SEE SHEET 2 FOR INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

MAIN LANE DESIGN SPEED = 55 MPH
ADT (2018) = 14,832
ADT (20 YR PROJECTED ADT) = 20,765
FUNCTIONAL CLASSIFICATION:
PRINCIPAL ARTERIAL - OTHER

FED RD DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	F2021(700)		1
STATE	DIST.	COUNTY	
TEXAS	WFS	WILBARGER	
CONT.	SECT.	JOB	HIGHWAY NO.
0043	07	119	US 287

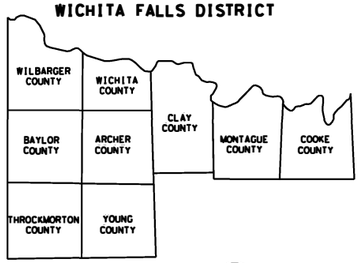
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

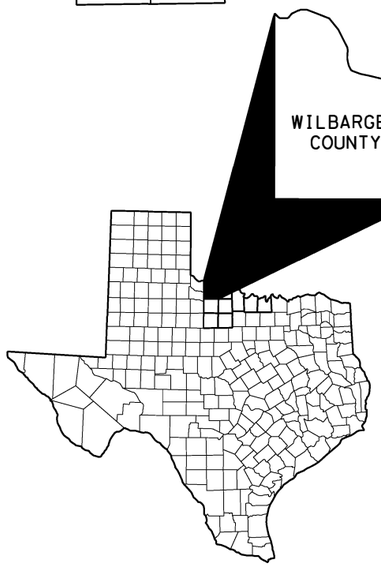
FEDERAL AID PROJECT NO. : F2021(700)
CONTROL SECTION JOB : 0043-07-119

WILBARGER COUNTY
US 287

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

WICHITA FALLS DISTRICT

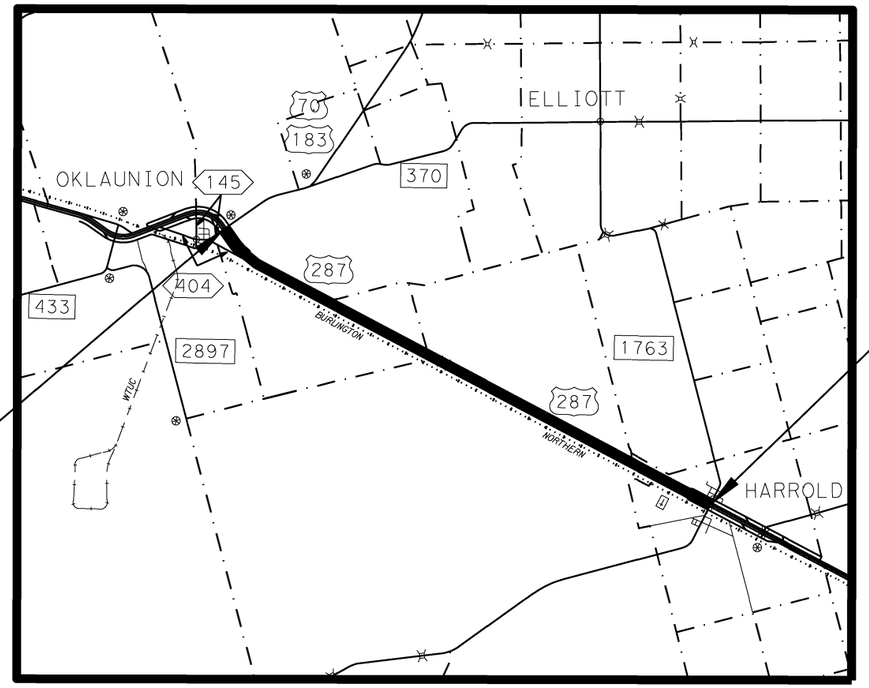




CSJ: 0156-05-058:	PROJECT LENGTH:	36,928.00 FT.	=	6.994 MI.	- ROADWAY
CSJ: 0156-05-058:	PROJECT LENGTH:	0.00 FT.	=	0.000 MI.	- BRIDGE
TOTAL PROJECT LENGTH:		36,928.00 FT.	=	6.994 MI.	

PROJECT LIMITS: FROM OKLAUNION TO HARROLD

FOR THE CONSTRUCTION OF HAZARD ELIMINATION & SAFETY
CONSISTING OF ADD LEFT TURN LANES AT CROSSOVERS



BEGIN PROJECT
CSJ: 0043-07-119
STA. 1164+76.79
REF. MARKER 300-0.005

END PROJECT
CSJ: 0043-07-119
STA. 1534+04.79
REF. MARKER 306+1.25

0 1 2
SCALE IN MILES

NO EXCEPTIONS
NO EQUATIONS
NO RAILROAD CROSSINGS

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 2012).

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 62 63

FILE #: \ENGDATA\DESIGN\US277\
0156050045\CADD/PLAN SHEETS
US277*TITLESHEET.DGN
DATE: 08/28/03

Texas Department of Transportation ®

SUBMITTED FOR LETTING 04/30/2021
Monty F. Brown, P.E.
DESIGN ENGINEER

APPROVED FOR LETTING
DIRECTOR, TRAFFIC OPERATIONS DIVISION

RECOMMENDED FOR LETTING
DISTRICT DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING
DIRECTOR, BRIDGE DIVISION

RECOMMENDED FOR LETTING 04/30/2021
Richard D. Brown P.E.
DISTRICT ENGINEER

APPROVED FOR LETTING
DIRECTOR, DESIGN DIVISION

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		GENERAL
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	9-12	QUANTITY SUMMARY
		TRAFFIC CONTROL PLAN
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**	26	TCP(1-5)-18
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**	88	PW
**	89-90	SETB-CD
**	91	PSET-RC
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	112	RAILROAD SCOPE OF WORK
		TRAFFIC STANDARDS
**	113	D & OM(1)-20
**	114	D & OM(2)-20
**	115	D & OM(3)-20
**	116	D & OM(4)-20
**	117	D & OM(5)-20
**	118	D & OM(6)-20
**	119	PM(1)-20
**	120	PM(3)-20
**	121	SMD(GEN)-08
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	SHEET NO.	DESCRIPTION
		ENVIRONMENTAL ISSUES
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	128	SW3P SIGN
	129	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
	130	STORMWATER POLLUTION PREVENTION PLAN
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**	138-140	EC(9)-16

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

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

Monty F. Brown, P.E. — NAME

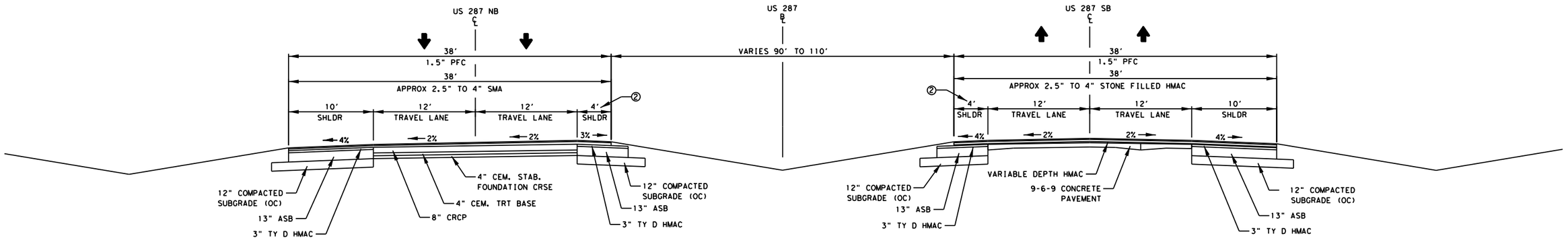
05/21/2021 — DATE

US 287
INDEX OF SHEETS

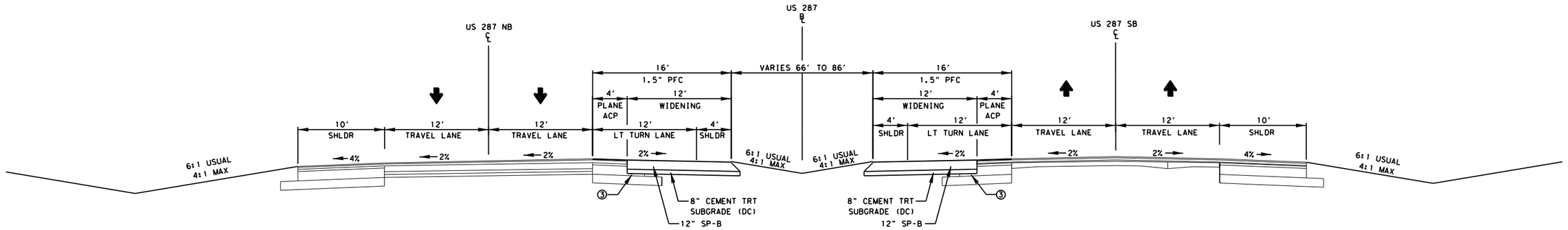
Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		2



EXISTING TYPICAL SECTION
STA 1164+76.79 TO STA 1534+04.79



PROPOSED TYPICAL SECTION

NORTHBOUND	SOUTHBOUND
STA 1219+10.82 TO STA 1230+67.03	STA 1208+22.49 TO STA 1219+99.15
STA 1247+35.15 TO STA 1259+36.56	STA 1236+50.79 TO STA 1248+48.94
STA 1282+36.96 TO STA 1293+86.28	STA 1271+51.11 TO STA 1283+08.34
STA 1304+64.57 TO STA 1316+21.96	STA 1293+79.74 TO STA 1305+47.97
STA 1321+08.74 TO STA 1333+14.00	STA 1310+64.41 TO STA 1322+71.43
STA 1347+91.27 TO STA 1359+51.14	STA 1337+08.18 TO STA 1348+74.79
STA 1371+40.78 TO STA 1383+00.16	STA 1360+55.50 TO STA 1372+21.92
STA 1386+88.67 TO STA 1398+54.24	STA 1376+04.39 TO STA 1387+79.03
STA 1416+14.37 TO STA 1427+78.63	STA 1405+30.23 TO STA 1416+98.88
STA 1474+85.32 TO STA 1486+30.77	STA 1464+11.31 TO STA 1475+90.04
STA 1486+30.77 TO STA 1492+82.39	STA 1475+90.04 TO STA 1487+16.87
STA 1492+82.39 TO STA 1504+81.98	STA 1487+16.87 TO STA 1492+82.50

NOTES:
1. SEE PLAN FOR EXCLUSION AND TAPER LOCATIONS
2. VARIES 4' TO 12' IN CROSSOVER AREAS
3. REMOVAL OF EXISTING ASB & TY D HMAC NOT ILLUSTRATED IN THE REMOVAL PLAN, IS TO BE PAID FOR USING EXCAVATION (ROADWAY) (ITEM 110)

NOT TO SCALE

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
TYPICAL SECTIONS

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
03	WILBARGER		3

DATE: 4/30/2021 9:33:50 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\1. General\3 - TYPICAL SECTION.dgn

GENERAL NOTES

Basis of Estimate:

Item - Description	Rate*	Unit
168 – Vegetative Watering	1.4 GAL/SY per Application every 2 weeks for 3 months	MG
275 – Cement (8")	3% by weight Est @ 120 LB /Cu Ft	TON
310 – Prime Coat (MC-30 or AE-P)	0.25 GAL/SY	GAL
314 – Emulsified Asphalt Treatment (Erosion Control) (MS-2 or SS-1)	0.20 GAL/SY	GAL
342 – PFC	95.0 LB / SY / Inch	TON
530 – Intersections, Driveways, and Turnouts Dense Graded HMA	110 LB / SY / Inch	TON
3076 – Dense Graded HMA	110 LB / SY / Inch	TON
3084 – Bonding Course	0.06 GAL/SY (Residual)	GAL

*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
Cody Bates, P.E.: Cody.Bates@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individual(s).

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

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.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at:

https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design.

Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 7 - Legal Relations and Responsibilities
No significant traffic generator events identified for this project.

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

Item Specific

Item 104 - Removing Concrete
Concrete foundations shall be broken down to a minimum depth of 24" below natural ground.

Item 105 – Removing Treated and Untreated Base and Asphalt Pavement
Material produced by milling operations is to remain the property of TxDOT. Mill asphalt pavement and stockpile planed material at the following location: 34.082483, -99.036444. RAP produced from this operation can be used as backfill for pavement edges.

Item 132 - Embankment
All borrow/aggregate sites shall meet the requirements of the Texas Aggregate Quarry and Pit Safety Act which can be found at www.txdot.gov/inside-txdot/division/maintenance/quarry.html

Highway: US 287

This material shall consist of suitable earth material such as loam, clay or other materials that will form a stable embankment and be free from vegetation or other objectionable matter. Any embankment needed from a borrow pit must first be approved by the Engineer.

Item 164 - Seeding for Erosion Control
Temporary seeding will be required in several small areas as work progresses to comply with the storm water pollution prevention plan and may require multiple mobilizations of seeding crew. The 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.

After seeding has been completed, apply emulsified asphalt at the rate specified in the Basis of Estimate. Emulsified asphalt will be paid for under Item 314, Emulsified Asphalt Treatment (Erosion Control) (MS-2 or SS-1).

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 275 - Cement Treatment (Road Mixed)
Cement percentage in the Basis of Estimate is for estimating purposes only. Determine actual cement quantity using TEX-120-E Test Method. Provide independent test results when determining target cement rate. The target range value of 100 to 150 psi Unconfined Compressive Strength is required.

Item 342 – Permeable Friction Course
The use of Recycled Asphalt Shingles (RAS) or Recycled Asphalt Pavement (RAP) will not be permitted in the surface mix for this project.

Item 354 – Planing and Texturing Pavement
Material produced by milling operations is to remain the property of TxDOT. Stockpile material produced from this operation at the following location: 34.082483, -99.036444. RAP produced from this operation can be used as backfill for pavement edges.

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Item 403– Temporary Special Shoring
The Contractor is responsible for identifying temporary special shoring areas prior to bidding the project. No additional payment will be made for quantities exceeding the engineer's plans estimate for this item.

No benching or sloping of sides of excavations will be allowed under this item, especially within the limits of the roadway.

For this project, shoring (special shoring) is defined as follows:

"Shoring (Shoring system)" means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Protect trenches, vertical walls and boring pits 5 ft. deep or deeper in accordance with OSHA Standards and Interpretations, 29 CFR 1926, Subpart P, "Excavations." No direct payment will be made for this work but will be considered subsidiary the various bid items.

Item 462– Concrete Box Culverts and Drains
Concrete box extensions and end treatments shall be cast in place.

Item 467 - Safety End Treatment
All type II SET's shall be precast. Provide a riprap apron where precast SET's are used.

Item 502 - Barricades, Signs, and Traffic Handling
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.

The Contractor's Responsible Person for TCP compliance is available by local telephone 24 hours a day and must respond to traffic control needs within 45 minutes of being notified.

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.

Highway: US 287

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.

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

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls
The disturbed area for this project, as shown on the plans, is 7.4 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.

The Contractor shall meet the requirements for concrete truck washouts as described in Part V of the TPDES General Permit TXR150000. This work, including materials and labor, will not be measured or paid for directly, but will be subsidiary to Item 506.

Anticipate multiple mobilizations for SWP3 work.

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 530 - Intersections, Driveways, and Turnouts
Provide Item 340, Dense Graded Hot-Mix Asphalt (Small Quantity), to overlay existing crossovers. Use mixture Type D PG binder 70-28. No Substitute PG Binder will be allowed on this project.

Highway: US 287

Payment to overlay existing crossovers will be paid for by the SY.

The use of Recycled Asphalt Shingles (RAS) or Recycled Asphalt Pavement (RAP) will not be permitted in the surface mix.

Item 644 – Small Roadside Sign Assemblies
Contractor is responsible for verifying sign locations prior to final placement. Stake sign support locations for verification by the engineer and obtain approval from the engineer prior to placement of sign supports.

Item 658 - Delineator and Object Marker Assemblies
Use wedge anchor system (WAP) for all delineators and object markers on this project.

Cast wedge anchor system for object markers into proposed headwalls as directed by the Engineer.

Item 666 - Reflectorized Pavement Markings
Use Type II beads on all striping.

Remove temporary tabs from all roads prior to striping. Removal of tabs will be subsidiary to pertinent items.

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

Item 672 - Raised Pavement Markers
Raised pavement marker adhesive will meet the requirements of Departmental Materials Specifications DMS-6130, "Bituminous Adhesive for Pavement Markers".

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

Item 3076 – Dense Graded HMA
Provide mixture Type B using PG binder 70-22. No Substitute PG Binder will be allowed on this project.

The Dense Graded mixture for this project shall contain no Recycled Asphalt Shingles (RAS) and no more than 10% Recycled Asphalt Pavement (RAP).

RAP shall not include more that 1.5% deleterious material when tested in accordance with Test Method TEX 413-A.

Item 3084 – Bonding Course
Spray paver will not be used unless otherwise authorized by Engineer.

QUANTITY SHEET

CONTROLLING PROJECT ID 0043-07-119 **DISTRICT** Wichita Falls **COUNTY** Wilbarger
HIGHWAY US 287

			CONTROL SECTION JOB		**0043-07-119**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00137527**		
			COUNTY		**Wilbarger**		
			HIGHWAY		**US 287**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)	SY	16.000		16.000	
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF	500.000		500.000	
	105-6022	REMOVING STAB BASE AND ASPH PAV (13")	SY	2,823.000		2,823.000	
	110-6001	EXCAVATION (ROADWAY)	CY	10,461.000		10,461.000	
	132-6004	EMBANKMENT (FINAL)(DENS CONT)(TY B)	CY	5,263.000		5,263.000	
	162-6002	BLOCK SODDING	SY	648.000		648.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	31,489.000		31,489.000	
	164-6041	DRILL SEEDING (TEMP) (WARM)	SY	15,745.000		15,745.000	
	164-6043	DRILL SEEDING (TEMP) (COOL)	SY	15,745.000		15,745.000	
	168-6001	VEGETATIVE WATERING	MG	269.000		269.000	
	275-6001	CEMENT	TON	384.000		384.000	
	275-6010	CEMENT TREAT (SUBGRADE) (8")	SY	35,552.000		35,552.000	
	310-6009	PRIME COAT (MC-30)	GAL	8,901.000		8,901.000	
	314-6021	EMULS ASPH (PRIME)(MS-2 OR SS-1)	GAL	2,731.000		2,731.000	
	342-6002	PFC (ASPHALT) PG76-22	TON	208.000		208.000	
	342-6006	PFC-C (AGGREGATE)(PG76 MIX) SAC-A	TON	2,980.000		2,980.000	
	354-6041	PLANE ASPH CONC PAV (1.5")	SY	11,989.000		11,989.000	
	403-6001	TEMPORARY SPL SHORING	SF	201.000		201.000	
	420-6009	CL A CONC (COLLAR)	EA	6.000		6.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	24.000		24.000	
	462-6046	CONC BOX CULV (3 FT X 3 FT)(EXTEND)	LF	16.000		16.000	
	462-6054	CONC BOX CULV (6 FT X 3 FT)(EXTEND)	LF	18.000		18.000	
	462-6055	CONC BOX CULV (6 FT X 4 FT)(EXTEND)	LF	16.000		16.000	
	462-6057	CONC BOX CULV (6 FT X 6 FT)(EXTEND)	LF	43.000		43.000	
	464-6009	RC PIPE (CL III)(42 IN)	LF	54.000		54.000	
	464-6011	RC PIPE (CL III)(54 IN)	LF	32.000		32.000	
	466-6196	WINGWALL (PW - 2) (HW=7 FT)	EA	1.000		1.000	
	467-6112	SET (TY I)(S=3 FT)(HW= 4 FT)(4:1)(C)	EA	1.000		1.000	
	467-6212	SET (TY I)(S= 6 FT)(HW= 4 FT)(4:1) (C)	EA	1.000		1.000	
	467-6219	SET (TY I)(S= 6 FT)(HW= 5 FT)(4:1) (C)	EA	1.000		1.000	
	467-6450	SET (TY II) (36 IN) (RCP) (4: 1) (C)	EA	1.000		1.000	
	467-6463	SET (TY II) (42 IN) (RCP) (4: 1) (C)	EA	3.000		3.000	
	467-6487	SET (TY II) (54 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	472-6011	REMOV & RE - LAY PIPE (36 IN)	LF	6.000		6.000	
	496-6004	REMOV STR (SET)	EA	12.000		12.000	
	496-6005	REMOV STR (WINGWALL)	EA	2.000		2.000	
	496-6007	REMOV STR (PIPE)	LF	64.000		64.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0043-07-119 **DISTRICT** Wichita Falls **COUNTY** Wilbarger
HIGHWAY US 287

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0043-07-119**			
		PROJECT ID		**A00137527**			
		COUNTY		**Wilbarger**			
		HIGHWAY		**US 287**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	500-6001	MOBILIZATION	LS	100.00%		100.00%	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	576.000		576.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	576.000		576.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,700.000		1,700.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,700.000		1,700.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	1,700.000		1,700.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	1,700.000		1,700.000	
	530-6011	INTRSCT, DRVWAYS, & TURNOUT (ACP)	SY	6,985.000		6,985.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	200.000		200.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	1.000		1.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	400.000		400.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	1.000		1.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000		2.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	97.000		97.000	
	644-6028	IN SM RD SN SUP&AM TYS80(1)SA(P-BM)	EA	34.000		34.000	
	644-6068	RELOCATE SM RD SN SUP&AM TY 10BWG	EA	3.000		3.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	96.000		96.000	
	658-6044	INSTL DEL ASSM (D-DY)SZ 2(WC)GND	EA	24.000		24.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	50.000		50.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	5.000		5.000	
	658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)	EA	5.000		5.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	2,282.000		2,282.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	22,200.000		22,200.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	26,795.000		26,795.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	48.000		48.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	24.000		24.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA	154.000		154.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	72.000		72.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	2,280.000		2,280.000	
	3076-6006	D-GR HMA TY-B PG70-22	TON	21,734.000		21,734.000	
	3084-6001	BONDING COURSE	GAL	6,964.000		6,964.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	136.000		136.000	
	6185-6002	TMA (STATIONARY)	DAY	170.000		170.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	85.000		85.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

QUANTITY SHEET

CONTROLLING PROJECT ID 0043-07-119 **DISTRICT** Wichita Falls **COUNTY** Wilbarger
HIGHWAY US 287

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0043-07-119**			
		PROJECT ID		**A00137527**			
		COUNTY		**Wilbarger**			
		HIGHWAY		**US 287**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF TURN LANE ITEMS

LOCATION			105 6022	110 6001	132 6004	275 6001	275 6010	310 6009	342 6002	342 6006	354 6041
			REMOVING STAB BASE AND ASPH PAV (13")	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY B)	CEMENT	CEMENT TREAT (SUBGRADE) (8")	PRIME COAT (MC-30)	PFC (ASPHALT) PG76-22	PFC-C (AGGREGATE) (PG76 MIX) SAC-A	PLANE ASPH CONC PAV (1.5")
SHEET NO.	START STA.	END STA.	SY	CY	CY	TON	SY	GAL	TON	TON	SY
SOUTHBOUND											
1	1208+22.49	1219+99.15	13	352	476	16.6	1538	385	9.0	129	512
2	1236+50.79	1248+48.94	19	402	401	16.6	1538	385	9.0	129	512
3	1271+51.11	1283+08.34	16	470	115	16.6	1538	385	9.0	129	514
4	1293+79.74	1305+47.97	15	359	515	16.6	1538	385	9.0	129	519
5	1310+64.41	1322+71.43	15	426	324	16.6	1538	385	9.0	130	537
6	1337+08.18	1348+74.79	14	388	468	16.6	1538	385	9.0	129	519
7	1360+55.50	1372+21.92	15	444	138	16.6	1538	385	9.0	129	518
8	1376+04.39	1387+79.03	17	464	126	16.6	1538	385	9.0	129	522
9	1405+30.23	1416+98.88	14	361	346	16.6	1538	385	9.0	129	519
10	1464+11.31	1475+90.04	18	420	206	16.6	1538	385	9.0	129	524
11	1475+90.04	1487+16.87	37	439	66	16.9	1563	391	9.0	129	501
12	1487+16.87	1492+82.50	28	212	114	9.3	857	214	5.0	73	305
NORTHBOUND											
1	1219+10.82	1230+67.03	149	246	18	16.6	1538	385	9.0	129	515
2	1247+35.15	1259+36.56	140	429	98	16.6	1538	385	9.0	130	510
3	1282+36.96	1293+86.28	141	446	100	16.6	1538	385	9.0	128	511
4	1304+64.57	1316+21.96	144	406	241	16.6	1538	385	9.0	128	514
5	1321+08.74	1333+14.00	144	407	197	16.6	1538	385	9.0	130	536
6	1347+91.27	1359+51.14	139	438	122	16.6	1538	385	9.0	129	516
7	1371+40.78	1383+00.16	131	377	529	16.6	1538	385	9.0	129	516
8	1386+88.67	1398+54.24	120	430	142	16.6	1538	385	9.0	128	518
9	1416+14.37	1427+78.63	125	424	180	16.6	1538	385	9.0	128	518
10	1474+85.32	1486+30.77	167	477	28	16.6	1538	385	9.0	127	509
11	1486+30.77	1492+82.39	171	279	3	9.1	843	211	5.0	71	290
12	1492+82.39	1504+81.98	142	580	1	16.6	1538	385	9.0	130	533
SECTION TOTALS			**1934**	**9672**	**4953**	**384**	**35552**	**8901**	**208**	**2980**	**11989**
PROJECT TOTALS			**1934**	**9672**	**5263**	**384**	**35552**	**8901**	**208**	**2980**	**11989**

SUMMARY OF TURN LANE ITEMS

LOCATION			662 6109	666 6036	666 6315	668 6077	668 6085	672 6010	3076 6006	3084 6001
			WK ZN PAV MRK SHT TERM (TAB) TY W	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	REFL PAV MRKR TY II-C-R	D-GR HMA TY-B PG70-22	BONDING COURSE
SHEET NO.	START STA.	END STA.	EA	LF	LF	EA	EA	EA	TON	GAL
SOUTHBOUND										
1	1208+22.49	1219+99.15	96	950	1100	2	1	95	940	285
2	1236+50.79	1248+48.94	96	950	1100	2	1	95	940	285
3	1271+51.11	1283+08.34	96	950	1100	2	1	95	940	285
4	1293+79.74	1305+47.97	96	950	1100	2	1	95	940	285
5	1310+64.41	1322+71.43	96	950	1100	2	1	95	940	285
6	1337+08.18	1348+74.79	96	950	1100	2	1	95	940	285
7	1360+55.50	1372+21.92	96	950	1100	2	1	95	940	285
8	1376+04.39	1387+79.03	96	950	1100	2	1	95	940	285
9	1405+30.23	1416+98.88	96	950	1100	2	1	95	940	285
10	1464+11.31	1475+90.04	96	950	1100	2	1	95	940	285
11	1475+90.04	1487+16.87	104	1040	1040	2	1	95	954	287
12	1487+16.87	1492+82.50	58	565	565	2	1	95	524	112
NORTHBOUND										
1	1219+10.82	1230+67.03	96	950	1100	2	1	95	940	285
2	1247+35.15	1259+36.56	96	950	1100	2	1	95	940	285
3	1282+36.96	1293+86.28	96	950	1100	2	1	95	940	285
4	1304+64.57	1316+21.96	96	950	1100	2	1	95	940	285
5	1321+08.74	1333+14.00	96	950	1100	2	1	95	940	285
6	1347+91.27	1359+51.14	96	950	1100	2	1	95	940	285
7	1371+40.78	1383+00.16	96	950	1100	2	1	95	940	285
8	1386+88.67	1398+54.24	96	950	1100	2	1	95	940	285
9	1416+14.37	1427+78.63	96	950	1100	2	1	95	940	285
10	1474+85.32	1486+30.77	96	950	1100	2	1	95	940	285
11	1486+30.77	1492+82.39	96	560	560	2	1	95	516	156
12	1492+82.39	1504+81.98	104	1035	1035	2	1	95	940	285
SECTION TOTALS			**2282**	**22200**	**25200**	**48**	**24**	**2280**	**21734**	**6540**
PROJECT TOTALS			**2282**	**22200**	**26795**	**48**	**24**	**2280**	**21734**	**6964**

US 287

QUANTITY SUMMARY

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		9

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SUMMARY OF DRAINAGE ITEMS

LOCATION			104 6009	403 6001	420 6009	462 6046	462 6054	462 6055	462 6057	464 6009	464 6011	466 6196
			REMOVING CONC (RIPRAP)	TEMPORARY SPL SHORING	CL A CONC (COLLAR)	CONC BOX CULV (3 FT X 3 FT) (EXTEND)	CONC BOX CULV (6 FT X 3 FT) (EXTEND)	CONC BOX CULV (6 FT X 4 FT) (EXTEND)	CONC BOX CULV (6 FT X 6 FT) (EXTEND)	RC PIPE (CL III) (42 IN)	RC PIPE (CL III) (54 IN)	WINGWALL (PW - 2) (HW=7 FT)
STRUCTURE	STATION	NB/SB	SY	SF	EA	LF	LF	LF	LF	LF	LF	EA
C-1	1253+54.50	NB										
C-2	1277+54.70	NB										
C-3	1340+79.16	SB		54					43			1
C-4	1341+52.34	NB										
C-5	1367+02.72	NB	16	28	1							
C-6	1367+02.80	SB		29		16						
C-7	1383+80.29	NB										
C-8	1383+83.43	SB		50	2			16			32	
C-9	1423+08.56	NB										
C-10	1423+06.29	SB										
C-11	1445+54.29	NB										
C-12	1445+57.02	SB										
C-13	1456+34.83	SB										
C-14	1474+58.09	NB										
C-15	1474+53.21	SB		40	3		18			54		
SECTION TOTALS			**16**	**201**	**6**	**16**	**18**	**16**	**43**	**54**	**32**	**1**
PROJECT TOTALS			**16**	**201**	**6**	**16**	**18**	**16**	**43**	**54**	**32**	**1**

SUMMARY OF DRAINAGE ITEMS

LOCATION			467 6112	467 6212	467 6219	467 6450	467 6463	467 6487	472 6011	496 6004	496 6005	658 6100
			SET (TY I) (S=3 FT) (HW= 4 FT) (4:1) (C)	SET (TY I) (S= 6 FT) (HW= 4 FT) (4:1) (C)	SET (TY I) (S= 6 FT) (HW= 5 FT) (4:1) (C)	SET (TY II) (36 IN) (RCP) (4: 1) (C)	SET (TY II) (42 IN) (RCP) (4: 1) (C)	SET (TY II) (54 IN) (RCP) (4: 1) (C)	REMOV & RE - LAY PIPE (36 IN)	REMOV STR (SET)	REMOV STR (WINGWALL)	INSTL OM ASSM (OM-2Z) (WFLX) GND (BI)
STRUCTURE	STATION	NB/SB	EA	EA	EA	EA	EA	EA	LF	EA	EA	EA
C-1	1253+54.50	NB										
C-2	1277+54.70	NB										
C-3	1340+79.16	SB									1	1
C-4	1341+52.34	NB										
C-5	1367+02.72	NB				1			6		1	1
C-6	1367+02.80	SB	1							1		1
C-7	1383+80.29	NB										
C-8	1383+83.43	SB			1			2		3		1
C-9	1423+08.56	NB										
C-10	1423+06.29	SB										
C-11	1445+54.29	NB										
C-12	1445+57.02	SB										
C-13	1456+34.83	SB										
C-14	1474+58.09	NB										
C-15	1474+53.21	SB		1			3			4		1
SECTION TOTALS			**1**	**1**	**1**	**1**	**3**	**2**	**6**	**8**	**2**	**5**
PROJECT TOTALS			**1**	**1**	**1**	**1**	**3**	**2**	**6**	**12**	**2**	**5**

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US 287

QUANTITY SUMMARY

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		10

SUMMARY OF GUARDRAIL ITEMS

LOCATION			104 6054	432 6045	540 6001	540 6016	542 6001	542 6002	544 6001	544 6003	658 6062	658 6060
			REMOVING CONCRETE (MOW STRIP)	RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (TIM POST)	DOWNSTREAM ANCHOR TERMINAL SECTION	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)	REMOVE DELIN & OBJECT MARKER ASSMS
STRUCTURE	STATION	NB/SB	LF	CY	LF		LF	EA	EA	EA	EA	EA
C-3 NORTH SIDE	1340+79.16	SB	250				200	1		1		5
C-3 SOUTH SIDE	1340+79.16	SB	250	24	200	1	200	1	1	1	5	5
SECTION TOTALS			**500**	**24**	**200**	**1**	**400**	**2**	**1**	**2**	**5**	**10**
PROJECT TOTALS			**500**	**24**	**200**	**1**	**400**	**2**	**1**	**2**	**5**	**50**

SUMMARY OF CROSSOVER ITEMS

LOCATION			530 6011	644 6004	644 6028	644 6068	644 6076	658 6044	658 6060	666 6315	668 6092	672 6009	3084 6001
			INTRSCT, DRVWAYS, & TURNOUT (ACP)	IN SM RD SN SUP&AM TY10BWG (1) SA (T)	IN SM RD SN SUP&AM TYS80 (1) SA (P-BM)	RELOCATE SM RD SN SUP&AM TY 10BWG	REMOVE SM RD SN SUP&AM	INSTL DEL ASSM (D-DY) SZ 2 (WC) GND	REMOVE DELIN & OBJECT MARKER ASSMS	RE PM W/RET REQ TY I (Y) 4" (SLD) (100M IL)	PREFAB PAV MRK TY C (W) (36") (YLD TRI)	REFL PAV MRKR TY II-A-A	BONDING COURSE
CROSSOVER NO.	STATION	SIGN LAYOUT	SY	EA	EA	EA	EA	EA	EA	LF	EA	EA	GAL
1	1219+47.83	F	410	8	2	1	6	2	2	110	10	6	25
2 (REMOVE)	1225+18.89						6		2	125			
3	1247+91.81	E	752	8	3		7	2	2	110	16	6	46
4 (REMOVE)	1258+92.73						6		2	70			
5	1282+68.26	F	383	8	2		6	2	2	110	10	6	23
6	1305+05.08	E	408	9	2		7	2	2	110	10	6	25
7	1321+88.38	A	787	8	4		9	2	2	110	16	6	48
8	1348+31.18	E	398	8	3		7	2	2	110	10	6	24
9	1371+79.48	E	419	8	3		7	2	2	110	10	6	26
10	1387+30.58	E	449	8	3		7	2	2	110	12	6	27
11	1416+55.69	E	474	8	3		7	2	2	130	12	6	29
12	1475+49.37	E	797	8	3		7	2	2	130	16	6	48
13	1486+74.35	E	833	8	3	1	7	2	2	130	16	6	50
14	1493+32.05	E	874	8	3	1	7	2	2	130	16	6	53
SECTION TOTALS			**6985**	**97**	**34**	**3**	**96**	**24**	**40**	**1595**	**154**	**72**	**424**
PROJECT TOTALS			**6985**	**97**	**34**	**3**	**96**	**24**	**50**	**26795**	**154**	**72**	**6964**

SUMMARY OF CROSSOVER REMOVAL ITEMS

CROSSOVER NO.	105 6022	110 6001	132 6004	164 6035	164 6041	164 6043	168 6001	496 6004	496 6007
	REMOVING STAB BASE AND ASPH PAV (13")	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY B)	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	VEGETATIVE WATERING	REMOV STR (SET)	REMOV STR (PIPE)
	SY	CY	CY	SY	SY	SY	MG	EA	LF
2	369	360	148	484	242	242	6	2	32
4	520	428	162	484	242	242	6	2	32
SECTION TOTALS	**889**	**788**	**310**	**968**	**484**	**484**	**12**	**4**	**64**
PROJECT TOTALS	**2823**	**10460**	**5263**	**31489**	**15745**	**15745**	**269**	**12**	**64**

US 287

QUANTITY SUMMARY

Texas Department of Transportation®

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		11

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SUMMARY OF EROSION CONTROL ITEMS

SHEET NO.	162 6002 BLOCK SODDING	164 6035 DRILL SEEDING (PERM) (RURAL) (CLAY)	164 6041 DRILL SEEDING (TEMP) (WARM)	164 6043 DRILL SEEDING (TEMP) (COOL)	168 6001 VEGETATIVE WATERING	314 6021 EMULS ASPH (PRIME)(MS-2 OR SS-1)	506 6002 ROCK FILTER DAMS (INSTALL) (TY 2)	506 6011 ROCK FILTER DAMS (REMOVE)	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	506 6041 BIODEG EROSN CONT LOGS (INSTL) (12")	506 6043 BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	SY	MG	GAL	LF	LF	LF	LF	LF	LF
SOUTHBOUND TURN LANE												
1	27	2322	1161	1161	19.5	122	24	24	50	50	50	50
2	27	1956	978	978	16.5	122	24	24	550	550	550	550
3	27	1100	550	550	9.3	122	24	24	50	50	50	50
4	27	2444	1222	1222	20.6	122	24	24	50	50	50	50
5	27	1344	672	672	11.3	122	24	24	50	50	50	50
6	27	1711	856	856	14.4	122	24	24	50	50	50	50
7	27	978	489	489	8.2	122	24	24	50	50	50	50
8	27	978	489	489	8.2	122	24	24	50	50	50	50
9	27	1833	917	917	15.4	122	24	24	50	50	50	50
10	27	1222	611	611	10.3	122	24	24	50	50	50	50
11	27	695	347	347	5.8	115	24	24	50	50	50	50
12	27	952	476	476	8.0	63	24	24	50	50	50	50
NORTHBOUND TURN LANE												
1	27	298	149	149	2.5	59	24	24	50	50	50	50
2	27	1047	524	524	8.8	116	24	24	50	50	50	50
3	27	978	489	489	8.2	122	24	24	50	50	50	50
4	27	1589	794	794	13.4	122	24	24	50	50	50	50
5	27	1589	794	794	13.4	122	24	24	50	50	50	50
6	27	1100	550	550	9.3	122	24	24	50	50	50	50
7	27	2689	1344	1344	22.6	122	24	24	50	50	50	50
8	27	1222	611	611	10.3	122	24	24	50	50	50	50
9	27	1467	733	733	12.3	122	24	24	50	50	50	50
10	27	576	288	288	4.8	115	24	24	50	50	50	50
11	27	187	94	94	1.6	62	24	24	50	50	50	50
12	27	244	122	122	2.1	122	24	24	50	50	50	50
SECTION TOTALS	**648**	**30521**	**15261**	**15261**	**257**	**2731**	**576**	**576**	**1700**	**1700**	**1700**	**1700**
PROJECT TOTALS	**648**	**31489**	**15745**	**15745**	**269**	**2731**	**576**	**576**	**1700**	**1700**	**1700**	**1700**

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	6001 6001 PORTABLE CHANGEABLE MESSAGE SIGN	6185 6002 TMA (STATIONARY)	6185 6005 TMA (MOBILE OPERATION)
	DAY	DAY	DAY
CSJ: 0043-07-119	136	170	85
PROJECT TOTALS	**136**	**170**	**85**

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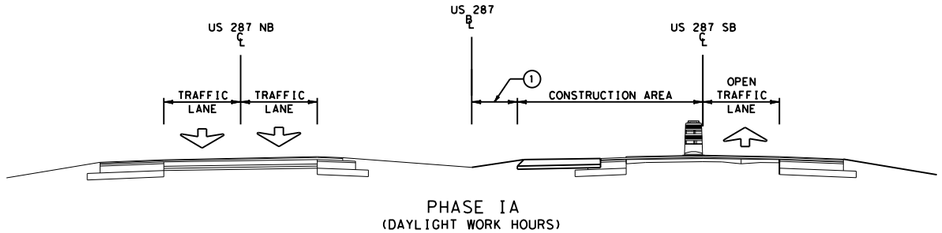
US 287

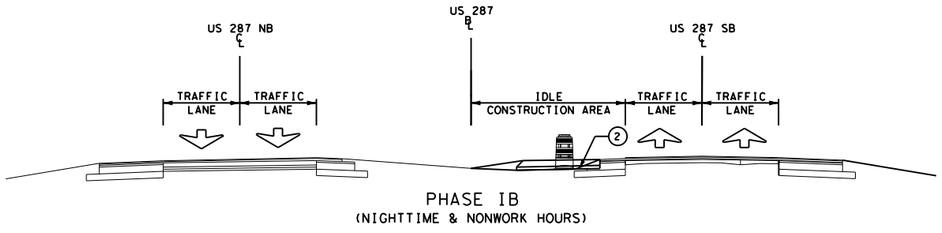
QUANTITY SUMMARY

Texas Department of Transportation®

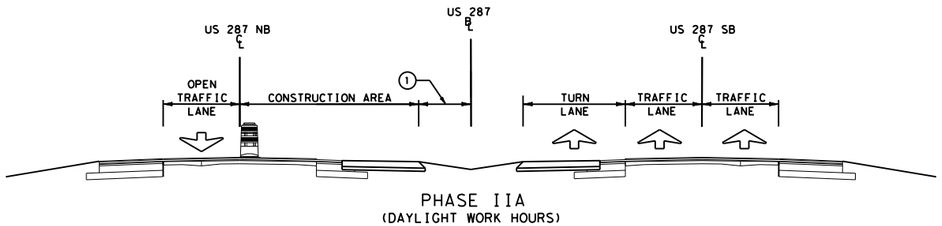
CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		12



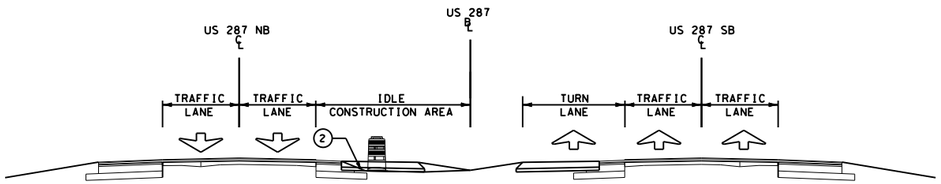
PHASE IA
(DAYLIGHT WORK HOURS)



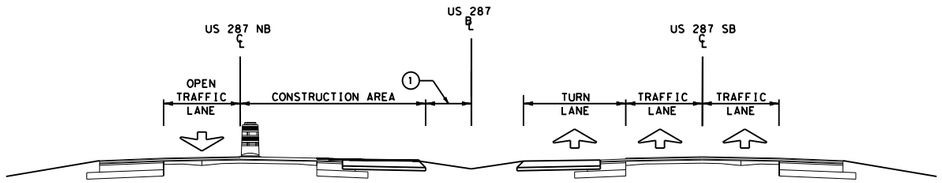
PHASE IB
(NIGHTTIME & NONWORK HOURS)



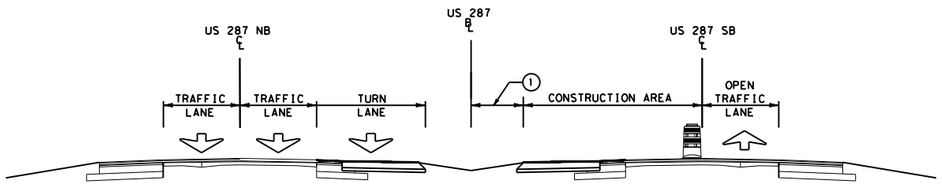
PHASE IIA
(DAYLIGHT WORK HOURS)



PHASE IIB
(NIGHTTIME & NONWORK HOURS)



PHASE IIIA
(1.5" HOTMIX OVERLAY)



PHASE IIIB
(1.5" HOTMIX OVERLAY)

SEQUENCE OF WORK:

PHASE I CONSTRUCTION TO INCLUDE INSTALLING BMP'S, EXTENDING DRAINAGE STRUCTURES, REMOVING STAB BASE & ASPHALT, PLANING OF EXISTING SHOULDER, EXCAVATION OF EXISTING ROADWAY & CROSSOVERS, CEMENT TREATING SUBGRADE, LAYING OF D-GR-B SUBSTRUCTURE, & EMBANKMENT PLACEMENT.

PHASE II CONSTRUCTION TO INCLUDE INSTALLING BMP'S, EXTENDING DRAINAGE STRUCTURES, REMOVING STAB BASE & ASPHALT, PLANING OF EXISTING SHOULDER, EXCAVATION OF EXISTING ROADWAY, CEMENT TREATING SUBGRADE, LAYING OF D-GR-B SUBSTRUCTURE, & EMBANKMENT PLACEMENT FOR OPPOSITE SIDE OF HWY.

PHASE III CONSTRUCTION TO INCLUDE PFC OVERLAY OF TURN LANES, D-GR OVERLAY OF CROSSOVERS, EMBANKMENT PLACEMENT, STRIPING, PAVEMENT MARKER PLACEMENT & PERMANENT SEEDING FOR BOTH SIDES OF THE HWY.

NOTES:

WORK ON BOTH SIDES OF THE ROAD WILL NOT BE ALLOWED UNLESS OTHERWISE DIRECTED BY ENGINEER.

MULTIPLE TURN LANES MAY BE CONSTRUCTED SIMULTANEOUSLY AS PERMITTED BY THE ENGINEER WHEN THE CONTRACTOR PROVES TO HAVE ADEQUATE FORCES & EQUIPMENT TO PERFORM MORE WORK & WHERE ADEQUATE CROSSOVER ACCESS TO THE TRAVELING PUBLIC PERMITS.

ALL TRAFFIC CONTROL WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

THE PORTION OF THIS PROJECT WHICH COINCIDES WITH EXISTING ROADS AND / OR PRIVATE DRIVES SHALL BE MAINTAINED AS ALL-WEATHER ROADS AND KEPT OPEN AT ALL TIMES UNLESS OTHERWISE APPROVED BY THE ENGINEER. THIS WILL BE CONSIDERED SUBSIDIARY TO TRAFFIC HANDLING AND BARRICADES.

CW 8-9a "SHOULDER DROP-OFF" SIGNS SHALL BE PLACED DURING PHASES IB & IIB AT A MAXIMUM SPACING OF 1,800 FT. PLACE OTHER SIGNS AND DEVICES AS REQUIRED ON THE EDGE CONDITION SHEET.

PHASES I, II & III CHANNELIZING DEVICES SHOWN ARE PLASTIC TRAFFIC DRUMS AS DESCRIBED ON BC(8)-20. OTHER APPROVED BASES AND SUPPORTS MAY BE USED WITH THE ENGINEER'S APPROVAL.

BARRICADE & CONSTRUCTION STDS BC(1-12)-14 REQUIRED FOR ALL PHASES. REFER TO WORK ZONE STANDARD (WZ) SHEETS FOR ADDITIONAL DETAILS. STANDARDS SHOWN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENTS FOR WORK ZONE SIGNING AND TRAFFIC CONTROL. ADDITIONAL OR OTHER DEVICES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

(1) - SEE THE VEGETATIVE ESTABLISHMENT DETAIL SHEET FOR BACKFILL OPERATIONS.

(2) - THE 3:1 SLOPE BACKFILL FOR END OF DAY OPERATIONS SHALL BE DURABLE CRUSHED STONE TYPE OF FLEXIBLE BASE OR OTHER MATERIALS APPROVED BY THE ENGINEER. WHEN WORK IS RESUMED ON THIS EXCAVATED AREA THIS BACKFILL MATERIAL SHALL BE INCORPORATED INTO THE ROAD WORK OR DISPOSED OF AS APPROVED BY THE ENGINEER. MATERIALS AND LABOR FOR THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

SCALE = N.T.S.

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
SEQUENCE OF WORK

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		13

DATE: 4/29/2021 2:56:36 PM
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

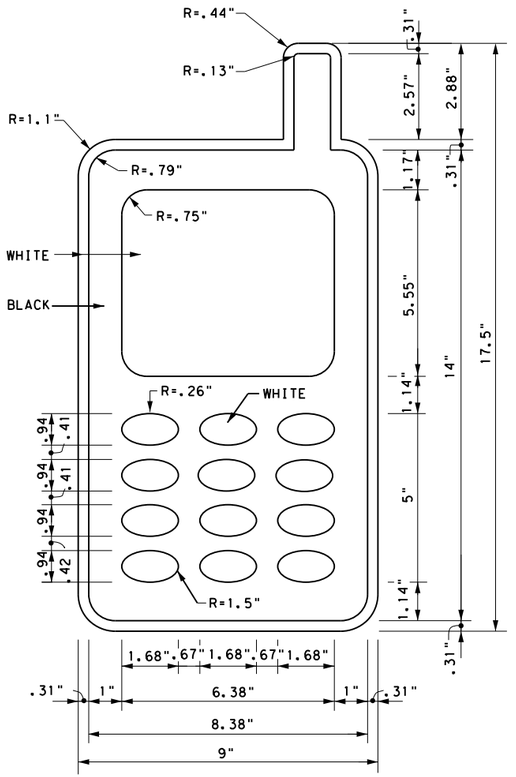
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

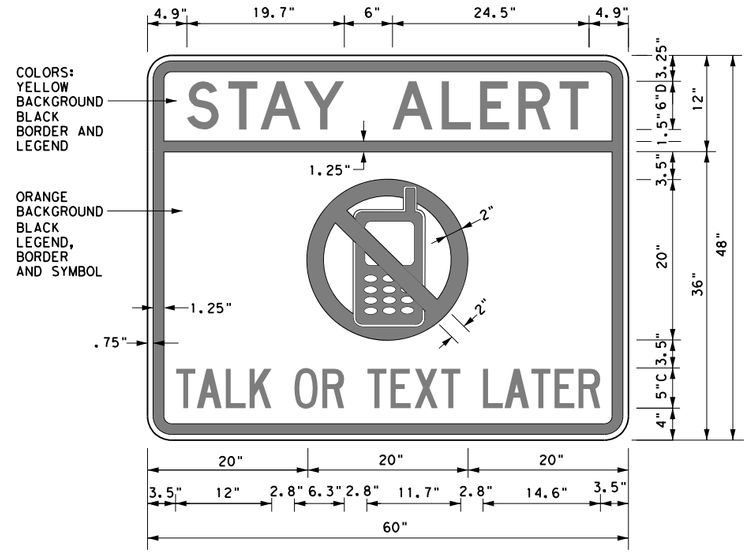
12. The Engineer has the final decision on the location of all traffic control devices.

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 APPAREL 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.





3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13	WFS	WILBARGER		14

DATE: 4/28/2021 11:25:15 PM
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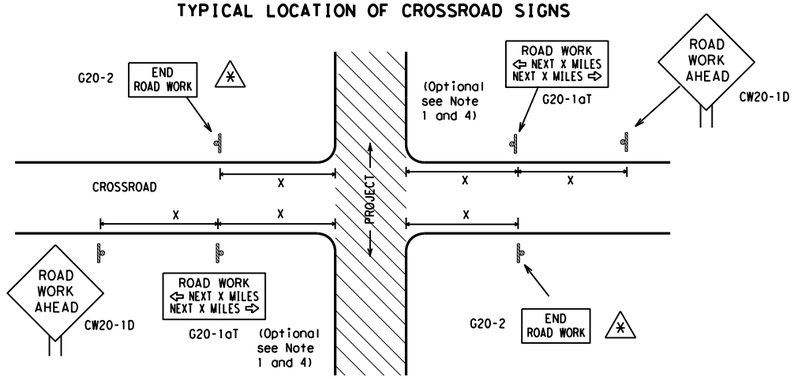
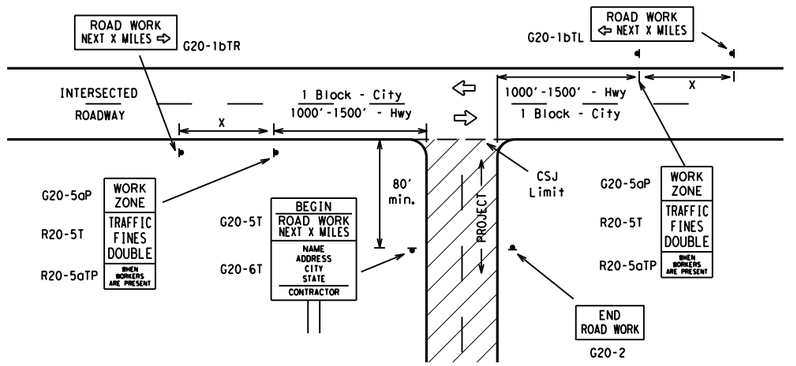
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

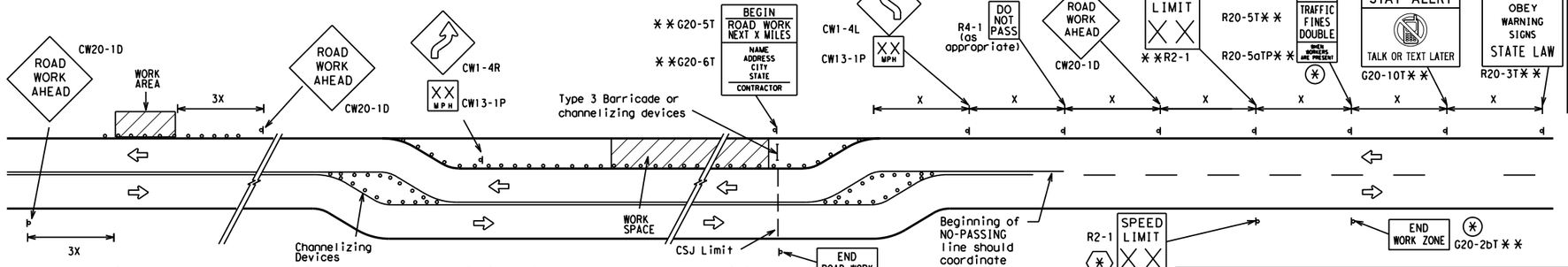
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

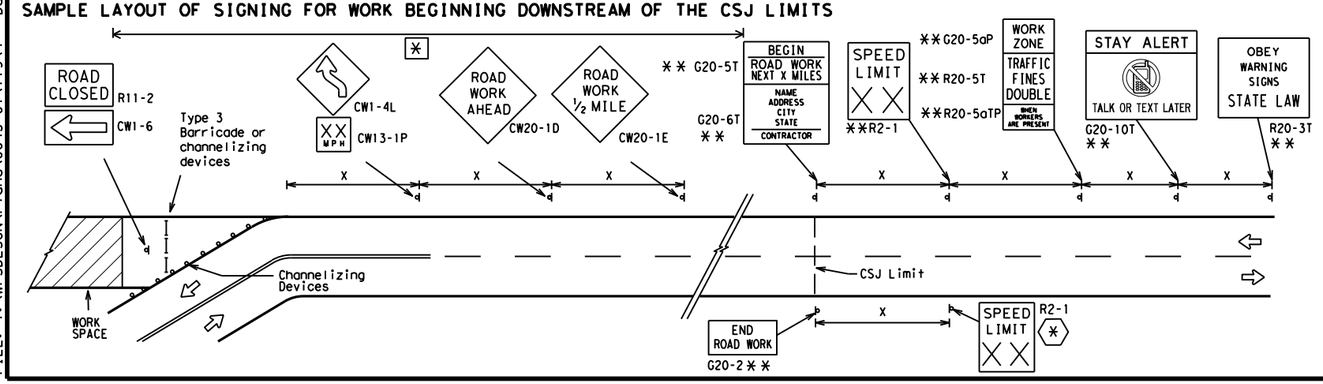
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

✱✱ Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

[✱] 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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WFS	WILBARGER		15

DATE: 4/28/2021 11:25:17 PM
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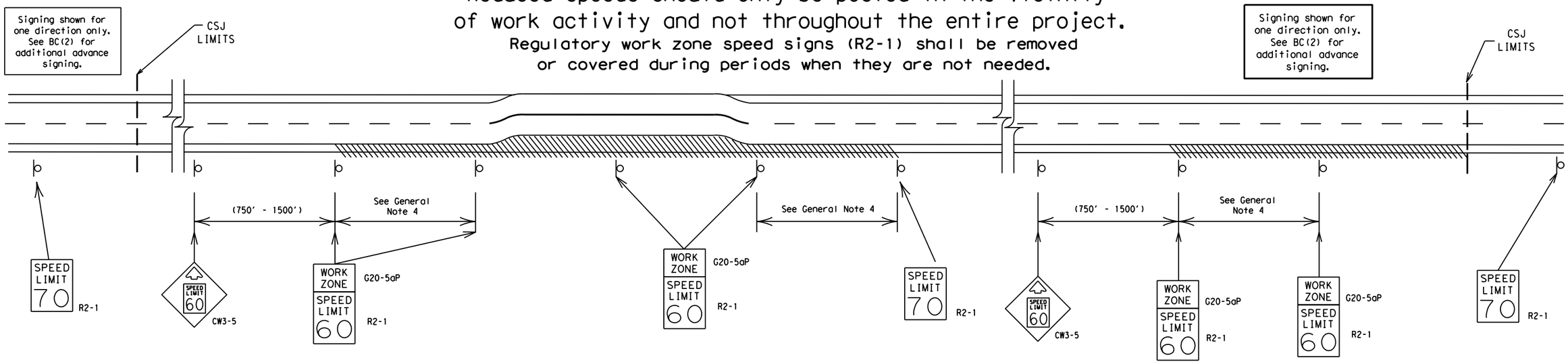
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		16

DATE: 4/28/2021 11:25:19 PM
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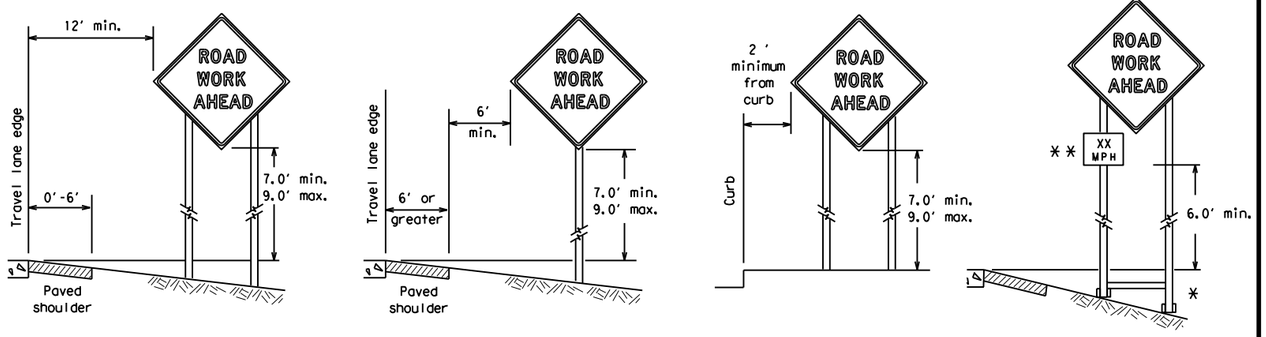
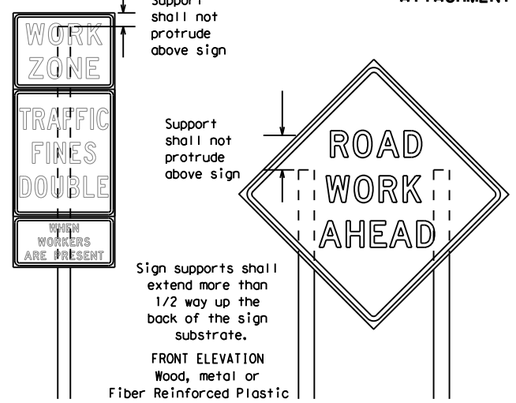
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



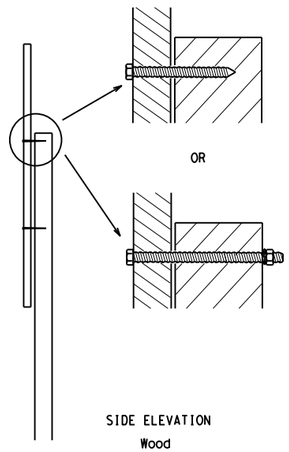
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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 spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

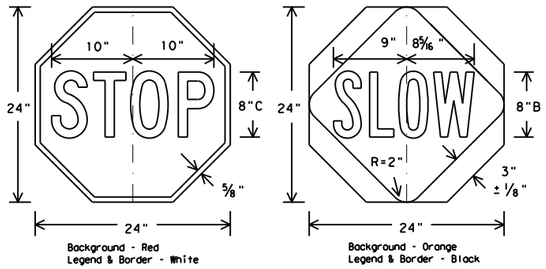


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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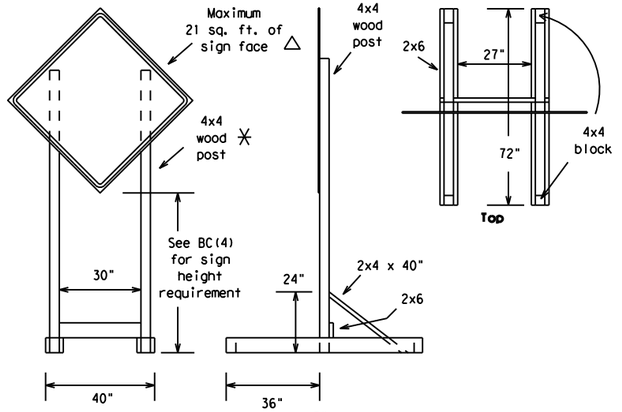
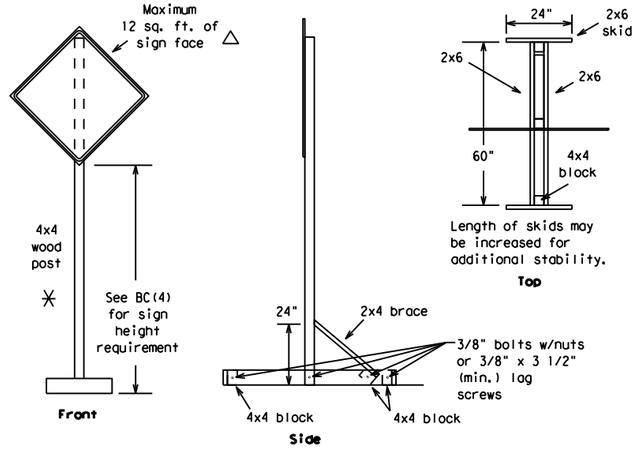
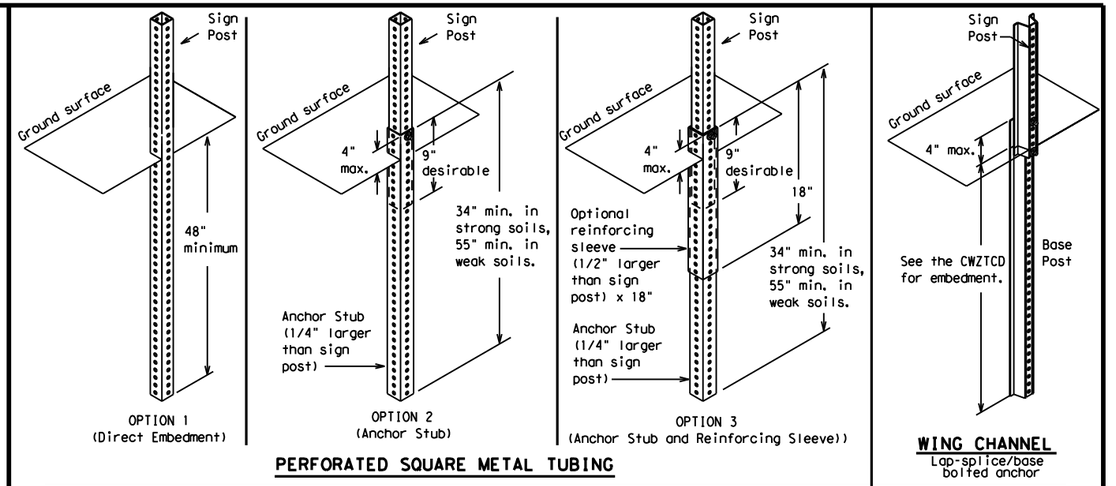
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WFS	WILBARGER		17





SKID MOUNTED WOOD SIGN SUPPORTS

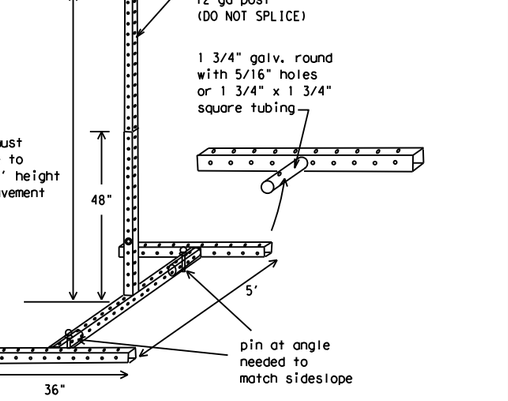
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

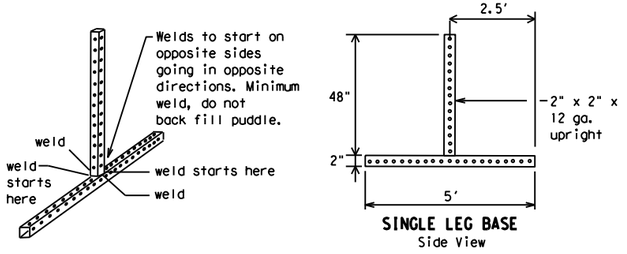


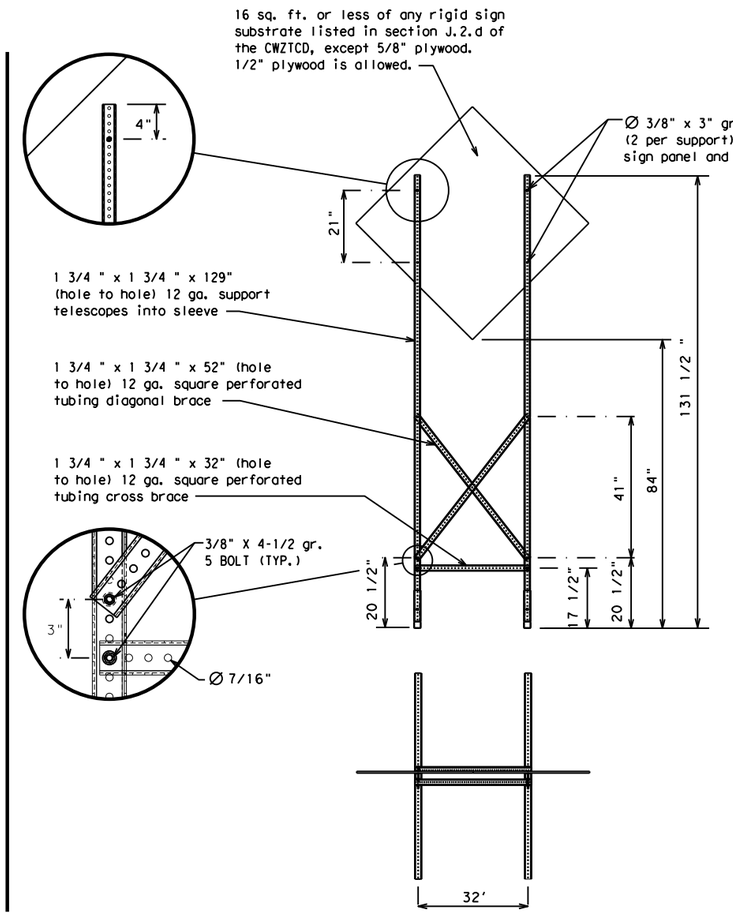
PERFORATED SQUARE METAL TUBING

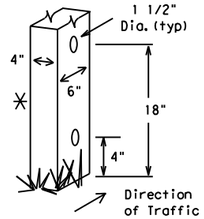
GROUND MOUNTED SIGN SUPPORTS

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.



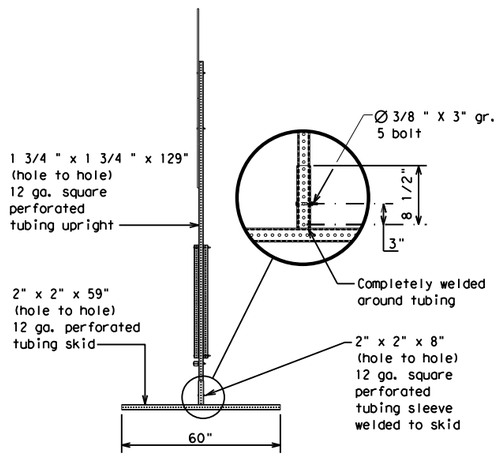






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation — Traffic Operations Division Standard

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WFS	WILBARGER		18

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

* See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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7-13	WFS	WILBARGER		19

100

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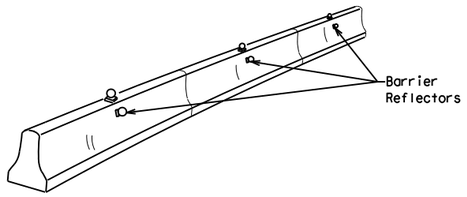
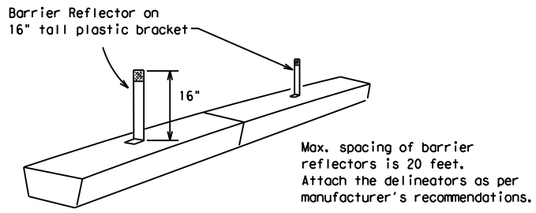
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

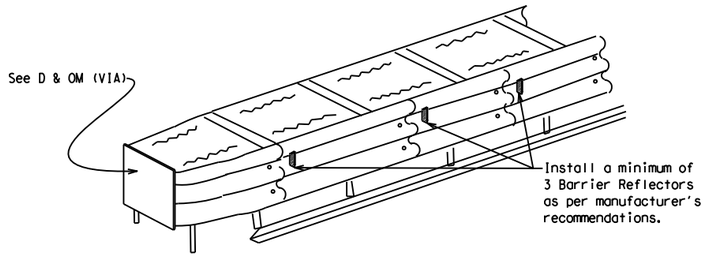


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

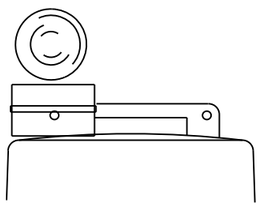


DELINEATION OF END TREATMENTS

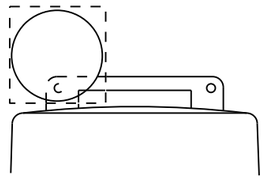
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

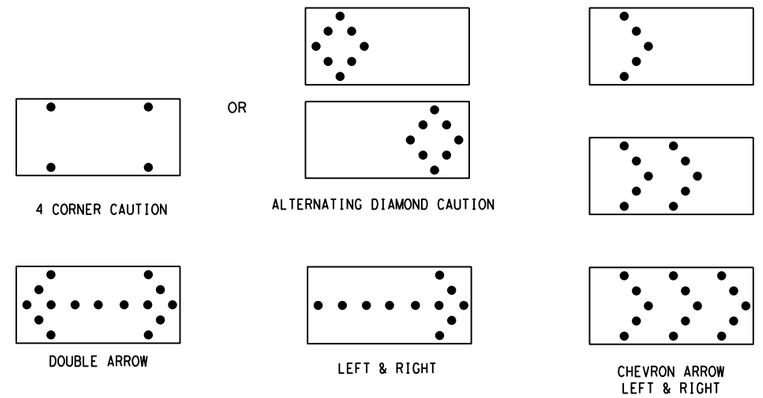
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WFS	WILBARGER		20

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

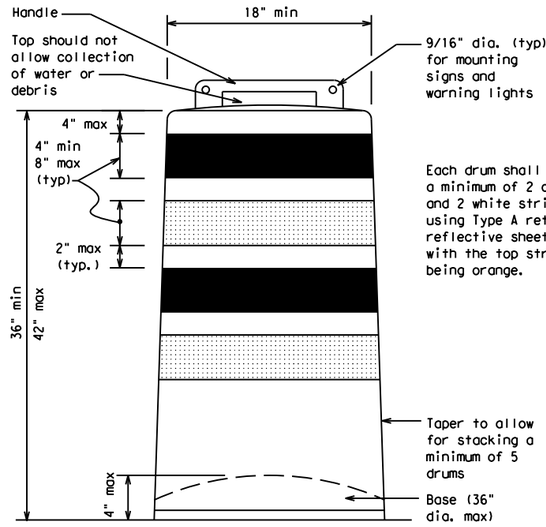
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

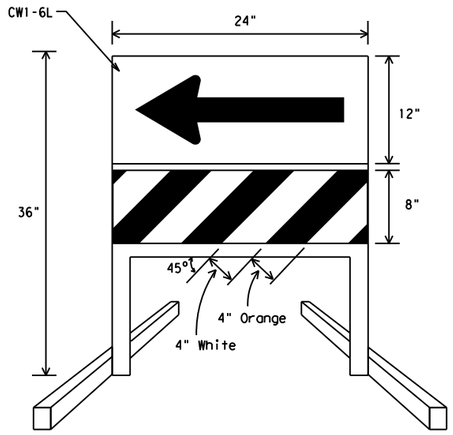
RETROREFLECTIVE SHEETING

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

BALLAST

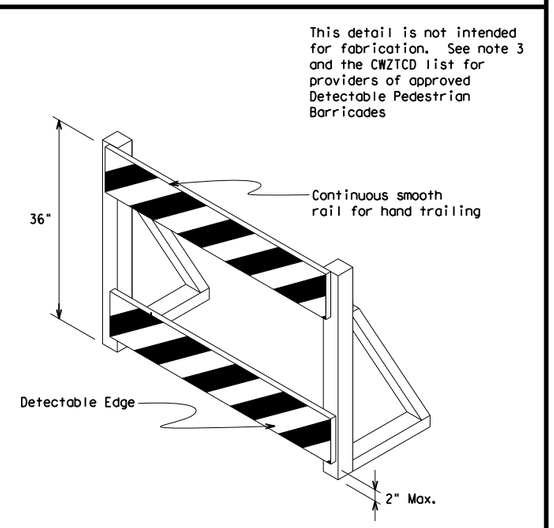
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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





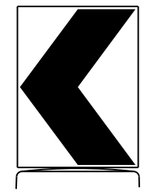
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

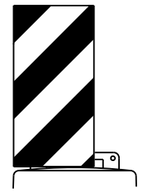


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	WFS	WILBARGER		21

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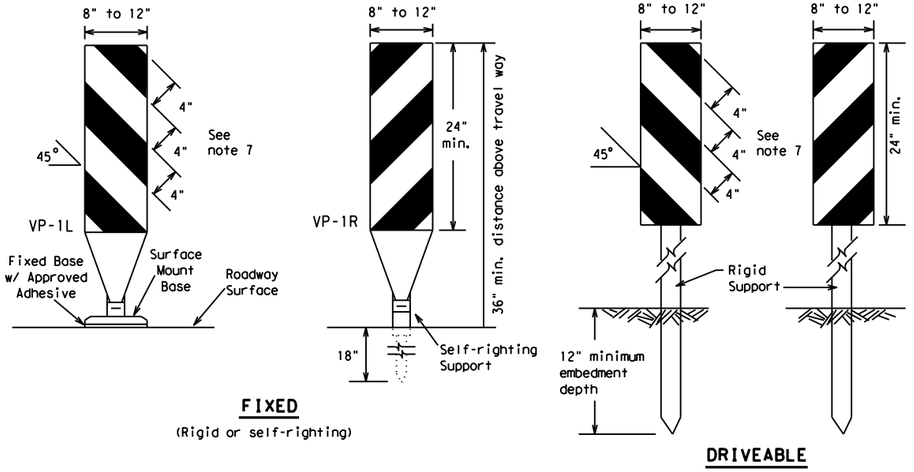
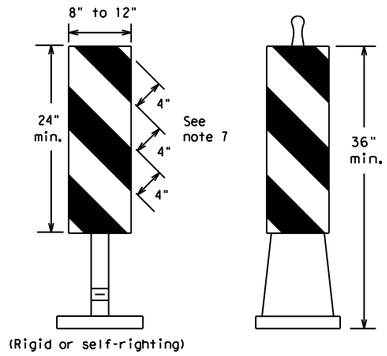


FIXED
(Rigid or self-righting)

DRIVEABLE

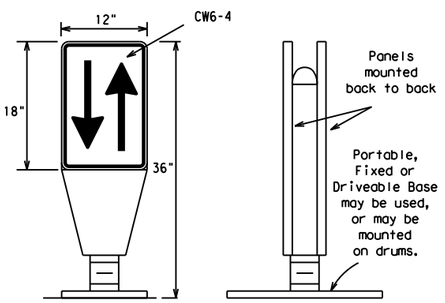


(Rigid or self-righting)

PORTABLE

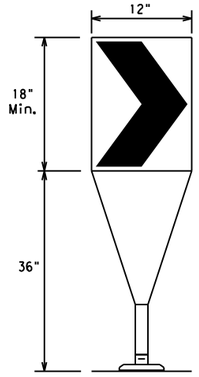
VERTICAL PANELS (VPs)

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



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



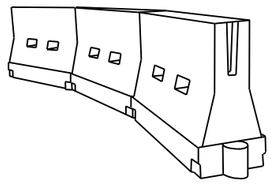
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	WFS	WILBARGER		22

DATE: 4/28/2021 11:25:37 PM
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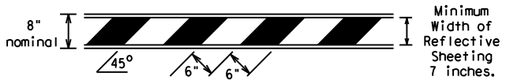
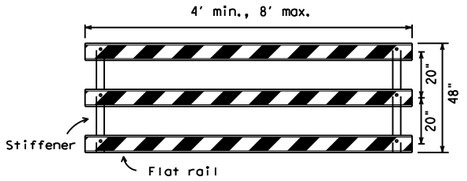
TYPE 3 BARRICADES

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 conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



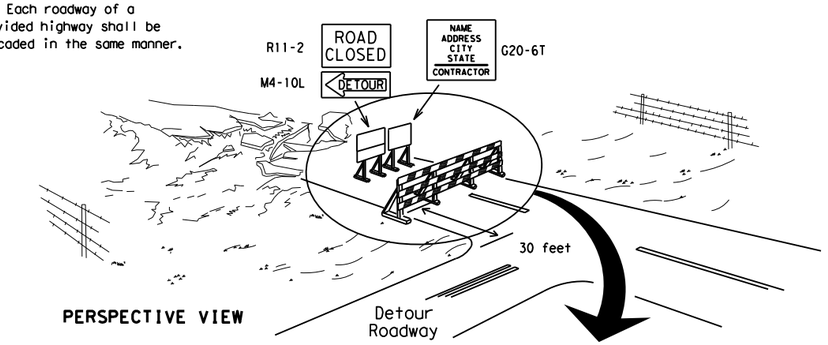
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

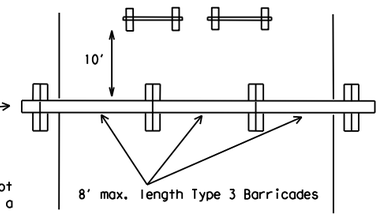
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

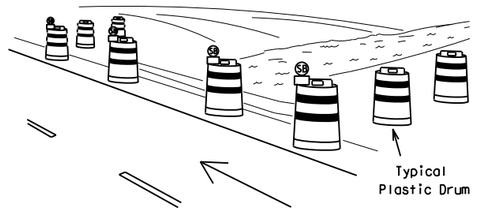
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

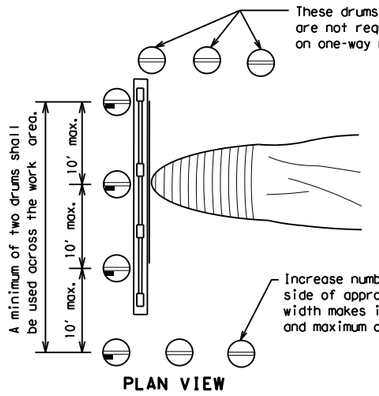
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

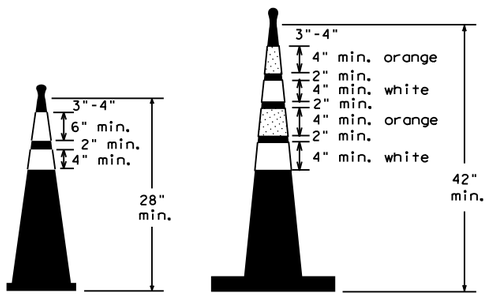
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

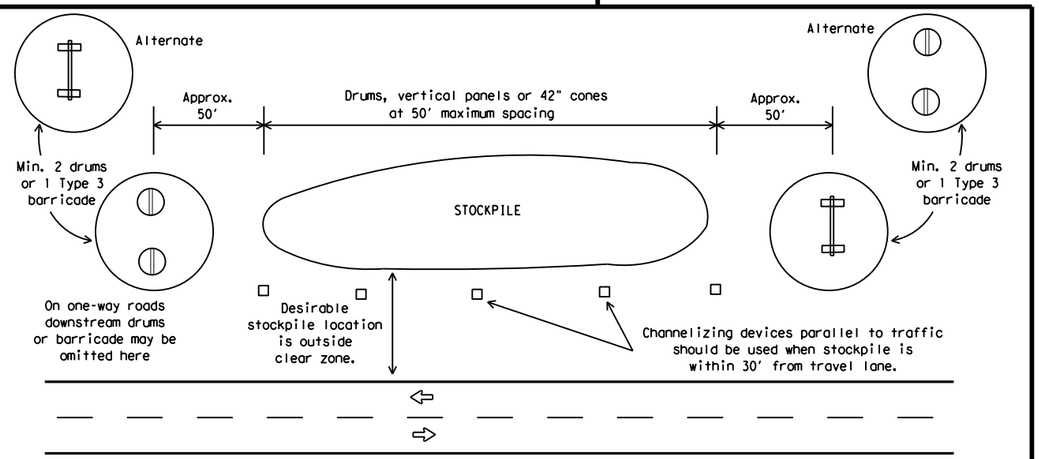
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

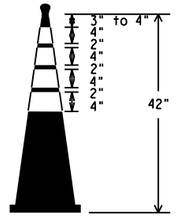
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13	0043	07	119	US 287
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	WFS	WILBARGER		23

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

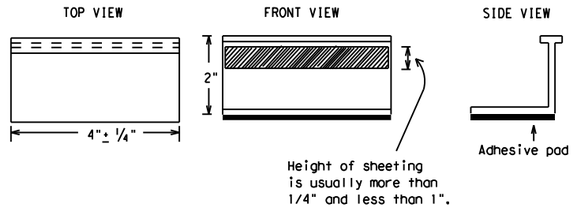
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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2-98 9-07	DIST	COUNTY		SHEET NO.
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11-02 8-14				

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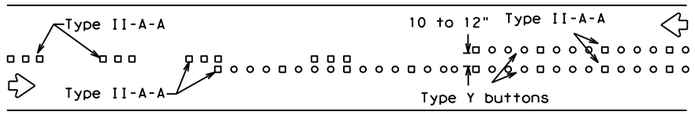
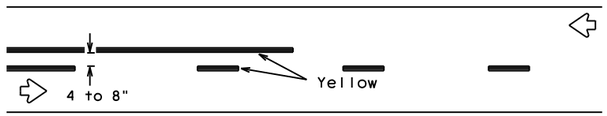
PAVEMENT MARKING PATTERNS

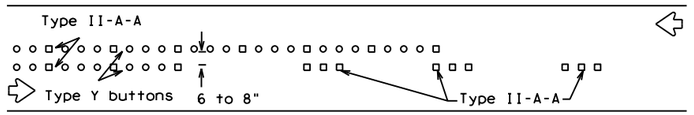
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



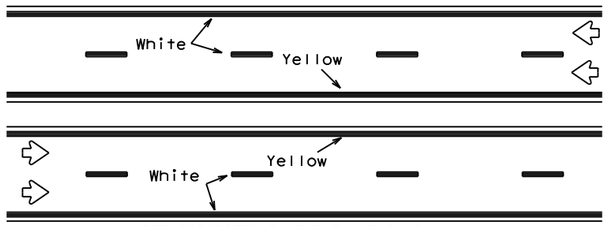
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



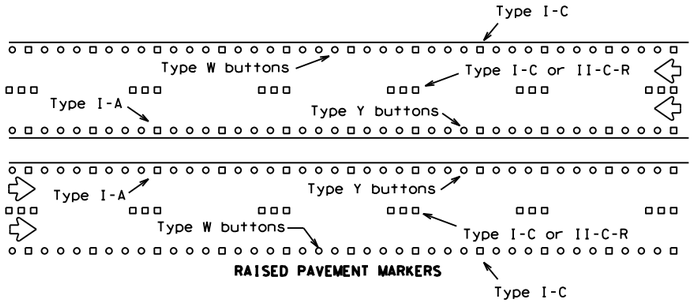
RAISED PAVEMENT MARKERS - PATTERN B

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

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



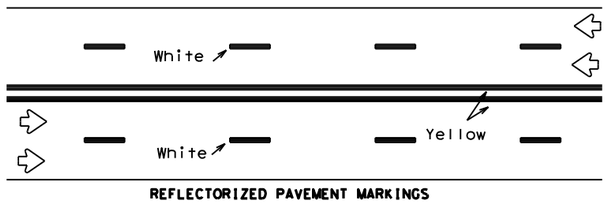
REFLECTORIZED PAVEMENT MARKINGS



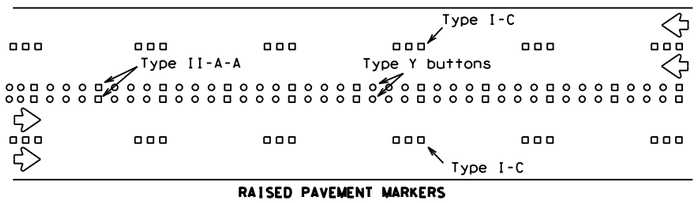
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



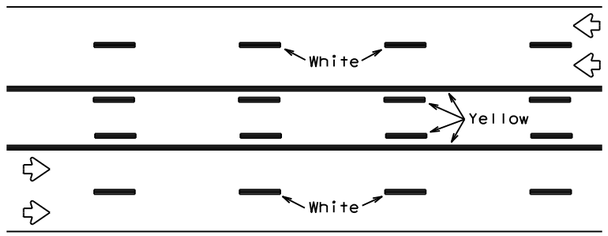
REFLECTORIZED PAVEMENT MARKINGS



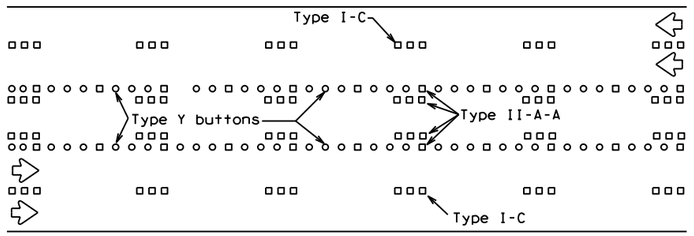
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

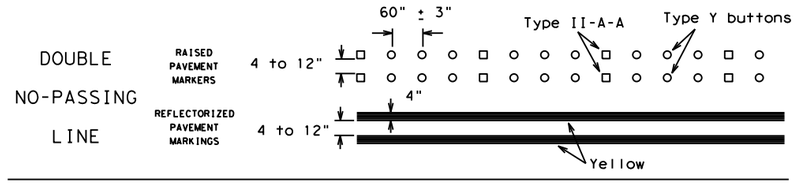
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

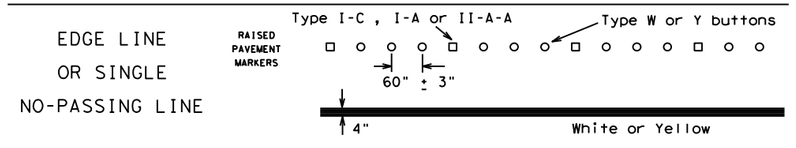
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

