DESIGN	FED. RD. DIV. NO.	STATE PROJECT NO.		HIGHWAY NO.
MLR	6	C 1451-3-17		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DALLAS	NAVARRO	1
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

FINAL PLANS

NAME OF CONTRACTOR: ____________________

DATE OF LETTING: ____________________

DATE WORK BEGAN: ____________________

DATE WORK COMPLETED: ____________________

DATE WORK ACCEPTED: ____________________

SUMMARY OF CHANGE ORDERS:

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT
C 1451-3-17
CSJ: 1451-03-017

FM 55

NAVARRO COUNTY

LIMITS: FROM SH 22
TO ELLIS COUNTY LINE

TOTAL LENGTH OF PROJECT =

ROADWAY	=22,764.00	FT.	= 4.311	MI.
BRIDGE	= 186.00	FT.	= 0.036	MI.
TOTAL	=22,950.00	FT.	= 4.347	MI.

FOR THE CONSTRUCTION OF: RESTORATION
CONSISTING OF: REHABILITATE OF EXISTING PAVEMENT AND ADD SHOULDERS

DESIGN SPEED = 50 MPH

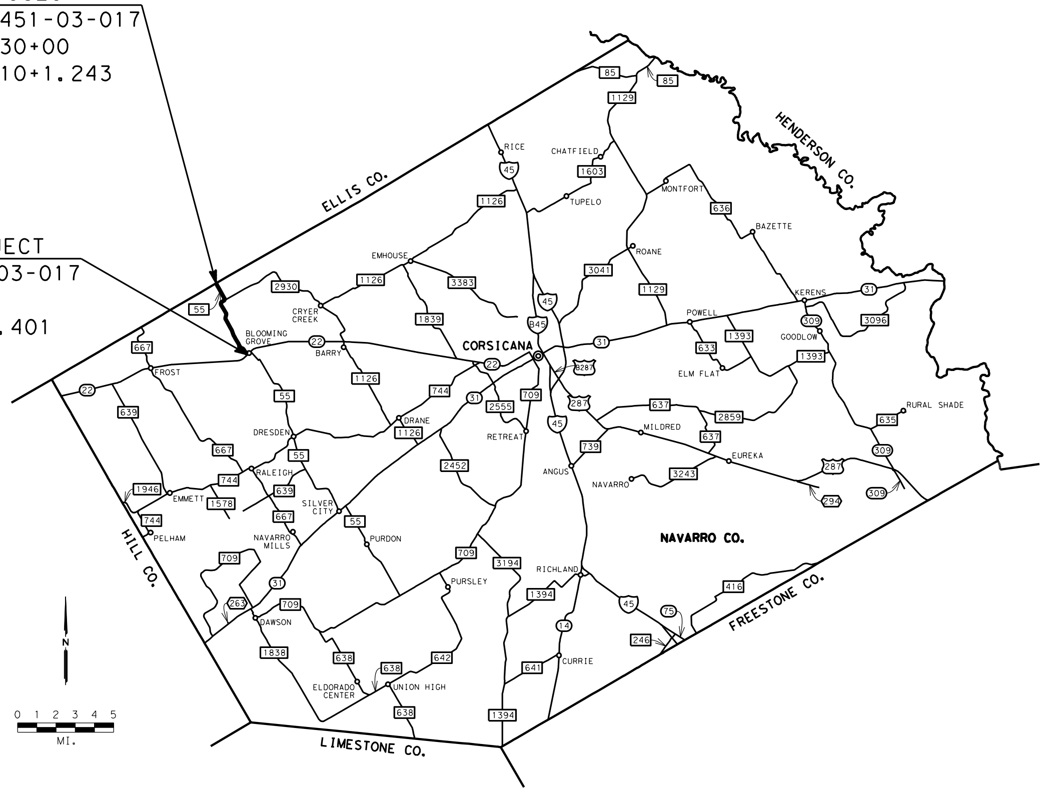
ADT = 1,075 (2022)
1,575 (2042)

FUNCTIONAL CLASS = RURAL MAJOR COLLECTOR

NOTE:
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000-008)

END PROJECT
CSJ 1451-03-017
STA 230+00
TRM 310+1.243

BEGIN PROJECT
CSJ 1451-03-017
STA 0+50
TRM 314+0.401



EQUATIONS: NONE
EXCEPTIONS: STA. 224+88 TO STA. 227+14
RAILROAD CROSSINGS: NONE

WORK WAS COMPLETED ACCORDING
TO THE PLANS AND CONTRACT.

__________, P.E.
Signature of Registrant & Date

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 2021-11-30
Mitchell L. Randall, P.E.
DESIGN ENGINEER

RECOMMENDED FOR LETTING 12/2/2021
DocuSigned by:
, P.E.
CD610F...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING 12/2/2021
DocuSigned by:
Juan A. Paredes, P.E., P.E.
4A97FFA3D...
AREA ENGINEER

APPROVED FOR LETTING: 12/3/2021
DocuSigned by:
, P.E.
E252765...
DISTRICT ENGINEER

DATE:

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

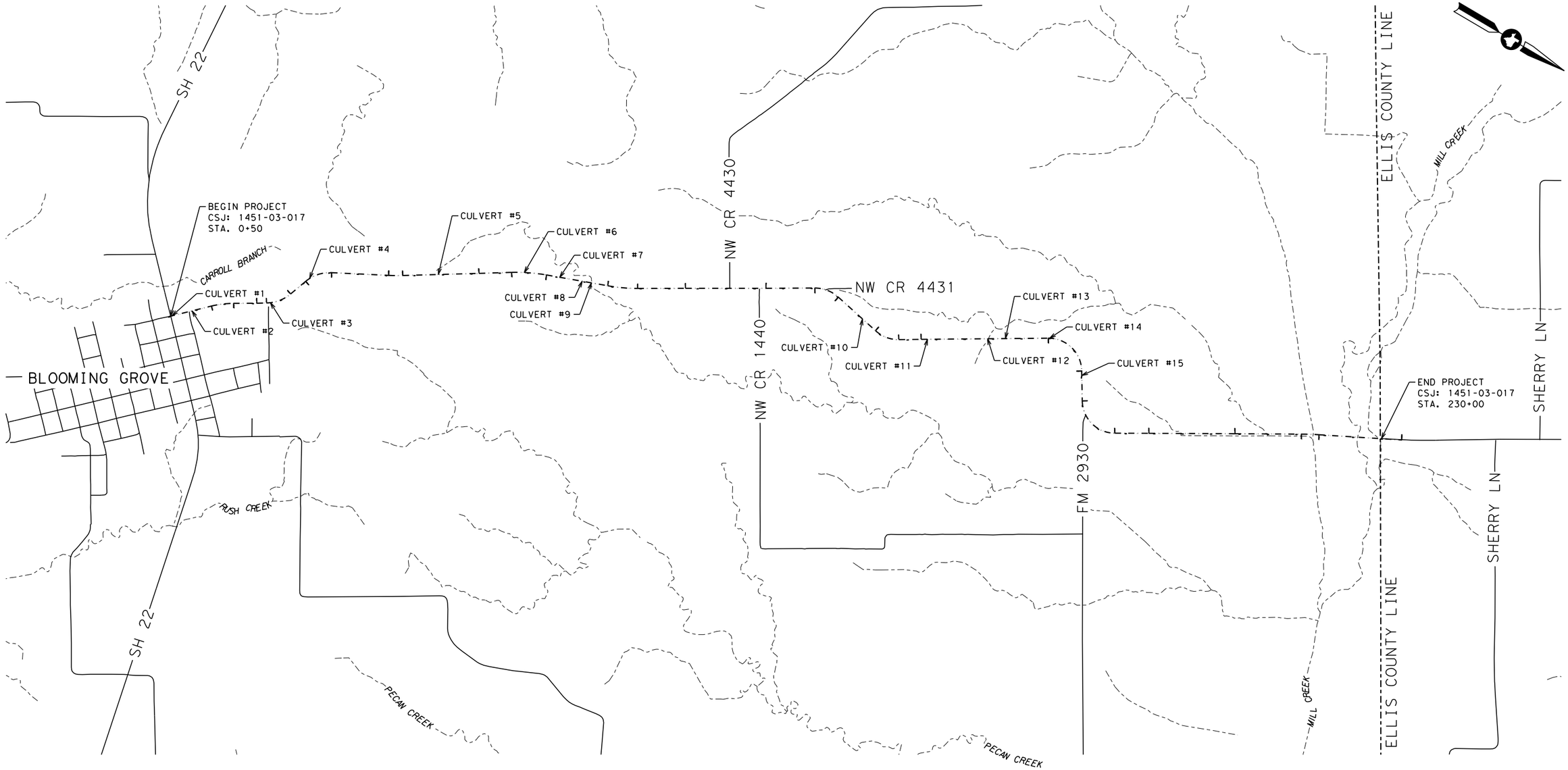
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

INDEX OF SHEETS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	2
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	



LIMITS: FROM SH 22 TO ELLIS COUNTY LINE

CULVERT #	CULVERT ℄ STATION	CROSSING
1	0+54.68	
2	4+17.59	
3	18+11.78	
4	26+34.93	
5	49+20.42	TRIBUTARY TO MILL CREEK
6	64+31.9	
7	70+61.19	
8	74+61.15	
9	76+27.05	TRIBUTARY TO MILL CREEK
10	125+89.45	
11	138+50.72	
12	149+08.87	TRIBUTARY TO MILL CREEK
13	152+21.74	
14	159+98.72	
15	169+69.48	

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55

PROJECT LAYOUT

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	3
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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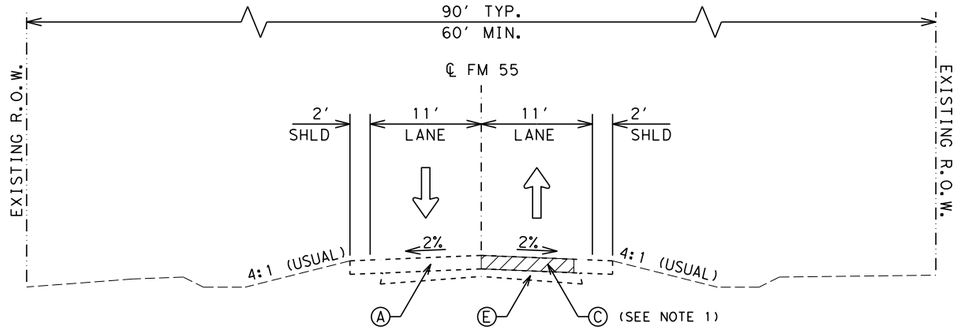
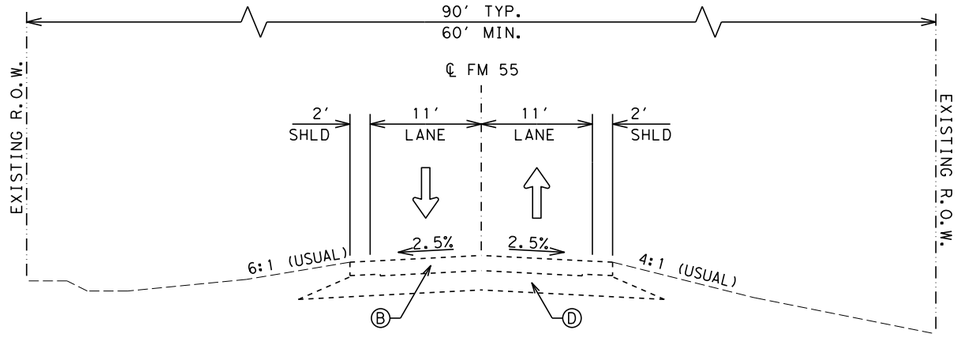
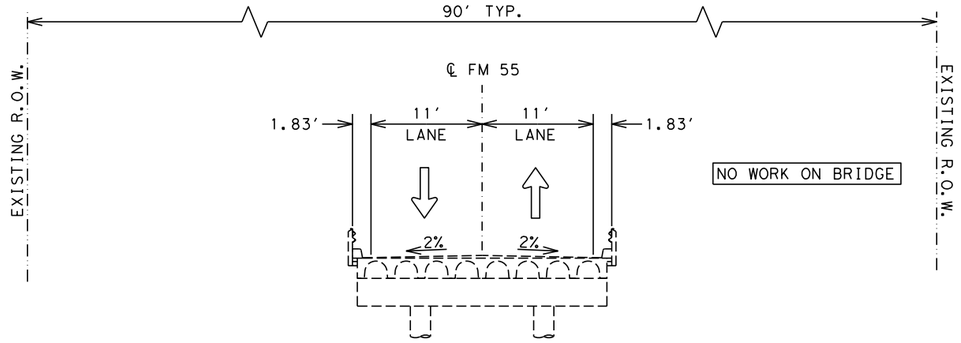


FM 55
STA. 0+50 TO STA. 174+69



FM 55
STA. 174+69 TO STA. 224+88
STA. 227+14 TO STA. 230+00



FM 55 (MILL CREEK BRIDGE)
STA. 224+88 TO STA. 227+14

NOTES:

1. LOCATION OF EXISTING 6" CONCRETE PAVEMENT TO BE REMOVED IS FROM STA. 31+25 TO STA. 32+25 AND STA. 137+25 TO STA. 138+25 (APPROXIMATE QUANTITY 245 SY).

LEGEND

- (A) 4"-12" EXIST. ACP
- (B) 6"-11" EXIST. ACP
- (C) 6" EXIST. CONCRETE
- (D) EXIST. FLEX BASE
- (E) EXIST. TREATED SUBGRADE

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
EXISTING
TYPICAL SECTIONS

NOT TO SCALE

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	4
CHECK	1451	03	017	

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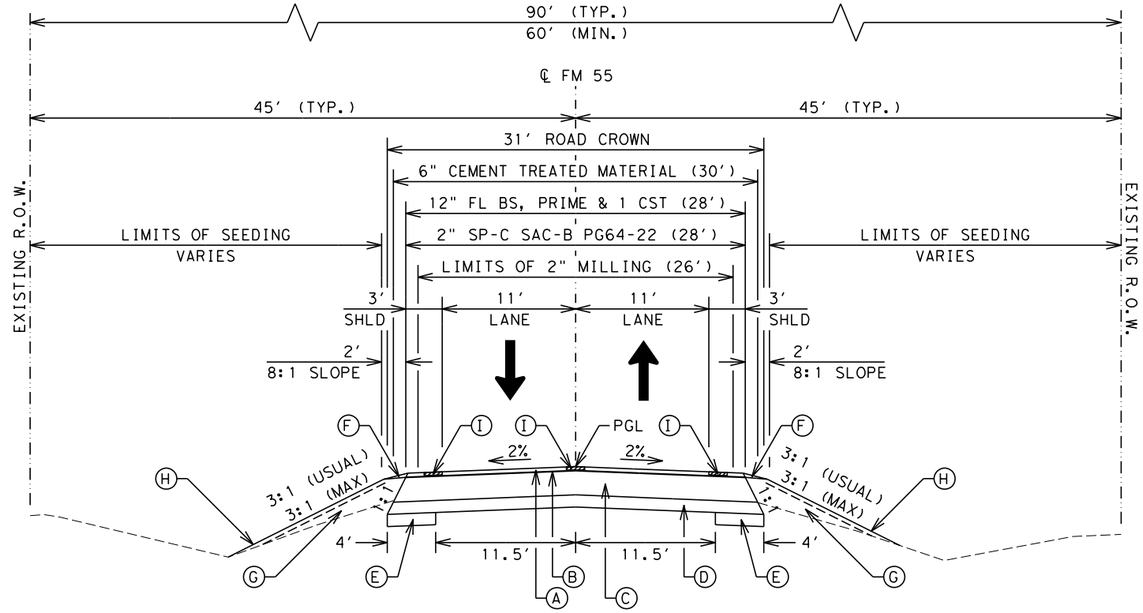
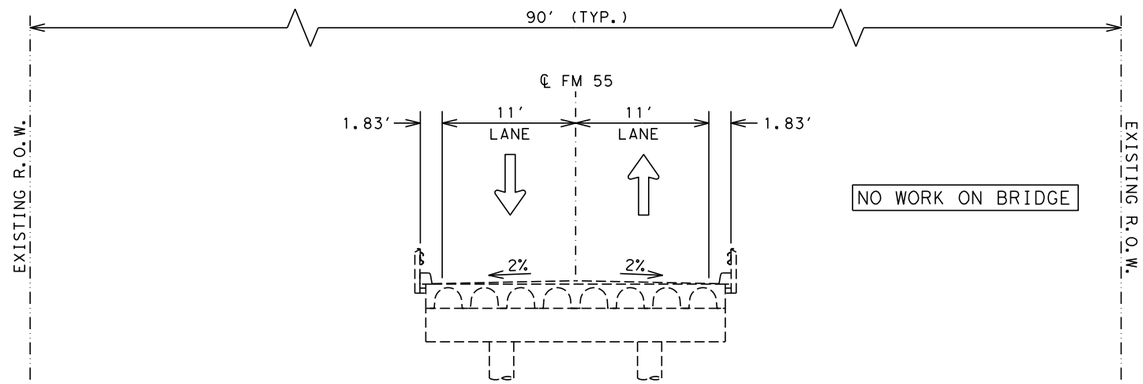


FM 55
STA. 0+50 TO STA. 224+88
STA. 227+14 TO STA. 230+00



FM 55 (MILL CREEK BRIDGE)
STA. 224+88 TO STA. 227+14

1. MILL 2" EXISTING HMAC OVER 26′ WIDTH (ITEM 354).
2. REWORK 4" EXISTING HMAC 26′ WIDE (ITEM 251) AND SPREAD OVER 30′ WIDTH.
3. PERFORM SUBGRADE WIDENING (ITEM 112).
4. MIX EXISTING MATERIAL WITH NEW FLEX. BASE (ITEM 247) TO ACHIEVE $^{30}/_{70}$ BLEND IN 6" LAYER OVER 30′ WIDTH, CONSISTING OF 1.8" RAP AND 4.2" FLEX. BASE, AND CEMENT TREAT WITH 2% CEMENT (ITEM 275).
5. PLACE 12" NEW FLEXIBLE BASE OVER 28′ WIDTH (ITEM 247).
6. PLACE PRIME (ITEM 314) AND ONE-COURSE SURFACE TREATMENT (ITEM 316).
7. PLACE 2" HMAC SP-C SAC-B PG64-22 (ITEM 3077).

NOTES:

1. PROPOSED PGL TO BE RAISED BY 14" ABOVE EXISTING PGL FROM STA. 3+30 TO STA. 222+08.
2. 2" MILLING TO BE PERFORMED BEFORE REWORK OF EXISTING MATERIALS.
3. SEE SUPERELEVATION DATA SHEETS FOR INFORMATION ON CROSS SLOPE TRANSITIONS.
4. SEE CULVERT LAYOUT SHEETS FOR SIDE SLOPES AT CULVERTS.
5. TIE IN FRONT SLOPE AT OR BEFORE EXISTING DITCHLINE EXCEPT AT CROSS CULVERTS OR WHERE SLOPE WOULD EXCEED 3:1.
6. FOR PAVEMENT EDGE DETAILS NOT SHOWN REFER TO STANDARD SHEET TE(HMAC)-11.

LEGEND

- (A) 2" HMAC SP-C SAC-B PG64-22
- (B) PRIME COAT & ONE-COURSE SURFACE TREATMENT
- (C) 12" FLEX. BASE (CMP IN PLC) (TY D GR1-2)
- (D) 6" CEMENT TREATED REWORKED MATERIAL ($^{30}/_{70}$ BLEND) RAP AND FLEX. BASE (RDWY DEL)(TY D GR1-2) W/ 2% CEMENT BY WEIGHT
- (E) 6" SUBGRADE WIDENING (REWORKED MATERIAL)
- (F) BACKFILL (TY A OR B)
- (G) EMBANKMENT (TY C)
- (H) SEEDING & COMPOST MANUF. TOPSOIL
- (I) MILLED RUMBLE STRIPS

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
PROPOSED
TYPICAL SECTIONS

NOT TO SCALE

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	5
	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE: 11/30/2021 TIME: 10:43:55
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SPECIFICATION DATA

Table 1: Soil Constants Requirements				
Item	Description	Plasticity Index		Note
		Max	Min	
132	EMBANKMENT (FINAL)(ORD COMP)(TY C)	40	8	1

Note 1: Material excavated from the project must meet the PI requirements when used in the top 10 feet of embankment that supports the pavement structure or other locations shown in the plans. Do not use shale and obtain approval to incorporate shaley clay produced by the construction project.

Table 2: Basis of Estimate for Permanent Construction					
Item	Description	Thickness	Rate		Quantity
162	Block Sod	N/A	See Specifications		593 SY
164	Drill Seed (Perm) (R) (C/S)	N/A	See Specifications		158,150 SY
166 *	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	9 Ton
168	Vegetative Watering (Warm)**	N/A	12	MG/Ac/Day	23,527 MG
314	Emuls Asph	N/A	0.20	Gal/SY	14,140 Gal
3077	SP MIXES	See Plans	110	Lbs./SY/In	7,777 Ton

*For contractor's information only
**Use Summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates.

Note:
(1) Base material weight based on 1.50 Ton/CY (dry- compacted)
(2) Asphalt weight based on 110 Lbs./SY/In
(3) Item 314 Residual Asphalt 0.20 Gal/SY

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County: Navarro

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Table 3: Basis of Estimate for Temporary Erosion Control Items				
Item	Description	Rate		Quantity
164	Drill Seeding (Temp) (Warm or Cool)	See Specifications		158,150 SY
166*	Fertilizer (12-6-6)	500	Lb/Ac	9 Ton
168	Vegetative Watering (Warm)**	12	MG/Ac/Day	23,527 MG

*For Contractor's Information Only.
**Use Summer rate for calculation, adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates.

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 35.29 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project requires coordination and permitting with environmental resources agencies as outlined in the plan set Environmental Permits, Issues and Commitments (EPIC) sheet. There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 “Project-Specific Locations”, provides a listing of regulatory agencies that may need to be contacted regarding this project.

Install traffic marking signs prior to sealcoat application and remove within three days after placement of traffic markings.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

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

Juan Paredes Juan.Paredes@txdot.gov
Amanda McKittrick Amanda.McKittrick@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

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/

CSJ: 1451-03-017 **Sheet 6A**

County: Navarro

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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.
Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders’ expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

Item 5:
Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (214-320-6205) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor’s negligence including, but not limited to, repair or replacement at the Contractor’s expense.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Place construction stakes/station markings at intervals of no more than 100 feet or as directed by the Engineer. Place stakes and markings so as not to interfere with normal construction operations.

Item 7:
Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Perform all electrical work in accordance with the National Electrical Code and Texas Department of Transportation Specifications.

Consult with appropriate electric company representatives according to their respective area to coordinate electrical services installations.

Holiday restrictions – the engineer may decide that no lane closures or construction operations shall be allowed during the restricted periods listed in the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restricted periods as actual, or expected, traffic conditions may warrant. Working days will not be charged for these restricted periods. No additional compensation will be allowed for these closures (i.e., overhead, delays, stand-by, barricades or any other associated cost impacts).

- New Year’s Eve and Day (noon on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (noon on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (noon on Friday thru 10:00pm Monday)
- Independence Day (noon on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (noon on Friday thru 10:00 pm Monday)

- Thanksgiving Holiday (noon on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (noon on December 23 thru 10:00 pm December 26)

No significant traffic generator events identified.

Item 8:
This Project will be a Standard Workweek.

Nighttime work is allowed in accordance with Article 8.3.3.

Meet weekly with the engineer to notify him or her of planned work for the upcoming week.

Critical Path Method (CPM) schedule in P6 format will be required for this project. Submit baseline schedule and obtain approval prior to beginning construction. The Estimate will be held if monthly schedule update is not submitted.

Item 100:
Remove the existing roadway small signs, delineators and object markers as shown on the plans, or as directed, during construction within the right of way. Small sign, delineator and object marker removals are subsidiary to this Item.

The limits of preparing right of way will be measured from Sta. 0+50 to Sta. 230+00 along the centerline of construction.

Tree trimming and tree brush removal shall be performed in accordance to details shown on TRB-15(1)DAL.

Avoid pruning oak trees between March 15 and the end of June to limit the potential spread of Oak Wilt disease.

Department will mark any trees to be removed with florescent orange paint.

Do not use a telescopic side boom rotary mower.

Tree Removal – Cut designated trees as close to the ground as possible but no higher than 6 in. above
the ground level until the stump can be removed according to the plans.

Brush Removal – Remove brush as directed at culverts, headwalls, wingwalls, guardrail, cable barrier, and riprap.

Neatly trim trees, overhanging branches and all underbrush to produce an 18-foot vertical clear area within the MUTCD roadway safety Clear Zone. Minimize any unnecessary vegetation disturbance outside of the Clear Zone. Do not disturb any vegetation beyond the TxDOT ROW line or its authorized easement.

Remove and dispose of all dead fall (trees and/or limbs already fallen to the ground) from within

CSJ: 1451-03-017 **Sheet 6B**

County: Navarro

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the roadway Clear Zone and where otherwise directed.. Any limbs that are less than 4 in. in diameter will be paid for in the same manner as trees that are to be felled and removed.

Do not use any chemical agents to aid in the deterioration or removal of the stump.

Do not prune the canopy to less than half of the overall height of the tree.

Trees blocking signs shall be trimmed as directed.

Burning of brush will not be permitted. Cleanup shall be continuous and concurrent with pruning, trimming, and removal operations.

Items 105, 251, and 354:
Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

Item 105:
Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at your own expense.

Item 110:
Excavated shale is not an acceptable material for embankment.

Items 110 and 132:
Scarify and loosen the excavated areas, unpaved surface areas, except rock, to a depth of at least 8 inches and compact in accordance with the specifications.

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.

Item 132:
Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for embankment and is expected to meet all material requirements for embankment regardless of the source.

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no expense to the department. The engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

Earth embankment Type C, is mainly composed of material other than shale. Furnish material that is free from vegetation or other objectionable material and that conforms to the requirements of Table 1 (Sheet A). If necessary, treat material with lime slurry in accordance with Item 260, “Lime Treatment (Road-Mixed)” in order to meet these requirements. Use Tex-121-E, figure 1, page 4 to calculate the amount of lime required. When lime treated subgrade is specified, 3000 PPM is the maximum allowed sulfate content in the top 3 feet when material comes from borrow source. Follow recommendations of 260.4.4 for mixing and mellowing. The

engineer will test material placed or excavated to a depth of one foot below and laterally to one foot outside the proposed treatment limit. Lime treatment of this material will not be paid for directly, but will be considered subsidiary to this item.

Do not use shaley clays in embankment unless approved in writing.

Item 134:
Start backfilling pavement edges as soon as possible after the surface course is started.

Backfill and compact the pavement edges to produce a smooth surface adjacent to the pavement with no vertical edges.

Use Type “A” or “B” material to backfill pavement edges as shown in plans. Type “A” or “B” material shall consist of suitable material that when compacted will support the pavement edge. RAP is considered suitable Type “A” or “B” material.

Blade the existing vegetation into a neat wind-row prior to overlay. After placing Ty A or Ty B backfill and placing seeding, the material from the wind-row shall be replaced on the completed slopes. Emulsion shall be placed at a 50/50 solution of water to emulsion over disturbed area. Emulsion rate=0.15 Gal/SY residual. This work, materials and equipment shall be subsidiary to Item 134.

Item 160:
Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than six inches below natural grade as topsoil.

Item 161:
Provide tickets representing quantity of compost delivered to site.

Item 247:
Construct uniform layer thickness of 12 inches, or less with the required density and moisture content. Minimum PI is equal to three (3) for all grades.

Item 301:
Provide liquid antistripping agents unless otherwise directed. Add the minimum dosage determined by the manufacturer or higher dosage determined by design requirement and try subsequent trials at 0.25% increments.

Item 314:
Apply MS-2 or SS-1 as a prime, dilute the asphalt with base finish water, distribute in successive applications, and work into the top 1/4” of flex base. Residual asphalt 0.20 Gal/SY.

CSJ: 1451-03-017 **Sheet 6C**

County: Navarro

Highway: FM 55

Item 316:

<table>
<tr><th></th><th>AC20-5TR, AC20-XP
AC15-P</th><th>CRS-2P</th><th>RC-250</th></tr>
<tr><td>JANUARY</td><td></td><td></td><td rowspan="3">REQUIRES INTERMEDIATE COURSE TO BE PLACED</td></tr>
<tr><td>FEBRUARY</td><td></td><td></td></tr>
<tr><td>MARCH</td><td></td><td rowspan="3">REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS</td><td></td></tr>
<tr><td>APRIL</td><td></td><td></td><td></td></tr>
<tr><td>MAY</td><td></td><td rowspan="4">REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS</td><td></td></tr>
<tr><td>JUNE</td><td></td><td></td></tr>
<tr><td>JULY</td><td></td><td></td></tr>
<tr><td>AUGUST</td><td></td><td></td></tr>
<tr><td>SEPTEMBER</td><td></td><td rowspan="4">REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS</td><td></td></tr>
<tr><td>OCTOBER</td><td></td><td></td></tr>
<tr><td>NOVEMBER</td><td></td><td rowspan="2">REQUIRES INTERMEDIATE COURSE TO BE PLACED</td></tr>
<tr><td>DECEMBER</td><td></td><td></td></tr>
</table>

RC-250 is only allowed as a first course in accordance with table above.

Utilize an asphalt distributor capable of providing a transversely varied asphalt rate. The Engineer will select the pavements where the transversely varied asphalt rate is required. When a transversely varied rate is required, the asphalt rate outside of the wheel paths will be between 22 and 32% higher than the asphalt rate applied in the wheel paths. Provide calibration documents to the Engineer that include a description of the spray bar(s) and nozzles that will be used and the percentage difference in asphalt rate achieved by each tested spray bar and nozzle arrangement. The nozzles proposed for use shall be clearly stamped or marked from the factory identifying the manufacturer.

First Course				
ITEM	APPLICATION			
	Emul. Asphalt Treatment	1st Course		
*Asphalt Type	MS-2 or SS-1	CRS-2P	AC20-5TR, AC20-XP, AC15-P	RC-250 #
*Asph. Rate (Gal/SY)	0.20	0.50	0.42	0.28
Aggregate Type		B or L	B or L	B or L
Aggregate Grade		3	3	5
Aggr. Rate (CY/SY)		1:105	1:105	1:125
Min. Cure Time	24 hrs	14 days (Emulsion)		

When RC-250 is used as the 1st course, an intermediate course will be required and will be placed as soon as temperature allows which will be before 2nd Course is placed.

Intermediate Seal	
ITEM	APPLICATION
	Intermediate Course
*Asphalt Type	CRS-2P
*Asph. Rate (Gal/SY)	0.44
Aggregate Type	B or L
Aggregate Grade	4
Aggr. Rate (CY/SY)	1:120

Second Course	
ITEM	APPLICATION
	2nd Course
*Asphalt Type	AC20-5TR, AC20-XP, AC15-P
*Asph. Rate (Gal/SY)	0.36
Aggregate Type	PB or PL
Aggregate Grade	4
Aggr. Rate (CY/SY)	1:120

* The information above is intended to provide general guidance and as a basis of estimate. Based on the season and weather conditions at the time, the engineer will determine the asphalt type and rates to be used at the time of application.

In addition to the temperature requirements of this Item, AC Asphalts used in Surface Treatments and Sealcoats must be placed between May 15 and August 31. Emulsions may be substituted for AC Asphalts outside this timeframe only with the approval of the Engineer.

Item 320:
Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix

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the material prior to placement. The effectiveness of the MTV's remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

The use of windrow pick-up equipment is allowed except on the first course of roadway material placed over the subgrade.

Item 354:
Remove the loose material from the roadway before opening to traffic.

Patch pavement cut to excessive depth by equipment failure with an approved epoxy material. Re-plane patched area to an acceptable approved ride quality. Payment for these corrections is subsidiary to this item.

Item 400:
Structural Excavation is not paid for directly but is considered subsidiary to pertinent Items.

When placing concrete storm drain pipe on slopes of greater than 10 percent, provide cement stabilized backfill to a depth shown on the plans.

Item 421:
Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Strength evaluation using maturity testing, Tex-426-A, may be used for all concrete elements except drilled shafts and mass concrete pours.

Provide a digital hydraulic compression testing Machine and accessories. The machine shall have a minimum testing range of 2500 pounds force to 250,000 pounds force with a hydraulic switching valve to allow for rapid advancing, hold, controlled advancing and rapid retracting. The machine shall have a load cell to measure compressive forces within the testing range and shall be calibrated and verified in accordance with ASTM latest version. The Machine can meet or exceed the following when approved by the Engineer:

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

Item 440:
Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strip and Rip Rap Items as approved. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved.

Item 464:
The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

Item 465:
All manholes, junction boxes and inlets will require inverts unless otherwise directed.

Item 496:
Use earth embankment TY C which conforms to the requirements of Table 1 as backfill material for excavation and voids resulting from the removal of existing structures. The materials required for this work will be subsidiary to this item.

Item 500:
Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

Item 502:
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.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Provide rectangular shape (CW12-2P) Temporary Clearance Signs on all bridges where the existing vertical clearance has changed. Install Signs to the satisfaction of the Engineer prior to opening to traffic. Plywood sign blanks will have minimum dimensions of 84" X 12". Work performed and materials are subsidiary to this item.

Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the engineer.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

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As approved by the Engineer, provide uniformed off duty police officers and squad cars during lane or ramp closures, night time work or other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement. Complete the weekly tracking form provided by the department and submit invoices that agree with the tracking form for payment at the end of each month approved services were provided. Reimbursement will not be made for coordination fees charged by any party.

Traffic Control Plans with Lane Closures causing backups of 10 minutes or greater in duration will be modified by the Engineer.

Limit lane closures along FM 55 near Blooming Grove Elementary to the hours between 9:00 am and 2:30 pm. Work in other areas of the project is not restricted to this time frame.

Item 506:
Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" plywood sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow

over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, “Temporary Erosion, Sedimentation, and Environmental Controls.

Item 585:
Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule 3 on the travel lanes.

Item 618:
The location of conduits and ground boxes are diagrammatic only and may be shifted to accommodate field conditions as directed.

Secure permission and approval from the proper authority prior to cutting into or removing any sidewalks or curbs for installation of this Item.

When holes are drilled through concrete structures, use a coring device. Do not use masonry or concrete drills.

Structurally mount junction boxes as shown on the plans. When used for traffic signal installations, use boxes 12"x12"x8", or as approved.

Use conduit hangers for 3 inch and larger conduit when hanging conduit from structures.

Place conduit under existing pavement by an approved boring method. Do not place boring pits closer than 2 feet from the edge of the pavement unless otherwise directed. Do not use water jetting. When conduits are bored, do not exceed 18 inches in the vertical and horizontal tolerances as measured from the intended target point.

Do not use a pneumatically driven device for punching holes beneath the pavement (commonly known as a "missile").

Furnish and install a non-metallic mule tape in conduit runs in excess of 50 feet. Also furnish and install non-metallic mule tape in conduit installed for future use and cap using standard weather-tight conduit caps, as approved. Furnish Garvin # PT-1250-3K, ComStar PUL 1250P3K, Ideal Part No. 31-315 or equal as approved by the Engineer. This work will not be paid for directly, but is subsidiary to this Item.

Use a colored cleaner-primer on all PVC to PVC joints before application of PVC cement.

Seal all conduit ends with a permanently soft, non-toxic duct seal. Use a duct seal that does not adversely affect other plastic materials or corrode metals.

Existing conduit is proposed for reuse in this project. Conduit prep will be paid for under Item 6027 as directed by the Engineer.

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When using existing conduit, ensure that all conduits have bushings and are cleaned of mud and debris. Restrap conduit that is being relocated to new timber poles as if it were a new installation. This work will not be paid for directly, but is subsidiary to this Item.

Communications cable shall be installed in a separate conduit and bored separately.

2” Schedule 80 PVC will be used at the power pole to supply electricity to underground services.

Item 620:
The equipment grounding conductor shall be identified by a continuous green colored jacket insulation or bare wire. Grounded conductors (Neutral) shall be identified by a continuous white colored jacket. Ungrounded conductors (Hot) in a 120/240v or 240/480v system shall be identified by each pole or leg. For 240-volt branch circuit fed from 120/240 source and 480-volt branch circuit fed from 240/480 source, ensure one leg is identified by a continuous black colored jacket and the other leg by a continuous red colored jacket.
For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Texas Department of Transportation (TxDOT) - Construction Division’s (CST) materials producers list. Category is “Roadway Illumination and Electrical Supplies.” Fuse holder is shown on list under Items 610 & 620. Provide 10 amp time delay fuses.

Item 628:
Contact the appropriate utility company during the first three weeks of the project lead-time period to allow adequate time for any necessary utility adjustments, transformer installation, etc.

Granite concrete service pole embedment depth shall be 10’ and shall be a minimum of 25’ above grade.

Backfill Granite Concrete service poles with a Class A concrete in accordance with Item 421, "Hydraulic Cement Concrete", except consider the concrete subsidiary to Item 628 for payment purposes.

The Meter Base or Transocket shall be mounted facing the roadway and the service enclosure shall be mounted on the opposite side of the service pole or pedestal.

Label the service enclosures indicating service address as well as all required information as shown on the Electrical Detail (ED) standard sheets. Labeling shall be silk screening or other acceptable method. This work will not be paid for directly, but is subsidiary to this Item.

A Licensed Master Electrician shall be required to install all electrical services.

Bill the electrical service power usage to the Texas Department of Transportation.

Item 636:
Leave the advance guide sign and/or the exit direction sign for an interchange in place at all times unless prior written approval is given. Replace signs removed by the Contractor before the end of the work day.

Manufacture all white legends using Clearview font on overhead and large ground-mounted guide signs. This includes destinations, cardinal directions, exit information and exit numbers. Use the font shown on the current standard sheets for all route markers (including interstate shields) and “Exit Only” panel information. Letter, arrow, and number heights shall all conform to the latest edition of the Standard Highway Sign Design Manual.

Provide two (2) sets of shop drawings for signs. The shop drawings shall conform to the details shown on the plans. The shop drawings shall show the details of the panels, wind beams, stiffeners, joint backing plates, splices, fasteners, brackets, and sign support connections. The shop drawings shall show letter types and sizes, interline spacing and message arrangements.

Affix a sign identification decal to the back of all signs and mark out the installation date in accordance with Item 643.

Attach sheeting applied to extruded aluminum panels to each individual extrusion.

All additional hat signs and plaques mounted to the top of signs shall be supported with wind beams 2.5 times the height of the sign and/or plaque.

Item 644:
Prior to taking elevations to determine lengths for fabrication of sign posts and/or sign support towers, obtain verification of all proposed locations.

All sign mounts shall have a clamp base system for all small roadside sign assemblies.

Item 656:
Probe for utilities and underground structures prior to drilling foundations. Foundations shall be paid for once regardless of extra work caused by obstructions.

Item 672:
Black adhesive will be used on asphalt pavements and white adhesive will be used on concrete pavements.

Item 730:
At the discretion of the Engineer, mow non-paved areas within the project prior to placement of permanent vegetation. Mow up to three (3) cycles per growing season.

Item 3077:
Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class B.

Provide PG binder 64-22 in Type SP-C mixture.

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Item 6185:
The total number of truck mounted attenuators (TMAs) or trailer attenuators (TAs) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario		Required TMA/TA	
(1-1)-18 / (1-2)-18			1	
(1-3)-18	A	B	1	2

TCP 2 Series	Scenario		Required TMA/TA	
(2-1)-18 / (2-2)-18	All		1	
(2-3)-18	A	B	1	2

TCP 3 Series	Scenario			Required TMA/TA
(3-1)-13	All			2
(3-3)-14	A	B	D	2
	C			3

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed for the project. Additional TMAs/TAs used that are not specified in the plans in which the contractor expects compensation will require prior approval from the Engineer.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1451-03-017 **DISTRICT** Dallas **COUNTY** Navarro
HIGHWAY FM 55

			CONTROL SECTION JOB		**1451-03-017**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00066974**		
			COUNTY		**Navarro**		
			HIGHWAY		**FM 55**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	229.500		229.500	
	104-6001	REMOVING CONC (PAV)	SY	245.000		245.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	233.000		233.000	
	105-6011	REMOVING STAB BASE AND ASPH PAV (2"-6")	SY	2,556.000		2,556.000	
	110-6001	EXCAVATION (ROADWAY)	CY	792.000		792.000	
	112-6001	SUBGRADE WIDENING (ORD COMP)	STA	227.240		227.240	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	22,182.000		22,182.000	
	134-6004	BACKFILL (TY A OR B)	STA	227.240		227.240	
	152-6001	ROAD GRADER WORK (ORD COMP)	STA	227.240		227.240	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	158,743.000		158,743.000	
	162-6002	BLOCK SODDING	SY	593.000		593.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	158,150.000		158,150.000	
	164-6051	DRILL SEED (TEMP)(WARM OR COOL)	SY	158,150.000		158,150.000	
	168-6001	VEGETATIVE WATERING	MG	47,149.000		47,149.000	
	247-6133	FL BS (RDWY DEL) (TY D GR 1-2)	TON	13,318.000		13,318.000	
	247-6313	FL BS (CMP IN PLC)(TY D GR1-2)(12")	SY	70,697.000		70,697.000	
	251-6065	REWORK BS MTL (TY B) (4") (ORD COMP)	SY	2,444.000		2,444.000	
	251-6096	REWORK BS MTL (TY C)(4")(ORD COMP)	SY	63,203.000		63,203.000	
	275-6001	CEMENT	TON	379.000		379.000	
	275-6004	CEMENT TREAT (MX EXST MTL & NW BS) (6")	SY	75,747.000		75,747.000	
	314-6021	EMULS ASPH (PRIME)(MS-2 OR SS-1)	GAL	14,140.000		14,140.000	
	316-6024	ASPH (CRS-2P)	GAL	26,239.000		26,239.000	
	316-6029	ASPH (RC-250)	GAL	6,599.000		6,599.000	
	316-6403	AGGR (TY-B GR-5 OR TY-L GR-5)	CY	189.000		189.000	
	316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	9,898.000		9,898.000	
	316-6435	AGGR (TY-B GR-4 OR TY-L GR-4 SAC-B)	CY	274.000		274.000	
	316-6440	AGGR (TY-B GR-3 OR TY-L GR-3)(SAC-B)	CY	449.000		449.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	65,648.000		65,648.000	
	400-6008	CUT & RESTORE ASPH PAVING	SY	243.000		243.000	
	402-6001	TRENCH EXCAVATION PROTECTION	LF	327.000		327.000	
	432-6009	RIPRAP (CONC) (CL B) (4")	CY	42.000		42.000	
	432-6024	RIPRAP (STONE COMMON)(DRY)(12 IN)	CY	14.000		14.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	72.000		72.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	424.000		424.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	298.000		298.000	
	464-6007	RC PIPE (CL III)(30 IN)	LF	430.000		430.000	
	464-6009	RC PIPE (CL III)(42 IN)	LF	4.000		4.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1451-03-017 **DISTRICT** Dallas **COUNTY** Navarro
HIGHWAY FM 55

			CONTROL SECTION JOB		**1451-03-017**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00066974**		
			COUNTY		**Navarro**		
			HIGHWAY		**FM 55**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	465-6128	INLET (COMPL)(PSL)(FG)(4FTX4FT-4FTX4FT)	EA	4.000		4.000	
	466-6026	HEADWALL (CH - FW - 15) (DIA= 48 IN)	EA	1.000		1.000	
	466-6099	HEADWALL (CH - PW - 0) (DIA= 30 IN)	EA	1.000		1.000	
	466-6102	HEADWALL (CH - PW - 0) (DIA= 42 IN)	EA	1.000		1.000	
	466-6136	HEADWALL (CH - PW - S) (DIA= 48 IN)	EA	1.000		1.000	
	467-6363	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	38.000		38.000	
	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)	EA	8.000		8.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	20.000		20.000	
	467-6417	SET (TY II) (30 IN) (RCP) (3: 1) (C)	EA	12.000		12.000	
	467-6423	SET (TY II) (30 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-6004	REMOV STR (SET)	EA	2.000		2.000	
	496-6007	REMOV STR (PIPE)	LF	1,371.000		1,371.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	13.000		13.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	200.000		200.000	
	506-6003	ROCK FILTER DAMS (INSTALL) (TY 3)	LF	240.000		240.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	440.000		440.000	
	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	246.000		246.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	246.000		246.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	13,800.000		13,800.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	13,800.000		13,800.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	550.000		550.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	550.000		550.000	
	530-6002	INTERSECTIONS (ACP)	SY	874.000		874.000	
	530-6004	DRIVEWAYS (CONC)	SY	279.000		279.000	
	530-6005	DRIVEWAYS (ACP)	SY	1,953.000		1,953.000	
	533-6003	RUMBLE STRIPS (SHOULDER) ASPHALT	LF	45,488.000		45,488.000	
	533-6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	22,724.000		22,724.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	787.500		787.500	
	540-6033	MTL BM GD FEN (LONG SPAN SYSTEM)	EA	2.000		2.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	10.000		10.000	
	560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4	EA	14.000		14.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	92.000		92.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	7.000		7.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	3.000		3.000	
	644-6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	EA	3.000		3.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	15.000		15.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1451-03-017 **DISTRICT** Dallas **COUNTY** Navarro
HIGHWAY FM 55

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**1451-03-017**			
		PROJECT ID		**A00066974**			
		COUNTY		**Navarro**			
		HIGHWAY		**FM 55**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND	EA	36.000		36.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	1,850.000		1,850.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	35,920.000		35,920.000	
	662-6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	2,351.000		2,351.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	27.000		27.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	44.000		44.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	76.000		76.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	42,833.000		42,833.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	3,548.000		3,548.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	1,850.000		1,850.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	35,920.000		35,920.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	574.000		574.000	
	685-6002	RELOCATE RDSD FLASH BEACON ASSEMBLY	EA	2.000		2.000	
	730-6107	FULL - WIDTH MOWING	CYC	3.000		3.000	
	3077-6013	SP MIXESSP-CSAC-B PG64-22	TON	7,777.000		7,777.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	157.000		157.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	82.000		82.000	
	08	EROSION CONTROL MAINTENANCE (NON-PART)	LS	1.000		1.000	
		LAW ENFORCEMENT	LS	1.000		1.000	
		SAFETY CONTINGENCY (NON-PART)	LS	1.000		1.000	

SUMMARY OF WORK ZONE ITEMS

LOCATION	0400-6008	0662-6032	0662-6034	0662-6110	6001-6002	6185-6002	6185-6003
	CUT & RESTORE ASPH PAVING	WK ZN PAV MRK NON-REMOV (Y)4" (BRK)	WK ZN PAV MRK NON-REMOV (Y)4" (SLD)	WK ZN PAV MRK SHT TERM (TAB)TY Y	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	SY	LF	LF	EA	EA	DAY	HR
STA. 0+50 TO STA. 230+00	243	1,850	35,920	2,351	2	157	82
TOTAL	243	1,850	35,920	2,351	2	157	82

FM 55
SUMMARY OF
WORK ZONE ITEMS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	8
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

SUMMARY OF ROADWAY ITEMS

LOCATION	0100-6002 PREPARING ROW	0104-6001 REMOVING CONC (PAV)	0110-6001 EXCAVATION (ROADWAY)	0112-6001 SUBGRADE WIDENING (ORD COMP)	0132-6005 EMBANKMENT (FINAL) (ORD COMP) (TY C)	0134-6004 BACKFILL (TY A OR B)	0152-6001 ROAD GRADER WORK (ORD COMP)	0247-6133 FL BS (RDWY DEL) (TY D GR 1-2)	0247-6313 FL BS (CMP IN PLC) (TY D GR1-2) (12")	0251-6065 REWORK BS MTL (TY B) (4") (ORD COMP)	0251-6096 REWORK BS MTL (TY C) (4") (ORD COMP)	0275-6001 CEMENT	0275-6004 CEMENT TREAT (MX EXST MTL & NW BS) (6")
	STA	SY	CY	STA	CY	STA	STA	TON	SY	SY	SY	TON	SY
STA. 0+50 TO STA. 230+00	229.50	245	792	227.24	22,182	227.24	227.24	13,318	70,697	2,444	63,203	379	75,747
TOTAL	229.50	245	792	227.24	22,182	227.24	227.24	13,318	70,697	2,444	63,203	379	75,747

SUMMARY OF ROADWAY ITEMS, CONT.

LOCATION	0314-6021 EMULS ASPH (PRIME) (MS-2 OR SS-1)	0316-6024 ASPH (CRS-2P)	0316-6029 ASPH (RC-250)	0316-6403 AGGR (TY-B GR-5 OR TY-L GR-5)	0316-6419 ASPH (AC-15P, AC-20-5TR OR AC-20XP)	0316-6435 AGGR (TY-B GR-4 OR TY-L GR-4 SAC-B)	0316-6440 AGGR (TY-B GR-3 OR TY-L GR-3) (SAC-B)	0354-6045 PLANE ASPH CONC PAV (2")	0432-6009 RIPRAP (CONC) (CL B) (4")	0432-6045 RIPRAP (MOW STRIP) (4 IN)	0540-6001 MTL W-BEAM GD FEN (TIM POST)	0540-6033 MTL BM GD FEN (LONG SPAN SYSTEM)	0544-6001 GUARDRAIL END TREATMENT (INSTALL)	3077-6013 SP MIXES SP-C SAC-B PG64-22
	GAL	GAL	GAL	CY	GAL	CY	CY	SY	CY	CY	LF	EA	EA	TON
STA. 0+50 TO STA. 230+00	14,140	26,239	6,599	189	9,898	274	449	65,648	42	72	787.5	2	10	7,777
TOTAL	14,140	26,239	6,599	189	9,898	274	449	65,648	42	72	787.5	2	10	7,777

FM 55
SUMMARY OF ROADWAY ITEMS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	9
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

EARTHWORK SUMMARY

STATION RANGE		0110-6001	0132-6005
FROM STA.	TO STA.	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)
		CY	CY
0+50.00	1+50.00	112.89	3.86
1+50.00	2+50.00	68.70	38.22
2+50.00	3+50.00	22.05	77.58
3+50.00	4+50.00	0	83.99
4+50.00	5+50.00	0	69.72
5+50.00	6+50.00	0	70.53
6+50.00	7+50.00	0	57.14
7+50.00	8+50.00	0	83.42
8+50.00	9+50.00	0	90.53
9+50.00	10+50.00	0	92.34
10+50.00	11+50.00	0	99.56
11+50.00	12+50.00	0	93.10
12+50.00	13+50.00	0	65.44
13+50.00	14+50.00	0	69.81
14+50.00	15+50.00	0	77.78
15+50.00	16+50.00	0	68.27
16+50.00	17+50.00	0	61.02
17+50.00	18+50.00	0	48.64
18+50.00	19+50.00	0	77.62
19+50.00	20+50.00	0	64.66
20+50.00	21+50.00	0	52.14
21+50.00	22+50.00	0	41.93
22+50.00	23+50.00	0	38.13
23+50.00	24+50.00	0	55.65
24+50.00	25+50.00	0	52.92
25+50.00	26+50.00	0	34.18
26+50.00	27+50.00	0	36.75
27+50.00	28+50.00	0	40.30
28+50.00	29+50.00	0	61.01
29+50.00	30+50.00	0	55.73
30+50.00	31+50.00	0	57.31
31+50.00	32+50.00	0	54.96
32+50.00	33+50.00	0	72.41
33+50.00	34+50.00	0	92.68
34+50.00	35+50.00	0	104.71
35+50.00	36+50.00	0	91.86
36+50.00	37+50.00	0	83.18
37+50.00	38+50.00	0	69.91
38+50.00	39+50.00	0	60.63
39+50.00	40+50.00	0	69.96
40+50.00	41+50.00	0	110.11
41+50.00	42+50.00	0	121.65
42+50.00	43+50.00	0	106.36
43+50.00	44+50.00	0	82.87
44+50.00	45+50.00	0	125.87
45+50.00	46+50.00	0	105.44
46+50.00	47+50.00	0	127.84
47+50.00	48+50.00	0	122.18
48+50.00	49+50.00	0	181.46
49+50.00	50+50.00	0	103.34
50+50.00	51+50.00	0	49.88
51+50.00	52+50.00	0	63.74
52+50.00	53+50.00	0	101.43
53+50.00	54+50.00	0	123.31
54+50.00	55+50.00	0	123.03
55+50.00	56+50.00	0	99.58
56+50.00	57+50.00	0	118.65
57+50.00	58+50.00	0	132.44

STATION RANGE		0110-6001	0132-6005
FROM STA.	TO STA.	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)
		CY	CY
58+50.00	59+50.00	0	115.00
59+50.00	60+50.00	0	126.00
60+50.00	61+50.00	0	146.11
61+50.00	62+50.00	0	220.18
62+50.00	63+50.00	0	307.09
63+50.00	64+50.00	0	365.88
64+50.00	65+50.00	0	324.98
65+50.00	66+50.00	0	182.08
66+50.00	67+50.00	0	206.78
67+50.00	68+50.00	0	265.23
68+50.00	69+50.00	0	251.36
69+50.00	70+50.00	0	233.96
70+50.00	71+50.00	0	172.74
71+50.00	72+50.00	0	137.88
72+50.00	73+50.00	0	128.48
73+50.00	74+50.00	0	86.72
74+50.00	75+50.00	0	26.34
75+50.00	76+50.00	0	66.66
76+50.00	77+50.00	0	166.40
77+50.00	78+50.00	0	127.42
78+50.00	79+50.00	0	74.62
79+50.00	80+50.00	0	86.65
80+50.00	81+50.00	0	117.63
81+50.00	82+50.00	0	148.27
82+50.00	83+50.00	0	181.72
83+50.00	84+50.00	0	154.74
84+50.00	85+50.00	0	109.04
85+50.00	86+50.00	0	76.12
86+50.00	87+50.00	0	65.18
87+50.00	88+50.00	0	52.10
88+50.00	89+50.00	0	45.68
89+50.00	90+50.00	0	73.89
90+50.00	91+50.00	0	100.51
91+50.00	92+50.00	0	104.04
92+50.00	93+50.00	0	107.91
93+50.00	94+50.00	0	98.88
94+50.00	95+50.00	0	102.21
95+50.00	96+50.00	0	97.61
96+50.00	97+50.00	0	66.93
97+50.00	98+50.00	0	76.74
98+50.00	99+50.00	0	93.67
99+50.00	100+50.00	0	69.10
100+50.00	101+50.00	0	43.91
101+50.00	102+50.00	0	34.92
102+50.00	103+50.00	0	55.72
103+50.00	104+50.00	0	83.13
104+50.00	105+50.00	0	104.68
105+50.00	106+50.00	0	77.25
106+50.00	107+50.00	0	112.32
107+50.00	108+50.00	0	153.32
108+50.00	109+50.00	0	135.68
109+50.00	110+50.00	0	106.04
110+50.00	111+50.00	0	47.89
111+50.00	112+50.00	0	42.75
112+50.00	113+50.00	0	64.68
113+50.00	114+50.00	0	67.37
114+50.00	115+50.00	0	72.09
115+50.00	116+50.00	0	90.02

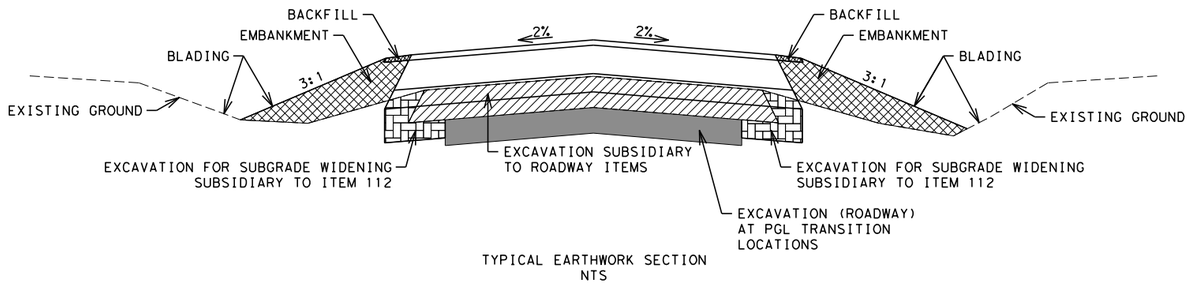
STATION RANGE		0110-6001	0132-6005
FROM STA.	TO STA.	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)
		CY	CY
116+50.00	117+50.00	0	99.35
117+50.00	118+50.00	0	101.64
118+50.00	119+50.00	0	99.64
119+50.00	120+50.00	0	56.67
120+50.00	121+50.00	0	34.03
121+50.00	122+50.00	0	36.18
122+50.00	123+50.00	0	44.71
123+50.00	124+50.00	0	47.19
124+50.00	125+50.00	0	89.90
125+50.00	126+50.00	0	207.02
126+50.00	127+50.00	0	115.74
127+50.00	128+50.00	0	55.22
128+50.00	129+50.00	0	78.20
129+50.00	130+50.00	0	101.27
130+50.00	131+50.00	0	67.86
131+50.00	132+50.00	0	129.04
132+50.00	133+50.00	0	110.85
133+50.00	134+50.00	0	60.30
134+50.00	135+50.00	0	54.27
135+50.00	136+50.00	0	53.18
136+50.00	137+50.00	0	62.88
137+50.00	138+50.00	0	173.17
138+50.00	139+50.00	0	177.28
139+50.00	140+50.00	0	90.45
140+50.00	141+50.00	0	138.42
141+50.00	142+50.00	0	148.23
142+50.00	143+50.00	0	108.21
143+50.00	144+50.00	0	76.64
144+50.00	145+50.00	0	136.69
145+50.00	146+50.00	0	138.52
146+50.00	147+50.00	0	103.62
147+50.00	148+50.00	0	132.75
148+50.00	149+50.00	0	160.81
149+50.00	150+50.00	0	146.90
150+50.00	151+50.00	0	98.72
151+50.00	152+50.00	0	125.57
152+50.00	153+50.00	0	83.39
153+50.00	154+50.00	0	55.30
154+50.00	155+50.00	0	47.37
155+50.00	156+50.00	0	45.03
156+50.00	157+50.00	0	47.01
157+50.00	158+50.00	0	55.08
158+50.00	159+50.00	0	79.02
159+50.00	160+50.00	0	170.61
160+50.00	161+50.00	0	144.35
161+50.00	162+50.00	0	37.28
162+50.00	163+50.00	0	57.89
163+50.00	164+50.00	0	74.90
164+50.00	165+50.00	0	78.42
165+50.00	166+50.00	0	53.96
166+50.00	167+50.00	0	50.56
167+50.00	168+50.00	0	86.75
168+50.00	169+50.00	0	230.59
169+50.00	170+50.00	0	295.10
170+50.00	171+50.00	0	108.51
171+50.00	172+50.00	0	82.10
172+50.00	173+50.00	0	140.49
173+50.00	174+50.00	0	176.63

STATION RANGE		0110-6001	0132-6005
FROM STA.	TO STA.	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)
		CY	CY
174+50.00	175+50.00	0	53.03
175+50.00	176+50.00	0	29.53
176+50.00	177+50.00	0	23.67
177+50.00	178+50.00	0	36.71
178+50.00	179+50.00	0	52.78
179+50.00	180+50.00	0	77.85
180+50.00	181+50.00	0	129.25
181+50.00	182+50.00	0	175.86
182+50.00	183+50.00	0	99.83
183+50.00	184+50.00	0	72.95
184+50.00	185+50.00	0	78.32
185+50.00	186+50.00	0	78.73
186+50.00	187+50.00	0	65.61
187+50.00	188+50.00	0	41.80
188+50.00	189+50.00	0	24.38
189+50.00	190+50.00	0	22.64
190+50.00	191+50.00	0	29.20
191+50.00	192+50.00	0	33.36
192+50.00	193+50.00	0	30.71
193+50.00	194+50.00	0	49.76
194+50.00	195+50.00	0	101.48
195+50.00	196+50.00	0	94.09
196+50.00	197+50.00	0	135.86
197+50.00	198+50.00	0	147.55
198+50.00	199+50.00	0	155.56
199+50.00	200+50.00	0	136.50
200+50.00	201+50.00	0	103.94
201+50.00	202+50.00	0	81.51
202+50.00	203+50.00	0	72.54
203+50.00	204+50.00	0	61.09
204+50.00	205+50.00	0	50.84
205+50.00	206+50.00	0	68.15
206+50.00	207+50.00	0	93.96
207+50.00	208+50.00	0	111.41
208+50.00	209+50.00	0	179.37
209+50.00	210+50.00	0	217.47
210+50.00	211+50.00	0	125.21
211+50.00	212+50.00	0	158.82
212+50.00	213+50.00	0	190.80
213+50.00	214+50.00	0	177.26
214+50.00	215+50.00	0	185.25
215+50.00	216+50.00	0	204.77
216+50.00	217+50.00	0	164.57
217+50.00	218+50.00	0	83.85
218+50.00	219+50.00	0	61.15
219+50.00	220+50.00	0	64.95
220+50.00	221+50.00	0	71.89
221+50.00	222+50.00	7.85	64.38
222+50.00	223+50.00	51.26	34.50
223+50.00	224+50.00	96.19	5.24
224+50.00	225+50.00	48.04	1.16
225+50.00	226+50.00	0	0.00
226+50.00	227+50.00	48.44	0.00
227+50.00	228+50.00	134.58	0.08
228+50.00	229+50.00	134.58	7.27
229+50.00	230+00.00	67.29	31.22

	0110-6001	0132-6005
	* # EXCAVATION (ROADWAY)	# EMBANKMENT (FINAL) (ORD COMP) (TY C)
	CY	CY
PROJECT TOTAL	792	22,182

* SEE MISCELLANEOUS DETAILS FOR PGL TRANSITION INFORMATION WHERE EXCAVATION OCCURS. BEYOND TRANSITION LOCATIONS EXCAVATION SUBSIDIARY TO ROADWAY ITEMS, SEE TYPICAL EARTHWORK SECTION BELOW AND SUMMARY OF ROADWAY ITEMS SHEET.

\# QUANTITY TABULATED ON SUMMARY OF ROADWAY ITEMS SHEET.



TYPICAL EARTHWORK SECTION
NTS

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
SUMMARY OF EARTHWORK

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	10
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

SUMMARY OF DRIVEWAY ITEMS

DRIVEWAY NUMBER / INTERSECTION NAME	STATION	OFFSET	THROAT WIDTH (FT)	TYPE	0104-6017 REMOVING CONC (DRIVEWAYS)	0105-6011 REMOVING STAB BASE AND ASPH PAV (2"-6")	0464-6003 RC PIPE (CL III)(18 IN)	0464-6005 RC PIPE (CL III)(24 IN)	0464-6007 RC PIPE (CL III)(30 IN)	0467-6363 SET (TY II) (18 IN) (RCP) (6: 1) (P)	0467-6395 SET (TY II) (24 IN) (RCP) (6: 1) (P)	0467-6423 SET (TY II) (30 IN) (RCP) (6: 1) (P)	0496-6007 REMOV STR (PIPE)	0530-6002 INTERSECTIONS (ACP)	0530-6004 DRIVEWAYS (CONC)	0530-6005 DRIVEWAYS (ACP)	0560-6011 MAILBOX INSTALL-S (TWW-POST) TY 4
					SY	SY	LF	LF	LF	EA	EA	EA	LF	SY	SY	SY	EA
1	0+81	LEFT	12	DRIVEWAY		21										32	
2	1+47	LEFT	12	DRIVEWAY		30	20			2						33	
3	1+96	RIGHT	14	DRIVEWAY		35		20			2		25			36	1
W. GRANGER ST	3+61	RIGHT	16	INTERSECTION		42	20			2			25	40			1
4	5+84	RIGHT	12	DRIVEWAY		50	16			2			24			53	
5	6+95	RIGHT	10	DRIVEWAY		45	14			2			19			46	1
6	13+09	LEFT	12	DRIVEWAY		12	18			2			24			53	
7	13+94	RIGHT	68	DRIVEWAY	233				84			2	100		279		1
LONE CEDAR PIKE	17+71	RIGHT	28	INTERSECTION		165								136			
8	19+95	RIGHT	12	DRIVEWAY		93	22			2			35			107	
9	25+99	RIGHT	14	DRIVEWAY		39										60	
10	26+76	LEFT	10	DRIVEWAY		44										60	
11	41+29	LEFT	12	DRIVEWAY		49										53	
12	43+22	LEFT	12	DRIVEWAY		41	18			2			27			53	
13	44+03	RIGHT	10	DRIVEWAY		42	16			2			16			46	
14	44+65	RIGHT	10	DRIVEWAY		35	16			2			16			46	
15	48+16	LEFT	12	DRIVEWAY		55		18			2		22			56	
16	54+26	RIGHT	20	DRIVEWAY		90		26			2		46			81	
17	59+31	RIGHT	10	DRIVEWAY		46		16			2					46	
18	65+32	RIGHT	20	DRIVEWAY		79		24			2		46			80	
19	74+84	RIGHT	14	DRIVEWAY		78										59	1
20	88+76	LEFT	14	DRIVEWAY		55	20			2			39			60	
21	99+38	RIGHT	12	DRIVEWAY		13	16			2			21			53	
NW CR 4430	100+61	LEFT	22	INTERSECTION		103								118			1
22	102+44	LEFT	14	DRIVEWAY		59	22			2			21			60	
NW CR 1440	105+83	RIGHT	16	INTERSECTION		66								99			
23	111+08	LEFT	14	DRIVEWAY		96	18			2			50			59	
24	114+58	RIGHT	10	DRIVEWAY		37	14			2			18			47	
NW CR 4431	117+58	LEFT	14	INTERSECTION		127								138			1
25	130+75	RIGHT	14	DRIVEWAY		72										63	1
26	143+90	RIGHT	10	DRIVEWAY		50	18			2			30			50	1
27	147+39	LEFT	12	DRIVEWAY			16						18			53	
28	149+23	RIGHT	14	DRIVEWAY												59	
29	157+57	RIGHT	12	DRIVEWAY		45	16			2			17			53	
30	158+75	LEFT	14	DRIVEWAY		66	18			2			22			60	1
31	161+98	LEFT	12	DRIVEWAY		62	26						44			78	
32	166+62	LEFT	16	DRIVEWAY		69										66	1
FM 2930	177+10	RIGHT	64	INTERSECTION		349								343			
33	185+62	LEFT	10	DRIVEWAY		39	14			2			14			46	1
34	193+93	RIGHT	10	DRIVEWAY		54		28			4		60			46	1
35	194+50	RIGHT	12	DRIVEWAY		42		32			4		44			53	
36	195+66	LEFT	10	DRIVEWAY		61		14			2		26			47	1
TOTAL					233	2,556	358	178	84	36	20	2	849	874	279	1,953	14

FM 55

SUMMARY OF DRIVEWAY ITEMS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	11
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

SUMMARY OF DRAINAGE ITEMS

CULVERT NO.	STATION	0402-6001 TRENCH EXCAVATION PROTECTION	0432-6024 RIPRAP (STONE COMMON)(DRY)(12 IN)	0464-6003 RC PIPE (CL III)(18 IN)	0464-6005 RC PIPE (CL III)(24 IN)	0464-6007 RC PIPE (CL III)(30 IN)	0464-6009 RC PIPE (CL III)(42 IN)	0465-6128 INLET (COMPL)(PSL)(FG)(4FTX4FT-4FTX4FT)	0466-6026 HEADWALL (CH - FW - 15)(DIA= 48 IN)	0466-6099 HEADWALL (CH - PW - 0)(DIA= 30 IN)	0466-6102 HEADWALL (CH - PW - 0)(DIA= 42 IN)	0466-6136 HEADWALL (CH - PW - S)(DIA= 48 IN)
		LF	CY	LF	LF	LF	LF	EA	EA	EA	EA	EA
1	0+54.68			66								
2	4+17.59	32				88						
3	18+11.78		2		2							
4	26+34.93											
5	49+20.42	44	2			52						
6	64+31.90	13				8		1				
7	70+61.19	46				60		1				
8	74+61.15				2							
9	76+27.05	7							1			1
10	125+89.45	46				54						
11	138+50.72	42	1		62							
12	149+08.87					12		1				
13	152+21.74	43	2		54							
14	159+98.72		7				4				1	
15	169+69.48	54				72		1		1		
PROJECT TOTAL		327	14	66	120	346	4	4	1	1	1	1

SUMMARY OF DRAINAGE ITEMS, CONT.

