

# STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

SEE SHEET 2 FOR INDEX OF SHEETS

FEDERAL AID PROJECT NO.			
F 2024 (686)			
CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
03	WICHITA		1

## PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT  
F 2024 (686)  
CONTROL NO: 0156-04-120, ETC.

## US 82, ETC. WICHITA COUNTY

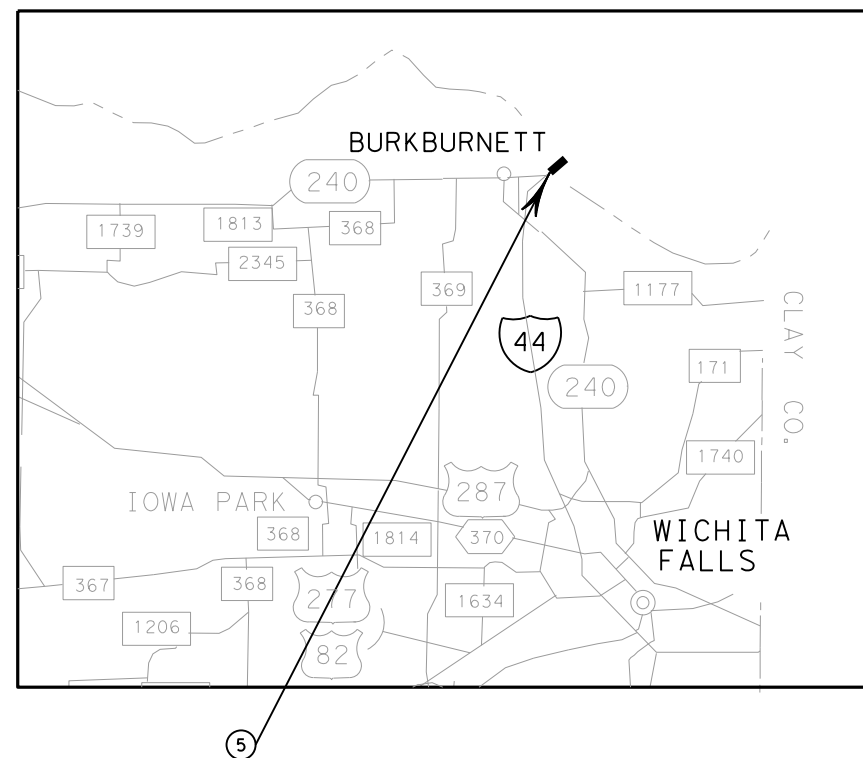
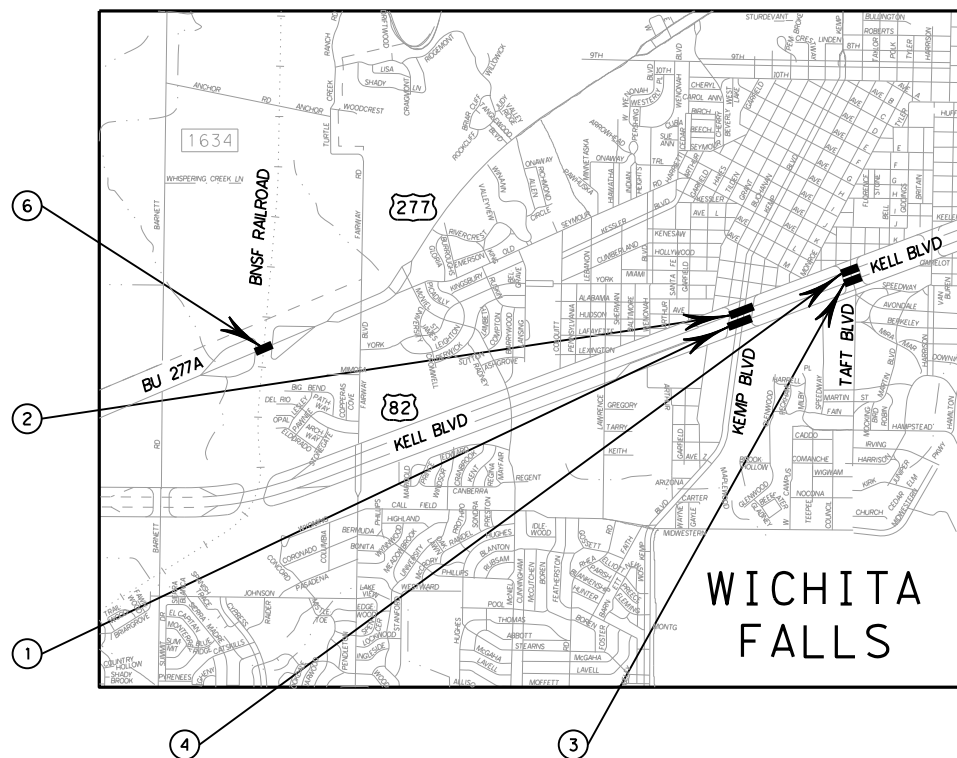
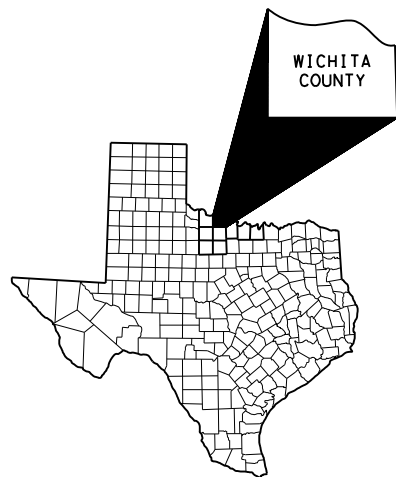
LIMITS: FROM VARIES WICHITA COUNTY  
TO

TOTAL LENGTH OF PROJECT =

BRIDGE	=	5377.00FT.	=	1.02MI.
ROADWAY	=	0.00FT.	=	0.00MI.
<b>TOTAL</b>	<b>=</b>	<b>5377.00FT.</b>	<b>=</b>	<b>1.02MI.</b>

TYPE OF WORK: FOR THE CONSTRUCTION OF RETROFIT BRIDGE RAIL  
CONSISTING OF UPGRADE BRIDGE RAIL AND APPROACH RAILING

REF. NO.	CSJ	HWY NO.	ELEMENT CROSSED	STRUCTURE NUMBER	LENGTH	AADT (2020)	AADT (2040)	DESIGN SPEED
1	0156-04-120	US 82 EB	KEMP BLVD	0156-04-079	359'	53452	106904	50
2	0156-04-121	US 82 WB	KEMP BLVD	0156-04-080	359'	53452	106904	50
3	0156-04-122	US 82 EB	TAFT BLVD	0156-04-082	275'	53452	106904	50
4	0156-04-123	US 82 WB	TAFT BLVD	0156-04-083	275'	53452	106904	50
5	0156-07-114	IH 44 NB	RED RIVER	0156-07-066	3809'	11705	23410	50
6	0156-14-028	BU 277A	BNSF RR	0156-14-065	300'	3898	5457	45



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



SUBMITTED FOR LETTING: 12/01/2023  
*Byron Jarama, P.E.*  
 SUPERVISING DESIGN ENGINEER

RECOMMENDED FOR LETTING: 12/01/2023  
*James L. Beaver, P.E.*  
 DISTRICT DIRECTOR OF TRANSPORTATION  
 PLANNING AND DEVELOPMENT

RECOMMENDED FOR LETTING: 12/01/2023  
*Michael P. Baum, P.E.*  
 DISTRICT ENGINEER

NOT TO SCALE

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

# INDEX OF SHEETS

**SHEET NO. DESCRIPTION**

**GENERAL**

- 1 TITLE SHEET
- 2 INDEX OF SHEETS
- 3-6 TYPICAL SECTIONS
- 7-8 GENERAL NOTES
- 9-12 ESTIMATE & QUANTITY
- 13-14 QUANTITY SUMMARY

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- ~~27~~ TCP(2-1)-18
- ~~28~~ TCP(2-3)-23
- ~~29~~ TCP(2-6)-18
- ~~30~~ TCP(3-1)-13
- ~~31~~ TCP(3-2)-13
- ~~32~~ TCP(3-3)-14
- ~~33~~ TCP(6-1)-12
- ~~34~~ TCP(6-2)-12
- ~~35~~ TCP(6-3)-12
- ~~36~~ TCP(6-4)-12
- ~~37~~ TCP(6-5)-12
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- ~~51-52~~ GF(31)TRTL3-20
- ~~53~~ GF(31)MS-19
- 54 EMBANKMENT DETAIL
- ~~55~~ SGT(13S)31-18
- ~~56~~ SGT(14W)31-18
- ~~57~~ ABSORB(M)-19
- ~~57A~~ SLED-19
- 58 CCSS
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- ~~62-65~~ C-RAIL-R
- 66 US 82 EB OVER KEMP BRIDGE LAYOUT
- 67 US 82 EB OVER TAFT BRIDGE LAYOUT
- 68 US 82 WB OVER TAFT BRIDGE LAYOUT
- 69 US 82 WB OVER KEMP BRIDGE LAYOUT
- 70-73 IH 44 NB OVER RED RIVER BRIDGE LAYOUT
- 74 BU 277A OVER BNSF BRIDGE LAYOUT

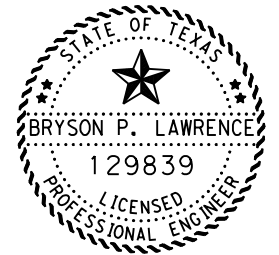
**PAVEMENT MARKINGS & DELINEATION STANDARDS**

- ~~75~~ D&OM(1)-20
- ~~76~~ D&OM(2)-20
- ~~77~~ D&OM(5)-20
- ~~78~~ D&OM(6)-20
- ~~79~~ D&OM(VIA)-20

**ENVIRONMENTAL ISSUES**

- 80 SW3P LAYOUT
- 81 EPIC
- 82-83 WFS-TA-VES

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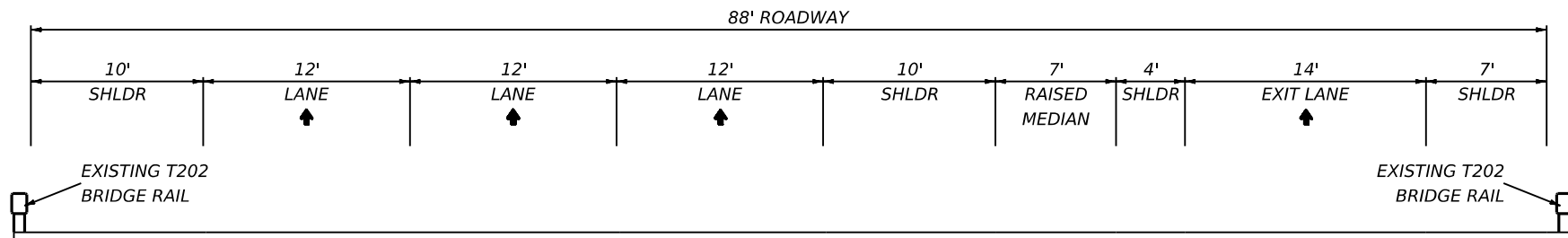
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A ~~✂~~ HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

*Bryson Lawrence, P.E.* 12/21/2023  
NAME DATE

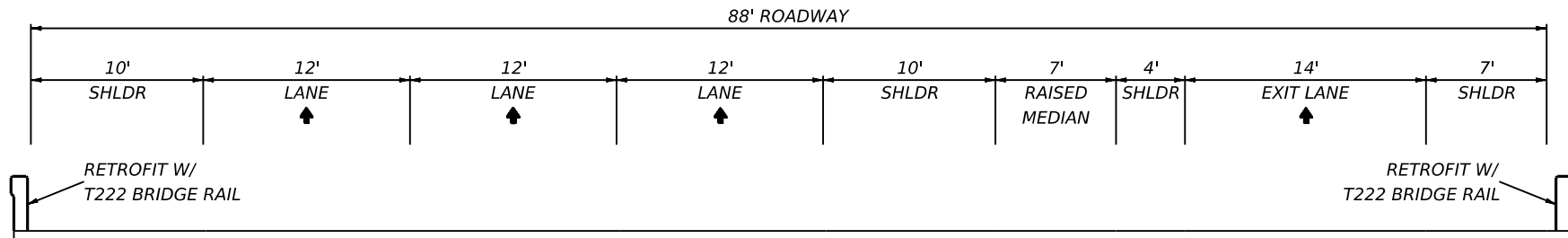
**US 82, ETC.  
INDEX OF  
SHEETS**

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC. US 82, ETC.	
DIST	COUNTY		SHEET NO.
WFS	WICHITA		2

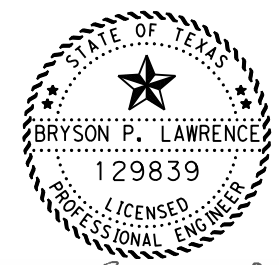
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EXISTING TYPICAL US 82 EB  
 NBI #0156-04-079 (@ KEMP)  
 STA 411+22.00 TO STA 415+08.00



PROPOSED TYPICAL US 82 EB  
 NBI #0156-04-079 (@ KEMP)  
 STA 411+22.00 TO STA 415+08.00



*Bryson Lawrence, P.E.*

12/21/2023

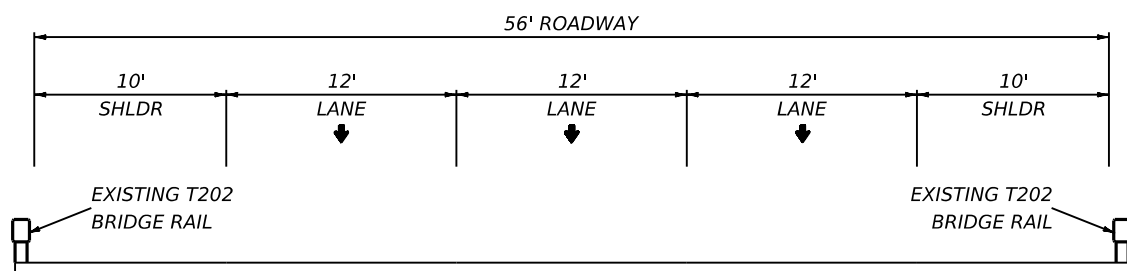
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**TYPICAL SECTIONS**



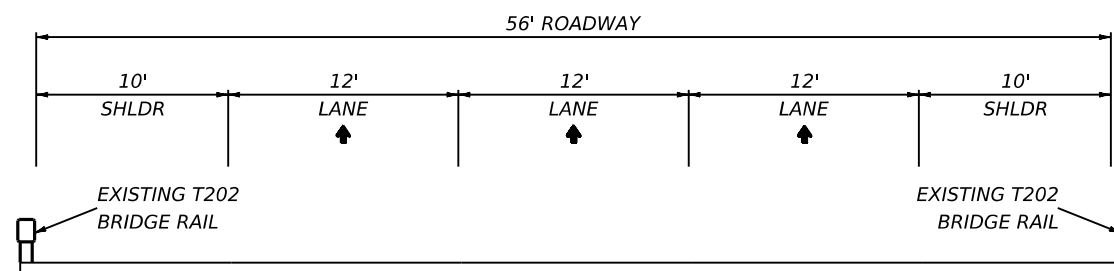
SHEET 1 OF 4  
 Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		3

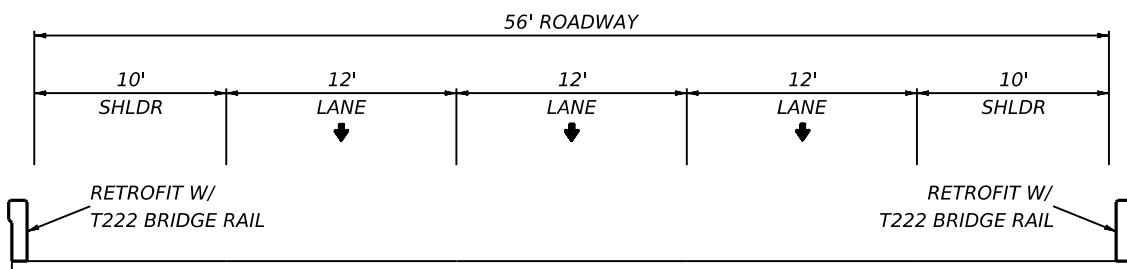
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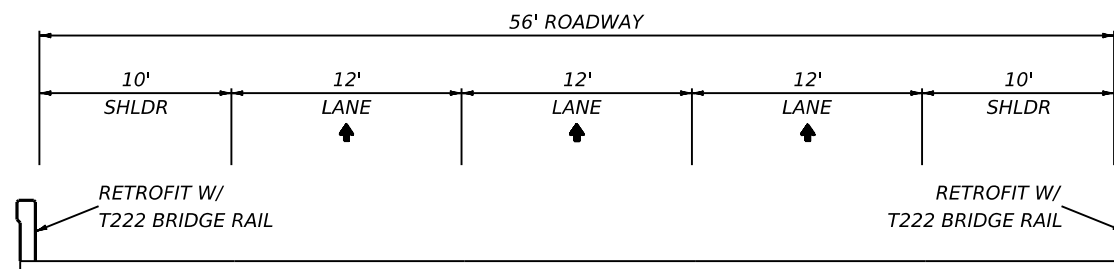
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 NBI #0156-04-083 (@ TAFT)  
 STA 442+55.00 TO STA 445+30.00



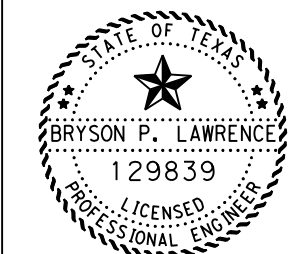
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PROPOSED TYPICAL US 82 WB  
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 STA 411+75.00 TO STA 415+08.00  
 NBI #0156-04-083 (@ TAFT)  
 STA 442+55.00 TO STA 445+30.00



PROPOSED TYPICAL US 82 EB  
 NBI #0156-04-082 (@ TAFT)  
 STA 442+40.00 TO STA 445+15.00

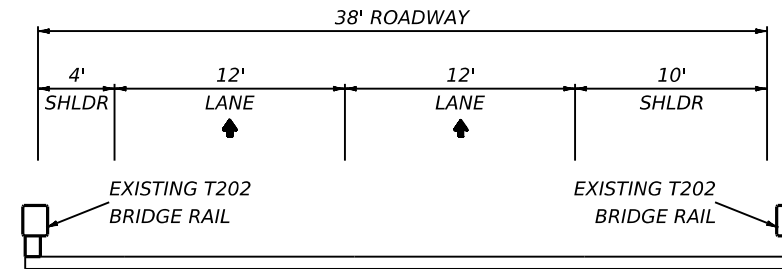


*Bryson Lawrence, P.E.*  
 12/21/2023

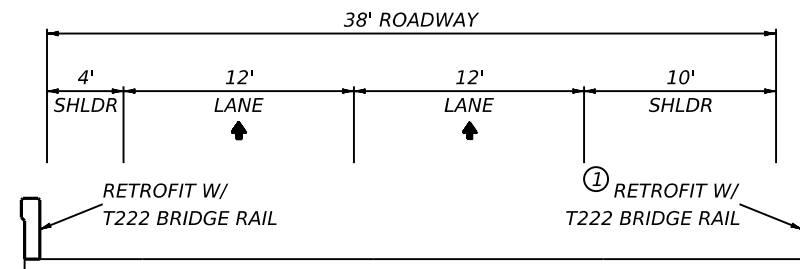
**US 82, ETC.**  
**TYPICAL SECTIONS**

© 2024			
SHEET 2 OF 4			
Texas Department of Transportation			
CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		4

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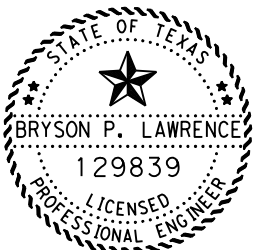
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 NBI #0156-07-066 (@ RED RIVER)  
 STA 1076+57.90 TO STA 1114+65.15



PROPOSED TYPICAL IH 44 NB  
 NBI #0156-07-066 (@ RED RIVER)  
 STA 1076+57.90 TO STA 1114+65.15

NOTES:

- 1 ADD OPTIONAL SIDE SLOT DRAINS TO OUTSIDE RAILING. SEE OPTIONAL SIDE SLOT DRAIN DETAIL ON "TRAFFIC RAIL TYPE T222" SHEET.



*Bryson Lawrence, P.E.*

12/21/2023

US 82, ETC.  
 TYPICAL SECTIONS

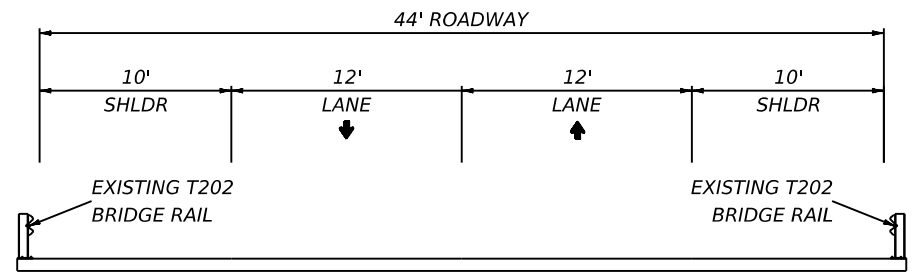


SHEET 3 OF 4

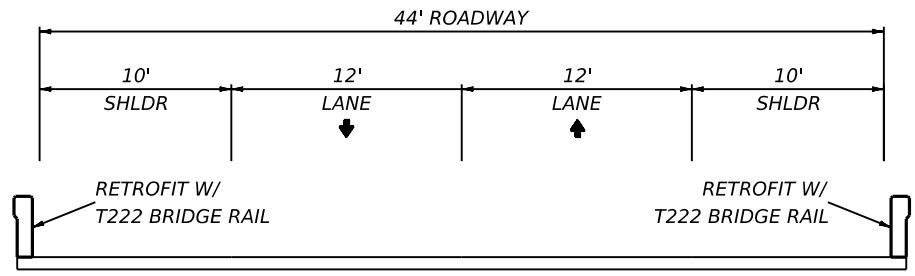
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	5	

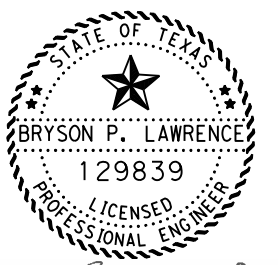
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EXISTING TYPICAL BU 277A  
 NBI #0156-14-065 (@ BNSF RR)  
 STA 48+50.00 TO STA 51+50.00



PROPOSED TYPICAL BU 277A  
 NBI #0156-14-065 (@ BNSF RR)  
 STA 48+50.00 TO STA 51+50.00



*Bryson Lawrence, P.E.*  
 12/21/2023

US 82, ETC.  
 TYPICAL SECTIONS



SHEET 4 OF 4  
 Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		6

**GENERAL NOTES****Basis of Estimate:**

<u>Item - Description</u>	<u>Rate*</u>	<u>Unit</u>
166 - Fertilizer	100 LB of Nitrogen / acre with a 3:1:1 ratio of N, P, K	LB
168 - Vegetative Watering 2 weeks for 3 months	1.4 GAL/SY per Application every	MG

\*For Contractor's information only, actual production rates may vary.

**General Requirements**

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

Callan Coltharp, P.E.: [Callan.Coltharp@txdot.gov](mailto:Callan.Coltharp@txdot.gov)  
Cody Bates, P.E.: [Cody.Bates@txdot.gov](mailto:Cody.Bates@txdot.gov)

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

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

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

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

**Bid Item Specific General Notes****Item 4 - Scope of Work**

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

**Item 5 - Control of the Work**

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

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

**Item 6 - Control of Materials**

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

Refer to the Buy America Material Classification Sheet for clarification on material categorization. The Buy America Material Classification Sheet is located at the link below:

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html>

**Item 7 - Legal Relations and Responsibilities**

No significant traffic generator events identified for this project.

The Contractor's responsible person as described in item 7.2.6.1 must be able to respond within 45 minutes of being notified.

**Item 8 - Prosecution and Progress**

For this project, contract time will be computed as described in Item 8 based on a standard workweek.

Progress schedule format shall be critical path method unless otherwise directed.

**Item 164 - Seeding for Erosion Control**

The Engineer may blend temporary and permanent seeding according to the temperatures and time of year in order to achieve maximum coverage in the least amount of time.

The contractor is responsible for the protection and maintenance of all seeded areas until final acceptance of the project. Maintenance includes:

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

**Item 166 - Fertilizer**

Fertilize all areas of the project that are seeded.

**Item 168 - Vegetative Watering**

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

**Item 451 - Retrofit Railing**

Contractor shall use saw cut method for the removal of existing rail.

**Item 502 - Barricades, Signs, and Traffic Handling**

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

CTB that is not in use shall be stored at Wichita Falls District Headquarters and will be stockpiled there after project is completed.

Highway: US 82, Etc.

Control: 0156-04-120, Etc.

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

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

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Work vehicles within 30 feet of the traveled way shall have strobe lights or rotating beacons in use.

Wear appropriate personal protective equipment at all times while outside of vehicles and equipment on the project.

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

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

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

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

**Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls**

The disturbed area for this project, as shown on the plans, is 0.15 acres. The total disturbed area (TDA) will establish the required authorization for storm water discharges. The TDA of the project will be determined as described by the Environmental Permits Issues and Commitments (EPIC) sheet.

Contractor shall meet the requirements for the Project SW3P binder as described on the SW3P sheet.

The Contractor shall collect and dispose of all waste material as required by the Storm Water Pollution Prevention Plan (SW3P).

If sediment escapes the construction site, immediately stop all work on the project, remove the sediment, and modify the SW3P site plan to prevent future non-compliance issues.

Highway: US 82, Etc.

Control: 0156-04-120, Etc.

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

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

**Item 512 – Portable Traffic Barrier**

Contractor shall stockpile concrete traffic barrier at Wichita Falls District Office.

**Item 542 - Removing Metal Beam Guard Fence**

The Contractor shall take possession of all salvaged materials including damaged guardrail that cannot be used and dispose of the salvaged material according to State and Federal regulations.

**Item 545 – Crash Cushion Attenuators**

Contractor shall stockpile crash cushions at Wichita Falls District Office while not in use.

**Item 658 - Delineator and Object Marker Assemblies**

Contractor shall take possession of all delineation elements that are removed from this project.

**Item 662 – Work Zone Pavement Markings**

Traffic buttons shall be used for temporary pavement markings on long-term lane closures.

Thermoplastic adhesive will be required on any concrete pavement applications.

**Item 6185 – Truck Mounted Attenuators (TMA) and Trailer Attenuator (TA)**

The total number of TMA's required for this project as shown on the TCP standard sheets is three/day on US 82 and IH 44, and two/day on BU 277A. There are no additional TMA's for project specific TCP sheets. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project.





# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0156-04-120

DISTRICT Wichita Falls  
HIGHWAY BU 277A, IH 44, US 82

COUNTY Wichita

CONTROL SECTION JOB				0156-04-120		0156-04-121		0156-04-122		0156-04-123		0156-07-114		0156-14-028	
PROJECT ID				A00126317		A00126318		A00126319		A00126382		A00126383		A00126384	
COUNTY				Wichita		Wichita		Wichita		Wichita		Wichita		Wichita	
HIGHWAY				US 82		US 82		US 82		US 82		IH 44		BU 277A	
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY											180.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY											722.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY											362.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY											362.000	
	168-6001	VEGETATIVE WATERING	MG											6.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY											40.000	
	451-6060	RETROFIT RAIL (TY T222)	LF	780.000		780.000		580.000		580.000		7,660.000		660.000	
	500-6001	MOBILIZATION	LS	1.000											
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000		2.000		2.000		16.000		3.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF											740.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF											740.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	640.000				480.000							
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	640.000		1,280.000		480.000		960.000		7,680.000		1,240.000	
	512-6037	PORT CTB (STKPL)(SGL SLP)(TY 1)	LF							160.000		340.000		620.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF											450.000	
	540-6011	MTL THRIE-BEAM GD FEN ADJUSTMENT	LF	75.000		50.000				50.000		50.000			
	540-6021	MTL THRIE-BEAM GD FEN (TIM POST)	EA							2.000				4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF											450.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA											2.000	
	544-6002	GUARDRAIL END TREATMENT (MOVE & RESET)	EA											2.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA											2.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	1.000		2.000		1.000		2.000		8.000		4.000	
	545-6004	CRASH CUSH ATTEN (STKPL)	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	9.000		6.000		6.000		6.000		41.000			
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA											18.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	6.000		6.000		6.000		6.000		41.000			
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA											6.000	
	662-6058	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	EA											487.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	2,750.000		1,750.000		1,430.000		2,390.000		8,680.000			
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	3,150.000		2,150.000		2,030.000		2,990.000		9,080.000		3,960.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	360.000		360.000		360.000		360.000		180.000			
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	2,750.000		1,750.000		1,430.000		2,390.000		8,680.000			
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	3,150.000		2,150.000		2,030.000		2,990.000		9,080.000		3,960.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	98.000										156.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	49.000											
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	12,140.000		4,260.000		3,820.000		5,740.000		17,940.000		4,560.000	



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0156-04-120

DISTRICT Wichita Falls  
HIGHWAY BU 277A, IH 44, US 82

COUNTY Wichita

CONTROL SECTION JOB				0156-04-120		0156-04-121		0156-04-122		0156-04-123		0156-07-114		0156-14-028	
PROJECT ID				A00126317		A00126318		A00126319		A00126382		A00126383		A00126384	
COUNTY				Wichita		Wichita		Wichita		Wichita		Wichita		Wichita	
HIGHWAY				US 82		US 82		US 82		US 82		IH 44		BU 277A	
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000						1.000					
	6185-6002	TMA (STATIONARY)	DAY	34.000		30.000		26.000		26.000		214.000		38.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	12.000		12.000		12.000		12.000		12.000		8.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000											
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000											
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS												1.000



CONTROLLING PROJECT ID 0156-04-120

DISTRICT Wichita Falls  
HIGHWAY BU 277A, IH 44, US 82

# Estimate & Quantity Sheet

COUNTY Wichita

CONTROL SECTION JOB				TOTAL EST.	TOTAL FINAL
PROJECT ID					
COUNTY					
HIGHWAY					
ALT	BID CODE	DESCRIPTION	UNIT		
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	180.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	722.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	362.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	362.000	
	168-6001	VEGETATIVE WATERING	MG	6.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	40.000	
	451-6060	RETROFIT RAIL (TY T222)	LF	11,040.000	
	500-6001	MOBILIZATION	LS	1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	27.000	
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	740.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	740.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	1,120.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	12,280.000	
	512-6037	PORT CTB (STKPL)(SGL SLP)(TY 1)	LF	1,120.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	450.000	
	540-6011	MTL THRIE-BEAM GD FEN ADJUSTMENT	LF	225.000	
	540-6021	MTL THRIE-BEAM GD FEN (TIM POST)	EA	6.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	450.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000	
	544-6002	GUARDRAIL END TREATMENT (MOVE & RESET)	EA	2.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	18.000	
	545-6004	CRASH CUSH ATTEN (STKPL)	EA	2.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	2.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	68.000	
	658-6014	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	EA	18.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	65.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	6.000	
	662-6058	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	EA	487.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	17,000.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	23,360.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	1,620.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	17,000.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	23,360.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	254.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	49.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	48,460.000	



# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0156-04-120

**DISTRICT** Wichita Falls

**COUNTY** Wichita

**HIGHWAY** BU 277A, IH 44, US 82

CONTROL SECTION JOB				TOTAL EST.	TOTAL FINAL
PROJECT ID					
COUNTY					
HIGHWAY					
ALT	BID CODE	DESCRIPTION	UNIT		
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	3.000	
	6185-6002	TMA (STATIONARY)	DAY	368.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	68.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000	
		RAILROAD FLAGGING: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	

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SUMMARY OF ROADWAY & BRIDGE ITEMS																						
CSJ: 0156-04-120, ETC. US 82, ETC.	132 6003	432 6045	451 6060	512 6001	512 6025	512 6037	540 6001	540 6011	540 6021	542 6001	544 6001	544 6002	544 6003	545 6003	545 6004	545 6019	658 6013	658 6014	658 6026	658 6062	6001 6002	6185 6002
	EMBANKMENT (FINAL)(ORD COMP)(TY B)	RIPRAP (MOW STRIP)(4 IN)	RETROFIT RAIL (TY T222)	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	PORT CTB (MOVE)(SGL SLP)(TY 1)	PORT CTB (STKPL)(SGL SLP)(TY 1)	MTL W-BEAM GD FEN (TIM POST)	MTL THRIE-BEAM GD FEN ADJUSTMENT	MTL THRIE-BEAM GD FEN (TIM POST)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (MOVE & RESET)	GUARDRAIL END TREATMENT (REMOVE)	GUARDRAIL END TREATMENT (REMOVE)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (STKPL)	CRASH CUSH ATTEN (INSTL)(S)(N) (TL3) ⑤	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ (BRF)CTB (BI)	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	PORTABLE CHANGEABLE MESSAGE SIGN
	CY	CY	LF	LF	LF	LF	LF	LF	EA	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	DAY
<b>US 82 over Kemp (EB)</b>																						
<b>NBI#0156-04-079</b>																						
INSIDE APPROACH								25											3			3
INSIDE OF BRIDGE			390	640 ①												1			3		1	13
OUTSIDE APPROACH								25									3				1	3
OUTSIDE OF BRIDGE			390		640 ②									1			3					12
OUTSIDE DEPARTURE								25									3					3
<b>SUB TOTAL</b>			<b>780</b>	<b>640</b>	<b>640</b>			<b>75</b>						<b>1</b>		<b>1</b>	<b>9</b>		<b>6</b>		<b>2</b>	<b>34</b>
<b>US 82 over Kemp (WB)</b>																						
<b>NBI#0156-04-080</b>																						
INSIDE APPROACH								25											3			3
INSIDE OF BRIDGE			390		640									1					3			12
OUTSIDE APPROACH								25									3					3
OUTSIDE OF BRIDGE			390		640									1			3					12
OUTSIDE DEPARTURE								25									3					3
<b>SUB TOTAL</b>			<b>780</b>		<b>1280</b>			<b>50</b>						<b>2</b>			<b>6</b>		<b>6</b>			<b>30</b>
<b>US 82 over Taft (EB)</b>																						
<b>NBI#0156-04-082</b>																						
INSIDE APPROACH								25											3			3
INSIDE OF BRIDGE			290	480 ①												1			3			10
OUTSIDE APPROACH								25									3					3
OUTSIDE OF BRIDGE			290		480 ②									1			3					10
OUTSIDE DEPARTURE								25									3					3
<b>SUB TOTAL</b>			<b>580</b>	<b>480</b>	<b>480</b>			<b>50</b>						<b>1</b>		<b>1</b>	<b>6</b>		<b>6</b>		<b>1</b>	<b>26</b>
<b>US 82 OVER TAFT (WB)</b>																						
<b>NBI#0156-04-083</b>																						
INSIDE APPROACH								25											3			3
INSIDE OF BRIDGE			290		480									1					3		1	10
OUTSIDE APPROACH								25									3					3
OUTSIDE OF BRIDGE			290		480	160 ②								1	1		3					10
OUTSIDE DEPARTURE								25									3					3
<b>SUB TOTAL</b>			<b>580</b>		<b>960</b>	<b>160</b>		<b>50</b>						<b>2</b>	<b>1</b>		<b>6</b>		<b>6</b>		<b>1</b>	<b>26</b>
<b>IH 44 over Red River (NB)</b>																						
<b>NBI#0156-07-066</b>																						
INSIDE APPROACH								25											3			3
INSIDE OF BRIDGE			3830		3840 ③									4					38			104
OUTSIDE APPROACH								25									3					3
OUTSIDE OF BRIDGE			3830		3840 ③	340 ③								4			38					104
OUTSIDE DEPARTURE								25									3					3
<b>SUB TOTAL</b>			<b>7660</b>		<b>7680</b>	<b>340</b>		<b>50</b>						<b>8</b>			<b>41</b>		<b>41</b>		<b>1</b>	<b>214</b>
<b>BU 277A over BNSF RR</b>																						
<b>NBI#0156-14-065</b>																						
WB APPROACH	70	13					175		1	175		1						3		2		6
WB SIDE OF BRIDGE			330		620									2				3				10
WB DEPARTURE	20	7					50		1	50	1		1					3		1		3
EB APPROACH	70	13					175		1	175		1						3		2		6
EB SIDE OF BRIDGE			330		620	620 ④								2	1			3				10
EB DEPARTURE	20	7					50		1	50	1		1					3		1		3
<b>SUB TOTAL</b>	<b>180</b>	<b>40</b>	<b>660</b>		<b>1240</b>	<b>620</b>	<b>450</b>		<b>4</b>	<b>450</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>		<b>18</b>		<b>6</b>		<b>3</b>	<b>38</b>
<b>PROJECT TOTALS</b>	<b>180</b>	<b>40</b>	<b>11040</b>	<b>1120</b>	<b>12280</b>	<b>1120</b>	<b>450</b>	<b>275</b>	<b>4</b>	<b>450</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>18</b>	<b>2</b>	<b>2</b>	<b>68</b>	<b>18</b>	<b>65</b>	<b>6</b>	<b>3</b>	<b>368</b>

**NOTES:**

- ① CTB WILL BE FURNISHED AND INSTALLED ON INSIDE OF BRIDGE AT "US 82 EB OVER KEMP" (640') AND "US 82 EB OVER TAFT" (480') AT THE SAME TIME SO THAT WORK MAY BE PERFORMED SIMULTANEOUSLY AT BOTH LOCATIONS.
- ② CTB WILL BE MOVED FROM INSIDE OF BRIDGE TO OUTSIDE OF BRIDGE AT "US 82 EB OVER KEMP" (640') AND "US 82 EB OVER TAFT" (480') SO THAT WORK MAY BE PERFORMED SIMULTANEOUSLY AT BOTH LOCATIONS. THIS ORDER OF CTB PLACEMENT WILL BE REPEATED AT "US 82 WB OVER TAFT" AND "US 82 WB OVER KEMP" RESPECTIVELY. 160' OF CTB WILL BE STORED AT THE SPECIFIED LOCATION (SEE GENERAL NOTES) UPON COMPLETION.
- ③ AT "IH 44 NB OVER RED RIVER" CTB WILL BE PLACED IN 960' SEGMENTS. THIS WILL REQUIRE 4 MOVES ON THE INSIDE OF BRIDGE AND 4 MOVES ON THE OUTSIDE OF BRIDGE. TOTAL CTB MOVES WILL EQUAL 3840' ON EACH SIDE. 340' OF CTB WILL BE STORED AT THE SPECIFIED LOCATION (SEE GENERAL NOTES) UPON COMPLETION.
- ④ "BU 277A OVER BNSF" WILL REQUIRE 620' OF CTB FOR WEST BOUND WORK AND THEN 620' OF CTB FOR EAST BOUND WORK. THIS REMAINING 620' OF CTB WILL BE STOCKPILED AT THE SPECIFIED LOCATION (SEE GENERAL NOTES).
- ⑤ ABSORB(M) CRASH CUSHION SHALL BE PROVIDED BY CONTRATOR.

**US 82, ETC.**  
**QUANTITY SUMMARY**

SHEET 1 OF 2  
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		13

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CSJ: 0156-04-120, ETC. US 82, ETC.	SUMMARY OF PAVEMENT MARKING ITEMS								
	662 6058	662 6063	662 6095	666 6300	666 6303	666 6315	672 6009	677 6001	6185 6005
	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)	RE PM W/RET REQ TY I (W)4"(BRK)(1 00MIL)	RE PM W/RET REQ TY I (W)4"(SLD)(10 0MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(10 0MIL)	REFL PAV MRKR TY II-A-A	ELIM EXT PAV MRK & MRKS (4")	TMA (MOBILE OPERATION)
EA	LF	LF	LF	LF	LF	EA	LF	DAY	
<b>US 82 over Kemp (EB)</b>									
<b>NBI#0156-04-079</b>									
INSIDE OF BRIDGE			3150	180		3150		3330	6
OUTSIDE OF BRIDGE		2750		180	2750			2930	6
<b>US 82 over Kemp (WB)</b>									
<b>NBI#0156-04-079</b>									
INSIDE OF BRIDGE			2150	180		2150		2330	6
OUTSIDE OF BRIDGE		1750		180	1750			1930	6
<b>US 82 over Taft (EB)</b>									
<b>NBI#0156-04-079</b>									
INSIDE OF BRIDGE			2030	180		2030		2210	6
OUTSIDE OF BRIDGE		1430		180	1430			1610	6
<b>US 82 over Taft (WB)</b>									
<b>NBI#0156-04-079</b>									
INSIDE OF BRIDGE			2990	180		2990		3170	6
OUTSIDE OF BRIDGE		2390		180	2390			2570	6
<b>IH 44 over Red River (NB)</b>									
<b>NBI#0156-04-079</b>									
INSIDE OF BRIDGE			9080	180		9080		9260	6
OUTSIDE OF BRIDGE		8680			8680			8680	6
<b>BU 277A over BNSF RR</b>									
<b>NBI#0156-14-065</b>									
WEST BOUND	262		1980			1980	78	2280	3
EAST BOUND	225		1980			1980	78	2280	3
<b>PROJECT TOTALS</b>	<b>487</b>	<b>17000</b>	<b>23360</b>	<b>1620</b>	<b>17000</b>	<b>23360</b>	<b>156</b>	<b>42580</b> ①	<b>66</b>

CSJ: 0156-04-120, ETC. US 82, ETC.	SUMMARY OF EROSION CONTROL ITEMS					
	164 6035	164 6041	164 6043	168 6001	506 6040	506 6043
	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	VEGETATIVE WATERING	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
SY	SY	SY	MG	LF	LF	
<b>BU 277A over BNSF RR</b>						
<b>NBI#0156-14-065</b>						
STA 53+75.00 TO 51+50.00(WB APPR)	250	125	125	2	250	250
STA 48+50.00 TO 47+50.00 (WB DEP)	111	56	56	1	120	120
STA 48+50.00 TO 46+25.00 (EB APPR)	250	125	125	2	250	250
STA 52+50.00 TO 51+51.00 (EB DEP)	111	56	56	1	120	120
<b>PROJECT TOTALS</b>	<b>722</b>	<b>362</b>	<b>362</b>	<b>6</b>	<b>740</b>	<b>740</b>

NOTES:

- ① INCLUDES ELIMINATION OF ANY NECESSARY EXISTING PAVEMENT MARKINGS AT EACH LOCATION PRIOR TO PLACEMENT OF WORK ZONE PAVEMENT MARKINGS.

**US 82, ETC.**  
**QUANTITY SUMMARY**



SHEET 2 OF 2  
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		14

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

**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).

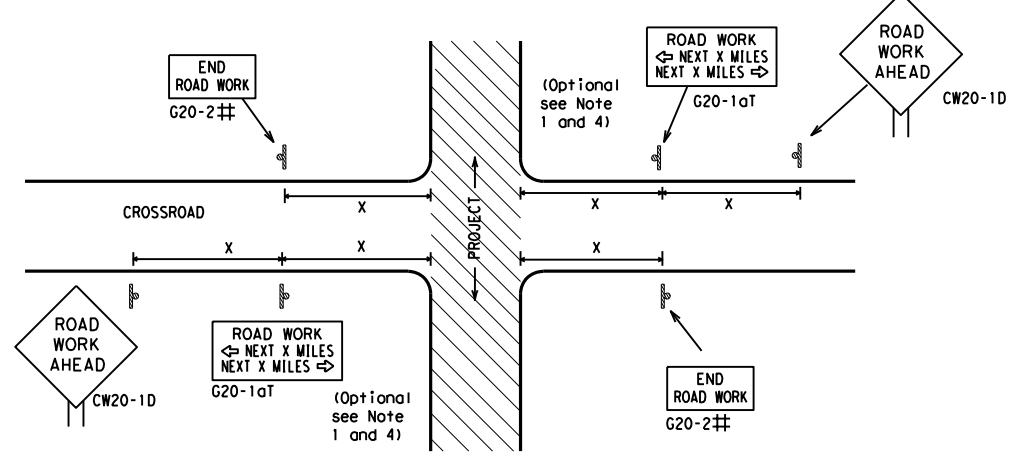
<b>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT</b> <a href="http://www.txdot.gov">http://www.txdot.gov</a>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS) "
STANDARD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

SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
<b>BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS</b>			
<b>BC (1) - 21</b>			
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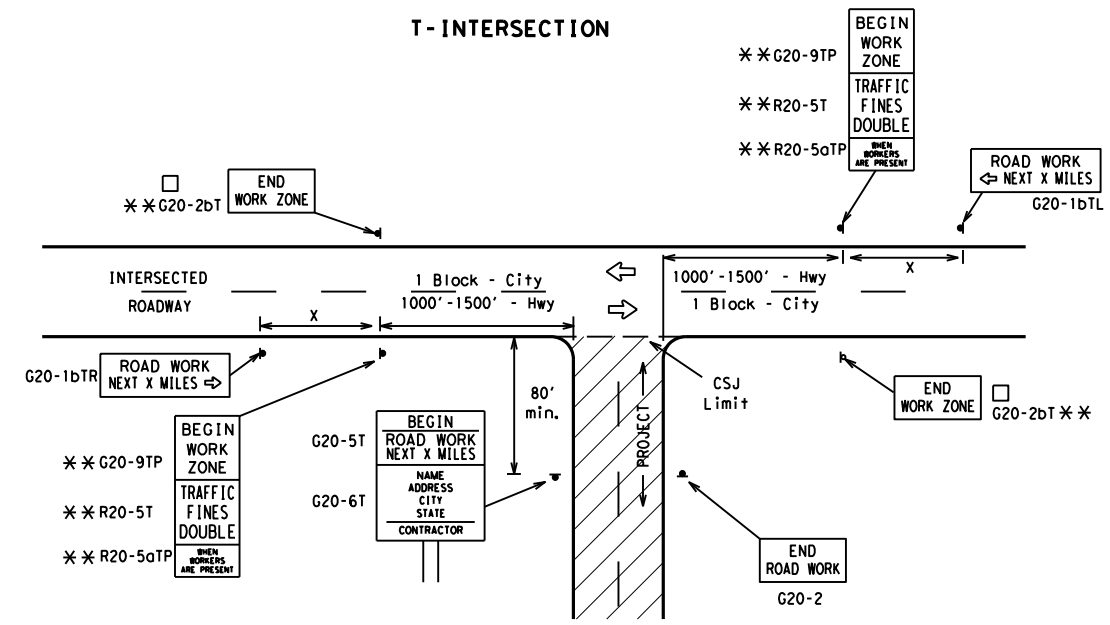
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**TYPICAL LOCATION OF CROSSROAD SIGNS**



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- 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.
  - 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.
  - 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.
  - 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.
  - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
  - 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**

- 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.
- 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<sup>1,5,6</sup>**

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 <sup>4</sup>	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 <sup>2</sup>
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
*			*	* <sup>3</sup>

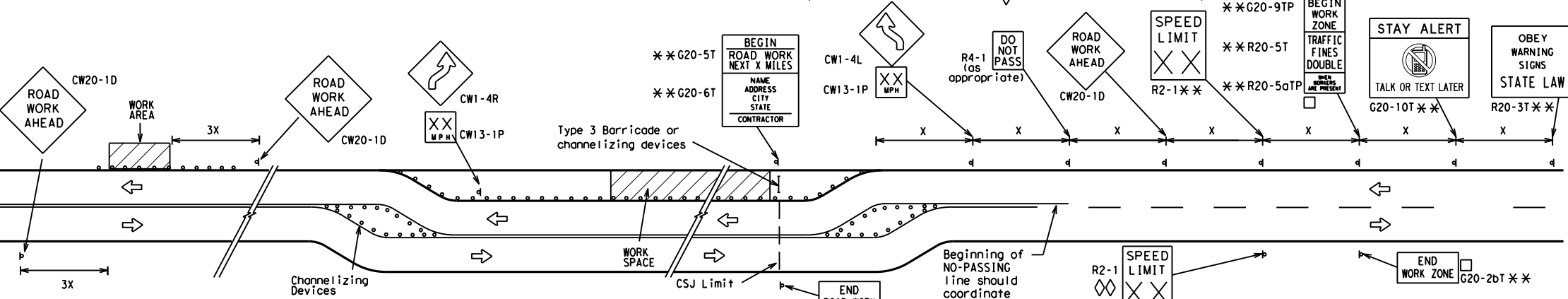
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

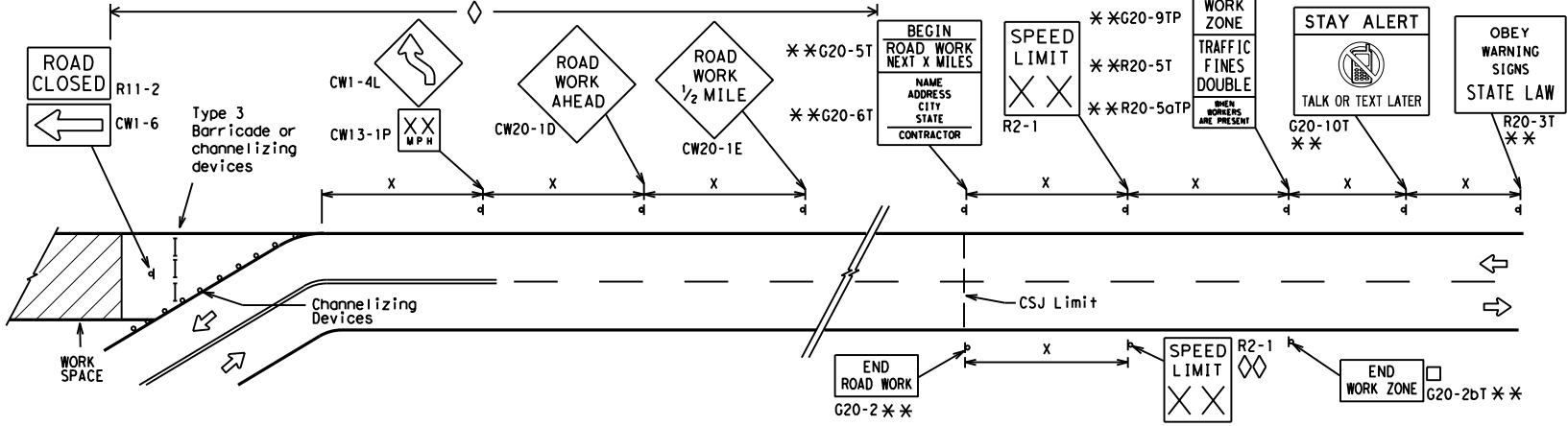
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

**WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS**

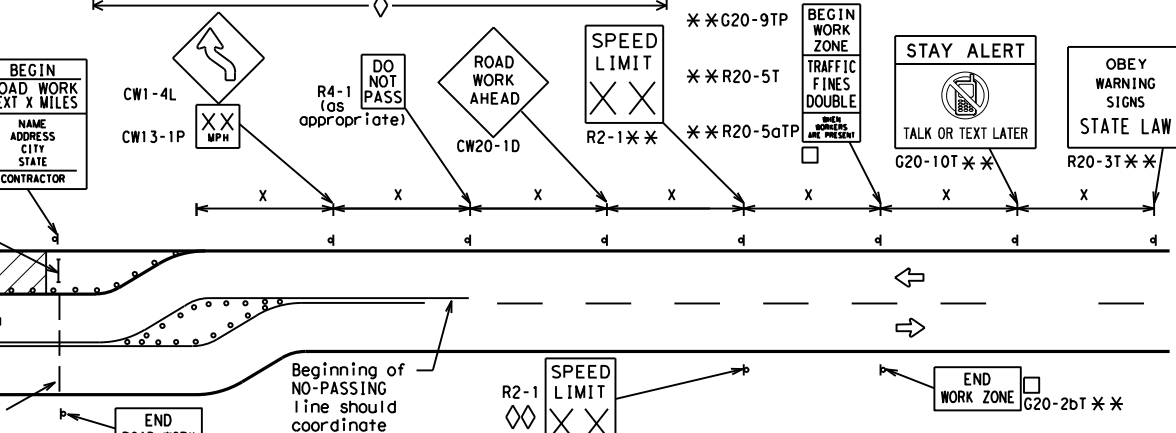


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



**SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS**



**NOTES**

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
  - CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
  - Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
  - Contractor will install a regulatory speed limit sign at the end of the work zone.