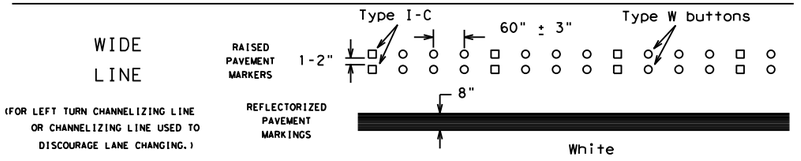


EDGE LINE OR SINGLE NO-PASSING LINE



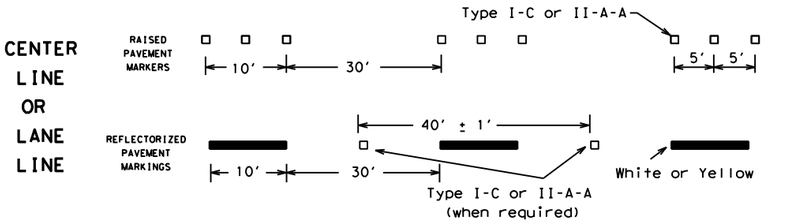
WIDE LINE

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

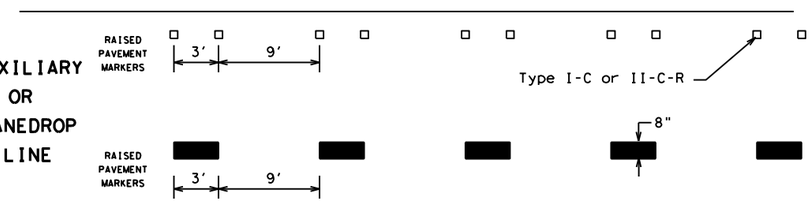


BROKEN LINES

CENTER LINE OR LANE LINE

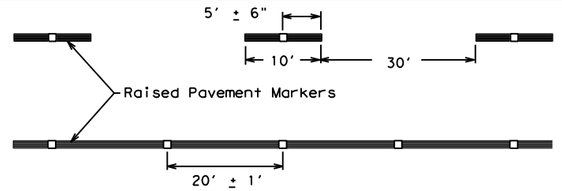


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	WFS	WILBARGER		25
11-02 8-14				

DATE: 4/28/2021 11:25:43 PM
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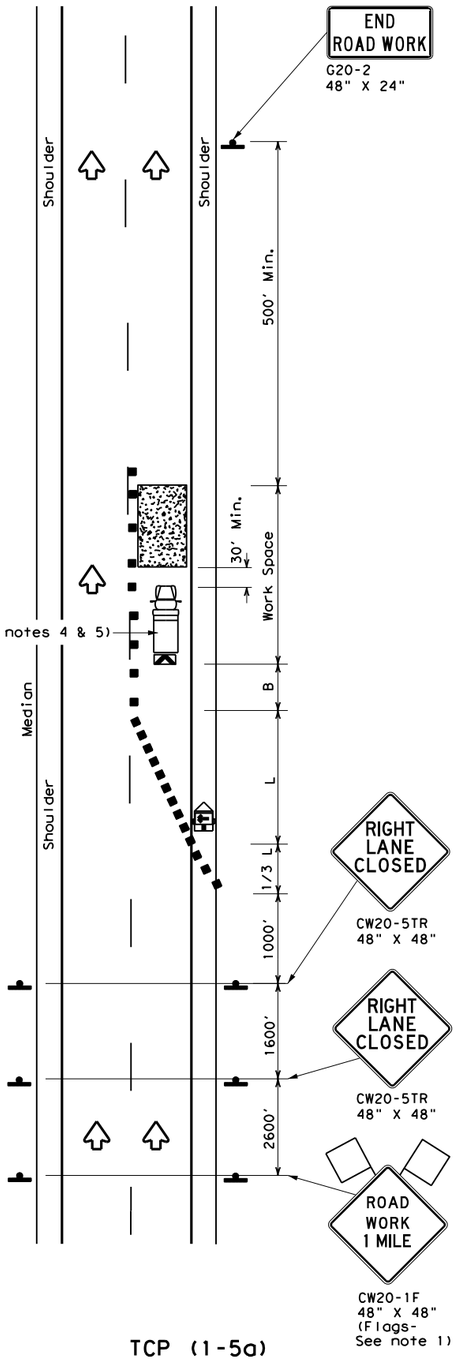
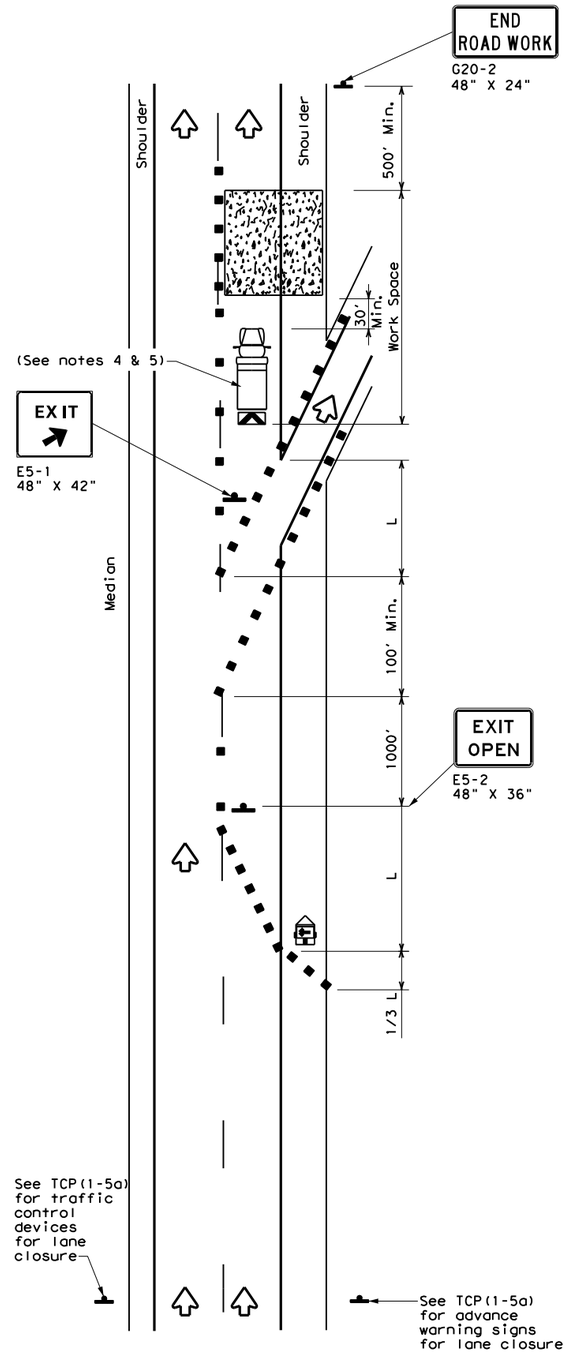


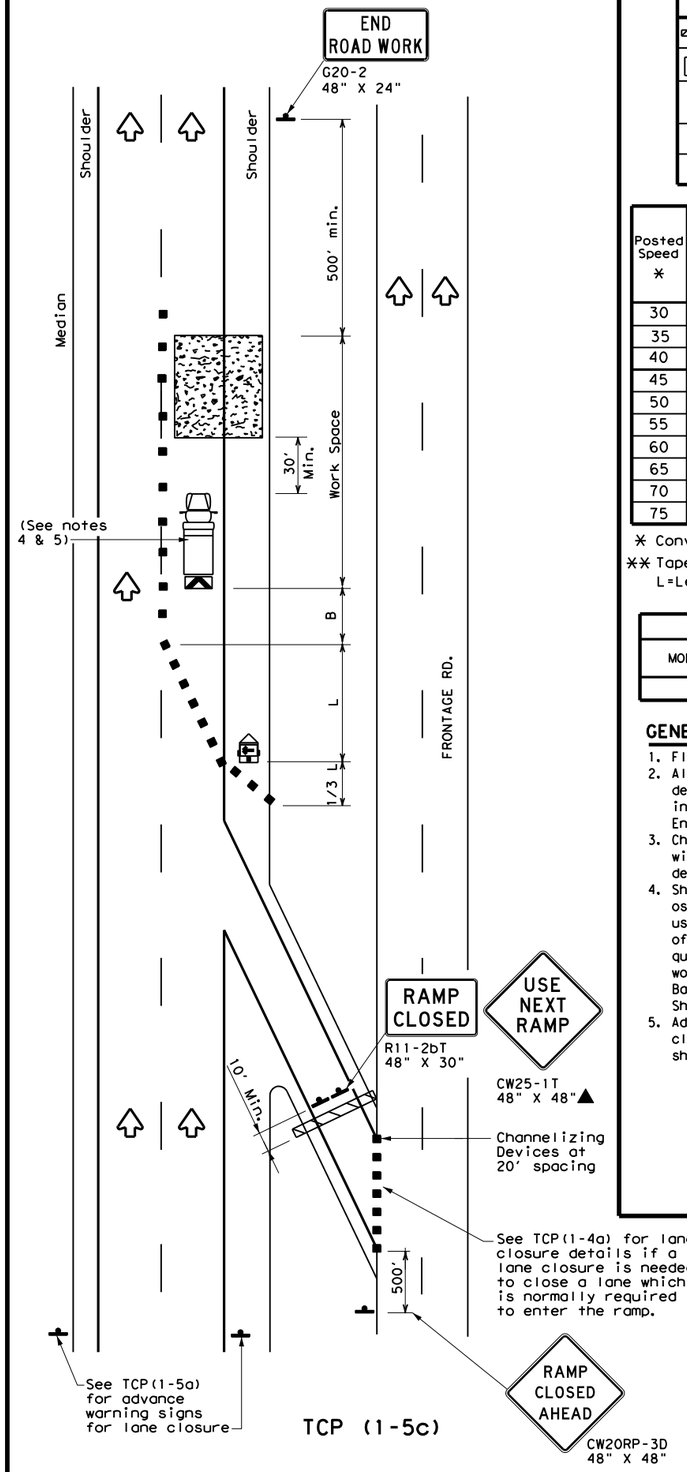
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned 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 FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		26

DATE: 4/28/2021 11:25:45 PM
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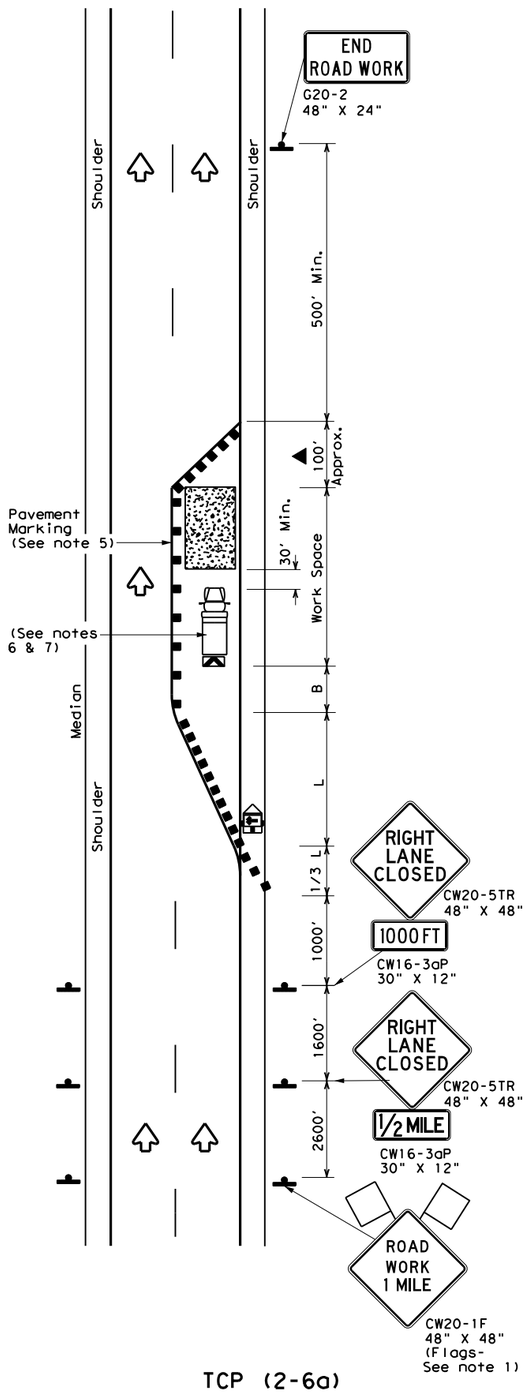
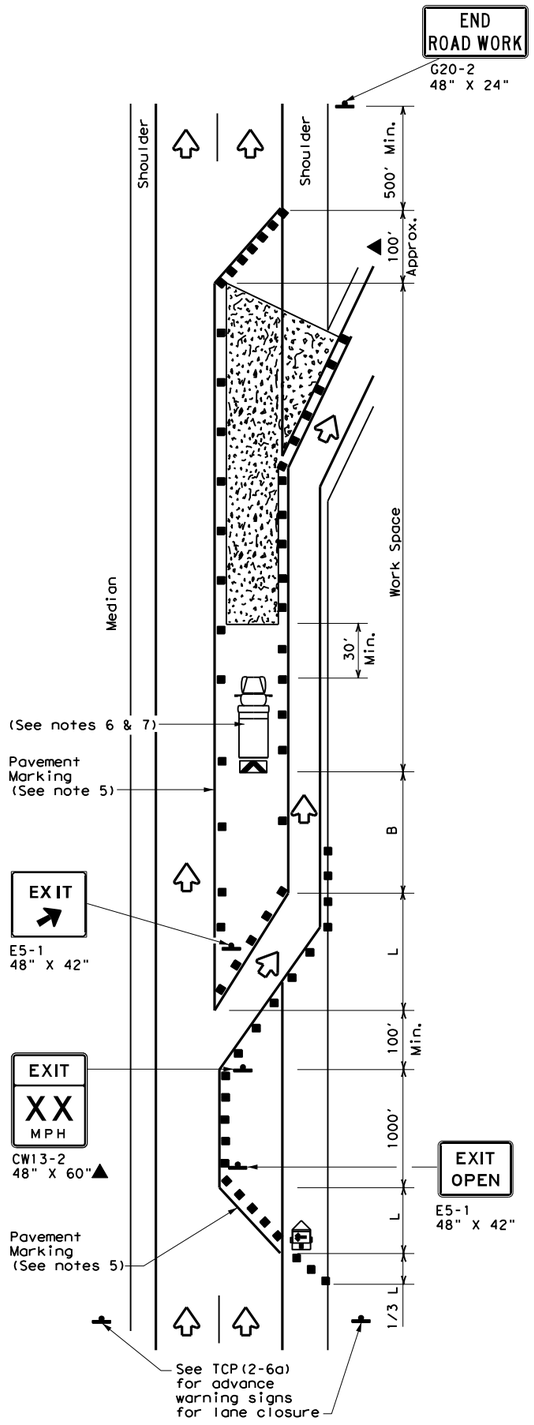


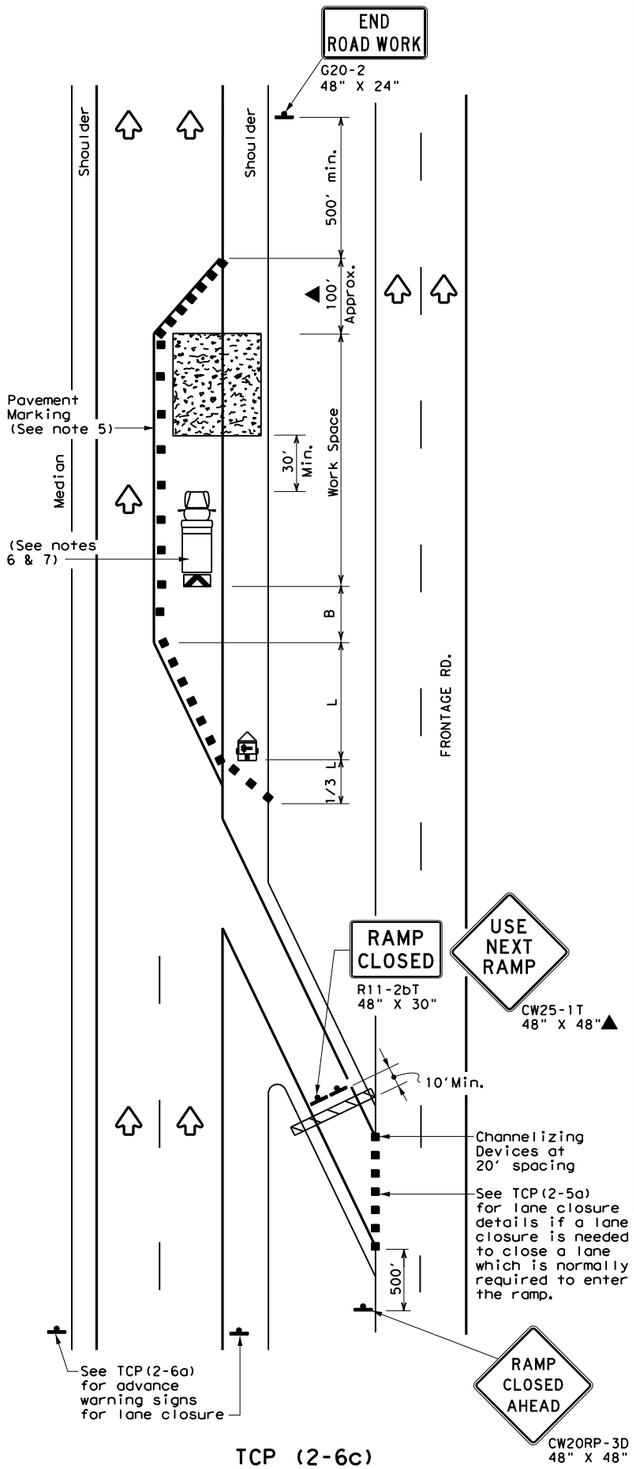
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		27

DATE: 4/28/2021 11:25:47 PM
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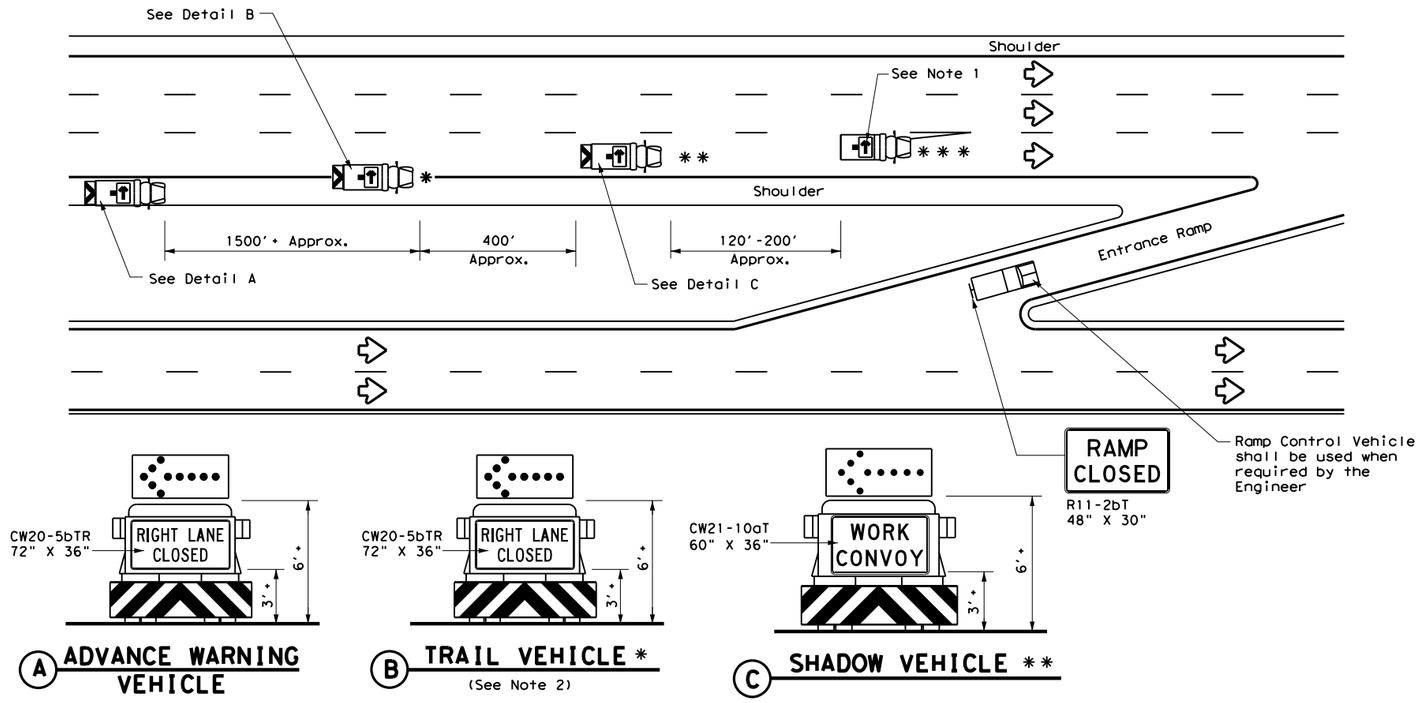
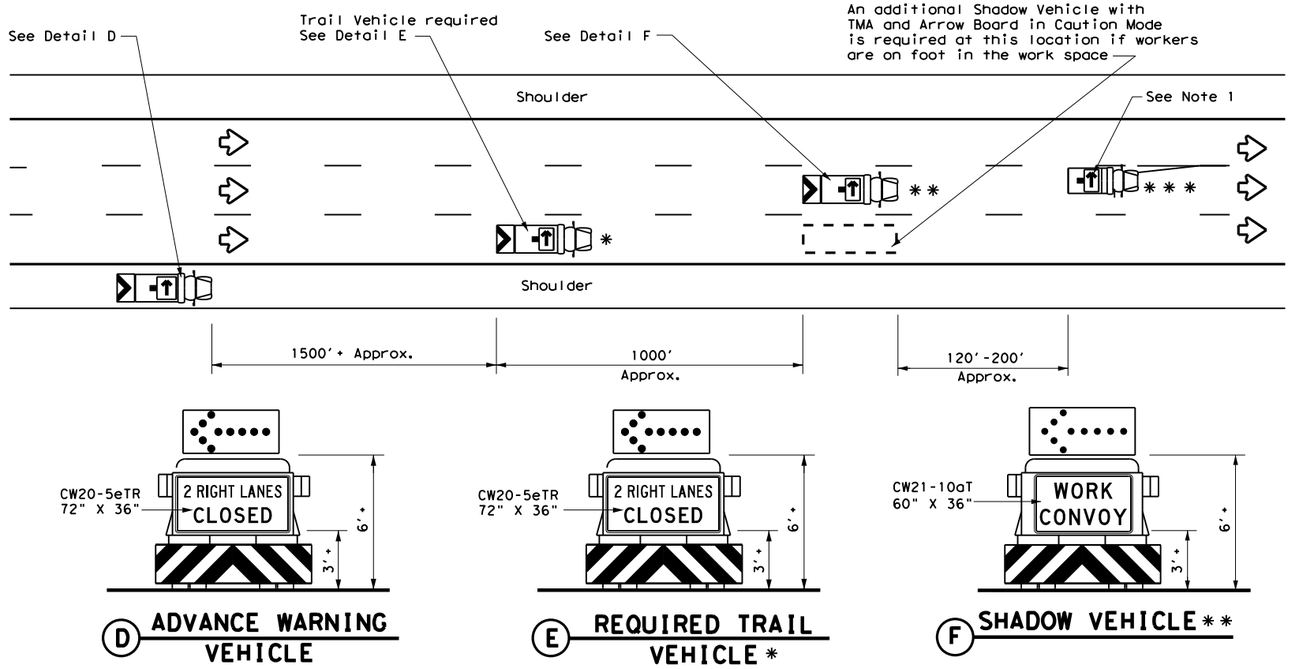


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



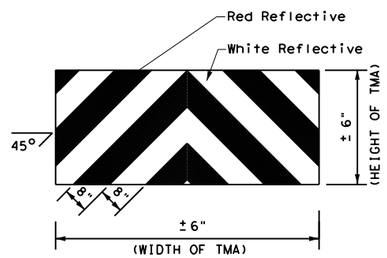
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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
✓				

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	WFS	WILBARGER		28
1-97				

176

DATE: 4/28/2021 11:25:49 PM
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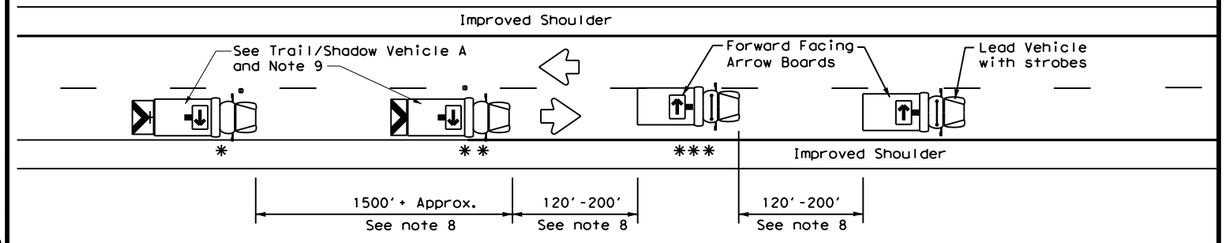
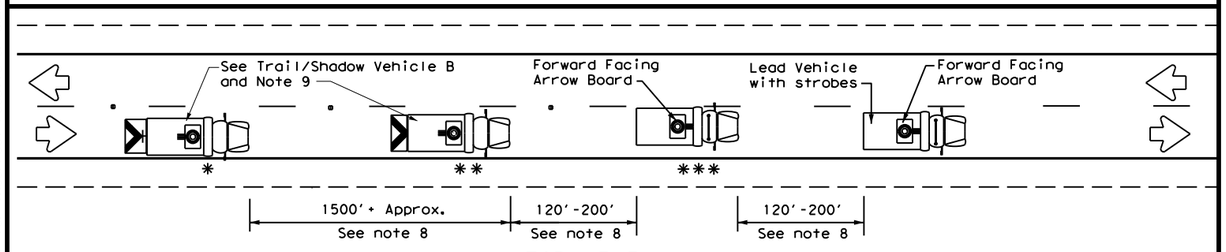


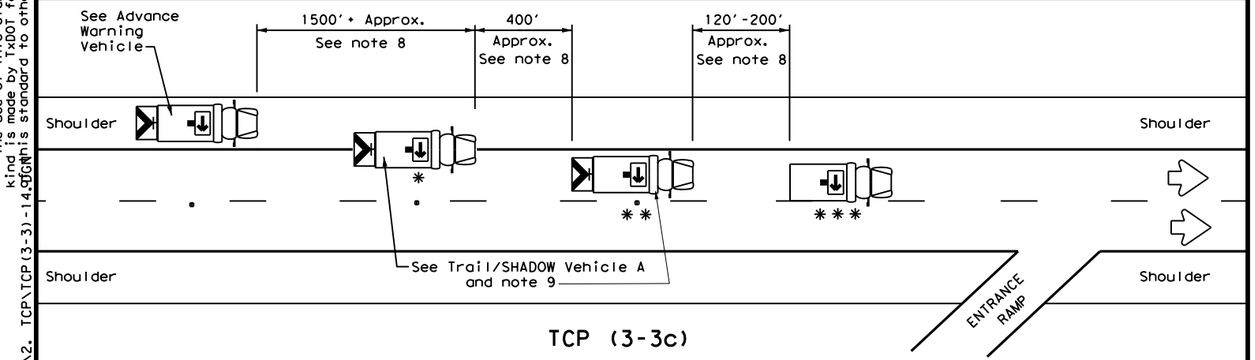
TCP (3-3a)

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



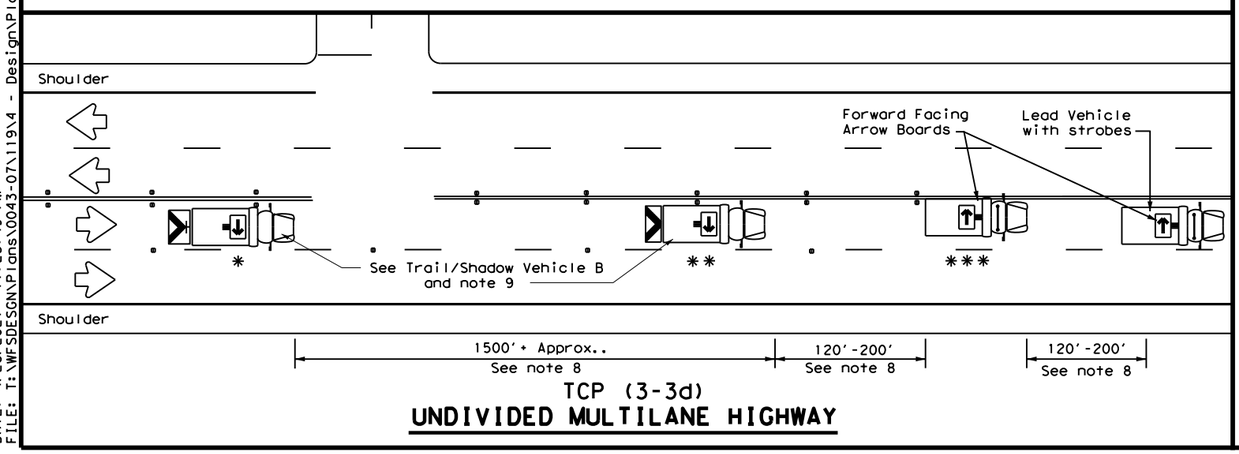
TCP (3-3b)

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



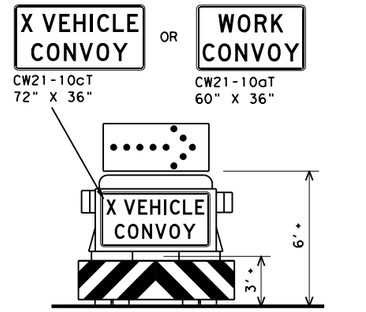
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



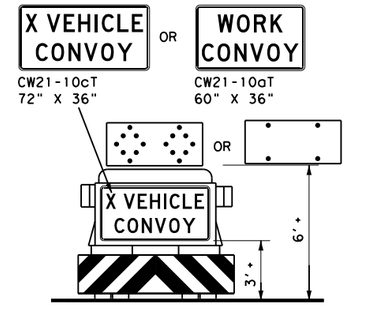
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



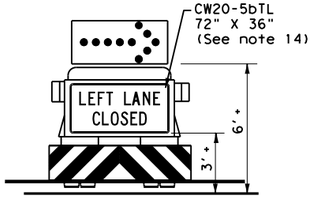
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

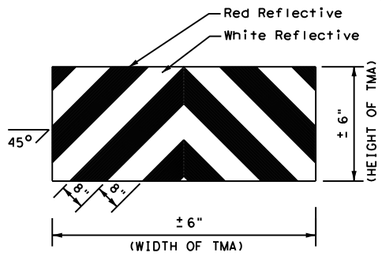


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

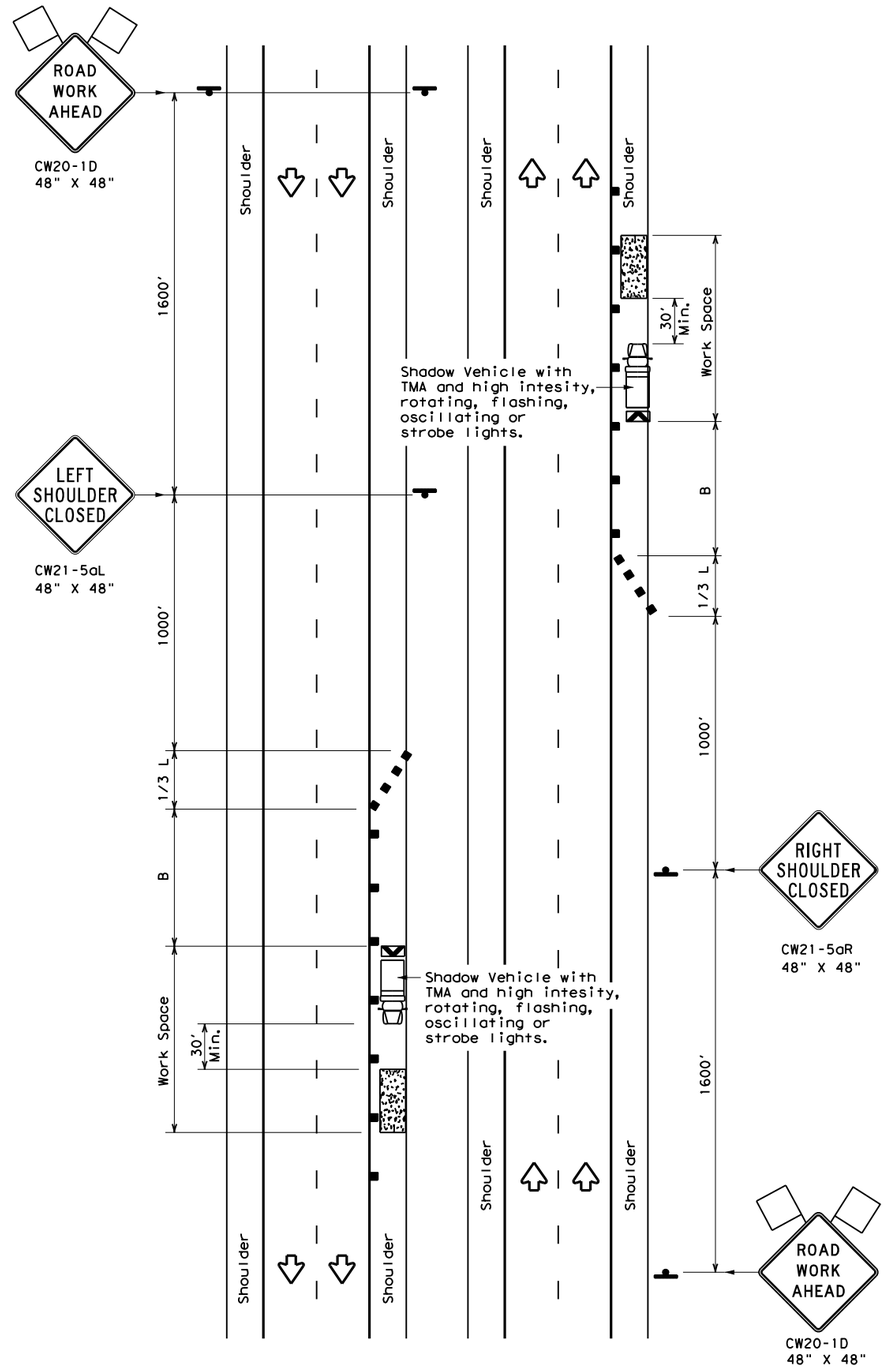
Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

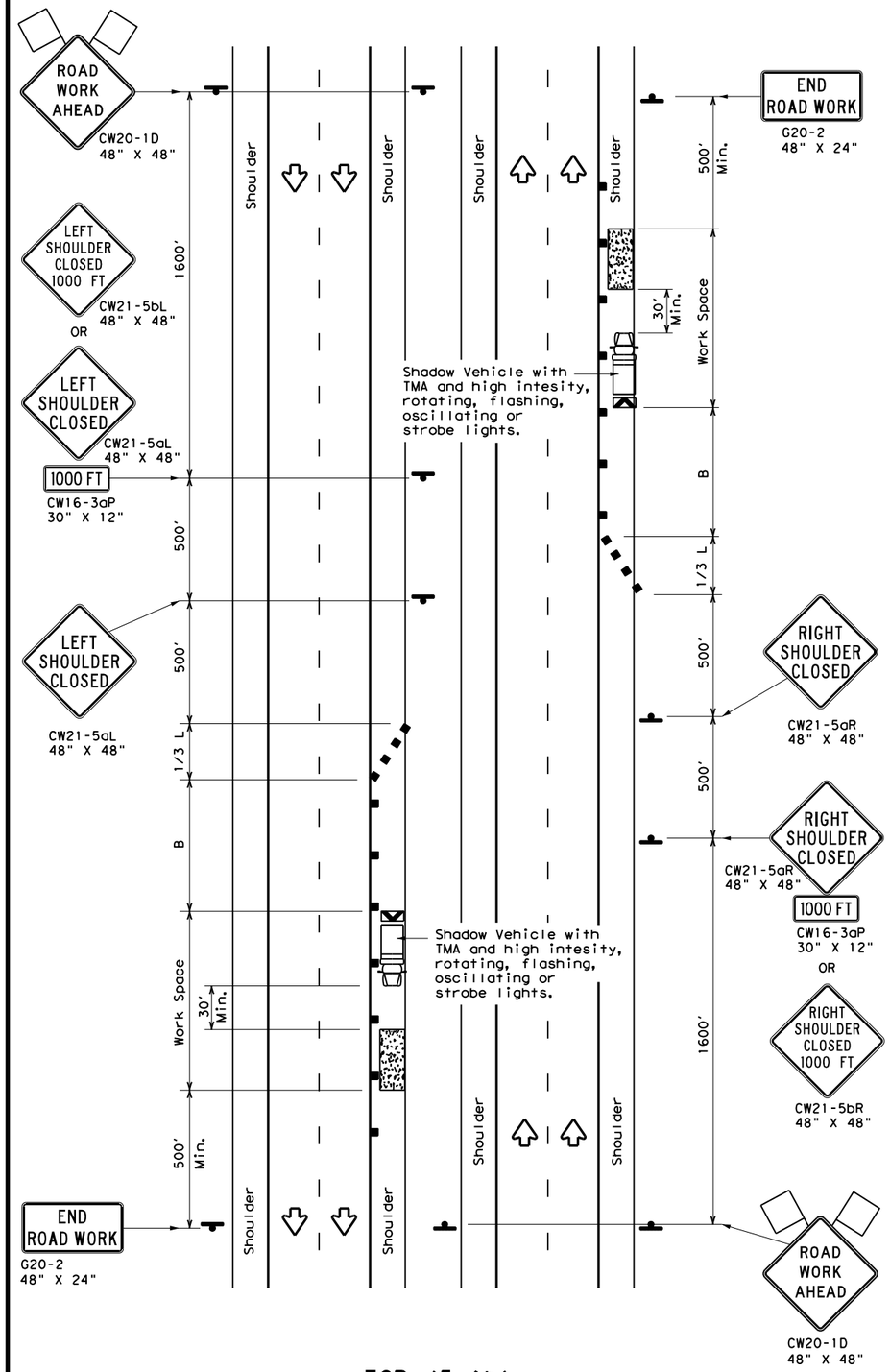
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	WFS	WILBARGER		29
1-97 7-14				



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

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

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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2-18	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		30

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DATE: 4/28/2021 11:25:54 PM
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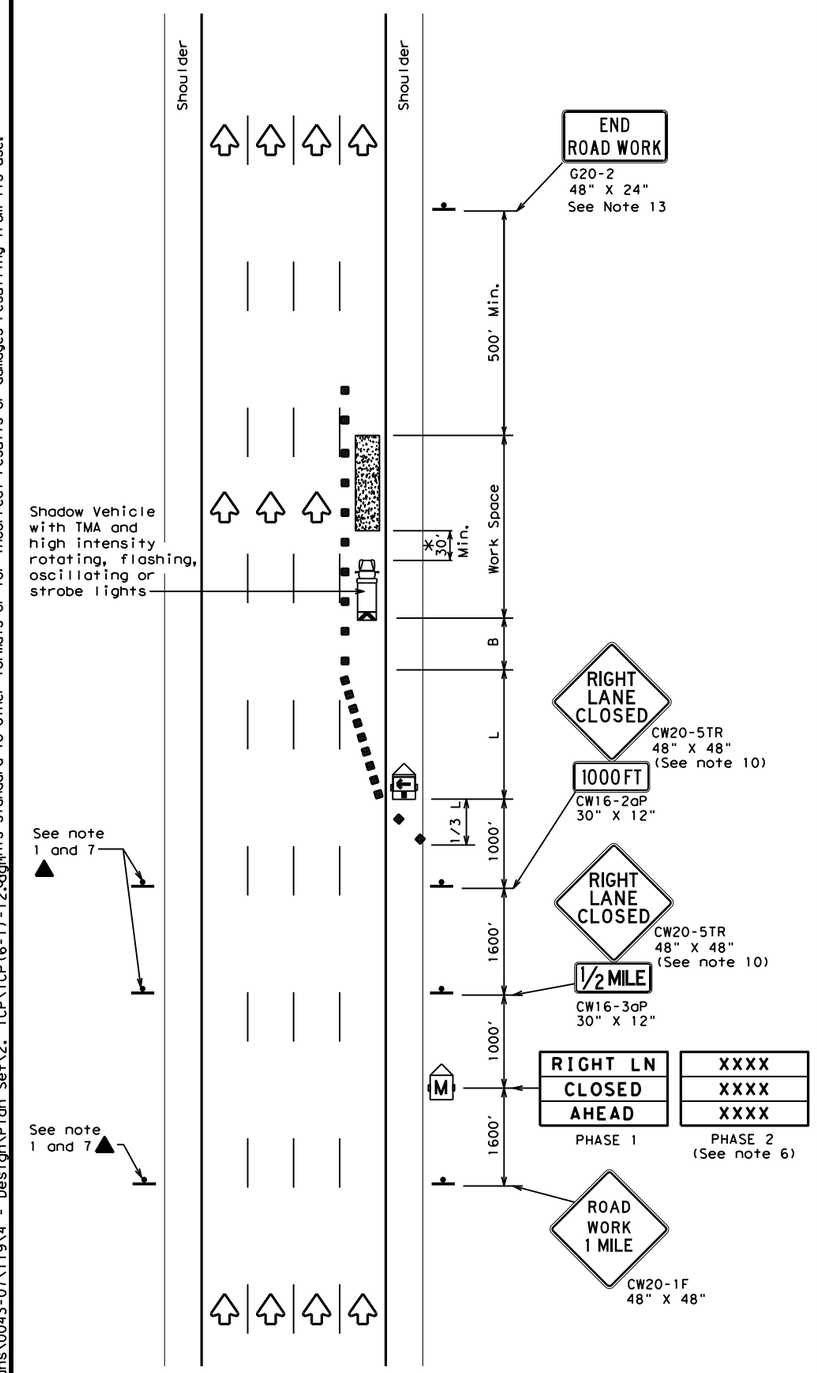
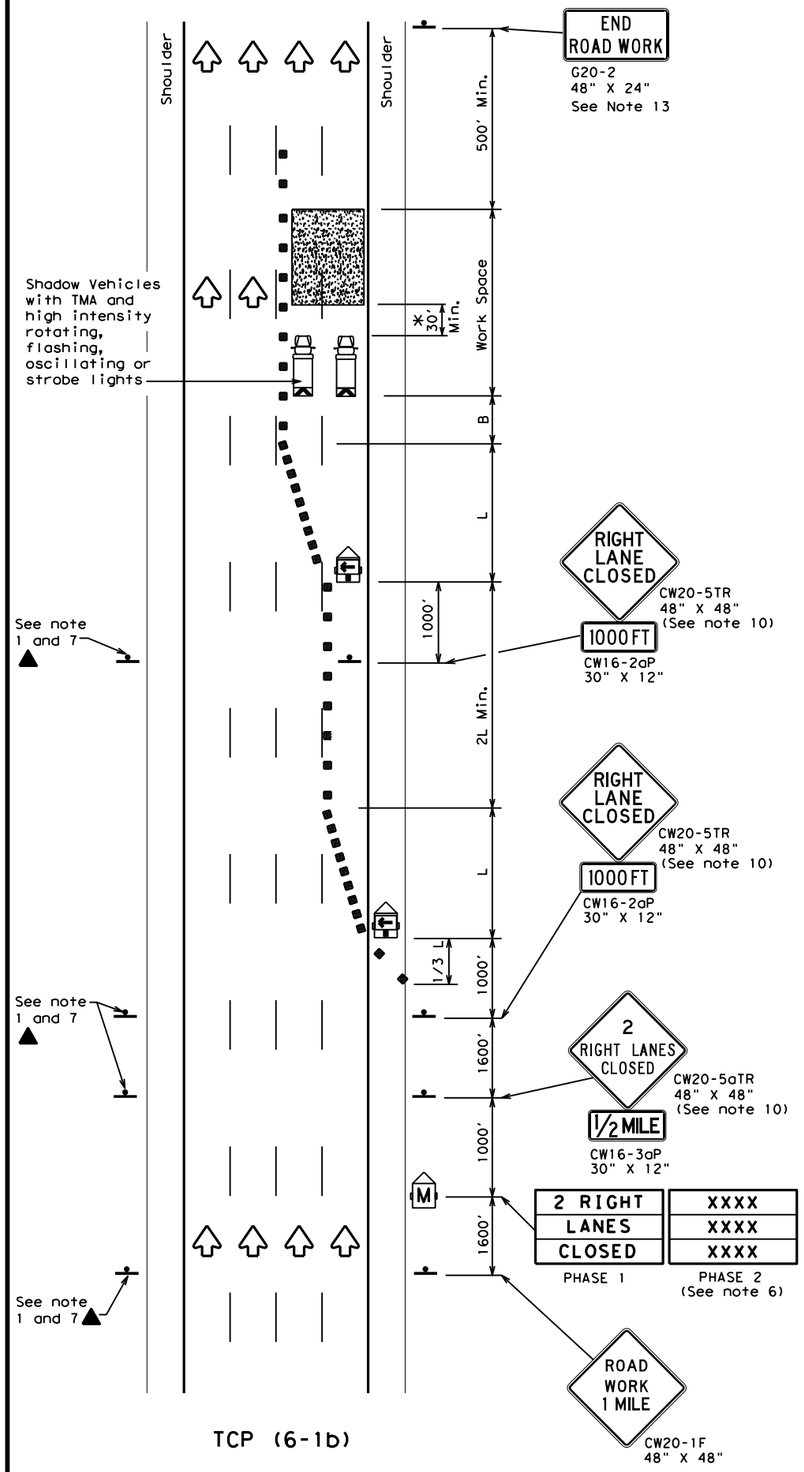


TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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

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

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
8-12	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		31

DATE: 4/28/2021 11:25:56 PM
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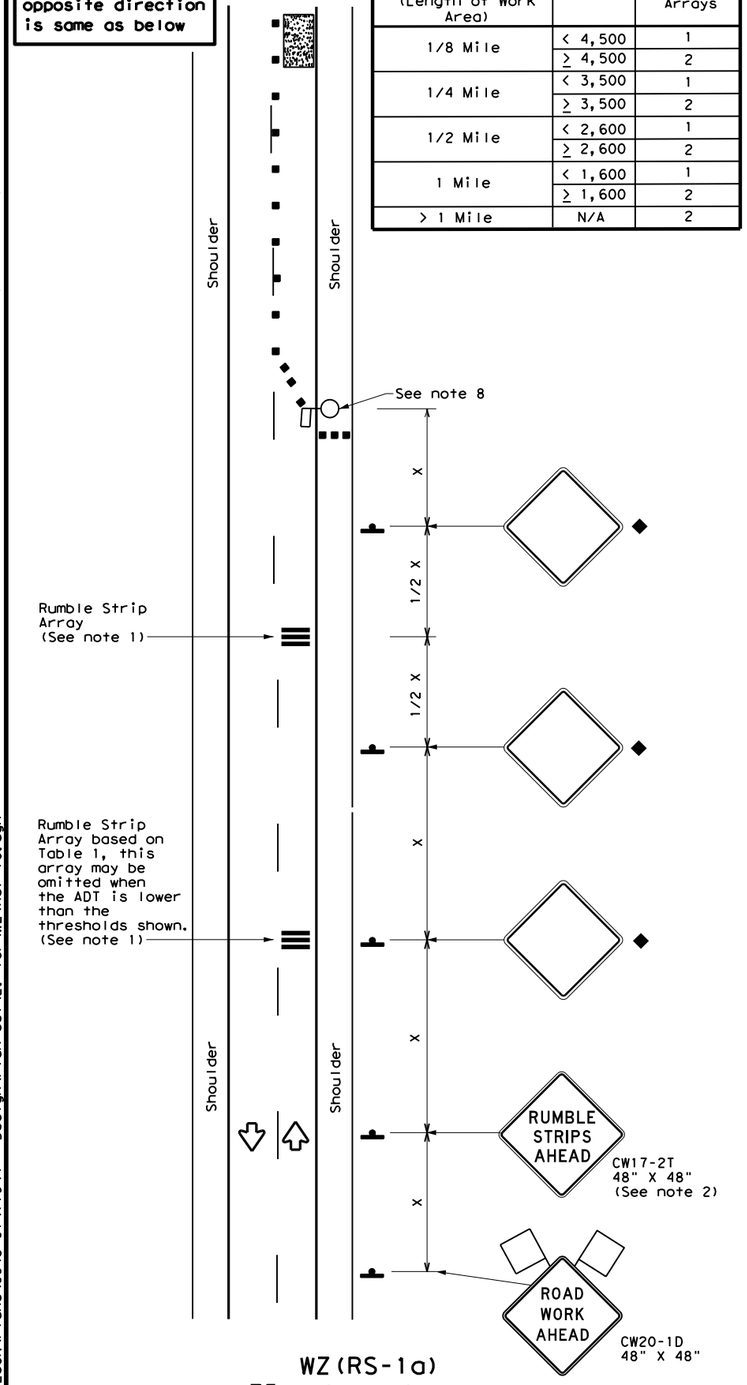
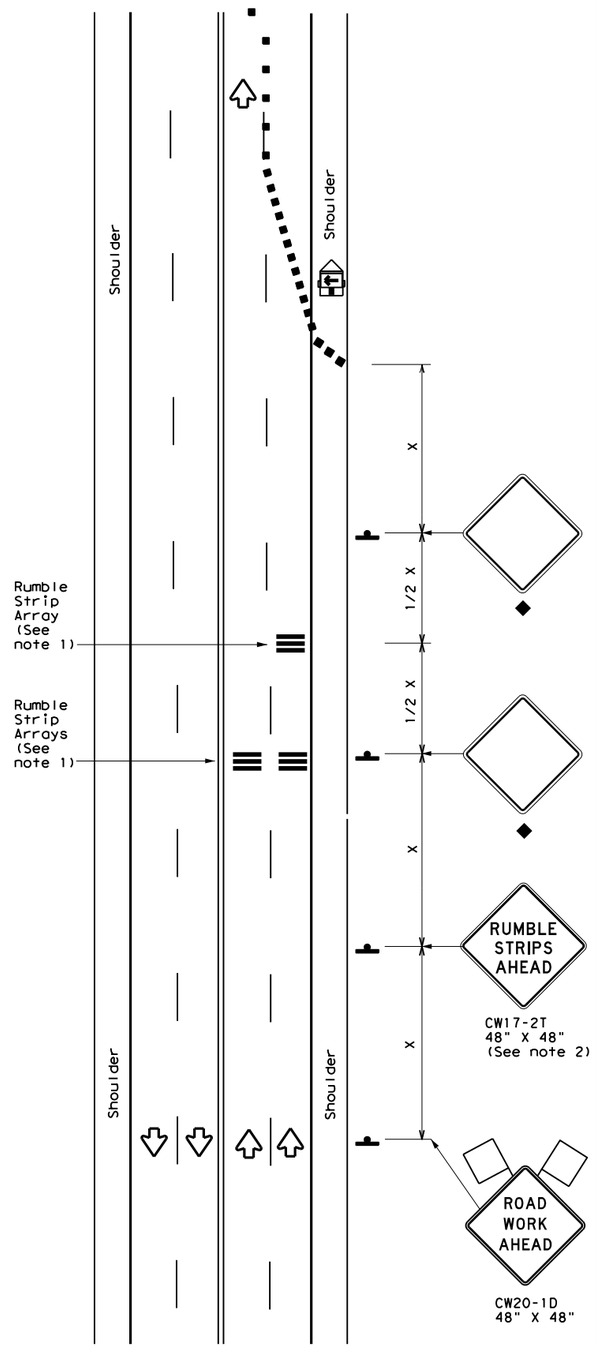
Warning sign and rumble strip sequence in opposite direction is same as below

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



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
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2-14	DIST	COUNTY		SHEET NO.
4-16	WFS	WILBARGER		32

DATE: 4/28/2021 11:25:58 PM
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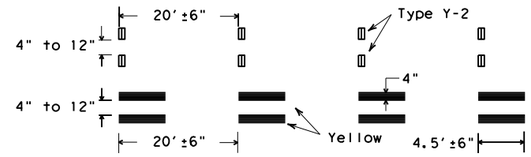
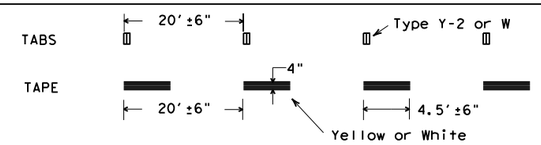
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

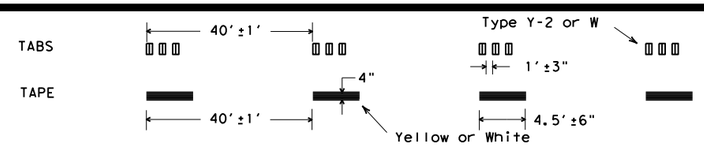


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



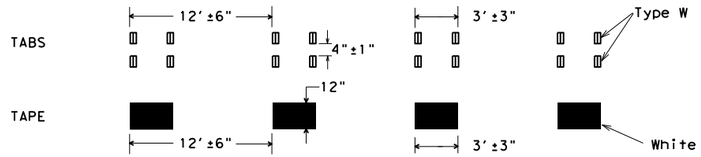
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

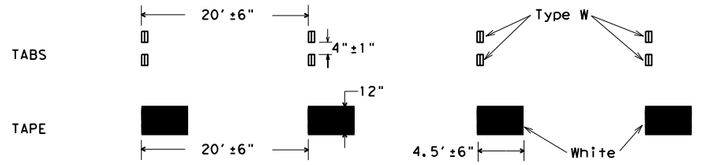


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



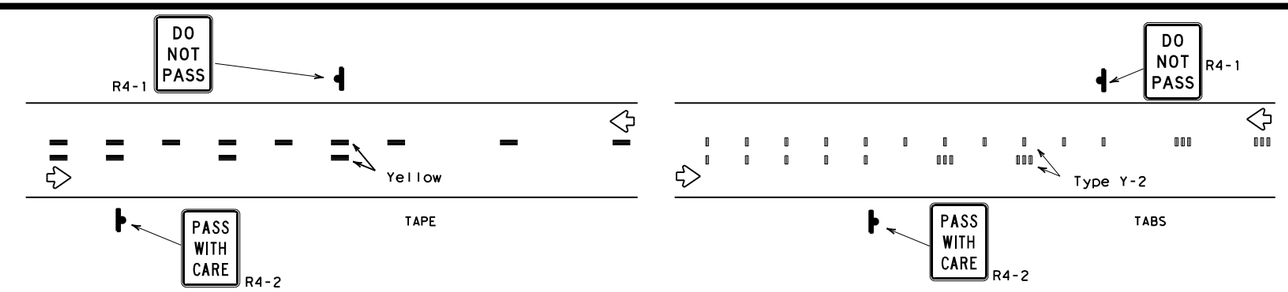
NOTES:

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

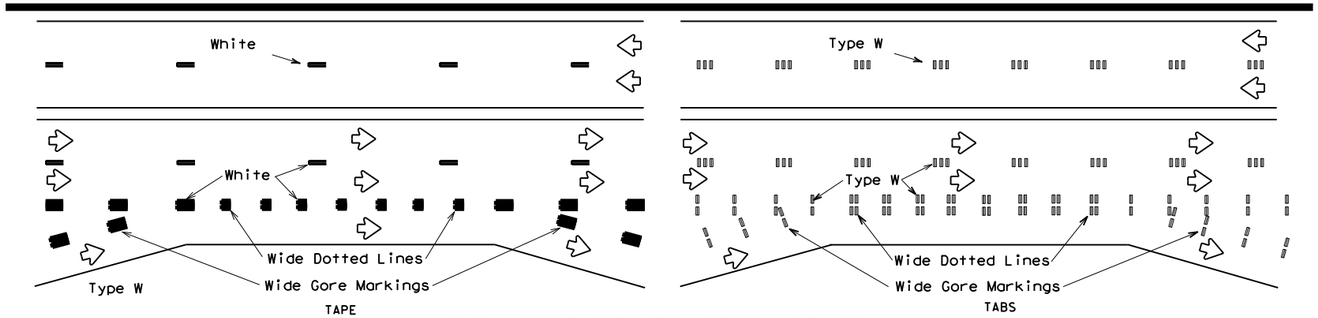
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

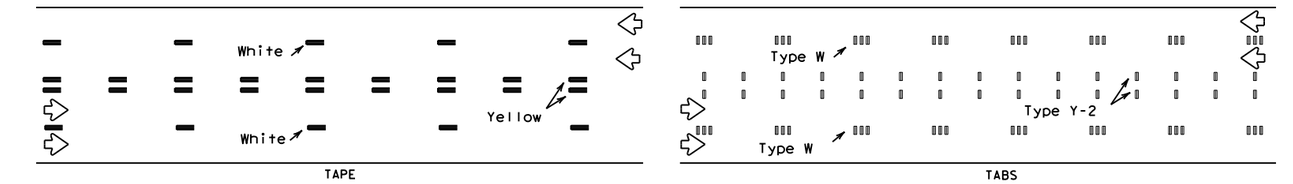
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



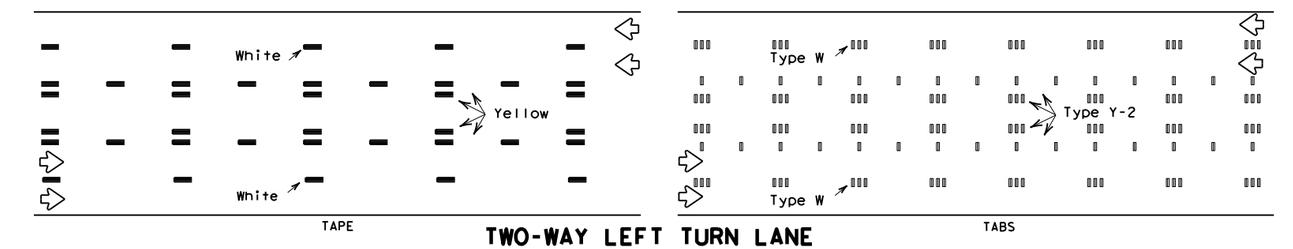
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



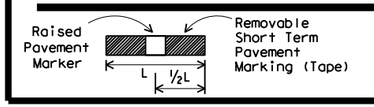
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0043	07	119	US 287
1-97		DIST	COUNTY		SHEET NO.
3-03		WFS	WILBARGER		33
7-13					

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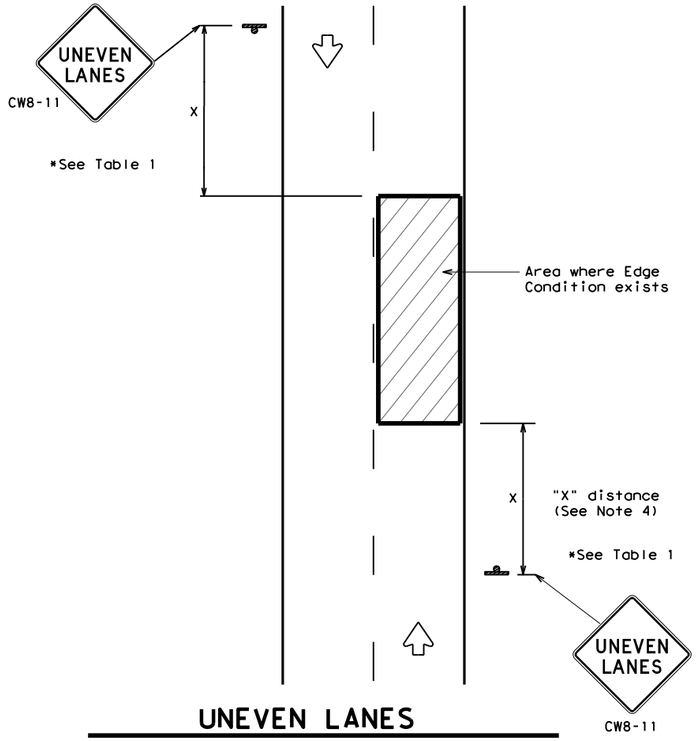
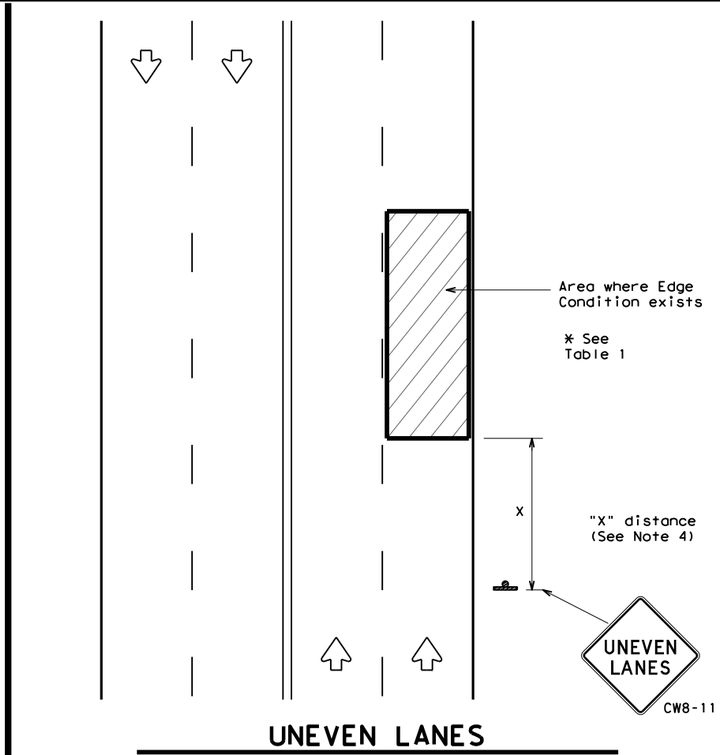
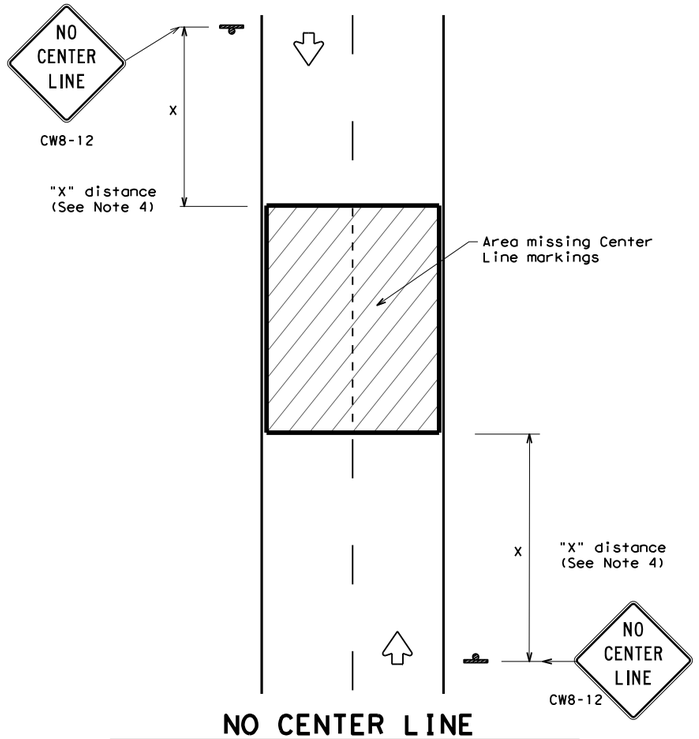


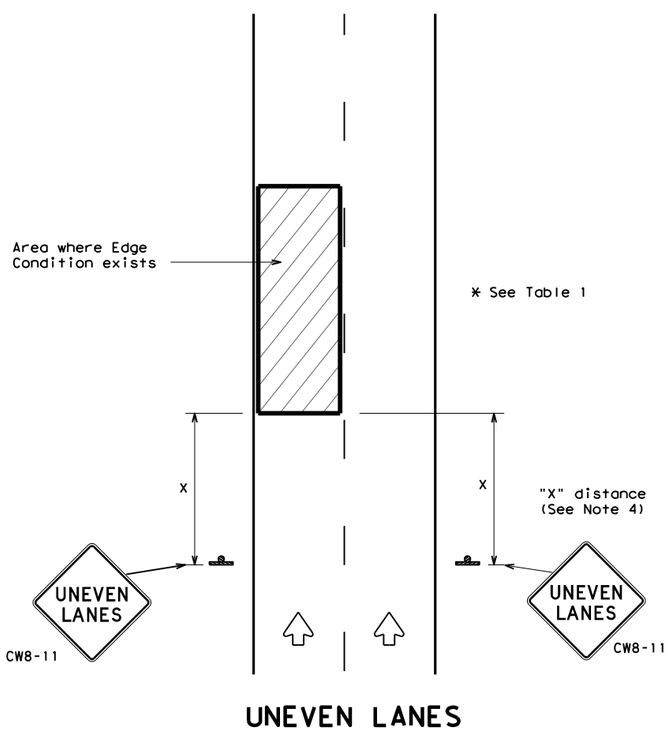
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

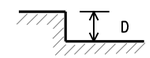
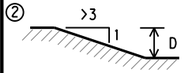
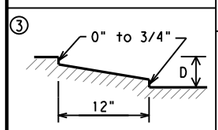
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

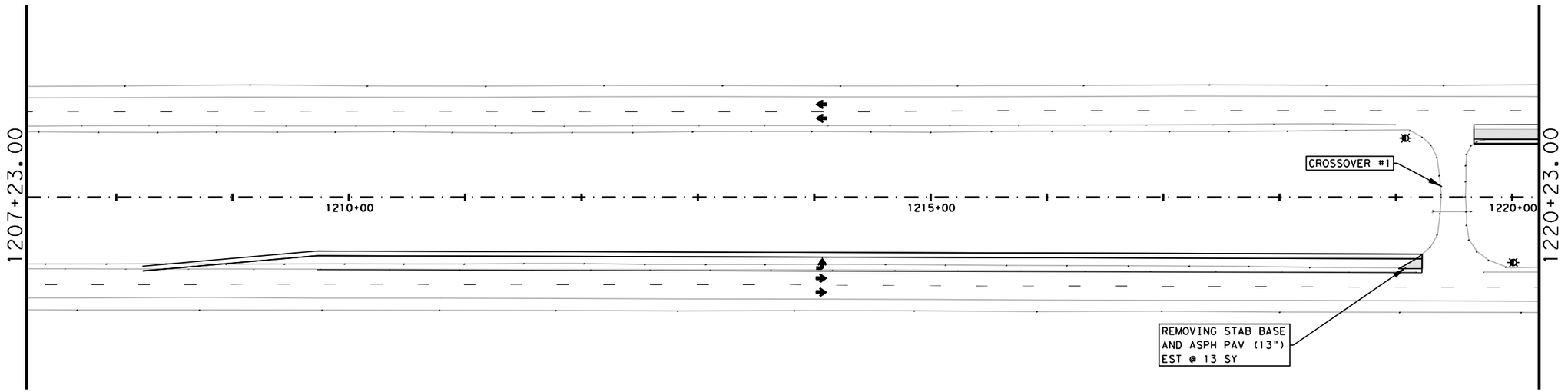
Texas Department of Transportation

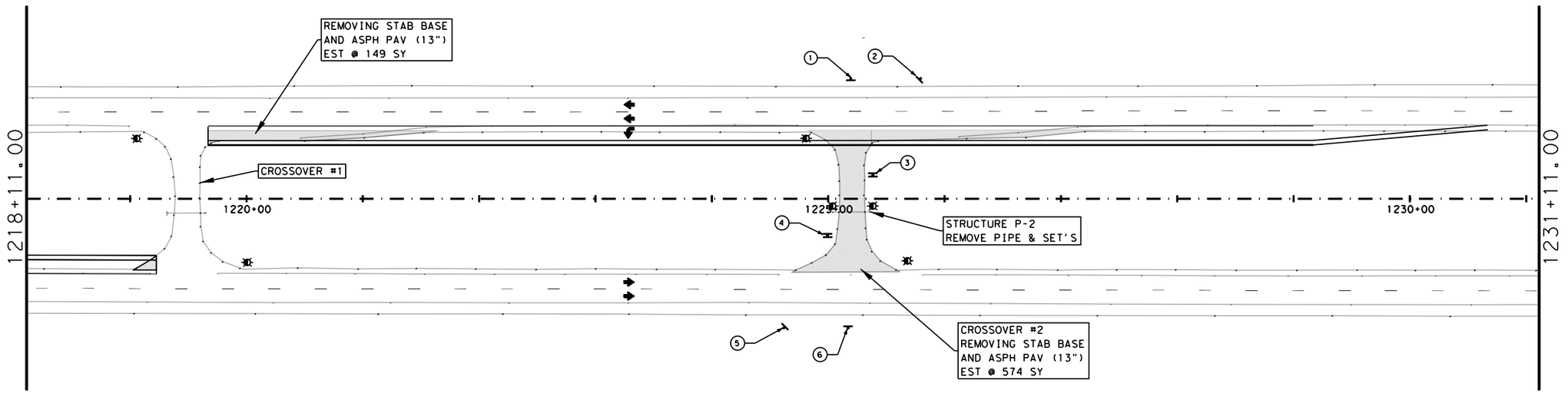
Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE:	wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0043	07	119	US 287
8-95 2-98 7-13		DIST	COUNTY		SHEET NO.
1-97 3-03		WFS	WILBARGER		34





LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

STATE OF TEXAS
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Monty F. Brown, P.E.

04/30/2021

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REMOVAL PLAN

2021 Texas Department of Transportation®

SHEET 1 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		35

DATE: 4/29/2021 2:57:58 PM
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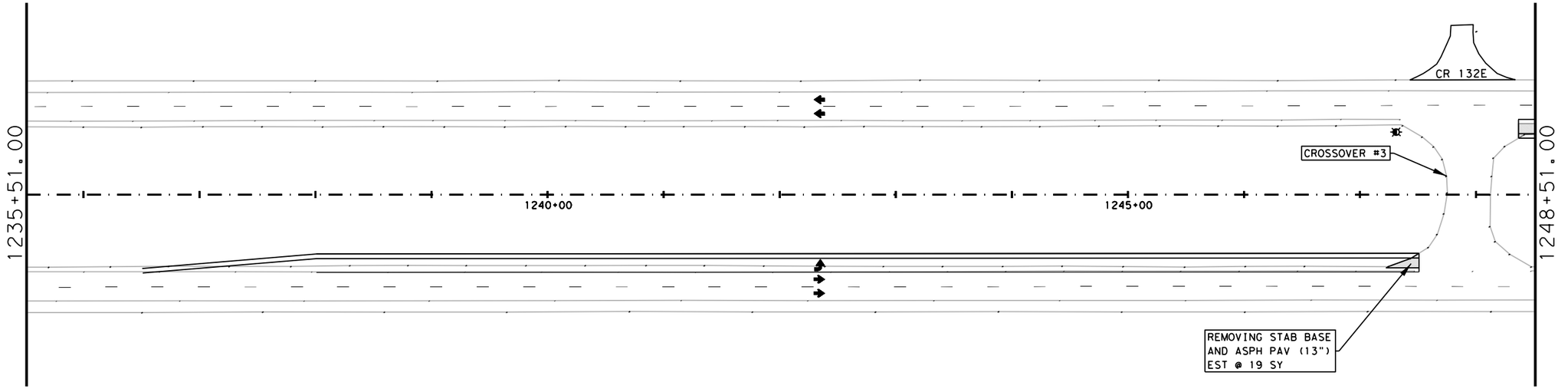

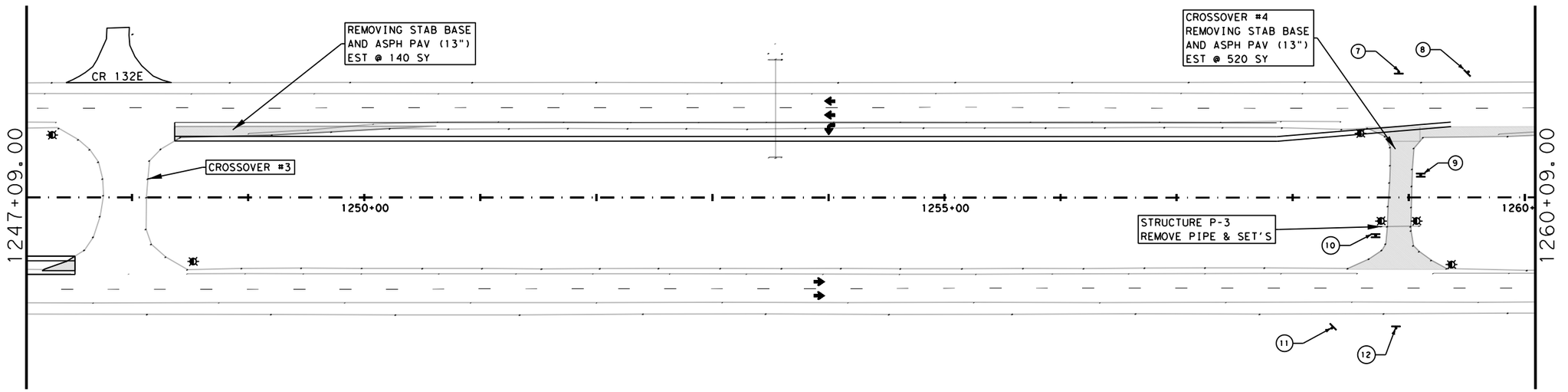

LEGEND

- REMOVING STAB BASE AND ASPH PAV (13")
- DELINEATOR TO BE REMOVED
- (X) SIGN TO BE REMOVED

SCALE
0 50 100

STATE OF TEXAS
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SHEET 2 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		36

DATE: 4/29/2021 2:58:01 PM
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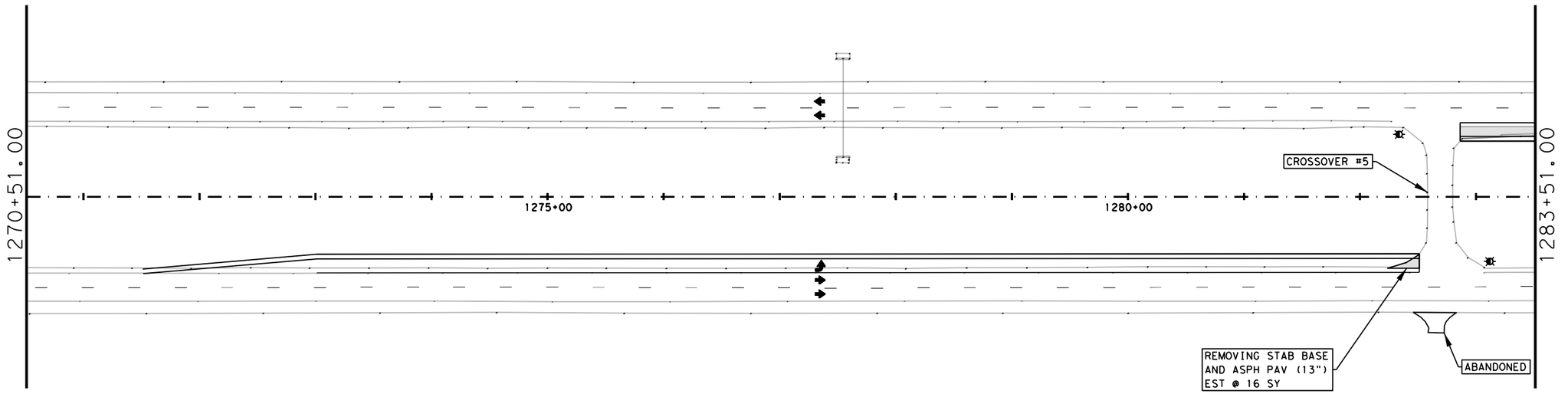

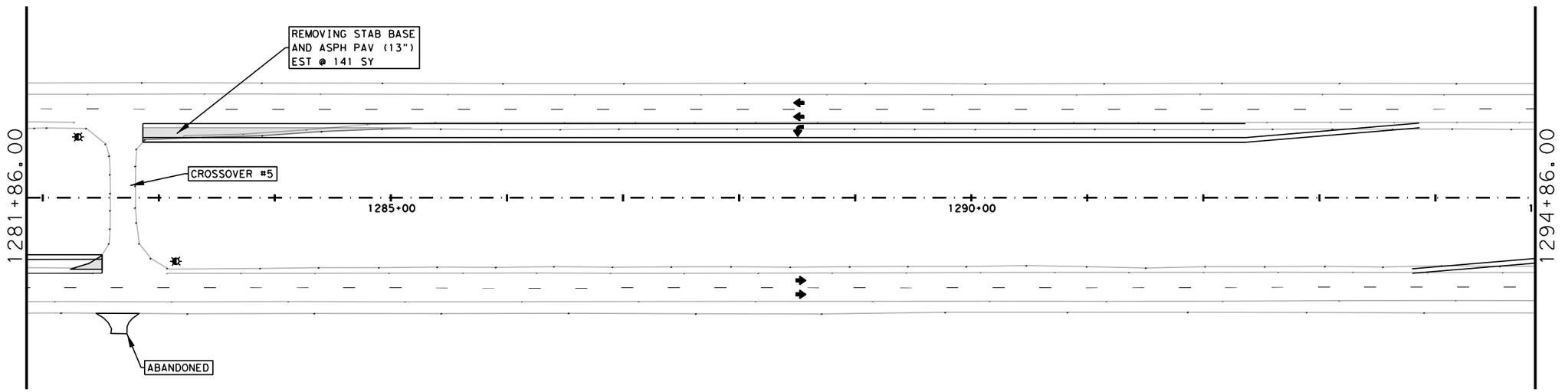

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

SIGN TO BE REMOVED

SCALE

0 50 100

STATE OF TEXAS
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SHEET 3 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		37

DATE: 4/29/2021 2:58:04 PM
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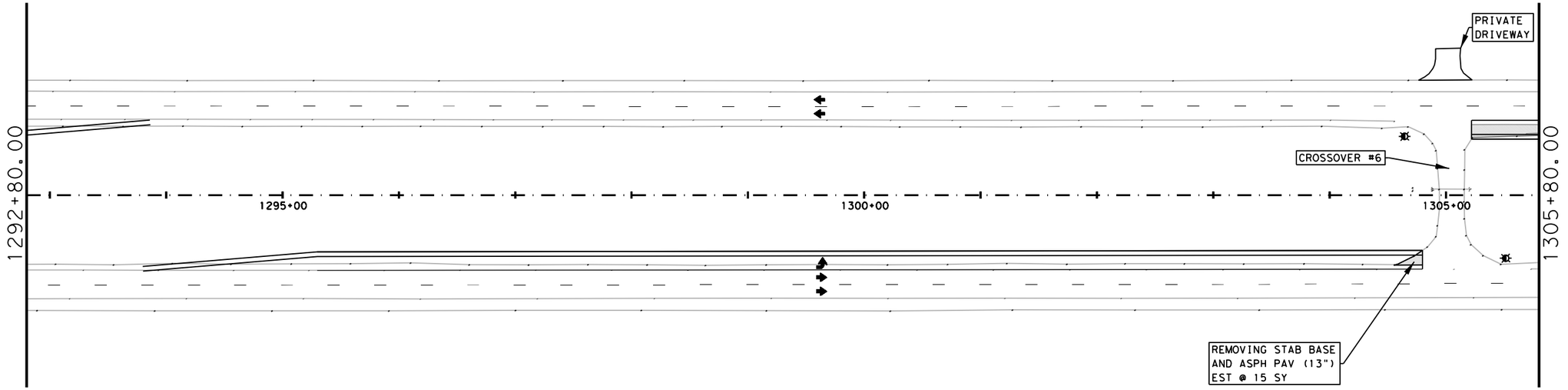

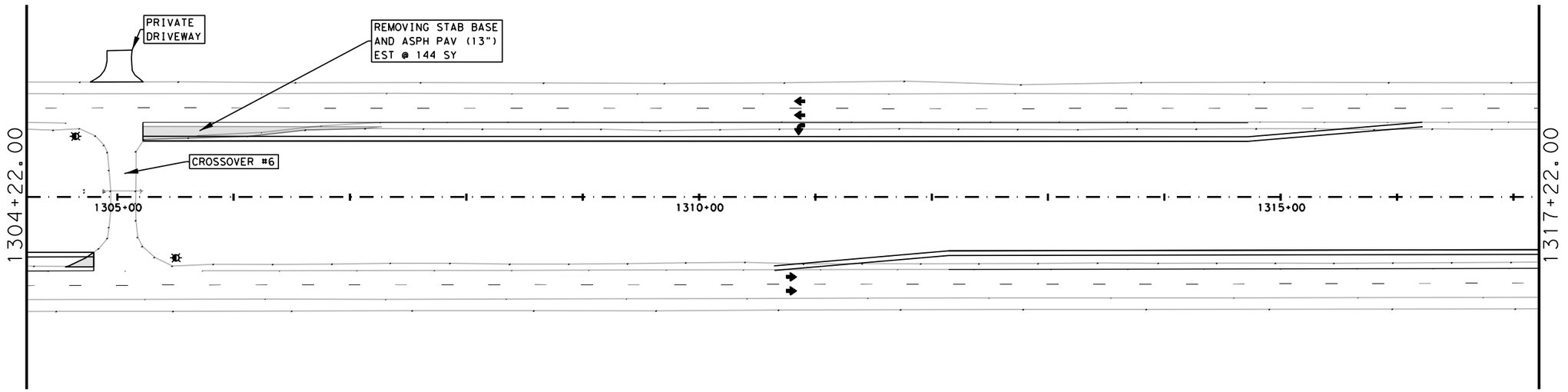

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

STATE OF TEXAS
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REMOVAL PLAN

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SHEET 4 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		38

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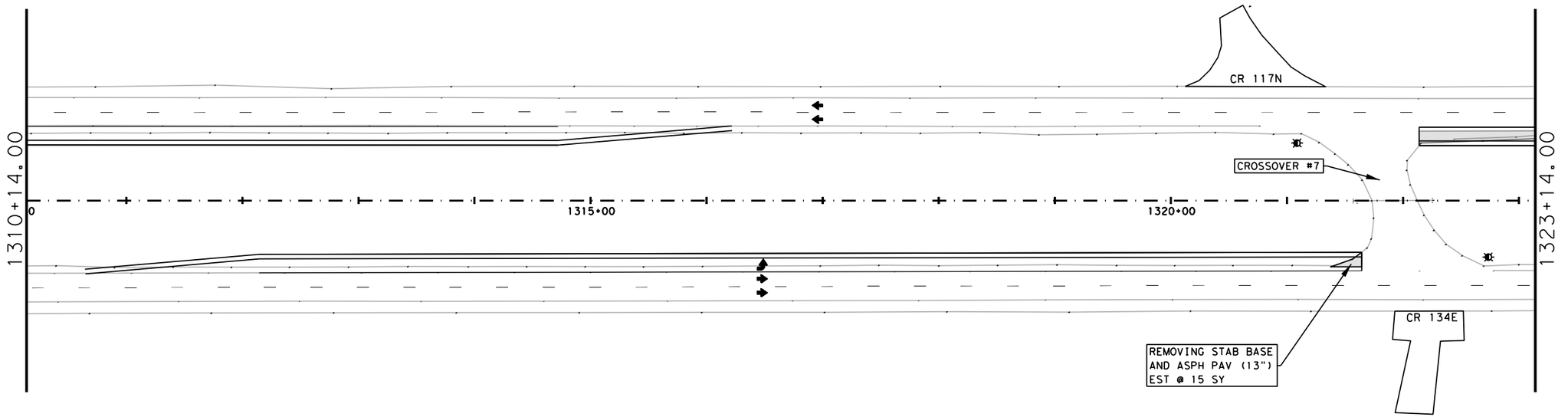

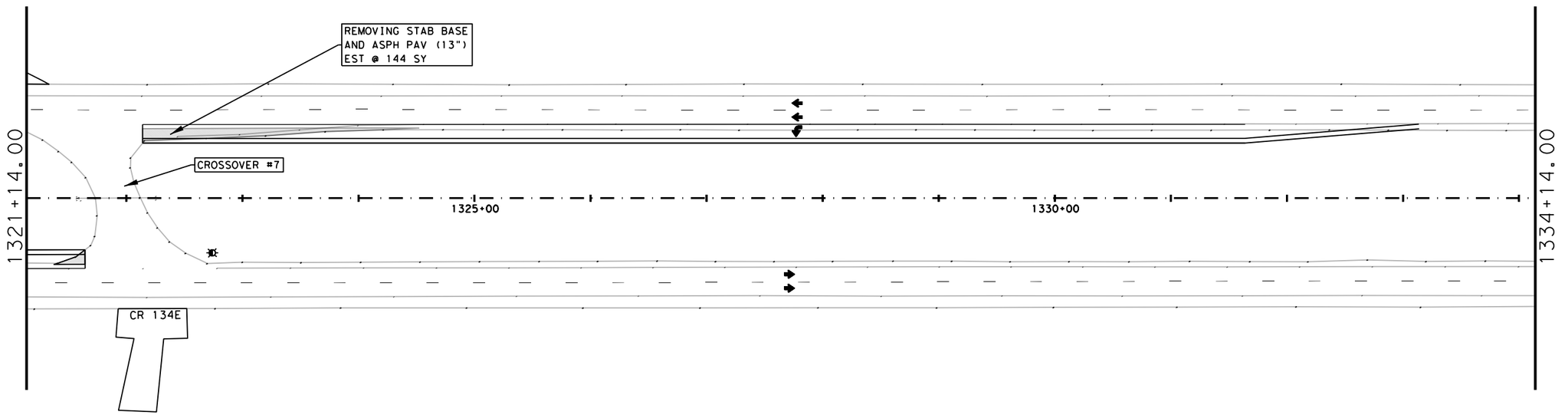

LEGEND

- REMOVING STAB BASE AND ASPH PAV (13")
- DELINEATOR TO BE REMOVED
- (X) SIGN TO BE REMOVED

SCALE
0 50 100

STATE OF TEXAS
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REMOVAL PLAN

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SHEET 5 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		39

DATE: 4/29/2021 2:58:10 PM
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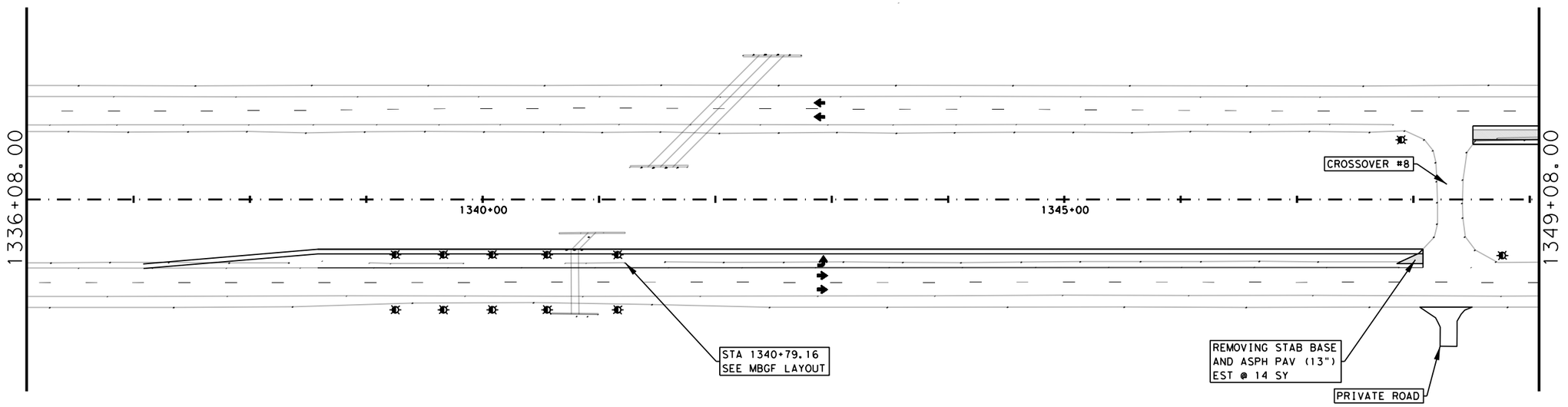

