FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	BR 2B23(226),ETC.	SH 6, ETC.	
STATE	DISTRICT	COUNTY	
TEXAS	BRY	GRIMES	
CONTROL	SECTION	JOB	SHEET NO.
0050	03	114, ETC.	1

DESIGN SPEED: N/A

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

SEE SHEET 2
FOR INDEX OF SHEETS
AND SHEET 3 FOR
PROJECT LOCATION MAP

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FINAL PLANS

CONTRACTOR:

LETTING DATE:

DATE CONTRACTOR BEGAN WORK:

DATE WORK WAS COMPLETED:

DATE WORK WAS ACCEPTED:

FINAL CONTRACT COST: $

PROJECT NUMBER: BR 2B23(226),ETC.

SH 6, ETC.
GRIMES COUNTY

TOTAL LENGTH OF PROJECT = 1056.09 FT= 0.200 MILES

FOR THE CONSTRUCTION OF BRIDGE MAINTENANCE CONSISTING OF BRIDGE MAINTENANCE

LOCATION NO.	HIGHWAY	CONTROL NO.	FUA ID NO.	LIMITS	2021/2041 ADT	STATION		REFERENCE MARKERS		TOTAL LENGTH (FT)	BRIDGE LENGTH (FT)	RDWY LENGTH (FT)
						FROM	TO	BEGIN	END			
1	SH 6 SB	0050-03-114	596809	AT BUS 6 NB NBI: 17-094-0-0050-03-062	29,923/41,892	419+98.33	424+21.58	RM 616+0.446 MI (6.493 MP)	RM 616+0.549 MI (6.596 MP)	423.25	295.00	128.25
2	SH 6 SB	0050-03-112	596810	AT SH 90 NBI: 17-094-0-0050-03-074	29,609/41,453	630+54.60	632+84.60	RM 612+0.510 MI (2.520 MP)	RM 612+0.610 MI (2.620 MP)	230.00	190.00	40.00
3	SH 6 NB	0050-03-113	596811, 596812	AT SH 90 NBI: 17-094-0-0050-03-075	29,609/41,453	630+54.60	632+84.60	RM 612+0.510 MI (2.520 MP)	RM 612+0.610 MI (2.620 MP)	230.00	190.00	40.00
4	BUS 6	0050-11-025	596813, 596814	AT CEDAR CREEK NBI: 17-094-0-0050-11-015	8,800/12,320	637+30.00	638+00.00	RM 426+1.858 MI (22.233 MP)	RM 426+1.958 MI (22.333 MP)	70.00	70.00	0.00
5	BUS 6	0050-11-024	596815, 596816, 596817, 596818	AT SANDY CREEK NBI: 17-094-0-0050-11-016	1,887/2,642	521+75.00	522+77.84	RM 430+0.069 MI (24.356 MP)	RM 430+0.119 MI (24.406 MP)	102.84	102.84	0.00

TEXAS DEPARTMENT OF TRANSPORTATION®

SUBMITTED FOR LETTING: DocuSigned by: 7/7/2023
01EBC5C65E334CE...
DESIGN MANAGER

RECOMMENDED FOR LETTING: DocuSigned by: 7/7/2023
DAA3B0624EE3419...
DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: DocuSigned by: 7/7/2023
60E5537715D24EA...
DISTRICT ENGINEER

STATE OF TEXAS
GREGORY M. KOCHERSPERGER
94869
LICENSED
PROFESSIONAL ENGINEER
6/5/2023

NO EXCEPTIONS
NO EQUATIONS
NO RAILROAD CROSSINGS

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 2022).

REV DATE: 2-12-2015
CSJ: 0050-03-112

FILENAME: c:\pwworking\central\d0710d308425\BRY_Grimes County BMP Titlesheet.dgn

INDEX OF SHEETS

STATE OF TEXAS
TREVOR CASTILLA
85405
LICENSED
PROFESSIONAL ENGINEER

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

Trevor L. Castilla, P.E. 7/26/2023
SIGNATURE OF REGISTRANT DATE

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER

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

Brett RC Allen, P.E. 07/26/2023
SIGNATURE OF REGISTRANT DATE

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248-1229
972.960.4400

INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
LJG	6			SH 6, ETC.
GRAPHICS LJG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BRA	TEXAS	BRY	GRIMES	2
CHECK BRA	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: ASMOLIK
DATE: 7/24/2023
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TIME: 4:04:50 PM
PENTABLE: 10347533-Grimes.tbl

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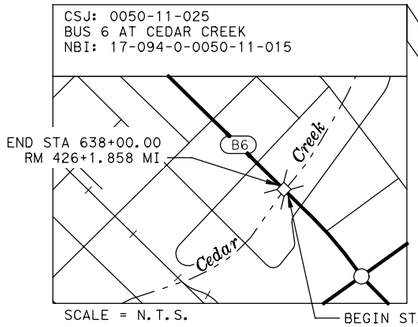
CSJ: 0050-11-025
BUS 6 AT CEDAR CREEK
NBI: 17-094-0-0050-11-015



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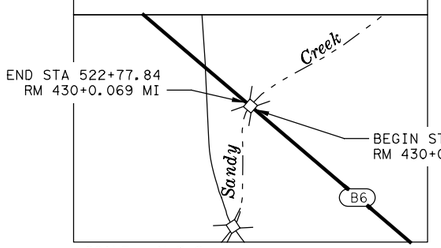
CSJ: 0050-11-024
BUS 6 AT SANDY CREEK
NBI: 17-094-0-0050-11-016



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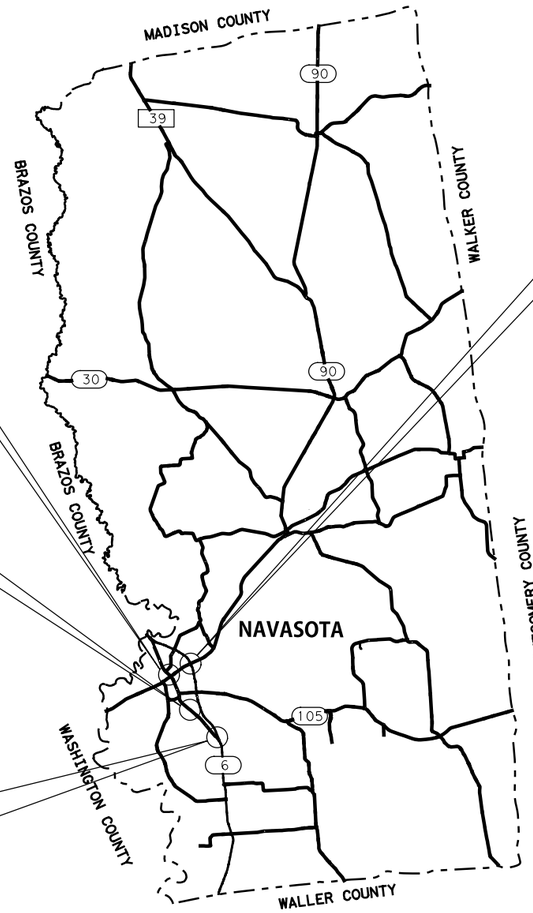

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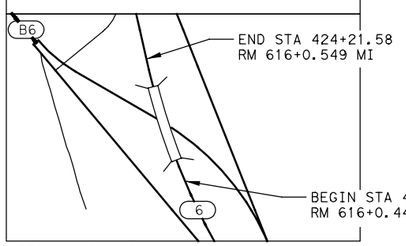
SH 6 SB OVERPASS AT BUS 6 NB
NBI: 17-094-0-0050-03-062



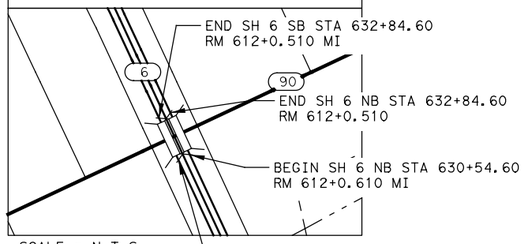
SCALE = N.T.S.

LOCATION MAP

GRIMES COUNTY
SCALE: N.T.S.

CSJ: 0050-03-112
SH 6 SB OVERPASS AT SH 90
NBI: 17-094-0-0050-03-074

CSJ: 0050-03-113
SH 6 NB OVERPASS AT SH 90
NBI: 17-094-0-0050-03-075



SCALE = N.T.S.

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023
Brett RC Allen

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248-1229
972.960.4400

Texas Department of Transportation

PROJECT LOCATION MAP

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
LJG	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LJG	TEXAS	BRY	GRIMES	
CHECK	CONTROL	SECTION	JOB	3
BRA	0050	03	114, ETC.	
CHECK				
BRA				

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DATE: 6/1/2023
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TIME: 8:38:50 AM
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BASIS OF ESTIMATE					
ITEM	**DESCRIPTION**	**COURSE**	**RATE**	**AMOUNT**	**QUANTITY**
166*	FERTILIZER **		0.3025 TON/AC	1.47 AC	0.45 TON
168	Vegetative Watering		20 GAL/SY	7,118 SY	142 MG

Note: Rates are for estimating purposes only. Actual Rates will be determined in the field.
** Tonnage represents Nitrogen content only.

GENERAL:

Contractor questions on this project are to be addressed to the following individuals:

James Robbins, P.E., A.E., James.Robbins@txdot.gov
Joseph Greive, P.E., A.A.E., Joseph.Greive@txdot.gov

Questions may 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.

For non-bridge items, send eligible shop plan submittals with PDF attachments directly to the reviewing office. Submit bridge, retaining wall, and structural item shop drawings following the directions described at
http://www.txdot.gov/business/resources/specifications/shop-drawings.html

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 a notarized 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.

Project Number: BR 2B23(226), Etc. **Sheet:** 4
Highway: SH 6, Etc. **Control:** 0050-03-114, Etc.
County: Grimes

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"

State contract mowers will mow the right of way during the growing season. The Contractor will be notified by the Engineer one week in advance of the anticipated time when mowers will be in the limits of the project. Clean the right of way to such a condition that allows the mowing contractors to safely mow.

Portions of this project along SH 6 are on a hurricane evacuation route. Furnish at the pre-construction meeting a written plan outlining procedures to suspend work, secure the job site and safely handle traffic through and across the project in the event of a hurricane evacuation.

During the hurricane season (June 1 through November 30), do not close any travel lanes except when the Contractor can demonstrate that he can provide labor, equipment, material, work plan, and quality of work to satisfactorily return all lanes to an open, all-weather travel surface within three days of receiving written or verbal notice but no later than 3 days prior to hurricane landfall. Construction of temporary lanes to an all-weather surface will be paid in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

In addition to lane closures, cease work 3 days prior to hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Prohibit the Contractor's, sub-contractors' or material suppliers' vehicles from entering or exiting the stream of traffic including material hauling and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

In the event of the declaration of a hurricane watch, warning, other severe weather warning or national or state emergency that requires the roadways in the vicinity be used as evacuation routes, cease all work that requires the Contractor's, sub-contractors' or material suppliers' vehicles to enter the stream of traffic on these primary or secondary evacuation routes. This work includes material hauling and delivery, and mobilization or demobilization of equipment.

The following roadways are recognized evacuation routes in the Bryan District:

Primary Evacuation Routes: IH 45, US 290, SH 6, SH 36.

Secondary Evacuation Routes: US 79, US 84, SH 7, SH 30, SH 21, SH 105.

Other routes may be designated.

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

- Day before and day of Texas A&M home football games
- Texas A&M graduation
- Texas A&M Parents Weekend

The Engineer may decide to restrict construction operations or lane closures on these key dates and/or special events.

ITEM 8 "PROSECUTION AND PROGRESS"

The following standard detail sheet(s) has(have) been modified.

C-RAIL-R (MOD)
PAINTING NBI NUMBERS (MOD)
WD-BPBW-22 (MOD)
WD-CSBJ-22 (MOD)

By noon of each Wednesday, provide the Engineer a written outline of the daily work schedule for the following week. Include in the outline the times and places for proposed traffic control changes, lane and shoulder closures, and moving operations or other operations that affect traffic on the roadway. Unless otherwise authorized by the Engineer, prosecute the work on this project in accordance with the following sequence of work as applicable for each location:

1) Set advance warning signs and barricades.
2) Install temporary storm water pollution protection (SWP3)
3) Place traffic control devices as shown in the TCP for each location
4) Remove existing pavement markings and install work zone pavement markings if applicable
5) Shift traffic as indicated in TCP for each location
6) Perform bridge repairs
7) Perform rail retrofit and replace MBGF if applicable
8) Shift traffic for phase 2 per TCP if applicable.
9) Perform bridge repairs
10) Perform rail retrofit and replace MBGF if applicable
11) Close lanes as shown in TCP to perform joint cleaning operations, construct polymer overlay, and/or perform bridge repairs if applicable

Some of these operations may be performed simultaneously.

Prepare Progress Schedule by the Critical Path Method.

Work is allowed to be performed during the nighttime.

Project Number: BR 2B23(226), Etc. **Sheet:** 4A
Highway: SH 6, Etc. **Control:** 0050-03-114, Etc.
County: Grimes

Equipment and material may be pre-staged at approved locations.

ITEM 132 "EMBANKMENT"

Provide Embankment material for areas outside the limits of the Pavement Structure with a plasticity index between 10 and 35.

ITEM 166 "FERTILIZER"

Fertilize all areas of project that are being seeded or sodded.

ITEM 168 "VEGETATIVE WATERING"

Vegetative watering is required for all areas of the project that are being seeded or sodded.

ITEM 301 "ASPHALT ANTISTRIPPING AGENT"

When the Contractor adds lime as an anti-stripping agent (or an equivalent anti-stripping agent) the lime or equivalent shall be added to the asphaltic concrete in the methods specified in this item unless otherwise approved by the Engineer. If an alternate method is proposed, the Engineer's approval will be based on test method Tex-242-F performed on the asphaltic concrete produced through the plant.

ITEM 320 "EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT"

Unless otherwise approved by the Engineer, provide a Material Transfer Device with remixing capabilities as specified in Item 320.2.3.3 Placement and Compaction Equipment for all asphaltic concrete pavement.

ITEM 351 "FLEXIBLE PAVEMENT STRUCTURE REPAIR"

Use of a motor grader will not be permitted for asphalt concrete pavement.

ITEM 354 "PLANING AND TEXTURING PAVEMENT"

Take ownership of reclaimed asphalt material.

Existing raised pavement markers in the proposed work area are to be removed prior to planing operations. This item will be considered subsidiary.
Construct a fine milling pattern by adjusting the speed of the drum and the machine, as approved by the Engineer.

ITEM 429 “CONCRETE STRUCTURE REPAIR”

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 and which proprietary implementation so the Engineer has sufficient time to review. The Engineer must approve in writing any procedures that differ from those in the Concrete Repair Manual or materials that are not included in one of TxDOT's MPLS materials they plan to utilize. Submit the package a minimum of two weeks prior to performing repair.

A hard copy of the Department’s Concrete Repair Manual shall be on-hand whenever concrete repairs are being performed.

For Vertical and Overhead repairs use preapproved Type C Repair Material.

Provide containment for repair materials to prevent materials from falling into the water.
Remove any repair materials that do fall into the water.

ITEM 432 “RIPRAP”

The fifty foot (50’) approach taper to the MBGF end treatment will be concrete Mow Strip unless otherwise shown in the plans or otherwise directed by the Engineer.

ITEM 446 “FIELD CLEANING AND PAINTING STEEL”

Provide a System I-A Paint with a Federal Standard 595B #742 color or as directed by the Engineer.

The existing coating to be removed may contain lead or other hazardous materials.

ITEM 502 “BARRICADES, SIGNS AND TRAFFIC HANDLING”

Where shown on applicable TCP standards, channelizing devices on the centerline are required at all times; including when a pilot vehicle is used to lead traffic. Mount a G20-4 sign at a

Project Number: BR 2B23(226), Etc. **Sheet:** 4B
Highway: SH 6, Etc. **Control:** 0050-03-114, Etc.
County: Grimes

conspicuous location on the rear of the vehicle. Traffic delays caused by one-lane, two-way traffic control, will not be allowed to exceed 5 minutes unless approved by the Engineer.

One way traffic control operations are required when placing centerline profile markings on all two-lane roadways, unless otherwise approved by the Engineer. Work area is limited to a maximum of 2 miles for this work.

During one-way operations, station flaggers at all county roads and any other locations, such as private businesses, that may have traffic entering the work area.

Removal of ground mounted temporary signs and supports as specified on standard sheet BC(5), shall include the immediate backfilling of support holes with Type B embankment material and the compaction of the backfill material.

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.

ITEM 512 “PORTABLE TRAFFIC BARRIER”

Do not pin PTB on bridge decks. For work zone safety, PTB shall not deflect more than 2 feet. Alternate anchoring methods may be required to meet these criteria. Refer to standard sheets.

ITEM 540 “METAL BEAM GUARD FENCE”

When the roadway is converted from two-way operation to one-way operation, the appropriate Metal Beam Guard Fence shall be relapped in the direction of travel. This will not be paid for directly but will be considered subsidiary to this Item

Furnish and Install only one type of timber post.

ITEM 544 “GUARDRAIL END TREATMENTS”

Furnish and install only MASH compliant guardrail end treatments.

Furnish and install a single type of guardrail end treatments project-wide (either wood post or steel post).

ITEM 662 "WORK ZONE PAVEMENT MARKINGS"

All striping limits must be approved by the Engineer before striping operations may begin.

ITEM 672 "RAISED PAVEMENT MARKERS"

Use flexible bituminous adhesive for applications on all pavement types.

ITEM 678 "PAVEMENT SURFACE PREPARATION FOR MARKINGS"

It is not anticipated that pavement surface preparation for markings will be needed. If the Engineer determines that it is needed, payment for work will be determined in accordance with Article 9.7 "Payment for Extra Work and Force Account Method".

ITEM 3077 "SUPERPAVE MIXTURES"

Hydrated lime, commercial lime slurry or an equivalent anti-stripping agent may be used. If hydrated lime or commercial lime slurry is used up to 1.0 percent may be added. If an equivalent anti-stripping agent is used, add according to manufacturer's recommendations. Provide hydrated lime or commercial lime slurry in accordance with DMS-6350, "Lime and Lime Slurry". Add hydrated lime, commercial lime slurry, or an equivalent anti-stripping agent in accordance with Section 301.4.2.

Apply tack coat through a distributor spray bar in accordance with Section 316.3.1. Distributor. If residual from emulsion tack is not tacky, then the Engineer can require the use of PG binder.

RAS is not permitted in thin level-up courses.

ITEM 6001 "PORTABLE CHANGEABLE MESSAGE SIGN"

Furnish, install, and operate up to 7 Portable Changeable Message Signs (PCMS) for this project. The signs can be used both on the project and within a ten (10) mile radius of the project. Locations, messages, and durations of use will be specified by the Engineer. The primary uses will be to inform the public of special events, lane and road closures, and changes in traffic control. Signs will be paid for only when used as directed by the Engineer.

Project Number: BR 2B23(226), Etc. **Sheet:** 4C
Highway: SH 6, Etc. **Control:** 0050-03-114, Etc.
County: Grimes

ITEM 6185 "TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)"

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan (TCP) for this project,

provide one (1) shadow vehicle(s) with TMA for TCP (2-1)-18 as detailed on General Note 4 of this standard sheet.

provide one (1) shadow vehicle(s) with TMA for TCP (2-5)-18 as detailed on General Note 3 of this standard sheet.

provide one (1) shadow vehicle(s) with TMA for TCP (2-6)-18 as detailed on General Note 6 of this standard sheet.

provide two (2) (shadow and trail) vehicle(s) with TMA for TCP(3-1)-13 as detailed on General Note 3 of this standard sheet.

provide two (2) (shadow and trail) vehicle(s) with TMA for TCP(3-3)-14 as detailed on General Note 3 of this standard sheet.

provide one (1) shadow vehicle(s) with TMA for TCP (6-1)-12 as detailed on this standard sheet.

Therefore, eight (8) total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

164 TMA(s) (days) are provided in the project estimate for stationary operations.
15 TMA(s) (days) are provided in the project estimate for mobile operations.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0050-03-114 **DISTRICT** Bryan **COUNTY** Grimes
HIGHWAY BS 6S, SH 6

														TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0050-03-112**		**0050-03-113**		**0050-03-114**		**0050-11-024**		**0050-11-025**			
		PROJECT ID		**A00192699**		**A00192701**		**A00192703**		**A00192697**		**A00192698**			
		COUNTY		**Grimes**		**Grimes**		**Grimes**		**Grimes**		**Grimes**			
		HIGHWAY		**SH 6**		**SH 6**		**SH 6**		**BS 6S**		**BS 6S**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	104-6021	REMOVING CONC (CURB)	LF	380.000		380.000		588.000						1,348.000	
	132-6001	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY							21.000				21.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	1,967.000		2,178.000		1,644.000						5,789.000	
	168-6001	VEGETATIVE WATERING	MG	39.000		4.000		33.000						116.000	
	351-6036	FLEX PAVEMENT STRUCTURE REPAIR (2-8")	SY	10.000				23.000						33.000	
	354-6002	PLAN & TEXT ASPH CONC PAV(0" TO 2")	SY	889.000		889.000								1,778.000	
	400-6005	CEM STABIL BKFL	CY							2.000				2.000	
	401-6001	FLOWABLE BACKFILL	CY							5.000				5.000	
	427-6002	CONCRETE PAINT FINISH	SF	4.000		4.000								8.000	
	429-6003	CONC STR REPAIR(DECK REP(PART DEPTH))	SF			5.000		1.000						6.000	
	429-6005	CONC STR REPAIR(DECK REP (FULL DEPTH))	SF			19.000								19.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	39.000		10.000		1.000		153.000		241.000		4.000	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY							62.000				62.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	36.000		39.000		34.000						109.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	172.000		172.000		134.000						478.000	
	439-6013	MULTI-LAYER POLYMER OVERLAY	SY	1,070.000		1,070.000		1,970.000						4,110.000	
	46-6010	CLEAN & PAINT EXIST STR (SYSTEM I-A)	LS					1.000						1.000	
	46-6016	CLEAN & PAINT EXIST RAIL (SYSTEM I-A)	LS									1.000		1.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF	4.000		4.000		704.500						1,592.500	
	483-6013	SHOT BLASTING	SY	1,070.000		1,070.000		1,970.000						4,110.000	
	500-6001	MOBILIZATION	LS					1.000						1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000		3.000		2.000		2.000		11.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY							224.000				224.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY							224.000				224.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	885.000		980.000		740.000		683.000				3,288.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	885.000		980.000		740.000		683.000				3,288.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO							2.000				2.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF			120.000								120.000	
	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF					810.000						810.000	
	512-6029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF	1,200.000		660.000		1,440.000						3,300.000	
	512-6053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF	90.000		720.000		120.000						930.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	462.500		562.500		450.000						1,475.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000		4.000						12.000	
	540-6010	MTL W-BEAM GD FEN ADJUSTMENT	LF							9.000				9.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.000		2.000		2.000						6.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	522.000		364.000		420.000						1,306.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000		2.000						6.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0050-03-114 **DISTRICT** Bryan **COUNTY** Grimes
HIGHWAY BS 6S, SH 6

														TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0050-03-112**		**0050-03-113**		**0050-03-114**		**0050-11-024**		**0050-11-025**			
		PROJECT ID		**A00192699**		**A00192701**		**A00192703**		**A00192697**		**A00192698**			
		COUNTY		**Grimes**		**Grimes**		**Grimes**		**Grimes**		**Grimes**			
		HIGHWAY		**SH 6**		**SH 6**		**SH 6**		**BS 6S**		**BS 6S**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL		
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	3.000		2.000		2.000						7.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	2.000		1.000		2.000						5.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA			1.000								1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA					2.000						2.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	3.000		3.000		5.000						11.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA							6.000				6.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	3.000		3.000		5.000						11.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	6.000		6.000		6.000						18.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA							6.000				6.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	6.000		6.000		6.000						18.000	
	662-6052	WK ZN PAV MRK REMOV (REFL) TY II-C-R	EA	2.000		3.000		5.000						10.000	
	662-6064	WK ZN PAV MRK REMOV (W)6"(BRK)	LF	46.000		53.000		91.000						190.000	
	662-6067	WK ZN PAV MRK REMOV (W)6"(SLD)	LF	4,332.000		4,090.000		3,634.000						12,056.000	
	662-6098	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF	4,332.000		4,090.000		3,634.000						12,056.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	1 9.000		1 1.000		125.000						415.000	
	662-6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	108.000		102.000		91.000						301.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	27.000		26.000		23.000						76.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	4,874.000		4,602.000		4,088.000						13,564.000	
	690-6001	REMOVAL OF CONDUIT	LF									50.000		50.000	
	712-6009	JT / CRCK SEAL (HOT - POURED RUBBER)	LF									2.000		2.000	
	752-6022	TREE TRIMMING AND BRUSH REMOVAL	LF					35.000						35.000	
	780-6004	CNC CRCK REPAR(DISCRETE)(ROUT AND SEAL)	LF					3.000				52.000		55.000	
	786-6001	CARBON FIBER REINF POLYMER PROTECTION	SF	76.000										76.000	
	786-6002	CARBON FIBER REINF POLYMER STRENGTHNING	SF							1,960.000				1,960.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	1 .000		1 .000		28.000		1 .000		1 .000		84.000	
	6038-6004	MULTIPOLYMER PAV MRK (W)(6")(SLD)	LF	2,166.000		2,045.000		1,817.000						6,028.000	
	6038-6005	MULTIPOLYMER PAV MRK (W)(6")(BRK)	LF	542.000		512.000		454.000						1,508.000	
	6038-6017	MULTIPOLYMER PAV MRK (Y)(6")(SLD)	LF	2,166.000		2,045.000		1,817.000						6,028.000	
	6185-6002	TMA (STATIONARY)	DAY	32.000		32.000		36.000		35.000		29.000		164.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	3.000		3.000		3.000		3.000		3.000		15.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS					1.000						1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS					1.000						1.000	

SUMMARY OF TRAFFIC CONTROL ITEMS

ITEM DESCRIPTION	510 6003 ONE-WAY TRAF CONT (PORT TRAF SIG)	512 6005 PORT CTB (FUR & INST) (F-SHAPE) (TY 1)	512 6029 PORT CTB (MOVE) (F-SHAPE) (TY 1)	512 6053 PORT CTB (REMOVE) (F-SHAPE) (TY 1)	545 6003 CRASH CUSH ATTEN (MOVE & RESET)	545 6005 CRASH CUSH ATTEN (REMOVE)	545 6019 CRASH CUSH ATTEN (INSTL)(S)(N) (TL3) *	662 6052 WK ZN PAV MRK REMOV (REFL) TY II-C-R	662 6064 WK ZN PAV MRK REMOV (W) 6"(BRK)	662 6067 WK ZN PAV MRK REMOV (W) 6"(SLD)
	MO	LF	LF	LF	EA	EA	EA	EA	LF	LF
SH 6 SB OVERPASS AT BUS 6 NB PHASE 1		810	750	60	1		2			1,817
SH 6 SB OVERPASS AT BUS 6 NB PHASE 2			690	60	1			5	91	1,817
SH 6 SB OVERPASS AT SH 90 PHASE 1			600	90	1					2,166
SH 6 SB OVERPASS AT SH 90 PHASE 2			600		1			2	46	2,166
SH 6 NB OVERPASS AT SH 90 PHASE 1		120	660	60	1					2,045
SH 6 NB OVERPASS AT SH 90 PHASE 2				660		1		3	53	2,045
BUS 6 AT CEDAR CREEK										
BUS 6 AT SANDY CREEK	2									
PROJECT TOTAL	**2**	**930**	**3,300**	**930**	**5**	**1**	**2**	**10**	**190**	**12,056**

* ADDITIONAL CRASH CUSHIONS TO BE INSTALLED AT THE ENGINEER'S DIRECTION.

SUMMARY OF TRAFFIC CONTROL ITEMS

ITEM DESCRIPTION	662 6098 WK ZN PAV MRK REMOV (Y) 6"(SLD)	662 6109 WK ZN PAV MRK SHT TERM (TAB)TY W	662 6110 WK ZN PAV MRK SHT TERM (TAB)TY Y	677 6001 ELIM EXT PAV MRK & MRKS (4")	6001 6001 PORTABLE CHANGEABLE MESSAGE SIGN	6185 6002 TMA (STATIONARY)	6185 6005 TMA (MOBILE OPERATION)
	LF	EA	EA	LF	DAY	DAY	DAY
SH 6 SB OVERPASS AT BUS 6 NB PHASE 1	1,817			4,088	14	17	1
SH 6 SB OVERPASS AT BUS 6 NB PHASE 2	1,817	125	91		14	19	2
SH 6 SB OVERPASS AT SH 90 PHASE 1	2,166			4,874	7	15	1
SH 6 SB OVERPASS AT SH 90 PHASE 2	2,166	149	108		7	17	2
SH 6 NB OVERPASS AT SH 90 PHASE 1	2,045			4,602	7	15	1
SH 6 NB OVERPASS AT SH 90 PHASE 2	2,045	141	102		7	17	2
BUS 6 AT CEDAR CREEK					14	29	3
BUS 6 AT SANDY CREEK					14	35	3
PROJECT TOTAL	**12,056**	**415**	**301**	**13,564**	**84**	**164**	**15**

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

QUANTITY SUMMARIES

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	6
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

USER: golmeido
DATE: 7/26/2023
SCALE: 1:1
FILE: ...\ROWY, TCP, AND PM GRIMES
TIME: 7:24:05 AM
PENTABLE: GRIMES.tbl

SUMMARY OF ROADWAY ITEMS

ITEM DESCRIPTION	351 6036 FLEX PAVEMENT STRUCTURE REPAIR (2-8")	354 6002 PLAN & TEXT ASPH CONC PAV (0" TO 2")	432 6045 RIPRAP (MOW STRIP) (4 IN)	540 6001 MTL W-BEAM GD FEN (TIM POST)	540 6006 MTL BEAM GD FEN TRANS (THRIE-BEAM)	540 6010 MTL W-BEAM GD FEN ADJUSTMENT	540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	542 6001 REMOVE METAL BEAM GUARD FENCE	544 6001 GUARDRAIL END TREATMENT (INSTALL)	544 6003 GUARDRAIL END TREATMENT (REMOVE)
	SY	SY	CY	LF	EA	LF	EA	LF	EA	EA
SH 6 SB OVERPASS AT BUS 6 NB	23		34	450.0	4		2	420	2	2
SH 6 SB OVERPASS AT SH 90	10	889	36	462.5	4		2	522	2	3
SH 6 NB OVERPASS AT SH 90		889	39	562.5	4		2	364	2	2
BUS 6 AT CEDAR CREEK										
BUS 6 AT SANDY CREEK						9				
PROJECT TOTAL	**33**	**1,778**	**109**	**1,475.0**	**12**	**9**	**6**	**1,306**	**6**	**7**

SUMMARY OF PAVEMENT MARKING ITEMS

ITEM DESCRIPTION	658 6013 INSTL DEL ASSM (D-SW)SZ (BRF)CTB	658 6014 INSTL DEL ASSM (D-SW)SZ (BRF)CTB(BI)	658 6026 INSTL DEL ASSM (D-SY)SZ (BRF)CTB	658 6061 INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2	658 6062 INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2(BI)	658 6064 INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2	672 6010 REFL PAV MRKR TY II-C-R	6038 6004 MULTIPOLYMER PAV MRK (W)(6")(SLD)	6038 6005 MULTIPOLYMER PAV MRK (W)(6")(BRK)	6038 6017 MULTIPOLYMER PAV MRK (Y)(6")(SLD)
	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF
SH 6 SB OVERPASS AT BUS 6 NB	5		5	6		6	23	1,817	454	1,817
SH 6 SB OVERPASS AT SH 90	3		3	6		6	27	2,166	542	2,166
SH 6 NB OVERPASS AT SH 90	3		3	6		6	26	2,045	512	2,045
BUS 6 AT CEDAR CREEK										
BUS 6 AT SANDY CREEK		6			6					
PROJECT TOTAL	**11**	**6**	**11**	**18**	**6**	**18**	**76**	**6,028**	**1,508**	**6,028**

SUMMARY OF SW3P ITEMS

ITEM DESCRIPTION	164 6003 BROADCAST SEED (PERM) (RURAL) (CLAY) *	166 6002 FERTILIZER ** (1/8 LB/SY)	168 6001 VEGETATIVE WATERING # (20 GAL/SY)	506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1) ##	506 6024 CONSTRUCTION EXIT (REMOVE)	506 6038 TEMP SEDMT CONT FENCE (INSTALL) ***	506 6039 TEMP SEDMT CONT FENCE (REMOVE)
	SY	TON	MG	SY	SY	LF	LF
SH 6 SB OVERPASS AT BUS 6 NB	1,644	0.10	33			740	740
SH 6 SB OVERPASS AT SH 90	1,967	0.12	39			885	885
SH 6 NB OVERPASS AT SH 90	2,178	0.14	44			980	980
BUS 6 AT CEDAR CREEK							
BUS 6 AT SANDY CREEK				224	224	683	683
PROJECT TOTAL	**5,789**	**0.45**	**116**	**224**	**224**	**3,288**	**3,288**

* SEEDING LIMITS ARE 20' WIDTH ADJACENT TO MOW STRIP ALONG MBGF AS DIRECTED BY ENGINEER.

** FOR CONTRACTORS INFORMATION ONLY: 1 CYCLE AT 1/8 LB/SY.

*** PROVIDE SEDIMENT CONTROL FENCE ADJACENT TO ENTIRE LENGTH OF MBGF AS DIRECTED BY ENGINEER.

\# VEGETATIVE WATERING: 12 APPLICATIONS AT 1.66 GAL/SY PER APPLICATION.

PROVIDE CONSTRUCTION EXITS AS DIRECTED BY ENGINEER. EACH DIMENSIONED 50'x20'.

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

QUANTITY SUMMARIES

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	7
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

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DATE: 7/26/2023
SCALE: 1:1 \RDWY, TCP, AND PM GRIMES
FILE: ...
TIME: 7:24:05 AM
PENTABLE: GRIMES.tbl

SUMMARY OF BRIDGE ITEMS

DESCRIPTION	ITEM 104	ITEM 132	ITEM 400	ITEM 401	ITEM 427	ITEM 429			ITEM 432	ITEM 438	ITEM 439
	104 6021	132 6001	400 6005	401 6001	427 6002	429 6003	429 6005	429 6007	432 6033	438 6004	439 6013
	REMOVING CONC (CURB)	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CEM STABIL BKFL	FLOWABLE BACKFILL	CONCRETE PAINT FINISH	CONC STR REPAIR(DECK REP(PART DEPTH))	CONC STR REPAIR(DECK REP (FULL DEPTH))	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (STONE PROTECTION) (18 IN)	CLEANING AND SEALING EXIST JOINTS(CL7)	MULTI-LAYER POLYMER OVERLAY
	LF	CY	CY	CY	SF	SF	SF	SF	CY	LF	SY
CSJ 0050-03-114 SH 6 SB OVERPASS AT BUS 6 NB (NBI: 17-094-0-0050-03-062)	588					1		1		134	1970
CSJ 0050-03-112 SH 6 SB OVERPASS AT SH 90 (NBI: 17-094-0-0050-03-074)	380				4			39		172	1070
CSJ 0050-03-113 SH 6 NB OVERPASS AT SH 90 (NBI: 17-094-0-0050-03-075)	380				4	5	19	10		172	1070
CSJ 0050-11-025 BUS 6 AT CEDAR CREEK (NBI: 17-094-0-0050-11-015)								241			
CSJ 0050-11-024 BUS 6 AT SANDY CREEK (NBI: 17-094-0-0050-11-016)		21	2	5				153	62		
PROJECT TOTALS	**1348**	**21**	**2**	**5**	**8**	**6**	**19**	**444**	**62**	**478**	**4110**

SUMMARY OF BRIDGE ITEMS (CONTINUED)

DESCRIPTION	ITEM 446		ITEM 451	ITEM 483	ITEM 690	ITEM 712	ITEM 752	ITEM 780		ITEM 786
	446 6010	446 6016	451 6024	483 6013	690 6001	712 6009	752 6022	780 6004	786 6001	786 6002
	CLEAN & PAINT EXIST STR (SYSTEM I-A)	CLEAN & PAINT EXIST RAIL (SYSTEM I-A)	RETROFIT RAIL (TY SSTR)	SHOT BLASTING	REMOVAL OF CONDUIT	JT / CRCK SEAL (HOT - POURED RUBBER)	TREE TRIMMING AND BRUSH REMOVAL	CNC CRCK REPAIR (DISCRETE) (ROUT AND SEAL)	CARBON FIBER REINF POLYMER PROTECTION	CARBON FIBER REINF POLYMER STRENGTHNING
	LF	CY	CY	SY	LF	LF	LF	LF	SF	SF
CSJ 0050-03-114 SH 6 SB OVERPASS AT BUS 6 NB (NBI: 17-094-0-0050-03-062)	1		704.5	1970			35	3		
CSJ 0050-03-112 SH 6 SB OVERPASS AT SH 90 (NBI: 17-094-0-0050-03-074)			444	1070					76	
CSJ 0050-03-113 SH 6 NB OVERPASS AT SH 90 (NBI: 17-094-0-0050-03-075)			444	1070						
CSJ 0050-11-025 BUS 6 AT CEDAR CREEK (NBI: 17-094-0-0050-11-015)		1			50	2		52		
CSJ 0050-11-024 BUS 6 AT SANDY CREEK (NBI: 17-094-0-0050-11-016)										1960
PROJECT TOTALS	**1**	**1**	**1592.5**	**4110**	**50**	**2**	**35**	**55**	**76**	**1960**

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248-1229
972.960.4400

Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
LJG	6			SH 6,ETC.
GRAPHICS LJG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BRA	TEXAS	BRY	GRIMES	8
CHECK BRA	CONTROL 0050	SECTION 03	JOB 114,ETC.	

USER: LGUALTIE
DATE: 6/7/2023
SCALE: 1:39600
FILE: c:\pwworking\central01\d3084294\BRT_Grimes County BMIP Quantity Sum3.dgn
TIME: 8:38:52 AM
PENTABLE: 10347533-Grimes.tbl

SH 6 SB OVER BUS 6 NB

SEQUENCE OF CONSTRUCTION:

1. SETUP BARRICADES, AND ADVANCE WARNING SIGNS AS SHOWN IN THE TCP AND BC STANDARDS. SIGNS MAY BE ADJUSTED IN THE FIELD WITH APPROVAL FROM THE ENGINEER.
2. INSTALL PORTABLE CHANGEABLE MESSAGE SIGNS AT LEAST 7 DAYS PRIOR TO ANTICIPATED CLOSURES.
3. INSTALL AND MAINTAIN EROSION CONTROL DEVICES AS SHOWN IN THE PLANS LIMITING INSTALLATION TO INDIVIDUAL WORK AREAS.
4. INSTALL TRAFFIC CONTROL DEVICES. REMOVE OR COVER SIGNS IN CONFLICT WITH THE TCP. INSTALL NIGHTTIME DETOUR ON BUS 6 NB USING DETOUR LAYOUT IN TCP PLANS. FULL CLOSURE CAN ONLY HAPPEN BETWEEN THE HOURS OF 9:00 PM AND 6:00 AM. FULL CLOSURE TO BE USED FOR CLEANING AND PAINTING OF STEEL GIRDERS. BUS 6 NB LANES TO BE CLOSED USING TCP (2-5)-18 AS NEEDED FOR PAINTING.
5. PHASE 1, INSTALL PORTABLE CONCRETE TRAFFIC BARRIER AS SHOWN IN TCP LAYOUTS. SHIFT TRAFFIC ON SH 6 AND CLOSE INSIDE LANE USING TCP (6-1)-12. CLOSE LANES ON BUS 6 NB AS NEEDED FOR REPAIRS, REQUIRES APPROVAL BY THE ENGINEER. REPLACE BRIDGE RAIL AND MBGF.
6. PHASE 2, MOVE AND RESET PORTABLE CONCRETE TRAFFIC BARRIER CLOSE OUTSIDE LANE TO TRAFFIC USING TCP (6-1)-12 CLOSE LANES ON BUS 6 NB AS NEEDED FOR REPAIRS, REQUIRES APPROVAL BY THE ENGINEER. REPLACE BRIDGE RAIL AND MBGF. REOPEN OUTSIDE LANE TO TRAFFIC.
7. PHASE 3, USING TCP (6-1)-12, CLOSE LANES AS SHOWN ON TCP TYPICAL SECTIONS TO PERFORM JOINT CLEANING OPERATIONS.
8. PHASE 4, USING TCP (5-1)-18, CONSTRUCT POLYMER OVERLAY OVER SH 6 AND PERFORM ADDITIONAL BRIDGE REPAIRS AS REQUIRED.
9. PLACE TEMPORARY TABS TO DESIGNATE LANES PRIOR TO INSTALLING FINAL PAVEMENT MARKINGS.
10. PLACE FINAL PAVEMENT MARKINGS.
11. PERFORM FINAL CLEANUP.

SH 6 SB OVERPASS AT SH 90 AND SH 6 NB OVERPASS AT SH 90

SEQUENCE OF CONSTRUCTION:

1. SETUP BARRICADES, AND ADVANCE WARNING SIGNS AS SHOWN IN THE TCP AND BC STANDARDS. SIGNS MAY BE ADJUSTED IN THE FIELD WITH APPROVAL FROM THE ENGINEER.
2. INSTALL PORTABLE CHANGEABLE MESSAGE SIGNS AT LEAST 7 DAYS PRIOR TO ANTICIPATED CLOSURES.
3. INSTALL AND MAINTAIN EROSION CONTROL DEVICES LIMITING INSTALLATION TO INDIVIDUAL WORK AREAS.
4. PHASE 1, INSTALL TRAFFIC CONTROL DEVICES. REMOVE OR COVER SIGNS IN CONFLICT WITH THE TCP. SHIFT TRAFFIC ON SH 6 AND CLOSE INSIDE LANE USING TCP (2-6)-18, INSTALL PORTABLE CONCRETE TRAFFIC BARRIER AS SHOWN IN TCP LAYOUTS. REPLACE BRIDGE RAIL AND MBGF. SH 90 U TURNS AND LANES TO BE CLOSED USING TCP (6-1)-12 AS NEEDED FOR BRIDGE REPAIRS. REQUIRES APPROVAL BY THE ENGINEER. PERFORM JOINT CLEANING OPERATIONS. CONSTRUCT POLYMER OVERLAY OVER SH 6 AND PERFORM ADDITIONAL BRIDGE REPAIRS AS REQUIRED. ONLY ONE LANE WILL BE CLOSED AT A TIME.
5. PHASE 2, MOVE AND RESET PORTABLE CONCRETE TRAFFIC BARRIER CLOSE OUTSIDE LANE TO TRAFFIC USING TCP (2-6)-18. CLOSE LANES ON SH 90 AS NEEDED FOR REPAIRS, REQUIRES APPROVAL BY THE ENGINEER. REPLACE BRIDGE RAIL AND MBGF. PERFORM JOINT CLEANING OPERATIONS. CONSTRUCT POLYMER OVERLAY OVER SH 6 AND PERFORM ADDITIONAL BRIDGE REPAIRS AS REQUIRED. REOPEN OUTSIDE LANE TO TRAFFIC.
6. PLACE TEMPORARY TABS TO DESIGNATE LANES PRIOR TO INSTALLING FINAL PAVEMENT MARKINGS.
7. PLACE FINAL PAVEMENT MARKINGS.
8. PERFORM FINAL CLEANUP.

BUS 6 AT CEDAR CREEK

SEQUENCE OF CONSTRUCTION:

1. SETUP BARRICADES, AND ADVANCE WARNING SIGNS AS SHOWN IN THE TCP AND BC STANDARDS. SIGNS MAY BE ADJUSTED IN THE FIELD WITH APPROVAL FROM THE ENGINEER.
2. INSTALL AND MAINTAIN EROSION CONTROL DEVICES LIMITING INSTALLATION TO INDIVIDUAL WORK AREAS.
3. INSTALL TRAFFIC CONTROL DEVICES. REMOVE OR COVER SIGNS IN CONFLICT WITH THE TCP.
4. CLOSE ONE SHOULDER AT A TIME USING TCP (2-1)-18. PERFORM BRIDGE REPAIRS. SEE BRIDGE SHEETS FOR ADDITIONAL DETAILS.
5. REOPEN INSIDE SHOULDER TO TRAFFIC AND PERFORM FINAL CLEANUP.

BUS 6 AT SANDY CREEK

SEQUENCE OF CONSTRUCTION:

1. SETUP BARRICADES, AND ADVANCE WARNING SIGNS AS SHOWN IN THE TCP AND BC STANDARDS. SIGNS MAY BE ADJUSTED IN THE FIELD WITH APPROVAL FROM THE ENGINEER.
2. INSTALL AND MAINTAIN EROSION CONTROL DEVICES LIMITING INSTALLATION TO INDIVIDUAL WORK AREAS.
3. INSTALL TRAFFIC CONTROL DEVICES. REMOVE OR COVER SIGNS IN CONFLICT WITH THE TCP.
4. CLOSE ONE LANE AT A TIME USING TCP (2-8)-23. PERFORM BRIDGE REPAIRS. SEE BRIDGE SHEETS FOR ADDITIONAL DETAILS.
5. REOPEN LANES TO TRAFFIC AND PERFORM FINAL CLEANUP.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED
PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO: F-16341

Texas Department of Transportation

TRAFFIC CONTROL PLAN NARRATIVE

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
	6			SH 6,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	9
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

USER: golmeida
DATE: 7/26/2023
SCALE: 1:2000
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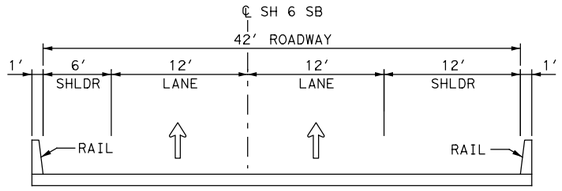
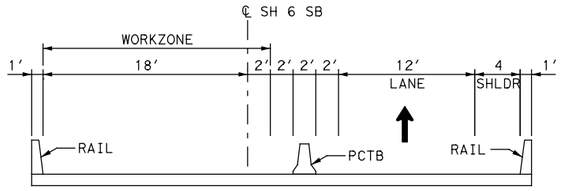
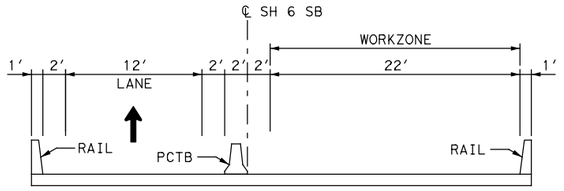
TIME: 7:24:07 AM
PENTABLE: GRIMES.tbl



SH 6 SB OVER BUS 6 NB - EXISTING



SH 6 SB OVER BUS 6 NB - PHASE 1

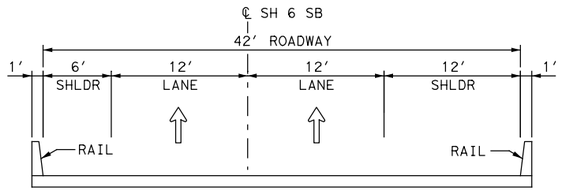


SH 6 SB OVER BUS 6 NB - PHASE 2

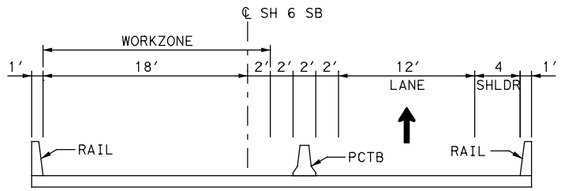
LEGEND

⇦ EXIST TRAFFIC FLOW ARROWS

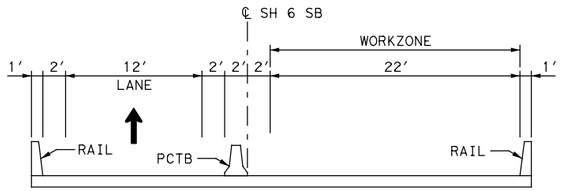
⬅ PROPOSED TRAFFIC FLOW ARROWS



SH 6 SB OVER SH 90 - EXISTING



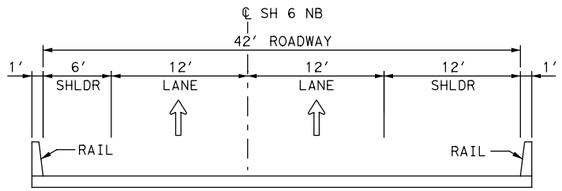
SH 6 SB OVER SH 90 - PHASE 1



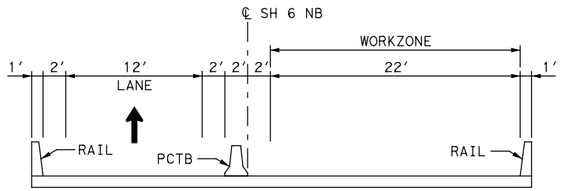
SH 6 SB OVER SH 90 - PHASE 2

NOTES:

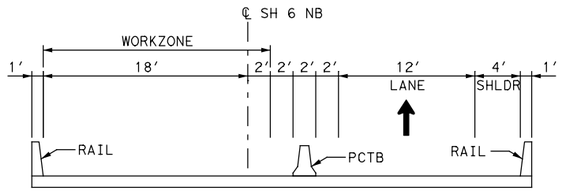
1. DIMENSIONS ARE TO FACE OF RAIL.



SH 6 NB OVER SH 90 - EXISTING



SH 6 NB OVER SH 90 - PHASE 1



SH 6 NB OVER SH 90 - PHASE 2

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

5/31/2023

NO.	REVISION	BY	DATE

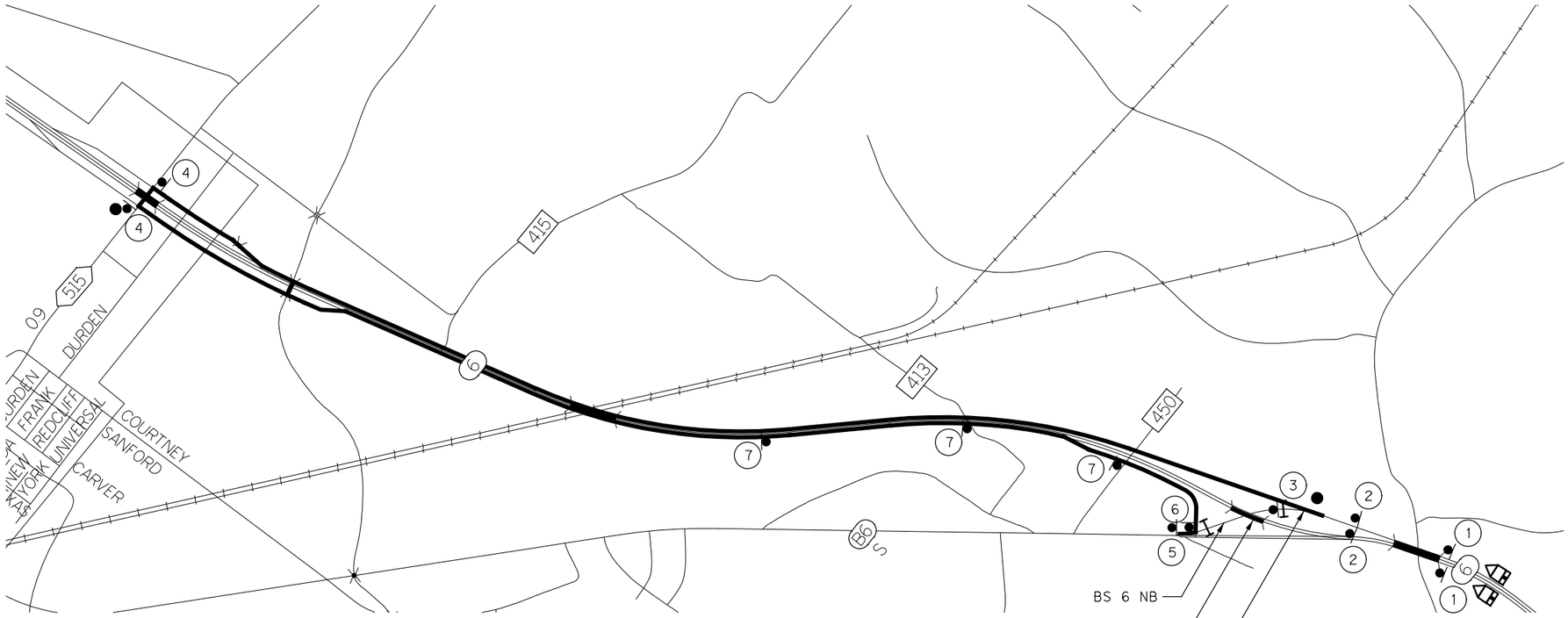
TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

TCP TYPICAL SECTIONS

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	10
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: malvarez
DATE: 5/31/2023
SCALE: 1:40
FILE: ...\Traffic_Control\TCP TYPICALS
TIME: 4:05:52 PM
PENTABLE: GRIMES.tbl



N

0 1500 3000
SCALE IN FEET

LEGEND:

- DETOUR ROUTE
- CONSTRUCTION SIGN
- TYPE III BARRICADE
- PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

NOTES:

1. ALL SIGNS, DEVICES, LOCATION AND SPACING SHALL CONFORM TO THE TMUTCD AND THE BC STANDARD DRAWINGS.
2. TY 3 BARRICADES TO BE PLACED IN A LOCATION THAT IS SATISFACTORY TO THE ENGINEER. BARRICADES SHOULD NOT BLOCK ACCESS TO PROPERTY OWNERS OUTSIDE OF PROJECT LIMITS.

RAMP CLOSED 1000 FT
CW20-3B
48" X 48"
(1)

RAMP CLOSED 500 FT
CW20-3C
48" X 48"
(2)

SG20-6
48" X 30"
NAME
ADDRESS
CITY
STATE
CONTRACTOR

R11-2
48" X 30"
ROAD CLOSED

TYPE III BARRICADE
(3)

DETOUR M4-8 24" X 12"
NORTH M3-1 24" X 12"
BUSINESS M4-3 24" X 12"
6 TEXAS M1-6T-2 24" X 24"
M5-1L 21" X 15"
(4)

END DETOUR M4-8a 24" X 18"
BUSINESS M4-3 24" X 12"
6 TEXAS M1-6T-2 24" X 24"
(5)

DETOUR M4-8 24" X 12"
NORTH M3-1 24" X 12"
BUSINESS M4-3 24" X 12"
6 TEXAS M1-6T-2 24" X 24"
M5-1R 21" X 15"
(6)

DETOUR M4-8 24" X 12"
NORTH M3-1 24" X 12"
BUSINESS M4-3 24" X 12"
6 TEXAS M1-6T-2 24" X 24"
M6-3 21" X 15"
(7)

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED
PROFESSIONAL ENGINEER
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NO.	REVISION	BY	DATE

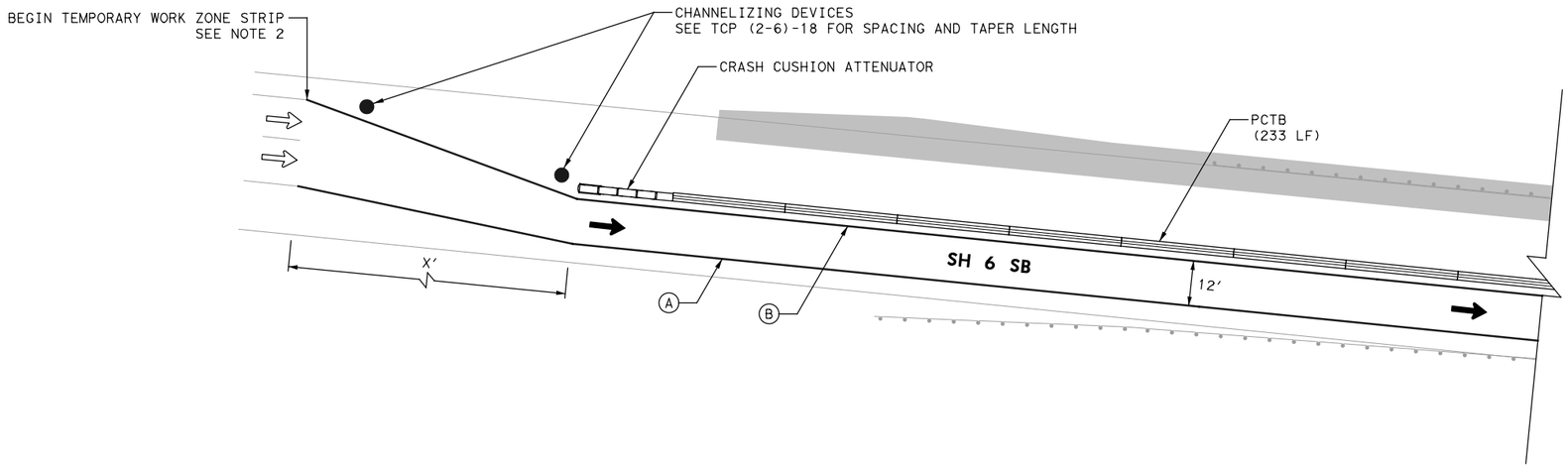
TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

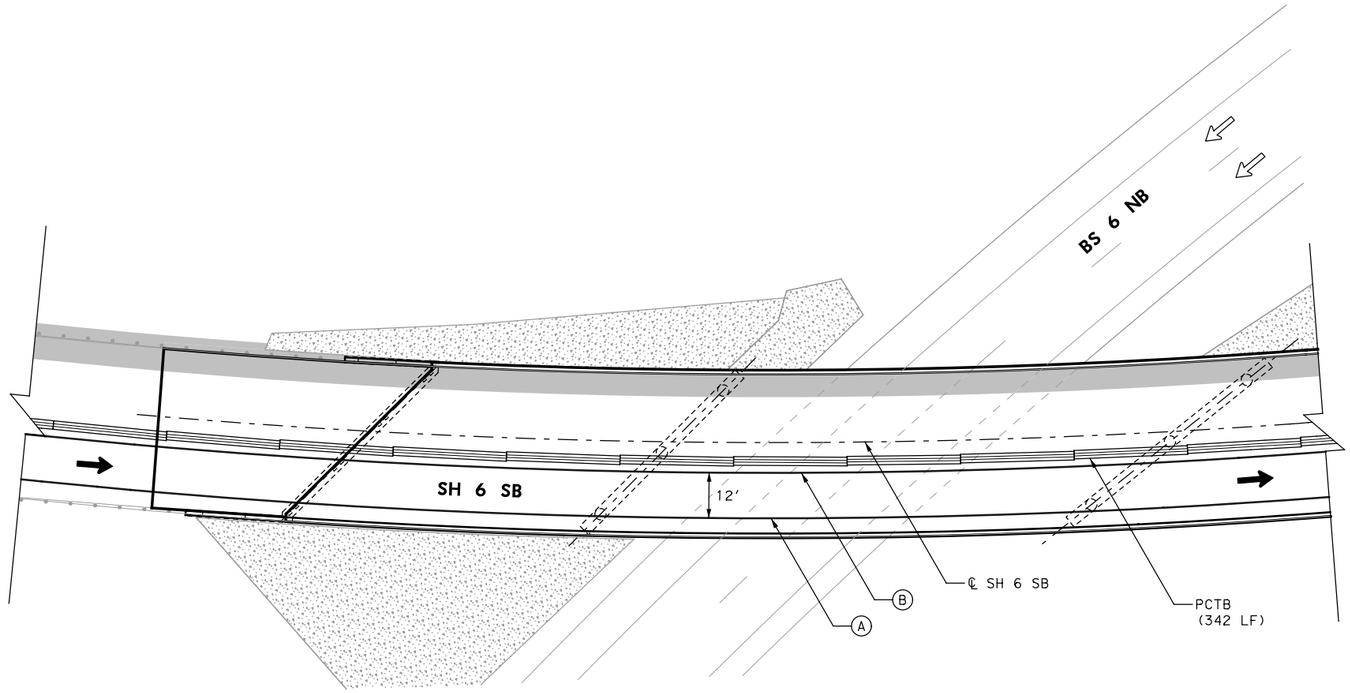
SH 6 SB OVERPASS AT BUS 6 NB TRAFFIC CONTROL PLAN DETOUR LAYOUT

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
CCG	6			SH 6, ETC.
GRAPHICS CCG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK CCG	TEXAS	BRY	GRIMES	11
CHECK CCG	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

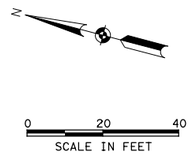
USER: malvarez
DATE: 5/31/2023
SCALE: 1:3000
FILE: ...\Traffic_Control\DETOUR LAYOUT
TIME: 4:05:54 PM
PENTABLE: GRIMES.tbl



NORTH END OF BRIDGE



MIDDLE OF BRIDGE



LEGEND

- (A) WK ZN PAV MRK REMOV (W)(6")(SLD)
- (B) WK ZN PAV MRK REMOV (Y)(6")(SLD)
- (C) WK ZN PAV MRK REMOV (W)(6")(BRK)
- (D) WK ZN PAV MRK REMOV (REFL) TY II-C-R
- EXIST TRAFFIC FLOW ARROWS
- PROPOSED TRAFFIC FLOW ARROWS
- CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

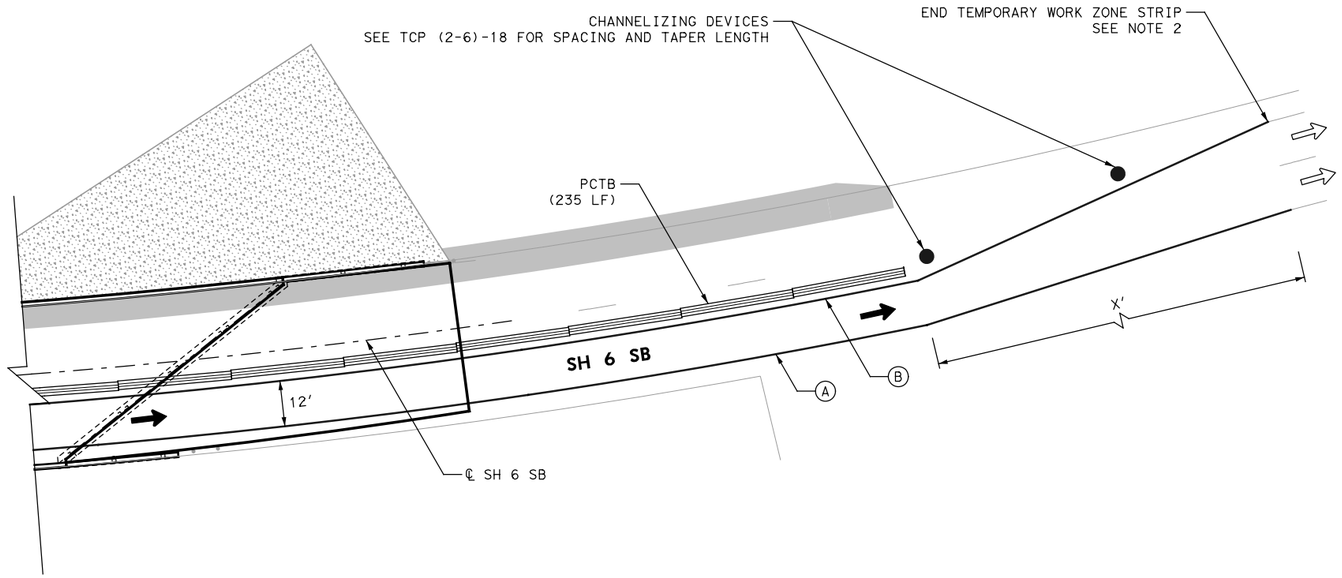
SH 6 SB OVERPASS AT BUS 6 NB TCP LAYOUT PHASE 1

SCALE: =1": 40'

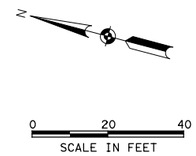
SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	12
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: golmeido
DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PHO1_PLO1_SH01
TIME: 7:24:12 AM
PENTABLE: GRIMES.tbl



SOUTH END OF BRIDGE



LEGEND

- (A) WK ZN PAV MRK REMOV (W)(6")(SLD)
- (B) WK ZN PAV MRK REMOV (Y)(6")(SLD)
- (C) WK ZN PAV MRK REMOV (W)(6")(BRK)
- (D) WK ZN PAV MRK REMOV (REFL) TY II-C-R
- EXIST TRAFFIC FLOW ARROWS
- PROPOSED TRAFFIC FLOW ARROWS
- CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED
PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

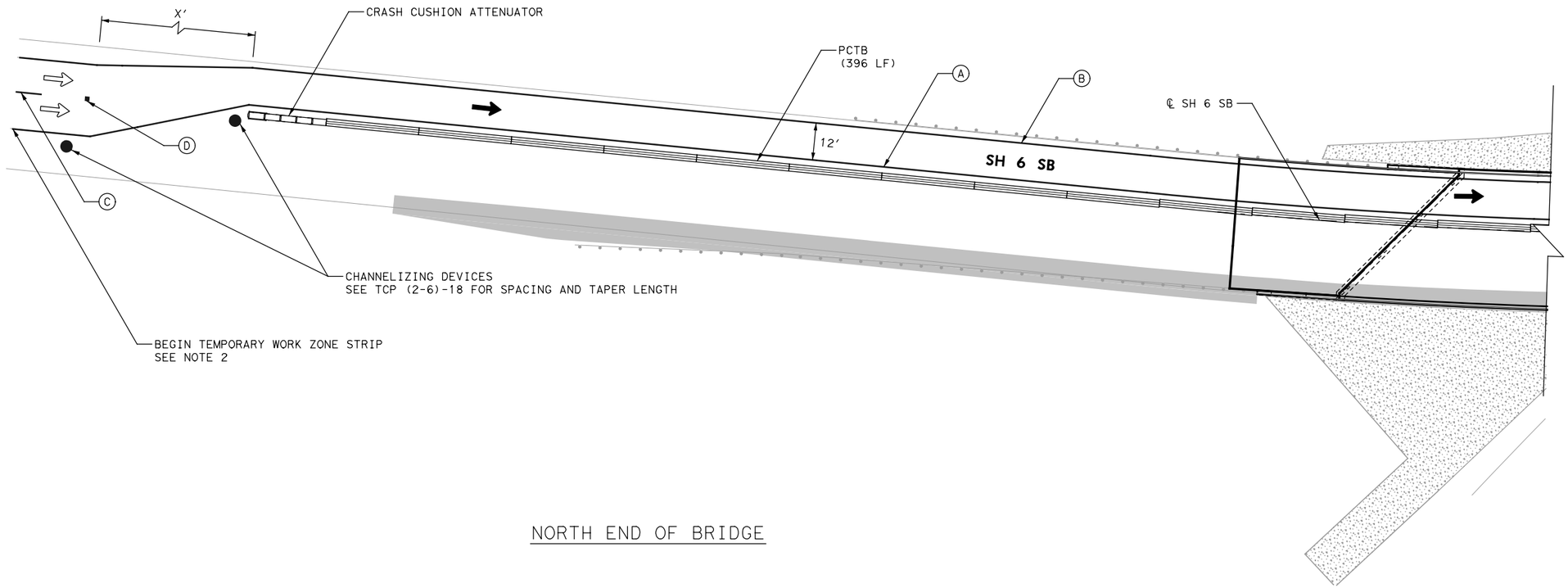
Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB TCP LAYOUT PHASE 1