**LEGEND**

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

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

**BC(2)-21**

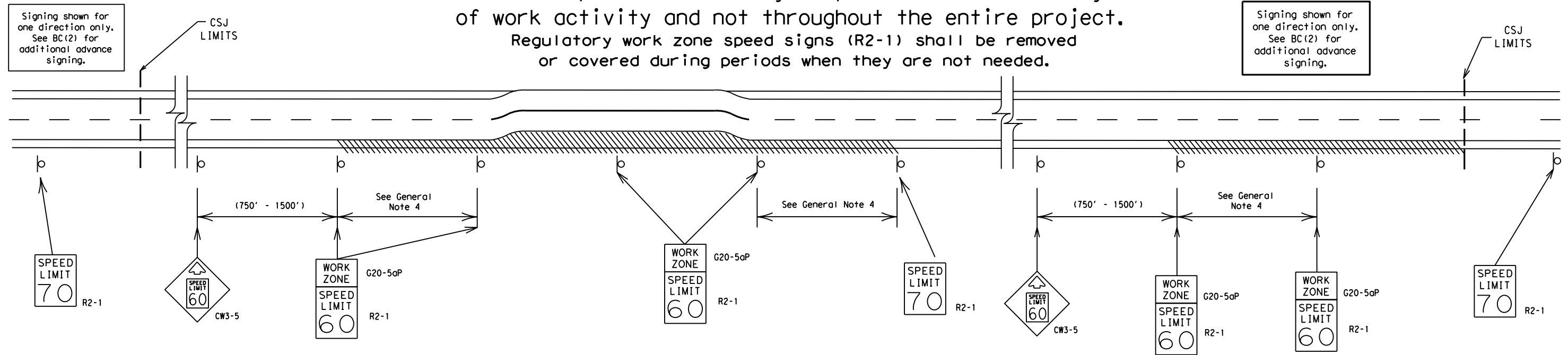
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7-13 5-21	WFS	WICHITA	16	



# 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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- 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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
  - Law enforcement.
  - Flagger stationed next to sign.
  - Portable changeable message sign (PCMS).
  - Low-power (drone) radar transmitter.
  - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

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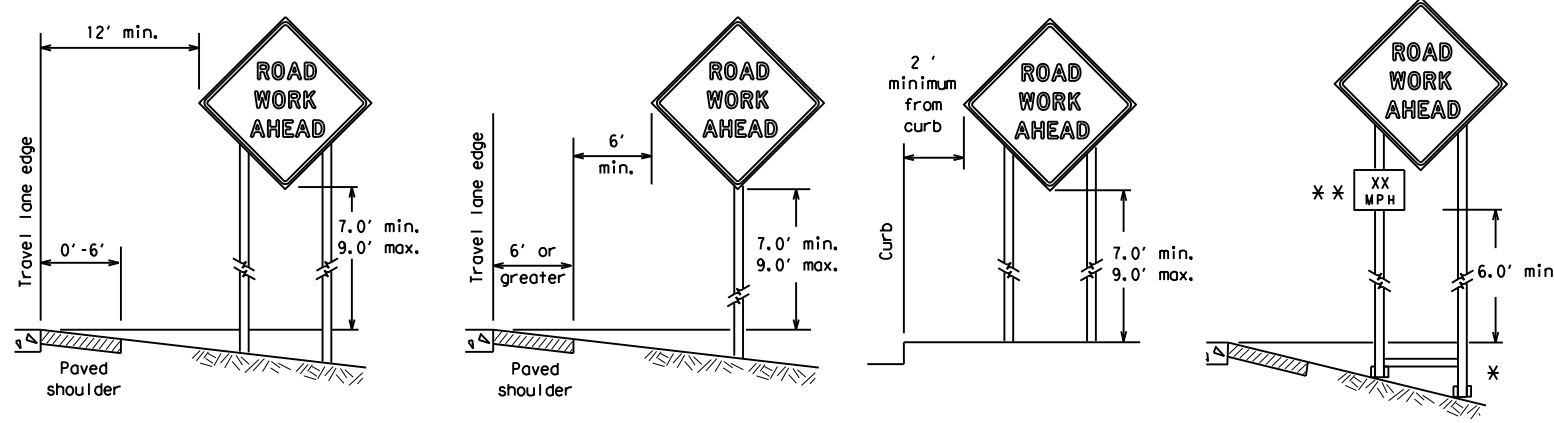
SHEET 3 OF 12

		Traffic Safety Division Standard	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
<h3>BC (3) - 21</h3>			
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7-13	5-21	SHEET NO.:	17

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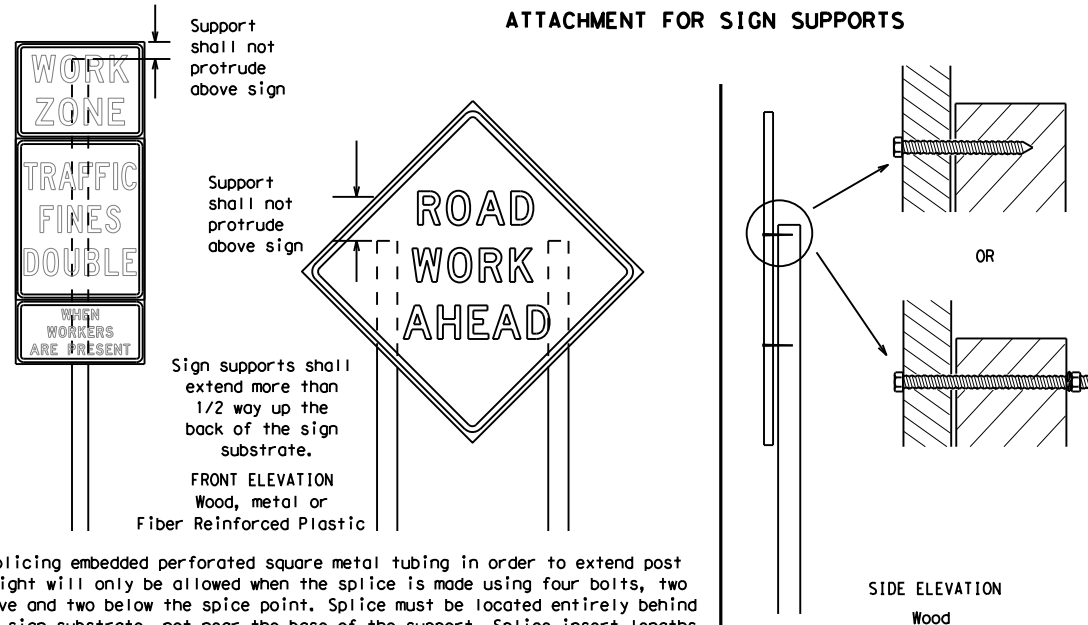
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



\* 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**



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 splice 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.

**GENERAL NOTES FOR WORK ZONE SIGNS**

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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)**

- 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.
  - Long-term stationary - work that occupies a location more than 3 days.
  - 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.
  - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
  - Short, duration - work that occupies a location up to 1 hour.
  - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

**SIGN MOUNTING HEIGHT**

- 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.
- 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.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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**

- 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**

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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**

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B<sub>FL</sub> or Type C<sub>FL</sub>, shall be used for rigid signs with orange backgrounds.

**SIGN LETTERS**

- 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**

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- 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.
- 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.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

**SIGN SUPPORT WEIGHTS**

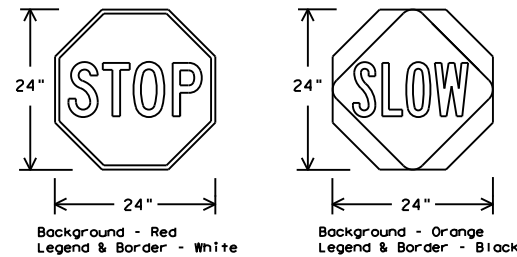
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

**FLAGS ON SIGNS**

- 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.

**STOP/SLOW PADDLES**

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B <sub>FL</sub> OR C <sub>FL</sub> 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**

- 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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

SHEET 4 OF 12

Texas Department of Transportation  
 Traffic Safety Division Standard

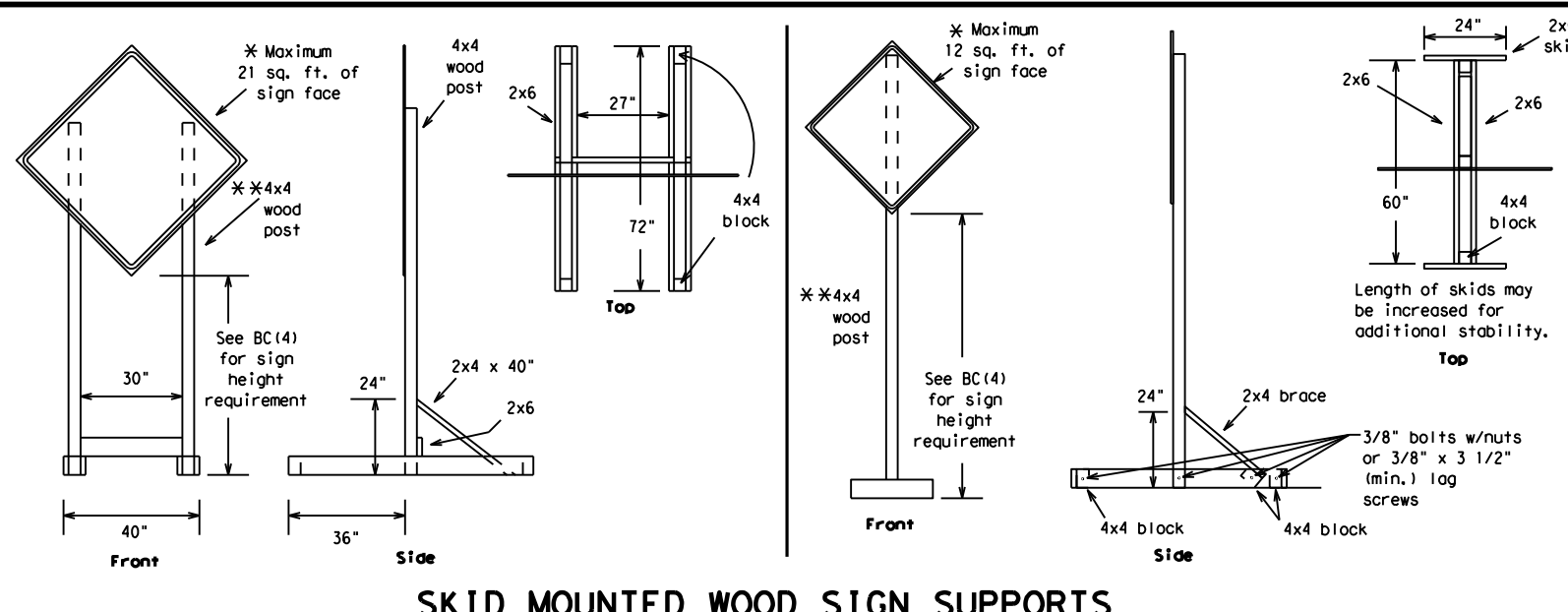
**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

**BC (4) - 21**

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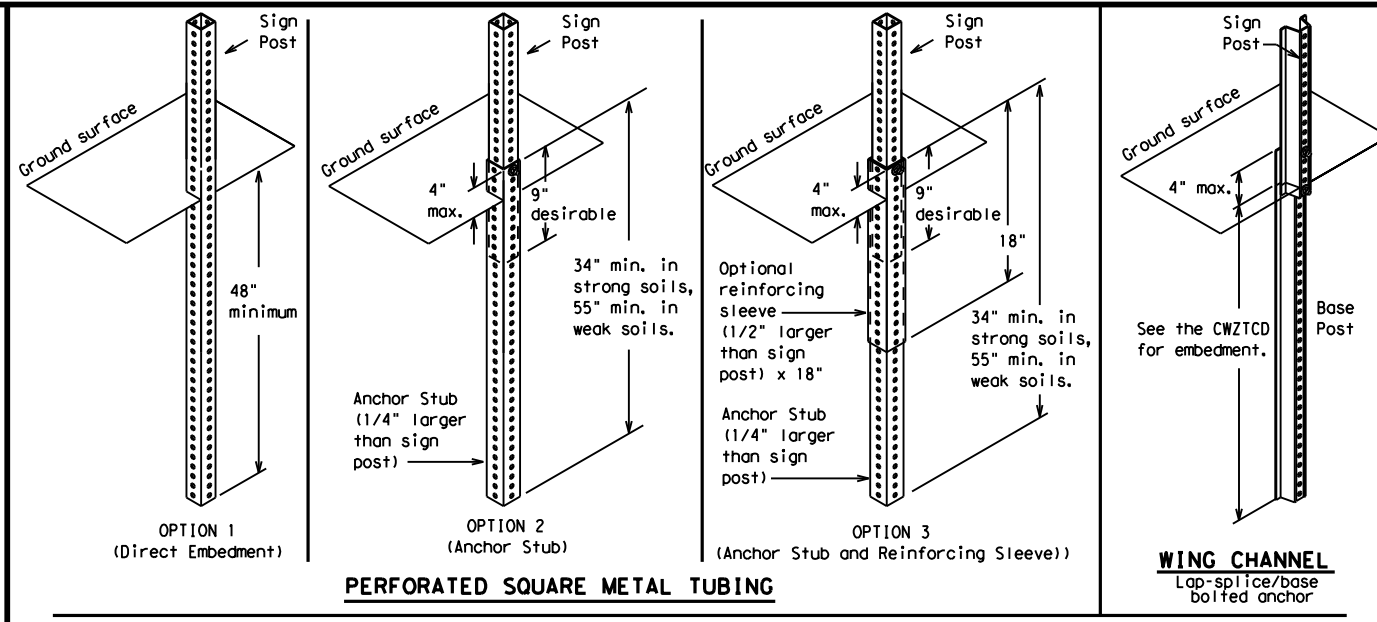
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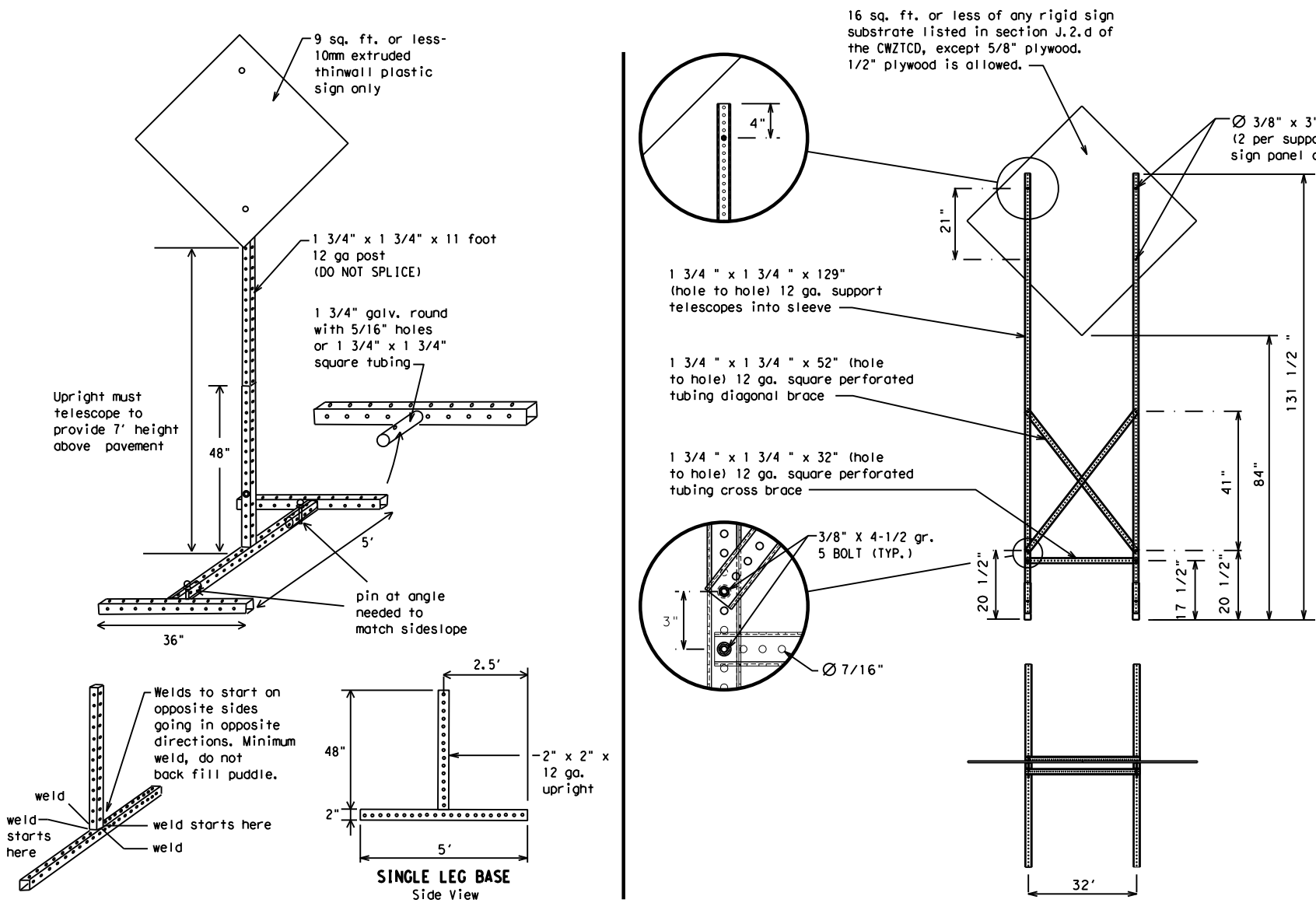
**SKID MOUNTED WOOD SIGN SUPPORTS**

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



**GROUND MOUNTED SIGN SUPPORTS**

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



**SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS**

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

**WEDGE ANCHORS**

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

**OTHER DESIGNS**

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

**GENERAL NOTES**

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

- \* See BC(4) for definition of "Work Duration."
- \*\* Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- ☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



**BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT**

**BC(5) - 21**

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9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	WFS	WICHITA	19					

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

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

### Other Condition List

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

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

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

### Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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



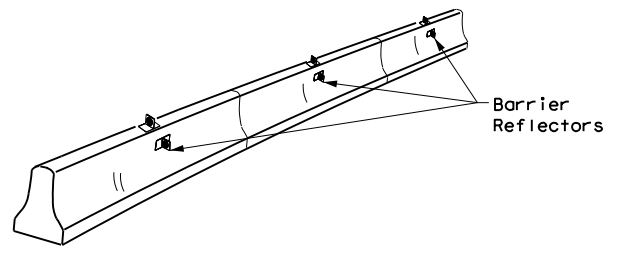
## BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC.	US 82, ETC.
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	WFS	WICHITA	20	

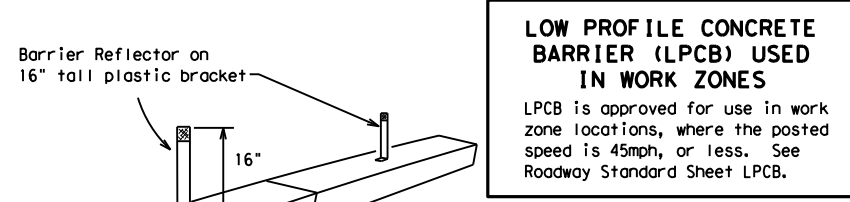
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



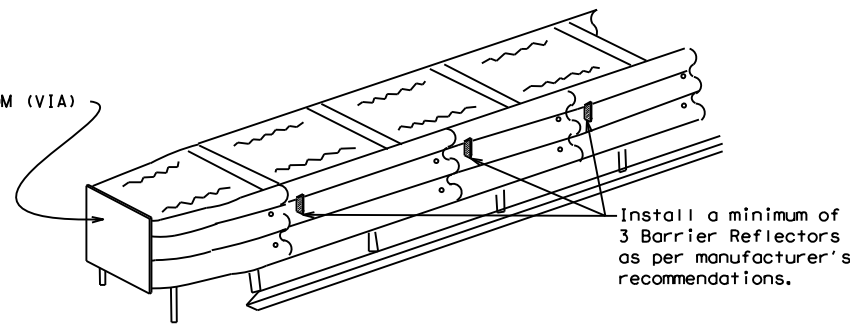
**CONCRETE TRAFFIC BARRIER (CTB)**

- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**  
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

**LOW PROFILE CONCRETE BARRIER (LPCB)**



**DELINEATION OF END TREATMENTS**

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**  
 End treatments used on CTB's in work zones shall meet the appropriate 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**

**WARNING LIGHTS**

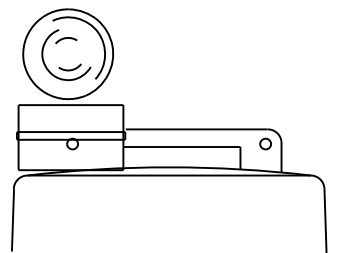
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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<sub>FL</sub> or C<sub>FL</sub> Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

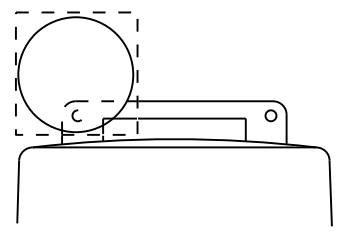
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- 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**

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



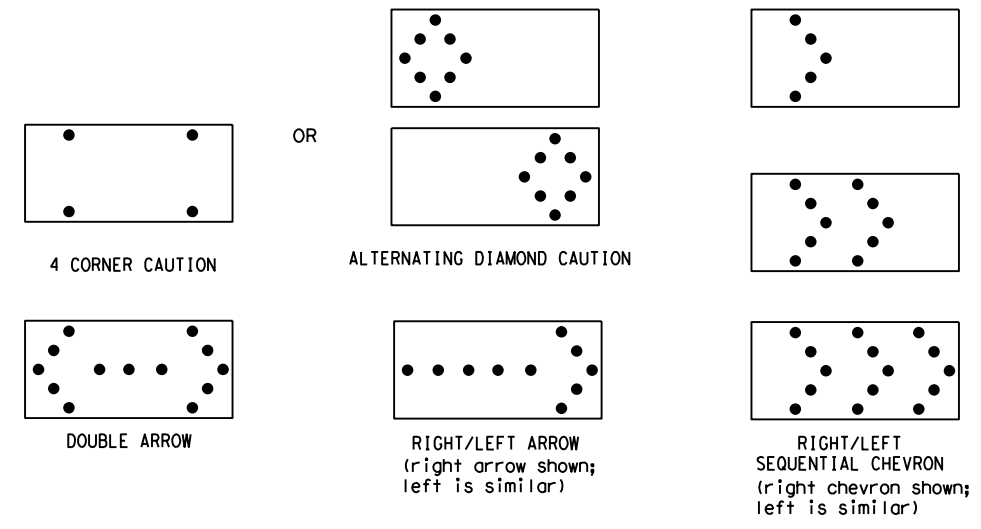
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- 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**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- 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.



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

**BC (7) -21**

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0156	04	120, ETC.		US 82, ETC.			
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**GENERAL NOTES**

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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**

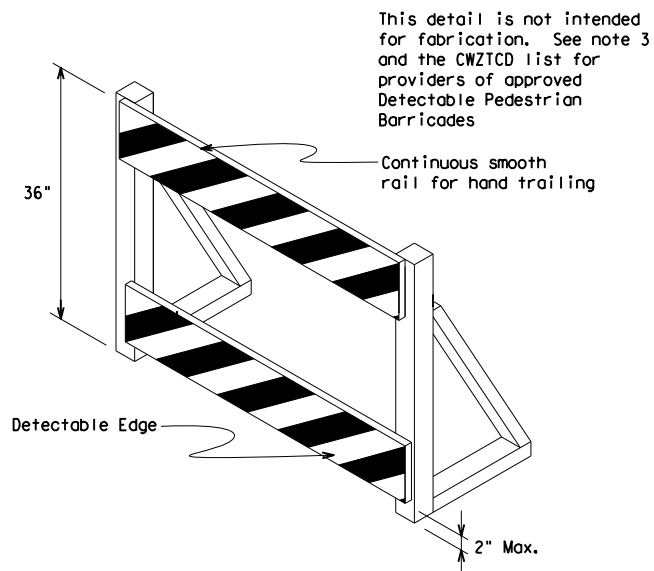
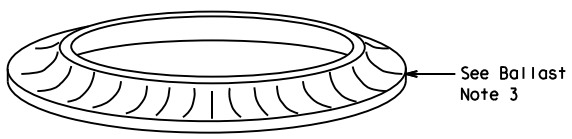
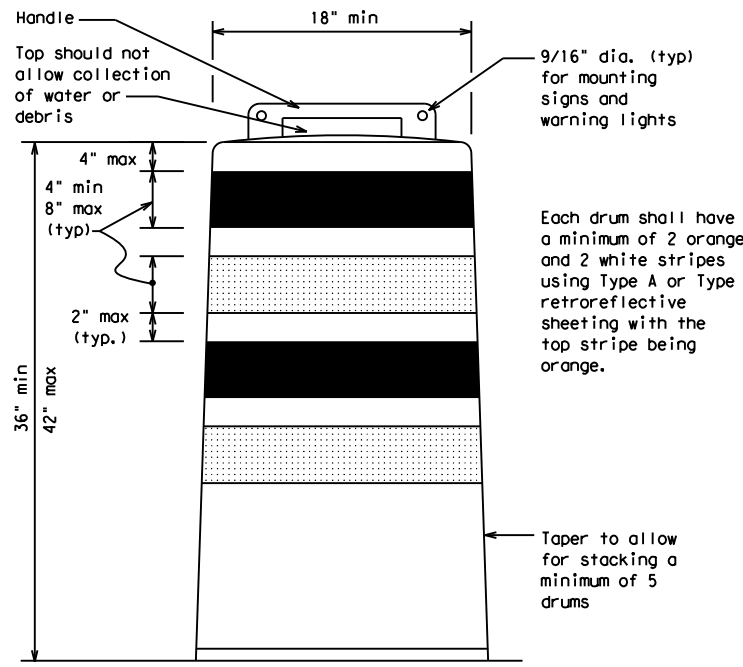
- Pre-qualified plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
  - The body and base shall lock together in such a manner that the body separates from the base when impacted 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.
  - 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.
  - 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.
  - 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.
  - 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.
  - 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.
  - Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
  - Drum body shall have a maximum unballasted weight of 11 lbs.
  - Drum and base shall be marked with manufacturer's name and model number.

**RETROREFLECTIVE SHEETING**

- 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.
- 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.

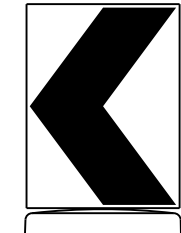
**BALLAST**

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

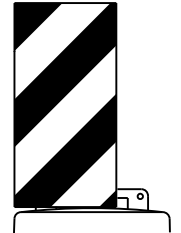


**DETECTABLE PEDESTRIAN BARRICADES**

- 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.
- 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.
- 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.
- 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.
- Warning lights shall not be attached to detectable pedestrian barricades.
- 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**

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B<sub>FL</sub> or Type C<sub>FL</sub> Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- 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.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12



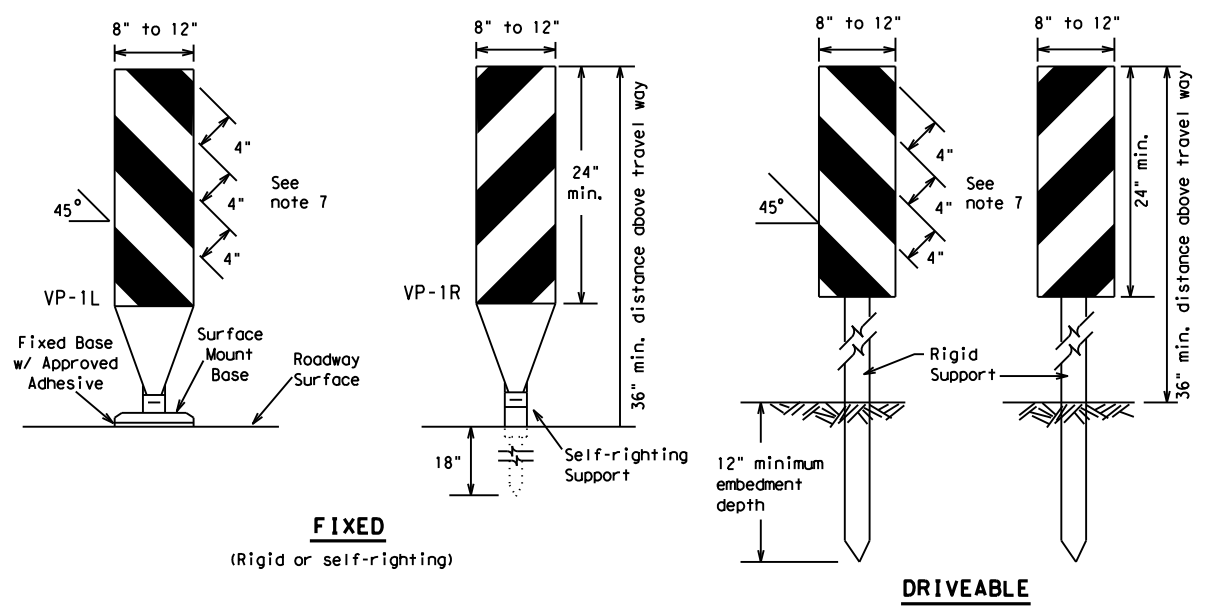
**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 21**

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REVISIONS		0156 04		120, ETC. US 82, ETC.					
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9-07	5-21	WFS	WICHITA	22					
7-13									

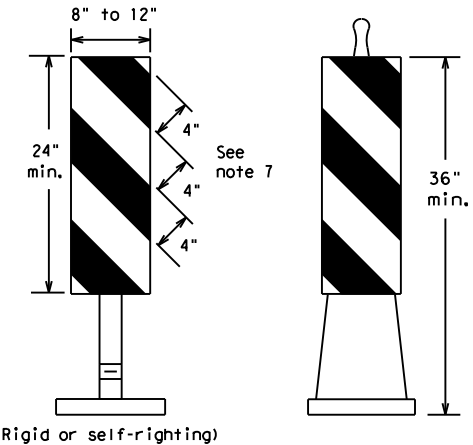
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**FIXED**  
(Rigid or self-righting)

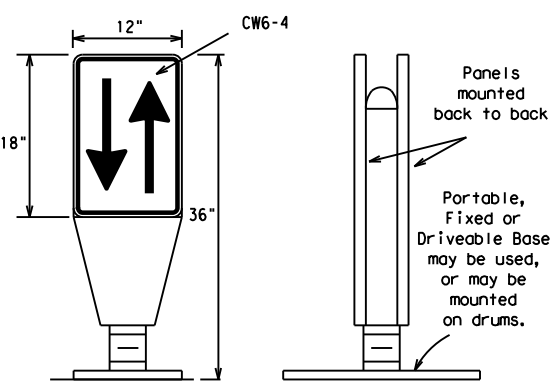
**DRIVEABLE**



**PORTABLE**

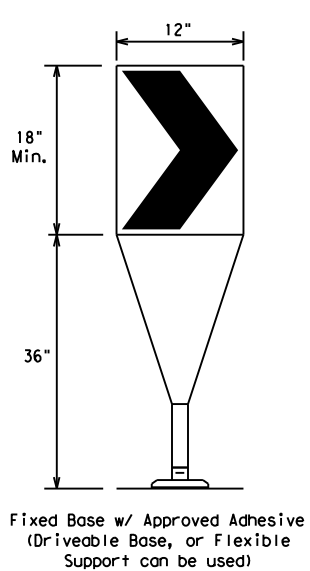
**VERTICAL PANELS (VPs)**

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 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.
- 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.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

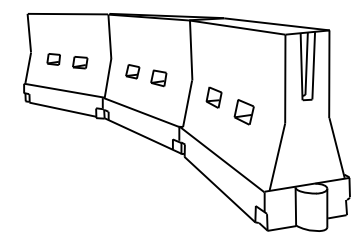
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base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



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

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B<sub>FL</sub> or Type C<sub>FL</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- 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**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- 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**

- 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.
- 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.
- 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.
- 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.
- 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**

**GENERAL NOTES**

- 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).
- 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.
- 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).
- 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.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- 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.

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

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

**SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS**

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (9) - 21**

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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	WFS	WICHITA	23	

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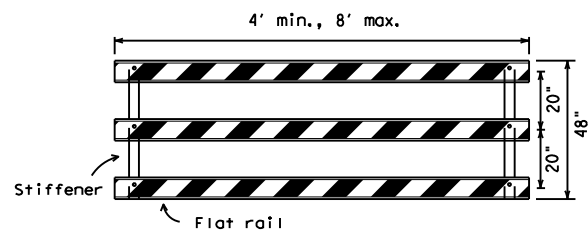
**TYPE 3 BARRICADES**

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.

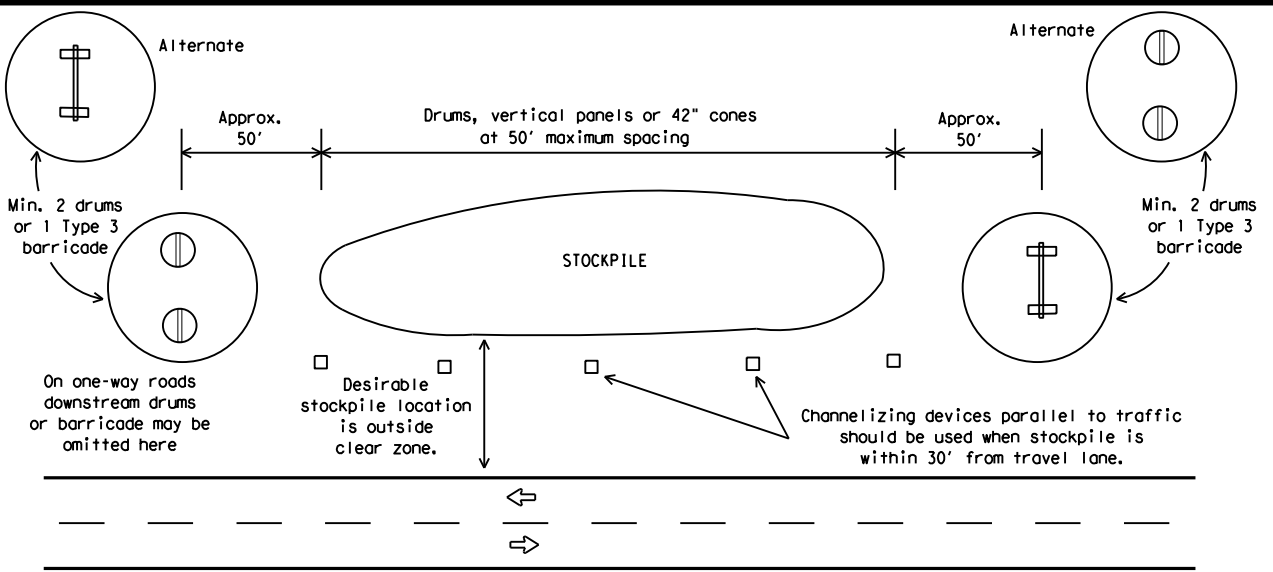


**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



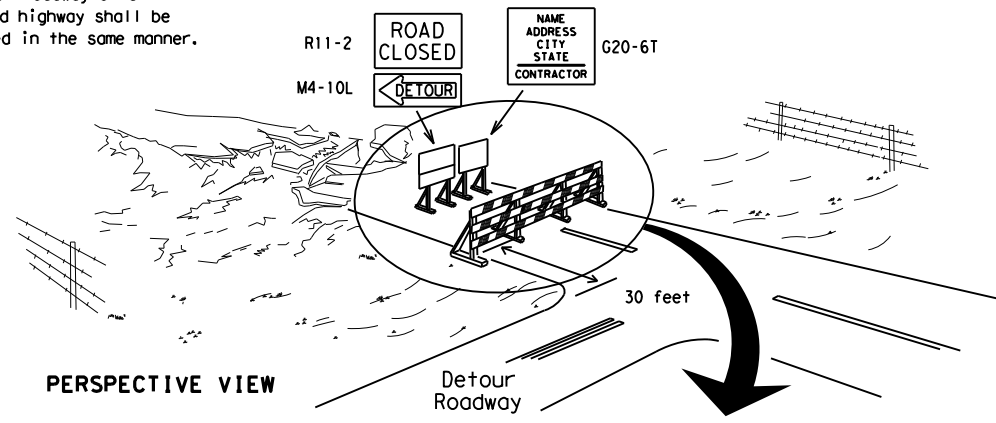
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**



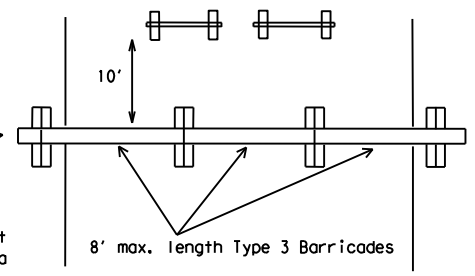
**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

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



**PERSPECTIVE VIEW**

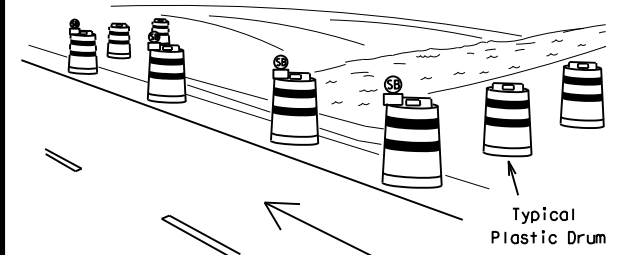
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



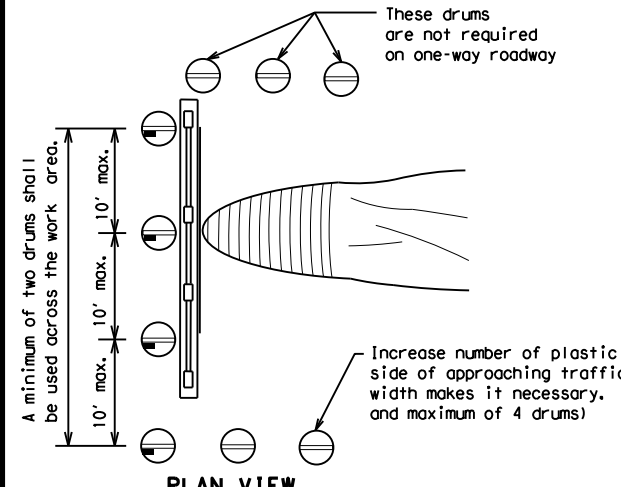
**PLAN VIEW**

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**



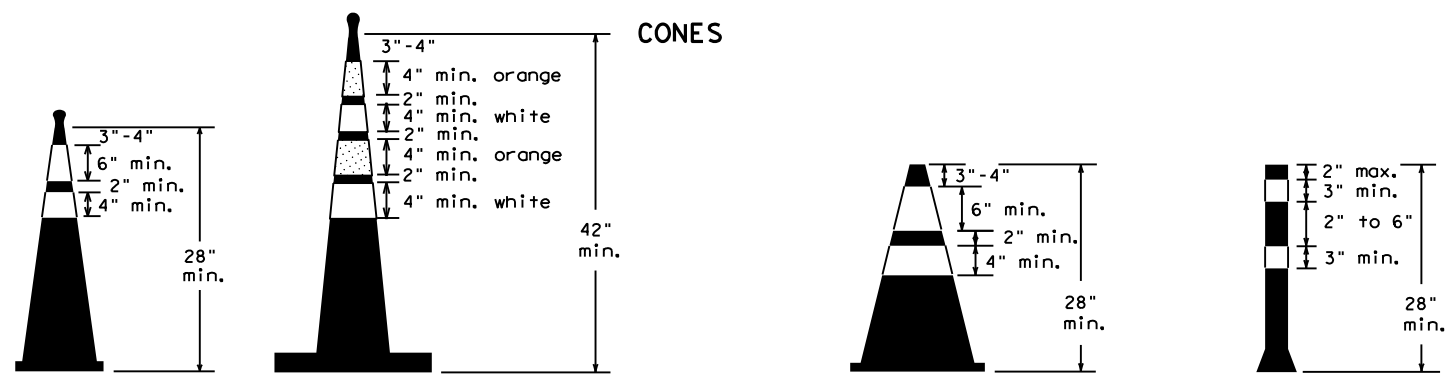
**PLAN VIEW**

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

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

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	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.



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) - 21**

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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	WFS	WICHITA	24	



## WORK ZONE PAVEMENT MARKINGS

### GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

### RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

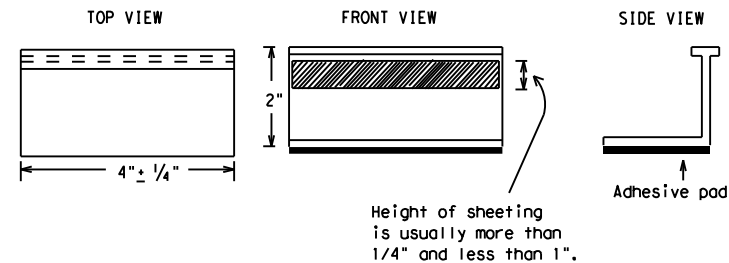
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
  - 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.
  - 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.
- Small design variances may be noted between tab manufacturers.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

**BC(11)-21**

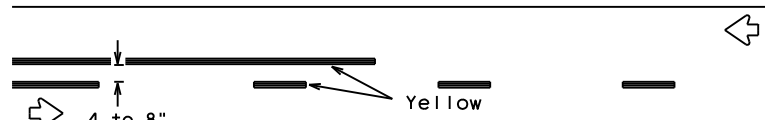
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1-02	7-13			
11-02	8-14			
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	WFS	WICHITA	<b>25</b>	

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## PAVEMENT MARKING PATTERNS

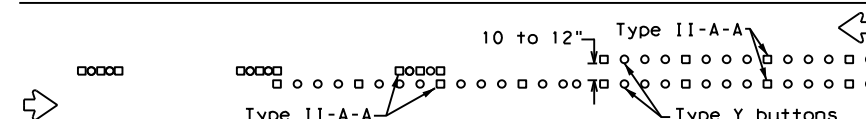


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

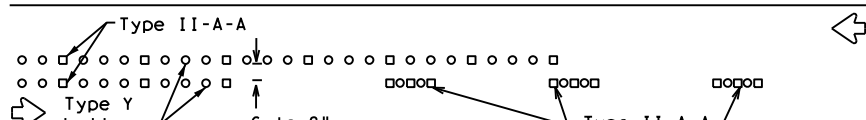


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.



RAISED PAVEMENT MARKERS - PATTERN A



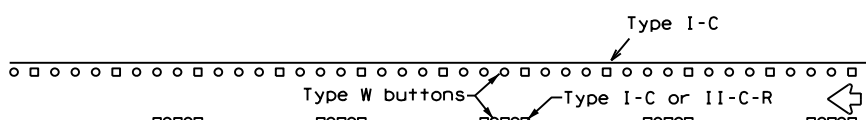
RAISED PAVEMENT MARKERS - PATTERN B

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



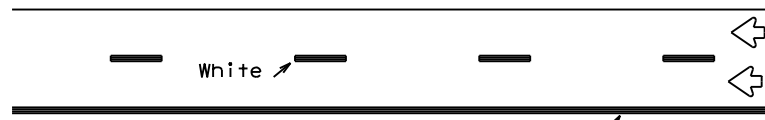
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



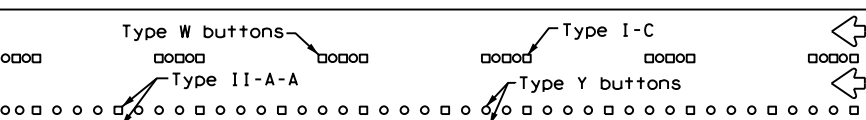
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



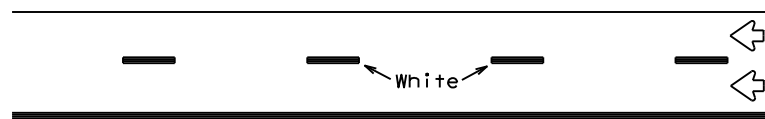
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



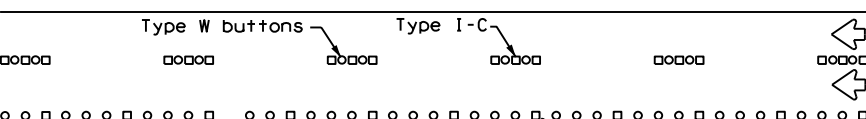
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

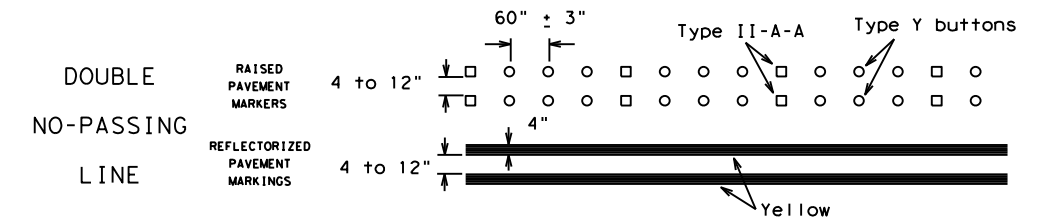
Prefabricated markings may be substituted for reflectORIZED pavement markings.



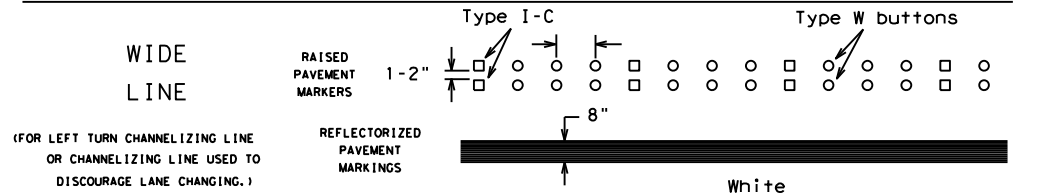
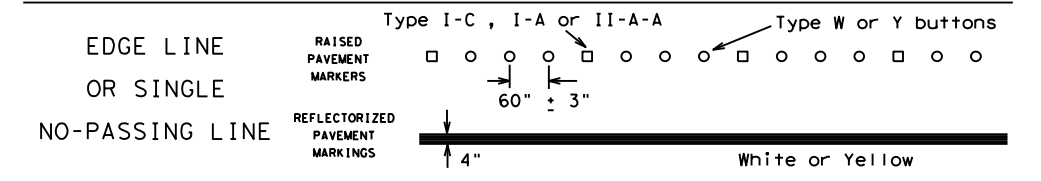
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

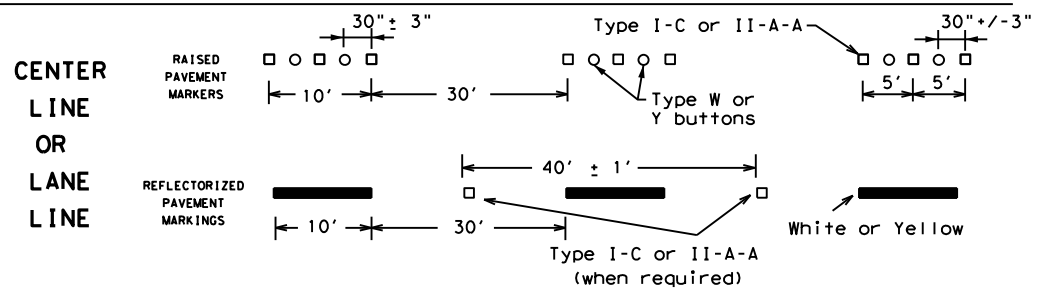
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



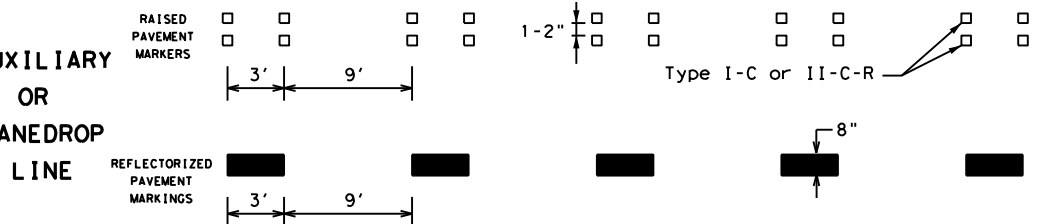
### SOLID LINES



### BROKEN LINES

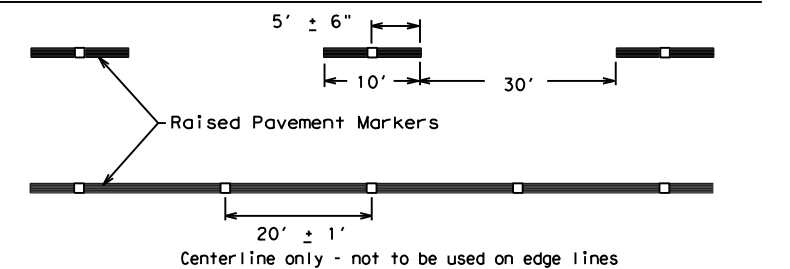


### AUXILIARY OR LANEDROP LINE



### 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.



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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."

