FED.RD. DIV.NO.	FEDERAL AID PROJECT	SHEET NO.
6	BR 2024 (304) ETC.	1
STATE	STATE DISTRICT	COUNTY
TEXAS	ODA	ECTOR, ETC
CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
0004	07	139, ETC	IH20, ETC

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT: BR 2024(304), ETC

ECTOR COUNTY, ETC
IH-20, ETC

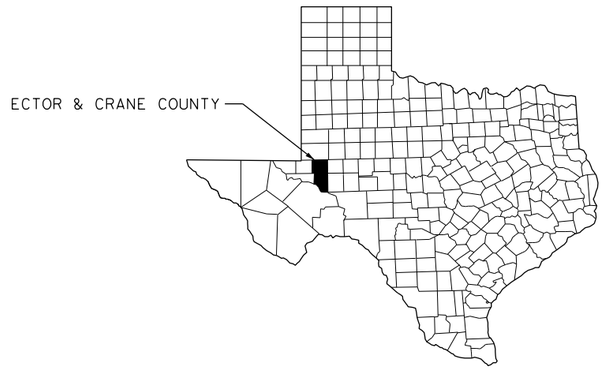
LIMITS: FM 1053 AT PECOS RIVER
IH 20 AT UPRR
IH 20 AT DRAW
SH 302 / LP 338 NB AT IH 20 / UPRR
LP 250 AT IH 20 BUS / UPRR

CONSTRUCTION OF BRIDGE MAINTENANCE

CONSISTING OF CLEANING AND SEALING EXISTING JOINTS, CONCRETE REPAIRS, STEEL PAINTING, RAIL RETROFIT AND MBGF.

INDEX OF SHEETS

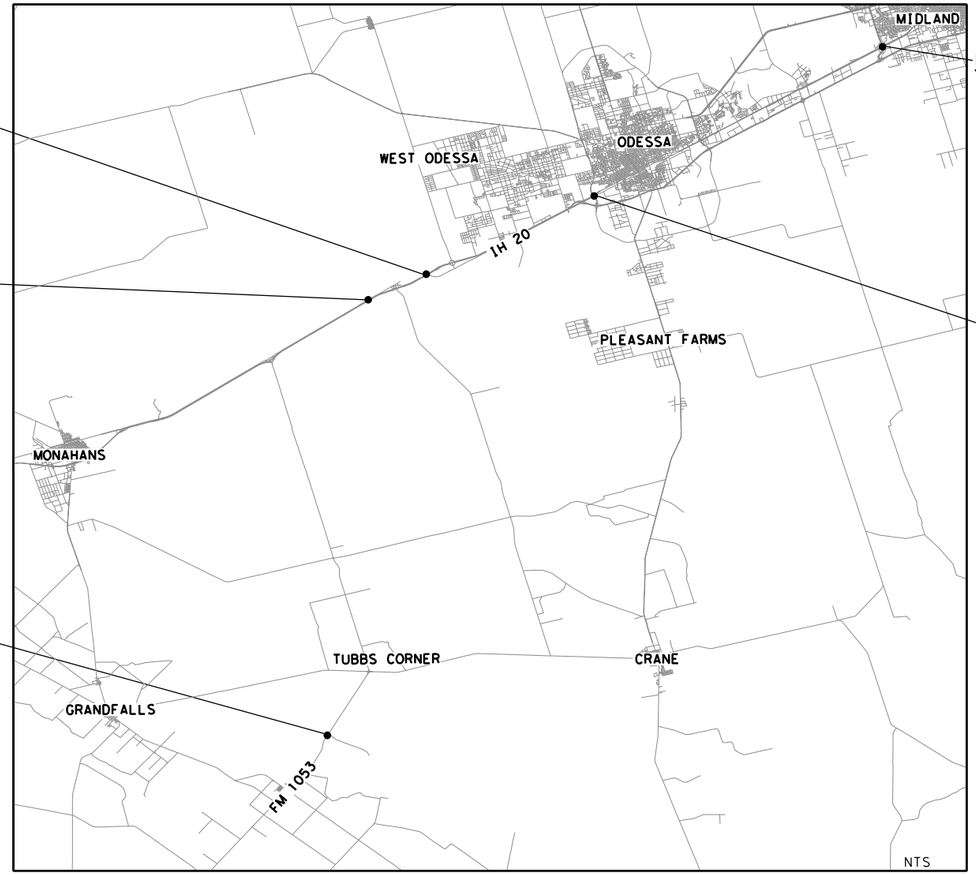
SEE SHEET 2



LOCATION 02 & 03
COUNTY: ECTOR
CSJ: 0004-07-139
CSJ: 0004-07-140
PROJECT NO.:
HIGHWAY: IH 20
LIMITS: UPRR
NBI: 06-069-0004-07-022
NBI: 06-069-0004-07-023
ROADWAY = 0.00 LF = 0.000 MI
BRIDGE = 400.00 LF = 0.076 MI
TOTAL = 400.00 LF = 0.076 MI

LOCATION 04 & 05
COUNTY: ECTOR
CSJ: 0004-07-142
CSJ: 0004-07-141
PROJECT NO.:
HIGHWAY: IH 20
LIMITS: DRAW
NBI: 06-069-0004-07-024
NBI: 06-069-0004-07-025
ROADWAY = 0.00 LF = 0.000 MI
BRIDGE = 400.00 LF = 0.076 MI
TOTAL = 400.00 LF = 0.076 MI

LOCATION 01
COUNTY: CRANE
CSJ: 0866-03-017
PROJECT NO.:
HIGHWAY: FM 1053
LIMITS: PECOS RIVER
NBI: 06-052-0866-03-002
ROADWAY = 0.00 LF = 0.048 MI
BRIDGE = 251.50 LF = 0.048 MI
TOTAL = 251.50 LF = 0.048 MI



FUNCTIONAL CLASSIFICATION: INTERSTATE
CSJ: 0004-07-139 DESIGN SPEED = 75 MPH
ADT = 31,297 (2022)
ADT = 43,816 (2042)
CSJ: 0004-07-140 DESIGN SPEED = 75 MPH
ADT = 31,297 (2022)
ADT = 43,816 (2042)
CSJ: 0004-07-141 DESIGN SPEED = 75 MPH
ADT = 30,807 (2022)
ADT = 43,130 (2042)
CSJ: 0004-07-142 DESIGN SPEED = 75 MPH
ADT = 30,807 (2022)
ADT = 43,130 (2042)

FUNCTIONAL CLASSIFICATION: MAJOR COLLECTOR
CSJ: 0866-03-017 DESIGN SPEED = 70 MPH
ADT = 1,045 (2022)
ADT = 1,463 (2042)

FUNCTIONAL CLASSIFICATION: PRINCIPAL ARTERIAL
CSJ: 2224-01-125 DESIGN SPEED = 55 MPH
ADT = 19,807 (2022)
ADT = 27,730 (2042)

FUNCTIONAL CLASSIFICATION: PRINCIPAL ARTERIAL
CSJ: 1188-02-120 DESIGN SPEED = 55 MPH
ADT = 17,948 (2022)
ADT = 31,230 (2042)

LOCATION 07
COUNTY: MIDLAND
CSJ: 1188-02-120
PROJECT NO.:
HIGHWAY: LP 250
LIMITS: IH20 BUS/UPRR
NBI: 06-165-0005-03-267
ROADWAY = 0.00 LF = 0.000 MI
BRIDGE = 504.00 LF = 0.095 MI
TOTAL = 504.00 LF = 0.095 MI

LOCATION 06
COUNTY: ECTOR
CSJ: 2224-01-125
PROJECT NO.:
HIGHWAY: SH 302/LP 338 NB
LIMITS: IH20/UPRR
NBI: 06-069-2224-01-228
ROADWAY = 0.00 LF = 0.000 MI
BRIDGE = 480.00 LF = 0.091 MI
TOTAL = 480.00 LF = 0.091 MI

STATE OF TEXAS
RICARDO A. PRIETO
91123
LICENSED
PROFESSIONAL ENGINEER

8/9/2023

2023
Texas Department of Transportation

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: UNION PACIFIC RAILROAD COMPANY

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 FHMA 1273, *October 23, 2023*)

RECOMMENDED FOR LETTING 09/15/2023
DocuSigned by: Joel Romero, PE
AREA ENGINEER

RECOMMENDED FOR LETTING 09/15/2023
DocuSigned by:
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

APPROVED FOR LETTING 09/15/2023
DocuSigned by: Eric Zyss, PE
DISTRICT ENGINEER

DATE: 8/9/2023 11:00:56 AM
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\01 general\Title Sheet.dgn

COUNTY_____ PROJ. NO._____
HWY. NO._____ LETTING DATE_____
DATE ACCEPTED_____

INDEX OF SHEETS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET ## HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

MARCELO CABALLERO — NAME
9/19/2023 — DATE

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET ** HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

KENNETH E. GOTTLEABER — NAME
9/19/2023 — DATE

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				2
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

LOCATION 02
HWY: IH 20 WB
CSJ: 0004-07-139
BEGIN PROJECT
STA. 989+37.10
END PROJECT
STA. 991+37.10

LOCATION 03
HWY: IH 20 EB
CSJ: 0004-07-140
BEGIN PROJECT
STA. 989+37.10
END PROJECT
STA. 991+37.10

LOCATION 04
HWY: IH 20 EB
CSJ: 0004-07-142
BEGIN PROJECT
STA. 1131+24.90
END PROJECT
STA. 1133+24.90

LOCATION 05
HWY: IH 20 WB
CSJ: 0004-07-141
BEGIN PROJECT
STA. 1131+24.90
END PROJECT
STA. 1133+24.90

LOCATION 01
HWY: FM 1053
CSJ: 0866-03-017
BEGIN PROJECT
STA. 280+39.25
END PROJECT
STA. 282+90.75

LOCATION 07
HWY: LP 250
CSJ: 1188-02-120
BEGIN PROJECT
STA. 931+23.97
END PROJECT
STA. 936+27.97

LOCATION 06
HWY: SH 302/LP 338 NB
CSJ: 2224-01-125
BEGIN PROJECT
STA. 1023+91.25
END PROJECT
STA. 1028+71.25

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

PROJECT LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				3
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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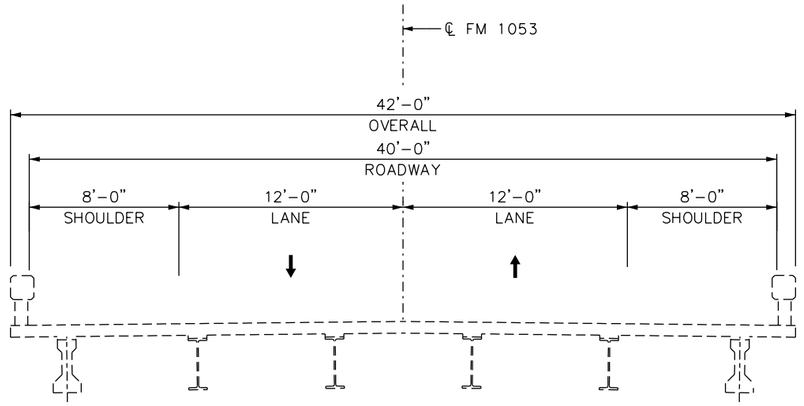

EXISTING BRIDGE TYPICAL SECTION
FM 1053
CSJ: 0866-03-017
STA. 280+39.25 TO STA. 282+90.75

NOTES:
1. FOR BRIDGE REPAIRS REFER TO "BRIDGE REPAIR LAYOUT" SHEET 61

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

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Texas Department of Transportation

TYPICAL SECTIONS

FM 1053 OVER PECOS RIVER
06-052-0866-03-002

SHEET 1 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				4
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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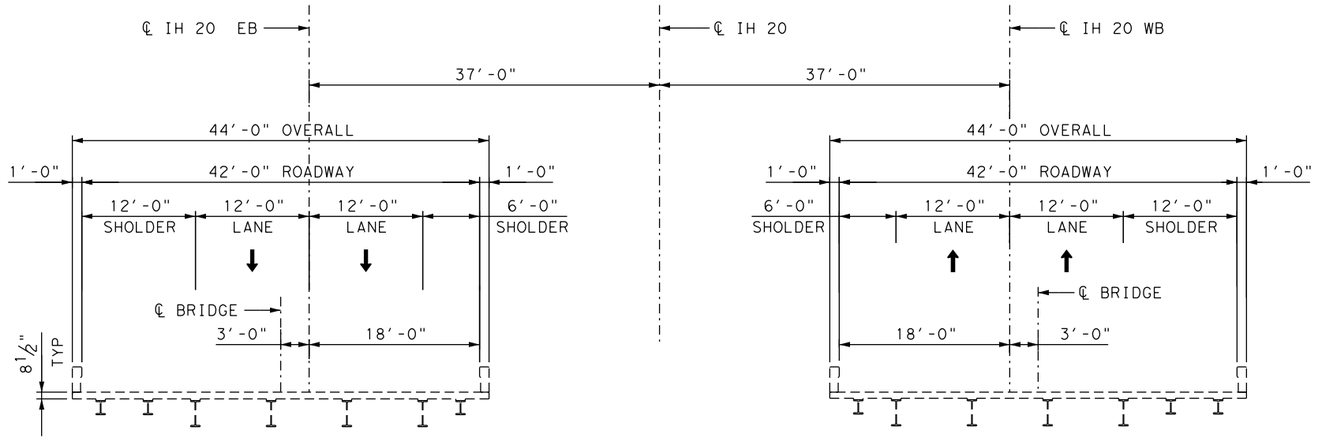
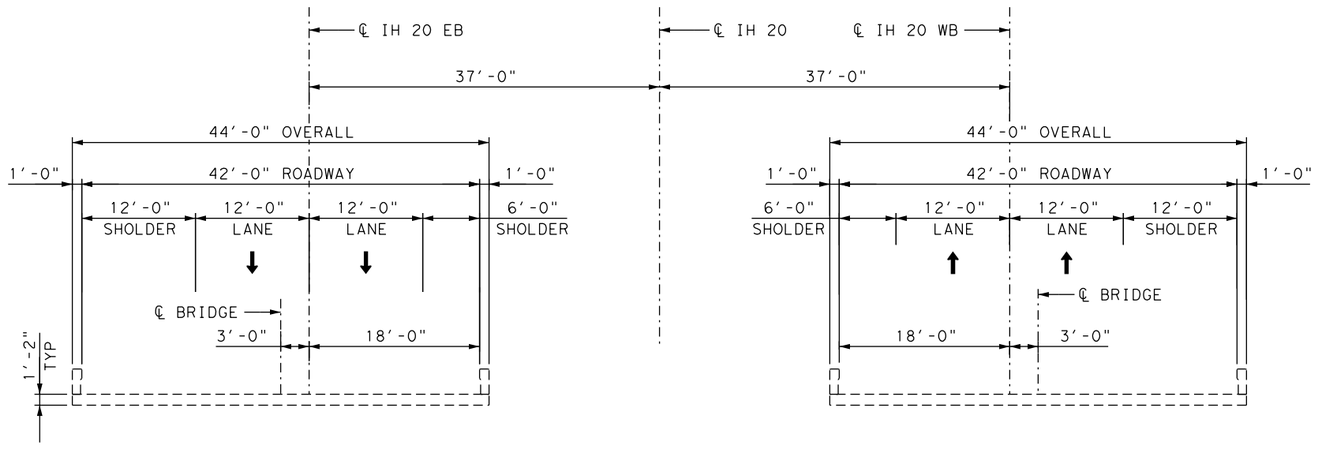


IH 20 EB OVER UPRR
EXISTING TYPICAL SECTION

CSJ: 0004-07-140
IH 20 EB OVER UPRR: STA. 989+37.10 TO STA. 991+37.10

IH 20 WB OVER UPRR
EXISTING TYPICAL SECTION

CSJ: 0004-07-139
IH 20 WB OVER UPRR: STA. 989+37.10 TO STA. 991+37.10



IH 20 EB OVER DRAW
EXISTING TYPICAL SECTION

CSJ: 0004-07-142
IH 20 EB OVER DRAW: STA. 1131+24.90 TO STA. 1133+24.90

IH 20 WB OVER DRAW
EXISTING TYPICAL SECTION

CSJ: 0004-07-141
IH 20 WB OVER DRAW: STA. 1131+24.90 TO STA. 1133+24.90

NOTES:
1. FOR BRIDGE REPAIRS REFER TO "BRIDGE REPAIR LAYOUTS" SHEETS 63, 65, 67 AND 69

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

TYPICAL SECTIONS
IH 20 OVER UPRR & DRAW
06-069-0004-07-022
06-069-0004-07-023
06-069-0004-07-024
06-069-0004-07-025

SHEET 2 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				5
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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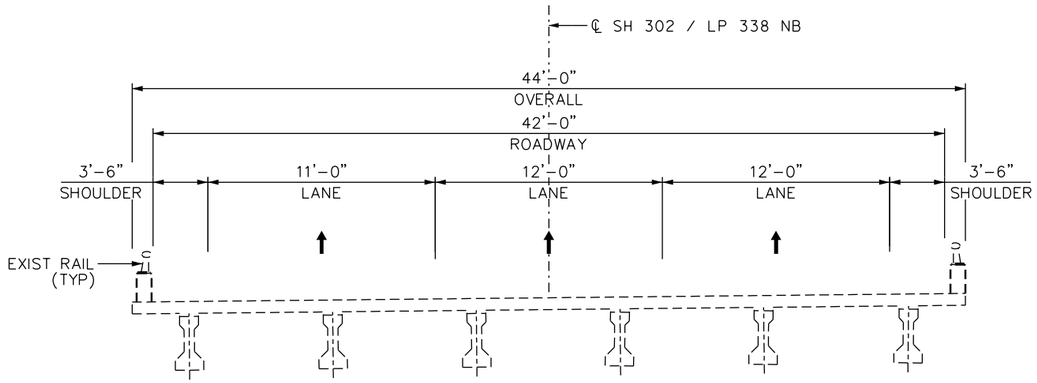
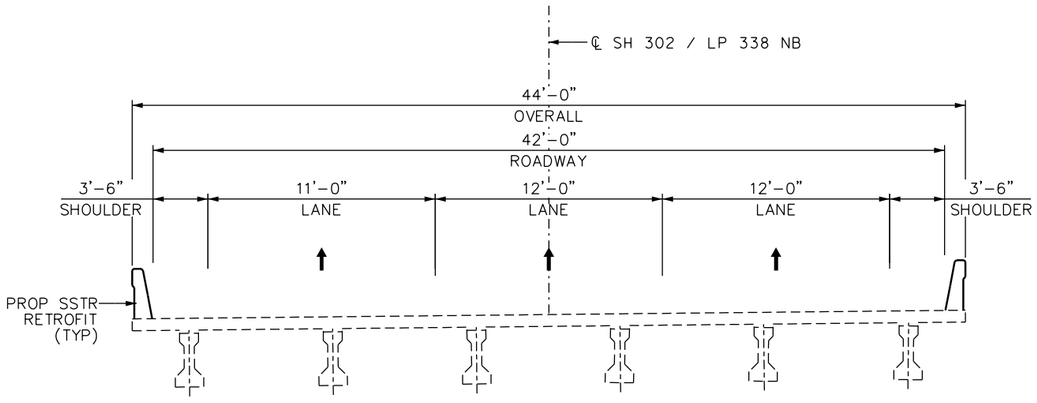


EXISTING BRIDGE TYPICAL SECTION
SH 302/LP 338 NB OVER IH 20 & UPRR
CSJ: 2224-01-125
STA. 1023+91.25 TO STA. 1028+71.25



PROPOSED BRIDGE TYPICAL SECTION
SH 302/LP 338 NB OVER IH 20 & UPRR
CSJ: 2224-01-125
STA. 1023+91.25 TO STA. 1028+71.25

NOTES:
1. FOR BRIDGE REPAIRS REFER TO "BRIDGE REPAIR LAYOUT" SHEET 71

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

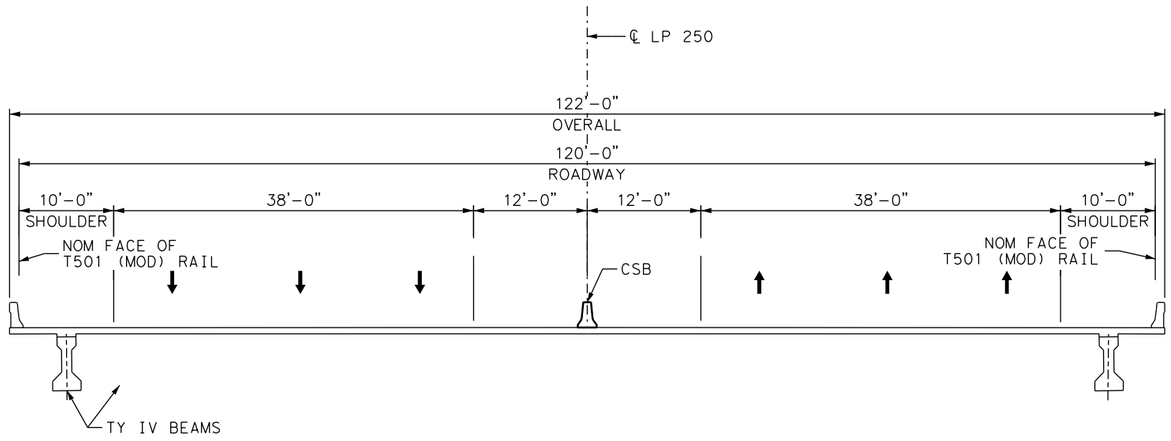
TYPICAL SECTIONS

SH 302/LP 338 NB OVER
IH 20 & UPRR
06-069-2224-01-228

SHEET 3 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				6
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09



EXIST/PROP BRIDGE TYPICAL SECTION
LP 250
CSJ: 1188-02-120
STA. 931+23.97 TO STA. 936+27.97

NOTES:
1. FOR BRIDGE REPAIRS REFER TO "BRIDGE REPAIR LAYOUT" SHEET 73

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

TYPICAL SECTIONS

LP 250 OVER IH20 BUS & UPRR
06-165-0005-03-267

SHEET 4 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				7
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

Contractor questions on this project will be accepted through email at the following address:

- ODA-PreLettingQuestions@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.

Item 5: Control of the Work

The following TxDOT Department standards have been modified for this project:

C-RAIL-R (MOD)

Item 6: Control of Materials

Restrict storage of equipment and materials to approved areas. The Engineer will not approve storage in any TxDOT yard.

Promptly and properly dispose of any waste generated from servicing equipment on the project.

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.
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

Utilities (public, private and TxDOT) exist throughout the project. Prior to any excavation, investigate to determine the utility locations within the project right of way. Contact the TxDOT Odessa Traffic Operations shop at 432-498-4690 to investigate and determine the location of any TxDOT utility that may exist within the project right of way. Exercise caution when excavating in areas where investigations have determined that utilities exist. The contractor is responsible for maintaining utility markings.

County: Ector, etc
Highway: IH-20, etc **Control: 0004-07-139, etc**

No significant traffic generator events identified.

As an element of ensuring public safety and convenience under Article 7.2.4, the Contractor is hereby directed to open all closed lanes and shoulder and remove all traffic control devices from any areas where work is not being actively performed unless overnight traffic control is required and approved by the engineer. Removed devices must be stored outside of the clear zones near the right of way line or removed from the right of way line entirely.

At any time during construction that a previously installed crash cushion is damaged by the traveling public and is requested to be repaired by the Engineer, the repair will be paid at the same unit cost as the original installation.

Item 8: Prosecution and Progress

The following portions of the plans may affect the Contractor's planned construction sequencing. The Contractor's attention is directed to the appropriate plan sheet or standard sheet.

-Traffic Control Plan

-Storm Water Pollution Prevention Plan

-Environmental Permit, Issues And Commitments (EPIC)

Working days will be computed and charged in accordance with Article 8. 3.1.4. "Standard Workweek."

Increased Liquidated Damages apply to this project using Road User Cost (RUC) of $862 per working day.

90-day lead time is needed to allow for sufficient time to obtain and produce materials needed for various bid items in this project.

Item 432: Riprap

Use approved expansion joint material and place between the proposed riprap and curb and gutter.

Reinforce all riprap on this project with no. 3 bars spaced 12 inches O.C.B.W. or no. 4 bars spaced at 18 inches O.C.B.W.

Broom finish all riprap on this project unless otherwise directed.

Polypropylene fiber may not be used in lieu of reinforcing steel.

In addition to reinforcing steel, polypropylene fiber is required at a rate of 1.5 lbs. /cy.

NO.	DATE	REVISION	APPROV.

consor F-12040

Texas Department of Transportation

GENERAL NOTES

SHEET 1 OF 3

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				8
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

Item 502: Barricades, Signs, and Traffic Handling

Stop work immediately if any major traffic control element such as an advanced warning flashing panel or TMA or PCMS is not in good working order or control setup.

Maintain "No Center Line", "Do Not Pass" and "Pass With Care" signs until the permanent lane markings have been placed in accordance with plans.

Place orange fencing around sidewalk, wheelchair ramps and other pedestrian areas that pose a hazard to pedestrian traffic as directed.

Use Shoulder Drop-Off (CW8-9A) signs during construction when shoulder drop-off conditions are 3 inches or greater or as directed. Placement shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices".

This project has a regulatory work zone speed reduction within the project limits. The work zone speed limit is reduced from 70 mph to 60 mph. Placement of speed reduction zone signs shall comply with BC (3)-21. Speed resumption sign(s) is required at the end of a speed reduction zone.

Place chevrons, at a minimum, on every other drum used for outsides of curves, merging tapers and shifting tapers.

Vertical panels shall be self-righting.

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.

When construction operations result in a drop-off of more than 2 inches, a 3:1 or flatter slope will be required. The slope must be constructed with a compacted material capable of supporting vehicles as approved by the Engineer. This work shall be done expeditiously during daylight hours. Flaggers and appropriate signing to safely guide traffic through the work area will be required as directed by the Engineer. This shall be considered subsidiary to Item 502.

Item 506: Temporary Erosion, Sedimentation, and Environmental Controls

In accordance with the Construction General Permit (CGP), erosion control and stabilization measures should be initiated as soon as practicable to include (list what our stabilization measures are – for example, replacing topsoil from windrow, erosion control blankets, seeding, etc.)

The total disturbed area for this project is 0.59 Acres. The disturbed area in this project, all project locations in the contract, and Contractor Project Specific Locations (PSLS), within 1 mile

County: Ector, etc
Highway: IH-20, etc **Control: 0004-07-139, etc**

of the project limits, for the contract will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission On Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLS for construction support activities on or off the right of way. When the total area disturbed for all projects in the contract and PSLS within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLS on the right of way, to the Engineer (or to the appropriate MS4 operator when on an off-state system route).

Upon acceptance of the project, all SW3P devices will become property of the State and maintenance responsibility is transferred to the State until final stabilization is attained.

When applying cement for emulsion, asphalt treatment, or any other soil stabilization, sprinkle water as needed to control cement from blowing and contaminating adjacent vegetation and waters.

Item 540: Metal Beam Guard Fence

Provide steel post for this project.

Item 542: Removing Metal Beam Guard Fence

Do not salvage any existing metal beam guard fence as State property; retain ownership of all material requiring removal including steel posts, metal rail, and hardware, and remove from the project.

For removal of posts embedded in concrete, remove the posts and the concrete footings; payment for removal of concrete footings is subsidiary to Item 542.

Item 658: Delineator and Object Marker Assemblies

Delineator and object marker assembly posts shall be composed of post-consumer recycled materials. Embedded stub shall be perforated square tubing.

Cup Mounted type delineation is needed for delineators on concrete barrier.

Item 4207: Steel Bridge Zone Painting

Apply default special protection system to steel superstructure members as directed.

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

General Note 7 of TCP (2-6)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as "required" plus the 'additional shadow vehicle' is the quantity that has been estimated for this operation.

NO.	DATE	REVISION	APPROV.

consor F-12040

Texas Department of Transportation

GENERAL NOTES

SHEET 2 OF 3

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				9
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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County: Ector, etc
Highway: IH-20, etc **Control: 0004-07-139, etc**

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (6-1)-12; the shadow vehicle(s) with TMA specified on the traffic control plan as "required" is the quantity that has been estimated for this operation.

The Contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Basis of Estimate for Stationary TMAs		
Standard	TMA (Stationary)	
	Required	Total
TCP (2-2)-18	2	2
TCP (6-1b)	4	4
TCP (6-2b)	2	2

NO.	DATE	REVISION	APPROV.

consor
F-12040

Texas Department of Transportation

GENERAL NOTES

SHEET 3 OF 3

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				10
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0004-07-139 **DISTRICT** Odessa **COUNTY** Crane, Ector, Midland
HIGHWAY FM 1053, IH 20, SH 302, SL 250

				0004-07-139		0004-07-140		0004-07-141		0004-07-142		0866-03-017		1188-02-120	
		CONTROL SECTION JOB													
		PROJECT ID		A00192563		A00192566		A00192571		A00192572		A00192561		A00199164	
		COUNTY		Ector		Ector		Ector		Ector		Crane		Midland	
		HIGHWAY		IH 20		IH 20		IH 20		IH 20		FM 1053		SL 250	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	471.000		471.000		373.000		373.000		517.000		14,212.000	
	429-6002	CONC STR REPAIR (EPOXY MORTAR)	SF	15.000								200.000			
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	180.000		80.000		446.000		463.000		300.000		5.000	
	429-6009	CONC STR REPAIR (STANDARD)	SF											10.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY											75.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY												
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	100.000		100.000		88.000		88.000		126.000		360.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF												
	500-6001	MOBILIZATION	LS	1.000											
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	9.000											
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	591.000		529.000		526.000		586.000		933.000		1,064.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	531.000		589.000		586.000		526.000		933.000		1,064.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO									1.000			
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF												
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF												
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF												
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF												
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA												
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA												
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF												
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA												
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA												
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA												
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA												
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA												
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA												
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA												
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA												
	658-6015	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	EA												
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA												
	658-6028	INSTL DEL ASSM (D-SY)SZ (BRF)GF1	EA												
	662-6092	WK ZN PAV MRK REMOV (W)36"(YLD TRI)	EA									2.000			
	780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF	15.000		50.000				20.000		30.000			
	4207-6003	STEEL BRIDGE ZONE PAINTING REF STR #3	EA	1.000		1.000						1.000			
	6185-6002	TMA (STATIONARY)	DAY	48.000		37.000		7.000		7.000		29.000		22.000	
	7306-6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA	2.000		2.000									
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0004-07-139 **DISTRICT** Odessa **COUNTY** Crane, Ector, Midland
HIGHWAY FM 1053, IH 20, SH 302, SL 250

			CONTROL SECTION JOB	**0004-07-139**		**0004-07-140**		**0004-07-141**		**0004-07-142**		**0866-03-017**		**1188-02-120**	
			PROJECT ID	**A00192563**		**A00192566**		**A00192571**		**A00192572**		**A00192561**		**A00199164**	
			COUNTY	**Ector**		**Ector**		**Ector**		**Ector**		**Crane**		**Midland**	
			HIGHWAY	**IH 20**		**IH 20**		**IH 20**		**IH 20**		**FM 1053**		**SL 250**	
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000											

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0004-07-139 **DISTRICT** Odessa **COUNTY** Crane, Ector, Midland
HIGHWAY FM 1053, IH 20, SH 302, SL 250

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**2224-01-125**			
			PROJECT ID		**A00192553**			
			COUNTY		**Ector**			
			HIGHWAY		**SH 302**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		EST.	FINAL		
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY		745.000		17,162.000	
	429-6002	CONC STR REPAIR (EPOXY MORTAR)	SF		80.000		295.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF		530.000		2,004.000	
	429-6009	CONC STR REPAIR (STANDARD)	SF				10.000	
	432-6001	RIPRAP (CONC)(4 IN)	CY				75.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY		56.000		56.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF		176.000		1,038.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF		1,012.000		1,012.000	
	500-6001	MOBILIZATION	LS				1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO				9.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF		526.000		4,755.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF		526.000		4,755.000	
	510-6003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO				1.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF		860.000		860.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF		860.000		860.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF		860.000		860.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF		925.000		925.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA		4.000		4.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA		2.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF		925.000		925.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA		1.000		1.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA		2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA		2.000		2.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA		1.000		1.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA		1.000		1.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA		1.000		1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA		1.000		1.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA		44.000		44.000	
	658-6015	INSTL DEL ASSM (D-SW)SZ (BRF)GF1	EA		34.000		34.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA		44.000		44.000	
	658-6028	INSTL DEL ASSM (D-SY)SZ (BRF)GF1	EA		16.000		16.000	
	662-6092	WK ZN PAV MRK REMOV (W)36"(YLD TRI)	EA				2.000	
	780-6002	CNC CRACK REPAIR (DISCRETE)(INJECT)	LF		130.000		245.000	
	4207-6003	STEEL BRIDGE ZONE PAINTING REF STR #3	EA				3.000	
	6185-6002	TMA (STATIONARY)	DAY		27.000		177.000	
	7306-6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT)	EA				4.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS				1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0004-07-139

DISTRICT Odessa

HIGHWAY FM 1053, IH 20, SH 302, SL 250

COUNTY Crane, Ector, Midland

		CONTROL SECTION JOB		**2224-01-125**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00192553**			
		COUNTY		**Ector**			
		HIGHWAY		**SH 302**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS			1.000	

SUMMARY OF TCP ITEMS

LOCATION	510 6003 ONE-WAY TRAF CONT (PORT TRAF SIG)	512 6001 PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	512 6025 PORT CTB (MOVE)(SGL SLP)(TY 1)	512 6049 PORT CTB (REMOVE)(SGL SLP)(TY 1)	545 6003 CRASH CUSH ATTEN (MOVE & RESET)	545 6005 CRASH CUSH ATTEN (REMOVE)	545 6019 CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	658 6013 INSTL DEL ASSM (D-SW)SZ (BRF)CTB	658 6026 INSTL DEL ASSM (D-SY)SZ (BRF)CTB	662 6092 WK ZN PAV MRK REMOV (W)36"(YLD TRI)	6185 6002 TMA (STATIONARY)
	MO	LF	LF	LF	EA	EA	EA	EA	EA	EA	DAY
CSJ: 0004-07-139											48
CSJ: 0004-07-140											37
CSJ: 0004-07-141											7
CSJ: 0004-07-142											7
CSJ: 0866-03-017	1									2	29
CSJ: 2224-01-125		860	860	860	1	1	1	44	44		27
CSJ: 1188-02-120											22
PROJECT TOTALS	**1**	**860**	**860**	**860**	**1**	**1**	**1**	**44**	**44**	**2**	**177**

SUMMARY OF BRIDGE ITEMS

LOCATION	428 6001 PENETRATING CONCRETE SURFACE TREATMENT	429 6002 CONC STR REPAIR (EPOXY MORTAR)	429 6007 CONC STR REPAIR (VERTICAL & OVERHEAD)	429 6009 CONC STR REPAIR (STANDARD)	432 6001 RIPRAP (CONC)(4 IN)	438 6004 CLEANING AND SEALING EXIST JOINTS(CL7)	451 6024 RETROFIT RAIL (TY SSTR)	780 6002 CNC CRACK REPAIR (DISCRETE) (INJECT)	4207 6003 STEEL BRIDGE ZONE PAINTING REF STR 3 *	7306 6001 BRIDGE SUBSTRUCTURE CLEANING (ABUT)
	SY	SF	SF	SF	CY	LF	LF	LF	EA	EA
CSJ: 0004-07-139	471	15	180			100		15	1	2
CSJ: 0004-07-140	471		80			100		50	1	2
CSJ: 0004-07-141	373		446			88				
CSJ: 0004-07-142	373		463			88		20		
CSJ: 0866-03-017	517	200	300			126		30	1	
CSJ: 2224-01-125	745	80	530			176	1012	130		
CSJ: 1188-02-120	14212		5	10	75	360				
PROJECT TOTALS	**17162**	**295**	**2004**	**10**	**75**	**1038**	**1012**	**245**	**3**	**4**

*BRIDGE SURFACE AREA QUANTITY SUMMARY
(FOR CONTRACTOR'S INFORMATION ONLY)

FM 1053
CSJ: 0866-03-017
TOTAL STEEL SURFACE AREA = 2,166 SF

IH20 WB
CSJ: 0004-07-139
TOTAL STEEL SURFACE AREA = 2,962 SF

IH20 EB
CSJ: 0004-07-140
TOTAL STEEL SURFACE AREA = 2,962 SF

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

SUMMARY OF QUANTITIES

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				15
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

SUMMARY OF MBGF ITEMS

LOCATION	432 6045 RIPRAP (MOW STRIP)(4 IN)	540 6002 MTL W-BEAM GD FEN (STEEL POST)	540 6006 MTL BEAM GD FEN TRANS (THRIE-BEAM)	540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION	542 6001 REMOVE METAL BEAM GUARD FENCE	542 6002 REMOVE TERMINAL ANCHOR SECTION	542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL	544 6001 GUARDRAIL END TREATMENT (INSTALL)	544 6003 GUARDRAIL END TREATMENT (REMOVE)	658 6015 INSTL DEL ASSM (D-SW)SZ (BRF)GF1	658 6028 INSTL DEL ASSM (D-SY)SZ (BRF)GF1
	CY	LF	EA	EA	LF	EA	EA	EA	EA	EA	EA
CSJ: 0004-07-139											
CSJ: 0004-07-140											
CSJ: 0004-07-141											
CSJ: 0004-07-142											
CSJ: 0866-03-017											
CSJ: 2224-01-125	56	925	4	2	925	1	2	2	1	34	16
CSJ: 1188-02-120											
PROJECT TOTALS	**56**	**925**	**4**	**2**	**925**	**1**	**2**	**2**	**1**	**34**	**16**

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	506 6042 BIODEG EROSN CONT LOGS (INSTL) (18")	506 6043 BIODEG EROSN CONT LOGS (REMOVE)
	LF	LF
CSJ: 0004-07-139	591	531
CSJ: 0004-07-140	529	589
CSJ: 0004-07-141	526	586
CSJ: 0004-07-142	586	526
CSJ: 0866-03-017	933	933
CSJ: 2224-01-125	526	526
CSJ: 1188-02-120	1064	1064
PROJECT TOTALS	**4755**	**4755**

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

SUMMARY OF QUANTITIES

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				16
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

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TRAFFIC CONTROL PLAN NARRATIVE:

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

GENERAL:

1. TRAFFIC MUST BE HANDLED THROUGHOUT THE PROJECT DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A SAFE AND COMFORTABLE PASSAGE FOR VEHICULAR TRAFFIC WITH MINIMAL INCONVENIENCE TO THE PUBLIC, AS SHOWN IN THE PLANS OR AS DIRECTED AND APPROVED BY THE ENGINEER.

2. THE CONTRACTOR MAY PROPOSE OR RECOMMEND MODIFICATIONS TO THE SEQUENCE OF CONSTRUCTION FOR CONSIDERATION BY THE ENGINEER. ANY MAJOR RECOMMENDED MODIFICATION BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS BID ITEMS, IMPACT TO TRAFFIC, AND EFFECT OF OVERALL PROJECT IN TIME AND COST. IF THIS PROPOSAL IS IMPLEMENTED, THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING DETAILED PLAN SHEETS TO BE SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR INCLUSION WITH THE CHANGE ORDER. THE CONTRACTOR CANNOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED PHASE OR SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME, DURING CONSTRUCTION, THE CONTRACTOR'S PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, THE CONTRACTOR WILL IMMEDIATELY CHANGE THEIR OPERATION TO CORRECT THE UNSATISFACTORY CONDITION.

3. TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR. ENSURE ADEQUATE POSITIVE DRAINAGE DURING ALL PHASES OF CONSTRUCTION.

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

5. THE CONTRACTOR WILL NOTIFY THE ENGINEER IN WRITING OF UPCOMING LANE CLOSURES 10 BUSINESS DAYS IN ADVANCE FOR ALL TEMPORARY CLOSURES OR DETOURS.

6. ACCESS TO ADJOINING PROPERTY MUST BE MAINTAINED AT ALL TIMES.

7. NO EQUIPMENT WILL BE LEFT WITHIN 30 FEET OF TRAVEL WAY AFTER WORKING HOURS UNLESS LOCATED BEHIND TRAFFIC BARRIER.

8. REMOVAL AND DISPOSAL OF EXISTING ABANDONED UTILITIES (EITHER PREVIOUSLY ABANDONED OR ABANDONED DURING THIS PROJECT) REQUIRED TO SUPPORT THIS PROJECT'S CONSTRUCTION WILL BE PERFORMED UNDER THE OVERALL PREPARING RIGHT OR WAY ITEM (ITEM 100).

9. COVER PERMANENT SIGNS IF NOT USED. PAYMENT WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

10. SEE BC STANDARDS AND THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) FOR SIGN SPACING AND LOCATION REQUIREMENTS NOT SHOWN IN THE PLANS.

11. SEE THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) FOR CHANNELIZING DEVICE SPACING REQUIREMENTS NOT SHOWN IN THE PLANS.

12. WORK ZONE PAVEMENT MARKINGS WILL BE RAISED PAVEMENT MARKERS ON THE NEW BRIDGE AND WILL BE PAID FOR UNDER ITEM 672.

13. THE CONTRACTOR WILL PROVIDE, CONSTRUCT, AND MAINTAIN ALL BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARD SHEETS SHALL BE IN CONFORMANCE WITH THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND THE STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS.

14. BARRICADES AND WARNING SIGNS SHALL BE PLACED AS SHOWN ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS DIRECTED BY FIELD CONDITIONS TO PROVIDE FOR THE SAFE PASSAGE OF TRAFFIC AT ALL TIMES.

15. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED AND APPROVED BY THE ENGINEER, AT SUCH POINTS, AND FOR SUCH PERIODS OR TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTOR'S PERSONNEL.

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

17. THE USE OF RUBBER-TIRED EQUIPMENT WILL BE REQUIRED FOR MOVING DIRT OR OTHER MATERIALS ALONG OR ACROSS PAVEMENT SURFACES. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS PAVEMENT, THEY SHALL PROTECT THE PAVEMENT FROM DAMAGE AS DIRECTED AND APPROVED BY THE ENGINEER.

18. THROUGHOUT CONSTRUCTION OPERATIONS, THE CONTRACTOR WILL BE REQUIRED TO CONDUCT THEIR HAULING OPERATIONS IN A MANNER SUCH THAT VEHICLES WILL NOT HAUL OVER PERVIOUSLY RE-COMPACTED SUBGRADE OR COMPACTED BASE MATERIAL, EXCEPT IN SHORT SECTIONS FOR DUMPING MANIPULATIONS.

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

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

SEQUENCE OF CONSTRUCTION:

1. PREPARING RIGHT OF WAY AND REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE CONSTRUCTION IS OCCURING, AS PER THE PHASES NOTED BELOW.

2. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), PER TMUTCD, SHALL BE PLACED 7 CALENDAR DAYS IN ADVANCE OF LANE CLOSURES AND CHANGES IN TRAFFIC PATTERNS. THE ENGINEER SHALL APPROVE THE LOCATION OF PCMS PRIOR TO PLACEMENT AND/OR RELOCATION. THE ENGINEER SHALL APPROVE THE WORDING OF THE PCMS.

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

9/14/2023

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

TRAFFIC CONTROL GENERAL NOTES

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				17
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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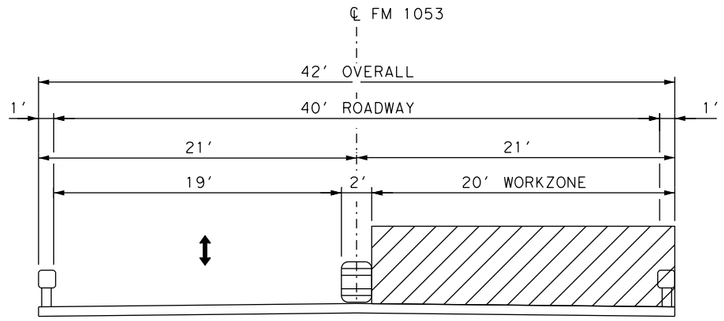
LEGEND

PROPOSED TRAFFIC ARROW

WORK ZONE

PHASE 1:

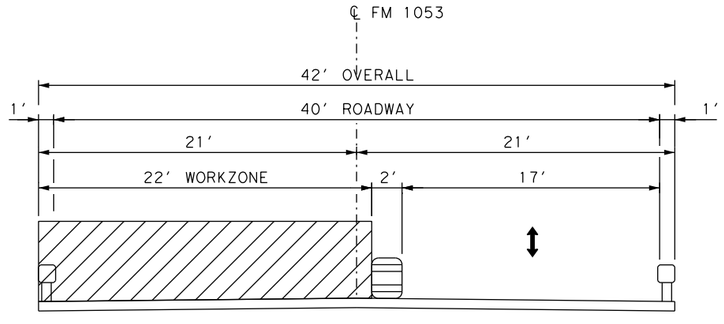
1. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND THE LATEST TMUTCD.
2. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
3. INSTALL ONE LANE TWO-WAY WORK TRAFFIC CONTROL AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
4. CLEAN AND SEAL EXISTING JOINTS.
5. APPLY BRIDGE ZONE PAINTING FOR EXISTING STEEL SUPERSTRUCTURE.



CLEAN AND SEAL JOINTS
STA 280+39.25 TO STA 282+90.75
PHASE I

PHASE 2:

1. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
3. INSTALL ONE LANE TWO-WAY WORK TRAFFIC CONTROL AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. CLEAN AND SEAL EXISTING JOINTS. REPAIR CRACKS AND SPALLS.
4. REMOVE ANY TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE PLANS.
5. COMPLETE ALL WORK ON THE PLANS AND AS DIRECTED.