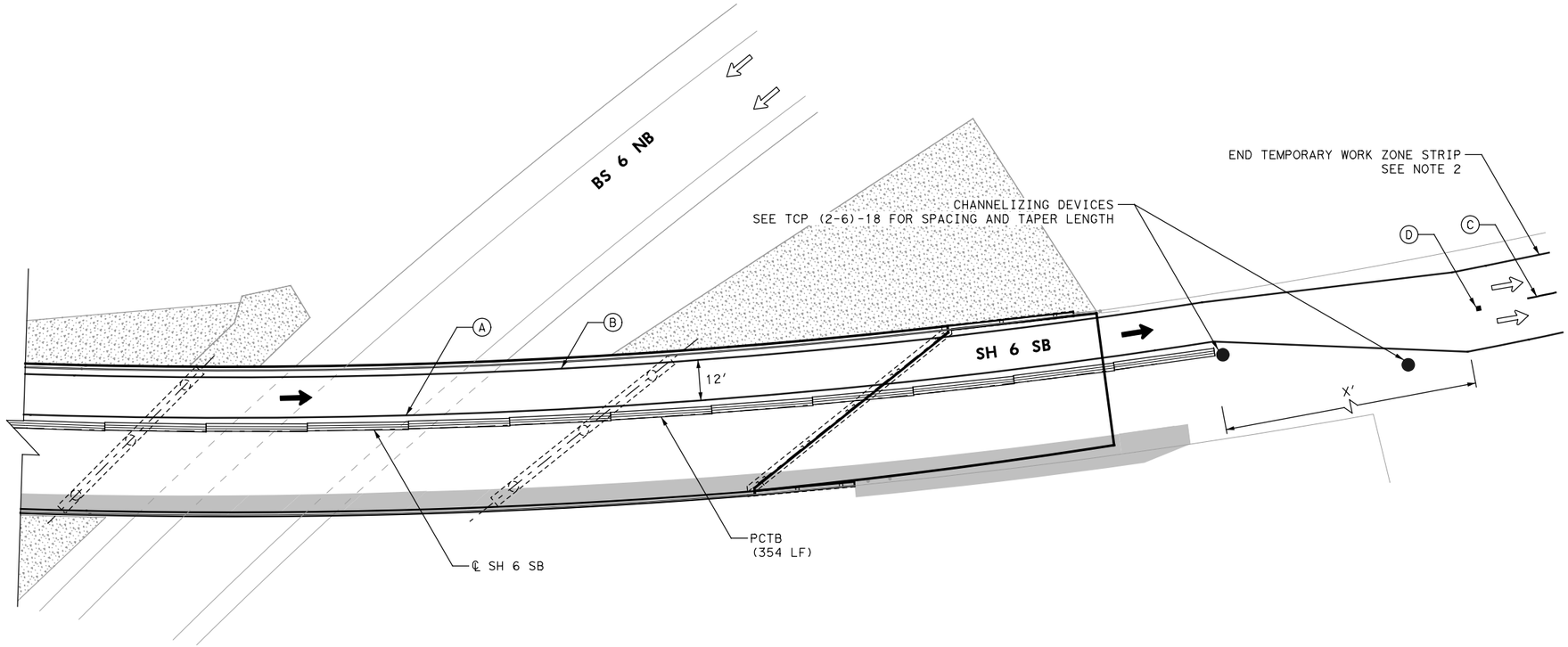
SCALE: =1": 40'

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	13
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

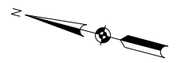
USER: gpimeida
DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PH01_PL01_SH02
TIME: 7:24:14 AM
PENTABLE: GRIMES.tbl



NORTH END OF BRIDGE



SOUTH END OF BRIDGE



LEGEND

- (A) WK ZN PAV MRK REMOV (W)(6")(SLD)
- (B) WK ZN PAV MRK REMOV (Y)(6")(SLD)
- (C) WK ZN PAV MRK REMOV (W)(6")(BRK)
- (D) WK ZN PAV MRK REMOV (REFL) TY II-C-R
- EXIST TRAFFIC FLOW ARROWS
- PROPOSED TRAFFIC FLOW ARROWS
- CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

JMT TBPE REGISTRATION NO. F-16341

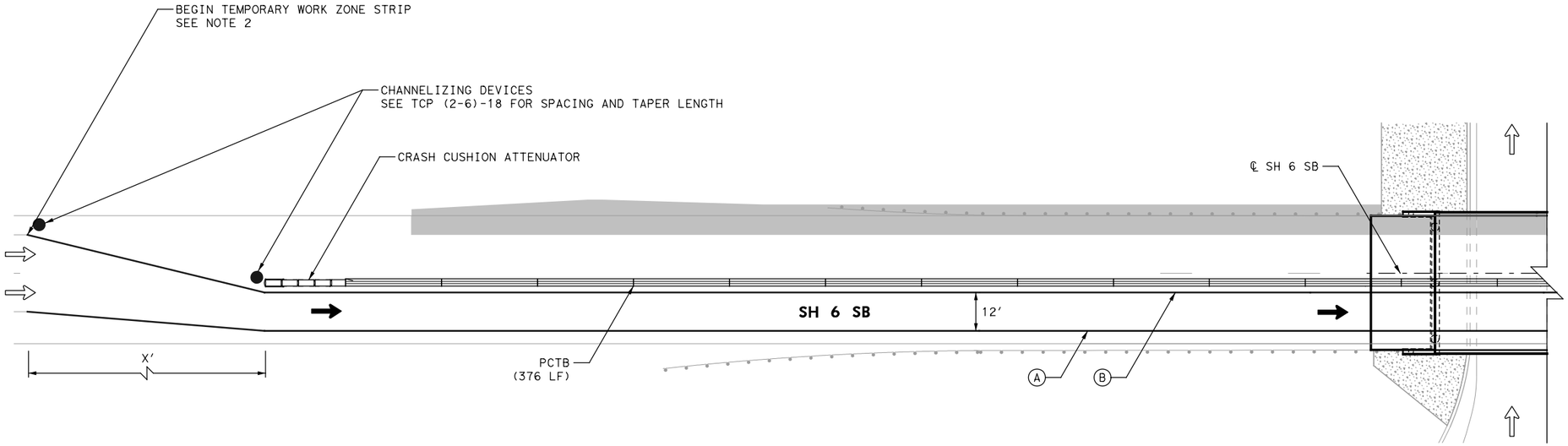
Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB TCP LAYOUT PHASE 2

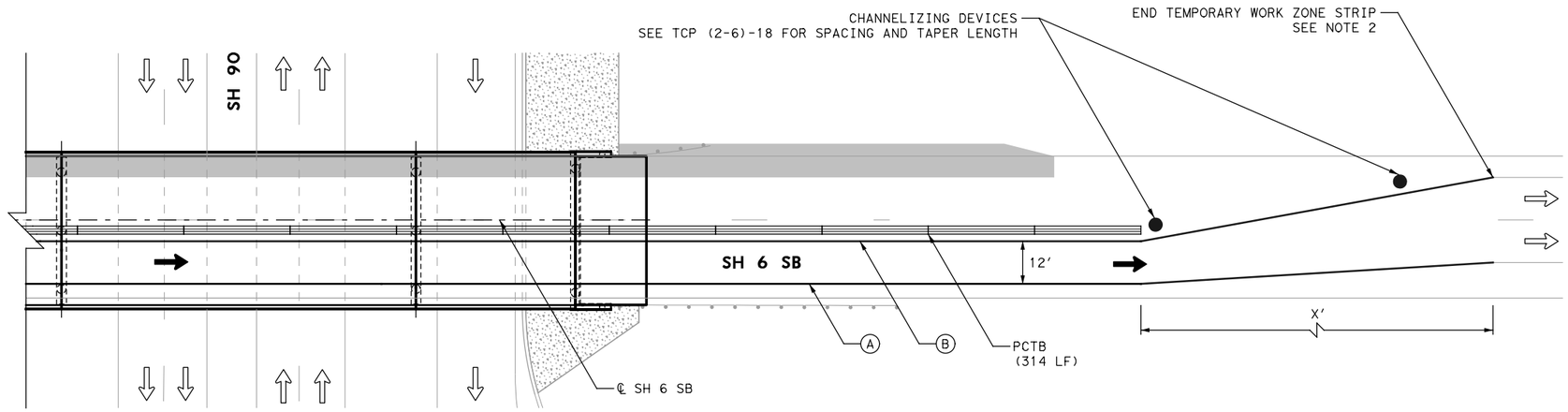
SCALE: =1": 40' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	14
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

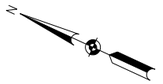
USER: golme1da
DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PH02_PLO1
TIME: 7:24:16 AM
PENTABLE: GRIMES.tbl



NORTH END OF BRIDGE



SOUTH END OF BRIDGE



LEGEND

- (A) WK ZN PAV MRK REMOV (W)(6")(SLD)
- (B) WK ZN PAV MRK REMOV (Y)(6")(SLD)
- (C) WK ZN PAV MRK REMOV (W)(6")(BRK)
- (D) WK ZN PAV MRK REMOV (REFL) TY II-C-R
- EXIST TRAFFIC FLOW ARROWS
- PROPOSED TRAFFIC FLOW ARROWS
- CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

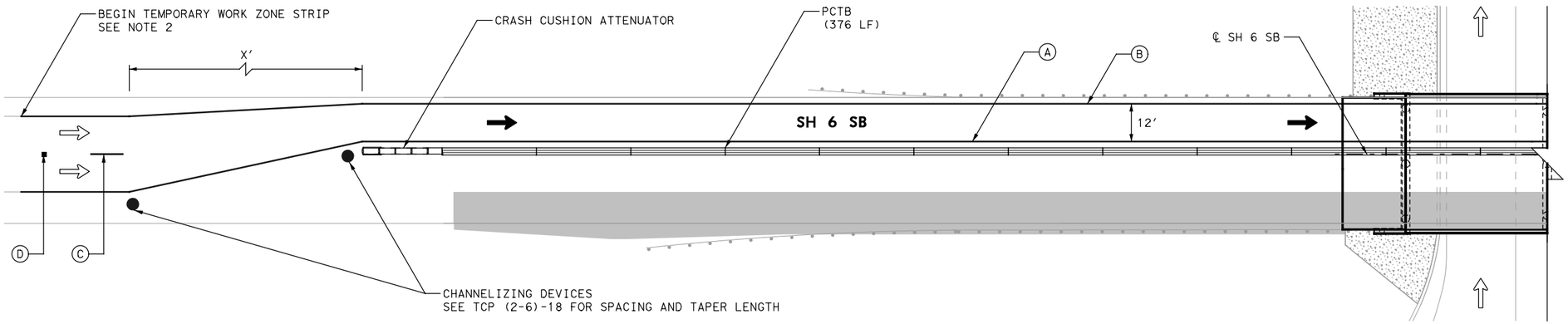
Texas Department of Transportation

SH 6 SB OVERPASS AT SH 90 TCP LAYOUT PHASE 1

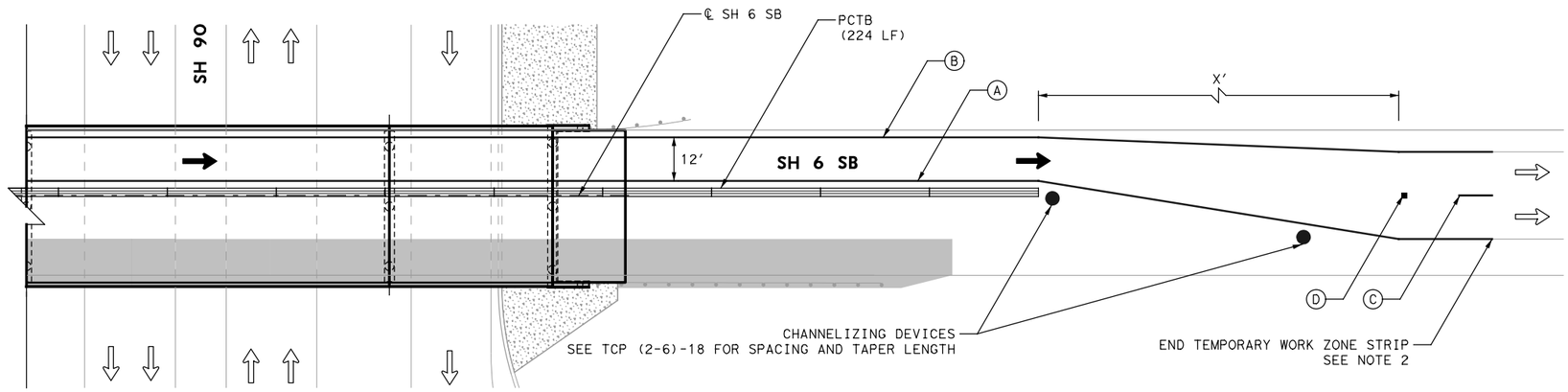
SCALE: =1": 40′ SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	15
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: gpimeida
DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PH01_PL03
TIME: 7:24:17 AM
PENTABLE: GRIMES.tbl



NORTH END OF BRIDGE



SOUTH END OF BRIDGE

0 20 40
SCALE IN FEET

LEGEND

A	WK ZN PAV MRK REMOV (W)(6")(SLD)
B	WK ZN PAV MRK REMOV (Y)(6")(SLD)
C	WK ZN PAV MRK REMOV (W)(6")(BRK)
D	WK ZN PAV MRK REMOV (REFL) TY II-C-R
⇦	EXIST TRAFFIC FLOW ARROWS
⬅	PROPOSED TRAFFIC FLOW ARROWS
▭	CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

STATE OF TEXAS
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7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

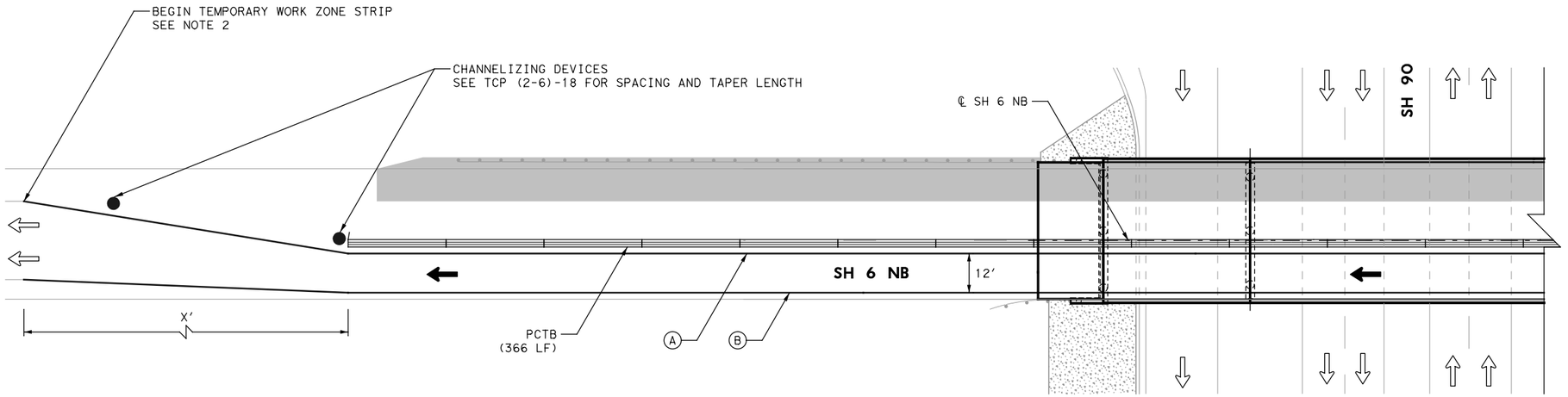
Texas Department of Transportation

SH 6 SB OVERPASS AT SH 90 TCP LAYOUT PHASE 2

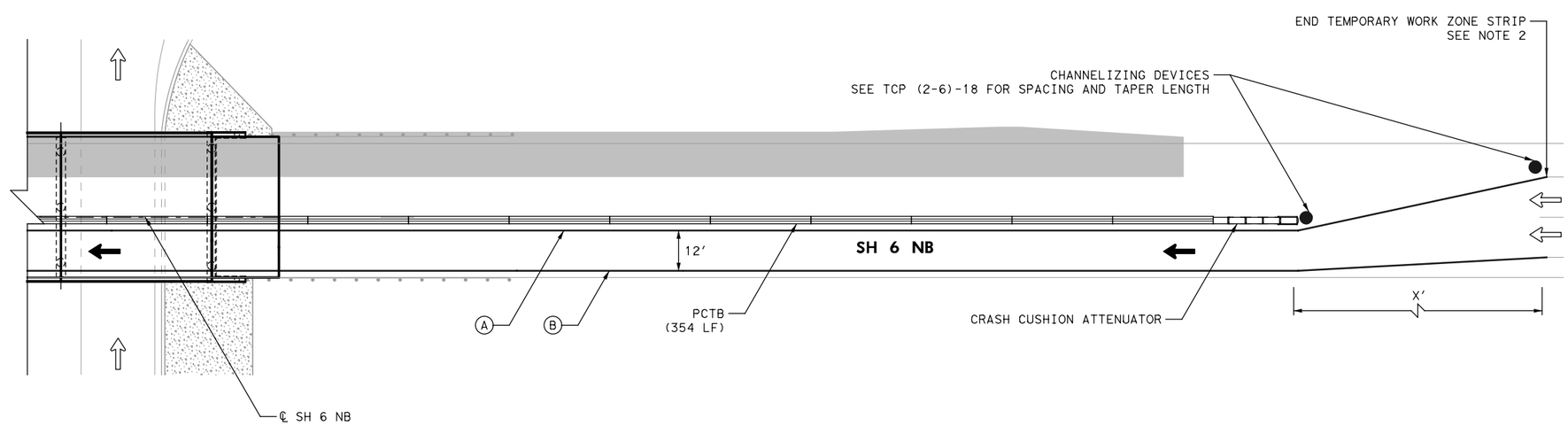
SCALE: =1": 40' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	16
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

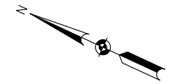
USER: gaimeida
DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PH02_PL03
TIME: 7:24:19 AM
PENTABLE: GRIMES.tbl



NORTH END OF BRIDGE



SOUTH END OF BRIDGE



LEGEND

- (A) WK ZN PAV MRK REMOV (W)(6")(SLD)
- (B) WK ZN PAV MRK REMOV (Y)(6")(SLD)
- (C) WK ZN PAV MRK REMOV (W)(6")(BRK)
- (D) WK ZN PAV MRK REMOV (REFL) TY II-C-R
- EXIST TRAFFIC FLOW ARROWS
- PROPOSED TRAFFIC FLOW ARROWS
- CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

STATE OF TEXAS
MIKAEL ALVAREZ
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7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

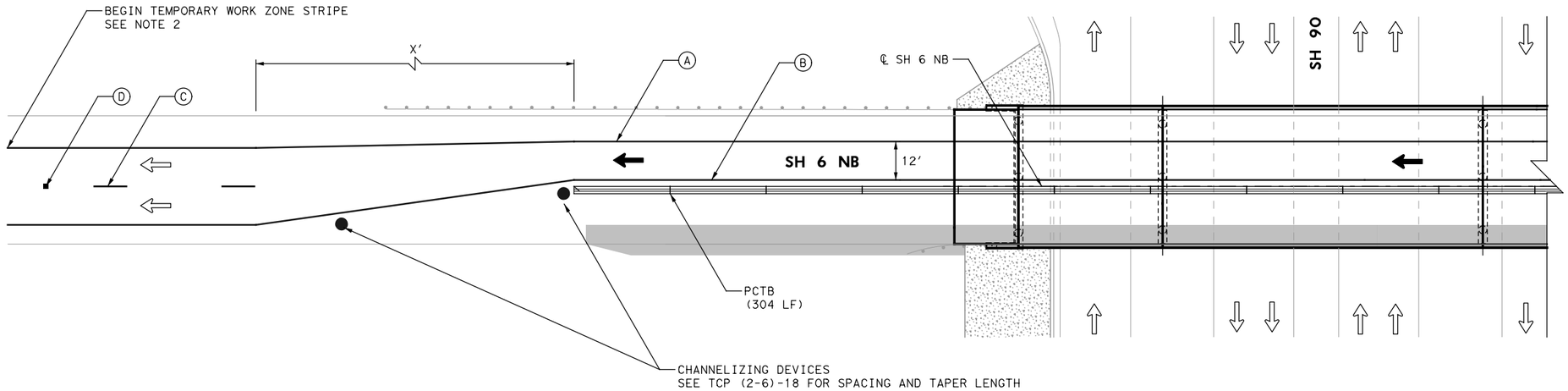
Texas Department of Transportation

SH 6 NB OVERPASS AT SH 90 TCP LAYOUT PHASE 1

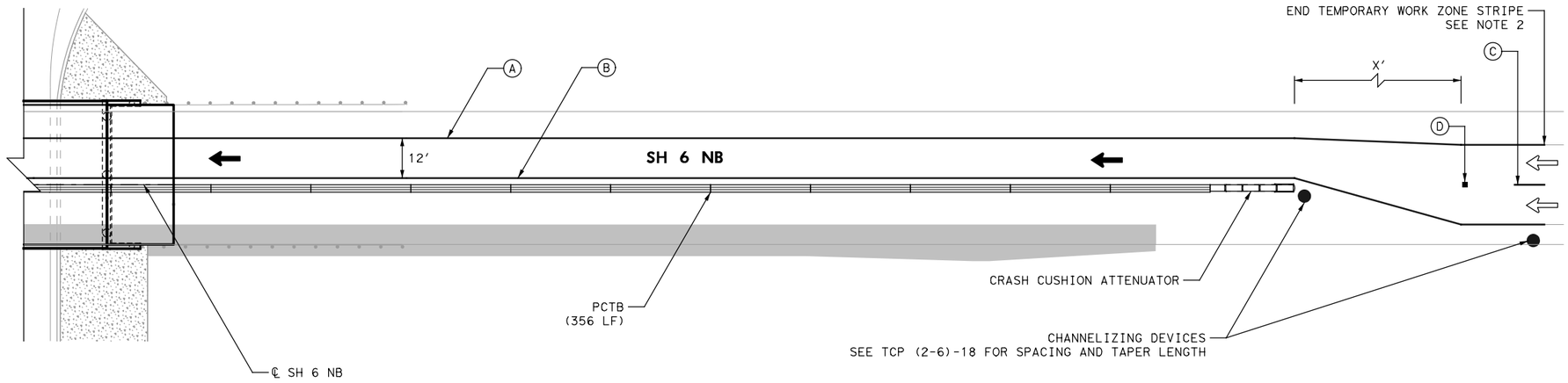
SCALE: =1"=40′ SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	17
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: gaime1da
DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PH01_PL02
TIME: 7:24:20 AM
PENTABLE: GRIMES.tbl



NORTH END OF BRIDGE



SOUTH END OF BRIDGE

LEGEND

- (A) WK ZN PAV MRK REMOV (W)(6")(SLD)
- (B) WK ZN PAV MRK REMOV (Y)(6")(SLD)
- (C) WK ZN PAV MRK REMOV (W)(6")(BRK)
- (D) WK ZN PAV MRK REMOV (REFL) TY II-C-R
- EXIST TRAFFIC FLOW ARROWS
- PROPOSED TRAFFIC FLOW ARROWS
- CONSTRUCTION ZONE

NOTES:

1. REFER TO TCP (2-6)-18 FOR ALL REQUIREMENTS, INCLUDING SHOULDER TAPER, TMA, AND ARROW PANEL.
2. STRIPE TO BE REPLACED WITH TEMPORARY WORK ZONE STRIPING TO LIMITS OF STRIPING REMOVED IN PHASE 1.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

SH 6 NB OVERPASS AT SH 90 TCP LAYOUT PHASE 2

SCALE: =1"=40' SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	18
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

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DATE: 7/26/2023
SCALE: 1:40
FILE: ...\GRIMES_TCP_PH02_PL02
TIME: 7:24:23 AM
PENTABLE: GRIMES.tbl

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

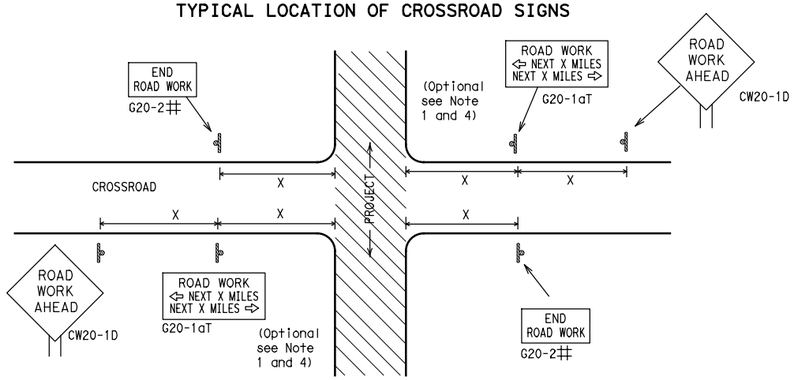
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0050	03	114,ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	BRY	GRIMES		19

DATE: 5/31/2023 4:06:13 PM
FILE: ...\Traffic Control\bc-21 (3).dgn

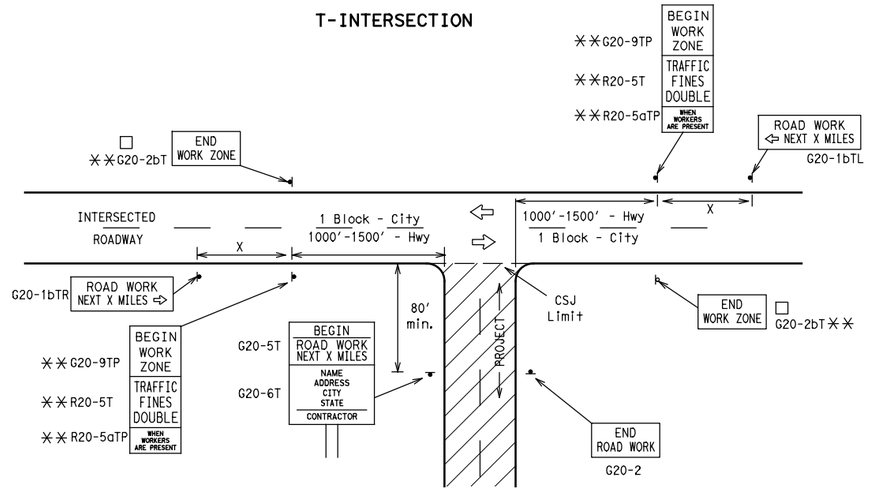
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

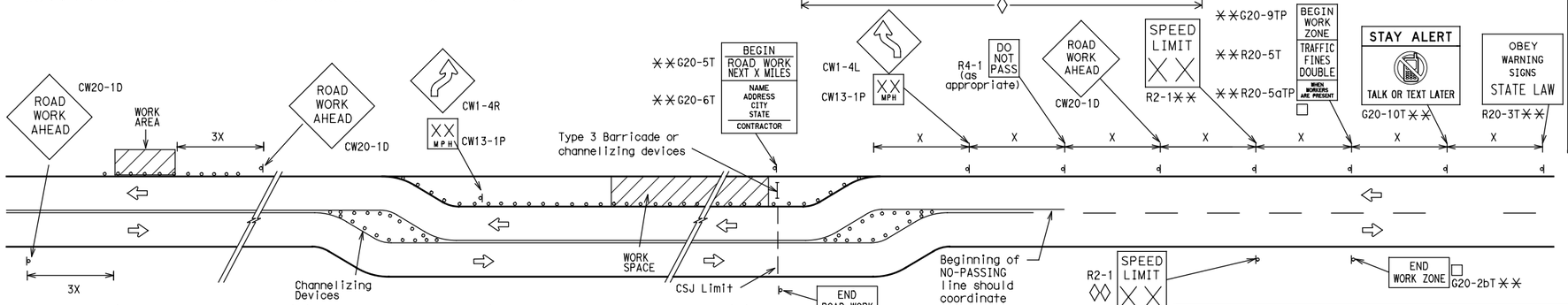
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

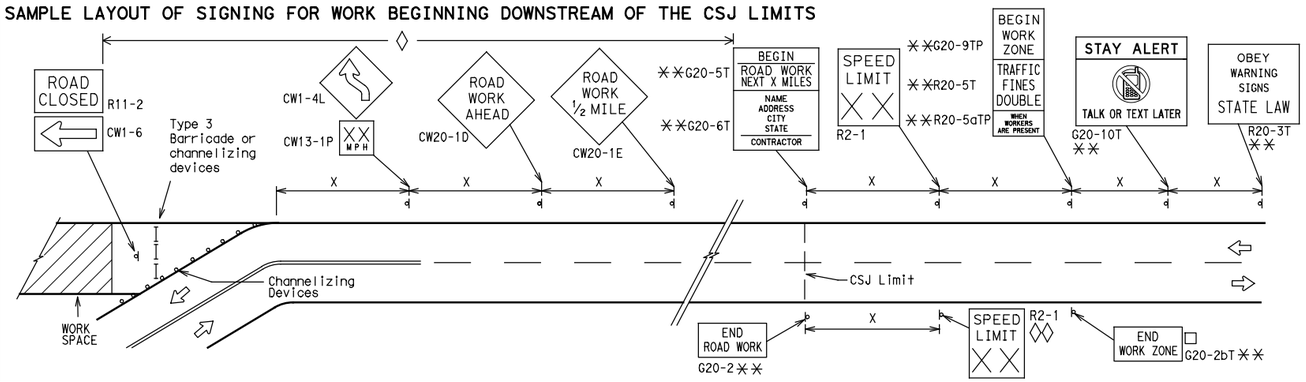
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

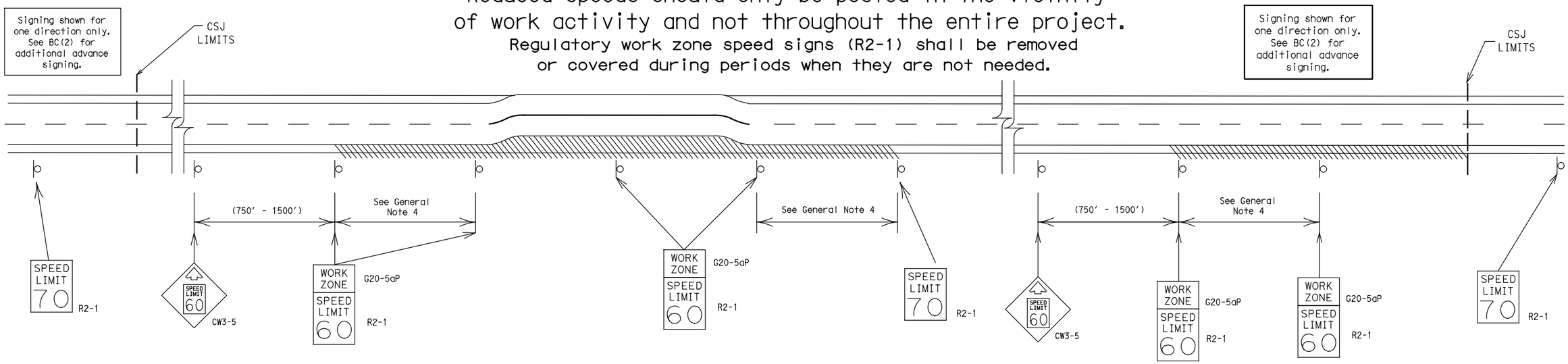
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		20

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
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		21

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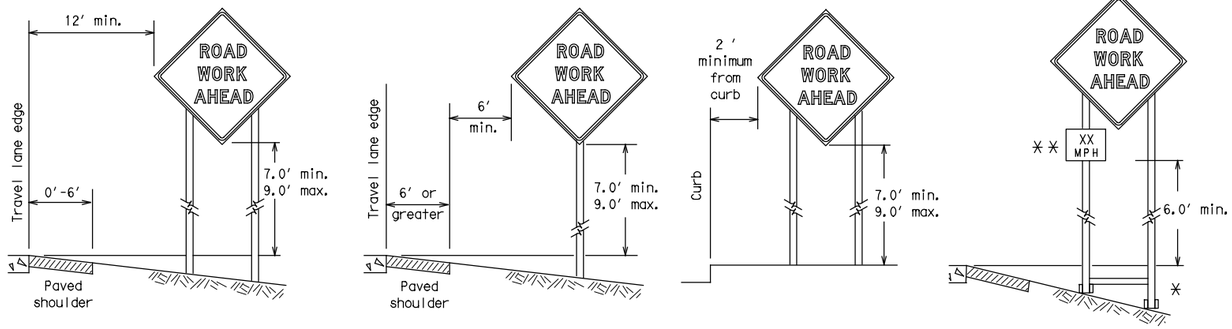
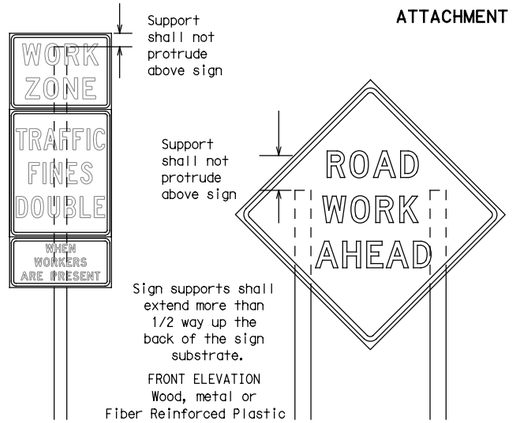
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

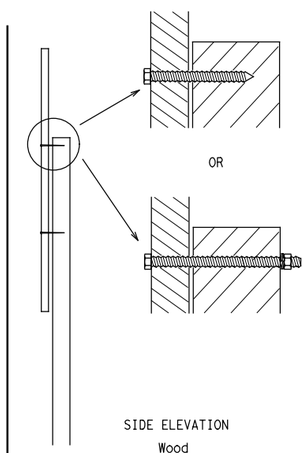


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





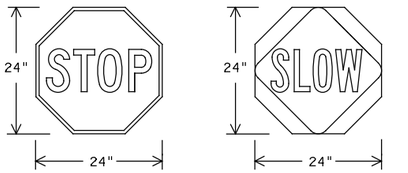
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		22

DATE: 5/31/2023 4:06:14 PM
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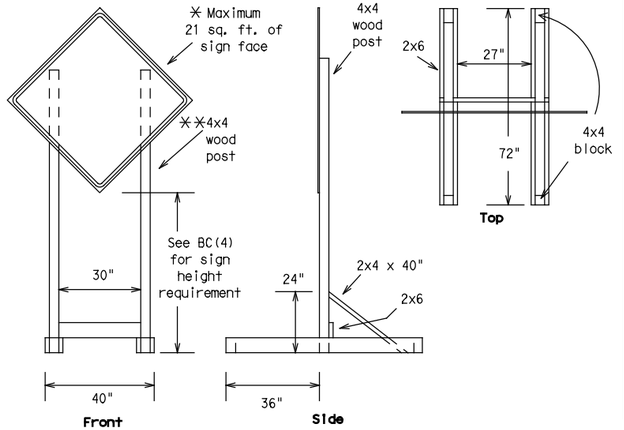
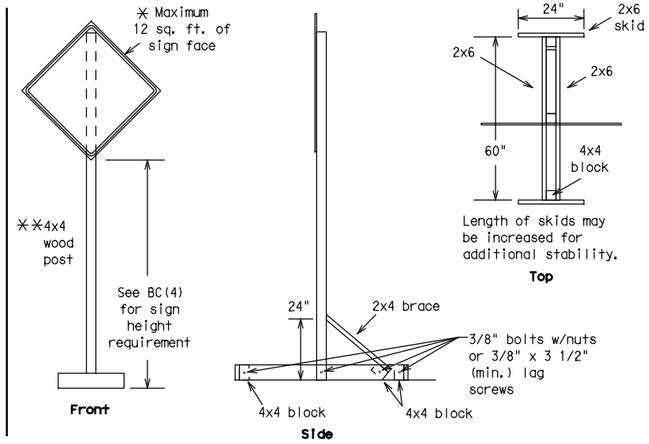
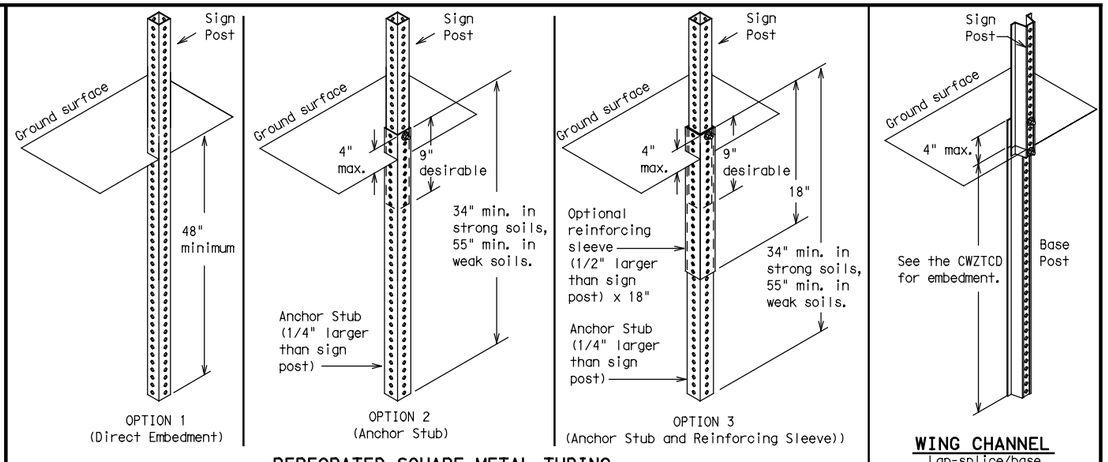




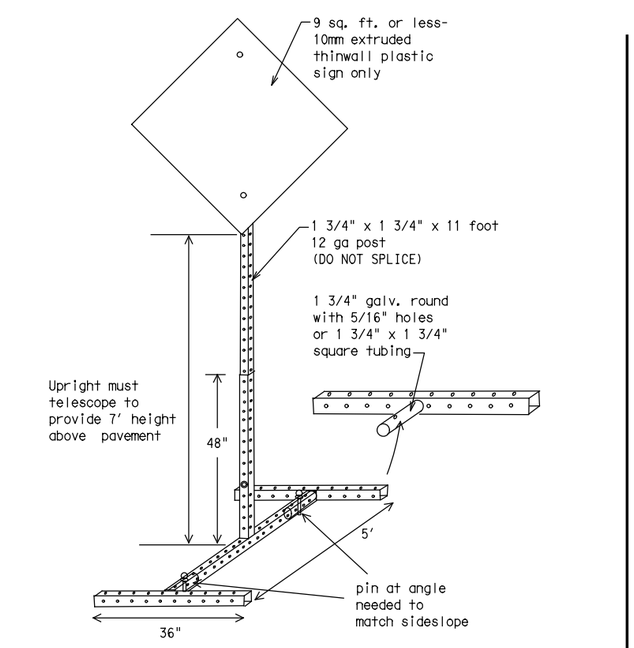
SKID MOUNTED WOOD SIGN SUPPORTS

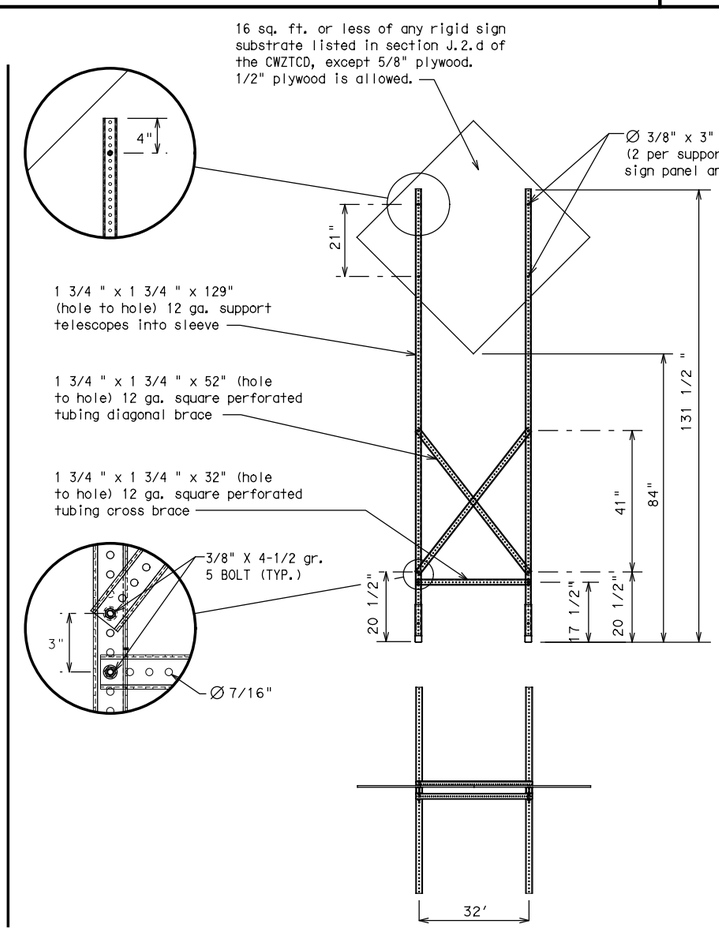
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

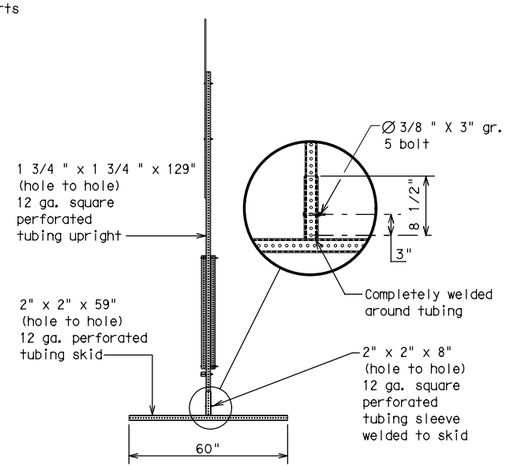


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		23

DATE: 5/31/2023 4:06:15 PM
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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
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

✳✳ 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	0050	03	114,ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		24

100

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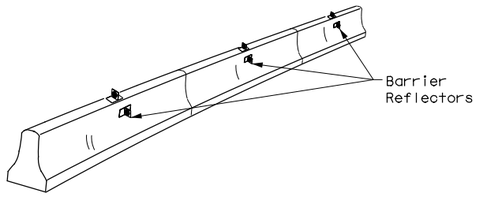
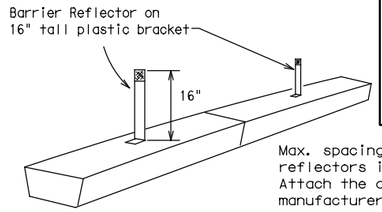
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



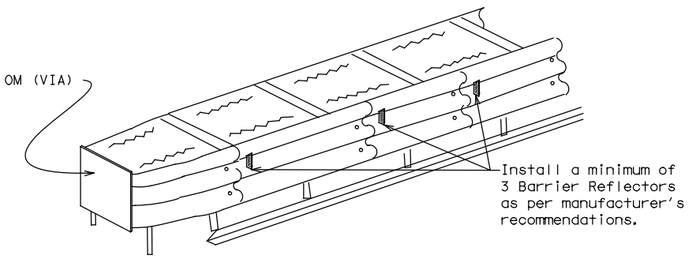
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

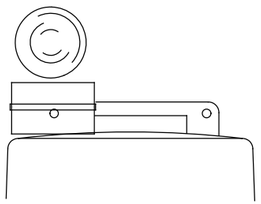
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

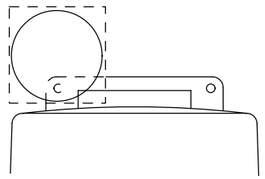
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

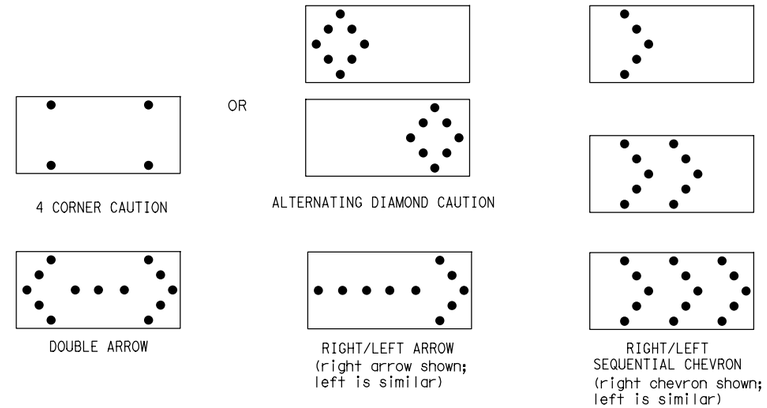
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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.

SHEET 7 OF 12

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	0050	03	114,ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		25

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

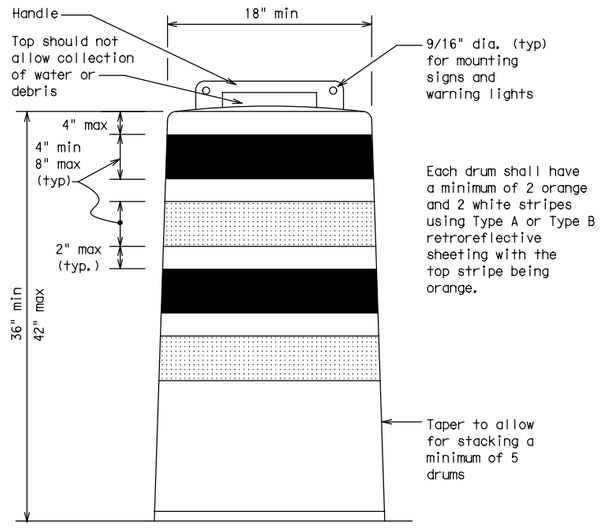
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

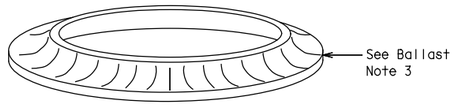
RETROREFLECTIVE SHEETING

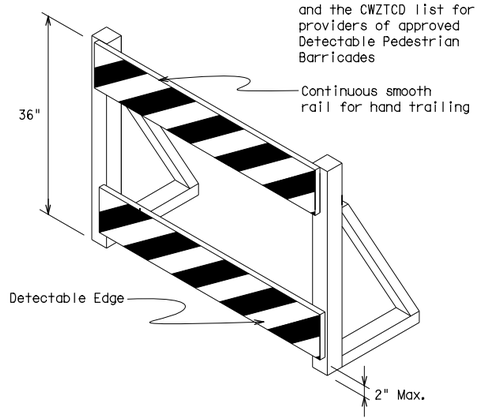
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

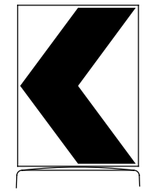




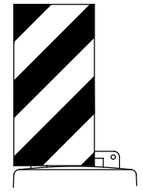


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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REVISIONS	0050	03	114,ETC.	SH 6
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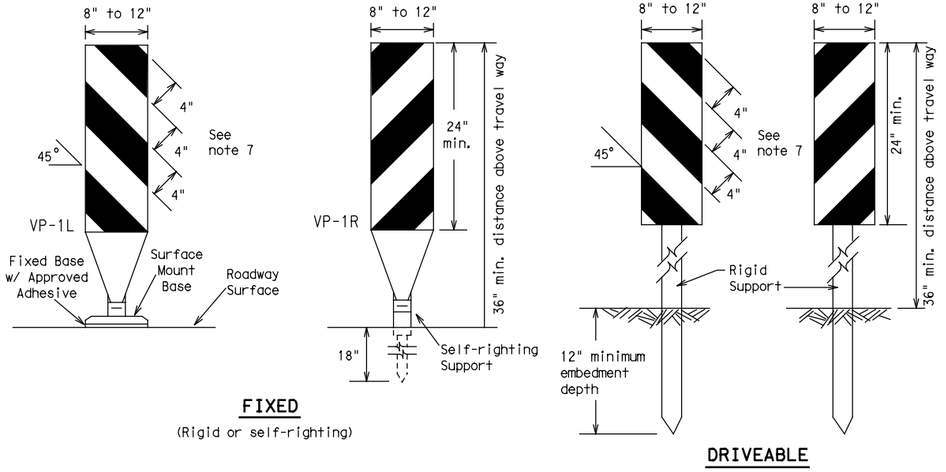
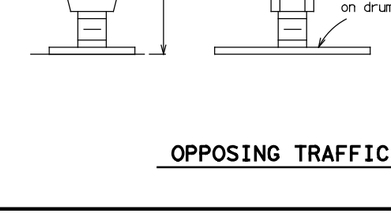


FIXED
(Rigid or self-righting)

DRIVEABLE

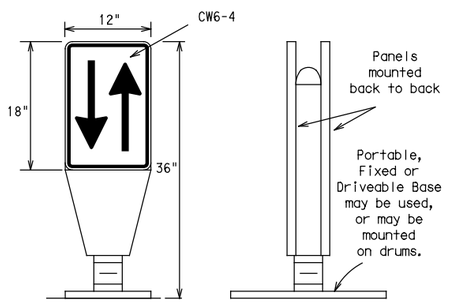


(Rigid or self-righting)

PORTABLE

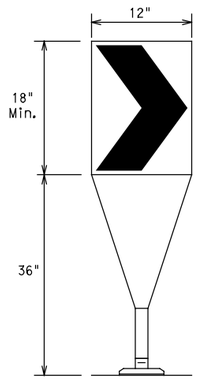
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



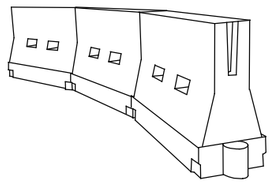
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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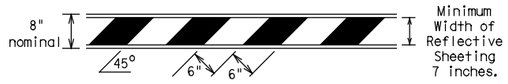
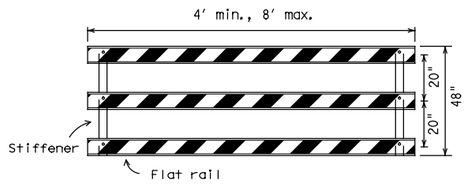
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



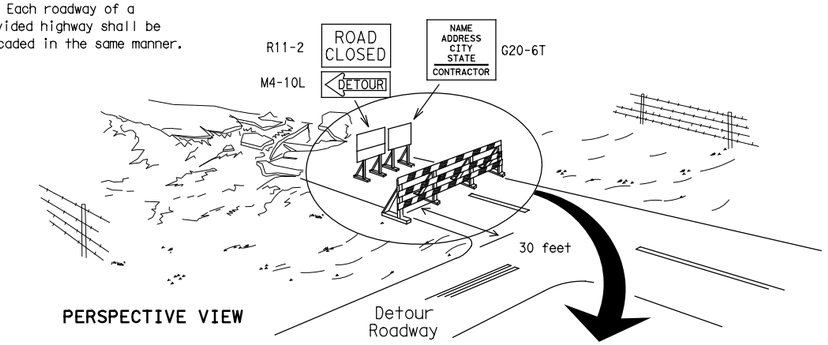
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

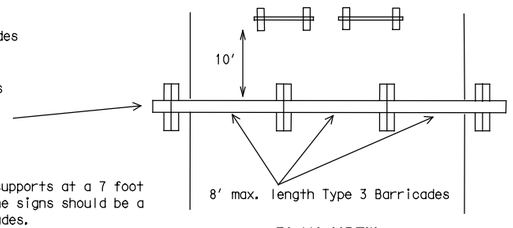
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

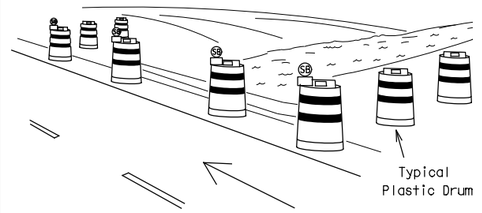
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

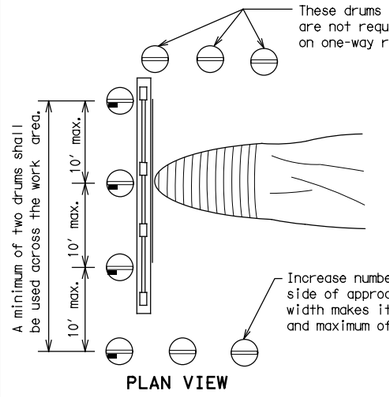
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

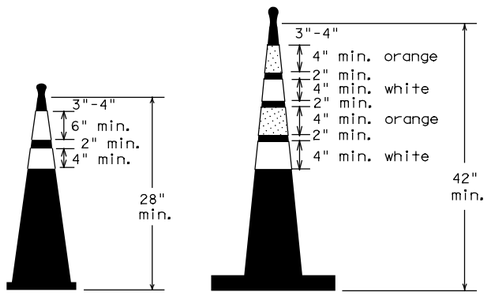
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

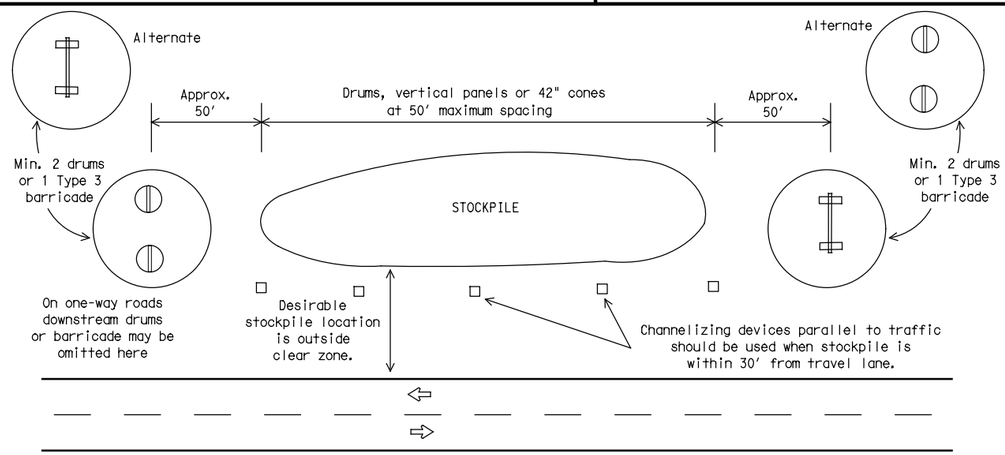
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	BRY	GRIMES		28

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

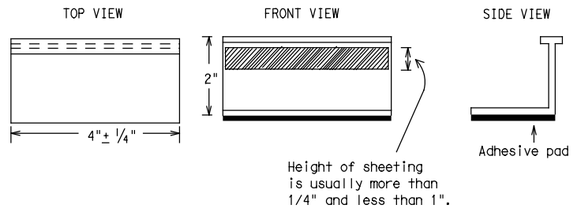
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	BRY	GRIMES		29
11-02 8-14				

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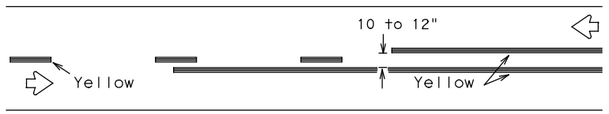
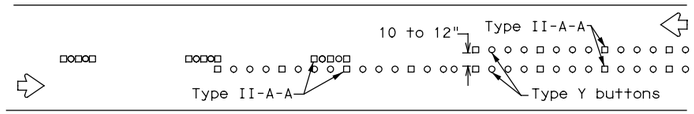
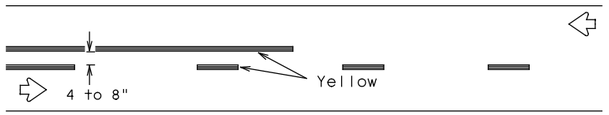
PAVEMENT MARKING PATTERNS



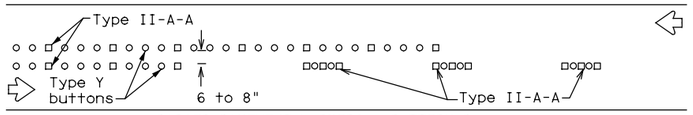
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



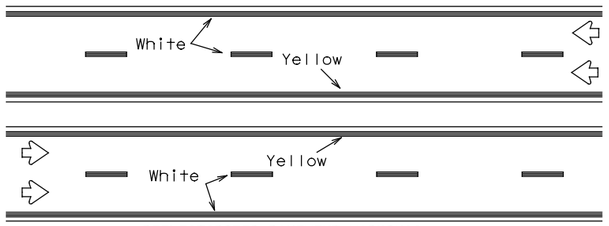
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



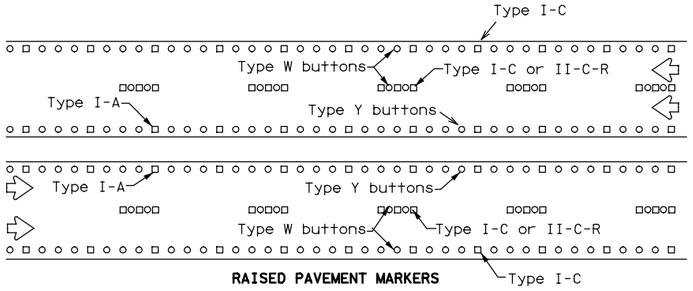
RAISED PAVEMENT MARKERS - PATTERN B

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

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



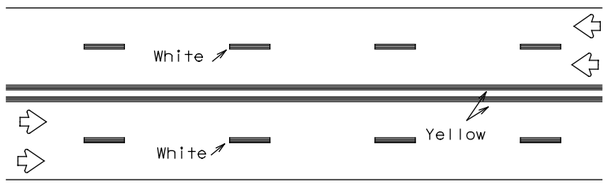
REFLECTORIZED PAVEMENT MARKINGS



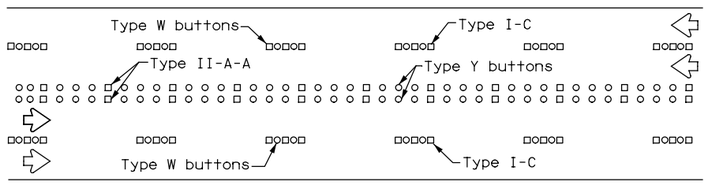
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



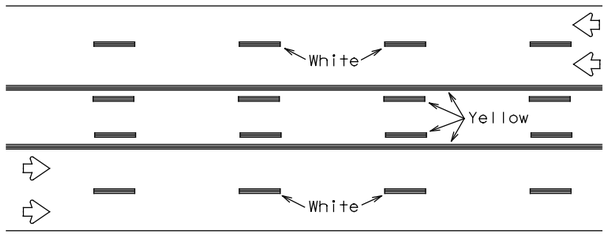
REFLECTORIZED PAVEMENT MARKINGS



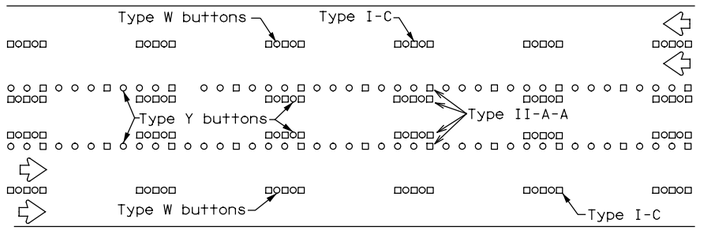
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

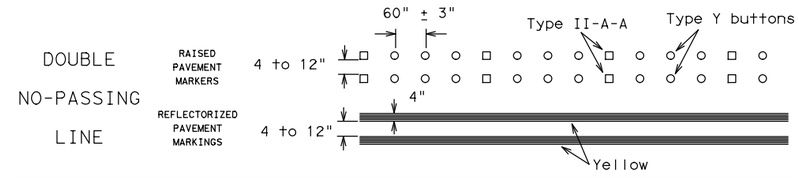
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

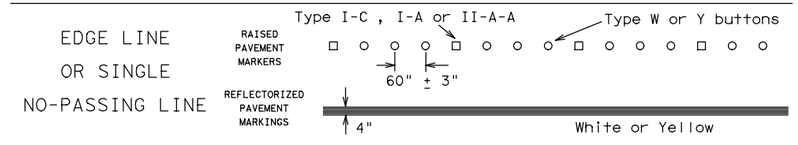
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

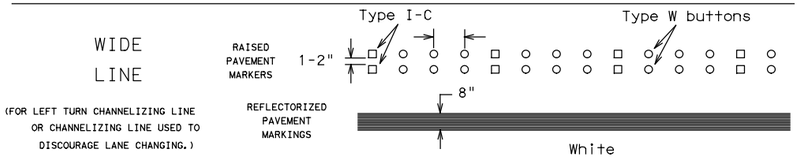


EDGE LINE OR SINGLE NO-PASSING LINE



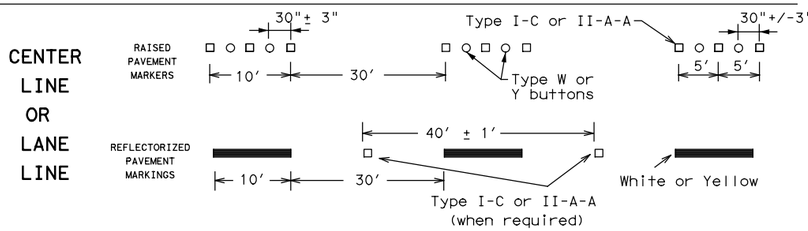
WIDE LINE

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

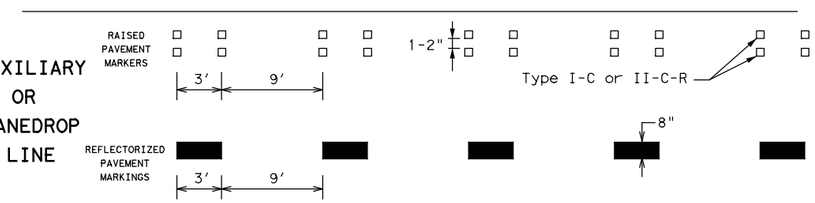


BROKEN LINES

CENTER LINE OR LANE LINE

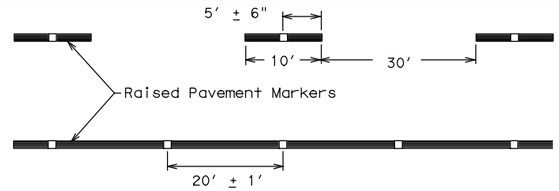


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0050	03	114,ETC.	SH 6
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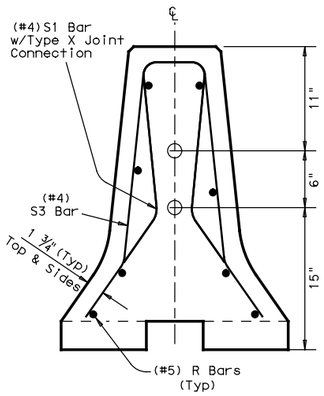
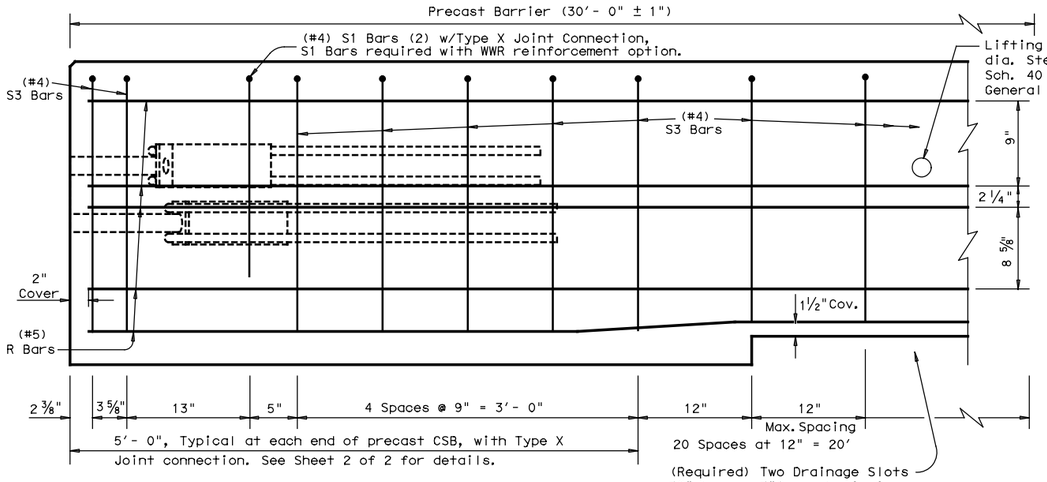


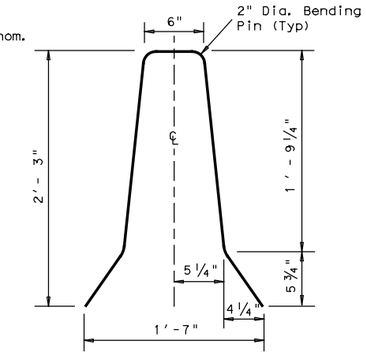
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



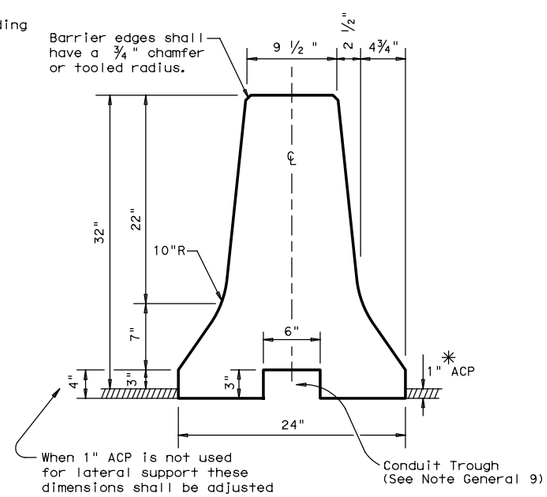
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



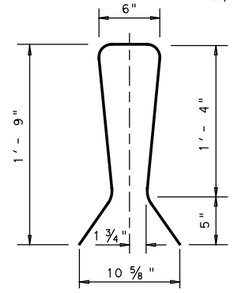
S3 Bar

#4 Bar



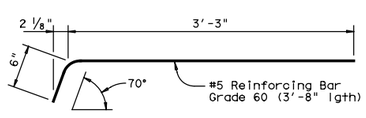
Concrete Safety Barrier

✳ When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.