CULVERT NO.	STATION	0467-6363 SET (TY II)(18 IN)(RCP)(6: 1)(P)	0467-6388 SET (TY II)(24 IN)(RCP)(3: 1)(C)	0467-6417 SET (TY II)(30 IN)(RCP)(3: 1)(C)	0496-6004 REMOV STR (SET)	0496-6007 REMOV STR (PIPE)
		EA	EA	EA	EA	LF
1	0+54.68	2				55
2	4+17.59			4		46
3	18+11.78		2		1	6
4	26+34.93			1		2
5	49+20.42			2		61
6	64+31.90			1		12
7	70+61.19			1		68
8	74+61.15		2			
9	76+27.05					40
10	125+89.45			2		58
11	138+50.72		2			54
12	149+08.87			1		4
13	152+21.74		2		1	53
14	159+98.72					
15	169+69.48					63
PROJECT TOTAL		2	8	12	2	522

FM 55
SUMMARY OF DRAINAGE ITEMS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	12
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

SUMMARY OF SIGNING ITEMS

LOCATION	0644-6001	0644-6004	0644-6033	0644-6036	0685-6002
	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U)	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	RELOCATE RDSD FLASH BEACON ASSEMBLY
	EA	EA	EA	EA	EA
SOSS, SHEET 1	7	1	1		1
SOSS, SHEET 2	8	2			1
SOSS, SHEET 3	12				
SOSS, SHEET 4	10	1	1		
SOSS, SHEET 5	11				
SOSS, SHEET 6	12				
SOSS, SHEET 7	10			1	
SOSS, SHEET 8	6		1	2	
SOSS, SHEET 9	11				
SOSS, SHEET 10	5	3			
TOTAL	92	7	3	3	2

SUMMARY OF STRIPING ITEMS

LOCATION	0666-6018	0666-6042	0666-6048	0666-6303	0666-6309	0666-6312	0666-6315	0672-6009
	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	REFL PAV MRKR TY II-A-A
	LF	LF	LF	LF	LF	LF	LF	EA
STA. 0+50 TO STA. 230+00	27	44	76	42,833	3,548	1,850	35,920	574
TOTAL	27	44	76	42,833	3,548	1,850	35,920	574

SUMMARY OF MISC. TRAFFIC ITEMS

LOCATION	0533-6003	0533-6004	0658-6061	0658-6099
	RUMBLE STRIPS (SHOULDER) ASPHALT	RUMBLE STRIPS (CENTERLINE) ASPHALT	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	INSTL OM ASSM (OM-2Z)(WFLX)GND
	LF	LF	EA	EA
STA. 0+50 TO STA. 230+00	45,488	22,724	15	36
TOTAL	45,488	22,724	15	36

FM 55
SUMMARY OF TRAFFIC ITEMS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	13
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	0161-6017 COMPOST MANUF TOPSOIL (4")	0162-6002 BLOCK SODDING	0164-6035 DRILL SEEDING (PERM) (RURAL) (CLAY)	0164-6051 DRILL SEED (TEMP) (WARM OR COOL)	0166-6002 * FERTILIZER	0168-6001 VEGETATIVE WATERING	0506-6002 ROCK FILTER DAMS (INSTALL) (TY 2)	0506-6003 ROCK FILTER DAMS (INSTALL) (TY 3)	0506-6011 ROCK FILTER DAMS (REMOVE)	0506-6020 ** CONSTRUCTION EXITS (INSTALL) (TY 1)	0506-6024 ** CONSTRUCTION EXITS (REMOVE)
	SY	SY	SY	SY	TON	MG	LF	LF	LF	SY	SY
STA 0+50 TO STA. 230+00	158,150		158,150	158,150	18	47,054	200	240	440	224	224
** 10% ADDITIONAL QUANTITY										22	22
CULVERT 1, STA. 0+54.68	16	16				3					
CULVERT 2, STA. 4+17.59	27	27				4					
CULVERT 3, STA. 18+11.78	20	20				3					
CULVERT 4, STA. 26+34.93	14	14				3					
CULVERT 5, STA. 49+20.42	28	28				5					
CULVERT 6, STA. 64+31.90	18	18				3					
CULVERT 7, STA. 70+61.19	27	27				4					
CULVERT 8, STA. 74+61.15	22	22				4					
CULVERT 9, STA. 76+27.05	224	224				34					
CULVERT 10, STA. 125+89.45	29	29				5					
CULVERT 11, STA. 138+50.72	33	33				5					
CULVERT 12, STA. 149+08.87	43	43				7					
CULVERT 13, STA. 152+21.74	26	26				4					
CULVERT 14, STA. 159+98.72	25	25				4					
CULVERT 15, STA. 169+69.48	41	41				7					
TOTAL	158,743	593	158,150	158,150	18	47,149	200	240	440	246	246

* FOR CONTRACTOR'S INFORMATION ONLY

** ADDITIONAL 10% QUANTITY FOR BMP ITEMS PROVIDED TO ALLOW FOR VARYING SITE CONDITIONS AND PERIODIC REPLACEMENT DUE TO NORMAL WEAR

SUMMARY OF EROSION CONTROL ITEMS, CONT.

LOCATION	0506-6038 ** TEMP SEDMT CONT FENCE (INSTALL)	0506-6039 ** TEMP SEDMT CONT FENCE (REMOVE)	0506-6042 ** BIODEG EROSN CONT LOGS (INSTL) (18")	0506-6043 ** BIODEG EROSN CONT LOGS (REMOVE)	0730-6107 FULL - WIDTH MOWING
	LF	LF	LF	LF	CYC
STA 0+50 TO STA. 230+00	12,540	12,540	500	500	3
** 10% ADDITIONAL QUANTITY	1,260	1,260	50	50	
CULVERT 1, STA. 0+54.68					
CULVERT 2, STA. 4+17.59					
CULVERT 3, STA. 18+11.78					
CULVERT 4, STA. 26+34.93					
CULVERT 5, STA. 49+20.42					
CULVERT 6, STA. 64+31.90					
CULVERT 7, STA. 70+61.19					
CULVERT 8, STA. 74+61.15					
CULVERT 9, STA. 76+27.05					
CULVERT 10, STA. 125+89.45					
CULVERT 11, STA. 138+50.72					
CULVERT 12, STA. 149+08.87					
CULVERT 13, STA. 152+21.74					
CULVERT 14, STA. 159+98.72					
CULVERT 15, STA. 169+69.48					
TOTAL	13,800	13,800	550	550	3

* FOR CONTRACTOR'S INFORMATION ONLY

** ADDITIONAL 10% QUANTITY FOR BMP ITEMS PROVIDED TO ALLOW FOR VARYING SITE CONDITIONS AND PERIODIC REPLACEMENT DUE TO NORMAL WEAR

FM 55
SUMMARY OF EROSION CONTROL ITEMS

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	14
	1451	03	017	

TCP GENERAL NOTES

1. OVERNIGHT LANE CLOSURES WILL BE PERMITTED WITH APPROVAL OF THE ENGINEER.

2. LIMIT THE LENGTH OF DAILY WORK TO AN AREA OF OPERATION THAT CAN BE COMPLETED IN ONE WORK DAY IN ORDER TO ALLOW FOR TWO-WAY TRAFFIC AT NIGHT. SUCH AREAS ARE NOT TO EXCEED ONE, (1), MILE IN LENGTH UNLESS OTHERWISE APPROVED BY THE ENGINEER. WITHIN THE ONE MILE SECTION, ONLY PLACE LANE CLOSURES IN THE AREA WHERE ACTUAL WORK IS BEING PERFORMED. COMPLETE EACH ONE MILE SECTION TO FIRST COURSE TREATMENT BEFORE PROCEEDING TO THE NEXT SECTION UNLESS OTHERWISE APPROVED BY THE ENGINEER.

3. INTERMITTENT ONE-WAY TRAFFIC CONTROL (LANE CLOSURES) WILL BE IN ACCORDANCE WITH TCP, BC, AND WZ STANDARDS AND AS DIRECTED BY THE ENGINEER.

4. THE CONTRACTOR WILL PROVIDE WRITTEN NOTICE TO THE ENGINEER BEFORE 1:00 PM ON THE BUSINESS DAY PRECEDING PROPOSED LANE CLOSURES. LANE CLOSURES WILL NOT BE PERMITTED WITHOUT THIS NOTIFICATION.

5. PAVEMENT EDGE DROP-OFFS WILL NOT BE ALLOWED TO REMAIN OVERNIGHT. AT THE END OF EACH WORKDAY ALL PAVEMENT EDGE DROP-OFFS SHALL BE BACKFILLED WITH A SUITABLE MATERIAL TO FORM A STABLE 3:1 OR FLATTER SLOPE.

6. COMPLY WITH TCP(7-1)-13 WHICH INCLUDES PROVISIONS FOR CERTAIN SIGNS TO BE INSTALLED AND REMAIN UNTIL PERMANENT PAVEMENT MARKINGS ARE IN PLACE. THESE SIGNS ARE IN ADDITION TO ANY SIGNS THAT MAY BE REQUIRED BY THE VARIOUS TCP & BC STANDARDS.

7. THE CONTRACTOR SHALL COVER OR REMOVE ANY CONFLICTING SIGNS OR PAVEMENT MARKINGS DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO ITEM 502. LOCATION OF CONSTRUCTION EXITS WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

8. THE CONTRACTOR WILL PROVIDE AND MAINTAIN SKILLED FLAGGERS EQUIPPED WITH TWO-WAY RADIOS TO HANDLE TRAFFIC THROUGH THE WORK AREAS FOR THE SAFETY AND CONVENIENCE OF THE TRAVELING PUBLIC AND CONTRACTOR PERSONNEL.

9. PAY ATTENTION TO ALL OVERHEAD UTILITIES.

10. MAINTAIN DRIVEWAY AND SIDE STREET ACCESS AT ALL TIMES WITH AN ALL-WEATHER SURFACE CONSISTING OF RAP OR BASE.

11. TEMPORARY STORM WATER POLLUTION PREVENTION PLAN (SW3P) EROSION CONTROL MEASURES SHALL ONLY BE PLACED IN AREAS WHERE SOIL DISTURBANCE IS EXPECTED TO OCCUR WITHIN TWO WEEKS. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS DIRECTED BY THE ENGINEER.

SUGGESTED SEQUENCE OF WORK

PHASE I

1. ERECT PROJECT SIGNS AND ADVANCE WARNING SIGNS AS SPECIFIED IN BC AND TCP STANDARDS OR AS DIRECTED BY THE ENGINEER.

2. PLACE SW3P DEVICES IN ACCORDANCE WITH APPLICABLE STANDARDS AND AS DIRECTED BY THE ENGINEER.

3. SET CHANNELIZATION DEVICES AND CONSTRUCT CULVERT EXTENSIONS/REPLACEMENTS. DURING CONSTRUCTION MAINTAIN POSITIVE DRAINAGE.

4. CONSTRUCT UPSTREAM OR DOWNSTREAM CULVERT EXTENSIONS ONE SIDE AT A TIME WITHOUT INTERRUPTION OF TRAFFIC FLOW. FOLLOW TCP(2-1)-18 AND TCP(2-2)-18 FOR THIS WORK.

PHASE II

1. DELINEATE PAVEMENT EDGE AND CENTERLINE WITH VERTICAL PANELS. SALVAGE EXISTING TOPSOIL FROM WORK AREA.

2. REMOVE EXISTING HMAC AS SHOWN IN TYPICAL SECTIONS AND AS DETAILED IN THE PLAN SHEETS. REMIX EXSTING MATERIAL WITH NEW FLEXIBLE BASE AND SPREAD OUT OVER 30' WIDTH AND NOTCHES. THIS WORK WILL BE PERFORMED IN ACCORDANCE WITH TCP(2-2)-18.

3. REWORK EACH AREA FULL WIDTH EACH DAY SUCH THAT NO GRADE DIFFERENCE IS PRESENT AT CENTERLINE.

4. CEMENT TREAT SUBGRADE MATERIAL IN HALF WIDTH.

5. PLACE NEW BASE SECTION IN HALF WIDTH. SEQUENCE OPERATIONS TO CONSTRUCT FULL WIDTH BASE SECTION SUCH THAT NO GRADE DIFFERENCE IS PRESENT AT COMPLETION OF DAILY OPERATIONS.

6. APPLY PRIME COAT AND PLACE FIRST COURSE TREATMENT.

7. CONSTRUCT DRIVEWAYS AND DRIVEWAY CULVERTS FOLLOWING TCP(2-1)-18.

PHASE III

1. PLACE HMAC FROM 0+50 TO 224+88 AND FROM STA. 227+14 TO STA. 230+00. FOLLOW TCP(2-2)-18 AND TCP(7-1)-13 FOR THIS WORK.

2. INSTALL SIGNS.

3. PLACE PERMANENT PAVEMENT MARKINGS FOLLOWING TCP(3-1)-13 AND TCP(3-3)-14 WITHIN 14 CALENDAR DAYS OF PLACEMENT OF FINAL SURFACE.

4. INSTALL MAILBOXES.

5. ESTABLISH PERMANENT VEGTATIVE COVER IN UNPAVED AREAS DISTURBED BY PROJECT.

6. PERFORM FINAL CLEANUP AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

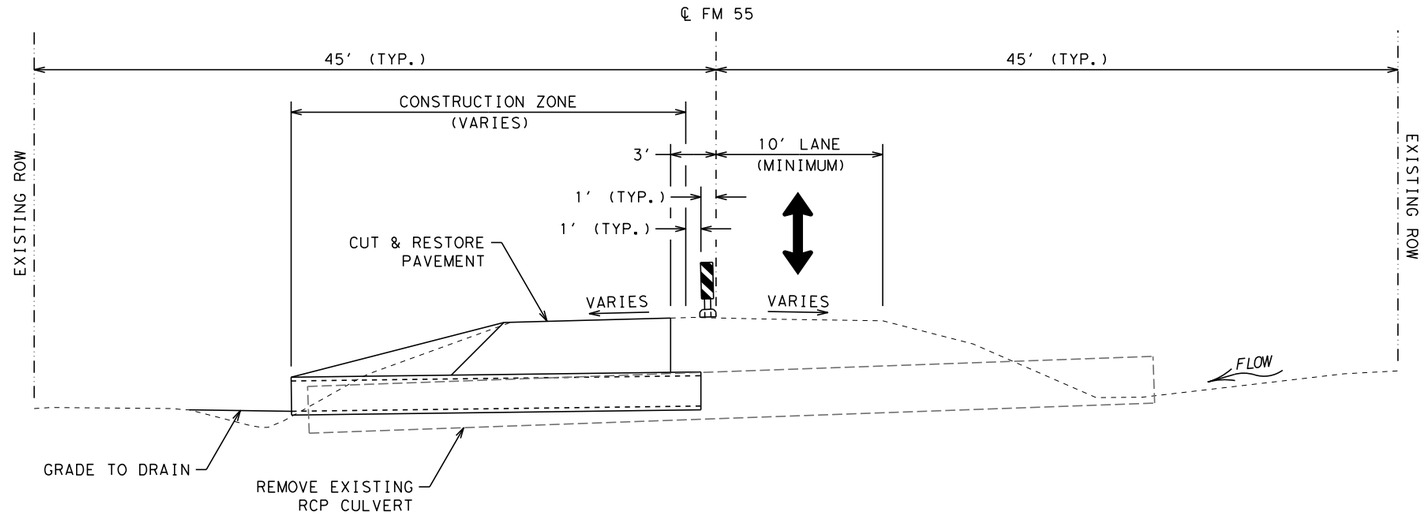
Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

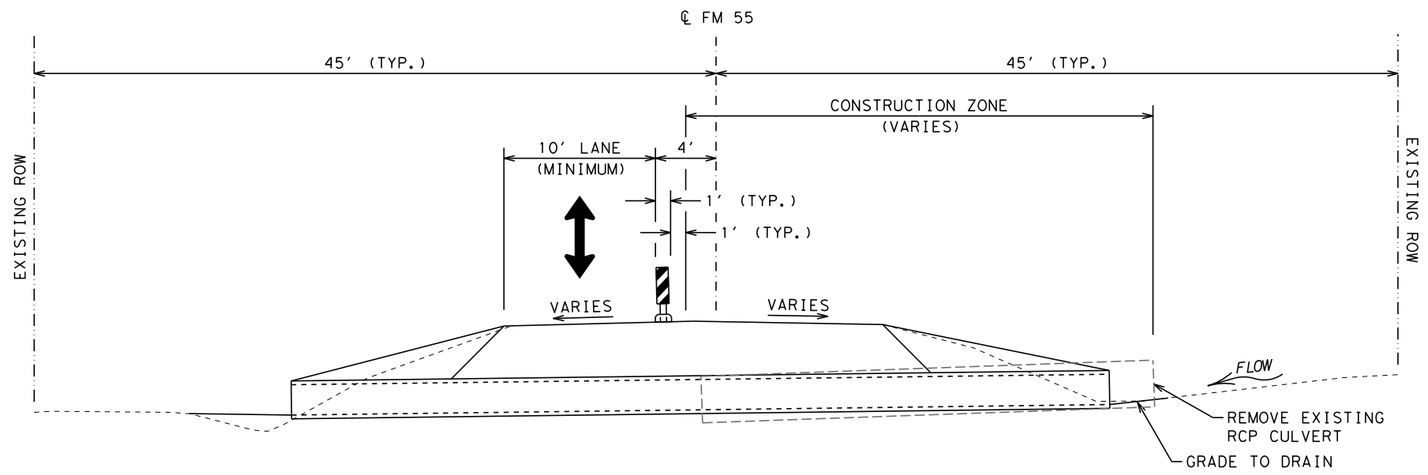
FM 55

TRAFFIC CONTROL PLAN
NARRATIVE

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	15
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	



TYPICAL TCP FOR CULVERT REPLACEMENT
STEP 1



TYPICAL TCP FOR CULVERT REPLACEMENT
STEP 2

NOTES:

1. INSTALL ADVANCE WARNING SIGNS. SEE BC & TCP STANDARDS AND TCP NARRATIVE FOR ADDITIONAL INFORMATION.
2. SEE CULVERT LAYOUTS FOR ADDITIONAL INFORMATION.
3. USE FLAGGERS AND PILOT VEHICLE TO HANDLE TRAFFIC FLOW.
4. CENTERLINE CHANNELIZATION DEVICES MAY BE OMITTED WHEN A PILOT CAR IS LEADING TRAFFIC IN ACCORDANCE WITH TCP(2-2)-18.
4. COMPLETE EACH CULVERT REPLACEMENT OR EXTENSION WITHOUT INTERRUPTION.
5. IF NEEDED PROVIDE TEMPORARY DETOUR WITH APPROVAL OF THE ENGINEER.
6. PROVIDE AND MAINTAIN A SMOOTH SURFACE AND PAVEMENT MARKINGS AS NEEDED AFTER CULVERT REPLACEMENT/EXTENSION.

LEGEND

VERTICAL PANEL

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
TCP
TYPICAL SECTIONS

NOT TO SCALE SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	16
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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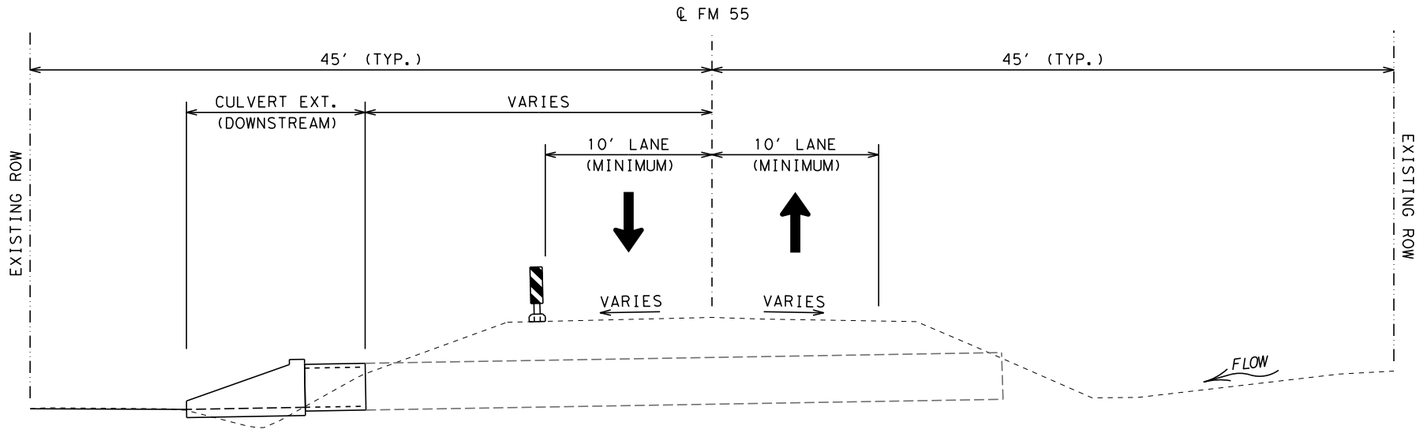
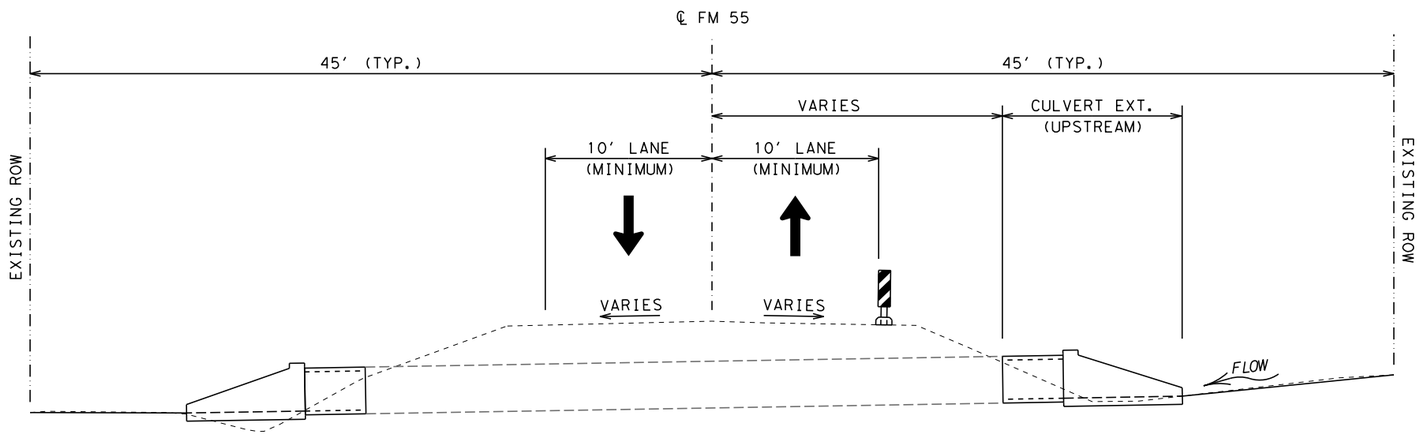


TYPICAL TCP FOR CULVERT EXTENSION
STEP 1



TYPICAL TCP FOR CULVERT EXTENSION
STEP 2

NOTES:

1. INSTALL ADVANCE WARNING SIGNS. SEE BC & TCP STANDARDS AND TCP NARRATIVE FOR ADDITIONAL INFORMATION.
2. SEE CULVERT LAYOUTS FOR ADDITIONAL INFORMATION.
3. USE FLAGGERS AND PILOT VEHICLE TO HANDLE TRAFFIC FLOW.
4. CENTERLINE CHANNELIZATION DEVICES MAY BE OMITTED WHEN A PILOT CAR IS LEADING TRAFFIC IN ACCORDANCE WITH TCP(2-2)-18.
4. COMPLETE EACH CULVERT REPLACEMENT OR EXTENSION WITHOUT INTERRUPTION.
5. IF NEEDED PROVIDE TEMPORARY DETOUR WITH APPROVAL OF THE ENGINEER.
6. PROVIDE AND MAINTAIN A SMOOTH SURFACE AND PAVEMENT MARKINGS AS NEEDED AFTER CULVERT REPLACEMENT/EXTENSION.

LEGEND

VERTICAL PANEL

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

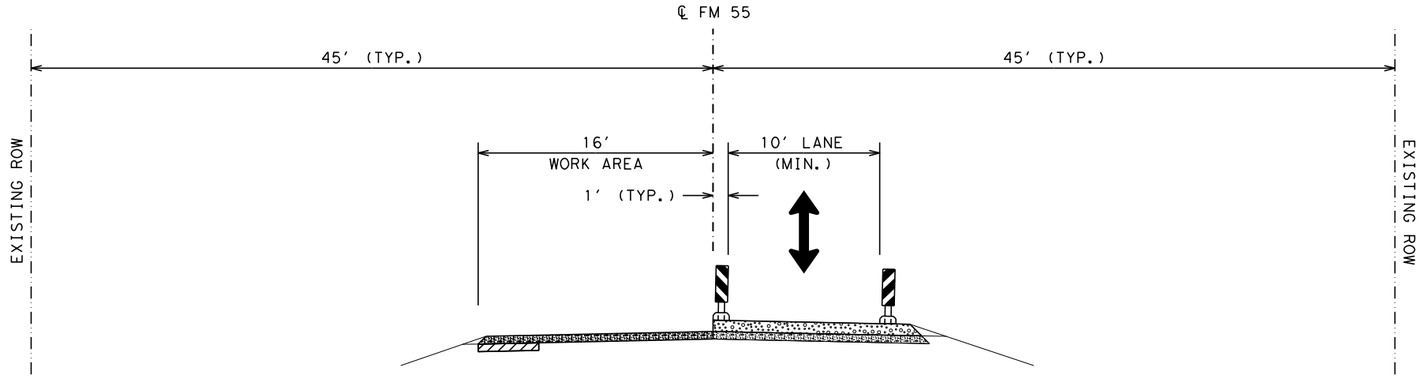
Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

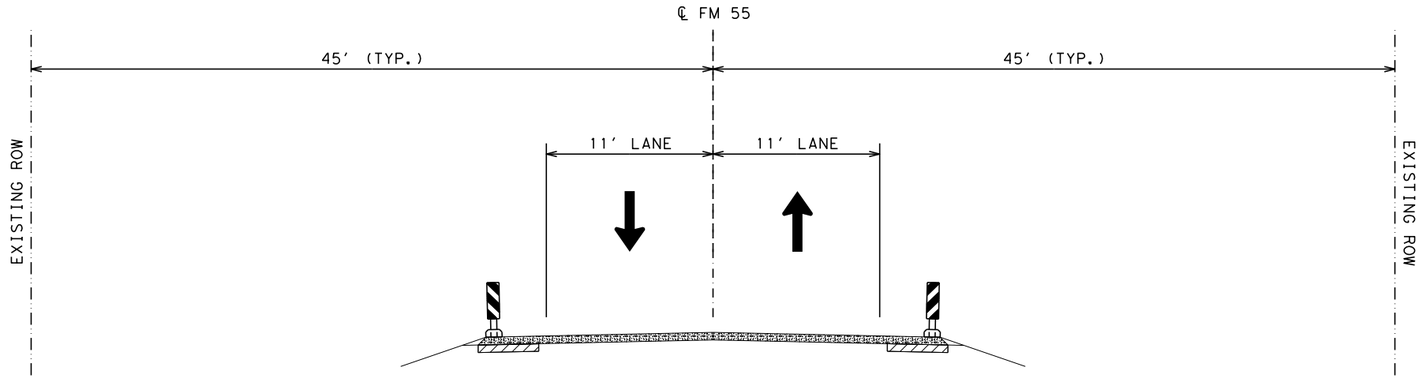
FM 55
TCP
TYPICAL SECTIONS

NOT TO SCALE — SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	17
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	



PHASE II
CONSTRUCTION OPERATION PRESENT



PHASE II
CONSTRUCTION OPERATION NOT PRESENT

NOTES:

1. INSTALL ADVANCE WARNING SIGNS. SEE BC & TCP STANDARDS AND TCP NARRATIVE FOR ADDITIONAL INFORMATION.
2. SEE CULVERT LAYOUTS FOR ADDITIONAL INFORMATION.
3. USE FLAGGERS AND PILOT VEHICLE TO HANDLE TRAFFIC FLOW.
4. CENTERLINE CHANNELIZATION DEVICES MAY BE OMITTED WHEN A PILOT CAR IS LEADING TRAFFIC IN ACCORDANCE WITH TCP(2-2)-18.
4. COMPLETE EACH CULVERT REPLACEMENT OR EXTENSION WITHOUT INTERRUPTION.
5. IF NEEDED PROVIDE TEMPORARY DETOUR WITH APPROVAL OF THE ENGINEER.
6. PROVIDE AND MAINTAIN A SMOOTH SURFACE AND PAVEMENT MARKINGS AS NEEDED AFTER CULVERT REPLACEMENT/EXTENSION.

LEGEND

VERTICAL PANEL

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

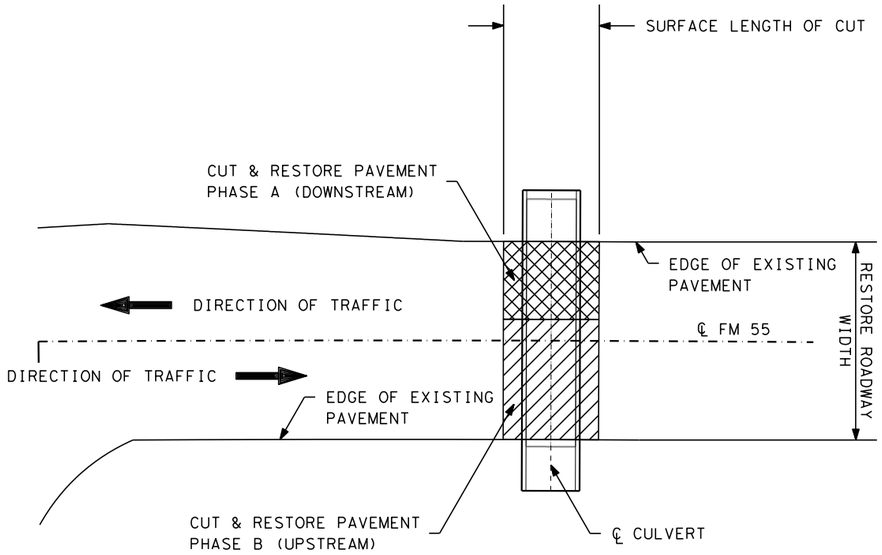
Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
TCP
TYPICAL SECTIONS

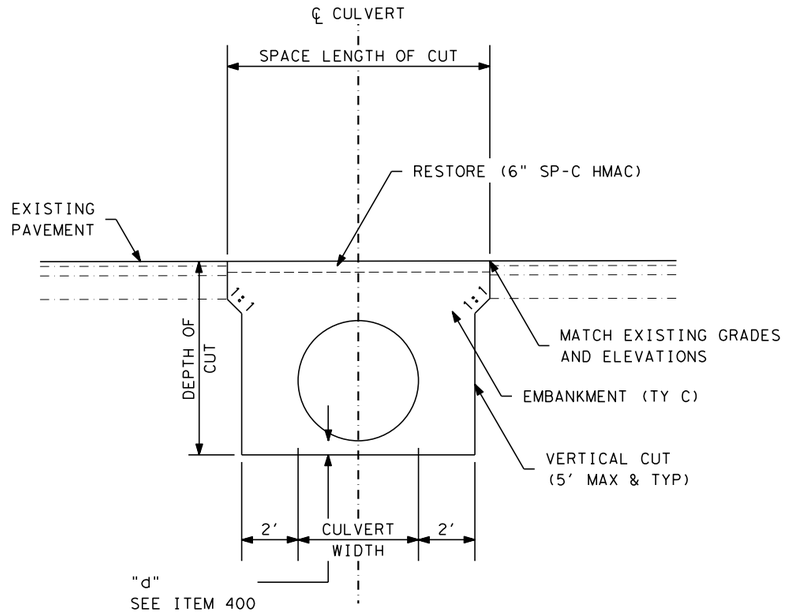
NOT TO SCALE — SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	18
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	



CUT & RESTORE DETAIL

PLAN VIEW
NTS
EXISTING CULVERT TO BE REMOVED



CUT & RESTORE DETAIL

PROFILE VIEW
NTS
EXISTING CULVERT TO BE REMOVED

ITEM 400 - CUT & RESTORE PAVEMENT

CULVERT	LOCATION	AREA SY
1	STA. 0+50.68 TO STA. 0+58.68	45
2	STA. 4+10.79 TO STA. 4+24.39	40
5	STA. 49+15.87 TO STA. 49+24.97	27
7	STA. 70+56.64 TO STA. 70+65.74	27
10	STA. 125+84.70 TO STA. 125+94.20	28
11	STA. 138+46.72 TO STA. 138+54.72	24
13	STA. 152+17.74 TO STA. 152+25.74	24
15	STA. 169+64.73 TO STA. 169+74.23	28
TOTAL		243

NOTE: EXISTING CULVERT AT THE INDICATED LOCATION WILL BE REMOVED AND REPLACED.

STATE OF TEXAS
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PAVEMENT CUT & RESTORE DETAILS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	19
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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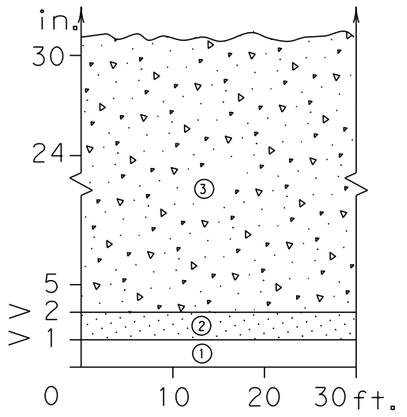
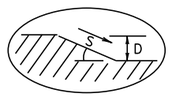
DATE:
FILE:

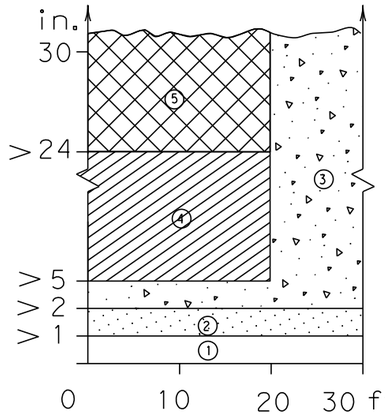
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

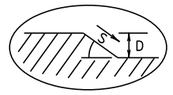


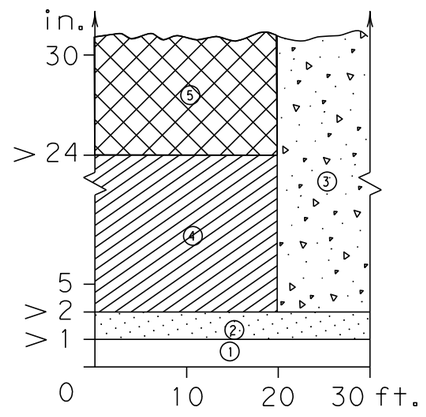
Edge Condition I
S = (3:1) (or flatter)



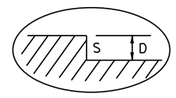


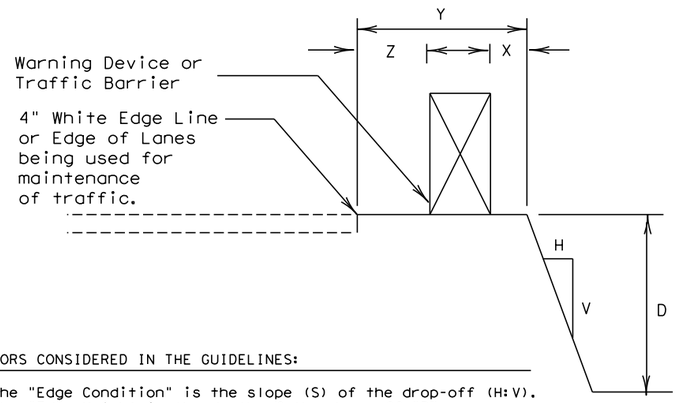
Edge Condition II
S = ((2.99):1) to (1:1)





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:

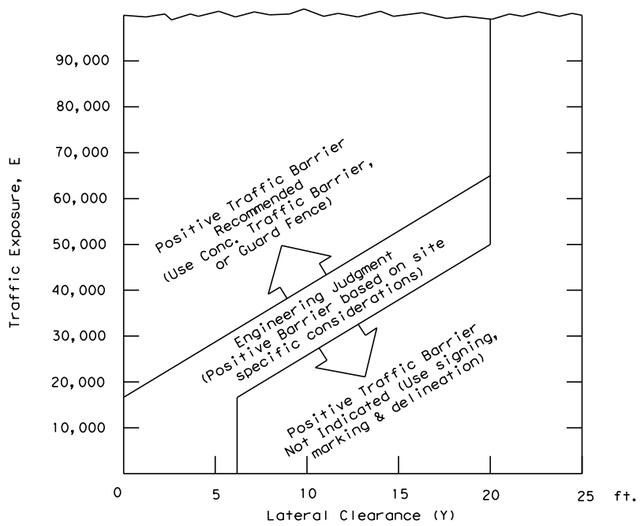
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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 differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

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

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



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

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

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

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

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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

REVISIONS
03-01
08-01 correct typos

CONT	SECT	JOB	HIGHWAY
1451	03	017	FM 55
DIST	COUNTY		SHEET NO.
DAL	NAVARRO		20

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	145103		017	FM 55
	DIST	COUNTY		SHEET NO.
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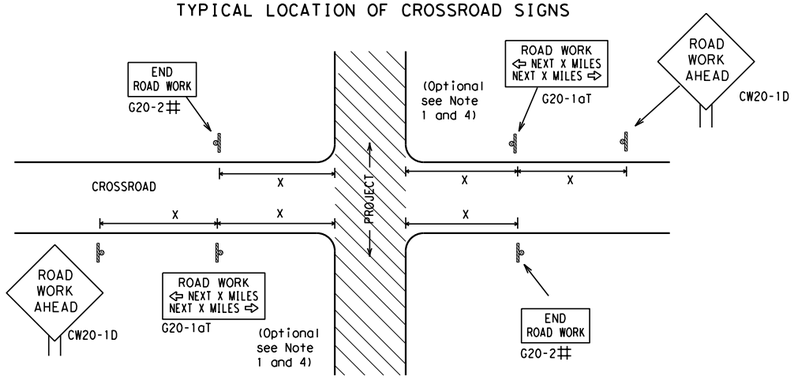
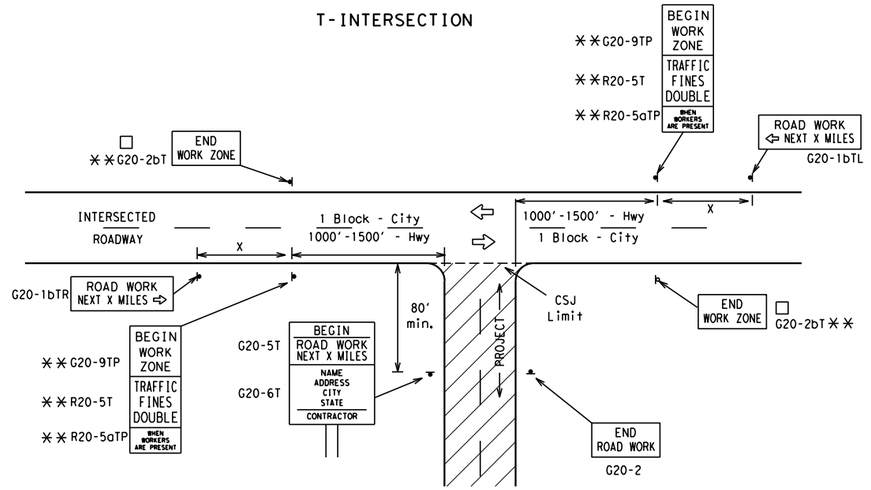
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

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

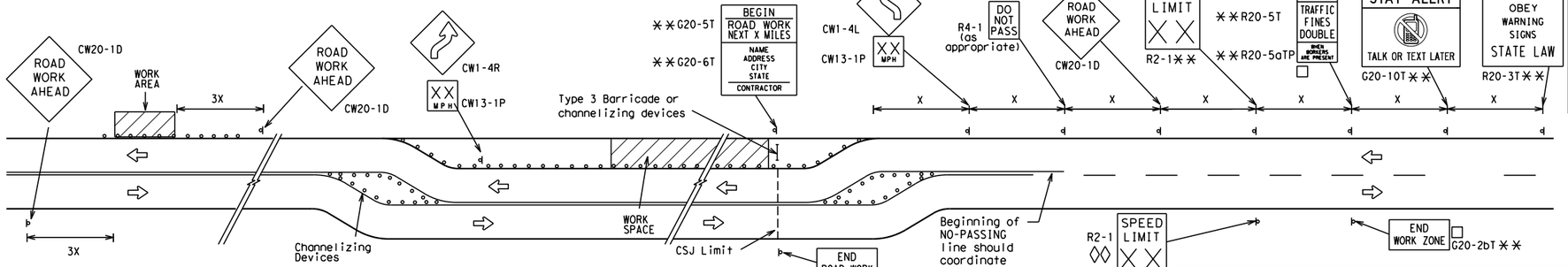
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

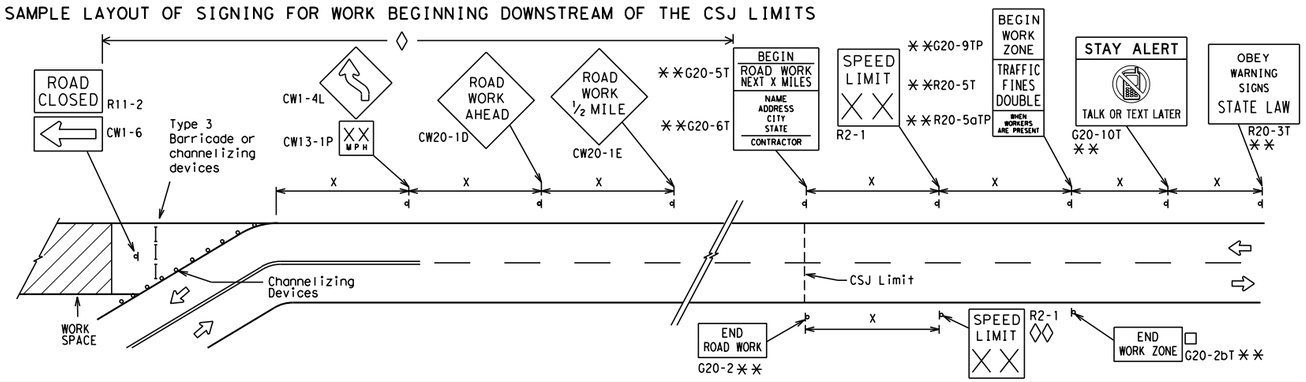
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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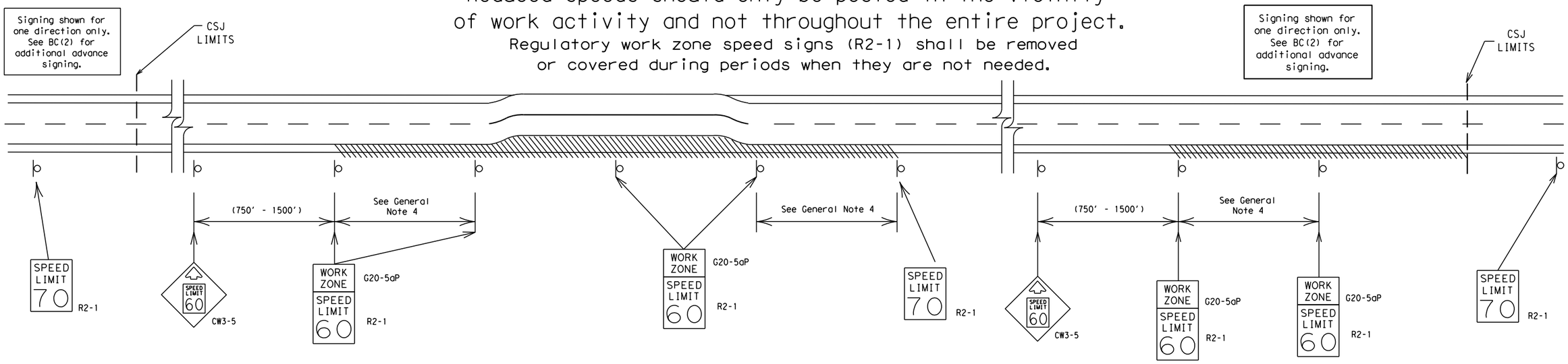
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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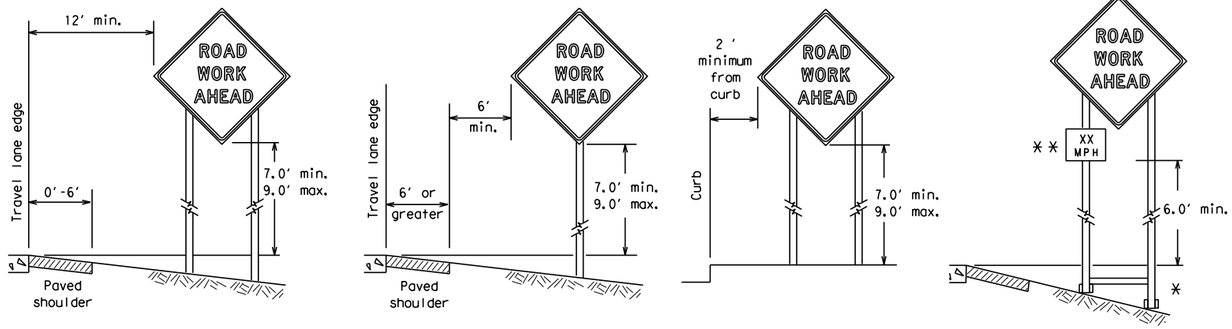
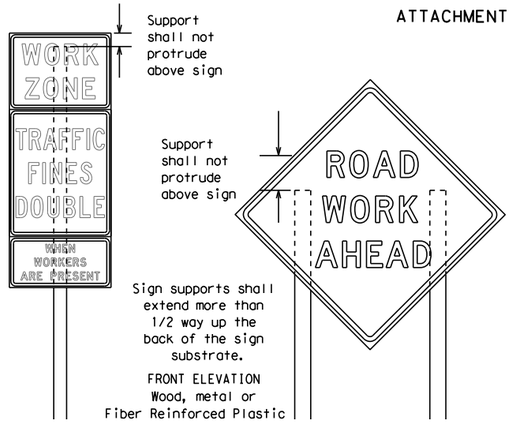
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

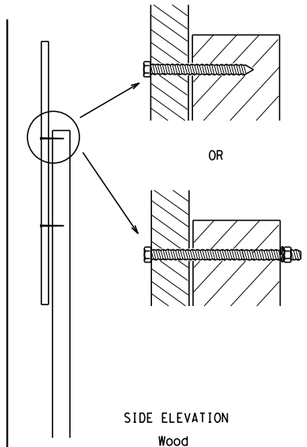


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





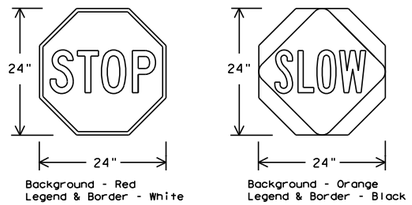
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

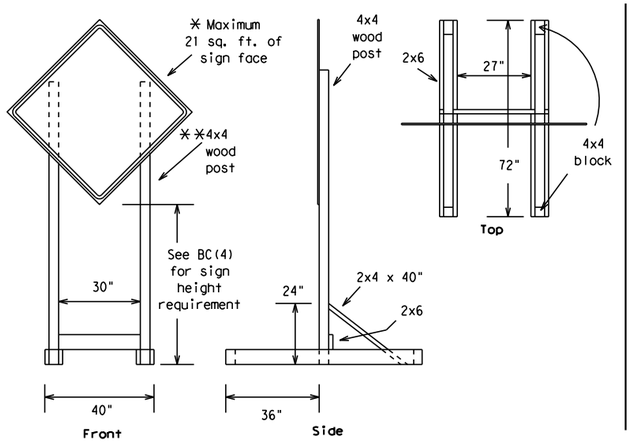
Traffic Safety Division Standard

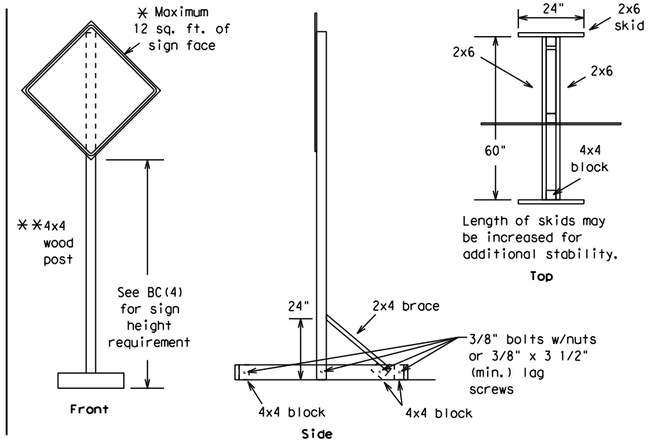
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	145103		017	FM 55
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	NAVARRO		24

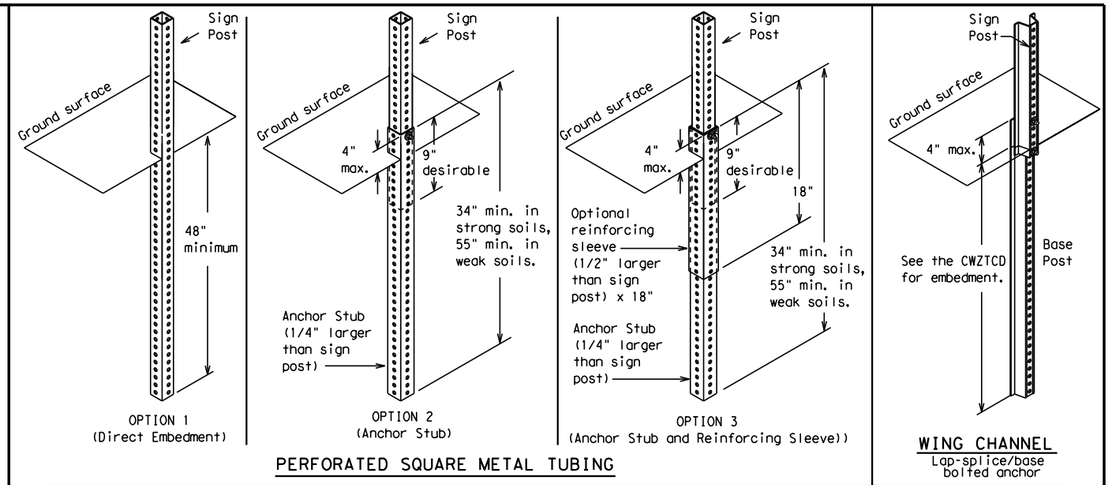
DATE:
FILE:





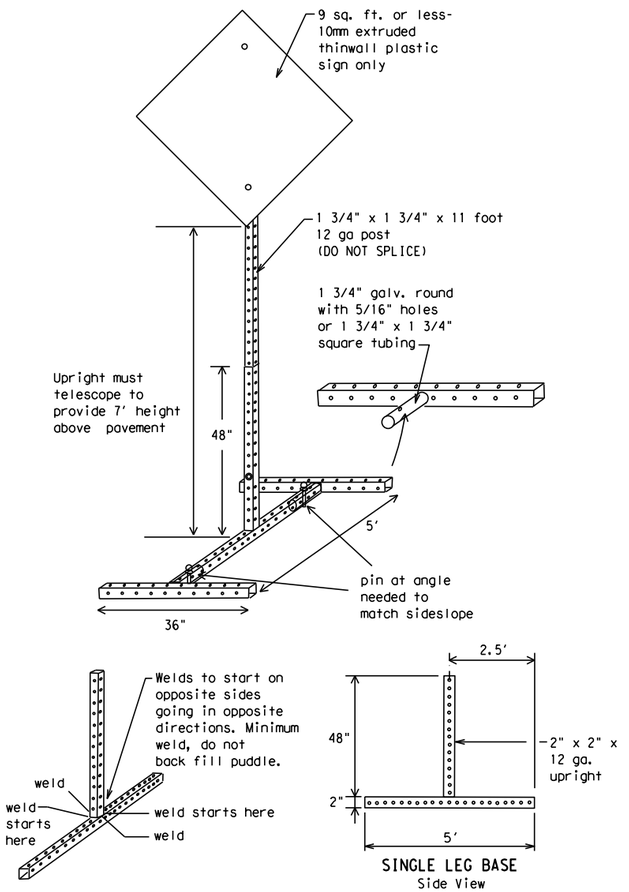
SKID MOUNTED WOOD SIGN SUPPORTS

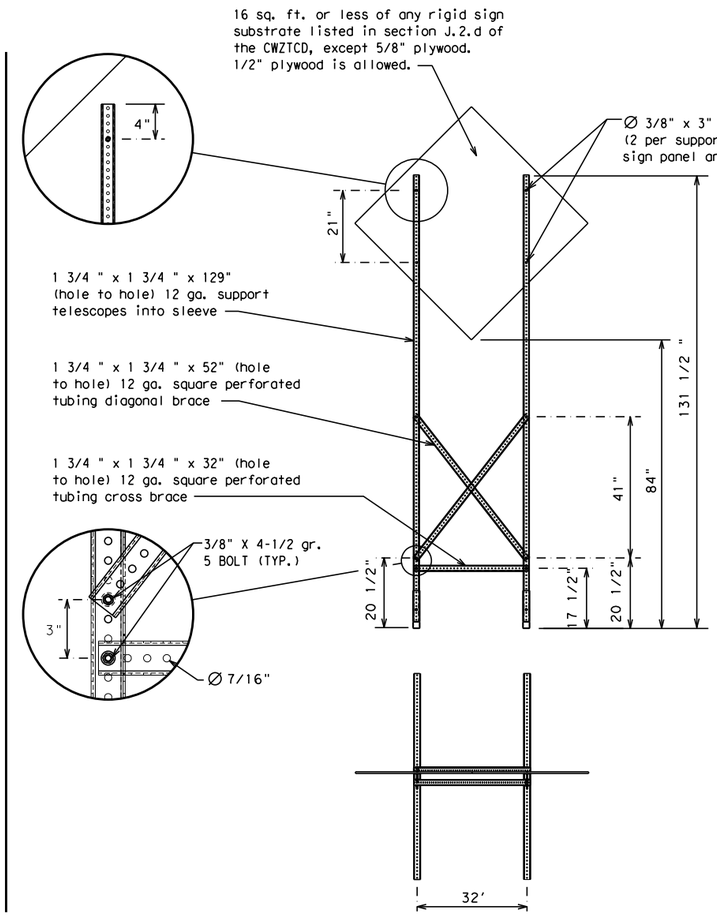
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

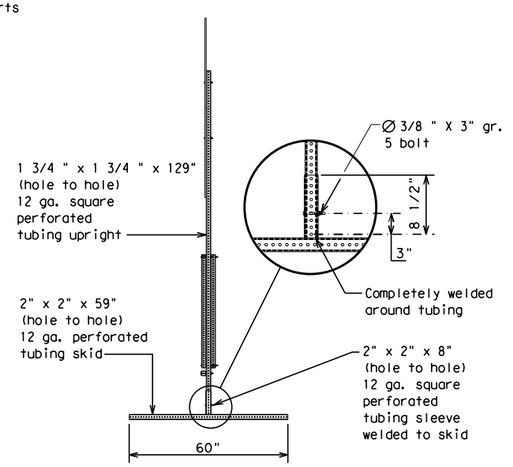


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

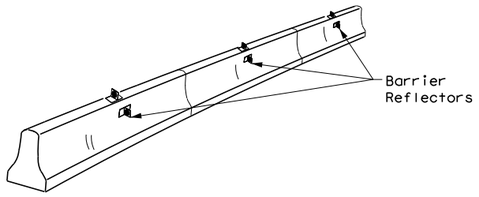
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	NAVARRO		26

100

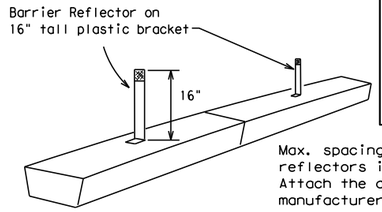
DATE:
FILE:

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



CONCRETE TRAFFIC BARRIER (CTB)

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

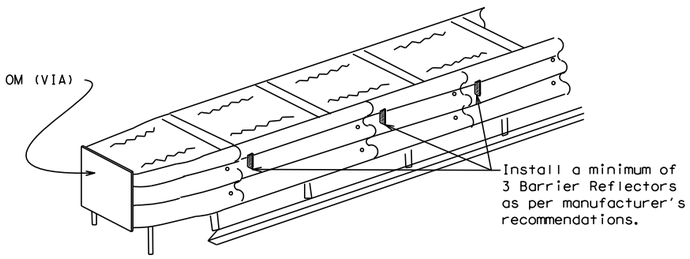


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

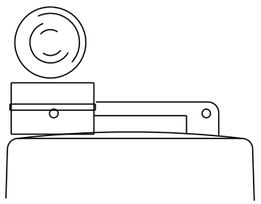


DELINEATION OF END TREATMENTS

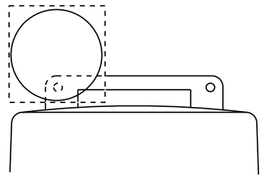
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

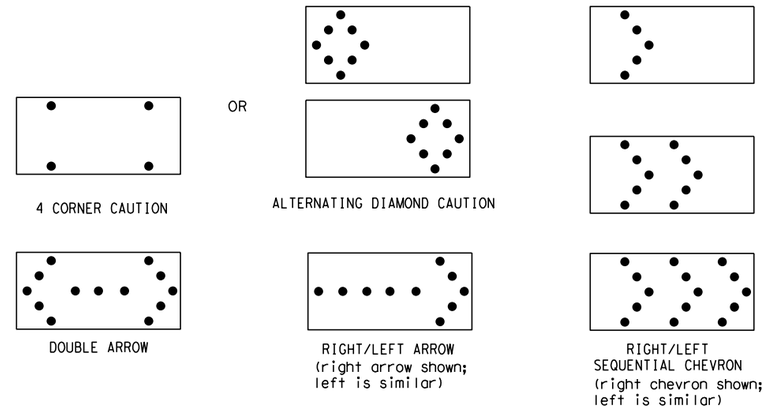
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

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

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

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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

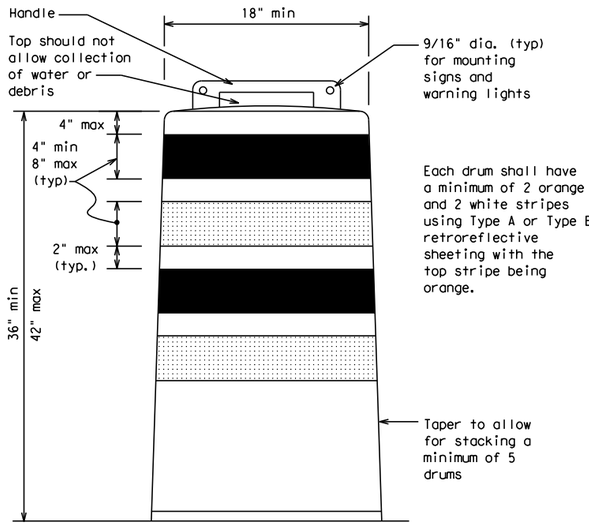
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

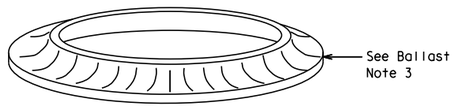
RETROREFLECTIVE SHEETING

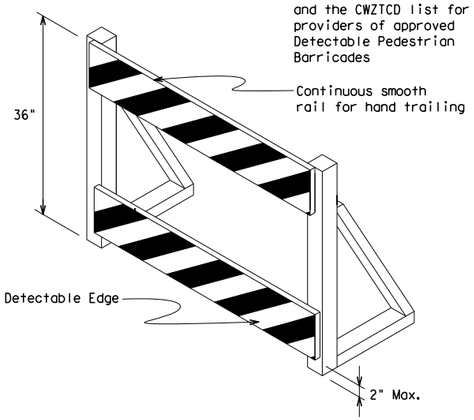
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

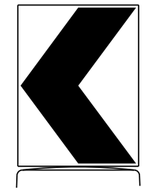




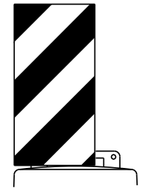


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

.

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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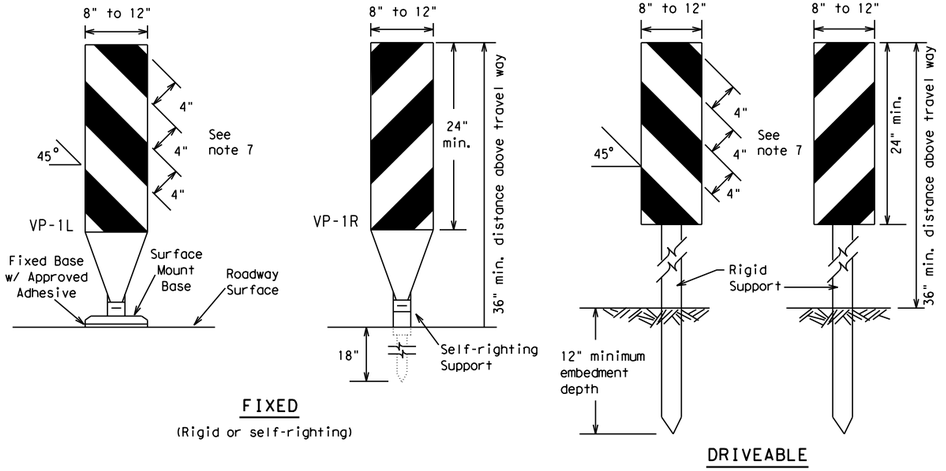
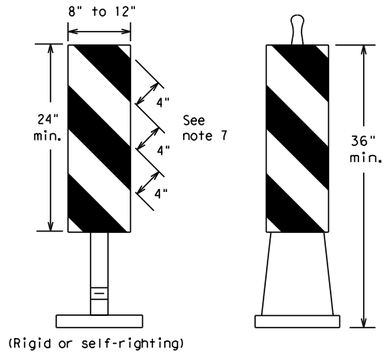


FIXED
(Rigid or self-righting)

DRIVEABLE

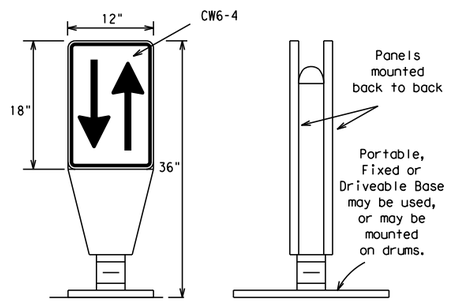


(Rigid or self-righting)

PORTABLE

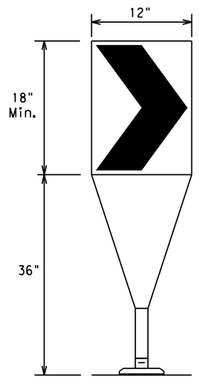
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



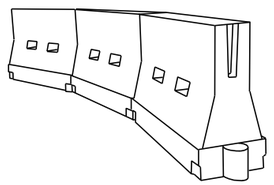
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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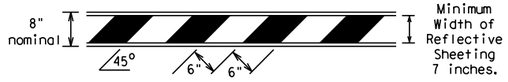
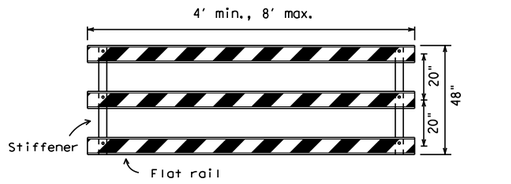
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



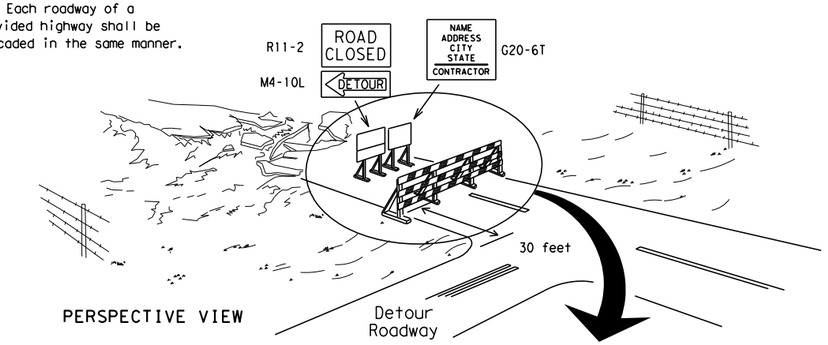
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

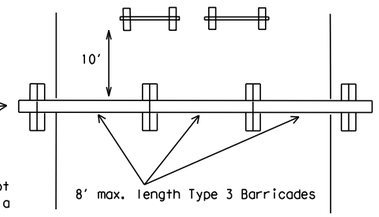
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

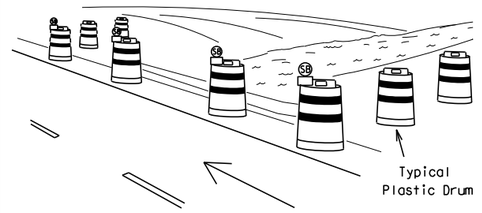
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

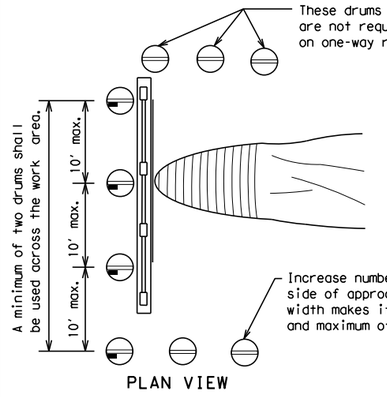
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

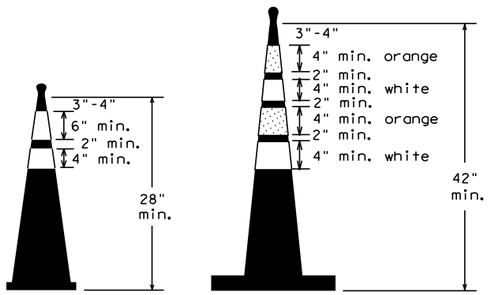
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



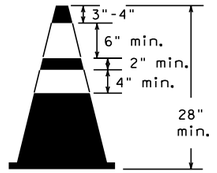
PLAN VIEW

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

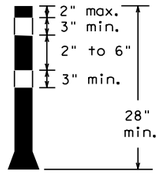
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

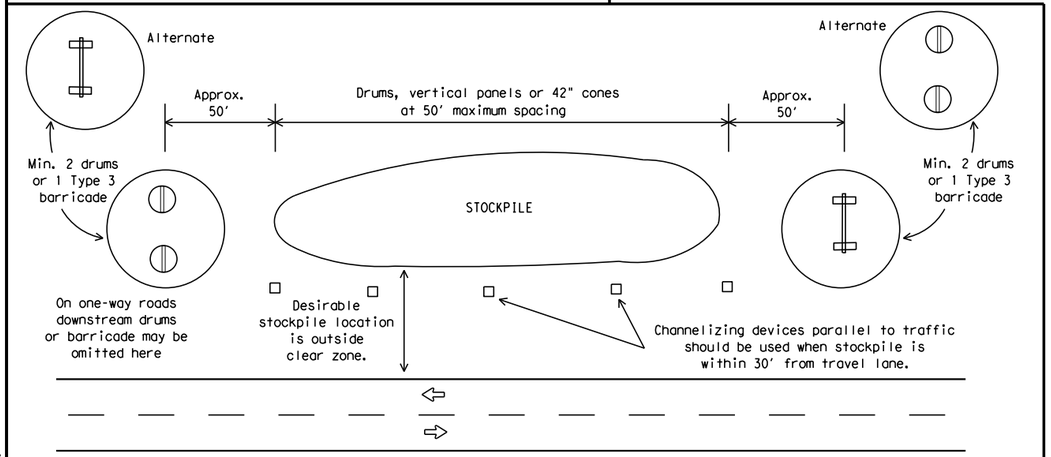


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

DATE:
FILE:

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	145	03	017	FM 55
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	NAVARRO		30

104

DATE:
FILE:

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

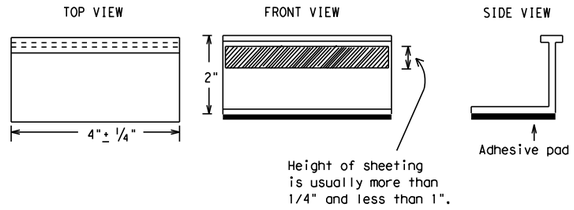
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

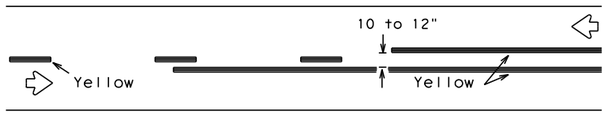
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

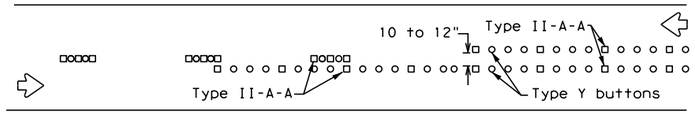
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	145103		017	FM 55
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	DAL	NAVARRO		31
11-02 8-14				

DATE:
FILE:

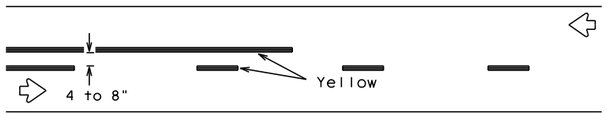
PAVEMENT MARKING PATTERNS



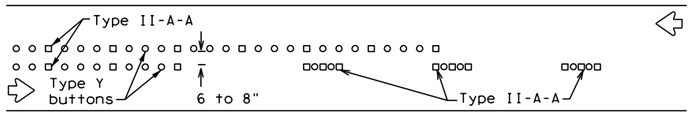
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



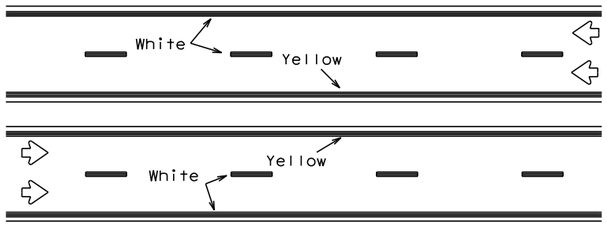
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



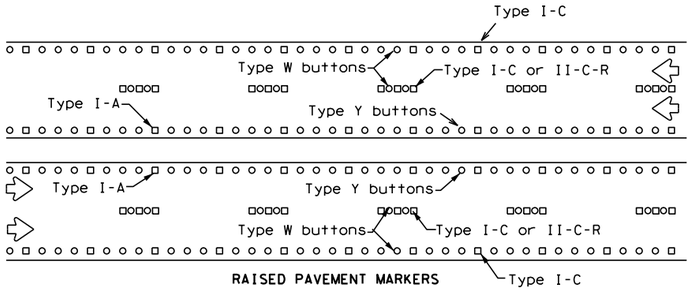
RAISED PAVEMENT MARKERS - PATTERN B

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

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



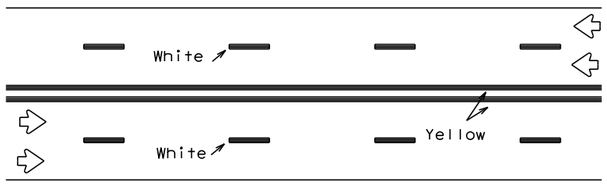
REFLECTORIZED PAVEMENT MARKINGS



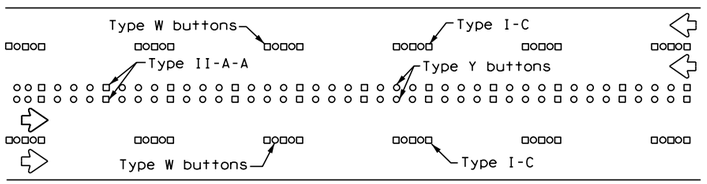
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



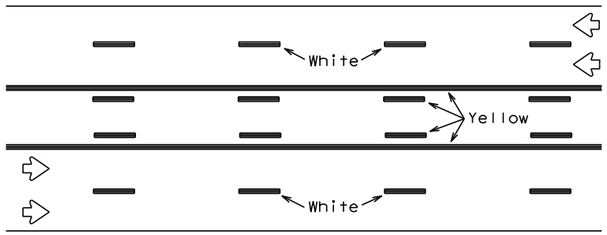
REFLECTORIZED PAVEMENT MARKINGS



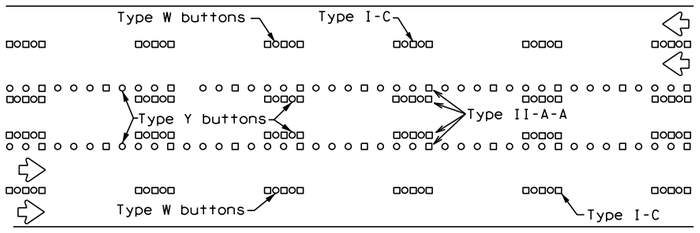
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