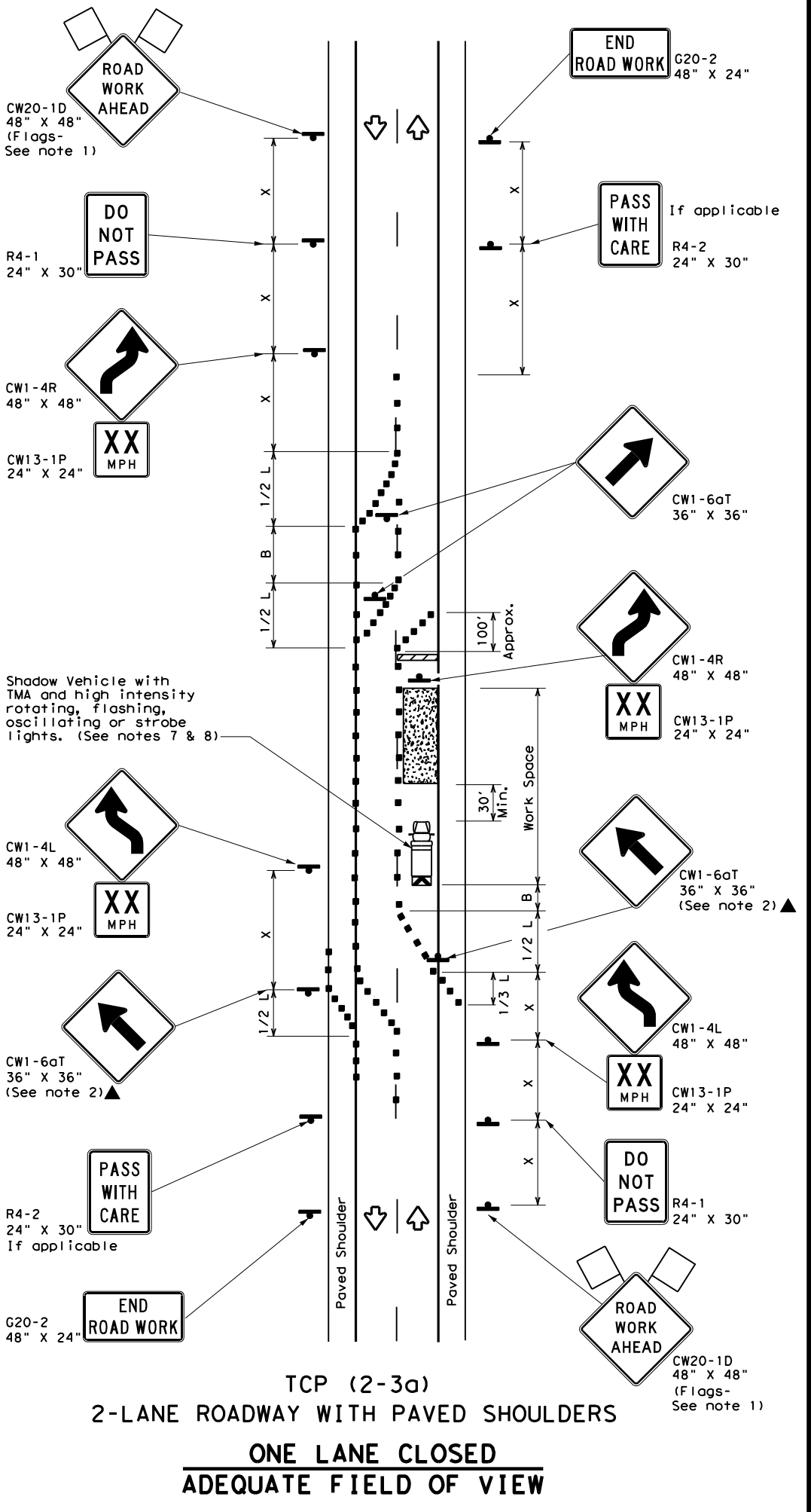
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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC.	US 82, ETC.
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	WFS	WICHITA	26	
11-02 8-14				

DATE: 11/30/2023 3:55:27 PM  
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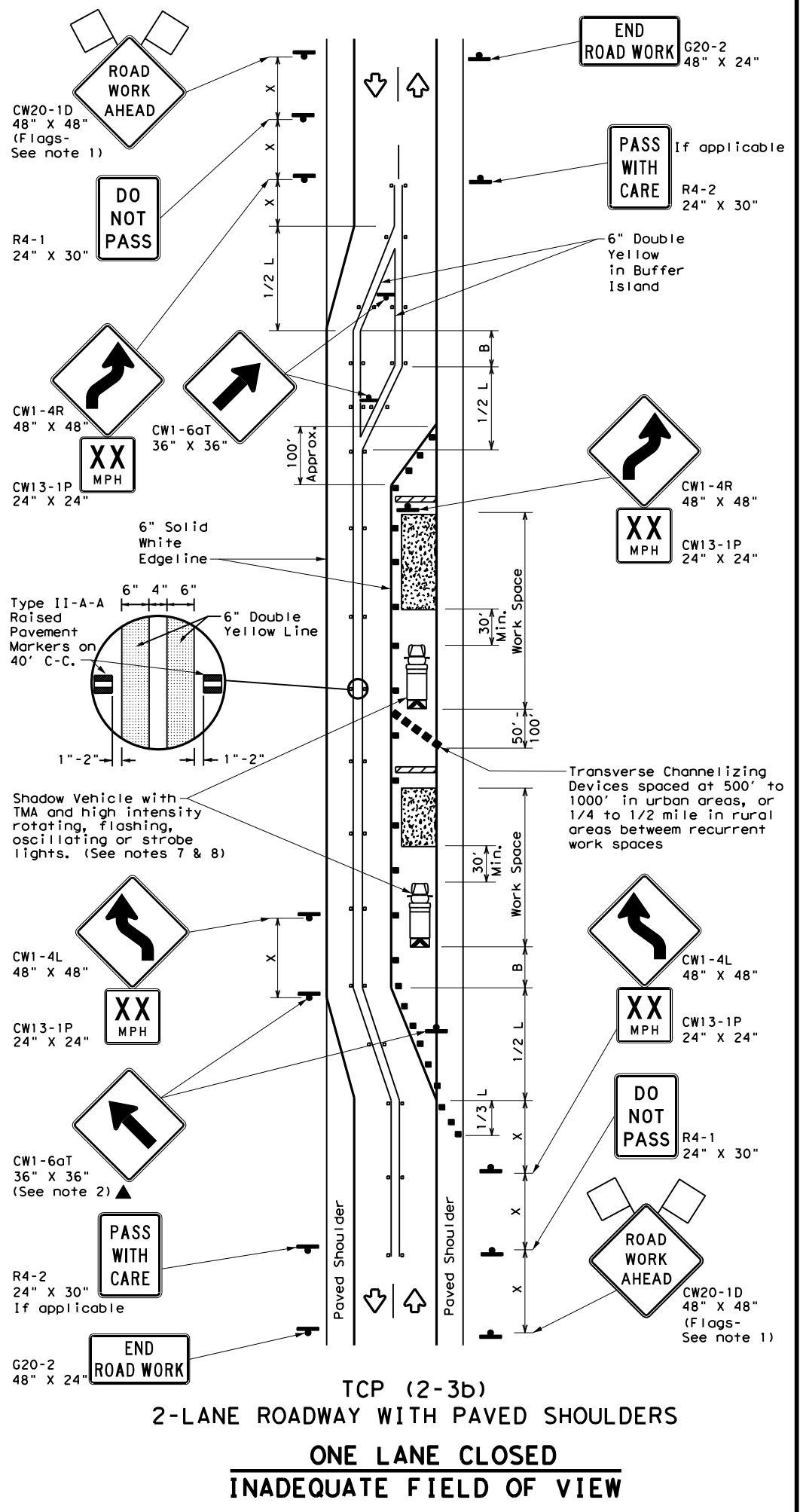


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DATE: 11/30/2023 3:55:35 PM  
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**TCP (2-3a)**  
 2-LANE ROADWAY WITH PAVED SHOULDERS  
 ONE LANE CLOSED  
 ADEQUATE FIELD OF VIEW



**TCP (2-3b)**  
 2-LANE ROADWAY WITH PAVED SHOULDERS  
 ONE LANE CLOSED  
 INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓
				TCP (2-3b) ONLY

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
  - 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.
  - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
  - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
  - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
  - Conflicting pavement marking shall be removed for long term projects.
  - 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.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

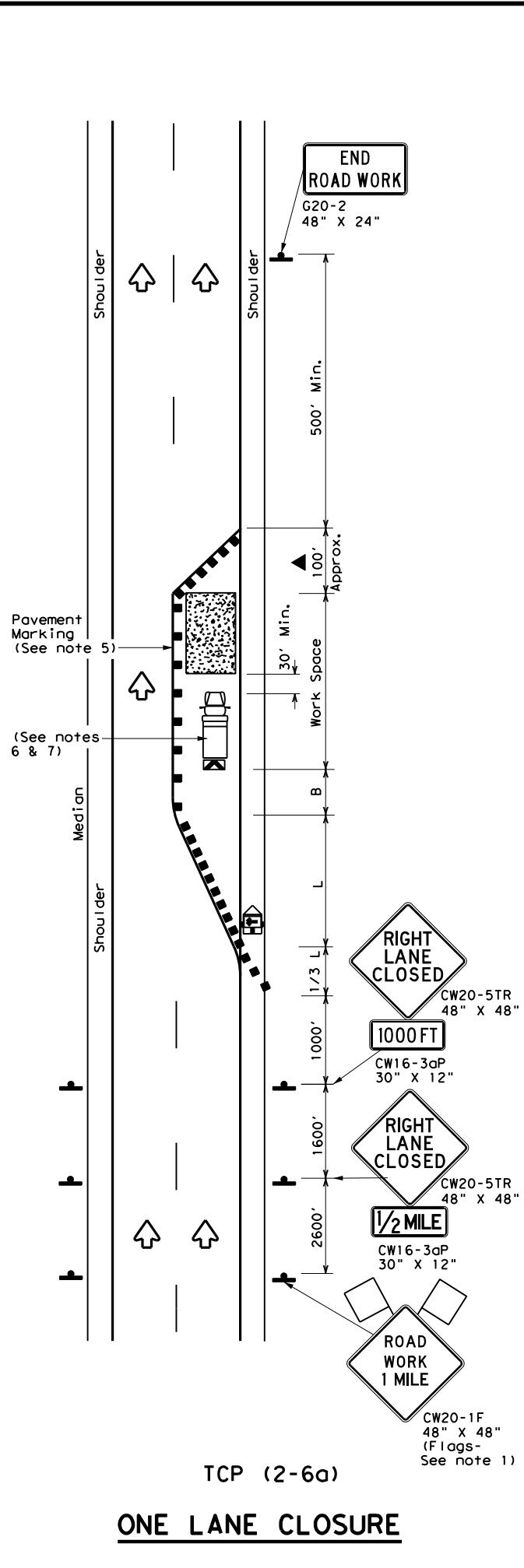
Texas Department of Transportation  
 Traffic Safety Division Standard

## TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

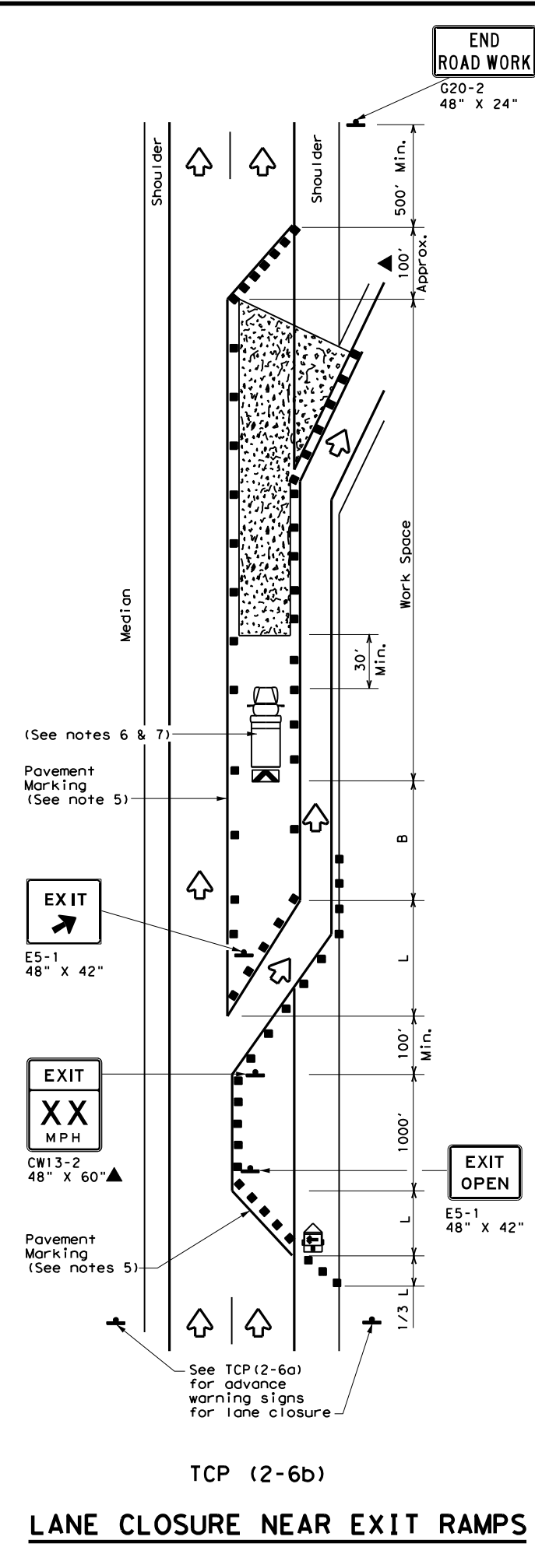
### TCP (2-3) - 23

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© TxDOT	April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS		0156	04	120, ETC.	US 82, ETC.
12-85	4-98	2-18			
8-95	3-03	4-23			
1-97	2-12				
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		WFS	WICHITA	28	

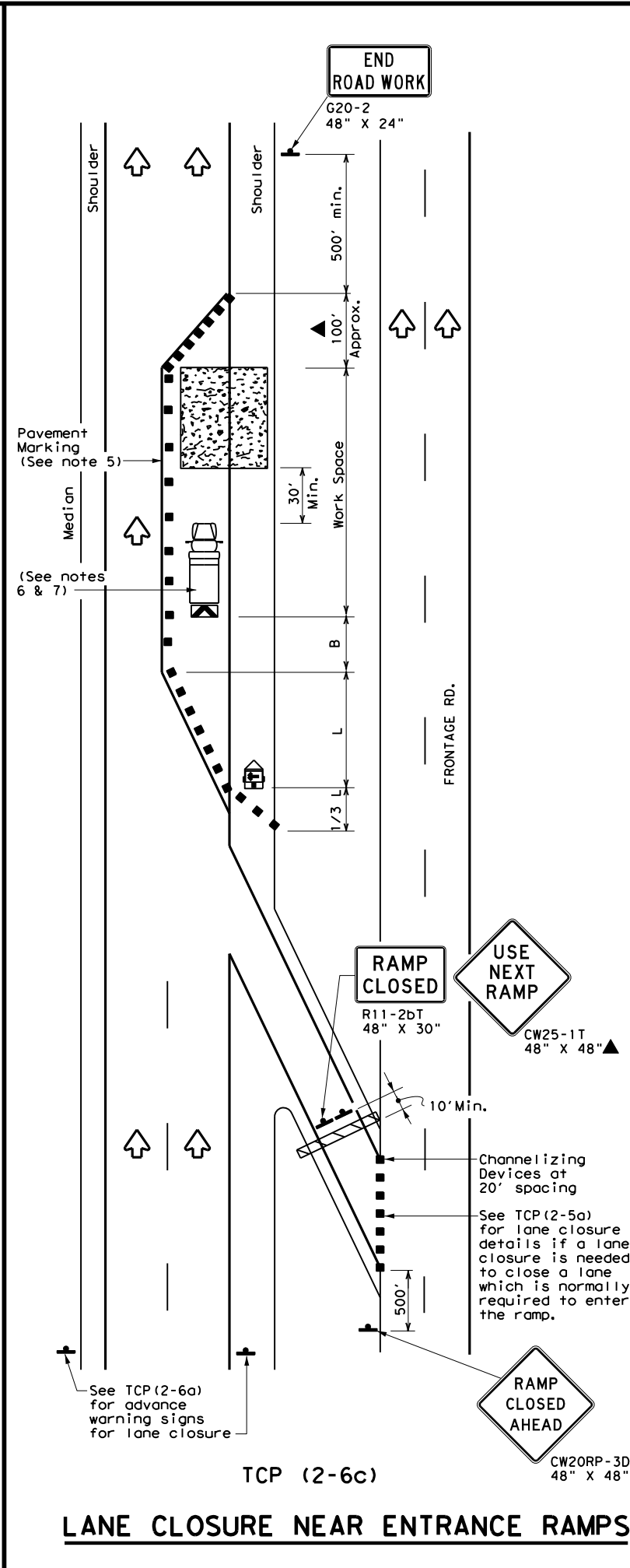
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TCP (2-6a)  
**ONE LANE CLOSURE**



TCP (2-6b)  
**LANE CLOSURE NEAR EXIT RAMP**



TCP (2-6c)  
**LANE CLOSURE NEAR ENTRANCE RAMP**

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

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

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

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

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

Texas Department of Transportation  
 Traffic Operations Division Standard

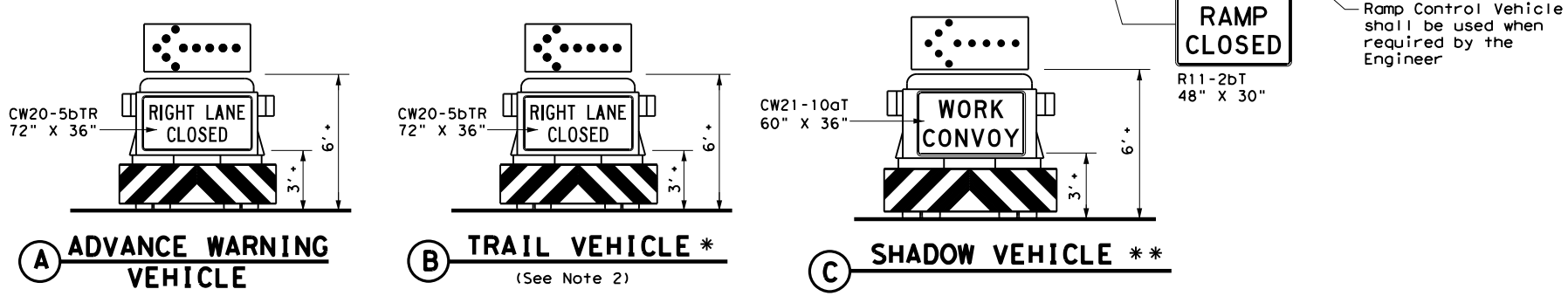
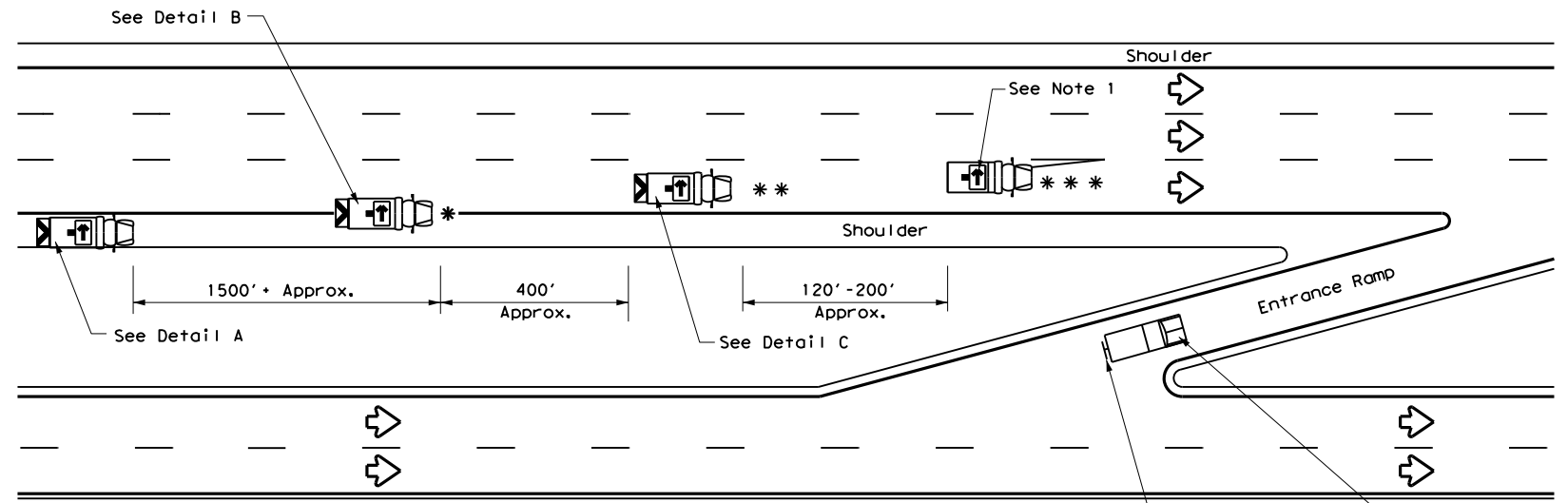
## TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

### TCP (2-6) - 18

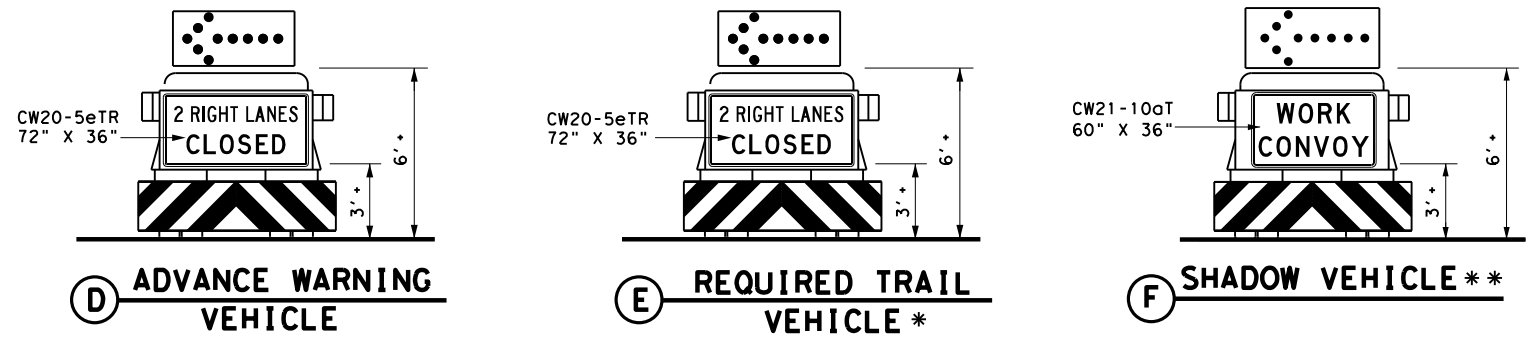
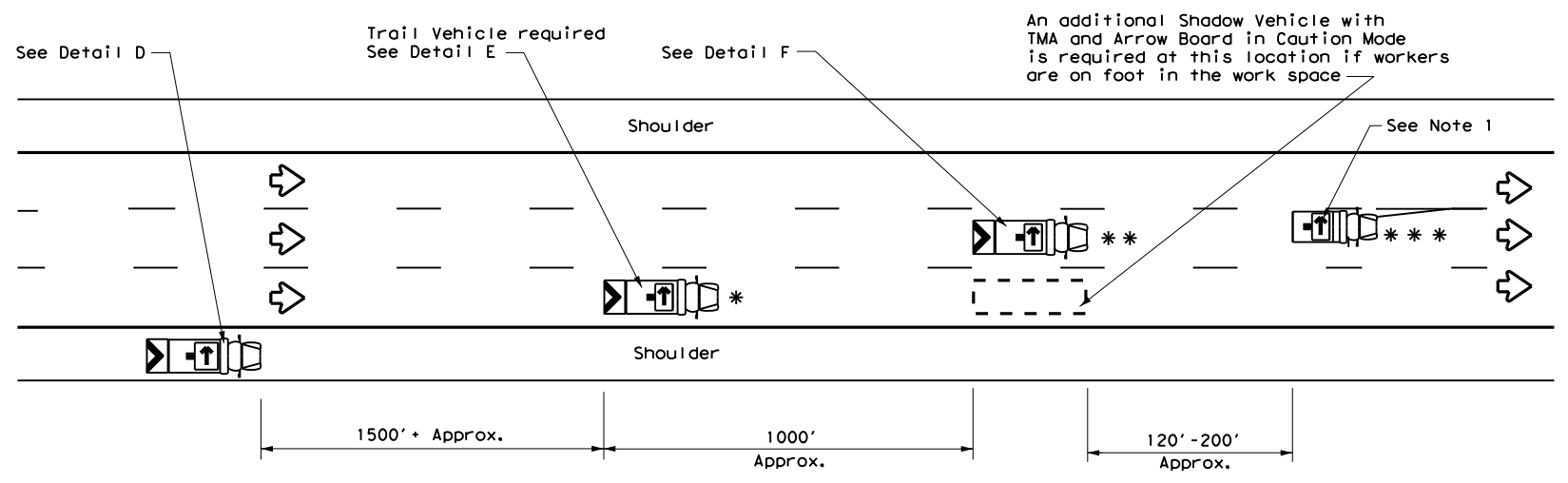
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC.	US 82, ETC.
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	WFS	WICHITA	29	
1-97 2-18				



DATE: 11/30/2023 3:55:46 PM  
 FILE: \\txdot.projectwiseonline.com:TXDOT12\Documents\03 - WFS\Design Projects\03-2023\03-2023-12-13\03-2023-12-13.dgn  
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**RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)**



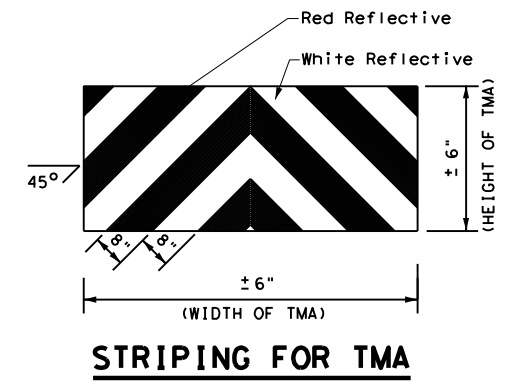
**INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)**

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
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**GENERAL NOTES**

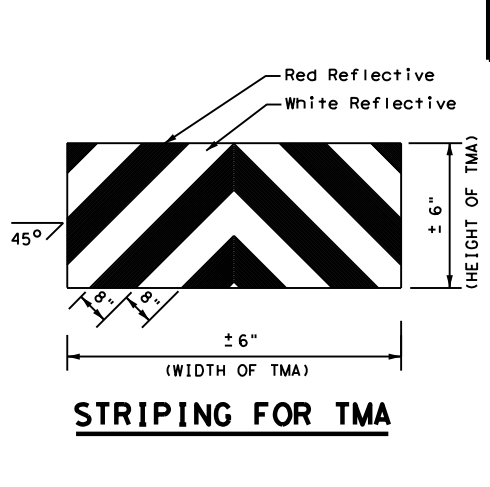
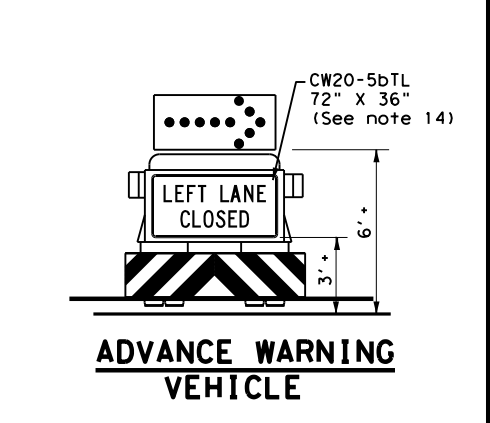
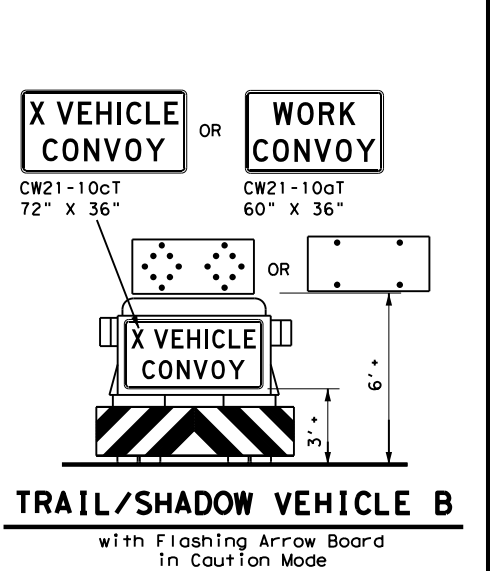
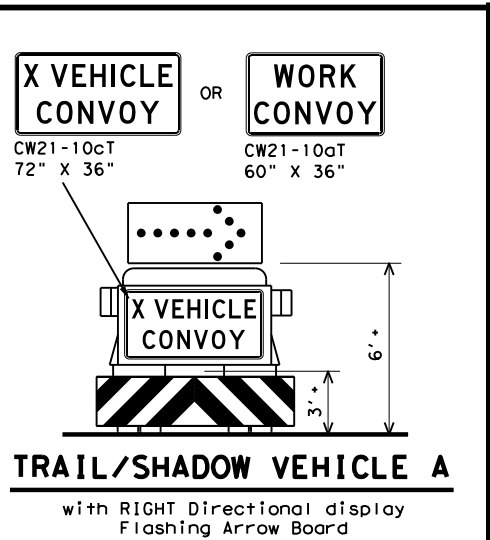
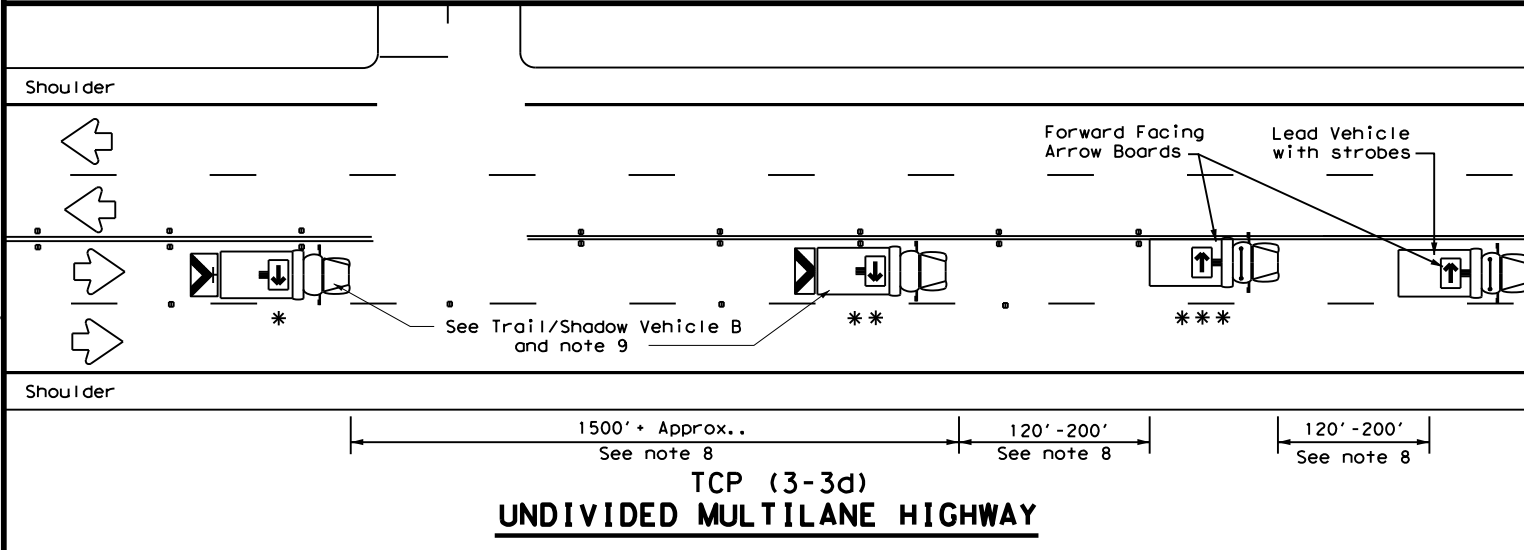
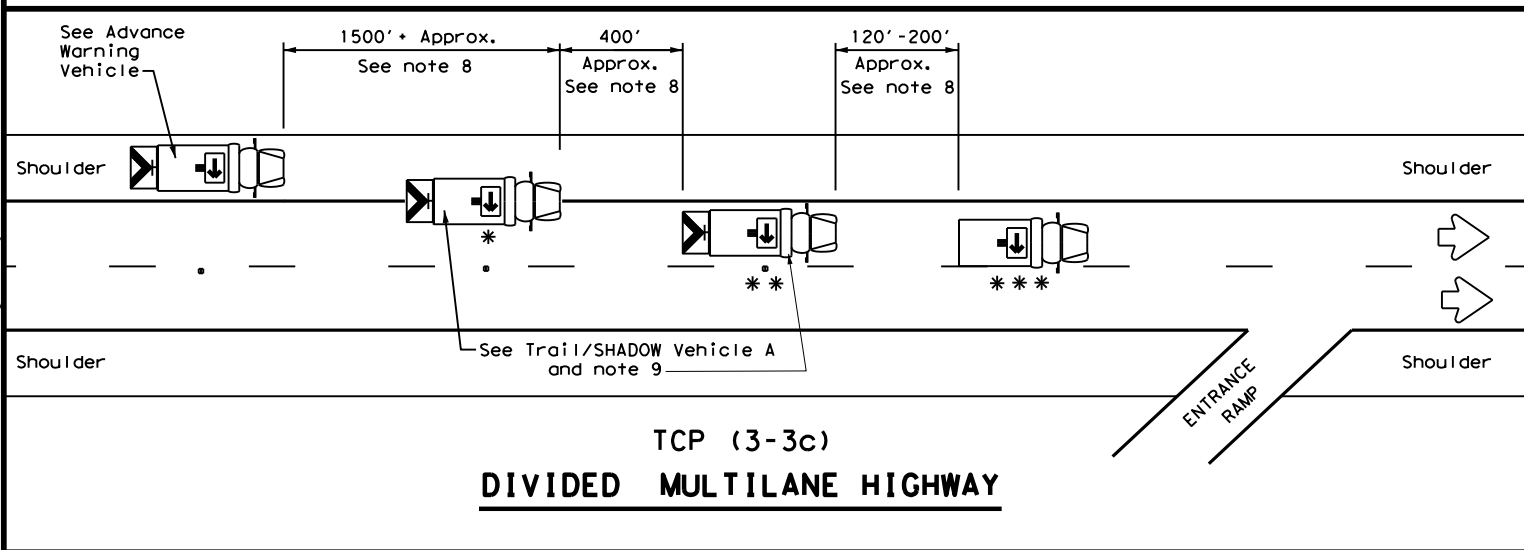
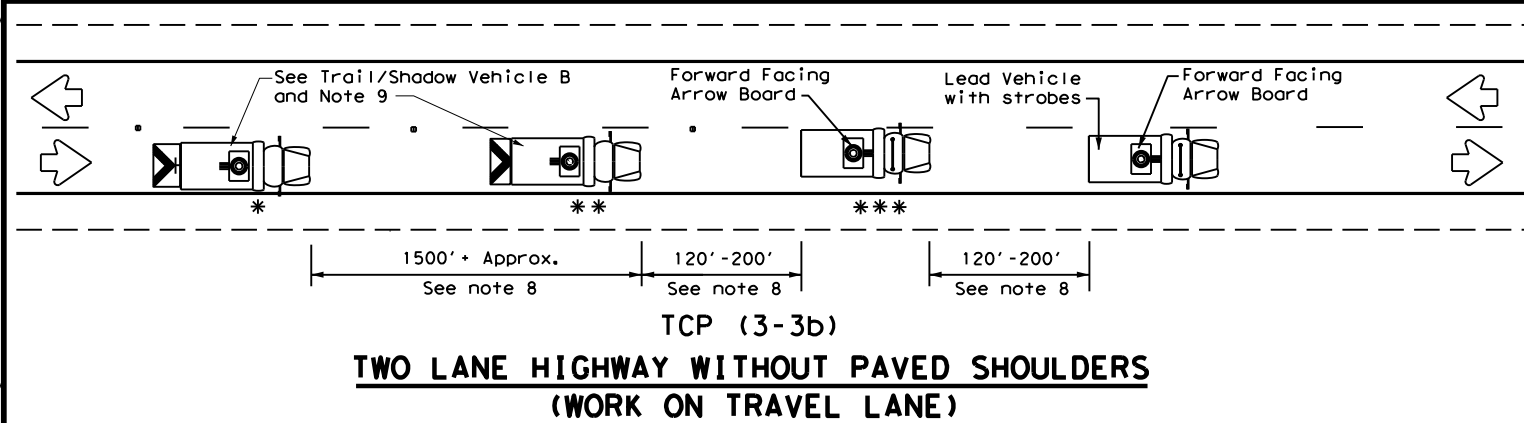
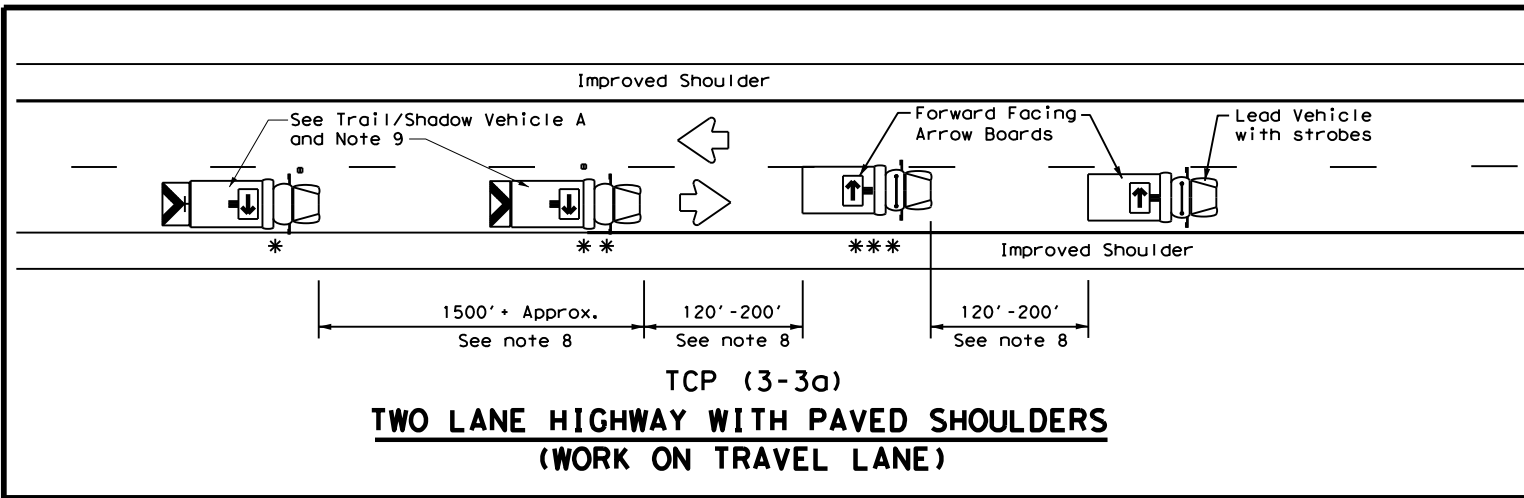
- ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the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



**STRIPING FOR TMA**

		<b>Traffic Operations Division Standard</b>	
<b>TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS</b>			
<b>TCP(3-2)-13</b>			
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT December 1985	CONT	SECT	JOB
REVISIONS	0156 04	120, ETC. US 82, ETC.	
2-94 4-98	DIST	COUNTY	SHEET NO.
8-95 7-13	WFS	WICHITA	31
1-97			

DATE: 11/30/2023 3:55:50 PM  
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LEGEND		
* Trail Vehicle		ARROW BOARD DISPLAY
** Shadow Vehicle		
*** Work Vehicle		RIGHT Directional
Heavy Work Vehicle		LEFT Directional
Truck Mounted Attenuator (TMA)		Double Arrow
Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

**GENERAL NOTES**

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

Texas Department of Transportation

Traffic Operations Division Standard

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

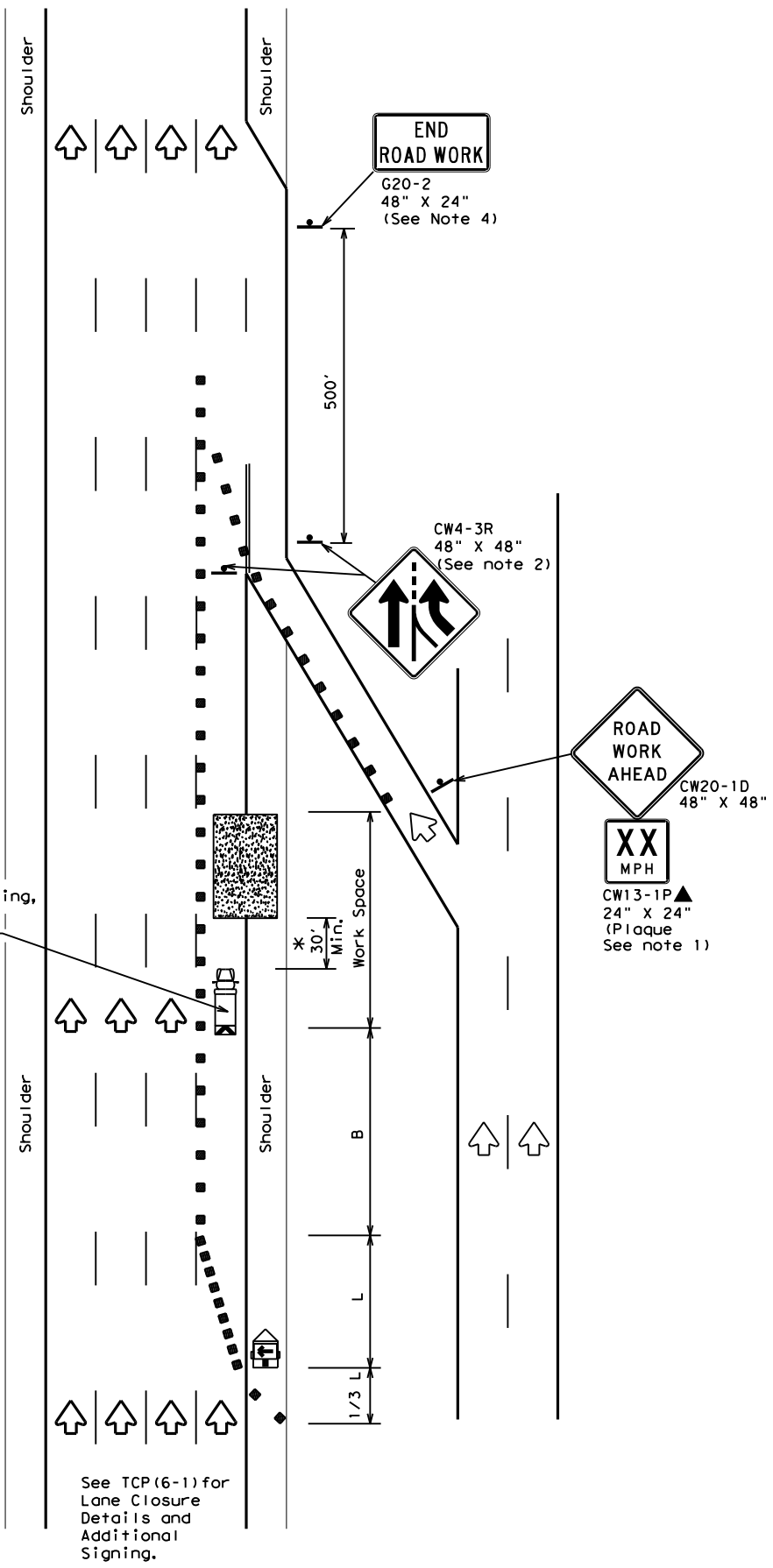
FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156 04	120, ETC. US 82, ETC.		
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	WFS	WICHITA	32	
1-97 7-14				



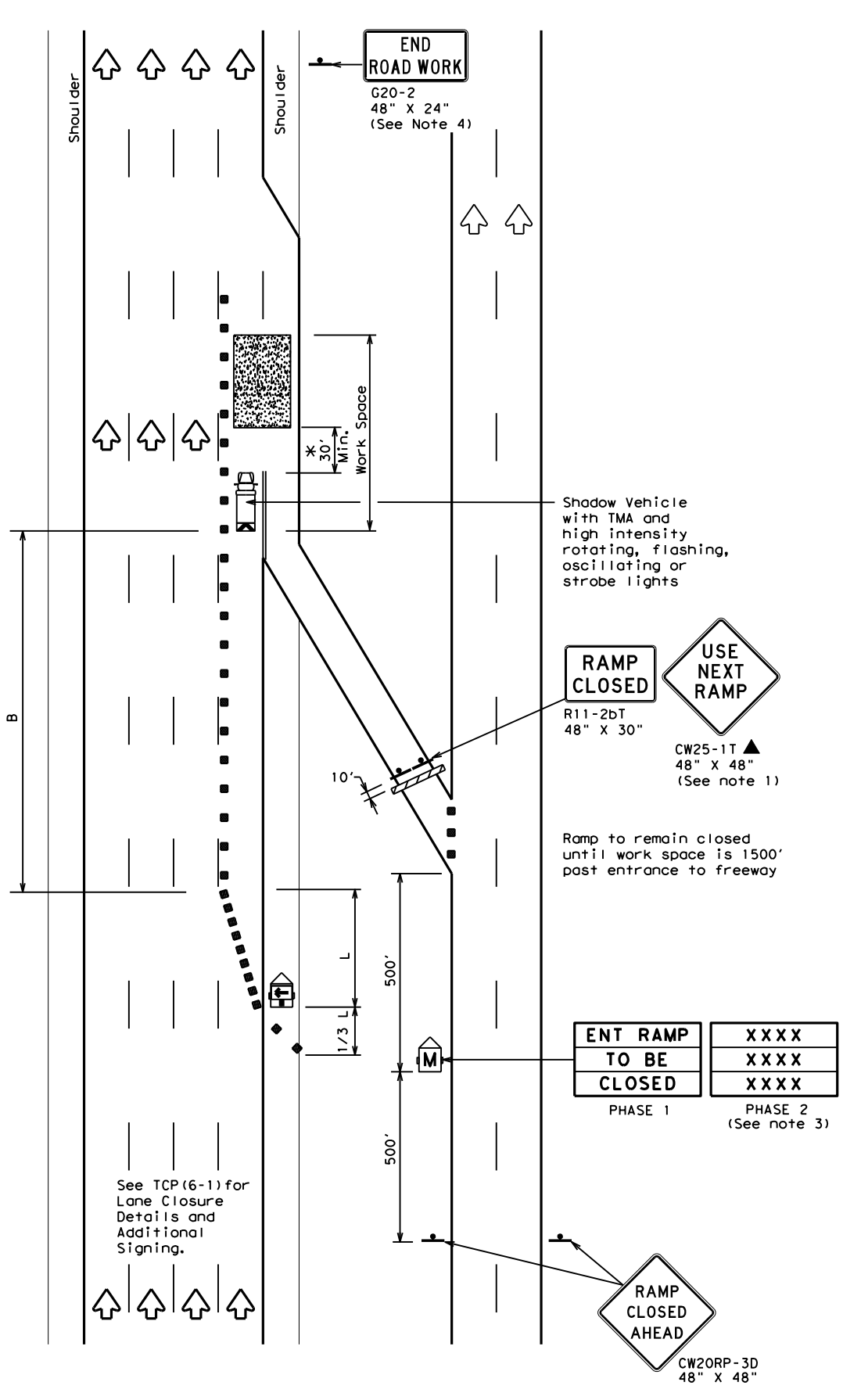


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or the accuracy of the information or the results of any calculations resulting from its use.

DATE: 11/30/2023 3:55:57 PM  
 FILE: pw://txdot.projectwiseonline.com:TXDOT12/Documents/03 - WFS/Design Projects/03a/03a01/03a01.dgn



TCP (6-2a)  
**ENTRANCE RAMP OPEN**  
**WORK WITHIN 500' OF RAMP**



TCP (6-2b)  
**ENTRANCE RAMP CLOSED**

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

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

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

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

**GENERAL NOTES**

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



**TRAFFIC CONTROL PLAN**  
**WORK AREA NEAR RAMP**

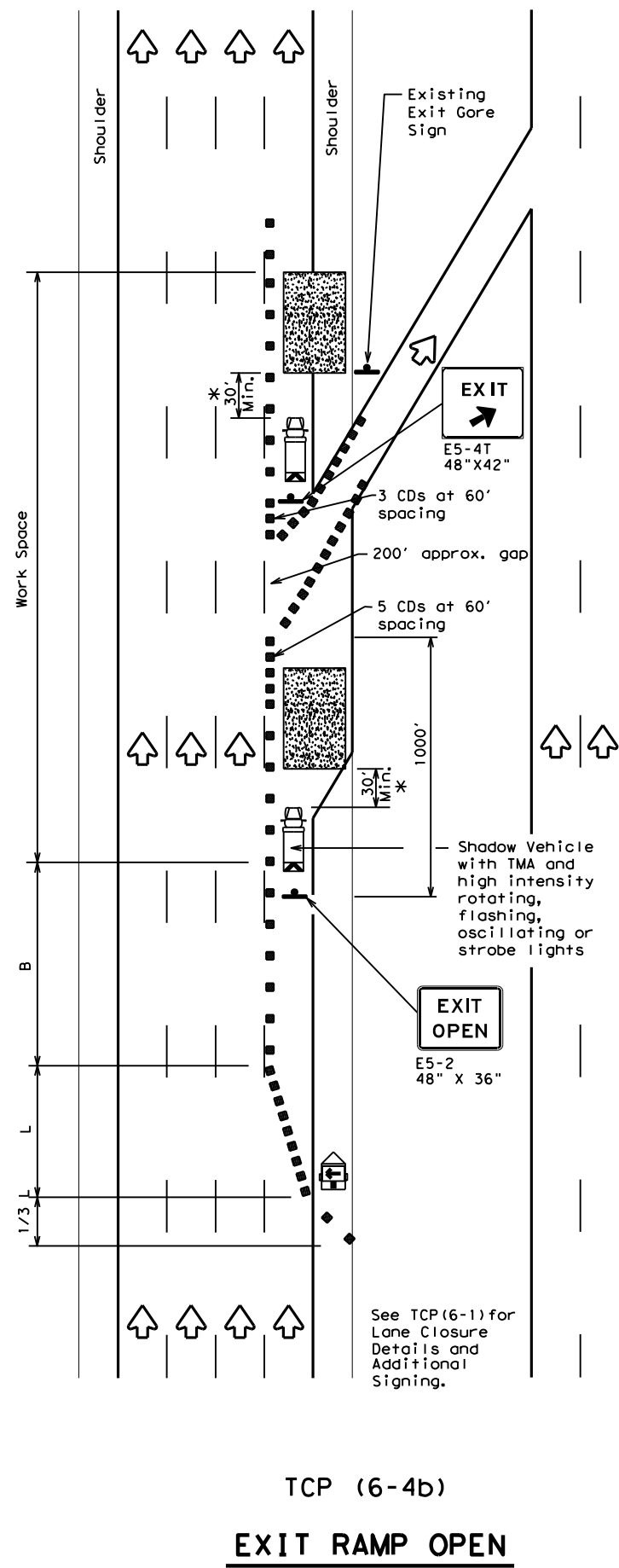
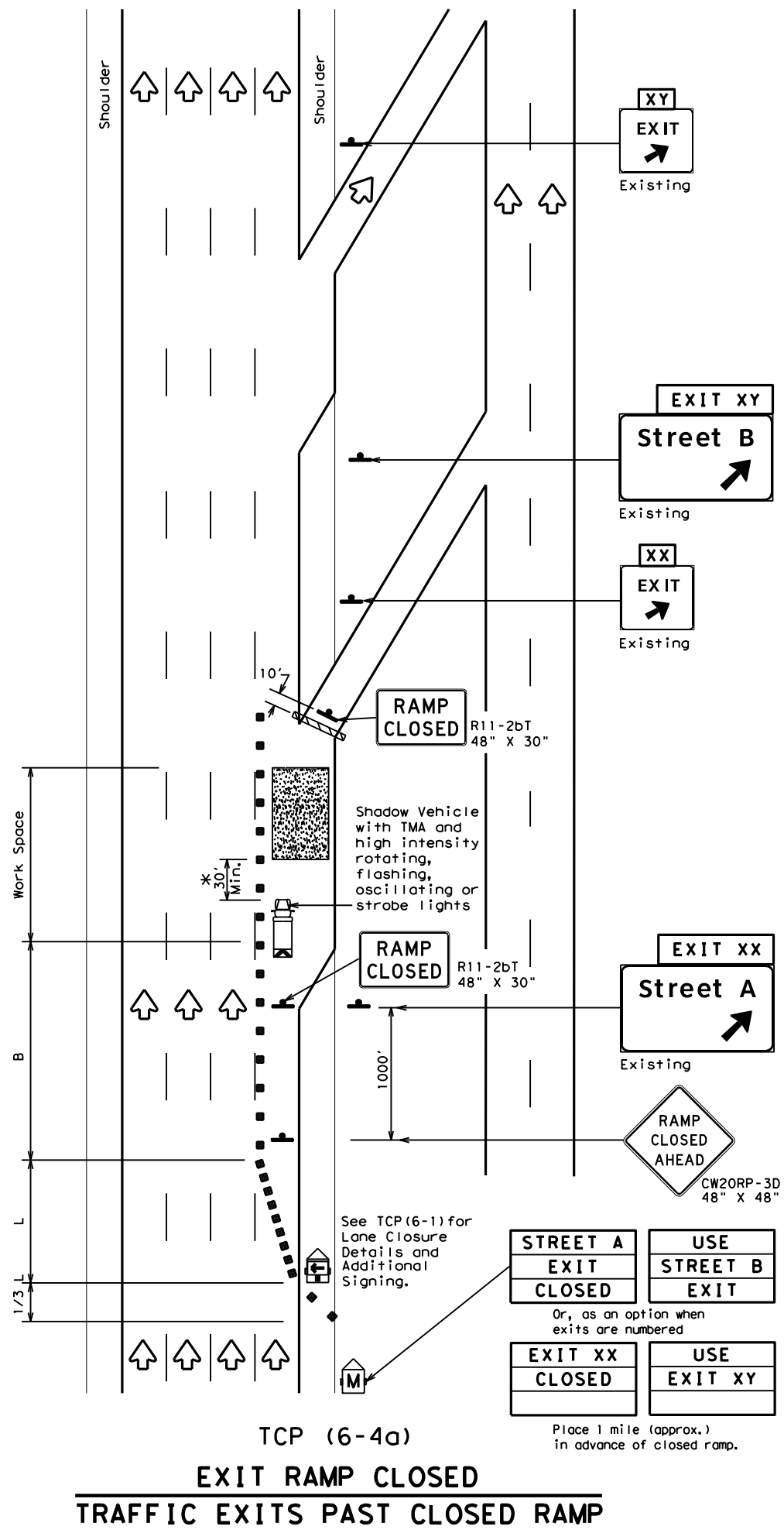
**TCP (6-2) - 12**

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©TxDOT	February 1994	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0156	04	120,	ETC.	US	82,	ETC.	
1-97	8-98			DIST	COUNTY	SHEET NO.			
4-98	8-12			WFS	WICHITA	34			



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

DATE: 11/30/2023 3:56:04 PM  
 FILE: pw://txdot.projectwiseonline.com:TXDOT12/Documents/03 - WFS/Design Projects/030912/030912.dgn



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

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- See BC Standards for sign details.

\*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

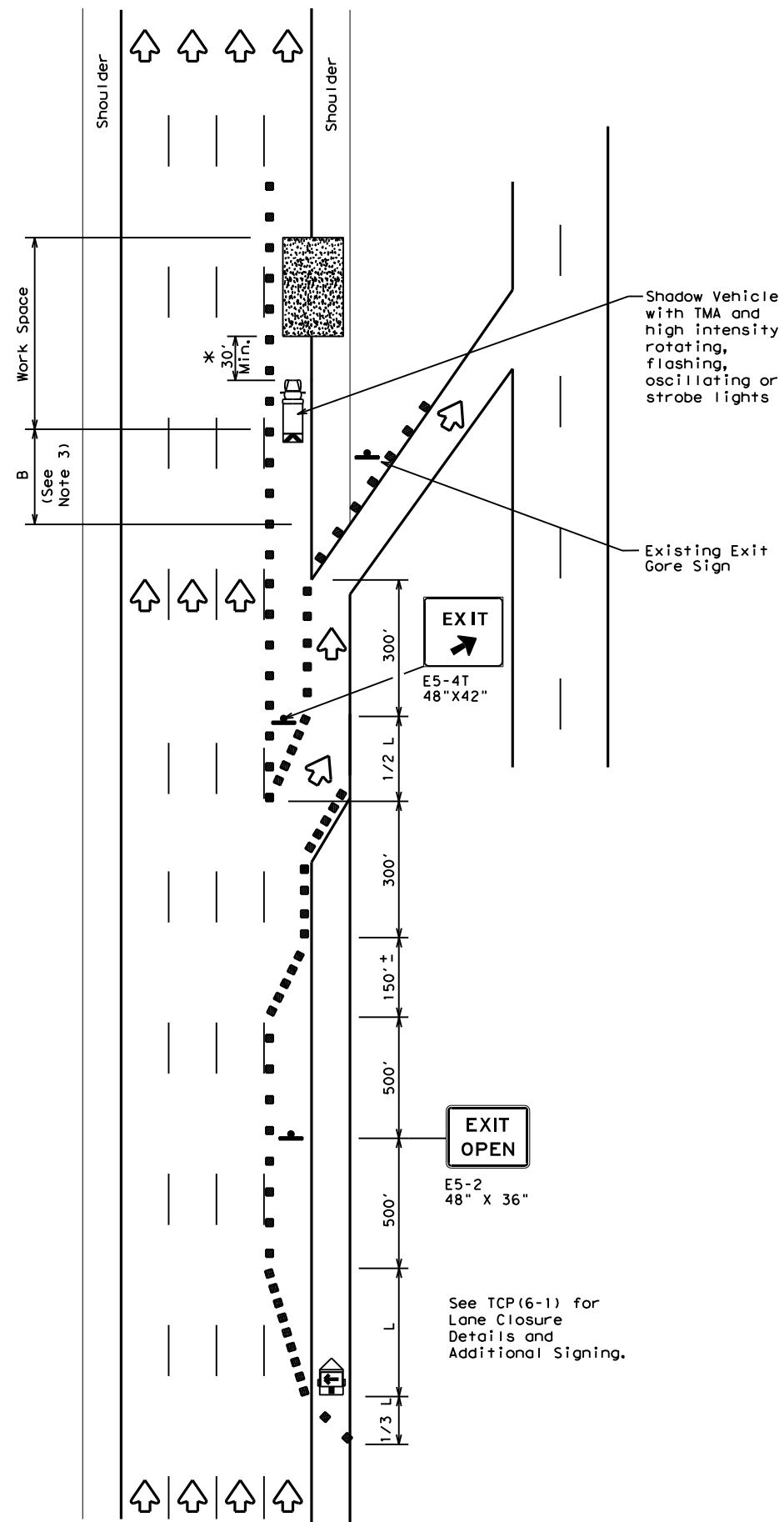
**TRAFFIC CONTROL PLAN**  
**WORK AREA AT EXIT RAMP**

**TCP (6-4) - 12**

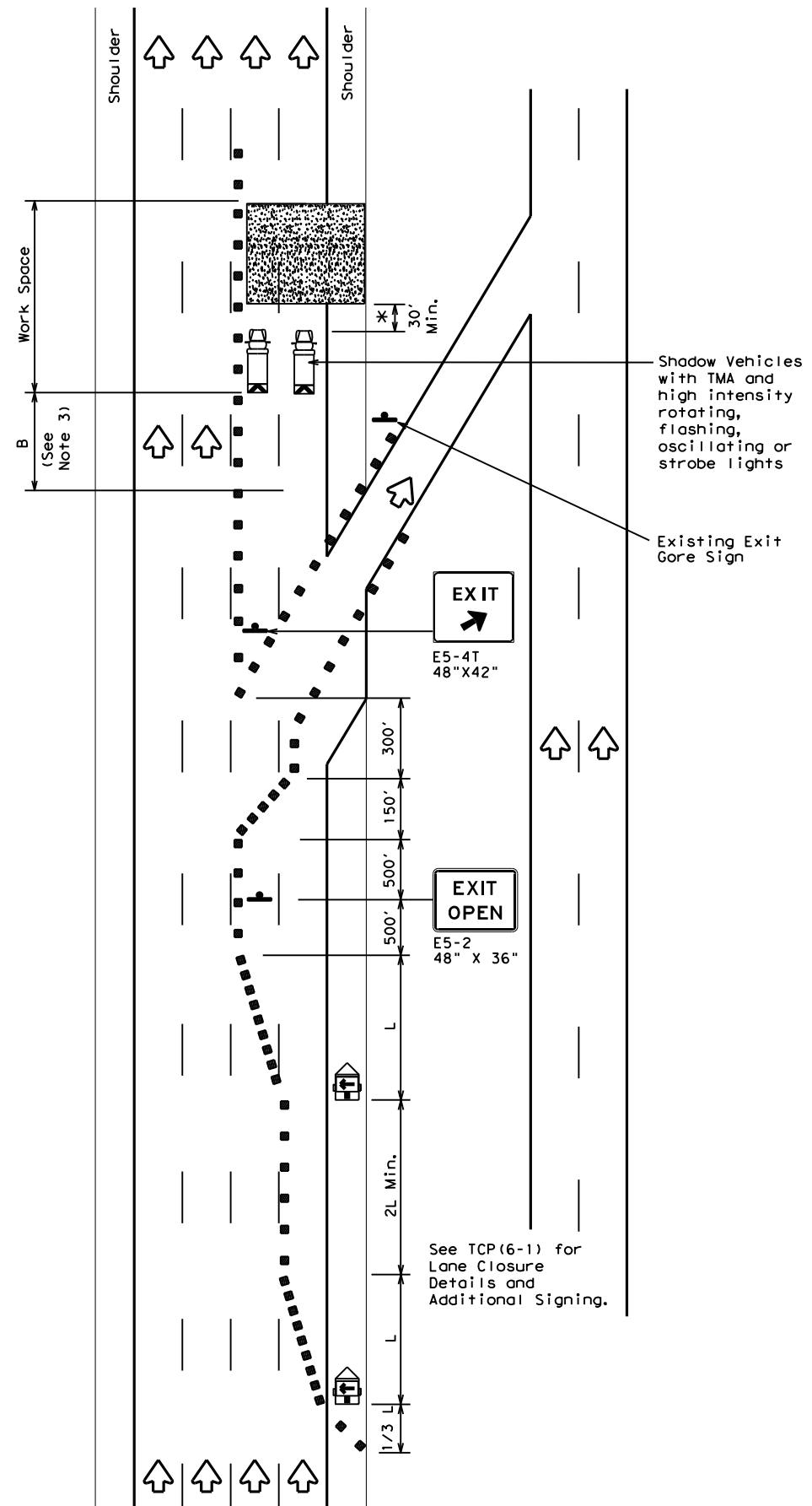
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©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC.	US 82, ETC.
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 8-12	WFS	WICHITA	36	

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DATE: 11/30/2023 3:56:07 PM  
 FILE: pw://txdot.projectwiseonline.com:TXDOT12/Documents/03 - WFS/Design Projects/03092023/03092023.dgn



TCP (6-5a)  
**EXIT RAMP OPEN**



TCP (6-5b)  
**EXIT RAMP OPEN  
 TWO LANE CLOSURE WITHIN  
 1500' PAST EXIT RAMP**

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

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

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

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- See BC standards for sign details.
- If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

\*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.