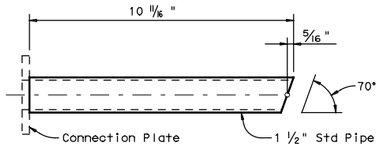
S1 Bar

#4 Bar (2) (Joint Type X)



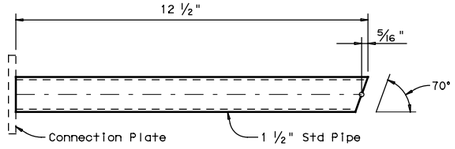
DEFORMED BAR ANCHOR DETAILS

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



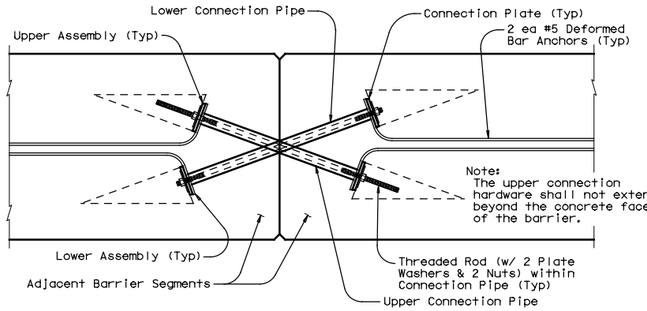
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly. Two (2) required per Joint.



LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly. Two (2) required per Joint.



TYPE X JOINT INSTALLATION DETAIL

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

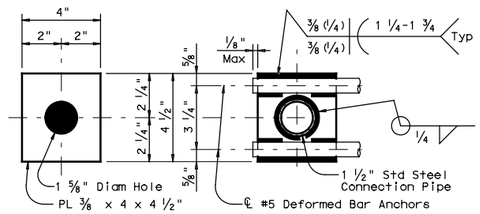
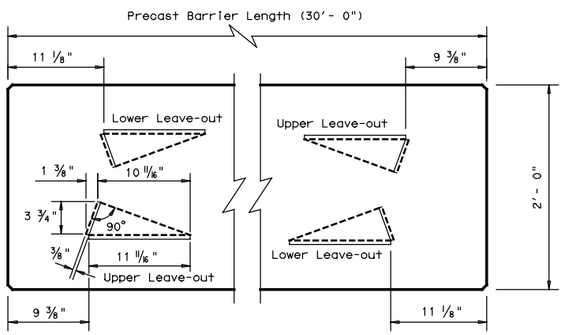


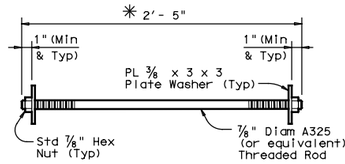
PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

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



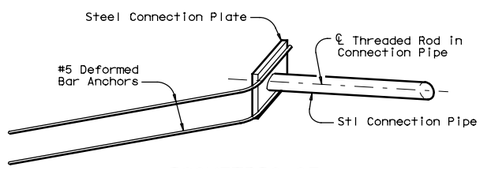
BARRIER PLAN AT END JOINTS



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts) (w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

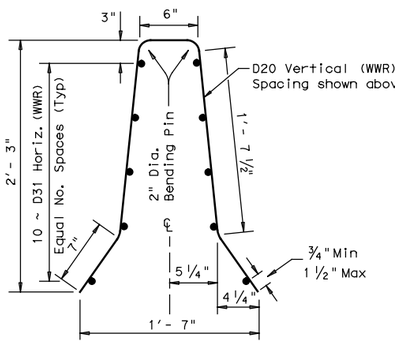
✳ The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.



Welded Wire Reinforcement (WWR) Option for Bars R and S3

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".

GENERAL NOTES

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a 3/4" chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.

Texas Department of Transportation — Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
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	BRY	GRIMES		31

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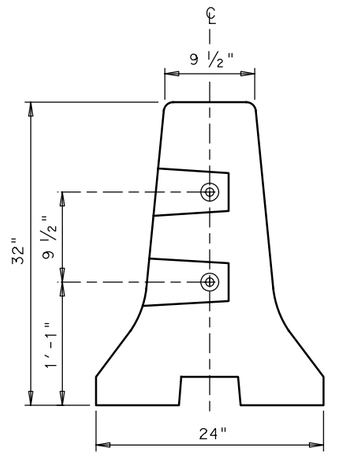
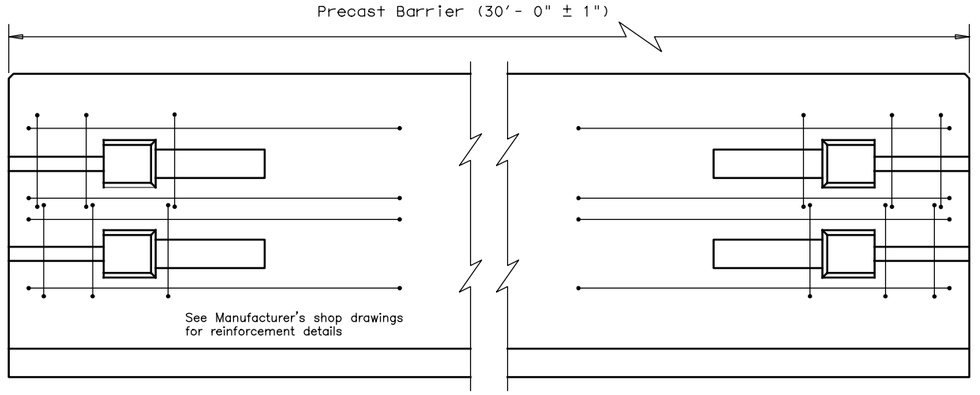


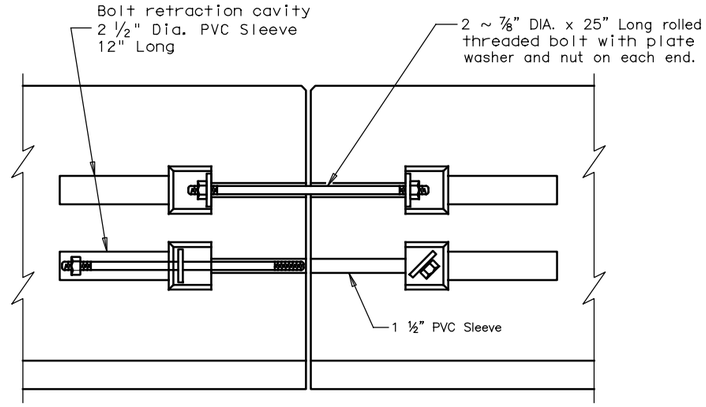
END VIEW (CSB) QUICK-BOLT

QUICK-BOLT POCKET LOCATIONS



ELEVATION (CSB) QUICK-BOLT

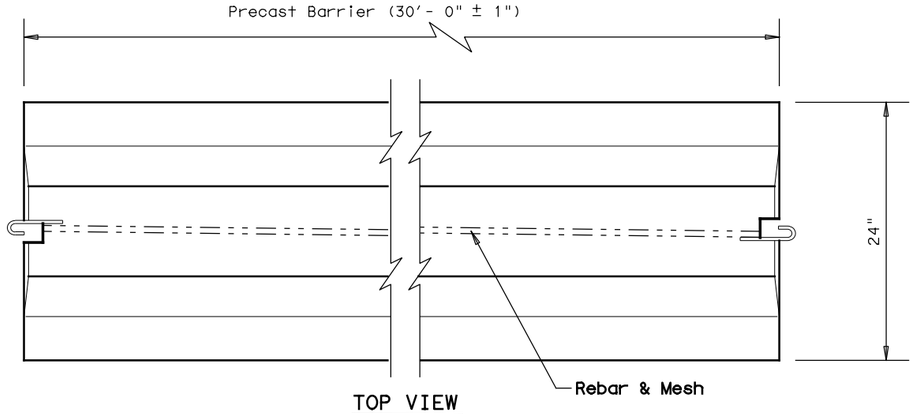
See Manufacturer's shop drawing for additional details



ELEVATION VIEW SHOWING JOINT CONNECTION

"QUICK-BOLT"

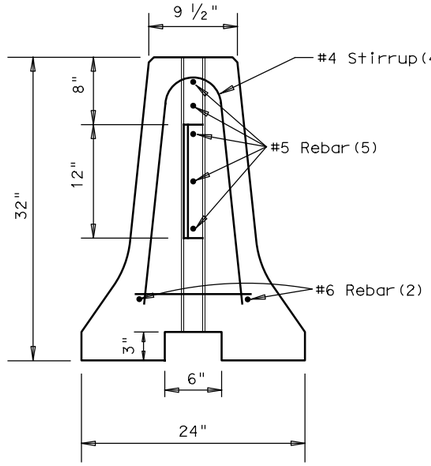
Joint Connection (Type Q)



TOP VIEW

PRECAST (CSB) WITH J-J HOOKS

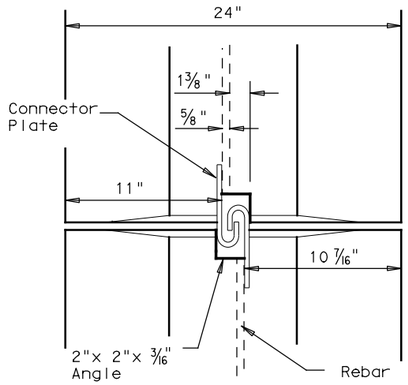
See Manufacturer's shop drawing for additional details



END VIEW

J-J HOOK CONNECTION

Joint Connection (Type J)



VIEW FROM ABOVE

J-J HOOK CONNECTION

Proprietary Joint Connections (CSB)

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

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

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

Texas Department of Transportation

Design Division Standard

CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		32

DATE: 5/31/2023 4:06:21 PM
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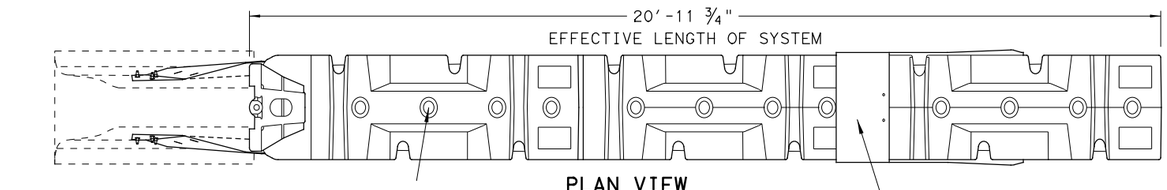
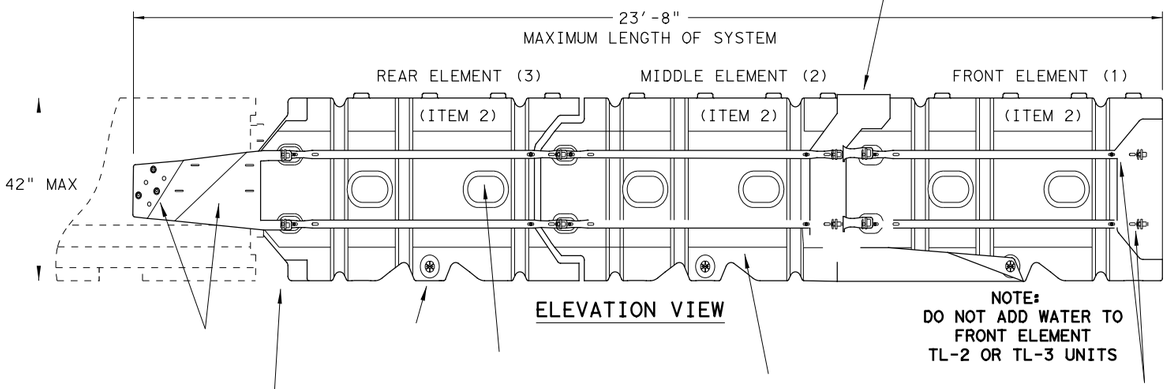
SYSTEM SHOWN - ABSORB-M TL-3



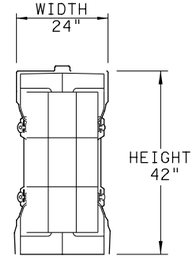
PLAN VIEW

TRAFFIC FLOW

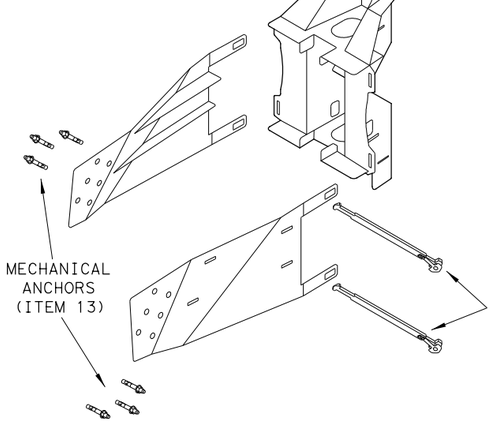


ELEVATION VIEW

TRAFFIC FLOW



SECTION A-A



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"

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).

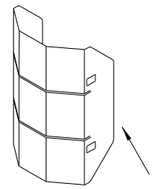
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
3	BSI-4004598	FILL CAPS	8	12
4	BSI-4004599	DRAIN PLUGS	2	3
5	BSI-1809053-00	TENSION 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

** APPLY DECAL



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

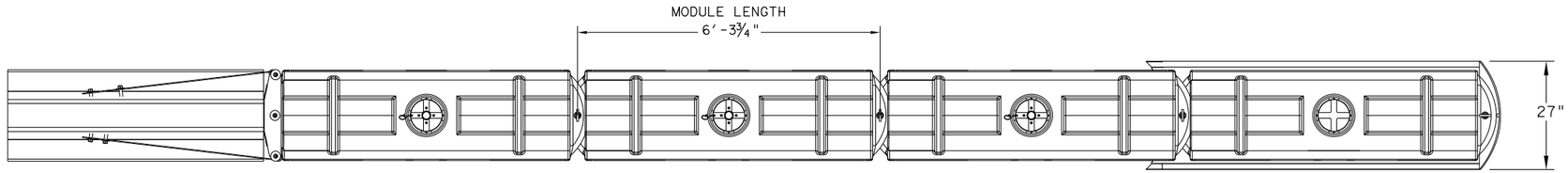
Texas Department of Transportation — Design Division Standard

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

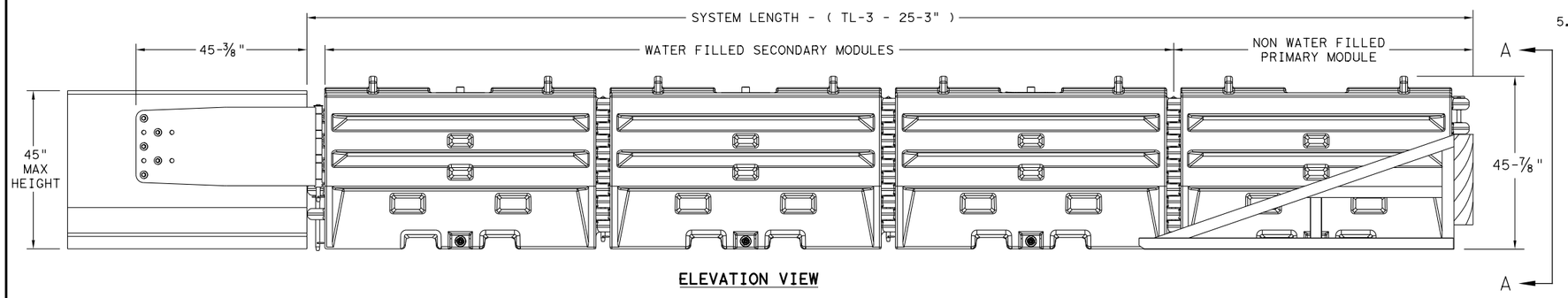
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		33

DATE: 5/31/2023
FILE: ...\absorbm19 (2).dgn

DATE: 5/31/2023
FILE: ...\Traffic Control\sled19 (1).dgn



PLAN VIEW



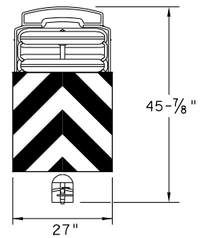
ELEVATION VIEW

GENERAL NOTES

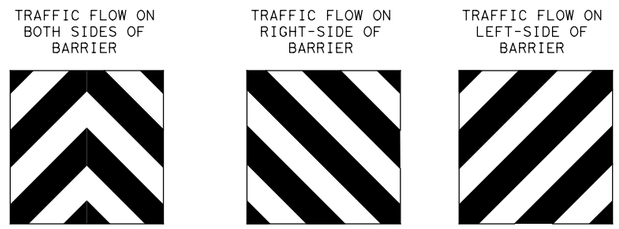
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE,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

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

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



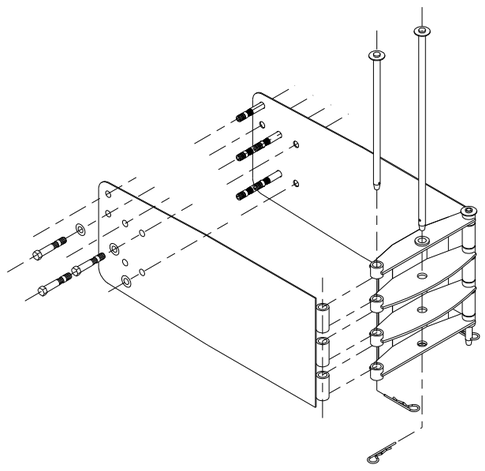
SECTION A-A



NOSE SHEETING PANEL DELINEATION

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

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



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

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

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

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

SACRIFICIAL

Texas Department of Transportation

Design Division Standard

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

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		34

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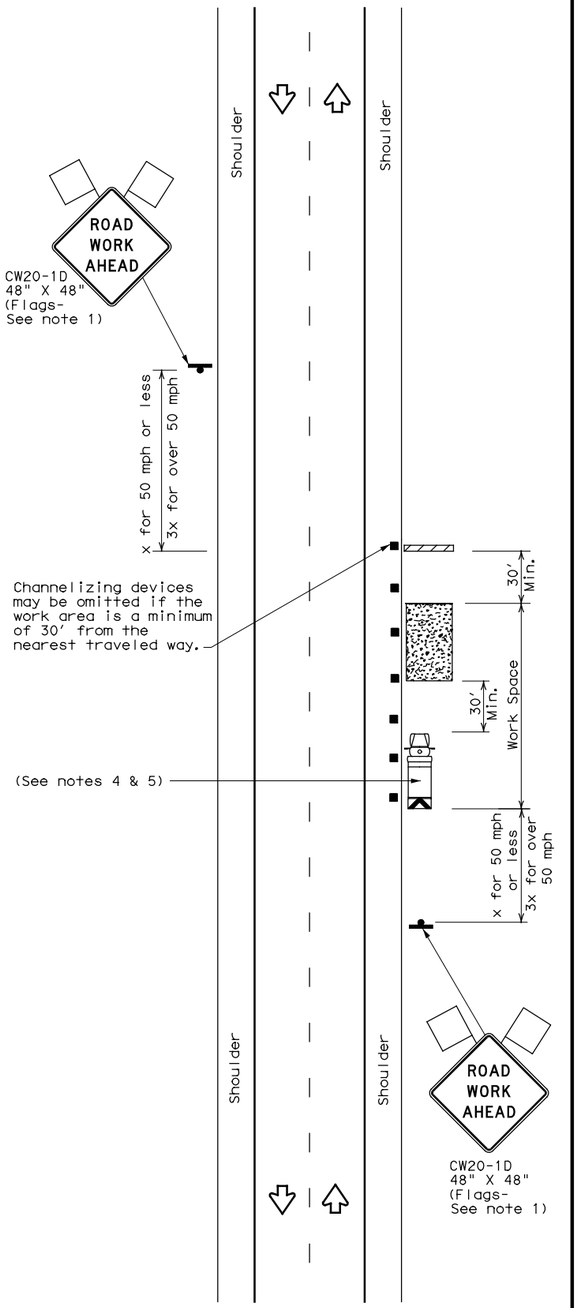
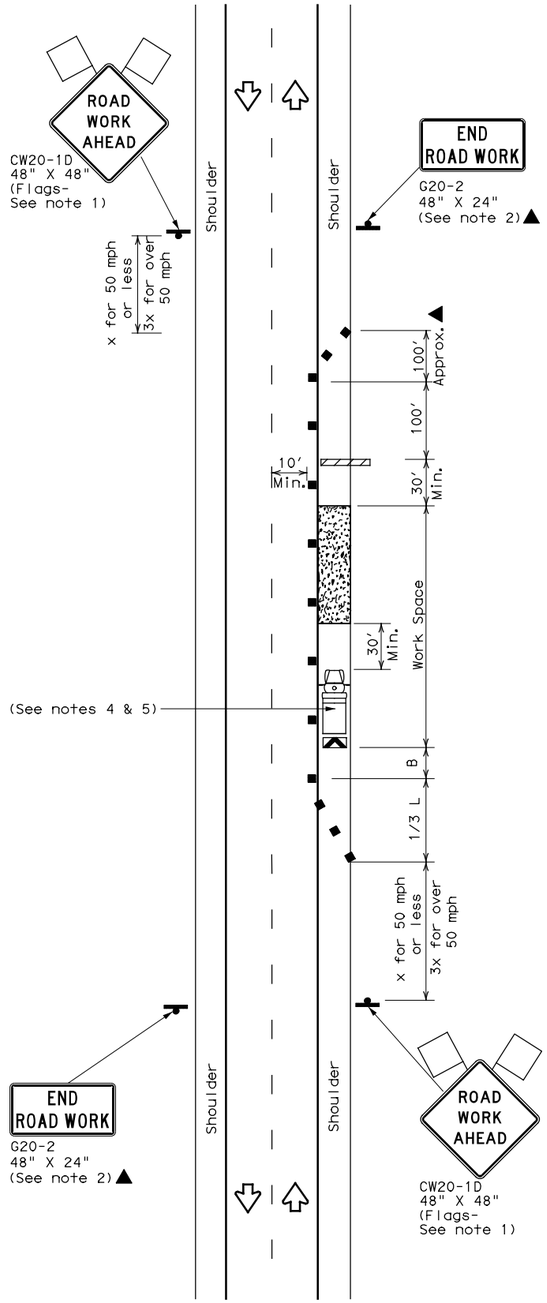


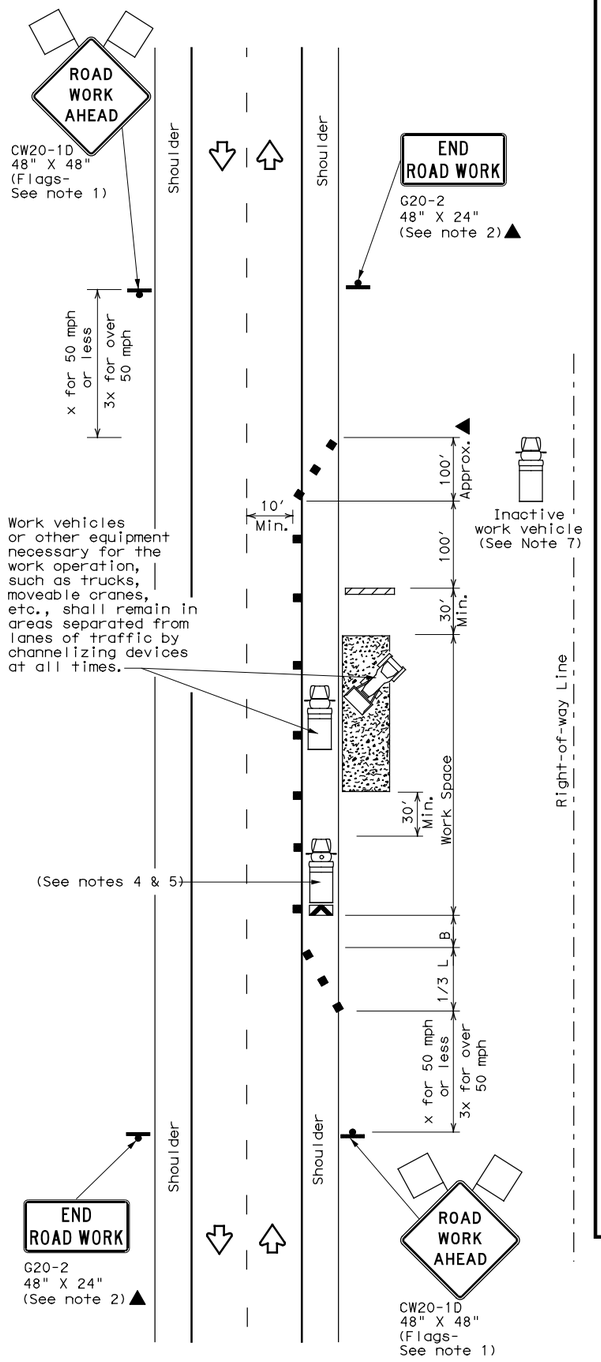
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

✳ Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	BRY	GRIMES		35
1-97 2-18				

161

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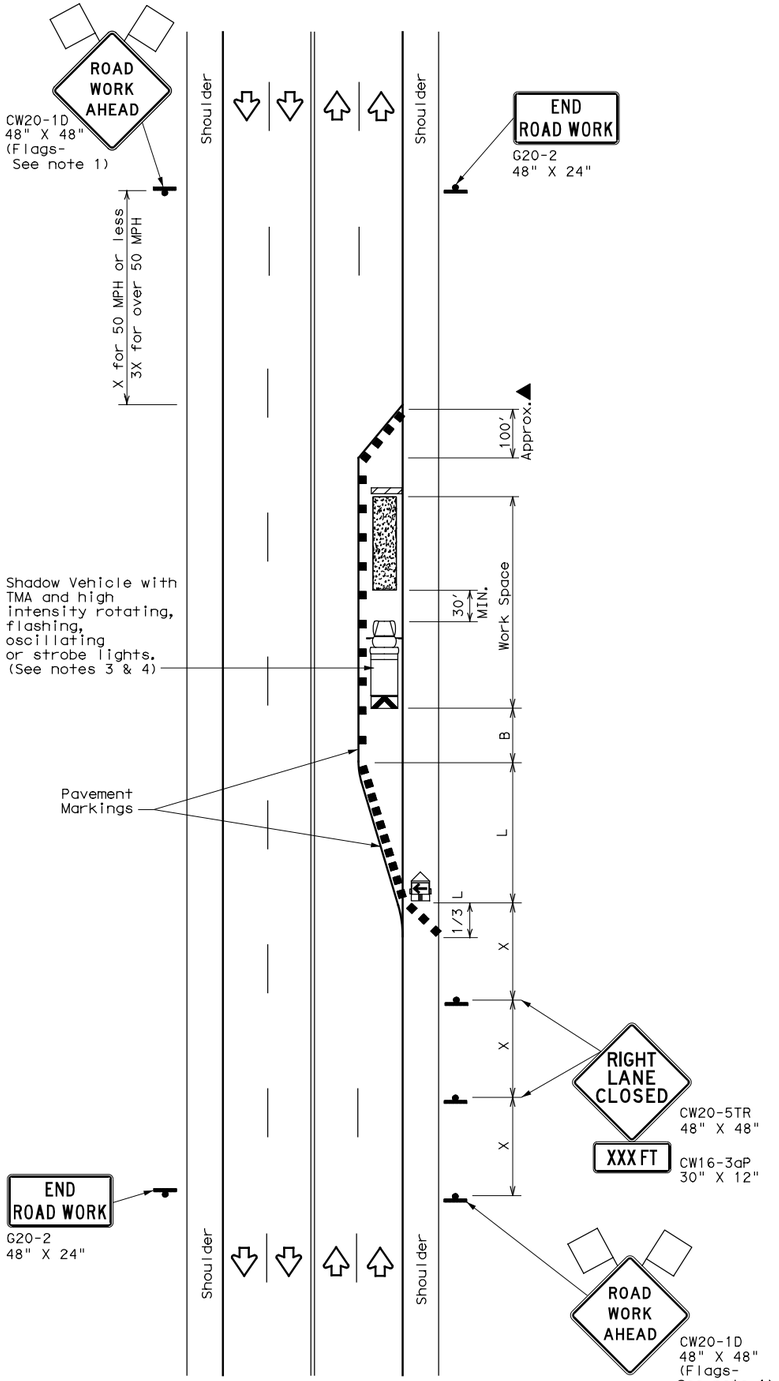
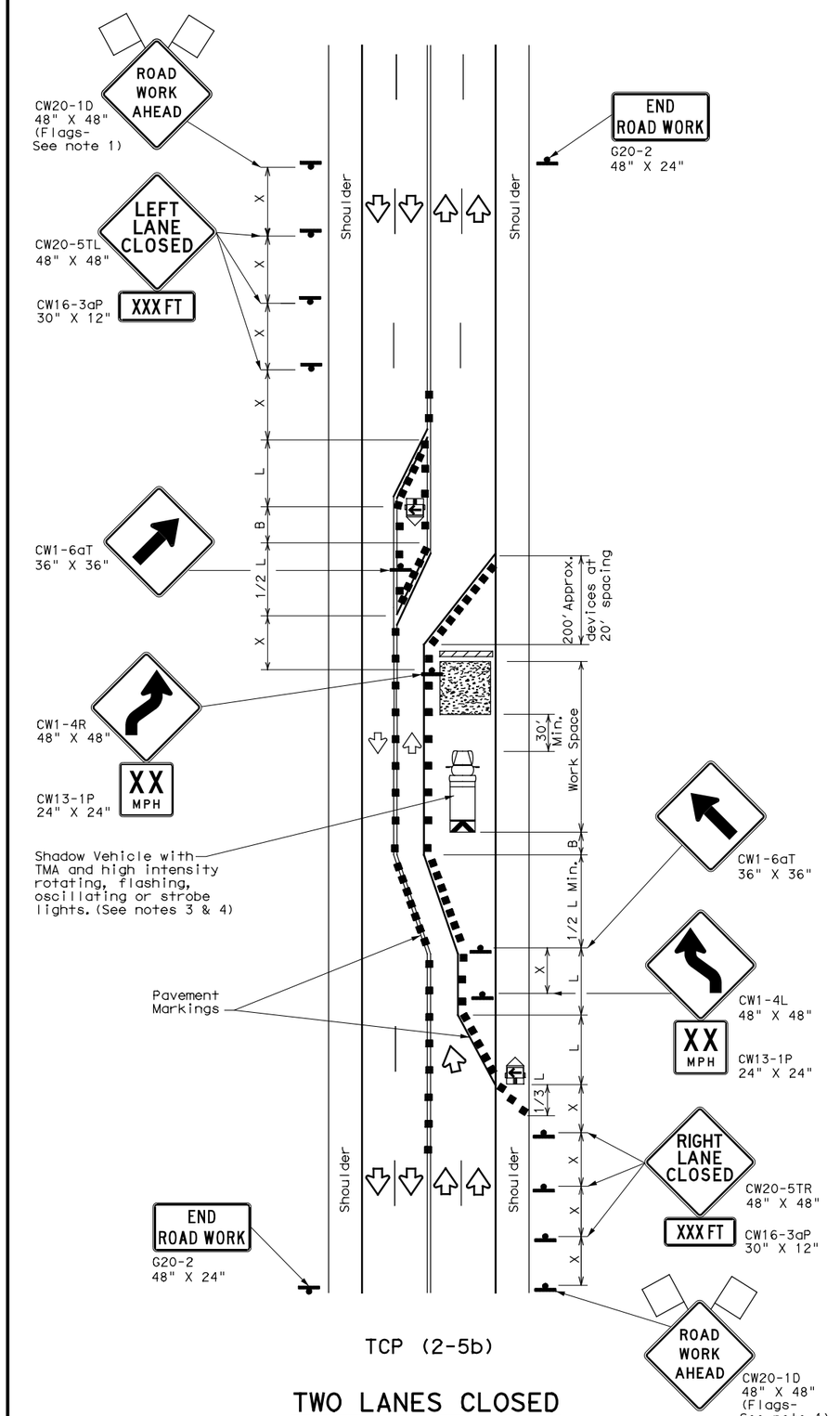


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	BRY	GRIMES		36

165

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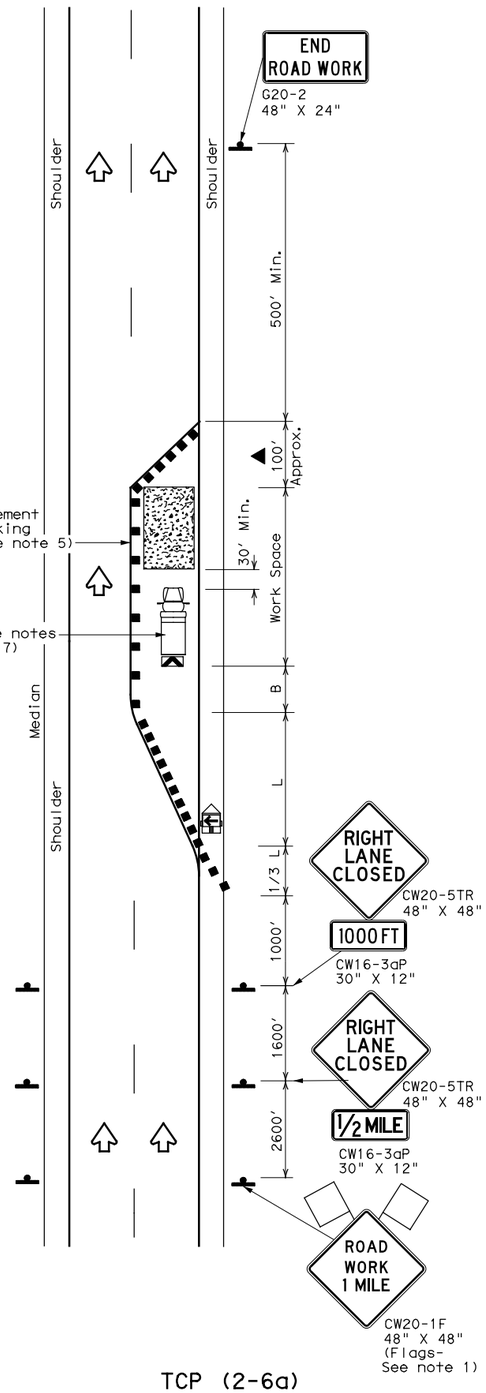
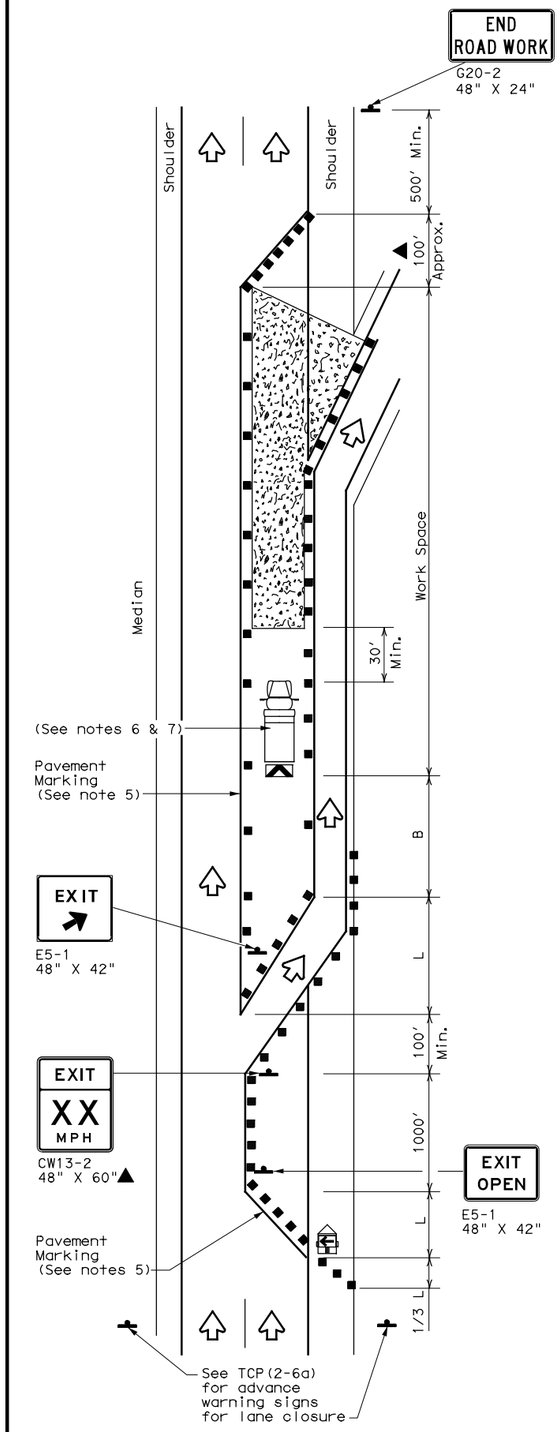


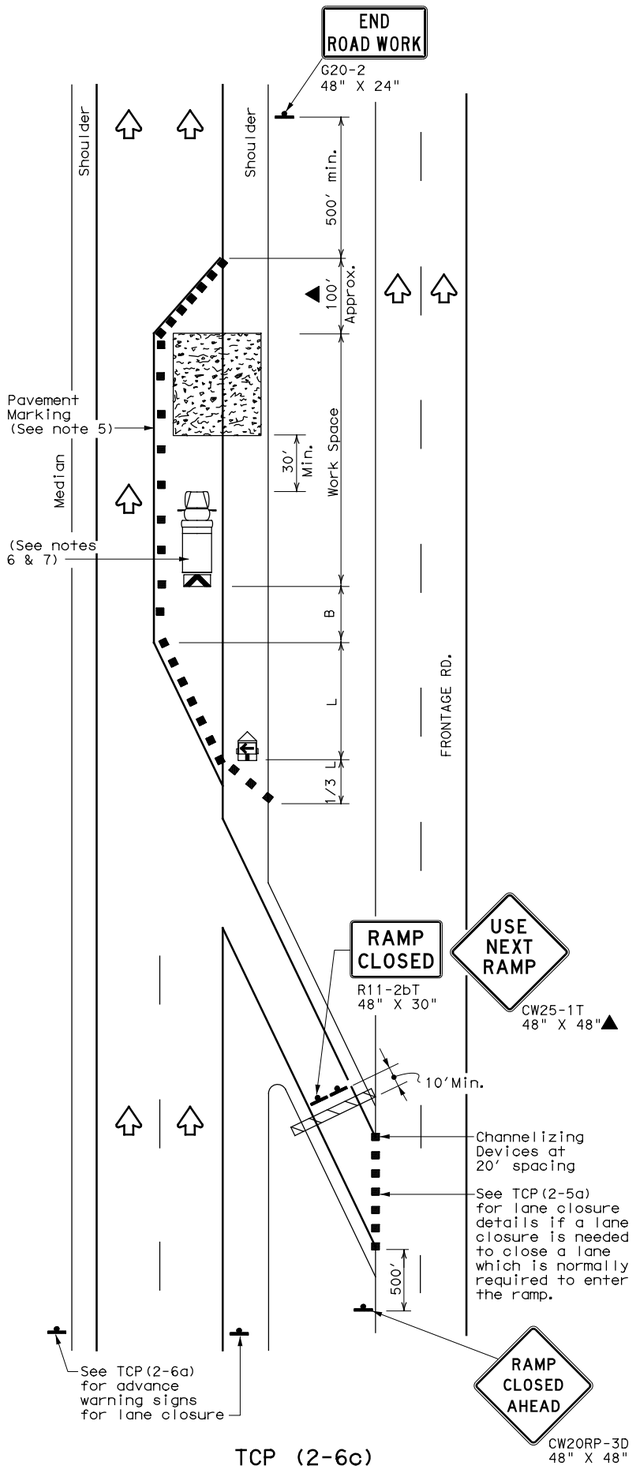
TCP (2-6a)

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	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		37

DATE: 5/31/2023 4:06:26 PM
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DATE: 7/26/2023 7:24:41 AM
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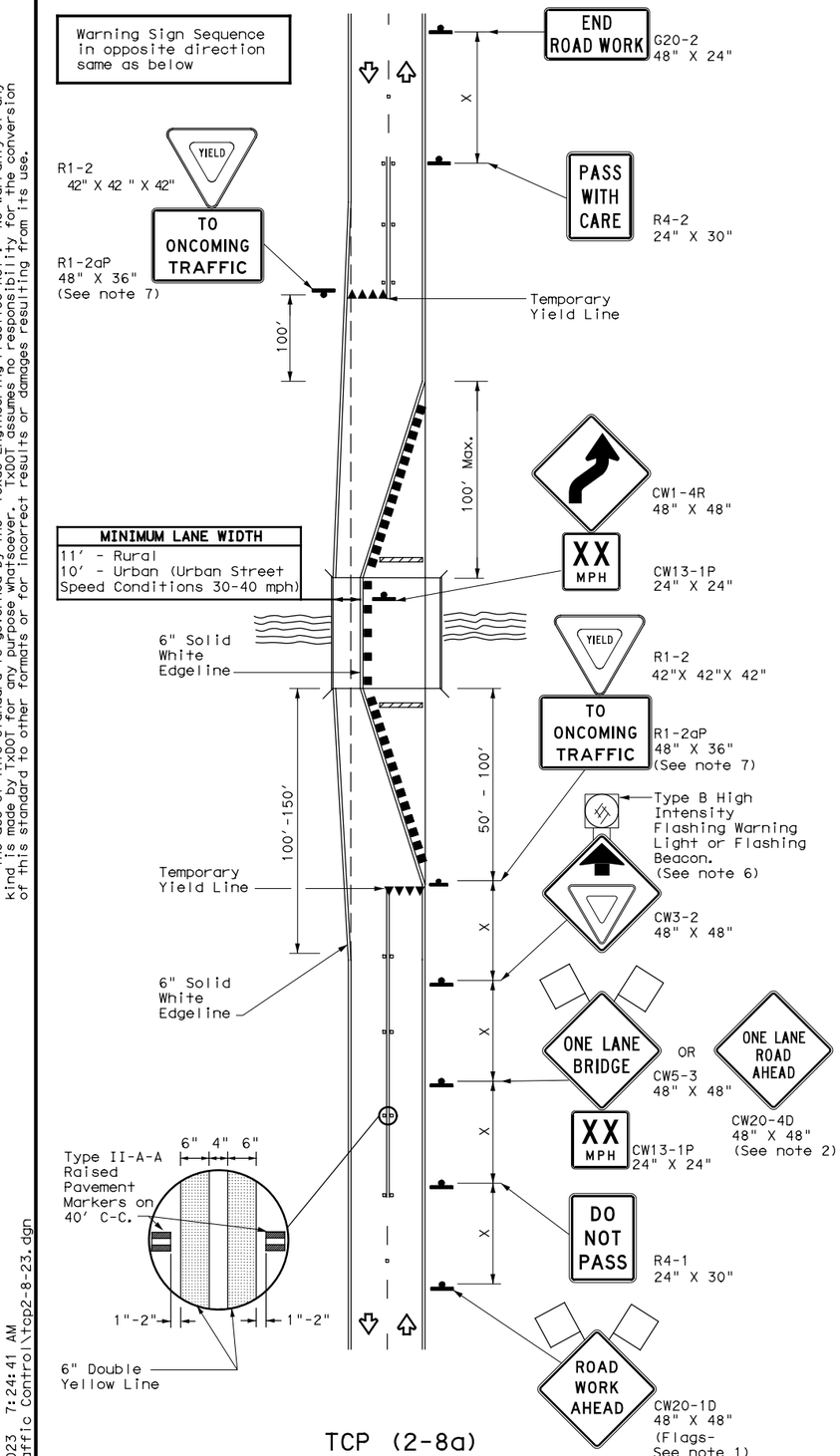
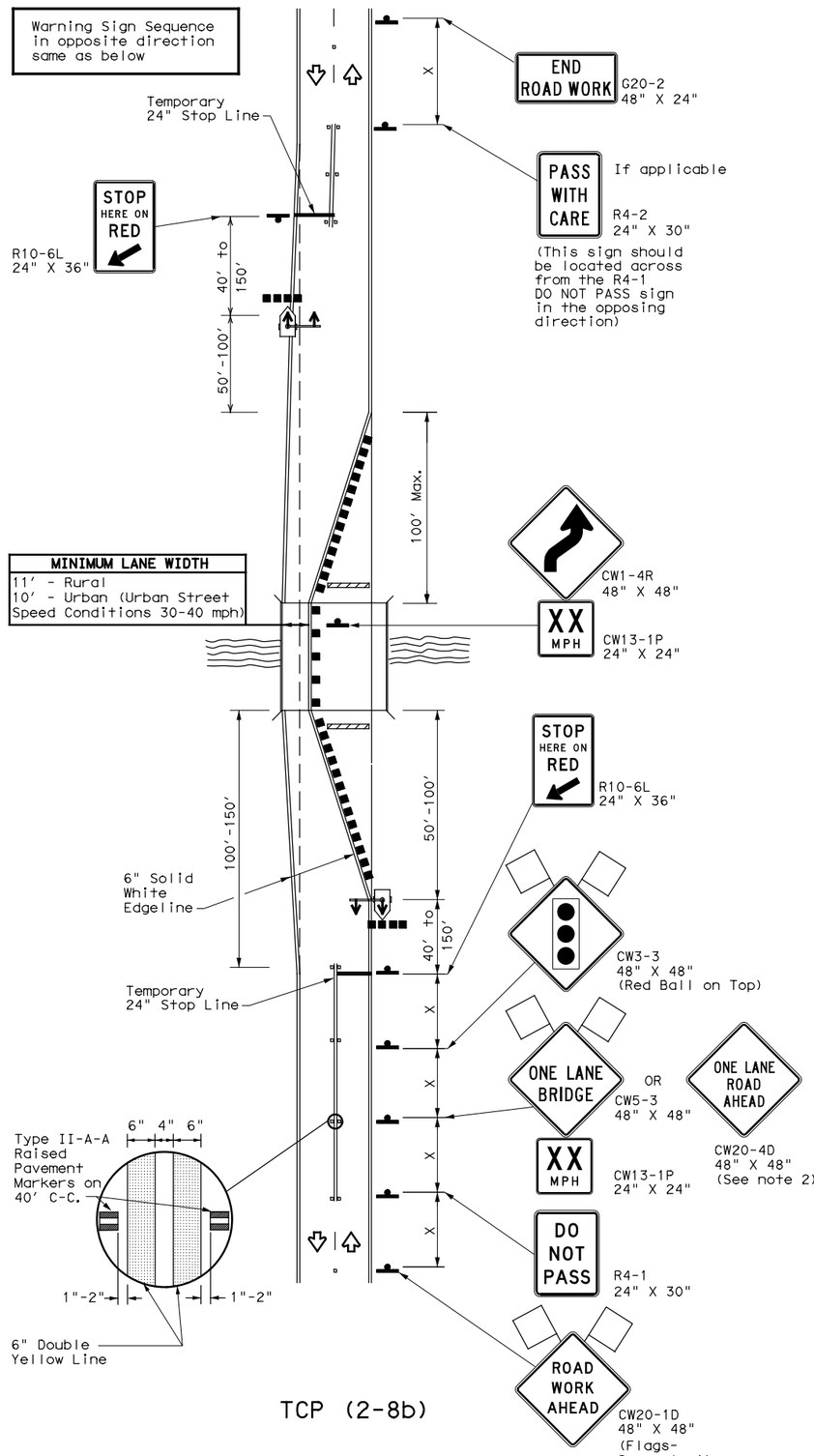


TCP (2-8a)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
(Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

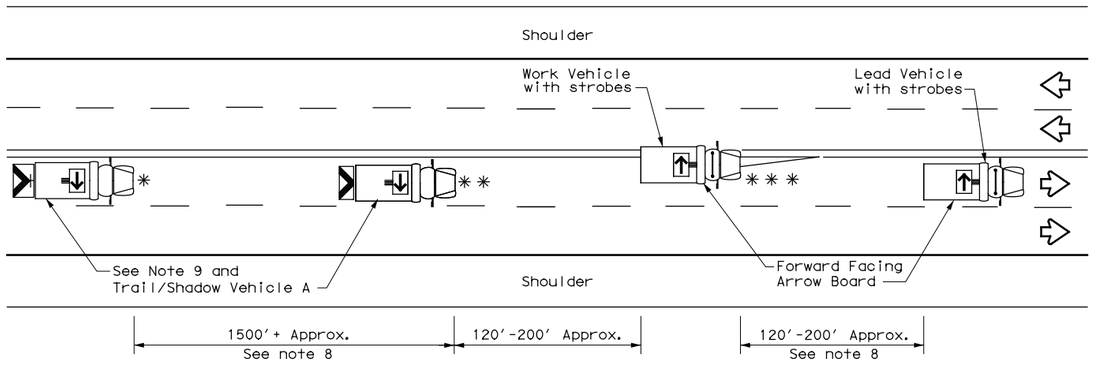
Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL PLAN
LONG TERM ONE-LANE TWO-WAY CONTROL

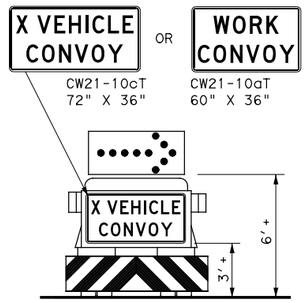
TCP(2-8)-23

FILE: tcp2-8-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		38



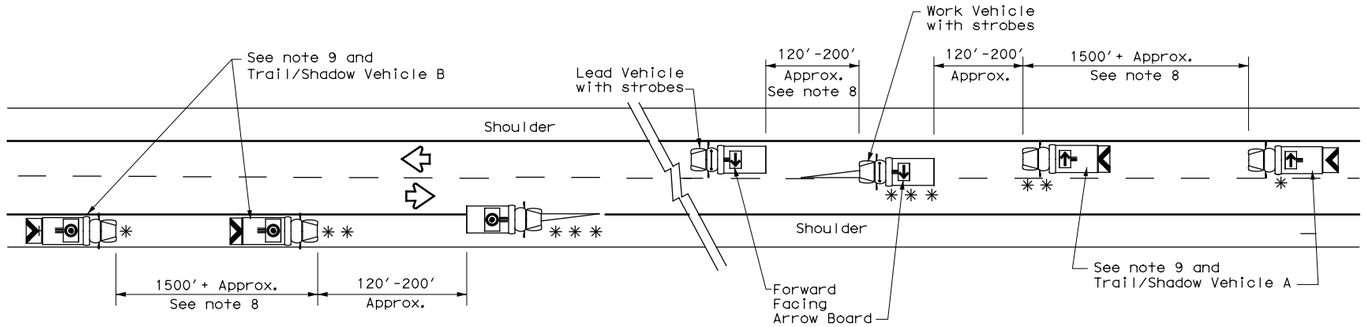
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

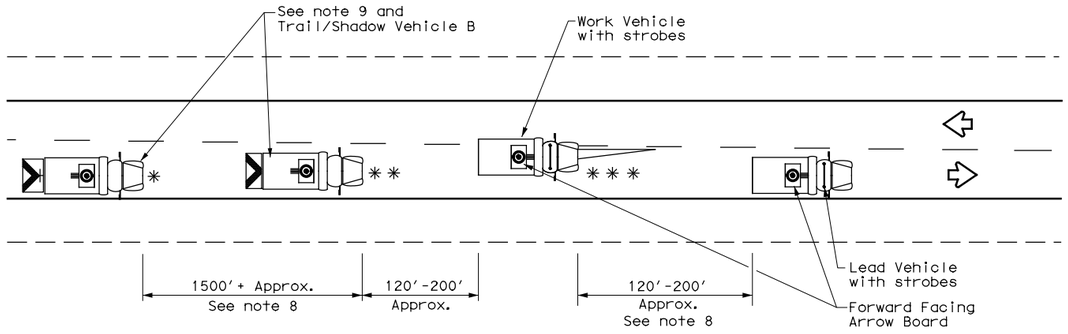


WORK ON SHOULDER

WORK ON TRAVEL LANE

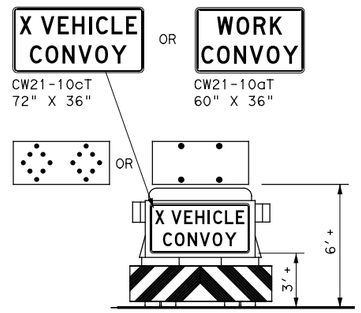
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

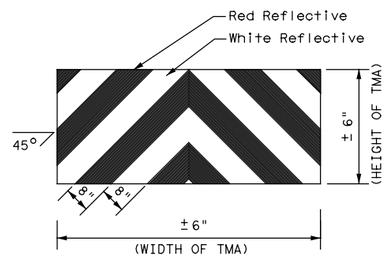
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP (3-1)-13

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	BRY	GRIMES		39
1-97				

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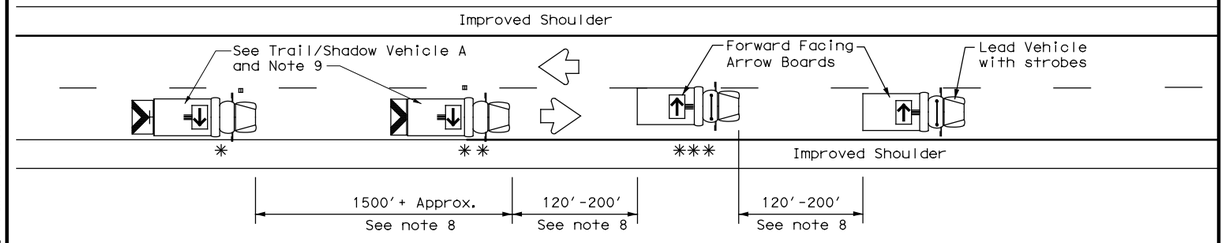
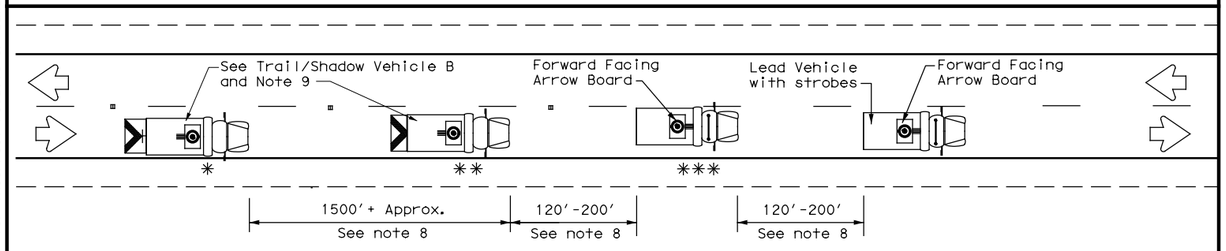


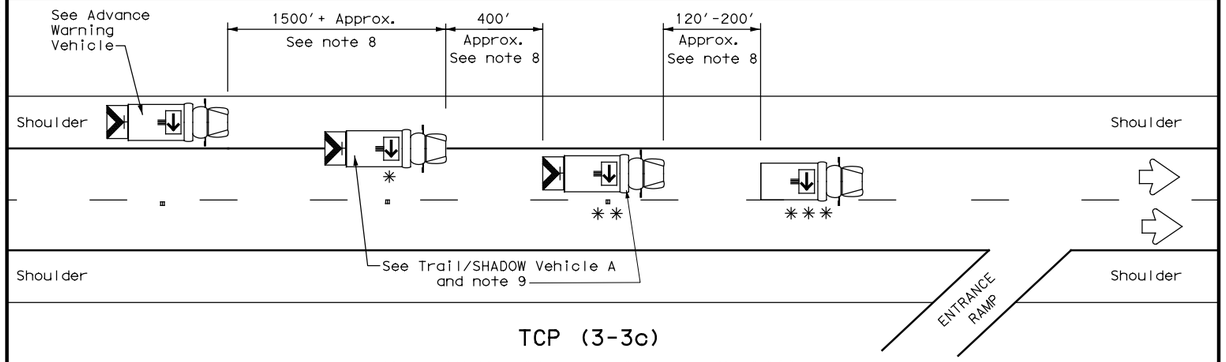
TCP (3-3a)

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



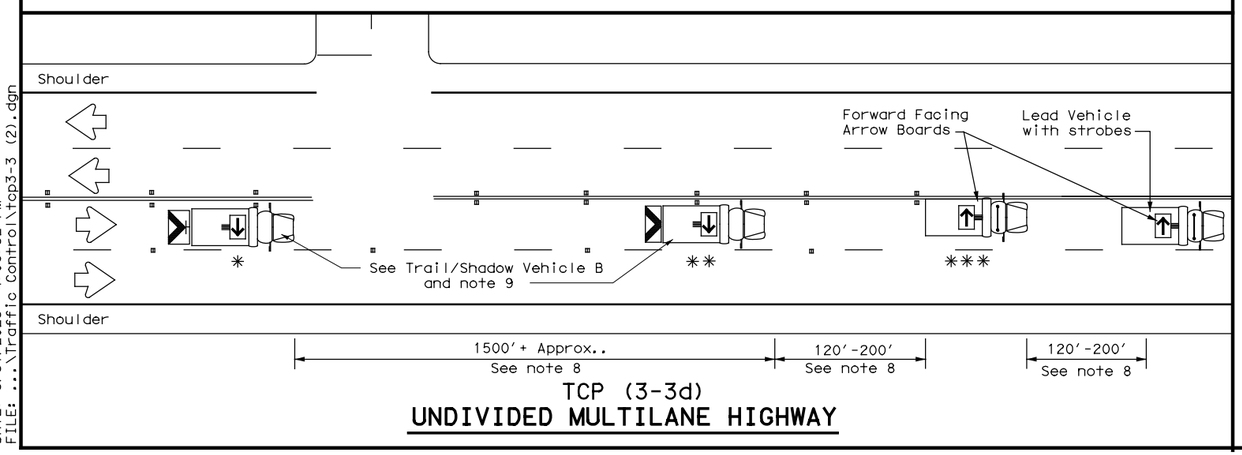
TCP (3-3b)

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



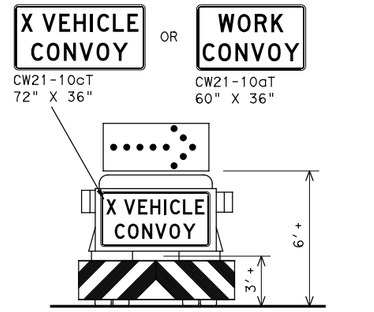
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



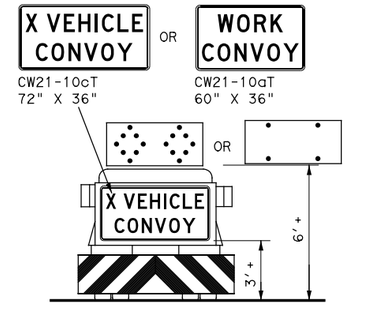
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



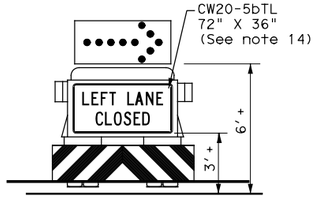
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

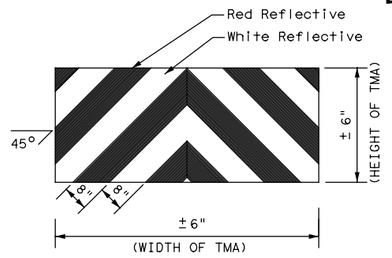


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	BRY	GRIMES		40
1-97 7-14				

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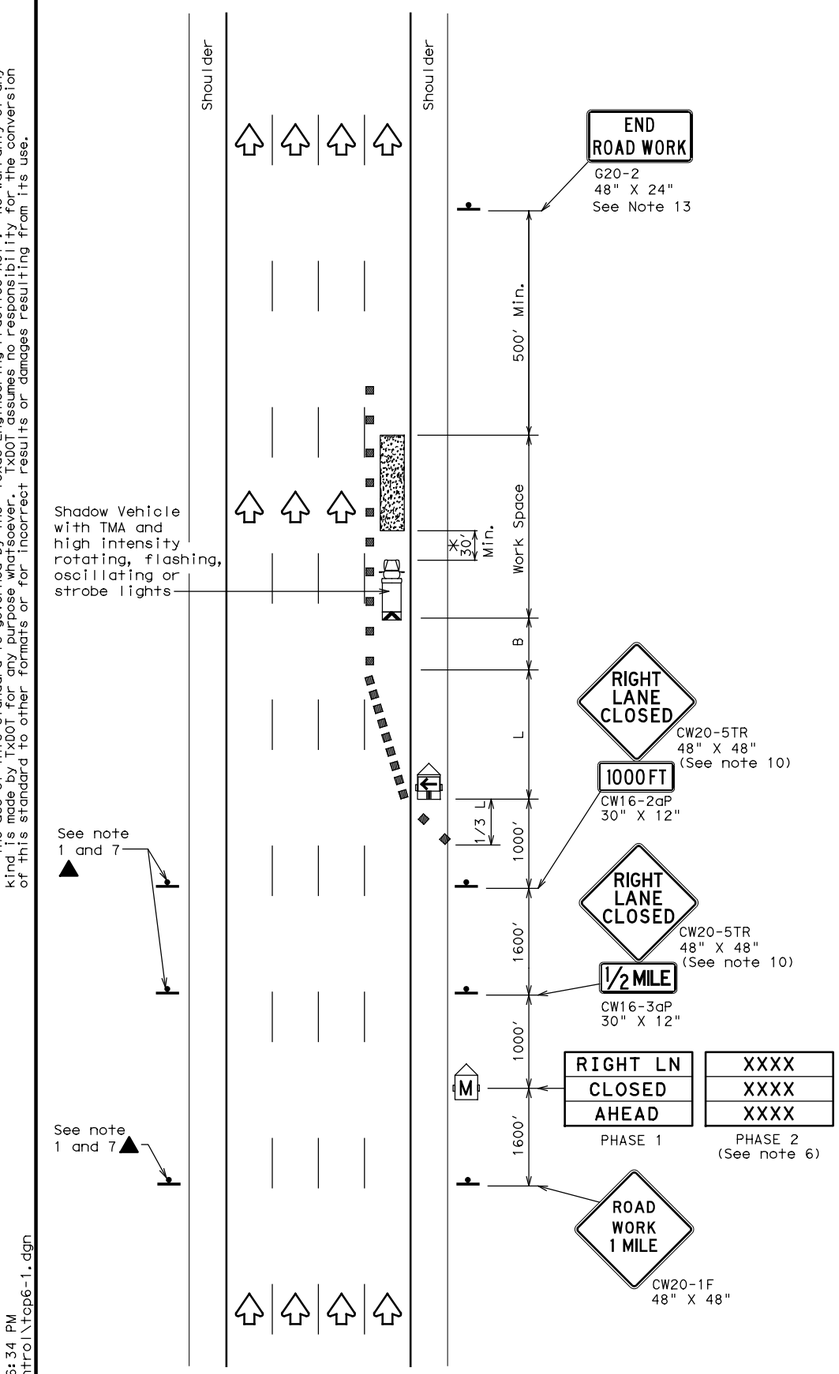
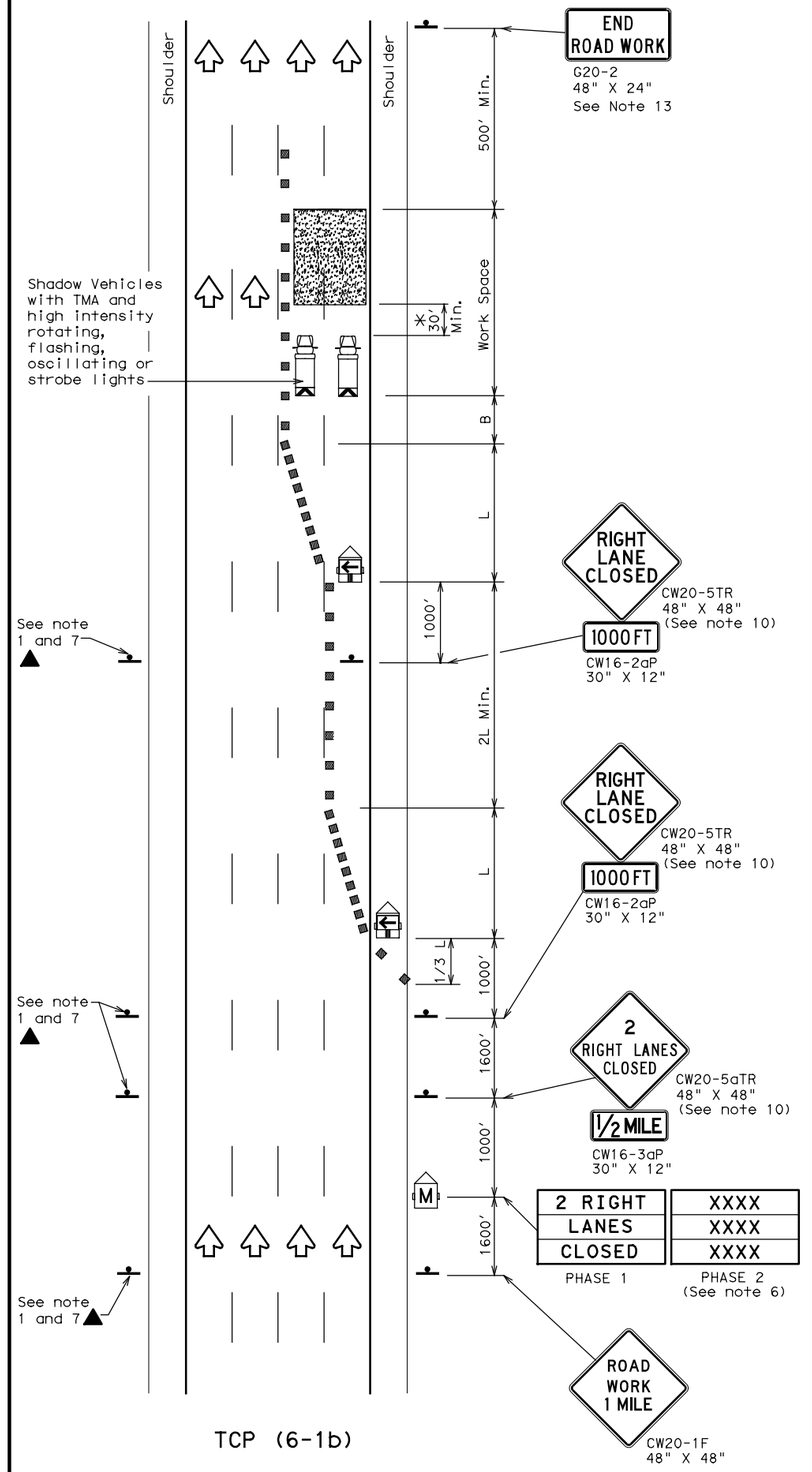