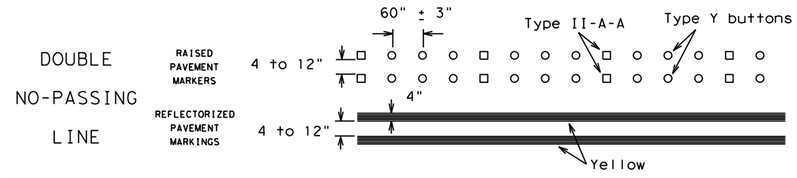
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

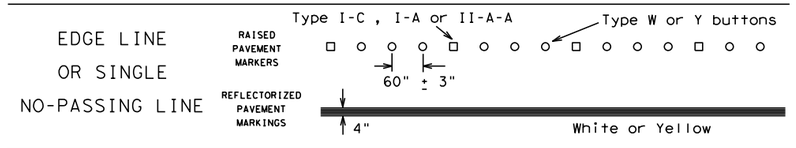
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

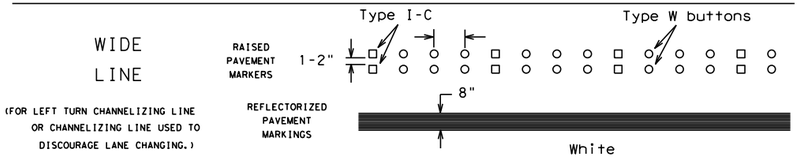


EDGE LINE OR SINGLE NO-PASSING LINE



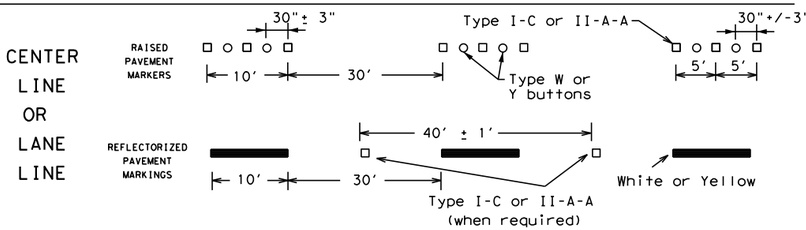
WIDE LINE

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

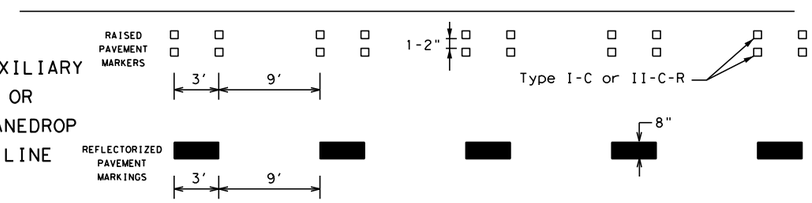


BROKEN LINES

CENTER LINE OR LANE LINE

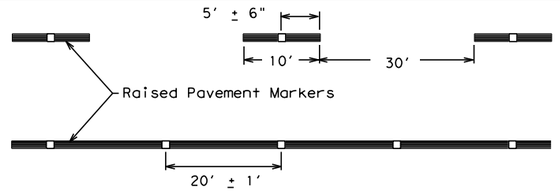


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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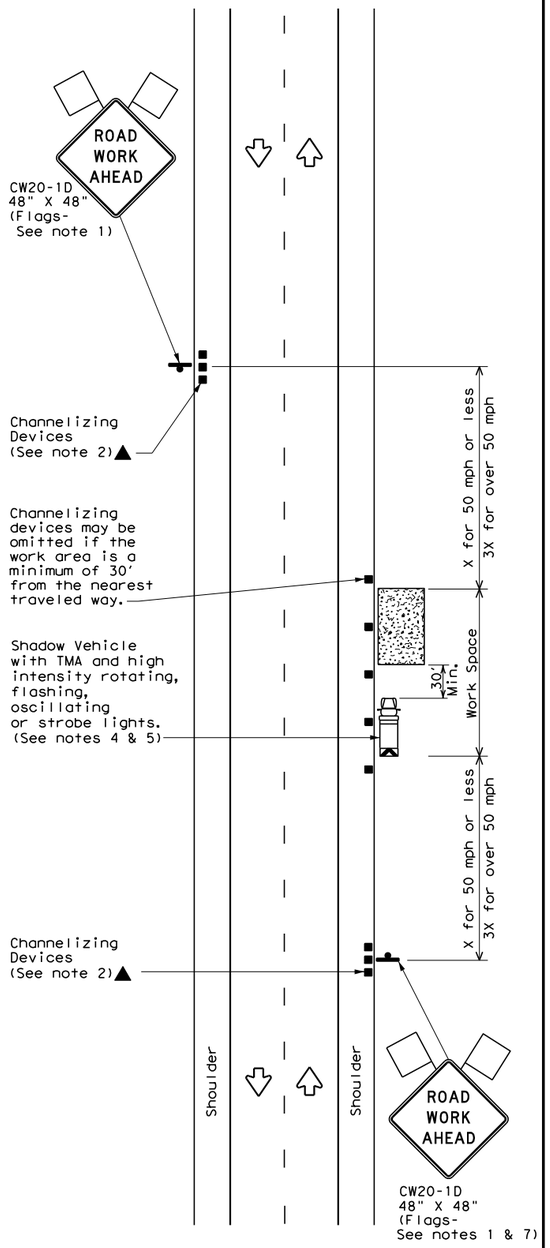
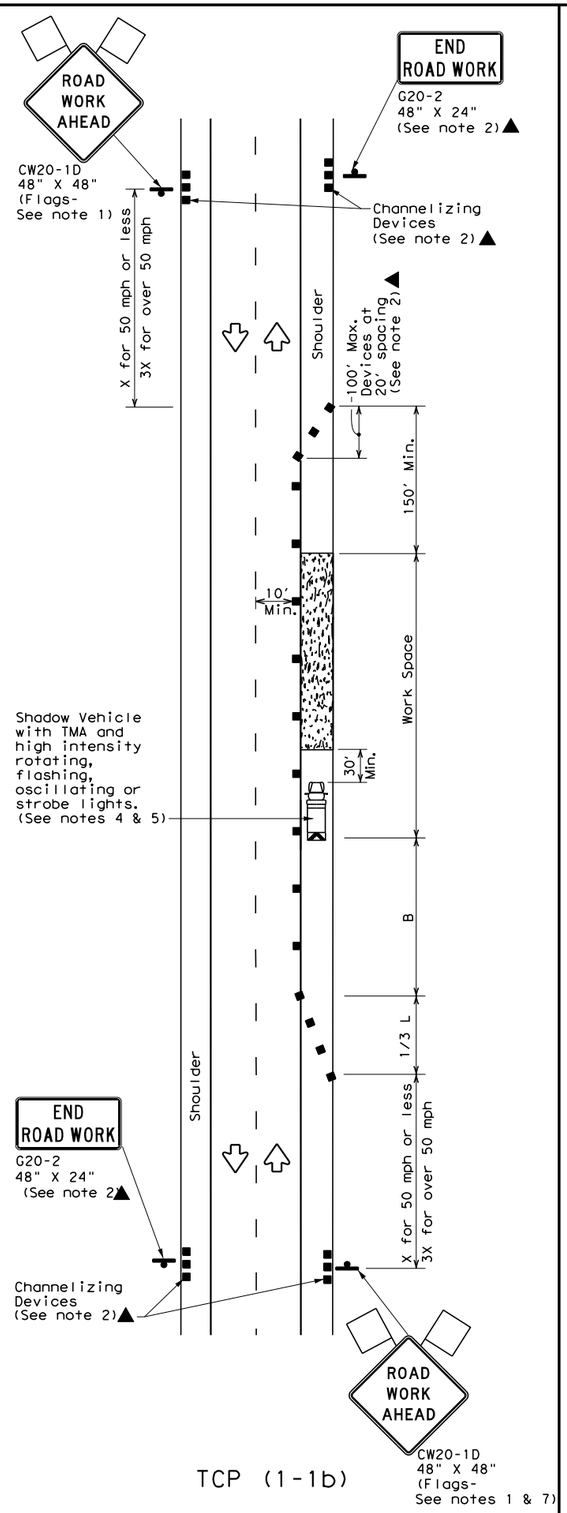
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	145	103	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		32

DATE:
FILE:



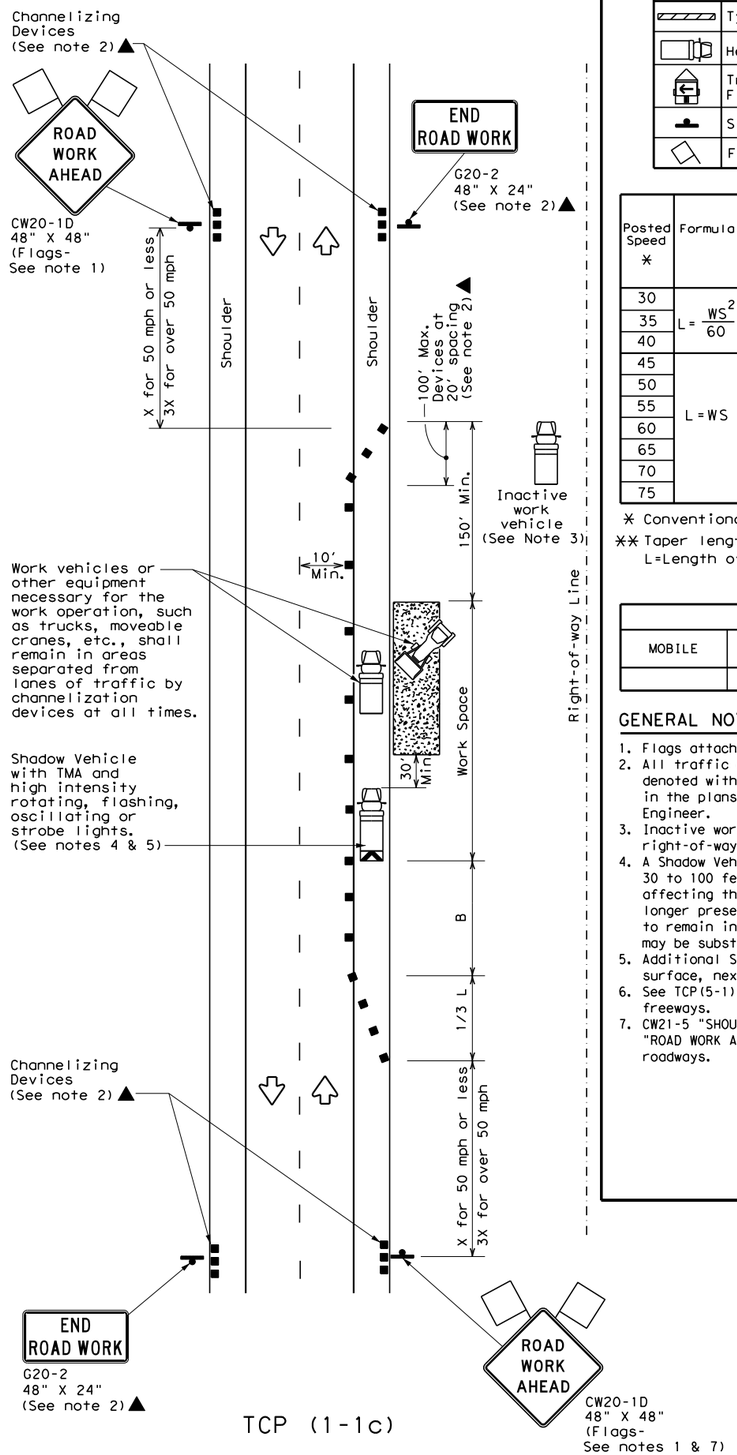
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

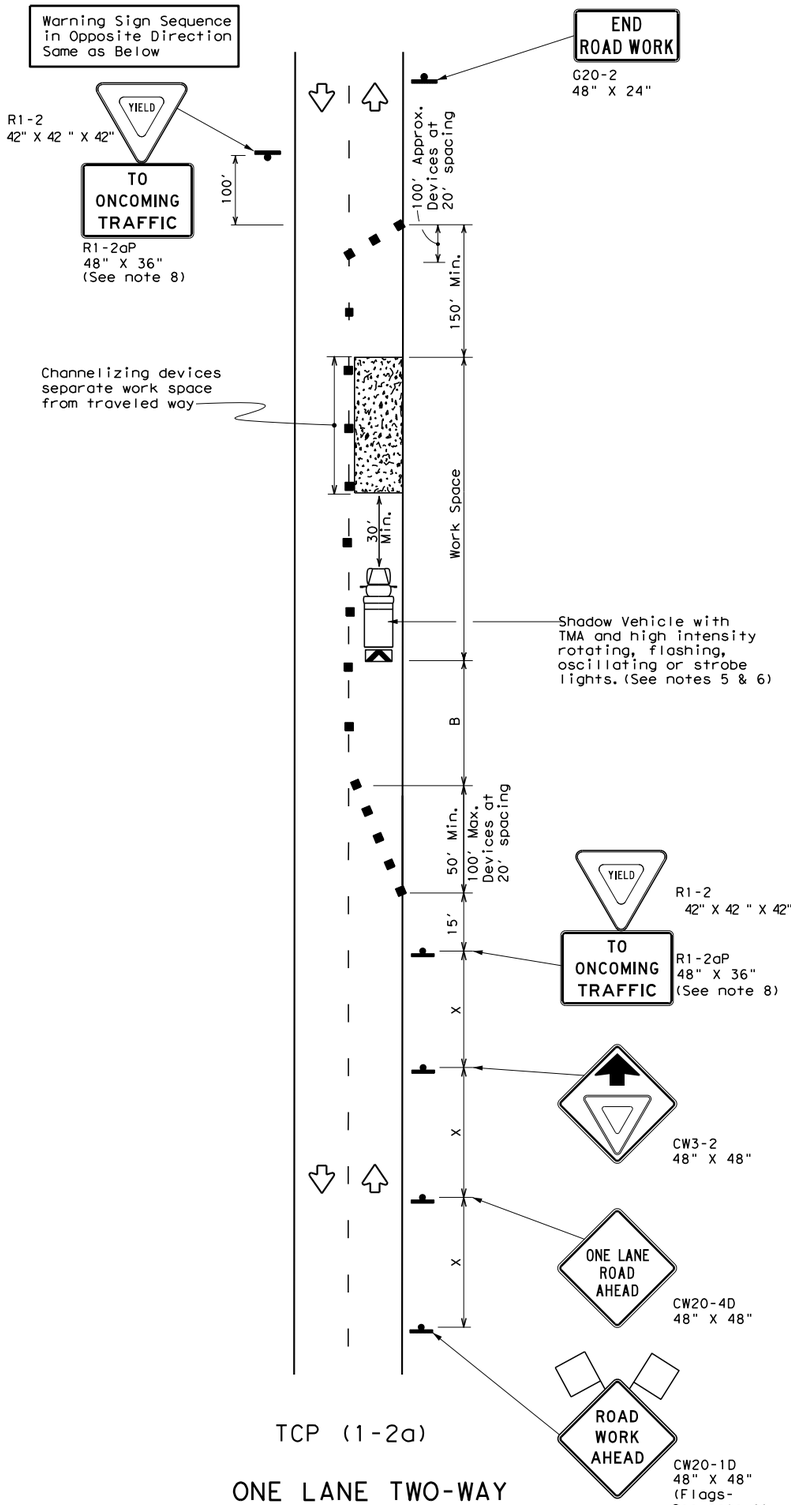
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	DAL	NAVARRO		33
1-97 2-18				

151

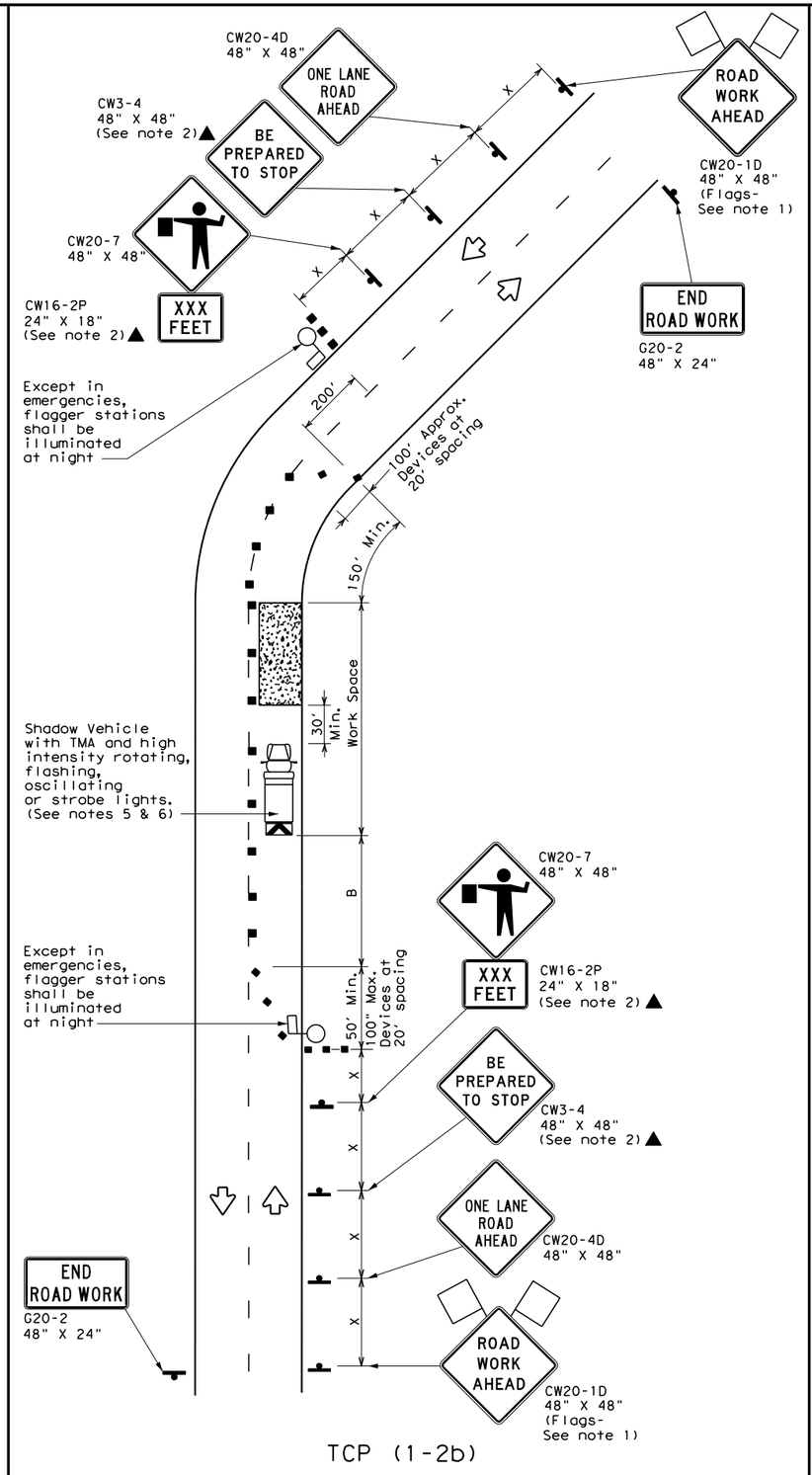
DATE:
FILE:



TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		34

DATE:
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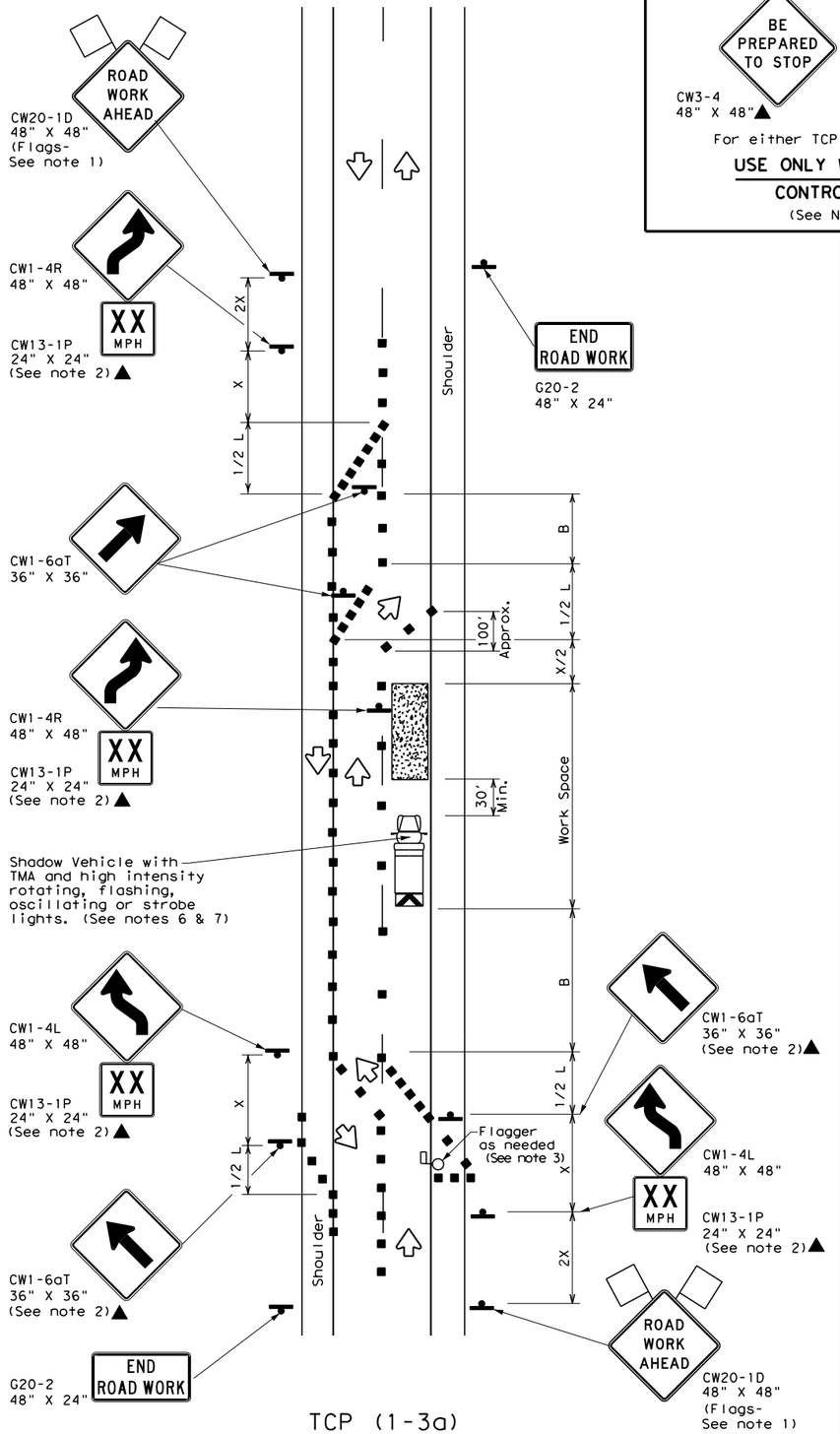
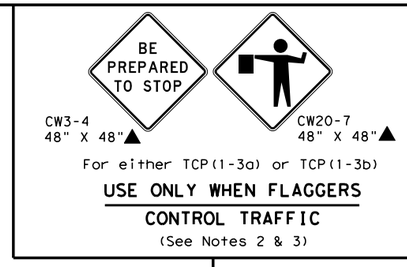
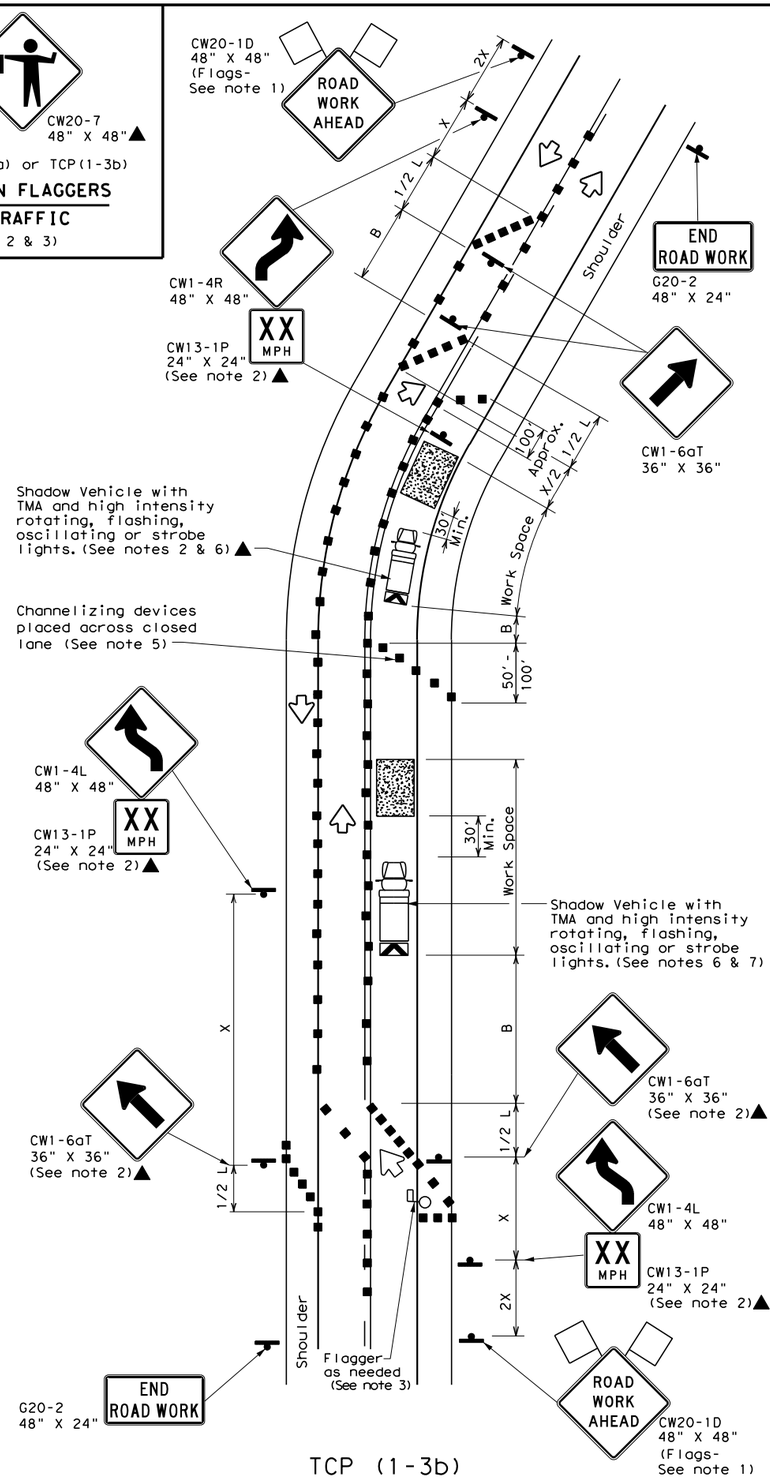


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW





TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	DAL	NAVARRO		35
1-97 2-18				

DATE:
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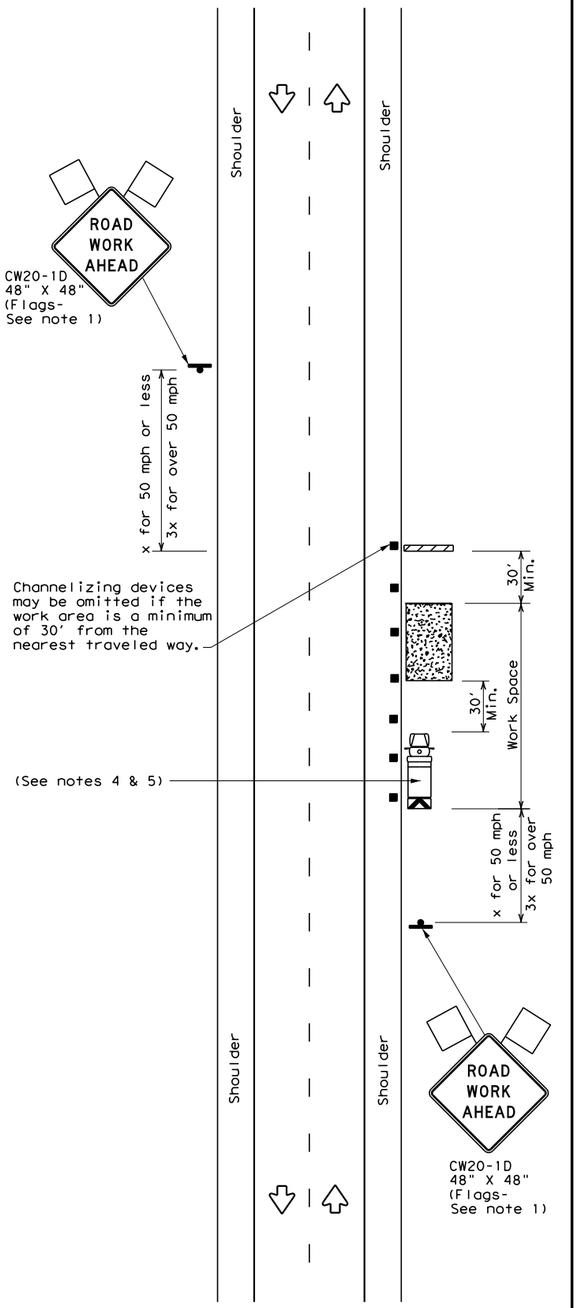
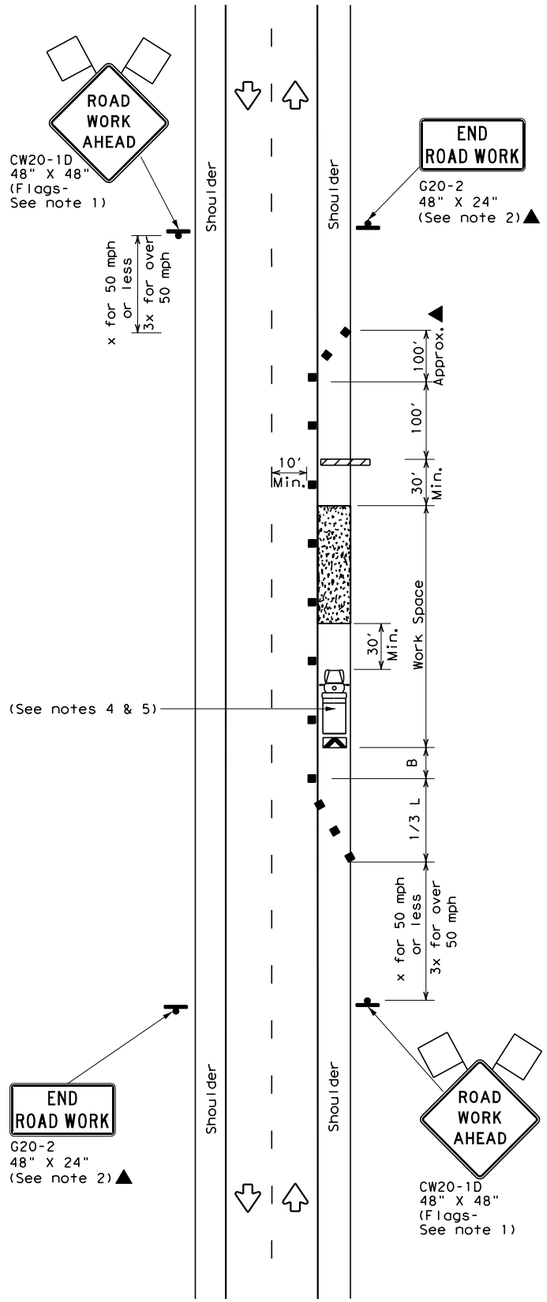


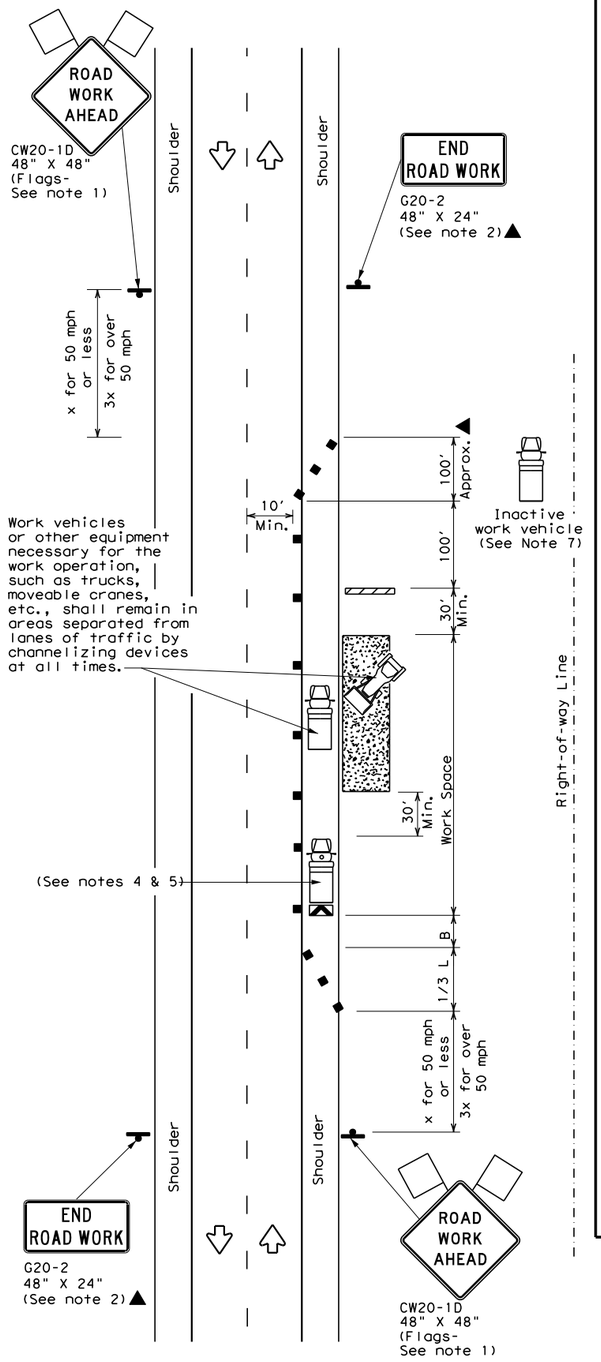
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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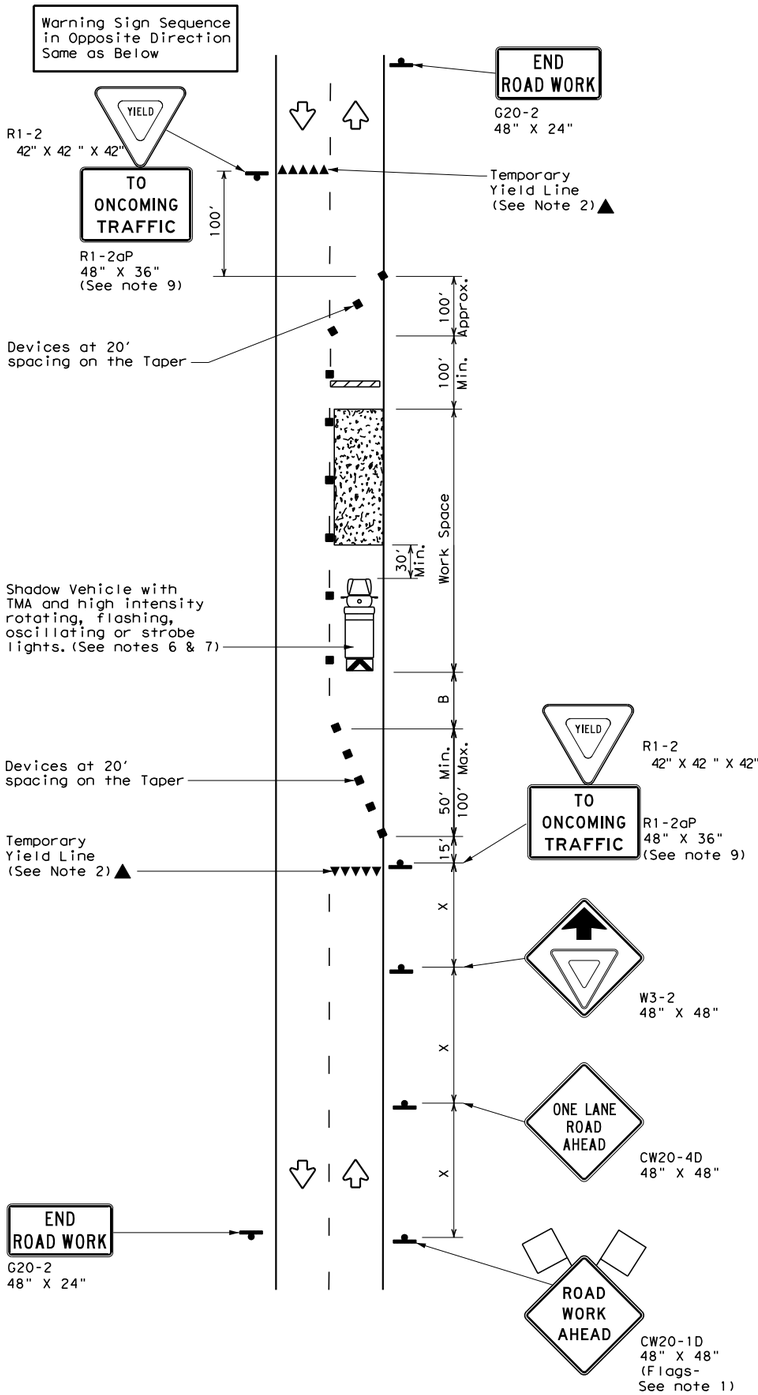
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	DAL	NAVARRO		36
1-97 2-18				

DATE:
FILE:



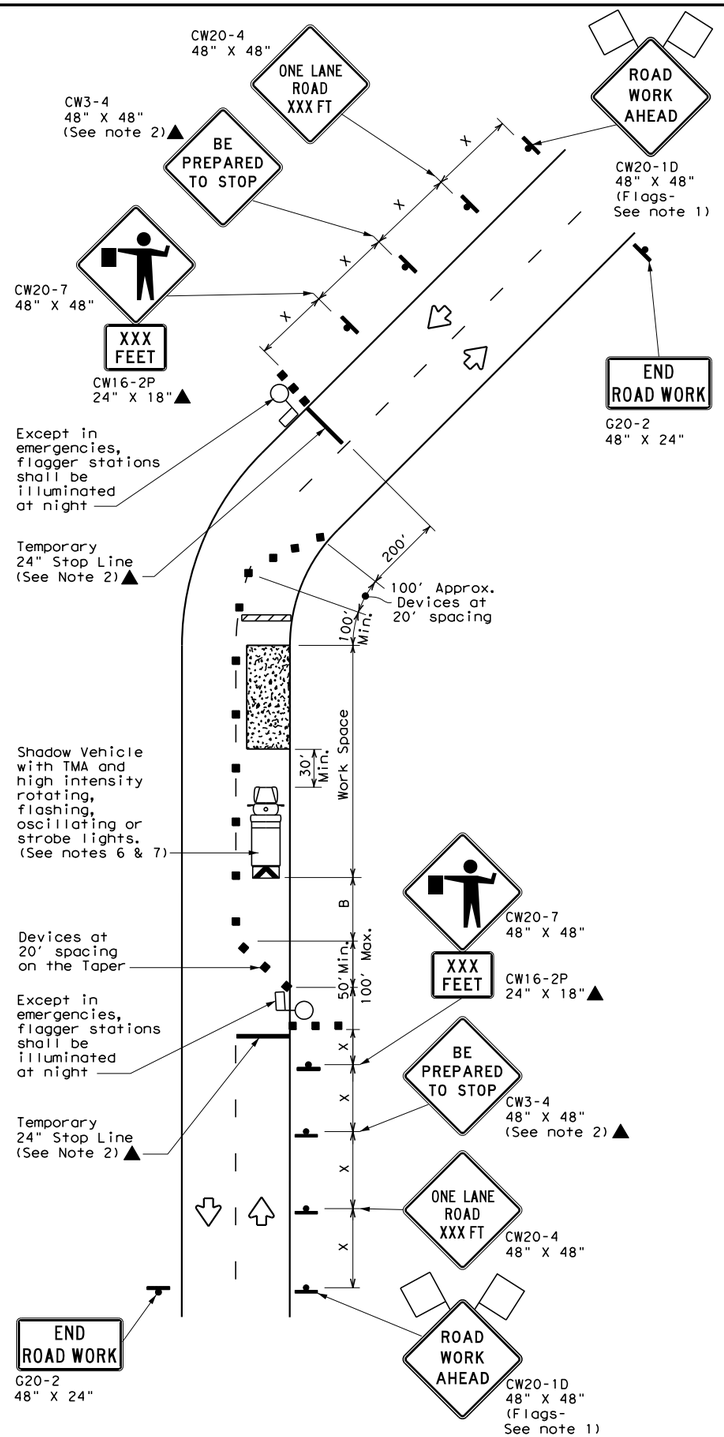
TCP (2-2a)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See Note 9)



TCP (2-2b)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH FLAGGERS

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

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

* Conventional Roads Only

** Taper lengths have been rounded off.

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1451	03	017	FM 55
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	DAL	NAVARRO		37

DATE:
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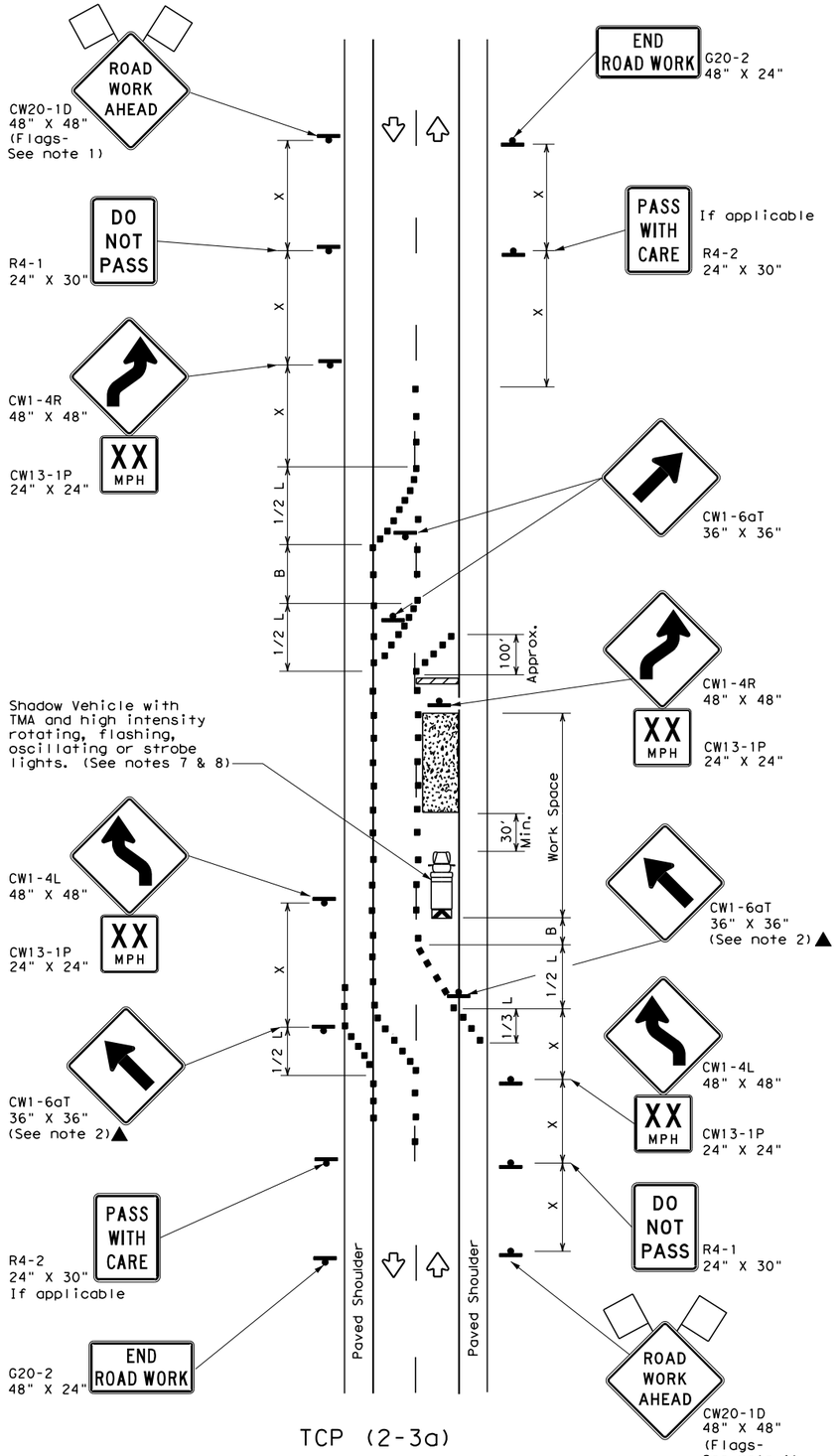
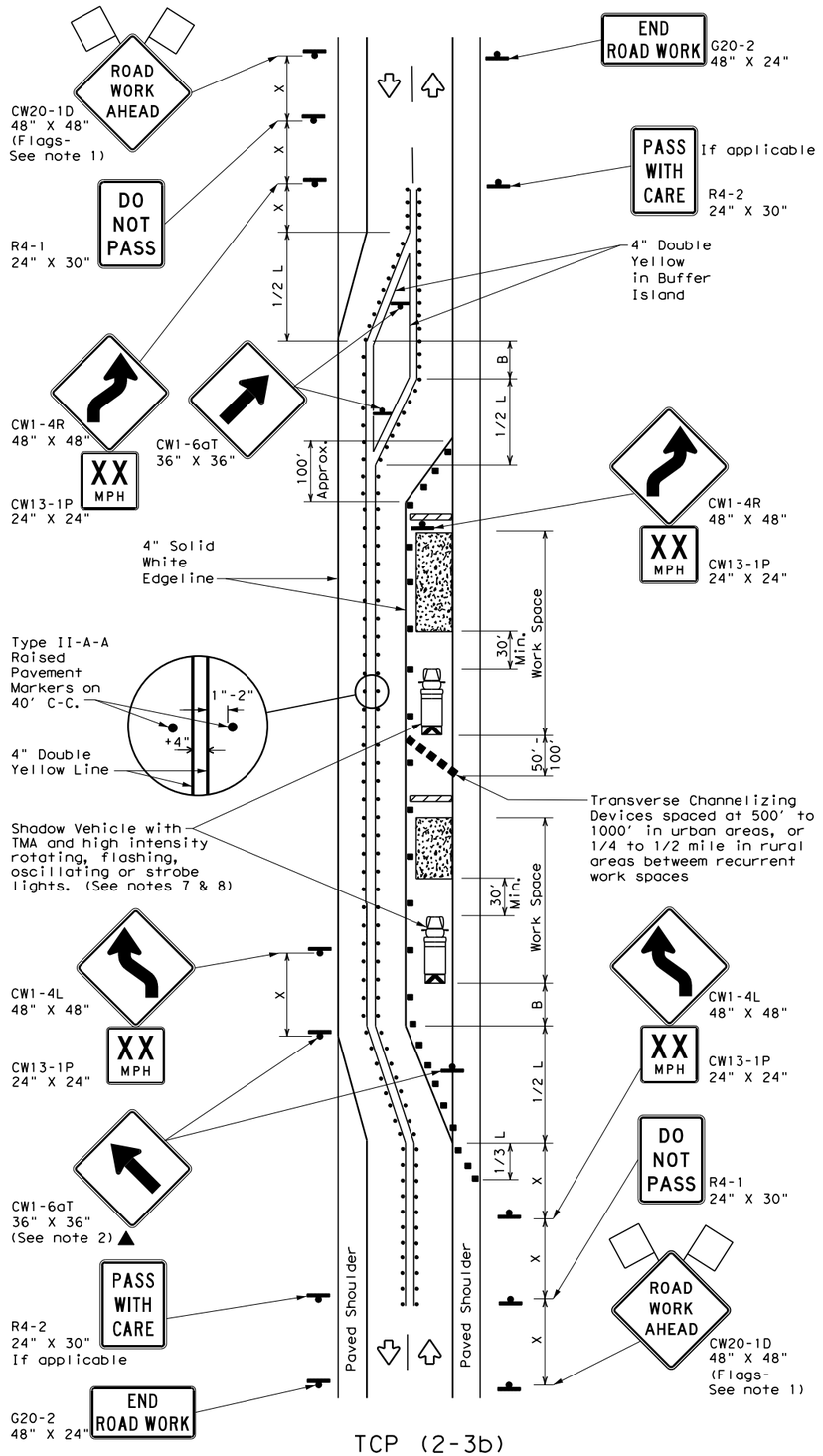


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 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
				TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
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1-97 2-12	DAL	NAVARRO		38
4-98 2-18				

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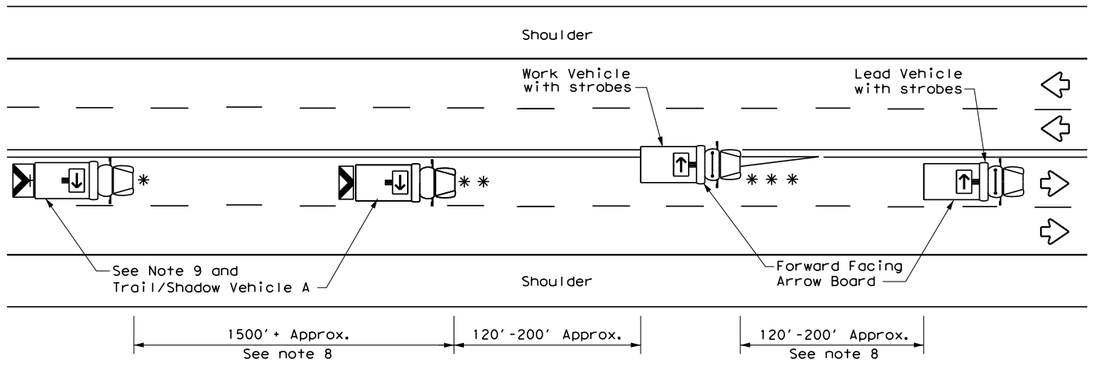
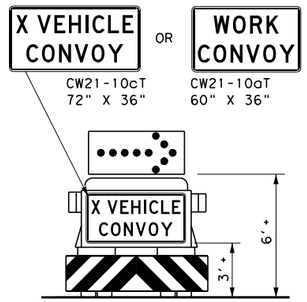


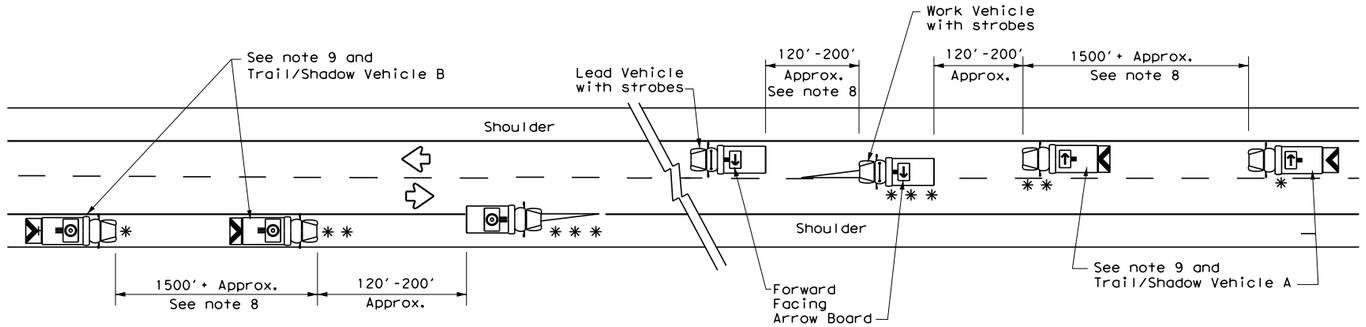
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

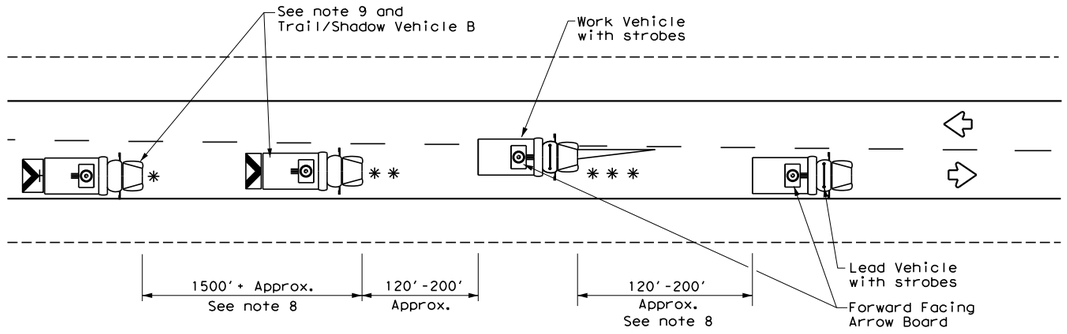


WORK ON SHOULDER

WORK ON TRAVEL LANE

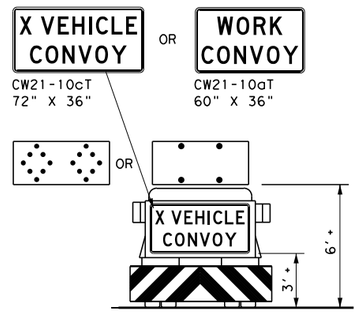
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

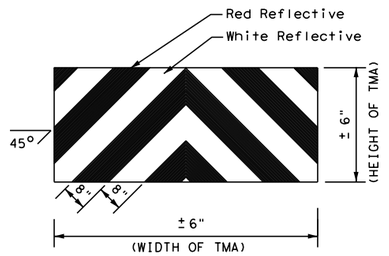
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
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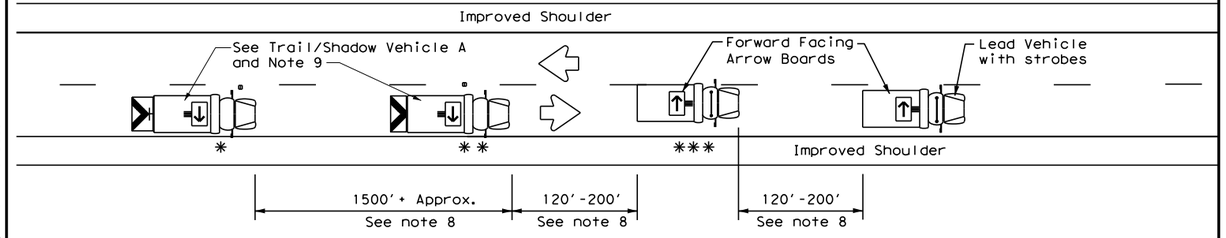
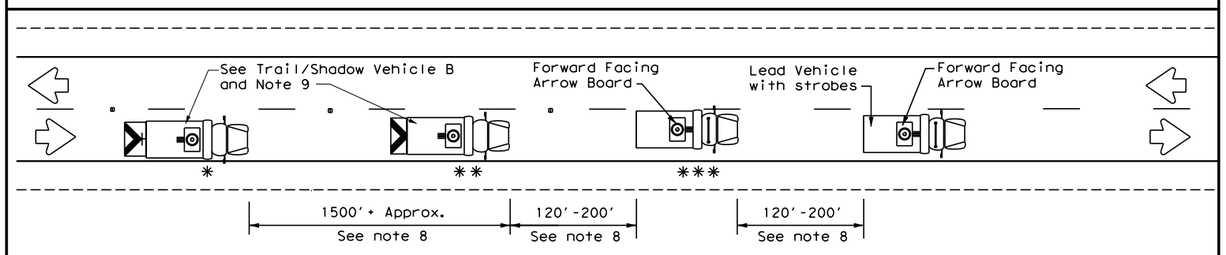
8-95 7-13	DAL	NAVARRO		39
1-97				



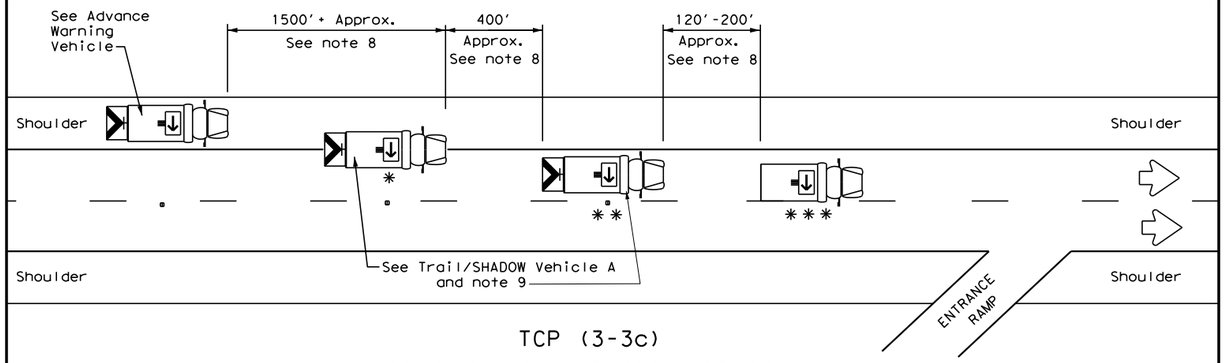
TCP (3-3a)

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



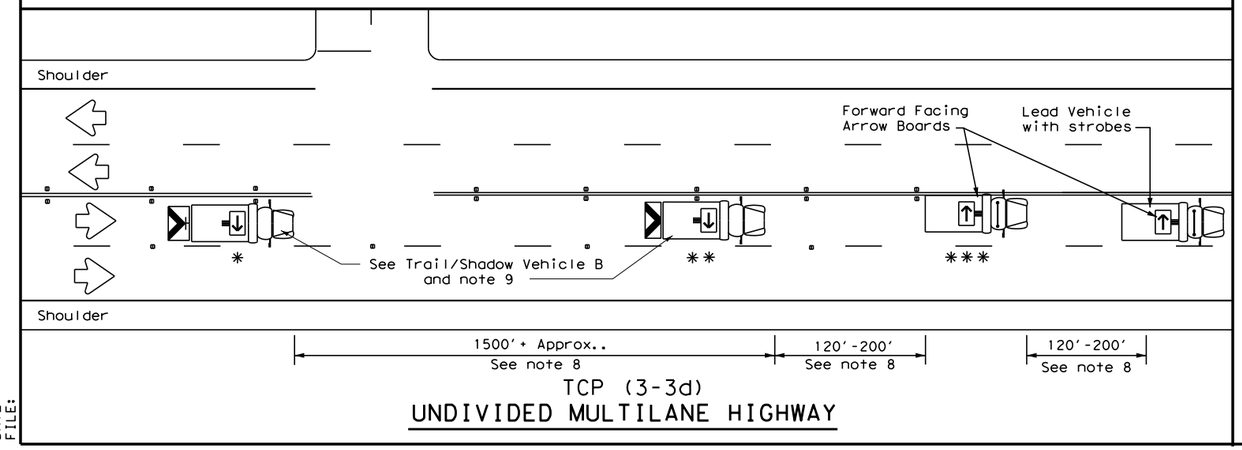
TCP (3-3b)

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



TCP (3-3c)

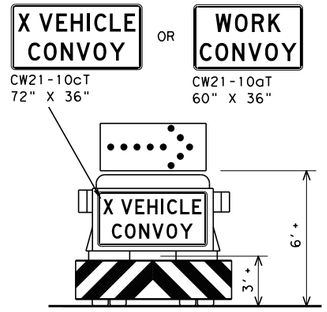
DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

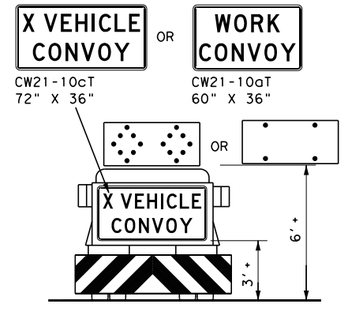
UNDIVIDED MULTILANE HIGHWAY

DATE:
FILE:



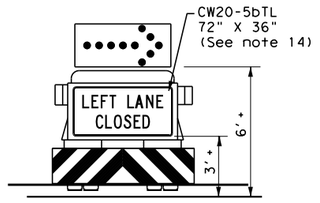
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

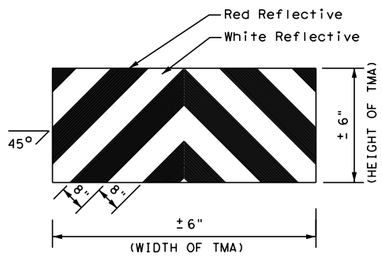


TRAIL/SHADOW VEHICLE B

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	1451	03	017	FM 55
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	DAL	NAVARRO		40
1-97 7-14				

177

DATE:
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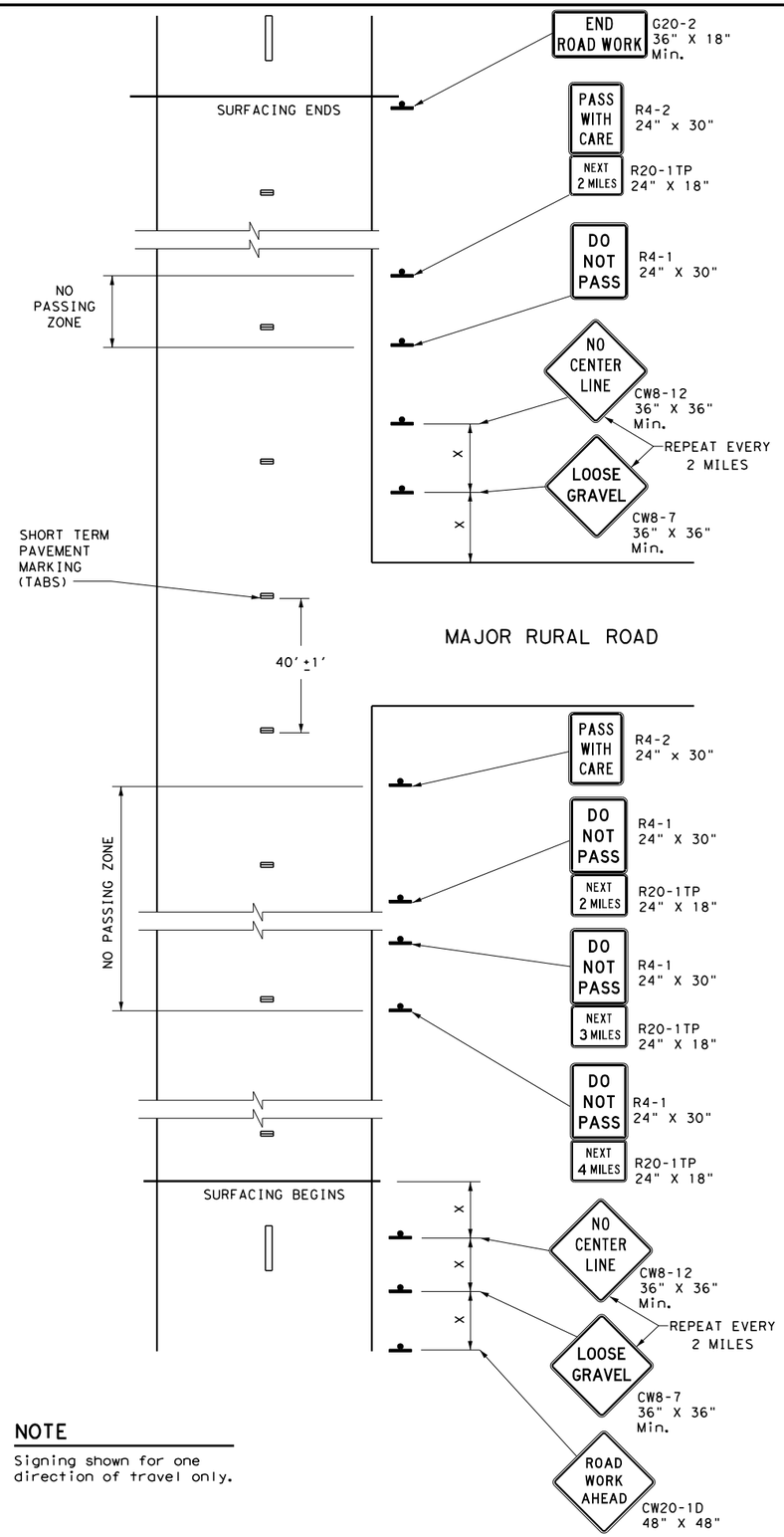
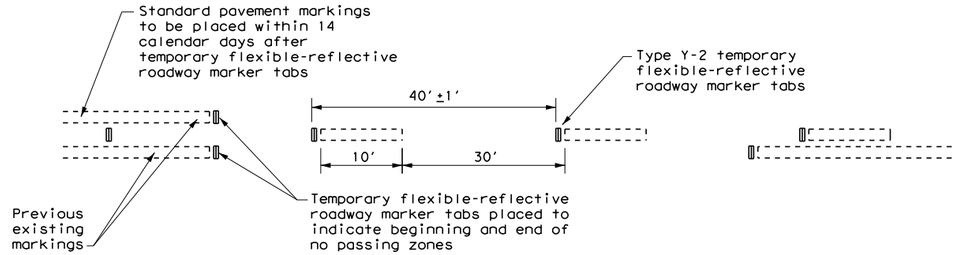


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

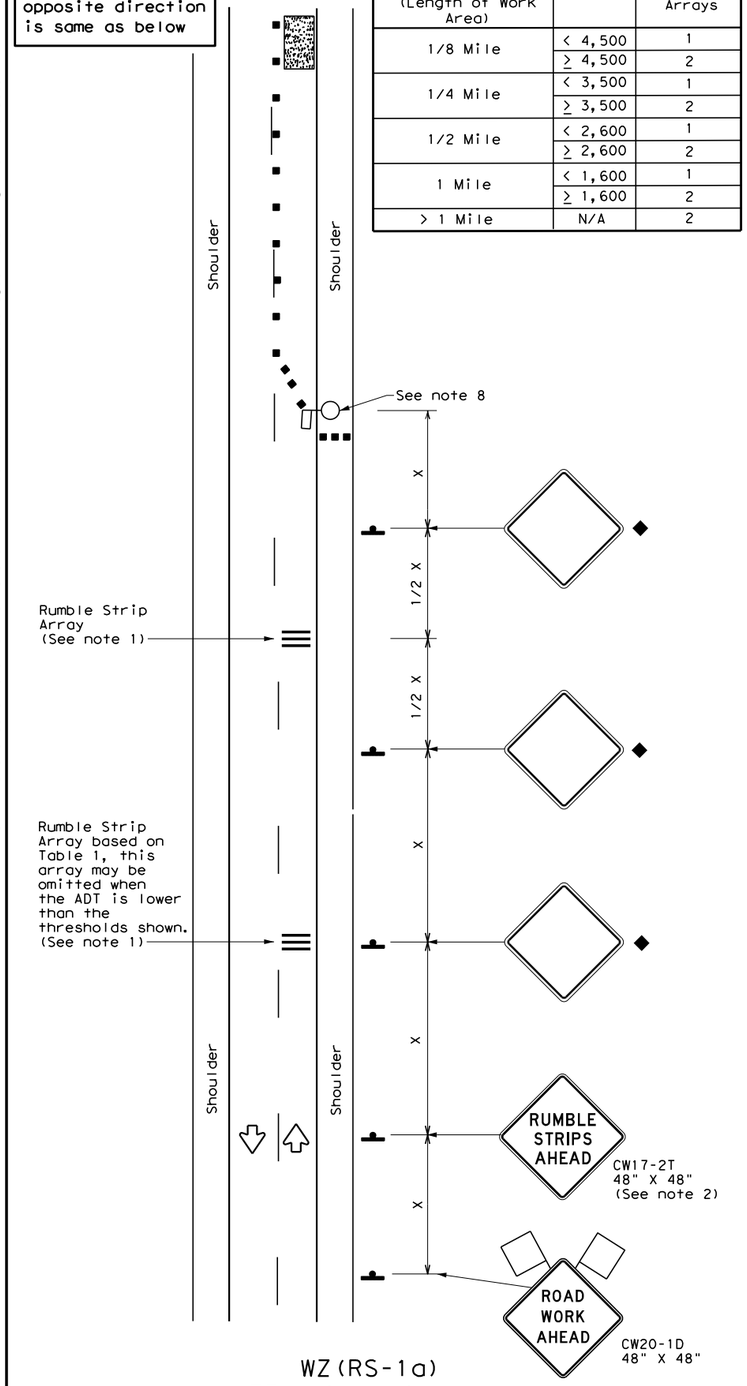
FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	DAL	NAVARRO		41

210

DATE:
FILE:

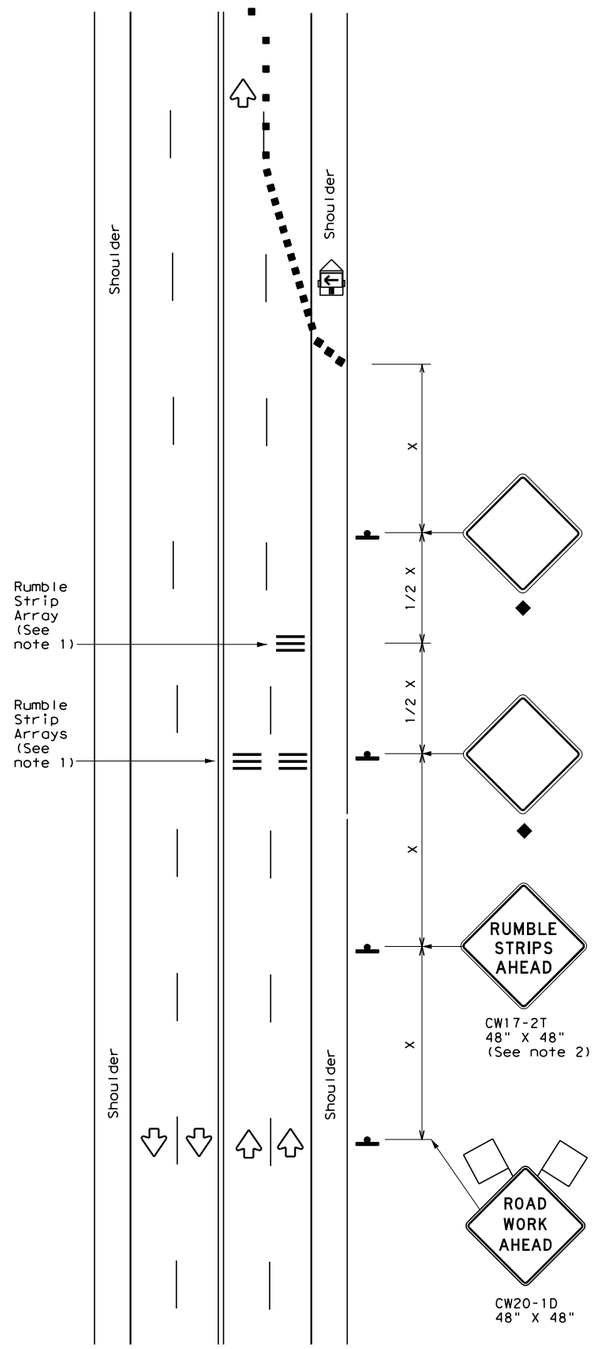
Warning sign and rumble strip sequence in opposite direction is same as below

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
REVISIONS	1451	03	017	FM 55
2-14	DIST	COUNTY		SHEET NO.
4-16	DAL	NAVARRO		42

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DATE:
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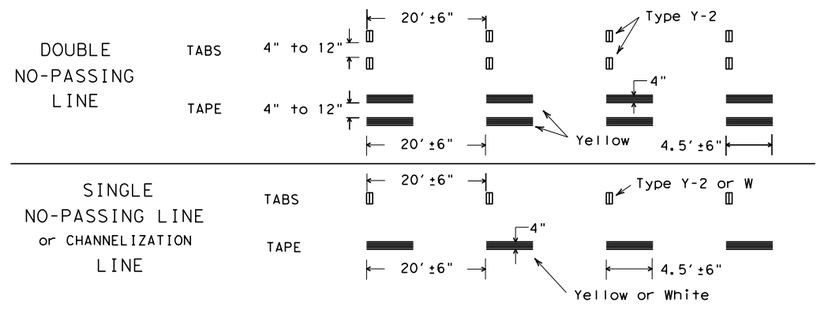
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



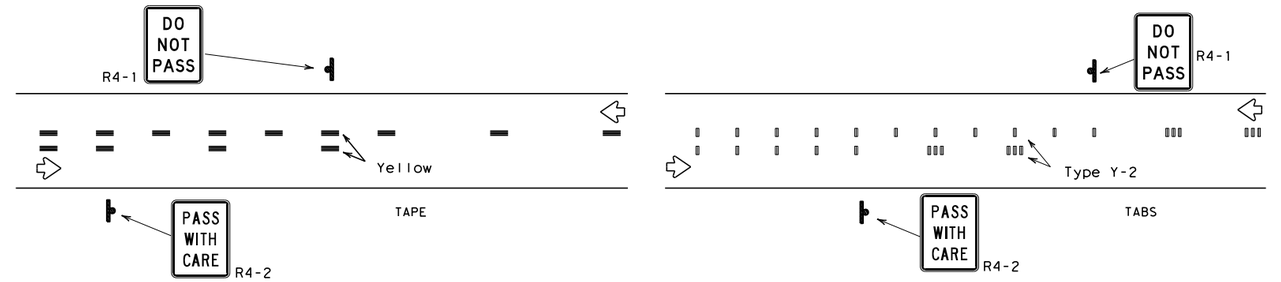
NOTES:

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.