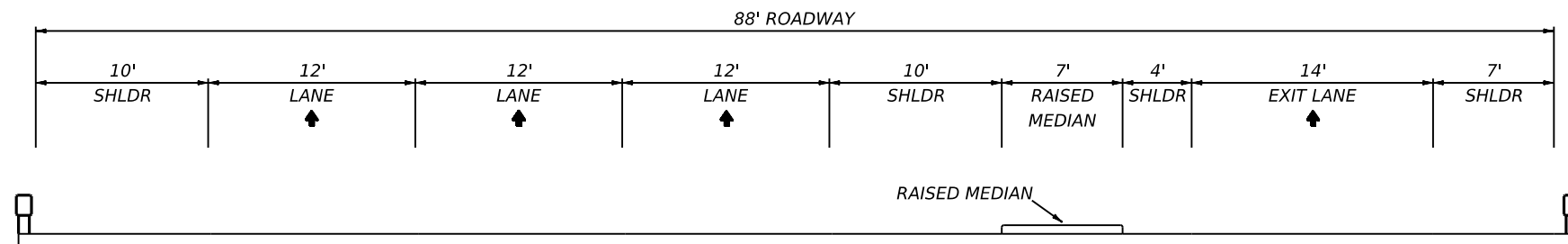
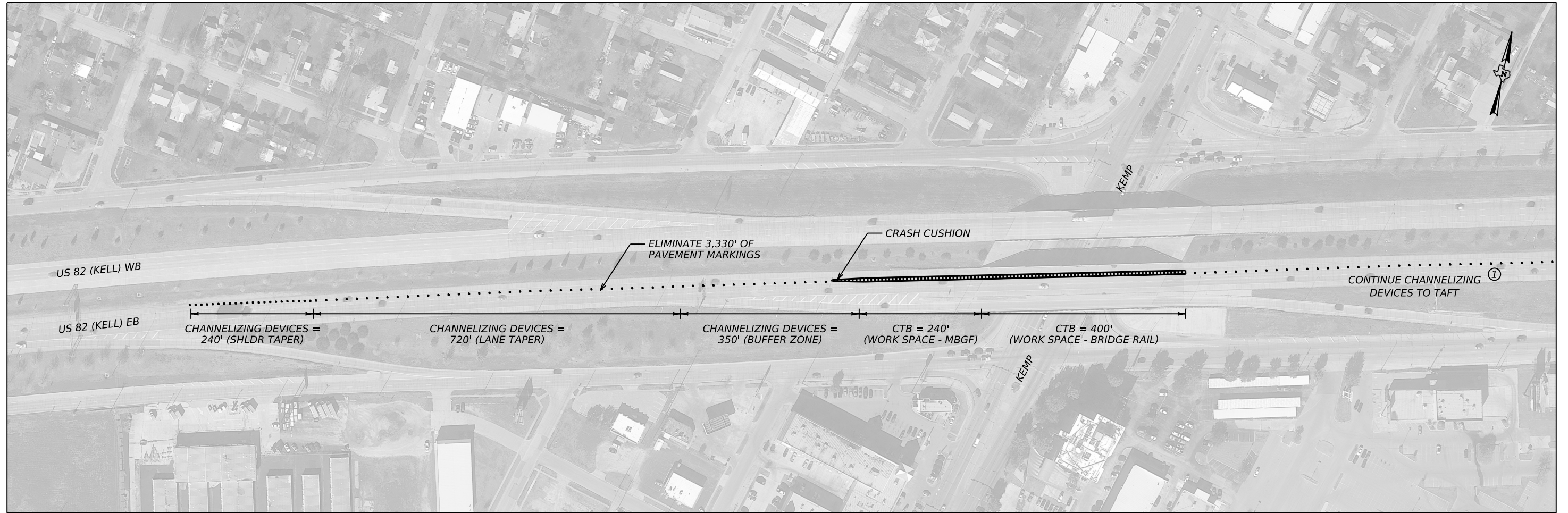


**TRAFFIC CONTROL PLAN  
 WORK AREA BEYOND EXIT RAMP**

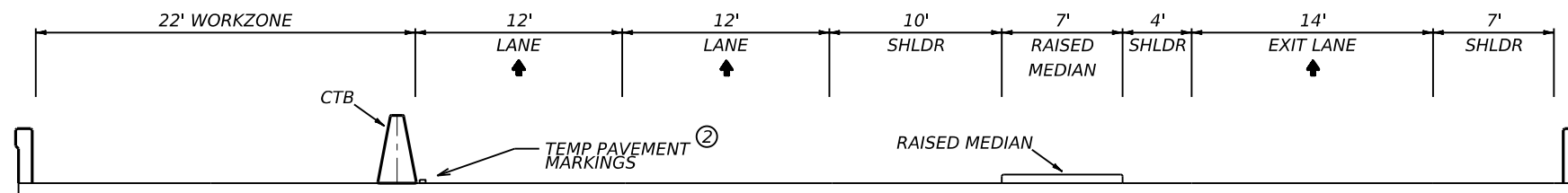
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© TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0156	04	120, ETC. US 82, ETC.					
1-97	8-98			DIST	COUNTY	SHEET NO.			
4-98	8-12			WFS	WICHITA	37			

DATE: 11/30/2023 3:56:16 PM  
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US 82 EB OVER KEMP (INSIDE)  
CSJ 0156-04-120 NBI #0156-04-079



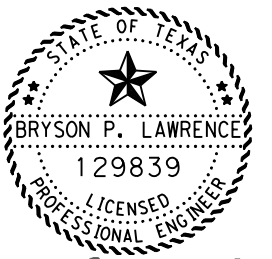
TRAFFIC CONTROL LAYOUT US 82 EB OVER KEMP (INSIDE)  
CSJ 0156-04-120 NBI #0156-04-079

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6-SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS(PCMS), FLAGGERS, AND SIGNAGE.

- ① WORK ZONE FOR US 82 EB OVER KEMP WILL EXTEND THROUGH US 82 EB OVER TAFT UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



*Bryson Lawrence, P.E.*

12/01/2023

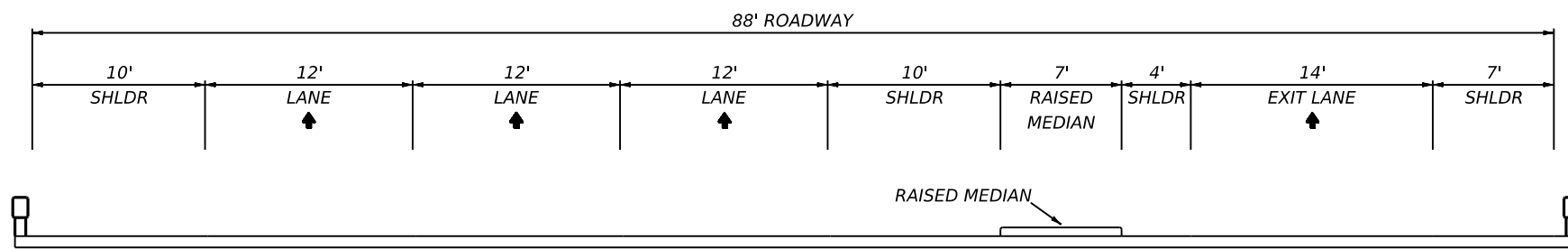
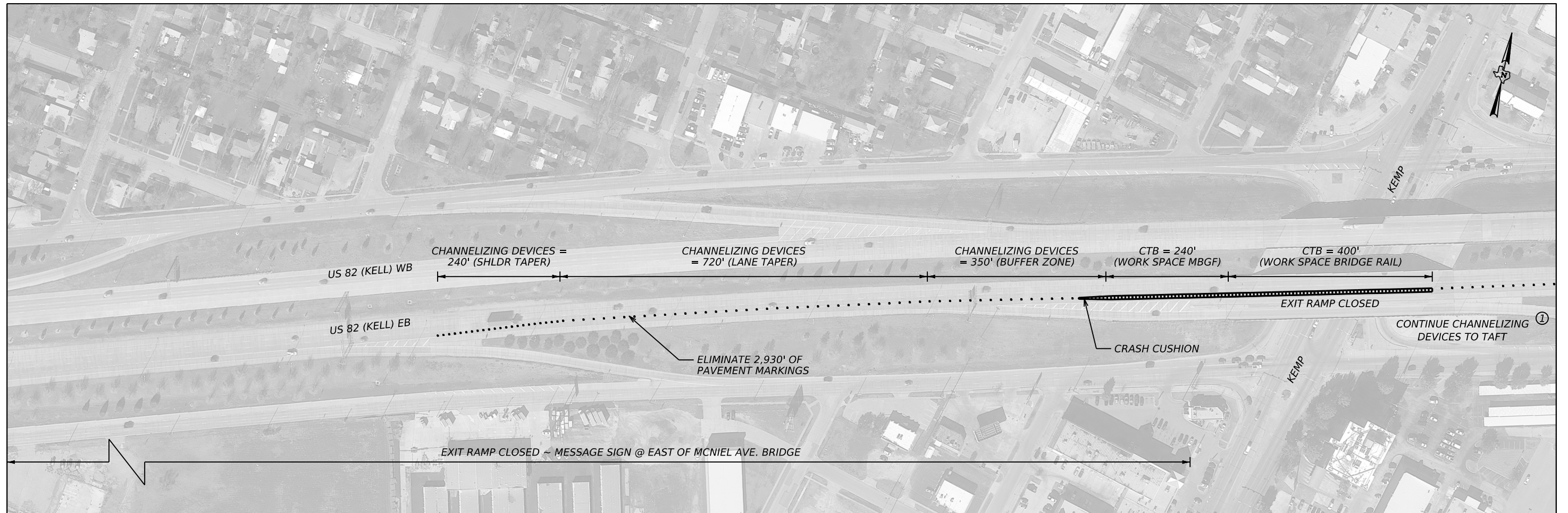
**US 82 EB OVER KEMP**  
**TCP LAYOUT**

NOT TO SCALE

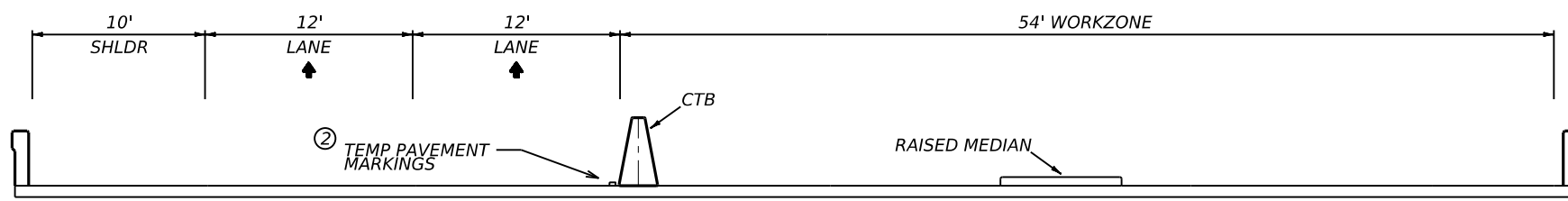


CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
WFS	WICHITA	38	

DATE: 11/30/2023 3:58:43 PM  
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US 82 EB OVER KEMP (OUTSIDE)  
CSJ 0156-04-120 NBI #0156-04-079



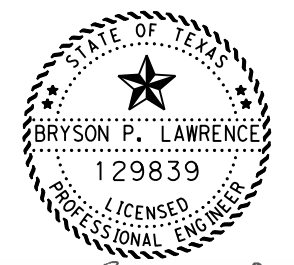
TRAFFIC CONTROL LAYOUT US 82 EB OVER KEMP (OUTSIDE)  
CSJ 0156-04-120 NBI #0156-04-079

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

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- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER

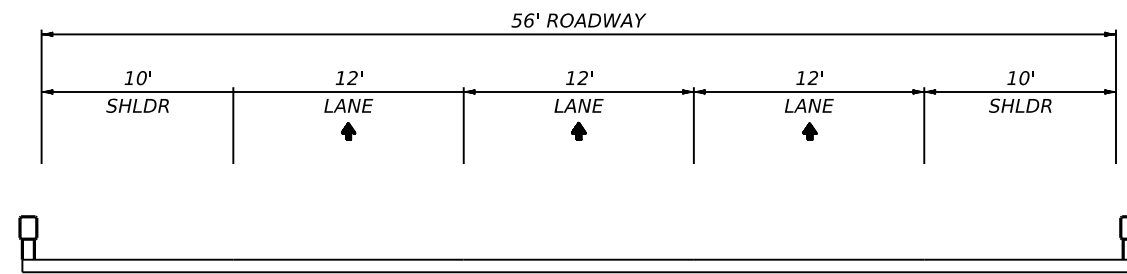
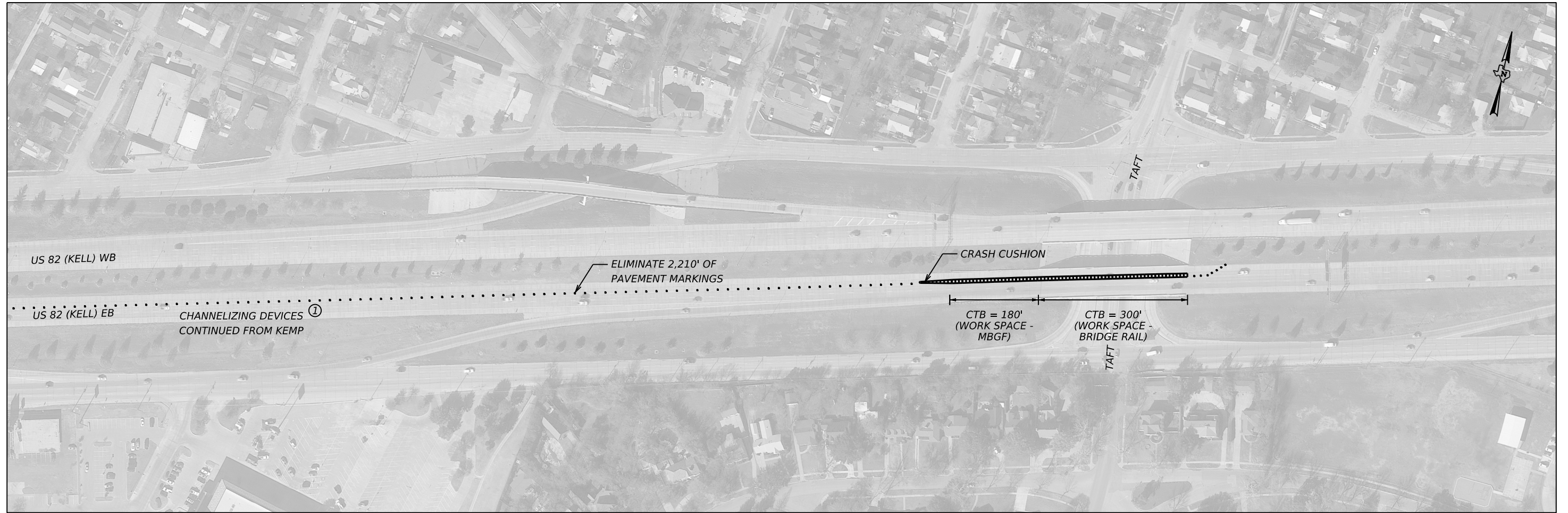


Bryson Lawrence, P.E.  
12/01/2023

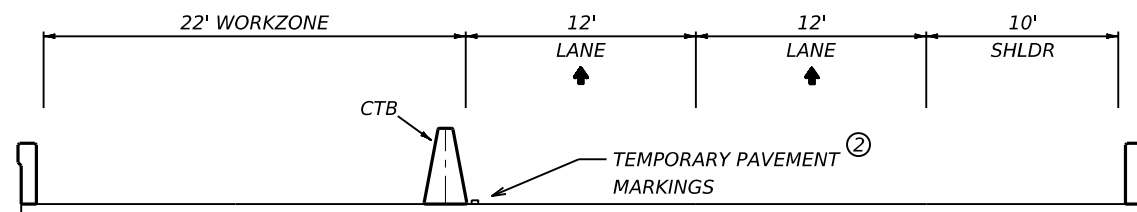
**US 82 EB OVER KEMP**  
**TCP LAYOUT**  
NOT TO SCALE



CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.
WFS	WICHITA		39



US 82 EB OVER TAFT (INSIDE)  
 CSJ 0156-04-122 NBI #0156-04-082



TRAFFIC CONTROL LAYOUT US 82 EB OVER TAFT (INSIDE)  
 CSJ 0156-04-122 NBI #0156-04-082

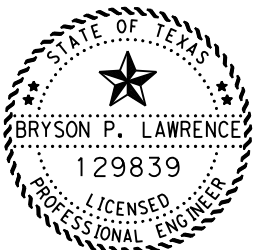
NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

① WORK ZONE FOR US 82 EB OVER KEMP WILL EXTEND THROUGH US 82 EB OVER TAFT UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



*Bryson Lawrence, P.E.*

12/01/2023

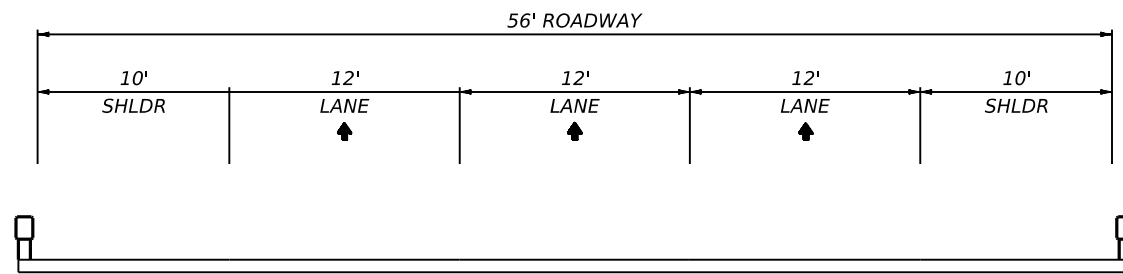
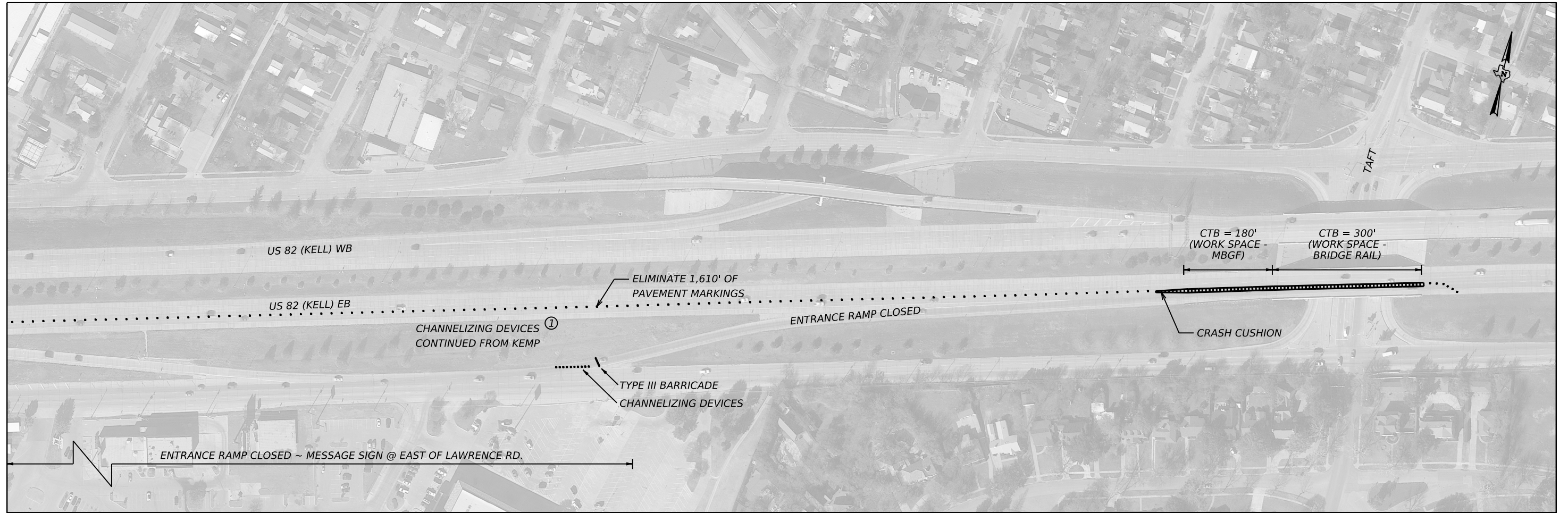
**US 82 EB OVER TAFT**  
**TCP LAYOUT**

NOT TO SCALE

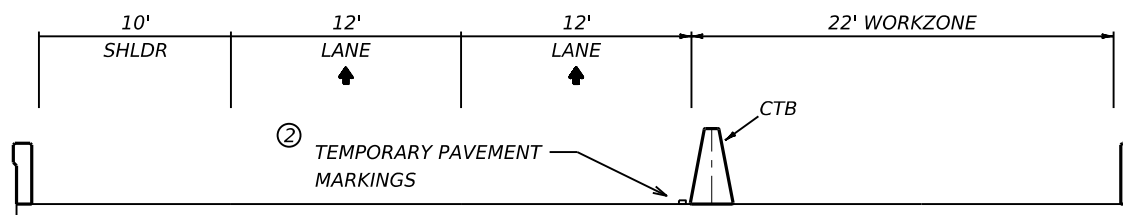


CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		40





US 82 EB OVER TAFT (OUTSIDE)  
CSJ 0156-04-122 NBI #0156-04-082



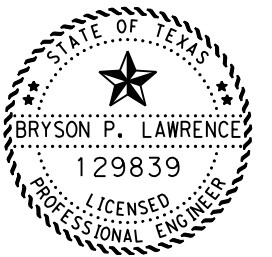
TRAFFIC CONTROL LAYOUT US 82 EB OVER TAFT (OUTSIDE)  
CSJ 0156-04-122 NBI #0156-04-082

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE

- ① WORK ZONE FOR US 82 EB OVER KEMP WILL EXTEND THROUGH US 82 EB OVER TAFT UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



*Bryson Lawrence, P.E.*

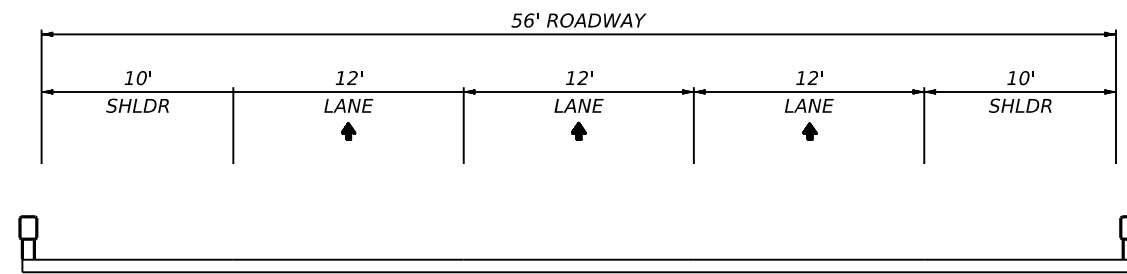
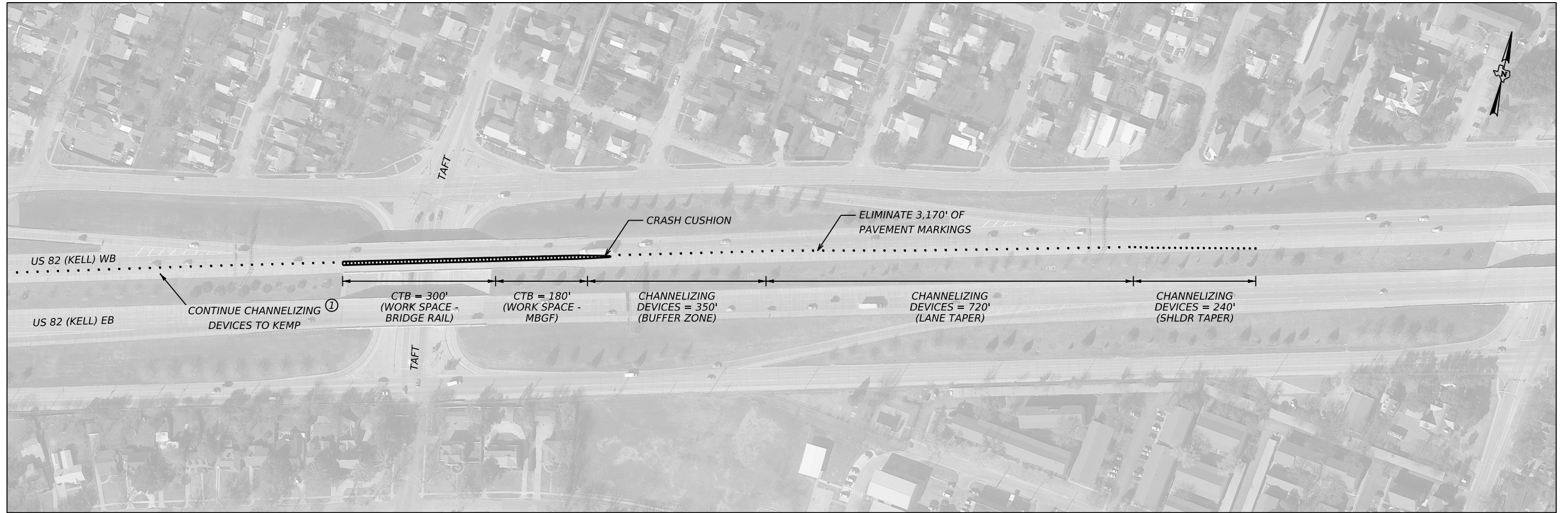
12/01/2023

**US 82 EB OVER TAFT**  
**TCP LAYOUT**

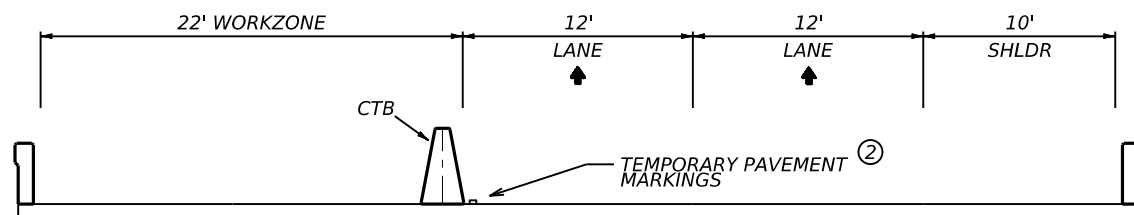
NOT TO SCALE



CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		41



US 82 WB OVER TAFT (INSIDE)  
 CSJ 0156-04-123 NBI #0156-04-083



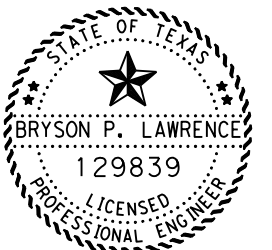
TRAFFIC CONTROL LAYOUT US 82 WB OVER TAFT (INSIDE)  
 CSJ 0156-04-123 NBI #0156-04-083

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① WORK ZONE FOR US 82 WB OVER TAFT WILL EXTEND THROUGH US 82 WB OVER KEMP UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② TRAFFIC BARRIERS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



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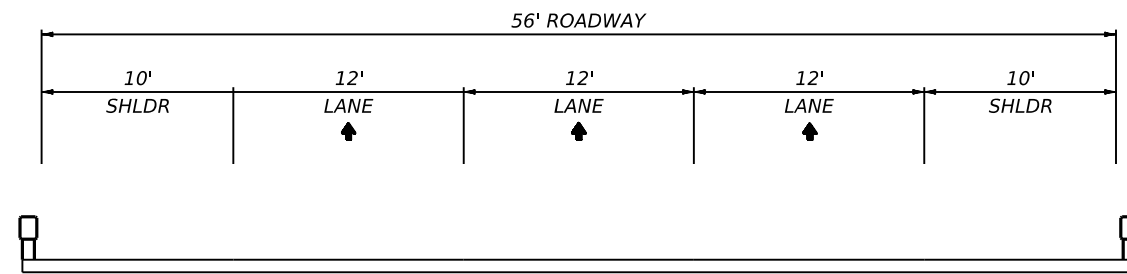
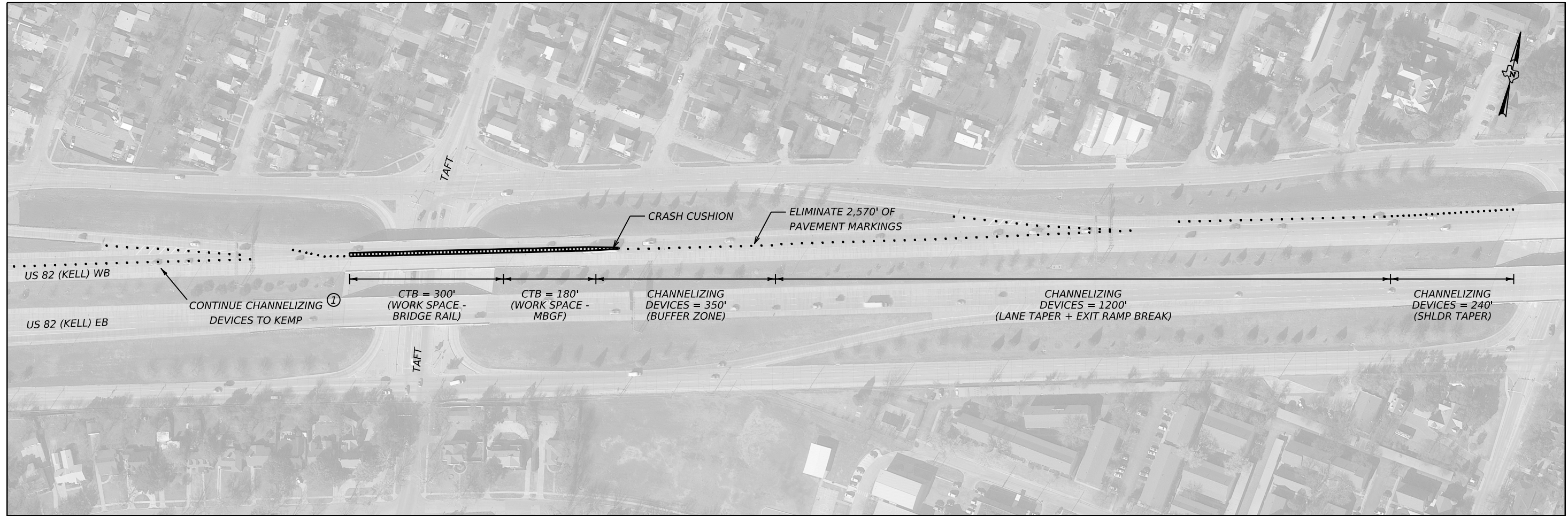
12/01/2023

**US 82 WB OVER TAFT**  
**TCP LAYOUT**

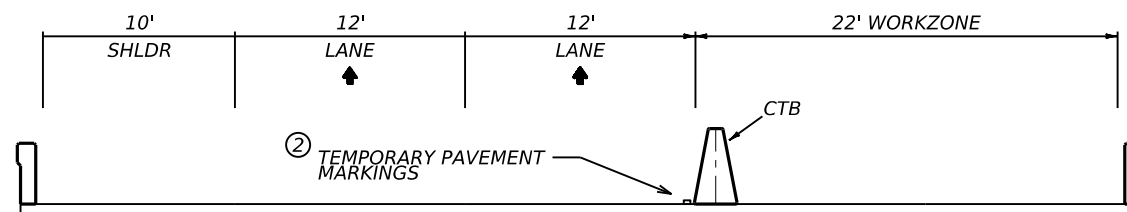
NOT TO SCALE



CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	42	



US 82 WB OVER TAFT (OUTSIDE)  
CSJ 0156-04-123 NBI #0156-04-083



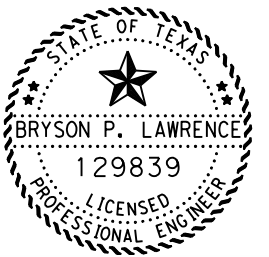
TRAFFIC CONTROL LAYOUT US 82 WB OVER TAFT (OUTSIDE)  
CSJ 0156-04-123 NBI #0156-04-083

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① WORK ZONE FOR US 82 WB OVER TAFT WILL EXTEND THROUGH US 82 WB OVER KEMP UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



*Bryson Lawrence, P.E.*

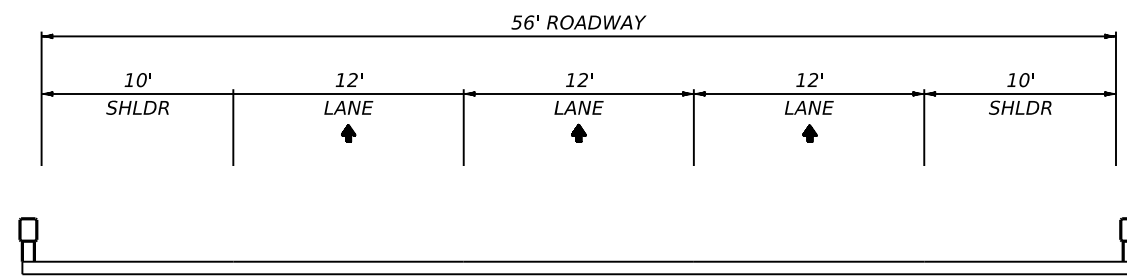
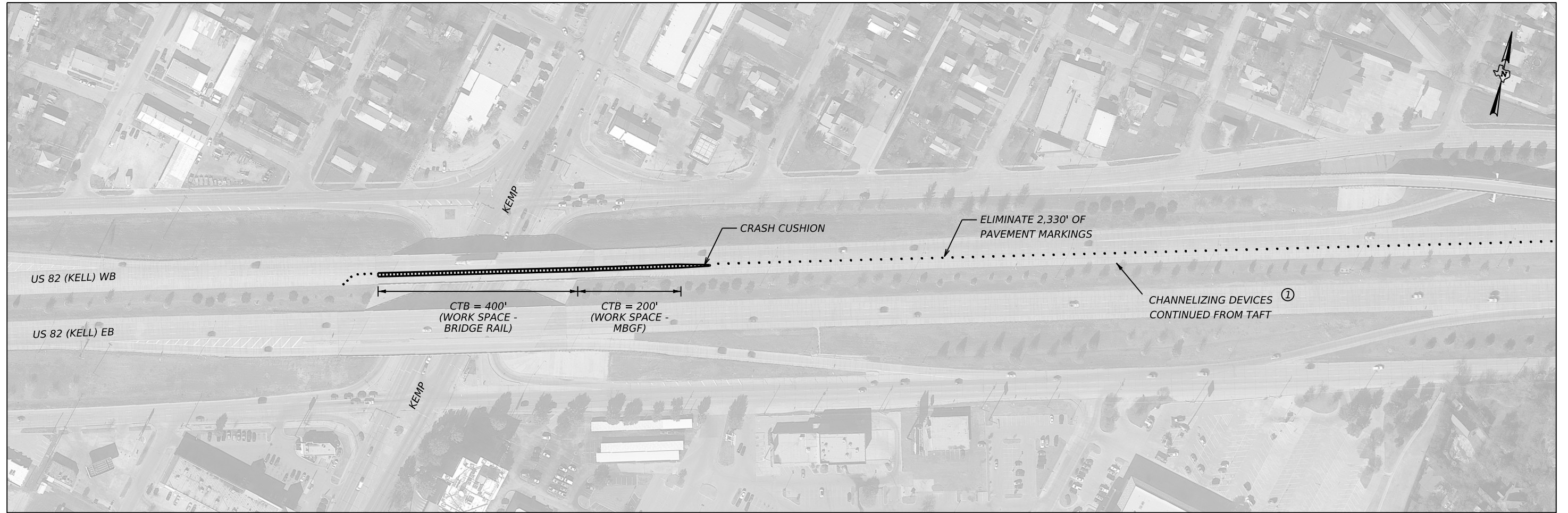
12/01/2023

**US 82 WB OVER TAFT  
TCP LAYOUT**

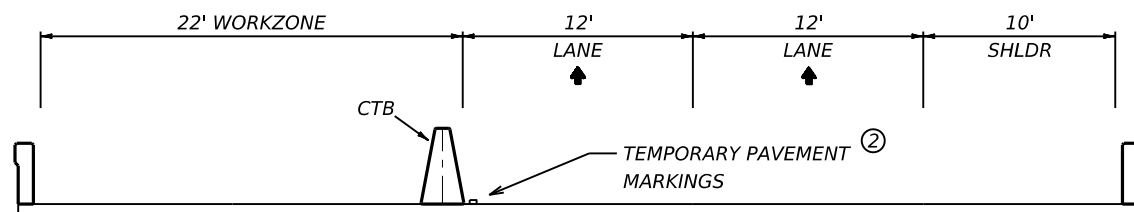
NOT TO SCALE



CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	43	



US 82 WB OVER KEMP (INSIDE)  
 CSJ 0156-04-121 NBI #0156-04-080



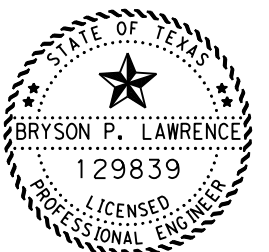
TRAFFIC CONTROL LAYOUT US 82 WB OVER KEMP (INSIDE)  
 CSJ 0156-04-121 NBI #0156-04-080

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① WORK ZONE FOR US 82 WB OVER TAFT WILL EXTEND THROUGH US 82 WB OVER KEMP UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



*Bryson Lawrence, P.E.*

12/01/2023

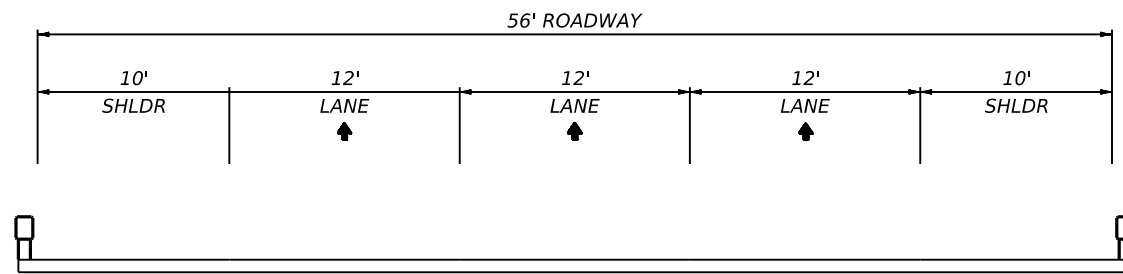
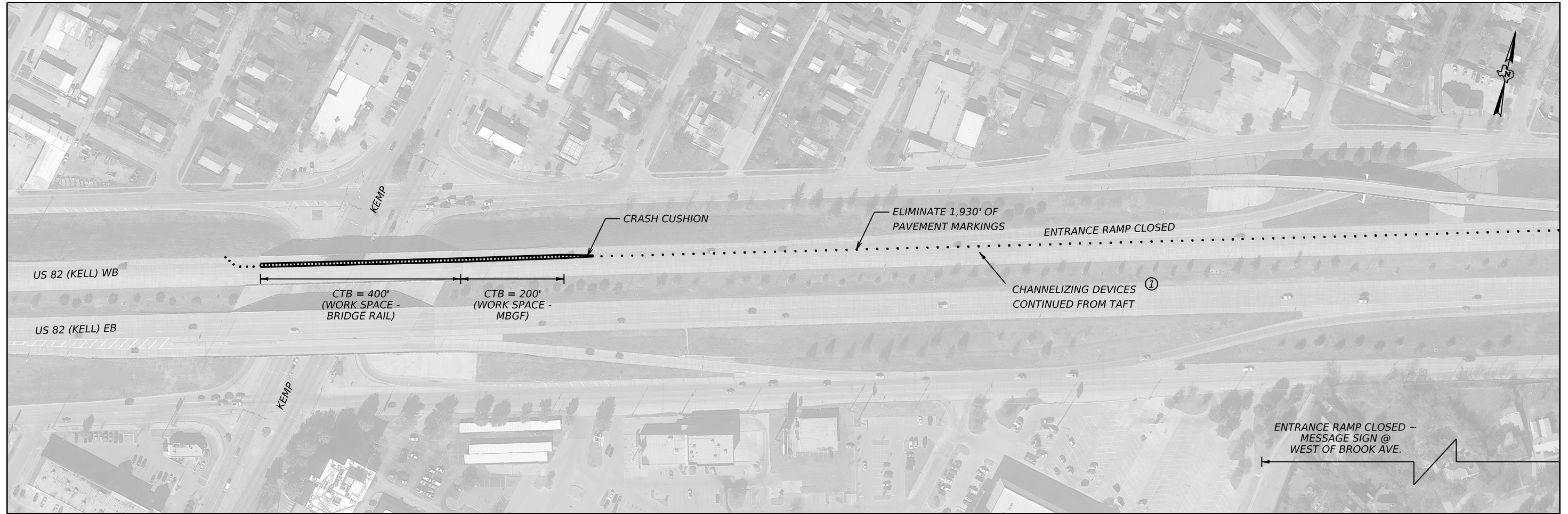
**US 82 WB OVER KEMP**  
**TCP LAYOUT**

NOT TO SCALE

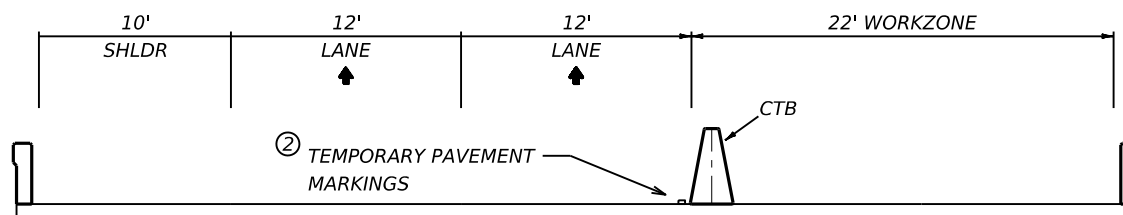


CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	44	

DATE: 11/30/2023 4:10:12 PM  
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US 82 WB OVER KEMP (OUTSIDE)  
 CSJ 0156-04-121 NBI #0156-04-080



TRAFFIC CONTROL LAYOUT US 82 WB OVER KEMP (OUTSIDE)  
 CSJ 0156-04-121 NBI #0156-04-080

NOTES:

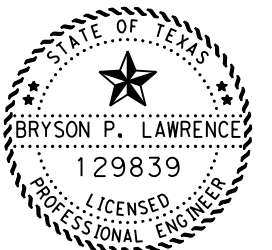
THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

SEE SHEET #38A FOR ADVANCE PLACEMENT OF PCMS FOR WORK ON OUTSIDE BRIDGE RAIL.

