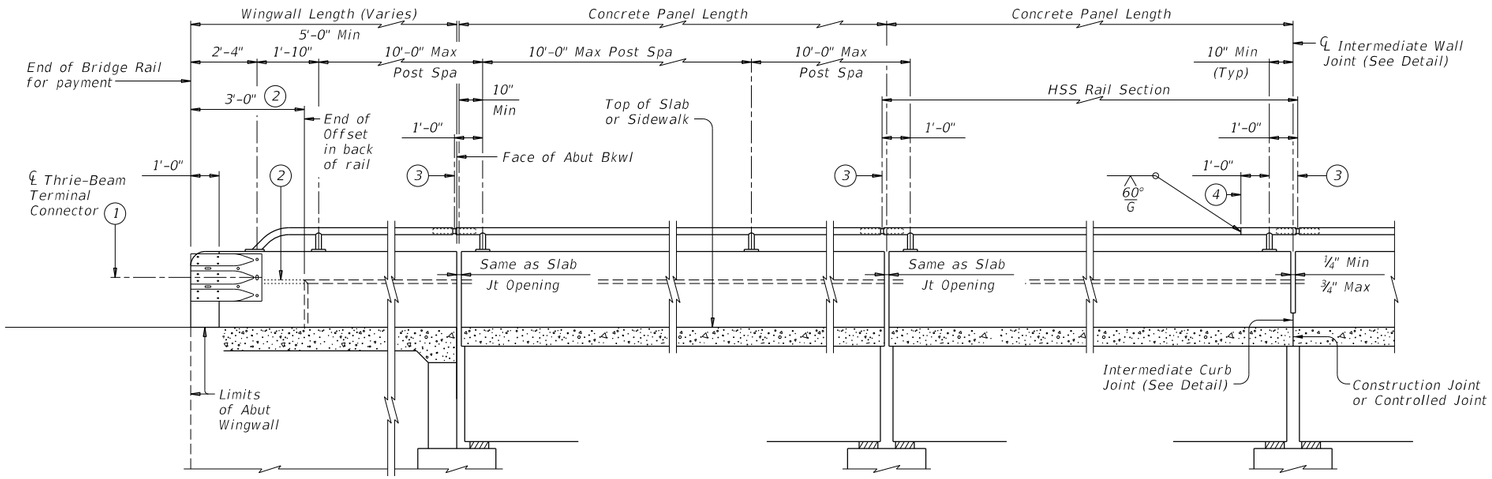
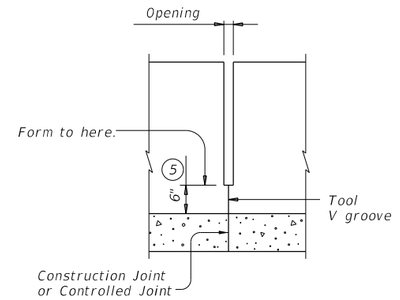


AT ABUTMENTS

AT BENTS WITH SLAB EXP JOINTS

AT BENTS WITHOUT SLAB EXP JOINTS

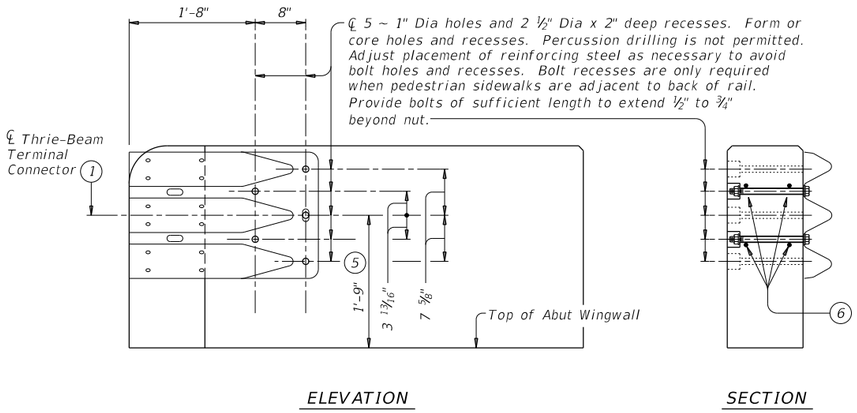
ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

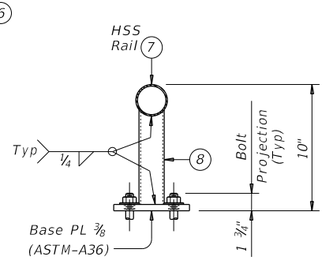
1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
3. ℄ Exp Joint or Splice Joint as required.
4. One shop splice per HSS rail section is permitted with minimum 85 percent penetration. The weld may be square groove, or single vee groove. Grind smooth.
5. Increase 2" for structures with overlay.
6. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
7. HSS 2.875 x 0.203
8. HSS 2.375 x 0.154
9. ⅜" Dia Hole in bottom of HSS rail (Minimum 1 hole between posts ~ Typ)



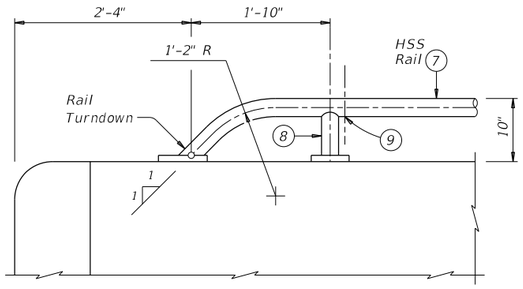
ELEVATION

SECTION

TERMINAL CONNECTION DETAILS

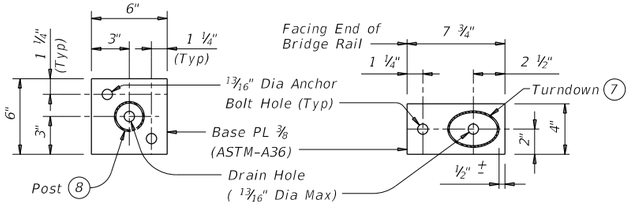


TRANSVERSE SECTION



Note that at least two anchor points (as shown) are required for the Bridge Rail on the Abutment Wingwall. Longer Wingwalls may require more than two Rail anchorages.

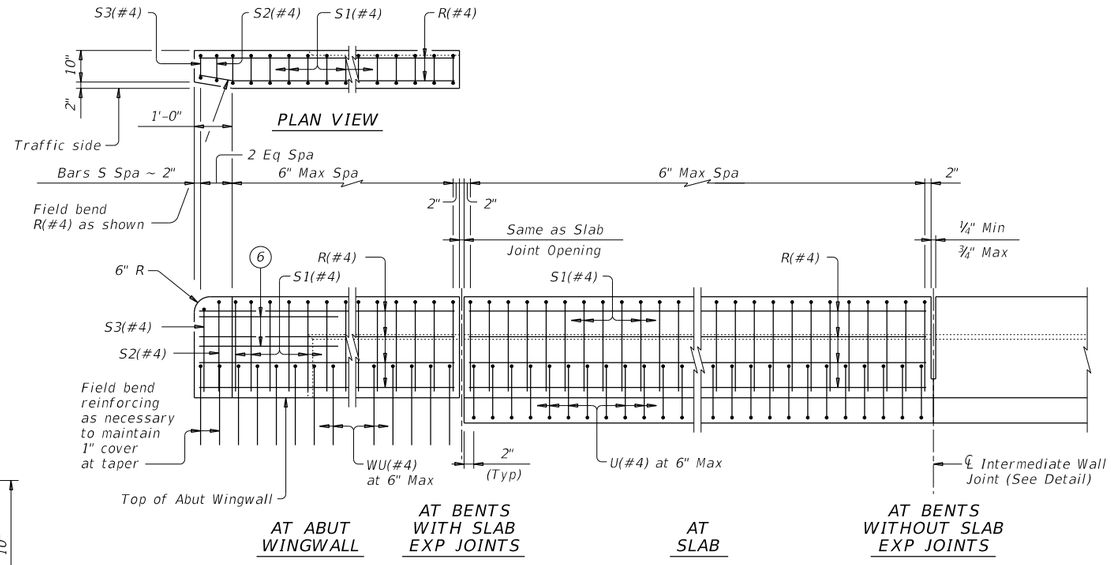
HSS RAIL TERMINAL DETAIL



POST BASE PLATE PLAN

RAIL TURNDOWN BASE PLATE PLAN

HSS RAIL DETAILS



AT ABUT WINGWALL

AT BENTS WITH SLAB EXP JOINTS

AT SLAB

AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

(Showing without raised sidewalk)

SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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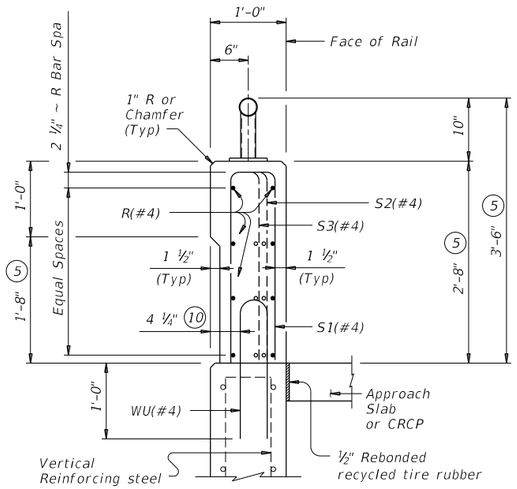
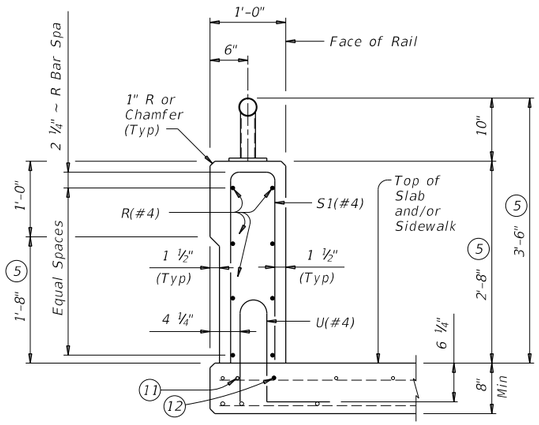
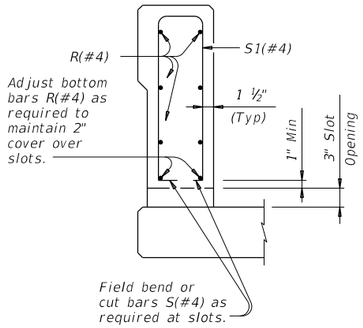


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

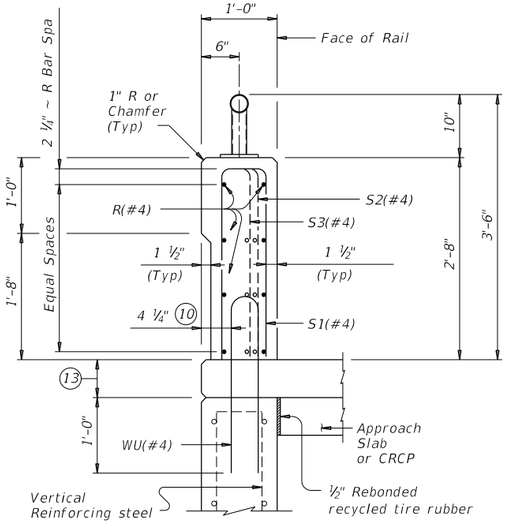


ON BRIDGE SLAB

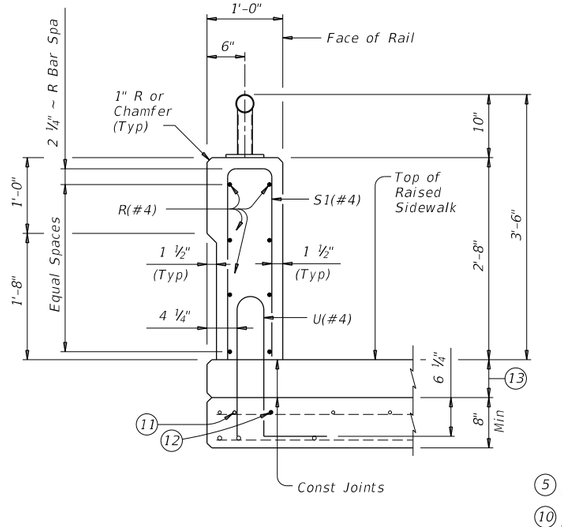
SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK



SECTION THRU OPTIONAL SIDE SLOT DRAIN

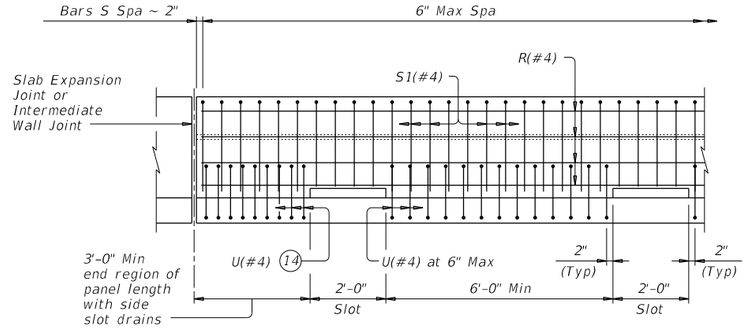


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

(5) Increase 2" for structures with overlay.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(11) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractors expense.

(12) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(13) Raised Sidewalk

(14) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C221

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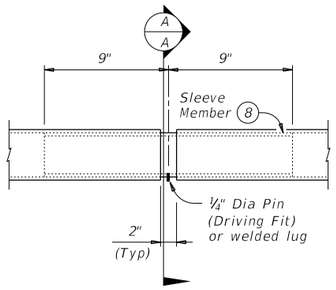
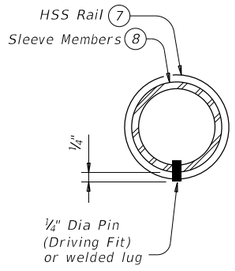
RAIL DATA FOR HORIZONTAL CURVES

	RADIUS TO FACE OF RAIL	MAX CHORD LENGTH	CONSTRUCT OR FABRICATE
HSS Rail	Over 2800'	29'-0"	Straight rail panels
	Over 1400' thru 2800'	14'-6"	To required radius or to chords shown
	Over 700' thru 1400'	7'-3"	
	Thru 700'	Zero	To required radius

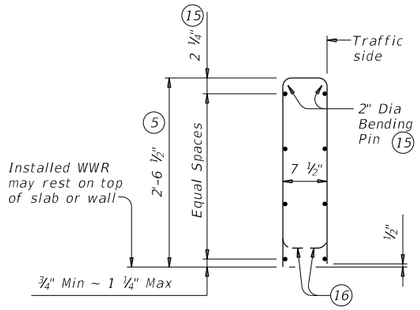


AT SPLICE OR EXP JTS



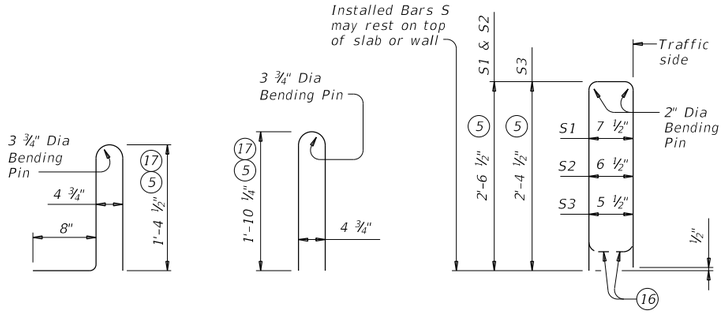
SECTION A-A

PIPE SPLICE DETAILS

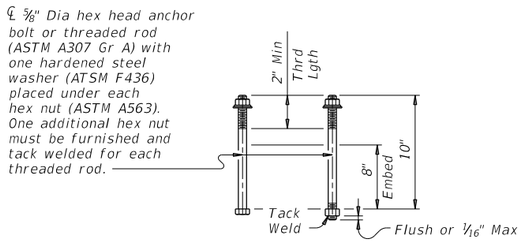


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

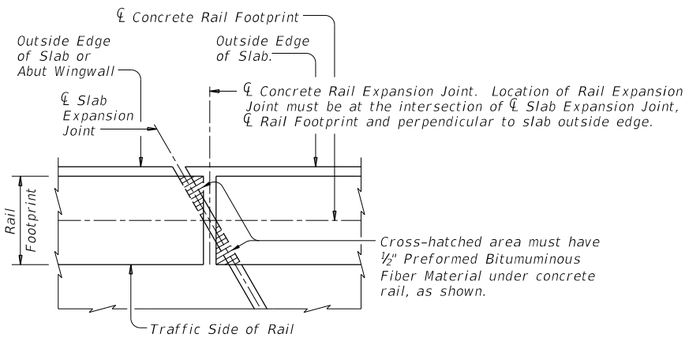
DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



BARS U (#4) BARS WU (#4) BARS S (#4)



CAST-IN-PLACE ANCHOR BOLT OPTIONS (18)



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

(5) Increase 2" for structures with overlay.
(7) HSS 2.875 x 0.203
(8) HSS 2.375 x 0.154
(15) No longitudinal wires may be in top center of cage.
(16) Bend or cut as required to clear drain slots.
(17) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
(18) See "Material Notes" for anchor bolt information.

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer and when adhesive anchor bolts are used. Slipforming parapet is not allowed if anchor bolts are cast with parapet wall. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

At the Contractor's option anchor bolts may be cast with the parapet. See "Material Notes".

Face of rail, parapet must be plumb unless otherwise approved by the Engineer. HSS rail posts must be square to the top of parapet. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.

Round or chamfer exposed edges of HSS rail and HSS rail posts to approximately 1/16" by grinding.

HSS rail sections must not include less than two posts, and no more than four (except at Abutments).

Chamfer all parapet exposed corners.

MATERIAL NOTES:

Provide Class "C" concrete. Povide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Provide ASTM A1085 or A500 Gr B or A53 Gr B for all HSS.

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over gavanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel". Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 3". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 5 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

Optional cast-in-place anchor bolts must be ⅝" Dia ASTM A307 Gr A bolts (or threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer (ASTM F436) at each bolt. Nuts must conform to ASTM A563 requirements.

Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

Average weight of railing with no overlay: 380 plf (total)
370 plf (Conc)
10 plf (Steel)

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

Texas Department of Transportation

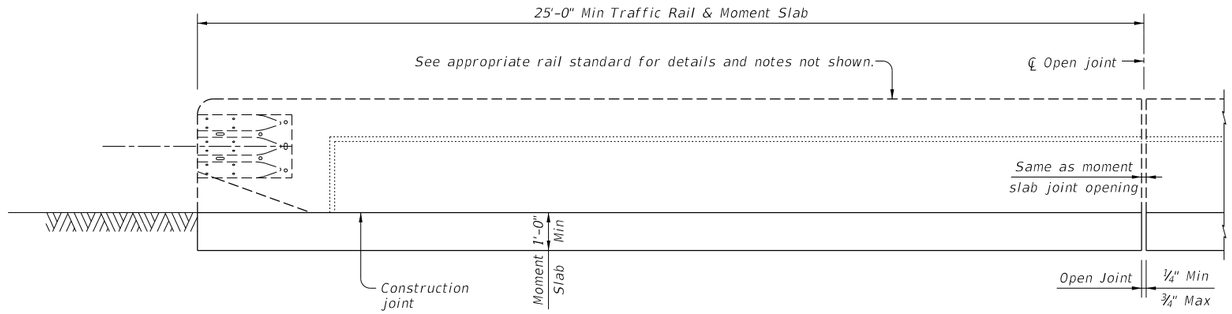
Bridge Division Standard

COMBINATION RAIL

TYPE C221

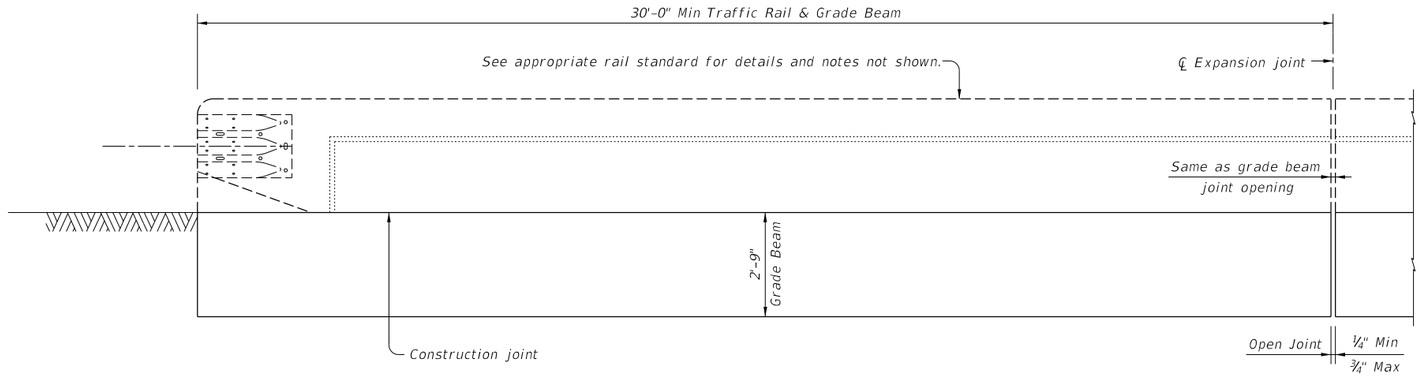
FILE: rlstd018-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		93

DATE: 11/17/2021 12:23:41 PM
FILE: I:\34000s\34832\B00\CADD\Sheets\SAN\Standards\Bridge\rlstd027-20 (TRF).dgn



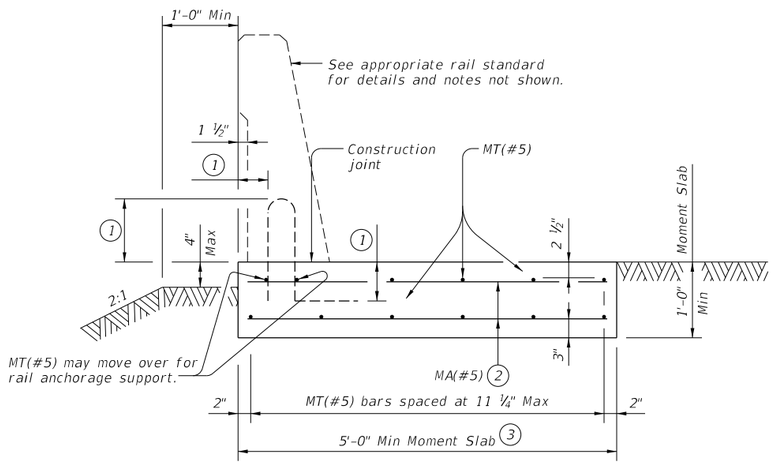
ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



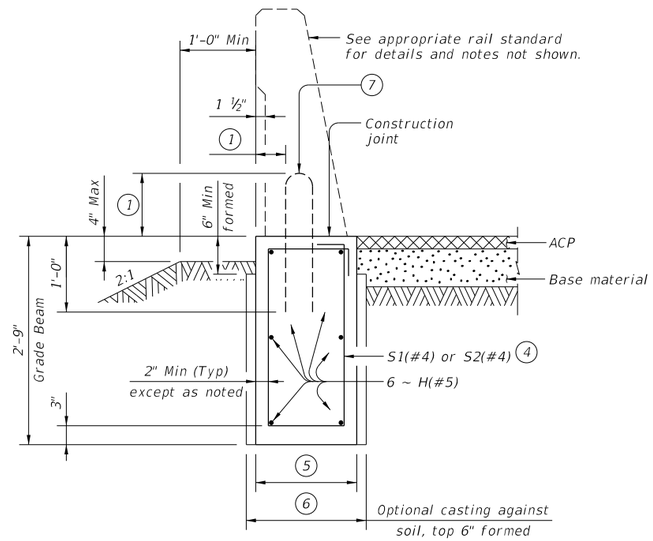
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

(Showing SSTR rail other rails are similar.)



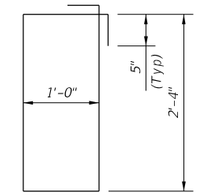
SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

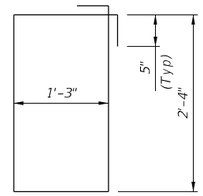
1. See applicable bridge rail standard.
2. MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 ½" longitudinally from outside edge of moment slab).
3. Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
4. S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 ½" longitudinally from outside edge of grade beam).
5. Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF.

   Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66. Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
6. 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS.

   1'-9" bridge rail types: T66 and C66.
7. Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant.

See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB).

The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations.

See appropriate rail standard for details and notes not shown.

This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project.

Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations.

The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement.

Excavation will be subsidiary to other Items.

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

Texas Department of Transportation

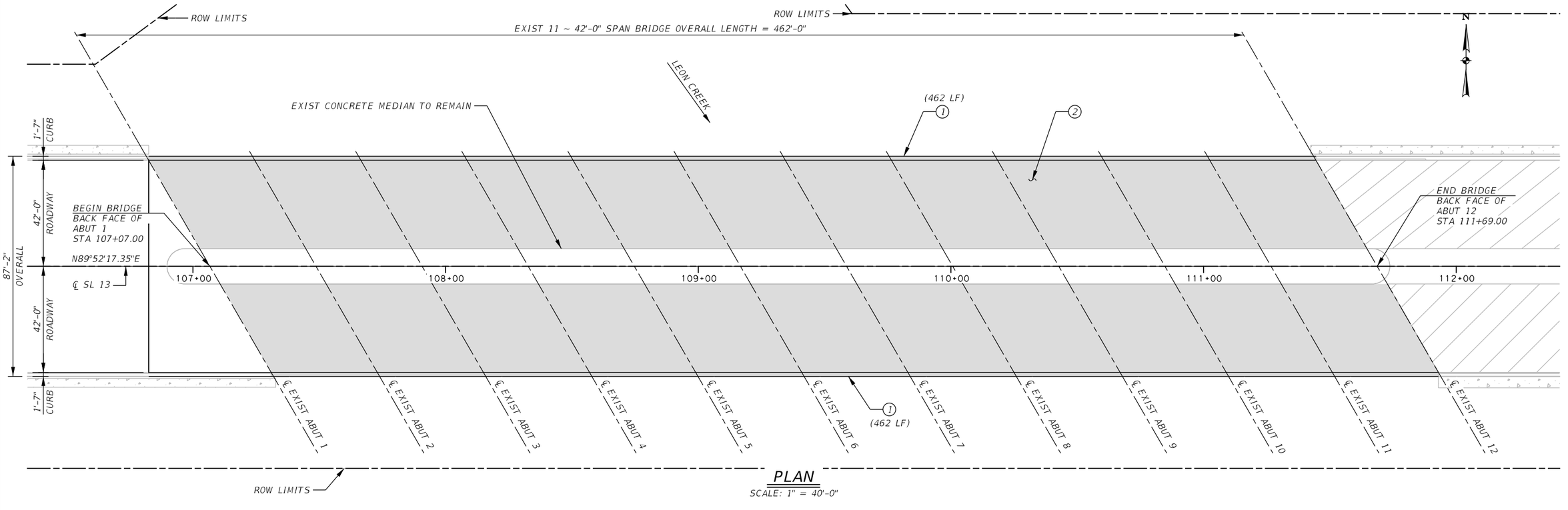
Bridge Division Standard

TRAFFIC RAIL FOUNDATIONS

FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS

TRF

FILE: rlstd027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS 07-20: Added moment slab with rail foundation lengths.	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		94



PLAN

SCALE: 1" = 40'-0"

(1) REMOVE T6 RAILING ALONG BRIDGE. REMOVAL IS SUBSIDIARY TO RETROFIT RAIL.

(2) REMOVE EXISTING OVERLAY. SEE PROJECT LAYOUT FOR OVERLAY REMOVAL BEGIN AND END STATIONS.

ESTIMATED REMOVAL QUANTITIES			
SL 13 OVER LEON CREEK			
ITEM	DESCRIPTION	UNIT	QUANTITY
496 6099	REMOVE STR (RAIL)	LF	924

GENERAL NOTES:

1. ALL DIMENSIONS AND OTHER INFORMATION PERTAINING TO EXISTING CONSTRUCTION ARE BASED ON AS-BUILT PLANS PROVIDED IN THESE PLANS FOR CONTRACTOR'S REFERENCE.
2. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK OR ORDERING MATERIALS.
3. AS-BUILT PLANS FOR EXISTING ROADWAY AND BRIDGE ARE AVAILABLE AT TxDOT OFFICE UPON REQUEST.
4. SEE STRUCTURE LAYOUT SHEETS FOR RAIL REPLACEMENT AND REPAIR WORK INFORMATION.
5. SEE RAIL REMOVAL & CONCRETE REPAIR DETAILS SHEET FOR ADDITIONAL INFORMATION REGARDING EXISTING RAIL DEMOLITION.
6. REFER ROADWAY SHEETS FOR INFORMATION OUTSIDE OF BRIDGE LIMITS.