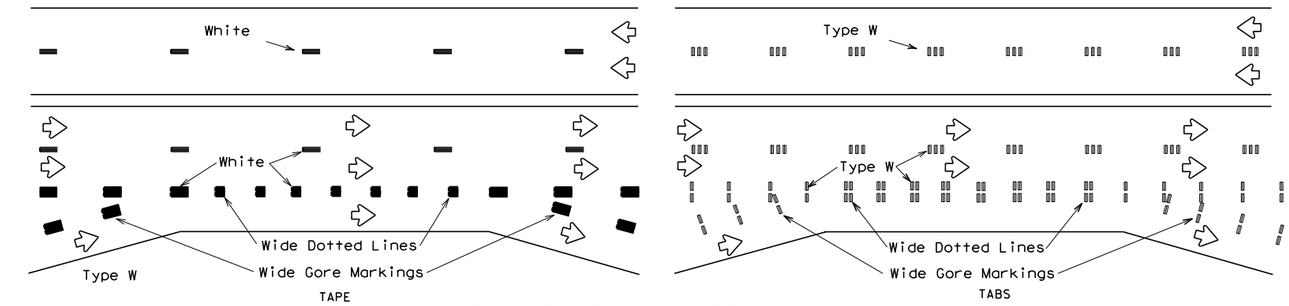
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

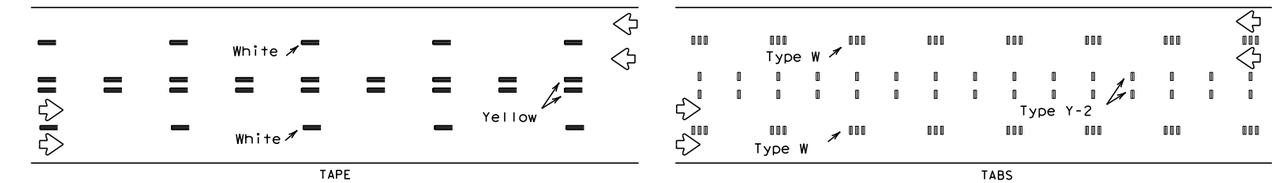
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



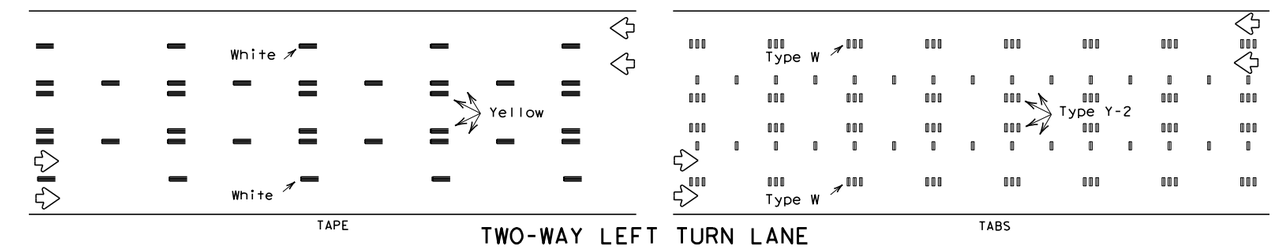
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



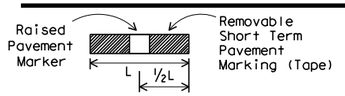
LANE LINES FOR DIVIDED HIGHWAY



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

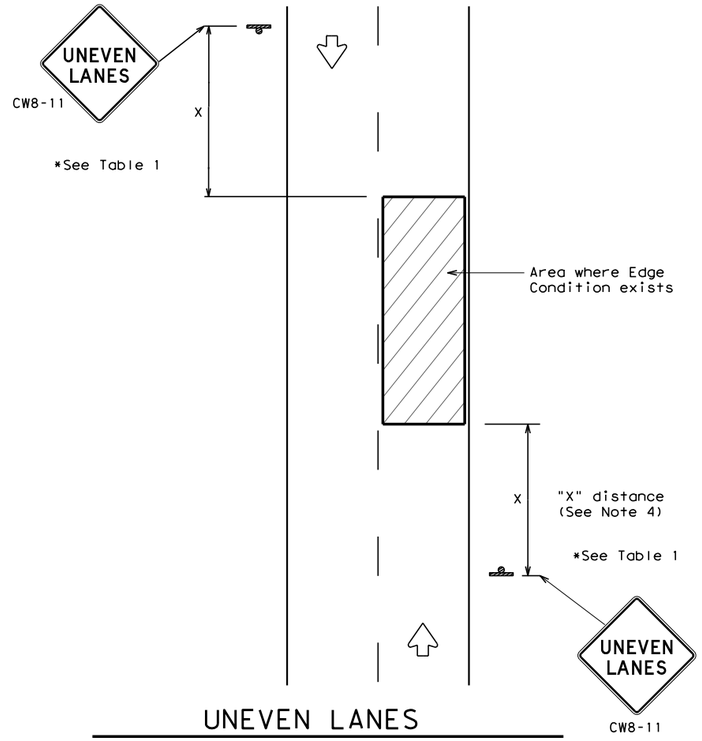
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

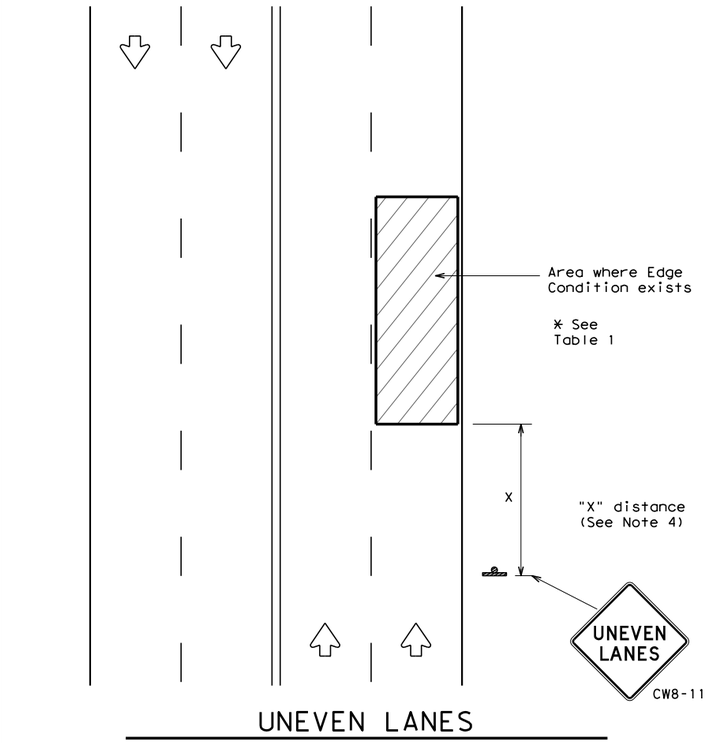
FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		1451	03	017	FM 55
1-97		DIST	COUNTY		SHEET NO.
3-03		DAL	NAVARRO		43
7-13					

111

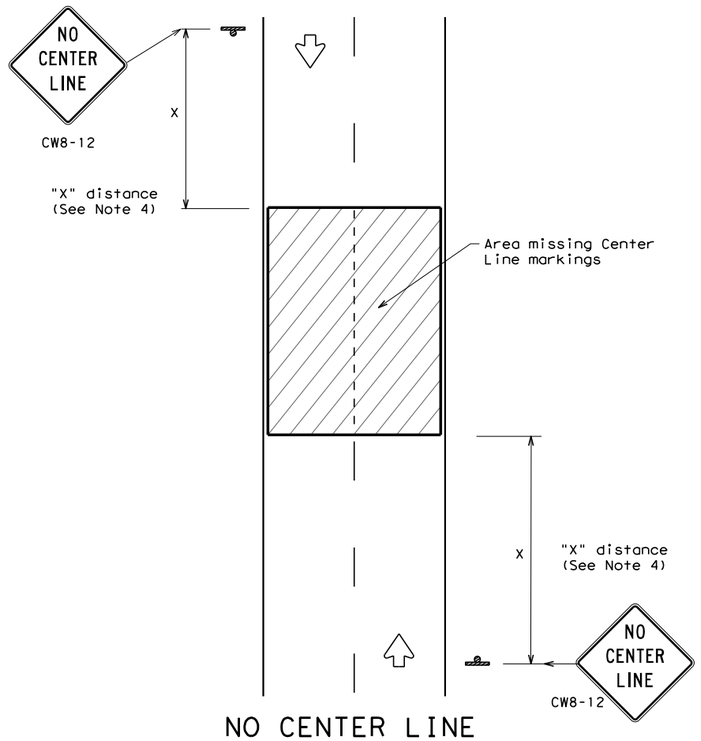
DATE:
FILE:



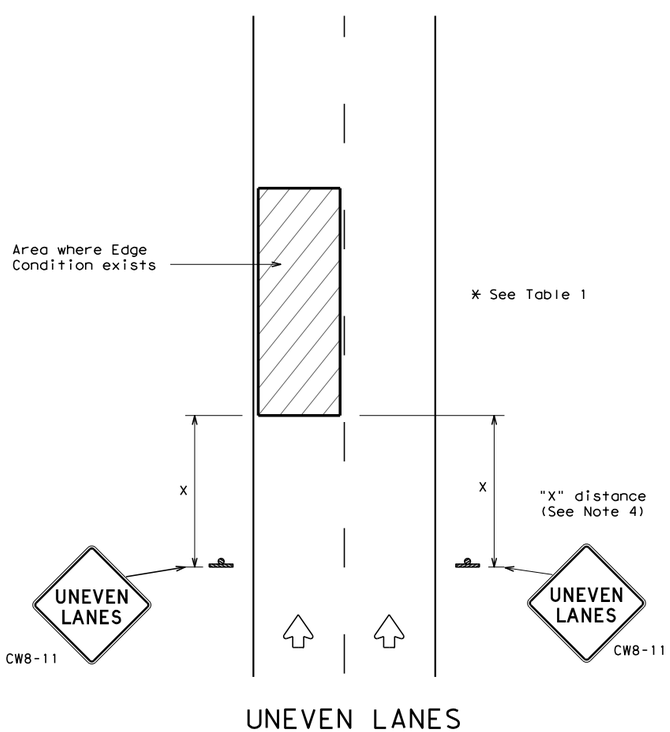
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

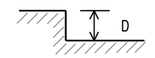
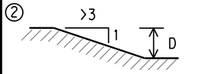
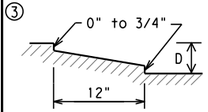
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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	1451	03	017	FM 55
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	DAL	NAVARRO		44

FM 55 HORIZONTAL ALIGNMENT DATA

	STATION	NORTHING	EASTING
Element: Linear			
POB	0+00.0000 R1	6721572.036	2519265.723
PC	7+67.0224 R1	6722119.628	2518728.632
Tangential Direction:	N 44°26'43.25" W		
Tangential Length:	767.0224		
Element: Circular			
PC	7+67.0224 R1	6722119.628	2518728.632
PI	9+64.9869 R1	6722260.958	2518590.011
CC		6723289.009	2519920.876
PT	11+61.1124 R1	6722430.781	2518488.275
Radius:	1670		
Delta:	13°31'14.79" Right		
Degree of Curvature(Arc):	3°25'51.19"		
Length:	394.09		
Tangent:	197.9645		
Chord:	393.1762		
Middle Ordinate:	11.6113		
External:	11.6926		
Tangent Direction:	N 44°26'43.25" W		
Radial Direction:	N 45°33'16.75" E		
Chord Direction:	N 37°41'05.86" W		
Radial Direction:	N 59°04'31.54" E		
Tangent Direction:	N 30°55'28.46" W		
Element: Linear			
PT	11+61.1124 R1	6722430.781	2518488.275
PI	15+73.3251 R1	6722784.395	2518276.435
Tangential Direction:	N 30°55'28.46" W		
Tangential Length:	412.2127		
Element: Linear			
PI	15+73.3251 R1	6722784.395	2518276.435
PC	17+45.0971 R1	6722930.309	2518185.8
Tangential Direction:	N 31°50'48.54" W		
Tangential Length:	171.772		
Element: Circular			
PC	17+45.0971 R1	6722930.309	2518185.8
PI	19+85.0233 R1	6723134.117	2518059.203
CC		6722571.507	2517608.166
PT	22+06.4039 R1	6723213.354	2517832.738
Radius:	680		
Delta:	38°52'08.48" Left		
Degree of Curvature(Arc):	8°25'33.06"		
Length:	461.3069		
Tangent:	239.9263		
Chord:	452.5117		
Middle Ordinate:	38.7448		
External:	41.0857		
Tangent Direction:	N 31°50'48.54" W		
Radial Direction:	N 58°09'11.46" E		
Chord Direction:	N 51°16'52.78" W		
Radial Direction:	N 19°17'02.97" E		
Tangent Direction:	N 70°42'57.03" W		
Element: Linear			
PT	22+06.4039 R1	6723213.354	2517832.738
PC	25+45.2773 R1	6723325.268	2517512.878
Tangential Direction:	N 70°42'57.03" W		
Tangential Length:	338.8734		
Element: Circular			
PC	25+45.2773 R1	6723325.268	2517512.878
PI	28+04.3933 R1	6723410.842	2517268.301
CC		6723948.237	2517730.846
PT	30+39.1036 R1	6723639.954	2517147.269
Radius:	660		
Delta:	42°52'11.79" Right		
Degree of Curvature(Arc):	8°40'52.24"		
Length:	493.8263		
Tangent:	259.116		
Chord:	482.3874		
Middle Ordinate:	45.6503		
External:	49.0424		
Tangent Direction:	N 70°42'57.03" W		
Radial Direction:	N 19°17'02.97" E		
Chord Direction:	N 49°16'51.13" W		
Radial Direction:	N 62°09'14.76" E		
Tangent Direction:	N 27°50'45.24" W		

	STATION	NORTHING	EASTING
Element: Linear			
POB	30+39.1036 R1	6723639.954	2517147.269
PC	40+48.4815 R1	6724532.453	2516675.793
Tangential Direction:	N 27°50'45.24" W		
Tangential Length:	1009.3778		
Element: Circular			
PC	40+48.4815 R1	6724532.453	2516675.793
PI	41+72.8754 R1	6724642.443	2516617.69
CC		6722991.039	2513757.91
PT	42+97.1517 R1	6724747.747	2516551.47
Radius:	3300		
Delta:	4°19'03.01" Left		
Degree of Curvature(Arc):	1°44'10.45"		
Length:	248.6703		
Tangent:	124.394		
Chord:	248.6114		
Middle Ordinate:	2.342		
External:	2.3437		
Tangent Direction:	N 27°50'45.24" W		
Radial Direction:	N 62°09'14.76" E		
Chord Direction:	N 30°00'16.74" W		
Radial Direction:	N 57°50'11.76" E		
Tangent Direction:	N 32°09'48.24" W		
Element: Linear			
PT	42+97.1517 R1	6724747.747	2516551.47
PI	56+36.2111 R1	6725881.305	2515838.641
Tangential Direction:	N 32°09'48.24" W		
Tangential Length:	1339.0593		
Element: Linear			
PI	56+36.2111 R1	6725881.305	2515838.641
PC	62+05.7171 R1	6726362.699	2515534.343
Tangential Direction:	N 32°17'52.08" W		
Tangential Length:	569.5061		
Element: Circular			
PC	62+05.7171 R1	6726362.699	2515534.343
PI	65+14.9643 R1	6726624.1	2515369.106
CC		6727965.658	2518070.19
PT	68+22.0347 R1	6726913.712	2515260.669
Radius:	3000		
Delta:	11°46'14.87" Right		
Degree of Curvature(Arc):	1°54'35.49"		
Length:	616.3175		
Tangent:	309.2472		
Chord:	615.2343		
Middle Ordinate:	15.8131		
External:	15.8969		
Tangent Direction:	N 32°17'52.08" W		
Radial Direction:	N 57°42'07.92" E		
Chord Direction:	N 26°24'44.64" W		
Radial Direction:	N 69°28'22.79" E		
Tangent Direction:	N 20°31'37.21" W		
Element: Linear			
PT	68+22.0347 R1	6726913.712	2515260.669
PC	79+20.2479 R1	6727942.197	2514875.582
Tangential Direction:	N 20°31'37.21" W		
Tangential Length:	1098.2133		
Element: Circular			
PC	79+20.2479 R1	6727942.197	2514875.582
PI	81+86.1737 R1	6728191.238	2514782.335
CC		6726890.25	2512066.06
PT	84+50.7130 R1	6728419.994	2514646.736
Radius:	3000		
Delta:	10°07'52.09" Left		
Degree of Curvature(Arc):	1°54'35.49"		
Length:	530.4651		
Tangent:	265.9258		
Chord:	529.7743		
Middle Ordinate:	11.7171		
External:	11.763		
Tangent Direction:	N 20°31'37.21" W		
Radial Direction:	N 69°28'22.79" E		
Chord Direction:	N 25°35'33.25" W		
Radial Direction:	N 59°20'30.70" E		
Tangent Direction:	N 30°39'29.30" W		

NOTE:

ALIGNMENT DATA PROVIDED FOR CONTRACTOR'S INFORMATION ONLY. CONSTRUCT ACCORDING TO EXISTING ROADWAY ALIGNMENT AND VERTICAL OFFSET AS NOTED IN TYPICAL SECTIONS AND PLAN SHEETS.

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
ALIGNMENT
DATA SHEETS

SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MDC	6	SEE TITLE SHEET		FM 55
GRAPHICS MDC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	45
CHECK JP	CONTROL	SECTION	JOB	
	1451	03	017	

FM 55 HORIZONTAL ALIGNMENT DATA

	STATION	NORTHING	EASTING
Element: Linear			
POB	84+50.7130 R1	6728419.994	2514646.736
PC	92+90.5926 R1	6729142.479	2514218.469
Tangential Direction:	N 30°39'29.30" W		
Tangential Length:	839.8796		
Element: Circular			
PC	92+90.5926 R1	6729142.479	2514218.469
PI	107+01.3679 R1	6730357.528	2513501.57
CC	N 30°32'28.63" W		
PT	1410.7753		
Radius:			
Delta:			
Degree of Curvature(Arc):	107+01.3679 R1	6730357.528	2513501.57
Length:	115+59.4973 R1	6731093.687	2513060.599
Tangent:	N 30°55'20.25" W		
Chord:	858.1294		
Middle Ordinate:			
External:			
Tangent Direction:	115+59.4973 R1	6731093.687	2513060.599
Radial Direction:	117+96.8045 R1	6731297.265	2512938.653
Chord Direction:		6731407.151	2513583.897
Radial Direction:	120+12.1323 R1	6731529.731	2512986.34
Tangent Direction:	610		
	42°30'53.54" Right		
Element: Linear	9°23'33.90"		
PT	452.6349		
PI	237.3072		
Tangential Direction:	442.322		
Tangential Length:	41.5039		
	44.534		
Element: Linear	N 30°55'20.25" W		
PI	N 59°04'39.75" E		
PC	N 9°39'53.48" W		
Tangential Direction:	S 78°24'26.71" E		
Tangential Length:	N 11°35'33.29" E		
Element: Circular			
PC	120+12.1323 R1	6731529.731	2512986.34
PI	128+99.7200 R1	6732399.213	2513164.702
CC	N 11°35'33.29" E		
PT	887.5877		
Radius:			
Delta:			
Degree of Curvature(Arc):	128+99.7200 R1	6732399.213	2513164.702
Length:	131+35.7764 R1	6732630.455	2513212.138
Tangent:		6732519.784	2512576.941
Chord:	133+49.5129 R1	6732832.028	2513089.292
Middle Ordinate:	600		
External:	42°57'07.42" Left		
Tangent Direction:	9°32'57.47"		
Radial Direction:	449.7929		
Chord Direction:	236.0564		
Radial Direction:	439.3343		
Tangent Direction:	41.6575		
	44.7655		
Element: Linear	N 11°35'33.29" E		
PT	S 78°24'26.71" E		
PC	N 9°53'00.42" W		
Tangential Direction:	N 58°38'25.87" E		
Tangential Length:	N 31°21'34.13" W		
Element: Circular			
PC	133+49.5129 R1	6732832.028	2513089.292
PI	137+42.3951 R1	6733167.517	2512884.834
CC	N 31°21'34.13" W		
PT	392.8822		
Radius:			
Delta:			
Degree of Curvature(Arc):	137+42.3951 R1	6733167.517	2512884.834
Length:	159+72.4399 R1	6735076.603	2511732.232
Tangent:	N 31°07'16.69" W		
Chord:	2230.0448		
Middle Ordinate:			
External:			
Tangent Direction:			
Radial Direction:			
Chord Direction:			
Radial Direction:			
Tangent Direction:			

Element: Linear			
POB	159+72.4399 R1	6735076.603	2511732.232
PC	165+52.0888 R1	6735572.826	2511432.639
Tangential Direction:		6735378.961	2512233.036
Tangential Length:	168+85.9801 R1	6735876.965	2511926.088
	585		
Element: Circular	89°28'24.61" Right		
PC	9°47'38.94"		
PI	913.5402		
CC	579.6489		
PT	823.5051		
Radius:	169.4463		
Delta:	238.5398		
Degree of Curvature(Arc):	N 31°07'16.69" W		
Length:	N 58°52'43.31" E		
Tangent:	N 13°36'55.62" E		
Chord:	S 31°38'52.08" E		
Middle Ordinate:	N 58°21'07.92" E		
External:			
Tangent Direction:			
Radial Direction:	168+85.9801 R1	6735876.965	2511926.088
Chord Direction:	174+20.5997 R1	6736157.478	2512381.205
Radial Direction:	N 58°21'07.92" E		
Tangent Direction:	534.6196		
Element: Linear			
PT	174+20.5997 R1	6736157.478	2512381.205
PI	179+83.3250 R1	6736452.738	2512860.247
Tangential Direction:		6736646.97	2512079.504
Tangential Length:	183+11.4010 R1	6736938.039	2512575.391
	575		
Element: Linear	88°45'49.49" Left		
PI	9°57'52.14"		
PC	890.8013		
Tangential Direction:	562.7253		
Tangential Length:	804.3529		
	164.0509		
Element: Circular	229.5401		
PC	N 58°21'07.92" E		
PI	S 31°38'52.08" E		
CC	N 13°58'13.18" E		
PT	N 59°35'18.43" E		
Radius:	N 30°24'41.57" W		
Delta:			
Degree of Curvature(Arc):			
Length:	183+11.4010 R1	6736938.039	2512575.391
Tangent:	189+11.6085 R1	6737455.665	2512271.561
Chord:	N 30°24'41.57" W		
Middle Ordinate:	600.2075		
External:			
Tangent Direction:			
Radial Direction:	189+11.6085 R1	6737455.665	2512271.561
Chord Direction:	204+24.8001 R1	6738762.384	2511508.518
Radial Direction:	N 30°16'56.21" W		
Tangent Direction:	1513.1916		
Element: Linear			
PT	204+24.8001 R1	6738762.384	2511508.518
PC	215+86.1113 R1	6739765.88	2510924.019
Tangential Direction:	N 30°13'09.23" W		
Tangential Length:	1161.3112		
Element: Circular			
PC	215+86.1113 R1	6739765.88	2510924.019
PI	217+42.1041 R1	6739900.674	2510845.506
CC		6742534.085	2515676.602
PT	218+98.0133 R1	6740039.702	2510774.76
Radius:	5500		
Delta:	3°14'57.16" Right		
Degree of Curvature(Arc):	1°02'30.27"		
Length:	311.902		
Tangent:	155.9928		
Chord:	311.8602		
Middle Ordinate:	2.2108		
External:	2.2117		
Tangent Direction:	N 30°13'09.23" W		
Radial Direction:	N 59°46'50.77" E		
Chord Direction:	N 28°35'40.65" W		
Radial Direction:	N 63°01'47.94" E		
Tangent Direction:	N 26°58'12.06" W		
	218+98.0133 R1	6740039.702	2510774.76
	233+59.7526 R1	6741342.468	2510111.826
	N 26°58'12.06" W		
	1461.7393		

NOTE:

ALIGNMENT DATA PROVIDED FOR CONTRACTOR'S INFORMATION ONLY. CONSTRUCT ACCORDING TO EXISTING ROADWAY ALIGNMENT AND VERTICAL OFFSET AS NOTED IN TYPICAL SECTIONS AND PLAN SHEETS.

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
ALIGNMENT
DATA SHEETS

SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MDC	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MDC	TEXAS	DAL	NAVARRO	46
CHECK	CONTROL	SECTION	JOB	
MJK	1451	03	017	
CHECK				
JP				

FM 55 VERTICAL ALIGNMENT DATA

		STATION	ELEVATION
Element: Linear			
	POB	0+00.0000 R1	600
	PVI	0+50.0000 R1	600.6556
	Tangent Grade:	1.31%	
	Tangent Length:	50	
Element: Linear			
	PVI	0+50.0000 R1	600.6556
	PVC	4+02.4700 R1	598.9417
	Tangent Grade:	-0.49%	
	Tangent Length:	352.47	
Element: Symmetrical Parabola			
	PVC	4+02.4700 R1	598.9417
	PVI	4+62.4700 R1	598.65
	PVT	5+22.4700 R1	599.0779
	VLOW	4+51.1206 R1	598.8235
	Length:	120	
	Entrance Grade:	-0.49%	
	Exit Grade:	0.71%	
	r= (g2 - g1) / L:	0.9995	
	k= 1 / (g2 - g1):	100.0544	
	Middle Ordinate:	0.1799	
Element: Linear			
	PVT	5+22.4700 R1	599.0779
	PVI	9+53.1400 R1	602.149
	Tangent Grade:	0.71%	
	Tangent Length:	430.67	
Element: Linear			
	PVI	9+53.1400 R1	602.149
	PVI	17+61.9600 R1	613.9446
	Tangent Grade:	1.46%	
	Tangent Length:	808.82	
Element: Linear			
	PVI	17+61.9600 R1	613.9446
	PVC	40+60.3638 R1	626.4263
	Tangent Grade:	0.54%	
	Tangent Length:	2298.4038	
Element: Symmetrical Parabola			
	PVC	40+60.3638 R1	626.4263
	PVI	42+98.0100 R1	627.7169
	PVT	45+35.6563 R1	615.5609
	VHIGH	41+05.9809 R1	626.5502
	Length:	475.2925	
	Entrance Grade:	0.54%	
	Exit Grade:	-5.12%	
	r= (g2 - g1) / L:	-1.1905	
	k= 1 / (g2 - g1):	84	
	Middle Ordinate:	-3.3616	
Element: Linear			
	PVT	45+35.6563 R1	615.5609
	PVC	47+34.6144 R1	605.3838
	Tangent Grade:	-5.12%	
	Tangent Length:	198.9581	
Element: Symmetrical Parabola			
	PVC	47+34.6144 R1	605.3838
	PVI	49+16.5200 R1	596.079
	PVT	50+98.4257 R1	600.2802
	VLOW	49+85.2580 R1	598.9734
	Length:	363.8113	
	Entrance Grade:	-5.12%	
	Exit Grade:	2.31%	
	r= (g2 - g1) / L:	2.0408	
	k= 1 / (g2 - g1):	49	
	Middle Ordinate:	3.3765	
Element: Linear			
	PVT	50+98.4257 R1	600.2802
	PVC	53+95.9068 R1	607.1507
	Tangent Grade:	2.31%	
	Tangent Length:	297.4811	
Element: Symmetrical Parabola			
	PVC	53+95.9068 R1	607.1507
	PVI	56+79.5400 R1	613.7013
	PVT	59+63.1733 R1	601.0977
	VHIGH	55+89.9084 R1	609.3909
	Length:	567.2665	
	Entrance Grade:	2.31%	
	Exit Grade:	-4.44%	
	r= (g2 - g1) / L:	-1.1905	
	k= 1 / (g2 - g1):	83.9999	
	Middle Ordinate:	-4.7886	

Element: Linear		STATION	ELEVATION
	PVT	59+63.1733 R1	601.0977
	PVI	67+31.1500 R1	566.9716
	Tangent Grade:	-4.44%	
	Tangent Length:	767.9768	
Element: Linear			
	PVI	67+31.1500 R1	566.9716
	PVC	75+07.9140 R1	537.401
	Tangent Grade:	-3.81%	
	Tangent Length:	776.764	
Element: Symmetrical Parabola			
	PVC	75+07.9140 R1	537.401
	PVI	77+50.8800 R1	528.1515
	PVT	79+93.8460 R1	537.3497
	VLOW	77+51.5551 R1	532.7634
	Length:	485.932	
	Entrance Grade:	-3.81%	
	Exit Grade:	3.79%	
	r= (g2 - g1) / L:	1.5625	
	k= 1 / (g2 - g1):	63.9999	
	Middle Ordinate:	4.6119	
Element: Linear			
	PVT	79+93.8460 R1	537.3497
	PVI	82+34.1700 R1	546.4479
	Tangent Grade:	3.79%	
	Tangent Length:	240.324	
Element: Linear	PVI	82+34.1700 R1	546.4479
	PVC	86+57.5894 R1	562.2085
	Tangent Grade:	3.72%	
	Tangent Length:	423.4194	
Element: Symmetrical Parabola	PVC	86+57.5894 R1	562.2085
	PVI	89+06.3800 R1	571.4691
	PVT	91+55.1707 R1	565.9924
	VHIGH	89+70.2576 R1	568.0277
	Length:	497.5813	
	Entrance Grade:	3.72%	
	Exit Grade:	-2.20%	
	r= (g2 - g1) / L:	-1.1905	
	k= 1 / (g2 - g1):	84.0003	
	Middle Ordinate:	-3.6843	
Element: Linear	PVT	91+55.1707 R1	565.9924
	PVC	92+36.8945 R1	564.1934
	Tangent Grade:	-2.20%	
	Tangent Length:	81.7238	
Element: Symmetrical Parabola	PVC	92+36.8945 R1	564.1934
	PVI	95+35.5200 R1	557.6196
	PVT	98+34.1456 R1	560.8996
	VLOW	96+35.3386 R1	559.8078
	Length:	597.2511	
	Entrance Grade:	-2.20%	
	Exit Grade:	1.10%	
	r= (g2 - g1) / L:	0.5525	
	k= 1 / (g2 - g1):	181.0009	
	Middle Ordinate:	2.4634	
Element: Linear	PVT	98+34.1456 R1	560.8996
	PVC	100+39.0670 R1	563.1504
	Tangent Grade:	1.10%	
	Tangent Length:	204.9214	
Element: Symmetrical Parabola	PVC	100+39.0670 R1	563.1504
	PVI	102+30.4100 R1	565.2521
	PVT	104+21.7531 R1	562.5045
	VHIGH	102+04.9215 R1	564.0613
	Length:	382.6861	
	Entrance Grade:	1.10%	
	Exit Grade:	-1.44%	
	r= (g2 - g1) / L:	-0.6623	
	k= 1 / (g2 - g1):	150.9999	
	Middle Ordinate:	-1.2123	
Element: Linear			
	PVT	104+21.7531 R1	562.5045
	PVI	113+56.4000 R1	549.0832
	Tangent Grade:	-1.44%	
	Tangent Length:	934.647	

NOTE:

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STATE OF TEXAS
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Signature of Registrant & Date

Texas Department of Transportation
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FM 55
ALIGNMENT
DATA SHEETS

SHEET 3 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MDC	6	SEE TITLE SHEET		FM 55
GRAPHICS MDC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	47
CHECK JP	CONTROL 1451	SECTION 03	JOB 017	

FM 55 VERTICAL ALIGNMENT DATA

		STATION	ELEVATION
Element: Linear	PVI	113+56.4000 R1	549.0832
	PVC	124+64.0578 R1	524.6334
	Tangent Grade:	-2.21%	
	Tangent Length:	1107.6578	
Element: Symmetrical Parabola	PVC	124+64.0578 R1	524.6334
	PVI	126+42.7600 R1	520.6888
	PVT	128+21.4622 R1	526.7238
	VLOW	126+05.3275 R1	523.0742
	Length:	357.4044	
	Entrance Grade:	-2.21%	
	Exit Grade:	3.38%	
	r= (g2 - g1) / L:	1.5625	
	k= 1 / (g2 - g1):	63.9998	
	Middle Ordinate:	2.4949	
Element: Linear		STATION	ELEVATION
	PVT	50+98.4257 R1	600.2802
	PVC	53+95.9068 R1	607.1507
	Tangent Grade:	2.31%	
	Tangent Length:	297.4811	
Element: Symmetrical Parabola			
	PVC	53+95.9068 R1	607.1507
	PVI	56+79.5400 R1	613.7013
	PVT	59+63.1733 R1	601.0977
	VHIGH	55+89.9084 R1	609.3909
	Length:	567.2665	
	Entrance Grade:	2.31%	
	Exit Grade:	-4.44%	
	r= (g2 - g1) / L:	-1.1905	
	k= 1 / (g2 - g1):	83.9999	
	Middle Ordinate:	-4.7886	
Element: Linear			
	PVT	59+63.1733 R1	601.0977
	PVI	67+31.1500 R1	566.9716
	Tangent Grade:	-4.44%	
	Tangent Length:	767.9768	
Element: Linear			
	PVI	67+31.1500 R1	566.9716
	PVC	75+07.9140 R1	537.401
	Tangent Grade:	-3.81%	
	Tangent Length:	776.764	
Element: Symmetrical Parabola			
	PVC	75+07.9140 R1	537.401
	PVI	77+50.8800 R1	528.1515
	PVT	79+93.8460 R1	537.3497
	VLOW	77+51.5551 R1	532.7634
	Length:	485.932	
	Entrance Grade:	-3.81%	
	Exit Grade:	3.79%	
	r= (g2 - g1) / L:	1.5625	
	k= 1 / (g2 - g1):	63.9999	
	Middle Ordinate:	4.6119	
Element: Linear			
	PVT	79+93.8460 R1	537.3497
	PVI	82+34.1700 R1	546.4479
	Tangent Grade:	3.79%	
	Tangent Length:	240.324	
Element: Linear	PVI	82+34.1700 R1	546.4479
	PVC	86+57.5894 R1	562.2085
	Tangent Grade:	3.72%	
	Tangent Length:	423.4194	

		STATION	ELEVATION
Element: Symmetrical Parabola	PVC	86+57.5894 R1	562.2085
	PVI	89+06.3800 R1	571.4691
	PVT	91+55.1707 R1	565.9924
	VHIGH	89+70.2576 R1	568.0277
	Length:	497.5813	
	Entrance Grade:	3.72%	
	Exit Grade:	-2.20%	
	r= (g2 - g1) / L:	-1.1905	
	k= 1 / (g2 - g1):	84.0003	
	Middle Ordinate:	-3.6843	
Element: Linear	PVT	91+55.1707 R1	565.9924
	PVC	92+36.8945 R1	564.1934
	Tangent Grade:	-2.20%	
	Tangent Length:	81.7238	
Element: Symmetrical Parabola	PVC	92+36.8945 R1	564.1934
	PVI	95+35.5200 R1	557.6196
	PVT	98+34.1456 R1	560.8996
	VLOW	96+35.3386 R1	559.8078
	Length:	597.2511	
	Entrance Grade:	-2.20%	
	Exit Grade:	1.10%	
	r= (g2 - g1) / L:	0.5525	
	k= 1 / (g2 - g1):	181.0009	
	Middle Ordinate:	2.4634	
Element: Linear	PVT	98+34.1456 R1	560.8996
	PVC	100+39.0670 R1	563.1504
	Tangent Grade:	1.10%	
	Tangent Length:	204.9214	
Element: Symmetrical Parabola	PVC	100+39.0670 R1	563.1504
	PVI	102+30.4100 R1	565.2521
	PVT	104+21.7531 R1	562.5045
	VHIGH	102+04.9215 R1	564.0613
	Length:	382.6861	
	Entrance Grade:	1.10%	
	Exit Grade:	-1.44%	
	r= (g2 - g1) / L:	-0.6623	
	k= 1 / (g2 - g1):	150.9999	
	Middle Ordinate:	-1.2123	
Element: Linear			
	PVT	104+21.7531 R1	562.5045
	PVI	113+56.4000 R1	549.0832
	Tangent Grade:	-1.44%	
	Tangent Length:	934.647	
Element: Linear	PVI	113+56.4000 R1	549.0832
	PVC	124+64.0578 R1	524.6334
	Tangent Grade:	-2.21%	
	Tangent Length:	1107.6578	
Element: Symmetrical Parabola	PVC	124+64.0578 R1	524.6334
	PVI	126+42.7600 R1	520.6888
	PVT	128+21.4622 R1	526.7238
	VLOW	126+05.3275 R1	523.0742
	Length:	357.4044	
	Entrance Grade:	-2.21%	
	Exit Grade:	3.38%	
	r= (g2 - g1) / L:	1.5625	
	k= 1 / (g2 - g1):	63.9998	
	Middle Ordinate:	2.4949	

NOTE:

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STATE OF TEXAS
MITCHELL L. RANDALL
129397
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PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
ALIGNMENT
DATA SHEETS

SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MDC	6	SEE TITLE SHEET		FM 55
GRAPHICS MDC	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	48
CHECK JP	CONTROL	SECTION	JOB	
	1451	03	017	

FM 55 VERTICAL ALIGNMENT DATA

Element: Linear		STATION	ELEVATION
	PVT	128+21.4622 R1	526.7238
	PVC	128+77.4936 R1	528.616
	Tangent Grade:	3.38%	
Element: Symmetrical Parabola	Tangent Length:	56.0314	
	PVC	128+77.4936 R1	528.616
	PVI	130+88.0900 R1	535.7281
	PVT	132+98.6864 R1	528.2989
	VHIGH	130+83.4969 R1	532.0945
	Length:	421.1928	
	Entrance Grade:	3.38%	
	Exit Grade:	-3.53%	
	r= (g2 - g1) / L:	-1.6393	
	k= 1 / (g2 - g1):	60.9998	
Element: Linear	Middle Ordinate:	-3.6353	
	PVT	132+98.6864 R1	528.2989
	PVC	136+31.5728 R1	516.5556
	Tangent Grade:	-3.53%	
Element: Linear	Tangent Length:	332.8864	
	PVC	136+31.5728 R1	516.5556
	PVI	138+42.5600 R1	509.1126
	PVT	140+53.5472 R1	509.4114
Element: Symmetrical Parabola	VLOW	140+37.2589 R1	509.3999
	Length:	421.9744	
	Entrance Grade:	-3.53%	
	Exit Grade:	0.14%	
	r= (g2 - g1) / L:	0.8696	
	k= 1 / (g2 - g1):	114.9999	
	Middle Ordinate:	1.9355	
	PVT	140+53.5472 R1	509.4114
	PVC	141+15.0199 R1	509.4985
	Tangent Grade:	0.14%	
Element: Linear	Tangent Length:	61.4727	
	PVC	141+15.0199 R1	509.4985
	PVI	143+32.2600 R1	509.8062
	PVT	145+49.5002 R1	498.8774
	VHIGH	141+26.9175 R1	509.5069
Element: Linear	Length:	434.4803	
	Entrance Grade:	0.14%	
	Exit Grade:	-5.03%	
	r= (g2 - g1) / L:	-1.1905	
	k= 1 / (g2 - g1):	84.0002	
Element: Symmetrical Parabola	Middle Ordinate:	-2.8091	
	PVT	145+49.5002 R1	498.8774
	PVC	146+58.6976 R1	493.384
	Tangent Grade:	-5.03%	
	Tangent Length:	109.1975	
	PVC	146+58.6976 R1	493.384
	PVI	148+31.3900 R1	484.6963
	PVT	150+04.0824 R1	482.2216
Element: Linear	Length:	345.3848	
	Entrance Grade:	-5.03%	
	Exit Grade:	-1.43%	
	r= (g2 - g1) / L:	1.0417	
	k= 1 / (g2 - g1):	96.0003	
Element: Symmetrical Parabola	Middle Ordinate:	1.5533	
	PVT	150+04.0824 R1	482.2216
	PVC	159+81.1584 R1	468.2203
	Tangent Grade:	-1.43%	
	Tangent Length:	977.076	
	PVC	159+81.1584 R1	468.2203
	PVI	161+06.7600 R1	466.4204
	PVT	162+32.3617 R1	469.5505
	VLOW	160+72.8697 R1	467.5632
Element: Linear	Length:	251.2033	
	Entrance Grade:	-1.43%	
	Exit Grade:	2.49%	
	r= (g2 - g1) / L:	1.5625	
	k= 1 / (g2 - g1):	64.0001	

Element: Symmetrical Parabola	Middle Ordinate:	1.2325	
	PVT	162+32.3617 R1	469.5505
	PVC	164+39.4303 R1	474.7107
	Tangent Grade:	2.49%	
	Tangent Length:	207.0686	
	PVC	164+39.4303 R1	474.7107
	PVI	165+99.1800 R1	478.6918
	PVT	167+58.9298 R1	479.2927
Element: Linear			
	Length:	319.4995	
	Entrance Grade:	2.49%	
	Exit Grade:	0.38%	
	r= (g2 - g1) / L:	-0.6623	
	k= 1 / (g2 - g1):	151.0002	
Element: Linear	Middle Ordinate:	-0.845	
	PVT	167+58.9298 R1	479.2927
	PVI	172+78.9500 R1	481.2489
	Tangent Grade:	0.38%	
Element: Symmetrical Parabola	Tangent Length:	520.0203	
	PVI	172+78.9500 R1	481.2489
	PVC	173+67.3940 R1	482.8055
	Tangent Grade:	1.76%	
	Tangent Length:	88.444	
	PVC	173+67.3940 R1	482.8055
	PVI	177+52.1200 R1	489.5768
	PVT	181+36.8460 R1	476.7435
	VHIGH	176+33.1571 R1	485.1443
	Length:	769.452	
	Entrance Grade:	1.76%	
	Exit Grade:	-3.34%	
	r= (g2 - g1) / L:	-0.6623	
	k= 1 / (g2 - g1):	150.9998	
	Middle Ordinate:	-4.9011	
	PVT	181+36.8460 R1	476.7435
	PVC	188+78.8346 R1	451.9931
	Tangent Grade:	-3.34%	
	Tangent Length:	741.9886	
	PVC	188+78.8346 R1	451.9931
	PVI	191+62.3100 R1	442.5372
	PVT	194+45.7855 R1	440.0388
	Length:	566.9509	
	Entrance Grade:	-3.34%	
	Exit Grade:	-0.88%	
	r= (g2 - g1) / L:	0.4329	
	k= 1 / (g2 - g1):	230.9992	
	Middle Ordinate:	1.7394	
	PVT	194+45.7855 R1	440.0388
	PVI	204+58.9900 R1	431.1089
	Tangent Grade:	-0.88%	
	Tangent Length:	1013.2046	
	PVI	204+58.9900 R1	431.1089
	PVI	217+45.0500 R1	429.8792
	Tangent Grade:	-0.10%	
	Tangent Length:	1286.06	
	PVI	217+45.0500 R1	429.8792
	PVI	222+36.8000 R1	427.0927
	Tangent Grade:	-0.57%	
	Tangent Length:	491.75	
	PVI	222+36.8000 R1	427.0927
	PVI	227+18.7300 R1	428.4265
	Tangent Grade:	0.28%	
	Tangent Length:	481.93	
	PVI	227+18.7300 R1	428.4265
	PVI	229+38.9063 R1	427.095
	Tangent Grade:	-0.60%	
	Tangent Length:	220.1763	
	PVI	229+38.9063 R1	427.095
	POE	232+85.7491 R1	426.9726
	Tangent Grade:	-0.04%	
	Tangent Length:	346.8428	

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129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55
ALIGNMENT
DATA SHEETS

SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MDC	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MDC	TEXAS	DAL	NAVARRO	49
CHECK	CONTROL	SECTION	JOB	
MJK	1451	03	017	
CHECK				
JP				

FM 55 CONTROL POINT DATA

CP1	6740006.264	2510749.88	424.618	IRSC
CP2	6737926.146	2512040.763	437.223	IRSC
CP3	6736708.679	2512674.944	476.298	IRSC

STATE OF TEXAS
MITCHELL L. RANDALL
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FM 55
CONTROL
POINT DATA

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	50
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:47:22
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\3. Roadway\Control Point Data Sheet.dgn

FM 55 SUPERELEVATION DATA

LEFT LANE

FROM STATION	TO STATION	SUPERELEVATION INFO
0+50.0000 R1	6+60.0000 R1	NORMAL CROWN AT -2.00%
6+60.0000 R1	8+10.0000 R1	TRANSITION -2.00% TO 4.80%
8+10.0000 R1	11+15.0000 R1	FULL SUPER 4.80%
11+15.0000 R1	12+65.0000 R1	TRANSITION 4.80% TO -2.00%
12+65.0000 R1	16+24.0000 R1	NORMAL CROWN AT -2.00%
16+24.0000 R1	18+00.0000 R1	TRANSITION -2.00% TO -6.00%
18+00.0000 R1	21+55.0000 R1	FULL SUPER -6.00%
21+55.0000 R1	23+31.0000 R1	TRANSITION -6.00% TO -2.00%
23+31.0000 R1	24+24.0000 R1	NORMAL CROWN AT -2.00%
24+24.0000 R1	26+00.0000 R1	TRANSITION -2.00% TO 6.00%
26+00.0000 R1	29+85.0000 R1	FULL SUPER 6.00%
29+85.0000 R1	31+61.0000 R1	TRANSITION 6.00% TO -2.00%
31+61.0000 R1	39+68.0000 R1	NORMAL CROWN AT -2.00%
39+68.0000 R1	40+80.0000 R1	TRANSITION -2.00% TO -3.10%
40+80.0000 R1	42+65.0000 R1	FULL SUPER -3.10%
42+65.0000 R1	43+77.0000 R1	TRANSITION -3.10% TO -2.00%
43+77.0000 R1	61+21.0000 R1	NORMAL CROWN AT -2.00%
61+21.0000 R1	62+40.0000 R1	TRANSITION -2.00% TO 3.40%
62+40.0000 R1	67+85.0000 R1	FULL SUPER 3.40%
67+85.0000 R1	69+04.0000 R1	TRANSITION 3.40% TO -2.00%
69+04.0000 R1	78+36.0000 R1	NORMAL CROWN AT -2.00%
78+36.0000 R1	79+55.0000 R1	TRANSITION -2.00% TO -3.40%
79+55.0000 R1	84+15.0000 R1	FULL SUPER -3.40%
84+15.0000 R1	85+34.0000 R1	TRANSITION -3.40% TO -2.00%
85+34.0000 R1	114+34.0000 R1	NORMAL CROWN AT -2.00%
114+34.0000 R1	116+10.0000 R1	TRANSITION -2.00% TO 6.00%
116+10.0000 R1	119+60.0000 R1	FULL SUPER 6.00%
119+60.0000 R1	121+36.0000 R1	TRANSITION 6.00% TO -2.00%
121+36.0000 R1	127+79.0000 R1	NORMAL CROWN AT -2.00%
127+79.0000 R1	129+55.0000 R1	TRANSITION -2.00% TO -6.00%
129+55.0000 R1	132+95.0000 R1	FULL SUPER -6.00%
132+95.0000 R1	134+71.0000 R1	TRANSITION -6.00% TO -2.00%
134+71.0000 R1	158+49.0000 R1	NORMAL CROWN AT -2.00%
158+49.0000 R1	160+25.0000 R1	TRANSITION -2.00% TO 6.00%
160+25.0000 R1	168+35.0000 R1	FULL SUPER 6.00%
168+35.0000 R1	170+11.0000 R1	TRANSITION 6.00% TO -2.00%
170+11.0000 R1	172+99.0000 R1	NORMAL CROWN AT -2.00%
172+99.0000 R1	174+75.0000 R1	TRANSITION -2.00% TO -6.00%
174+75.0000 R1	182+60.0000 R1	FULL SUPER -6.00%
182+60.0000 R1	184+36.0000 R1	TRANSITION -6.00% TO -2.00%
184+36.0000 R1	215+25.0000 R1	NORMAL CROWN AT -2.00%
215+25.0000 R1	216+15.0000 R1	TRANSITION -2.00% TO 2.10%
216+15.0000 R1	218+70.0000 R1	FULL SUPER 2.10%
218+70.0000 R1	219+60.0000 R1	TRANSITION 2.10% TO -2.00%
219+60.0000 R1	230+00.0000 R1	NORMAL CROWN AT -2.00%

RIGHT LANE

FROM STATION	TO STATION	SUPERELEVATION INFO
0+50.0000 R1	6+60.0000 R1	NORMAL CROWN AT -2.00%
6+60.0000 R1	8+10.0000 R1	TRANSITION -2.00% TO -4.80%
8+10.0000 R1	11+15.0000 R1	FULL SUPER -4.80%
11+15.0000 R1	12+65.0000 R1	TRANSITION -4.80% TO -2.00%
12+65.0000 R1	16+24.0000 R1	NORMAL CROWN AT -2.00%
16+24.0000 R1	18+00.0000 R1	TRANSITION -2.00% TO 6.00%
18+00.0000 R1	21+55.0000 R1	FULL SUPER 6.00%
21+55.0000 R1	23+31.0000 R1	TRANSITION 6.00% TO -2.00%
23+31.0000 R1	24+24.0000 R1	NORMAL CROWN AT -2.00%
24+24.0000 R1	26+00.0000 R1	TRANSITION -2.00% TO -6.00%
26+00.0000 R1	29+85.0000 R1	FULL SUPER -6.00%
29+85.0000 R1	31+61.0000 R1	TRANSITION -6.00% TO -2.00%
31+61.0000 R1	39+68.0000 R1	NORMAL CROWN AT -2.00%
39+68.0000 R1	40+80.0000 R1	TRANSITION -2.00% TO 3.10%
40+80.0000 R1	42+65.0000 R1	FULL SUPER 3.10%
42+65.0000 R1	43+77.0000 R1	TRANSITION 3.10% TO -2.00%
43+77.0000 R1	61+21.0000 R1	NORMAL CROWN AT -2.00%
61+21.0000 R1	62+40.0000 R1	TRANSITION -2.00% TO -3.40%
62+40.0000 R1	67+85.0000 R1	FULL SUPER -3.40%
67+85.0000 R1	69+04.0000 R1	TRANSITION -3.40% TO -2.00%
69+04.0000 R1	78+36.0000 R1	NORMAL CROWN AT -2.00%
78+36.0000 R1	79+55.0000 R1	TRANSITION -2.00% TO 3.40%
79+55.0000 R1	84+15.0000 R1	FULL SUPER 3.40%
84+15.0000 R1	85+34.0000 R1	TRANSITION 3.40% TO -2.00%
85+34.0000 R1	114+34.0000 R1	NORMAL CROWN AT -2.00%
114+34.0000 R1	116+10.0000 R1	TRANSITION -2.00% TO -6.00%
116+10.0000 R1	119+60.0000 R1	FULL SUPER -6.00%
119+60.0000 R1	121+36.0000 R1	TRANSITION -6.00% TO -2.00%
121+36.0000 R1	127+79.0000 R1	NORMAL CROWN AT -2.00%
127+79.0000 R1	129+55.0000 R1	TRANSITION -2.00% TO 6.00%
129+55.0000 R1	132+95.0000 R1	FULL SUPER 6.00%
132+95.0000 R1	134+71.0000 R1	TRANSITION 6.00% TO -2.00%
134+71.0000 R1	158+49.0000 R1	NORMAL CROWN AT -2.00%
158+49.0000 R1	160+25.0000 R1	TRANSITION -2.00% TO -6.00%
160+25.0000 R1	168+35.0000 R1	FULL SUPER -6.00%
168+35.0000 R1	170+11.0000 R1	TRANSITION -6.00% TO -2.00%
170+11.0000 R1	172+99.0000 R1	NORMAL CROWN AT -2.00%
172+99.0000 R1	174+75.0000 R1	TRANSITION -2.00% TO 6.00%
174+75.0000 R1	182+60.0000 R1	FULL SUPER 6.00%
182+60.0000 R1	184+36.0000 R1	TRANSITION 6.00% TO -2.00%
184+36.0000 R1	215+25.0000 R1	NORMAL CROWN AT -2.00%
215+25.0000 R1	216+15.0000 R1	TRANSITION -2.00% TO -2.10%
216+15.0000 R1	218+70.0000 R1	FULL SUPER -2.10%
218+70.0000 R1	219+60.0000 R1	TRANSITION -2.10% TO -2.00%
219+60.0000 R1	230+00.0000 R1	NORMAL CROWN AT -2.00%

STATE OF TEXAS
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FM 55
SUPERELEVATION
DATA

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	51
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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FM 55 CORE BORING INFORMATION

BORING ID	LATITUDE	LONGITUDE	ASPHALT THICKNESS (IN)	CONCRETE THICKNESS (IN)	BASE THICKNESS (IN)
P1	N32.092973	W96.722243	6.25	-	5.75
P2	N32.096226	W96.725191	4.0	-	6.0
P3	N32.098749	W96.728798	0.25	5.0	6.0
P4	N32.102427	W96.731181	7.5	-	6.0
P5	N32.105995	W96.733673	7.0	-	5.0
P6	N32.109829	W96.735534	11.0	-	2.0
P7	N32.113603	W96.737710	6.5	-	4.0
P8	N32.117253	W96.740199	7.25	-	8.0
P9	N32.120979	W96.741439	8.75	-	6.0
P10	N32.124866	W96.741939	0.25 (ABOVE CONCRETE SECTION) & 4.5 (BENEATH CONCRETE SECTION)	5.25	6.0
P11	N32.128528	W96.744406	9.5	-	5.5
P12	N32.132239	W96.744958	12.5	-	3.0
P13	N32.135432	W96.742823	10.5	-	8.0
P14	N32.139054	W96.745273	10.5	-	-
P15	N32.142814	W96.747696	9.5	-	6.0
P16	N32.146221	W96.749734	5.75	-	6.0

DATE: 11/30/2021 TIME: 10:47:34
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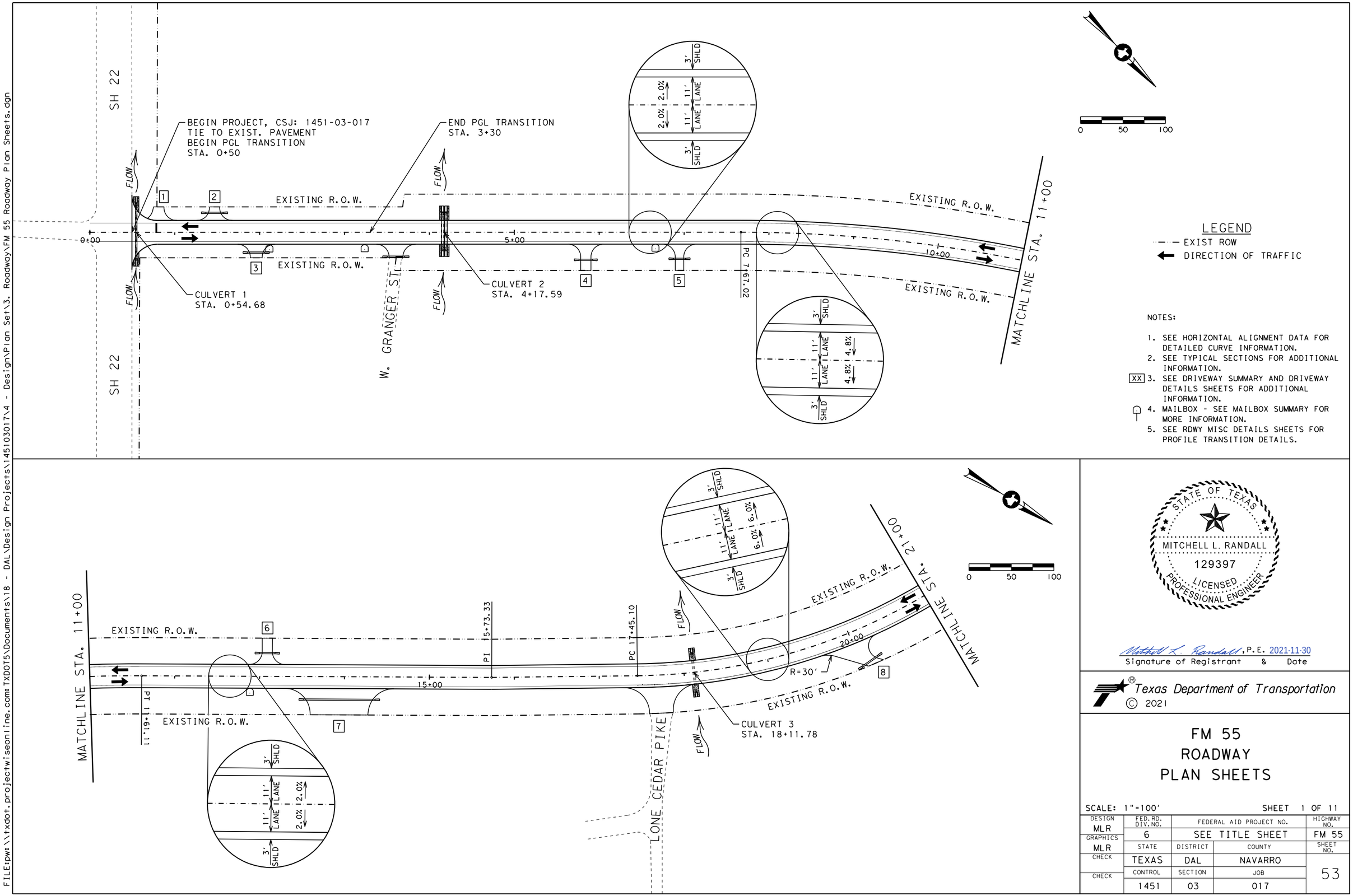
FM 55
CORE BORING
INFORMATION

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	52
	CONTROL	SECTION	JOB	
CHECK	1451	03	017	



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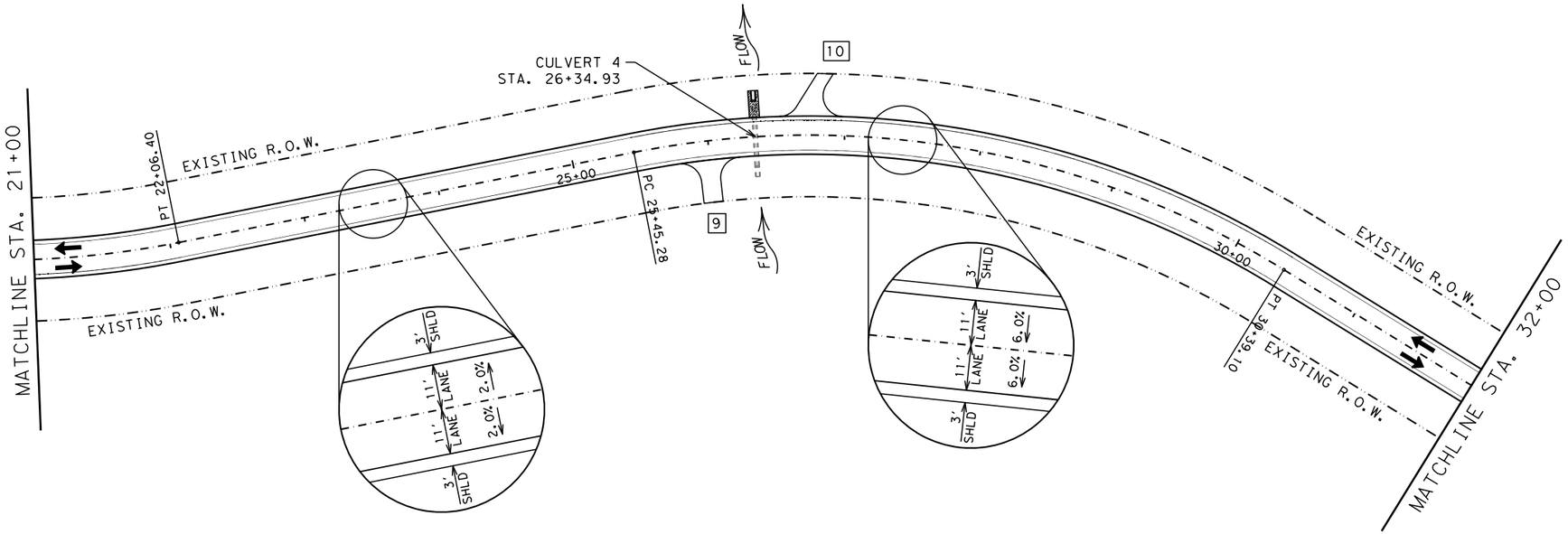
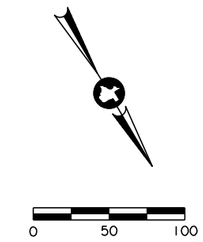
FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 1 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	53
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	





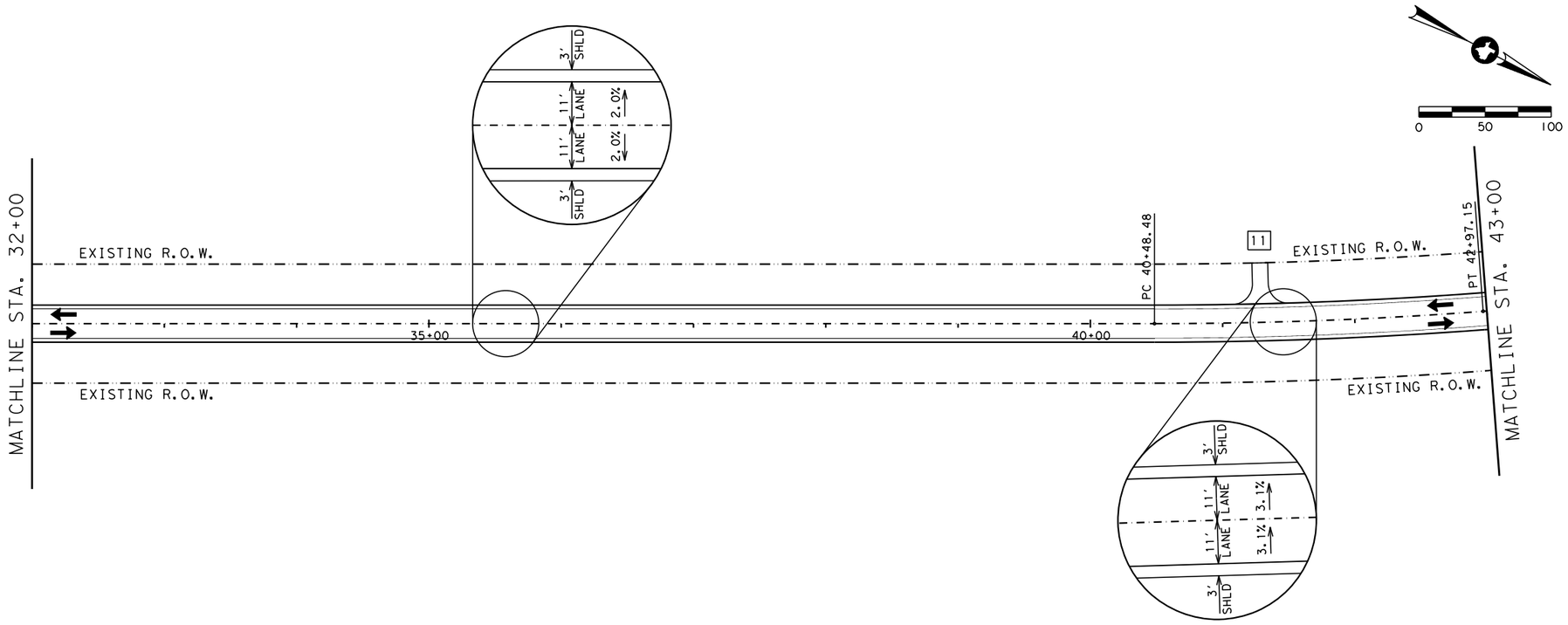
LEGEND

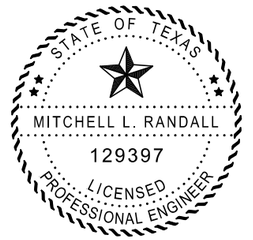
EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. [XX] SEE DRIVEWAY SUMMARY AND DRIVEWAY DETAILS SHEETS FOR ADDITIONAL INFORMATION.
4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
5. SEE RDWY MISC DETAILS SHEETS FOR PROFILE TRANSITION DETAILS.





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FM 55 ROADWAY PLAN SHEETS

SCALE: 1"=100' SHEET 2 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	54
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:47:42
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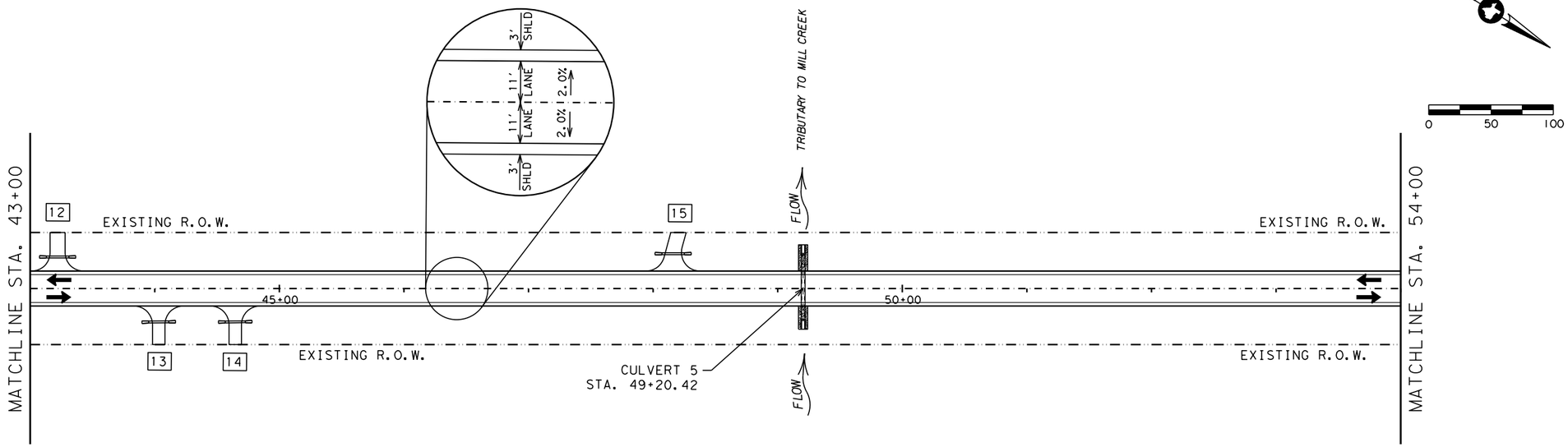


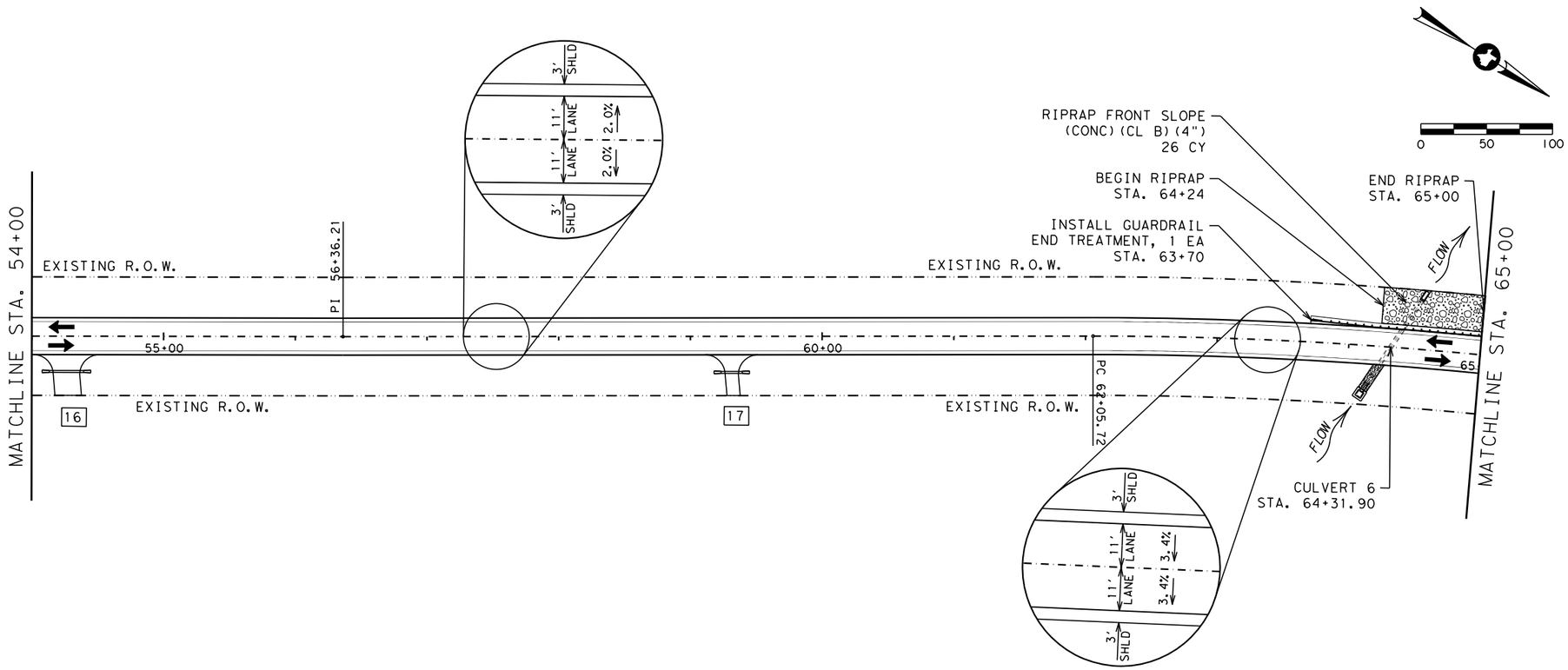
LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. [XX] SEE DRIVEWAY SUMMARY AND DRIVEWAY DETAILS SHEETS FOR ADDITIONAL INFORMATION.
4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
5. SEE RDWY MISC DETAILS SHEETS FOR PROFILE TRANSITION DETAILS.