TCP (6-1a)

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" ✳✳			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. 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 8-12	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		41

201

DATE: 5/31/2023 4:06:34 PM
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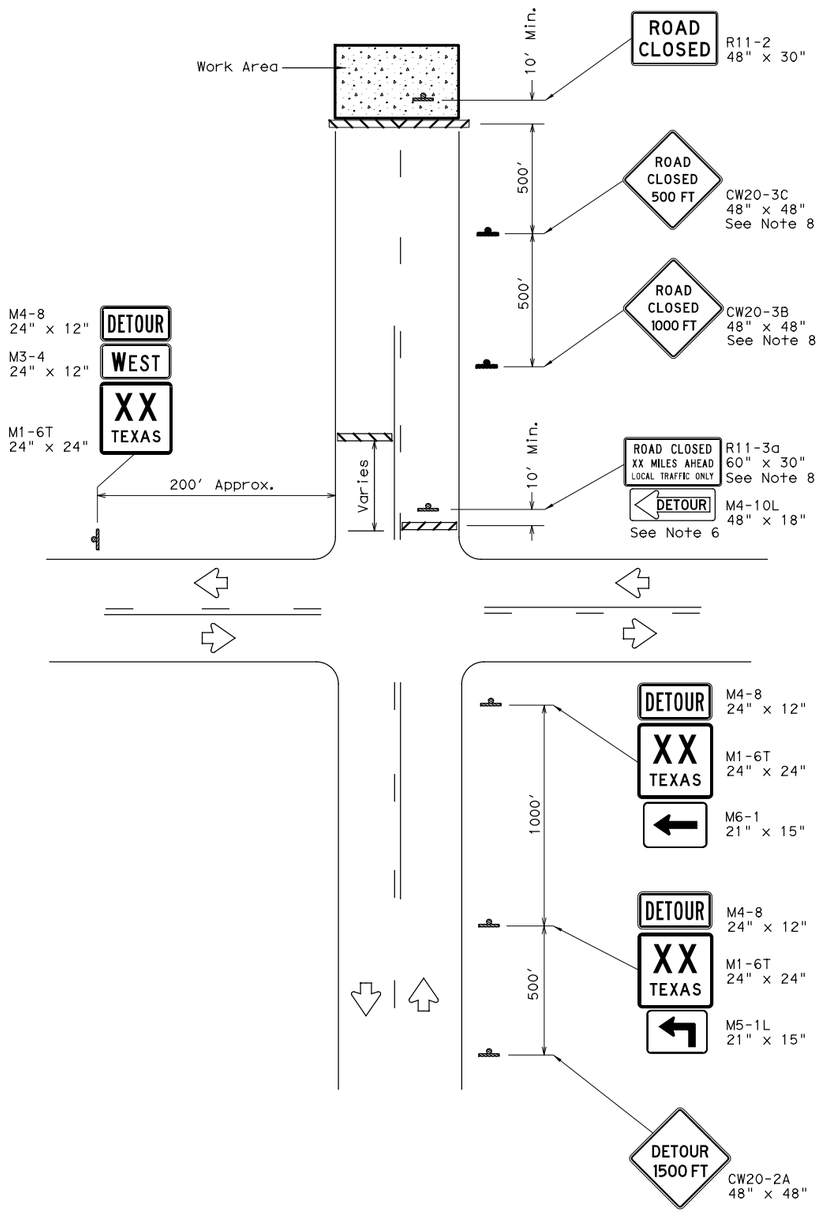
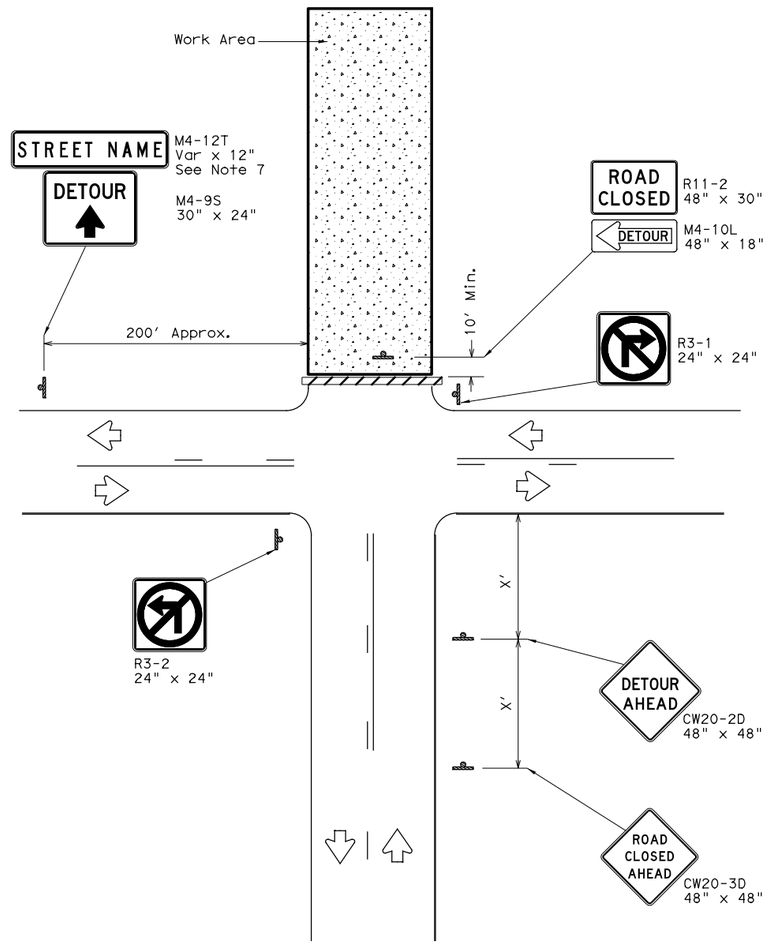


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

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

LEGEND	
	Type 3 Barricade
	Sign

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

* Conventional Roads Only

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
1-97 4-98 7-13 2-98 3-03	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		42

113

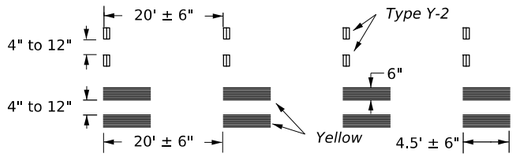
DATE: 5/31/2023 4:06:36 PM
FILE: ...\Traffic Control\wzrcd-13.dgn

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

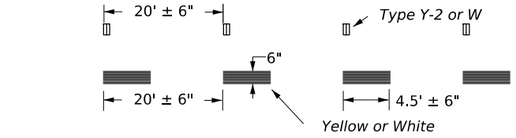
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

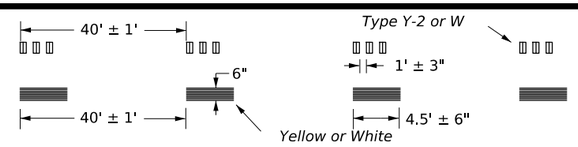


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



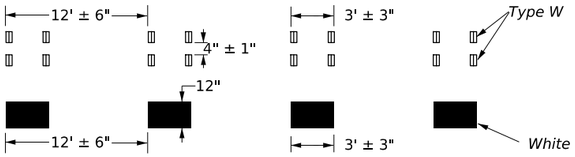
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

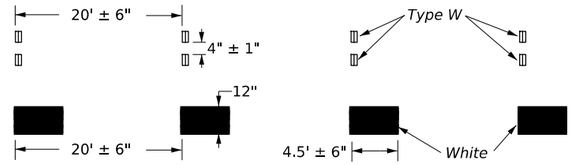


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



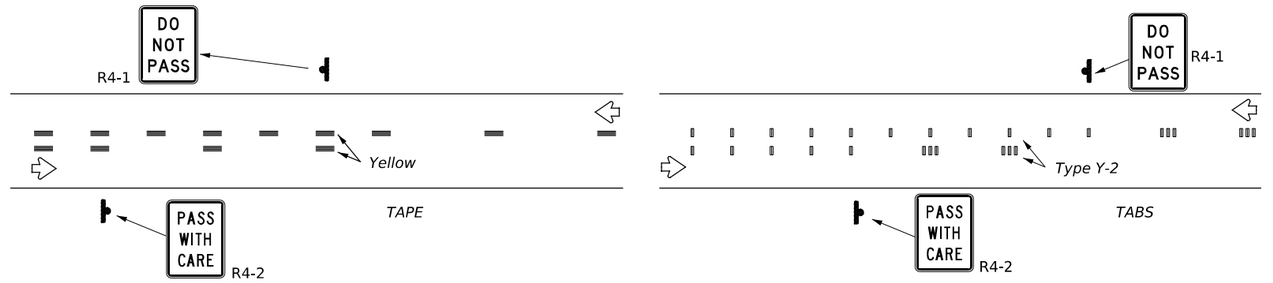
NOTES:

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

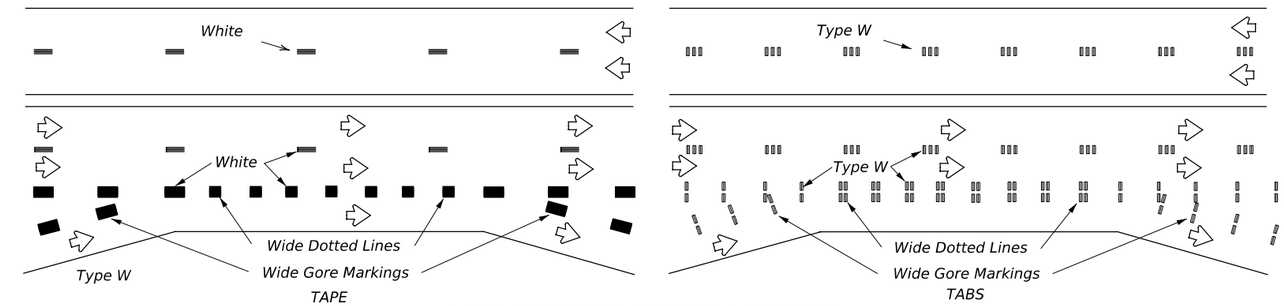
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

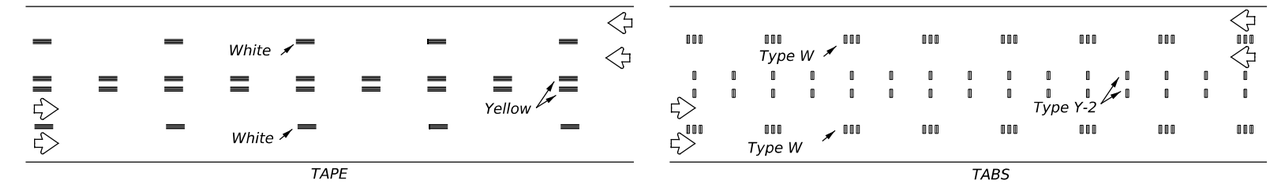
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



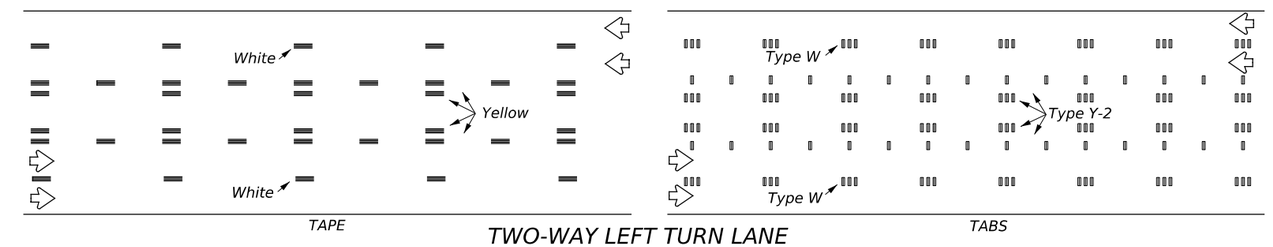
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



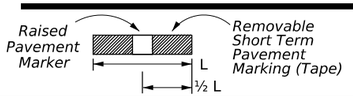
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
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4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	BRY	GRIMES		43
3-03				

111

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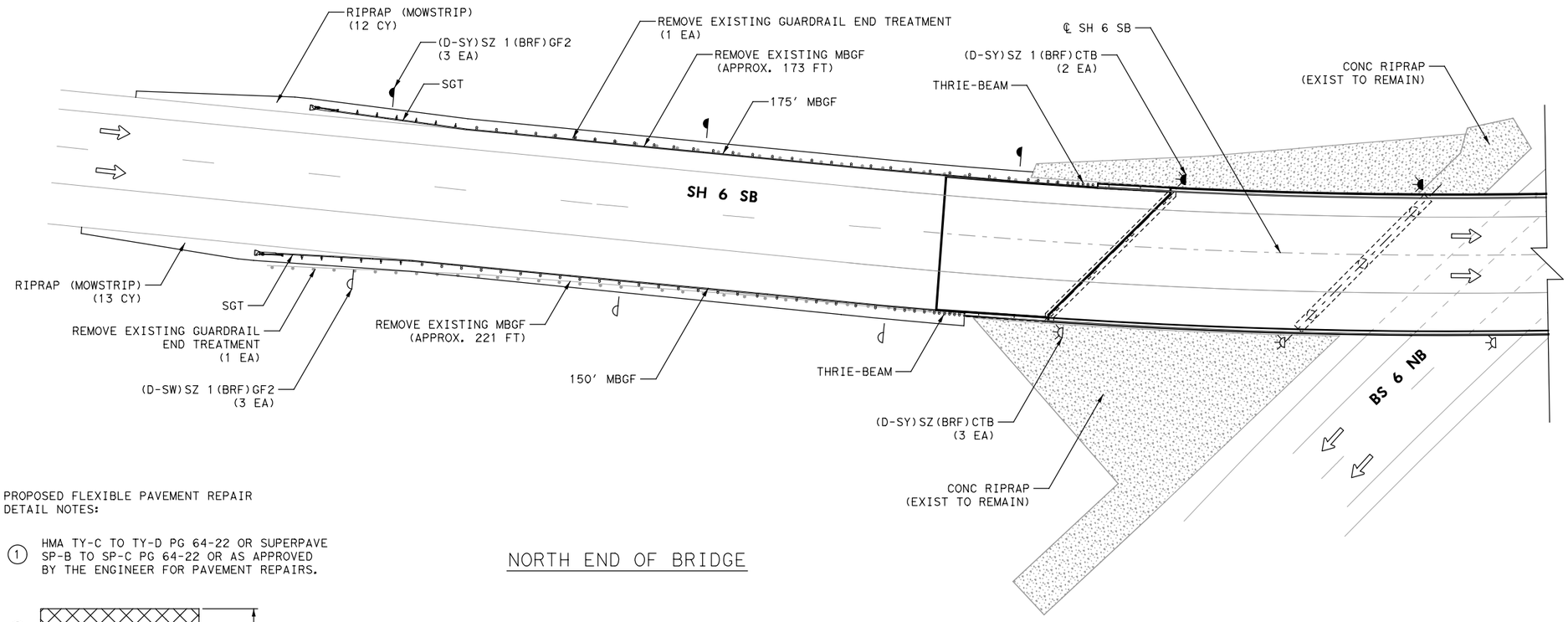
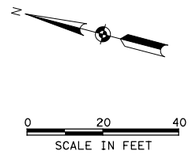




LEGEND

- TRAFFIC FLOW ARROWS
- (D-SW)SZ(BRF)CTB
- (D-SY)SZ(BRF)CTB
- (D-SW)SZ 1(BFR)GF2
- (D-SY)SZ 1(BFR)GF2

LENGTH OF NEED CALCULATION

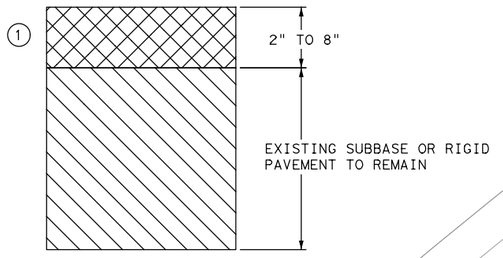
$L_u = 250 - \frac{250}{D_u} \times G_u$ $L_d = 250 - \frac{250}{D_d} \times G_d$

RIGHT SIDE	RIGHT SIDE
L_u = 167 FT	L_d = 67 FT
D_u = 30 FT	D_d = 30 FT
G_u = 10 FT	G_d = 22 FT

LEFT SIDE	LEFT SIDE
L_u = 200 FT	L_d = 100 FT
D_u = 30 FT	D_d = 30 FT
G_u = 6 FT	G_d = 18 FT

PROPOSED FLEXIBLE PAVEMENT REPAIR
DETAIL NOTES:

① HMA TY-C TO TY-D PG 64-22 OR SUPERPAVE SP-B TO SP-C PG 64-22 OR AS APPROVED BY THE ENGINEER FOR PAVEMENT REPAIRS.



NORTH END OF BRIDGE

SOUTH END OF BRIDGE

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER
5/31/2023

NO.	REVISION	BY	DATE

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation
© 2023

SH 6 SB OVERPASS AT BUS 6 NB MBGF LAYOUT

SCALE: =1": 40' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
	6			SH 6,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	44
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

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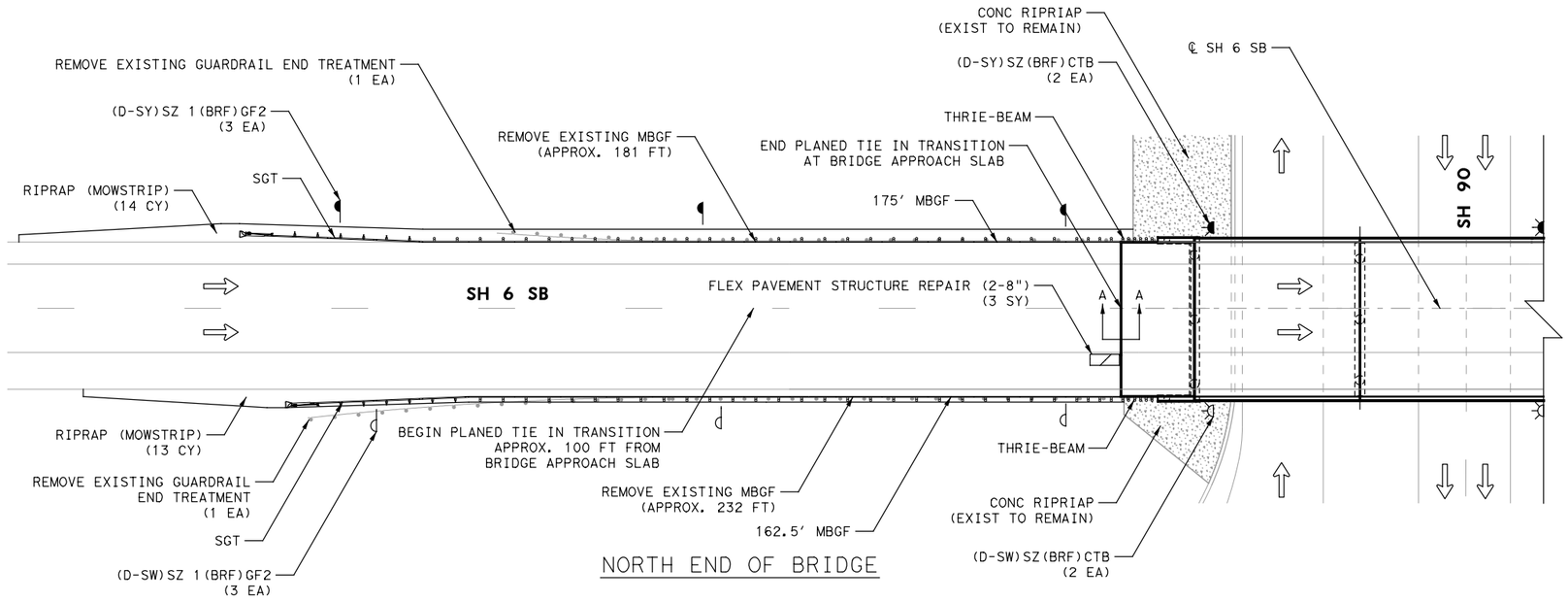
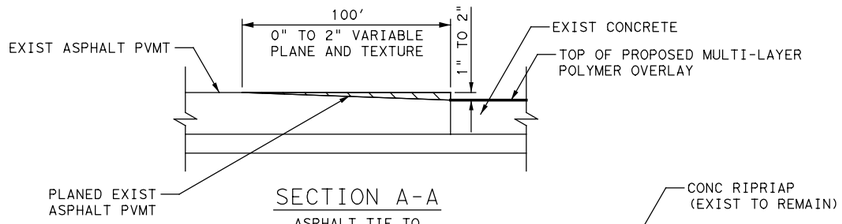


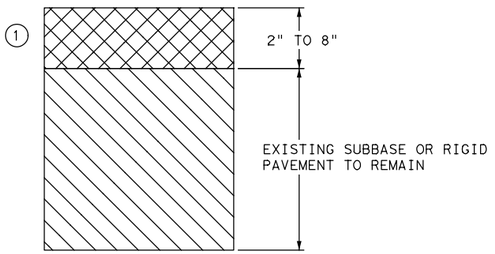


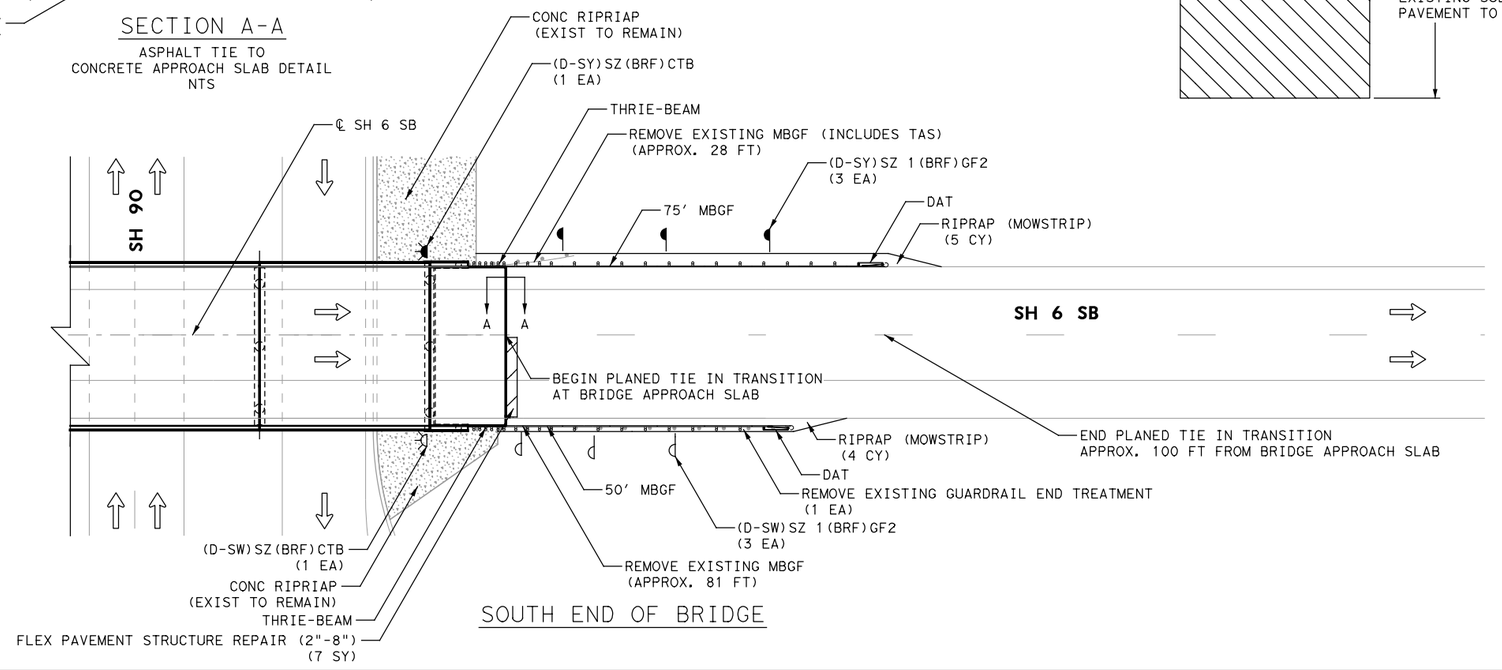
SECTION A-A

ASPHALT TIE TO CONCRETE APPROACH SLAB DETAIL
NTS

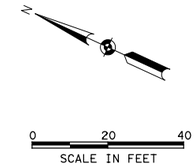
PROPOSED FLEXIBLE PAVEMENT REPAIR DETAIL NOTES:

(1) HMA TY-C TO TY-D PG 64-22 OR SUPERPAVE SP-B TO SP-C PG 64-22 OR AS APPROVED BY THE ENGINEER FOR PAVEMENT REPAIRS.





SOUTH END OF BRIDGE



LEGEND

- TRAFFIC FLOW ARROWS
- (D-SW)SZ(BRF)CTB
- (D-SY)SZ(BRF)CTB
- (D-SW)SZ 1(BFR)GF2
- (D-SY)SZ 1(BFR)GF2

LENGTH OF NEED CALCULATION

$L_u = 250 - \frac{250}{D_u} \times G_u$ $L_d = 250 - \frac{250}{D_d} \times G_d$

RIGHT SIDE	RIGHT SIDE
L_u = 167 FT	L_d = 67 FT
D_u = 30 FT	D_d = 30 FT
G_u = 10 FT	G_d = 22 FT

LEFT SIDE	LEFT SIDE
L_u = 200 FT	L_d = 100 FT
D_u = 30 FT	D_d = 30 FT
G_u = 6 FT	G_d = 18 FT

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

5/31/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-1634!

Texas Department of Transportation

SH 6 SB OVERPASS AT SH 90 MBGF LAYOUT

SCALE: =1": 40'

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	45
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

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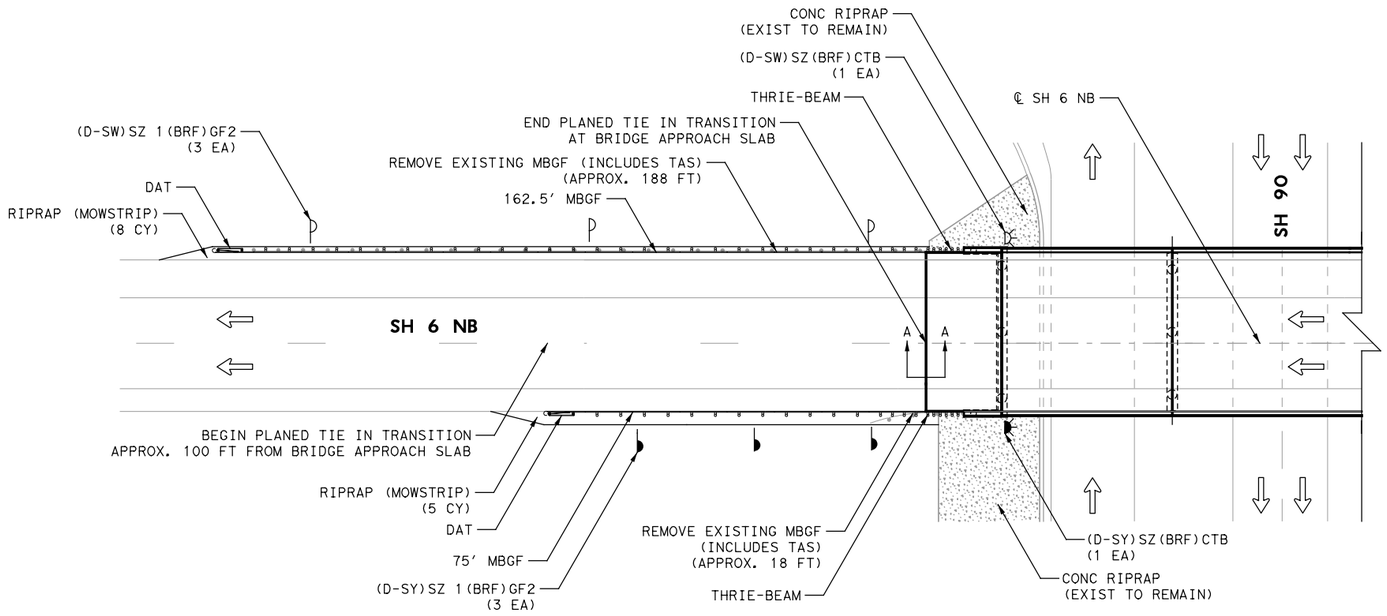
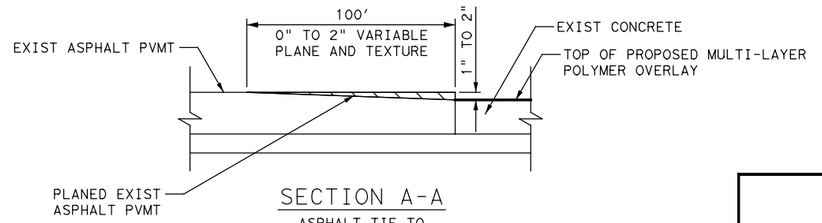
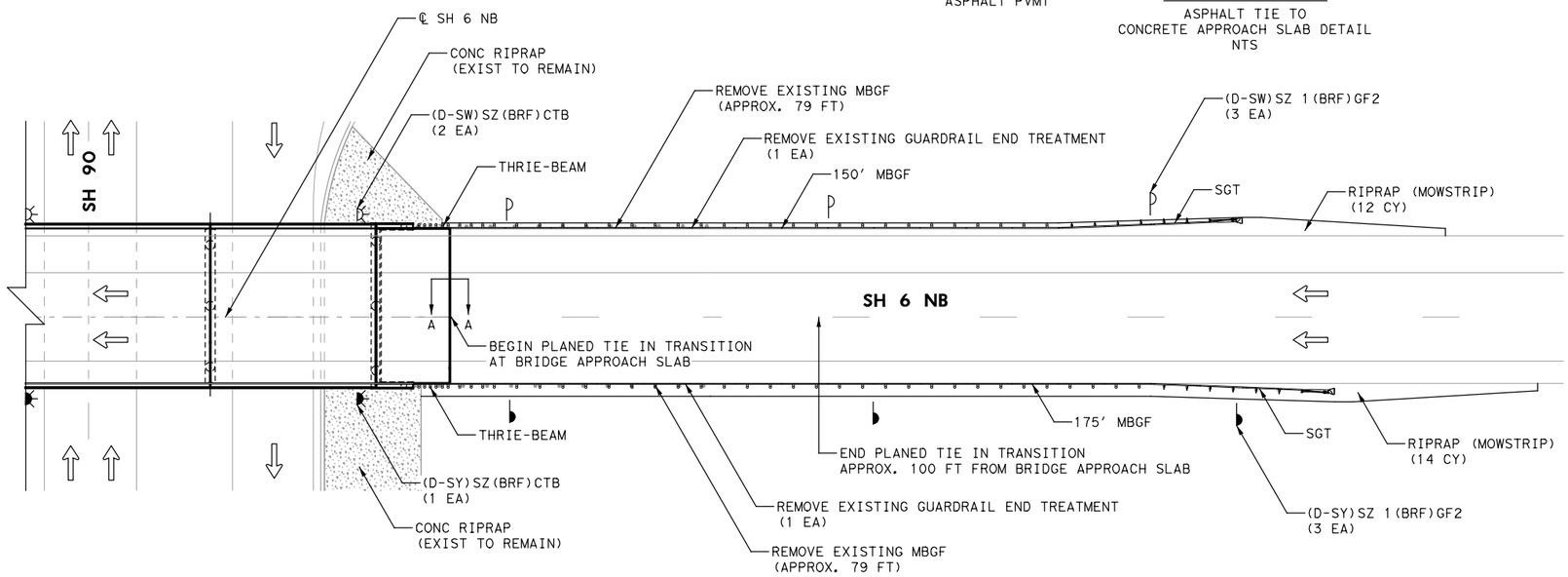


NORTH END OF BRIDGE

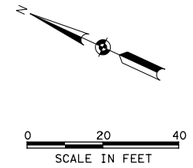


SECTION A-A

ASPHALT TIE TO
CONCRETE APPROACH SLAB DETAIL
NTS



SOUTH END OF BRIDGE



LEGEND

- TRAFFIC FLOW ARROWS
- (D-SW)SZ(BRF)CTB
- (D-SY)SZ(BRF)CTB
- (D-SW)SZ 1(BFR)GF2
- (D-SY)SZ 1(BFR)GF2

LENGTH OF NEED CALCULATION

$L_u = 250 - \frac{250}{D_u} \times G_u$ $L_d = 250 - \frac{250}{D_d} \times G_d$

RIGHT SIDE	RIGHT SIDE
L_u = 167 FT	L_d = 67 FT
D_u = 30 FT	D_d = 30 FT
G_u = 10 FT	G_d = 22 FT
LEFT SIDE	**LEFT SIDE**
L_u = 200 FT	L_d = 100 FT
D_u = 30 FT	D_d = 30 FT
G_u = 6 FT	G_d = 18 FT

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED
PROFESSIONAL ENGINEER

5/31/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO: F-16341

Texas Department of Transportation

SH 6 NB OVERPASS AT SH 90 MBGF LAYOUT

SCALE: =1": 40' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	46
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

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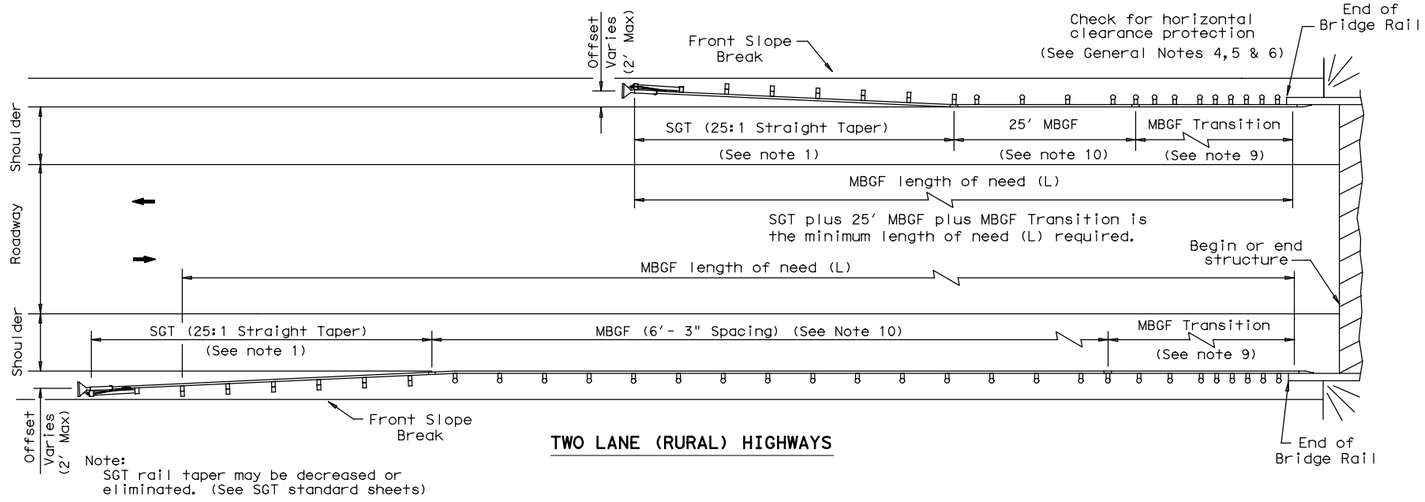
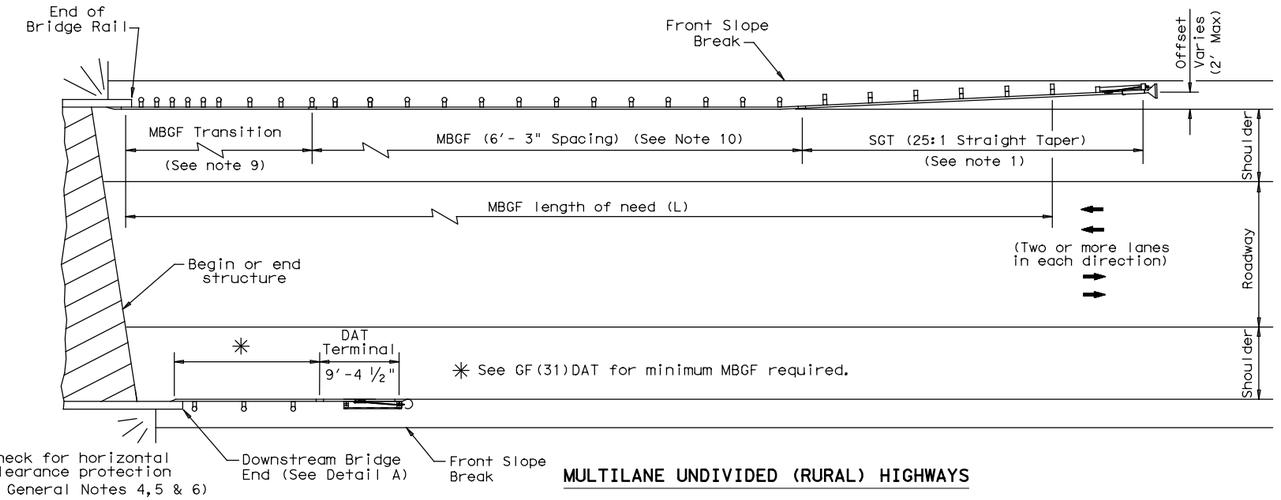
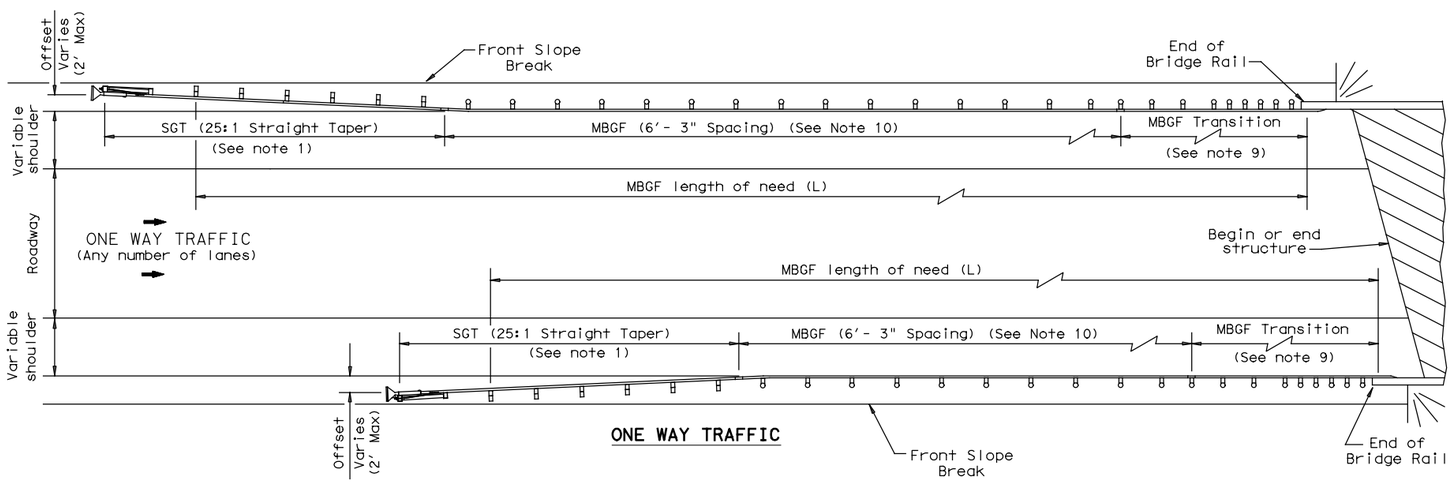


TWO LANE (RURAL) HIGHWAYS

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



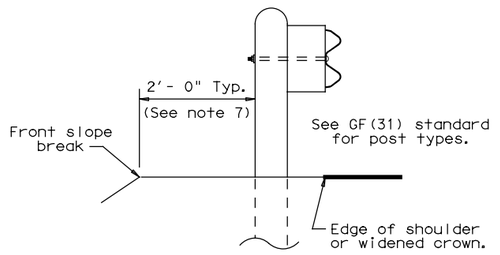
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



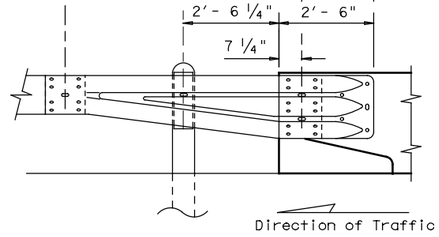
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED APRIL 2014 SEE (MEMO 0414)	0050	03	114, ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		47

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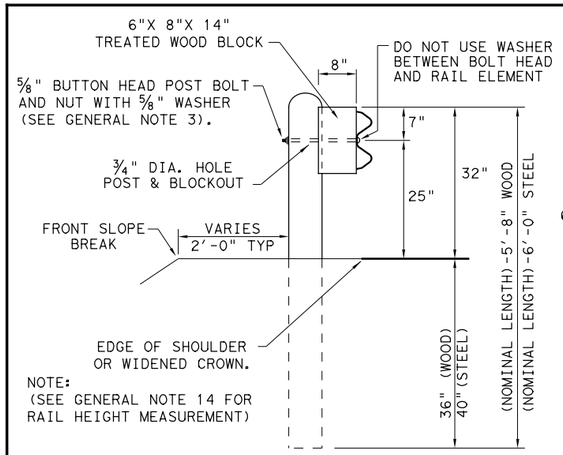
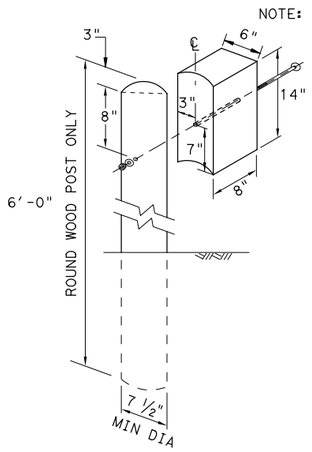
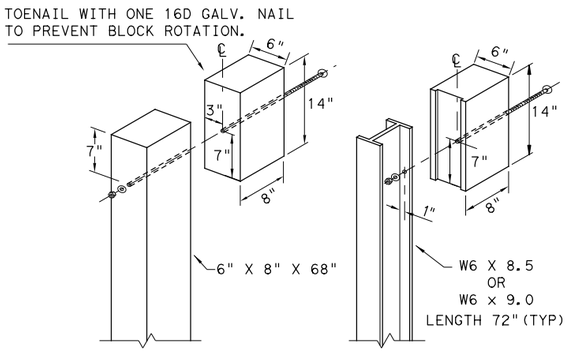


TYPICAL POST PLACEMENT



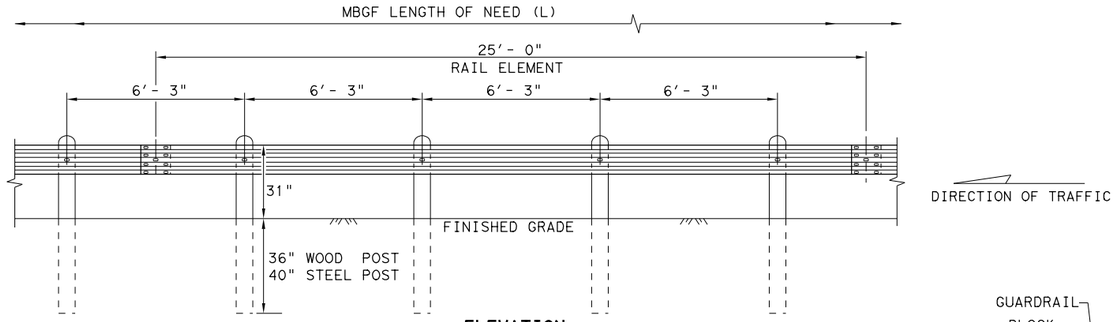
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

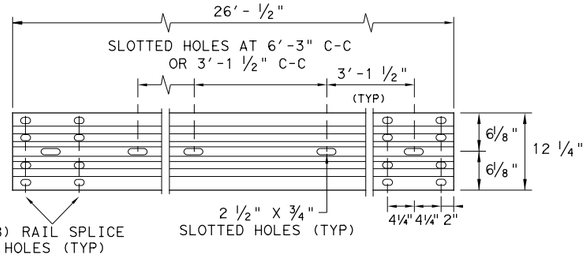
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



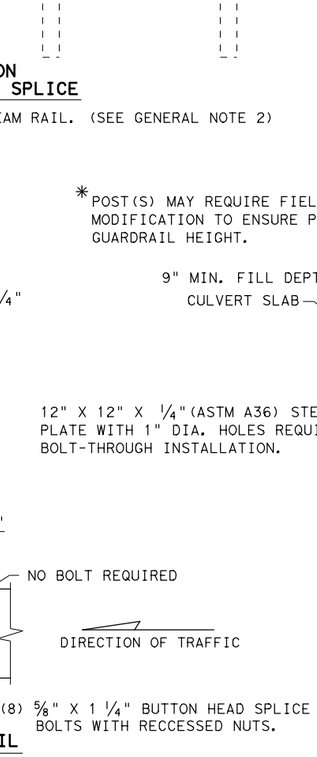
ELEVATION MID-SPAN RAIL SPLICE

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

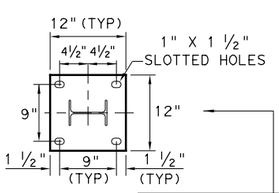


ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

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



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



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

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" 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 1/4" MIN. BEYOND NUT.

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

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

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

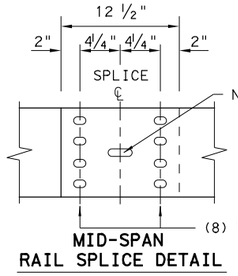
SPLICE BOLT LENGTH — VARIES

FBB01 = 1 1/4"
FBB02 = 2"
5/8"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

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.

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

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
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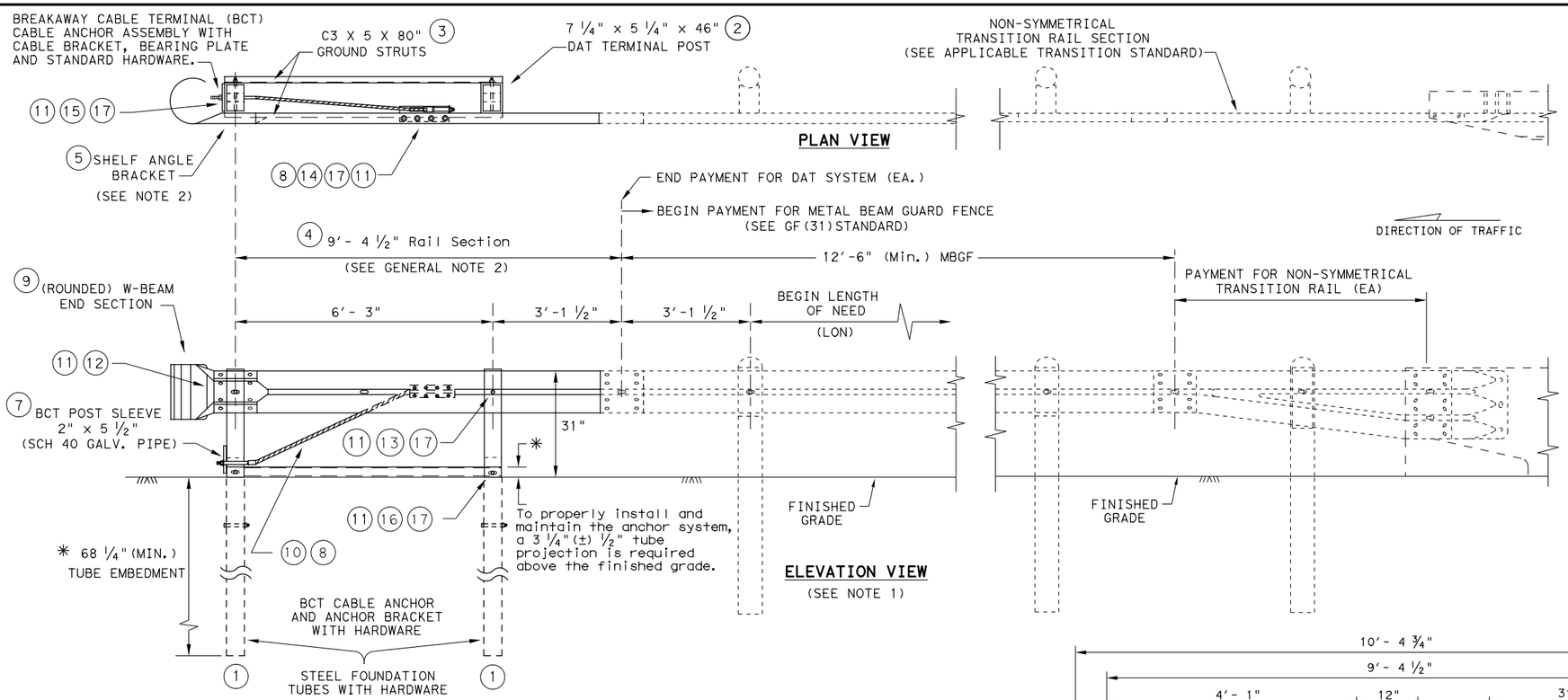


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

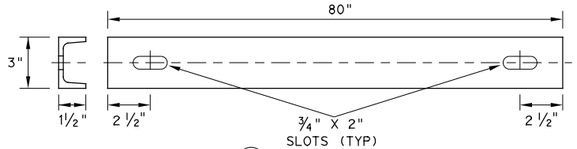
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

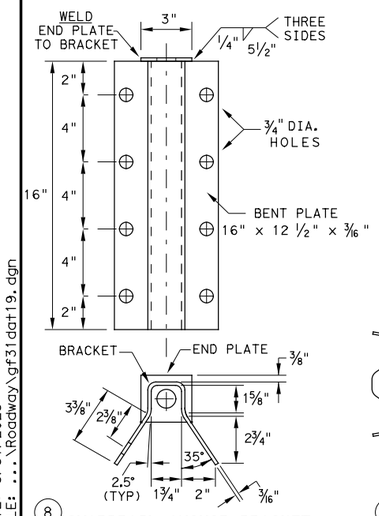
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

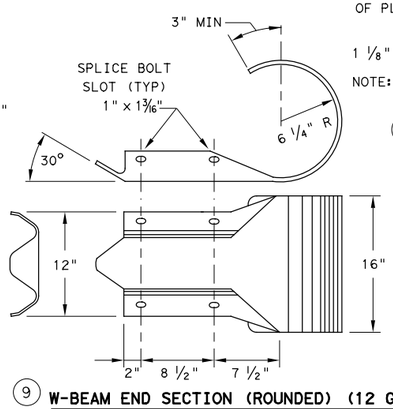
(4) TERMINAL RAIL ELEMENT FOR DAT



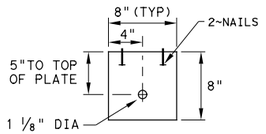
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

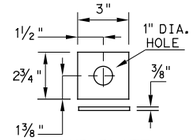


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

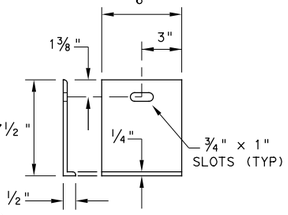


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

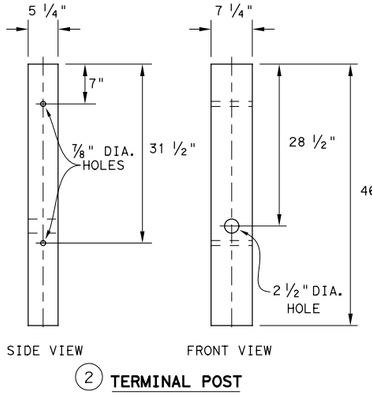
(6) BEARING PLATE
8"x 8"x 5/8" R



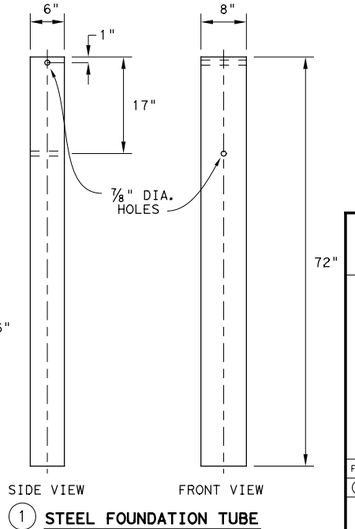
END PLATE



(5) SHELF ANGLE BRACKET



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



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

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
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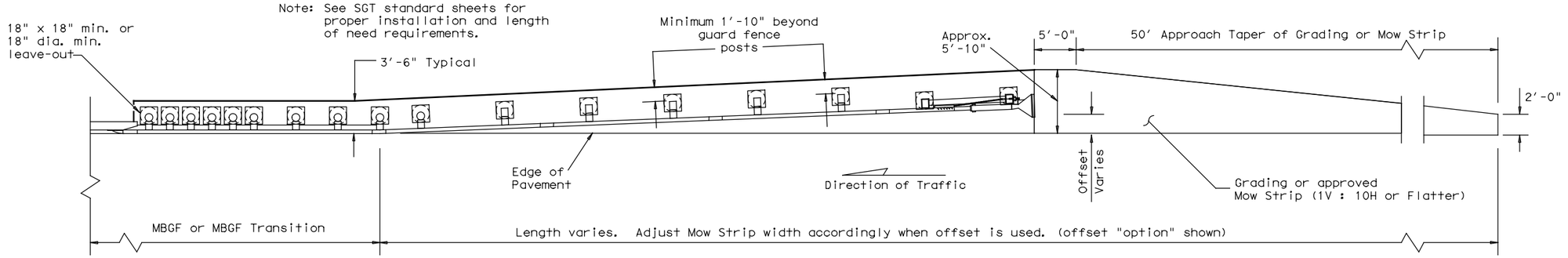
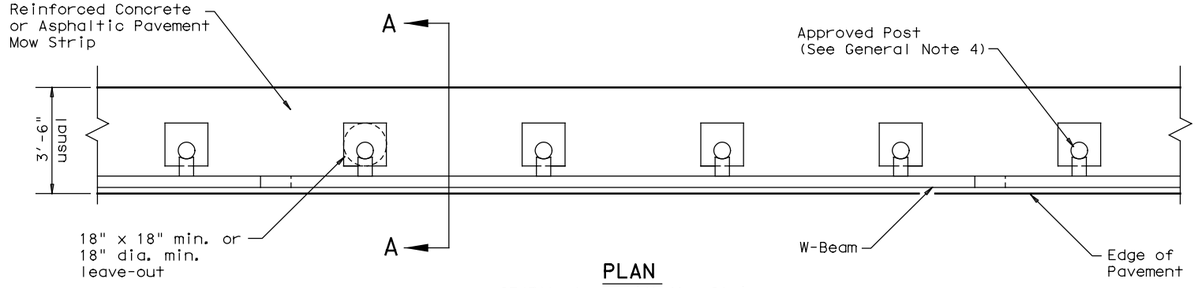
	BRY	GRIMES		49

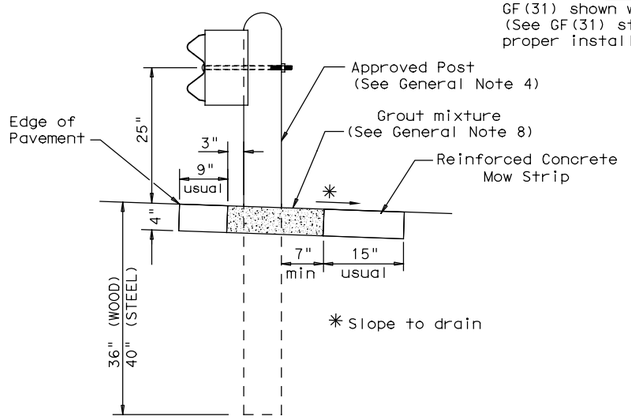


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



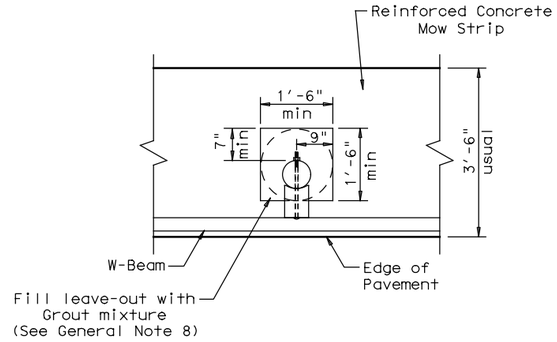
PLAN

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



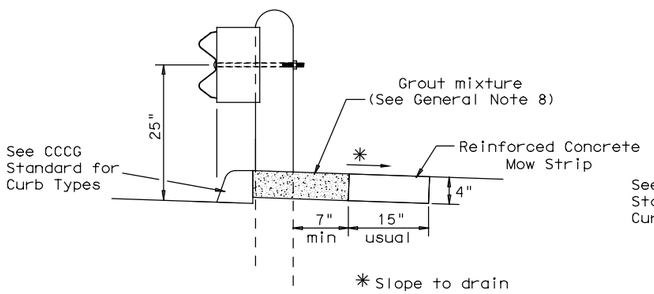
SECTION A-A

Typical



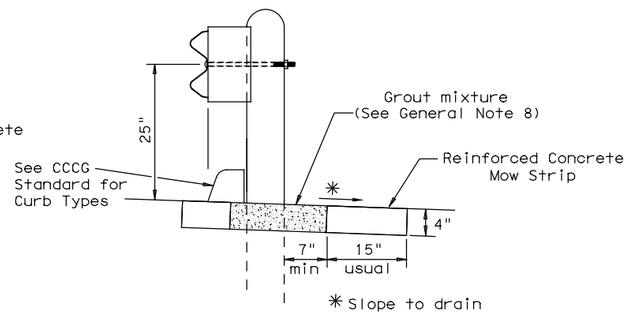
MOW STRIP DETAIL

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



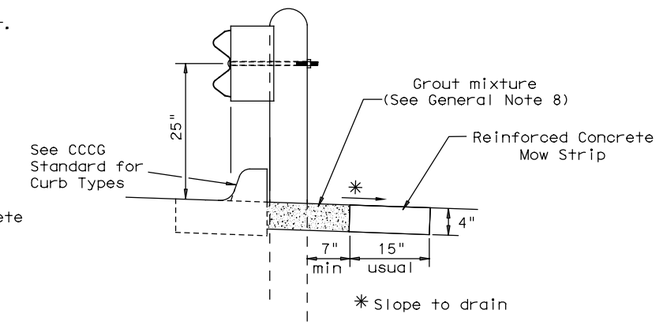
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
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DATE: 5/31/2023
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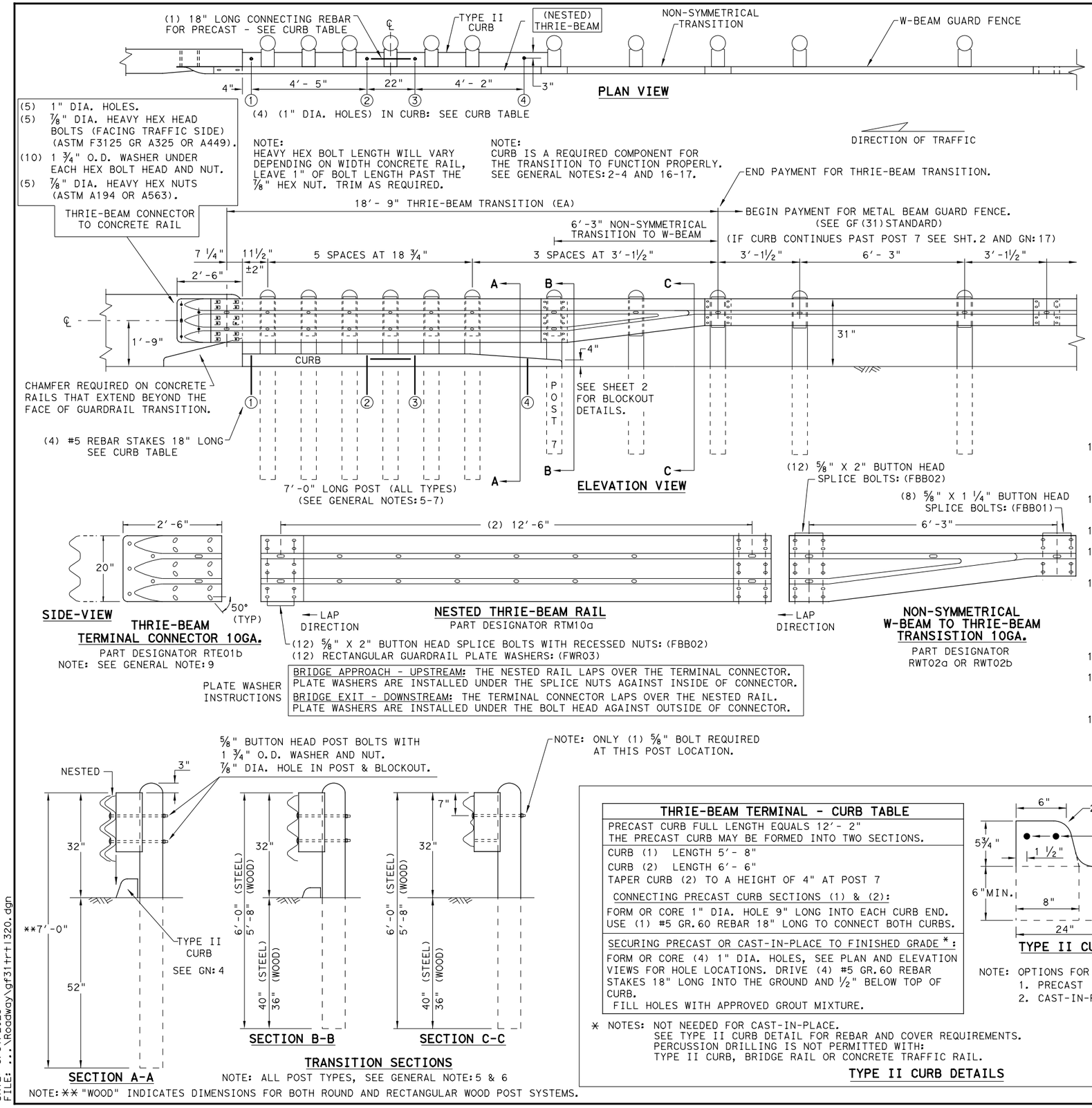


GENERAL NOTES

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.