09·30·2021
STATE OF TEXAS
BRIAN V. BURNS
134705
LICENSED
PROFESSIONAL ENGINEER
Brian V. Burns

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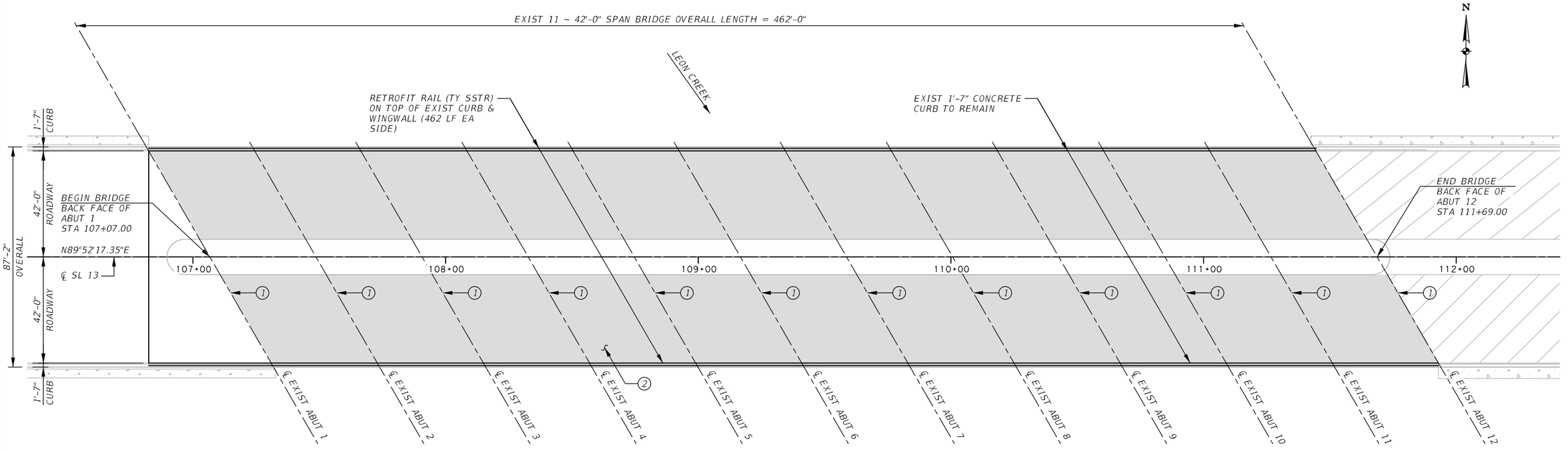
SL 13

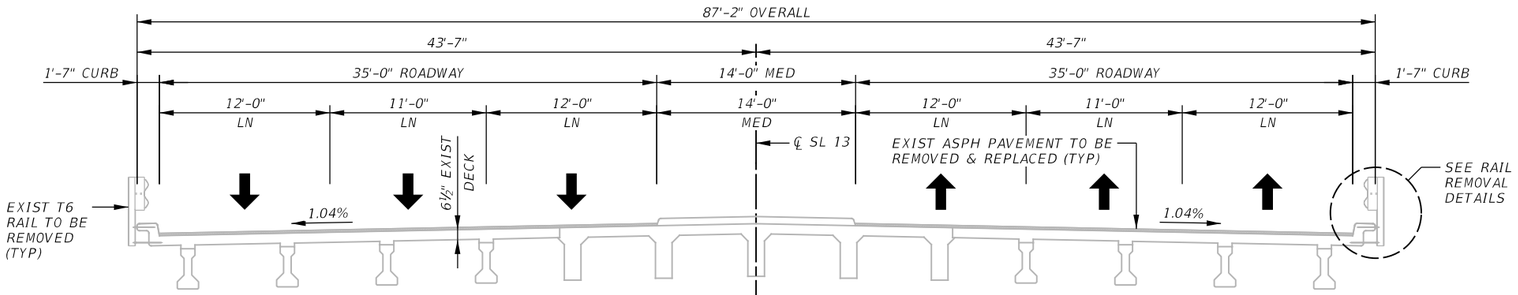
RAIL REMOVAL PLAN

SCALE: AS NOTED SHEET 1 OF 1

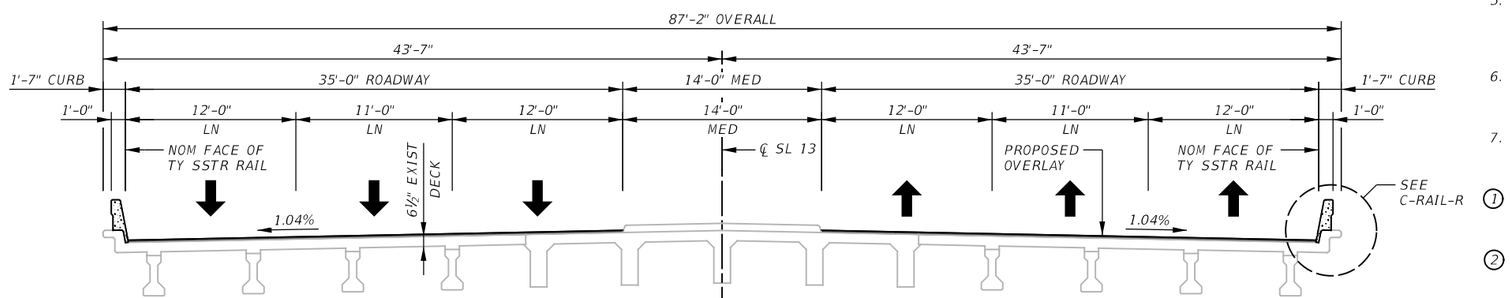
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		95
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13



PLAN
SCALE: 1" = 40'-0"



EXIST TYPICAL SECTION
SCALE: 3/32" = 1'-0"



PROPOSED TYPICAL SECTION
SCALE: 3/32" = 1'-0"

GENERAL NOTES:

1. ALL DIMENSIONS AND OTHER INFORMATION PERTAINING TO EXISTING CONSTRUCTION ARE BASED ON AS-BUILT PLANS. AS-BUILT PLANS FOR EXISTING ROADWAY, BRIDGE, AND CROSSING ROADWAY BELOW THE BRIDGE ARE AVAILABLE AT TxDOT OFFICE UPON REQUEST.
2. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK OR ORDERING MATERIALS.
3. SEE RAIL REMOVAL PLAN FOR ADDITIONAL INFORMATION.
4. SEE C-RAIL-R SHEETS FOR ADDITIONAL INFORMATION REGARDING CONSTRUCTION OF NEW CONCRETE RAIL.
5. SEE RAIL REMOVAL AND CONCRETE REPAIR DETAILS SHEET FOR ADDITIONAL INFORMATION REGARDING THE REPAIR OF EXISTING CONCRETE BRIDGE ELEMENTS.
6. PROPOSED CONCRETE RAIL MEETS LOAD RATING TL-3 REGARDLESS OF HIGHER RATING INDICATED ON RAIL STANDARD.
7. CONTRACTOR TO VISIT SITE AND VERIFY REPAIR QUANTITY BEFORE BID.

(1) REPAIR EXISTING ARMOR JOINT. EXISTING SEAL REMOVAL AND REPLACEMENT IS SUBSIDIARY TO JOINT REPAIR.

(2) INSTALL OVERLAY, SEE PROJECT LAYOUT SHEETS FOR OVERLAY LIMITS.

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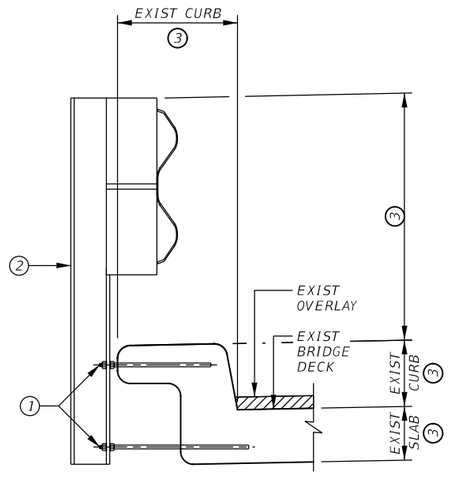
SL 13
STRUCTURE LAYOUT

SCALE: AS NOTED SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		96
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

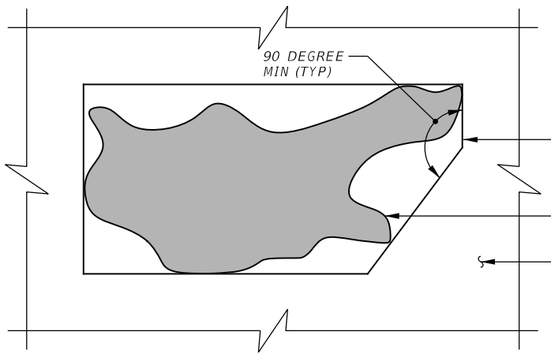
1. UNSCREW HEX NUTS AND REMOVE EXISTING POST AND RAIL. CUT EXISTING RODS AND/OR BOLTS FLUSH WITH FACE OF EXISTING CURB OR WINGWALL. CLEAN ALL VISIBLE CORROSION ON REMAINING END OF BOLTS AND PAINT WITH A RUST-INHIBITING PAINT. PAINT SHALL MATCH COLOR OF CONCRETE TO THE EXTENT POSSIBLE.
2. ALL RAILING SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
3. DIMENSIONS OF EXISTING ELEMENTS ARE SHOWN IN AS-BUILT CONSTRUCTION DOCUMENTS.



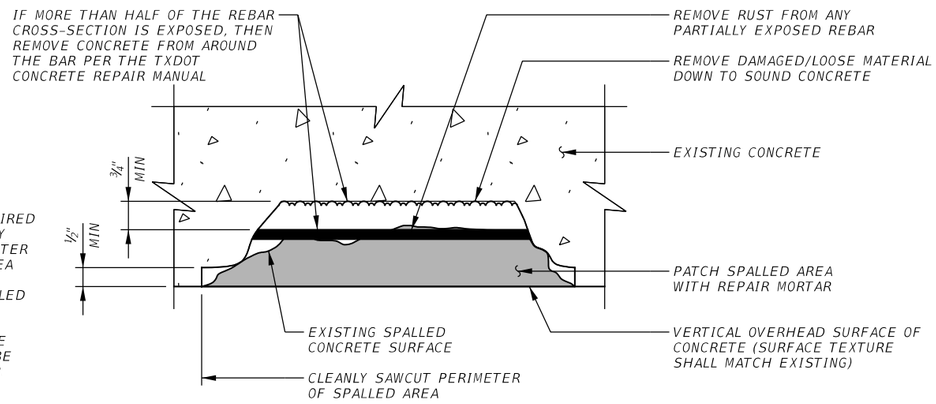
EXISTING RAIL REMOVAL AT BRIDGE

CONCRETE REPAIR NOTES:

1. REPAIR DAMAGED CONCRETE FROM REMOVAL OF EXISTING RAIL WITH DETAILS PROVIDED THIS SHEET.
2. INCLUDE UNIT COSTS FOR ALL REPAIR METHODS WITH BID IN THE EVENT QUANTITIES CHANGE DURING CONSTRUCTION.
3. COMPLY WITH TXDOT SPECIFICATION ITEM 429 "CONCRETE STRUCTURE REPAIR" FOR CONCRETE REPAIR.
4. FOLLOW THE PROCEDURES OUTLINED IN THE TXDOT "CONCRETE REPAIR MANUAL" FOR ALL CONCRETE REPAIR WORK UNLESS APPROVED OTHERWISE.
5. IN ADDITION TO THE REQUIREMENTS IN THE TXDOT "CONCRETE REPAIR MANUAL", FOLLOW ALL RECOMMENDATIONS PROVIDED BY THE REPAIR PRODUCT MANUFACTURER.
6. CATEGORIZE SPALLED AREAS BASED ON THE CURRENT SEVERITY OF DAMAGE PER THE DEFINITIONS PROVIDED IN SECTION 2.1 OF THE TXDOT "CONCRETE REPAIR MANUAL". REPAIR MINOR AND INTERMEDIATE SPALLS PER PROCEDURES OUTLINED IN THE APPROPRIATE SECTION IN CHAPTER 3 OF THE MANUAL. NO MAJOR SPALLS ARE ANTICIPATED.
7. FOR MINOR SPALLS: IN ACCORDANCE WITH TXDOT "DMS 6100 EPOXIES AND ADHESIVES", REPAIR MATERIAL SHALL BE A TXDOT TYPE VIII EPOXY MORTAR. ONLY PRE-APPROVED MATERIALS LISTED ON THE MATERIAL PRODUCER LIST (MPL) FOR EPOXIES AND ADHESIVES MAY BE USED.
8. FOR INTERMEDIATE SPALLS: IN ACCORDANCE WITH TXDOT "DMS 4655 CONCRETE REPAIR MATERIALS", REPAIR MATERIALS SHALL BE A CEMENTITIOUS REPAIR MORTAR' FOR RAPID VERTICAL OR OVERHEAD APPLICATIONS. TYPE A-3 MATERIALS SHALL APPLY FOR REPAIRS LESS THAN 1" DEEP, AND TYPE A-4 MATERIALS SHALL APPLY FOR REPAIRS BETWEEN 1" AND 6" DEEP. ONLY PRE-APPROVED MATERIALS LISTED ON THE MATERIAL PRODUCER LIST (MPL) FOR CONCRETE REPAIR MATERIALS MAY BE USED.
9. SUBMIT ALL PROPOSED REPAIR PRODUCTS AND PROCEDURES TO THE ENGINEER FOR APPROVAL PRIOR TO APPLICATION. IT SHALL BE CLEARLY NOTED WHERE EACH REPAIR PRODUCT IS INTENDED TO BE USED.
10. MATCH COLOR OF EPOXY COMPOUND AND ANY ADDED AGGREGATES WITH COLOR OF EXISTING CONCRETE TO THE EXTENT POSSIBLE.
11. REPAIR OR REPLACE DEFECTIVE AREAS AND PATCH AREAS THAT LOSE BOND AFTER CURING, AT THE CONTRACTOR'S EXPENSE, IN ACCORDANCE WITH TXDOT SPECIFICATION ITEM 429 "CONCRETE STRUCTURE REPAIR".



TYPICAL CONCRETE REPAIR PLAN



TYPICAL CONCRETE REPAIR SECTION

09·30·2021
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134705
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SL 13

RAIL REMOVAL & CONCRETE REPAIR DETAILS

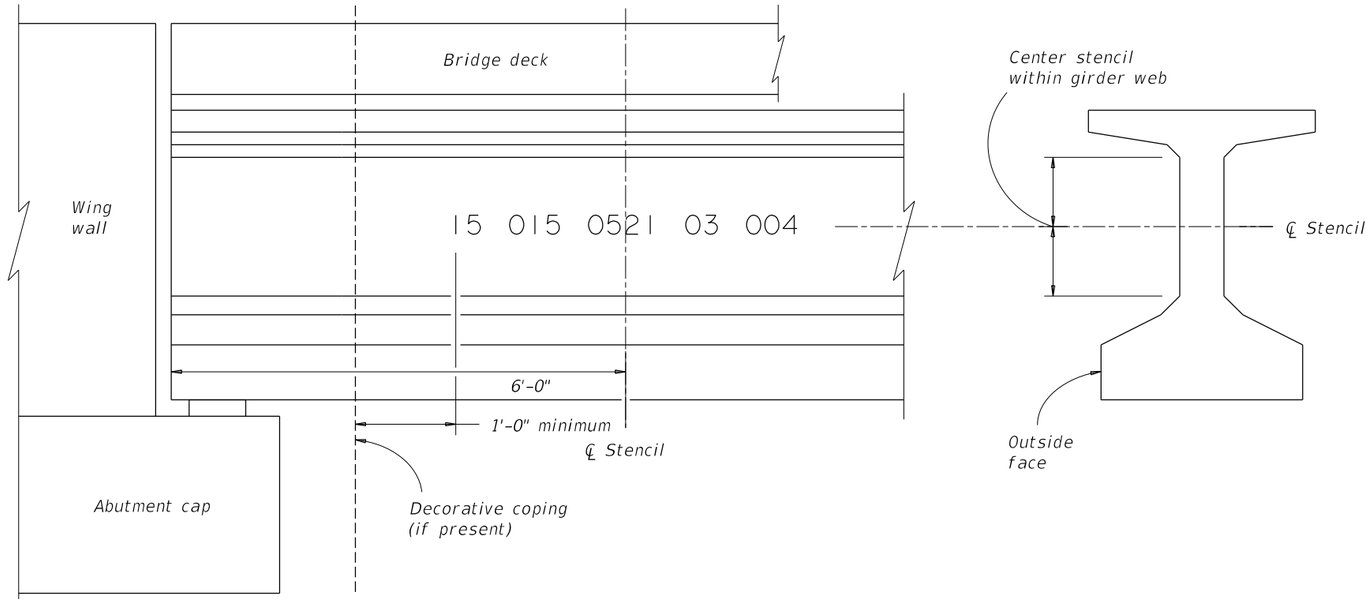
SCALE: NTS SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		97
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

15 015 0521 03 004

San Antonio District designation | County designation | Control number | Section nunber | Structure number

PAINTED STRUCTURE NUMBER DETAIL



TYPICAL BRIDGE CORNER (ELEVATION)

SAN ANTONIO DISTRICT COUNTY DESIGNATIONS

Atascosa 007
Bandera 010
Bexar 015
Comal 046
Frio 083
Guadalupe 095
Kendall 131
Kerr 133
McMullen 162
Medina 163
Uvalde 232
Wilson 247

GENERAL NOTES:
Apply stucture number in accordance with Special Specification for Stenciling Permanent Structure Numbers.

SAN ANTONIO DISTRICT STANDARD

Texas Department of Transportation
San Antonio District (Structural Design)
Prepared by and for the use of TxDOT

BRIDGE NBI NUMBER STENCIL LEON CREEK

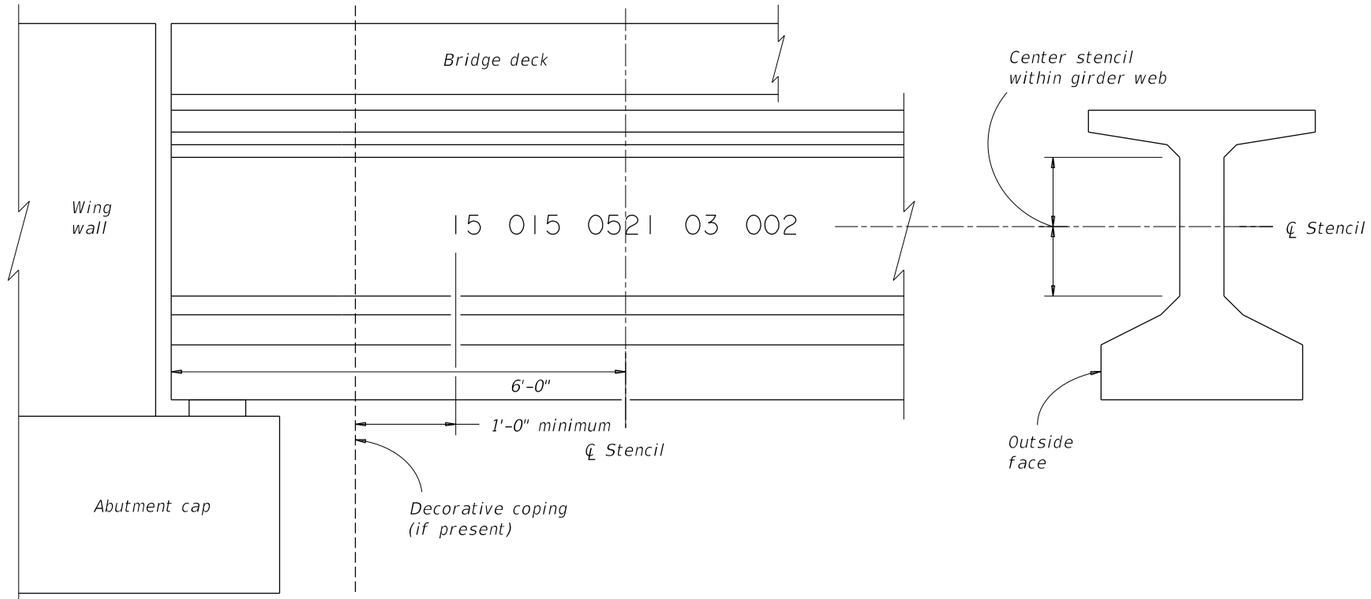
DN: BCL	CK: XXX	FILENAME: 000000000 SA District Stencil.dgn		
DW: SRF	CK: XXX	ORIGINAL DRAWING DATE: August 2019		
DIST	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		COUNTY
SAT	6	SEE TITLE SHEET		BEXAR
CONTROL	SECTION	JOB	SHEET NO.	ROUTE
0521	02	042	98	SL 13

REVISIONS:

15 015 0521 03 002

San Antonio District designation | County designation | Control number | Section nunber | Structure number

PAINTED STRUCTURE NUMBER DETAIL



TYPICAL BRIDGE CORNER (ELEVATION)

SAN ANTONIO DISTRICT COUNTY DESIGNATIONS

Atascosa 007
Bandera 010
Bexar 015
Comal 046
Frio 083
Guadalupe 095
Kendall 131
Kerr 133
McMullen 162
Medina 163
Uvalde 232
Wilson 247

GENERAL NOTES:
Apply stucture number in accordance with Special Specification for Stenciling Permanent Structure Numbers.

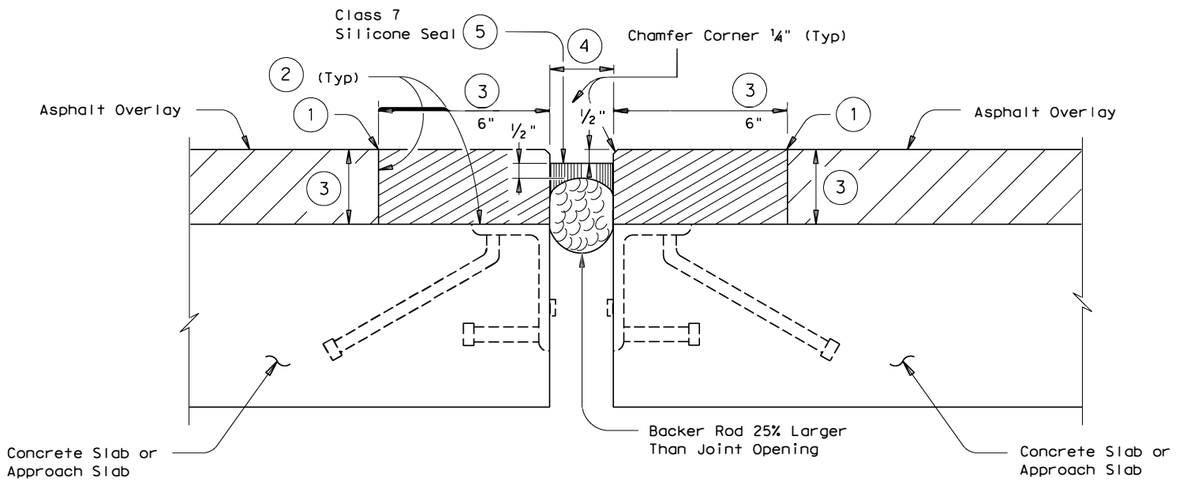
SAN ANTONIO DISTRICT STANDARD

Texas Department of Transportation
San Antonio District (Structural Design)
Prepared by and for the use of TxDOT

BRIDGE NBI NUMBER STENCIL KELLY FIELD

DN: BCL	CK: XXX	FILENAME: 000000000 SA District Stencil.dgn		
DW: SRF	CK: XXX	ORIGINAL DRAWING DATE: August 2019		
DIST	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		COUNTY
SAT	6	SEE TITLE SHEET		BEXAR
CONTROL	SECTION	JOB	SHEET NO.	ROUTE
0521	02	042	99	SL 13

REVISIONS:



SECTION

Angle type armor shown. Detail is identical for plate type armor or unarmored joint.

GENERAL NOTES:

Header Type Joint must be in accordance with Item 454, "Bridge Expansion Joints".

Unless shown otherwise on the plans, header material will be paid for by the cubic foot and sealant by the linear foot in accordance with Item 454, "Bridge Expansion Joints".

Removal and replacement of loose existing steel and repair of deck must be in accordance with Item 785, "Bridge Joint Repair or Replacement". This work is subsidiary to Item 454, "Bridge Expansion Joints - Armor Joints", or "Bridge Expansion Joints - SEJ".

Work performed and materials furnished for cleaning existing joints will be paid for by the linear foot under Item 438, "Cleaning and Sealing Joints".

Any asphaltic material deposited on bent or abutment caps must be removed.

AFTER EXISTING OVERLAY IS REMOVED:

Clean joint of any bituminous material, dirt, grease, or other deleterious material. Joint opening must be cleaned of old expansion material or devices in accordance with Item 438, "Cleaning and Sealing Joints".

The entire length of the joint must be checked. If any steel is present, remove and replace any portion determined to be unsound. Repair the deck. An approved concrete repair material must be used to repair any deep spall in the deck that leaves less than 6 inches of the original concrete below the spall. Spalls in the deck that are not so deep may be filled with header material. Removal and repair of deck must be accordance with Item 785, "Bridge Joint Repair or Replacement". Repair of damage caused by the Contractor must be repaired at the Contractor's expense in accordance with Item 429, "Concrete Structure Repair".

Place surface treatment according to the plans.

AFTER NEW OVERLAY IS PLACED:

(1) Saw cut overlay to the top of deck and remove material to expose the joint.

(2) Surfaces where header material is to be placed must be clean and dry in accordance with the manufacturer's specifications. Remove all asphaltic materials from the deck where the header material is placed.

(3) Place header material in accordance with Item 454, "Bridge Expansion Joints - Header Type Expansion Joint". Match the thickness of the header material with the thickness of the overlay as shown in the plans. Do not cantilever header material over the joint opening.

(4) Match existing joint opening or set at the minimum:

a. 1 inch at 70 degrees F when the distance between joints is 150 feet or less
b. 2 inches at 70 degrees F when the distance between joints is greater than 150 feet
c. or as directed by the Engineer

(5) After placing header material, install backer rod and sealant in accordance with Item 438, "Cleaning and Sealing Joints".
Extend sealant up into rail or curb 6 inches on low side or sides of deck. If the Class 7 sealant cannot be effectively placed in the vertical position, a Class 4 sealant is allowed for the extention of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with manufacturer's specifications.

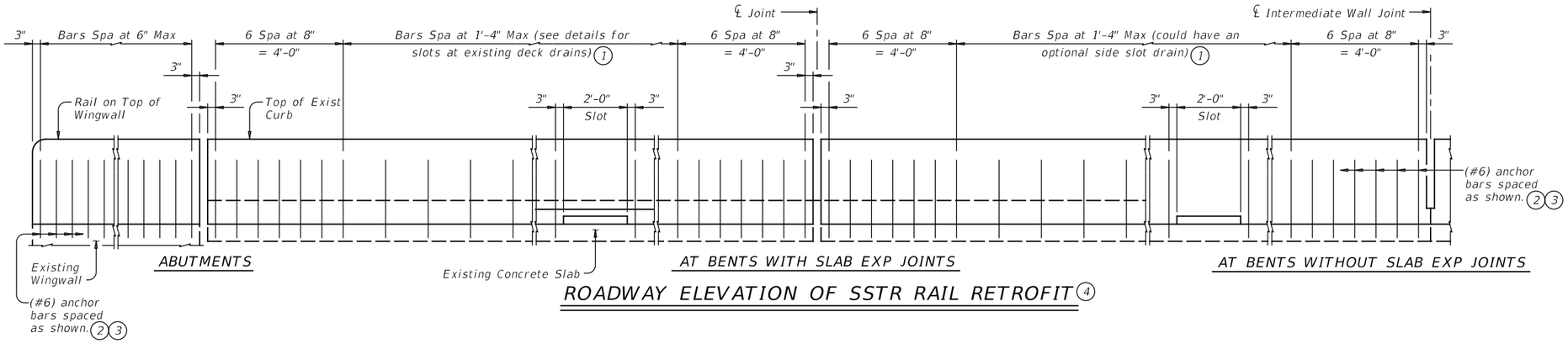
SAN ANTONIO DISTRICT STANDARD

Texas Department of Transportation

EXPANSION JOINT HEADER REPAIR

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	SEE TITLE SHEET		100
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:
FILE:



ROADWAY ELEVATION OF SSTR RAIL RETROFIT (4)

(1) Center side slots over existing deck drains as detailed

(2) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 ¼". Anchor adhesive chosen must be 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. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(3) See SSTR Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors".

(4) Showing spacing of (#6) anchor bar epoxy anchored in a rail retrofit condition. Secondary (#4) anchor bar epoxy anchored in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See rail standard for details and notes not shown.

(5) Provide #6 x 7'-0" horiz bar centered over slot. Clip bottom rail bar as needed to accomodate slot (provide 3" end cover)

(6) See detail for modification to existing wingwall.

(7) Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 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. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).

(8) See SSTR rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.

(9) Do not cast rails on top of overlay/seal coats. Install retrofit rail prior to new overlay placement.

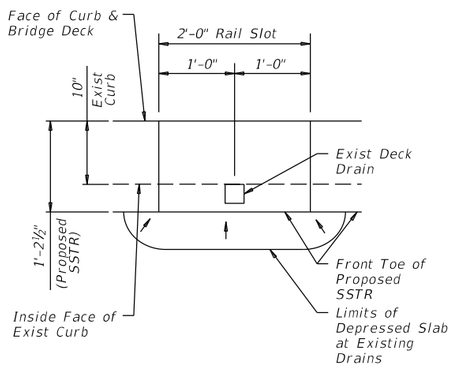
(10) See RDWY elevation for additional S bars surrounding slot. Clip bottom of S bars as needed to accomodate slot (provide 3" clear cover).

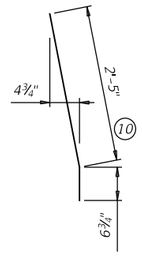
(11) Space (#4) stirrups at 8" Max. (Spaced 3 1#4" longitudinally from retrofitted ends of wingwall).

(12) 7 ~ (#5) bars with 3" end cover.

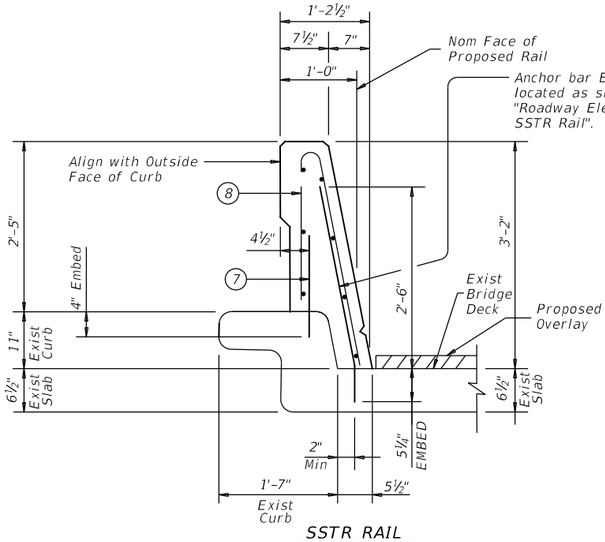
(13) Space (#4) bars at 8" max with 3" end cover, spaced with (#4) stirrups.