STATE OF TEXAS
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Mitchell L. Randall, P.E. 2021-11-30
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Texas Department of Transportation

FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 3 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS: MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	55
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:47:42
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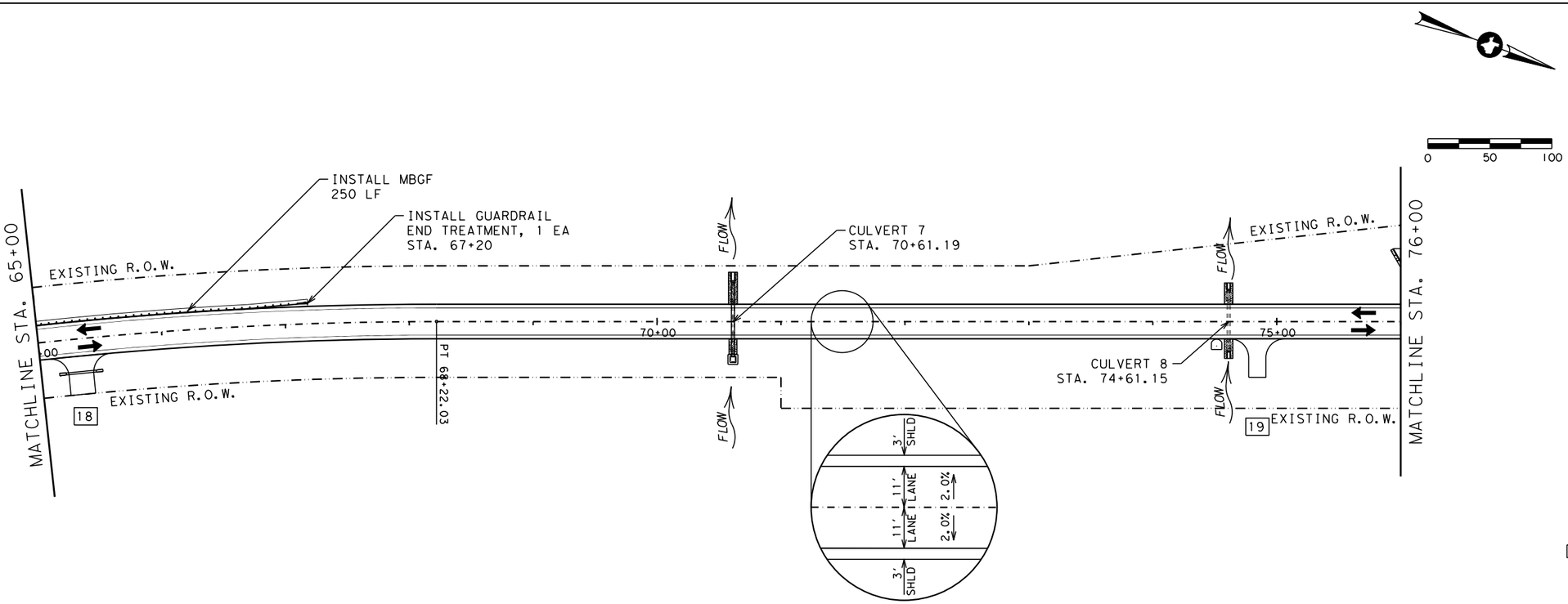


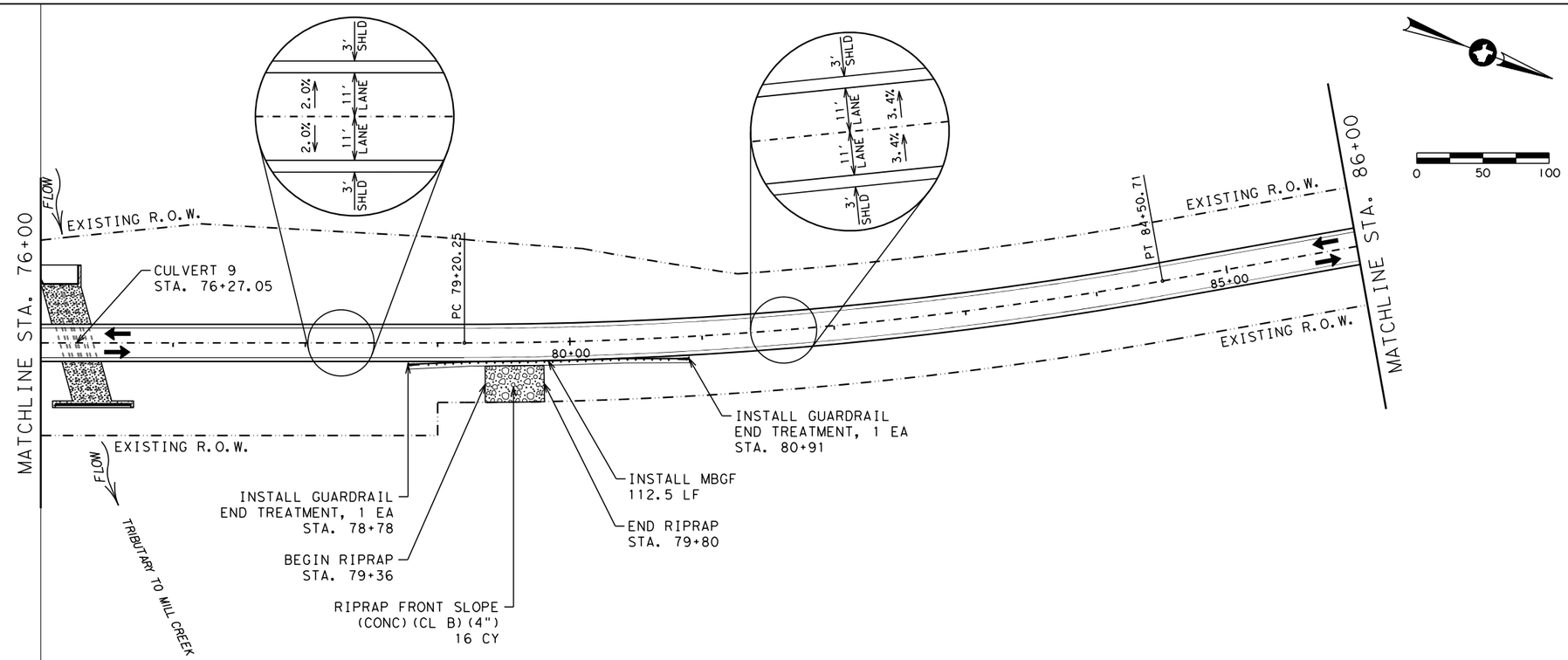
LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. [XX] SEE DRIVEWAY SUMMARY AND DRIVEWAY DETAILS SHEETS FOR ADDITIONAL INFORMATION.
4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
5. SEE RDWY MISC DETAILS SHEETS FOR PROFILE TRANSITION DETAILS.



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Mitchell L. Randall, P.E. 2021-11-30
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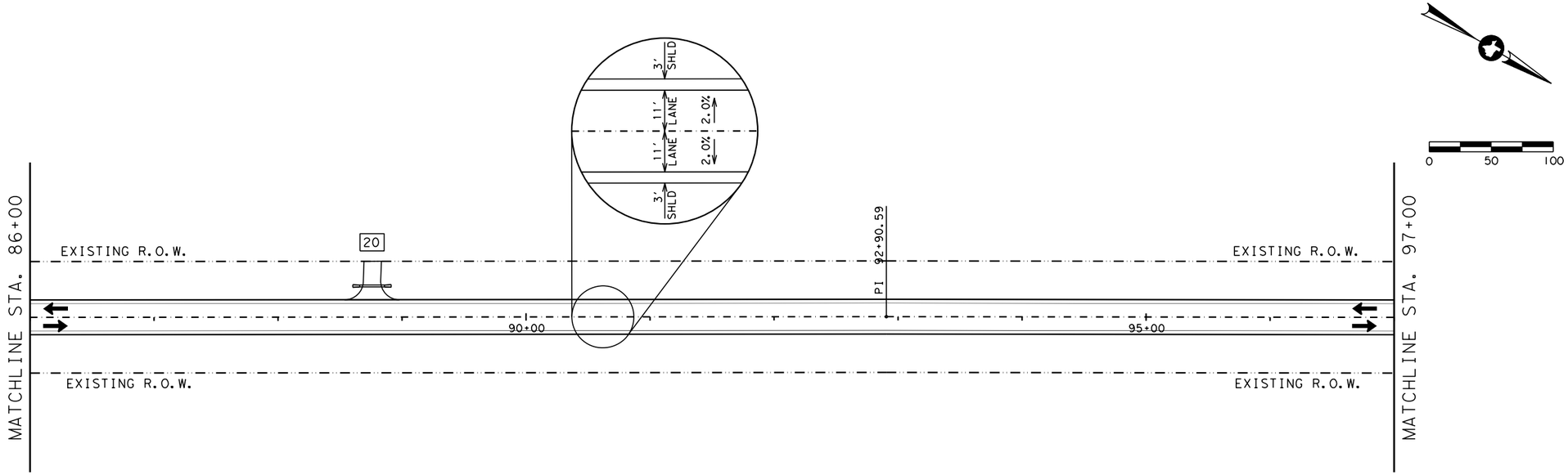
Texas Department of Transportation

FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 4 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	56
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	



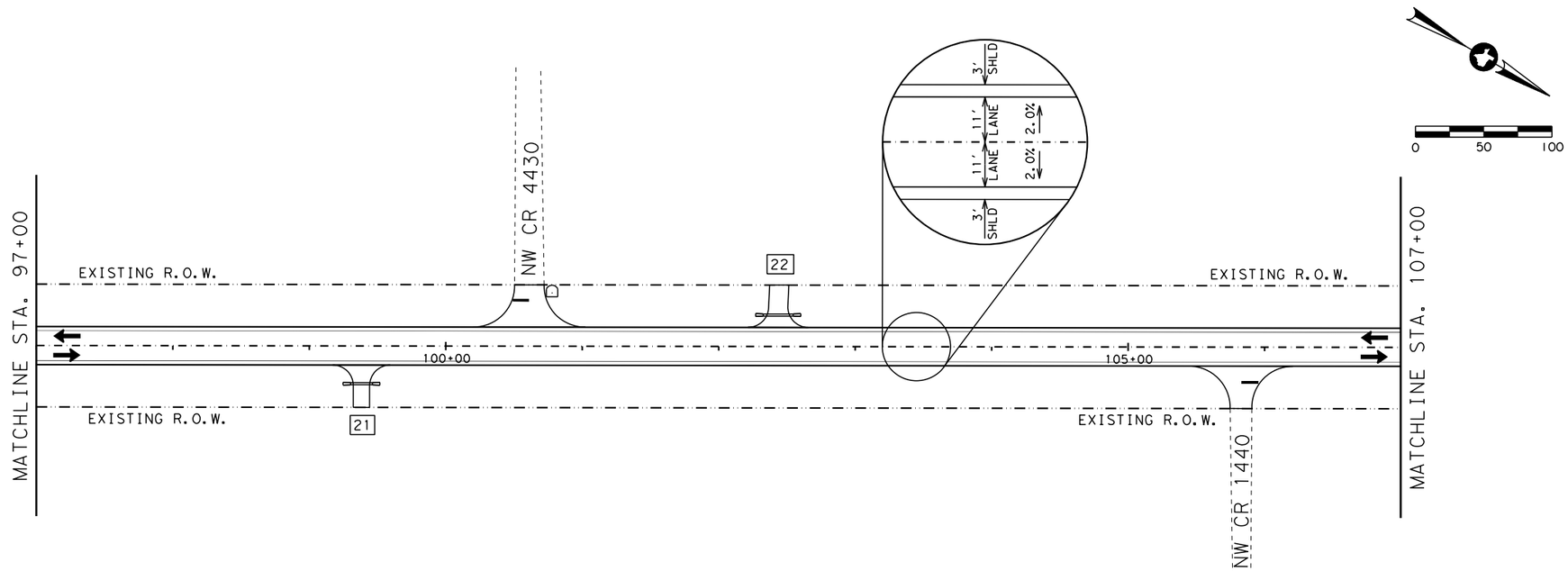
LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. [XX] SEE DRIVEWAY SUMMARY AND DRIVEWAY DETAILS SHEETS FOR ADDITIONAL INFORMATION.
4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
5. SEE RDWY MISC DETAILS SHEETS FOR PROFILE TRANSITION DETAILS.



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FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 5 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	57
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:47:43
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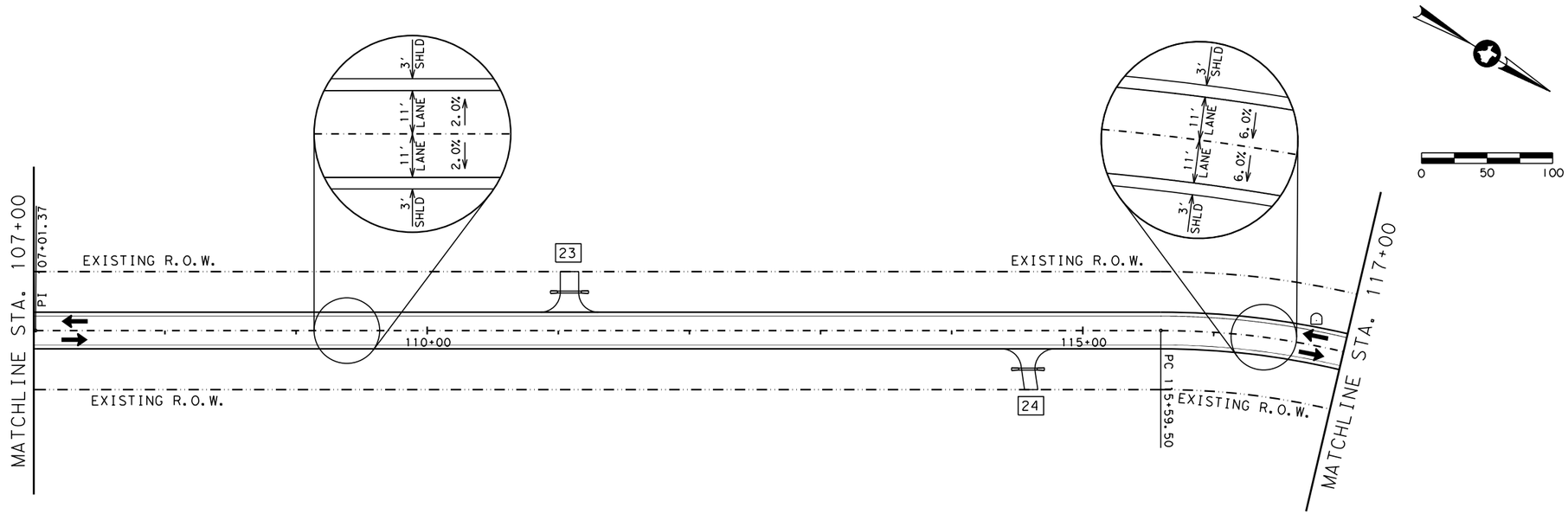


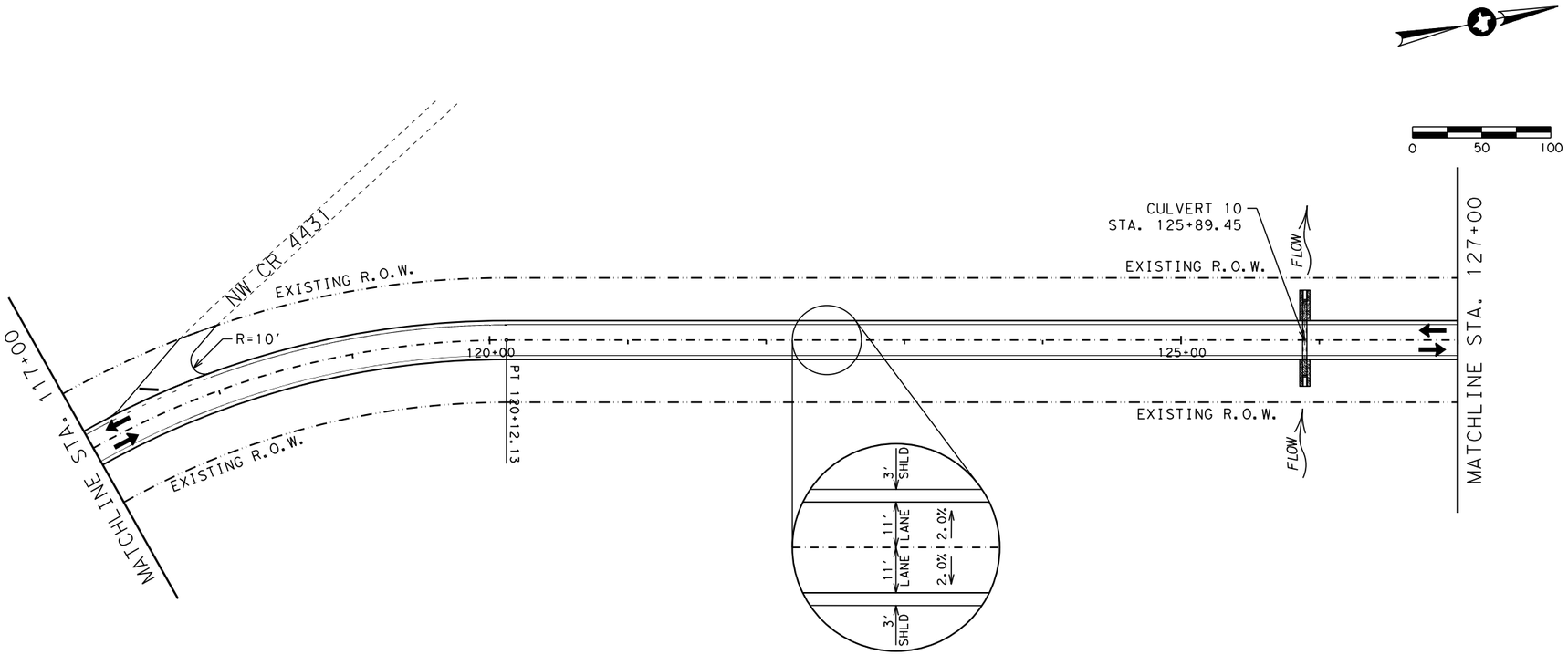
LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. XX SEE DRIVEWAY SUMMARY AND DRIVEWAY DETAILS SHEETS FOR ADDITIONAL INFORMATION.
4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
5. SEE RDWY MISC DETAILS SHEETS FOR PROFILE TRANSITION DETAILS.



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FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 6 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	58
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

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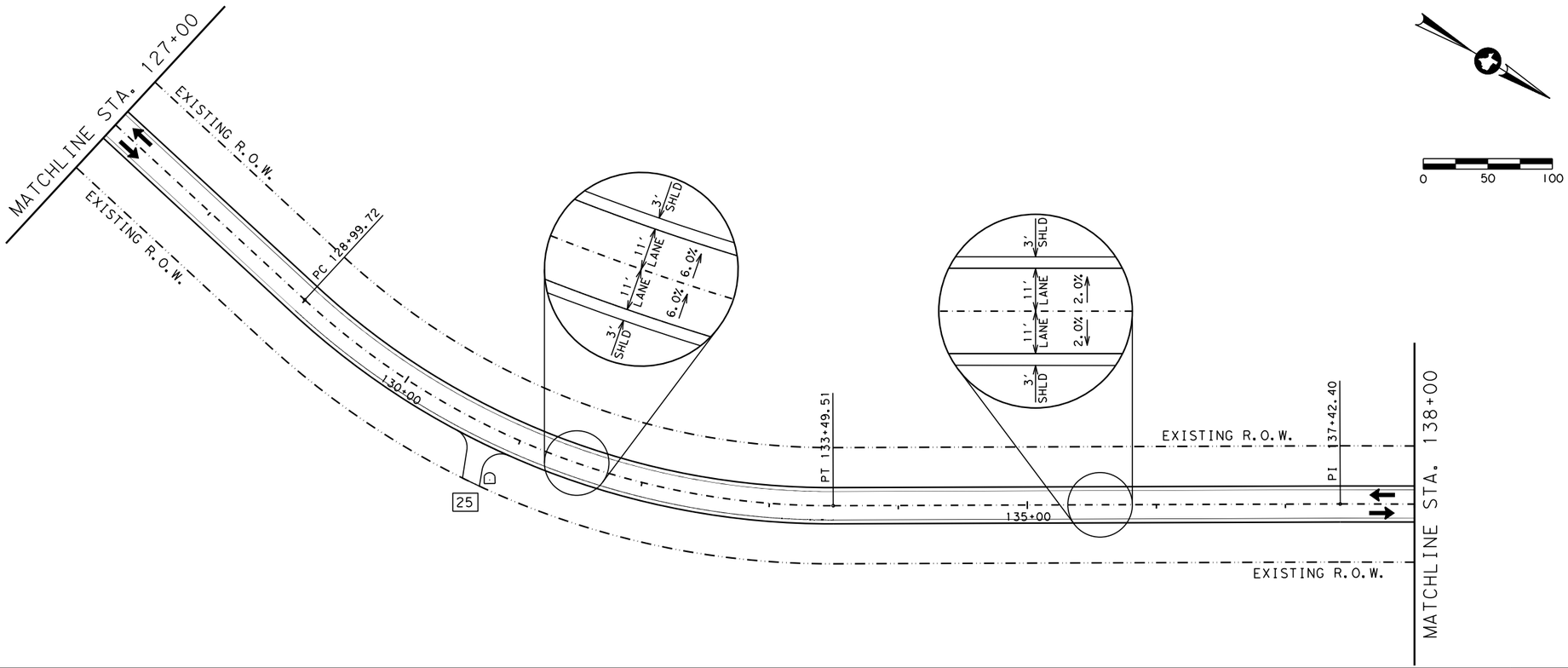


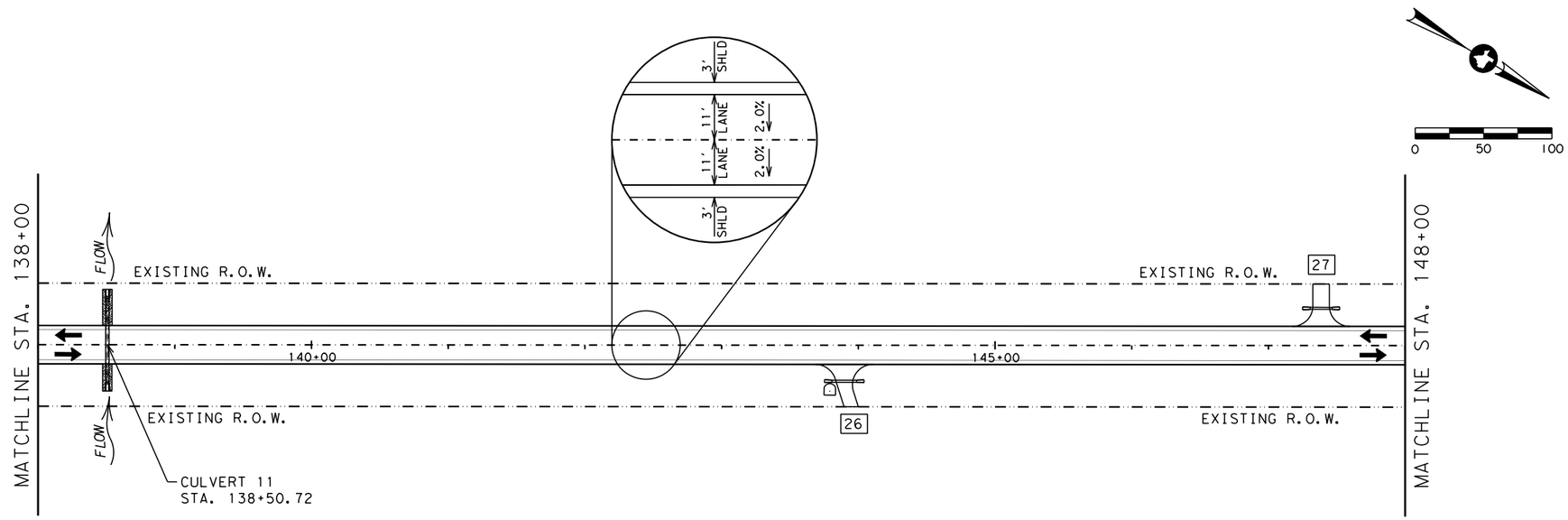
LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
3. XX SEE DRIVEWAY SUMMARY AND DRIVEWAY DETAILS SHEETS FOR ADDITIONAL INFORMATION.
4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
5. SEE RDWY MISC DETAILS SHEETS FOR PROFILE TRANSITION DETAILS.



STATE OF TEXAS
MITCHELL L. RANDALL
129397
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PROFESSIONAL ENGINEER

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FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 7 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	59
CHECK	1451	03	017	

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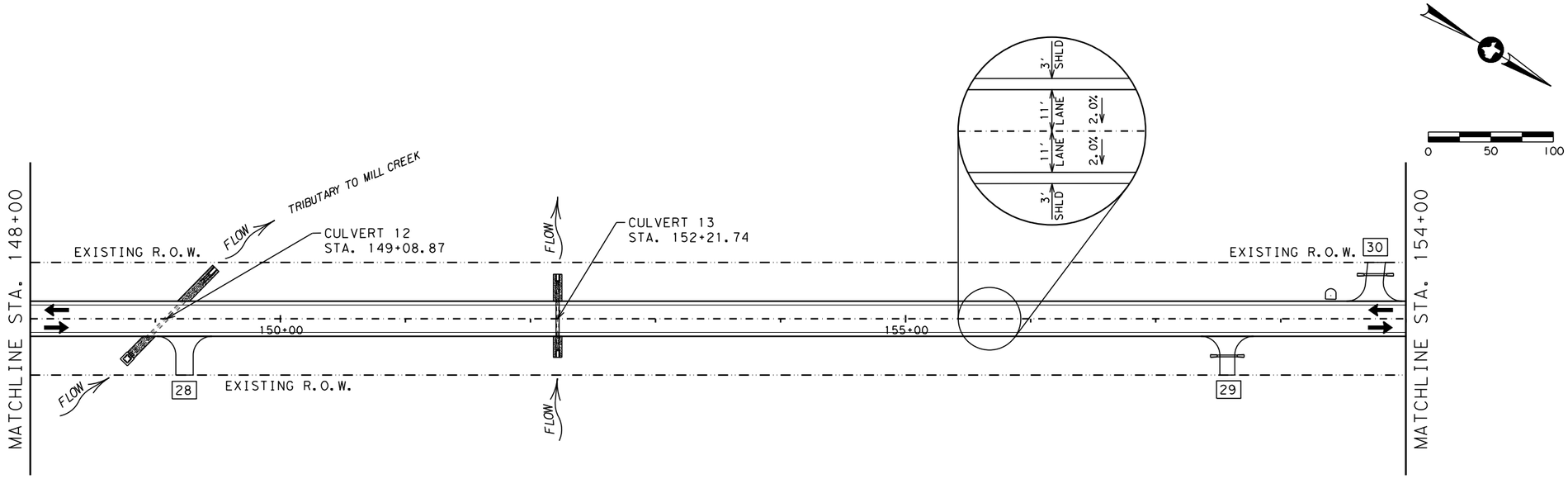

LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

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2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
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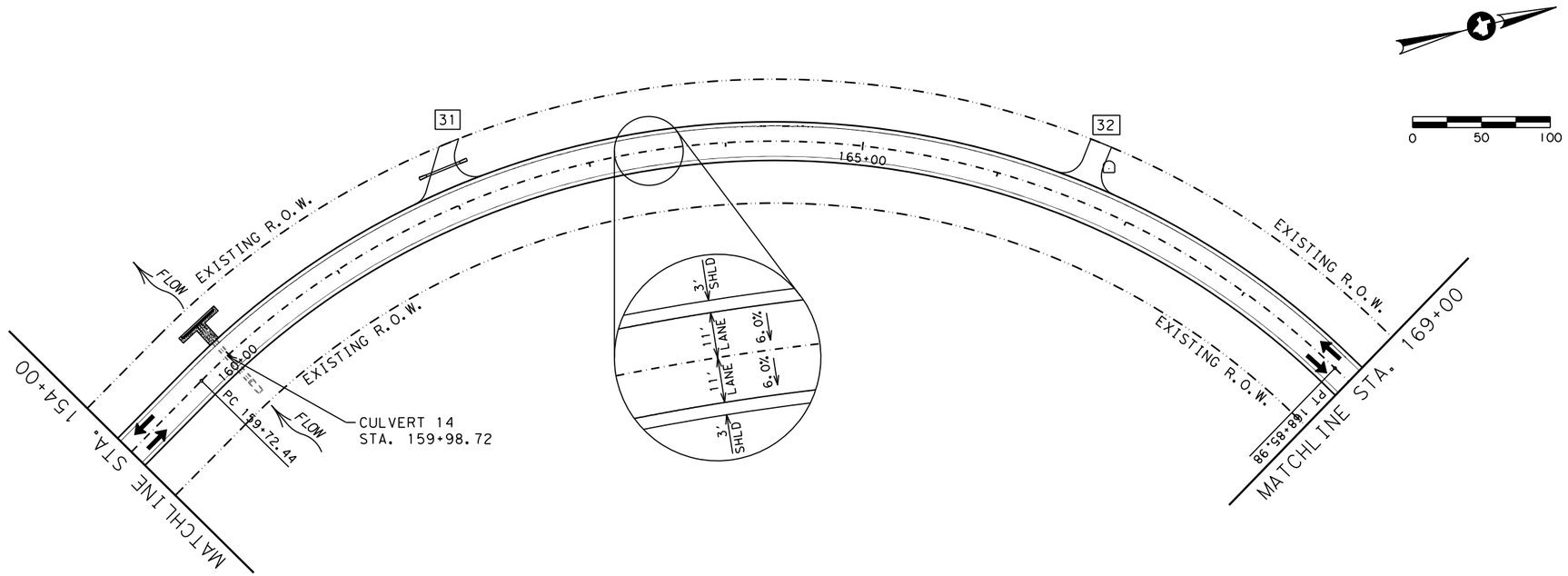

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Mitchell L. Randall, P.E. 2021-11-30
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FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 8 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	60
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

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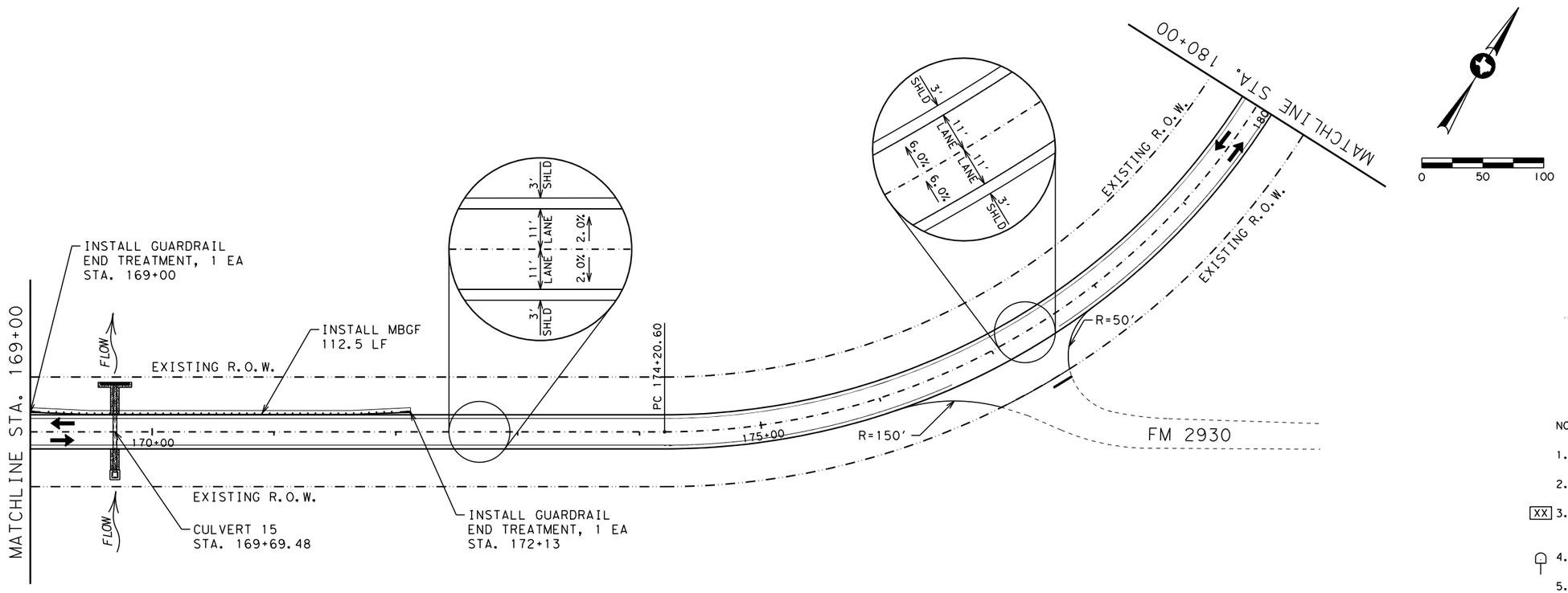

LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
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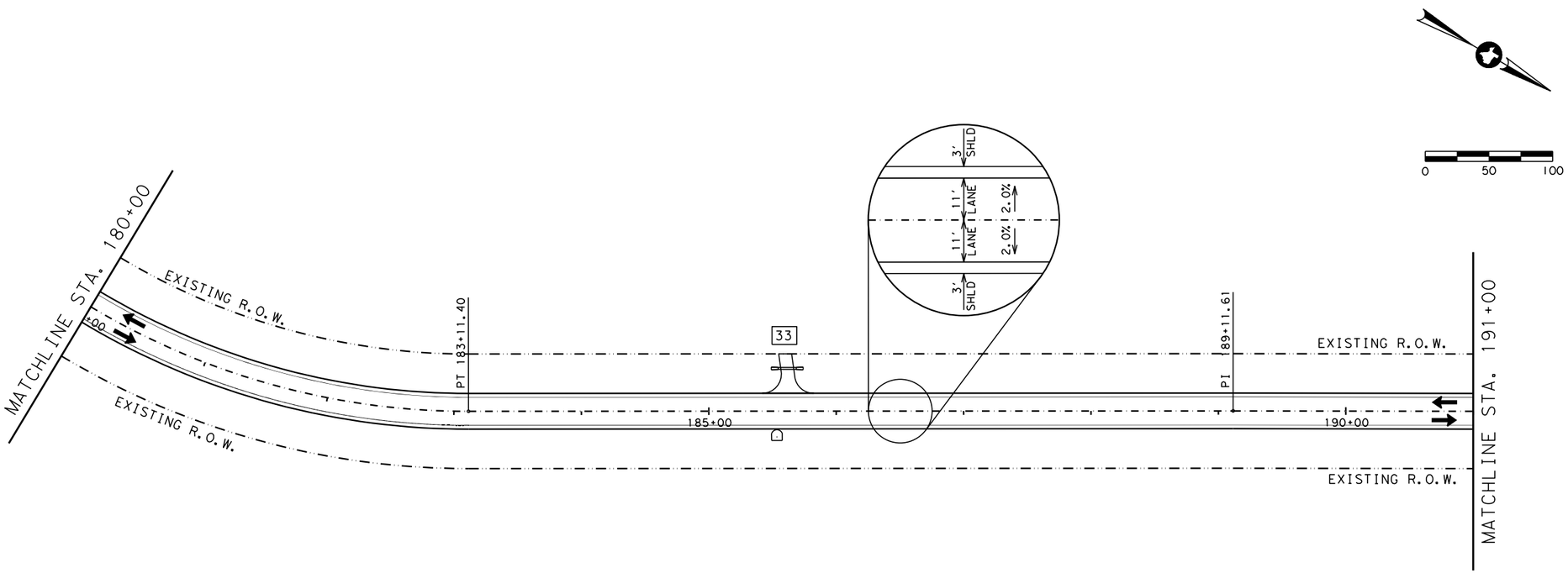

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FM 55 ROADWAY PLAN SHEETS

SCALE: 1"=100' SHEET 9 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK	CONTROL	SECTION	JOB	
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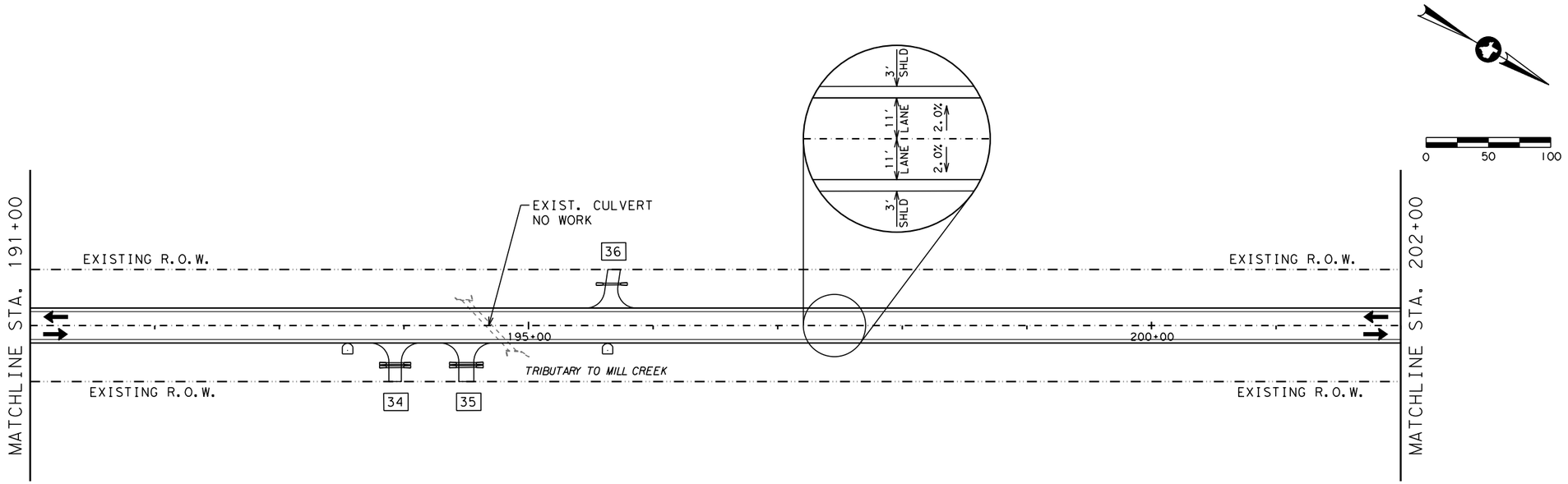

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LEGEND

EXIST ROW

DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
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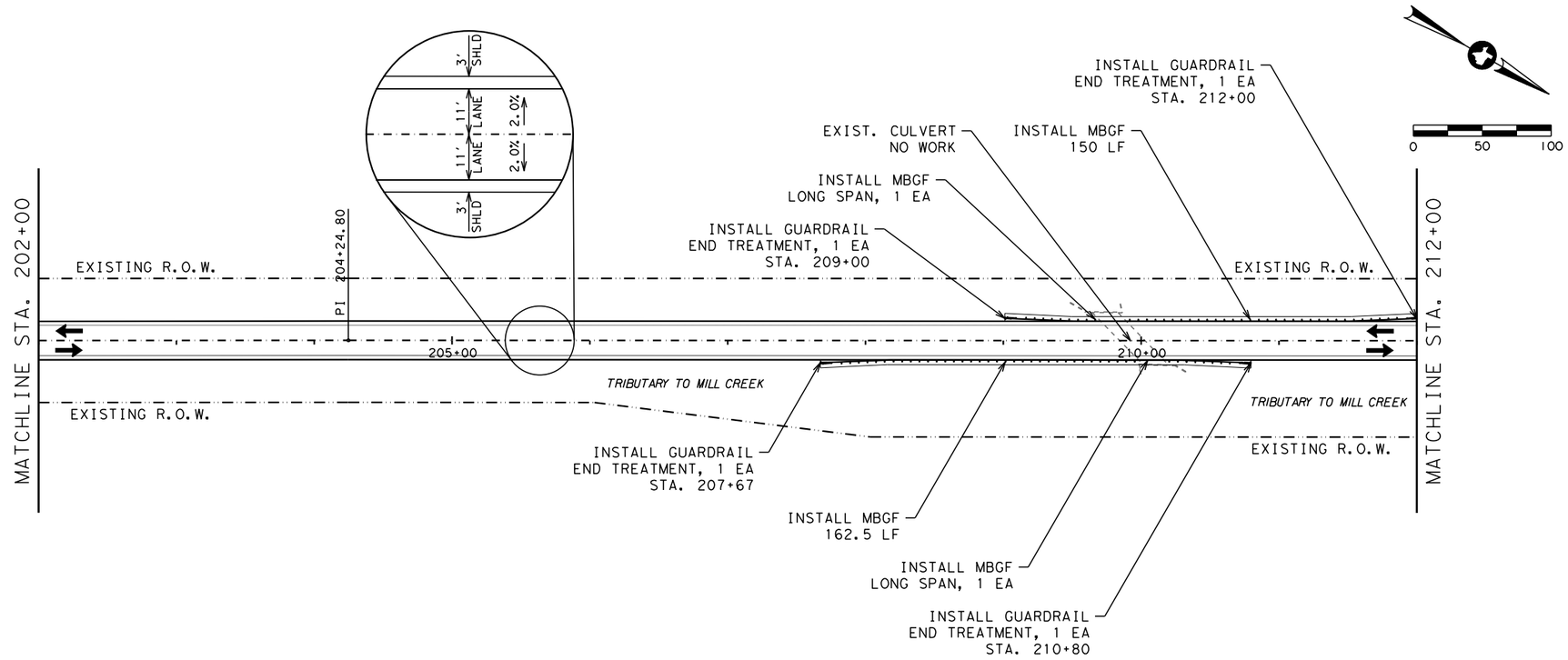

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FM 55
ROADWAY
PLAN SHEETS

SCALE: 1"=100' SHEET 10 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	62
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:47:44
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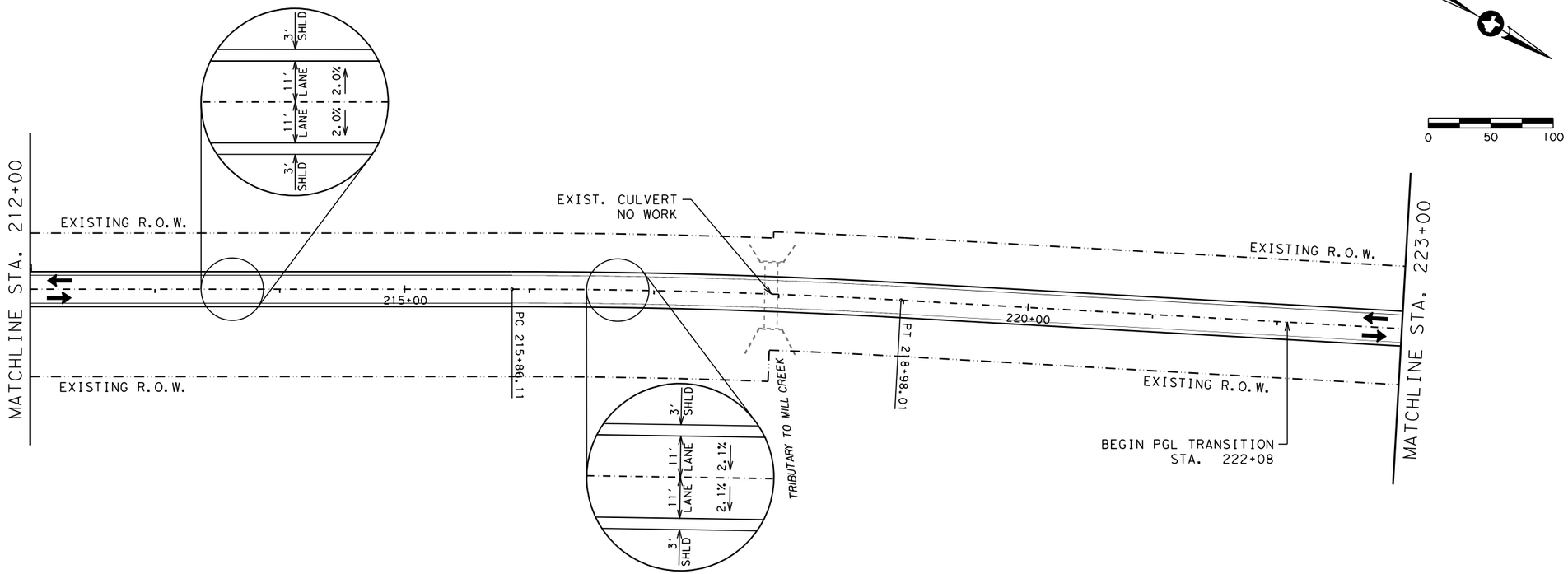

LEGEND

- EXIST ROW
- DIRECTION OF TRAFFIC

NOTES:

1. SEE HORIZONTAL ALIGNMENT DATA FOR DETAILED CURVE INFORMATION.
2. SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
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4. MAILBOX - SEE MAILBOX SUMMARY FOR MORE INFORMATION.
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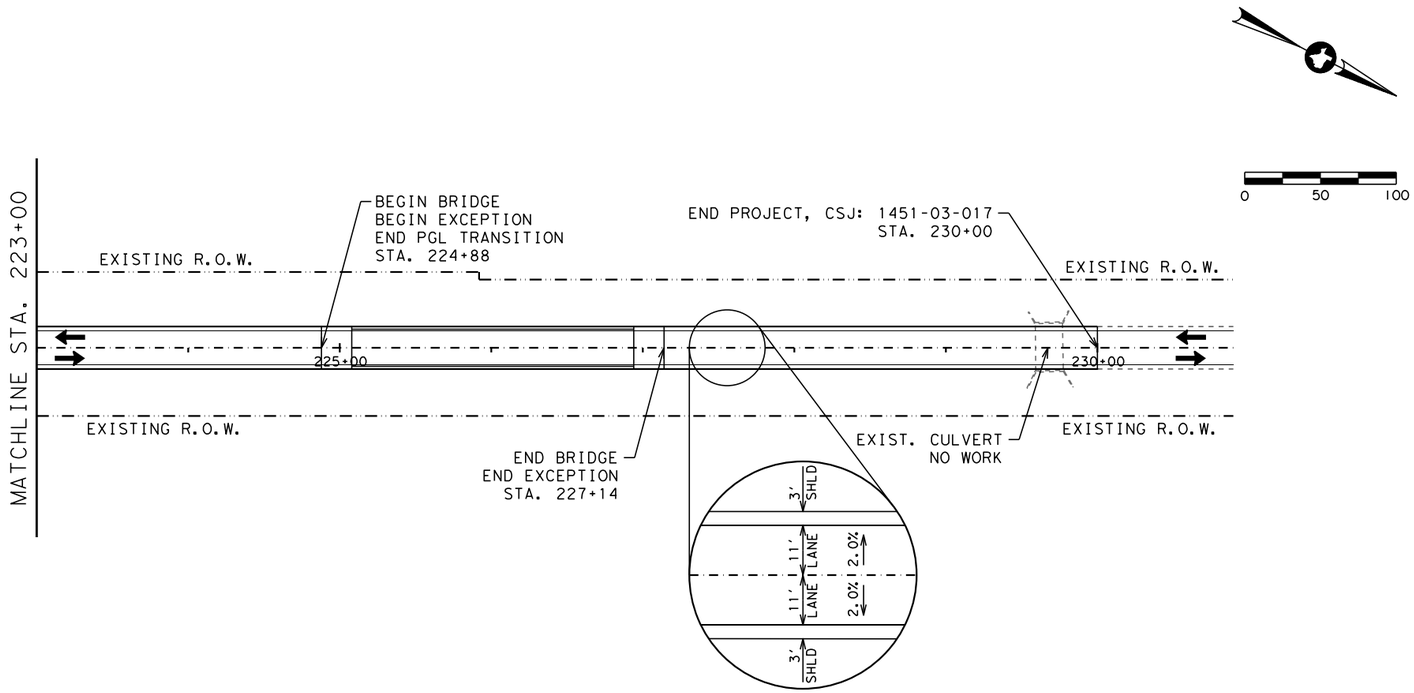

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FM 55 ROADWAY PLAN SHEETS

SCALE: 1"=100' SHEET 11 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	63
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

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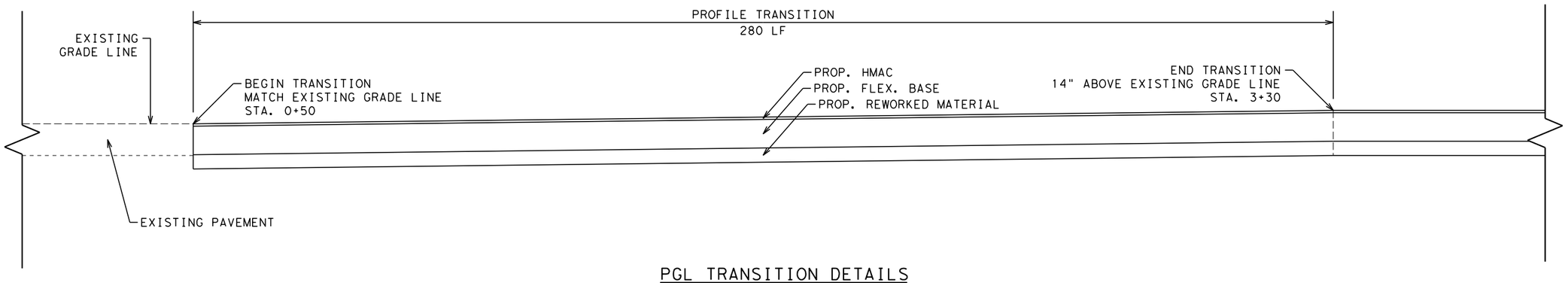
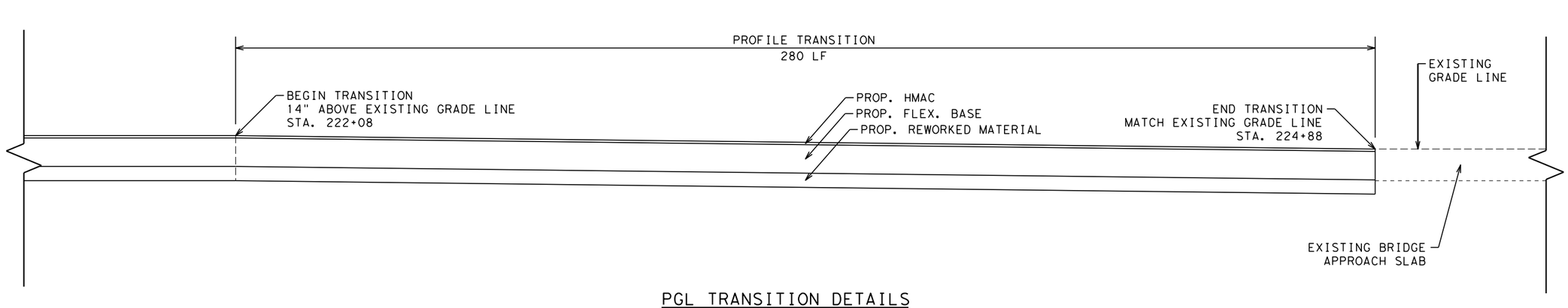


PGL TRANSITION DETAILS

BEGIN PROJECT
STA. 0+50 TO STA. 3+30



PGL TRANSITION DETAILS

MILL CREEK BRIDGE APPROACH
STA. 222+28 TO STA. 224+88

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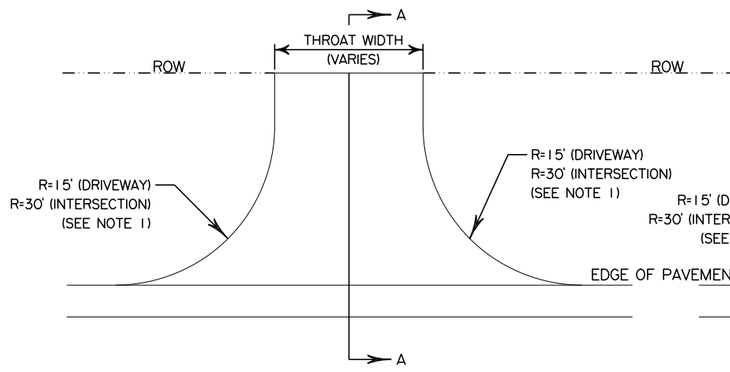
FM 55
MISCELLANEOUS DETAILS

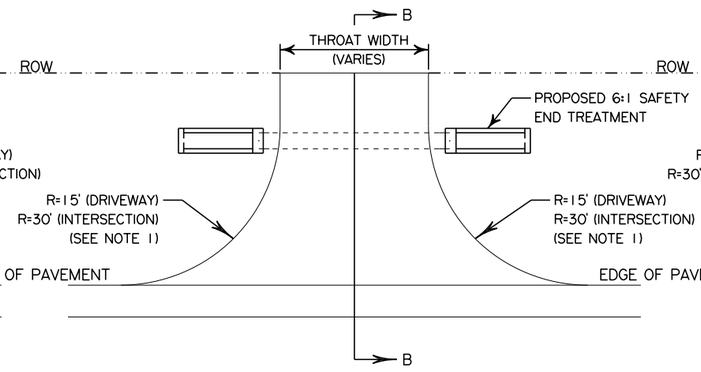
NOT TO SCALE

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	64
	1451	03	017	

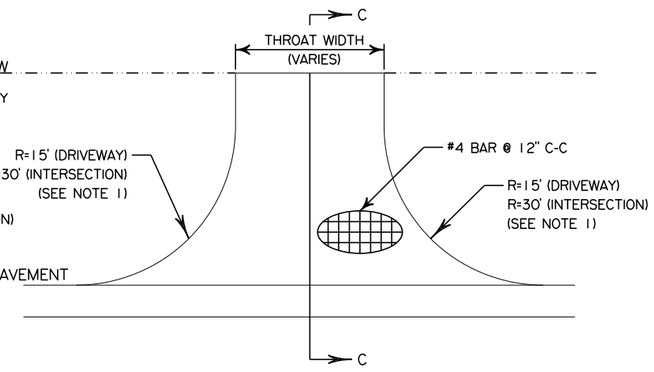
TYPICAL
DRIVEWAY/INTERSECTION
HMA

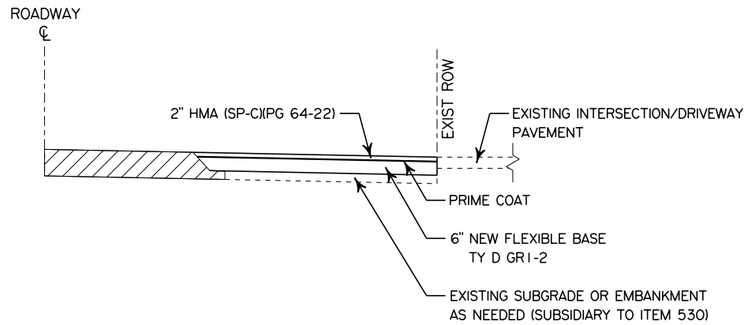


TYPICAL
DRIVEWAY/INTERSECTION
HMA OR CONCRETE WITH PIPE

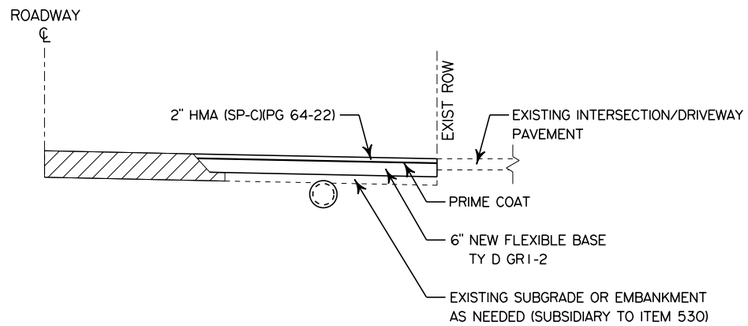


TYPICAL
DRIVEWAY/INTERSECTION
CONCRETE

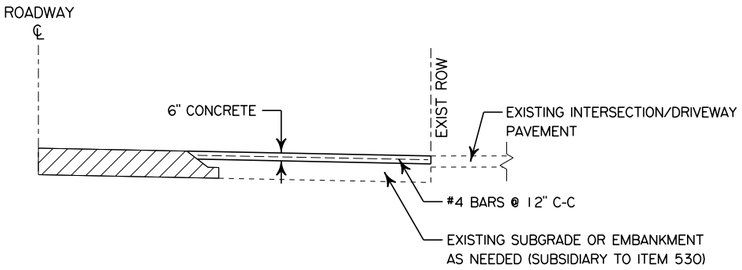




INTERSECTION/DRIVEWAY
SECTION A-A HMA



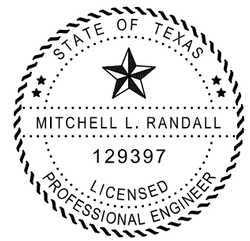
INTERSECTION/DRIVEWAY
SECTION B-B HMA



DRIVEWAY
SECTION C-C CONCRETE

NOTES:

1. DRIVEWAY RETURN RADIUS IS 15' FOR RESIDENTIAL DRIVEWAYS OR 30' FOR CROSS STREET INTERSECTIONS UNLESS OTHERWISE NOTED IN THE PLAN SHEETS.
2. DRIVEWAY LOCATIONS MAY BE SHIFTED AT TIME OF CONSTRUCTION AS DIRECTED BY THE ENGINEER TO MATCH EXISTING CONDITIONS.
3. SEE DRIVEWAY SUMMARY SHEET FOR THROAT WIDTHS AND ADDITIONAL INFORMATION.



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DRIVEWAY DETAILS

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	65
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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DATE: 11/30/2021
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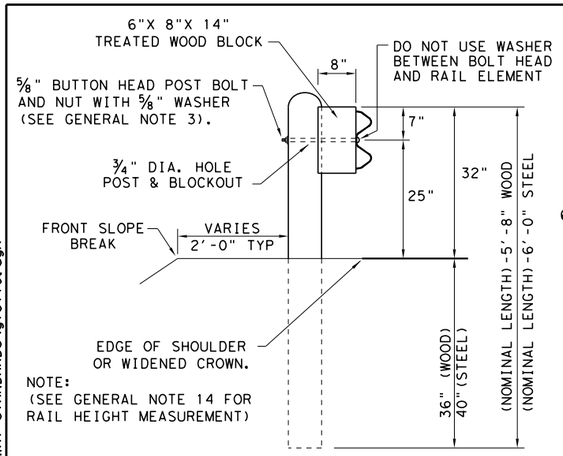
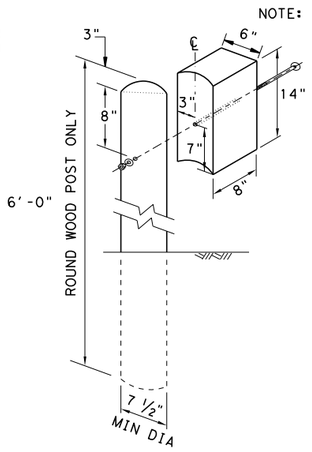
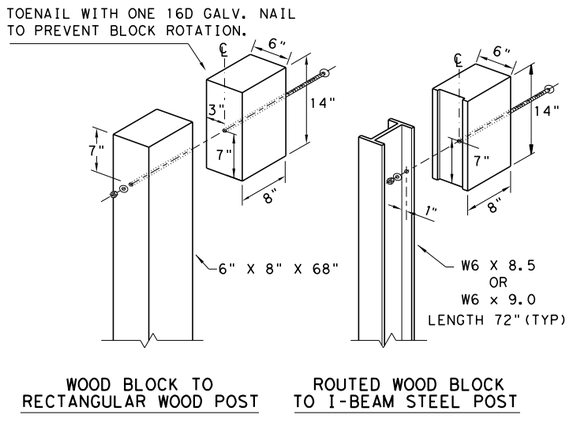


TYPICAL POST PLACEMENT



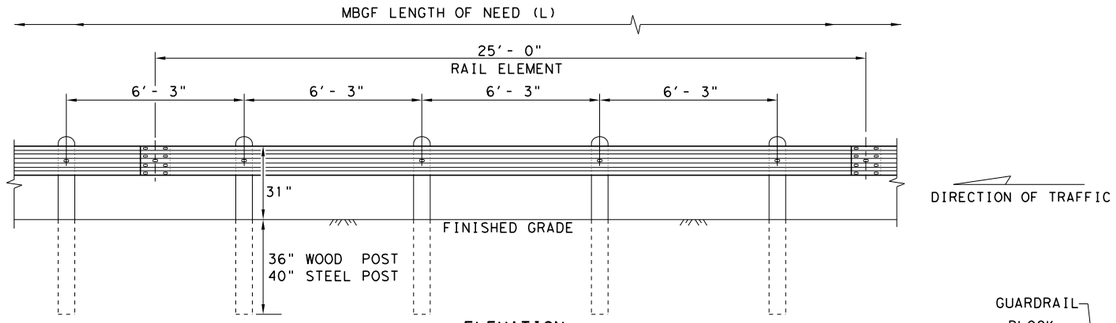
WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST

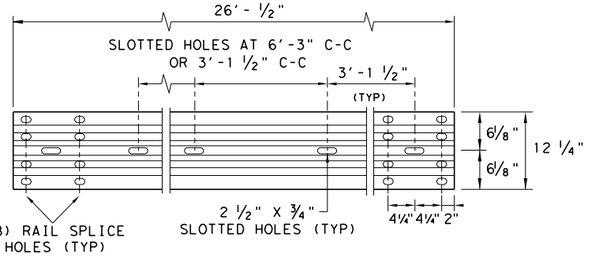
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



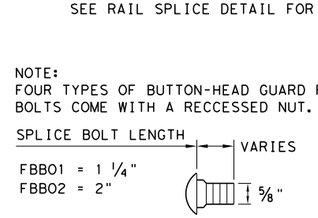
ELEVATION
MID-SPAN RAIL SPLICE

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



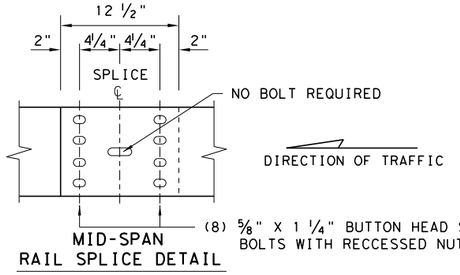
ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

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



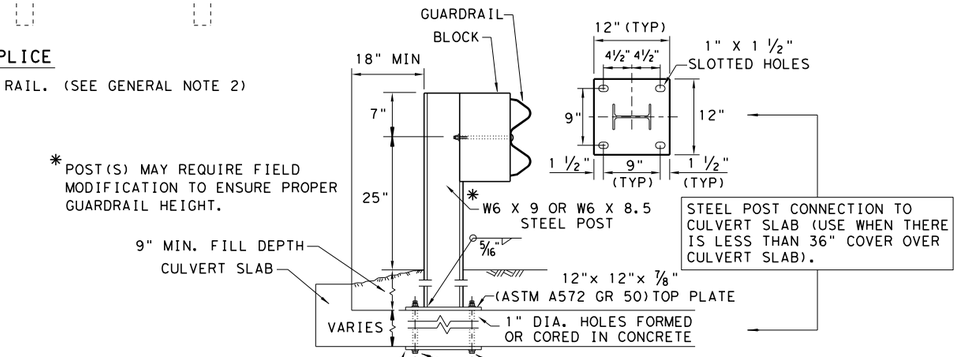
BUTTON HEAD BOLT

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



MID-SPAN
RAIL SPLICE DETAIL

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



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

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

LOW FILL CULVERT POST

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

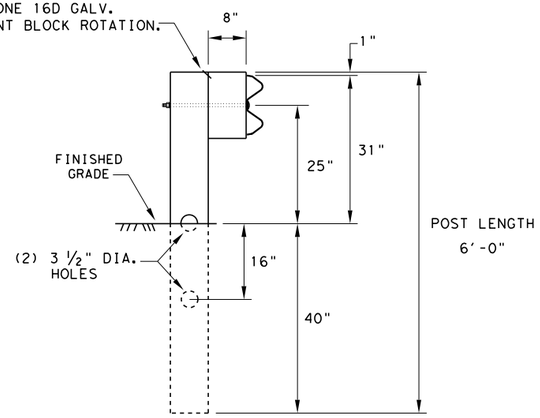
Design Division Standard

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	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		66

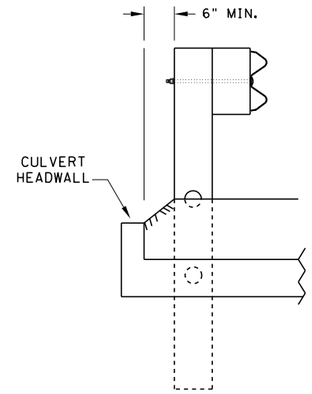
DATE: 11/30/2021
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\3. Roadway\ROADWAY STANDARDS\gf31is19.dgn

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



RECTANGULAR CRT POST
(6"X 8" X 6' LONG)

(6) CRT REQUIRED
SEE ELEVATION DETAIL FOR LOCATIONS



LATERAL OFFSET BETWEEN THE GUARDRAIL AND THE CULVERT HEADWALL

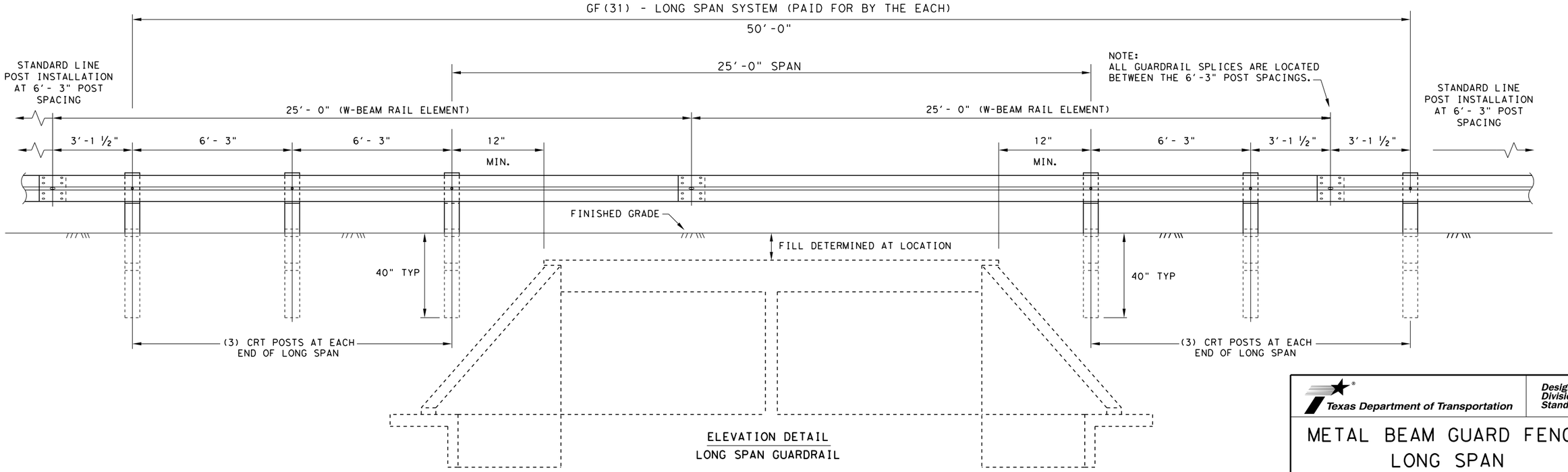
GENERAL NOTES

1. THE TYPE OF LINE POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF THE TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT SHALL MEET ALL REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12'- 6" OR 25'- 0" NOMINAL LENGTHS.
3. RAIL POST HOLES ARE OFFSET 3'- 1 ½" FROM STANDARD GUARDRAIL TO ACCOMMODATE THE MIDSPAN SPLICING.
4. 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 NO MORE THAN 1" BEYOND IT.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
7. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
8. REFER TO GF(31) STANDARD SHEET FOR ADDITIONAL DETAILS.
9. FLAME CUTTING OF HOLES IN GUARDRAIL SHALL NOT BE PERMITTED. IF YOU ENCOUNTER MIS-ALIGNED BOLT HOLES IN GUARDRAIL CONTACT THE DESIGN DIVISION FOR ADDITIONAL INFORMATION & OPTIONS.

DIRECTION OF TRAFFIC

NOTE: SEE GF(31) STANDARD FOR STANDARD LINE POSTS.