① WORK ZONE FOR US 82 WB OVER TAFT WILL EXTEND THROUGH US 82 WB OVER KEMP UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER



*Bryson Lawrence, P.E.*

12/01/2023

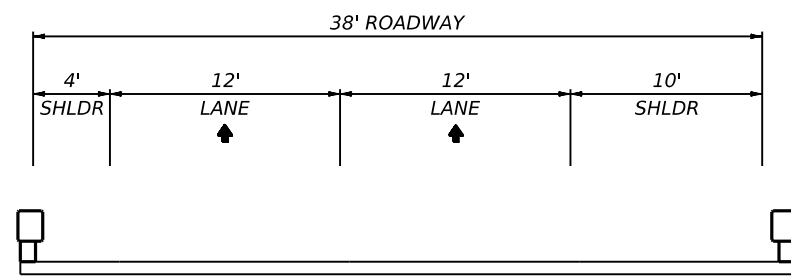
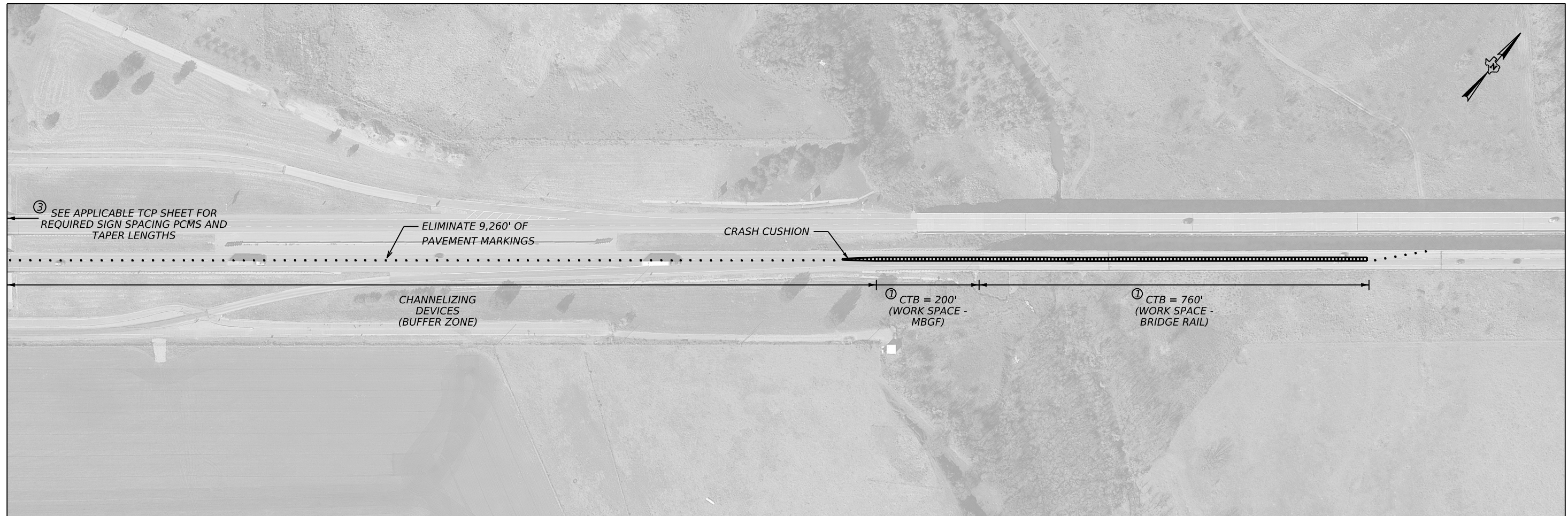
**US 82 WB OVER KEMP**  
**TCP LAYOUT**

NOT TO SCALE

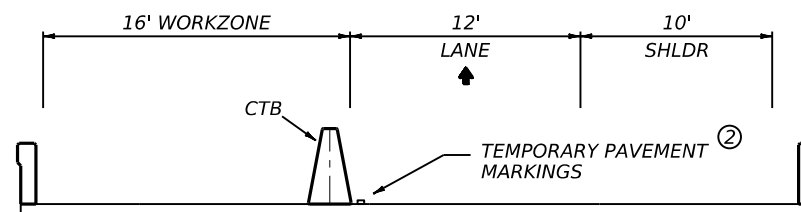


CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		45

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IH 44 NB OVER RED RIVER (INSIDE)  
 CSJ 0156-07-114 NBI #0156-07-066



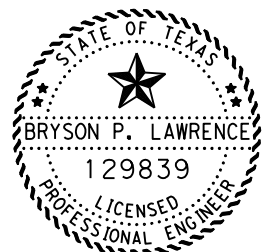
TRAFFIC CONTROL LAYOUT IH 44 NB OVER RED RIVER (INSIDE)  
 CSJ 0156-07-114 NBI #0156-07-066

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① MULTIPLE CTB MOVES WILL BE REQUIRED AT THIS LOCATION. FOR WORK ON OUTSIDE OF BRIDGE THERE ARE FOUR ESTIMATED MOVES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER
- ③ HILL BLOCKS VIEW OF LANE CLOSURE ADJUST ACCORDING TO TRAFFIC CONDITIONS OR AS DIRECTED BY THE ENGINEER



*Bryson Lawrence, P.E.*  
 12/01/2023

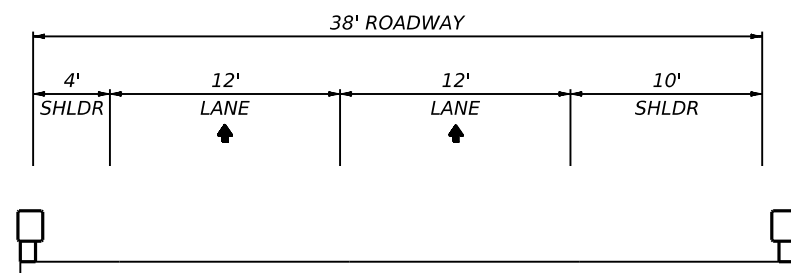
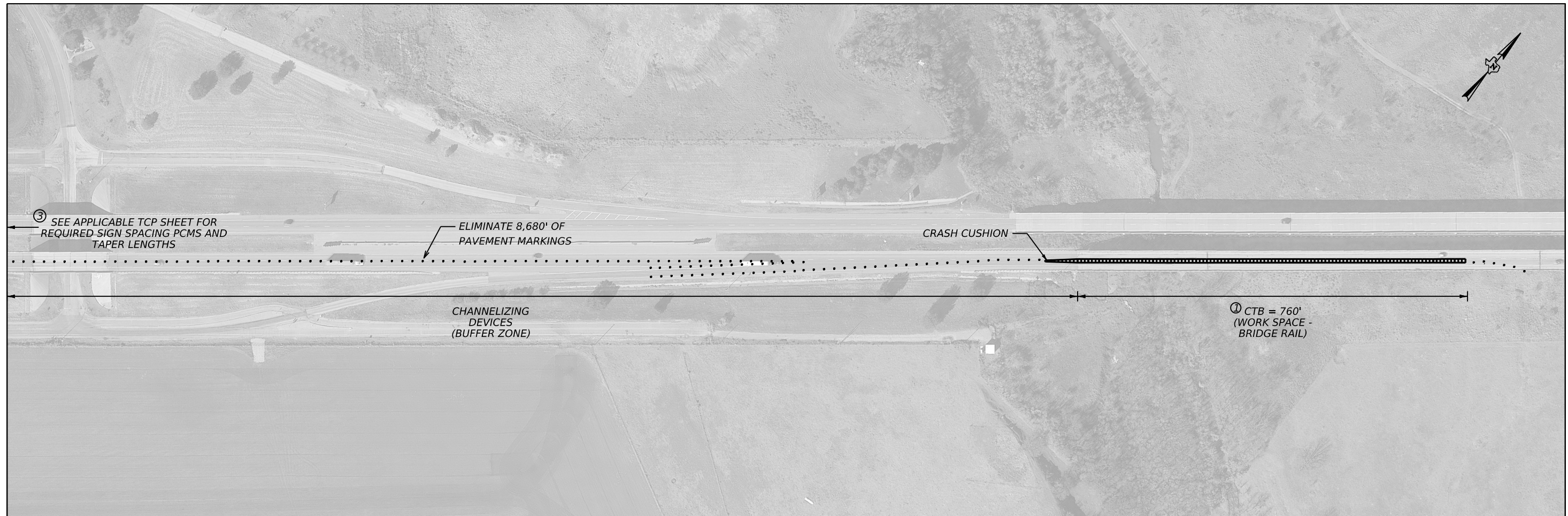
**IH 44 NB OVER RED RIVER  
 TCP LAYOUT**

NOT TO SCALE

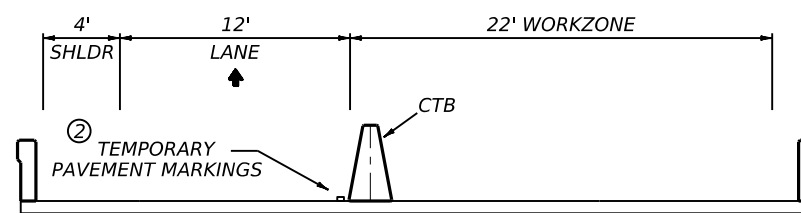


CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC. US 82, ETC.	
DIST	COUNTY		SHEET NO.
WFS	WICHITA		46

DATE: 11/30/2023 4:17:00 PM  
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IH 44 NB OVER RED RIVER (OUTSIDE)  
 CSJ 0156-07-114 NBI #0156-07-066



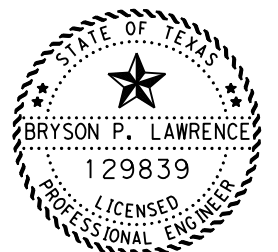
TRAFFIC CONTROL LAYOUT IH 44 NB OVER RED RIVER (OUTSIDE)  
 CSJ 0156-07-114 NBI #0156-07-066

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (6 SERIES) STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① MULTIPLE CTB MOVES WILL BE REQUIRED AT THIS LOCATION. FOR WORK ON INSIDE OF BRIDGE THERE ARE FOUR ESTIMATED MOVES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ② TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER
- ③ HILL BLOCKS VIEW OF LANE CLOSURE ADJUST ACCORDING TO TRAFFIC CONDITIONS OR AS DIRECTED BY THE ENGINEER



*Bryson Lawrence, P.E.*

12/01/2023

**IH 44 NB OVER RED RIVER TCP LAYOUT**

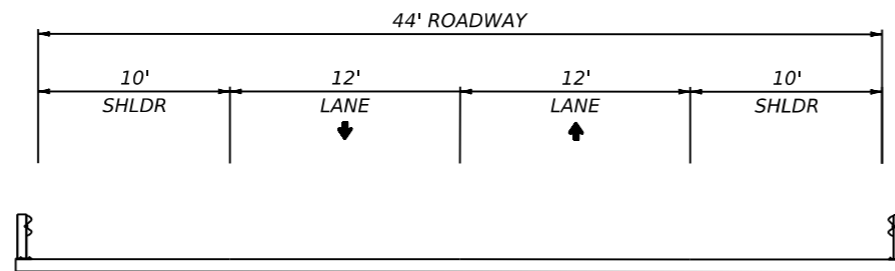
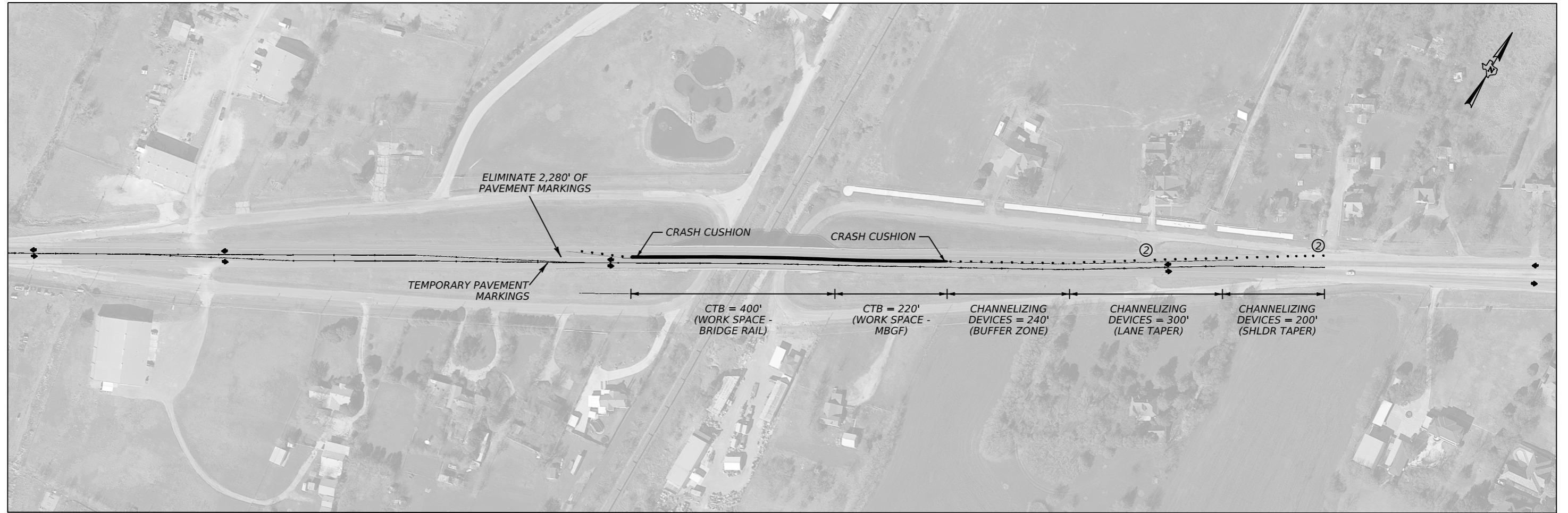
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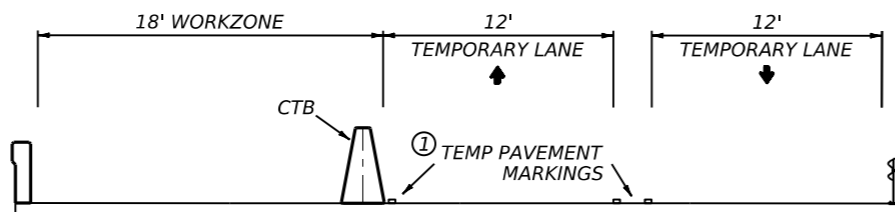
CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC. US 82, ETC.	
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	47	

DATE: 12/1/2023 9:37:26 AM

FILE: pw://tcdot.projectwiseonline.com:TXDOT2/Documents/03 - WFS/Design Projects/015604120/4 - Design/Plan Set/2. TCP/TRAFFIC CONTROL LAYOUT BU277A WB OVER BNSF.gdgn



BU 277A OVER BNSF RR (WEST BOUND)  
CSJ 0156-14-028 NBI #0156-14-065



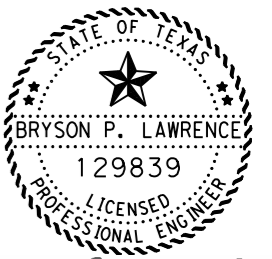
TRAFFIC CONTROL LAYOUT BU 277A OVER BNSF RR (WEST BOUND)  
CSJ 0156-14-028 NBI #0156-14-065

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (2-3)-18 STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVES (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② LEAVE ACCESS OPEN TO FEEDER ROADS AND DRIVEWAYS



*Bryson Lawrence, P.E.*

12/01/2023

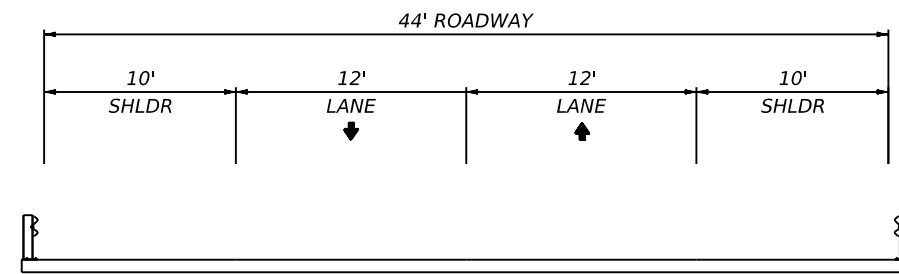
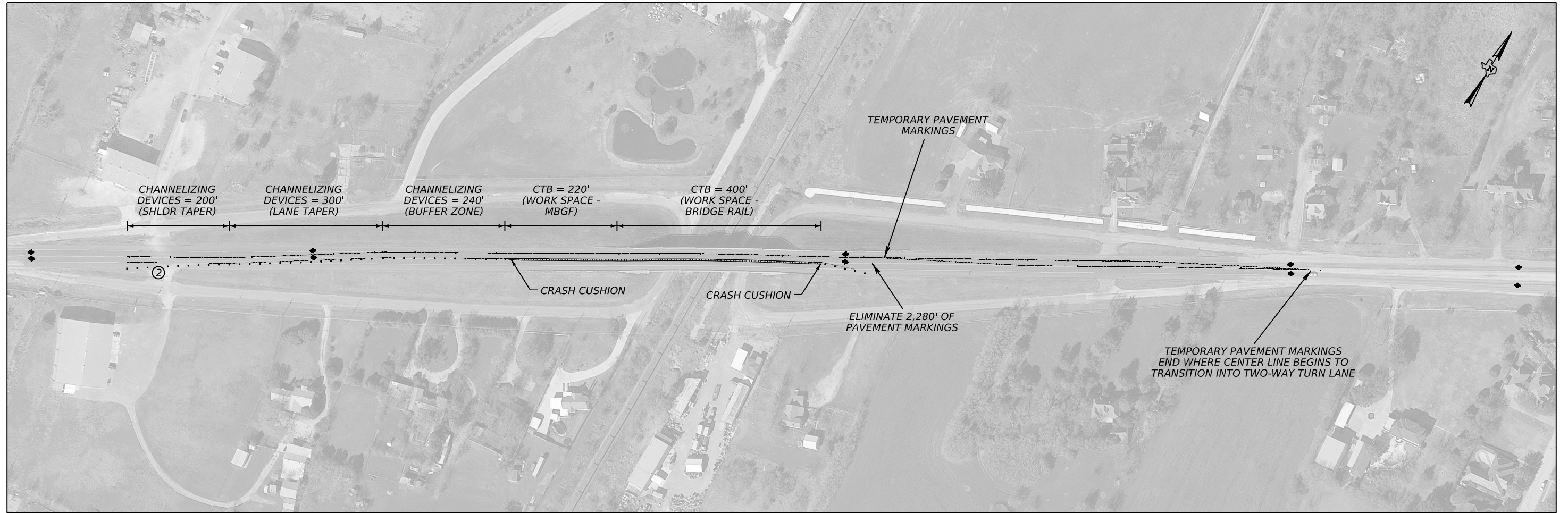
**BU 277A WB  
OVER BNSF  
TCP LAYOUT**

NOT TO SCALE

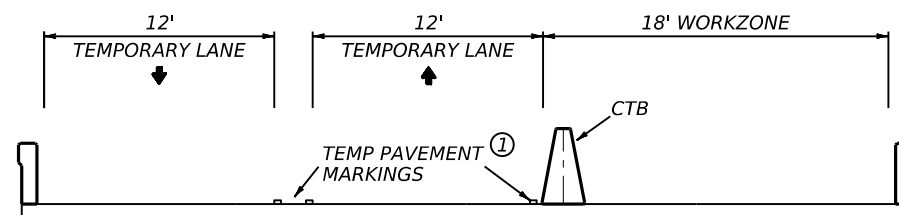


CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC. US 82, ETC.	
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	48	





BU 277A OVER BNSF RR (EAST BOUND)  
 CSJ 0156-14-028 NBI #0156-14-065



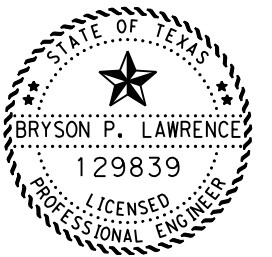
TRAFFIC CONTROL LAYOUT BU 277A OVER BNSF RR (EAST BOUND)  
 CSJ 0156-14-028 NBI #0156-14-065

NOTES:

THIS SHEET IS FOR GENERAL CHANNELIZING DEVICE PLACEMENT AND ESTIMATING PURPOSES.

REFER TO BARRICADE AND CONSTRUCTION SHEETS, AND TCP (2-3)-18 STANDARD SHEETS FOR DETAILED GUIDANCE REGARDING PLACEMENT OF BARRICADES, CHANNELIZING DEVICES, TRUCK MOUNTED ATTENUATORS (TMA), TRAILER MOUNTED FLASHING ARROW BOARDS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS), FLAGGERS, AND SIGNAGE.

- ① TRAFFIC BUTTONS AND THERMOPLASTIC ADHESIVE (ON CONCRETE PAVEMENTS) SHALL BE USED FOR TEMPORARY PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- ② LEAVE ACCESS OPEN TO FEEDER ROADS AND DRIVEWAYS



*Bryson Lawrence, P.E.*

12/01/2023

**BU 277A EB  
 OVER BNSF  
 TCP LAYOUT**

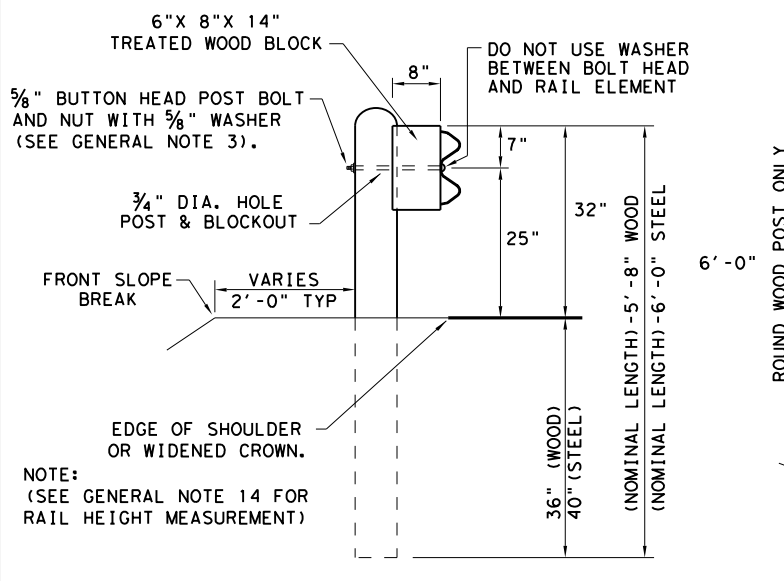
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CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC. US 82, ETC.	
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	49	

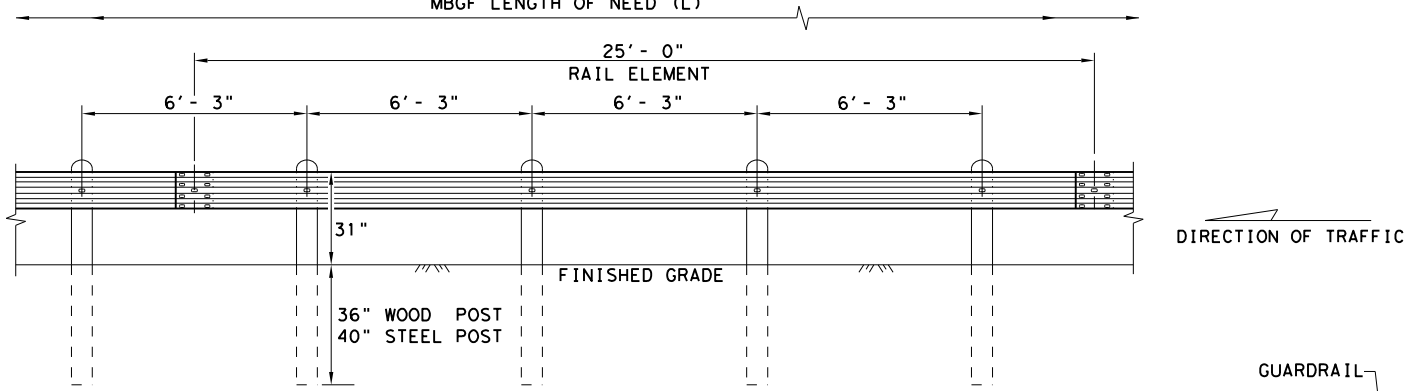
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TxDOT FOR ANY PURPOSE WHATSOEVER. TxDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 11/30/2023  
 FILE: pw://txdot.projectwiseonline.com:TXDOT2/Projects/015604120/4 - WFS/Design Projects/015604120/4 - Design/Plan Set/3. Roadway/GF (31)-19.dgn



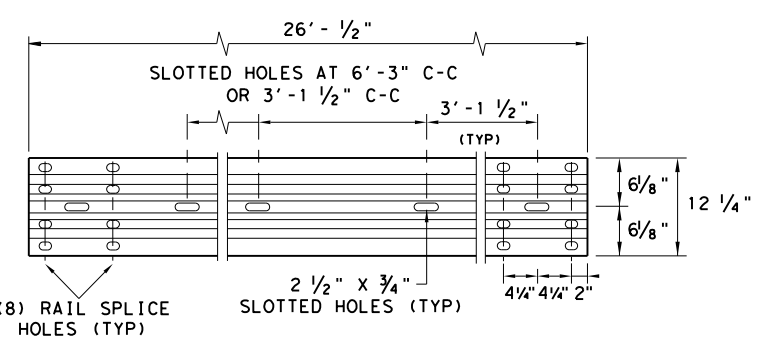
**TYPICAL POST PLACEMENT**

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



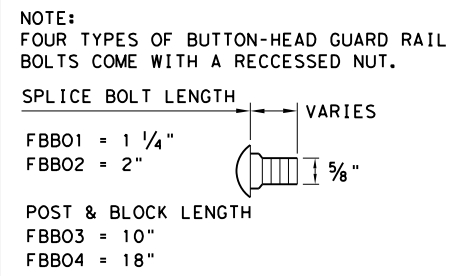
**ELEVATION MID-SPAN RAIL SPLICE**

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



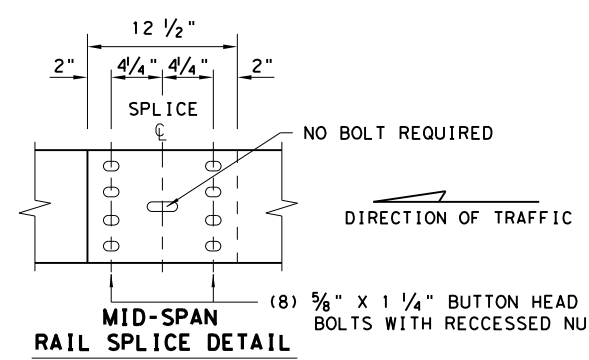
**ELEVATION 25' - 0" (NOM.) W-BEAM SECTION**

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



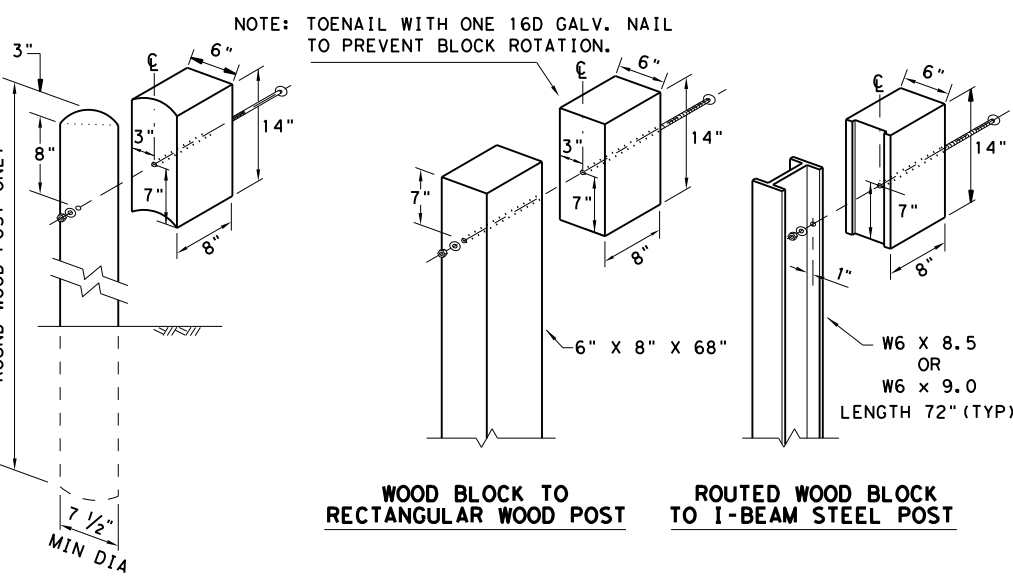
**BUTTON HEAD BOLT**

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



**MID-SPAN RAIL SPLICE DETAIL**

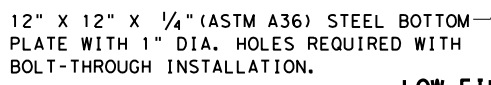
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.



**WOOD BLOCK TO ROUND WOOD POST**      **ROUTED WOOD BLOCK TO I-BEAM STEEL POST**

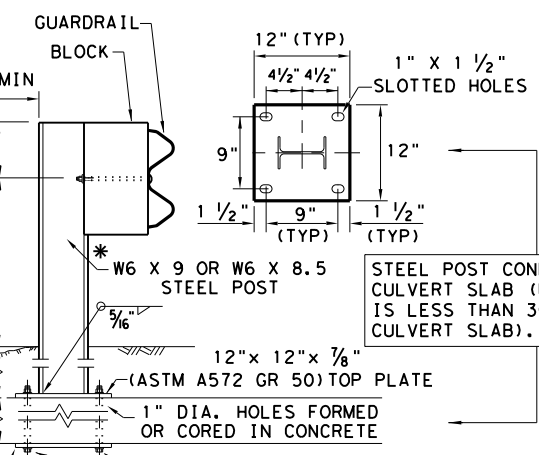
**WOOD BLOCK TO ROUND WOOD POST**

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



**LOW FILL CULVERT POST**

12" x 12" x 1/4" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.



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

NOTE: TWO INSTALLATION OPTIONS.

- BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.
- EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 7/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

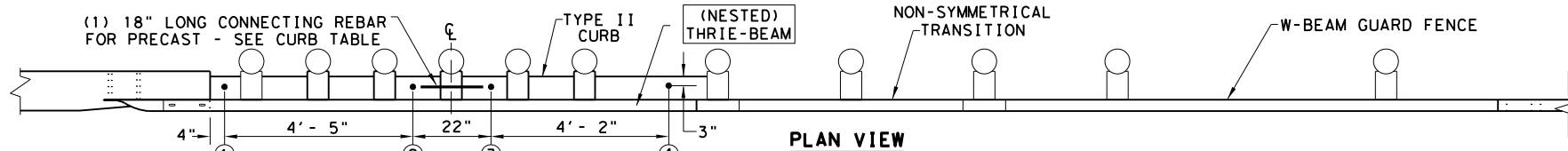
NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

**GENERAL NOTES**

- 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."
- RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25' - 0", OR 12' - 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3' - 1 1/2" C-C OR 6' - 3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
- 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 3/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
- FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
- CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
- THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
- 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.
- 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.
- 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.
- POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
- SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
- 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.
- 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.
- 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.

		Design Division Standard	
<b>METAL BEAM GUARD FENCE</b> <b>TL-3 MASH COMPLIANT</b> <b>GF(31)-19</b>			
FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP
© TxDOT: NOVEMBER 2019	CONT	SECT	JOB
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DIST	COUNTY	SHEET NO.	
WFS	WICHITA	50	

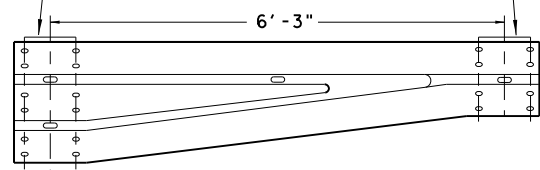
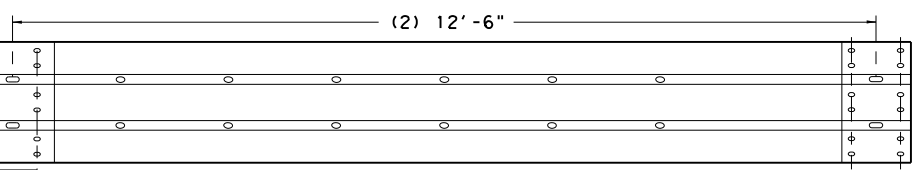
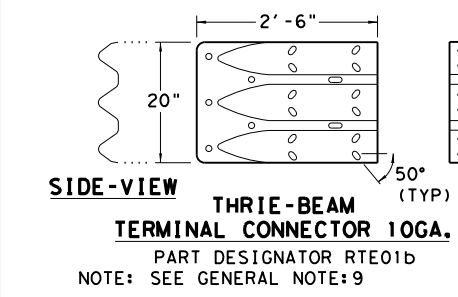
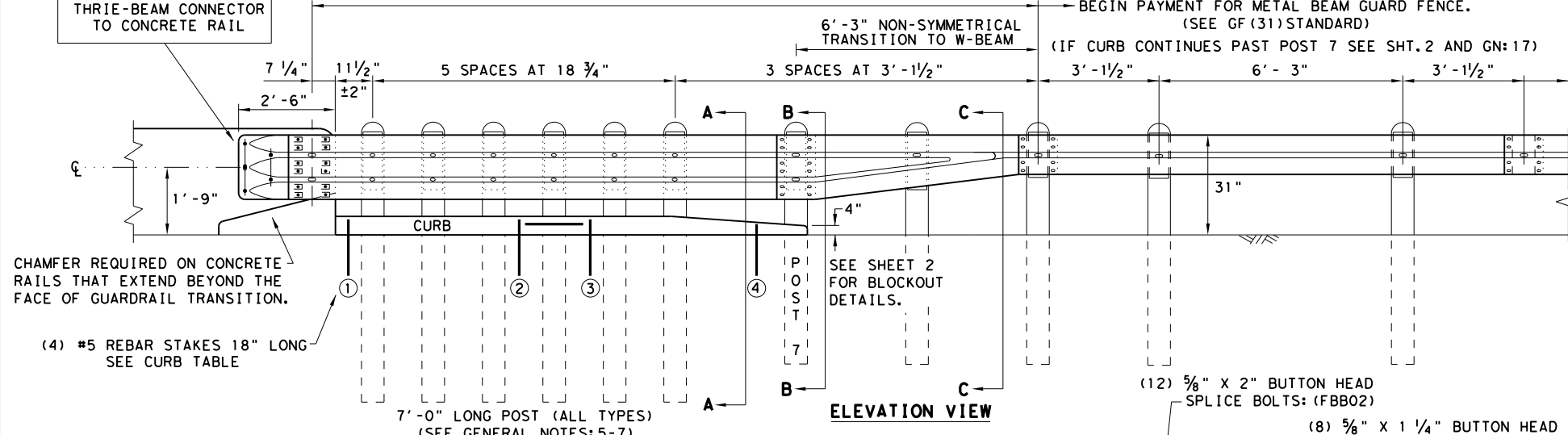
11/30/2023  
 DATE: 11/30/2023  
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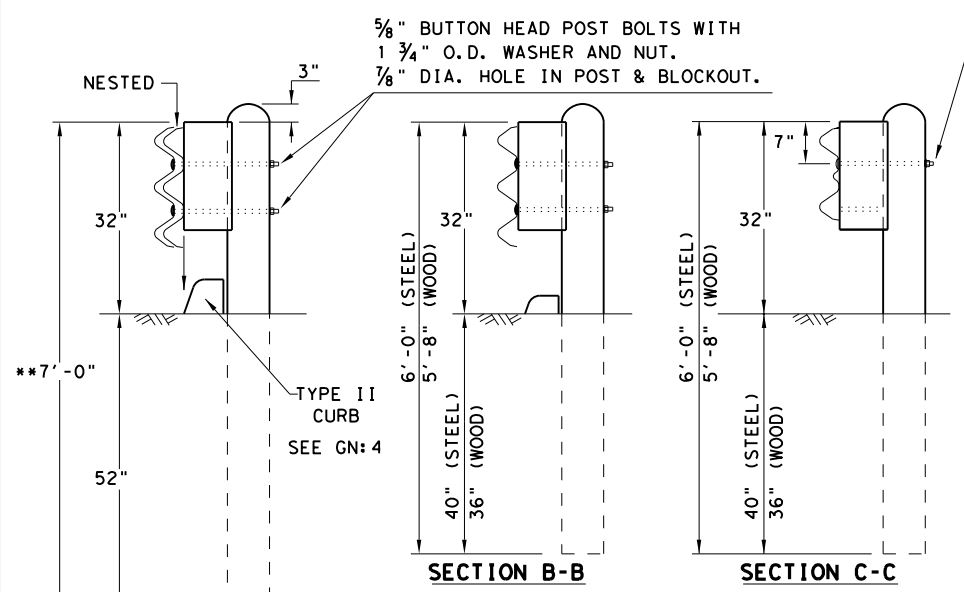
- (5) 1" DIA. HOLES.
- (5) 7/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
- (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (5) 7/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:  
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 7/8" HEX NUT. TRIM AS REQUIRED.

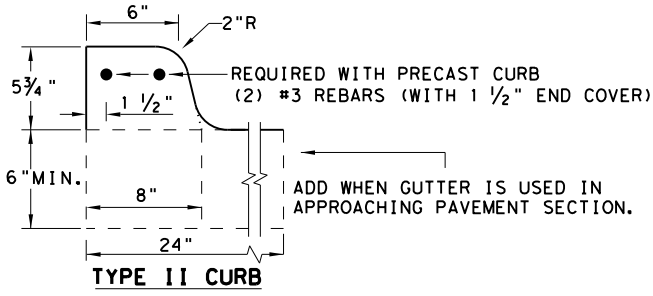
NOTE:  
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.



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



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.



\* 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.

**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 CCGG 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 (FWC16G) 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.

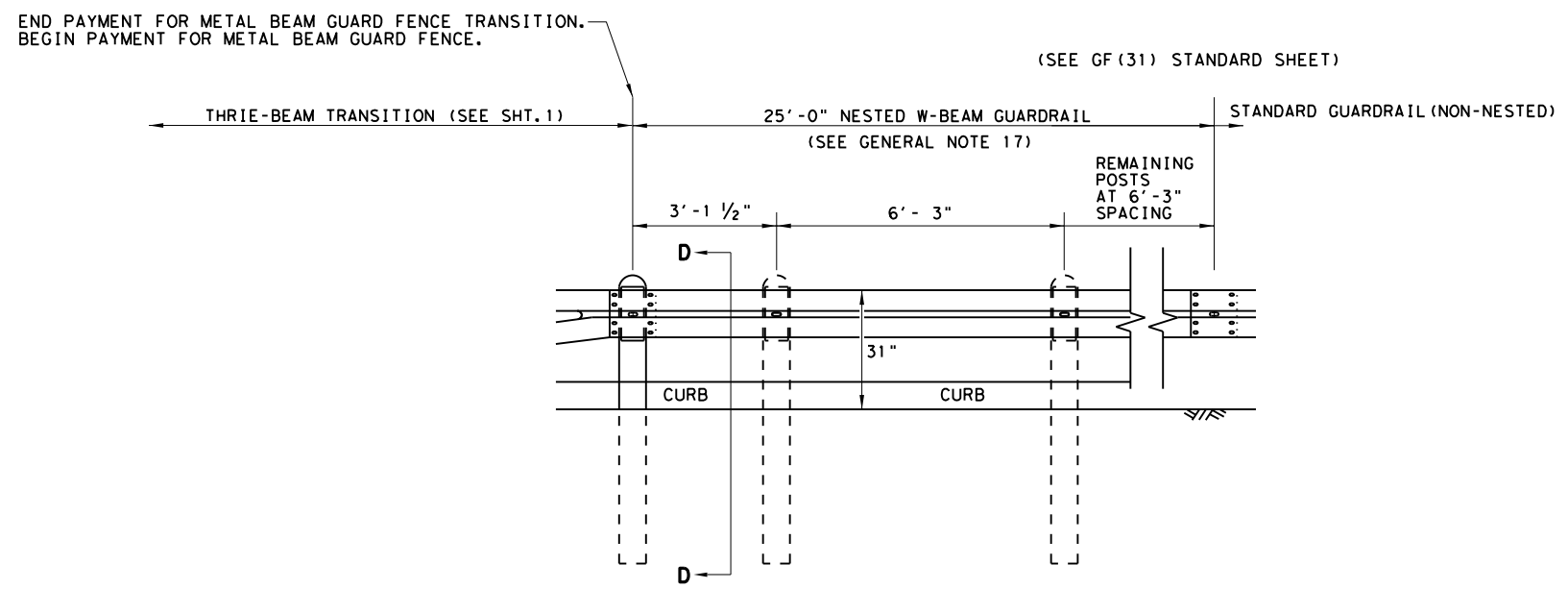
**HIGH-SPEED TRANSITION**  
**SHEET 1 OF 2**

		Design Division Standard	
<b>METAL BEAM GUARD FENCE</b> <b>THRIE-BEAM TRANSITION</b> <b>TL-3 MASH COMPLIANT</b> <b>GF (31) TR TL3-20</b>			
FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2020	CONT	SECT	JOB
REVISIONS	0156	04	120, ETC. US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	51	

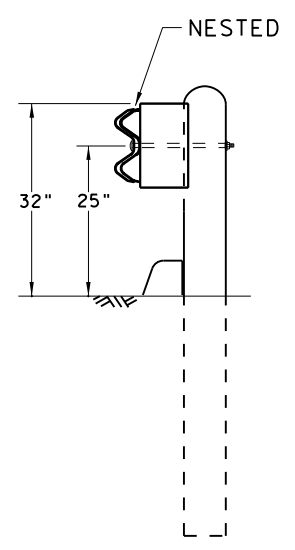
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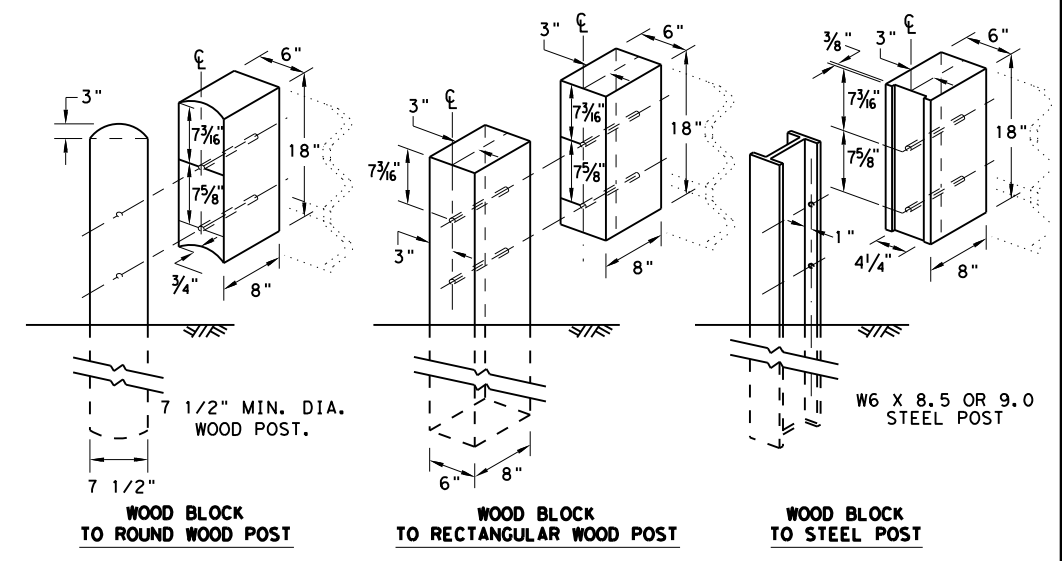
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THREE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

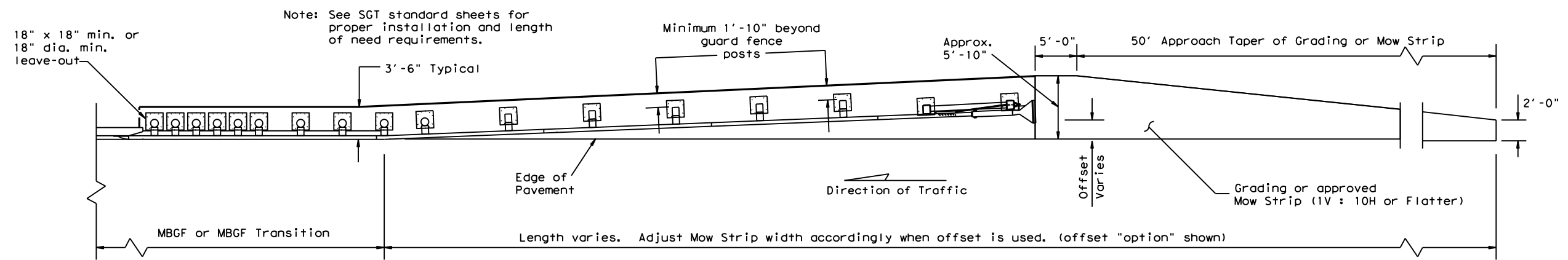
SHEET 2 OF 2

Texas Department of Transportation      Design Division Standard

METAL BEAM GUARD FENCE  
 THREE-BEAM TRANSITION  
 TL-3 MASH COMPLIANT  
 GF (31) TR TL3-20

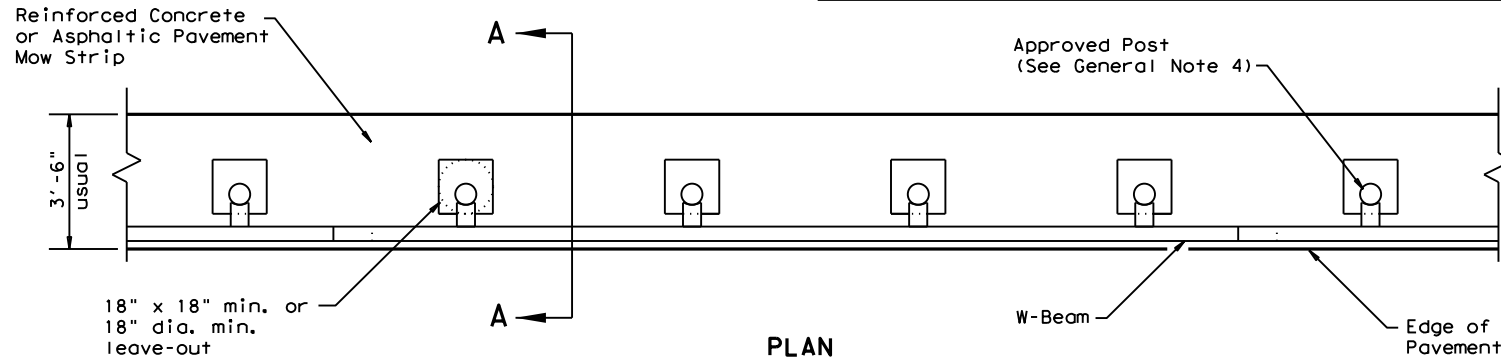
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©TXDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC. US 82, ETC.	
DIST	COUNTY		SHEET NO.	
WFS	WICHITA		52	

DATE: 11/30/2023  
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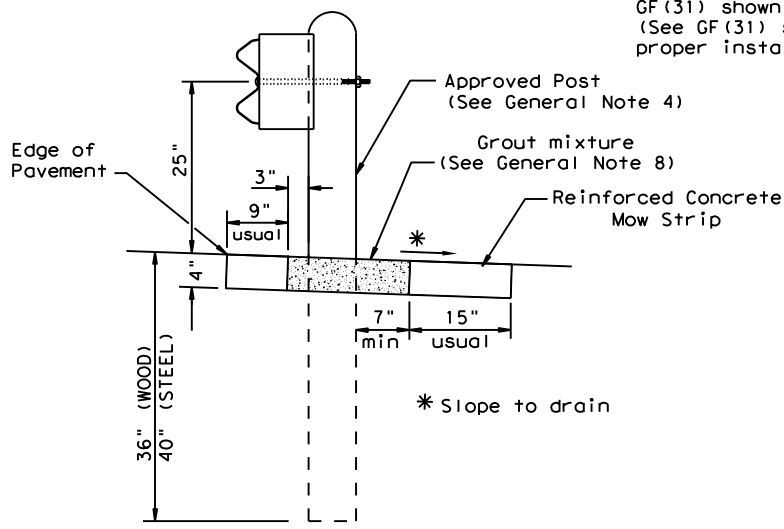
**GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS**

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.



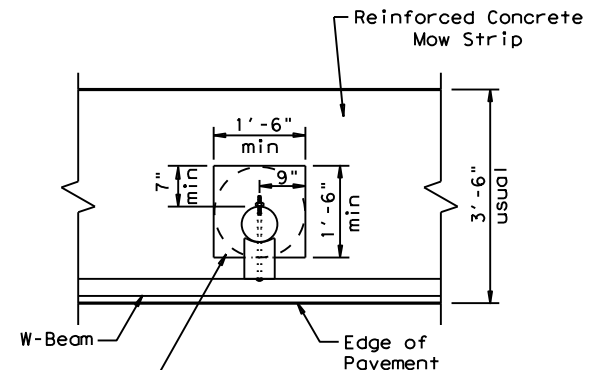
**PLAN**

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



**SECTION A-A**

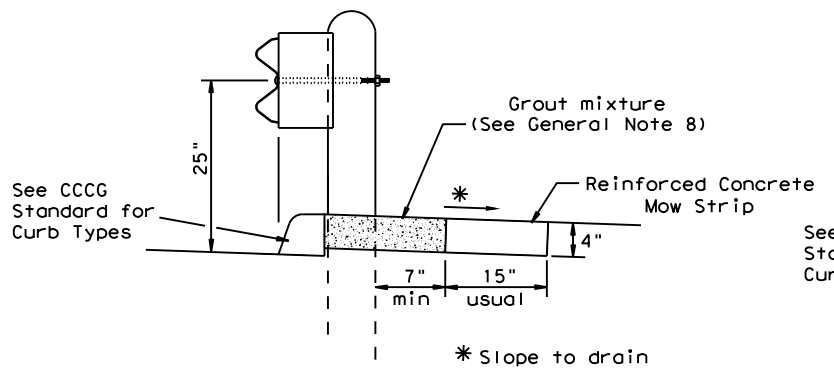
Typical



**MOW STRIP DETAIL**

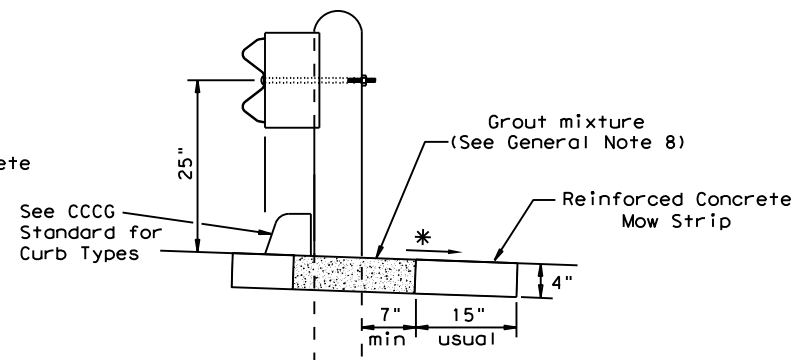
Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.

- 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 1/2" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
  5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
  6. Thickness of the mow strip will be 4".
  7. The limits of payment for reinforced concrete will include leave-outs for the posts.
  8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



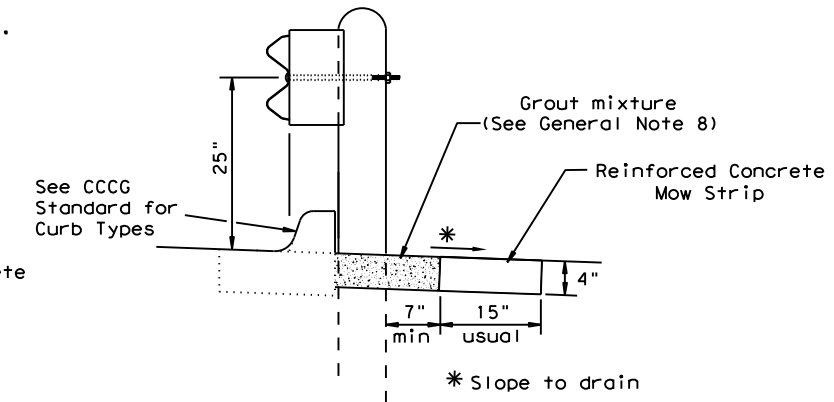
**CURB OPTION (1)**

This option will increase the post embedment throughout the system.



**CURB OPTION (2)**

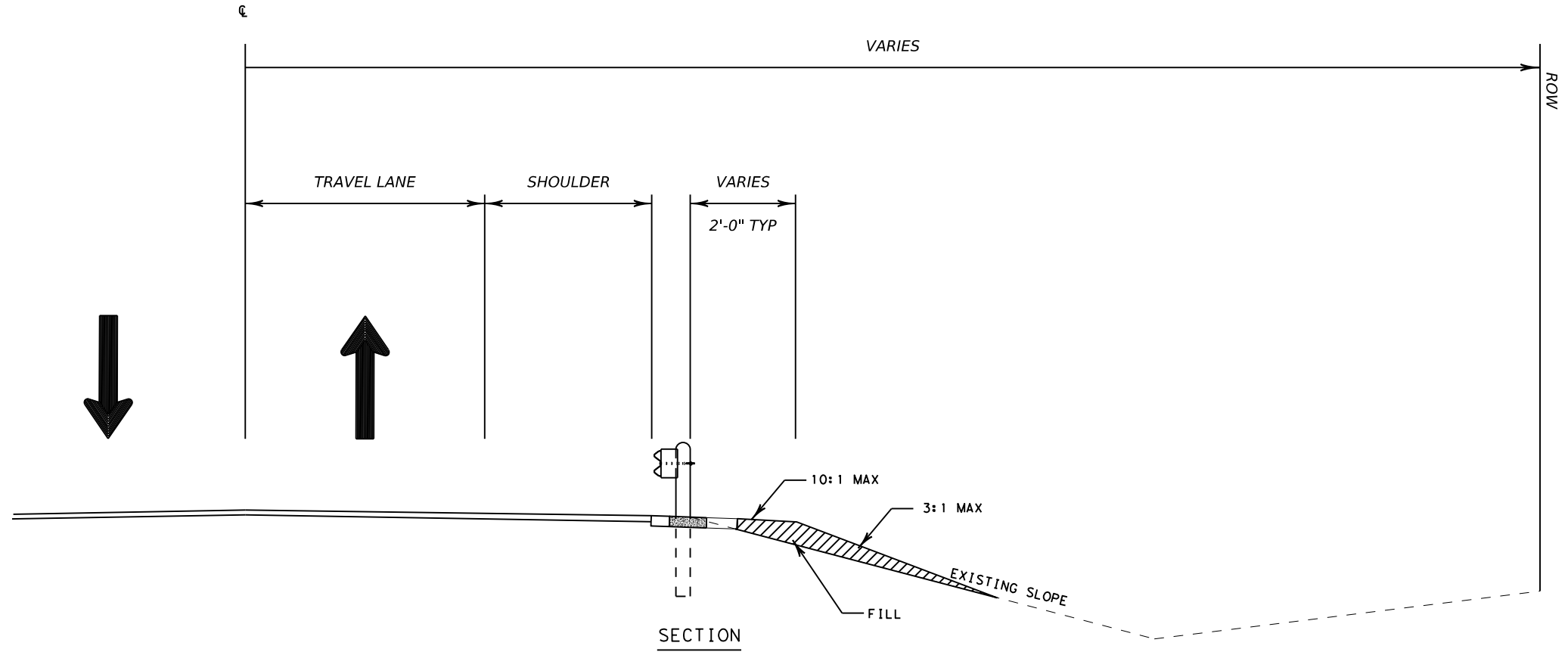
Curb shown on top of mow strip



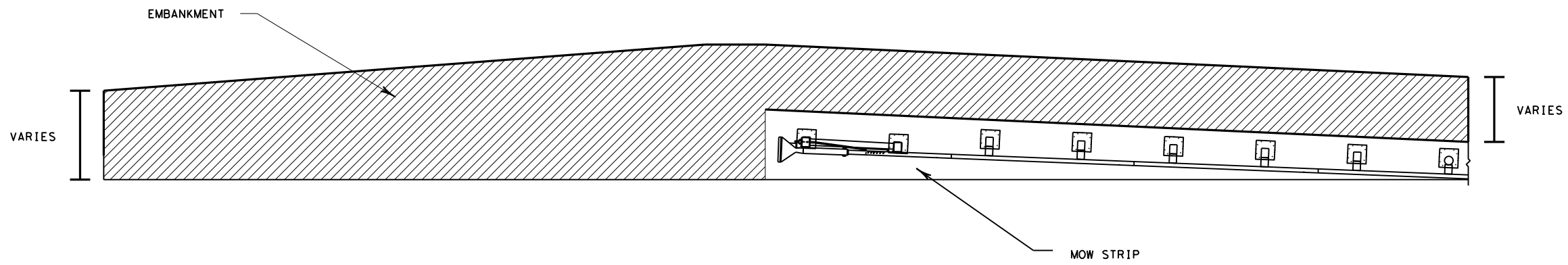
**CURB OPTION (3)**

		Design Division Standard	
<b>METAL BEAM GUARD FENCE (MOW STRIP)</b> <b>TL-3 MASH COMPLIANT</b> <b>GF (31)MS-19</b>			
FILE: gf31ms19.dgn	DN:TXDOT	CK:KM	DW:VP
©TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS		015604120	ETC. US 82, ETC.
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WFS	WICHITA	53	

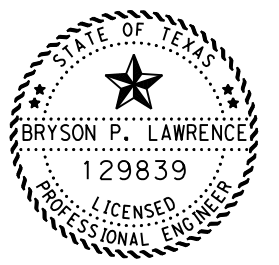
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- NOTES:
1. THE MATERIAL USED SHALL BE STABLE SOIL CAPABLE OF SUSTAINING VEGETATION.
  2. MATERIAL MUST BE APPROVED BY THE ENGINEER BEFORE CONSTRUCTION BEGINS.
  3. COMPLETE ALL EMBANKMENT WORK PRIOR TO PLACEMENT OF PROPOSED MBGF AND SGT.
  4. SEE GF(31)MS-19 FOR DETAILS NOT SHOWN.