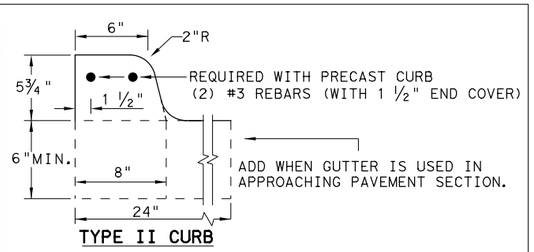
THRIE-BEAM TERMINAL - CURB TABLE

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: gf31tr-tl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		51

DATE: 5/31/2023
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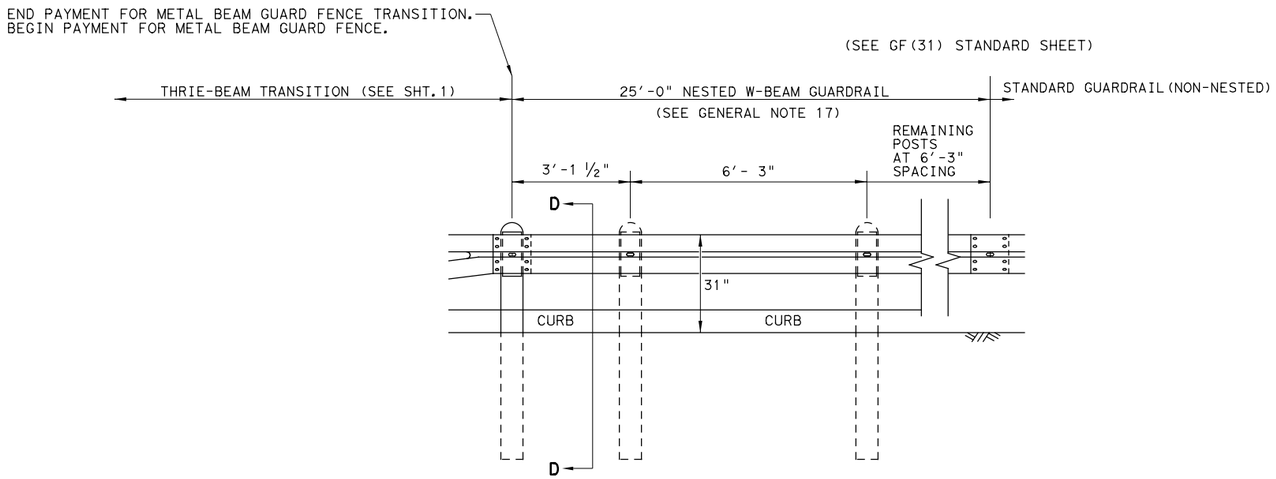
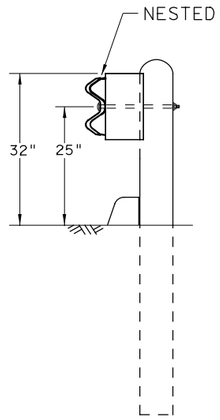
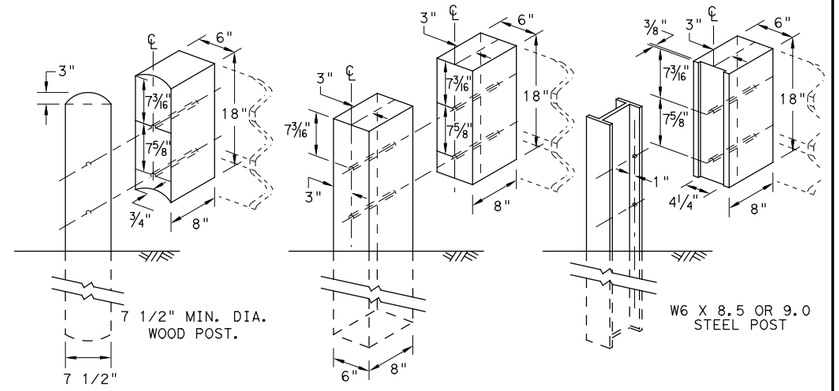
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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
REVISIONS	0050	03	114,ETC.	SH 6
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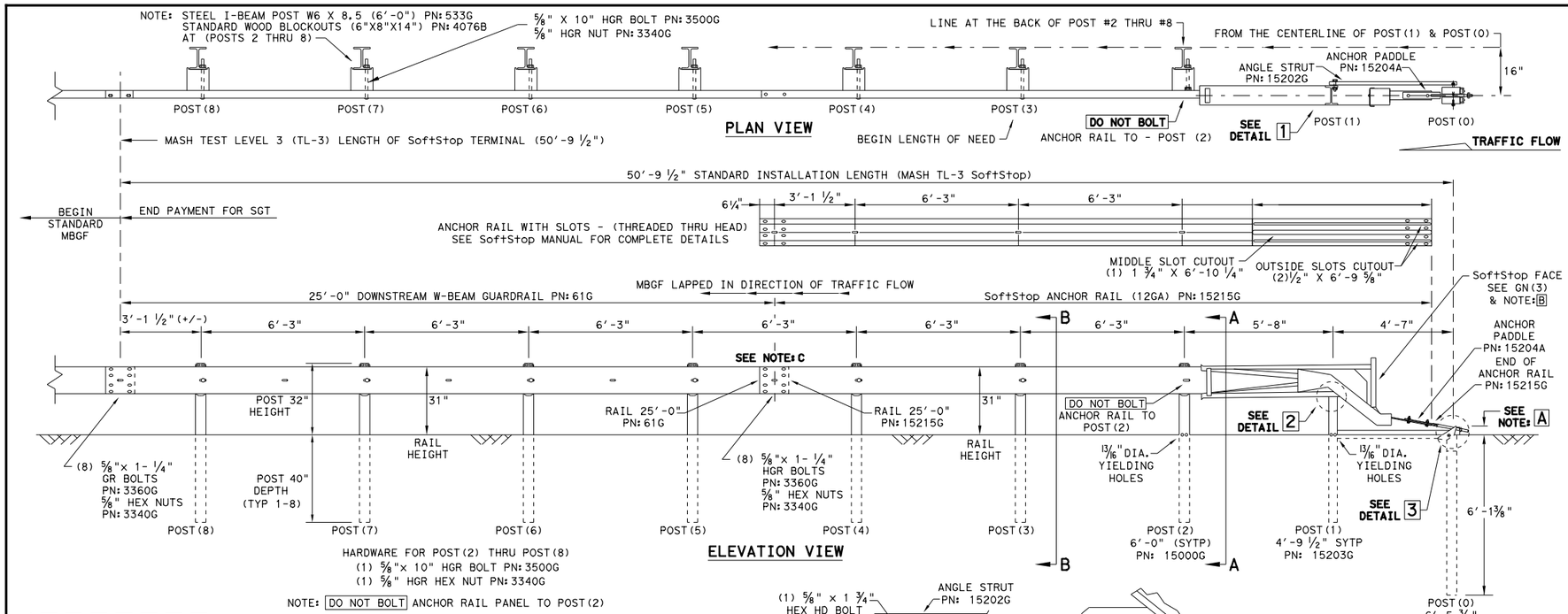

GENERAL NOTES

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	7/8" 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
REVISIONS	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		53

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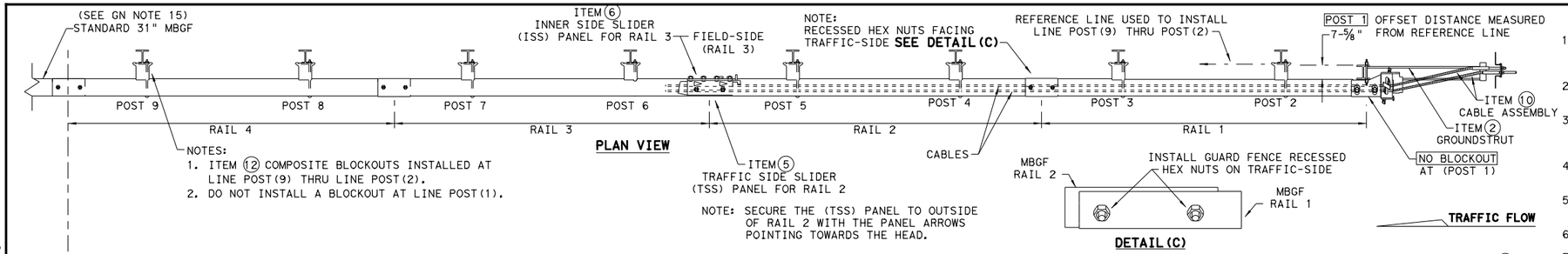

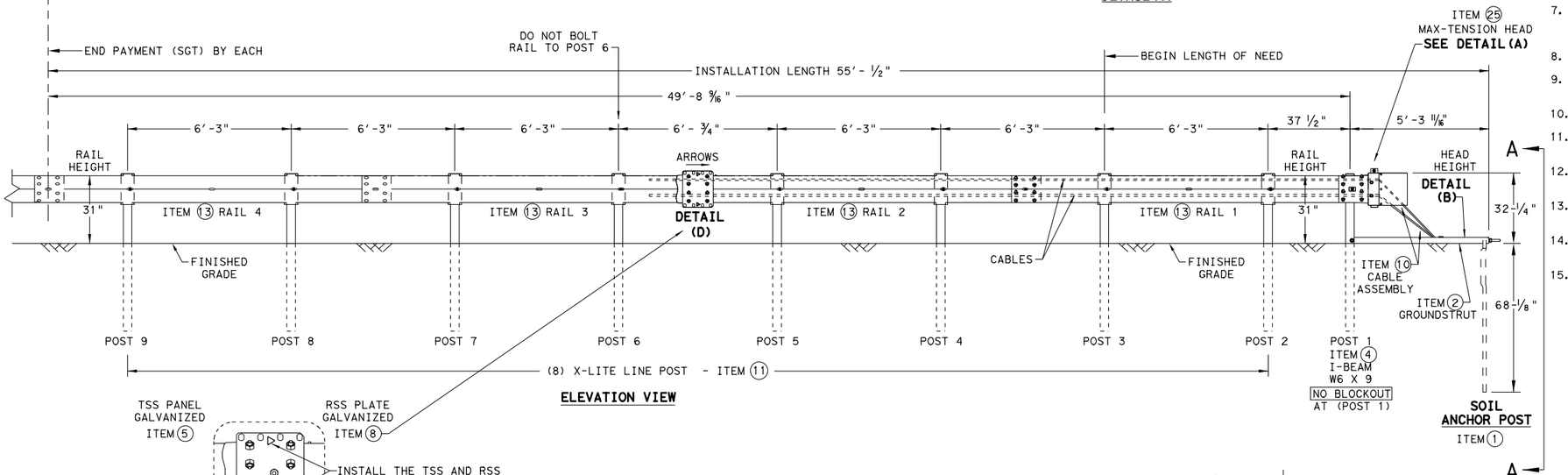

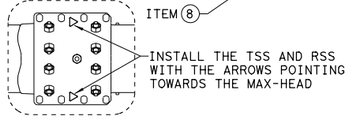

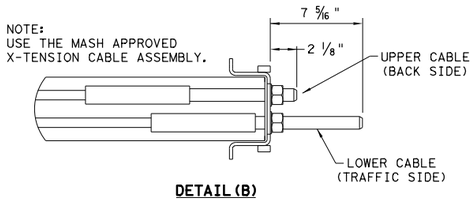

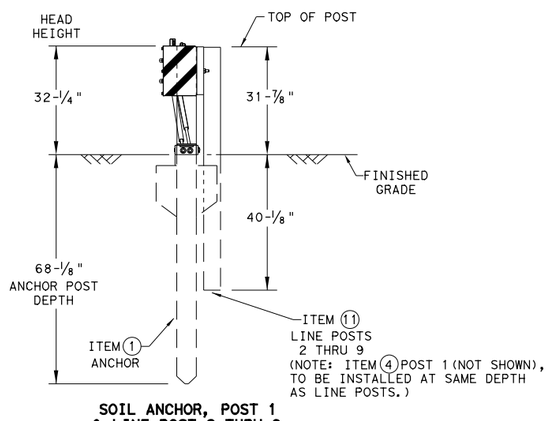

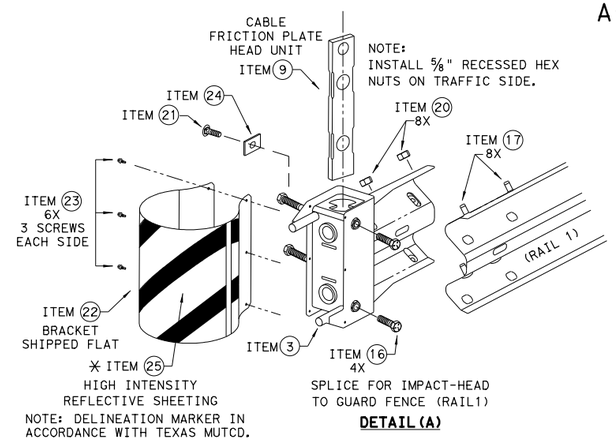

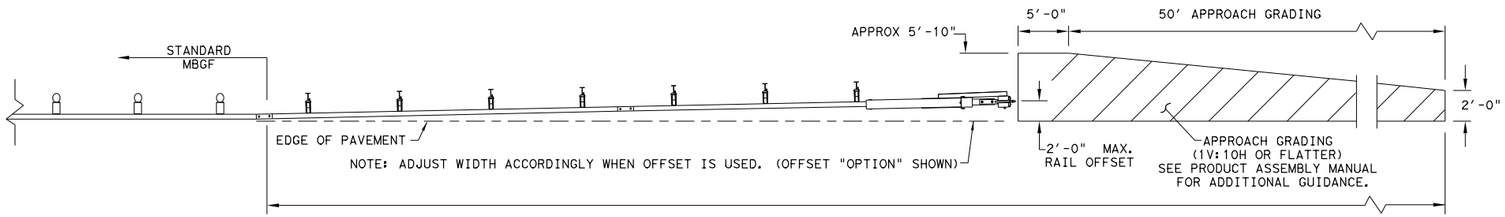

GENERAL NOTES

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

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

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
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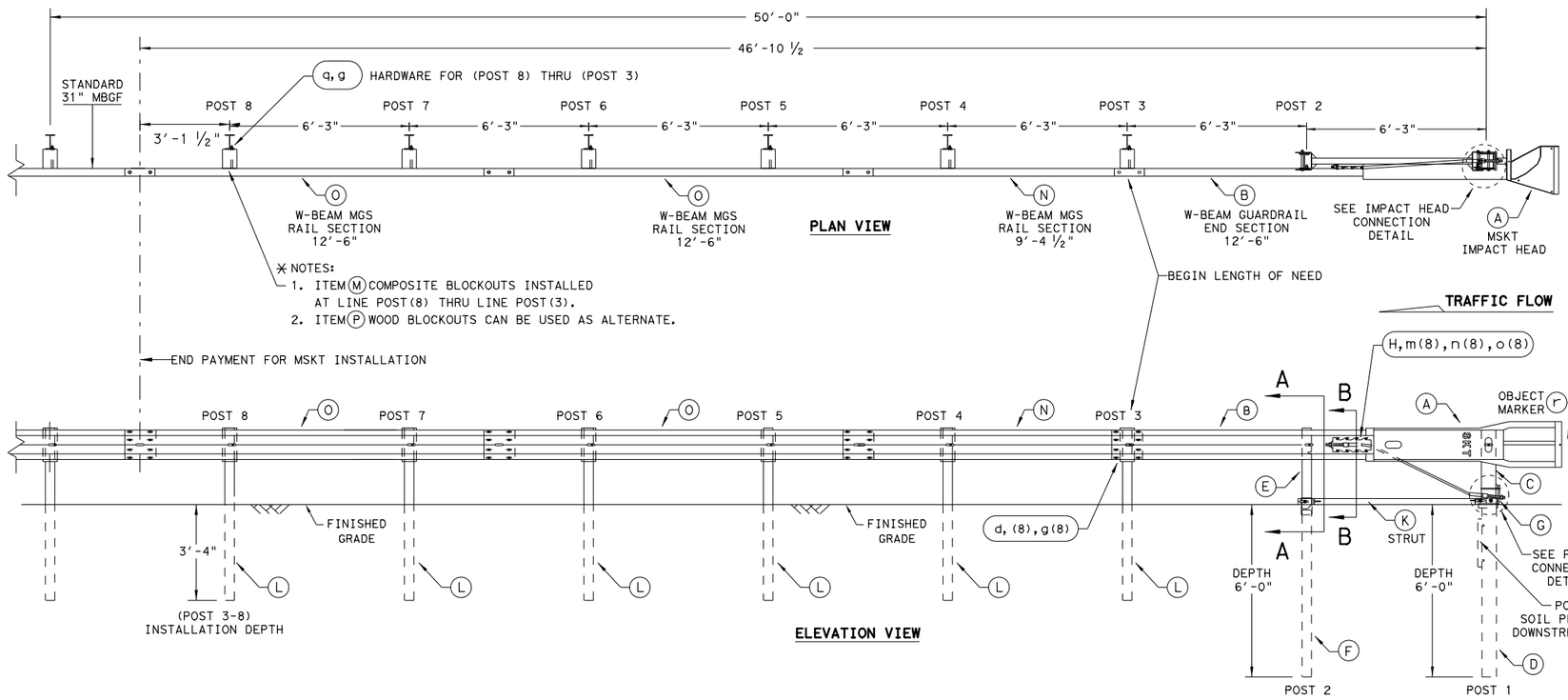


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

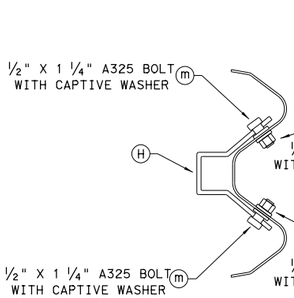
GENERAL NOTES

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

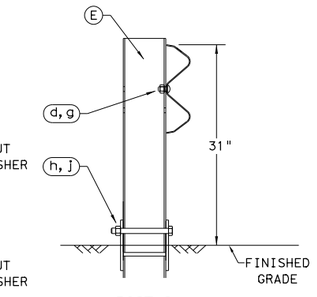
SEE NOTES: ✳

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

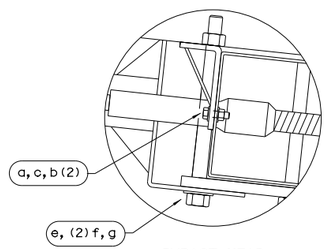
ALTERNATIVE ITEMS NOT SHOWN. ✳✳
✳ ITEM(P) 8" WOOD-BLOCKOUT
✳✳ ITEM(Q) 25′GUARD FENCE PANEL



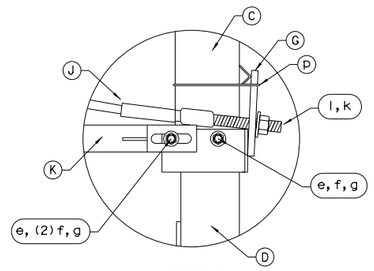
SECTION B-B
ANCHOR BRACKET



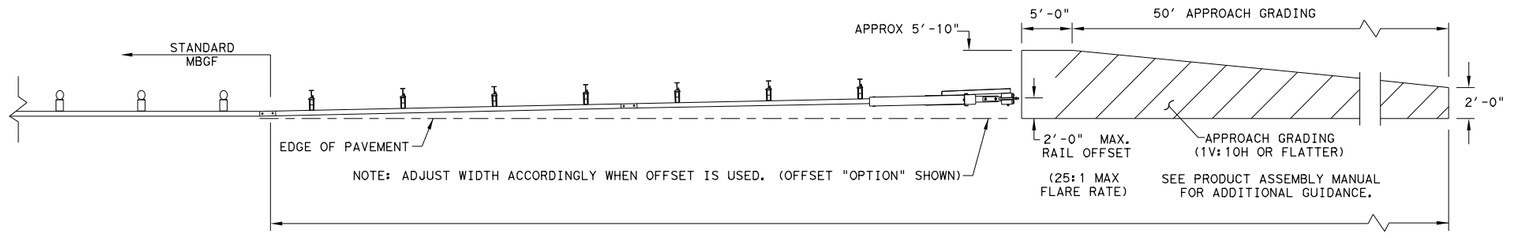
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

TRAFFIC FLOW

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

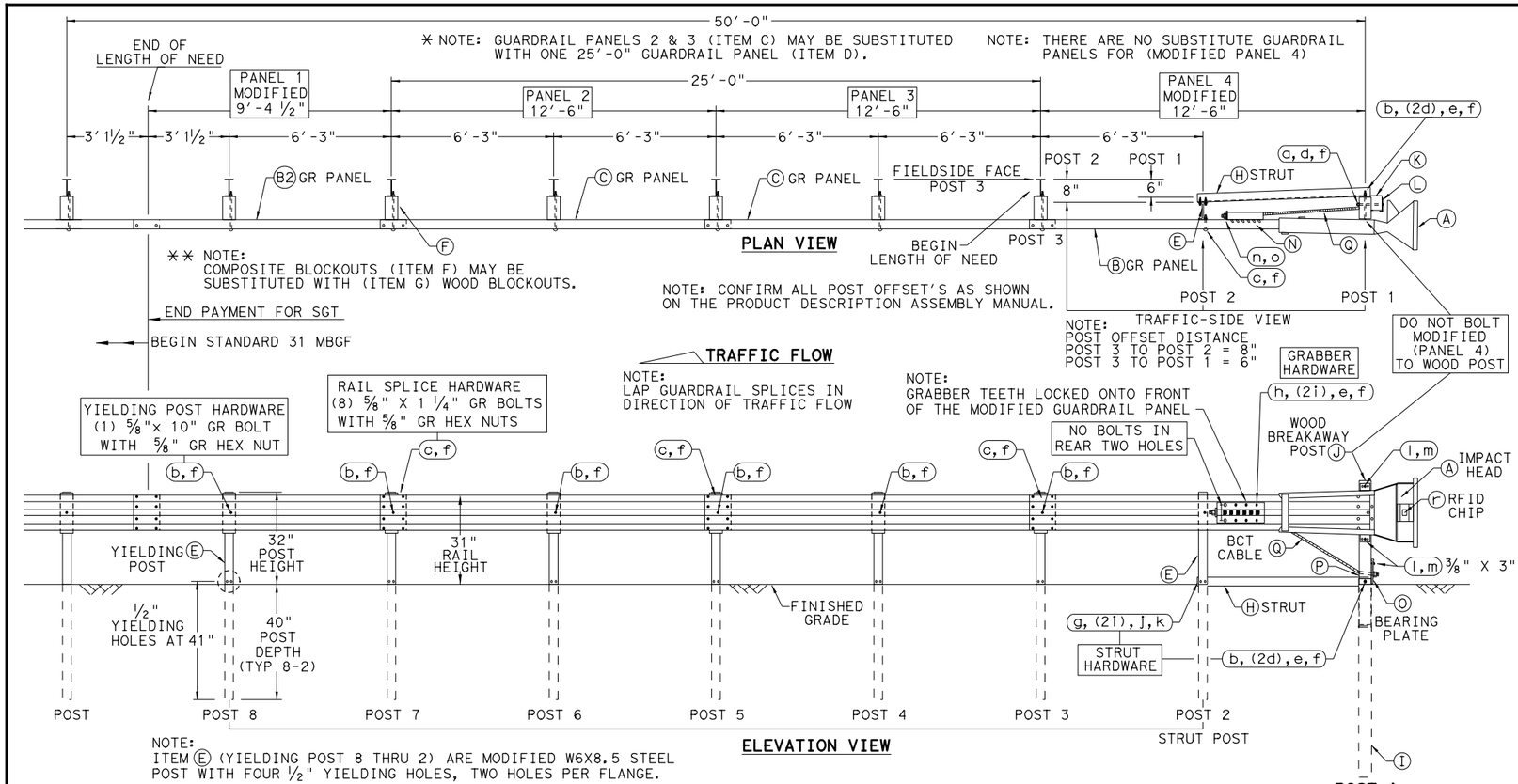
Texas Department of Transportation

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	0050	03	114,ETC.	SH 6	
	DIST	COUNTY		SHEET NO.	
	BRY	GRIMES		55	

DATE: 5/31/2023
FILE: ...\Roadway\sgt12s3118.dgn

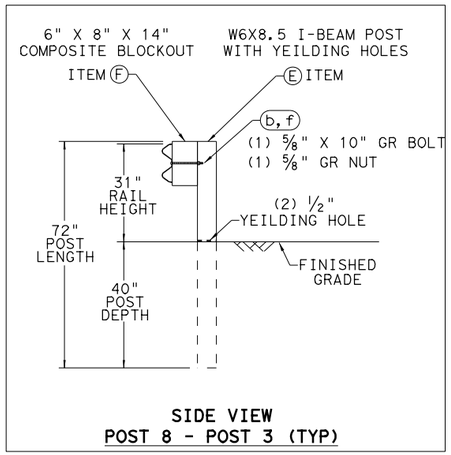


GENERAL NOTES

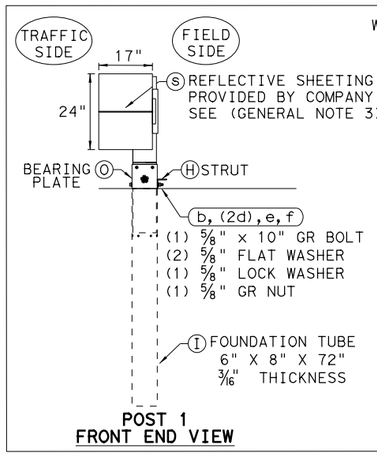
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
H	1	STRUT 3" X 3" X 80" x 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" x 3/16"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
		SMALL HARDWARE	
a	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

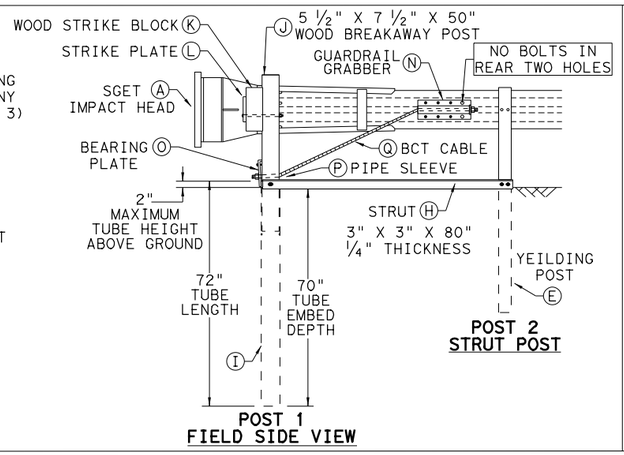
ALTERNATIVE ITEMS
NOTE: SEE PLAN VIEW
* D
** G



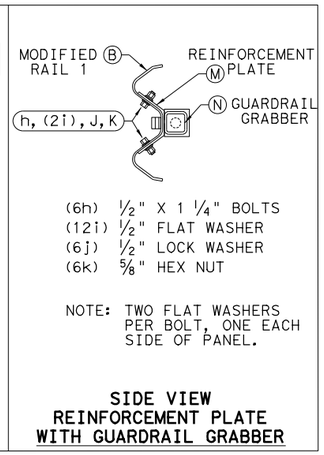
SIDE VIEW
POST 8 - POST 3 (TYP)



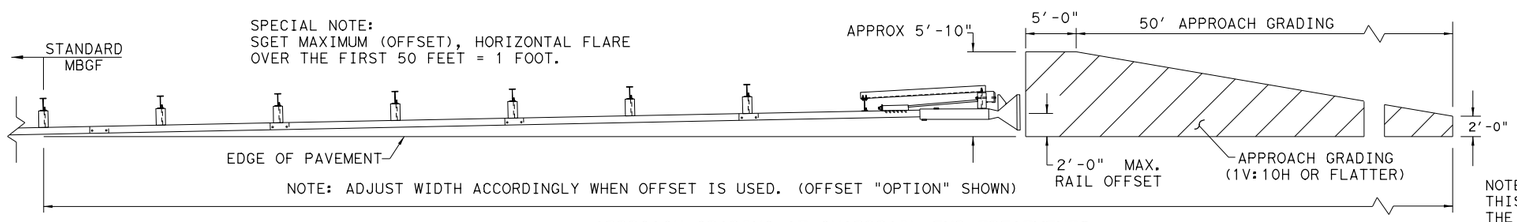
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW
POST 2
STRUT POST



SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT(15)31-20

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP		
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0050	03	114, ETC.	SH 6		
	DIST	COUNTY		SHEET NO.		
	BRY	GRIMES		56		

DATE: 5/31/2023
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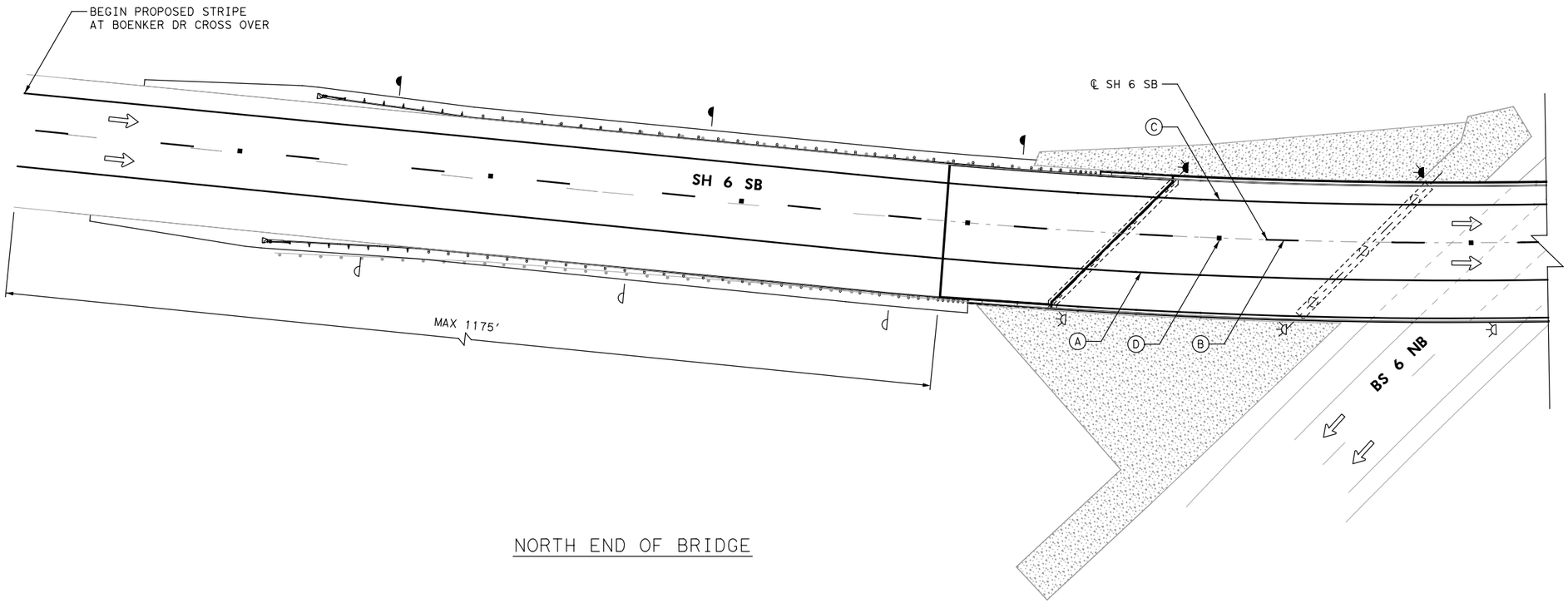
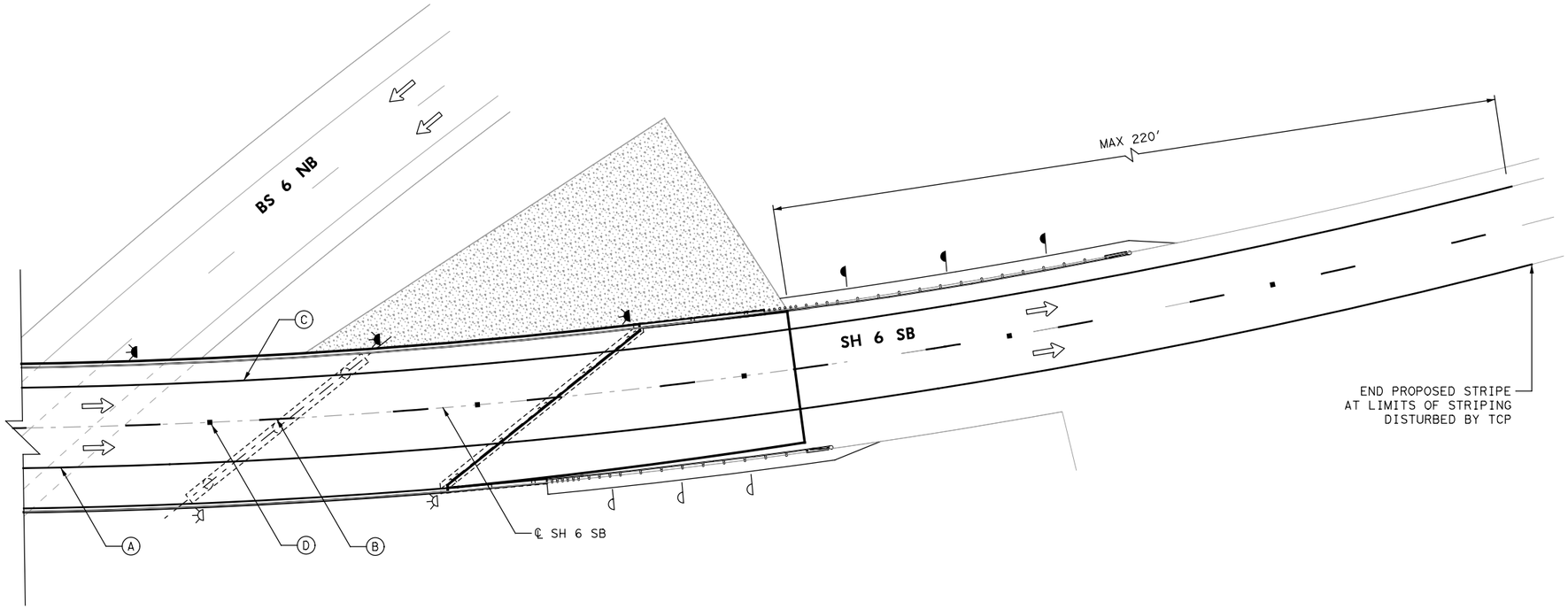


NORTH END OF BRIDGE



SOUTH END OF BRIDGE

N

0 20 40
SCALE IN FEET

LEGEND

(A)	MULTIPOLYMER PAV MRK (W)(6")(SLD)
(B)	MULTIPOLYMER PAV MRK (W)(6")(BRK)
(C)	MULTIPOLYMER PAV MRK (Y)(6")(SLD)
(D)	REFL PAV MRKR TY II-C-R
⇦	TRAFFIC FLOW ARROWS
	(D-SW)SZ(BRF)CTB
	(D-SY)SZ(BRF)CTB
	(D-SW)SZ 1(BFR)GF2
	(D-SY)SZ 1(BFR)GF2

NOTES:

1. DELINEATORS QUANTIFIED IN MBGF LAYOUT SHEETS.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB PAVEMENT MARKING LAYOUT

SCALE: =1":40' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
	6			SH 6,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	57
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

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DATE: 7/26/2023
SCALE: 1:40
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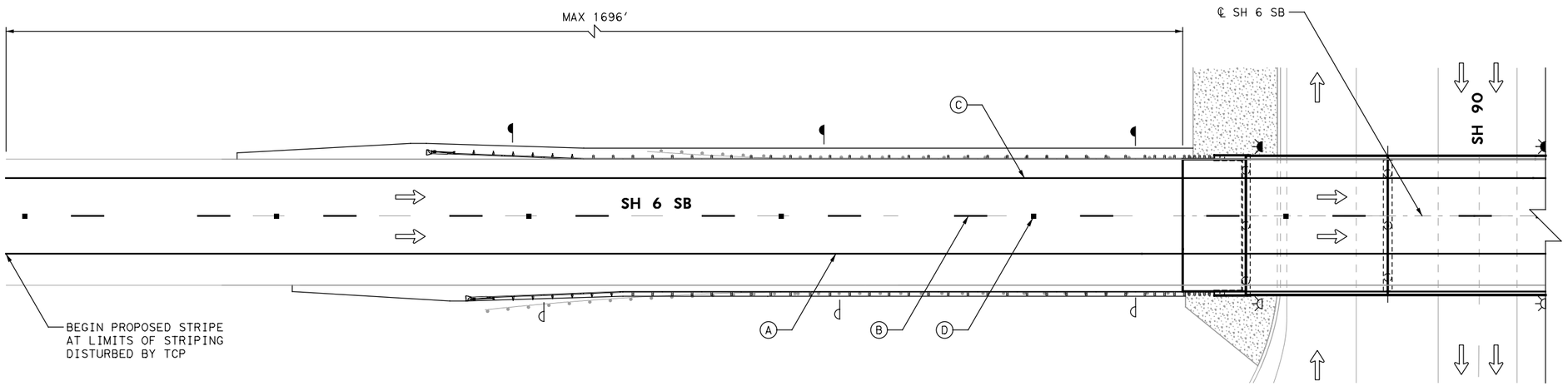
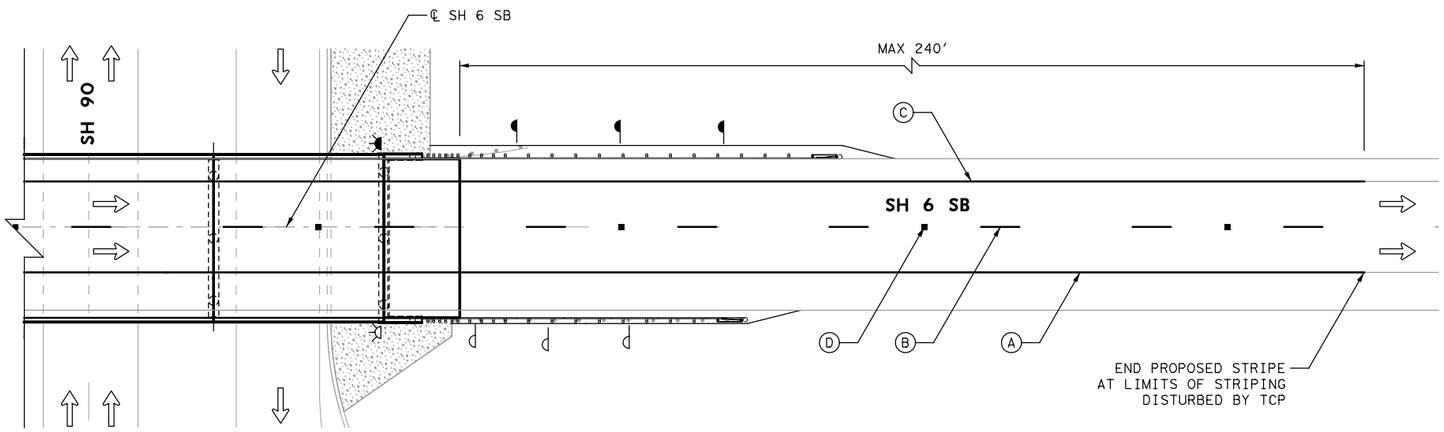


NORTH END OF BRIDGE



SOUTH END OF BRIDGE

LEGEND

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (D) REFL PAV MRKR TY II-C-R
- TRAFFIC FLOW ARROWS
- (D-SW)SZ(BRF)CTB
- (D-SY)SZ(BRF)CTB
- (D-SW)SZ 1(BFR)GF2
- (D-SY)SZ 1(BFR)GF2

NOTES:

1. DELINEATORS QUANTIFIED IN MBGF LAYOUT SHEETS.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

SH 6 SB OVERPASS AT SH 90 PAVEMENT MARKING LAYOUT

SCALE: =1": 40'

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	58
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: gaimeida
DATE: 7/26/2023
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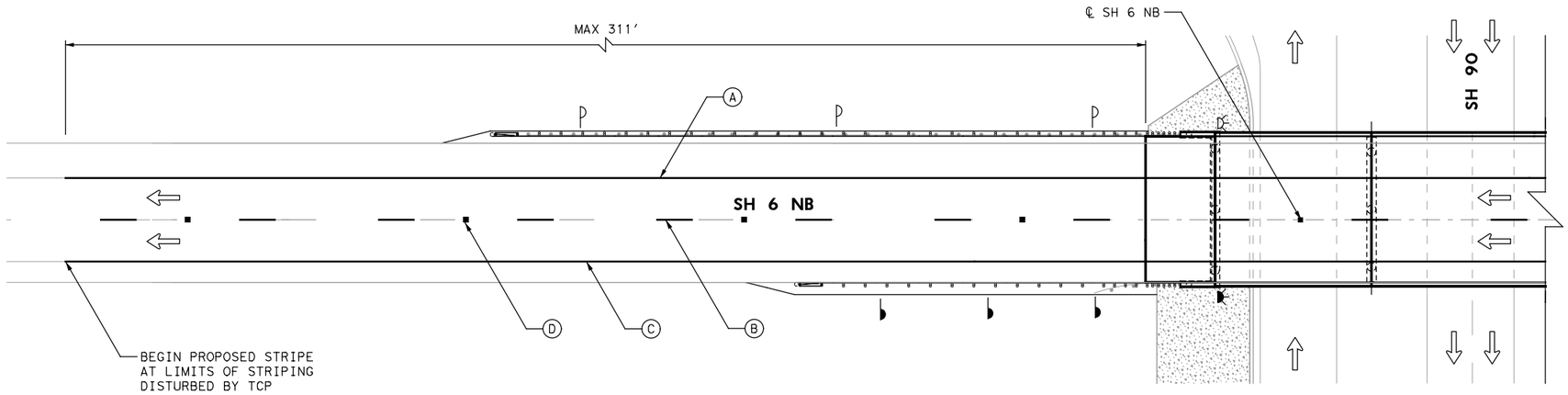
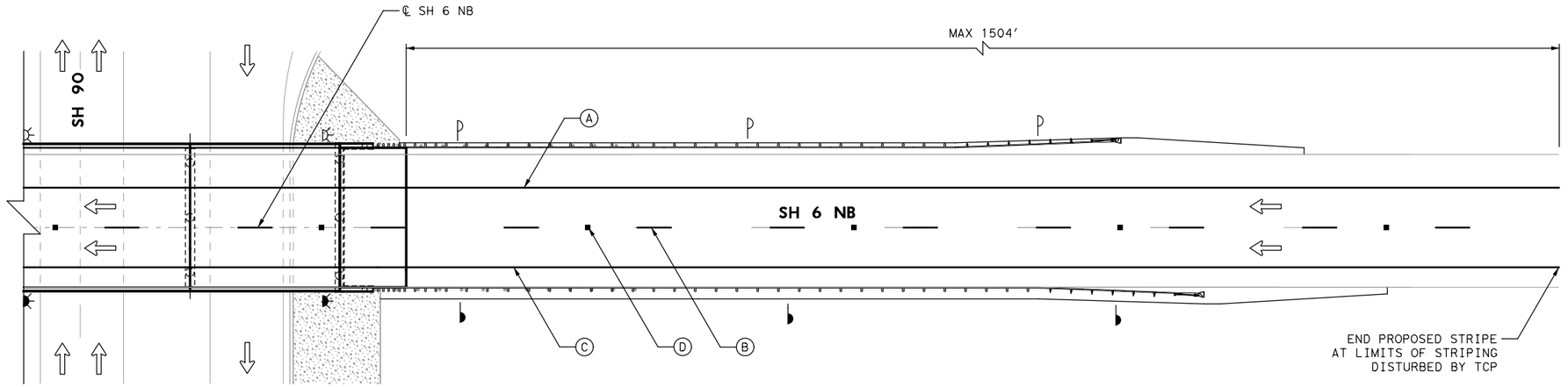


NORTH END OF BRIDGE



SOUTH END OF BRIDGE

0 20 40
SCALE IN FEET

LEGEND

- (A) MULTIPOLYMER PAV MRK (W)(6")(SLD)
- (B) MULTIPOLYMER PAV MRK (W)(6")(BRK)
- (C) MULTIPOLYMER PAV MRK (Y)(6")(SLD)
- (D) REFL PAV MRKR TY II-C-R
- TRAFFIC FLOW ARROWS
- (D-SW)SZ(BRF)CTB
- (D-SY)SZ(BRF)CTB
- (D-SW)SZ 1(BFR)GF2
- (D-SY)SZ 1(BFR)GF2

NOTES:

1. DELINEATORS QUANTIFIED IN MBGF LAYOUT SHEETS.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

7/26/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SH 6 NB OVERPASS AT SH 90 PAVEMENT MARKING LAYOUT

SCALE: =1": 40'

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	59
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

USER: gpimeida
DATE: 7/26/2023
SCALE: 1:40
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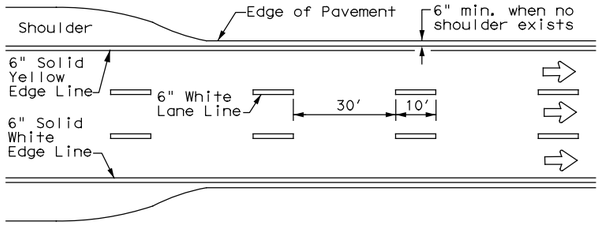
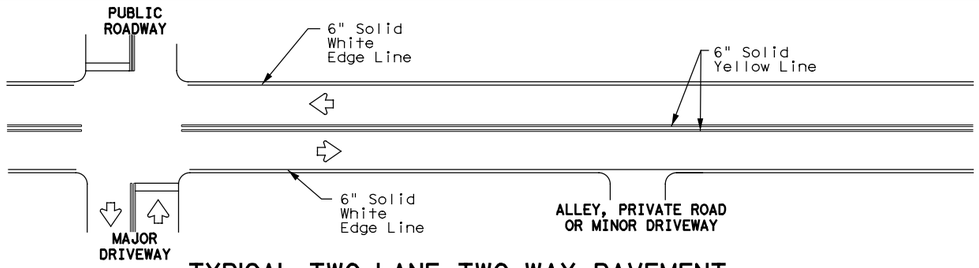
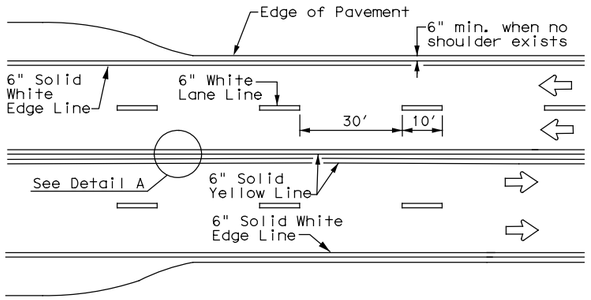
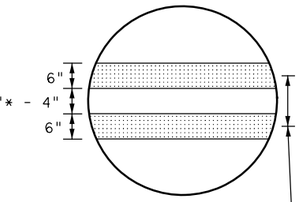


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





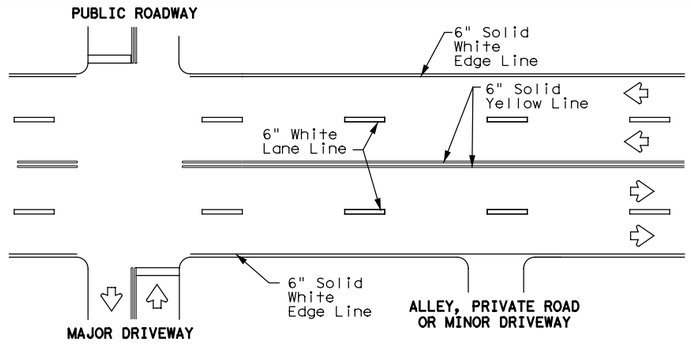
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

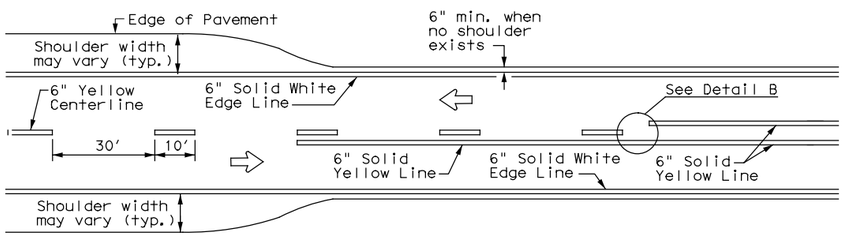
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

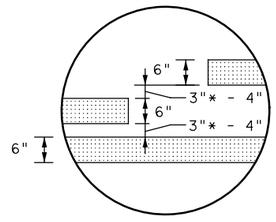
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



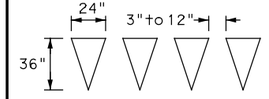
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

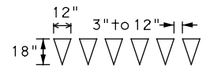
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

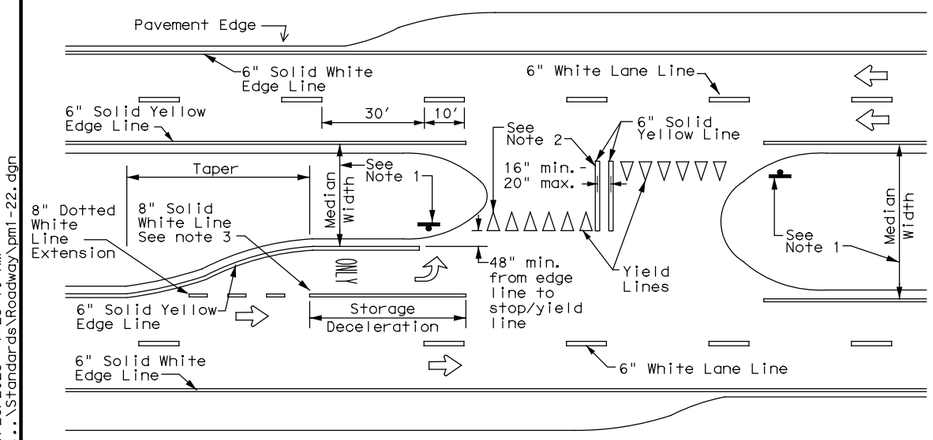


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

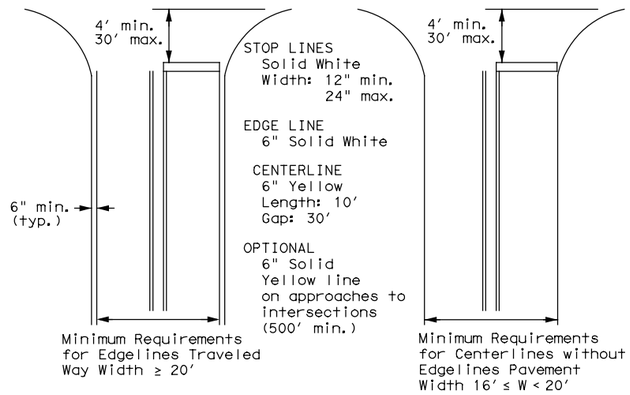
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines 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. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines 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 center of edge line to the center of edge line 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.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

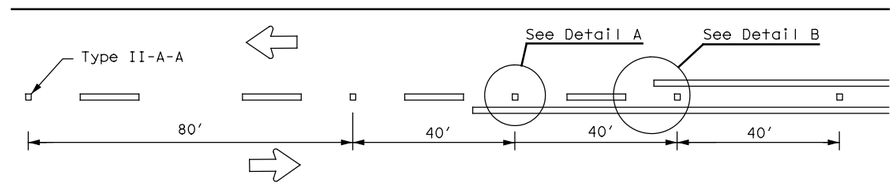
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12	0050	03	114, ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		60

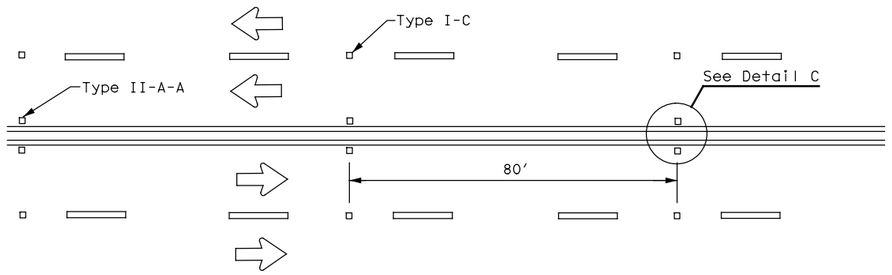
22A

DATE: 7/26/2023 7:25:10 AM
FILE: ...\Standards\Roadway\pm1-22.dgn

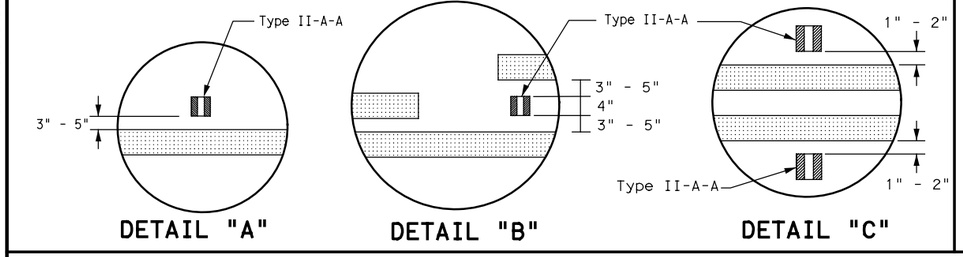
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

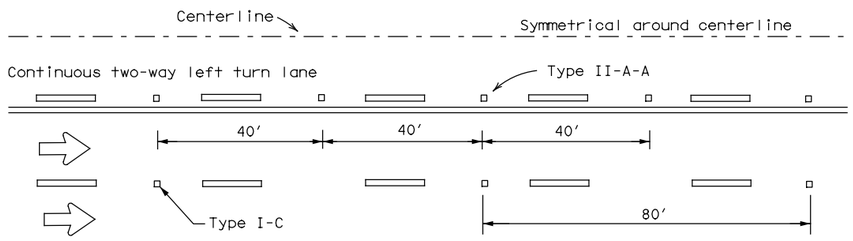


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

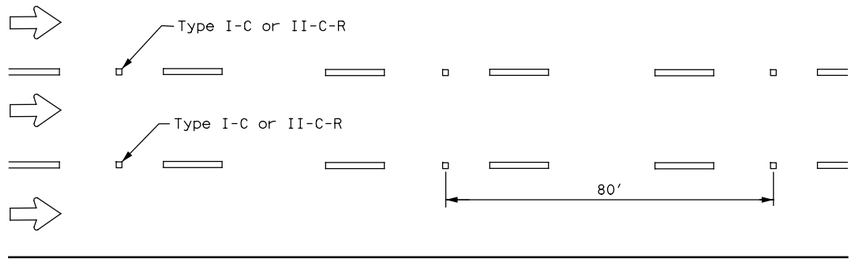


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



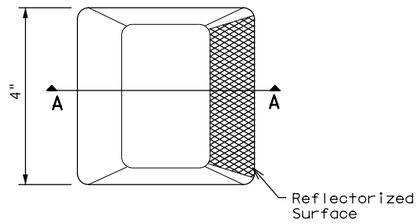
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

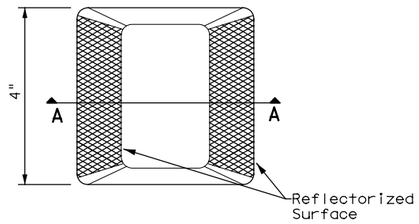
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

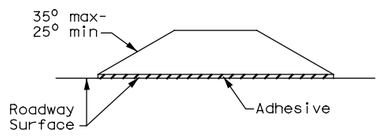
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

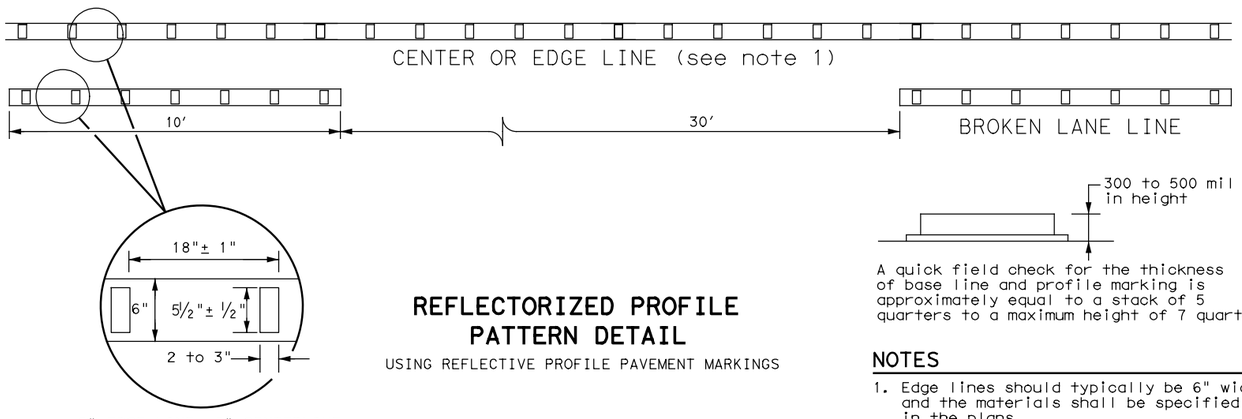


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

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.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. 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 along 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.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

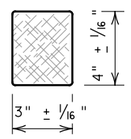
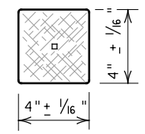
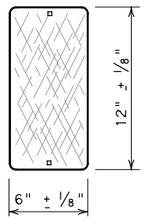
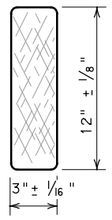
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		61

22B

DATE: 7/26/2023 7:25:11 AM
FILE: ...\Standards\Roadway\pm2-22.dgn

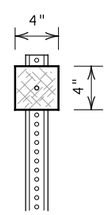
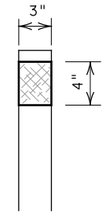
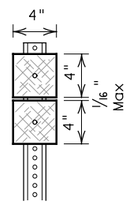
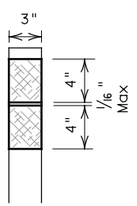
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			

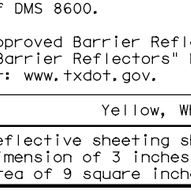
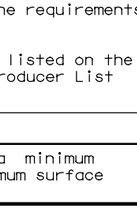
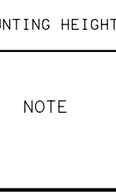
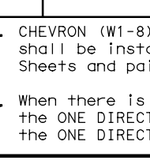
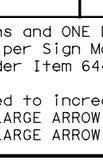
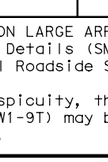
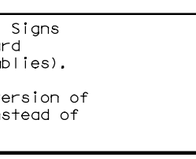
NOTE

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.

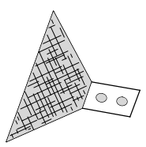
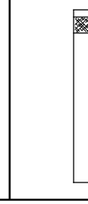
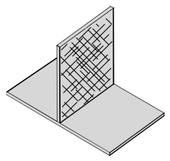
DELINEATORS

	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

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

BARRIER REFLECTORS (BRF)

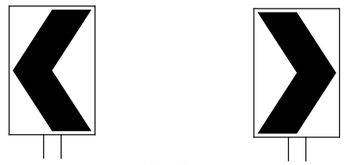
	GF1	GF2	CTB
DEVICE			

1. Barrier reflectors shall meet the requirements of DMS 8600.
2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.

SHEETING	Yellow, White, Red
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.

CHEVRONS

DEVICE



W1-8

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

NOTE

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

ONE DIRECTION LARGE ARROW

DEVICE

W1-6

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

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

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

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	0050	03	114,ETC.	SH 6
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	BRY	GRIMES		62

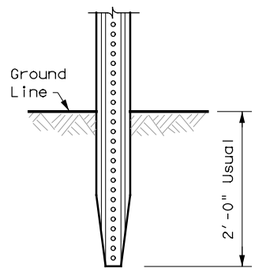
20A

DATE: 5/31/2023 4:07:09 PM
FILE: ...\Standards\Roadway\dom1-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

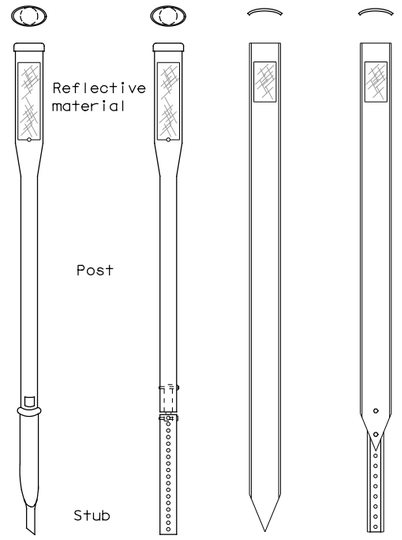


NOTES

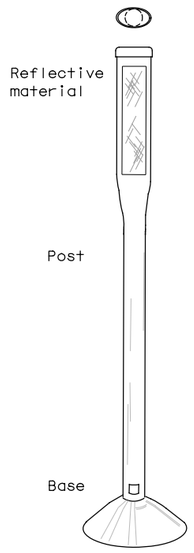
1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND



SRF



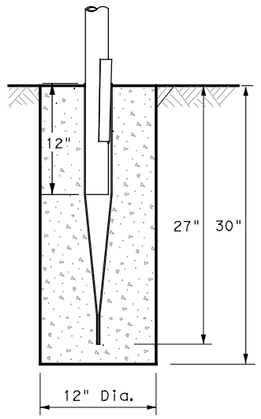
EMBEDDED | SURFACE MOUNT

NOTES

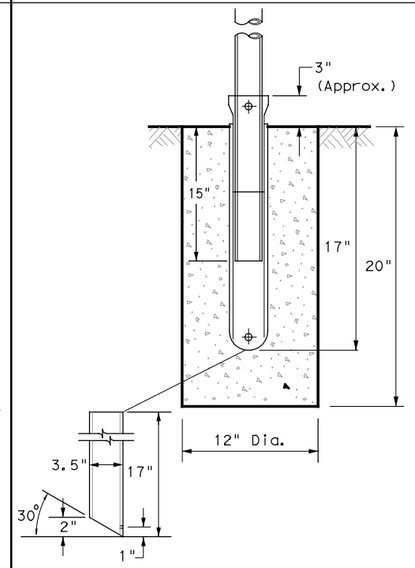
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline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

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

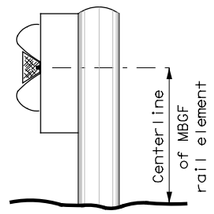
NOTE

1. Install per manufacturer's recommendations.

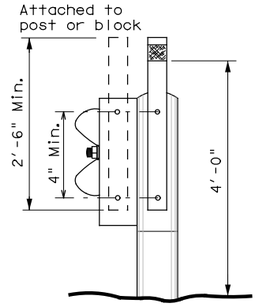
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

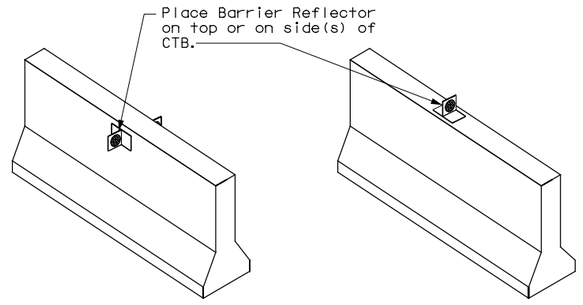
GF1



GF2



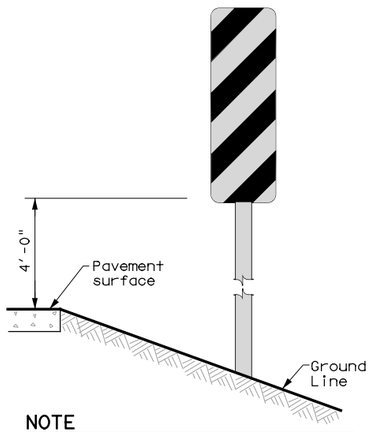
CONCRETE TRAFFIC BARRIER (CTB)



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.