GF(31) - LONG SPAN SYSTEM (PAID FOR BY THE EACH)



ELEVATION DETAIL
LONG SPAN GUARDRAIL

Texas Department of Transportation

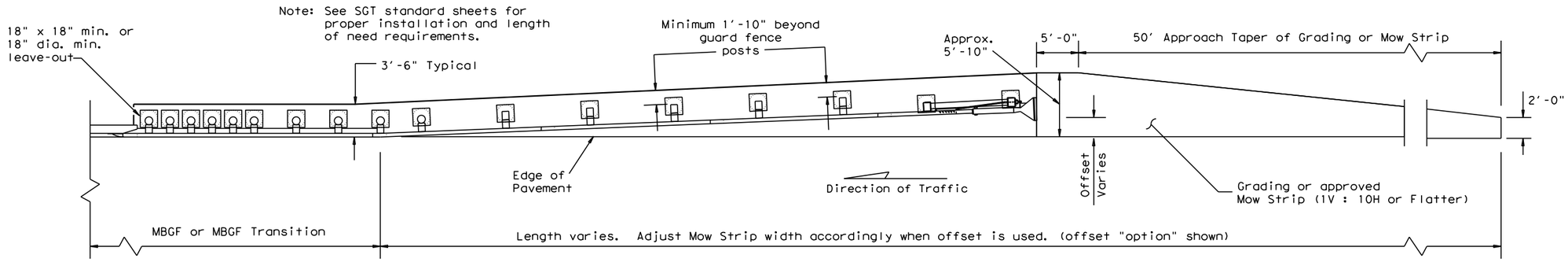
Design Division Standard

METAL BEAM GUARD FENCE
LONG SPAN
TL-3 MASH COMPLIANT

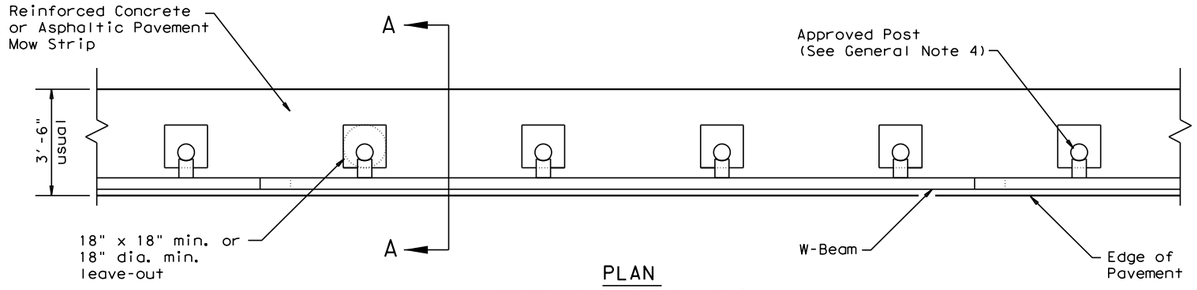
GF(31)LS-19

FILE: gf31is19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG		
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY		
REVISIONS	1451	03	017	FM 55		
	DIST	COUNTY		SHEET NO.		
	DAL	NAVARRO		67		

DATE: 11/30/2021
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\3. Roadway\ROADWAY STANDARDS\gf31ms19.dgn

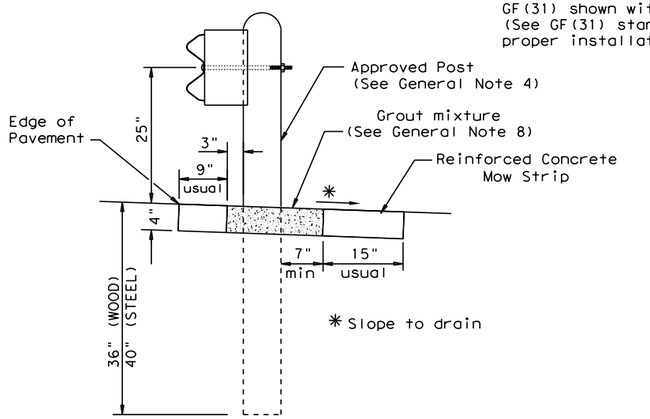


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



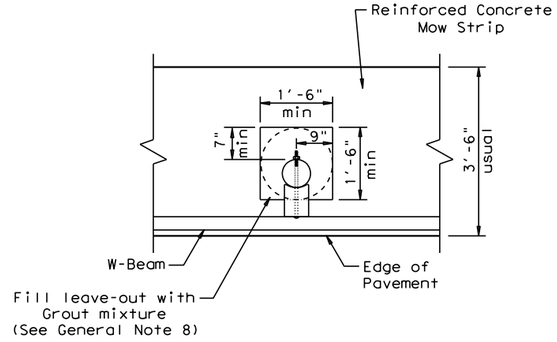
PLAN

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



SECTION A-A

Typical



MOW STRIP DETAIL

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

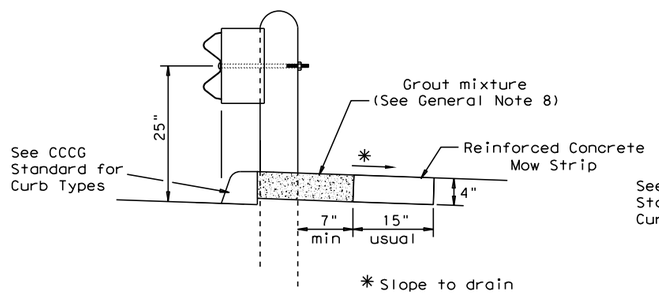
Note: Site Condition(s)

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

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

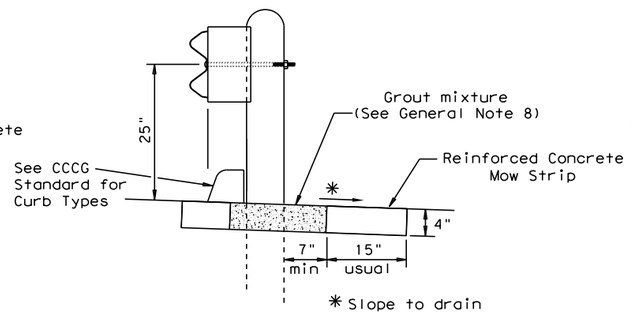
GENERAL NOTES

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



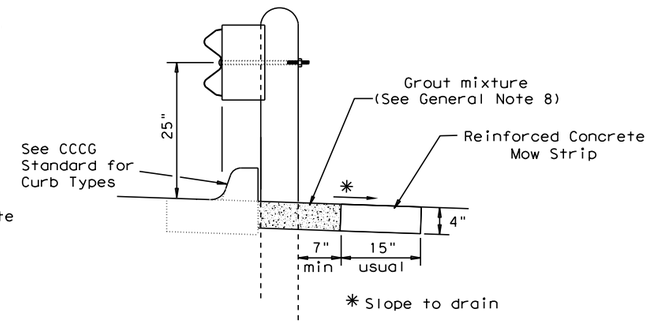
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

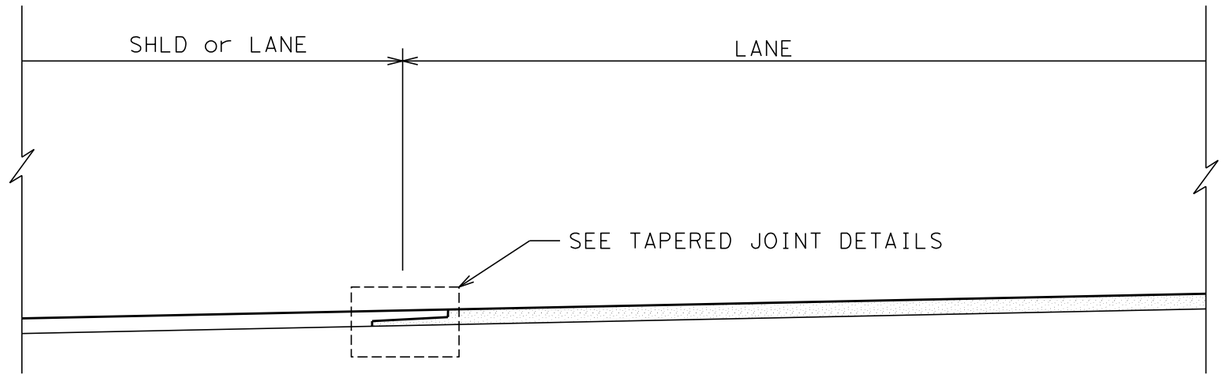
Texas Department of Transportation

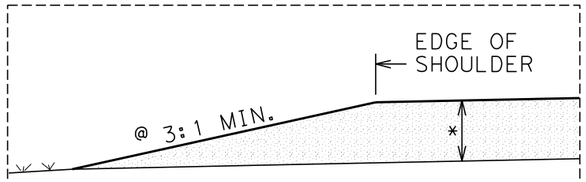
Design Division Standard

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

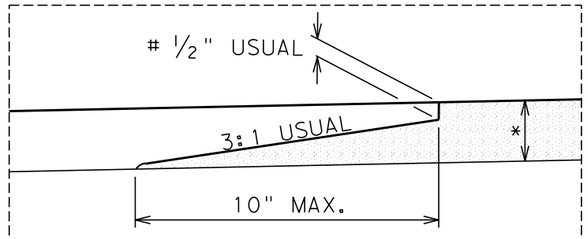
GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
© TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		68

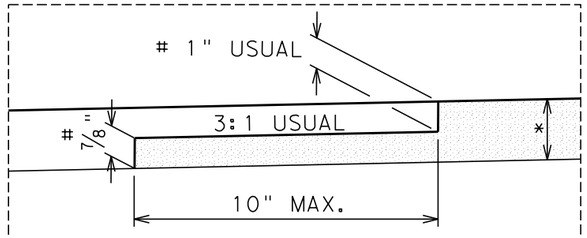




TAPERED OUTSIDE EDGE DETAIL



TAPERED JOINT DETAIL 1.5" TO 4" LIFTS



TAPERED JOINT DETAIL OVER 4" LIFTS

@ IF BACKFILLED SLOPE IS LESS THAN 3:1, COVER WEDGE WITH APPROVED BACKFILL.

* SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.
# NOTCH DEPTH SHALL NOT BE LESS THAN NOMINAL AGGREGATE SIZE.

NOTES:

1. THE ABOVE DETAILS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH AND BE LAID MONOLITHICALLY WITH ADJOINING MAT. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED. CLEAN WEDGE PRIOR TO PLACEMENT OF TACK COAT. TACK COAT SHALL BE APPLIED UNIFORMLY TO THE IN-PLACE TAPER WITH A DISTRIBUTOR BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED. COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED AS NEAR TO FINAL DENSITY AS POSSIBLE. ROLL ADJACENT MAT FROM HOT SIDE TO COLD.

2. THE TYPE OF DEVICE TO PRODUCE ABOVE REFERENCED DETAILS SHALL PROVIDE INITIAL COMPACTION EQUIVALENT TO LAYDOWN MACHINE, WITH FINAL DENSITY ADHERING TO NOTE 1, AND BE APPROVED BY THE ENGINEER.

3. HOT MIX MATERIAL AND PLACEMENT SHALL BE PAID FOR UNDER THE PERTINENT ITEM. ANY ADDITIONAL SURFACE PREPARATION, TACK COAT, TACK COAT PLACEMENT, EQUIPMENT, LABOR, TOOLS AND INCIDENTALS TO PRODUCE TAPERED EDGE AND JOINTS AS DESCRIBED ABOVE SHALL BE CONSIDERED SUBSIDIARY TO THE HOT MIX ITEM.

4. THE TAPERED JOINT DETAIL IS NOT INTENDED FOR USE ON 2 WAY 2 LANE ROADBED CENTERLINE WITH LESS THAN 22' OVERALL WIDTH.

5. FULL PAVING OF ALL LANES AND SHOULDRS BY THE END OF EACH DAY PRODUCTION WILL NOT REQUIRE A TAPERED JOINT.

HOT MIX EDGE AND LONGITUDINAL JOINT DETAILS DALLAS DISTRICT STANDARD

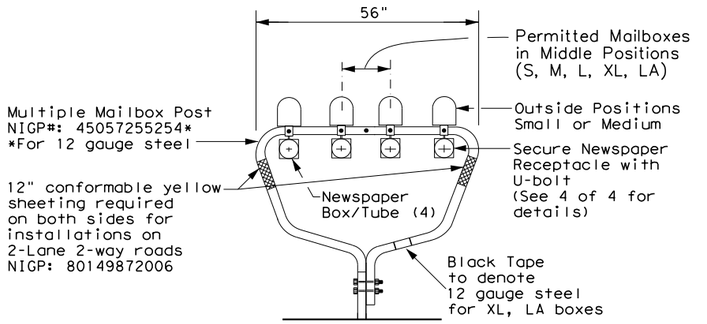
LJD(1-1)-07

FED. RD. DIV. NO.	PROJECT NUMBER		SHEET NUMBER
6	SEE TITLE SHEET		69
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	NAVARRO	
CONTROL	SECTION	SECTION	HIGHWAY NUMBER
1451	03	017	FM 55

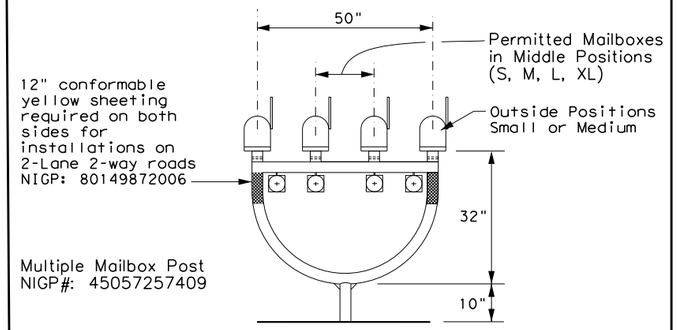
REVISED ON 9/10/08

DATE:
FILE:

TYPE 1 - MULTIPLE



TYPE 4 - MULTIPLE



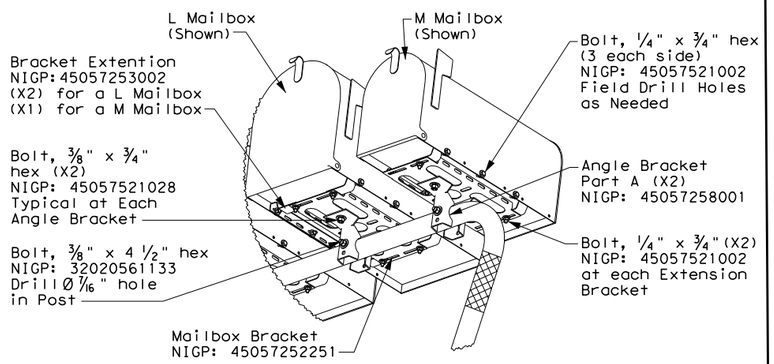
MAILBOX SIZES

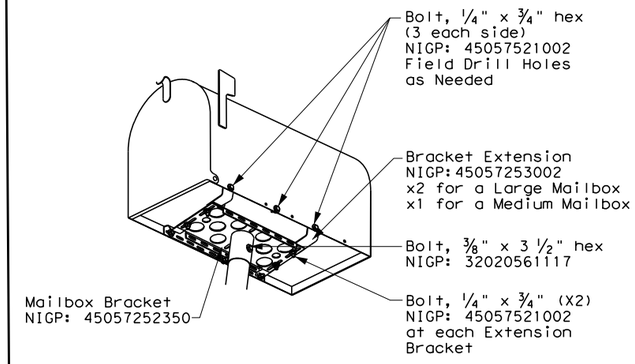
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 ½"	6"	7"	6 LBS
MEDIUM	22 ½" *	8" *	11 ½" *	8 LBS
LARGE	23 ½"	11 ½"	13 ½"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 ½"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

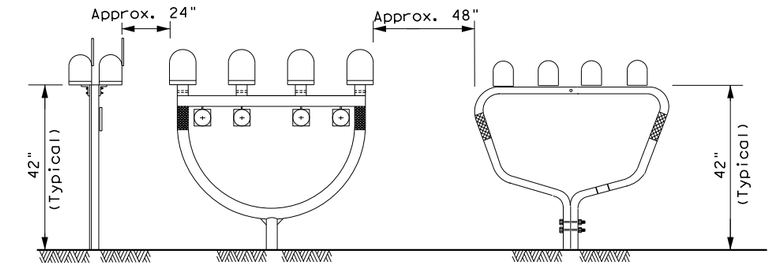
GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.





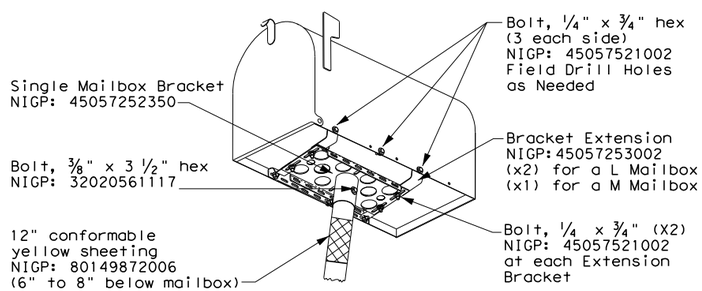
TYPICAL INSTALLATION MEASUREMENTS

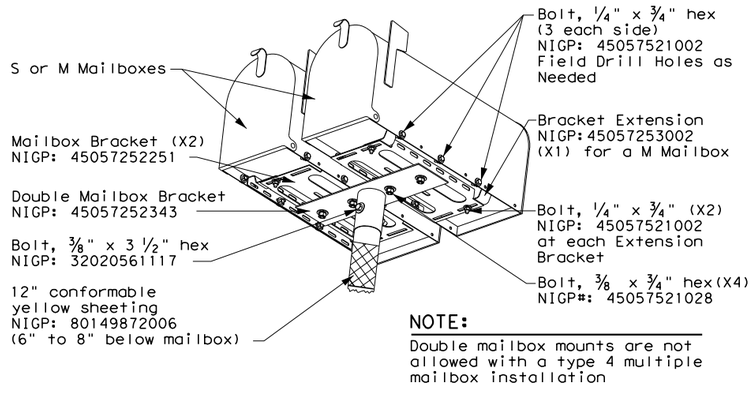


NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

TYPE 2 and 4 - SINGLE/DOUBLE

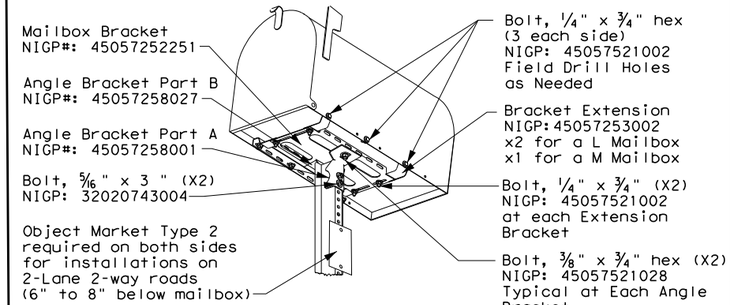


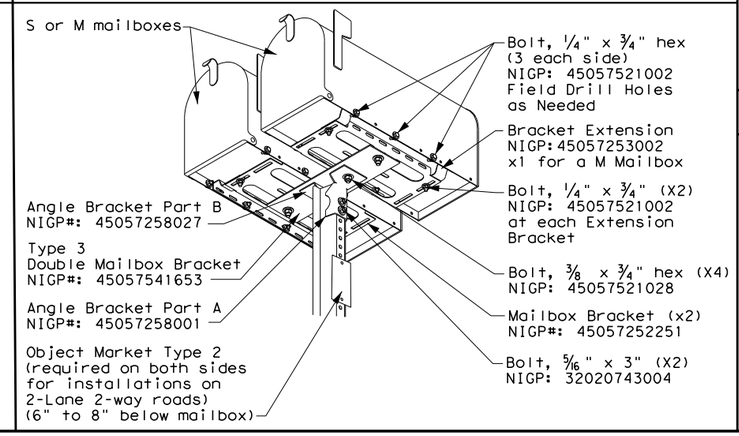


NOTE:

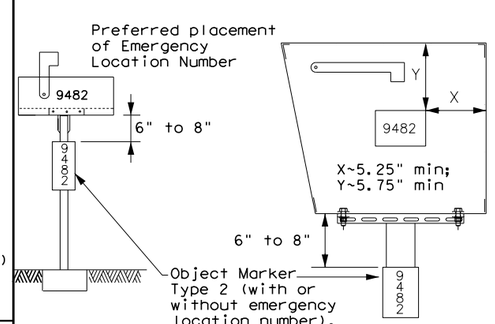
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

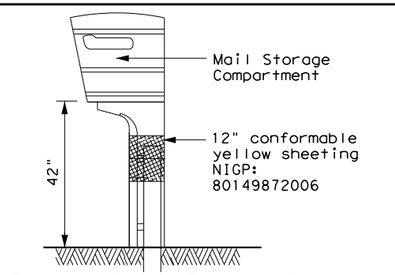


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation

Maintenance Division Standard

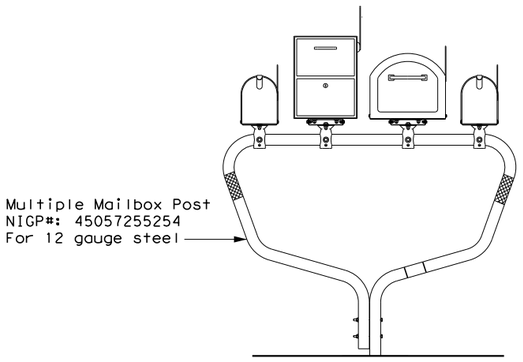
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

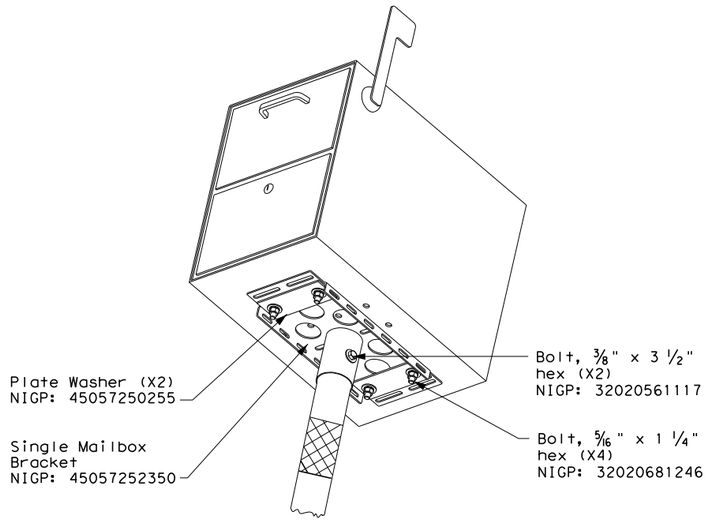
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		70

DATE:
FILE:

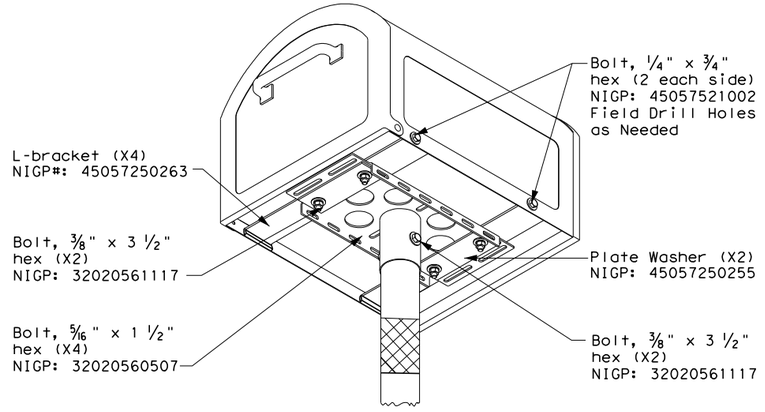
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

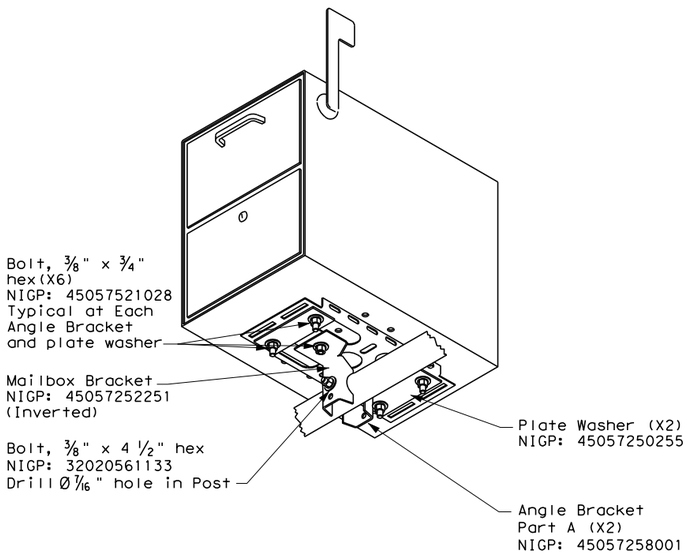


TYPE 2/4 - SINGLE XL MAILBOX

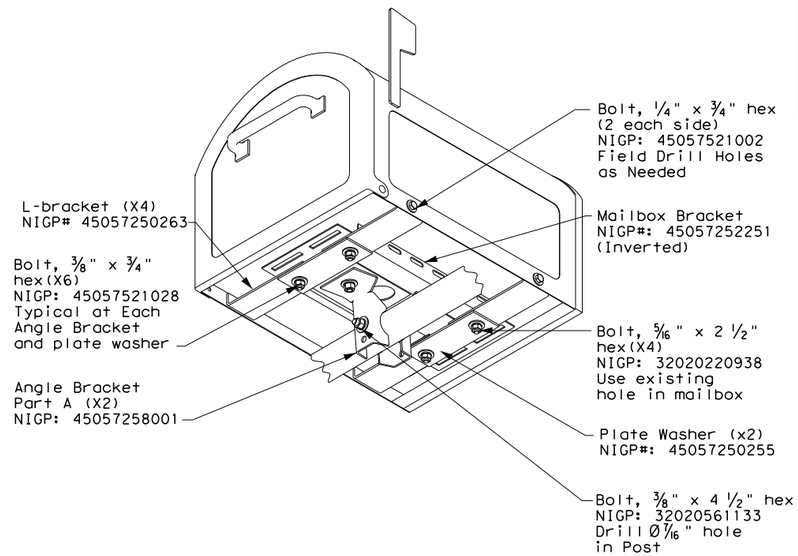


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

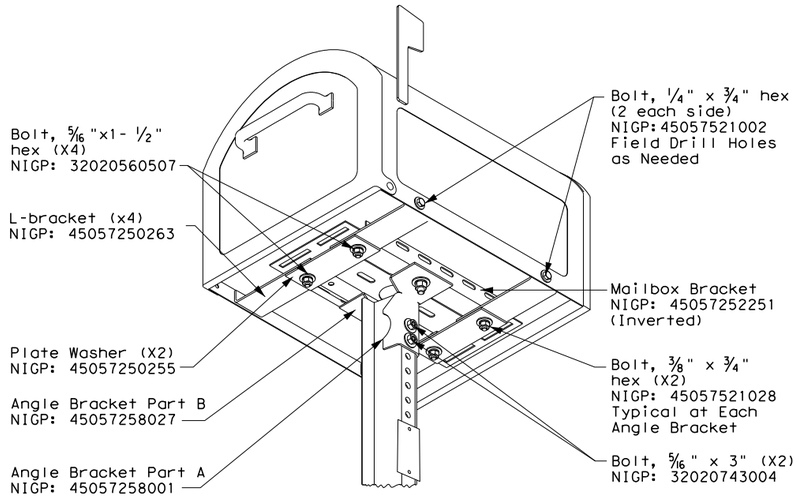
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

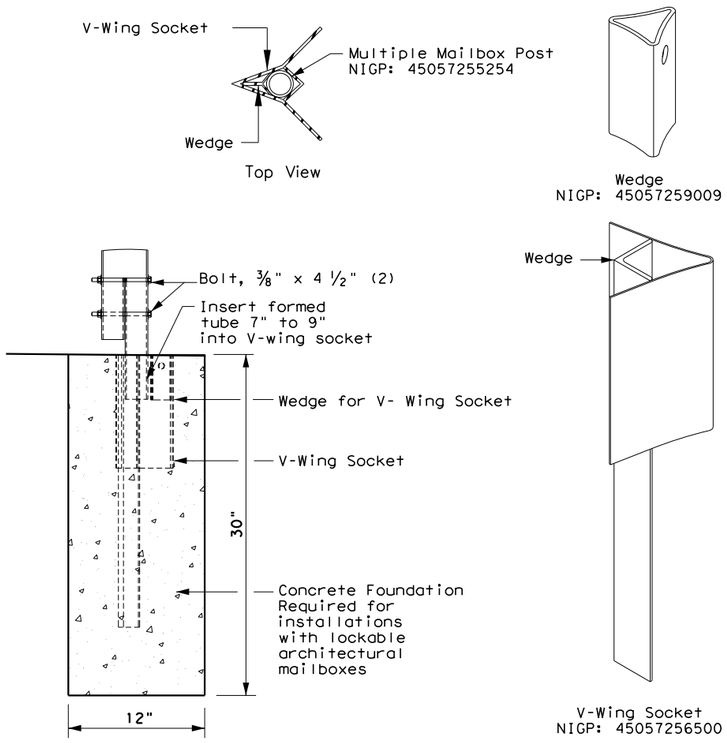
XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

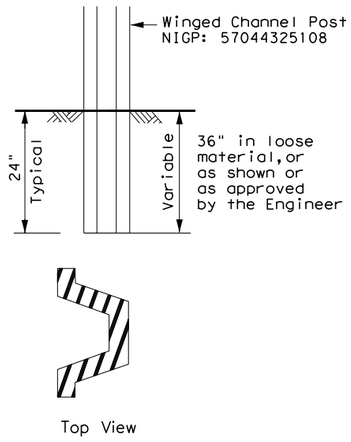
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		71

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



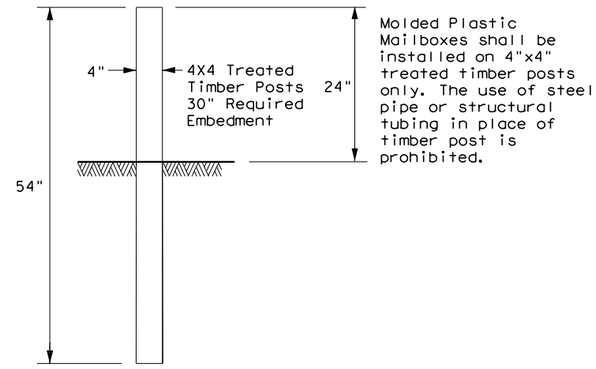
TYPE 3 - SUPPORT/FOUNDATION



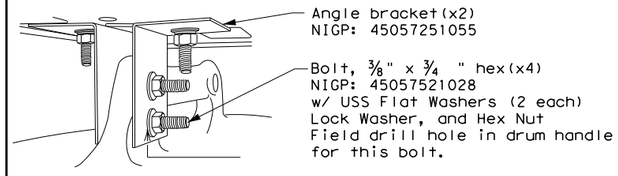
NOTES:

1. Attach Object Marker(OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

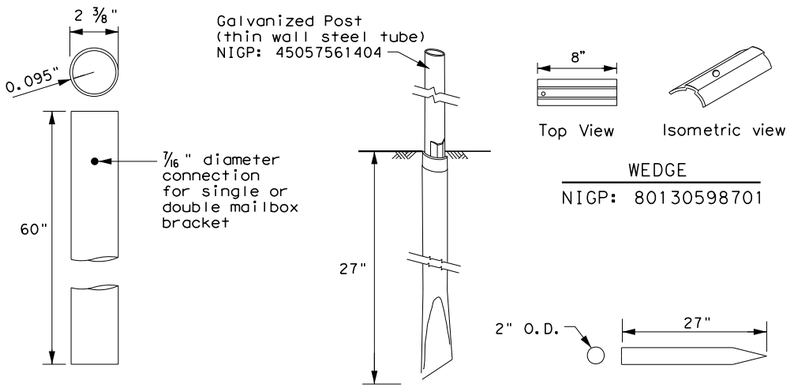
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System

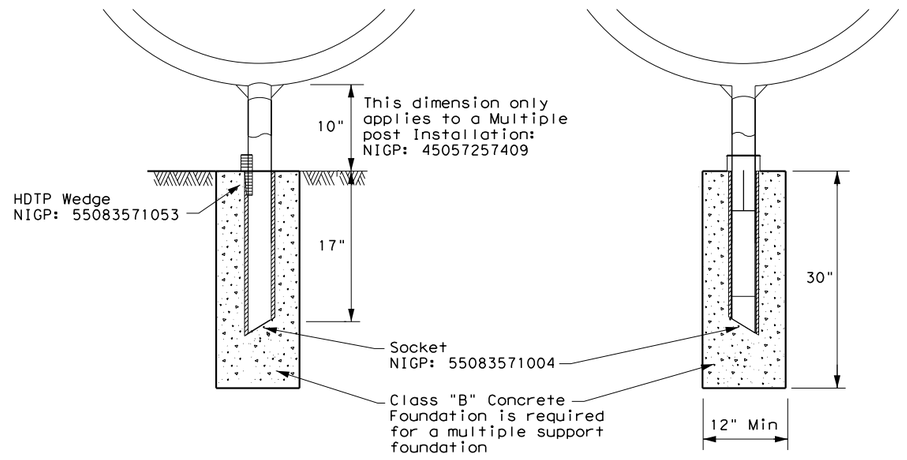


MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
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REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		72

DATE:
FILE:

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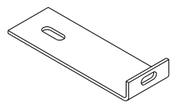
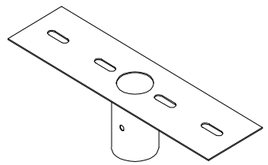
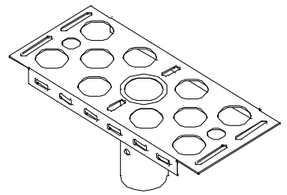
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



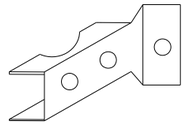
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



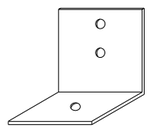
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



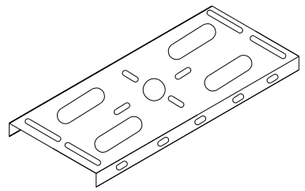
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



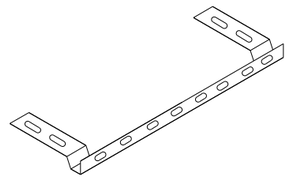
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



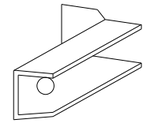
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



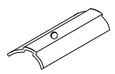
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



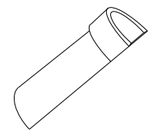
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



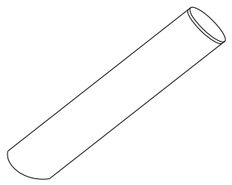
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

NIGP: 45057541653
Type 3 double mailbox bracket

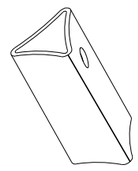


NIGP: 55083571053
Type 4 Mailbox Wedge

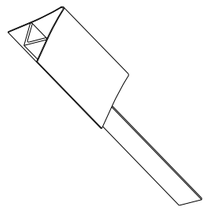


NIGP: 55083571004
Type 4 Mailbox Socket

NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

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	DAL	NAVARRO		73

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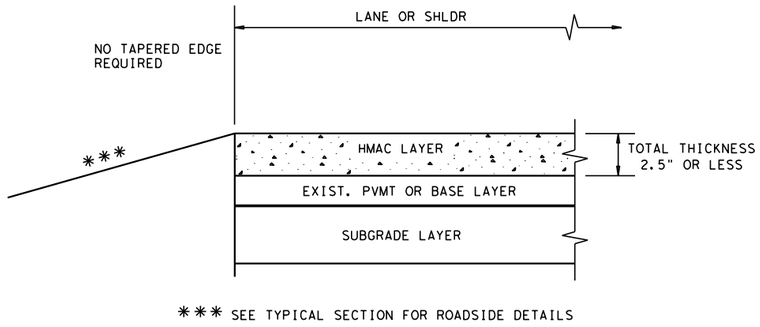
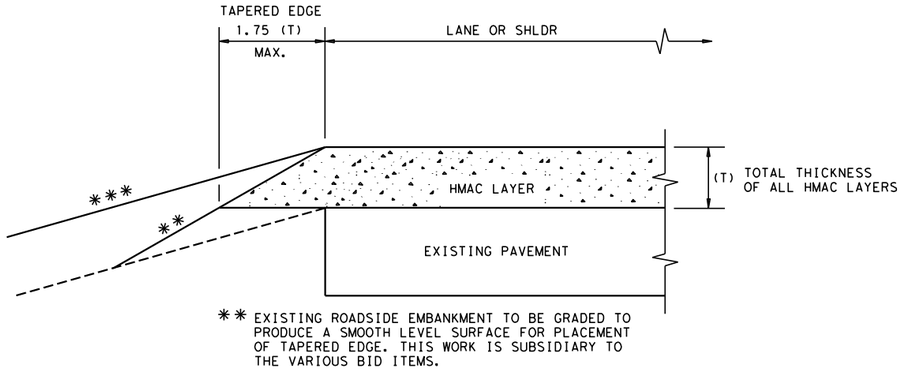


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

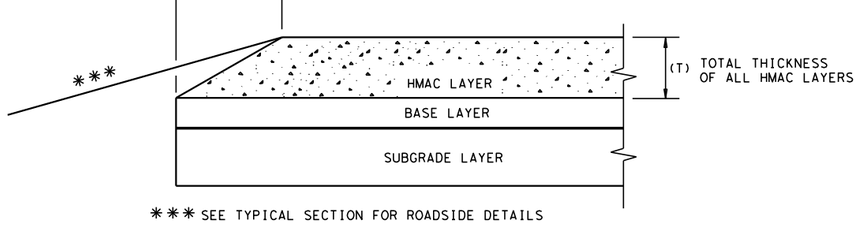
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

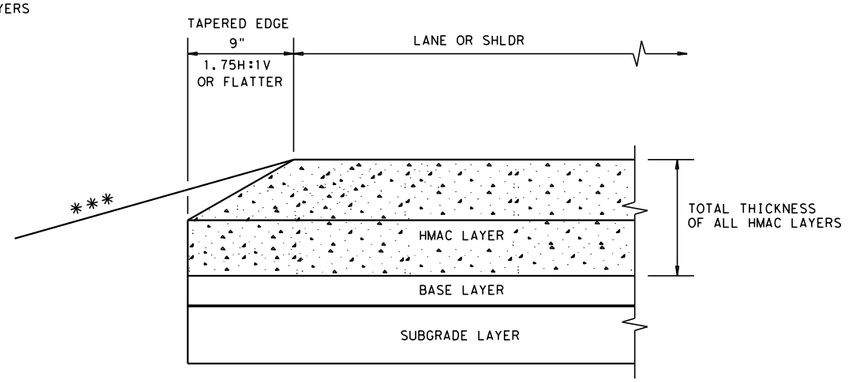
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:		
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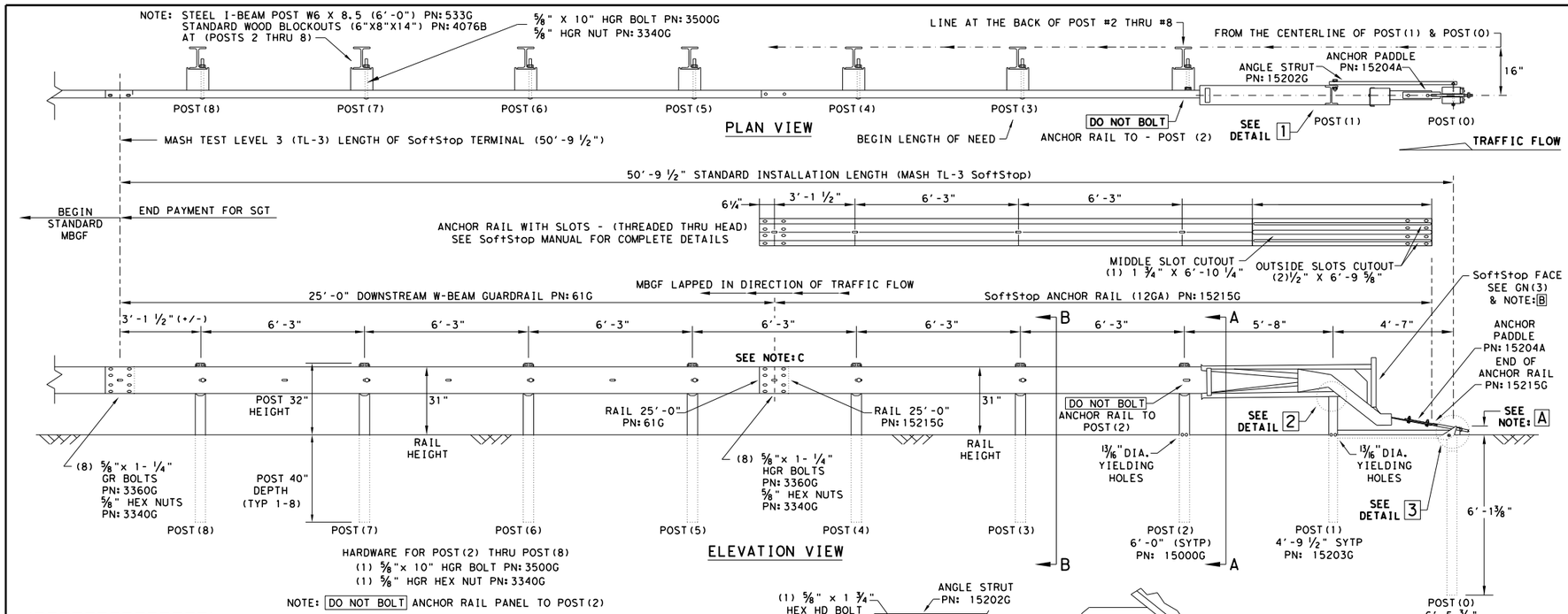
	DAL	NAVARRO			74	



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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT		CK: KM	DW: VP		CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	1451	03	017		FM 55	
	DIST	COUNTY			SHEET NO.	
	DAL	NAVARRO			75	

DATE:
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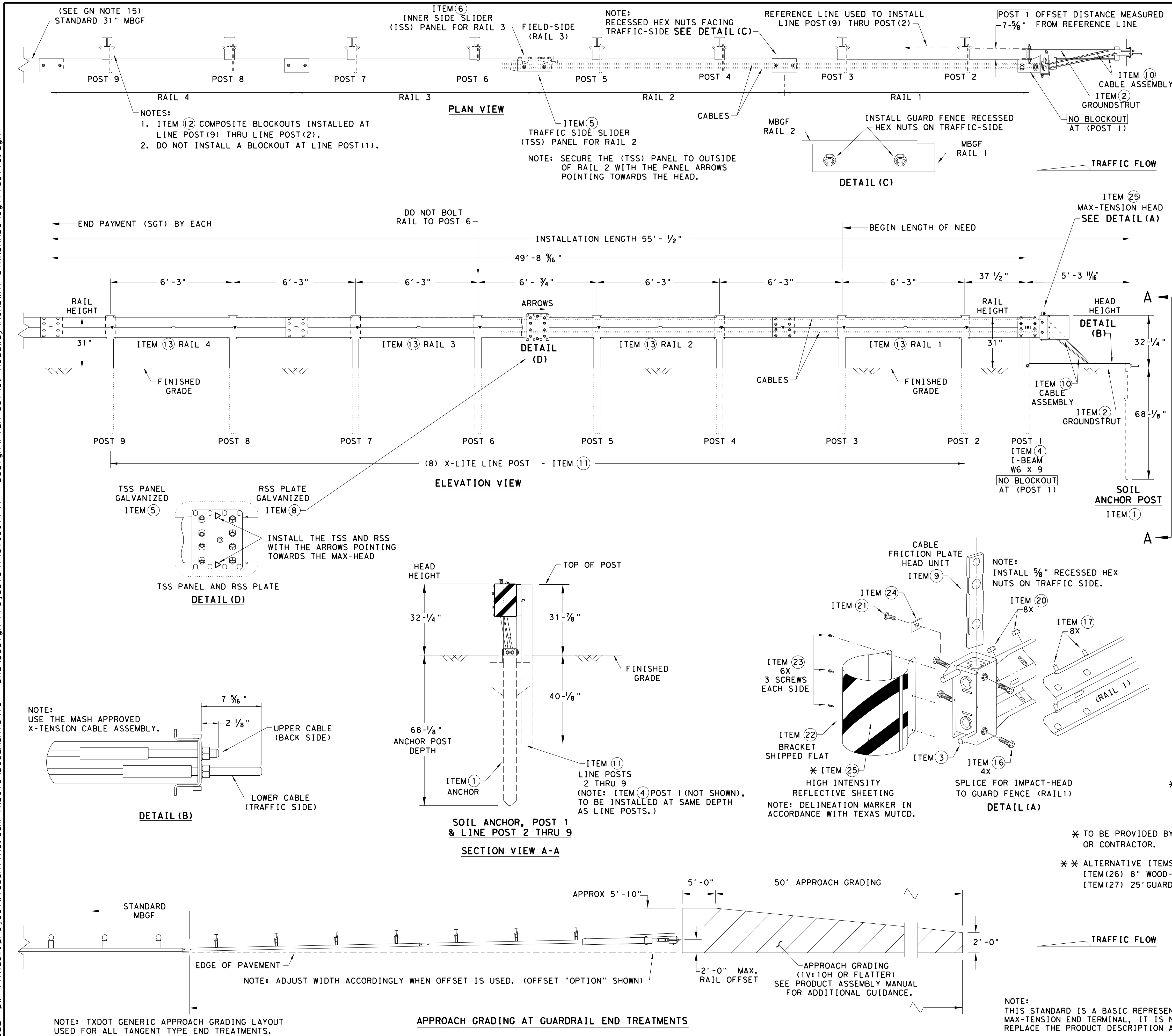
(SEE GN NOTE 15)
STANDARD 31" MBGF
ITEM 6 INNER SIDE SLIDER (ISS) PANEL FOR RAIL 3
FIELD-SIDE (RAIL 3)
NOTE: RECESSED HEX NUTS FACING TRAFFIC-SIDE SEE DETAIL (C)
REFERENCE LINE USED TO INSTALL LINE POST(9) THRU POST(2)
POST 1 OFFSET DISTANCE MEASURED FROM REFERENCE LINE
7-5/8"
POST 9
POST 8
POST 7
POST 6
POST 5
POST 4
POST 3
POST 2
RAIL 4
RAIL 3
RAIL 2
RAIL 1
ITEM 10 CABLE ASSEMBLY
ITEM 2 GROUNDSTRUT
NO BLOCKOUT AT (POST 1)
PLAN VIEW
NOTES:
1. ITEM 12 COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).
ITEM 5 TRAFFIC SIDE SLIDER (TSS) PANEL FOR RAIL 2
NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.
CABLES
MBGF RAIL 2
INSTALL GUARD FENCE RECESSED HEX NUTS ON TRAFFIC-SIDE
MBGF RAIL 1
DETAIL (C)
TRAFFIC FLOW
END PAYMENT (SGT) BY EACH
DO NOT BOLT RAIL TO POST 6
ITEM 25 MAX-TENSION HEAD SEE DETAIL (A)
INSTALLATION LENGTH 55'- 1/2"
BEGIN LENGTH OF NEED
49'-8 9/16"
6'-3"
6'- 3/4"
37 1/2"
5'-3 11/16"
RAIL HEIGHT
ARROWS
HEAD HEIGHT
DETAIL (B)
31"
32-1/4"
ITEM 13 RAIL 4
ITEM 13 RAIL 3
ITEM 13 RAIL 2
ITEM 13 RAIL 1
DETAIL (D)
FINISHED GRADE
ITEM 10 CABLE ASSEMBLY
ITEM 2 GROUNDSTRUT
68-1/8"
POST 1 ITEM 4 I-BEAM W6 X 9
NO BLOCKOUT AT (POST 1)
SOIL ANCHOR POST ITEM 1
(8) X-LITE LINE POST - ITEM 11
ELEVATION VIEW
A
TSS PANEL GALVANIZED ITEM 5
RSS PLATE GALVANIZED ITEM 8
INSTALL THE TSS AND RSS WITH THE ARROWS POINTING TOWARDS THE MAX-HEAD
TSS PANEL AND RSS PLATE
DETAIL (D)
HEAD HEIGHT
TOP OF POST
32-1/4"
31-7/8"
FINISHED GRADE
40-1/8"
68-1/8" ANCHOR POST DEPTH
ITEM 1 ANCHOR
ITEM 11 LINE POSTS 2 THRU 9 (NOTE: ITEM 4 POST 1 (NOT SHOWN), TO BE INSTALLED AT SAME DEPTH AS LINE POSTS.)
SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9
SECTION VIEW A-A
NOTE: USE THE MASH APPROVED X-TENSION CABLE ASSEMBLY.
7 5/16"
2 1/8"
UPPER CABLE (BACK SIDE)
LOWER CABLE (TRAFFIC SIDE)
DETAIL (B)
CABLE FRICTION PLATE HEAD UNIT ITEM 9
NOTE: INSTALL 5/8" RECESSED HEX NUTS ON TRAFFIC SIDE.
ITEM 24
ITEM 21
ITEM 20 8X
ITEM 17 8X
ITEM 23 6X 3 SCREWS EACH SIDE
(RAIL 1)
ITEM 22 BRACKET SHIPPED FLAT
ITEM 3
ITEM 16 4X
* ITEM 25 HIGH INTENSITY REFLECTIVE SHEETING
NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.
SPLICE FOR IMPACT-HEAD TO GUARD FENCE (RAIL1)
DETAIL (A)
STANDARD MBGF
APPROX 5'-10"
5'-0"
50' APPROACH GRADING
2'-0"
EDGE OF PAVEMENT
2'-0" MAX. RAIL OFFSET
APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.
NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)
TRAFFIC FLOW
APPROACH GRADING AT GUARDRAIL END TREATMENTS
NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

GENERAL NOTES

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

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

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

Texas Department of Transportation — Design Division Standard

MAX-TENSION END TERMINAL MASH - TL-3

SGT(11S)31-18

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST		COUNTY	SHEET NO.
	DAL		NAVARRO	76

DATE: 11/30/2021
FILE: pw:\\txdot.projectwiseonline.com:TXDOTS\Documents\18 - DAL\Design Projects\1451-03-017\a other design roadway standards\sgt11s3118.dgn

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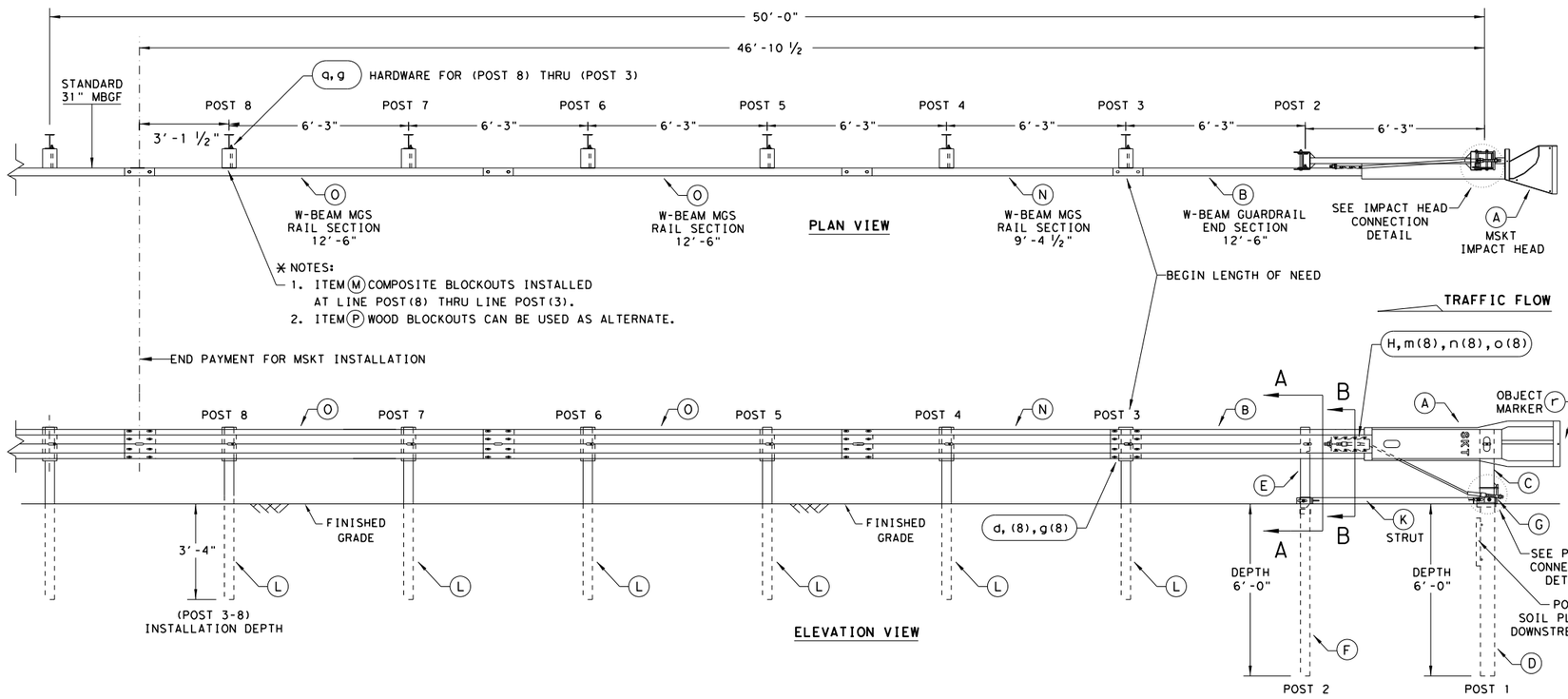
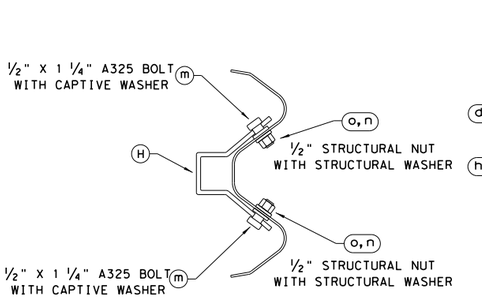
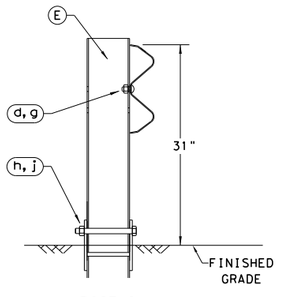
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\3. Roadway\ROADWAY STANDARDS\sgt12s3118.dgn



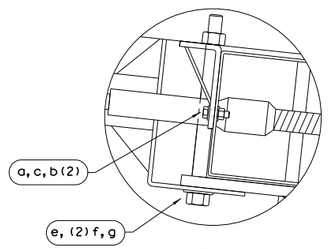
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



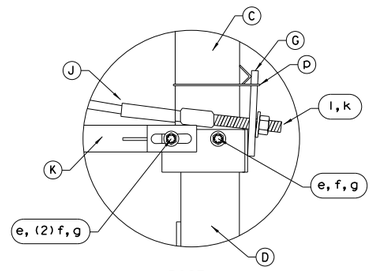
SECTION B-B
ANCHOR BRACKET



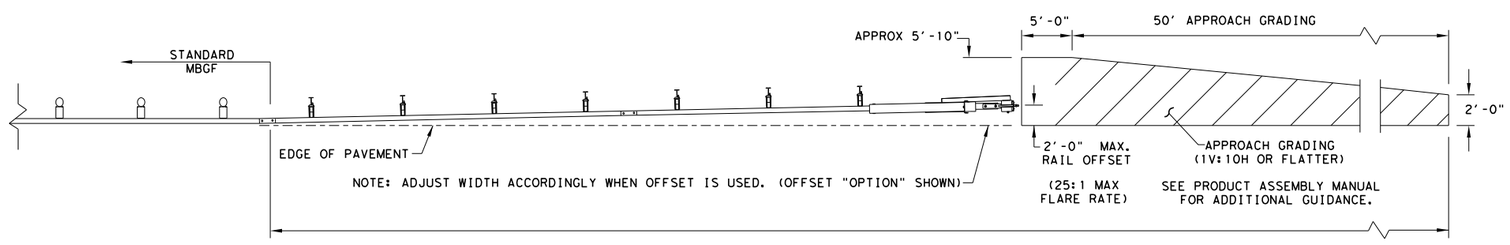
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

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

SEE NOTES: ✳

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1451	03	017	FM 55	
	DIST	COUNTY		SHEET NO.	
	DAL	NAVARRO		77	

DATE: 11/30/2021
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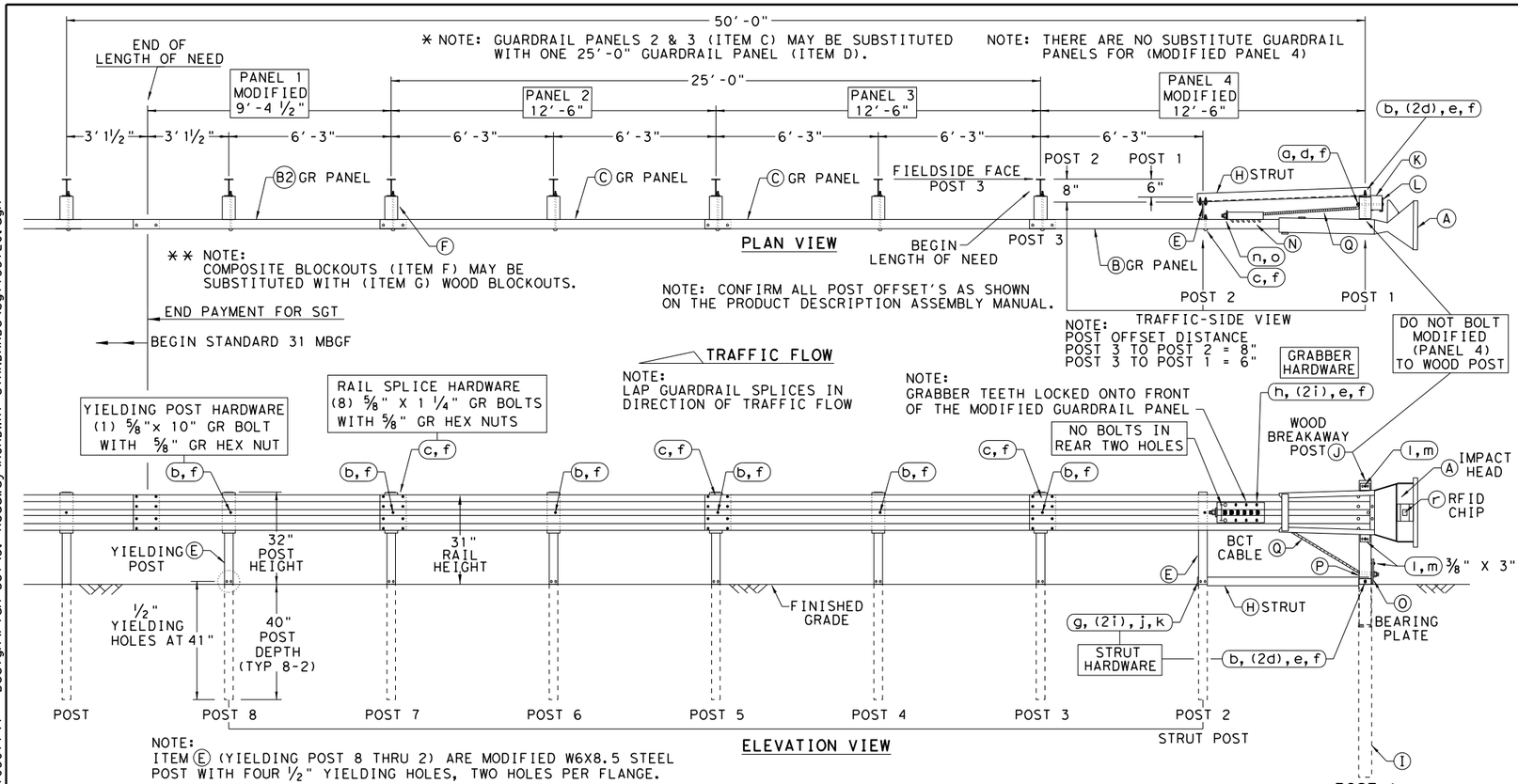
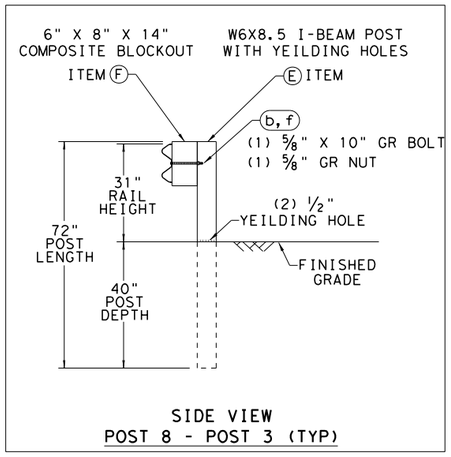


GENERAL NOTES

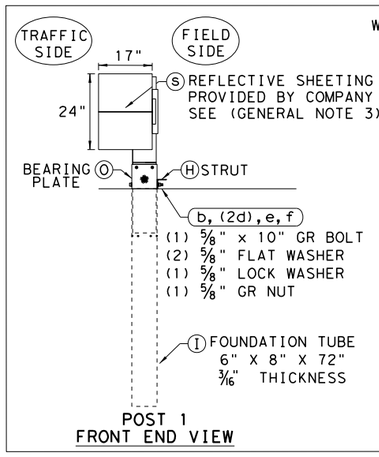
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

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

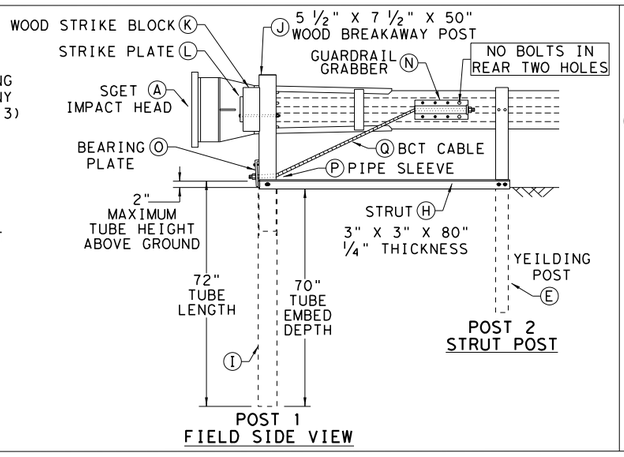
ALTERNATIVE ITEMS
* D
** G
NOTE: SEE PLAN VIEW



SIDE VIEW
POST 8 - POST 3 (TYP)

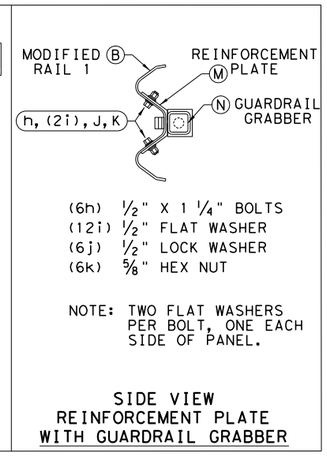


POST 1
FRONT END VIEW



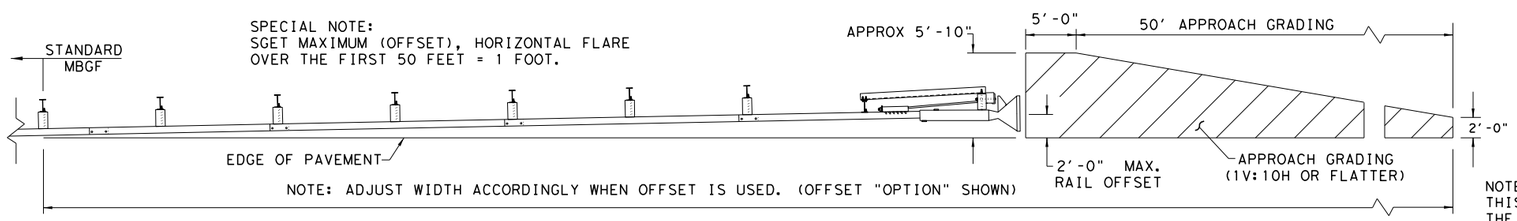
POST 1
FIELD SIDE VIEW

POST 2
STRUT POST



NOTE: TWO FLAT WASHERS PER BOLT, ONE EACH SIDE OF PANEL.

SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER



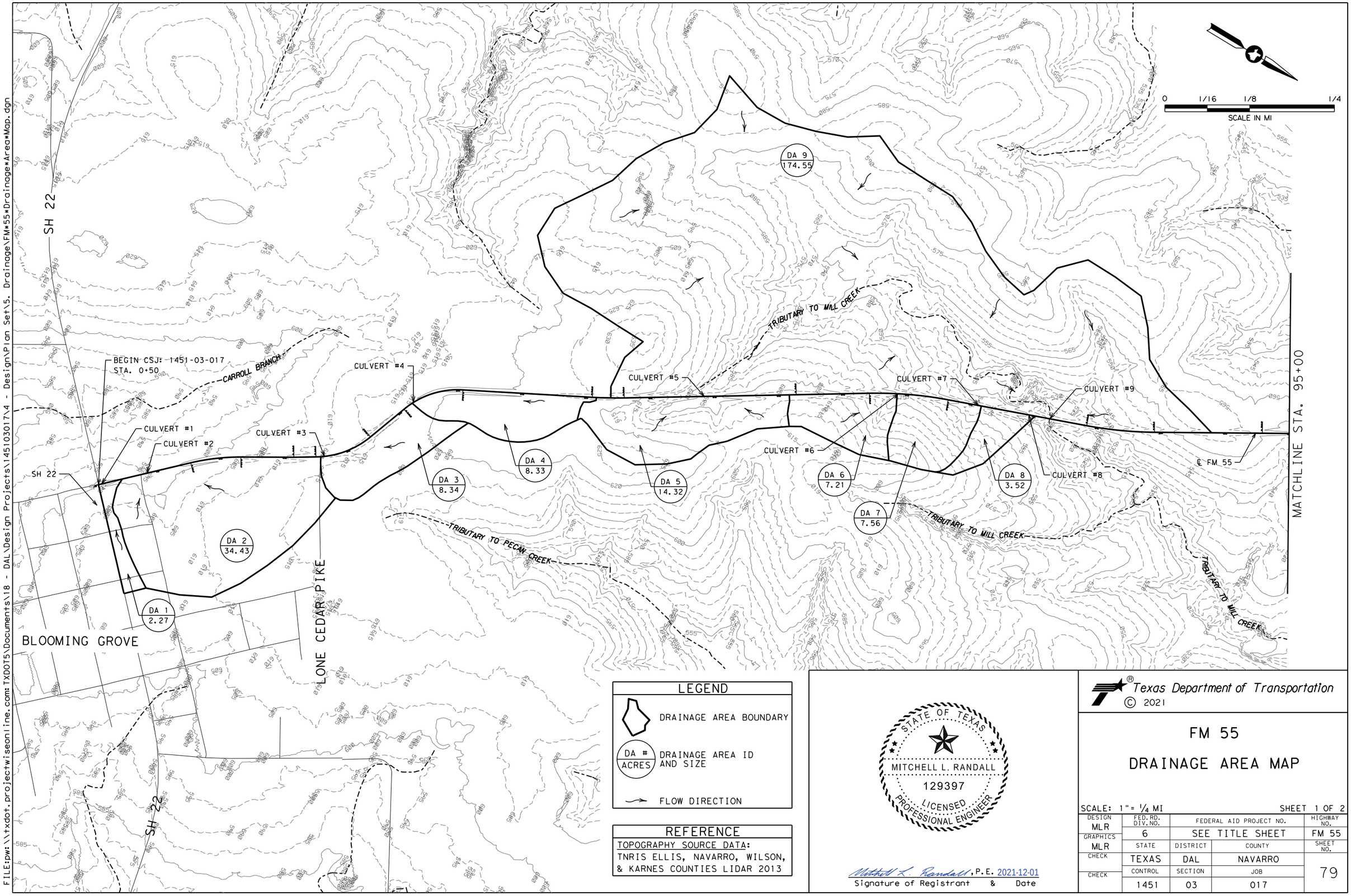
APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

Texas Department of Transportation
Design Division Standard

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

FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
© TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		78



LEGEND	
	DRAINAGE AREA BOUNDARY
DA # / ACRES	DRAINAGE AREA ID AND SIZE
	FLOW DIRECTION

REFERENCE

TOPOGRAPHY SOURCE DATA:
TNRIS ELLIS, NAVARRO, WILSON, & KARNES COUNTIES LIDAR 2013

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-12-01
Signature of Registrant & Date

Texas Department of Transportation

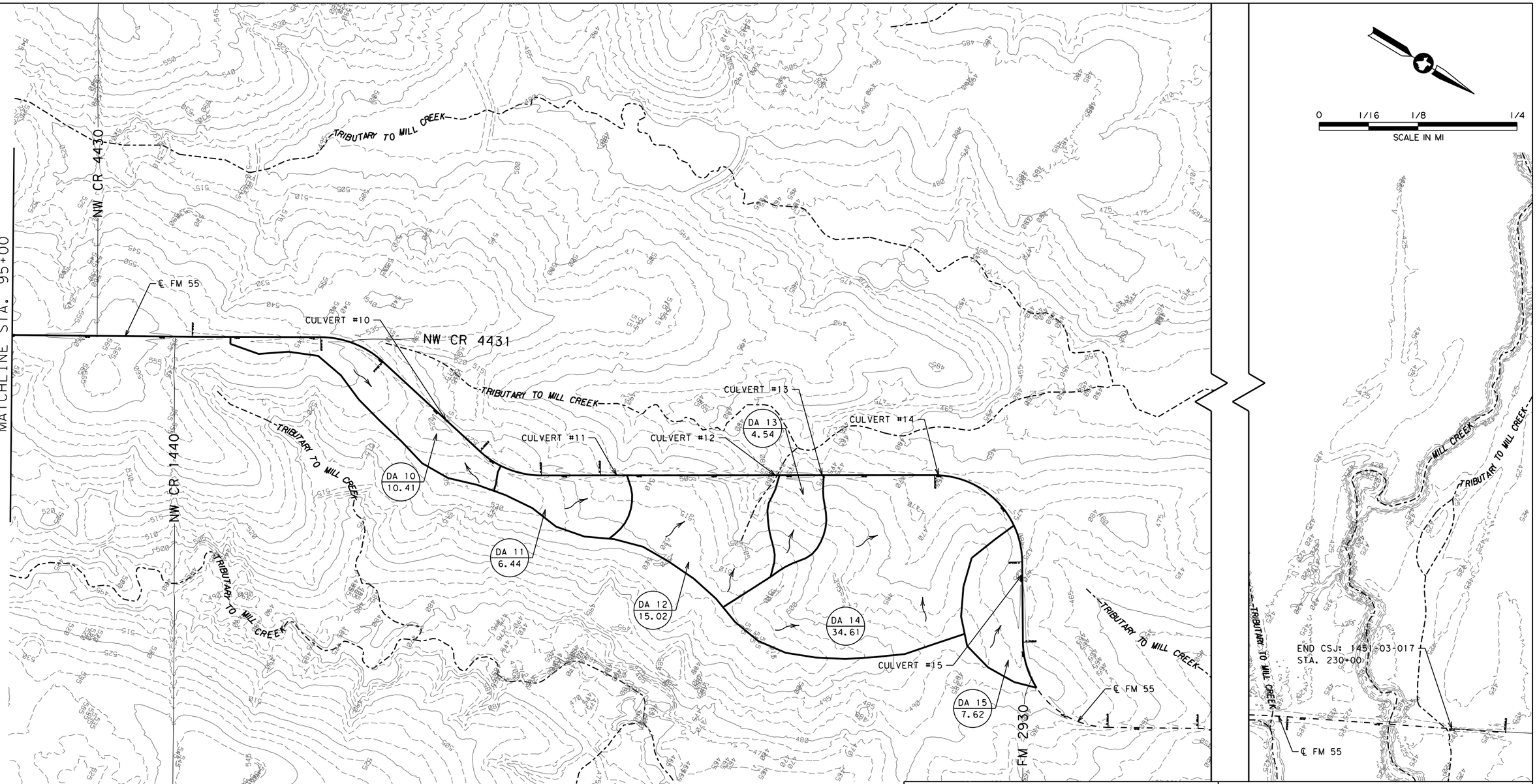
FM 55

DRAINAGE AREA MAP

SCALE: 1" = ¼ MI SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	79
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:12/1/2021 TIME:13:05:03
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\5. Drainage\FM*55*Drainage*AreaMap.dgn



LEGEND

- DRAINAGE AREA BOUNDARY
- DA # / ACRES — DRAINAGE AREA ID AND SIZE
- FLOW DIRECTION

REFERENCE

TOPOGRAPHY SOURCE DATA:
TNRIS ELLIS, NAVARRO, WILSON, & KARNES COUNTIES LIDAR 2013

STATE OF TEXAS
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129397
LICENSED PROFESSIONAL ENGINEER

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FM 55

DRAINAGE AREA MAP

SCALE: 1" = 1/4 MI SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS: MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	80
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:12/1/2021 TIME:13:05:04
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DRAINAGE AREA RUNOFF COMPUTATIONS

DRAINAGE AREA	HYDROLOGIC METHOD	TIME OF CONCENTRATION METHOD	RURAL WATERSHED RUNOFF COEFFICIENT COMPONENTS				TOTAL RUNOFF COEFFICIENT "C"	DRAINAGE AREA SIZE "A" (AC)	TIME OF CONCENTRATION "T_C" (MIN)	INTENSITY "I" (IN/HR)		DRAINAGE AREA DISCHARGE "Q" (CFS)	
			C_R	C_I	C_V	C_S				10-YR	100-YR	10-YR	100-YR
1	RATIONAL	NRCS	0.10	0.08	0.15	0.12	0.45	2.271	24.1	4.64	7.20	4.74	7.36
2	RATIONAL	NRCS	0.10	0.08	0.15	0.12	0.45	34.430	29.1	4.19	6.53	59.3	92.4
3	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	8.338	27.0	4.37	6.79	10.9	17.0
4	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	8.325	31.5	4.00	6.25	9.99	15.6
5	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	14.315	12.2	6.39	9.70	27.4	41.7
6	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	7.214	13.2	6.19	9.41	13.4	20.4
7	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	7.556	15.6	5.75	8.80	13.0	20.0
8	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	3.523	11.3	6.59	9.97	6.96	10.5
9	RATIONAL	KERBY-KIRPICH	0.10	0.06	0.06	0.06	0.28	174.550	48.6	3.08	4.86	150.5	237.5
10	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	10.410	17.9	5.40	8.29	16.9	26.0
11	RATIONAL	NRCS	0.10	0.06	0.06	0.06	0.28	6.435	17.1	5.51	8.46	9.93	15.2
12	RATIONAL	NRCS	0.10	0.06	0.06	0.06	0.28	15.015	20.3	5.07	7.82	21.3	32.9
13	RATIONAL	NRCS	0.12	0.06	0.06	0.08	0.32	4.542	14.8	5.89	8.99	8.56	13.1
14	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	34.612	17.2	5.50	8.44	57.1	87.6
15	RATIONAL	NRCS	0.10	0.06	0.06	0.08	0.30	7.620	14.2	6.00	9.14	13.7	20.9

NOTES:

1. TxDOT HYDRAULIC DESIGN MANUAL REVISED SEP. 2019 WAS UTILIZED FOR THE DESIGN OF THIS PROJECT.
2. DESIGN STORM FREQUENCY FOR RUNOFF COMPUTATIONS IS 10-YR WITH 100-YR PERFORMED AS A CHECK.