NOT TO SCALE



*Bryson Lawrence, P.E.*

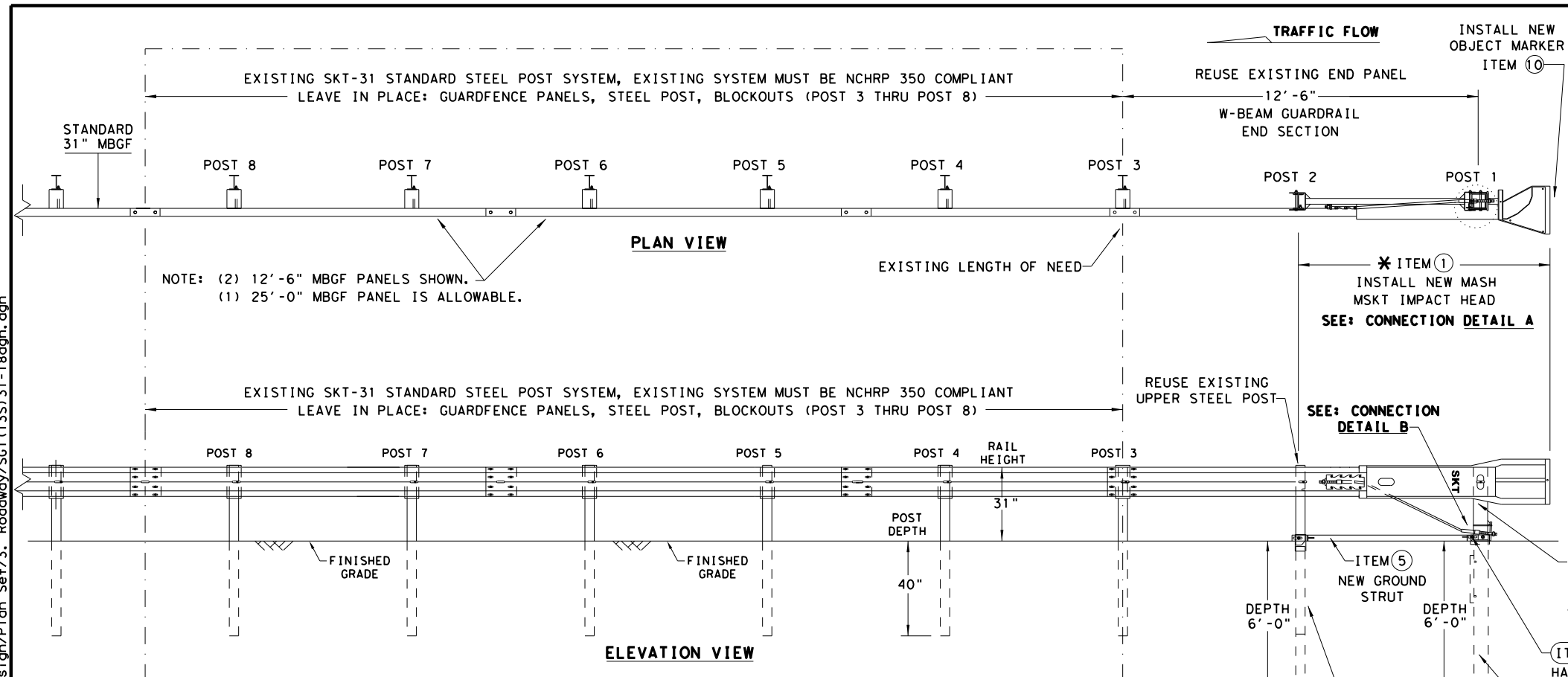
12/01/2023

**US 82, ETC.  
 EMBANKMENT  
 DETAIL**

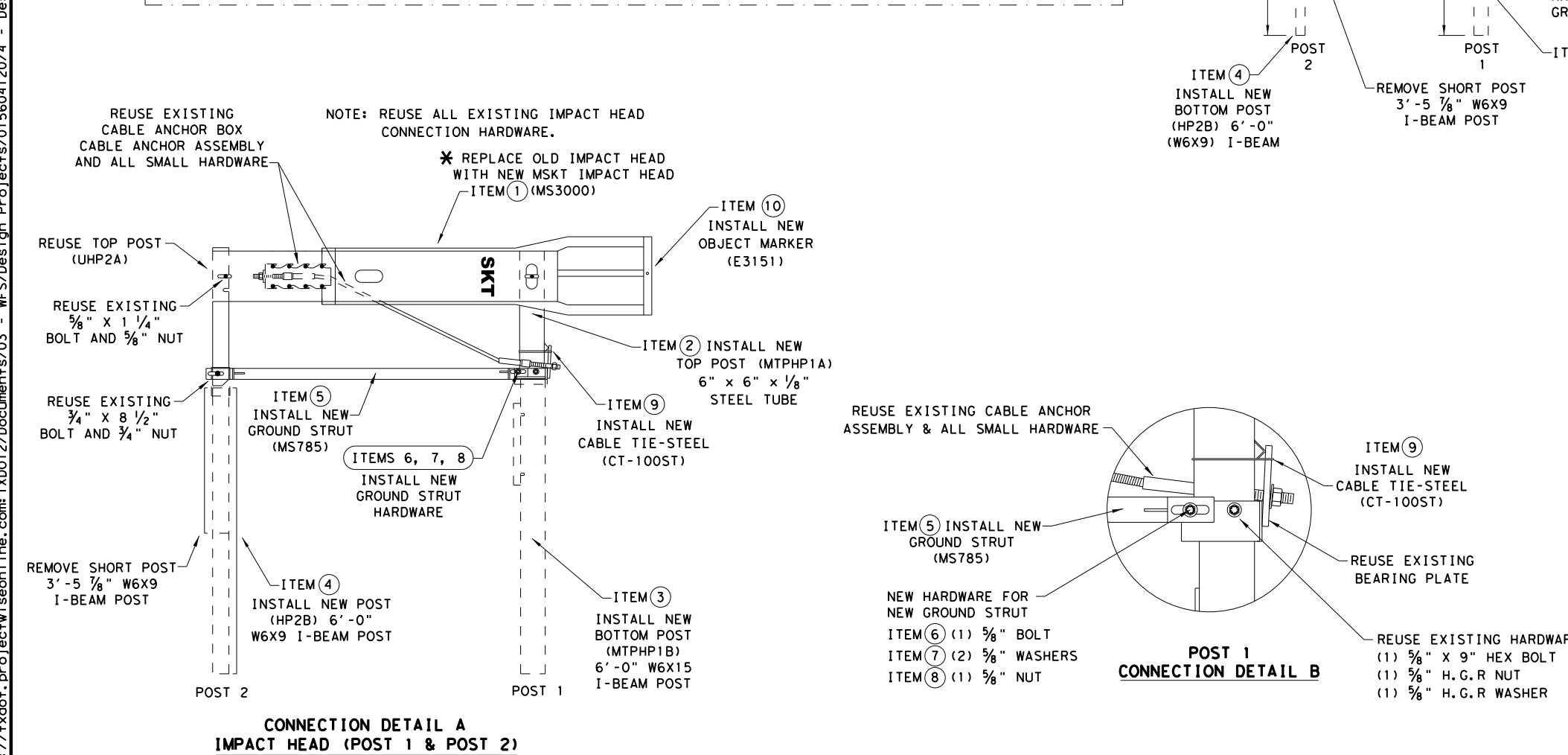


CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	54	

DATE: 11/30/2023  
 FILE: pw://txdot.projectwiseonline.com:TXDOT2/Projects/015604120/4 - Design/Plan Set/3. Roadway/SGT(13S)31-18.dgn  
 WFS/Design Projects/015604120/4 - Design/Plan Set/3. Roadway/SGT(13S)31-18.dgn



- GENERAL NOTES**
- 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
  - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
  - 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.
  - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
  - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
  - IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
  - POSTS SHALL NOT BE SET IN CONCRETE.
  - THE EXISTING SKT 31" STANDARD STEEL POST SYSTEM MUST BE THOROUGHLY INSPECTED, AND DETERMINED TO BE INTACT, AND FREE OF ANY DAMAGE OR DEFECTS BEFORE RETROFITTING. THIS INSPECTION INCLUDES COMPLETING THE MSKT RETROFIT INSPECTION CHECKLIST FOR THE EXISTING SKT 31" STEEL POST NCHRP 350 SYSTEM. ALL EXISTING, AND REUSABLE PARTS MUST BE FREE OF ANY DAMAGE FOR A MASH COMPLIANT RETROFIT.
  - UNDER NO CIRCUMSTANCES SHALL THE GUARDFENCE WITHIN THE MSKT SYSTEM BE CURVED.
  - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRANCHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
  - SPECIAL DRIVING CAP TO BE USED WHEN DRIVING (LOWER POSTS 1 & 2) TO PREVENT DAMAGE TO THE WELDED PLATES.



ITEMS	QTY	MAIN SYSTEM COMPONENTS	PART NUMBERS
* 1	1	MSKT IMPACT HEAD	MS3000
2	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
3	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
4	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
5	1	GROUND STRUT	MS785
6	1	5/8" X 9" HEX BOLT (GRD A449)	B580904A
7	2	5/8" WASHERS	W050
8	1	5/8" H.G.R NUT	N050
9	1	CABLE TIE-STEEL	CT-100ST
* 10	1	OBJECT MARKER 18" X 18"	E3151

**COMPONENTS REQUIRED TO RETROFIT: EXISTING 31" STEEL POST (NCHRP 350) SKT GUARDFENCE TERMINAL WITH THE NEW 31" (MASH COMPLIANT) MSKT IMPACT HEAD.**

\* IF THE EXISTING NCHRP 350 (31" STEEL POST SKT) ALREADY HAS THE MSKT IMPACT HEAD THERE IS NO NEED TO REPLACE THE IMPACT HEAD OR OBJECT MARKER AS LONG AS IT IS NOT DAMAGED.

Design Division Standard

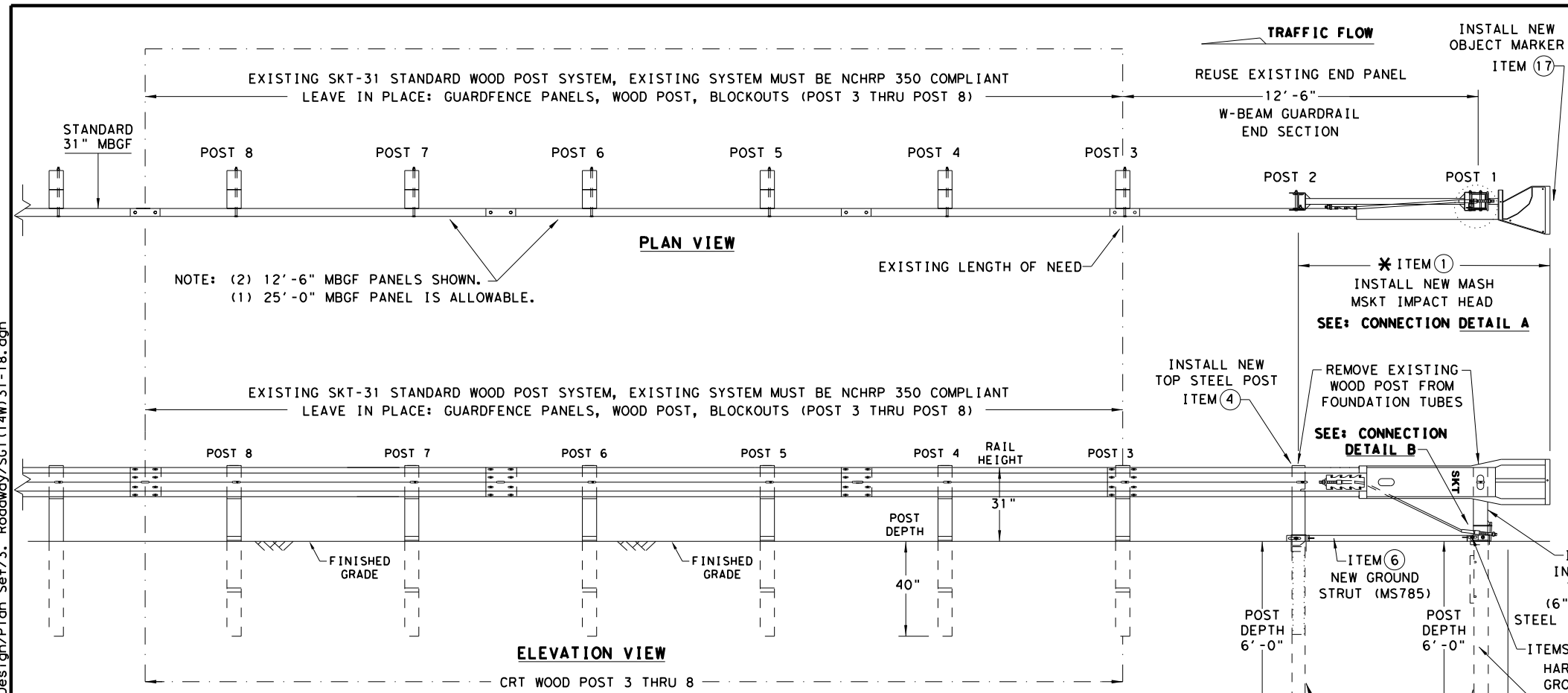
**RETROFIT STANDARD  
 SKT 31" STEEL POST SYSTEM  
 TO MASH MSKT  
 SGT (13S) 31-18**

FILE: sgt13s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC.	US 82, ETC.
	DIST	COUNTY	SHEET NO.	
	WFS	WICHITA	55	

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

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NOTE: (2) 12'-6" MBGF PANELS SHOWN.  
 (1) 25'-0" MBGF PANEL IS ALLOWABLE.

REUSE EXISTING CABLE ANCHOR BOX, CABLE ANCHOR ASSEMBLY AND ALL SMALL HARDWARE

INSTALL NEW ITEM (13) & (12)  
 (1) 5/8" X 1 1/4" SPLICE BOLT (B580122)  
 (1) 5/8" HGR NUT (N050)

REMOVE WOOD POST FROM FOUNDATION TUBE

ITEM (4) INSTALL NEW TOP STEEL POST (UHP2A)

ITEM (14) & (15) INSTALL NEW HEX BOLT (B340854A) (1) 3/4" X 8 1/2" (1) 3/4" NUT (N030)

REMOVE STEEL FOUNDATION TUBES AT POSTS 1 & 2  
 SEE NOTE: \*\*

ITEM (5) INSTALL NEW BOTTOM POST (HP2B) 6'-0" W6X9 I-BEAM POST

CONNECTION DETAIL A  
 IMPACT HEAD (POST 1 & POST 2)

REPLACE OLD IMPACT HEAD WITH NEW MSKT IMPACT HEAD ITEM (1) (MS3000)

INSTALL NEW HARDWARE FOR MOUNTING IMPACT HEAD TO (POST 1)  
 ITEM (7) (2) 5/16" X 1" HEX BOLT (GRD 5)  
 ITEM (8) (4) 5/16" WASHER  
 ITEM (9) (2) 5/16" HEX NUT

ITEM (17) INSTALL NEW OBJECT MARKER (E3151)

ITEM (2) INSTALL NEW TOP POST (6" X 6" X 1/8") STEEL TUBE (MTPHP1A)

ITEMS (10, 11, 12) INSTALL NEW GROUND STRUT HARDWARE

ITEM (16) INSTALL NEW CABLE TIE-STEEL (CT-100ST)

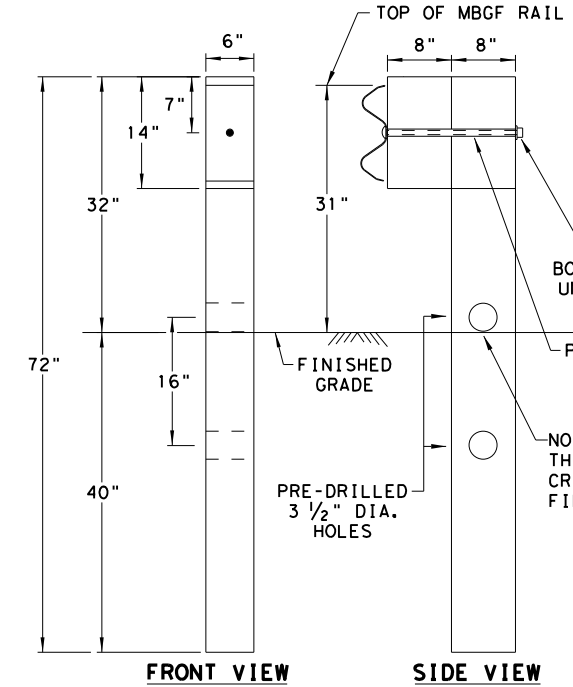
ITEM (3) INSTALL NEW BOTTOM POST (MTPHP1B) 6'-0" W6X15 I-BEAM POST

ITEM (6) INSTALL NEW GROUND STRUT (MS785)  
 NEW HARDWARE FOR NEW GROUND STRUT AND FOR POST 1 CONNECTION  
 ITEM (10) (2) 5/8" X 9" BOLT  
 ITEM (11) (3) 5/8" WASHERS  
 ITEM (12) (2) 5/8" NUT

POST 1 CONNECTION DETAIL B

ITEM (5) INSTALL NEW BOTTOM POST (HP2B) 6'-0" (W6X9) I-BEAM POST

\*\* NOTE: EXTRA SOIL COMPACTION WILL BE NEEDED AROUND NEW (POSTS 1 & 2) DUE TO THE REMOVAL OF THE STEEL FOUNDATION TUBES.



FRONT VIEW SIDE VIEW  
 EXISTING WOOD POSTS 3-8  
 CONTROLLED RELEASE TERMINAL (CRT)

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

**GENERAL NOTES**

- 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
- FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
- 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.
- FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
- HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
- IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
- POSTS SHALL NOT BE SET IN CONCRETE.
- THE EXISTING SKT 31" STANDARD WOOD POST SYSTEM MUST BE THOROUGHLY INSPECTED, AND DETERMINED TO BE INTACT, AND FREE OF ANY DAMAGE OR DEFECTS BEFORE RETROFITTING. THIS INSPECTION INCLUDES COMPLETING THE MSKT RETROFIT INSPECTION CHECKLIST FOR THE EXISTING SKT 31" WOOD POST NCHRP 350 SYSTEM. ALL EXISTING, AND REUSABLE PARTS MUST BE FREE OF ANY DAMAGE FOR A MASH COMPLIANT RETROFIT.
- UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
- A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRANCHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
- SPECIAL DRIVING CAP TO BE USED WHEN DRIVING (LOWER POSTS 1 & 2) TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEMS	QTY	MAIN SYSTEM COMPONENTS	PART NUMBERS
1	1	MSKT IMPACT HEAD	MS3000
2	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
3	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
4	1	POST 2 - ASSEMBLY TOP	UHP2A
5	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
6	1	GROUND STRUT	MS785
7	2	5/16" X 1" HEX BOLT (GRD 5)	B516014A
8	4	5/16" WASHERS	W0516
9	2	5/16" HEX NUT	N0516
10	2	5/8" X 9" HEX BOLT (GRD A449)	B580904A
11	3	5/8" WASHERS	W050
12	3	5/8" H.G.R NUT	N050
13	1	5/8" X 1 1/4" SPLICE BOLT	B580122
14	1	3/4" X 8 1/2" HEX BOLT (GRD 5)	B340854A
15	1	3/4" HEX NUT	N030
16	1	CABLE TIE-STEEL	CT-100ST
17	1	OBJECT MARKER 18" X 18"	E3151

COMPONENTS REQUIRED TO RETROFIT: EXISTING 31" WOOD POST (NCHRP 350 SKT) GUARDRAIL TERMINAL WITH THE NEW 31" (MASH COMPLIANT MSKT IMPACT HEAD).  
 \* IF THE EXISTING NCHRP 350 (31" WOOD POST SKT) ALREADY HAS THE MSKT IMPACT HEAD THERE IS NO NEED TO REPLACE THE IMPACT HEAD OR OBJECT MARKER AS LONG AS IT IS NOT DAMAGED.

USE EXISTING 5/8" X 18" BOLT WITH (1 5/8") O.D. WASHER UNDER 5/8" HGR NUT FIELD-SIDE

NOTE: THE BOTTOM OF THE UPPER 3 1/2" CRT HOLE IS APPROXIMATELY AT FINISHED GRADE.

Texas Department of Transportation  
 Design Division Standard

**RETROFIT STANDARD  
 SKT 31" WOOD POST SYSTEM  
 TO MASH MSKT  
 SGT (14W) 31-18**

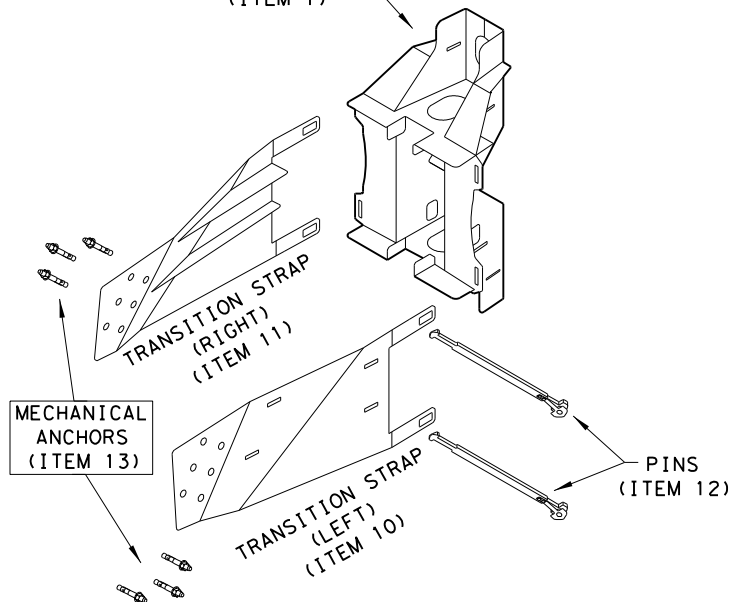
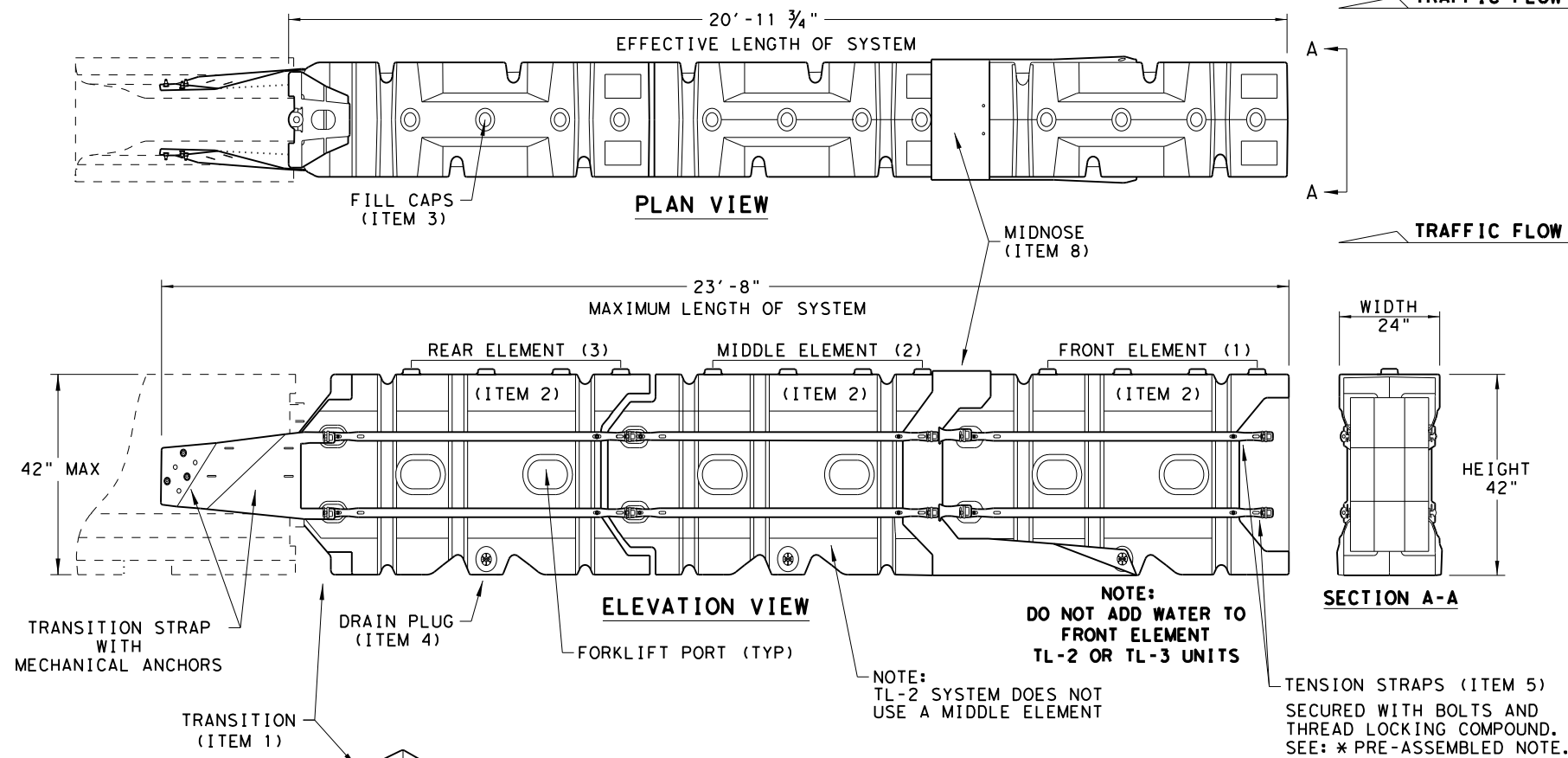
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© TXDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156 04	120, ETC.	US 82, ETC.	
	DIST	COUNTY	SHEET NO.	
	WFS	WICHITA	56	



DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TxDOT FOR ANY PURPOSE WHATSOEVER. TxDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE:  
FILE:

SYSTEM SHOWN - ABSORB-M TL-3

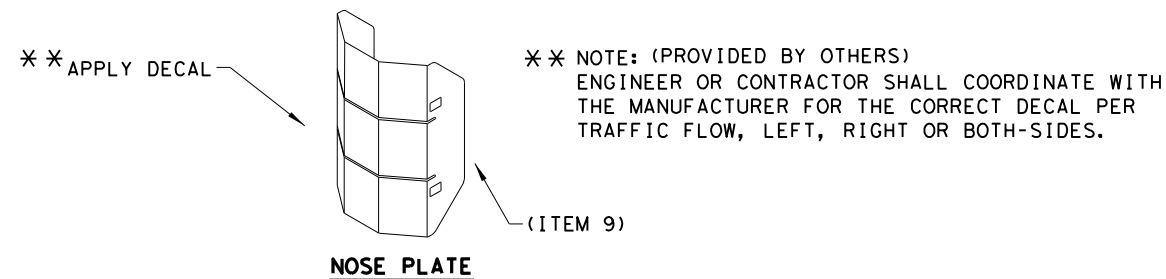


THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

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.



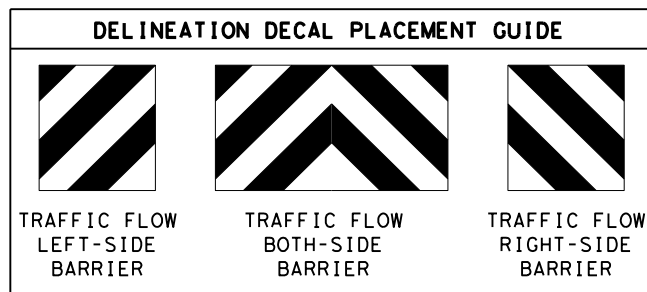
NOTE: APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

**GENERAL NOTES**

- 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
- THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
- 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.
- MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
- THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
- THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
- 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

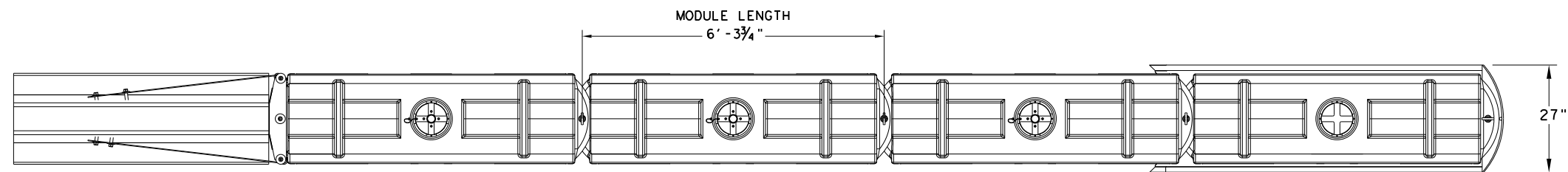


**SACRIFICIAL**

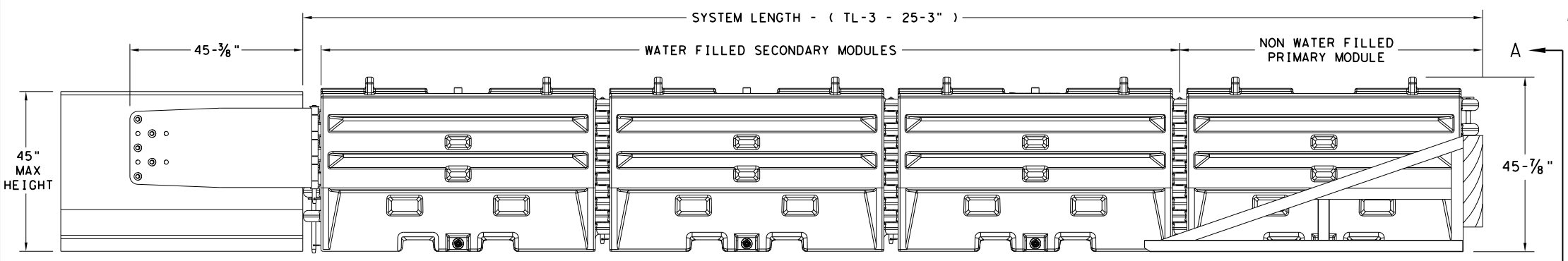
		Design Division Standard	
<b>LINDSAY TRANSPORTATION SOLUTIONS CRASH CUSHION (MASH TL-3 &amp; TL-2) TEMPORARY - WORK ZONE ABSORB (M) - 19</b>			
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2019	CONT	SECT	JOB
REVISIONS			HIGHWAY
	DIST	COUNTY	SHEET NO.

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DATE: 12/20/2023  
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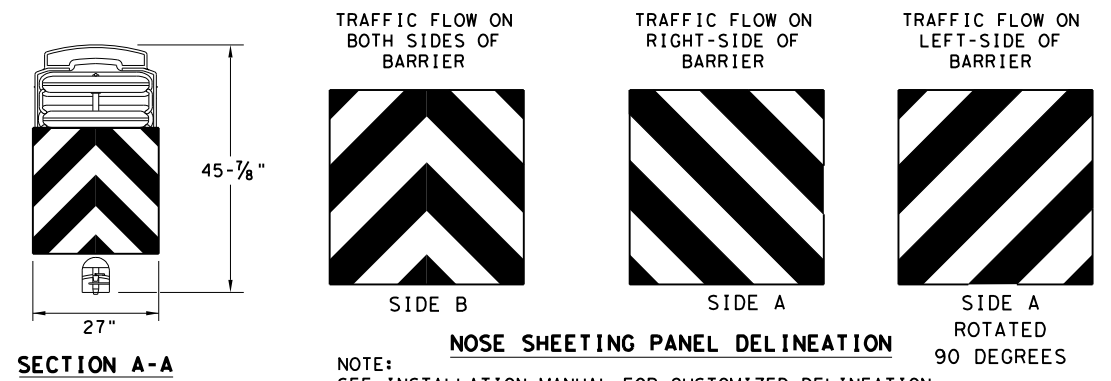
**PLAN VIEW**



**ELEVATION VIEW**

**GENERAL NOTES**

- REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
- 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.
- MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
- THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- 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

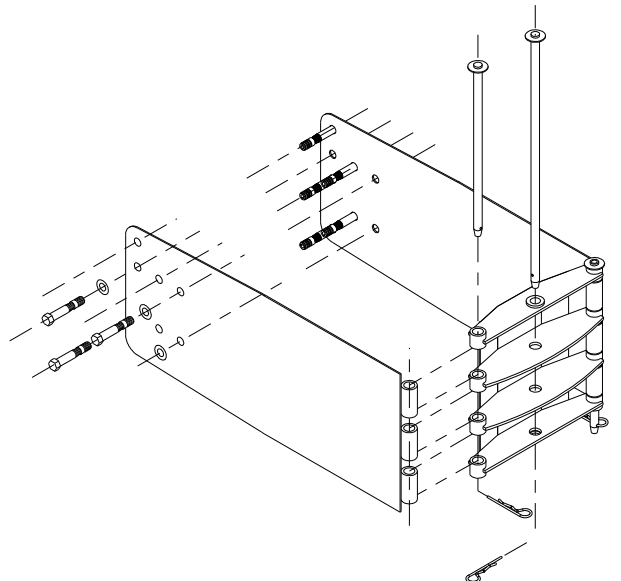


**NOSE SHEETING PANEL DELINEATION**

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

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

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



**SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB**

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

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

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

**SACRIFICIAL**

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	0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.	
WFS	WICHITA		57A	



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

This project is adjacent or parallel work, not within RR ROW:  
 DOT No.: 276371Y  
 Crossing Type: Crossover  
 RR Company Operating Track at Crossing: BNSF  
 RR Company Owning Track at Crossing: BNSF  
 RR MP: 5.298  
 RR Subdivision: Valley Jct-Allendale  
 City: Wichita Falls  
 County: Wichita  
 CSJ at this Crossing: 0156-14-028

Scope of Work, including any TCP, to be performed by State Contractor:

Remove existing bridge rail and retrofit with new.

Scope of Work to be performed by Railroad Company:

N/A

**II. FLAGGING & INSPECTION**

No. of Days of Railroad Flagging Expected: 20  
 On this project, night or weekend flagging is:  
 Expected  
 Not Expected

Flagging services will be provided by:  
 Railroad Company: TxDOT will pay flagging invoices. Flagging Agreement with Railroad will be needed  
 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 877-984-677

**BNSF** BNSFinfo@railprofs.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:

**III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD**

Required. Railroad Point of Contact: \_\_\_\_\_  
 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.

**IV. RAILROAD INSURANCE REQUIREMENTS**

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

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

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.

Escalated Limits	
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

Railroad Protective Liability Limits	
<input type="checkbox"/> Not Required	
<input checked="" type="checkbox"/> Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Structure Projects. Includes new construction or replacement of overpass/underpass structures	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other: _____	

**V. CONTRACTOR'S RIGHT OF ENTRY (CROE)**

Not Required  
 Required: UPRR Maintenance Consent Letter. TxDOT to assist  
 Required: TxDOT to assist in obtaining the UPRR CROE  
 Required: Contractor to obtain
 

- BNSF: Temporary Occupancy Permit  
<https://bnsf.railpermitting.com>
- KCS  
[https://jllrpg.360works.com/fmi/webd/rpo\\_web\\_kcs.fmp12](https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12)
- Other Railroads: \_\_\_\_\_

To view previously approved CROE templates agreed upon between the State and Railroad, see: <https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entry-agreements.html>

Approved CROE 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 CROE between the Contractor and the Railroad if required on project.

**VI. RAILROAD COORDINATION MEETING**

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

**VII. RAILROAD SAFETY ORIENTATION**

A. Complete the Railroad's course "Orientation for Contractor's Safety," and maintain 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.

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

**VIII. SUBCONTRACTORS**

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

**IX. EMERGENCY NOTIFICATION**

**In Case of Railroad Emergency**

Call: BNSF \_\_\_\_\_

Railroad Emergency Line at: (800) 832-5452 \_\_\_\_\_

Location: DOT 276371Y \_\_\_\_\_

RR Milepost: 5.298 \_\_\_\_\_

Subdivision: Valley Jct-Allendale \_\_\_\_\_

**RRD Review Only**

Initials: JL

Date: 6/22/2023

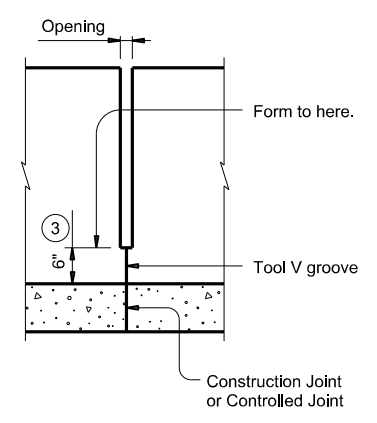
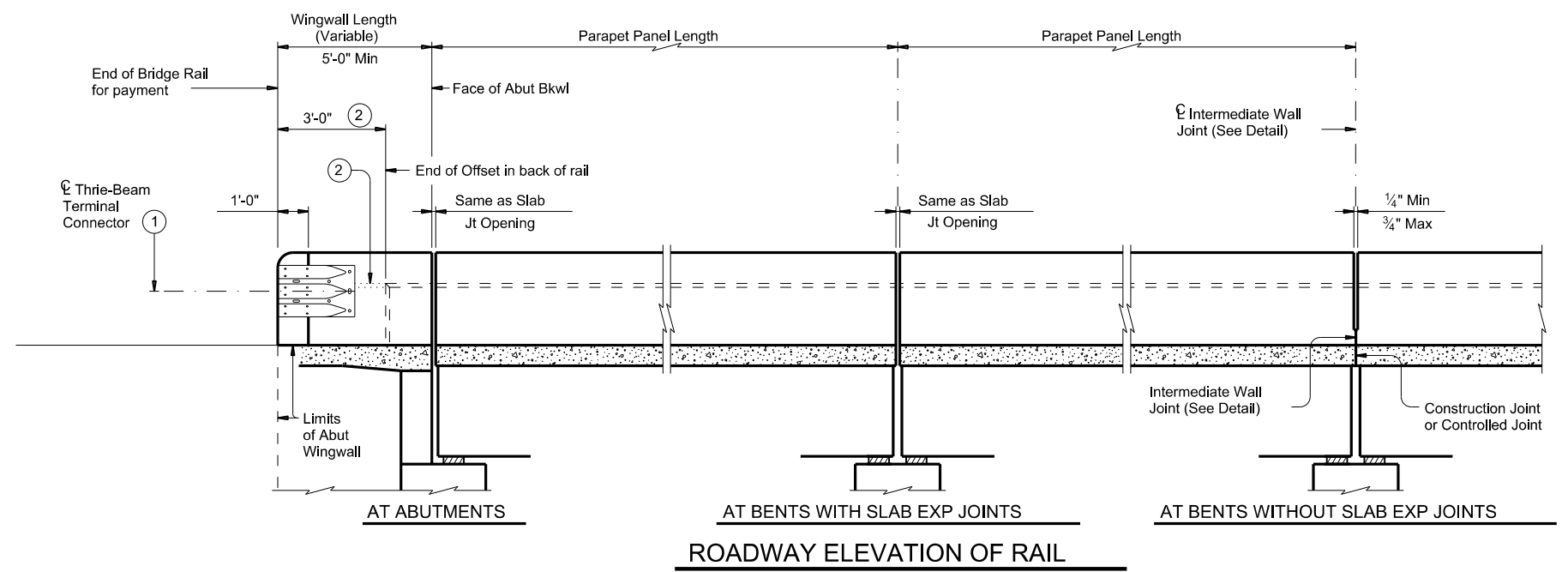
**Rail Division**

## RAILROAD SCOPE OF WORK

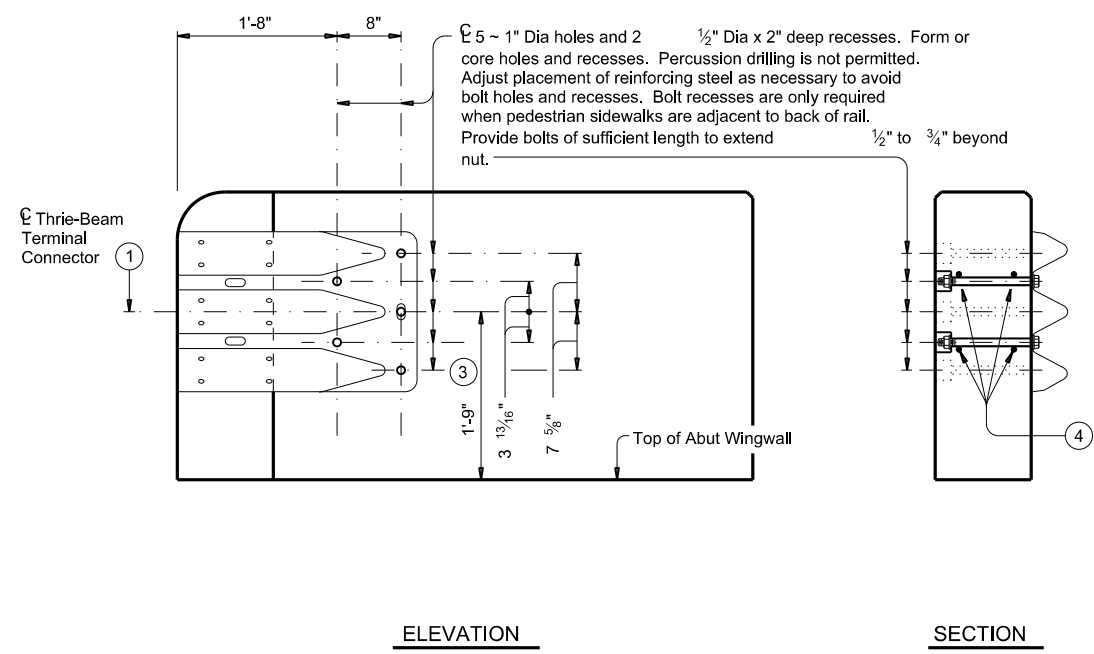
### PROJECT SPECIFIC DETAILS

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© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
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WFS		Wichita		59

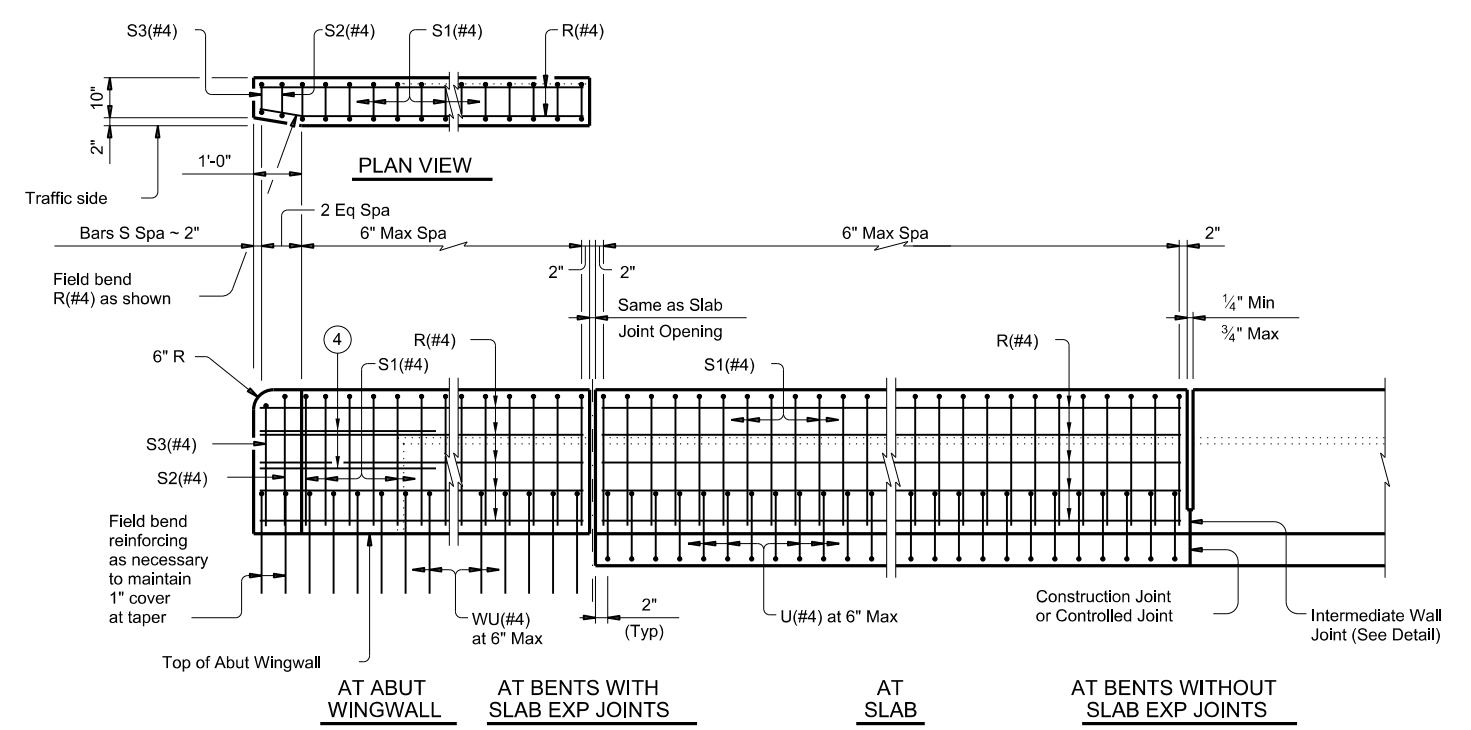
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 DRAWING: TRAFFIC RAIL TYPE T222.dgn  
 DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.



**INTERMEDIATE WALL JOINT DETAIL**  
Provide at all interior bents without slab expansion joints.

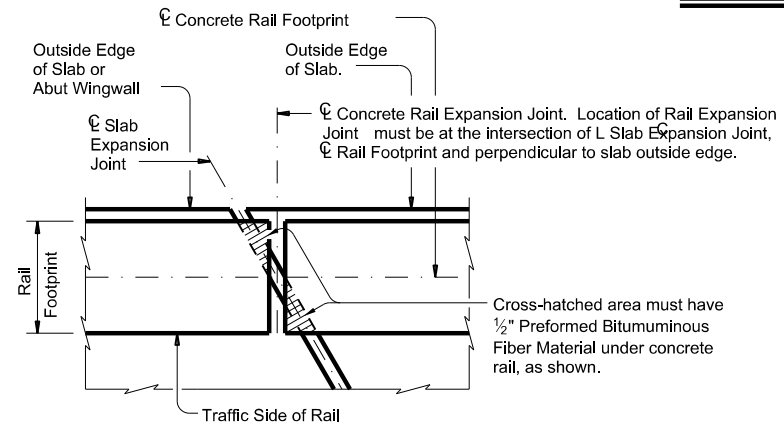


**TERMINAL CONNECTION DETAILS**



**ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT**

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
- ③ Increase 2" for structures with overlay.
- 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. Field bend as needed.



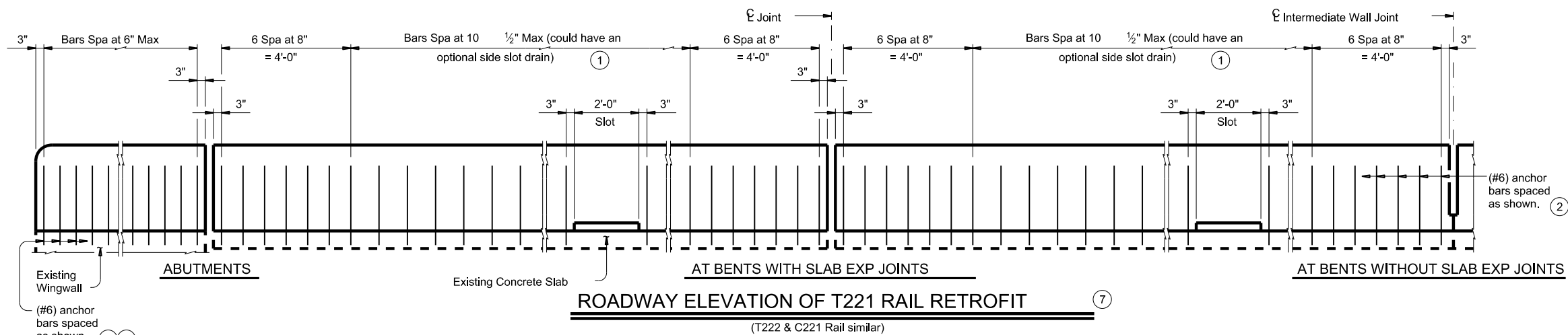
**PLAN OF RAIL AT EXPANSION JOINTS**  
Example showing Slab Expansion Joints without breakbacks.

SHEET 1 OF 2

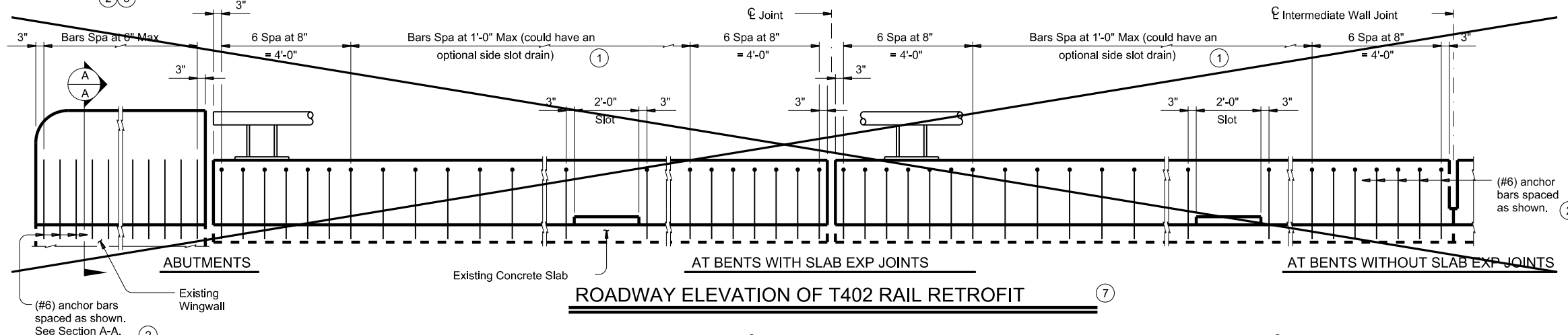
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<h1>TRAFFIC RAIL</h1>			
<h2>TYPE T222</h2>			
FILE: rstd003-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	HIGHWAY
REVISIONS	0156	04	120, ETC. US 82, ETC.
DIST	COUNTY	SHEET NO.	
WFS	WICHITA	60	



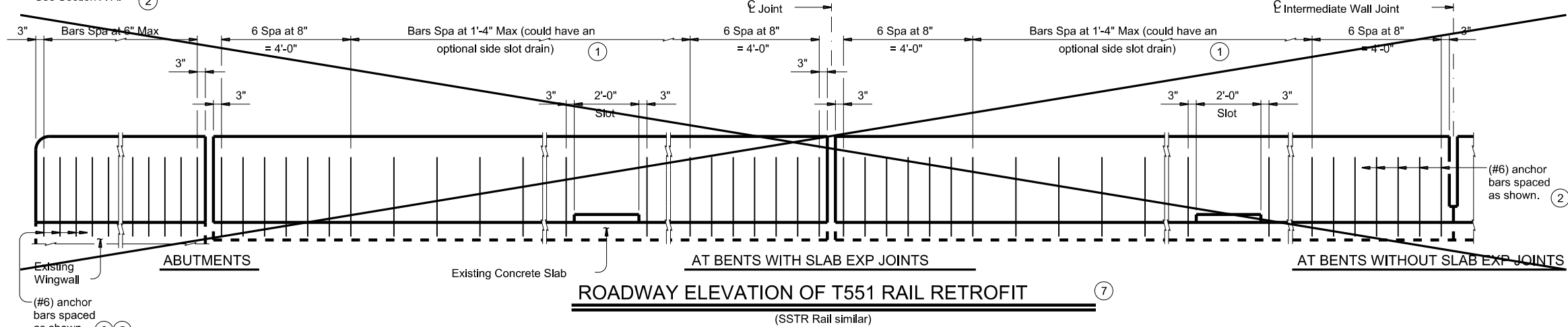
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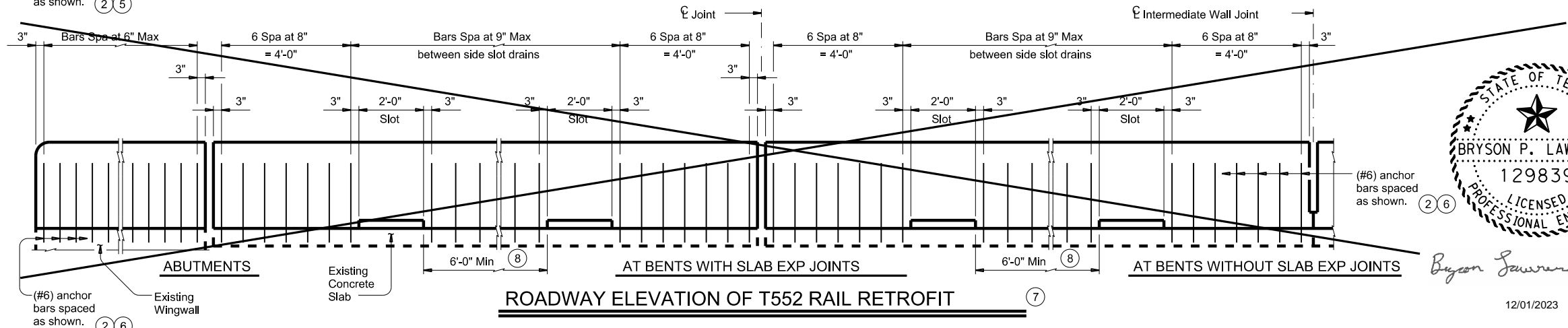
**ROADWAY ELEVATION OF T221 RAIL RETROFIT**  
(T222 & C221 Rail similar)



**ROADWAY ELEVATION OF T402 RAIL RETROFIT**

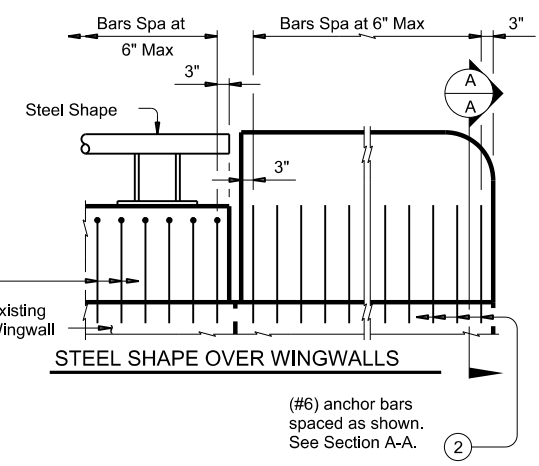


**ROADWAY ELEVATION OF T551 RAIL RETROFIT**  
(SSTR Rail similar)



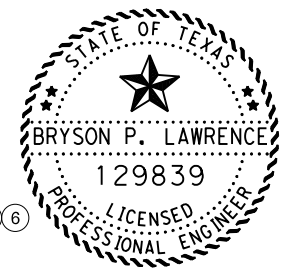
**ROADWAY ELEVATION OF T552 RAIL RETROFIT**

- 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 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".
- ③ See T221, T222 or C221 Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors."
- ④ See T402 or C402 Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors."



- ⑤ 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."
- ⑥ See T552 Rail Sections in "Rail Retrofit Section on Wingwalls using Adhesive Anchors" and/or "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors."
- ⑦ Showing spacing of (#6) adhesive anchor in a rail retrofit condition. Secondary (#4) adhesive anchor in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See rail standard for details and notes not shown.
- ⑧ Place side slot drains as shown. See appropriate rail standard for side slot drains, except as noted.