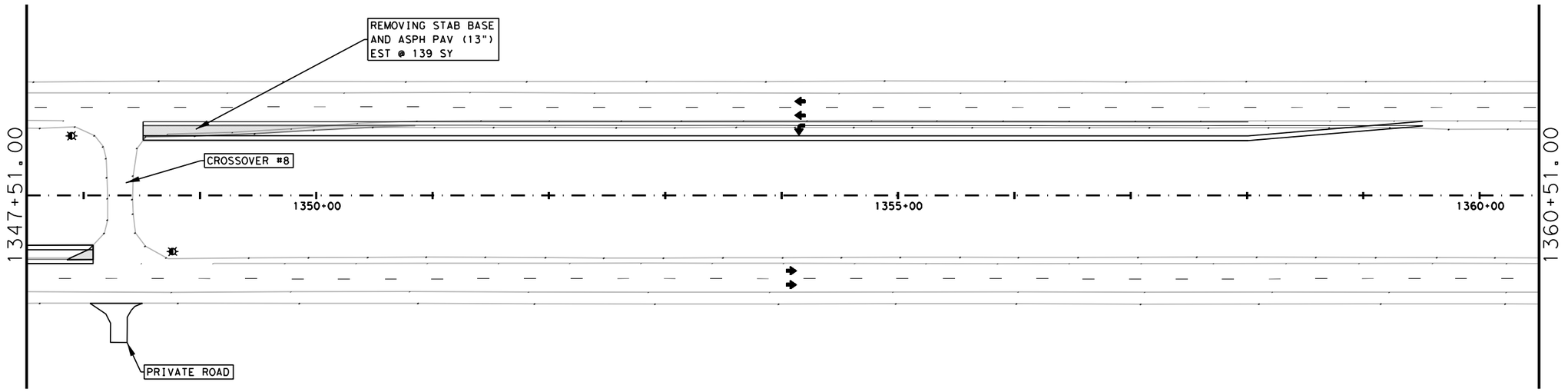

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

STATE OF TEXAS
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SHEET 6 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		40

DATE: 4/29/2021 2:58:13 PM
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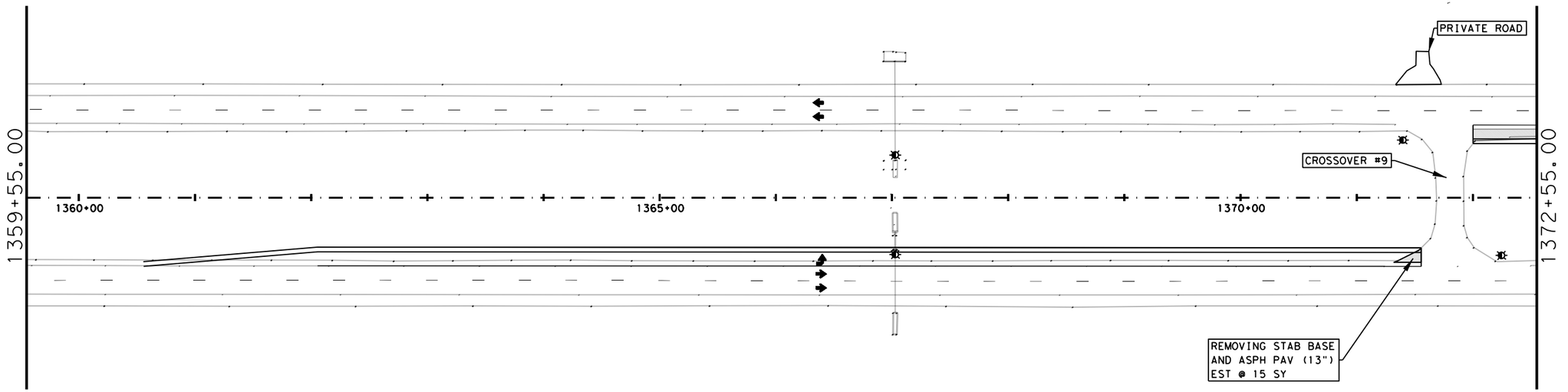

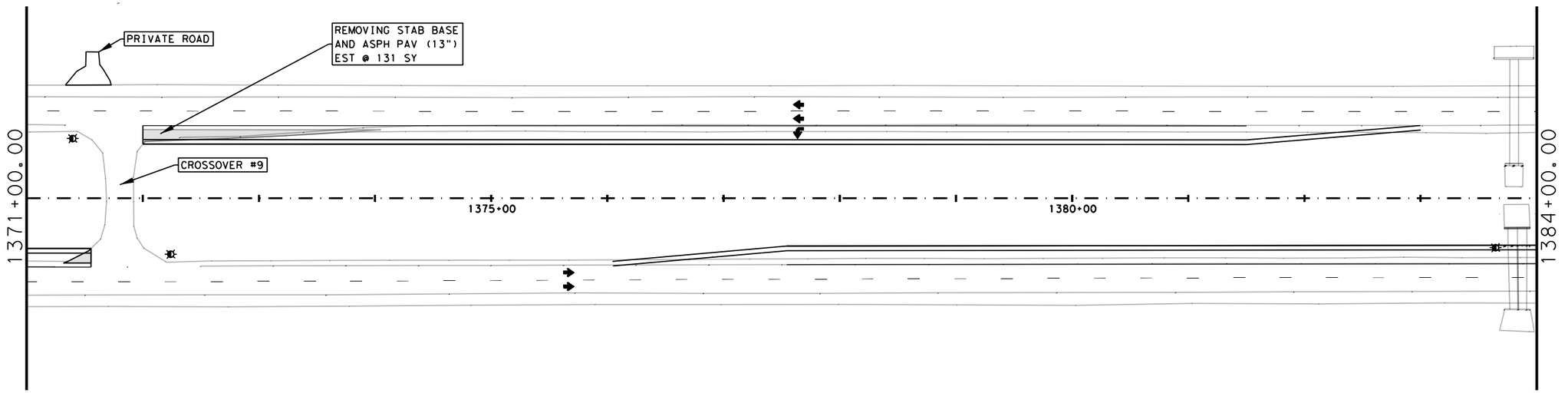

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

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REMOVAL PLAN

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SHEET 7 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		41

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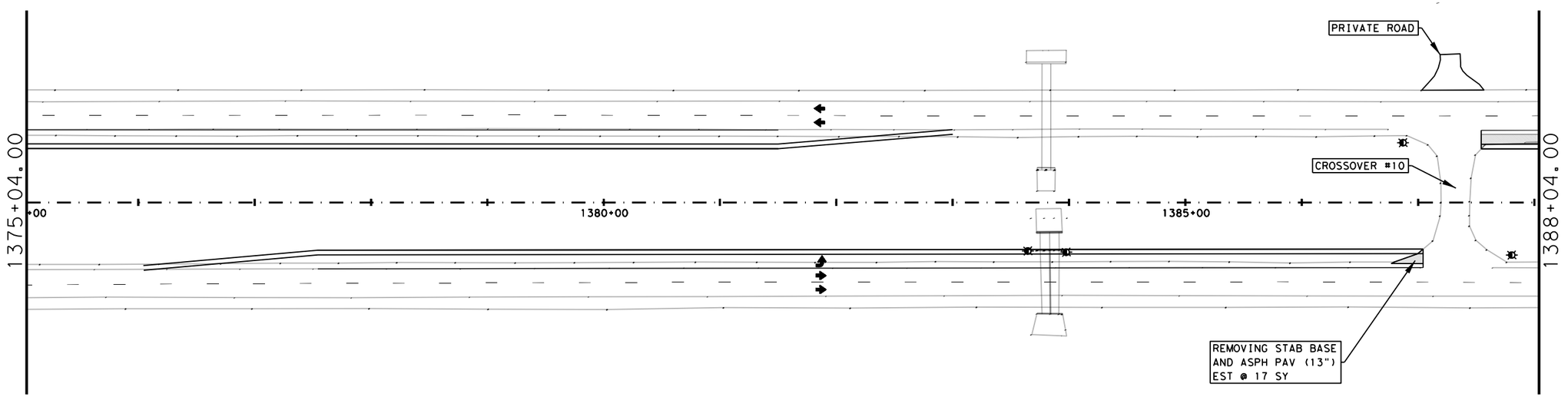

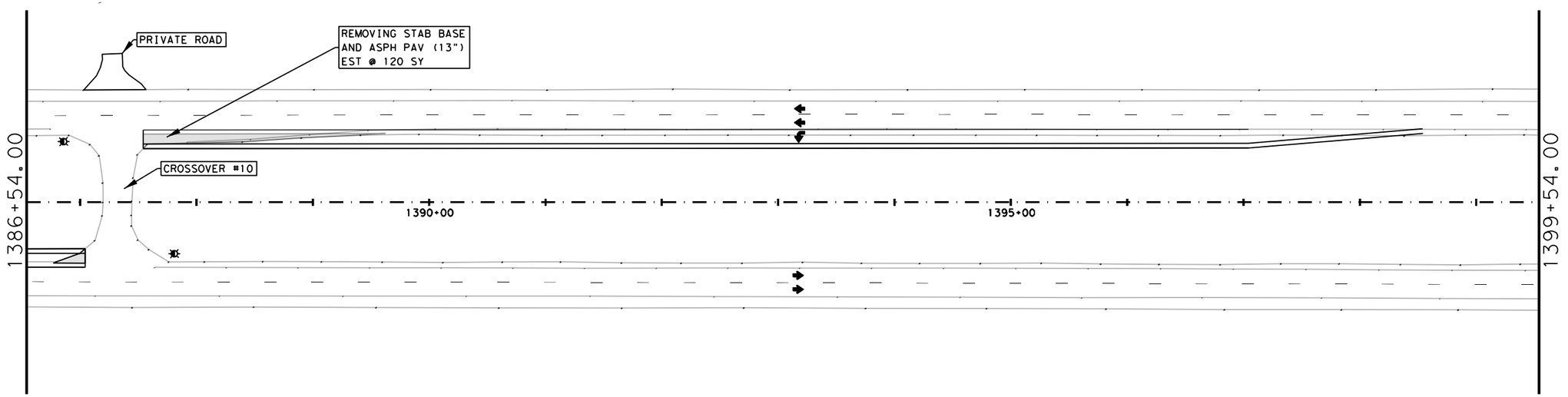

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

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SHEET 8 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		42

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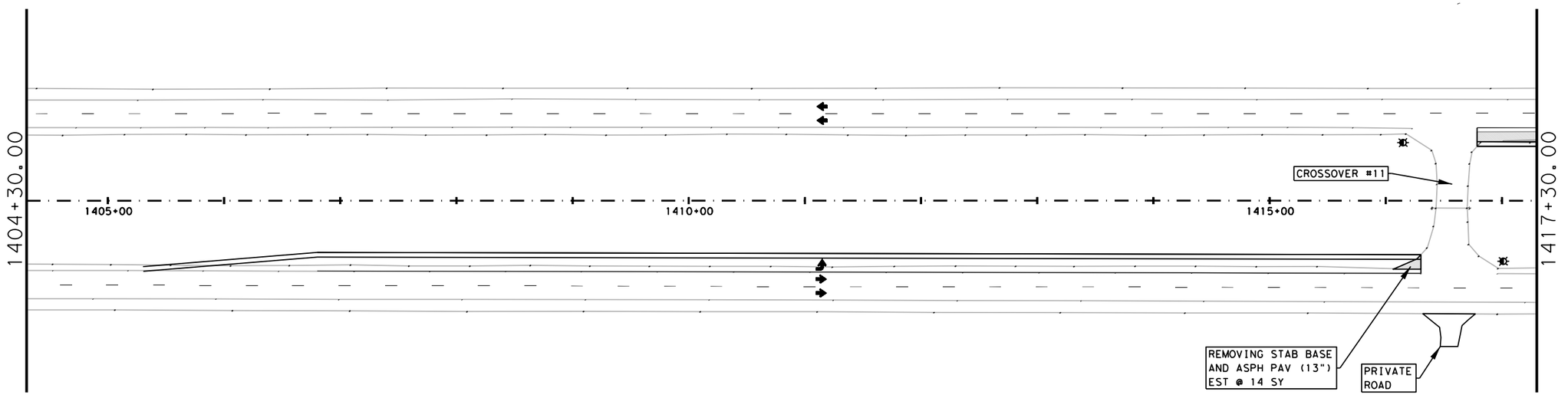

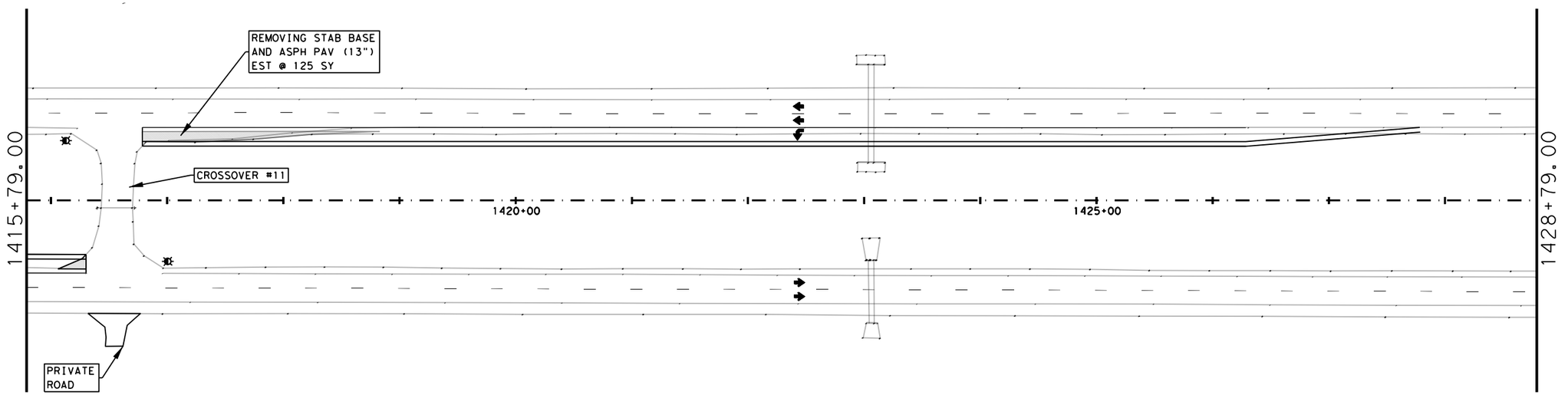

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

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SHEET 9 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		43

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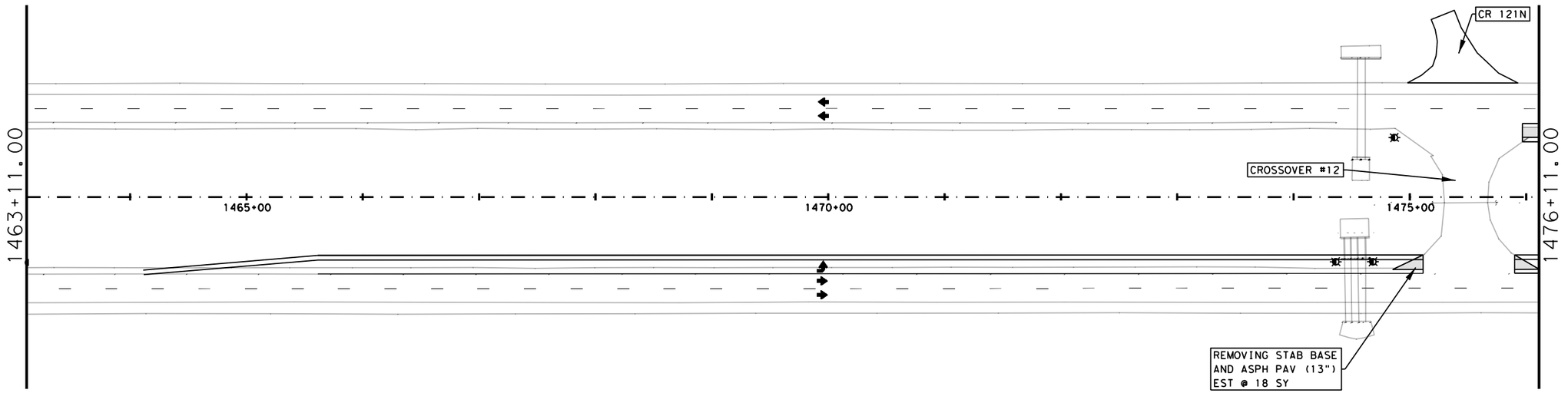

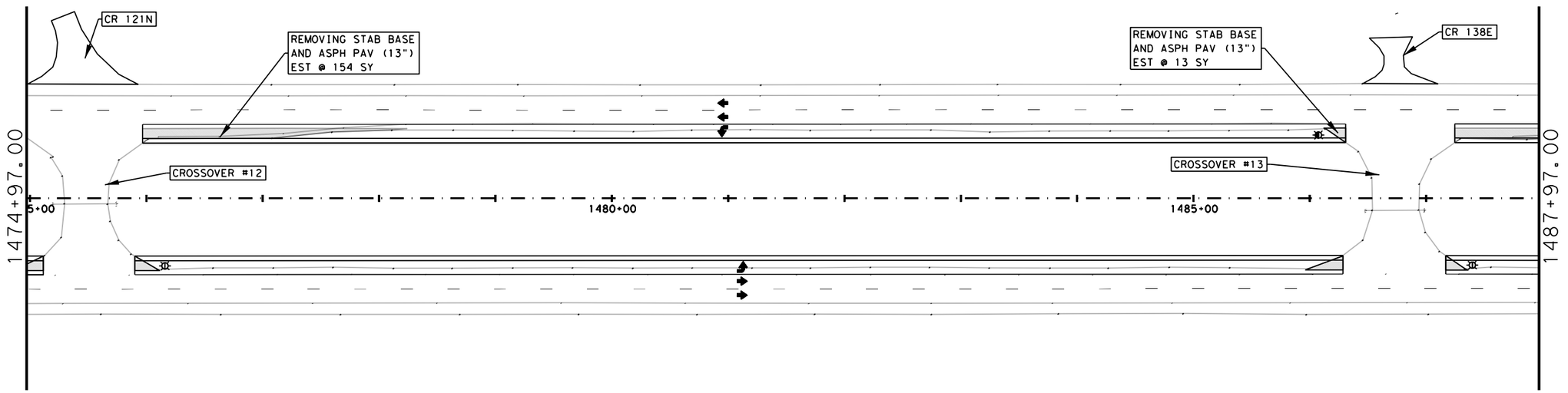

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

STATE OF TEXAS
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04/30/2021

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REMOVAL PLAN

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SHEET 10 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		44

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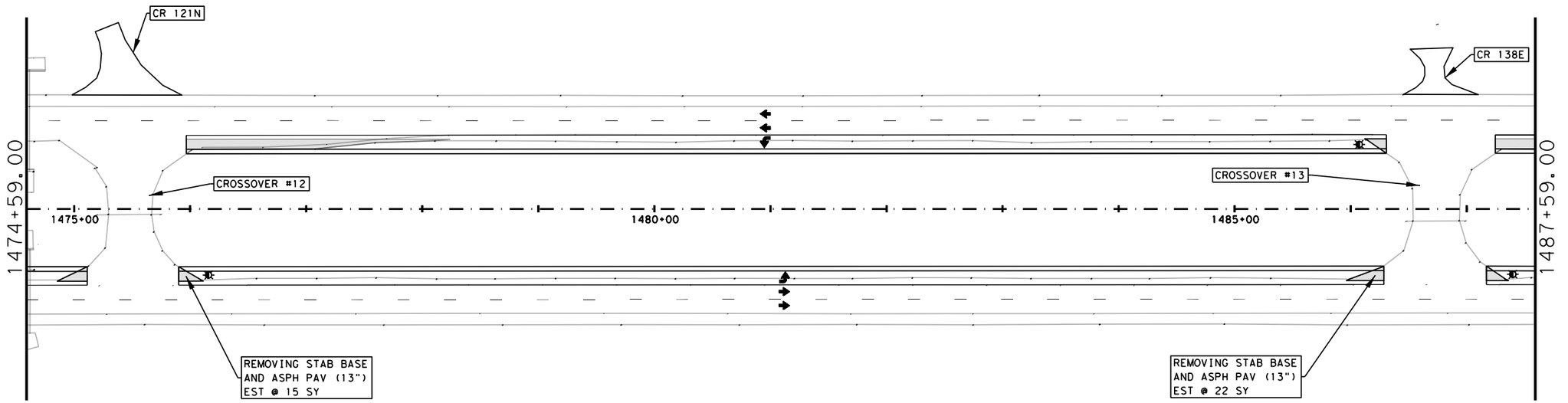

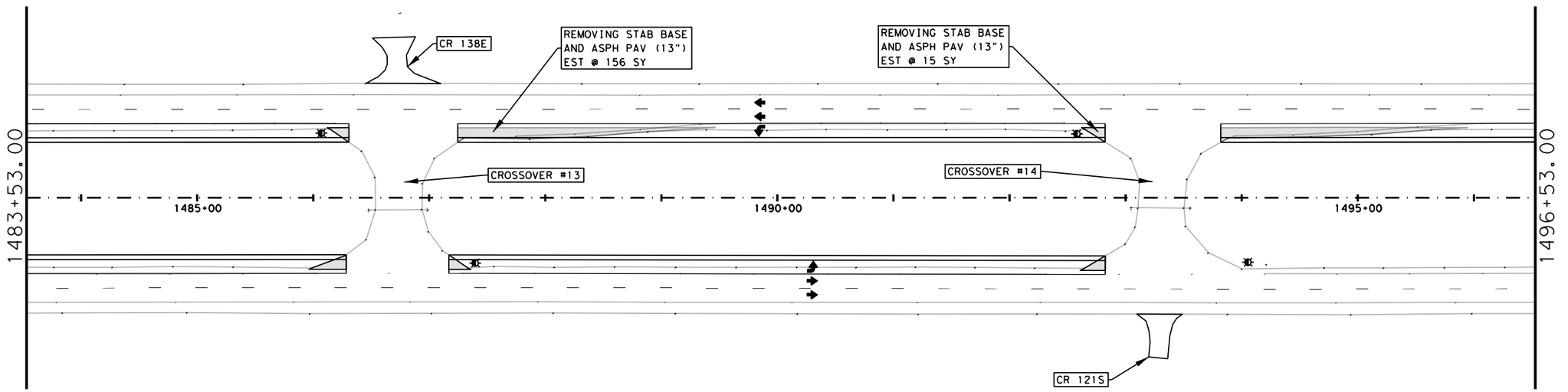

LEGEND

- REMOVING STAB BASE AND ASPH PAV (13")
- DELINEATOR TO BE REMOVED
- (X) SIGN TO BE REMOVED

SCALE
0 50 100

STATE OF TEXAS
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REMOVAL PLAN

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SHEET 11 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		45

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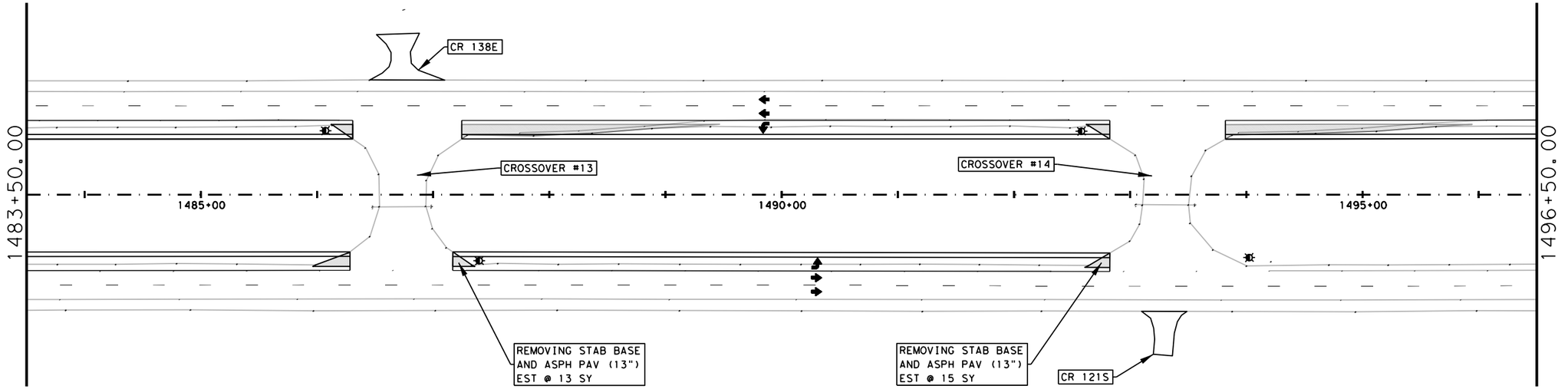

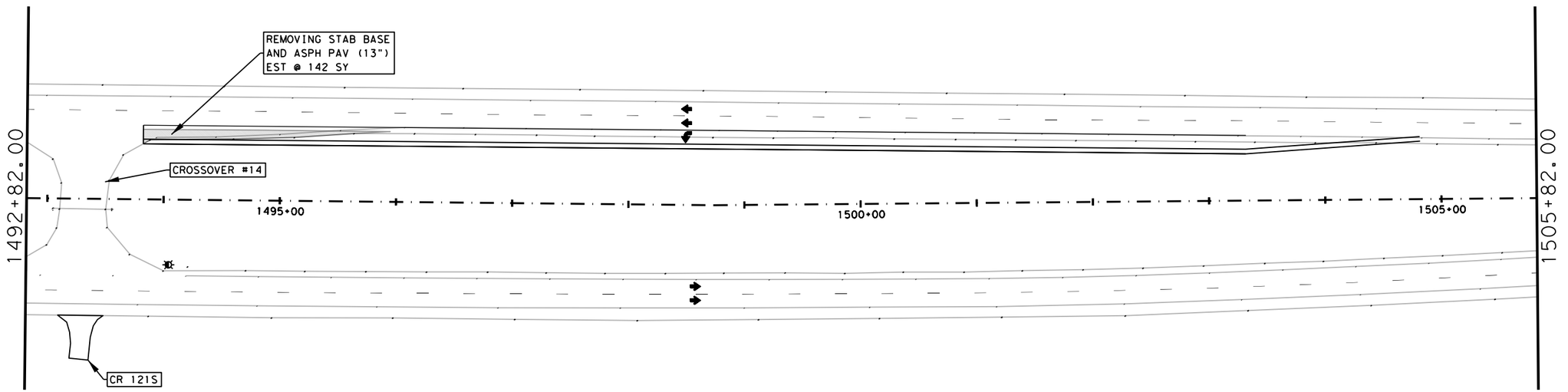

LEGEND

REMOVING STAB BASE AND ASPH PAV (13")

DELINEATOR TO BE REMOVED

(X) SIGN TO BE REMOVED

SCALE

0 50 100

STATE OF TEXAS
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REMOVAL PLAN

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SHEET 12 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		46

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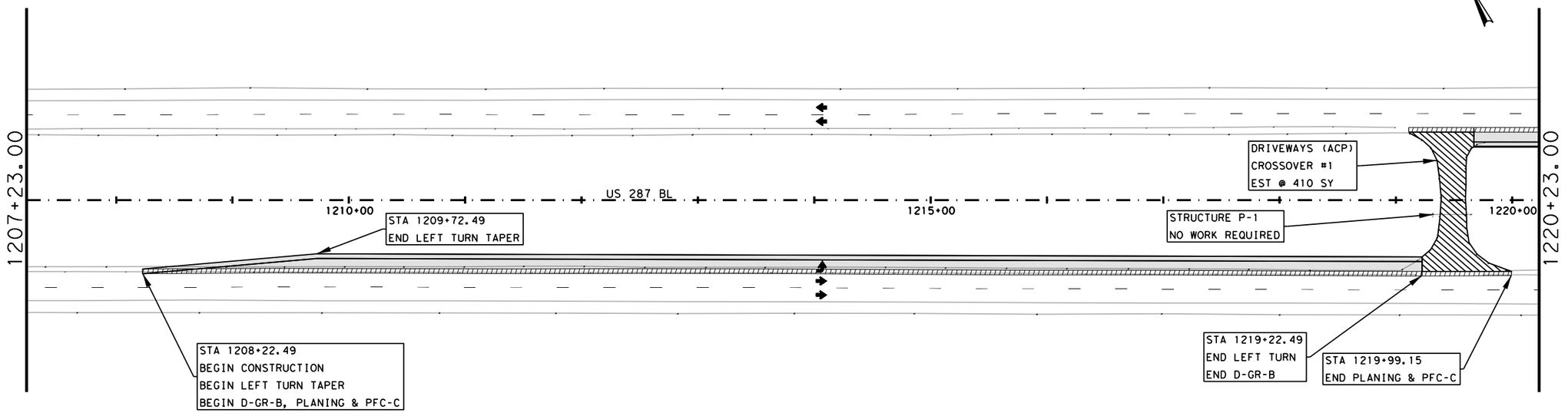
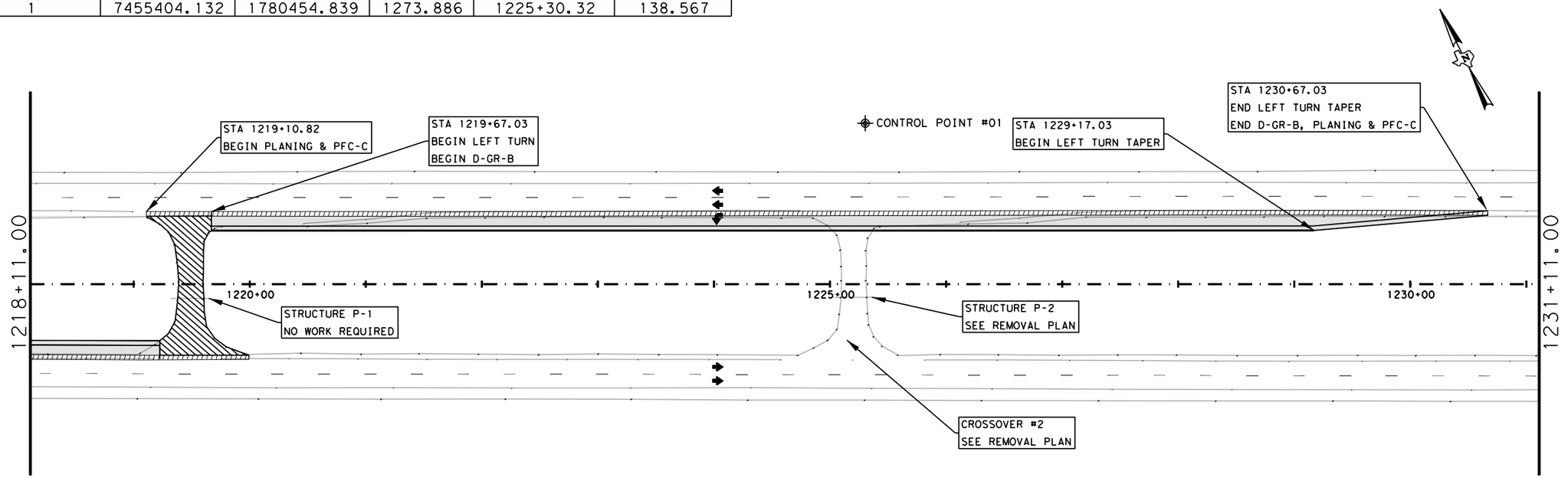


LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY

Control Point	Northing	Easting	Elevation	Station	Left Offset
1	7455404.132	1780454.839	1273.886	1225+30.32	138.567



SCALE
0 50 100

STATE OF TEXAS
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04/30/2021

US 287
ROADWAY PLAN

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SHEET 1 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		47

DATE: 4/29/2021 2:58:43 PM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

Control Point	Northing	Easting	Elevation	Station	Left Offset
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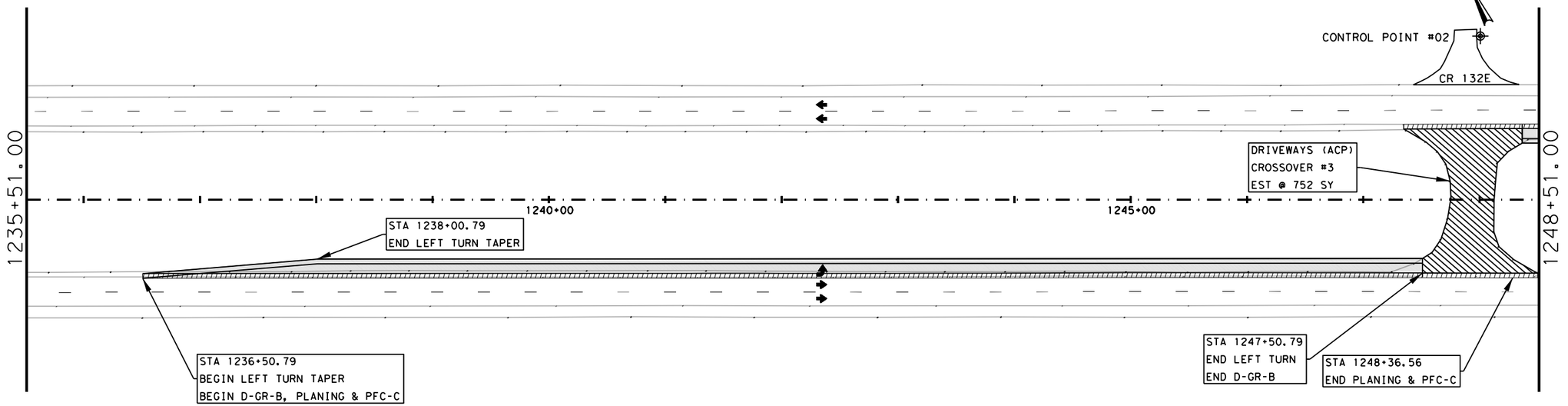

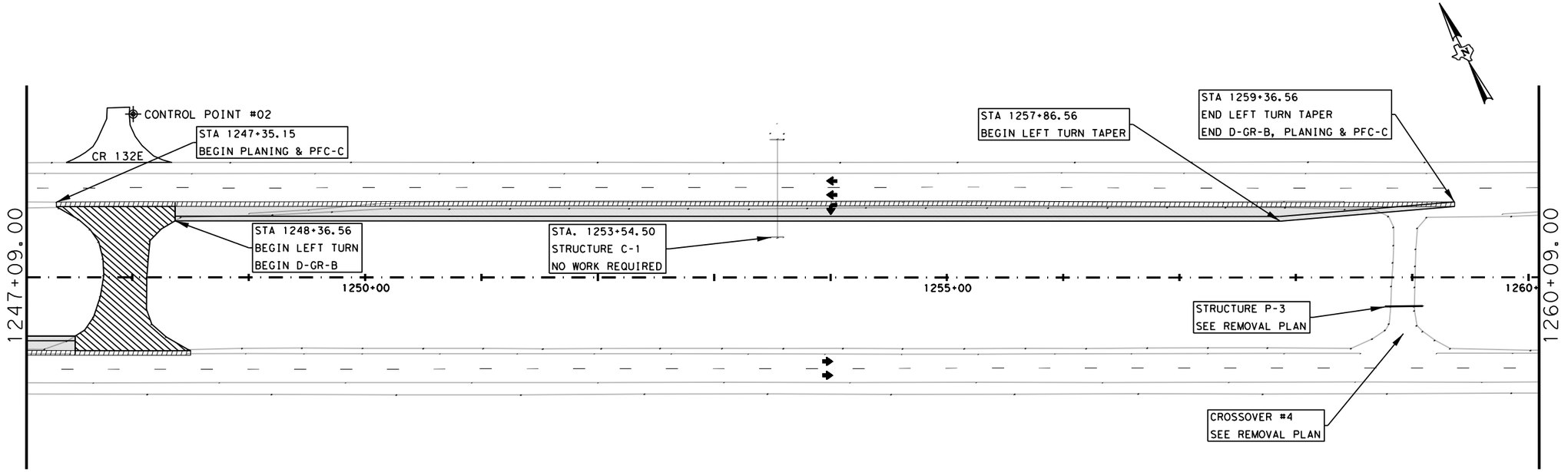

LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY

SCALE
0 50 100

STATE OF TEXAS
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ROADWAY PLAN

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SHEET 2 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		48

DATE: 4/29/2021 2:58:45 PM
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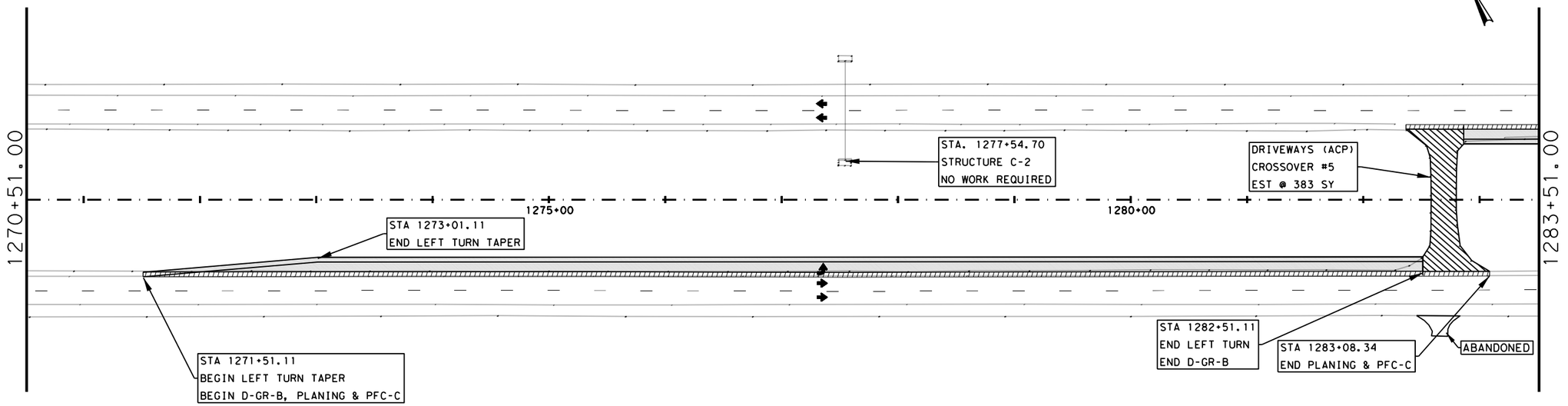

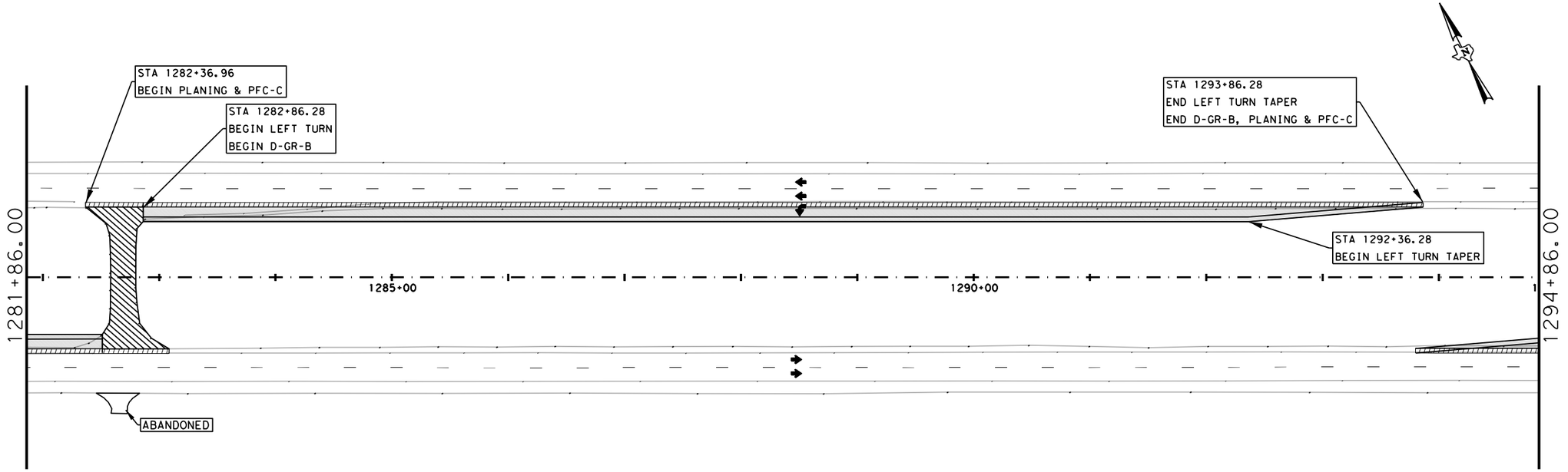

LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY

SCALE
0 50 100

STATE OF TEXAS
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US 287
ROADWAY PLAN

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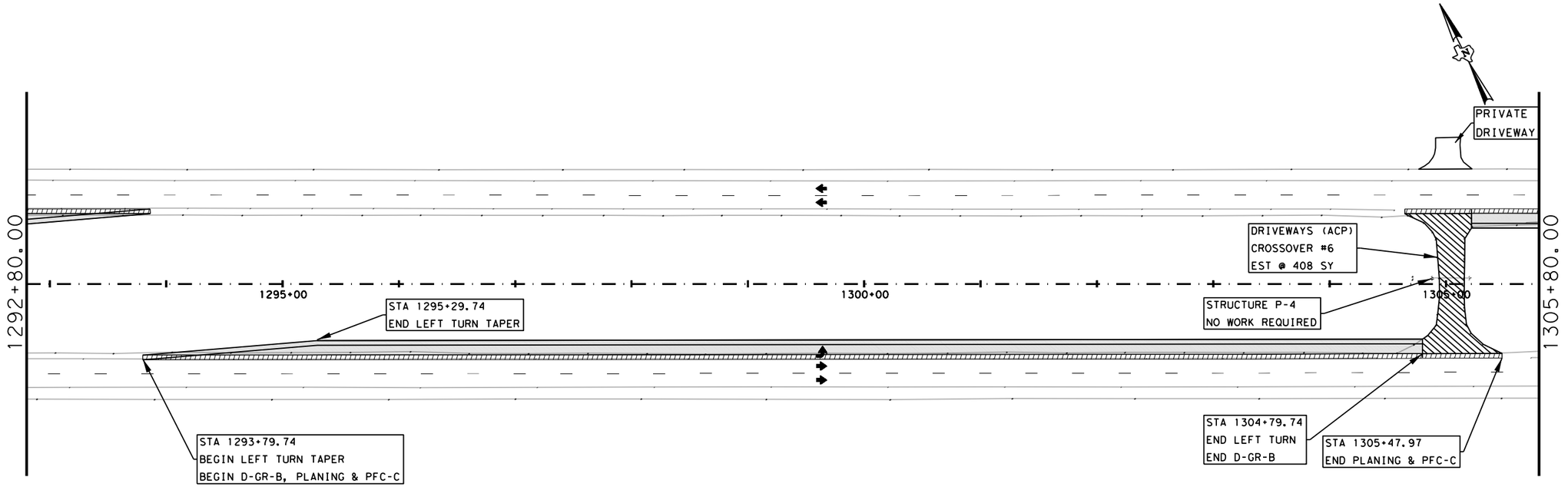
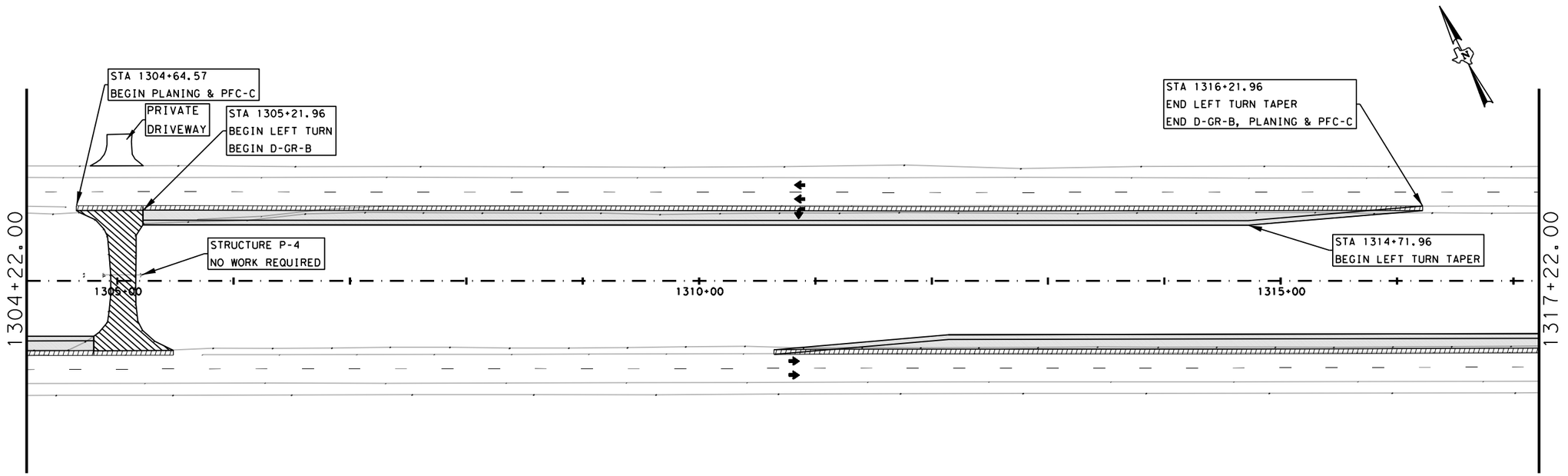
SHEET 3 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		49

DATE: 4/29/2021 2:58:48 PM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn





LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
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SCALE
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STATE OF TEXAS
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04/30/2021

US 287
ROADWAY PLAN

2021 Texas Department of Transportation®

SHEET 4 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		50

DATE: 4/29/2021 2:58:51 PM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

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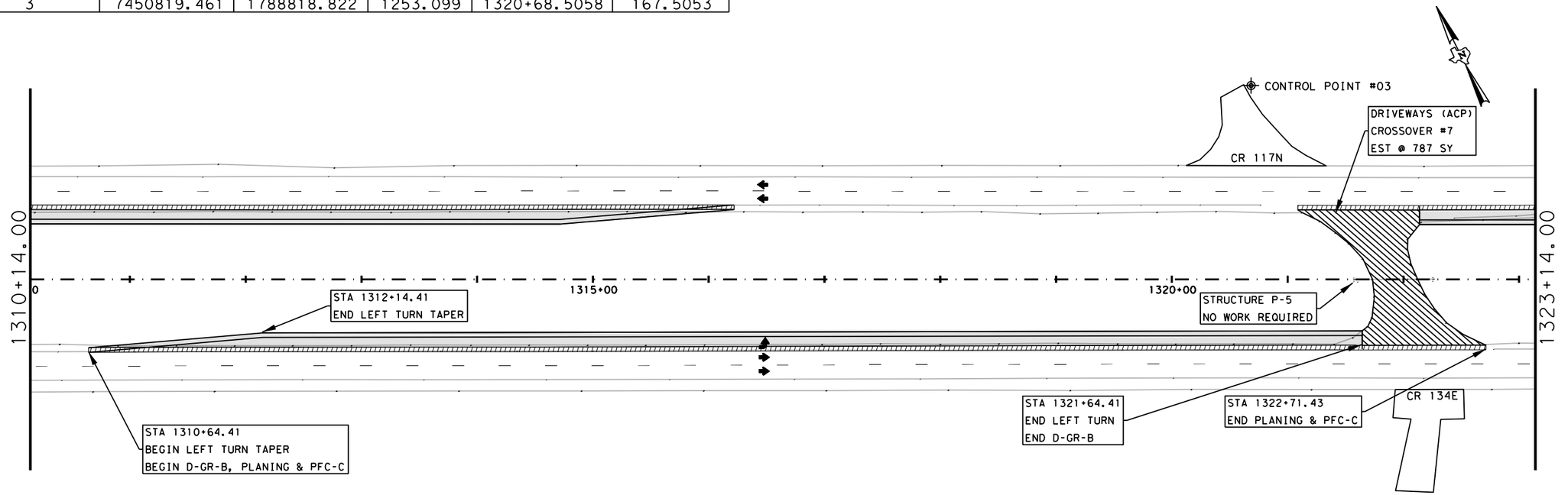
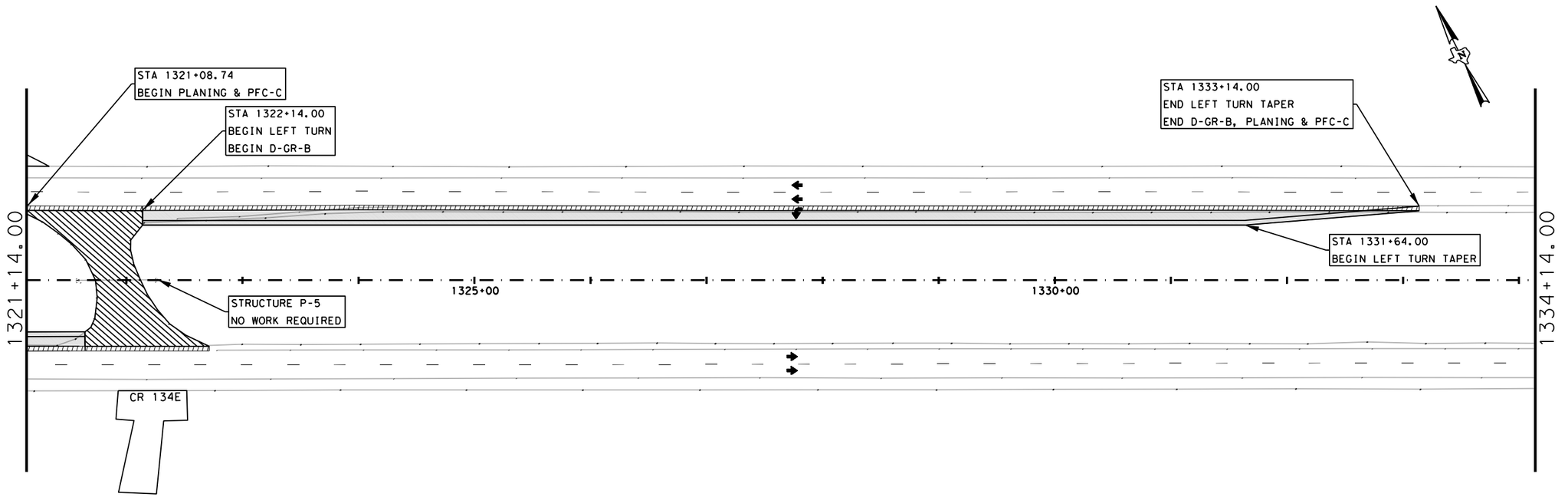


LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY



SCALE
0 50 100

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SHEET 5 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		51

DATE: 4/29/2021 2:58:54 PM
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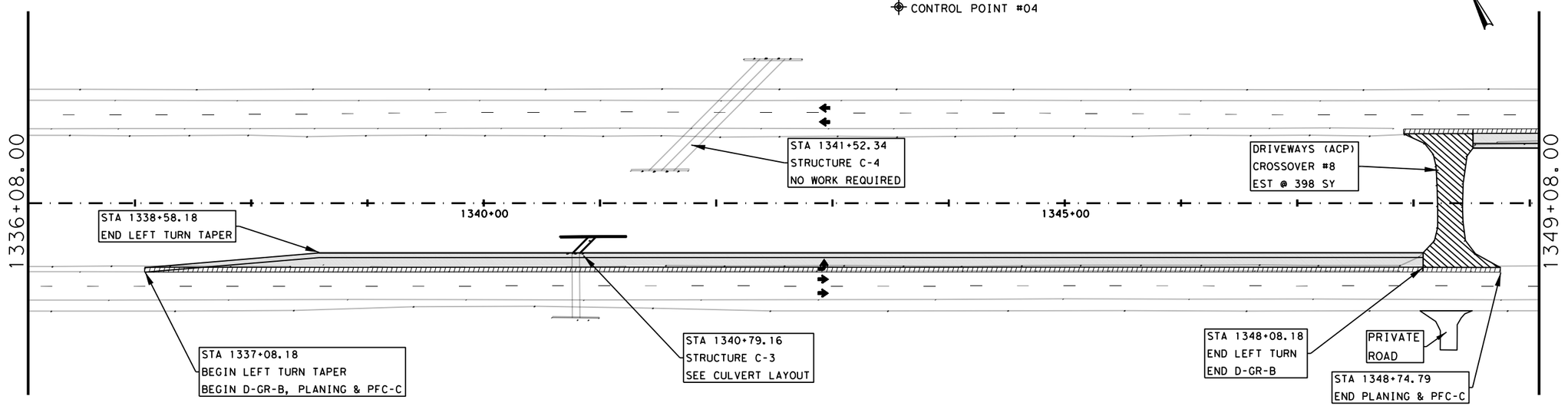

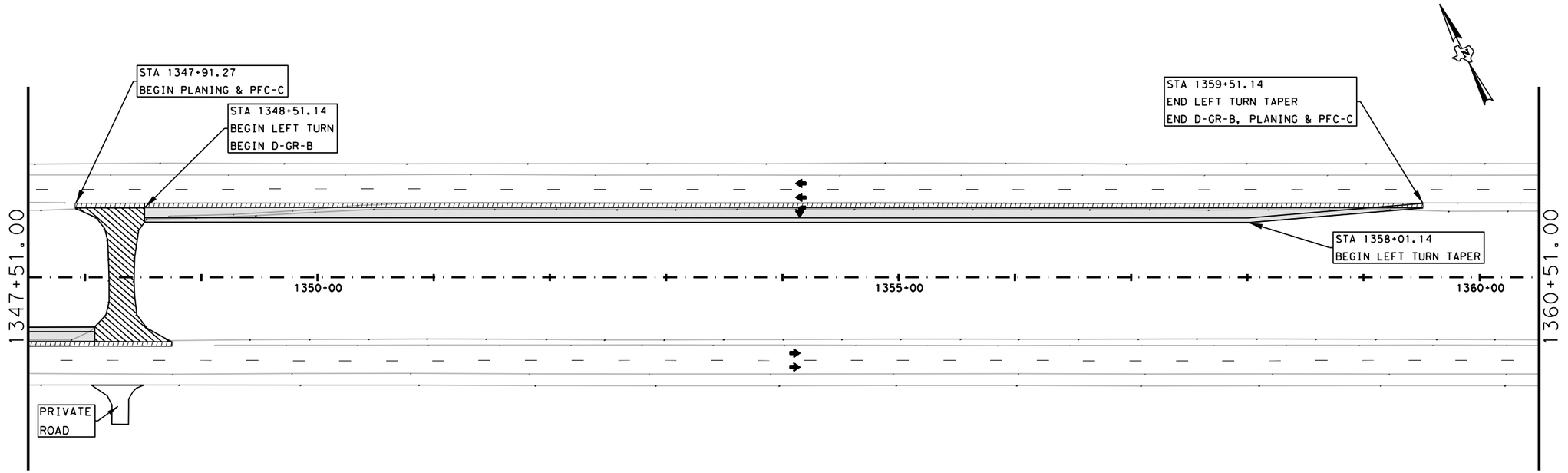

LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
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SCALE
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SHEET 6 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		52

DATE: 4/29/2021 2:58:56 PM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

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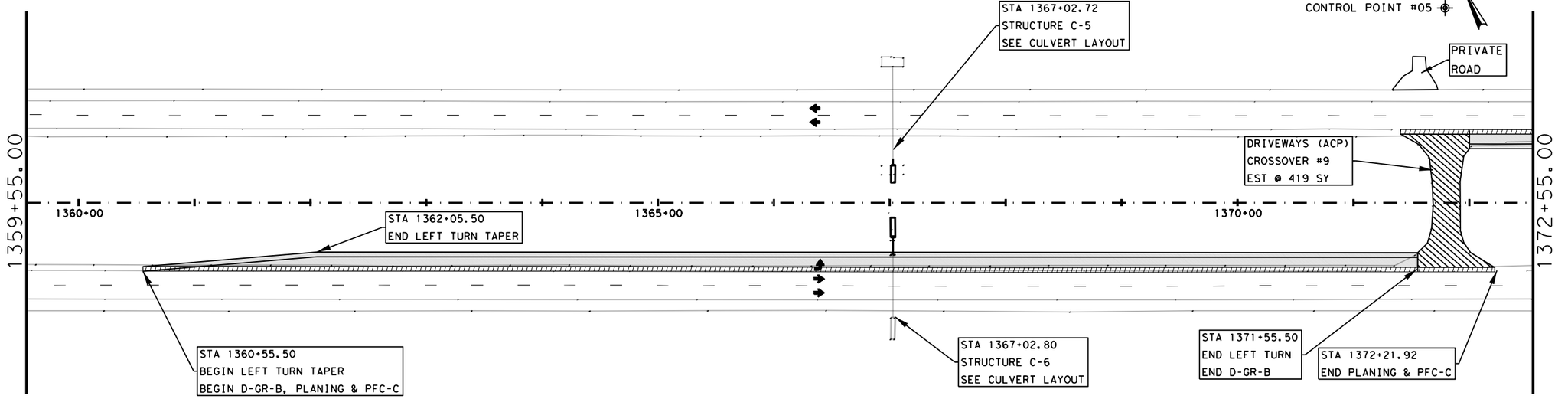

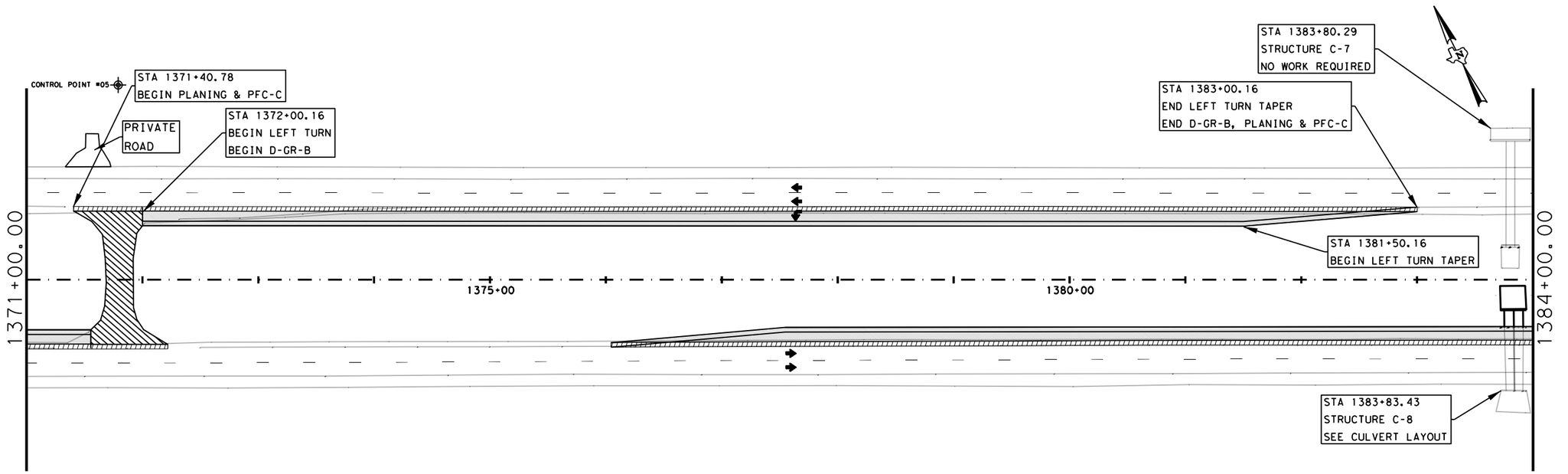

LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY

SCALE
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SHEET 7 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		53

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Control Point	Northing	Easting	Elevation	Station	Left Offset
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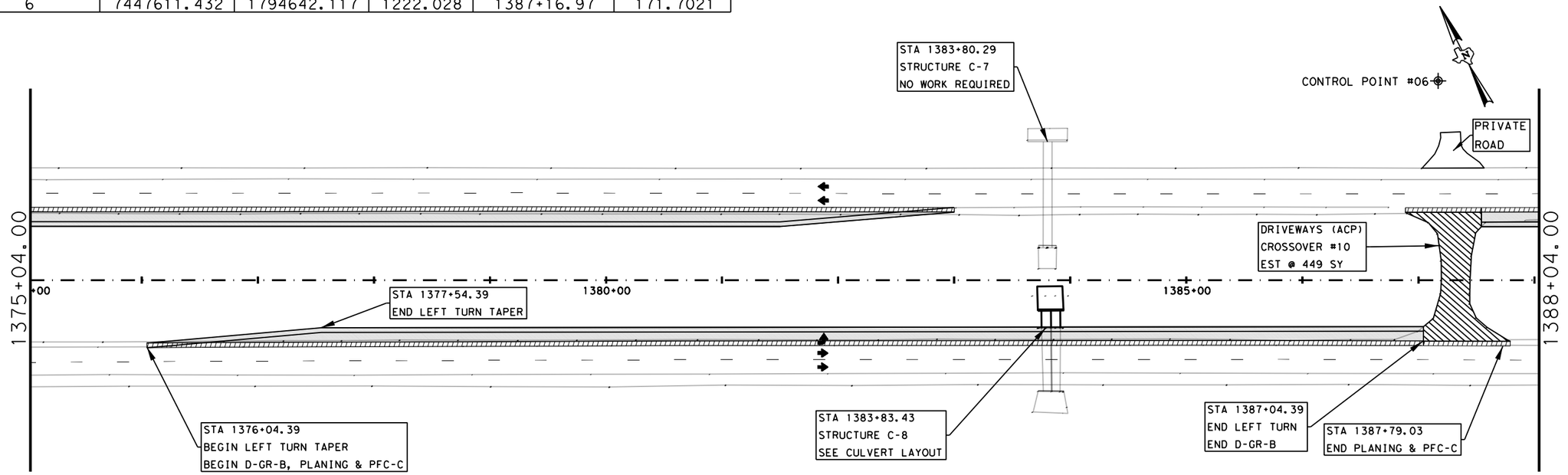
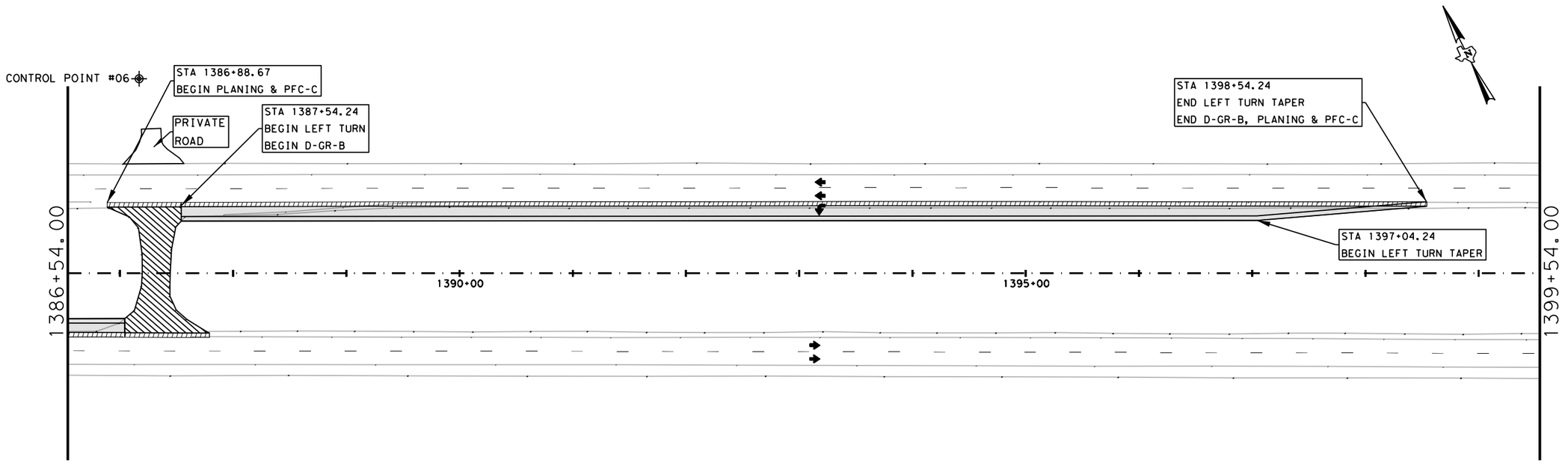


LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY



SCALE
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SHEET 8 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		54

DATE: 4/29/2021 2:59:02 PM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

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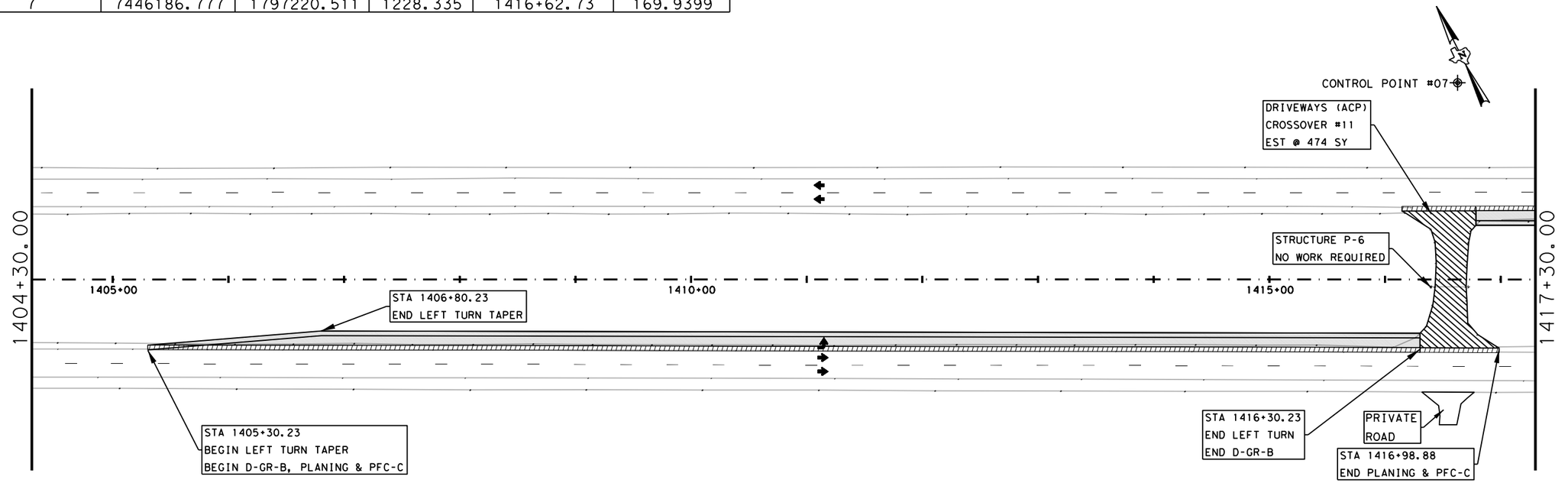

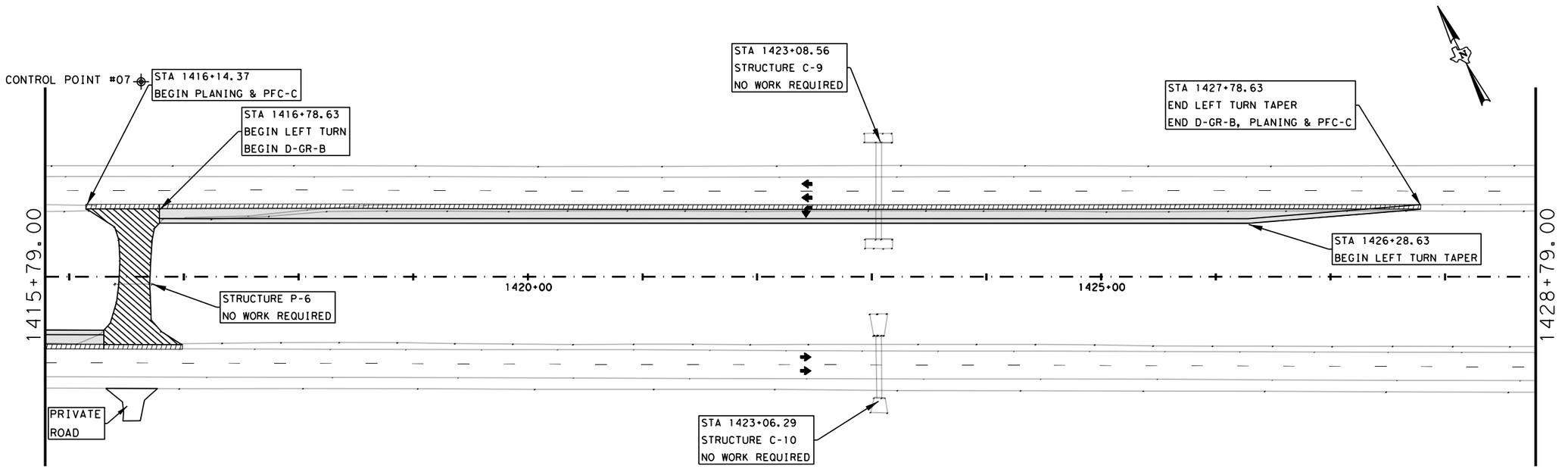

LEGEND

- 8" CEMENT TREAT, 12" D-GR TYPE B, & 1 1/2" PFC-C
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY

SCALE
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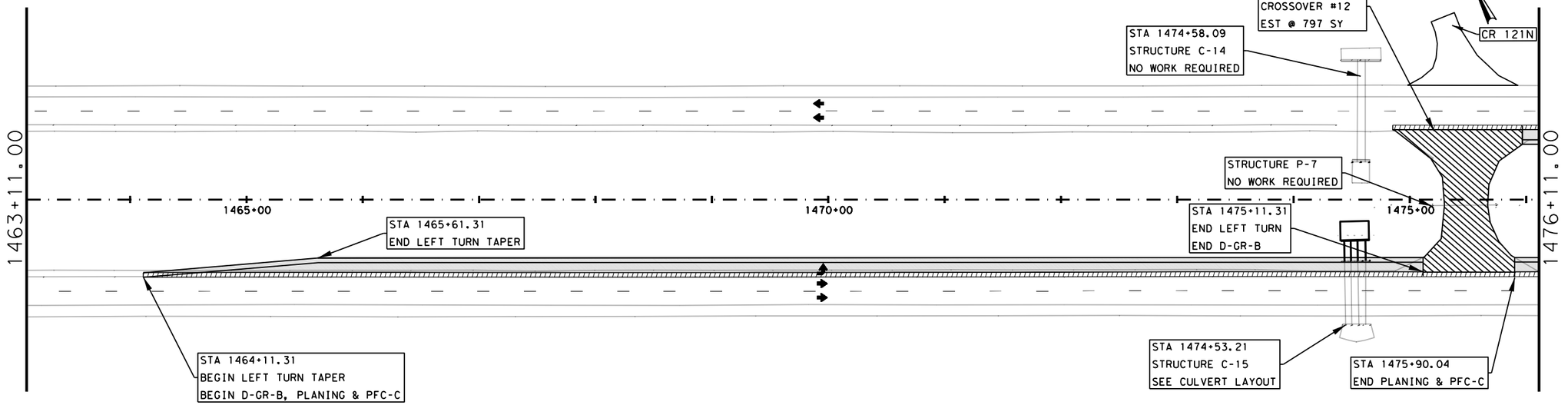
SHEET 9 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		55

DATE: 4/29/2021 2:59:05 PM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

Control Point	Northing	Easting	Elevation	Station	Left Offset
8	7443356.987	1802368.733	1221.78	1475+37.40	180.9935
9	7442788.204	1803353.864	1227.951	1486+74.73	159.216



LEGEND

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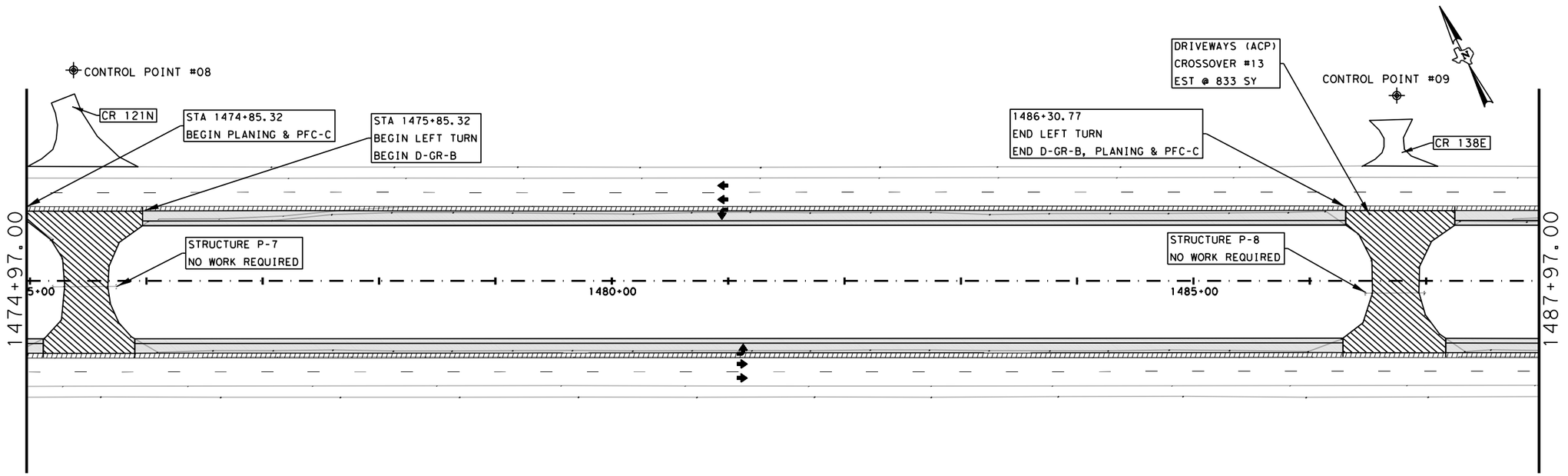
- 1 1/2" PLANING & PFC-C
- 1 1/2" D-GR OVERLAY



SCALE
0 50 100

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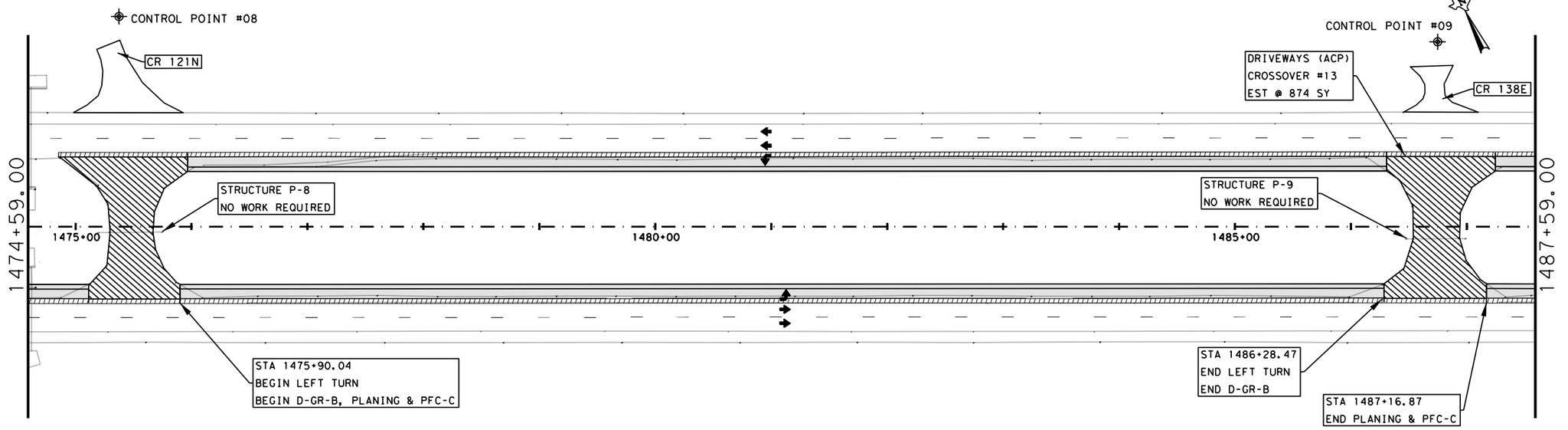
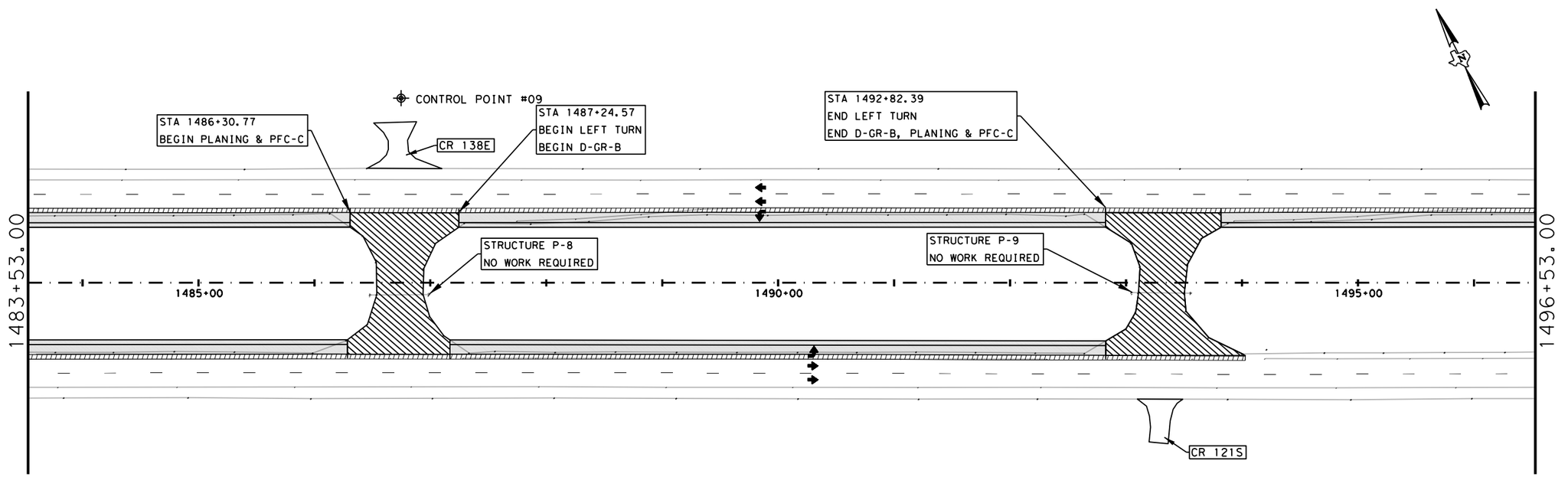
SHEET 10 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		56

DATE: 4/29/2021 2:59:08 PM
FILE: T:\WFSDESIGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

Control Point	Northing	Easting	Elevation	Station	Left Offset
8	7443356.987	1802368.733	1221.78	1475+37.40	180.9935
9	7442788.204	1803353.864	1227.951	1486+74.73	159.216





LEGEND

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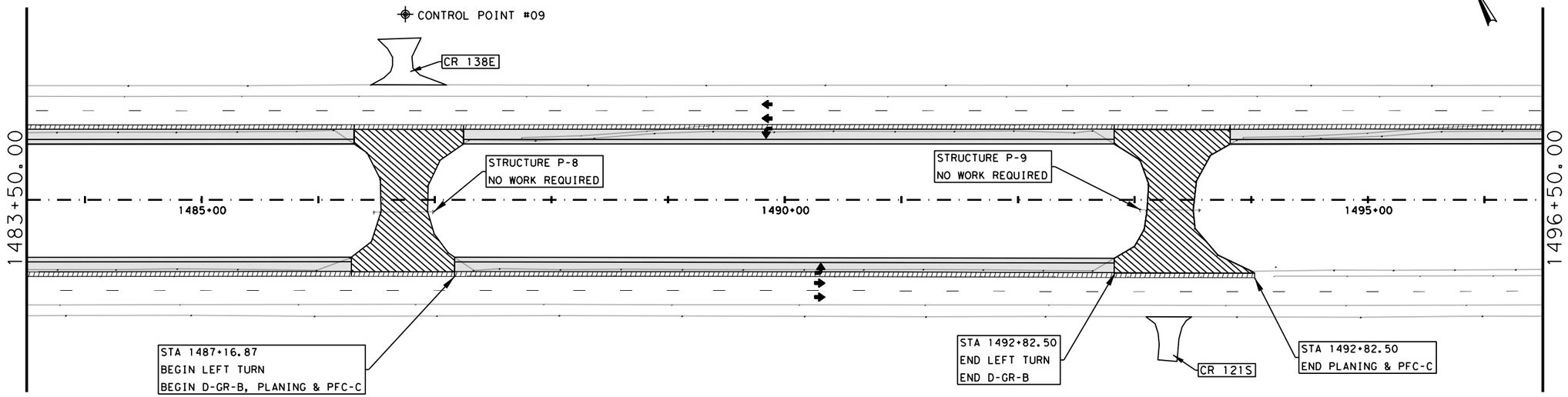
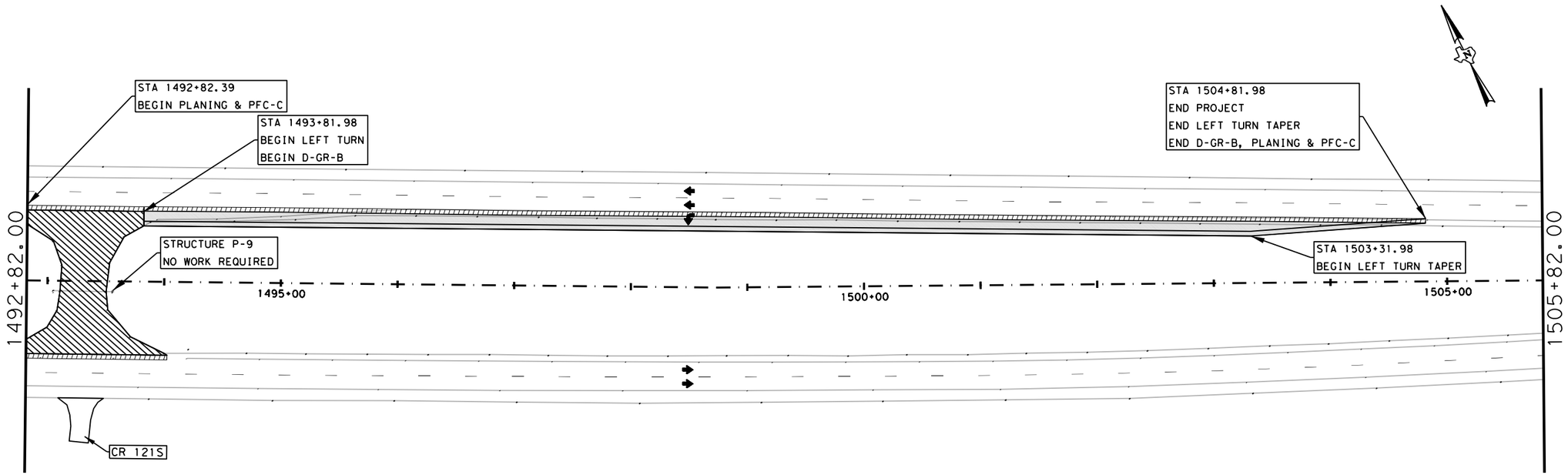
SHEET 11 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		57

DATE: 4/29/2021 2:59:11 PM
FILE: T:\WFSDESIGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

Control Point	Northing	Easting	Elevation	Station	Left Offset
9	7442788.204	1803353.864	1227.951	1486+74.73	159.216





LEGEND

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SCALE
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SHEET 12 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		58

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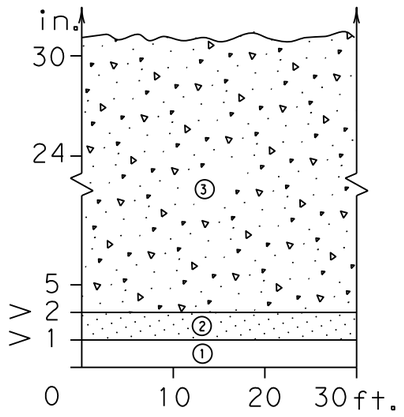
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\3. Roadway\1 - ROADWAY PLAN.dgn

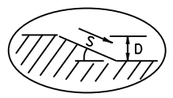
DATE:
FILE:

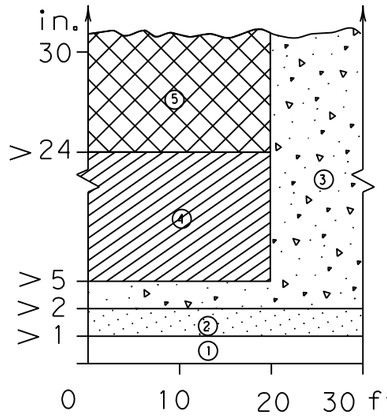
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

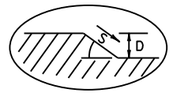


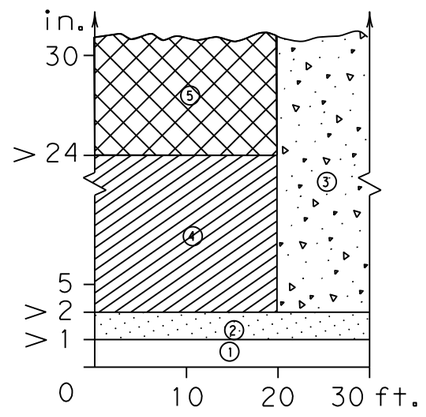
Edge Condition I
S = (3:1) (or flatter)



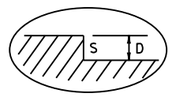


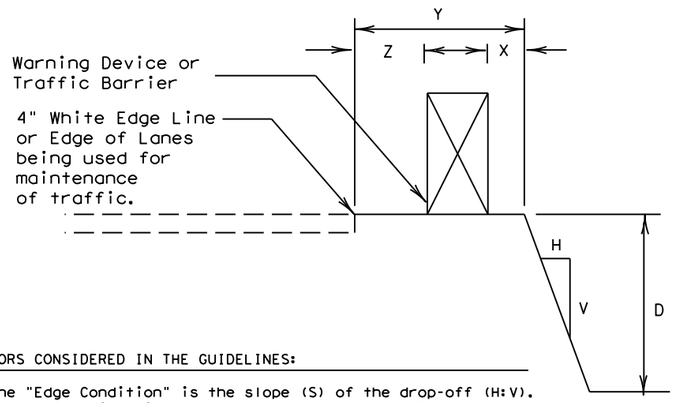
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

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

Edge Condition Notes:

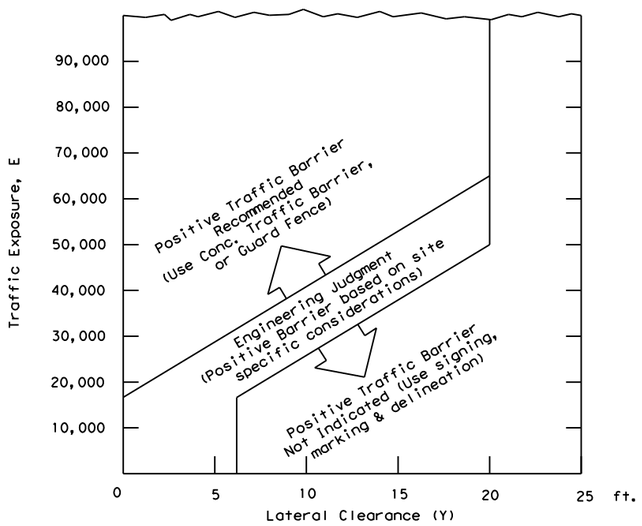
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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

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

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

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



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

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

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

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

Engineer's Seal

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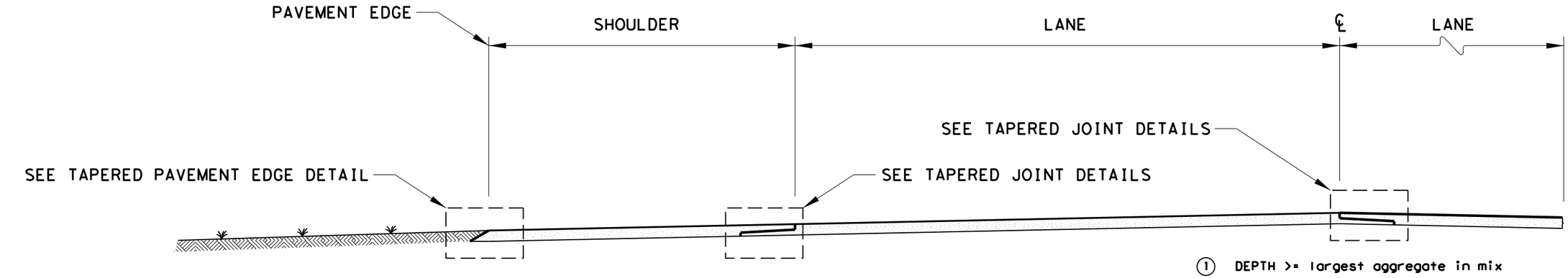
04/30/2021

Texas Department of Transportation
Traffic Operations Division

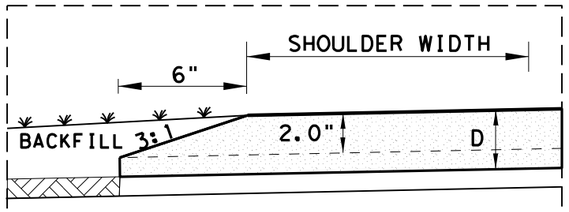
TREATMENT FOR VARIOUS EDGE CONDITIONS

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

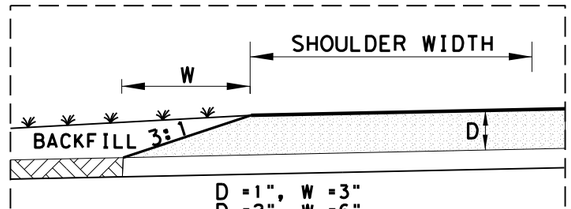
REVISIONS	CONT	SECT	JOB	HIGHWAY
03-01	0043	07	119	US 287
08-01 correct typos	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		59



① DEPTH >= largest aggregate in mix

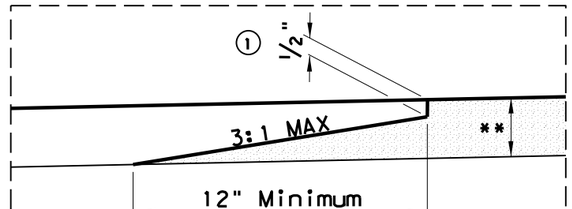


TAPERED PAVEMENT EDGE DETAIL"SAFETY EDGE" WHEN D IS > 2.0"

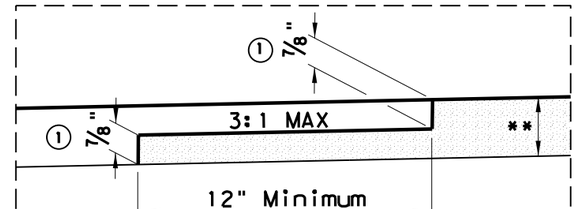


D =1", W =3"
D =2", W =6"

TAPERED PAVEMENT EDGE DETAIL"SAFETY EDGE" WHEN D IS 2.0" OR LESS



TAPERED JOINT DETAIL HMA LIFT THICKNESS LESS THAN 2"



TAPERED JOINT DETAIL HMA LIFT THICKNESS MORE THAN 2"

** SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.

NOTES:

LONGITUDINAL JOINTS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED SCREED ATTACHMENT WHICH WILL PRODUCE THE DESIRED SHAPE WITH THE MAIN SCREED. USE OF AN EXTERNAL STRIKE-OFF DEVICE TO MODIFY THE MAT SHAPE AFTER PASSING OF THE SCREED WILL NOT BE ALLOWED. TACK COAT SHALL BE APPLIED TO THE IN-PLACE TAPER BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED.