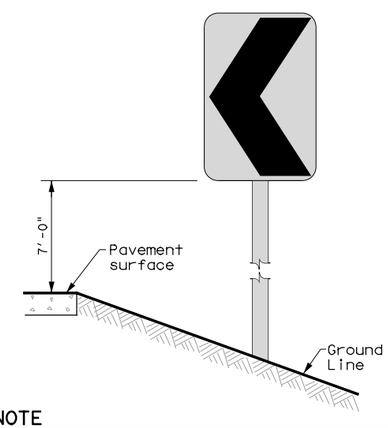
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

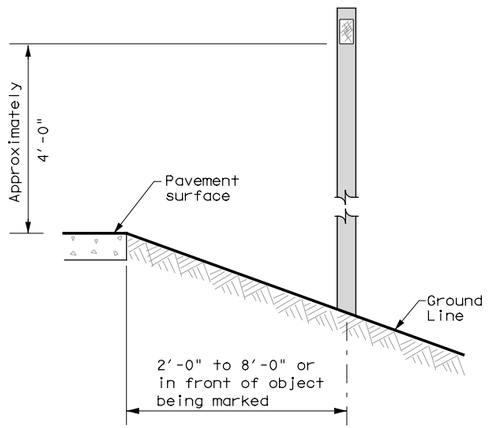
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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

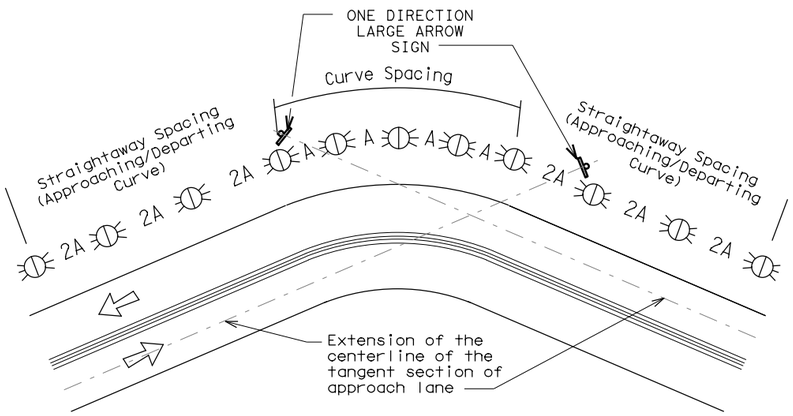
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	BRY	GRIMES		63

20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

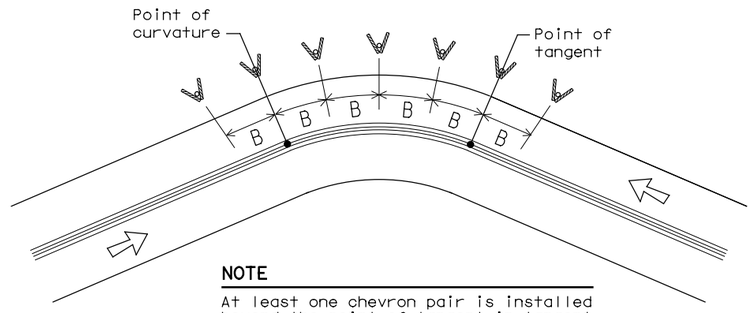
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	BRY	GRIMES		64

20C

DATE: 5/31/2023 4:07:12 PM
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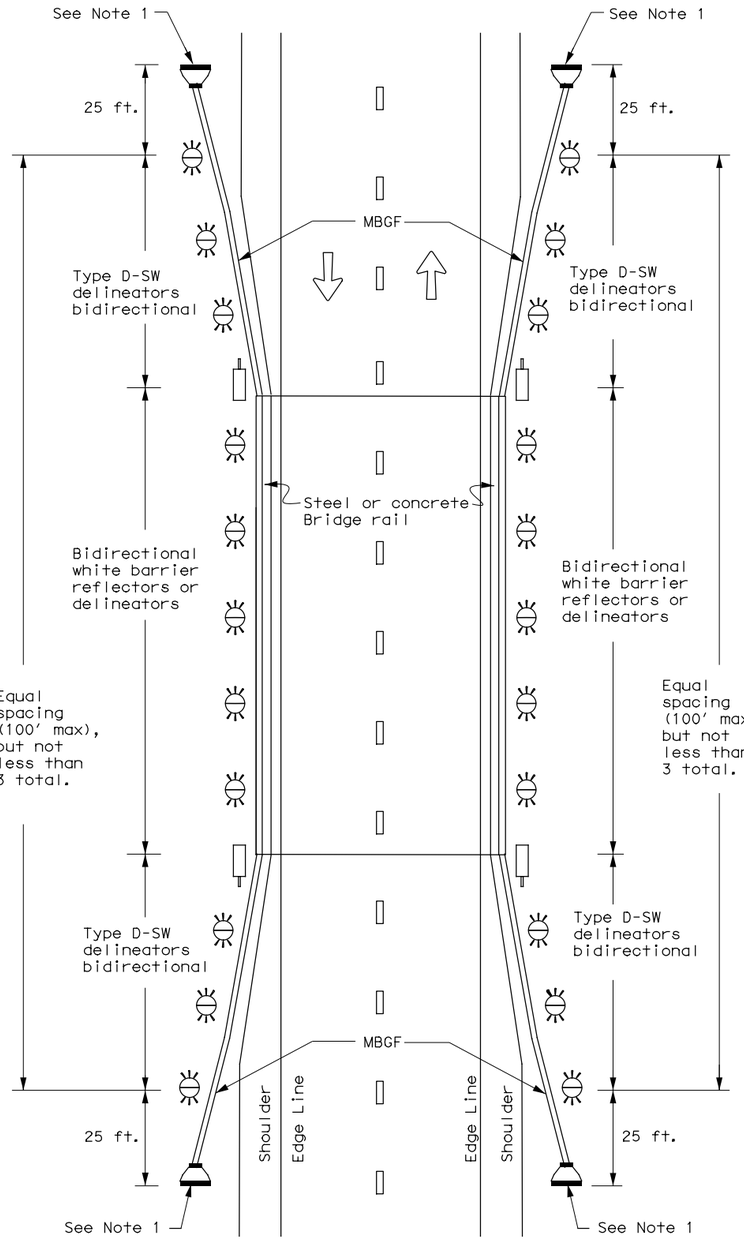
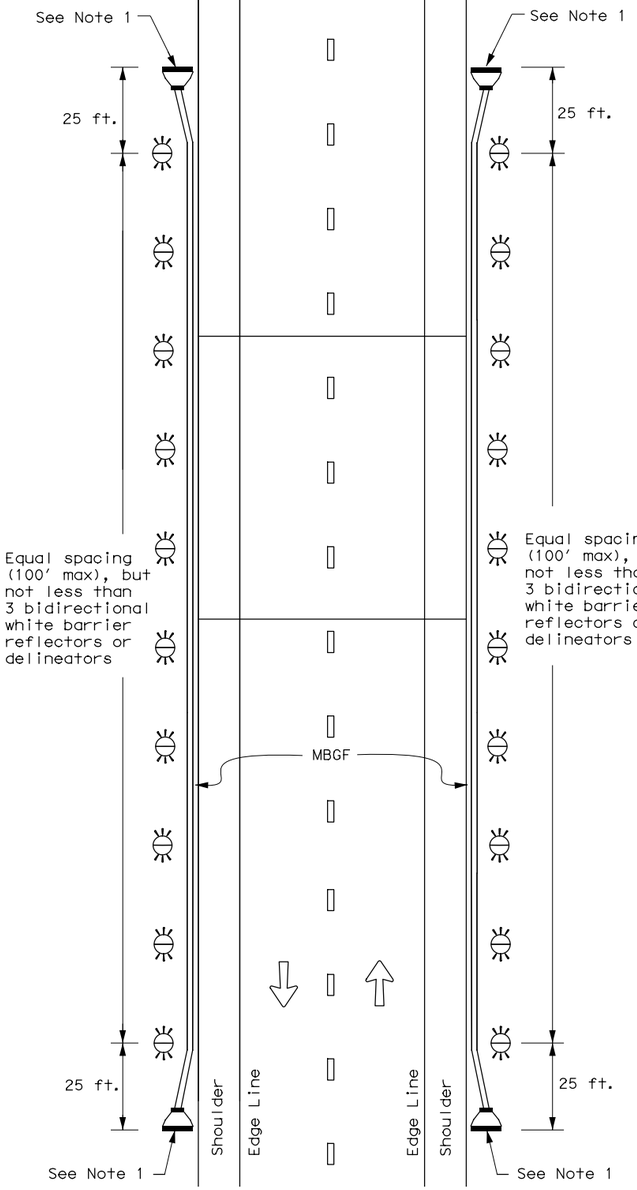
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

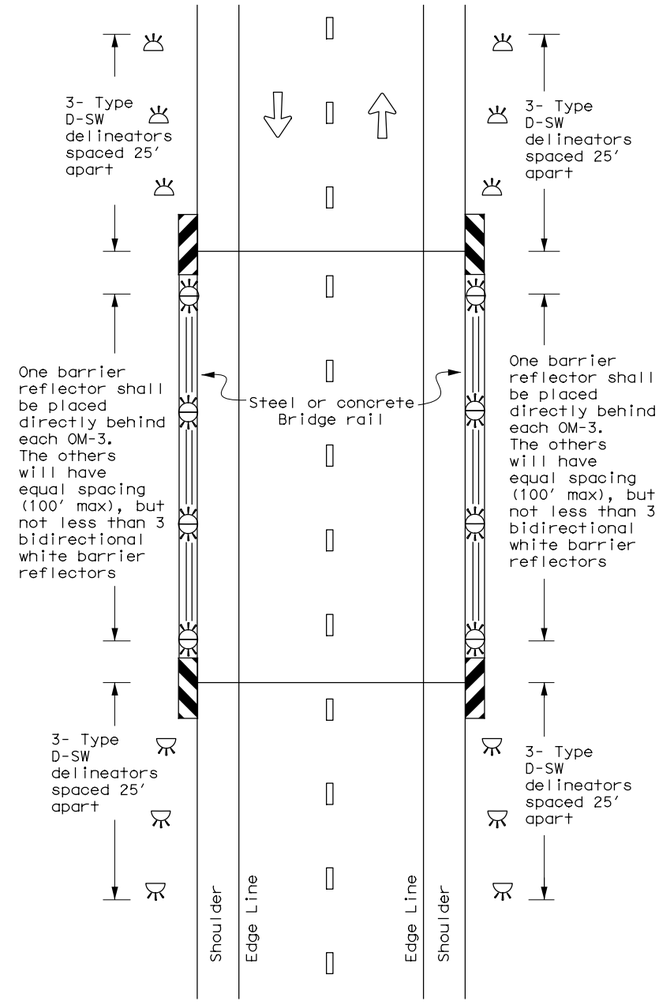
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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	0050	03	114, ETC.	SH 6
7-20	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		65

20E

DATE: 5/31/2023 4:07:13 PM
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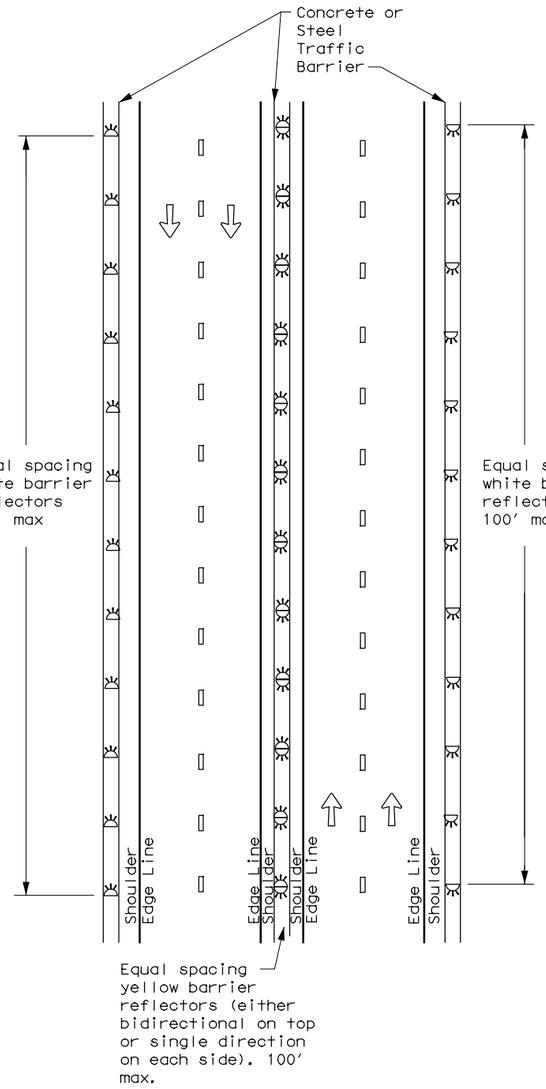
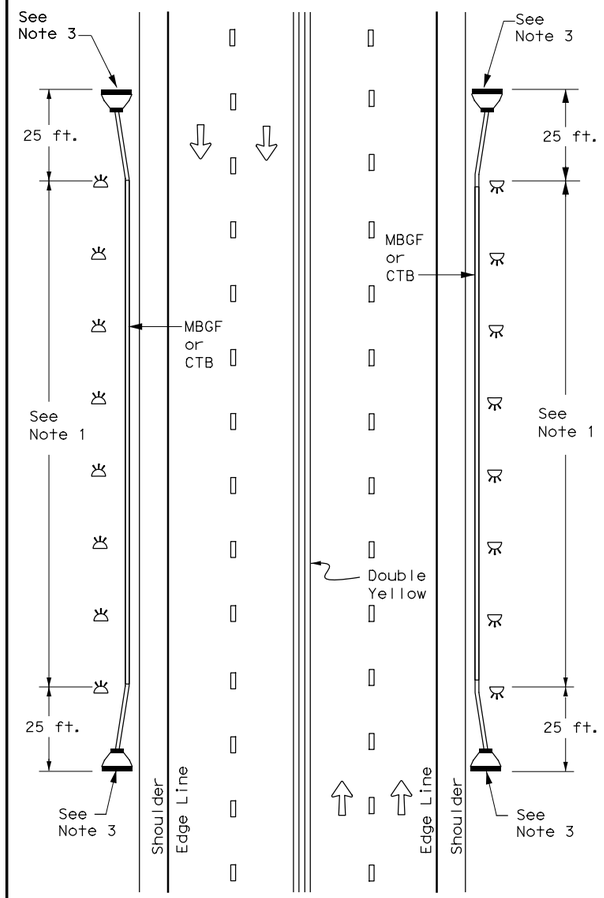
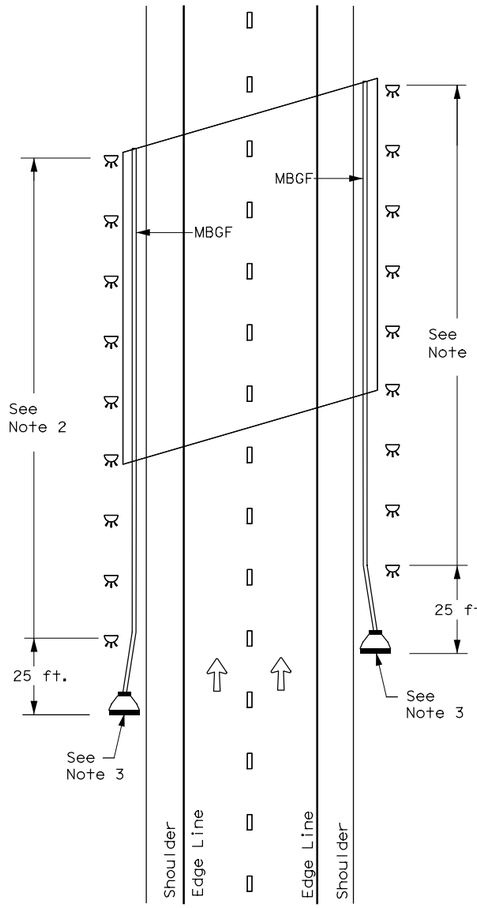
CONTINUOUS CONCRETE OR STEEL BARRIER



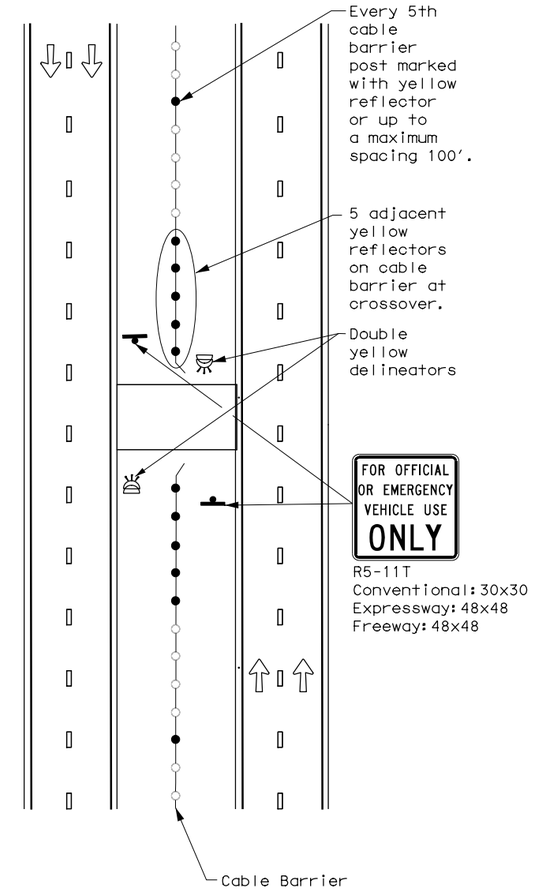
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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
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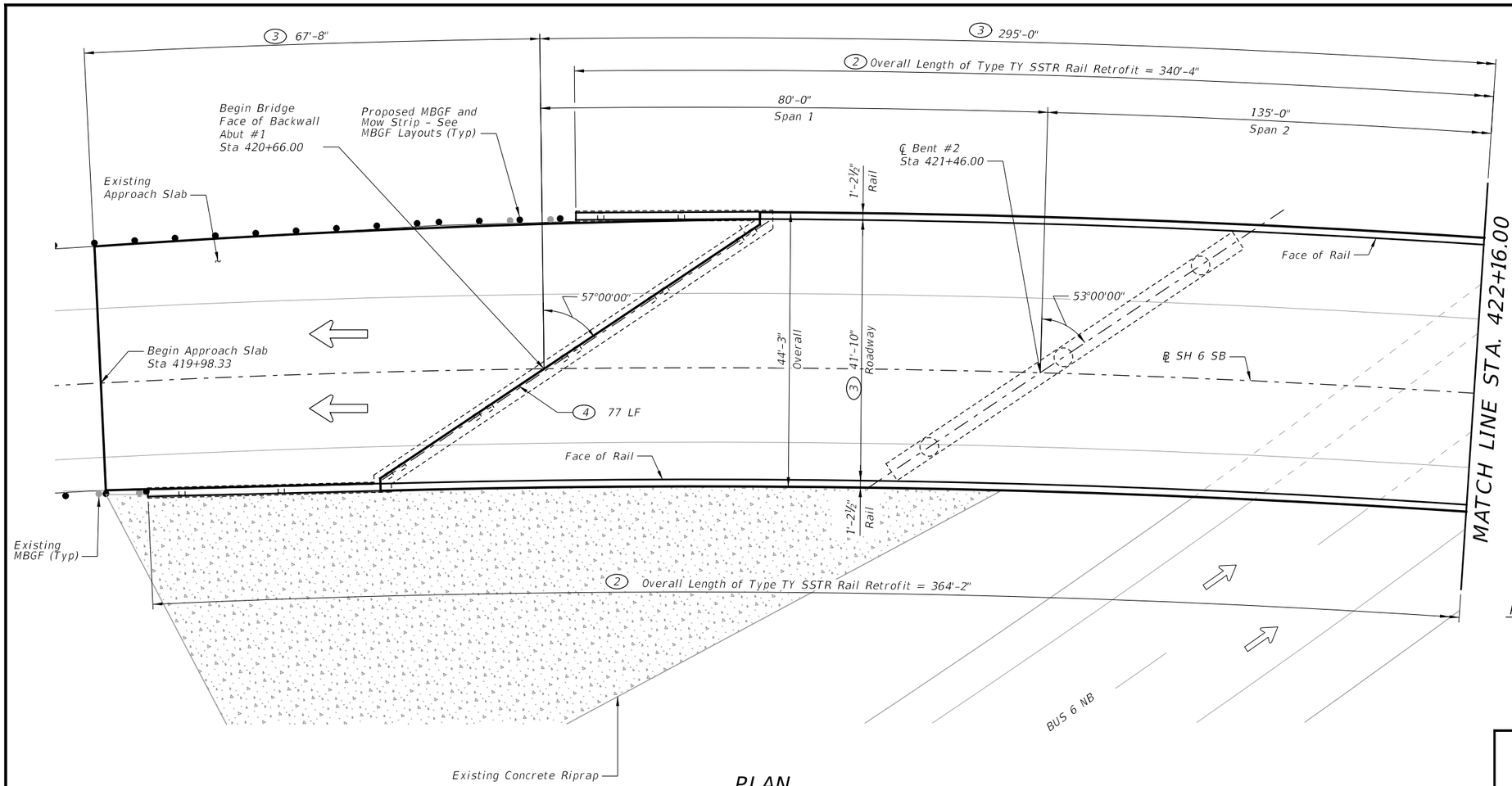
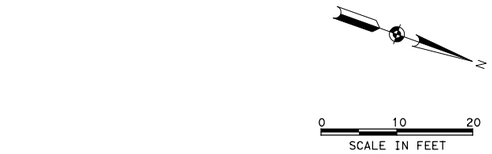
7-20	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		66

20F



PLAN



GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids and all locations shall be approved by the Engineer prior to beginning repair work.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

(XX) XX XX
- XX — Repair No. - See Table of Repairs
- XX — Estimated Repair Quantity At Each Location
- XX — Repair Quantity Unit

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
1	Repair the spall/delamination in the deck surface. See Plan for locations.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	1	SF	Repair as partial-depth deck repairs in accordance with Chapter 3, Section 4 of the TxDOT Concrete Repair Manual
2	Retrofit existing Type T1 rail with a TY SSTR Rail. Remove existing brush curb. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	704.5	LF	See SSTR Rail Retrofit Details on C-RAIL-R (MOD).
		104	REMOVING CONC (CURB)	588	LF	
3	Shot blast deck and approach slabs and apply multi-layer polymer overlay after completion of rail retrofit and curb removal.	483	SHOT BLASTING	1970	SY	See Multi-layer Polymer Overlay Notes on the Miscellaneous Bridge Repair Details sheets. FUAID 596809 is resolved by this repair.
		439	MULTI-LAYER POLYMER OVERLAY	1970	SY	
4	Clean and seal existing joint after completion of rail retrofit, curb removal, and overlay. See Plan for locations.	438	CLEANING AND SEALING EXIST JOINTS(CL7)	134	LF	See WD-CSBJ-22(MOD).
5	Clean and coat steel girders, diaphragms, and bearings with System II Coating in all spans.	446	CLEAN & PAINT EXIST STR (SYSTEM I-A)	1	LS	Clean and coat with System I-A Coating in accordance with Item 446 (approximately 27,000 SF). See Existing Plans sheets for SH 6 SB Overpass at BUS 6 NB for additional information. Existing coating contains lead.
6	Repair the spalls in the substructure units. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	1	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
7	Rout and seal cracks in cap with silicone seal at Abutment 1. See Substructure Repair Isometrics for location.	780	CNC CRCK REPAIR (DISCRETE) (ROUT AND SEAL)	3	LF	Rout and seal cracks per TxDOT Concrete Repair Manual Chapter 3, Section 7, Method 1.
8	Clear Vegetation from Bent 2. See Substructure Repair Isometrics for location.	752	TREE TRIMMING AND BRUSH REMOVAL	35	LF	

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248-1229
972.960.4400

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB BRIDGE LOCATION REPAIR PLAN

NBI# 17-094-0-0050-03-062

SCALE: 1"=20' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6,ETC.
GRAPHICS JCH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LJG	TEXAS	BRY	GRIMES	67
	CONTROL	SECTION	JOB	
CHECK LJG	0050	03	114,ETC.	

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DATE: 6/12/2023
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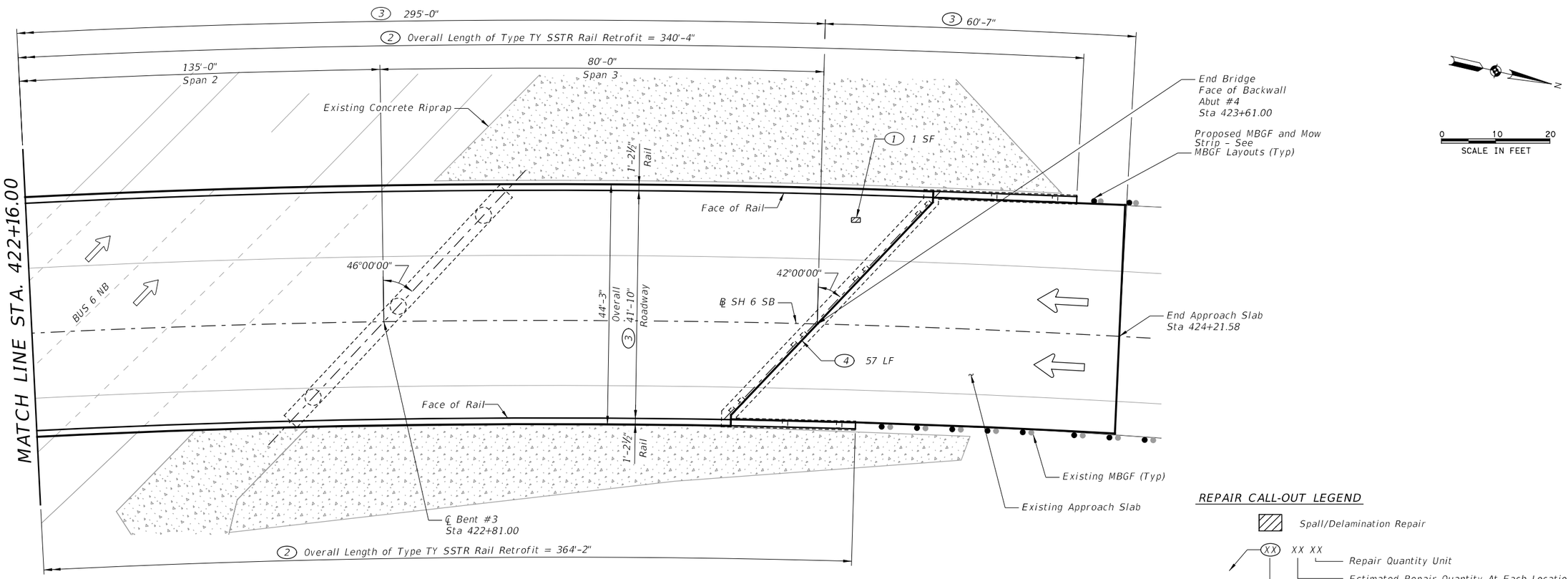


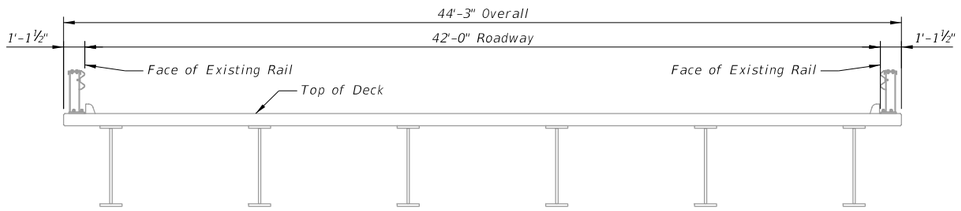
PLAN

REPAIR CALL-OUT LEGEND

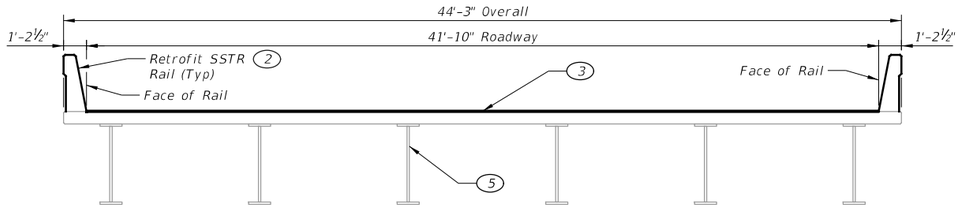
Spall/Delamination Repair

(XX) XX XX

- XX XX — Repair Quantity Unit
- XX XX — Estimated Repair Quantity At Each Location
- (XX) — Repair No. - See Table of Repairs



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248-1229
972.960.4400

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB BRIDGE LOCATION REPAIR PLAN

NBI# 17-094-0-0050-03-062

SCALE: 1"=20' SHEET 2 OF 2

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EB	6			SH 6,ETC.
GRAPHICS JCH	STATE	DISTRICT	COUNTY	SHEET NO.
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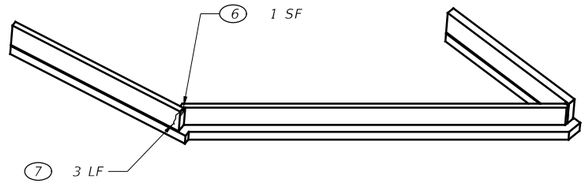


NORTH FACE
Looking South

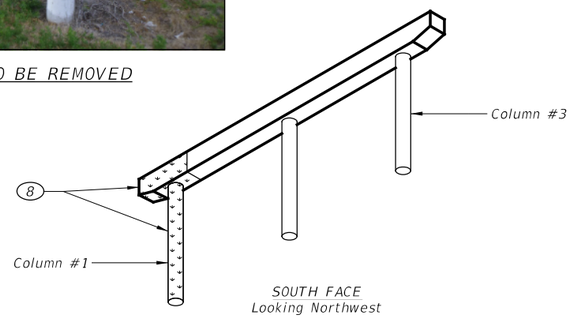
ABUTMENT 1

No Repair

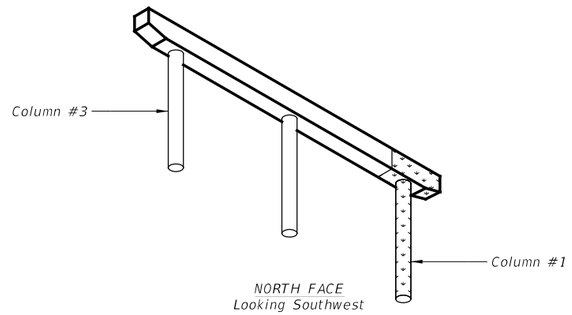
SOUTH FACE
Looking North

ABUTMENT 4

8 VEGETATION TO BE REMOVED

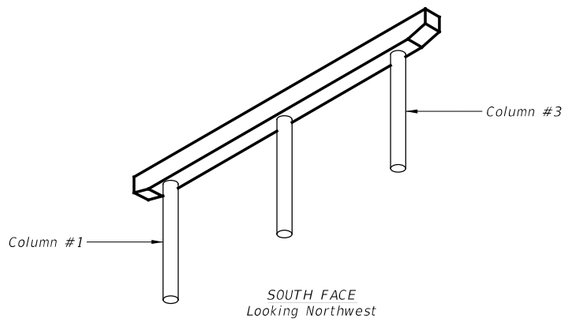


SOUTH FACE
Looking Northwest

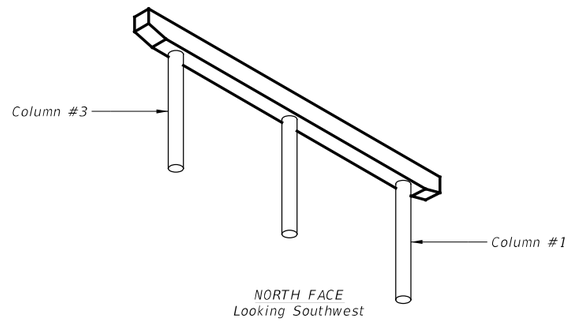


NORTH FACE
Looking Southwest

BENT 2



SOUTH FACE
Looking Northwest



NORTH FACE
Looking Southwest

No Repair

BENT 3

SUBSTRUCTURE REPAIR ISOMETRICS

REPAIR CALL-OUT LEGEND

- Clear Vegetation
- Spall/Delamination Repair
- (XX) XX XX
  - XX XX — Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - (XX) — Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023
Brett RC Allen

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
17111 Preston Road, Suite 300
Dallas, Texas 75248-1229
972.960.4400

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 17-094-0-0050-03-062

SCALE: N.T.S. SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6, ETC.
GRAPHICS RA	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LJG	TEXAS	BRY	GRIMES	69
CHECK LJG	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

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TIME: 8:38:58 AM
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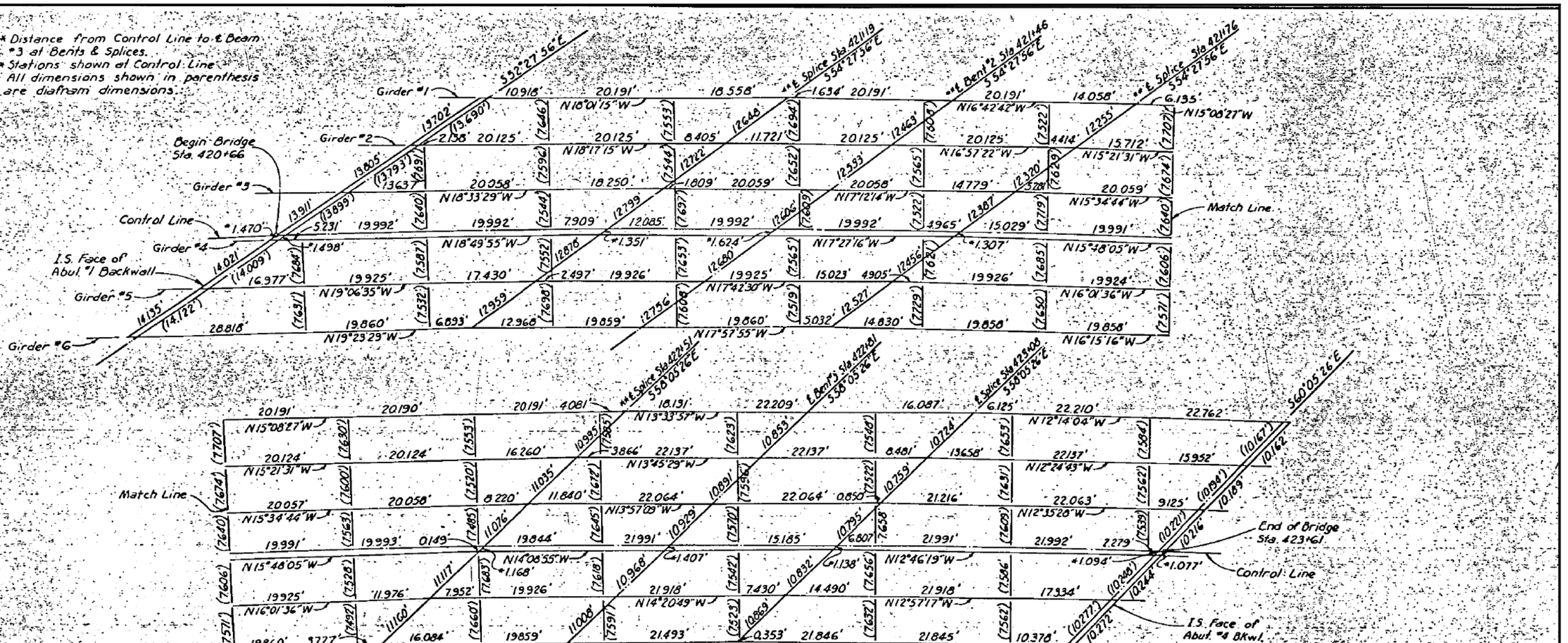
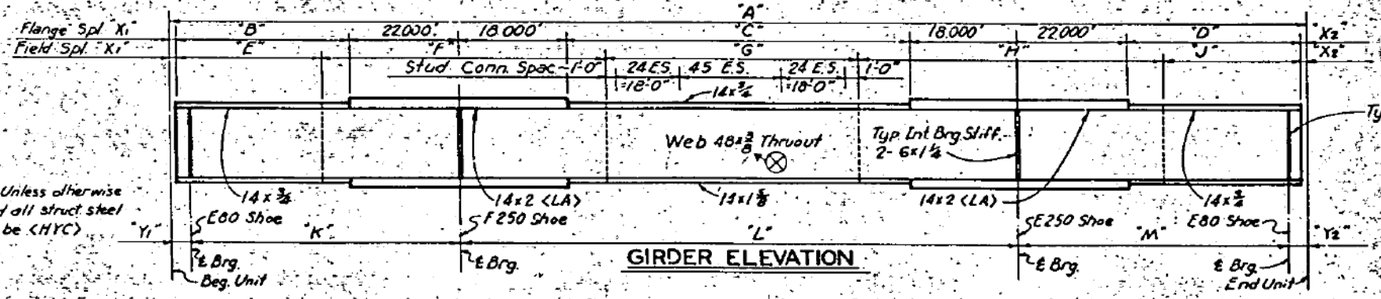
* Distance from Control Line to ℄ Beam #3 at Bents & Splices.
** Stations shown at Control Line
All dimensions shown in parenthesis are diafram dimensions.



FRAMING PLAN



GIRDER ELEVATION

TABLE OF VARIABLE DIMENSIONS

GRDR.	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	"X1"	"X2"	"Y1"	"Y2"
#1	284.053'	53.540'	94.048'	55.684'	49.209'	56.074'	70.788'	56.427'	50.774'	74.561'	130.048'	76.911'	.458'	.323'	1.437'	1.096'
#2	287.766'	54.812'	95.746'	56.427'	50.335'	56.385'	72.220'	56.621'	51.424'	75.824'	131.746'	77.651'	.458'	.323'	1.446'	1.099'
#3	291.547'	56.114'	97.475'	57.177'	51.487'	56.705'	73.675'	56.818'	52.081'	77.115'	133.475'	78.398'	.458'	.323'	1.457'	1.102'
#4	295.400'	57.448'	99.232'	57.939'	52.666'	57.034'	75.153'	57.020'	52.746'	78.439'	135.232'	79.157'	.458'	.323'	1.467'	1.105'
#5	299.327'	58.814'	101.022'	58.710'	53.874'	57.371'	76.656'	57.226'	53.419'	79.794'	137.022'	79.924'	.458'	.323'	1.478'	1.109'
#6	303.331'	60.216'	102.844'	59.490'	55.113'	57.719'	78.183'	57.436'	54.099'	81.185'	138.844'	80.701'	.458'	.323'	1.489'	1.112'

60A

FIELD CHANGE NO. 1

PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB
EXISTING PLANS 295'-0" CONT PLATE GIRDER UNIT
FRAME DETAILS
NBI# 17-094-0-0050-03-062

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
N/A	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CAM	TEXAS	BRY	GRIMES	70
CHECK	CONTROL	SECTION	JOB	
N/A	0050	03	114, ETC.	
CHECK				
LJG				

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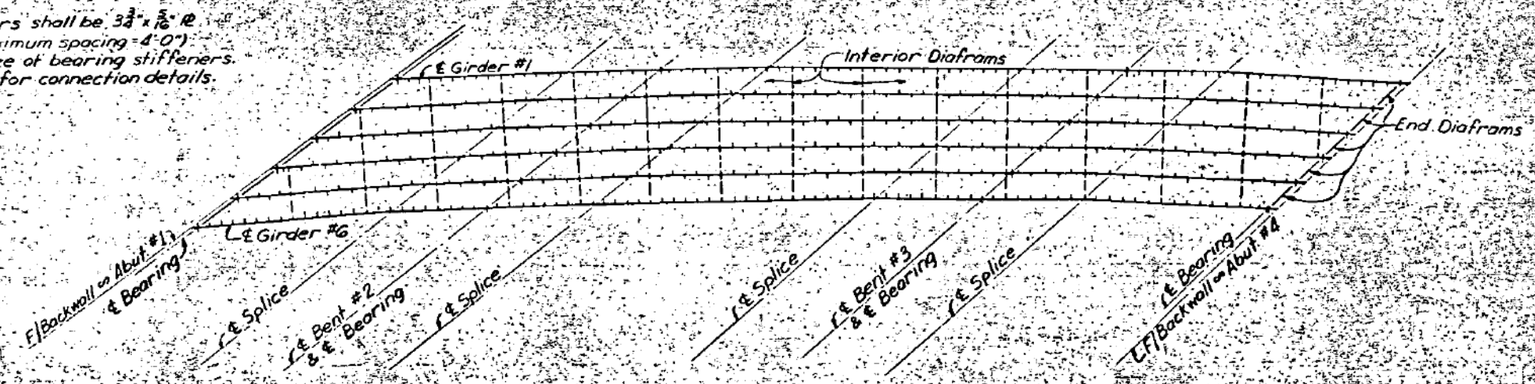
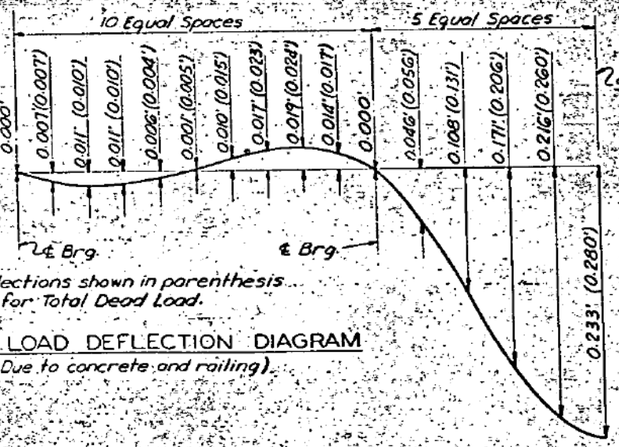
NOTE:
Intermediate stiffeners shall be $3\frac{3}{4}$" x $\frac{5}{16}$" PL and located as shown (maximum spacing = 4'-0").
See Girder Detail for size of bearing stiffeners.
See Plate Girder Details for connection details.

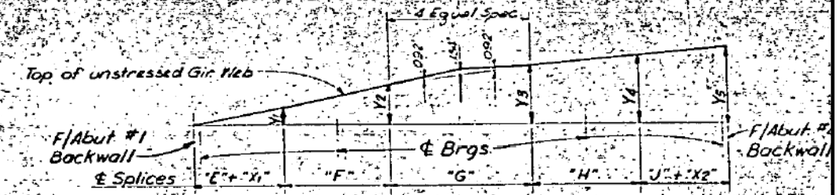


STIFFENER LOCATION
LEFT THRUWAY OVERPASS



NOTE: Deflections shown in parenthesis are for Total Dead Load.

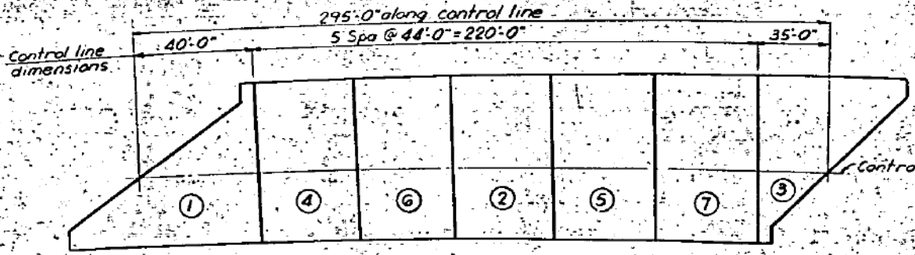
DEAD LOAD DEFLECTION DIAGRAM
(Due to concrete and railing).



See Girder Details for horizontal dimensions.
Blocking includes vertical curve and total dead load deflectio

VERTICAL BLOCKING DIAGRAM

VARIABLE DIMENSIONS					
Girder	Ordinate				
	Y1	Y2	Y3	Y4	Y5
#1	0.774'	1.725'	2.553'	2.914'	3.309'
#2	0.815'	1.793'	2.663'	3.045'	3.460'
#3	0.857'	1.864'	2.779'	3.181'	3.616'
#4	0.902'	1.938'	2.899'	3.322'	3.778'
#5	0.949'	2.015'	3.025'	3.469'	3.947'
#6	0.998'	2.095'	3.155'	3.621'	4.121'



CONCRETE PLACING SEQUENCE

Note: Variation of the placing sequence and location of construction joints will be permitted.
Segmental placements may be lengthened thereby reducing the number of joints. Approval of the Engineer will be required.
Continuous placement of concrete with transverse machine screeding and proper retardation will be permitted.

PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB
EXISTING PLANS 295'-0" CONT PLATE GIRDER UNIT
MISC DETAILS
NBI# 17-094-0-0050-03-062

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
N/A	6			SH 6, ETC.
GRAPHICS CAM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK N/A	TEXAS	BRY	GRIMES	71
CHECK LJG	CONTROL 0050	SECTION 03	JOB 114, ETC.	

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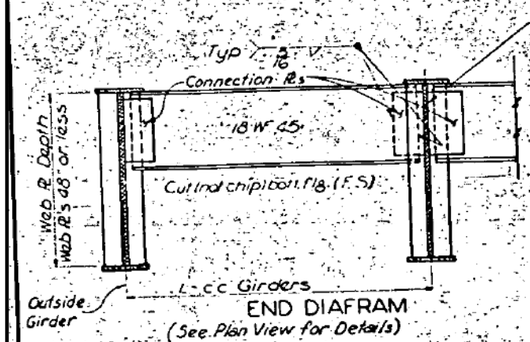


END DIAFRAM
(See Plan View for Details)

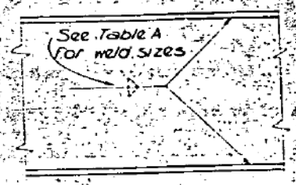
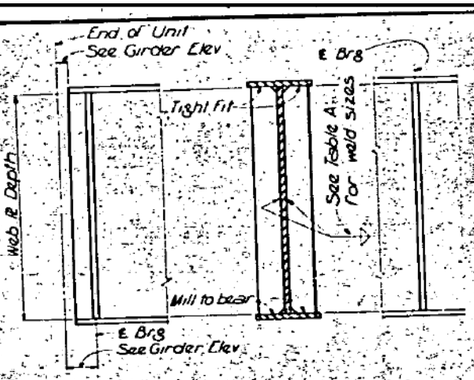


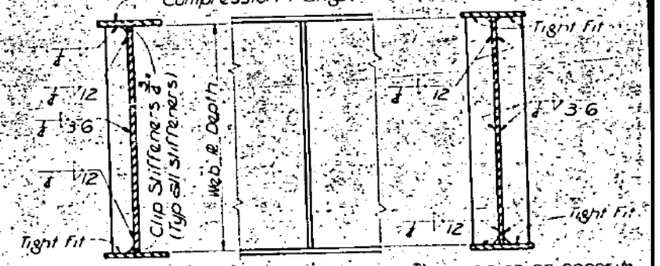
TABLE A	
Plate Thickness if Fl8 or stiffener	Weld Size
Over ¼" to ½"	¼"
Over ½" to 1¼"	⅜"
Over 1¼"	½"

FLANGE TO WEB WELDING

Note If the automatic submerged arc process is used, either the fillet welds shown or a square butt weld may be used between flange and web at the fabricators option



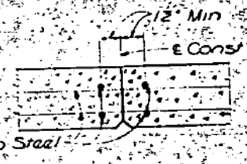
END BEARINGS



INTERIOR BEARINGS

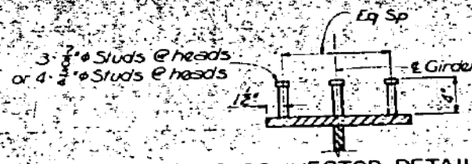
INTERMEDIATE

STIFFENER DETAILS
(See Framing Plan for size & location)



CONSTRUCTION JOINT DETAIL

Chamfer all const jts or open jts from top of slab to outside of beam or Armor Pl.



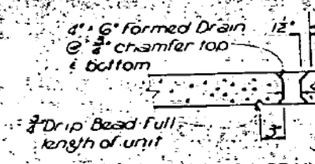
STUD CONNECTOR DETAILS

Notes: Studs shall be Electric arc end-welded to the flanges with complete fusion

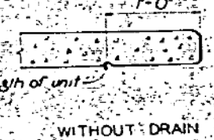
Unless otherwise shown on the Girder Elevation, stud connectors shall be spaced as follows:

For HS 20 Loading, stud connectors shall be spaced on all girders at 4'0" centers throughout the length of the gir except that they shall be omitted within a distance of ¼ the span on each side of each interior support for continuous units.

For H15 & H20 Loading, stud connectors shall be spaced on the outside girders only at 10'0" centers on the portions of the girder as stated above for HS 20 Loading.



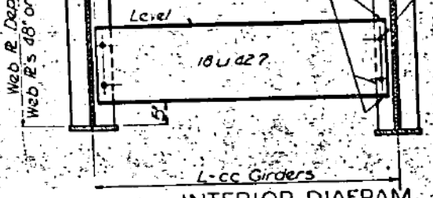
WITH DRAIN



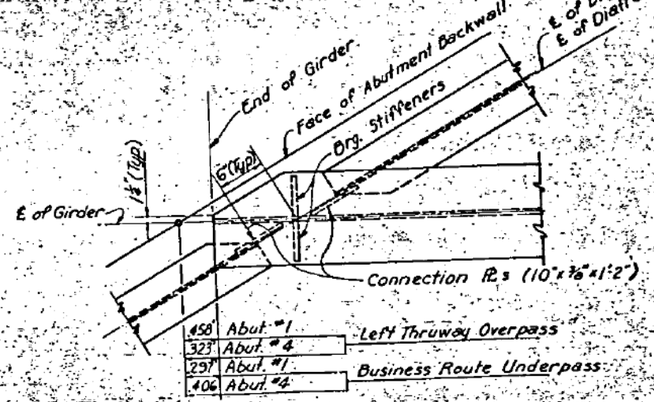
WITHOUT DRAIN

Note Drains, if any, to be located as directed by the field engineer No drains shall be permitted over rdwys & RR tracks

EDGE OF SLAB DETAILS



INTERIOR DIAFRAM



458'	Abut. #1	Left Thruway Overpass
323'	Abut. #4	
297'	Abut. #1	Business Route Underpass
406'	Abut. #4	

PLAN OF END DIAFRAM AND END OF GIRDER

70

PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB EXISTING PLANS PLATE GIRDER DETAILS

NBI# 17-094-0-0050-03-062

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
N/A	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CAM	TEXAS	BRY	GRIMES	
CHECK	CONTROL	SECTION	JOB	72
N/A	0050	03	114, ETC.	
CHECK				
LJG				

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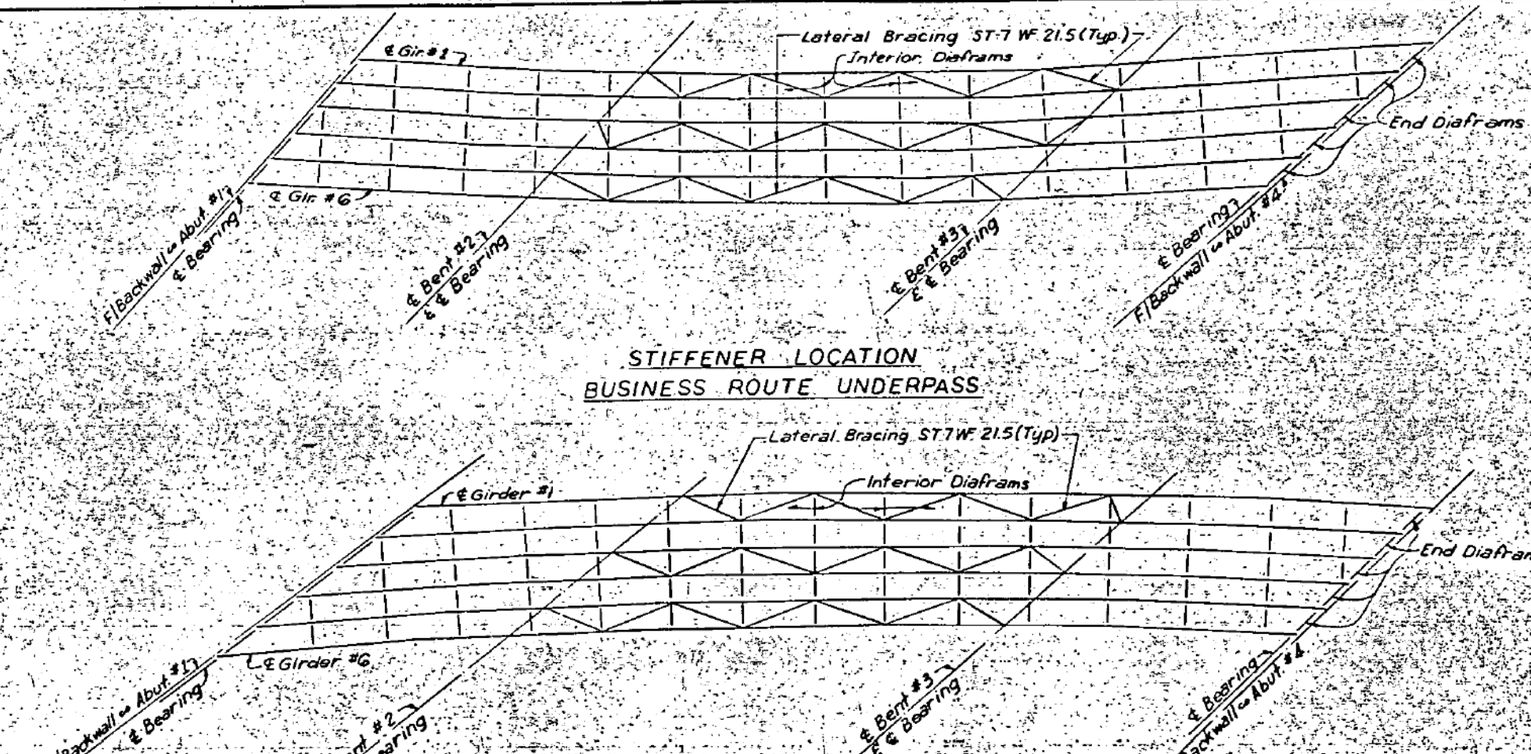
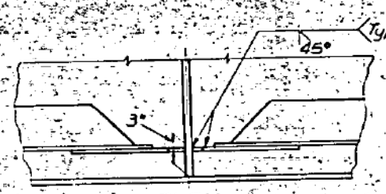
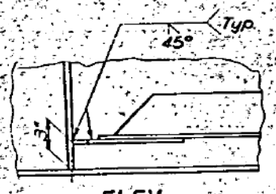


STIFFENER LOCATION
BUSINESS ROUTE UNDERPASS

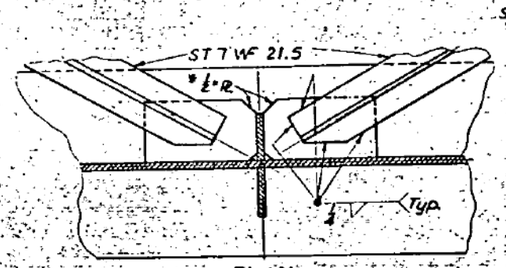
STIFFENER LOCATION
LEFT THRUWAY OVERPASS



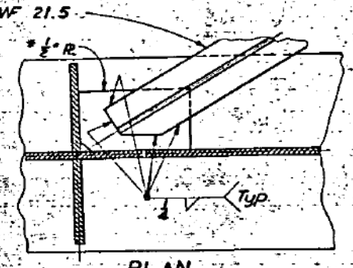
ELEV.



ELEV.



PLAN
AT INTERIOR STIFF.

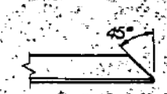


PLAN
AT BEARING STIFF.

BOTTOM LATERAL CONNECTION DETAILS

Bottom lateral bracing to be used only where shown on framing plan.

* Size of gusset shall be sufficient to allow at least 36" of a ¼" Fillet weld.



Clip outstanding leg of all angles on diaframs. Clip web on all bottom lateral bracing.

Additional Structural Steel required for lateral bracing.

Str. Stl. (Gir.~HYC)
Business Route Underpass ∞ 10,000 #
Left Thruway Overpass ∞ 9,700 #

70A

Field Change No.1

PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB EXISTING PLANS PLATE GIRDER DETAILS LATERAL BRACING

NBI# 17-094-0-0050-03-062

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
N/A	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK	CONTROL	SECTION	JOB	
N/A	0050	03	114, ETC.	
CHECK				
LJG				

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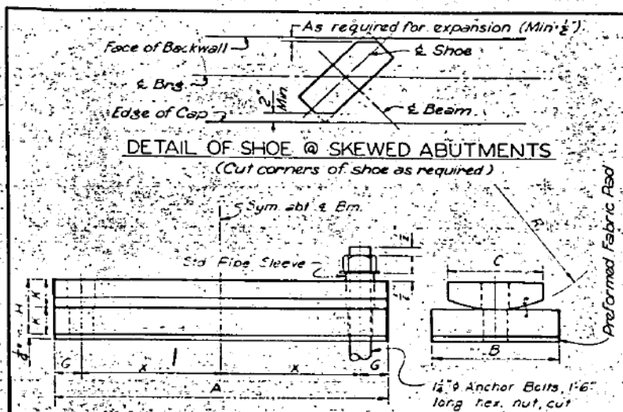


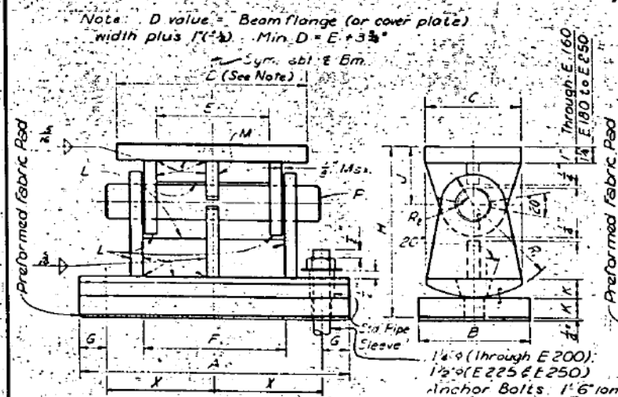
DETAIL OF SHOE @ SKEWED ABUTMENTS

(Cut corners of shoe as required)

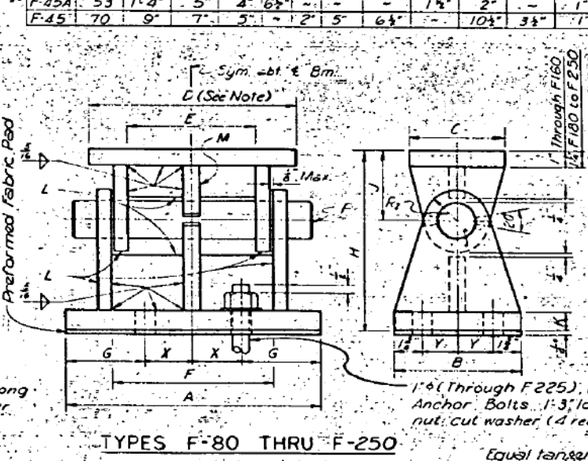
** Note: This type of shoe shall not be used unless specifically called for on bridge layout or span details.

TYPES F-45A THRU F-160A

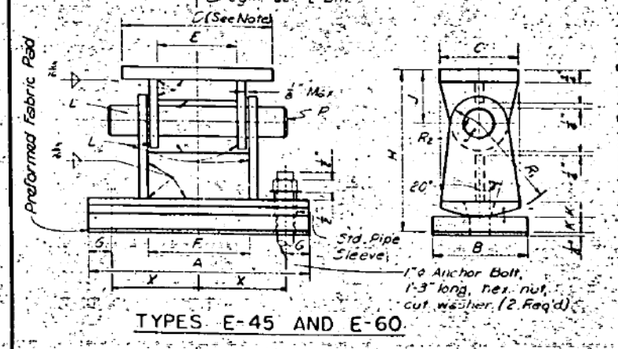
Note: D value = Beam flange (or cover plate) width plus ½" (±⅛"). Min. D = E + 3⅜"



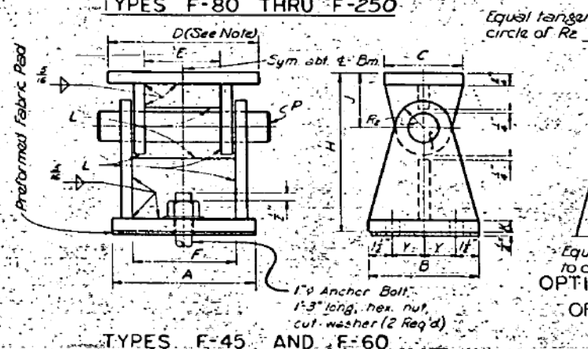
TYPES E-80 THRU E-250



TYPES F-80 THRU F-250



TYPES E-45 AND E-60

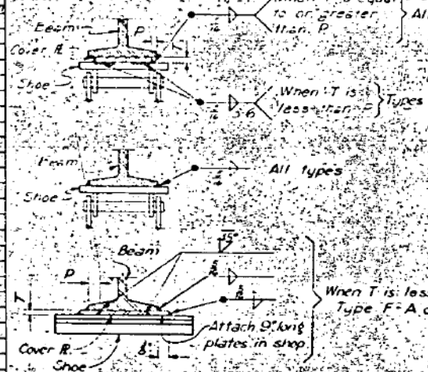


TYPES F-45 AND F-60

TABLE OF VARIABLE DIMENSIONS

Shoe	Wt.(#)	A	B	C	X	Y	E	F	G	H	J	K	L	M	R_1	R_2	P	Anchor Bolt Projection
E-45	86	1'-2"	6"	5"	5½	~	5"	6½"	1¾"	10¾"	3½"	1"	¾" R	~	6"	1¾"	2'-6 x 10¾" Pin, ⅞" Cotters	4¾"
E-60	111	1'-3"	6"	5"	6"	~	4½"	6½"	1¾"	11"	3¾"	1¼"	¾" R	~	6"	2"	2'-9 x 11¾" Pin, ⅞" Cotters	4¾"
E-80	151	1'-5"	7"	6"	6½	~	7½"	9"	1¾"	11"	3¾"	1¼"	¾" R	¾" R	6"	2"	2'-9 x 1'-1¼" Pin, ⅞" Cotters	5"
E-100	161	1'-6"	7"	6"	7⅛	~	7½"	9½"	1¾"	11¾"	4¼"	1½"	¾" R	¾" R	6"	2"	2'-9 x 1'-2" Pin, ⅞" Cotters	5"
E-120	203	1'-9"	7"	6"	8¾	~	8½"	10"	1¾"	1'-0"	4¾"	1½"	¾" R	1" R	6"	2½"	2'-9 x 1'-3" Pin, ⅞" Cotters	5½"
E-140	261	1'-7"	9"	7"	10¼	~	7½"	9½"	1¾"	1'-2½"	5¾"	1½"	¾" R	1" R	8"	2½"	2'-9 x 1'-2½" Pin, ⅞" Cotters	6"
E-160	291	1'-9"	9"	7"	10¾	~	7½"	9½"	2"	1'-2½"	6¾"	1½"	¾" R	1" R	8"	2½"	3'-9 x 1'-2½" Pin*	6"
E-180	340	1'-9"	9"	7"	8½	~	7⅛"	10"	2"	1'-4"	5"	2"	1⅛"R	1⅛"R	9"	2½"	3'-0 x 1'-3¼" Pin*	6¼"
E-200	390	1'-9"	10"	8"	8½	~	7¼"	10"	2"	1'-5"	5"	2"	1¼"R	1¼"R	10"	2½"	3'-9 x 1'-3" Pin*	6½"
E-225	490	1'-9"	11"	9"	8½	~	6⅜	10"	2"	1'-6⅛"	5"	2⅛"	1½"R	1½"R	11"	2½"	3'-0 x 1'-3¾" Pin*	7¼"
E-250	610	1'-10"	12"	10"	8⅜	~	7¼"	10½"	2⅛"	1'-8"	5½"	2¼"	1½"R	1½"R	12"	2¾"	3½" ø x 1'-4¼" Pin*	7¾"
F-60	89	10"	7"	5"	~	2"	4½"	6½"	~	11"	3¾"	1¼"	¾" R	~	~	2"	2'-9 x 1'-1¾" Pin, ⅞" Cotters	3"
F-80	121	1'-0"	7"	6"	2½	1¾	7½"	9"	¾"	11"	3¾"	1¼"	¾" R	¾" R	~	2"	2'-9 x 1'-1¾" Pin, ⅞" Cotters	3"
F-100	136	1'-1"	8"	6"	2⅜	2¼	7½"	9½"	3½"	11¾"	4¾"	1¾"	¾" R	⅞" R	~	2"	2'-9 x 1'-2" Pin, ⅞" Cotters	3"
F-120	168	1'-4"	8"	6"	3"	2¼	8½"	10½"	¾"	1'-0"	4¾"	1¾"	¾" R	1" R	~	2¼"	2'-9 x 1'-3" Pin, ⅞" Cotters	3¼"
F-140	212	1'-4"	9"	7"	2⅜	2⅜	7½"	9½"	3½"	1'-2½"	4¾"	1¾"	¾" R	1" R	~	2½"	2'-9 x 1'-2¾" Pin, ⅞" Cotters	3½"
F-160	242	1'-4"	10"	7"	2⅝	3⅛	7½"	9½"	3½"	1'-2½"	4¾"	1¾"	1" R	1" R	~	2½"	3'-0 x 1'-2½" Pin*	3½"
F180	310	1'-5"	11"	7"	2⅝	3⅜	7"	9¾"	3⅝"	1'-4"	5"	2"	1¼"R	1¼"R	~	2½"	3'-0 x 1'-3" Pin*	3¾"
F200	350	1'-5"	12"	8"	2⅝	4⅛	7"	9¾"	3¾"	1'-5"	5"	2"	1¼"R	1¼"R	~	2½"	3'-0 x 1'-3" Pin*	3¾"
F225	450	1'-6"	13"	9"	2⅝	4⅜	6⅜"	10"	6⅛"	1'-6⅛"	5"	2⅛"	1½"R	1½"R	~	2½"	3'-0 x 1'-3¾" Pin*	4"
F250	540	1'-8"	13"	10"	4⅛	4⅛	7¾"	11"	5⅛"	1'-8"	5½"	2¼"	1½"R	1½"R	~	2¾"	3½" ø x 1'-4¼" Pin*	4½"
F-60A	66	1'-5"	5"	4"	1"	~	~	~	~	11"	2½"	~	~	~	6"	~	~	5"
F-80A	83	1'-7"	6"	5"	1¾	~	~	~	~	1¼"	2½"	~	1½"	~	6"	~	~	5"
F-100A	102	1'-8"	6"	5"	8⅛	~	~	~	~	1½"	3"	~	1½"	~	6"	~	~	5½"
F-120A	106	1'-9"	6"	5"	8¼	~	~	~	~	1½"	3"	~	1½"	~	6"	~	~	5½"
F-140A	132	1'-9"	7"	6"	8½	~	~	~	~	1¾"	3¼"	~	1¾"	~	8"	~	~	5¾"
F-160A	152	1'-9"	8"	6"	8⅜	~	~	~	~	1¾"	3½"	~	1¾"	~	8"	~	~	6"
F-45A	53	1'-4"	5"	4"	6½	~	~	~	~	1¼"	2"	~	~	1"	~	~	6"	~	4½"
F-45	70	9"	7"	5"	~	2"	5"	6½"	~	~	10½"	3½"	1"	⅝"R	~	~	1½"	2'-9 x 10⅝" Pin & Cotters	2¾"

* With recessed pin nuts.



CONNECTIONS TO BEAMS

GENERAL NOTES:

Material for shoes shall conform to Specification "Metal for Structures" except:

Cast ductile iron will not be permitted for top bolsters of shoes. Top bolsters shall be structural steel or cast steel.

If cast ductile iron is used for portions of shoes other than top bolsters, then shop welding will not be permitted.

Surface finishes shall conform to A.S.A. Standard. Finishes as follows:

Pins and Pin Holes 125

Rockers 250

Holes in base plates shall be ⅛" larger than the anchor bolt size.

Bottoms of holes in rocker plates shall be ½" larger than the anchor bolt size.

The nominal diameter of the standard pipe sleeves for expansion shoes shall be the same as the anchor bolt size.

Anchor bolt nuts shall be tightened and threads burred.

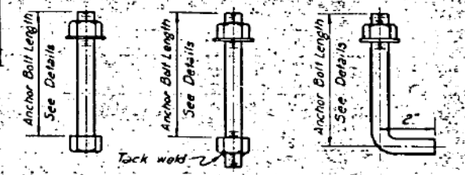
Titles under shoe details indicate type of shoe and design capacity, i.e.:

F-45 - Fixed shoe with a capacity of 45 kips.

F-45A - Fixed shoe, alternate, with a capacity of 45 kips.

E-45 - Expansion shoe with a capacity of 45 kips.

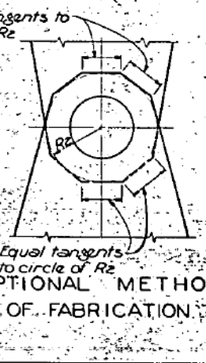
Payment for shoes will be made on the basis of the weights shown in the table regardless of the actual weights. Anchor bolts are included in weights shown. Weld metal is not included.



ALTERNATE ANCHOR BOLTS

Anchor bolts shall not be galvanized nor painted.

Note: Each shoe shall be placed on a preformed fabric pad as specified in Item 441.33(2) except that the pad thickness shall be ¾" (±⅛"). When the masonry is placed below grade, the bearing seat area shall be raised to grade on a bed of Portland cement mortar as specified in Item 441.33(6). No direct payment will be made for preformed fabric pads, they will be considered subsidiary to the Item Structural Steel (Shoe & Armor Jt). Preformed fabric pads shall consist of 8 ounce duck and high quality natural rubber in 16 (±2) plies.



