FEDERAL AID PROJECT NO.			
BR 2B24(022)			
CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC.
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC.		1

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

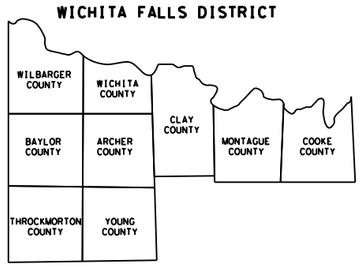
SEE SHEET 2 FOR INDEX OF SHEETS

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

BMIP 0043-06-098, ETC.

VARIOUS BRIDGES DISTRICTWIDE
WILBARGER COUNTY, ETC.

WICHITA FALLS DISTRICT



LIMITS: VARIOUS LOCATIONS

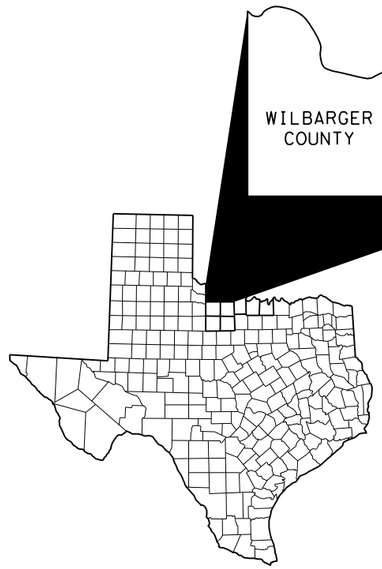
TOTAL LENGTH OF PROJECT =

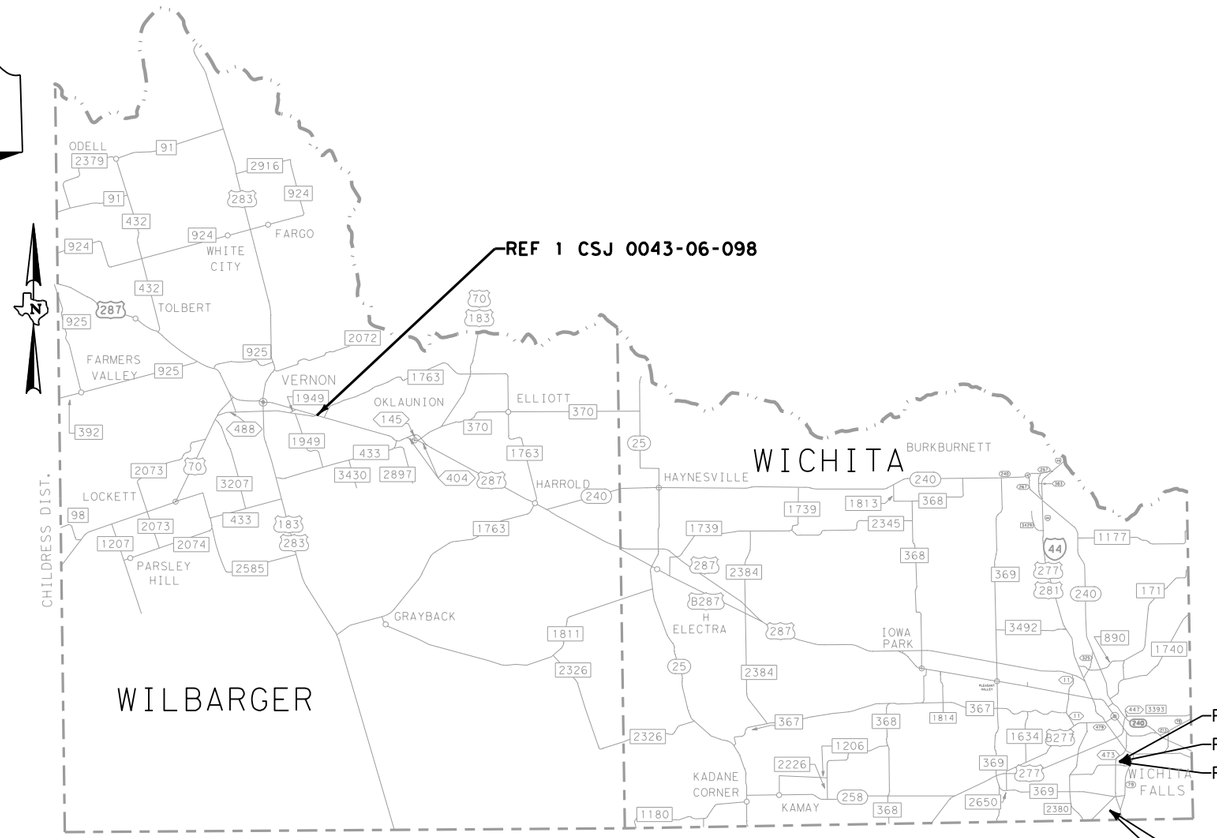
BRIDGE	=	1545.00FT.	=	0.293MI.
ROADWAY	=	0.00FT.	=	0.000MI.
TOTAL	=	1545.00FT.	=	0.293MI.

REF. NO.	STRUCTURE ID	ROADWAY	FEATURE CROSSED
1	03-244-0043-06-113	US 70 EB/287 SB	BU 287F
2	03-243-0044-01-100	US 82EB/US 287SB	US 281
3	03-243-0044-01-101	US 82WB/US 287SB	US 82WB CONN TO US 281SB
4	03-243-0044-01-119	US82WB CONN US281S	US 281
5	03-243-0249-01-067	SH 79 NB	US 281
6	03-243-0283-06-070	SH 79 NB	SH 79 SB CONN FM 369 WB

PROJECT LIMIT SIGNS AS SHOWN ON BC(2)-21 WILL BE REQUIRED UNLESS WAIVED BY THE ENGINEER

TYPE OF WORK: FOR ROUTINE MAINTENANCE OF BRIDGE PREVENTATIVE MAINTENANCE CONSISTING OF CONCRETE SPALL REPAIR, BRIDGE DECK REPAIR, BRIDGE DECK OVERLAY, BRIDGE JOINT REPAIR, RIP RAP REPAIR, REPLACE BEARINGS, CLEAN AND PAINT STRUCTURES.





CONTRACTOR NAME:_____
CONTRACTOR ADDRESS:_____
LETTING DATE:_____
DATE TIME CHARGES BEGAN:_____
DATE WORK BEGAN:_____
DATE WORK COMPLETED:_____
DATE OF ACCEPTANCE:_____

Texas Department of Transportation ®

SUBMITTED FOR LETTING: 03/04/2024
Christian J. Sierra, P.E.
DISTRICT BRIDGE ENGINEER

RECOMMENDED FOR LETTING: 03/04/2024
James S. Brown P.E.
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 03/04/2024
Michael D. Brown P.E.
DISTRICT ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED SHALL GOVERN ON THIS PROJECT. REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 2023).

EXCEPTIONS: N/A
EQUATIONS: N/A
RAILROAD CROSSINGS: N/A

DATE: 3/1/2024 4:14:12 PM
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INDEX OF SHEETS

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

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

Andrew Mosley, P.E. — 03/03/2024

NAME — DATE

US 70, ETC
INDEX OF SHEETS

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		2

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LEGEND	
★	STRUCTURE LOCATION

N

REF #1 NBI: 03-244-0-0043-06-113
US 70 EB/US 287 SB OVER BU 287

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.
03/03/2024

0 MI 0.25 MI 0.5 MI

Texas Department of Transportation | Bridge Division

LOCATION MAP

SHEET 1 OF 3

DATE:
FILE:

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		3

LEGEND

★ WORK LOCATION

REF #2 NBI: 03-243-0-0044-01-100
US 287 SB OVER US 281

REF #3 NBI: 03-243-0-044-01-101
US 82 EB/US 287 SB OVER SH 79 SB

REF #4 NBI: 03-243-0-044-01-119
US 287 SB OVER SH 79

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/03/2024

0 MI 0.25 MI 0.5 MI

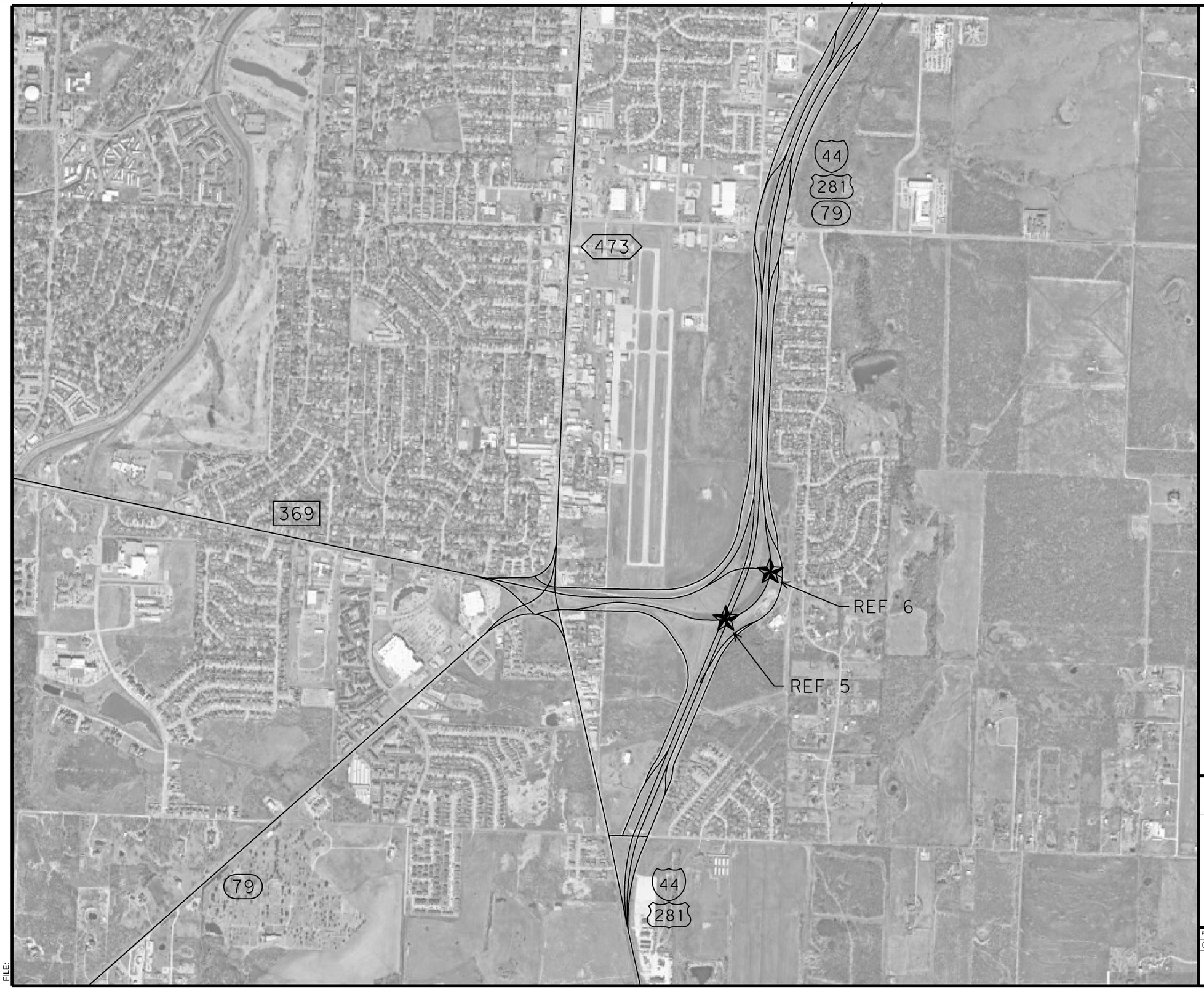
Texas Department of Transportation | Bridge Division

LOCATION MAP

SHEET 2 OF 3

DATE:
FILE:

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		4



LEGEND	
★	WORK LOCATION

REF #5 NBI: 03-243-0-0249-01-067
SH 79 NB OVER US 281

REF #6 NBI: 03-243-0-0283-06-070
US 281 OVER FM 369

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/03/2024

0 MI 0.25 MI 0.5 MI

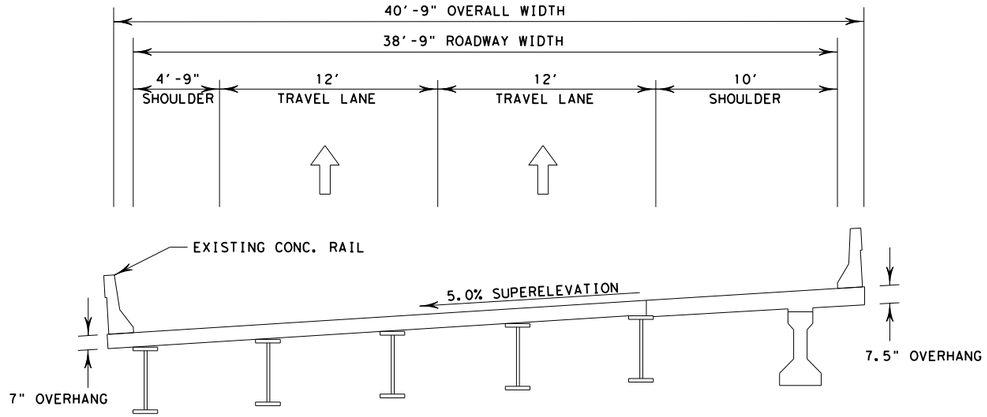
Texas Department of Transportation | Bridge Division

LOCATION MAP

SHEET 3 OF 3

DATE:
FILE:

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		5



US 82 EB/US 287 WB
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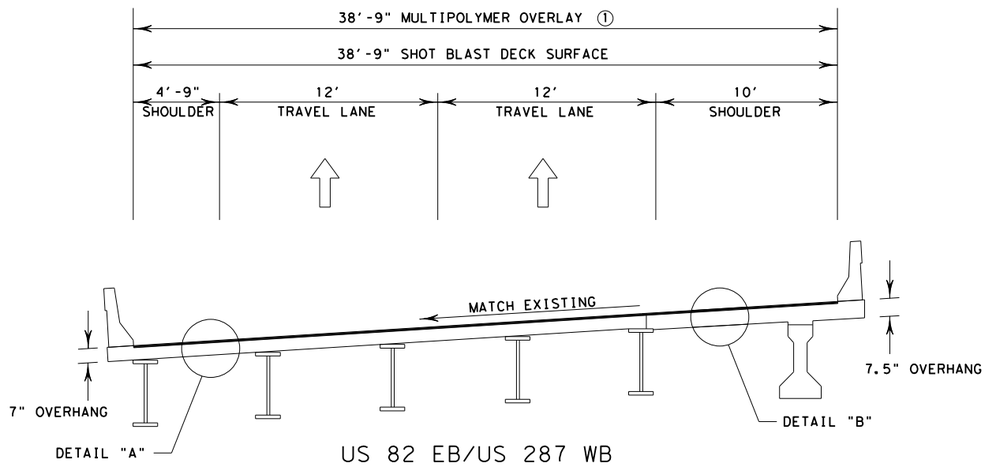
STA. 843+91.58 TO STA. 846+51.56



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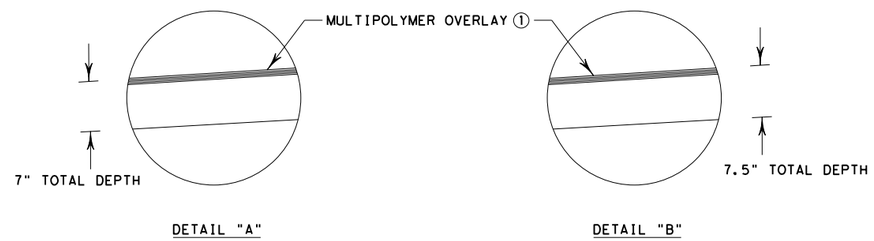
PROPOSED TYPICAL SECTION - BRIDGE
STA. 843+91.58 TO STA. 846+51.56



DETAIL "A"

DETAIL "B"

NOT TO SCALE

① REFER TO THE MULTILAYER POLYMER NOTES SHEET FOR MORE INFORMATION.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/03/2024

TYPICAL SECTIONS

REF ■1
NBI:03-244-0043-06-113

9/3/2024
Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC		6

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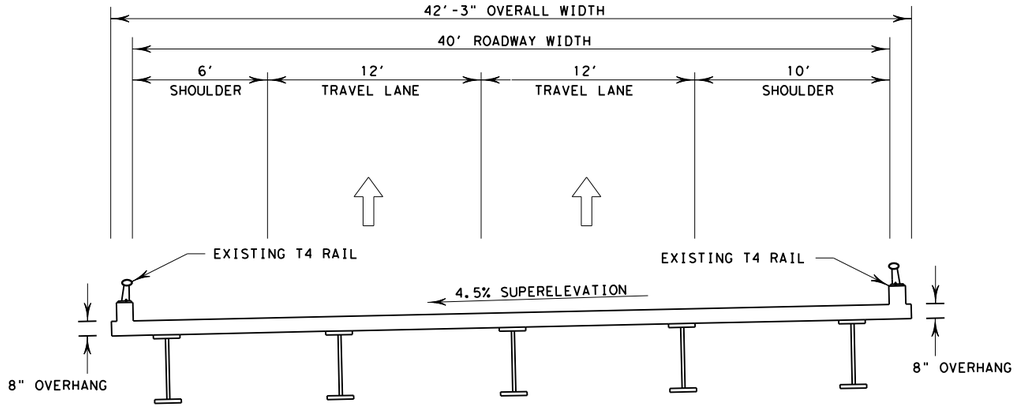

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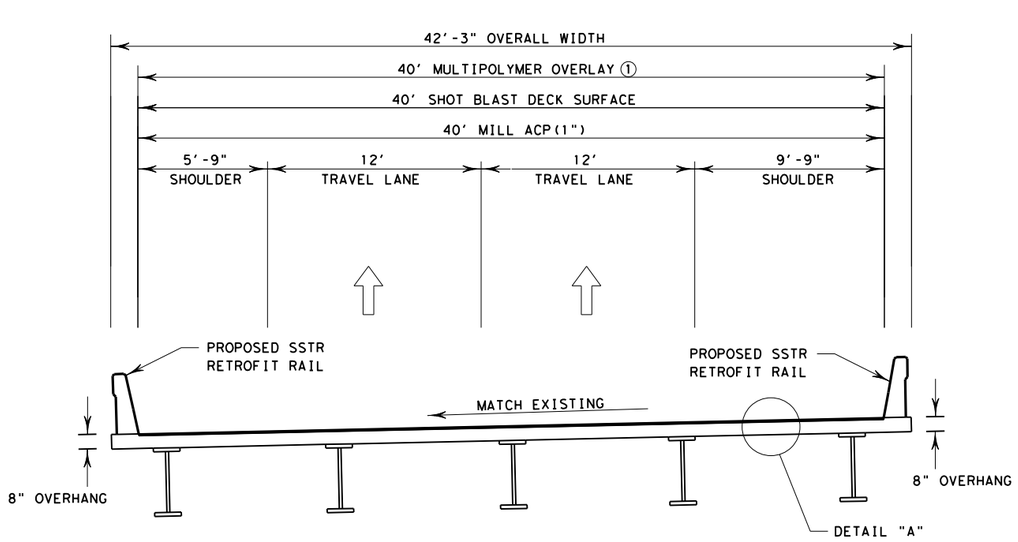
STA. 64+93.34 TO STA. 67+68.34



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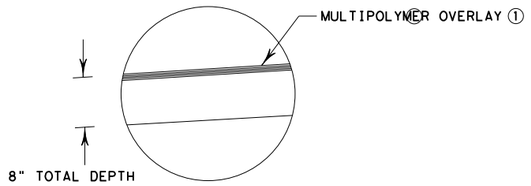

DETAIL "A"

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NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/03/2024

TYPICAL SECTIONS

REF #2
NBI:03-243-0044-01-100

9/3/2024
Texas Department of Transportation®

SHEET 2 OF 6

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70,ETC
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC		7

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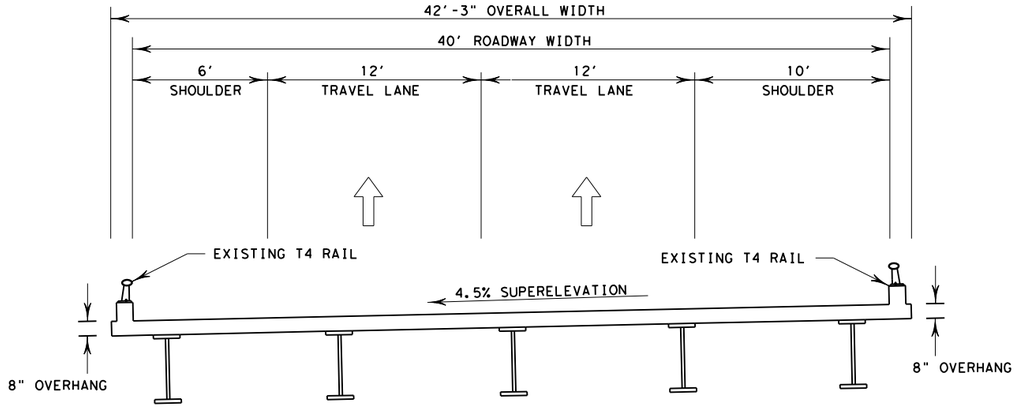

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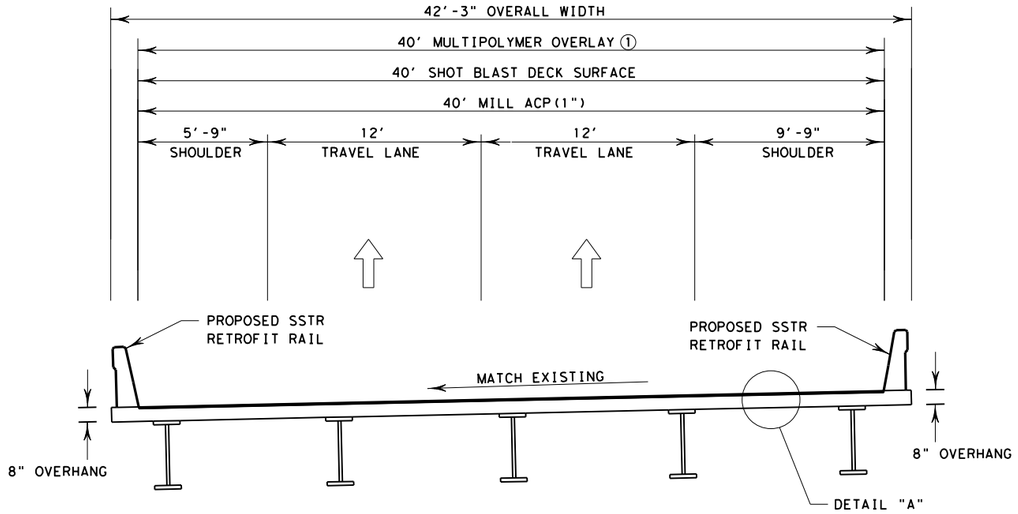

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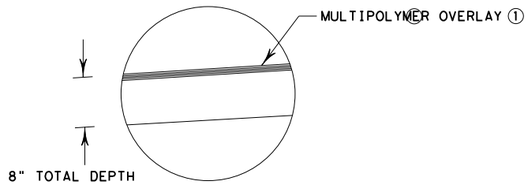

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NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/03/2024

TYPICAL SECTIONS

REF #3
NBI:03-243-0044-01-101

9/3/2024
Texas Department of Transportation®

SHEET 3 OF 6

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70,ETC
DIST	COUNTY		SHEET NO.
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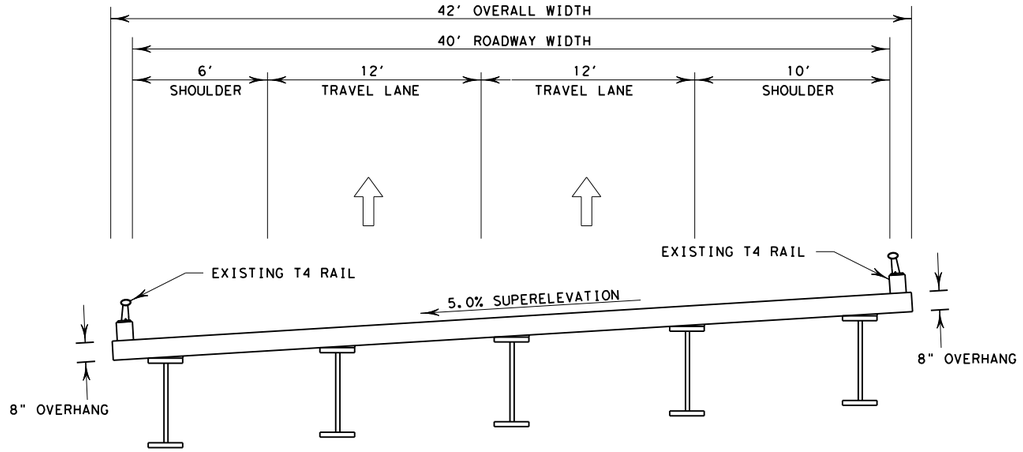
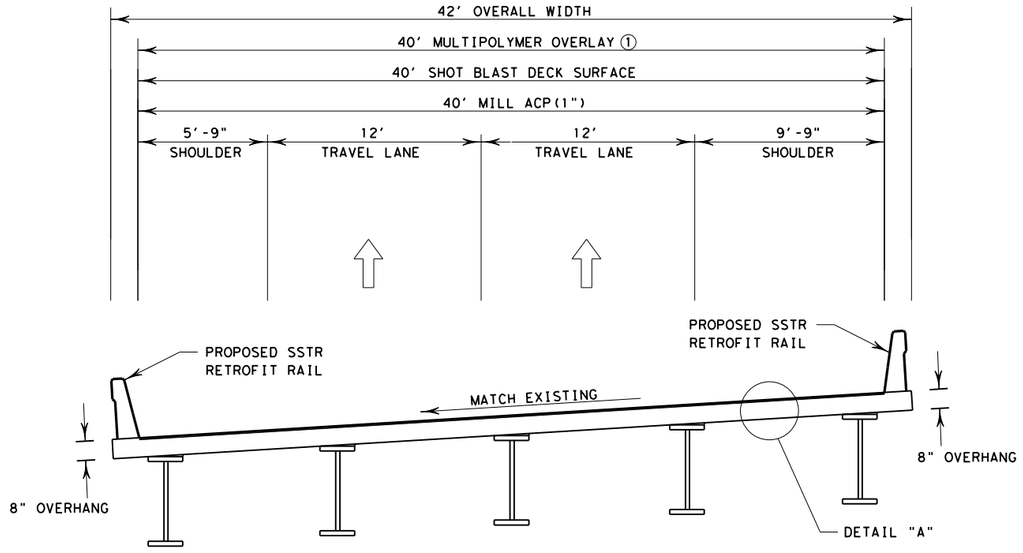


US 82 WB CONN US 281 SB
EXISTING TYPICAL SECTION - BRIDGE
STA. 44+24.83 TO STA. 47+53.83



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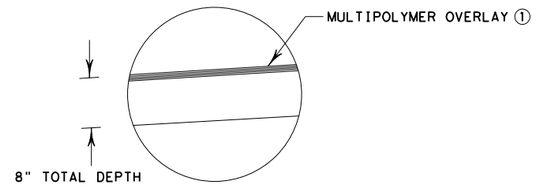
PROPOSED TYPICAL SECTION - BRIDGE
STA. 44+24.83 TO STA. 47+53.83



DETAIL "A"

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NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/03/2024

TYPICAL SECTIONS

REF #4
NBI:03-243-0044-01-119

9/3/2024
Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70,ETC
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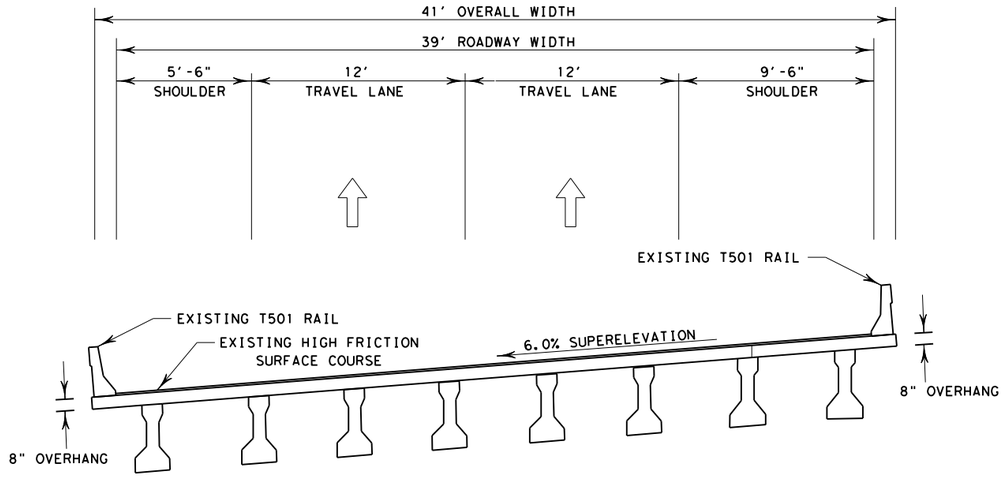

SH 79
EXISTING TYPICAL SECTION - BRIDGE
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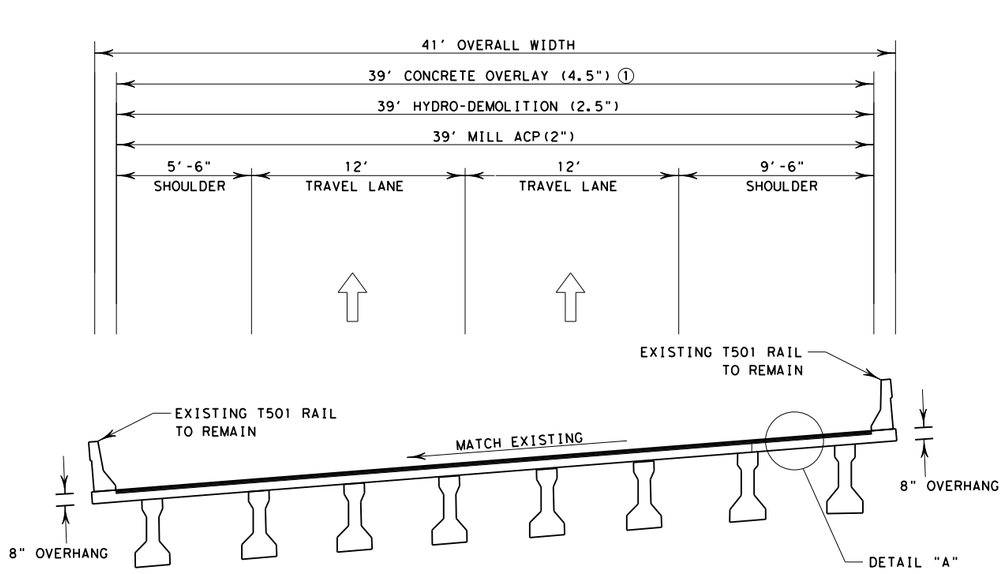

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PROPOSED TYPICAL SECTION - BRIDGE
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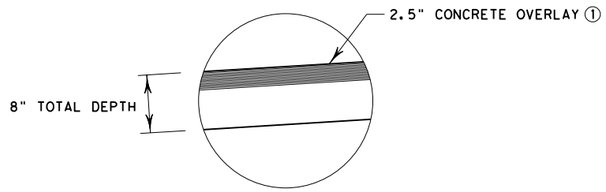

DETAIL "A"

① REFER TO CONCRETE OVERLAY NOTES SHEET FOR MORE INFORMATION.

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/03/2024

TYPICAL SECTIONS

REF #5
NBI: 03-243-0249-01-067

9/3/2024
Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0043	06	098, ETC.	US 70, ETC
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC		10

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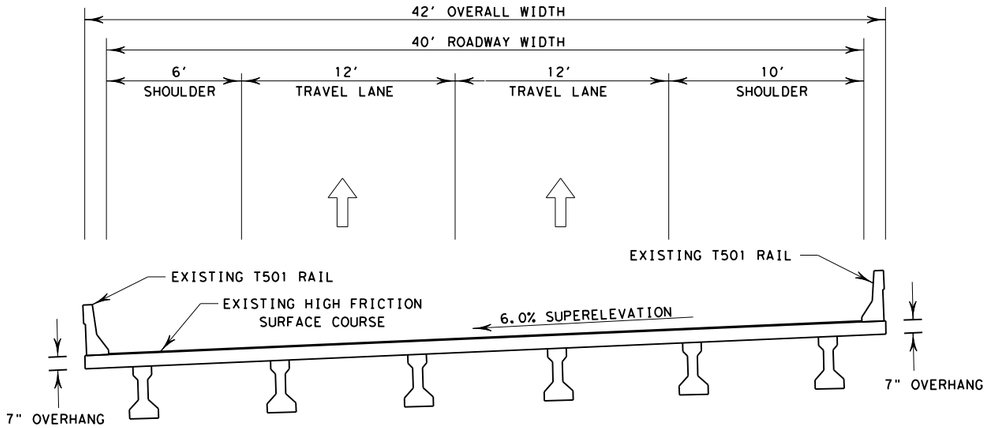

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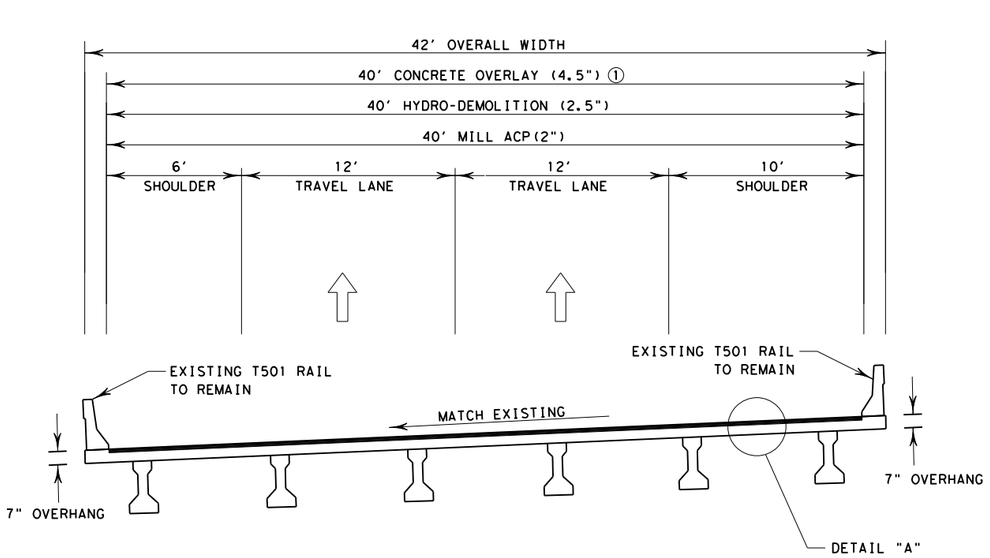

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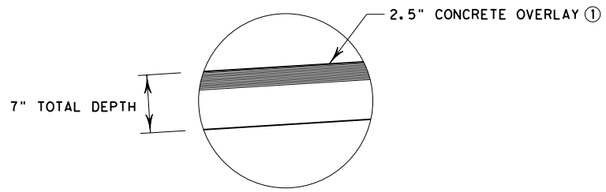

DETAIL "A"

① REFER TO CONCRETE OVERLAY NOTES SHEET FOR MORE INFORMATION.

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/03/2024

TYPICAL SECTIONS

REF #6
NBI:03-243-0283-06-070

9/3/2024
Texas Department of Transportation®

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0043	06	098,ETC.	US 70,ETC
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC		11

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GENERAL NOTES

Basis of Estimate:

Item - Description	Rate*	Unit
166 - Fertilizer	100 LB of Nitrogen / acre with a 3:1:1 ratio of N, P, K	LB
168 - Vegetative Watering	1.4 GAL/SY per Application every 2 weeks for 3 months	MG
314 – Emulsified Asphalt Treatment (Erosion Control) (MS-2 or SS-1)	0.25 GAL / SY	GAL

General Requirements

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

Callan Coltharp, P.E.: Callan.Coltharp@txdot.gov
Cody Bates, P.E.: Cody.Bates@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

The following standard detail sheets have been modified:
T501 Transition Retrofit Guide (MOD)
Retrofit Guide for Concrete Rails(MOD)

Bid Item Specific General Notes

Item 4 - Scope of Work

For the preconstruction conference submit a work schedule; temporary water pollution control plan; material sources; the person responsible for the SW3P; written utility coordination plan; certification statements; request for proposed subcontractors and letters designating the project superintendent, safety officer, and payroll officer at the preconstruction conference.

Item 5 - Control of the Work

Provide the Engineer a minimum 24 hours' notice for work requiring inspection or testing.

The progress schedule format shall be critical path method unless otherwise directed.

Item 6 - Control of Materials

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit an original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Item 7 - Legal Relations and Responsibilities

No significant traffic generator events identified for this project.

Item 8 - Prosecution and Progress

For this project, contract time will be computed as described in Item 8 based on a Standard Workweek (8.3.1.4.).

For Contractor's information, a new high school is scheduled to open near Ref. 2 & Ref. 3. The first day of school will be August 15, 2024 and traffic may increase. Please plan work accordingly.

Item 164 - Seeding for Erosion Control

Seeding will be required in several small areas as work progresses to comply with the storm water pollution prevention plan and may require multiple mobilizations of seeding crew. The contractor is responsible for the protection and maintenance of all seeded areas until final acceptance of the project. Maintenance includes:

1. Protection of seeded and mulched areas against traffic.

2. Mowing of weeds and tall vegetation, if needed, to prevent loss of soil moisture or choking out of grass seedlings. Mowing will be done as directed by the Engineer and will not be paid for directly.

Item 166 – Fertilizer

Fertilize all areas of the project that are seeded.

Item 168 - Vegetative Watering

Water as directed by the Engineer all areas that receive seed to sustain grass growth to obtain a minimum 70% vegetative cover within the right of way. This may require the contractor to water the newly established grass for a period of up to three months after all other work on the contract is completed and before the project is accepted. Watering shall be done at times determined by the Engineer in order to minimize any loss due to evaporation.

Item 354 – Planing and Texturing Pavement

Use caution when performing milling operations not to damage bridge deck. Repair any damage caused by contractor operations as directed by the Engineer and described in item 429. This work will be considered subsidiary to the milling bid item on the contract.

Contractor shall submit a plan of proposed planing operations to the Engineer for approval prior to commencing work. Plan the planing operations in a manner that will prevent a vertical edge of 2 inches or greater from being open to traffic overnight.

Planing operations shall be conducted so as to permit the broken white centerline to remain as long as possible.

Multiple mobilizations may be required to perform all milling operations. No additional payment will be made for multiple mobilizations.

Clean and sweep the pavement and bridge deck area as directed by the Engineer after the milling operation and prior to overlay.

Material milled off bridges shall become the property of the contractor and removed from the project.

Item 429 - Concrete Structure Repair

All repair locations shall be marked by contractor for approval by Engineer prior to beginning repairs.

Areas to be repaired at each location shall be repaired in accordance with the Department's Concrete Repair Manual. The Contractor must prepare and submit formal procedures outlining repair plans a minimum of 2 weeks prior to performing repairs. The Engineer must approve in writing any procedures that differ from those in the Concrete Repair Manual or materials that are not included on the Department's MPL.

Moist curing will be required unless curing membrane is approved by the Engineer. If curing membrane is approved for use, the Contractor must use a curing membrane that is recommended for use by the repair material manufacturer.

The Contractor shall maintain a hardcopy of the Department's Concrete Repair Manual on-site when concrete repair work is taking place.

Damage to sound concrete or to reinforcement outside the repair area will be repaired at no cost to the department.

Item 432 – Riprap

Saw cut pavement edges along the proposed mow strip locations to create a smooth joint between the roadway and mow strip. This work shall be subsidiary to item 432.

The use of synthetic fibers will not be permitted in the mow strip for any locations on this project. Use #3 rebar or approved wire mesh for steel reinforcement.

Item 434 – Bridge Bearings

Bearing pad replacement in junction with bid item 442-6011 should be performed on half an abutment at a time in order to maintain traffic flow. Half an abutment includes the north face for a total of 5 bearing pads per abutment. The existing bearing pads on the south face are to remain in place.

Item 439 – Bridge Deck Overlays

Grooving will be required for structures 03-243-0-0249-01-067 and 03-243-0-0283-06-070. This work will be subsidiary to item 439.

Highway: US 287 SB, ETC.

Furnish and place steel fiber reinforced concrete (FRC) as bridge deck overlay for structures 03-243-0-0249-01-067 and 03-243-0-0283-06-070.

Steel fibers will be made from stainless steel and meet the physical property requirements prescribed in ASTM A820. For overlay thinner than 2.5 in., the nominal length must be 1.5 in. (37.5 mm) long. For thicker overlay, the nominal length must be 2.0 in. (50 mm) long. 1 in. Helix Fibers are also allowed. Steel fibers must have a quantity of at least 2,000 fibers per pound and a fiber aspect ratio of 40 to 60. The steel fibers must not have any hooks or 90° bends. The steel fibers must be free from rust, oil and other deleterious materials. Steel fibers must be transported, stored and applied to the concrete mixture in accordance with the manufacturer's recommendations. This work will be subsidiary to item 439.

The steel fiber dosage rate must be 70 to 80 lb. per cubic yard of concrete.

Measure fibers by weight within the tolerance of -3% to +5%.

Furnish FRC free of fiber balls.

The use of Silica Fume will not be allowed.

Item 495 – Raising Existing Structures

This item shall be utilized at locations of bearing replacements and repair of beam seats on abutment/bent caps. Locations that have been identified are listed below:

REF 1 - NBI: 03-244-0043-06-113
REF 2 - NBI: 03-243-0044-01-100
REF 3 - NBI: 03-243-0044-01-101
REF 4 - NBI: 03-243-0044-01-119

A copy of the plans for the existing bridges to be lifted will be provided by TxDOT upon request by the Contractor.

Item 499 – Adjusting Steel Shoes

Rocker bearing shoe adjustment work should be performed on half an abutment at a time in order to maintain traffic flow. Half an abutment includes the north and south face for a total of 5 bearing pads per abutment.

Item 502 - Barricades, Signs, and Traffic Handling

Contractor shall store all traffic control devices not currently being used at a location approved by the Engineer.

Highway: US 287 SB, ETC.

The Traffic Control Plan (TCP) for this project includes the plans, the Texas Manual on Traffic Control Devices, Barricade and Construction Standard Sheets, Standard TCP Sheets, and as otherwise required by the Engineer.

Work will not be permitted without adequate traffic control devices in place. Work will only be permitted on one side of the roadway at any time.

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.

Work vehicles within 30 feet of the traveled way shall have strobe lights or rotating beacons in use.
Wear appropriate personal protective equipment at all times while outside of vehicles and equipment on the project.

Contractor shall not set up traffic control at multiple locations. All work and traffic control operations shall be complete prior to advancing to next location unless otherwise directed by the Engineer.

Provide adequate flagging on side roads to ensure that traffic flow is not compromised during one way traffic control operations.

Repair barricades within 48 hours after barricade report has been delivered to the Contractor. Failure to comply will cease all work until barricades are repaired to the satisfaction of the Department. Replace all damaged traffic control devices immediately. Remove any damaged traffic control devices from the project within 24 hours.

Failure to make necessary corrections to Traffic Control items based on barricade inspections will be cause for withholding the monthly estimate until such corrections are made.

Remove from the roadway and store in a central location approved by the Engineer all temporary traffic control devices, such as cones, barrels, portable signs, vertical panels, etc., which will not be used within 24 hours. This includes removal of temporary traffic control devices from the roadway over the weekend.

Refer to the "Worksheet for Edge Condition Treatment Types" for the proper traffic control devices to be used for the various edge conditions.

Cover or remove portable CW 8-12 "NO CENTER STRIPE" signs immediately upon completion of striping of the roadway.

Perform all construction work in daylight hours unless the engineer approves nighttime work in writing. Do not allow any construction equipment to be placed on the roadway until 30 minutes after sunrise and ensure that all construction equipment is removed from the roadway 30 minutes before sunset. Sunrise and sunset times will be as determined by NOAA at the following website https://gml.noaa.gov/grad/solcalc/sunrise.html

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls

The Contractor shall install concrete truck washouts as shown on the WFS-TA-BMP plan sheet. This work including materials and labor will not be measured or paid for directly but will be subsidiary to Item 506.

It is anticipated that there will be minimal erosion control devices required for this project. However, in the event that additional erosion control measures are needed, the storm water pollution and prevention plan (SW3P) for this project shall consist of using the following items:

Erosion control logs, Permanent seeding, and Vegetative watering

Verify locations and dimensions of BMP's and obtain the Engineer's approval prior to placement. BMP locations indicated on the plans are approximate and may be adjusted as necessary by the Engineer.

If it is determined that other erosion control devices are needed, payment for the work will be determined in accordance with Article 4.4, "Changes in the Work".

Item 542 – Removing Metal Beam Guard Fence

Removed existing rail elements, timber and metal posts shall become the property of the contractor and removed from the project.

Item 666 - Reflectorized Pavement Markings

Use Type II beads on all striping.

Remove temporary tabs from all roads prior to striping. Removal of tabs will be subsidiary to item 666.

The lead vehicle and trail vehicle will be required for all striping operations as shown on TCP (3-2)-13.

Item 672 - Raised Pavement Markers

Raised pavement marker adhesive will meet the requirements of Departmental Materials Specifications DMS-6130, "Bituminous Adhesive for Pavement Markers".

The lead vehicle and trail vehicle(s) will be required for all marker installation operations as shown on TCP(3-3)-14.

Item 4207 - Field Cleaning and Painting Steel

The steel girders, end diaphragms, and bearings are the only members to be cleaned and painted for the following structures, unless directed by the Engineer. See zone painting detail sheet for the estimated surface area and additional details for painting.

Location	Roadway/Channel	Contamination	Paint Description and Location
REF #1, NBI:03-244-0043-06-113	US 70 EB over BU 287 WB	Lead containing paint in silver paint	Silver Paint on steel beams and cross members near joints.
REF #2, NBI:03-243-0044-01-100	US 287 SB over US 281	Lead based paint in silver paint	Silver paint on steel beams and cross members near joints.
REF #3, NBI:03-243-0044-01-101	US 82 EB/US 287 SB over SH 70 SB	Lead based paint in silver paint	Silver paint on steel beams and cross members near joints.
REF #4, NBI:03-243-0044-01-119	US 287 SB over SH 79	Lead containing paint in silver paint	Silver paint on steel beams and cross members near joints.

For cleaning and painting of the listed bridge(s) above, follow the guidelines below:
A) The purpose of the washing should be to clean the structure of dirt and debris, not paint removal.
B) The wash water should be potable water that does not contain blasting grit, chemicals, or soaps.
C) The pressure of the power washer should be < 6000 psi.
D) The discharge should be to the ground as "irrigation". A direct stream discharge should be avoided without specific authorization from TCEQ.
E) There should be measures to avoid the release of solids such as paint chips.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0043-06-098 **DISTRICT** Wichita Falls **COUNTY** Wichita, Wilbarger
HIGHWAY SH 79, US 281, US 70, US 82

			CONTROL SECTION JOB	**0043-06-098**		**0044-01-112**		**0044-01-113**		**0044-01-114**		**0249-01-052**		**0283-06-028**	
			PROJECT ID	**A00201292**		**A00201265**		**A00201266**		**A00201267**		**A00201264**		**A00201291**	
			COUNTY	**Wilbarger**		**Wichita**		**Wichita**		**Wichita**		**Wichita**		**Wichita**	
			HIGHWAY	**US 70**		**US 82**		**US 82**		**US 82**		**US 281**		**SH 79**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	104-6009	REMOVING CONC (RIPRAP)	SY					9.000		26.000					
	104-6028	REMOVING CONC (MISC)	SY	79.000		195.000		152.000		195.000		470.280		488.000	
	104-6039	REMOVE CONC (ABUTMENT BACKWALL)	CY	3.000											
	104-6044	REMOVING CONC (FLUME)	SY			3.000				10.000					
	132-6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	23.060		16.890		17.420		18.670		16.300		32.590	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	319.440											
	164-6007	BROADCAST SEED (PERM) (URBAN) (CLAY)	SY			316.670		326.670		350.000		388.890		638.890	
	168-6001	VEGETATIVE WATERING	MG	2.680		2.660		2.740		2.940		3.270		5.370	
	314-6009	EMULS ASPH (EROSN CONT)(MULTI)	GAL	79.860		79.170		81.670		87.500		97.220		159.720	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY			2,240.000		850.000		1,450.000		1,400.000		1,120.000	
	401-6001	FLOWABLE BACKFILL	CY	9.000		4.000		2.000				8.000			
	420-6013	CL C CONC (ABUT)	CY	3.000											
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	341.100		364.500		371.000		449.200		233.900		190.400	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	350.000		800.000		400.000		500.000		250.000		350.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF									15.000		15.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	64.000		77.000		78.000		54.000		61.000		11.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY					1.000		3.000					
	432-6044	RIPRAP (CONC)(FLUME)	CY	2.000		6.000				1.300					
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	46.290		34.890		28.850		34.980		31.280		54.510	
	434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	10.000											
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	146.000											
	438-6003	CLEANING AND SEALING EXIST JOINTS(CL5)	LF	248.000		252.000		272.000		226.000		160.000		90.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	140.000								251.000		160.000	
	439-6012	REINFORCED CONCRETE OVERLAY (4.5 IN)	SY									1,400.000		1,120.000	
	439-6013	MULTI-LAYER POLYMER OVERLAY	SY	1,120.000		1,120.000		850.000		1,450.000					
	442-6011	STR STEEL (PEDESTAL)	LB	1,670.000											
	451-6024	RETROFIT RAIL (TY SSTR)	LF			603.000		463.000		736.000					
	483-6008	HYDRO-DEMOLITION (2 1/2 IN)	SY									1,400.000		1,120.000	
	483-6013	SHOT BLASTING	SY	1,120.000		1,120.000		850.000		1,450.000					
	495-6001	RAISING EXIST STRUCT	LS	1.000											
	499-6001	ADJUST STL SHOES	EA			10.000		10.000		10.000					
	500-6001	MOBILIZATION	LS	1.000											
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000											
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	575.000		570.000		588.000		630.000		700.000		1,150.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	575.000		570.000		588.000		630.000		700.000		1,150.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF			425.000		400.000				630.000		500.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF			425.000		400.000		1,450.000					

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0043-06-098 **DISTRICT** Wichita Falls **COUNTY** Wichita, Wilbarger
HIGHWAY SH 79, US 281, US 70, US 82

			CONTROL SECTION JOB	**0043-06-098**		**0044-01-112**		**0044-01-113**		**0044-01-114**		**0249-01-052**		**0283-06-028**	
			PROJECT ID	**A00201292**		**A00201265**		**A00201266**		**A00201267**		**A00201264**		**A00201291**	
			COUNTY	**Wilbarger**		**Wichita**		**Wichita**		**Wichita**		**Wichita**		**Wichita**	
			HIGHWAY	**US 70**		**US 82**		**US 82**		**US 82**		**US 281**		**SH 79**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF			50.000		50.000		725.000		630.000		500.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	582.000		400.000		460.000		475.000		500.000		1,050.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	2.000		2.000		2.000		2.000		2.000		2.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.000				1.000		2.000				1.000	
	540-6018	MTL BM GD FEN TRANS (NON - SYM)	EA	2.000		1.000		1.000		2.000		1.000		1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	525.000		300.000		350.000		450.000		520.000		1,095.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	1.000				1.000		1.000				1.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA											1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1.000		2.000		1.000		2.000		2.000		1.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	1.000		2.000		2.000		2.000		2.000		1.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA			1.000		1.000		2.000		1.000		1.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA					1.000		1.000		1.000		1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA			1.000		1.000				1.000		1.000	
	644-6064	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA											1.000	
	644-6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	1.000		1.000		1.000		1.000		2.000			
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	4.000		4.000		4.000		4.000		4.000		4.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	4.000		4.000		4.000		4.000		4.000		4.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	5.000		6.000		4.000		6.000		7.000		18.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	6.000		5.000		6.000		7.000		5.000		5.000	
	662-6057	WK ZN PAV MRK REMOV (TRAF BTN) TY W	LF	355.000		339.000		247.000		427.000		317.000		223.000	
	662-6059	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	LF	350.000		335.000		246.000		420.000		320.000		219.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	27.000		27.000		18.000		33.000		24.000		18.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF			1,080.000									
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF			3,288.000		2,034.000		3,330.000		3,696.000		2,599.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF			1,297.000		678.000		1,110.000		1,232.000		850.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	90.000		310.000		180.000		280.000		300.000		220.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	354.000		1,225.000		678.000		1,110.000		1,232.000		875.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	350.000		1,297.000		678.000		1,110.000		1,232.000		850.000	
	672-6007	REFL PAV MRKR TY I-C	EA	4.000		16.000		8.000		14.000		15.000		1.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF			6,886.000		4,248.000		6,660.000		7,392.000		5,174.000	
	778-6001	CONCRETE RAIL REPAIR (IN-KIND)	LF	265.000										5.000	
	785-6004	BRIDGE JOINT REPAIR (ARMOR)	LF			220.000		270.000		264.000					
	785-6013	BRIDGE JOINT REPLACEMENT (HEADER)	LF									76.000		80.000	
	4207-6001	STEEL BRIDGE ZONE PAINTING REF STR #1	EA	1.000											
	4207-6002	STEEL BRIDGE ZONE PAINTING REF STR #2	EA			1.000									
	4207-6003	STEEL BRIDGE ZONE PAINTING REF STR #3	EA					1.000							
	4207-6004	STEEL BRIDGE ZONE PAINTING REF STR #4	EA							1.000					

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0043-06-098 **DISTRICT** Wichita Falls **COUNTY** Wichita, Wilbarger
HIGHWAY SH 79, US 281, US 70, US 82

			CONTROL SECTION JOB	**0043-06-098**		**0044-01-112**		**0044-01-113**		**0044-01-114**		**0249-01-052**		**0283-06-028**	
			PROJECT ID	**A00201292**		**A00201265**		**A00201266**		**A00201267**		**A00201264**		**A00201291**	
			COUNTY	**Wilbarger**		**Wichita**		**Wichita**		**Wichita**		**Wichita**		**Wichita**	
			HIGHWAY	**US 70**		**US 82**		**US 82**		**US 82**		**US 281**		**SH 79**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	14.000		7.000		7.000		14.000		7.000		7.000	
	6185-6002	TMA (STATIONARY)	DAY	10.000		8.000		8.000		8.000		14.000		14.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	1.000		1.000		1.000		1.000		1.000		1.000	
	7306-6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2.000		2.000		2.000		2.000		2.000		2.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000											
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0043-06-098

DISTRICT Wichita Falls
HIGHWAY SH 79, US 281, US 70, US 82

COUNTY Wichita, Wilbarger

CONTROL SECTION JOB / PROJECT ID / COUNTY / HIGHWAY				TOTAL EST.	TOTAL FINAL
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		
	104-6009	REMOVING CONC (RIPRAP)	SY	35.000	
	104-6028	REMOVING CONC (MISC)	SY	1,579.280	
	104-6039	REMOVE CONC (ABUTMENT BACKWALL)	CY	3.000	
	104-6044	REMOVING CONC (FLUME)	SY	13.000	
	132-6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	124.930	
	164-6001	BROADCAST SEED (PERM) (RURAL) (SANDY)	SY	319.440	
	164-6007	BROADCAST SEED (PERM) (URBAN) (CLAY)	SY	2,021.120	
	168-6001	VEGETATIVE WATERING	MG	19.660	
	314-6009	EMULS ASPH (EROSN CONT)(MULTI)	GAL	585.140	
	354-6021	PLANE ASPH CONC PAV(0" TO 2")	SY	7,060.000	
	401-6001	FLOWABLE BACKFILL	CY	23.000	
	420-6013	CL C CONC (ABUT)	CY	3.000	
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	1,950.100	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	2,650.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	30.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	345.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY	4.000	
	432-6044	RIPRAP (CONC)(FLUME)	CY	9.300	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	230.800	
	434-6003	ELASTOMERIC BEARING (SPECIAL)	EA	10.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	146.000	
	438-6003	CLEANING AND SEALING EXIST JOINTS(CL5)	LF	1,248.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	551.000	
	439-6012	REINFORCED CONCRETE OVERLAY (4.5 IN)	SY	2,520.000	
	439-6013	MULTI-LAYER POLYMER OVERLAY	SY	4,540.000	
	442-6011	STR STEEL (PEDESTAL)	LB	1,670.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF	1,802.000	
	483-6008	HYDRO-DEMOLITION (2 1/2 IN)	SY	2,520.000	
	483-6013	SHOT BLASTING	SY	4,540.000	
	495-6001	RAISING EXIST STRUCT	LS	1.000	
	499-6001	ADJUST STL SHOES	EA	30.000	
	500-6001	MOBILIZATION	LS	1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	4,213.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	4,213.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	1,955.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	2,275.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0043-06-098

DISTRICT Wichita Falls
HIGHWAY SH 79, US 281, US 70, US 82

COUNTY Wichita, Wilbarger

				TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB			
		PROJECT ID			
		COUNTY			
		HIGHWAY			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF	1,955.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	3,467.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	12.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	6.000	
	540-6018	MTL BM GD FEN TRANS (NON - SYM)	EA	8.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	3,240.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	4.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	9.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	10.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	6.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	4.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	4.000	
	644-6064	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA	1.000	
	644-6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	6.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	24.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	24.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	46.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	34.000	
	662-6057	WK ZN PAV MRK REMOV (TRAF BTN) TY W	LF	1,908.000	
	662-6059	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	LF	1,890.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	147.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,080.000	
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	14,947.000	
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	5,167.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	1,380.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	5,474.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	5,517.000	
	672-6007	REFL PAV MRKR TY I-C	EA	58.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	30,360.000	
	778-6001	CONCRETE RAIL REPAIR (IN-KIND)	LF	270.000	
	785-6004	BRIDGE JOINT REPAIR (ARMOR)	LF	754.000	
	785-6013	BRIDGE JOINT REPLACEMENT (HEADER)	LF	156.000	
	4207-6001	STEEL BRIDGE ZONE PAINTING REF STR #1	EA	1.000	
	4207-6002	STEEL BRIDGE ZONE PAINTING REF STR #2	EA	1.000	
	4207-6003	STEEL BRIDGE ZONE PAINTING REF STR #3	EA	1.000	
	4207-6004	STEEL BRIDGE ZONE PAINTING REF STR #4	EA	1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0043-06-098

DISTRICT Wichita Falls

COUNTY Wichita, Wilbarger

HIGHWAY SH 79, US 281, US 70, US 82

				TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB			
		PROJECT ID			
		COUNTY			
		HIGHWAY			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	56.000	
	6185-6002	TMA (STATIONARY)	DAY	62.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	6.000	
	7306-6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	12.000	
	18	LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	

SUMMARY OF ROADWAY ITEMS

LOCATION	104 6028	132 6001	432 6045	540 6001	540 6006	540 6016	540 6018	542 6001	542 6002	542 6003	544 6001	544 6003	658 6013	658 6026	658 6061	658 6064
	REMOVING CONC (MISC)	EMBANKMENT (FINAL)(ORD COMP)(TY A)	RIPRAP (MOW STRIP)(4 IN)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	DOWNSTREAM ANCHOR TERMINAL SECTION	MTL BM GD FEN TRANS (NON - SYM)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	REMOVE DOWNSTREAM ANCHOR TERMINAL	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2
	SY	CY	CY	LF	EA	EA	EA	LF	EA	EA	EA	EA	EA	EA	EA	EA
CSJ: 0043-06-098																
REF 1	79	23.06	46.29	582	2	2	2	525	1		1	1	4	4	5	6
NBI 03-244-0043-06-113																
CSJ: 0044-01-112																
REF 2	195	16.89	34.89	400	2		1	300			2	2	4	4	6	5
NBI 03-243-0044-01-100																
CSJ: 0044-01-113																
REF 3	152	17.42	28.85	460	2	1	1	350	1		1	2	4	4	4	6
NBI 03-243-0044-01-101																
CSJ: 0044-01-114																
REF 4	195	18.67	34.98	475	2	2	2	450	1		2	2	4	4	6	7
NBI 03-243-0044-01-119																
CSJ: 0249-01-052																
REF 5	235	16.3	31.28	500	2		1	520			2	2	4	4	7	5
NBI 03-243-0249-01-067																
CSJ: 0283-06-028																
REF 6	488	32.59	54.51	1050	2	1	1	1095	1	1	1	1	4	4	18	5
NBI 03-243-0283-06-070																
PROJECT TOTALS	**1344**	**124.93**	**230.8**	**3467**	**12**	**6**	**8**	**3240**	**4**	**1**	**9**	**10**	**24**	**24**	**46**	**34**

SUMMARY OF BRIDGE = 1 ITEMS NBI: 03-244-0-0043-06-113

LOCATION	104 6039	401 6001	420 6013	428 6001	429 6003	429 6007	432 6044	434 6003	438 6003	438 6004	439 6013	442 6011	483 6013	495 6001	778 6001	4207 6001	7306 6001
	REMOVE CONC (ABUTMENT BACKWALL)	FLOWABLE BACKFILL	CL C CONC (ABUT)	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC)(FLUME)	ELASTOMERIC BEARING (SPECIAL)	CLEANING AND SEALING EXIST JOINTS(CL5)	CLEANING AND SEALING EXIST JOINTS(CL7)	MULTI-LAYER POLYMER OVERLAY	STR STEEL (PEDESTAL)	SHOT BLASTING	RAISING EXIST STRUCT	CONCRETE RAIL REPAIR (IN-KIND)	STEEL BRIDGE ZONE PAINTING REF STR #1	BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	CY	CY	CY	SY	SF	SF	CY	EA	LF	LF	SY	LB	SY	LS	LF	EA	EA
CSJ: 0043-06-098	3	9	3	341.1	350	64	1	10	248	140	1120	1670	1120	1	265	1	2
REFERENCE #1																	
PROJECT TOTALS	**3**	**9**	**3**	**341.1**	**350**	**64**	**1**	**10**	**248**	**140**	**1120**	**1670**	**1120**	**1**	**265**	**1**	**2**

SUMMAR OF BRIDGE = 2 ITEMS NBI: 03-243-0-0044-01-100

LOCATION	104 6044	354 6021	401 6001	428 6001	429 6003	429 6007	432 6044	438 6003	439 6013	451 6024	483 6013	499 6001	785 6004	4207 6002	7306 6001
	REMOVING CONC (FLUME)	PLANE ASPH CONC PAV(0" TO 2")	FLOWABLE BACKFILL	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC)(FLUME)	CLEANING AND SEALING EXIST JOINTS(CL5)	MULTI-LAYER POLYMER OVERLAY	RETROFIT RAIL (TY SSTR)	SHOT BLASTING	ADJUST STL SHOES	BRIDGE JOINT REPAIR (ARMOR)	STEEL BRIDGE ZONE PAINTING REF STR #2	BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	SY	SY	CY	SY	SF	SF	CY	LF	SY	LF	SY	EA	LF	EA	EA
CSJ: 0044-01-112	3	1120	4	364.5	400	77	6	252	1120	603	1120	10	220	1	2
REFERENCE #2															
PROJECT TOTALS	**3**	**1120**	**4**	**364.5**	**400**	**77**	**6**	**252**	**1120**	**603**	**1120**	**10**	**220**	**1**	**2**

US 70, ETC

QUANTITY SUMMARY

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		22

SUMMARY OF BRIDGE = 3 ITEMS NBI: 03-243-0-0044-01-101

LOCATION	104 6009	354 6021	401 6001	428 6001	429 6003	429 6007	432 6001	438 6003	439 6013	451 6024	483 6013	499 6001	785 6004	4207 6003	7306 6001
	REMOVING CONC (RIPRAP)	PLANE ASPH CONC PAV(0" TO 2")	FLOWABLE BACKFILL	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC)(4 IN)	CLEANING AND SEALING EXIST JOINTS(CL5)	MULTI-LAYER POLYMER OVERLAY	RETROFIT RAIL (TY SSTR)	SHOT BLASTING	ADJUST STL SHOES	BRIDGE JOINT REPAIR (ARMOR)	STEEL BRIDGE ZONE PAINTING REF STR #3	BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	SY	SY	CY	SY	SF	SF	CY	LF	SY	LF	SY	EA	LF	EA	EA
CSJ: 0044-01-113	9	850	2	371	400	78	1	272	850	463	850	10	270	1	2
REFERENCE #3															
PROJECT TOTALS	**9**	**850**	**2**	**371**	**400**	**78**	**1**	**272**	**850**	**463**	**850**	**10**	**270**	**1**	**2**

SUMMARY OF BRIDGE = 4 ITEMS NBI: 03-243-0-0044-01-119

LOCATION	104 6009	104 6044	354 6021	428 6001	429 6003	429 6007	432 6001	432 6044	438 6003	439 6013	451 6024	483 6013	499 6001	785 6004	4207 6004	7306 6001
	REMOVING CONC (RIPRAP)	REMOVING CONC (FLUME)	PLANE ASPH CONC PAV(0" TO 2")	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC)(4 IN)	RIPRAP (CONC)(FLUME)	CLEANING AND SEALING EXIST JOINTS(CL5)	MULTI-LAYER POLYMER OVERLAY	RETROFIT RAIL (TY SSTR)	SHOT BLASTING	ADJUST STL SHOES	BRIDGE JOINT REPAIR (ARMOR)	STEEL BRIDGE ZONE PAINTING REF STR #4	BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	SY	SY	SY	SY	SF	SF	CY	CY	LF	SY	LF	SY	EA	LF	EA	EA
CSJ: 0044-01-114	26	10	1450	449.2	500	54	3	1.3	226	1450	736	1450	10	264	1	2
REFERENCE #4																
PROJECT TOTALS	**26**	**10**	**1450**	**449.2**	**500**	**54**	**3**	**1.3**	**226**	**1450**	**736**	**1450**	**10**	**264**	**1**	**2**

SUMMARY OF BRIDGE = 5 ITEMS NBI: 03-243-0-0249-01-067

LOCATION	354 6021	401 6001	428 6001	429 6003	429 6005	429 6007	438 6003	438 6004	439 6012	483 6008	785 6013	7306 6001
	PLANE ASPH CONC PAV(0" TO 2")	FLOWABLE BACKFILL	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR(DECK REP (FULL DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING AND SEALING EXIST JOINTS(CL5)	CLEANING AND SEALING EXIST JOINTS(CL7)	REINFORCED CONCRETE OVERLAY (4.5 IN)	HYDRO-DEMOLITION (2 1/2 IN)	BRIDGE JOINT REPLACEMENT (HEADER)	BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	SY	CY	SY	SF	SF	SF	LF	LF	SY	SY	LF	EA
CSJ: 0249-01-052	1400	8	233.9	250	15	61	160	251	1400	1400	76	2
REFERENCE #5												
PROJECT TOTALS	**1400**	**8**	**233.9**	**250**	**15**	**61**	**160**	**251**	**1400**	**1400**	**76**	**2**

SUMMARY OF BRIDGE = 6 ITEMS NBI: 03-243-0-0283-06-070

LOCATION	354 6021	428 6001	429 6003	429 6005	429 6007	438 6003	438 6004	439 6012	483 6008	778 6001	785 6013	7306 6001
	PLANE ASPH CONC PAV(0" TO 2")	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR(DECK REP (FULL DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING AND SEALING EXIST JOINTS(CL5)	CLEANING AND SEALING EXIST JOINTS(CL7)	REINFORCED CONCRETE OVERLAY (4.5 IN)	HYDRO-DEMOLITION (2 1/2 IN)	CONCRETE RAIL REPAIR (IN-KIND)	BRIDGE JOINT REPLACEMENT (HEADER)	BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	SY	SY	SF	SF	SF	LF	LF	SY	SY	LF	LF	EA
CSJ: 0283-06-028	1120	190.4	350	15	11	90	160	1120	1120	5	80	2
REFERENCE #6												
PROJECT TOTALS	**1120**	**190.4**	**350**	**15**	**11**	**90**	**160**	**1120**	**1120**	**5**	**80**	**2**

US 70, ETC

QUANTITY SUMMARY

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		23

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	512 6001	512 6025	512 6049	545 6003	545 6005	545 6019	662 6057	662 6059	662 6109	6001 6001	6185 6002	6185 6005	666 6170	666 6207
	PORT CTB (FUR & INST)(SGL SLOPE) (TY 1)	PORT CTB (MOVE)(SGL SLP) (TY 1)	PORT CTB (REMOVE)(SGL SLP) (TY 1)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (S)(N)(TL3)	WK ZN PAV MRK REMOV (TRAF BTN) TY W	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	WK ZN PAV MRK SHT TERM (TAB)TY W	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)	REFL PAV MRK TY II (W) 4" (SLD)	REFL PAV MRK TY II (Y) 4" (SLD)
	LF	LF	LF	EA	EA	EA	LF	LF	EA	DAY	DAY	DAY	LF	LF
CSJ: 0043-06-098														
REF 1							355	350	27	14	10	1		
NBI 03-244-0043-06-113														
CSJ: 0044-01-112														
REF 2	425	425	50	1		1	339	335	27	7	8	1	3288	1297
NBI 03-243-0044-01-100														
CSJ: 0044-01-113														
REF 3	400	400	50	1	1	1	247	246	18	7	8	1	2034	678
NBI 03-243-0044-01-101														
CSJ: 0044-01-114														
REF 4		1450	725	2	1		427	420	33	14	8	1	3330	1110
NBI 03-243-0044-01-119														
CSJ: 0249-01-052														
REF 5	630		630	1	1	1	317	320	24	7	14	1	3696	1232
NBI 03-243-0249-01-067														
CSJ: 0283-06-028														
REF 6	500		500	1	1	1	223	219	18	7	14	1	2599	850
NBI 03-243-0283-06-070														
PROJECT TOTALS	**1955**	**2275**	**1955**	**6**	**4**	**4**	**1908**	**1890**	**147**	**56**	**62**	**6**	**14947**	**5167**

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	666 6036	666 6300	666 6303	666 6315	672 6007	677 6001
	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	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"(SLD) (100MIL)	REFL PAV MRKR TY I-C	ELIM EXT PAV MRK & MRKS (4")
	LF	LF	LF	LF	EA	LF
CSJ: 0043-06-098						
REF 1		90	354	350	4	
NBI 03-244-0043-06-113						
CSJ: 0044-01-112						
REF 2	1080	310	1225	1297	16	6886
NBI 03-243-0044-01-100						
CSJ: 0044-01-113						
REF 3		180	678	678	8	4248
NBI 03-243-0044-01-101						
CSJ: 0044-01-114						
REF 4		280	1110	1110	14	6660
NBI 03-243-0044-01-119						
CSJ: 0249-01-052						
REF 5		300	1232	1232	15	7392
NBI 03-243-0249-01-067						
CSJ: 0283-06-028						
REF 6		220	875	850	11	5174
NBI 03-243-0283-06-070						
PROJECT TOTALS	**1080**	**1380**	**5474**	**5517**	**68**	**30360**

SUMMARY OF EROSION CONTROL ITEMS

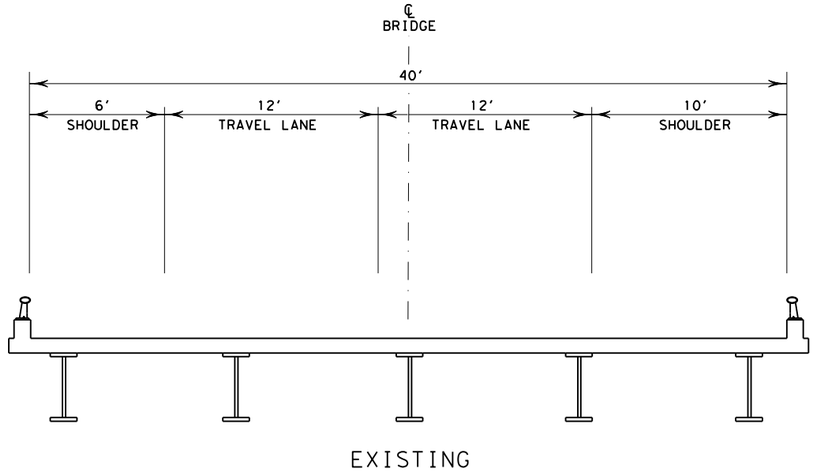
LOCATION	164 6001	164 6007	168 6001	314 6009	506 6040	506 6043
	BROADCAST SEED (PERM) (RURAL) (SANDY)	BROADCAST SEED (PERM) (URBAN) (CLAY)	VEGETATIVE WATERING	EMULS ASPH (EROSN CONT) (MULTI)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	MG	GAL	LF	LF
CSJ: 0043-06-098						
REF 1	319.44		2.68	79.86	575	575
NBI 03-244-0043-06-113						
CSJ: 0044-01-112						
REF 2		316.67	2.66	79.17	570	570
NBI 03-243-0044-01-100						
CSJ: 0044-01-113						
REF 3		326.67	2.74	81.67	588	588
NBI 03-243-0044-01-101						
CSJ: 0044-01-114						
REF 4		350	2.94	87.5	630	630
NBI 03-243-0044-01-119						
CSJ: 0249-01-052						
REF 5		388.89	3.27	97.22	700	700
NBI 03-243-0249-01-067						
CSJ: 0283-06-028						
REF 6		638.89	5.37	159.72	1150	1150
NBI 03-243-0283-06-070						
PROJECT TOTALS	**319.44**	**2021.12**	**19.66**	**585.14**	**4213**	**4213**

US 70, ETC

QUANTITY SUMMARY

SHEET 3 OF 3

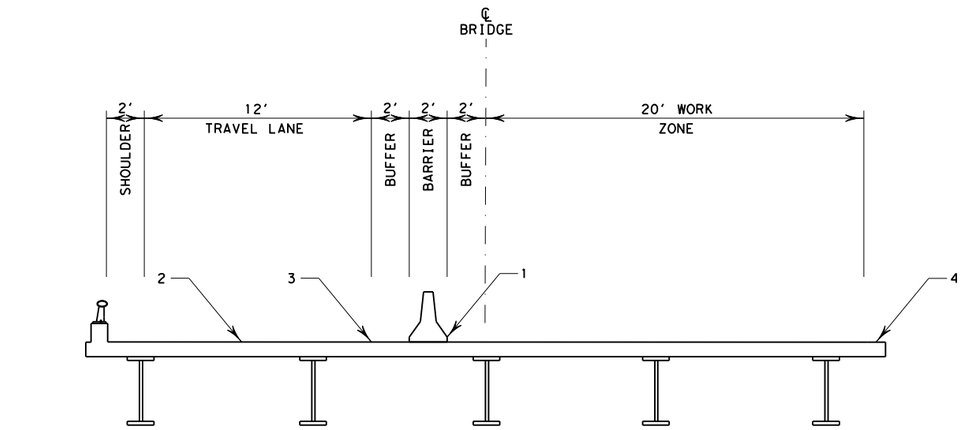
CONT	SECT	JOB	HIGHWAY
0043	06	098, ETC.	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		24



EXISTING

TCP NARRATIVE

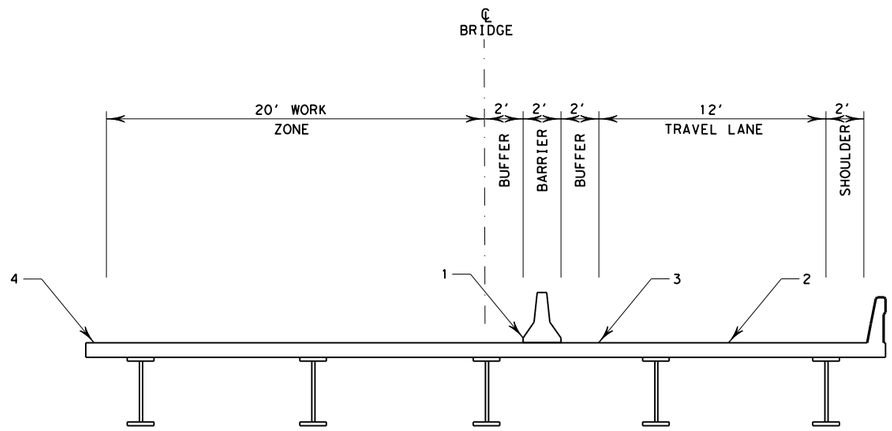
1. INSTALL BARRICADES, SIGNS AND STAGE TCP.