(14) Face of rail and/or toe of rail. Location or placement of rail retrofit must match face of rail and/or toe of rail on bridge.



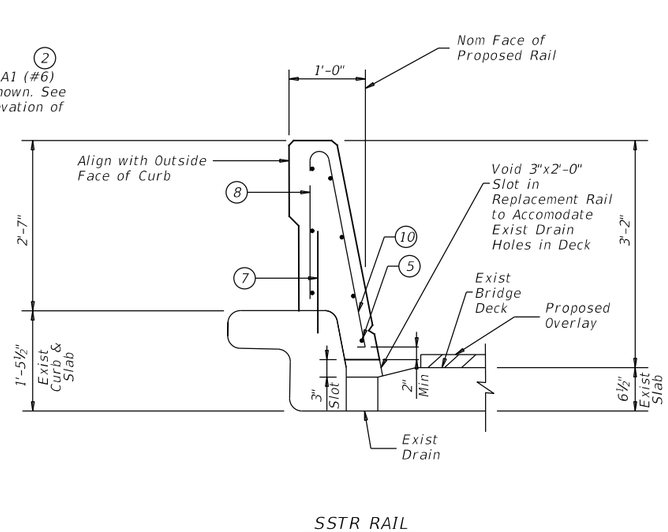


ANCHOR BAR EA1 (#6)



SSTR RAIL

RETROFIT RAIL SECTION ON CONCRETE SLAB



SSTR RAIL

RETROFIT RAIL DETAILS AT EXIST DECK DRAINS

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

By adding additional anchorage, welding can be performed at a minimum spacing of 3 ft between the cage and additional anchorage. By satisfying additional anchorage requirements slip forming is allowed. Do not weld to the required anchorage.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

(#6) and (#4) anchor bars used for the epoxied anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

Payment for a rail retrofit will be as per Item 451, "Retrofit Rail (Ty SSTR)".

All proposed concrete rail exposed surfaces (other than recessed areas) shall have Sherwin Williams SW6142 "Macadamia" color, or approved equal. The recessed areas shall have Sherwin Williams SW6125 "Craft Paper" color, or approved equal. See rail sections for recessed area limits. Surface finish shall be done according to Item 427, "Surface Finishes for Concrete." Concrete color finishes are subsidiary to Item 450, and no separate payment will be made.

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

09·30·2021

STATE OF TEXAS
BRIAN V. BURNS
134705
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY BRIAN V. BURNS, P.E. NO. 134705, ON 09/30/2021. ALTERATION OF A SEALED DOCUMENT WITHOUT THE PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC. 1201 N. BOWSER RD, RICHARDSON, TX 75081. TBPELS ENGINEERING FIRM #F-312.

SHEET 1 OF 1

Texas Department of Transportation

Bridge Division Standard

RETROFIT GUIDE FOR CONCRETE RAILS

(SSTR)

C-RAIL-R

FILE: rlstd022-20.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042, ETC	SL 13
07-20: Text change from epoxy to adhesive and changed MASH Test Level note.	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		101

DATE: 11/17/2021 12:23:44 PM
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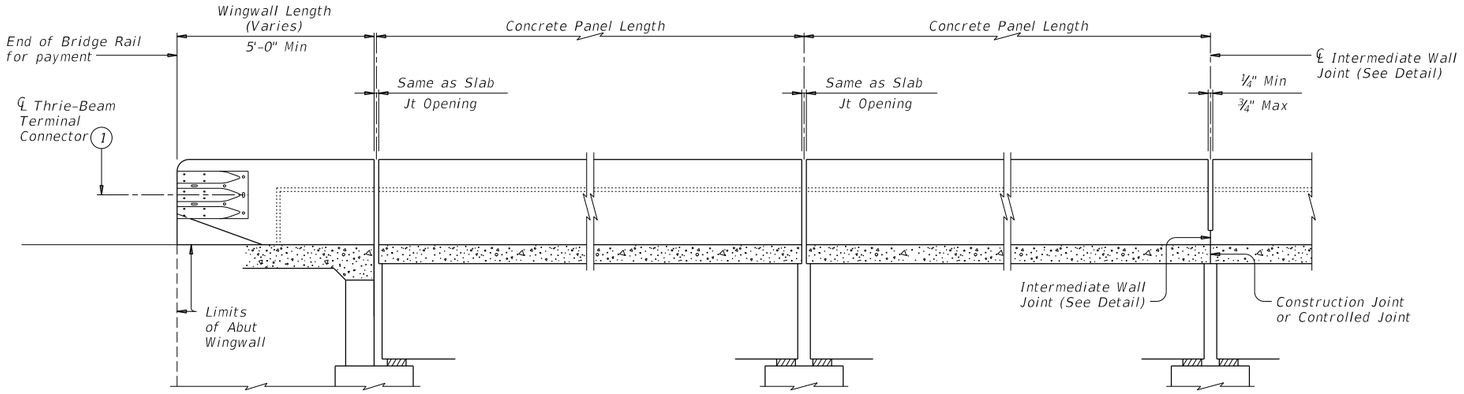
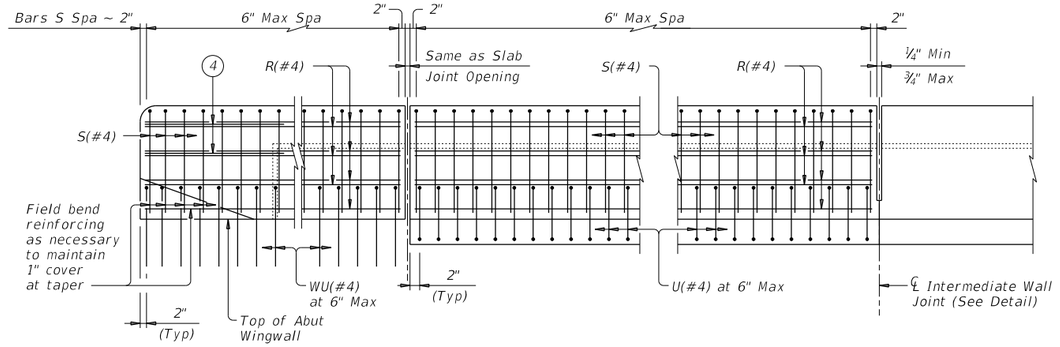
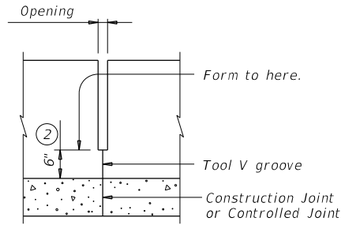


AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



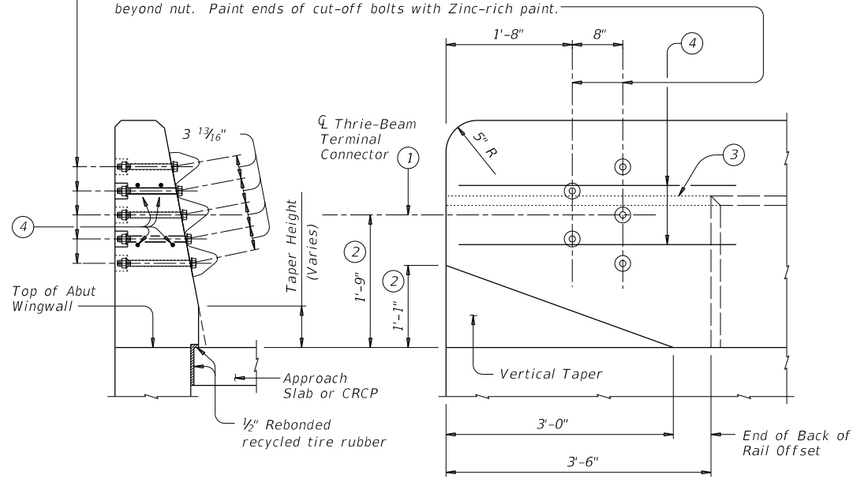
INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		102

DATE: 11/17/2021 12:23:45 PM
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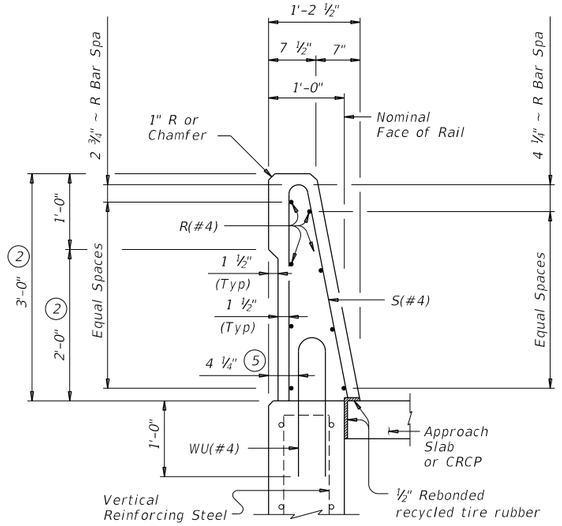
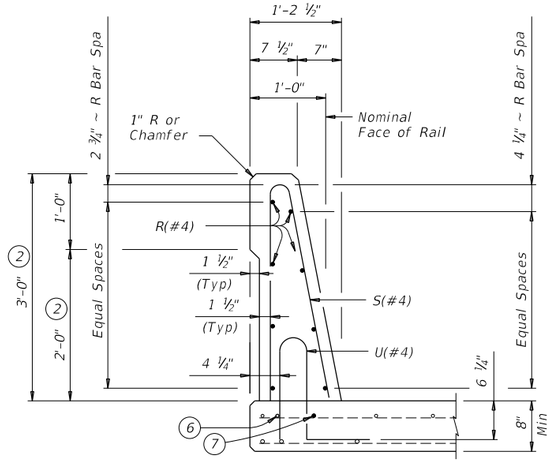


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greator to side slot drain.

CONSTRUCTION NOTES:

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

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

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

Provide bar laps, where required, as follows:

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

GENERAL NOTES:

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

Do not use this railing on bridges with expansion joints providing more than 5" movement.

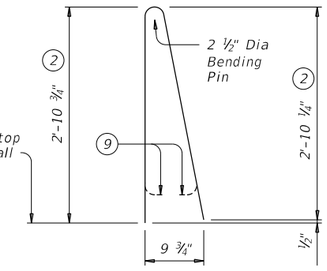
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

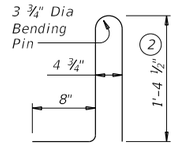
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

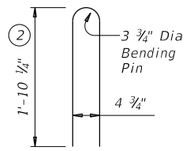
Reinforcing bar dimensions shown are out-to-out of bar.



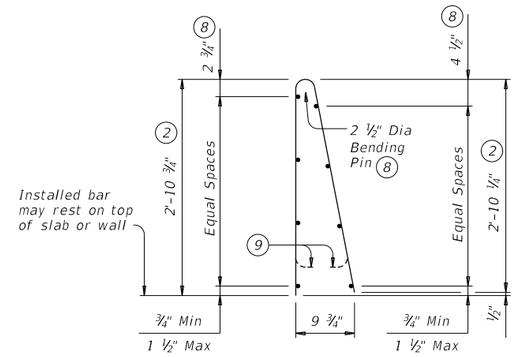
BARS S (#4)



BARS U (#4)

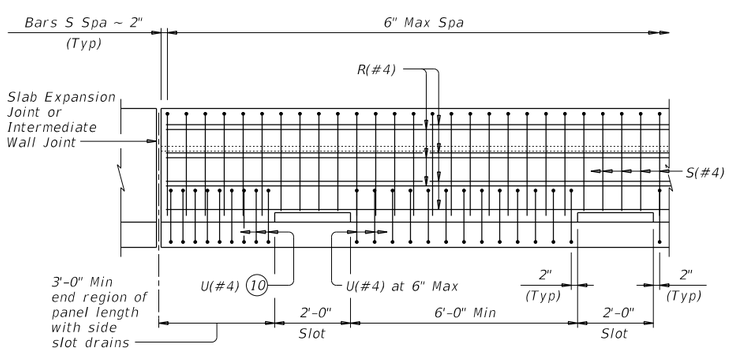


BARS WU (#4)



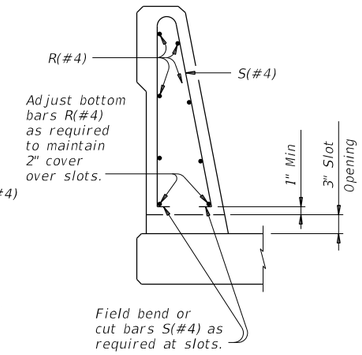
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		103

ESTIMATED QUANTITIES SIGNING

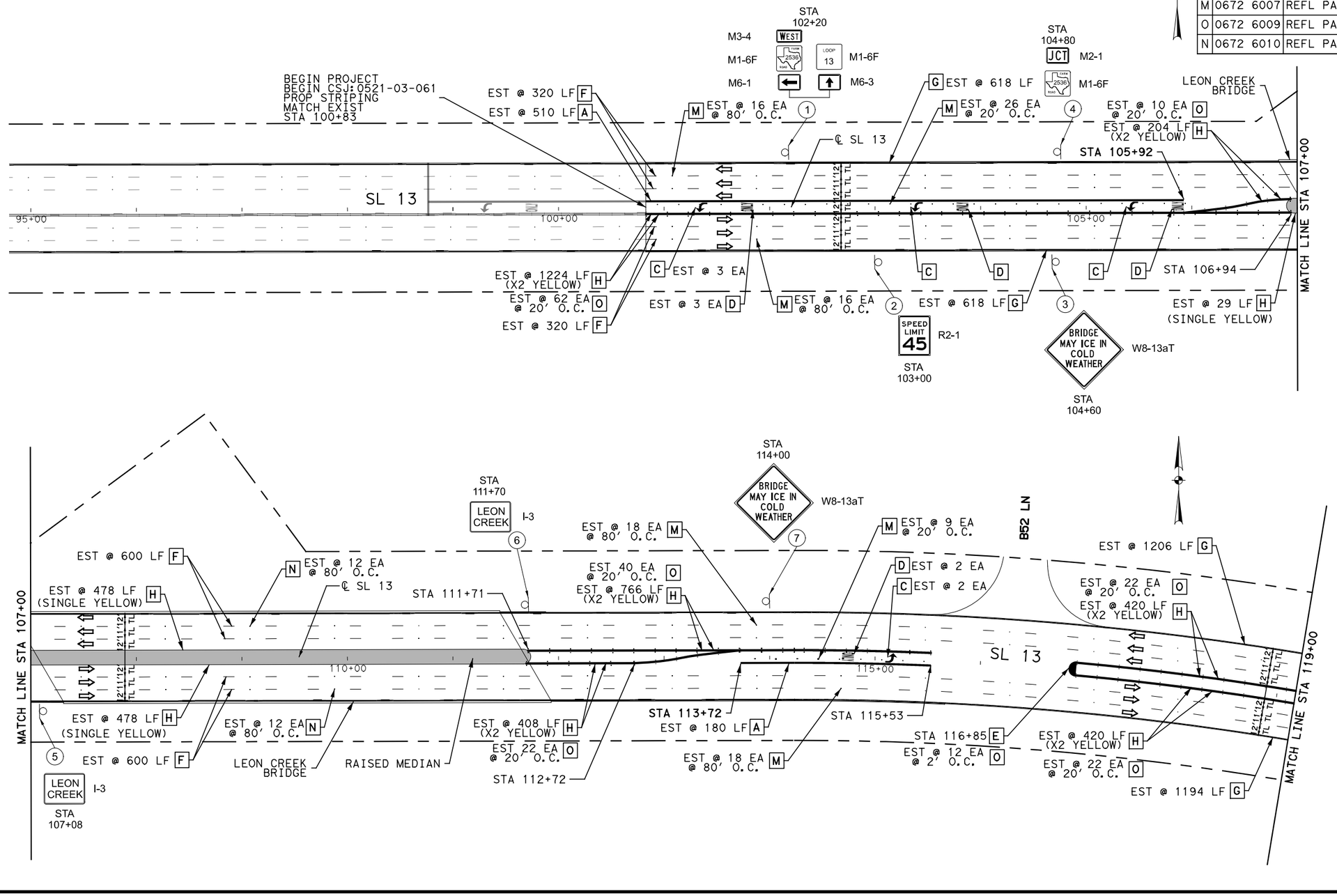
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	3
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	3
0644 6076	REMOVE SM RD SN SUP&AM	EA	7

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)

ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	9898
0666 6226	PAVEMENT SEALER 8"	LF	690
0666 6230	PAVEMENT SEALER 24"	LF	
0666 6231	PAVEMENT SEALER (ARROW)	EA	4
0666 6232	PAVEMENT SEALER (WORD)	EA	4
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	1

ESTIMATED QUANTITIES PAVEMENT MARKINGS

	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	690
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	4
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	1
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	1840
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	3636
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	4422
M	0672 6007	REFL PAV MRKR TY I-C	EA	103
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	190
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	24



N

LEGEND:

- # REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

NAME 11/17/2021 DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TEDSI TBPE F-1640

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 100+83 TO STA 119+00

SHEET 1 OF 9

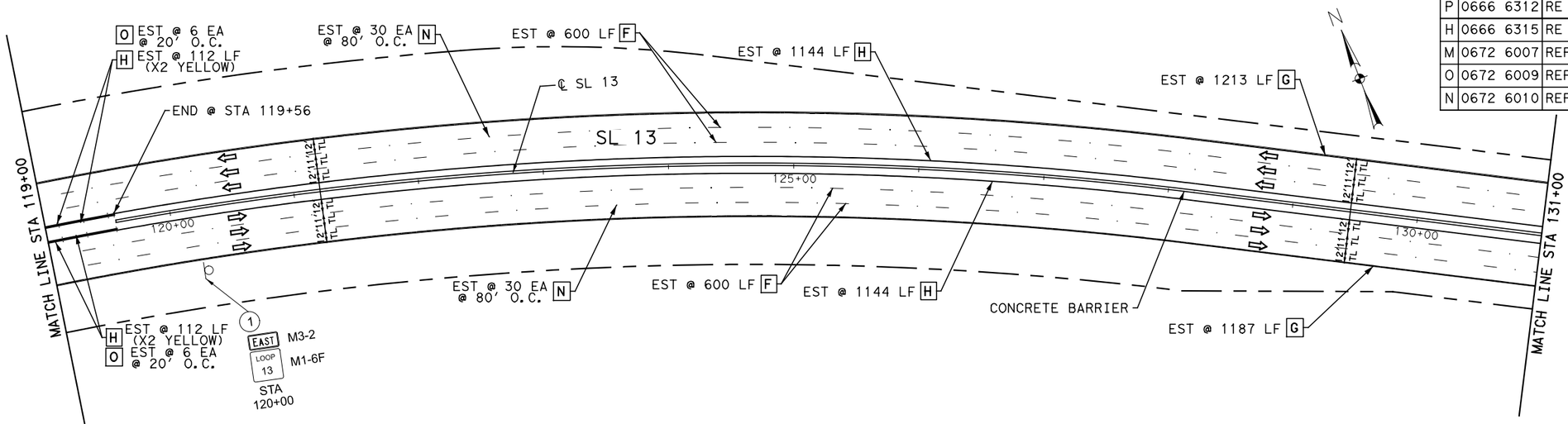
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		104
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

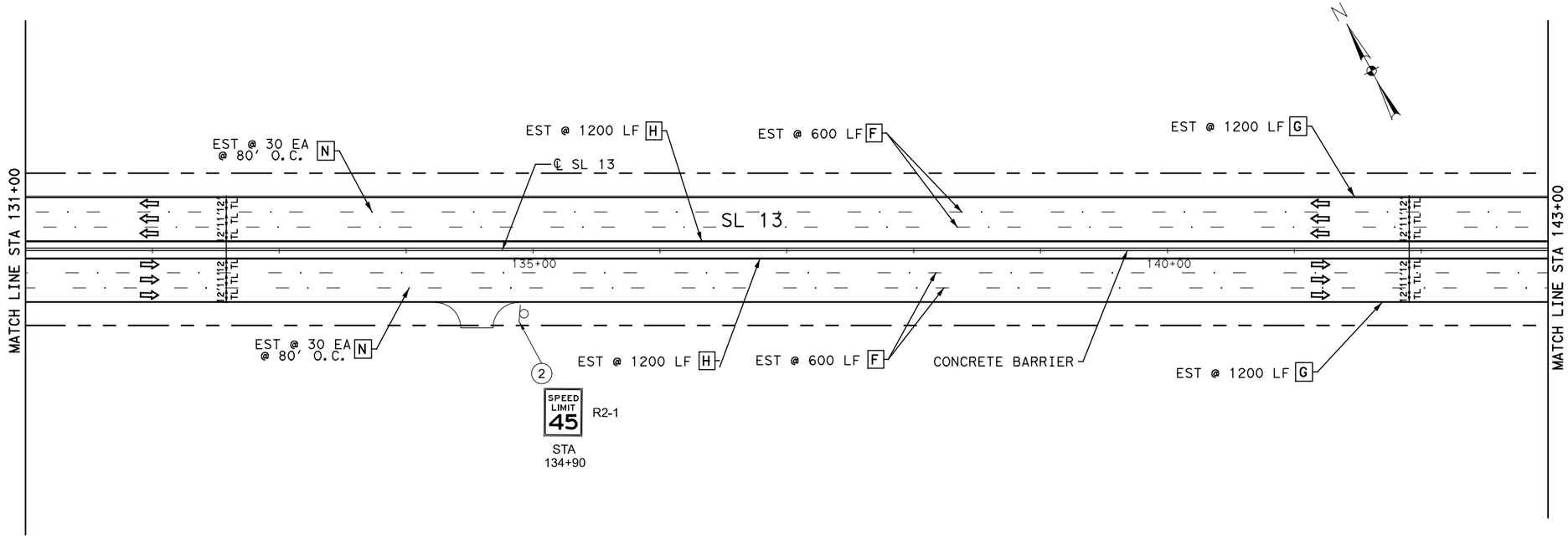
DATE:11/17/2021 TIME:10:52:37 AM
FILE:...\Pavement Markings\SPM-01.dgn

ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	
0644 6076	REMOVE SM RD SN SUP&AM	EA	2

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	12112
0666 6226	PAVEMENT SEALER 8"	LF	
0666 6230	PAVEMENT SEALER 24"	LF	
0666 6231	PAVEMENT SEALER (ARROW)	EA	
0666 6232	PAVEMENT SEALER (WORD)	EA	
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	

	ESTIMATED QUANTITIES PAVEMENT MARKINGS			
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	2400
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4800
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	4912
M	0672 6007	REFL PAV MRKR TY I-C	EA	
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	12
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	120





LEGEND:

- # REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

NAME 11/17/2021 DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TBPE F-1640

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 119+00 TO STA 143+00

SHEET 2 OF 9

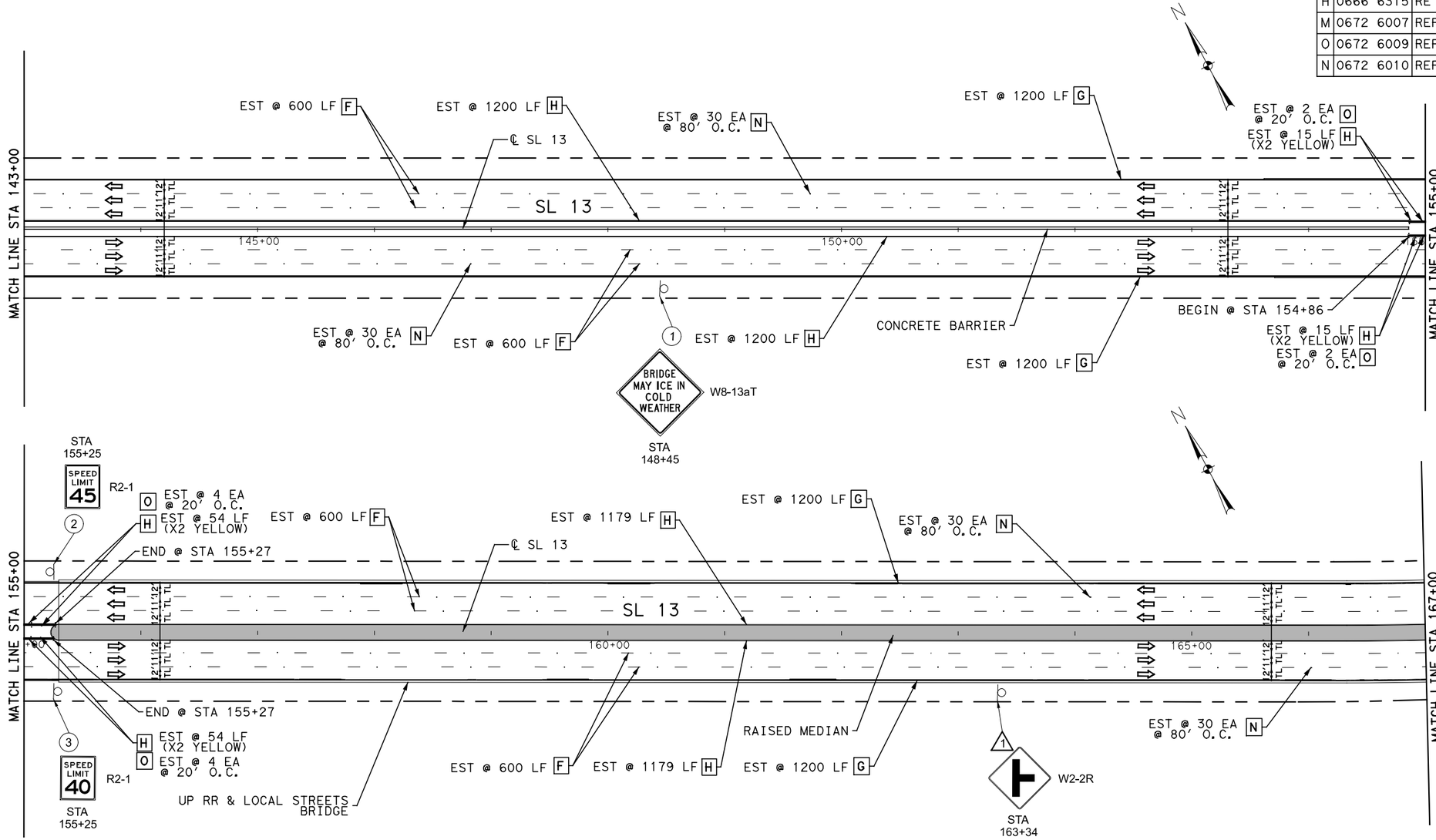
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		105
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:11/17/2021 TIME:10:52:42 AM
FILE:...\Pavement Markings\SPM-02.dgn

ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	9
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	
0644 6076	REMOVE SM RD SN SUP&AM	EA	3

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	12096
0666 6226	PAVEMENT SEALER 8"	LF	
0666 6230	PAVEMENT SEALER 24"	LF	
0666 6231	PAVEMENT SEALER (ARROW)	EA	
0666 6232	PAVEMENT SEALER (WORD)	EA	
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	

	ESTIMATED QUANTITIES PAVEMENT MARKINGS			
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	2400
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4800
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	4896
M	0672 6007	REFL PAV MRKR TY I-C	EA	
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	12
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	120



LEGEND:

- # REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

NAME 11/17/2021 DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
TEDSI
TBPE F-1640
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 143+00 TO STA 167+00

SHEET 3 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		106
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:11/17/2021 TIME:10:52:47 AM
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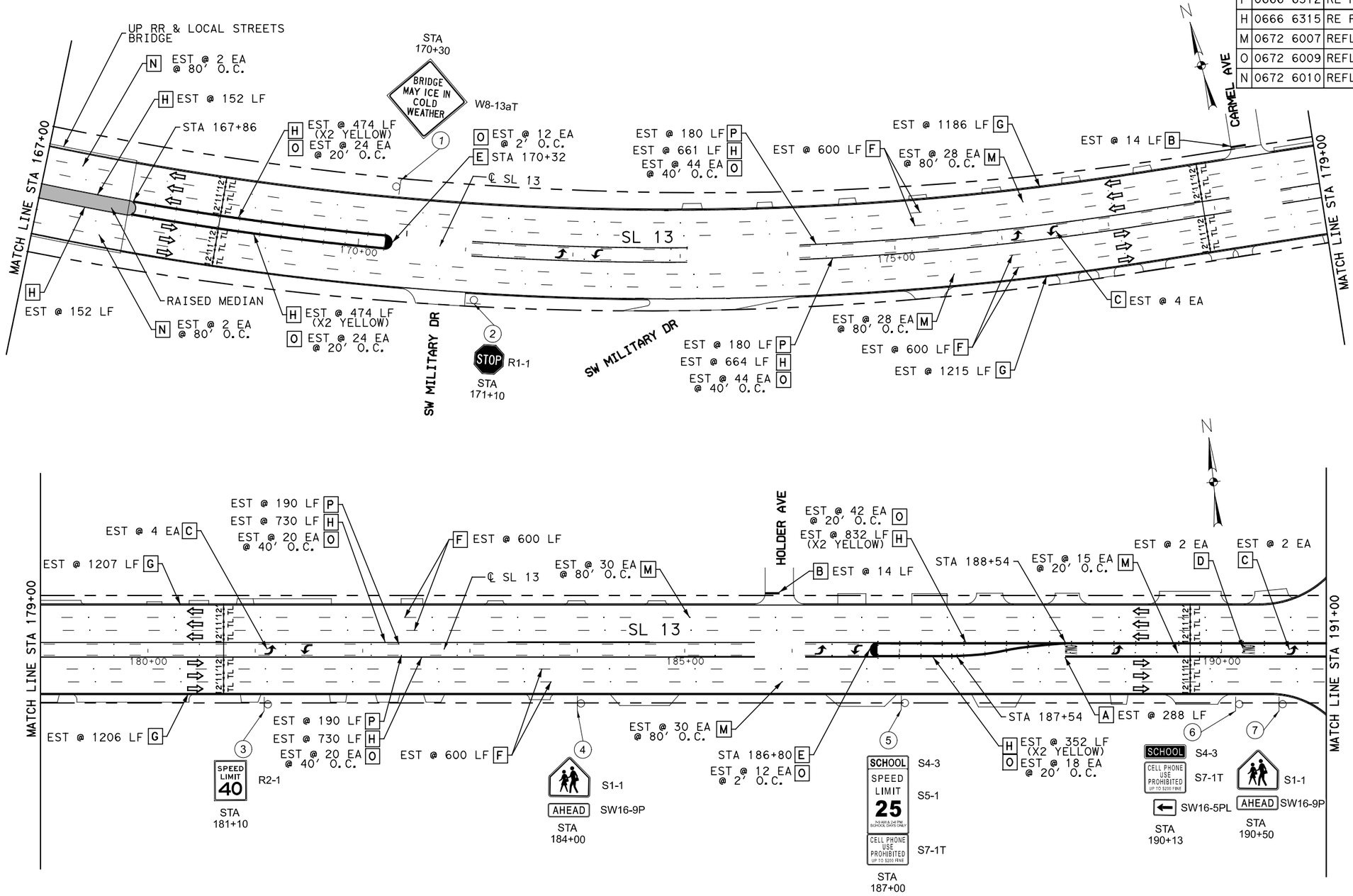
ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	6
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	1
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	
0644 6076	REMOVE SM RD SN SUP&AM	EA	7