SHEET 1 OF 4



**RETROFIT GUIDE FOR CONCRETE RAILS**  
(T221, T222, C221, T402, C402, T551, SSTR & T552)  
(Not to be used as a standard)  
**C-RAIL-R**

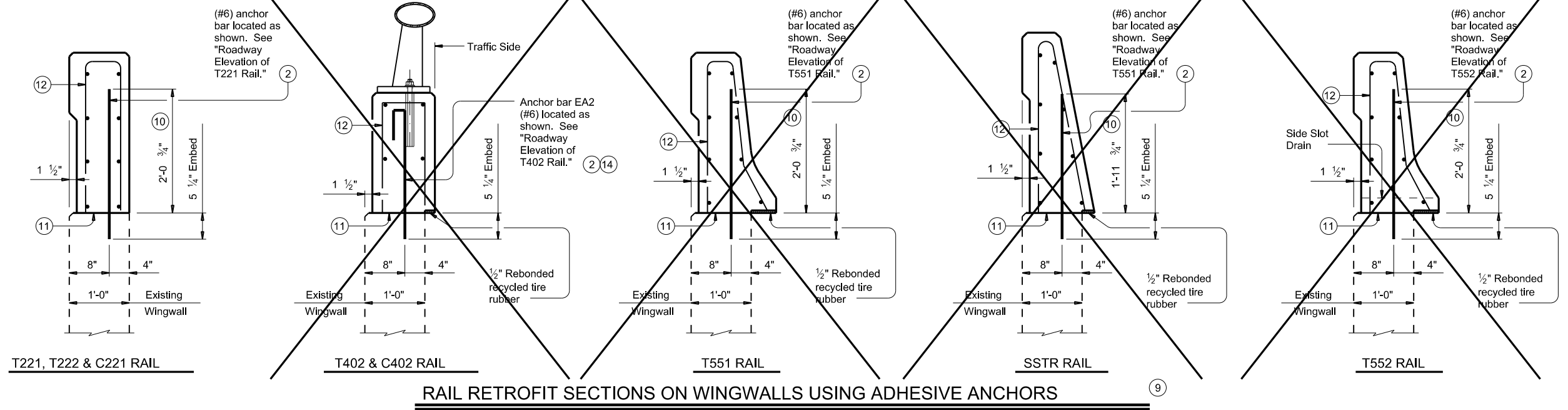
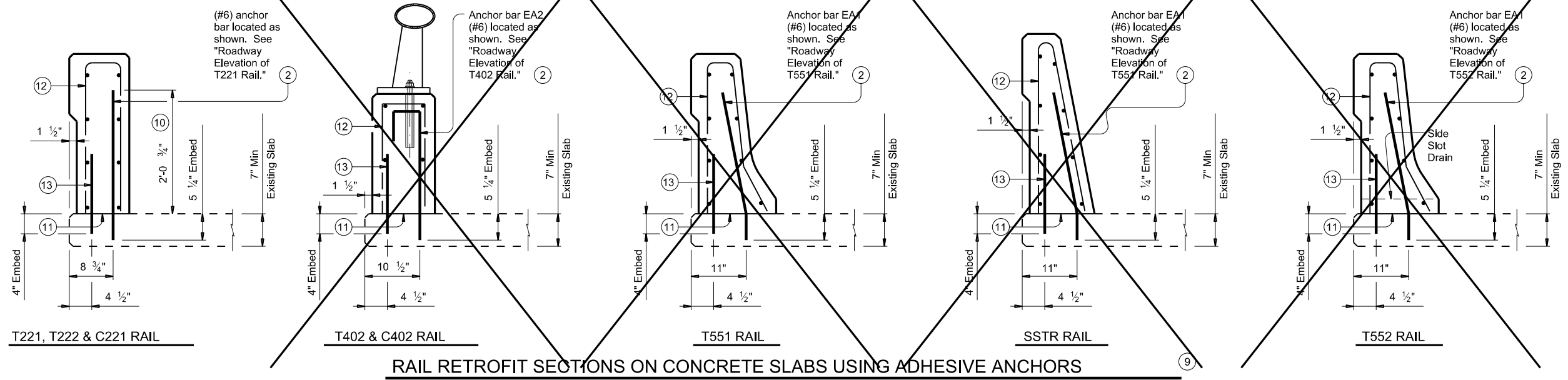
*Bryson Lawrence, P.E.*

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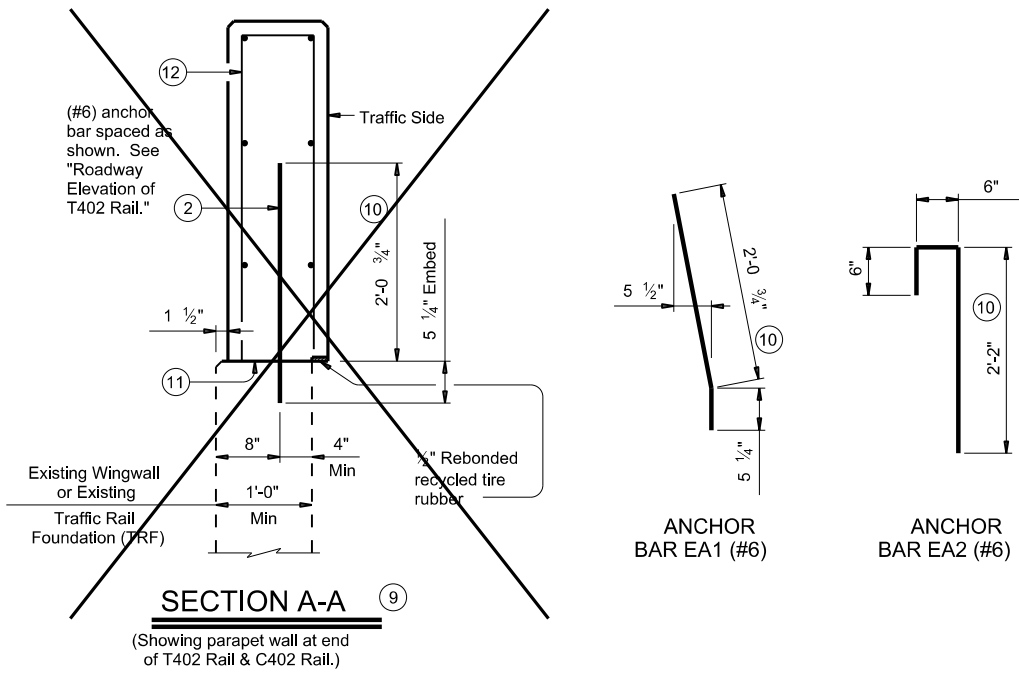
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REVISIONS	CONT	SECT	JOB	HIGHWAY
07-20: Text change from epoxy to adhesive and changed MASH Test Level note.	DIST	COUNTY	SHEET NO.	

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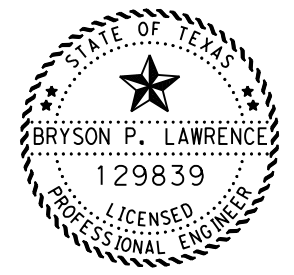
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Rail retrofits on existing Traffic Rail Foundations (TRF) are similar.



- ② 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".
- ⑨ Showing location or locations of anchor bars in a rail retrofit condition. See appropriate rail standard for details and notes not shown.
- ⑩ Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- ⑪ Do not cast rails or parapet walls on top of overlays/seal coats.
- ⑫ See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.
- ⑬ Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).
- ⑭ (#6) anchor bars need to be rotated slightly to fit in designated area, as shown.



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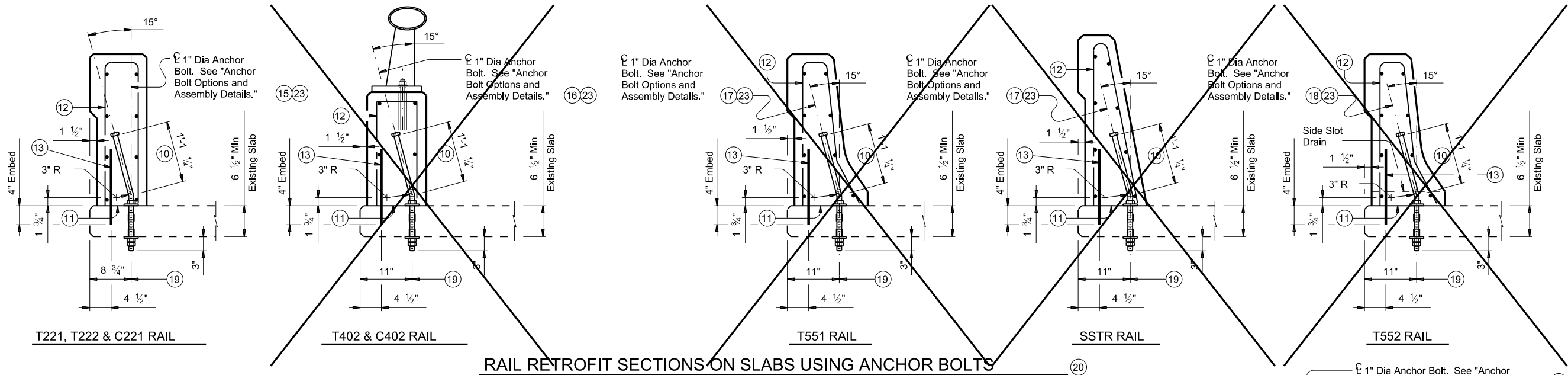
SHEET 2 OF 4

		<b>Bridge Division Standard</b>	
<b>RETROFIT GUIDE FOR CONCRETE RAILS</b> (T221, T222, C221, T402, C402, T551, SSTR & T552) (Not to be used as a standard) <b>C-RAIL-R</b>			
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©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
07-20: Text change from epoxy to adhesive and changed MASH Test Level note.		DEST	COUNTY
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DATE: FILE:

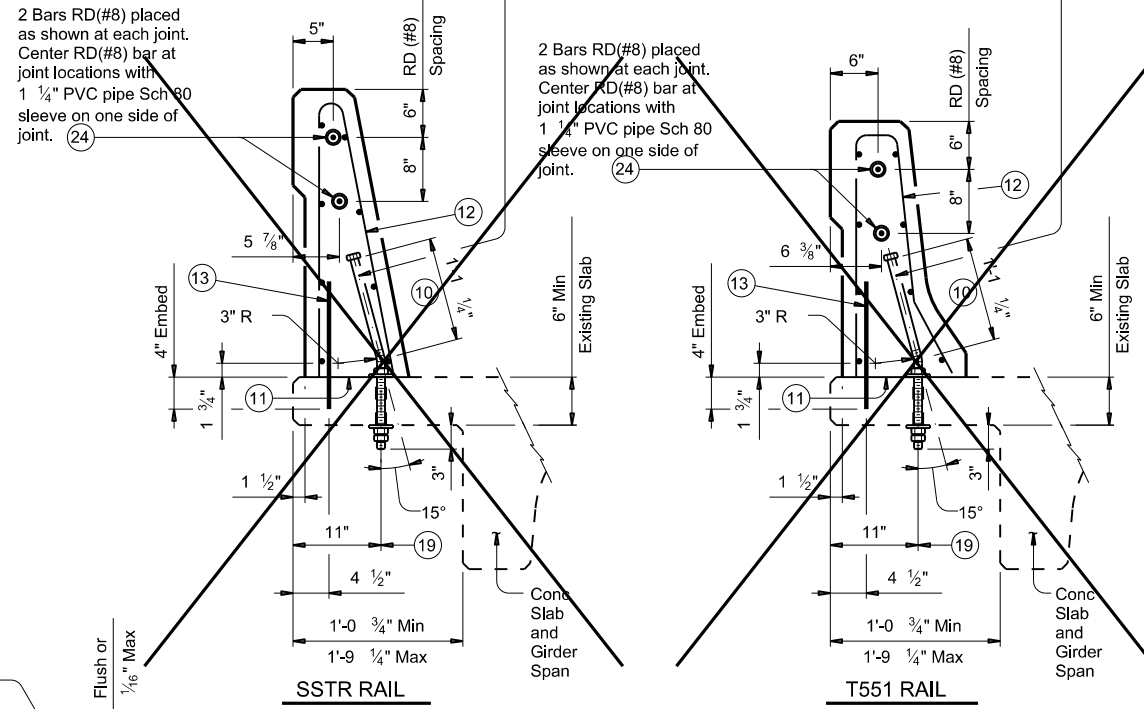


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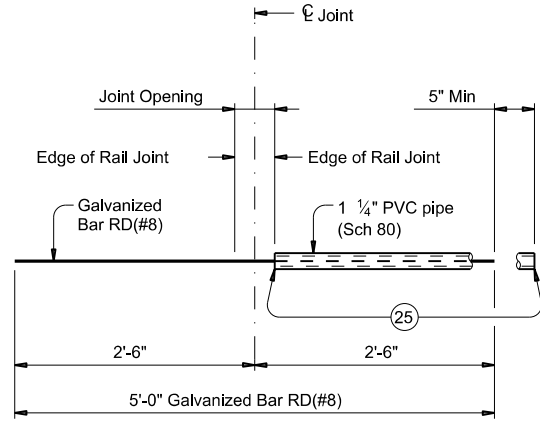
**RAIL RETROFIT SECTIONS ON SLABS USING ANCHOR BOLTS**

- 10 Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- 11 Do not cast rails or parapet walls on top of overlays/seal coats.
- 12 See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.
- 13 Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).
- 15 1" Dia Anchor Bolt Spaced longitudinally along rail at 18" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).
- 16 1" Dia Anchor Bolt Spaced longitudinally along rail at 21" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).
- 17 1" Dia Anchor Bolt Spaced longitudinally along rail at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).
- 18 1" Dia Anchor Bolt Spaced longitudinally along rail at 20" Max (Spaced 6" longitudinally from outside edge and edge of side slot drains).
- 19 1/16" to 1/4" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding 1/2" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.
- 20 Showing location of anchor bars and anchor bolts in a rail retrofit condition. See appropriate rail standard for details and notes not shown.
- 21 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.
- 22 Plate Washer 3/8" x 3 x 3 ASTM A36 with 1/16" Dia Hole centered.
- 23 Galvanize anchor bolts, nuts and plate washers.
- 24 See "Bar RD(#8) Assembly Detail."
- 25 Tape ends of 1/4" PVC pipe Sch 80 to prevent concrete or mortar from seeping in.

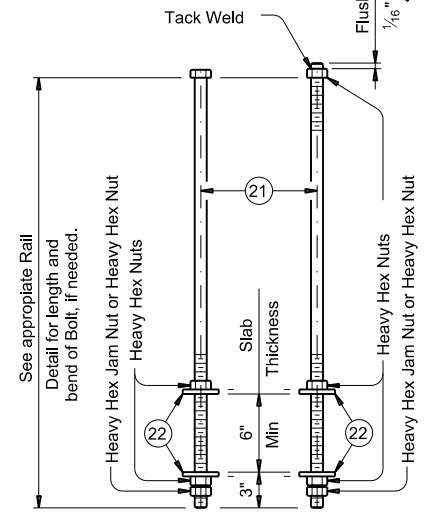


**RAIL RETROFIT SECTIONS ON CG (PAN FORM) SPANS**

Only SSTR and T551 Rails can be retrofitted to Pan Form overhangs as shown.

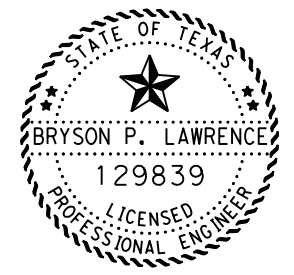


**BAR RD(#8) ASSEMBLY DETAIL**



**ANCHOR BOLT OPTIONS AND ASSEMBLY DETAILS**

SHEET 3 OF 4



*Bryson Lawrence, P.E.*

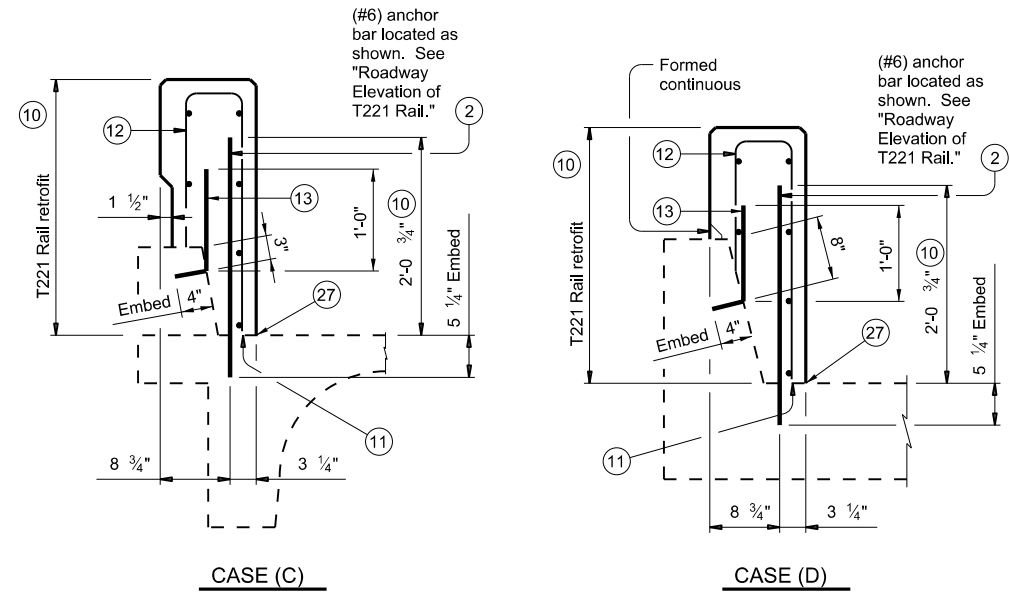
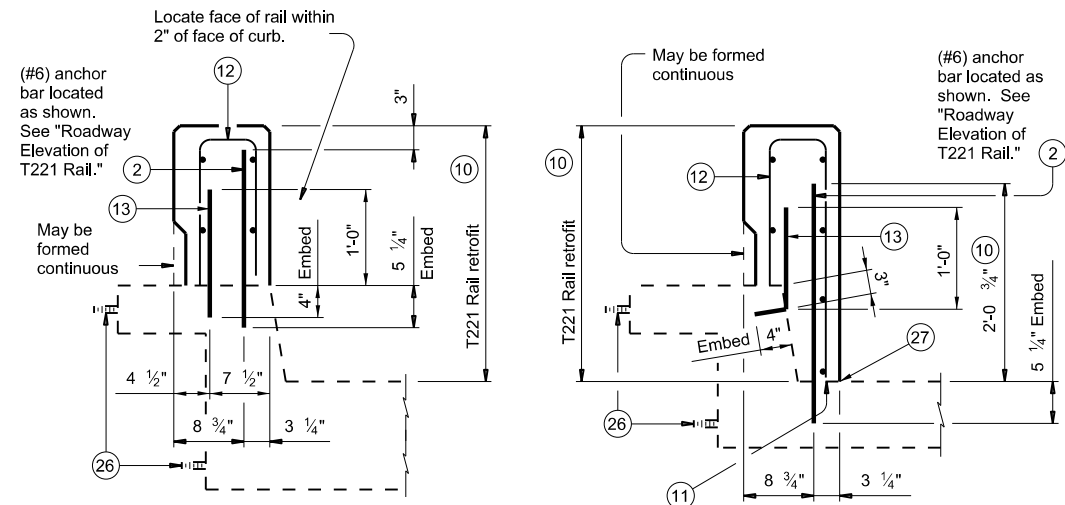
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		<b>Bridge Division Standard</b>	
<b>RETROFIT GUIDE FOR CONCRETE RAILS</b> (T221, T222, C221, T402, C402, T551, SSTR & T552) (Not to be used as a standard) <b>C-RAIL-R</b>			
FILE: RL-C-RAIL-R-20.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
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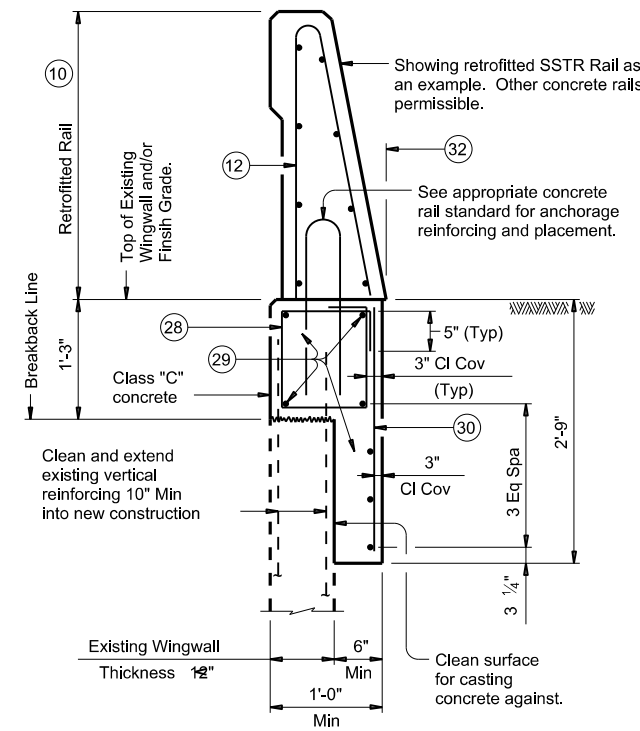


**T221 RAIL RETROFIT EXAMPLES**

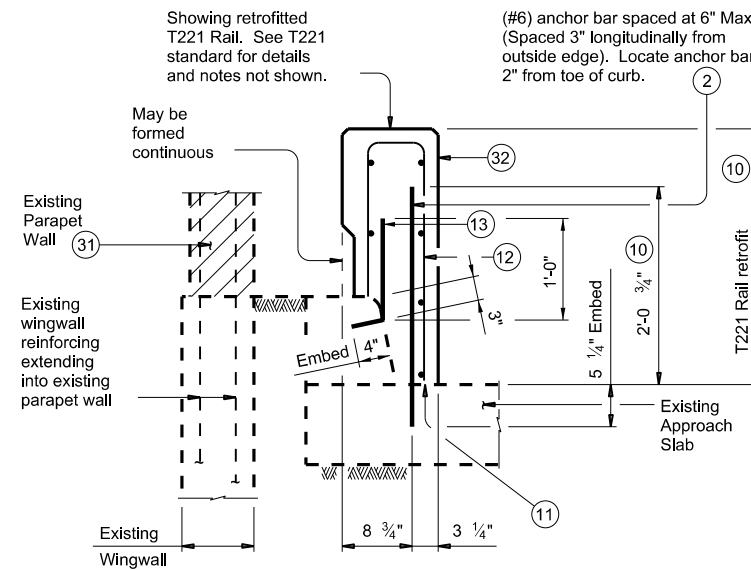
- ② Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing 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".
- ⑨ Showing location or locations of anchor bars in a rail retrofit condition. See appropriate rail standard for details and notes not shown.
- ⑩ Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- ⑪ Do not cast rails or parapet walls on top of overlays/seal coats.
- ⑫ See appropriate rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.
- ⑬ Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).
- ⑳ Remove existing rail, cut and grind anchor bolts flush, and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing."
- ㉑ Void out area in rail retrofit to accommodate existing drain holes in deck.
- ㉒ Space (#4) stirrups at 8" Max. (Spaced 3 1/4" longitudinally from retrofitted ends of wingwall).
- ㉓ 7 ~ (#5) bars with 3" end cover.
- ㉔ Space (#4) bars at 8" Max with 3" end cover, spaced with (#4) stirrups.
- ㉕ Remove all concrete and reinforcing steel from existing parapet wall. Existing reinforcing cut off from existing wingwall must be painted with two coats of a zinc-rich paint conforming to the Item "Galvanizing."
- ㉖ Face of rail and/or toe of rail. Location or placement of rail retrofit must match face of rail and/or toe of rail on bridge.

- Case (A): Permitted only with Type T221, T222, C221 and SSTR rails. Do not use this detail unless existing curb is at least 10" wide at its base and the flexural strength, Mn, of the curb at its base is at least 10.5 kip-ft per foot, with no strength reduction factor applied.
- Case (B): Locate anchor bar 2" from toe of curb.
- Case (C): Locate anchor bar no closer than 2" from toe of curb.
- Case (D): Do not remove any part of curb unless it has been determined to not be a structural element. Locate anchor bar 2" from toe of curb.

1/4" Anchor



**SECTION OF EXISTING PARALLEL WINGWALLS LESS THAN 12" THICK**



**SECTION OF EXISTING PARALLEL OR FLARED WINGWALLS WITH APPROACH SLAB**

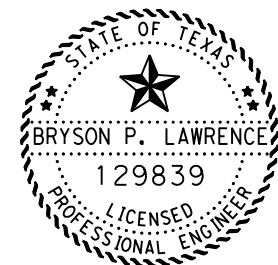
**CONSTRUCTION NOTES:**  
 Field verify dimensions before commencing work and ordering materials.  
 By adding additional anchorage, welding can be performed at a minimum spacing of 3 ft between the cage and additional anchorage. By satisfying additional anchorage requirements slip forming is allowed. Do not weld to the required anchorage.  
 Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

**MATERIAL NOTES:**  
 Provide Grade 60 reinforcing steel.  
 Epoxy coat or galvanize all reinforcing steel if required elsewhere.  
 (#6) and (#4) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

**GENERAL NOTES:**  
 Use of these retrofit details will result in a railing acceptable for the MASH Test Level indicated on the applicable rail standard.  
 Rail anchorage details shown on this guide may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Not all possible combinations of existing railing, curbs, parapets etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this guide.  
 Do not remove any part of a curb until it has been evaluated to not be a load-carrying structural component.  
 Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.  
 Payment for a rail retrofit will be as per Item 451, "Retrofit Railing", by the type of the rail retrofit. All details shown herein are subsidiary to rail retrofit. Examples are "Retrofit Rail (Ty T551)", "Retrofit Rail (Ty SSTR)", etc.

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

This sheet is to be used as a guide for retrofitting existing structures with rails listed on this sheet. Details with appropriate notes from this guide should be prepared for the specific application. Dimensions of existing slab thickness, curb widths, heights, etc., should be shown. Particular care should be taken in identifying the bridge abutment wingwall conditions and providing for proper reinforcement anchorage and approach guard fence post positioning. This sheet may not be used without modification. The details shown may need to be amended if the exact existing condition is not covered. In all cases, details and notes not required must be crossed out or eliminated, "(MOD)" added, this note and the phrase "(Not to be used as a standard)" removed, and the sheet sealed and signed.



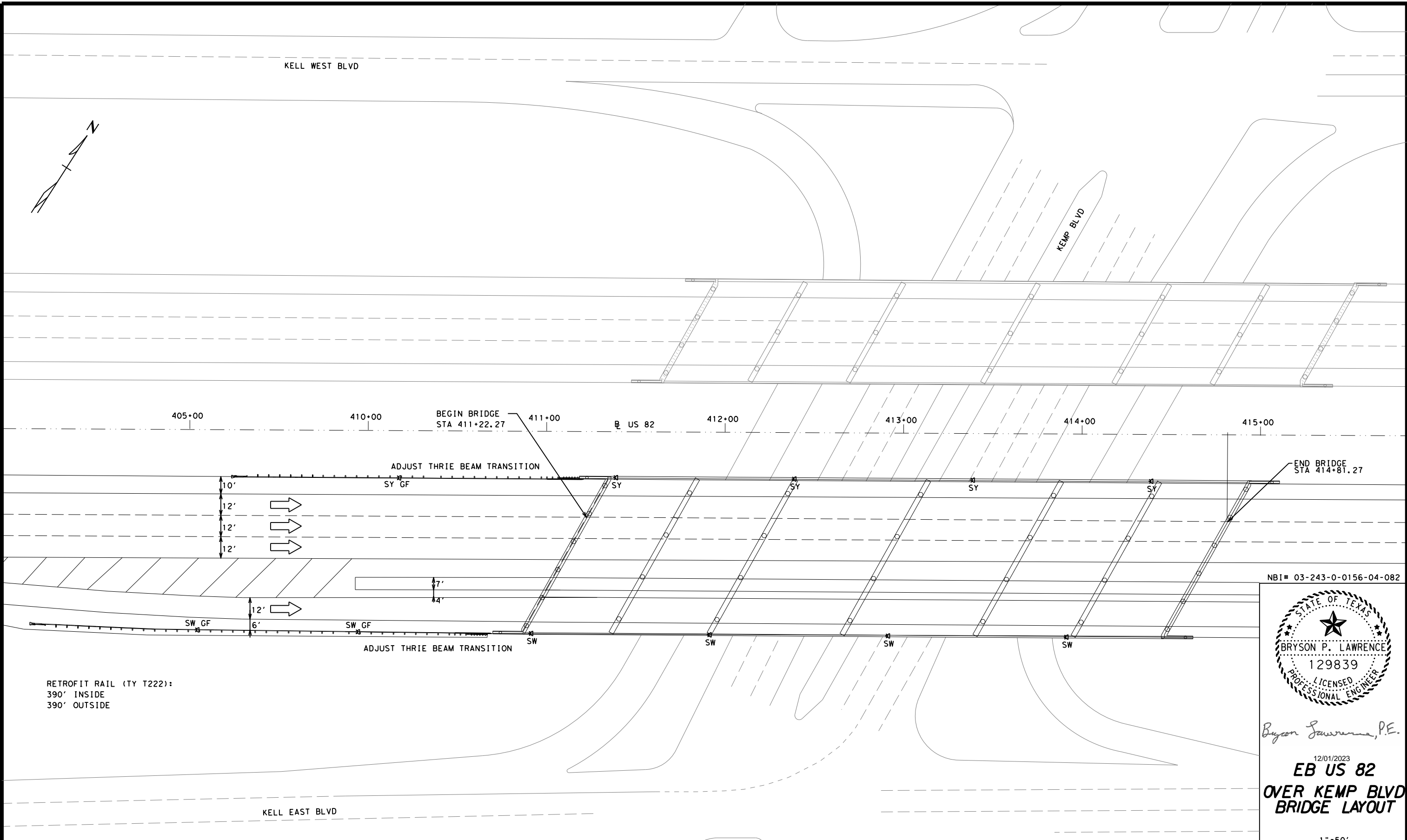
Bryson Lawrence, P.E.

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Texas Department of Transportation		Bridge Division Standard	
<b>RETROFIT GUIDE FOR CONCRETE RAILS</b> (T221, T222, C221, T402, C402, T551, SSTR & T552) (Not to be used as a standard) <b>C-RAIL-R</b>			
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REVISIONS	DIST		COUNTY
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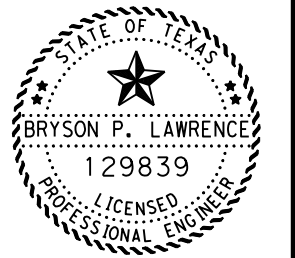
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RETROFIT RAIL (TY T222):  
 390' INSIDE  
 390' OUTSIDE

- DE SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- DE SY - INSTL DEL ASSM (D-SY)SZ 1 (BRF)SRF
- SW\_GF DE - INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2
- SY\_GF DE - INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2

NBI# 03-243-0-0156-04-082



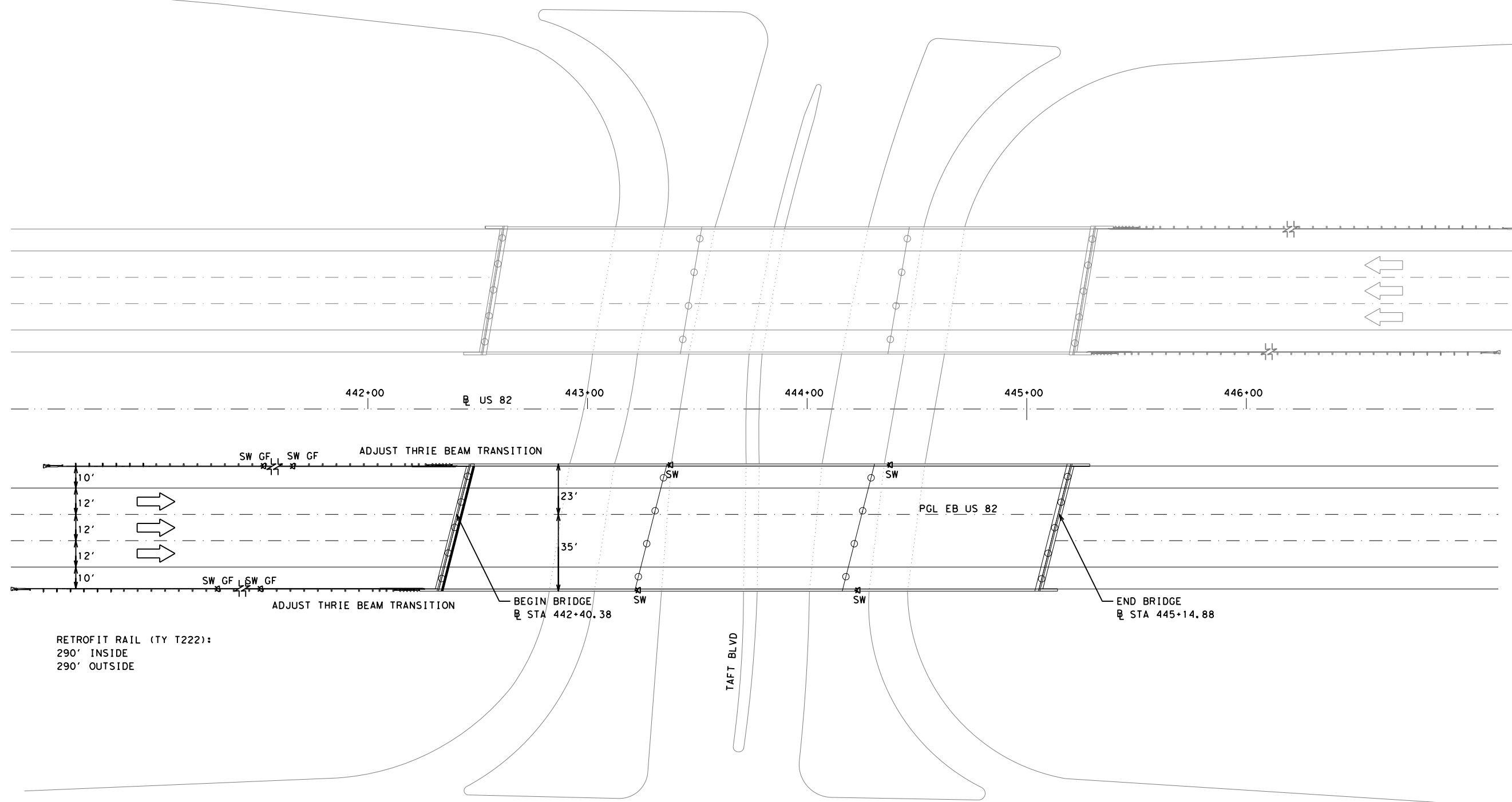
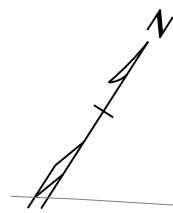
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12/01/2023  
**EB US 82  
 OVER KEMP BLVD  
 BRIDGE LAYOUT**

1" = 50'

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FEDERAL AID PROJECT NO.	66	SHEET NO.	
STATE	DISTRICT	COUNTY	
TEXAS	WFS	WICHITA	
CONTROL	SECTION	JOB	HIGHWAY NO.
0156	04	120, US 82, ETC.	ETC.

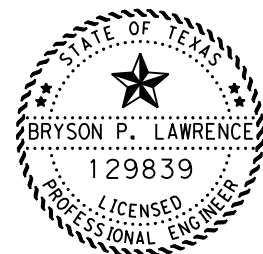
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RETROFIT RAIL (TY T222):  
 290' INSIDE  
 290' OUTSIDE

- SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- SW\_GF - INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2

NBI# 03-243-0-0156-04-082



*Bryson Lawrence, P.E.*

12/01/2023  
**US 82 EB  
 OVER TAFT BLVD  
 BRIDGE LAYOUT**

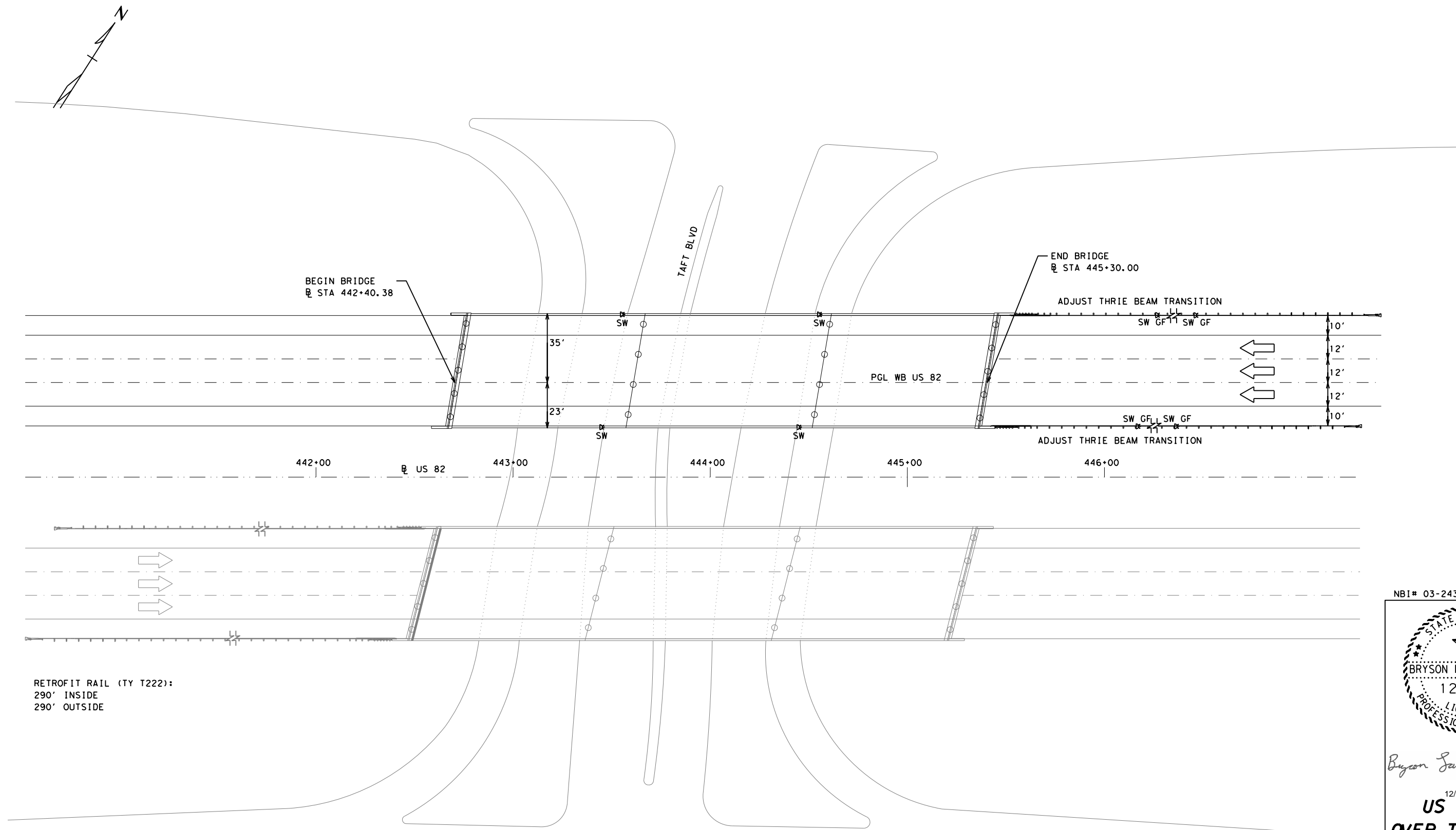
1" = 50'

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 SHEET 1 OF 1

FEDERAL AID PROJECT NO.	SHEET NO.		
120, US 82, ETC.	67		
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TEXAS	WFS	WICHITA	
CONTROL	SECTION	JOB	HIGHWAY NO.
0156	04	120, US 82, ETC.	

ETC.

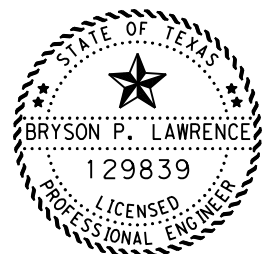
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RETROFIT RAIL (TY T222):  
 290' INSIDE  
 290' OUTSIDE

- SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- SW\_GF - INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2

NBI# 03-243-0-0156-04-083



*Bryson Lawrence, P.E.*

12/01/2023  
**US 82 WB  
 OVER TAFT BLVD  
 BRIDGE LAYOUT**

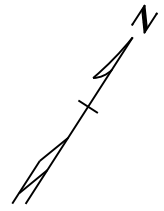
1" = 50'

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 SHEET 1 OF 1

FEDERAL AID PROJECT NO.	SHEET NO.		
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CONTROL	SECTION	JOB	HIGHWAY NO.
0156	04	120, US 82, ETC.	

ETC.

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BEGIN BRIDGE  
 STA 411+75.25

KEMP BLVD

ADJUST THRIE BEAM TRANSITION

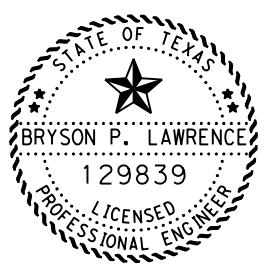
410+00 411+00 US 82 412+00 413+00 414+00 415+00 416+00 417+00

END BRIDGE  
 STA 415+34.25  
 ADJUST THRIE BEAM TRANSITION

RETROFIT RAIL (TY T222):  
 390' INSIDE  
 390' OUTSIDE

- DE SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- DE SY - INSTL DEL ASSM (D-SY)SZ 1 (BRF)SRF
- SW\_GF DE - INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2
- SY\_GF DE - INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2

NBI# 03-243-0-0156-04-079



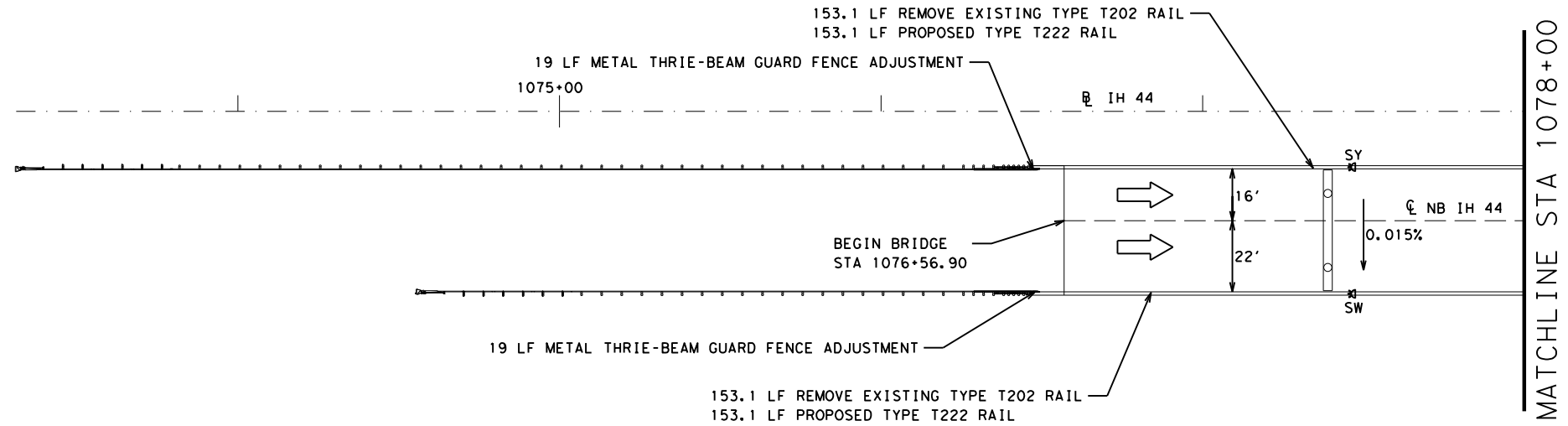
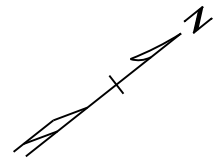
*Bryson Lawrence, P.E.*

12/01/2023  
**WB US 82  
 AT KEMP BLVD  
 LAYOUT**

1" = 50'

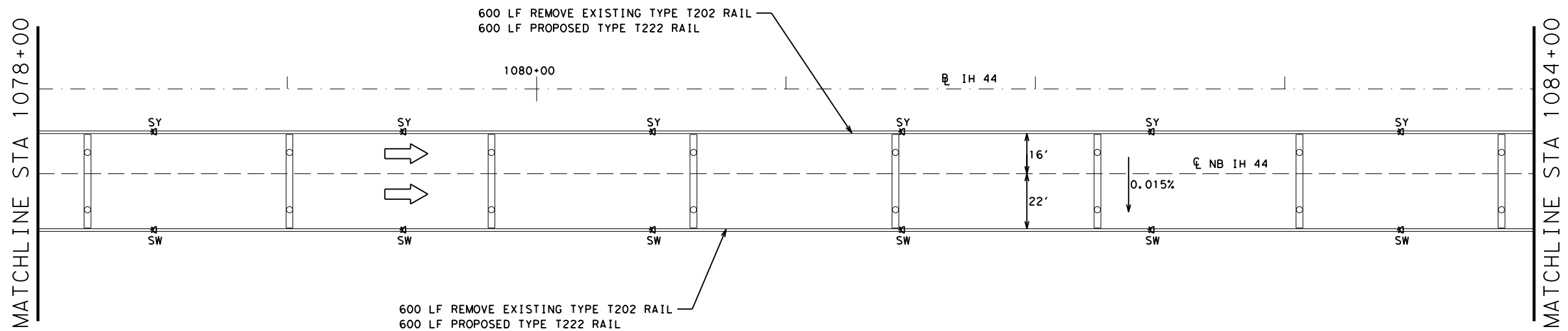
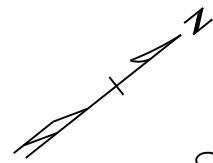
© 2024 Texas Department of Transportation		SHEET 1 OF 1	
FEDERAL AID PROJECT NO.	69	STATE	DISTRICT
TEXAS	WFS	TEXAS	WICHITA
CONTROL	SECTION	JOB	HIGHWAY NO.
0156	04	120, US 82, ETC.	ETC.

FILE: p:\ttdot\_projects\seonline.com\TXDOT2\Documents\03 - WFS\Design Projects\015604120\4 - Design\Plan Set\7. Bridge\Red River Bridge Layout 1 OF 4.dgn  
 DATE: 11/30/2023 4:23:49 PM

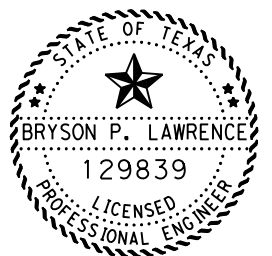


- # SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- # SY - INSTL DEL ASSM (D-SY)SZ 1 (BRF)SRF
- SY\_GF - INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2

NOTE: DRAINAGE SLOTS TO BE CONSTRUCTED IN PROPOSED RAIL MIDSPAN ON ALL SPANS ON THE RIGHT SIDE OF THE STRUCTURE OR AS DIRECTED.



NBI# 03-243-0-0156-07-066



*Bryson Lawrence, P.E.*

12/01/2023

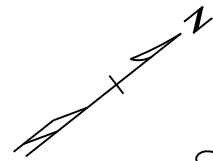
**IH 44 NB  
LAYOUT**

1" = 50'

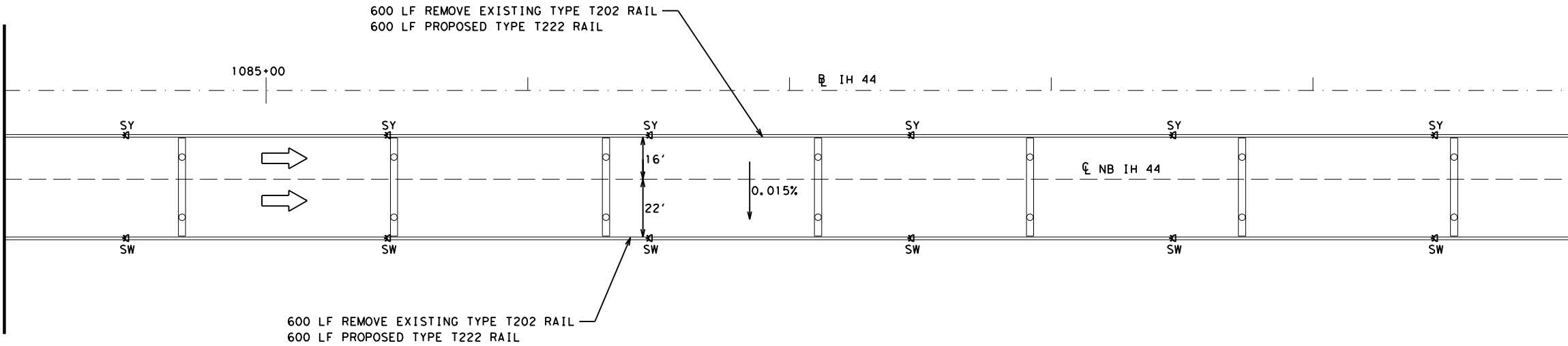
© 2024 Texas Department of Transportation

FEDERAL AID PROJECT NO.		SHEET NO.	
STATE		COUNTY	
TEXAS	WFS	WICHITA	
CONTROL SECTION		JOB HIGHWAY NO.	
0156	04120, E1S 82, ETC		

FILE: p:\ttdot\_projects\seonline.com\TXDOT2\Documents\03 - WFS\Design Projects\015604120\4 - Design\Plan Set\7. Bridge\Red River Bridge Layout 2 OF 4.dgn  
 DATE: 11/30/2023 4:23:52 PM



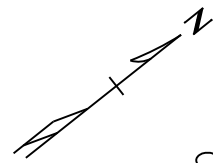
MATCHLINE STA 1084+00



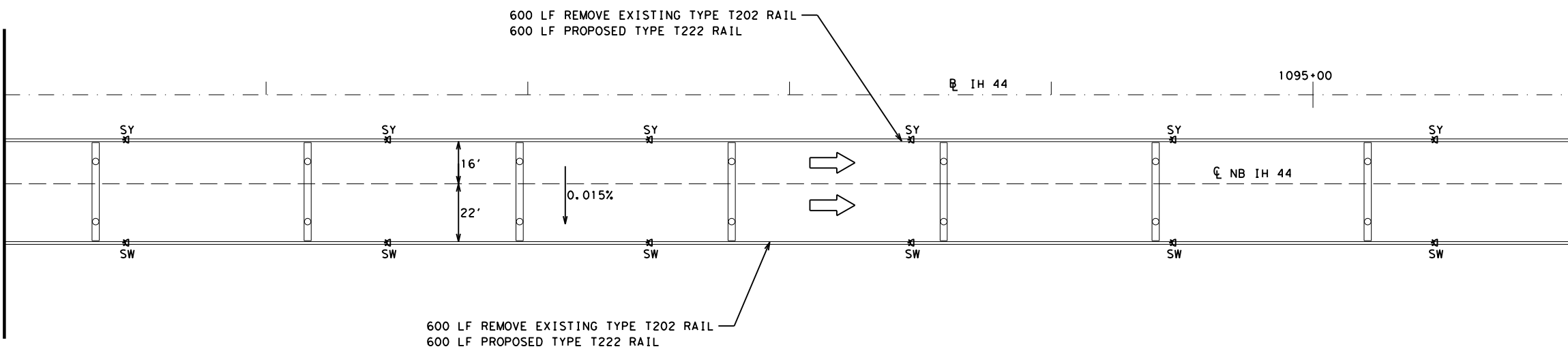
MATCHLINE STA 1090+00

- SY - INSTL DEL ASSM (D-SY)SZ 1 (BRF)SRF
- SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- SY\_GF - INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2

NOTE: DRAINAGE SLOTS TO BE CONSTRUCTED IN PROPOSED RAIL MIDSPAN ON ALL SPANS ON THE RIGHT SIDE OF THE STRUCTURE OR AS DIRECTED.

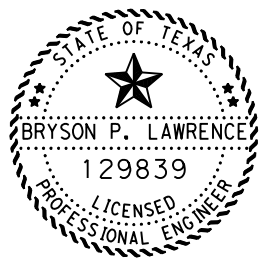


MATCHLINE STA 1090+00



MATCHLINE STA 1096+00

NBI# 03-243-0-0156-07-066



*Bryson Lawrence, P.E.*

12/01/2023

**IH 44 NB  
LAYOUT**

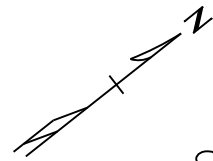
1" = 50'

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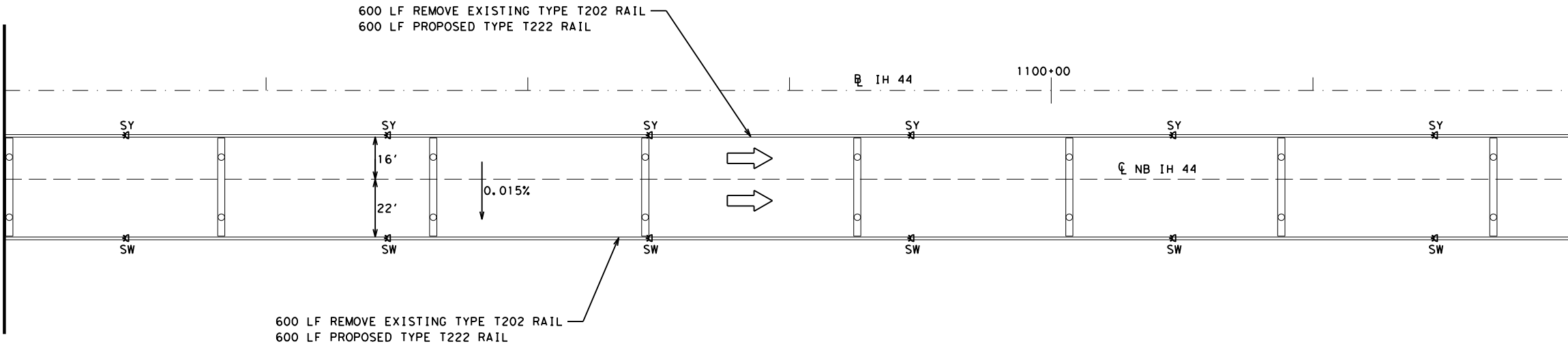
FEDERAL AID PROJECT NO.		SHEET NO.	
STATE		COUNTY	
TEXAS	WFS	WICHITA	
CONTROL SECTION		JOB HIGHWAY NO.	
0156	04120, E1S 82, ETC		



FILE: p:\ttdot\_projects\wiseonline.com\TXDOT2\Documents\03 - WFS\Design Projects\015604120\4 - Design\Plan Set\7. Bridge\Red River Bridge Layout 3 OF 4.dgn  
 DATE: 11/30/2023 4:23:55 PM



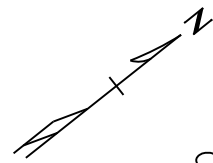
MATCHLINE STA 1096+00



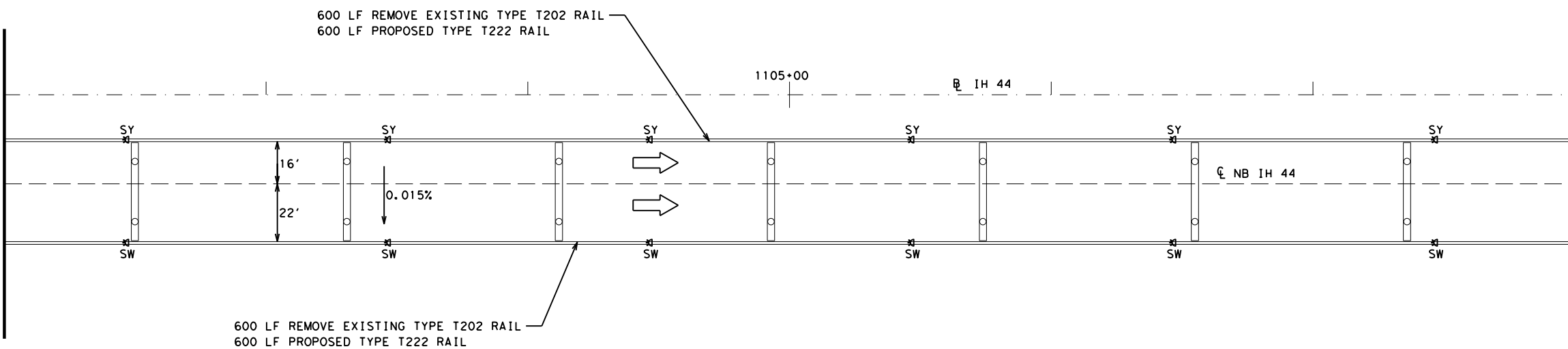
MATCHLINE STA 1102+00

- SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF
- SY - INSTL DEL ASSM (D-SY)SZ 1 (BRF)SRF
- SY\_GF - INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2

NOTE: DRAINAGE SLOTS TO BE CONSTRUCTED IN PROPOSED RAIL MIDSPAN ON ALL SPANS ON THE RIGHT SIDE OF THE STRUCTURE OR AS DIRECTED.