CLEAN AND SEAL JOINTS
STA 280+39.25 TO STA 282+90.75
PHASE II

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

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Texas Department of Transportation

TRAFFIC CONTROL PLAN TYPICAL SECTIONS

FM 1053 OVER PECOS RIVER

SHEET 1 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				18
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

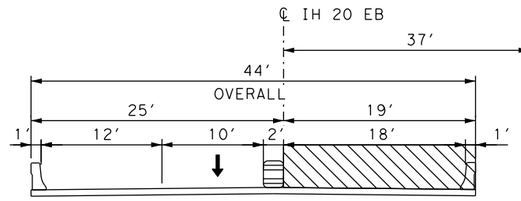
LEGEND

→ PROPOSED TRAFFIC ARROW

▨ WORK ZONE

PHASE 1:

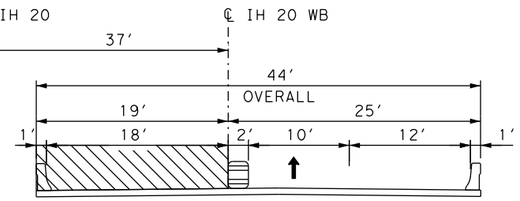
1. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND THE LATEST TMUTCD.
2. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
3. SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
4. CLEAN AND SEAL EXISTING JOINTS.
5. APPLY BRIDGE ZONE PAINTING FOR EXISTING STEEL SUPERSTRUCTURE. (IH-20 OVER UPRR)



CLEAN AND SEAL JOINTS

IH 20 EB AT DRAW: STA 989+37.10 TO STA 991+37.10
IH 20 EB AT UPRR: STA 1131+24.90 TO STA 1133+24.90

PHASE I



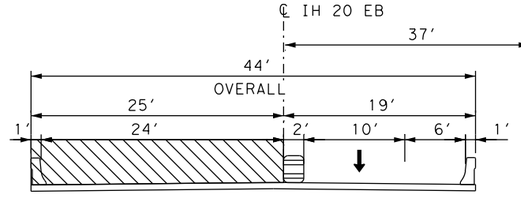
CLEAN AND SEAL JOINTS

IH 20 WB AT DRAW: STA 989+37.10 TO STA 991+37.10
IH 20 WB AT UPRR: STA 1131+24.90 TO STA 1133+24.90

PHASE I

PHASE 2:

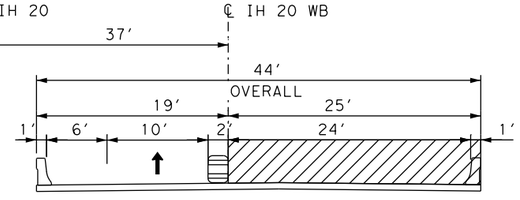
1. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
2. INSTALL SHOULDER AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. CLEAN AND SEAL EXISTING JOINTS. REPAIR CRACKS AND SPALLS.
4. REMOVE ANY TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE PLANS.
5. COMPLETE ALL WORK ON THE PLANS AND AS DIRECTED.



CLEAN AND SEAL JOINTS

IH 20 WB AT DRAW: STA 989+37.10 TO STA 991+37.10
IH 20 WB AT UPRR: STA 1131+24.90 TO STA 1133+24.90

PHASE II



CLEAN AND SEAL JOINTS

IH 20 EB AT DRAW: STA 989+37.10 TO STA 991+37.10
IH 20 EB AT UPRR: STA 1131+24.90 TO STA 1133+24.90

PHASE II

SCALE: NTS

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138393
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Texas Department of Transportation

TRAFFIC CONTROL PLAN TYPICAL SECTIONS
IH 20 OVER DRAW
IH 20 OVER UPRR

SHEET 2 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				19
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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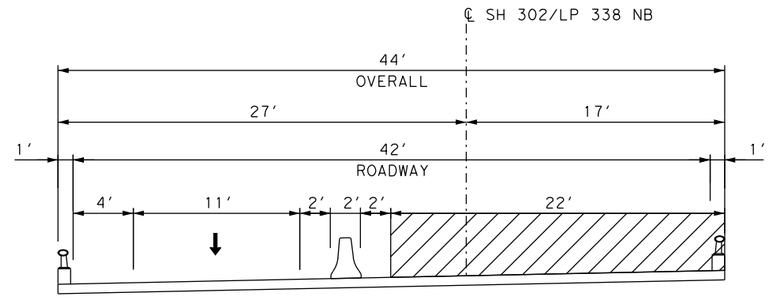
LEGEND

PROPOSED TRAFFIC ARROW

WORK ZONE

PHASE 1:

1. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND THE LATEST TMUTCD.
2. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
3. INSTALL SHOULDER WORK TRAFFIC CONTROL AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
4. CLEAN AND SEAL EXISTING JOINTS. RETROFIT RAIL SSTR. REPAIR CRACKS AND SPALLS.

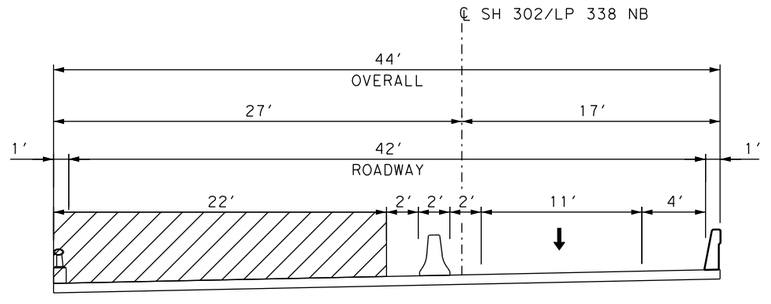


INSTALL RAILING,
REPLACE MBGF,
AND CLEAN AND SEAL JOINTS.
STA 1023+91.25 TO STA 1028+71.25

PHASE I

PHASE 2:

1. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
2. INSTALL SHOULDER WORK TRAFFIC CONTROL AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. CLEAN AND SEAL EXISTING JOINTS. RETROFIT RAIL SSTR. REPAIR CRACKS AND SPALLS.
4. REMOVE ANY TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE PLANS.
5. COMPLETE ALL WORK ON THE PLANS AND AS DIRECTED.



INSTALL RAILING,
REPLACE MBGF,
AND CLEAN AND SEAL JOINTS.
STA 1023+91.25 TO STA 1028+71.25

PHASE II

SCALE: NTS

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TRAFFIC CONTROL PLAN TYPICAL SECTIONS

SH 302/LP 338 NB OVER IH 20 & UPRR

SHEET 3 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				20
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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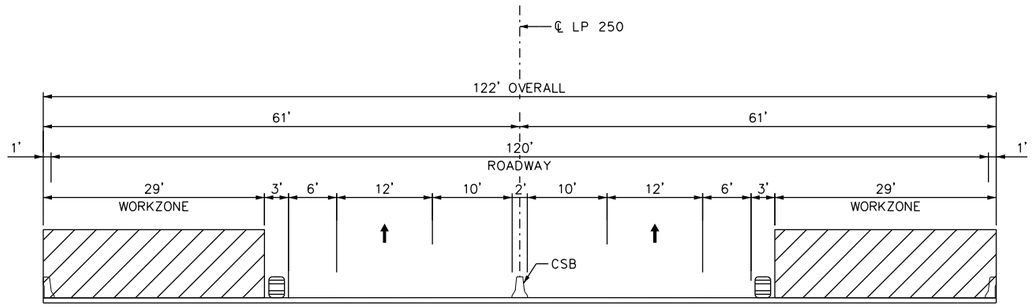
LEGEND

PROPOSED TRAFFIC ARROW

WORK ZONE

PHASE 1:

1. INSTALL ADVANCE WARNING SIGNS ACCORDING TO THE BC STANDARDS AND THE LATEST TMUTCD.
2. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
3. INSTALL SHOULDER WORK TRAFFIC CONTROL AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
4. CLEAN AND SEAL EXISTING JOINTS. INSTALL PENETRATING CONCRETE SURFACE TREATMENT AT BRIDGE DECK AND SUBSTRUCTRURE ELEMENTS. REPAIR SPALLS.

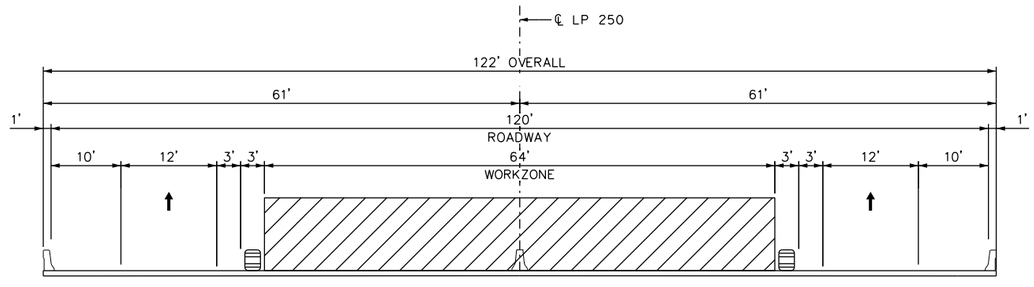


PENETRATING CONCRETE SURFACETRATMENT
CLEAN AND SEAL JOINTS
STA. 931+23.97 TO STA. 936+27.97

PHASE I

PHASE 2:

1. INSTALL TEMPORARY EROSION CONTROL IN ACCORDANCE WITH THE PLANS OR AS DIRECTED.
2. INSTALL SHOULDER WORK TRAFFIC CONTROL AND SET UP TRAFFIC CONTROL IN ACCORDANCE WITH THE TCP LAYOUTS, TYPICAL SECTIONS, AND APPLICABLE TCP STANDARDS.
3. CLEAN AND SEAL EXISTING JOINTS. INSTALL PENETRATING CONCRETE SURFACE TREATMENT AT BRIDGE DECK AND SUBSTRUCTRURE ELEMENTS. REPAIR SPALLS.
4. REMOVE ANY TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE PLANS.
5. COMPLETE ALL WORK ON THE PLANS AND AS DIRECTED.



PENETRATING CONCRETE SURFACETRATMENT
CLEAN AND SEAL JOINTS
STA. 931+23.97 TO STA. 936+27.97

PHASE II

SCALE: NTS

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TRAFFIC CONTROL PLAN TYPICAL SECTIONS

LP 250 OVER IH20 BUS & UPRR

SHEET 4 OF 4

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				21
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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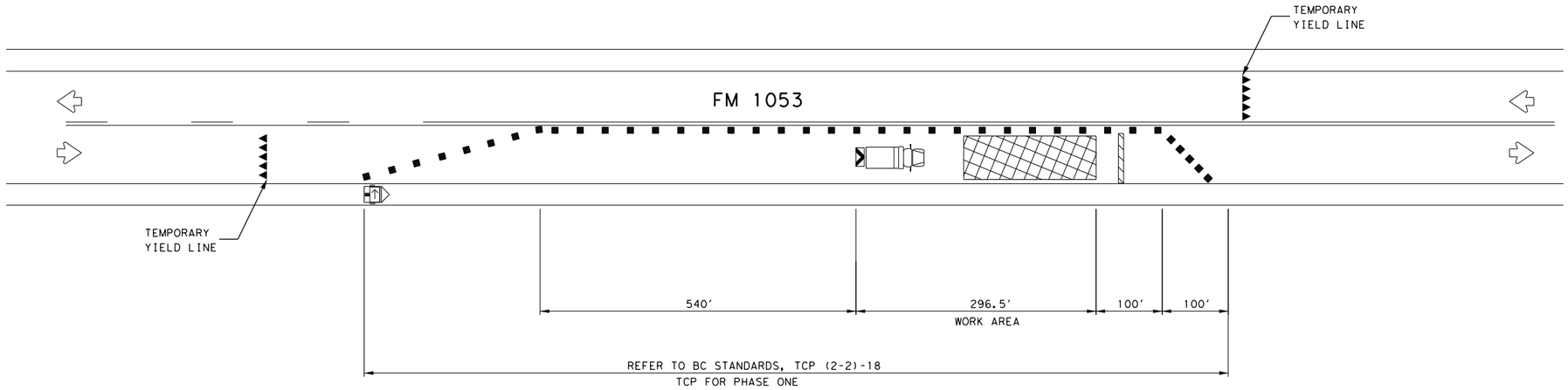
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger



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TRAFFIC CONTROL PLAN
FM 1053 OVER PECOS RIVER
PHASE ONE

SHEET 1 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				22
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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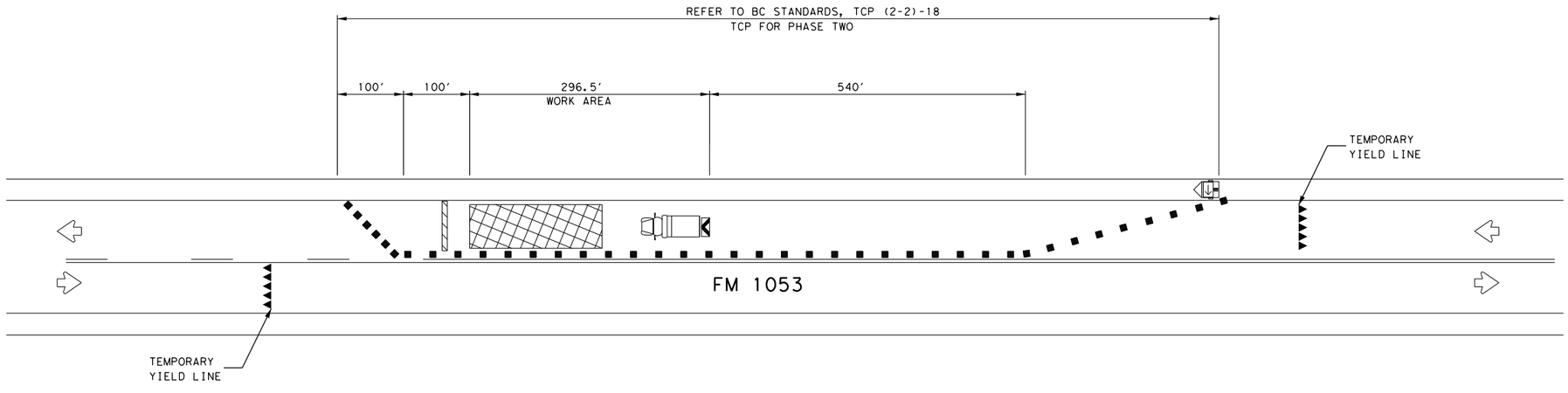
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger



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TRAFFIC CONTROL PLAN
FM 1053 OVER PECOS RIVER PHASE TWO

SHEET 2 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				23
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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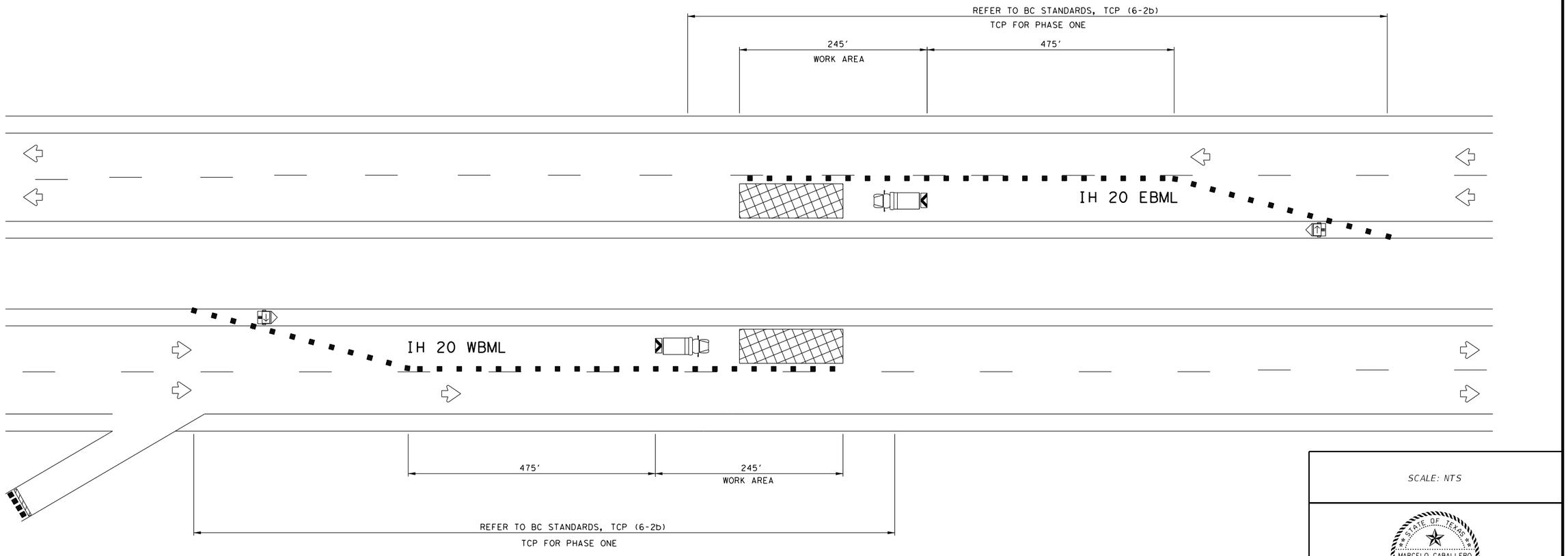
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger



SCALE: NTS

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TRAFFIC CONTROL PLAN
IH 20 OVER UPRR
IH 20 OVER DRAW
PHASE ONE

SHEET 1 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				24
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

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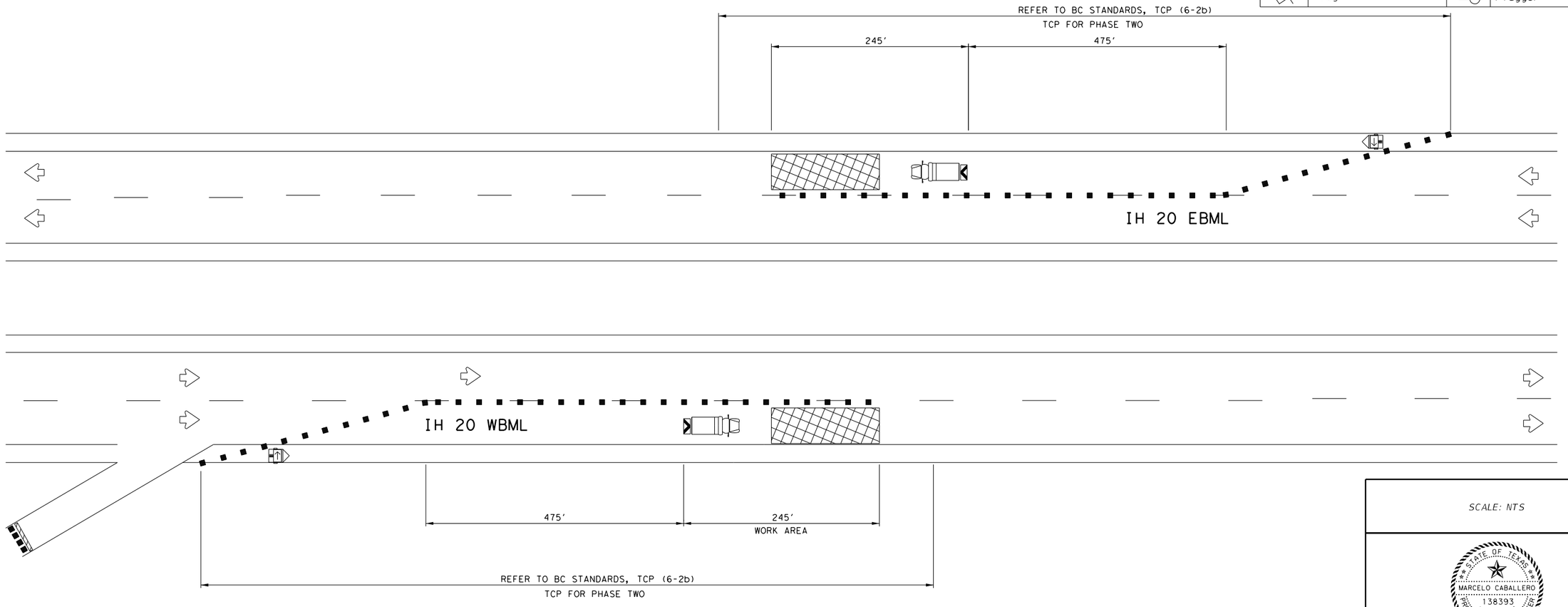
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger



SCALE: NTS

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TRAFFIC CONTROL PLAN
IH 20 OVER UPRR
IH 20 OVER DRAW
PHASE TWO

SHEET 2 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				25
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

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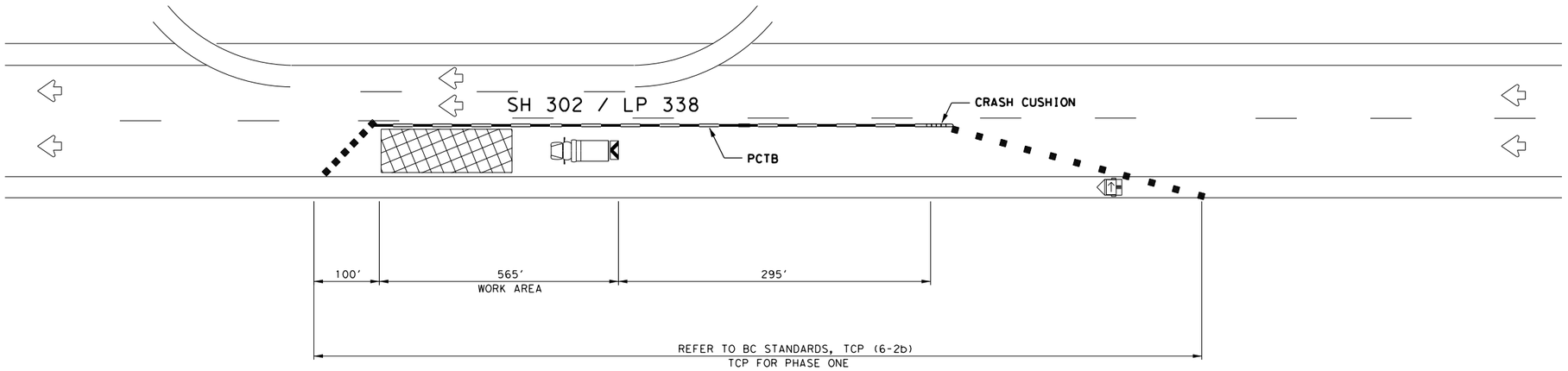
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger



SCALE: NTS

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TRAFFIC CONTROL PLAN

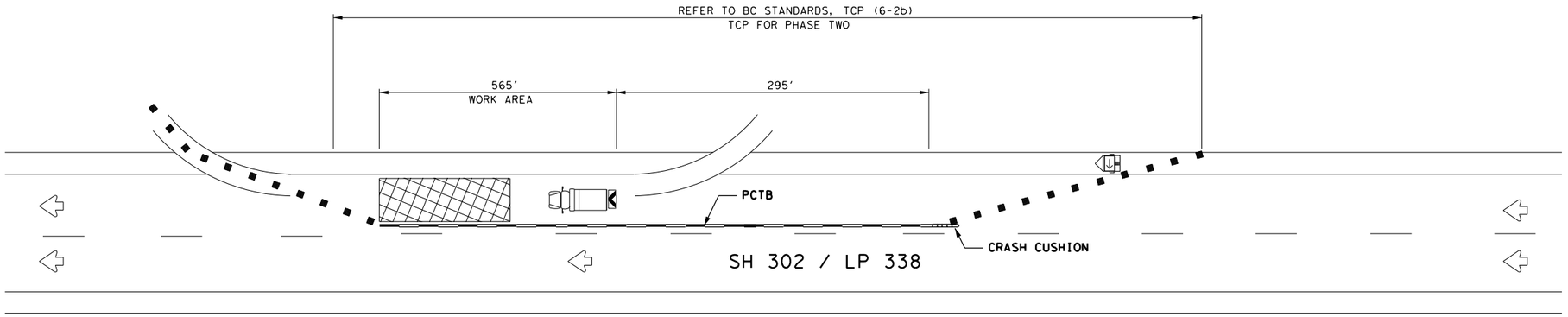
SH 302/LP 338 NB OVER IH 20 & UPRR PHASE ONE

SHEET 1 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				26
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

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



SCALE: NTS

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8/17/2023

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Texas Department of Transportation

TRAFFIC CONTROL PLAN

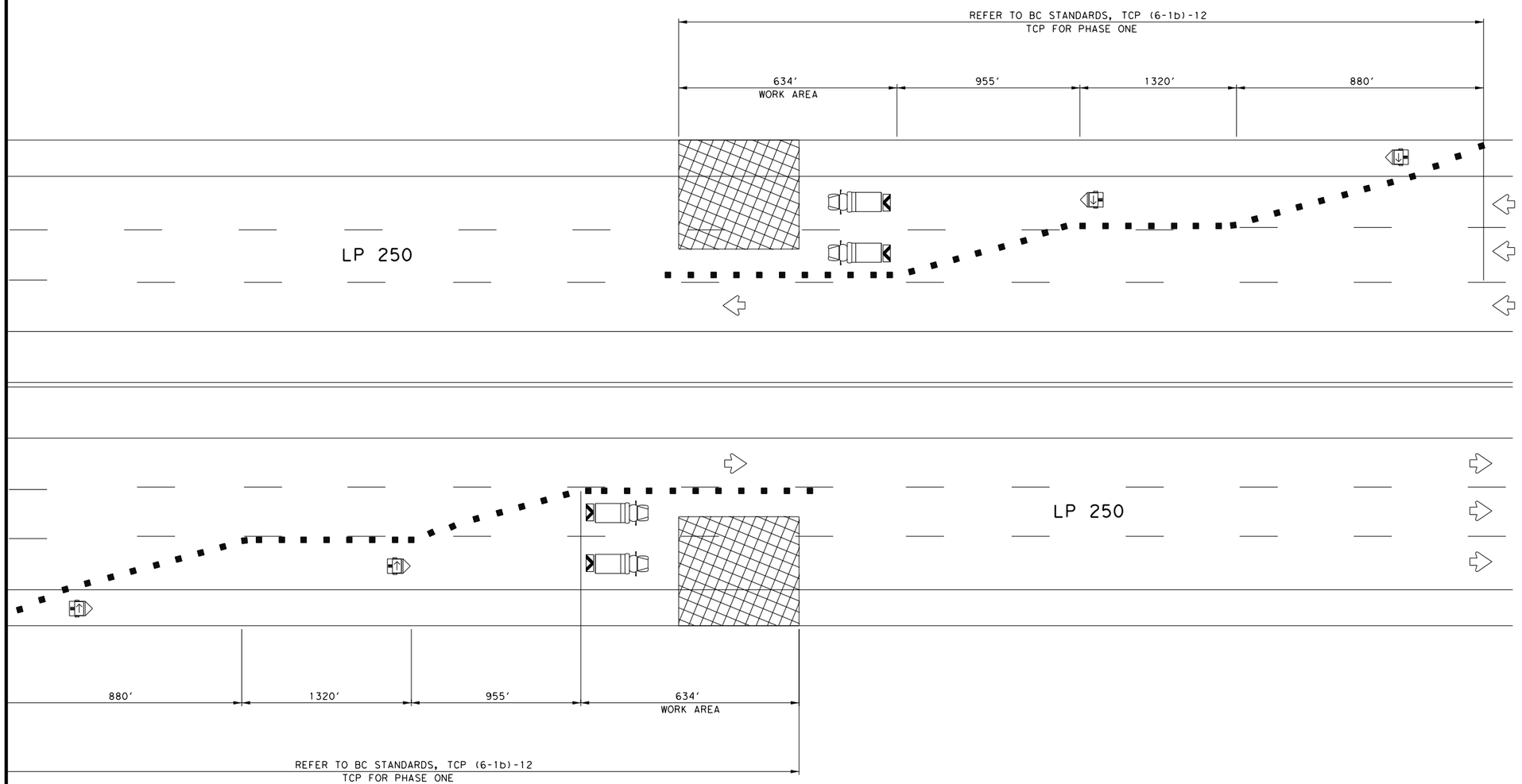
SH 302/LP 338 NB OVER IH 20 & UPRR PHASE TWO

SHEET 2 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				27
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

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



SCALE: NTS

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8/17/2023

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Texas Department of Transportation

TRAFFIC CONTROL PLAN

LP 250 OVER IH 20 BUS & UPRR PHASE ONE

SHEET 1 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				28
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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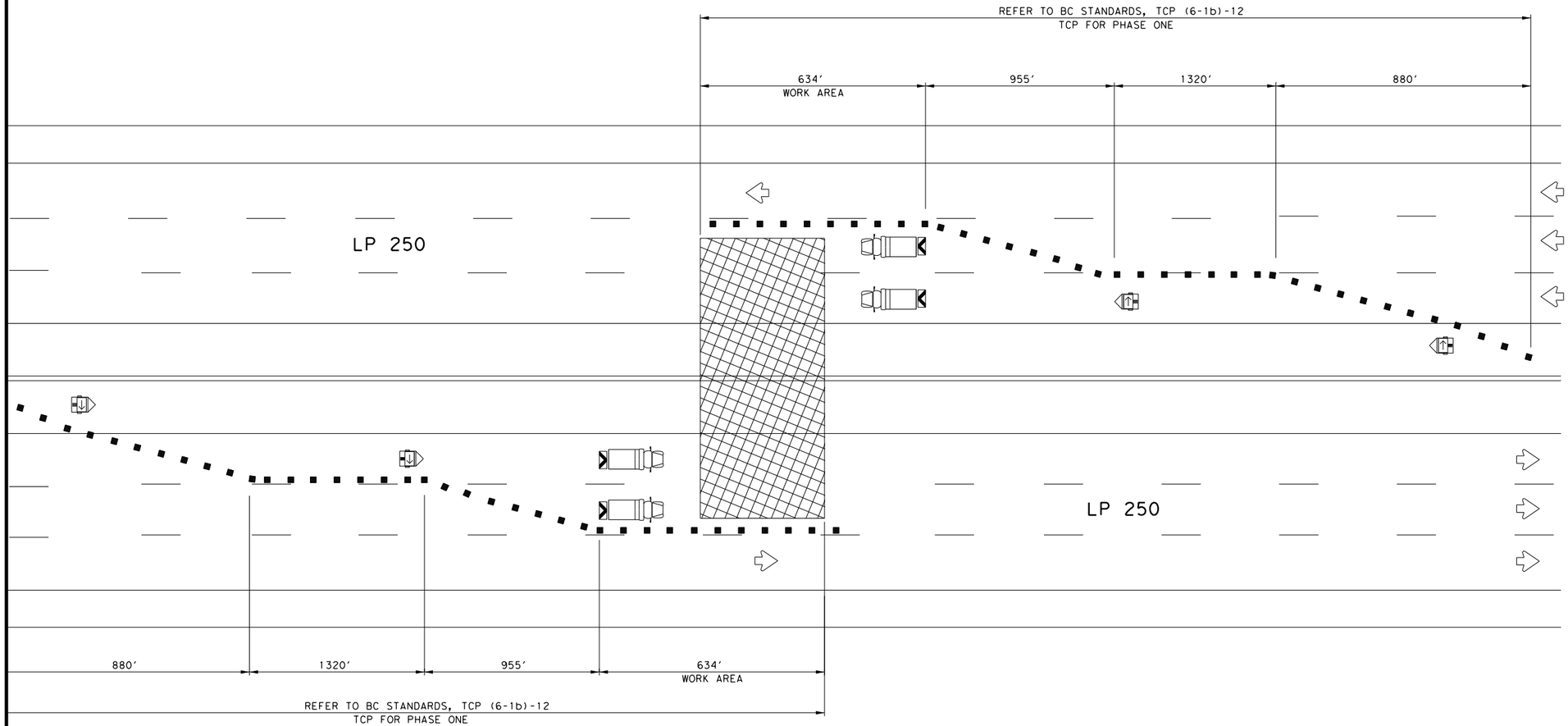
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger



SCALE: NTS

STATE OF TEXAS
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Texas Department of Transportation

TRAFFIC CONTROL PLAN

LP 250 OVER IH 20 BUS & UPRR PHASE TWO

SHEET 2 OF 2

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				29
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

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LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC. #	N	W	N	W	N	W
1	ONE	N/A	SH 302/LP 338 NB OVER IH 20 & UPRR	STA 1023+91.25	TL-3	UNI	N/A	N/A	CRASH CUSHION				X								X	
2	TWO	N/A	SH 302/LP 338 NB OVER IH 20 & UPRR	STA 1023+91.25	TL-3	UNI	N/A	N/A	CRASH CUSHION					X	X	1					X	
												TOTALS	1	1	1							

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

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwylse.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
	DIST		COUNTY	
	ODA		ECTOR, ETC	
	FEDERAL AID PROJECT			SHEET NO.
				30

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0004	07	139,ETC	IH20,ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR,ETC		31

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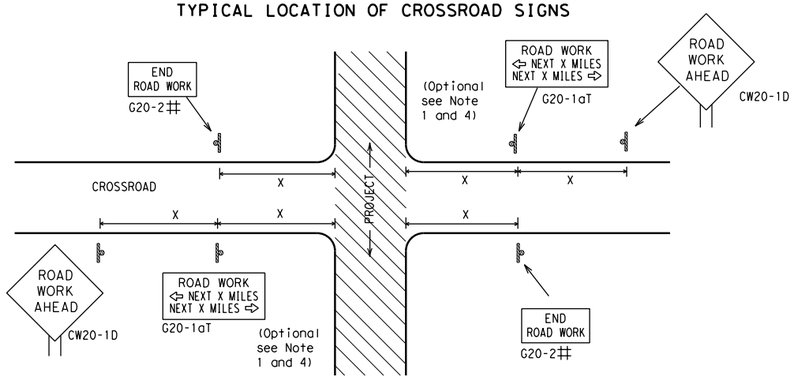
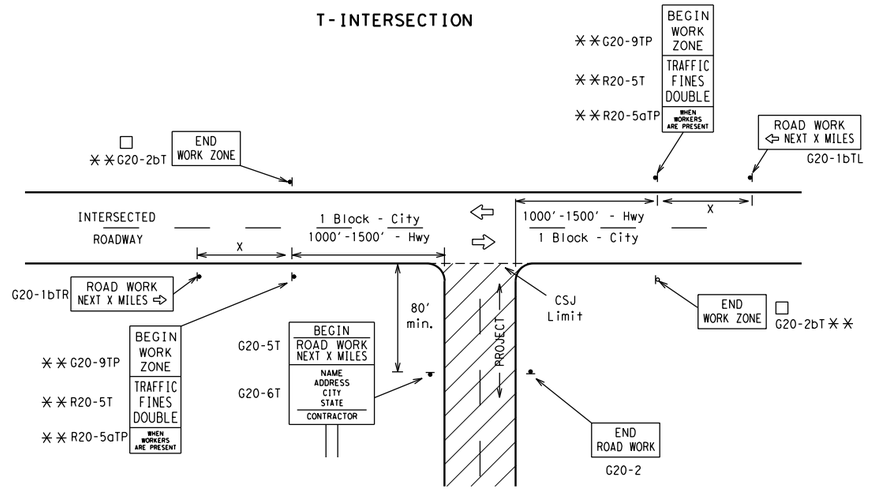
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

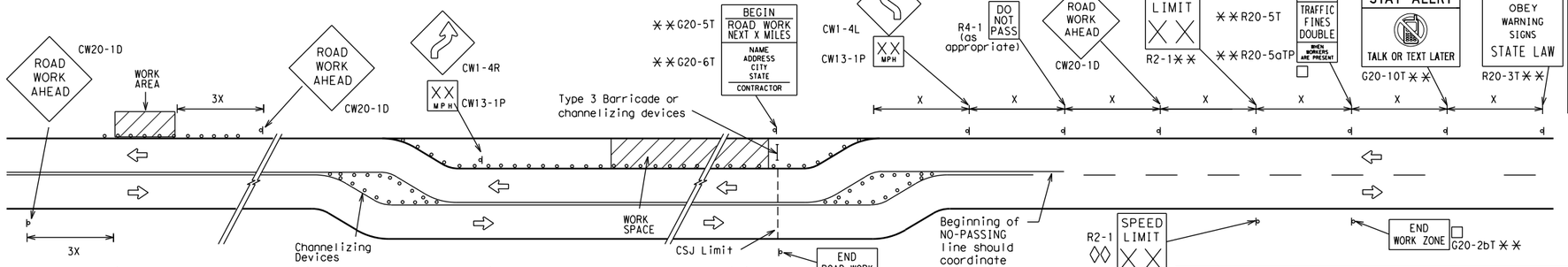
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

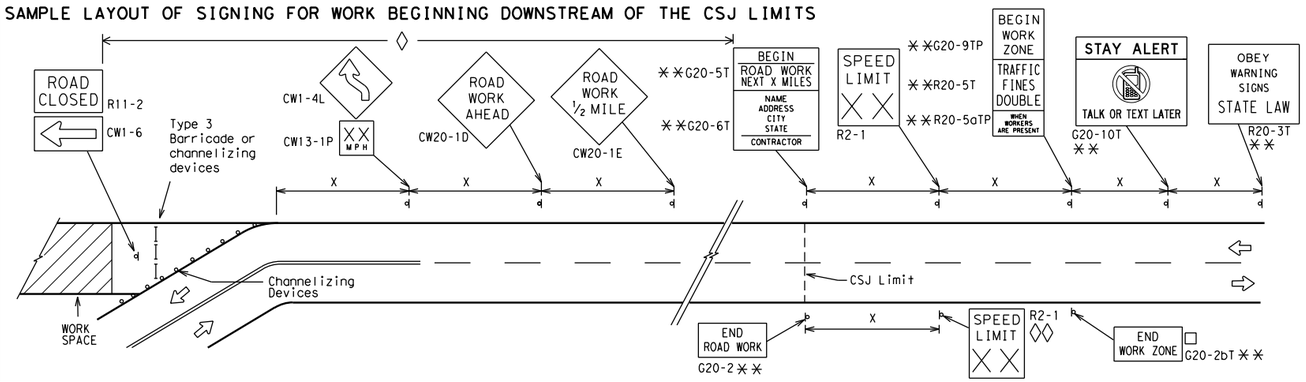
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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REVISIONS	0004	07	139,ETC	IH20,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	ECTOR,ETC		32

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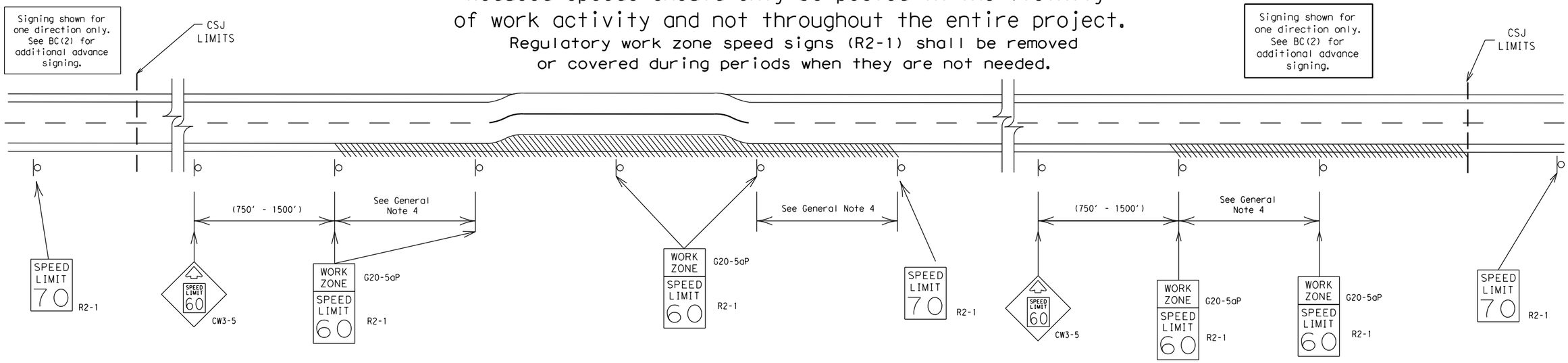
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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REVISIONS	0004	07	139, ETC	IH20, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	ECTOR, ETC		33

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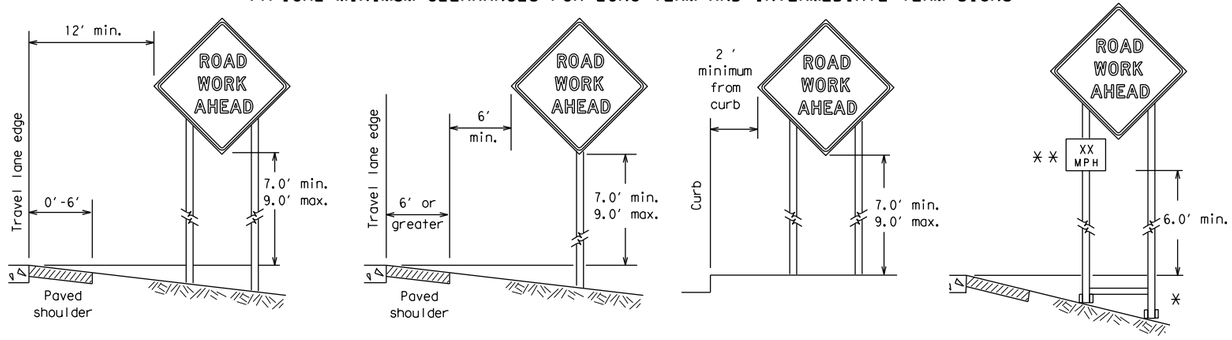
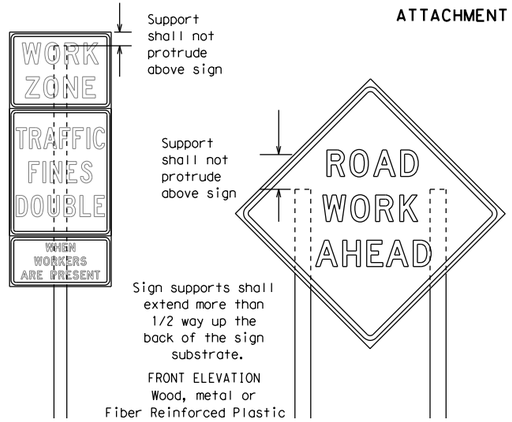
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



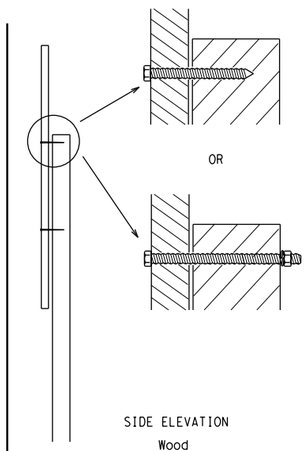
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

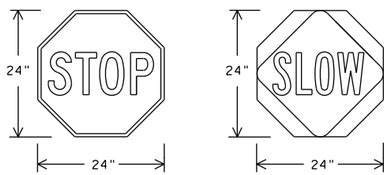
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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7-13 5-21	ODA	ECTOR,ETC		34

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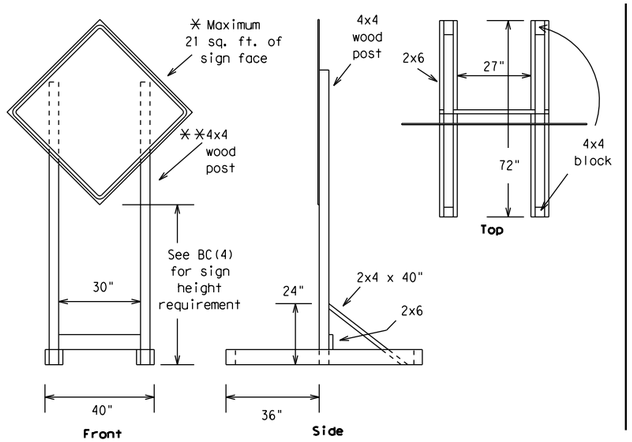
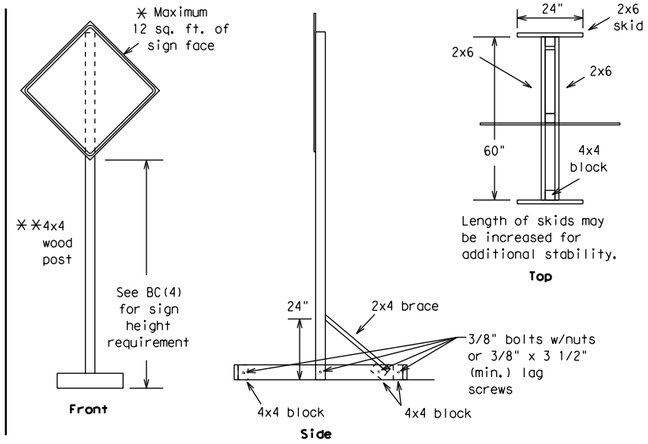
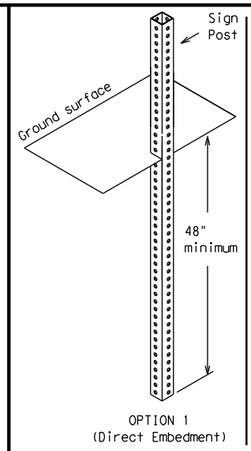
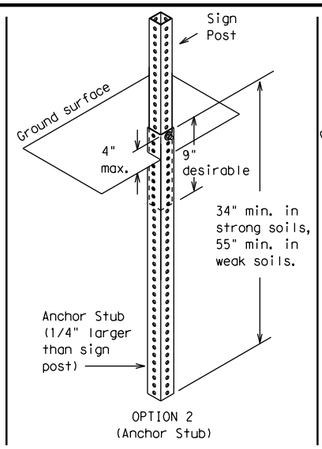


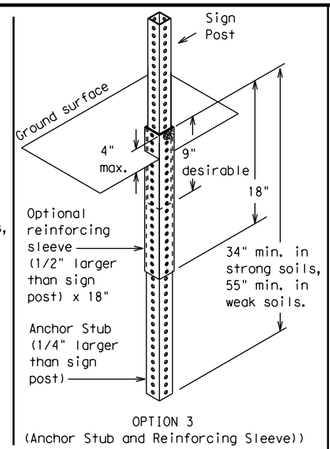


SKID MOUNTED WOOD SIGN SUPPORTS

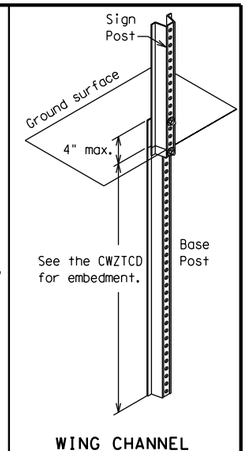
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