PAVEMENT EDGES SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL BE PLACED WITHIN THE NORMAL LANE WIDTH UNLESS OTHERWISE SHOWN ON THE PLANS. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED SCREED ATTACHMENT WHICH WILL PRODUCE THE DESIRED SHAPE WITH THE MAIN SCREED. USE OF AN EXTERNAL STRIKE-OFF DEVICE TO MODIFY THE MAT SHAPE AFTER PASSING OF THE SCREED WILL NOT BE ALLOWED. COMPACTION OF THE PAVEMENT EDGE TAPER WILL BE REQUIRED TO AS NEAR TO FINAL DENSITY AS POSSIBLE.

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED PROFESSIONAL ENGINEER

US 287 HOT MIX LONGITUDINAL JOINT DETAILS

Texas Department of Transportation

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		59A

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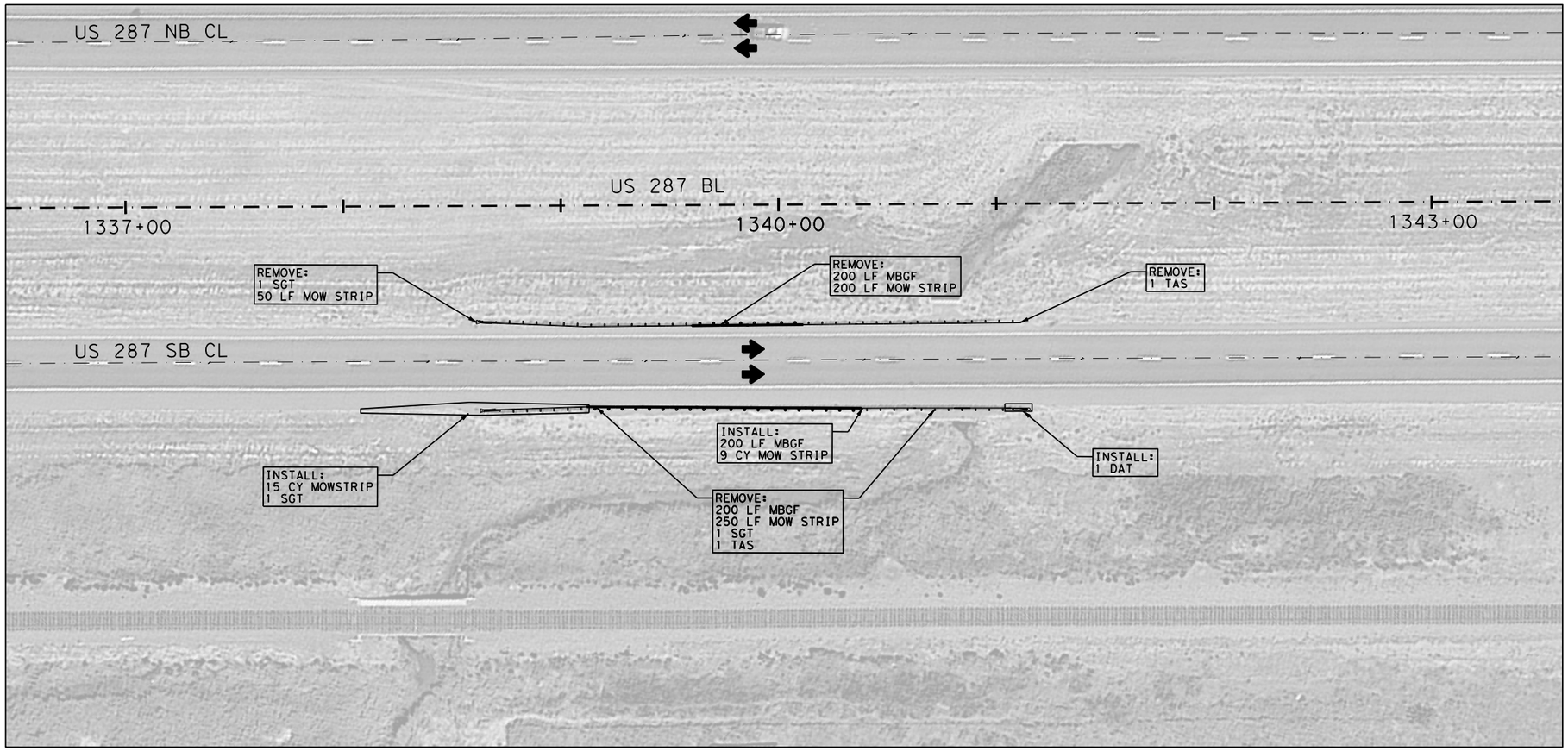

STATE OF TEXAS
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89218
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PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

STRUCTURE C-3
MBGF
LAYOUT

NOT TO SCALE

Texas Department of Transportation®

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		60

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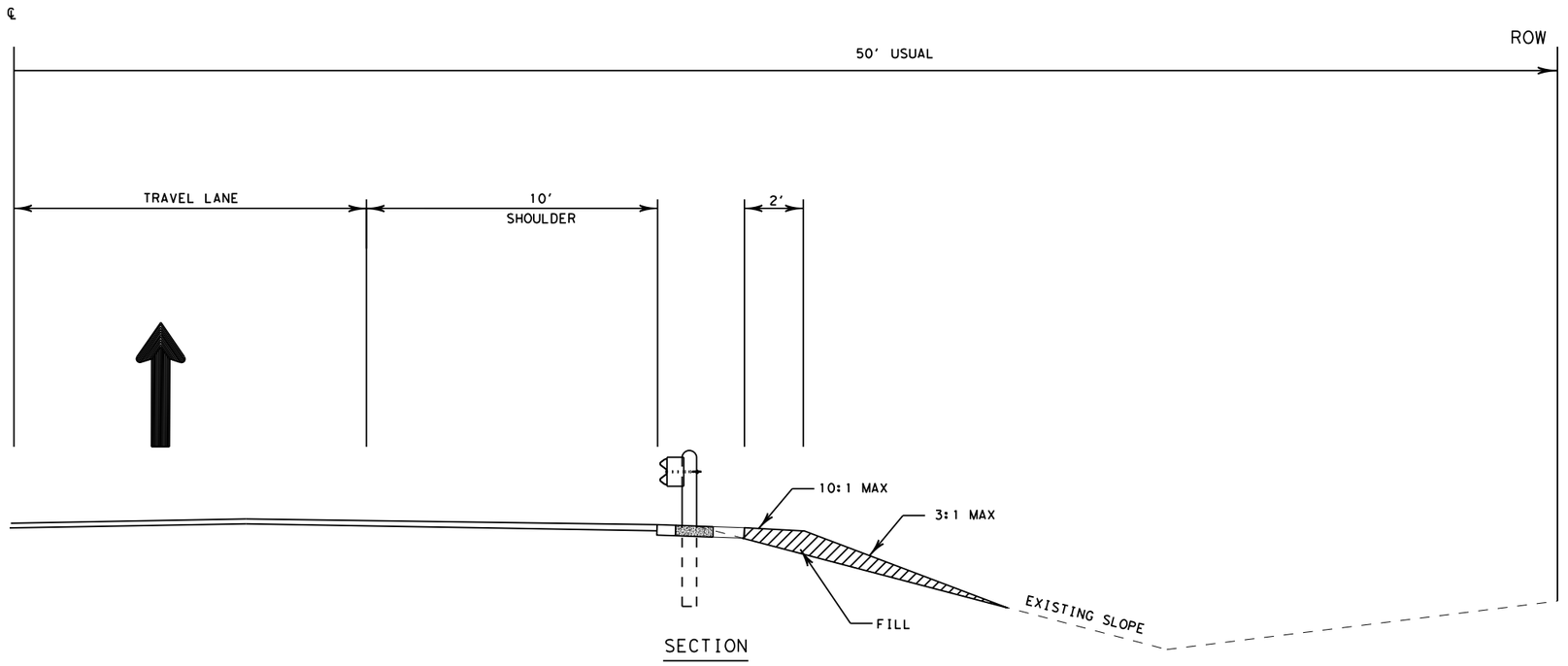
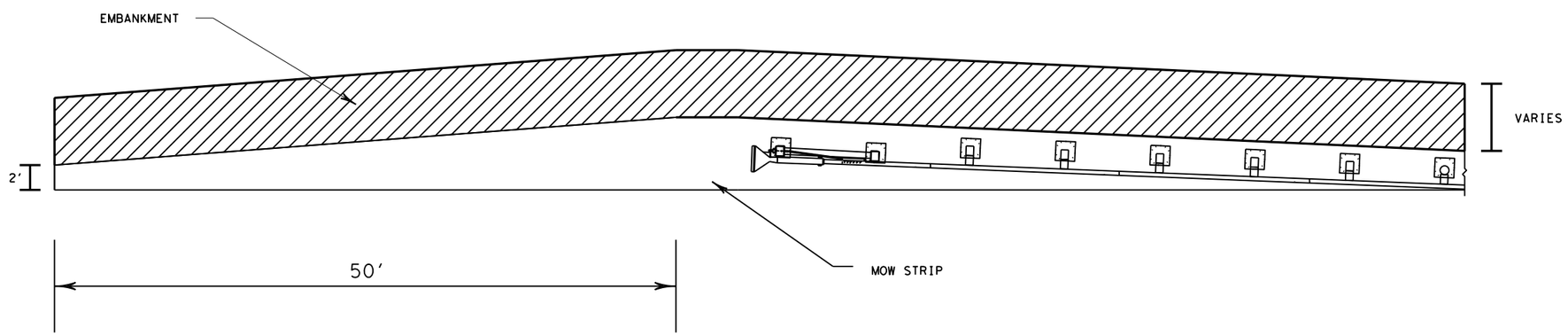


SECTION



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.

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04/30/2021

US 287
EMBANKMENT DETAIL

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SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		61

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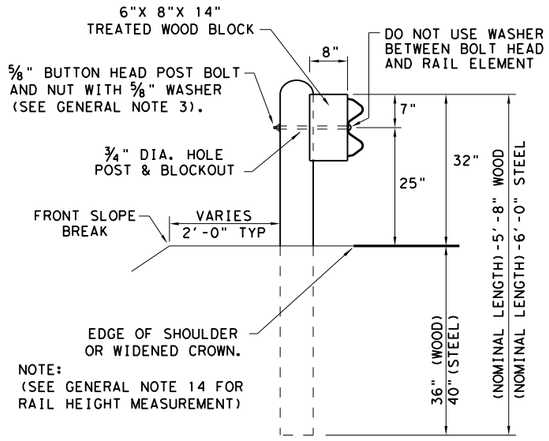
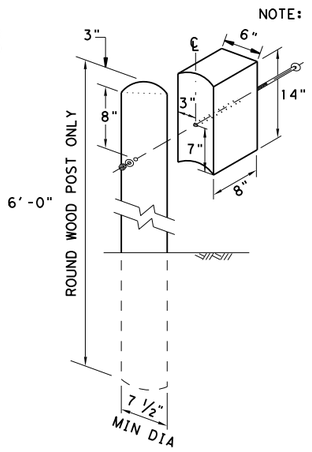
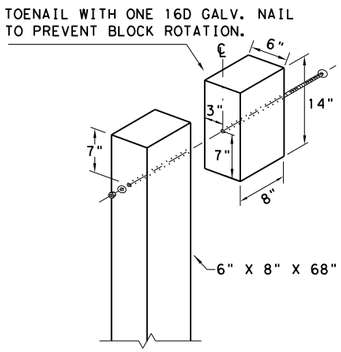


TYPICAL POST PLACEMENT

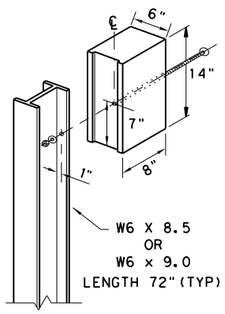


WOOD BLOCK TO ROUND WOOD POST

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

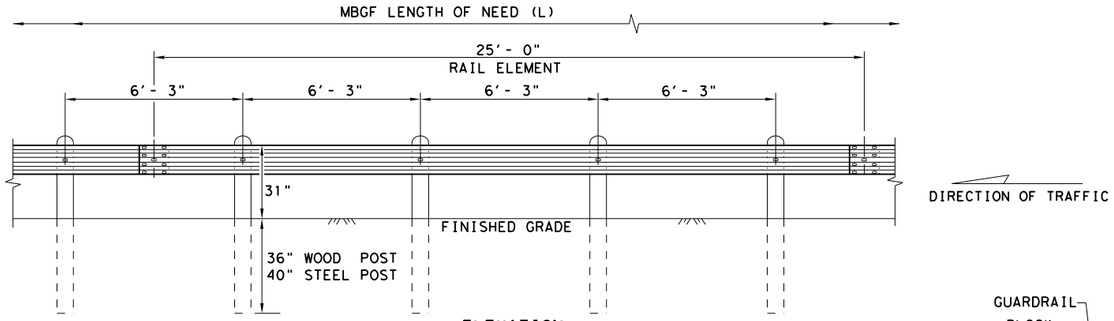


WOOD BLOCK TO RECTANGULAR WOOD POST



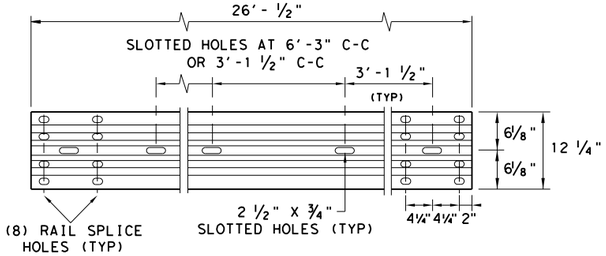
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



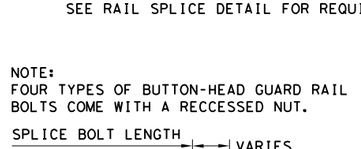
ELEVATION
MID-SPAN RAIL SPLICE

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



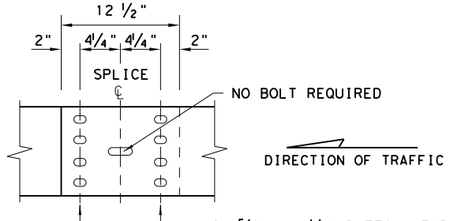
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



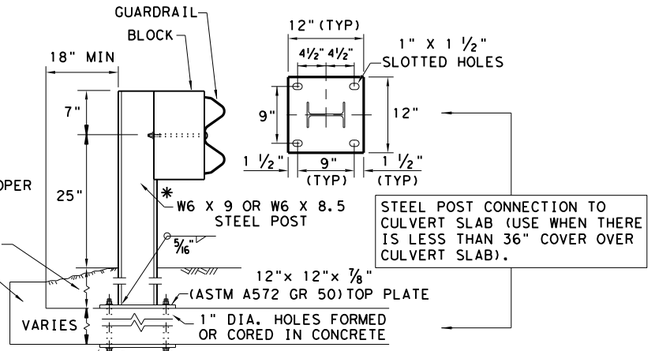
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



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

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

12" X 12" X ¼" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST

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

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

GENERAL NOTES

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

Texas Department of Transportation — Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		62

DATE: 4/30/2021
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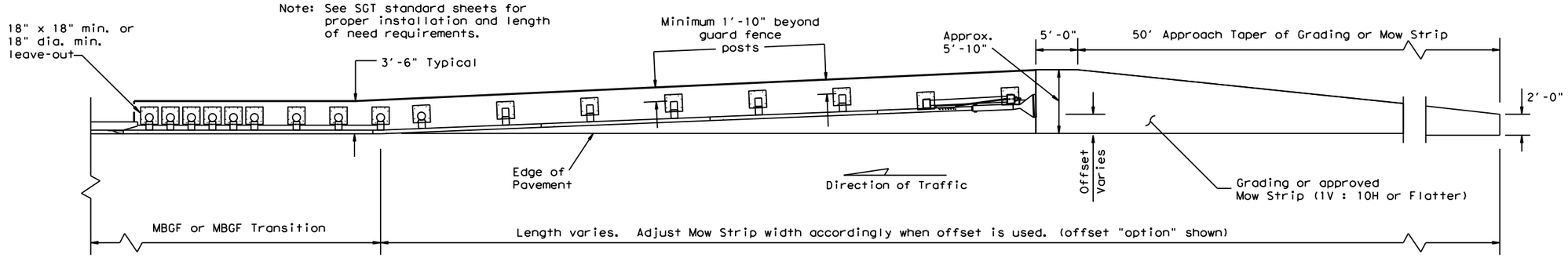
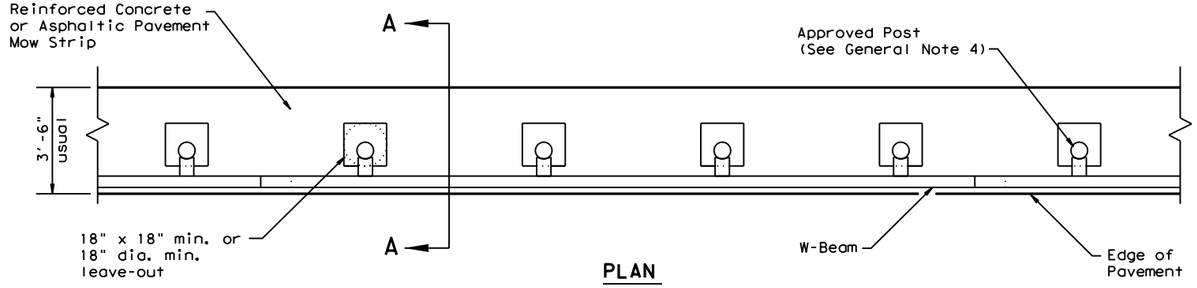
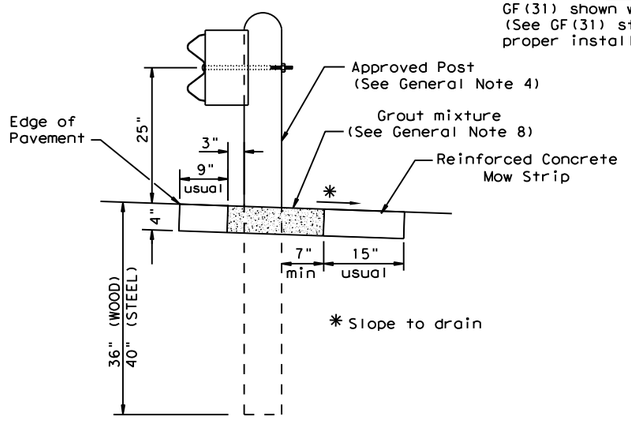


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



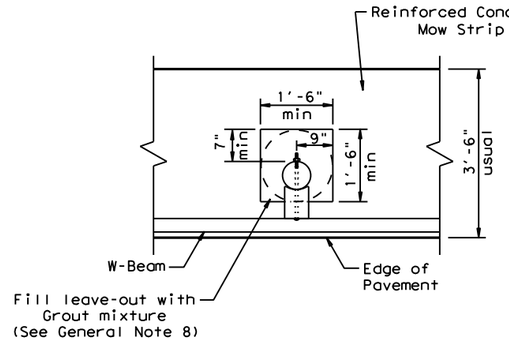
PLAN

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



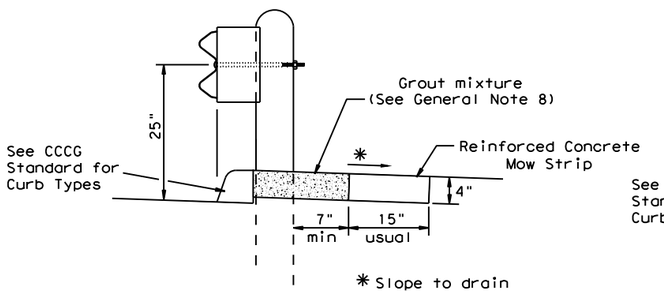
SECTION A-A

Typical



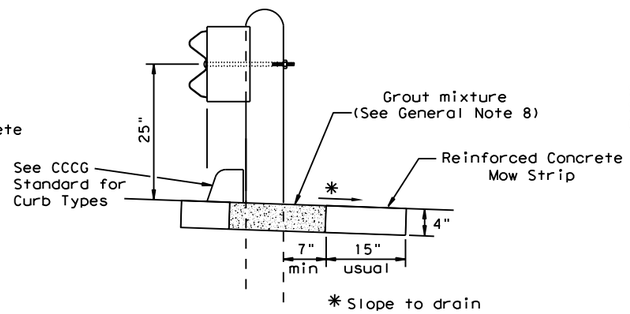
MOW STRIP DETAIL

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



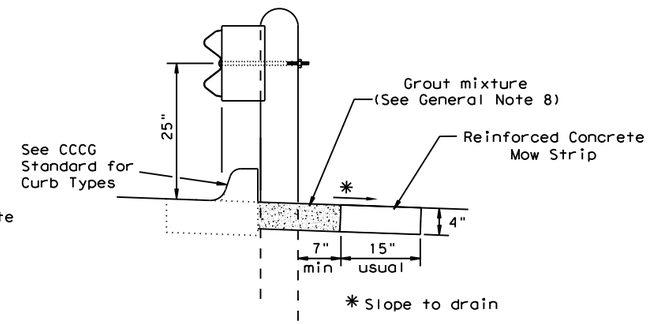
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation | Design Division Standard

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

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0043	07	119	US 287	
	DIST	COUNTY		SHEET NO.	
	WFS	WILBARGER		63	

DATE: 4/30/2021
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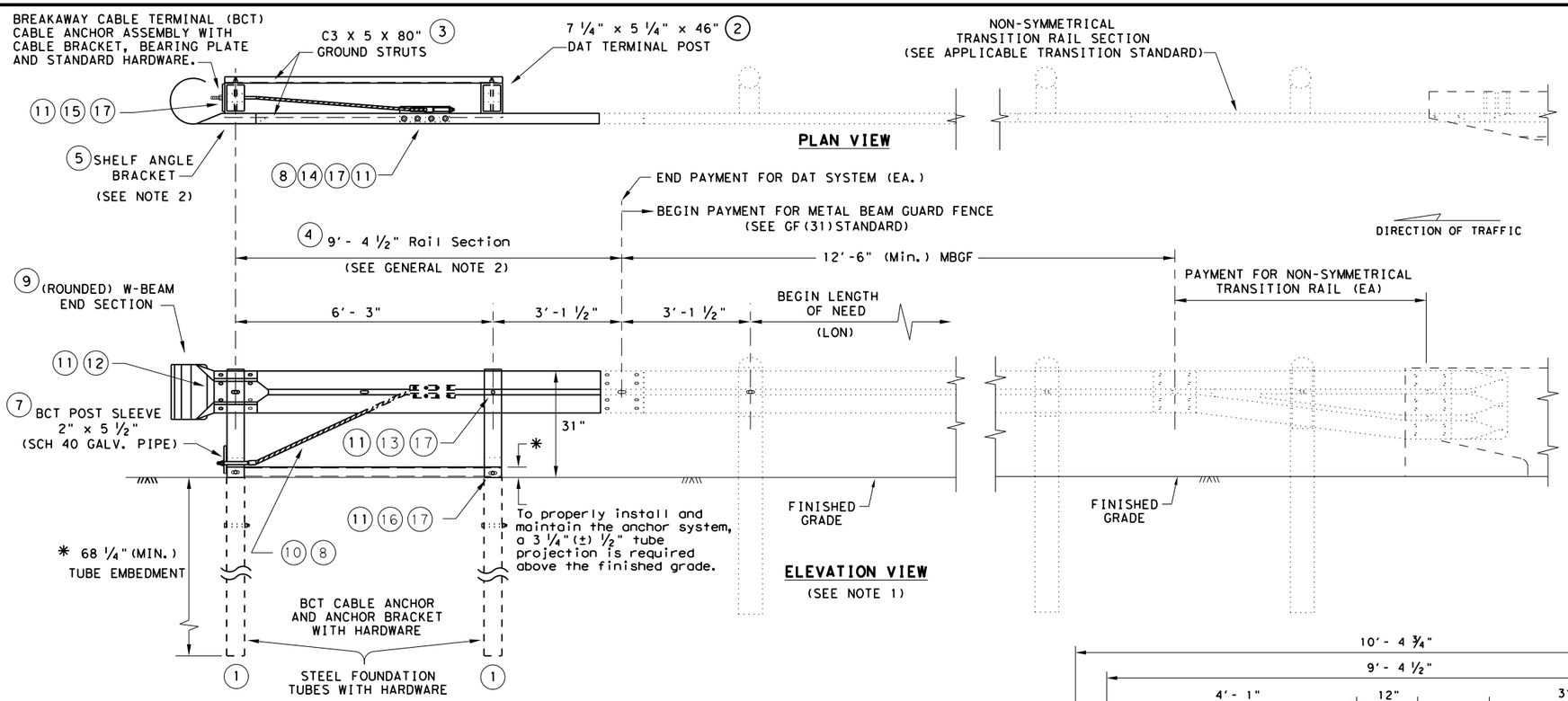


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

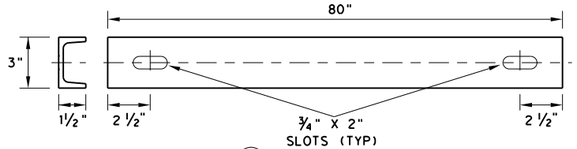
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

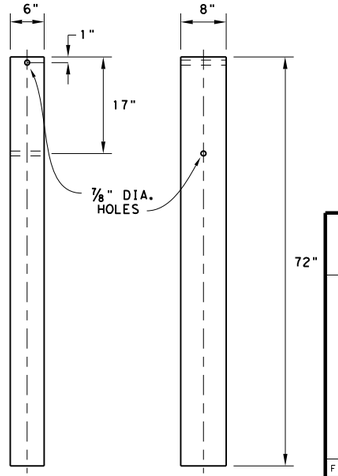
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

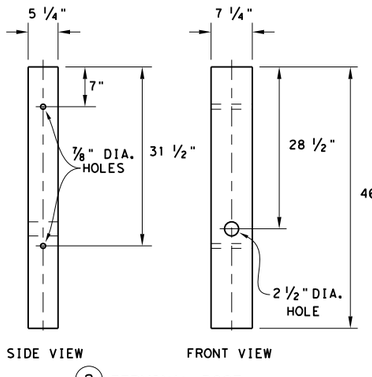
(4) TERMINAL RAIL ELEMENT FOR DAT



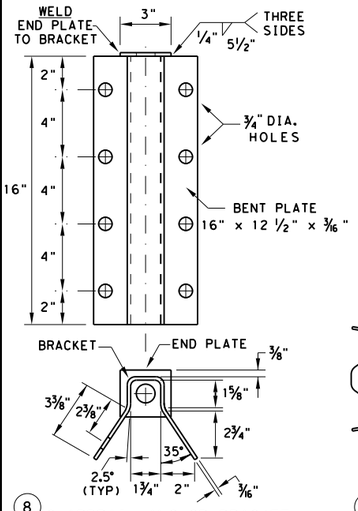
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



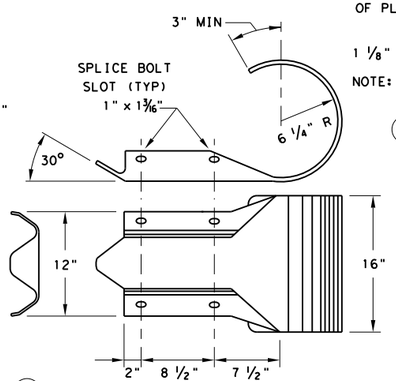
(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE



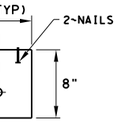
(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(8) GUARDRAIL ANCHOR BRACKET

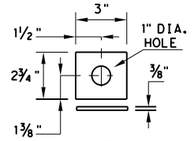


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

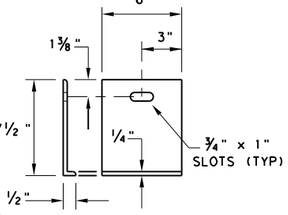


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

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



END PLATE



(5) SHELF ANGLE BRACKET

Texas Department of Transportation — Design Division Standard

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

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		64

DATE: 4/30/2021 8:40:46 AM
FILE: I:\WFSDESGN\Plans\WFS Standards\DGNs\Barrier\MBGF\SGT(10S)31-16.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

POST(1)

POST(0)

TRAFFIC FLOW

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

BEGIN LENGTH OF NEED

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)1½" X 6'-9 ⅝"

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

SoftStop FACE SEE GN(3) & NOTE: B

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: A

SEE NOTE: C

POST 32" HEIGHT

31"

RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

SEE DETAIL 3

ⅬⅥ" DIA. YIELDING HOLES

(8) ⅝"x 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

(8) ⅝"x 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3)

POST(2) 6'-0" (SYTP) PN: 15000G

POST(1) 4'-9 ½" SYTP PN: 15203G

POST(0) 6'-5 ⅜" PN: 15205A

6'-1⅜"

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

ⅬⅥ" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR. DH PN: 3245G

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'- 1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

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

TRAFFIC FLOW

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

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

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST HEIGHT 17"- ½"

4'- 9 ½"

ⅬⅥ" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

STANDARD MBGF

2'-0"

EDGE OF PAVEMENT

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

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

GENERAL NOTES

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

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

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR. DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR. DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR. DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		65

DATE: 4/30/2021
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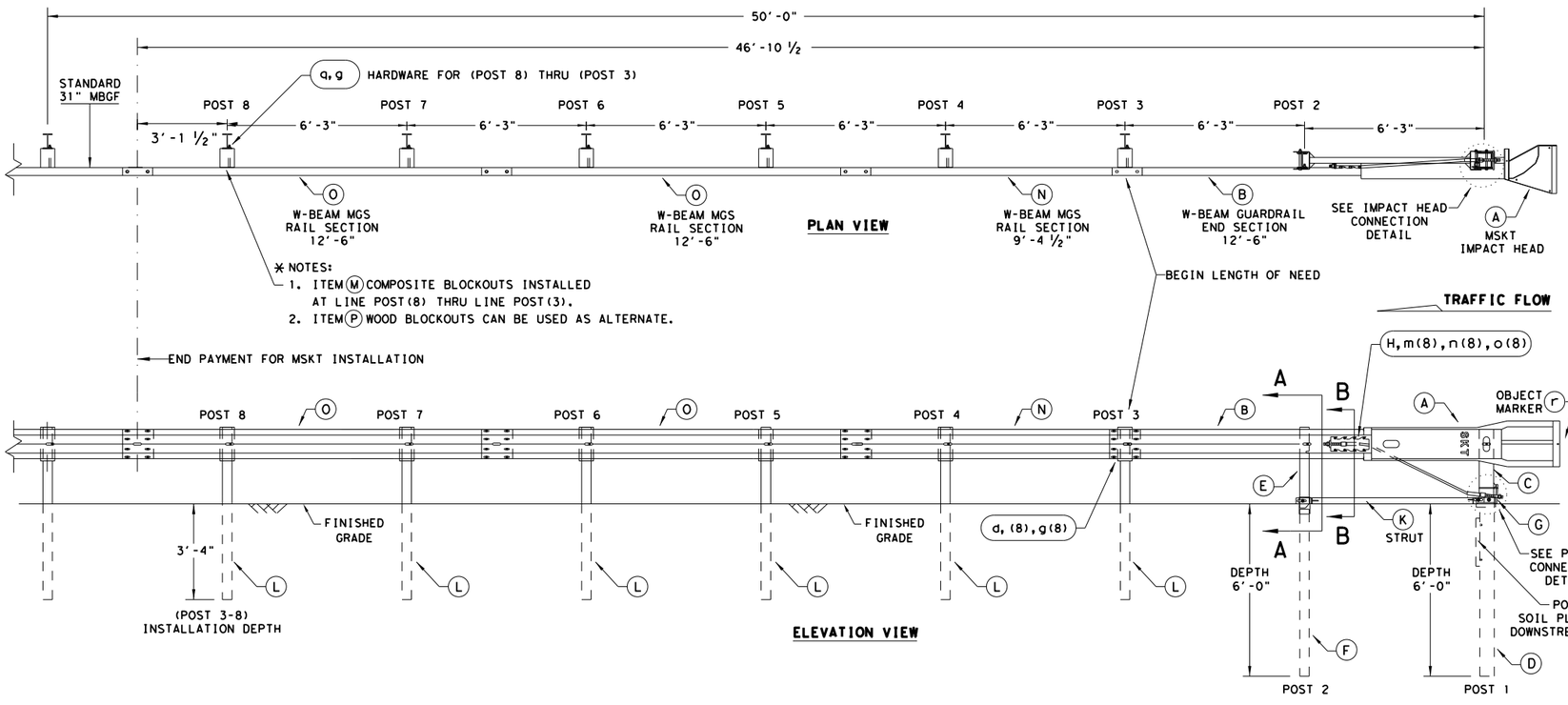
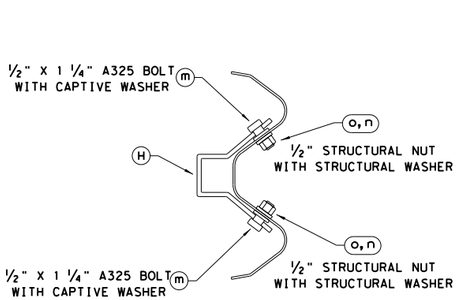
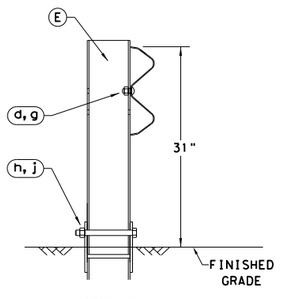


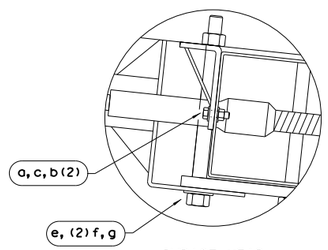
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



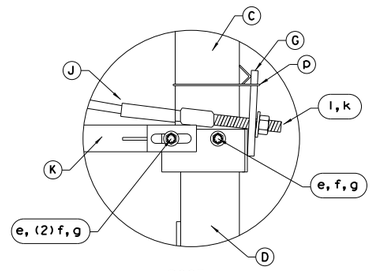
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

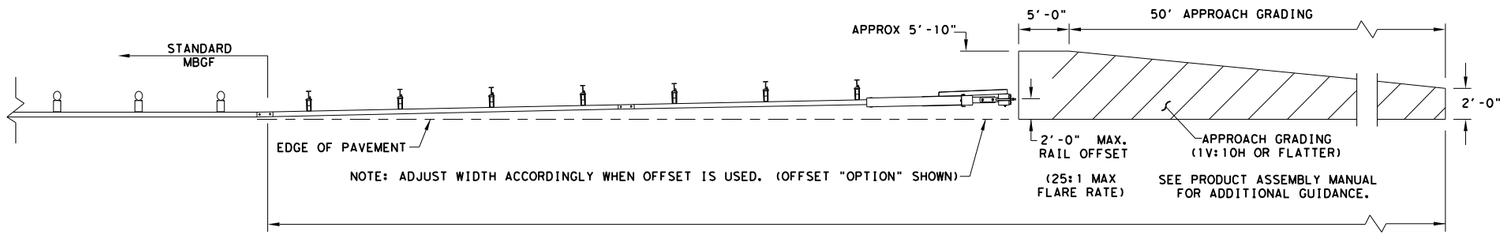
GENERAL NOTES

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: *

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



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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

Design Division Standard

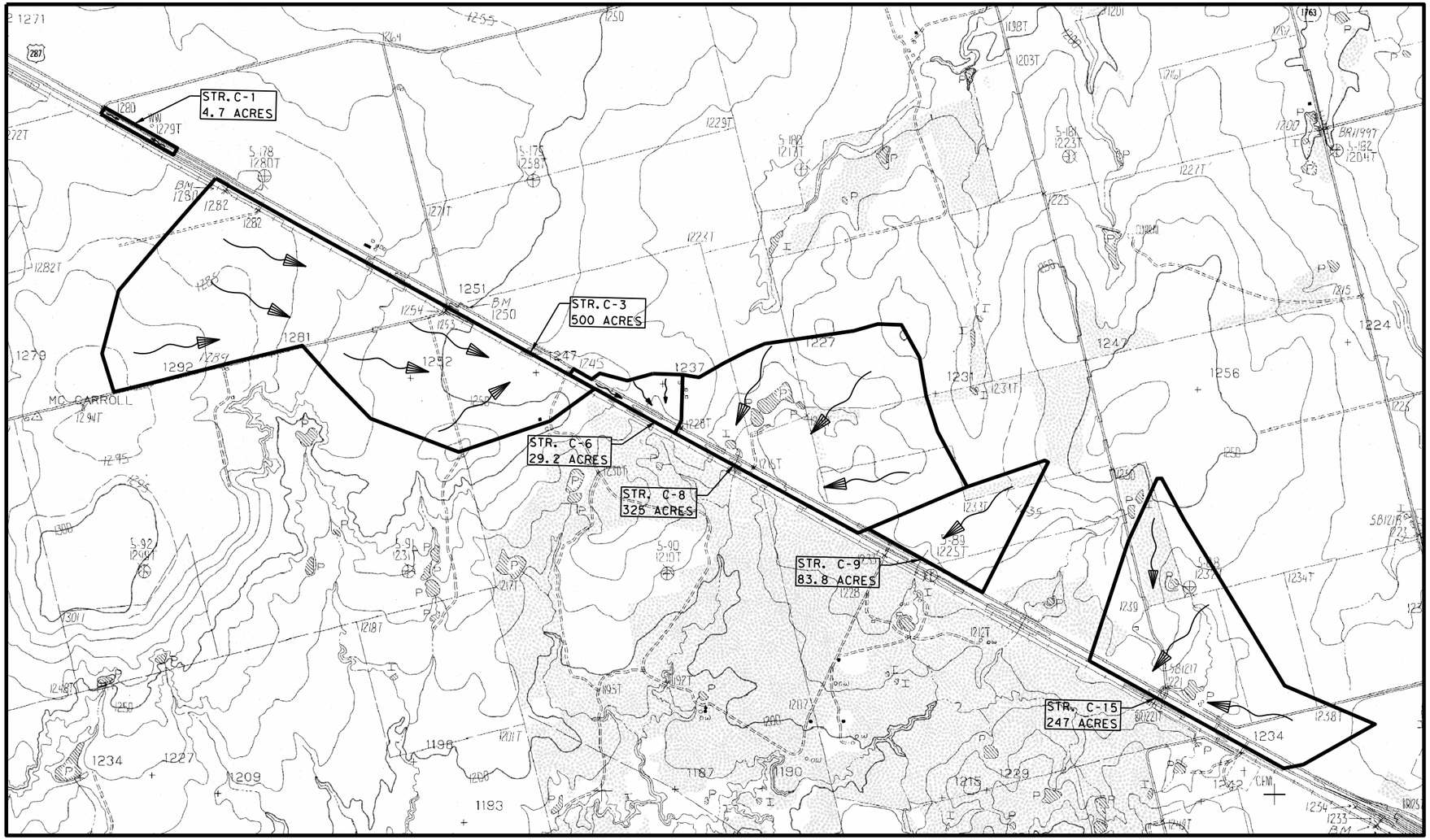
SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0043	07	119	US 287	
	DIST	COUNTY		SHEET NO.	
	WFS	WILBARGER		66	

LEGEND

STR. # ACRES — LOCATION # DRAINAGE AREA (ACRES)

FLOW DIRECTION



STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
DRAINAGE AREA MAP

0 0.25 0.50

SCALE IN MILES

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SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		67

DATE: 4/30/2021 8:40:55 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\5. Drainage\1 - DRAINAGE MAPS.dgn

HYDROLOGIC DATA - RATIONAL METHOD (DA < 200 ACRES)																	
ROADWAY: US 287 - 0043-07-119					2 YR		5 YR		10 YR		25 YR		50 YR		100 YR		REMARKS
STR	DESIGN FREQ	AREA acres	C	tc min.	I in / hr	Q cfs	I in / hr	Q cfs	I in / hr	Q cfs	I in / hr	Q cfs	I in / hr	Q cfs	I in / hr	Q cfs	OVERTOPPING FREQUENCY (year)
C-1	25	4.7	0.32	56	1.49	2	1.99	3	2.38	4	2.92	4	3.34	5	3.80	6	NO OVERTOPPING OCCURS
C-6	25	29.2	0.34	37	1.96	19	2.61	26	3.12	31	3.81	38	4.35	43	4.93	49	NO OVERTOPPING OCCURS
C-9	25	83.8	0.34	70	1.28	36	1.71	49	2.04	58	2.51	72	2.88	82	3.27	93	NO OVERTOPPING OCCURS

HYDROLOGIC DATA - NRCS/HYDROGRAPH METHOD (HEC-HMS 4.3) (DA > 200 ACRES)																	
ROADWAY: US 287 - CSJ: 0043-07-119						2 Year (50%)		5 Year (20%)		10 Year (10%)		25 Year (4%)		50 Year (2%)		100 Year (1%)	REMARKS
STRUCTURE	DESIGN FREQ	AREA (SQ MI)	AREA (ACRES)	Tc (MIN)	SOIL CURVE NO.	RAINFALL (INCHES)	Q (CFS)	RAINFALL (INCHES)	Q (CFS)	RAINFALL (INCHES)	Q (CFS)	RAINFALL (INCHES)	Q (CFS)	RAINFALL (INCHES)	Q (CFS)	RAINFALL (INCHES)	Q (CFS)	OVERTOPPING FREQUENCY (year)
C-3	25	0.78	500	100	72	3.31	152	4.18	254	4.94	351	6.04	501	6.93	628	7.88	767	OVERTOPPING AT 50 YEAR FLOOD
C-8	25	0.51	325	65	73	3.31	141	4.18	233	4.94	320	6.04	454	6.93	567	7.88	690	OVERTOPPING AT 50 YEAR FLOOD
C-15	25	0.39	247	61	73	3.31	114	4.18	187	4.94	256	6.04	362	6.93	451	7.88	548	OVERTOPPING AT 50 YEAR FLOOD

HYDRAULIC DATA (HY-8) (FHWA'S VERSION 7.60)																				
ROADWAY: US 287 - CSJ: 0043-07-119																				
STRUCTURE		DESCRIPTION	ALLOWABLE ELEVATION	LENGTH	CULV		D.S. CHANNEL		DESIGN FREQ YEAR (SEE HYDROLOGIC DATA FOR DESIGN YEAR ANALYZED)						FREQ YEAR = 100					
					SLOPE	MANNING	SLOPE	MANNING	Q	HEADWATER ELEVATION	TAILWATER DEPTH	NORMAL DEPTH	VELOCITY		Q	HEADWATER ELEVATION	TAILWATER DEPTH	NORMAL DEPTH	VELOCITY	
													TAILWATER	OUTLET					TAILWATER	OUTLET
				(FT)	(%)	"n"	(%)	"n"	(CFS)	(FT)	(FT)	(FT)	(FT/S)	(FT/S)	(CFS)	(FT)	(FT)	(FT)	(FT/S)	(FT/S)
C-1	EXIST	1 ~ 18" RCP	1282	84.00	0.830	0.012	0.010	0.030	4	1279.26	0.49	0.64	2.37	2.64	6	1279.59	0.60	0.81	2.65	3.68
	PROP	1 ~ 18" RCP		84.00	0.830	0.012				1279.26	0.49	0.64	2.37	2.64		1279.59	0.60	0.81	2.65	3.68
C-3	EXIST	2 ~ 6' X 6' MBC	1243.2	55.00	0.200	0.012	0.003	0.030	501	1242.97	5.32	5.15	5.24	6.96	767	1243.82	6.30	4.92	5.83	6.58
	PROP	2 ~ 6' X 6' MBC		70.00	0.200	0.012				1243.00	5.32	4.22	5.24	6.96		1243.82	6.30	4.02	5.83	6.52
C-6	EXIST	1 ~ 3' X 3' MBC	1225.06	54.00	2.100	0.012	0.027	0.030	38	1222.66	1.13	0.99	6.22	11.19	49	1223.25	1.27	1.19	6.63	11.87
	PROP	1 ~ 3' X 3' MBC		70.00	2.100	0.012				1222.99	1.13	1.00	6.22	11.53		1223.58	1.27	1.19	6.63	12.21
C-8	EXIST	1 ~ 6' X 4' MBC	1212.75	54.00	1.300	0.012	0.019	0.030	454	1211.76	3.53	1.96	10.21	13.29	690	1213.11	4.18	2.27	11.33	13.99
	PROP	1 ~ 6' X 4' MBC		70.00	1.300	0.012				1211.97	3.53	1.96	10.21	13.66		1213.14	4.18	2.19	11.33	14.29
C-9	EXIST	2 ~ 36" RCP	1227.49	84.00	0.700	0.012	0.020	0.030	72	1224.85	1.70	1.65	6.54	8.83	93	1225.54	1.80	1.95	6.98	9.41
	PROP	2 ~ 36" RCP		84.00	0.700	0.012				1224.85	1.70	1.65	6.54	8.83		1225.54	1.80	1.95	6.98	9.41
C-15	EXIST	1 ~ 6' X 3' MBC	1219.69	55.00	1.300	0.012	0.010	0.030	362	1218.94	3.67	2.13	7.58	8.01	548	1220.04	4.34	2.12	8.41	8.81
	PROP	1 ~ 6' X 3' MBC		73.00	1.300	0.012				1219.15	3.67	1.92	7.58	8.01		1220.05	4.34	2.09	8.41	8.63

HYDROLOGIC DATA - OMEGA EM REGRESSION EQUATIONS (DA > 200 ACRES)													
ROADWAY: US 287 - CSJ: 0043-07-119													
STRUCTURE	DESIGN FREQ YEAR	DRAINAGE AREA (A) (SQ MI)	ANNUAL PRECIPITATION (P) (INCHES)	CHANNEL LENGTH (L) (FT)	CHANNEL SLOPE (S) (FT/FT)	OMEGA EM (*)	2 YR Q (CFS)	5 YR Q (CFS)	10 YR Q (CFS)	25 YR Q (CFS)	50 YR Q (CFS)	100 YR Q (CFS)	OVERTOPPING FREQUENCY
C-3	25	0.78	28	7506	0.007	-0.027	107	193	258	349	422	507	INFORMATIONAL PURPOSES ONLY
C-8	25	0.51	28	3771	0.005	-0.027	73	123	160	208	246	288	INFORMATIONAL PURPOSES ONLY
C-15	25	0.39	28	3411	0.007	-0.027	68	115	150	196	231	272	INFORMATIONAL PURPOSES ONLY

NRCS METHOD:

1. LAG TIME = 0.4 X TIME OF CONCENTRATION (Tc) FOR DEVELOPED AREAS. LAG TIME = 0.6 X TIME OF CONCENTRATION (Tc) FOR TRADITIONAL LAG TIME. LAG TIME = 0.7 X TIME OF CONCENTRATION (Tc) FOR UNDEVELOPED AREAS.
2. COMPOSITE CURVE NUMBERS WERE CALCULATED USING NRCS CN LOSS MODEL AND ACCOUNTED FOR DIFFERING LAND USE AND HYDROLOGIC SOIL GROUPS FOUND WITHIN THE RESPECTIVE WATERSHED BY USING THE WEB SOIL SURVEY.
3. STORMS WERE MODELED AS 24-HOUR DURATION EVENTS USING SCS TYPE II TEMPORAL DISTRIBUTION WITH NO AREAL REDUCTION FACTOR.

RATIONAL METHOD:

1. RAINFALL INTENSITIES WERE CALCULATED USING THE TXDOT EBDLKUP-2019.XLSM SPREADSHEET TOOL "RAINFALL INTENSITY-DURATION FREQUENCY COEFFICIENTS FOR TEXAS, WHICH IS BASED ON NOAA ATLAS 14 PRECIPITATION FREQUENCY ATLAS OF THE UNITED STATES, VOLUME 11, VERSION 2.0: TEXAS (PERICA ET AL. 2018). METHODOLOGY: ANNUAL MAXIMUM SERIES (AMS).

GENERAL NOTES:

1. THERE HAS BEEN NO HISTORY OF ANY FLOODING OR OVERTOPPING OF THE ROADWAY FOR ALL STRUCTURES LISTED PER AREA ENGINEER CALLAN COLTHARP AND MAINTENANCE SUPERVISORS BRIAN MOORE.
2. THESE CALCULATIONS WERE PERFORMED TO VERIFY THAT THE MODIFICATIONS DO NOT SIGNIFICANTLY IMPACT HYDRAULIC PERFORMANCE.
3. RESULTS ARE BASED ON UNOBSTRUCTED FLOW.

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HYDRAULIC DATA

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CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		68

DATE: 4/30/2021 8:41:08 AM
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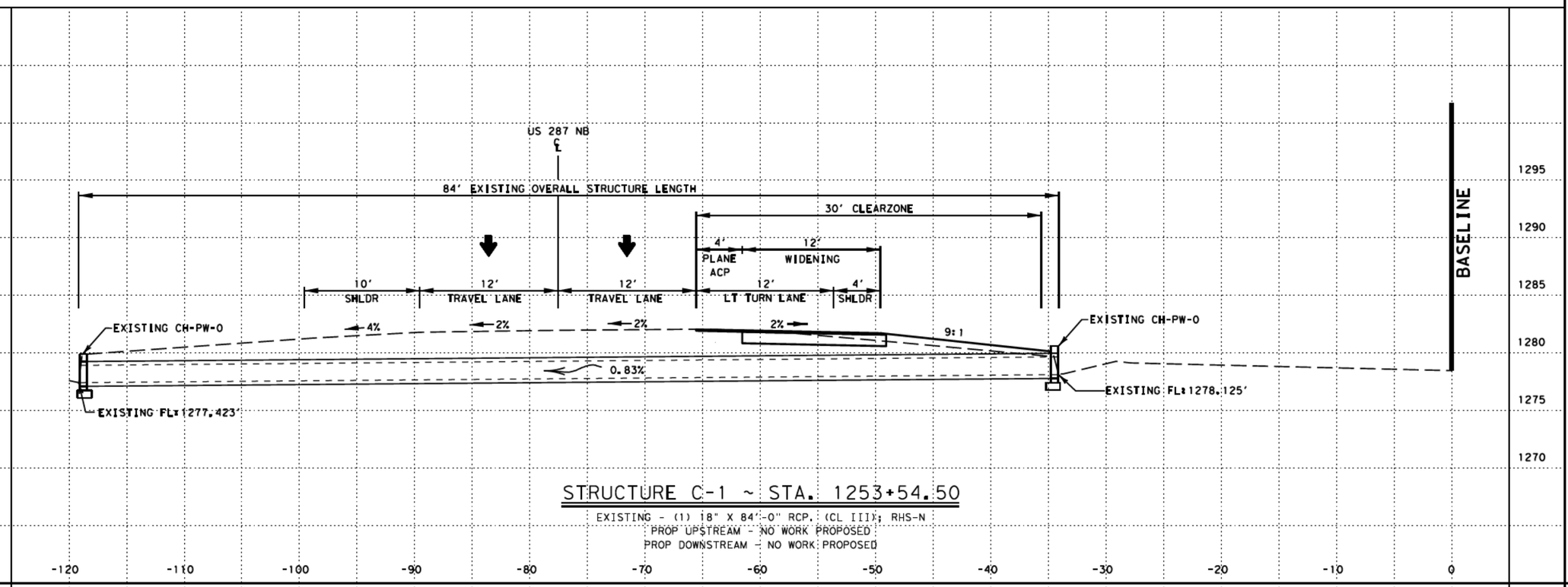
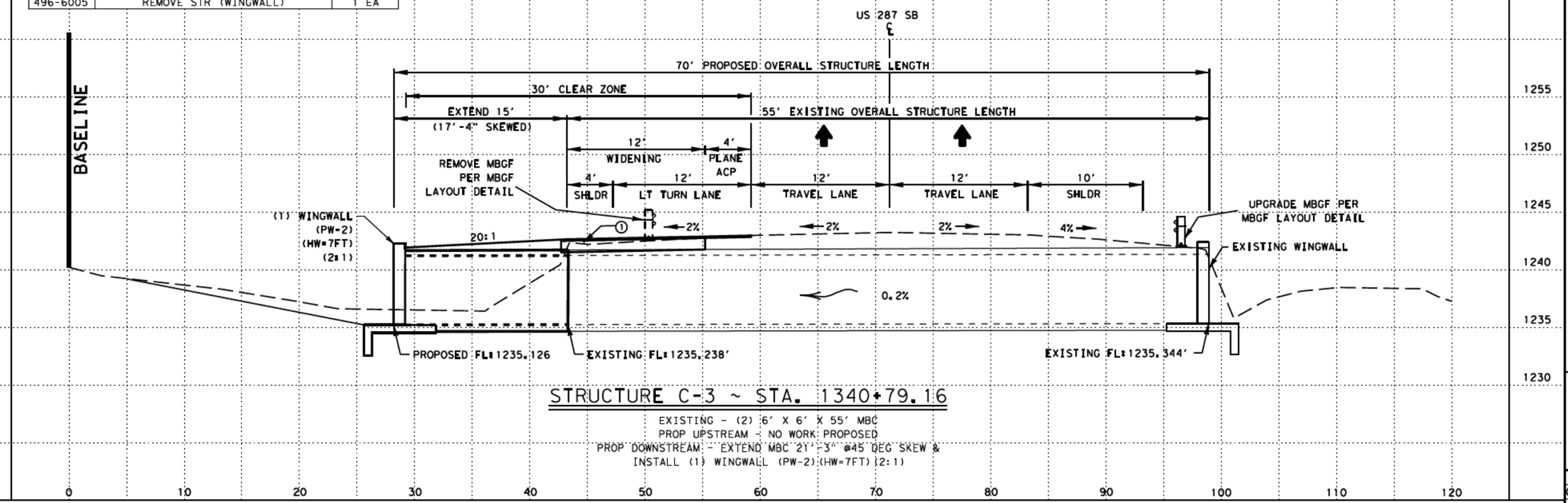


STRUCTURE C-1 ~ STA. 1253+54.50

EXISTING - (1) 18" X 84'-0" RCP. (CL IIIX; RHS-N
PROP UPSTREAM - NO WORK PROPOSED
PROP DOWNSTREAM - NO WORK PROPOSED

ITEM	DESCRIPTION	QUANTITY
462-6057	CONC BOX CULV (6FT X 6FT)(EXTEND)	43 LF
466-6196	WINGWALL(PW-2)(HW=7FT)	1 EA
496-6005	REMOVE STR (WINGWALL)	1 EA



STRUCTURE C-3 ~ STA. 1340+79.16

EXISTING - (2) 6' X 6' X 55' MBC
PROP UPSTREAM - NO WORK PROPOSED
PROP DOWNSTREAM - EXTEND MBC 21'-3" @45 DEG SKEW &
INSTALL (1) WINGWALL (PW-2)(HW=7FT)(2:1)

General Notes:

1. PLACE D-GR TYPE B MIXTURE (ITEM 3076) AT FULL DEPTH TO THE TOP OF THE CULVERT BOX

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SCALE IN FEET

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0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		69

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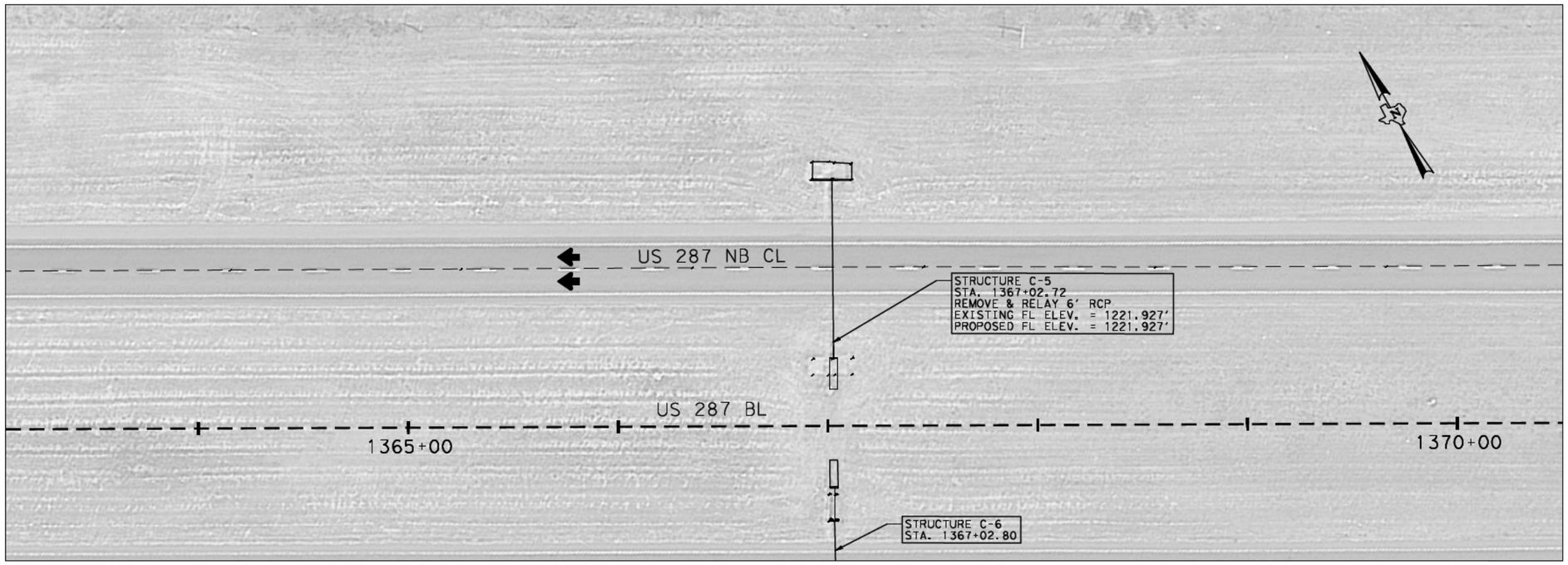
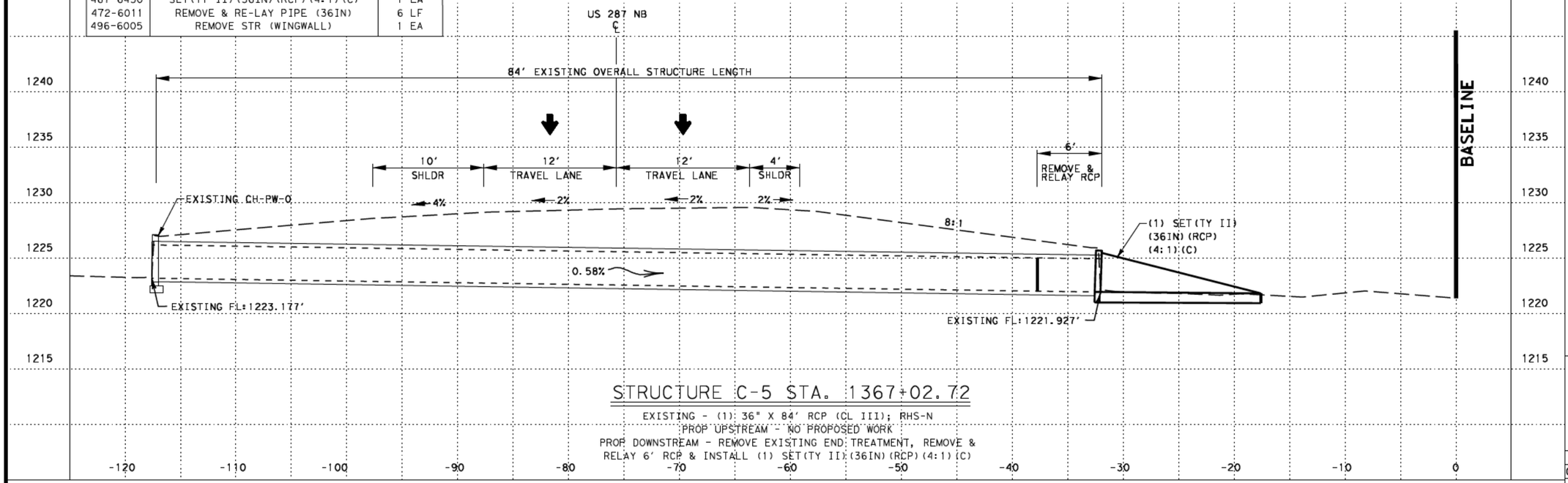


NOT TO SCALE

ITEM	DESCRIPTION	QUANTITY
104-6009	REMOVING CONC (RIPRAP)	16 SY
420-6009	CL A CONC (COLLAR)	1 EA
467-6450	SET(TY II)(36IN)(RCP)(4:1)(C)	1 EA
472-6011	REMOVE & RE-LAY PIPE (36IN)	6 LF
496-6005	REMOVE STR (WINGWALL)	1 EA



STRUCTURE C-5 STA. 1367+02.72

EXISTING - (1) 36" X 84' RCP (CL III); RHS-N
PROP UPSTREAM - NO PROPOSED WORK
PROP DOWNSTREAM - REMOVE EXISTING END TREATMENT, REMOVE & RELAY 6' RCP & INSTALL (1) SET(TY II)(36IN)(RCP)(4:1)(C)

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CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		70

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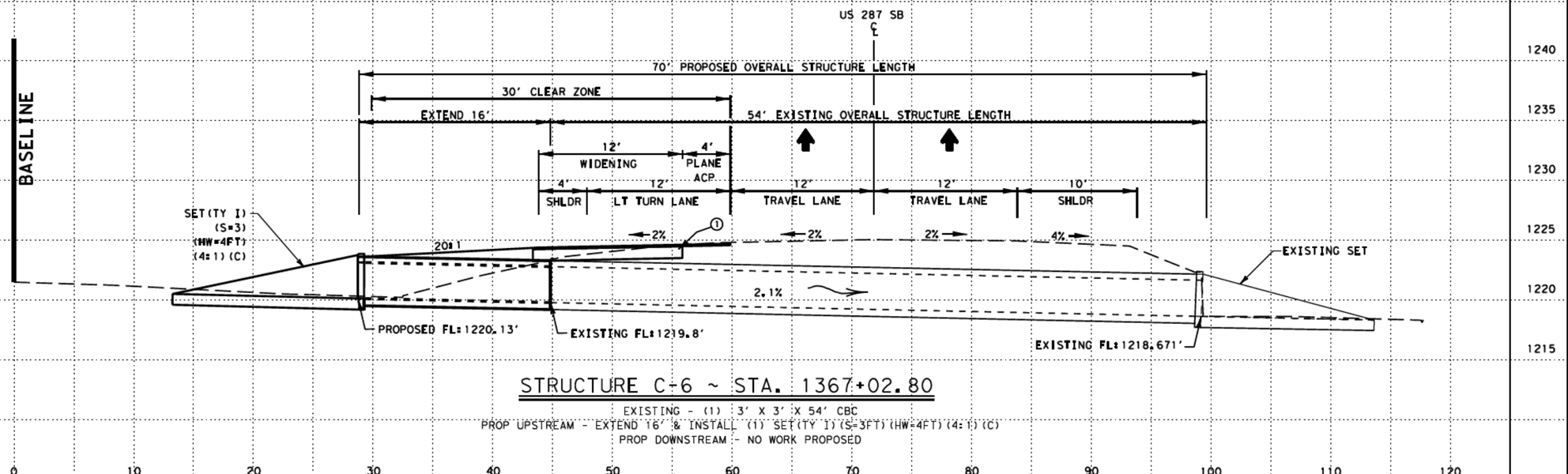
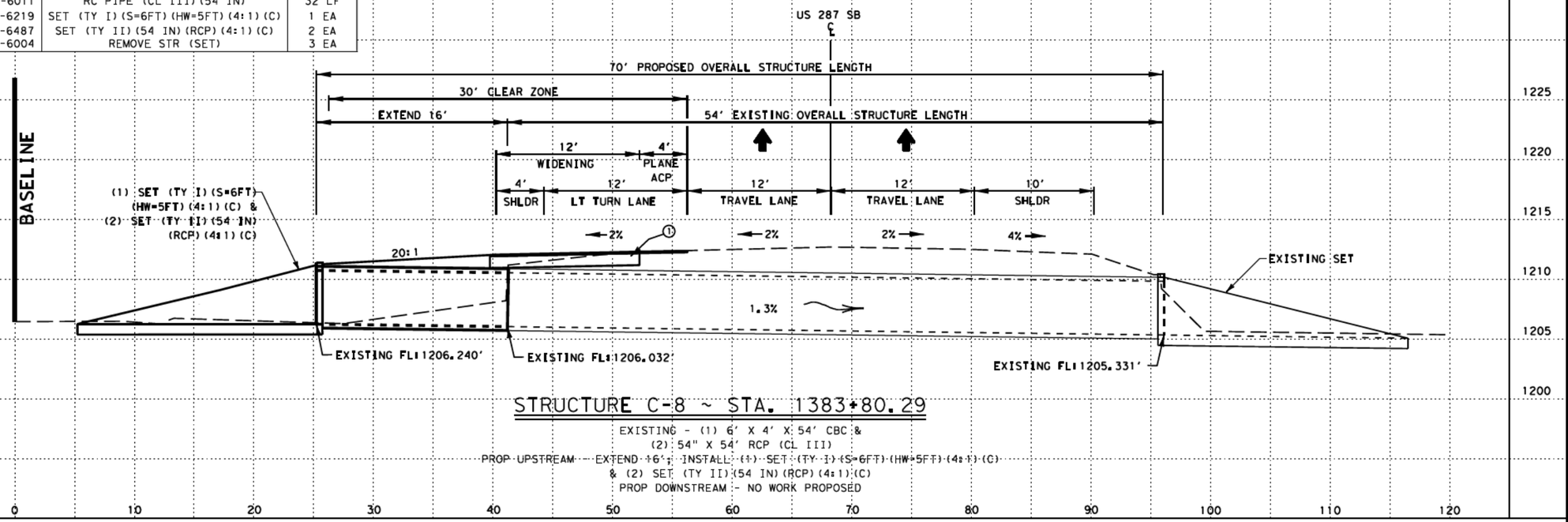
ITEM	DESCRIPTION	QUANTITY
462-6046	CONC BOX CULV (3FT X 3FT) (EXTEND)	16 LF
467-6112	SET (TY I) (S=3) (HW=4FT) (4:1) (C)	1 EA
496-6004	REMOVE STR (SET)	1 EA



STRUCTURE C-6 ~ STA. 1367+02.80

EXISTING - (1) 3' X 3' X 54' CBC
PROP UPSTREAM - EXTEND 16' & INSTALL (1) SET (TY I) (S=3FT) (HW=4FT) (4:1) (C)
PROP DOWNSTREAM - NO WORK PROPOSED

ITEM	DESCRIPTION	QUANTITY
420-6009	CL A CONC (COLLAR)	2 EA
462-6055	CONC BOX CULV (6FT X 4FT) (EXTEND)	16 LF
464-6011	RC PIPE (CL III) (54 IN)	32 LF
467-6219	SET (TY I) (S=6FT) (HW=5FT) (4:1) (C)	1 EA
467-6487	SET (TY II) (54 IN) (RCP) (4:1) (C)	2 EA
496-6004	REMOVE STR (SET)	3 EA



STRUCTURE C-8 ~ STA. 1383+80.29

EXISTING - (1) 6' X 4' X 54' CBC &
(2) 54" X 54' RCP (CL III)
PROP UPSTREAM - EXTEND 16'; INSTALL (1) SET (TY I) (S=6FT) (HW=5FT) (4:1) (C)
& (2) SET (TY II) (54 IN) (RCP) (4:1) (C)
PROP DOWNSTREAM - NO WORK PROPOSED

General Notes:

1. PLACE D-GR TYPE B MIXTURE (ITEM 3076) AT FULL DEPTH TO THE TOP OF THE CULVERT BOX

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CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		71

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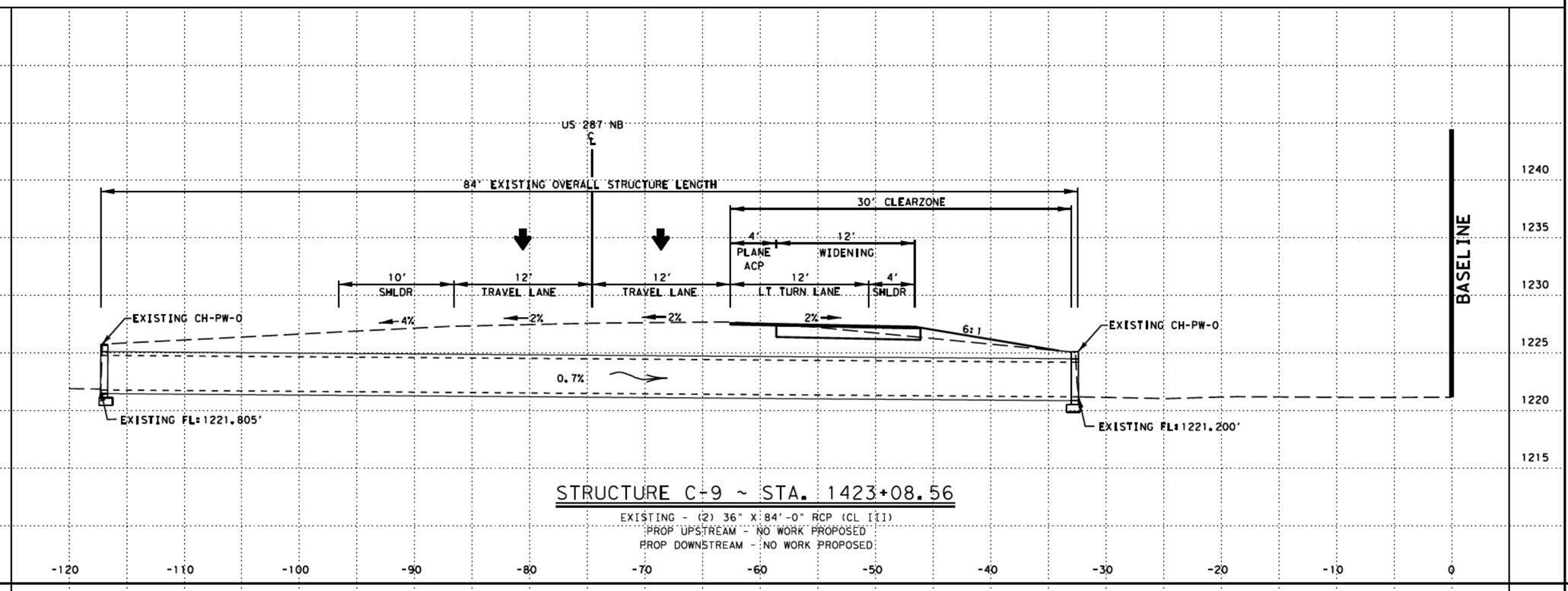
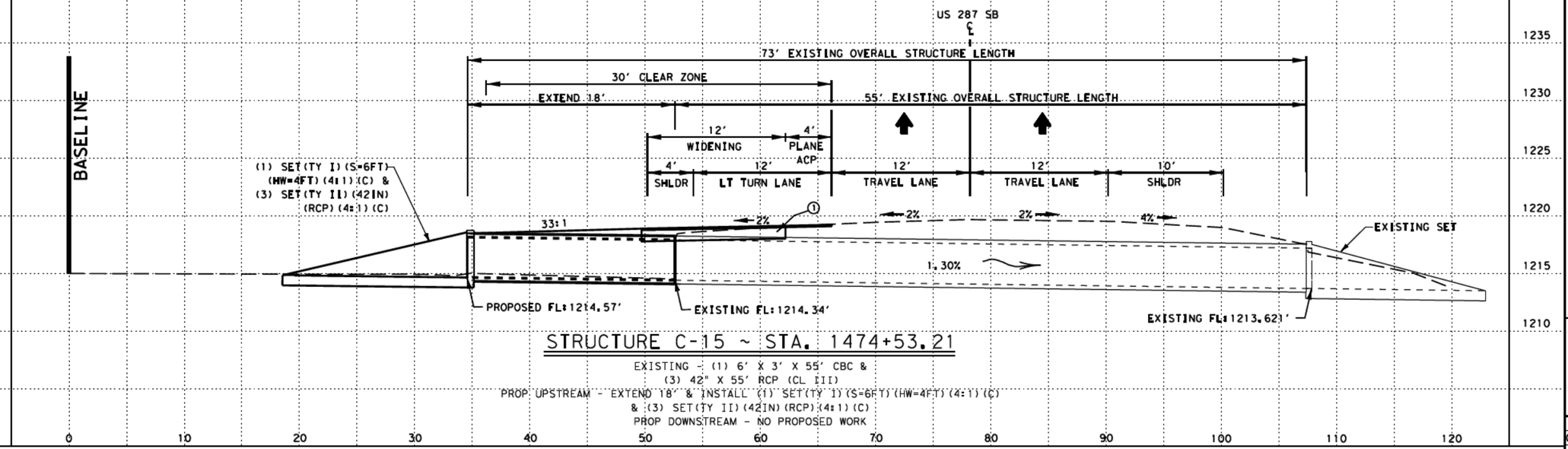


STRUCTURE C-9 ~ STA. 1423+08.56

EXISTING - (2) 36" X 84'-0" RCP (CL III)
PROP UPSTREAM - NO WORK PROPOSED
PROP DOWNSTREAM - NO WORK PROPOSED

ITEM	DESCRIPTION	QUANTITY
420-6009	CL A CONC (COLLAR)	3 EA
462-6054	CONC BOX CULV (6FT X 3FT)(EXTEND)	18 LF
464-6009	RC PIPE (CL III)(42 IN)	54 LF
467-6212	SET(TY I)(S=6)(HW=4FT)(4:1)(C)	1 EA
467-6463	SET (TY II)(42 IN)(4:1)(C)	3 EA
496-6004	REMOVE STR (SET)	4 EA



STRUCTURE C-15 ~ STA. 1474+53.21

EXISTING - (1) 6' X 3' X 55' CBC &
(3) 42" X 55' RCP (CL III)
PROP UPSTREAM - EXTEND 18' & INSTALL (1) SET(TY I)(S=6FT)(HW=4FT)(4:1)(C)
& (3) SET(TY II)(42IN)(RCP)(4:1)(C)
PROP DOWNSTREAM - NO PROPOSED WORK

General Notes:

① PLACE D-GR TYPE B MIXTURE (ITEM 3076) AT FULL DEPTH TO THE TOP OF THE CULVERT BOX

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SCALE IN FEET

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0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		72

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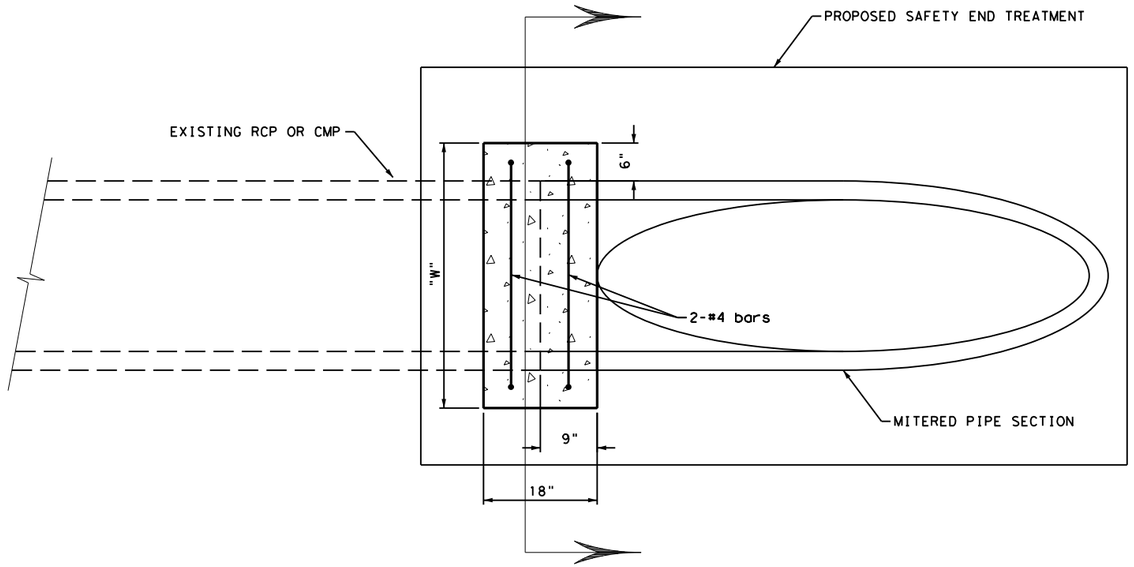
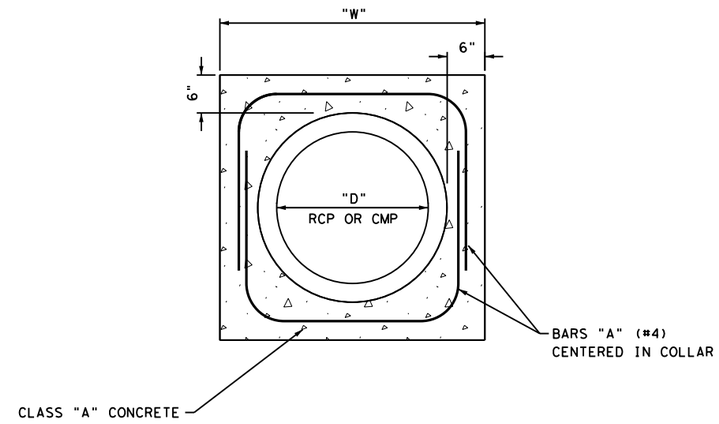


PLAN VIEW



SECTION A-A

CONCRETE COLLAR DETAIL

NOTES:

1. USE CONCRETE COLLARS ON ANY OR ALL JOINTS AND CONNECTIONS AS DEEMED NECESSARY BY THE ENGINEER IN ORDER TO ENSURE A PROPER WATER TIGHT SEAL ON ALL PIPE CONNECTIONS AS DIRECTED BY THE ENGINEER.

2. ALL LABOR, MATERIAL AND INCIDENTALS REQUIRED TO ACCOMPLISH THE CONSTRUCTION OF THE COLLARS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS UNLESS OTHERWISE NOTED IN THE PLANS.

3. REINFORCEMENT BARS MAY BE MECHANICALLY FIELD BENT. USE MINUMUM LAP REQUIRED IN ITEM 440, TABLE 6.

4. FOR ESTIMATING PURPOSES A CONCRETE COLLAR WAS CALCULATED AT EACH CONNECTION TO MITERED PIPE SECTION. FOR SECTIONS OF PIPE PAID FOR BY REMOVE AND RELAY ITEM, GROUT REMAINING INSIDE JOINTS AS DIRECTED BY THE ENGINEER WITH AN APPROVED MATERIAL.

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CONCRETE COLLAR DETAIL

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0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		73

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FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\5. Drainage\4 - CONCRETE COLLAR DETAIL.dgn

Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (C.Y.)	Class "C" Conc (Curb) (2) (C.Y.)	Class "C" Conc (Wingwall) (3) (C.Y.)	Total Wingwall Area (S.F.)
STRUCTURE C-3 (Lt)	2 ~ 6' X 6'	16'	MC-6-16	PW-2	45	2:1	7"	7"	1.000	7.583	N/A	N/A	18.620	19.445	N/A	0.0	0.7	19.5	276
STRUCTURE C-6 (Lt)	1 ~ 3' X 3'	16'	SCC-3&4	SETB-CD	0	4:1	7"	7"	1.000	4.333	N/A	N/A	16.000	N/A	4.167	0.0	0.2	3.2	N/A
STRUCTURE C-8 (Lt)	1 ~ 6' X 4'	16'	SCC-5&6	SETB-CD	0	4:1	7"	7"	1.000	5.333	N/A	N/A	20.000	N/A	7.167	0.0	0.3	5.7	N/A
STRUCTURE C-15 (Lt)	1 ~ 6' X 3'	16'	SCC-5&6	SETB-CD	0	4:1	7"	7"	1.000	4.333	N/A	N/A	16.000	N/A	7.167	0.0	0.3	4.3	N/A

NOTES:

Skew Angle = 0° for SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standards.
30° Maximum for Safety End Treatment

SL:1 = Horizontal:1 Vertical
Side Slope at culvert for Flared or Straight Wingwalls. Channel Slope for Parallel Wingwalls.
Slope shall be 3:1 or flatter for Safety End Treatments.

T = Box Culvert Top Slab Thickness. Dimension can be found on the applicable Box Culvert Standard.

U = Box Culvert Wall Thickness. Dimension can be found on the applicable Box Culvert Standard.

C = Curb Height.

See applicable wing or end treatment standards for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.
Hw = Height of Wingwall.
A = Distance from Face of Curb to End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
B = Offset of End of Wingwall (Not applicable to Parallel or Straight Wingwalls).
Lw = Length of Longest Wingwall.
Ltw = Length of Culvert Toewall (Not applicable when using Riprap Apron).
Atw = Length of Anchor Toewall (Applicable to Safety End Treatment only).
Total Wingwall Area = Wingwall area in S.F. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) The wall heights shown will be rounded to the nearest Foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the RAC standard, quantities shown must be increased by a factor of 2. If Class "S" concrete is required for the top slab of the culvert, the curb concrete shall also be Class "S". Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wing, footing, culvert toewall (if any), anchor toewall (if any) and wingwall toewall. Riprap apron, culvert and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor shall have the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it shall be the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the Box Culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the Box Culvert Wingwalls and Safety End Treatments.

An Excel 97 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet shall be signed, sealed, and dated by a licensed Professional Engineer.

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Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		74

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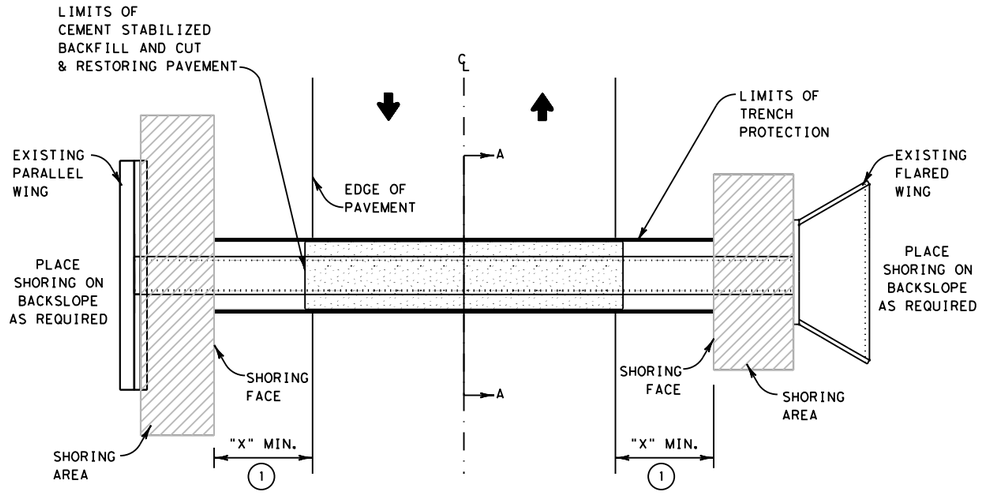
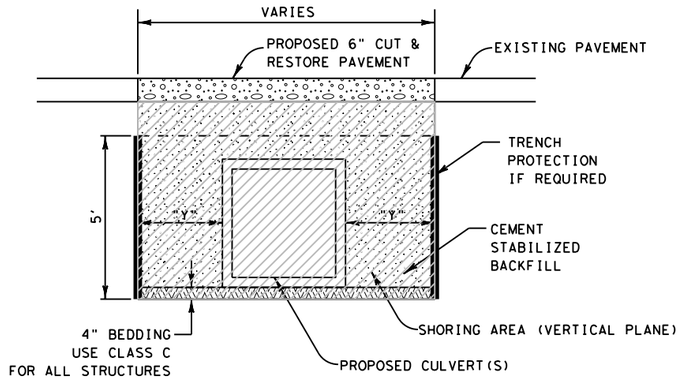


PLAN VIEW
TYPICAL SECTION



SECTION A-A
SHORING AND CUT & RESTORING PAVEMENT DETAIL

SURFACE AREA IN A VERTICAL PLANE TO BE MEASURED AND PAID IF GREATER THAN FIVE FEET. THIS SHALL INCLUDE INGRESS/EGRESS AREAS.