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	13175
0666 6226	PAVEMENT SEALER 8"	LF	288
0666 6230	PAVEMENT SEALER 24"	LF	28
0666 6231	PAVEMENT SEALER (ARROW)	EA	10
0666 6232	PAVEMENT SEALER (WORD)	EA	2
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	2

	ESTIMATED QUANTITIES PAVEMENT MARKINGS			
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	288
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	28
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	10
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	2
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	2400
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4814
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	740
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	5221
M	0672 6007	REFL PAV MRKR TY I-C	EA	131
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	260
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	4



LEGEND:

- # REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

11/17/2021
NAME DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TBPE F-1640

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 167+00 TO STA 191+00

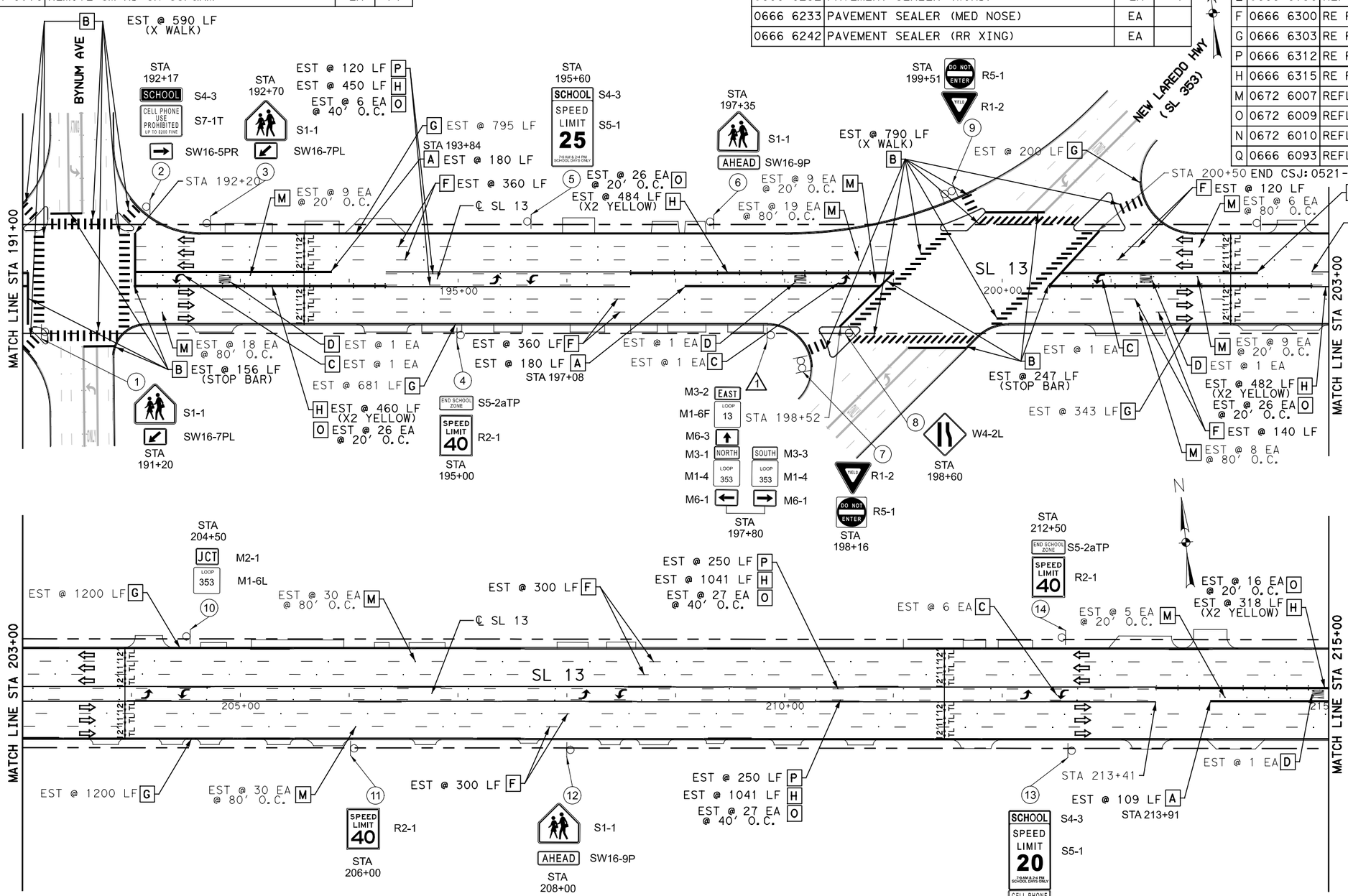
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		107
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:11/17/2021 TIME:10:52:57 AM
FILE:...\Pavement Markings\SPM-04.dgn

ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	21
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	10
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	2
0644 6076	REMOVE SM RD SN SUP&AM	EA	14

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	10895
0666 6226	PAVEMENT SEALER 8"	LF	469
0666 6230	PAVEMENT SEALER 24"	LF	1783
0666 6231	PAVEMENT SEALER (ARROW)	EA	11
0666 6232	PAVEMENT SEALER (WORD)	EA	4
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	
0666 6242	PAVEMENT SEALER (RR XING)	EA	

ESTIMATED QUANTITIES PAVEMENT MARKINGS			
ITEM	DESCRIPTION	UNIT	QTY
A 0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	469
B 0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	1783
C 0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	11
D 0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	4
E 0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	
F 0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	1580
G 0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4419
P 0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	620
H 0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	4276
M 0672 6007	REFL PAV MRKR TY I-C	EA	143
O 0672 6009	REFL PAV MRKR TY II-A-A	EA	154
N 0672 6010	REFL PAV MRKR TY II-C-R	EA	
Q 0666 6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	



DATE:11/17/2021 TIME:10:53:02 AM
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ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

NAME 11/17/2021 DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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TEDSI TBPE F-1640

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 191+00 TO STA 215+00

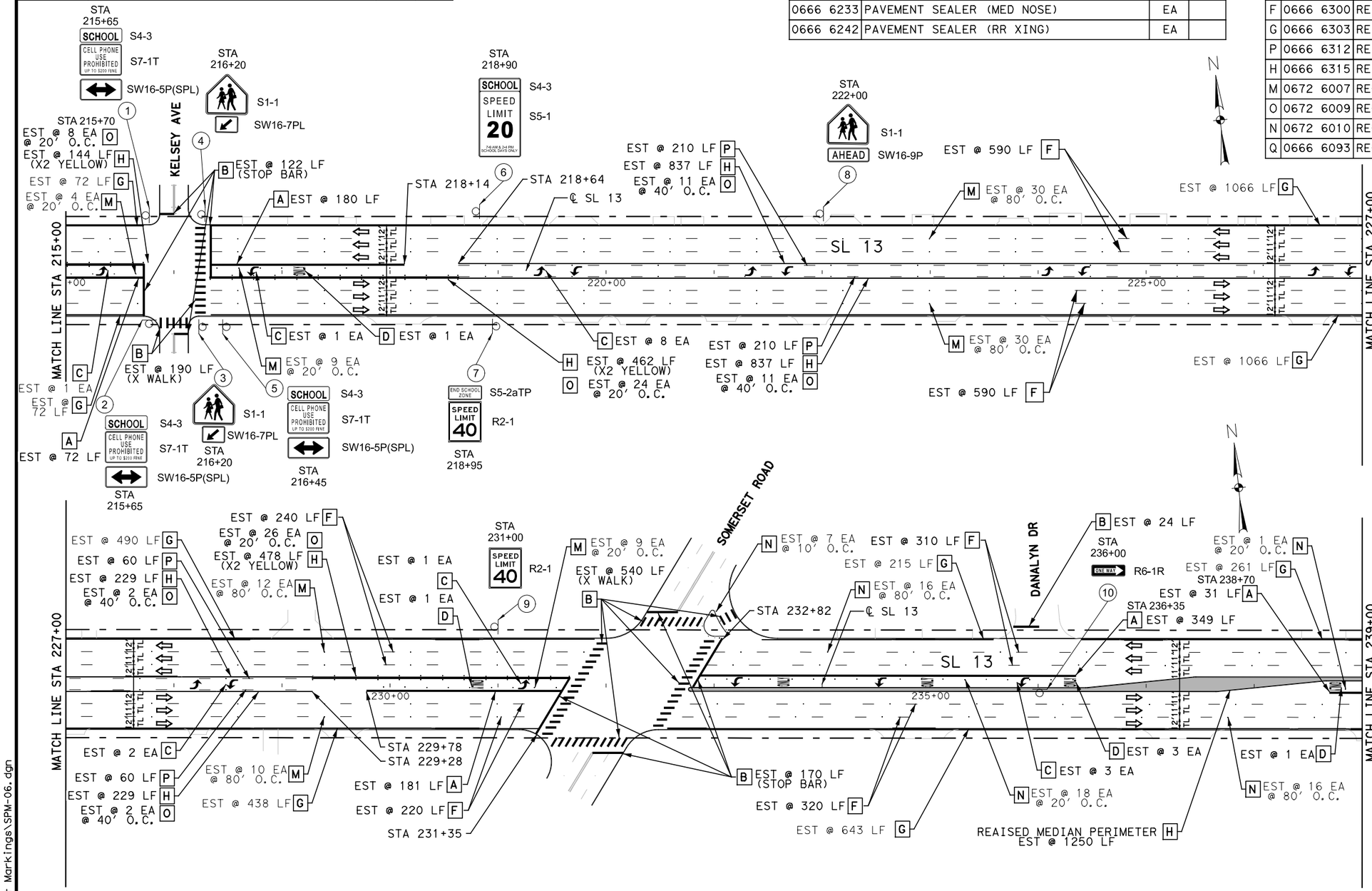
SHEET 5 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		108
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	7
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	3
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	
0644 6076	REMOVE SM RD SN SUP&AM	EA	10

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	11599
0666 6226	PAVEMENT SEALER 8"	LF	813
0666 6230	PAVEMENT SEALER 24"	LF	1046
0666 6231	PAVEMENT SEALER (ARROW)	EA	16
0666 6232	PAVEMENT SEALER (WORD)	EA	6
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	
0666 6242	PAVEMENT SEALER (RR XING)	EA	

	ESTIMATED QUANTITIES PAVEMENT MARKINGS			
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	813
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	1046
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	16
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	6
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	2270
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4323
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	540
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	4466
M	0672 6007	REFL PAV MRKR TY I-C	EA	104
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	84
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	58
Q	0666 6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	



LEGEND:

- (#) REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

11/17/2021
NAME DATE

No	REVISION	BY	DATE

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SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 215+00 TO STA 239+00

SHEET 6 OF 9

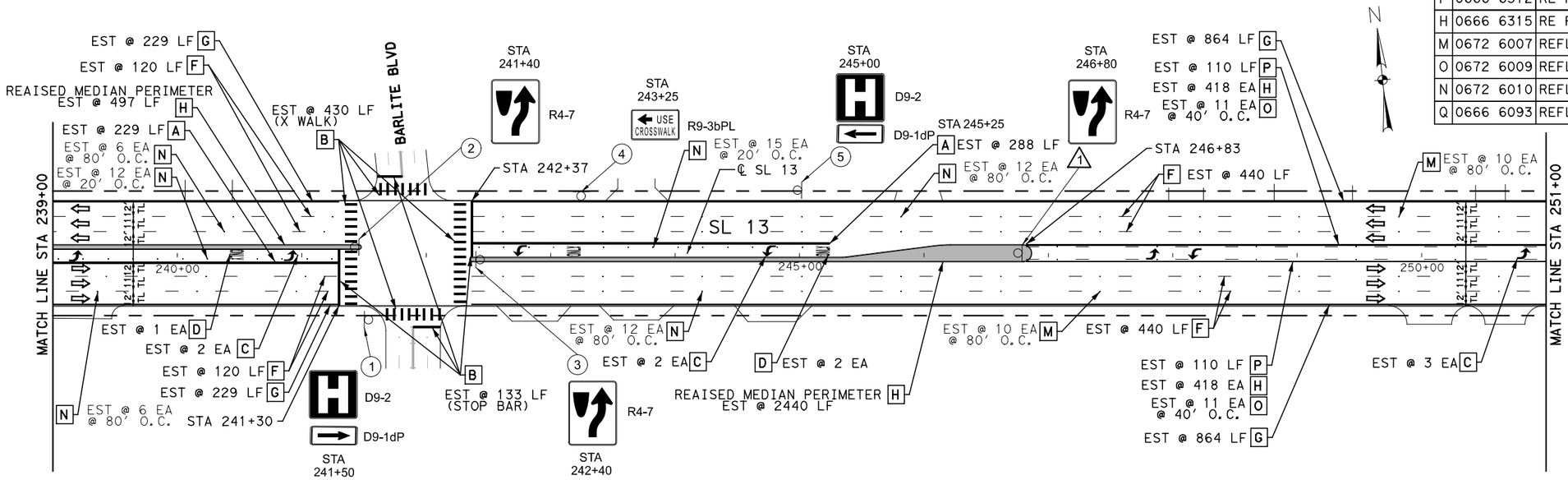
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		109
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

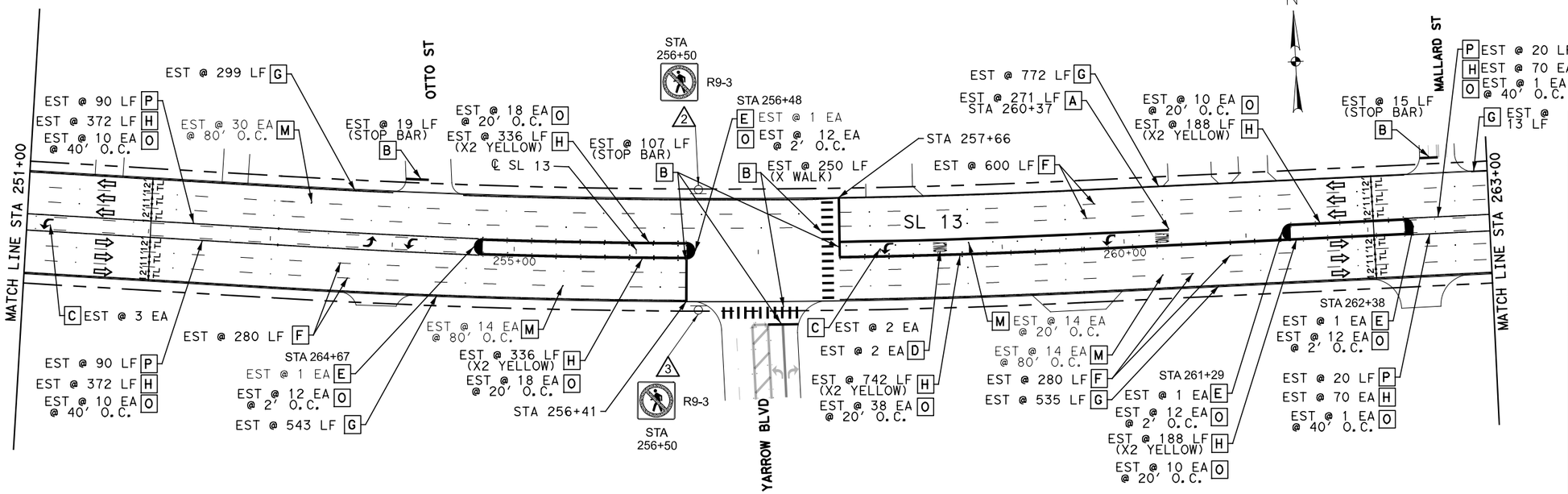
DATE:11/17/2021 TIME:10:53:08 AM
FILE:...\Pavement Markings\SPM-06.dgn

ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	9.5
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	5
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	
0644 6076	REMOVE SM RD SN SUP&AM	EA	5

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	13515
0666 6226	PAVEMENT SEALER 8"	LF	788
0666 6230	PAVEMENT SEALER 24"	LF	954
0666 6231	PAVEMENT SEALER (ARROW)	EA	12
0666 6232	PAVEMENT SEALER (WORD)	EA	5
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	4
0666 6242	PAVEMENT SEALER (RR XING)	EA	

	ESTIMATED QUANTITIES PAVEMENT MARKINGS			
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	788
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	954
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	12
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	5
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	4
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	2280
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4348
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	440
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	6447
M	0672 6007	REFL PAV MRKR TY I-C	EA	92
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	186
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	63
Q	0666 6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	





LEGEND:

- # REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

11/17/2021
NAME DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898
TEDSI TBPE F-1640

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 239+00 TO STA 263+00

SHEET 7 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		110
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:11/17/2021 TIME:10:53:13 AM
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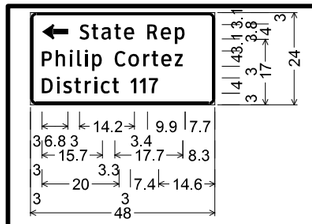
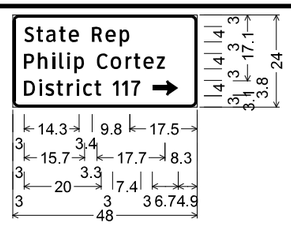


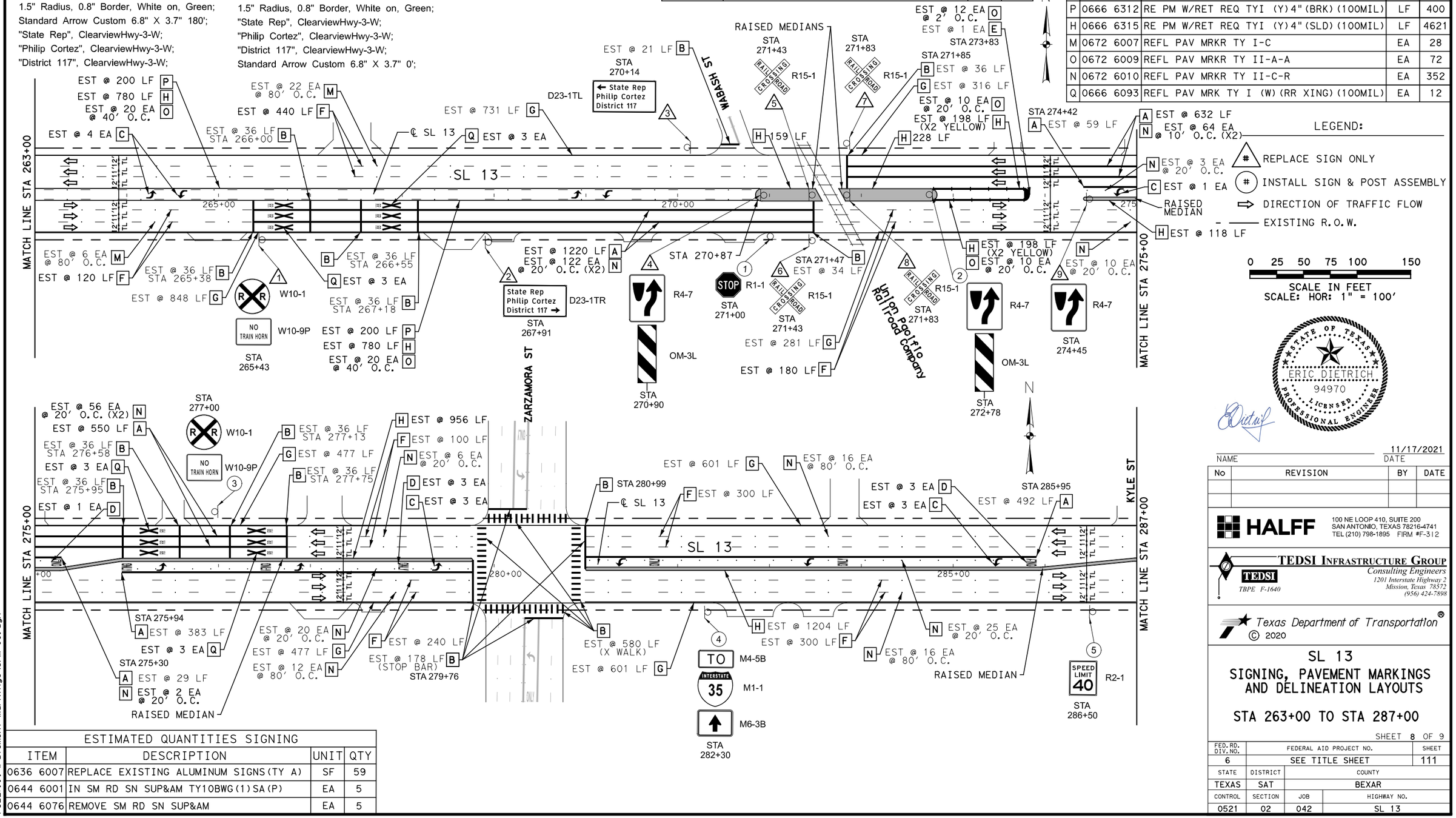
D23-1TL_48x24;
1.5" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 6.8" X 3.7" 180';
"State Rep", ClearviewHwy-3-W;
"Philip Cortez", ClearviewHwy-3-W;
"District 117", ClearviewHwy-3-W;



D23-1TR_48x24;
1.5" Radius, 0.8" Border, White on, Green;
"State Rep", ClearviewHwy-3-W;
"Philip Cortez", ClearviewHwy-3-W;
"District 117", ClearviewHwy-3-W;
Standard Arrow Custom 6.8" X 3.7" 0';

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	11033
0666 6226	PAVEMENT SEALER 8"	LF	3365
0666 6230	PAVEMENT SEALER 24"	LF	1116
0666 6231	PAVEMENT SEALER (ARROW)	EA	11
0666 6232	PAVEMENT SEALER (WORD)	EA	7
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	1
0666 6242	PAVEMENT SEALER (RR XING)	EA	12

ESTIMATED QUANTITIES PAVEMENT MARKINGS				
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	3365
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	1116
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	11
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	7
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	1
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	1680
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	4332
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	400
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	4621
M	0672 6007	REFL PAV MRKR TY I-C	EA	28
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	72
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	352
Q	0666 6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	12



ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	59
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	5
0644 6076	REMOVE SM RD SN SUP&AM	EA	5

DATE:11/17/2021 TIME:10:53:18 AM
FILE:...\Pavement Markings\SPM-08.dgn

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED
PROFESSIONAL ENGINEER

11/17/2021
NAME DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
SAN ANTONIO, TEXAS 78216-4741
TEL (210) 798-1895 FIRM #F-312

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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TEDSI
TBPE F-1640

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 263+00 TO STA 287+00

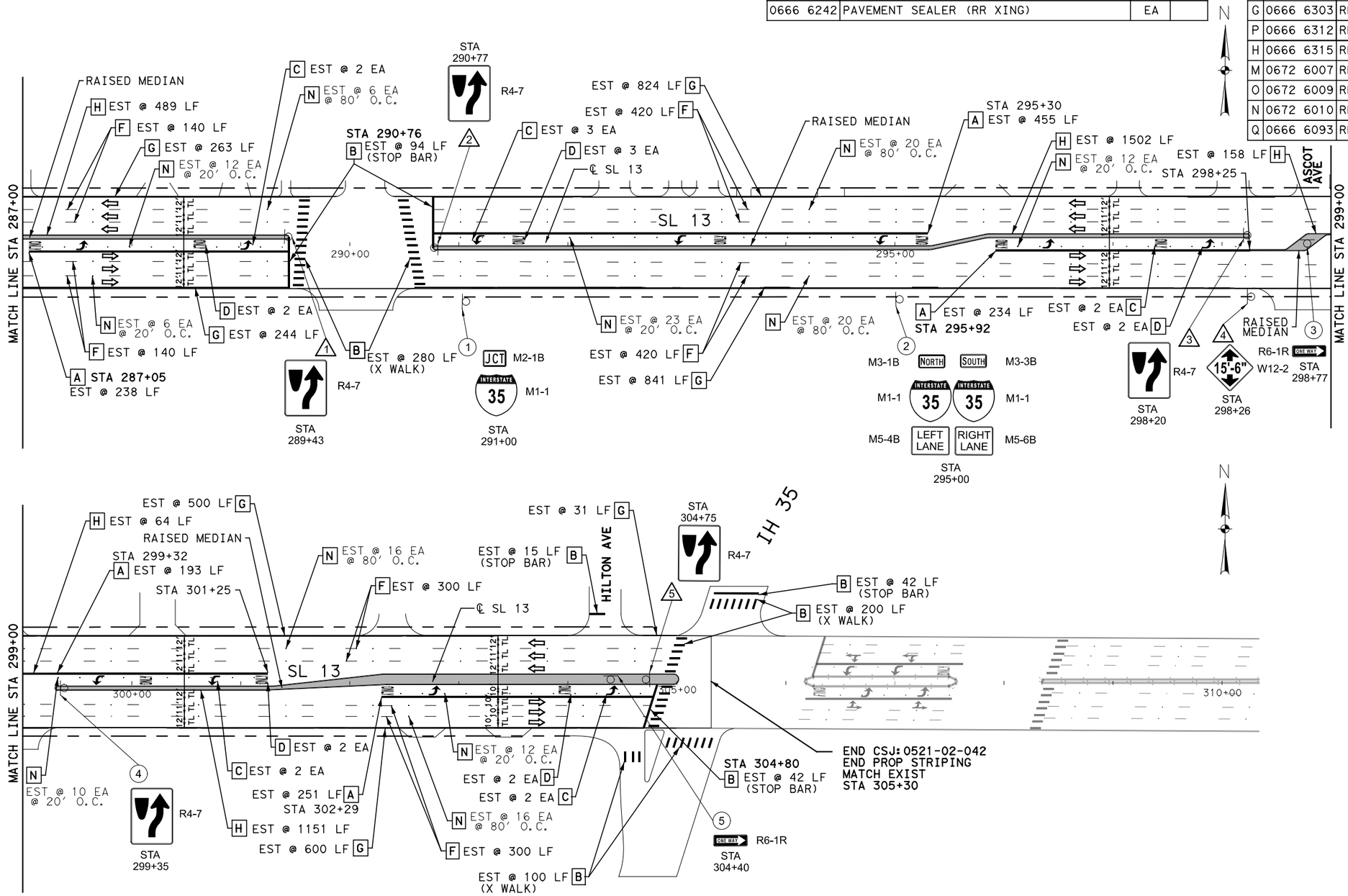
SHEET 8 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		111
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

ESTIMATED QUANTITIES SIGNING			
ITEM	DESCRIPTION	UNIT	QTY
0636 6007	REPLACE EXISTING ALUMINUM SIGNS(TY A)	SF	29
0644 6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
0644 6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
0644 6044	IN SM RD SN SUP&AM TYS80(1)SB(U)	EA	1
0644 6076	REMOVE SM RD SN SUP&AM	EA	5

ESTIMATED QUANTITIES PAVEMENT MARKINGS (CONT.)			
ITEM	DESCRIPTION	UNIT	QTY
0666 6224	PAVEMENT SEALER 4"	LF	8387
0666 6226	PAVEMENT SEALER 8"	LF	1371
0666 6230	PAVEMENT SEALER 24"	LF	773
0666 6231	PAVEMENT SEALER (ARROW)	EA	11
0666 6232	PAVEMENT SEALER (WORD)	EA	11
0666 6233	PAVEMENT SEALER (MED NOSE)	EA	
0666 6242	PAVEMENT SEALER (RR XING)	EA	

	ESTIMATED QUANTITIES PAVEMENT MARKINGS			
	ITEM	DESCRIPTION	UNIT	QTY
A	0666 6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1371
B	0666 6048	REFL PAV MRK TY I(W)24"(SLD)(100MIL)	LF	773
C	0666 6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	11
D	0666 6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	11
E	0666 6156	REF PAV MRK TY I (Y)(MED NOSE)(100MIL)	EA	
F	0666 6300	RE PM W/RET REQ TYI (W)4"(BRK)(100MIL)	LF	1720
G	0666 6303	RE PM W/RET REQ TYI (W)4"(SLD)(100MIL)	LF	3303
P	0666 6312	RE PM W/RET REQ TYI (Y)4"(BRK)(100MIL)	LF	
H	0666 6315	RE PM W/RET REQ TYI (Y)4"(SLD)(100MIL)	LF	3364
M	0672 6007	REFL PAV MRKR TY I-C	EA	
O	0672 6009	REFL PAV MRKR TY II-A-A	EA	
N	0672 6010	REFL PAV MRKR TY II-C-R	EA	153
Q	0666 6093	REFL PAV MRK TY I (W)(RR XING)(100MIL)	EA	



LEGEND:

- # REPLACE SIGN ONLY
- (#) INSTALL SIGN & POST ASSEMBLY
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W.