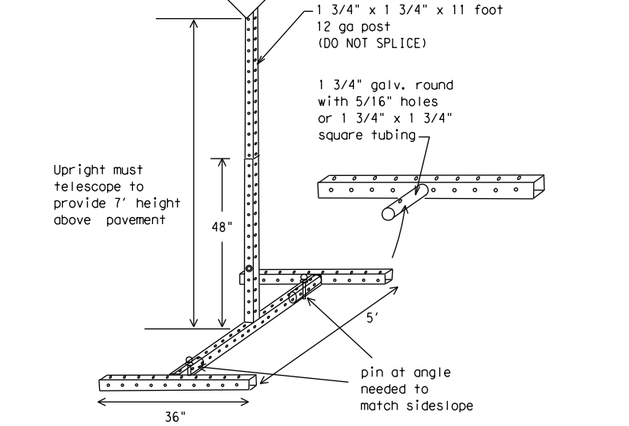
PERFORATED SQUARE METAL TUBING

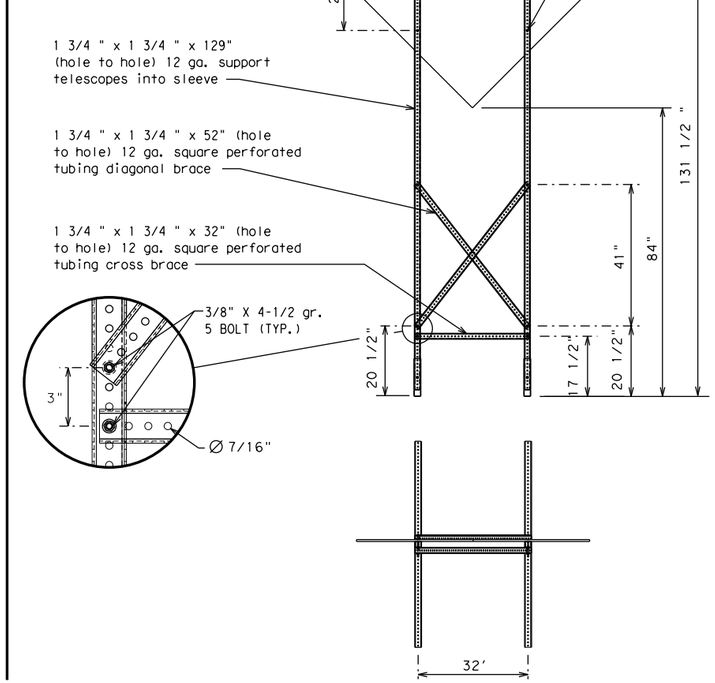


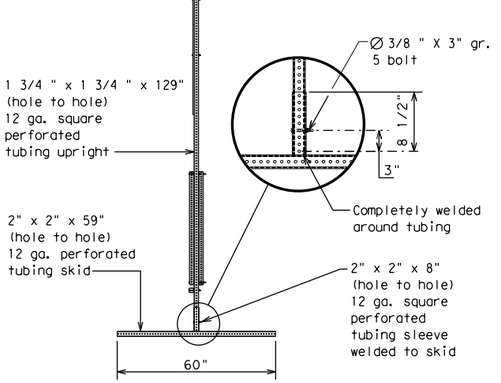
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	ECTOR, ETC		35

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS		0004	07	139, ETC	IH20, ETC
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13 5-21		ODA	ECTOR, ETC		36

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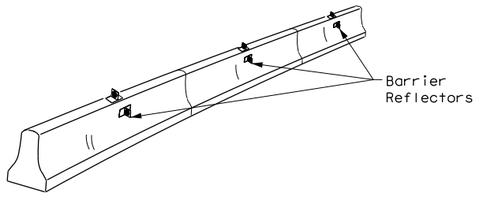
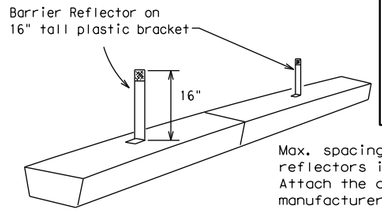
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

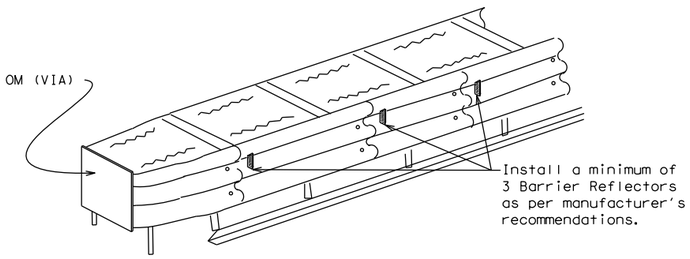


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

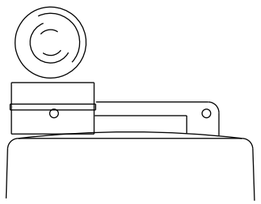


DELINEATION OF END TREATMENTS

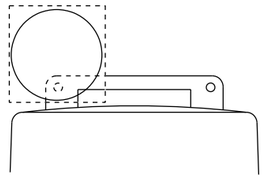
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

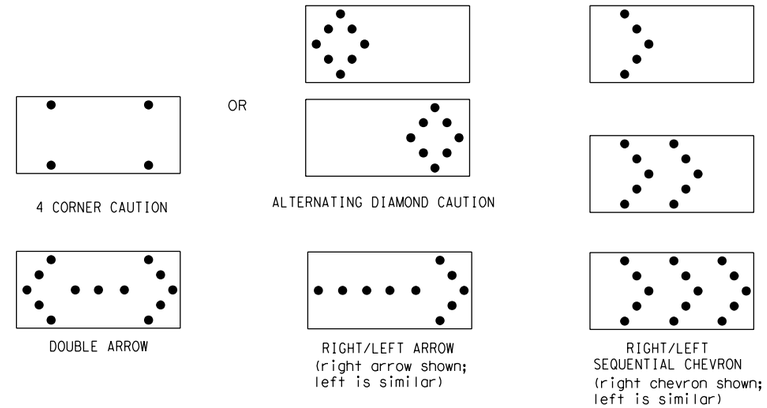
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

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

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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	ECTOR, ETC		37

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

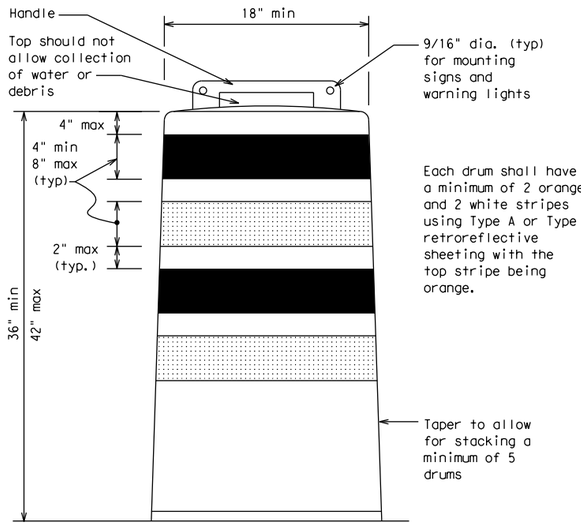
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

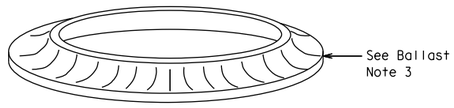
RETROREFLECTIVE SHEETING

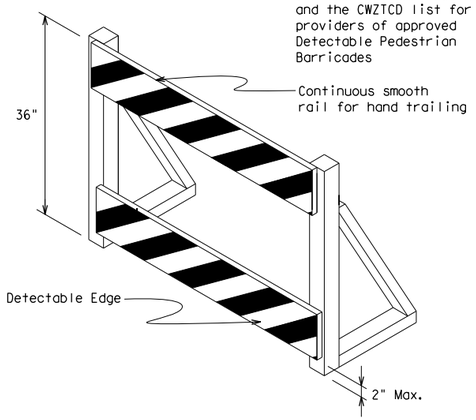
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

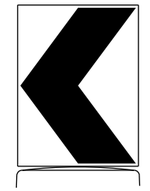




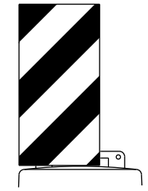


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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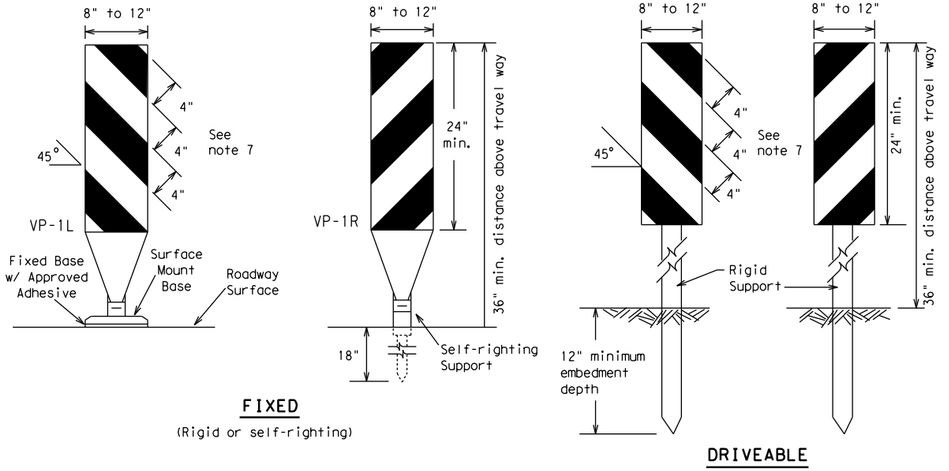
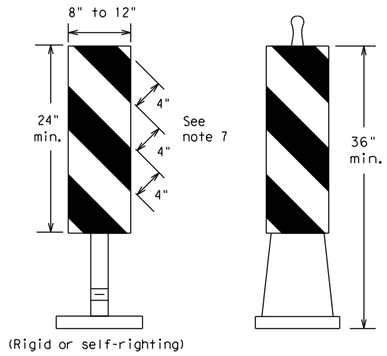


FIXED

(Rigid or self-righting)

DRIVEABLE

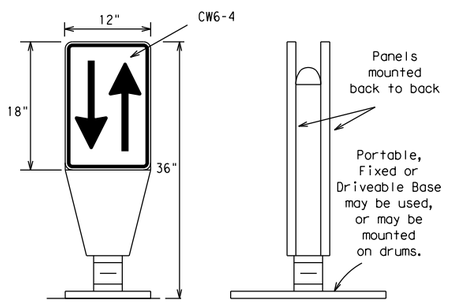


(Rigid or self-righting)

PORTABLE

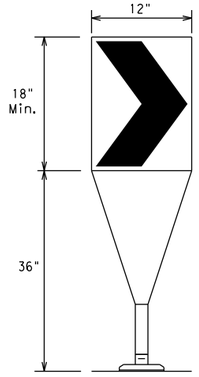
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS

GENERAL NOTES

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

LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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7-13 5-21	ODA	ECTOR, ETC		39

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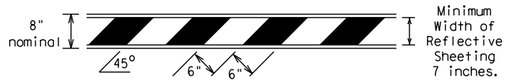
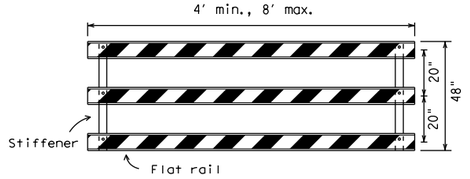
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



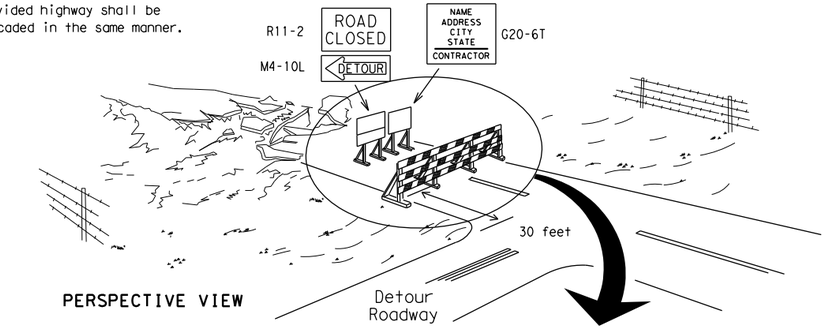
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

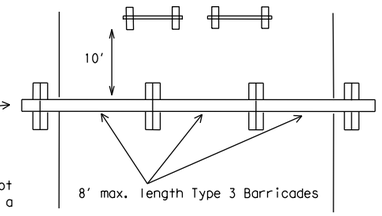
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

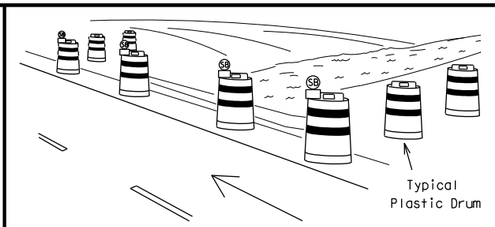
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

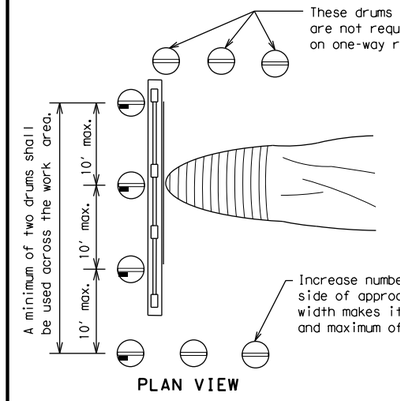
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

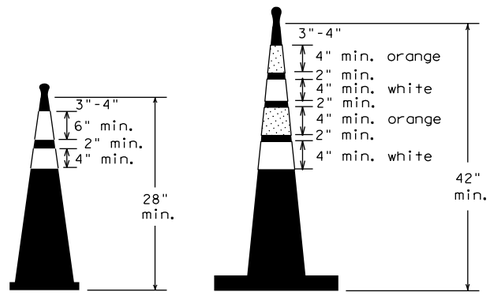
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



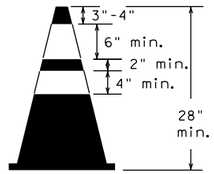
PLAN VIEW

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

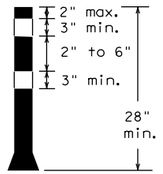
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

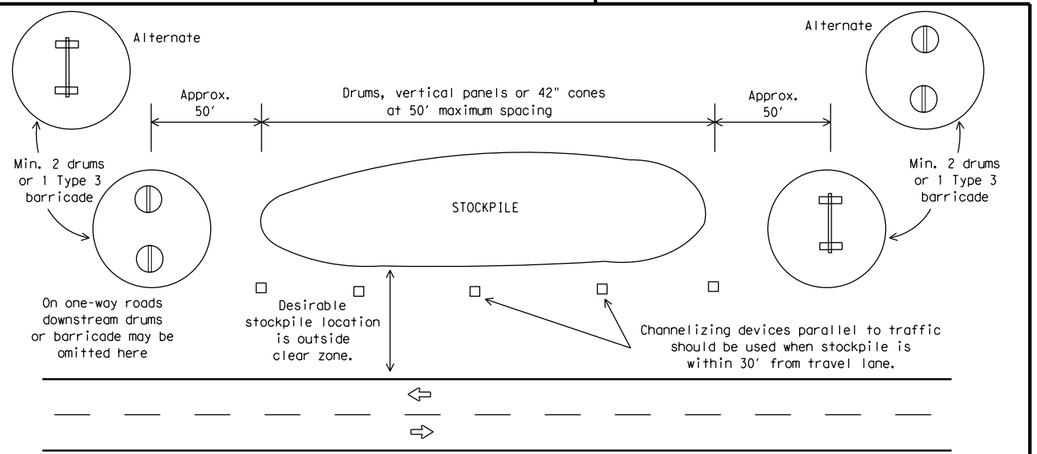


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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 9-07 8-14 7-13 5-21	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		40

DATE: 8/17/2023 1:47:06 PM
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

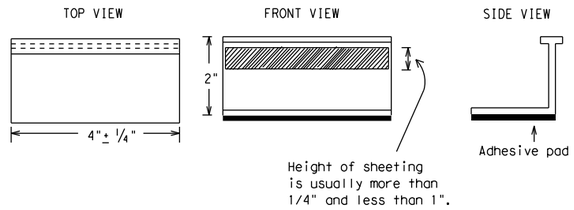
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21	0004	07	139,ETC	IH20,ETC
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	ODA	ECTOR,ETC		41

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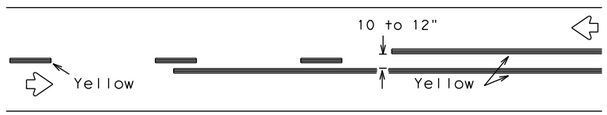
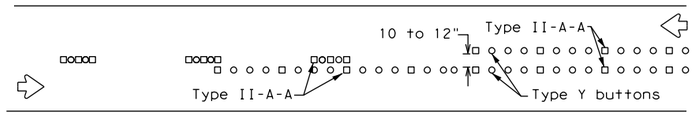
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\02 tcp\standards\bc-(12)-21.dgn

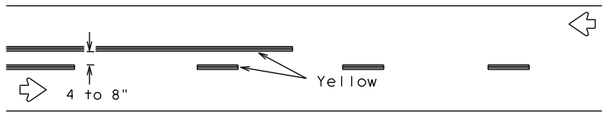
PAVEMENT MARKING PATTERNS



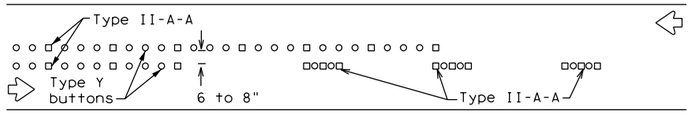
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



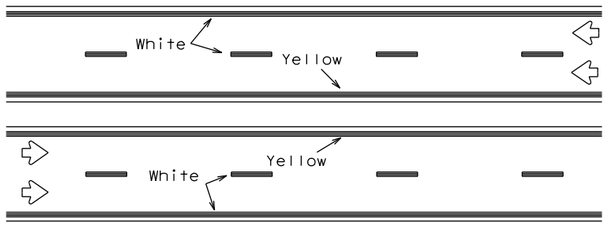
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



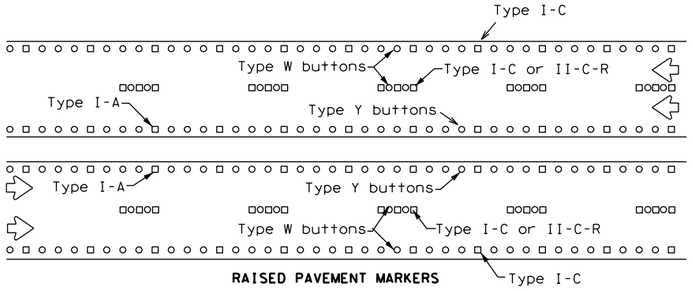
RAISED PAVEMENT MARKERS - PATTERN B

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

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



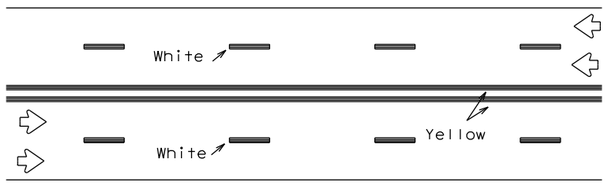
REFLECTORIZED PAVEMENT MARKINGS



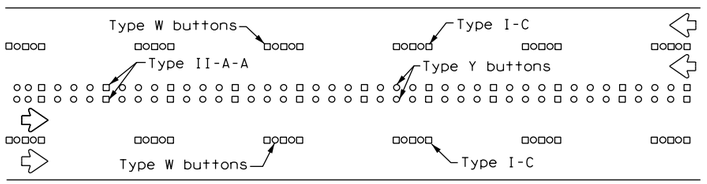
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



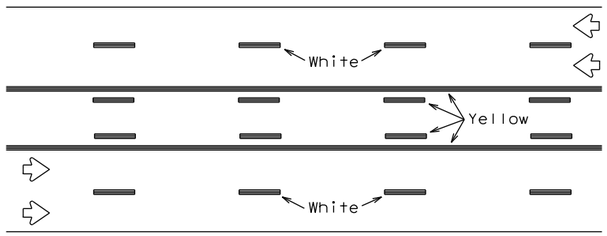
REFLECTORIZED PAVEMENT MARKINGS



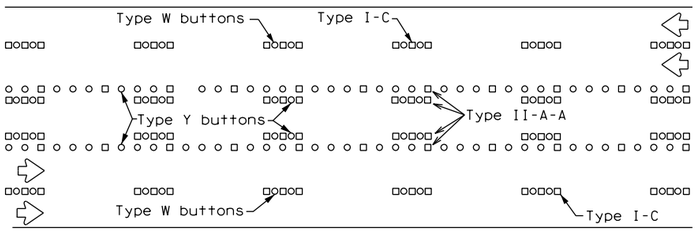
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

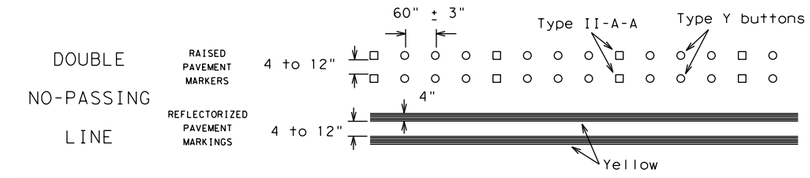
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

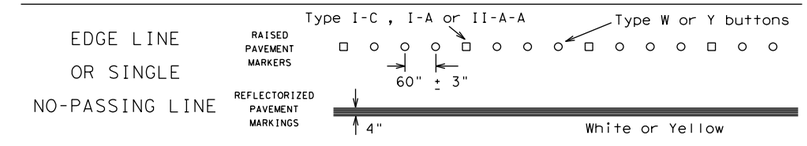
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

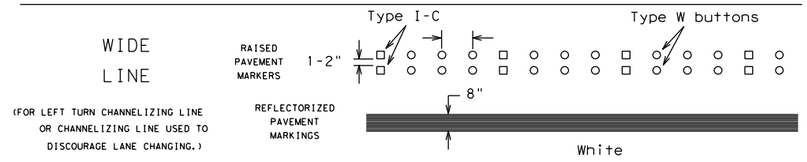


EDGE LINE OR SINGLE NO-PASSING LINE



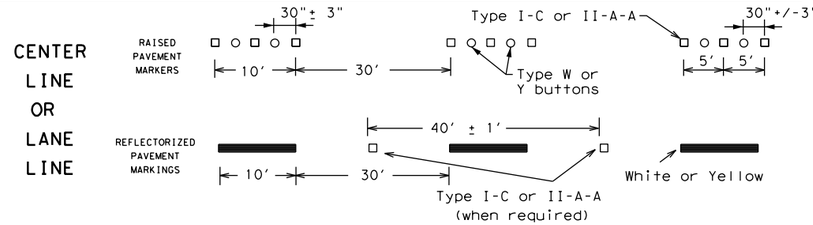
WIDE LINE

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

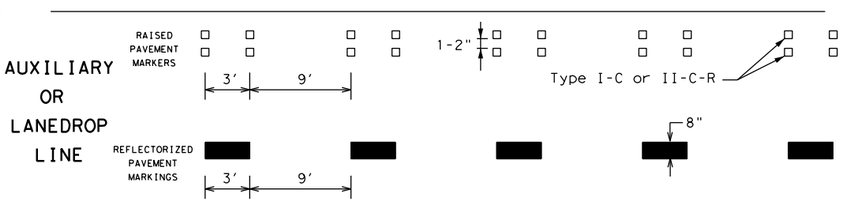


BROKEN LINES

CENTER LINE OR LANE LINE

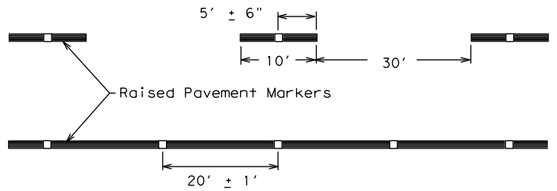


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		42

DATE: 8/17/2023
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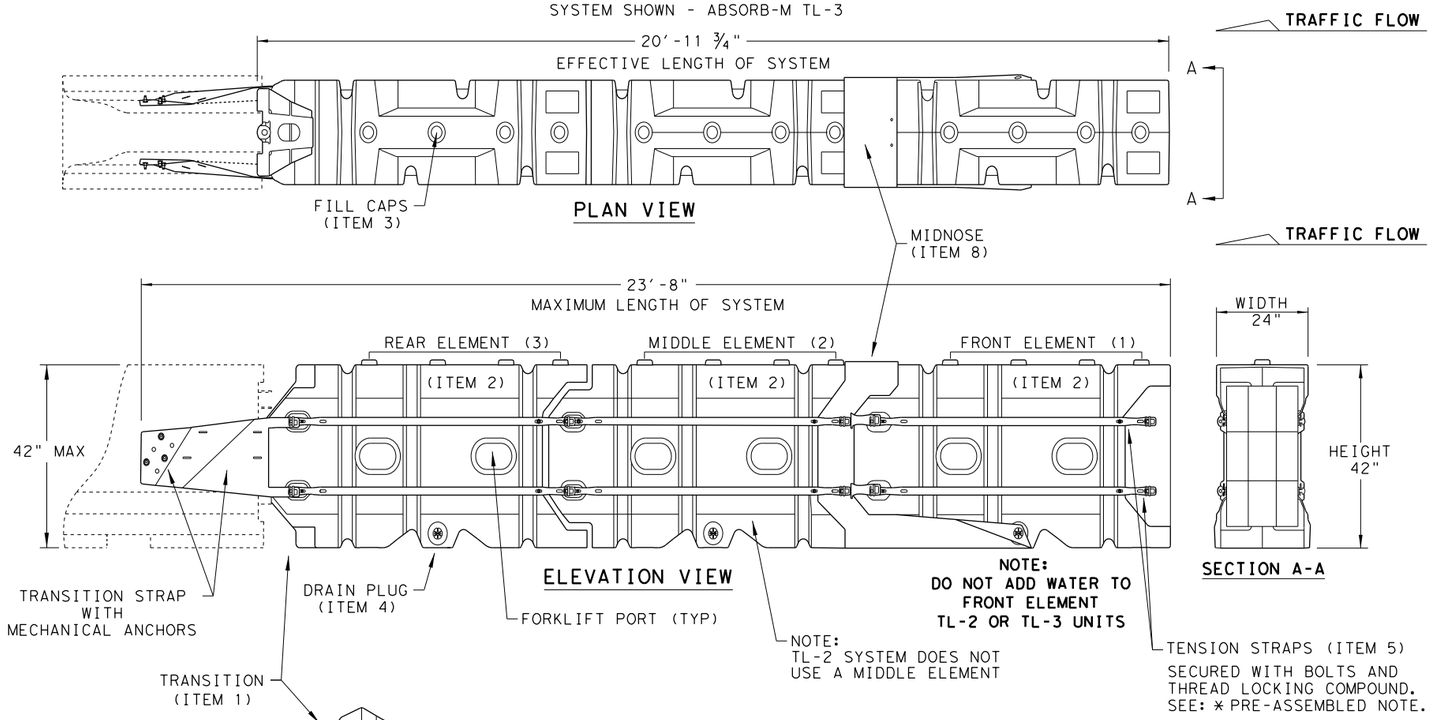
SYSTEM SHOWN - ABSORB-M TL-3



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

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

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

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

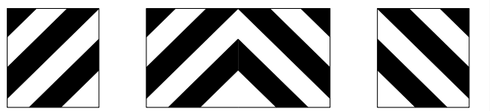
GENERAL NOTES

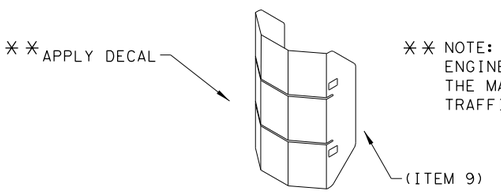
1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M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

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

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE





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:
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139,ETC	IH20,ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR,ETC		43

DATE: 8/17/2023
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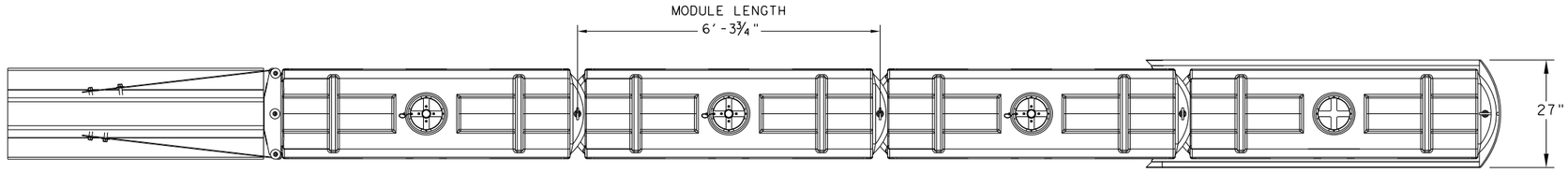
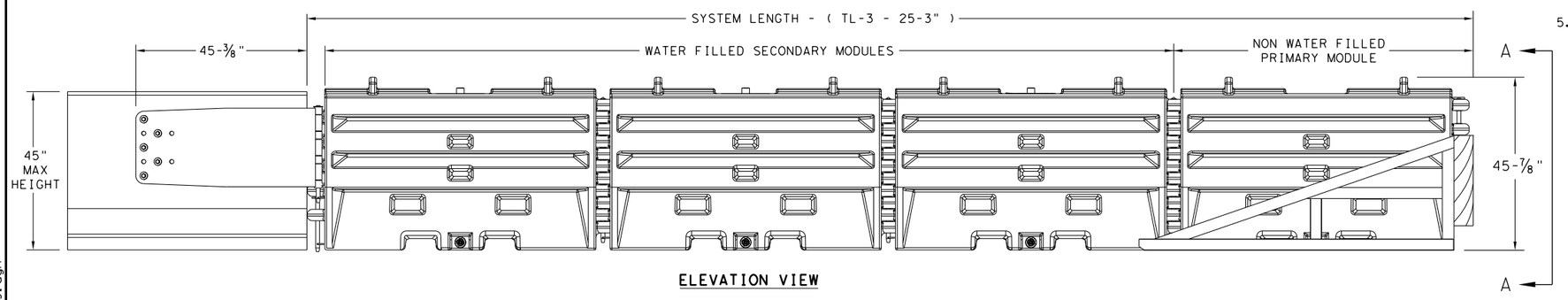


PLAN VIEW



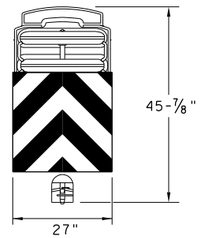
ELEVATION VIEW

GENERAL NOTES

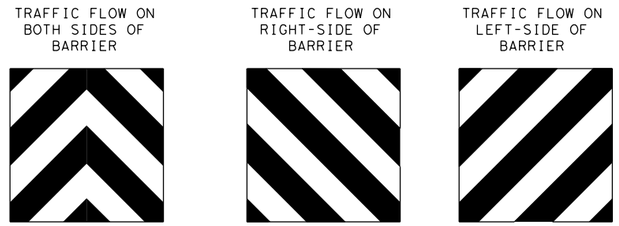
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE,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

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

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

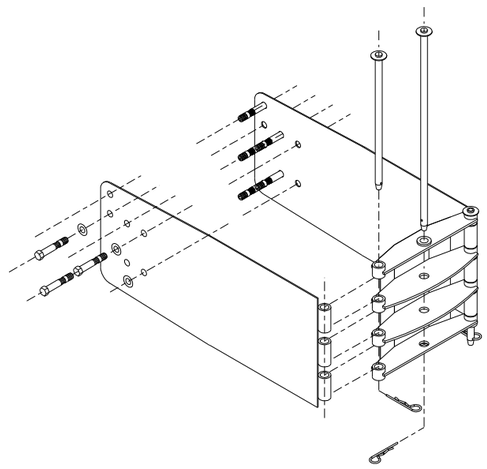


SECTION A-A



NOSE SHEETING PANEL DELINEATION

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



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

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

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

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

SACRIFICIAL

BILL OF MATERIAL

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

Texas Department of Transportation

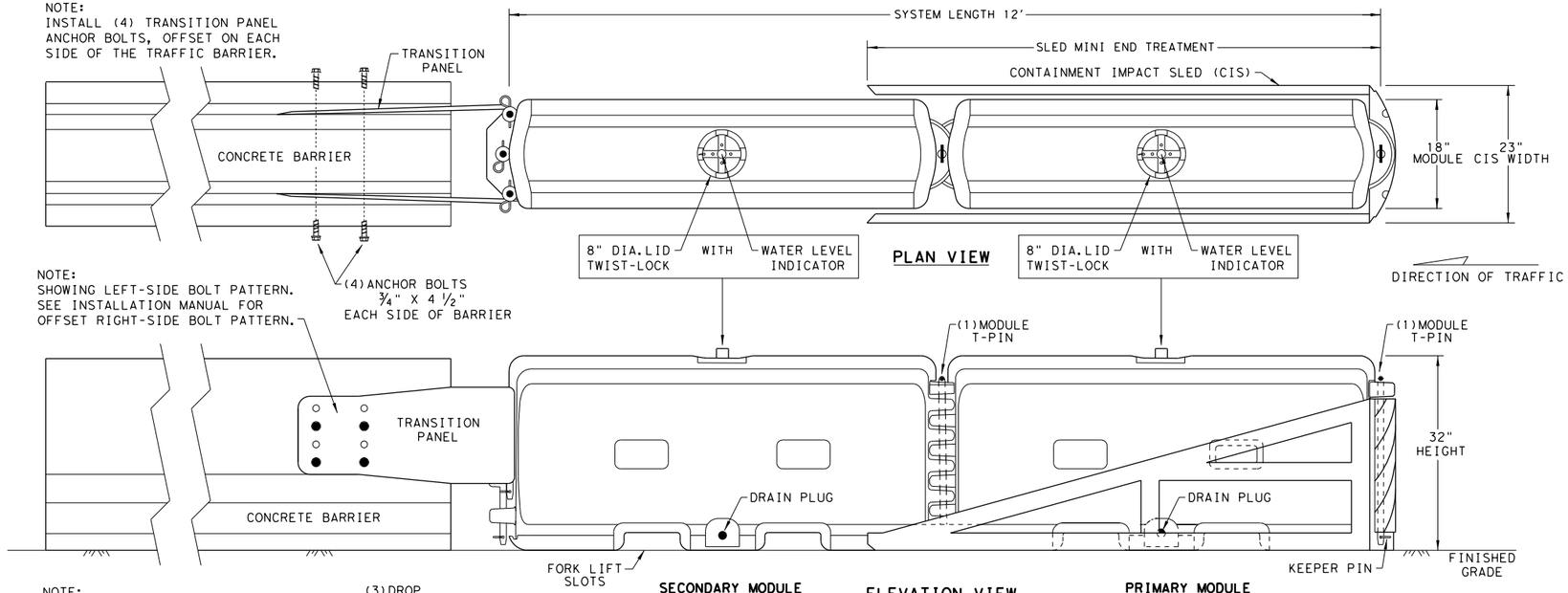
Design Division Standard

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

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		44

DATE: 8/17/2023
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\02 tcp\standards\sledmini19.dgn

NOTE:
INSTALL (4) TRANSITION PANEL ANCHOR BOLTS, OFFSET ON EACH SIDE OF THE TRAFFIC BARRIER.



NOTE:
SHOWING LEFT-SIDE BOLT PATTERN.
SEE INSTALLATION MANUAL FOR OFFSET RIGHT-SIDE BOLT PATTERN.

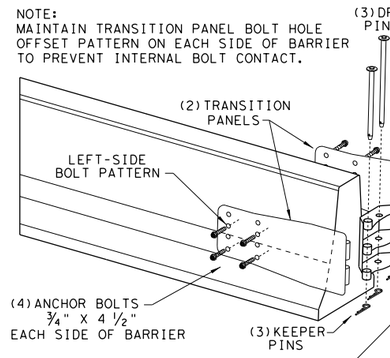
PLAN VIEW

SECONDARY MODULE
WATER FILLED

ELEVATION VIEW

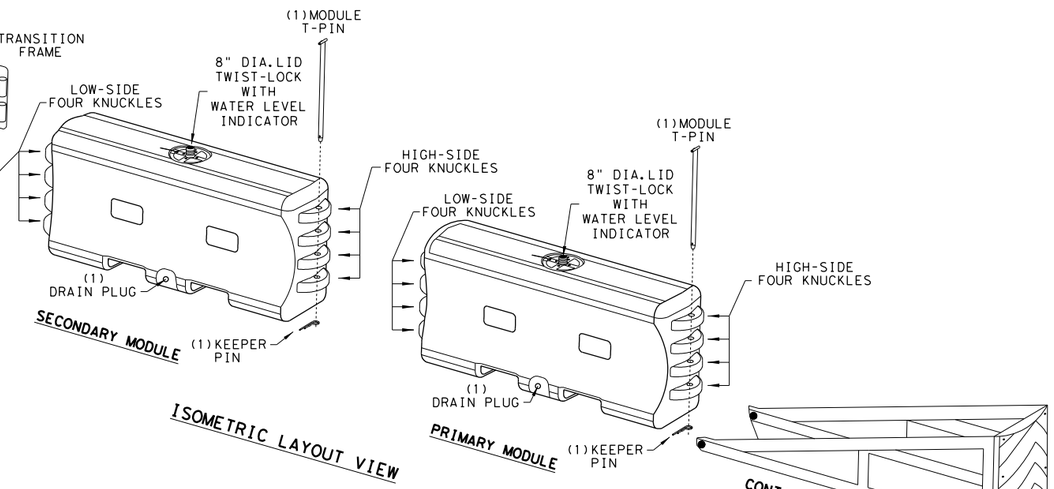
PRIMARY MODULE
WATER FILLED
WITH CONTAINMENT IMPACT SLED

NOTE:
MAINTAIN TRANSITION PANEL BOLT HOLE OFFSET PATTERN ON EACH SIDE OF BARRIER TO PREVENT INTERNAL BOLT CONTACT.



TRANSITION FRAME

NOTE:
TRANSITION FRAME SITS ON LOW-SIDE (TOP KNUCKLE).



ISOMETRIC LAYOUT VIEW

NOSE PLATE

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

GENERAL NOTES

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

SLED MINI TL-2 - BILL OF MATERIALS

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

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

DELINEATION DECAL PLACEMENT GUIDE

TRAFFIC FLOW ON LEFT-SIDE OF BARRIER

TRAFFIC FLOW ON BOTH-SIDES OF BARRIER

TRAFFIC FLOW ON RIGHT-SIDE OF BARRIER

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

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

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

SACRIFICIAL

Texas Department of Transportation

Design Division Standard

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

SLEDMINI-19

FILE: sledmini19	DN: TxDOT	CK: KM	DN: VP	CK:	
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0004	07	139, ETC	IH20, ETC	
	DIST	COUNTY		SHEET NO.	
	ODA	ECTOR, ETC		45	

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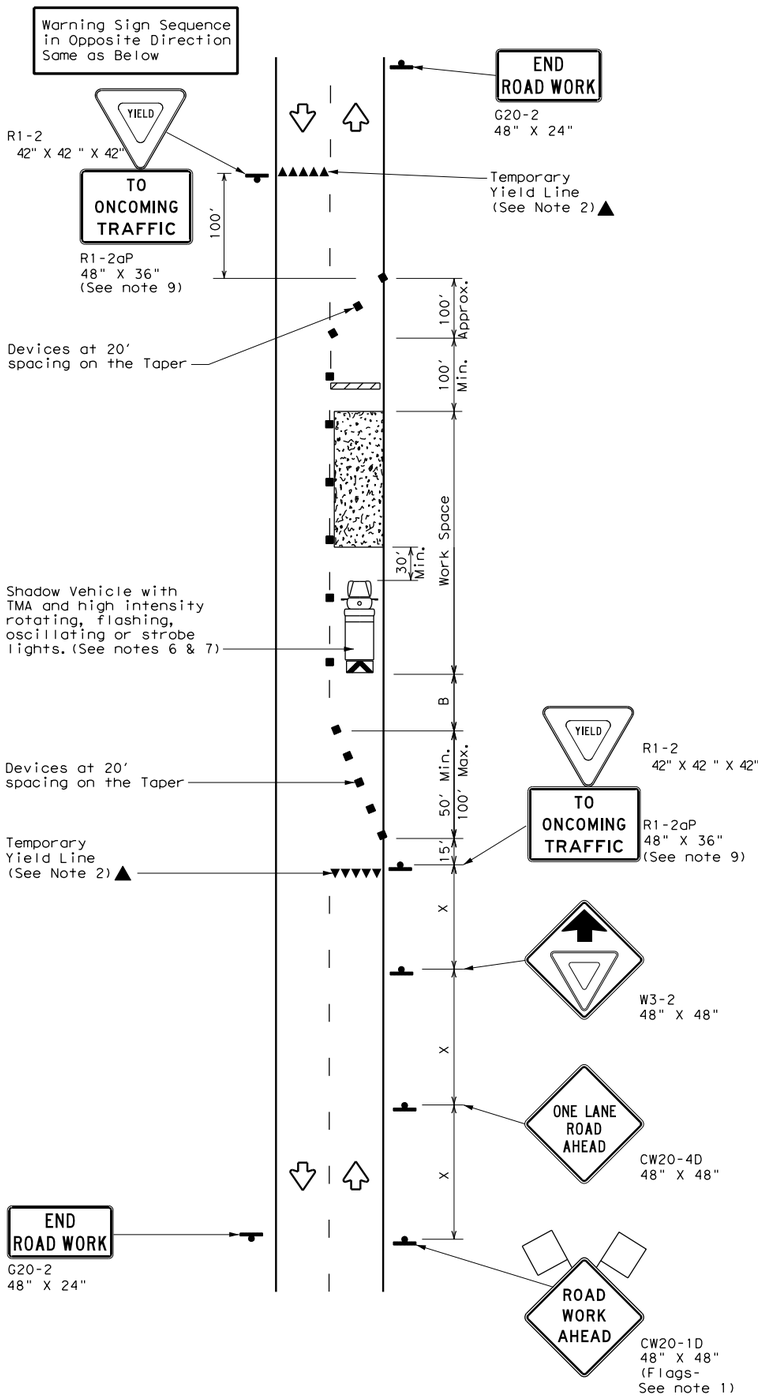
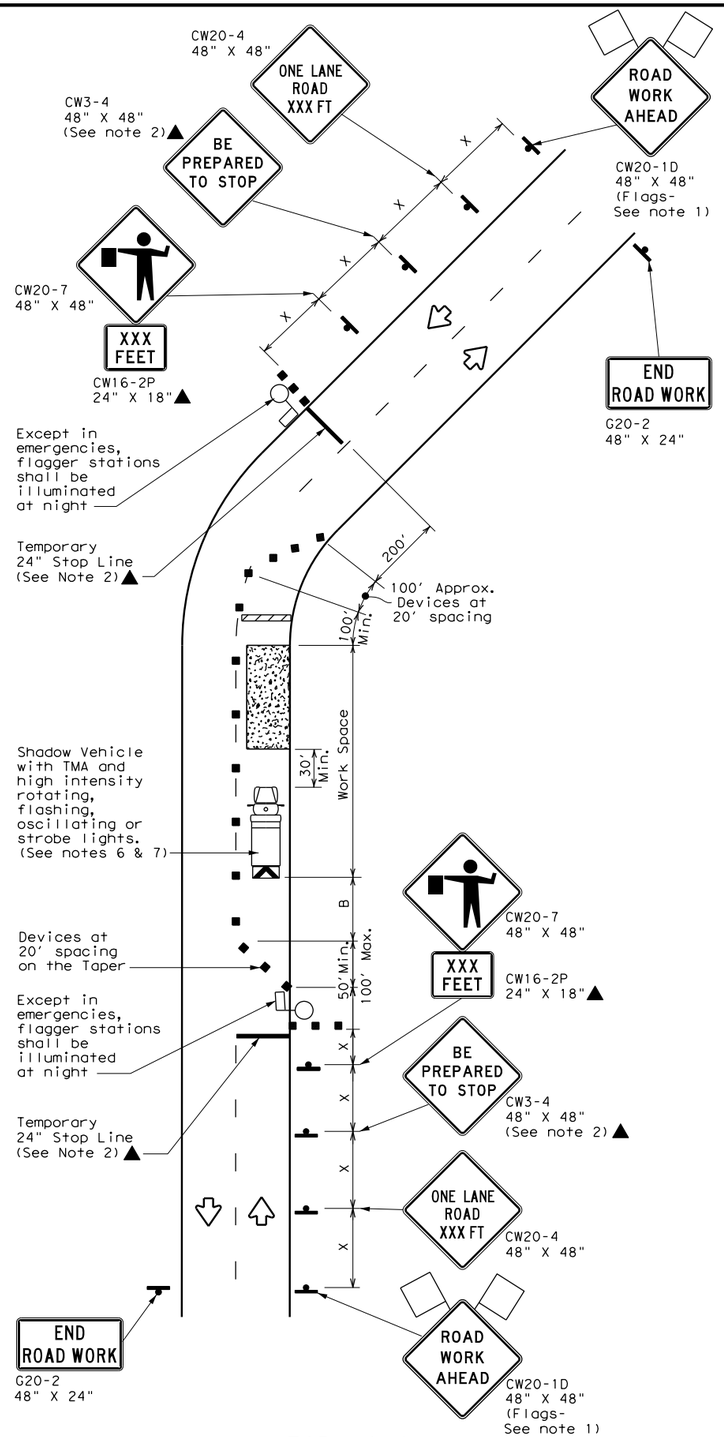