CEMENT STABILIZED BACKFILL

SL:1 = SLOPE RATIO (HORIZONTAL : 1 VERTICAL) SEE REQUIREMENTS BASED ON SOIL TYPE

(1) ADEQUATE PHYSICAL BARRIER PROTECTION SHALL BE PROVIDED AT ALL EXCAVATIONS IN ACCORDANCE WITH WORKSHEET FOR EDGE CONDITION TREATMENT TYPES AND BC(10)-14. THIS SHALL BE AS DIRECTED BY THE ENGINEER.

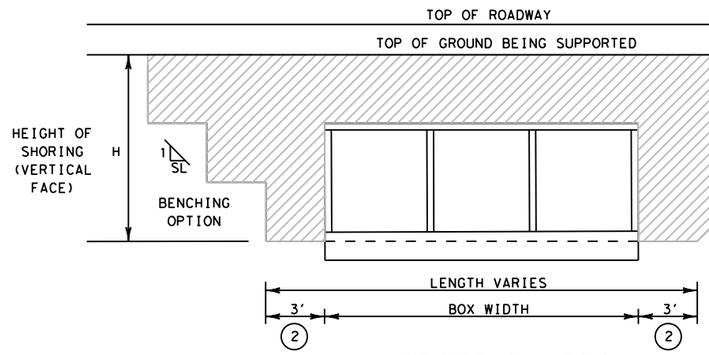
EMBANKMENT FRONT SLOPE SHALL BE A 3:1 OR FLATTER FROM EDGE OF PAVEMENT TO SHORING FACE. SEE EDGE CONDITION TREATMENT TYPES FOR REQUIRED DEVICES.

MINIMUM "X" OFFSET DISTANCE SHALL BE SPECIFIED IN SHORING PLAN SUBMITTED BY THE CONTRACTOR AND BASED ON SPECIFIC STRUCTURE LOCATION. THIS OFFSET WILL BE BASED ON SOIL TYPES, STABILITY, SLOPE ANALYSIS, AND SURCHARGE LOADING, BUT IN NO CASE SHALL IT BE LESS THAN 5 FEET.

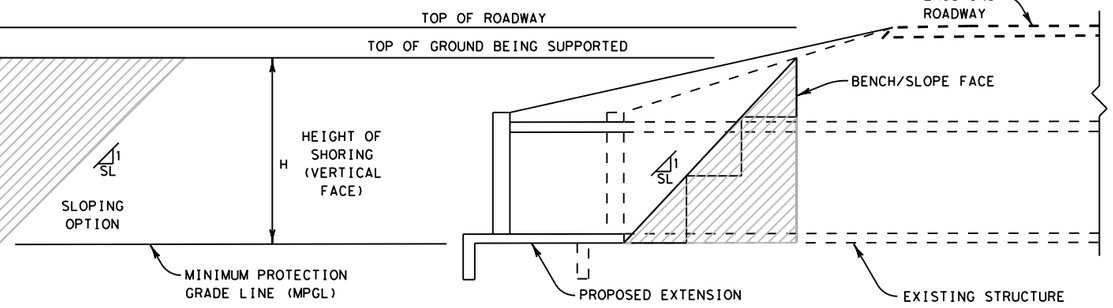
(2) DISTANCE IS MEASURED FROM END OF BOX OR END TREATMENT PLUS 3 FEET IF SHORING PLACEMENT IS REQUIRED.

"Y" ~ DIMENSION AS SPECIFIED BY ITEM 400 BUT NO LESS THAN ONE FOOT.

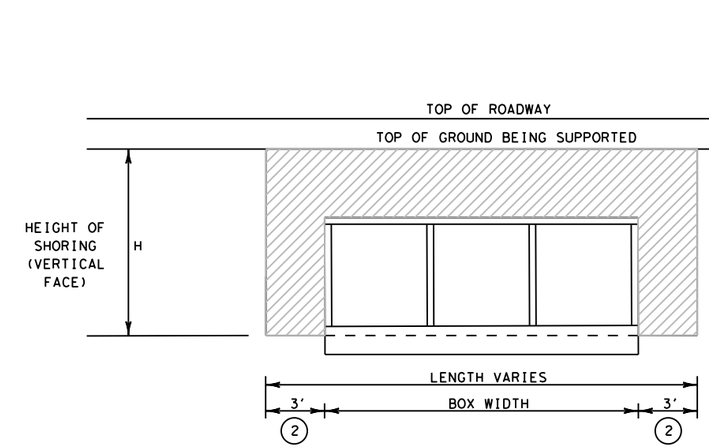
DETAILS AND NOTES SHOWN ARE GENERIC ILLUSTRATIONS AND DO NOT COVER ALL POSSIBLE SCENARIOS THAT MAY BE ENCOUNTERED ON A PROJECT. THE DETAILS ARE NOT A SUBSTITUTE FOR THE REQUIRED SPECIFIC ENGINEERED PLAN THAT IS TO BE SUBMITTED FOR APPROVAL AT EACH LOCATION THAT REQUIRES TEMPORARY SPECIAL SHORING. ALL ENGINEERED PLAN REQUIREMENTS SHALL COMPLY WITH OSHA STANDARDS 29 CFR PART 1926, SUBPART P.



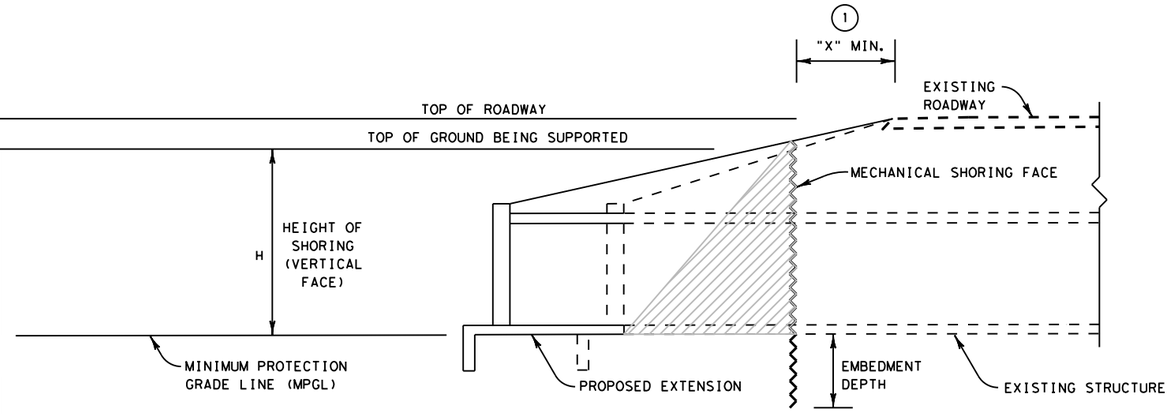
PROFILE VIEW
SLOPING/BENCHING



CROSS SECTION VIEW
SLOPING/BENCHING



PROFILE VIEW
MECHANICAL SHORING



CROSS SECTION VIEW
MECHANICAL SHORING

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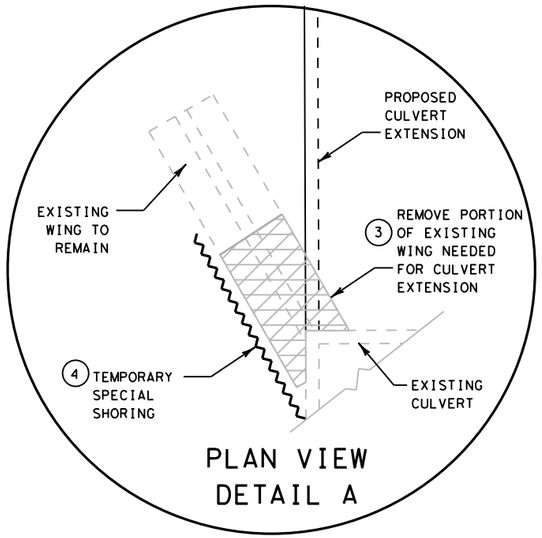
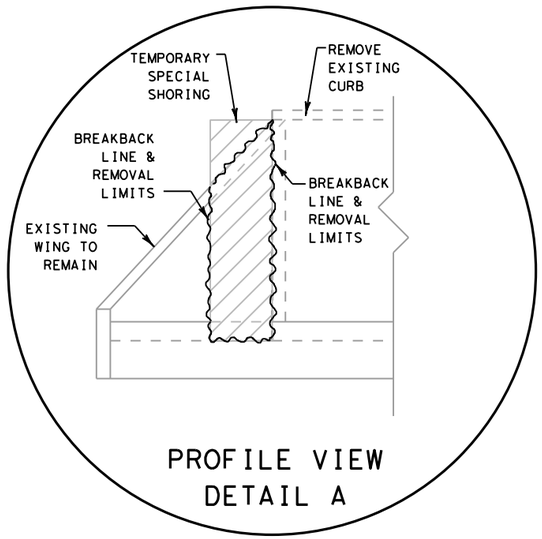
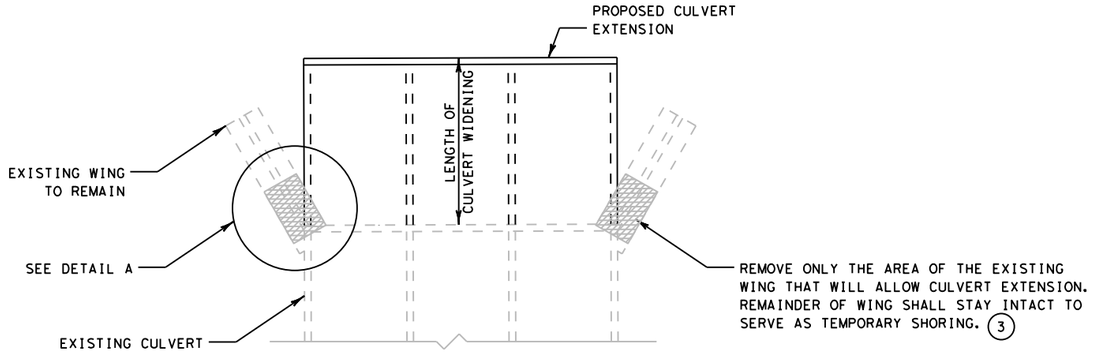


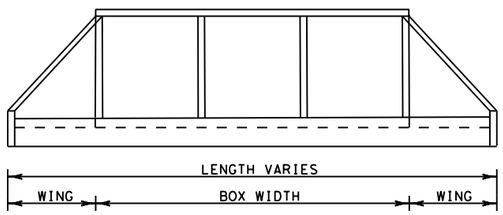
PLAN VIEW
DETAIL A



PROFILE VIEW
DETAIL A



PLAN VIEW
BOX CULVERT EXTENSION WITH
PARTIAL SECTION OF FLARED WINGS REMAINING IN PLACE



PROFILE VIEW
EXISTING BOX CULVERT WITH FLARED WINGS

SURFACE AREA IN A VERTICAL PLANE TO BE MEASURED AND PAID IF GREATER THAN FIVE FEET.

REMOVAL AREA

(3) AREA AND EXTENT OF REMOVAL SHOWN MAY VARY. REMAINDER OF EXISTING WING MAY REMAIN IN PLACE IF PROPER BACKFILL AND A MINIMUM FILL HEIGHT CAN BE ACHIEVED. IN SOME CASES THE EXISTING WING MAY HAVE TO BE FULLY REMOVED. THE ENGINEER SHALL APPROVE BREAKBACK LINES AND AREA TO REMAIN OR TO BE REMOVED PRIOR TO BEGINNING WORK. PAYMENT FOR ALL WORK SHALL BE SUBSIDIARY TO SHORING ITEMS.

(4) PLACE SHORING FOR PROTECTION IN AREA WHERE EXISTING WING WAS REMOVED AS DESIGNED BY ENGINEERED PLAN SUBMITTED BY CONTRACTOR.

DETAILS AND NOTES SHOWN ARE GENERIC ILLUSTRATIONS AND DO NOT COVER ALL POSSIBLE SCENARIOS THAT MAY BE ENCOUNTERED ON A PROJECT. THE DETAILS ARE NOT A SUBSTITUTE FOR THE REQUIRED SPECIFIC ENGINEERED PLAN THAT IS TO BE SUBMITTED FOR APPROVAL AT EACH LOCATION THAT REQUIRES TEMPORARY SPECIAL SHORING. ALL ENGINEERED PLAN REQUIREMENTS SHALL COMPLY WITH OSHA STANDARDS 29 CFR PART 1926, SUBPART P.

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CONT	SECT	JOB	HIGHWAY
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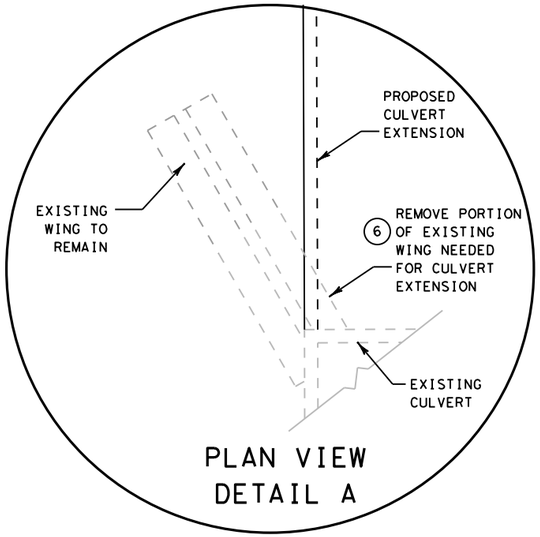
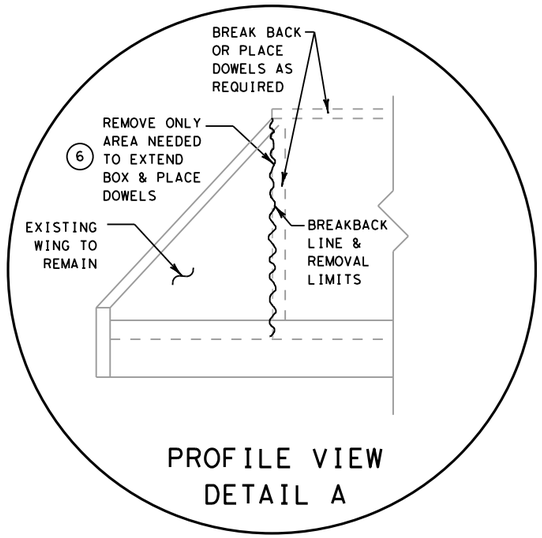
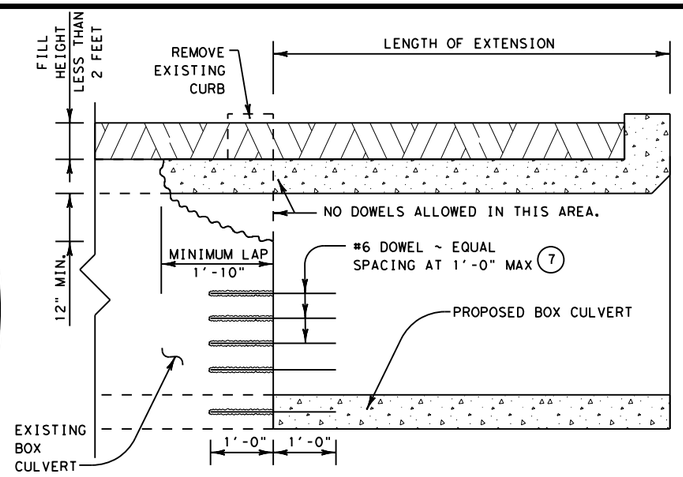


PLAN VIEW
DETAIL A



PROFILE VIEW
DETAIL A



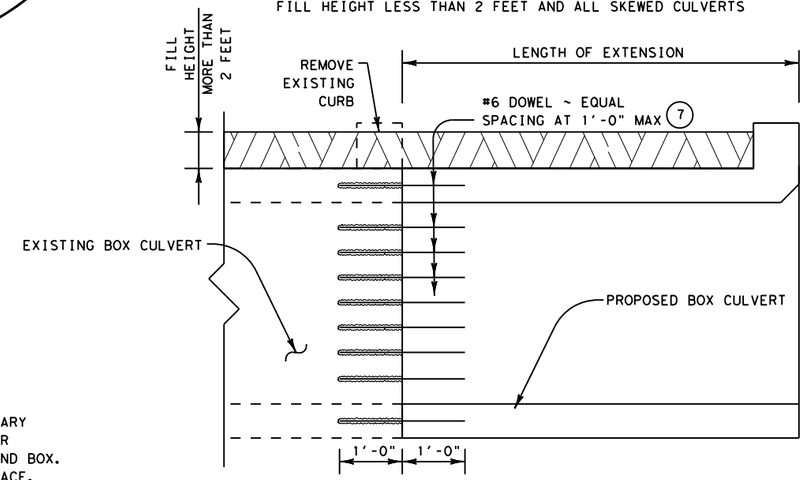
LENGTHENING DETAIL TYPICAL 7
FILL HEIGHT LESS THAN 2 FEET AND ALL SKEWED CULVERTS

6 REMAINDER OF EXISTING WING MAY REMAIN IN PLACE IF PROPER BACKFILL AND A MINIMUM FILL HEIGHT CAN BE ACHIEVED. ENGINEER SHALL APPROVE BREAKBACK LINES AND AREA TO REMAIN OR TO BE REMOVED PRIOR TO BEGINNING WORK.

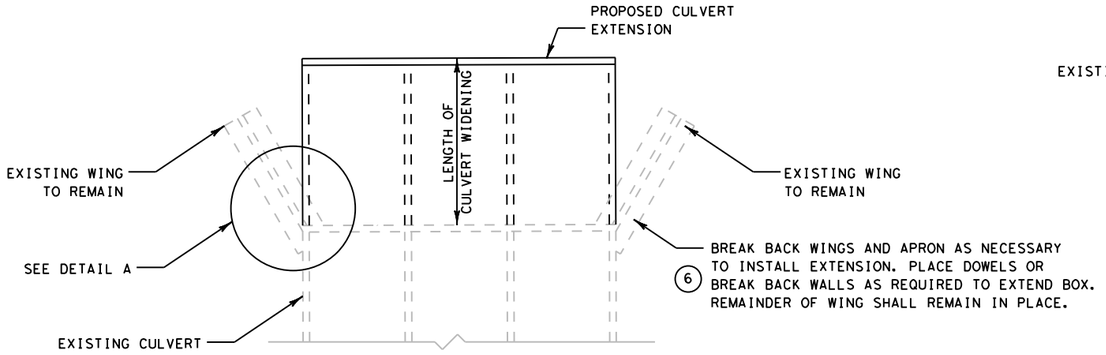
7 FOR BOX CULVERTS WITH LESS THAN 2'-0" OF FILL, BREAK BACK THE TOP SLAB TO PROVIDE A 1'-10" MINIMUM LAP OF THE EXISTING LONGITUDINAL BARS WITH THE LONGITUDINAL BARS IN THE EXTENSION. DOWELS ARE NOT ALLOWED FOR BOX CULVERTS WITH LESS THAN 2'-0" OF FILL.

FOR BOX CULVERTS WITH MORE THAN 2'-0" OF FILL, BREAK BACK THE TOP SLAB TO PROVIDE A 1'-10" MINIMUM LAP OF THE EXISTING LONGITUDINAL BARS WITH THE LONGITUDINAL BARS IN THE EXTENSION. ALTERNATIVELY, IF THE BOX IS NON-SKEWED, EMBED #6 ANCHOR BARS WITH A TYPE III, C, D, E, OR F ANCHOR ADHESIVE INTO THE EXISTING WALLS, TOP, AND BOTTOM SLAB AT 1'-0" CENTER-TO-CENTER SPACING. MINIMUM EMBEDMENT DEPTH IS 12".

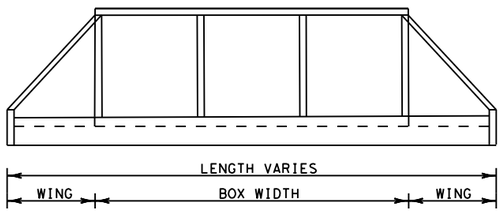
CORE AND GROUT #6 DOWEL 1'-0" INTO EXISTING STRUCTURE AS SHOWN IN ACCORDANCE WITH ITEM 420.4.7.10, "CONCRETE STRUCTURES" ~ INSTALLATION OF DOWELS AND ANCHOR BOLTS."



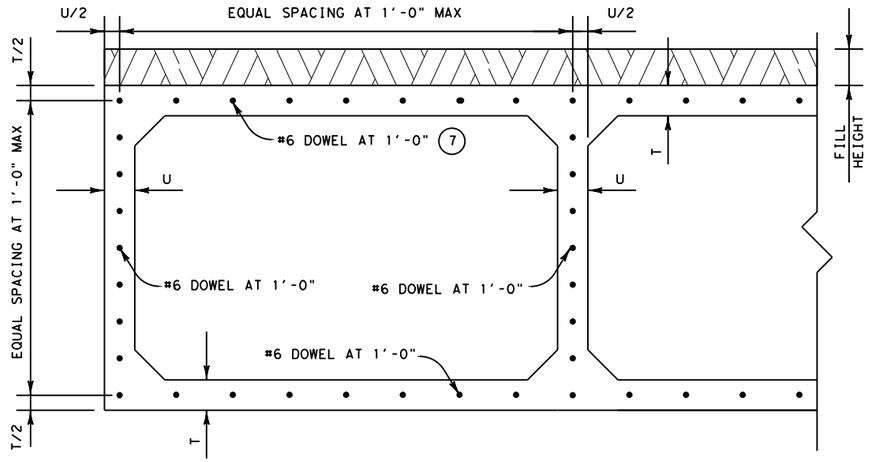
LENGTHENING DETAIL TYPICAL 7
FILL HEIGHT MORE THAN 2 FEET AND NOT A SKEWED CULVERT



PLAN VIEW
BOX CULVERT EXTENSION WITH
FLARED WINGS REMAINING IN PLACE



PROFILE VIEW
EXISTING BOX CULVERT WITH FLARED WINGS



LENGTHENING DETAIL TYPICAL SECTION 7
NOTE: ONLY SHOWING DOWELS OTHER REINFORCING NOT SHOWN FOR CLARITY.

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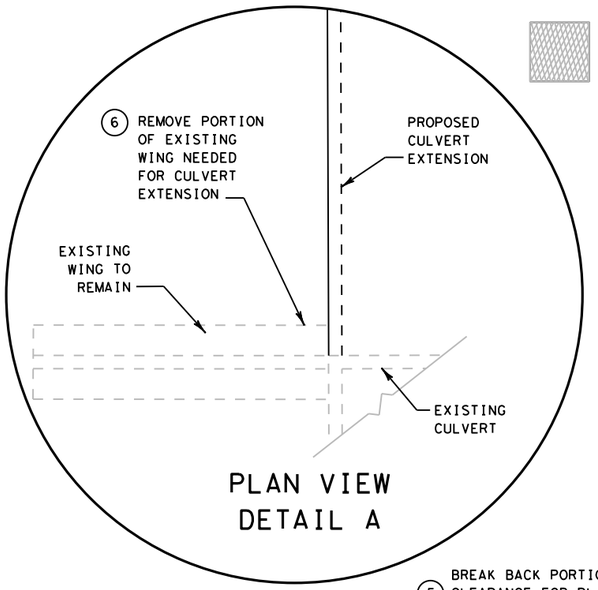
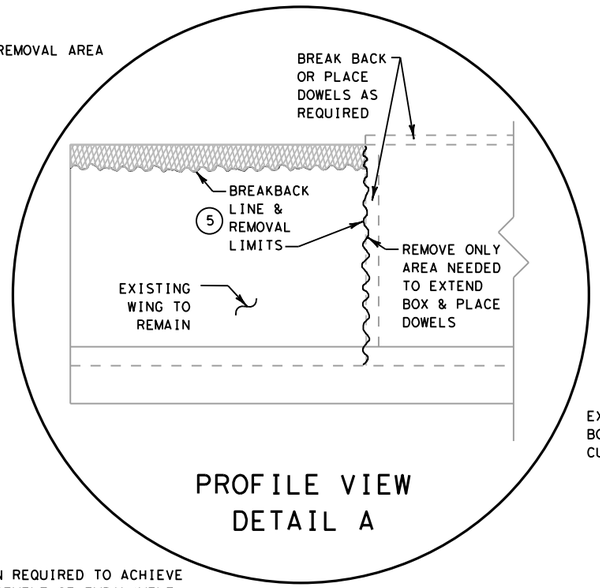
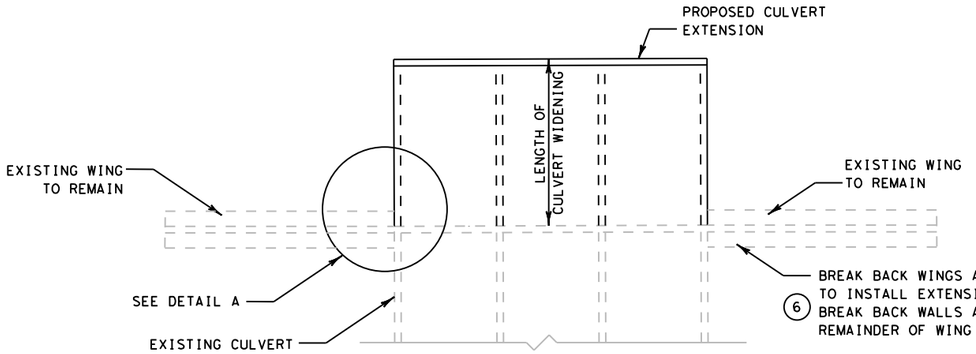


PLAN VIEW
DETAIL A

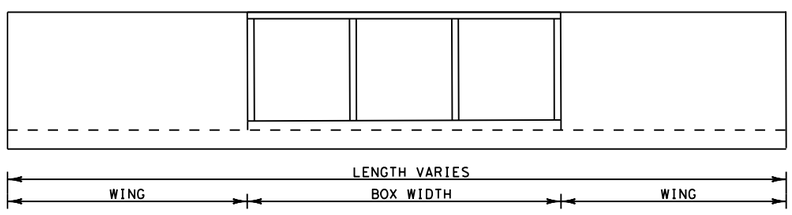


PROFILE VIEW
DETAIL A

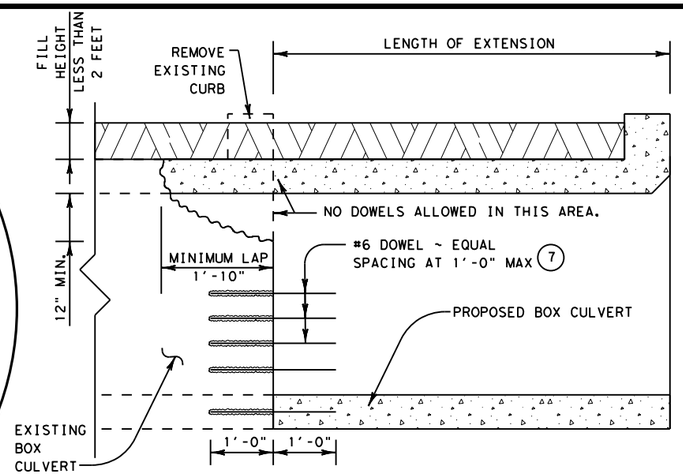
5 BREAK BACK PORTION REQUIRED TO ACHIEVE CLEARANCE FOR PLACEMENT OF EMBANKMENT FOR FRONT SLOPE AS REQUIRED BY TYPICAL.



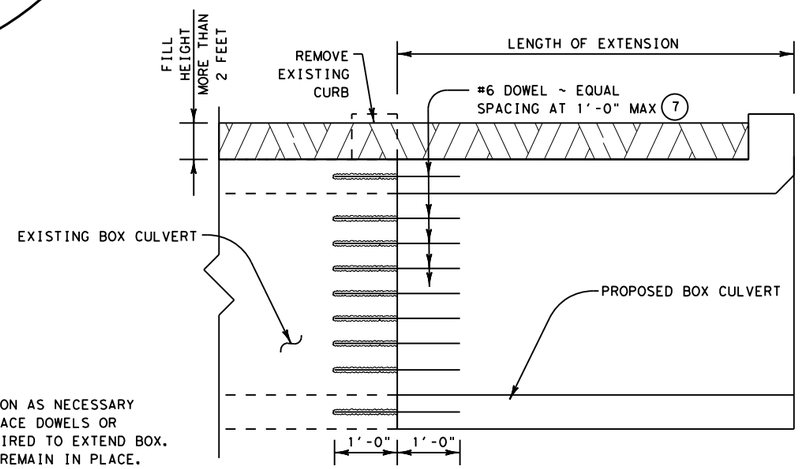
PLAN VIEW
BOX CULVERT EXTENSION WITH
PARTIAL SECTION OF PARALLEL
WINGS REMAINING IN PLACE



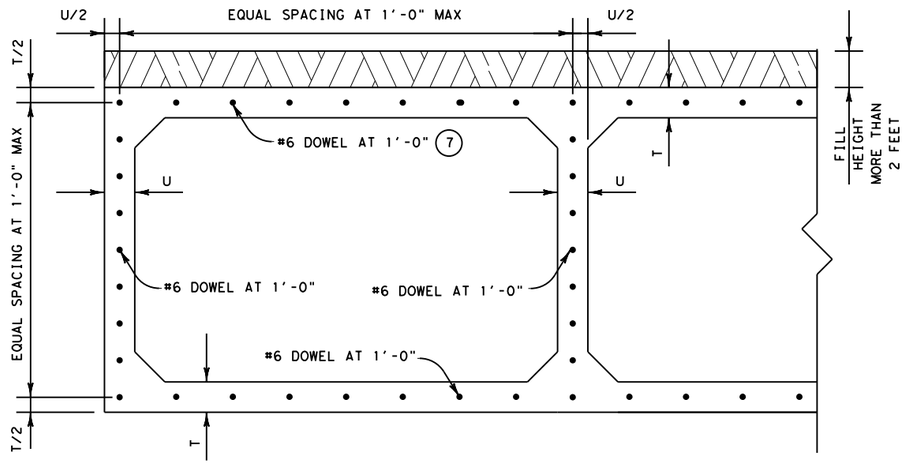
PROFILE VIEW
EXISTING BOX CULVERT WITH PARALLEL WINGS



LENGTHENING DETAIL TYPICAL 7
FILL HEIGHT LESS THAN 2 FEET AND ALL SKEWED CULVERTS



LENGTHENING DETAIL TYPICAL 7
FILL HEIGHT MORE THAN 2 FEET AND NOT A SKEWED CULVERT



LENGTHENING DETAIL TYPICAL SECTION 7
NOTE: ONLY SHOWING DOWELS OTHER REINFORCING NOT SHOWN FOR CLARITY.

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7 FOR BOX CULVERTS WITH LESS THAN 2'-0" OF FILL, BREAK BACK THE TOP SLAB TO PROVIDE A 1'-10" MINIMUM LAP OF THE EXISTING LONGITUDINAL BARS WITH THE LONGITUDINAL BARS IN THE EXTENSION. DOWELS ARE NOT ALLOWED FOR BOX CULVERTS WITH LESS THAN 2'-0" OF FILL.

FOR BOX CULVERTS WITH MORE THAN 2'-0" OF FILL, BREAK BACK THE TOP SLAB TO PROVIDE A 1'-10" MINIMUM LAP OF THE EXISTING LONGITUDINAL BARS WITH THE LONGITUDINAL BARS IN THE EXTENSION. ALTERNATIVELY, IF THE BOX IS NON-SKEWED, EMBED #6 ANCHOR BARS WITH A TYPE III, C, D, E, OR F ANCHOR ADHESIVE INTO THE EXISTING WALLS, TOP, AND BOTTOM SLAB AT 1'-0" CENTER-TO-CENTER SPACING. MINIMUM EMBEDMENT DEPTH IS 12".

CORE AND GROUT #6 DOWEL 1'-0" INTO EXISTING STRUCTURE AS SHOWN IN ACCORDANCE WITH ITEM 420.4.7.10, "CONCRETE STRUCTURES" ~ INSTALLATION OF DOWELS AND ANCHOR BOLTS."

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TEMPORARY SHORING AND TRENCH PROTECTION GENERAL NOTES:

THE SHORING PLAN SHALL ADDRESS VERY CLEARLY WITH RESPECT TO THE PROPOSED CONTRACTORS SEQUENCE OF WORK AND METHODS FOR SHORING FOR THE DURATION OF THE PROJECT EXPOSURE.

THE SHORING PLAN SHALL NOT BE A GENERIC PLAN BUT VERY SPECIFIC IN REGARDS TO EACH LOCATION THAT REQUIRES SHORING WITH ALL RELEVANT MATERIALS TO BE USED WITH SPECIFICATIONS DETAILING THOSE MATERIALS ALONG WITH ANY MANUFACTURERS SPECIFICATIONS OF MATERIALS BEING USED.

BENCHING, SLOPING, MECHANICAL SHORING INSTALLED OUTSIDE LIMITS SHOWN WILL NOT BE PAID FOR UNLESS APPROVED IN WRITING BY THE ENGINEER.

SUBSTITUTION OF BENCHING/SLOPING FOR MECHANICAL SHORING WILL NOT BE PERMITTED UNLESS APPROVED IN WRITING BY THE ENGINEER.

SUBSITUTION OF MECHANICAL SHORING FOR BENCHING/SLOPING WILL NOT BE PERMITTED UNLESS APPROVED IN WRITING BY THE ENGINEER.

DETAILED SHORING PLAN WILL BE CONSIDERED PREREQUISITE TO SUBSTITUTION OF ORIGINAL SHORING PROPOSED IN PLAN.

SUBMIT SOIL CLASSIFICATION AND IDENTIFICATION TESTING THAT IS PERFORMED FOR EACH STRUCTURE TO THE ENGINEER PRIOR TO COMMENCING WORK.

CALCULATIONS THAT ARE SUBMITTED SHALL INCLUDE A GLOBAL STABILITY ANALYSIS TO ENSURE IMPLEMENTATION OF THE SHORING DOES NOT CREATE A HAZARD TO THE ROADWAY. ALL DESIGN CALCULATIONS SHALL CLEARLY INDICATE DESIGN ASSUMPTIONS, SOIL PARAMETERS, SURCHARGE LOADING AND GEOMETRY USED FOR ANALYSIS AND ALL OTHER INFORMATION DEEMED PERTINENT. TYPICAL SECTIONS SHOULD BE SUBMITTED TO VERIFY THE MODELS AND METHODS PROPOSED FOR USE BY THE CONTRACTOR ACCOUNT FOR SURCHARGE LOADING.

SUBMIT COMPETENT PERSONS NAME THAT WILL BE ON SITE WHILE SHORING SYSTEMS ARE IN USE. THAT PERSON SHALL BE RESPONSIBLE FOR MAKING SURE THAT ALL ELEMENTS OF THE PLAN ARE ADHERED TO AND SHALL NOTIFY THE ENGINEER IF CONDITIONS ENCOUNTERED ARE DIFFERENT THAN ANTICIPATED AND SHOWN ON THE SUBMITTED AND APPROVED PLAN.

SHORING MUST BE PROPERLY INSTALLED PRIOR TO EXCAVATION. LOCATION OF SHORING SHOWN IS DIAGRAMMATIC AND NOT THE MEANS AND METHOD OF DOING THE WORK.

EVALUATION OF THE EXISTING WINGWALL TO REMAIN SHALL BE PERFORMED TO ENSURE STABILITY OF THE WALL ONCE DETACHED FROM EXISTING CULVERT WALL. SUBMIT THIS EVALUATION FOR APPROVAL PRIOR TO PERFORMING ANY REMOVAL.

SHORING ITEM WILL BE MEASURED BY THE SQUARE FOOT OF SURFACE AREA OF A VERTICAL PLANE AT THE FACE OF THE SHORING BETWEEN THE TOP OF THE GROUND BEING SUPPORTED AND THE MINIMUM PROTECTION GRADE LINE SHOWN.

SHORING PROJECTING ABOVE THE LEVEL OF THE GROUND BEING SUPPORTED AND CAUSED BY THE CONTRACTORS OPERATIONS WILL NOT BE MEASURED FOR PAYMENT. SHORING THAT PROJECTS ABOVE THE LEVEL OF THE GROUND AND PRESENTS A HAZARD TO THE TRAVELING PUBLIC SHALL BE PROTECTED BY MEANS AND METHODS APPROVED BY THE ENGINEER AND AT THE EXPENSE OF THE CONTRACTOR PERFORMING THE WORK AND SUBSIDAIRY TO ITEM 403.

TRENCH PROTECTION WILL BE MEASURED BY THE LINEAR FOOT OF PROTECTION IN PLACE.

TRENCHES OR EXCAVATIONS LESS THAN FIVE FEET IN DEPTH SHALL ALSO BE EFFECTIVELY PROTECTED WHEN EXAMINATION OF GROUND INDICATES HAZARDOUS GROUND MOVEMENT MAY BE EXPECTED.

WHERE TRENCH PROTECTION IS SHOWN IN THE ROADWAY AREA NO BENCHING OR SLOPING WILL BE ALLOWED.

DETAILS AND NOTES SHOWN ARE GENERIC ILLUSTRATIONS AND DO NOT COVER ALL POSSIBLE SCENARIOS THAT MY BE ENCOUNTERED ON A PROJECT. THE DETAILS ARE NOT A SUBSTITUTE FOR THE REQUIRED SPECIFIC ENGINEERED PLAN THAT IS TO BE SUBMITTED FOR APPROVAL AT EACH LOCATION THAT REQUIRES TEMPORARY SPECIAL SHORING. ALL ENGINEERED PLAN REQUIREMENTS FOR THOSE LOCATIONS SHALL COMPLY WITH OSHA STANDARDS 29 CFR PART 1926, SUBPART P AND AASHTO STANDARDS SPECIFICATIONS FOR HIGHWAY BRIDGES OR AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND AREMA MANUAL FOR RAILWAY ENGINEERING FOR RAILROAD LOADING.

SEE ITEM 402 TRENCH PROTECTION AND ITEM 403 TEMPORARY SPECIAL SHORING FOR ADDITIONAL REQUIREMENTS NOT STATED.

REQUIREMENTS BEFORE BEGINNING SHORING WORK OPERATIONS:

1. SUBMIT DETAILS AND DESIGN CALCULATIONS BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER FOR APPROVAL THAT COMPLIES WITH OSHA STANDARDS AND INTERPRETATIONS, 29 CFR 1926, SUBPART P, EXCAVATIONS. DESIGN STRUCTURAL SYSTEMS TO COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES OR AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
2. SUBMIT PROPOSED SEQUENCE OF WORK AND METHOD FOR SHORING IF DIFFERENT THAN PROPOSED IN THE SUBMITTED ENGINEERED PLAN.
3. RECEIVE APPROVAL FOR SUBSTITUTE SHORING AS SHOWN IN THE SUBMITTED ENGINEERED PLAN.
4. SUBMIT COMPETENT PERSONS NAME THAT WILL BE ON SITE.
5. SUBMIT SOIL CLASSIFICATION AND IDENTIFICATION TEST FOR EACH SPECIFIC STRUCTURE LOCATION.
6. PROCEED WITH WORK ONLY AFTER APPROVAL IS GIVEN BY THE ENGINEER.

MAXIMUM ALLOWABLE SLOPES PER 29 CFR 1926.652		
SOIL TYPE	SLOPE (H:V)	ANGLE (DEGREES)
STABLE ROCK	VERTICAL	90
TYPE A	3/4 : 1	53
TYPE B	1 : 1	45
TYPE C	1 ½ : 1	34

MAXIMUM ALLOWABLE DEPTH OF CUT/TRENCH VARIES. SEE APPROVED ENGINEERED PLAN FOR SPECIFICS. SLOPES SHALL BE FLATTENED WHEN AN EXCAVATION HAS WATER CONDITIONS, SILTY MATERIALS, LOOSE BOULDERS, AND AREAS WHERE EROSION, DEEP FROST ACTION, SLIDE PLANES APPEAR, LOADING IMPOSED BY STRUCTURES, SURCHARGE LOADING FROM EQUIPMENT, OVERLYING MATERIAL LOADING, OR STORED MATERIAL; AND VIBRATION FROM EQUIPMENT, BLASTING, TRAFFIC OR OTHER SOURCES ARE PRESENT.

CUT AND RESTORING PAVEMENT GENERAL NOTES:

LIMITS OF CEMENT STABILIZED BACKFILL AND CUT & RESTORE PAVEMENT SHALL EXTEND 6" BEYOND EXISTING EDGE OF PAVEMENT ON EACH SIDE OF THE ROADWAY.

SEE QUANTITY SUMMARY FOR TEMPORARY SPECIAL SHORING AND TRENCH PROTECTION QUANTITIES AT APPLICABLE STRUCTURES.

TEMPORARY SPECIAL SHORING SHALL BE PLACED ON VERTICAL PLANE PARALLEL TO THE ROADWAY AS SHOWN ON SECTION A-A AND AS DESIGNED BY SUBMITTED ENGINEERED PLAN.

ON MULTI-BARREL STRUCTURES, ACCOUNT FOR ADDITIONAL BARREL WIDTHS AND BARREL SPACING. SEE CULVERT DATA SHEET FOR PROPOSED WORK AND APPLICABLE STANDARDS FOR STRUCTURE DIMENSIONS.

PLACE CEMENT STABILIZED BACKFILL AT DEPTH TO ALLOW A MINIMUM DEPTH OF 6" OF HOTMIX PLACEMENT.

HOT MIX TYPE TO BE APPROVED BY THE ENGINEER.

LENGTHENING AND SPECIAL NOTES FOR DOWEL OPERATIONS:

THE BREAK BACK LINES, AS SHOWN OR AS LOCATED AND APPROVED BY THE ENGINEER, SHALL BE SAW CUT(SCORED) 1" DEEP AND NORMAL TO THE CONCRETE SURFACE AS TO PROVIDE A CLEAN FIT UP OF NEW CONSTRUCTION. AFTER SCORING, REMOVE DAMAGED PORTIONS OF THE EXISTING STRUCTURE AND REPAIR AREAS TO A NEAT CONDITION MATCHING THE ORIGINAL PROFILE.

CARE SHALL BE TAKEN IN BREAKING BACK THE CONCRETE SO THAT EXISTING REINFORCING CAN BE RE-USED IF NEEDED. EXPOSED REINFORCING WHICH REMAINS FIRMLY ANCHORED TO THE CONCRETE SHALL BE CLEANED AND INCORPORATED INTO THE NEW CONSTRUCTION.

THE ROUGHENED, EXPOSED CONCRETE SURFACES SHALL BE CLEANED OF ALL LOOSE DEBRIS PRIOR TO THE PLACEMENT OF NEW CONCRETE.

UNLESS OTHERWISE APPROVED BY THE ENGINEER, USE ONLY HAND TOOLS OR POWER-DRIVEN CHIPPING HAMMERS (15-LB CLASS MAXIMUM) TO REMOVE CONCRETE ADJACENT TO EXTENSION AREA TO AVOID DAMAGING SURROUNDING CONCRETE.

HOLES SHALL BE DRILLED WITH A NON-IMPACT, ROTARY CORE DRILL AND CLEANED PER TXDOT SPECIFICATION REQUIREMENTS AND ADHESIVE MANUFACTURER'S INSTRUCTIONS. NO IMPACT HAMMER DRILLS WILL BE ALLOWED. NOTE THAT A SPECIAL DRILL BIT (TO CUT THROUGH EXISTING REINFORCING) MAY BE REQUIRED. ANCHORS SHALL BE INSTALLED PER ADHESIVE MANUFACTURER'S INSTRUCTIONS. SEE ITEM 420 "CONCRETE STRUCTURES SECTION 420.4.7.10 INSTALLATION OF DOWELS AND ANCHOR BOLTS IN ADDITION TO ITEM 450 RAILING FOR ALL INSTALLATION REQUIREMENTS.

ANCHOR ADHESIVE CHOSEN MUST BE ABLE TO ACHIEVE A BASIC BOND STRENGTH IN TENSION, N_{ba}, OF 26.4 KIPS. SUBMIT SIGNED AND SEALED CALCULATIONS OR THE MANUFACTURERS 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." TEST ADHESIVE ANCHORS IN ACCORDANCE WITH ITEM 450.3.3, "TESTS." TEST 3 ANCHORS PER 100 ANCHORS INSTALLED. BREAK BACK WINGS AND APRON AS NECESSARY TO INSTALL THE EXTENSION. CLEAN AND EXTEND THE EXPOSED WINGWALL AND APRON REINFORCING INTO THE EXTENSION. WHEN LENGTHENING EXISTING BOX CULVERTS WITH DIMENSIONS DIFFERENT THAN CURRENT STANDARD DIMENSIONS, FORM HORIZONTAL AND VERTICAL TRANSITIONS AS DIRECTED BY THE ENGINEER. MATCH BOTTOM SLABS TO MAINTAIN AN UNINTERRUPTED FLOW LINE. FIELD BEND EXISTING AND NEW REINFORCING INTO TRANSITIONS AND MAINTAIN SPECIFIED COVER REQUIREMENTS.

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287

TEMPORARY SHORING DETAILS

SHEET 5 OF 6

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		79

DATE: 4/30/2021 8:53:38 AM
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SUMMARY OF TEMPORARY SPECIAL SHORING & TRENCH PROTECTION										
STRUCTURE #	STATION	STRUCTURE TYPE	DESCRIPTION OF STRUCTURE	SB/NB	EXISTING END TREATMENT TYPE	TYPE OF SHORING		TRENCH PROTECTION (LF)	**RETAIN EXISTING PARALLEL WING (YES/NO)	**RETAIN EXISTING FLARED WING (YES/NO)	REMARKS
						BENCH OR SLOPING (SF)	MECHANICAL (SF)				
C-3	1340+79.16	BOX	(2) 6'X6'X55' MBC	SB	FLARED		54		NO	NO	
C-5	1367+02.72	PIPE	(1) 36"X84' RCP	NB	PARALLEL		28		NO	NO	
C-6	1383+80.29	BOX	(1) 5'X3'X54' CBC	SB	STRAIGHT		29		NO	NO	
C-8	1383+83.43	BOX & PIPE	(1) 6'X4'X54' CBC & (2) 54"X54' RCP	SB	STRAIGHT		50		NO	NO	
C-15	1474+53.21	BOX & PIPE	(1) 6'X3'X55' CBC & (3) 42"X55' RCP	SB	STRAIGHT		40		NO	NO	
PROJECT TOTALS							201				

NOTE:
EVALUATION OF THE EXISTING WINGWALL TO REMAIN SHALL BE PERFORMED TO ENSURE STABILITY OF THE WALL ONCE DETACHED FROM EXISTING CULVERT WALL. SUBMIT THIS EVALUATION FOR APPROVAL PRIOR TO PERFORMING ANY REMOVAL.

US 287

TEMPORARY SHORING DETAILS

Texas Department of Transportation

SHEET 6 OF 6

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		80

DATE: 4/30/2021 11:15:46 AM
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DATE: 4/30/2021 11:54:34 AM
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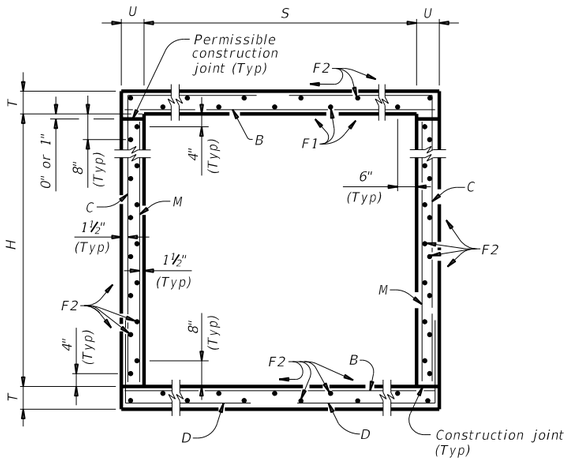
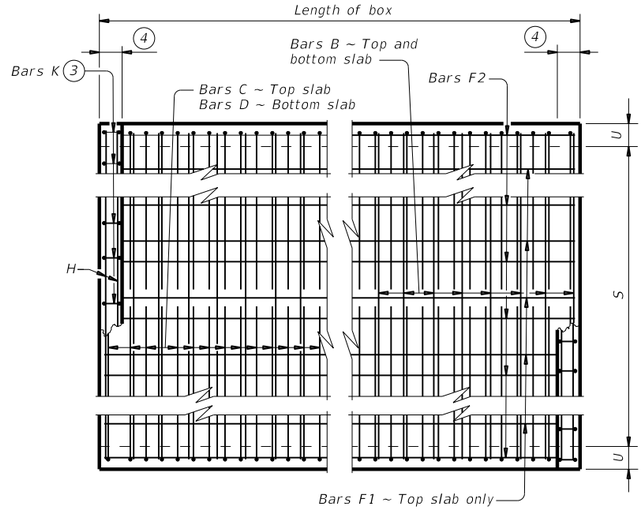
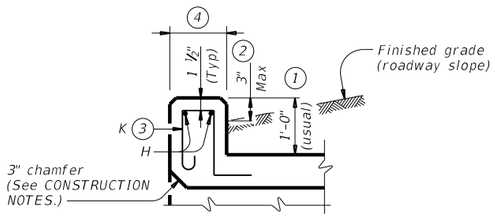


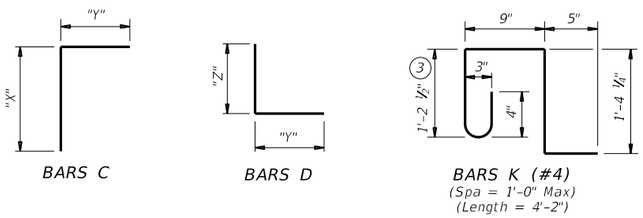
TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB



BARS C

BARS D

BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.

Chamfer the bottom edge of the top slab 3" at the entrance.

Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:

- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:

- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.

See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		81

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
3' – 0"	2' – 0"	8"	7"	30'	108	#5	9"	3' – 11"	441	108	#4	9"	5' – 4"	385	2' – 6"	2' – 10"	108	#4	9"	5' – 1"	367	2' – 10"	2' – 3"	108	9"	2' – 0"	144	3	39' – 9"	80	19	39' – 9"	505	3' – 11"	10	10	28	0.292	48.1	0.3	38	12.0	1,960
3' – 0"	3' – 0"	8"	7"	30'	108	#5	9"	3' – 11"	441	108	#4	9"	6' – 4"	457	3' – 6"	2' – 10"	108	#4	9"	5' – 1"	367	2' – 10"	2' – 3"	108	9"	3' – 0"	216	3	39' – 9"	80	23	39' – 9"	611	3' – 11"	10	10	28	0.335	54.3	0.3	38	13.7	2,210
4' – 0"	2' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	5' – 8"	613	2' – 6"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	2' – 0"	144	3	39' – 9"	80	21	39' – 9"	558	4' – 11"	13	12	33	0.342	63.4	0.4	46	14.1	2,581
4' – 0"	3' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	6' – 8"	721	3' – 6"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	3' – 0"	216	3	39' – 9"	80	25	39' – 9"	664	4' – 11"	13	12	33	0.385	70.5	0.4	46	15.8	2,867
4' – 0"	4' – 0"	8"	7"	30'	108	#5	9"	4' – 11"	554	162	#4	6"	7' – 8"	830	4' – 6"	3' – 2"	162	#4	6"	5' – 5"	586	3' – 2"	2' – 3"	108	9"	4' – 0"	289	3	39' – 9"	80	25	39' – 9"	664	4' – 11"	13	12	33	0.428	75.1	0.4	46	17.5	3,049

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

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 its results or damages resulting from its use.

DATE: 4/30/2021 11:54:36 AM
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HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		82

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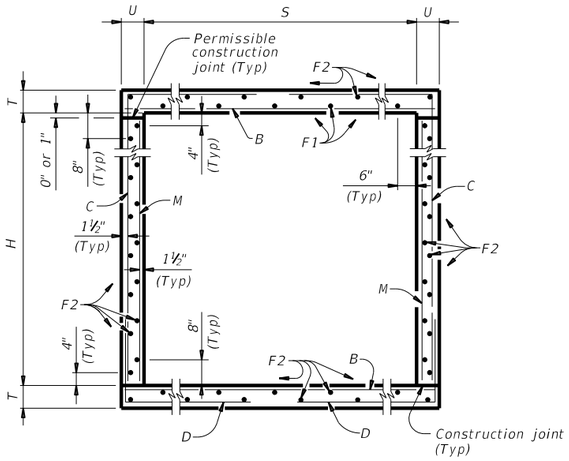
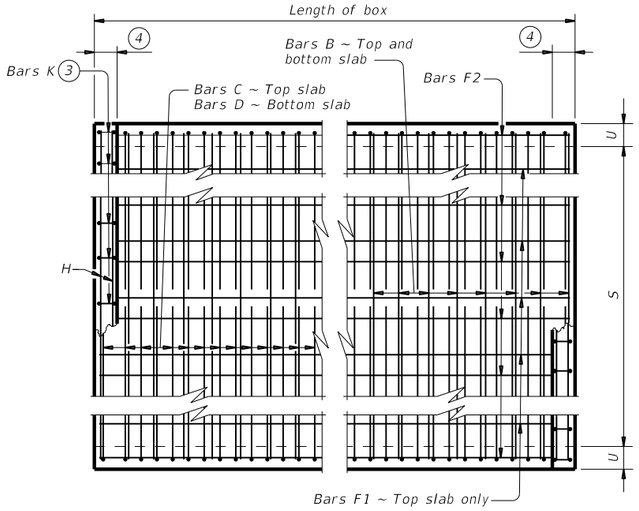
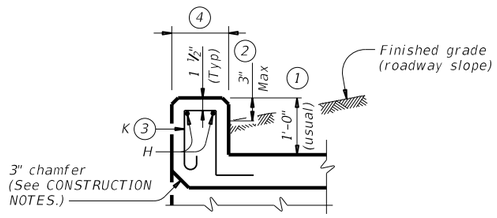


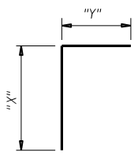
TYPICAL SECTION



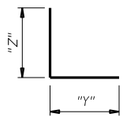
PLAN OF REINF STEEL



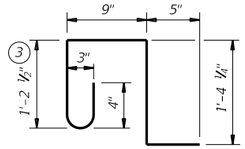
SECTION THRU CURB



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

(1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

(4) 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		83

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																										QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' – 0"	2' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 3"	704	2' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.391	80.5	0.5	55	16.1	3,276
5' – 0"	2' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	6' – 4"	713	2' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	2' – 0"	144	4	39' – 9"	106	22	39' – 9"	584	5' – 11"	16	14	39	0.429	81.0	0.5	55	17.6	3,294
5' – 0"	3' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 3"	817	3' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.434	87.8	0.5	55	17.8	3,567
5' – 0"	3' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	7' – 4"	826	3' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	3' – 0"	216	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.472	88.3	0.5	55	19.3	3,585
5' – 0"	4' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 3"	929	4' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.477	92.4	0.5	55	19.5	3,752
5' – 0"	4' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	8' – 4"	939	4' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	4' – 0"	289	4	39' – 9"	106	26	39' – 9"	690	5' – 11"	16	14	39	0.515	92.9	0.5	55	21.1	3,771
5' – 0"	5' – 0"	8"	7"	26'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 3"	1,042	5' – 6"	3' – 9"	108	#5	9"	6' – 5"	723	3' – 9"	2' – 8"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.521	99.7	0.5	55	21.3	4,044
5' – 0"	5' – 0"	9"	7"	30'	108	#6	9"	5' – 11"	960	108	#5	9"	9' – 4"	1,051	5' – 7"	3' – 9"	108	#5	9"	6' – 6"	732	3' – 9"	2' – 9"	108	9"	5' – 0"	361	4	39' – 9"	106	30	39' – 9"	797	5' – 11"	16	14	39	0.559	100.2	0.5	55	22.8	4,062
6' – 0"	2' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	6' – 7"	742	2' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.440	89.1	0.5	63	18.1	3,628
6' – 0"	2' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	6' – 8"	1,126	2' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	2' – 0"	144	5	39' – 9"	133	25	39' – 9"	664	6' – 11"	18	16	45	0.485	108.6	0.5	63	19.9	4,407
6' – 0"	2' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	6' – 10"	1,155	2' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	2' – 0"	110	5	39' – 9"	133	25	39' – 9"	664	7' – 1"	19	18	50	0.551	109.9	0.5	69	22.6	4,463
6' – 0"	3' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	7' – 7"	854	3' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.484	96.4	0.5	63	19.9	3,918
6' – 0"	3' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	7' – 8"	1,295	3' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	3' – 0"	216	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.528	117.3	0.5	63	21.6	4,754
6' – 0"	3' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	7' – 10"	1,324	3' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	3' – 0"	164	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.601	118.1	0.5	69	24.6	4,792
6' – 0"	4' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	8' – 7"	967	4' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.527	101.0	0.5	63	21.6	4,104
6' – 0"	4' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	8' – 8"	1,464	4' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	4' – 0"	289	5	39' – 9"	133	29	39' – 9"	770	6' – 11"	18	16	45	0.571	123.3	0.5	63	23.4	4,996
6' – 0"	4' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	8' – 10"	1,493	4' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	4' – 0"	219	5	39' – 9"	133	29	39' – 9"	770	7' – 1"	19	18	50	0.650	123.7	0.5	69	26.5	5,016
6' – 0"	5' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	9' – 7"	1,080	5' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.570	108.3	0.5	63	23.3	4,395
6' – 0"	5' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	9' – 8"	1,633	5' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	5' – 0"	361	5	39' – 9"	133	33	39' – 9"	876	6' – 11"	18	16	45	0.614	132.0	0.5	63	25.1	5,343
6' – 0"	5' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	9' – 10"	1,661	5' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	5' – 0"	274	5	39' – 9"	133	33	39' – 9"	876	7' – 1"	19	18	50	0.700	131.9	0.5	69	28.5	5,345
6' – 0"	6' – 0"	8"	7"	20'	108	#6	9"	6' – 11"	1,122	108	#5	9"	10' – 7"	1,192	6' – 6"	4' – 1"	108	#5	9"	6' – 9"	760	4' – 1"	2' – 8"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.613	115.6	0.5	63	25.0	4,685
6' – 0"	6' – 0"	9"	7"	26'	108	#6	9"	6' – 11"	1,122	162	#5	6"	10' – 8"	1,802	6' – 7"	4' – 1"	162	#5	6"	6' – 10"	1,155	4' – 1"	2' – 9"	108	9"	6' – 0"	433	5	39' – 9"	133	37	39' – 9"	982	6' – 11"	18	16	45	0.657	140.7	0.5	63	26.8	5,690
6' – 0"	6' – 0"	10"	8"	30'	108	#6	9"	7' – 1"	1,149	162	#5	6"	10' – 10"	1,830	6' – 8"	4' – 2"	162	#5	6"	7' – 0"	1,183	4' – 2"	2' – 10"	82	12"	6' – 0"	329	5	39' – 9"	133	37	39' – 9"	982	7' – 1"	19	18	50	0.749	140.2	0.5	69	30.5	5,675

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		84

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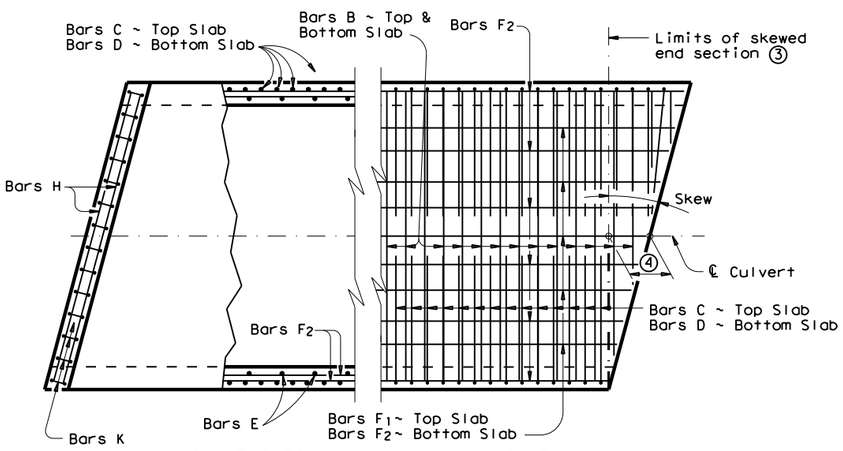


PLAN OF SKEWED ENDS ~ FROM 0° TO 15° ⑦

② When the spacing between Bars B becomes less than half of the normal spacing, bars shall be cut to avoid fouling

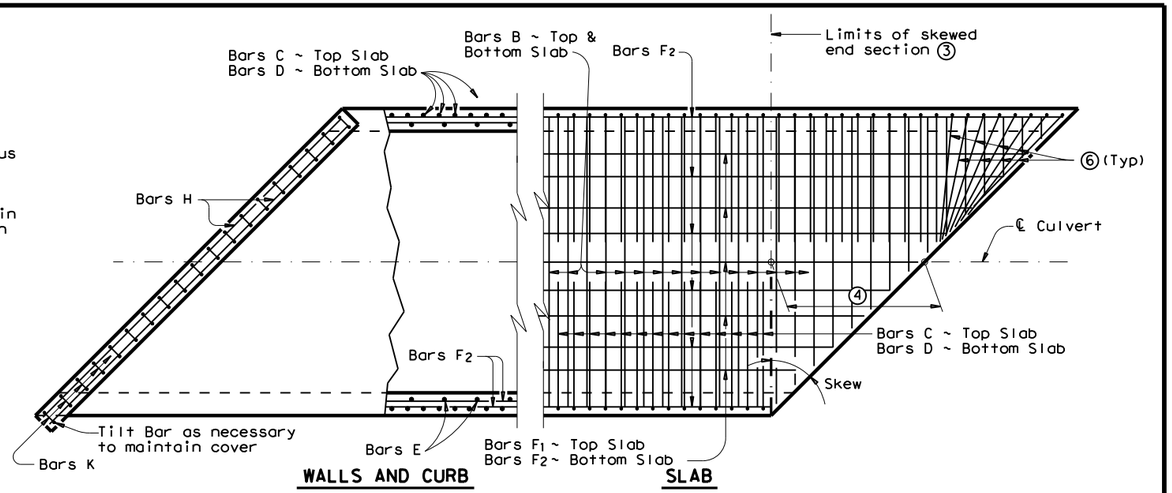
③ The length of Bars B and E will vary in the skewed end sections

④ [One half of overall width] x [Tan of the skew angle]

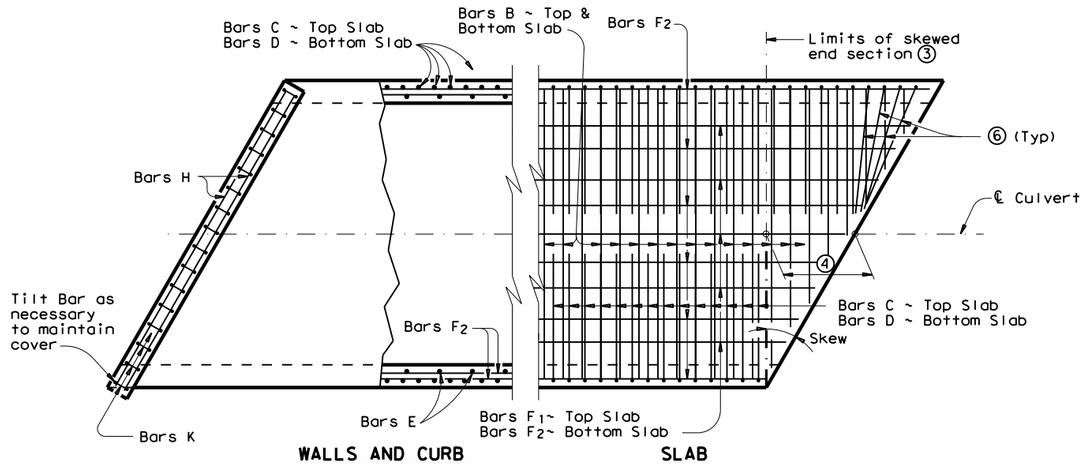
⑤ Bars F_1 and F_2 shall be continuous through the angle section. They shall be bent to remain parallel to the walls of the Box Culvert.

⑥ When necessary to avoid fouling in acute corners, the slab extension leg of Bars C and Bars D may be shortened to a minimum of 1'-6" for skews of 30° and 45°.

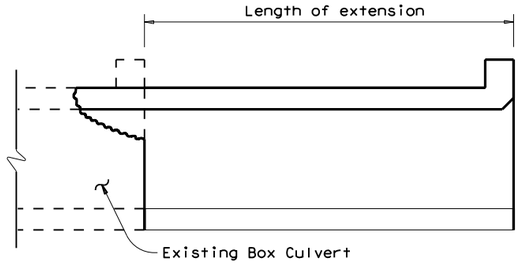
⑦ For skews of 15° or less, the contractor has the option of placing Bars B, C and D parallel to the skewed end while maintaining spacing along centerline box. Lengths of Bars B shown on the standards shall be increased to accommodate the skew.



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

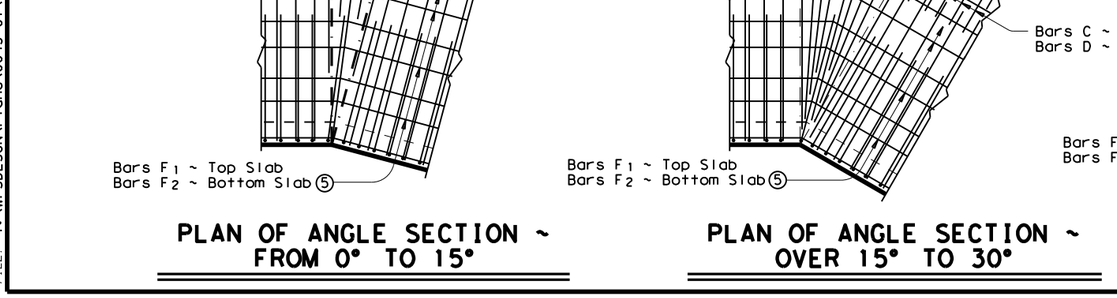


PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



LENGTHENING DETAIL ①

① For box culverts with less than 2'-0" of fill, the top slab shall be broken back to provide a minimum 1'-10" lap of the existing longitudinal bars with the longitudinal bars in the extension. If the depth of fill is 2'-0" or greater, the top slab shall be broken back to provide a 1'-0" minimum embedment of existing longitudinal reinforcing into the extension. Alternatively, if the fill height is greater than 2'-0", the existing curb may be left in place and 2'-0" long #6 bars shall be drilled and grouted 1'-0" into the existing top slab at 1'-6" center to center spacing. Wings and apron shall be broken back as necessary to install the extension. Exposed wingwall and apron reinforcing may be removed or cleaned and included in the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, horizontal and vertical transitions shall be formed as directed by the Engineer. Bottom slabs shall match to maintain an uninterrupted flow line. Existing and new reinforcing shall be field bent into transition maintaining specified cover requirements.



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" with these exceptions: use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

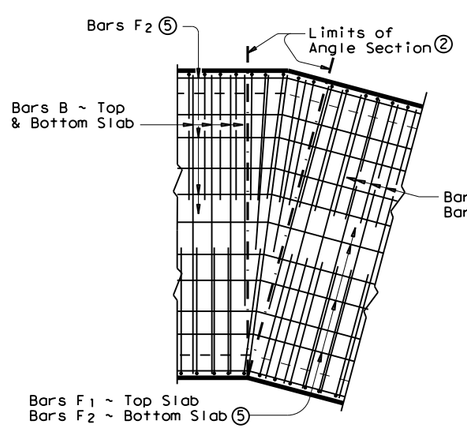
Class "C" concrete shall have a minimum compressive strength of 3,600 psi. Class "S" concrete shall have a minimum compressive strength of 4,000 psi.

The use of permanent forms is not allowed.

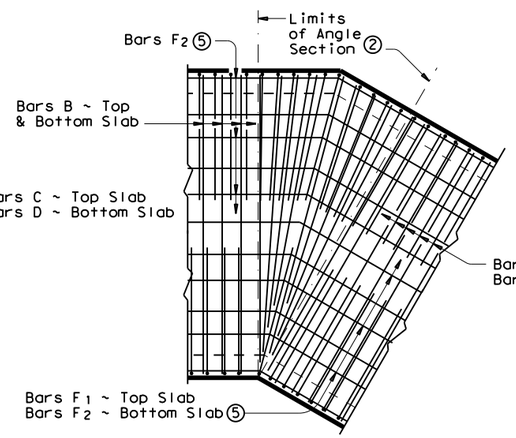
Refer to Single Box Culverts Cast-in-Place standard for details of straight sections of culvert. For skewed sections and angle sections refer to Single Box Culverts Cast-in-Place standard for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown. For Skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume and reinforcing steel weight by dividing the values shown on the culvert standards by the cosine of the skew angle.

Laps for Bars H, when required, shall be 1'-9" for uncoated bars and 2'-7" for epoxy coated.

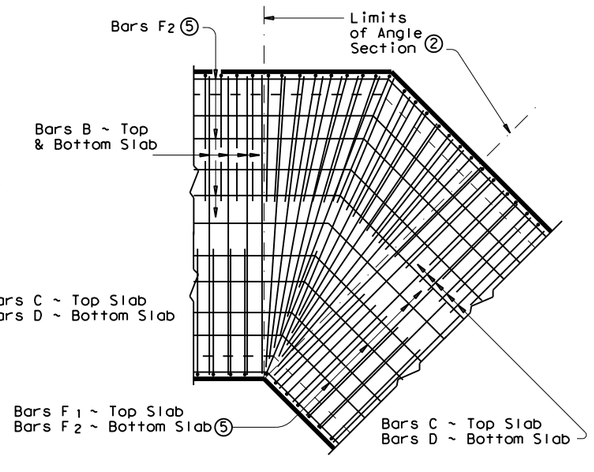
HL93 LOADING



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

FILE: sccmdste.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		85

DATE: 4/30/2021 8:53:57 AM
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DATE: 4/30/2021 8:53:59 AM
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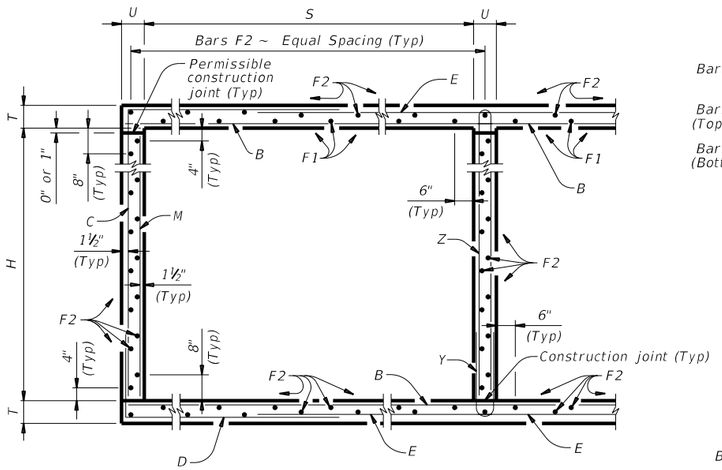
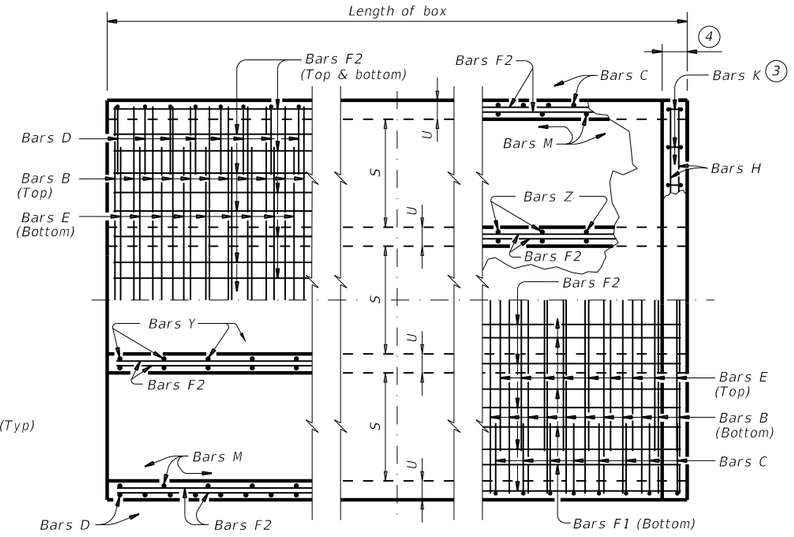
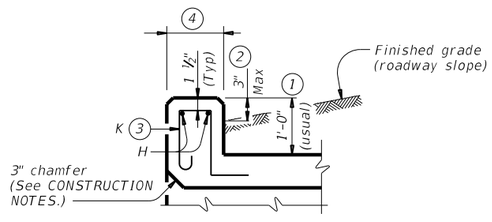


TYPICAL SECTION



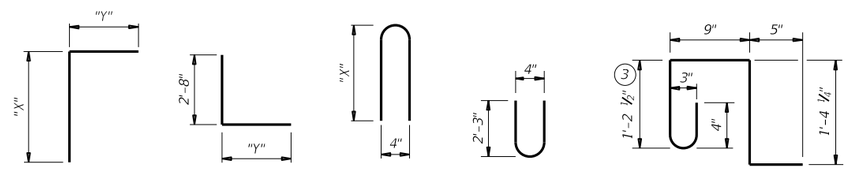
BOTTOM SLAB TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
2'-0"	2'-7 ½"	4'-1"
3'-0"	3'-7 ½"	4'-1"
4'-0"	4'-7 ½"	4'-1"
5'-0"	5'-7 ½"	4'-1"
6'-0"	6'-7 ½"	4'-1"



BARS C BARS D BARS Z BARS Y BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

(1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

(4) 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE
6'-0" SPAN
0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		86

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NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4								Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
												Bars C		Bars D																				Bars Y		Bars Z											
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Length	Wt	Length	Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	6' – 0"	2' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	44	18"	39' – 9"	1,168	108	9"	2' – 0"	144	54	9"	4' – 9"	171	5' – 5"	195	13' – 6"	36	30	84	0.894	182.4	1.0	120	36.8	7,414
3	6' – 0"	2' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	63	18"	39' – 9"	1,673	108	9"	2' – 0"	144	108	9"	4' – 9"	343	5' – 5"	391	20' – 1"	54	44	122	1.302	260.9	1.5	176	53.6	10,611
4	6' – 0"	2' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	82	18"	39' – 9"	2,177	108	9"	2' – 0"	144	162	9"	4' – 9"	514	5' – 5"	586	26' – 8"	71	56	156	1.711	339.4	2.0	227	70.4	13,801
5	6' – 0"	2' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	101	18"	39' – 9"	2,682	108	9"	2' – 0"	144	216	9"	4' – 9"	685	5' – 5"	782	33' – 3"	89	70	195	2.120	417.9	2.5	284	87.3	16,999
6	6' – 0"	2' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	6' – 8"	751	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	120	18"	39' – 9"	3,186	108	9"	2' – 0"	144	270	9"	4' – 9"	857	5' – 5"	977	39' – 10"	106	82	228	2.529	496.4	3.0	334	104.1	20,189
2	6' – 0"	3' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	3' – 0"	216	54	9"	4' – 9"	171	7' – 5"	268	13' – 6"	36	30	84	0.958	192.8	1.0	120	39.3	7,832
3	6' – 0"	3' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	3' – 0"	216	108	9"	4' – 9"	343	7' – 5"	535	20' – 1"	54	44	122	1.389	274.4	1.5	176	57.1	11,152
4	6' – 0"	3' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	3' – 0"	216	162	9"	4' – 9"	514	7' – 5"	803	26' – 8"	71	56	156	1.819	356.1	2.0	227	74.7	14,469
5	6' – 0"	3' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	3' – 0"	216	216	9"	4' – 9"	685	7' – 5"	1,070	33' – 3"	89	70	195	2.250	437.7	2.5	284	92.5	17,790
6	6' – 0"	3' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	7' – 8"	864	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	3' – 0"	216	270	9"	4' – 9"	857	7' – 5"	1,338	39' – 10"	106	82	228	2.681	519.3	3.0	334	110.2	21,107
2	6' – 0"	4' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	50	18"	39' – 9"	1,328	108	9"	4' – 0"	289	54	9"	4' – 9"	171	9' – 5"	340	13' – 6"	36	30	84	1.023	199.2	1.0	120	41.9	8,089
3	6' – 0"	4' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	71	18"	39' – 9"	1,885	108	9"	4' – 0"	289	108	9"	4' – 9"	343	9' – 5"	679	20' – 1"	54	44	122	1.475	282.6	1.5	176	60.5	11,481
4	6' – 0"	4' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	92	18"	39' – 9"	2,443	108	9"	4' – 0"	289	162	9"	4' – 9"	514	9' – 5"	1,019	26' – 8"	71	56	156	1.927	366.1	2.0	227	79.1	14,870
5	6' – 0"	4' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	113	18"	39' – 9"	3,000	108	9"	4' – 0"	289	216	9"	4' – 9"	685	9' – 5"	1,359	33' – 3"	89	70	195	2.380	449.5	2.5	284	97.7	18,264
6	6' – 0"	4' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	8' – 8"	976	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	134	18"	39' – 9"	3,558	108	9"	4' – 0"	289	270	9"	4' – 9"	857	9' – 5"	1,698	39' – 10"	106	82	228	2.832	533.0	3.0	334	116.2	21,652
2	6' – 0"	5' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	56	18"	39' – 9"	1,487	108	9"	5' – 0"	361	54	9"	4' – 9"	171	11' – 5"	412	13' – 6"	36	30	84	1.088	209.6	1.0	120	44.5	8,505
3	6' – 0"	5' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	79	18"	39' – 9"	2,098	108	9"	5' – 0"	361	108	9"	4' – 9"	343	11' – 5"	824	20' – 1"	54	44	122	1.562	296.2	1.5	176	64.0	12,024
4	6' – 0"	5' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	102	18"	39' – 9"	2,708	108	9"	5' – 0"	361	162	9"	4' – 9"	514	11' – 5"	1,235	26' – 8"	71	56	156	2.035	382.7	2.0	227	83.4	15,536
5	6' – 0"	5' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	125	18"	39' – 9"	3,319	108	9"	5' – 0"	361	216	9"	4' – 9"	685	11' – 5"	1,647	33' – 3"	89	70	195	2.509	469.3	2.5	284	102.8	19,056
6	6' – 0"	5' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	9' – 8"	1,089	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	148	18"	39' – 9"	3,930	108	9"	5' – 0"	361	270	9"	4' – 9"	857	11' – 5"	2,059	39' – 10"	106	82	228	2.983	555.9	3.0	334	122.3	22,570
2	6' – 0"	6' – 0"	9"	7"	108	#6	9"	13' – 6"	2,190	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	10' – 2"	1,649	10	18"	39' – 9"	266	62	18"	39' – 9"	1,646	108	9"	6' – 0"	433	54	9"	4' – 9"	171	13' – 5"	484	13' – 6"	36	30	84	1.153	220.0	1.0	120	47.1	8,921
3	6' – 0"	6' – 0"	9"	7"	108	#6	9"	20' – 1"	3,258	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	16' – 9"	2,717	15	18"	39' – 9"	398	87	18"	39' – 9"	2,310	108	9"	6' – 0"	433	108	9"	4' – 9"	343	13' – 5"	968	20' – 1"	54	44	122	1.648	309.7	1.5	176	67.4	12,565
4	6' – 0"	6' – 0"	9"	7"	108	#6	9"	26' – 8"	4,326	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	23' – 4"	3,785	20	18"	39' – 9"	531	112	18"	39' – 9"	2,974	108	9"	6' – 0"	433	162	9"	4' – 9"	514	13' – 5"	1,452	26' – 8"	71	56	156	2.144	399.4	2.0	227	87.7	16,204
5	6' – 0"	6' – 0"	9"	7"	108	#6	9"	33' – 3"	5,394	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	29' – 11"	4,853	25	18"	39' – 9"	664	137	18"	39' – 9"	3,638	108	9"	6' – 0"	433	216	9"	4' – 9"	685	13' – 5"	1,936	33' – 3"	89	70	195	2.639	489.1	2.5	284	108.0	19,849
6	6' – 0"	6' – 0"	9"	7"	108	#6	9"	39' – 10"	6,462	108	#5	9"	10' – 8"	1,202	6' – 9"	760	108	#6	9"	36' – 6"	5,921	30	18"	39' – 9"	797	162	18"	39' – 9"	4,302	108	9"	6' – 0"	433	270	9"	4' – 9"	857	13' – 5"	2,420	39' – 10"	106	82	228	3.134	578.9	3.0	334	128.3	23,488

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE

6'-0" SPAN

0' TO 16' FILL

MC-6-16

FILE: mc616ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		87

DATE: 4/30/2021 8:54:05 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\5. Drainage\WINGS FOR SINGLE & MULTI-BOX CULVERTS\PW-BOX CULVERTS\PW.dgn

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

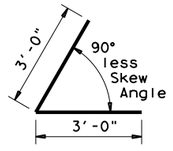
Dimensions					Variable Reinforcing				Estimated ④ Quantities per ft of wing (2~Wings)		Estimated Quantities per ft of Toewall (1~Toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'- 2"	1'- 2"	1'- 0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'- 9"	1'- 7"	1'- 2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'- 4"	2'- 0"	1'- 4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'- 0"	2'- 3"	1'- 9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'- 6"	2'- 8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'- 0"	2'-10"	2'- 2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'- 5"	3'- 0"	2'- 5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'- 2"	3'- 6"	2'- 8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'- 8"	3'- 9"	2'-11"	1'- 0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'- 2"	4'- 0"	3'- 2"	1'- 2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'- 5"	3'- 5"	1'- 4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'- 6"	4'-10"	3'- 8"	1'- 6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'- 0"	3'-11"	1'- 7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING (2~Wings)

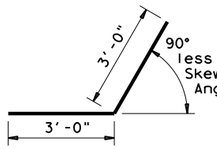
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

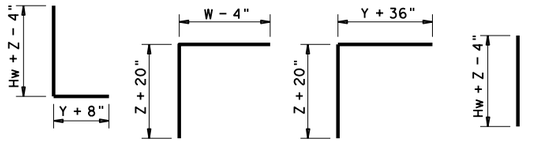
Bar	Size	No	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

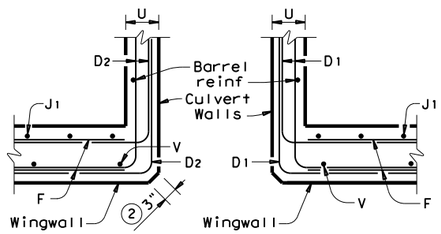
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
= (Hw - 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

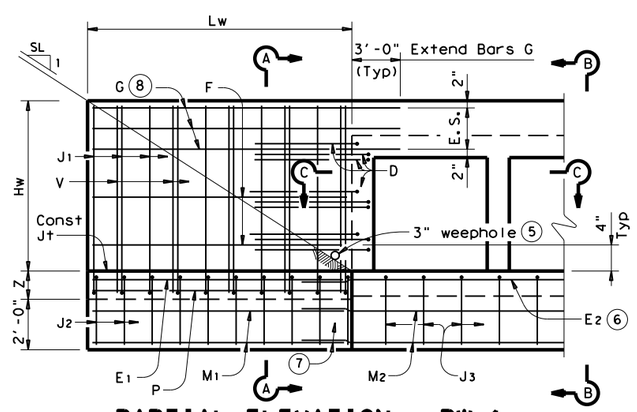
For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings ~ SF)
= (2)(Hw)(Lw) for Ty PW-1
= (2)(Hw)(Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

Hw = Height of Wingwall
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans
SL:1 = Channel Slope ratio. (Horizontal: 1 Vertical, Usual value is 2:1)
θ = Culvert Skew

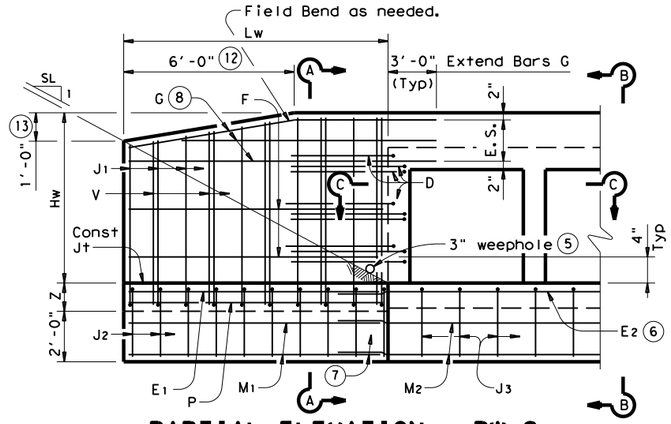
See applicable box culvert standard for S, H, T and U values.



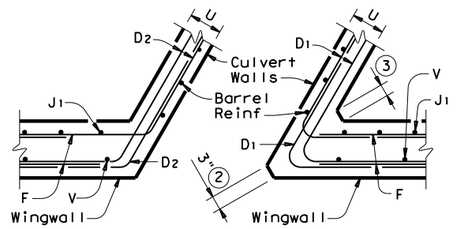
SECTION C-C



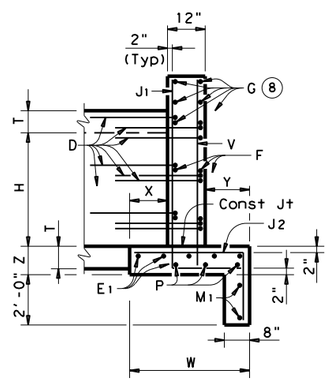
PARTIAL ELEVATION - PW-1



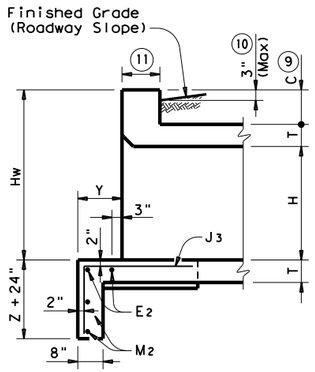
PARTIAL ELEVATION - PW-2



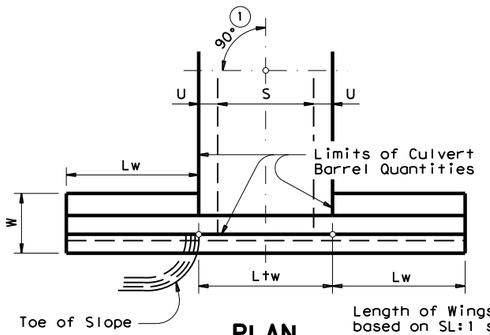
SECTION C-C



SECTION A-A
(Showing Wing Reinf)

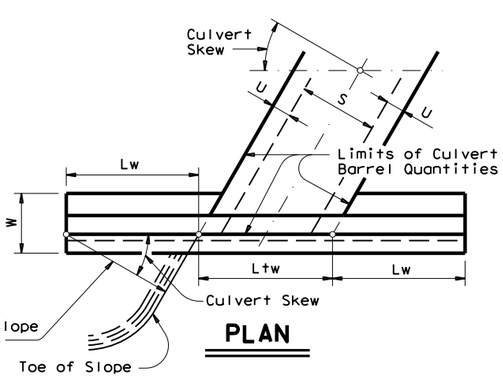


SECTION B-B
(Showing Wing Reinf)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° Skew)

1. Skew Angle = 0°
2. At discharge end, chamfer may be ¾".
3. For 15° Skew ~ 1"
   For 30° Skew ~ 2"
   For 45° Skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.
9. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, curbs cannot project more than 3" above finished grade.
    - For structures with bridge rail, build curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

GENERAL NOTES:

Designed in accordance with AASHTO LRFD Bridge Design Specifications.

Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.

Provide 1 ¼" Min clear cover to reinforcing steel.

Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.

See BCS sheet for wingwall type and additional dimensions and information.

The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DESIGNER NOTES:

Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.

Type PW-2 can only be used for applications without a railing mounted to the wingwall.