0 25 50 75 100 150

SCALE IN FEET
SCALE: HOR: 1" = 100'

STATE OF TEXAS
ERIC DIETRICH
94970
LICENSED PROFESSIONAL ENGINEER

11/17/2021
NAME DATE

No	REVISION	BY	DATE

HALFF
100 NE LOOP 410, SUITE 200
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TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
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TBPE F-1640
1201 Interstate Highway 2
Mission, Texas 78572
(956) 424-7898

SL 13
SIGNING, PAVEMENT MARKINGS AND DELINEATION LAYOUTS
STA 287+00 TO END

SHEET 9 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET
6	SEE TITLE SHEET		112
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	HIGHWAY NO.
0521	02	042	SL 13

DATE:11/17/2021 TIME:10:53:26 AM
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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

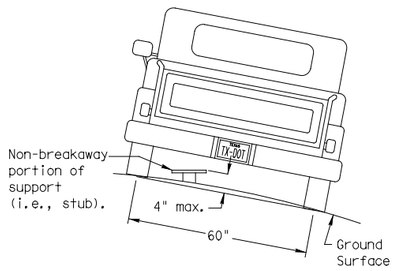
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

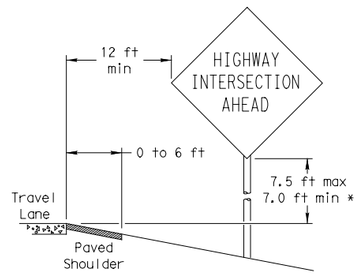
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

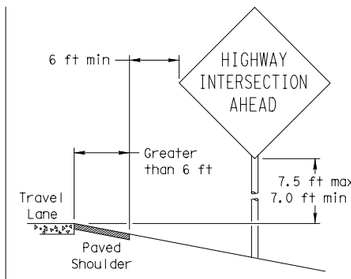
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

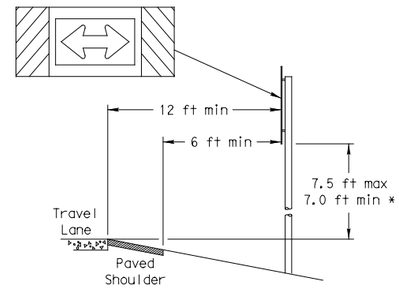
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



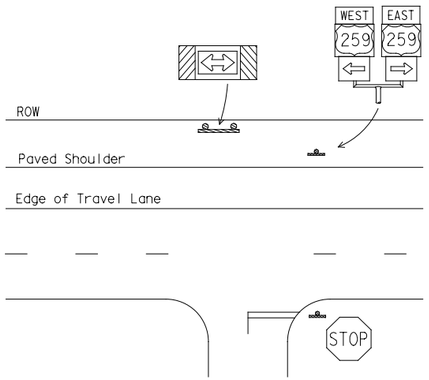
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

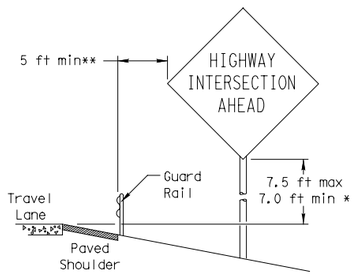
T-INTERSECTION



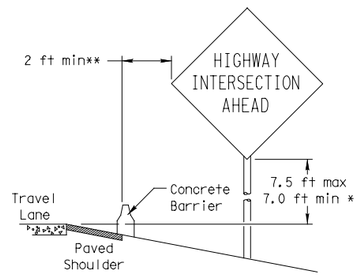
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER

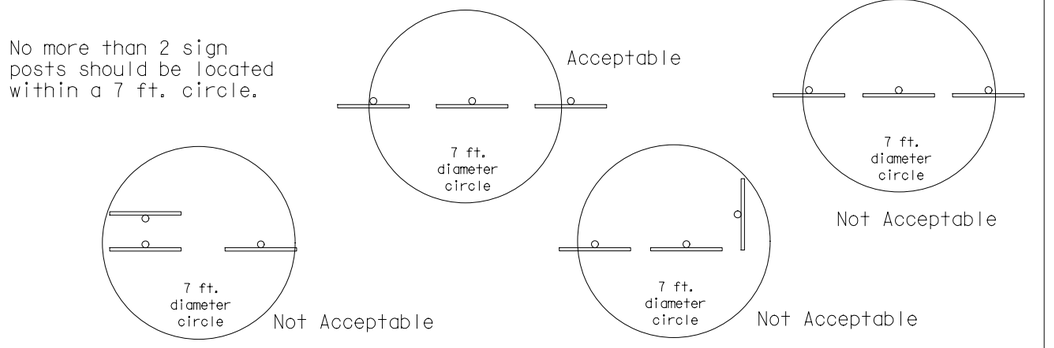


BEHIND GUARDRAIL



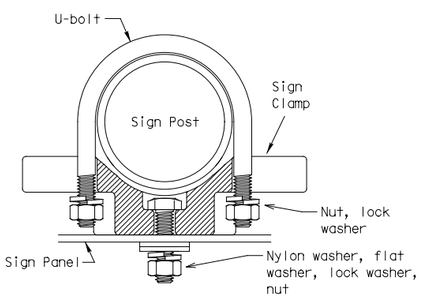
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

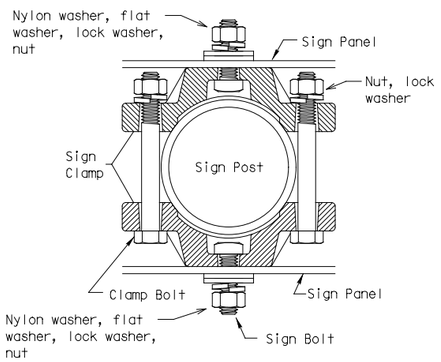


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



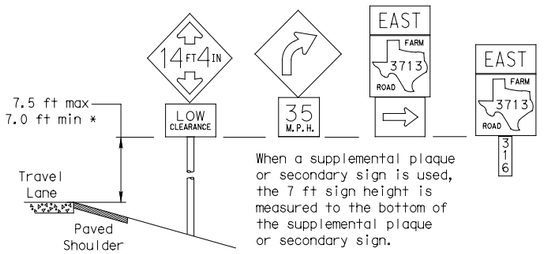
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

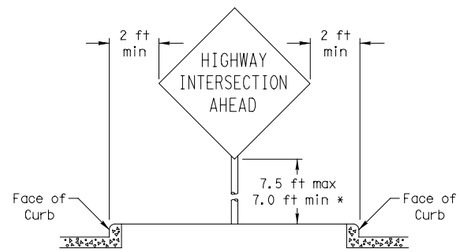
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



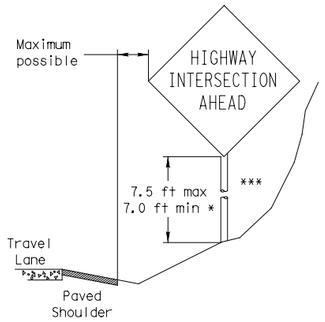
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* 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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

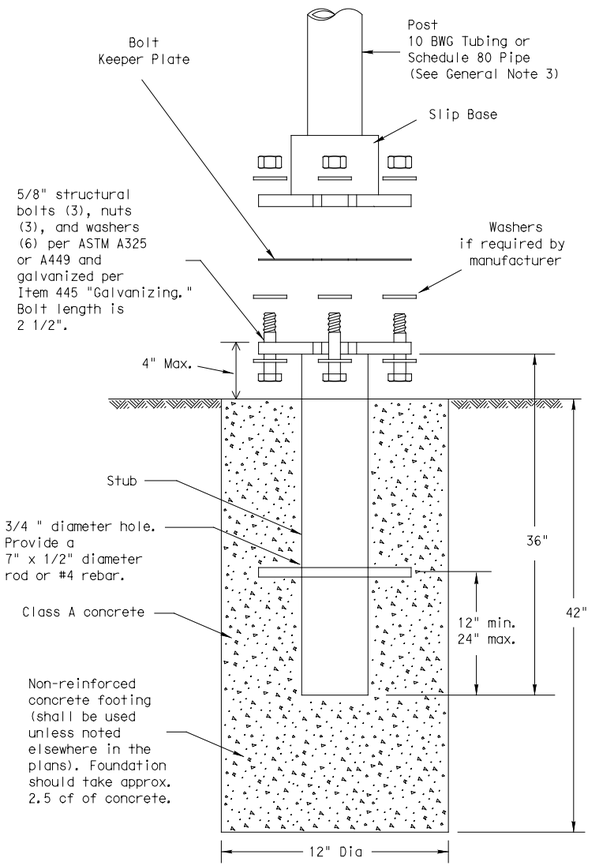
REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0521	02	042	SL 13
DIST	COUNTY		SHEET NO.
SAT	BEXAR		113

26A

DATE: 8/25/2021 4:04:55 PM
FILE: ...\Standards\smdgen.dgn

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:

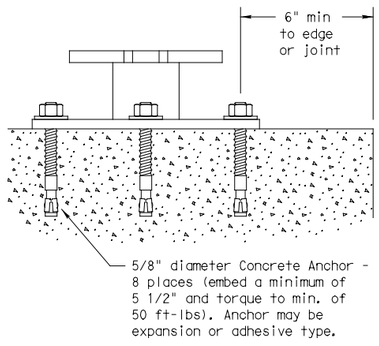
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   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
CONT	SECT	JOB	HIGHWAY
0521	02	042	SL 13
DIST	COUNTY		SHEET NO.
SAT	BEXAR		114

REVISIONS
9-08

26B

DATE: 8/25/2021 4:04:59 PM
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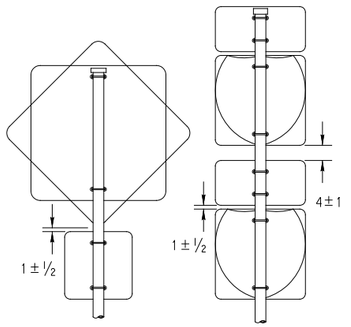
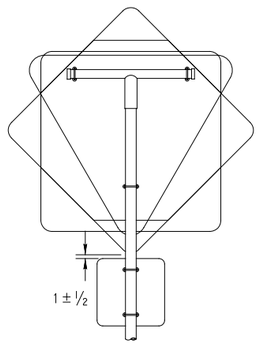
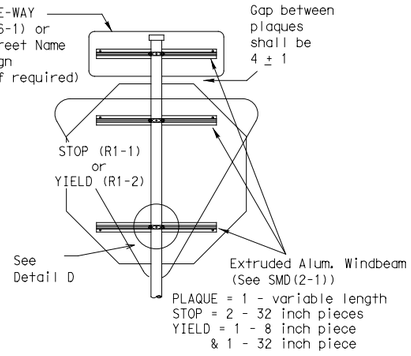


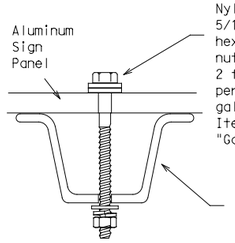
SM RD SGN ASSM TY XXXXX(1)XX(P)



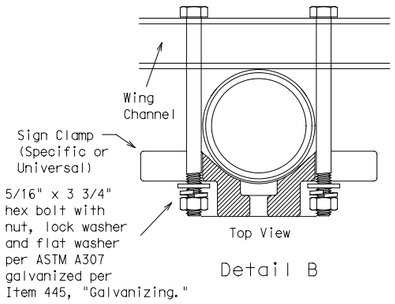
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



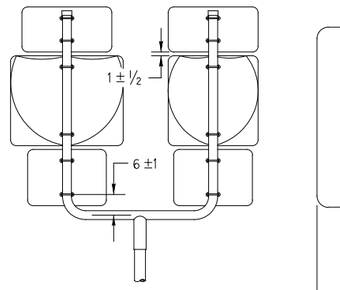
Detail B

GENERAL NOTES:

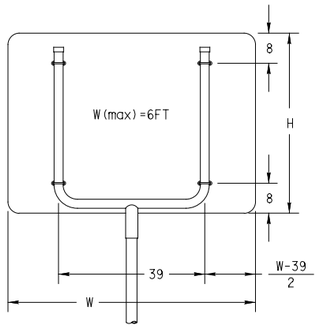
1.

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.



SM RD SGN ASSM TY XXXXX(1)XX(U)



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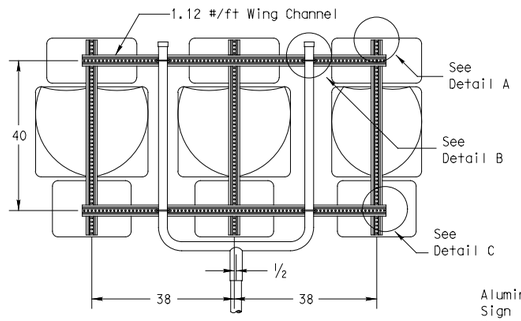
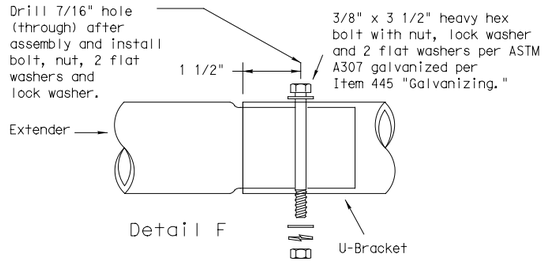
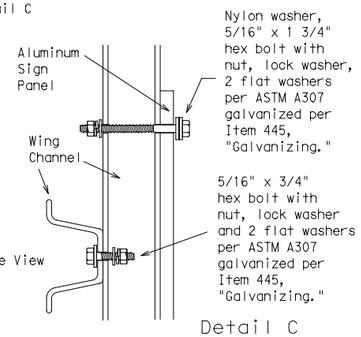


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

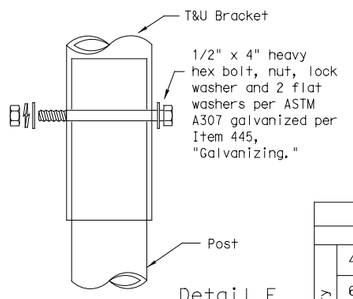


Detail F

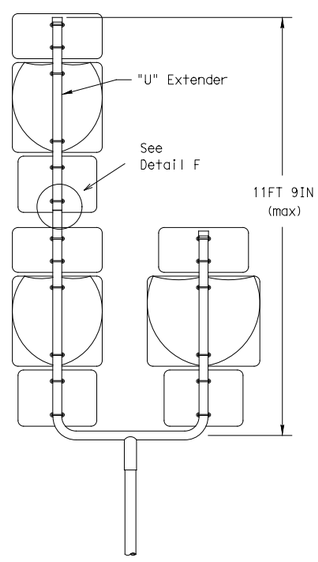
Splices shall only be allowed behind the sign substrate.



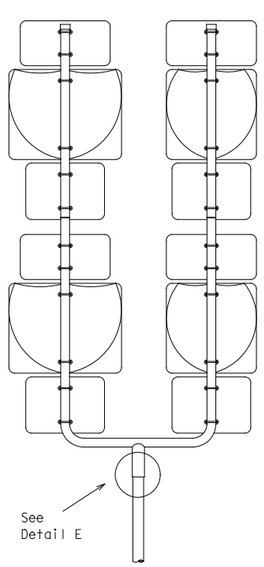
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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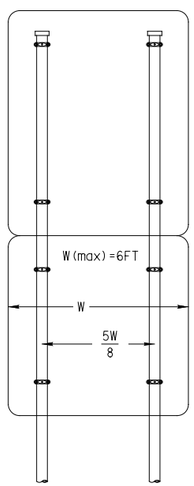
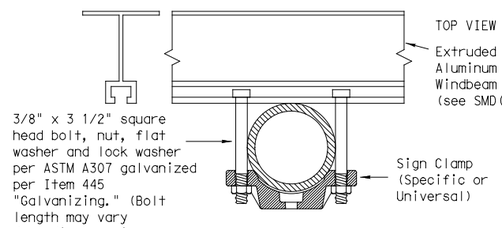
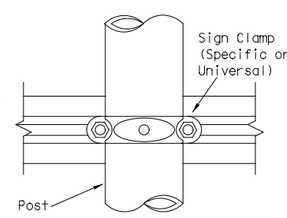


SM RD SGN ASSYM TY XXXXX(2)XX(P)

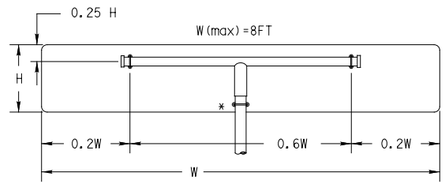
SIDE VIEW





Detail D

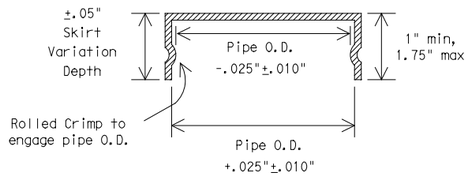
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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)



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.

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
0521	02	042	SL 13
DIST	COUNTY		SHEET NO.
SAT	BEXAR		115

9-08 REVISIONS

26C

DATE: 8/25/2021 4:05:03 PM
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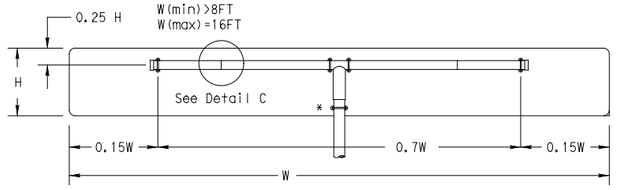
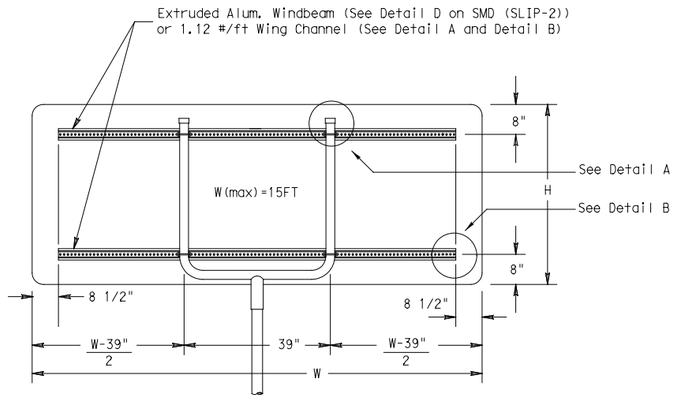
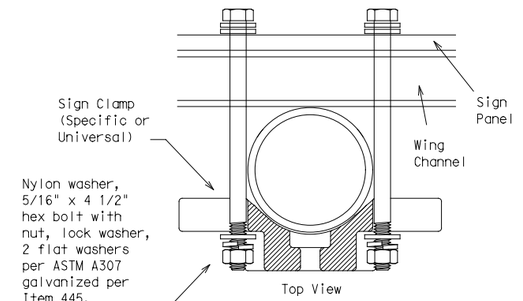


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

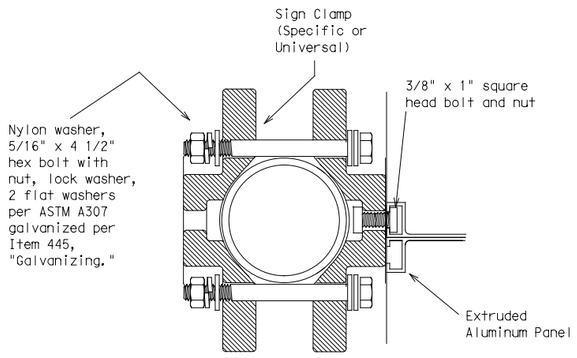
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

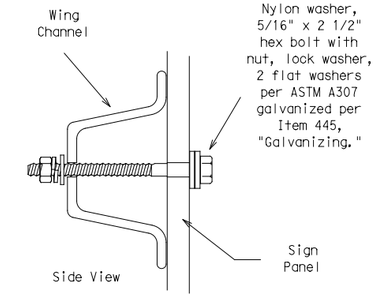


Detail A

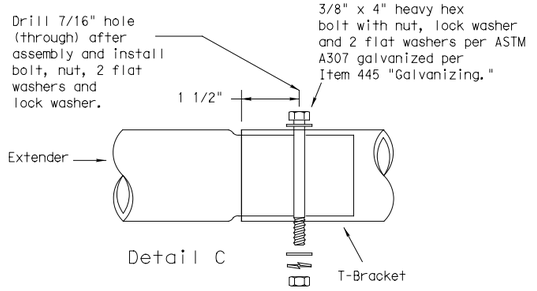


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

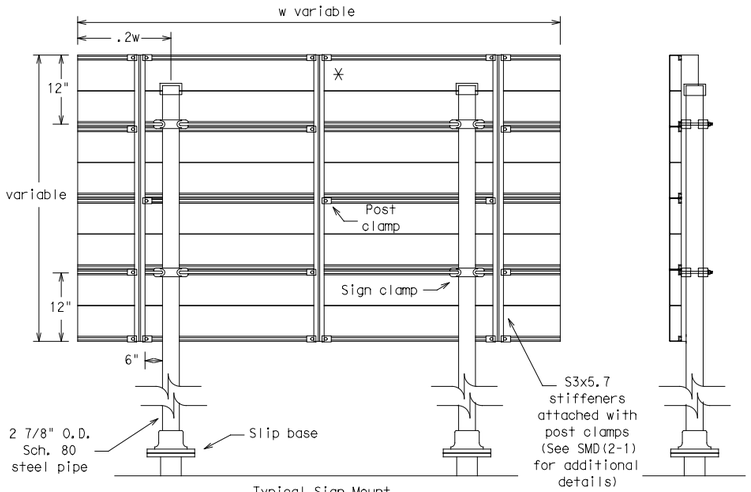


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

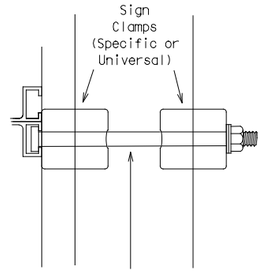


Typical Sign Mount

SM RD SGN ASSM TY S80(2)XX(P-EXAL)

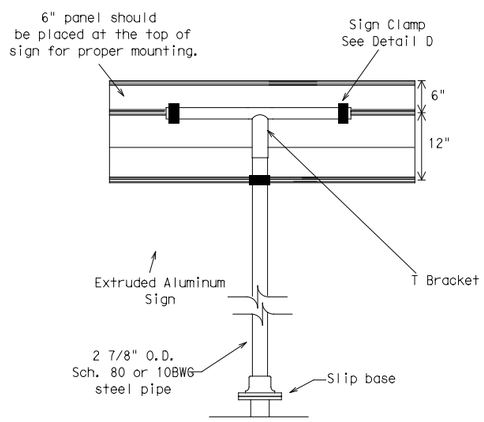
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

See Detail E
for clamp installation

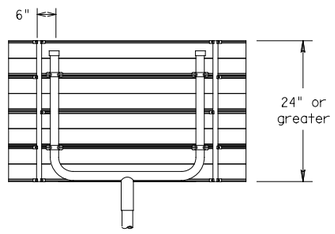


3/8" x 4 1/2"
square head
bolt, nut,
flat washer
and lock washer per
ASTM A307 galvanized
per Item 445,
"Galvanizing."

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

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

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		116

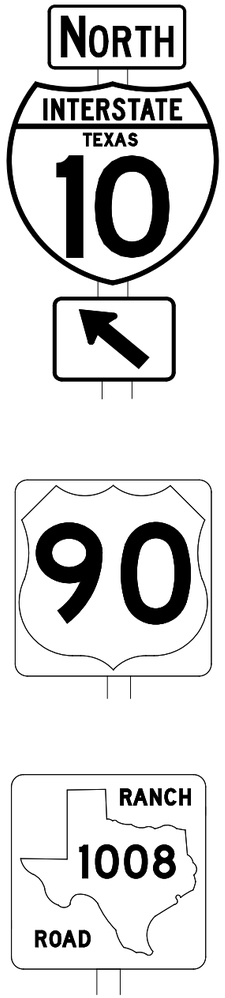
26D

DATE: 8/25/2021 4:05:07 PM
FILE: ...\Standards\smds3.dgn

DATE: 8/25/2021 4:05:10 PM
FILE: ...\Standards\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

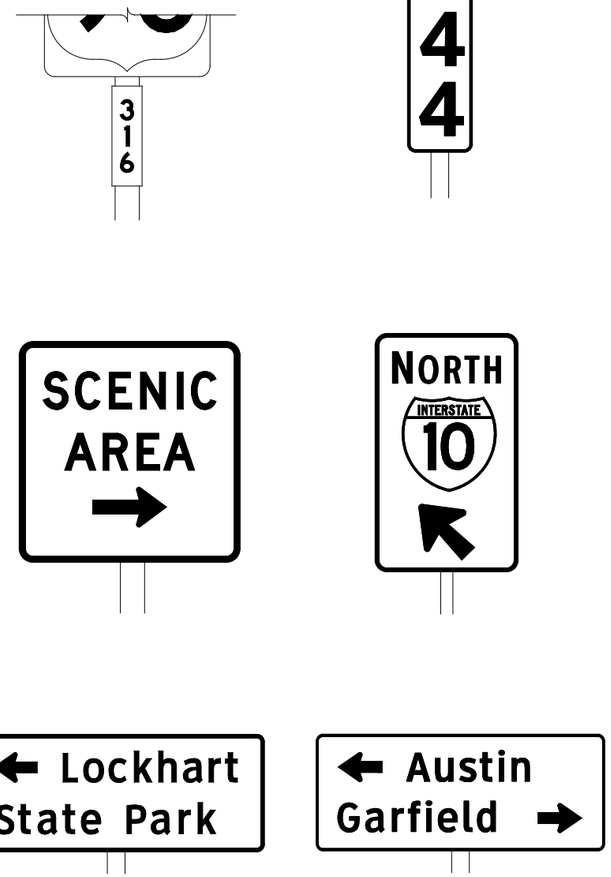
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

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

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

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

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

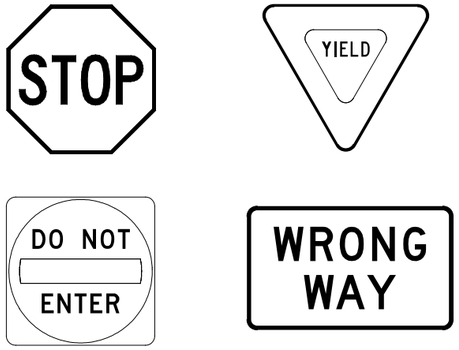
TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	SAT	BEXAR		117

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

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

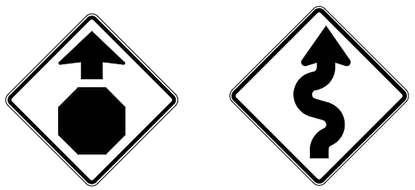
ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

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

http://www.txdot.gov/

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

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-03 7-13 9-08	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		118

4

DATE: 8/25/2021 4:05:14 PM
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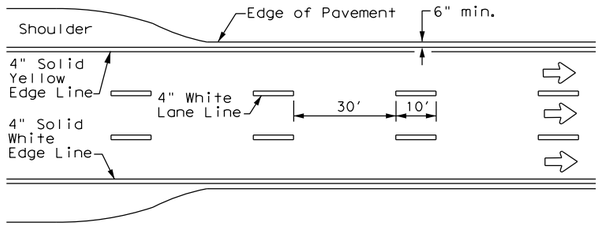
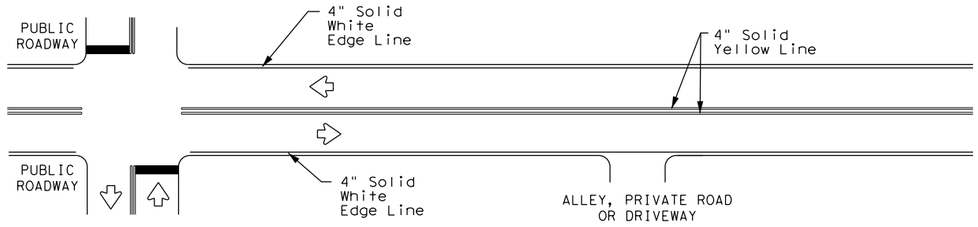
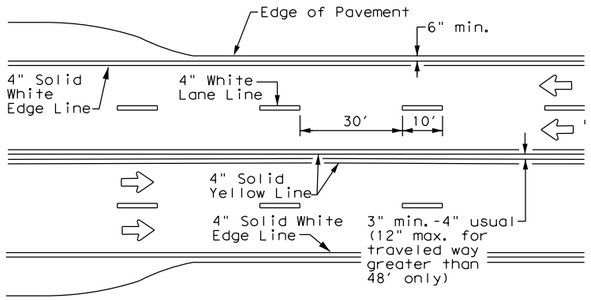


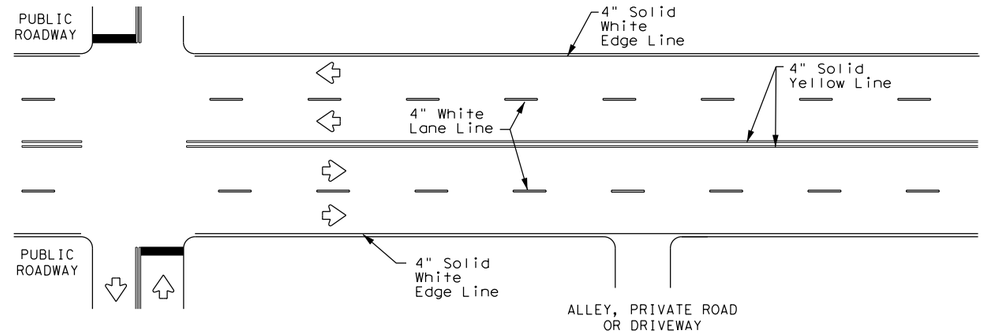
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