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. 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 off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	0004	07	139,ETC	IH20,ETC
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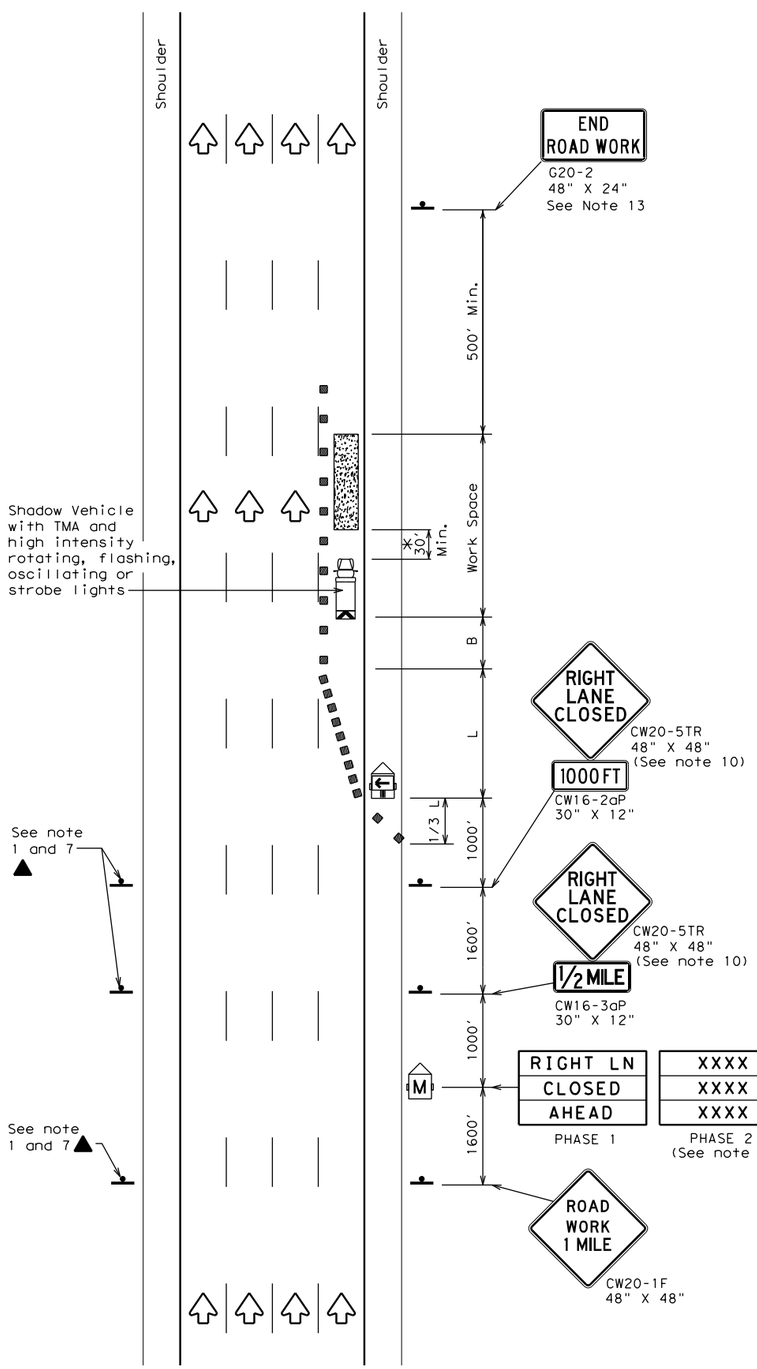
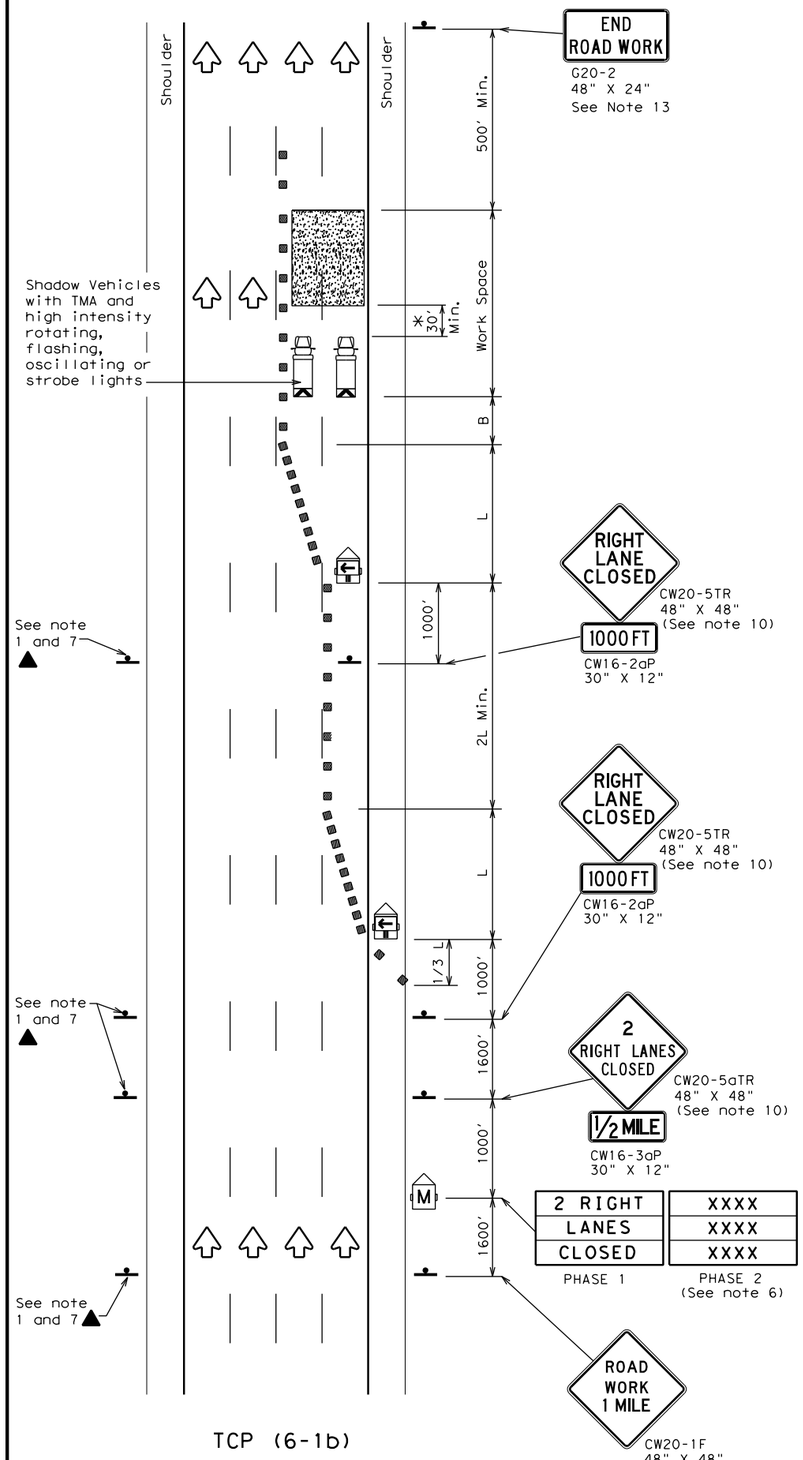


TCP (6-1a)

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	0004	07	139,ETC	IH20,ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR,ETC		47

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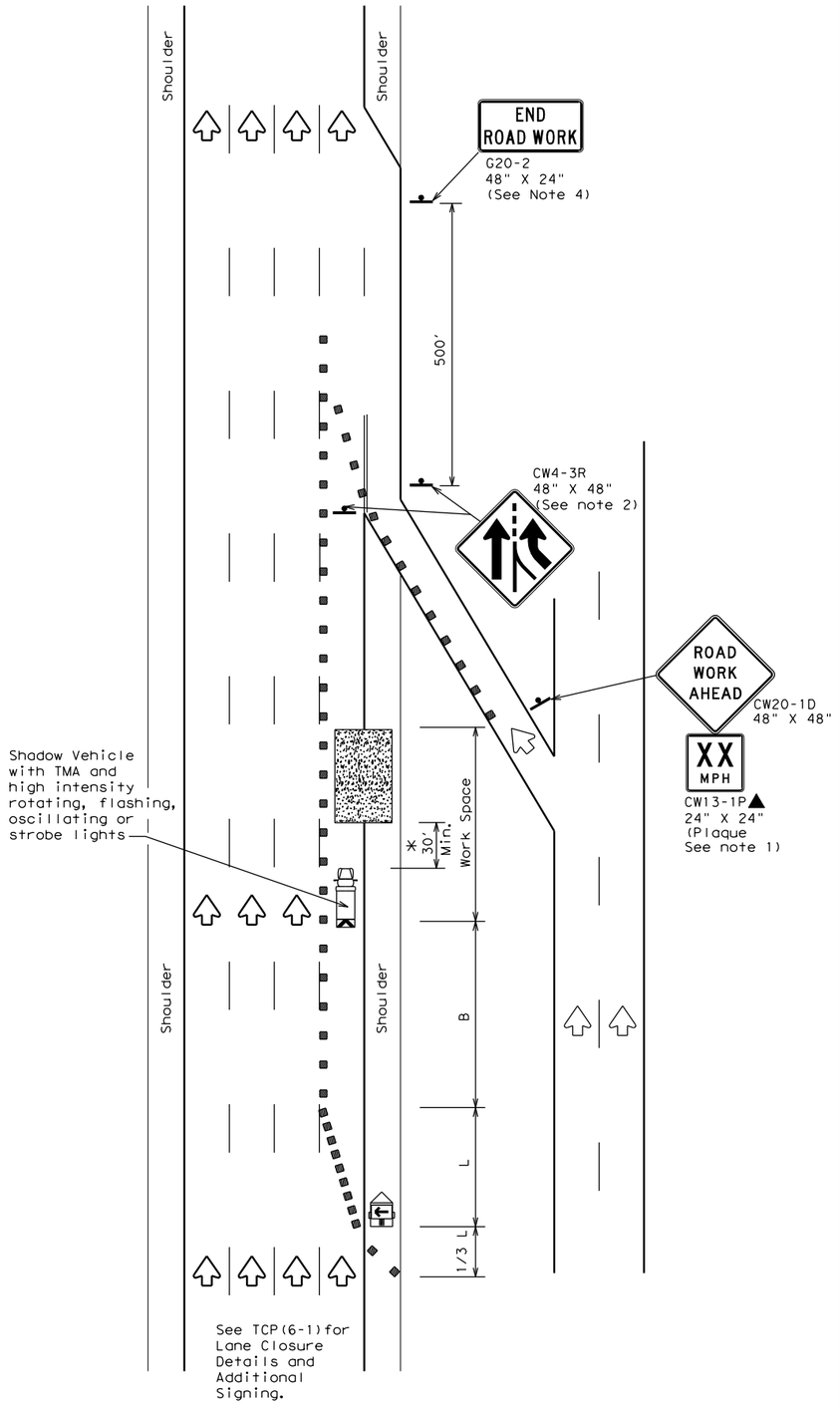
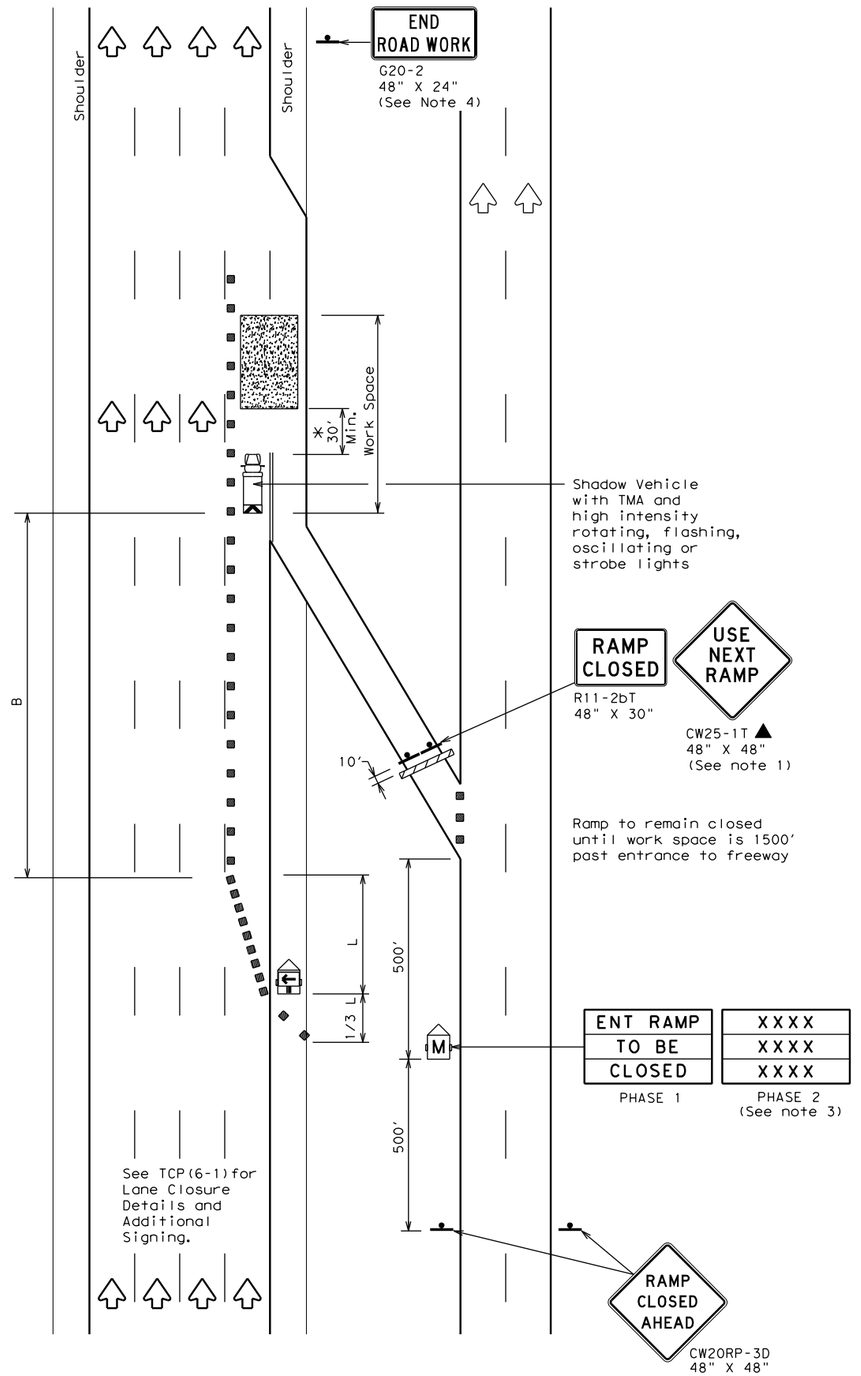


TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
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1-97 8-98	DIST	COUNTY		SHEET NO.
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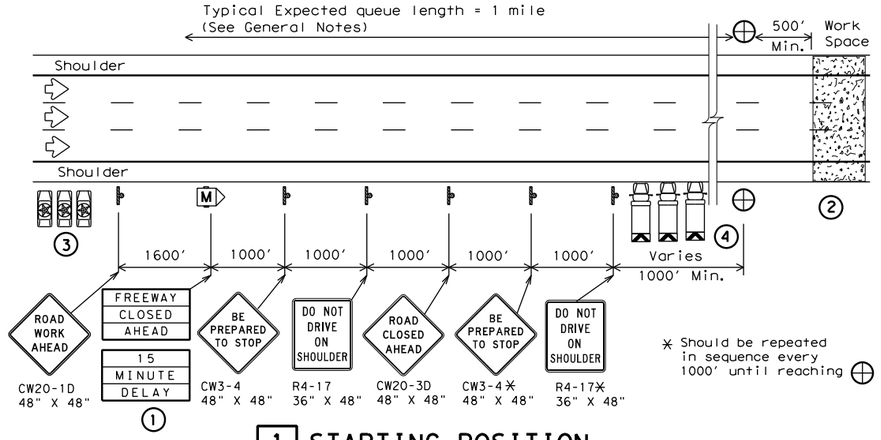


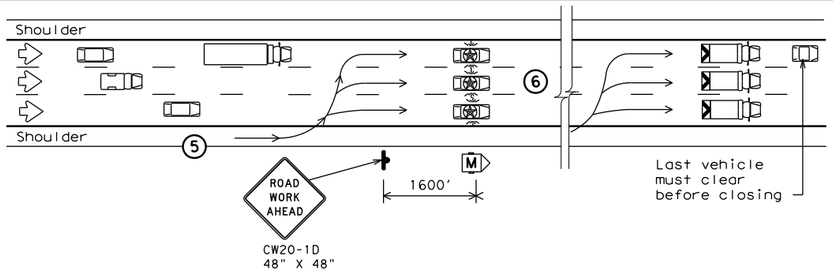
1 STARTING POSITION

(1) Traffic control devices should be installed or located near their intended position prior to beginning temporary roadway closure sequence. Duplicate signs should be erected on the median side of the roadway when median width permits. Warning signs should not be placed on the paved shoulders that will be used by the WARNING LEOV, or where movement of the LEOVs or barrier vehicles will be impeded.

(2) Prior to beginning the roadway closure sequence, all equipment, materials, personnel, and other items necessary to complete the work should be gathered near the work area. Entrance ramps located in the area where a queue is expected to build should be closed.

(3) There should be one LEOV for every lane to be controlled, plus a minimum of one to warn traffic approaching a queue. An additional lead law enforcement officer is desirable to remain with the Engineer's or Contractor's point of contact (POC) during the operation in order to improve communication with all LEOVs involved.

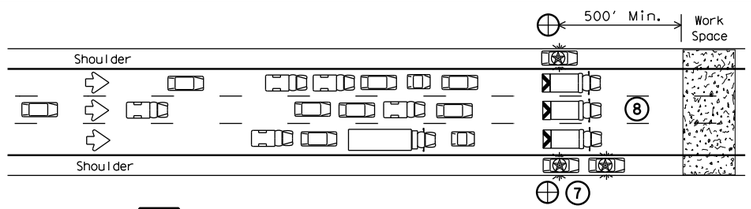
(4) One barrier vehicle with a Truck Mounted Attenuator and amber or blue and amber high intensity flashing/oscillating/strobe lighting shall be used for each lane to be closed.



2 REDUCING SPEED OPERATION

(5) Starting position of the LEOVs should be in advance of the most distant warning signs.

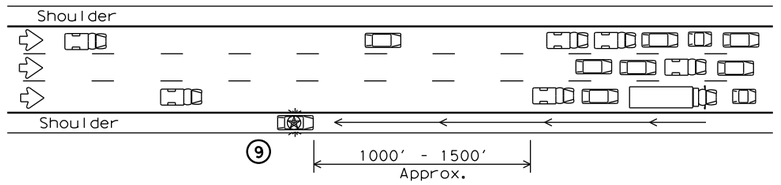
(6) Once the LEOVs have achieved an abreast blocking formation while traveling toward the CP, emergency lights and headlights should be turned "ON". The LEOVs should maintain formation, not allow traffic to pass, and begin to decelerate. The LEOVs should continue to decelerate, giving the barrier vehicles opportunity to be staged upstream of the work space after traffic has cleared. The LEOVs should then continue to decelerate slowly until bringing traffic to a stop near the barrier vehicles.



3 ALL TRAFFIC STOPPED AT CP

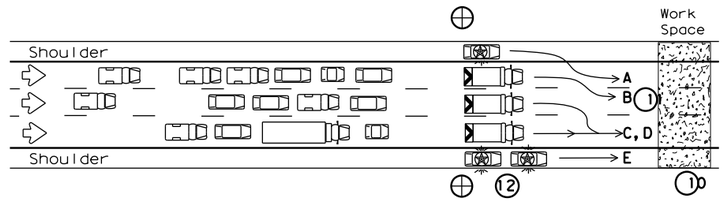
(7) Once traffic is stopped the LEOVs should park on the shoulders with emergency lighting "ON" in order to provide law enforcement presence at the closure and keep shoulders blocked ahead of the work space. They should stay in radio contact with the WARNING LEOV.

(8) The barrier vehicles should be parked, one in each lane, the parking brake set, with the high visibility flashing/oscillating/strobe lighting "ON," and the transmission in gear.



4 WARNING THE TRAFFIC QUEUE

(9) The WARNING LEOV should proceed to the right shoulder of the roadway, with emergency lights on approximately 1000' in advance of the traffic queue (stopped traffic) as the queue develops. When determined that limited sight distance situations (crest of hills, sharp roadway curvature, etc.) may occur to motorists approaching the queue, the WARNING LEOV may proceed 1/4 mile or more in advance of the queue.



5 RELEASING STOPPED TRAFFIC

(10) All equipment, materials, personnel, and other items should be removed from the roadway and maintain an adequate clear zone.

(11) When the roadway is clear for traffic, the LEOV should proceed forward from the left shoulder followed by the barrier vehicles, from left to right, as shown alphabetically in the plan view.

(12) The LEOV or LEOVs on the right shoulder may remain on the shoulder until satisfied that traffic is moving satisfactorily before merging or proceeding.

(13) LEOVs and barrier vehicles should re-group at their respective starting positions if necessary.

LEGEND			
■ ■	Channelizing Devices	⊕	Control Position (CP)
M	Portable Changeable Message Sign (PCMS)		Barrier Vehicle with Truck Mounted Attenuator
	Law Enforcement Officer's Vehicle(LEOV)		Traffic Flow

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

GENERAL NOTES

1. All traffic control devices shall conform with the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional guidelines for traffic control devices may be found in the TMUTCD. Signs conflicting with the roadway closure sequence should be completely removed or covered. Additional traffic control devices may be required for closure of access roads, cross streets, exit and entrance ramps as directed by the Engineer.

2. Law enforcement officers and all workers involved should review and understand all procedures before the roadway closure sequence begins. Pre-work meetings may be held for this purpose. Local emergency services and media should have advance notification of roadway closure, expected dates and approximate times of closures.

3. Law enforcement officers shall be in uniform and have jurisdiction in the locale of the work area. An additional WARNING Law Enforcement Officer's Vehicle (LEOV) may be used on the median side of the roadway where median shoulder width permits (See sequence #9).

4. The roadway closure should be during off-peak hours, as shown in the plans, or as directed by the Engineer.

5. Work should be limited to approximately 15 minutes maximum duration unless otherwise directed by the Engineer based on existing roadway conditions. If the work is not complete within 15 minutes, or if the end of the traffic queue extends past the most distant advance warning signs, the work area should be cleared of all equipment, materials, personnel, and other items, and the roadway reopened. When the queue has dissipated and the traffic flow appears normal the roadway closure sequence may be repeated.

6. For traffic volumes greater than 1000 Passenger Cars Per Hour Per Lane (PCPHPL), or for roadway closures that exceed 15 minutes, see details elsewhere in the plan.

7. If traffic queues beyond the advance warning signs during one road closure sequence, the advance warning should be extended prior to repeating the road closure sequence. When possible, PCMS signs should be located in advance of the last available exit prior to the closure to allow motorists the choice of an alternate route.

THIS PLAN IS INTENDED TO BE USED AT LOCATIONS/TIMES WHEN TRAFFIC VOLUMES ARE LESS THAN 1000 PASSENGER CARS PER HOUR PER LANE.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHORT DURATION FREEWAY CLOSURE SEQUENCE

TCP(6-7)-12

FILE: tcp6-7.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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4-98	ODA	ECTOR, ETC		49

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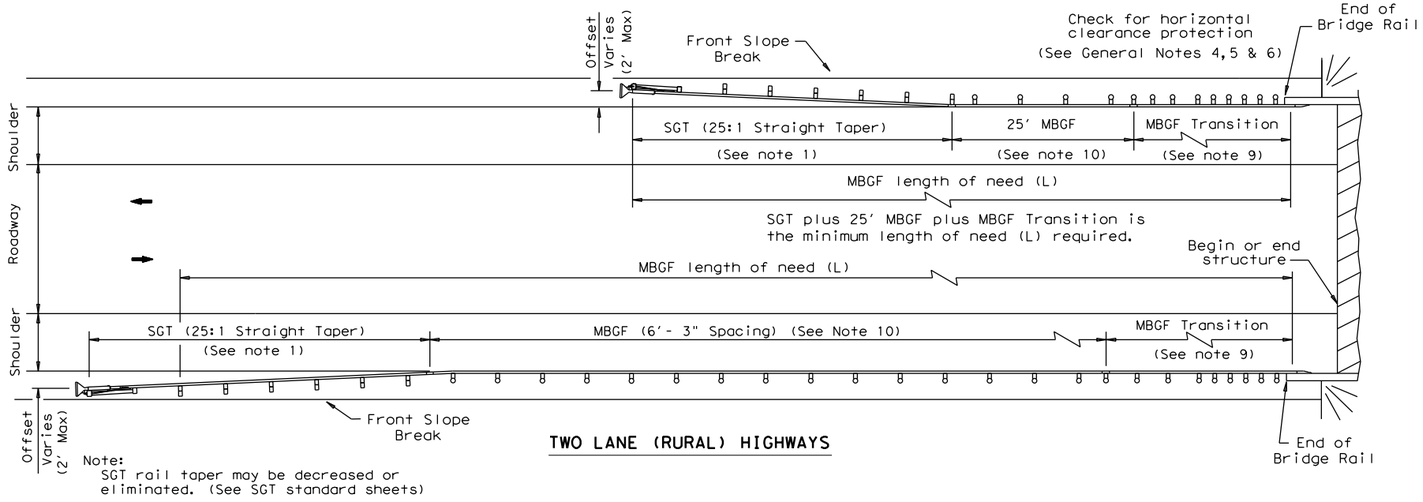
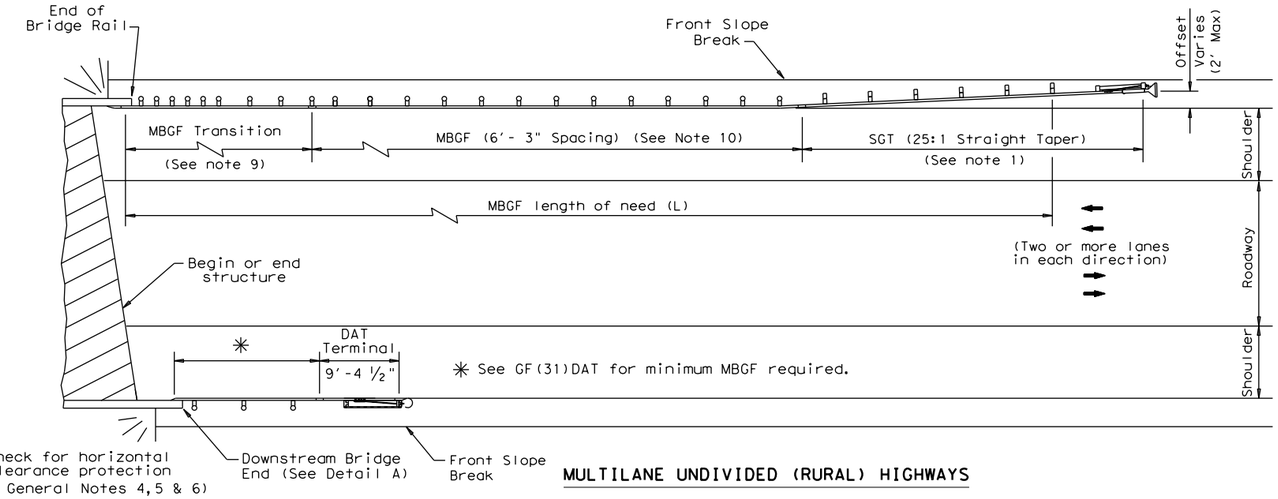
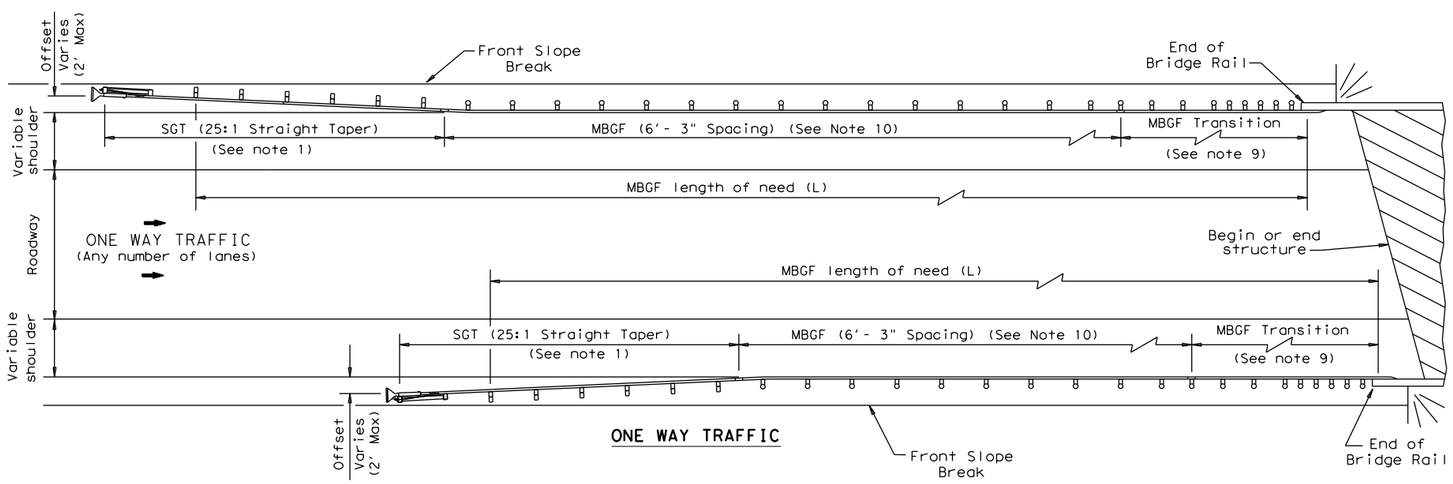


TWO LANE (RURAL) HIGHWAYS

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



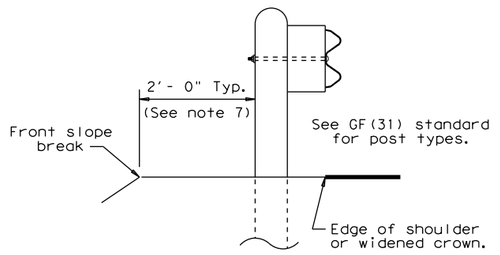
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



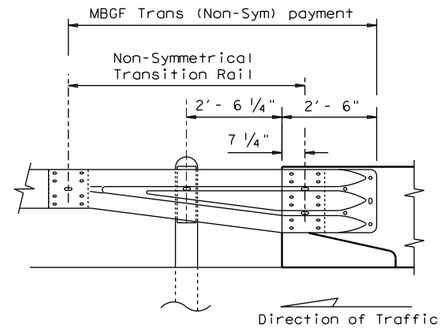
ONE WAY TRAFFIC

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)	0004	07	139, ETC	IH20, ETC
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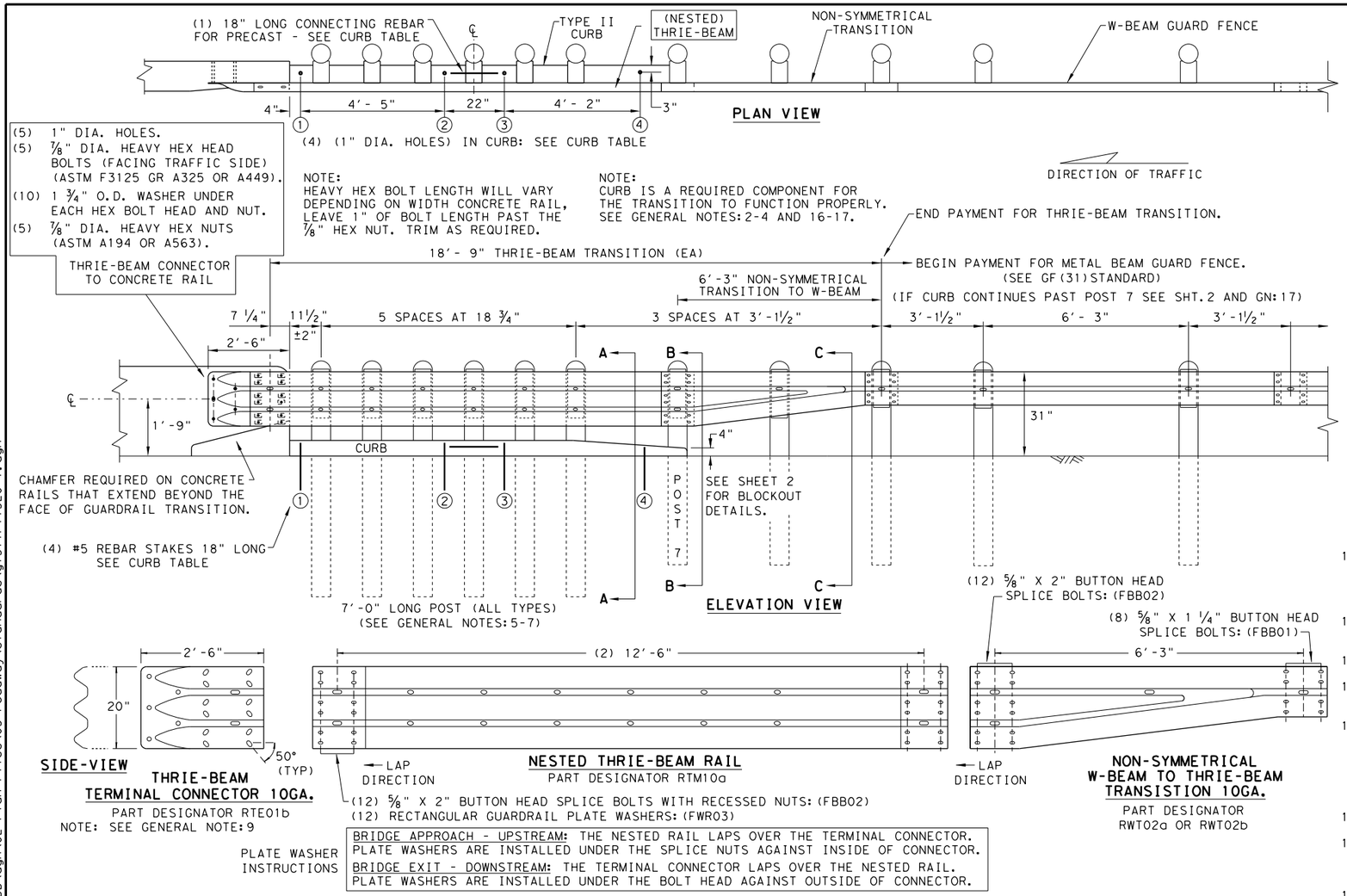
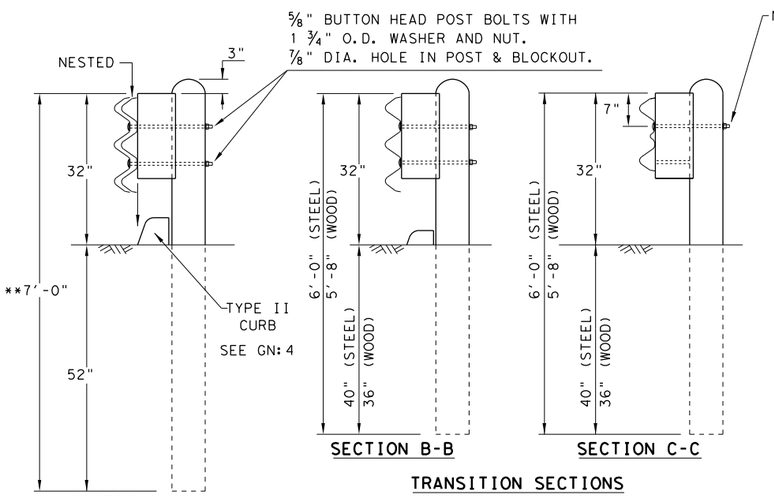
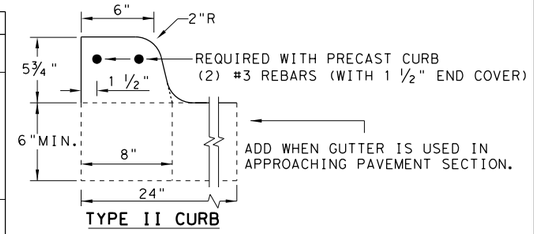




THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



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

GENERAL NOTES

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

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
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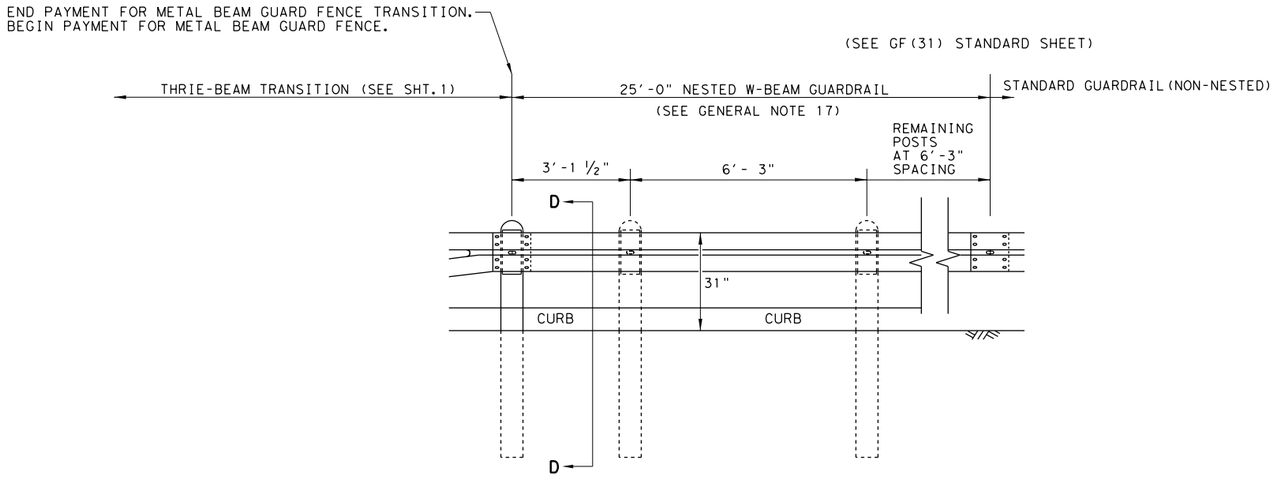
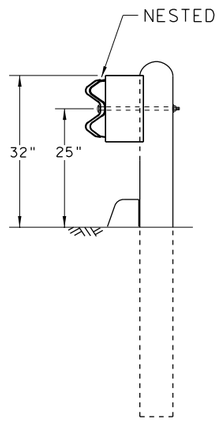
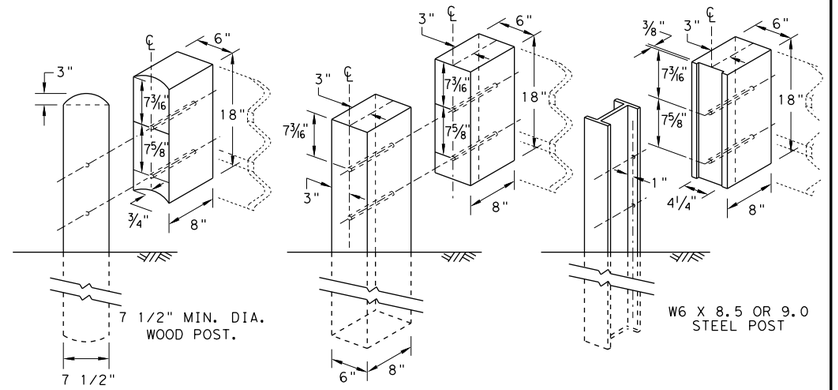
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



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

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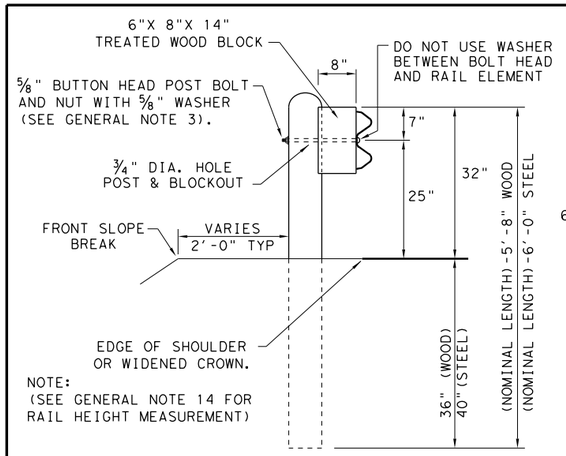
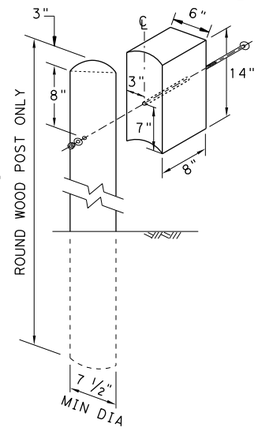
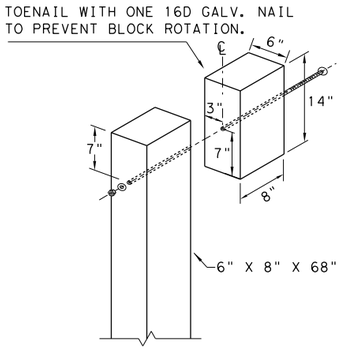


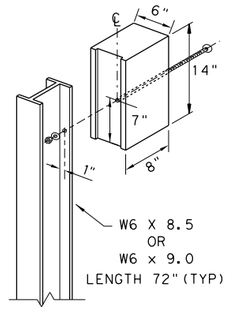
TYPICAL POST PLACEMENT



WOOD BLOCK TO ROUND WOOD POST

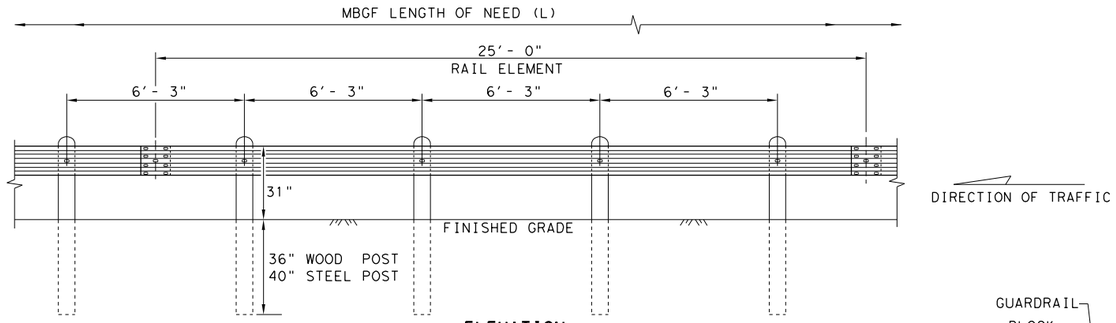


WOOD BLOCK TO RECTANGULAR WOOD POST



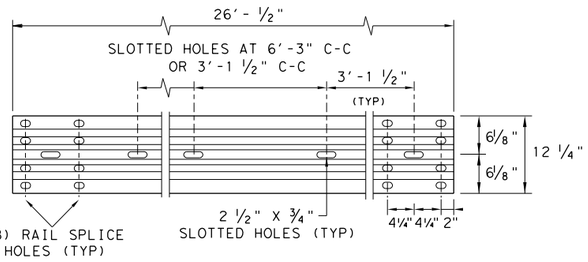
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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.

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

SPLICE BOLT LENGTH — VARIES

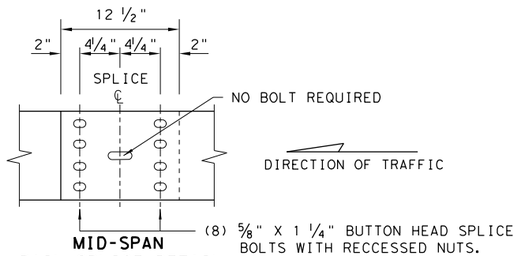
FBB01 = 1 ¼"
FBB02 = 2"

⅝"

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

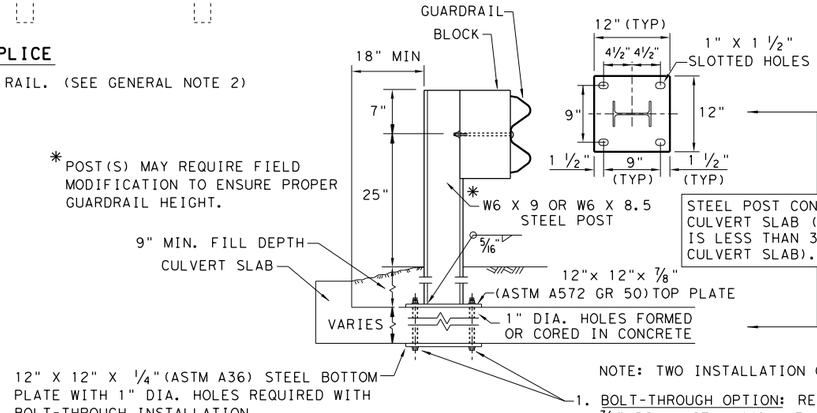
BUTTON HEAD BOLT

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.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139,ETC	IH20,ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR,ETC		53

DATE: 8/17/2023
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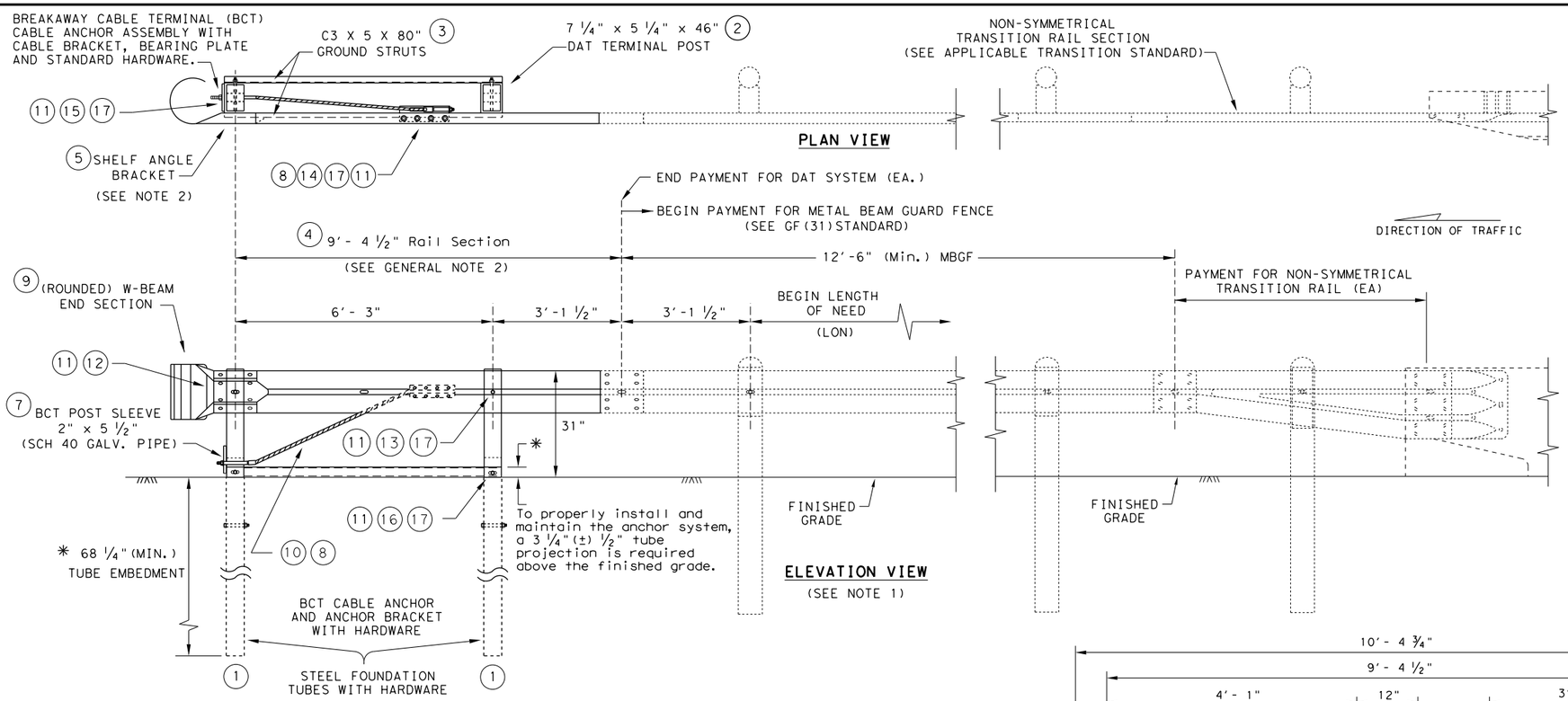


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

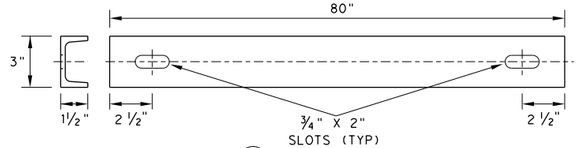
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

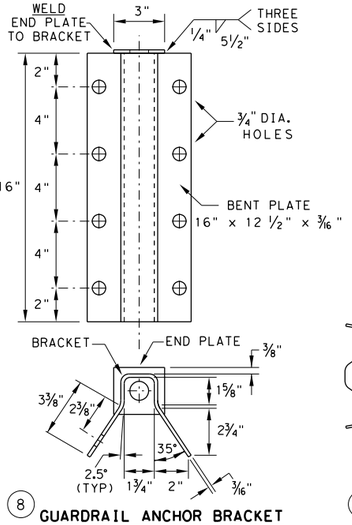
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

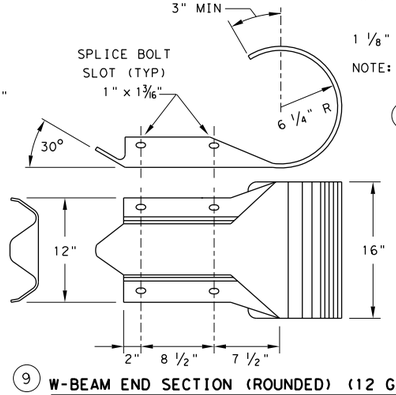
(4) TERMINAL RAIL ELEMENT FOR DAT



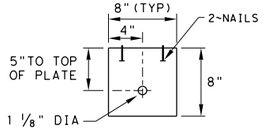
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

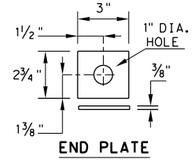


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

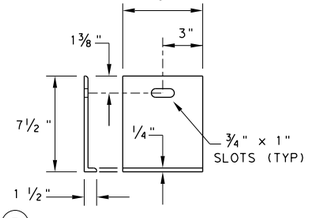


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

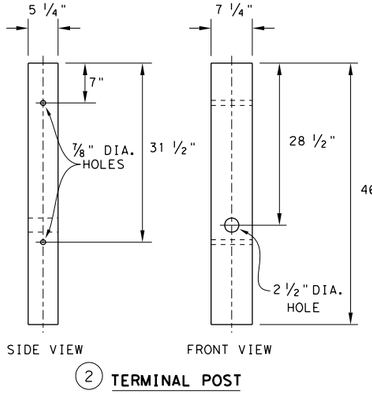
(6) BEARING PLATE
8"x 8"x 5/8" PL



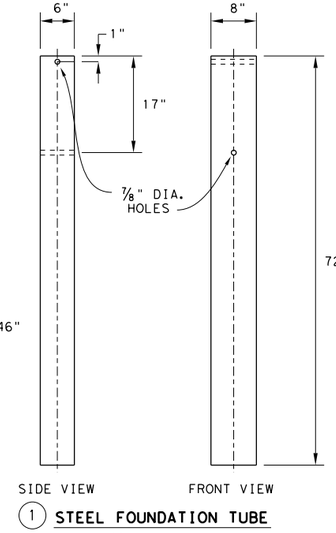
END PLATE



(5) SHELF ANGLE BRACKET



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



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

Texas Department of Transportation

Design Division Standard

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

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0004	07	139,ETC	IH20,ETC	
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	ODA	ECTOR,ETC		54	

DATE: 8/17/2023
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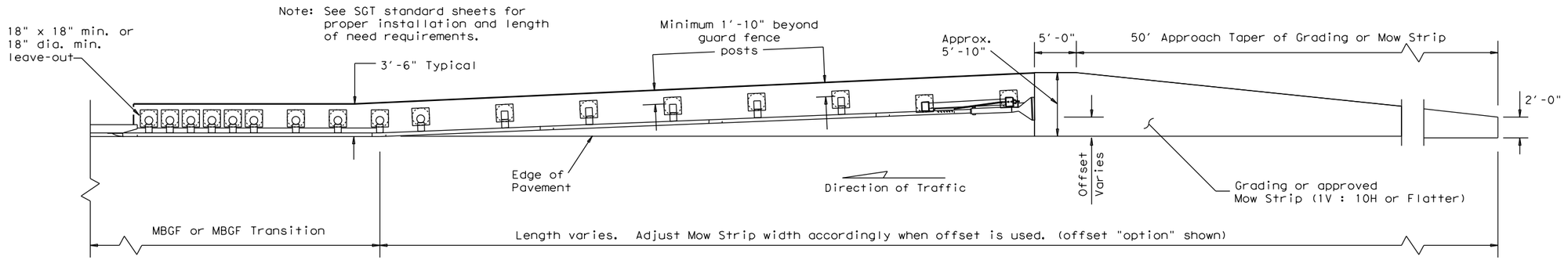
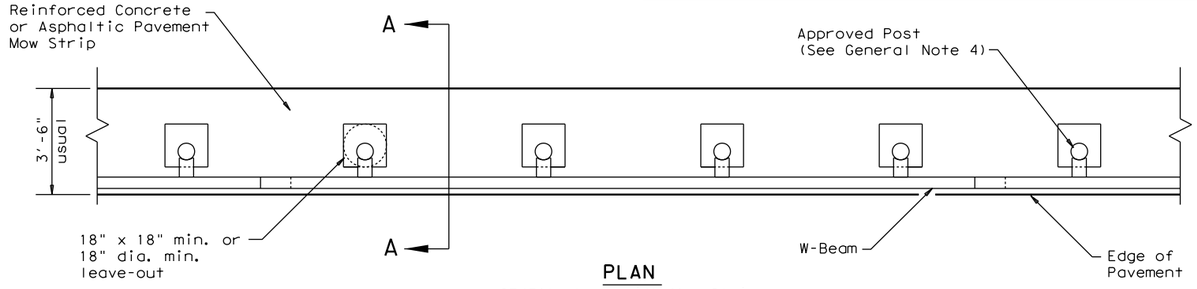


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

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

SECTION A-A

Typical

MOW STRIP DETAIL

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

CURB OPTION (1)

This option will increase the post embedment throughout the system.