PROPOSED TCP PHASE 1

TCP NARRATIVE

1. INSTALL TEMP. BARRIER AS ILLUSTRATED HERE AND ON TCP DETAILS SHEET. DO NOT PIN BARRIER TO BRIDGE DECK BUT ALLOW A 2FT MIN. BUFFER BEHIND BARRIER.
2. REMOVE EXISTING WHITE EDGELINE STRIPE.
3. INSTALL TEMP. STRIPE PER STRIPE LAYOUT SHEETS.
4. REMOVE T4 RAIL AND REPLACE WITH SSTR ON 1ST SIDE OF BRIDGE.
   (FOR REFERENCES 2 AND 3, SEE DETOUR LAYOUT SHEETS AND TCP DETAIL SHEET FOR MORE INFORMATION.)
   (FOR REFERENCE 4, SEE TCP DETAIL SHEET FOR MORE INFORMATION.)



PROPOSED TCP PHASE 2

TCP NARRATIVE

1. RESET TEMP. BARRIER AS ILLUSTRATED FOR PHASE 2. DO NOT PIN BARRIER TO BRIDGE DECK BUT ALLOW 2FT MIN. BUFFER BEHIND BARRIER.
2. REMOVE EXISTING WHITE EDGELINE STRIPE.
3. INSTALL TEMP. STRIPE PER STRIPE LAYOUT SHEETS.
4. REMOVE T4 RAIL AND REPLACE WITH SSTR ON NORTH SIDE OF BRIDGE.
5. SHOT BLAST AND PLACE MULTIPOLYMER OVERLAY USING TCP(6-2).
6. INSTALL FINAL STRIPE USING TCP(3-2) AND TCP(3-3).

NBI: 03-243-0-0044-01-100
NBI: 03-243-0-0044-01-101
NBI: 03-243-0-0044-01-119

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

SEQUENCE OF WORK

BRIDGE RAIL REPLACEMENT

9/1/2024

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC		25

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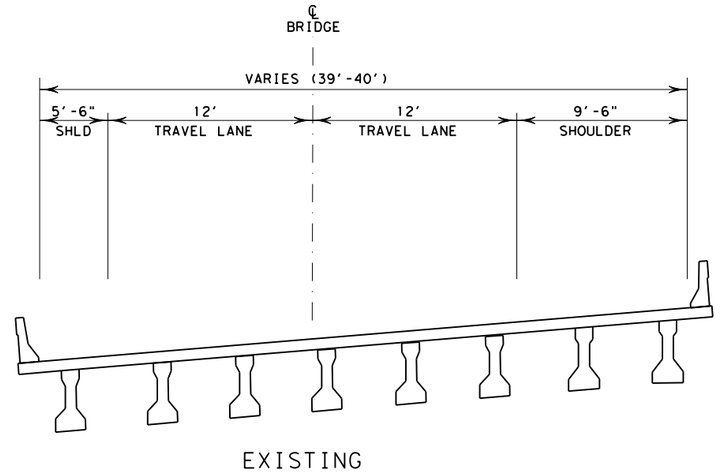

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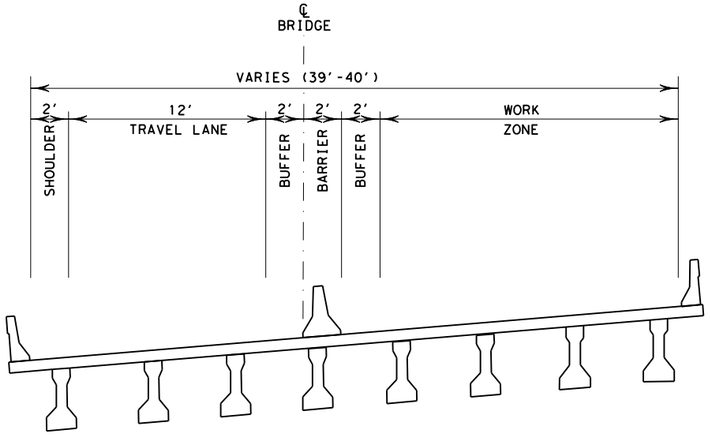
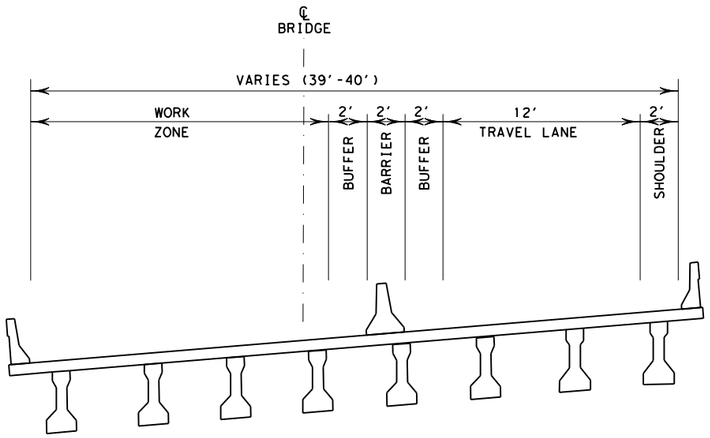


PROPOSED TCP PHASE 1



PROPOSED TCP PHASE 2

TCP NARRATIVE

1. INSTALL BARRICADES, SIGNS AND STAGE TCP.

TCP NARRATIVE

1. INSTALL TEMP. BARRIER AS ILLUSTRATED HERE AND ON TCP DETAILS SHEET. DO NOT PIN BARRIER TO BRIDGE DECK BUT ALLOW A 2FT MIN. BUFFER BEHIND BARRIER.
2. REMOVE EXISTING WHITE EDGELINE STRIPE.
3. INSTALL TEMP. STRIPE PER STRIPE LAYOUT SHEETS.
4. PERFORM HYDRO-DEMOLITION ON FIRST SIDE OF BRIDGE. NO WORK SHALL BE PERFORMED DIRECLY OVER LANES OPEN TO TRAFFIC. DURING HYDRO-DEMOLITION OPERATION CLOSE TRAVEL LANE AND ADJACENT SHOULDER USING TCP(2-6).
5. PLACE CONCRETE OVERLAY AND ALLOW TO CURE.

TCP NARRATIVE

1. RESET TEMP. BARRIER AS ILLUSTRATED FOR PHASE 2. DO NOT PIN BARRIER TO BRIDGE DECK BUT ALLOW 2FT MIN. BUFFER BEHIND BARRIER.
2. REMOVE EXISTING WHITE EDGELINE STRIPE.
3. INSTALL TEMP. STRIPE PER STRIPE LAYOUT SHEETS.
4. PERFORM HYDRO-DEMOLITION ON FIRST SIDE OF BRIDGE. NO WORK SHALL BE PERFORMED DIRECLY OVER LANES OPEN TO TRAFFIC. DURING HYDRO-DEMOLITION OPERATION CLOSE UNDERNEATH TRAVEL LANE AND ADJACENT SHOULDER USING TCP(2-6).
5. INSTALL CONCRETE OVERLAY AND ALLOW TO CURE.
6. INSTALL FINAL STRIPE USING TCP(3-2) AND TCP(3-3).

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

SEQUENCE OF WORK
HYDRO-DEMOLITION

9/1/2024

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
03	WILBARGER, ETC		26

NBI: 03-243-0-0249-01-067
NBI: 03-243-0-0283-06-070

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DATE: 3/4/2024 12:40:59 AM
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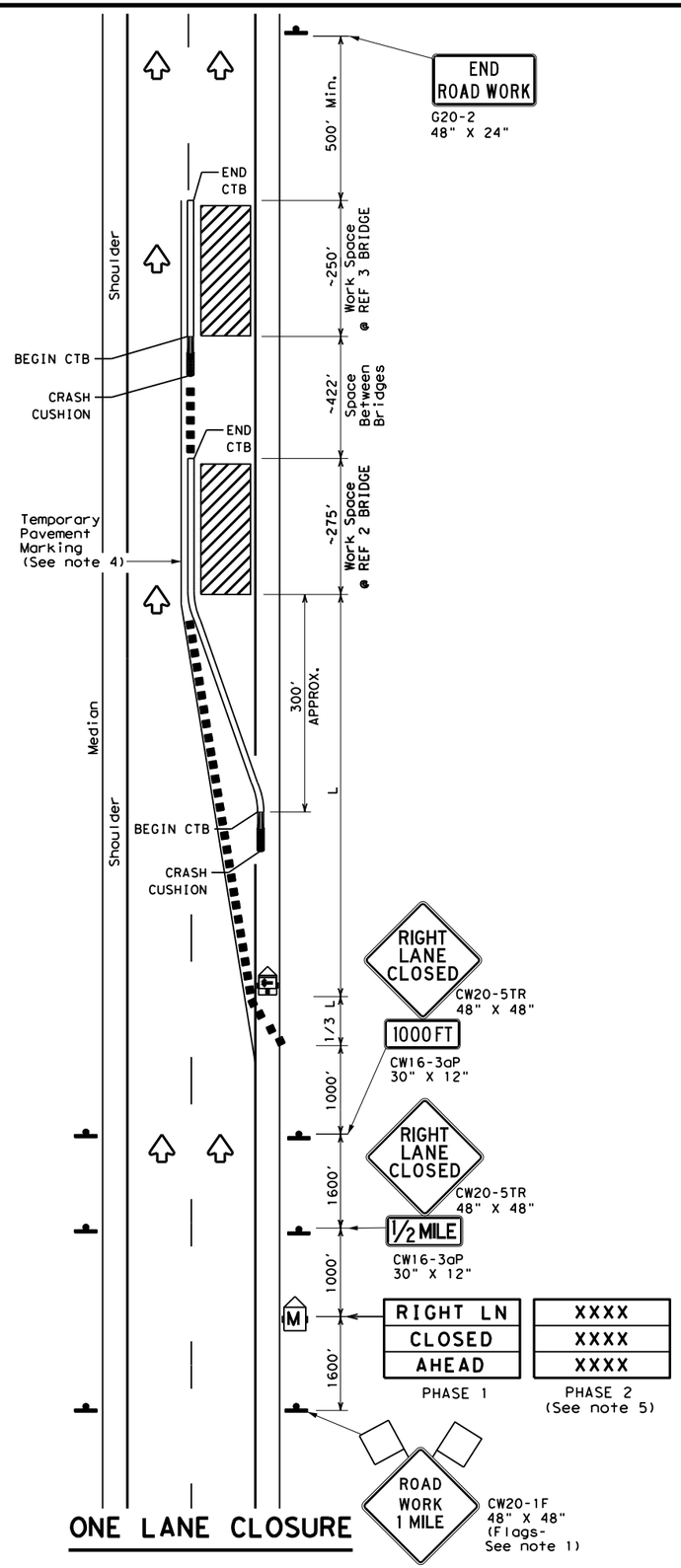

ONE LANE CLOSURE

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		Crash Cushion

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"
60	L=WS	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. All traffic control devices illustrated are REQUIRED. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
2. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
3. Drums are the typical channelizing devices. Other channelizing devices may be used as directed by the Engineer.
4. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
5. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.

REF #2 NBI:03-243-0044-01-100
REF #3 NBI:03-243-0044-01-101

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03/04/2024

Texas Department of Transportation
Traffic Operations Division

TCP DETAILS FOR BRIDGE REPAIR WORK

REFERENCE #2 & #3
"ONE TIME USE ONLY"

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
2-94 2-12
8-95
1-97
4-98

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		27

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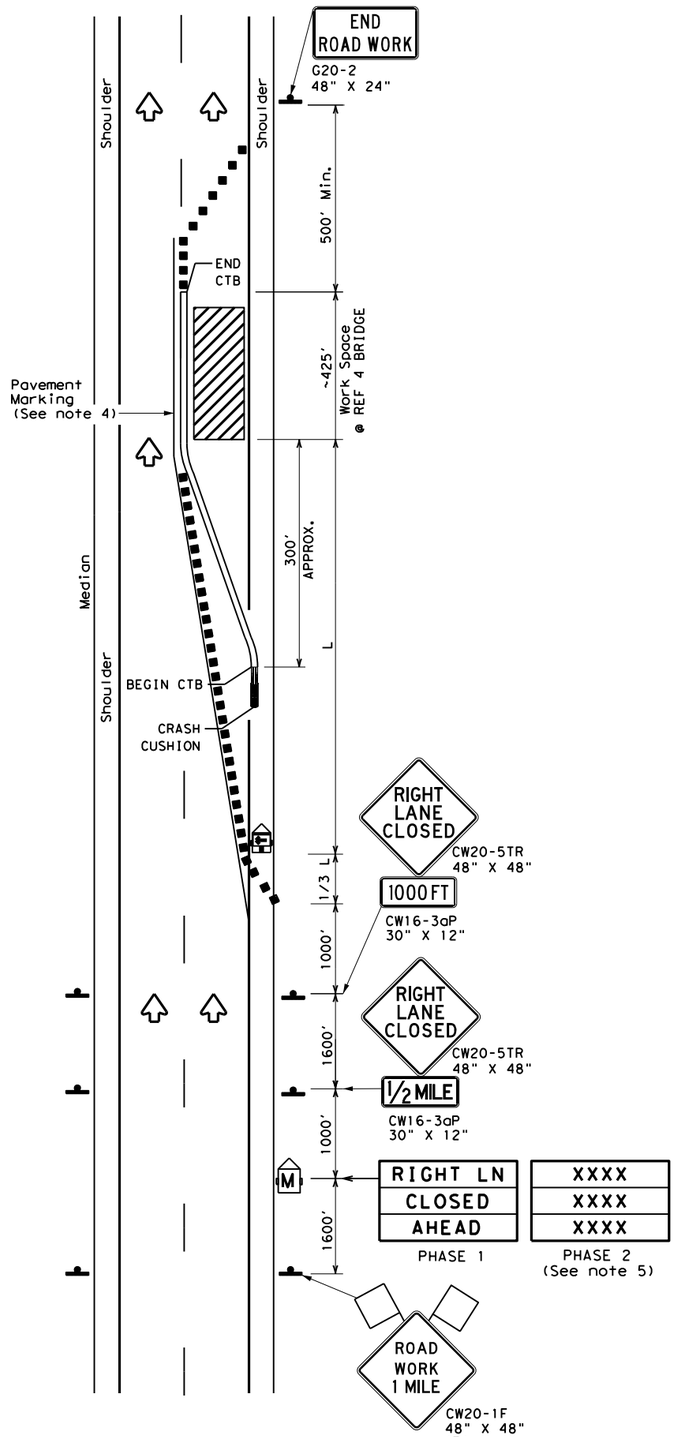

ONE LANE CLOSURE

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		Crash Cushion

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"
60	L=WS	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. All traffic control devices illustrated are REQUIRED. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
2. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
3. Drums are the typical channelizing devices. Other channelizing devices may be used as directed by the Engineer.
4. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
5. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.

REF #4 NBI:03-243-0044-01-119

STATE OF TEXAS
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Andrew Mosley, P.E.

03/04/2024

Texas Department of Transportation
Traffic Operations Division

TCP DETAILS FOR BRIDGE REPAIR WORK

REFERENCE #4
"ONE TIME USE ONLY"

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
2-94 2-12
8-95
1-97
4-98

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		28

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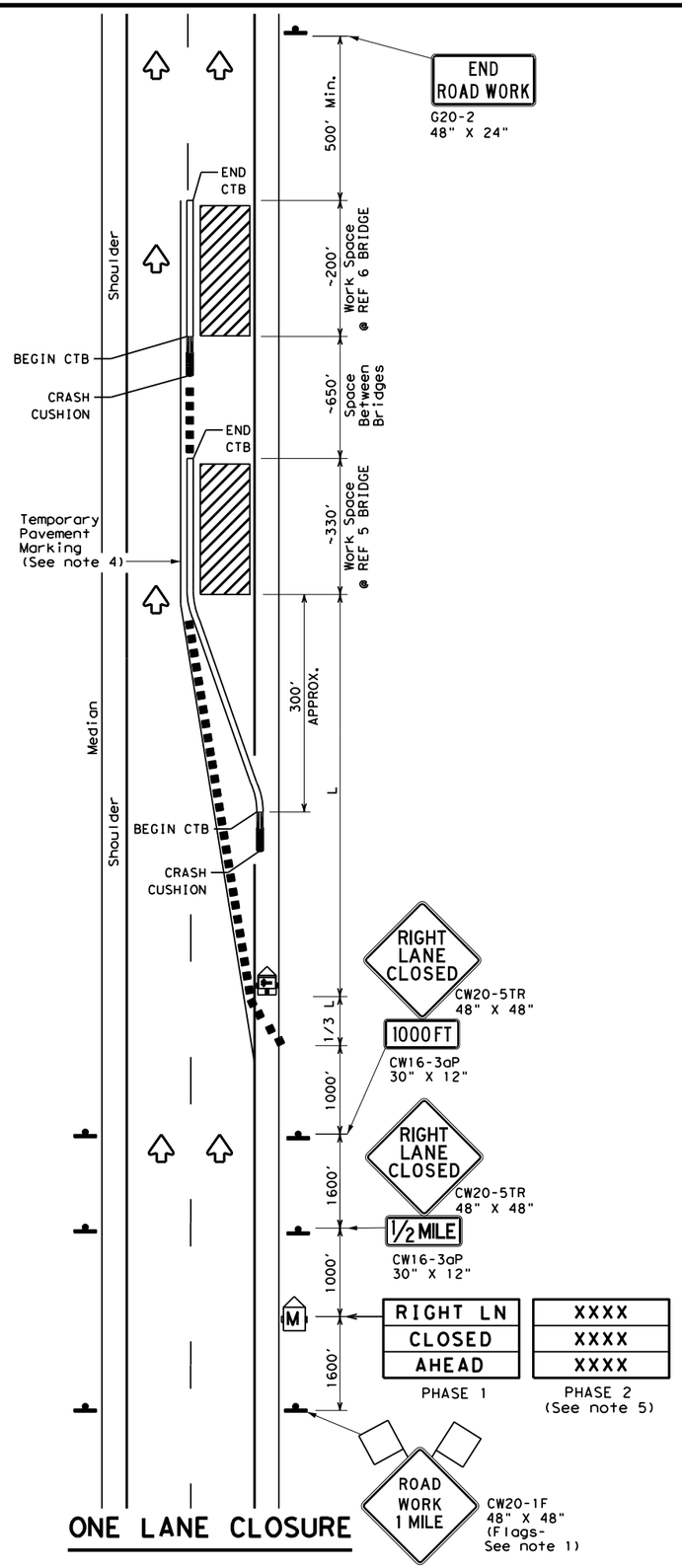

ONE LANE CLOSURE

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		Crash Cushion

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"
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* 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. All traffic control devices illustrated are REQUIRED. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
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3. Drums are the typical channelizing devices. Other channelizing devices may be used as directed by the Engineer.
4. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
5. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.

REF #5 NBI:03-243-0249-01-067
REF #6 NBI:03-243-0283-06-070

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Andrew Mosley, P.E.
03/04/2024

Texas Department of Transportation
Traffic Operations Division

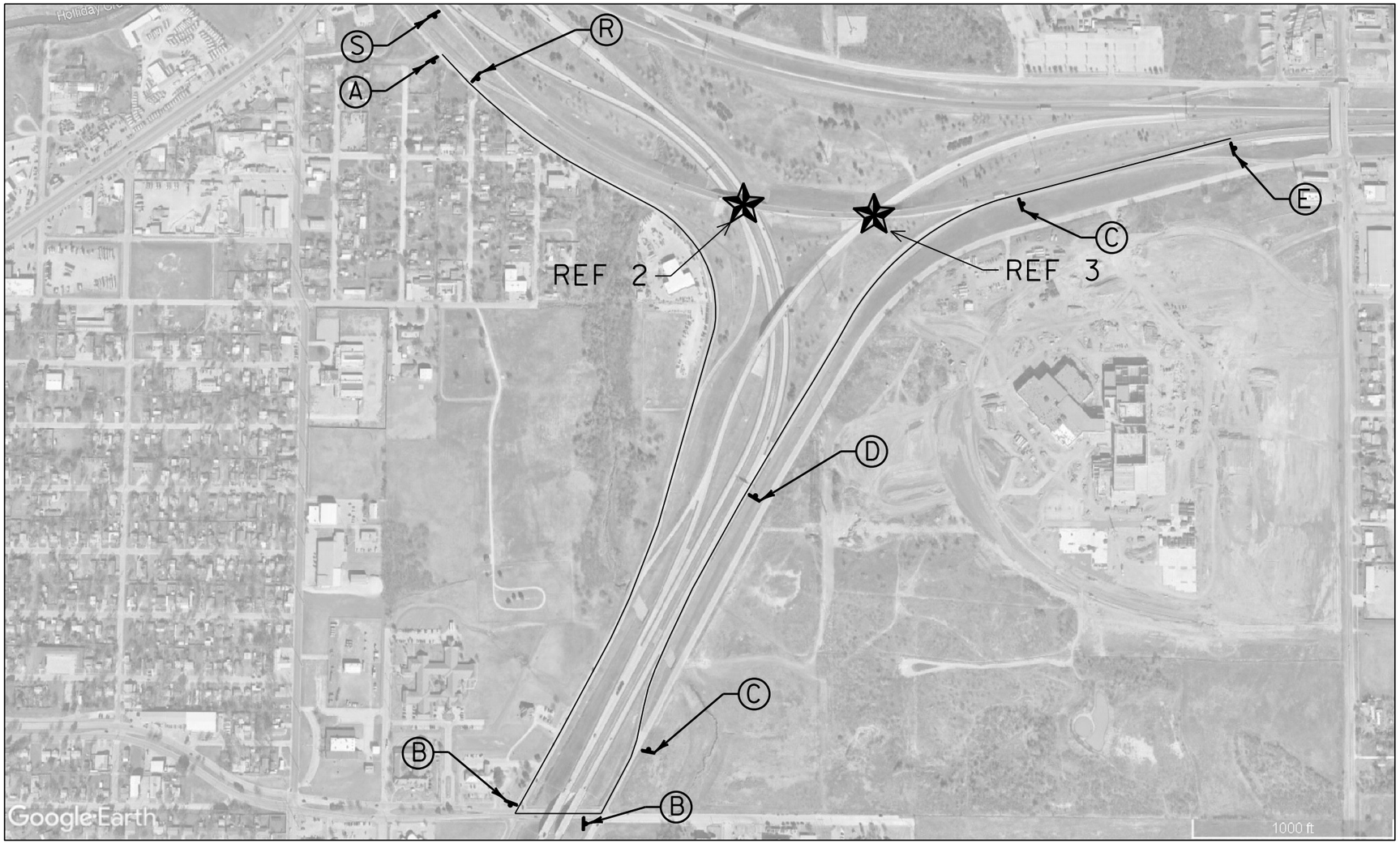
TCP DETAILS FOR BRIDGE REPAIR WORK

REFERENCE #5 & #6
"ONE TIME USE ONLY"

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
2-94 2-12
8-95
1-97
4-98

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		29



LEGEND

- SIGN POST
- TYPE III BARRICADE
- MESSAGE BOARD
- WORK LOCATION
- PROPOSED DETOUR ROUTE

NOTES:

1. DETOUR TO BE USED WHEN PERFORMING BRIDGE RAIL REPLACEMENTS ON THE SOUTH BOUND SIDE OF BRIDGE REFERENCES 2 & 3 AND WHILE THE ENTRANCE RAMP IS CLOSED. DETOUR MAY ALSO BE IMPLEMENTED WHILE RE SETTING ROCKER BEARINGS.

2. LOCATIONS OF TCP DEVICES ARE FOR ILLUSTRATION PURPOSES ONLY, EXACT LOCATIONS MAY VARY IN THE FIELD AS DIRECTED BY THE ENGINEER.

3. WARNING/DETOUR SIGNS SHOWN ON THIS SHEET ARE THE MINIMUM CONSTRUCTION ZONE SIGNING. INSTALL ADDITIONAL BARRICADES, WARNING SIGNS, MESSAGE BOARDS, ETC. IN ACCORDANCE WITH THE BC SHEETS AND THE MUTCD OR AS DIRECTED BY THE ENGINEER. ANY ADDITIONAL TRAFFIC CONTROL DEVICES REQUIRED BY THE ENGINEER WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

4. SPACE ALL WORK ZONE SIGNS IN ACCORDANCE WITH THE BC SHEETS OR AS DIRECTED BY THE ENGINEER.

5. COVER ALL EXISTING SIGNS IN CONFLICT WITH THE WORK ZONE SIGNS.

STATE OF TEXAS
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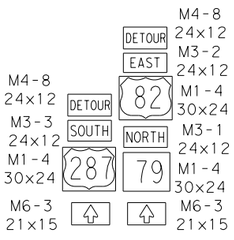
Andrew Mosley, P.E.

03/03/2024

NBI: 03-244-0-0044-01-100
NBI: 03-244-0-0044-01-101



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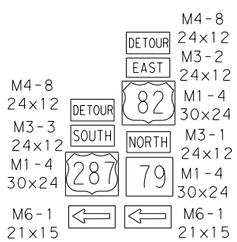

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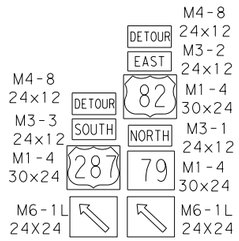

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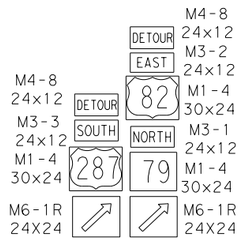

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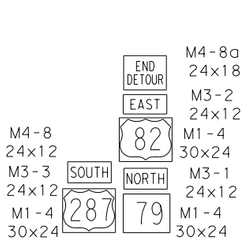

E

ENTRANCE RAMP CLOSURE AS SHOWN ON TCP (6-2b)

R

INSTALL LANE CLOSURE SIGNS AS SHOWN ON TCP(6-2) AND THE TCP DETAILS SHEET

S

Texas Department of Transportation — Bridge Division

DETOUR LAYOUT

REF #2 - US 82 EB/US 281 NB
OVER IH 44 NB/US 281 NB
REF #3 - US 82 EB/US 287 SB
OVER SH 79 SB

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	004306	098	US 70, ETC	
	DIST	COUNTY		SHEET NO.
	WF	WILBARGER, ETC		30

DATE:
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	WFS	WILBARGER, ETC		31
5-10 5-21				

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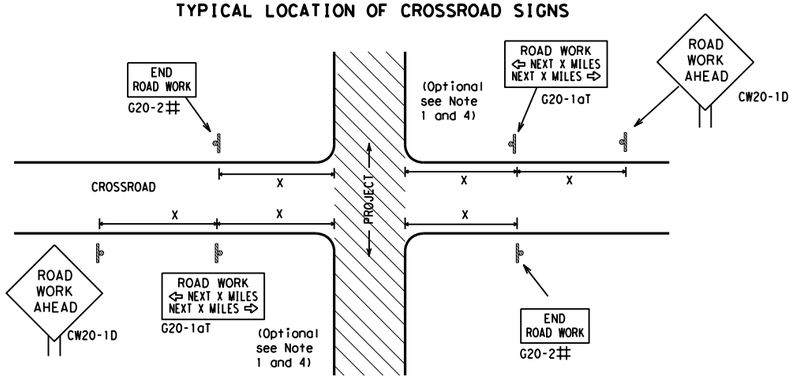
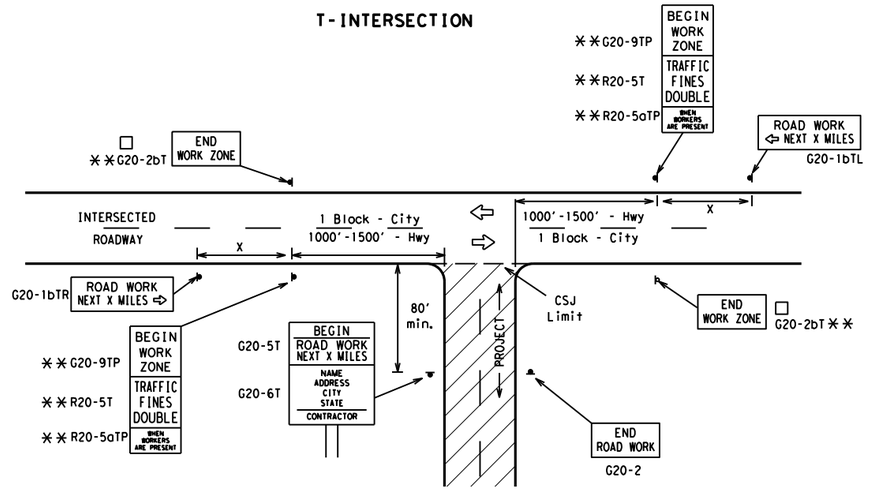
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

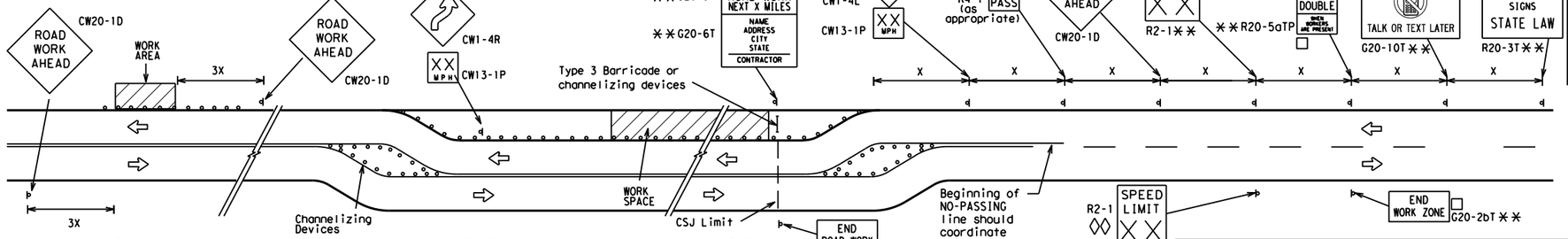
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

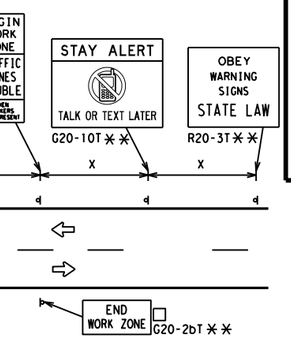
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

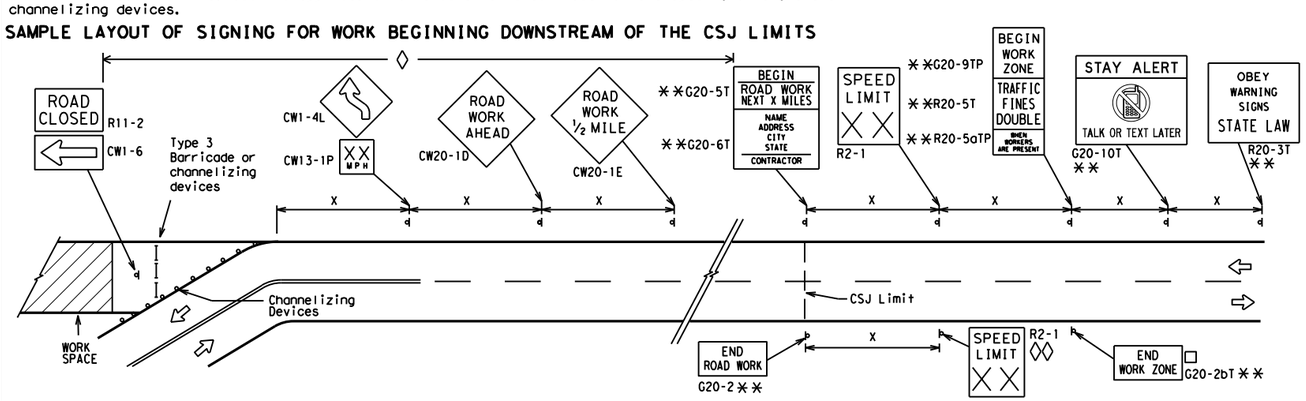


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0043	06	098	US 70, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
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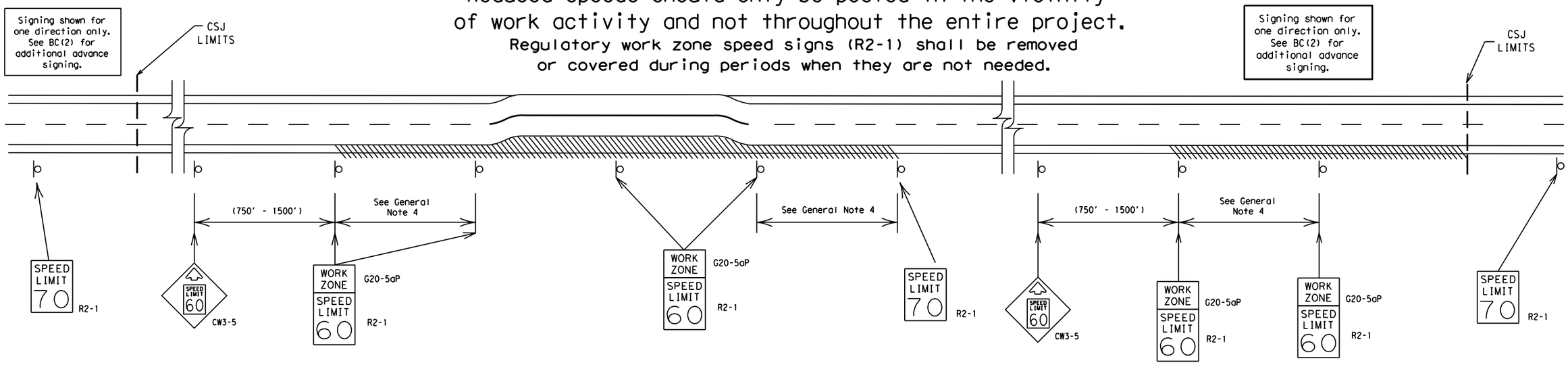
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	WILBARGER, ETC		33

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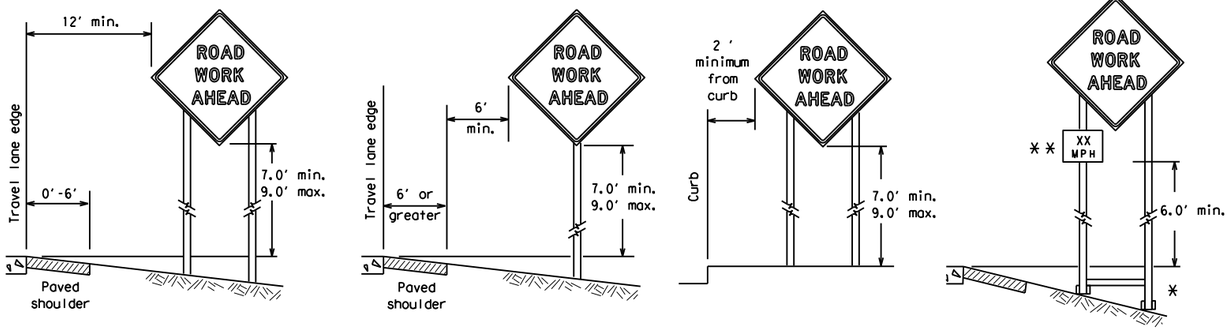
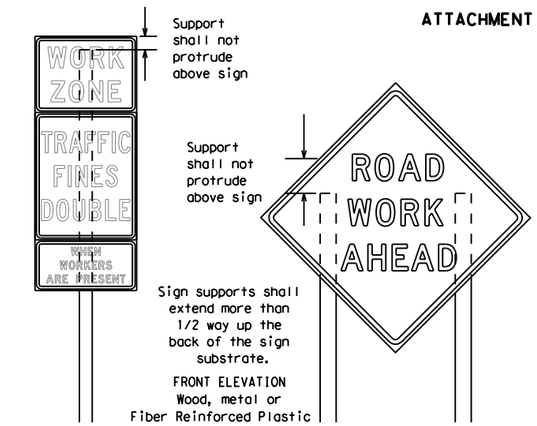
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

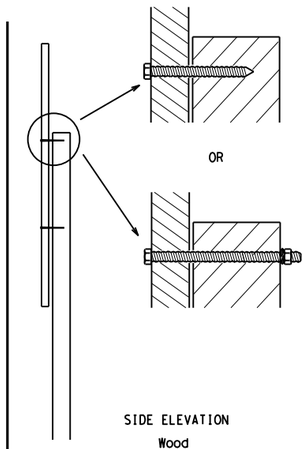


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





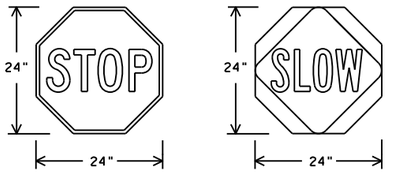
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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7-13 5-21	WFS	WILBARGER, ETC		34

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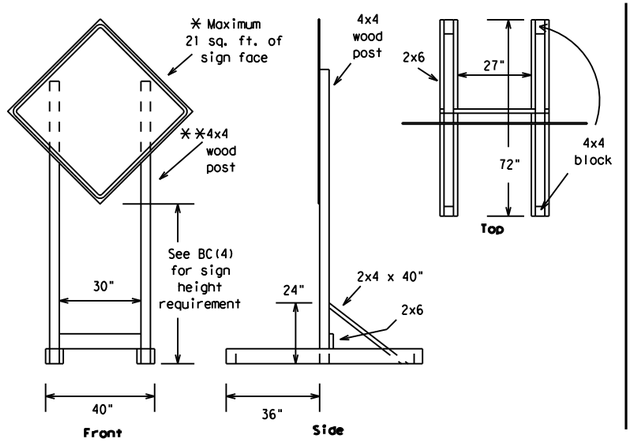
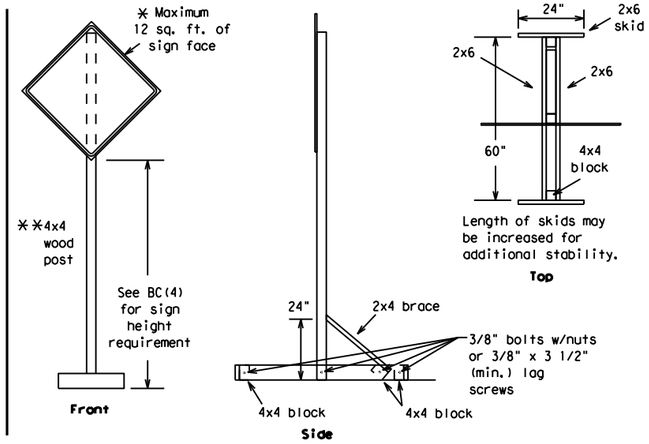
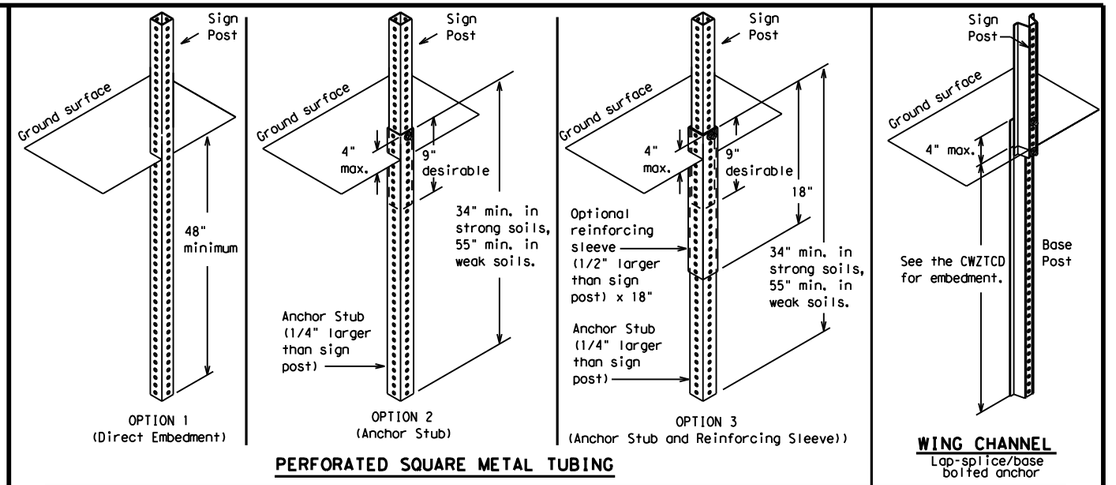




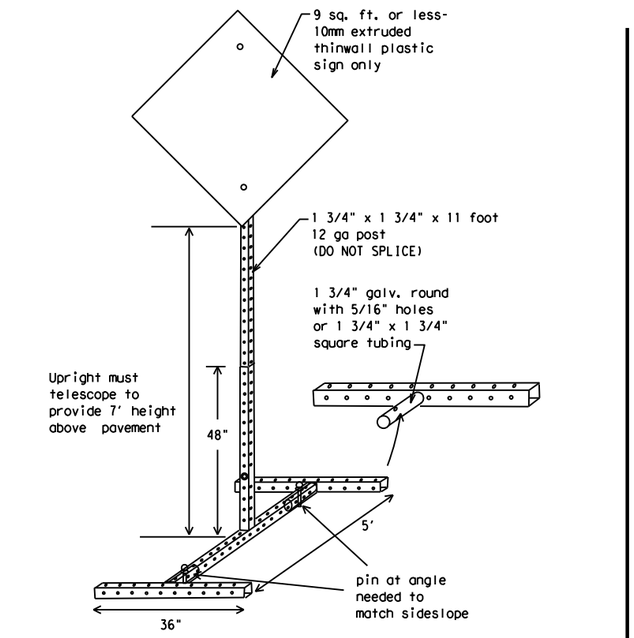
SKID MOUNTED WOOD SIGN SUPPORTS

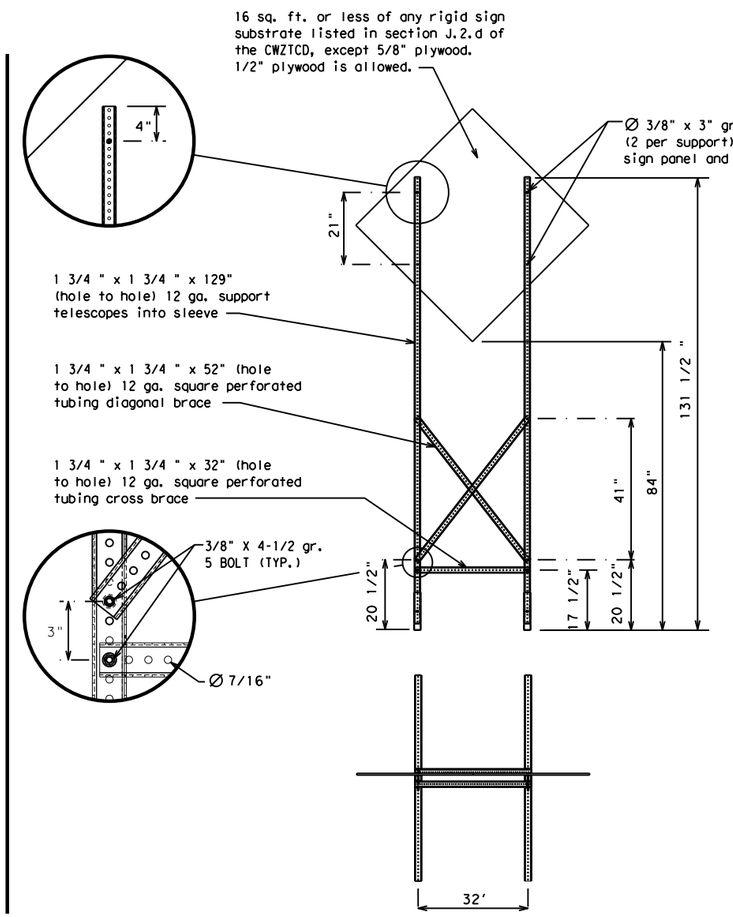
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

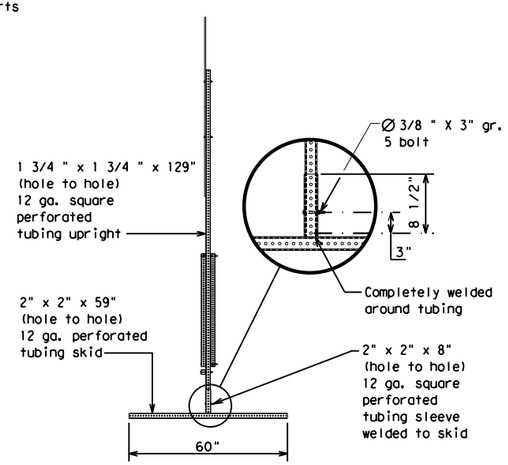


GROUND MOUNTED SIGN SUPPORTS

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.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	WILBARGER, ETC		35

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

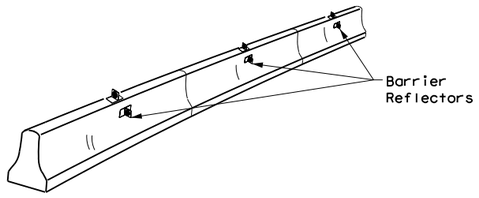
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	WILBARGER, ETC		36

100

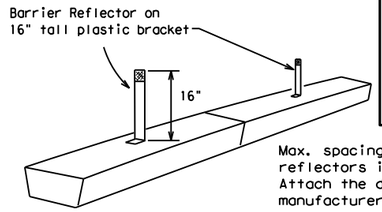
DATE: 3/1/2024 5:24:02 PM
FILE: \\FS-WFSHQ.dot.state.tx.us\Data1\Data\WFS\Groups\WFSDESGN\Plans\0043-06\098\4 - Design\Plan Set\2. TCP\BC-21.dgn

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.

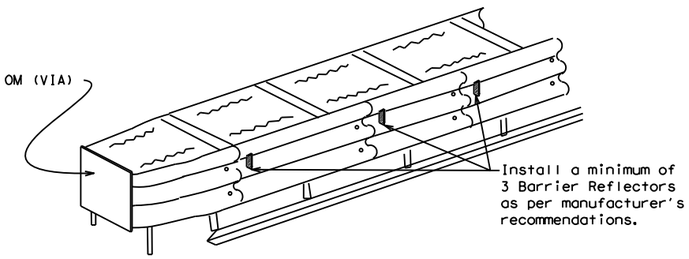


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) 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.

LOW PROFILE CONCRETE BARRIER (LPCB)

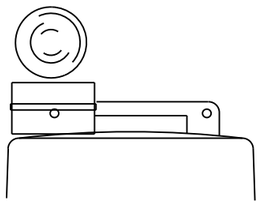


DELINEATION OF END TREATMENTS

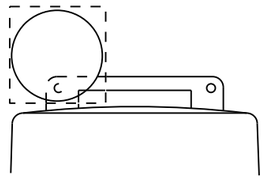
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

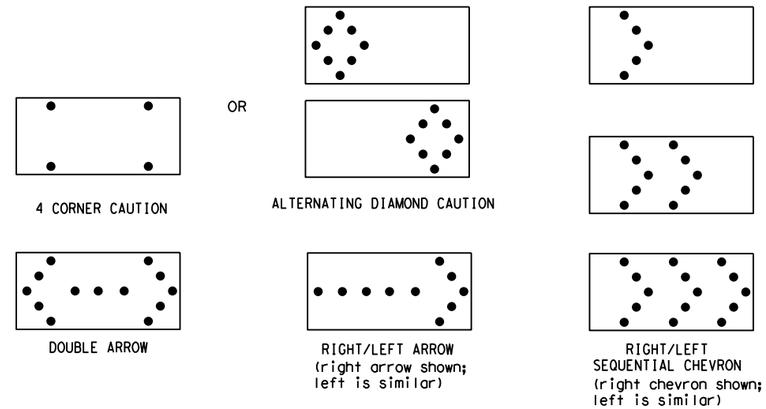
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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:



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WFS	WILBARGER, ETC		37

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DATE: 3/1/2024 5:24:02 PM
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

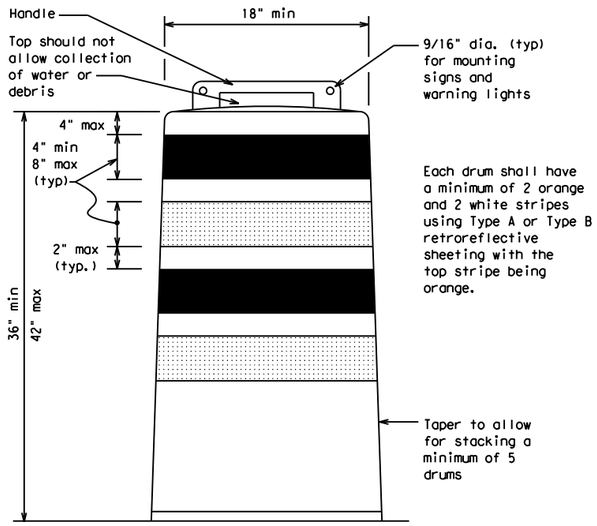
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

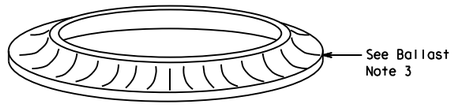
RETROREFLECTIVE SHEETING

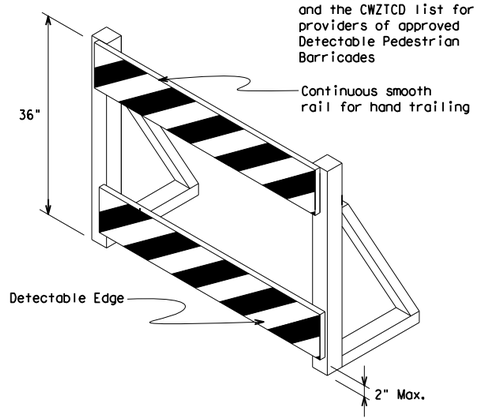
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

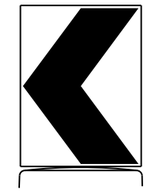




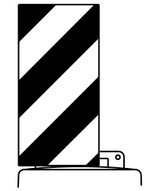


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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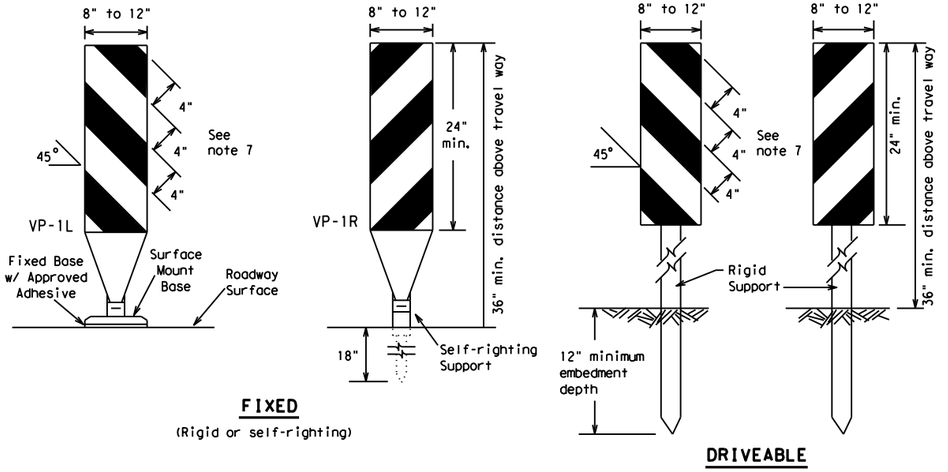
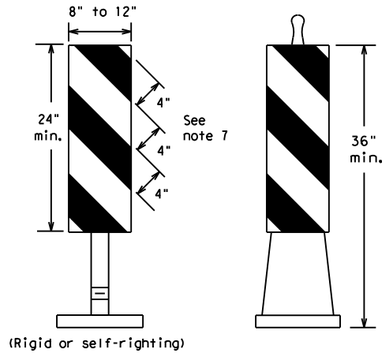


FIXED
(Rigid or self-righting)

DRIVEABLE

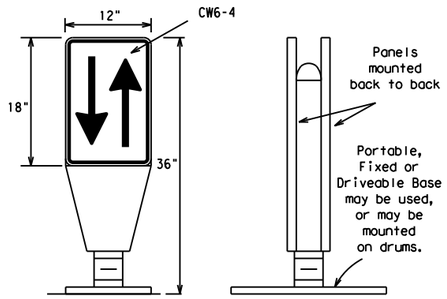


(Rigid or self-righting)

PORTABLE

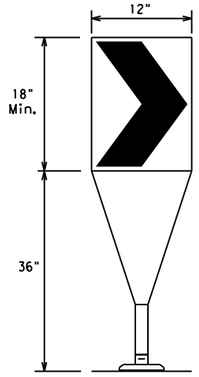
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



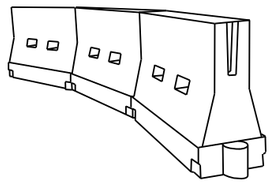
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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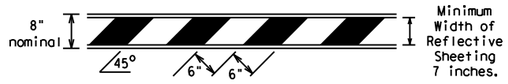
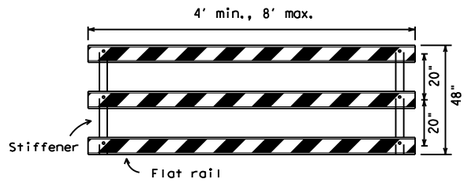
TYPE 3 BARRICADES

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.



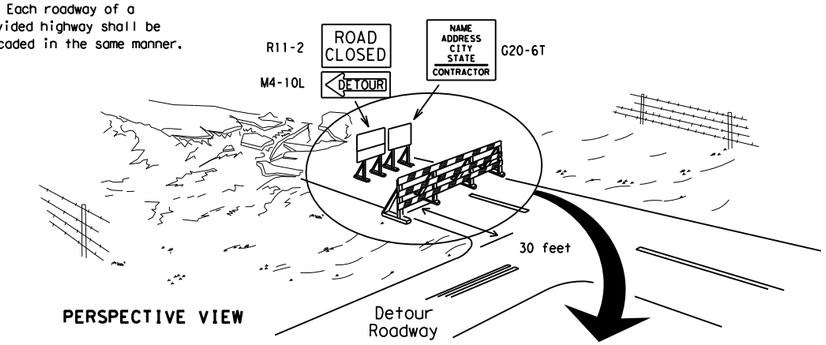
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

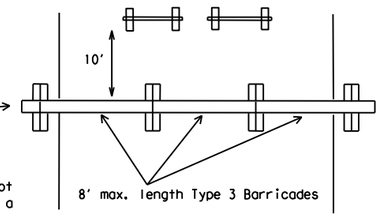
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

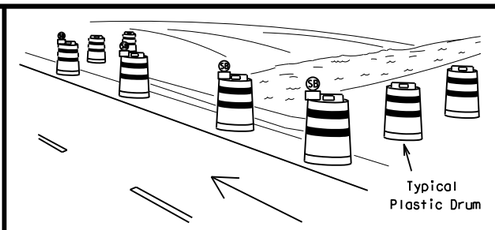
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

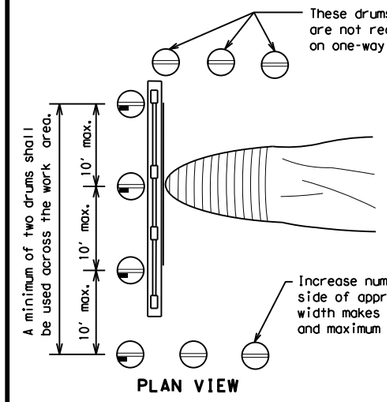
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

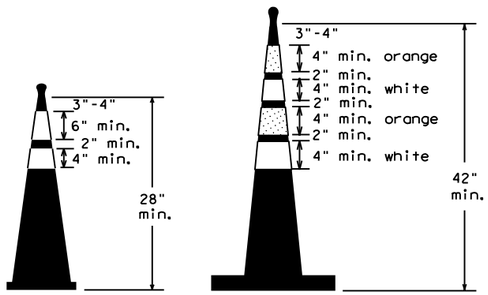
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

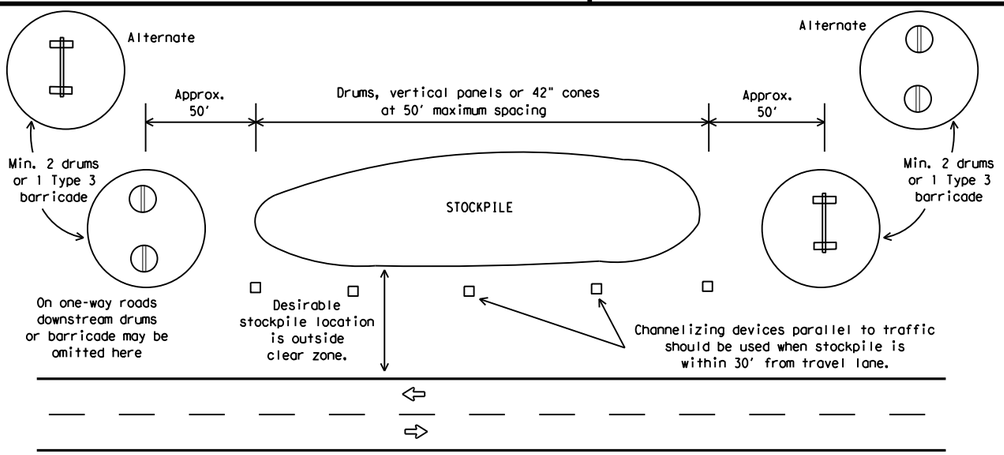
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

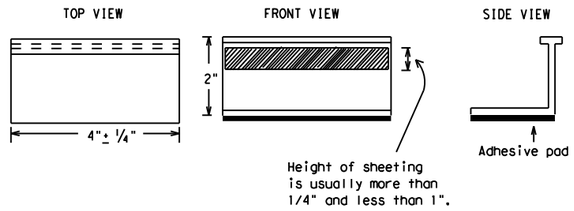
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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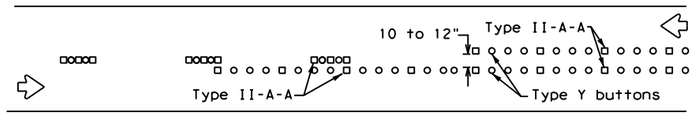
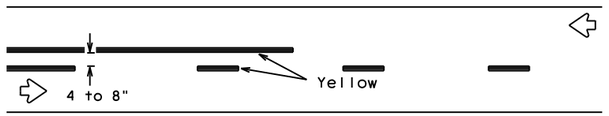
PAVEMENT MARKING PATTERNS

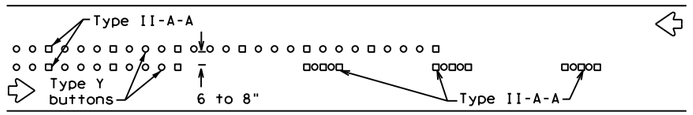
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



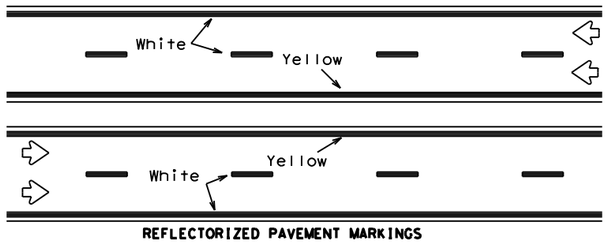
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



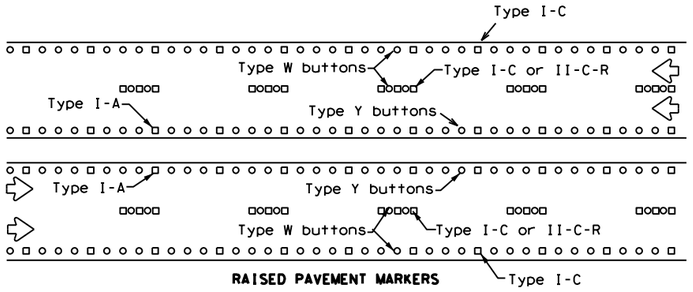
RAISED PAVEMENT MARKERS - PATTERN B

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



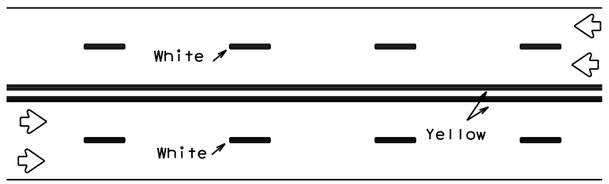
REFLECTORIZED PAVEMENT MARKINGS



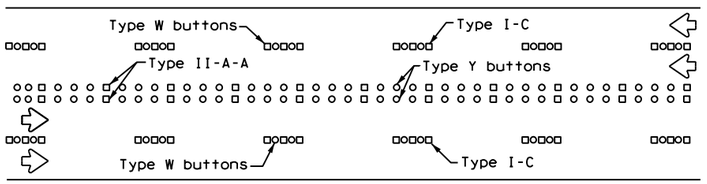
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



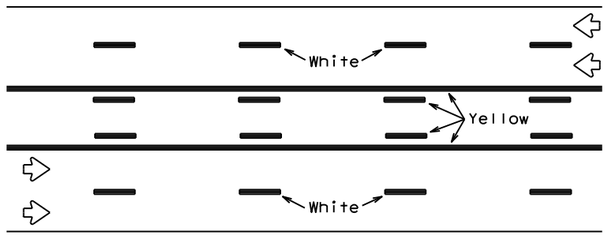
REFLECTORIZED PAVEMENT MARKINGS



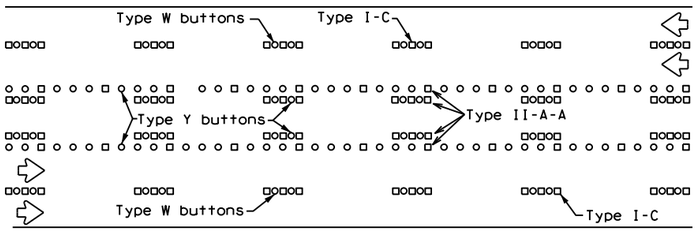
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

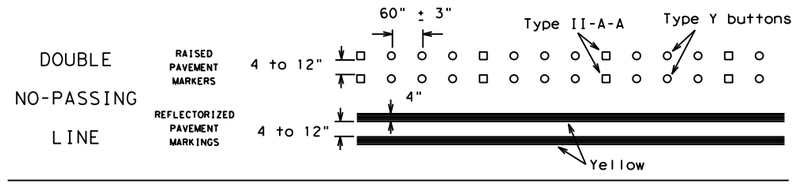
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

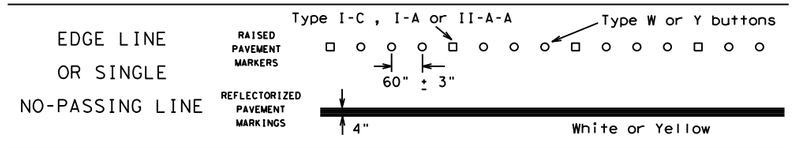
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

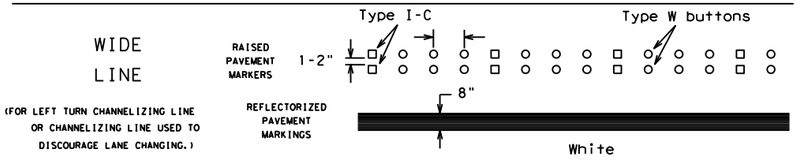


EDGE LINE OR SINGLE NO-PASSING LINE



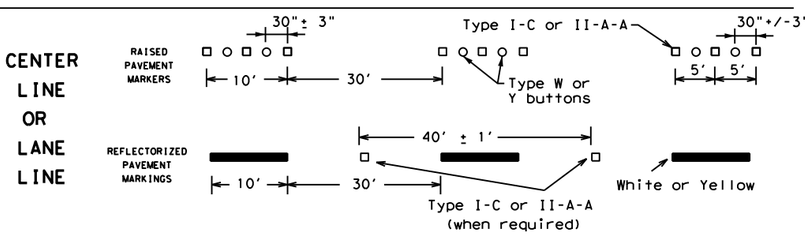
WIDE LINE

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

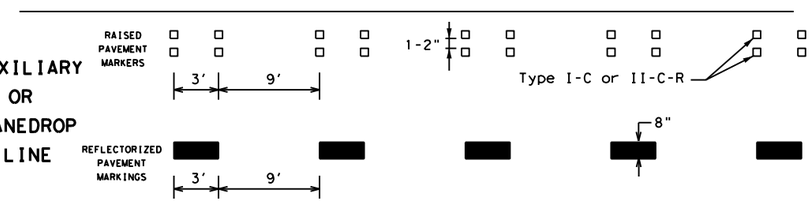


BROKEN LINES

CENTER LINE OR LANE LINE

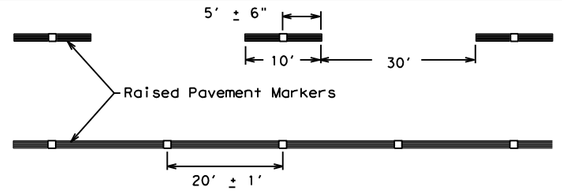


AUXILIARY OR LANEDROP LINE



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
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21	0043	06	098	US 70, ETC
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	WFS	WILBARGER, ETC		42