Texas Department of Transportation — Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

FILE: pwstde01.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2.	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		88

DATE: 4/30/2021 8:54:07 AM
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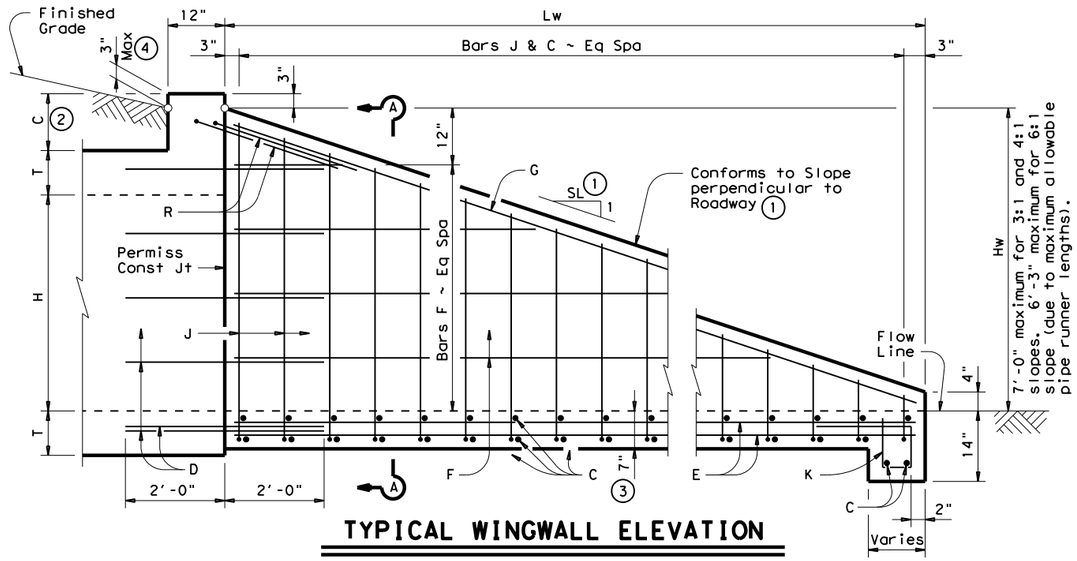
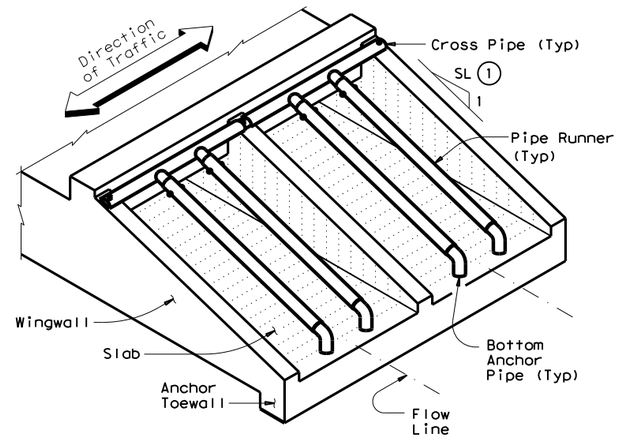


TYPICAL WINGWALL ELEVATION

(Pipe Runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

Formulas: (All values are in Feet)

Hw = H + T + C - 0.250'
Lw = (Hw - 0.333') (SL)

For Cast-in-place culverts:

Atw = (N) (S) + (N + 1) (U)

For Precast culverts:

Atw = (N) (2U + S) + (N - 1) (0.500')

Total Wingwall Area (S.F.)
= (0.5) (Hw + 0.333') (Lw) (N + 1)

Total Concrete Volume (C.Y.)
= [(Wingwall Area) (0.583') +
(Lw) (Atw) (0.583') +
(Atw) (1.167') (1.167' - 0.583')] ÷ (27)

Pipe Runner Length
= (Lw) (K1) - (1.917')

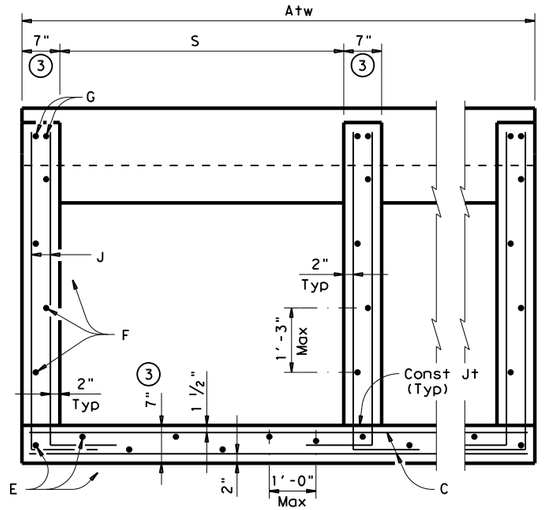
Total Reinforcing (Lbs)
= (1.55) (Lw) (Atw) +
(4.43) (Atw) +
(K2) (Hw) (N + 1) ($\sqrt{Lw}$)

C = Height of Curb above top of Top Slab
Hw = Height of Wingwall
K = Constant Value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054 ~	7.45
4:1	~ 1.031 ~	8.49
6:1	~ 1.014 ~	10.30

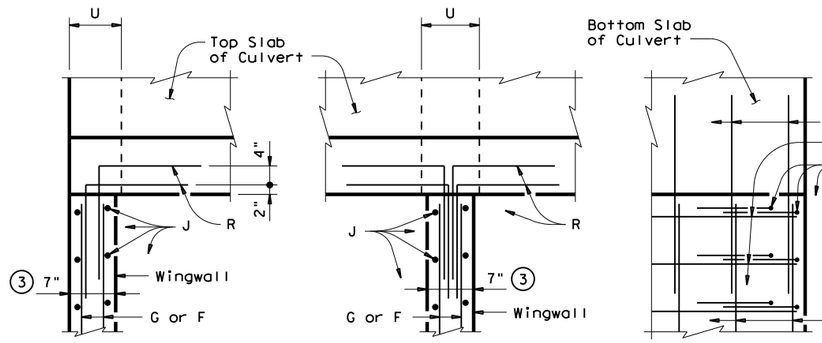
Atw = Anchor Toewall Length
Lw = Length of Wingwall
N = Number of Culvert Barrels
SL:1 = Side Slope Ratio (Horizontal : 1 Vertical)

See applicable box culvert standard for H, S, T, and U values.



SECTION A-A

(Showing typical Wingwall and Wing Slab reinforcing)
(Pipe Runners not shown for clarity)

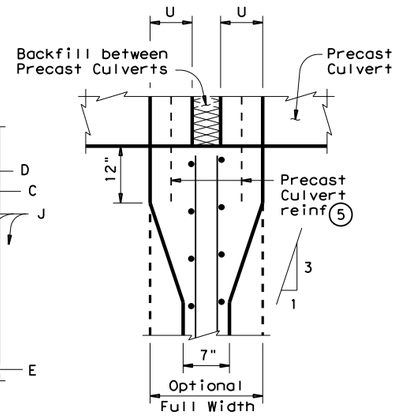


AT TOP OF EXTERIOR WINGWALL (Cast-in-Place Culvert)

AT TOP OF INTERIOR WINGWALL (Cast-in-Place Culvert)

AT OUTSIDE OF BOTTOM SLAB (Cast-in-Place Culvert)

PLAN VIEWS OF CORNER DETAILS



AT INTERIOR WINGWALL (Precast Culvert)

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

The Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.

Pipe Runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

All reinforcing steel shall be Grade 60. All reinforcing shall be adjusted as necessary to provide a minimum clear cover of 1 ¼".

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

The quantities for Pipe Runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.

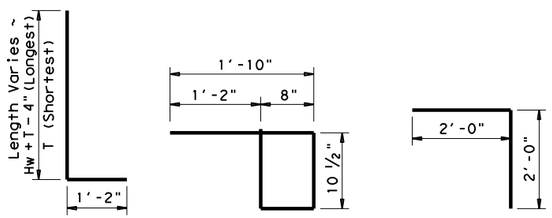
Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except the concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

See BCS standard sheet for additional dimensions and information.

Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the Safety End Treatments.



BARS J

BARS K (Length = 4'-3")

BARS R

TABLE OF REINFORCING BAR SIZES & SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	match F & E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	Shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	Shown

1. Recommended values of slope are: 3:1, 4:1, & 6:1. Slope shall be 3:1 or flatter.
2. 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to ECD standard.
3. Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
4. For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
5. For Culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into Wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the "Wingwall Connection Detail" on the SCP-MD standard.

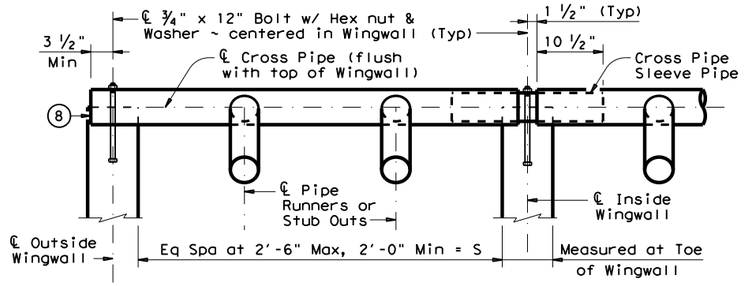
Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

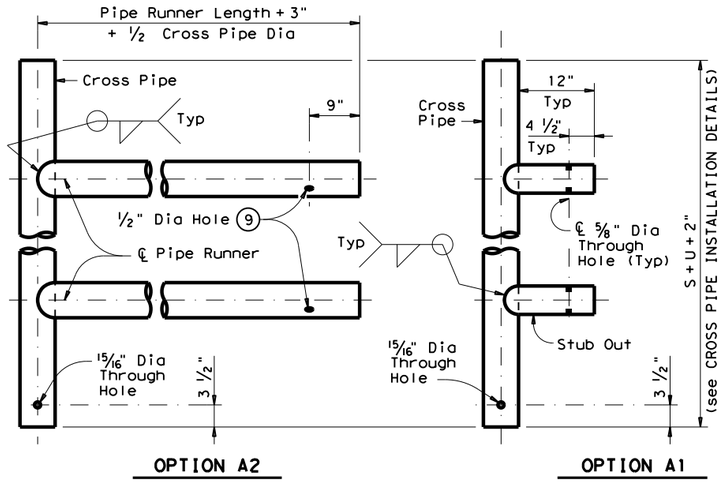
SETB-CD

FILE: setbcdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		89



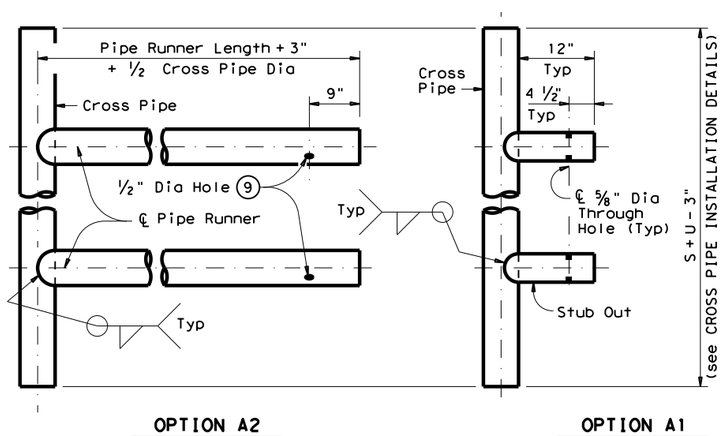
NOTE: At Contractor's option, the Cross Pipe may be made continuous across the Inside Wingwalls. If such option is selected, the Sleeve Pipe shall be omitted and a 15⁄16" diameter through hole be made in the Cross Pipe to accept the anchor bolt at the centerline of each Inside Wingwall.

CROSS PIPE INSTALLATION DETAILS



OPTION A2 OPTION A1

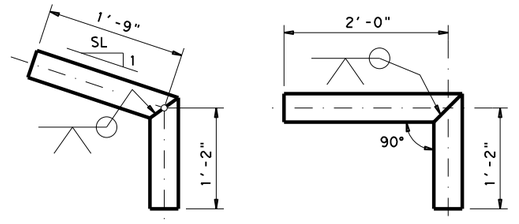
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

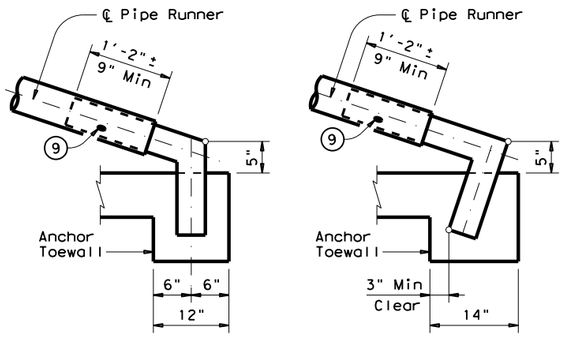
FOR USE IN INSIDE CULVERT BAY

CROSS PIPE AND CONNECTIONS DETAILS



OPTION A OPTION B

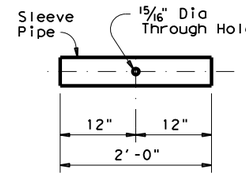
BOTTOM ANCHOR PIPE DETAILS (10)



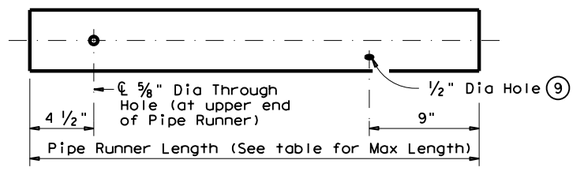
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity)

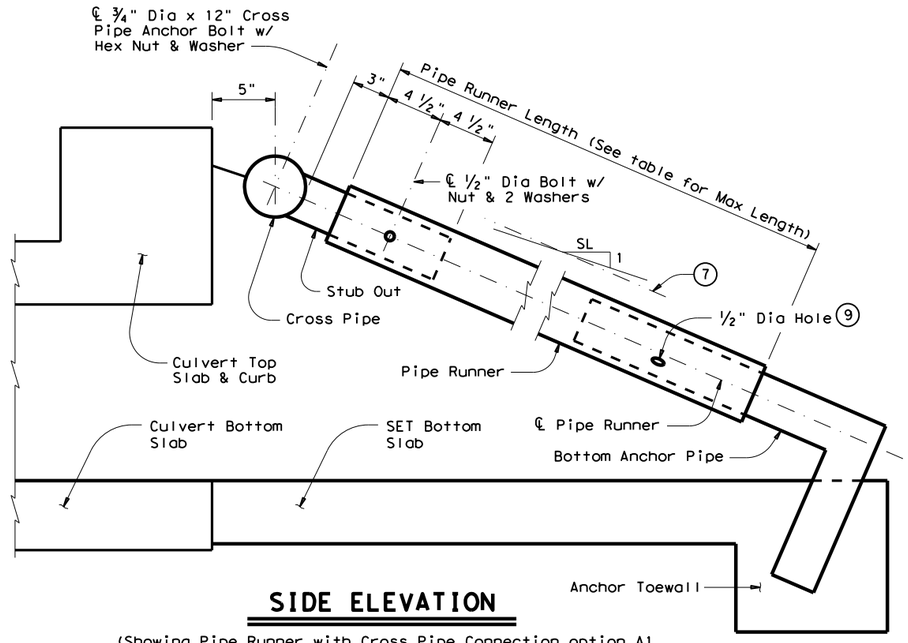


CROSS PIPE SLEEVE PIPE DETAILS



NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS



SIDE ELEVATION

(Showing Pipe Runner with Cross Pipe Connection option A1 and anchor Pipe option B2. Wingwall not shown for clarity)

(6) Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out shall be the same size as the Anchor Pipe.

(7) Note that actual slope of Safety Pipe Runner may vary slightly from Side Slope.

(8) Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, the ½" hole shall be inspected to ensure that the lap of the Safety Pipe Runner with the Bottom Anchor Pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the Runner) may be substituted for the mitered and welded joint in the Bottom Anchor Pipe.

MAXIMUM PIPE RUNNER LENGTHS & REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES (6)

Maximum Pipe Runner Length	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
10'- 0"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'- 8"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
34'- 2"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

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SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

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©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
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	WFS	WILBARGER		90

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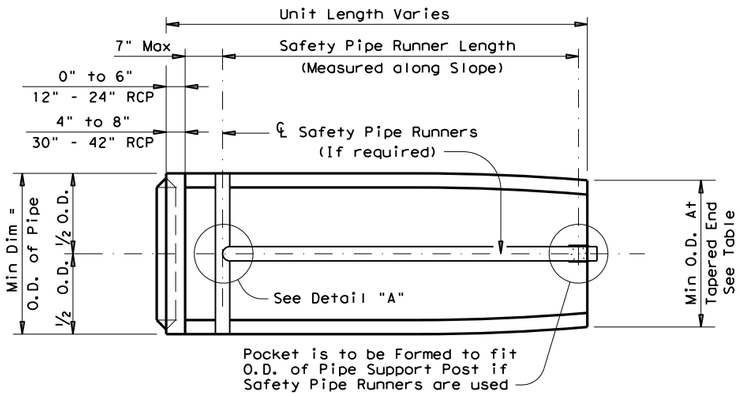
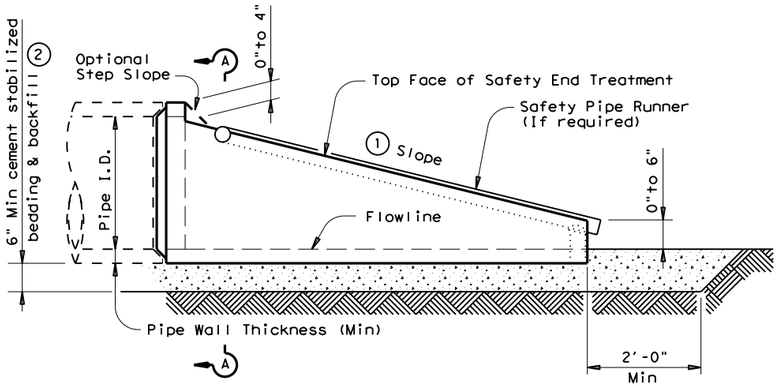


PLAN VIEW



LONGITUDINAL ELEVATION

Maximum Safety Pipe Runner Lengths & Required Safety Pipe Runner Sizes			
Maximum Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11'- 2"	3" STD	3.500"	3.068"
15'- 6"	3 ½" STD	4.000"	3.548"
20'-10"	4" STD	4.500"	4.026"
35'- 4"	5" STD	5.563"	5.047"

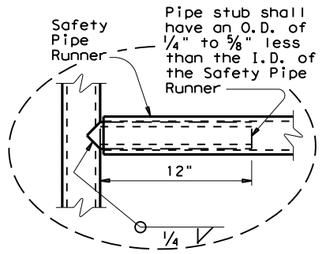
(1) Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.

(2) Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the Safety End Treatment backfill shall be as directed by Engineer.

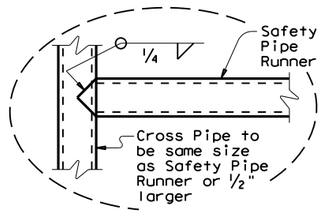
(3) The top 4" of void between Precast End Treatments shall be filled with concrete Riprap and shall be considered subsidiary to Safety End Treatment.

(4) Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

PIPE I.D.	MINIMUM WALL THICKNESS	MINIMUM O.D.	MIN O.D. AT TAPERED END	MIN REINF REQUIREMENTS (Sq in/ft of pipe)	SLOPE	MINIMUM LENGTH OF UNIT	SINGLE PIPE		MULTIPLE PIPE	
							SKEW	PIPE RUNNERS REQUIRED	SKEW	PIPE RUNNERS REQUIRED
12"	2"	16"	16"	0.07 CIRC.	3:1	2'-0"	<=45 deg	No	<=45 deg	No
					4:1	2'-8"				
					6:1	4'-0"				
15"	2 ¼"	19 ½"	19"	0.07 CIRC.	3:1	2'-10"	<=45 deg	No	<=45 deg	No
					4:1	3'-9"				
					6:1	5'-8"				
18"	2 ½"	23"	21 ½"	0.07 CIRC.	3:1	3'-8"	<=45 deg	No	<=45 deg	No
					4:1	4'-10"				
					6:1	7'-3"				
24"	3"	30"	27"	0.07 CIRC.	3:1	5'-3"	<=45 deg	No	<=30 deg	No
					4:1	7'-0"			>30 deg	Yes
					6:1	10'-6"				
30"	3 ½"	37"	31"	0.18 CIRC.	3:1	6'-3"	<=15 deg	No	<=15 deg	No
					4:1	8'-2"				
					6:1	12'-1"	>15 deg	Yes	>15 deg	Yes
36"	4"	44"	36"	0.19 ELIP.	3:1	7'-10"	=0 deg	No	=>0 deg	Yes
					4:1	10'-4"				
					6:1	15'-4"	>0 deg	Yes		
42"	4 ½"	51"	41 ½"	0.23 ELIP.	3:1	9'-6"	=>0 deg	Yes	=>0 deg	Yes
					4:1	12'-6"				
					6:1	18'-7"				

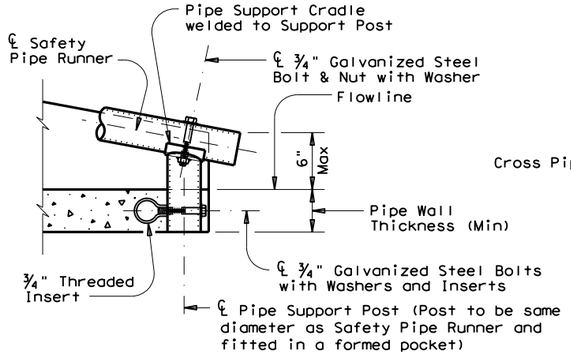


OPTION A



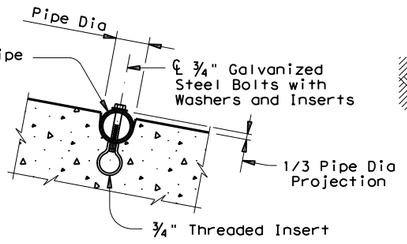
OPTION B

DETAIL A



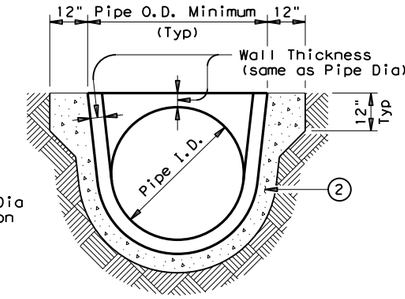
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

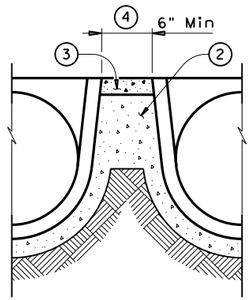


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



SECTION A-A



MULTIPLE PIPE INSTALLATION

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

All precast concrete end sections shall be manufactured in accordance with Item "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Precast concrete end sections shall be provided with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

Pipe Runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety Pipe Runners, Cross Pipes, Pipe Support Posts, and Pipe Stubs shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-RC

FILE: psetrcss.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
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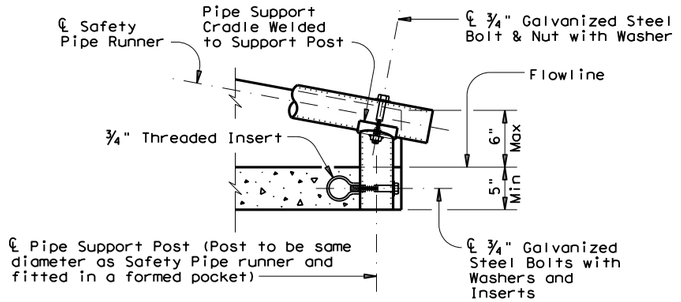
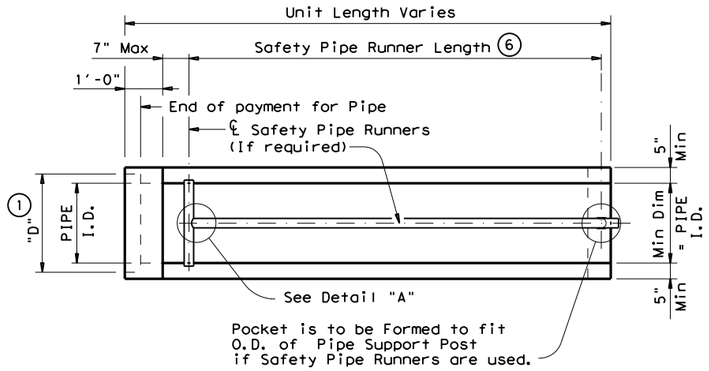
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		91

PIPE I.D.	PIPE WALL "B" THICKNESS	① "D"	SLOPE	MINIMUM LENGTH OF UNIT	SINGLE PIPE		MULTIPLE PIPE	
					SKEW	PIPE RUNNERS REQUIRED	SKEW	PIPE RUNNERS REQUIRED
12"	2"	17"	3:1	2'-11"	<=45 deg	No	<=45 deg	No
			4:1	3'-6"				
			6:1	4'-9"				
15"	2 ¼"	20 ½"	3:1	3'-8"	<=45 deg	No	<=45 deg	No
			4:1	4'-7"				
			6:1	6'-5"				
18"	2 ½"	24"	3:1	4'-6"	<=45 deg	No	<=45 deg	No
			4:1	5'-8"				
			6:1	8'-0"				
24"	3"	31"	3:1	6'-2"	<=45 deg	No	<=30 deg	No
			4:1	7'-10"			>30 deg	Yes
			6:1	11'-3"				
30"	3 ½"	38 ½"	3:1	7'-10"	<=15 deg	No	<=15 deg	No
			4:1	10'-1"				
			6:1	14'-8"	>15 deg	Yes	>15 deg	Yes
36"	4"	45 ½"	3:1	9'-5"	=0 deg	No	=>0 deg	Yes
			4:1	12'-3"				
			6:1	17'-11"	>0 deg	Yes		
42"	4 ½"	52 ½"	3:1	11'-1"	=>0 deg	Yes	=>0 deg	Yes
			4:1	14'-5"				
			6:1	21'-2"				

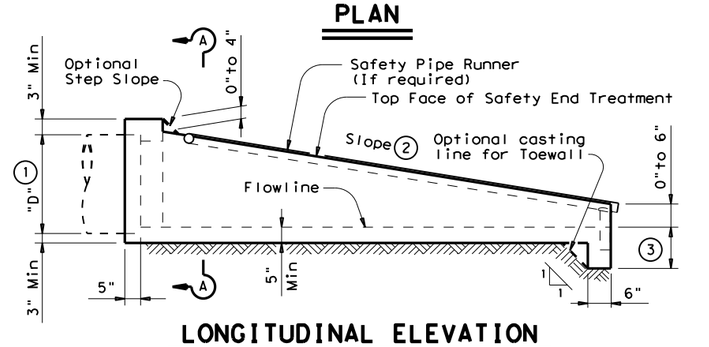


END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

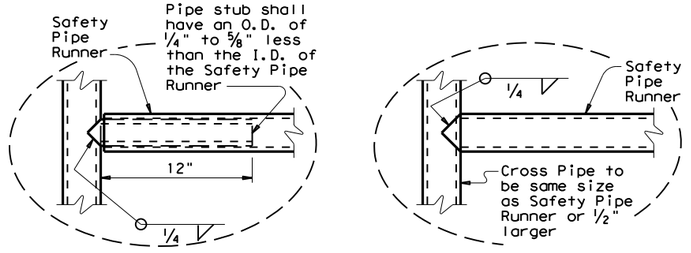
(If required)



PLAN

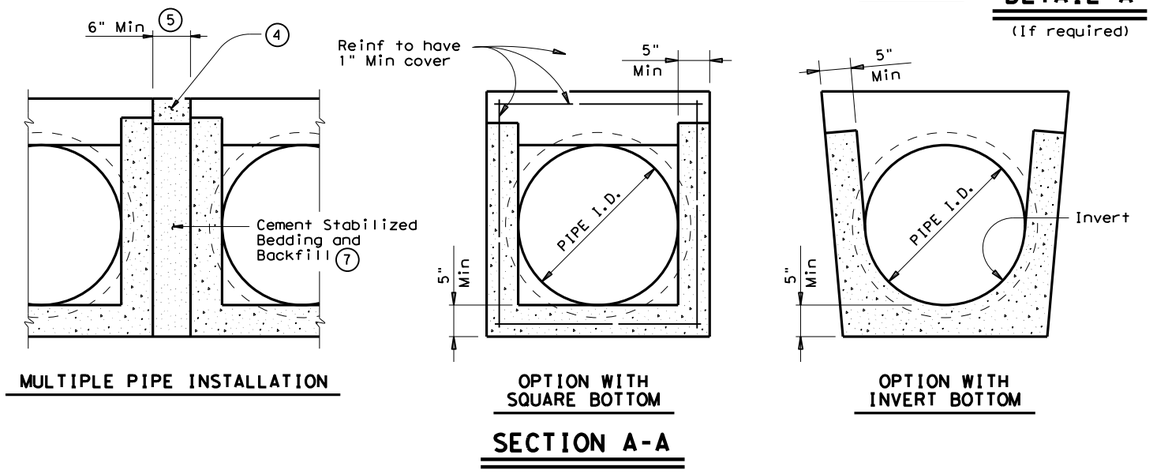


LONGITUDINAL ELEVATION

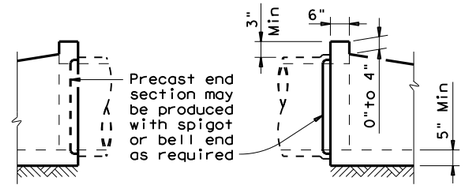


DETAIL A

(If required)



SECTION A-A



OPTIONAL JOINT

(Showing joint between RCP and Precast Safety End Treatment)

Maximum Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11'- 2"	3" STD	3.500"	3.068"
15'- 6"	3 ½" STD	4.000"	3.548"
20'-10"	4" STD	4.500"	4.026"
35'- 4"	5" STD	5.563"	5.047"

① Dimension "D" is based on ASTM C-76, Class III, Wall thickness "B". If any other wall thickness is used, dimension "D" must be adjusted accordingly.

② Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

③ Toewall to be used only when dimension is shown elsewhere in the plans.

④ The top 4" of void between precast end treatments shall be filled with concrete riprap and shall be considered subsidiary to Safety End Treatment.

⑤ Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

⑥ Measured along Slope.

⑦ Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill shall be as directed by Engineer.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture of this product shall conform to requirements of Item "Safety End Treatment" except as noted below :

A. Minimum reinforcing shall be #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6 x 6 - W12 x W12 or 5 x 5 - W10 x W10 welded wire reinforcement (WWR).

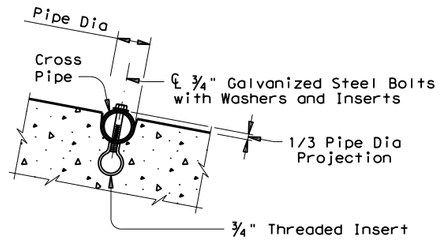
B. Concrete for precast (steel formed) sections shall be Class "C" with a minimum compressive strength of 3600 psi.

At the option and expense of the Contractor the next larger size of Safety End Treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe Runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety Pipe Runners, Cross Pipes, Pipe Support Posts, and Pipe Stubs shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

FILE: psetscss.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-10: Add note for synthetic fibers.	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		92

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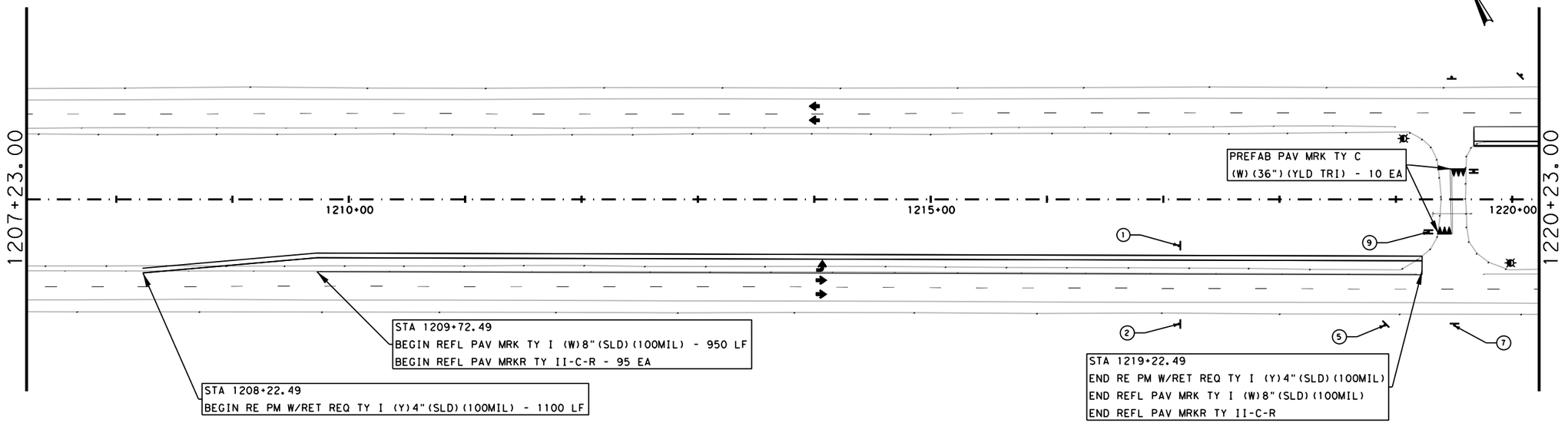

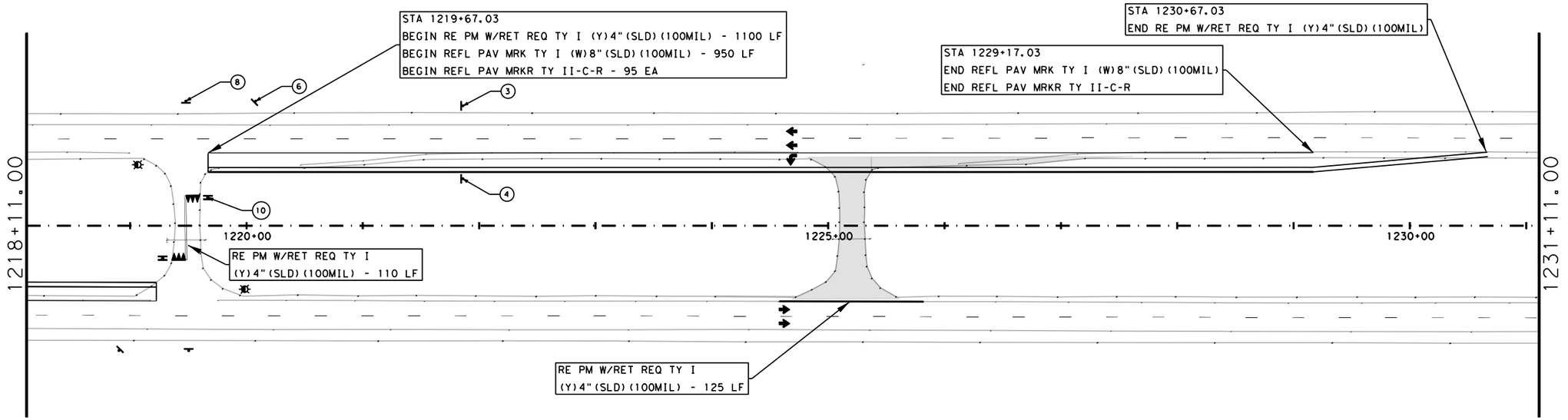

LEGEND

(X) SIGN TO BE INSTALLED

DEL ASSM (D-DY)

GENERAL NOTES

1. REMOVE & REPLACE ALL SIGNS. REFERENCE THE CROSSOVER LAYOUT SHEET FOR SIGN PLACEMENT. ADD SIGNS WHERE NEEDED.
2. REFER TO SOSS SHEET FOR THE PROPOSED CROSSOVER LAYOUT.

SCALE
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SHEET 1 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		93

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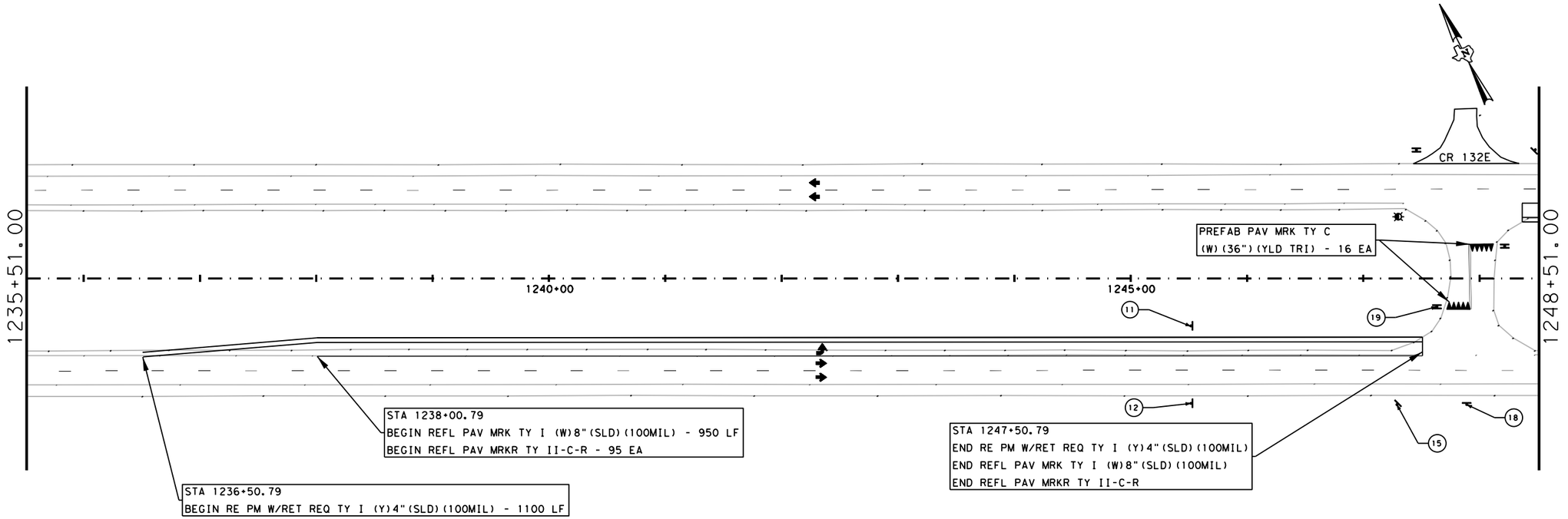

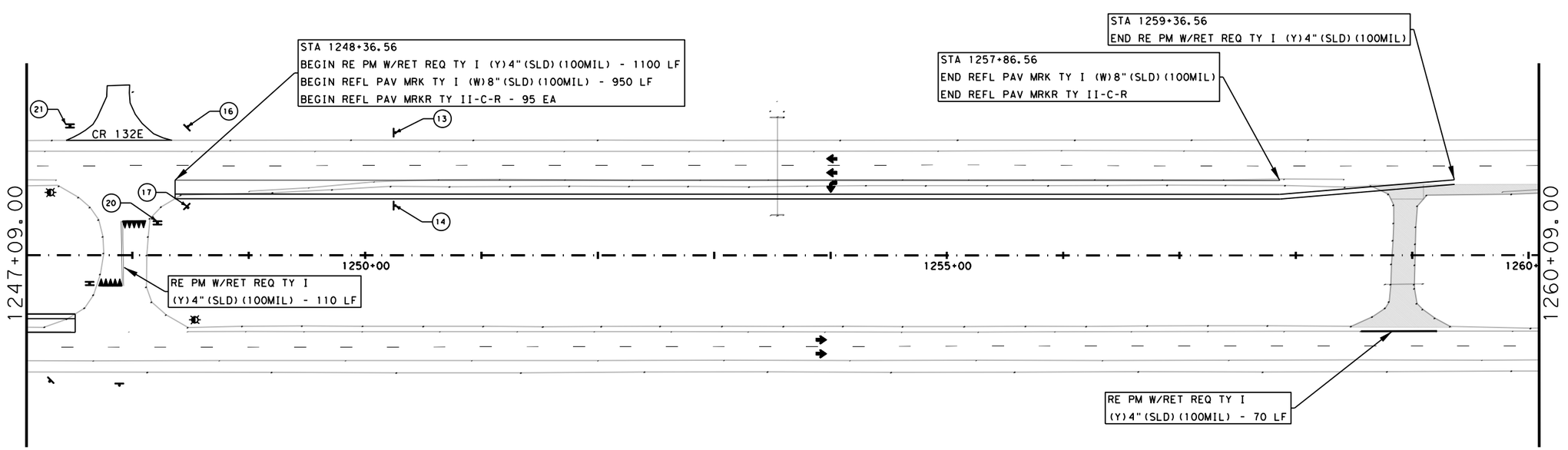

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0043	07	119	US 287
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WFS	WILBARGER		94

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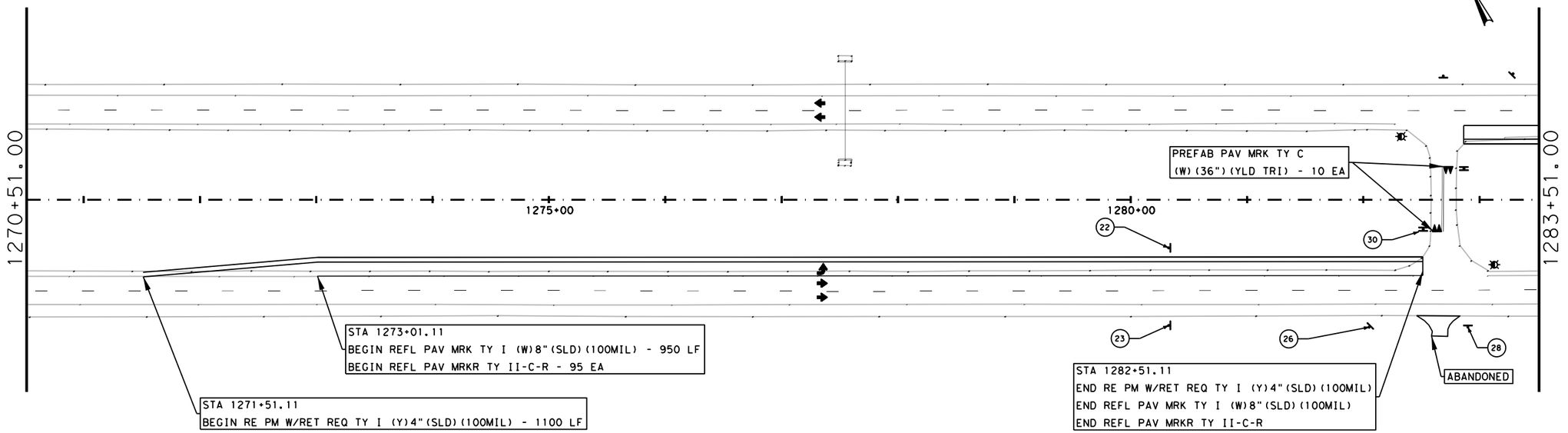

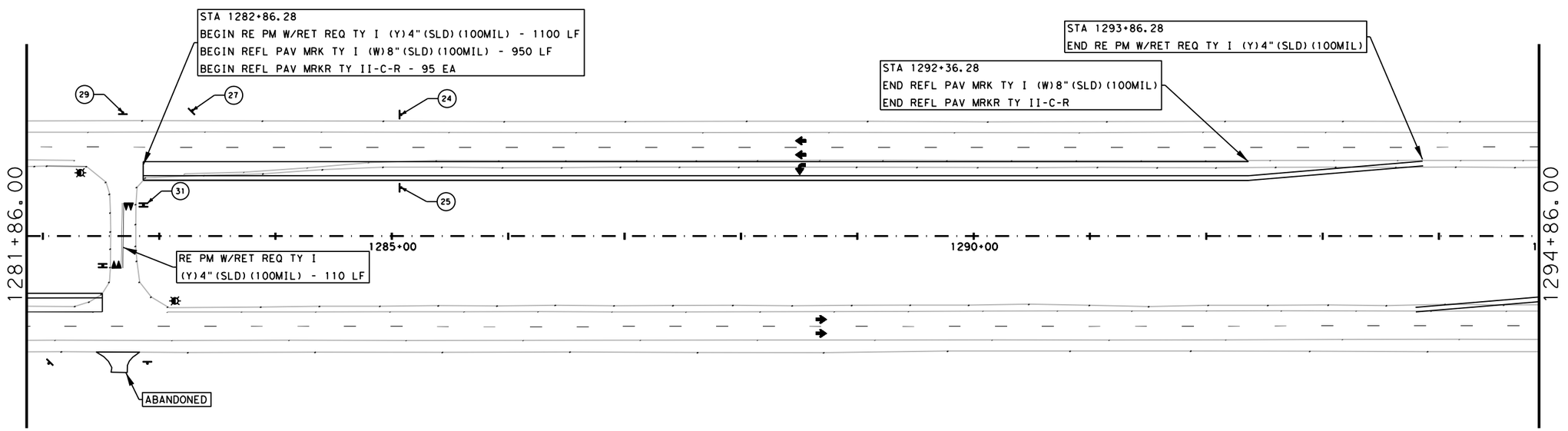

LEGEND

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0043	07	119	US 287
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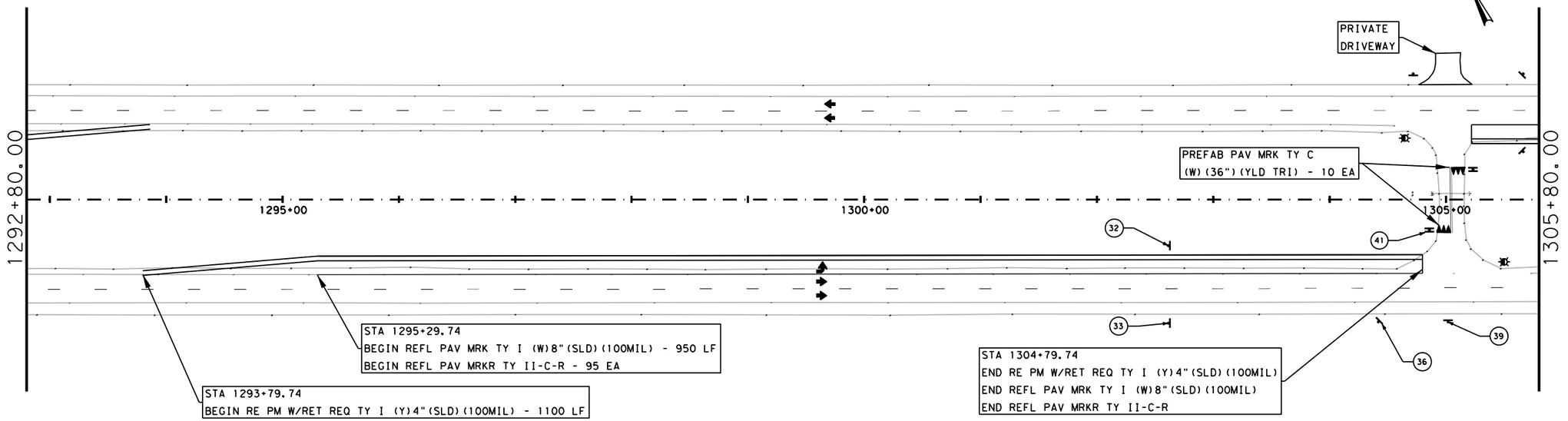

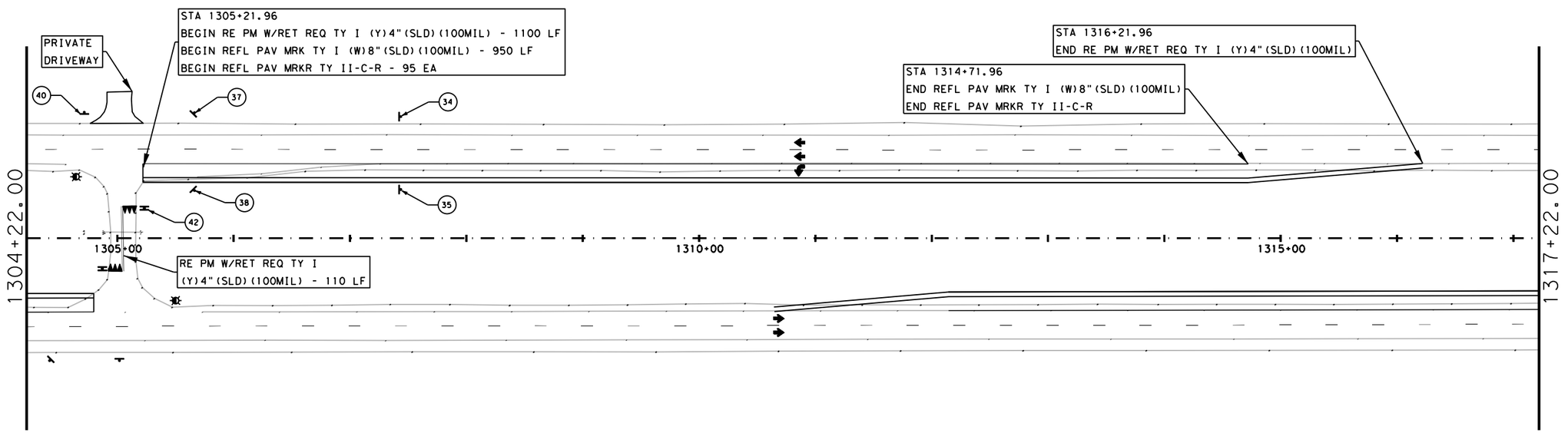

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0043	07	119	US 287
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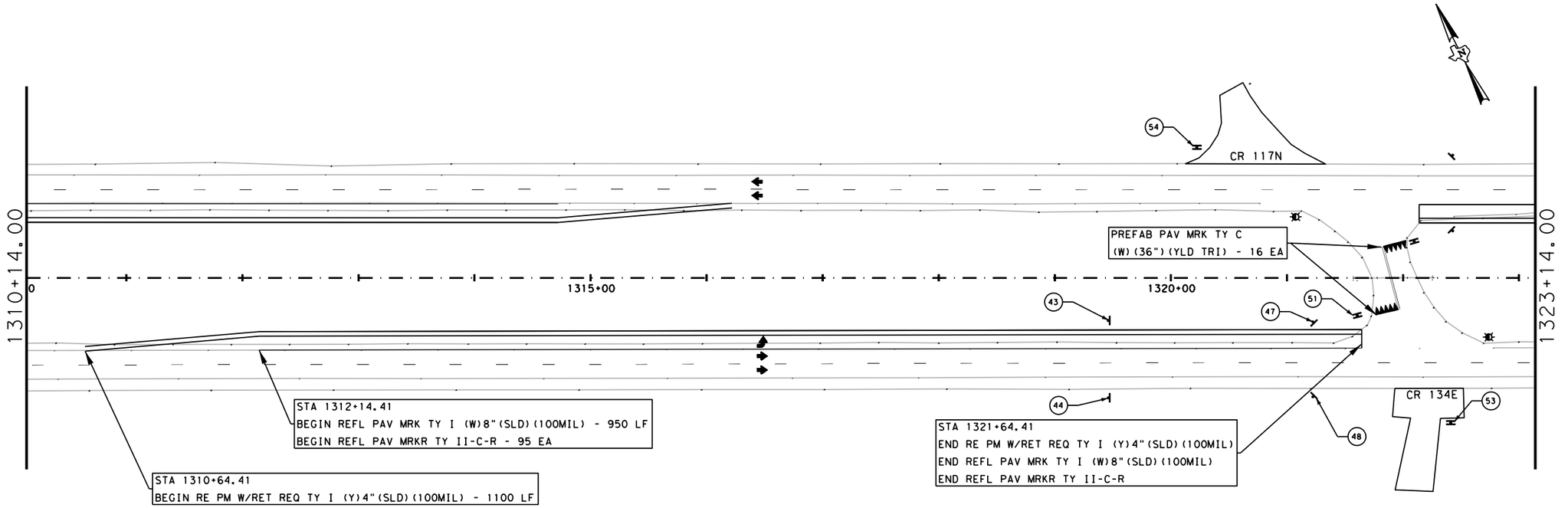

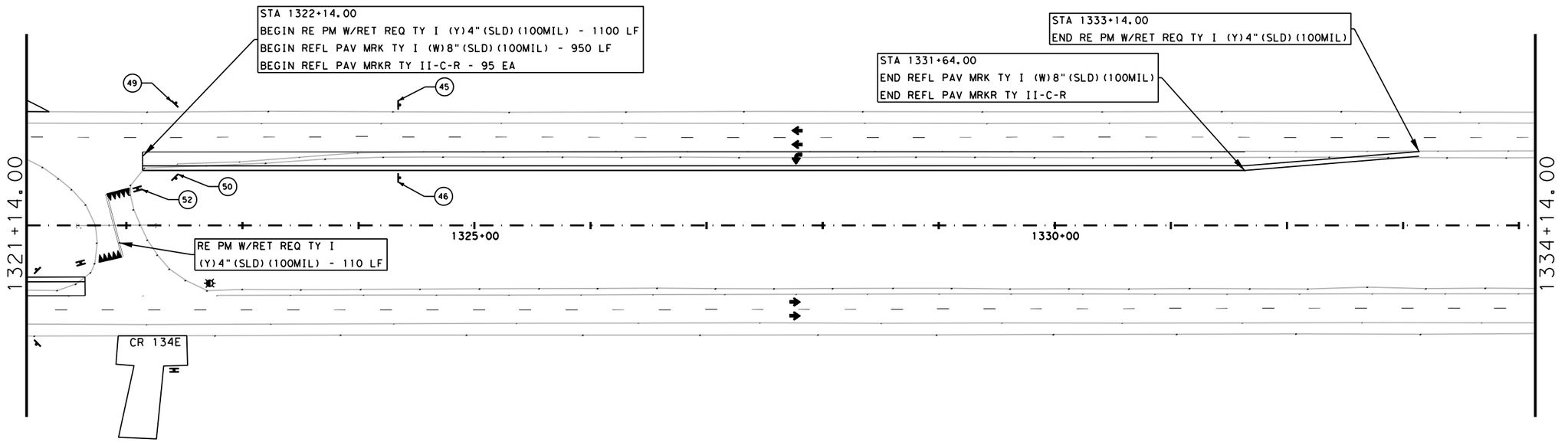

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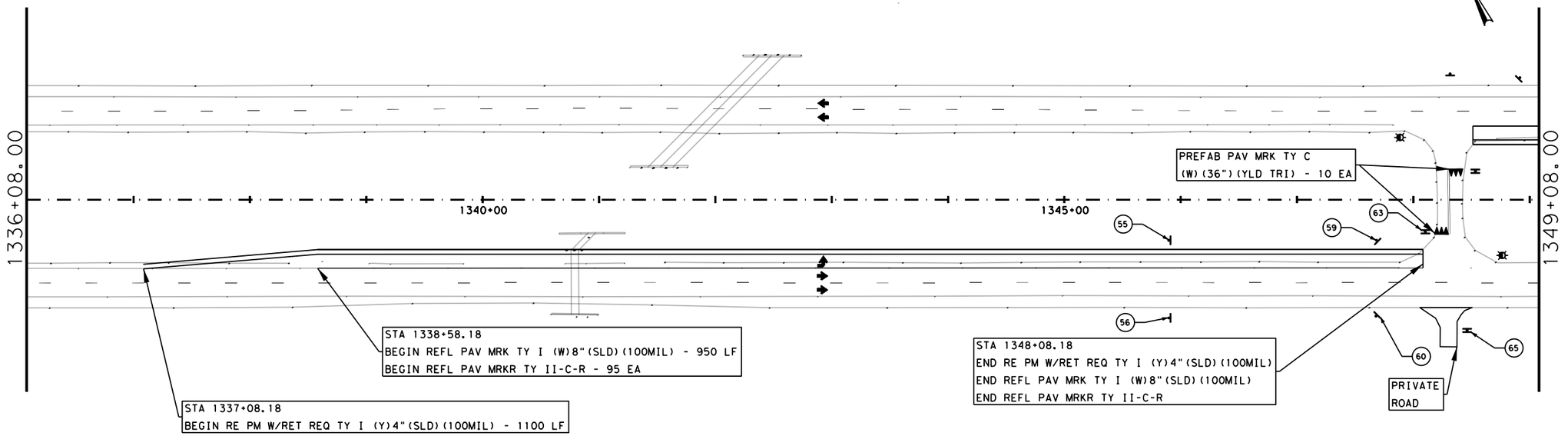

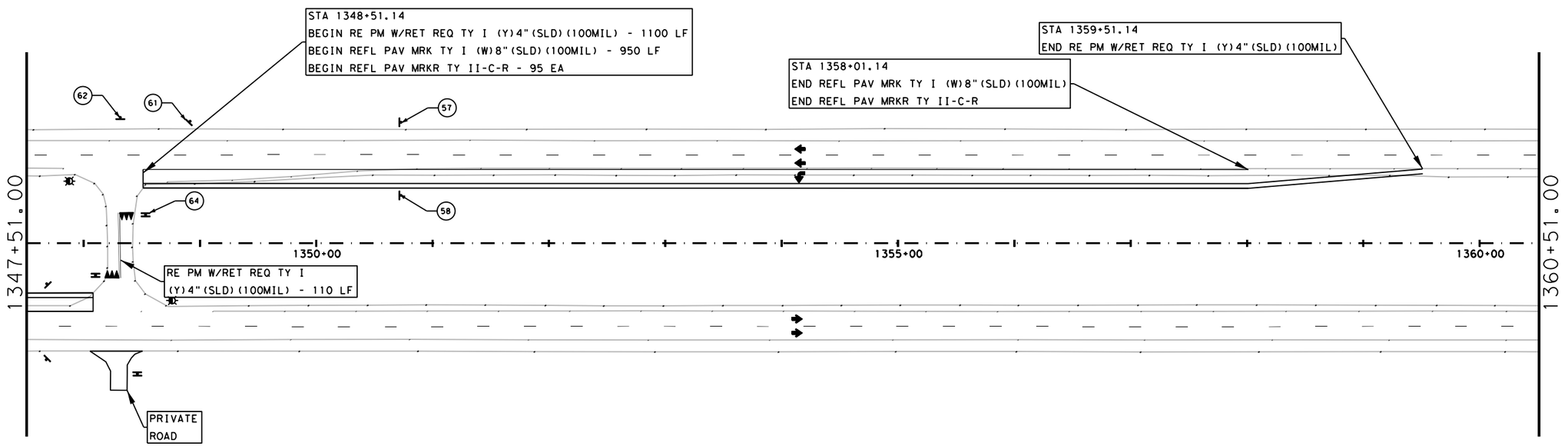

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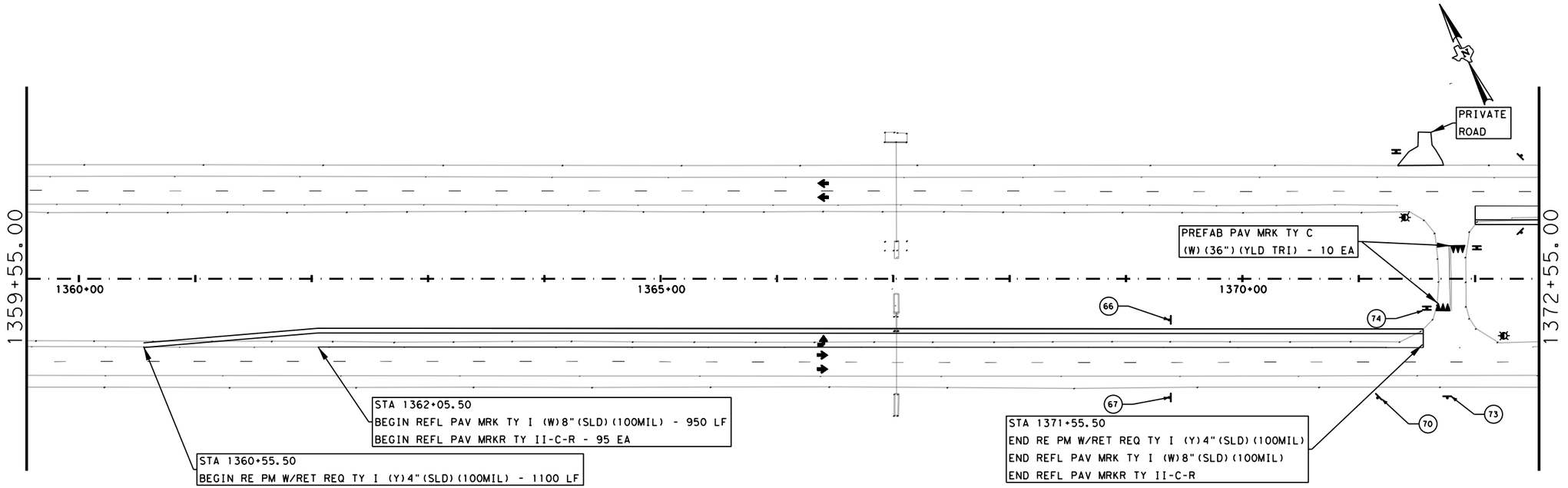

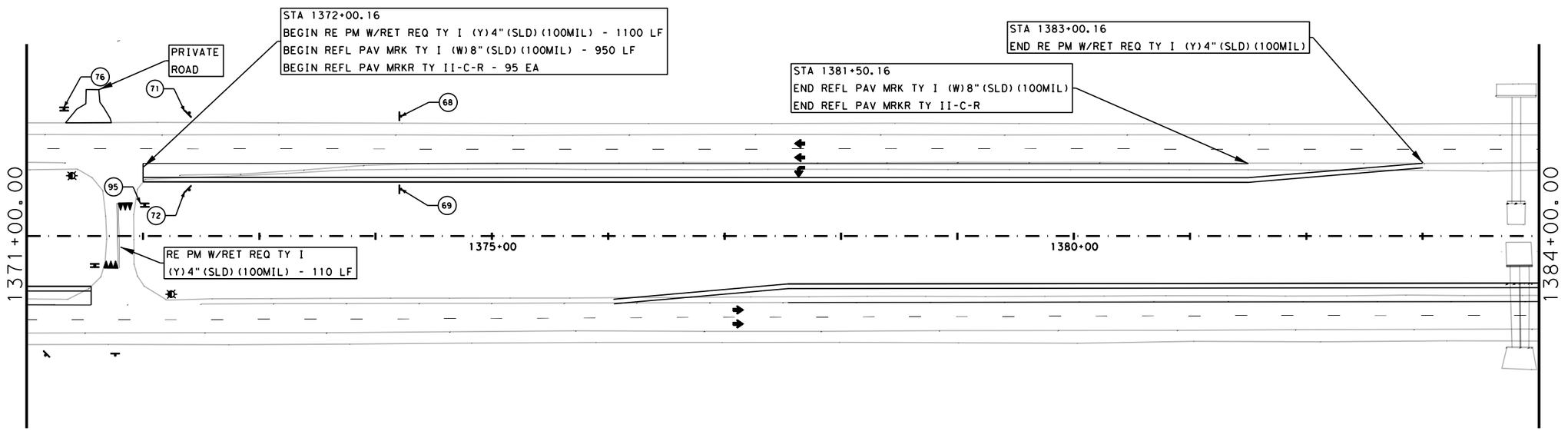

LEGEND

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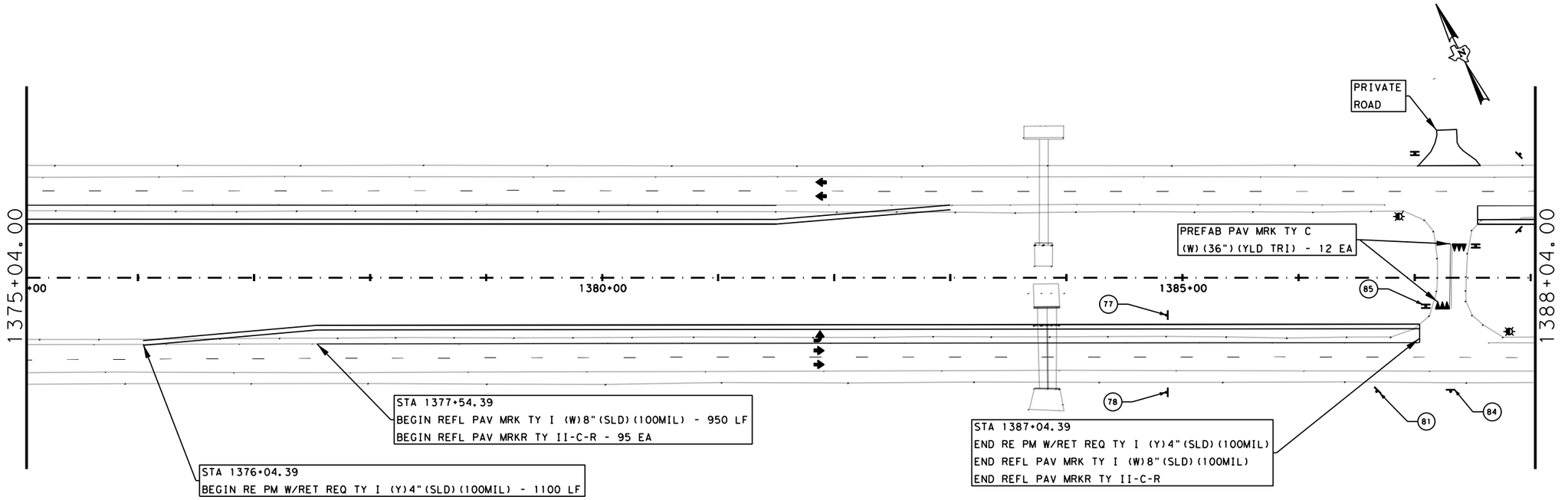

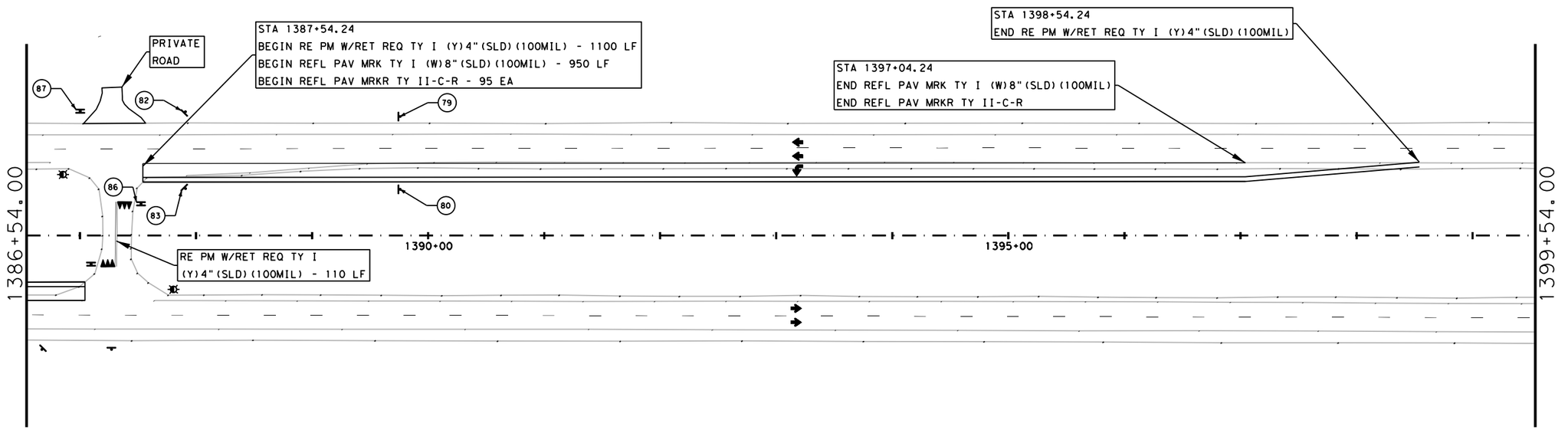

LEGEND

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CONT	SECT	JOB	HIGHWAY
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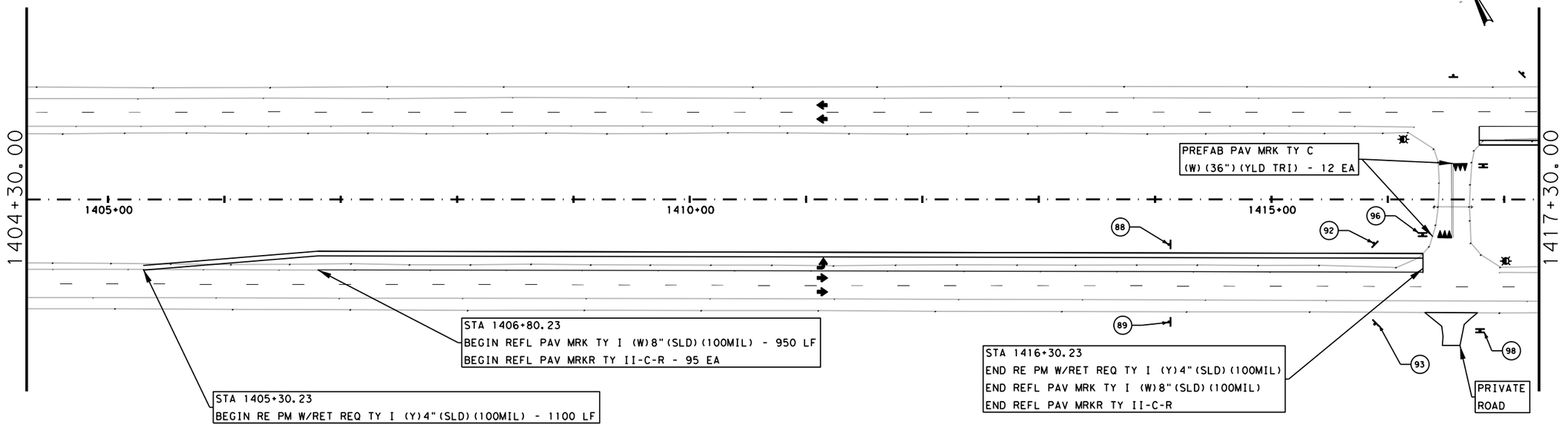

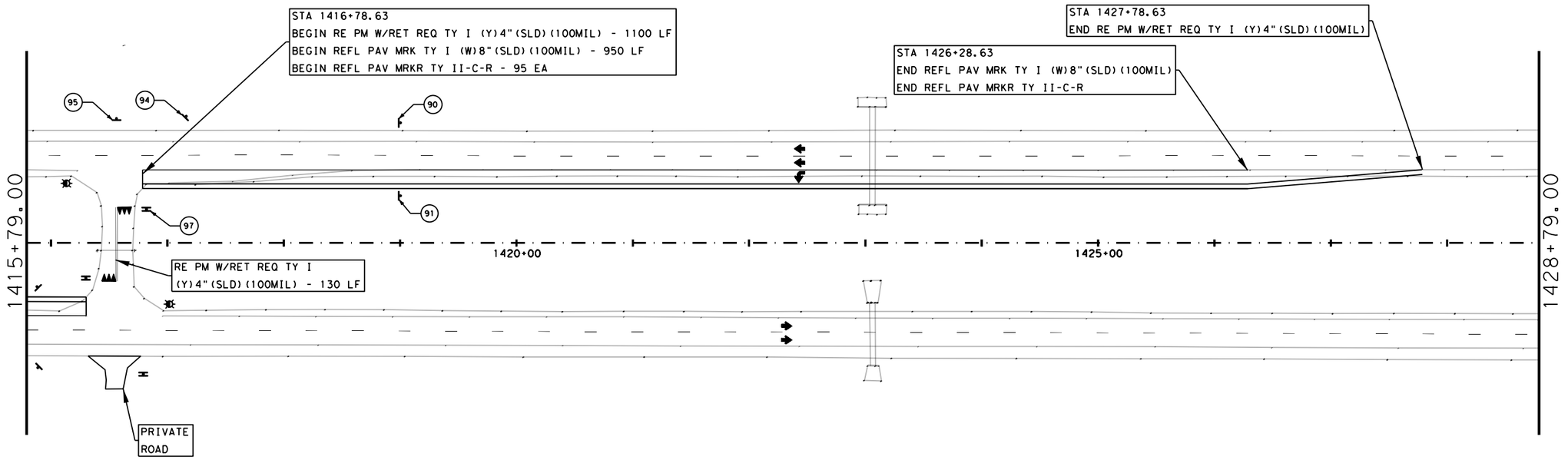

LEGEND

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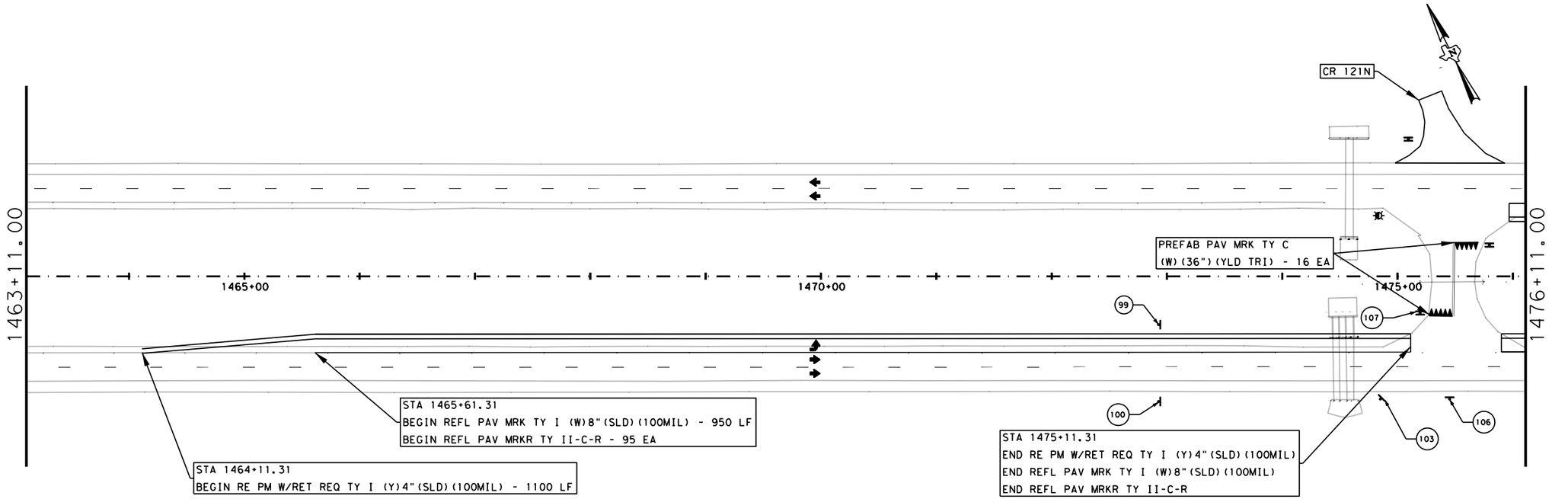

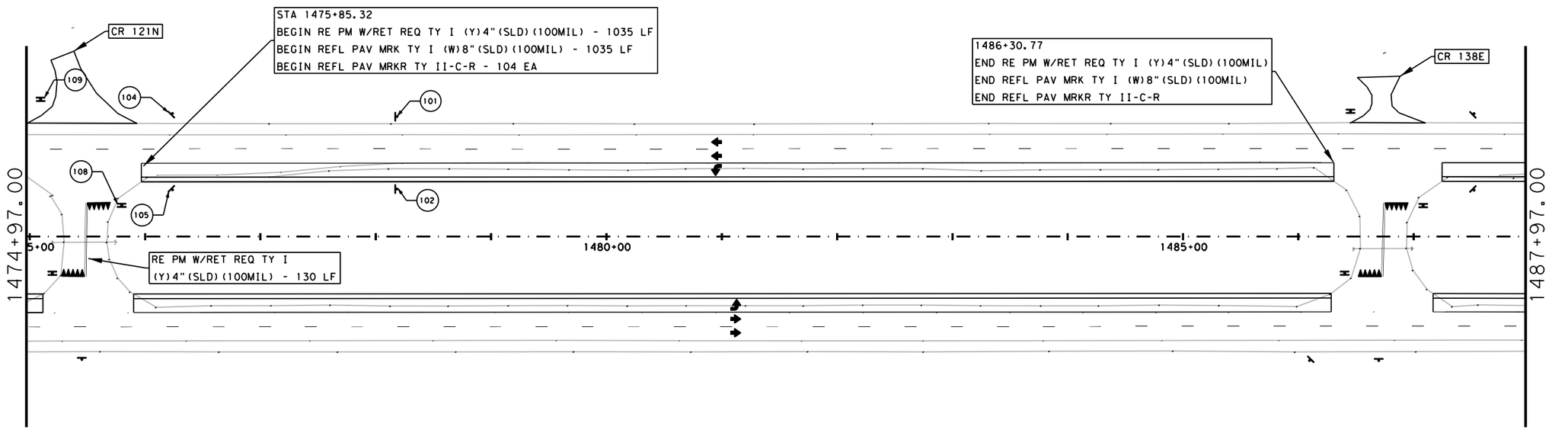

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SHEET 10 OF 12

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY		SHEET NO.
WFS	WILBARGER		102

DATE: 4/30/2021 8:55:05 AM
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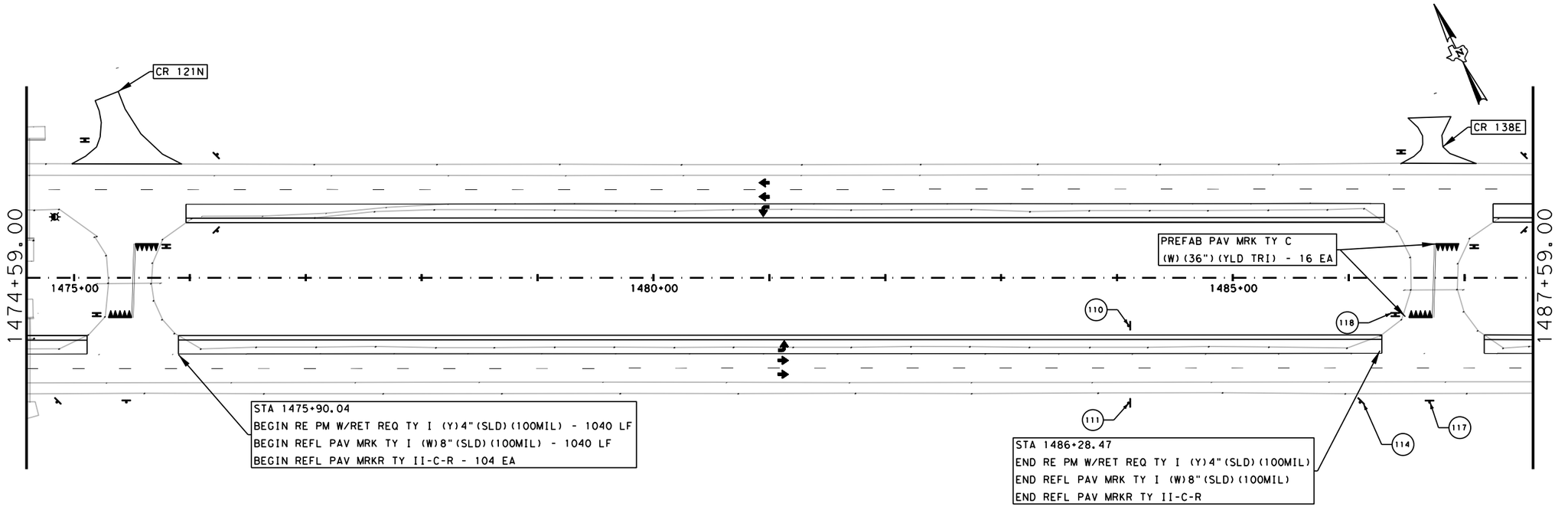

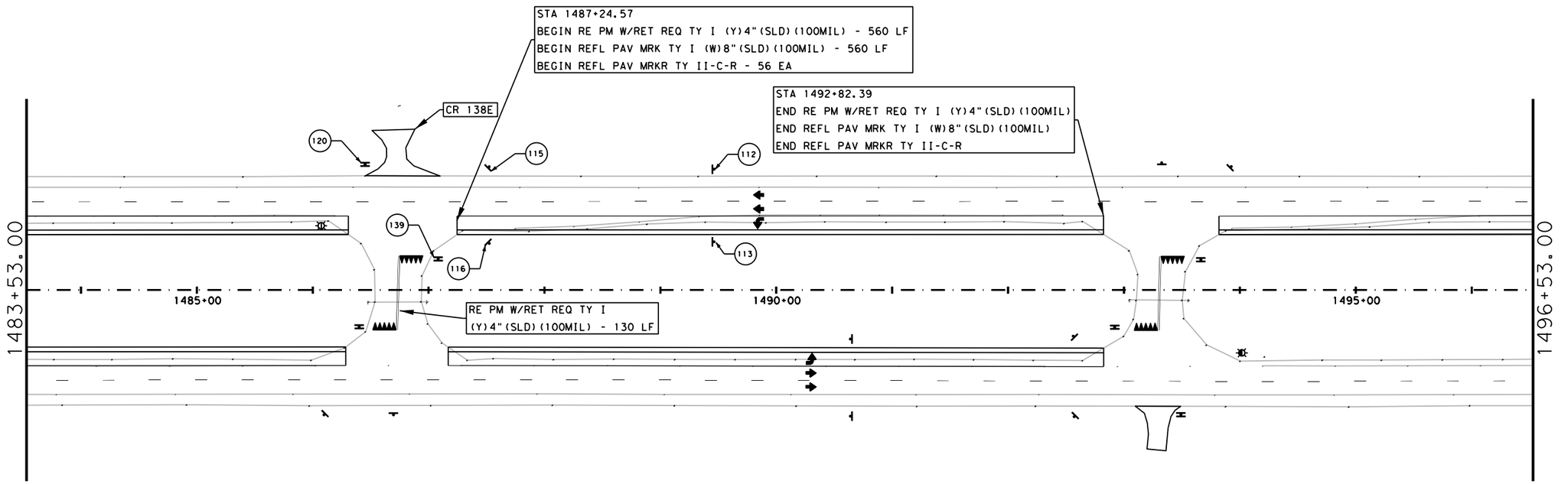

LEGEND

(X) SIGN TO BE INSTALLED

DEL ASSM (D-DY)

GENERAL NOTES

1. REMOVE & REPLACE ALL SIGNS. REFERENCE THE CROSSOVER LAYOUT SHEET FOR SIGN PLACEMENT. ADD SIGNS WHERE NEEDED.
2. REFER TO SOSS SHEET FOR THE PROPOSED CROSSOVER LAYOUT.

SCALE
0 50 100

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
PAVEMENT MARKS AND SMALL SIGN PLAN

2021 Texas Department of Transportation®

SHEET 11 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		103

DATE: 4/30/2021 8:55:08 AM
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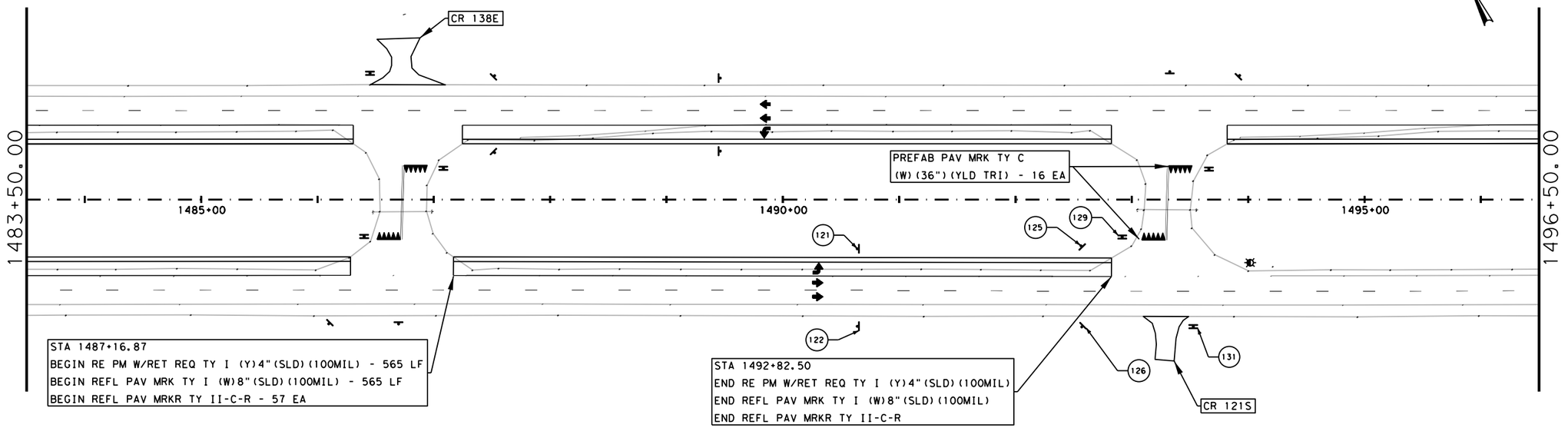

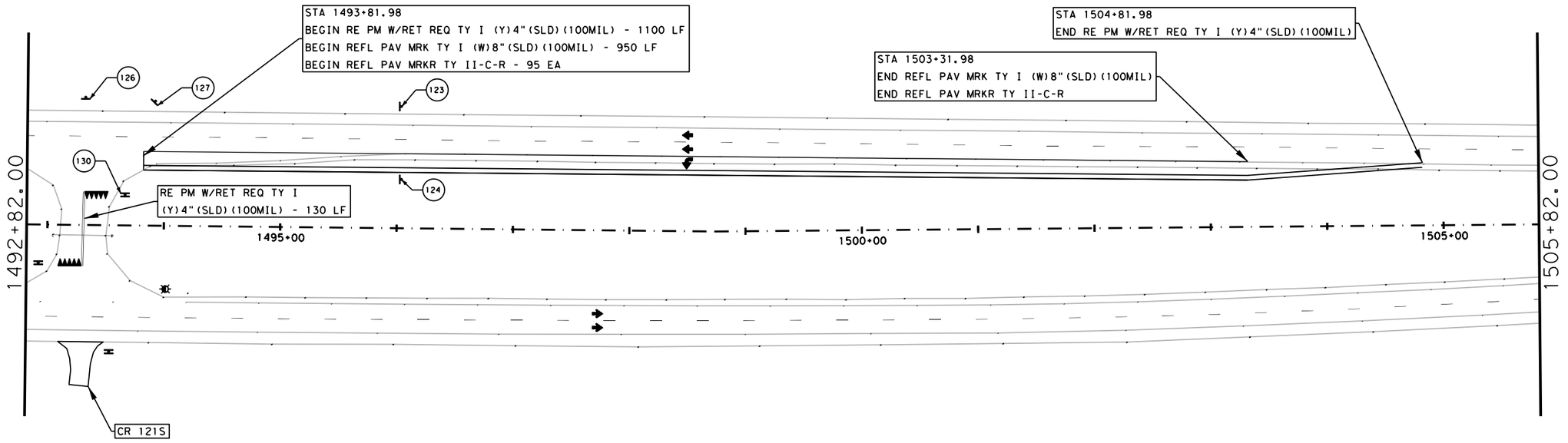

LEGEND

(X) SIGN TO BE INSTALLED

DEL ASSM (D-DY)

GENERAL NOTES

1. REMOVE & REPLACE ALL SIGNS. REFERENCE THE CROSSOVER LAYOUT SHEET FOR SIGN PLACEMENT. ADD SIGNS WHERE NEEDED.
2. REFER TO SOSS SHEET FOR THE PROPOSED CROSSOVER LAYOUT.