CURB OPTION (2)

Curb shown on top of mow strip

CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0004	07	139, ETC		IH20, ETC	
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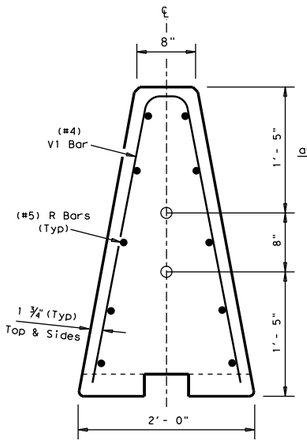
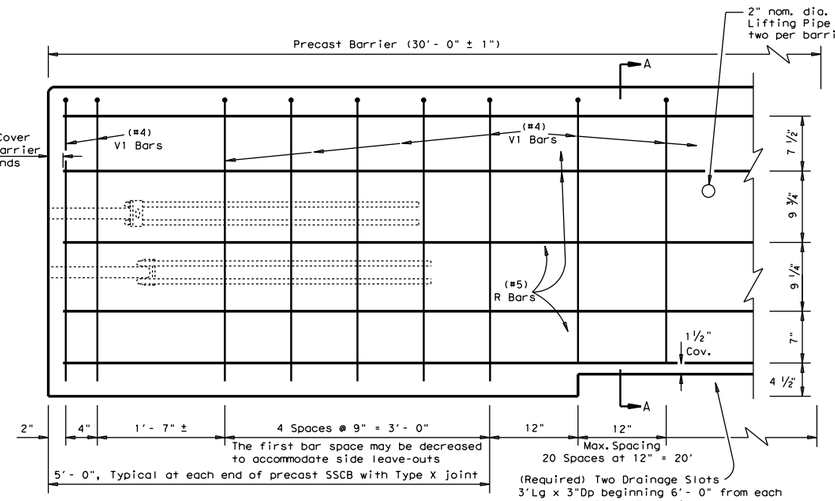


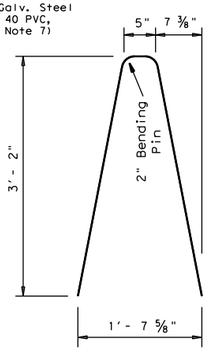
End View
Precast Barrier

Pipe locations for Joint
Type X connection



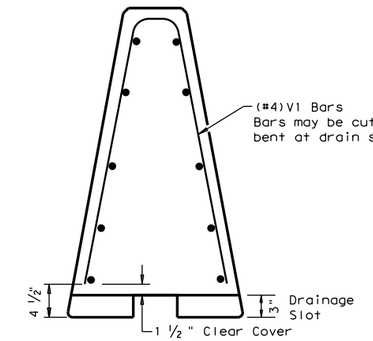
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)

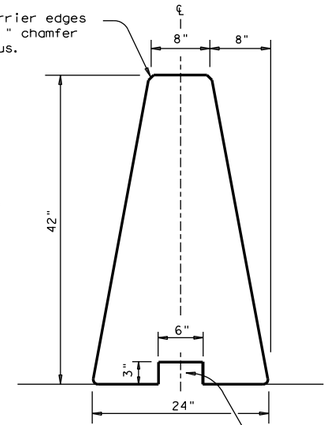


V1 Bar
#4 Rebar

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

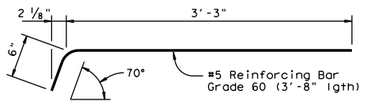


Section A-A
Steel Placement at
(Required) Drainage Slots



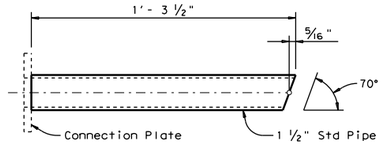
Single Slope Concrete Traffic Barrier

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



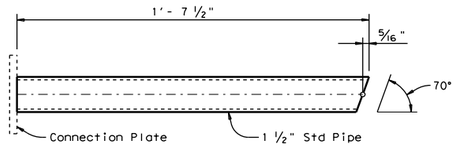
DEFORMED BAR ANCHOR DETAILS

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



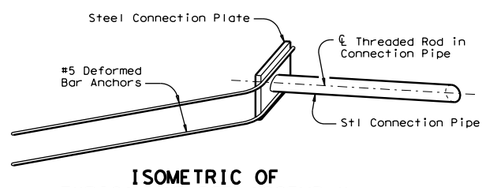
UPPER CONNECTION PIPE DETAILS

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



LOWER CONNECTION PIPE DETAILS

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

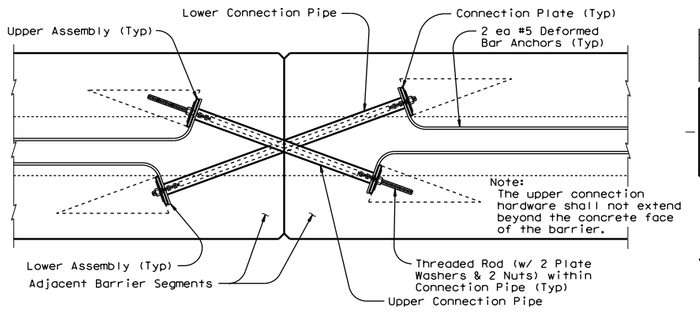


ISOMETRIC OF
TYPICAL WELDED ASSEMBLY

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

General Notes

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

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

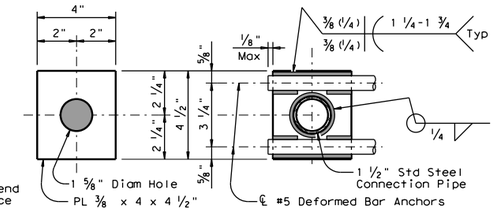
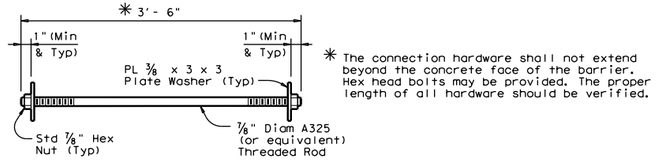


PLATE DIMENSIONS
WELDING DETAILS
CONNECTION PLATE DETAILS

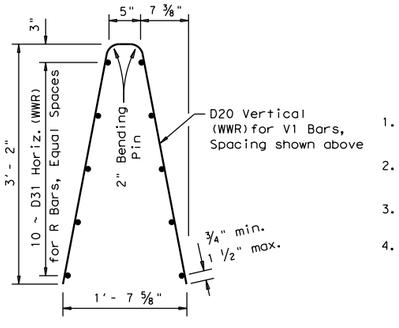
One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



CONNECTION BOLT OR
THREADED ROD DETAIL

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

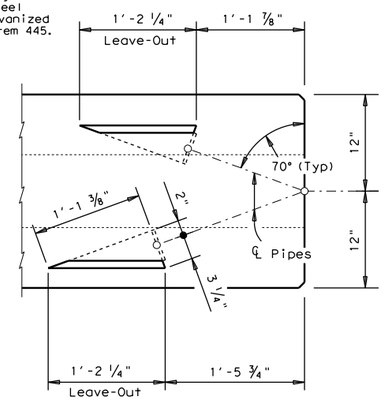
Weight of one precast 30 ft.
(SSCB) segment = Approx. 10.5 Tons
or 717 lbs per ft.



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

(WWR) General Notes

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



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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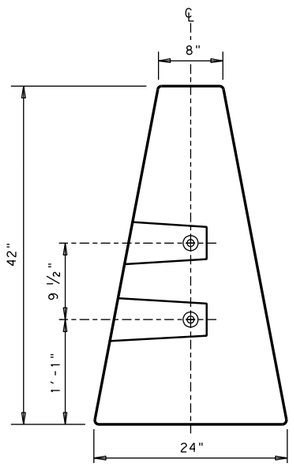
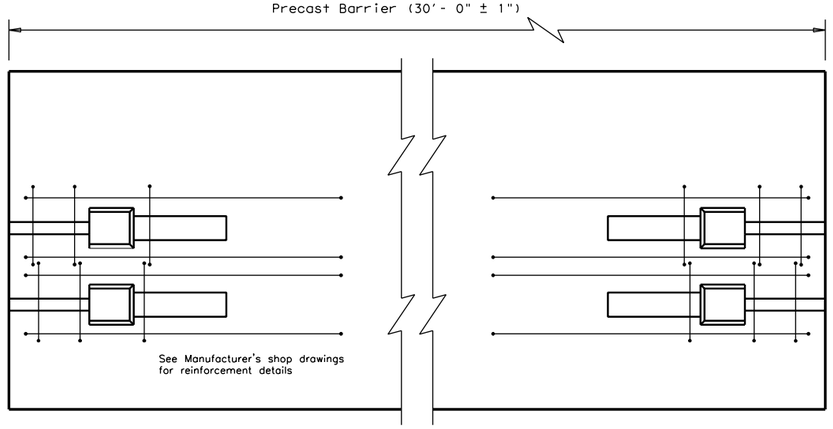
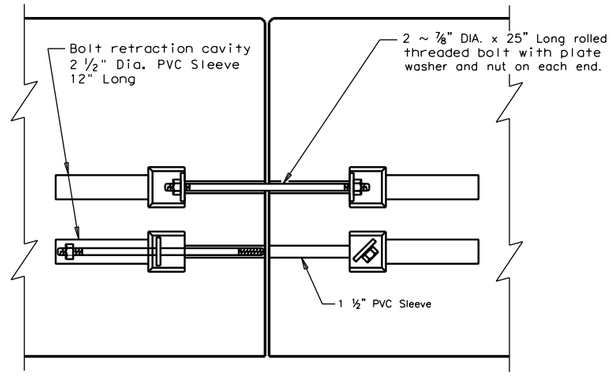


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

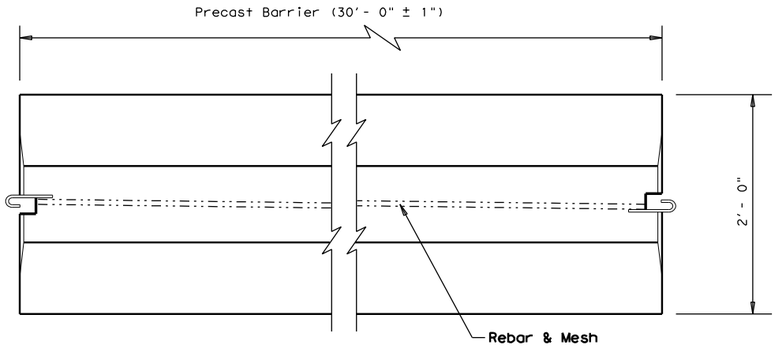


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

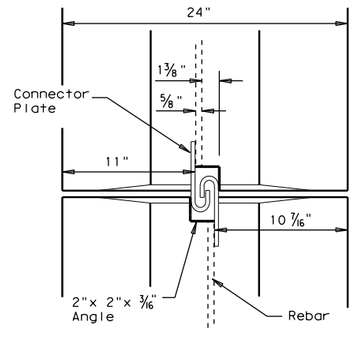


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

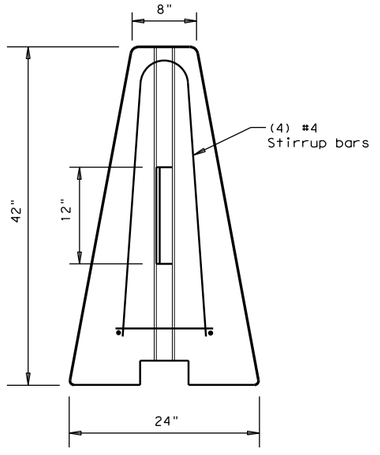
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



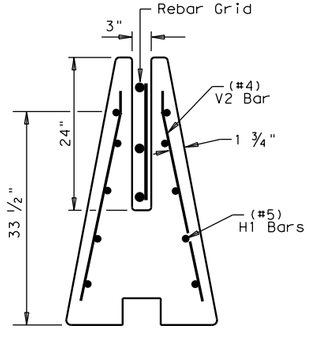
END VIEW

Proprietary Joint Connections (SSCB)

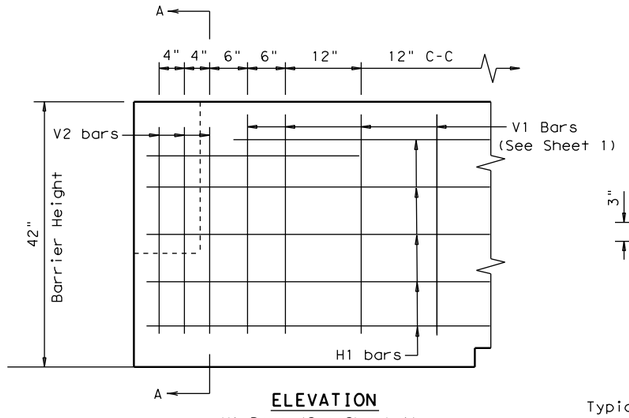
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

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

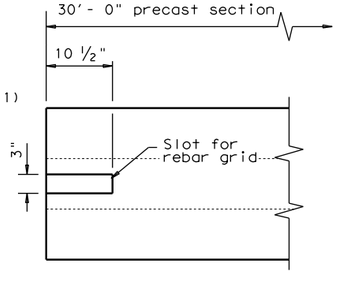
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



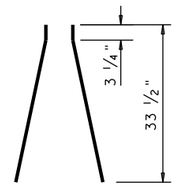
SECTION A-A
Showing (Type R) Rebar Grid



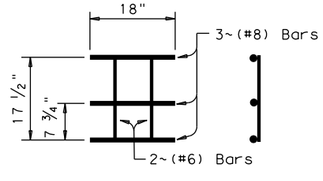
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



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



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139,ETC	IH20,ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR,ETC		57

DATE: 8/17/2023
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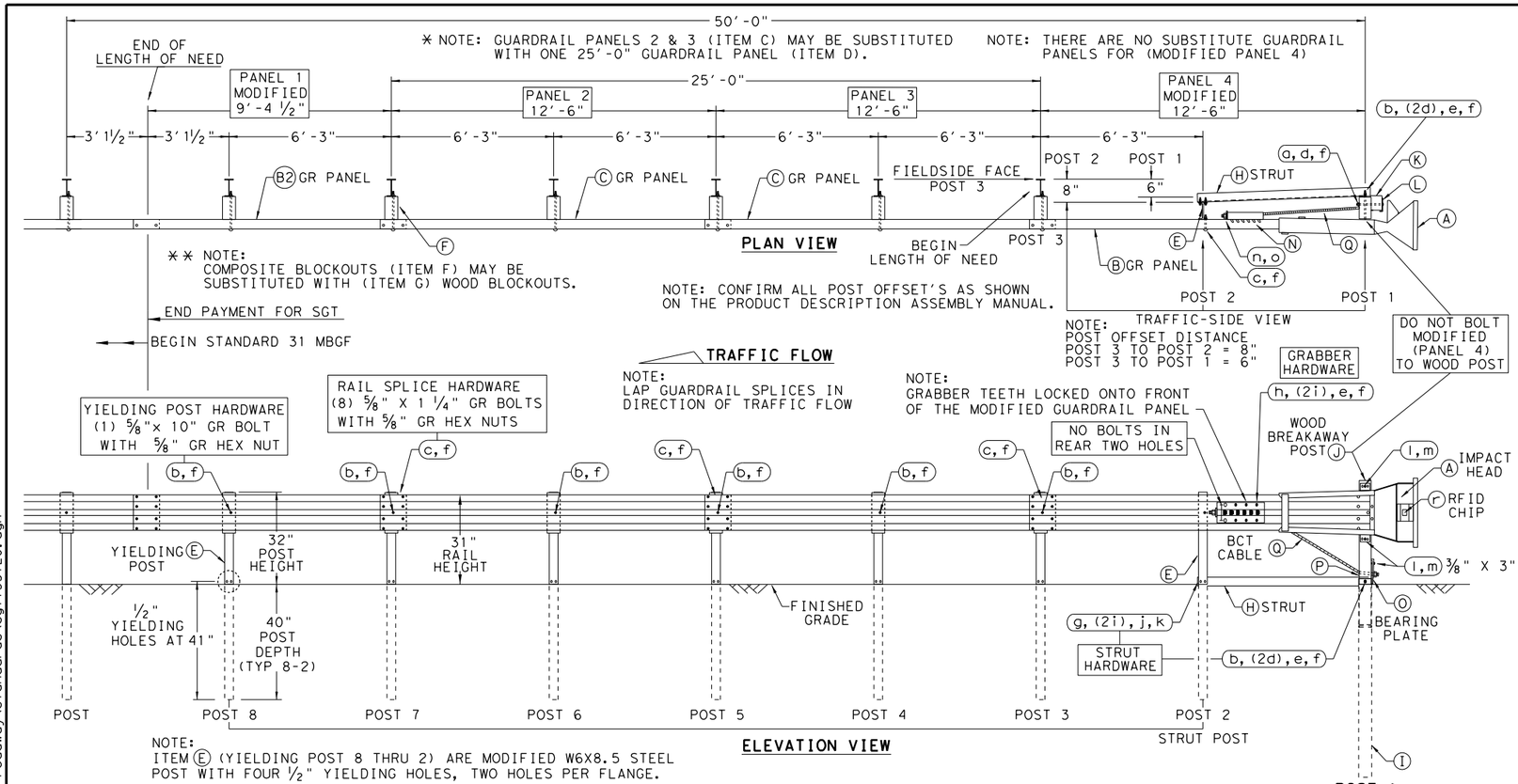
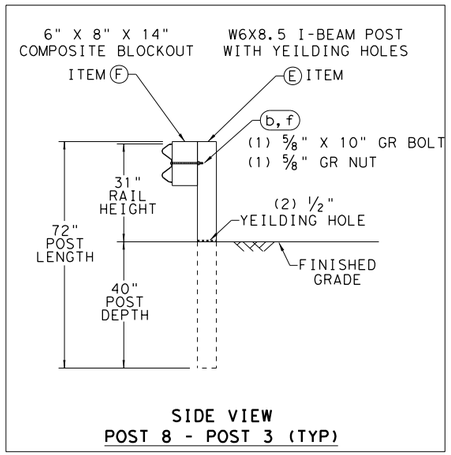


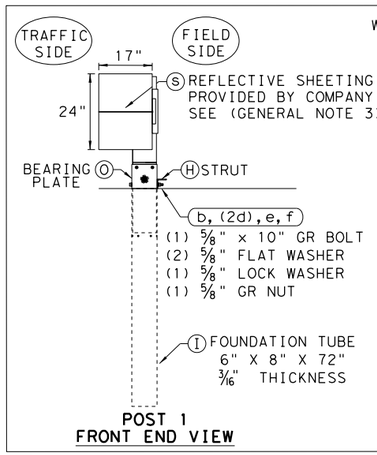
GENERAL NOTES

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

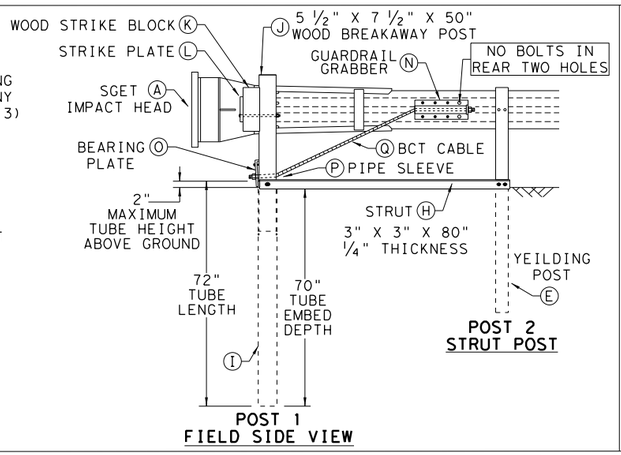
ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD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



SIDE VIEW
POST 8 - POST 3 (TYP)

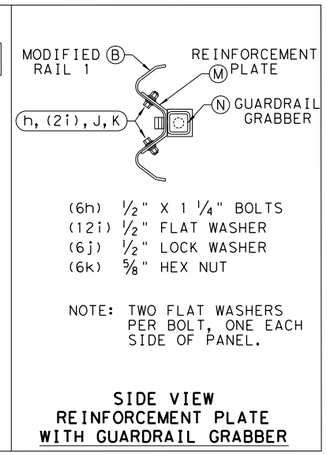


POST 1
FRONT END VIEW

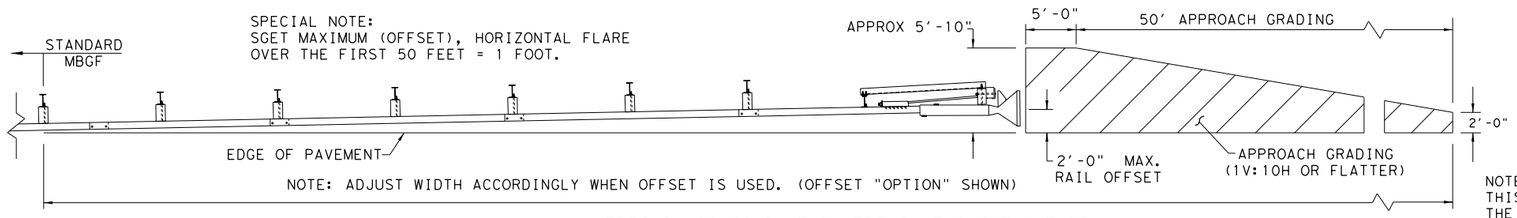


POST 1
FIELD SIDE VIEW

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		
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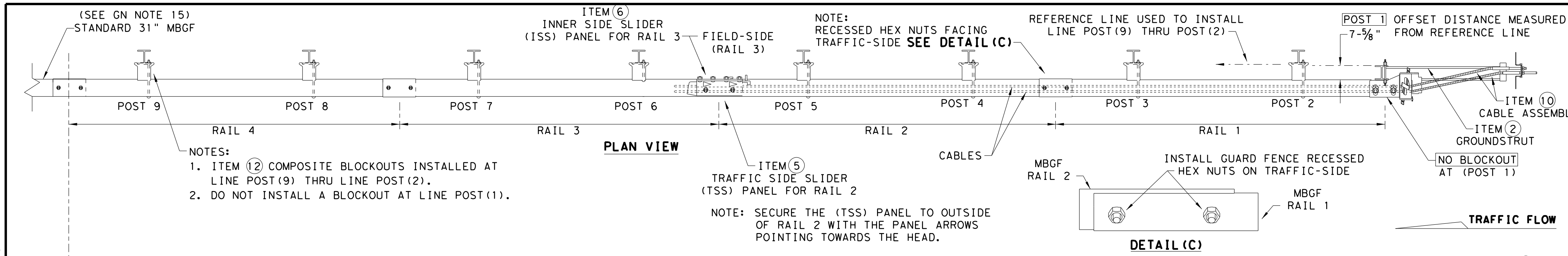
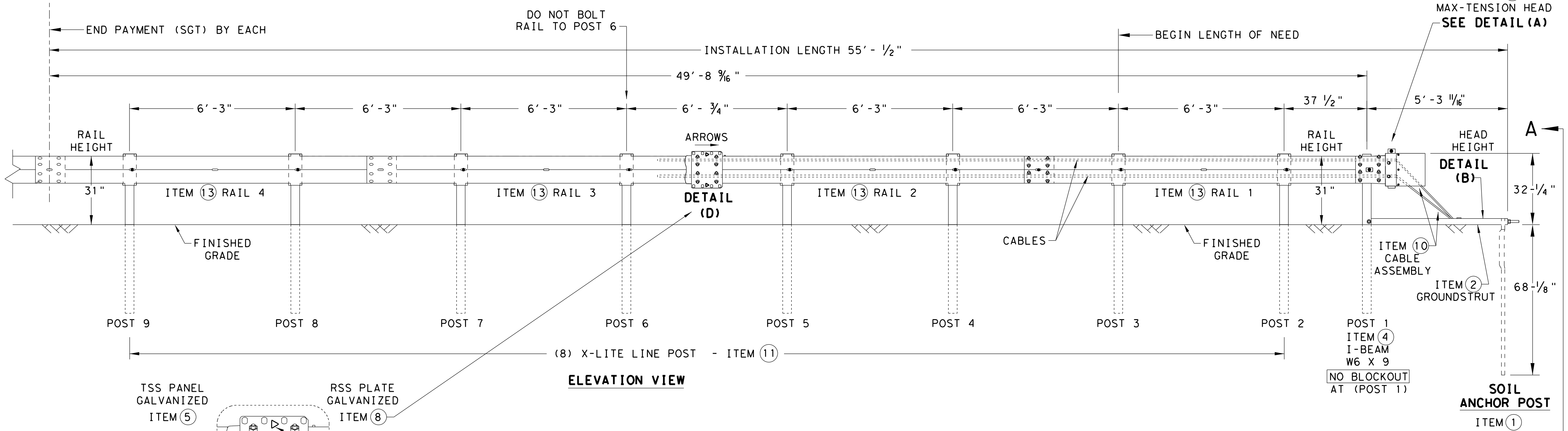
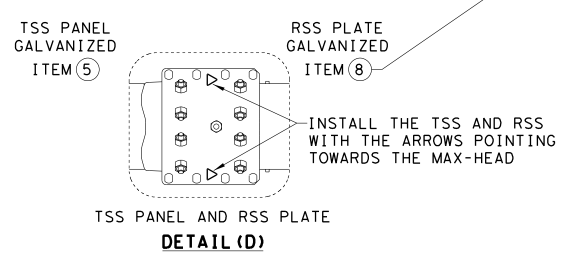
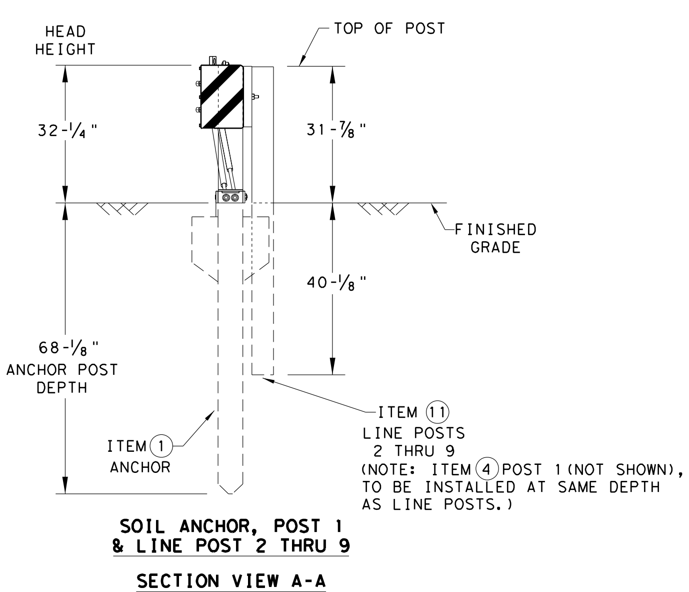
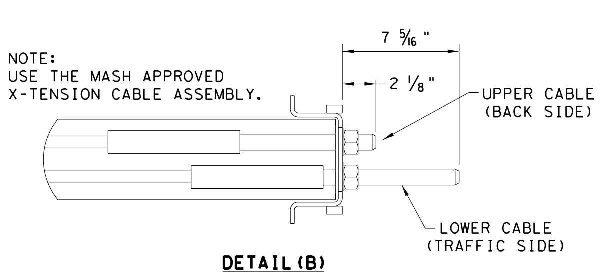
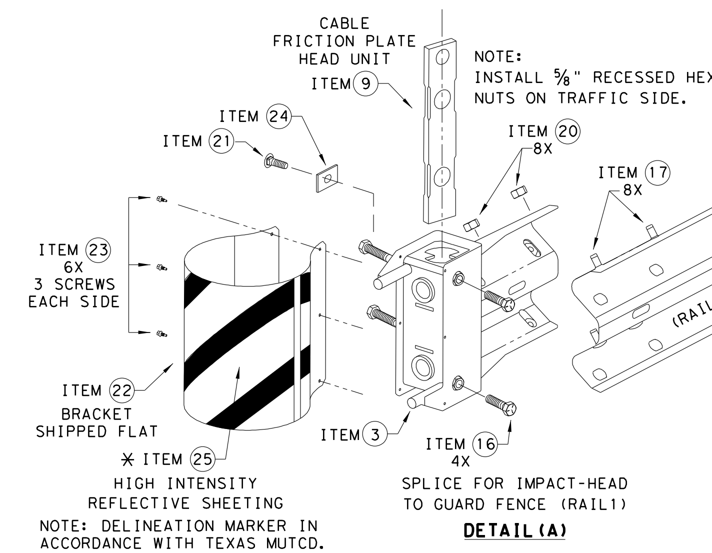












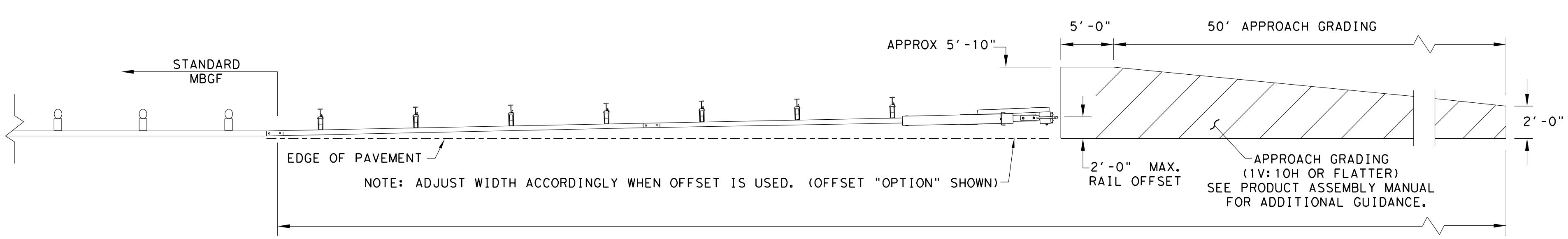
GENERAL NOTES

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 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. 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



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE 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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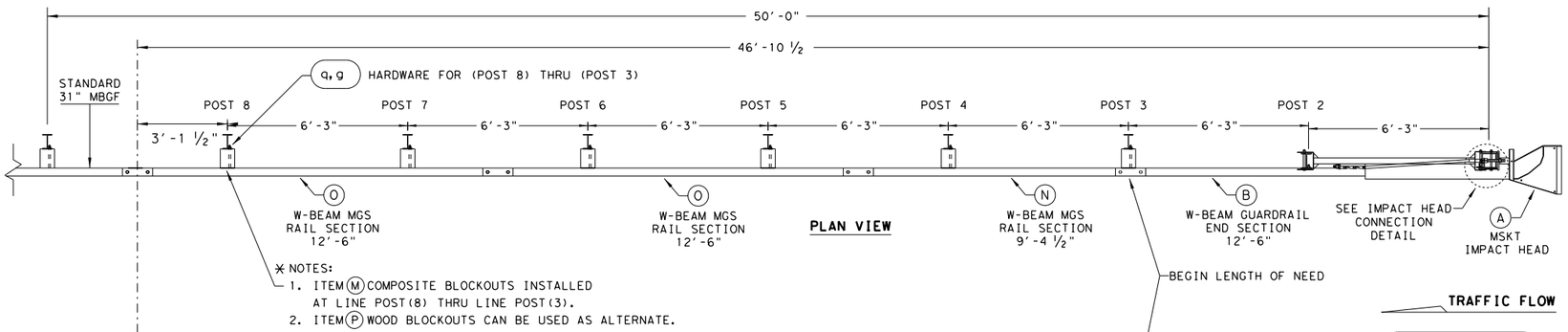
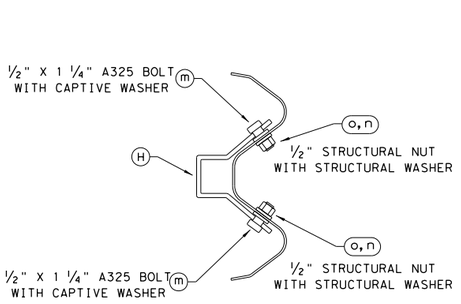
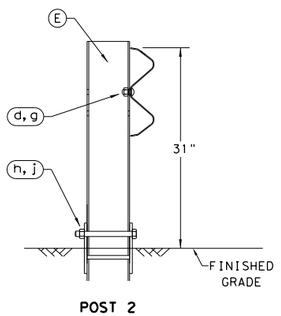
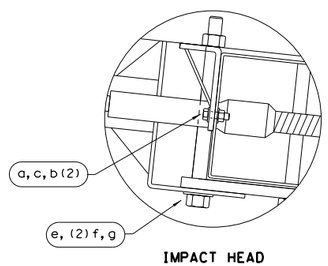
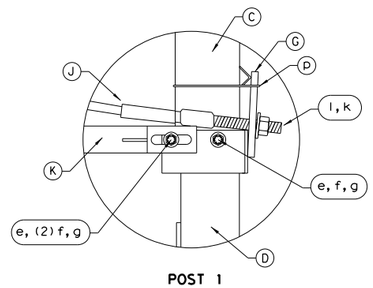


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









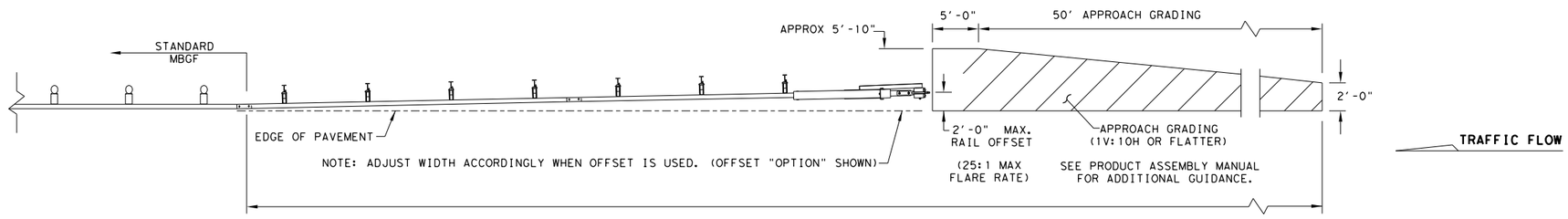
GENERAL NOTES

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: ✳

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

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



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

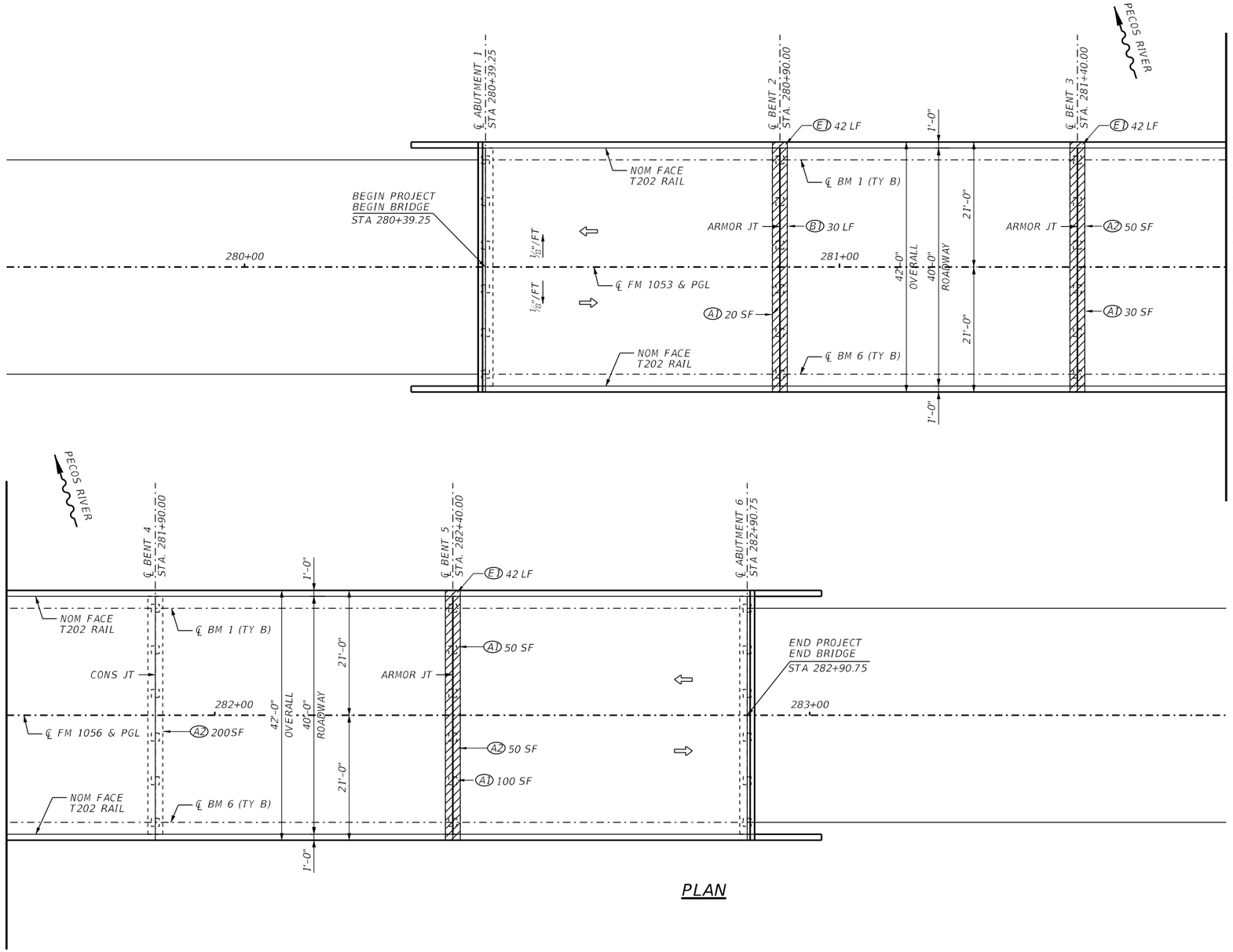
Design Division Standard

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	0004	07	139,ETC		IH20,ETC		
	DIST	COUNTY			SHEET NO.		
	ODA	ECTOR,ETC			60		



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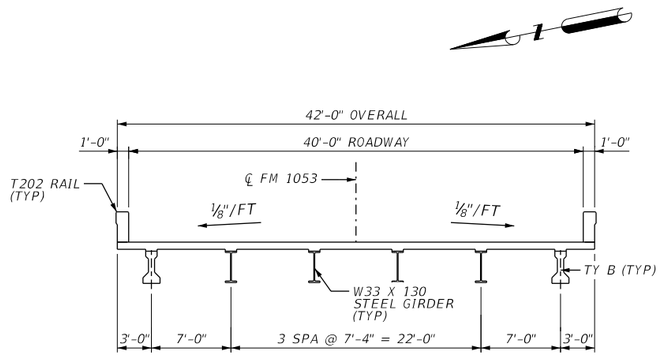

TYPICAL SECTION

LEGEND

CLEANING AND SEALING EXISTING JOINT SEE DETAIL

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

- A1 MINOR SPALL
- A2 INTERMEDIATE SPALL
- B1 EPOXY INJECT
- E1 CLEANING AND SEALING EXISTING JOINTS

NOTES:

1. SEE "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. FOR TYPICAL SECTION REFER TO "TYPICAL SECTIONS" SHEET 4.
3. SEE "ZONE PAINTING DETAILS" SHEET FOR REPAIR NOTES, AND ADDITIONAL INFORMATION.

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
438	6004	CLEANING AND SEALING EXIST JOINTS (CL 7) E1	LF	126
4207	6003	STEEL BRIDGE ZONE PAINTING REF STR 3*	EA	1

* ITEMS TO BE PAINTED SHALL INCLUDE BEAM ENDS, DIAPHRAGMS AND STEEL BEARINGS AT INTERIOR BENTS AND ABUTMENTS. (APPROX. 2,166 SF). ANY ADDITIONAL ITEMS SHALL BE VERIFIED BY THE ENGINEER.

0 10' 20'

SCALE: 1" = 20'

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

consor F-12040

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

LOCATION 01
FM 1053 OVER PECOS RIVER
06-052-0866-03-002

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				61
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

BENT 2 NORTH FACE

BENT 3 SOUTH FACE

BENT 2 SOUTH FACE

BENT 5 BOTTOM CAP

BENT 4 BOTTOM CAP

REPAIR TYPE	LOCATION	UNIT	QTY
A1	BENT 2 NORTH FACE BETWEEN PILES 3 & 5	SF	20
B1	BENT 2 SOUTH FACE BETWEEN PILES 2 & 3	LF	30
A2	BENT 3 SOUTH FACE BETWEEN PILES 2 & 3	SF	50
A1	BENT 3 SOUTH FACE BETWEEN PILES 4 & 5	SF	30
A2	BENT 4 BOTTOM CAP BETWEEN PILES 3 & 5	SF	200
A1	BENT 5 SOUTH FACE ABOVE PILE 5	SF	100
A1	BENT 5 BOTTOM CAP ABOVE PILE 2	SF	50
A2	BENT 5 BOTTOM CAP ABOVE PILE 4 & 5	SF	50
A1		TOTAL	200
A2		TOTAL	300
B1		TOTAL	30

REPAIR CALL-OUT LEGEND

REPAIR TYPE DESCRIPTION

- (A1) MINOR SPALL
- (A2) INTERMEDIATE SPALL
- (B1) EPOXY INJECT

NOTES:

1. SEE "BRIDGE SPALL REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

2. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.