106

DATE: 3/1/2024 5:24:04 PM
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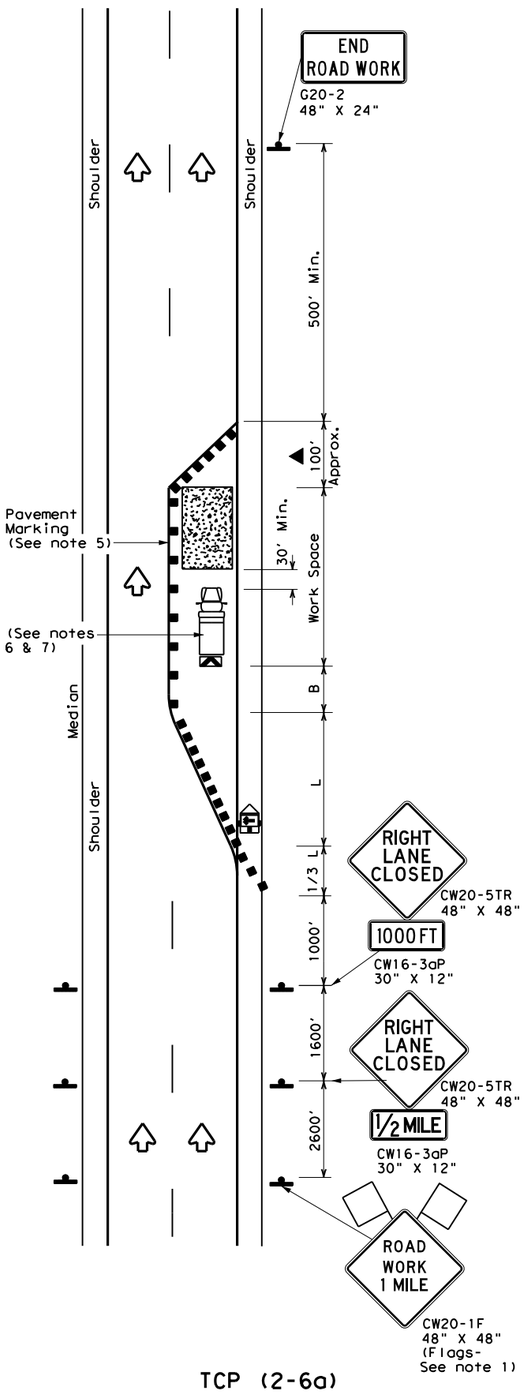
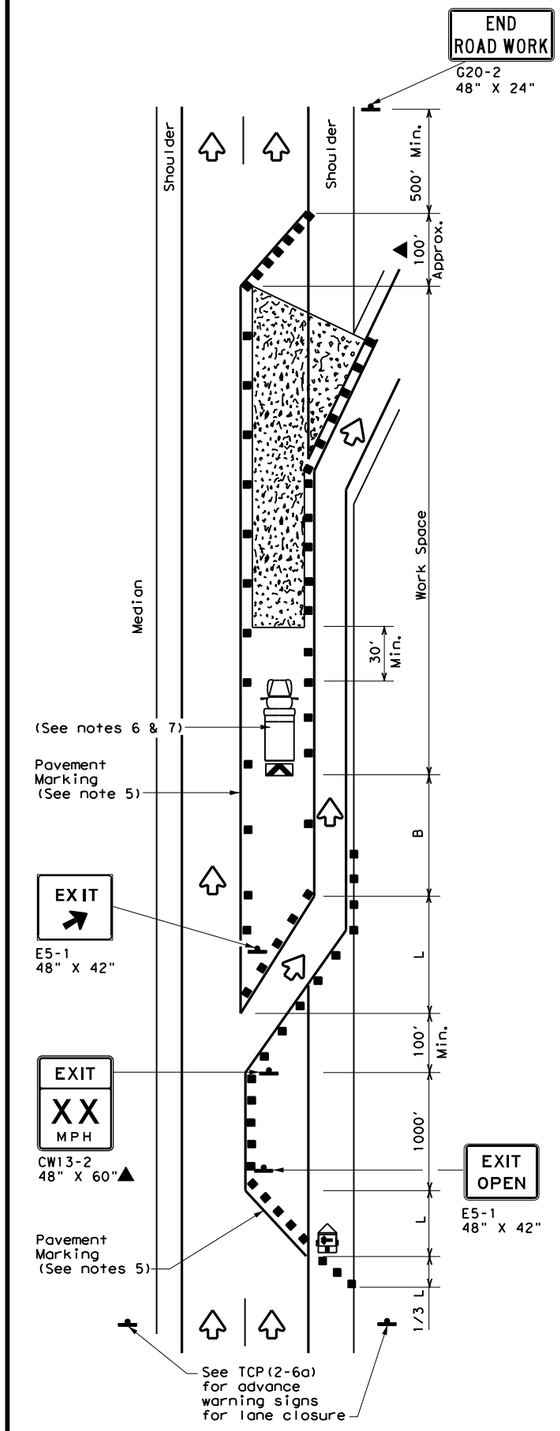


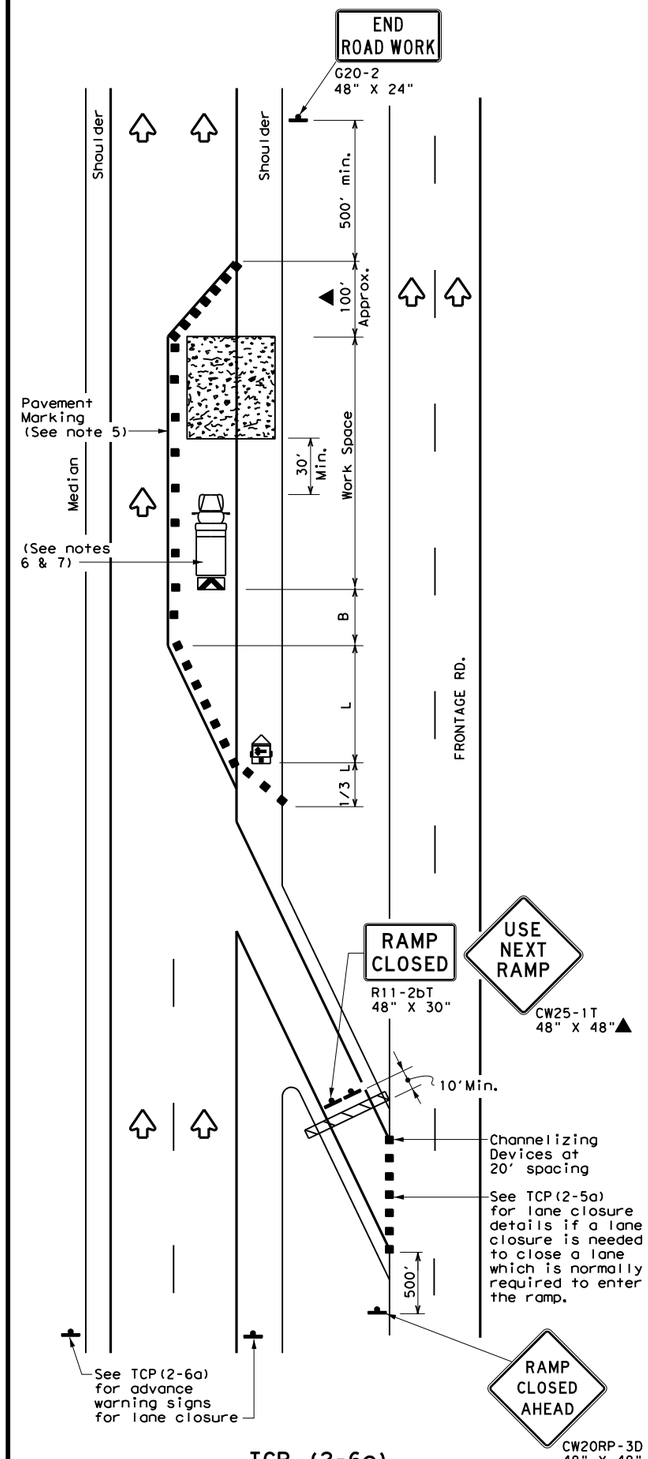
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

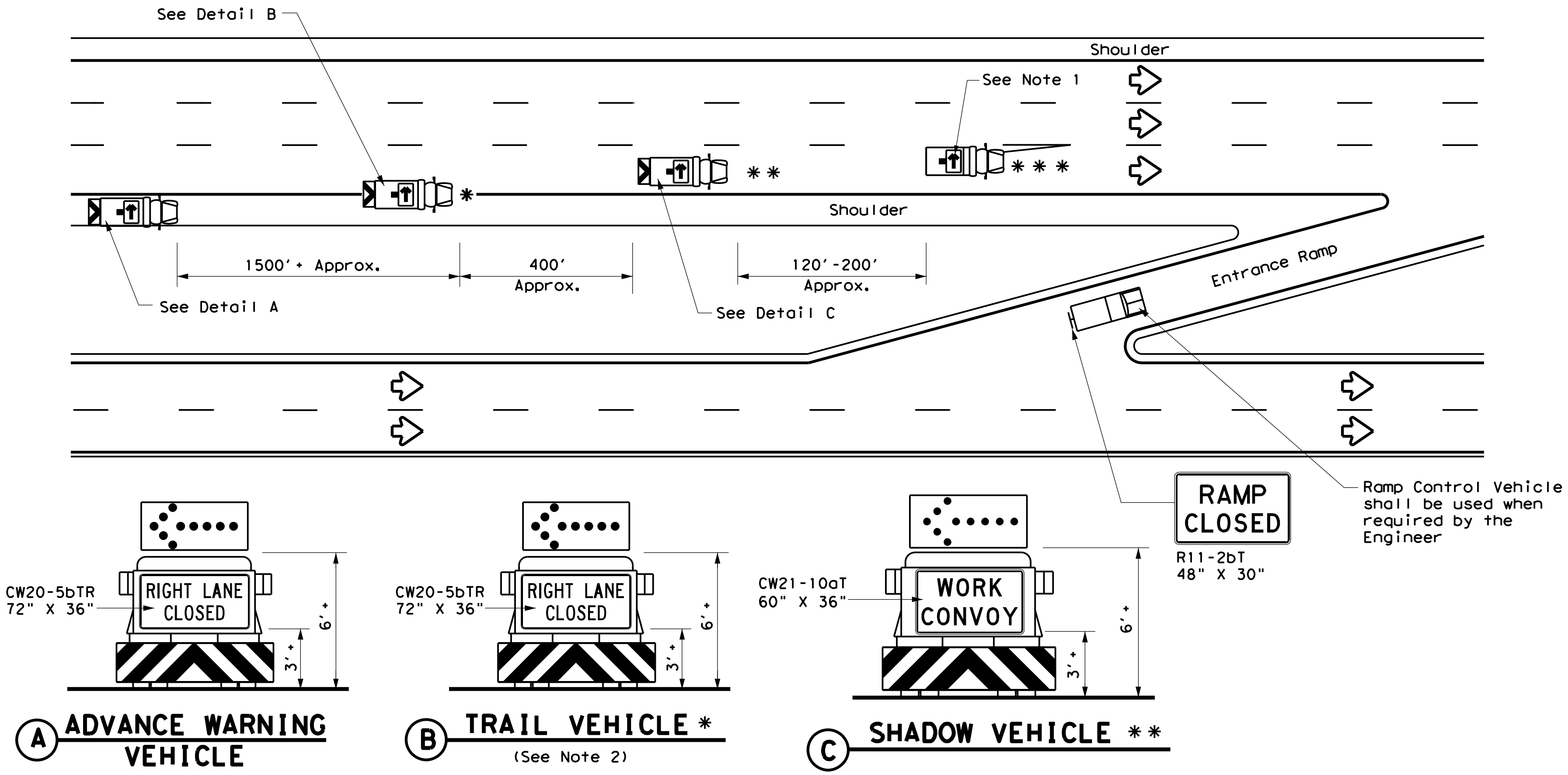
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		43

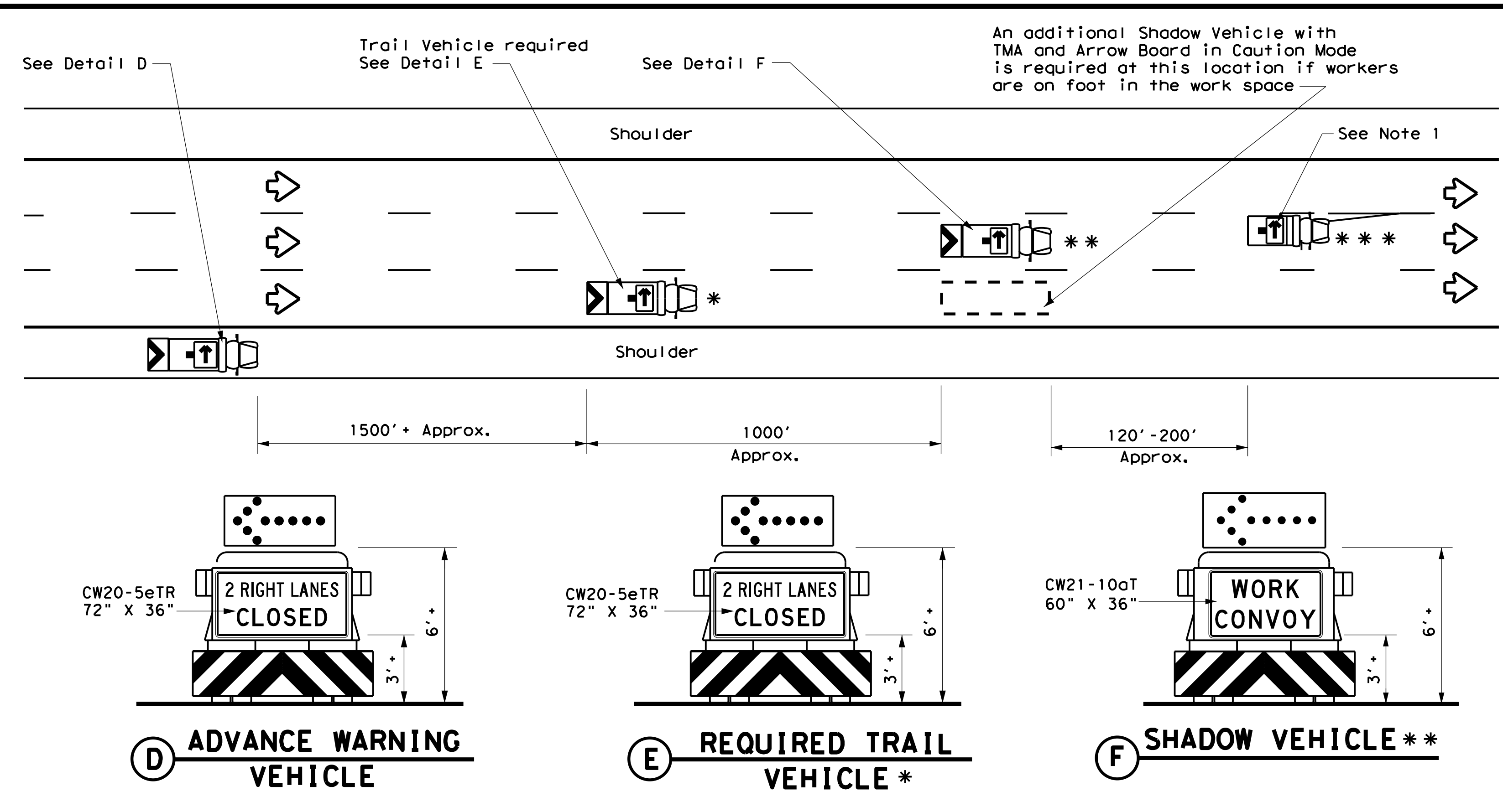


A ADVANCE WARNING VEHICLE

B TRAIL VEHICLE *
(See Note 2)

C SHADOW VEHICLE **

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



D ADVANCE WARNING VEHICLE

E REQUIRED TRAIL VEHICLE *

F SHADOW VEHICLE **

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

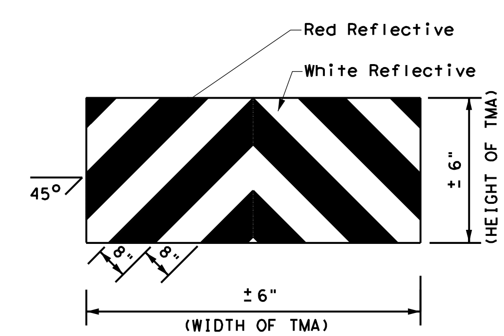
LEGEND

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		44

176

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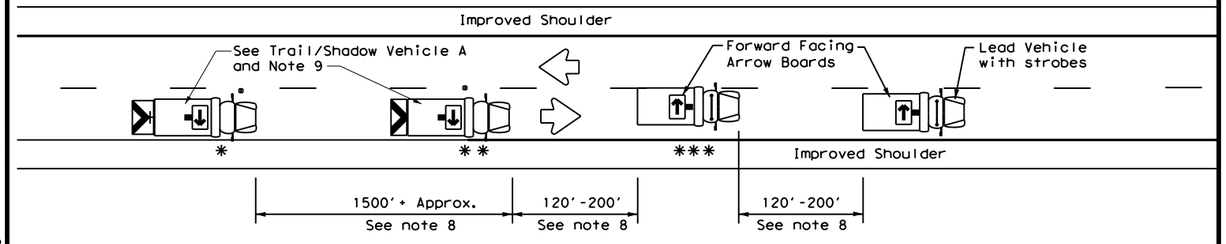
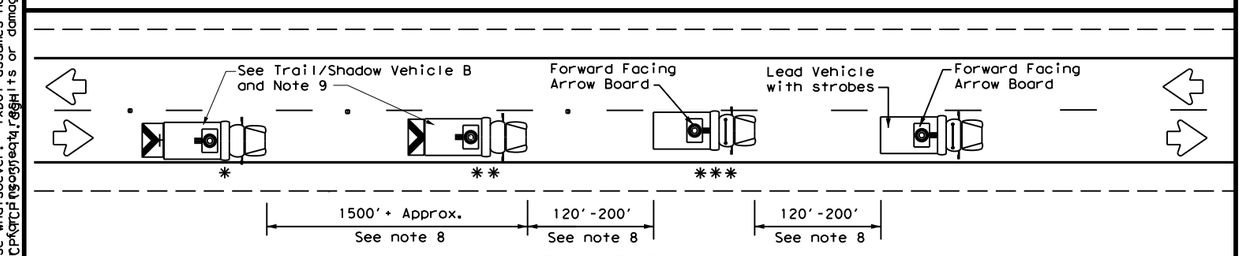


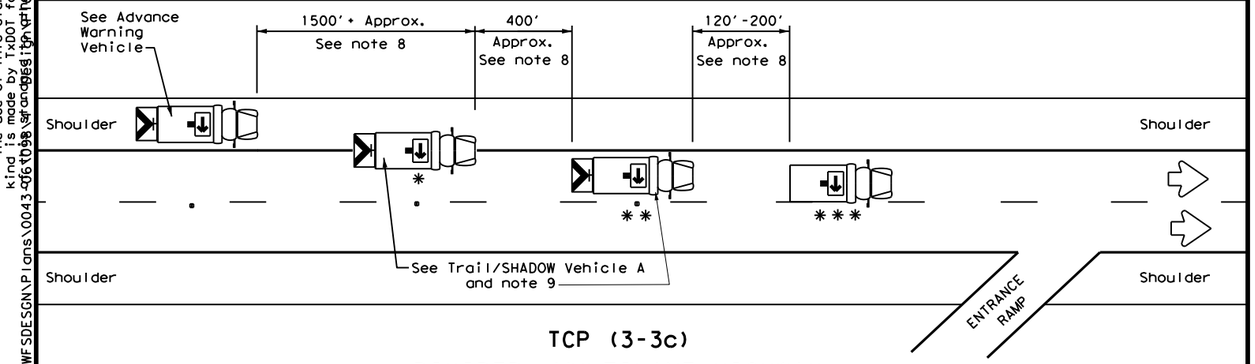
TCP (3-3a)

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



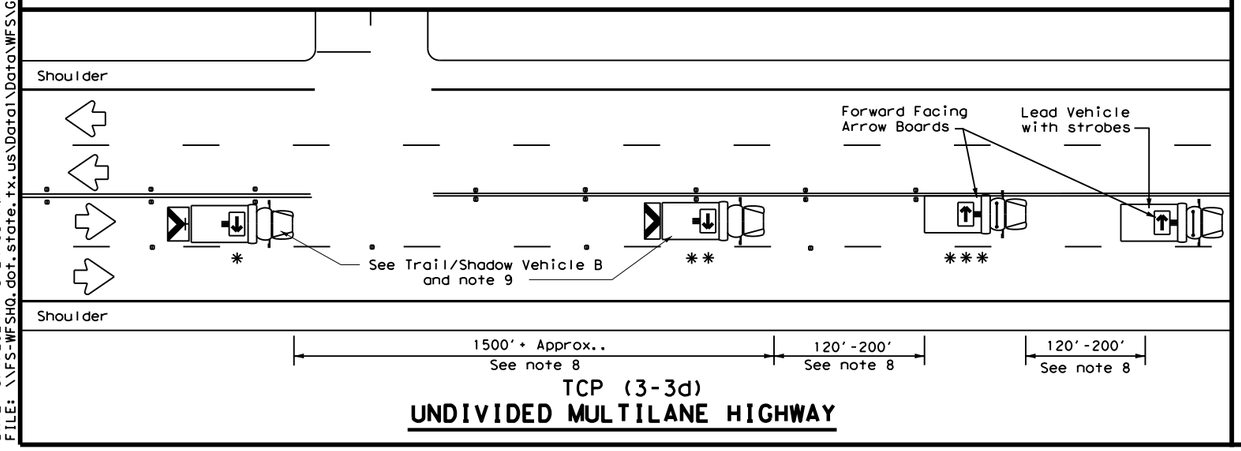
TCP (3-3b)

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



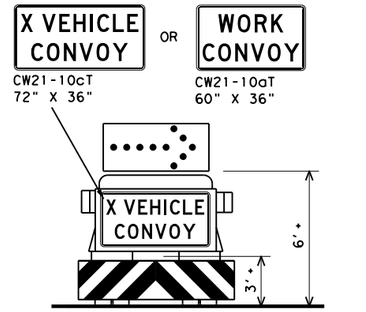
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



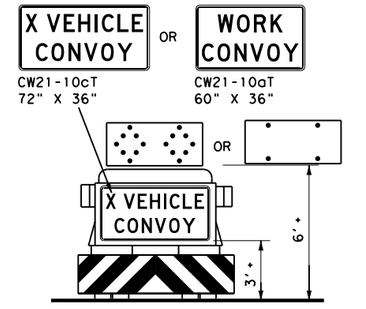
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



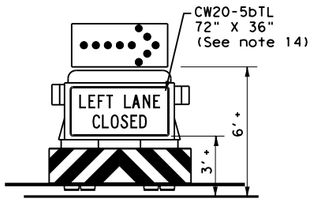
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

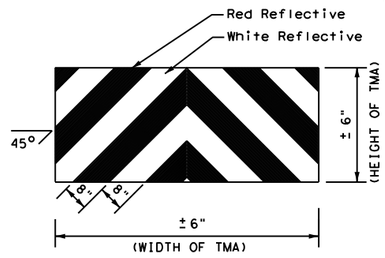


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	WFS	WILBARGER, ETC		45
1-97 7-14				

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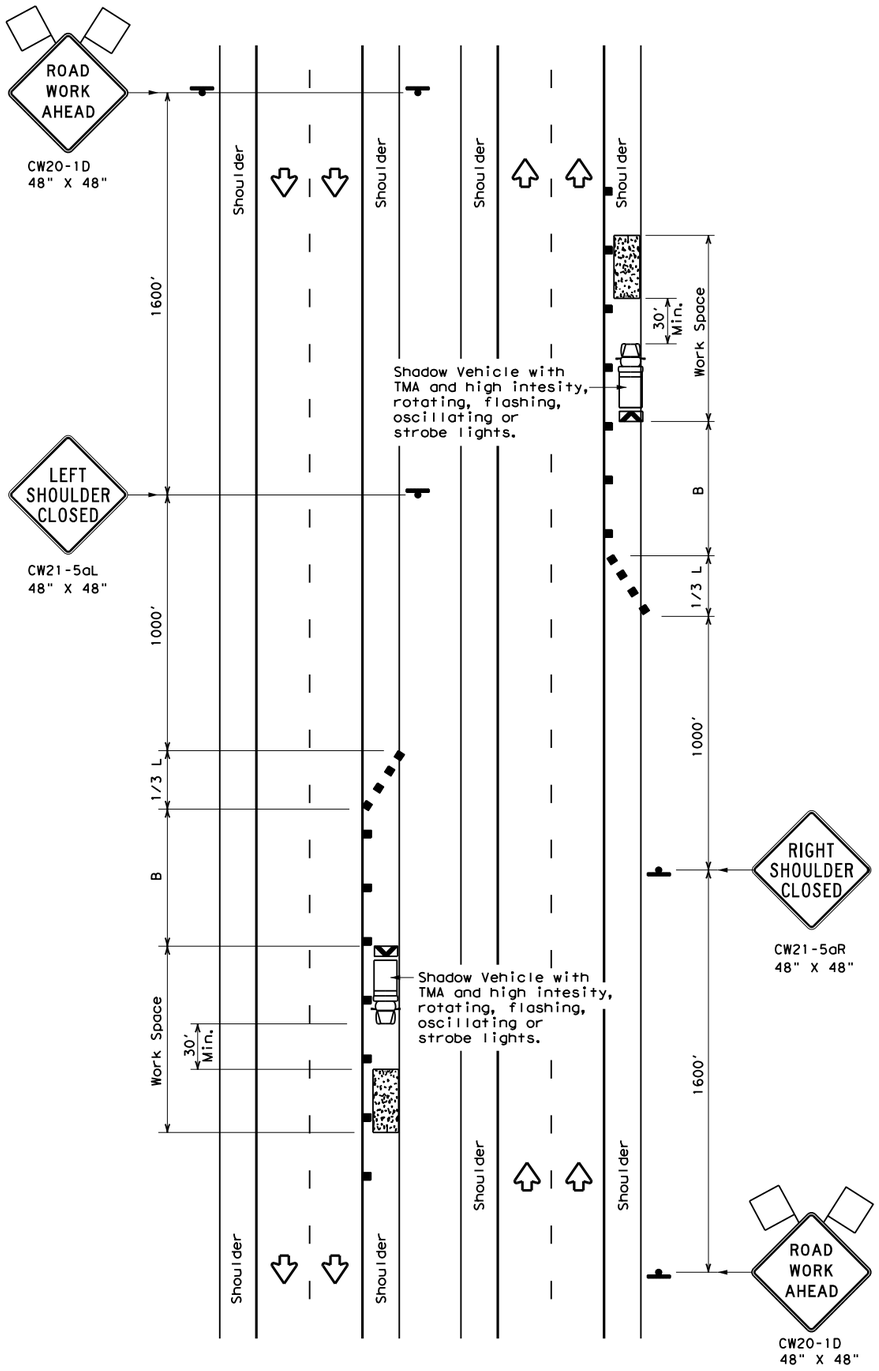
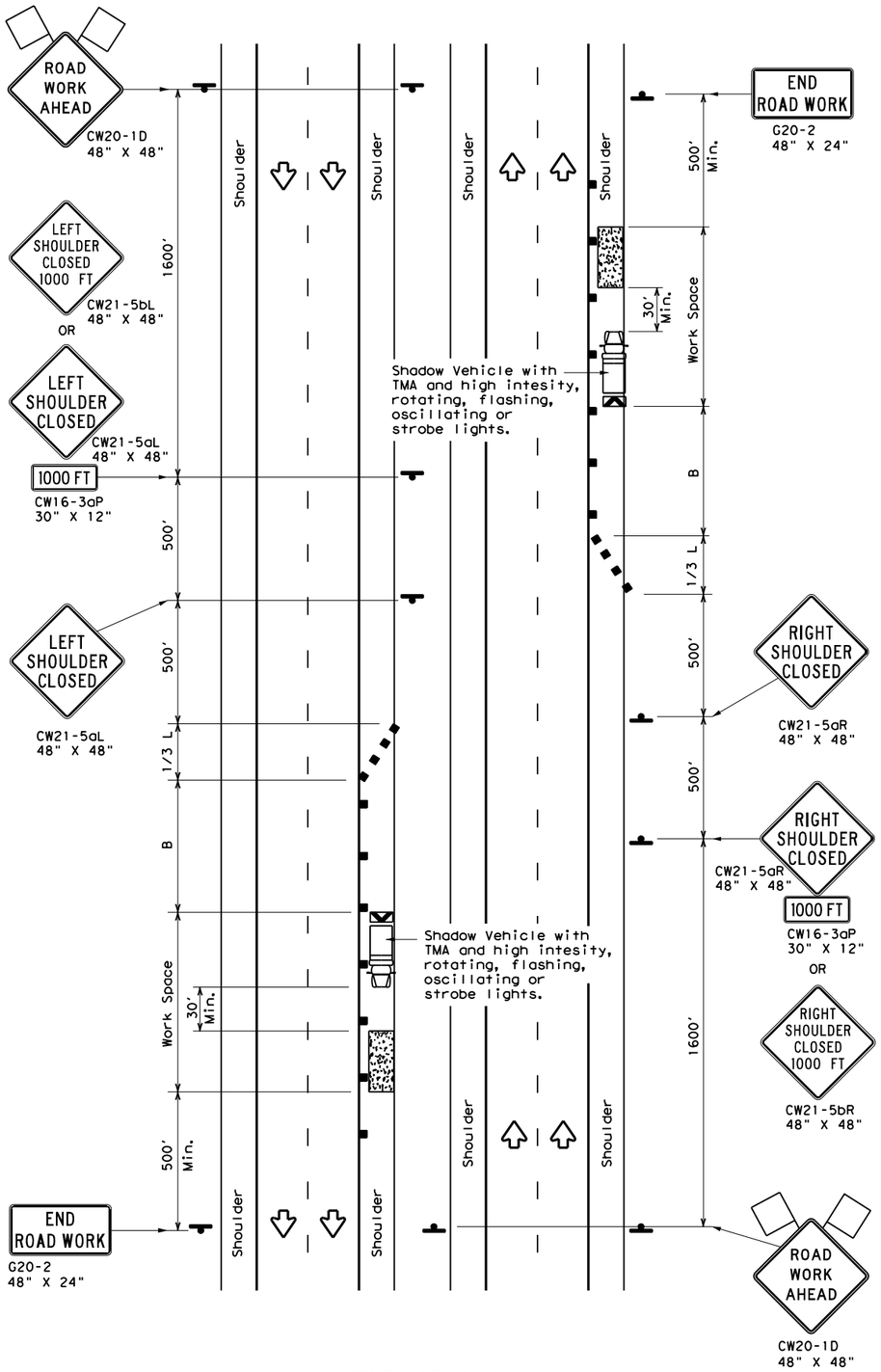


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		46

DATE: 3/1/2024 5:42:00 PM
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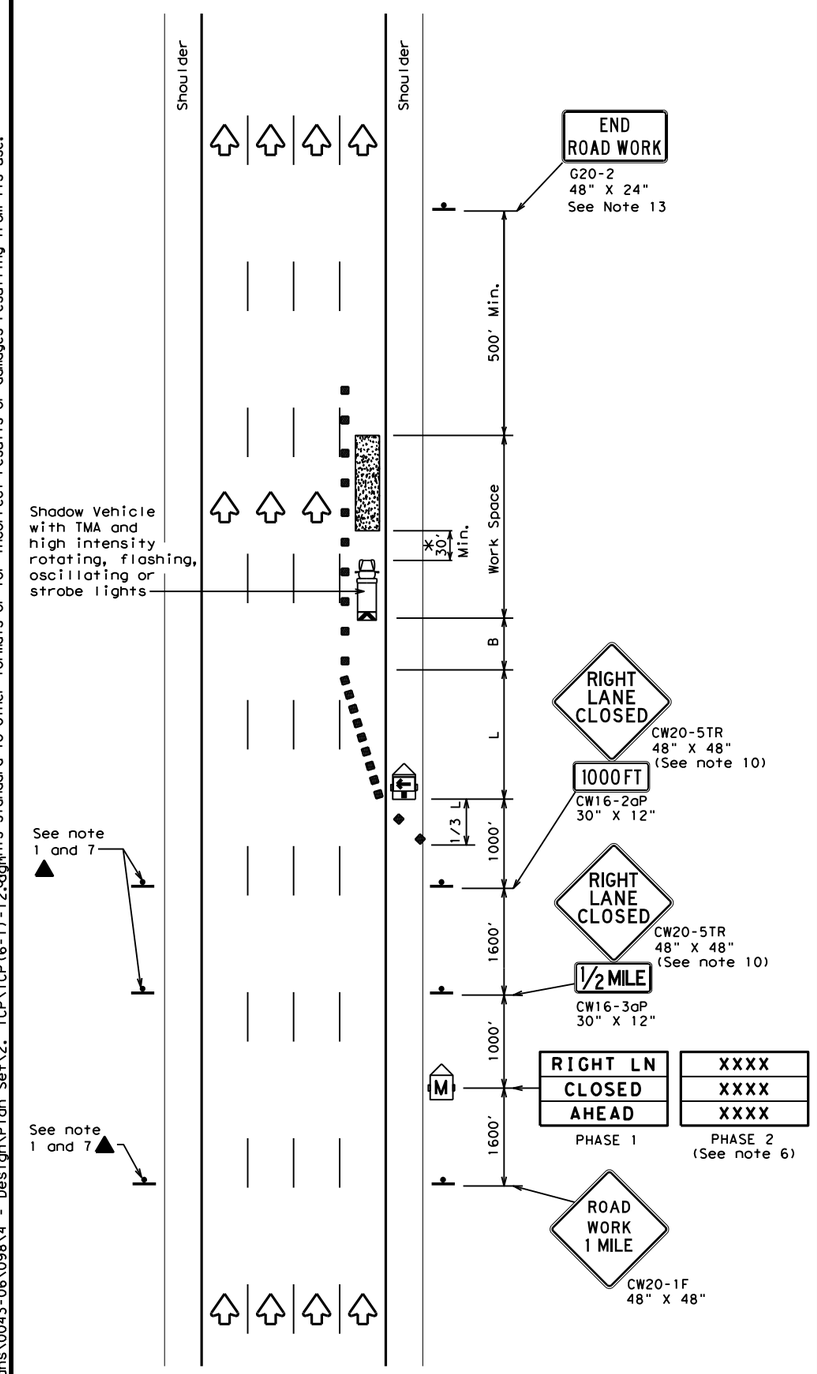
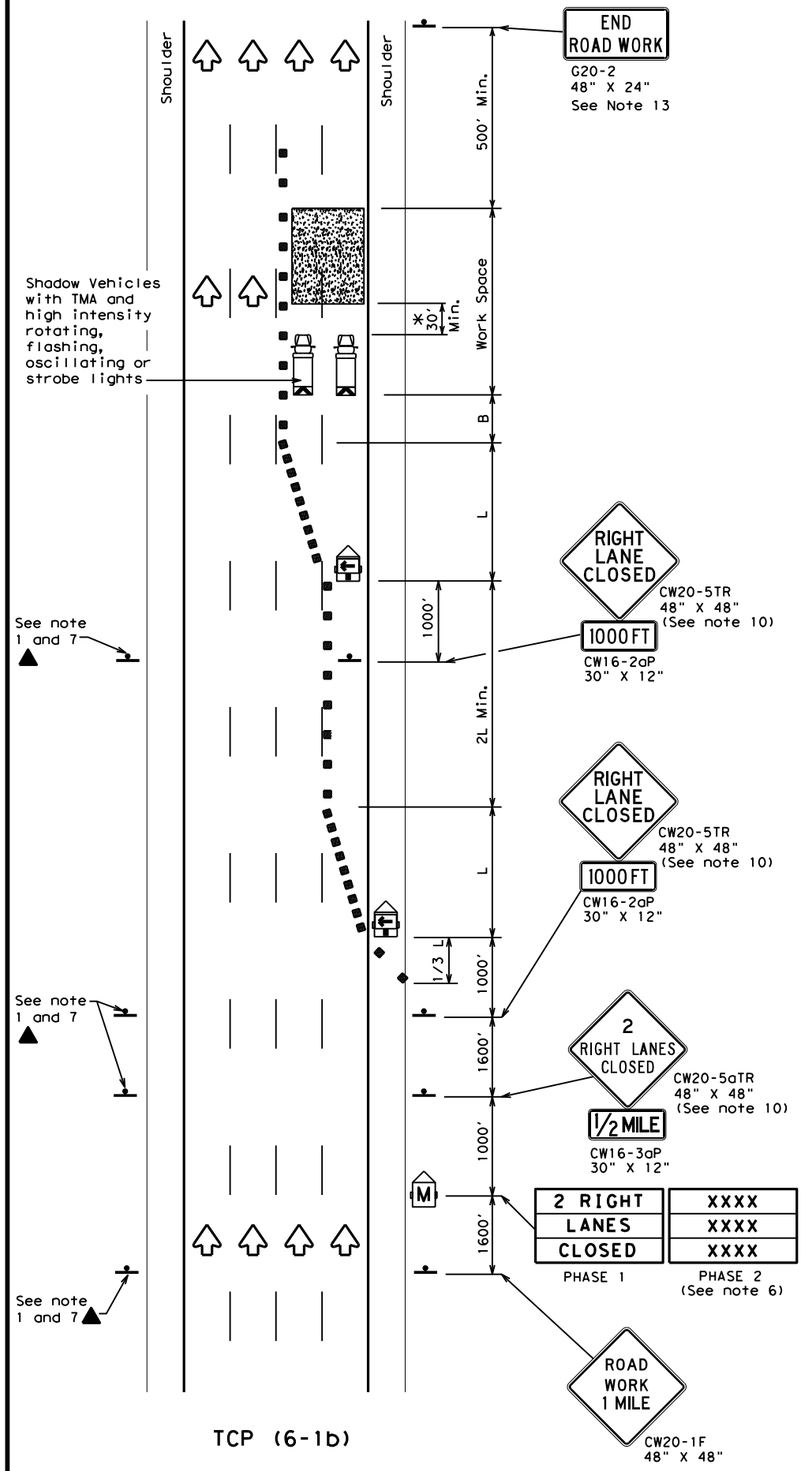


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

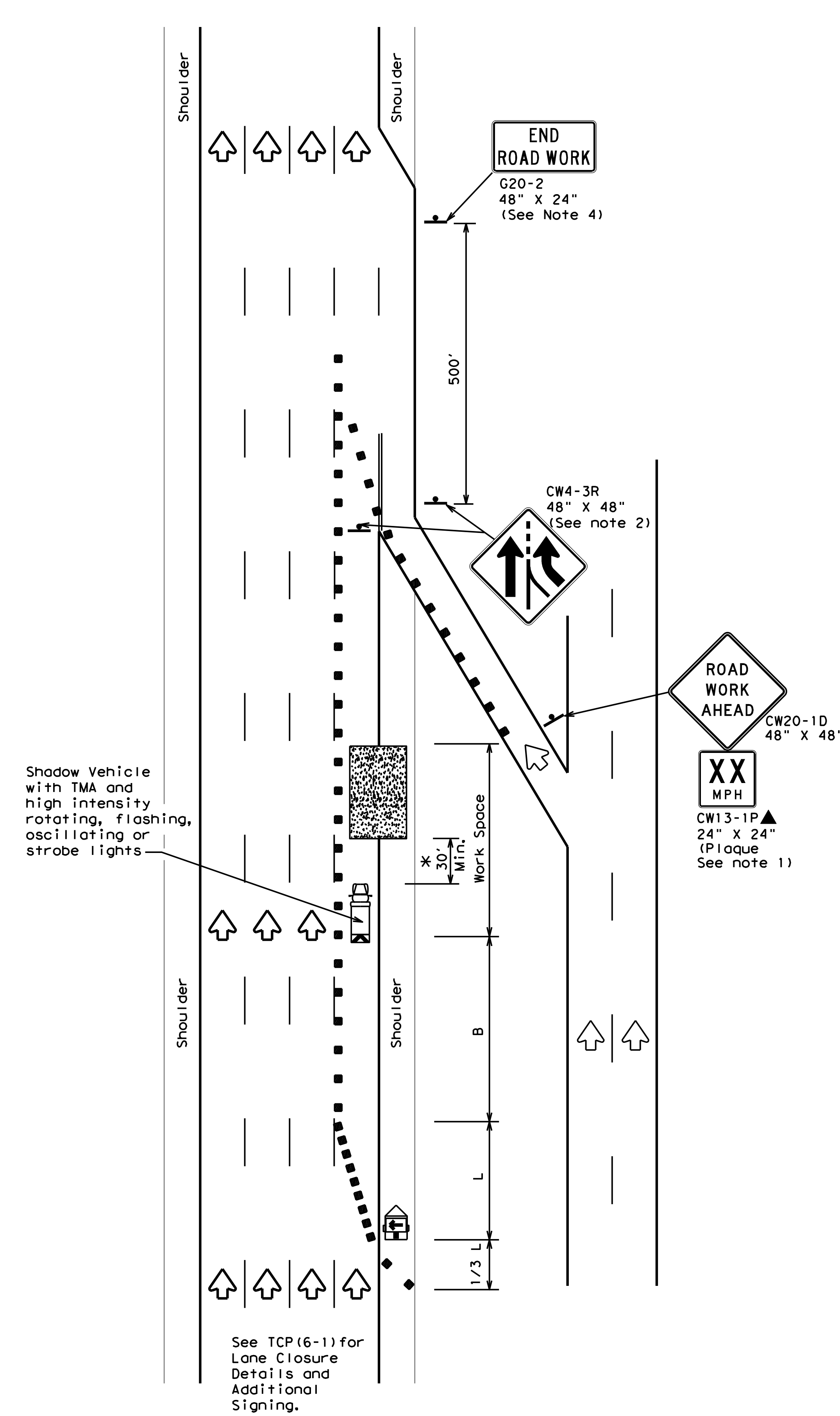
* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

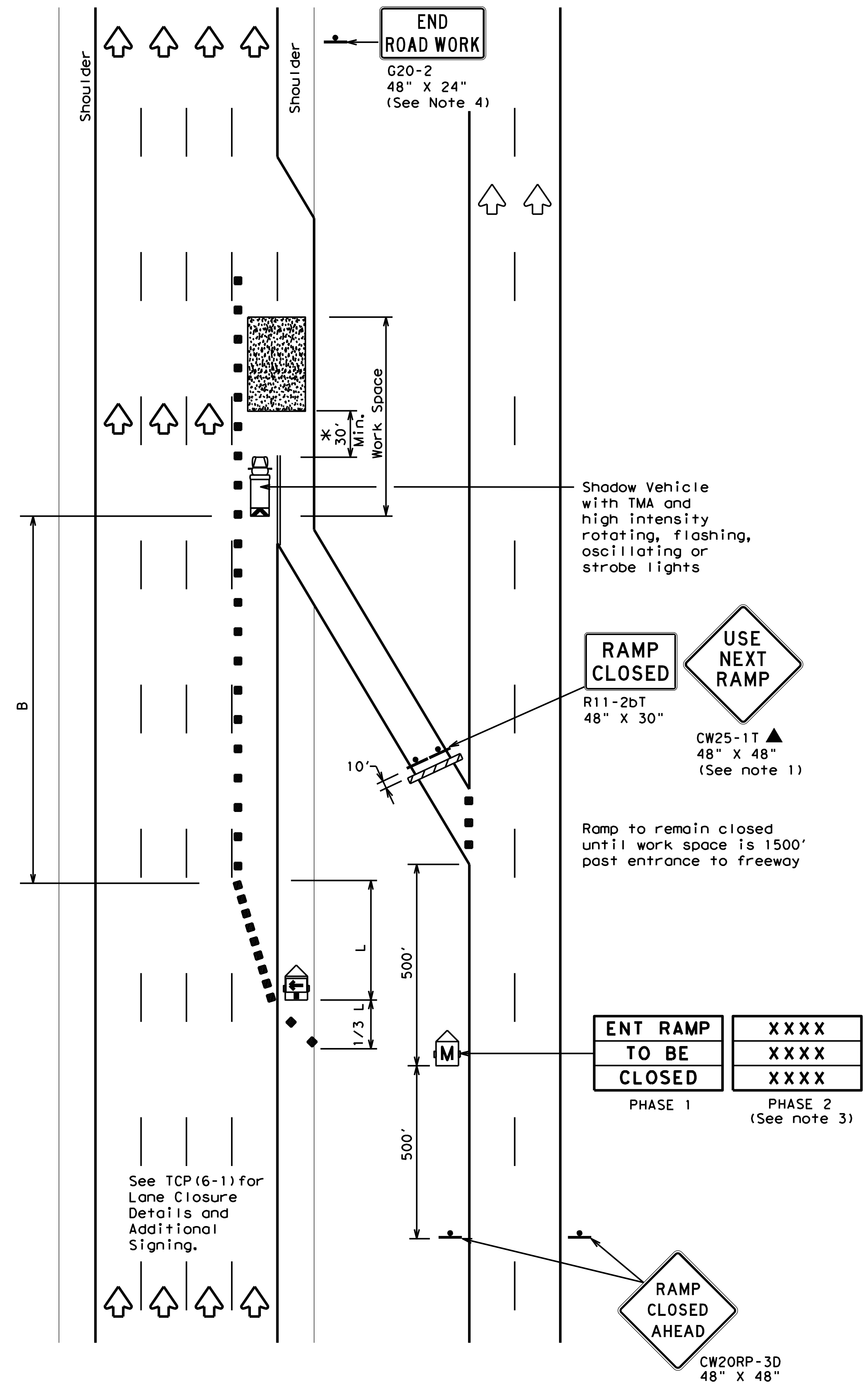
TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
8-12	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		47



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 8-98 4-98 8-12	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		48

202

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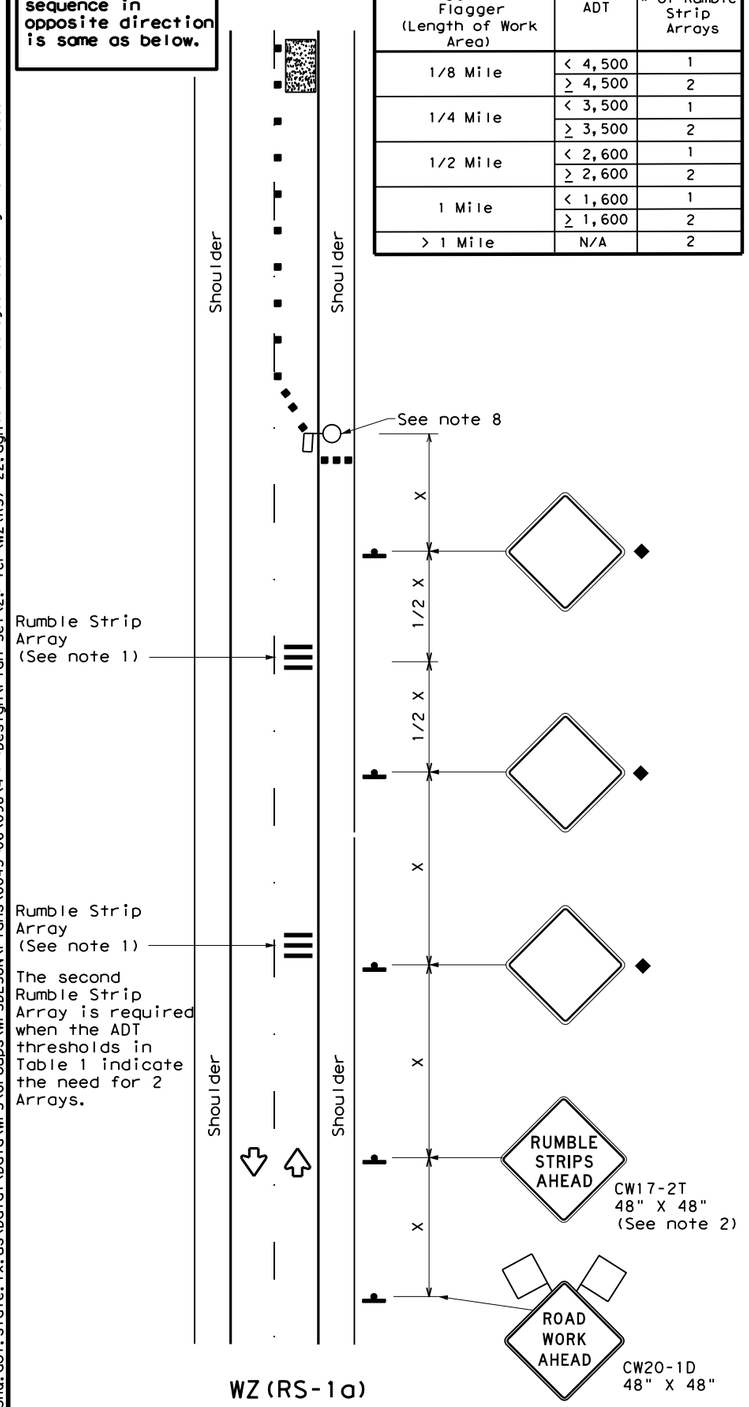
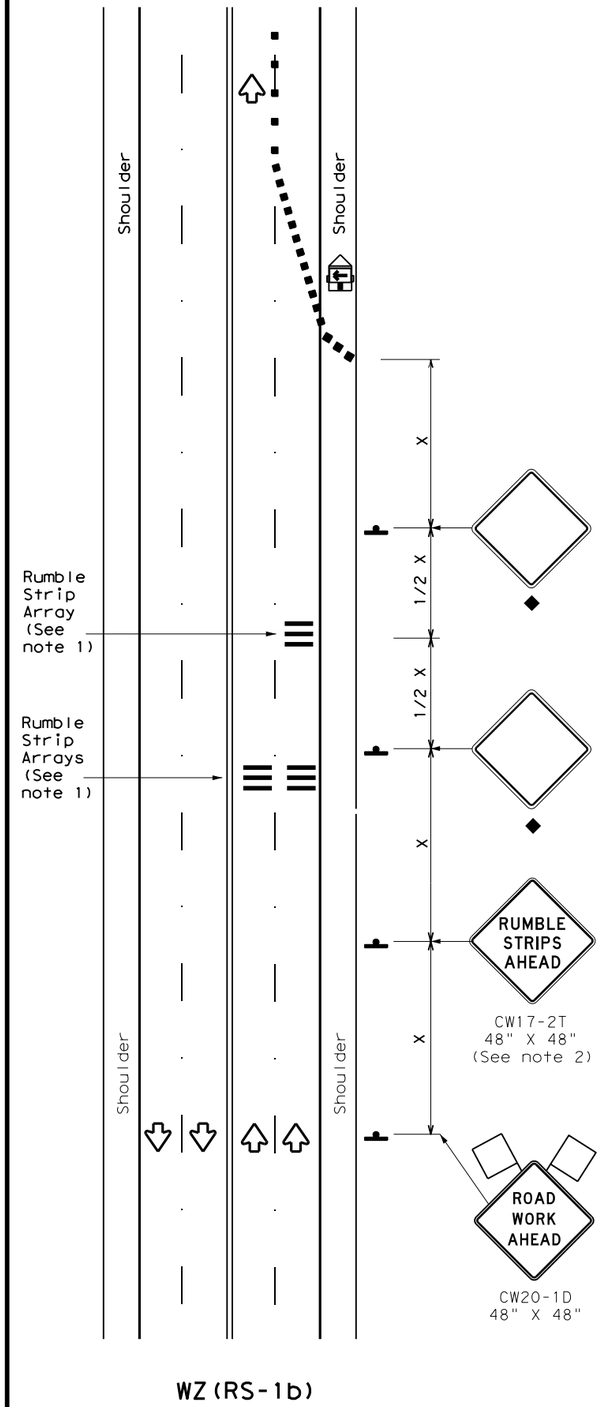
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

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

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

* Conventional Roads Only

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

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

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

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

Texas Department of Transportation — Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		49

117

NOTES

1. SOUTH BOUND LEFT LANE APPROACH - REMOVE APPROX. 275 LF OF EXISTING GUARDRAIL FROM THE BRIDGE END. INSTALL THRIE BEAM, INSTALL MBGF AT CURRENT STANDARD MBGF HEIGTH AND TAPER THE LAST FULL 25' SEGMENT TO TIE INTO EXISTING MBGF HEIGTH. ANTICIPATE HAVING TO FIELD MEASURE AND CUT ONE SEGMENT OF RAIL TO FILL IN REMAINING "GAP". THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 540-6001. MAKE SPLICE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

2. SOUTH BOUND RIGHT LANE APPROACH - THE UPSTREAM MOW STRIP TRANSITION SHOULD BE REDUCED TO 30 LF DUE TO THE WIDTH TAPERING FROM ONLY 3.5 FT WIDE TO 2 FT WIDE.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

Texas Department of Transportation

GUARDRAIL LAYOUT

REFERENCE #1

NBI: 03-244-0-0043-06-113

US 70 EB/US 287 SB
OVER BU 287F

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		50

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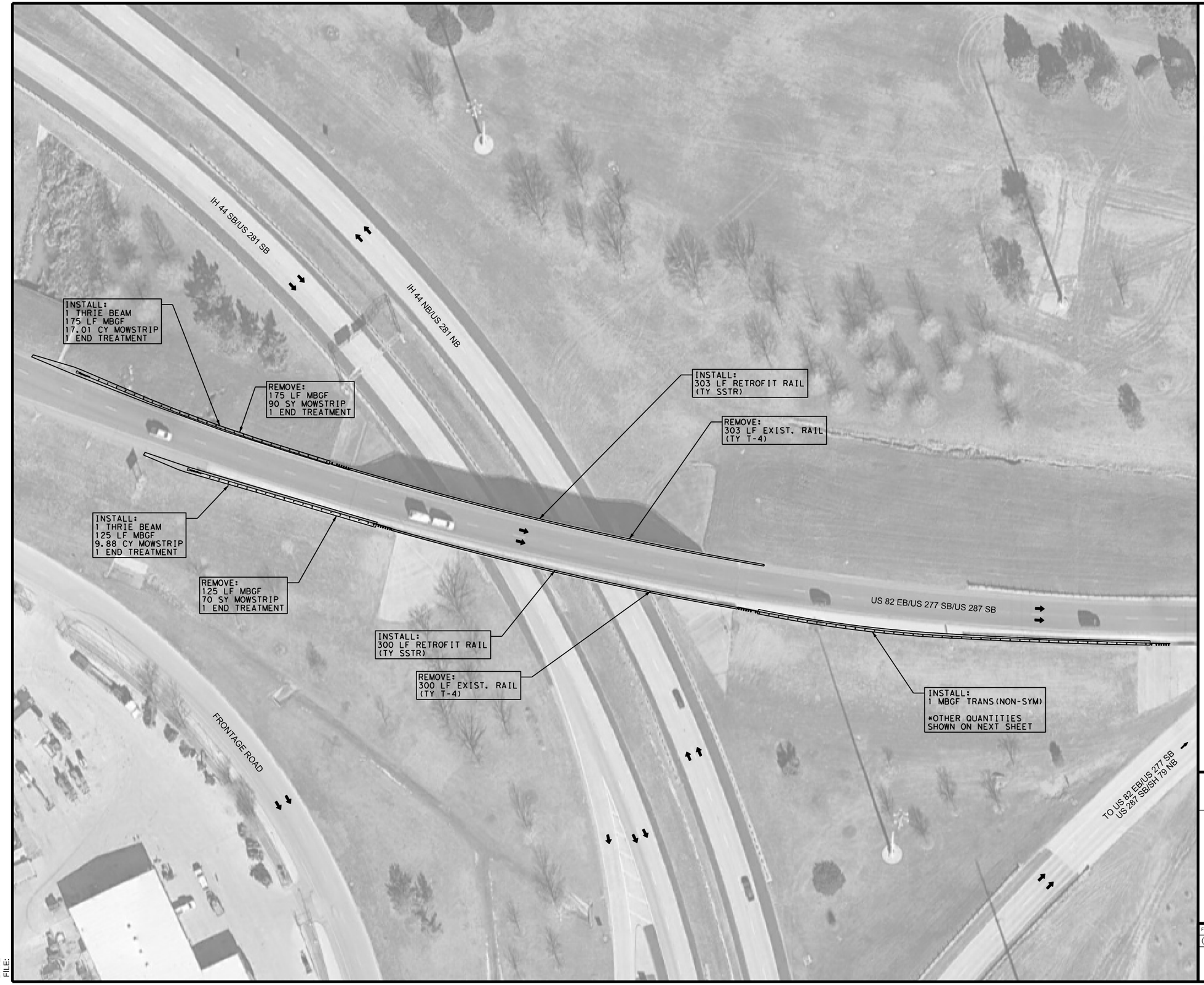
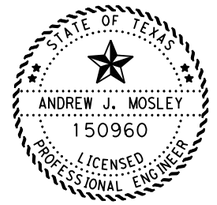


DATE:
FILE:

NOTES

1. SOUTH BOUND RIGHT LANE APPROACH - THE MOW STRIP TRANSITION SHOULD BE REDUCED TO 30 LF DUE TO THE WIDTH TAPERING FROM ONLY 3.5 FT WIDE TO 2 FT WIDE.

2. SOUTH BOUND RIGHT LANE DEPARTURE - WILL BE EXTENDED TO CONNECT TO THE APPROACH MBGF FOR THE ADJACENT STRUCTURE. AT MINIMUM, ONE PIECE OF W-BEAM WILL HAVE TO BE FIELD MEASURED AND CUT TO MAKE THE CONNECTION. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 540-6001.
*ONLY THE MATERIAL QUANTITIES FOR THE TRANSITION TO BRIDGE RAIL ARE LISTED HERE. ESTIMATED QUANTITIES FOR THE W-BEAM AND MOWSTRIP CAN BE FOUND ON THE NEXT PLAN SHEET.



Andrew Mosley, P.E.

03/04/2024

NBI: 03-243-0-0044-01-100

Texas Department of Transportation

GUARDRAIL LAYOUT

REFERENCE #2

CSJ: 0044-01-112

US 82 EB/US 287 SB
OVER US 281

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
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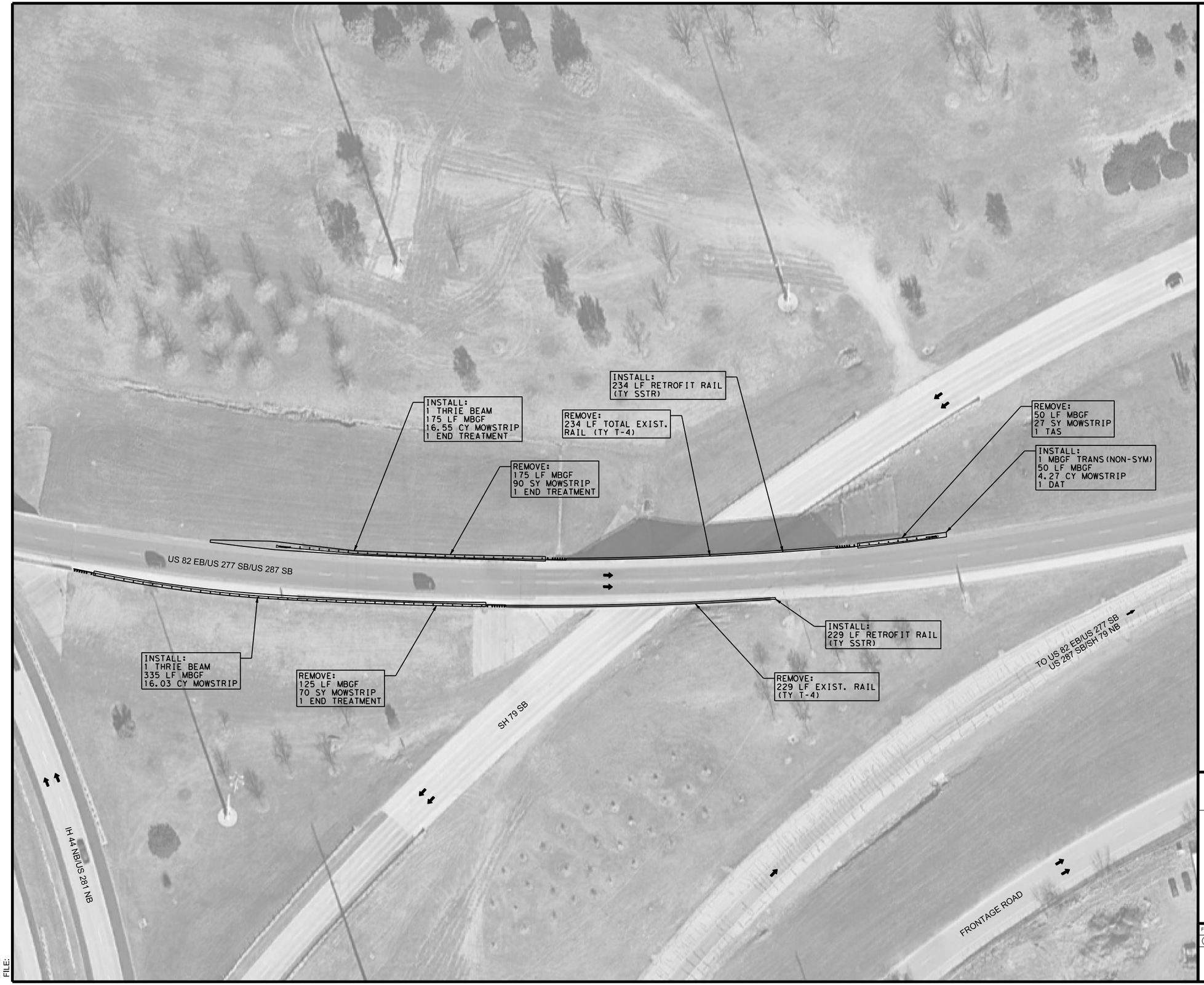

DATE:
FILE:

NOTES

1. SOUTH BOUND RIGHT LANE APPROACH - WILL BE EXTENDED TO CONNECT TO THE DEPARTURE MBGF FOR THE ADJACENT STRUCTURE. AT MINIMUM, ONE PIECE OF W-BEAM WILL HAVE TO BE FIELD MEASURED AND CUT TO MAKE THE CONNECTION. MAKE SPLICE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
*THE MATERIAL QUANTITIES FOR THE TRANSITION TO BRIDGE RAIL, ESTIMATED QUANTITIES FOR THE W-BEAM AND MOWSTRIP, ARE LISTED HERE.

2. SOUTH BOUND LEFT LANE DEPARTURE - THE MOW STRIP TRANSITION SHOULD BE REDUCED TO 30 LF DUE TO THE WIDTH TAPERING FROM ONLY 3.5 FT WIDE TO 2 FT WIDE.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

NBI: 03-243-0-0044-01-101

Texas Department of Transportation

GUARDRAIL LAYOUT

REFERENCE #3

CSJ: 0044-01-113

US 82 EB/US 287 SB
OVER US 82WB CONN US 281 S

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
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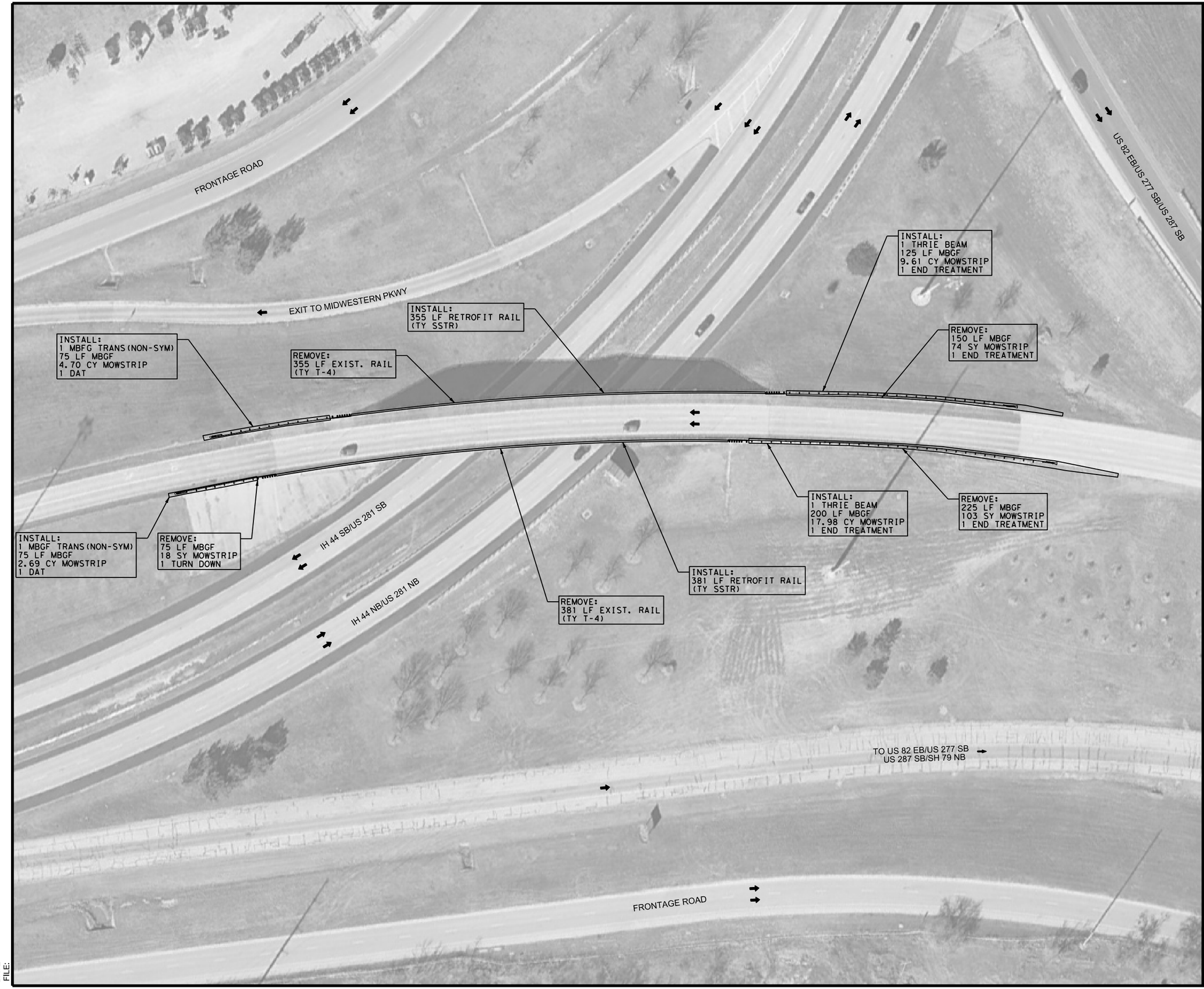

DATE:
FILE:

NOTES

1. SOUTH BOUND RIGHT LANE APPROACH - THE MOW STRIP TRANSITION SHOULD BE REDUCED TO 30 LF DUE TO THE WIDTH TAPERING FROM ONLY 3.5 FT WIDE TO 2 FT WIDE.

2. SOUTH BOUND LEFT LANE DEPARTURE - EXISTING MOW STRIP SHOULD BE SAW CUT AT 2' WIDE. THE REPLACEMENT MOW STRIP IS ESTIMATED BASED ON 2' WIDE MOW STRIP.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

NBI: 03-243-0-0044-01-119

Texas Department of Transportation

GUARDRAIL LAYOUT

REFERENCE #4

CSJ: 0044-01-114

US 82 WB CONN US 281 S
OVER US 281

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
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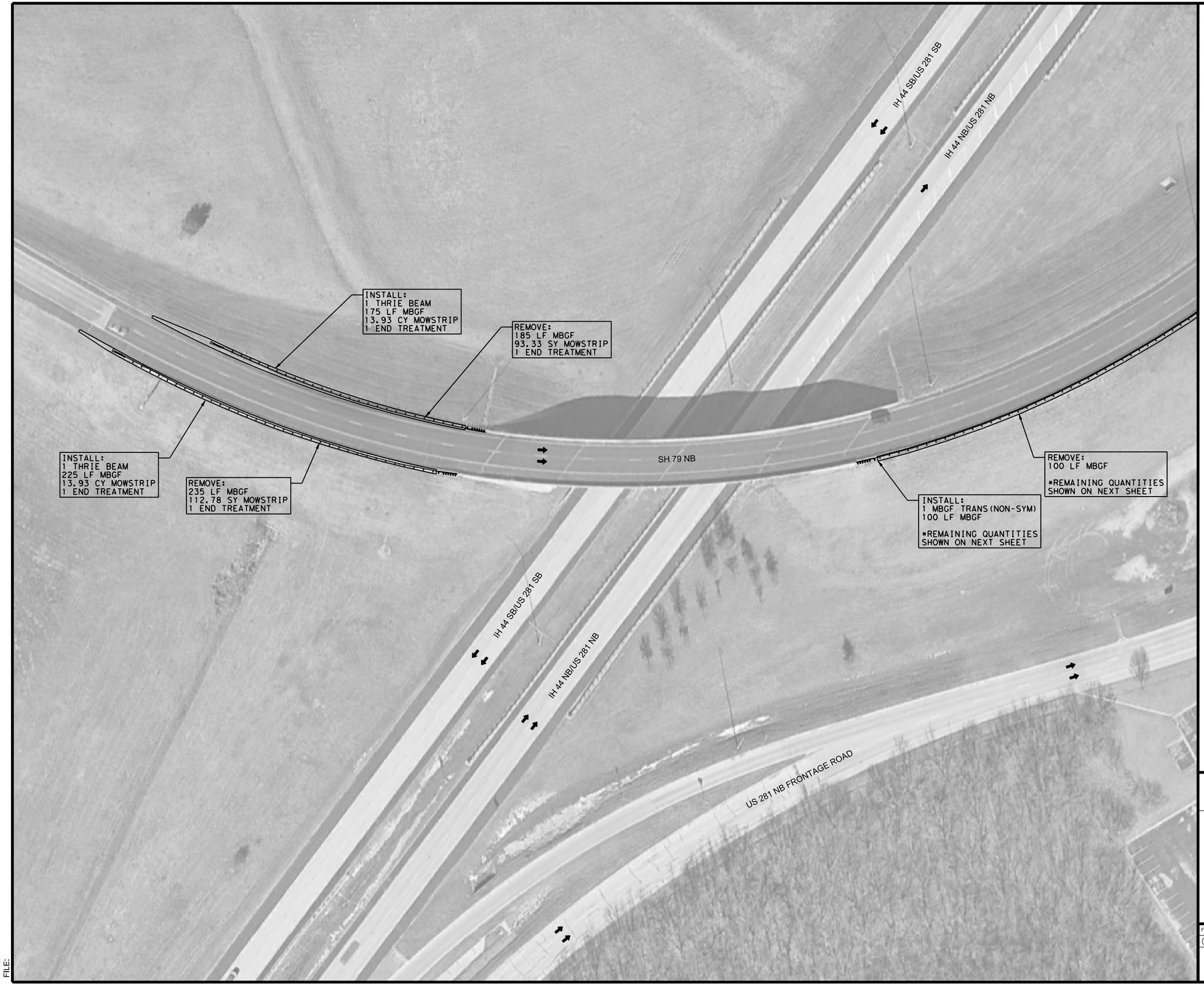
	WFS	WILBARGER, ETC		53



DATE:
FILE:

NOTES

1. NORTH/EAST BOUND RIGHT LANE APPROACH - THE MOW STRIP TRANSITION SHOULD BE REDUCED TO 30 LF DUE TO THE WIDTH TAPERING FROM ONLY 3.5 FT WIDE TO 2 FT WIDE.