SCALE
0 50 100

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
PAVEMENT MARKS AND SMALL SIGN PLAN

2021 Texas Department of Transportation®

SHEET 12 OF 12

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		104

DATE: 4/30/2021 8:55:11 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\3 - PAVEMENT MARKING & SMALL SIGN PLAN.dgn

SUMMARY OF SMALL SIGNS

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

LOCATION	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	POST TYPE (FRP = Fiberglass, TWT = Thin-wall, 10BWG = 10 BWG, S80 = Sched 80)	POSTS (Posts (1 or 2))	ANCHOR TYPE (UA = Univer-Conc, UB = Univer-Bolt, SA = Slip-Conc, SB = Slip-Bolt, WS = Wedge Steel, WP = Wedge Pistic)	MOUNTING DESIGNATION (P = Prefb."Plain", T = Prefab. "T", U = Prefab. "U")	MOUNTING DESIGNATION (1EXT or 2EXT = # of Ext. BM = Extruded Beam, WC = 1.12 #/ft Wing Chan. EXAL = Extruded Alum. Signs)	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
CROSSOVER #1 (Layout F)	1	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	2	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	3	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	4	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	5	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	6	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	7	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	8	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	9	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	10	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
CROSSOVER #3 (Layout E)	11	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	12	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	13	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	14	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	15	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	16	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	17	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	18	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	19	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	20	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	21	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							
CROSSOVER #5 (Layout F)	22	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	23	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	24	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	25	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	26	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	27	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	28	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	29	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	30	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	31	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
CROSSOVER #6 (Layout E)	32	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	33	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	34	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	35	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	36	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	37	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	38	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	39	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	40	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	41	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	42	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							

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

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

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NOTE:

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2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
4-16	DIST	COUNTY		SHEET NO.
8-16	WFS	WILBARGER		105

DATE: 4/30/2021 8:55:15 AM
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SUMMARY OF SMALL SIGNS

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

LOCATION	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	POST TYPE (FRP = Fiberglass, TWT = Thin-wall, 10BWG = 10 BWG, S80 = Sched 80)	POSTS (Posts (1 or 2))	ANCHOR TYPE (UA = Univer-Conc, UB = Univer-Bolt, SA = Slip-Conc, SB = Slip-Bolt, WS = Wedge Steel, WP = Wedge Pistic)	MOUNTING DESIGNATION (P = Prefb."Plain", T = Prefab. "T", U = Prefab. "U")	MOUNTING DESIGNATION (1EXT or 2EXT = # of Ext. BM = Extruded Beam, WC = 1.12 #/ft Wing Chan. EXAL = Extruded Alum. Signs)	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
CROSSOVER #7 (Layout A)	43	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	44	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	45	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	46	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	47	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	48	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	49	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	50	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	51	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	52	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	53	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3	DIVIDED HIGHWAY <w/ THRU STREET SYMBOL>	30 x 24	X							
	54	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3	DIVIDED HIGHWAY <w/ THRU STREET SYMBOL>	30 x 24	X							
CROSSOVER #8 (Layout E)	55	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	56	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	57	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	58	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	59	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	60	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	61	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	62	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	63	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	64	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	65	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							
CROSSOVER #9 (Layout E)	66	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	67	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	68	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	69	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	70	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	71	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	72	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	73	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	74	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	75	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	76	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							

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

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

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
4-16	DIST	COUNTY		SHEET NO.
8-16	WFS	WILBARGER		106

18

DATE: 4/30/2021 8:55:17 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\SOSS.dgn

SUMMARY OF SMALL SIGNS

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

LOCATION	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	POST TYPE (FRP = Fiberglass, TWT = Thin-wall, 10BWG = 10 BWG, S80 = Sched 80)	POSTS (Posts (1 or 2))	ANCHOR TYPE (UA = Univer-Conc, UB = Univer-Bolt, SA = Slip-Conc, SB = Slip-Bolt, WS = Wedge Steel, WP = Wedge Plastic)	MOUNTING DESIGNATION (P = Prefb."Plain", T = Prefab. "T", U = Prefab. "U")	MOUNTING DESIGNATION (1EXT or 2EXT = # of Ext., BM = Extruded Beam, WC = 1.12 #/ft Wing Chan., EXAL = Extruded Alum. Signs)	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
CROSSOVER #10 (Layout E)	77	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	78	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	79	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	80	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	81	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	82	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	83	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	84	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	85	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	86	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	87	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							
CROSSOVER #11 (Layout E)	88	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	89	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	90	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	91	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	92	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	93	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	94	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	95	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	96	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	97	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	98	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							
CROSSOVER #12 (Layout E)	99	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	100	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	101	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	102	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	103	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	104	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	105	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	106	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	107	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	108	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	109	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
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DATE: 4/30/2021 8:55:19 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\V4 - Design\Plan Set\8. Traffic\SOSS.dgn

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0043	07	119	US 287
4-16		DIST	COUNTY		SHEET NO.
8-16		WFS	WILBARGER		107

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SUMMARY OF SMALL SIGNS

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

LOCATION	SIGN NO.	SIGN DESIGNATION	SIGN CONTENT	SIGN DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	POST TYPE (FRP = Fiberglass, TWT = Thin-wall, 10BWG = 10 BWG, S80 = Sched 80)	POSTS (Posts (1 or 2))	ANCHOR TYPE (UA = Univer-Conc, UB = Univer-Bolt, SA = Slip-Conc, SB = Slip-Bolt, WS = Wedge Steel, WP = Wedge Plastic)	MOUNTING DESIGNATION (P = Prefb."Plain", T = Prefab. "T", U = Prefab. "U")	MOUNTING DESIGNATION (1EXT or 2EXT = # of Ext., BM = Extruded Beam, WC = 1.12 #/ft Wing Chan., EXAL = Extruded Alum. Signs)	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
CROSSOVER #13 (Layout E)	110	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	111	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	112	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	113	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	114	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	115	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	116	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	117	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	118	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	119	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	120	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							
CROSSOVER #14 (Layout E)	121	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	122	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	123	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	124	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	125	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	126	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	127	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	128	R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X		10BWG	1	SA	T		
	129	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
	130	R1-2	YIELD	48 x 48 x 48	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
	131	R1-1	STOP	36 x 36	X		S80	1	SA	P	BM	
		R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X							
		R6-1L	ONE WAY <IN LEFT ARROW>	54 x 18	X							
		R6-3a	DIVIDED HIGHWAY <w/ T-INTERSEC SYMBOL>	30 x 24	X							

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

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

http://www.txdot.gov/

NOTE:

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

SHEET 4 OF 4

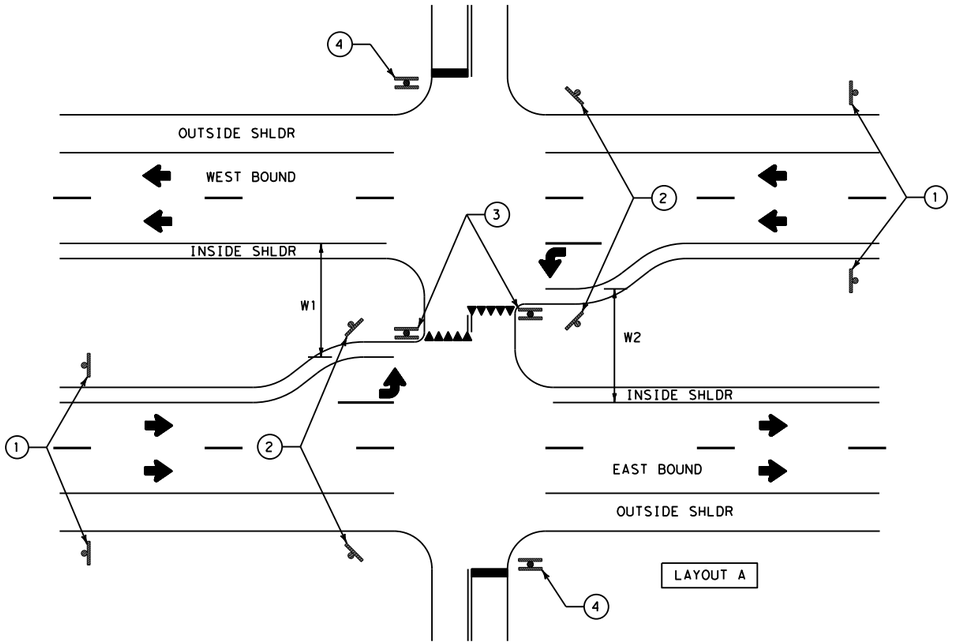
Texas Department of Transportation | Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

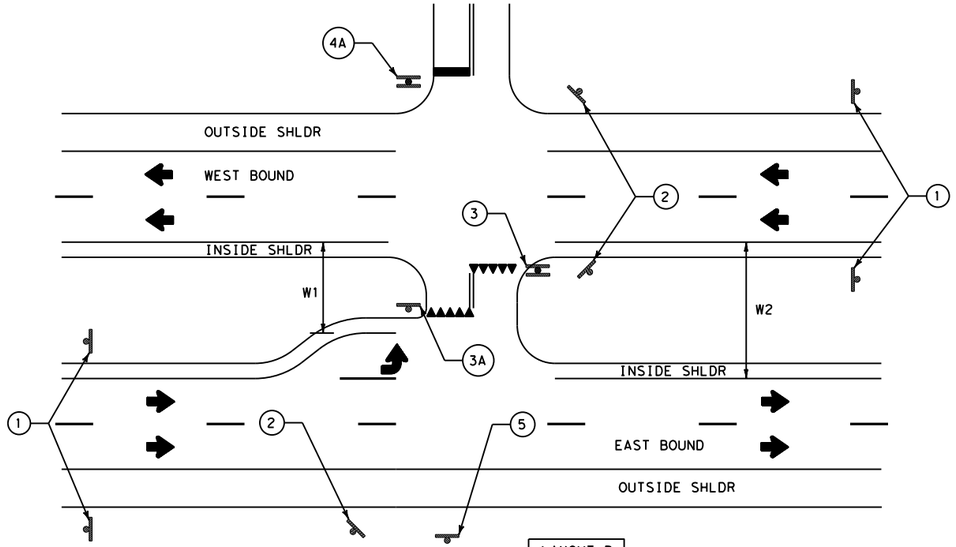
SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
4-16	DIST	COUNTY		SHEET NO.
8-16	WFS	WILBARGER		108

DATE: 4/30/2021 8:55:20 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\SOSS.dgn



LAYOUT A



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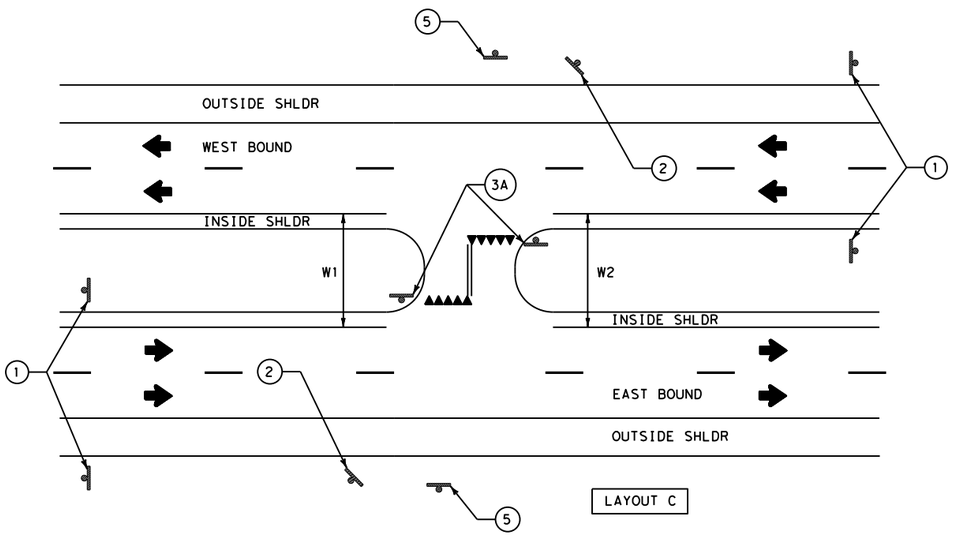

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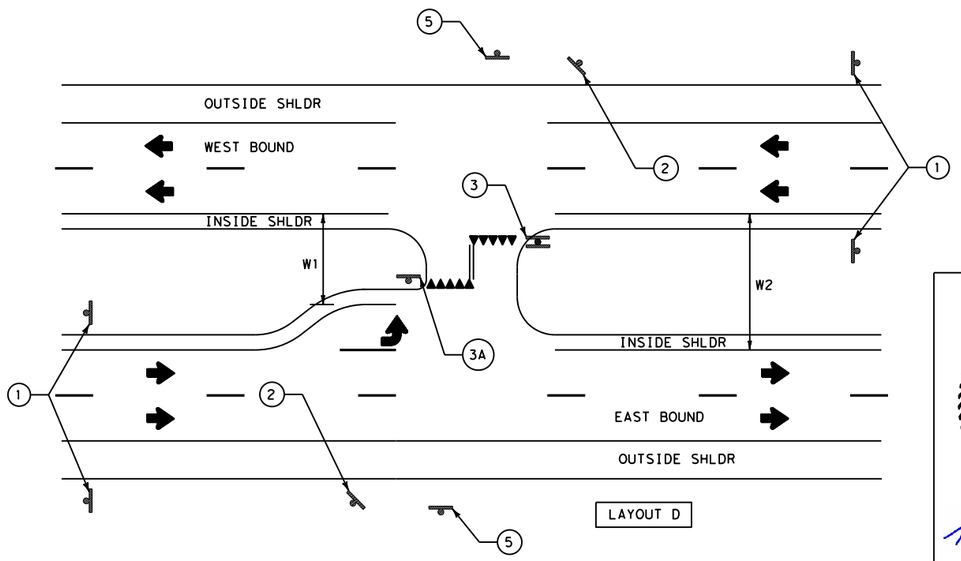

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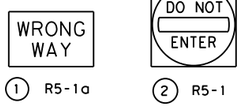
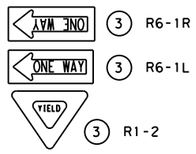
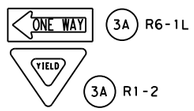
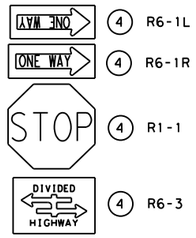


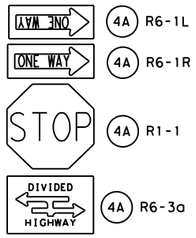
1 R5-1a

2 R5-1









NOTES:

CONFIGURATIONS DEPICTED ON THIS SHEET REPRESENT THE MAJORITY OF CROSSOVERS ON THIS PROJECT SEE "SIGN CREW FIELD BOOK", CHAPTER 7 SECTION 2 FOR OTHER CONFIGURATIONS NOT SHOWN.

SEE THE "SIGN CREW FIELD BOOK", CHAPTER 7 SECTION 2 FOR LAYOUT OF ADDITIONAL ROUTE MARKER SIGNING REQUIRED.

AS SHOWN ON PM(1)-20 NOTE #1, THE NARROWEST MEDIAN WIDTH, W1 OR W2, WILL BE THE CONTROLLING WIDTH TO DETERMINE IF STOP/YIELD SIGNS ARE REQUIRED. A WIDE MEDIAN IS DEFINED AS W1 AND W2 >30FT ON PM(1)-20. THIS WILL BE SHOWN ON THE CROSSOVER SUMMARY SHEET.

AS SHOWN ON PM(1)-20 NOTE #2, IF A 50FT OR GREATER MEDIAN CENTERLINE CAN BE PLACED INSTALL MEDIAN STRIPING AND STOP BARS/YEILD TRIANGLES AS SHOWN ON THE CROSSOVER SUMMERY SHEET.

N.T.S

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
CROSSOVER LAYOUT
MEDIAN > 30FT

Texas Department of Transportation®

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		109

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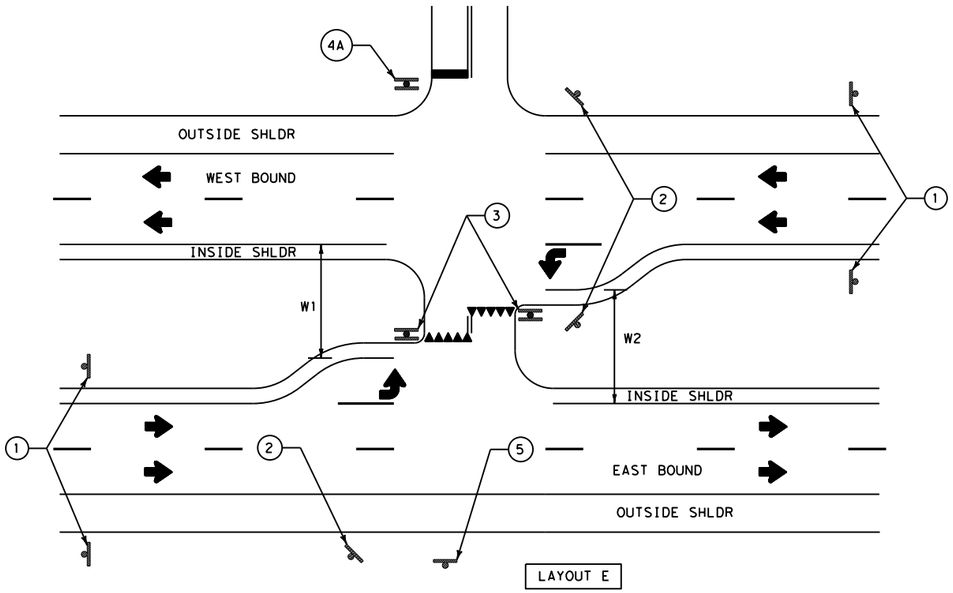

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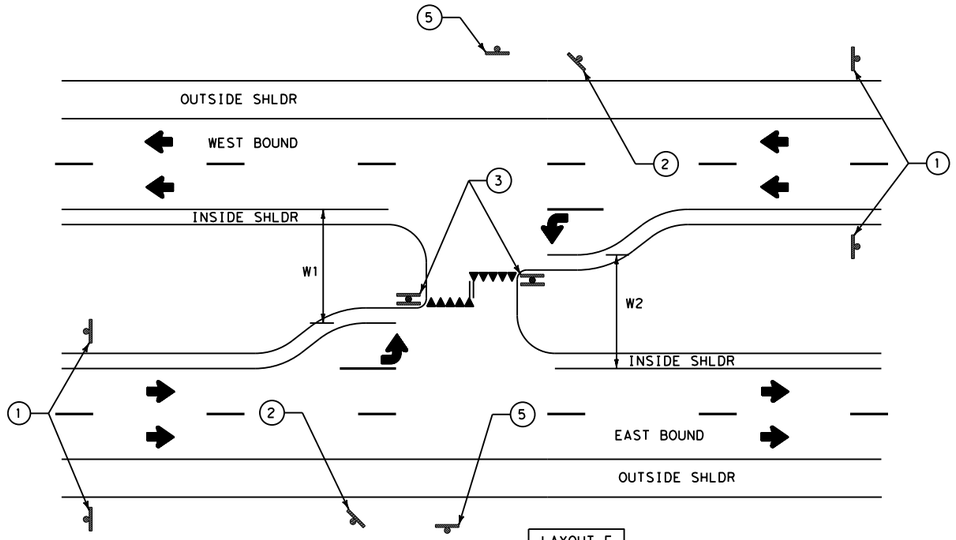
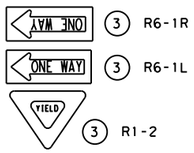
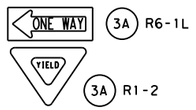


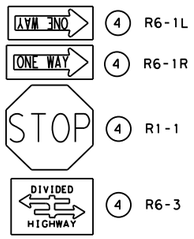
LAYOUT F

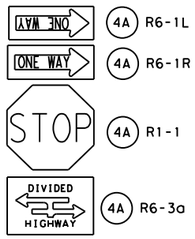
1 R5-1a

2 R5-1









NOTES:

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N.T.S

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
CROSSOVER LAYOUT
MEDIAN > 30FT

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		110

DATE: 4/30/2021 8:55:28 AM
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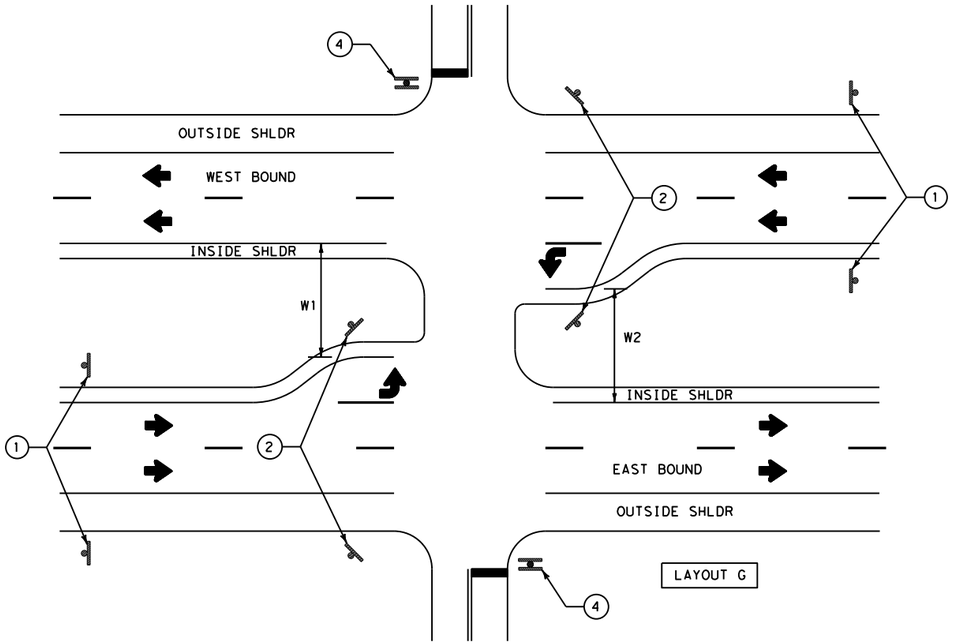
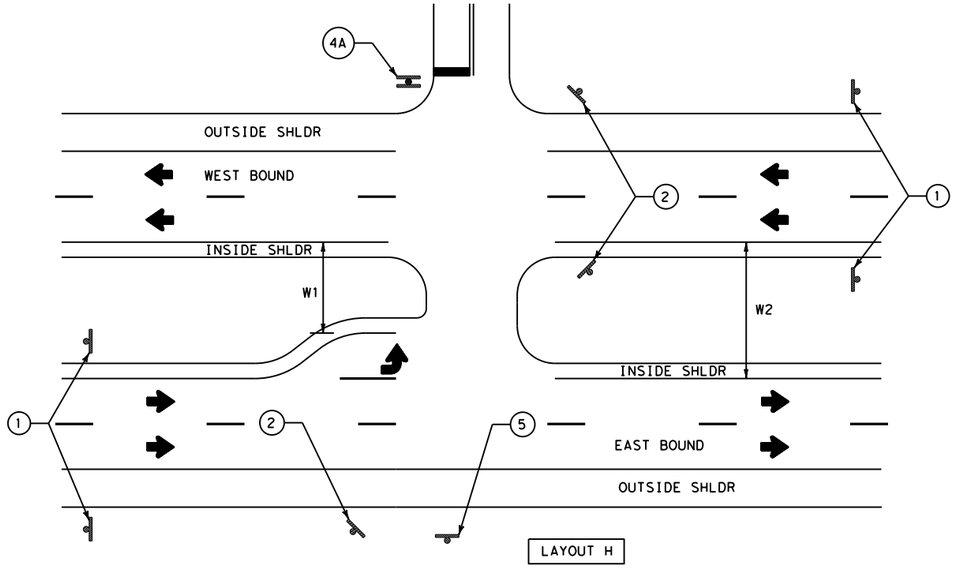


LAYOUT G



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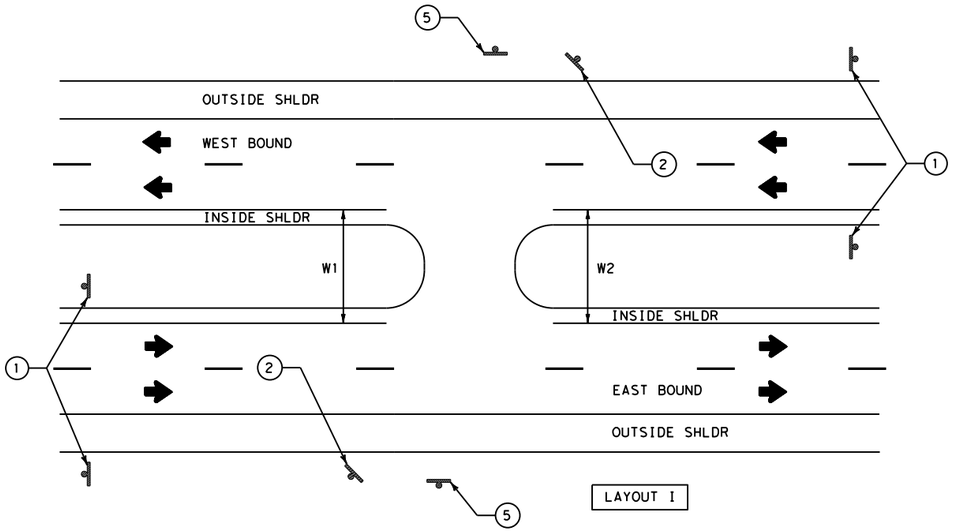
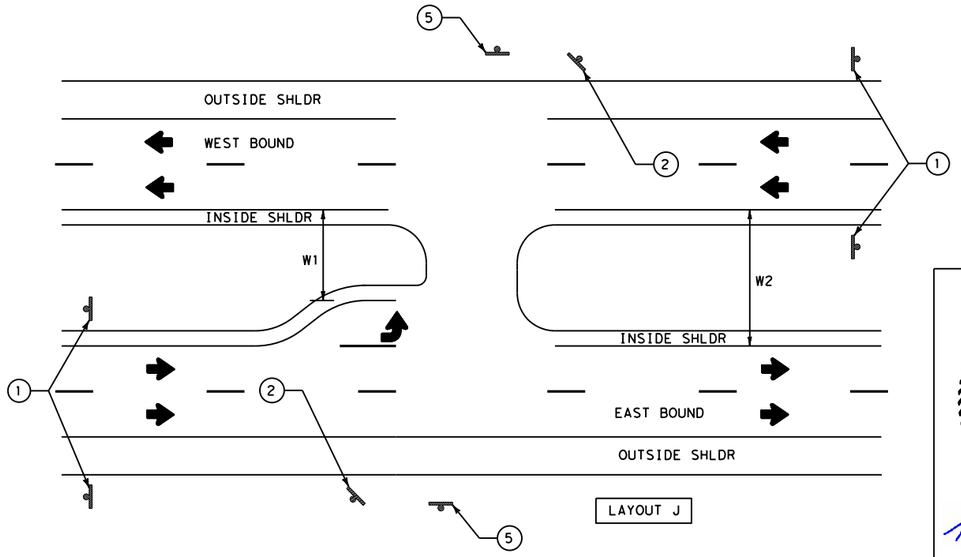


LAYOUT I



LAYOUT J

WRONG WAY
1 R5-1a

DO NOT ENTER
2 R5-1

3 3A SIGNS 3 AND 3A ONLY PERTAIN TO MEDIANS IN WHICH W1 AND W2 >30FT.

ONE WAY 4 R6-1L
ONE WAY 4 R6-1R
STOP 4 R1-1
DIVIDED HIGHWAY 4 R6-3

ONE WAY 4A R6-1L
ONE WAY 4A R6-1R
STOP 4A R1-1
DIVIDED HIGHWAY 4A R6-3a

ONE WAY 5 R6-1L

NOTES:

CONFIGURATIONS DEPICTED ON THIS SHEET REPRESENT THE MAJORITY OF CROSSOVERS ON THIS PROJECT SEE "SIGN CREW FIELD BOOK", CHAPTER 7 SECTION 2 FOR OTHER CONFIGURATIONS NOT SHOWN.

SEE THE "SIGN CREW FIELD BOOK", CHAPTER 7 SECTION 2 FOR LAYOUT OF ADDITIONAL ROUTE MARKER SIGNING REQUIRED.

AS SHOWN ON PM(1)-20 NOTE #1, A NARROW MEDIAN IS DEFINED AS W1 OR W2 <30FT. THIS WILL BE SHOWN ON THE CROSSOVER SUMMARY SHEET.

N.T.S

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287 CROSSOVER LAYOUT MEDIAN < 30FT

Texas Department of Transportation®

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		111

DATE: 4/30/2021 8:55:29 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\CROSSOVER LAYOUT.dgn

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

DOT #: *Near DOT 274960G*
Crossing Type: *At Grade*
RR Company Owning Track at Crossing: *BNSF Railway Company*
Operating RR Company at Track: *BNSF Railway Company*
RR MP: *151.750*
RR Subdivision: *Red River Vall*
City: *Harrold*
County: *Wilbarger*
CSJ at this Crossing: *0043-07-119*
Highway/Roadway name crossing the railroad: *US 287 Is Adjacent*
# of regularly scheduled trains per day at this crossing: *30*
# of switching movements per day at this crossing: *0*
% of estimated contract cost of work within railroad ROW: *0%*

Scope of Work at this Crossing to Be Performed by State Contractor:
No work will be performed at a railroad crossing. Drainage structures will be extended and left turn lanes will be added within the TXDOT ROW on US 287's median. (1) 250' section of guardrail will be removed and upgraded outside of the median, directly adjacent to the south bound lane on US HWY 287 (approx. 30' from the Railroad ROW)

Scope of Work at this Crossing to Be Performed by Railroad Company:
No work is to be performed by Railroad Company.

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

N/A

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: *0*

On this project, night or weekend flagging is:

- ☐ Expected
- ☑ Not Expected

Flagging services will be provided by:

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

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

Contact Information for Flagging:

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

Contractor must incorporate Construction Inspection into anticipated construction schedule.

- ☑ Not Required
- ☐ Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

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

- ☐ Required
- ☑ Not Required

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

V. RAILROAD INSURANCE REQUIREMENTS

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

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

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

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

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

Railroad Protective Liability

- ☑ Not Required
- ☐ Non - Bridge Projects — $2,000,000 / $6,000,000
- ☐ Bridge Projects — $5,000,000 / $10,000,000
- ☐ Other

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

On this project, an ROE agreement is:

- ☑ Not Required
- ☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)
- ☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

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

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

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

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

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

- ☑ Not Required
- ☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

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

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call *BNSF Railway (BNSF)*
Railroad Emergency Line at *800-832-5452 Option 1*
Location: *Near DOT 274960G*
RR Milepost: *151.750*
Subdivision: *Red River Vall*

Texas Department of Transportation — Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
©TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	004307		119	US 287
3/2020	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		112

DATE:
FILE:

DATE: 4/30/2021 8:55:35 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\D&OM(1)-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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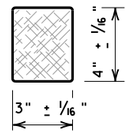
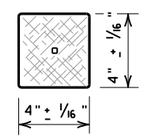
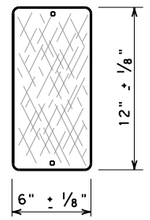
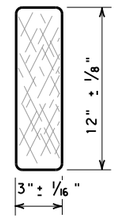
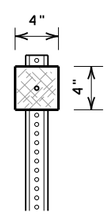
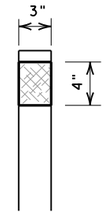
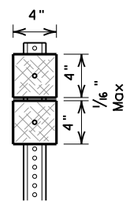
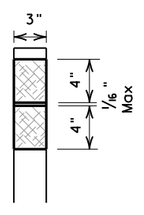
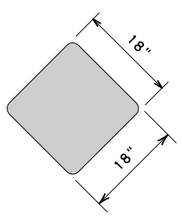
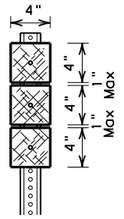
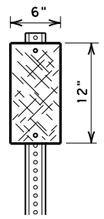
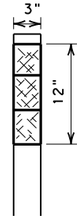
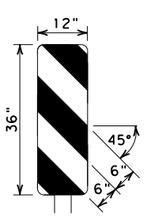
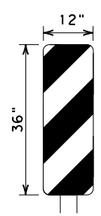
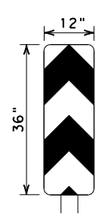
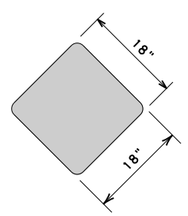
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

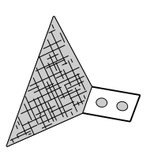
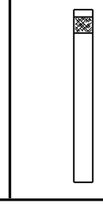
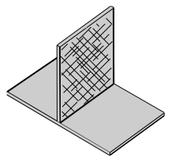
DELINEATORS

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

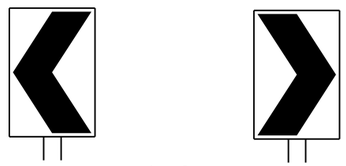
OBJECT MARKERS

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

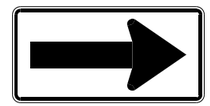
BARRIER REFLECTORS (BRF)

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

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
S = Single
D = Double

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

REFLECTOR UNIT SIZE
1 or 2

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

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

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

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

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

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

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

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

DIRECTION
If Required
BI = Bi-Directional

DEPARTMENTAL MATERIAL SPECIFICATIONS

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

NOTE:

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WFS	WILBARGER		113

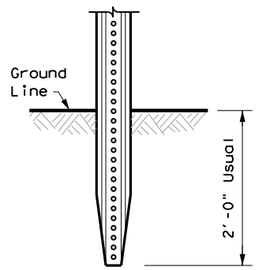
20A

DATE: 4/30/2021 8:55:39 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\D&OM(2)-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

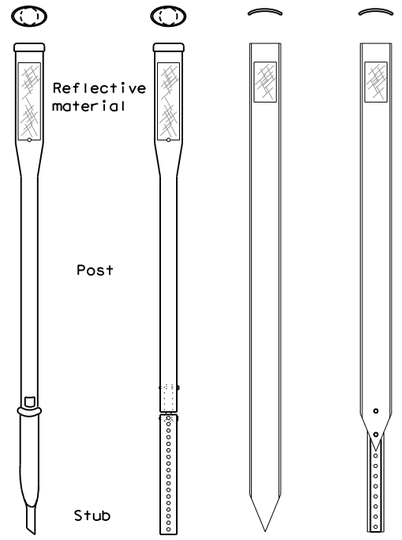


NOTES

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

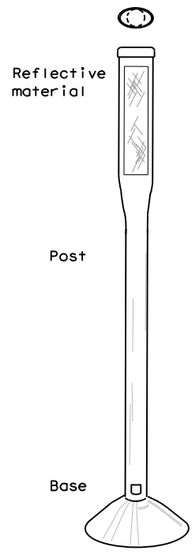
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



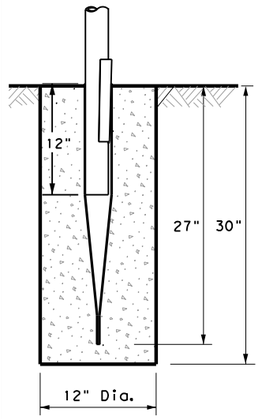
SURFACE MOUNT

NOTES

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

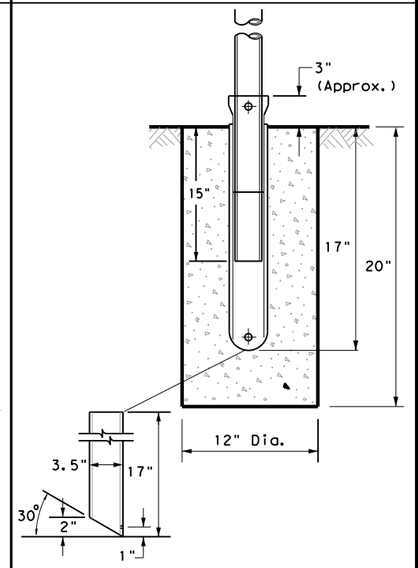
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

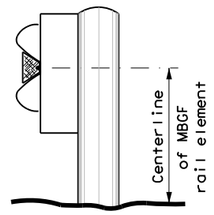
NOTE

1. Install per manufacturer's recommendations.

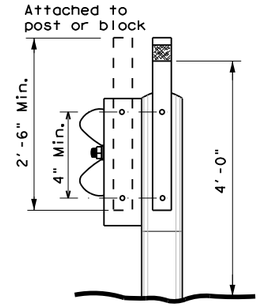
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

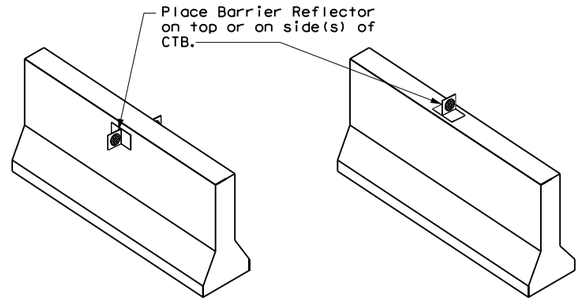
GF1



GF2



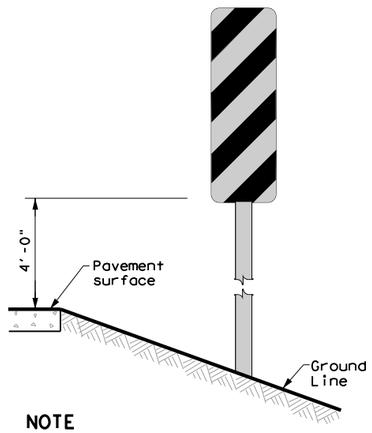
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

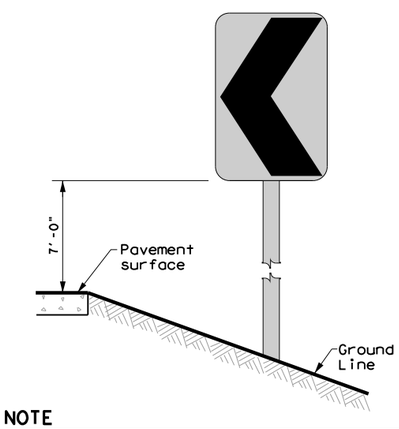
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

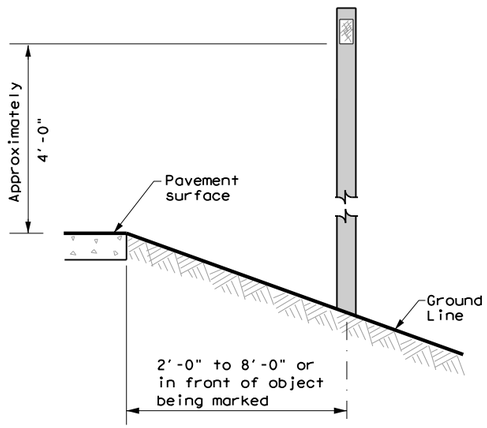
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

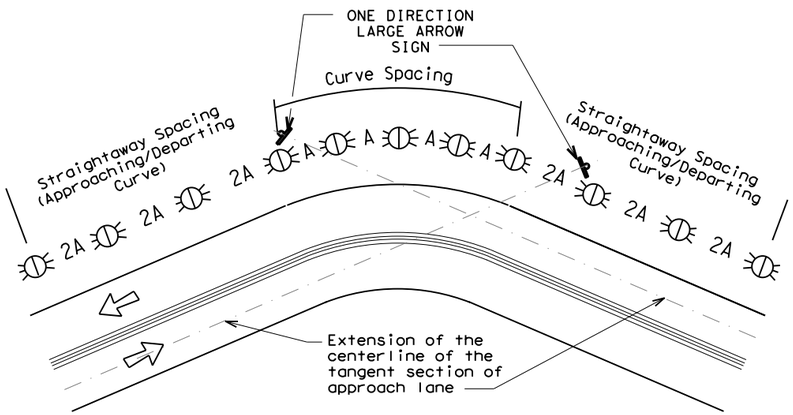
FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	WFS	WILBARGER		114

20B

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

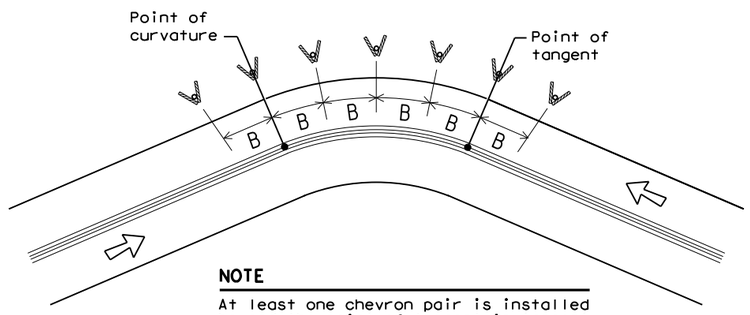
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	WFS	WILBARGER		115

20C

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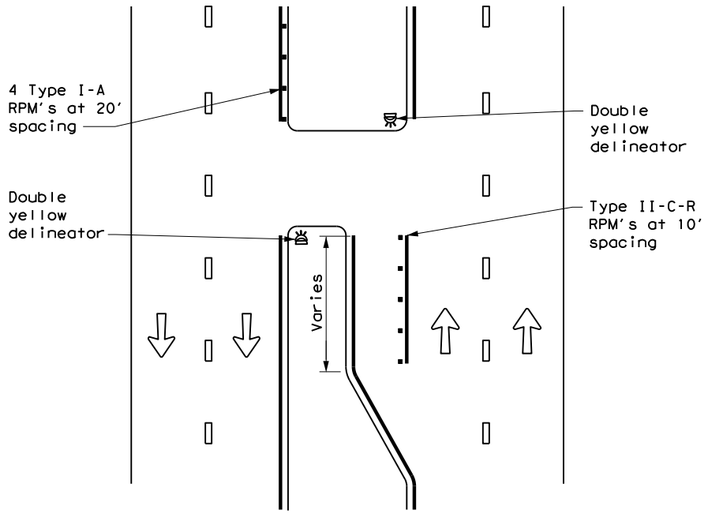
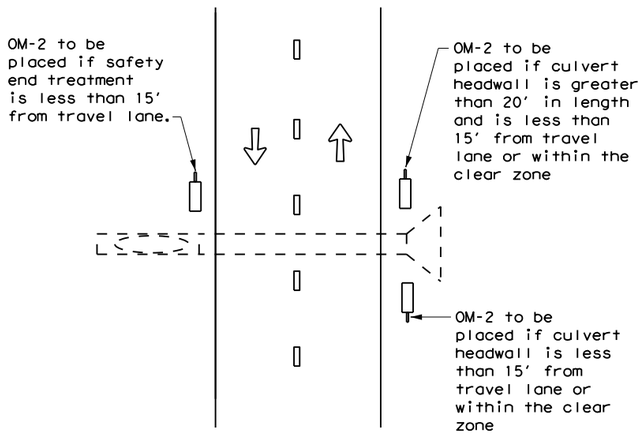
CROSSOVERS



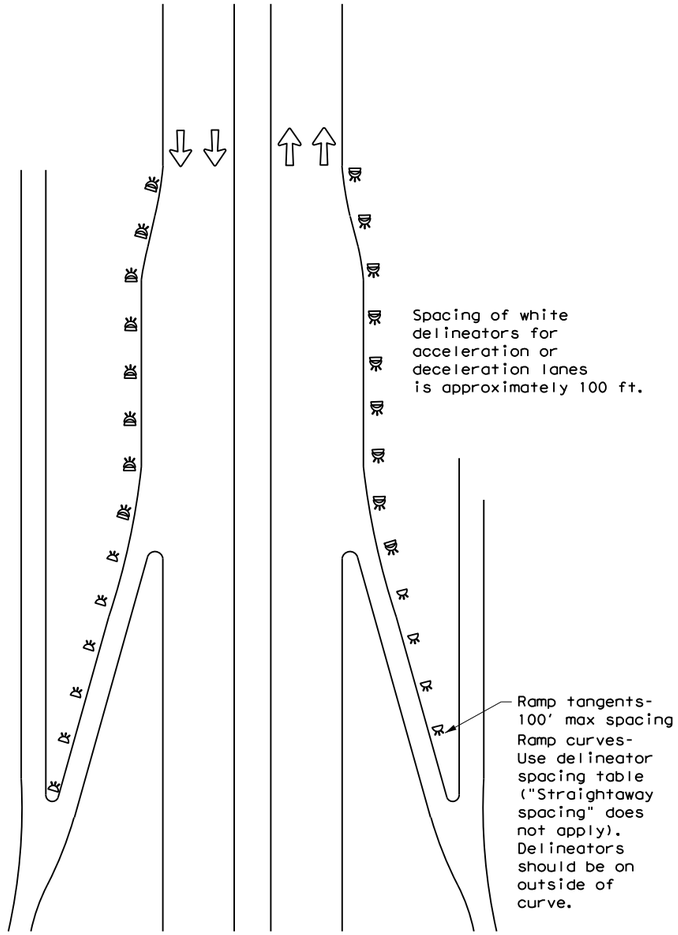
DETAIL 1

FOR CULVERTS WITHOUT MBGF



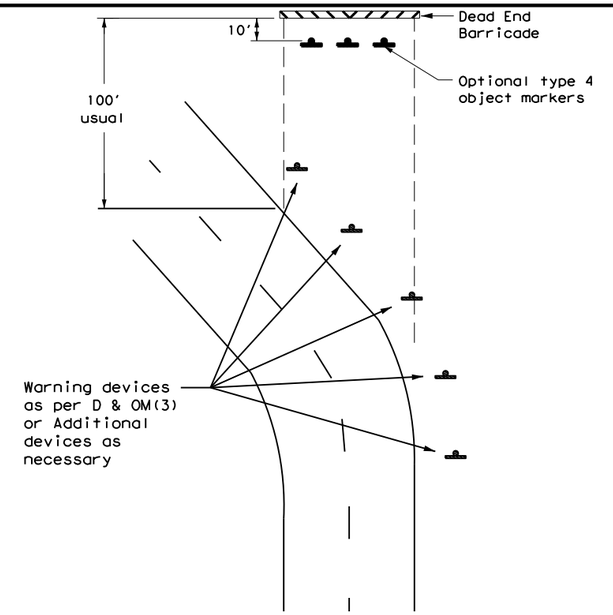
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



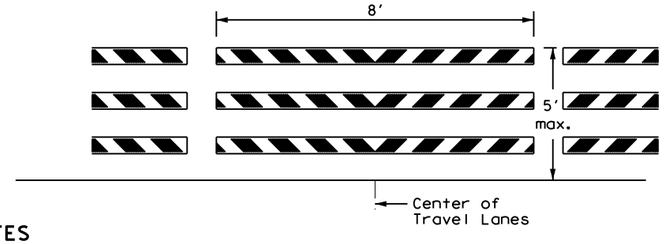
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

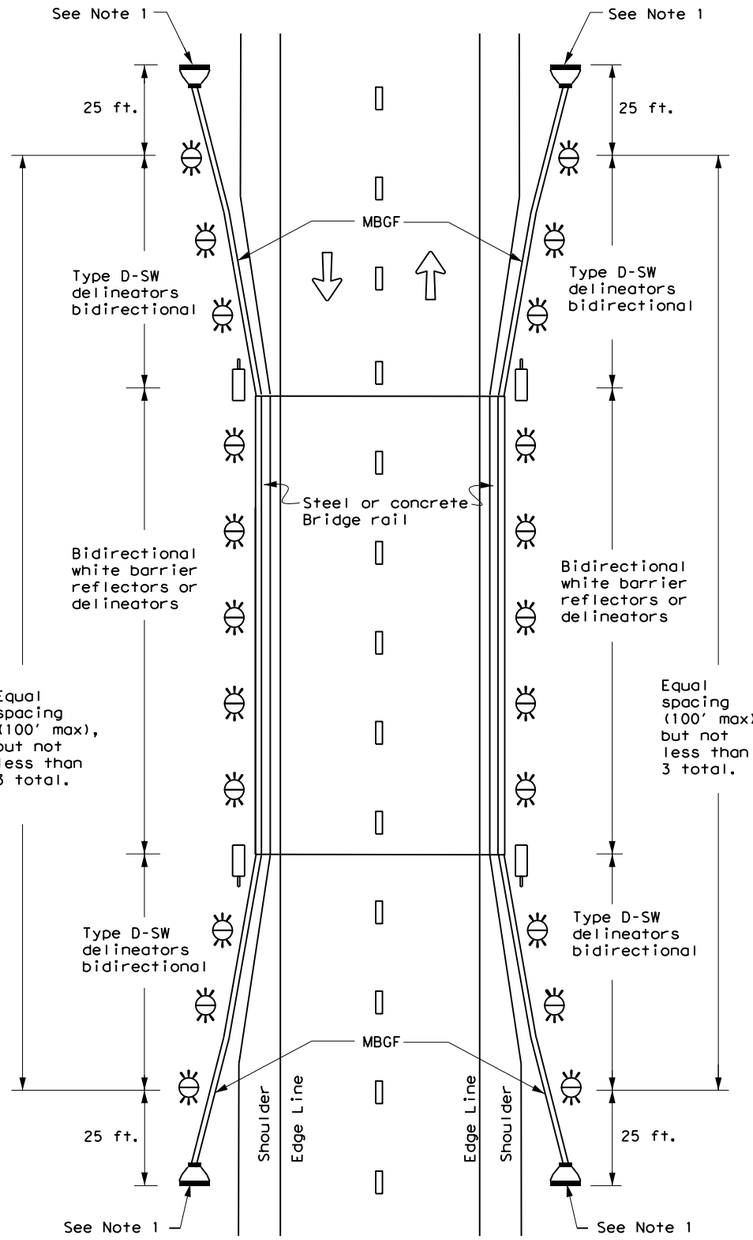
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
3-15	DIST	COUNTY		SHEET NO.
7-20	WFS	WILBARGER		116

20D

DATE: 4/30/2021 8:55:51 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\D&OM(5)-20.dgn

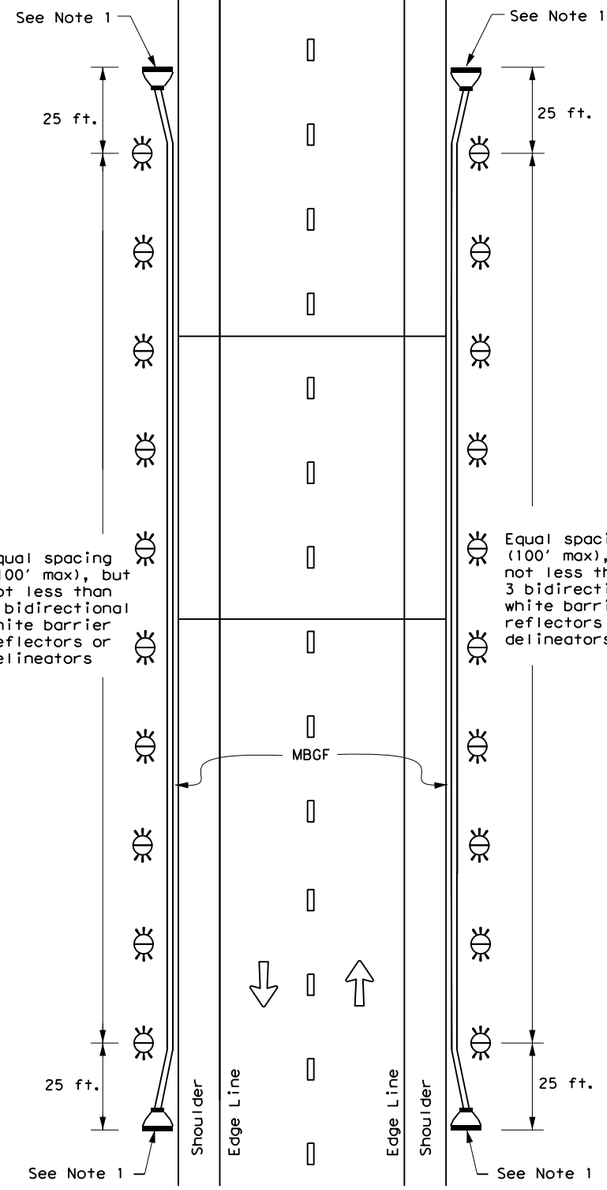
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

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

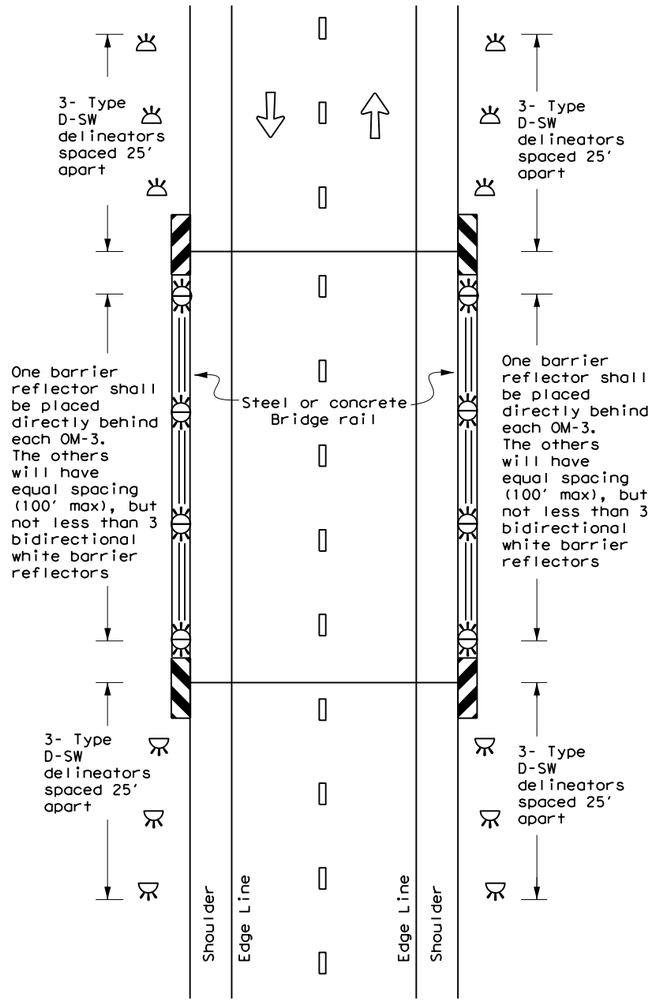
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

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

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



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

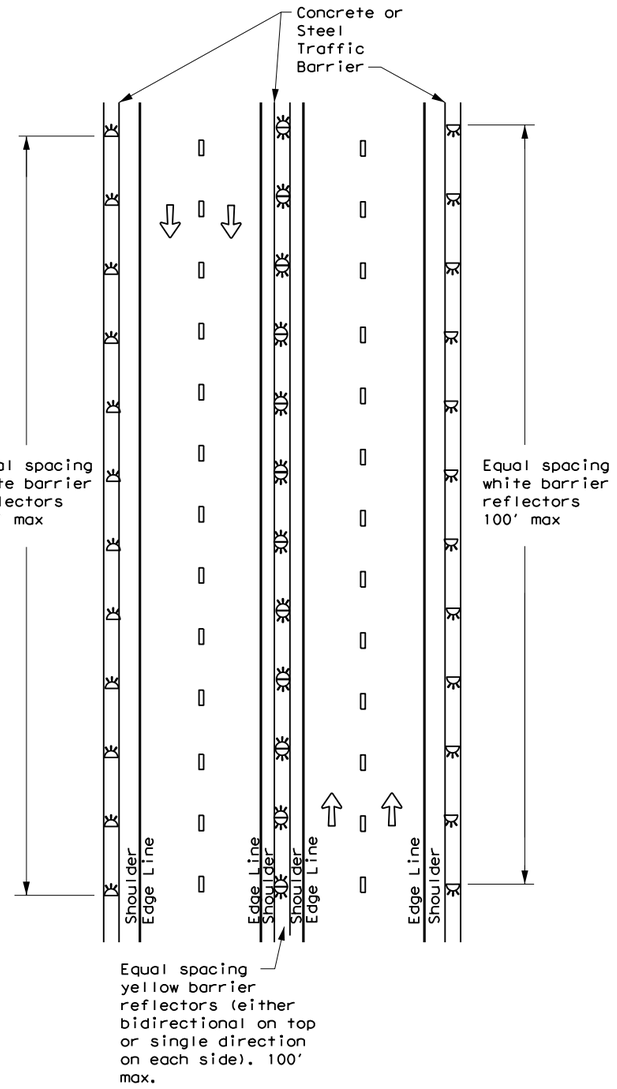
D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
7-20	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		117

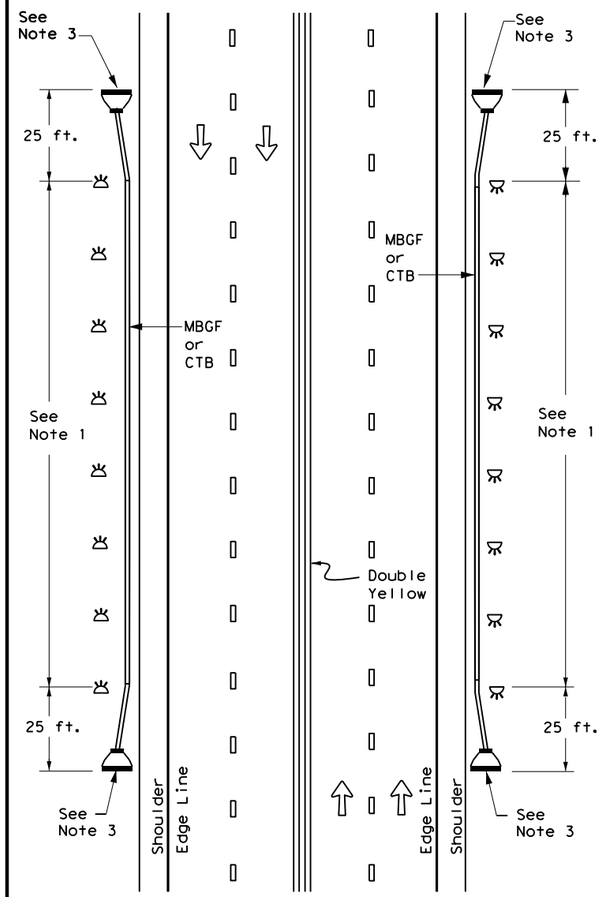
20E

DATE: 4/30/2021 8:55:55 AM
FILE: T:\WFSDESGN\Plans\0043-07\119\4 - Design\Plan Set\8. Traffic\D&OM(6)-20.dgn

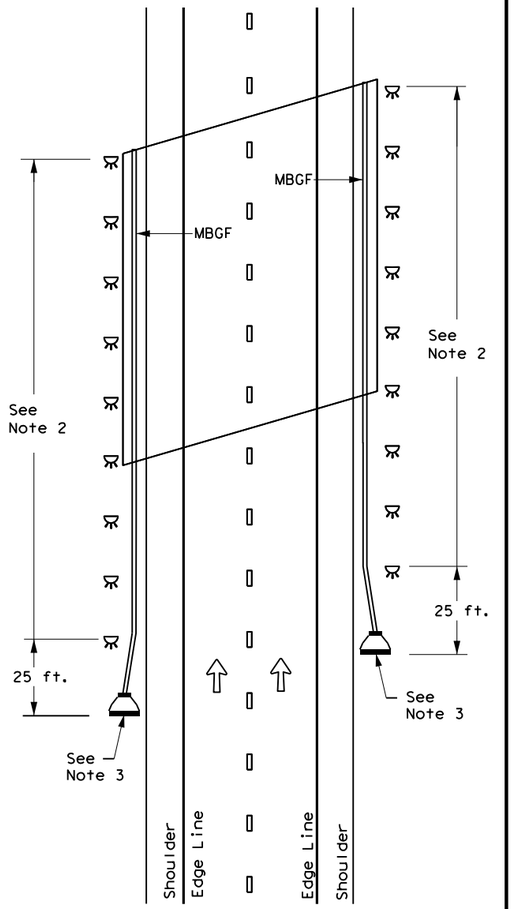
CONTINUOUS CONCRETE OR STEEL BARRIER



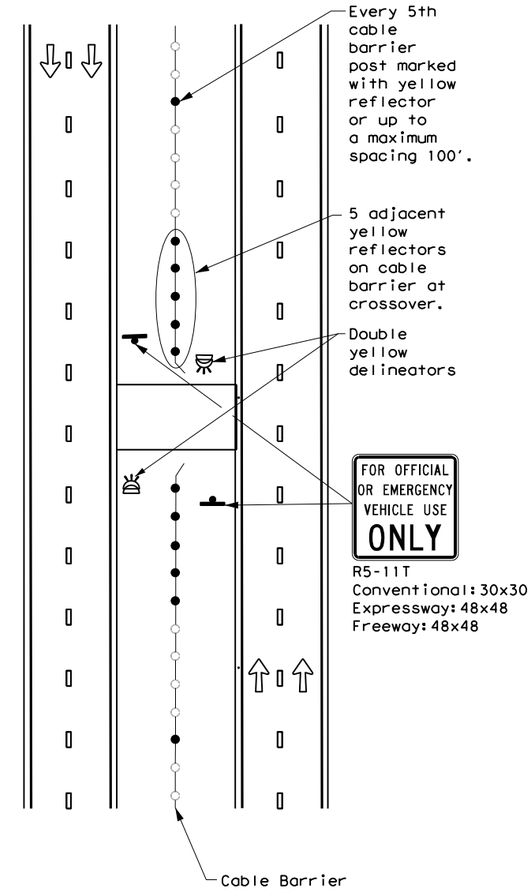
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
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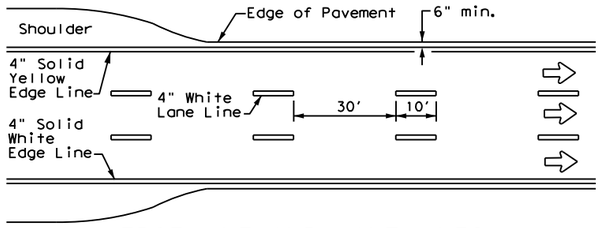
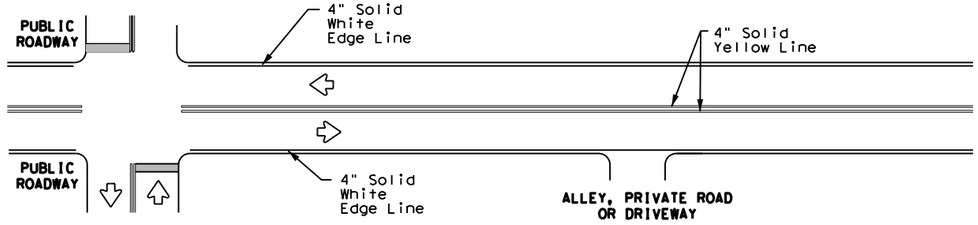
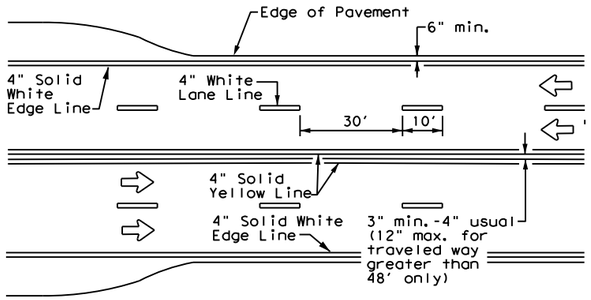
7-20	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		118



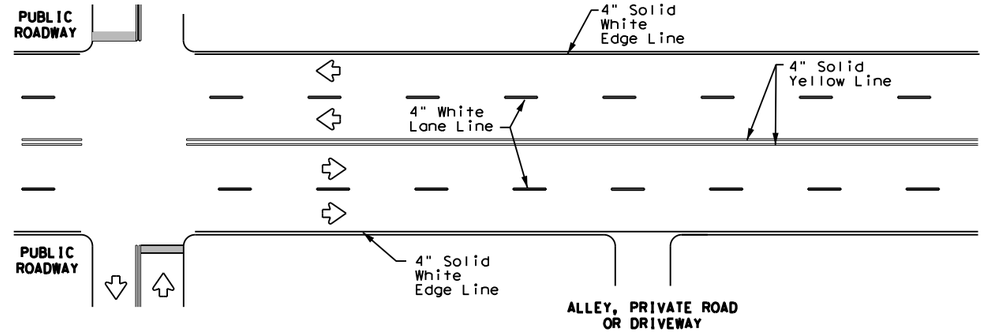
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



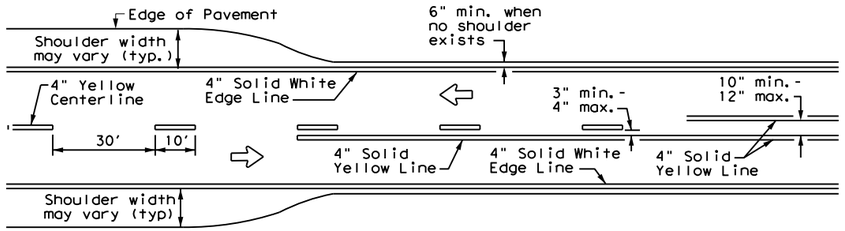
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



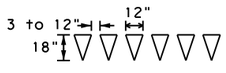
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



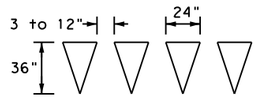
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

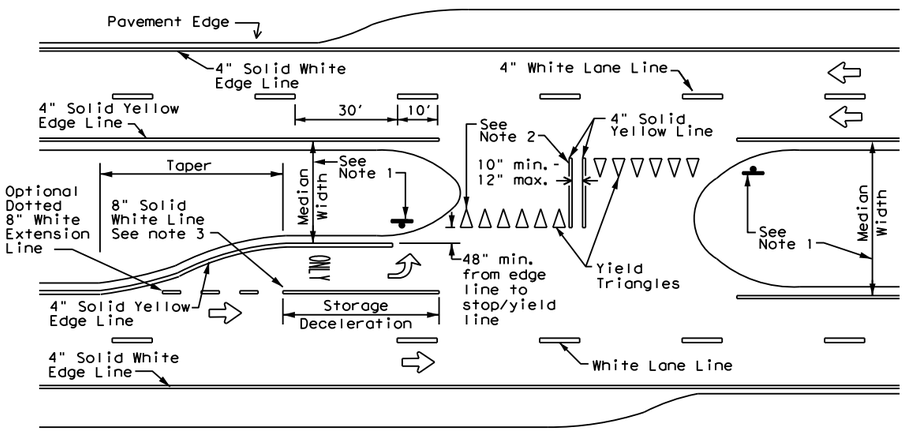


For posted speed on road being marked equal to or less than 40 MPH.



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

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

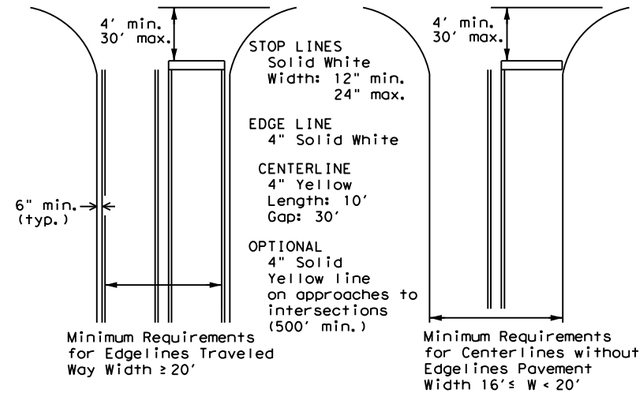
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0043	07	119	US 287
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	WFS	WILBARGER		119

22B

DATE: 4/30/2021 8:55:58 AM
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DATE: DATE/TIME 8:56:01 AM
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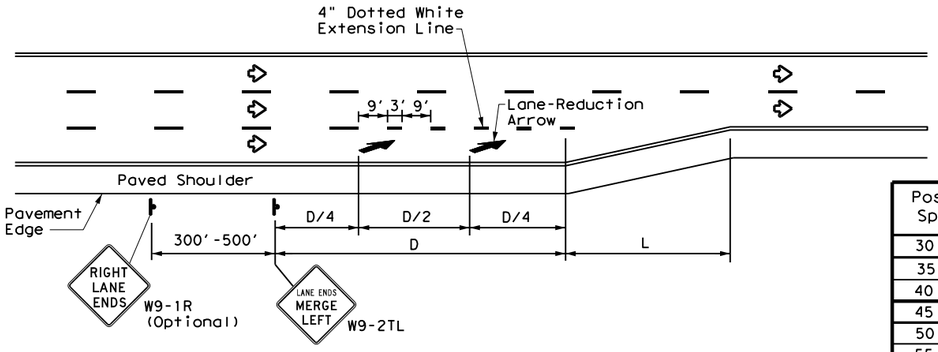
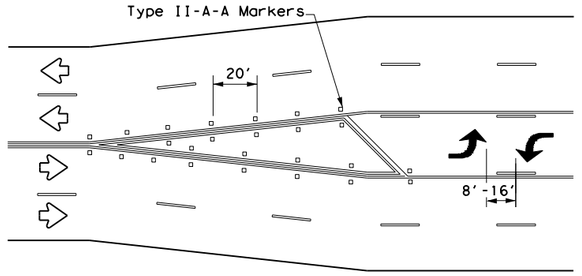


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

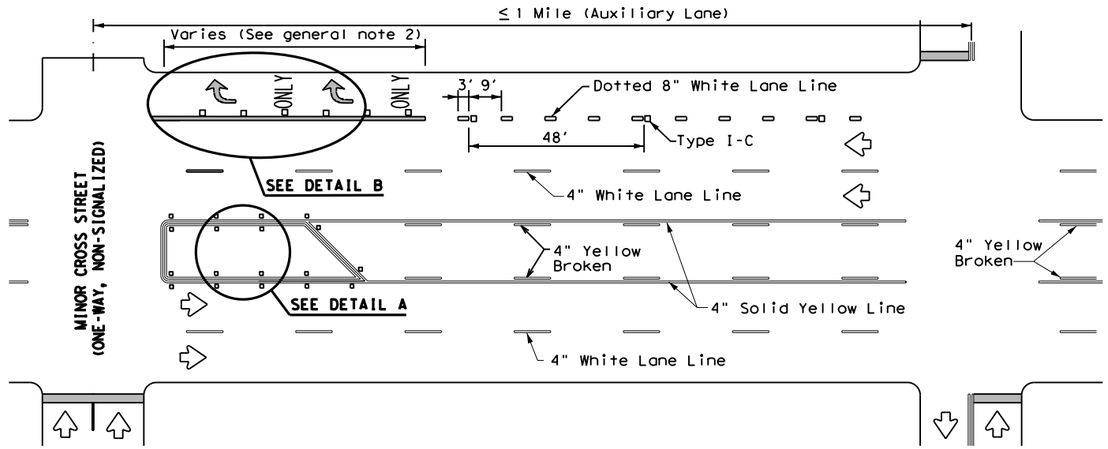
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

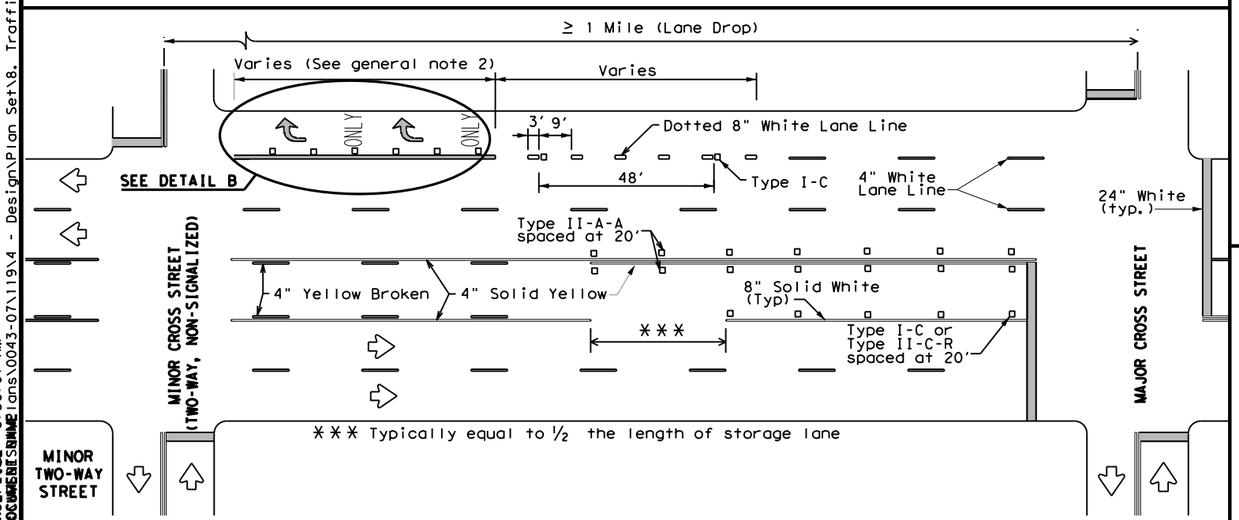
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

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

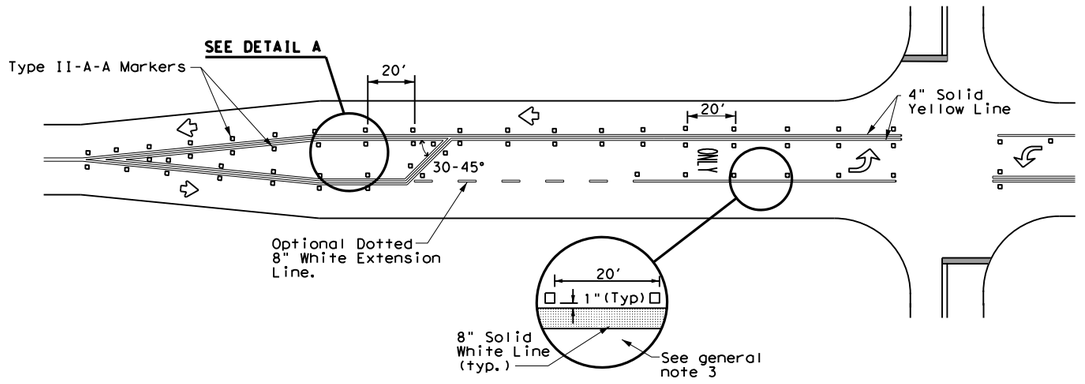
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



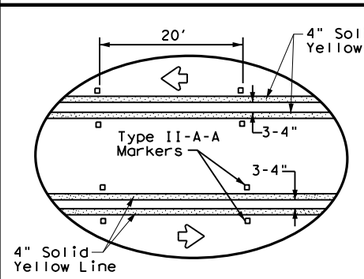
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



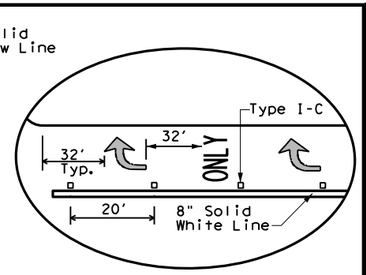
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0043	07	119	US 287
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	WFS	WILBARGER		120
3-03 6-20				

220

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

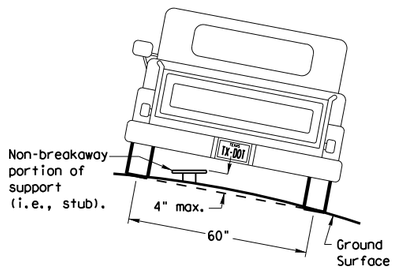
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

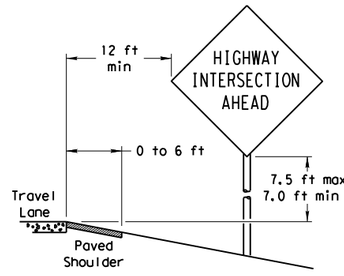
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

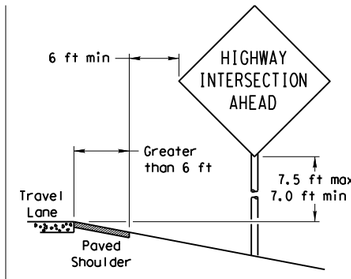
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

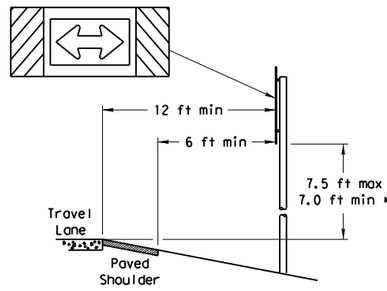
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



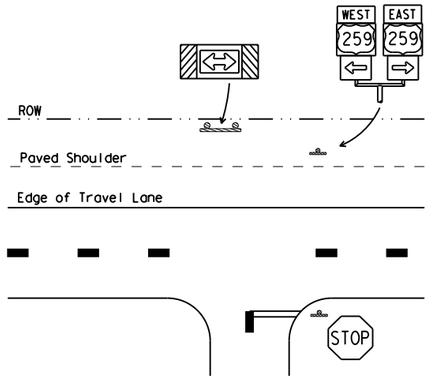
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

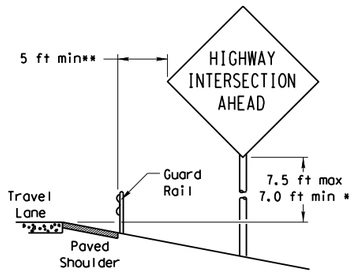
T-INTERSECTION



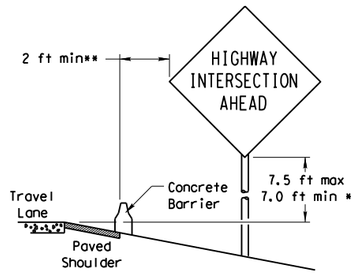
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



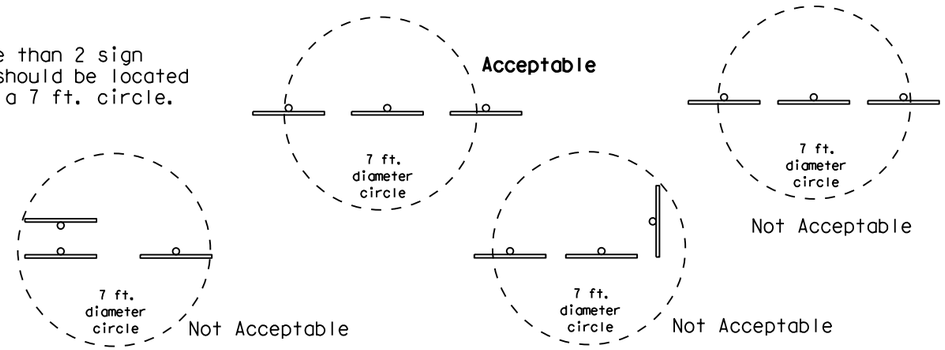
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

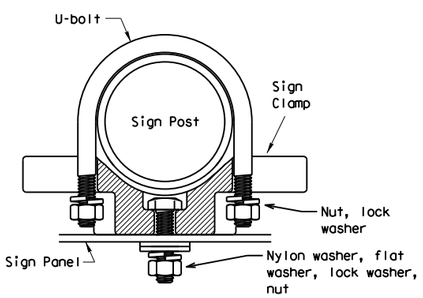
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

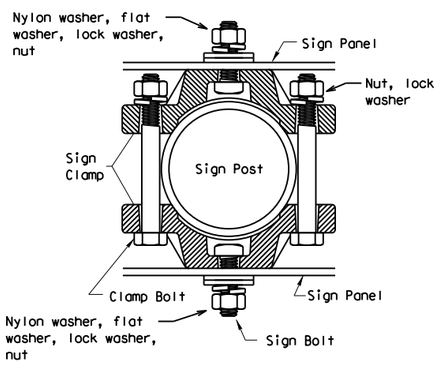


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

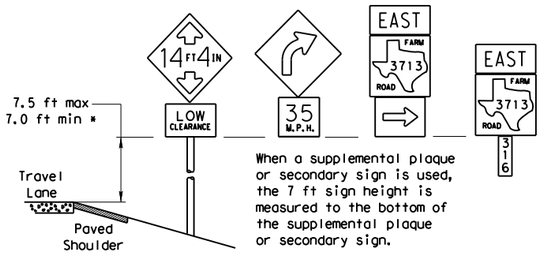
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



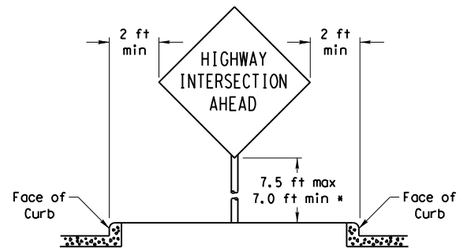
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



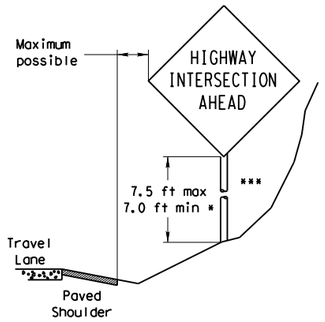
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		121

26A

DATE: 4/30/2021 8:56:03 AM
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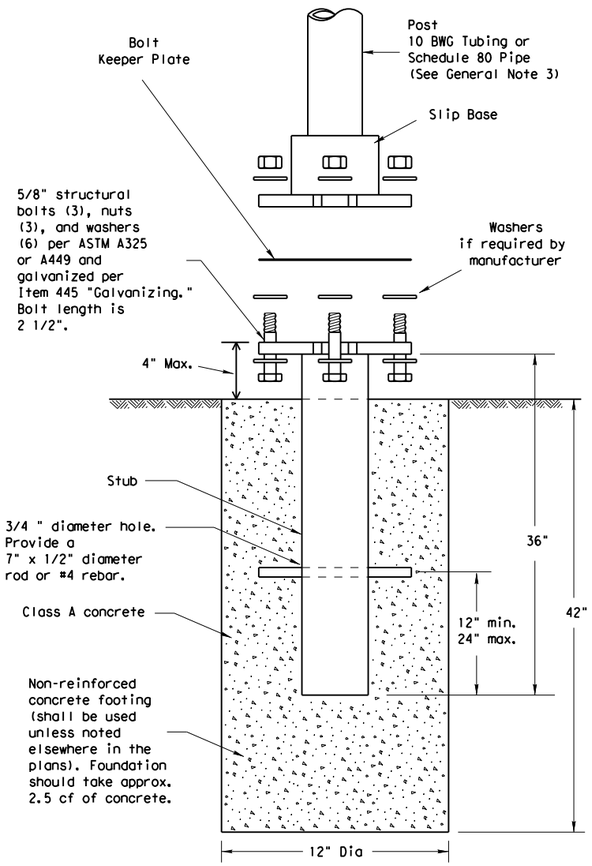
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

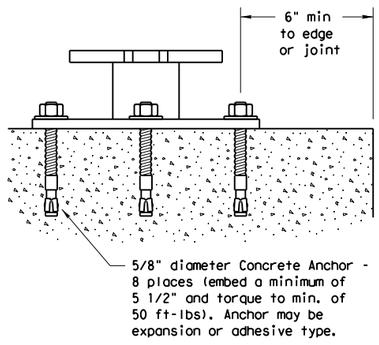
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		122

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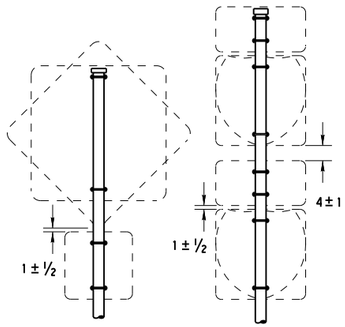
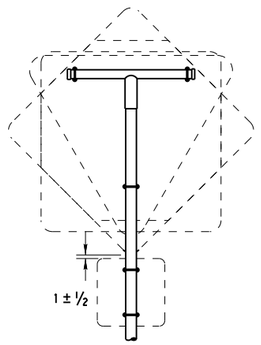


SM RD SGN ASSM TY XXXXX(1)XX(P)



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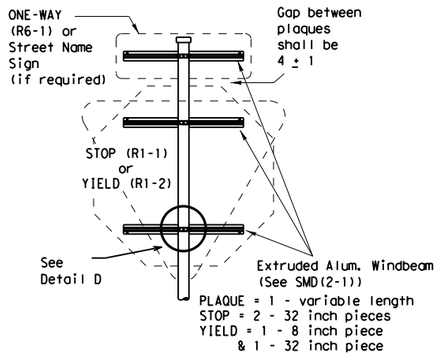

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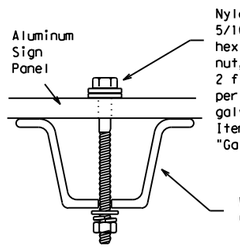
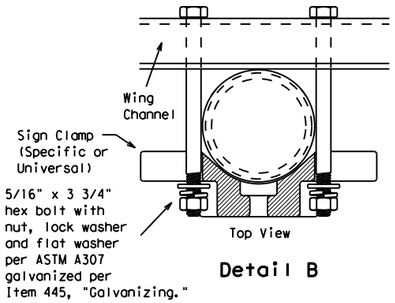
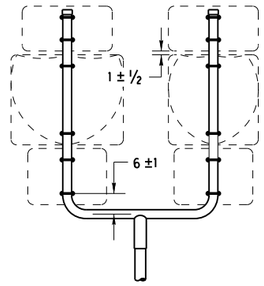


Detail A



Detail B



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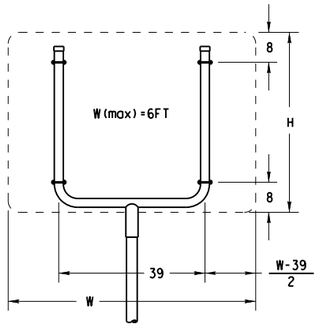

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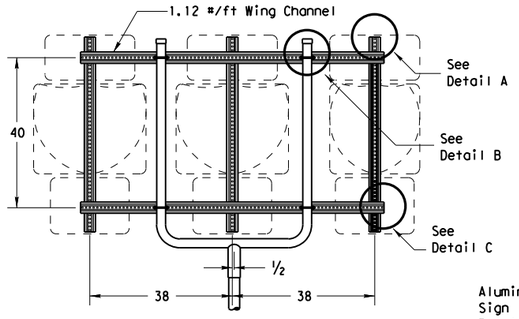
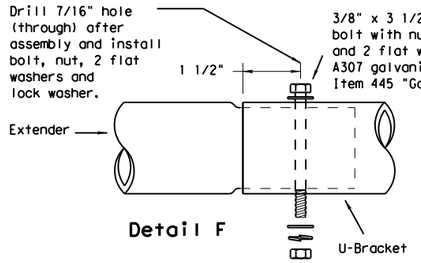
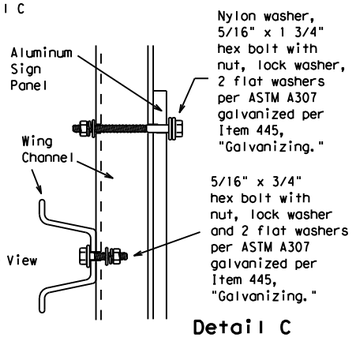


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

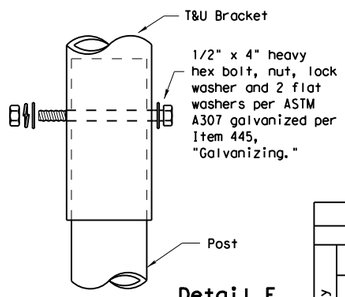


Detail F

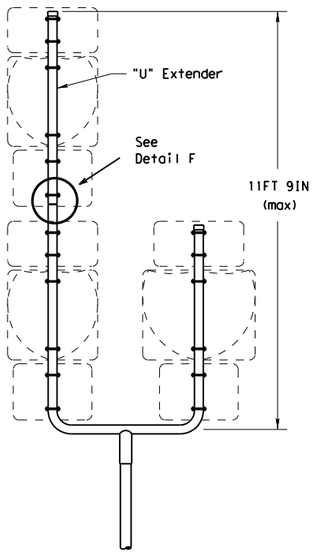
Splices shall only be allowed behind the sign substrate.