3. PHOTOGRAPHS ARE PROVIDED FOR CONTRACTOR'S INFORMATION AND ARE INTENDED TO SHOW GENERALIZED IDEA OF THE STRUCTURE'S CONDITION. EXTENT OF DAMAGE MAY VARY FROM WHAT IS SHOWN IN PHOTOS.

SCALE: NTS

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 2)	SY	517
429	6002	CONC STR REPAIR (EPOXY MORTAR) (A1)	SF	200
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	300
780	6002	CONC CRCK REPR (DISCRETE) (INJECT) (B1)	LF	30

STATE OF TEXAS
MARCELO CABALLERO
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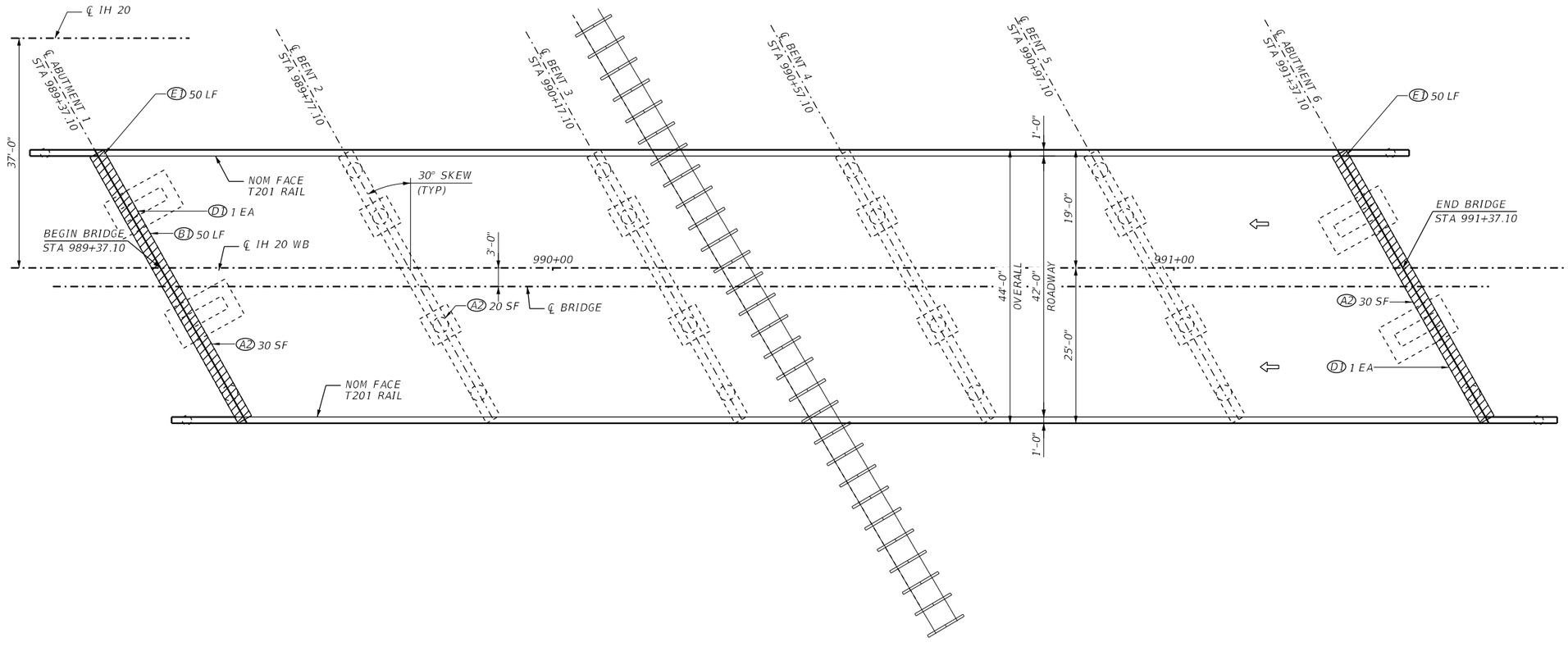
SUBSTRUCTURE REPAIR

LOCATION 01
FM 1053 OVER PECOS RIVER
06-052-0866-03-002

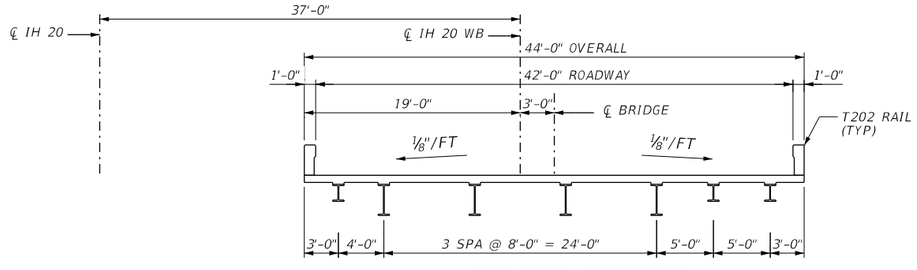
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				62
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09



PLAN



TYPICAL SECTION

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
438	6004	CLEANING AND SEALING EXIST JOINTS (CL 7) (E1)	LF	100
4207	6003	STEEL BRIDGE ZONE PAINTING REF STR 3*	EA	1
7306	6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT) (D1)	EA	2

* ITEMS TO BE PAINTED SHALL INCLUDE BEAM ENDS, DIAPHRAGMS AND STEEL BEARINGS AT INTERIOR BENTS AND ABUTMENTS. (APPROX. 2,962 SF). ANY ADDITIONAL ITEMS SHALL BE VERIFIED BY THE ENGINEER.

LEGEND

CLEANING AND SEALING EXISTING JOINT SEE DETAIL

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION – SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

- (A2) INTERMEDIATE REPAIR
- (B1) EPOXY INJECT
- (D1) CLEANING ABUTMENT
- (E1) CLEANING AND SEALING EXISTING JOINTS

NOTES:

1. SEE "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. FOR TYPICAL SECTION REFER TO "TYPICAL SECTIONS" SHEET 5.
3. SEE "ZONE PAINTING DETAILS" SHEET FOR REPAIR NOTES, AND ADDITIONAL INFORMATION.

0 10' 20'

SCALE: 1" = 20'

STATE OF TEXAS
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BRIDGE REPAIR LAYOUT

LOCATION 02
IH 20 WB OVER UPRR
06-069-0004-07-022

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				63
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

REPAIR TYPE	LOCATION	UNIT	QTY
A2	ABUTMENT 1 BACKWALL BETWEEN GIRDERS 2 & 3	SF	20
A1	ABUTMENT 6 CAP	SF	15
A2	ABUTMENT 1 CAP	SF	10
A2	ABUTMENT 1 BACKWALL BETWEEN GIRDERS 5 & 6	SF	20
A2	ABUTMENT 6 BACKWALL BETWEEN GIRDERS 2 & 3	SF	10
A2	BENT 2 COLUMN 2 SOUTH FACE	SF	10
A2	BENT 2 COLUMN 3 SOUTH FACE	SF	10
A2	BENT 3 COLUMN 1 WEST FACE	SF	10
A2	BENT 3 COLUMN 2 SOUTH FACE	SF	30
A2	BENT 5 COLUMNS 1 & 2	SF	60
B1	ABUTMENT 6 CAP	LF	15
A1		TOTAL	15
A2		TOTAL	180
B1		TOTAL	15

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(A1) MINOR SPALL

(A2) INTERMEDIATE SPALL

(B1) EPOXY INJECT

(A2) 10 SF

ABUTMENT 1 BACKWALL

(A2) 10 SF

ABUTMENT 6 BACKWALL

(A1) 15 SF

ABUTMENT 6 CAP

BENT 3 COLUMN 2

(A2) 60 SF

BENT 5 COLUMNS 1 & 2

(B1) 15 LF

ABUTMENT 6 BACKWALL

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 2)	SY	471
429	6002	CONC STR REPAIR (EPOXY MORTAR) (A1)	SF	15
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	180
780	6002	CONC CRCK REPR (DISCRETE) (INJECT) (B1)	LF	15

NOTES:

1. SEE "BRIDGE SPALL REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

2. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.

3. PHOTOGRAPHS ARE PROVIDED FOR CONTRACTOR'S INFORMATION AND ARE INTENDED TO SHOW GENERALIZED IDEA OF THE STRUCTURE'S CONDITION. EXTENT OF DAMAGE MAY VARY FROM WHAT IS SHOWN IN PHOTOS.

STATE OF TEXAS
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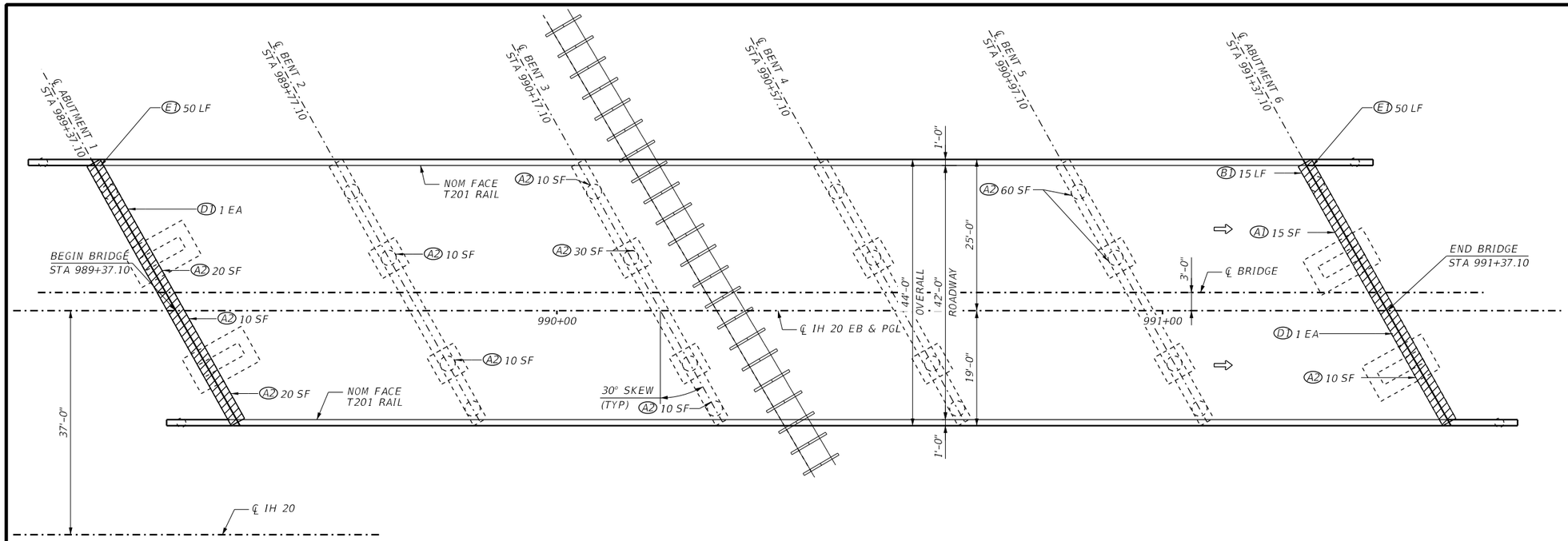
SUBSTRUCTURE REPAIR

LOCATION 02
IH 20 WB OVER UPRR
06-069-0004-07-022

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				64
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09



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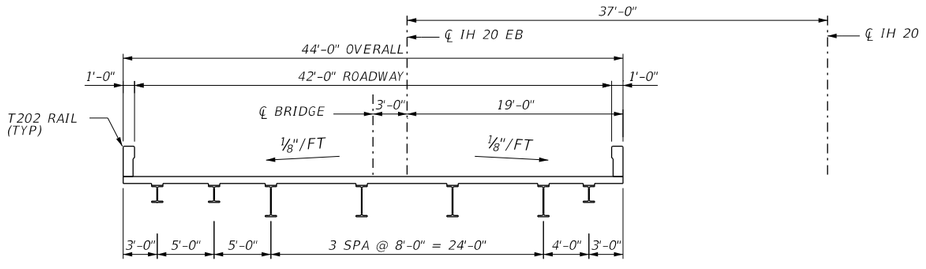

TYPICAL SECTION

LEGEND

CLEANING AND SEALING EXISTING JOINT SEE DETAIL

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

- (A1) MINOR SPALL
- (A2) INTERMEDIATE REPAIR
- (B1) EPOXY INJECT
- (D1) CLEANING ABUTMENT
- (E1) CLEANING AND SEALING EXISTING JOINTS

NOTES:

1. SEE "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. FOR TYPICAL SECTION REFER TO "TYPICAL SECTIONS" SHEET 5.
3. SEE "ZONE PAINTING DETAILS" SHEET FOR REPAIR NOTES, AND ADDITIONAL INFORMATION.

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
438	6004	CLEANING AND SEALING EXIST JOINTS (CL 7) (E1)	LF	100
4207	6003	STEEL BRIDGE ZONE PAINTING REF STR 3*	EA	1
7306	6001	BRIDGE SUBSTRUCTURE CLEANING (ABUT) (D1)	EA	2

* ITEMS TO BE PAINTED SHALL INCLUDE BEAM ENDS, DIAPHRAGMS AND STEEL BEARINGS AT INTERIOR BENTS AND ABUTMENTS. (APPROX. 2,962 SF). ANY ADDITIONAL ITEMS SHALL BE VERIFIED BY THE ENGINEER.

0 10' 20'

SCALE: 1" = 20'

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BRIDGE REPAIR LAYOUT

LOCATION 03
IH 20 EB OVER UPRR
06-069-0004-07-023
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				65
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

REPAIR TYPE	LOCATION	UNIT	QTY
B1	ABUTMENT 1 BACKWALL	LF	50
A2	ABUTMENT 6 CAP BETWEEN GIRDER 3 & 4	SF	30
A2	BENT 2 COLUMN 3 SOUTH FACE	SF	20
A2	ABUTMENT 1 CAP	SF	30
A2		TOTAL	80
B1		TOTAL	50

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

- (A1) MINOR SPALL
- (A2) INTERMEDIATE SPALL
- (B1) EPOXY INJECT

NOTES:

1. SEE "BRIDGE SPALL REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.
3. PHOTOGRAPHS ARE PROVIDED FOR CONTRACTOR'S INFORMATION AND ARE INTENDED TO SHOW GENERALIZED IDEA OF THE STRUCTURE'S CONDITION. EXTENT OF DAMAGE MAY VARY FROM WHAT IS SHOWN IN PHOTOS.

(A2) 30 SF

ABUTMENT 6 CAP BETWEEN GIRDERS 3 & 4

(A2) 20 SF

BENT 2 COLUMN 3

(B1) 50 LF

ABUTMENT 1 BACKWALL

(A2) 30 SF

ABUTMENT 1 CAP

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 2)	SY	471
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	80
780	6002	CONC CRCK REPR (DISCRETE) (INJECT) (B1)	LF	50

STATE OF TEXAS
MARCELO CABALLERO
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PROFESSIONAL ENGINEER

8/17/2023

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Texas Department of Transportation

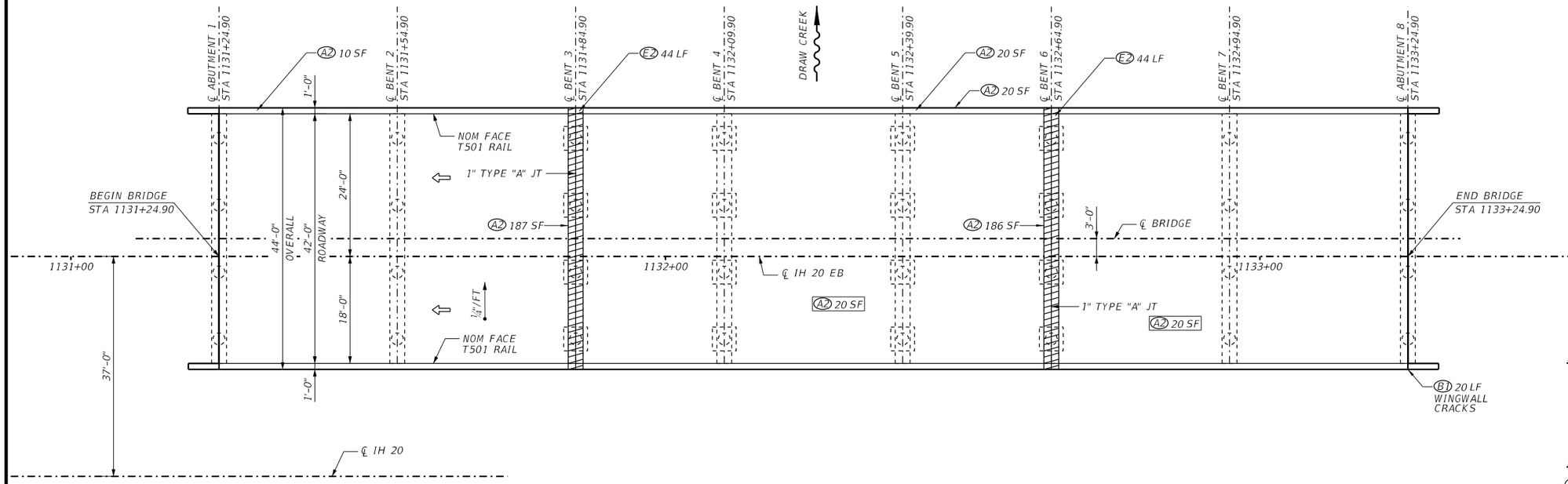
SUBSTRUCTURE REPAIR

LOCATION 03
IH 20 EB OVER UPRR
06-069-0004-07-023

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				66
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09



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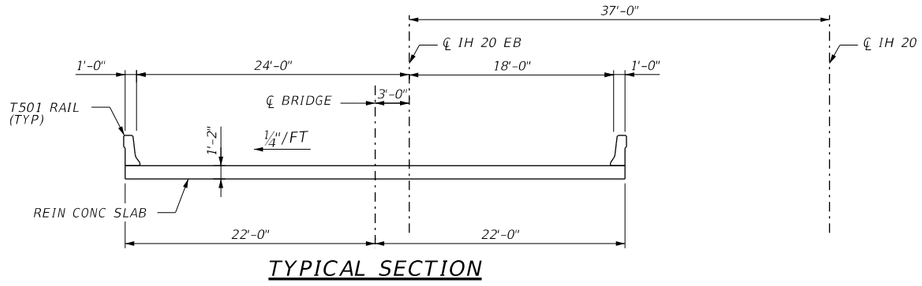

TYPICAL SECTION

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	90
438	6004	CLEANING AND SEALING EXISTING JOINTS (CL 7) (E2)	LF	88
780	6002	CONC CRACK REPAIR (DISCRETE) (INJECT) (B1)	LF	20

LEGEND

CLEANING AND SEALING EXISTING JOINT SEE DETAIL

(XX) XX XX DECK SOFFIT

REPAIR CALL-OUT LEGEND

(XX) XX XX
- XX XX — REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- (XX) — REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(A2) INTERMEDIATE SPALL

(B1) EPOXY INJECT

(E2) CLEANING AND SEALING JOINTS (CL 7)

NOTES:

1. SEE "BRIDGE SPALLS REPAIR DETAILS", "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

0 10' 20'

SCALE: 1" = 20'

STATE OF TEXAS
MARCELO CABALLERO
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LICENSED PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

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Texas Department of Transportation

BRIDGE REPAIR LAYOUT

LOCATION 04
IH 20 EB OVER DRAW
06-069-0004-07-024
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				67
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

BENT CAP 3

BENT CAP 6

REPAIR TYPE	LOCATION	UNIT	QTY
A2	BENT CAP 3 NORTH FACE	SF	187
A2	BENT CAP 6 NORTH FACE	SF	186
A2		TOTAL	373

REPAIR CALL-OUT LEGEND

(XX) XX XX
- XX XX — REPAIR QUANTITY UNIT
- XX — ESTIMATED REPAIR QUANTITY
- (XX) — REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(A1) MINOR SPALL

(A2) INTERMEDIATE SPALL

NOTES:

1. SEE "BRIDGE SPALL REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

2. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.

3. PHOTOGRAPHS ARE PROVIDED FOR CONTRACTOR'S INFORMATION AND ARE INTENDED TO SHOW GENERALIZED IDEA OF THE STRUCTURE'S CONDITION. EXTENT OF DAMAGE MAY VARY FROM WHAT IS SHOWN IN PHOTOS.

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 2)	SY	373
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	373

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

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F-12040

Texas Department of Transportation

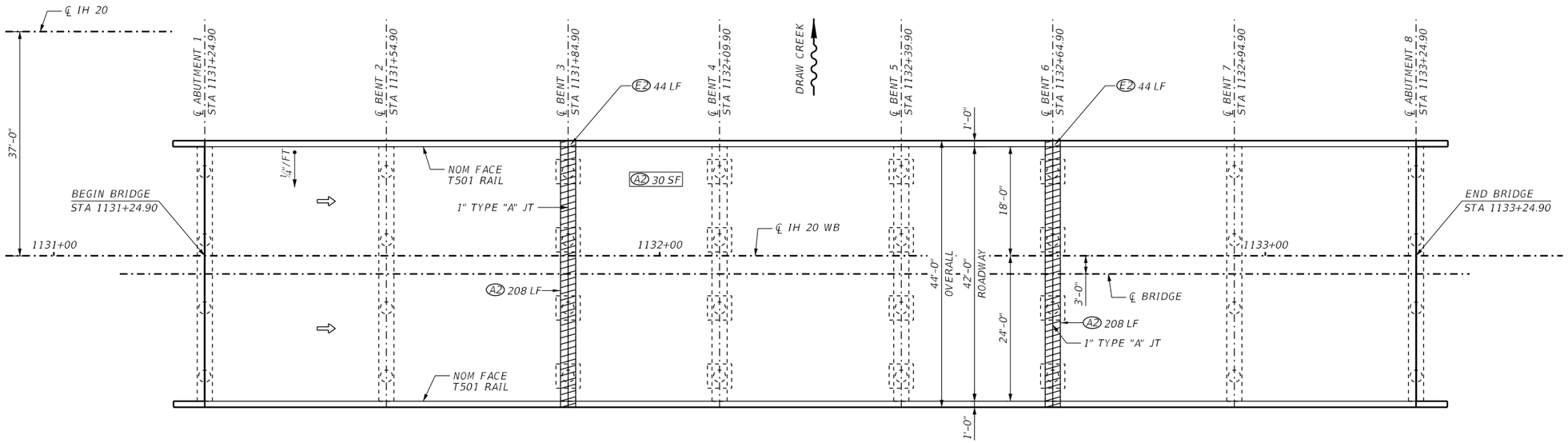
SUBSTRUCTURE REPAIR

LOCATION 04
IH 20 EB OVER DRAW
06-069-0004-07-024

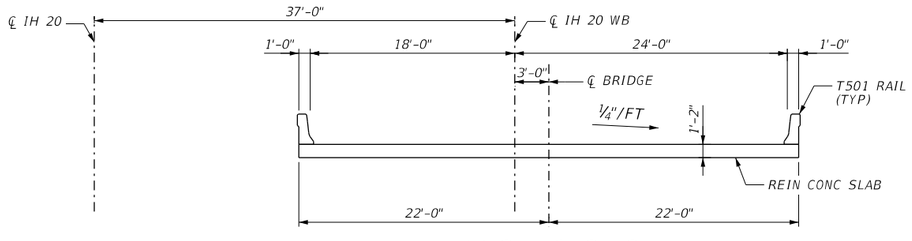
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				68
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09



PLAN



TYPICAL SECTION

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	30
438	6004	CLEANING AND SEALING EXISTING JOINTS (CL 7) (E2)	LF	88

LEGEND

CLEANING AND SEALING EXISTING JOINT SEE DETAIL

(XX) XX XX DECK SOFFIT

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(A2) INTERMEDIATE SPALL

(E2) CLEANING AND SEALING JOINTS (CL 7)

NOTES:

1. SEE "BRIDGE SPALLS REPAIR DETAILS", "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

0 10' 20'

SCALE: 1" = 20'

STATE OF TEXAS
MARCELO CABALLERO
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8/17/2023

NO.	DATE	REVISION	APPROV.

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F-12040

Texas Department of Transportation

BRIDGE REPAIR LAYOUT

LOCATION 05
IH 20 WB OVER DRAW
06-069-0004-07-025
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				69
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

BENT CAP 2

BENT CAP 6

REPAIR TYPE	LOCATION	UNIT	QTY
A2	BENT CAP 2 EAST FACE	SF	208
A2	BENT CAP 6 WEST FACE	SF	208
A2		TOTAL	416

REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

(A1) MINOR SPALL

(A2) INTERMEDIATE SPALL

NOTES:

1. SEE "BRIDGE SPALL REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

2. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.

3. PHOTOGRAPHS ARE PROVIDED FOR CONTRACTOR'S INFORMATION AND ARE INTENDED TO SHOW GENERALIZED IDEA OF THE STRUCTURE'S CONDITION. EXTENT OF DAMAGE MAY VARY FROM WHAT IS SHOWN IN PHOTOS.

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 2)	SY	373
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	416

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MARCELO CABALLERO
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SUBSTRUCTURE REPAIR

LOCATION 05
IH 20 WB OVER DRAW
06-069-0004-07-025

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				70
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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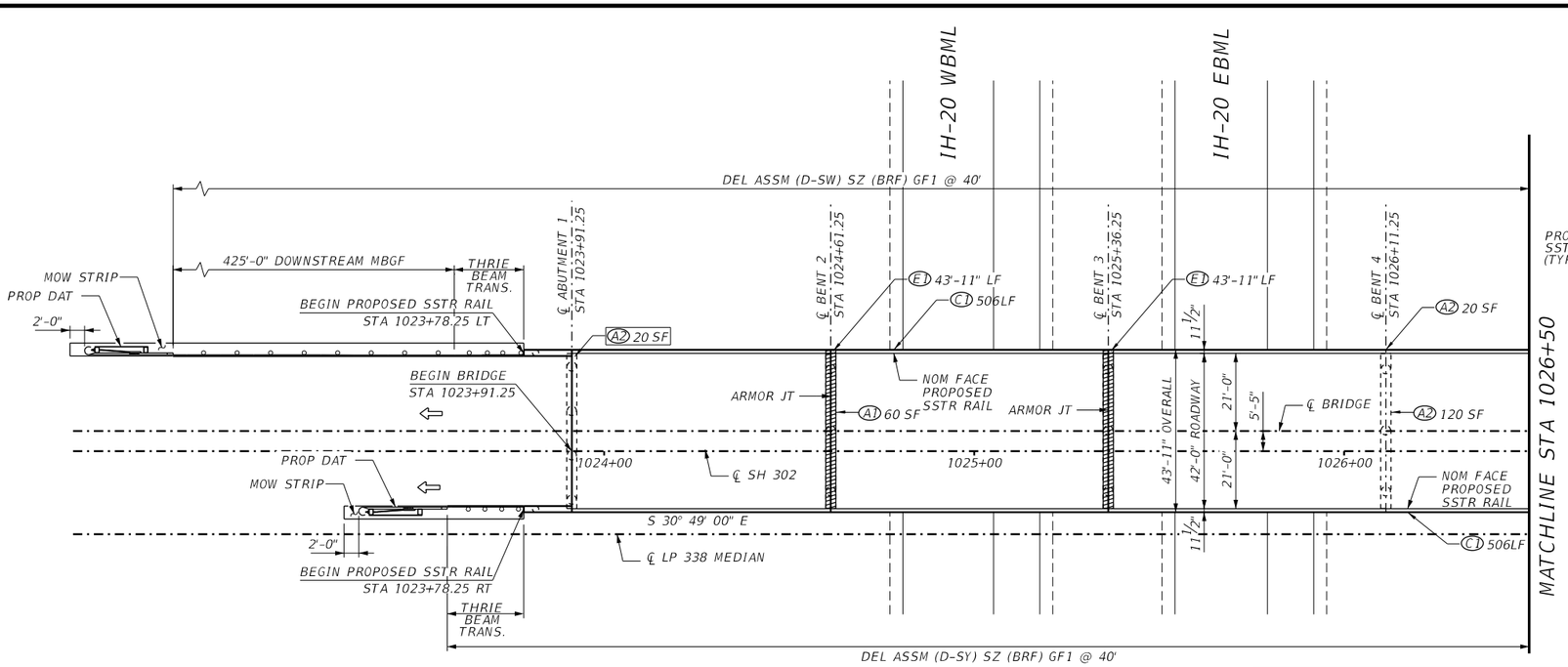
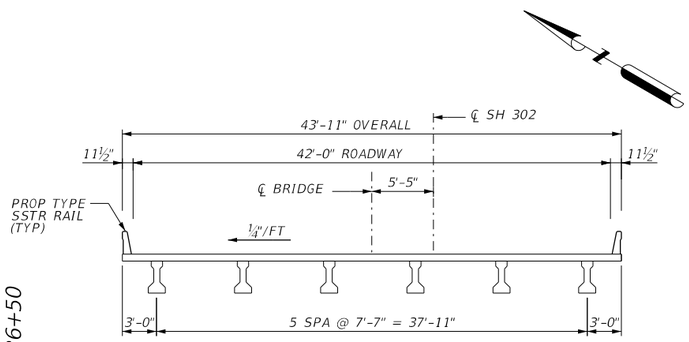




TYPICAL SECTION

LEGEND

- CLEANING AND SEALING EXISTING JOINT SEE DETAIL
- (XX) XX XX DECK SOFFIT

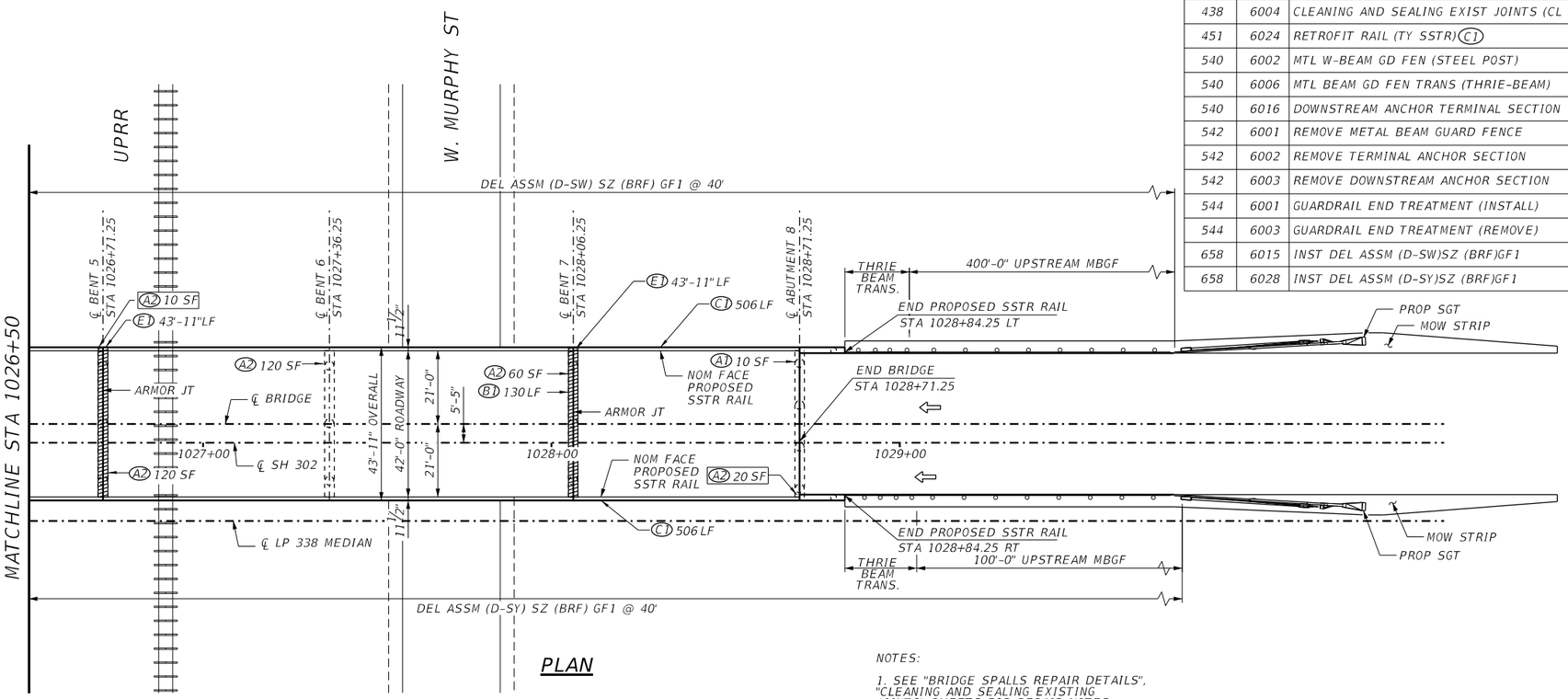
REPAIR CALL-OUT LEGEND

(XX) XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

- (A2) INTERMEDIATE SPALLS
- (C1) PROPOSED RAIL RETROFIT (TY SSTR)
- (E1) CLEANING AND SEALING EXISTING JOINTS

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	50
432	6045	RIPRAP (MOW STRIP)(4 IN)	CY	56
438	6004	CLEANING AND SEALING EXIST JOINTS (CL 7) (E1)	LF	176
451	6024	RETROFIT RAIL (TY SSTR) (C1)	LF	1012
540	6002	MTL W-BEAM GD FEN (STEEL POST)	LF	925
540	6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4
540	6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2
542	6001	REMOVE METAL BEAM GUARD FENCE	LF	925
542	6002	REMOVE TERMINAL ANCHOR SECTION	EA	1
542	6003	REMOVE DOWNSTREAM ANCHOR SECTION	EA	2
544	6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
544	6003	GUARDRAIL END TREATMENT (REMOVE)	EA	1
658	6015	INST DEL ASSM (D-SW)SZ (BRF)GF1	EA	34
658	6028	INST DEL ASSM (D-SY)SZ (BRF)GF1	EA	16



PLAN

NOTES:

1. SEE "BRIDGE SPALLS REPAIR DETAILS", "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

0 10' 20'

SCALE: 1" = 20'

STATE OF TEXAS
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8/17/2023

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BRIDGE REPAIR LAYOUT

LOCATION 06
SH 302/LP 338 NB OVER IH 20 & UPRR
06-069-2224-01-228
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				71
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

BENT CAP 2

BENT 7 COLUMN 2

BENT CAP 7

BENT CAP 6

REPAIR TYPE	LOCATION	UNIT	QTY
A1	ABUTMENT 8 SOUTHEAST CORNER	SF	10
A2	BENT 7 CAP SOFFIT	SF	120
B1	BENT 7 CAP	LF	130
A1	BENT 2 CAP	SF	60
A2	BENT 4 CAP SOFFIT	SF	120
A2	BENT 5 CAP SOFFIT	SF	120
A2	BENT 6 CAP SOFFIT	SF	120
A2	BENT 7 COLUMN 2 SOUTH FACE	SF	50
A1	BENT 6 EAST END CAP	SF	10
A1		TOTAL	80
A2		TOTAL	480
B1		TOTAL	130

REPAIR CALL-OUT LEGEND

XX XX
- XX — REPAIR TYPE DESIGNATION - SEE BELOW
- XX — ESTIMATED REPAIR QUANTITY
- XX — REPAIR QUANTITY UNIT

REPAIR TYPE DESCRIPTION

- A1 MINOR SPALL
- A2 INTERMEDIATE SPALL
- B1 EPOXY INJECT

NOTES:

1. SEE "BRIDGE SPALL REPAIR DETAILS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.

2. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.

3. PHOTOGRAPHS ARE PROVIDED FOR CONTRACTOR'S INFORMATION AND ARE INTENDED TO SHOW GENERALIZED IDEA OF THE STRUCTURE'S CONDITION. EXTENT OF DAMAGE MAY VARY FROM WHAT IS SHOWN IN PHOTOS.

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 2)	SY	745
429	6002	CONC STR REPAIR (EPOXY MORTAR) (A1)	SF	80
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	480
780	6002	CONC CRCK REPR (DISCRETE) (INJECT) (B1)	LF	130

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8/17/2023

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SUBSTRUCTURE REPAIR

LOCATION 06
SH 302/LP 338 NB OVER IH 20 & UPRR
06-069-2224-01-228
SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				72
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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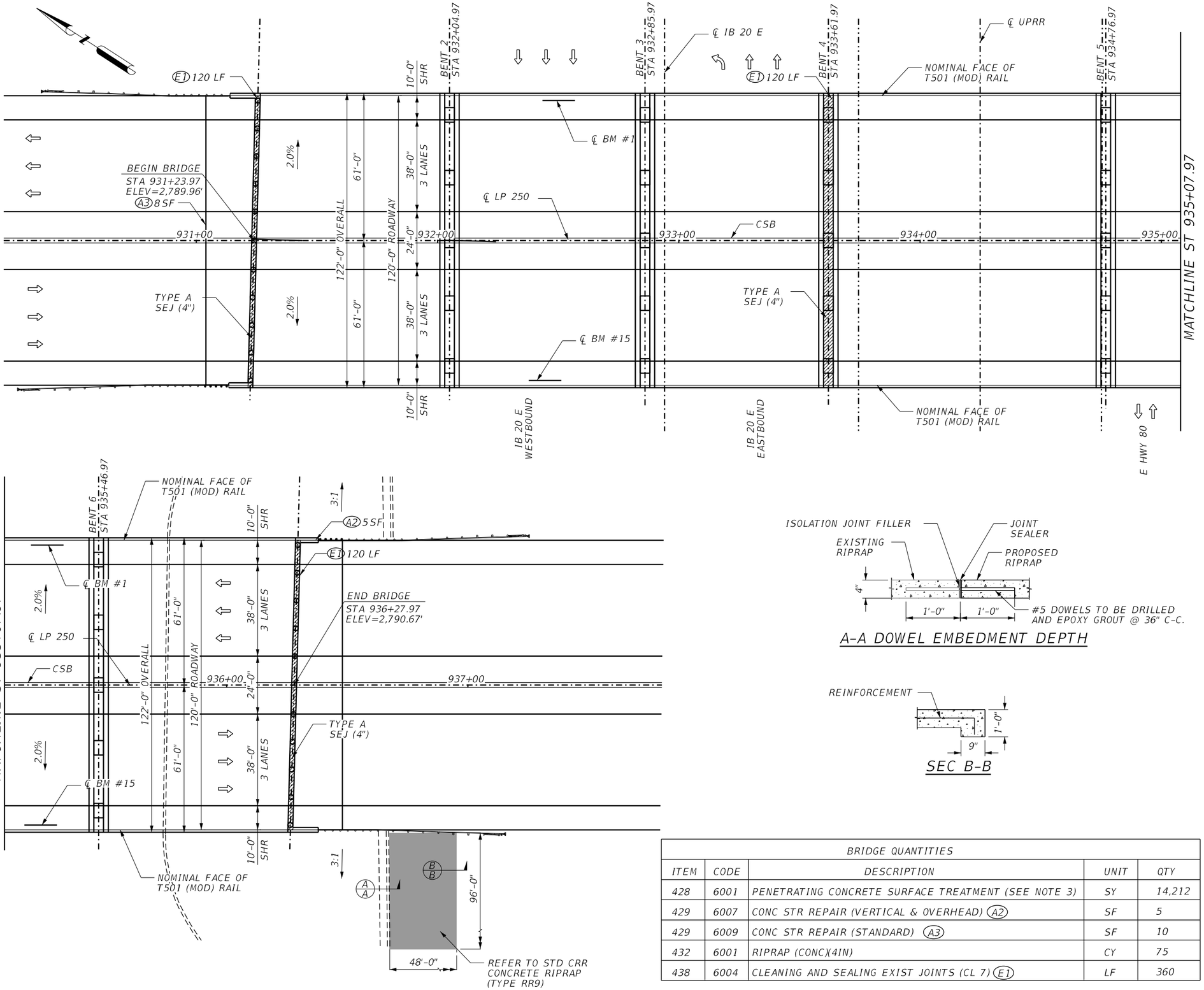

LEGEND

- CLEANING AND SEALING EXISTING JOINT SEE DETAIL
- RIPRAP (CONC)(4IN)
- EXISTING TRAFFIC FLOW

REPAIR CALL-OUT LEGEND

XX XX XX
- REPAIR QUANTITY UNIT
- ESTIMATED REPAIR QUANTITY
- REPAIR TYPE DESIGNATION - SEE BELOW

REPAIR TYPE DESCRIPTION

- A2 INTERMEDIATE REPAIR
- A3 STANDARD REPAIR
- E1 CLEANING AND SEALING EXISTING JOINTS

NOTES:

1. SEE "BRIDGE SPALLS REPAIR DETAILS", "CLEANING AND SEALING EXISTING JOINTS" SHEETS FOR REPAIR NOTES, DETAILS AND ADDITIONAL INFORMATION.
2. FOR TYPICAL SECTION REFER TO "TYPICAL SECTIONS" SHEET 7.
3. PENETRATING CONCRETE SURFACE TREATMENT SHALL BE APPLIED IN SUBSTRUCTURE ELEMENTS AND DRAIN SLOTS.

A-A DOWEL EMBEDMENT DEPTH

SEC B-B

BRIDGE QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QTY
428	6001	PENETRATING CONCRETE SURFACE TREATMENT (SEE NOTE 3)	SY	14,212
429	6007	CONC STR REPAIR (VERTICAL & OVERHEAD) (A2)	SF	5
429	6009	CONC STR REPAIR (STANDARD) (A3)	SF	10
432	6001	RIPRAP (CONC)(4IN)	CY	75
438	6004	CLEANING AND SEALING EXIST JOINTS (CL 7) (E1)	LF	360

0 20' 40'

SCALE: 1" = 40'

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BRIDGE REPAIR LAYOUT

LOCATION 07
LP 250 OVER IH20 BUS & UPRR
06-165-0005-03-267

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				73
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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(A1) *Minor Spall*

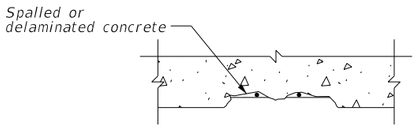
1. *Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.*
2. *Prepare detailed repair procedure in accordance with Chapter 3, Section 1 of the TxDOT Concrete Repair Manual.*
3. *If greater than ½ of bar is exposed, proceed as Intermediate Spall Repair.*
4. *Repairs are paid as Item 429 6002 Conc Str Repair (Epoxy Mortar).*

(A2) *Intermediate Spall (Vertical & Overhead)*

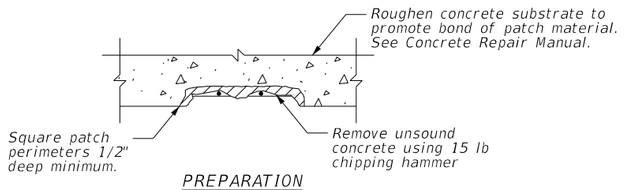
1. *Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.*
2. *Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and the Intermediate Concrete Repair Detail.*
3. *Trowel apply type c repair materials per DMS-4655 to a maximum depth of 4". Repairs deeper than 4" should be formed and poured in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual. Bagged concrete (extended) is permissible for formed and poured repairs.*
4. *Repairs are paid as Item 429 6007 Conc Str Repair (Vertical & Overhead).*

(A3) *Intermediate Spall (standard)*

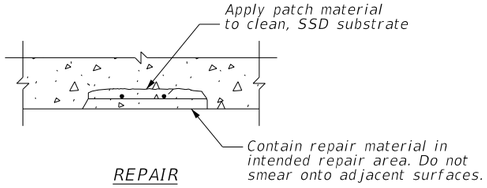
1. *Identify and mark all repair locations prior to beginning work. Verify areas and quantities with the Engineer. Provide access for the Engineer to inspect and verify repair areas.*
2. *Prepare detailed repair procedure in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual and detail below.*
3. *Trowel apply type c repair materials per DMS-4655 to a maximum depth of 4". Repairs deeper than 4" should be formed and poured in accordance with Chapter 3, Section 2 of the TxDOT Concrete Repair Manual. Bagged concrete (extended) is permissible for formed and poured repairs.*
4. *Repairs are paid as Item 429 6009 Concrete Structure Repair (standard).*



DAMAGED CONDITION

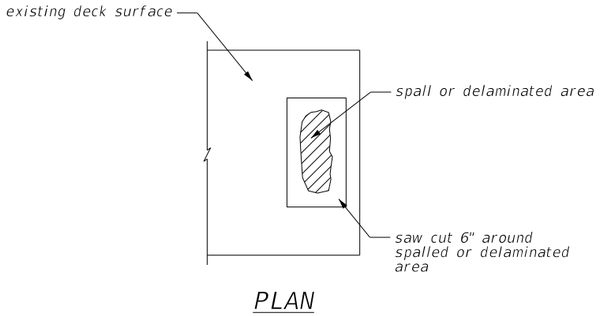


PREPARATION



REPAIR

INTERMEDIATE CONCRETE (A2) REPAIR DETAIL



PLAN

(B1) *Epoxy Inject Crack*

1. *Perform epoxy injection in accordance with TxDOT Concrete Repair Manual, Chapter 3, Section 5 and Item 780.*
2. *Repairs are paid as Item 780 Concrete Crack Repair (Discrete) (Inject).*

General Note:

1. All repair notes stated here may not be fully encompassing, reference the TxDOT Concrete Repair Manual for further clarification. The TxDOT Concrete Repair Manual shall be present at all times during any concrete repair work.

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED PROFESSIONAL ENGINEER

9/8/2023

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SH 302

BRIDGE SPALL REPAIR DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				74
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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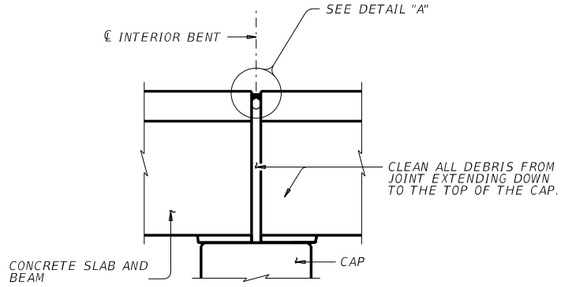
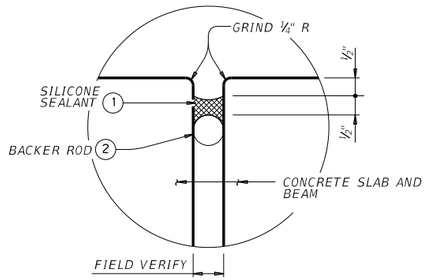


JOINT WITH SILICONE SEAL

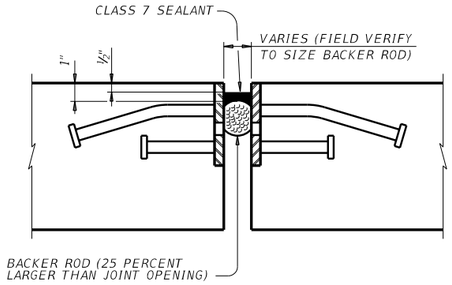
(USED WITHOUT ACP OVERLAY)

EXISTING CONCRETE SLAB & GIRDER JOINT REPAIR (E2)



DETAIL "A"

1. USE CLASS 7 SILICONE SEALANT. PREPARE JOINT AND SEAL IN ACCORDANCE WITH ITEM 438 "CLEANING AND SEALING JOINTS."
2. BACKER ROD MUST BE 25% LARGER THAN JOINT OPENING AND MUST BE COMPATIBLE WITH THE SEALANT.