2. NORTH/EAST BOUND RIGHT LANE DEPARTURE - WILL REMAIN CONNECTED TO THE APPROACH MBGF FOR THE ADJACENT STRUCTURE. AT MINIMUM, ONE PIECE OF W-BEAM WILL HAVE TO BE FIELD MEASURED AND CUT TO MAKE THE CONNECTION. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 540-6001.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

NBI: 03-243-0-0249-01-067

Texas Department of Transportation

GUARDRAIL LAYOUT

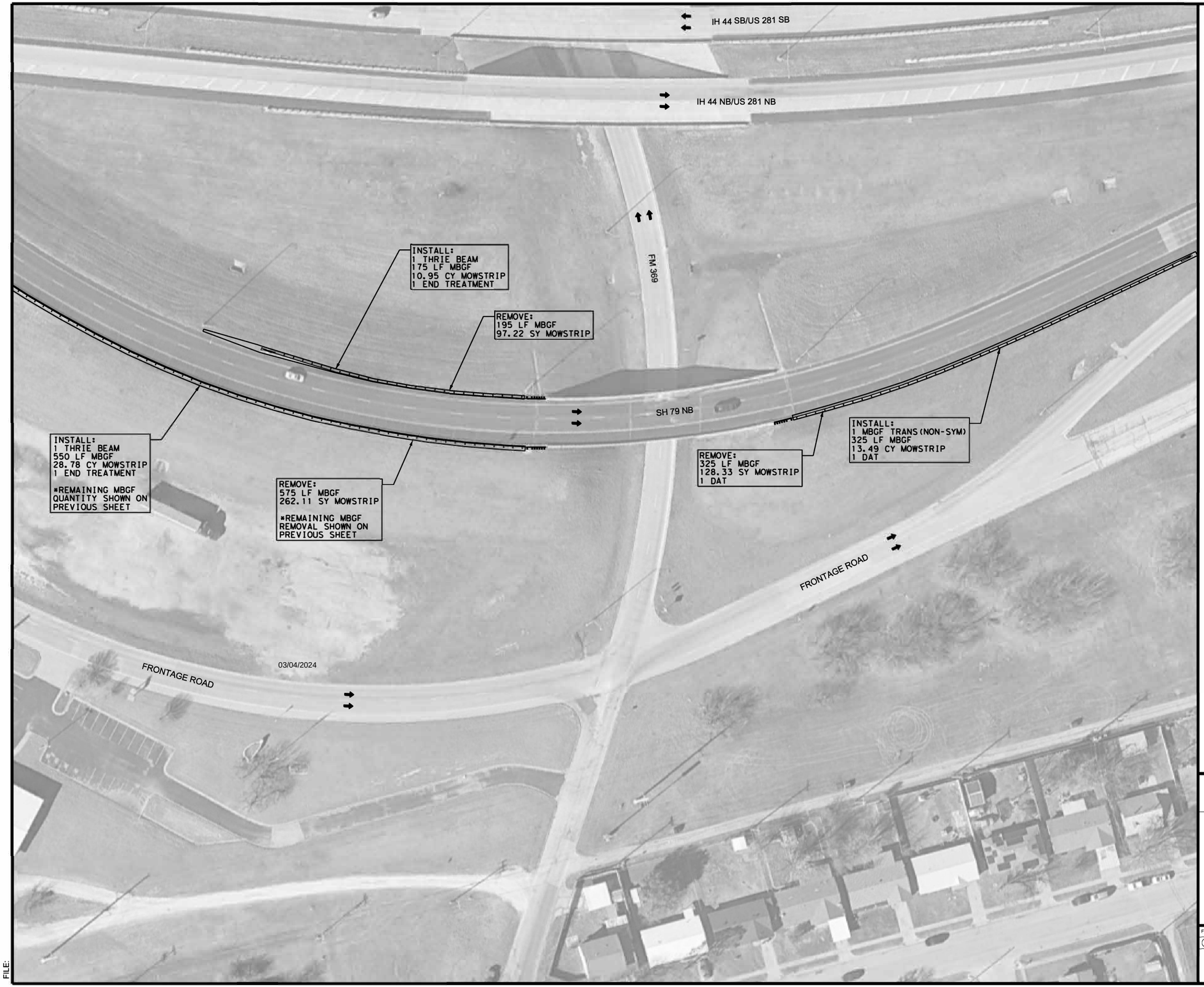
REFERENCE #5

CSJ: 0249-01-052

SH 79 NB

OVER US 281

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		54



DATE:
FILE:

NOTES

1. NORTH BOUND RIGHT LANE APPROACH - WILL REMAIN CONNECTED TO THE DEPARTURE FOR THE ADJACENT STRUCTURE. AT MINIMUM, ONE PIECE OF W-BEAM WILL HAVE TO BE FIELD MEASURED AND CUT TO MAKE THE CONNECTION. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 540-6001. MAKE SPLICE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

NBI: 03-243-0-0283-06-070

Texas Department of Transportation

GUARDRAIL LAYOUT

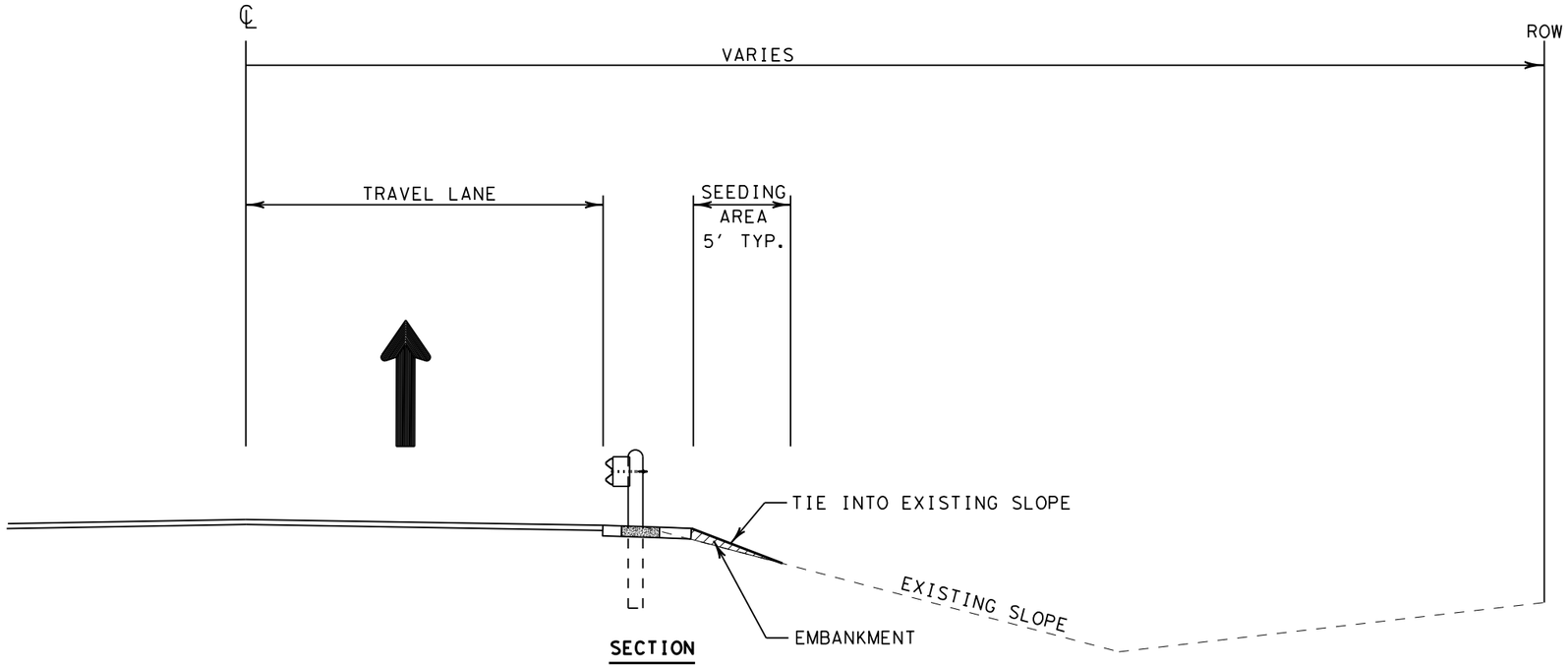
REFERENCE #6

CSJ: 0283-06-028

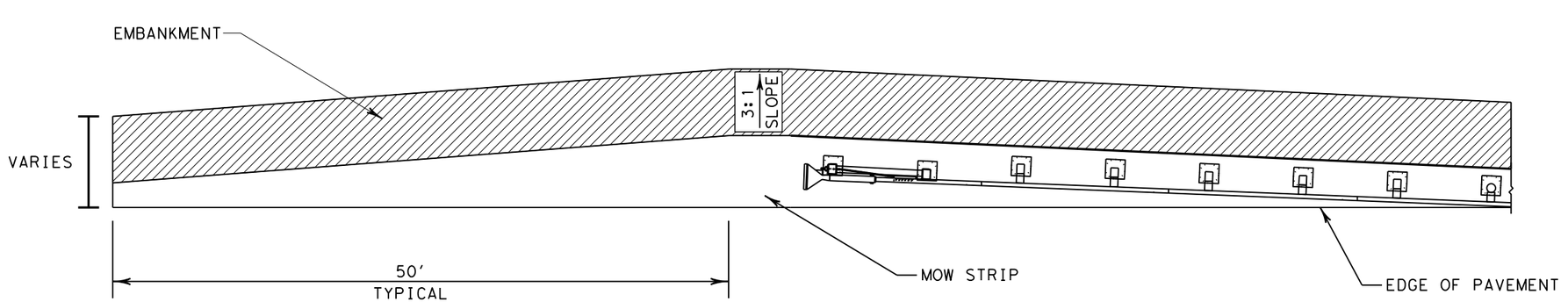
SH 79 NB

OVER SH 79 CONN FM 369 WB

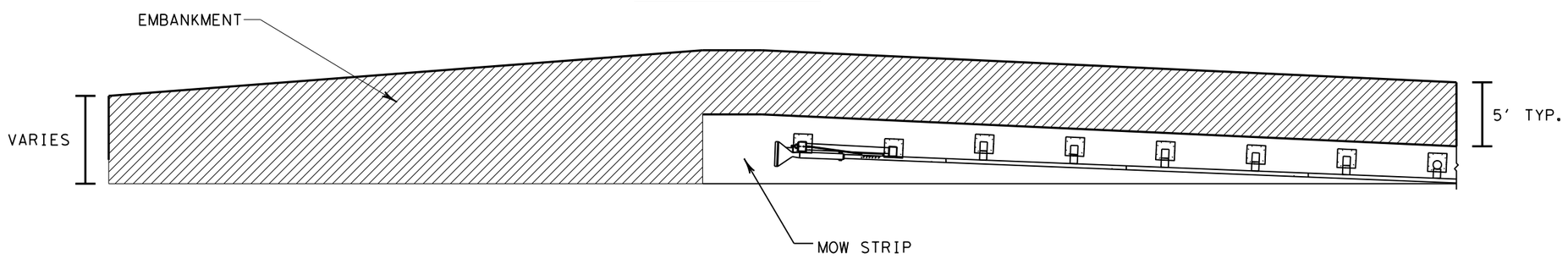
FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		55



SECTION



PLAN (CONDITION 1)



PLAN (CONDITION 2)

NOTES:

1. MATERIAL MUST BE APPROVED BY THE ENGINEER BEFORE CONSTRUCTION BEGINS.
2. COMPLETE ALL EMBANKMENT WORK PRIOR TO PLACEMENT OF PROPOSED MBGF AND SGT.
3. AREAS WHERE EMBANKMENT IS ADDED MUST BE SEEDED, FERTILIZED, AND WATERED MEETING THE REQUIREMENTS HEREIN. THIS WORK WILL BE PAID FOR UNDER ITEMS 164 AND 168.

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

US 70, ETC
EMBANKMENT DETAIL

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		56

DATE: 3/1/2024 5:24:10 PM
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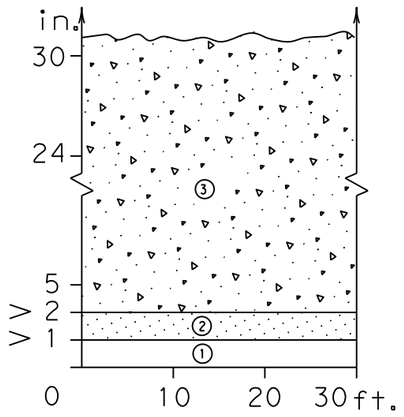
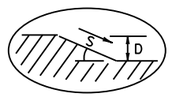
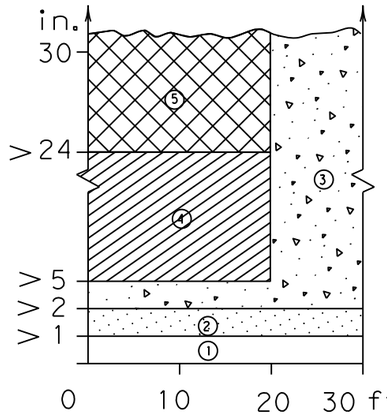
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

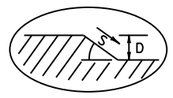


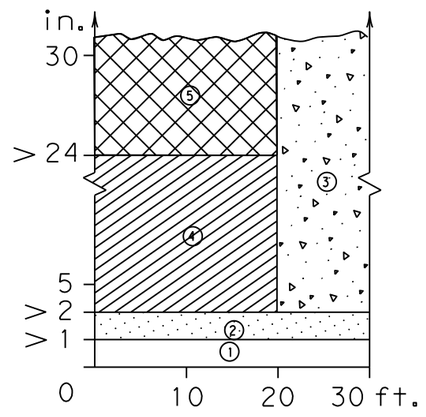
Edge Condition I
S = (3:1) (or flatter)



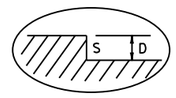


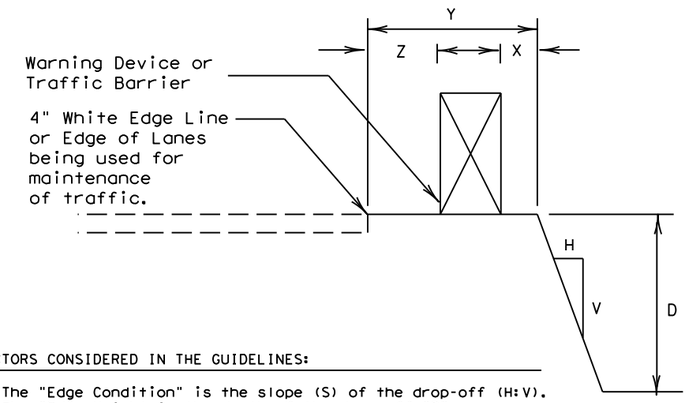
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

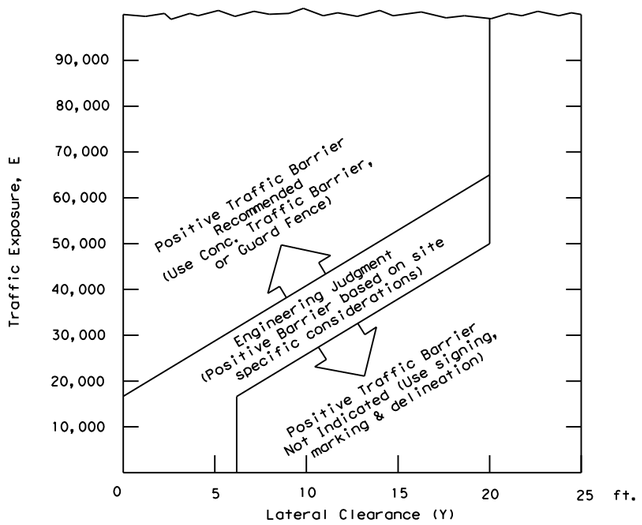
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1 E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2 Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3 An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
03-01
08-01 correct typos

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		57

DATE:
FILE:

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
A	1	18	REF 2 NBI 0044-01-100	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'	X						X			
B	1	18	REF 3 NBI 0044-01-101	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'	X						X			
C	2	18	REF 2 NBI 0044-01-100	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'			X	A			X			
D	2	18	REF 3 NBI 0044-01-101	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'		X	X	B			X			
E	1	19	REF 4 NBI 0044-01-119	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'			X	D			X			
F	2	19	REF 4 NBI 0044-01-119	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'		X	X	E			X			
G	1	20	REF 5 NBI 0249-01-067	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'	X			C			X			
H	1	20	REF 6 NBI 0283-06-070	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'	X			F			X			
I	2	20	REF 5 NBI 0249-01-067	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'			X	G			X			
J	2	20	REF 6 NBI 0283-06-070	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'			X	H			X			
I	2	20	REF 5 NBI 0249-01-067	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'		X		I			X			
J	2	20	REF 6 NBI 0283-06-070	N/A	TL-3	UNI	N/A	N/A	TEMP. RAIL TYPE SSTR	1' - 2"	30"	30'		X		J			X			
												TOTALS	4	4	6							

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/rdwyise.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		
	WFSWIL	BARGER, ETC		
	FEDERAL AID PROJECT			SHEET NO.
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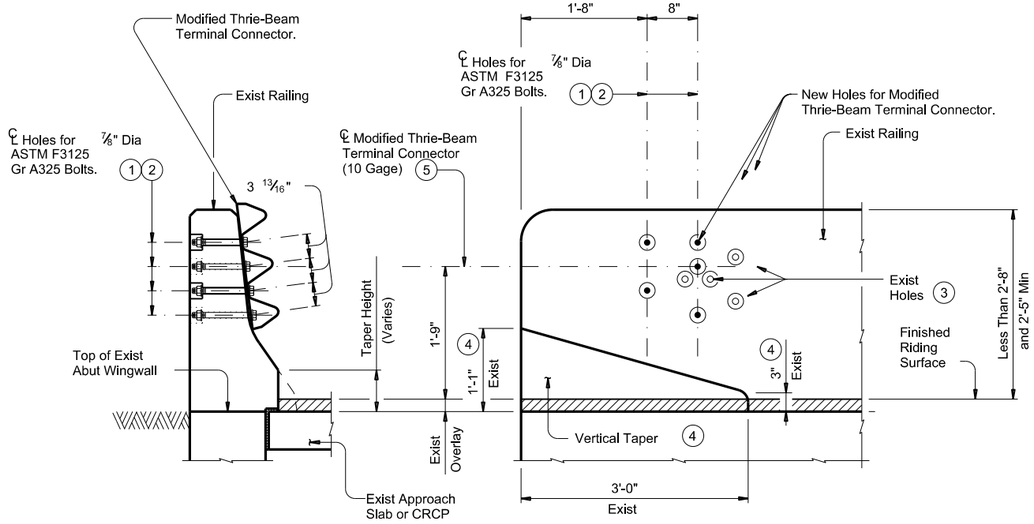


SECTION ELEVATION

TERMINAL CONNECTION ON EXISTING RAIL WITH OVERLAY

(1) ℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Holes and recesses must be core drilled. Percussion drilling is not permitted. Concrete spalls in rail exceeding ½" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the contractor's expense. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

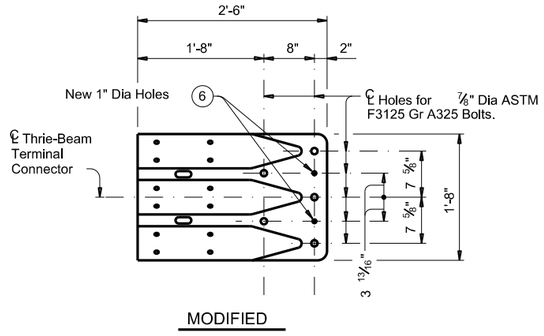
(2) ℄ 5 ~ 7/8" Dia F3125 Gr A325 Bolts with two 1 ¾" O.D. washers. Place washer under each head and nut. The 5 Terminal Connection Bolts must be tightened in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Bolts must be cut off after installation so as to extend no more than ¾" beyond nut. End of cut-off bolt must be painted with two coats of zinc-rich paint conforming to the Item "Galvanizing".

(3) Existing anchor bolt holes in rail that can not be utilized and are within 3" of a new bolt hole must be filled with an epoxy grout prior to coring new holes.

(4) If vertical taper is not present, then a vertical taper must be field cut to limits shown when the existing rail measurement is 2'-8". Rail measurement should be taken from behind rail as to not include overlay if present. If existing rail measurement is 2'-10" and existing rail does not have vertical taper, then add 2" to vertical dimensions and field cut vertical taper. Any exposed reinforcing steel from field cut taper must be ground flush and painted with two coats of zinc-rich paint conforming to the Item "Galvanizing".

(5) 10 Gage Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Metal Beam Guard Fence Transitions must be attached to the bridge rail and extended along the embankment unless otherwise shown in the plans.

(6) Terminal Connector must be modified for the Terminal Connection on Existing Rail with Overlay with two new 1" Dia holes as shown. Top new 1" Dia hole is used in lieu of existing top hole in terminal connector. All other existing holes in terminal connector must be used. Additional hole on bottom of terminal connector is used for other side for opposite hand. Damage to galvanization caused by this modification must be painted with two coats of zinc-rich paint conforming to the Item "Galvanizing".



MODIFIED

THRIE-BEAM TERMINAL CONNECTORS (5)

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

Remove any MBGF (W-beam) and attachment hardware, from the face of rail if present, prior to installation of new MBGF Transition. Dispose of these materials as directed by the Engineer. Plugging of exposed existing bolt holes is not necessary except as stated herein or otherwise indicated on the plans. This work is considered subsidiary to the pertinent bid items.

If vertical taper is not present, then a vertical taper must be field cut to limits shown and debris removed.

Attach the MBGF Transition to the existing rail and extend along the embankment using the Thrie-Beam Terminal Connection unless shown otherwise on the plans. Splice the Approach Guard Rail and the Terminal Connection with the normal 12 connection bolts. Refer to Metal Beam Guard Fence detail sheets for additional details and information not shown herein.

MATERIAL NOTES:

Galvanize all steel components unless otherwise noted.

GENERAL NOTES:

These details are shown for retrofitting MBGF transitions to existing rails only and not used for new construction.

Shop drawings are not required for this installation.

Materials, fabrication and installation of this assembly are to be included in the price bid for "Metal Beam Guard Fence."

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

Texas Department of Transportation

Bridge Division Standard

T501 TRANSITION RETROFIT GUIDE (MOD)

(ONE TIME USE ONLY)

FILE:	DN: TxDOT	CK: APK	DW: JTR	CK: APK
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		59

DATE: 3/1/2024
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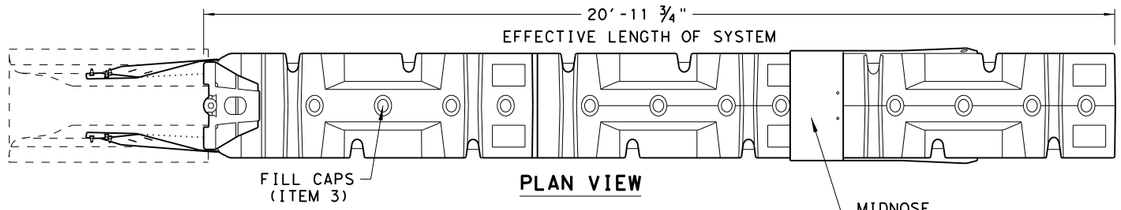
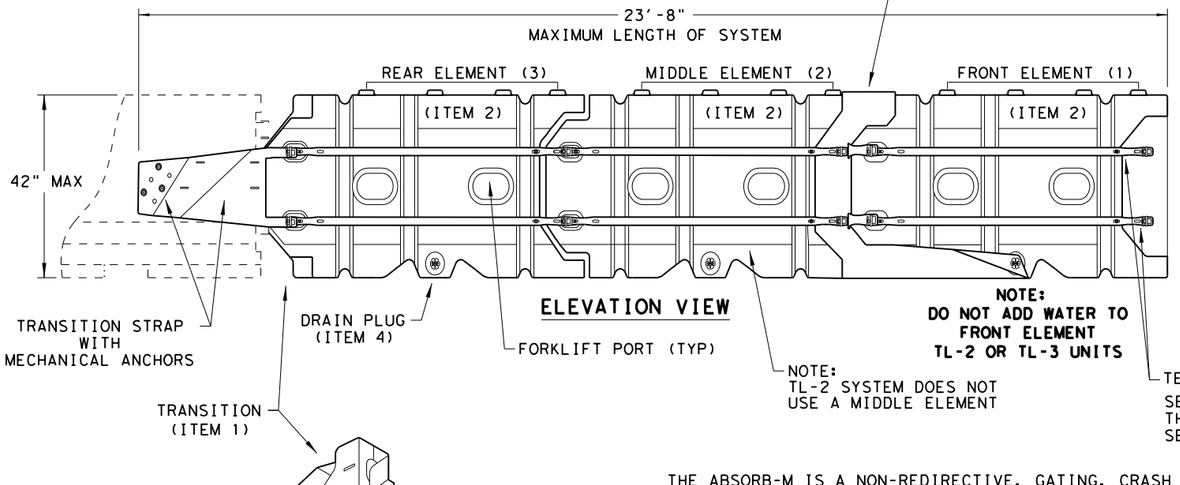
SYSTEM SHOWN - ABSORB-M TL-3



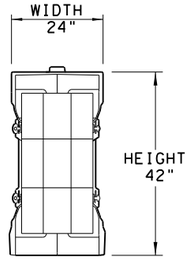
PLAN VIEW

TRAFFIC FLOW

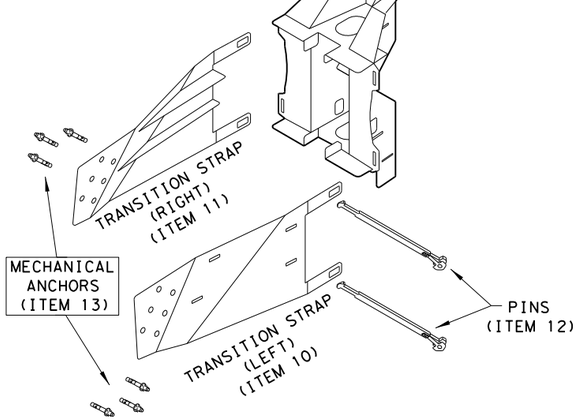


ELEVATION VIEW

TRAFFIC FLOW



SECTION A-A



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

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

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

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

GENERAL NOTES

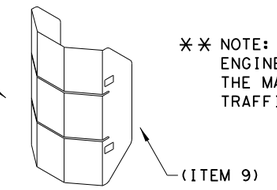
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M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

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

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE

TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER



NOSE PLATE

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

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

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

SACRIFICIAL

Texas Department of Transportation — Design Division Standard

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

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		60

DATE: 3/1/2024
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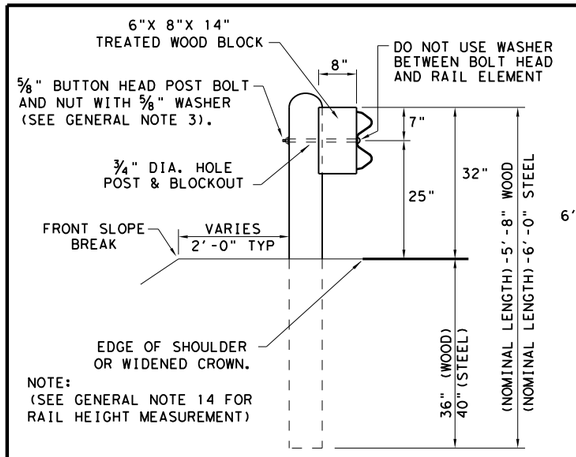
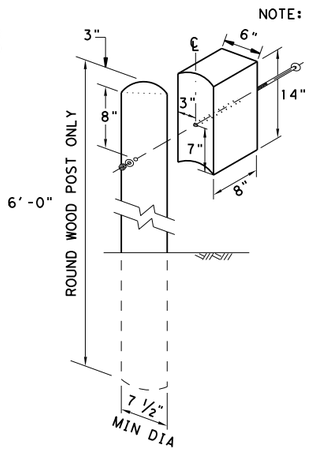
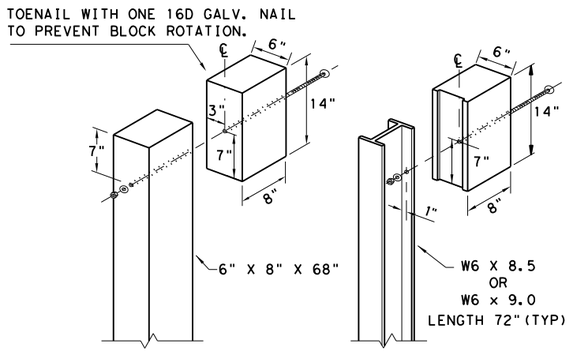


TYPICAL POST PLACEMENT



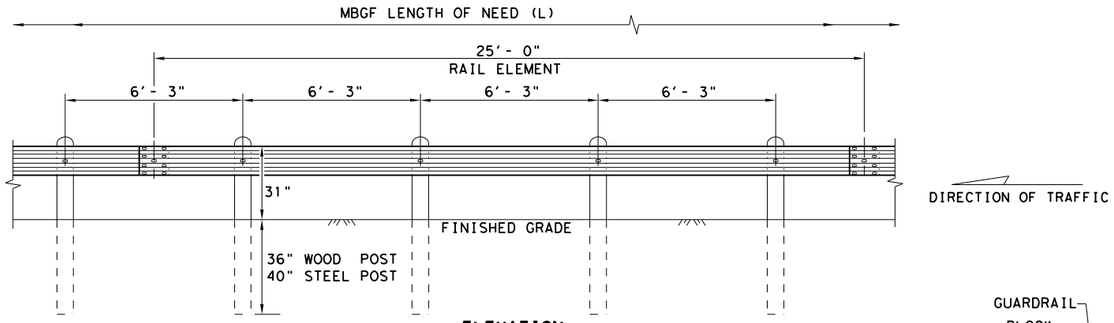
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

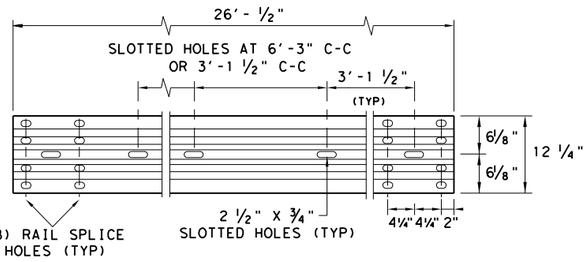
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



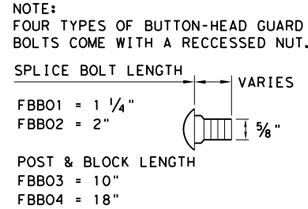
ELEVATION MID-SPAN RAIL SPLICE

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



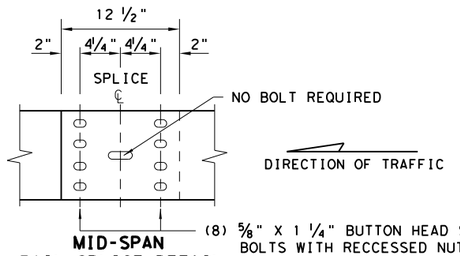
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



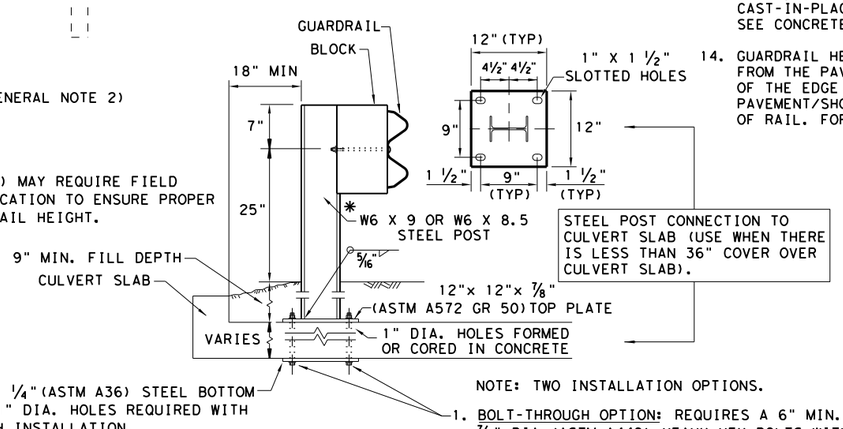
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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.

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

Texas Department of Transportation — Design Division Standard

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

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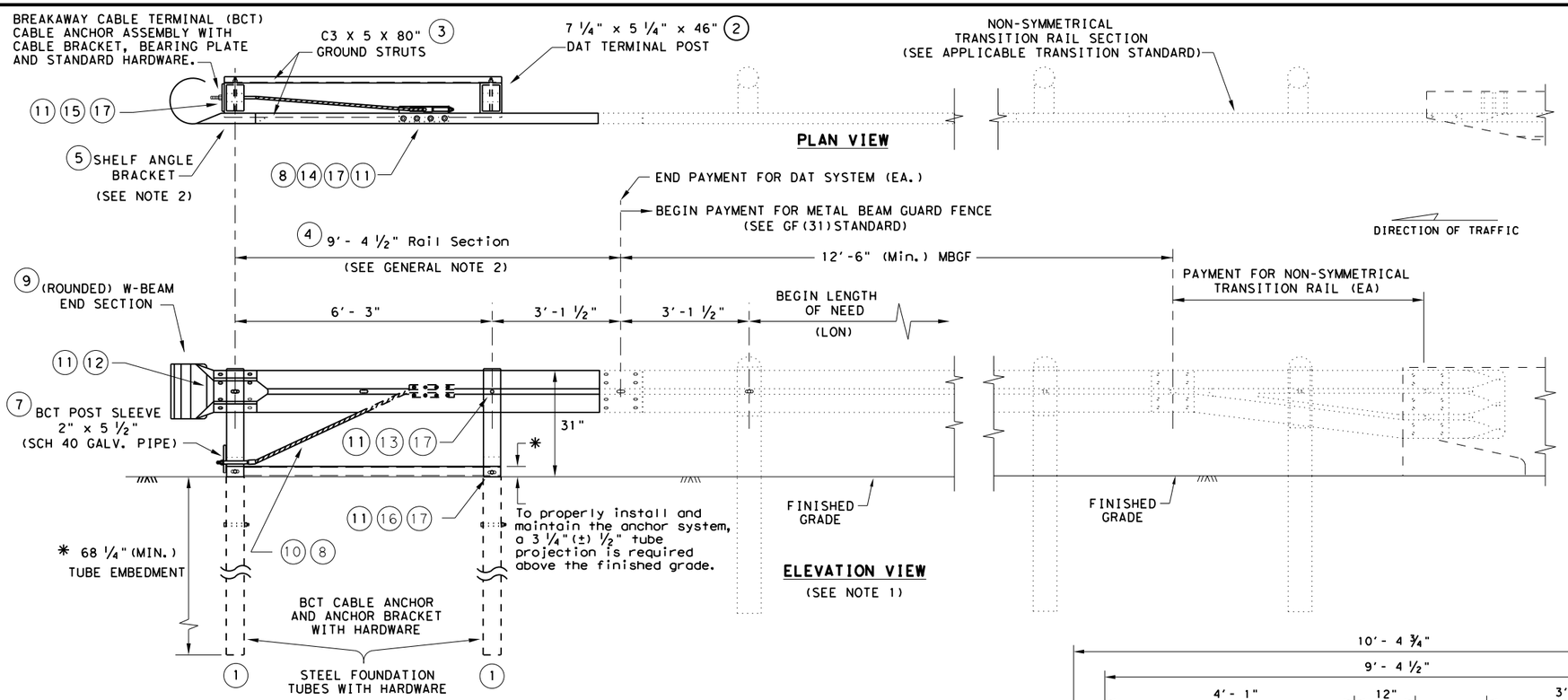


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

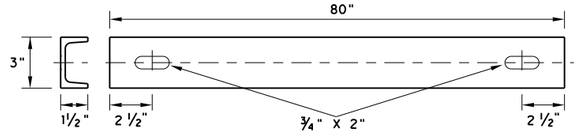
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 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

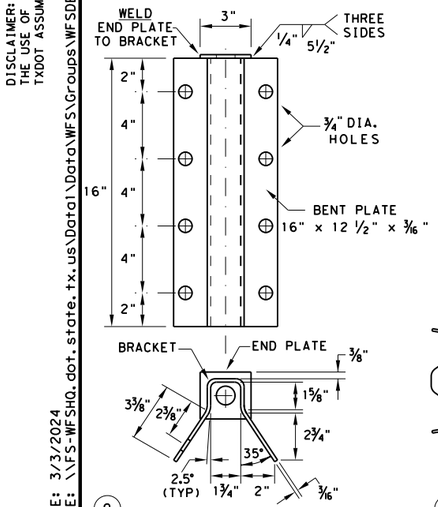
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(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

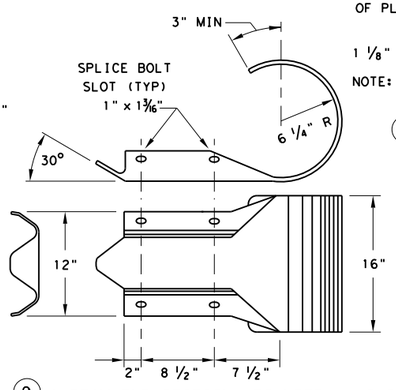
(4) TERMINAL RAIL ELEMENT FOR DAT



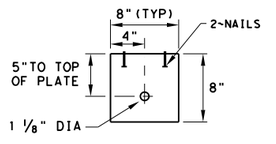
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

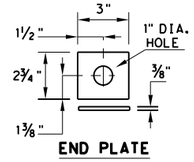


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

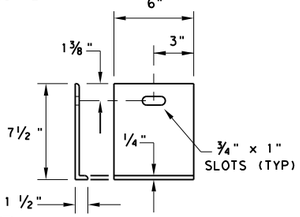


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

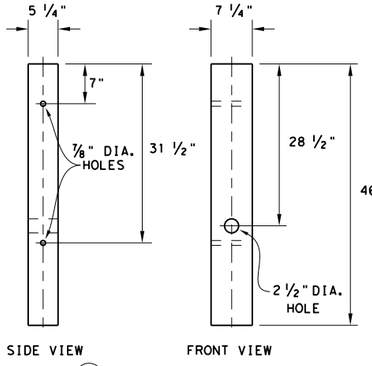
(6) BEARING PLATE
8"x 8"x 5/8" PL



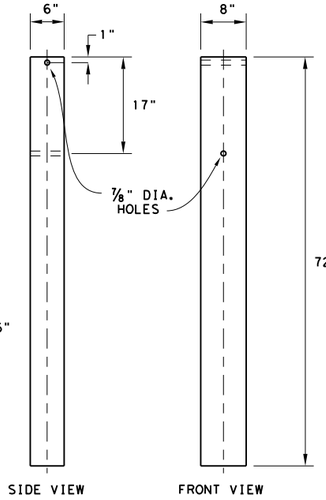
END PLATE



(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

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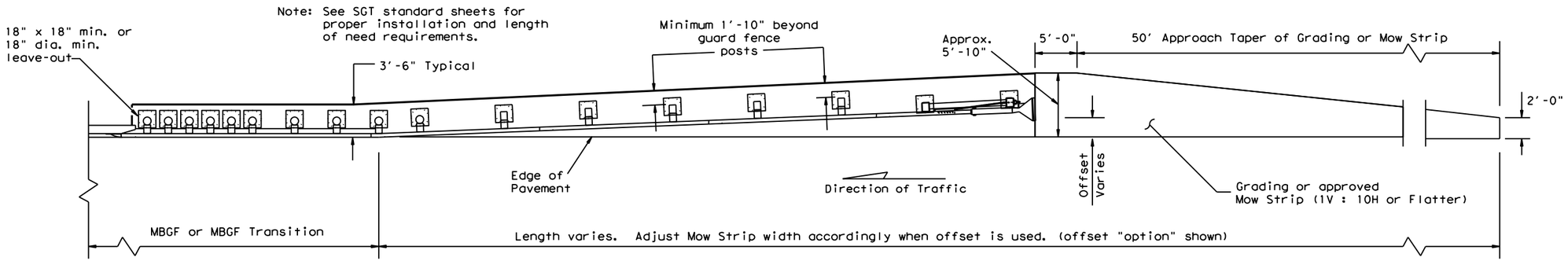
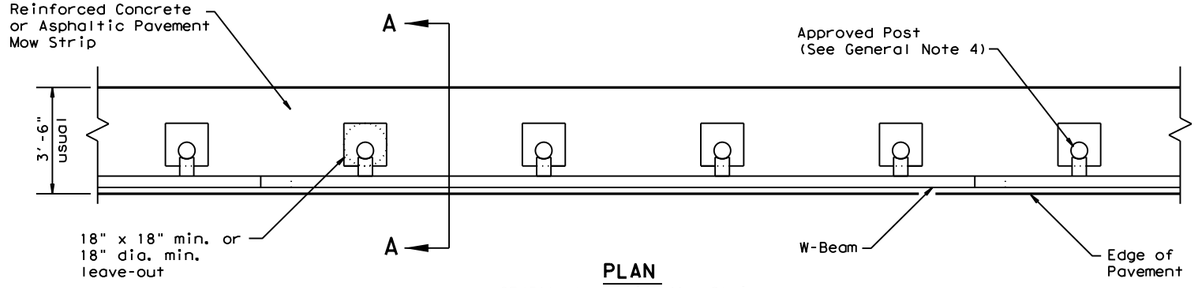
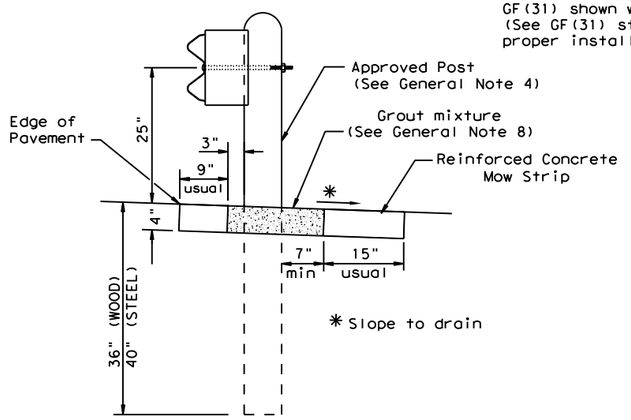


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



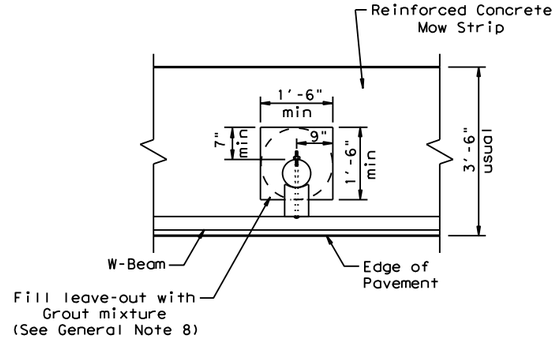
PLAN

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.

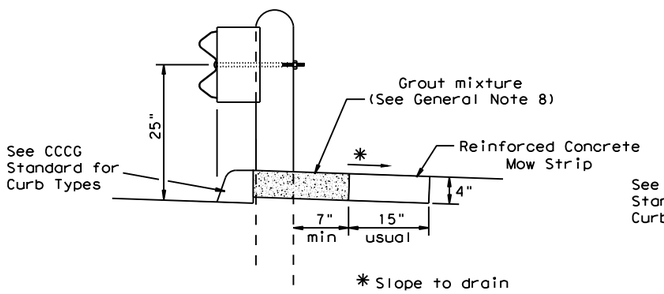
Note: Site Condition(s)

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.

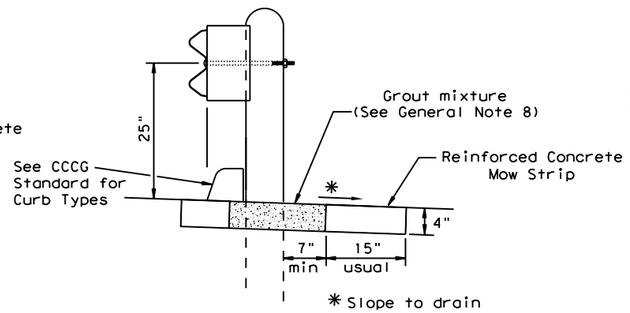
GENERAL NOTES

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.



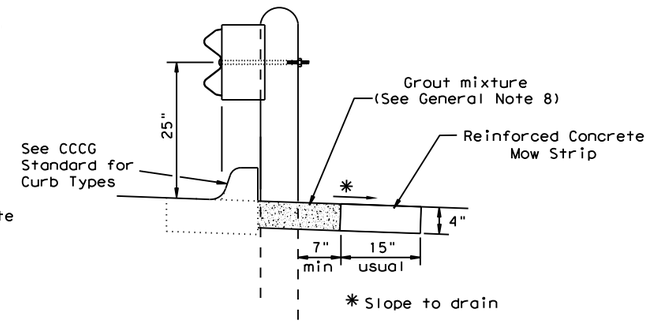
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

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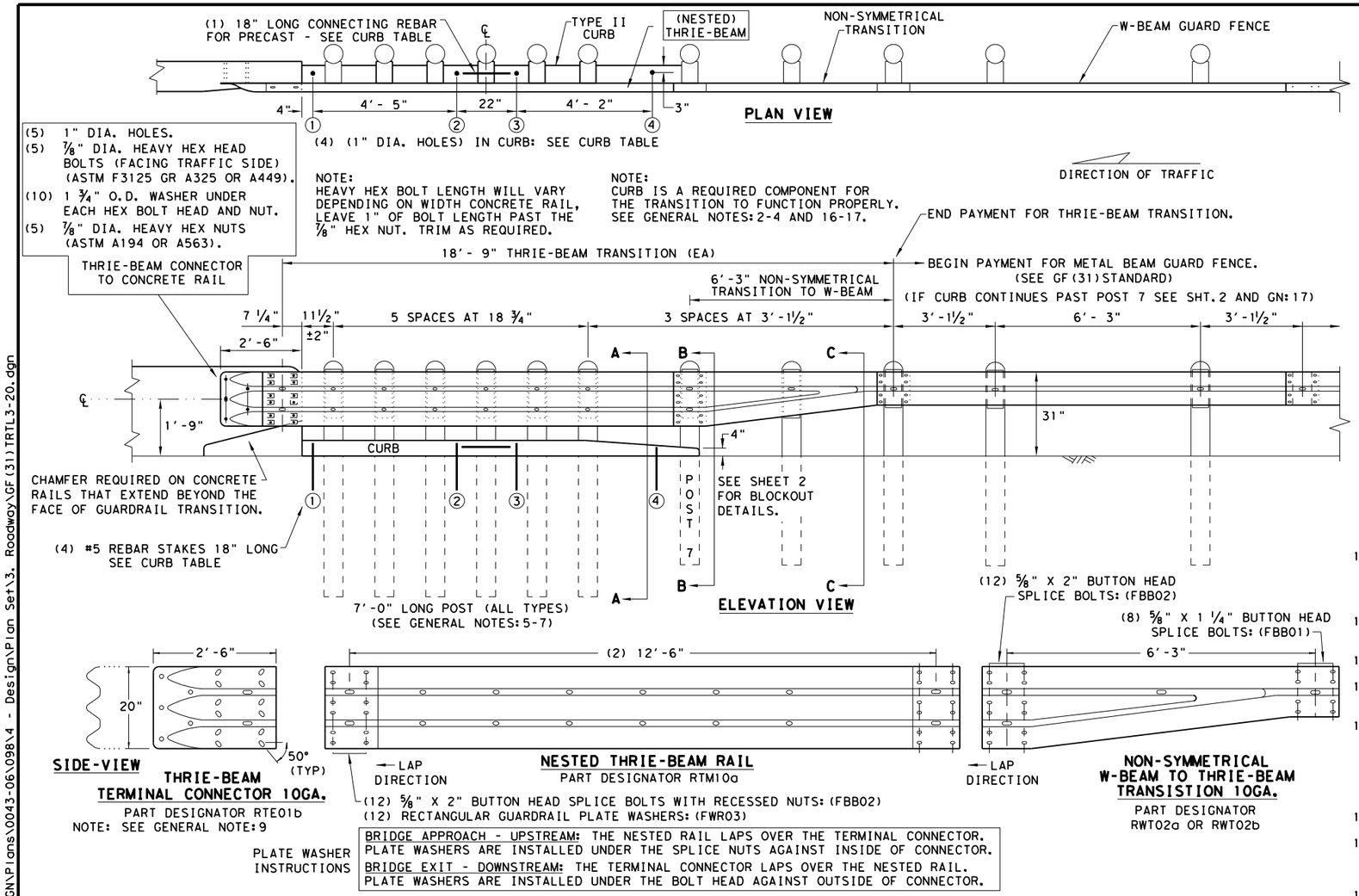


GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

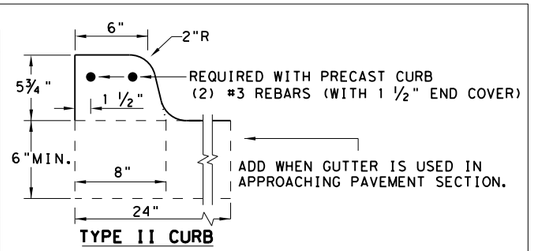
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END.
USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY		
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	WFS	WILBARGER, ETC		64		

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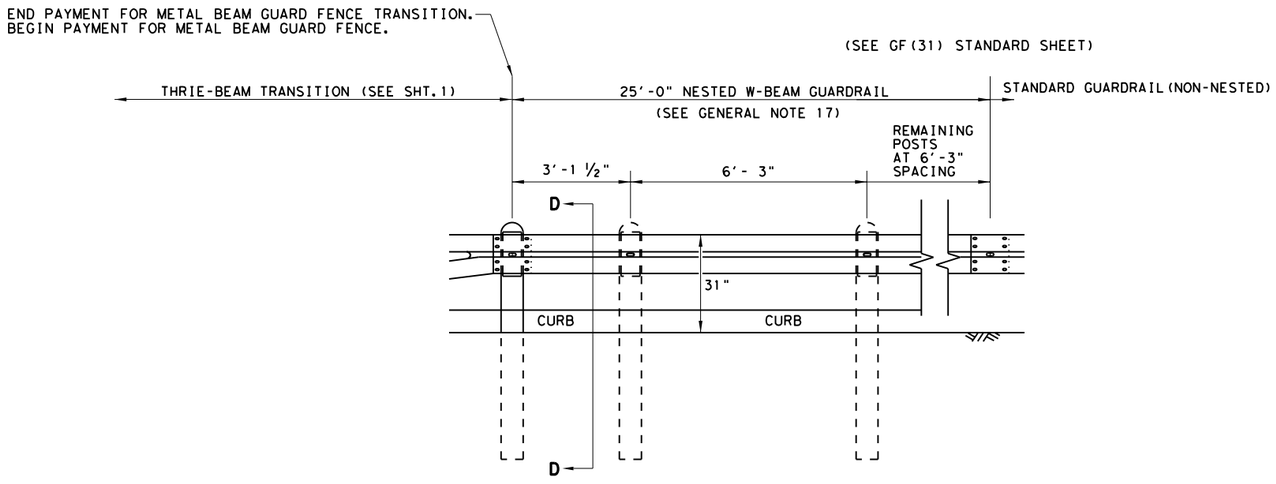
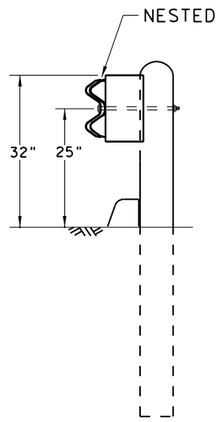
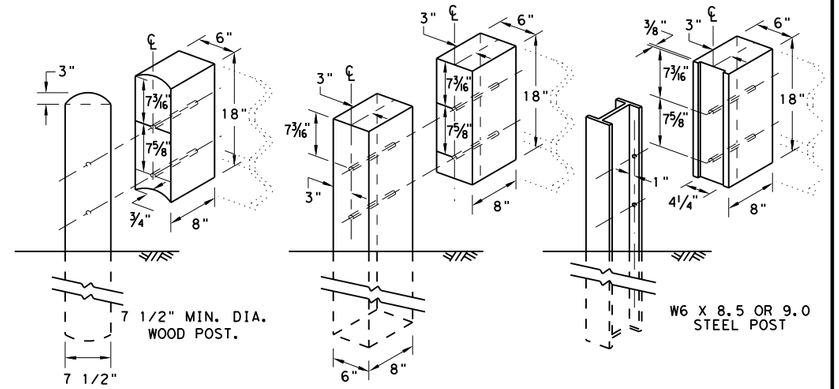
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
	WFS	WILBARGER, ETC		65	

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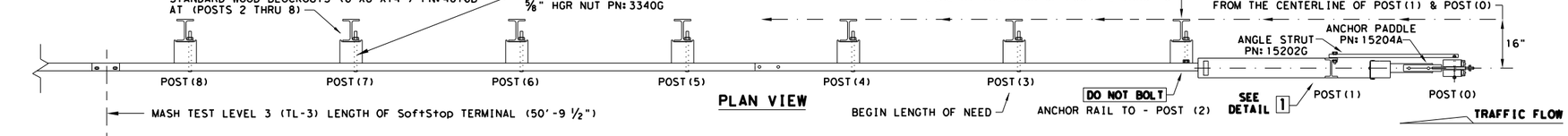
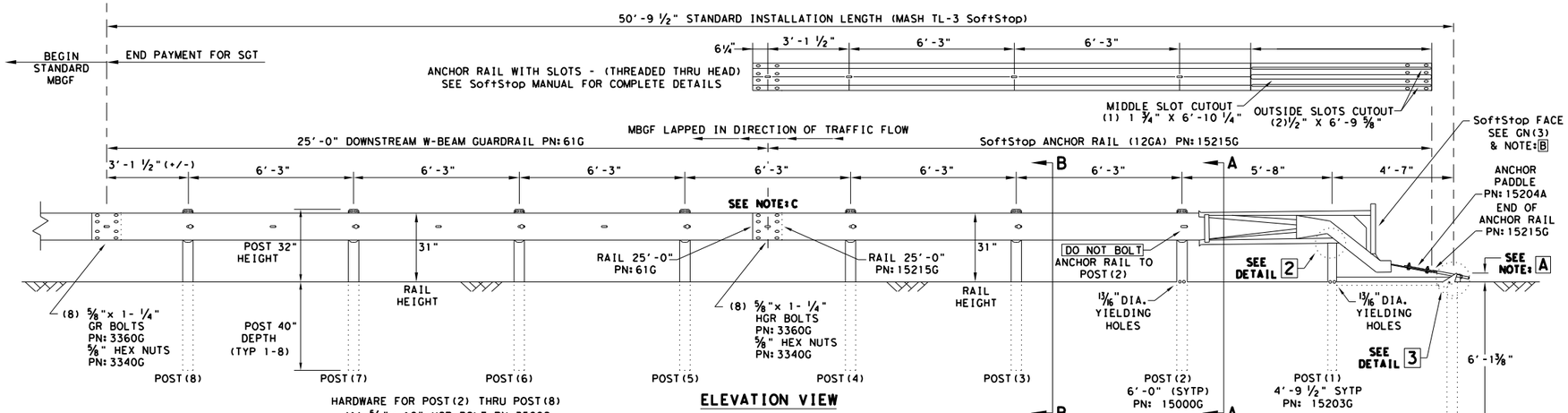
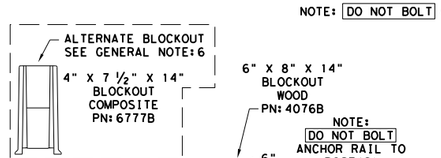


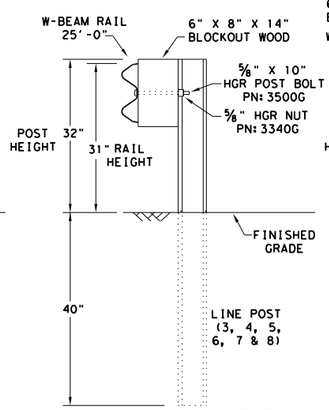




ISOMETRIC VIEW POST(1 & 2)

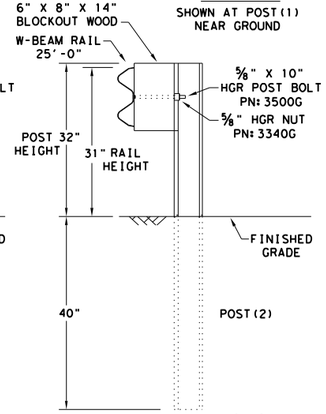
W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)



SECTION VIEW B-B

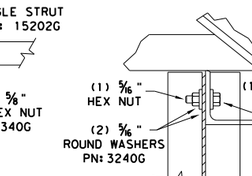
6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G



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)

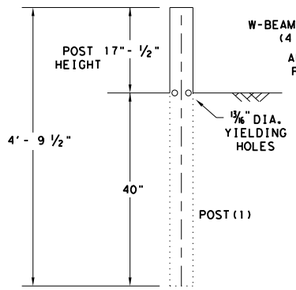


DETAIL 1

SHOWN AT POST(1) NEAR GROUND

DETAIL 2

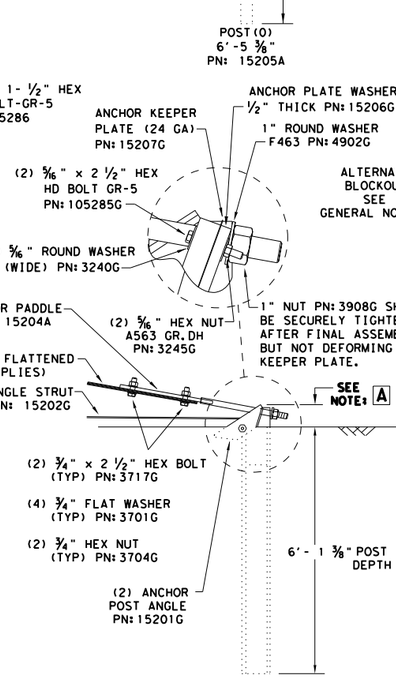
SHOWN AT POST(1)



FRONT VIEW POST(1)

4'-9 1/2" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

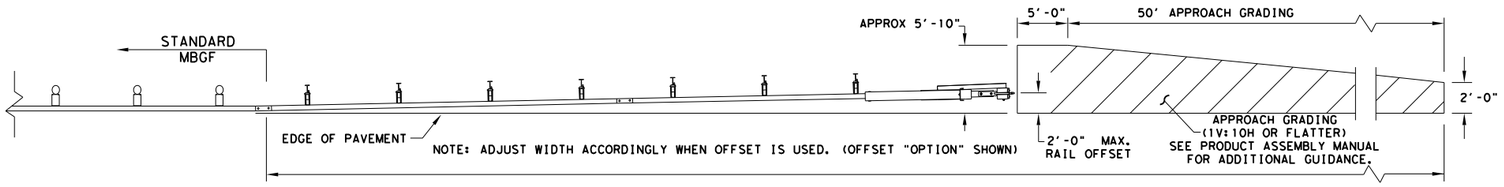
NOTE: NO BLOCKOUT INSTALLED AT POST(1)



DETAIL 3 AT POST(0)

6'-5 3/8" (W6 X 15)
I-BEAM POST PN: 15205A

TRAFFIC FLOW



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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 3-3/4" 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 7/8")
15203G	1	POST #1 - (SYTP) (4'- 9 1/2")
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 1/2" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" 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	3/4" x 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" x 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" x 10" HGR POST BOLT A307
3391G	1	5/8" x 1 3/4" HEX HD BOLT A325
4489G	1	5/8" x 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" x 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" x 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

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

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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	WFS	WILBARGER, ETC				66

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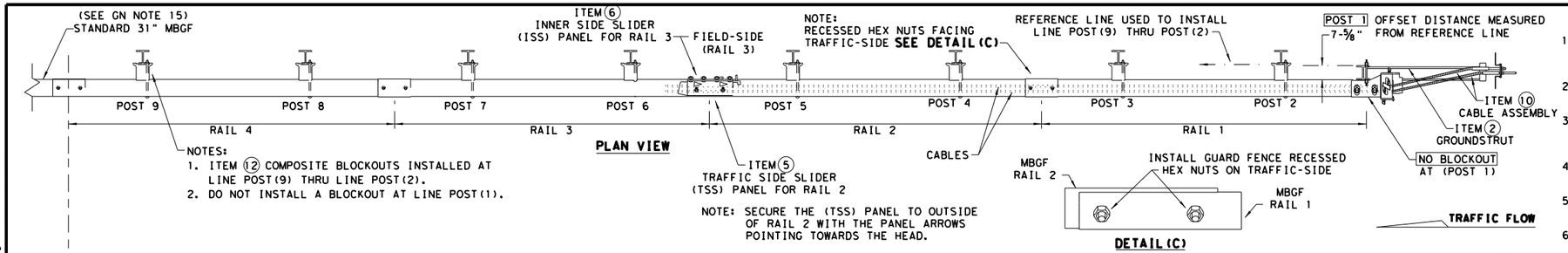

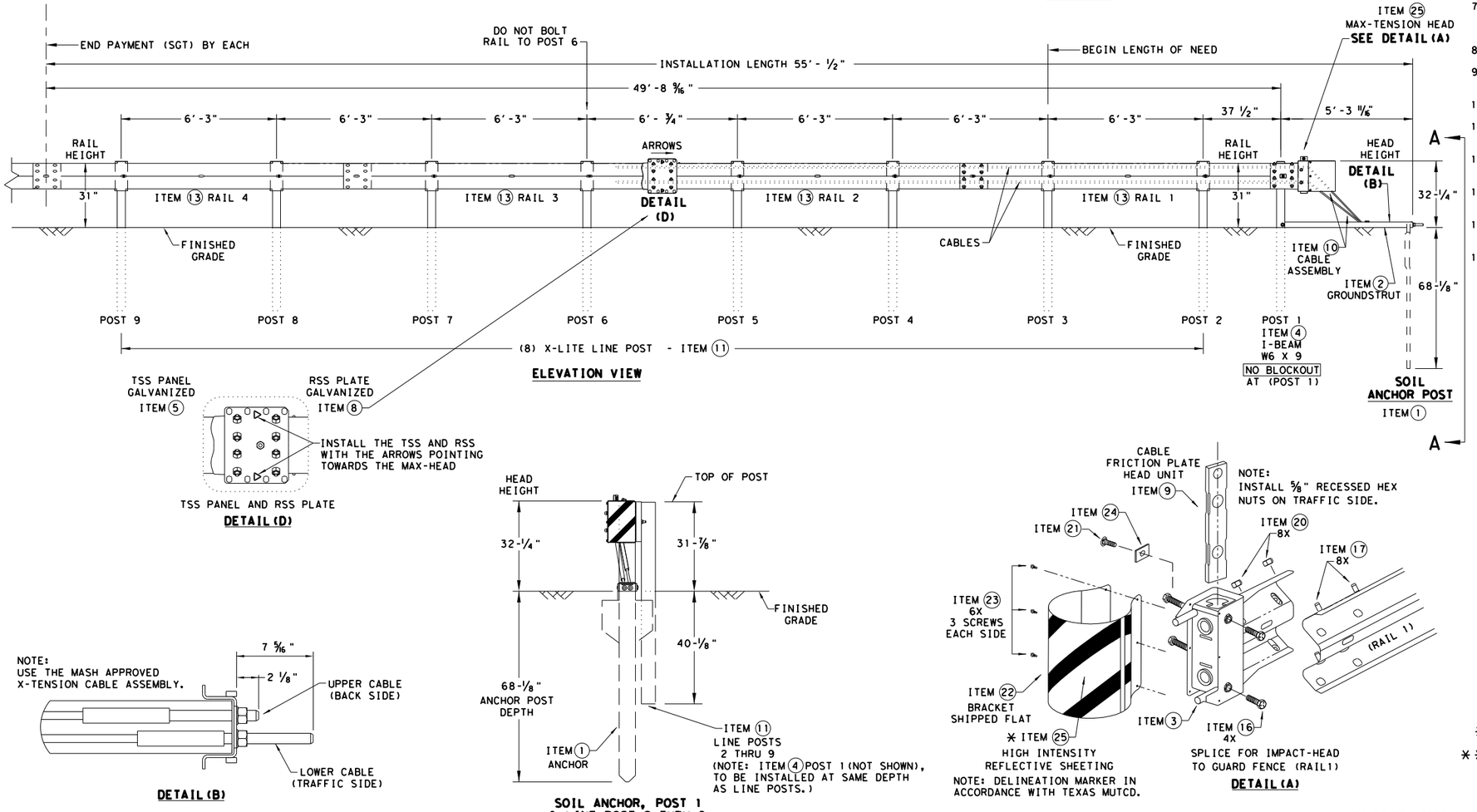

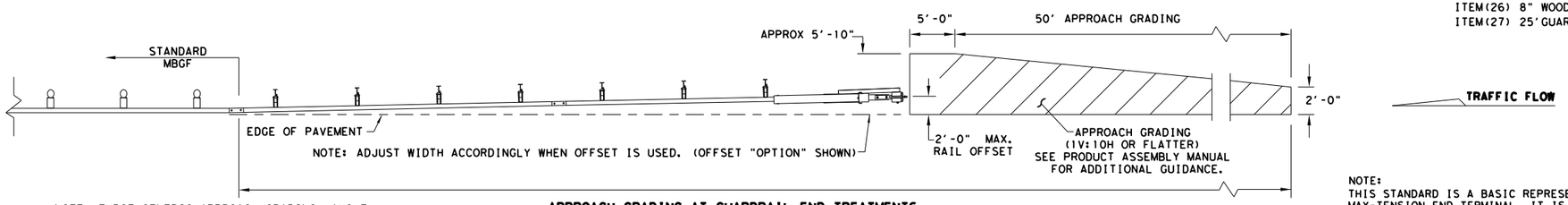

TRAFFIC FLOW

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	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" 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
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	WFS	WILBARGER, ETC		67

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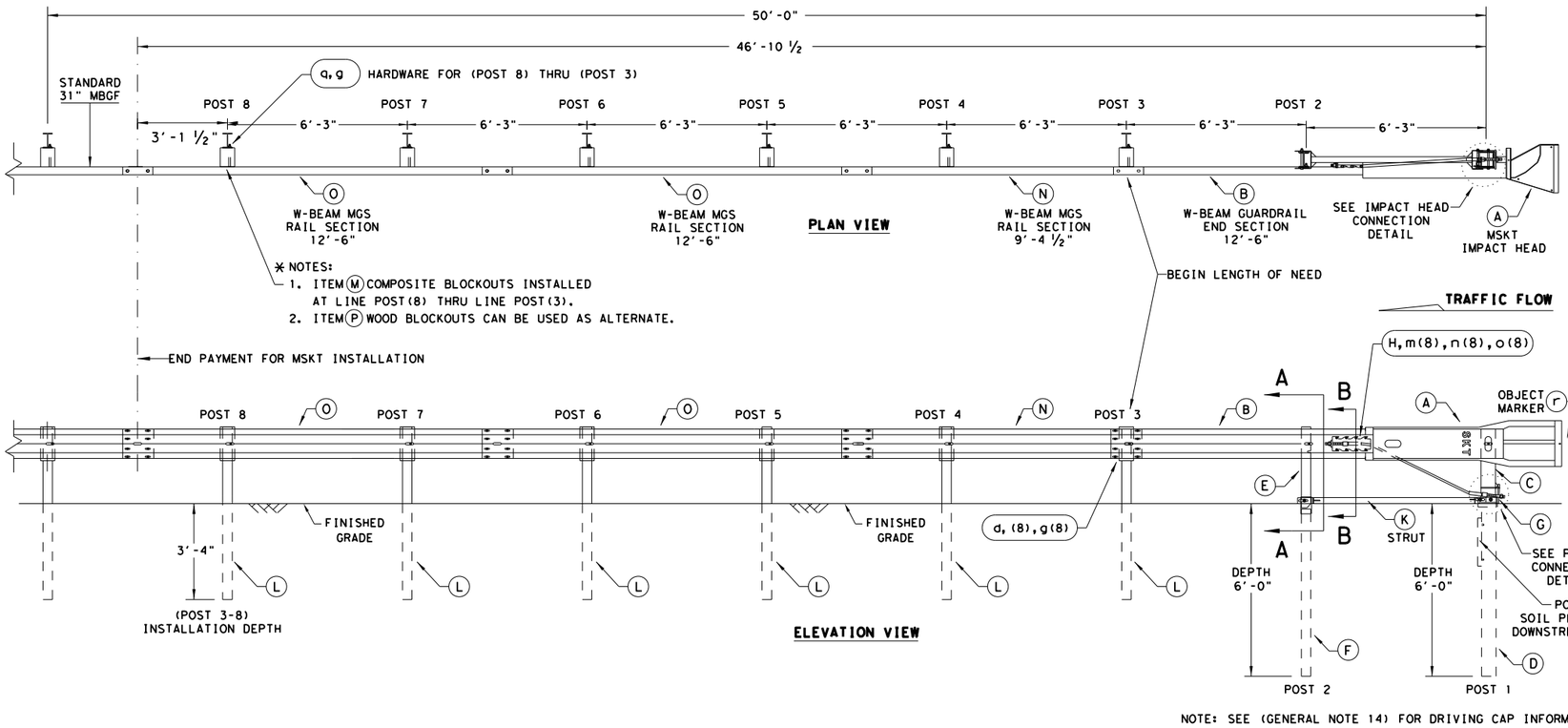
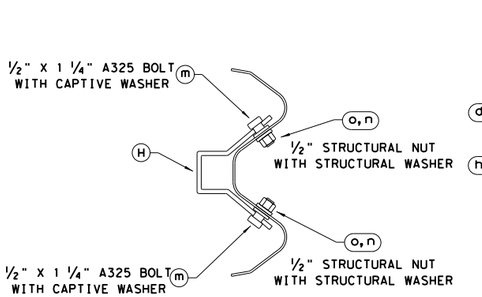
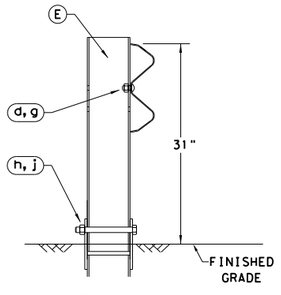


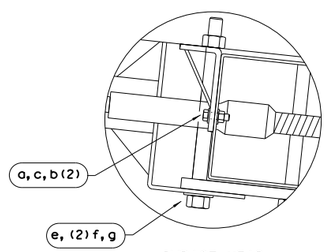
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



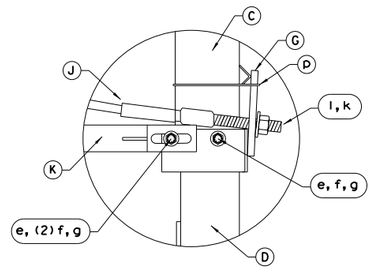
SECTION B-B
ANCHOR BRACKET



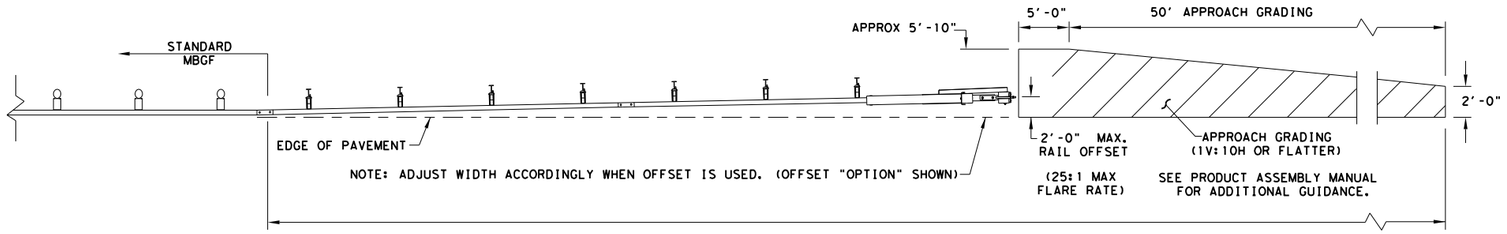
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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.