Detail C



Detail E



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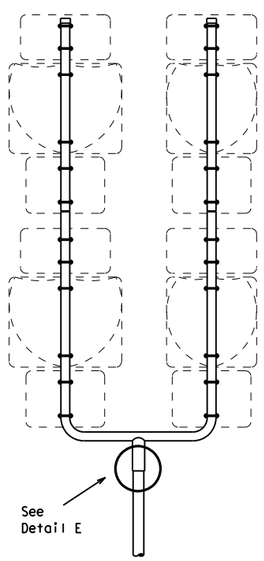

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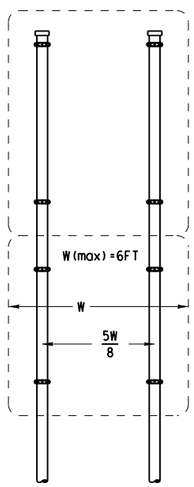
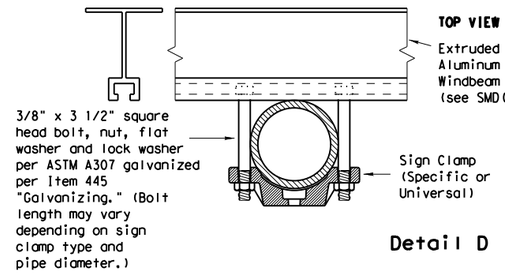
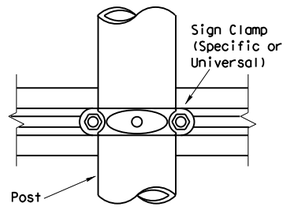


SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D



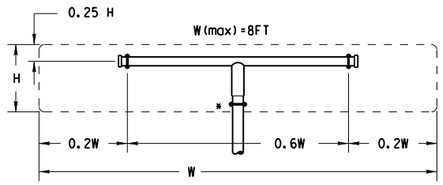
GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

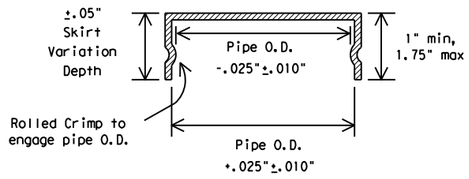
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
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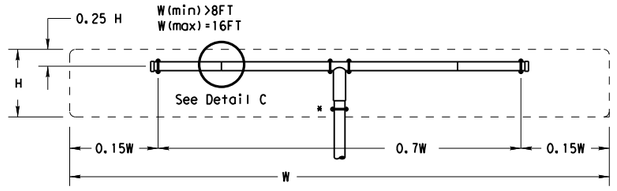
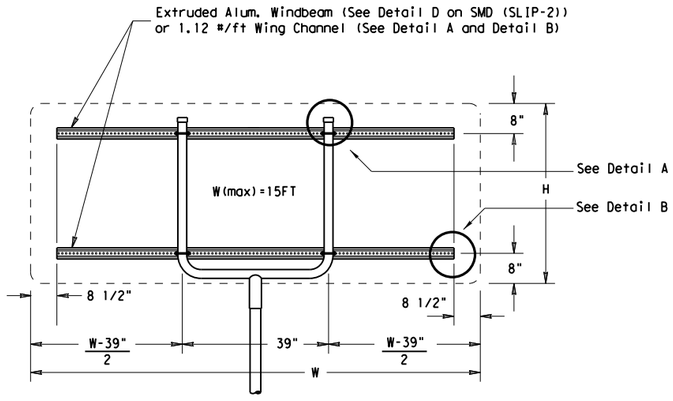


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



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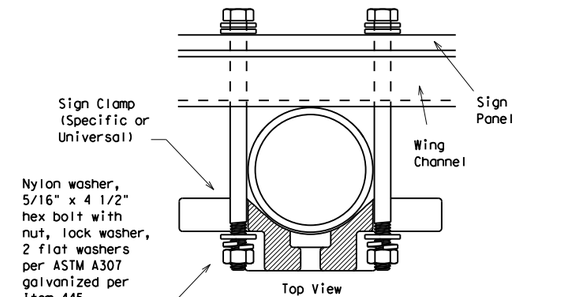
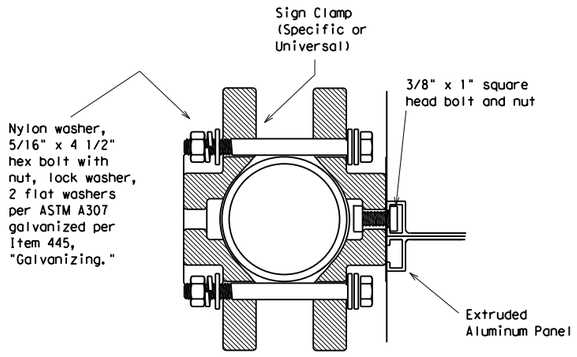
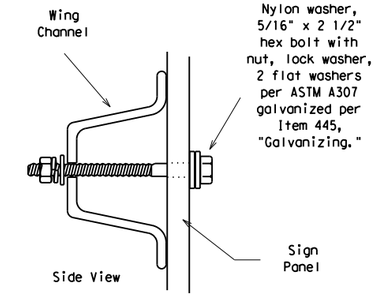


Top View

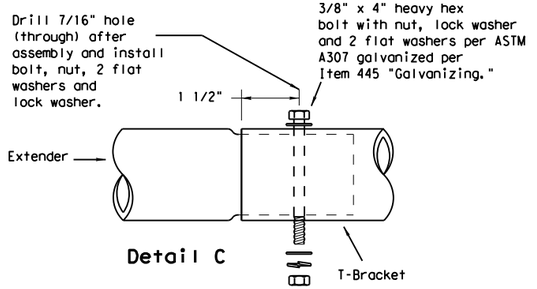
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

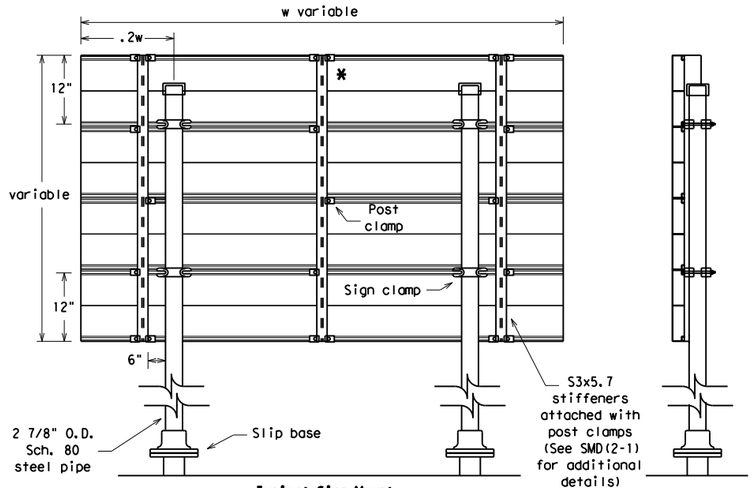


Detail B



Detail C

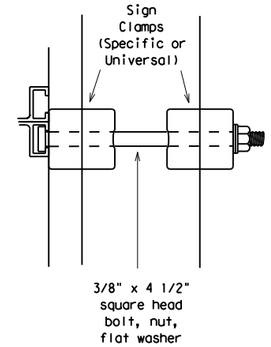
Splices shall only be allowed behind the sign substrate.



Typical Sign Mount

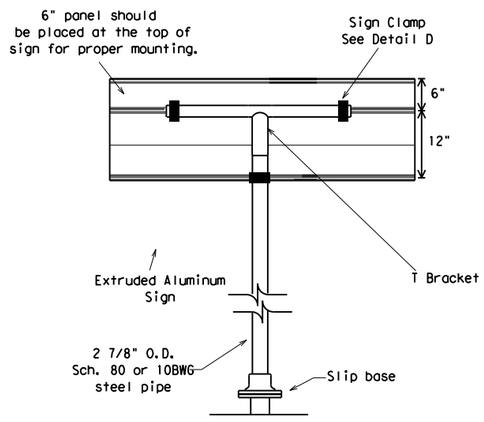
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

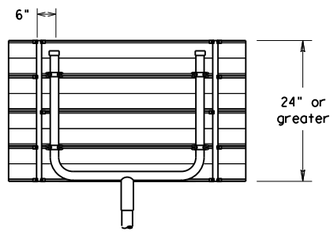


See Detail E
for clamp installation

Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		124

PART 1 - GENERAL

1.01 DESCRIPTION

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

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

1.02 REQUEST FOR INFORMATION / CLARIFICATION

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

1.03 PLANS / SPECIFICATIONS

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

PART 2 - UTILITIES AND FIBER OPTIC

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

PART 3 - CONSTRUCTION

3.01 GENERAL

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

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

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

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

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

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

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

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

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

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

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

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

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

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

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

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

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

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

3.04 INSURANCE

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

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad 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 Railroad specific contractor right of entry for training information."

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

3.06 COOPERATION

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

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

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

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

3.08 APPROVAL OF REDUCED CLEARANCES

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

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

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		124A

3.09 MAINTENANCE OF RAILROAD FACILITIES

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

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

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

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

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

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

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

3.11 RAILROAD REPRESENTATIVES

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

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

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

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

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

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

3.12 COMMUNICATIONS AND SIGNAL LINES

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

3.13 TRAFFIC CONTROL

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

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

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

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

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

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

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

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

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

3.15 RAILROAD FLAGGING

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

3.16 CLEANING OF RIGHT-OF-WAY

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

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0043	07	119	US 287
	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		124B

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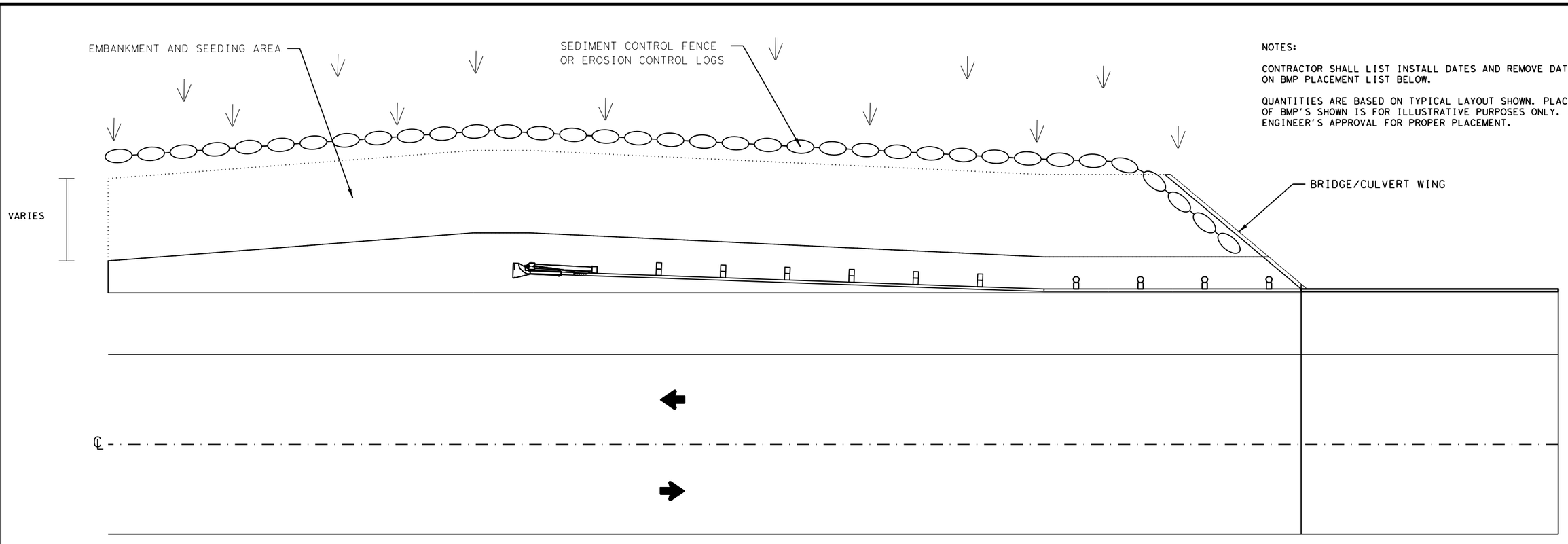

NOTES:

CONTRACTOR SHALL LIST INSTALL DATES AND REMOVE DATES ON BMP PLACEMENT LIST BELOW.

QUANTITIES ARE BASED ON TYPICAL LAYOUT SHOWN. PLACEMENT OF BMP'S SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. SEEK ENGINEER'S APPROVAL FOR PROPER PLACEMENT.

TYPICAL BMP LAYOUT

REFERENCE NO.	BMP PLACEMENT - UPSTREAM END					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
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REFERENCE NO.	BMP PLACEMENT - DOWNSTREAM END					
	DATE INSTALLED	DATE DISTURBED	DATE MAINTAINED	DATE REPLACED	DATE STABILIZED	DATE REMOVED
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10						

NOT TO SCALE

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
TYPICAL SW3P
LAYOUT

Texas Department of Transportation
SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		125

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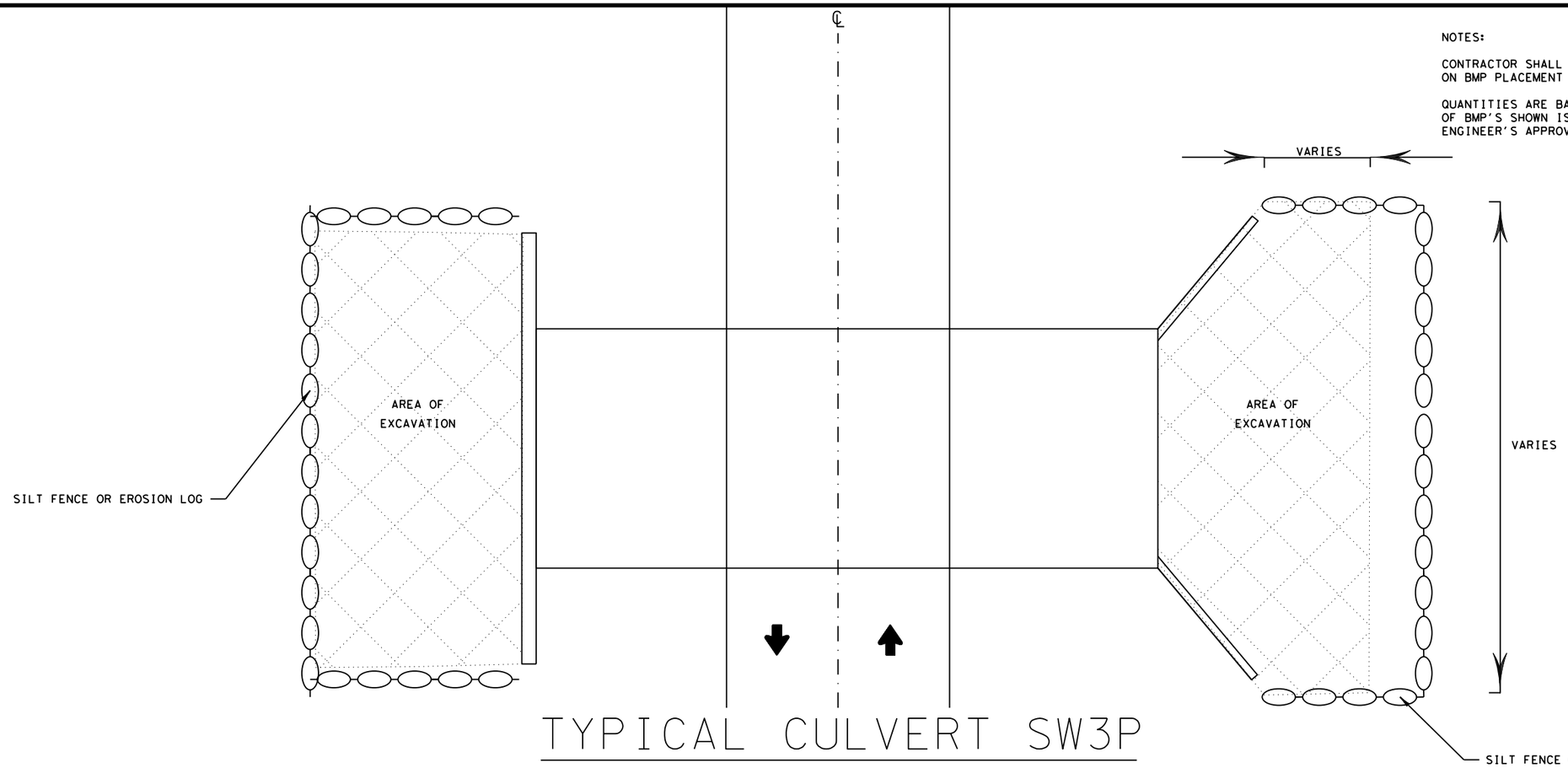
NOTES:

CONTRACTOR SHALL LIST INSTALL DATES AND REMOVE DATES ON BMP PLACEMENT LIST BELOW.

QUANTITIES ARE BASED ON TYPICAL LAYOUT SHOWN. PLACEMENT OF BMP'S SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. SEEK ENGINEER'S APPROVAL FOR PROPER PLACEMENT.



TYPICAL CULVERT SW3P

REFERENCE NO.	BMP PLACEMENT - UPSTREAM END					
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NOT TO SCALE

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
TYPICAL SW3P LAYOUT

Texas Department of Transportation

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		126

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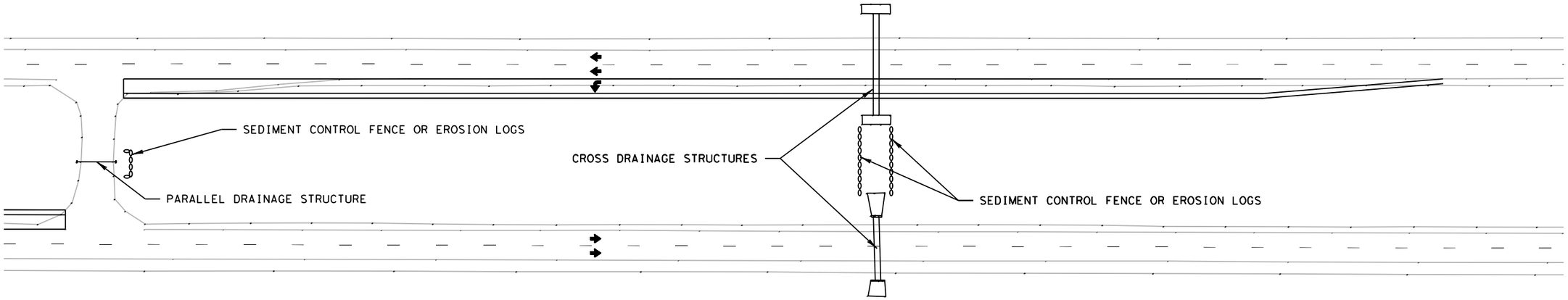
NOTES:

CONTRACTOR SHALL LIST INSTALL DATES AND REMOVE DATES ON BMP PLACEMENT LIST BELOW.

QUANTITIES ARE BASED ON TYPICAL LAYOUT SHOWN. PLACEMENT OF BMP'S SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. SEEK ENGINEER'S APPROVAL FOR PROPER PLACEMENT.



TYPICAL CROSSOVER & TURN LANE SW3P

REFERENCE NO.	BMP PLACEMENT - UPSTREAM END					
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REFERENCE NO.	BMP PLACEMENT - DOWNSTREAM END					
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NOT TO SCALE

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

US 287
TYPICAL SW3P
LAYOUT

Texas Department of Transportation
SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0043	07	119	US 287
DIST	COUNTY		SHEET NO.
WFS	WILBARGER		127

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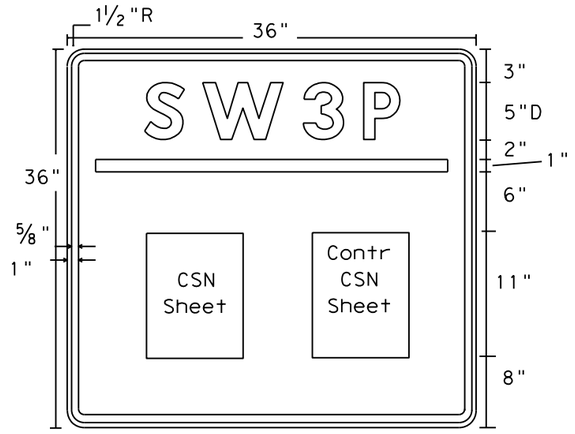
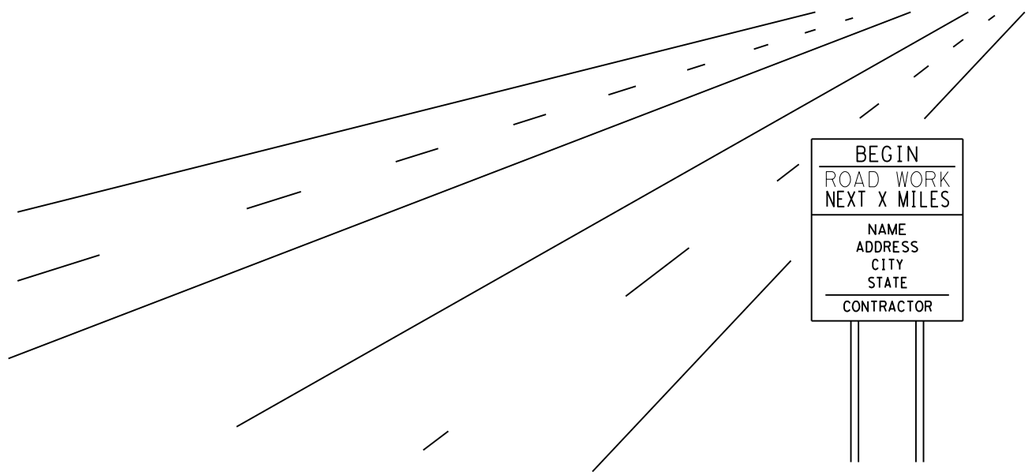


SW3P SIGN

TxDOT Large or Small Construction Site Notice (CSN) & Contractor Large or Small Construction Site Notice (CCSN)



Sign Dimensions

36" X 36"

Letters - White
Numbers - White
Border - White
Background - Blue

GENERAL NOTES:

1. The alphabets and lateral spacing between letters and numerals shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways", (TMUTCD) latest edition, and the "Compliant Work Zone Traffic Control Devices List". Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.
2. Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting Type C.
3. CSN & CCSN Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
4. Signs should be placed just inside the right of way line at the project limits at a readable height. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. If placed outside the clear zone, SW3P sign may be placed perpedicular or parallel to ROW line.
5. Final location of the signs will be approved by the Engineer.

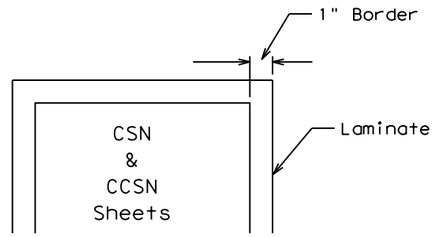
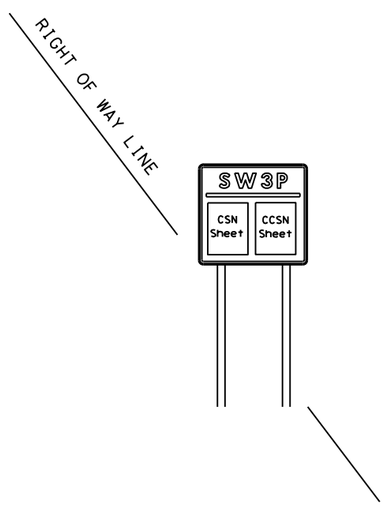


Figure 1



DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
WHITE	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

Texas Department of Transportation
WICHITA FALLS DISTRICT STANDARD

US 287

SW3P SIGN

FILE:	DN: TxDOT	CK:	DW:	CK:	
©TxDOT 2021	DISTRICT	FEDERAL AID PROJECT		HIGHWAY	
	WFS	SEE TITLE SHEET		US 287	
REVISION DATE: 5/12/17	COUNTY	CONTROL	SECT	JOB	SHEET
	WILBARGER	0043	07	119	128

LEVELS DISPLAYED
PATH:

DATE: 4/30/2021 8:56:39 AM
FILE: T:\WFSDESIGN\Plans\0043-07\119\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.

☐ No Action Required ☑ Required Action

Action No.

1. 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.
2. 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.
3. 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.
4. Send a copy of the NOI, NOC, NOT to any non-TxDOT MS4 operators that receive discharges from the project, if applicable.

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.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☐ No Action Required ☑ Required Action

Action No.

1. Work around the right of way is prohibited without coordinating with the Environmental Coordinator.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☑ Required Action

Action No.

1. Impacts to vegetation should be kept to the minimum necessary. Associated impacts will be the minimum necessary to extend culverts and widen the roadway as necessary.
2. Trees shall be trimmed rather than removed when feasible.
3. Disturbed areas would be re-vegetated according to TxDOT's standard practices for rural areas, which to the extent practicable, is in compliance with Executive Memorandum on Beneficial Landscaping, if applicable.

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

☐ No Action Required ☑ Required Action

Action No.

Migratory Bird Treaty Act (MBTA): Migratory birds may arrive in the project area to breed during construction of the proposed project. Measures would be taken to avoid the take of migratory birds, their occupied nests, eggs, or young, in accordance with the Migratory Bird Treaty Act, through phasing of work or preventative measures. Between October 1 and February 15, the contractor would remove all old migratory bird nests from any structures that would be affected by the proposed project, and complete any bridge work/demolition and/or vegetation clearing. In addition, the contractor would be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repelling sprays and/or gels, between February 15 and October 1.

In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided.

Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed.

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

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:

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

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

☐ Yes ☑ No

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

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

☐ Yes ☐ No

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

1. If sheen or other contamination is visible in the waters of the U.S., or on the project site, the site shall be immediately cleaned up in accordance with local, state and federal regulations.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☑ Required Action

Action No.

1. Keep noise to a minimum. Reduce idling of vehicles and equipment.
2. Maintain project site. Minimize dust and airborne particles to the maximum extent practical.
3. Collect sanitary waste in accordance with local regulations by a sanitary waste collector. Portable units shall not be placed in or near a waterway or drainage area
4. TxDOT EMS Policy Statement (English & Spanish) should be displayed at the construction site.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0043	07	119	US 287
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	WILBARGER		129

DATE: 4/30/2021 12:06:47 PM
FILE: T:\WFSDESIGN\Plans\0043-07\119\4 - Design\Plan Set\9. Environmental\STORMWATER POLLUTION PREVENTION PLAN (SW3P).dgn

A. GENERAL SITE DATA

1. PROJECT LIMITS: *From Oklaunion to Harrold*

Begin Project Coordinates : Latitude (N): 34.1314976 Longitude (W): -99.1368554
End Project Coordinates : Latitude (N): 34.0809428 Longitude (W): -99.0316251

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet*
- *Drainage Patterns: SW3P Layout*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections*
- *Location of Erosion and Sediment Controls: SW3P Layout*
- *Surface Waters and Discharge Locations: SW3P Layout*
- *Project Specific Location(s) (PSL): To be determined by the project Construction Personnel. Location(s) shown on SW3P Site Map (If PSL location(s) is within one mile of project) and information located in project SW3P Binder (Reference Item #10 below).*

3. PROJECT DESCRIPTION:

Add left turn lanes at crossovers

4. MAJOR SOIL DISTURBING ACTIVITIES:

Extending structures & adding left turn lanes

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

US 287 soils are primarily composed of Rotan, Vernon and Wichita clay loam. Nearly level to gently sloping (0-2%).

6. TOTAL PROJECT AREA:

US 287 - 212 Acres

7. TOTAL AREA TO BE DISTURBED:

US 287 - 10 Acres (4.7%)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: *0.50*
AFTER CONSTRUCTION: *0.48*

9. NAME OF RECEIVING WATERS:

Storm water runoff in the project area flows into livestock ponds, and unnamed Tributaries which flow into Red River.

10. PROJECT SW3P Binder:

A. For projects disturbing one to five acres, TxDOT and the Contractor will maintain SW3P Binders at the project field office (If there is not a project field office, TxDOT's binder should be kept at the Area Office) which contains the following: Index Sheet, TCEQ Signature Authority, TCEQ Small Construction Site Notice, Contractor Certification of Compliance, SW3P Inspector Qualification Statements, Inspection and Maintenance Reports (Form 2118), EPIC Sheet, SW3P Sheet, Site Location Maps, Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.

B. For projects disturbing 5 acres or more, TxDOT and the Contractor will follow the actions listed in (10.A.) above with the addition of the following: Notice Of Intent (N.O.I.) and Fee Payment Form, TCEQ Large Construction Site Notice (to be used instead of Small Site Notice), and TPDES Permit Coverage Notice.

C. For projects disturbing less than one acre, actions described in (10.A.) and (10.B.) above are not required. Acreage is calculated by adding Total Disturbed Area within project limits (See #7 above) and the PSL(s) acreage located on or within one mile of project.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- ___ TEMPORARY SEEDING
- ___ MULCHING (Hay or Straw)
- P BUFFER ZONES
- ___ PLANTING
- P SEEDING
- ___ SODDING
- T PRESERVATION OF NATURAL RESOURCES
- ___ FLEXIBLE CHANNEL LINER
- ___ RIGID CHANNEL LINER
- ___ SOIL RETENTION BLANKET
- ___ COMPOST MANUFACTURED TOPSOIL
- T VERTICAL TRACKING
- ___ OTHER:

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- T SILT FENCES
- T EROSION CONTROL LOGS
- ___ EROSION CONTROL COMPOST BERMS (Low Velocity)
- T ROCK FILTER DAMS
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ___ DIVERSION DIKE AND SWALE COMBINATIONS
- ___ PIPE SLOPE DRAINS
- ___ PAVED FLUMES
- ___ ROCK BEDDING AT CONSTRUCTION EXIT
- ___ TIMBER MATTING AT CONSTRUCTION EXIT
- ___ CHANNEL LINERS
- ___ SEDIMENT TRAPS
- ___ SEDIMENT BASINS
- ___ STORM INLET SEDIMENT TRAP
- ___ STONE OUTLET STRUCTURES
- ___ CURBS AND GUTTERS
- ___ STORM SEWERS
- ___ VELOCITY CONTROL DEVICES
- ___ OTHER:

NOTE: TOP OF BMP'S SHOULD NOT BE HIGHER THAN ROADWAY ELEVATION AS NOT TO FLOOD ROADWAY UNLESS PRIOR APPROVAL FROM ENGINEER IS OBTAINED.

3. STORM WATER MANAGEMENT:

A. Storm water drainage will be provided by ditches, inlets, and storm water systems which carry drainage within the R.O.W. to the lows within the roadway and project site which drains to natural facilities.

B. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4 :1 or flatter slopes with permanent vegetative cover.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

1. *Remove existing headwall.*
2. *Place BMPs.*
3. *Extend structures.*
4. *Backfill.*
5. *Apply sod.*

5. NON-STORM WATER DISCHARGES:

Filter non-storm water discharges, or hold in retention basins, before being allowed to mix with storm water. These discharges consist of, but not limited to, non-polluted ground water, spring water, foundation or footing drain water, water used for dust control or pavement washing and vehicle washwater containing no detergents.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

Maintain all erosion and sediment controls in good working order. Perform any necessary cleaning/repairs/replacements at the earliest possible date prior to next rain event, but no later than 7 calendar days. Ensure the surrounding ground has dried sufficiently to prevent damage from equipment. "Too Wet" is the only reason for not adhering to timeframes described. When construction activities permanently or temporarily cease and are not expected to resume for 14 or more days on a disturbed portion of the site, stabilization measures must be initiated immediately.

2. INSPECTION:

A TxDOT Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days. An Inspection and Maintenance Report, signed by the TxDOT Inspector and the Contractor, will be filed for each inspection. Revise/clean/repair/replace each BMP control device in accordance with the current Field Inspection and Maintenance Report (Form 2118) and Item 1 (Maintenance) above. On projects that disturb less than one acre and do not meet the definition of a construction project, inspections are not required.

3. WASTE MATERIALS:

On a daily basis, or as may be directed, collect all waste materials, trash and debris from the construction site and deposit into a metal dumpster having a secure cover and which meets all state and local city solid waste management requirements. Empty the dumpster as required by regulation, or as may be directed, at a local approved landfill site. Do not bury construction waste on the construction project site.

4. HAZARDOUS WASTE & SPILL REPORTING:

As a minimum, any products in the following categories are considered to be hazardous: Paints, Acids, Solvents, Fuels, Asphalt Products, Chemical Additives for Soil Stabilization, and Concrete Curing Compounds or Additives. When storing hazardous material on the project site, or at a Project Specific Location, take all practicable precaution to prevent and/or contain any spillage of these materials. In the event of a spill, contact the spill coordinator immediately.

5. SANITARY WASTE:

Use a licensed sanitary waste management contractor to collect all sanitary waste from portable units as may be required by local regulation, or as directed.

6. CONSTRUCTION VEHICLE TRACKING:

On a regular basis, or as may be directed, dampen haul roads for dust control and stabilize construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be available on a daily basis, or as may be directed, to remove sediment from paved roadways abutting or traversing the project site.

7. MANAGEMENT PRACTICES:

A. Construct disposal areas, stockpiles, haul roads and PSL's in a manner that will minimize and control the amount of sediment that may enter receiving waters. Do not locate disposal areas in any wetland, waterbody or streambed.

B. Locate construction staging areas, vehicle maintenance and PSL's areas in a manner to minimize the runoff of pollutants.

C. When working in or near a wetland, install and maintain operating soil erosion and sediment controls at all times during construction and isolate the work from the wetland.

D. Clear all waterways as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.

E. Procedures and/or practices should be taken to control dust.

F. Sediment to be removed from roadways daily or when work begins after weather events if construction activities have ceased due to weather event.

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

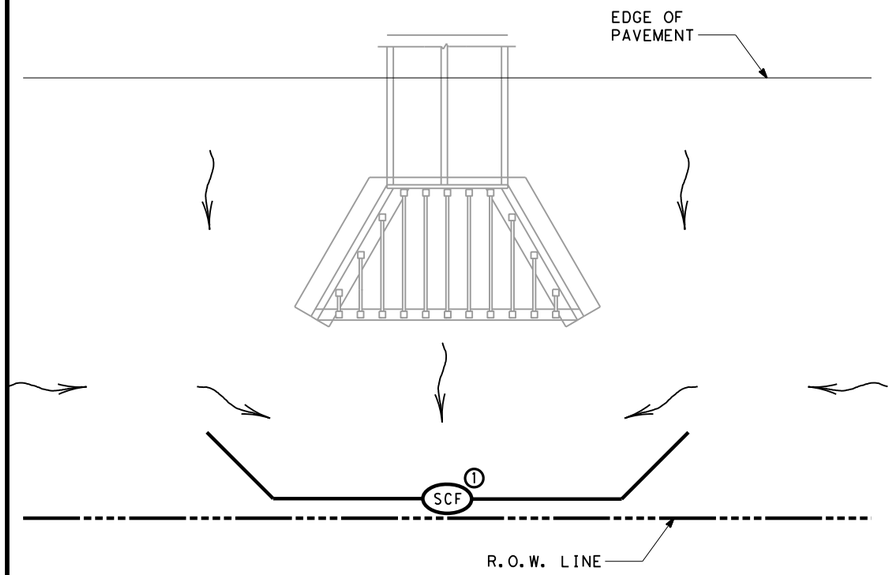
Texas Department of Transportation

WICHITA FALLS DISTRICT ENVIRONMENTAL

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

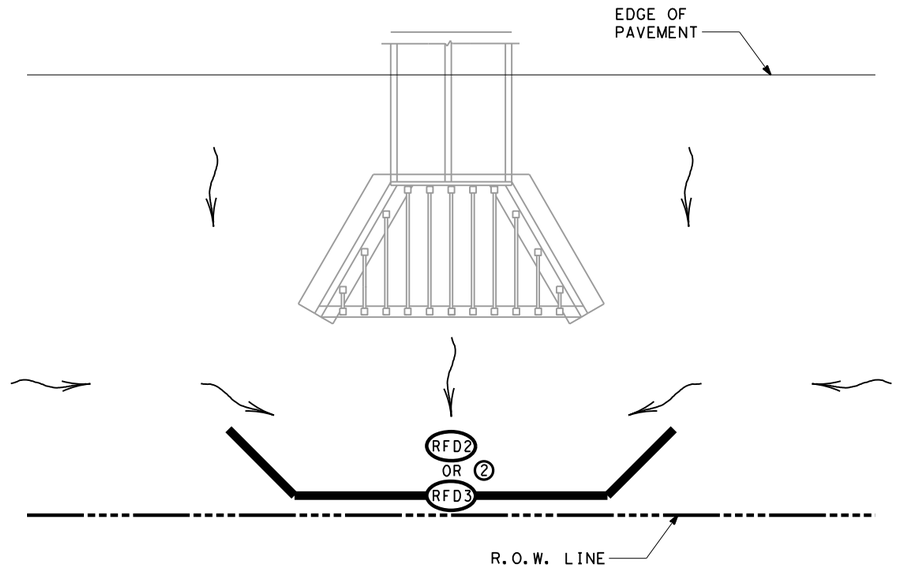
TEMPLATE REVISION DATE: 04/26/2016

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		US 287
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	WFS	WILBARGER	130
CHECK	CONTROL	SECTION	JOB	
	0043	07	119	



BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



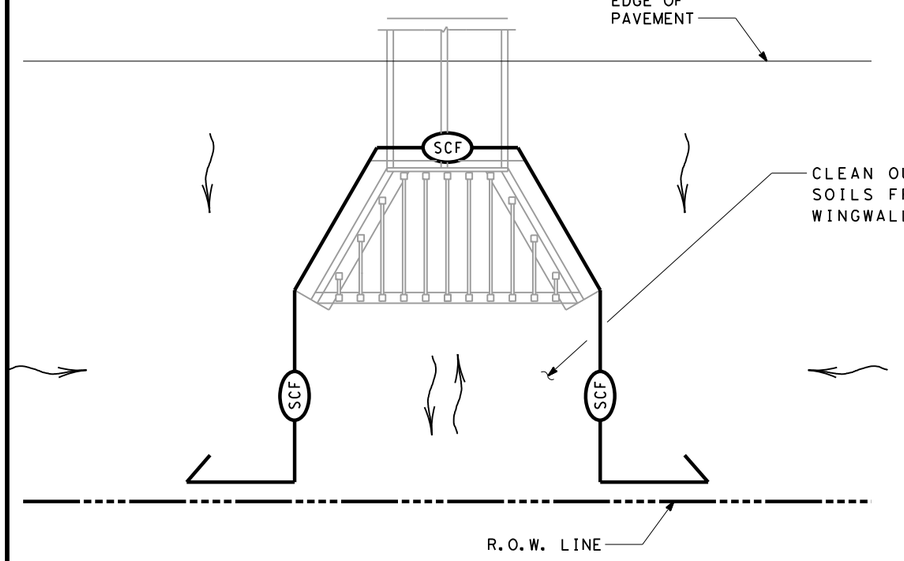
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

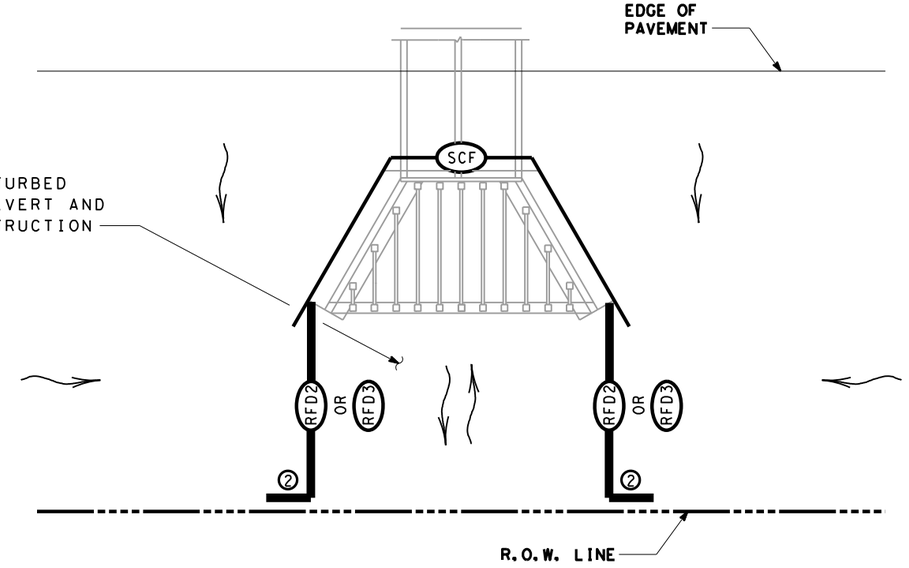
NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

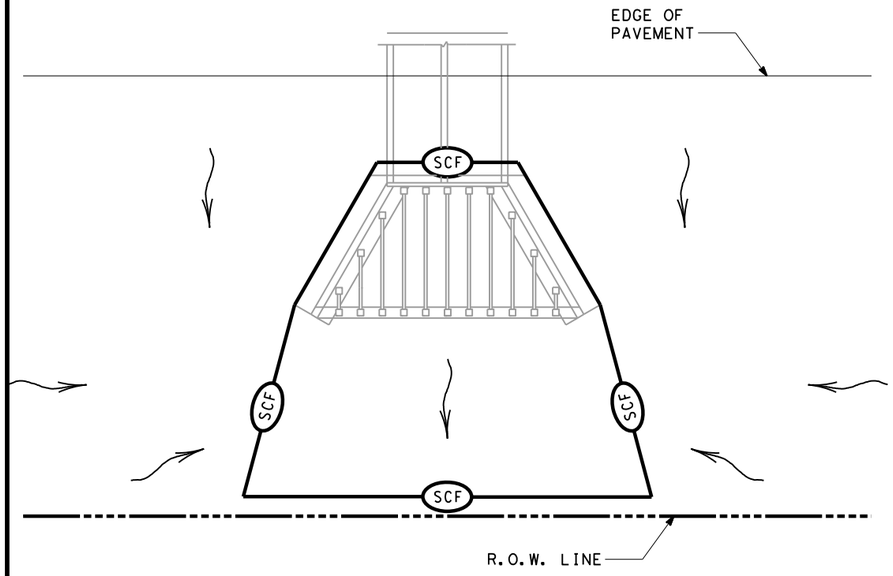
SCALE = NTS SHEET 1 OF 4

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

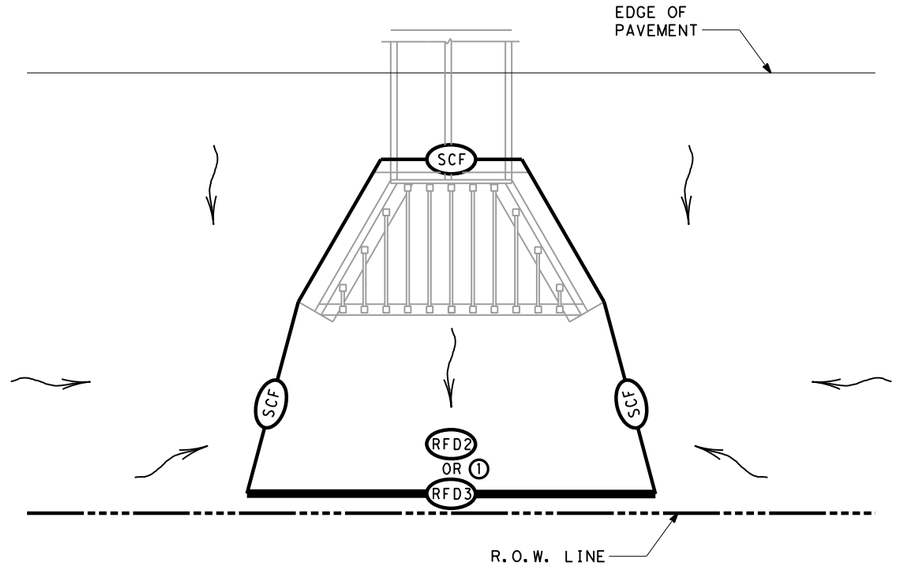
WFS-TA-BMP

FILE: BMPLAYOUTS.dgn		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
© TxDOT 2009		CONT	SECT	JOB	HIGHWAY	
REVISIONS		0043	07	119	US 287	
JULY 2019		DIST	COUNTY		SHEET NO.	
		WFS	WILBARGER		131	



BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



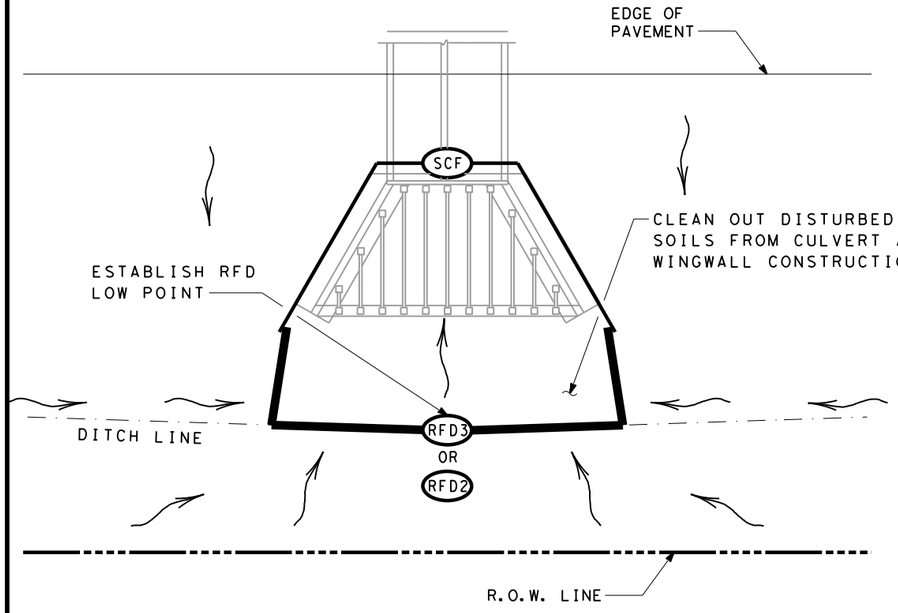
BEST MANAGEMENT PRACTICE (BMP) #6

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

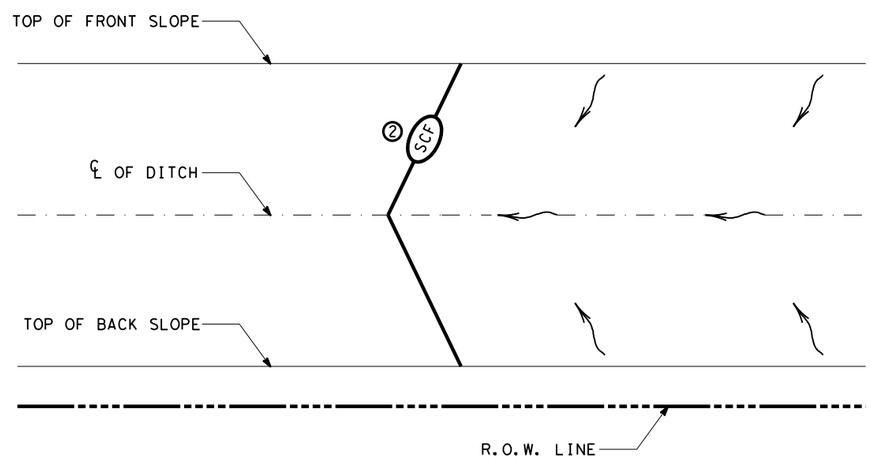
NOTES:

1. PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.
2. ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.



BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #8

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

SCALE = NTS SHEET 2 OF 4

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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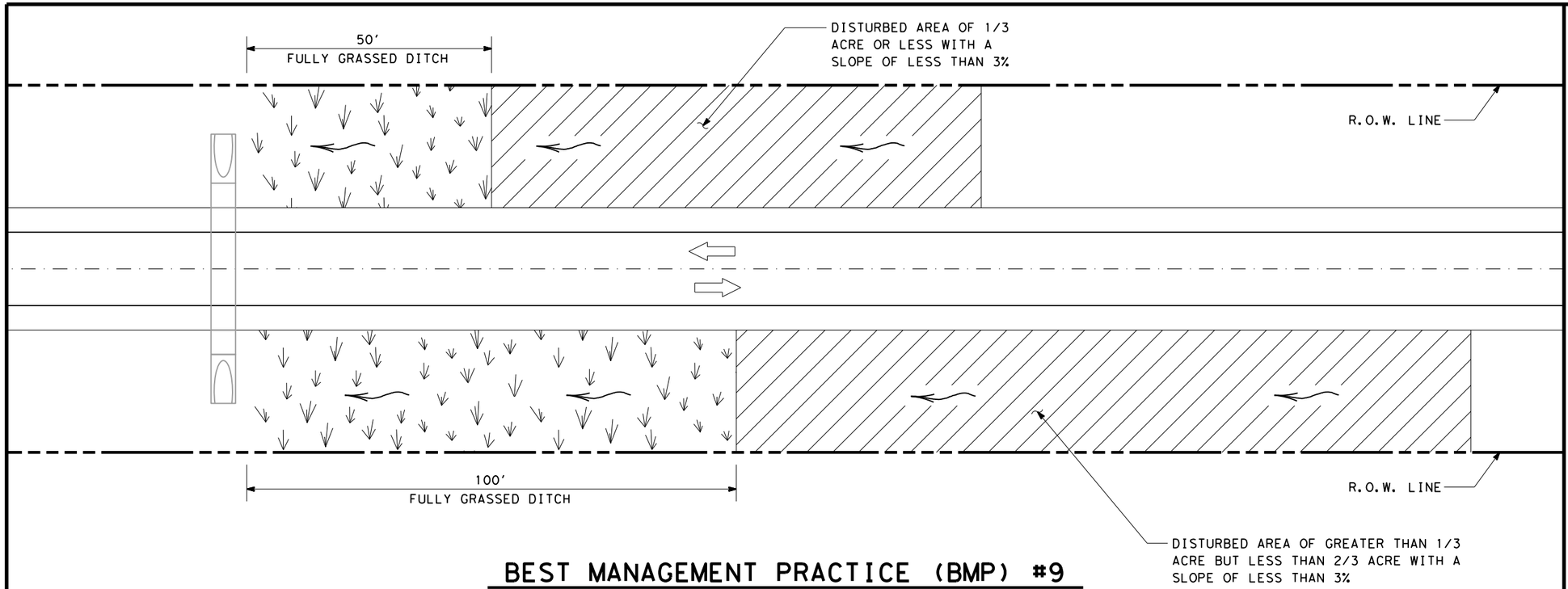
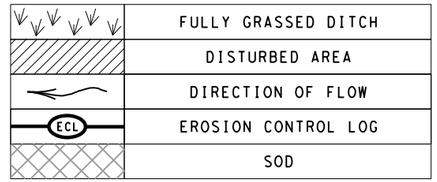


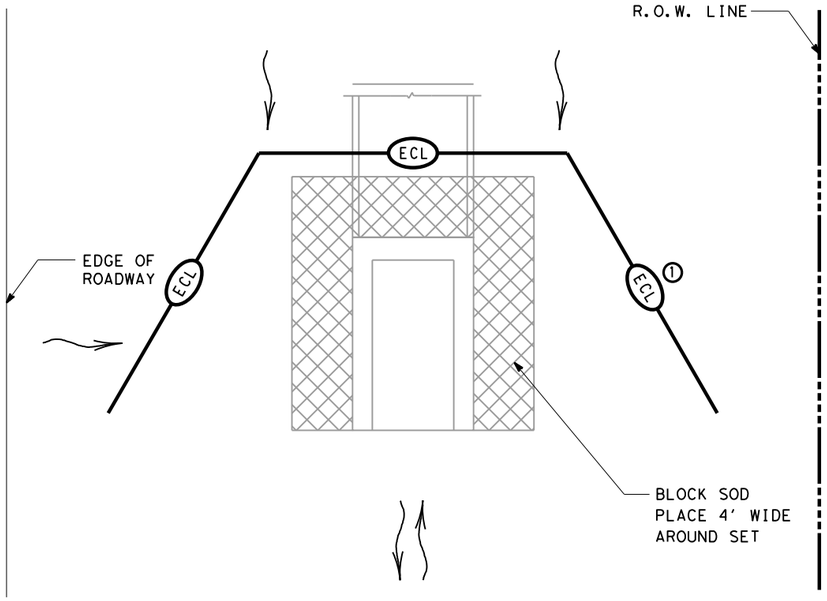
BEST MANAGEMENT PRACTICE (BMP) #9

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS



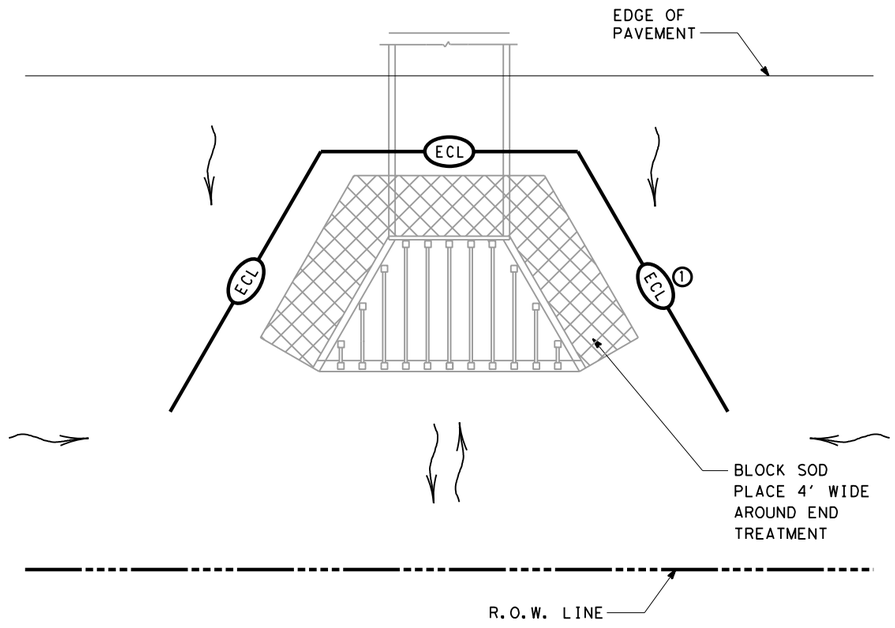
NOTES:

1. SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED BY THE ENGINEER.



BEST MANAGEMENT PRACTICE (BMP) #10

SEDIMENT CONTROL AT
PARALLEL DRAINAGE STRUCTURE ENTRANCE/EXIT



BEST MANAGEMENT PRACTICE (BMP) #11

SEDIMENT CONTROL AT
CROSS DRAINAGE STRUCTURE ENTRANCE/EXIT

STATE OF TEXAS
MONTY F. BROWN
89218
LICENSED
PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

04/30/2021

SCALE = NTS SHEET 3 OF 4

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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DEPARTMENT MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
VINYL NON-REFLECTIVE DECAL SHEETING	DMS-8320

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
WHITE	BACKGROUND	TYPE C (FLUORESCENT PRISMATIC)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE DECAL SHEETING

SIGN GENERAL NOTES:

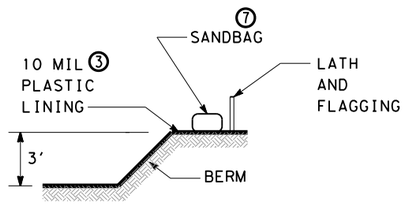
A. THE ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", (TMUTCD) LATEST EDITION, AND THE "COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST". LATERAL SPACING OF TEXT SHALL PROVIDE A BALANCED APPEARANCE. ALL MATERIALS SHALL CONFORM TO DEPARTMENT SPECIFICATIONS.

B. LEGEND AND BORDER MAY BE APPLIED BY REVERSE SCREENING PROCESS WITH TRANSPARENT COLORED INK, CUT-OUT WHITE REFLECTIVE SHEETING APPLIED TO COLORED BACKGROUND OR COMBINATION THEREOF. BACKGROUND SHALL BE REFLECTIVE SHEETING TYPE C.

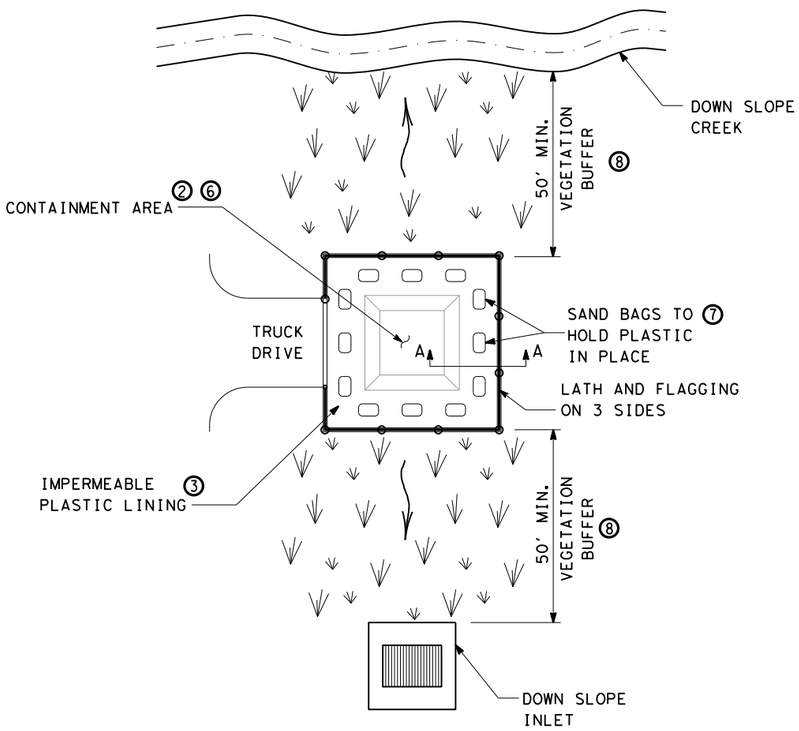
C. FINAL SIGN LOCATION SHALL BE AS APPROVED BY THE ENGINEER. IF THE SIGN CANNOT BE PLACED OUTSIDE THE CLEAR ZONE, IT MUST ADHERE TO THE TMUTCD. IF PLACED OUTSIDE THE CLEAR ZONE, SIGN MAY BE PLACED PERPENDICULAR OR PARALLEL TO ROW LINE.

D. SIGN DIMENSION IS 42" WIDE X 24" TALL WITH 5" BLACK LETTERS.

CONCRETE WASHOUT SIGN DETAIL (10)

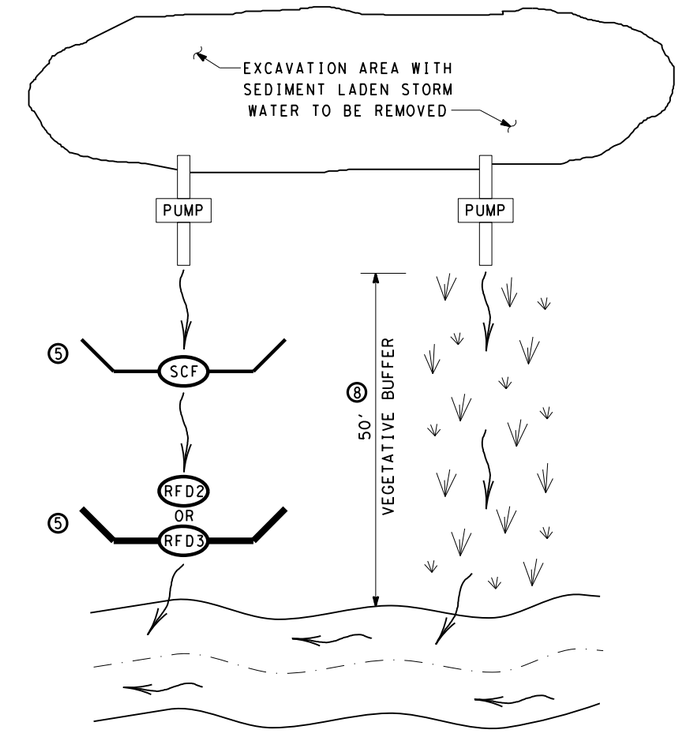


SECTION A-A



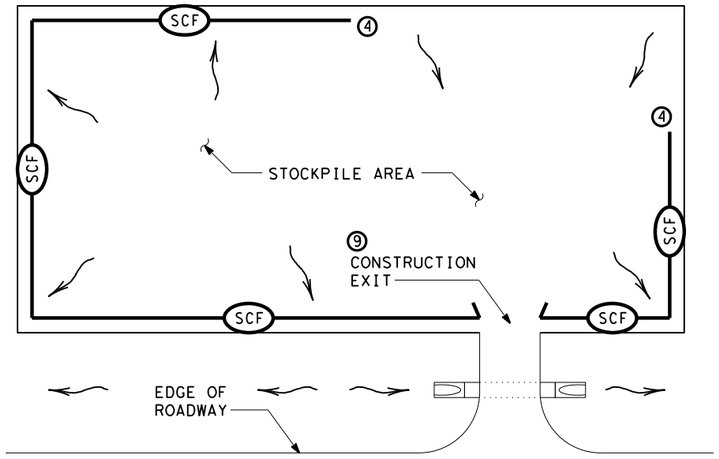
BEST MANAGEMENT PRACTICE (BMP) #12

CONCRETE TRUCK WASHOUT AREA (10)



BEST MANAGEMENT PRACTICE (BMP) #13

PUMPED STORM WATER SEDIMENT CONTROLS (1)



BEST MANAGEMENT PRACTICE (BMP) #14

STOCKPILE SEDIMENT CONTROL

	VEGETATIVE BUFFER
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

NOTES:

1. PUMPED STORM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS.
2. WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.
3. EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING. USE 10 MIL PLASTIC LINING MINIMUM.
4. START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
5. ROCK FILTER DAMS, SEDIMENT CONTROL FENCE, OR OTHER DEVICES CAN BE SUBSTITUTED AS DIRECTED.
6. ACTUAL SIZE, LAYOUT, & LOCATION WILL BE DETERMINED IN THE FIELD.
7. AN EARTHEN BERM MAY BE USED IN LIEU OF SANDBAGS.
8. VEGETATIVE BUFFER SHOULD HAVE AT A MINIMUM 70% VEGETATIVE COVERAGE
9. PLACEMENT OF DEVICES FOR OFFSITE TRACKING AS APPLICABLE AND/OR DIRECTED BY THE ENGINEER.
10. ALL ITEMS REQUIRED FOR CONCRETE WASHOUT AND SIGN SHALL BE SUBSIDIARY TO ITEM 506.

Monty F. Brown, P.E.

04/30/2021

SCALE = NTS SHEET 4 OF 4

Texas Department of Transportation
Wichita Falls District

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

WFS-TA-BMP

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ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (URBAN) (SAND or CLAY)

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

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) WARM SEASON SEEDING

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

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (CLAY)

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

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) WARM SEASON SEEDING

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

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (PERMANENT) (RURAL) (SANDY)

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

NOTES:

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

STATE OF TEXAS
MONTY F. BROWN
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PROFESSIONAL ENGINEER

Monty F. Brown, P.E.

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SCALE = NTS SHEET 1 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

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	WFS	WILBARGER		135

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (URBAN) COOL SEASON SEEDING

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

ITEM 164 SEEDING FOR EROSION CONTROL

SEED (TEMPORARY) (RURAL) COOL SEASON SEEDING

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

NOTES:

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

FOR DRILL SEEDING

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

FOR BROADCAST SEEDING

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

ITEM 314 EMULSIFIED ASPHALT TREATMENT

TIME SCHEDULE	FUNCTIONAL USE:
IMMEDIATELY AFTER: SOIL PREPARATION OR WITHIN 24 HOURS AFTER SEEDING, APPLY THE TACK COAT TO DESIGNATED SOIL SURFACES.	SOIL EROSION CONTROL, OR MOISTURE RETENTION BARRIER.

NOTES:

1. ALL TRUCK APPLICATIONS SHALL BE COMPLETED IN ONE PASS OF THE DISTRIBUTOR. ALL TOUCH UP WORK WILL BE FINISHED BY HAND AND HOSE PROCEDURES. APPLY FROM EDGE OF PAVEMENT THROUGH THE FULL SPECIFIED AREAS.
2. ENGINEER WILL INSPECT FOR ACCURACY THE OVERALL DEPTH OF THE APPLIED TACK COAT MATERIALS.
3. FURTHER VEHICULAR TRAFFIC IS NOT ALLOWED ON LAID BY TACK COAT SURFACES. AT THE CONTRACTORS EXPENSE ALL DAMAGES TO TACK COAT SURFACES WILL BE RE -SHOT AS DIRECTED BY THE ENGINEER.
4. USE MATERIALS AS SPECIFIED FOR EROSION CONTROL ON TABLE 18 IN ITEM 300 ASPHALTS, OILS, AND EMULSIONS, AT A RATE OF 0.25 GAL/SY.

ITEM 166 FERTILIZER

TIME SCHEDULE	FUNCTIONAL USE:
AFTER TOPSOIL PLOWING PREPARATIONS ARE COMPLETED, FERTILIZE ROW SOIL SURFACES AND HARROW 2" TO 4" DEEP INTO PLACE.	PLANT NUTRIENTS FOR PLANT AND ROOT DEVELOPMENT.

FERTILIZER SHALL BE EVENLY DISTRIBUTED AT A RATE OF 100 LBS OF NITROGEN PER ACRE.
THE BREAK DOWN OF THE NITROGEN ELEMENT SHALL BE IN A 50% SLOW RELEASE FORM.
ANALYSIS OF THE (NPK) IS: 3:1:1 OR AS DIRECTED BY THE AREA ENGINEER.

ITEM 166 NOTES:

1. BROADCAST SPECIFIED FERTILIZER FROM THE EDGE OF PAVEMENT, THROUGH THE ENTIRE ROW SEED BED AREA. APPLICATIONS FOR EDGE OF PAVEMENT, CULVERTS, SIGN POST AREAS, GUARD RAILS AND ISOLATED AREAS SHALL BE APPLIED BY WALK BEHIND SPREADERS AND BY HAND. NO FERTILIZER ALLOWED ON PAVEMENT SURFACES.

2. ALL SPREADERS SHALL BE CALIBRATED BY THE CONTRACTOR AND THE ENGINEER FOR ACCURACY AND PERFORMANCE. SHALL USE UNOPENED 50# BAGS OF SPECIFIED FERTILIZER FOR DAILY CALIBRATIONS. APPLICATION SHALL BE A EVEN DISTRIBUTION OF PRODUCT ON DESIGNATED SOIL SURFACES.

3. FERTILIZER SHALL BE DELIVERED IN 50# BAGS UNLESS OTHERWISE SPECIFIED OR APPROVED PRIOR TO DELIVERY. BAGS SHALL BE CLEARLY LABELED SHOWING CONTENTS. IF BULK FERTILIZER IS APPROVED, DOCUMENTATION WILL BE REQUIRED FOR EACH LOAD OF MATERIAL DELIVERED VERIFYING AUTHENTICITY OF THE MATERIAL. CULTURAL PROCEDURES ARE UNDER THE DIRECTION OF THE TXDOT AREA ENGINEER.

STATE OF TEXAS
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PROFESSIONAL ENGINEER

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04/30/2021

SCALE = NTS SHEET 2 OF 2

Texas Department of Transportation
Wichita Falls District Standard

TYPICAL APPLICATION FOR VEGETATION ESTABLISHMENT SHEET

WFS-TA-VES

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	DIST	COUNTY		SHEET NO.
	WFS	WILBARGER		136

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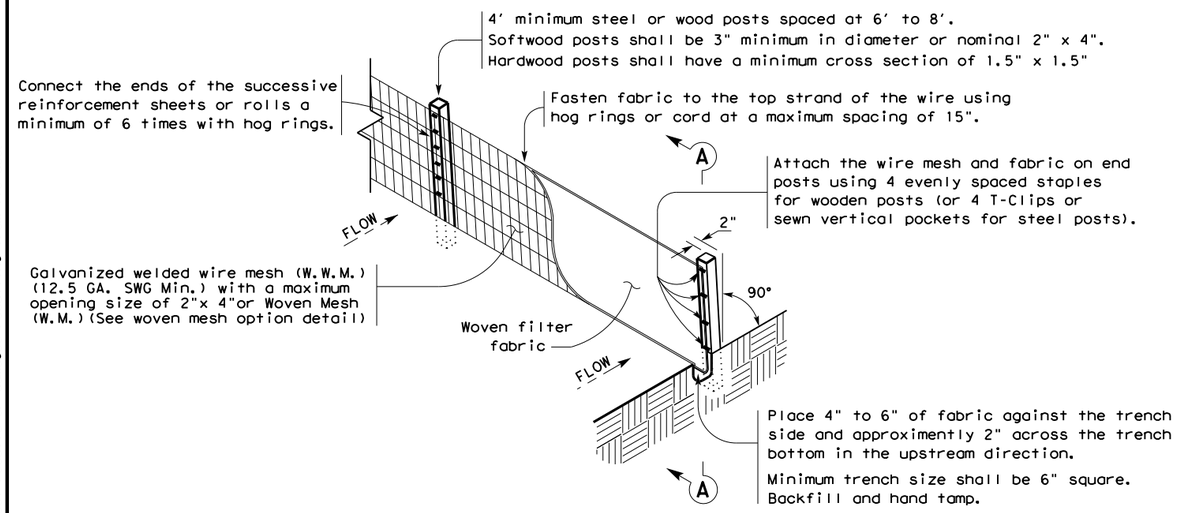
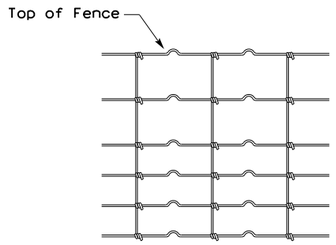
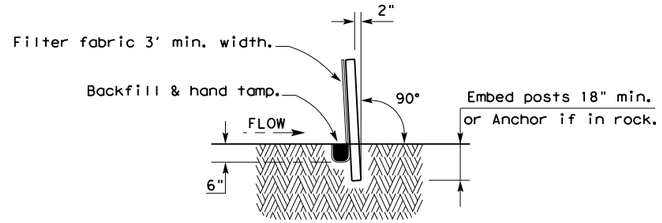


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

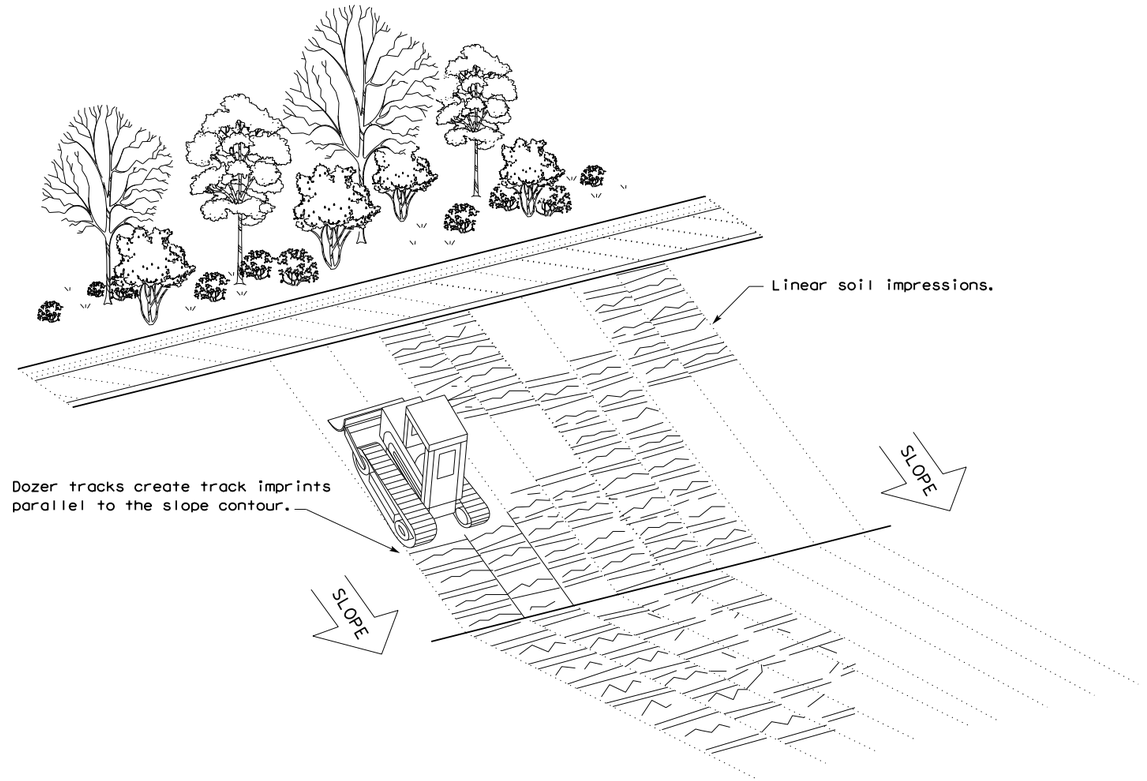
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
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REVISIONS	0043	07	119		US 287		
	DIST	COUNTY					SHEET NO.
	WFS	WILBARGER					137

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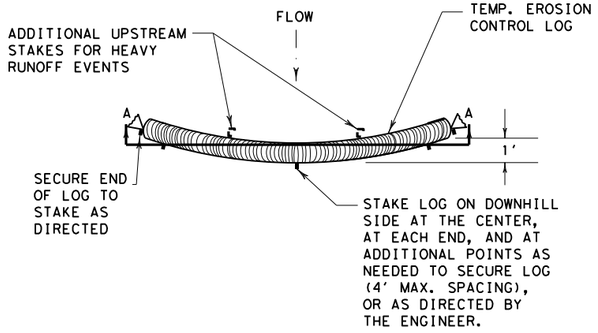
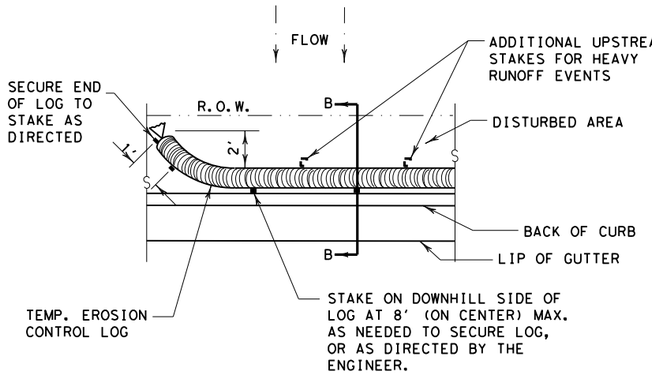
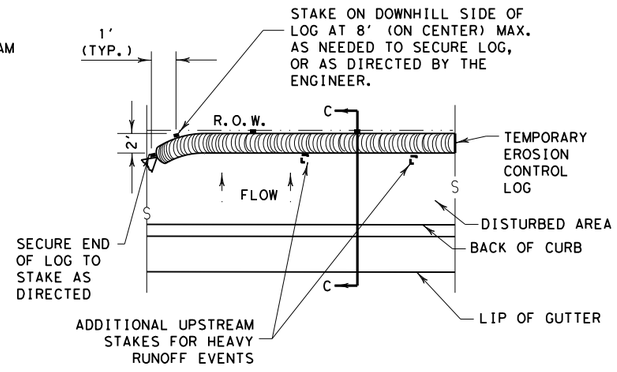


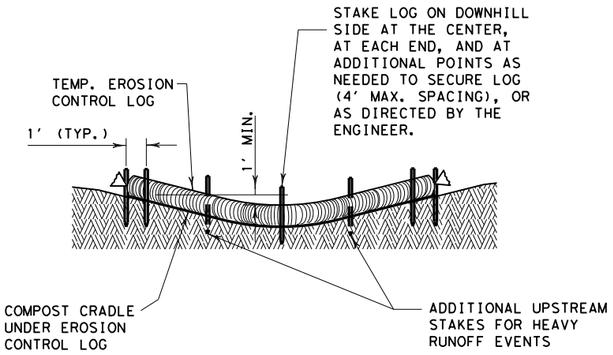
PLAN VIEW



PLAN VIEW



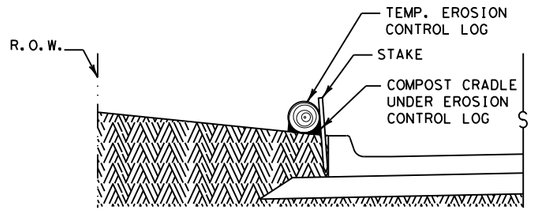
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

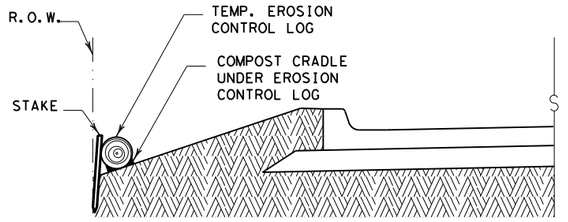
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

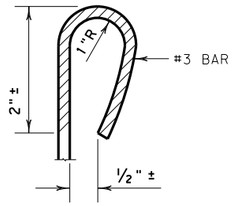
CL-BOC



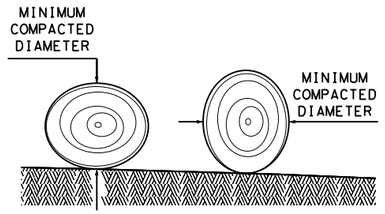
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

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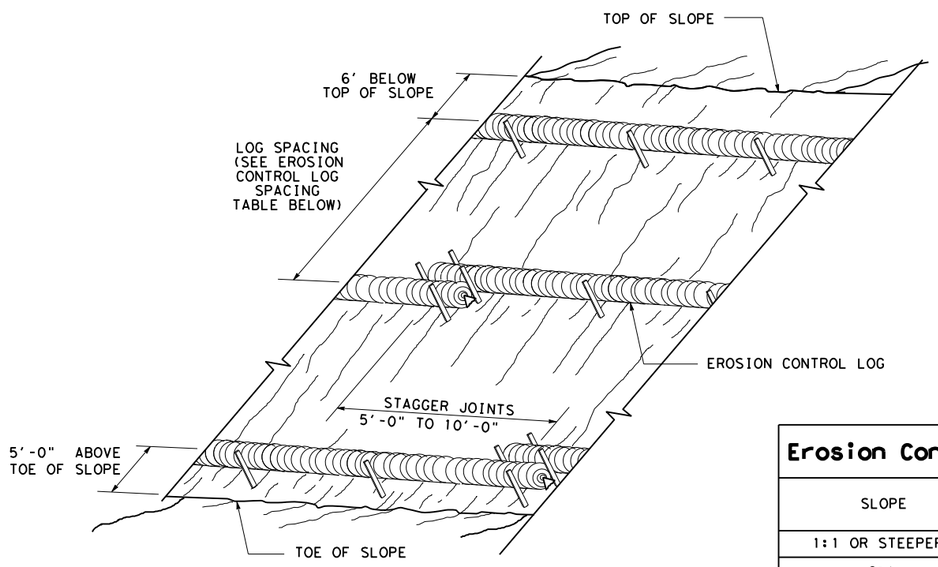
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

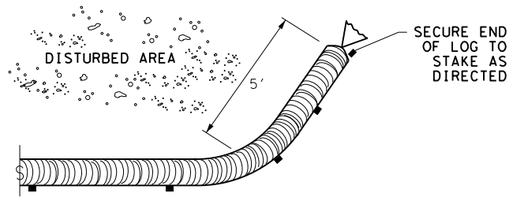
EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0043	07	119		US 287		
	DIST	COUNTY				SHEET NO.	
	WFS	WILBARGER				138	



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

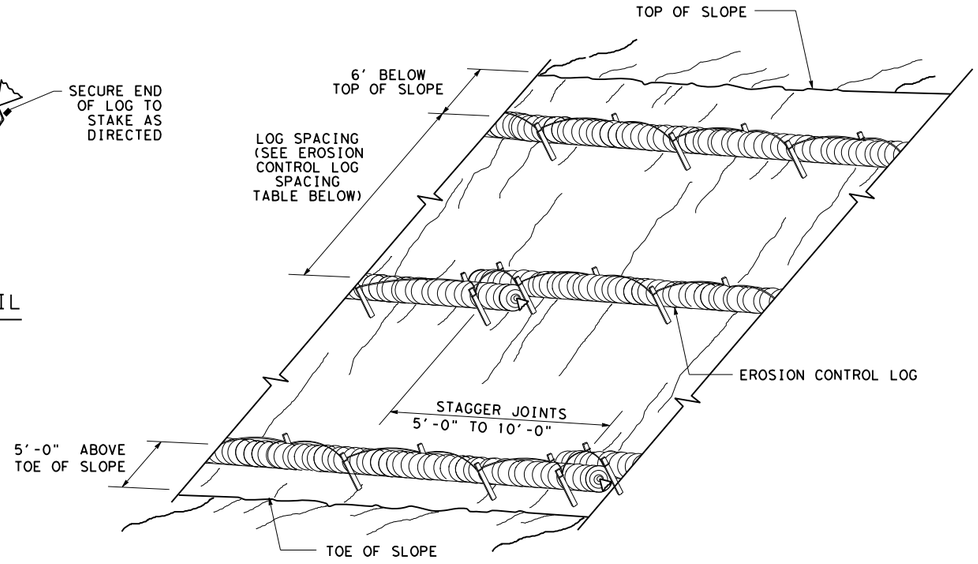
CL-SST



END SECTION RAP DETAIL

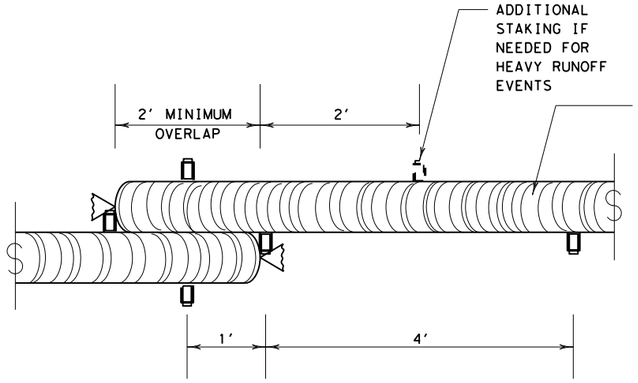
Erosion Control Log Spacing Table				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

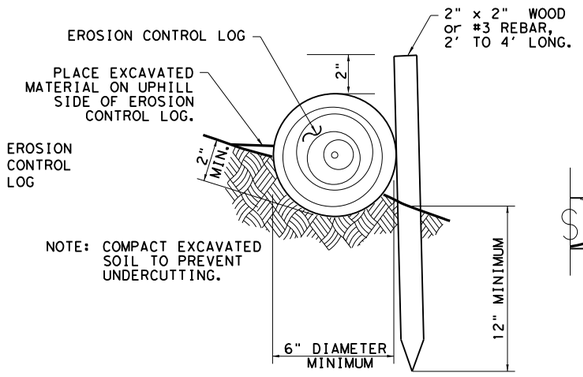
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

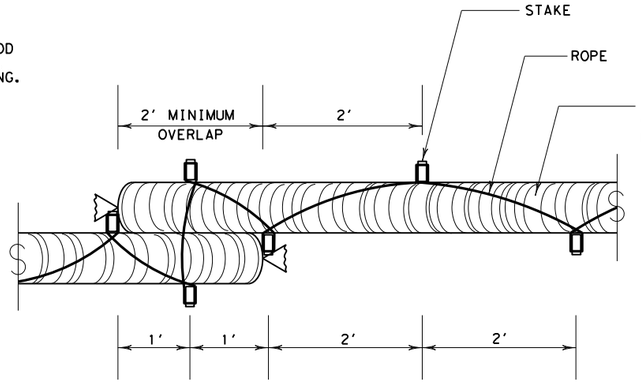


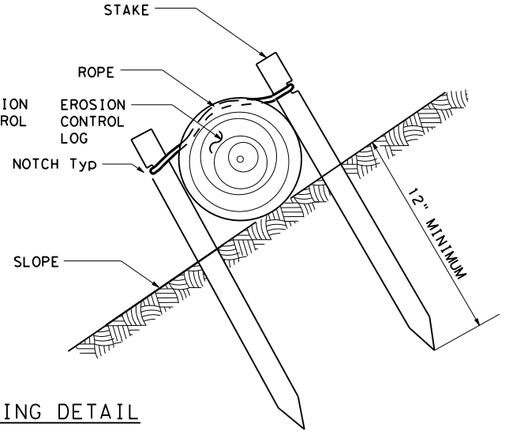


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

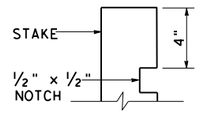
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0043	07	119		US 287	
	DIST		COUNTY			SHEET NO.
	WFS		WILBARGER			139

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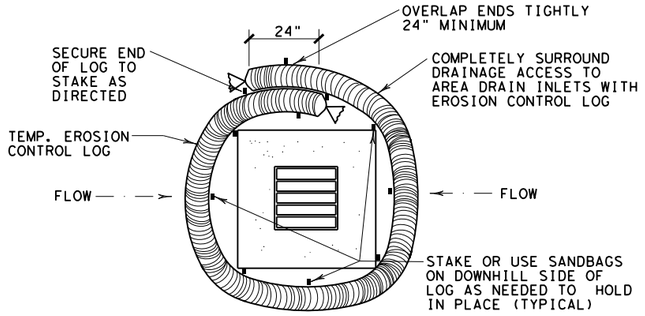
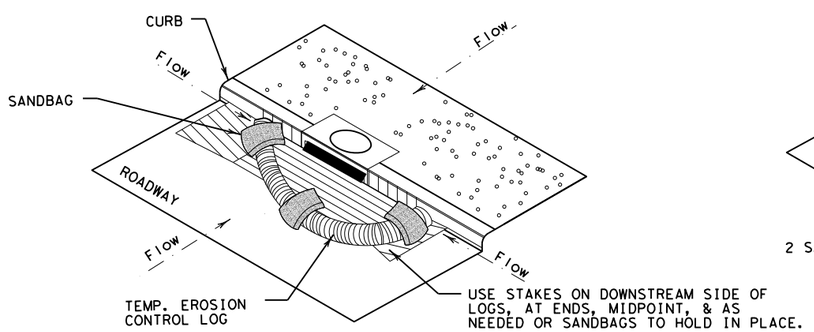


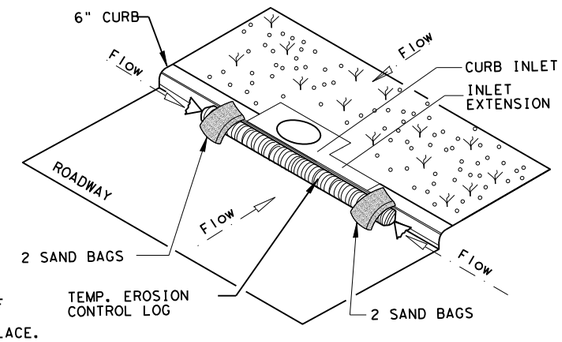
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

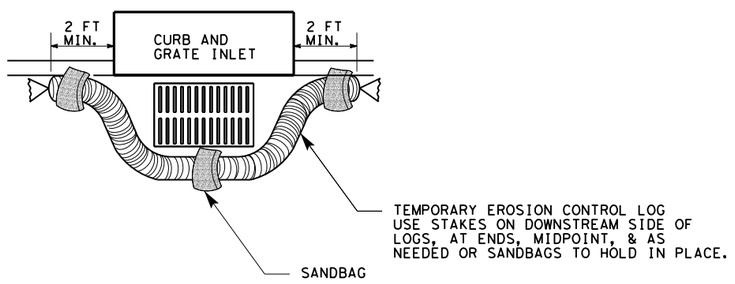
CL-CI



EROSION CONTROL LOG AT CURB INLET

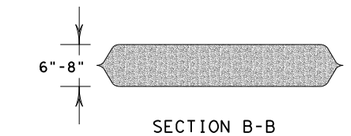
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

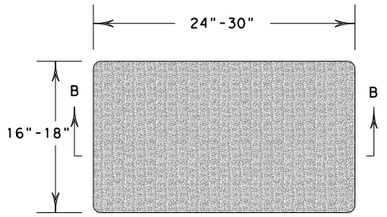


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0043	07	119		US 287	
	DIST	COUNTY				SHEET NO.
	WFS	WILBARGER				140