CLEANING AND SEALING EXISTING ARMOR JOINTS (E1)

(SHOWING ARMOR JOINT SECTION)

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, "CLEAN 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.

PROCEDURE FOR CLEANING AND SEALING CONCRETE GIRDER JOINT WITH SILICONE SEAL:

1) CLEAN JOINT OPENING OF ALL OLD EXPANSION MATERIALS/DEVICES, DIRT, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS." CLEAN JOINT OUT FULL DEPTH OF THE JOINT.
2) OBTAIN APPROVAL OF CLEANED JOINT PRIOR TO PROCEEDING WITH JOINT SEALING OPERATION.
3) PLACE BACKER ROD INTO JOINT OPENING 1" BELOW THE TOP OF CONCRETE. THE BACKER ROD MUST BE 25% LARGER THAN THE JOINT OPENING.
4) SEAL THE JOINT OPENING WITH A CLASS 7 SILICONE. RECESS SEAL ½" BELOW TOP OF CONCRETE IN TRAVEL LANES AND ⅛" BELOW TOP OF CONCRETE IN SHOULDERS.

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING (FULL DEPTH) OF ALL DEBRIS, PROVIDING AND PLACING BACKER ROD, SAW-CUTTING JOINT OPENING, AND SEALING JOINT IS PAID FOR BY AND MEASURED BY THE FOOT OF "CLEANING AND SEALING EXISTING JOINTS."

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE TO PREPARE THE JOINT.

PROVIDE CLASS 7 SILICONE SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILLERS" "ALTERNATIVELY, GRAY SEAL 6990 BY FIBRECRETE PRESERVATION MAY BE SUBSTITUTED FOR THE CLASS 7 SEALANT WITH THE ENGINEER'S APPROVAL.".

EXTEND SEALANT UP INTO RAIL OR CURB 3 INCHES ON LOW SIDE OR SIDES OF DECK. IF THE CLASS 7 SEALANT CANNOT BE EFFECTIVELY PLACED IN THE VERTICAL POSITION, A CLASS 4 SEALANT COMPATIBLE WITH THE CLASS 7 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.

SCALE: NTS

STATE OF TEXAS
MARCELO CABALLERO
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CLEANING AND SEALING EXISTING JOINTS

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				75
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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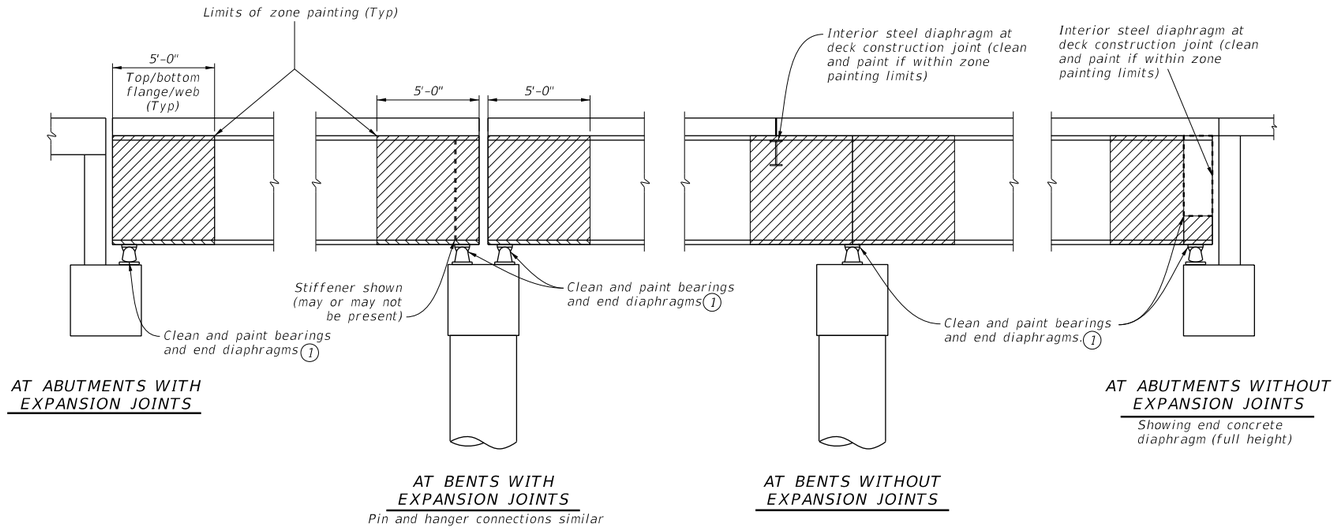


PARTIAL STEEL BEAM ELEVATION (3)

Dimensions shown are basis of paint estimate but do not define exact limits of repainting. Address deteriorated paint as directed by the Engineer. Painting perimeter does not need to be a vertical plane except on exterior surfaces of exterior beams.

STRUCTURE NOTES:

Clean and apply the default special protection system to beam ends, steel end diaphragms, and bearings at interior bents. Address other areas along flanges and areas of beam ends at abutments as directed..

SPECIAL PROTECTION SYSTEM

DEFAULT:

- Apply 0.5-1.0 mil DFT of penetrating seal to specified surfaces.
- Apply minimum 4.0 mils DFT topcoat to specified surfaces.
- Apply an additional 14-18 WFT protection coat of HRCSA to all exposed bearing sufaces after other coats have cured and in accordance with manufacturer recommendations.

ZONE PAINTING NOTES:

Prepare the surfaces to be cleaned by using hand tools, vacuuming, and water blasting as described in Special Specification 4207, "Steel Bridge Zone Painting" for default Special Protection System.

Water blast all bearings for a minimum of 1 minute each while moving nozzle to thoroughly clean all surfaces. Keep nozzle no further than 6 inches from the surface. Blast concealed surfaces of end diaphragms below bridge expansion joints.

Use oil-free compressed air to blow out tightly confined locations.

Probe around edges of remaining paint with hand scraper to ensure all delaminated paint is removed.

GENERAL NOTES:

Clean and paint the structure in accordance with Special Specification 4207, "Steel Bridge Zone Painting."

Provide potable water for water blasting steel. Water from municipal supplies approved by the Texas Department of Health will not require testing. When water is provided from another source, test for chlorides and provide water with a maximum chloride concentration of 500 ppm (500 mg/L).

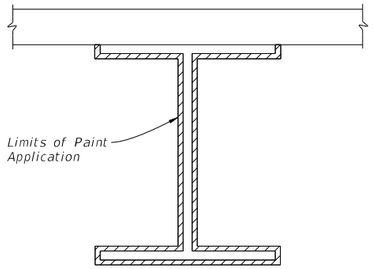
The default Special Protection System includes:

- Penetrating Sealer (DMS-8101)
- Top Coat (DMS-8105)

Provide a High Ratio Calcium Sulfonate (HRCSA) top coat for bearings.

Provide compatible penetrating sealer and top coat from the same manufacturer.

Tint the proposed paint system to match the existing bridge paint color. Select the proposed paint color from the Federal Standard Colors list. Submit proposed paint color samples to the Engineer for approval before paint purchase.



STEEL BEAM CROSS SECTION WITH ZONE PAINT LIMITS

TABLE OF ESTIMATED QUANTITIES (2)

STRUCTURE NUMBER (& FEATURE CROSSED)	REFERENCE NUMBER	QUANTITY PER STRUCTURE (SF)
06-052-0866-03-002 OVER PECOS RIVER	3	2,166
06-069-0004-07-022 OVER UPRR	3	2,962
06-069-0004-07-023 OVER UPRR	3	2,962
TOTAL QUANTITY (SF)		8,090

(1) Bearings and diaphragms may vary from what is shown.

(2) Paint quantities shown include allowance for bearings, diaphragms and other minor areas as determined by the Engineer.

(3) Showing minimum areas of paint application. Spot clean and paint other locations on the bridge as directed by the Engineer.

SCALE: NTS

STATE OF TEXAS
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8/17/2023

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ZONE PAINTING DETAILS

SHEET 1 OF 1

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				76
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

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DATE: 8/17/2023 1:48:40 PM
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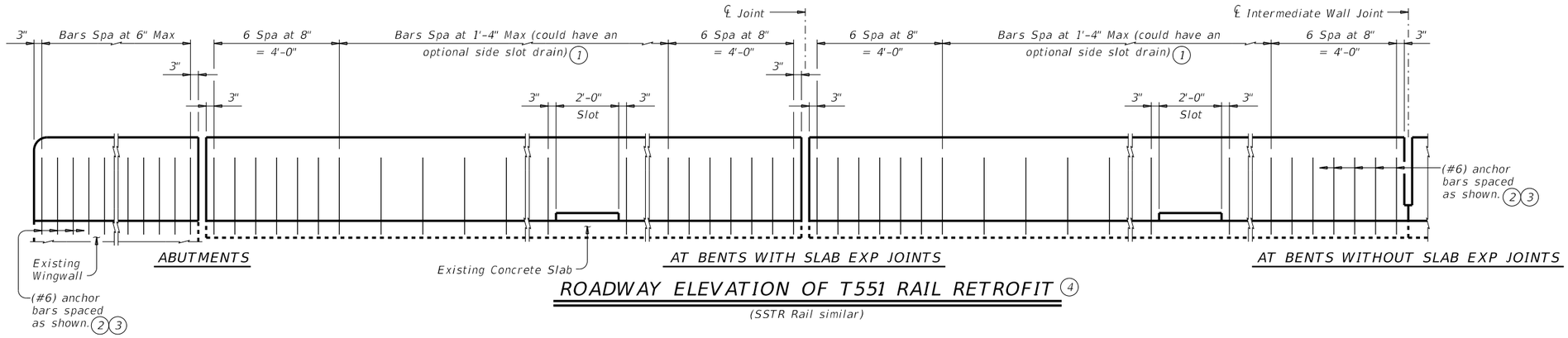
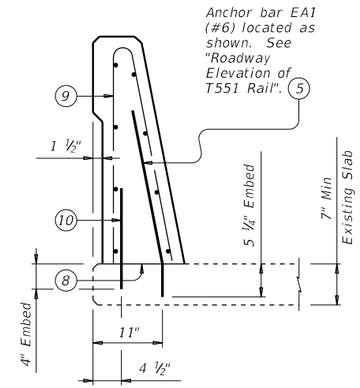


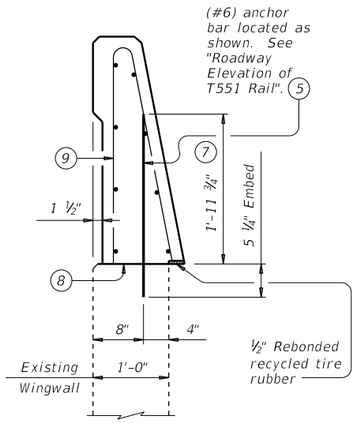
ROADWAY ELEVATION OF T551 RAIL RETROFIT (4)

(SSTR Rail similar)



SSTR RAIL

RAIL RETROFIT SECTIONS ON CONCRETE SLABS USING ADHESIVE ANCHORS (6)



SSTR RAIL

RAIL RETROFIT SECTIONS ON WINGWALLS USING ADHESIVE ANCHORS (6)

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

(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 5 ¼". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(3) See T551 or SSTR Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors".

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

(5) Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 1#4". 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".

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

(7) 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.

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

(9) 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.

(10) Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or Fanchor 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).

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED PROFESSIONAL ENGINEER

8/17/2023

SHEET 1 OF 1

Texas Department of Transportation

Bridge Division Standard

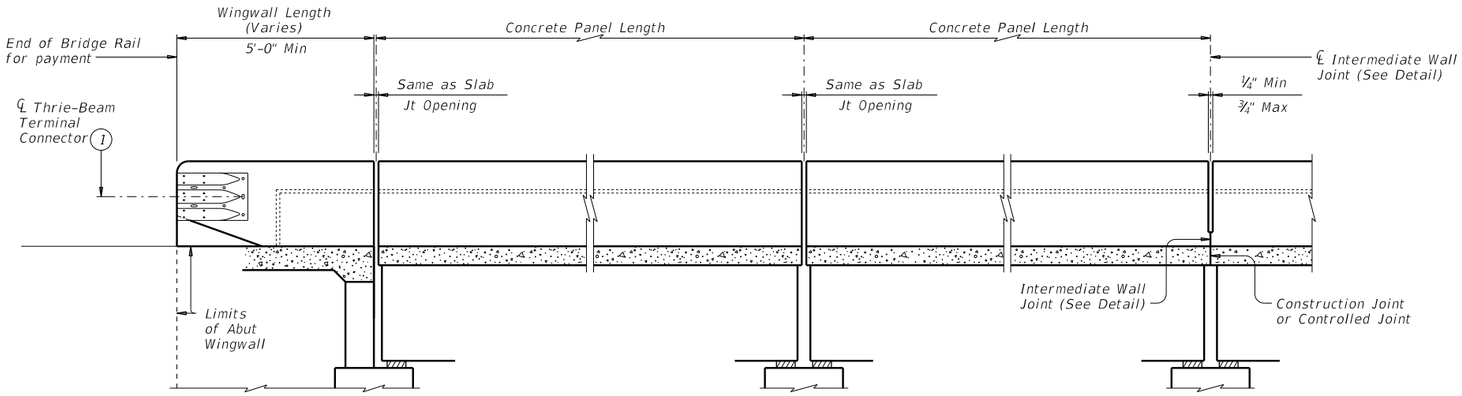
RETROFIT GUIDE FOR CONCRETE RAILS

(SSTR)

C-RAIL-R (MOD)

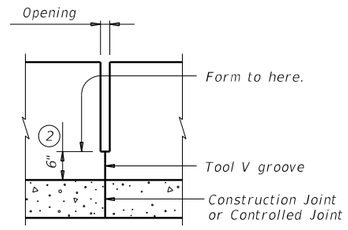
FILE: ristd022-20.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
07-20: Text change from epoxy to adhesive and changed MASH Test Level note.	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		77

DATE: 8/17/2023 1:48:42 PM
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\rlstd014-19.dgn



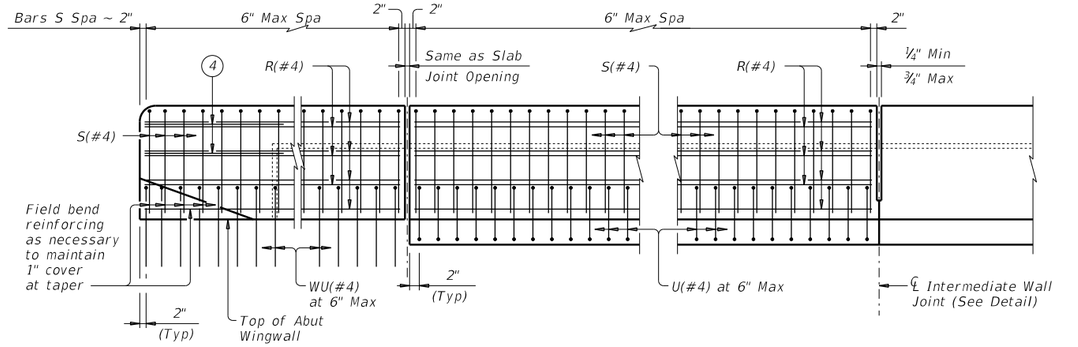
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

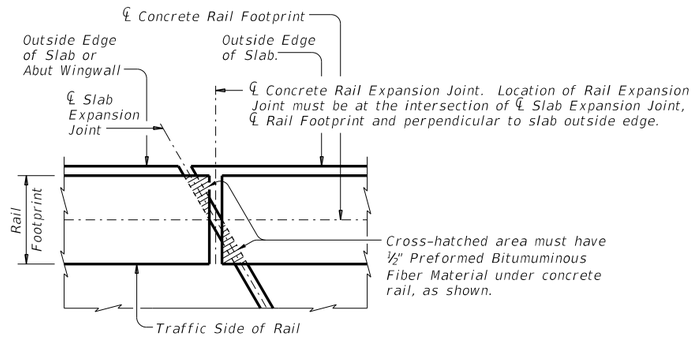


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



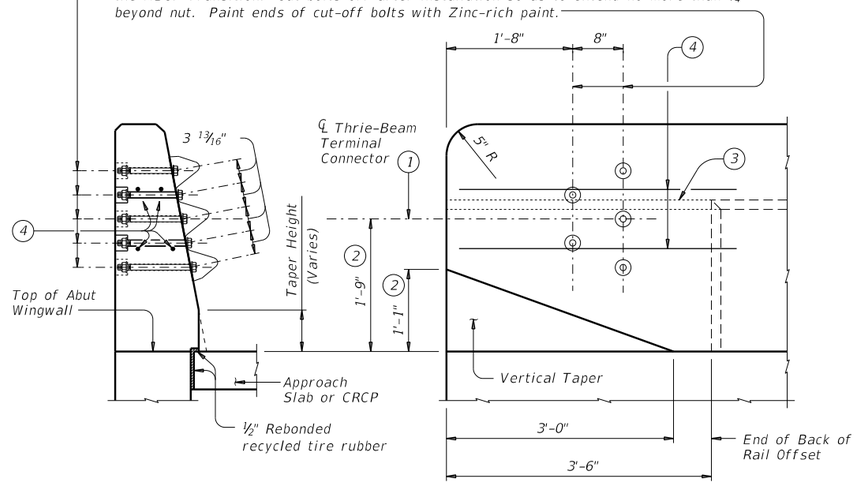
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



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.

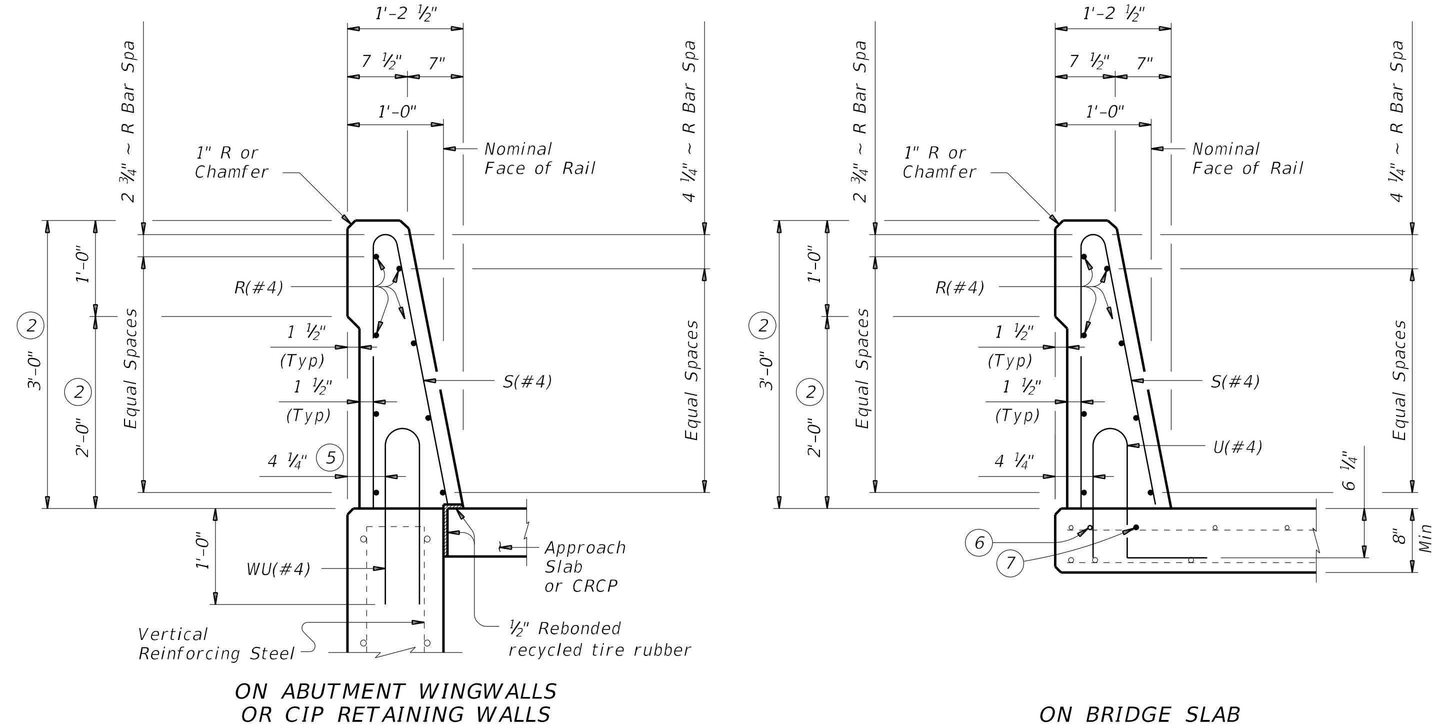
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

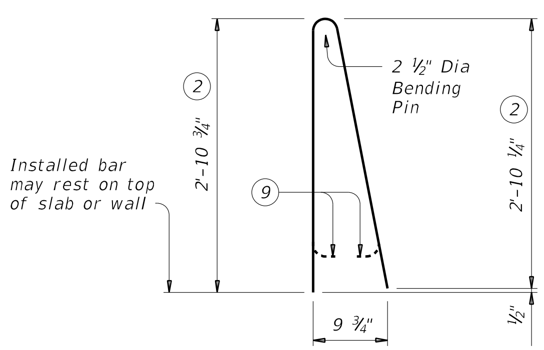
FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		78



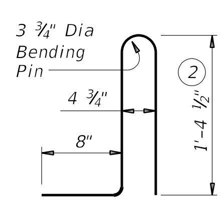
ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

ON BRIDGE SLAB

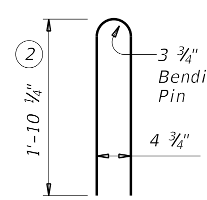
SECTIONS THRU RAIL



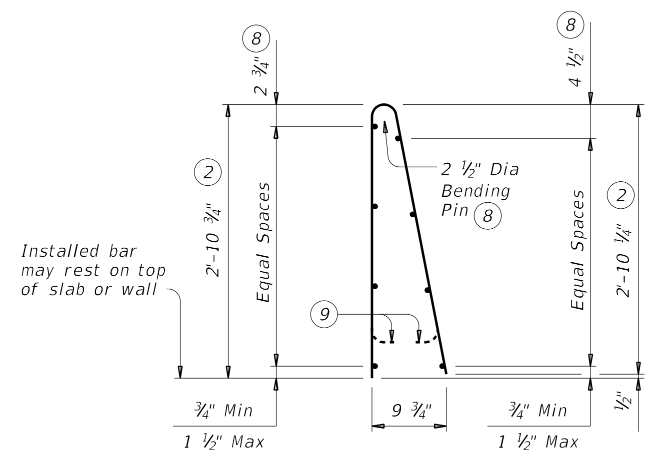
BARS S (#4)



BARS U (#4)

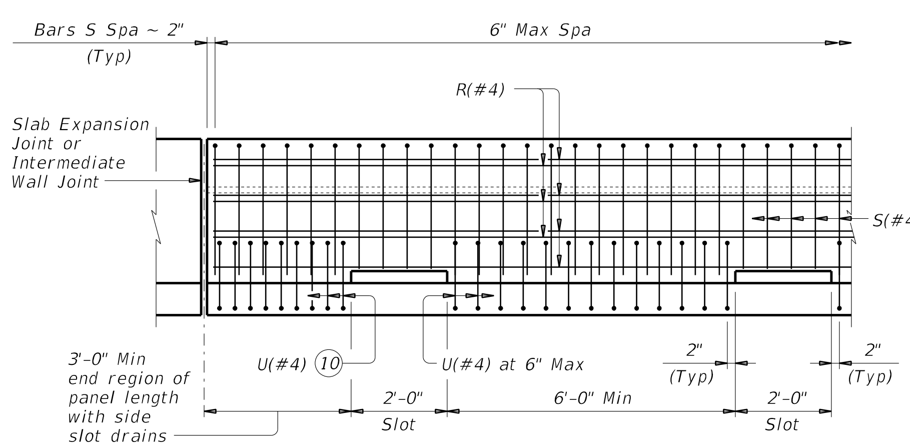


BARS WU (#4)



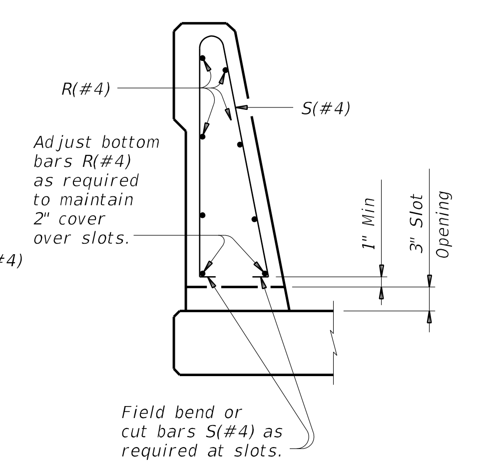
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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

(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.

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	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		79

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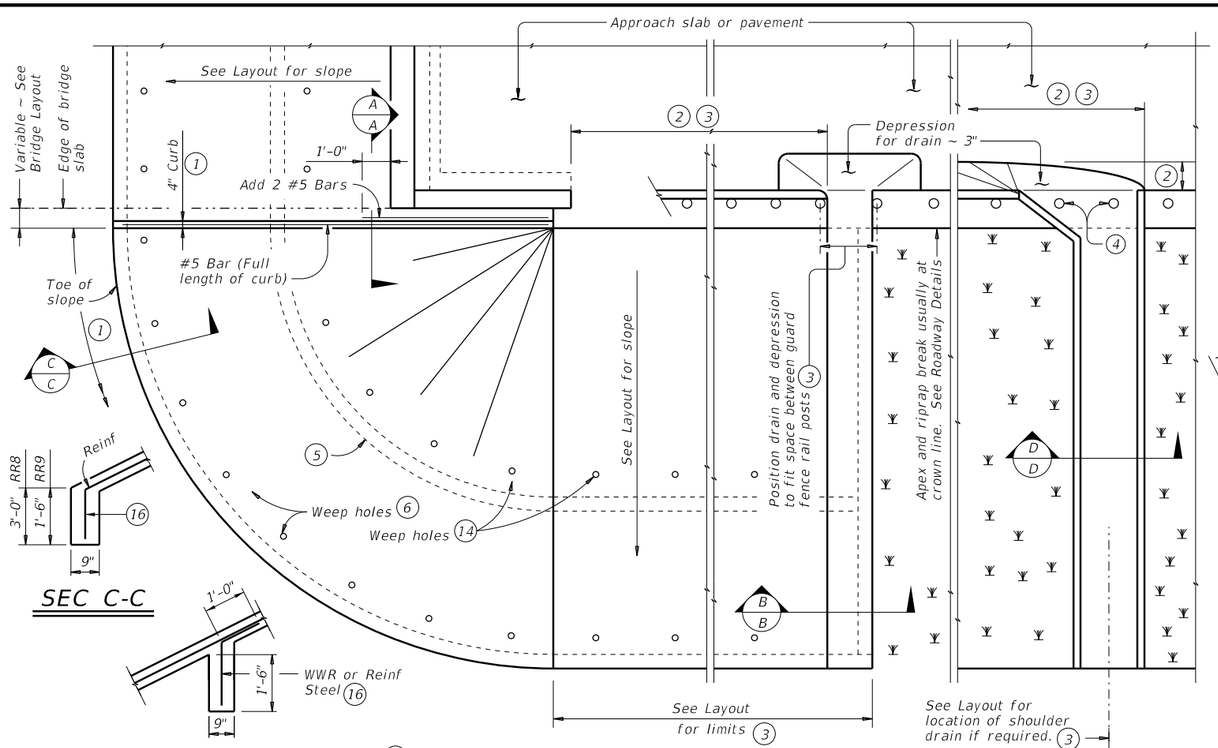
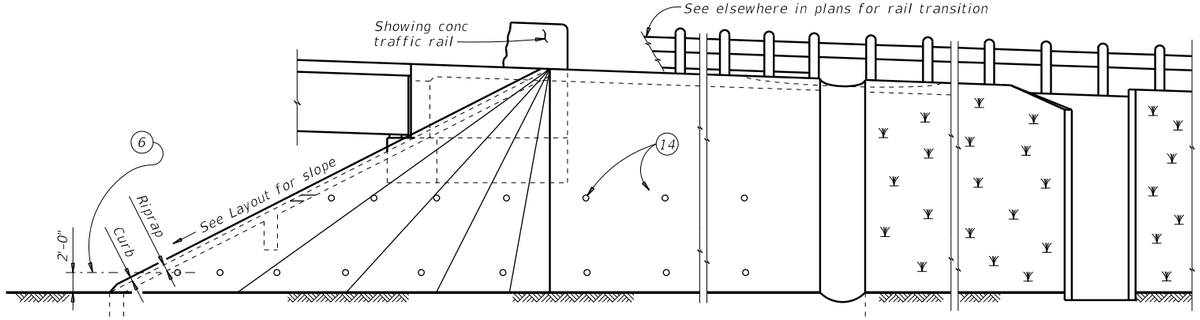


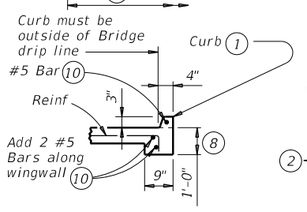
PLAN

SEC C-C

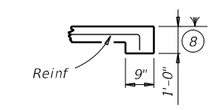
INTERMEDIATE TOEWALL



ELEVATION

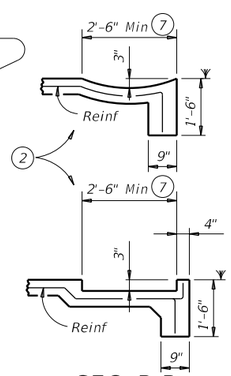


SEC A-A



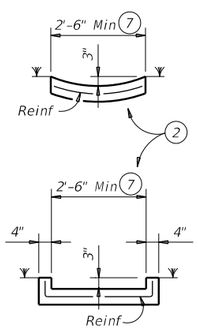
SEC B-B

(No drain)



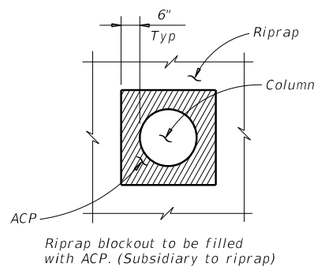
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

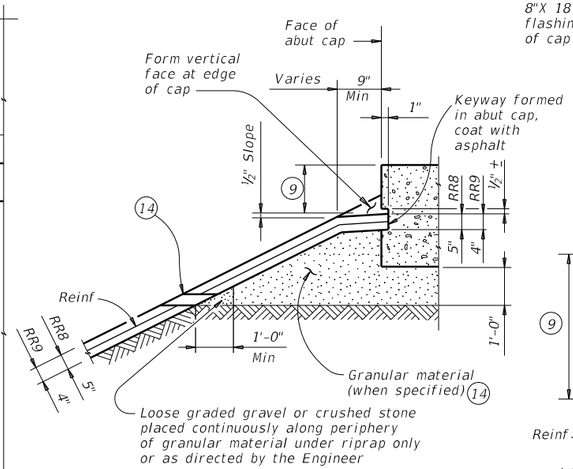
(Shoulder drain)



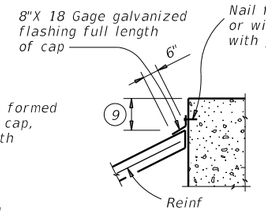
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

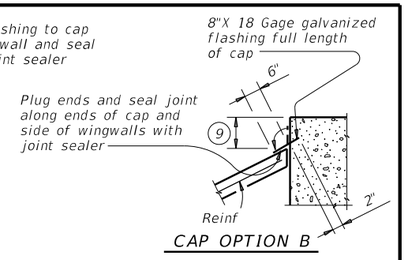
(As directed by the Engineer)



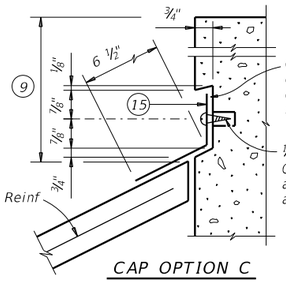
SHOWING KEYWAY OPTION



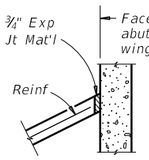
CAP OPTION A



CAP OPTION B

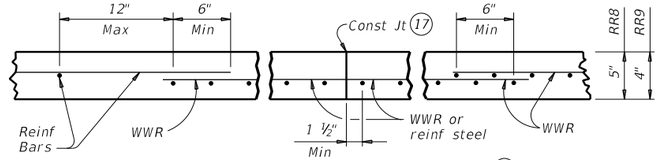


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

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

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

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

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		80

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DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 441019J
Crossing Type: ** RR UNDER
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD COMPANY
Operating RR Company at Track: UNION PACIFIC RAILROAD COMPANY
RR MP: 586.800
RR Subdivision: TOYAH
City: ODESSA
County: ECTOR
CSJ at this Crossing: 0004-07-139
Highway/Roadway name crossing the railroad: IH 20
# of regularly scheduled trains per day at this crossing: 0
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 1%

Scope of Work at this Crossing to Be Performed by State Contractor:
CLEANING AND SEALING JOINTS, CONCRETE REPAIRS ON SUBSTRUCTURE, RAIL RETROFIT AND MBGF REPLACEMENT.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 10

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☒ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- UP.request@nrssinc.net
Call Center 877-984-6777

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required

☐ Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit

Railroad Protective Liability		
☐	Not Required	
☒	Non - Bridge Projects	$2,000,000 / $6,000,000
☐	Bridge Projects	$5,000,000 / $10,000,000
☐	Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☐ Not Required

☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)

☒ Required: UPRR Maintenance Consent Letter. TxDOT CST to assist.

☐ Required: Contractor to obtain (see Item 5, Article 8.4)
With the following railroad companies:

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☐ Not Required
☒ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call Union Pacific Railroad Company
Railroad Emergency Line at 888-877-7267
Location: DOT 441019J
RR Milepost 586.800
Subdivision TOYAH

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 9/2021	0004	07	139	IH 20
	DIST	COUNTY		SHEET NO.
	06	ECTOR		80A

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 796234C
Crossing Type: ** RR UNDER
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD COMPANY
Operating RR Company at Track: UNION PACIFIC RAILROAD COMPANY
RR MP: 577.100
RR Subdivision: TOYAH
City: ODESSA
County: ECTOR
CSJ at this Crossing: 2224-01-125
Highway/Roadway name crossing the railroad: IH 20 at SH 302
# of regularly scheduled trains per day at this crossing: 0
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 1%

Scope of Work at this Crossing to Be Performed by State Contractor:
CLEANING AND SEALING JOINTS, CONCRETE REPAIRS ON SUBSTRUCTURE AND SUPERSTRUCTURE, RAIL RETROFIT AND MBGF REPLACEMENT.

Scope of Work at this Crossing to Be Performed by Railroad Company:
FLAGGING

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

NONE

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: 10

On this project, night or weekend flagging is:

☐ Expected
☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices
☐ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☒ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- UP.request@nrssinc.net
Call Center 877-984-6777

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required

☐ Required: Contact Information for Construction Inspection:

_____
_____
_____

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required
☒ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

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Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
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Business Automobile	$2,000,000 combined single limit

Railroad Protective Liability		
☐	Not Required	
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Location: DOT 796234C
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Subdivision TOYAH

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 9/2021	0004	07	139	IH 20
	DIST	COUNTY		SHEET NO.
	06	ECTOR		80B

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 924004F
Crossing Type: ** RR UNDER
RR Company Owning Track at Crossing: UNION PACIFIC RAILROAD COMPANY
Operating RR Company at Track: UNION PACIFIC RAILROAD COMPANY
RR MP: 547.500
RR Subdivision: TOYAH
City: MIDLAND
County: MIDLAND
CSJ at this Crossing: 0005-03-267
Highway/Roadway name crossing the railroad: SL 250
# of regularly scheduled trains per day at this crossing: 0
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: 1%

Scope of Work at this Crossing to Be Performed by State Contractor:
CLEANING AND SEALING JOINTS, CONCRETE REPAIRS ON SUBSTRUCTURE AND SUPERSTRUCTURE, RAIL RETROFIT AND MBGF REPLACEMENT.

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Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS

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Location: DOT 924004F
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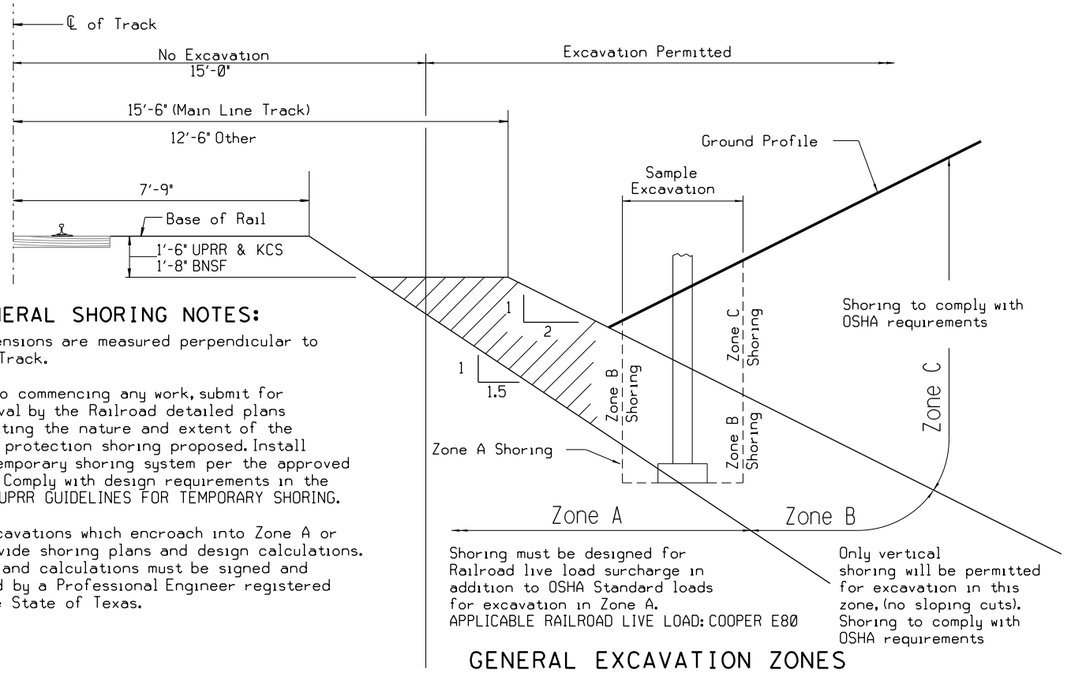
Subdivision TOYAH

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS 9/2021	0004	07	139	BI 20
	DIST	COUNTY		SHEET NO.
	06	ECTOR		80C



GENERAL EXCAVATION ZONES

GENERAL SHORING NOTES:

1. All dimensions are measured perpendicular to ℄ of Track.
2. Prior to commencing any work, submit for approval by the Railroad detailed plans indicating the nature and extent of the track protection shoring proposed. Install the temporary shoring system per the approved plans. Comply with design requirements in the BNSF/UPRR GUIDELINES FOR TEMPORARY SHORING.
3. For excavations which encroach into Zone A or B, provide shoring plans and design calculations. Plans and calculations must be signed and sealed by a Professional Engineer registered in the State of Texas.

GENERAL SHORING REQUIREMENTS ‡

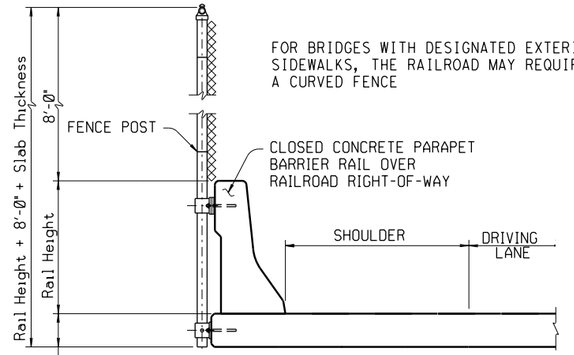
RAILROAD GENERAL NOTES:

1. Railroad review and approval of shoring, erection, demolition, and falsework is required. Allow a minimum of four weeks for the review and approval of each submittal.
2. The proposed grade separation project shall not increase the quantity and/or characteristics of the flow in the Railroad's ditches and/or drainage structures. In the rare event that a grade separation project will increase the quantity and/or characteristics of flow in such elements, such a design must be reviewed and approved by the Railroad.
3. Verify the elevation of the existing top-of-rail profile before beginning construction. Bring all discrepancies to the attention of the Railroad prior to construction.
4. Submit a proposed method of erosion and sediment control for approval by the Railroad.
5. Design and construct all shoring systems that impact the Railroad's operations and/or support the Railroad's embankment per current Railroad Guidelines for Temporary Shoring.
6. Comply with Railroad Demolition Guidelines for all demolitions within the Railroad's right of way and/or demolition that may impact the Railroad's tracks or operations.
7. Design erection methods over the Railroad's right of way to cause no interruption to the Railroad's operation, enabling the track(s) to remain open to traffic per the Railroad's requirements. Coordinate construction work windows with the Railroad's Designated Representative.
8. Design all construction phasing that may impact the Railroad operations to cause no interruption to the Railroad's operations, enabling the track(s) to remain open to traffic per the Railroad's requirements. Coordinate construction work windows with the Railroad's Designated Representative.
9. Comply with minimum construction clearances for falsework outlined in the Railroad's Guidelines.
10. Verify all permanent clearances before project closing.
11. For Railroad coordination please refer to Sheets 2 and 3 and the TxDOT Standard Specifications.

For shoring/excavations in Zone A or B, TxDOT requires a predesigned and approved shoring design in the PS&E. If this is the case no Contractor submittal is required.

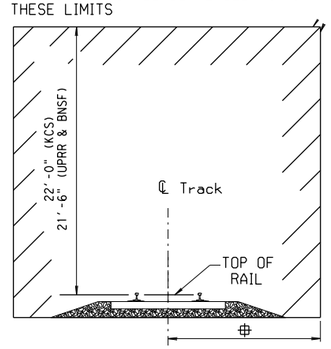
FOR THE FOLLOWING INFORMATION PLEASE REFER TO THE PLAN AND ELEVATION DRAWINGS OF THE BRIDGE PLANS. THE PLAN AND ELEVATION DRAWINGS SHALL SHOW ALL REQUIRED INFORMATION PER BNSF/UPRR GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECT PLAN NO. 711100 SHEET 2.

1. Centerline of bridge and/or centerline of project.
2. Track layout and limits of Railroad right of way with respect to centerline of main lines.
3. Future tracks, access roadways and existing tracks as main line, siding, spur, etc.
4. Point of minumum vertical clearance and distance, Measured perpendicular, from the centerline of nearest track.
5. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of obstruction such as substructure above grade.
6. Horizontal clearance at right angle from centerline of nearest existing or future track to the face of nearest foundation below grade.
7. Horizontal spacing at right angle between centerlines of existing and/or future tracks.
8. Limits of shoring and minimum distance at right angle from centerline of nearest track.
9. All existing facilities and utilities and their proposed relocation, if required.
10. Toe of riprap or earth slope and/or limits of retaining wall.
11. Existing and proposed contours. (not required if the existing groundlines or drainage characteristics in Railroad ROW will not be altered).
12. Railroad Milepost and direction of increasing Milepost.
13. Direction of flow for all drainage systems within project limits.
14. Limits of barrier rail and fence with respect to centerline of track.
15. Depth of foundation below bottom of tie. (for footings only)
16. Top and bottom of pier protection wall elevation relative to top of rail elevation.
17. Controlling dimensions of drainage ditches and/or drainage structures.
18. Top of rail elevations for all tracks.
19. Minimum permanent vertical clearance above top of high rail to the lowest point under the bridge.
20. Existing and proposed groundline & roadway profile.
21. Type of riprap slope paving.
22. Location of deck drains.
23. Total width of superstructure.
24. Width of shoulder and/or sidewalk.



TYPICAL FENCE ON BARRIER DETAIL

ONLY REQUIRED ON OVERPASSES IF SHOWN ON BRIDGE LAYOUT. (AREAS WITH PEDESTRIANS ON BRIDGE, RAIL YARDS, OR HISTORY OF VANDALISM)



MINIMUM CONSTRUCTION CLEARANCE ENVELOPE

(NORMAL TO RAILROAD)
15'-0" (UPRR), (BNSF) and 14'-0" (KCS)

GENERAL NOTES:

Design and Construction for Railroad Projects shall be in accordance with the AREMA Manual for Railway Engineering and BNSF/UPRR Guidelines for Railroad Grade Separation Projects or Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses, or DART Light Rail Project Design Criteria Manual, and the TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges AS APPLICABLE TO THE RAILROAD COMPANY INVOLVED.

See BNSF/UPRR Guidelines for Grade Seperation Projects Plan No. 711100 and TxDOT Railroad Fence Details Sheet for additional information. A curved top fence extending 8'-0" above top of sidewalk is acceptable only where there is a traffic rail between roadway and sidewalk.

See Kansas City Southern Guidelines for the Design and Construction of Overpasses and Underpasses for corresponding BNSF/UPRR sheets referenced.

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

9/14/2023

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		80D

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.dgn

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PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad Company and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad's website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, FRA (Federal Railway Administration) and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of Railroad's train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor's machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the Railroad's flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. A railroad flag person will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.18 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the Railroad's course "Orientation for Contractor's Safety", and maintain current registration prior to working on the Railroad's property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR), and 14' - 0" (KCS) horizontal from centerline of track
B. 22' - 0" (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement until receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED
PROFESSIONAL ENGINEER

9/14/2023

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.dgn

SHEET 2 OF 3

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR FOR BRIDGE CONSTRUCTION

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		80E

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3.09 CONSTRUCTION AND AS-BUILT SUBMITTALS

A. Provide TxDOT submittals for construction materials and procedures as outlined below and indicated in TxDOT Standard Specifications. A summary of most TxDOT submittal requirements can be found at: www.dot.state.tx.us/publications/bridge/items reviewed.pdf

B. The tables below provide the Railroad's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in these bid documents. The review times indicated below represent the total time, including the Railroad's required four (4) weeks.

C. TxDOT will forward relevant submittals to the Railroad Manager of Industry and Public Projects unless otherwise directed by the Railroad. TxDOT and the Engineer of Record will review and include comments prior to forwarding to the Railroad. Submit items in Table 1 for both railroad overpass and underpass projects, as applicable. Submit items in Table 2 for railroad underpass projects only.