OPTIONAL METHOD OF FABRICATION

PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

SH 6 SB OVERPASS AT BUS 6 NB
EXISTING PLANS
STANDARD SHOES
NBI# 17-094-0-0050-03-062

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
N/A	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CAM	TEXAS	BRY	GRIMES	74
CHECK	CONTROL	SECTION	JOB	
N/A	0050	03	114, ETC.	
CHECK				
LJG				

Rev 12-66 added 1" Preformed Fabric Pad

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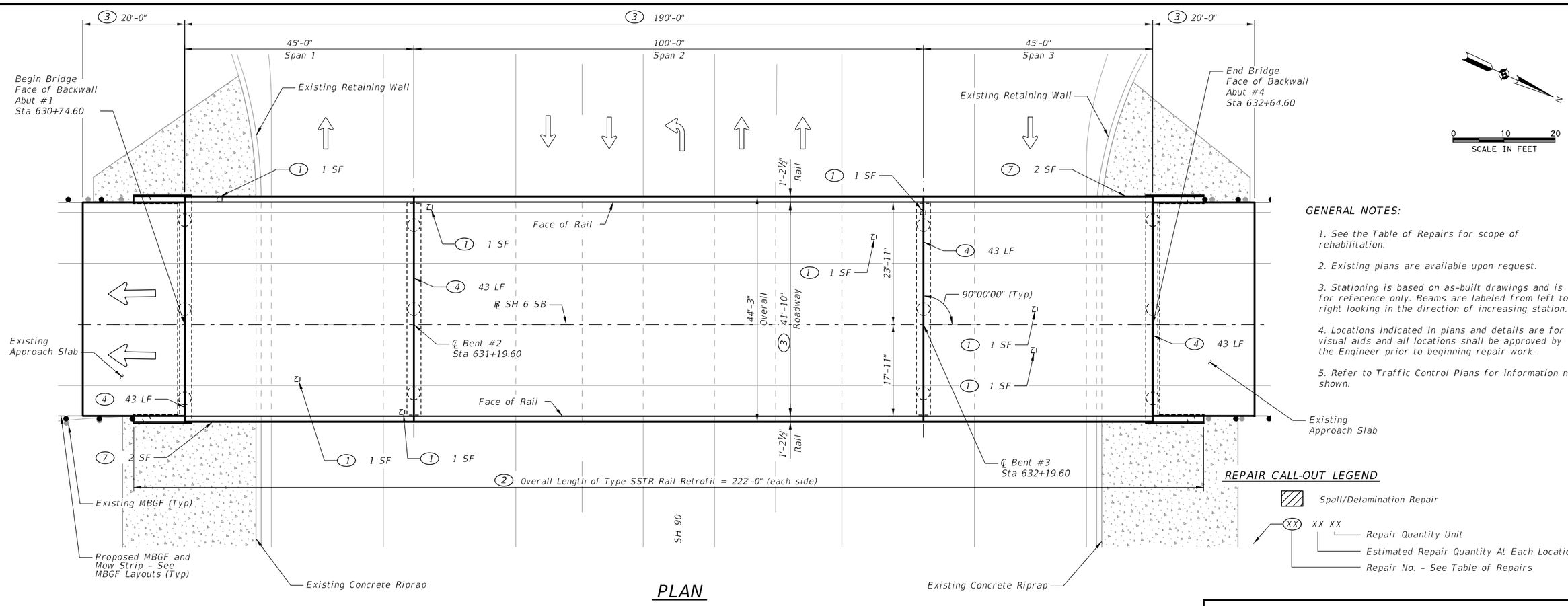
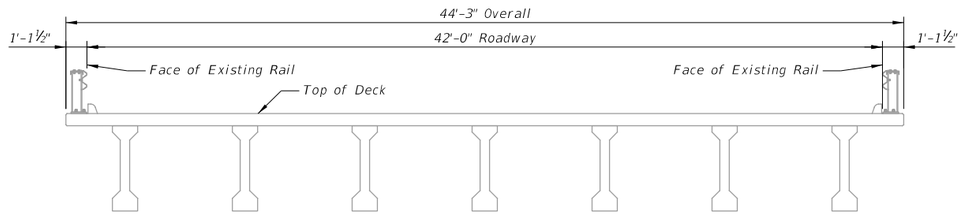
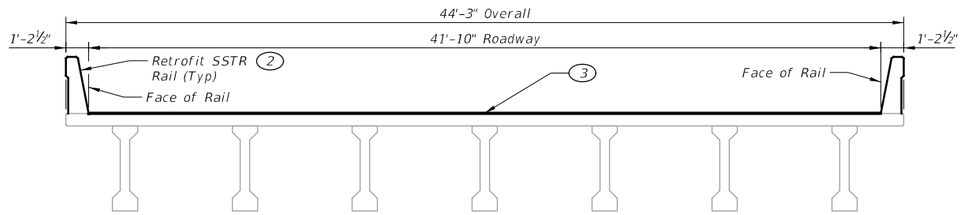


PLAN



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids and all locations shall be approved by the Engineer prior to beginning repair work.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

(XX) XX XX
- XX XX — Repair Quantity Unit
- XX XX — Estimated Repair Quantity At Each Location
- (XX) — Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED
PROFESSIONAL ENGINEER
06/02/2023
Brett RC Allen

NO.	REVISION	BY	DATE

HDR
Firm Registration No. F-754
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Dallas, Texas 75248-1229
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Texas Department of Transportation

SH 6 SB OVERPASS AT SH 90 BRIDGE LOCATION REPAIR PLAN

NBI# 17-094-0-0050-03-074

SCALE: 1"=20' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6,ETC.
GRAPHICS JCH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LJG	TEXAS	BRY	GRIMES	75
CHECK LJG	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

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TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Repair the spalls/delaminations in the deck soffit. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	8	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(2)	Retrofit existing Type T1 rail with a TY SSTR Rail. Remove existing brush curb. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	444	LF	See SSTR Rail Retrofit Details on C-RAIL-R (MOD).
		104	REMOVING CONC (CURB)	380	LF	
(3)	Shot blast deck and approach slabs and apply multi-layer polymer overlay after completion of rail retrofit and curb removal.	483	SHOT BLASTING	1070	SY	See Multi-layer Polymer Overlay Notes on the Miscellaneous Bridge Repair Details sheets. FUAID 596810 is resolved by this repair.
		439	MULTI-LAYER POLYMER OVERLAY	1070	SY	
(4)	Clean and seal existing joint after completion of rail retrofit, curb removal, and overlay. See Plan for locations.	438	CLEANING AND SEALING EXIST JOINTS(CL7)	172	LF	See WD-CSBJ-22(MOD).
(5)	Repair the impact spalls and failing impact repair patches in the beams. See Table of Beam Repairs for locations. Apply carbon fiber reinforced polymer to the bottom flange of the beam after concrete repairs.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	23	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2. Use concrete repair materials on beams with a minimum 3-day compressive strength of 6,000 psi. See WD-BPBW-22 (MOD).
		786	CARBON FIBER REINF POLYMER PROTECTION	76	SF	
(6)	Repair the substructure spalls. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	8	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(7)	Remove existing incorrect NBI number and paint the correct NBI number on the structure. See Plan for locations.	427	CONCRETE PAINT FINISH	4	SF	Paint the correct NBI number on the bridge at two locations. See Painting NBI Numbers (MOD).

(5) TABLE OF BEAM REPAIRS

Span	Beam	Location	Spall Repair Quantity	CFRP Protection Quantity
2	1	1/4 Span	2 SF	16 SF
			1 SF	12 SF
		Midspan	18 SF	32 SF
		Bent 3	2 SF	16 SF
TOTAL			23 SF	76 SF

(7) REMOVAL AND REPLACEMENT OF PAINTED NBI NUMBER

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023
Brett RC Allen

NO.	REVISION	BY	DATE

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Texas Department of Transportation

SH 6 SB OVERPASS AT SH 90 BRIDGE LOCATION REPAIR PLAN

NBI# 17-094-0-0050-03-074

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JCH	TEXAS	BRY	GRIMES	76
CHECK	CONTROL	SECTION	JOB	
LJG	0050	03	114,ETC.	
CHECK				
LJG				

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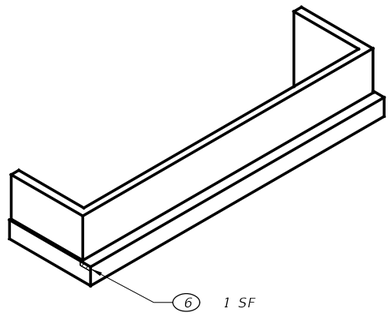
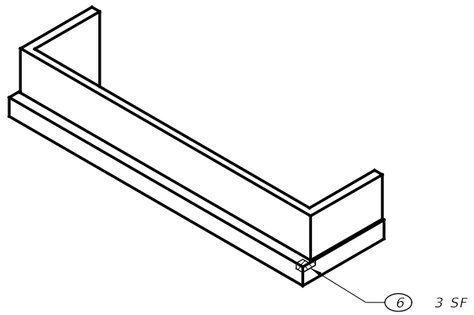


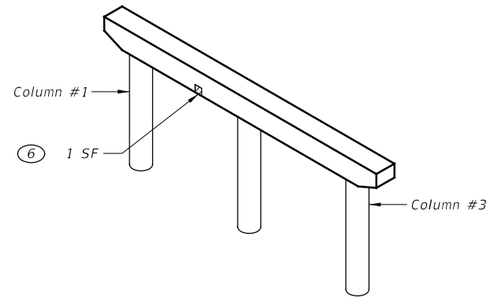
NORTHWEST FACE
Looking South

ABUTMENT 1



SOUTHEAST FACE
Looking West

ABUTMENT 4



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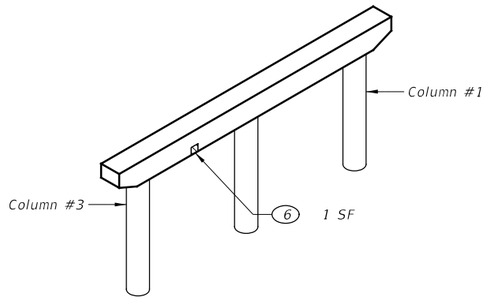
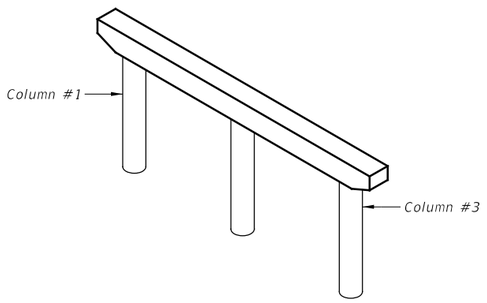
Looking West

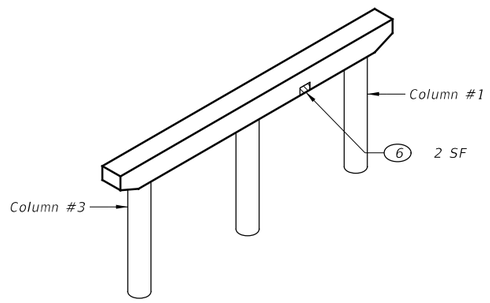


NORTHWEST FACE
Looking South

BENT 3



SOUTHEAST FACE
Looking West



NORTHWEST FACE
Looking South

BENT 2

REPAIR CALL-OUT LEGEND

SUBSTRUCTURE REPAIR ISOMETRICS

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023

NO.	REVISION	BY	DATE

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Texas Department of Transportation

SH 6 SB OVERPASS AT SH 90
SUBSTRUCTURE REPAIR ISOMETRICS
NBI# 17-094-0-0050-03-074

SCALE: N.T.S. SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JCH	TEXAS	BRY	GRIMES	77
CHECK	CONTROL	SECTION	JOB	
LJG	0050	03	114, ETC.	
CHECK				
LJG				

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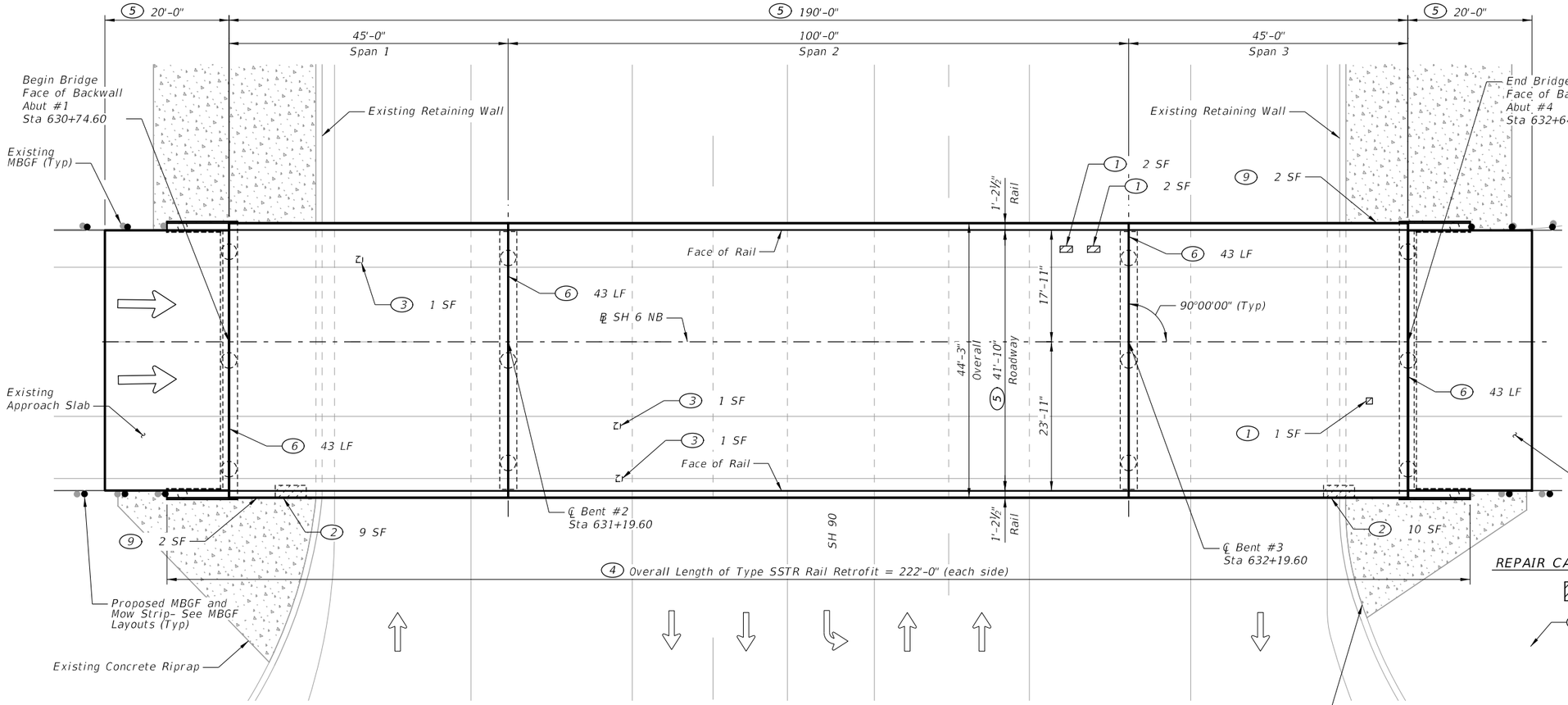
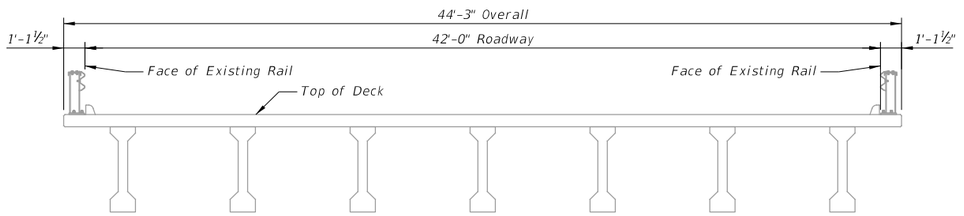


PLAN



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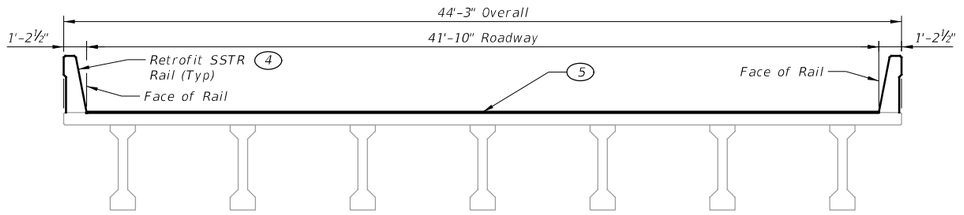

PROPOSED TYPICAL SECTION

GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids and all locations shall be approved by the Engineer prior to beginning repair work.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

(XX) XX XX
- XX XX — Repair Quantity Unit
- Estimated Repair Quantity At Each Location
- (XX) — Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023

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Texas Department of Transportation

SH 6 NB OVERPASS AT SH 90 BRIDGE LOCATION REPAIR PLAN

NBI# 17-094-0-0050-03-075

SCALE: 1"=20' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6, ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JCH	TEXAS	BRY	GRIMES	
CHECK	CONTROL	SECTION	JOB	78
LJG	0050	03	114, ETC.	
CHECK				
LJG				

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TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Repair the spalls/delaminations in the deck surface. See Plan for locations.	429	CONC STR REPAIR(DECK REP(PART DEPTH))	5	SF	Repair as partial-depth deck repairs in accordance with Chapter 3, Section 4 of the TxDOT Concrete Repair Manual.
(2)	Repair the spalls/delaminations in the edge of deck. See Plan for location.	429	CONC STR REPAIR(DECK REP (FULL DEPTH))	19	SF	Repair as full-depth deck repairs in accordance with Chapter 3, Section 4 of the TxDOT Concrete Repair Manual. FUAID 596811 is resolved by this repair.
(3)	Repair the spalls/delaminations in the deck soffit. See Plan for locations. Coordinate repairs with curb removal and rail retrofit.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	3	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(4)	Retrofit existing Type T1 rail with a TY SSTR Rail. Remove existing brush curb. See Plan for locations.	451	RETROFIT RAIL (TY SSTR)	444	LF	See SSTR Rail Retrofit Details on C-RAIL-R (MOD).
		104	REMOVING CONC (CURB)	380	LF	
(5)	After completion of deck repairs, rail repairs, and curb removal, shot blast deck and approach slabs and apply multi-layer polymer overlay (MLPO) to deck and approach slab surfaces. Mask the joints and seals. See Plan for locations.	483	SHOT BLASTING	1070	SY	See Muli-layer Polymer Overlay Notes on the Miscellaneous Bridge Repair Details sheets. FUAID 596812 is resolved by this repair.
		439	MULTI-LAYER POLYMER OVERLAY	1070	SY	
(6)	Clean and seal existing joint after completion of rail retrofit, curb removal, and overlay. See Plan for locations.	438	CLEANING AND SEALING EXIST JOINTS(CL7)	172	LF	See WD-CSBJ-22(MOD).
(7)	Repair the spalls/delaminations in the beams and diaphragms. See Table of Beam Repairs and Table of Diaphragm Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	2	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(8)	Repair the substructure spalls. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	5	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(9)	Remove existing incorrect NBI number and paint the correct NBI number on the structure. See Plan for locations.	427	CONCRETE PAINT FINISH	4	SF	Paint the correct NBI number on the bridge at two locations. See Painting NBI Numbers (MOD).

(2) TYPICAL LIMIT OF SPALL FOR DECK FULL DEPTH REPAIR

(7) TABLE OF BEAM REPAIRS

Span	Beam	Location	Repair Quantity
3	5	3/4 Span	1 SF
TOTAL			1 SF

(7) TABLE OF DIAPHRAGM REPAIRS

Location	Span	Bay	Repair Quantity
Midspan	1	5	1 SF
TOTAL			1 SF

(9) REMOVAL AND REPLACEMENT OF PAINTED NBI NUMBER

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023
Brett RC Allen

NO.	REVISION	BY	DATE

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Dallas, Texas 75248-1229
972.960.4400

Texas Department of Transportation

SH 6 NB OVERPASS AT SH 90
BRIDGE LOCATION REPAIR PLAN
NBI# 17-094-0-0050-03-075

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
EB	6			SH 6, ETC.
GRAPHICS JCH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK LJG	TEXAS	BRY	GRIMES	79
CHECK LJG	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

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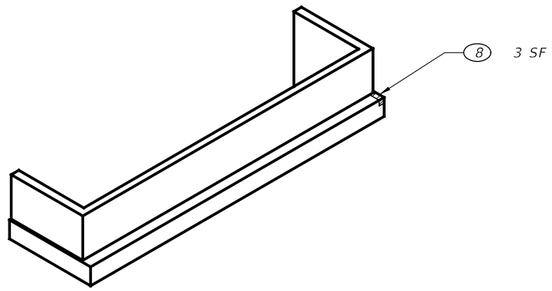
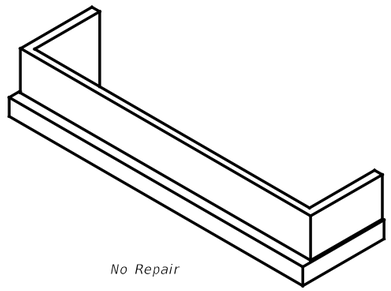


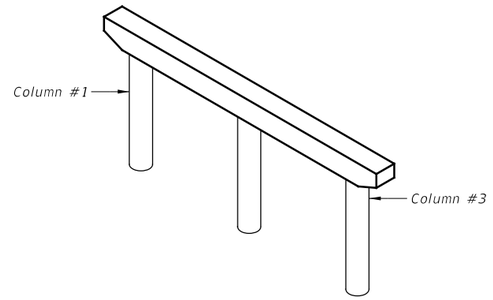
NORTHWEST FACE
Looking South

ABUTMENT 1

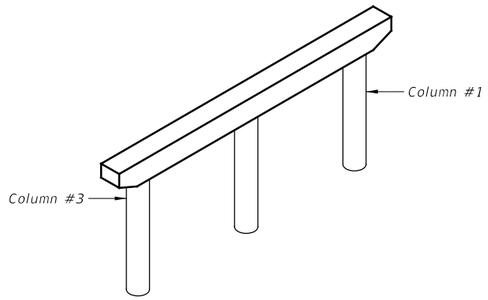


SOUTHEAST FACE
Looking West

ABUTMENT 4

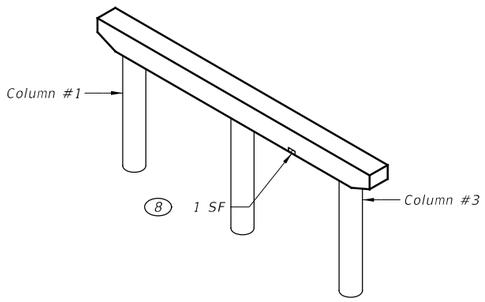


SOUTHEAST FACE
Looking West

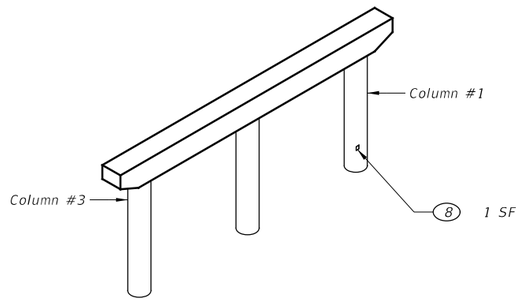


NORTHWEST FACE
Looking South

BENT 3



SOUTHEAST FACE
Looking West



NORTHWEST FACE
Looking South

BENT 2

SUBSTRUCTURE REPAIR ISOMETRICS

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

XX XX
- XX — Repair No. - See Table of Repairs
- XX — Estimated Repair Quantity At Each Location
- XX — Repair Quantity Unit

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER

06/02/2023

Brett RC Allen

NO.	REVISION	BY	DATE

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Texas Department of Transportation

SH 6 NB OVERPASS AT SH 90 SUBSTRUCTURE REPAIR ISOMETRICS

NBI# 17-094-0-0050-03-075

SCALE: N.T.S. SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JCH	TEXAS	BRY	GRIMES	
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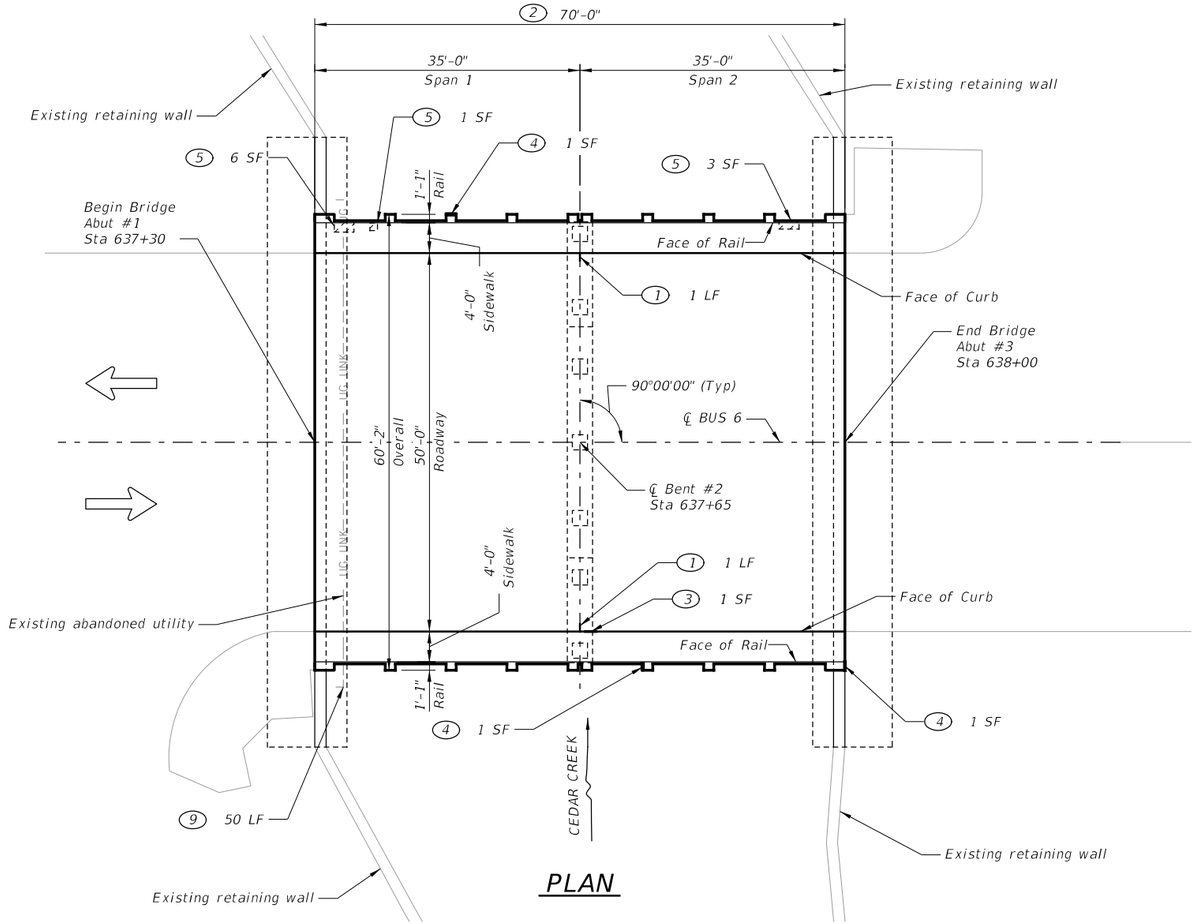
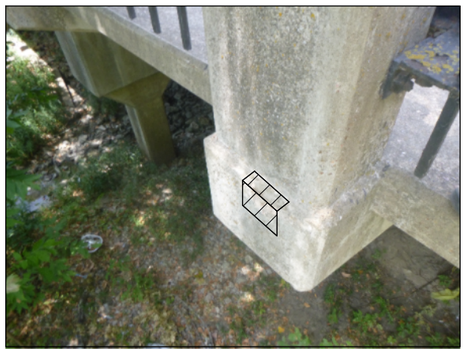
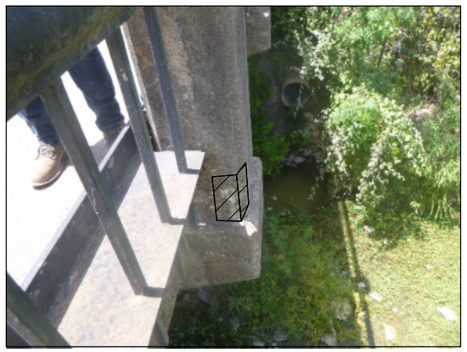


PLAN



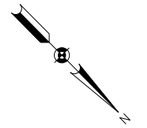
SW RAIL, 3RD POST FROM SOUTH CORNER



NE RAIL, 4TH POST FROM NORTH CORNER

NE RAIL, POST AT NOTH CORNER

④ LIMIT OF RAIL SPALL REPAIRS



GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids and all locations shall be approved by the Engineer prior to beginning repair work.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

(XX) XX XX
- XX — Repair No. – See Table of Repairs
- XX — Estimated Repair Quantity At Each Location
- XX — Repair Quantity Unit

STATE OF TEXAS
BRETT R.C. ALLEN
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Texas Department of Transportation

BUS 6
AT CEDAR CREEK
BRIDGE LOCATION REPAIR PLAN
NBI# 17-094-0-0050-11-015

SCALE: 1"=20' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Reseal section of missing seal at Joint 2. See Plan for locations.	712	JT / CRCK SEAL (HOT - POURED RUBBER)	2	LF	Seal with hot poured rubber (Class 3) per DMS-6310.
(2)	Clean and paint steel elements of bridge rail.	446	CLEAN & PAINT EXIST RAIL (SYSTEM I-A)	1	LS	Clean and coat steel elements of bridge rail with System I-A Overcoating per Item 446, "Field Cleaning and Painting Steel." Existing coating contains lead. Area of coating is approximately 640 SF. See BUS 6 at Cedar Creek Existing Plans Railing Details sheet for additional information.
(3)	Repair the spall/delamination in the curb. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	1	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(4)	Repair the spalls/delaminations in the rails. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	3	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(5)	Repair the spalls/delaminations in the deck soffit. See Plan for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	10	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2.
(6)	Repair the spalls/delaminations in the tee beams and diaphragms. See Table of Tee Beam Repairs and Table of Diaphragm Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	217	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2. FUAID 596813 is resolved by this repair.
(7)	Rout and seal cracks in cap with silicone seal in substructures. See Substructure Repair Isometrics for locations.	780	CNC CRCK REPAIR (DISCRETE) (ROUT AND SEAL)	52	LF	Rout and seal cracks per TxDOT Concrete Repair Manual Chapter 3, Section 7, Method 1.
(8)	Repair the spalls/delaminations in the substructures. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	10	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2. FUAID 596814 is resolved by this repair.
(9)	Remove existing broken pipe conduit at Abutment 1.	690	REMOVAL OF CONDUIT	50	LF	Contractor shall verify the conduit is abandoned before beginning work.

(6) TABLE OF TEE BEAM REPAIRS

Span	Tee Beam	Location	Spall Repair Quantity
1	1	Abutment 1	1 SF
		Abutment 1	1 SF
		1/4 Span	3 SF
		Bent 2	1 SF
	2	Bent 2	1 SF
	3	Midspan	1 SF
	4	Abutment 1 to Midspan	29 SF
		2/3 Span	2 SF
		3/4 Span	1 SF
		Bent 2	1 SF
	5	Bent 2	2 SF
	6	Bent 2	1 SF
		Bent 2	3 SF
	7	Abutment 1	1 SF
	8	1/4 Span	15 SF
		Midspan	3 SF
		2/3 Span	15 SF
	9	3/4 Span	1 SF
	11	Abutment 1	1 SF
2	2	Abutment 3	2 SF
	3	Midspan	2 SF
	4	Entire Span	70 SF
	5	Bent 2	2 SF
	7	Bent 2	1 SF
	8	Bent 2	1 SF
		1/4 Span	2 SF
		Last 30' of Span	38 SF
	9	Bent 2	3 SF
	10	Bent 2	1 SF
	11	2/3 Span	1 SF
TOTAL			206 SF

(6) TABLE OF DIAPHRAGM REPAIRS

Location	Span	Bay	Spall Repair Quantity
Abutment 1	1	2	1 SF
Bent 2		1	1 SF
	2	1	5 SF
		6	1 SF
		8	3 SF
TOTAL			11 SF

(3) LIMIT OF SPALL FOR CURB SPALL REPAIR

STATE OF TEXAS
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06/02/2023
Brett RC Allen

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Texas Department of Transportation

BUS 6
AT CEDAR CREEK
BRIDGE LOCATION REPAIR PLAN
NBI# 17-094-0-0050-11-015

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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GRAPHICS JCH	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK LJG	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

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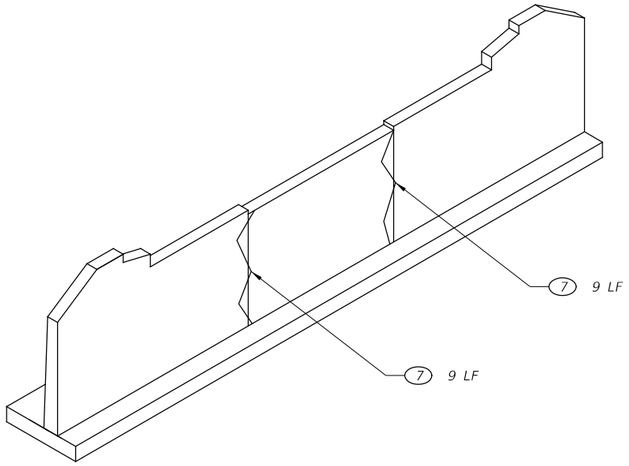
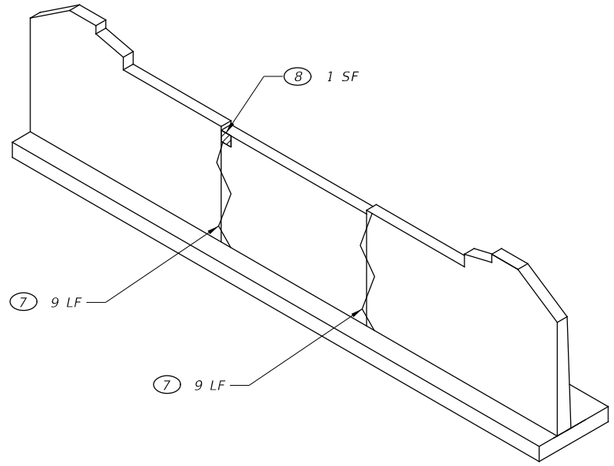


NORTHWEST FACE
Looking South

ABUTMENT 1

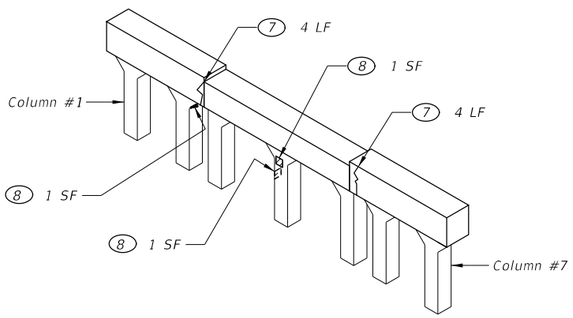
ABUTMENT 3, NE WIDENING JOINT

(7) TYPICAL CRACK REPAIR



SOUTHEAST FACE
Looking West

ABUTMENT 3



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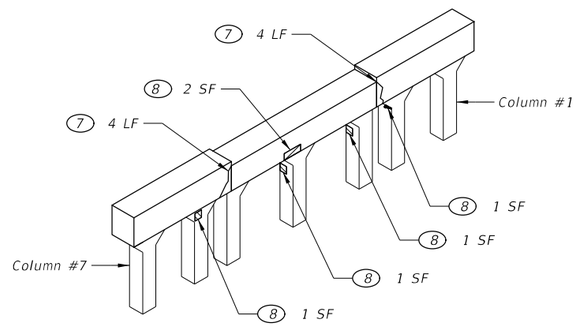

NORTHWEST FACE
Looking South

BENT 2

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

(XX) XX XX
- Repair Quantity Unit
- Estimated Repair Quantity At Each Location
- Repair No. - See Table of Repairs

SUBSTRUCTURE REPAIR ISOMETRICS

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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06/02/2023
Brett RC Allen

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Texas Department of Transportation

BUS 6
AT CEDAR CREEK
SUBSTRUCTURE REPAIR ISOMETRICS
NBI# 17-094-0-0050-11-015

SCALE: N.T.S. SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
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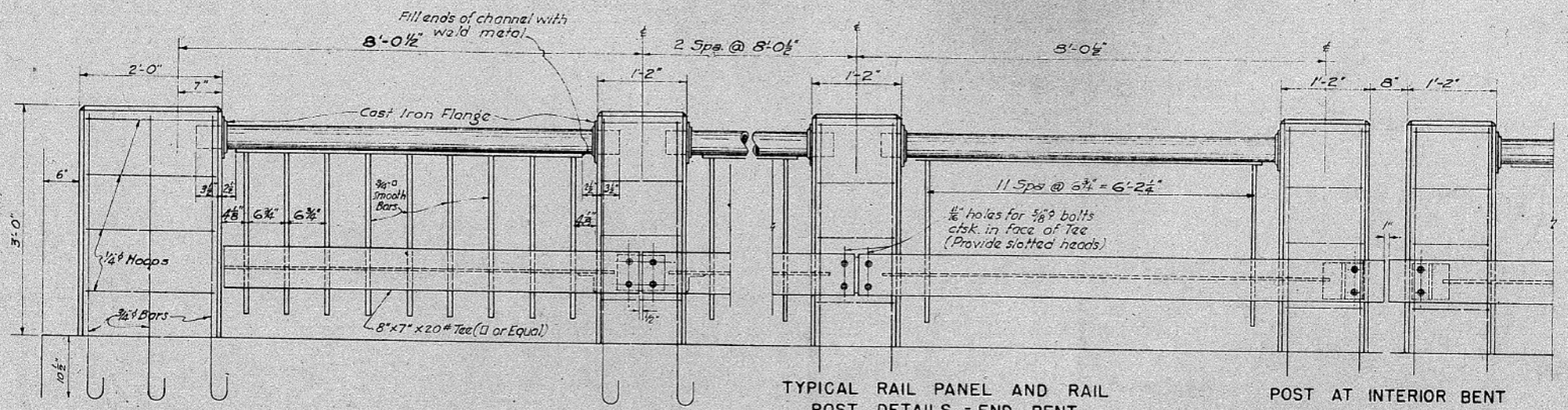
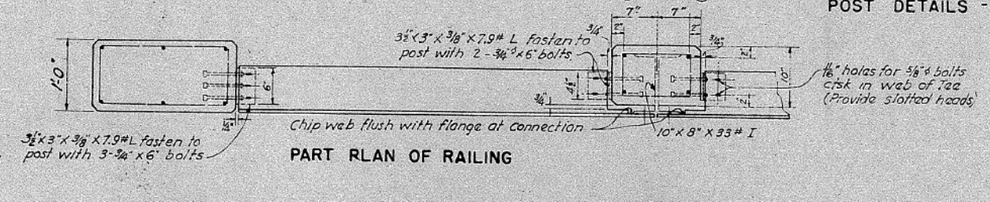
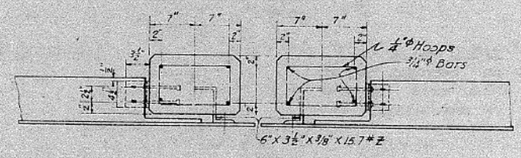


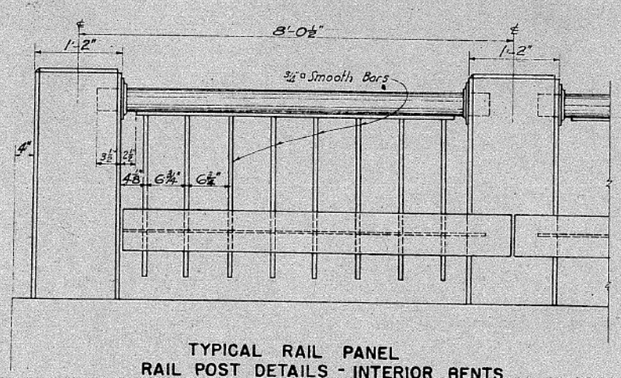
TYPICAL RAIL PANEL AND RAIL POST DETAILS - END BENT



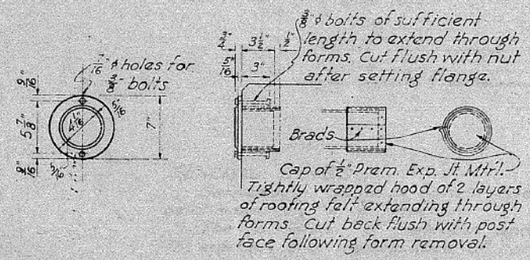
PART RLAN OF RAILING



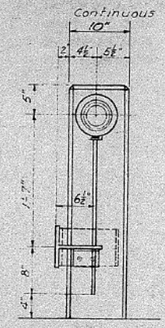
PLAN INTERIOR END POST CONNECTION



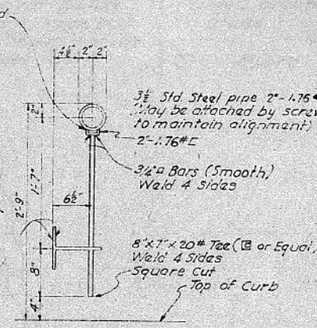
TYPICAL RAIL PANEL
RAIL POST DETAILS - INTERIOR BENTS



CAST IRON FLANGE AND POST CONNECTION



SIDE ELEVATION
INTERIOR RAIL POST



SECTION THRU
METAL RAIL

GENERAL NOTES:-

All concrete shall be class A. All corners shall be chamfered ¾". Dimensions relating to reinforcing steel are to center of bars. The metal railing sections shall receive one shop coat and one field coat of red lead and oil and two field coats of aluminum paint.

PROVIDED FOR CONTRACTOR'S INFORMATION ONLY

Texas Department of Transportation

BUS 6
AT CEDAR CREEK
EXISTING PLANS
RAILING DETAILS
NBI# 17-094-0-0050-11-015

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
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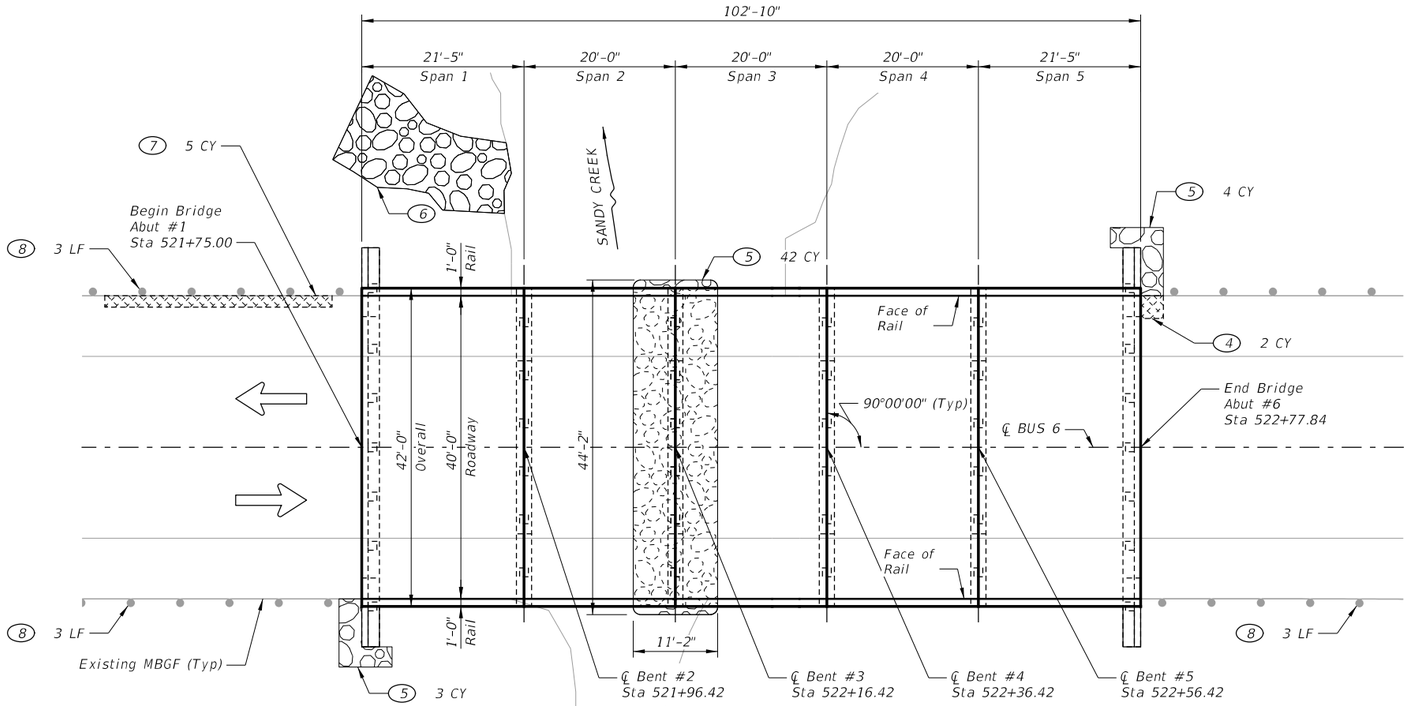
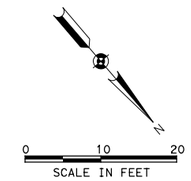


PLAN

6 EROSION CHANNEL AT SOUTH CORNER

5 EROSION CHANNEL AT BENT 3



GENERAL NOTES:

1. See the Table of Repairs for scope of rehabilitation.
2. Existing plans are available upon request.
3. Stationing is based on as-built drawings and is for reference only. Beams are labeled from left to right looking in the direction of increasing station.
4. Locations indicated in plans and details are for visual aids and all locations shall be approved by the Engineer prior to beginning repair work.
5. Refer to Traffic Control Plans for information not shown.

REPAIR CALL-OUT LEGEND

- Stone Riprap
- Cement Stabilized Backfill
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. - See Table of Repairs

STATE OF TEXAS
BRETT R.C. ALLEN
133221
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06/02/2023
Brett RC Allen

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Texas Department of Transportation

BUS 6
AT SANDY CREEK
BRIDGE LOCATION REPAIR PLAN
NBI# 17-094-0-0050-11-016

SCALE: 1"=20' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	ITEM	BID ITEM DESCRIPTION	QUANTITY	UNIT	DETAILS/NOTES
(1)	Repair the spalls/delaminations in the flat slab soffit. See Table of Flat Slab Soffit Repairs for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	141	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2. FUAID 596815 is resolved by this repair.
(2)	Apply carbon fiber reinforced polymer to the entirety of the soffit of the 1952 widening portion of the flat slab, both sides.	786	CARBON FIBER REINF POLYMER STRENGTHNING	1960	SF	The 1952 widening width to which the CFRP is to be applied is 9'-7". See BUS 6 at Sandy Creek CFRP Strengthening Details sheet.
(3)	Repair the spalls/delaminations in the abutments, bents, and piles. See Substructure Repair Isometrics for locations.	429	CONC STR REPAIR (VERTICAL & OVERHEAD)	12	SF	Repair as intermediate spalls per the TxDOT Concrete Repair Manual Chapter 3, Section 2. FUAID 596816 & FUAID 596817 are resolved by this repair.
(4)	Fill void under mow strip behind east wingwall with cement stabilized backfill. See Plan for location.	400	CEM STABIL BKFL	2	CY	FUAID 596818 at south corner is resolved by this repair.
(5)	Install stone riprap around base of piles at Bent 3. Place stone riprap behind east and west wingwalls. See Plan for locations.	432	RIPRAP (STONE PROTECTION) (18 IN)	49	CY	For Bent 3, see Bent Stone Riprap Detail on Miscellaneous Bridge Repair Details. For west wingwall, fill void under mow strip with cement stabilized backfill at east wingwall before placing stone riprap. FUAID 596818 at east corner is resolved by this repair.
(6)	Fill eroded drainage channel near south wingwall with embankment and top with stone riprap. See Plan for location.	132	EMBANKMENT (FINAL)(ORD COMP)(TY A)	21	CY	See Erosion Channel Detail on the Miscellaneous Bridge Details sheets.
		432	RIPRAP (STONE PROTECTION) (18 IN)	13	CY	
(7)	Fill undermined area of mow strip at south corner wingwall with flowable fill. See Plan for locations. A quantity allowance of 5 CY is provided to be used as directed by Engineer.	401	FLOWABLE BACKFILL	5	CY	FUAID 596818 at east corner is resolved by this repair.
(8)	Reattach disconnected posts to MBGF. See Plan for locations.	540	MTL W-BEAM GD FEN ADJUSTMENT	9	LF	Item is a Roadway Item, and the quantity is summarized in the associated table.

(4) UNDERMINING AT SOUTH CORNER MOWSTRIP

(1) TABLE OF FLAT SLAB SOFFIT REPAIRS

Span	Longitude Location	Transverse Location	No. of Spalls	Spall Repair Quantity
1	Abutment 1	NE Widening Joint	1	1 SF
	1/4 Span	SW Widening Joint	1	3 SF
	3/4 Span	SW Widening Joint	1	3 SF
	Bent 2	Center of Slab	1	9 SF
2	Bent 2	NE Widening Joint	1	4 SF
	Midspan	NE Widening Joint	1	3 SF
3	Bent 3	Center of Slab	5	9 SF Total
		SW Edge	1	1 SF
	Midspan to Bent 4	Center of Slab	10	28 SF Total
		NE Widening Joint	10	17 SF Total
	2/3 Span to Bent 4	NE Side	6	6 SF Total
	Bent 4	SW Side	9	14 SF Total
4	Bent 4	SW Widening Joint	1	1 SF
	Entire Span	NE Widening Joint	7	15 SF Total
	Bent 5	NE Edge	1	1 SF
5	Bent 5	SW Widening Joint	3	5 SF Total
		Center of Slab	3	4 SF Total
	Midspan	SW Widening Joint	2	3 SF Total
		Center of Slab	1	1 SF
		NE Side	3	9 SF Total
	Midspan to Abutment 6	NE Widening Joint	3	4 SF Total
TOTAL				141 SF

(8) TYPICAL DISCONNECTED POST

STATE OF TEXAS
BRETT R.C. ALLEN
133221
LICENSED PROFESSIONAL ENGINEER
06/02/2023
Brett RC Allen

NO.	REVISION	BY	DATE

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972.960.4400

Texas Department of Transportation

BUS 6
AT SANDY CREEK
BRIDGE LOCATION REPAIR PLAN
NBI# 17-094-0-0050-11-016

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
CAM	6			SH 6,ETC.
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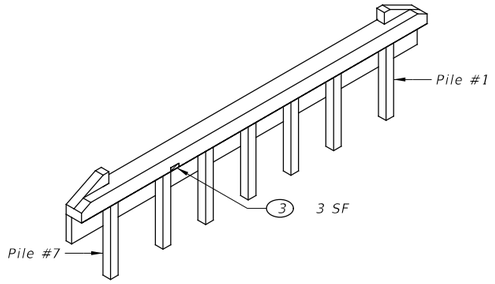
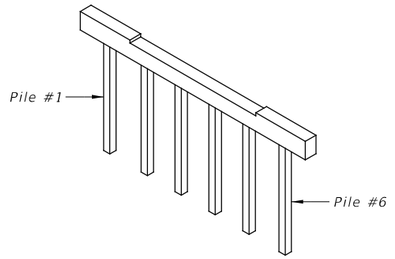
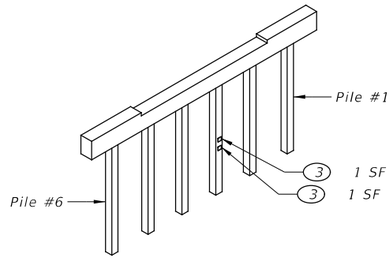


NORTHWEST FACE
Looking South

ABUTMENT 1

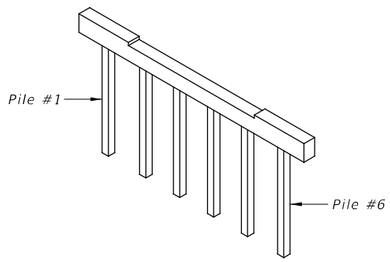


SOUTHEAST FACE
Looking West

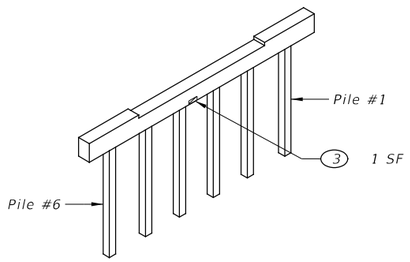


NORTHWEST FACE
Looking South

BENT 3



SOUTHEAST FACE
Looking West



NORTHWEST FACE
Looking South

BENT 2

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

XX XX
- Repair Quantity Unit
- Estimated Repair Quantity At Each Location
- Repair No. - See Table of Repairs

SUBSTRUCTURE REPAIR ISOMETRICS

STATE OF TEXAS
BRETT R.C. ALLEN
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BUS 6
AT SANDY CREEK
SUBSTRUCTURE REPAIR ISOMETRICS
NBI# 17-094-0-0050-11-016

SCALE: N.T.S. SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
CAM	6			SH 6,ETC.
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK	CONTROL	SECTION	JOB	87
LJG	0050	03	114,ETC.	
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LJG				

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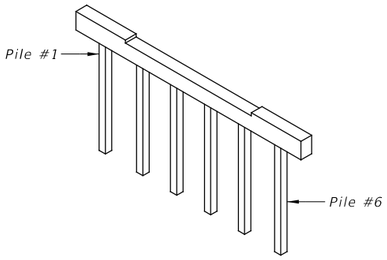
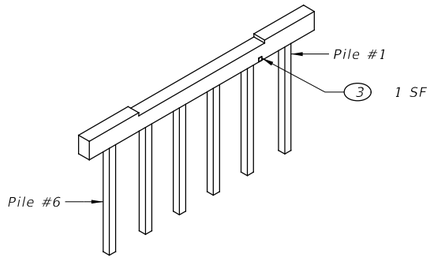
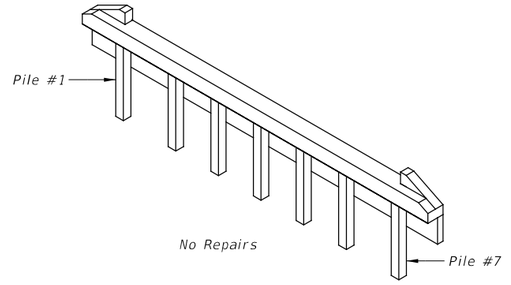


SOUTHEAST FACE
Looking West



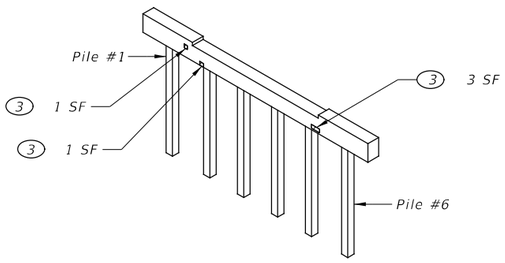
NORTHWEST FACE
Looking South

BENT 4

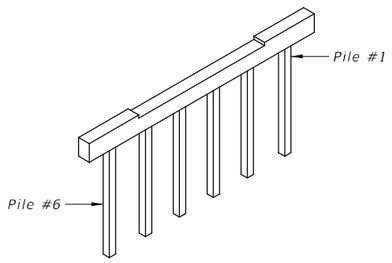


SOUTHEAST FACE
Looking West

ABUTMENT 6



SOUTHEAST FACE
Looking West



NORTHWEST FACE
Looking South

BENT 5

REPAIR CALL-OUT LEGEND

Spall/Delamination Repair

XX XX
- Repair Quantity Unit
- Estimated Repair Quantity At Each Location
- Repair No. - See Table of Repairs

SUBSTRUCTURE REPAIR ISOMETRICS

STATE OF TEXAS
BRETT R.C. ALLEN
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LICENSED PROFESSIONAL ENGINEER
06/02/2023

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Texas Department of Transportation

BUS 6
AT SANDY CREEK
SUBSTRUCTURE REPAIR ISOMETRICS
NBI# 17-094-0-0050-11-016

SCALE: N.T.S. SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
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GRAPHICS JCH	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK LJG	CONTROL	SECTION	JOB	
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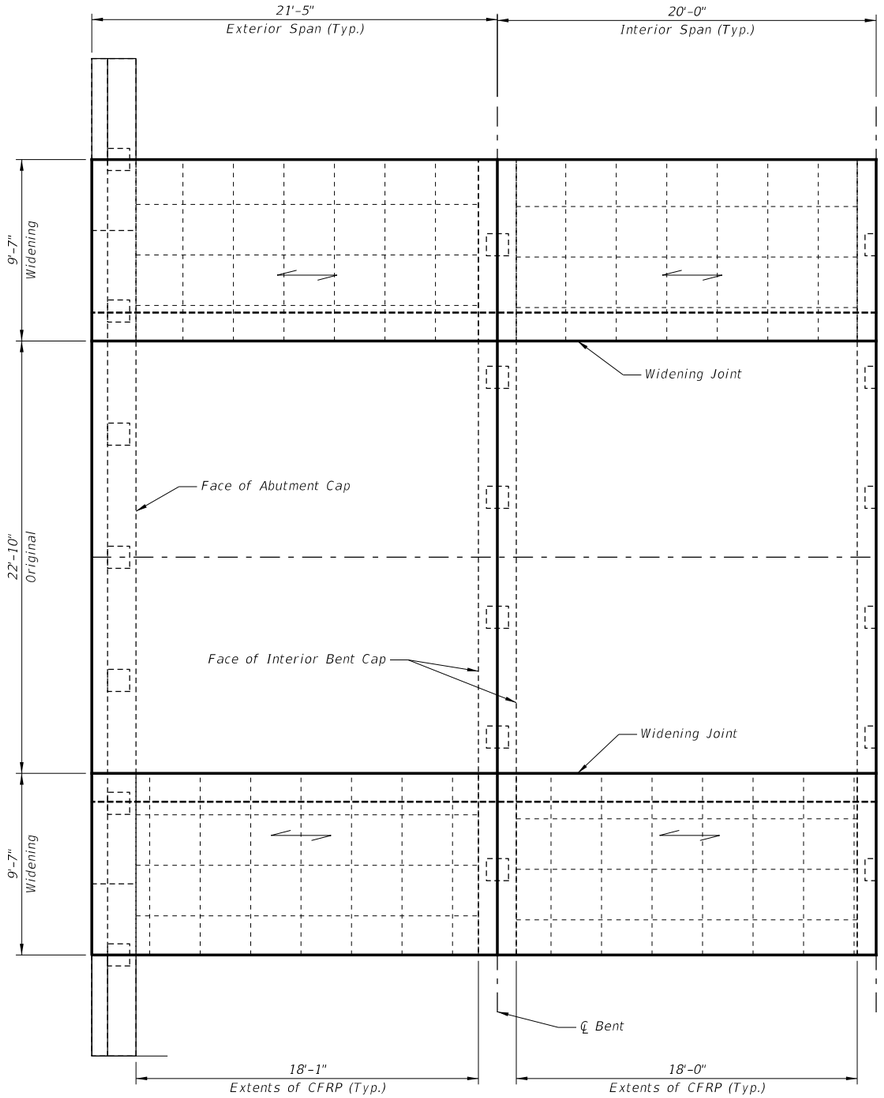
SPAN 1 SW WIDENING JOINT

SPAN 2 NE WIDENING JOINT

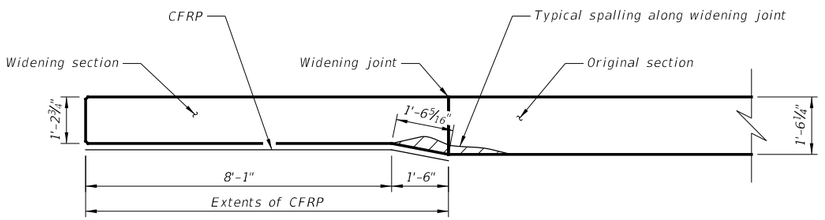
SPAN 5 SW WIDENING JOINT

TYPICAL CONDITION OF EXISTING WIDENING JOINTS



CFRP LAYOUT PLAN

(Exterior and interior span shown)



CFRP TYPICAL TRANSVERSE SECTION

Scale: 1/4" = 1'-0"

MATERIAL NOTES:

Submit detailed concrete repair procedure for approval prior to beginning work.

Choose a FRP system prequalified for Structural Member Protection that meets the requirements of DMS 4700, "Externally Bonded Fiber Reinforced Polymer (FRP) System for Repairing and Strengthening Concrete Structure Members".

Perform CFRP pull-off test according to Item 786, "Carbon Fiber Reinforced Polymer" in the presence of the Engineer.

Use concrete repair materials listed on the current Material Producer List for DMS 4655.

CARBON FIBER REINFORCED POLYMER STRENGTHENING NOTES:

1. After completing all spall and delamination repairs, prepare surface and apply Carbon Fiber Reinforced Polymer (CFRP) per Item 786, "Carbon Fiber Reinforced Polymer".
2. Orient unidirectional fibers longitudinally, along bottom of flat slab. Utilize largest widths practical and overlap successive wraps by 6" minimum. Entire extents of CFRP surface need not be covered. Strips of CFRP may be used if capacity is met.
3. Provide an additional factored flexural capacity of 11 kip*ft minimum by CFRP, where phi = 0.9 to 0.75 for flexural analysis, for the widened portion of the flat slab. The resulting Load Rating shall be HS23 Operating or greater and the SHV Operating Factor shall be equal or greater than 1.
4. Provide signed and sealed calculations and working drawings for increasing factored flexural capacity. See Item 786 for submittal requirements.
5. Coat completed CFRP with UV protective paint as recommended by manufacturer. Match color to surrounding concrete as approved by Engineer.

PROCEDURE:

1. Relocate traffic off of widening section. See Traffic Control Plans for additional information.
2. Sound and remove loose and delaminated concrete.
3. Perform concrete repair work.
4. Clean and prepare concrete surfaces for CFRP Installation.
5. Install CFRP.
6. Coat repair area with concrete paint in accordance with Item 427, "Surface Finishes for Concrete."
7. Overpass can be opened to traffic after repair material reaches 3,600 psi and CFRP has completely cured.

REPAIR CALL-OUT LEGEND

- Carbon Fiber Reinforced Polymer Wrap
- Spall/Delamination Repair
- Direction of Fiber
- (XX) XX XX
  - Repair Quantity Unit
  - Estimated Repair Quantity At Each Location
  - Repair No. – See Table of Repairs

STATE OF TEXAS
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Texas Department of Transportation

BUS 6
AT SANDY CREEK
CFRP STRENGTHENING DETAILS
NBI# 17-094-0-0050-11-016

SCALE: 1/8"=1'-0" SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
CAM	6			SH 6, ETC.
GRAPHICS				
CAM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	
LJG	CONTROL	SECTION	JOB	89
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LJG				

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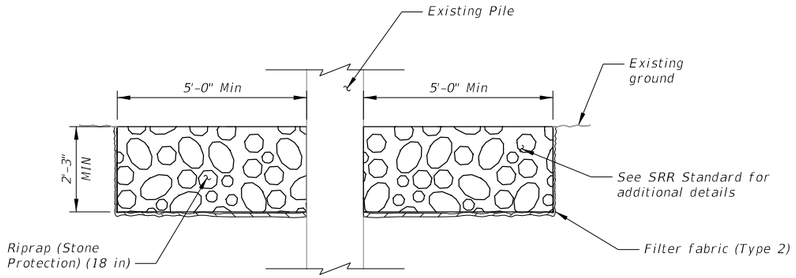
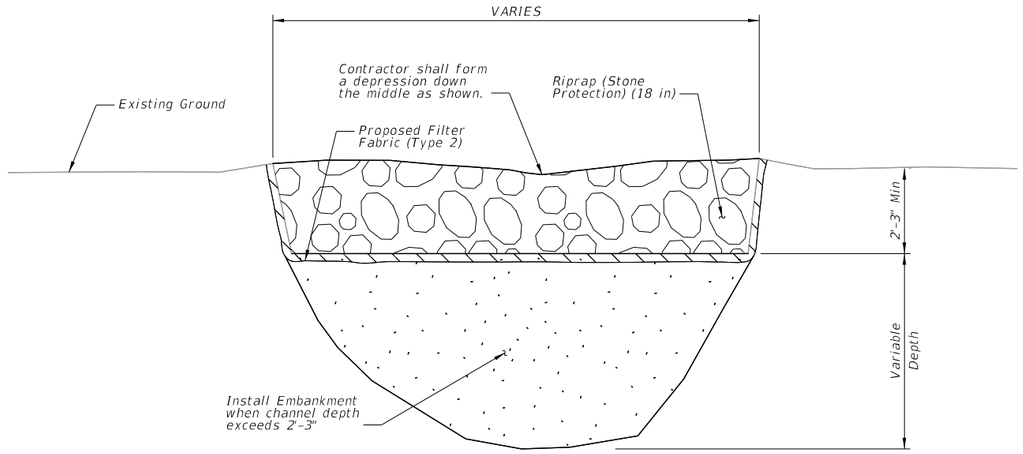


BENT STONE RIPRAP DETAIL



EROSION CHANNEL DETAIL

MUTLI-LAYER POLYMER OVERLAY NOTES:

1. Shot blast the deck and clean with high pressure air. Remove all oil and other contaminants.
2. Provide a surface profile with less than ¼" deviation. Areas with a deviation greater than ¼" shall be repaired as a Partial-Depth Deck Repairs. Deck repairs are paid for as Item 429, "Concrete Structure Repair". Concrete repairs shall be allowed to cure and shot blasted prior to the application of the overlay. Test moisture content in concrete repairs to ensure it is below manufacturer's requirements.
3. Mask existing joints and deck drains.
4. Install Multi-layer Polymer Overlay per Item 439, "Bridge Deck Overlays". Provide system utilizing Methyl Methacrylate (MMA) Resin.
5. Reapply roadway striping to match the original stripping.
6. Seal joints after placement of overlay.

STATE OF TEXAS
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972.960.4400

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MISCELLANEOUS BRIDGE REPAIR DETAILS

SCALE: N.T.S. **SHEET 1 OF 1**

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
CAM	6			SH 6, ETC.
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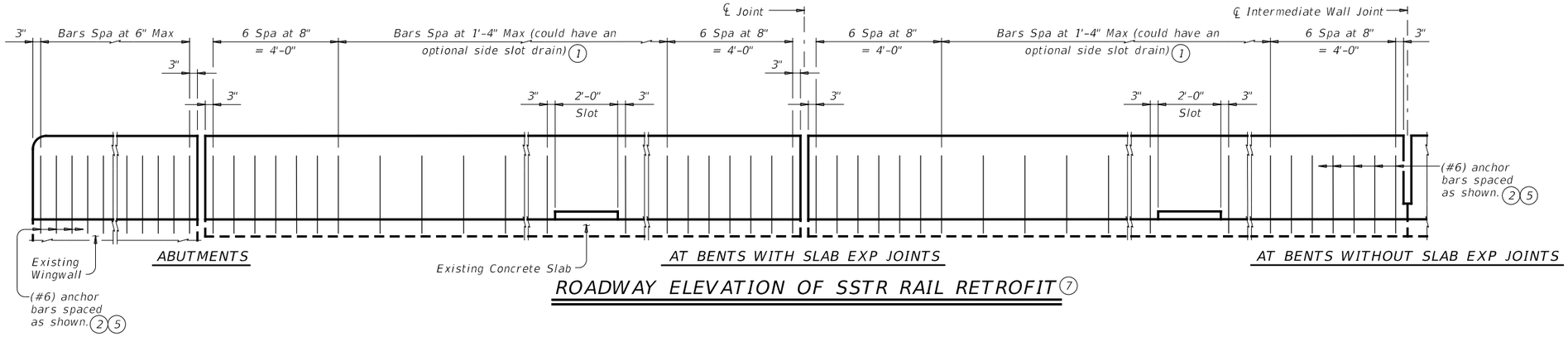


ROADWAY ELEVATION OF SSTR RAIL RETROFIT (7)

(1) When side slot drains are used, provide 8'-0" Min clear spacing between drain slots.

(2) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5¼". 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".