STATE OF TEXAS
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Mitchell L. Randall, P.E. 2021-12-01
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FM 55
RUNOFF COMPUTATIONS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	81
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:12/1/2021 TIME:13:05:09
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CULVERT HYDRAULIC CALCULATIONS

CULVERT	DRAINAGE AREA ID	STATION	DESCRIPTION		SLOPE (%)	ALLOWABLE HEADWATER ELEVATION (FT)	FLOWRATE "Q" (CFS)		HW ELEVATION (FT)		TW ELEVATION (FT)		OUTFALL VELOCITY (FPS)	
							10-YR	100-YR	10-YR	100-YR	10-YR	100-YR	10-YR	100-YR
1	1	0+54.68	EXISTING:	18"x55' CMP	0.5	599.14	4.74	7.36	598.79	599.22	597.85	597.99	4.68	5.57
			PROPOSED:	18"x66' RCP										
2	2	4+17.59	EXISTING:	36"x46' RCP	0.5	598.32	59.3	92.4	598.11	599.87	596.00	596.35	7.58	9.18
			PROPOSED:	2-30"x44' RCP										
3	3	18+11.78	EXISTING:	24"x50' RCP	3.6	613.66	10.9	17.0	613.11	613.82	610.58	610.81	10.5	11.3
			PROPOSED:	24"x44' RCP										
4	4	26+34.93	EXISTING:	30"x49' RCP	0.8	618.13	10.0	15.6	615.84	616.32	615.06	615.31	6.15	6.92
			PROPOSED:	30"x47' RCP										
5	5	49+20.42	EXISTING:	30"x58' RCP	1.6	598.84	27.4	41.7	596.87	598.45	595.26	596.14	10.1	8.49
			PROPOSED:	30"x52' RCP										
6	6	64+31.90	EXISTING:	30"x81' RCP	1.5	579.71	13.4	20.4	575.48	575.69	567.04	567.27	9.04	10.1
			PROPOSED:	30"x83' RCP										
7	7	70+61.19	EXISTING:	30"x63' RCP	0.5	553.85	13.0	20.0	552.04	552.24	547.75	548.07	6.16	6.85
			PROPOSED:	30"x60' RCP										
8	8	74+61.15	EXISTING:	24"x47' RCP	2.0	538.62	6.96	10.5	536.61	537.01	534.61	534.75	7.19	7.99
			PROPOSED:	24"x49' RCP										
9	9	76+27.05	EXISTING:	4-48"x104' RCP	0.9	533.47	150.5	237.5	525.37	527.67	525.11	527.02	2.98	4.71
			PROPOSED:	4-48"x94" RCP										
10	10	125+89.45	EXISTING:	30"x58' RCP	0.5	522.54	16.9	25.9	519.45	520.28	517.58	517.71	6.50	7.16
			PROPOSED:	30"x54' RCP										
11	11	138+50.72	EXISTING:	24"x54' RCP	3.0	510.35	9.93	15.2	506.90	507.60	503.53	503.63	10.2	11.2
			PROPOSED:	24"x62' RCP										
12	12	149+08.87	EXISTING:	30"x82' RCP	0.7	483.51	21.3	32.9	481.41	482.70	476.75	477.14	6.63	8.00
			PROPOSED:	30"x91' RCP										
13	13	152+21.74	EXISTING:	24"x53' RCP	2.3	478.54	8.56	13.1	475.94	476.48	473.14	473.17	8.90	9.72
			PROPOSED:	24"x54' RCP										
14	14	159+98.72	EXISTING:	42"x52' RCP	2.6	467.33	57.1	87.6	465.70	468.14	464.38	465.19	12.3	9.11
			PROPOSED:	42"x56' RCP										
15	15	169+69.48	EXISTING:	30"x61' RCP	0.5	479.42	13.7	20.9	475.66	475.90	471.46	471.79	6.06	6.76
			PROPOSED:	24"x72' RCP										

NOTES:

1. TxDOT HYDRAULIC DESIGN MANUAL REVISED SEP. 2019 WAS UTILIZED FOR THE DESIGN OF THIS PROJECT.

2. HYDRAULIC CALCULATIONS WERE PERFORMED USING HY-8 7.60. HYDRUALIC CALCULATIONS FOR CULVERTS WITH DROP INLETS WERE PERFORMED WITH GEOPAK DRAINAGE.

STATE OF TEXAS
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FM 55
CULVERT CALCULATIONS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	82
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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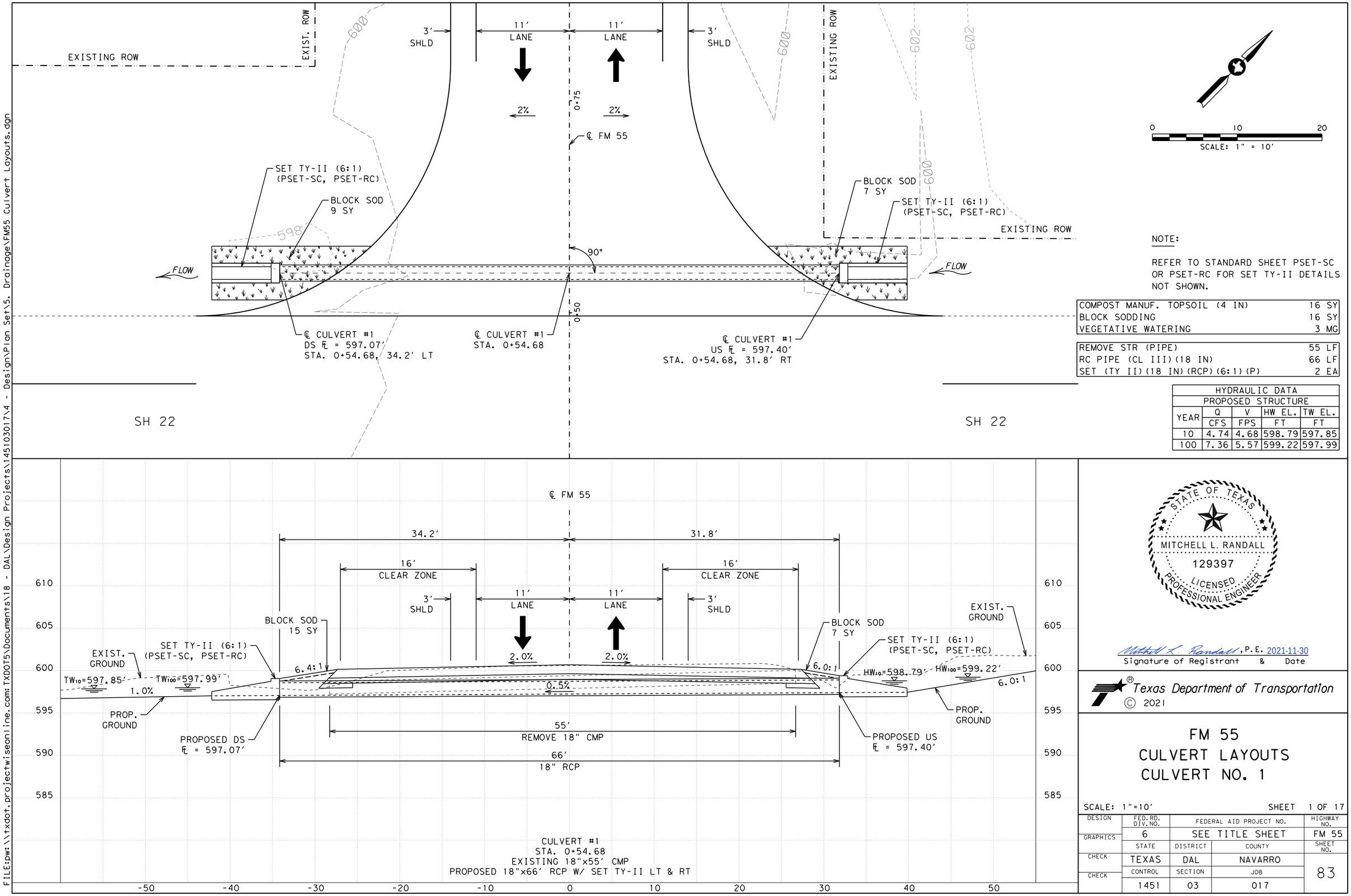

NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	16 SY
BLOCK SODDING	16 SY
VEGETATIVE WATERING	3 MG

REMOVE STR (PIPE)	55 LF
RC PIPE (CL III)(18 IN)	66 LF
SET (TY II)(18 IN)(RCP)(6:1)(P)	2 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	4.74	4.68	598.79	597.85
100	7.36	5.57	599.22	597.99

CULVERT #1
STA. 0+54.68
EXISTING 18"x55' CMP
PROPOSED 18"x66' RCP W/ SET TY-II LT & RT

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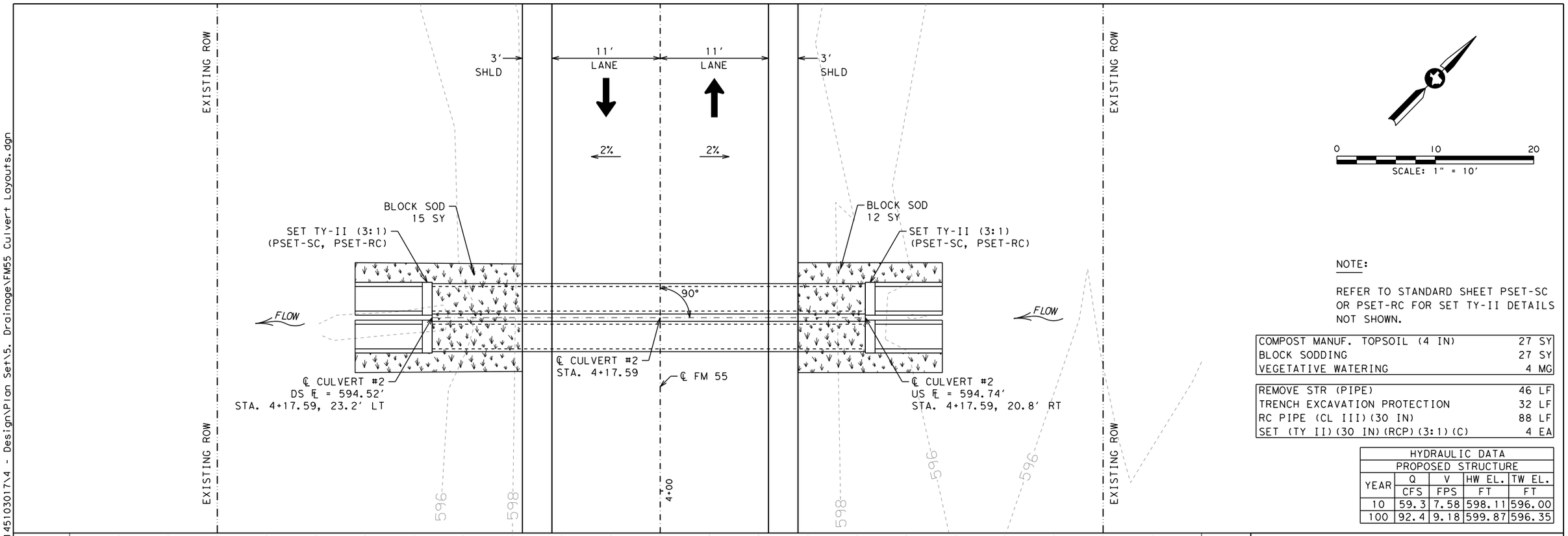
FM 55
CULVERT LAYOUTS
CULVERT NO. 1

SCALE: 1"=10' SHEET 1 OF 17

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	83
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	



0 10 20

SCALE: 1" = 10′

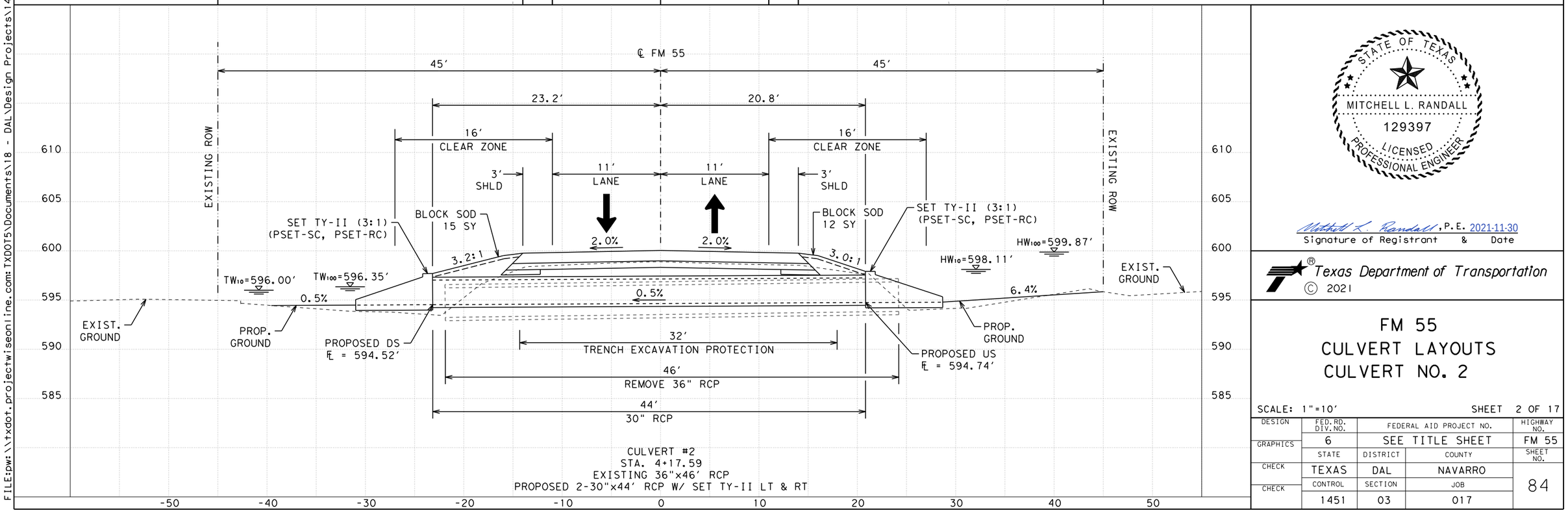
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	27 SY
BLOCK SODDING	27 SY
VEGETATIVE WATERING	4 MG

REMOVE STR (PIPE)	46 LF
TRENCH EXCAVATION PROTECTION	32 LF
RC PIPE (CL III)(30 IN)	88 LF
SET (TY II)(30 IN)(RCP)(3:1)(C)	4 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	59.3	7.58	598.11	596.00
100	92.4	9.18	599.87	596.35



CULVERT #2
STA. 4+17.59
EXISTING 36"x46′ RCP
PROPOSED 2-30"x44′ RCP W/ SET TY-II LT & RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 2

SCALE: 1"=10′ SHEET 2 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	84
	1451	03	017	

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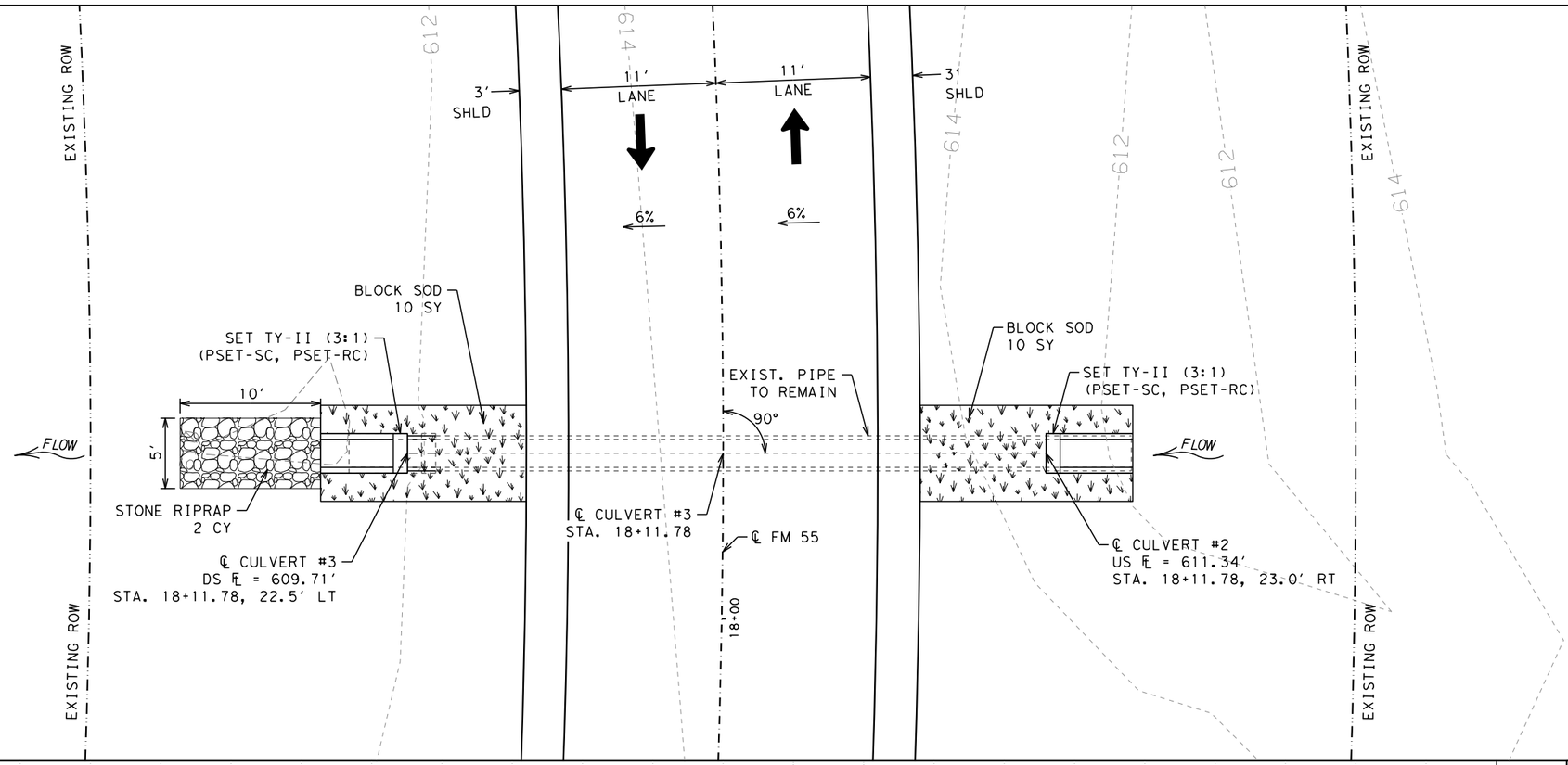
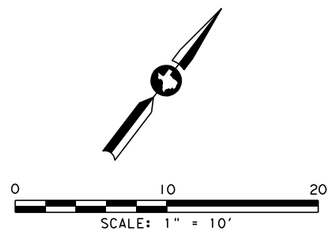




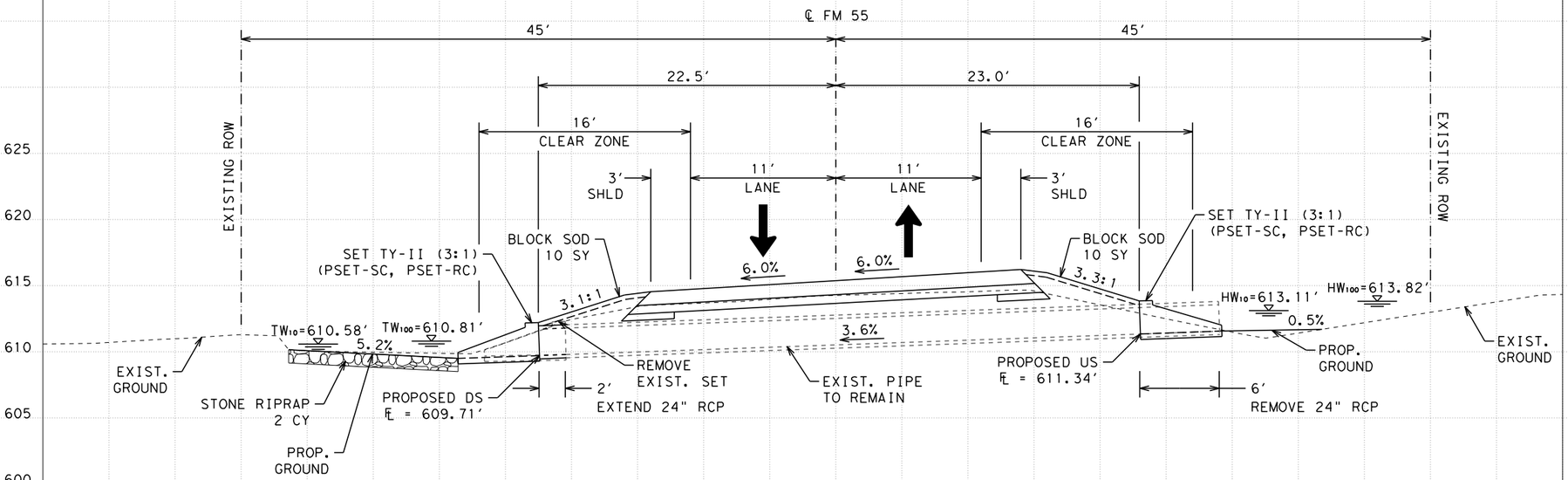
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

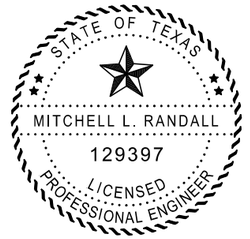
COMPOST MANUF. TOPSOIL (4 IN)	20 SY
BLOCK SODDING	20 SY
VEGETATIVE WATERING	3 MG

REMOVE STR (SET)	1 EA
REMOVE STR (PIPE)	6 LF
RIPRAP (STONE COMMON)(DRY)(12 IN)	2 CY
RC PIPE (CL III)(24 IN)	2 LF
SET (TY II)(24 IN)(RCP)(3:1)(C)	2 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	10.9	10.5	613.11	610.58
100	17.0	11.3	613.82	610.81



CULVERT #3
STA. 18+11.78
EXISTING 24"x50' RCP W/ SET TY-II LT
PROPOSED 24"x46' RCP W/ SET TY-II LT & RT



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FM 55
CULVERT LAYOUTS
CULVERT NO. 3

SCALE: 1"=10' SHEET 3 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	85
	1451	03	017	

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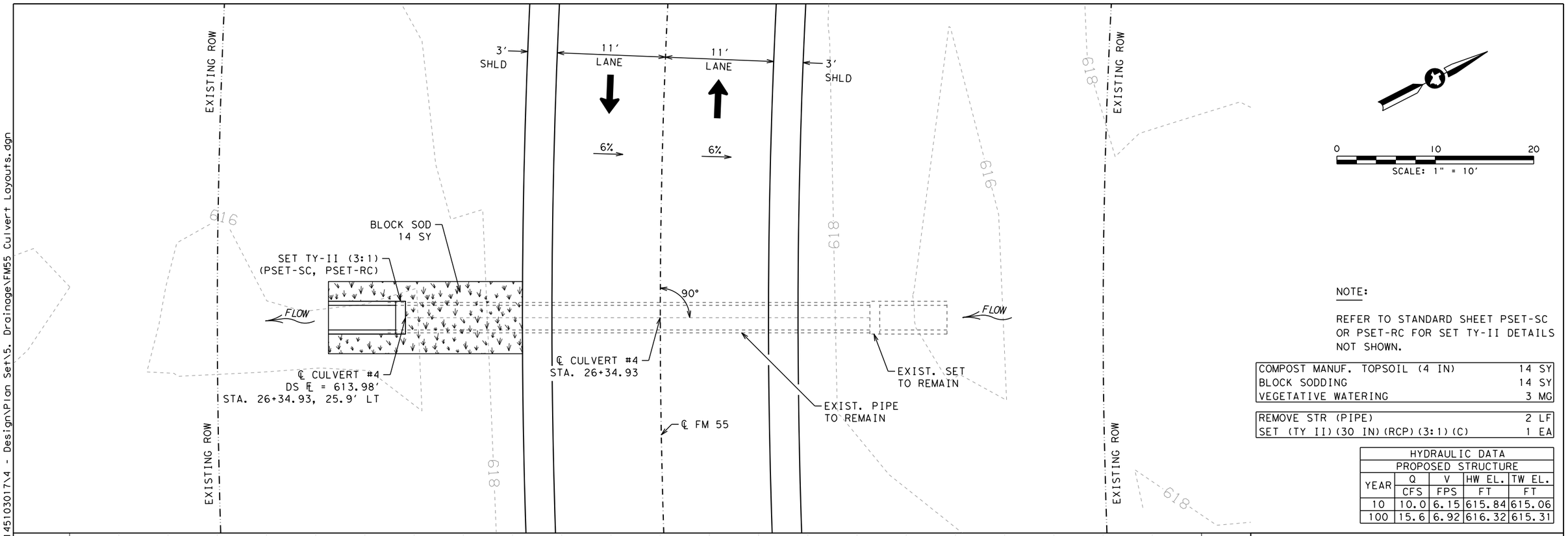


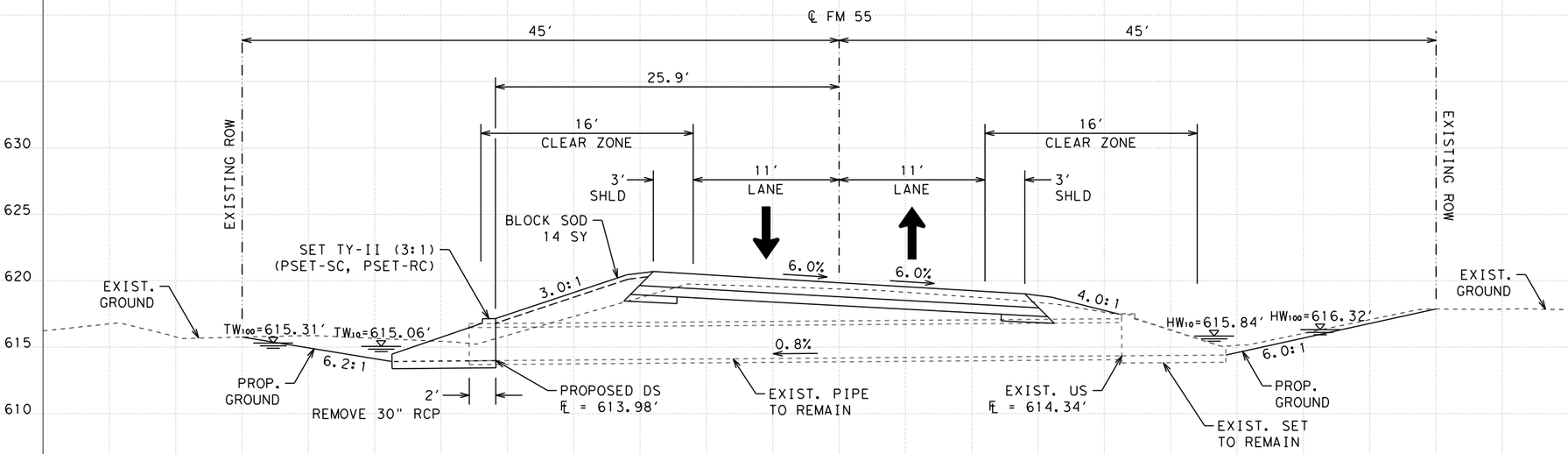
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	14 SY
BLOCK SODDING	14 SY
VEGETATIVE WATERING	3 MG

REMOVE STR (PIPE)	2 LF
SET (TY II)(30 IN)(RCP)(3:1)(C)	1 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	10.0	6.15	615.84	615.06
100	15.6	6.92	616.32	615.31



CULVERT #4
STA. 26+34.93
EXISTING 30"x49′ RCP W/ SET TY-II RT
PROPOSED 30"x47′ RCP W/ SET TY-II LT & RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 4

SCALE: 1"=10′ SHEET 4 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	86
	1451	03	017	

DATE:11/30/2021 TIME:10:49:23
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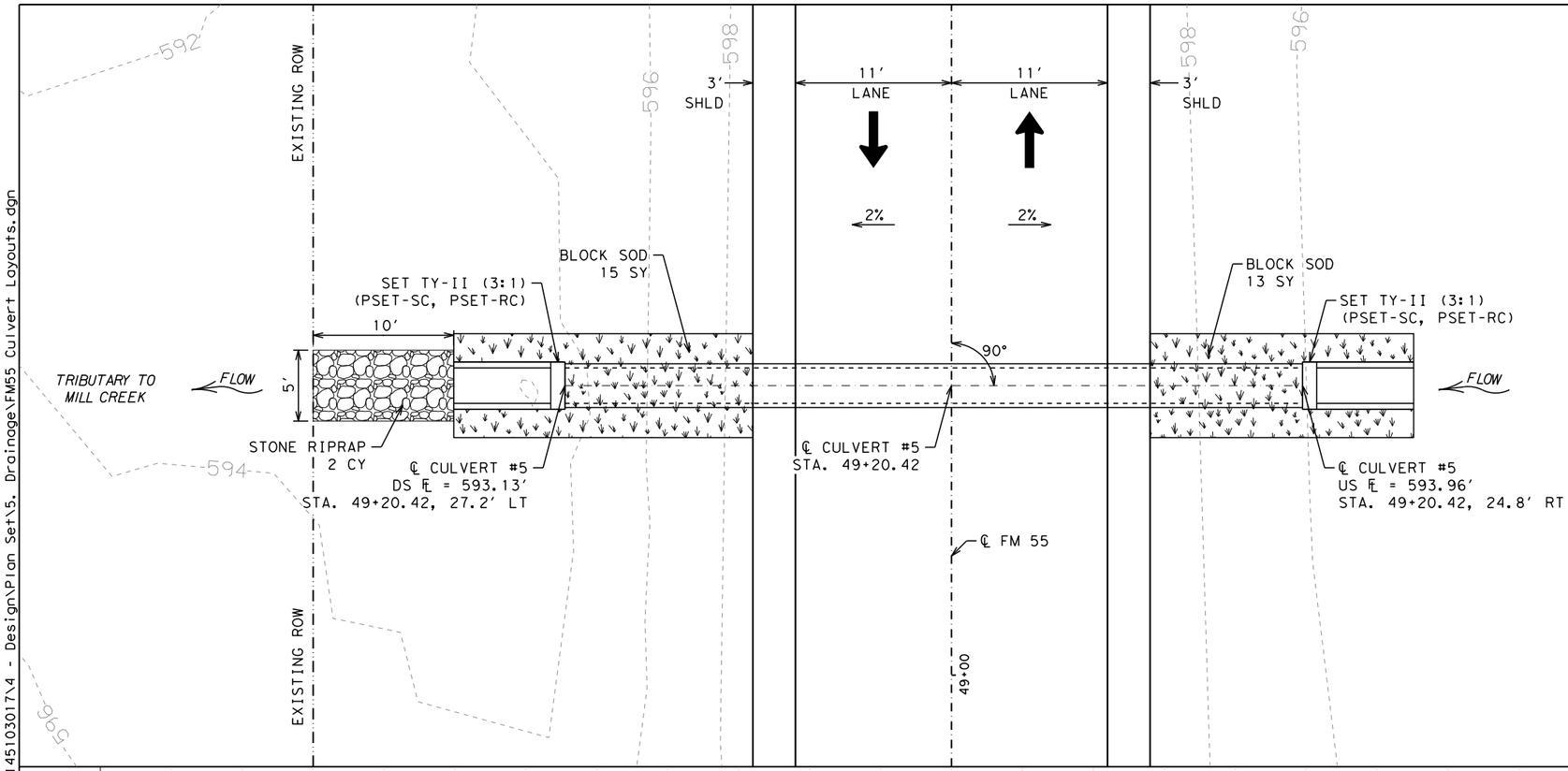
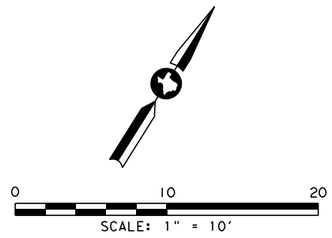




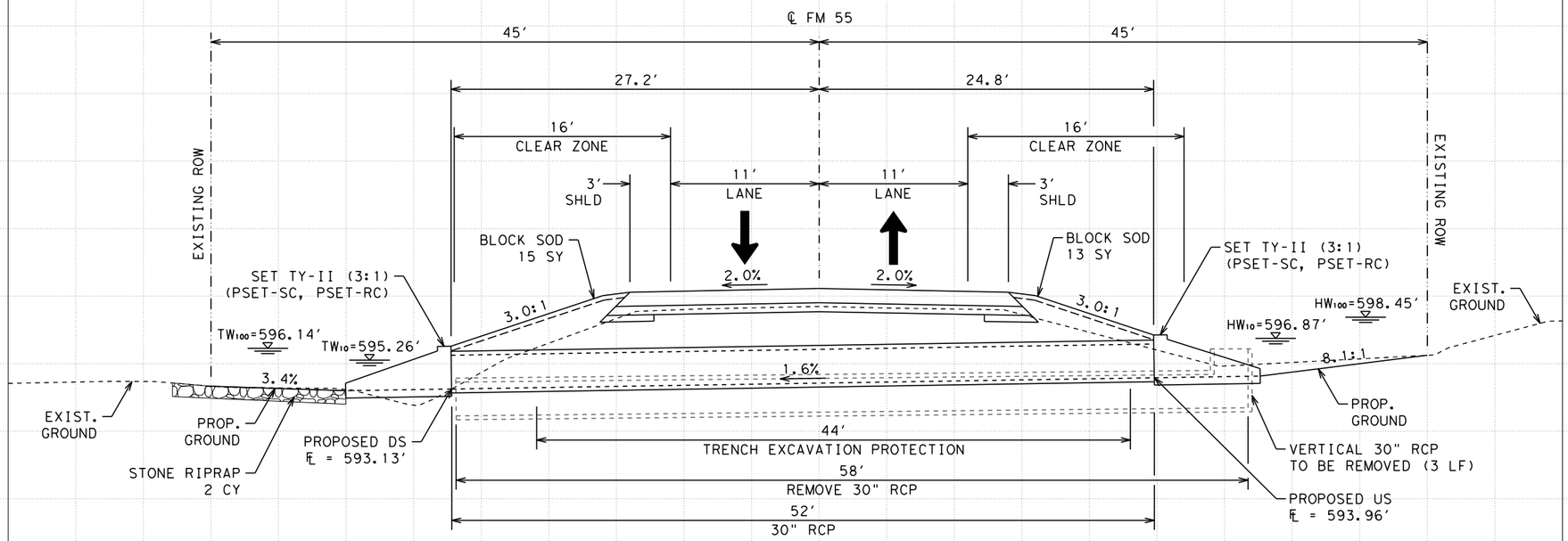
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	28 SY
BLOCK SODDING	28 SY
VEGETATIVE WATERING	5 MG

REMOVE STR (PIPE)	61 LF
TRENCH EXCAVATION PROTECTION	44 LF
RIPRAP (STONE COMMON)(DRY)(12 IN)	2 CY
RC PIPE (CL III)(30 IN)	52 LF
SET (TY II)(30 IN)(RCP)(3:1)(C)	2 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	27.4	10.1	596.87	595.26
100	41.7	8.49	598.45	596.14



CULVERT #5
STA. 49+20.42
EXISTING 30"x58' RCP W/ 30" RCP DI RT
PROPOSED 30"x52' RCP W/ SET TY-II LT & RT

STATE OF TEXAS
MITCHELL L. RANDALL
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Mitchell L. Randall, P.E. 2021-11-30
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FM 55
CULVERT LAYOUTS
CULVERT NO. 5

SCALE: 1"=10' SHEET 5 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	87
	1451	03	017	

DATE:11/30/2021 TIME:10:49:24
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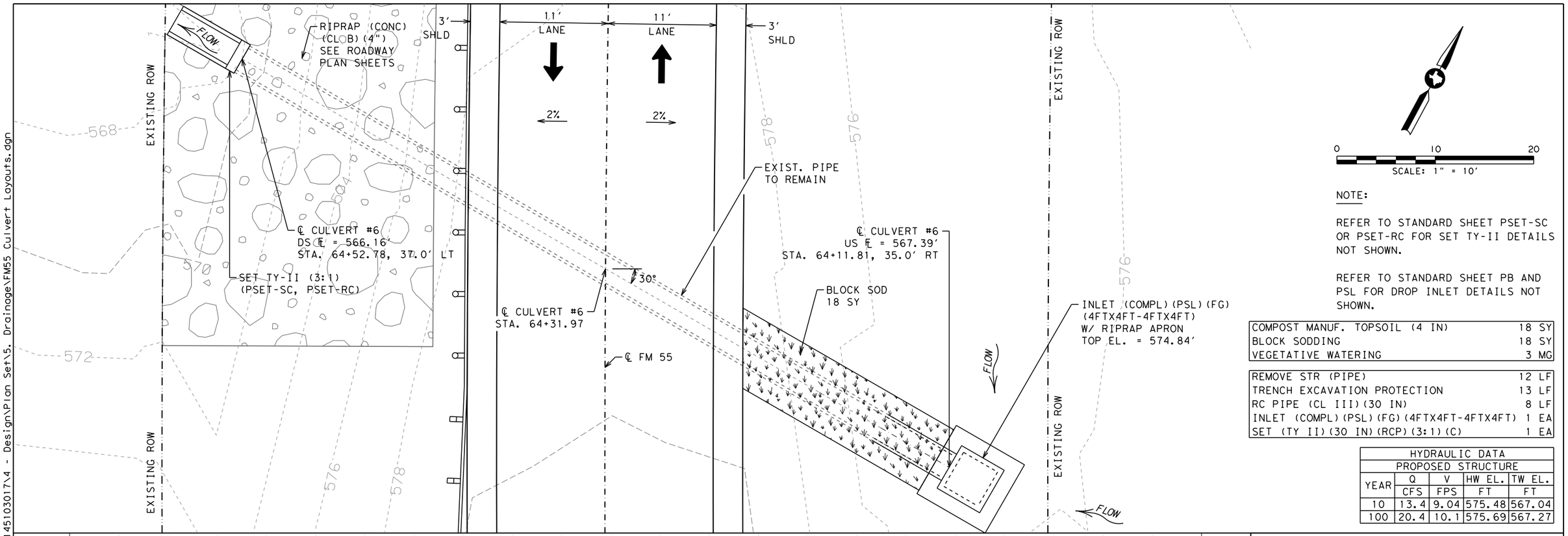


NOTE:

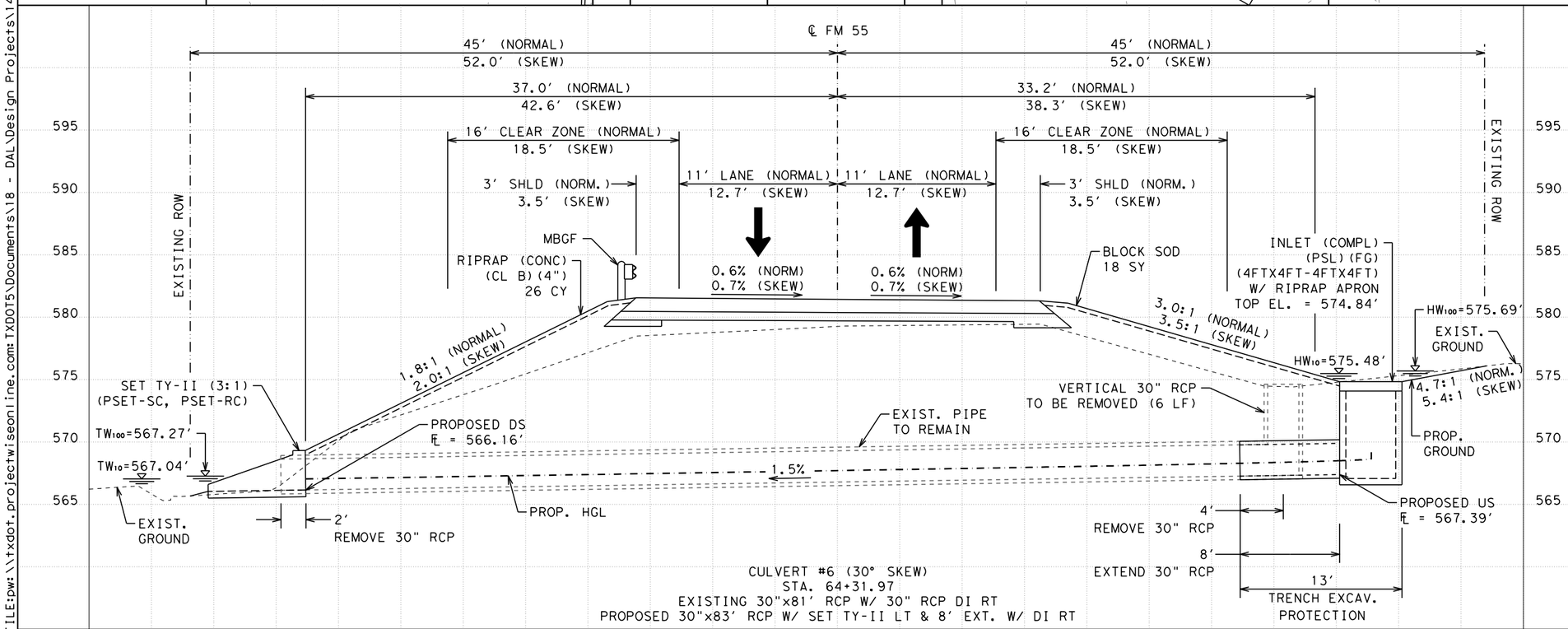
REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

REFER TO STANDARD SHEET PB AND PSL FOR DROP INLET DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	18 SY
BLOCK SODDING	18 SY
VEGETATIVE WATERING	3 MG

REMOVE STR (PIPE)	12 LF
TRENCH EXCAVATION PROTECTION	13 LF
RC PIPE (CL III) (30 IN)	8 LF
INLET (COMPL) (PSL) (FG) (4FTX4FT-4FTX4FT)	1 EA
SET (TY II) (30 IN) (RCP) (3:1) (C)	1 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	13.4	9.04	575.48	567.04
100	20.4	10.1	575.69	567.27



CULVERT #6 (30° SKEW)
STA. 64+31.97
EXISTING 30"x81' RCP W/ 30" RCP DI RT
PROPOSED 30"x83' RCP W/ SET TY-II LT & 8' EXT. W/ DI RT

STATE OF TEXAS
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129397
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FM 55
CULVERT LAYOUTS
CULVERT NO. 6

SCALE: 1"=10'

SHEET 6 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	88
	1451	03	017	

DATE:11/30/2021 TIME:10:49:25
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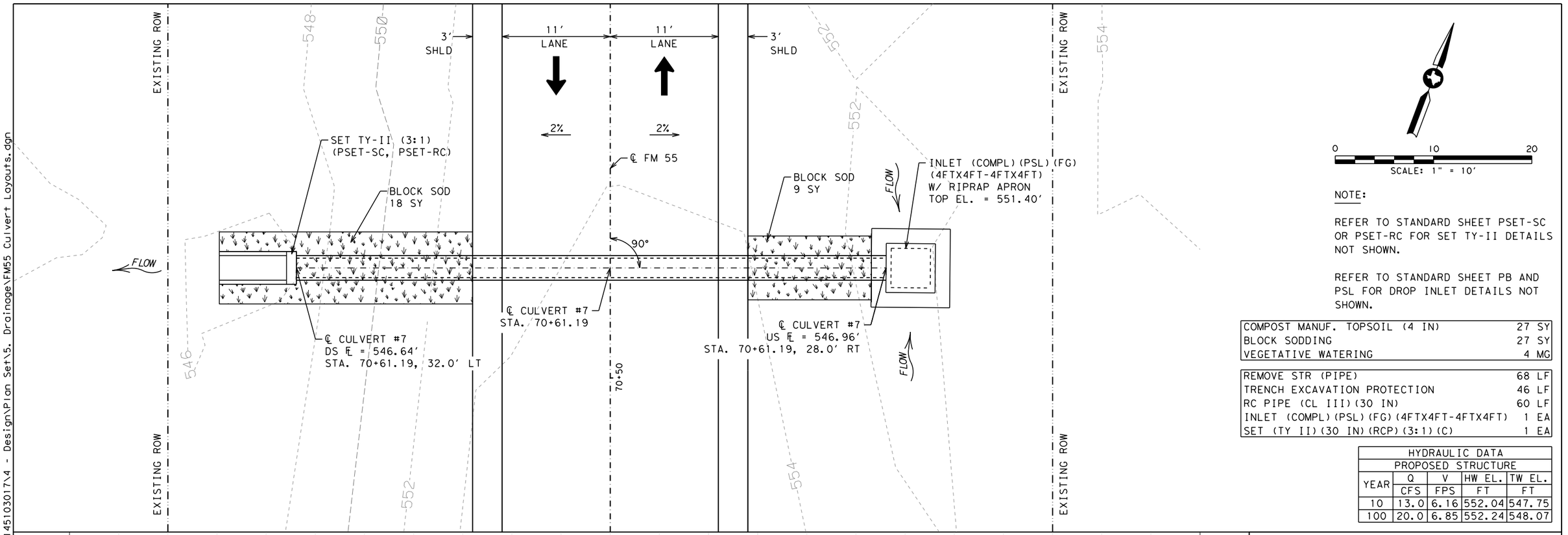


NOTE:

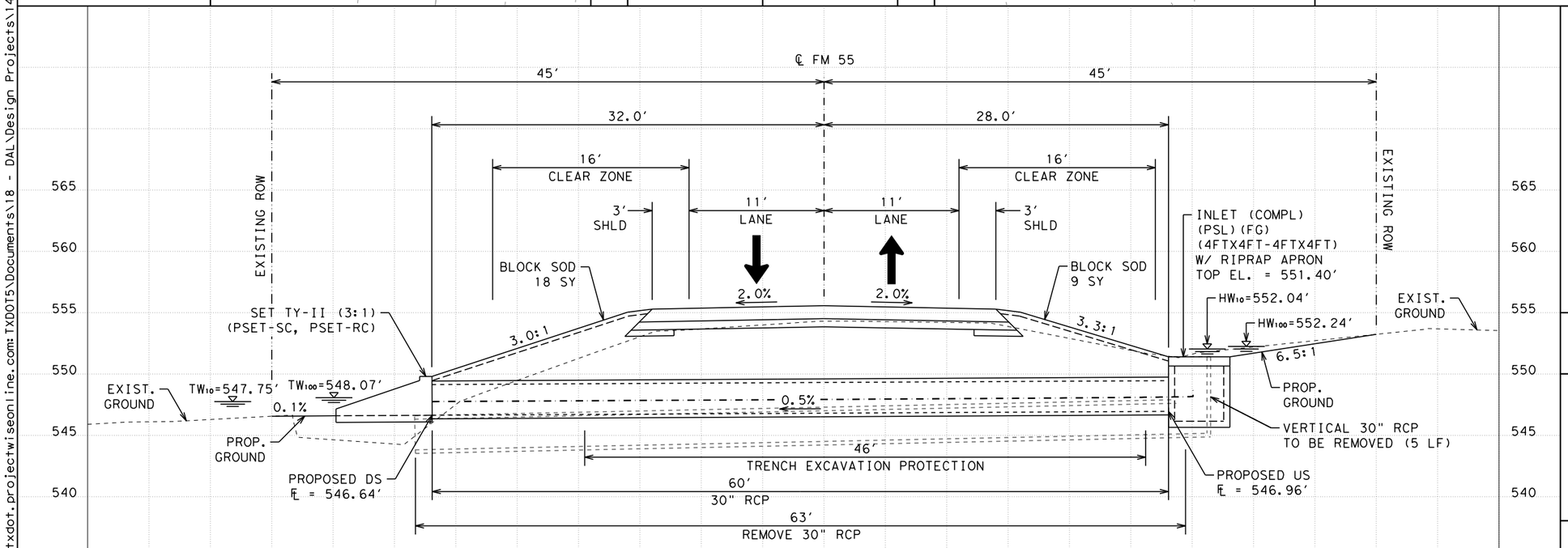
REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

REFER TO STANDARD SHEET PB AND PSL FOR DROP INLET DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	27 SY
BLOCK SODDING	27 SY
VEGETATIVE WATERING	4 MG

REMOVE STR (PIPE)	68 LF
TRENCH EXCAVATION PROTECTION	46 LF
RC PIPE (CL III)(30 IN)	60 LF
INLET (COMPL)(PSL)(FG)(4FTX4FT-4FTX4FT)	1 EA
SET (TY II)(30 IN)(RCP)(3:1)(C)	1 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	13.0	6.16	552.04	547.75
100	20.0	6.85	552.24	548.07



CULVERT #7
STA. 70+61.19
EXISTING 30"x63' RCP W/ 30" RCP DI RT
PROPOSED 30"x60' RCP W/ SET TY-II LT & DI RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 7

SCALE: 1"=10'

SHEET 7 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	89
	1451	03	017	

DATE:11/30/2021 TIME:10:49:25
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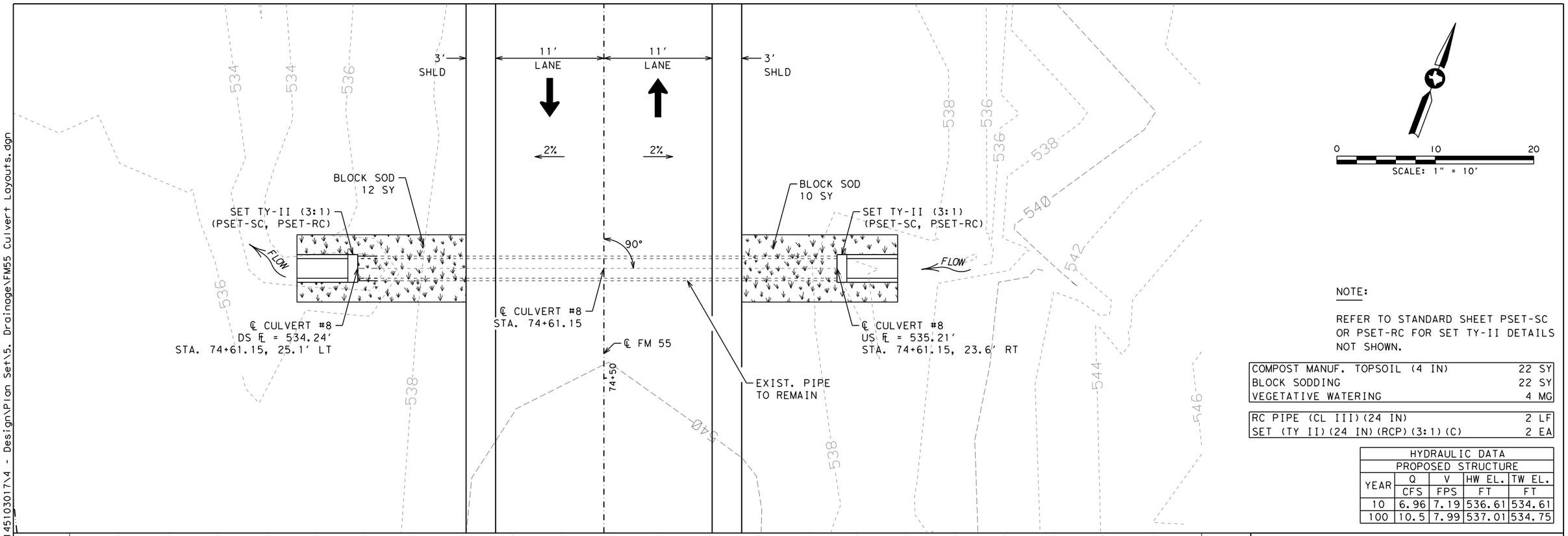


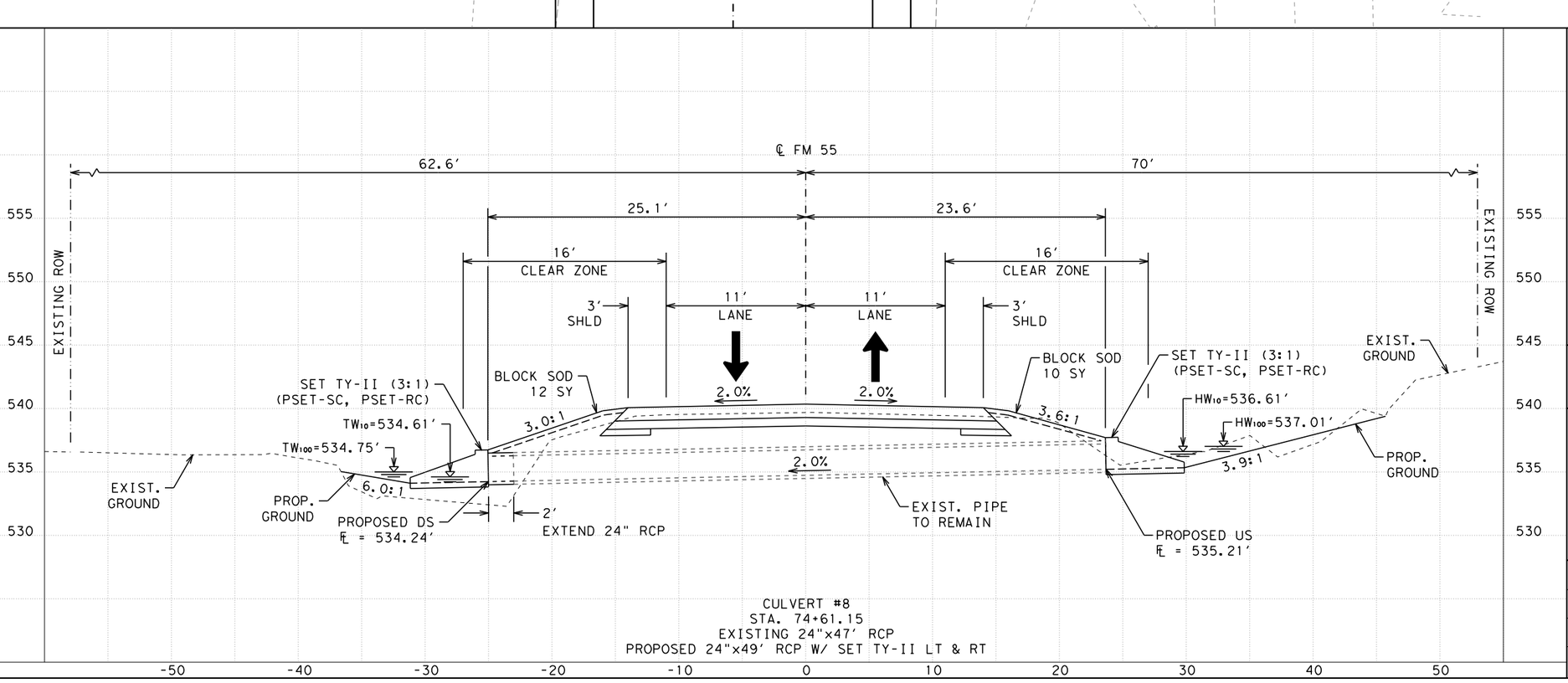
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	22 SY
BLOCK SODDING	22 SY
VEGETATIVE WATERING	4 MG

RC PIPE (CL III)(24 IN)	2 LF
SET (TY II)(24 IN)(RCP)(3:1)(C)	2 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	6.96	7.19	536.61	534.61
100	10.5	7.99	537.01	534.75



CULVERT #8
STA. 74+61.15
EXISTING 24"x47' RCP
PROPOSED 24"x49' RCP W/ SET TY-II LT & RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 8

SCALE: 1"=10'

SHEET 8 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	90
	1451	03	017	

DATE:11/30/2021 TIME:10:49:26
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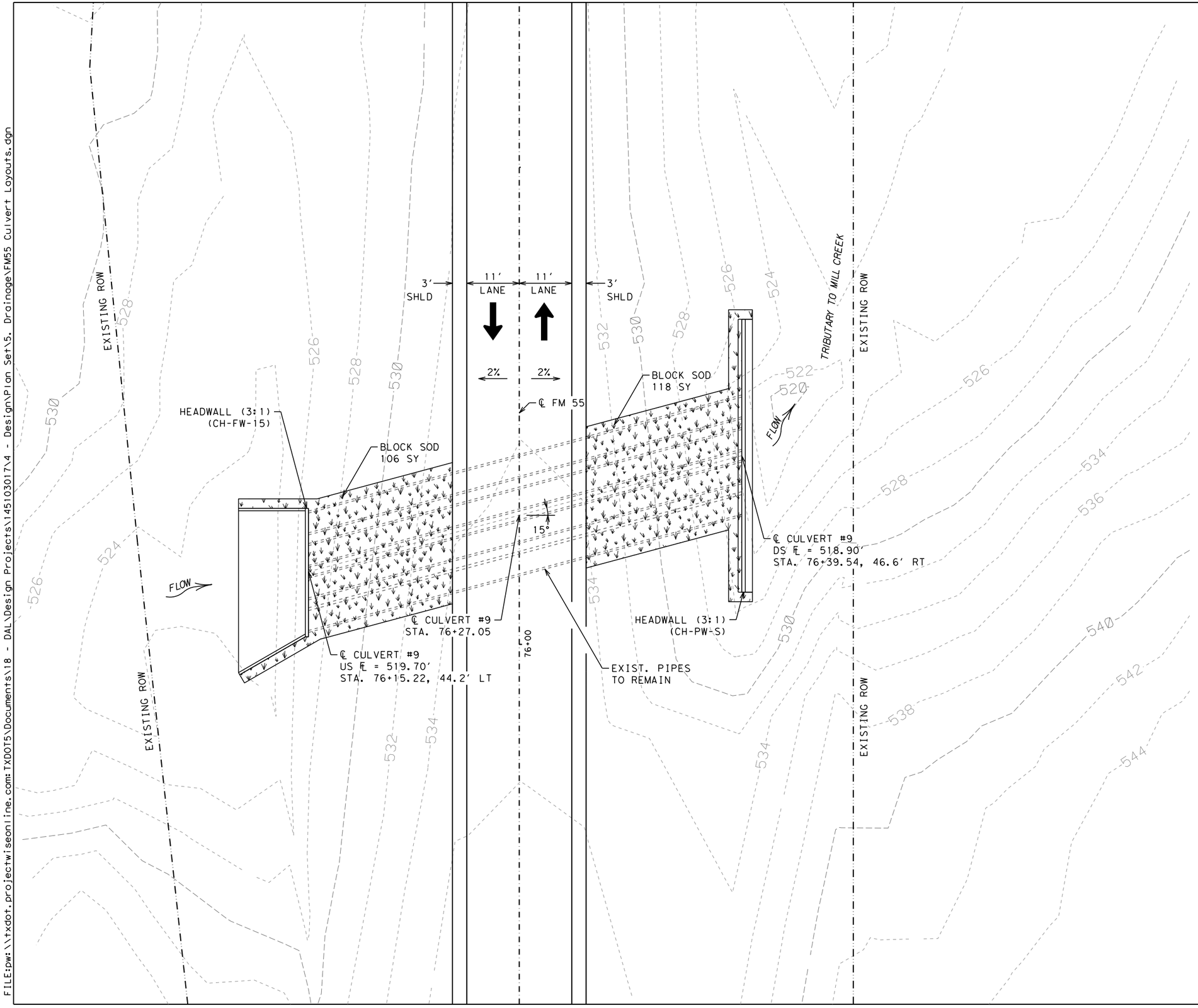

0 20 40

SCALE: 1" = 20'

NOTE:

REFER TO STANDARD SHEET CH-FW-15 AND CH-PW-S FOR HEADWALL DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	224 SY
BLOCK SODDING	224 SY
VEGETATIVE WATERING	34 MG

REMOVE STR (PIPE)	40 LF
TRENCH EXCAVATION PROTECTION	7 LF
HEADWALL (CH-FW-15)(DIA=48 IN)	1 EA
HEADWALL (CH-PW-S)(DIA=48 IN)	1 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	150.5	2.98	525.37	525.11
100	237.5	4.71	527.67	527.02

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FM 55
CULVERT LAYOUTS
CULVERT NO. 9

SCALE: 1"=20' SHEET 9 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	91
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:49:27
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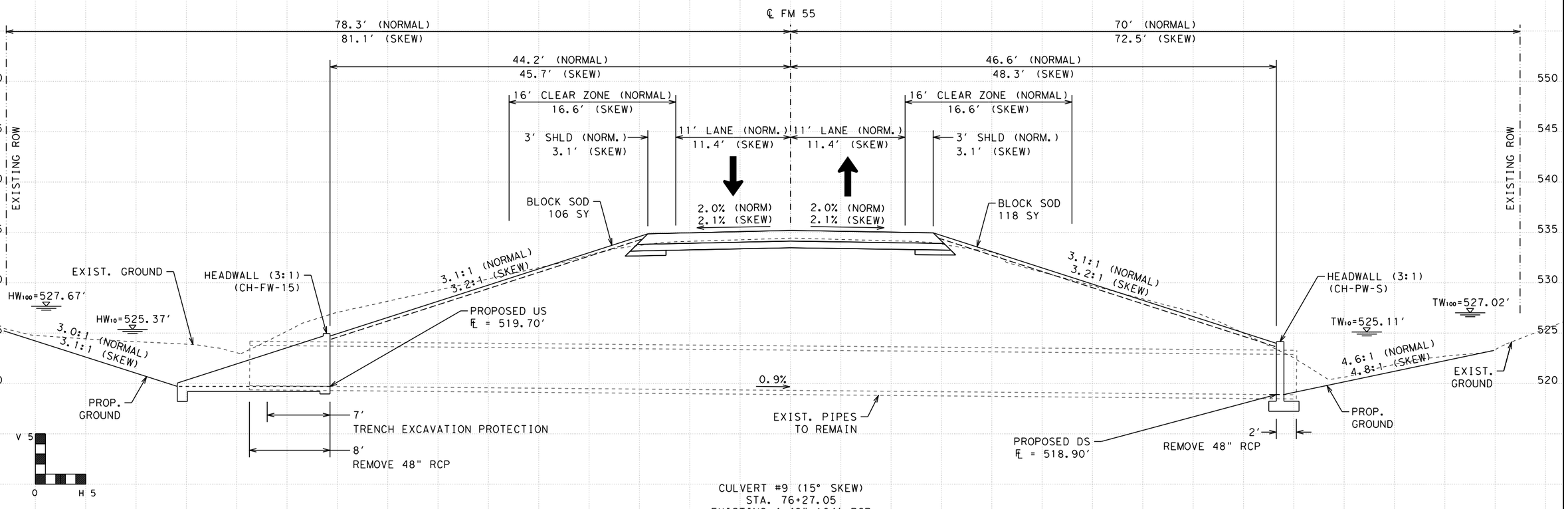

CULVERT #9 (15° SKEW)
STA. 76+27.05
EXISTING 4-48"x104' RCP
PROPOSED 4-48"x94' RCP W/ CH-FW-15 LT & CH-PW-S RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 9

SCALE: 1"=10'

SHEET 10 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	92
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:49:27
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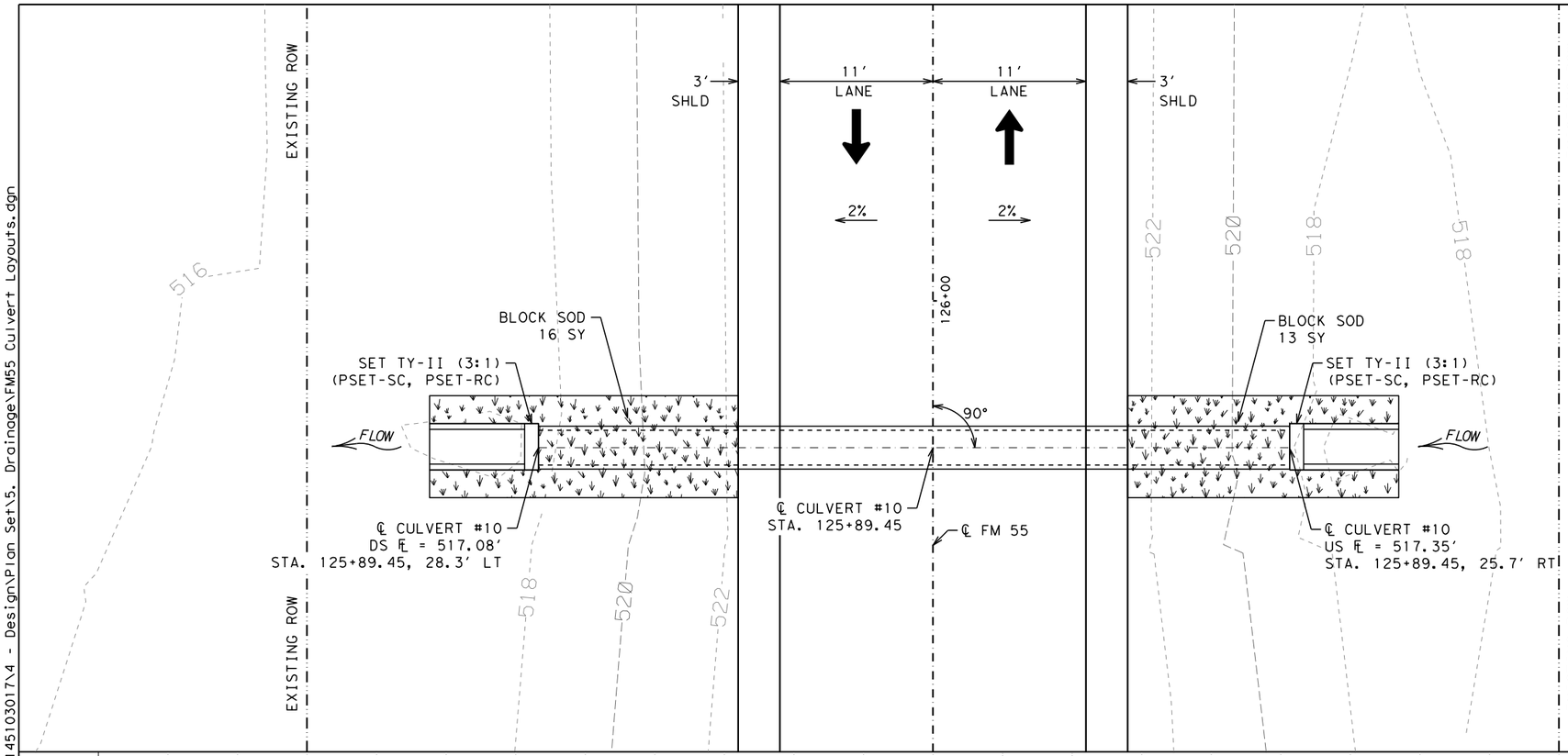
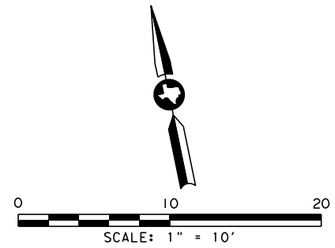