TABLE 1 - RAILROAD SUBMITTAL REQUIREMENTS FOR OVERPASS & UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	REVIEW TIME
1	Shoring design and details	6	6 weeks
2	Falsework design and details	6	6 weeks
3	Drainage design provisions	6	6 weeks
4	Erection diagrams and sequence	6	6 weeks
5	Demolition diagram and sequence	6	6 weeks

TABLE 2 - RAILROAD SUBMITTAL REQUIREMENTS FOR UNDERPASS PROJECTS

ITEM	DESCRIPTION	SETS	NOTES	REVIEW TIME
1	Shop drawings	6	Steel and Concrete members	6 weeks
2	Bearings	6	For all structures	6 weeks
3	Concrete Mix Designs	6	For all structures	6 weeks
4	Rebar & Strand certifications	6	For superstructure only	6 weeks
5	28 day concrete strength	6	For superstructure only	6 weeks
6	Waterproofing material certifications and installation procedure	6	Waterproofing & protective boards	6 weeks
7	Structural steel certifications	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
8	Fabrication and Test reports	6	All fracture critical members & other members requiring improved notch toughness	6 weeks
9	Welding Procedures and Welder Certification	6	AWS requirements	6 weeks
10	Foundation Construction Reports or Notes	6	Pile driving, drilled shaft construction, bearing pressure test reports for spread footings	6 weeks
11	Compaction testing reports for backfill at abutments	6	Must meet 95% maximum dry density, Modified Procter ASTM D1557	6 weeks

D. TxDOT shall submit As-Built Records to the Railroad when TxDOT has processed the final project plans. These records shall consist of the following items:

Overpass Projects

1. Electronic files of all structure design drawings with as constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as constructed modifications shown.

Underpass Projects

1. Electronic files of all structure design drawings with as constructed modifications shown, in Microstation J or Acrobat .PDF format.
2. Hard copies of all structure design drawings with as constructed modifications shown.
3. Final approved copies of shop drawings for concrete and steel members.
4. Foundation Construction Reports
5. Compaction testing reports for backfill at abutments

3.10 APPROVAL OF DETAILS

Submit details of the construction affecting Railroad's tracks and property not already included in the Contract Plans to the Railroad Designated Representative through TxDOT for the Railroad's review and written approval before such work is undertaken. Allow a total six (6) weeks for review and approval of these submittals, which includes the Railroad's four (4) week review time.

3.11 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractor's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the Project Site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.12 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
1. Pre-construction meetings.
2. Pile driving/drilling of caissons or drilled shafts.
3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
4. Erection of precast concrete or steel bridge superstructure.
5. Placement of waterproofing (prior to placing ballast on bridge deck).
6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.13 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad, at expense of TxDOT, to protect Railroad's facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to Railroad's facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any contractor's operations when, in the opinion of the Railroad Designated Representative, Railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.14 WALKWAYS REQUIRED

Maintain along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than twelve feet (12') from centerline of track. Remove any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours before the close of each work day. Construct walkways with railings over open excavation areas when in close proximity of track. Do not violate allowable clearances of these railings to centerline of track: 8' - 6" horizontally for tangent track or 9' - 6" horizontally for curved track.

3.15 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad, will be done by its own forces and it is not a part of the Work under this Contract.

3.16 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.17 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
7:00 AM to 9:00 PM CST Monday-Friday except holidays,
staffed 24 hrs/day for emergencies
48 hrs notice required

BNSF 1-800-533-2891
24 hour number
5 working days notice required

KCS 1-800-344-8377
Texas One Call, a 24 hour number
48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near Railroad's property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.18 RAILROAD FLAGGING

Per the RIGHT OF ENTRY agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor work and at least 30 working days in advance of any Contractor work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.19 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the Right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

STATE OF TEXAS
MARCELO CABALLERO
138393
LICENSED PROFESSIONAL ENGINEER

9/14/2023

SHEET 3 OF 3

Texas Department of Transportation — Rail Division

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0004	07	139, ETC	IH20, ETC
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	ODA	ECTOR, ETC		80F

RAILROAD REQUIREMENTS FOR BRIDGE CONSTRUCTION.dgn

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. N/A

2.

☒ No Action Required ☐ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Logs	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. Avoid harm to migratory birds, eggs, and active nests;
2. Do not disturb, destroy, or remove active nests,
3. including ground nesting birds, during the nesting
4. season; Inactive nests and/or vegetation suspected to contain nests should be removed outside of nesting season (nesting season is tipically March 15 to september 15).

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No TBD

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required

☐ Required Action

Action No.

1.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0004	07	139, ETC	IH20, ETC
05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		81

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):

004-07-139

1.2 PROJECT LIMITS:

From: FM 1053 at Pecos River, IH 20 at UPRR, IH 20 at DRA,

To: SH 302/LP 338 NB over IH 20 BUS & UPRR

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 31°45'3.12"N ,(Long) 102°33'44.73"W

END: (Lat) 31°45'1.95"N ,(Long) 102°33'46.89"W

1.4 TOTAL PROJECT AREA (Acres): 0.39

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.00

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Construction of bridge maintenance consisting of bridge maintenance

1.7 MAJOR SOIL TYPES:

Soil Type	Description
SILTY CLAY LOAM	BROWN, SOFT W/ SAND
GRAVELLY CLAY LOAM	BROWN, HARD W/ GRAVEL
CLAY LOAM	DARK BROWN, HARD W/ SAND
GRAVELLY LOAM	DARK BROWN, HARD W/ SAND

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
X 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
X 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
X 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
☐ Revegetation of unpaved areas
☐ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☐ 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
X Construction debris and waste from various construction activities
X Contaminated water from excavation or dewatering pump-out water
X Sanitary waste from onsite restroom facilities
X 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
Pecos River	
DRAW CREEK	

* 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: _____

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

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			82
STATE	STATE DIST.	COUNTY	
TEXAS	ODA	ECTOR,ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0004	07	139,ETC	IH-20,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

- ☐ X Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☐ Permanent Planting, Sodding or Seeding
- X ☐ 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

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ 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:

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

2.5 POLLUTION PREVENTION MEASURES:

- X Chemical Management
- X Concrete and Materials Waste Management
- X Debris and Trash Management
- X Dust Control
- X Sanitary Facilities
- X Other: Sanitary waste from portable units will be collected by a licensed sanitary waste management contractor
- ☐ 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:

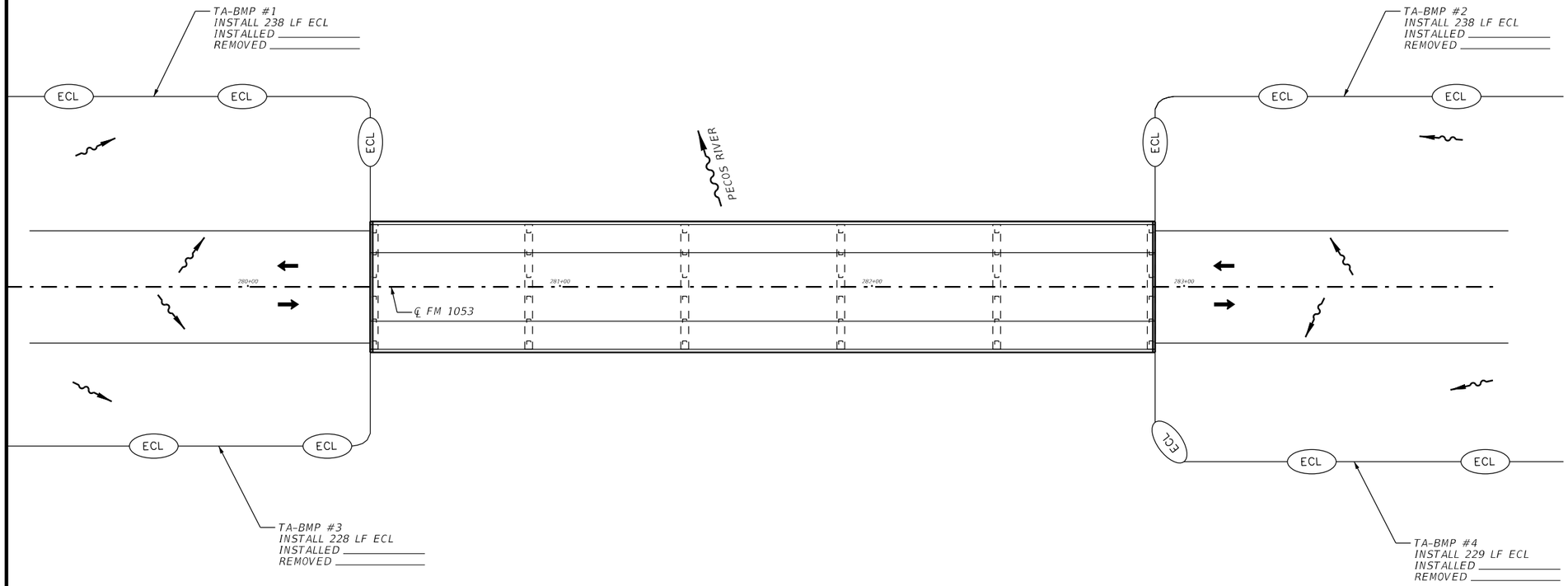
Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being 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.

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

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			83
STATE	STATE DIST.	COUNTY	
TEXAS	ODA	ECTOR,ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
0004	07	139,ETC	IH-20,ETC

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	933		933	
CSJ 0866-03-017 TOTAL	933		933	



LEGEND

ECL — EROSION CONTROL LOG (18")

FLOW DIRECTION

NOTES

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER IN THE FIELD.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL IN BE ACCORDANCE WITH THE TxDOT STANDARDS FOR EROSION CONTROL.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
REGISTERED PROFESSIONAL ENGINEER
8/9/2023

NO.	DATE	REVISION	APPROV.

Bartlett&West
9330 LBJ FREEWAY, STE 1150 - DALLAS, TX 75243
PHONE 888-200-6464
TBPE FIRM REGISTRATION NO. 6499

Texas Department of Transportation

FM 1053

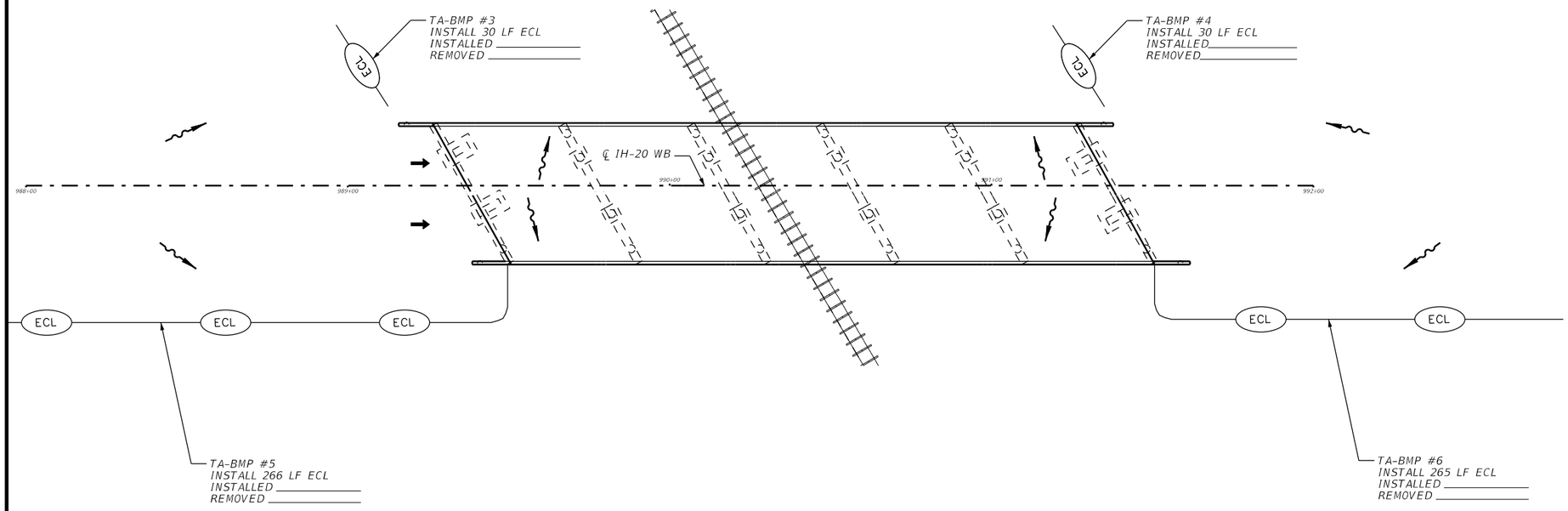
SWP3 LAYOUT

FM 1053 OVER PECOS RIVER
06-052-0866-03-002

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				84
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH-20,ETC

XXXX-XX

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	591		531	
CSJ 0004-07-139 TOTAL	591		531	



LEGEND

ECL — EROSION CONTROL LOG (18")

FLOW DIRECTION

NOTES

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER IN THE FIELD.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL IN BE ACCORDANCE WITH THE TxDOT STANDARDS FOR EROSION CONTROL.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
REGISTERED PROFESSIONAL ENGINEER
8/9/2023

NO.	DATE	REVISION	APPROV.

Bartlett&West
9330 LBJ FREEWAY, STE 1150 - DALLAS, TX 75243
PHONE 888-200-6464
TBPE FIRM REGISTRATION NO. 6499

Texas Department of Transportation

IH 20

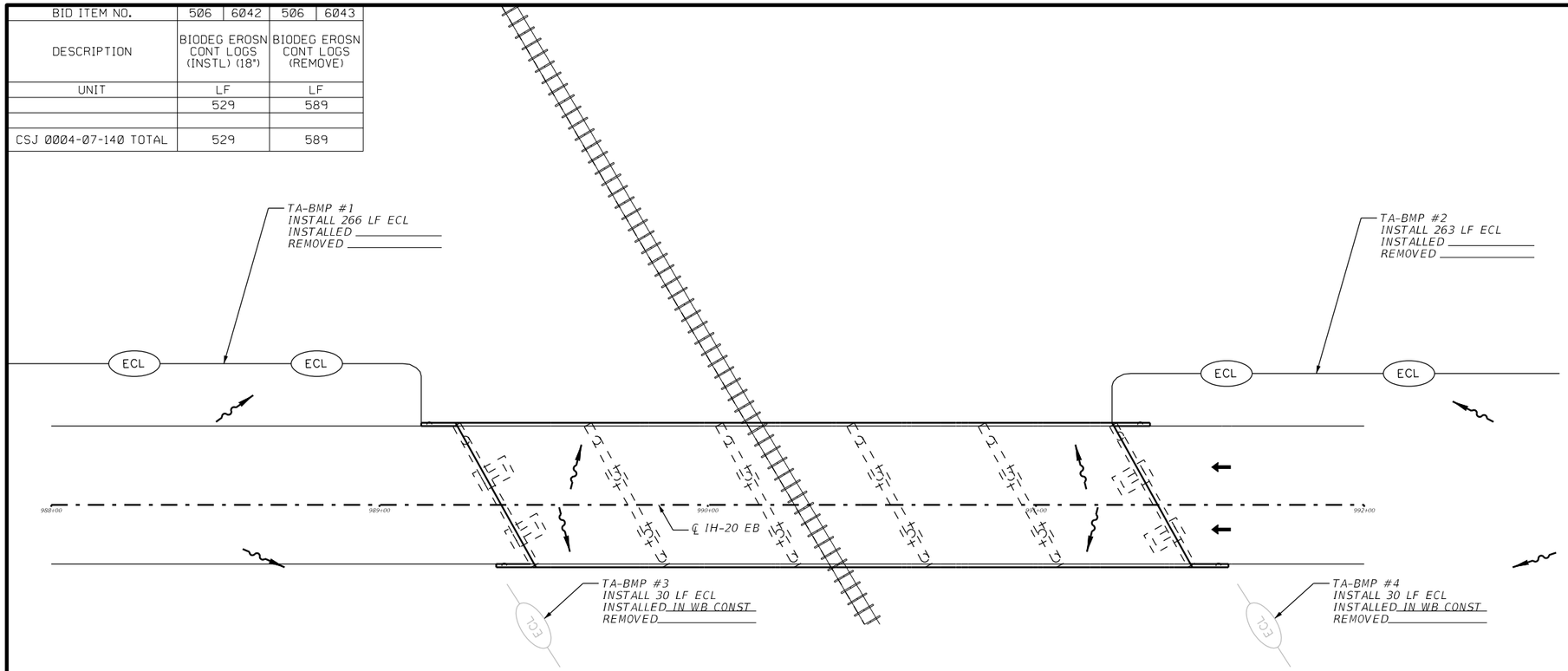
SWP3 LAYOUT

IH-20 WB OVER UPRR
06-069-0004-07-022

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				85
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH-20,ETC

TXXXX-XX

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	529		589	
CSJ 0004-07-140 TOTAL	529		589	



LEGEND

ECL — EROSION CONTROL LOG (18")

FLOW DIRECTION

NOTES

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER IN THE FIELD.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL IN BE ACCORDANCE WITH THE TxDOT STANDARDS FOR EROSION CONTROL.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
REGISTERED PROFESSIONAL ENGINEER
8/9/2023

NO.	DATE	REVISION	APPROV.

Bartlett&West
9330 LBJ FREEWAY, STE 1150 - DALLAS, TX 75243
PHONE 888-200-6464
TBPE FIRM REGISTRATION NO. 6499

Texas Department of Transportation

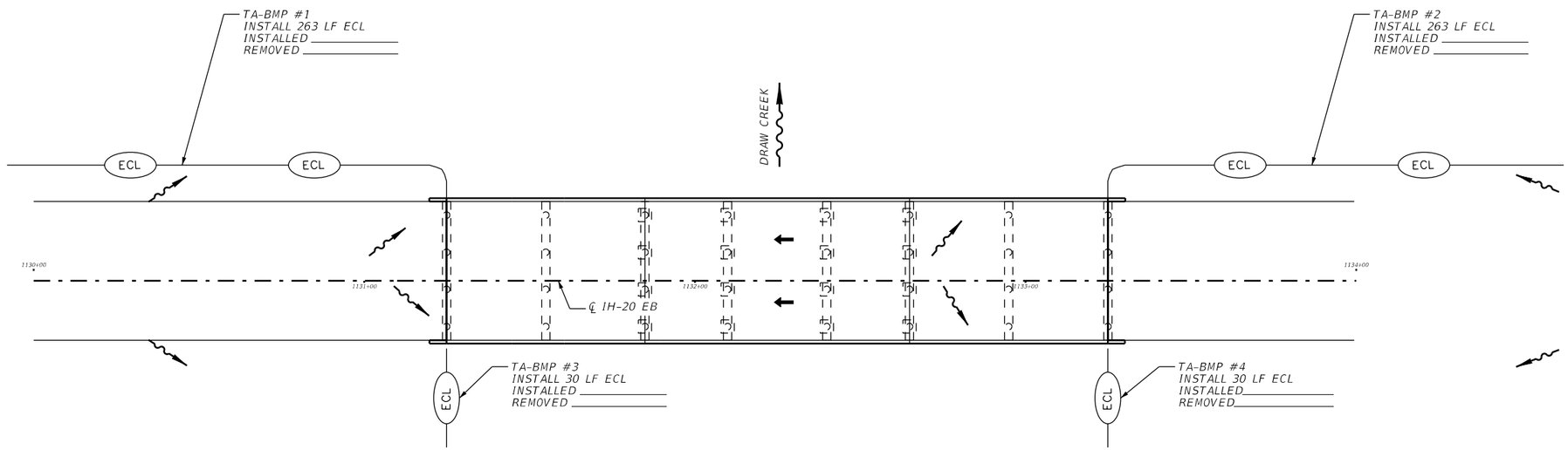
IH 20

SWP3 LAYOUT

IH-20 EB OVER UPRR
06-069-0004-07-023

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				86
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH-20,ETC

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	586		526	
CSJ 0004-07-142 TOTAL	586		526	



LEGEND

ECL — EROSION CONTROL LOG (18")

FLOW DIRECTION

NOTES

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER IN THE FIELD.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL IN BE ACCORDANCE WITH THE TxDOT STANDARDS FOR EROSION CONTROL.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
REGISTERED PROFESSIONAL ENGINEER
8/9/2023

NO.	DATE	REVISION	APPROV.

Bartlett&West
9330 LBJ FREEWAY, STE 1150 - DALLAS, TX 75243
PHONE 888-200-6464
TBPE FIRM REGISTRATION NO. 6499

Texas Department of Transportation

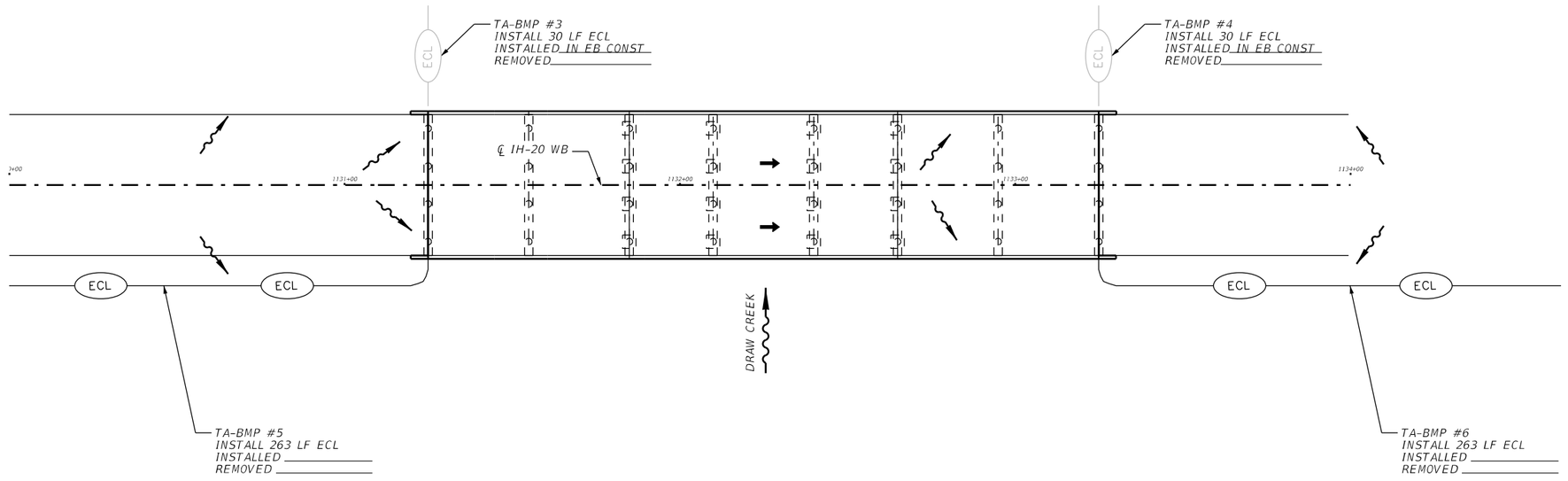
IH 20

SWP3 LAYOUT

IH-20 EB OVER DRAW CREEK
06-069-0004-07-024

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				87
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH-20,ETC

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	526		586	
CSJ 0004-07-141 TOTAL	526		586	



LEGEND

ECL — EROSION CONTROL LOG (18")

FLOW DIRECTION

NOTES

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER IN THE FIELD.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL IN BE ACCORDANCE WITH THE TxDOT STANDARDS FOR EROSION CONTROL.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
REGISTERED PROFESSIONAL ENGINEER
8/9/2023

NO.	DATE	REVISION	APPROV.

Bartlett&West
9330 LBJ FREEWAY, STE 1150 - DALLAS, TX 75243
PHONE 888-200-6464
TBPE FIRM REGISTRATION NO. 6499

Texas Department of Transportation

IH 20

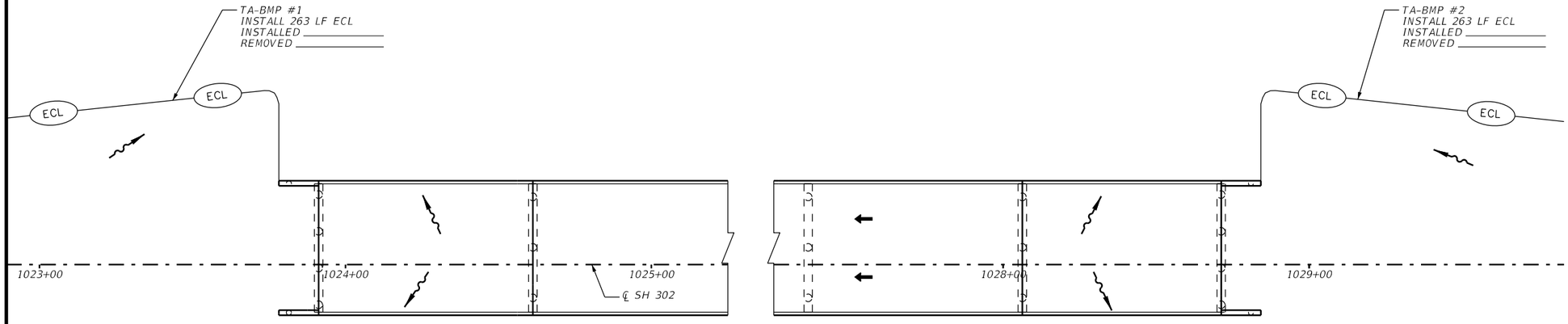
SWP3 LAYOUT

IH-20 WB OVER DRAW CREEK
06-069-0004-07-025

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				88
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH-20,ETC

TXXXX-XX

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	526		526	
CSJ 2224-01-125 TOTAL	526		526	



LEGEND

ECL — EROSION CONTROL LOG (18")

FLOW DIRECTION

NOTES

1. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER IN THE FIELD.
2. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL IN BE ACCORDANCE WITH THE TxDOT STANDARDS FOR EROSION CONTROL.

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
KENNETH E. GOTTLEABER
61759
REGISTERED
PROFESSIONAL ENGINEER
8/9/2023

NO.	DATE	REVISION	APPROV.

Bartlett&West
9330 LBJ FREEWAY, STE 1150 - DALLAS, TX 75243
PHONE 888-200-6464
TBPE FIRM REGISTRATION NO. 6499

Texas Department of Transportation

SH 302

SWP3 LAYOUT

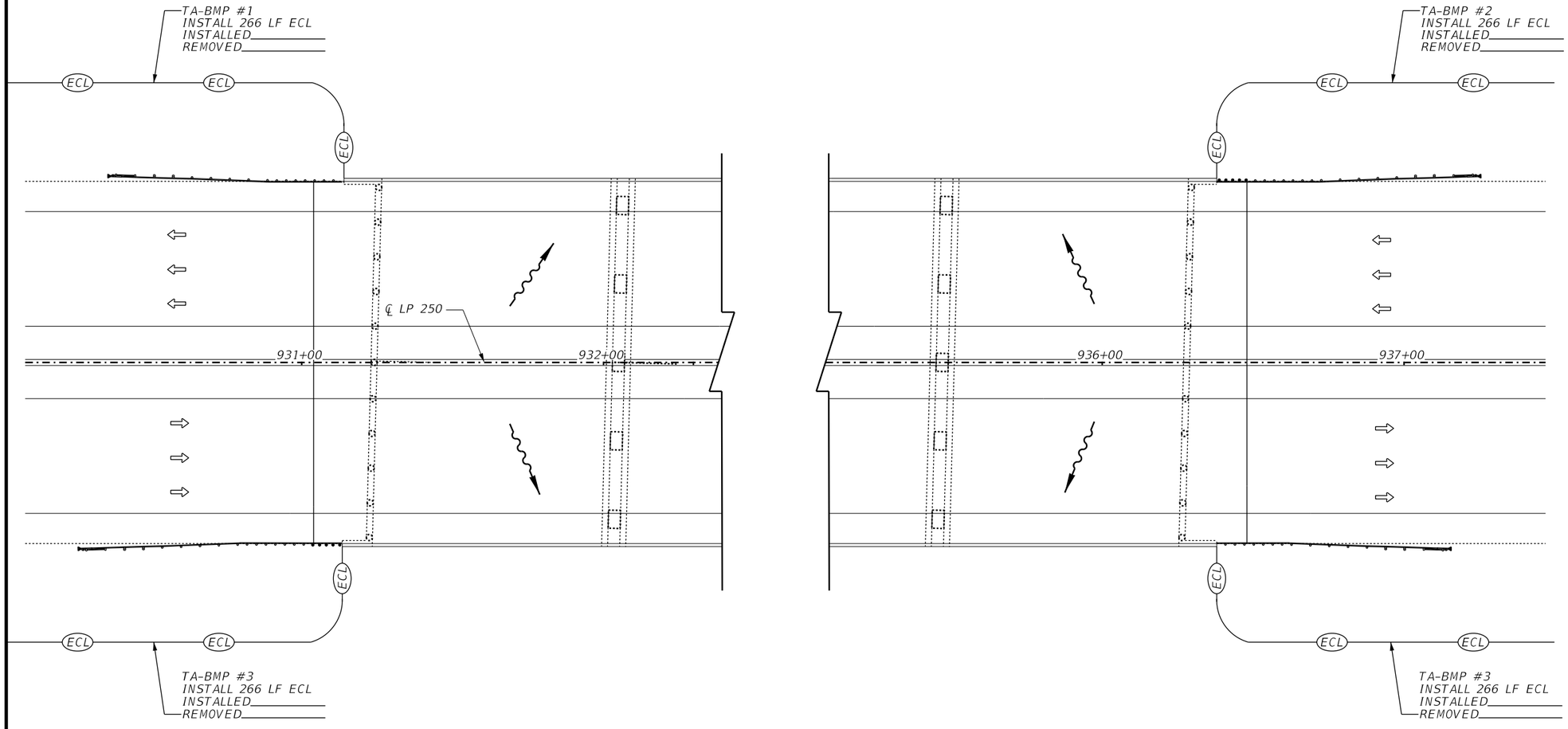
SH 302/LP 338 NB OVER
IH-20 & UPRR
06-069-2224-01-228

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				89
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH-20,ETC

XXXX-XX

8/9/2023 3:08:16 PM c:\projectwise\bartwest-pw.bentley.com_ca\bartwest-pw-03\adeel.saleh@bartwest.com\dms05079\SH302_EC_06.dgn

BID ITEM NO.	506	6042	506	6043
DESCRIPTION	BIODEG EROSN CONT LOGS (INSTL) (18")		BIODEG EROSN CONT LOGS (REMOVE)	
UNIT	LF		LF	
	1064		1064	
CSJ 1188-02-120 TOTAL	1064		1064	



LEGEND

- EXISTING TRAFFIC FLOW
- EXISTING DRAINAGE FLOW
- ECL — EROSION CONTROL LOG (12")

0 20' 40'

SCALE: 1" = 40'

STATE OF TEXAS
RICARDO A. PRIETO
91123
LICENSED
PROFESSIONAL ENGINEER

8/17/2023

NO.	DATE	REVISION	APPROV.

consor
F-12040

Texas Department of Transportation

LP 250

SW3P LAYOUT

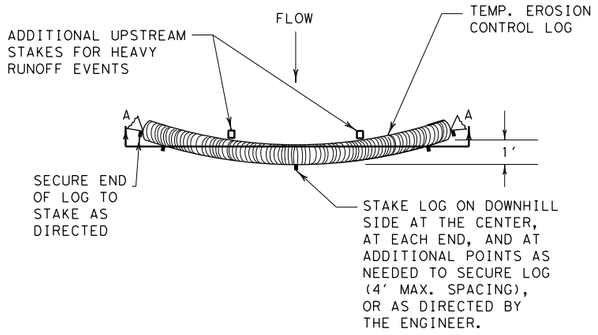
LP 250 OVER IH20 BUS & UPRR
06-069-0005-03-267

SHEET 7 OF 7

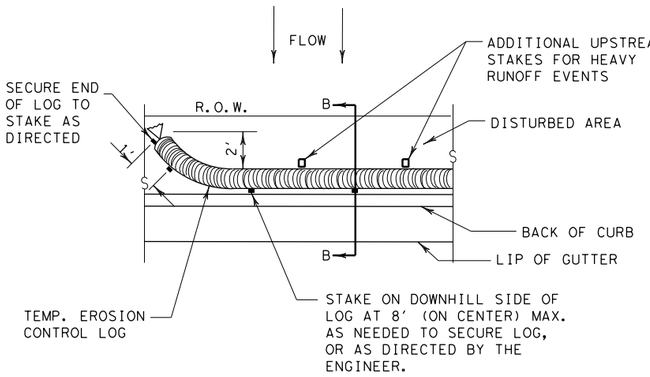
FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT			SHEET NO.
6	TEXAS				90
STATE DISTRICT	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
ODA	ECTOR,ETC	0004	07	139,ETC	IH20,ETC

D190247TX.09

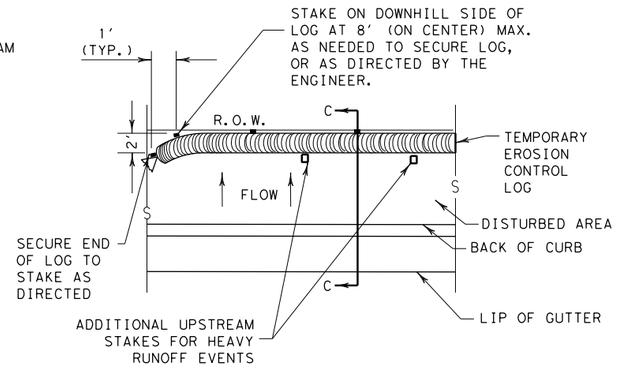
DATE: 8/17/2023
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\13 env\standards\016_ec916-1.dgn



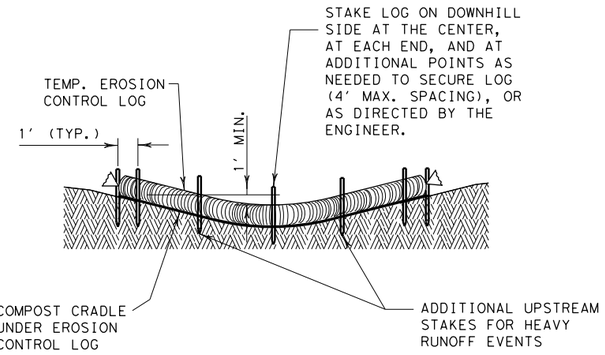
PLAN VIEW



PLAN VIEW



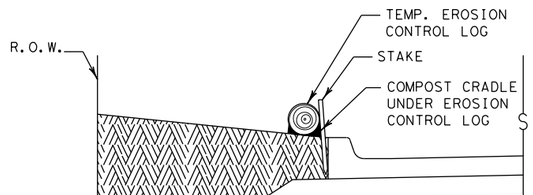
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

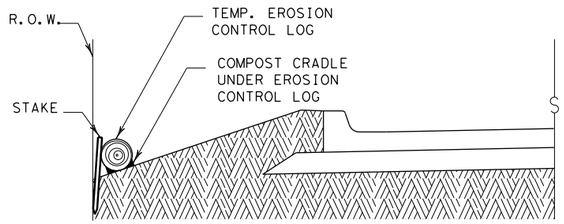
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

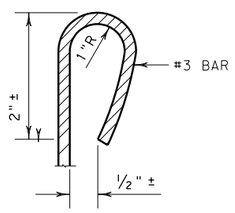
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

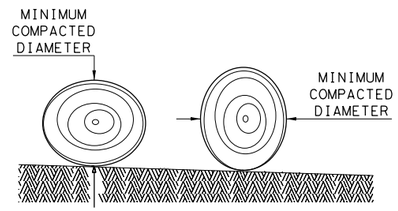
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

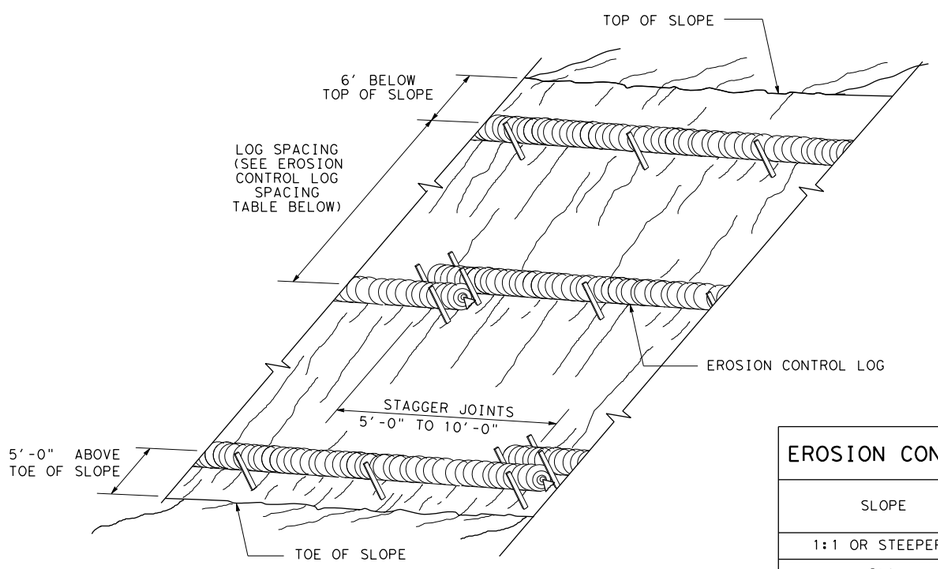
Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

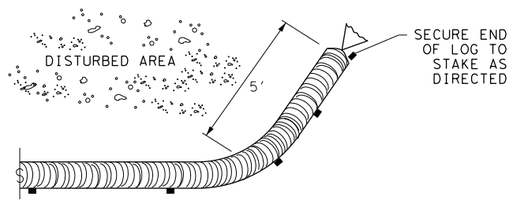
EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0004	07	139, ETC		IH20, ETC		
	DIST	COUNTY			SHEET NO.		
	ODA	ECTOR, ETC			91		



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

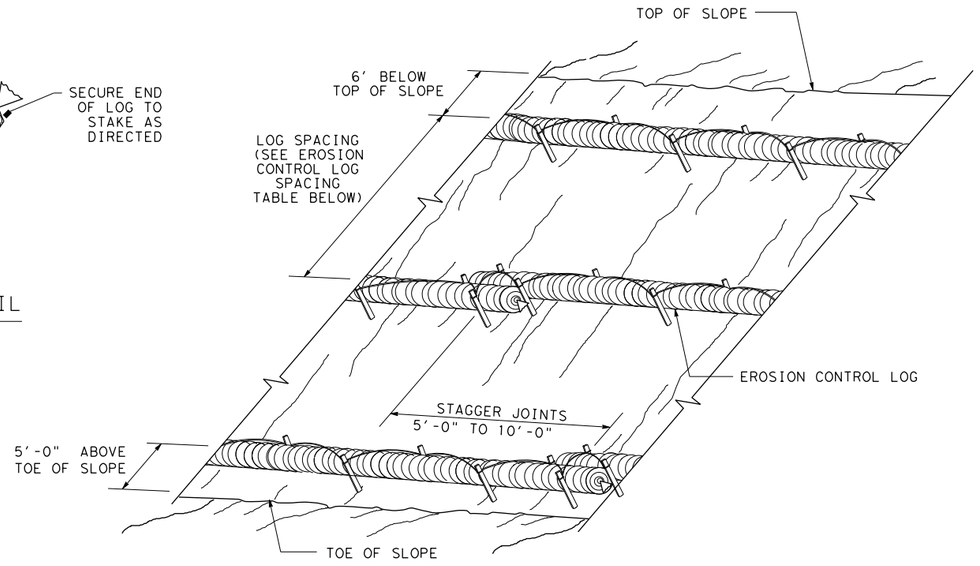
CL-SST



END SECTION RAP DETAIL

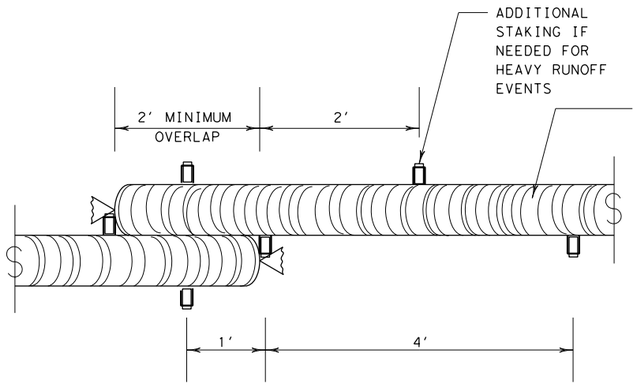
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

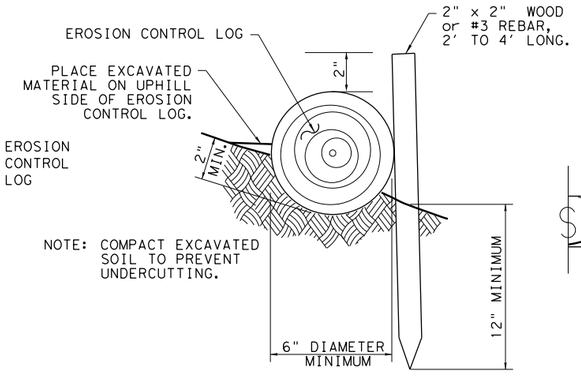
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

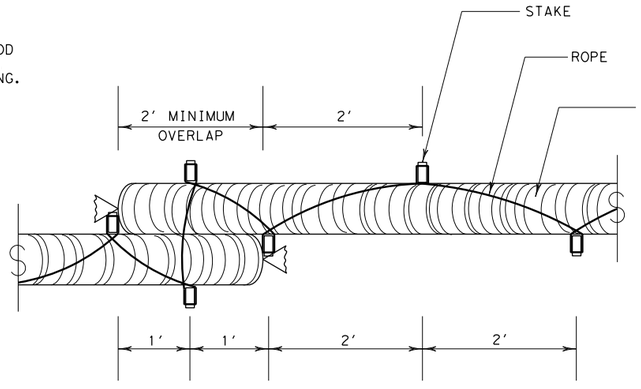


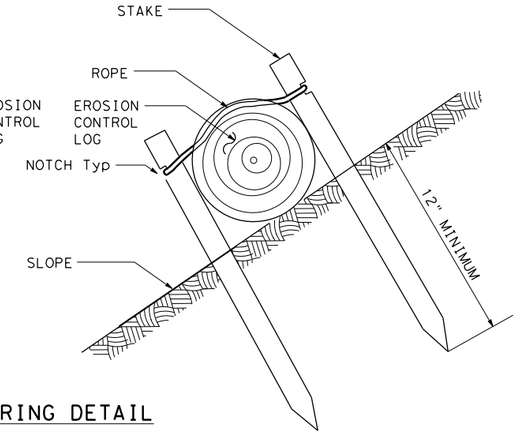


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

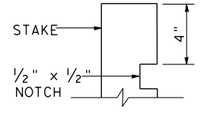
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

DATE: 8/17/2023
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\13 env\standards\016_ec916-2.dgn

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

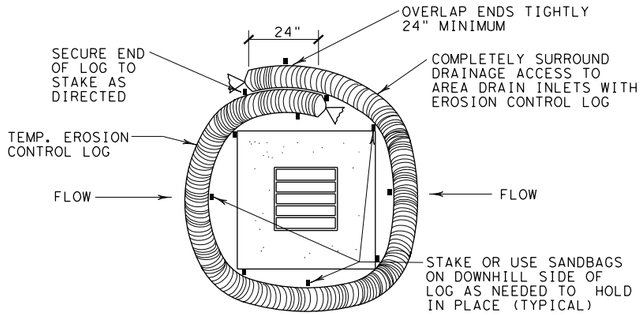
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

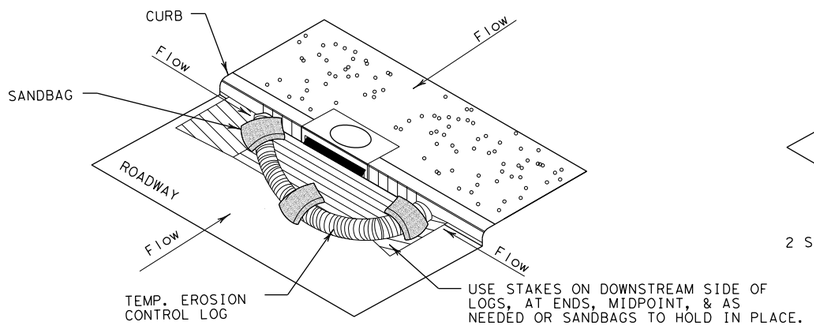
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0004	07	139, ETC	IH20, ETC
	DIST	COUNTY		SHEET NO.
	ODA	ECTOR, ETC		92

DATE: 8/17/2023
FILE: A:_V-TPD\Projects\TX\2019\D190247TX.09\1_Design\500_CADD\dgn\02 Plan Files\13 env\standards\016_ec916-3.dgn



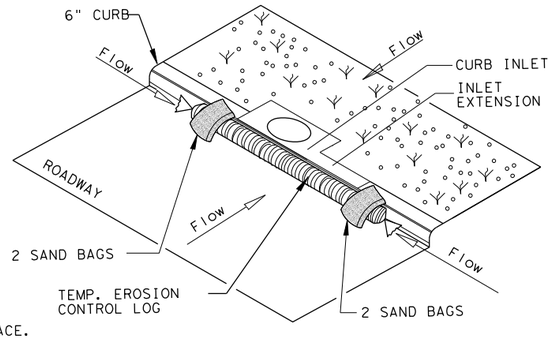
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

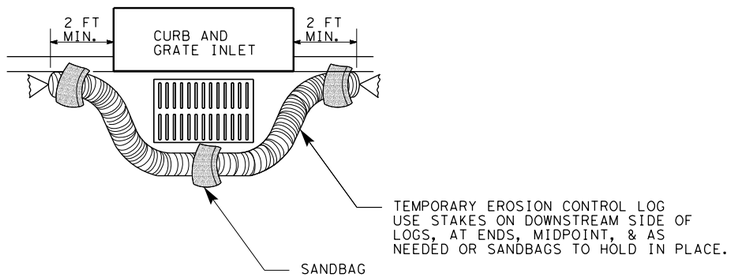
CL-CI



EROSION CONTROL LOG AT CURB INLET

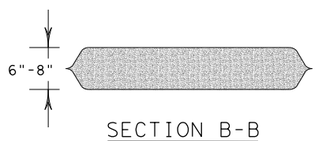
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

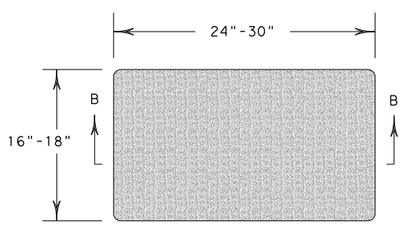


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS			
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0004	07	139, ETC	IH20, ETC			
	DIST	COUNTY		SHEET NO.			
	ODA	ECTOR, ETC		93			