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 ⅛" 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 ½")	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	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: *

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0043	06	098	US 70, ETC	
	DIST	COUNTY		SHEET NO.	
	WFS	WILBARGER, ETC		68	

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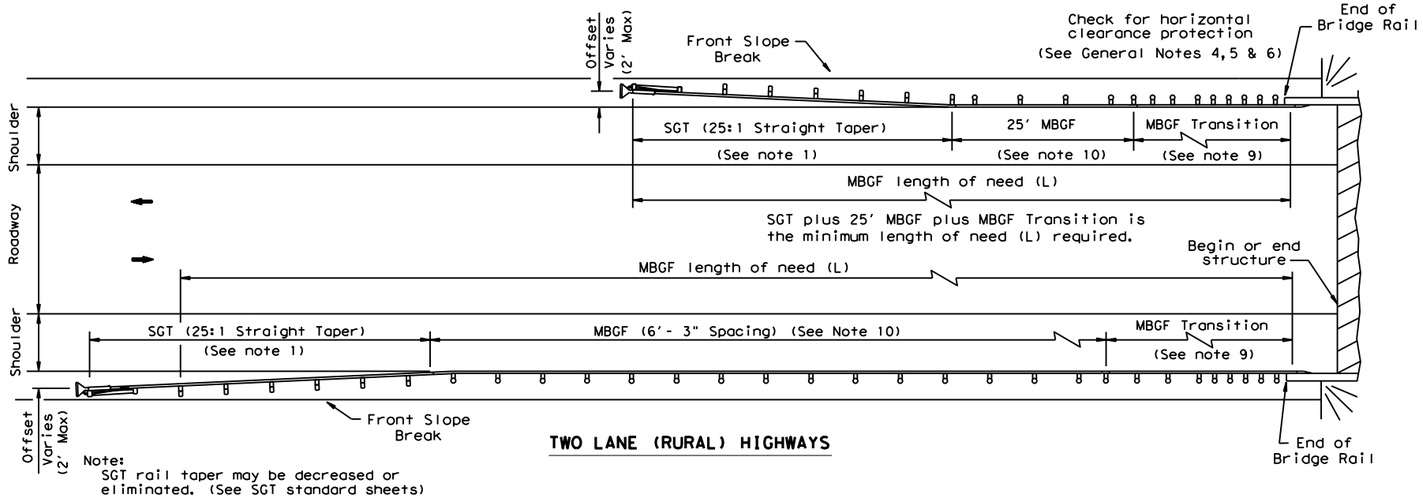
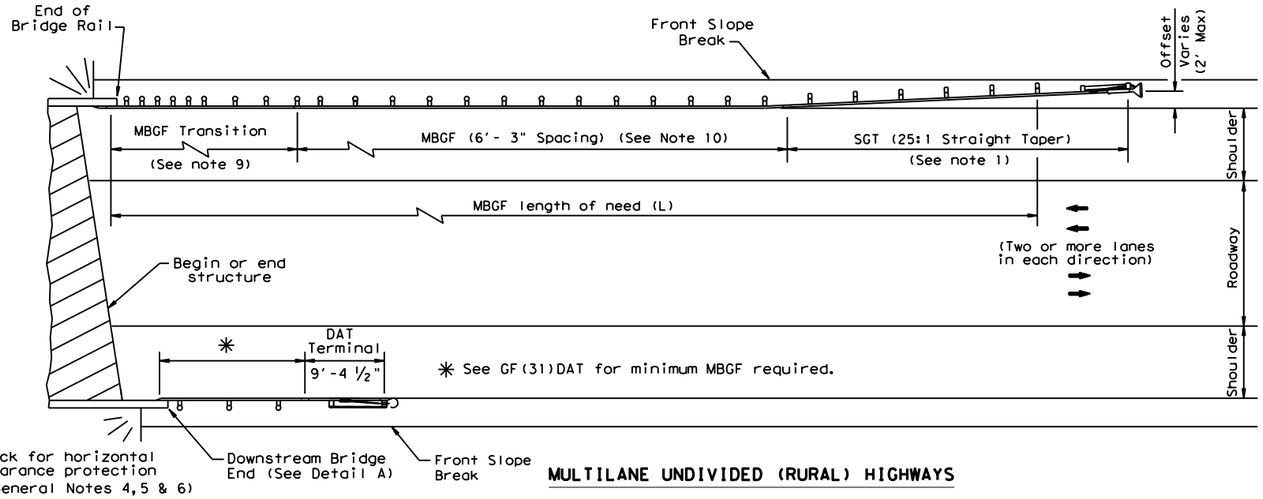
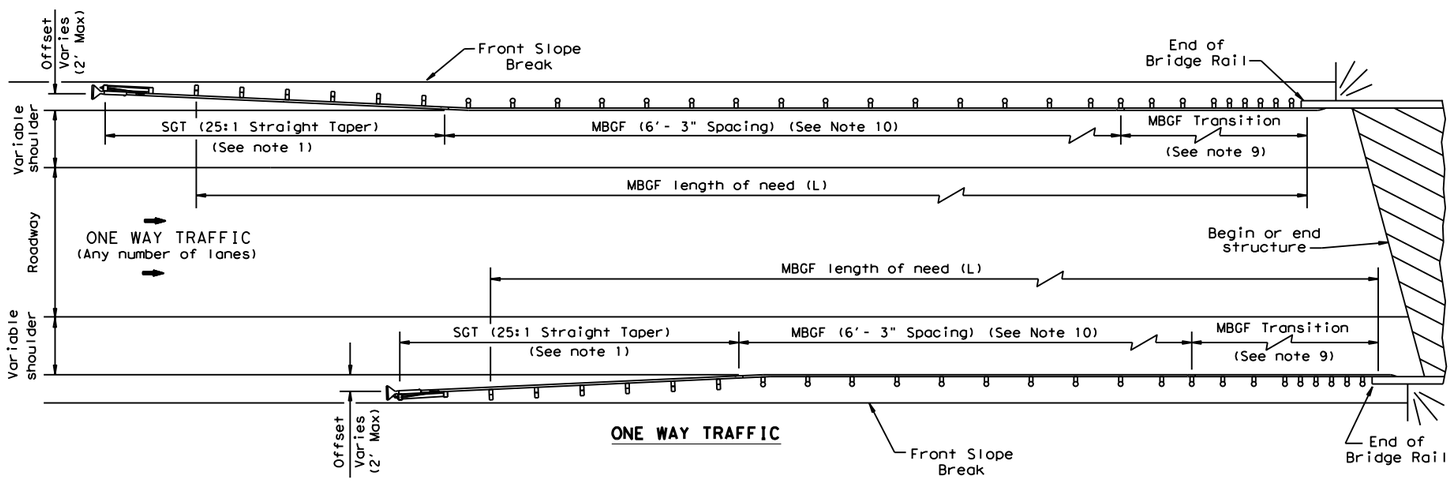


TWO LANE (RURAL) HIGHWAYS

Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)



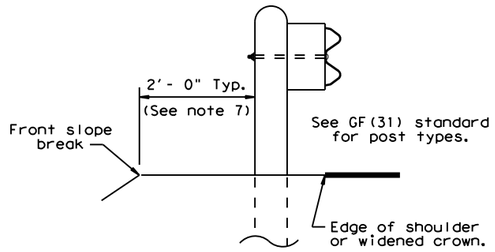
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



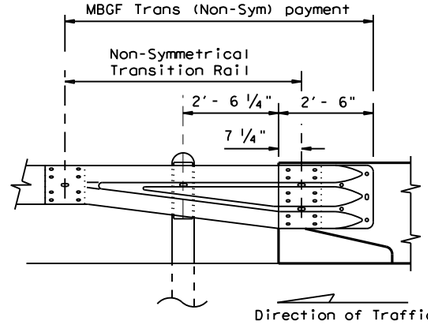
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

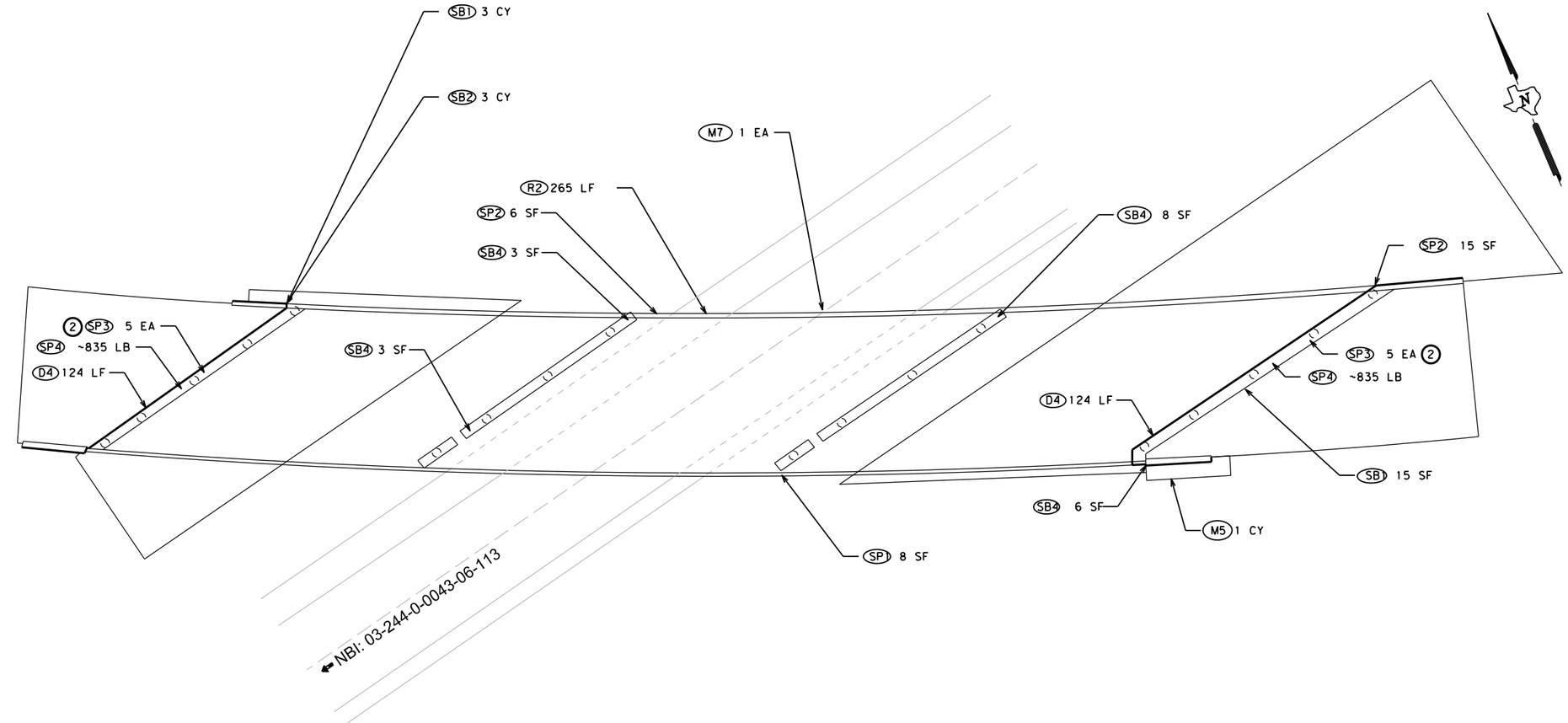
Texas Department of Transportation — Design Division Standard

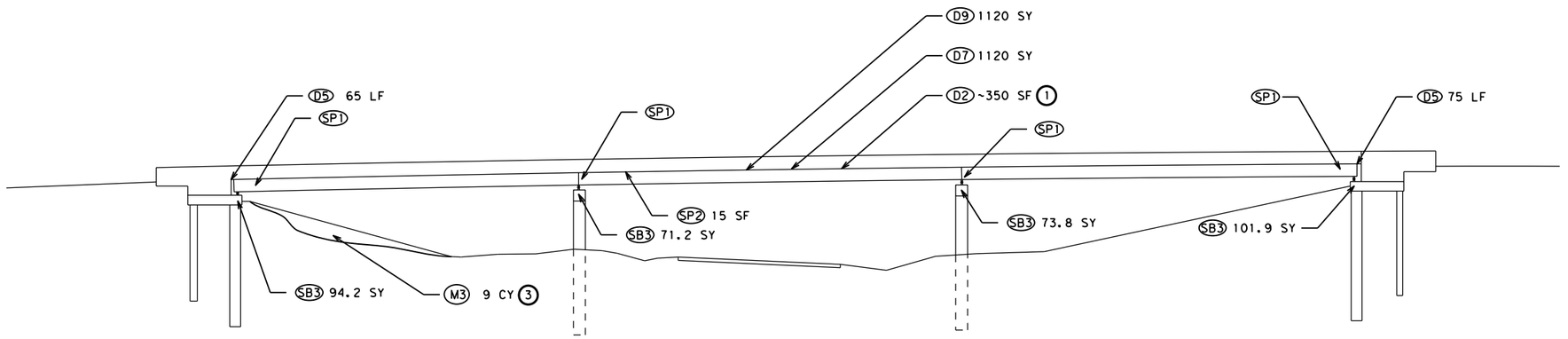
BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		69



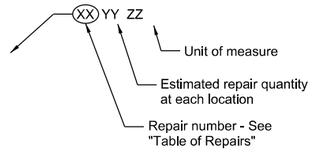


EXISTING 3 SPAN - CONTINUOUS SPAN STEEL I-BEAM WIDENED WITH PRESTRESSED CONCRETE I-BEAMS 56 DEG SKEW

GENERAL NOTES

1. Information for layouts, stations, or elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (12/2023). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   34 (INV)
   57 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

NBI: 03-244-0-0043-06-113

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

REFERENCE #1

CSJ: 0043-06-098

US 70 EB/US 287 SB
OVER BU 287F

FOR AREA OFFICE USE ONLY				
#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	550406			
2	707012			
3	707069			

DATE:
FILE:

FILE: DN: ____ CK: ____ DW: ___ CK: __

©TxDOT JULY 2021__
REVISIONS

CONT	SECT	JOB	HIGHWAY
0043	06	098,ETC.	US 70,ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		70

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATION	DETAILS/NOTES
D2	429 6003	CONC STR REPAIR (DECK REPAIR (PART DEPTH))	SF	350	REPAIR SPALLS AND DELAMINATIONS IN DECK SURFACE PRIOR TO SHOT BLASTING AND OVERLAY	
D4	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	248	CLEAN AND SEAL JOINTS BETWEEN THE ABUTMENT AND THE CONCRETE RIP RAP	
D5	438 6004	CLEANING AND SEALING JOINTS (CL7)	LF	140	CLEAN AND SEAL DECK EXPANSION JOINTS AT EACH END OF THE BRIDGE AS INDICATED	
D7	439 6013	MULTI-LAYER POLMER OVERLAY	SY	1120	APPLY OVERLAY TO BRIDGE DECK SURFACE	SEE MLPO NOTES FOR MORE INFORMATION
D9	483 6013	SHOT BLASTING	SY	1120	SHOT BLAST DECK TO PREP SURFACE FOR THE MULTI-LAYER POLYMER OVERLAY	SEE MLPO NOTES FOR MORE INFORMATION
R2	778 6001	CONCRETE RAIL REPAIR (IN-KIND)	LF	265	REPAIR SPALLS AND DELAMINATED CONCRETE ON FRONT AND BACK SIDE OF EXISTING CONCRETE BRIDGE RAIL	
SP1	4207 6001	STEEL BRIDGE ZONE PAINTING	EA	1	CLEAN AND PAINT BEAM ENDS, BEARINGS, AND DIAPHRAMS AT LOCATIONS SHOWN. CLEAN AND PAINT OTHER LOCATIONS AS DETERMINED BY THE ENGINEER	SEE ZONE PAINTING DETAILS SHEET FOR MORE INFORMATION
SP2	429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	29	REPAIR SPALLS AND DELAMINATIONS ON UNDERSIDE OF BRIDGE DECK AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SP3	434 6003	ELASTOMERIC BEARING (SPECIAL)	EA	10	INSTALL 5 ELASTOMERIC PADS AT EACH ABUTMENT	
SP4	442 6011	STR STEEL (PEDESTAL)	LB	1670	INSTALL 5 STEEL PEDESTALS AT EACH ABUTMENT TO REPLACE EXISTING ROCKER BEARINGS	
SP5	495 6001	RAISING EXIST STRUCT	LS	1	RAISE STRUCTURE AT EACH ABUTMENT TO REMOVE EXIST ROCKER BEARINGS, INSTALL STEEL PEDESTALS AND ELASTOMERIC PADS	
SB1	104 6039	REMOVE CONC (ABUTMENT BACKWALL)	CY	3	REMOVED NORTH WEST ABUTMENT WING THAT HAS DETATCHED FROM THE REST OF THE BACK WALL	
SB2	420 6013	CL C CONC (ABUT)	CY	3	REPLACE NORTH WEST ABUTMENT WING THAT HAS DETATCHED FROM THE REST OF THE BACK WALL	
SB3	428 6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	341.1	APPLY SILANE TO ALL FACES OF BENT CAPS AND CONCRETE AT LOCATIONS INDICATED	SEE WATERPROOFING DETAILS SHEET FOR MORE INFORMATION
SB4	429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	35	REPAIR SPALLS AND DELAMINATIONS AT LOCATIONS SHOWN	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB5	7306 6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2	REMOVE DEBRIS AND CLEAN ALONG ABUTMENT CAP AND AT BEARING LOCATIONS	
M3	401 6001	FLOWABLE BACKFILL	CY	9	FILL VOIDS UNDER CONC RIP RAP ON THE WEST SIDE	
M5	432 6044	RIPRAP (CONC)(FLUME)	CY	1	INSTALL SHOULDER DRAIN AT SOUTH EAST BRIDGE CORNER AND TIE INTO EXISTING CONC RIP RAP	SEE MS-CRR STANDARD FOR MORE INFORMATION
M7	644 6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	1	INSTALL RAIL MOUNTED CLEARANCE SIGN AS INDICTED ON LAYOUT	SEE MS-BMCS STANDARD FOR MORE INFORMATION

STATE OF TEXAS
ANDREW J. MOSLEY
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LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

Texas Department of Transportation

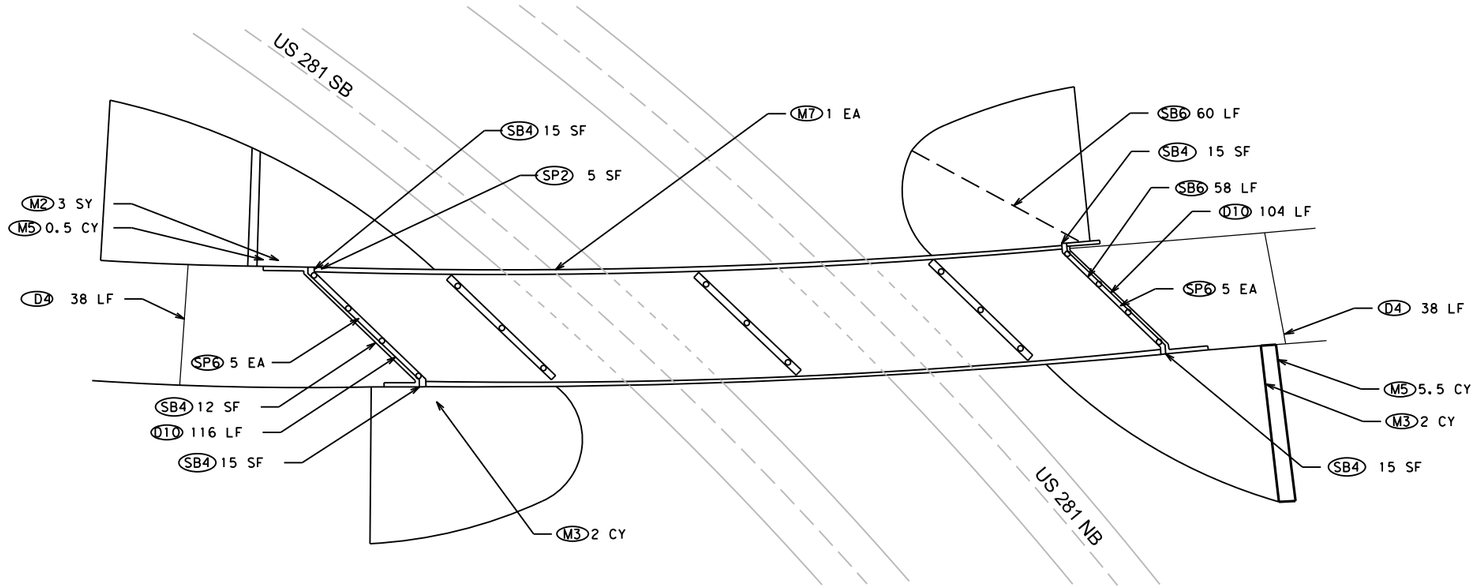
BRIDGE SUMMARY OF REPAIRS
REFERENCE #1

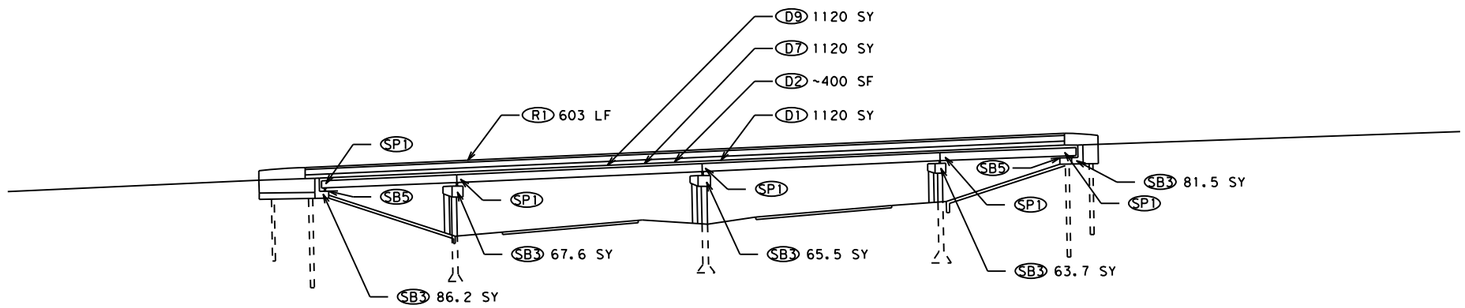
NBI: 03-244-0-0043-06-113

US 70 EB/US 287 SB
OVER BU 287

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	004306	098	ETC	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		71

DATE:
FILE:



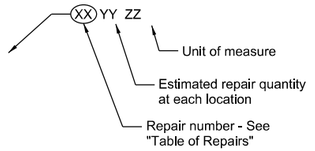


EXISTING 4 SPAN - CONTINUOUS SPAN STEEL BEAM 45 DEG SKEW

GENERAL NOTES

1. Information for layouts, stations, or elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (12/2023). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   28 (INV)
   48 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
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Andrew Mosley, P.E.
04/02/2024

NBI: 03-243-0-0044-01-100

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

REFERENCE #2

CSJ: 0044-01-112

US 82 EB/US 287 SB
OVER US 281

FILE:	DN: ____	CK: ____	DW: ___	CK: __
©TxDOT JULY 2021__	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098,ETC.	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		72

DATE:
FILE:

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATION	DETAILS/NOTES
D1	354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	1120	MILL OFF EXISTING THIN LAYER DECK OVERLAY PRIOR TO SHOT BLASTING OR PARTIAL DEPTH DECK REPAIR IS PERFORMED	
D2	429 6003	CONC STR REPAIR (DECK REPAIR (PART DEPTH))	SF	400	REPAIR SPALLS AND DELAMINATIONS IN DECK SURFACE PRIOR TO SHOT BLASTING AND OVERLAY	
D4	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	76	CLEAN AND SEAL JOINTS AT APPROACH SLAB	
D7	439 6013	MULTI-LAYER POLMER OVERLAY	SY	1120	APPLY OVERLAY TO BRIDGE DECK SURFACE	SEE MLPO NOTES FOR MORE INFORMATION
D9	483 6013	SHOT BLASTING	SY	1120	SHOT BLAST DECK TO PREP SURFACE FOR THE MULTI-LAYER POLYMER OVERLAY	SEE MLPO NOTES FOR MORE INFORMATION
D10	785 6004	BRIDGE JOINT REPAIR (ARMOR)	LF	220	REMOVE AND REPLACE EXPANSION JOINT HEADERS AT EACH END OF THE BRIDGE	SEE JOINT DETAILS SHEET FOR MORE INFORMATION
R1	451 6024	RETROFIT RAIL (TY SSTR)	LF	603	REMOVE EXISTING T4 RAIL AND REPLACE WITH SSTR RAIL	SEE C-RAIL-R AND SSTR STANDARD FOR MORE INFORMATION
SP1	4207 6002	STEEL BRIDGE ZONE PAINTING	EA	1	CLEAN AND PAINT BEAM ENDS, BEARINGS, AND DIAPHRAMS AT LOCATIONS SHOWN. CLEAN AND PAINT OTHER LOCATIONS AS DETERMINED BY THE ENGINEER	SEE ZONE PAINTING DETAILS SHEET FOR MORE INFORMATION
SP2	429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	5	REPAIR SPALLS AND DELAMINATIONS ON UNDERSIDE OF BRIDGE DECK AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SP6	499 6001	ADJUST STL SHOES	EA	10	RE-SET ROCKER BEARINGS AT EACH ABUTMENT TO ALLOW FOR PROPER MOVEMENT OF THE STRUCTURE	
SB3	428 6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	364.5	APPLY SILANE TO ALL FACES OF BENT CAPS AND CONCRETE AT LOCATIONS INDICATED	SEE WATERPROOFING DETAILS SHEET FOR MORE INFORMATION
SB4	429 6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	SF	72	REPAIR SPALLS AND DELAMINATIONS IN ABUTMENT BACKWALL AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB5	432 6044	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2	REMOVE DEBRIS AND CLEAN ALONG ABUTMENT CAP AND AT BEARING LOCATIONS	DEBRIS REMOVAL TO INCLUDE APPROX 140 LF OF FLASHING AT BOTTOM OF ABUTMENT CAP
SB6	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	176	CLEAN AND SEAL JOINTS BETWEEN THE ABUTMENT AND THE CONCRETE RIP RAP AND AS INDICATED	
M2	104 6044	REMOVE CONC (FLUME)	SY	3	REMOVE PART OF SHOULDER DRAIN ALONG NORTH WEST ABUTMENT WING	
M3	401 6001	FLOWABLE BACKFILL	CY	4	FILL VOIDS UNDER CONCRETE RIP RAP IN AREAS INDICATED	SEE MS-CRR STANDARD FOR MORE INFORMATION
M5	432 6044	RIPRAP (CONC)(FLUME)	CY	6	PLACE CONCRETE FLUMES IN LOCATIONS AS INDICATED	SEE MS-CRR STANDARD FOR MORE INFORMATION
M7	644 6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	1	INSTALL RAIL MOUNTED CLEARANCE SIGN AS INDICTED ON LAYOUT	SEE MS-BMCS STANDARD FOR MORE INFORMATION

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

Texas Department of Transportation

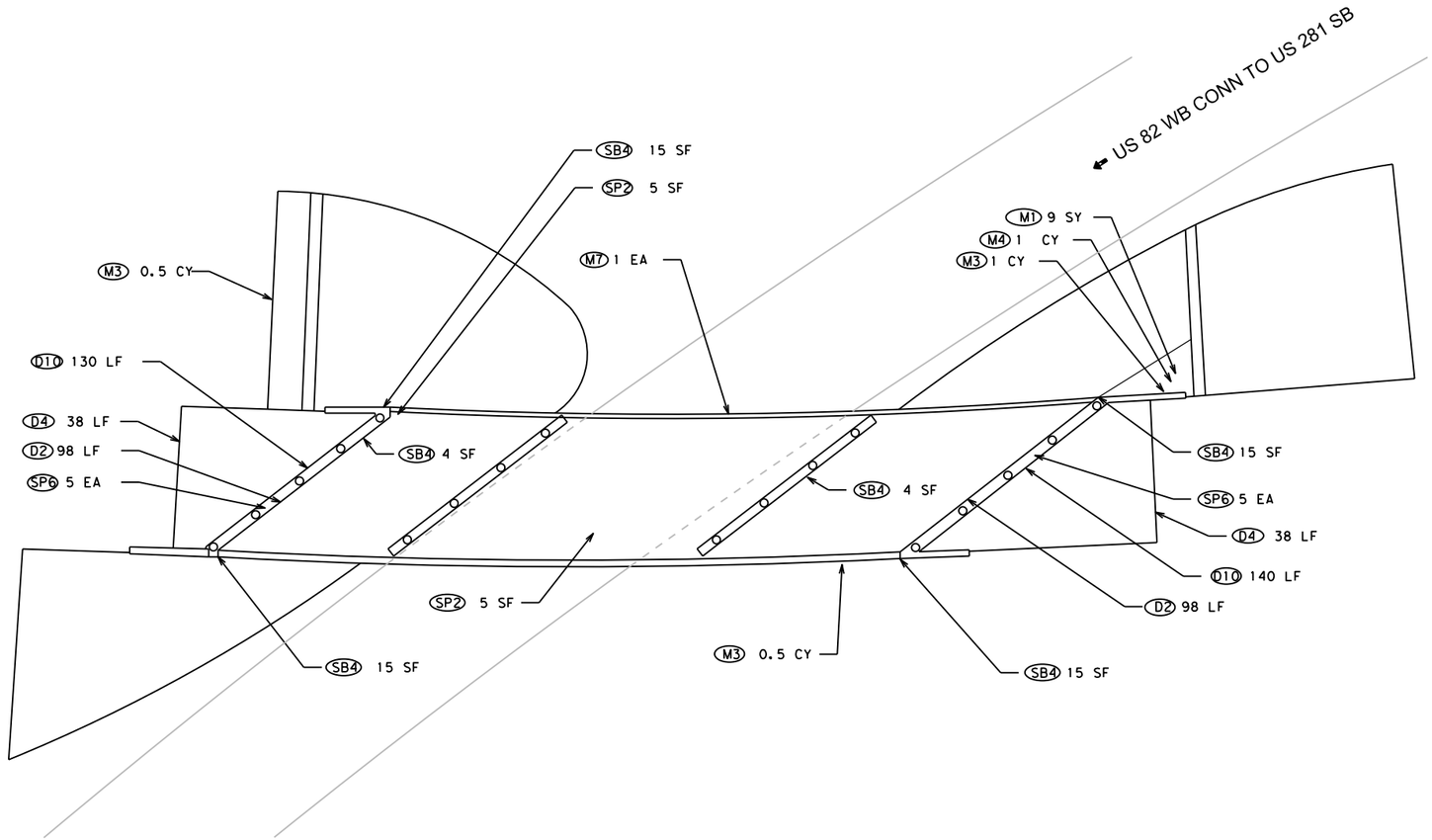
BRIDGE SUMMARY OF REPAIRS
REFERENCE #2

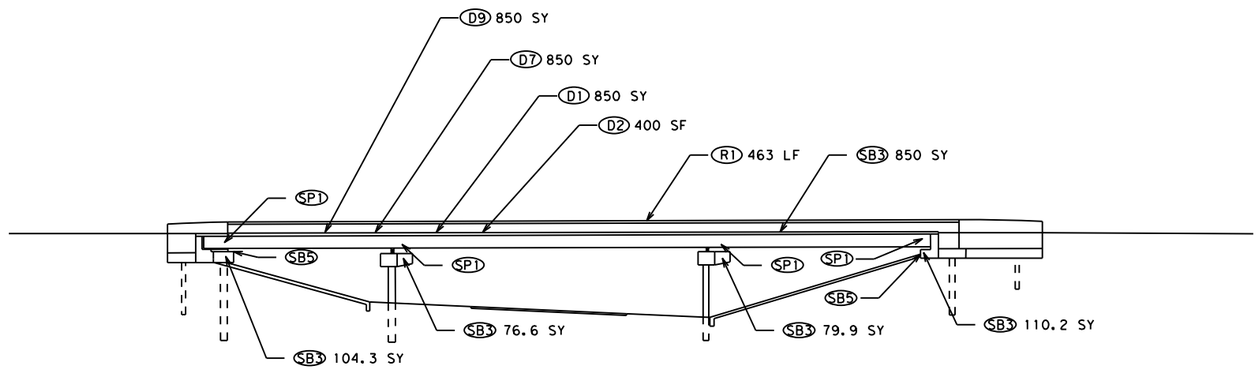
NBI: 03-244-0-0044-01-100

US 287 OVER
US 281

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	00430609	8, ETC	US 70, ETC	
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		73

DATE:
FILE:



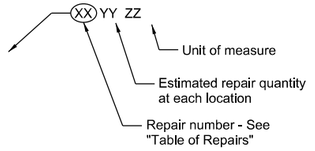


EXISTING 3 SPAN - CONTINUOUS SPAN STEEL BEAM 45 DEG SKEW

GENERAL NOTES

1. Information for layouts, stations, or elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (12/2023). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   31 (INV)
   51 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

NBI: 03-243-0-0044-01-101

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

REFERENCE #3

CSJ: 0044-01-113

US 82 EB/US 287 SB OVER
US 28 WB CONN TO US 281 SB

FILE:	DN: ____	CK: ____	DW: ____	CK: __
©TxDOT JULY 2021 __	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098,ETC.	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		74

DATE:
FILE:

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATION	DETAILS/NOTES
D1	354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	850	MILL OFF EXISTING THIN LAYER DECK OVERLAY PRIOR TO SHOT BLASTING OR PARTIAL DEPTH DECK REPAIR IS PERFORMED	
D2	429 6003	CONC STR REPAIR (DECK REPAIR (PART DEPTH))	SF	400	REPAIR SPALLS AND DELAMINATIONS IN DECK SURFACE PRIOR TO SHOT BLASTING AND OVERLAY	
D4	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	76	CLEAN AND SEAL JOINTS AT APPROACH SLAB	
D7	439 6013	MULTI-LAYER POLMER OVERLAY	SY	850	APPLY OVERLAY TO BRIDGE DECK SURFACE	SEE MLPO NOTES FOR MORE INFORMATION
D9	483 6013	SHOT BLASTING	SY	850	SHOT BLAST DECK TO PREP SURFACE FOR THE MULTI-LAYER POLYMER OVERLAY	SEE MLPO NOTES FOR MORE INFORMATION
D10	785 6004	BRIDGE JOINT REPAIR (ARMOR)	LF	270	REMOVE AND REPLACE EXPANSION JOINT HEADERS AT EACH END OF THE BRIDGE	SEE JOINT DETAILS SHEET FOR MORE INFORMATION
R1	451 6024	RETROFIT RAIL (TY SSTR)	LF	463	REMOVE EXISTING T4 RAIL AND REPLACE WITH SSTR RAIL	SEE C-RAIL-R AND SSTR STANDARD FOR MORE INFORMATION
SP1	4207 6003	STEEL BRIDGE ZONE PAINTING	EA	1	CLEAN AND PAINT BEAM ENDS, BEARINGS, AND DIAPHRAMS AT LOCATIONS SHOWN. CLEAN AND PAINT OTHER LOCATIONS AS DETERMINED BY THE ENGINEER	SEE ZONE PAINTING DETAILS SHEET FOR MORE INFORMATION
SP2	429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	10	REPAIR SPALLS AND DELAMINATIONS ON UNDERSIDE OF BRIDGE DECK AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SP6	499 6001	ADJUST STL SHOES	EA	10	RE-SET ROCKER BEARINGS AT EACH ABUTMENT TO ALLOW FOR PROPER MOVEMENT OF THE STRUCTURE	
SB3	428 6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	371	APPLY SILANE TO ALL FACES OF BENT CAPS AND CONCRETE AT LOCATIONS INDICATED	SEE WATERPROOFING DETAILS SHEET FOR MORE INFORMATION
SB4	429 6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	SF	68	REPAIR SPALLS AND DELAMINATIONS IN ABUTMENT BACKWALL AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB5	7306 6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2	REMOVE DEBRIS AND CLEAN ALONG ABUTMENT CAP AND AT BEARING LOCATIONS	DEBRIS REMOVAL TO INCLUDE APPROX 156 LF OF FLASHING AT BOTTOM OF ABUTMENT CAP
SB6	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	196	CLEAN AND SEAL JOINTS BETWEEN THE ABUTMENT AND THE CONCRETE RIP RAP AND AS INDICATED	
M1	104 6009	REMOVING CONC (RIPRAP)	SY	9	REMOVE SUNKEN IN CORNER OF CONC RIPRAP ALONG NORTH EAST ABUTMENT WING WALL	
M3	401 6001	FLOW FILL	CY	2.0	FILL VOIDS UNDER CONCRETE RIP RAP IN AREAS INDICATED	
M4	432 6001	4" RIP RAP	CY	1.0	REPLACE SUNKEN IN CORNER OF CONC RIPRAP ALONG NORTH EAST ABUTMENT WING WALL	SEE MS-CRR STANDARD FOR MORE INFORMATION
M7	644 6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	1	INSTALL RAIL MOUNTED CLEARANCE SIGN AS INDICTED ON LAYOUT	SEE MS-BMCS STANDARD FOR MORE INFORMATION

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

DATE:
FILE:

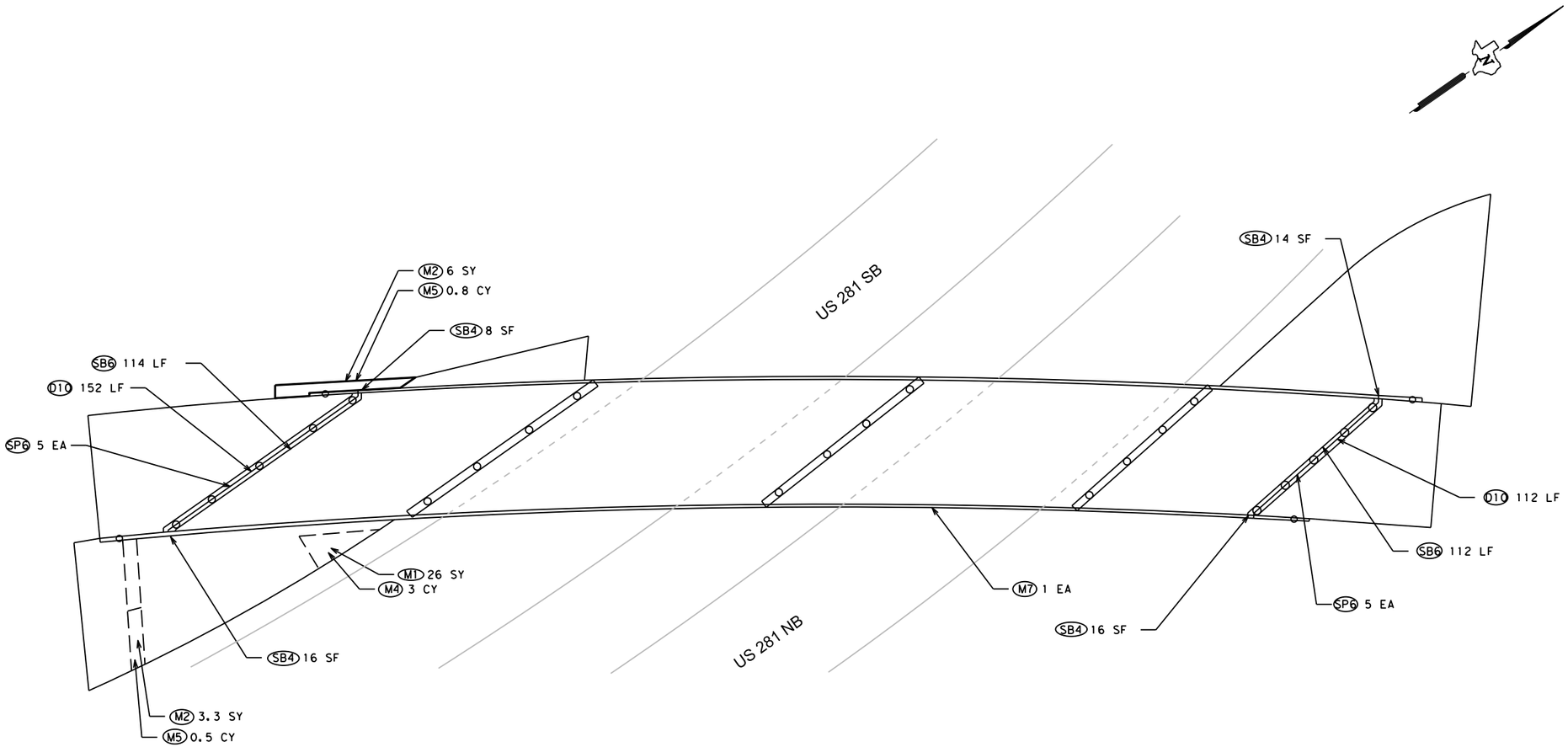
Texas Department of Transportation

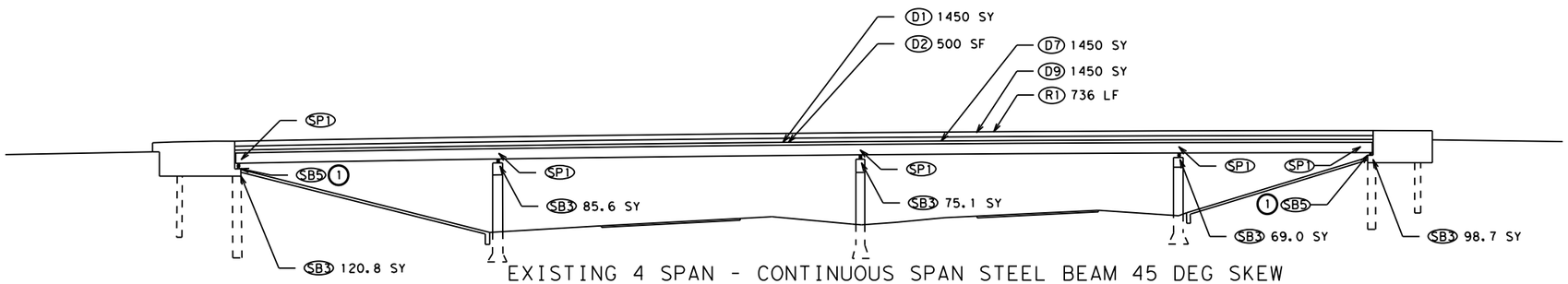
BRIDGE SUMMARY OF REPAIRS
REFERENCE #3

NBI: 03-244-0-0044-01-101

US 82 EB/US 287 SB
OVER SH 79 SB

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	004306098	ETC	US 70, ETC	
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC	75	





EXISTING 4 SPAN - CONTINUOUS SPAN STEEL BEAM 45 DEG SKEW

GENERAL NOTES

1. Information for layouts, stations, or elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (12/2023). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   40 (INV)
   67 (OR)

REPAIR CALL-OUT LEGEND

XX YY ZZ
- XX — Repair number - See "Table of Repairs"
- YY — Estimated repair quantity at each location
- ZZ — Unit of measure

SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

NBI: 03-243-0-0044-01-119

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

REFERENCE #4

CSJ: 0044-01-114

US82 WB CONN US281S
OVER US 281

FOR AREA OFFICE USE ONLY				
#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
1	593117			

DATE:
FILE:

FILE:	DN: ____	CK: ____	DW: ____	CK: ____
©TxDOT JULY 2021__ REVISIONS	CONT	SECT	JOB	HIGHWAY
	0043	06	098,ETC.	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		76

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATION	DETAILS/NOTES
D1	354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	1450	MILL OFF EXISTING THIN LAYER DECK OVERLAY PRIOR TO SHOT BLASTING OR PARTIAL DEPTH DECK REPAIR IS PERFORMED	
D2	429 6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	500	REPAIR SPALLS AND DELAMINATIONS IN DECK SURFACE PRIOR TO SHOT BLASTING AND OVERLAY	
D7	439 6013	MULTI-LAYER POLYMER OVERLAY	SY	1450	APPLY OVERLAY TO BRIDGE DECK SURFACE	SEE MLPO NOTES FOR MORE INFORMATION
D9	483 6013	SHOT BLASTING	SY	1450	SHOT BLAST DECK TO PREP SURFACE FOR THE MULTI-LAYER POLYMER OVERLAY	SEE MLPO NOTES FOR MORE INFORMATION
D10	785 6004	BRIDGE JOINT REPAIR (ARMOR)	LF	264	REMOVE AND REPLACE EXPANSION JOINT HEADERS AT EACH END OF THE BRIDGE	SEE JOINT DETAILS SHEET FOR MORE INFORMATION
R1	451 6024	RETROFIT RAIL (TY SSTR)	LF	736	REMOVE EXISTING T4 RAIL AND REPLACE WITH SSTR RAIL	SEE C-RAIL-R AND SSTR STANDARD FOR MORE INFORMATION
SP1	4207 6004	STEEL BRIDGE ZONE PAINTING	EA	1	CLEAN AND PAINT BEAM ENDS, BEARINGS, AND DIAPHRAMS AT LOCATIONS SHOWN. CLEAN AND PAINT OTHER LOCATIONS AS DETERMINED BY THE ENGINEER	SEE ZONE PAINTING DETAILS SHEET FOR MORE INFORMATION
SP6	499 6001	ADJUST STL SHOES	EA	10	RE-SET ROCKER BEARINGS AT EACH ABUTMENT TO ALLOW FOR PROPER MOVEMENT OF THE STRUCTURE	
SB3	428 6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	449.2	APPLY SILANE TO ALL FACES OF BENT CAPS AND CONCRETE AT LOCATIONS INDICATED	SEE WATERPROOFING DETAILS SHEET FOR MORE INFORMATION
SB4	429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	54	REPAIR SPALLS AND DELAMINATIONS IN ABUTMENT BACKWALLS AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB5	7306 6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2	REMOVE DEBRIS AND CLEAN ALONG ABUTMENT CAP AND AT BEARING LOCATIONS	DEBRIS REMOVAL TO INCLUDE APPROX 150 LF OF FLASHING AT BOTTOM OF ABUTMENT CAP
SB6	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	226	CLEAN AND SEAL JOINTS BETWEEN THE ABUTMENT AND THE CONCRETE RIP RAP AND AS INDICATED	
M1	104 6009	REMOVING CONC (RIPRAP)	SY	26	REMOVE SECTION OF DAMAGED CONC RIP RAP AS INDICATED ON LAYOUT	
M2	104 6044	REMOVING CONC (FLUME)	SY	10	REMOVE SECTIONS OF DAMAGED RIP RAP FLUMES AS INDICATED ON LAYOUT	
M4	432 6001	RIPRAP (CONC)(4 IN)	CY	3	REPLACE SECTION OF REMOVED CONC RIP RAP AS INDICATED	SEE MS-CRR STANDARD FOR MORE INFORMATION
M5	432 6044	RIPRAP (CONC)(FLUME)	CY	1	REPLACE SECTIONS OF REMOVED RIP RAP FLUMES AS INDICATED	SEE MS-CRR STANDARD FOR MORE INFORMATION
M7	644 6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	1.0	INSTALL RAIL MOUNTED CLEARANCE SIGN AS INDICTED ON LAYOUT	SEE MS-BMCS STANDARD FOR MORE INFORMATION

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

Texas Department of Transportation

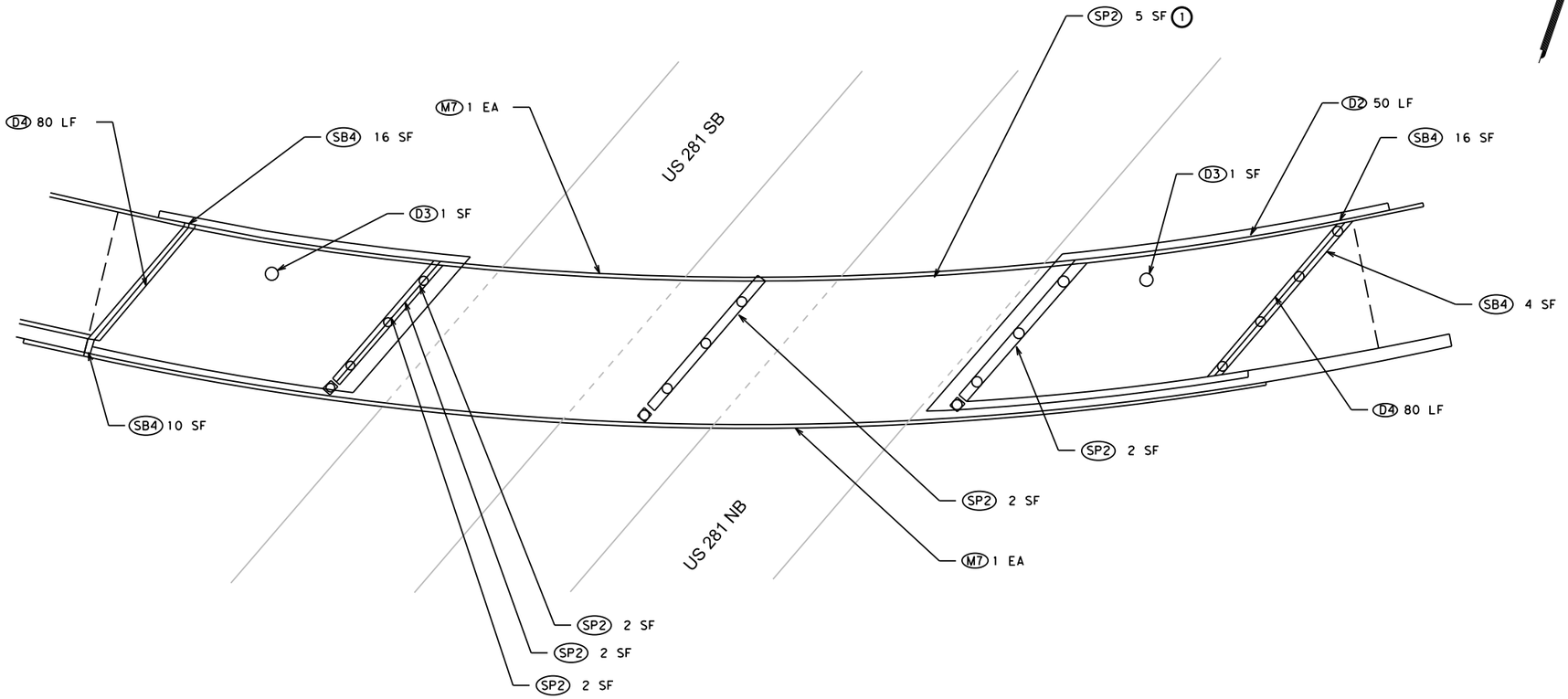
BRIDGE SUMMARY OF REPAIRS
REFERENCE #4

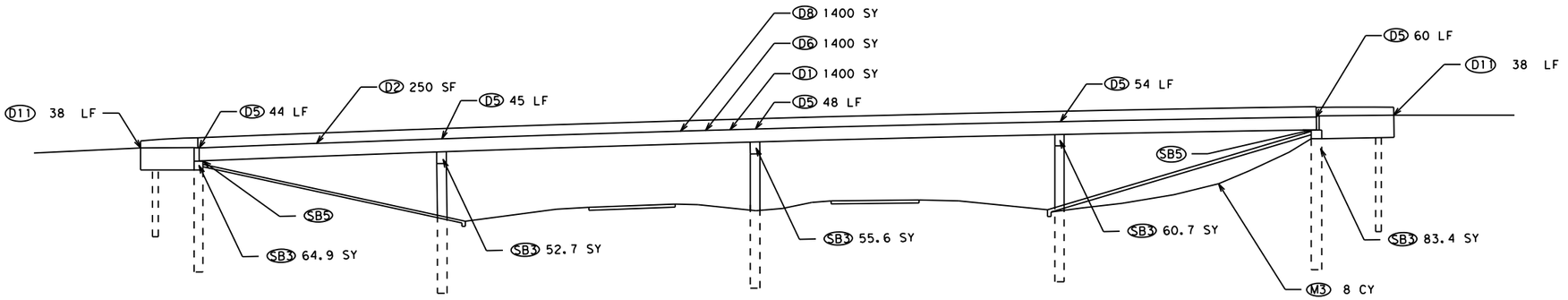
NBI: 03-244-0-0044-01-119

US 287 SB
OVER SH 79

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	004306098, ETC			US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		77

DATE:
FILE:



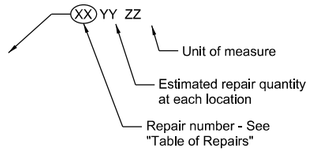


EXISTING 4 SPAN - SIMPLE SPAN PRESTRESSED CONCRETE I BEAM, VARIABLE SKEW

GENERAL NOTES

1. Information for layouts, stations, or elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (12/2023). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   35 (INV)
   75 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

NBI: 03-243-0-0249-01-067

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

REFERENCE #5

CSJ: 0249-01-052

SH 79 NB OVER
US 281

#	FUA ID	DATE COMPLETED	PICTURE/S TAKEN	ASSETWISE UPDATED
(1)	xxxxxx			

FOR AREA OFFICE USE ONLY

DATE:
FILE:

FILE: | DN: ____ | CK: ____ | DW: ___ | CK: __

©TxDOT JULY 2021__
REVISIONS

CONT	SECT	JOB	HIGHWAY
0043	06	098,ETC.	US 70,ETC

DIST	COUNTY	SHEET NO.
WFS	WILBARGER, ETC	78

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATION	DETAILS/NOTES
D1	354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	1400	MILL OFF EXISTING THIN LAYER DECK OVERLAY PRIOR TO SHOT BLASTING OR PARTIAL DEPTH DECK REPAIR IS PERFORMED	
D2	429 6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	250	REPAIR SPALLS AND DELAMINATIONS IN DECK SURFACE PRIOR TO SHOT BLASTING AND OVERLAY	
D3	429 6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	15	REPAIR CORE HOLES IN DECK AS INDICATED, REPAIR ANY ADDITIONAL AREAS THAT RESULT IN PUNCH OUT DURING THE HYDRO-DEMOLITION PROCESS	
D4	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	160	CLEAN AND SEAL JOINTS BETWEEN THE ABUTMENT AND THE CONCRETE RIP RAP AND AS INDICATED	
D5	438 6004	CLEANING AND SEALING JOINTS (CL7)	LF	251	CLEAN AND SEAL DECK EXPANSION JOINTS AFTER CONCRETE OVERLAY	
D6	439 6012	REINFORCED CONCRETE OVERLAY (4.5 IN)	SY	1400	INSTALL CONCRETE OVERLAY FOR BRIDGE DECK	SEE CONC OVERLAY NOTES FOR MORE INFORMATION
D8	483 6008	HYDRO-DEMOLITION (2 1/2 IN)	SY	1400	REMOVE CONCRETE DECK SUFACE DOWN TO FIRST MAT OF REINFORCEMENT AS DESCRIBED IN THE PLANS	SEE CONC OVERLAY NOTES FOR MORE INFORMATION
D11	785-6013	BRIDGE JOINT REPLACEMENT (HEADER)	LF	76	REPLACE JOINT AT APPROACH SLABS OF BRIDGE	
SP2	429 6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	SF	15	REPAIR SPALLED END OF BEAMS TO COVER EXPOSED WIRE STRAND ENDS	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB3	428 6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	233.9	APPLY SILANE TO ALL FACES OF BENT CAPS AND CONCRETE AT LOCATIONS INDICATED	SEE WATERPROOFING DETAILS SHEET FOR MORE INFORMATION
SB4	429 6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	SF	46	REPAIR SPALLS AND DELAMINATIONS IN THE ABUTMENT BACKWALL AND WINGS AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB5	7306 6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2	REMOVE ROADWAY DEBRIS AND FLASHING AT THE ABUTMENT CAP AND AROUND THE BEARING SEAT AREA	
M3	401 6001	FLOWABLE BACKFILL	CY	8	FILL VOID UNDER THE CONCRETE RIP RAP AS INDICATED	
M7	644 6065	IN BRIDGE MNT CLEARANCE SGN ASSM(TY S)	EA	2	INSTALL RAIL MOUNTED CLEARANCE SIGN AS INDICTED ON LAYOUT	SEE MS-BMCS STANDARD FOR MORE INFORMATION

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

Texas Department of Transportation

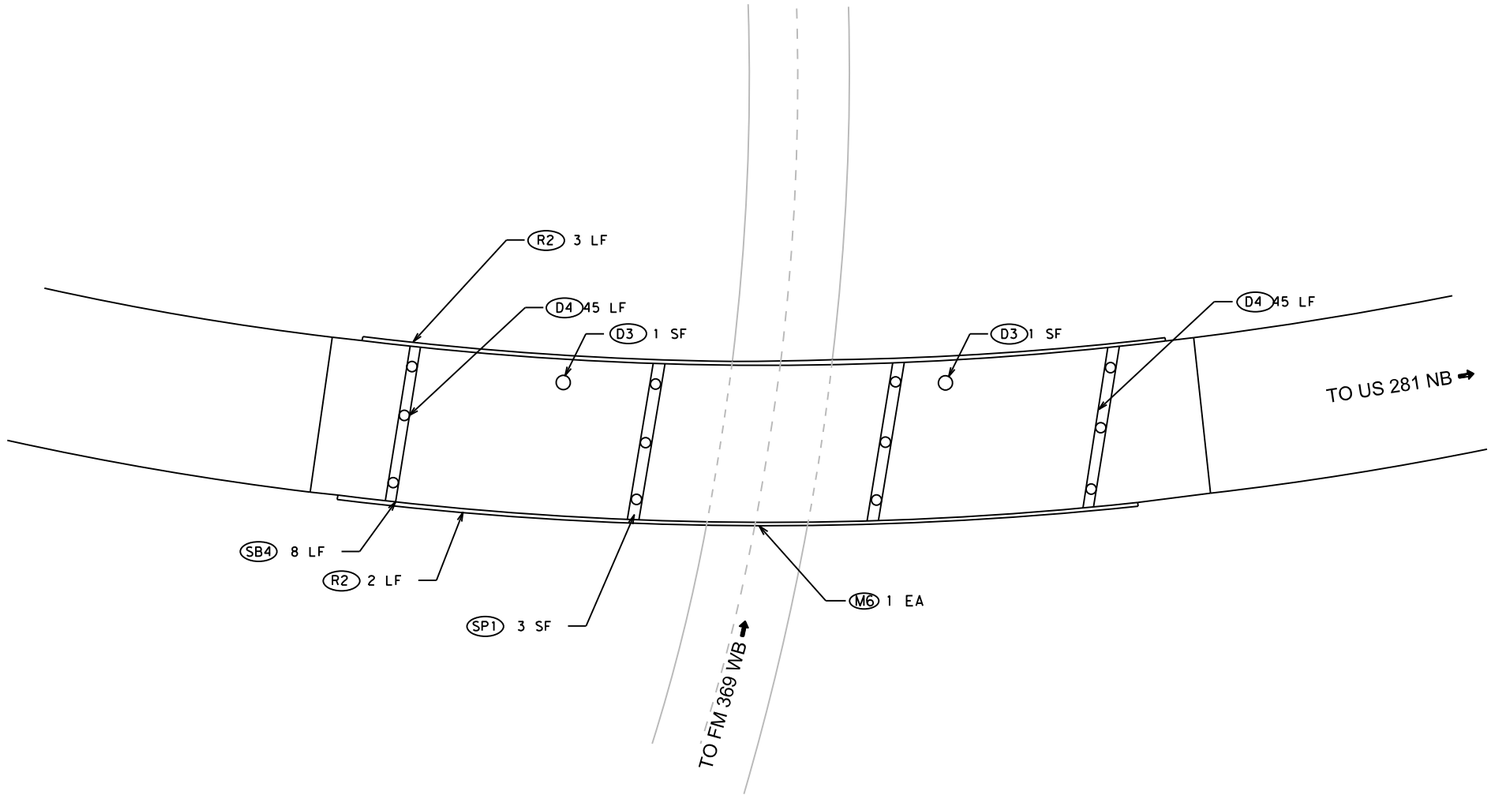
BRIDGE SUMMARY OF REPAIRS
REFERENCE #5

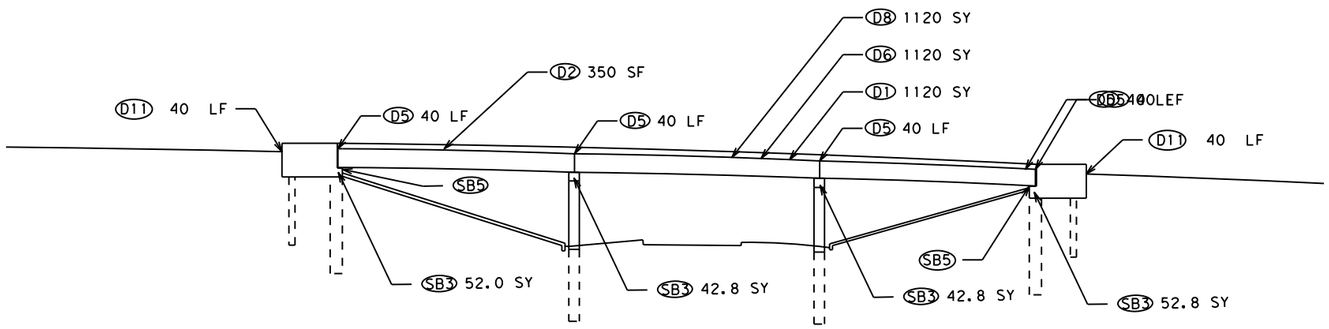
NBI: 03-243-0-0249-01-067

SH 79 NB OVER
US 281

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	004306	098,	ETC	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER,	ETC	79

DATE:
FILE:



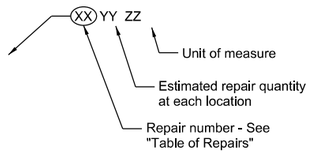


EXISTING 3 SPAN - CONCRETE I BEAM VARIABLE SKEW

GENERAL NOTES

1. Information for layouts, stations, or elevations shown are based on as-built plans. Copies of available portions of as-built plans may be provided upon request.
2. Repair locations and quantities are based on Condition Survey dated (12/2023). Current conditions may vary. Field verify locations and extent of repairs in the presence of the Engineer prior to ordering materials.
3. Existing Load Rating:
   27 (INV)
   68 (OR)

REPAIR CALL-OUT LEGEND



SYMBOL	APPLICABLE REPAIR AREAS
D-#	Deck, joints, overhangs, approach slabs
R-#	Rails, approach MBGF
SP-#	Superstructure elements, bearings
SB-#	Substructure elements
M-#	Miscellaneous (Riprap, shoulder drains, etc)

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

NBI: 03-243-0-0283-06-070

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

REFERENCE #6

CSJ: 0283-06-028

SH 79 NB OVER
SH79 SB CONN FM369 WB

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098,ETC.	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		80

DATE:
FILE:

TABLE OF REPAIRS

REPAIR NO.	ITEM	BID ITEM DESCRIPTION	UNIT	QUANTITY	REPAIR DESCRIPTION/LOCATION	DETAILS/NOTES
D1	354 6021	PLANE ASPH CONC PAV(0" TO 2")	SY	1120	MILL OFF EXISTING THIN LAYER DECK OVERLAY PRIOR TO SHOT BLASTING OR PARTIAL DEPTH DECK REPAIR IS PERFORMED	
D2	429 6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF	350	REPAIR SPALLS AND DELAMINATIONS IN DECK SURFACE PRIOR TO SHOT BLASTING AND OVERLAY	
D3	429 6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF	15	REPAIR CORE HOLES IN DECK AS INDICATED, REPAIR ANY ADDITIONAL AREAS THAT RESULT IN PUNCH OUT DURING THE HYDRO-DEMOLITION PROCESS	
D4	438 6003	CLEANING AND SEALING JOINTS (CL5)	LF	90	CLEAN AND SEAL JOINTS BETWEEN THE ABUTMENT AND THE CONCRETE RIP RAP AND AS INDICATED	
D5	438 6004	CLEANING AND SEALING JOINTS (CL7)	LF	160	CLEAN AND SEAL DECK EXPANSION JOINTS AFTER CONCRETE OVERLAY	
D6	439 6012	REINFORCED CONCRETE OVERLAY (4.5 IN)	SY	1120	INSTALL CONCRETE OVERLAY FOR BRIDGE DECK	SEE CONC OVERLAY NOTES FOR MORE INFORMATION
D8	483 6008	HYDRO-DEMOLITION (2 1/2 IN)	SY	1120	REMOVE CONCRETE DECK SUFACE DOWN TO FIRST MAT OF REINFORCEMENT AS DESCRIBED IN THE PLANS	SEE CONC OVERLAY NOTES FOR MORE INFORMATION
D11	785-6013	BRIDGE JOINT REPLACEMENT (HEADER)	LF	80	REPLACE JOINT AT APPROACH SLABS OF BRIDGE	
R2	778 6001	CONCRETE RAIL REPAIR (IN-KIND)	LF	5	REPAIR SPALLS AND DELAMINATED CONCRETE ON FRONT AND BACK SIDE OF EXISTING CONCRETE BRIDGE RAIL	
SP2	429 6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	SF	3	REPAIR SPALLS AND DELAMINATION IN DECK UNDERHANG AS INDICATED	
SB3	428 6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	190.4	APPLY SILANE TO ALL FACES OF BENT CAPS AND CONCRETE AT LOCATIONS INDICATED	SEE WATERPROOFING DETAILS SHEET FOR MORE INFORMATION
SB4	429 6007	CONC STR REPAIR (VERTICAL AND OVERHEAD)	SF	8	REPAIR DELAMINATED CONCRETE ON ABUT BACKWALL AS INDICATED	REFER TO TXDOT CONCRETE REPAIR MANUAL FOR MORE INFORMATION
SB5	7306 6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2	REMOVE ROADWAY DEBRIS, LUMBER, AND FLASHING AT THE ABUTMENT CAP AND AROUND THE BEARING SEAT AREA	
M6	644 6064	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA	1	INSTALL RAIL MOUNTED CLEARANCE SIGN AS INDICTED ON LAYOUT	SEE MS-BMCS STANDARD FOR MORE INFORMATION

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

04/02/2024

Texas Department of Transportation

BRIDGE SUMMARY OF REPAIRS
REFERENCE #6

NBI: 03-243-0-0283-06-070

US 281 OVER
FM 369

DATE:
FILE:

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	004306	098, ETC		US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		81

DATE: 3/4/2024 1:59:42 AM
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MULTI-LAYER POLYMER OVERLAY (MLPO) NOTES:

Perform work in accordance with Item 439, “Bridge Deck Overlays" and below instructions. A technical representative of the overlay manufacturer should be present at the pre-construction meeting and execution of all work associated with the overlay installation.

1. Plane asphalt from bridge deck per Item 354, "Planing and Texturing Pavement." The thickness of the existing ACP is approximately 1.0 inch.

2. Inspect the bridge deck for any potential deck repairs or delaminated concrete. Perform partial and/or full depth bridge deck repairs in accordance with Item 429, “Concrete Structure Repair” and Chapter 3, Section 4 of TxDOT Concrete Repair Manual. Repair materials must be compatible with MLPO system. Cure repairs in accordance with Manufacturer’s recommendations unless approved otherwise. Test moisture content in concrete repairs to ensure it conforms to Manufacturer's requirements. This work will be paid for in accordance with Item 429, “Concrete Structure Repair.”

3. Prepare the deck surface by shot blasting and cleaning with high pressure air. Remove all oil and other contaminants.

4. Mask existing joints and deck drains.

5. Identify moisture in the deck per ASTM 04263 or other approved methods. Do not begin the overlay installation until the deck is properly dry.

6. Install Multi-layer Polymer Overlay per Item 439, "Bridge Deck Overlays".

7. Install pavement markings as shown on plans after the overlay is cured.

8. Seal all the expansion joints. See elsewhere in plans for joint details.

REF #	NBI #	FEATURE CARRIED	FEATURE CROSSED
1	03-244-0-0043-06-113	US 287 SB	BU 287F
2	03-243-0-0044-01-100	US 82EB/US 287 SB	US 281
3	03-243-0-0044-01-101	US 82EB/US 287 SB	US 82WB CONN TO US 281 SB
4	03-243-0-0044-01-119	US 82WB CONN US 281 SB	US 281

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03/04/2024

SHEET 1 OF 1

Texas Department of Transportation | Bridge Division

MLPO NOTES

ONE-TIME USE ONLY
VARIOUS STRUCTURES

FILE:	DN:	CK:	DW:	CK:
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		82

LATEX-MODIFIED CONCRETE (LMC) OVERLAY AND CONCRETE OVERLAY (CO) NOTES:

Perform work in accordance with Item 439, "Bridge Deck Overlays" and instructions below.

1. Plane asphalt from bridge deck per Item 354, "Planing and Texturing Pavement." The thickness of the existing ACP is approximately 2.0 inches.
2. Prepare concrete deck surface for overlay installation. See SURFACE PREPARATION NOTES.
3. Water blast surface and any exposed steel with minimum 5,000 psi blast to remove all dirt, loose rust, and other contaminants and then use dry compressed air until the surface is cleared of debris. Perform pressure blasting no earlier than 24 hours before placing the overlay.
4. Cover the surface with wet cotton mats or wet burlap and opaque/white plastic sheets, and keep saturated for a minimum of 8 hours before placement of overlay.
5. Immediately before placing concrete, remove cover and blow off any standing water. Maintain saturated surface dry (SSD) condition on deck to receive overlay.
6. Mask existing joints and deck drains. Saw cutting of joints after overlay installation is prohibited.
7. Adjust the screed and screed rail as necessary to provide the approved grade and required thickness. Adjustments should be made during the screed dry run. Correct any areas with insufficient clearance by adjusting the screed and rail system or by chipping or scarifying as approved by the Engineer. Clean areas where removal occurs by pressure washing with a minimum of 5,000 psi.
8. Verify that ambient temperature, wind speed, and relative humidity are within the limits specified by the Engineer. Wind screens and fog spray may be submitted as part of the placement plan to minimize evaporation.
9. Place 4.5 inch overlay. Consolidate concrete around joints with a pencil vibrator. Use an internal vibrator for areas with 3" depth or greater in advance of the screed.
10. Meet the straightedge and finishing requirements specified in Section 422.4.7, "Finish and Interim Curing of Bridge Slabs" for finishing the concrete overlay.
11. Cure as required by Item 439, "Bridge Deck Overlays." See CURING NOTES.
12. The Contractor is responsible for the ride quality of the finished surface. See Article 422.4.10, "Defective Work," for acceptance criteria to be enforced for this work.
13. Groove surface in accordance with Article 422.4.11 "Final Surface Texture."
14. Install pavement markings as shown on plans.
15. Seal all the expansion joints. See elsewhere in plans for joint details.

SURFACE PREPARATION NOTES:

Concrete removal and surface preparation beyond cleaning utilizing air, water, and abrasive blasting will be paid for in accordance with Item 483, "Concrete Bridge Deck Surfacing."

HYDRO-DEMOLITION

1. Perform hydro-demolition on bridge deck to remove 2.5" of deck concrete. See HYDRO-DEMOLITION NOTES.

HYDRO-DEMOLITION NOTES:

Perform work in accordance with Item 483, "Concrete Bridge Deck Surfacing" and instructions below.