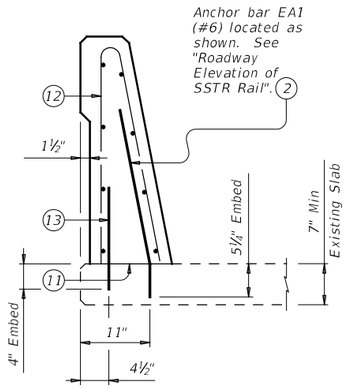
(3) Not used.

(4) Not used.

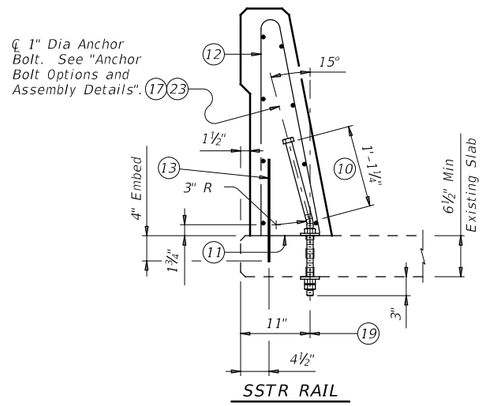
(5) See SSTR Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors".

(6) Not used.

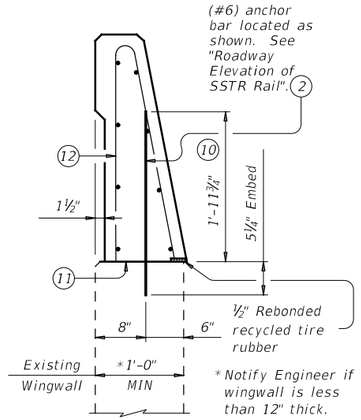
(7) Showing spacing of (#6) adhesive anchor in a rail retrofit condition. Secondary (#4) adhesive anchor in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See rail standard for details and notes not shown.



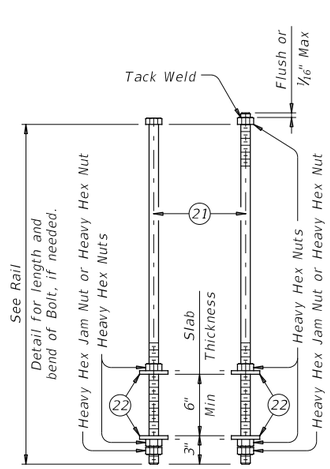
RAIL RETROFIT SECTIONS ON CONCRETE SLABS USING ADHESIVE ANCHORS (9)



RAIL RETROFIT SECTIONS ON SLABS USING ANCHOR BOLTS (20)



RAIL RETROFIT SECTIONS ON WINGWALLS USING ADHESIVE ANCHORS (9)



ANCHOR BOLT OPTIONS AND ASSEMBLY DETAILS (23)

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.

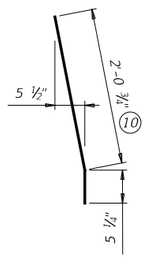
(#6) and (#4) anchor bars used for the epoxied anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

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

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 Rail (Ty SSTR)". All details shown herein are subsidiary to rail retrofit.



ANCHOR BAR EA1 (#6)

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

(8) Not used.

(9) Showing location or locations of anchor bars in a rail retrofit condition. See SSTR rail standard for details and notes not shown.

(10) 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.

(11) Do not cast rails or parapet walls on top of overlays/seal coats.

(12) 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.

(13) 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).

(14) Not used.

(15) Not used.

(16) Not used.

(17) ℄ 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).

(18) Not used.

(19) ℄ 1 1/16" to 1¼" 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.

(20) Showing location of anchor bars and anchor bolts in a rail retrofit condition. See appropriate rail standard for details and notes not shown.

(21) ℄ 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.

(22) Place Washer ⅜ x 3 x 3 ASTM with 1 1/16" Dia Hole centered.

(23) Galvanize anchor bolts, nuts and plate washers.

SHEET 1 OF 1

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06/02/2023

Texas Department of Transportation

Bridge Division Standard

RETROFIT GUIDE FOR CONCRETE RAILS (SSTR) (RETROFIT)

C-RAIL-R (MOD)

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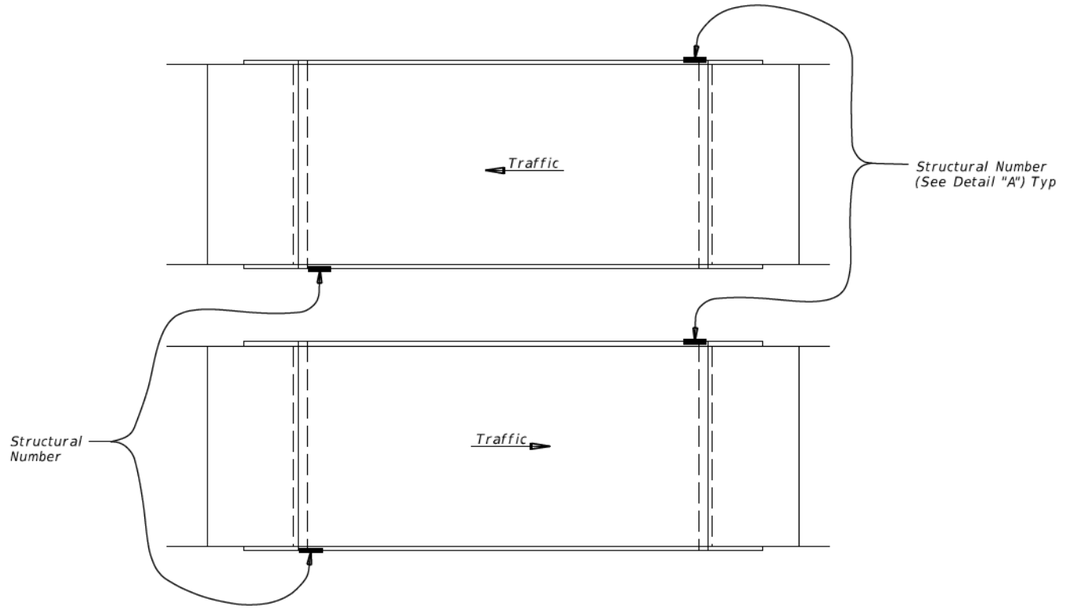
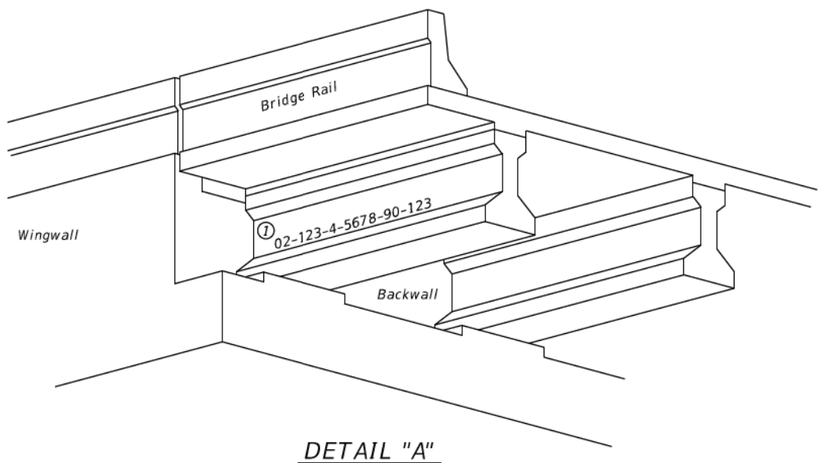
07-20: Text change from epoxy to adhesive and changed MASH Test Level note.	DIST	COUNTY		SHEET NO.
11-21: Update to SSTR Rail Retrofit.	BRY	GRIMES		91

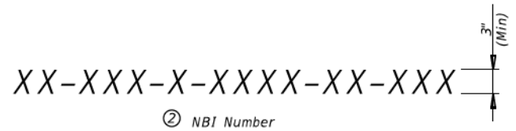


AT BRIDGE LOCATIONS



DETAIL "A"

① Apply NBI number on both sides of structure (once each side). Apply to outside beam close to abutment on the upstream traffic side at bridge locations. Apply to headwall adjacent to wingwall at culvert locations.



Structure Name	NBI Number to Apply
SH 6 SB over SH 90	17-094-0-0050-03-074
SH 6 NB over SH 90	17-094-0-0050-03-075

DETAIL FOR NBI NUMBERS

GENERAL NOTES:

Cost of furnishing and painting NBI numbers, including paint and stencil plates shall be paid at the unit bid price for "Surface Finishes for Concrete" under Item 427.

Each structure shall have 2 (two) NBI numbers painted per structure.

SHEET 1 OF 1

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STATE OF TEXAS
BRETT R.C. ALLEN
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PROFESSIONAL ENGINEER
06/02/2023

Texas Department of Transportation

PAINTING NBI NUMBERS (MOD)

FILE:	DN: CAM	CK: LJG	DW: CAM	CK: LJG
©TxDOT 05-01-18	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
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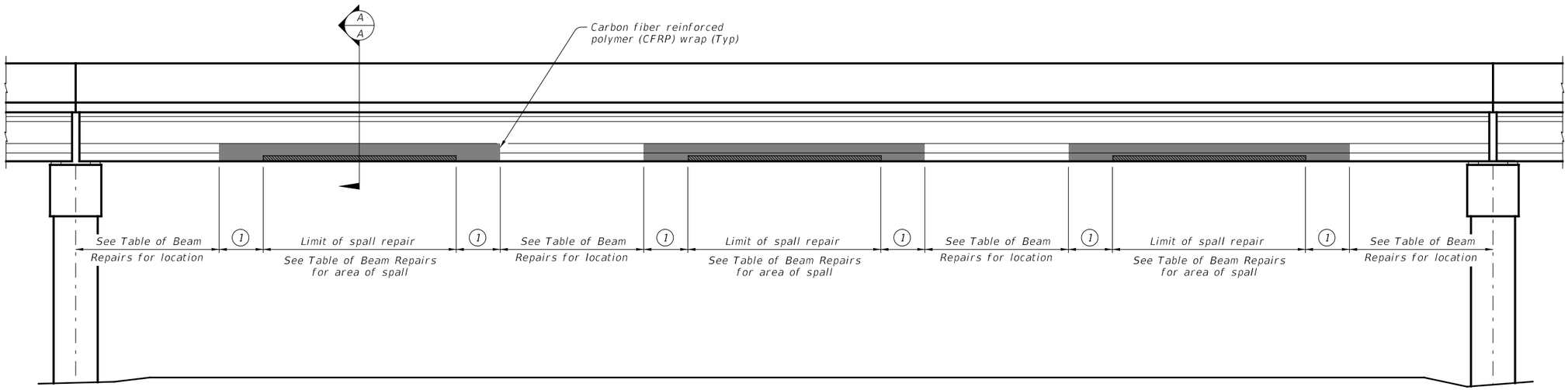
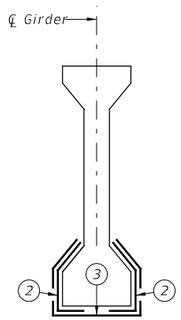


TYPICAL BRIDGE ELEVATION

CFRP TABLE	
BEAM / GIRDER TYPE	(SQ FT) AREA PER LF
Size 54	4.0



SIZE 54

SECTION A-A

(Showing typical beam sections.)

(1) 1'-0" Min

(2) First layer – place 24" wide carbon fiber fabric sheets longitudinally on beams/girders, with fiber orientation parallel to beam/girder centerline. Locate sheets on bottom corners of beam/girder as shown. Overlap fabric sheets a minimum of 6" in the longitudinal direction to achieve full installation length.

(3) Second layer – place carbon fiber fabric sheets transversely on beam/girder, with fiber orientation perpendicular to beam/girder centerline. Wrap sheets on bottom and sides of beam/girder to limits shown. Wrap butt joints in the longitudinal direction to achieve full installation length.

CONSTRUCTION NOTES:

For unpaintedbeams/girders, install approved CFRP system and apply the protective top coating with color and texture to match adjacent concrete. Mask adjacent concrete prior to coating.

For painted beams/girders, install approved CFRP system and apply the protective top coating prior to painting. Paint concrete and CFRP to produce uniform finish, as specified elsewhere.

GENERAL NOTES:

Provide and apply CFRP system, including protective top coating, in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)".

Install CFRP wrap to beams/girders shown on the layout, in the location and to the limits given.

Payment for the Bridge Protective Beam Wrap is in accordance with Item 786, "Carbon Fiber Reinforced Polymer (CFRP)". Quantity is measured by the square foot of beam/girder surface area covered.

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133221
LICENSED
PROFESSIONAL ENGINEER

06/02/2023

Texas Department of Transportation

Bridge Division

BRIDGE PROTECTIVE BEAM WRAP (MOD)

WD-BPBW-22 (MOD)

FILE: WD-BPBW-22.dgn	DN: CAM	CK: LJG	DW: CAM	CK: LJG
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6, ETC.
11-21: Update to Size 54 Beam.	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		93

DATE: 6/1/2023 8:40:26 AM
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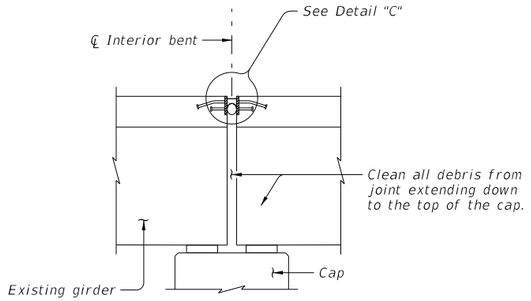
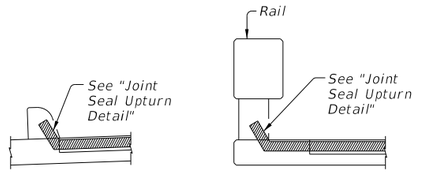


ARMOR JOINT



AT CURB AT CONCRETE BRIDGE RAIL

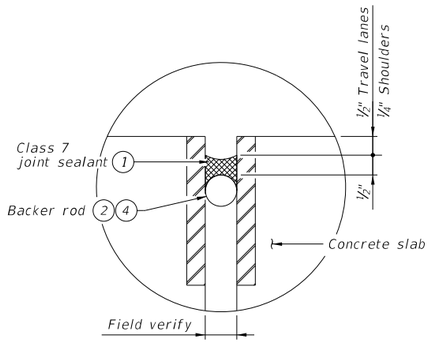
JOINT SEALANT TERMINATION DETAIL

(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.

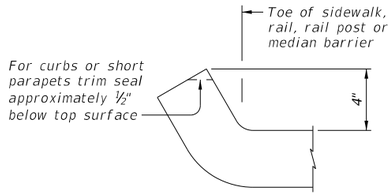
(3) Not used.

(4) Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.



DETAIL "C"

(Stud anchors not shown for clarity.)



JOINT SEAL UPTURN DETAIL

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 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.

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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06/02/2023

SHEET 1 OF 1

Texas Department of Transportation — Bridge Division

CLEANING AND SEALING EXISTING BRIDGE JOINTS (MOD)

WD-CSBJ-22 (MOD)

FILE: WD-CSBJ-22.dgn	DN: CAM	CK: LJG	DW: CAM	CK: LJG
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6, ETC.
11-21: Update for Armor Joint Detail only.	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		94

DATE: 6/1/2023 8:40:27 AM
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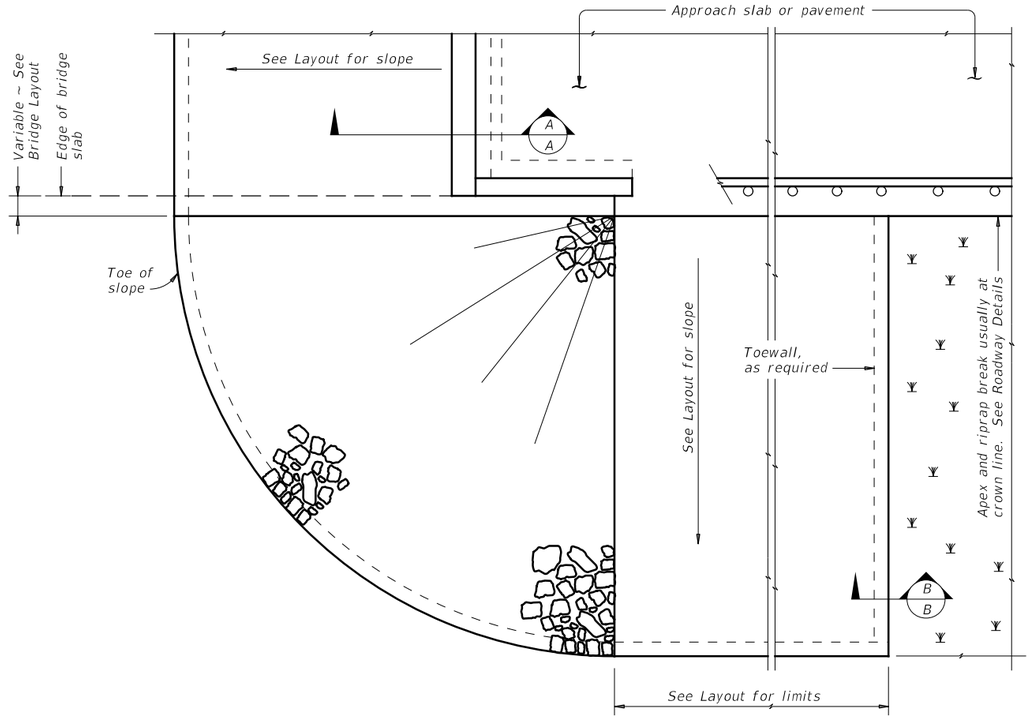
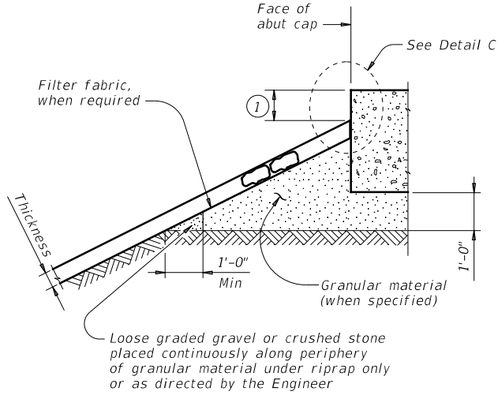
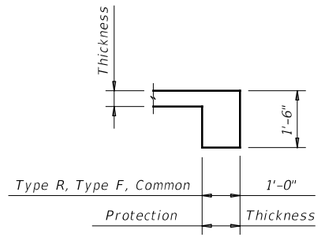


PLAN

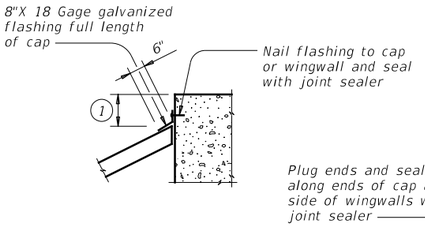


SECTION A-A AT CAP

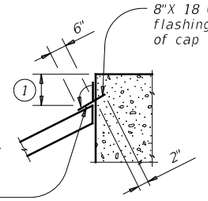


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

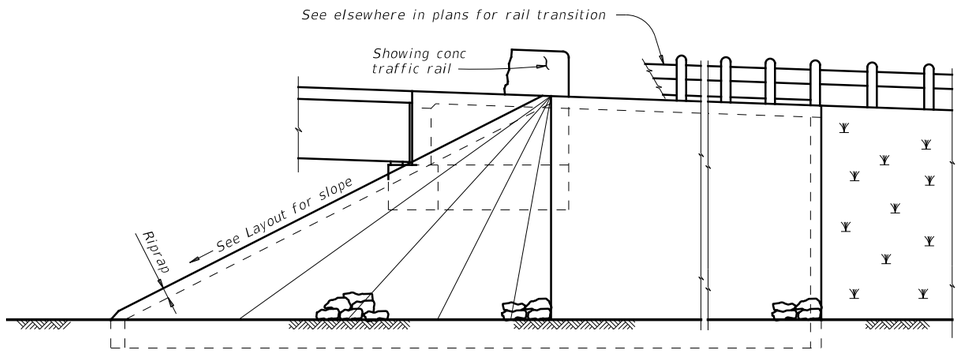


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES			
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0050	03	114, ETC.	SH 6, ETC.			
	DIST	COUNTY		SHEET NO.			
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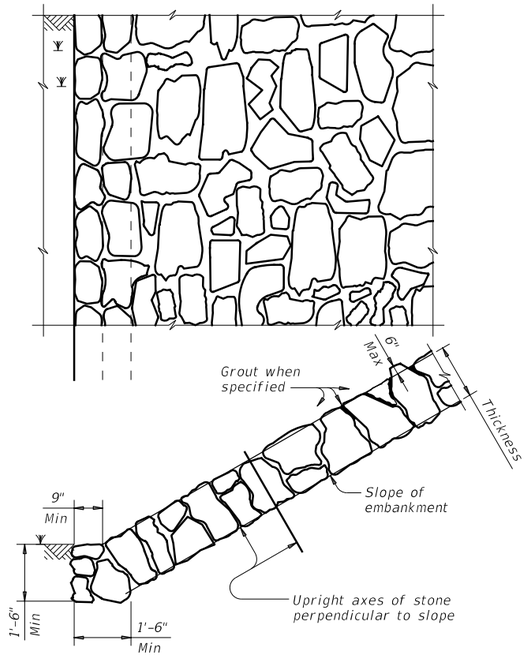


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

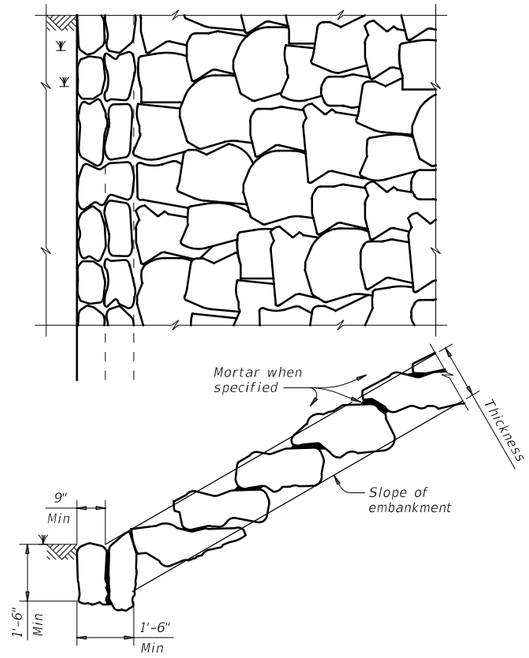


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

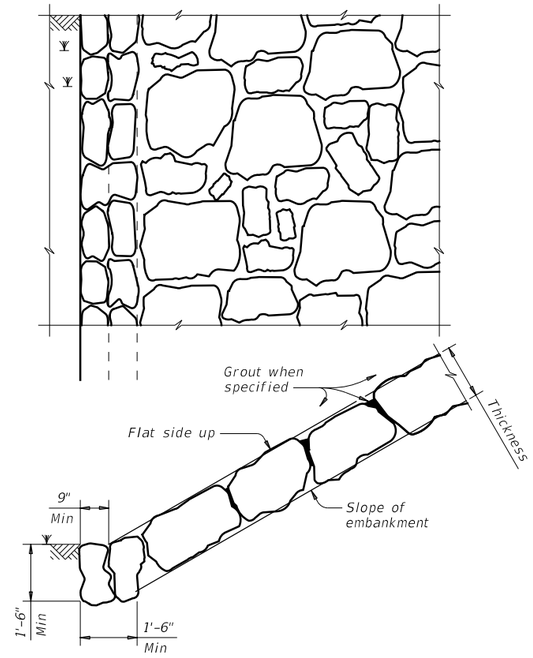


FIGURE 3 ~ TYPE F STONE RIPRAP

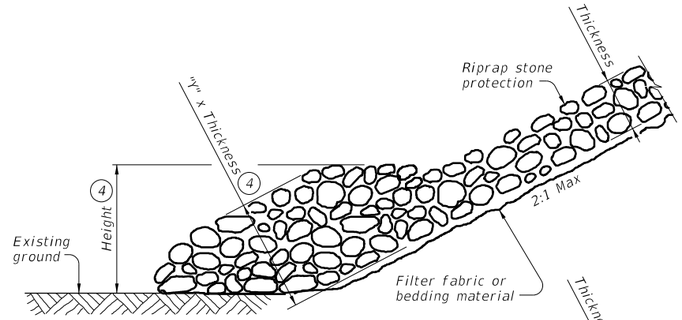
grouted

2 *Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.*

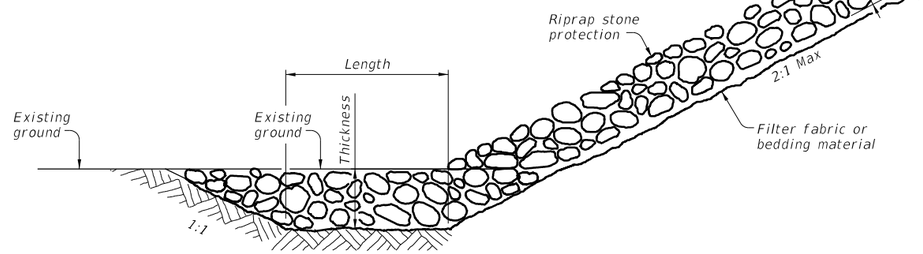
3 *Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.*

4 *"Y" and Height need to be defined. See layout or detail sheet for values if this option is used.*

5 *List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.*
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS 5

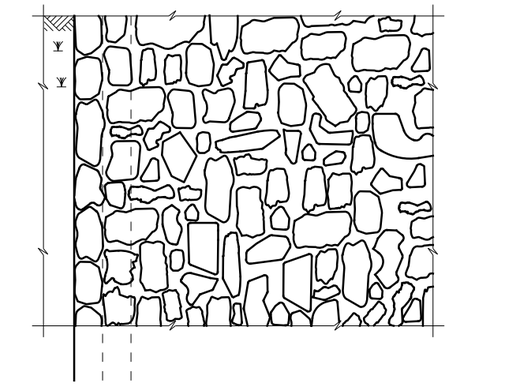


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

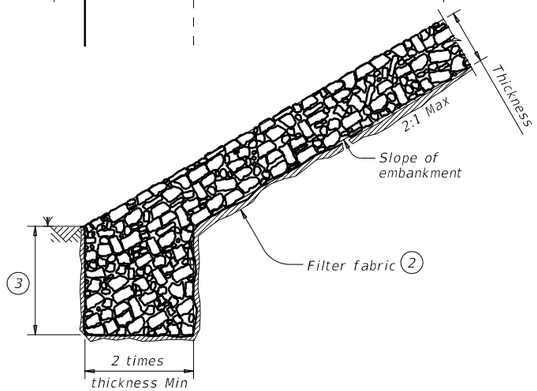


FIGURE 5 ~ PROTECTION STONE RIPRAP 5

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6, ETC.
	DIST	COUNTY		SHEET NO.
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DATE: 6/1/2023 8:40:29 AM
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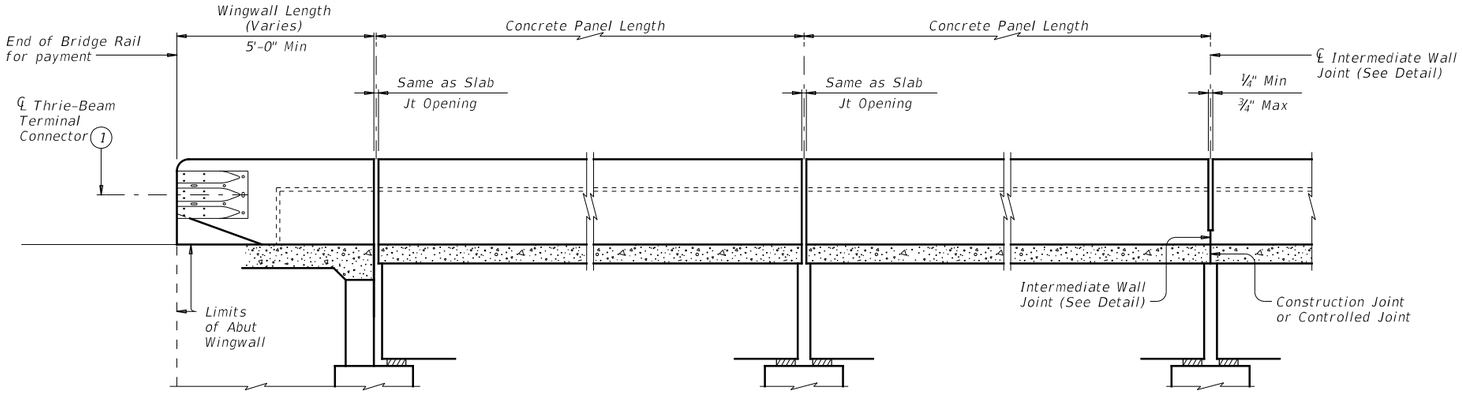
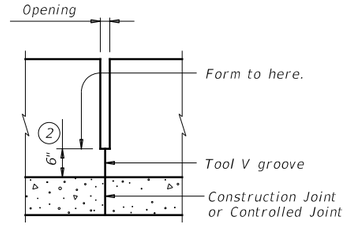


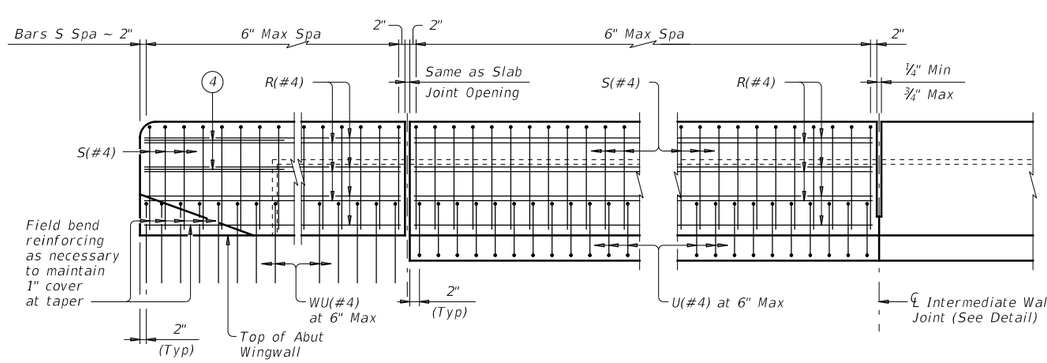
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

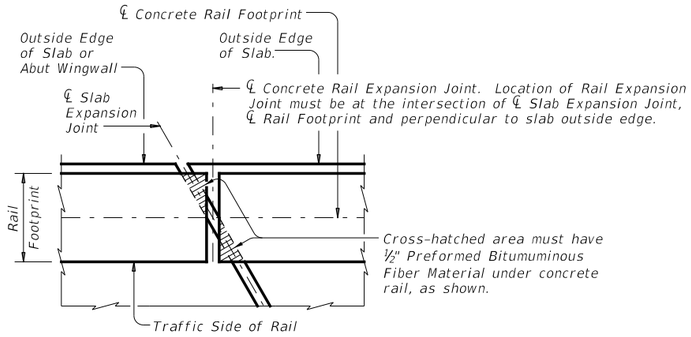


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



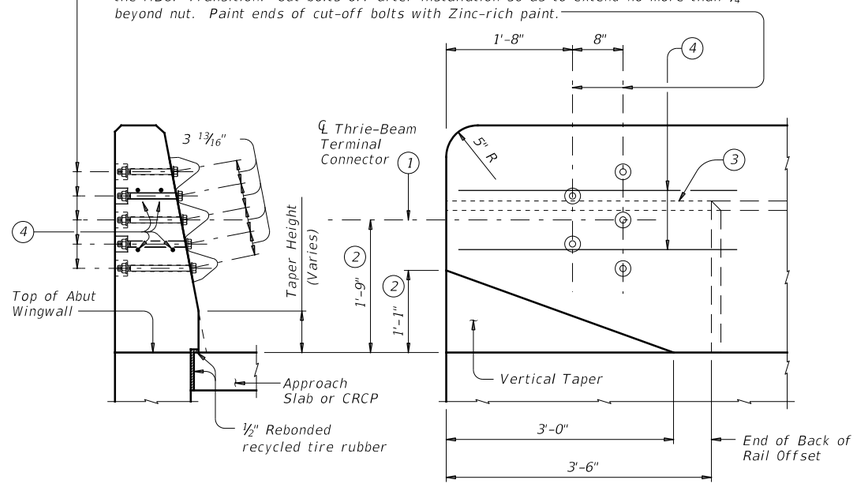
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. Increase 2" for structures with Overlay.
3. Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
4. Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6, ETC.
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		97

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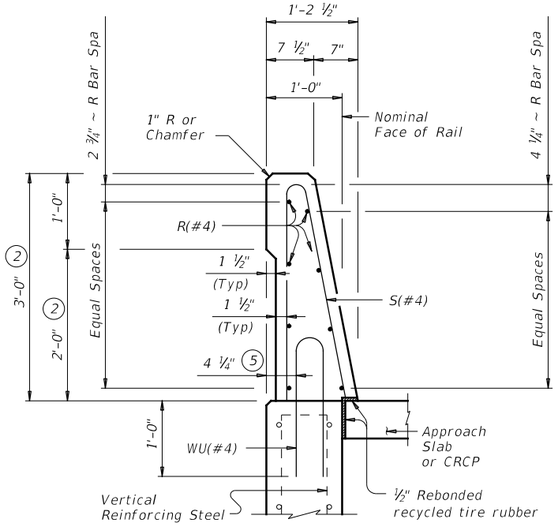
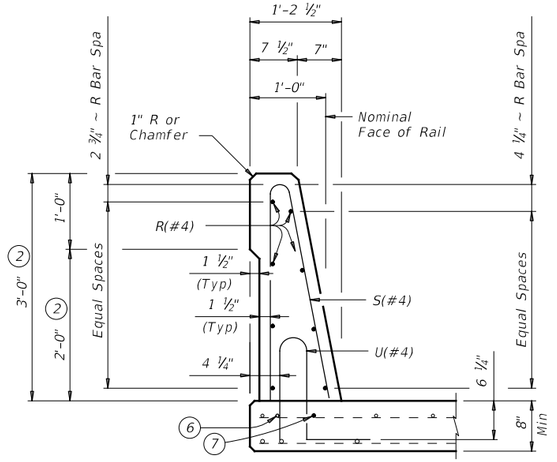


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

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

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

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

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

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

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

CONSTRUCTION NOTES:

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

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

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

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

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"

Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

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

Do not use this railing on bridges with expansion joints providing more than 5" movement.

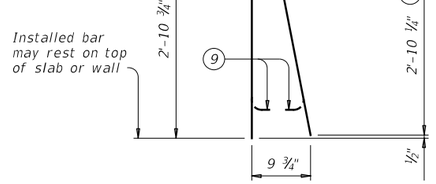
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

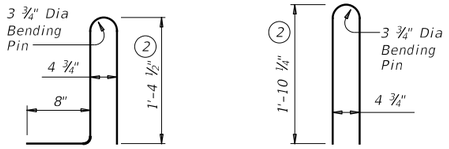
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

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

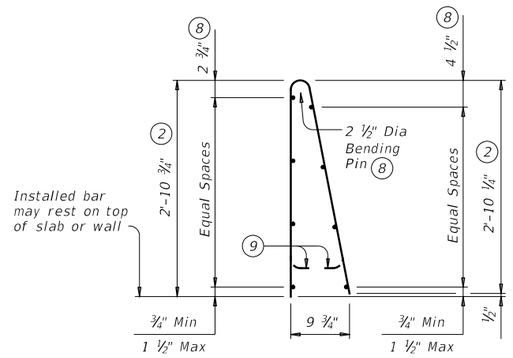


BARS S (#4)



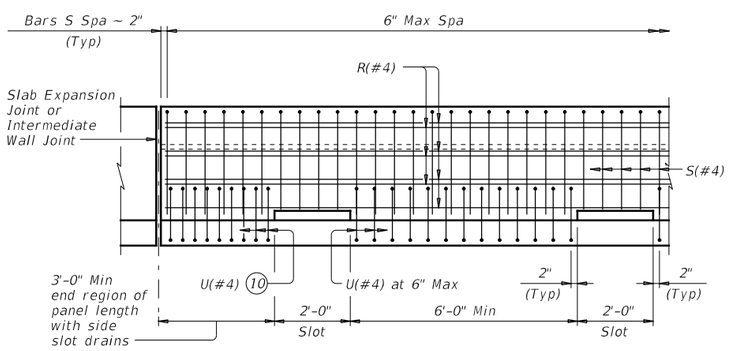
BARS U (#4)

BARS WU (#4)



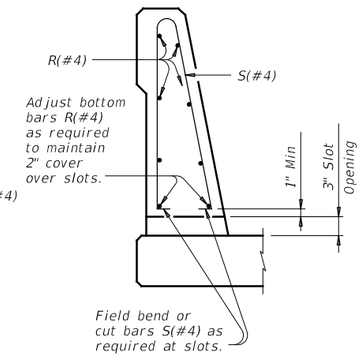
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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



OPTIONAL SIDE SLOT DRAIN DETAIL

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



SECTION THRU OPTIONAL SIDE SLOT DRAIN

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114, ETC.	SH 6, ETC.
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		98

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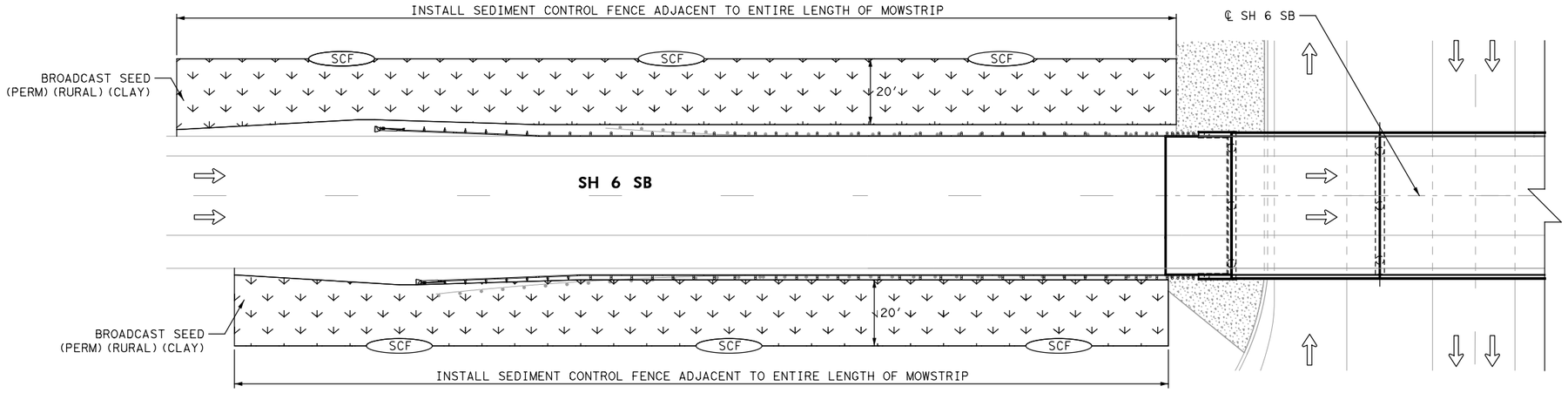
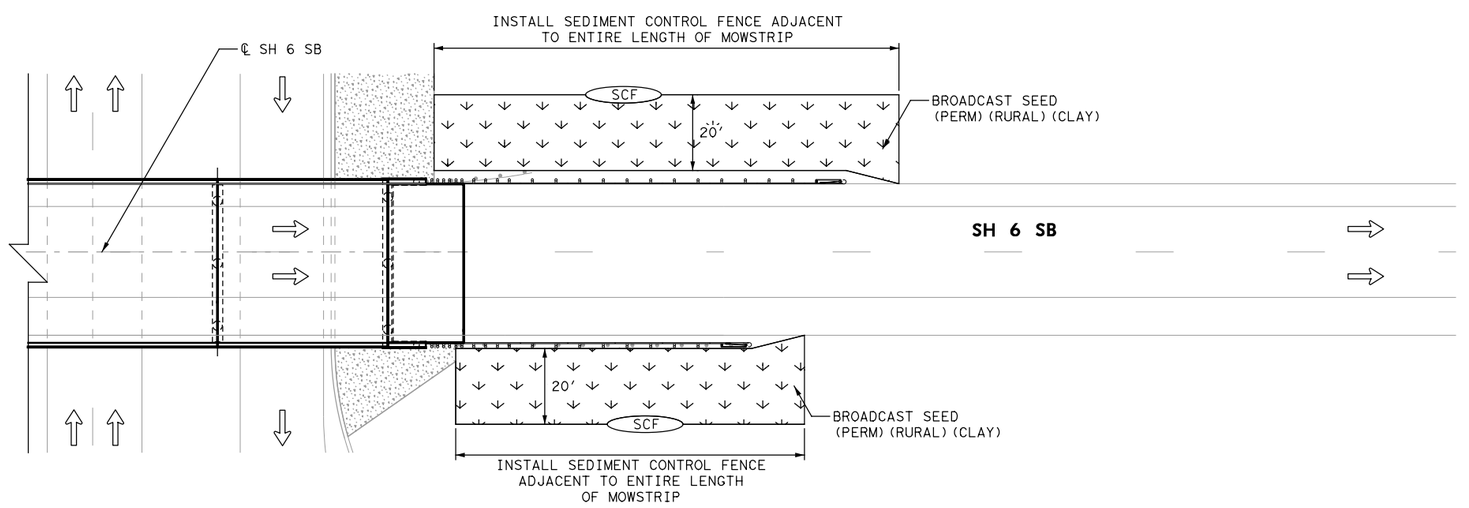


NORTH END OF BRIDGE



SOUTH END OF BRIDGE

N

0 20 40
SCALE IN FEET

LEGEND

- EXIST TRAFFIC FLOW ARROWS
- SCF — SEDIMENT CONTROL FENCE
- SEEDING

NOTES:

1. SW3P TYPICAL LAYOUT APPLIES TO SH 6 SB OVERPASS AT SH 90, AND SH 6 NB OVERPASS AT SH 90.
2. PROVIDE CONSTRUCTION EXITS AS DIRECTED BY ENGINEER. EACH DIMENSIONED 50'x20'.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED PROFESSIONAL ENGINEER

5/31/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation
© 2023

SWP3 TYPICAL LAYOUT

SCALE: =1": 40'

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6,ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	99
CHECK	CONTROL	SECTION	JOB	
	0050	03	114,ETC.	

USER: malvarez
DATE: 5/31/2023
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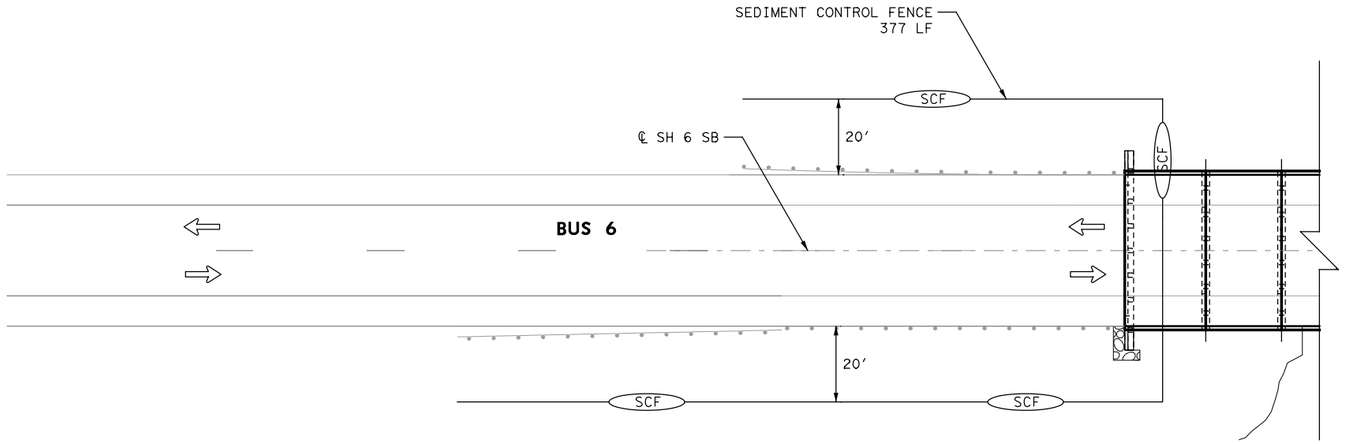
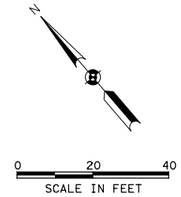


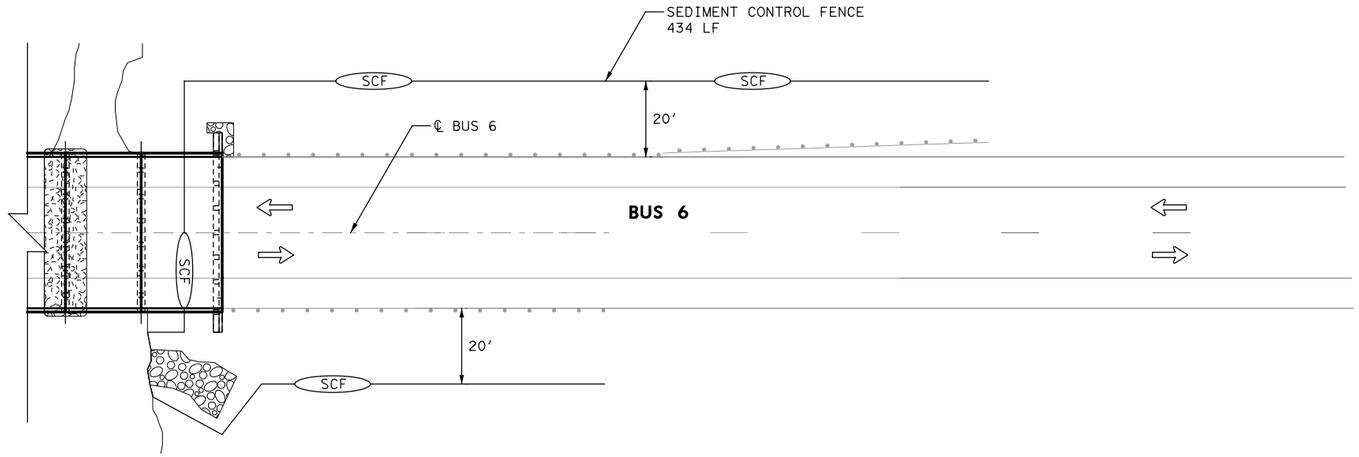


LEGEND

- EXIST TRAFFIC FLOW ARROWS
- SCF — SEDIMENT CONTROL FENCE
- SEEDING

NOTES:

1. SW3P TYPICAL LAYOUT APPLIES TO SH 6 AT SANDY CREEK.
2. PROVIDE CONSTRUCTION EXITS AS DIRECTED BY ENGINEER. EACH DIMENSIONED 50′x20′.



5/31/2023

NO.	REVISION	BY	DATE

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

BUS 6
AT SANDY CREEK
SWP3 TYPICAL LAYOUT

SCALE: =1": 40′ SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			SH 6, ETC.
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	BRY	GRIMES	100
CHECK	CONTROL	SECTION	JOB	
	0050	03	114, ETC.	

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STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.
For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.
This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0050-03-114, 0050-03-112, 0050-03-113, 0050-11-025, 0050-11-024

1.2 PROJECT LIMITS:

From: SEE LOCATION MAP

To: SEE LOCATION MAP

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 30°-20'-38" ,(Long) 96°-3'-5"

END: (Lat) 30°-20'-38" ,(Long) 96°-3'-35"

BEGIN: (Lat) 30°-23'-50" ,(Long) 96°-4'-18"

END: (Lat) 30°-23'-48" ,(Long) 96°-4'-17"

BEGIN: (Lat) 30°-23'-48" ,(Long) 96°-4'-16"

END: (Lat) 30°-23'-50" ,(Long) 96°-4'-17"

BEGIN: (Lat) 30°-23'-23" ,(Long) 96°-5'-22"

END: (Lat) 30°-23'-22" ,(Long) 96°-5'-21"

BEGIN: (Lat) 30°-21'-49" ,(Long) 96°-4'-23"

END: (Lat) 30°-21'-50" ,(Long) 96°-4'-24"

1.4 TOTAL PROJECT AREA (Acres): 2.35 ACRES

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.16 ACRES

1.6 NATURE OF CONSTRUCTION ACTIVITY:

BRIDGE MAINTENANCE CONSISTING OF BRIDGE PREVENTATIVE MAINTENANCE

1.7 MAJOR SOIL TYPES:

Soil Type	Description
SAND (SH 6)	CHAZOS LOAMY FINE SAND, 1 TO 5% SLOPES
SAND (SH 6 NB)	CHAZOS LOAMY FINE SAND, 1 TO 5% SLOPES
SAND (SH 6 SB)	CHAZOS LOAMY FINE SAND, 1 TO 5% SLOPES
LOAM (CEDAR CREEK)	GOWKER CLAY LOAM, FREQUENTLY FLOODED
LOAM (SANDY CREEK)	GOWKER CLAY LOAM, FREQUENTLY FLOODED

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- ☐ PSLs determined during preconstruction meeting
- ☐ PSLs determined during construction
- ☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

- X Mobilization
- X Install sediment and erosion controls
- ☐ Blade existing topsoil into windrows, prep ROW, clear and grub
- ☐ Remove existing pavement
- ☐ Grading operations, excavation, and embankment
- ☐ Excavate and prepare subgrade for proposed pavement widening
- ☐ Remove existing culverts, safety end treatments (SETs)
- X Remove existing metal beam guard fence (MBGF), bridge rail
- ☐ Install proposed pavement per plans
- ☐ Install culverts, culvert extensions, SETs
- X Install mow strip, MBGF, bridge rail
- ☐ Place flex base
- ☐ Rework slopes, grade ditches
- ☐ Blade windrowed material back across slopes
- X Revegetation of unpaved areas
- X Achieve site stabilization and remove sediment and erosion control measures
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- X Sediment laden stormwater from stormwater conveyance over disturbed area
- X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- X Solvents, paints, adhesives, etc. from various construction activities
- ☐ Transported soils from offsite vehicle tracking
- ☐ Construction debris and waste from various construction activities
- ☐ Contaminated water from excavation or dewatering pump-out water
- ☐ Sanitary waste from onsite restroom facilities
- ☐ Trash from various construction activities/receptacles
- ☐ Long-term stockpiles of material and waste
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
CEDAR CREEK	NAVASOTA RIVER (SECTION 1209)
SANDY CREEK	BRAZOS RIVER (SECTION 1202)

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- ☐ Other: _____
- ☐ Other: _____

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED
PROFESSIONAL ENGINEER

5/31/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			101
STATE	STATE DIST.	COUNTY	
TEXAS	BRY	BRAZOS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	03	112, ETC.	SH 6, ETC.

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- X ☐ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- X ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- X Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STATE OF TEXAS
MIKAEL ALVAREZ
144049
LICENSED
PROFESSIONAL ENGINEER

5/31/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			102
STATE	STATE DIST.	COUNTY	
TEXAS	BRY	BRAZOS	
CONT.	SECT.	JOB	HIGHWAY NO.
0050	03	112, ETC.	SH 6, ETC.

During the planning phase of project development the following environmental permits, issues and commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities. As additional environmental clearances may be required.

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.

☒ Required Action ☐ No Action Required

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction

Refer to 2014 TxDOT Standard Specification Items:
7.7.2 Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention PLans (SWP3)
506 Temporary Erosion, Sedimentation and Environmental Controls
734 Litter Removal
735 Debris Removal
738 Cleaning and Sweeping Highways

II. WORK IN OR NEAR STREAMS, WATER BODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.
The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP#

Required Actions: List locations of waters of the US.

1. Sandy Creek

Information regarding the USACE Nationwide Permit Program can be found at:
http://www.swf.usace.army.mil/Missions/Regulatory/Permitting/GeneralPermits.aspx

Refer to 2014 TxDOT Standard Specification Items:
7.7.3 Work in Waters of the United States
7.7.6 Project Specific Locations
496 Removing Structures
506 Temporary Erosion, Sedimentation and Environmental Controls
506.4.3.4 Restricted Activities and Required Precautions

III. CULTURAL RESOURCES

Refer to 2014 TxDOT Standard Specification Item 7.7.1 Cultural Resources, in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) immediately cease work in the vicinity and contact the Engineer.

☐ Required Action ☒ No Action Required

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

☐ Required Action ☒ No Action Required

Refer to 2014 TxDOT Standard Specification Items:
160 Topsoil
161 Compost
162 Sodding for Erosion Control
164 Seeding for Erosion Control
166 Fertilizer
168 Vegetative Watering
169 Soil Retention Blankets
170 Irrigation System
180 Wildflower Seeding
192 Landscape Planting
193 Landscape Establishment
506 Temporary Erosion, Sedimentation, and Environmental Controls
730 Roadside Mowing
751 Landscape Maintenance
752 Tree and Brush Removal

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☒ Required Action ☐ No Action Required

Action No.

1. Do not kill snakes or other animals!
2. Do not destroy nests on structures within the project limits.

   Temporarily prevent the building of nests on any structures that require work within the project limits during the construction timeframe.

   This can be accomplished by application of bird repellant gel, netting, or removal by hand every 3-4 days.

   The nesting/breeding season for migratory birds is March 1 - September 1.

Under the Migratory Bird Treaty Act (MBTA), it is unlawful by any means or manner, to pursue, hunt, take, capture, [or] kill any migratory birds except as permitted by regulation (16 U.S.C. 703-704). Neither the statute nor its implementing regulations (Title 50, Code of Federal Regulations, Parts 10, 13, 21) exempt unintentional take of migratory birds. The unauthorized take (e.g. killing, capturing, or collecting) of migratory birds is a strict liability criminal offense that does not require knowledge or specific intent on the part of the offender. Even when engaged in an otherwise lawful activity for which the intent is not the killing of migratory birds, a violation may be committed.

3. If caves or sinkholes are discovered, cease work in the immediate area to verify the presence or absence of wildlife.
4. BMPs for T and E species will be discussed at the preconstruction meeting.

The Bryan District Environmental Section can be contacted at (979) 778-9766 to assist with the removal of wildlife that will not leave on their own with gentle persuasion.

Refer to 2014 TxDOT Standard Specification Item:
7.7.6 Project Specific Locations

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 appropiate 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 Engineerimmediately. The Contractor shall be responsiblefor the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notifiy DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discoverd on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ Required Action ☐ No Action Required

Action No.

1. The Clean Water Act, in part, requires that any spill of oil that could enter a waterway, as defined by the Act, and that violates appliacble water quality standards or causes a film or sheen on water require reporting to the TCEQ and local authorities.
   Contact the Bryan District Environmental Section at 979-778-9766.

   If potentially hazardous material and/or contaminated media (i.e. soil, groudwater, surface water, sediment, building materials) are unexpectedly encountered during construction, immediately cease work in the vicinity and contact the Engineer.

   Refer to 2014 TxDOT Standard Specification Items:
   6.10 Hazardous Materials
   7.12 Responsibility for Hazardous Materials

VII. OTHER ENVIRONMENTAL ISSUES

☐ Required Action ☒ No Action Required

Refer to 2014 TxDOT Standard Specification Items:

7.7.6 Project Specific Locations
751 Landscape Maintenance

Contacts:

Mr. John D. Moravec
Environmental Coordinator
Texas Department of Transportation
Bryan District
2591 N. Earl Rudder Freeway
Bryan, TX 77803
Phone: (979) 778-9766
Fax: (979) 778-9702
e-mail: John.Moravec@txdot.gov

PRINT DATE	REVISION DATE
06/30/2023	02/12/2015

Texas Department of Transportation
Bryan District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED. RD. DIV. NO.	PROJECT NUMBER		HIGHWAY NUMBER
6			SH 6, ETC.
STATE	DISTRICT	COUNTY	
TEXAS	BRY	GRIMES	
CONTROL	SECTION	JOB	SHEET NO.
0050	03	114, ETC.	103

REV DATE: 2-12-2015
CSJ: 0050-03-114
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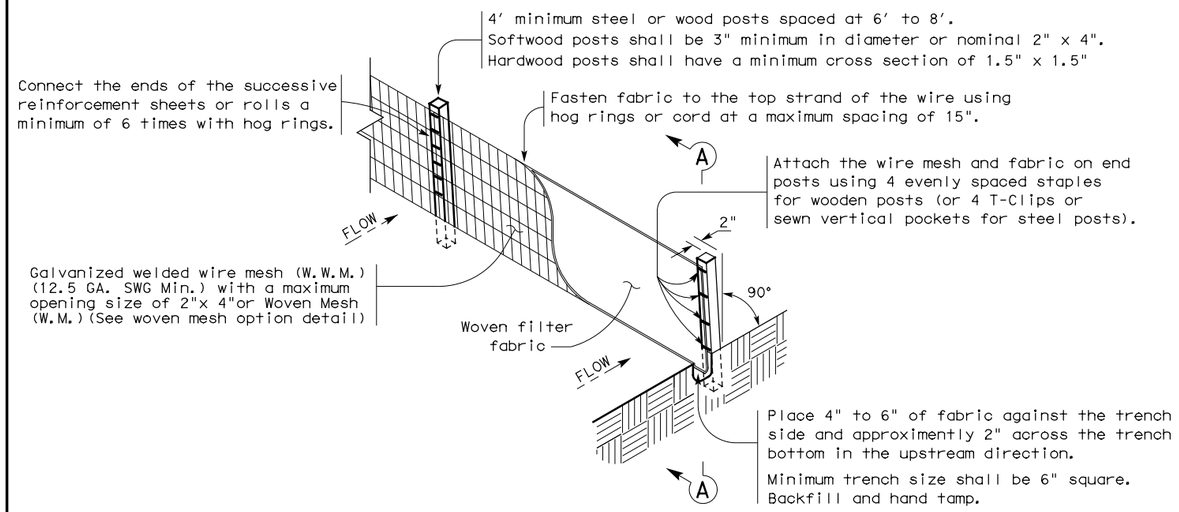
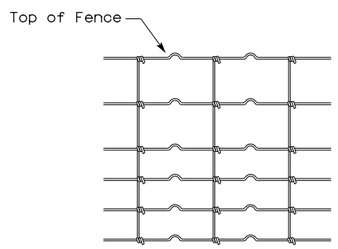
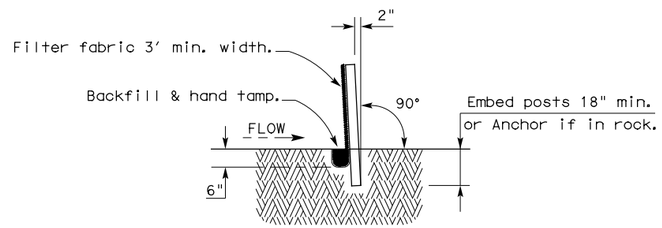


TEMPORARY SEDIMENT CONTROL FENCE

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.

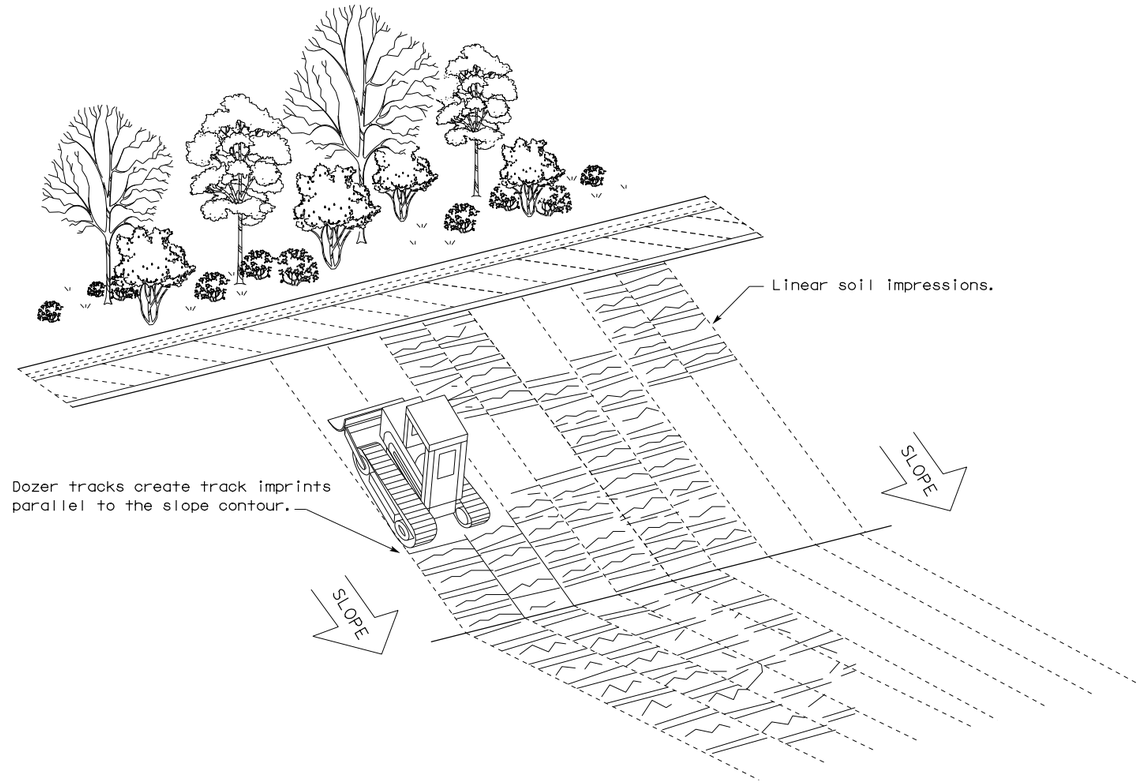
LEGEND

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

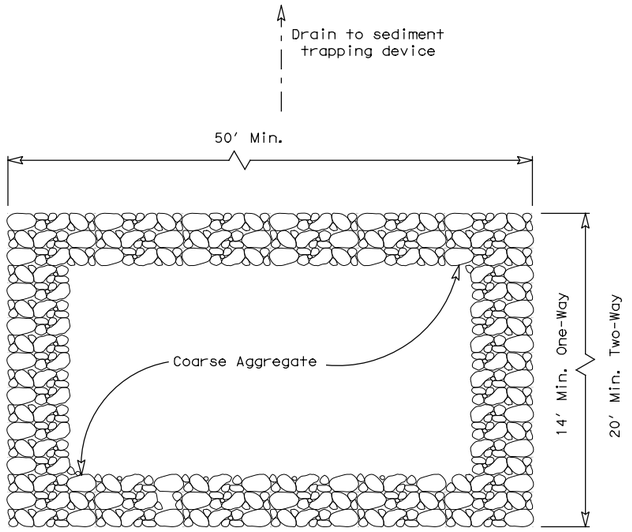
FENCE & VERTICAL TRACKING

EC(1)-16

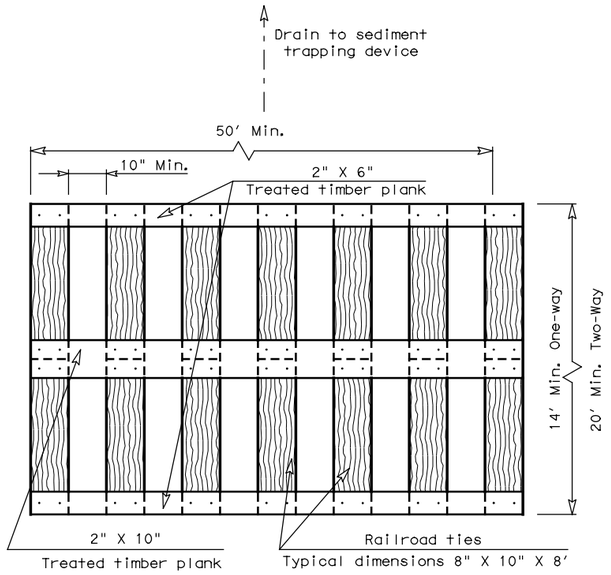
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		104

DATE: 2023
FILE: Environmental\ec116.dgn

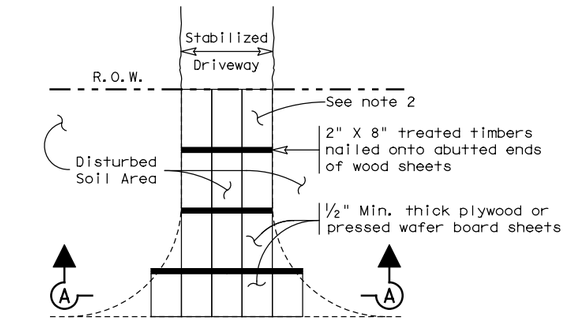
DATE: 5/31/2023
FILE: ...\Environmental\ec316 (1).dgn



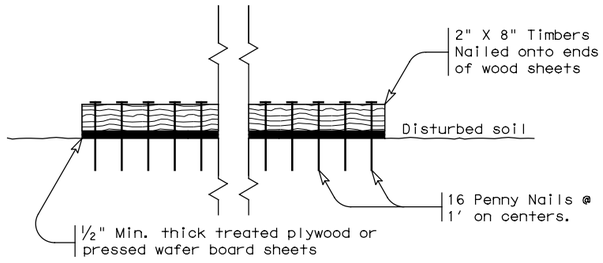
PLAN VIEW



PLAN VIEW



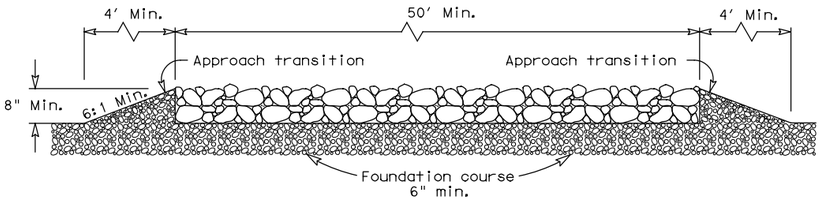
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



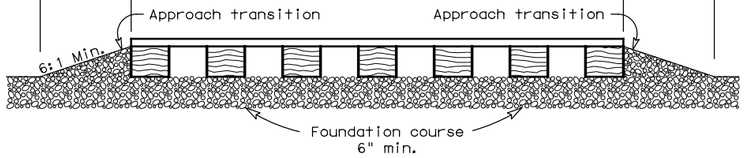
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50′.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50′.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0050	03	114,ETC.	SH 6
	DIST	COUNTY		SHEET NO.
	BRY	GRIMES		105