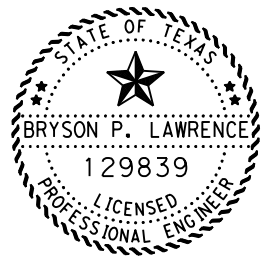


MATCHLINE STA 1102+00



MATCHLINE STA 1108+00

NBI# 03-243-0-0156-07-066



*Bryson Lawrence, P.E.*

12/01/2023

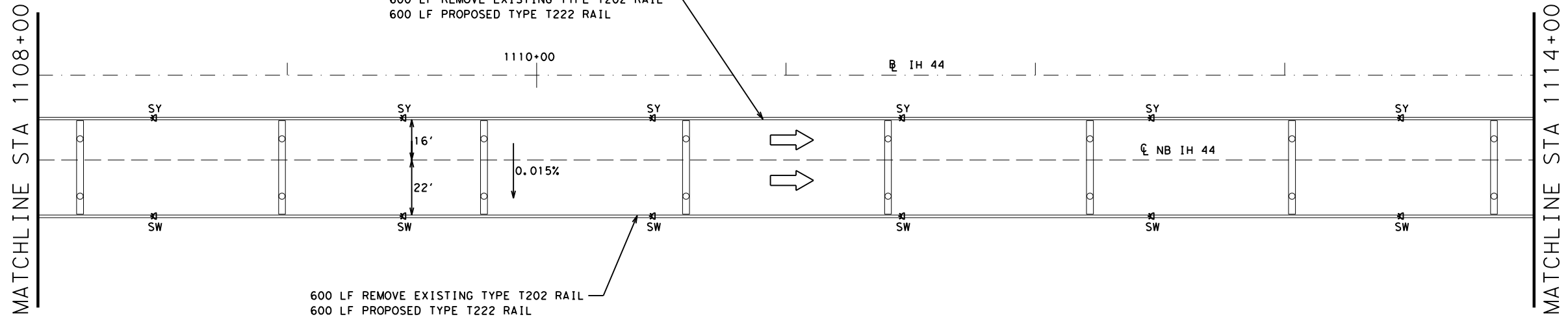
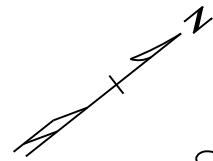
**IH 44 NB  
LAYOUT**

1" = 50'

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SHEET 3 OF 4

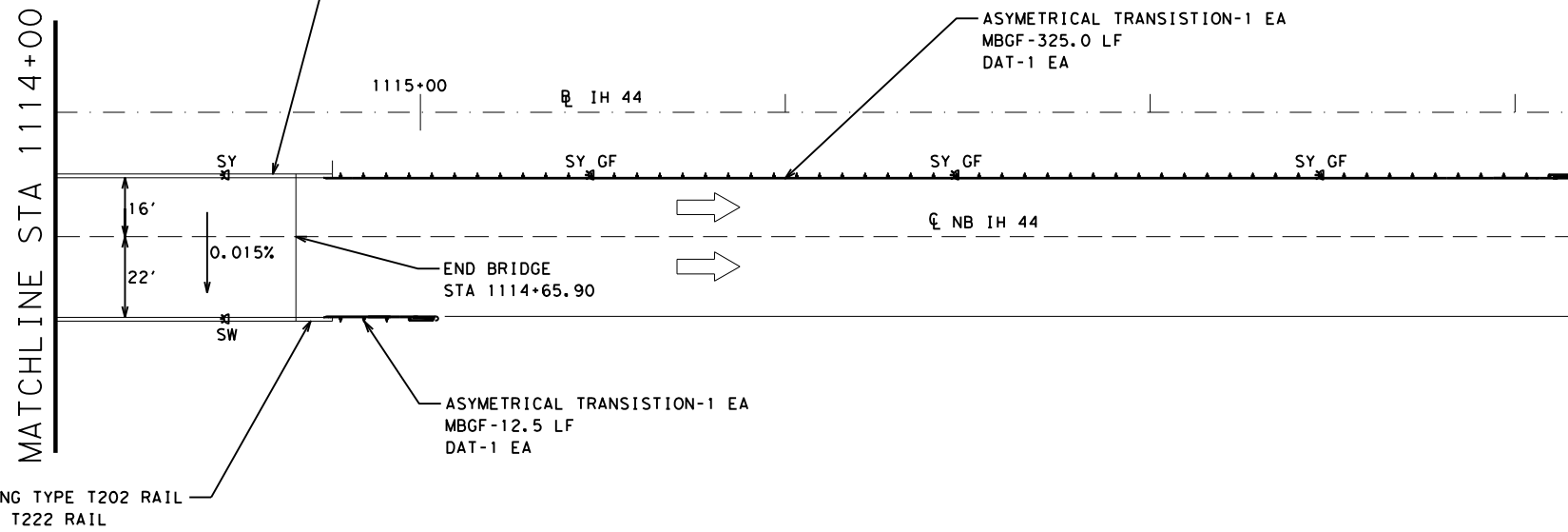
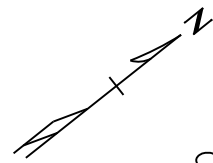
FUNDING DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEXAS	WFS	WICHITA
CONTROL	SECTION	JOB
0156	04120, E1S 82, ETC	

FILE: p:\t\tdot\_projects\wiseonline.com\TXDOT2\Documents\03 - WFS\Design Projects\015604120\4 - Design\Plan Set\7. Bridge\Red River Bridge Layout 4 OF 4.dgn  
 DATE: 11/30/2023 4:23:59 PM



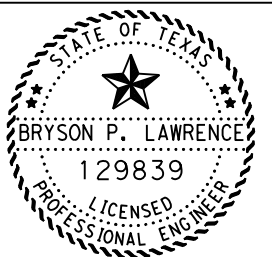
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- SY - INSTL DEL ASSM (D-SY)SZ 1 (BRF)SRF
- SY\_GF - INSTL DEL ASSM (D-SY)SZ 1 (BRF)GF2

NOTE: DRAINAGE SLOTS TO BE CONSTRUCTED IN PROPOSED RAIL MIDSPAN ON ALL SPANS ON THE RIGHT SIDE OF THE STRUCTURE OR AS DIRECTED.



75.9 LF REMOVE EXISTING TYPE T202 RAIL  
 75.9 LF PROPOSED TYPE T222 RAIL

NBI# 03-243-0-0156-07-066



*Bryson Lawrence, P.E.*

12/01/2023

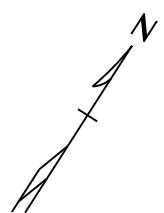
**IH 44 NB  
 LAYOUT**

1" = 50'

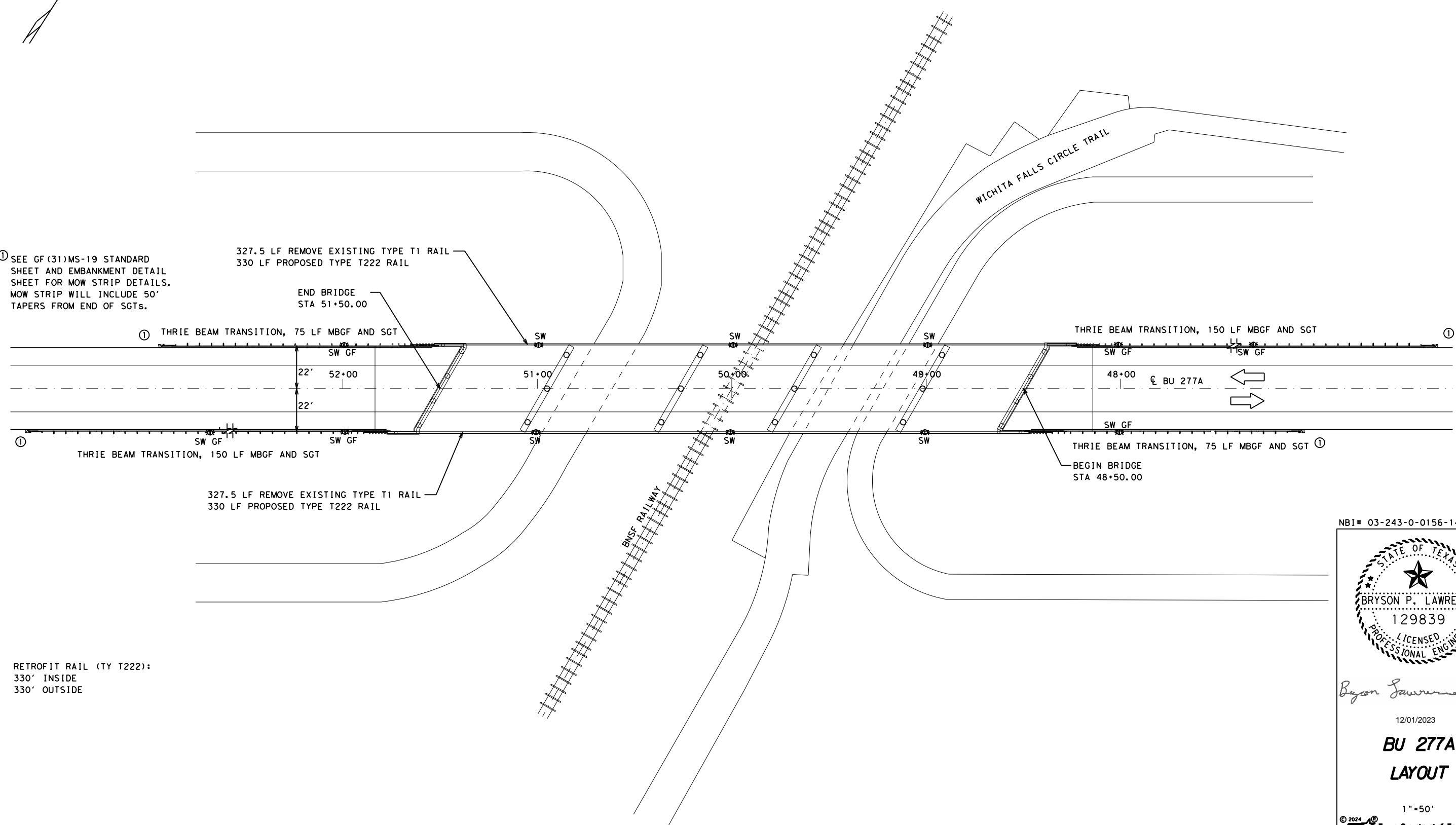
© 2024 Texas Department of Transportation  
 SHEET 4 OF 4

FEDERAL AID PROJECT NO.		SHEET NO.	
STATE		COUNTY	
TEXAS	WFS	WICHITA	
CONTROL		HIGHWAY NO.	
0156	04120, EIS 82, ETC		

FILE: p:\ttdot\_projects\wiseonline.com\TXDOT2\Documents\03 - WFS\Design Projects\015604120\4 - Design\Plan Set\7. Bridge\US 277A over BNSF.dgn  
 DATE: 11/30/2023 4:24:03 PM



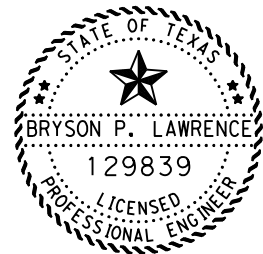
① SEE GF(31)MS-19 STANDARD SHEET AND EMBANKMENT DETAIL SHEET FOR MOW STRIP DETAILS. MOW STRIP WILL INCLUDE 50' TAPERS FROM END OF SGTs.



RETROFIT RAIL (TY T222):  
 330' INSIDE  
 330' OUTSIDE

SW - INSTL DEL ASSM (D-SW)SZ 1 (BRF)SRF (BI)  
 SW\_GF - INSTL DEL ASSM (D-SW)SZ 1 (BRF)GF2 (BI)

NBI# 03-243-0-0156-14-065



*Bryson Lawrence, P.E.*

12/01/2023

**BU 277A  
 LAYOUT**

1" = 50'

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FEDERAL AID PROJECT NO.	120, US 82, ETC.	
SHEET NO.	74	
STATE	DISTRICT	COUNTY
TEXAS	WFS	WICHITA
CONTROL	SECTION	JOB
0156	04	120, US 82, ETC.

ETC.

DATE: 11/30/2023 4:24:06 PM  
 FILE: \\txdot.projectwiseonline.com:TXDOT12\Documents\03 - WFS\Design Projects\030121\030121.dwg  
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for any errors or omissions resulting from its use.

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE	DOUBLE	INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX (XX)	
								NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRF = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount DIRECTION If Required BI = Bi-Directional BR = Bi-Directional with red on back	
SHEETING	Yellow, White or Red Type B or C reflective sheeting				SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.				POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

OBJECT MARKERS								INSTL OM ASSM (OM-XX) (XXXX)XXX (XX)		
DEVICE	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)	TYPE OF OBJECT MARKER 1, 2, 3, or 4	
		OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4	NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector units (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional
SHEETING	Yellow-Type B <sub>FL</sub> or C <sub>FL</sub> Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective yellow - Type B <sub>FL</sub> or C <sub>FL</sub> Sheeting			Red -Type B <sub>FL</sub> or C <sub>FL</sub> Sheeting	DEPARTMENTAL MATERIAL SPECIFICATIONS FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES) DMS-4400 SIGN FACE MATERIALS DMS-8300 DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS DMS-8600	
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT		
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP		

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE:		
DEVICE	GF1	GF2	CTB	 W1-8				 W1-6		Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.	
SHEETING	Yellow, White, Red			SIZE (W x L)	18" x 24" (Conventional)	24" x 30" (Conventional Oversize)	30" x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)		48" x 24" (Conventional)
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.			MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"	
				NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).						

**DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION**  
**D & OM(1)-20**

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	OW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
10-09 3-15	0156 04	120, ETC. US 82, ETC.		
4-10 7-20	DIST	COUNTY	SHEET NO.	
	WFS	WICHITA	75	

20A

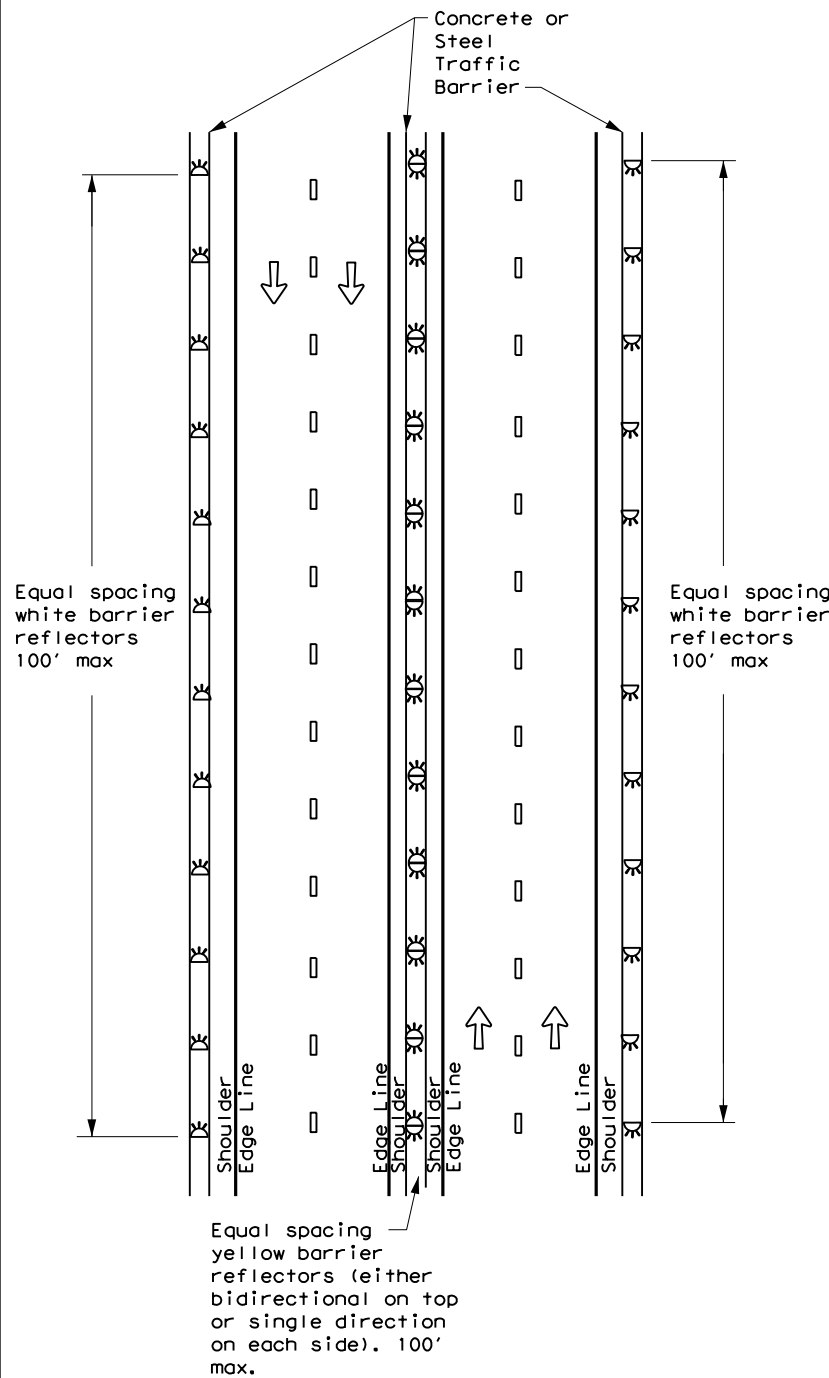




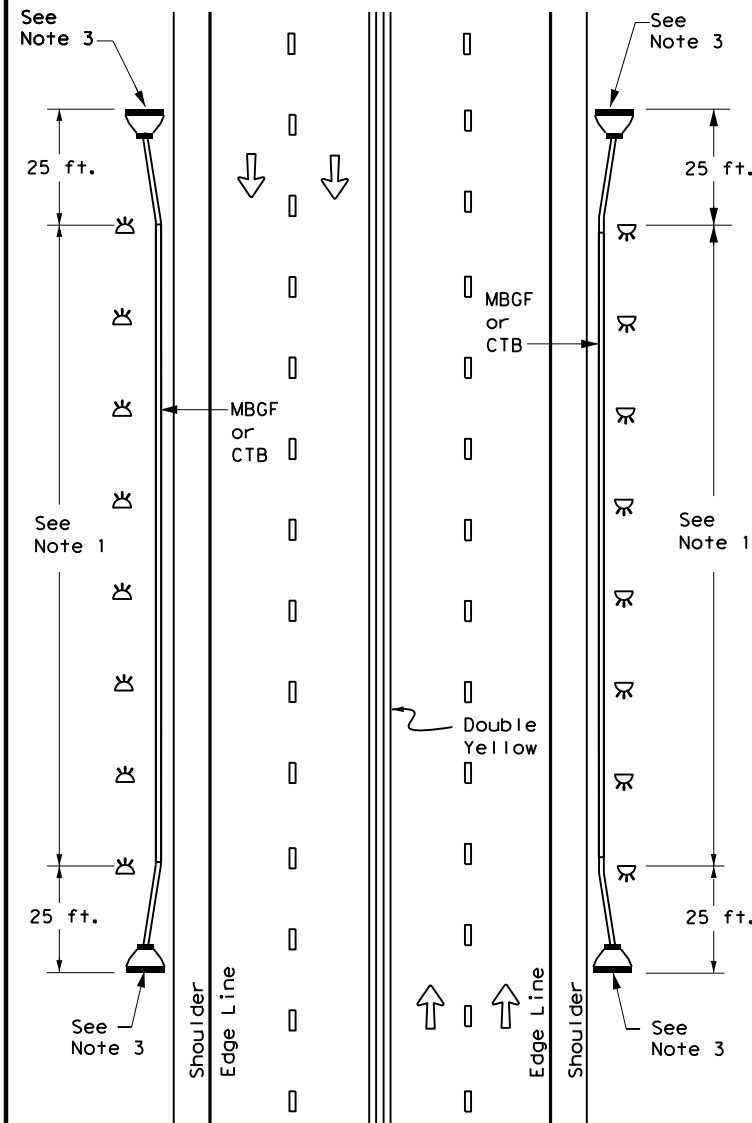
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion or adaptation of this standard to other uses or for damages resulting from its use.

DATE: 11/30/2023 4:24:17 PM  
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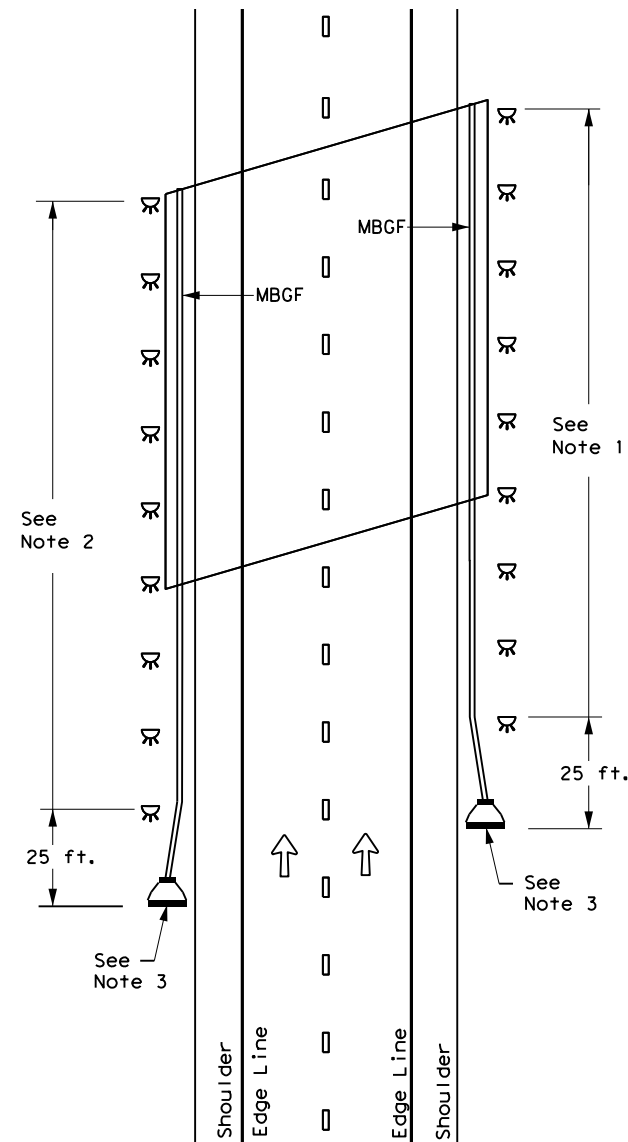
### CONTINUOUS CONCRETE OR STEEL BARRIER



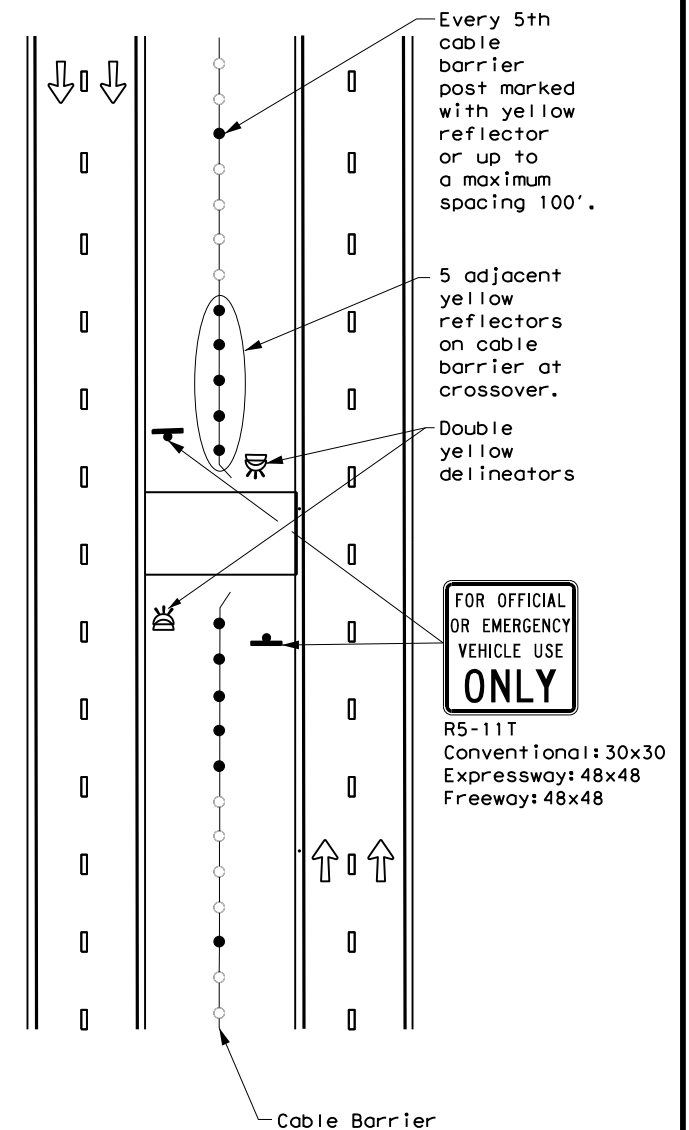
### MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



### DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



### EMERGENCY CROSSOVER



#### NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuous Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

#### LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

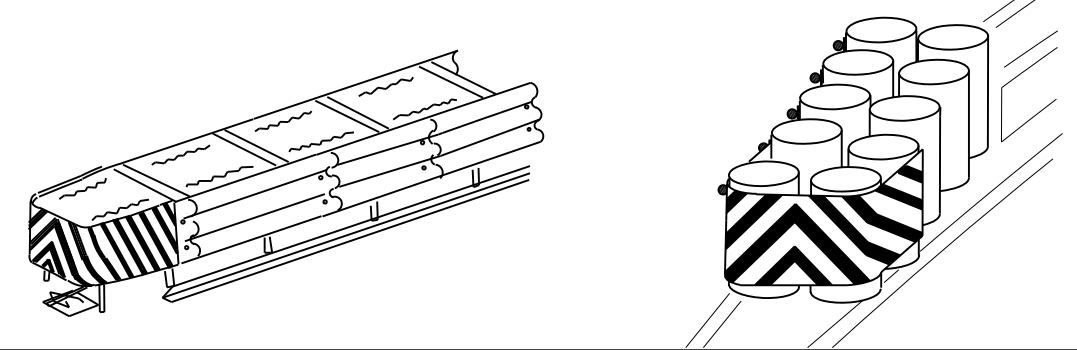
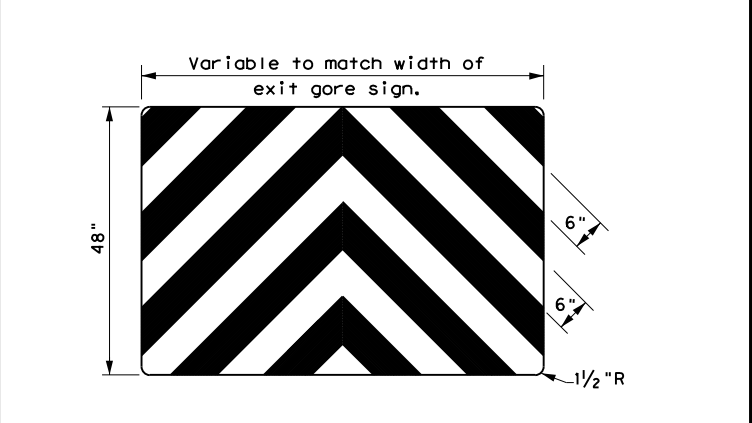
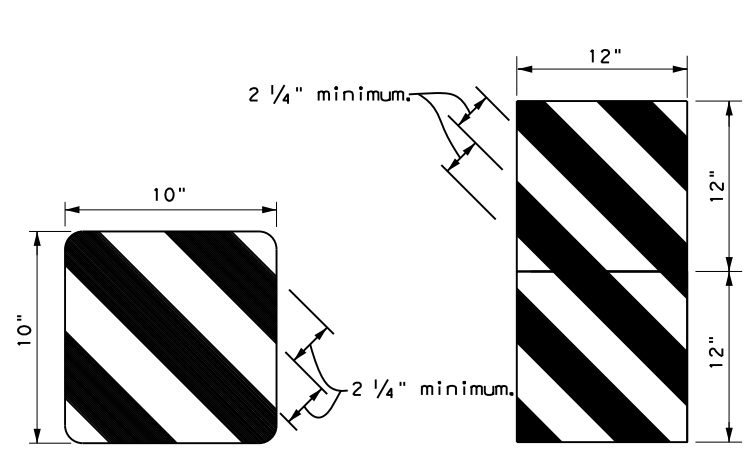
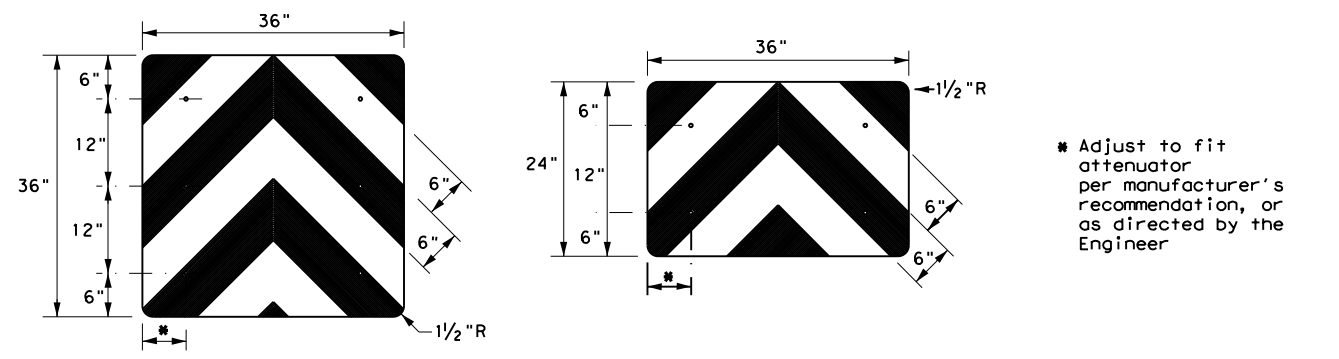
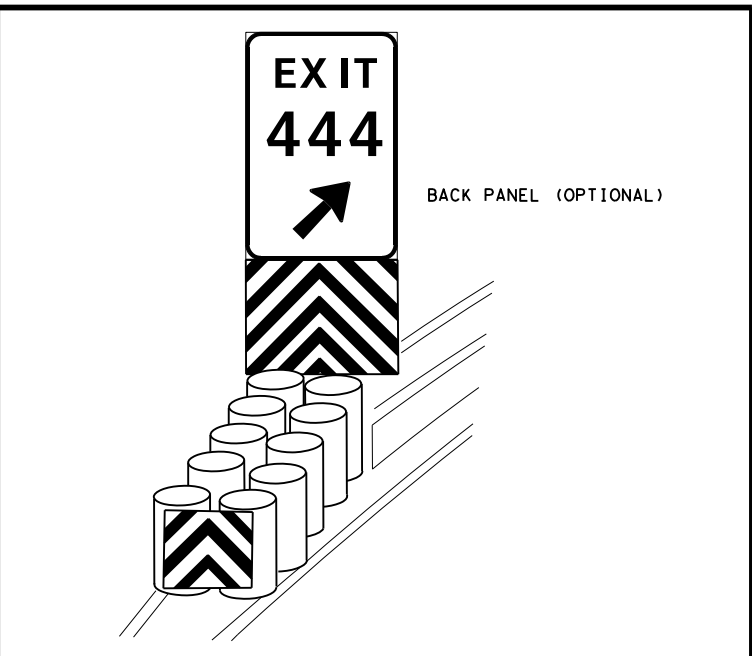
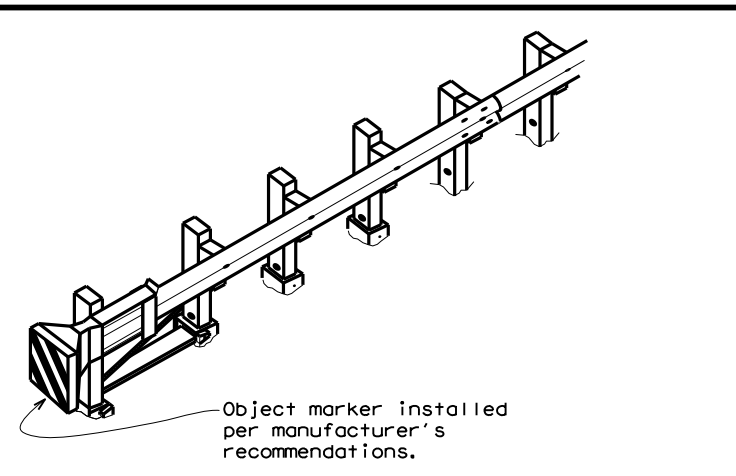
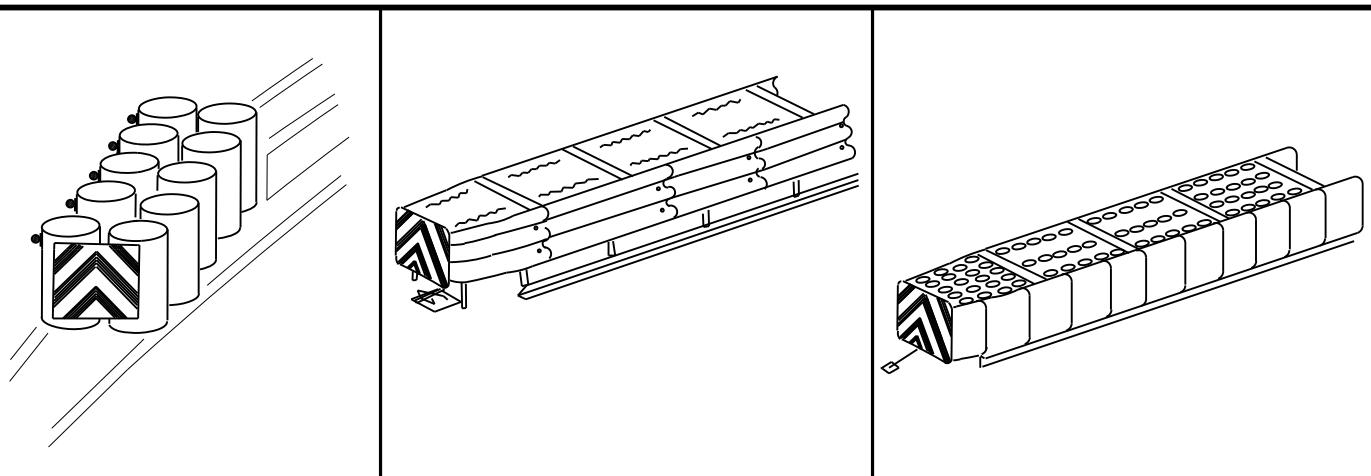
## DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

### D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0156	04	120, ETC. US 82, ETC.	
7-20	DIST	COUNTY	SHEET NO.	
	WFS	WICHITA	78	

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DATE: 11/30/2023 4:24:20 PM  
 FILE: pw://txdot.projectwiseonline.com:TXDOT12/Documents/03 - WFS/Design Projects/030121/030121.dgn



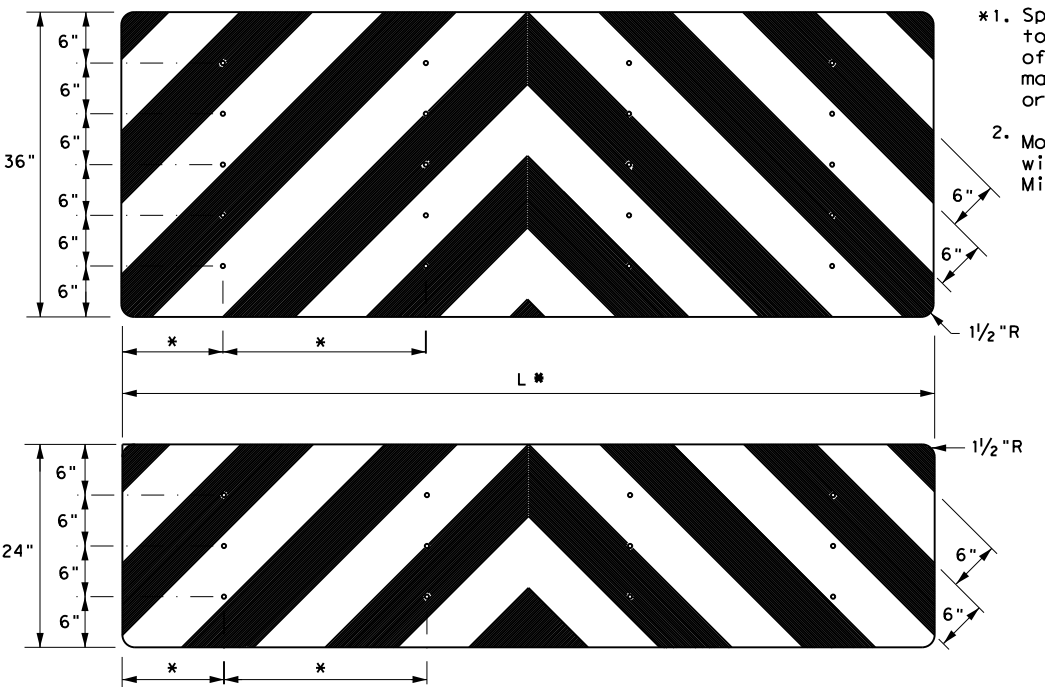
OBJECT MARKERS SMALLER THAN 3 FT<sup>2</sup>

**NOTES**

- Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
- Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.
- Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 1/4".
- Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.
- Object Marker at nose of attenuator is subsidiary to the attenuator.
- See D & OM (1-4) for required barrier reflectors.

**NOTES**

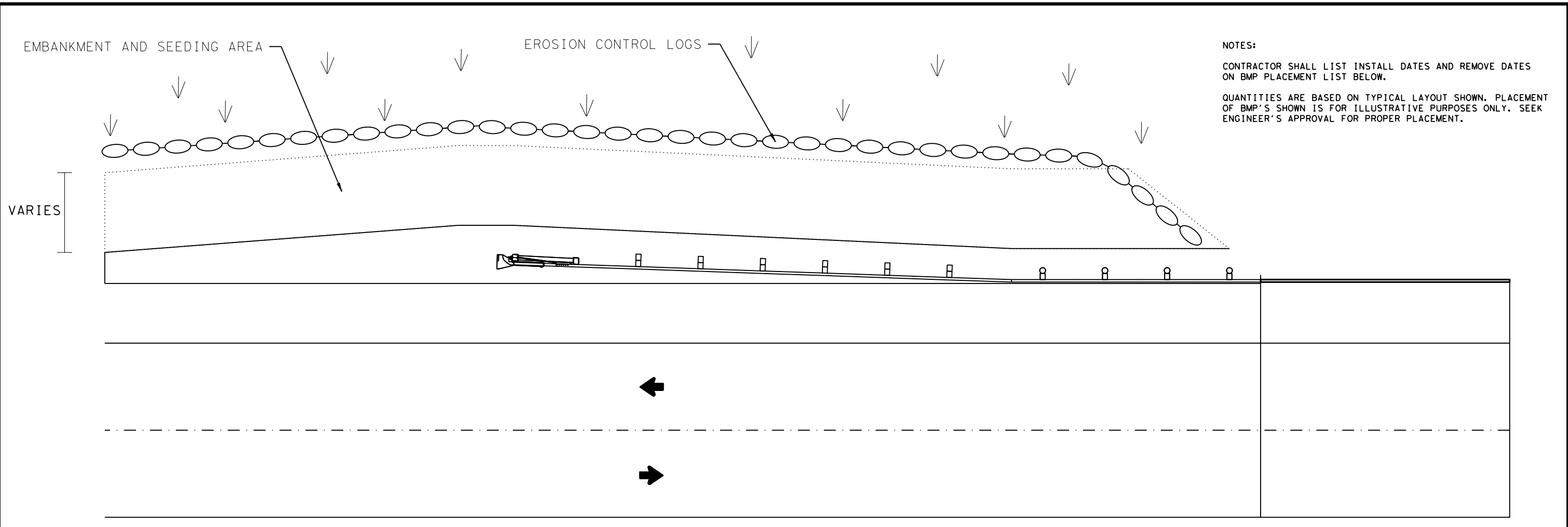
- Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's recommendation, or as directed by the Engineer.
- Mounting should be flush with top of attenuator. Minimum size 96" x 24".



		<b>Traffic Safety Division Standard</b>	
<b>DELINEATOR &amp; OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS</b>			
<b>D &amp; OM(VIA) -20</b>			
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT
© TXDOT December 1989	CONT	SECT	JOB
REVISIONS		0156 04	120, ETC. US 82, ETC.
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	WFS	WICHITA	79
4-98 7-20			
20G			



DATE: 11/30/2023 4:24:24 PM  
 FILE: pw://twdot.projectwiseonline.com:TXDOT12/Documents/03 - WFS/Design Projects/015604120/4 - Design/Plan Set/9. Environmental/SW3P\_LAYOUT.dgn

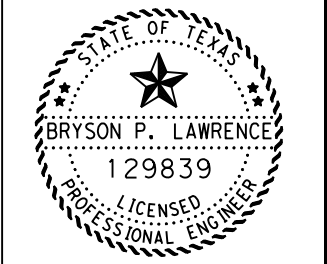


**NOTES:**  
 CONTRACTOR SHALL LIST INSTALL DATES AND REMOVE DATES ON BMP PLACEMENT LIST BELOW.  
 QUANTITIES ARE BASED ON TYPICAL LAYOUT SHOWN. PLACEMENT OF BMP'S SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. SEEK ENGINEER'S APPROVAL FOR PROPER PLACEMENT.

## TYPICAL BMP LAYOUT

BMP PLACEMENT - UPSTREAM END						
REFERENCE NO.	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
1						
2						
3						
4						

BMP PLACEMENT - DOWNSTREAM END						
REFERENCE NO.	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
1						
2						
3						
4						



*Bryson Lawrence, P.E.*

12/01/2023

**US 82, ETC.**  
 TYPICAL SW3P  
 LAYOUT  
 BU 277A

NOT TO SCALE  
 Texas Department of Transportation  
 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0156	04	120, ETC.	US 82, ETC.
DIST	COUNTY		SHEET NO.
WFS	WICHITA		80

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.  
 DATE: 11/30/2023 4:24:27 PM  
 FILE: pw://txdot.projectwiseonline.com:TXDOT12/Documents/03 - WFS/Design Projects/015604120/4 - Design/Plan Set/9 - Environmental/EPIC.dgn

**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. None
2.  No Action Required  Required Action

Action No.

5 ACRES OR MORE:

- The project disturbs five or more acres of surface area. The total disturbed acreage is the combined acreage to be disturbed on the project and the contractors PSL.
- The Department will post a large site notice, file a notice of intent (NOI), notice of change (NOC), if applicable, and a notice of termination (NOT) along with other requirements per TPDES GP TXR 150000 as the entity having operational control over plans and specifications for work shown on the plans in the right of way.
- The Contractor shall file a NOI, NOC, if applicable, and a NOT and post a large site notice along with other requirements as the entity of having day-to-day operational control of the work shown on the plans in the right of way.

**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.

**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

**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

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

- No Action Required  Required Action

Bird BMPs: Nests that are active should not be disturbed. Do not destroy, or remove active nests, including ground nesting birds, during the nesting season, March through August. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. Do not collect, capture, relocate, or transport bird, eggs, young, or active nests without a permit.

**VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES**

General (applies to all projects):  
 Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- \* Dead or distressed vegetation (not identified as normal)
- \* Trash piles, drums, canister, barrels, etc.
- \* Undesirable smells or odors
- \* Evidence of leaching or seepage of substances

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

- Yes  No

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

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

- Yes  No

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

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

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

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

- No Action Required  Required Action

NBI# 03-243-0-0156-07-066; Black felt at abutment deck joint tested positive for asbestos containing material. The asbestos tested positive at a concentration of 5%. None of the work items for this project are to disturb the asbestos containing material.

**VII. OTHER ENVIRONMENTAL ISSUES**

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

- No Action Required  Required Action

Action No.

- Reduce idling of vehicles and equipment.
- Maintain project site. Minimize dust and airborne particles to the maximum extent practical.
- Collect sanitary waste in accordance with local regulations by a sanitary waste collector. Portable units shall not be placed in or near a waterway or drainage area.
- TxDOT EMS Policy Statement (English & Spanish) shall be displayed at the construction site.
- Collect all waste materials, trash, and debris from the construction site daily and deposit into a metal dumpster having a secure cover.

**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

**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
12-12-2011 (DS) REVISIONS	0156	04	120, ETC.	US 82, ETC.
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	WFS	WICHITA	81	

ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (PERMANENT) (URBAN) (SAND or CLAY)		
"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: BUFFALO GRASS (Texoka) COMMON BERMUDA GRASS (HULLED) BLUE GRAMA (NATIVE)	4.0 LBS PLS / ACRE 5.0 LBS PLS / ACRE 1.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (PERMANENT) (RURAL) (CLAY)		
"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP SIDEOATS GRAMA BUFFALOGRASS BERMUDA GRASS BLACKWELL SWITCHGRASS ILLINOIS BUNDLEFLOWER	1.5 LBS PLS / ACRE 1.5 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 0.5 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

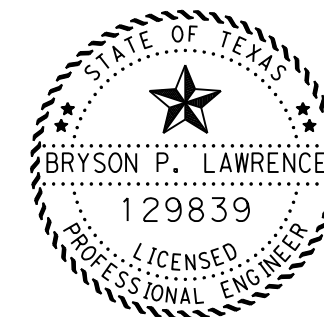
ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (PERMANENT) (RURAL) (SANDY)		
"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
PERMANENT: EARLY SPRING SEED FROM FEBRUARY 1st THROUGH May 15th. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP: GREEN SPRANGLETOP BERMUDA GRASS SAND LOVEGRASS SAND DROPSEED WEEPING LOVEGRASS BLUE GRAMA PARTRIDGE PEAS (COMANCHE)	1.5 LBS PLS / ACRE 2.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE 1.0 LBS PLS / ACRE @1/4 -1/2" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (TEMPORARY) (URBAN) WARM SEASON SEEDING		
"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) FOXTAIL MILLET	3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (TEMPORARY) (RURAL) WARM SEASON SEEDING		
"WARM SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: LATE SPRING & SUMMER SEED FROM MAY 16th THROUGH AUGUST 31st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP FOXTAIL MILLET	3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 20. LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. SEE NOTES ON TA-VES SHEET 2 OF 2 FOR ADDITIONAL INFORMATION.



*Bryson Lawrence, P.E.*

12/01/2023

SCALE = NTS SHEET 1 OF 2

**Texas Department of Transportation**  
Wichita Falls District Standard  
**TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET**

**WFS-TA-VES**

FILE: BMPLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0156	04	120, ETC. US 82, ETC.	
	DIST	COUNTY	SHEET NO.	
	WFS	WICHITA	82	

ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (TEMPORARY) (URBAN) COOL SEASON SEEDING		
"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) COMMON BERMUDA GRASS (UNHULLED) TALL FESCUE ANNUAL RYE GRASS	3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

ITEM 164 SEEDING FOR EROSION CONTROL		
SEED (TEMPORARY) (RURAL) COOL SEASON SEEDING		
"COOL SEASON" PLANTING DATES	SEED MIXTURE	PURE LIVE SEED RATE & PLANT DEPTH.
TEMPORARY: EARLY FALL SEED FROM SEPTEMBER 1st THROUGH DECEMBER 1st. AS AREAS OF THE ROW ARE PREPARED AND DETERMINED READY FOR DRILL SEEDING.	NEW CROP SEED: TYPE : BUFFALOGRASS (TEXOKA) BERMUDA GRASS (UNHULLED) GREEN SPRANGLETOP WESTERN WHEATGRASS CANADA WILD RYE GRASS ELBON RYE GRASS	3.0 LBS PLS / ACRE 4.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 3.0 LBS PLS / ACRE 2.0 LBS PLS / ACRE 15.0 LBS PLS / ACRE @ 1" Soil Depth
SOIL PREPARATION EQUIPMENT AND PRACTICES: RIPPER --- DISK --- HARROW --- CULTI-PACKER .		

NOTES:

1. ALL SEED MIXTURE TYPES SHALL BE PURCHASED IN PRE- MIXED BAGS, "BY TYPE" BLENDED BY THE GROWER SHIPPER.
2. SOILS THAT ARE COMPACTED, HAVE CLOUDS, SHALL BE REWORKED UNTIL READY FOR SEEDING. AS DIRECTED.
3. ALL SOIL SURFACES SHALL BE LEVEL WITH NATURAL FLOWING SMOOTH GRADES. NO TIRE RUTS OR FURTHER TRAFFIC ALLOWED.
4. SOIL SURFACE SHALL BE FIRM BUT NOT COMPACTED, ALLOWING 1/4" DEPRESSION UNDER NORMAL FOOT TRAFFIC.
5. SEED 100% OF THE BED AREA. NO SKIPS OR VOID AREAS ALLOWED. EXAMPLE: AREAS AROUND SIGN POSTS AND INLETS.
6. SEED UP TO THE FIRST 6" OF THE EDGE OF PAVEMENT. AS DIRECTED, HAND RAKE ISOLATED SEEDED AREAS.
7. WEIGH ALL CALIBRATED SEED SAMPLES FOR ACCURACY AND PRESENT DOCUMENTATION TO ENGINEER.

FOR DRILL SEEDING

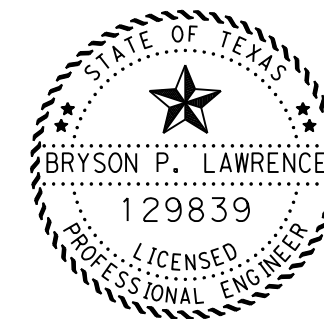
8. USE ONLY PROFESSIONAL NATIVE GRASS OR TURF GRASS (MULTI- 3 BIN) DRILL SEEDERS. NO DROP SEEDERS ALLOWED. OTHER TYPES OF SEEDERS AS APPROVED BY THE ENGINEER.
9. CALIBRATE DRILL SEEDER FOR SPECIFIED (PLS) PER ACRE BEFORE DRILL SEEDING.
10. DRILL SEEDER MUST BE EQUIPPED WITH THE LARGE FRONT CUTTING COULTERS DURING THE INSPECTION OF DRILL SEEDER.

FOR BROADCAST SEEDING

11. USE ONLY COMMERCIAL TYPE CYCLONE TYPE SPREADERS.
12. CALIBRATE CYCLONE SPREADER FOR 1000 Sq. Ft. (PLS) PER ACRE BEFORE SEEDING.
13. TO PREVENT SEED SEPARATION IN SPREADERS, SPREAD ALL SEED TYPES INDEPENDENTLY IN A SEPARATE APPLICATION.
14. IMMEDIATELY AFTER SEEDING, IN ONE OR TWO OPERATIONS, CULTI-PACK THE SEEDED SOILS AND FIRM SEED INTO SURFACE.
15. DISCONTINUE SEEDING IF WIND EXCEEDS 10 MPH.

ITEM 314 EMULSIFIED ASPHALT TREATMENT	
TIME SCHEDULE	FUNCTIONAL USE:
IMMEDIATELY AFTER: SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.	SOIL EROSION CONTROL, OR MOISTURE RETENTION BARRIER.
NOTES:	
<ol style="list-style-type: none"> <li>1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.</li> <li>2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.</li> <li>3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.</li> <li>4. USE MATERIALS AS SPECIFIED FOR EROSION CONTROL ON TABLE 18 IN ITEM 300 ASPHALTS, OILS, AND EMULSIONS, AT A RATE OF 0.25 GAL/SY.</li> </ol>	

ITEM 166 FERTILIZER	
TIME SCHEDULE	FUNCTIONAL USE:
AFTER TOPSOIL PLOWING PREPARATIONS ARE COMPLETED, FERTILIZE ROW SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.	PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.
FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 100 LBS OF NITROGEN PER ACRE. THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM. ANALYSIS OF THE (NPK) IS: 3:1:1 OR AS DIRECTED BY THE AREA ENGINEER.	
ITEM 166 NOTES:	
<ol style="list-style-type: none"> <li>1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.</li> <li>2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE A EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.</li> <li>3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED, DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT AREA ENGINEER.</li> </ol>	



*Bryson Lawrence, P.E.*

12/01/2023

SCALE = NTS SHEET 2 OF 2

Texas Department of Transportation  
Wichita Falls District Standard  
**TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET**

**WFS-TA-VES**

FILE: BMLAYOUTS.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CR: TXDOT
© TXDOT 2009	CONT	SECT	JOB	HIGHWAY
REVISIONS JULY 2019	0156	04	120, ETC. US 82, ETC.	
	DIST	COUNTY	SHEET NO.	
	WFS	WICHITA	83	