1. Submit a water disposal plan associated with the work for approval. Protect surrounding property and traffic from water spray and material that is dislodged. Provide water for hydro-demolition that meets the requirements of Article 421.2.5, Table 1. Additional cost for disposal of contaminated water is subsidiary to the hydro-demolition.
2. Provide remotely operated vacuum unit to reclaim water, debris and concrete cuttings. Collect water, debris and concrete cuttings in a separate unit located off of the bridge deck. Do not allow loaded reclamation units on bridge deck after hydro-demolition has occurred without a structural analysis signed and sealed by a licensed professional engineer. All equipment on bridge deck must be in accordance with Articles 7.16.2 and 7.16.3.
3. Block all inlets during hydro-demolition and overlay operations. Do not perform hydro-demolition work over open roadways or sidewalks. Do not permit any vehicular or pedestrian traffic below the bridge deck during hydro-demolition activities.
4. Provide a combination of milling and hydro-demolition sufficient to provide for a 4.5" (nominal) inlay. At a minimum, hydro-demolition will be no less than 3/4" in unless otherwise shown in the plans.
5. Demonstrate hydro-demolition on test areas as designated to calibrate machine to obtain concrete removal depth and finish as specified and as approved.
6. Ensure all unsound concrete is being removed after hydro-demolition. Additional chipping (with chipping hammer) or hydro-demolition may be required to remove remaining delaminated areas. Do not damage reinforcing steel. If bond between steel and concrete is destroyed, remove concrete (15 lb max chipping hammer) to expose bar and provide a clearance of not less than 3/4".

CURING NOTES:

CONCRETE OVERLAY (CO) CURING NOTES:

1. Apply wet burlap to cure the overlay as soon as possible after the concrete has been textured. Keep the burlap continuously wet for 4 days. Cover burlap with opaque or white polyethylene sheeting for duration of wet cure period.
2. Water cure the overlay in accordance with Article 422.4.8, "Final Curing," for an additional 4 days. Maintain the surface temperature of the concrete above 40°F for the required curing period.
3. Do not open to traffic until overlay concrete has reached a minimum f'c of 4,000 psi.

REF #	NBI #	FEATURE CARRIED	FEATURE CROSSED
5	03-243-0-0249-01-067	SH 79 NB	US 281
6	03-243-0-0283-06-070	SH 79 NB	SH 79 SB CONN/FM 369 WB

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03/04/2024

SHEET 1 OF 1

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CONCRETE OVERLAY NOTES

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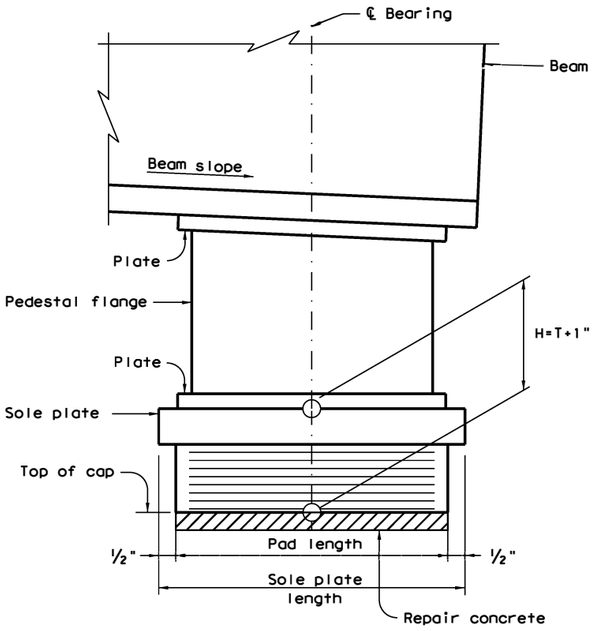
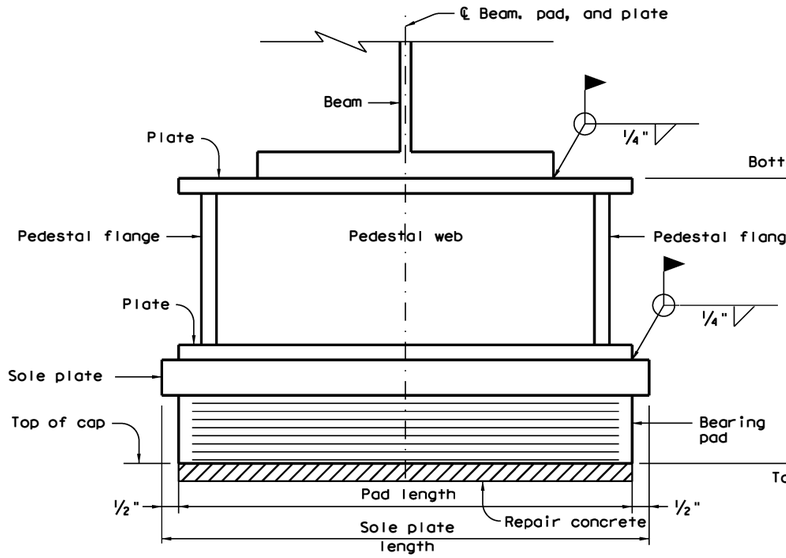
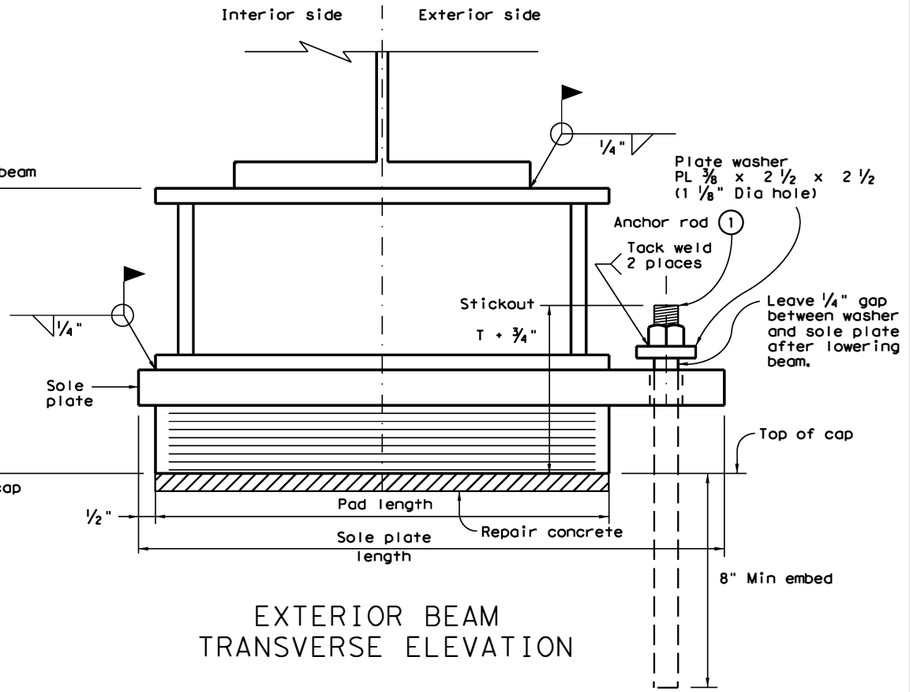


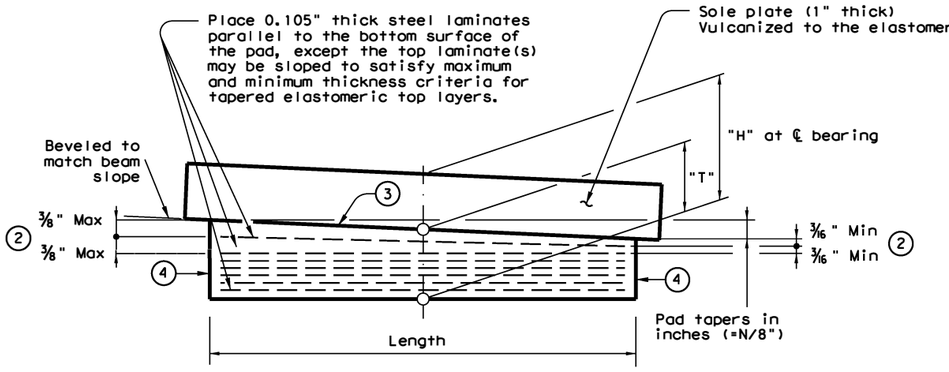
SIDE ELEVATION



INTERIOR BEAM
TRANSVERSE ELEVATION



EXTERIOR BEAM
TRANSVERSE ELEVATION



LAMINATED ELASTOMERIC BEARING PAD DETAILS

50 Durometer - For beam slopes < 3% - Maximum taper ¼"

NOTE - Showing standard bearing pad design. Designer to determine layer thicknesses, pad durometer, and number of layers required and modify detail as needed.

BEARING PAD SUMMARY TABLE						
NBI	Abut / Bent No.	Bearing Pad Dimensions			H (inch) (H=T+1")	Quantity
		L (inch)	W (inch)	T (inch)		
03-244-0043-06-113	1	15	9	2.75	3.75	5
	4	15	9	2.75	3.75	5

BEAM SLOPES FT/FT ~ 03-244-0-0043-06-113					
Section	BM#1	BM#2	BM#3	BM#4	BM#5
ABUT. 1	+0.00509	+0.00535	+0.00560	+0.00584	+0.00610
ABUT. 2	+0.00900	+0.00938	+0.00974	+0.01009	+0.01045

NOTES:

(1) 1" Dia threaded rod (ASTM A 193 Gr B7 or F 1554 Gr 105) with heavy hex nut and plate washer. Hot-dip galvanize rod, nut and washer. Sizing, drilling and cleaning rod roles must follow the adhesive Manufacturer's directions. Embed using a Type III (Class C, D, E or F) adhesive meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

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

(3) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. Include the value of "N" (amount of taper in ⅛" increments) in this mark. Examples: N=0, (for 0" taper) N=1, (for ⅛" taper) N=2, (for ¼" taper) etc. Fabricated pad top surface slope must not vary from plan beam slope by more than $\frac{(0.0625")}{(\text{Length})}$ IN/IN.

(4) Locate permanent mark here.

MATERIAL NOTES:

Provide sole plates conforming to ASTM A36.

Provide coating to sole plates as per TxDOT Item 441.2.4.1.2 System IV in accordance with DMS-8101 after vulcanization.

Provide pedestal plates conforming to ASTM A36 unless otherwise noted.

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436. Hot dip galvanizing of rod, nut, and washer as per Item 445, "Galvanizing".

Sizing, drilling, and cleaning rod holes must follow the epoxy Manufacturer's directions. Use a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the Manufacturer's static mixing nozzle/dual cartridge system.

GENERAL NOTES:

Raise structure per Item 495, "Raising Existing Structures" to facilitate bearing pad replacement. Costs of furnishing and installing elastomeric bearing pads, sole plates, and anchor rod assembly are paid for in accordance with Item 434, "Bridge Bearings". Material for permanent steel Item 442, " Metal for Structures".

The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. A copy of the bearing layout is to be provided to the Engineer. Permanently mark each bearing in accordance with the bearing layout.

Provide shop drawings for approval.

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Sheet 1 of 2

Texas Department of Transportation

Wichita Falls District

BEARING REPLACEMENT PEDESTAL

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03-244-0-0043-06-113

FILE: STEEL PEDESTAL DETAILS.dgn	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
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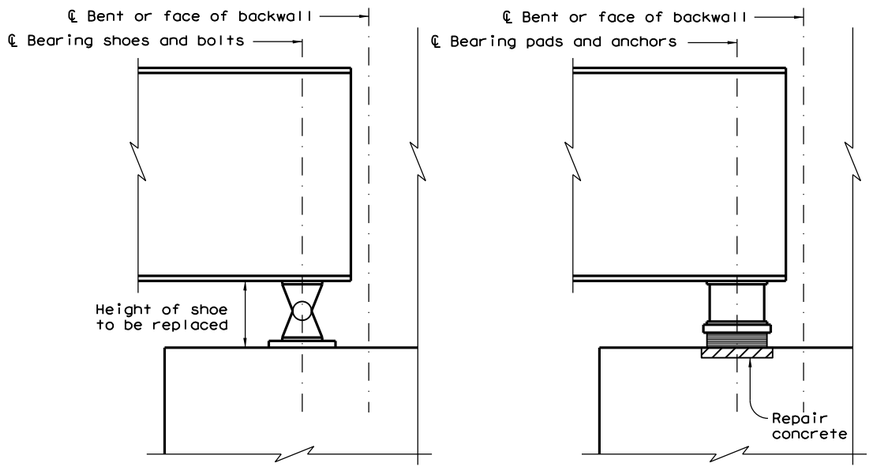
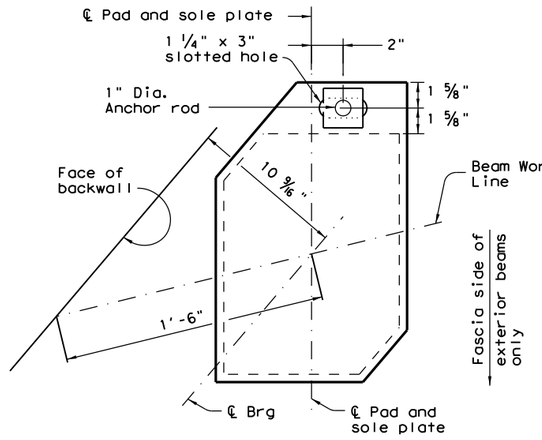
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		84



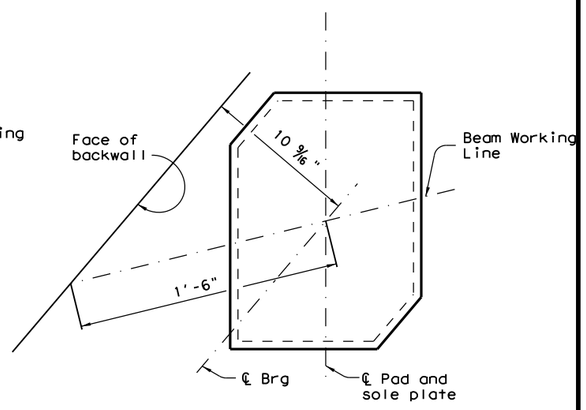
EXISTING

REPLACEMENT

Remove existing shoes and cut anchor bolts flush with top of cap. Remove existing welds if present prior to raising structure.



PLAN AT EXTERIOR BEAM



PLAN AT INTERIOR BEAM

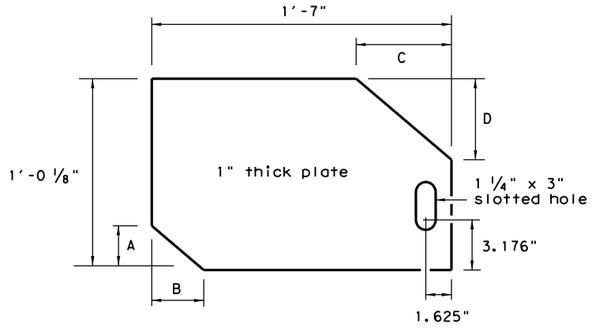
BEARING PLACEMENT AND ANCHOR ROD DETAIL (1)

Anchor rod for exterior beams only

TABLE OF CLIP DIMENSIONS							
NBI	Pedestal	Ped plate & Brg pad		Sole plate			
	A	A	B	A	B	C	D
03-244-0-0043-06-113	2.260"	2.529"	2.974"	2.798"	3.290"	6.043"	5.138"

NOTES:

(1) Verify and adjust placement of pad and sole plate before final installation.



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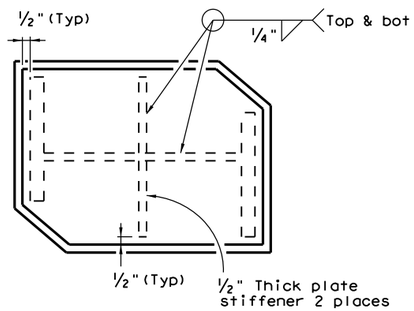
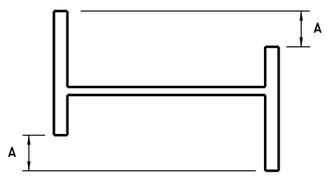
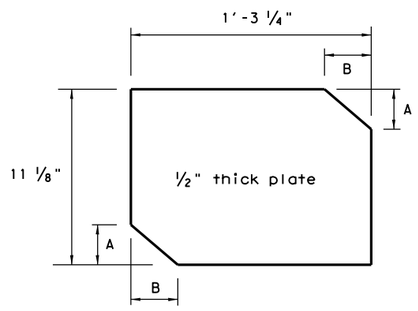
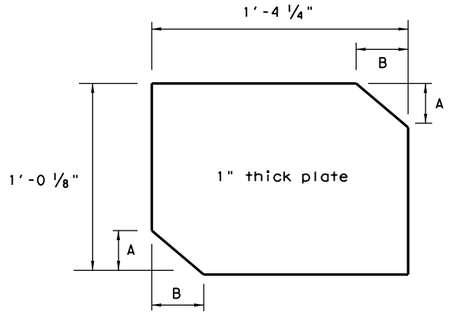




W 14 X 82 PEDESTAL

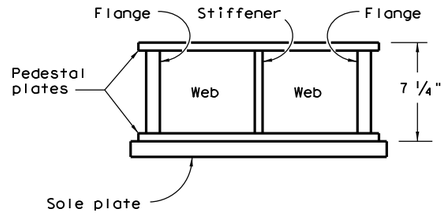


PEDESTAL PLATE AND BEARING PAD

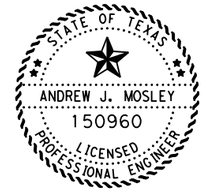


INTERIOR BEAM

SOLE PLATE



PEDESTAL ASSEMBLY



Andrew Mosley, P.E.

03/25/2024

Sheet 2 of 2

Texas Department of Transportation — Wichita Falls District

BEARING REPLACEMENT PEDESTAL

ONE-TIME USE ONLY

03-244-0-0043-06-113

FILE: STEEL PEDESTAL DETAILS.dgn	DN:	CK:	DW:	CK:
©TxDOT February ,2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		85

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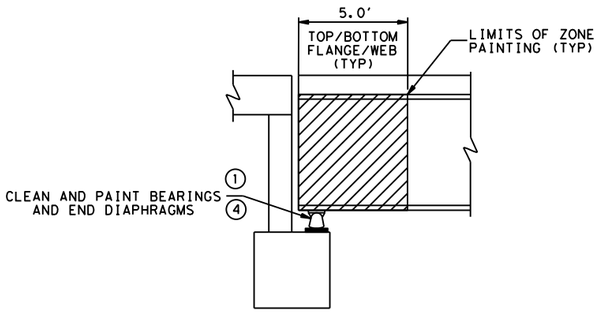
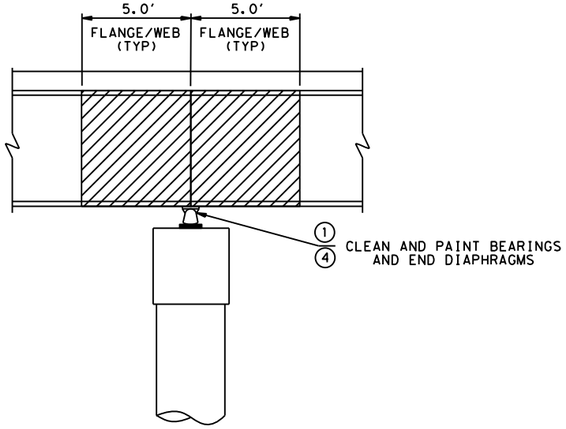
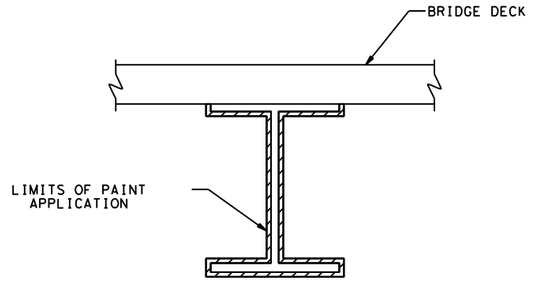


AT ABUTMENTS WITH EXPANSION JOINTS



AT BENTS WITHOUT EXPANSION JOINTS



STEEL BEAM CROSS SECTION
WITH ZONE PAINTING LIMITS

PARTIAL STEEL BEAM ELEVATION (3)

DIMENSIONS SHOWN ARE BASIS OF PAINT ESTIMATE BUT DO NOT DEFINE EXACT LIMITS OF REPAINTING. ADDRESS DETERIORATED PAINT AS DIRECTED BY THE ENGINEER. PAINTING PERIMETER DOES NOT NEED TO BE VERTICAL PLANE EXCEPT ON EXTERIOR SURFACES OF EXTERIOR BEAMS

TABLE OF PAINT QUANTITIES (2)

REF. NO.	NBI	FEATURE CROSSED	APPROX. AREA TO BE PAINTED (SF)
1	03-244-0-0043-09-113	VERNON ACCESS O-PASS	1,890
2	03-243-0-0044-01-100	US 281	2,462
3	03-243-0-0044-01-101	US 82WB CONN TO US 281SB	1,882
4	03-243-0-0044-01-119	US 281	2,469
		TOTAL	8,703

(1) BEARING TYPE MAY VARY FROM WHAT IS SHOWN. DIAPHRAGM TYPES VARY FROM STRUCTURE TO STRUCTURE.

(2) PAINT QUANTITIES SHOWN INCLUDE ALLOWANCE FOR BEARINGS, DIAPHRAGMS AND OTHER MINOR AREAS AS DETERMINED BY THE ENGINEER.

(3) SHOWING MINIMUM AREAS OF PAINT APPLICATION. SPOT CLEAN AND PAINT OTHER LOCATIONS ON THE BRIDGE AS DIRECTED BY THE ENGINEER.

(4) SEE "CLEANING AT EXPANSION BEARINGS" DETAIL.

(5) COMPLETELY REMOVE ALL DEBRIS AND PACK RUST FROM UNDER BEARINGS BEFORE APPLYING SPECIAL PROTECTION SYSTEM. USE TOOLS AND METHODS THAT WILL NOT DAMAGE THE EXISTING BEARING OR CAP. ENGINEER MAY REQUEST DEMONSTRATION OF THE TOOLS AND METHODS BEFORE BEGINNING WORK.

ZONE PAINTING NOTES:

PREPARE THE SURFACES TO BE CLEANED BY USING HAND TOOLS, VACUUMING, AND WATER BLASTING AS DESCRIBED IN SPECIAL SPECIFICATION 4207, "STEEL BRIDGE ZONE PAINTING" FOR DEFAULT SPECIAL PROTECTION SYSTEM.

WATER BLAST ALL BEARINGS FOR A MINIMUM OF 1 MINUTE EACH WHILE MOVING NOZZLE TO THOROUGHLY CLEAN ALL SURFACES. KEEP NOZZLE NO FURTHER THAN 6 INCHES FROM THE SURFACE. BLAST CONCEALED SURFACES OF ANY END DIAPHRAGMS BELOW BRIDGE EXPANSION JOINTS.

USE OIL-FREE COMPRESSED AIR TO BLOW OUT TIGHTLY CONFINED LOCATIONS.

PROBE AROUND EDGES OF REMAINING PAINT WITH HAND SCRAPER TO ENSURE ALL DELAMINATED PAINT IS REMOVED.

GENERAL NOTES:

CLEAN AND PAINT THE STRUCTURE IN ACCORDANCE WITH SPECIAL SPECIFICATION 4207, "STEEL BRIDGE ZONE PAINTING."

PROVIDE POTABLE WATER FOR WATER BLASTING STEEL. WATER FROM MUNICIPAL SUPPLIES APPROVED BY THE TEXAS DEPARTMENT OF HEALTH WILL NOT REQUIRE TESTING. WHEN WATER IS PROVIDED FROM ANOTHER SOURCE, TEST FOR CHLORIDES AND PROVIDE WATER WITH A MAXIMUM CONCENTRATION OF 500 PPM (500 MG/L).

THE DEFAULT SPECIAL PROTECTION SYSTEM INCLUDES:
PENETRATING SEALER (DMS-8101)
TOP COAT (DMS-8105)

PROVIDE A HIGH RATIO CALCIUM SULTANATE (HRCSA) TOP COAT FOR BEARINGS.

PROVIDE COMPATIBLE PENETRATING SEALER AND TOP COAT FROM THE SAME MANUFACTURER.

TINT THE PROPOSED PAINT SYSTEM TO MATCH THE EXISTING BRIDGE PAINT COLOR. SELECT THE PROPOSED PAINT COLOR FROM THE FEDERAL STANDARD COLORS LIST. SUBMIT PROPOSED PAINT COLOR SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE PAINT PURCHASE.

SPECIAL PROTECTION SYSTEM

DEFAULT:
APPLY 0.5-1.0 MIL DFT OF PENETRATING SEAL TO SPCIFIFIED SURFACES.
APPLY MINIMUM 4.0 MILS DFT TOPCOAT TO SPECIFIED SURFACES
APPLY AN ADDITIONAL 14-18 WFT PROTECTION COAT OF HRCSA TO ALL EXPOSED BEARING SURFACES AFTER OTHER COATS HAVE CURED AND IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

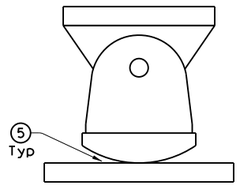
STRUCTURE NOTES:

REF STR # 1: CLEAN AND APPLY THE DEFAULT SPECIAL PROTECTION SYSTEM TO BEAM ENDS, STEEL END DIAPHRAGMS, AND BEARINGS AT INTERIOR BENTS. ADDRESS OTHER AREAS ALONG FLANGES AND AREAS OF BEAM ENDS AT ABUTMENTS AS DIRECTED.

REF STR # 2: CLEAN AND APPLY THE DEFAULT SPECIAL PROTECTION SYSTEM TO BEAM ENDS, STEEL END DIAPHRAGMS, AND BEARINGS AT INTERIOR BENTS. ADDRESS OTHER AREAS ALONG FLANGES AND AREAS OF BEAM ENDS AT ABUTMENTS AS DIRECTED.

REF STR # 3: CLEAN AND APPLY THE DEFAULT SPECIAL PROTECTION SYSTEM TO BEAM ENDS, STEEL END DIAPHRAGMS, AND BEARINGS AT INTERIOR BENTS. ADDRESS OTHER AREAS ALONG FLANGES AND AREAS OF BEAM ENDS AT ABUTMENTS AS DIRECTED.

REF STR # 4: CLEAN AND APPLY THE DEFAULT SPECIAL PROTECTION SYSTEM TO BEAM ENDS, STEEL END DIAPHRAGMS, AND BEARINGS AT INTERIOR BENTS. ADDRESS OTHER AREAS ALONG FLANGES AND AREAS OF BEAM ENDS AT ABUTMENTS AS DIRECTED.



ROCKER BEARING

CLEANING AT EXPANSION BEARINGS

Andrew Mosley, P.E.
04/02/2024

Texas Department of Transportation — Bridge Division

STEEL ZONE PAINTING NOTES
(ONE-TIME USE)

VARIOUS BRIDGES

FILE: XX.dgn	DN: XX	CK: XX	DW: XX	CK: XX
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
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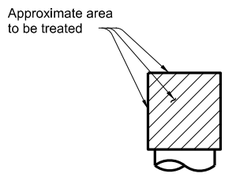
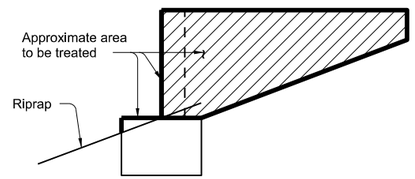


TYPICAL BENT WATERPROOFING DETAIL

Treat all faces of the cap as shown, except for bearing seat buildups.



TYPICAL ABUTMENT AND WINGWALL WATERPROOFING DETAIL

Treat the face of backwall and top, front, and ends of cap as shown, except bearing seats.

TABLE OF ESTIMATED QUANTITIES

NBI	Abutment/ Bent Number	Silane (SY)
		428-6001
03-244-0-0043-06-113	ABUT. #1	94.2
	BENT #2	71.2
	BENT #3	73.8
	ABUT. #4	101.9
03-243-0-0044-01-100	ABUT. #1	86.2
	BENT #2	67.6
	BENT #3	65.5
	BENT #4	63.7
	ABUT. #5	81.5
03-243-0-0044-01-101	ABUT. #1	104.3
	BENT #2	76.6
	BENT #3	79.9
	ABUT. #4	110.2
03-243-0-0044-01-119	ABUT. #1	120.8
	BENT #2	85.6
	BENT #3	75.1
	BENT #4	69.0
	ABUT. #5	98.7
03-243-0-0249-01-067	ABUT. #1	64.9
	BENT #2	52.7
	BENT #3	55.6
	BENT #4	60.7
	ABUT. #5	83.4
03-243-0-0283-06-070	ABUT. #1	52.0
	BENT #2	42.8
	BENT #3	42.8
	ABUT. #4	52.8
PROJECT TOTALS		2,033.5

WATERPROOFING PROCEDURE FOR UNCOATED STRUCTURES:

1) Perform all repairs on substructures prior to proceeding with waterproofing. Obtain approval of the repairs from the Engineer prior to waterproofing.
2) Clean exposed surfaces of existing substructures using abrasive blasting in accordance with Item 428, "Penetrating Concrete Surface Treatment." Water blasting may be used if approved by the Engineer.
3) Seal exposed surfaces as indicated on the plans and in accordance with Item 428, "Penetrating Concrete Surface Treatment." See detail for limits.

GENERAL NOTES:

Provide epoxy for waterproofing in accordance with DMS-6100, "Epoxies and Adhesives." Submit product information for approval prior to use.

Provide silane in accordance with DMS-8140, "Penetrating Concrete Surface Treatment."

Applying epoxy waterproofing to the tops of bearing seats or pedestals is not to be considered in the quantity for payment.

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03/04/2024

Texas Department of Transportation

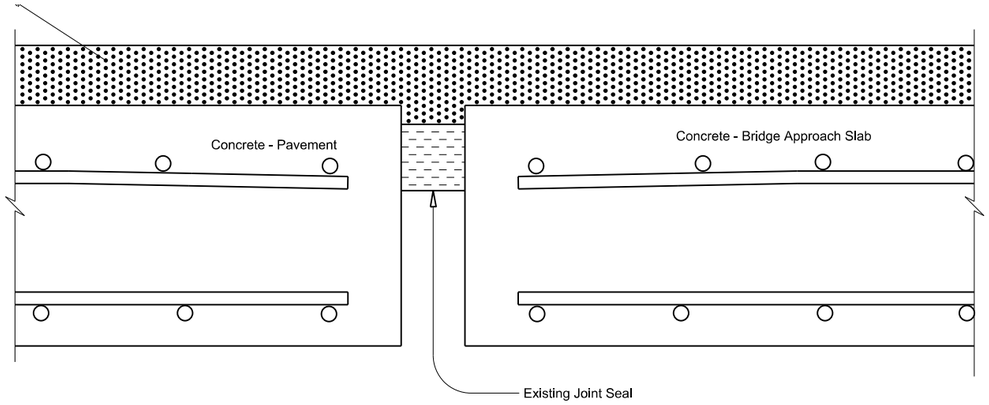
Bridge Division

WATERPROOFING DETAILS

ONE-TIME USE ONLY
VARIOUS STRUCTURES

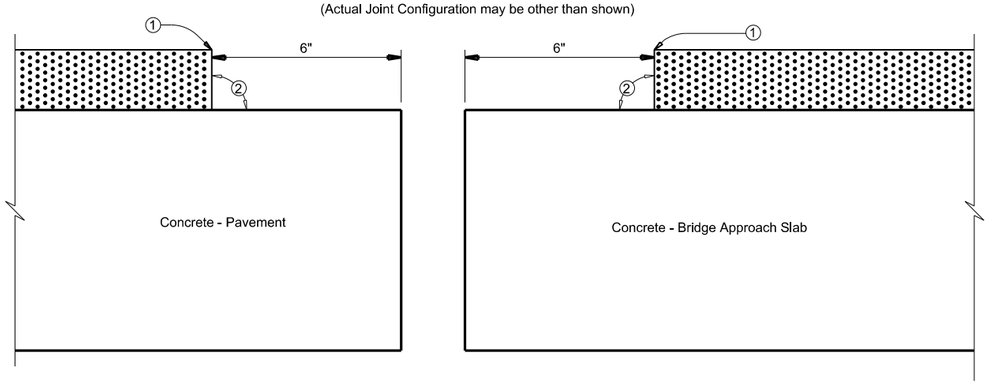
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		87

TYPICAL DETAIL - CLEAN AND SEAL EXPANSION JOINTS WITHOUT ARMOR



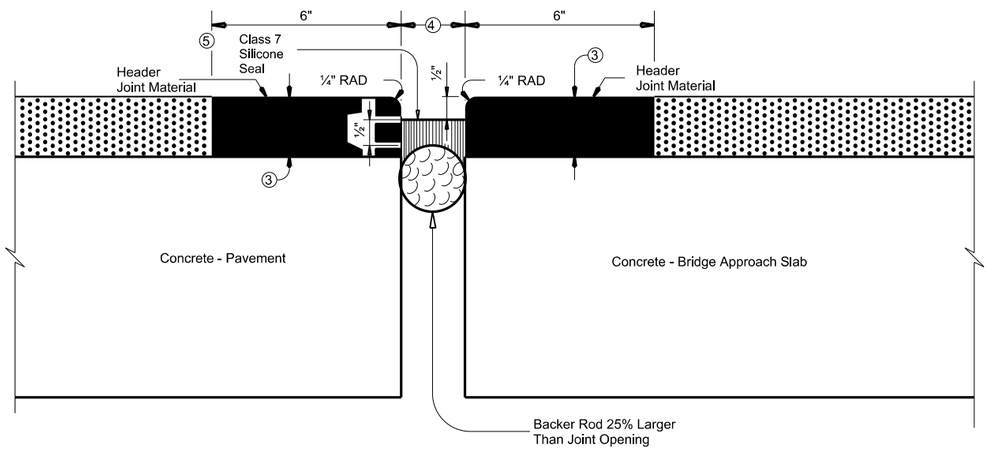
SECTION THRU EXISTING EXPANSION JOINT

(Actual Joint Configuration may be other than shown)



SECTION THRU EXISTING JOINT

Showing Removal



SECTION THRU EXISTING JOINT WITH NEW SEAL

Showing Proposal

NOTES

1. SAW CUT EXISTING HOT MIX OVERLAY AND REMOVE MATERIAL OF EXISTING JOINT.
2. JOINT OPENING SHALL BE AS DIRECTED BY THE ENGINEER.
3. SEAL WHEN REQUIRED AS DIRECTED BY THE ENGINEER. EXTEND SEALANT UP INTO RAIL OR CURB 6 INCHES ON LOW SIDE OR SIDES OF DECK.

GENERAL NOTES

USE THIS DETAIL TO REPAIR THE JOINTS BETWEEN THE ROADWAY AND APPROACH SLABS IN ACCORDANCE WITH ITEM 785. REPLACING OF THESE JOINTS WILL BE PAID FOR UNDER BID ITEM 785-6013. ADJACENT CONCRETE REPAIR AND SEAL MATERIAL SHOWN SHALL BE SUBIDIARY TO THIS ITEM.

THE ENTIRE LENGTH OF EXISTING JOINT WILL BE CHECKED AND ANY PORTION THAT IS DETERMINED UNSOUND BY THE ENGINEER WILL BE REMOVED AS DIRECTED BY THE ENGINEER.

SUMMARY OF STRUCTURES TO BE REPAIRED			
REF #	STRUCTURE ID	ROADWAY	FEATURE CROSSED
6	03-243-0-0283-06-070	SH 79 NB	SH 79 SB CONN/FM 369WB

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04/03/2024

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JOINT REPAIR DETAIL

CONT	SECT	JOB	HIGHWAY
0043	06	098,ETC.	US 70,ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		88

DATE: 4/2/2024 11:55:22 PM
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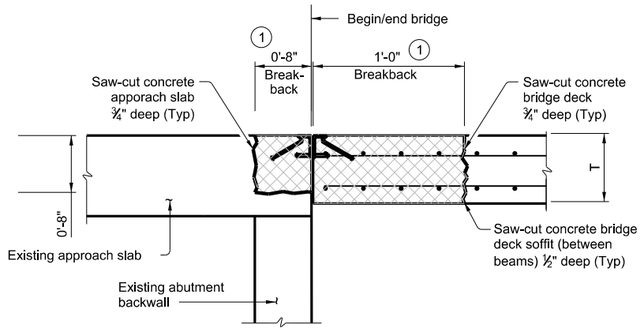
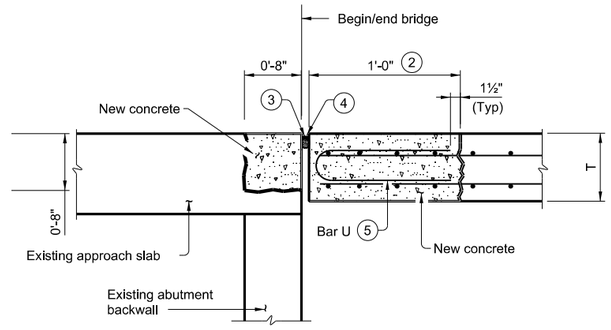


REMOVAL DETAIL

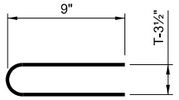


RECONSTRUCTION DETAIL

BEGIN/END OF BRIDGE SLAB DETAILS

With Silicone Joint Seal

1. Saw cut deck ¾" at the breakback line prior to concrete removal. Remove concrete bridge deck as shown. Use hand tools, power driven chipping hammers (30-lb class maximum), or hydro-demolition to remove concrete. Do not damage existing reinforcing, existing beams, or any other portion of the structure to remain.
2. Clean and extend existing reinforcing. Repair damaged coating for epoxy coated or galvanized rebar. Contractor may opt for replacing transverse reinforcing at no additional cost to the Department. Provide minimum lap according to Reinforcing Bar Table if bars are cut. Extend repair concrete to be flush with existing surface. Removal of expansion joint, if present, is subsidiary to Item 785, "Bridge Joint Repair or Replacement."
3. Use Class 7 Silicone Seal.
4. Set joint opening at 1" @ 70°F, or as directed by the engineer.
5. Space Bars U at 12" maximum, center to center. Bars may be bundled with existing longitudinal reinforcing. Adjust Bars U spacing as needed to avoid joint anchorage.



BARS U (#5)

REINFORCING BAR TABLE

Size	Bar Laps	
	Uncoated	Coated
#4	1'-7"	2'-5"
#5	2'-0"	3'-0"

Reinforcing steel is approximately 3 lbs/sf per mat

SUMMARY OF STRUCTURESTO BE REPAIRED

STRUCTURE ID	ROADWAY	FEATURECROSSED
03-243-0-0044-01-100	US 82 EB/US 287 SB	US 281
03-243-0-0044-01-101	US 82 EB/US 287 SB	US 82 WB CONN US 281S
03-243-0-0044-01-119	US 82 WB CONN US 281S	US 281

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide Class K or Class S concrete (f'c=4,000 psi, Course Aggregate Grades 2-5). Alternatively, if approved by the Engineer, provide Type A or D concrete repair materials meeting the requirements of DMS 4655, "Concrete Repair Materials." Achieve a minimum compressive strength fc = 3,600 psi prior to opening to traffic.

GENERAL NOTES:

Perform work in accordance with the TXDOT Concrete Repair Manual, Chapter 3, Section 4 and Item 785, "Bridge Joint Repair or Replacement." A copy of the Concrete Repair Manual must be available onsite during all concrete repair operations. All work to remove existing joint and install new joint, including repair concrete and installing new reinforcing steel, is paid in accordance with Item 785 and measured by the linear foot.

Obtain approval for all tools, equipment, materials and techniques proposed before beginning work.

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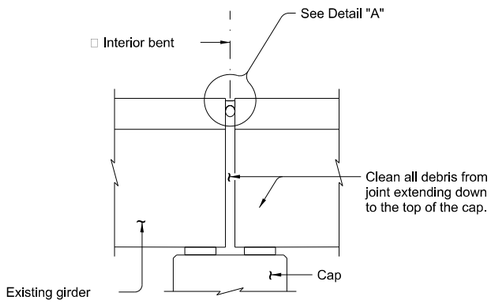
04/03/2024

Texas Department of Transportation

JOINT REPAIR DETAIL

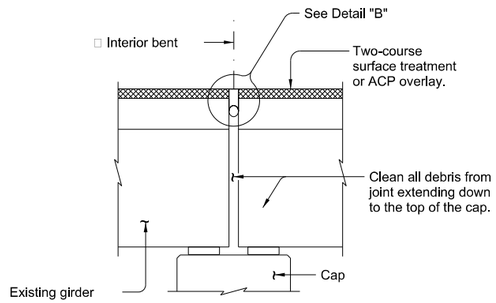
CONT	SECT	JOB	HIGHWAY
0043	06	098,ETC.	US 70,ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		89

DATE:
FILE:



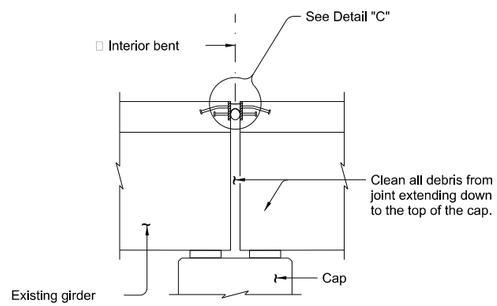
JOINT WITH SILICONE SEAL

(Used without ACP overlay)



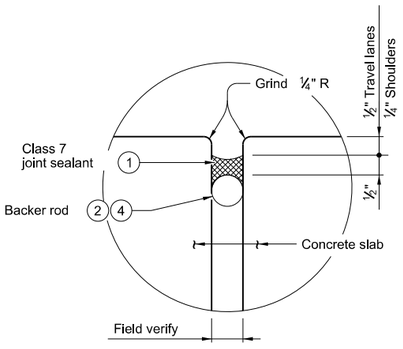
JOINT W/ HOT-POURED RUBBER SEAL

(Used with ACP overlay)

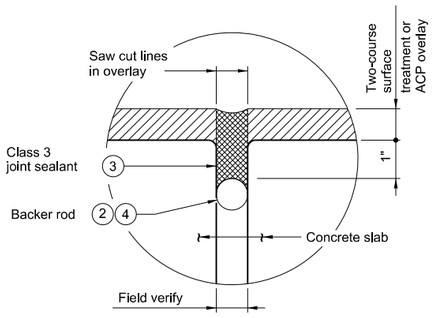


ARMOR JOINT

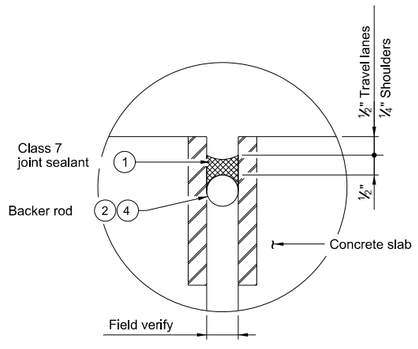
(Used with ACP overlay)



DETAIL "A"



DETAIL "B"



DETAIL "C"

(Stud anchors not shown for clarity.)

1. Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
2. Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
3. Use Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
4. Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH SILICONE SEAL:

1) Clean joint opening of all existing expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.

2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.

4) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of concrete in travel lanes and ¼" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH HOT-POURED RUBBER SEAL:

1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a ½" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.

2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.

4) Seal the joint opening with a Class 3 joint sealant. Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS:

1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.

2) Abrasive blast clean existing steel surface where silicone seal is to be placed.

3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.

4) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.

5) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of concrete in travel lanes and ¼" below top of concrete in shoulders.

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03/04/2024

GENERAL NOTES:

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting asphalt overlay, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the linear foot.

Obtain approval for all tools, equipment, materials and techniques proposed to clean and seal the joint.

Provide Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay.

Provide Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.

Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 joint sealant cannot be effectively placed in the vertical position, a Class 4 joint sealant compatible with the Class 7 joint sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with Manufacturer's specifications.

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

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VARIOUS STRUCTURES

FILE:	DN:	CK:	DW:	CK:
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	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		90

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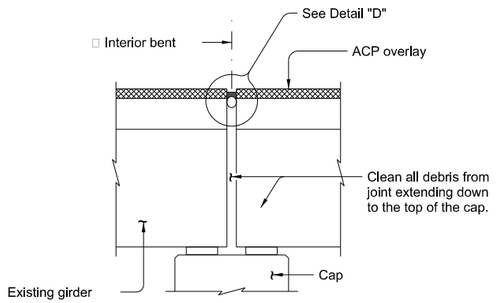
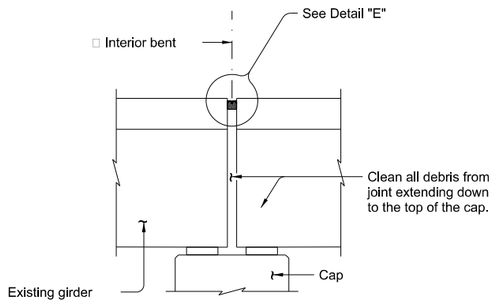


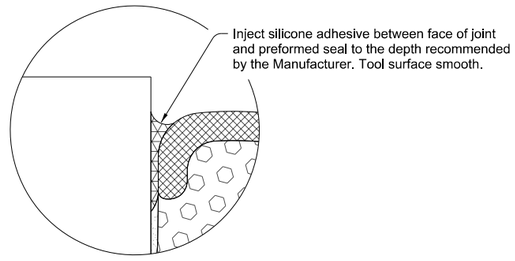
HEADER JOINT WITH SILICONE SEAL

(used with ACP overlay with joints more than 100 ft apart)

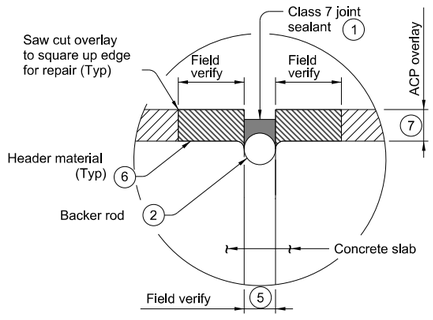


JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL

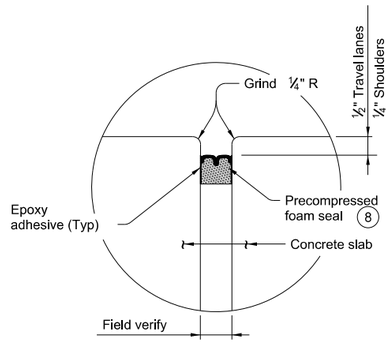
(used without ACP overlay)



SILICONE INJECTION



DETAIL "D"



DETAIL "E"

PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH SILICONE SEAL AND HEADER JOINT REPAIR

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."

2) Saw cut and remove damaged portions of existing header material to neat lines. Repair deck joint spalls greater than 2" deep in accordance with Item 785, "Bridge Joint Repair or Replacement." Shallower spalls may be filled with header material.

3) Clean the voided region of all materials that could inhibit the bond between header material and concrete or steel.

4) Form the joint opening to the required width and place header material to fill voided region. Repair header material in accordance with Item 785, "Bridge Joint Repair or Replacement."

5) Place backer rod into joint opening 1" below the top of header material. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.

6) Seal the joint opening with a Class 7 joint sealant. Recess seal ½" below top of header in travel lanes and ¼" below top of header in shoulders.

PROCEDURE FOR CLEANING AND SEALING JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL

1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." When sealing joints for slab spans, slab beam spans, pan girder spans, or box beam spans, fill void below proposed seal with extruded polystyrene foam.

2) Correctly size joint seal based on field measurement and in accordance with Manufacturer's specifications. Multiple seal widths may be required. Ensure proper seal is selected for each joint.

3) Abrasive blast clean existing joint surfaces where seal is to be applied.

4) Wipe down joint surfaces to remove contaminants.

5) Mask areas adjacent to joint opening sufficiently to keep epoxy off deck surface.

6) Apply epoxy to joint opening side surfaces.

7) While epoxy is still tacky, remove shrink wrap from seal and install in joint opening.

8) Recess top of joint seal ½" in travel lanes and ¼" in shoulders.

9) Inject silicone adhesive along top interface of seal with joint side surface according to Manufacturer's recommendations. Tool to spread adhesive as necessary. See Silicone Injection detail.

(1) Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."

(2) Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(5) Match existing joint opening or set at a minimum:
a. 1" at 70°F when the distance between joints is 150 ft or less
b. 2" at 70°F when the distance between joints is greater than 150 ft.
c. As directed by the Engineer.

(6) Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but do not exceed 4". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."

(7) Maximum thickness is 4".

(8) See table of Approved Precompressed Foam Seal Manufacturers on Sheet 3 of 3.

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03/04/2024

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CLEANING AND SEALING EXISTING BRIDGE JOINTS

ONE-TIME USE ONLY
VARIOUS STRUCTURES

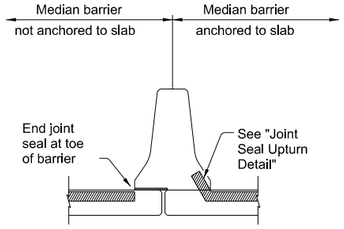
FILE:	DN:	CK:	DW:	CK:
©TxDOT August 2022 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		91

APPROVED PRECOMPRESSED FOAM SEAL MANUFACTURERS

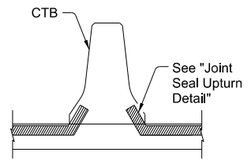
MANUFACTURER	SEAL TYPE
Watson Bowman Acme	Wabo FS
SSI	Silspec SES
Sealtite	Sealtite 50N
EMSEAL	BEJS

TABLE OF ESTIMATED QUANTITIES

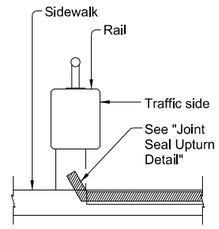
STRUCTURE NUMBER (FEATURE CROSSED)	JOINT TYPE	ITEM	DESCRIPTION	NUMBER OF JOINTS	QUANTITY (LF)
03-244-0-0043-06-113	CLASS 7	438-6004	CLEANING & SEALING EXIST JOINTS (CL7)	2	140
03-243-0-0249-01-067	CLASS 7	438-6004	CLEANING & SEALING EXIST JOINTS (CL7)	5	251
03-243-0-0283-06-070	CLASS 7	438-6004	CLEANING & SEALING EXIST JOINTS (CL7)	4	160



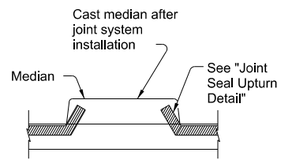
WITH OPEN DECK JOINT
BELOW MEDIAN BARRIER



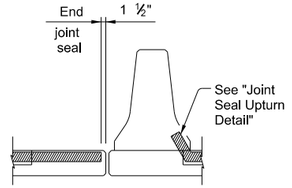
AT CONCRETE TRAFFIC BARRIER



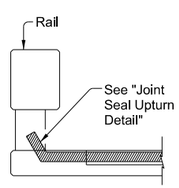
AT SIDEWALK
BEHIND BRIDGE RAIL



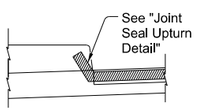
AT RAISED MEDIAN



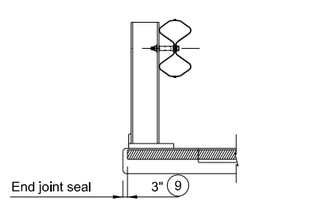
WITH OPEN DECK JOINT
ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



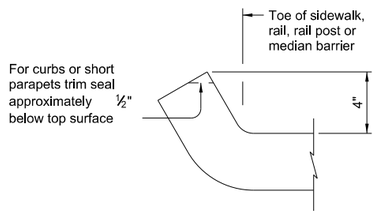
AT SIDEWALK



AT STEEL POST BRIDGE RAIL

JOINT SEALANT TERMINATION DETAILS

(9) 1 ½" for precompressed foam and silicone seal



JOINT SEAL UPTURN DETAIL

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

SHEET 3 OF 3

Texas Department of Transportation | Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS

ONE-TIME USE ONLY
VARIOUS STRUCTURES

FILE:	DN:	CK:	DW:	CK:
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
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	WFS	WILBARGER, ETC		92

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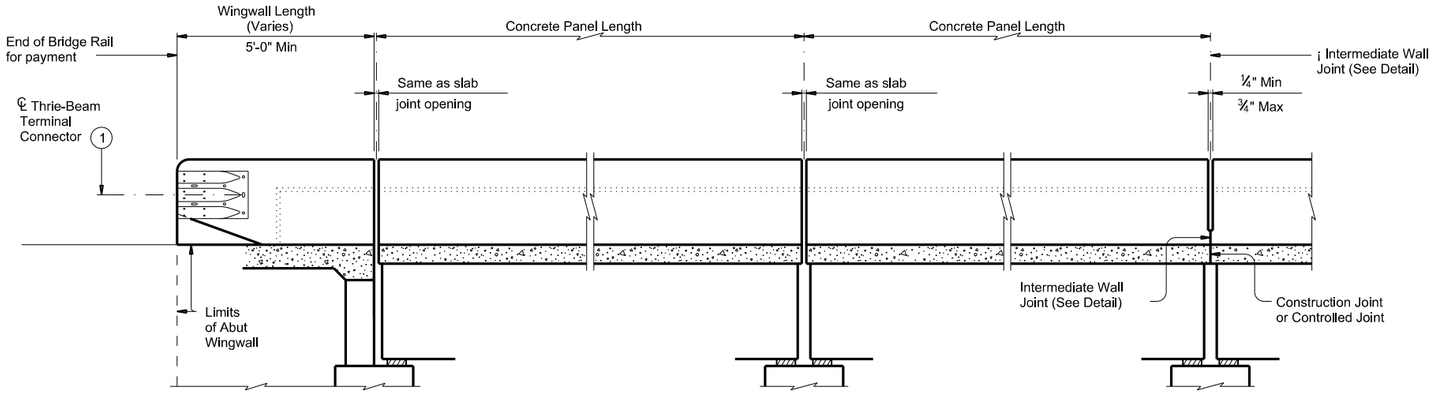
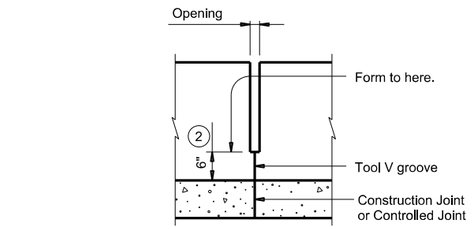


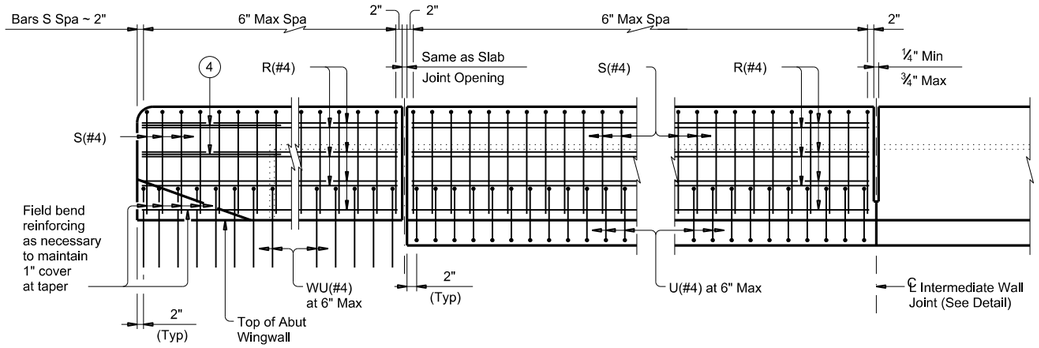
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

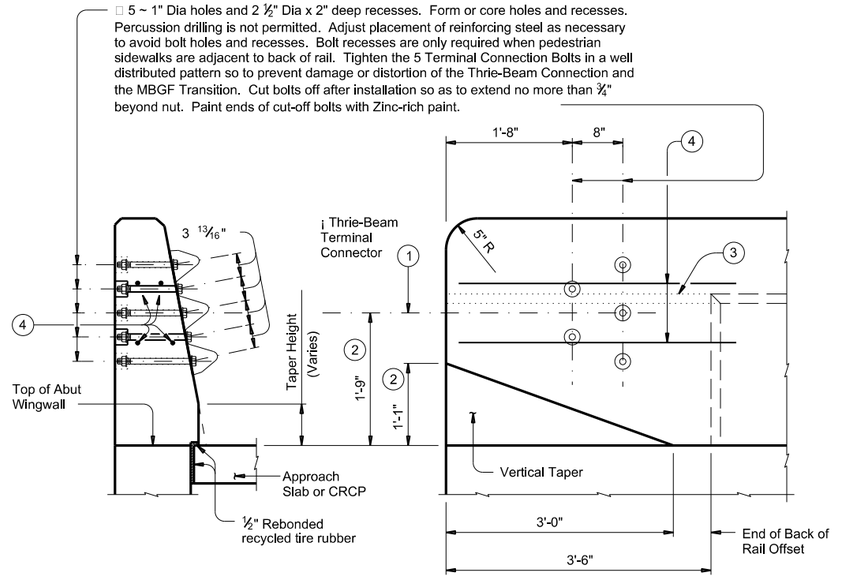


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.

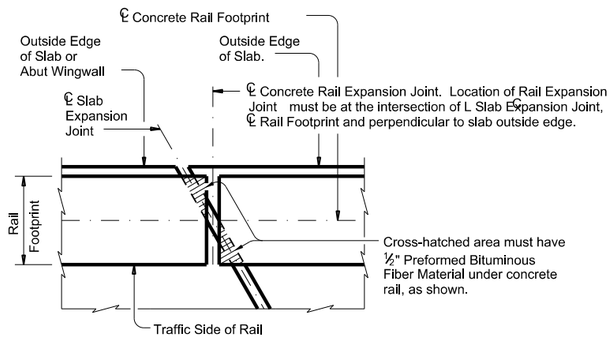


ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

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.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
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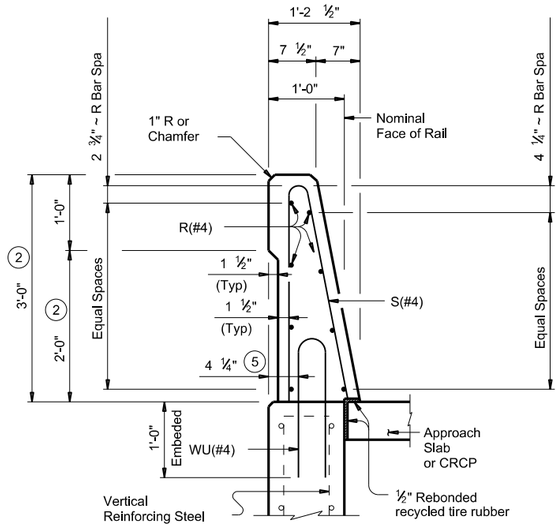
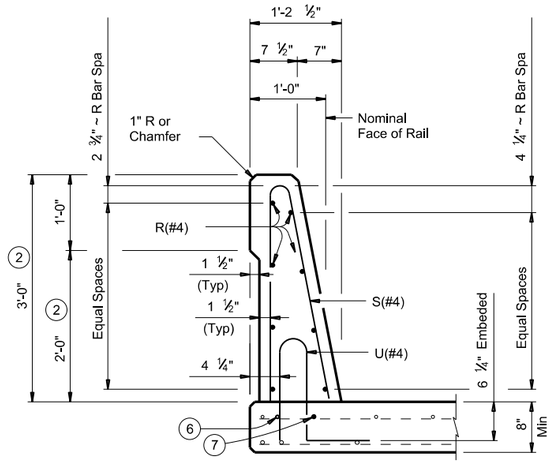


ON ABUTMENT WINGWALLS
OR CIP RETAINING WALLS



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.

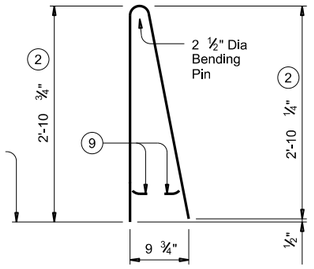
(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

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

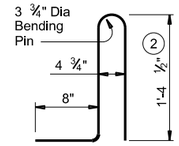
(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

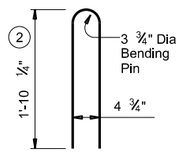
(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.



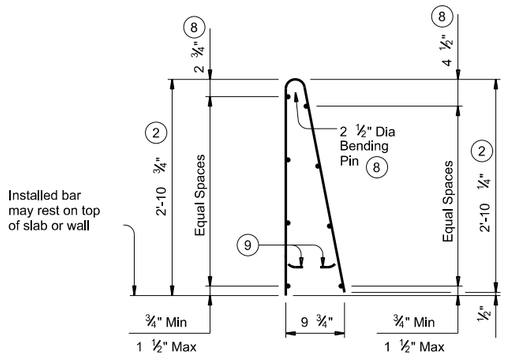
BARS S (#4)



BARS U (#4)
(Existing)

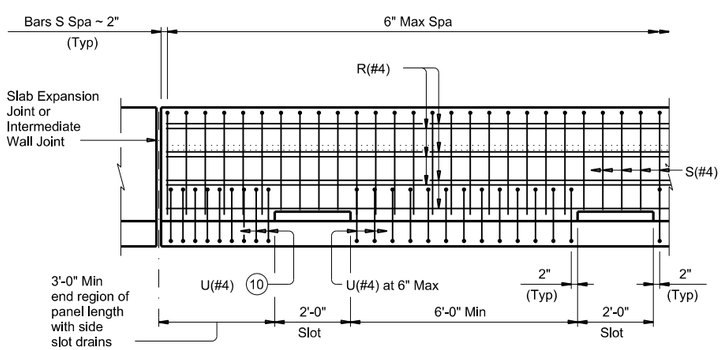


BARS WU (#4)
(Existing)



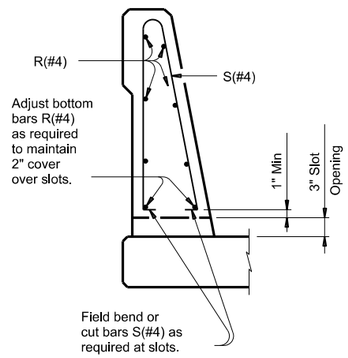
OPTIONAL WELDED WIRE
REINFORCEMENT (WWR)

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

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.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL
SINGLE SLOPE

TYPE SSTR

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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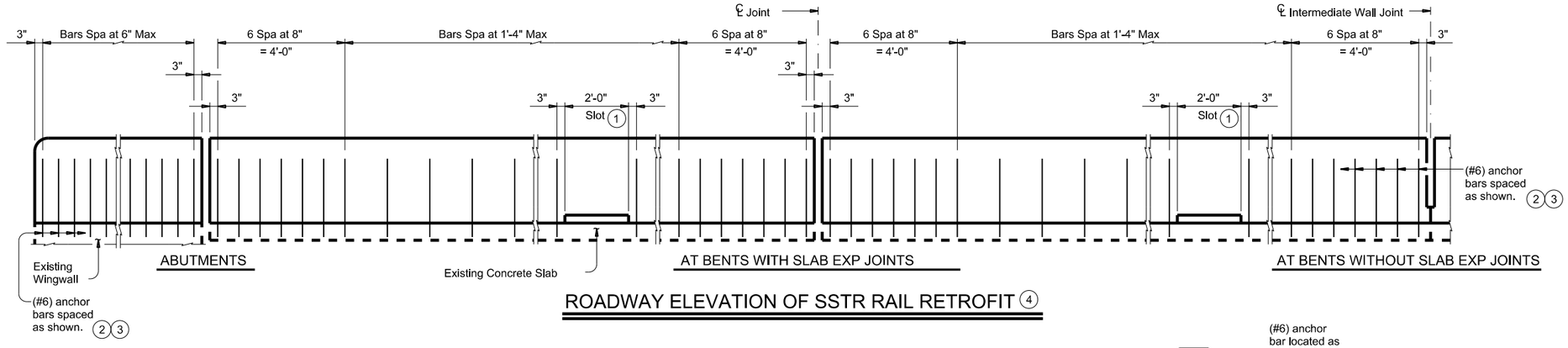
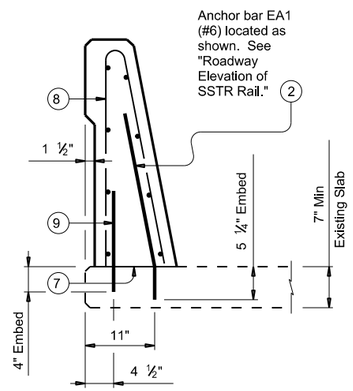
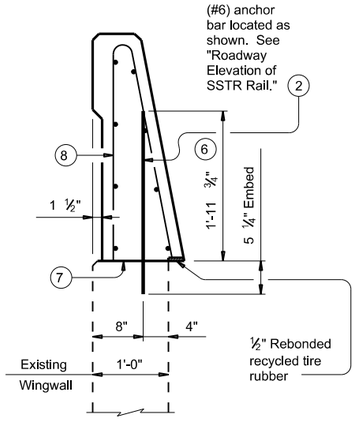


ROADWAY ELEVATION OF SSTR RAIL RETROFIT (4)



SSTR RAIL

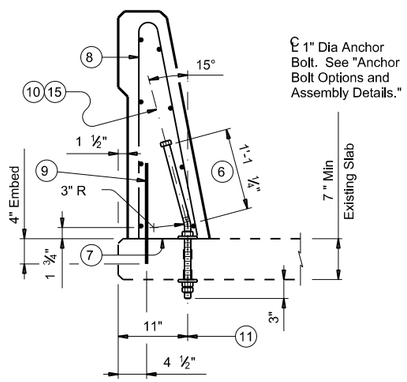
RAIL RETROFIT SECTIONS ON CONCRETE SLABS USING ADHESIVE ANCHORS (5)



SSTR RAIL

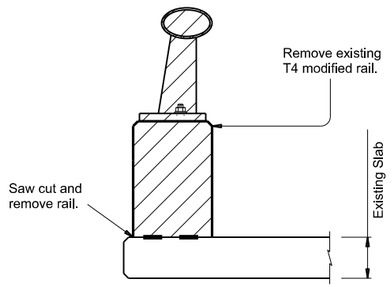
RAIL RETROFIT SECTIONS ON WINGWALLS USING ADHESIVE ANCHORS (5)

Rail retrofits on existing Traffic Rail Foundations (TRF) are similar.



SSTR RAIL

RAIL RETROFIT SECTIONS ON SLABS USING ANCHOR BOLTS (12)



EXISTING RAIL REMOVAL DETAIL (16)

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.
03/04/2024

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

RETROFIT GUIDE FOR CONCRETE RAILS (MOD)
(SSTR)

C-RAIL-R

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©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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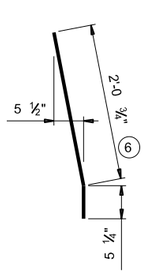
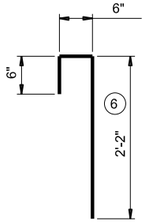
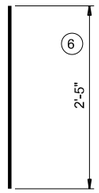
1. Optional side slot drains will not be used for this project.
2. Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 ¼". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed 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) adhesive anchor in a rail retrofit condition. Secondary (#4) adhesive anchor 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. Showing location or locations of anchor bars in a rail retrofit condition. See appropriate rail standard for details and notes not shown.
6. Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
7. Do not cast rails or parapet walls on top of overlays/seal coats.
8. See appropriate 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. 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).
10. L 1" Dia Anchor Bolt Spaced longitudinally along rail at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).
11. L 1 1/16" to 1 ¼" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding ½" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.
12. Showing location of anchor bars and anchor bolts in a rail retrofit condition. See appropriate rail standard for details and notes not shown.
13. L 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.
14. Plate Washer ⅜ x 3 x 3 ASTM A36 with 1 1/16" Dia Hole centered.
15. Galvanize anchor bolts, nuts and plate washers.
16. Remove existing rail, cut and grind anchor bolts flush, and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing."



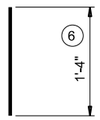
ANCHOR BAR EA1 (#6)



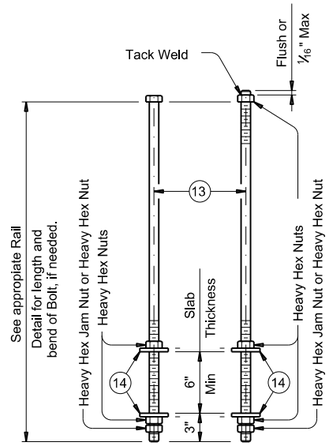
ANCHOR BAR EA2 (#6)



EMBEDED ANCHOR BAR (#6)



EMBEDED SECONDARY ANCHOR BAR (#4)



ANCHOR BOLT OPTIONS (15) AND ASSEMBLY DETAILS

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.

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

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if required elsewhere.

(#6) and (#4) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

Use of these retrofit details will result in a railing acceptable for the MASH Test Level indicated on the applicable rail standard.

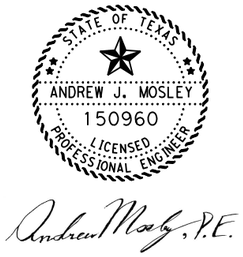
Rail anchorage details shown on this guide may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Not all possible combinations of existing railing, curbs, parapets etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this guide.

Do not remove any part of a curb until it has been evaluated to not be a load-carrying structural component.

Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.

Payment for a rail retrofit will be as per Item 451, "Retrofit Railing", by the type of the rail retrofit. All details shown herein are subsidiary to rail retrofit. Examples are "Retrofit Rail (Ty T551)", "Retrofit Rail (Ty SSTR)", etc.