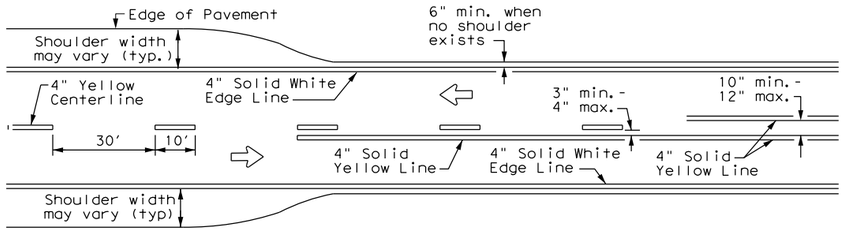
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



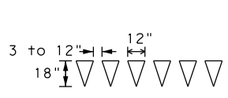
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



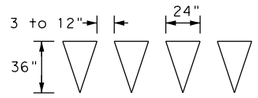
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

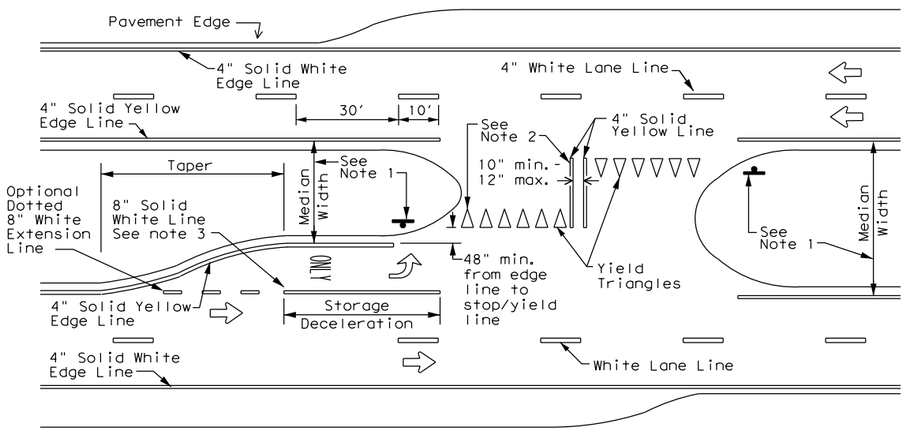


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

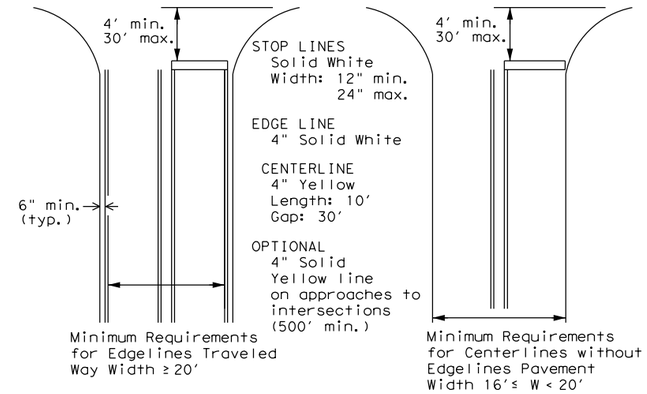
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths
for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0521	02	042	SL 13
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAN	BEXAR		119

22A

DATE: 11/17/2021 12:23:47 PM
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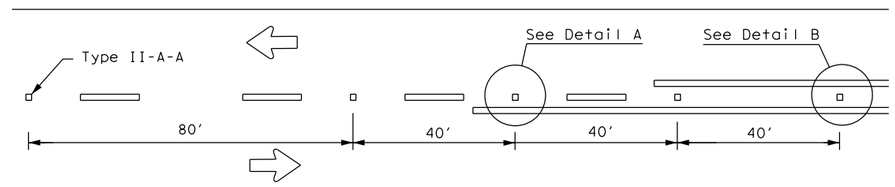
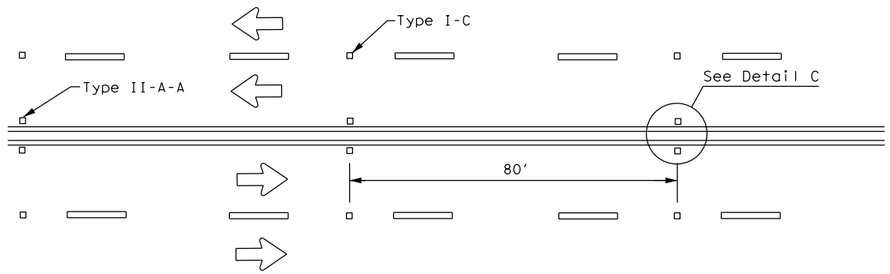
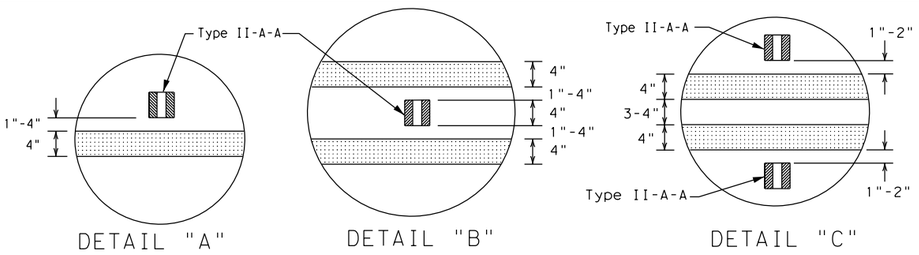
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



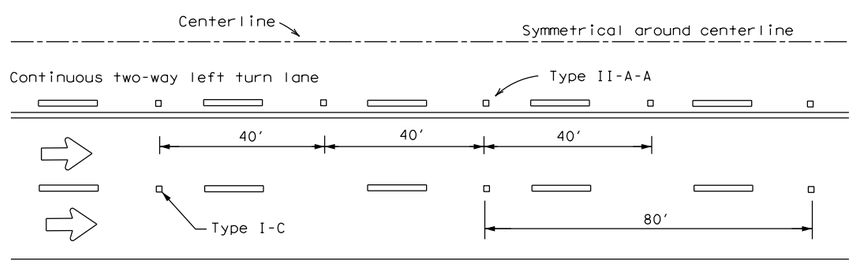
CENTERLINE FOR ALL TWO LANE ROADWAYS



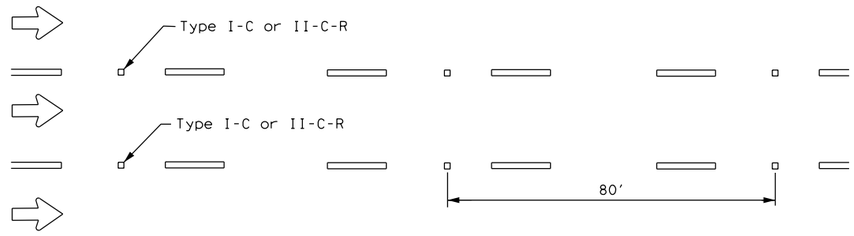
CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"

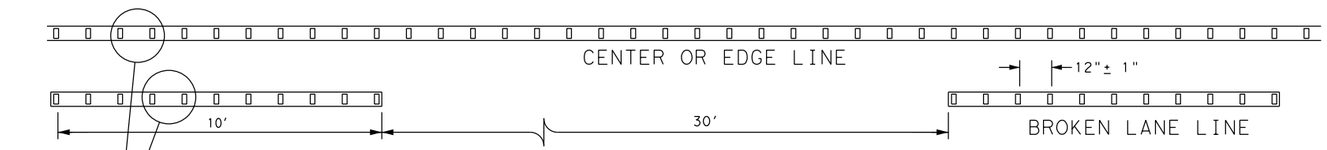


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



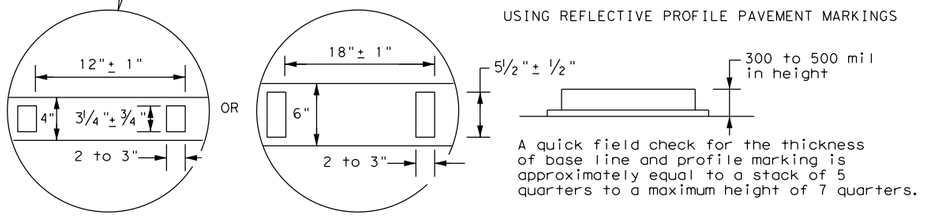
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



REFLECTORIZED PROFILE
PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

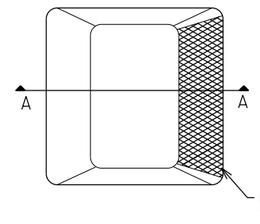
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

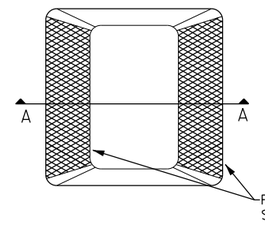
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

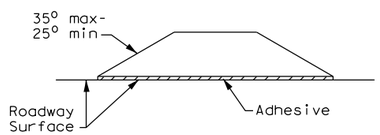
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0521	02	042	SL 13
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	SAN	BEXAR		120

22B

DATE: 11/17/2021 12:23:47 PM
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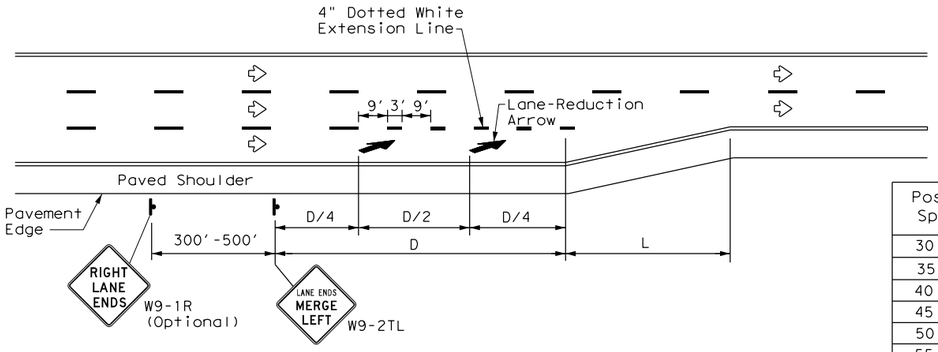
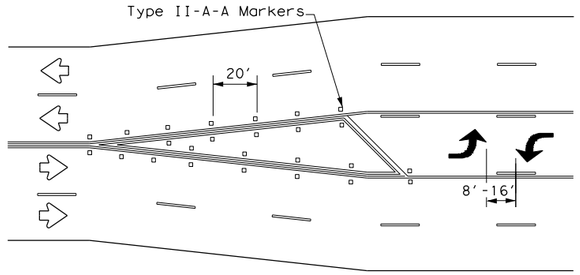


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

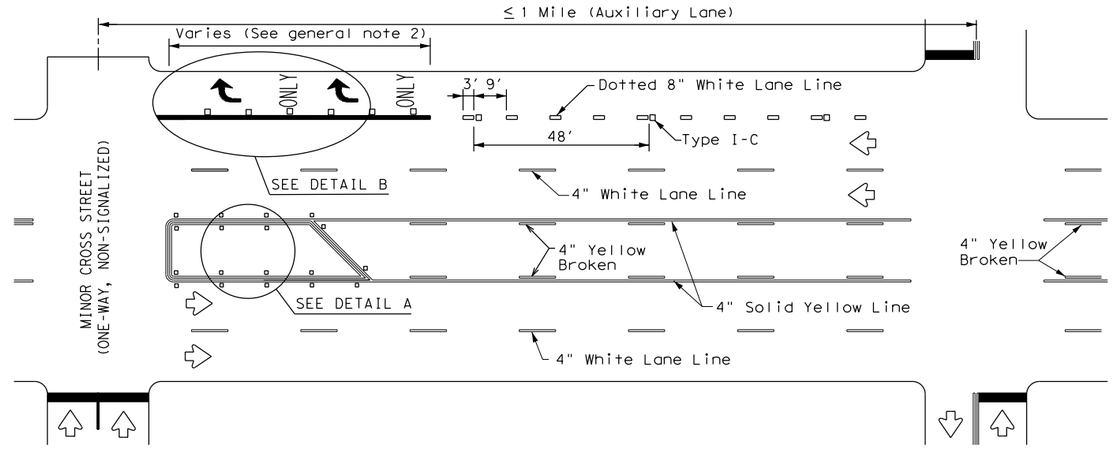
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

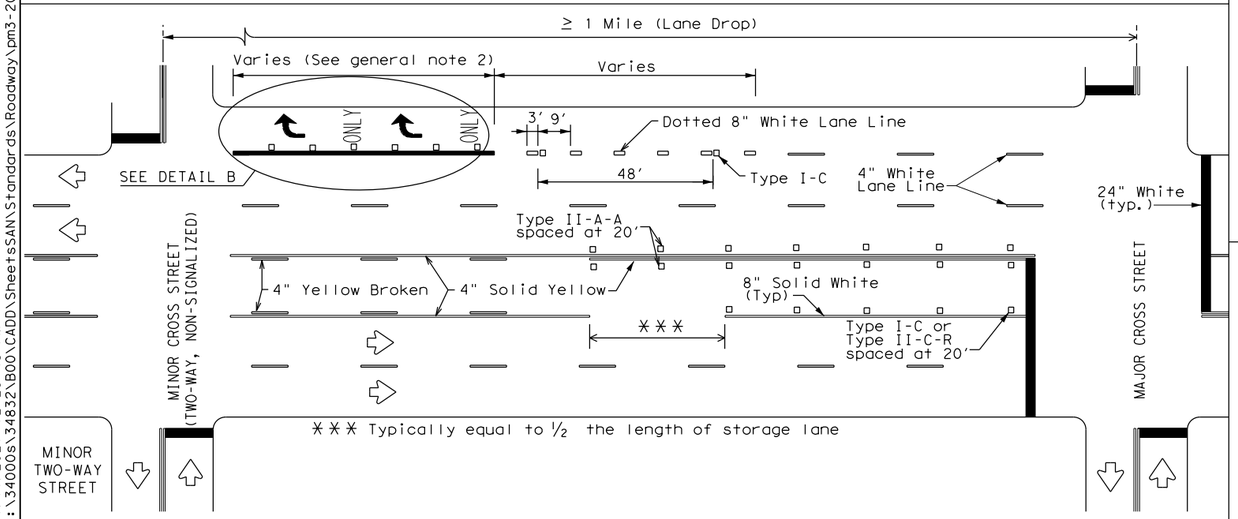
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

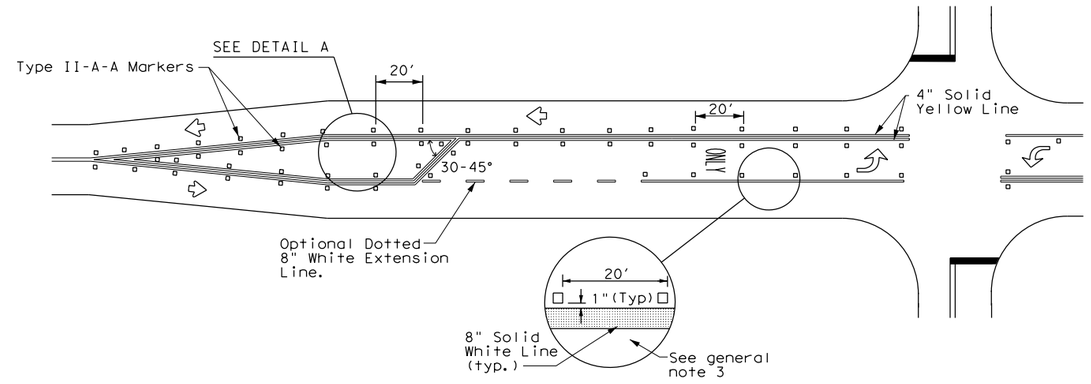
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



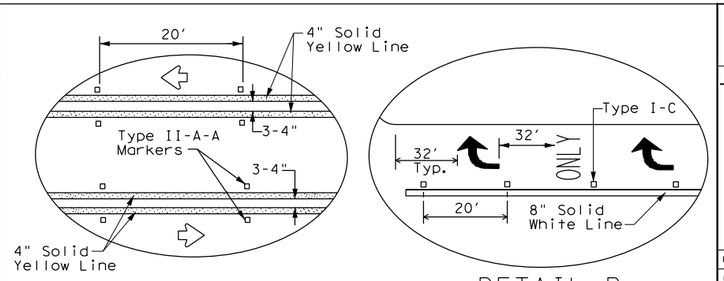
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A DETAIL B

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	SAN	BEXAR		121
3-03 6-20				

22C

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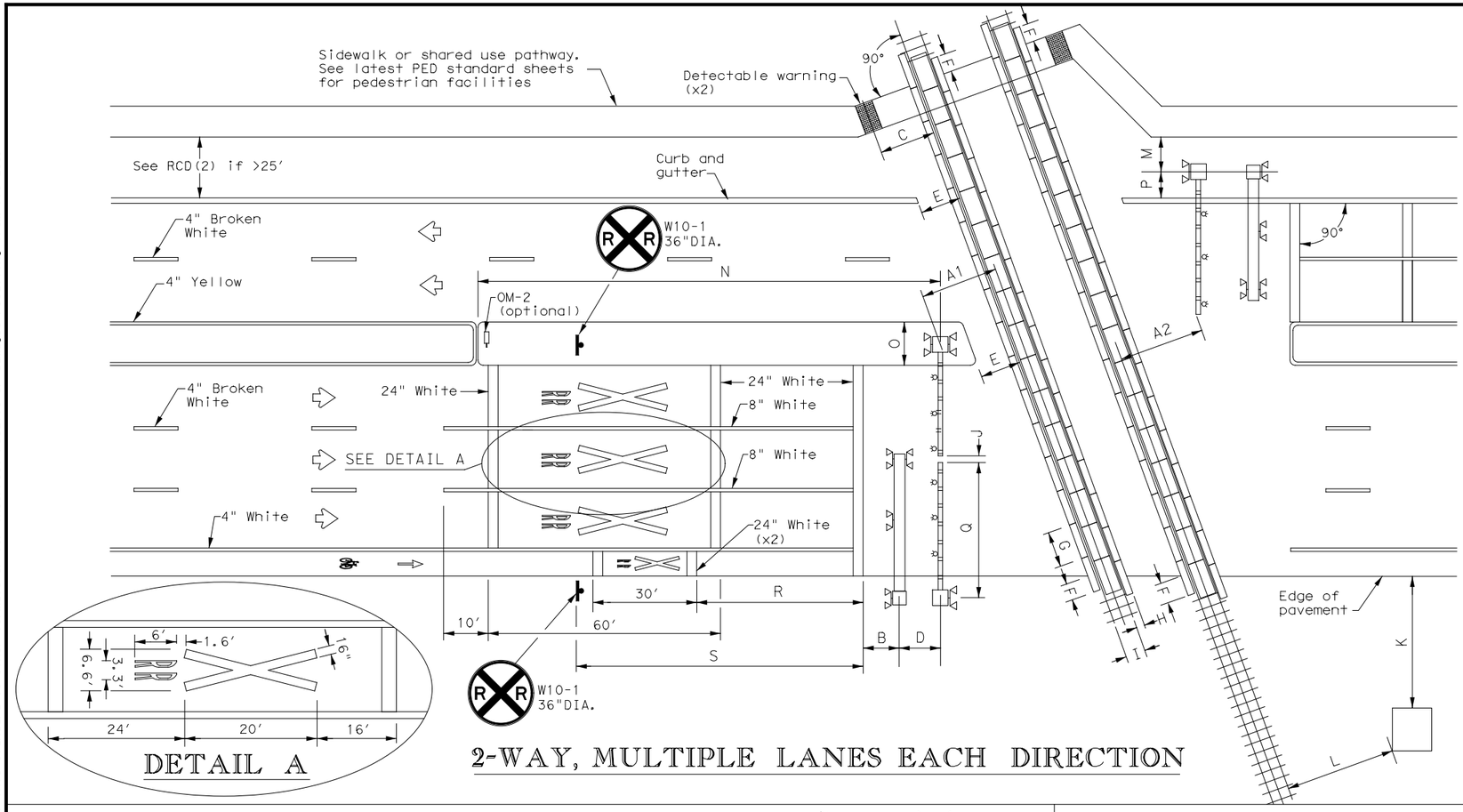


2-WAY, MULTIPLE LANES EACH DIRECTION

DETAIL A

NOTES

A1: Center of RR mast to center of rail: 12' minimum, 15' typical.

A2: Tip of gate to center of rail: 12' minimum, 15' typical.

B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).

C: Center of detectable warning device to nearest rail: 6' minimum

D: Center of gate mast to center of cantilever mast: 6' typical. NOTE: Cantilever may be located in front or behind gates.

E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.

F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.

G: Length of panels along rail: 8' typical.

H: Width of field panel: 2' typical (check with railroad company).

I: Distance between rails: 4'-8.5".

J: Tip of gate to tip of gate: 2' maximum for Quiet Zone SSM or 90% of traveled way covered by gates for all other locations.

K: Nearest edge of RR cabin from edge of pavement: 30' typical. NOTE: Cabinet not required to be parallel to edge of pavement.

L: Nearest edge of RR cabin from nearest rail: 25' typical.

M: Center of RR mast to edge of sidewalk: 6' minimum.

N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60'will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.

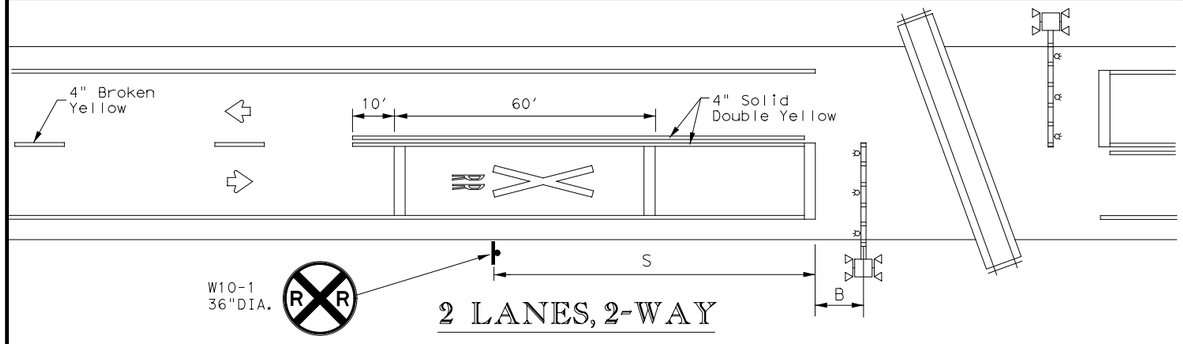
O: Width of median: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.

P: Center of RR mast to face of curb: 4'-3" minimum.
Center of RR mast to edge of pavement (with shoulder): 6' minimum
Center of RR mast to edge of pavement (no shoulder): 8'-3" minimum
NOTE: BNSF prefers 5'-3", 7', and 9'-3" minimums, respectively.

Q: Gate length: 28' or less typical, but railroad company may allow up to 32'under special circumstances.

R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.

S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.



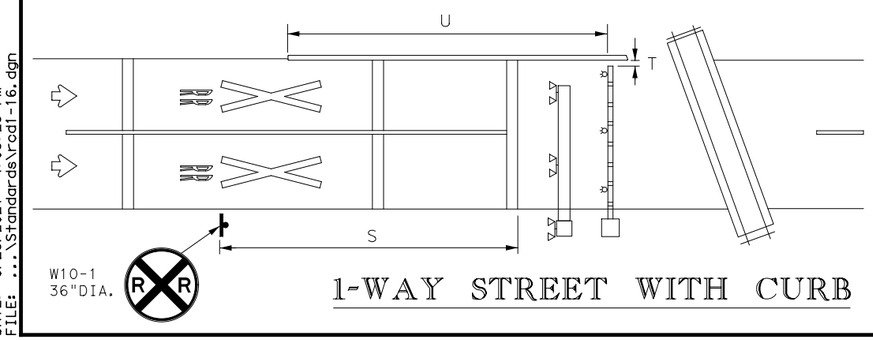
2 LANES, 2-WAY

TABLE 1	
Approach Speed(mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

LEGEND	
	Sign
	Object Marker
	Traffic Flow
	Cantilever
	Gate Assembly
	Mast Flasher Pair

GENERAL NOTES

1. Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
2. Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
3. Medians preferred whenever possible to prevent vehicles from driving around gates.
4. Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
5. See SMD standard sheets for sign mounting details.
6. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.

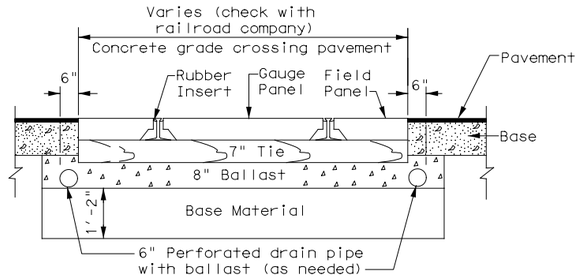


1-WAY STREET WITH CURB

NOTES

T: Tip of gate to edge of curb: 1' max for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations

U: Non-traversable curb length from gate: 100' min. for a Quiet Zone SSM, 10' min for all other locations.



CROSSING SURFACE CROSS SECTION

Texas Department of Transportation

Traffic Operations Division Standard

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-16

FILE: rcd1-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT FEBRUARY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		122

DATE: 8/25/2021 4:05:29 PM
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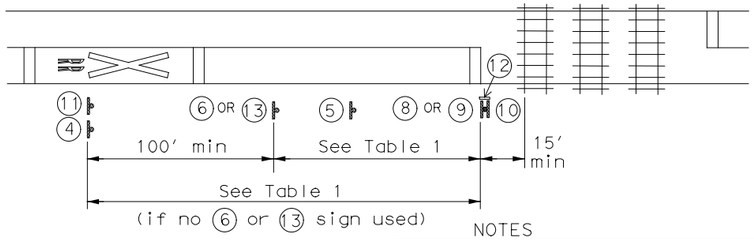
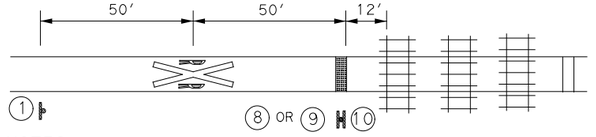


NOTES

1. Stop or yield sign may also be installed to the left of the crossbuck sign, rather than below it.
2. A 2" white retroreflective strip shall be installed on front and back of crossbuck sign post.

PASSIVE CROSSING



NOTES

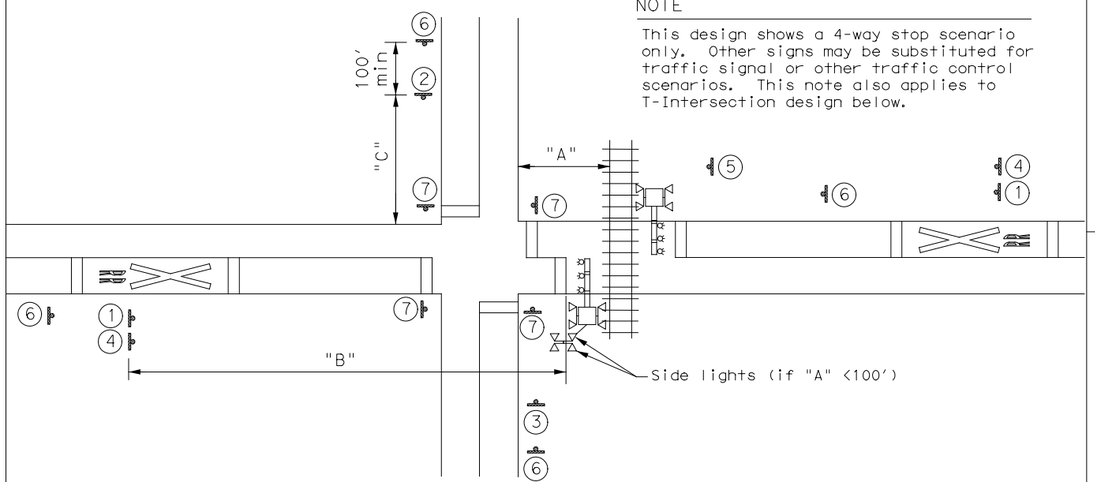
1. A shared use pathway is considered a separate pathway crossing when more than 25′ from traveled way of adjacent roadway.
2. Detectable warning used at stop bar.
3. Smaller sign sizes preferred than shown to the right on this sheet.

PATHWAY CROSSING

TABLE 1	
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

GENERAL NOTES

1. Railroad company to provide active traffic control devices, CROSSBUCK (R15-1), NUMBER OF TRACKS Plaque (R15-2P) (if more than 1 track), and EMERGENCY NOTIFICATION (I-13) signs.
2. LOW GROUND CLEARANCE (W10-5) signs may be relocated further upstream of crossing to provide advance warning of alternate route.
3. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2) signs may be modified as needed to fit roadway geometry.
4. Table 1 placement distances may vary per Sect. 2C.05 of the TMUTCD.
5. See Table 1 to determine placement of STOP AHEAD (W3-1) and YIELD AHEAD (W3-2) signs unless shown otherwise.
6. DO NOT STOP ON TRACKS (R8-8) signs installed when potential for vehicles stopping on tracks is significant as determined by sealing engineer. Install so sign does not block view of RR mast.
7. See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.



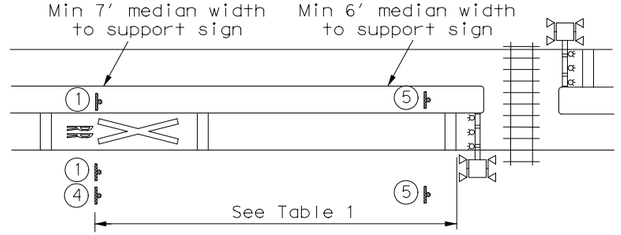
NOTE

This design shows a 4-way stop scenario only. Other signs may be substituted for traffic signal or other traffic control scenarios. This note also applies to T-Intersection design below.

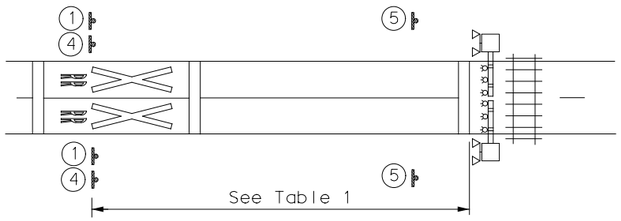
	"A" <100′	"A" ≥100′
"B"	See Table 1. Place pavement markings and signs on opposite side of intersection from rail if spacing from Table 1 would put markings within intersection.	See Table 1. Place pavement markings and signs between rail and intersection if spacing from Table 1 would put markings within intersection.
"C"	See Table 1.	GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-2, W10-3, W10-4) signs should only be installed if W10-1 sign is not between intersection and railroad crossing. If needed, see Table 1.

GRADE CROSSING NEAR A PARALLEL STREET

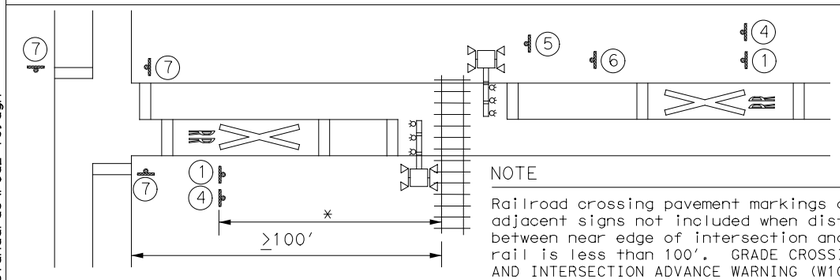
2-WAY



2-WAY WITH MEDIAN



1-WAY

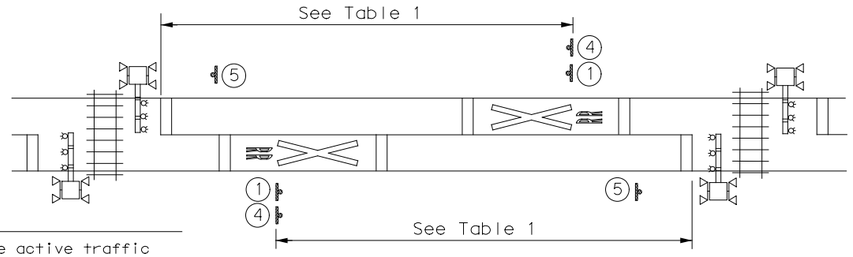


*Use Table 1 if sufficient space exists.

NOTE

Railroad crossing pavement markings and adjacent signs not included when distance between near edge of intersection and near rail is less than 100′. GRADE CROSSING AND INTERSECTION ADVANCE WARNING (W10-3) signs installed on roadway parallel with rail in this case.

T-INTERSECTION



NOTE

Separate active traffic control devices, railroad crossing pavement markings, and adjacent signs required when tracks are more than 100′ apart.

2 ADJACENT CROSSINGS

SIGNS

**	**	**	IF NEEDED	
1 W10-1 36"DIA.	2 W10-2L 36"X36"	3 W10-2R 36"X36"	4 LOW GROUND CLEARANCE W10-5P 30"x24"	W10-5 36"X36"
IF NEEDED	IF NEEDED			
DO NOT STOP ON TRACKS		STOP ALL WAY	RAIL CROSSING ROAD 3 TRACKS	
5 R8-8 24"X30"	6 W3-1 30"X30"	7 R1-1 36"X36" R1-3P 18"X6"	8 R15-1 48"X9" R15-2P 27"X18" STOP R1-1 36"X36"	
RAIL CROSSING ROAD 3 TRACKS YIELD	RAIL CROSSING ROAD 3 TRACKS	R W10-1 36"DIA. NO GATES OR LIGHTS W10-13P 30"X24"	REPORT EMERGENCY OR PROBLEM 1-800-555-5555 CROSSING 836 597 H	
9 R15-1 48"X9" R15-2P 27"X18" R1-2 48"X48"X48"	10 R15-1 48"X9" R15-2P 27"X18"	11 **	Sign may be placed perpend. to travel lanes. 12 I-13 15"X9"	
IF NEEDED				
13 W3-2 30"X30"				

** Includes a NO TRAIN HORN Plaque (W10-9P) if crossing is in a Quiet Zone. LOW GROUND CLEARANCE Plaque (W10-5P) if needed is mounted below W10-2/W10-3/W10-4 signs.

NO TRAIN HORN W10-9P 30"X24"

LOW GROUND CLEARANCE W10-5P 30"X24"

Texas Department of Transportation

Traffic Operations Division Standard

RAILROAD CROSSING DETAILS SIGNING & STRIPING

RCD(2)-16

FILE: rcd2-16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT FEBRUARY 2016	CONT	SECT	JOB	HIGHWAY
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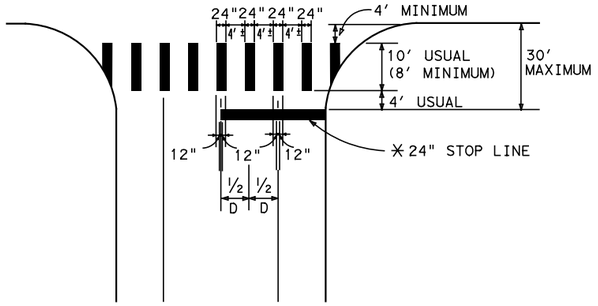
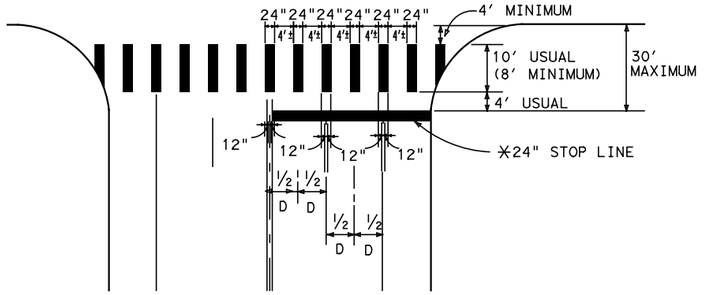
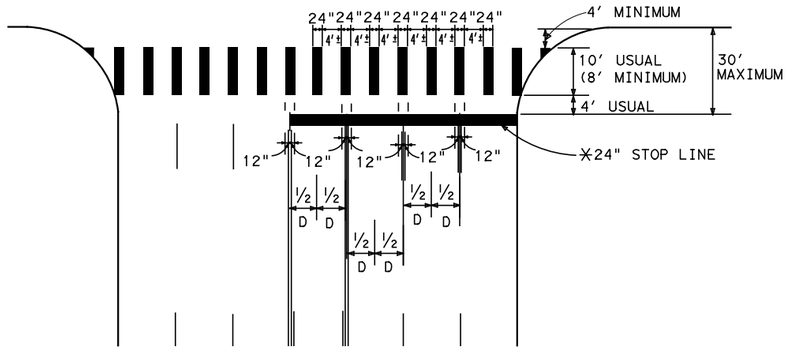


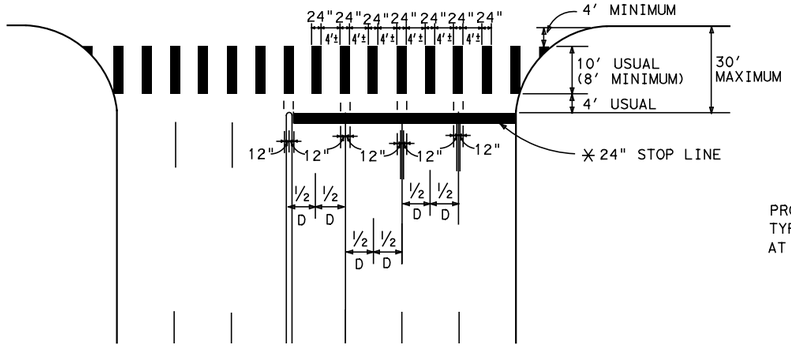
TWO LANES WITH SHOULDERS



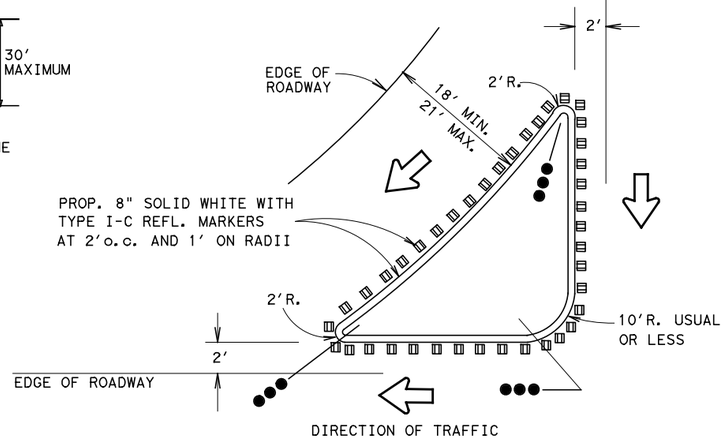
FOUR LANES WITH SHOULDERS



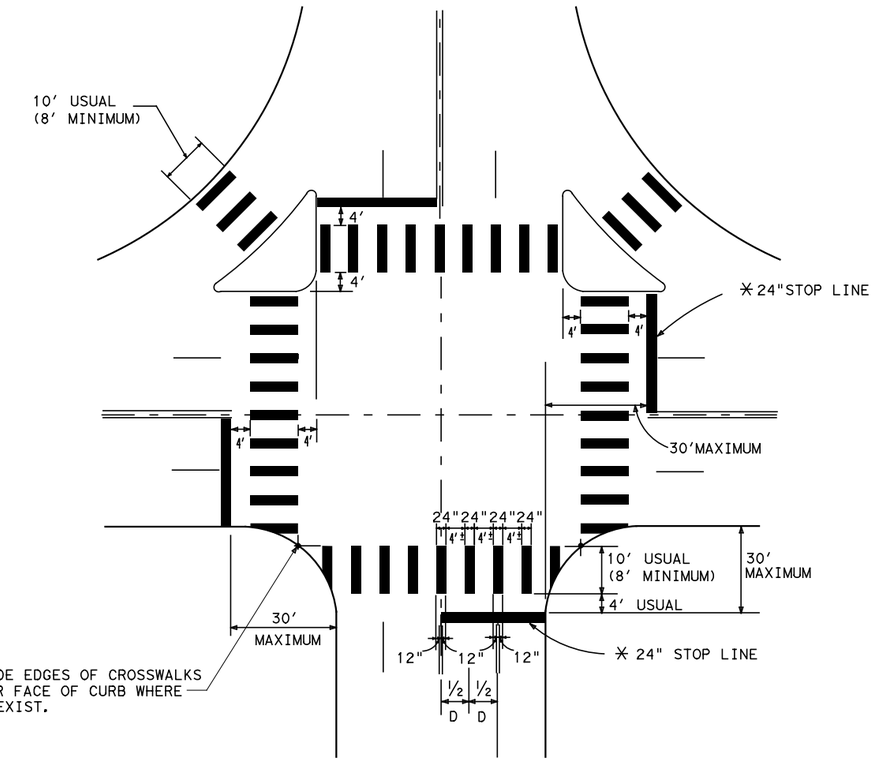
MULTI - LANES



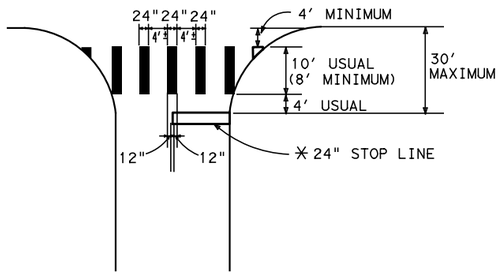
MULTI - LANE WITH MEDIAN



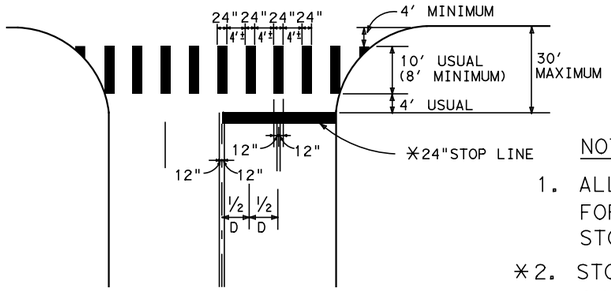
TYPICAL RIGHT TURN ISLAND
WITH DELINEATION



INTERSECTION WITH RIGHT - TURN ISLANDS



TWO LANES



FOUR LANES

NOTES:

1. ALL LONGITUDINAL LINES FORMING CROSSWALK AND STOP LINES SHALL BE WHITE
✳2. STOP LINES AS REQUIRED ON DETAILED PAVEMENT MARKING PLANS.
3. "D" IS EQUAL TO ONE HALF THE DISTANCE.

LEVELS DISPLAYED ACC:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

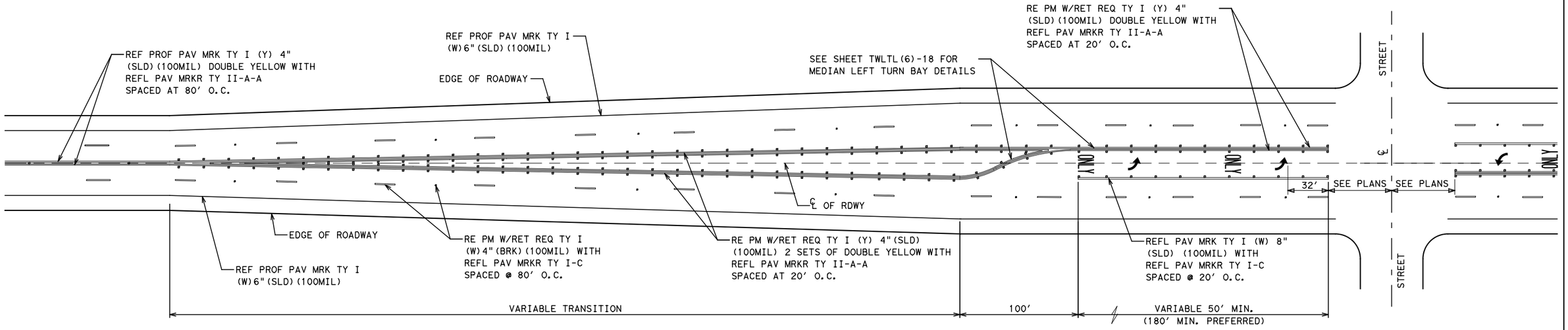
San Antonio District Standard

TYPICAL CROSSWALK DETAILS

TCD-05

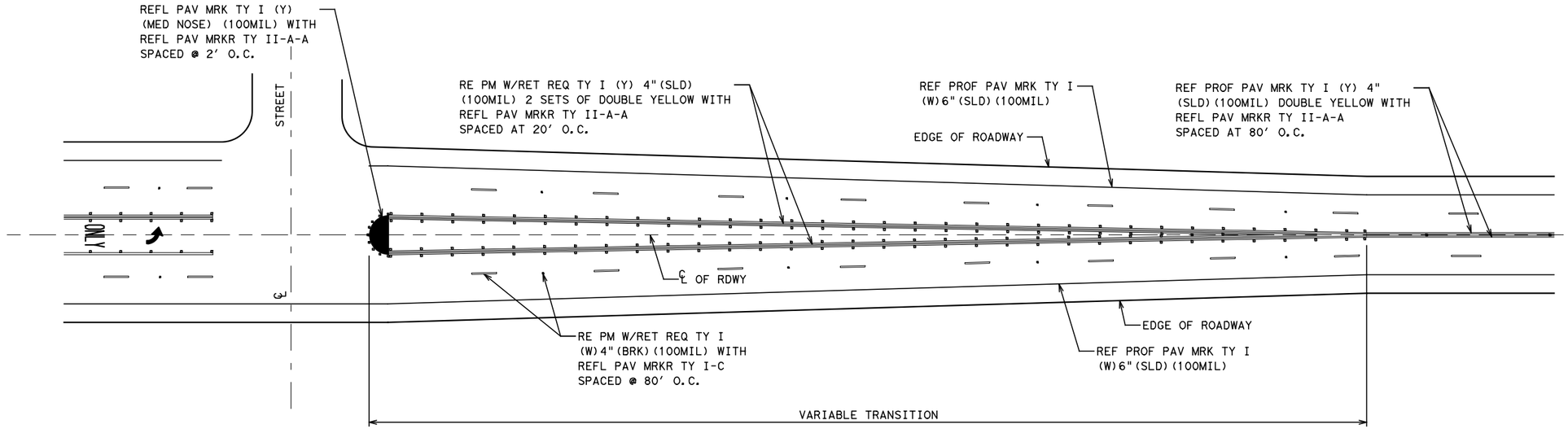
 Texas Department of Transportation

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
DEC 1999	6	SEE TITLE SHEET		124
AUG 2005	STATE	DIST.	COUNTY	
	TEXAS	SAT	BEXAR	
	CONT.	SECT.	JOB	HIGHWAY NO.
	0521	02	042	SL 13



TYPICAL MEDIAN LEFT TURN BAY (FOR USE ON RURAL ROADS)

SIGNALIZED AND NON-SIGNALIZED CROSS STREETS
WITH LEFT TURN BAY



TYPICAL TRANSITION

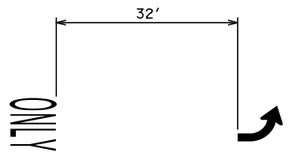
LEFT TURN BAY END CONDITION AND ROADWAY TRANSITION

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-12 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE. ALSO REFER TO STATE STANDARD PM(3)-12)

LEGEND

☐ REFLECTIVE MARKER



LEGEND

TYPICAL DETAIL
(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-12)

Texas Department of Transportation ©2018

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - RURAL ROADS

SCALE: NS — **TWLTL(1)-18**

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
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NOV 2007	TEXAS	SAT	BEXAR	
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MARCH 2010	0521	02	042	SL 13
MAY 2010				
MAY 2018				

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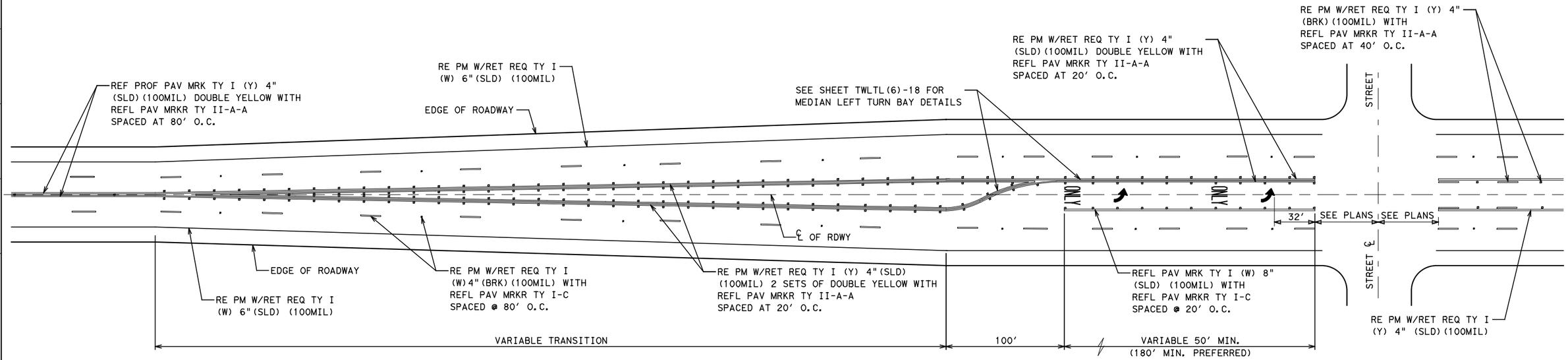
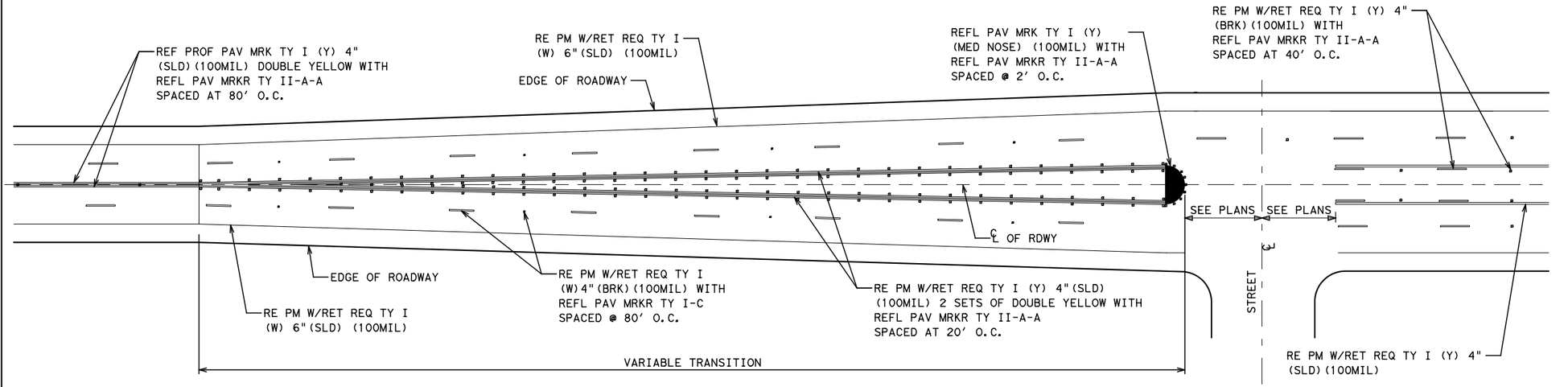


TYPICAL MEDIAN LEFT TURN BAY

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



TYPICAL TRANSITION

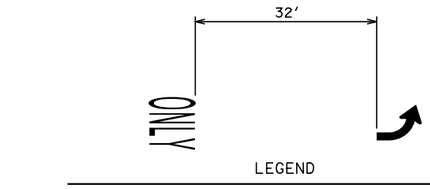
AT BEGINNING AND END OF TWO WAY CENTER LEFT TURN LANE

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-12 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE. ALSO REFER TO STATE STANDARD PM(3)-12)

LEGEND

☐ REFLECTIVE MARKER



LEGEND

TYPICAL DETAIL
(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-12)

Texas Department of Transportation

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS — **TWLTL(2)-18**

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
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MAY 2018				

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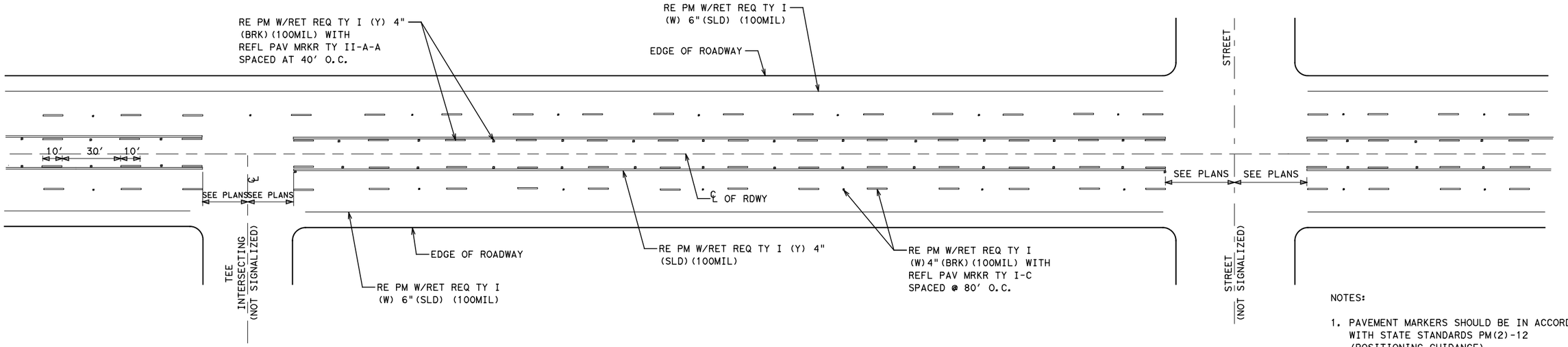

TWO WAY LEFT TURN LANE DETAILS
NON-SIGNALIZED INTERSECTIONS

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-12 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE. ALSO REFER TO STATE STANDARD PM(3)-12)

LEGEND

☐ REFLECTIVE MARKER

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS **TWLTL(3)-18**

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MARCH 2010	0521	02	042	SL 13
MAY 2010				
MAY 2018				

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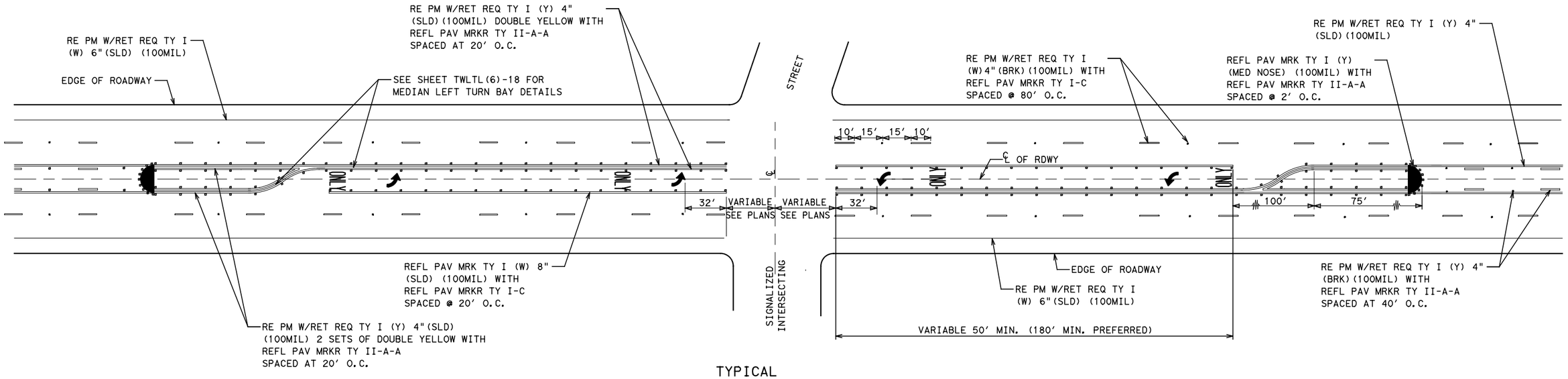
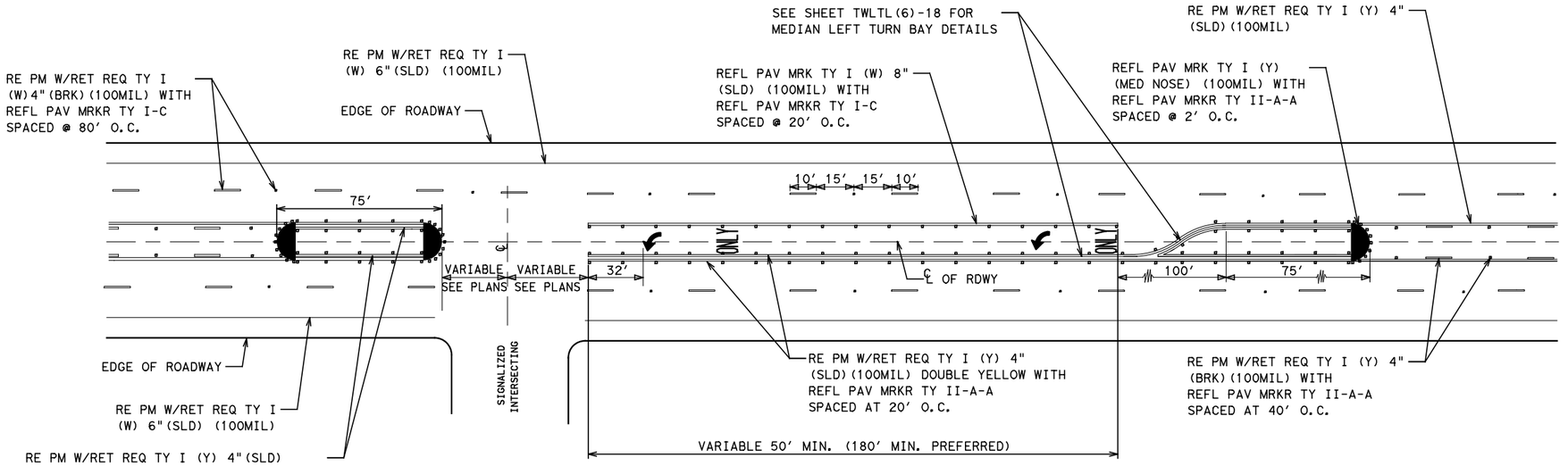
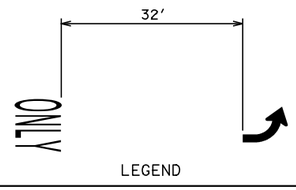


TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED INTERSECTING



TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED TEE INTERSECTION



LEGEND

TYPICAL DETAIL

(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-12)

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-12 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE. ALSO REFER TO STATE STANDARD PM(3)-12)