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



Andrew Mosley, P.E.
03/04/2024

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

RETROFIT GUIDE FOR CONCRETE RAILS(MOD)
(SSTR)

C-RAIL-R

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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07-20: Text change from epoxy to adhesive and changed MASH Test Level note.	DIST	COUNTY		SHEET NO.
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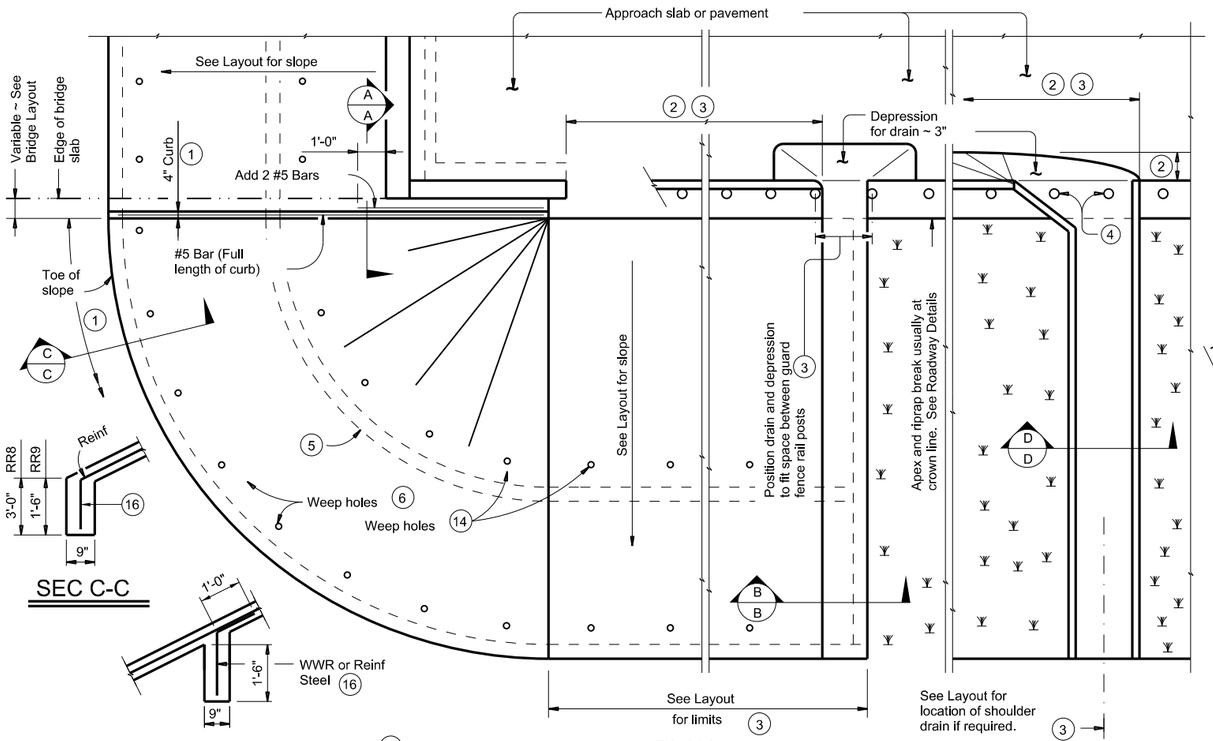
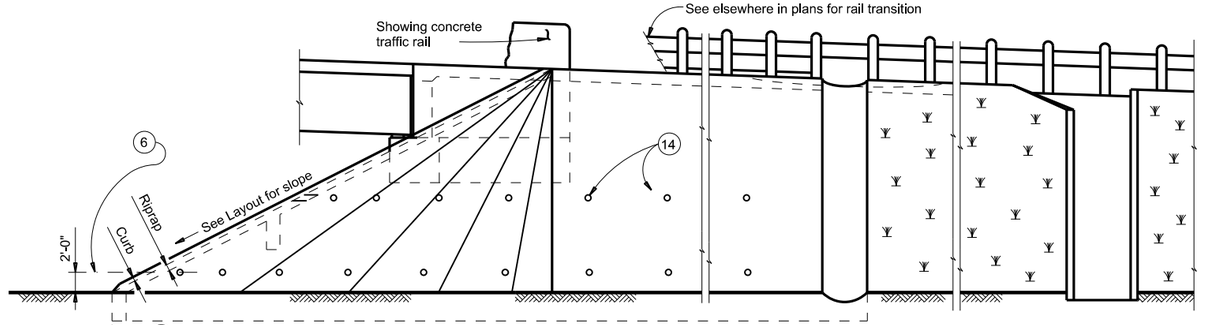


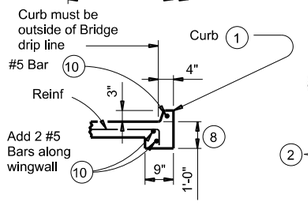
PLAN

SEC C-C

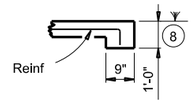
INTERMEDIATE TOEWALL (5)



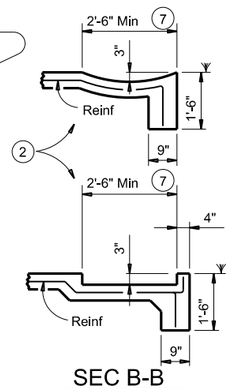
ELEVATION



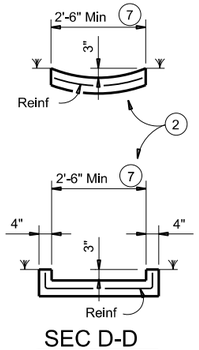
SEC A-A



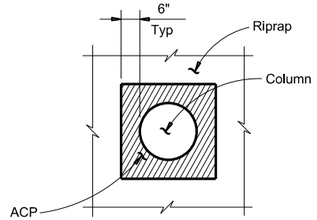
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

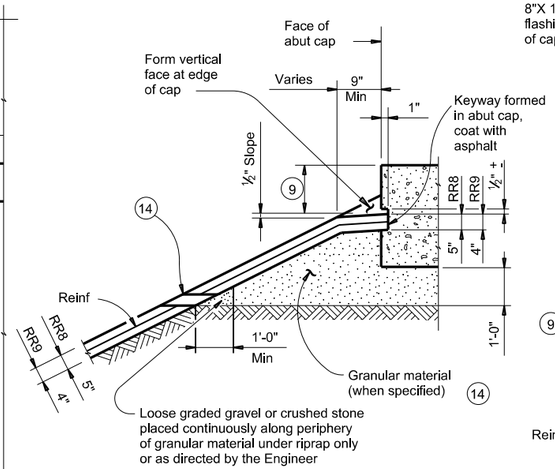


SEC D-D
(Shoulder drain)

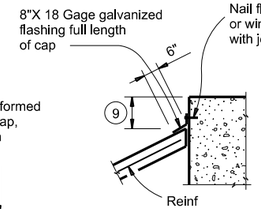


Riprap blockout to be filled with ACP. (Subsidiary to riprap)

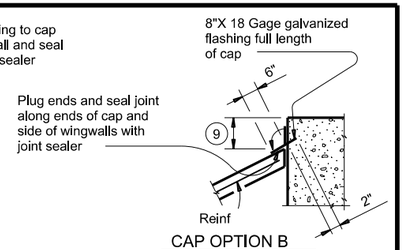
RIPRAP DETAIL AT COLUMNS
(As directed by the Engineer)



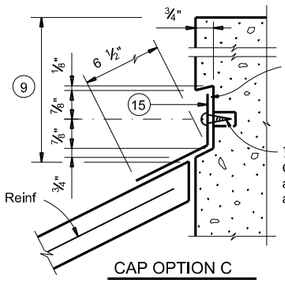
SHOWING KEYWAY OPTION



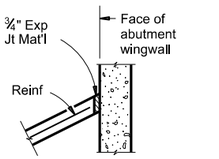
CAP OPTION A



CAP OPTION B

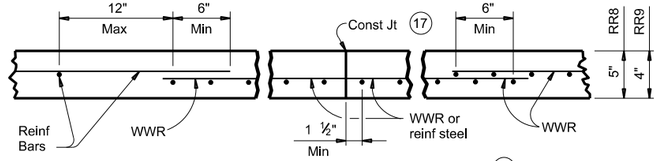


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

(1) When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.

(2) Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.

(3) Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

(4) See details elsewhere in plans for installation of guard fence posts through concrete riprap.

(5) Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

(6) Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.

(7) Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.

(8) Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.

(9) Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

(10) #5 bars shown are required even when synthetic fiber reinforcing option is selected.

(11) Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.

(12) Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.

(13) Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

(14) If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.

(15) 8" x 18 Gage Galv Sheet Metal

(16) Provide WWR or #3 bars, with 1'-0" extension into slope.

(17) WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:
Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.
Provide Grade 60 reinforcing steel.
Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".
See Layout for limits of riprap.
RR8 is to be used on stream crossings.
RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		96

FINAL STRIPE

ITEM	DESC.	QUANTITY
666-6300	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	90 LF
666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	354 LF
666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	350 LF
672-6007	REFL PAV MRKR TY I-C	4 EA

N

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/29/2024

Texas Department of Transportation

STRIPING LAYOUT

REFERENCE #1

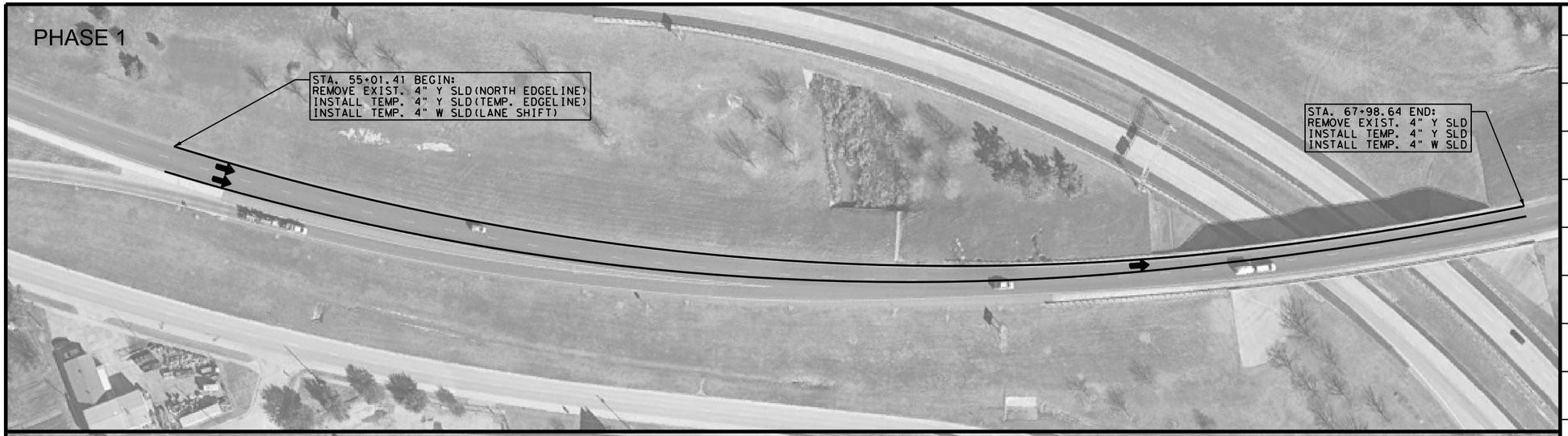
NBI: 03-244-0-0043-06-113

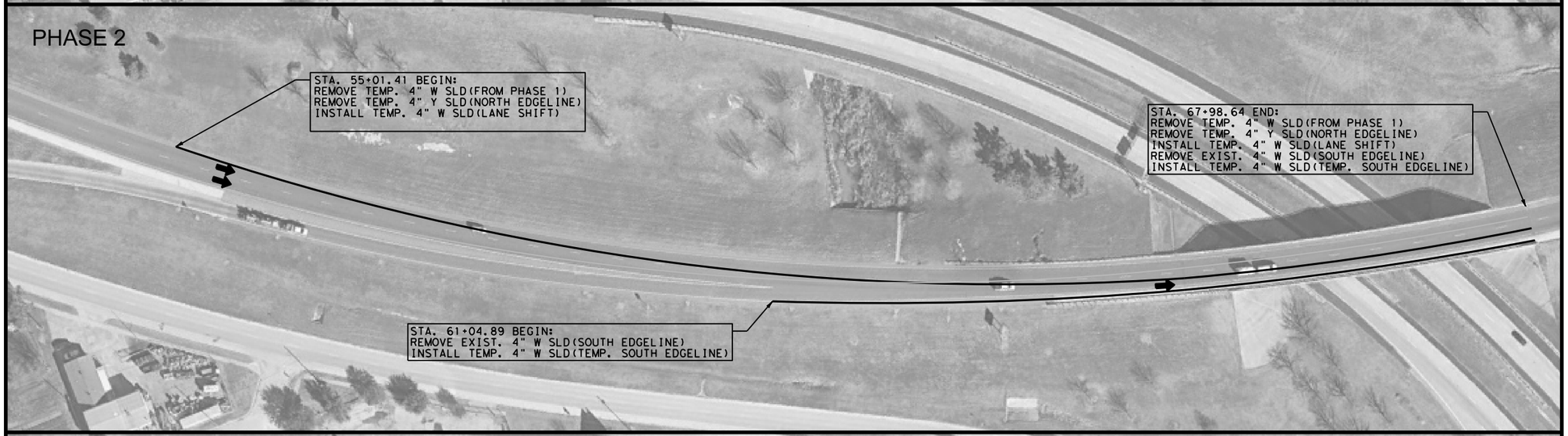
US 70 EB/US 287 SB

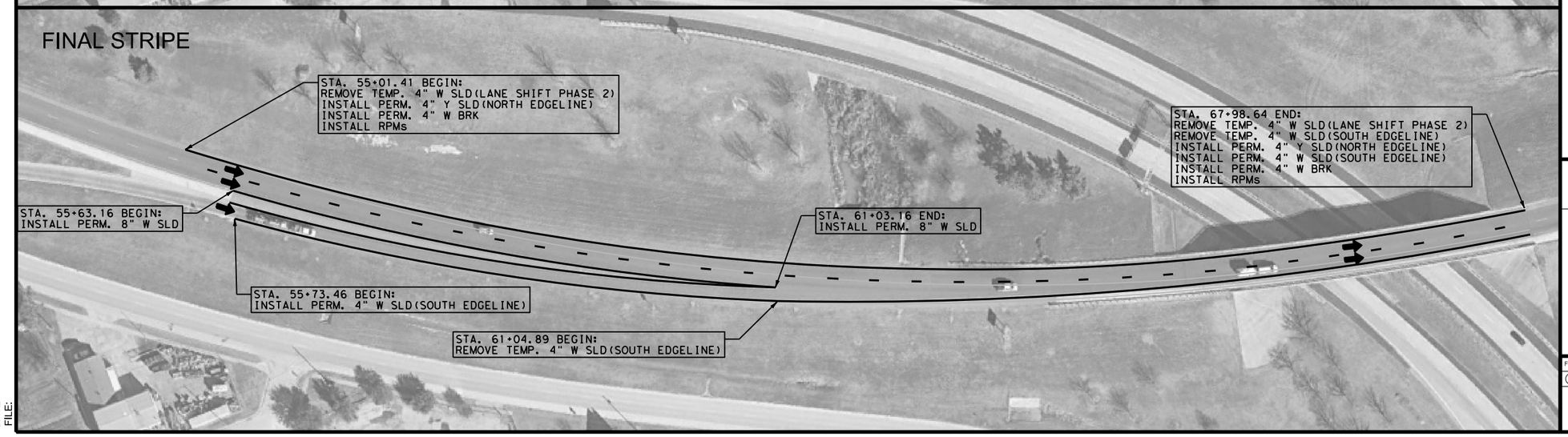
OVER BU 287F

DATE:
FILE:

FILE:	DN: ____	CK: ____	DW: ___	CK: __
©TxDOT JULY 2021 __	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		98







ITEM	DESC.	QUANTITY
666-6170	REFL PAV MRK TY I (W)8" (SLD)(100MIL)	1080 LF
666-6170	REFL PAV MRK TY II (W) 4" (SLD)	3288 LF
666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	1297 LF
666-6300	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	310 LF
666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	1225 LF
666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	1297 LF
672-6007	REFL PAV MRKR TY I-C	16 EA
672-6007	ELIM EXT PAV MRK & MRKS (4")	6886 EA

N

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/29/2024

Texas Department of Transportation

STRIPING LAYOUT

REFERENCE #2

NBI: 03-243-0-0044-01-100

US 82 EB/US 287 SB
OVER US 281

FILE:	DN:	CK:	DW:	CK:
©TxDOT JULY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		99

DATE:
FILE:

ITEM	DESC.	QUANTITY
666-6170	REFL PAV MRK TY II (W) 4" (SLD)	2034 LF
666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	678 LF
666-6300	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	180 LF
666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	678 LF
666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	678 LF
672-6007	REFL PAV MRKR TY I-C	8 EA
672-6007	ELIM EXT PAV MRK & MRKS (4")	4248 EA

N

STATE OF TEXAS
ANDREW J. MOSLEY
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LICENSED
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Andrew Mosley, P.E.

03/29/2024

Texas Department of Transportation

STRIPING LAYOUT

REFERENCE #3

NBI: 03-243-0-0044-01-101

US 82 EB/US 287 SB

OVER US 82 WB CONN US 281 S

DATE:
FILE:

FILE: _____ DN: ____ CK: ____ DW: ____ CK: ____

REVISIONS

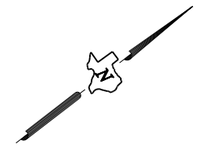
CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70,ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		100

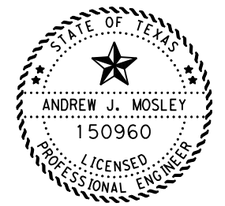
PHASE 1

PHASE 2

FINAL STRIPE

ITEM	DESC.	QUANTITY
666-6170	REFL PAV MRK TY II (W) 4" (SLD)	3330 LF
666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	1110 LF
666-6300	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	280 LF
666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	1110 LF
666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	1110 LF
672-6007	REFL PAV MRKR TY I-C	14 EA
672-6007	ELIM EXT PAV MRK & MRKS (4")	6660 EA





Andrew Mosley, P.E.

03/29/2024

Texas Department of Transportation

STRIPING LAYOUT

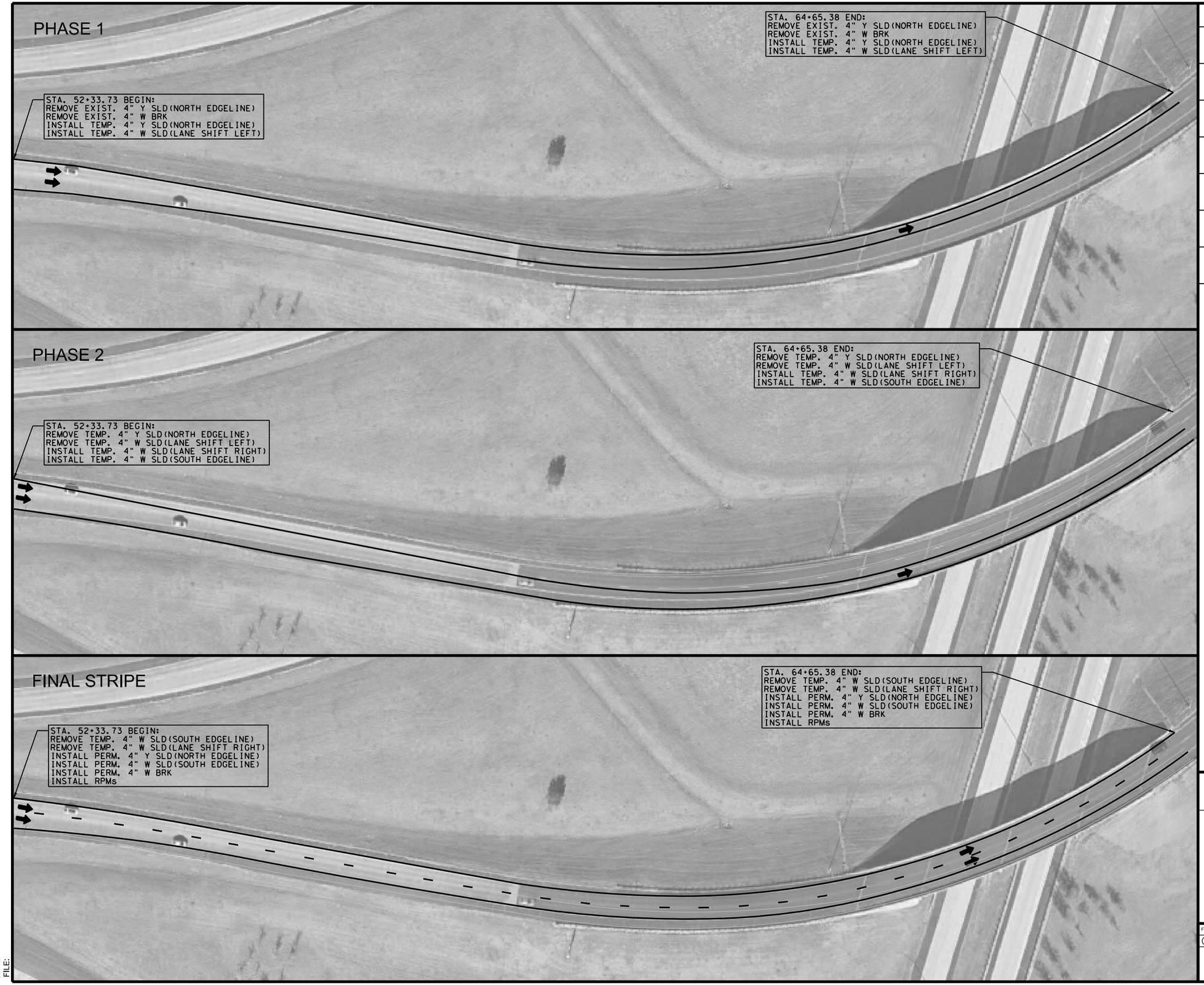
REFERENCE #4

NBI: 03-243-0-0044-01-119

US 82 WB CONN US 281 S
OVER US 281

FILE:	DN: ____	CK: ____	DW: ____	CK: __
©TxDOT JULY 2021 __	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		101

DATE:
FILE:



ITEM	DESC.	QUANTITY
666-6170	REFL PAV MRK TY II (W) 4" (SLD)	3696 LF
666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	1232 LF
666-6300	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	300 LF
666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	1232 LF
666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	1232 LF
672-6007	REFL PAV MRKR TY I-C	15 EA
672-6007	ELIM EXT PAV MRK & MRKS (4")	7392 EA

N

STATE OF TEXAS
ANDREW J. MOSLEY
150960
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03/29/2024

Texas Department of Transportation

STRIPING LAYOUT

REFERENCE #5

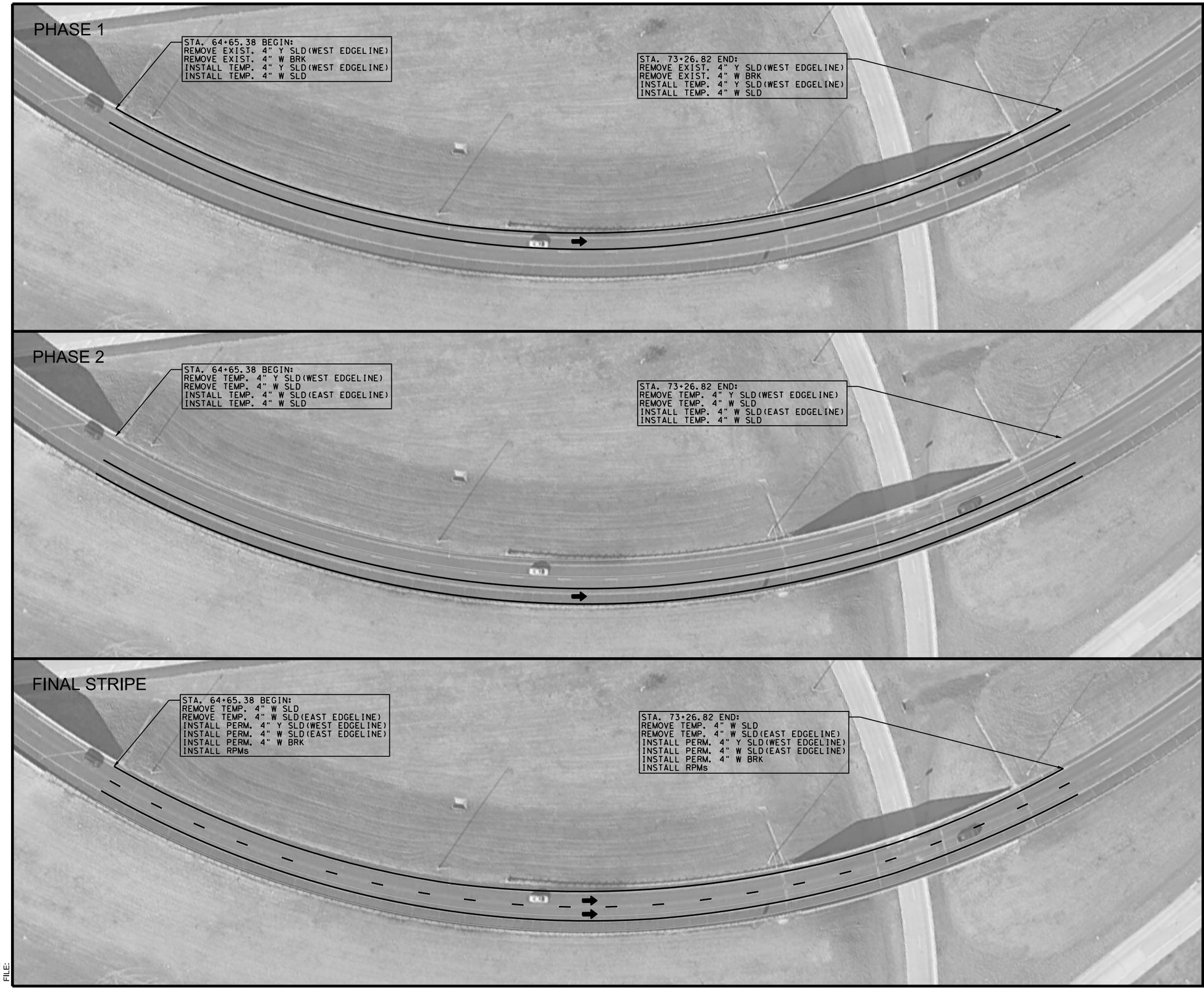
NBI: 03-243-0-0249-01-067

SH 79 NB

OVER US 281

FILE:	DN: ____	CK: ____	DW: ___	CK: ___
©TxDOT JULY 2021__	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		102

DATE:
FILE:



ITEM	DESC.	QUANTITY
666-6170	REFL PAV MRK TY II (W) 4" (SLD)	2599 LF
666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	850 LF
666-6300	RE PM W/RET REQ TY I (W)4"(BRK) (100MIL)	220 LF
666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	875 LF
666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	850 LF
672-6007	REFL PAV MRKR TY I-C	11 EA
672-6007	ELIM EXT PAV MRK & MRKS (4")	5174 EA

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/29/2024

Texas Department of Transportation

STRIPING LAYOUT

REFERENCE #6

NBI: 03-243-0-0283-06-070

SH 79 NB

OVER SH 79 CONN FM 369 WB

FILE:	DN: ____	CK: ____	DW: ___	CK: __
©TxDOT JULY 2021 __	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70,ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		103

DATE:
FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
70	1	W12-2a	15 FT 3 IN	84X24	x				BRI	DGE	MOUNT	S
72	2	W12-2a	16 FT 6 IN	84X24	x				BRI	DGE	MOUNT	S
74	3	W12-2a	15 FT 4 IN	84X24	x				BRI	DGE	MOUNT	S
76	4	W12-2a	15 FT 8 IN	84X24	x				BRI	DGE	MOUNT	S
78	5	W12-2a	16 FT 11 IN	84X24	x				BRI	DGE	MOUNT	S
78	6	W12-2a	15 FT 11 IN	84X24	x				BRI	DGE	MOUNT	S
80	7	W12-2a	15 FT 4 IN	84X24	x				BRI	DGE	MOUNT	N

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

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

http://www.txdot.gov/

NOTE:

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

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0043	06	098	US 70, ETC
4-16		DIST	COUNTY		SHEET NO.
8-16		WFS	WILBARGER, ETC		104

18

DATE: 3/2/2024 11:02:53 PM
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DATE: 3/3/2024 12:06:22 AM
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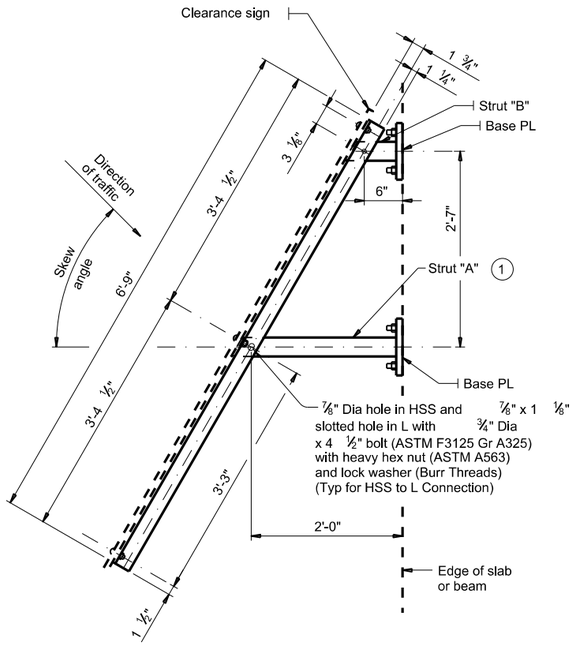
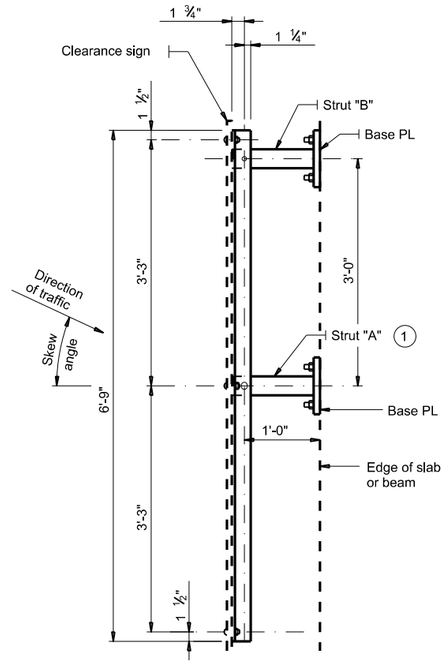
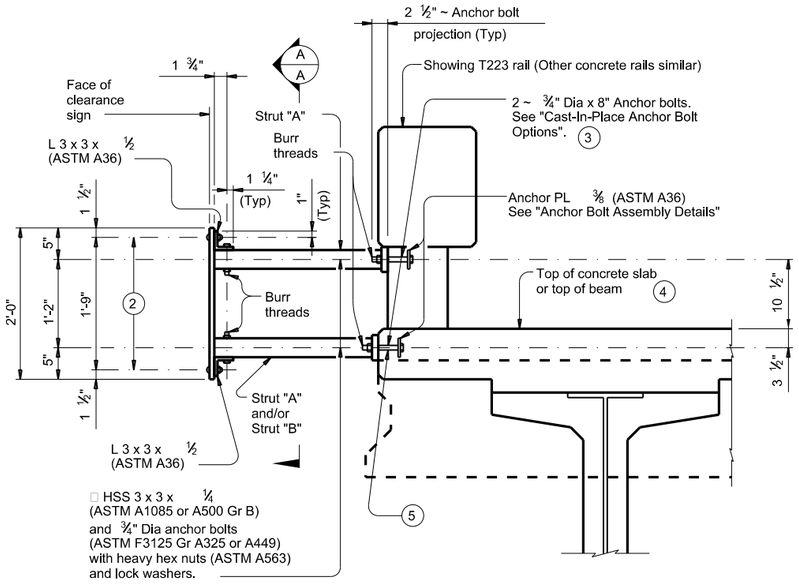


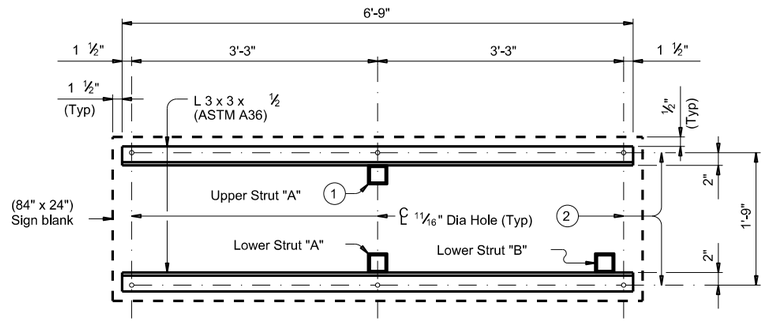
PLAN OF
TYPE S MOUNT
(Used for skews over 30°)



PLAN OF
TYPE N MOUNT
(Used for 0° to 30° skews)



SECTION



SECTION A-A

(1) Locate centerline of Strut A no closer than 12" from a vertical concrete edge.

(2) ⅞" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.

(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(4) For decked slab beams topped with a 2 course surface treatment and ACP overlay.

(5) Anchor bolts to be cast into decked slab beams topped with a 2 course surface treatment or ACP overlay. Anchor bolts with heavy hex nuts, regular lock washers, hardened washers and anchor plate that is embedded in the beam will be provided by the beam Fabricator.

CONSTRUCTION NOTES:

Install the vertical face of clearance sign plumb unless otherwise approved by the Engineer.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 1 anchor per bridge mounted clearance sign installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components after fabrication unless otherwise noted.

GENERAL NOTES:

This standard provides details to mount a vertical clearance sign (84" x 24") to bridges. Rail Types T631, T631LS, PR11, PR22 and PR3 are not accommodated.

The Engineer will furnish the clearance to be shown on the sign.

See Bridge Layout for sign location and mounting type (Type N or S).

Cost of furnishing, installing, relocating or removing a clearance sign, including structural steel for sign mount, is included in unit price bid for Item 644, "Small Roadside Sign Assemblies".

One Sign Blank (84" x 24") is 14 SF.

Average steel weight for one complete Type N Mount is 219 Lb.

Average steel weight for one complete Type S Mount is 233 Lb.

Texas Department of Transportation

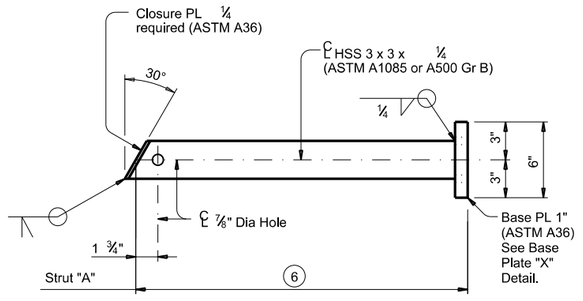
Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

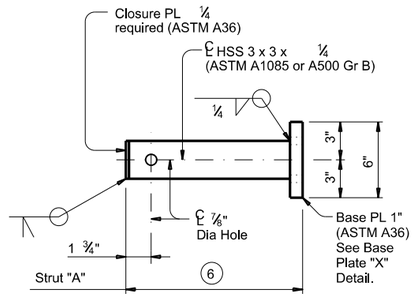
BMCS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		105

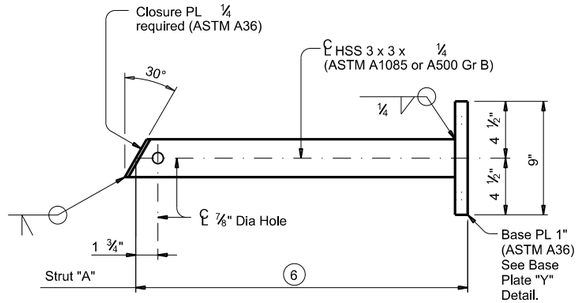
DATE: 3/3/2024 12:06:49 AM
FILE: T:\WFSDESGN\Plans\0043-06\098\4 - DesignPlan Set\8. Traffic\MS-BMCS-19.dgn



FOR T411 AND C411 RAIL TYPES



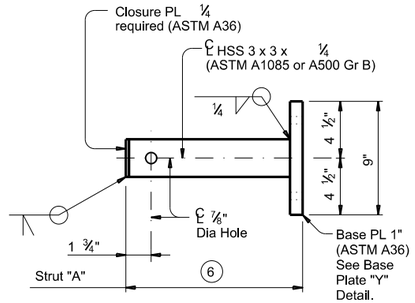
FOR T411 AND C411 RAIL TYPES



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

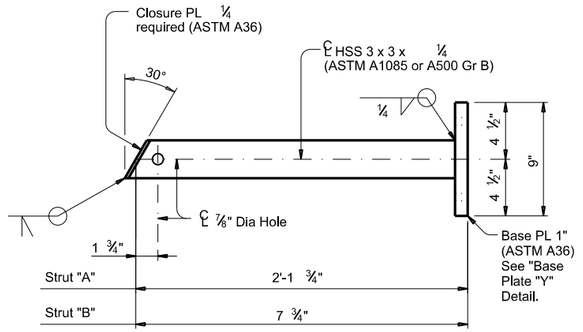
(Used for skews over 30°)



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

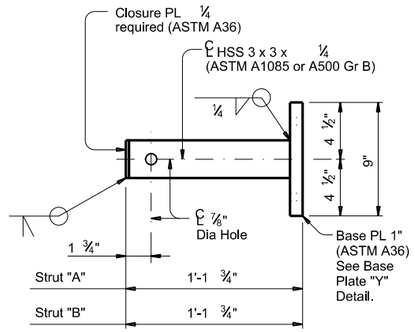
UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



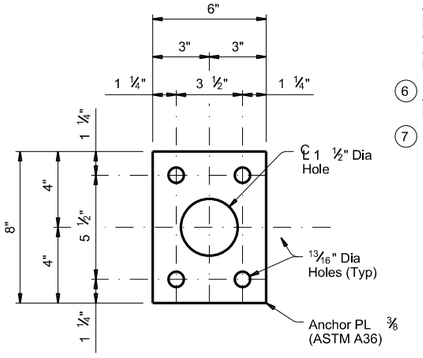
LOWER STRUT DETAILS FOR (TYPE S MOUNT)

(Used for skews over 30°)

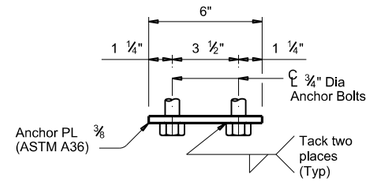


LOWER STRUT DETAILS FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



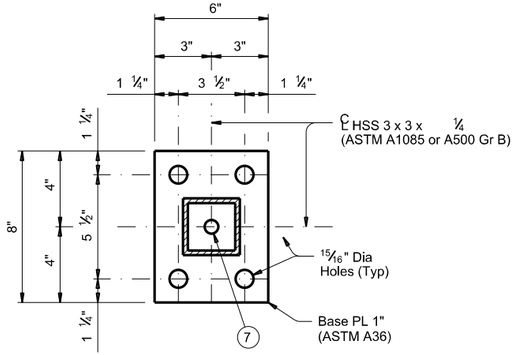
PLAN OF ANCHOR PLATE



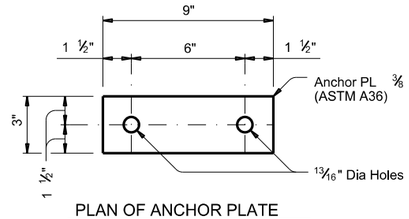
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

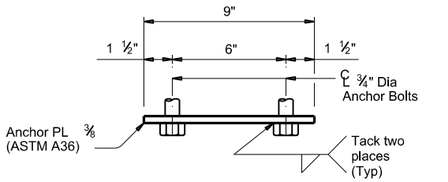
(Used on Base Plate "X" with T411 and C411 rail types.)



BASE PLATE "X" DETAIL



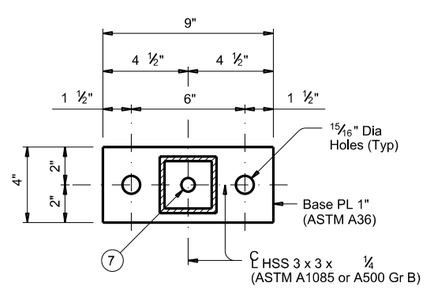
PLAN OF ANCHOR PLATE



ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

(Used on Base Plate "Y" and with T1F, T2P, C2P, T1W, C1W, T66 and C66 rail types.)



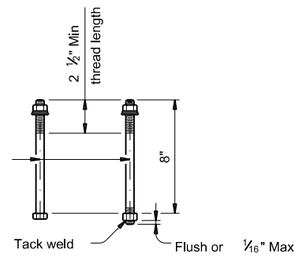
BASE PLATE "Y" DETAIL

(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(7) Hole required to drain zinc from base plate during galvanizing.

¾" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened washer and one regular lock washer placed under heavy hex nut (ASTM A563). Furnish one additional heavy hex nut for each threaded rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (3)

SHEET 2 OF 3

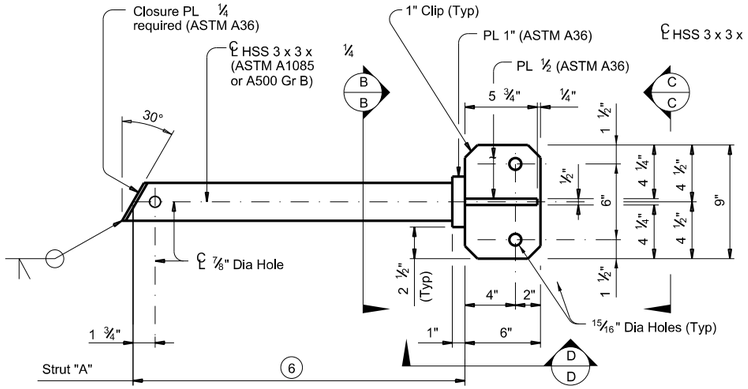
Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

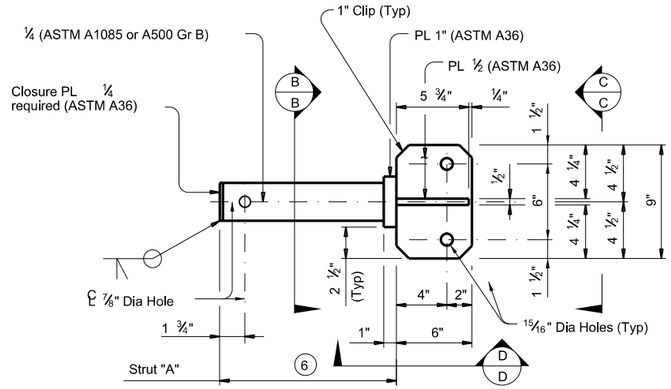
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		106



FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

(Used for skews over 30°)



FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)

(2) □ ⅝" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.

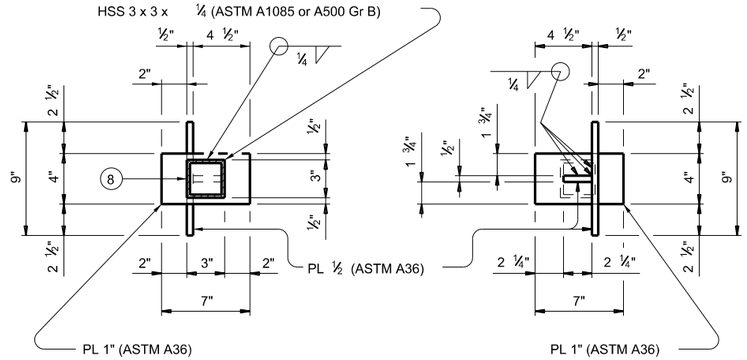
(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(4) For decked slab beams topped with a 2 course surface treatment and ACP overlay.

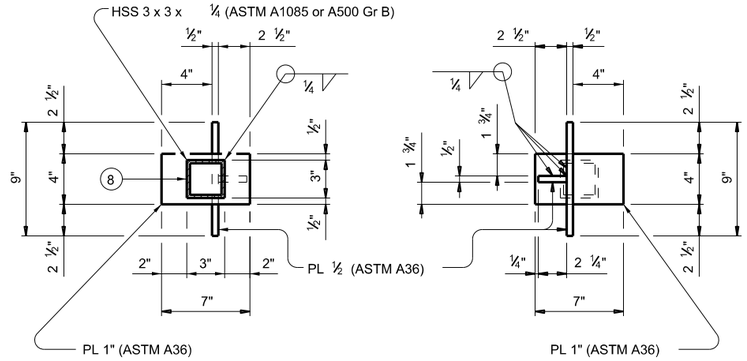
(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(8) Hole required in bottom of HSS to drain zinc during galvanizing.

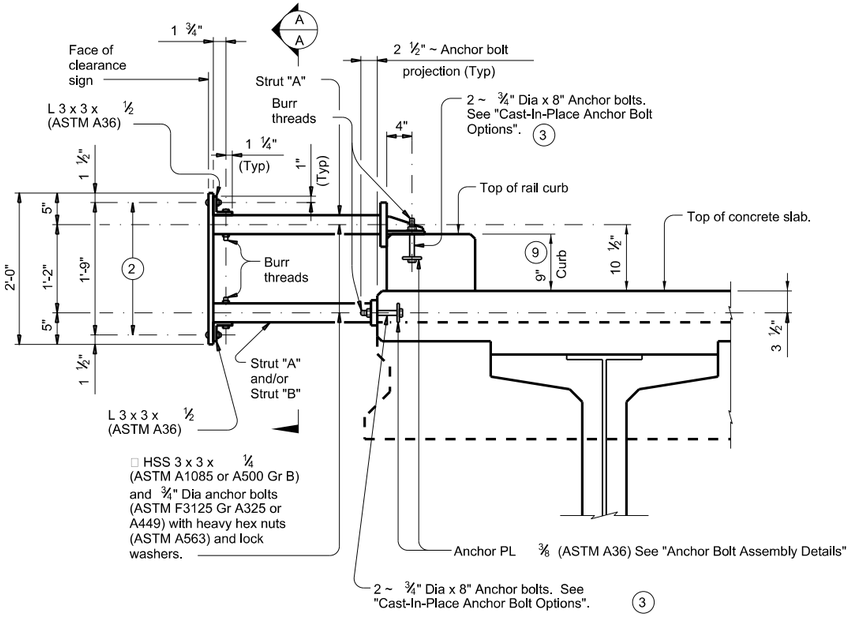
(9) 11" curb is for structures with 2" ACP overlay.



FOR 9" HIGH CURBS



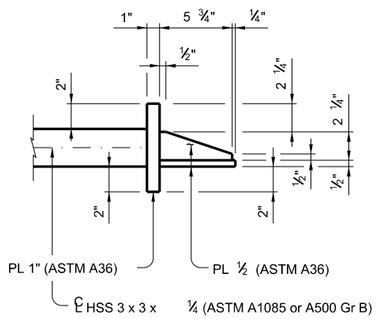
FOR 11" HIGH CURBS



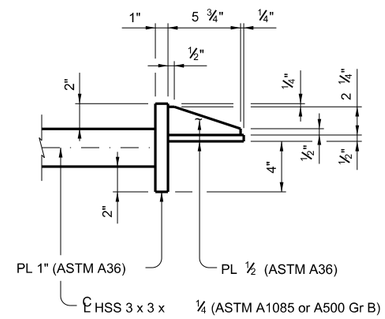
SECTION THRU T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL CURB

Showing sign mount on a 9" high curb, 11" high curb similar.

SECTION B-B



FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

VIEW C-C

VIEW D-D

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		107

DATE: 3/3/2024 12:07:04 AM
FILE: T:\WFSDESGN\Plans\0043-06\098\4 - Design\Plan Set\8. Traffic\MS-BMCS-19.dgn

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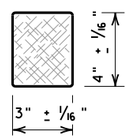
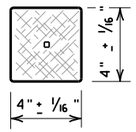
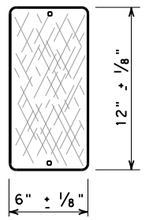
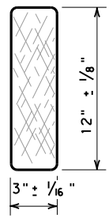
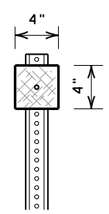
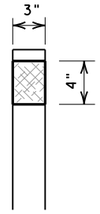
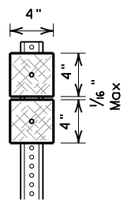
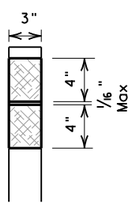
DATE: DATE TIME
FILE: DOCUMENT NAME

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

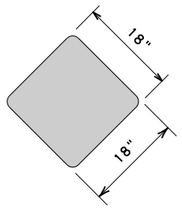
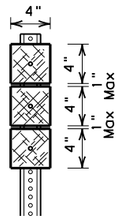
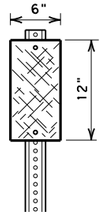
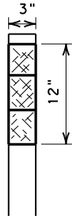
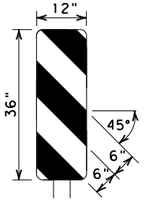
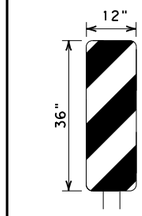
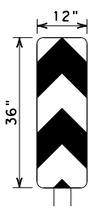
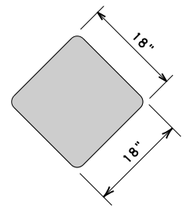
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

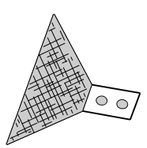
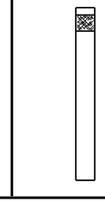
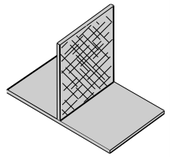
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

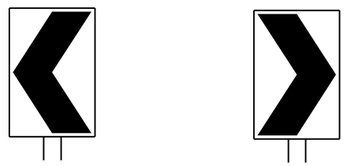
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE

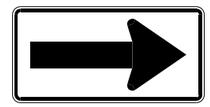


SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

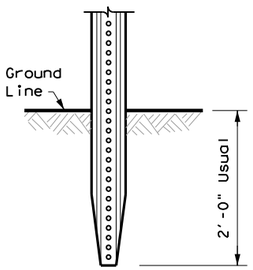
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WFS	WILBARGER, ETC		108

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

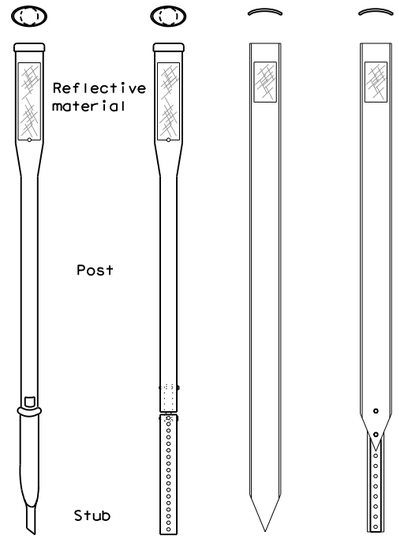


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

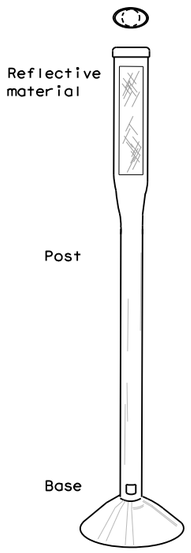
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



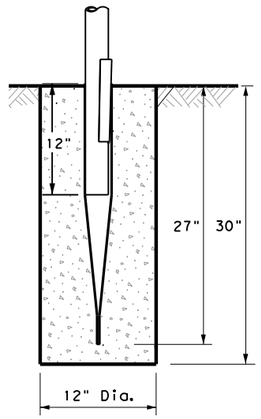
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

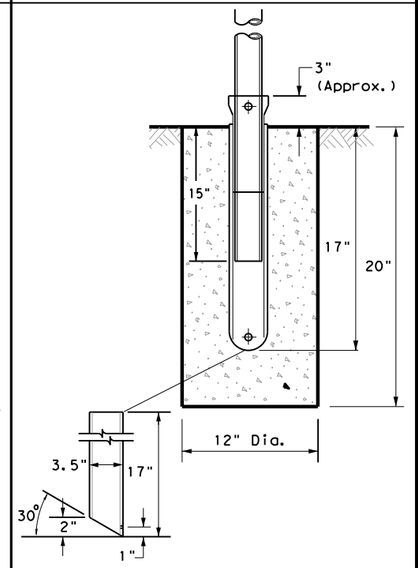
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

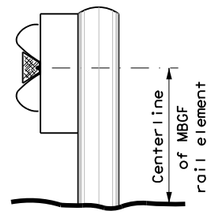
NOTE

1. Install per manufacturer's recommendations.

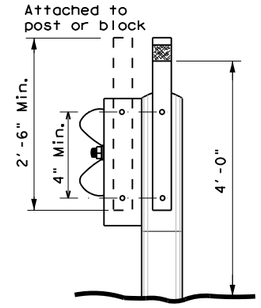
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

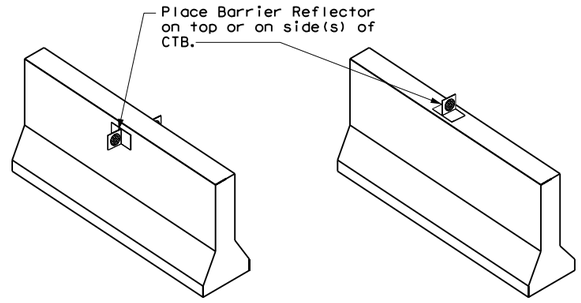
GF1



GF2



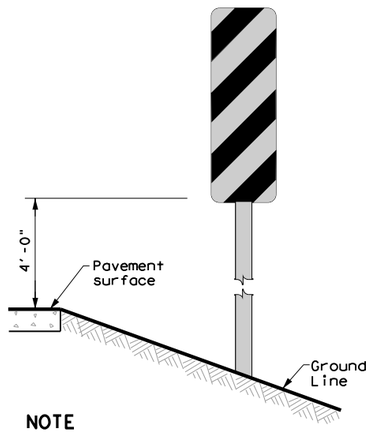
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

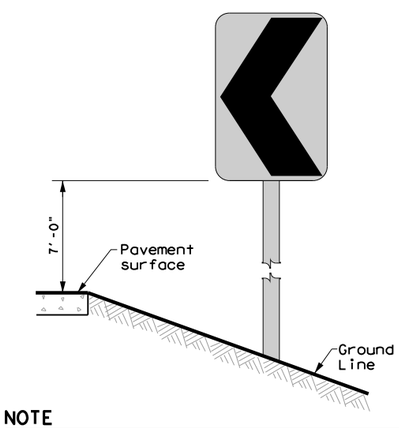
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

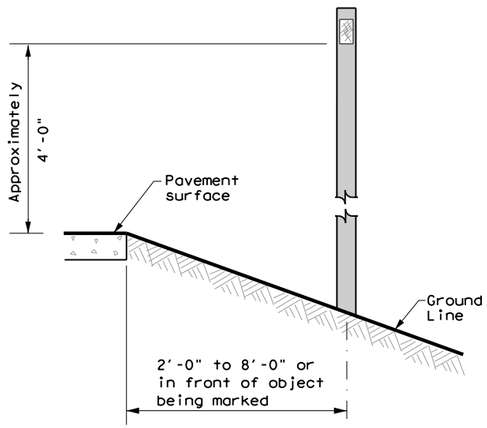
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

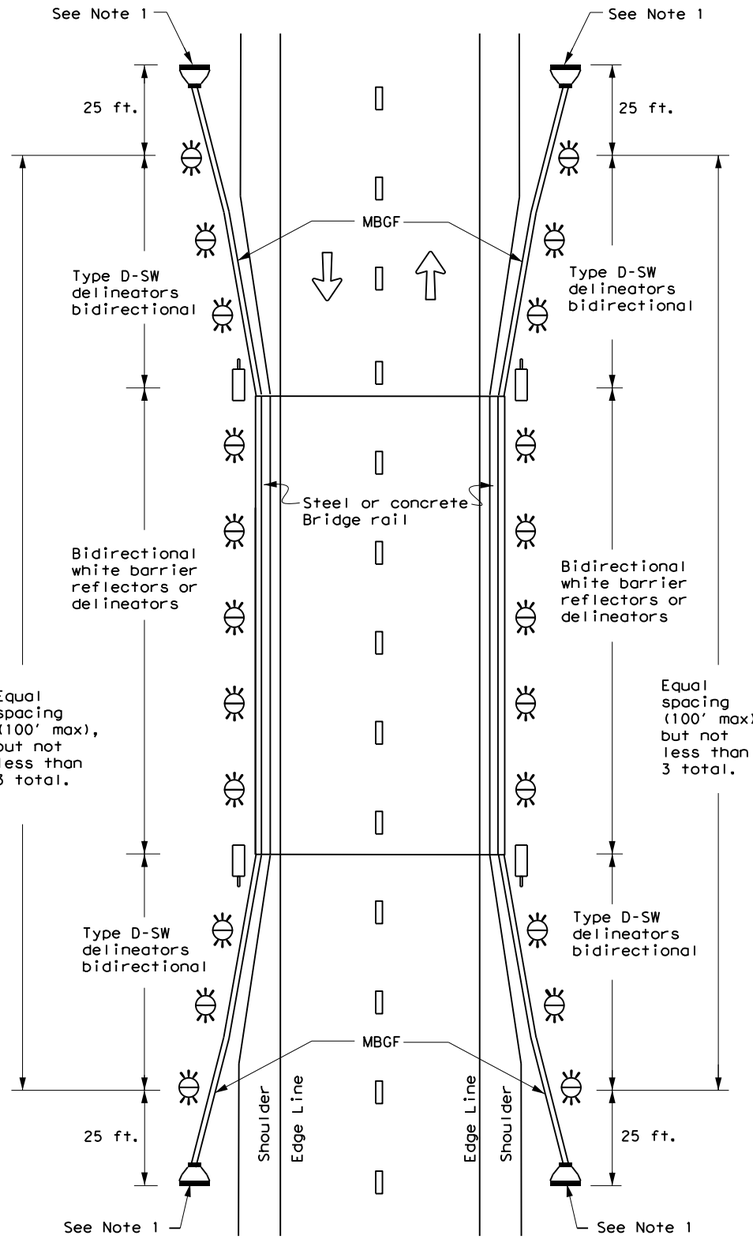
D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WFS	WILBARGER, ETC		109

20B

DATE: DATE TIME
FILE: DOCUMENT NAME

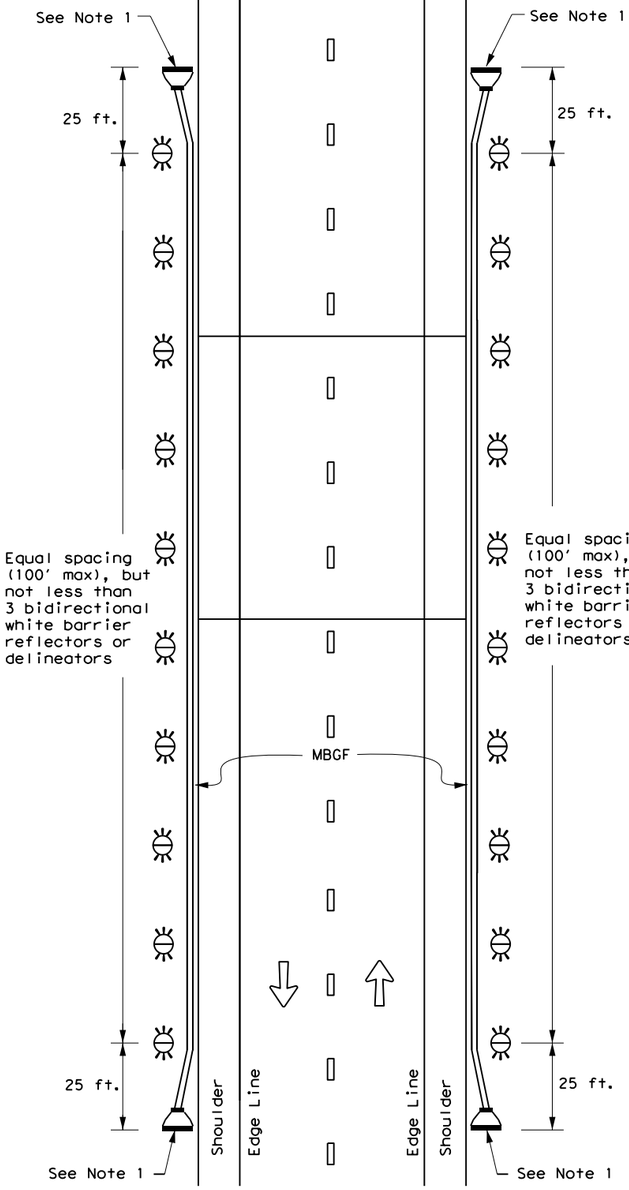
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

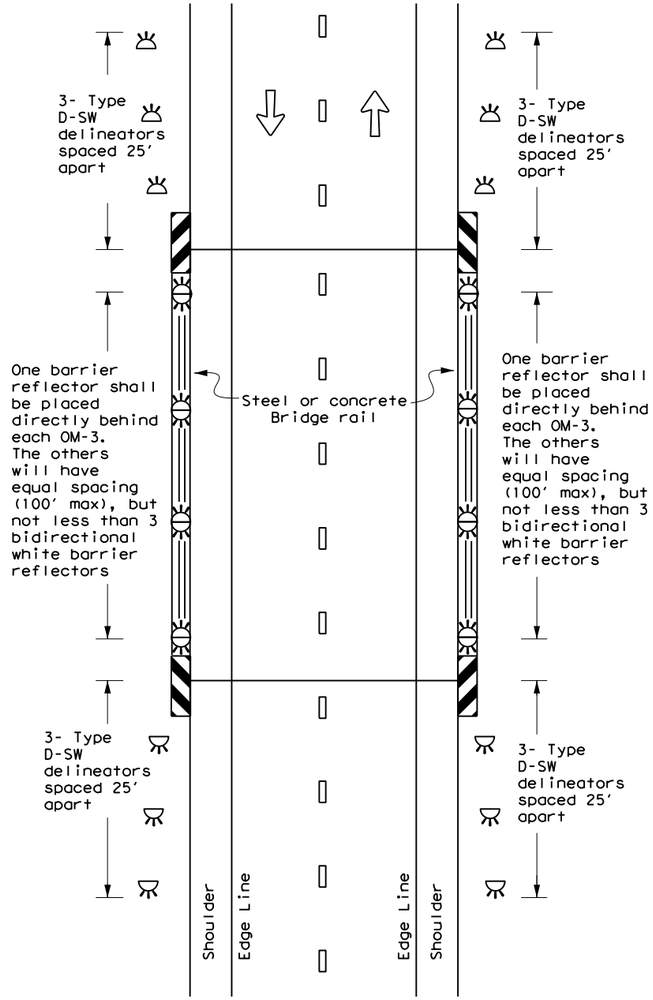
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

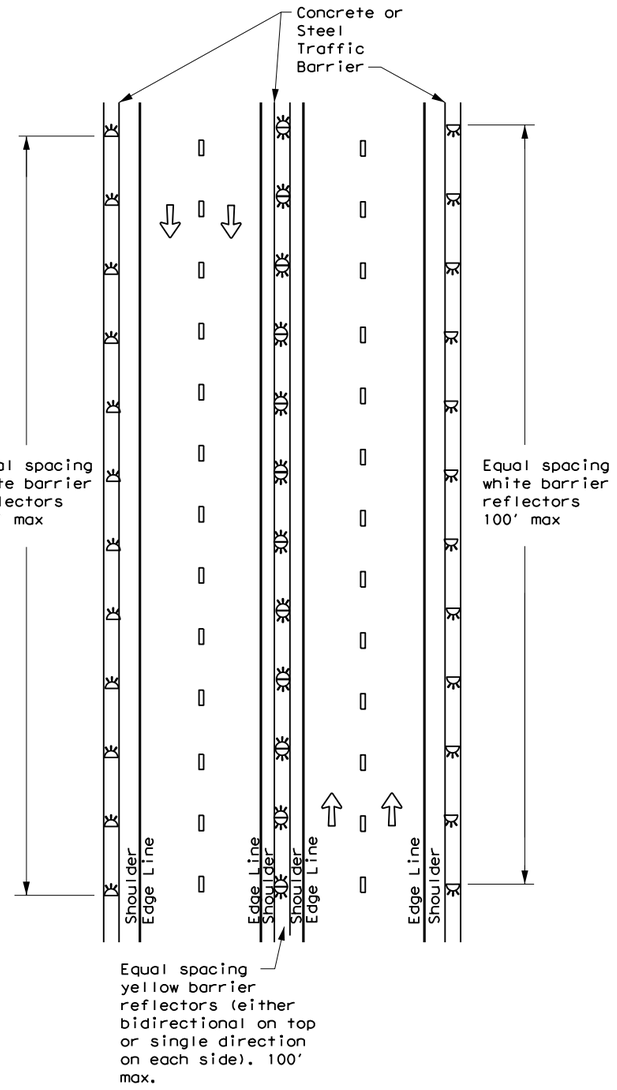
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
7-20	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		110

20E

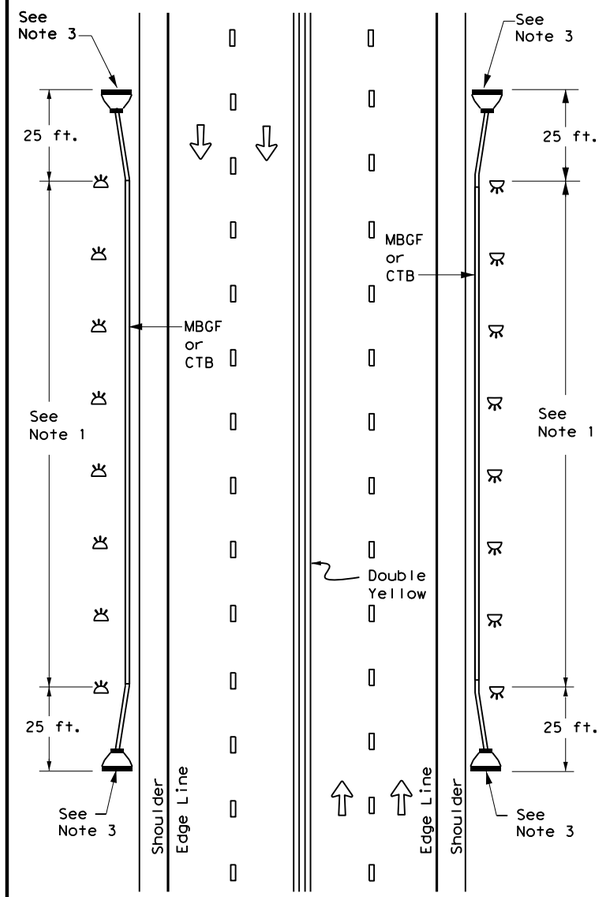
DATE: DATE TIME
FILE: DOCUMENT NAME

DATE:
FILE:

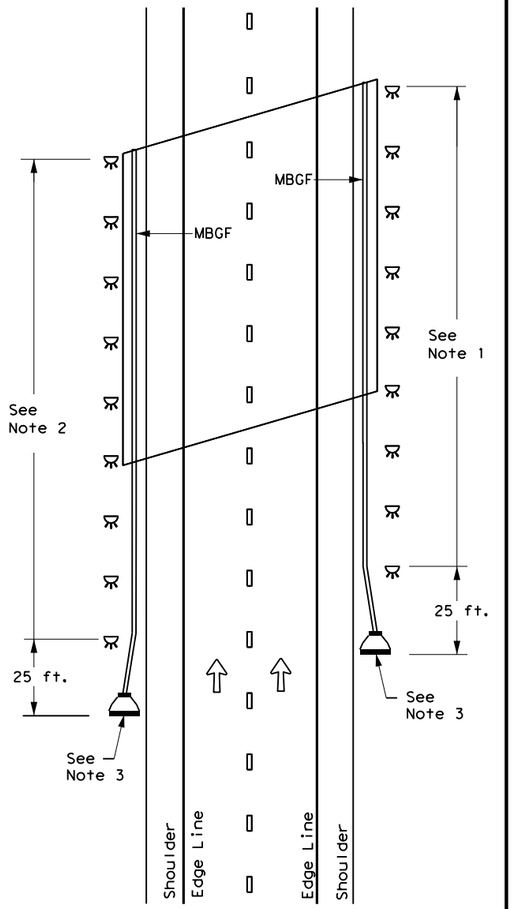
CONTINUOUS CONCRETE OR STEEL BARRIER



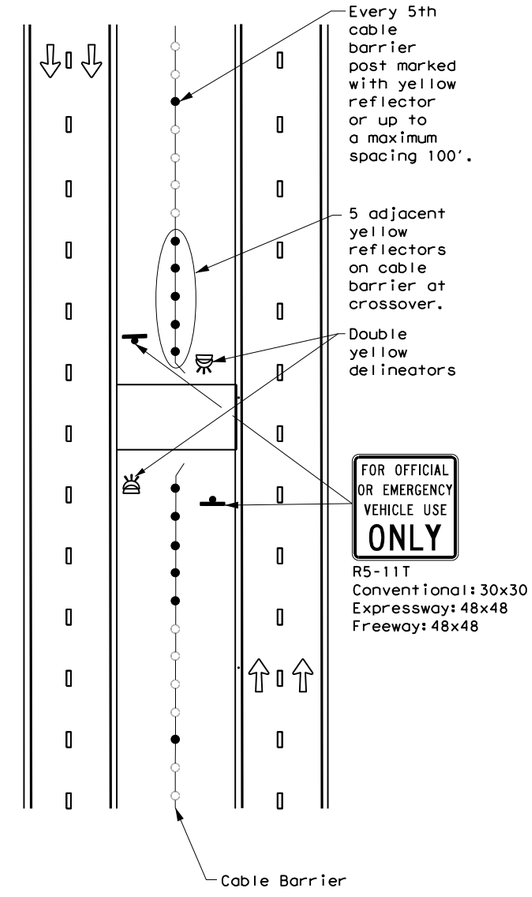
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100′ max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100′ max.)
2. Equal spacing (100′ max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

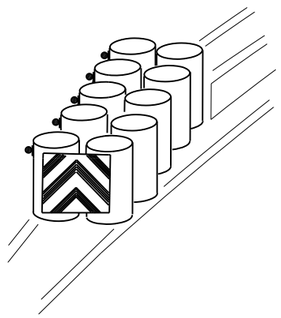
Texas Department of Transportation

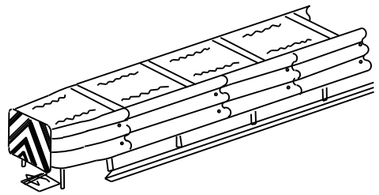
Traffic Safety Division Standard

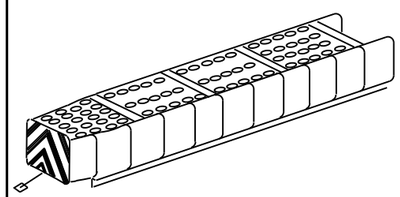
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

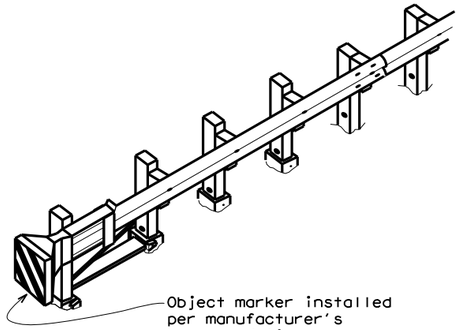
D & OM(6)-20

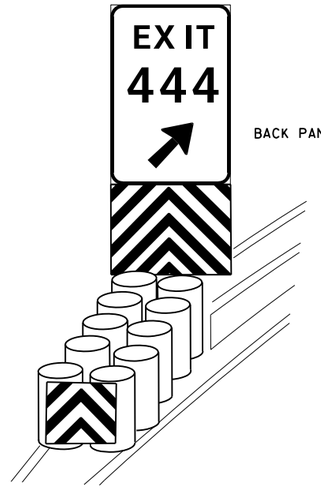
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
7-20	DIST	COUNTY		SHEET NO.