LEGEND

☐ REFLECTIVE MARKER

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS

TWLTL(4)-18

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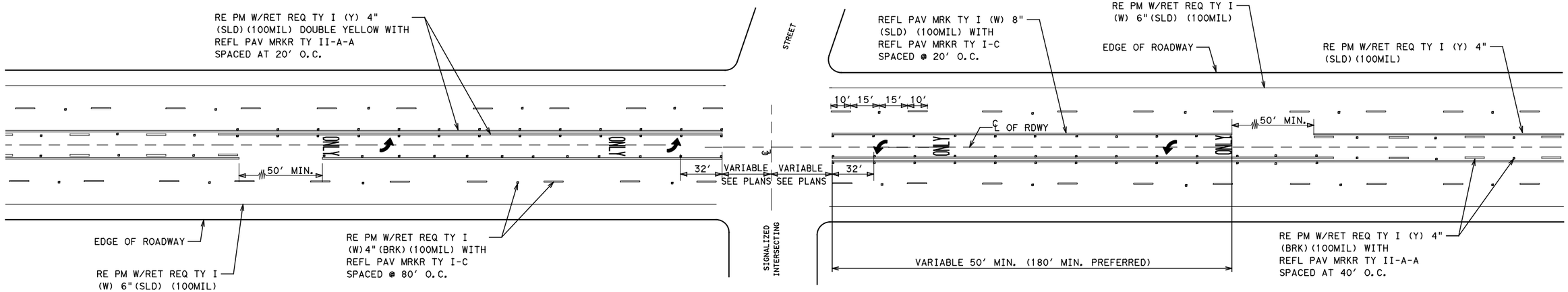
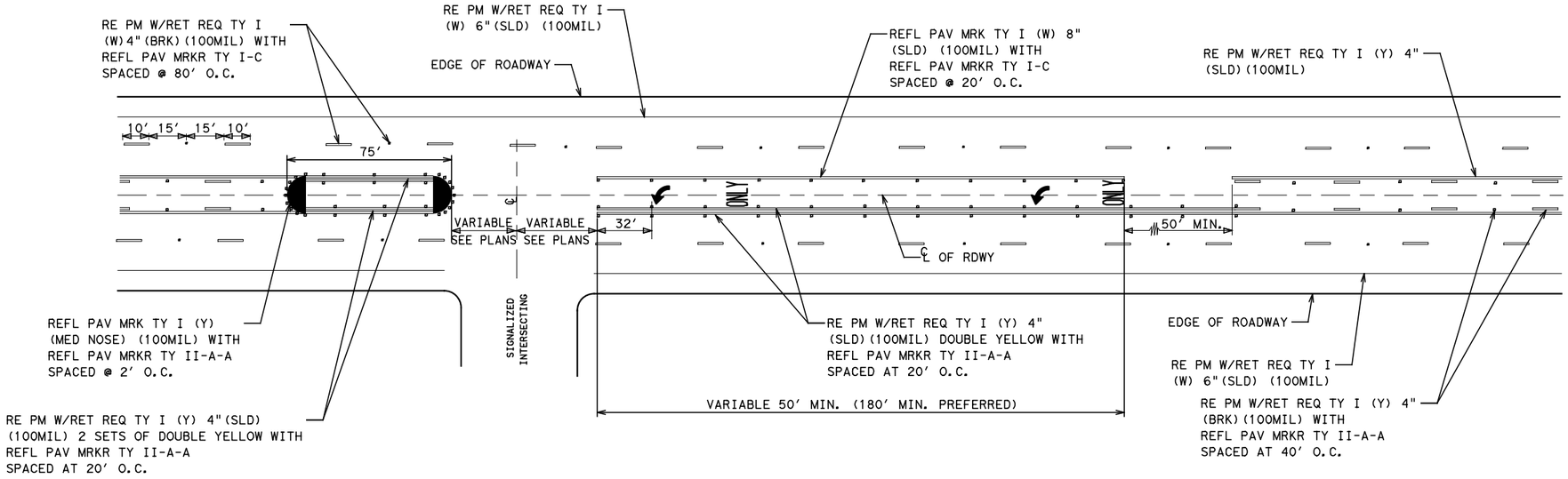
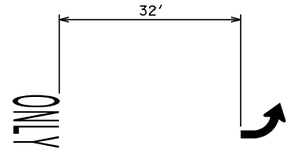


TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED INTERSECTION



TYPICAL
TWO WAY LEFT TURN LANE DETAILS
SIGNALIZED TEE INTERSECTION



LEGEND

TYPICAL DETAIL

(PLACE LEGENDS IN ACCORDANCE TO STATE STANDARD PM(3)-12)

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-12 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE. ALSO REFER TO STATE STANDARD PM(3)-12)

LEGEND

☐ REFLECTIVE MARKER

Texas Department of Transportation © 2018

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS — **TWLTL(5)-18**

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AUG 2002	6	SEE TITLE SHEET		129
APRIL 2003	STATE	DIST.	COUNTY	
NOV 2007	TEXAS	SAT	BEXAR	
SEPT 2008	CONT.	SECT.	JOB	HIGHWAY NO.
MARCH 2010	0521	02	042	SL 13
MAY 2010				
MAY 2018				

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CHECKED BY: G.G./OMG REVISED BY: JCO3
REVISED ON: 5-18
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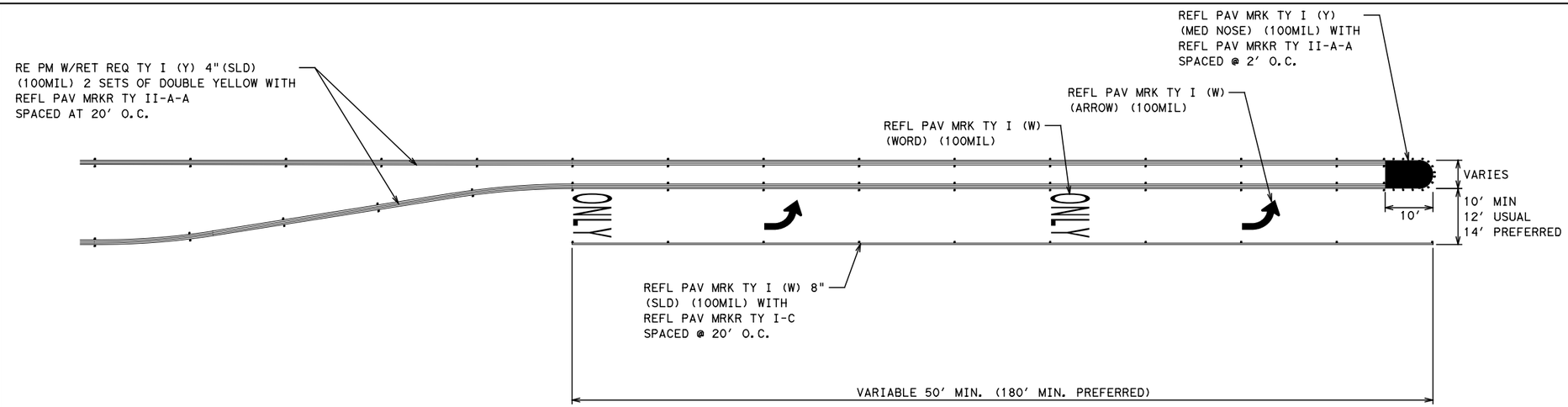
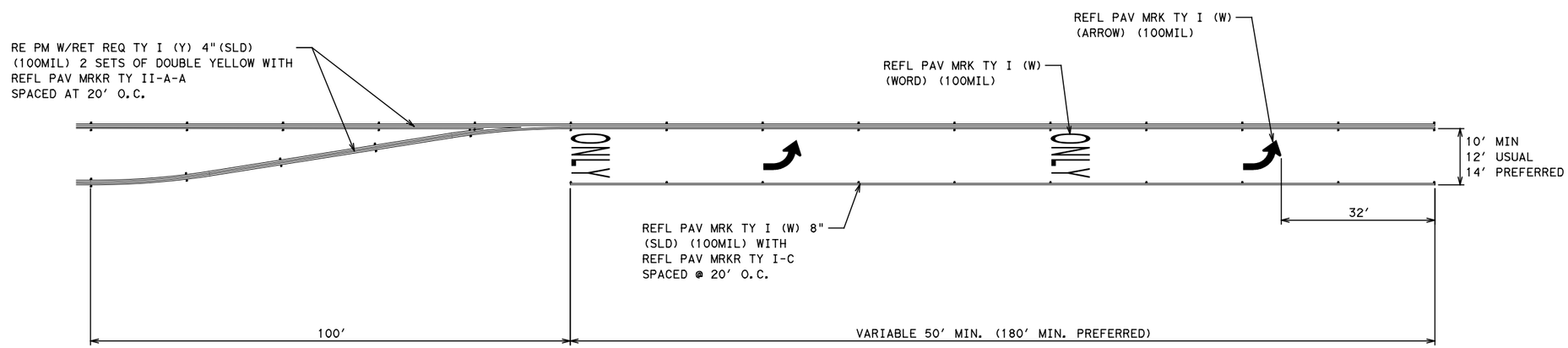
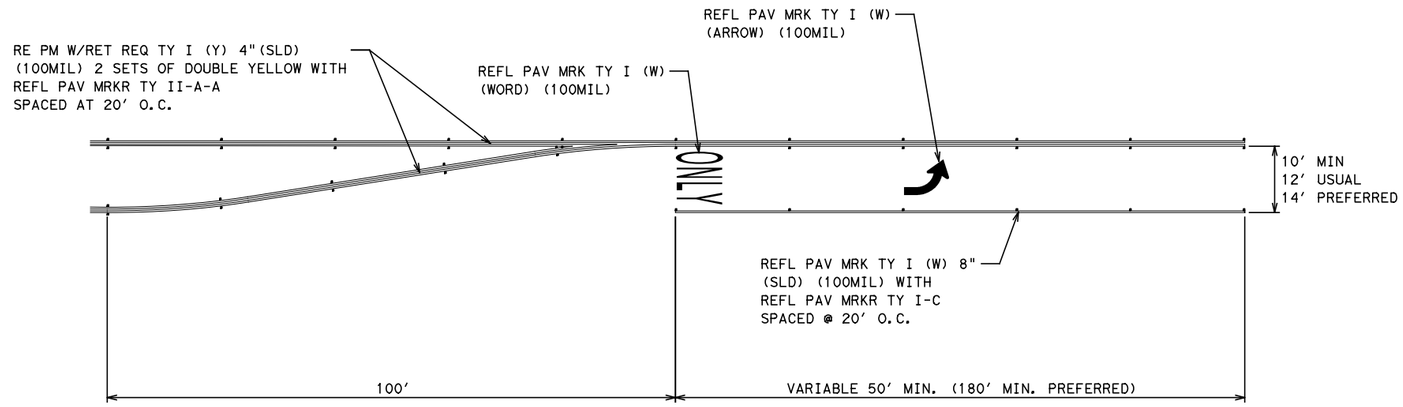
8/25/2021







MEDIAN LEFT TURN BAY DETAILS

NOTES:

1. PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STATE STANDARDS PM(2)-12 (POSITIONING GUIDANCE).
2. PAVEMENT MARKING ARROWS SHALL COMPLY TO TEXAS MUTCD
3. LEFT TURN BAY LAYOUT, TWO SETS OF "WORDS" AND "ARROWS" SHALL BE USED IF THE LENGTH OF THE BAY IS EQUAL TO OR GREATER THAN 180 FEET. THE BOTTOM OF THE FIRST "ONLY" SHALL BE PLACED AT THE BEGINNING OF THE TURN BAY LANE LINE AS SHOWN ABOVE. ALSO REFER TO STATE STANDARD PM(3)-12)

LEGEND

☐ REFLECTIVE MARKER

Texas Department of Transportation

San Antonio District Standard

TWO WAY LEFT TURN LANE AND LEFT TURN BAYS - URBAN ROADS

SCALE: NS **TWLTL(6)-18**

REVISIONS	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
AUG 2002	6	SEE TITLE SHEET		130
APRIL 2003	STATE	DIST.	COUNTY	
NOV 2007	TEXAS	SAT	BEXAR	
SEPT 2008	CONT.	SECT.	JOB	HIGHWAY NO.
MARCH 2010	0521	02	042	SL 13
MAY 2010				
MAY 2018				

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DATE TIME
DOCUMENT NAME

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ 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 Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.
5. NOI required: ☐Yes ☒No

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☒ Other Nationwide Permit Required: NWP# 3A - NO PCN IS REQUIRED

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1. NWP 3A WILL BE REQUIRED AT LEON CREEK STA 110+00.00
2.
3.
4.

401 Best Management Practices: (Not applicable if no USACE permit)

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	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.
4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3.
4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

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 follwing 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

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

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
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic_2015-10-09_SAT.dgn	DN: TxDOT		CK: TxDOT	DW: BW		CK: GAG	
©TxDOT OCTOBER 2015	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0521	02	042		SL 13		
	DIST	COUNTY				SHEET NO.	
	SAN	BEXAR				131	

Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from it's relative position.

A. GENERAL SITE DATA

1. PROJECT LIMITS: *From Leon Creek to IH-35*

2. PROJECT SITE MAPS:
   - *Project Latitude 29.36564 Project Longitude 98.59105*
   - *Project Location Map: Shown on Title Sheet*
   - *Drainage Patterns: Shown on Drainage Area Maps N/A*
   - *Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections (Sheet 6)*
   - *Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets*
   - *Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.*
   - *Surface Waters and Discharge Locations: N/A*

3. PROJECT DESCRIPTION: *Base Repair, Mill, Seal Coat, Overlay, and Pavement Markings*

Non-Joint Bid Utilities are not part of this SW3P.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

1. *Install controls down-slope of work area and initiate inspection and maintenance activities.*
2. *Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.*
3. *Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):*

___ *Placement of road base*
___ *Exstensive ditch grading*
___ *Upgrading or replacing culverts or bridges*
___ *Temporary detour road(s)*
_X_ *Other: BRUSH CLEARING, MBGF INSTALLATION*

5. EXISTING AND PROPOSED CONDITIONS:

Description of existing vegetative cover: Native Grasses
Percentage of existing vegetative cover: <1%
Existing vegetative cover:(mark one)
___ *Thick or uniformly established*
___ *Thin and Patchy*
_X_ *None or minimal cover*
Description of soils:
Site Acreage: 37.00 *Acreage disturbed: 2.50*
Site runoff coefficient (pre-construction): N/A *Site runoff coefficient (post-construction): N/A*

6. RECEIVING WATERS: *(Mark all that apply)*

___ *A classified stream does not pass through project.*
_X_ *A classified stream passes through project. Name Leon Creek, Sixmile Creek Segment Number ____*
Name of receiving waters that will receive discharges from disturbed areas of the project: Leon Creek, Sixmile Creek

Site is in a Municipal Separate Storm Sewer System (MS4).
MS4 Operator (name): TxDOT

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

___ SEEDING
___ MULCHING (Hay or Straw)
___ BUFFER ZONES
___ PLANTING
___ COMPOST/MULCH FILTER BERM
_P_ SODDING
___ PRESERVATION OF NATURAL RESOURCES
___ FLEXIBLE CHANNEL LINER
___ RIGID CHANNEL LINER
___ SOIL RETENTION BLANKET
___ COMPOST MANUFACTURED TOPSOIL
___ OTHER: (Specify Practice)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

_T_ SILT FENCES
___ HAY BALES
___ ROCK FILTER DAMS
___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
___ DIVERSION DIKE AND SWALE COMBINATIONS
___ PIPE SLOPE DRAINS
___ PAVED FLUMES
___ ROCK BEDDING AT CONSTRUCTION EXIT
___ TIMBER MATTING AT CONSTRUCTION EXIT
___ CHANNEL LINERS
___ SEDIMENT TRAPS
___ SEDIMENT BASINS
_X_ STORM INLET SEDIMENT TRAP
___ STONE OUTLET STRUCTURES
___ CURBS AND GUTTERS
___ STORM SEWERS
___ VELOCITY CONTROL DEVICES
_X_ OTHER: *SAND BAGS*

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include:(mark all that apply)

___ *Existing or new vegetation provides natural filtration.*
___ *The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
___ *Project includes permanent sedimentation controls (other than grass).*
___ *Velocities do not require dissipation devices.*
___ *Velocity-dissipation devices included in the design.*
___ *Other : _____*

4. NON-STORM WATER DISCHARGES:

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other: _____*

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

See the EPIC sheet for additional environmental information.

HALFF
100 NE INTERSTATE 410 LOOP
SUITE 200
SAN ANTONIO, TEXAS 78216
TEL (210) 798-1895 FIRM #F-312

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STATE OF TEXAS
JOHNNY L. CLAYTON
107215
LICENSED PROFESSIONAL ENGINEER

, P.E. 11/17/2021
Signature of Registrant & Date

REVISION DATE:

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			SL 13
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	SHEET NO.
0521	02	042	132

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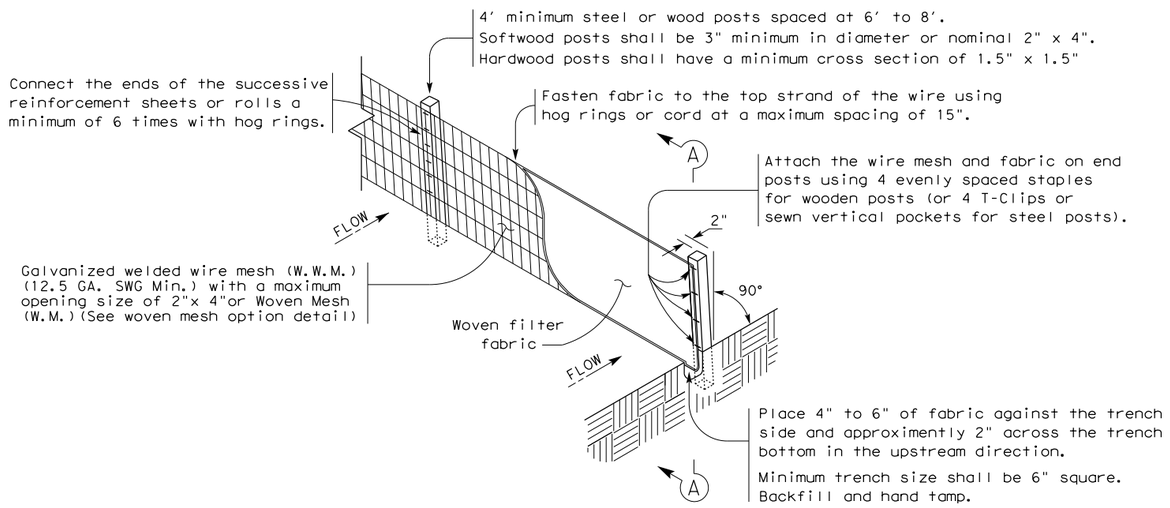
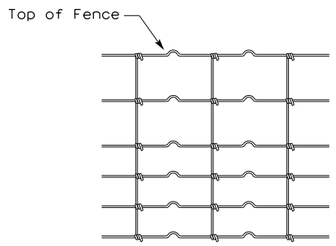
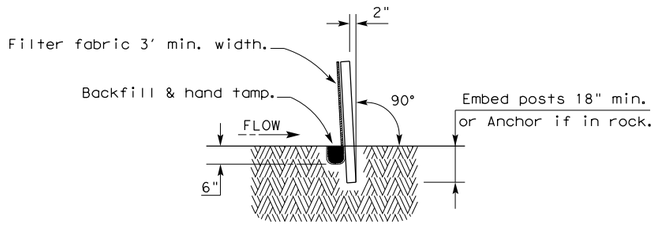


TEMPORARY SEDIMENT CONTROL FENCE

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.

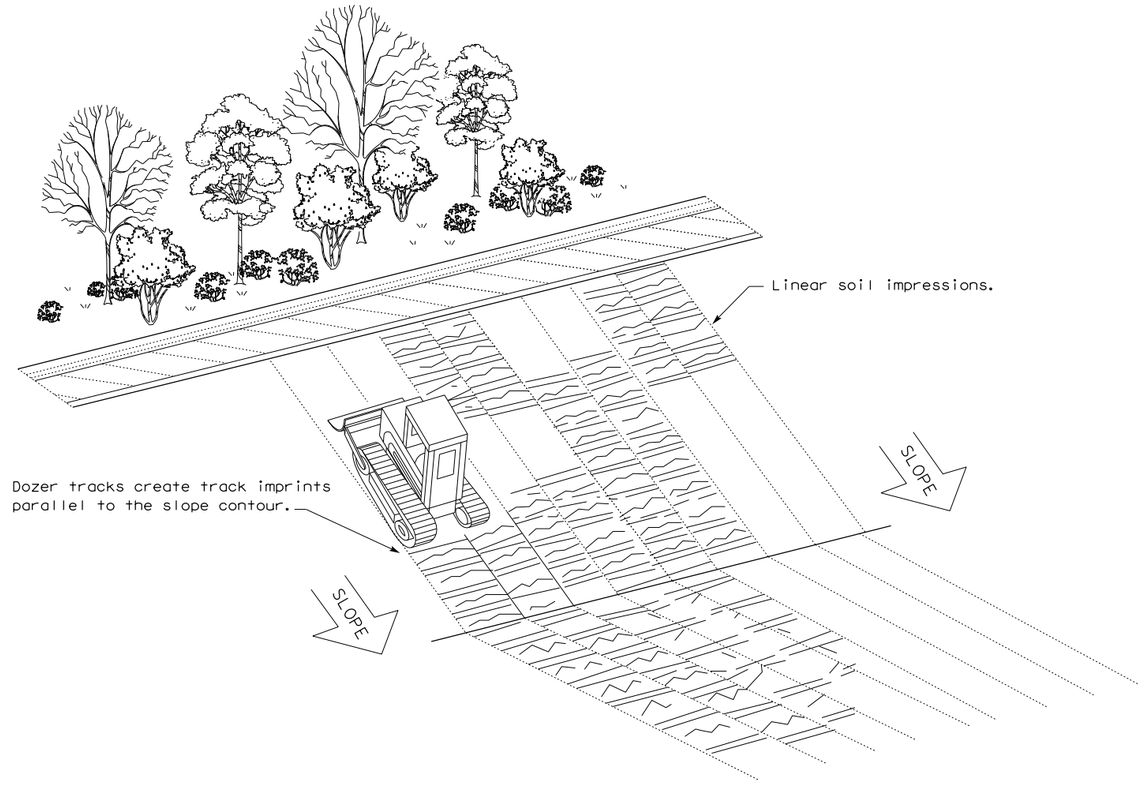
LEGEND

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	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		133

DATE: 11/17/2021
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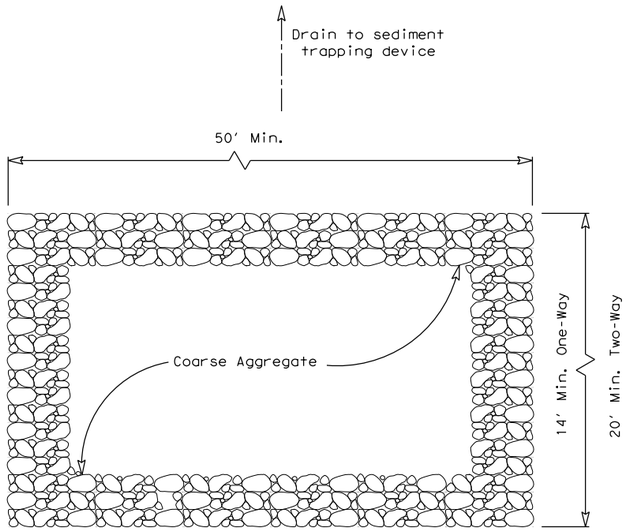
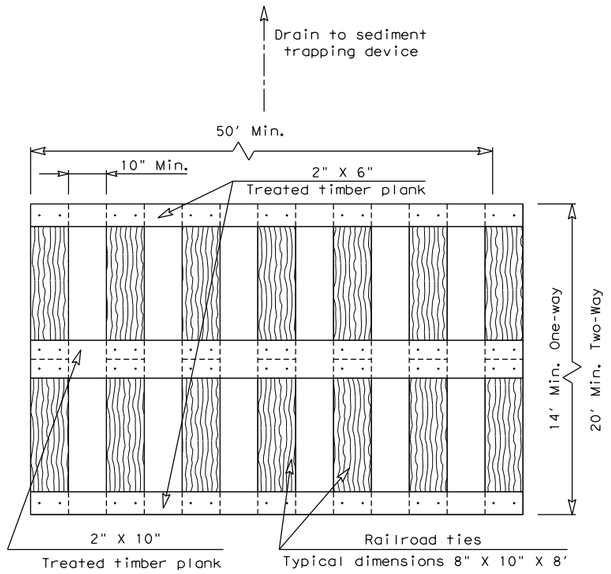
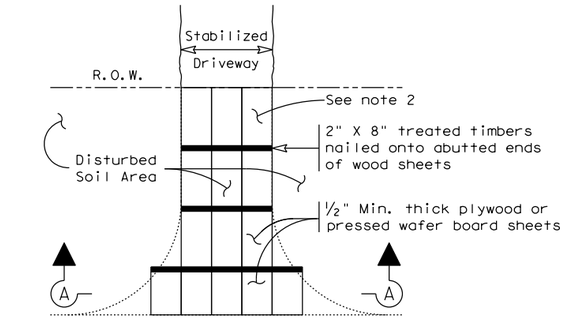


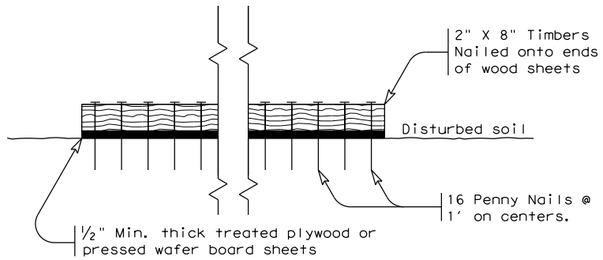
PLAN VIEW



PLAN VIEW



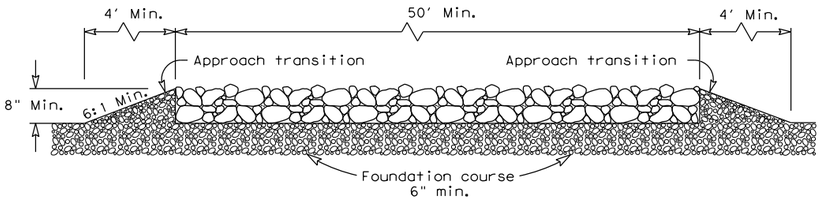
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

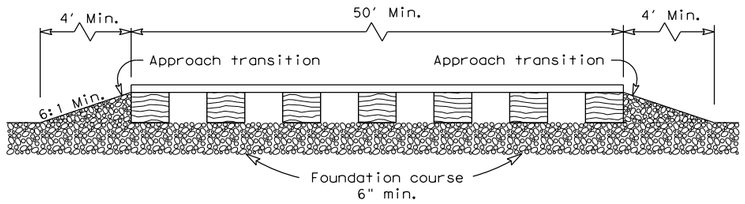
SHORT TERM



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	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		134

DATE: 11/17/2021 12:23:53 PM
FILE: I:\34000s\34832\B00\CADD\Sheets\SAN\COMBINED_95%\34832 RR_042-01.dgn

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 435956N
Crossing Type:** AT GRADE
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR
RR MP: 5.970
RR Subdivision: CORPUS CHRISTI
City: SAN ANTONIO
County: BEXAR
CSJ at this Crossing: 0521-02-042
Highway/Roadway name crossing the railroad: SL 13
# of regularly scheduled trains per day at this crossing: 4
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

Scope of Work at this Crossing to Be Performed by State Contractor:
Mill and overlay roadway and replace pavement markings

Scope of Work at this Crossing to Be Performed by Railroad Company:
Railroad flagging

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

III. FLAGGING

of Days of Railroad Flagging Expected: 10

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The railroad requires a 30 day notice if their flaggers are to be utilized. If contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:
Railpros Field Services
email: up.info@railpros.com
or phone the call center
at 877-315-0513, ext. 116

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

Coordinate with TxDOT for any work to be performed by the railroad company. TxDOT must issue a work order for any work done by the rail road company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Contractor shall provide the proper insurance as shown in the table below.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several railroad companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit
Railroad Protective Liability	$2,000,000 / $6,000,000

VI. CONTRACTOR'S RIGHT-OF-ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☐ Not Required
☒ Required: TxDOT to assist in obtaining (see Item 5, Article 8.3)

With the following railroad companies: Union Pacific Railroad

☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

To view previously approved ROE agreement templates agreed upon between the State and railroad company, see:

http://www.txdot.gov/inside-txdot/division/traffic/samples.html

Approved ROE agreement templates are not to be modified by the Contractor.

Contractor shall not operate within railroad rights of way without an executed Construction & Maintenance agreement between the state and the railroad and an executed ROE agreement between the contractor and the railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required
☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call Union Pacific Railroad Emergency Line
at 888-877-7267
Location: DOT 435956N
RR Milepost 5.970 CORPUS CHRISTI Subdivision

Texas Department of Transportation | Traffic Operations Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/2015	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		135

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 447959T
Crossing Type: ** HIGHWAY OVERPASS
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR
RR MP: 265.180
RR Subdivision: LAREDO
City: SAN ANTONIO
County: BEXAR
CSJ at this Crossing: 0521-03-061
Highway/Roadway name crossing the railroad: SL 13
# of regularly scheduled trains per day at this crossing: 12
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

DOT #: 764314G
Crossing Type: ** HIGHWAY OVERPASS
RR Company Owning Track at Crossing: UPRR
Operating RR Company at Track: UPRR
RR MP: 217.91
RR Subdivision: DEL RIO
City: SAN ANTONIO
County: BEXAR
CSJ at this Crossing: 0521-03-061
Highway/Roadway name crossing the railroad: SL 13
# of regularly scheduled trains per day at this crossing: 12
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: <1%

Scope of Work at this Crossing to Be Performed by State Contractor:
Mill and overlay roadway and replace pavement markings

Scope of Work at this Crossing to Be Performed by Railroad Company:
Railroad flagging

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

III. FLAGGING

of Days of Railroad Flagging Expected: 0

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

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☒ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

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Location: DOT 447959T
RR Milepost 265.180 LAREDO Subdivision

In Case of Railroad Emergency
Call Union Pacific Railroad Emergency Line
at 888-877-7267
Location: DOT 764314G
RR Milepost 217.91 DEL RIO Subdivision

Texas Department of Transportation | Traffic Operations Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/2015	0521	02	042	SL 13
	DIST	COUNTY		SHEET NO.
	SAN	BEXAR		136