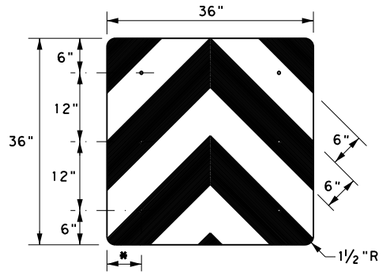


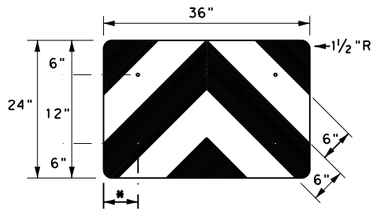




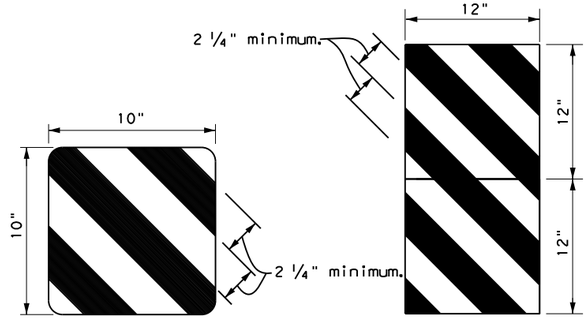




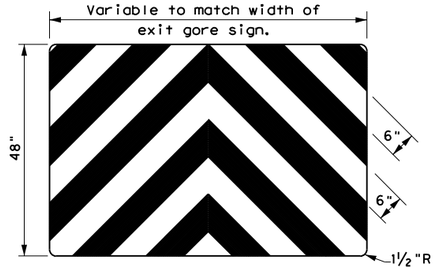


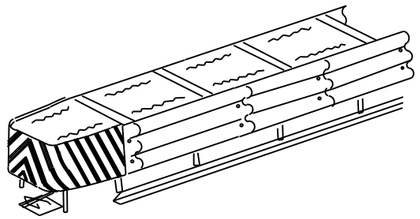


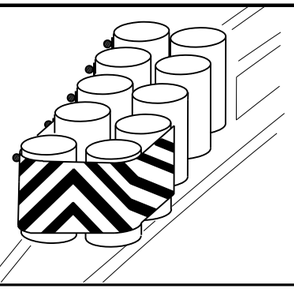
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

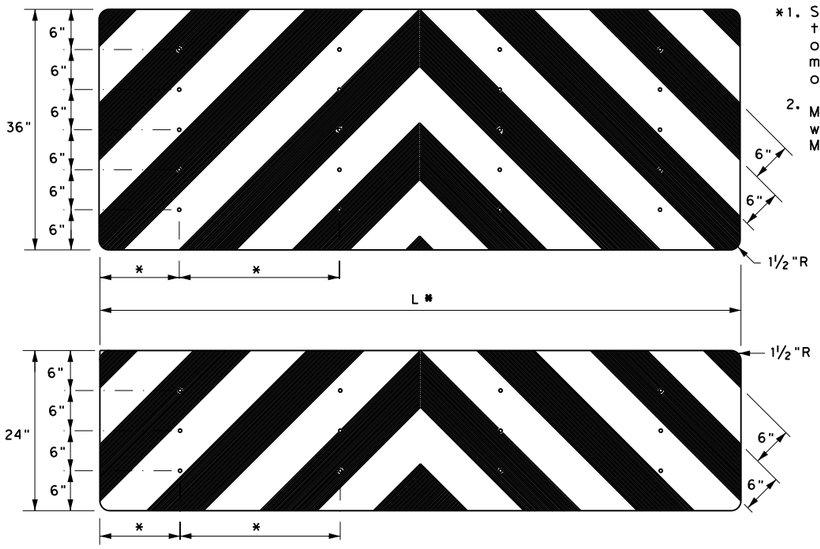


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

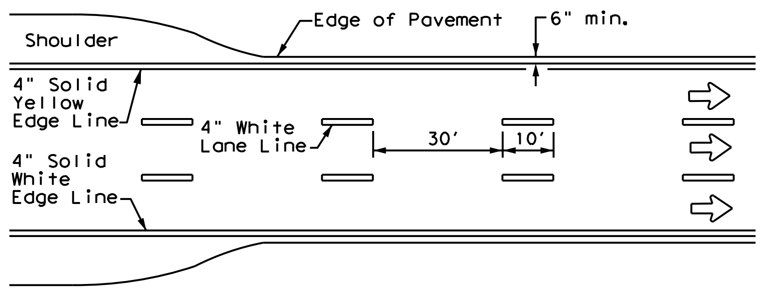
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

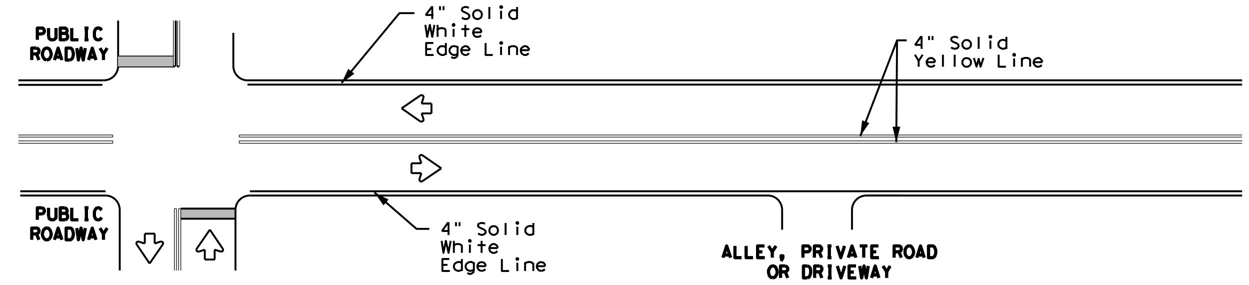
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	WFS	WILBARGER, ETC		112
4-98 7-20				

20G

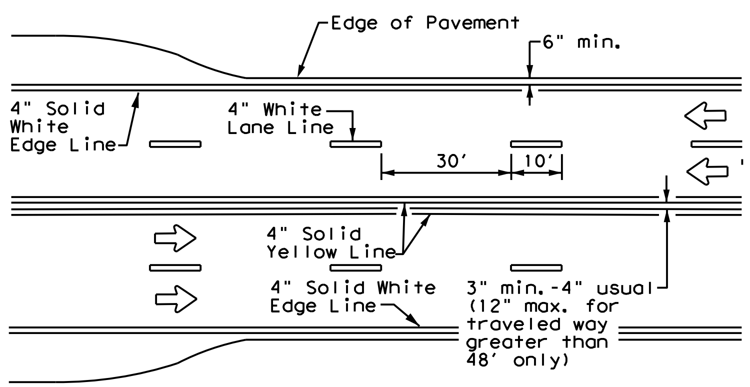
DATE: DATE TIME
FILE: DOCUMENT NAME



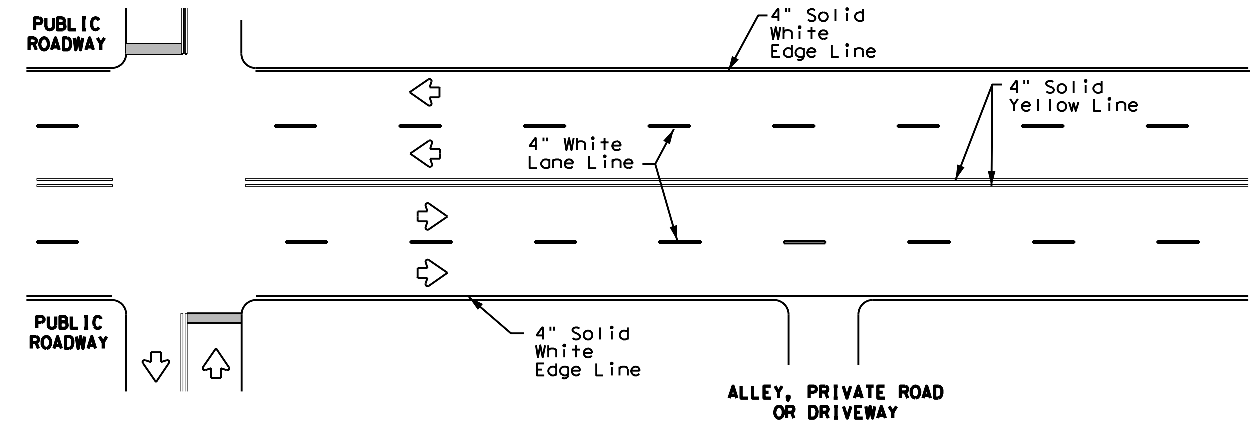
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



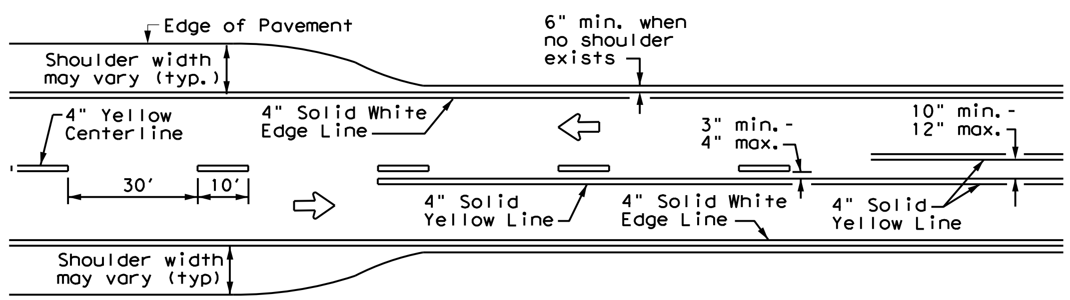
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



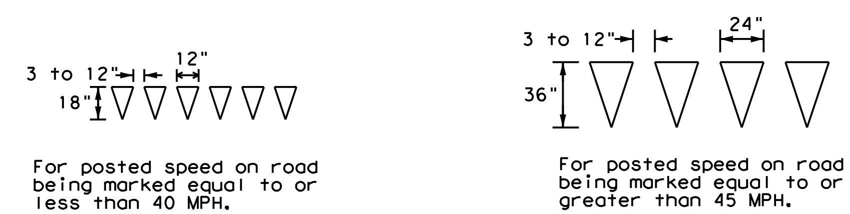
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



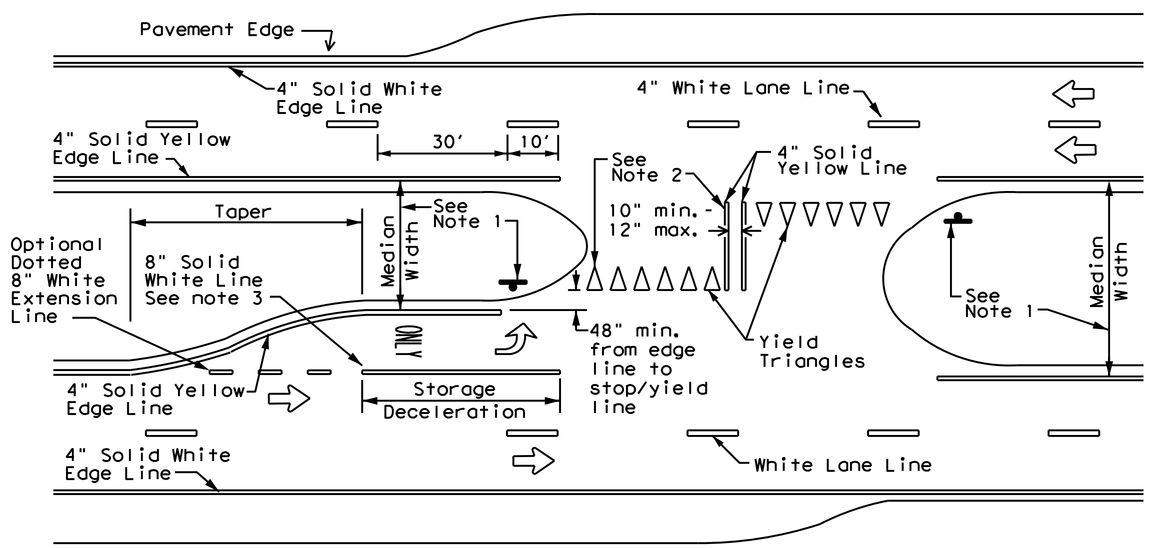
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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.

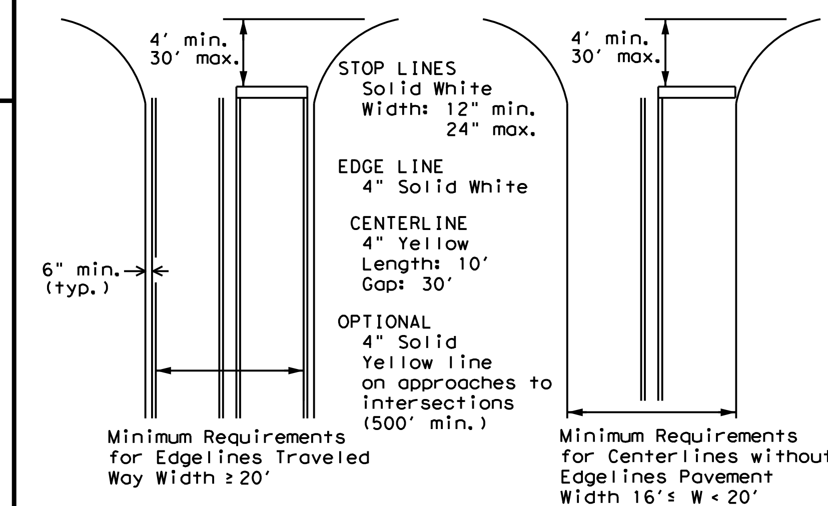
GENERAL NOTES

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

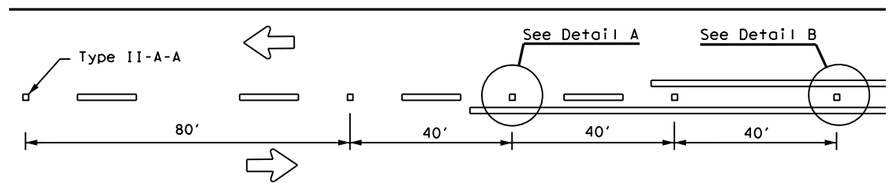
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

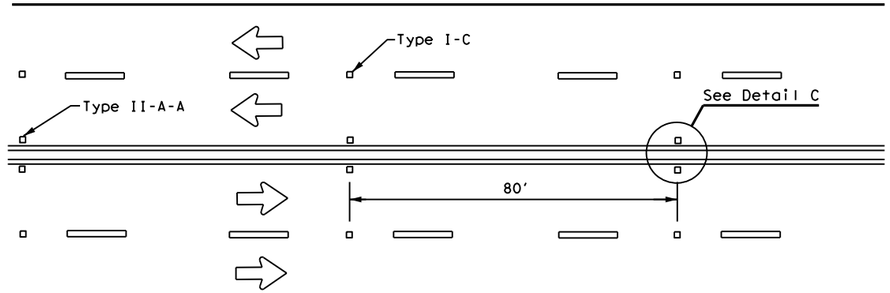
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 5-00 2-12 8-00 6-20	0043	06	098	US 70,ETC
	DIST		COUNTY	SHEET NO.
	WFS		WILBARGER, ETC	113

22A

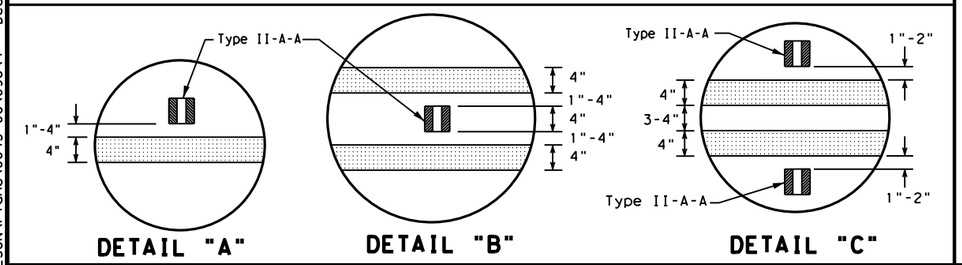
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



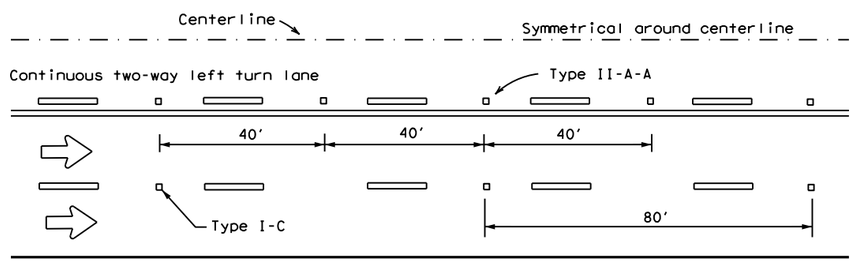
CENTERLINE FOR ALL TWO LANE ROADWAYS



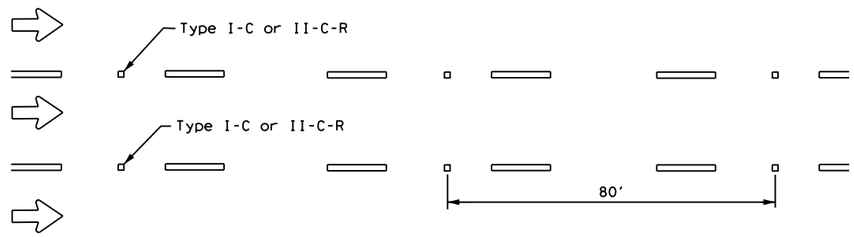
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

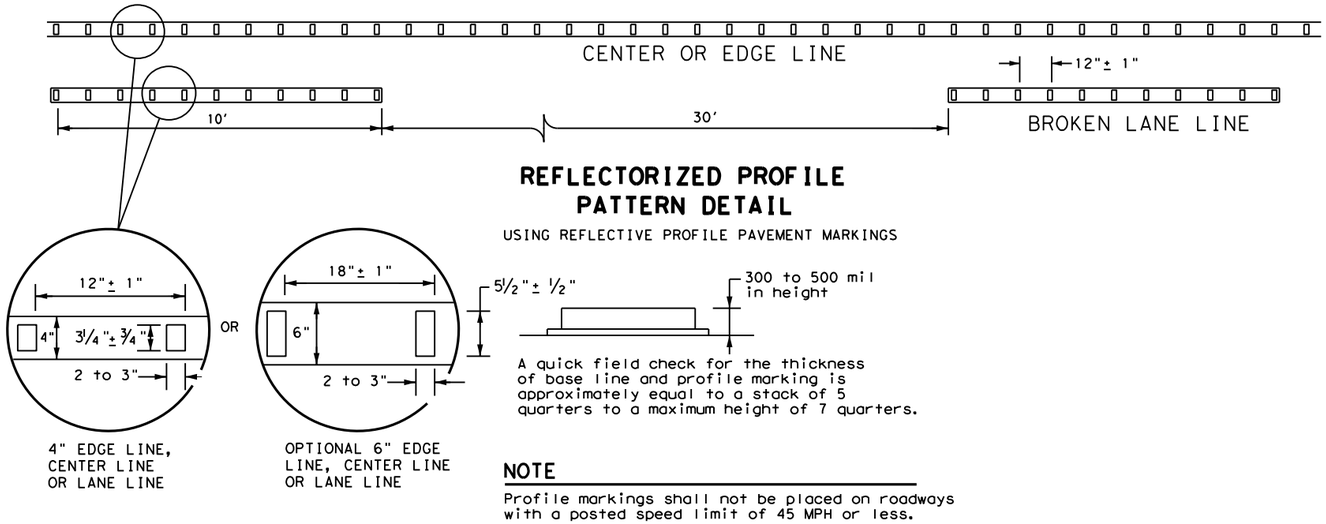


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

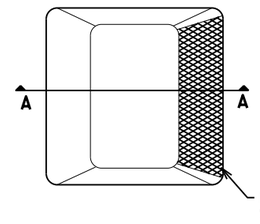
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

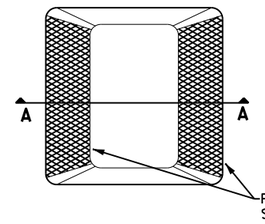
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

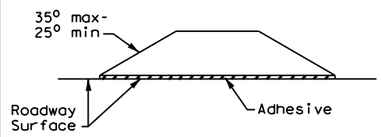
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



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 5-00 2-12 8-00 6-20	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		114

22B

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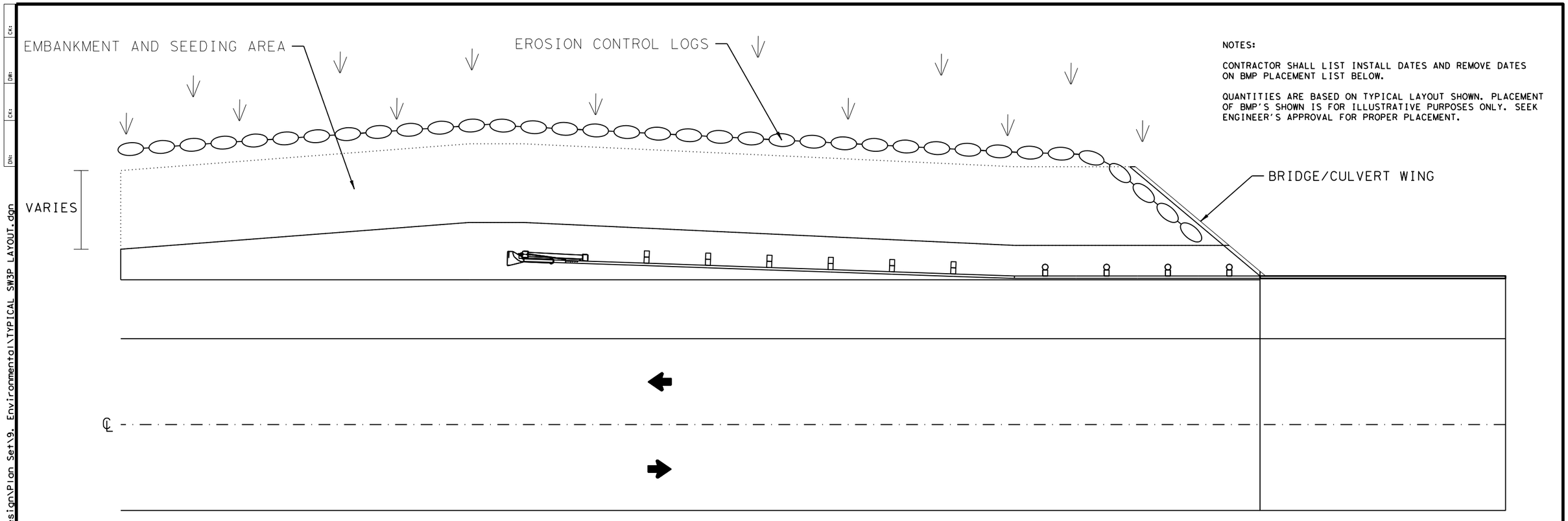

NOTES:

CONTRACTOR SHALL LIST INSTALL DATES AND REMOVE DATES ON BMP PLACEMENT LIST BELOW.

QUANTITIES ARE BASED ON TYPICAL LAYOUT SHOWN. PLACEMENT OF BMP'S SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. SEEK ENGINEER'S APPROVAL FOR PROPER PLACEMENT.

TYPICAL BMP LAYOUT

REFERENCE NO.	BMP PLACEMENT - UPSTREAM END					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

REFERENCE NO.	BMP PLACEMENT - DOWNSTREAM END					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

NOT TO SCALE

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

US 70, ETC
TYPICAL SW3P LAYOUT

Texas Department of Transportation

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
WFS	WILBARGER, ETC		115

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. CITY OF WICHITA FALLS

- [ ] No Action Required
- [x] Required Action

Action No.

1. The project disturbs less than one acre of surface area. The contractor is responsible for the PSL as defined in the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges. The total disturbed acreage is the combined acreage to be disturbed on the project and the contractors PSL.
2. Prevent stormwater pollution by controlling erosion and sedimentation to the maximum extent practical. Comply with the SW3P and revise as necessary or as required by the Engineer.
3. This EPIC must be updated if the disturbed area increases to one or more acres during the course of construction.
4. It may become necessary to post a site notice and/or NOI for the project and/or PSL in a location accessible to the public and TCEQ, EPA, or other inspector if the disturbed area increases to more than 1 acre.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

- [x] No Permit Required
- [ ] Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- [ ] Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- [ ] Individual 404 Permit Required
- [ ] Other Nationwide Permit Required: NWP# ______

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

Impacts to waters of the U.S. are prohibited.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
[x] Temporary Vegetation	[ ] Silt Fence	[ ] Vegetative Filter Strips
[ ] Blankets/Matting	[ ] Rock Filter Dams	[ ] Retention/Irrigation Systems
[ ] Mulch	[ ] Vegetative Filter Strips	[ ] 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	[x] Erosion Control Logs	[ ] 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	[x] Vegetation Lined Ditches
	[ ] Stone Outlet Sediment Traps	[ ] Sand Filter Systems
	[ ] Sediment Basins	[ ] Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

- [x] No Action Required
- [ ] Required Action

Action No.

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
- [x] Required Action

Action No.

1. Vegetation disturbances should be limited to backfilling edges of mow strip and kept to the minimum necessary to complete the project.
2. Re-vegetation of disturbed areas shall be done in accordance with TxDOT's standard practices, in compliance with the Executive Memorandm on Beneficial Landscaping.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

- [ ] No Action Required
- [x] Required Action

Action No.

1. Bird BMPs: Migratory birds may arrive in the project area to breed during construction of the proposed project. Per the Migratory Bird Treaty Act (MBTA), measures would be taken to avoid disturbing or killing of migratory birds. Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season, March through August. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests prior to nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

- [x] Yes
- [ ] No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

- [x] Yes
- [ ] No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

The asbestos abatement work will be contracted and paid for by TxDOT resources. Contact the engineer to confirm asbestos abatement has been completed prior to starting work items on Reference #4 (NBI:03-243-0044-01-119)

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

- [ ] No Action Required
- [x] Required Action

Lead based paint has been identified on the bridge rail for Ref. 2,3, and 4. Removal shall be done by unbolting the rail. No sanding, cutting, or torching of painted metal components is authorized.

Lead based paint has been identified on the bridge girders for Ref. 1,2,3, and 4. See item 4207 in the general notes for details.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

- [ ] No Action Required
- [x] Required Action

Action No.

1. Keep noise to a minimum. Reduce idling of vehicles and equipment.
2. Maintain project site. Minimize dust and airborne particles to the maximum extent practical.
3. Collect sanitary waste in accordance with local regulations by a sanitary waste collector. Portable units shall not be placed near a waterway or drainage area.
4. Collect all waste materials, trash, and debris from the construction site daily and deposit into a metal dumpster having a secure cover.
5. TxDOT EMS Policy Statement (English & Spanish) should be displayed at the construction site.

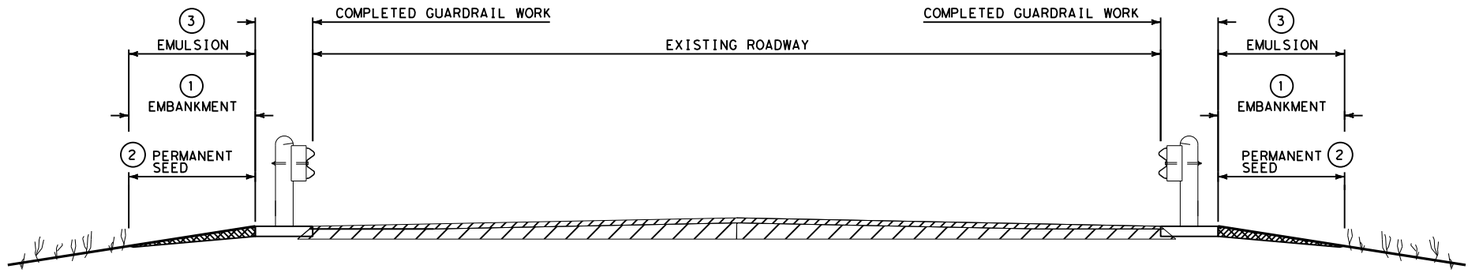
Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: 12-12-2011 (DS); 05-07-14 ADDED NOTE SECTION IV.; 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0043	06	098	US 70,ETC
	DIST		COUNTY	SHEET NO.
	WFS		WILBARGER, ETC	116

NOTES:

1. REFER TO BMP #16 FOR THE LOCATION OF THE DIRT EMBANKMENT PLACEMENT. PLACEMENT DISTANCE IS TO BE A MINIMUM OF 5' OR AS NEEDED TO ACHIEVE SMOOTH TIE IN TO EXISTING FRONT SLOPE. REFER TO BMP#15 ON WFS-TA-BMP PLAN SHEET.
2. PERMANENT SEED ESTIMATED @ 5' ONCE ALL DISTURBANCE ACTIVITIES HAVE BEEN COMPLETED. REFER TO THE VEGETATIVE ESTABLISHMENT PLAN SHEET FOR SEEDING MIXTURES.
3. EMULSION HAS BEEN ESTIMATED AT A MINIMUM OF 5' REFER TO THE BASIS OF ESTIMATES FOR THE APPLICATION RATE.



PROPOSED PERMANENT
SEEDING TYPICAL

N. T. S.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

US 70, ETC
VEGETATIVE ESTABLISHMENT DETAIL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	06	098	US 70, ETC
DIST	COUNTY		SHEET NO.
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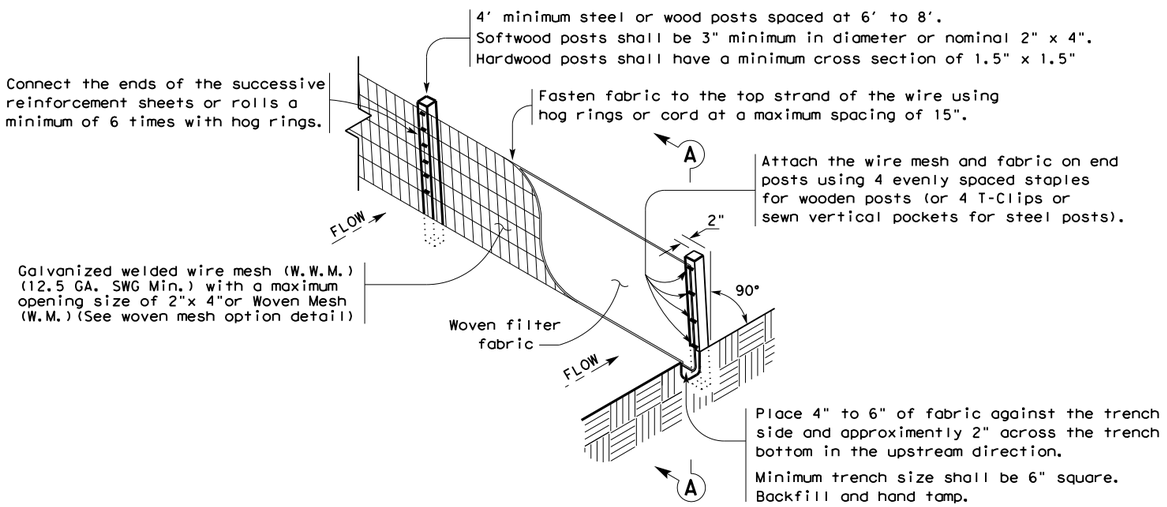
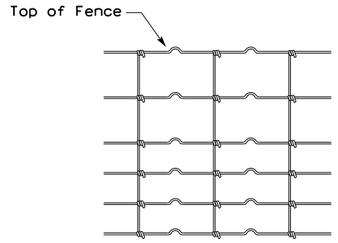
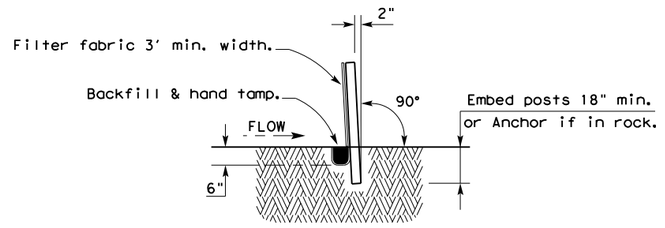


TEMPORARY SEDIMENT CONTROL FENCE

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.

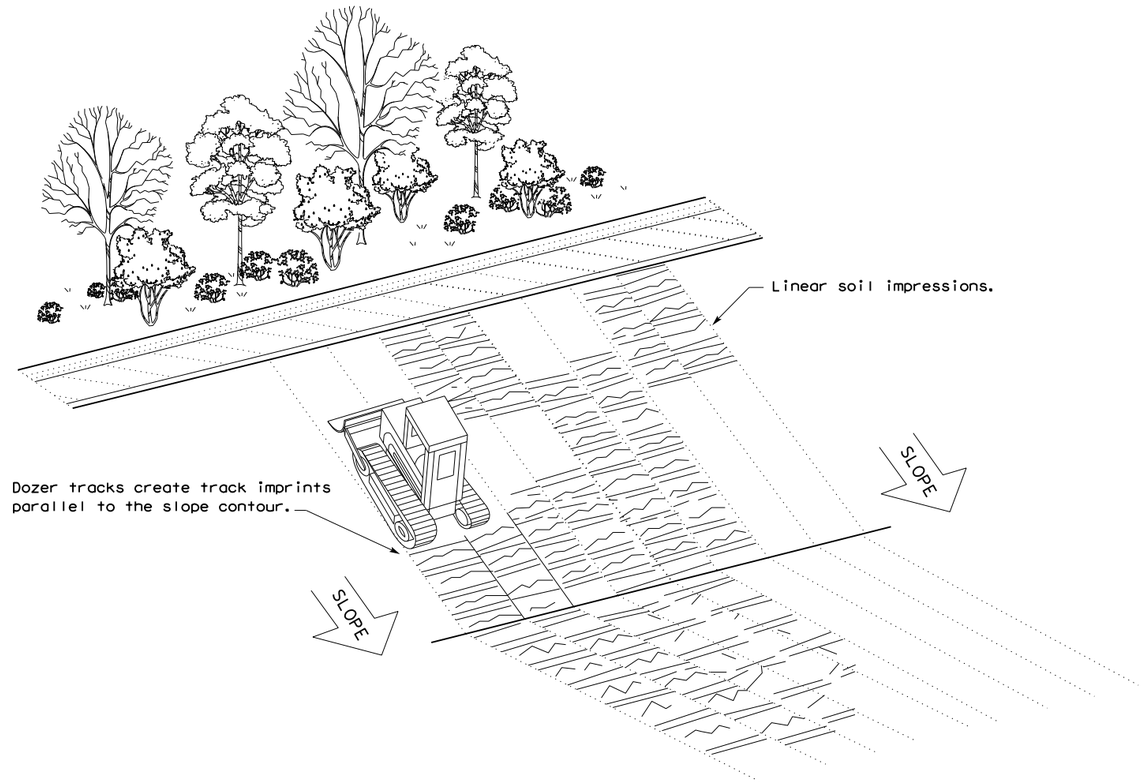
LEGEND

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	0043	06	098		US 70, ETC	
	DIST	COUNTY			SHEET NO.	
	WFS	WILBARGER, ETC			118	

DATE: 3/4/2024
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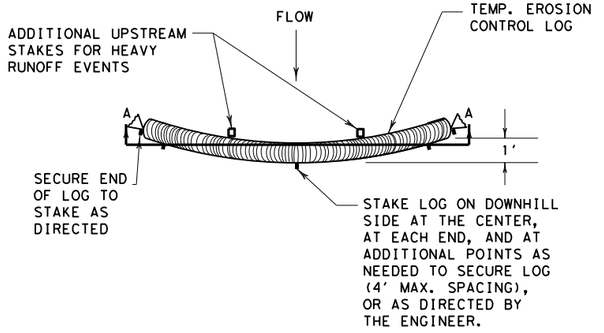
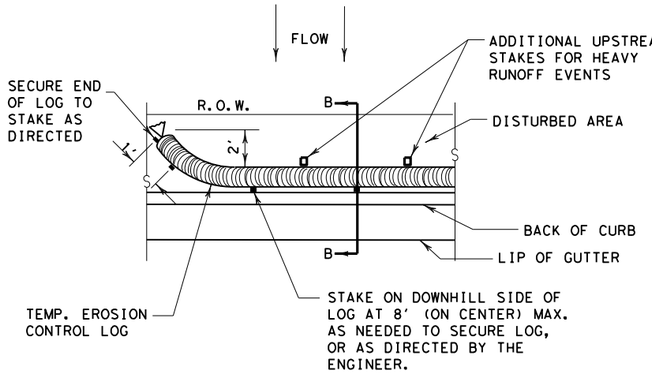
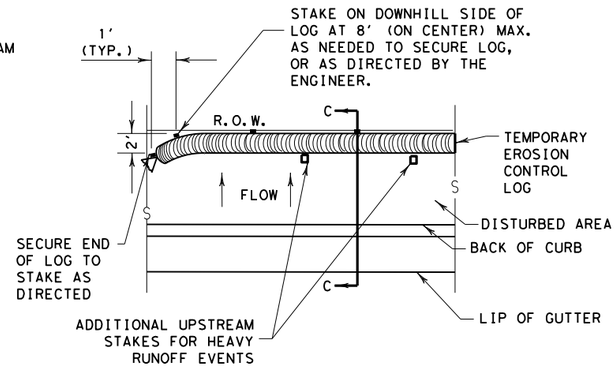


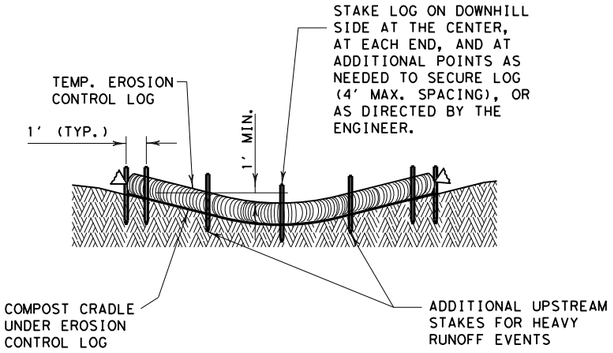
PLAN VIEW



PLAN VIEW



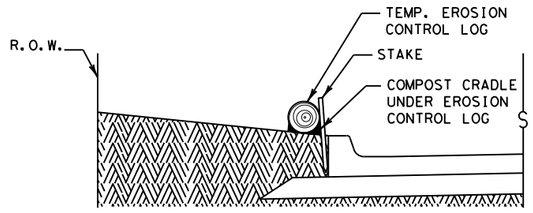
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

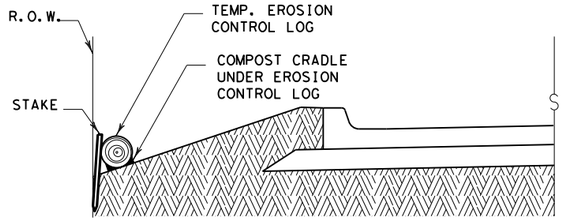
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

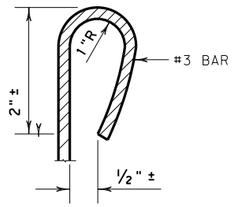
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

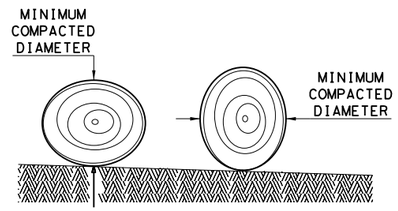
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916		DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0043	06	098		US 70, ETC	
		DIST		COUNTY			SHEET NO.
		WFS		WILBARGER, ETC			119

DATE: 3/4/2024
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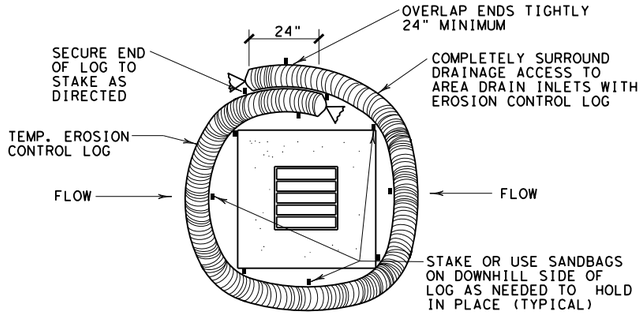
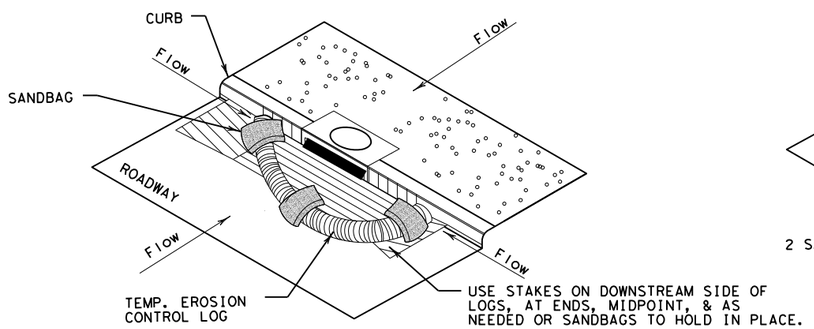


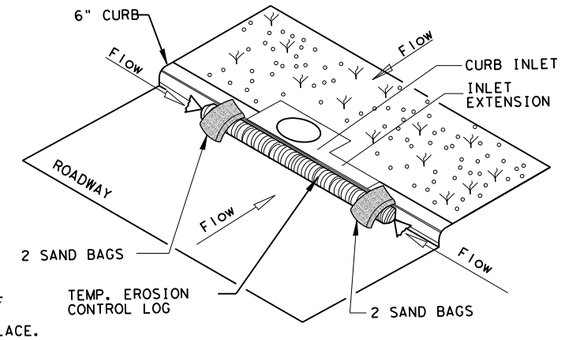
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

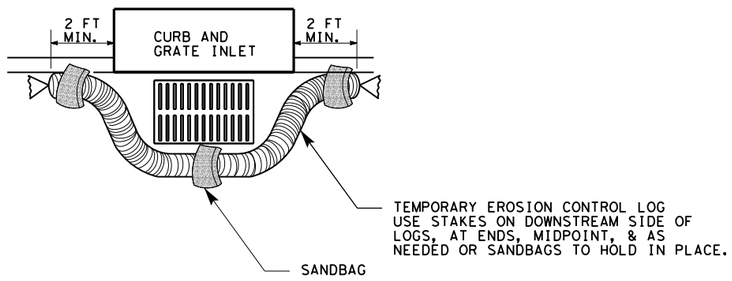
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

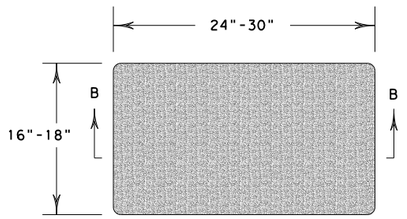
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

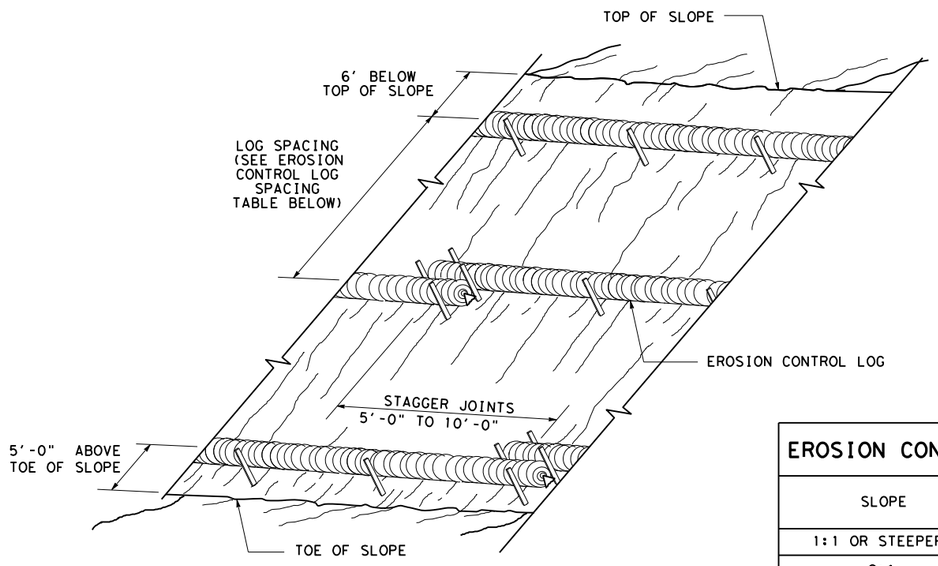
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

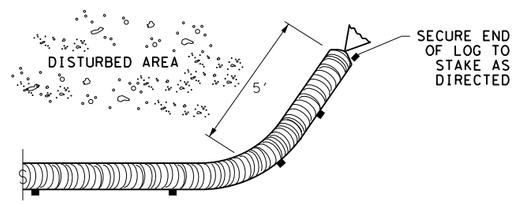
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		121

DATE: 3/4/2024
FILE: \\FS-WFSHQ.dot.state.tx.us\Data1\Data\WFS\Groups\WFSDESGN\Plans\0043-06\098V4 - Design\Plan Set\9. Environmental\EC(9)-16.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

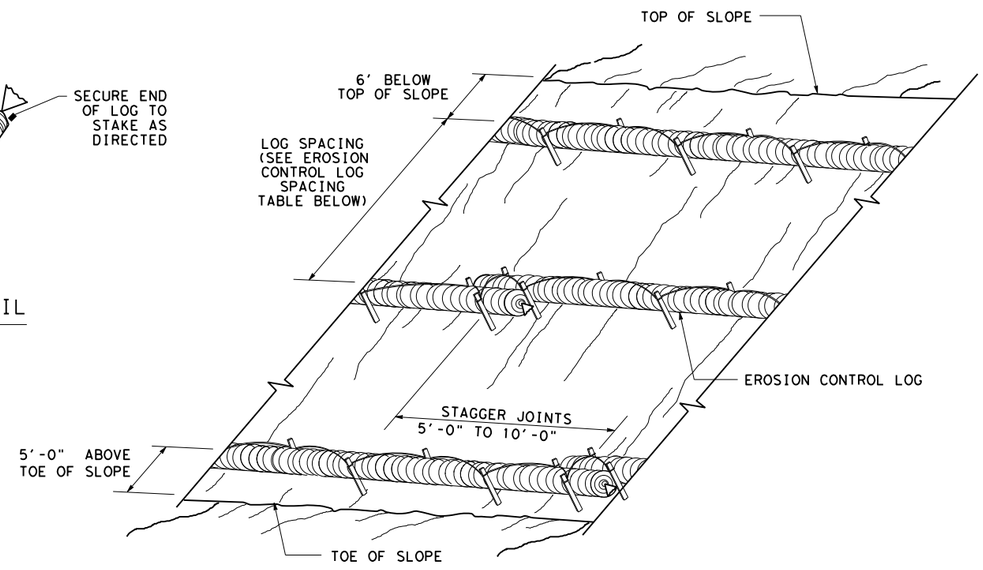
CL-SST



END SECTION RAP DETAIL

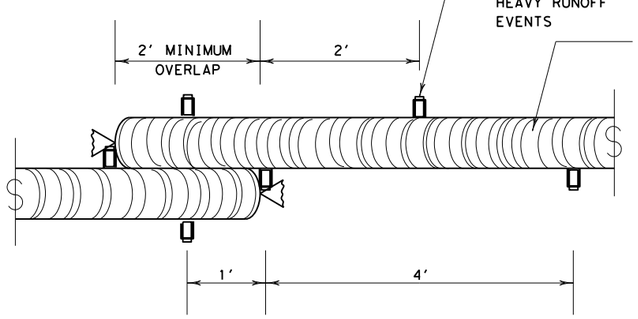
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

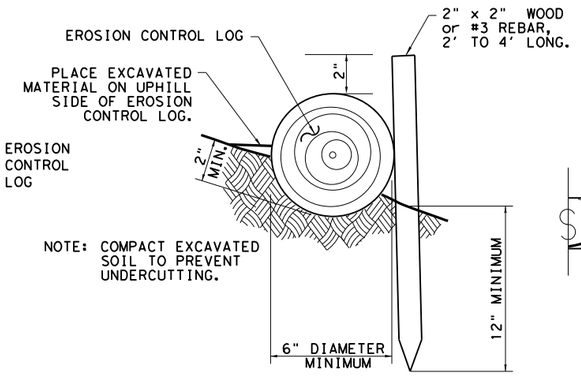
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

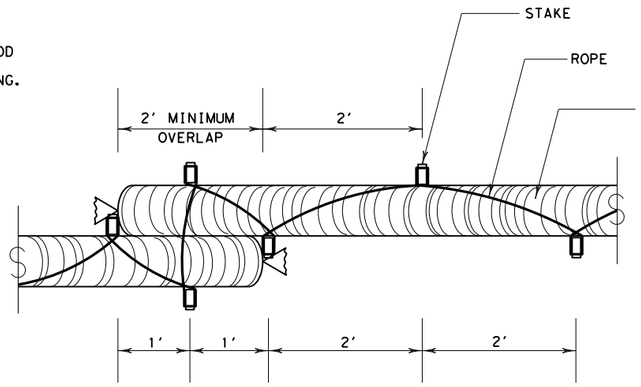


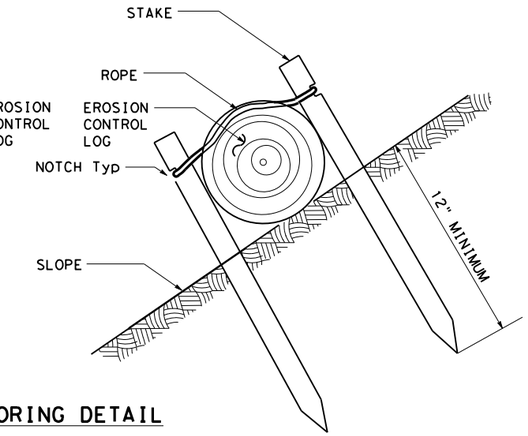


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

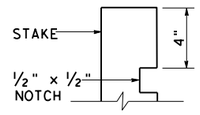
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		120

DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
WHITE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

SIGN GENERAL NOTES:

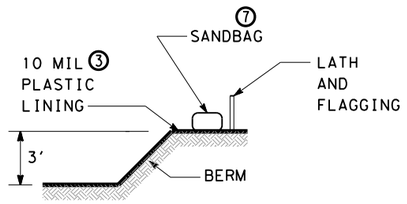
A. THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", (TMUTCD) LATEST EDITION, AND THE "COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST". LATERAL SPACING OF TEXT SHALL PROVIDE A BALANCED APPEARANCE. ALL MATERIALS SHALL CONFORM TO DEPARTMENT SPECIFICATIONS.

B. LEGEND AND BORDER MAY BE APPLIED BY REVERSE SCREENING PROCESS WITH TRANSPARENT COLORED INK, CUT-OUT WHITE REFLECTIVE SHEETING APPLIED TO COLORED BACKGROUND OR COMBINATION THEREOF. BACKGROUND SHALL BE REFLECTIVE SHEETING TYPE C.

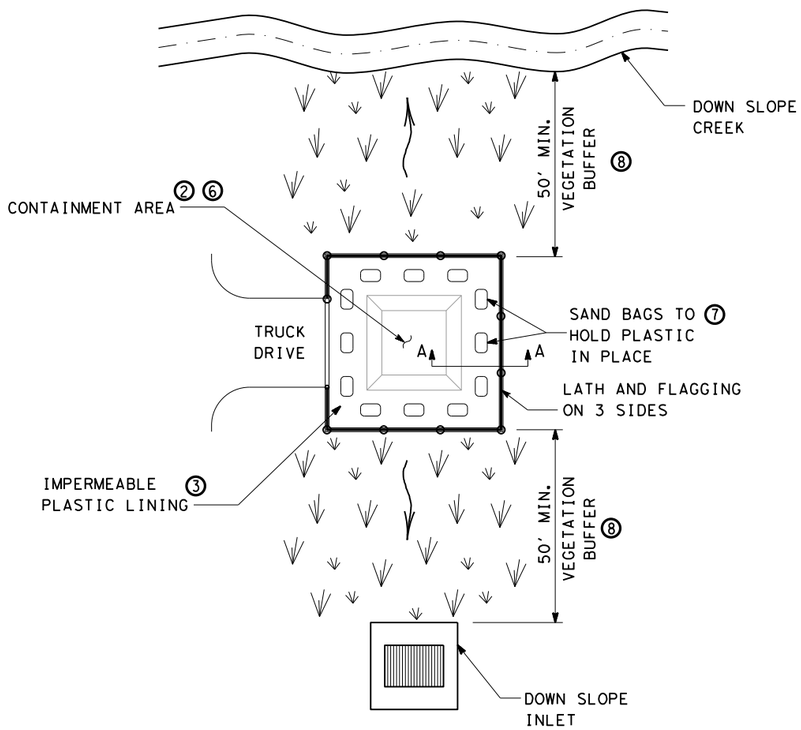
C. FINAL SIGN LOCATION SHALL BE AS APPROVED BY THE ENGINEER. IF THE SIGN CANNOT BE PLACED OUTSIDE THE CLEAR ZONE, IT MUST ADHERE TO THE TMUTCD. IF PLACED OUTSIDE THE CLEAR ZONE, SIGN MAY BE PLACED PERPENDICULAR OR PARALLEL TO ROW LINE.

D. SIGN DIMENSION IS 42" WIDE X 24" TALL WITH 5" BLACK LETTERS.

CONCRETE WASHOUT SIGN DETAIL (10)

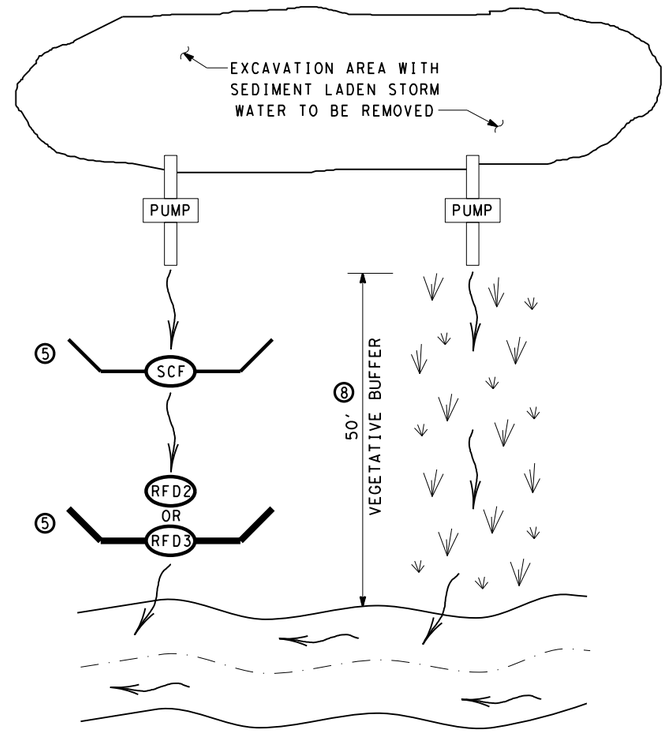


SECTION A-A



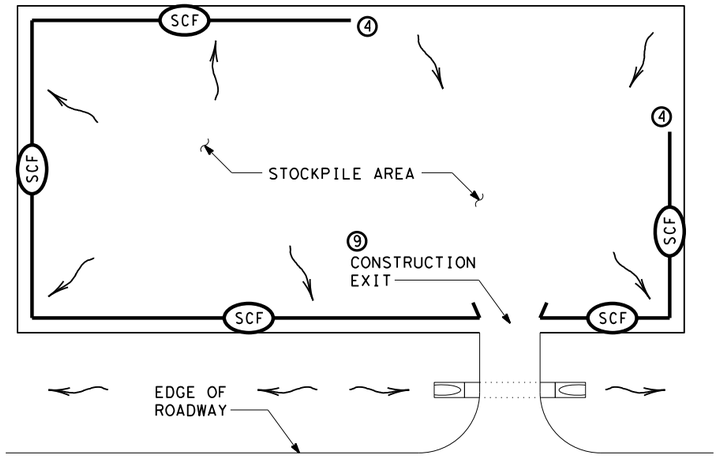
BEST MANAGEMENT PRACTICE (BMP) #12

CONCRETE TRUCK WASHOUT AREA (10)



BEST MANAGEMENT PRACTICE (BMP) #13

PUMPED STORM WATER SEDIMENT CONTROLS (1)



BEST MANAGEMENT PRACTICE (BMP) #14

STOCKPILE SEDIMENT CONTROL

	VEGETATIVE BUFFER
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

NOTES:

1. PUMPED STORM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS.
2. WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.
3. EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING. USE 10 MIL PLASTIC LINING MINIMUM.
4. START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
5. ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED.
6. ACTUAL SIZE, LAYOUT, & LOCATION WILL BE DETERMINED IN THE FIELD.
7. AN EARTHEN BERM MAY BE USED IN LIEU OF SANDBAGS.
8. VEGETATIVE BUFFER SHOULD HAVE AT A MINIMUM 70% VEGETATIVE COVERAGE
9. PLACEMENT OF DEVICES FOR OFFSITE TRACKING AS APPLICABLE AND/OR DIRECTED BY THE ENGINEER.
10. ALL ITEMS REQUIRED FOR CONCRETE WASHOUT AND SIGN SHALL BE SUBSIDIARY TO ITEM 506.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED
PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

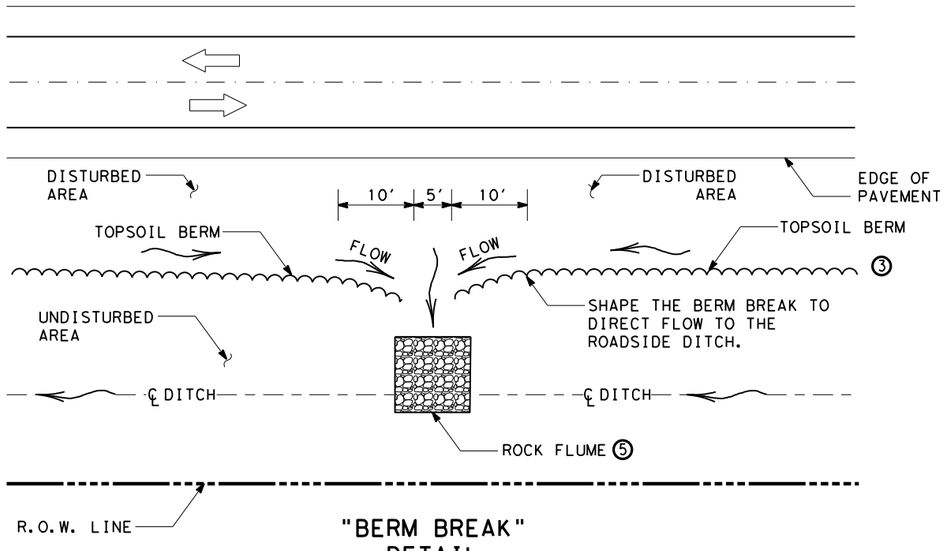
SCALE = NTS SHEET 1 OF 2

Texas Department of Transportation
Wichita Falls District

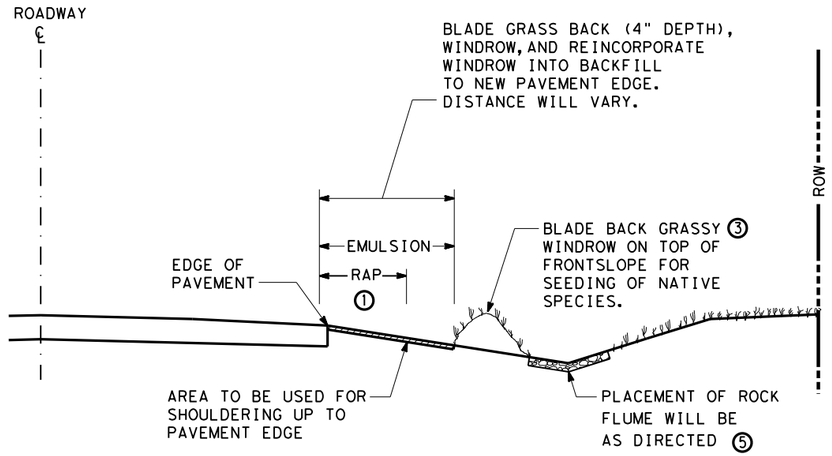
TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		122



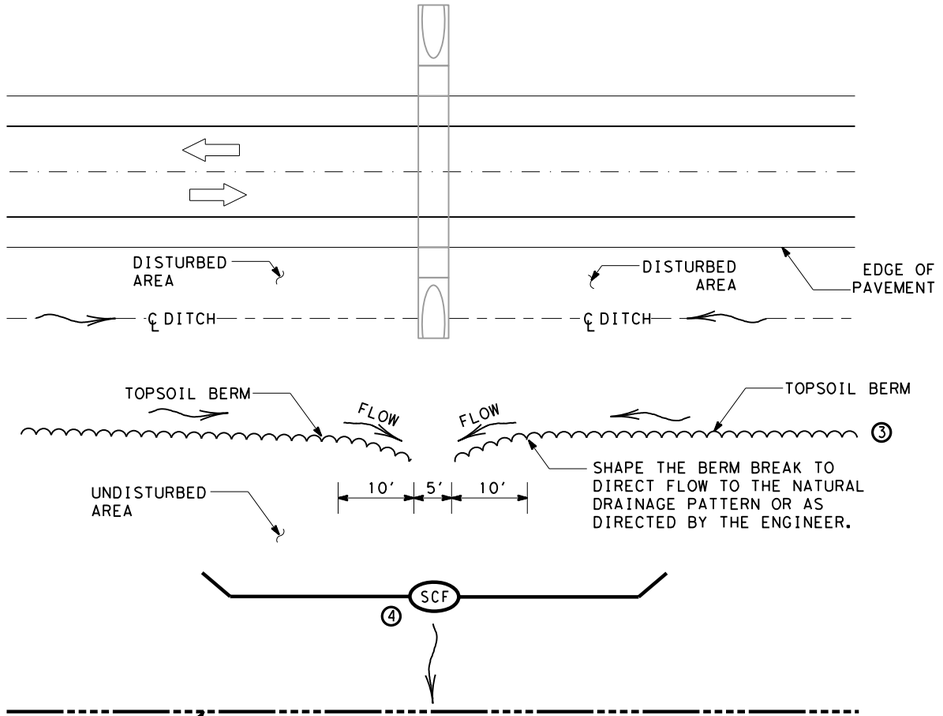
"BERM BREAK" DETAIL PLAN VIEW ②



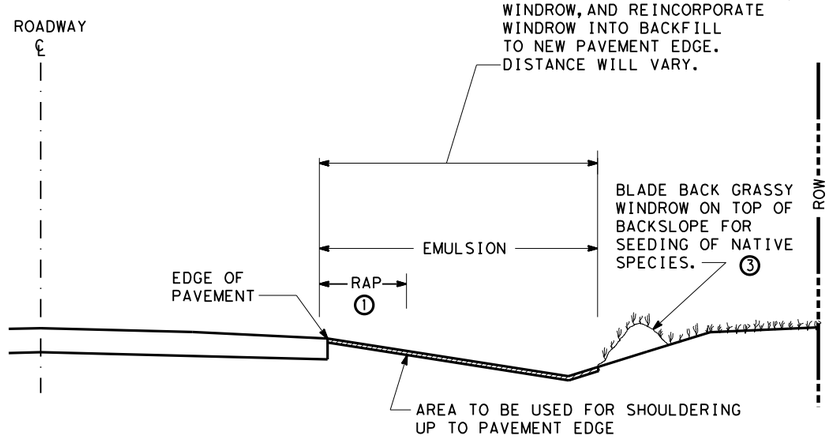
TYPICAL DITCH SECTION
SHOWING BERM/WINDROW OF TOPSOIL

BEST MANAGEMENT PRACTICE (BMP) #15

SEDIMENT CONTROL AND BERM DETAIL
WITH BERM ON FRONTSLOPE



"BERM BREAK" DETAIL PLAN VIEW ②



TYPICAL DITCH SECTION
SHOWING BERM/WINDROW OF TOPSOIL

BEST MANAGEMENT PRACTICE (BMP) #16

SEDIMENT CONTROL AND BERM DETAIL AT CROSS DRAINAGE STRUCTURE
WITH BERM ON BACKSLOPE

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
	ROCK FLUME~ENERGY DISSAPATOR
	BERM

NOTES:

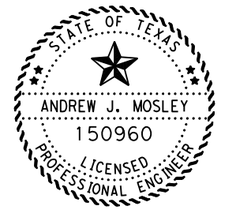
① AS DIRECTED PLACE RAP ADJACENT TO EDGE OF PAVEMENT AS A BACKFILL MATERIAL. PLACEMENT DISTANCE IS TO BE A MINIMUM OF 4' OR AS NEEDED TO ACHIEVE SMOOTH TIE IN TO EXISTING FRONT SLOPE.

② BREAK BERM SO THAT MAXIMUM FLOW LENGTH ALONG THE BERM IS LESS THAN 1000'. BREAK BERM IN LOW AREAS WHERE FLOW MAY OVERTOP THE BERM. DO NOT BREAK BERM ON HILLTOPS OR WHERE RUNOFF AND SEDIMENT FLOW DIRECTLY OFF THE ROW.

③ LOCATION OF BERM WILL VARY. BERM COULD BE PLACED ON FRONTSLOPE OR BACKSLOPE DEPENDING ON FIELD CONDITIONS. SEE SPECIFIC SW3P LAYOUT SHEET FOR MORE DETAILS ON LOCATION OF BERM.

④ ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, EROSION CONTROL LOGS, ROCK FLUME, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED. DEVICE MAY NOT BE NEEDED IN ALL LOCATIONS. SEE SPECIFIC SW3P LAYOUT SHEET FOR MORE DETAILS ON LOCATION OF DEVICES.

⑤ PLACE ROCK FLUME DISSAPATOR AS DIRECTED BY THE ENGINEER. SIZE AND LOCATIONS OF ROCK FLUME WILL VARY. PROVIDE ROCK OR RUBBLE WITH A 3" TO 6" AGGREGATE. SECURE ROCK WITH 20-GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMTER HEXAGONAL OPENINGS. ROCK SHOULD BE PLACED ON THE MESH AND MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE ROCK AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES. PAYMENT WILL BE MADE BY ITEM TEMP PAVED FLUME (INSTALL).



Andrew Mosley, P.E.

03/04/2024

SCALE = NTS SHEET 2 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT		
		CONT	SECT	JOB	HIGHWAY		
REVISIONS JULY 2019		0043	06	098	US 70, ETC		
		DIST	COUNTY		SHEET NO.		
		WFS	WILBARGER, ETC		123		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (URBAN) (SAND or CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: BUFFALO GRASS (Texoka) COMMON BERMUDA GRASS (HULLED) BLUE GRAMA (NATIVE)	 4.0 LBS PLS / ACRE 5.0 LBS PLS / ACRE 1.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) WARM SEASON SEEDING

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) FOXTAIL MILLET	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (CLAY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP SIDEOATS GRAMA BUFFALOGRASS BERMUDA GRASS BLACKWELL SWITCHGRASS ILLINOIS BUNDLEFLOWER	 1.5 LBS PLS / ACRE 1.5 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 0.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) WARM SEASON SEEDING

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP FOXTAIL MILLET	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 20. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (SANDY)

"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP BERMUDA GRASS SAND LOVEGRASS SAND DROPSEED WEEPING LOVEGRASS BLUE GRAMA PARTRIDGE PEAS (COMANCHE)	 1.5 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. SEE NOTES ON TA-VES SHEET 2 OF 2 FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

SCALE = NTS SHEET 1 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0043	06	098	US 70, ETC
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER, ETC		124

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) TALL FESCUE ANNUAL RYE GRASS	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) COOL SEASON SEEDING

"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP WESTERN WHEATGRASS CANADA WILD RYE GRASS ELBON RYE GRASS	 3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. ALL SEED MIXTURE TYPES SHALL BE PURCHASED IN PRE- MIXED BAGS, "BY TYPE" BLENDED BY THE GROWER SHIPPER.
2. SOILS THAT ARE COMPACTED, HAVE CLODS, SHALL BE REWORKED UNTIL READY FOR SEEDING. AS DIRECTED.
3. ALL SOIL SURFACES SHALL BE LEVEL WITH NATURAL FLOWING SMOOTH GRADES. NO TIRE RUTS OR FURTHER TRAFFIC ALLOWED.
4. SOIL SURFACE SHALL BE FIRM BUT NOT COMPACTED, ALLOWING 1/4" DEPRESSION UNDER NORMAL FOOT TRAFFIC.
5. SEED 100% OF THE BED AREA. NO SKIPS OR VOID AREAS ALLOWED. EXAMPLE: AREAS AROUND SIGN POSTS AND INLETS.
6. SEED UP TO THE FIRST 6" OF THE EDGE OF PAVEMENT. AS DIRECTED, HAND RAKE ISOLATED SEEDED AREAS.
7. WEIGH ALL CALIBRATED SEED SAMPLES FOR ACCURACY AND PRESENT DOCUMENTATION TO ENGINEER.

FOR DRILL SEEDING

8. USE ONLY PROFESSIONAL NATIVE GRASS OR TURF GRASS (MULTI- 3 BIN) DRILL SEEDERS. NO DROP SEEDERS ALLOWED. OTHER TYPES OF SEEDERS AS APPROVED BY THE ENGINEER.
9. CALIBRATE DRILL SEEDER FOR SPECIFIED (PLS) PER ACRE BEFORE DRILL SEEDING.
10. DRILL SEEDER MUST BE EQUIPPED WITH THE LARGE FRONT CUTTING COULTERS DURING THE INSPECTION OF DRILL SEEDER.

FOR BROADCAST SEEDING

11. USE ONLY COMMERCIAL TYPE CYCLONE TYPE SPREADERS.
12. CALIBRATE CYCLONE SPREADER FOR 1000 Sq. Ft. (PLS) PER ACRE BEFORE SEEDING.
13. TO PREVENT SEED SEPARATION IN SPREADERS, SPREAD ALL SEED TYPES INDEPENDENTLY IN A SEPARATE APPLICATION.
14. IMMEDIATELY AFTER SEEDING, IN ONE OR TWO OPERATIONS, CULTI-PACK THE SEEDED SOILS AND FIRM SEED INTO SURFACE.
15. DISCONTINUE SEEDING IF WIND EXCEEDS 10 MPH.

ITEM 314 EMULSIFIED ASPHALT TREATMENT

TIME SCHEDULE	FUNCTIONAL USE:
IMMEDIATELY AFTER: SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.	SOIL EROSION CONTROL, OR MOISTURE RETENTION BARRIER.

NOTES:

1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.
2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.
3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.
4. USE MATERIALS AS SPECIFIED FOR EROSION CONTROL ON TABLE 18 IN ITEM 300 ASPHALTS, OILS, AND EMULSIONS, AT A RATE OF 0.25 GAL/SY.

ITEM 166 FERTILIZER

TIME SCHEDULE	FUNCTIONAL USE:
AFTER TOPSOIL PLOWING PREPARATIONS ARE COMPLETED, FERTILIZE ROW SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.	PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.

FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 100 LBS OF NITROGEN PER ACRE.
THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM.
ANALYSIS OF THE (NPK) IS: 3:1:1 OR AS DIRECTED BY THE AREA ENGINEER.

ITEM 166 NOTES:

1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.

2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE A EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.

3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED, DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT AREA ENGINEER.

STATE OF TEXAS
ANDREW J. MOSLEY
150960
LICENSED PROFESSIONAL ENGINEER

Andrew Mosley, P.E.

03/04/2024

SCALE = NTS SHEET 2 OF 2

Texas Department of Transportation
Wichita Falls District Standard

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