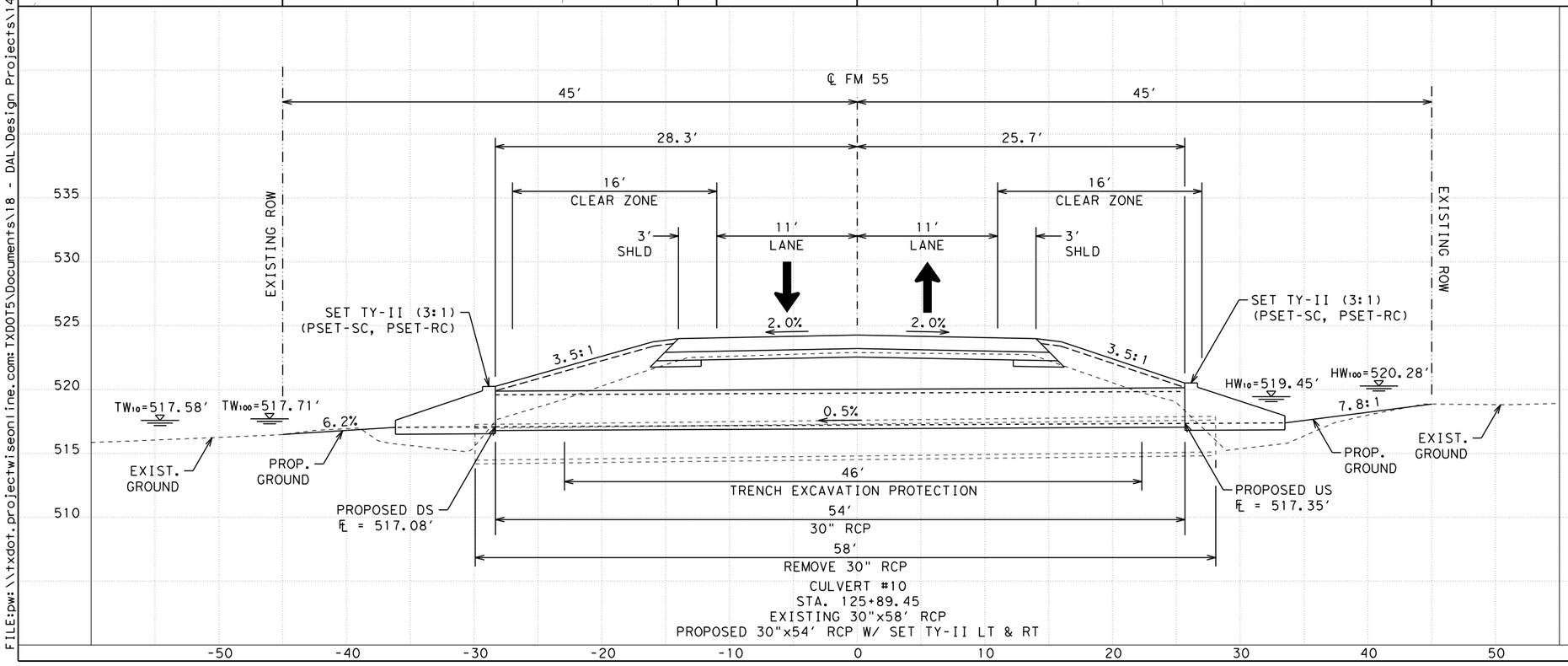
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	29 SY
BLOCK SODDING	29 SY
VEGETATIVE WATERING	5 MG

REMOVE STR (PIPE)	58 LF
TRENCH EXCAVATION PROTECTION	46 LF
RC PIPE (CL III)(30 IN)	54 LF
SET (TY II)(30 IN)(RCP)(3:1)(C)	2 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	16.9	6.50	519.45	517.58
100	25.9	7.16	520.28	517.71



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FM 55
CULVERT LAYOUTS
CULVERT NO. 10

SCALE: 1"=10′ SHEET 10 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	93
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

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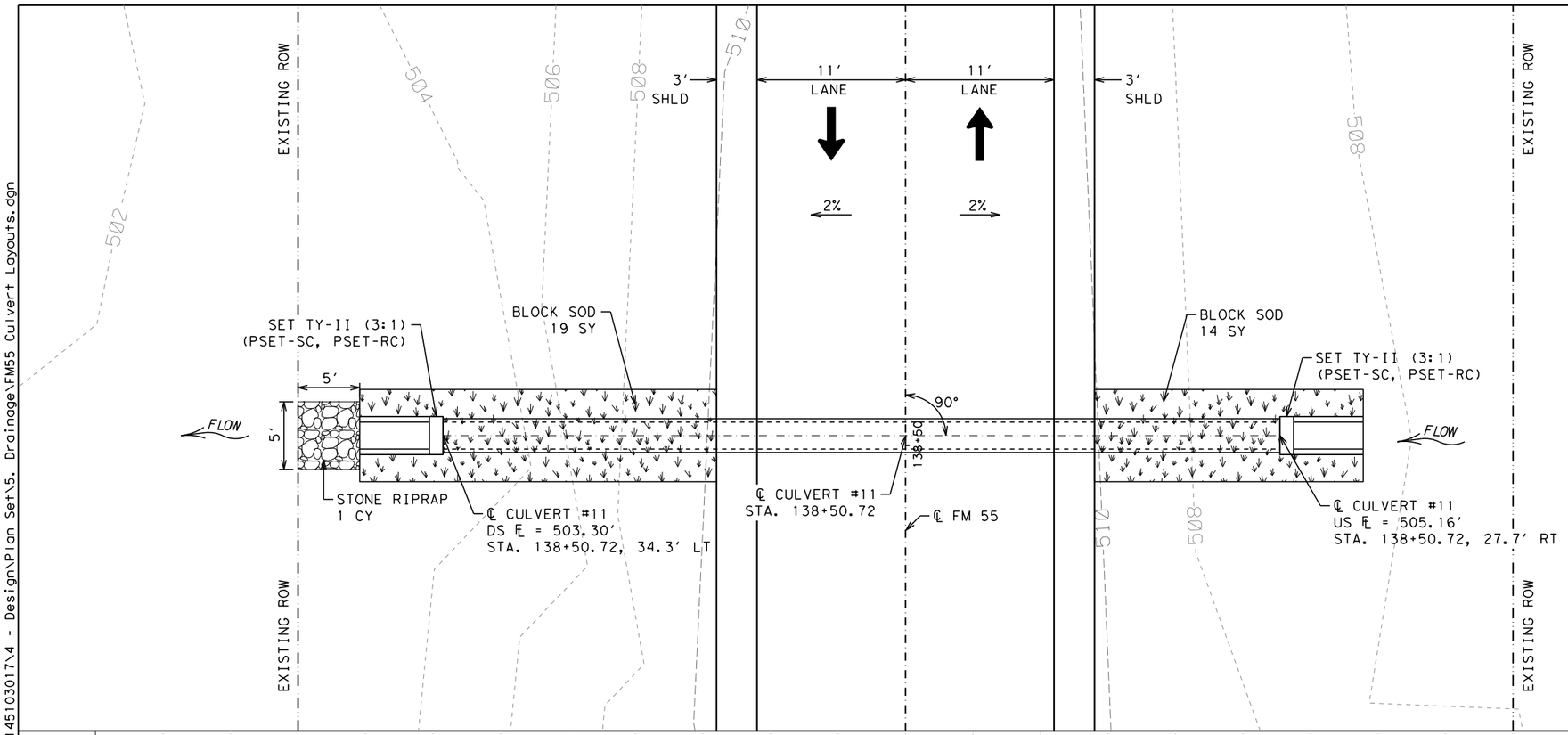
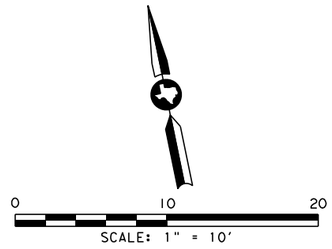




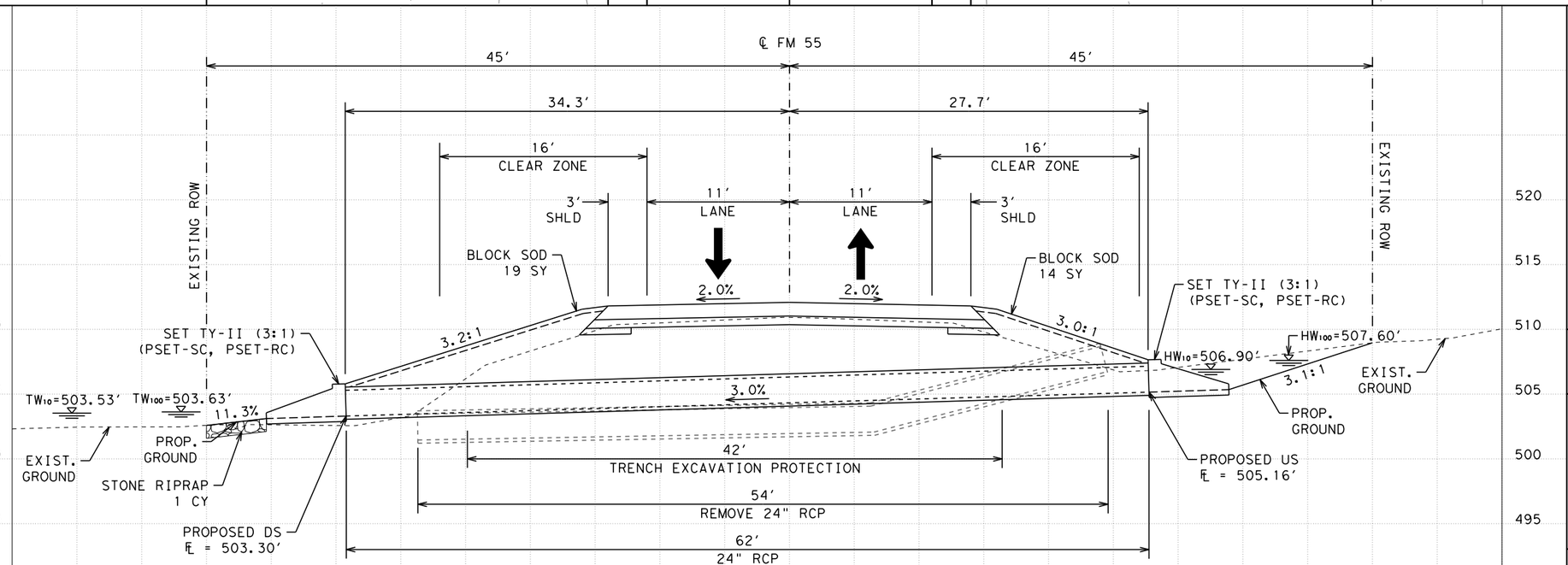
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	33 SY
BLOCK SODDING	33 SY
VEGETATIVE WATERING	5 MG

REMOVE STR (PIPE)	54 LF
TRENCH EXCAVATION PROTECTION	42 LF
RIPRAP (STONE COMMON)(DRY)(12 IN)	1 CY
RC PIPE (CL III)(24 IN)	62 LF
SET (TY II)(24 IN)(RCP)(3:1)(C)	2 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	9.93	10.2	506.90	503.53
100	15.2	11.2	507.60	503.63



CULVERT #11
STA. 138+50.72
EXISTING 24"x54′ RCP
PROPOSED 24"x62′ RCP W/ SET TY-II LT & RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 11

SCALE: 1"=10′ SHEET 11 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	94
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:49:28
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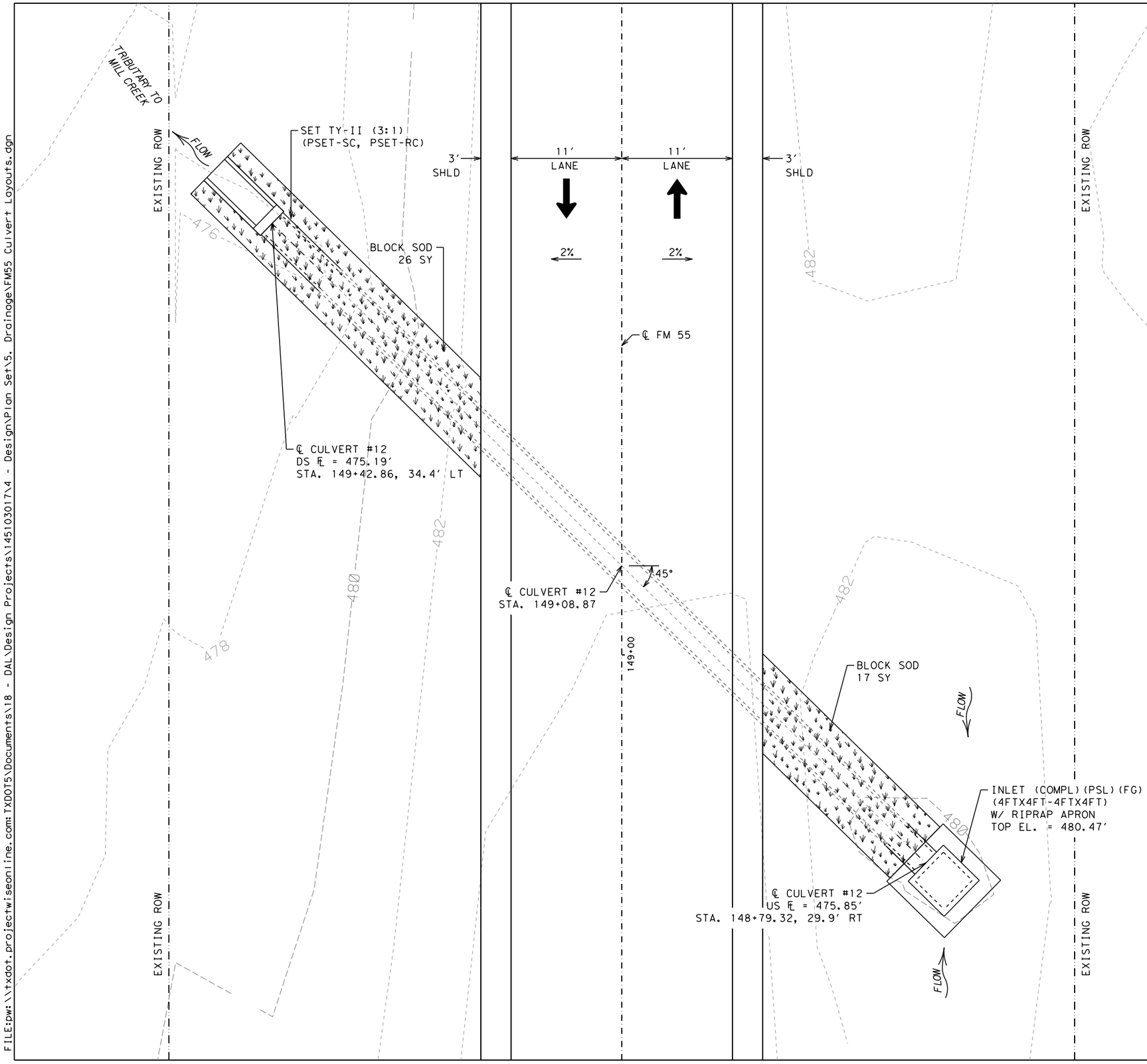

0 10 20

SCALE: 1" = 10'

NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

REFER TO STANDARD SHEET PB AND PSL FOR DROP INLET DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	43 SY
BLOCK SODDING	43 SY
VEGETATIVE WATERING	7 MG

REMOVE STR (PIPE)	4 LF
RC PIPE (CL III)(30 IN)	12 LF
INLET (COMPL)(PSL)(FG)(4FTX4FT-4FTX4FT)	1 EA
SET (TY II)(30 IN)(RCP)(3:1)(C)	1 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	21.3	6.63	481.41	476.75
100	32.9	8.00	482.70	477.14

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FM 55
CULVERT LAYOUTS
CULVERT NO. 12

SCALE: 1"=10' SHEET 13 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	95
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:49:29
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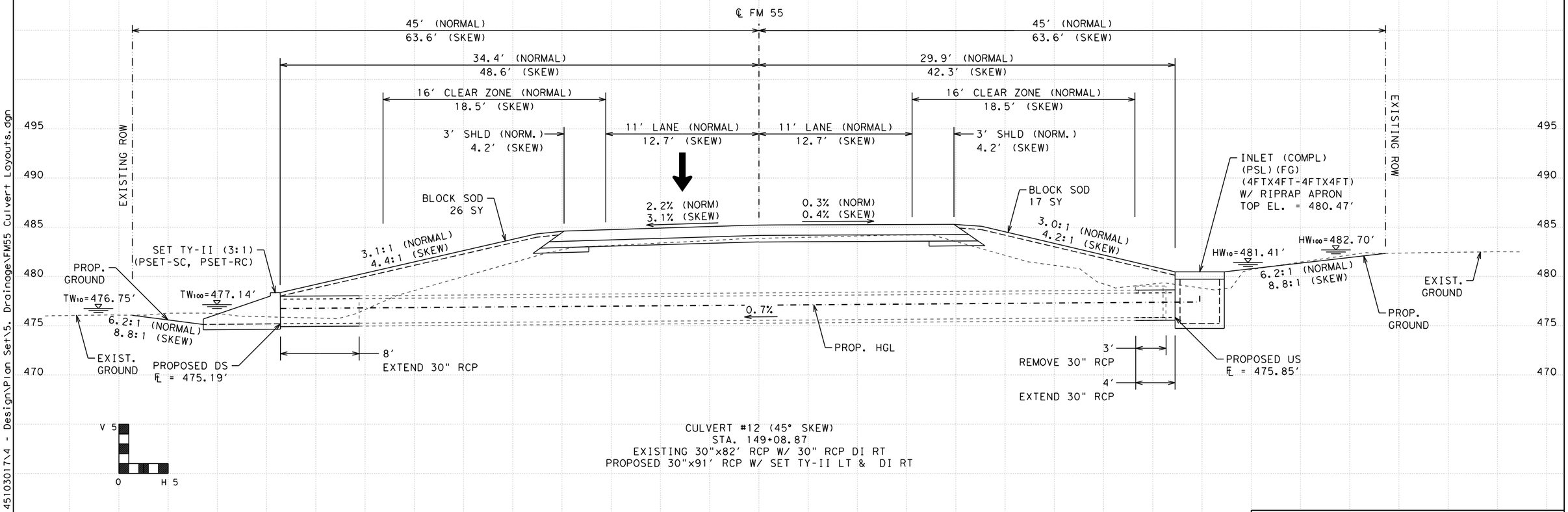

V 5

0 H 5

CULVERT #12 (45° SKEW)
STA. 149+08.87
EXISTING 30"x82′ RCP W/ 30" RCP DI RT
PROPOSED 30"x91′ RCP W/ SET TY-II LT & DI RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 12

SCALE: 1"=10′ SHEET 14 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	96
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:49:29
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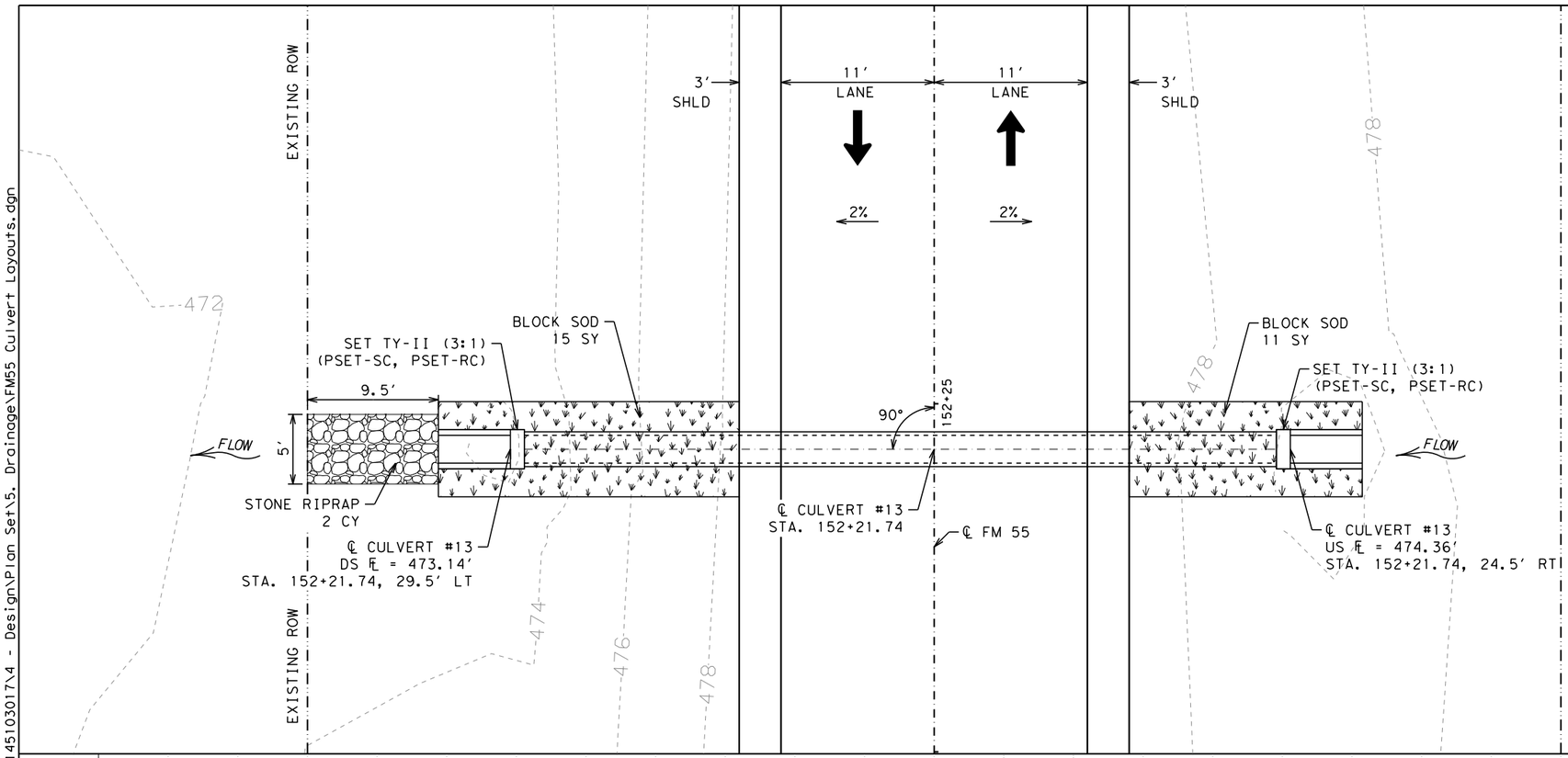
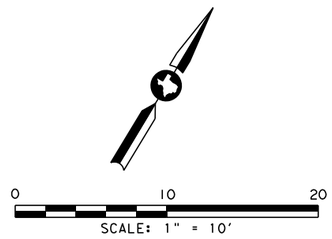




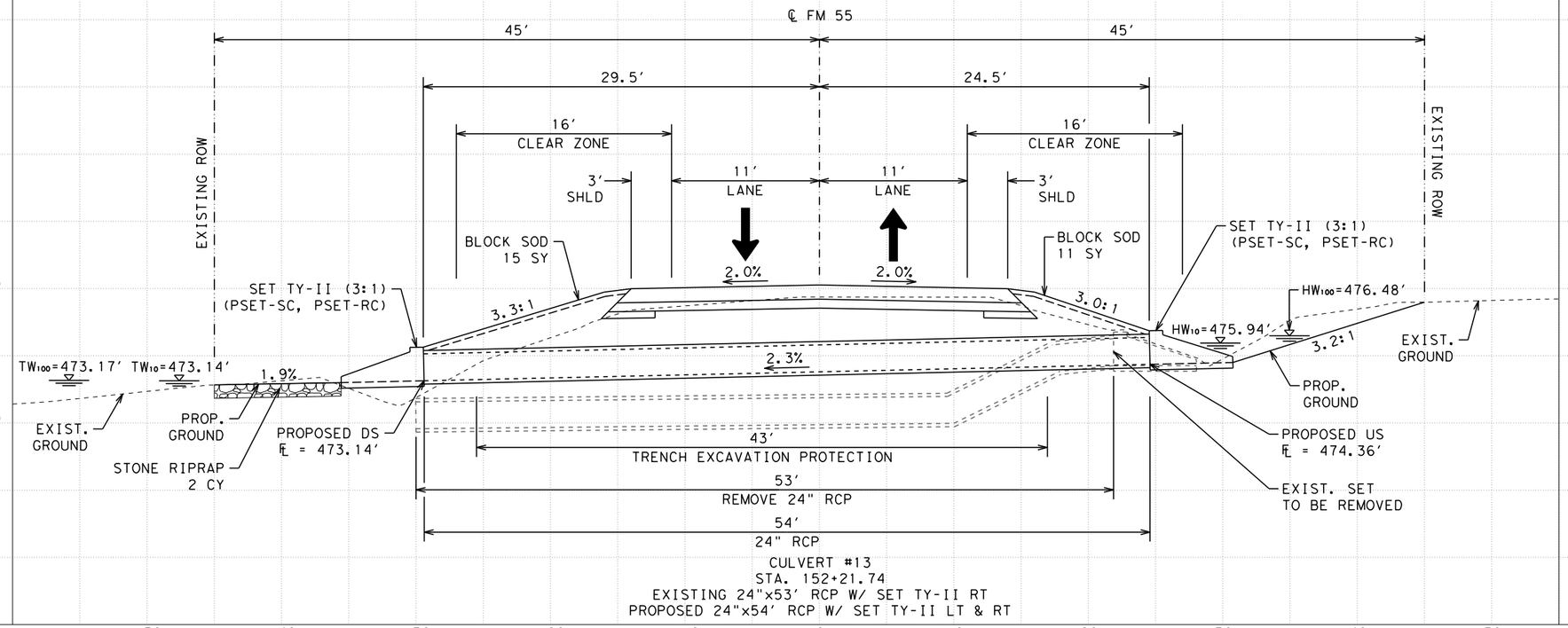
NOTE:

REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	26 SY
BLOCK SODDING	26 SY
VEGETATIVE WATERING	4 MG

REMOVE STR (SET)	1 EA
REMOVE STR (PIPE)	53 LF
TRENCH EXCAVATION PROTECTION	43 LF
RIPRAP (STONE COMMON)(DRY)(12 IN)	2 CY
RC PIPE (CL III)(24 IN)	54 LF
SET (TY II)(24 IN)(RCP)(3:1)(C)	2 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	8.56	8.90	475.94	473.14
100	13.1	9.72	476.48	473.17



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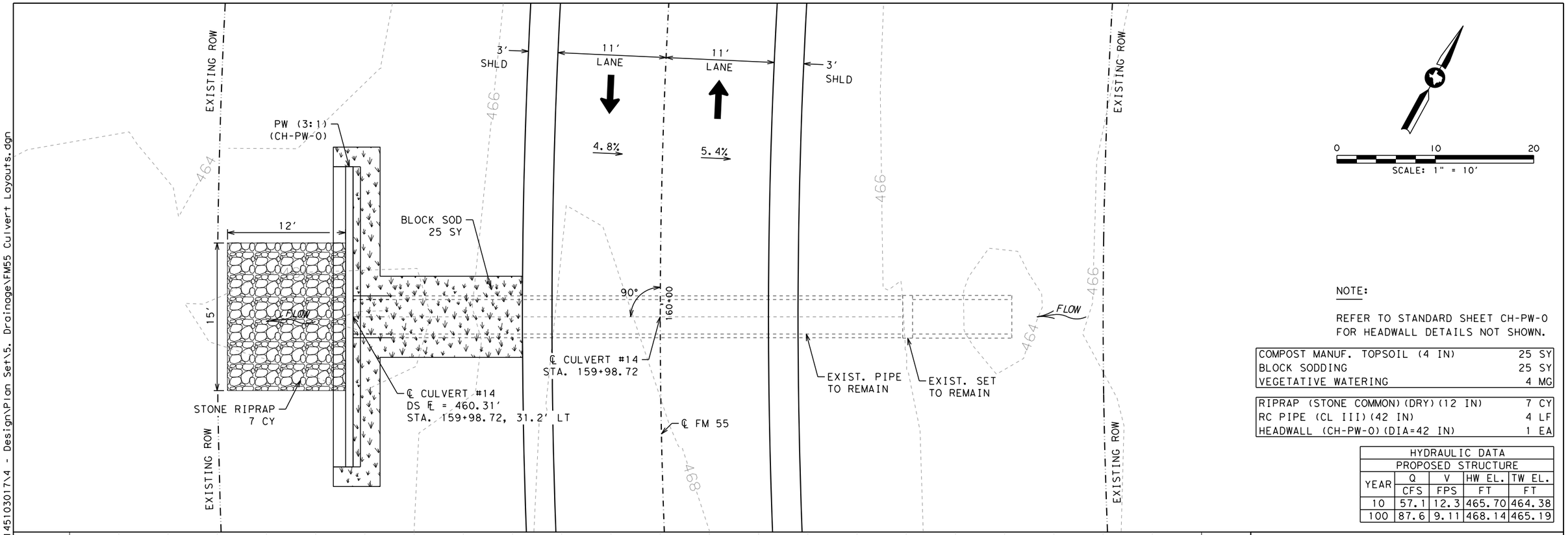
FM 55
CULVERT LAYOUTS
CULVERT NO. 13

SCALE: 1"=10′ SHEET 15 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	97
	1451	03	017	



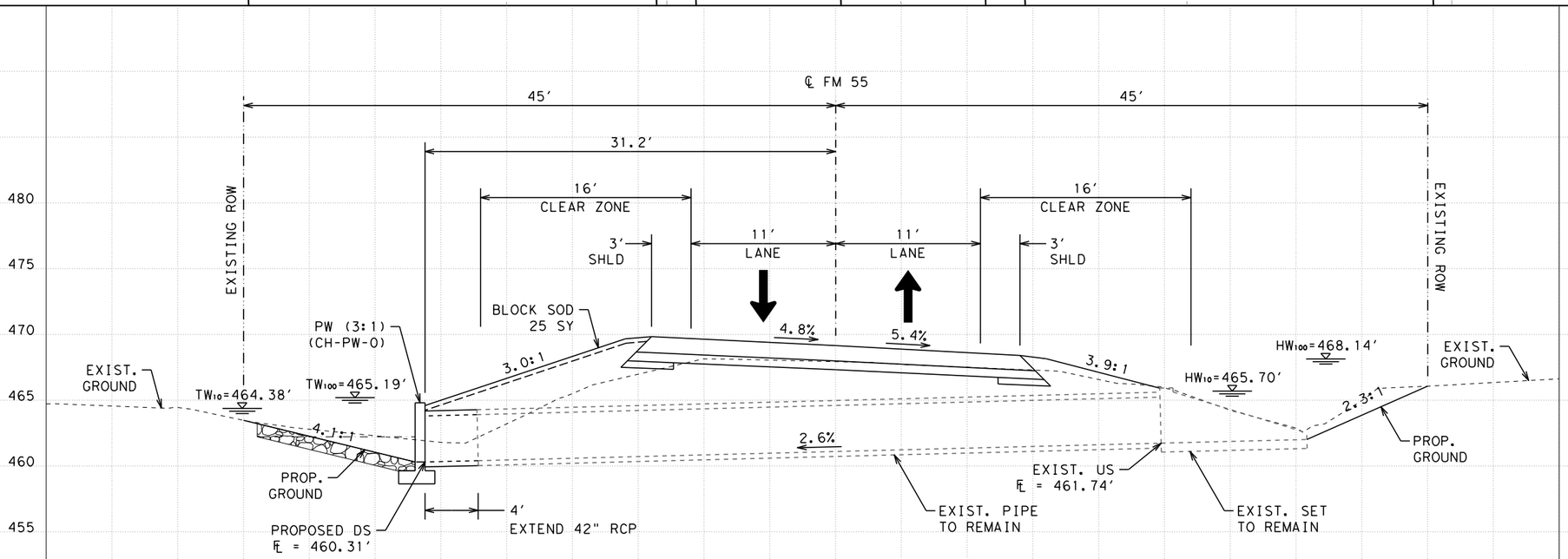
NOTE:

REFER TO STANDARD SHEET CH-PW-0 FOR HEADWALL DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	25 SY
BLOCK SODDING	25 SY
VEGETATIVE WATERING	4 MG

RIPRAP (STONE COMMON)(DRY)(12 IN)	7 CY
RC PIPE (CL III)(42 IN)	4 LF
HEADWALL (CH-PW-0)(DIA=42 IN)	1 EA

HYDRAULIC DATA PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	57.1	12.3	465.70	464.38
100	87.6	9.11	468.14	465.19



CULVERT #14
STA. 159+98.72
EXISTING 42"x52' RCP W/ SET TY-II RT
PROPOSED 42"x56' RCP W/ PW LT & SET TY-II RT

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FM 55
CULVERT LAYOUTS
CULVERT NO. 14

SCALE: 1"=10'

SHEET 16 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	98
	1451	03	017	

DATE:11/30/2021 TIME:10:49:30
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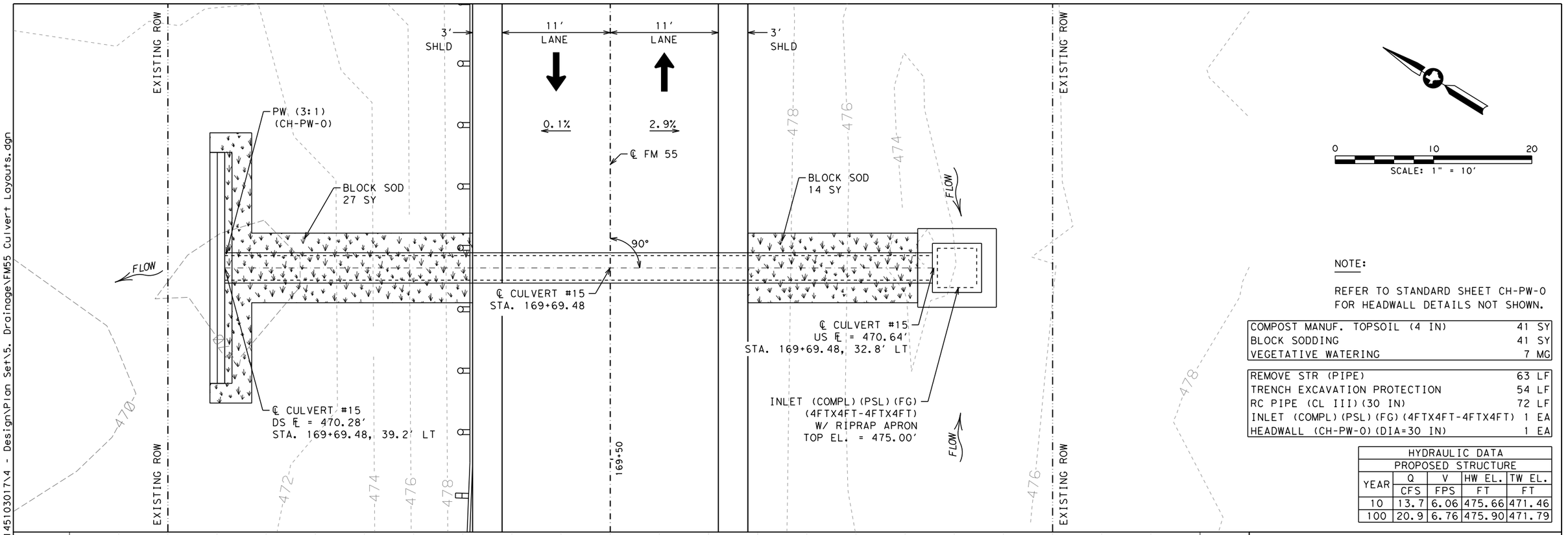


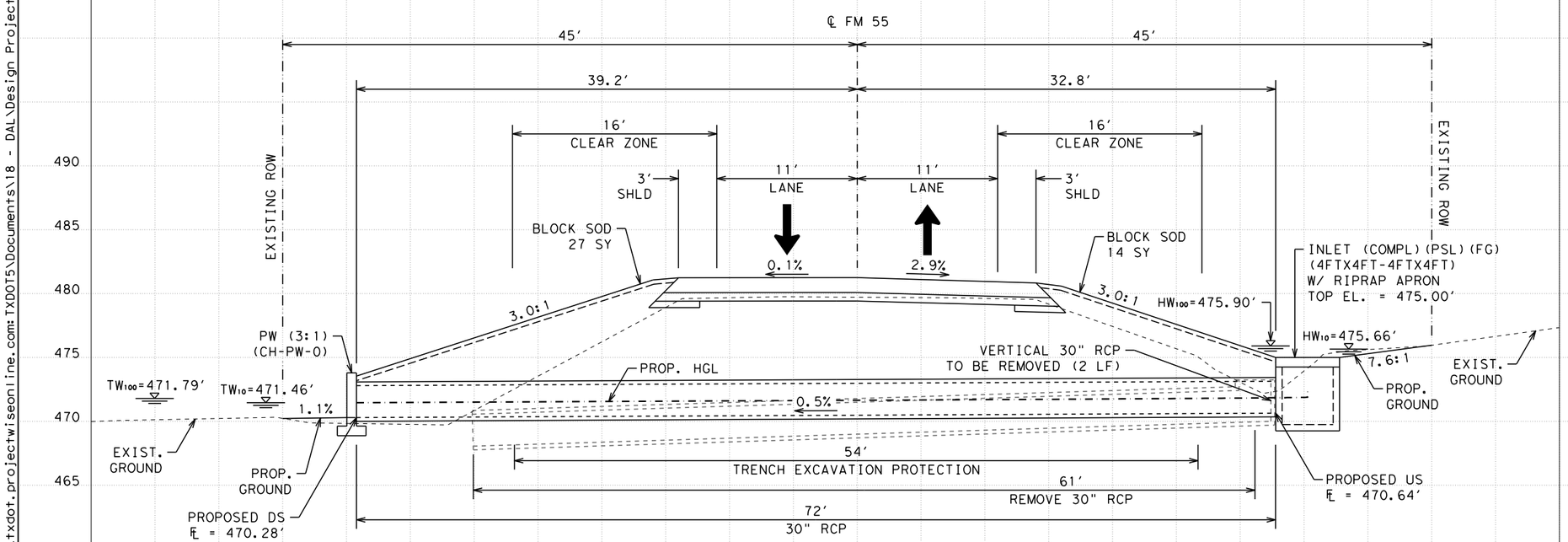
NOTE:

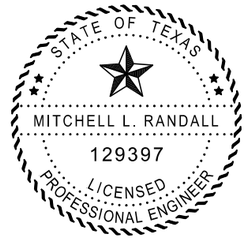
REFER TO STANDARD SHEET CH-PW-0 FOR HEADWALL DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	41 SY
BLOCK SODDING	41 SY
VEGETATIVE WATERING	7 MG

REMOVE STR (PIPE)	63 LF
TRENCH EXCAVATION PROTECTION	54 LF
RC PIPE (CL III)(30 IN)	72 LF
INLET (COMPL)(PSL)(FG)(4FTX4FT-4FTX4FT)	1 EA
HEADWALL (CH-PW-0)(DIA=30 IN)	1 EA

HYDRAULIC DATA				
PROPOSED STRUCTURE				
YEAR	Q	V	HW EL.	TW EL.
	CFS	FPS	FT	FT
10	13.7	6.06	475.66	471.46
100	20.9	6.76	475.90	471.79





Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation
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FM 55
CULVERT LAYOUTS
CULVERT NO. 15

SCALE: 1"=10' SHEET 17 OF 17

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	99
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:49:31
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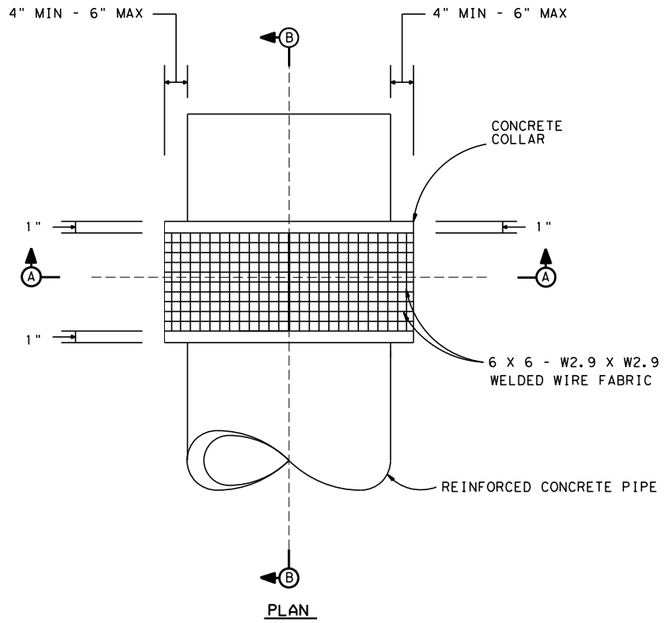
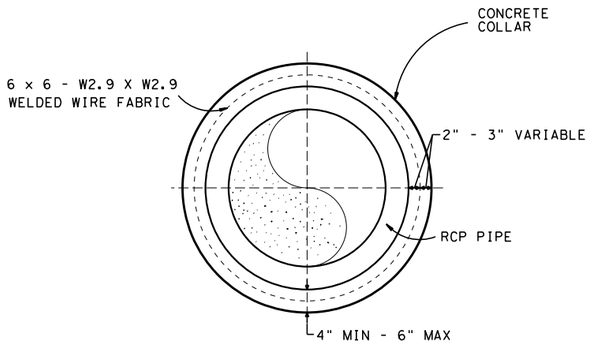
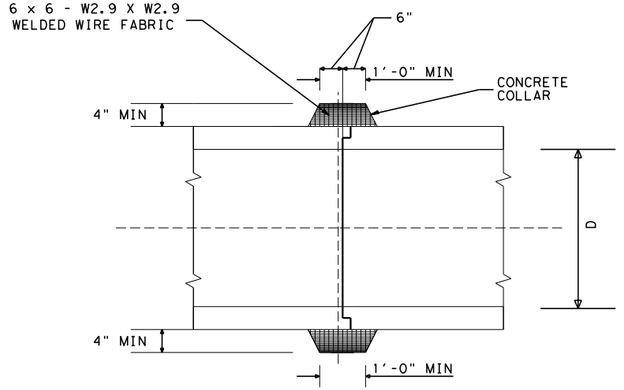


PLAN



SECTION A-A



SECTION B-B

END TO END PIPE CONNECTION

NTS

NOTES:

1.) CONCRETE COLLAR FOR END TO END PIPE CONNECTIONS SHALL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.

2.) CONCRETE SHALL BE: CL A, CL B, CL C OR CL D.

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

CONCRETE COLLAR DETAILS

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	NAVARRO	100
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DISCLAIMER:
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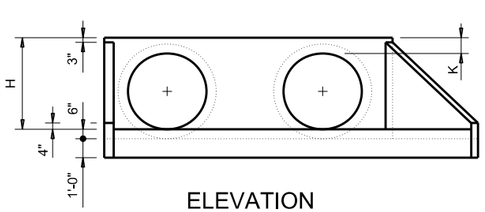
DATE:
FILE:

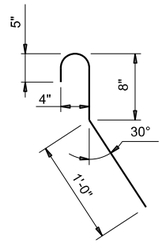
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	Values for One Pipe W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be Added for Each Addt'l Pipe X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	3' - 3 ½"	2' - 8 ¾"	2' - 10"	3' - 3 ¼"	85	0.5	1' - 9 ¾"	20	0.2
	15"	3' - 10 ½"	3' - 0 ¼"	3' - 4"	3' - 10 ¼"	97	0.6	2' - 3"	25	0.3
	18"	4' - 5 ½"	3' - 4"	3' - 10"	4' - 5"	119	0.8	2' - 9 ¼"	32	0.4
	21"	5' - 0 ¾"	3' - 7 ½"	4' - 4"	5' - 0"	134	0.9	3' - 2 ¼"	43	0.5
	24"	5' - 9 ¼"	4' - 0 ¾"	4' - 10"	5' - 7"	154	1.1	3' - 8 ½"	51	0.6
	27"	6' - 4 ½"	4' - 4 ½"	5' - 4"	6' - 2"	164	1.3	4' - 0 ¾"	57	0.7
	30"	6' - 11 ½"	4' - 8"	5' - 10"	6' - 8 ¾"	187	1.5	4' - 5 ¾"	67	0.8
	33"	7' - 6 ½"	4' - 11 ¾"	6' - 4"	7' - 3 ¾"	205	1.7	4' - 10"	73	0.9
	36"	8' - 1 ¾"	5' - 3 ¼"	6' - 10"	7' - 10 ¾"	231	1.9	5' - 3 ¼"	82	1.1
	42"	9' - 3 ¾"	5' - 10 ½"	7' - 10"	9' - 0 ½"	271	2.4	6' - 0 ½"	100	1.4
	48"	10' - 9 ½"	6' - 5 ¾"	9' - 4"	10' - 9 ¼"	325	3.2	6' - 9 ¾"	121	1.8
	54"	11' - 11 ¾"	7' - 1"	10' - 4"	11' - 11 ¼"	384	3.8	7' - 9 ¼"	154	2.2
	60"	13' - 1 ¾"	7' - 8 ¼"	11' - 4"	13' - 1"	431	4.5	8' - 6 ½"	178	2.6
	66"	14' - 4"	8' - 3 ½"	12' - 4"	14' - 3"	489	5.3	9' - 0 ¾"	198	3.0
	72"	15' - 6 ¼"	8' - 10 ¾"	13' - 4"	15' - 4 ¾"	537	6.1	9' - 8"	220	3.3
3:1	12"	4' - 1 ¼"	2' - 8 ¾"	4' - 3"	4' - 11"	108	0.7	1' - 9 ¾"	23	0.2
	15"	4' - 10"	3' - 0 ¼"	5' - 0"	5' - 9 ¼"	127	0.9	2' - 3"	29	0.3
	18"	5' - 7"	3' - 4"	5' - 9"	6' - 7 ¾"	156	1.1	2' - 9 ¼"	37	0.5
	21"	6' - 3 ¾"	3' - 7 ½"	6' - 6"	7' - 6"	177	1.3	3' - 2 ¼"	49	0.6
	24"	7' - 2"	4' - 0 ¾"	7' - 3"	8' - 4 ½"	204	1.6	3' - 8 ½"	59	0.7
	27"	7' - 11"	4' - 4 ½"	8' - 0"	9' - 2 ¾"	225	1.9	4' - 0 ¾"	68	0.9
	30"	8' - 7 ¾"	4' - 8"	8' - 9"	10' - 1 ¼"	260	2.2	4' - 5 ¾"	79	1.0
	33"	9' - 4 ½"	4' - 11 ¾"	9' - 6"	10' - 11 ¾"	282	2.5	4' - 10"	86	1.2
	36"	10' - 1 ¼"	5' - 3 ¼"	10' - 3"	11' - 10"	313	2.9	5' - 3 ¼"	97	1.4
	42"	11' - 7"	5' - 10 ½"	11' - 9"	13' - 6 ¾"	379	3.7	6' - 0 ½"	122	1.8
	48"	13' - 5 ¾"	6' - 5 ¾"	14' - 0"	16' - 2"	465	4.9	6' - 9 ¾"	152	2.4
	54"	14' - 11 ½"	7' - 1"	15' - 6"	17' - 10 ¾"	544	5.9	7' - 9 ¼"	190	3.0
	60"	16' - 5"	7' - 8 ¼"	17' - 0"	19' - 7 ½"	616	7.0	8' - 6 ½"	224	3.5
	66"	17' - 10 ¾"	8' - 3 ½"	18' - 6"	21' - 4 ¼"	701	8.1	9' - 0 ¾"	248	4.0
	72"	19' - 4 ¼"	8' - 10 ¾"	20' - 0"	23' - 1 ¼"	786	9.4	9' - 8"	281	4.6
4:1	12"	4' - 11"	2' - 8 ¾"	5' - 8"	6' - 6 ½"	136	0.9	1' - 9 ¾"	26	0.3
	15"	5' - 9 ½"	3' - 0 ¼"	6' - 8"	7' - 8 ½"	162	1.2	2' - 3"	33	0.4
	18"	6' - 8 ¼"	3' - 4"	7' - 8"	8' - 10 ¼"	198	1.5	2' - 9 ¼"	43	0.6
	21"	7' - 6 ¾"	3' - 7 ½"	8' - 8"	10' - 0"	232	1.8	3' - 2 ¼"	57	0.7
	24"	8' - 6 ¾"	4' - 0 ¾"	9' - 8"	11' - 2"	264	2.2	3' - 8 ½"	68	0.9
	27"	9' - 5 ¼"	4' - 4 ½"	10' - 8"	12' - 3 ¾"	292	2.6	4' - 0 ¾"	79	1.1
	30"	10' - 4"	4' - 8"	11' - 8"	13' - 5 ¾"	333	3.0	4' - 5 ¾"	91	1.3
	33"	11' - 2 ½"	4' - 11 ¾"	12' - 8"	14' - 7 ½"	368	3.5	4' - 10"	104	1.5
	36"	12' - 1"	5' - 3 ¼"	13' - 8"	15' - 9 ¼"	411	4.0	5' - 3 ¼"	115	1.7
	42"	13' - 10"	5' - 10 ½"	15' - 8"	18' - 1"	495	5.1	6' - 0 ½"	144	2.2
	48"	16' - 2 ¼"	6' - 5 ¾"	18' - 8"	21' - 6 ¾"	612	6.8	6' - 9 ¾"	183	3.0
	54"	17' - 11 ¼"	7' - 1"	20' - 8"	23' - 10 ¼"	729	8.2	7' - 9 ¼"	231	3.7
	60"	19' - 8 ¼"	7' - 8 ¼"	22' - 8"	26' - 2"	824	9.8	8' - 6 ½"	270	4.4
	66"	21' - 5 ½"	8' - 3 ½"	24' - 8"	28' - 5 ¾"	947	11.4	9' - 0 ¾"	305	5.0
	72"	23' - 2 ½"	8' - 10 ¾"	26' - 8"	30' - 9 ½"	1,060	13.2	9' - 8"	342	5.7
6:1	12"	6' - 6 ¾"	2' - 8 ¾"	8' - 6"	9' - 9 ¾"	192	1.4	1' - 9 ¾"	30	0.4
	15"	7' - 8 ¾"	3' - 0 ¼"	10' - 0"	11' - 6 ½"	230	1.9	2' - 3"	40	0.5
	18"	8' - 10 ¾"	3' - 4"	11' - 6"	13' - 3 ¼"	281	2.4	2' - 9 ¼"	51	0.7
	21"	10' - 0 ¾"	3' - 7 ½"	13' - 0"	15' - 0 ¼"	334	2.9	3' - 2 ¼"	69	1.0
	24"	11' - 4 ¼"	4' - 0 ¾"	14' - 6"	16' - 9"	377	3.5	3' - 8 ½"	83	1.3
	27"	12' - 6 ¼"	4' - 4 ½"	16' - 0"	18' - 5 ¾"	428	4.2	4' - 0 ¾"	98	1.5
	30"	13' - 8 ¼"	4' - 8"	17' - 6"	20' - 2 ½"	488	4.9	4' - 5 ¾"	113	1.8
	33"	14' - 10 ¼"	4' - 11 ¾"	19' - 0"	21' - 11 ¼"	551	5.7	4' - 10"	130	2.0
	36"	16' - 0 ¼"	5' - 3 ¼"	20' - 6"	23' - 8"	606	6.5	5' - 3 ¼"	145	2.4
	42"	18' - 4 ½"	5' - 10 ½"	23' - 6"	27' - 1 ½"	740	8.4	6' - 0 ½"	184	3.1
	48"	21' - 6 ¾"	6' - 5 ¾"	28' - 0"	32' - 4"	946	11.4	6' - 9 ¾"	240	4.1
	54"	23' - 10 ¾"	7' - 1"	31' - 0"	35' - 9 ½"	1,124	13.8	7' - 9 ¼"	303	5.2
	60"	26' - 2 ¾"	7' - 8 ¼"	34' - 0"	39' - 3"	1,278	16.4	8' - 6 ½"	358	6.2

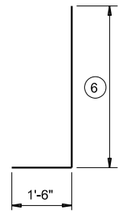


ELEVATION

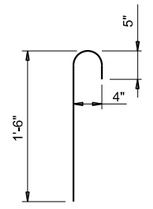
(Showing dimensions.)



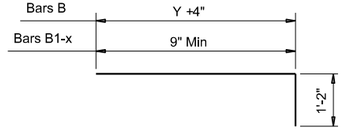
BARS CL
(Length = 2'-5")



BARS VL and VS

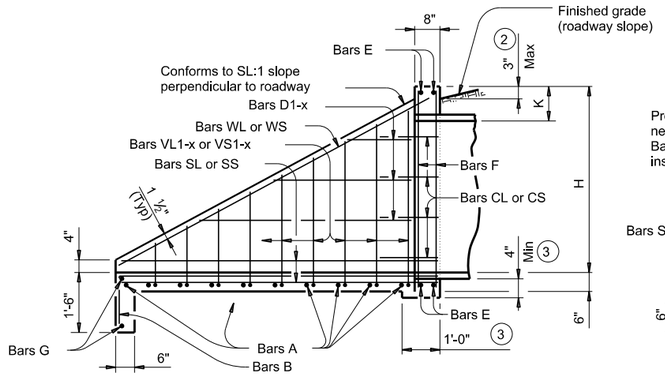


BARS CS
(Length = 2'-3")

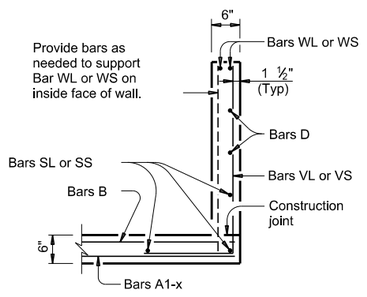


BARS B and B1-x

PLAN



TYPICAL WING ELEVATION



SECTION A-A

TABLE OF REINFORCING STEEL (5)

Bar	Size	Spa	No.
A	#4	1' - 0"	~
B	#3	1' - 6"	~
CL & CS	#4	1' - 0"	~
D	#3	1' - 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
SL & SS	#4	~	6
VL & VS	#4	1' - 0"	~
WL & WS	#5	~	4

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (4)	H
12"	0' - 9"	1' - 0"	2' - 0"
15"	0' - 11"	1' - 0"	2' - 3"
18"	1' - 2"	1' - 0"	2' - 6"
21"	1' - 4"	1' - 0"	2' - 9"
24"	1' - 7"	1' - 0"	3' - 0"
27"	1' - 8"	1' - 0"	3' - 3"
30"	1' - 10"	1' - 0"	3' - 6"
33"	1' - 11"	1' - 0"	3' - 9"
36"	2' - 1"	1' - 0"	4' - 0"
42"	2' - 4"	1' - 0"	4' - 6"
48"	2' - 7"	1' - 3"	5' - 3"
54"	3' - 0"	1' - 3"	5' - 9"
60"	3' - 3"	1' - 3"	6' - 3"
66"	3' - 3"	1' - 3"	6' - 9"
72"	3' - 4"	1' - 3"	7' - 3"

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.

(4) Dimensions shown are usual and maximum.

(5) Quantities shown are for one structure end only (one headwall).

(6) Min Length = 6" 3" x $\left(\frac{12 \times H \ 7\text{-}}{12 \times L}\right)$

Max Length = 12 x H 3" x - $\left(\frac{12 \times H \ 7\text{-}}{12 \times L}\right)$ -

(7) Lengths of wings based on SL:1 slope along this line.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation

Bridge Division Standard

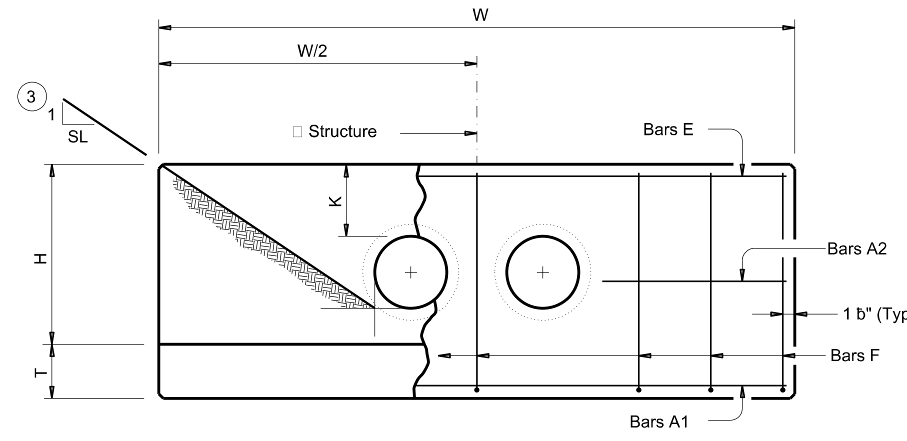
CONCRETE HEADWALLS
WITH FLARED WINGS FOR 15° SKEW PIPE CULVERTS

CH-FW-15

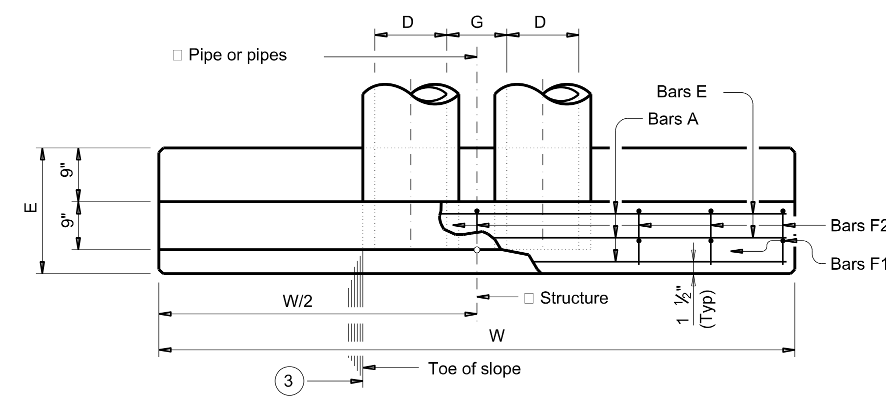
FILE: chfw15se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		101

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

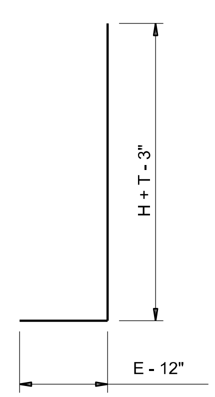
Slope	Dia of Pipe (D)	Values for One Pipe: W	Values for One Pipe: Reinf (Lbs) (1)	Values for One Pipe: Conc (CY) (2)	Values To Be Added for Each Addt'l Pipe: W	Values To Be Added for Each Addt'l Pipe: Reinf (Lbs) (1)	Values To Be Added for Each Addt'l Pipe: Conc (CY) (2)
2:1	12"	9' - 0"	122	1.1	1' - 9"	15	0.2
	15"	10' - 3"	136	1.3	2' - 2"	16	0.2
	18"	11' - 6"	163	1.5	2' - 8"	19	0.3
	21"	12' - 9"	200	1.8	3' - 1"	31	0.4
	24"	14' - 0"	217	2.1	3' - 7"	34	0.4
	27"	15' - 3"	254	2.4	3' - 11"	37	0.5
	30"	16' - 6"	272	2.7	4' - 4"	40	0.6
	33"	17' - 9"	314	3.1	4' - 8"	43	0.6
	36"	19' - 0"	371	3.9	5' - 1"	46	0.8
	42"	21' - 6"	442	4.9	5' - 10"	52	1.0
	48"	25' - 0"	569	6.4	6' - 7"	59	1.3
	54"	27' - 6"	701	7.5	7' - 6"	82	1.6
	60"	30' - 0"	794	8.8	8' - 3"	90	1.8
	66"	32' - 6"	894	10.2	8' - 9"	96	2.0
	72"	35' - 0"	1,055	11.7	9' - 4"	103	2.3
3:1	12"	13' - 0"	175	1.6	1' - 9"	14	0.2
	15"	14' - 9"	193	1.9	2' - 2"	17	0.2
	18"	16' - 6"	228	2.2	2' - 8"	19	0.3
	21"	18' - 3"	299	2.6	3' - 1"	31	0.4
	24"	20' - 0"	323	3.0	3' - 7"	33	0.4
	27"	21' - 9"	371	3.5	3' - 11"	37	0.5
	30"	23' - 6"	415	4.0	4' - 4"	40	0.5
	33"	25' - 3"	469	4.6	4' - 8"	43	0.6
	36"	27' - 0"	556	5.7	5' - 1"	46	0.8
	42"	30' - 6"	675	7.1	5' - 10"	52	1.0
	48"	35' - 6"	837	9.2	6' - 7"	59	1.3
	54"	39' - 0"	1,015	11.0	7' - 6"	84	1.6
	60"	42' - 6"	1,171	12.9	8' - 3"	91	1.8
	66"	46' - 0"	1,298	14.9	8' - 9"	98	2.0
	72"	49' - 6"	1,561	17.1	9' - 4"	103	2.3
4:1	12"	17' - 0"	229	2.0	1' - 9"	15	0.2
	15"	19' - 3"	266	2.4	2' - 2"	17	0.2
	18"	21' - 6"	308	2.9	2' - 8"	19	0.3
	21"	23' - 9"	382	3.5	3' - 1"	31	0.3
	24"	26' - 0"	430	3.9	3' - 7"	34	0.4
	27"	28' - 3"	486	4.7	3' - 11"	37	0.5
	30"	30' - 6"	539	5.2	4' - 4"	40	0.6
	33"	32' - 9"	603	6.0	4' - 8"	42	0.6
	36"	35' - 0"	738	7.5	5' - 1"	47	0.8
	42"	39' - 6"	881	9.3	5' - 10"	52	1.0
	48"	46' - 0"	1,102	12.1	6' - 7"	61	1.3
	54"	50' - 6"	1,364	14.4	7' - 6"	84	1.6
	60"	55' - 0"	1,547	16.9	8' - 3"	91	1.8
	66"	59' - 6"	1,741	19.5	8' - 9"	98	2.0
	72"	64' - 0"	2,077	22.4	9' - 4"	102	2.3
6:1	12"	25' - 0"	336	3.0	1' - 9"	14	0.2
	15"	28' - 3"	384	3.6	2' - 2"	17	0.2
	18"	31' - 6"	452	4.2	2' - 8"	19	0.3
	21"	34' - 9"	581	5.1	3' - 1"	31	0.4
	24"	38' - 0"	644	5.8	3' - 7"	34	0.4
	27"	41' - 3"	737	6.9	3' - 11"	37	0.5
	30"	44' - 6"	807	7.7	4' - 4"	39	0.6
	33"	47' - 9"	912	8.9	4' - 8"	44	0.6
	36"	51' - 0"	1,108	11.0	5' - 1"	48	0.8
	42"	57' - 6"	1,318	13.7	5' - 10"	54	1.0
	48"	67' - 0"	1,682	17.9	6' - 7"	59	1.3
	54"	73' - 6"	2,072	21.3	7' - 6"	83	1.6
	60"	80' - 0"	2,351	24.9	8' - 3"	89	1.8
	66"	86' - 6"	2,643	28.9	8' - 9"	96	2.0
	72"	93' - 0"	3,121	33.1	9' - 4"	101	2.3



ELEVATION

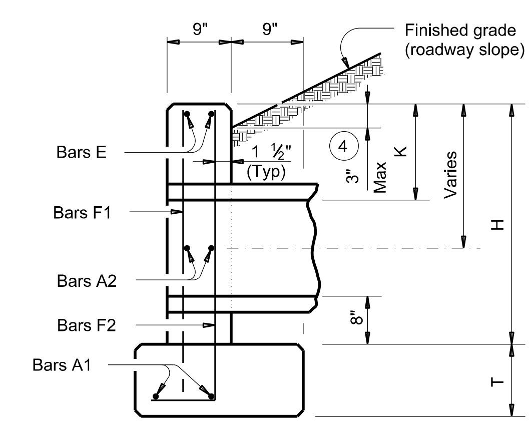


PLAN OF NON-SKEWED PIPES



BARS F2

1. Total quantities include one 3'-1" lap for bars over 60' in length.
2. Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
3. Indicated slope is perpendicular to centerline pipe or pipes.
4. For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
5. Dimensions shown are usual and maximum.
6. Quantities shown are for one structure end only (one headwall).



SECTION AT CENTER OF PIPE

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' - 9"	1' - 0"	2' - 8"	0' - 9"	1' - 9"
15"	0' - 11"	1' - 0"	2' - 11"	0' - 9"	1' - 9"
18"	1' - 2"	1' - 0"	3' - 2"	0' - 9"	1' - 9"
21"	1' - 4"	1' - 0"	3' - 5"	0' - 9"	2' - 0"
24"	1' - 7"	1' - 0"	3' - 8"	0' - 9"	2' - 0"
27"	1' - 8"	1' - 0"	3' - 11"	0' - 9"	2' - 3"
30"	1' - 10"	1' - 0"	4' - 2"	0' - 9"	2' - 3"
33"	1' - 11"	1' - 0"	4' - 5"	0' - 9"	2' - 6"
36"	2' - 1"	1' - 0"	4' - 8"	1' - 0"	2' - 6"
42"	2' - 4"	1' - 0"	5' - 2"	1' - 0"	2' - 9"
48"	2' - 7"	1' - 3"	5' - 11"	1' - 0"	3' - 0"
54"	3' - 0"	1' - 3"	6' - 5"	1' - 0"	3' - 3"
60"	3' - 3"	1' - 3"	6' - 11"	1' - 0"	3' - 6"
66"	3' - 3"	1' - 3"	7' - 5"	1' - 0"	3' - 9"
72"	3' - 4"	1' - 3"	7' - 11"	1' - 0"	4' - 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' - 6"	~
E	#5	~	2
F	#5	1' - 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation — Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0

FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT 1451	SECT 03	JOB 017	HIGHWAY FM 55
REVISIONS	DIST DAL	COUNTY NAVARRO		SHEET NO. 102

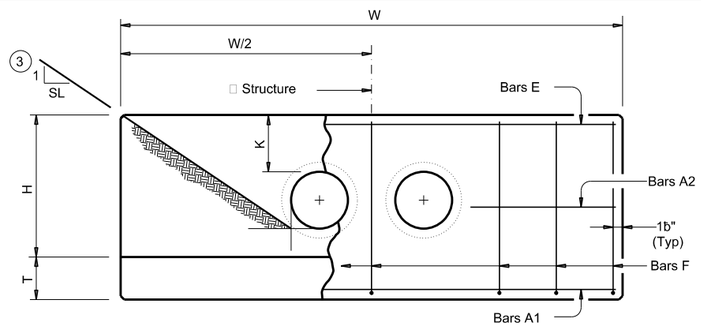
DATE: 11/30/2021 10:49:56
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\1451030174 - Design Set 5. Drainage\DRAINAGE STANDARDS\chpw0ste-20.dgn

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

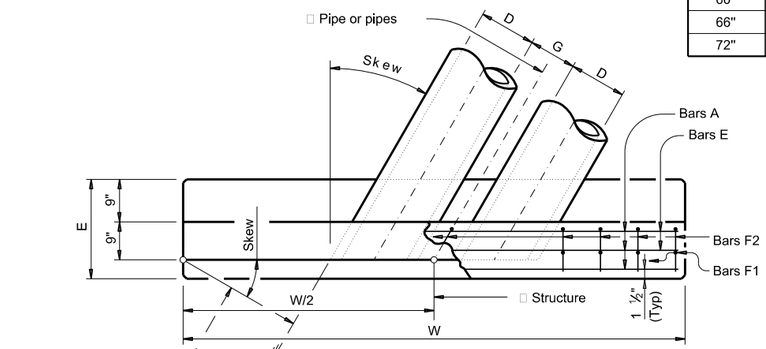
DATE:

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	15° Skew						30° Skew						45° Skew					
		Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe			Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' - 4"	124	1.1	1' - 9 ¾"	15	0.2	10' - 5"	130	1.2	2' - 0"	16	0.2	12' - 9"	159	1.5	2' - 5 ¾"	17	0.3
	15"	10' - 7"	136	1.3	2' - 3"	17	0.2	11' - 10"	159	1.5	2' - 6"	18	0.2	14' - 6"	191	1.8	3' - 0 ¾"	20	0.3
	18"	11' - 11"	165	1.5	2' - 9"	19	0.3	13' - 3"	174	1.7	3' - 1"	29	0.3	16' - 3"	207	2.1	3' - 9 ¼"	33	0.4
	21"	13' - 2"	203	1.9	3' - 2 ¼"	31	0.4	14' - 9"	233	2.1	3' - 6 ¾"	33	0.4	18' - 0"	276	2.6	4' - 4 ¼"	36	0.5
	24"	14' - 6"	240	2.1	3' - 8 ¼"	34	0.4	16' - 2"	251	2.4	4' - 1 ¾"	36	0.5	19' - 10"	318	2.9	5' - 0 ¾"	39	0.6
	27"	15' - 9"	258	2.5	4' - 0 ¾"	38	0.5	17' - 7"	292	2.8	4' - 6 ¼"	39	0.6	21' - 7"	342	3.4	5' - 6 ¼"	44	0.7
	30"	17' - 1"	297	2.8	4' - 5 ¾"	40	0.6	19' - 1"	311	3.1	5' - 0"	42	0.6	23' - 4"	388	3.8	6' - 1 ¾"	47	0.8
	33"	18' - 5"	320	3.3	4' - 9 ¾"	43	0.6	20' - 6"	358	3.6	5' - 4 ¾"	46	0.7	25' - 1"	439	4.4	6' - 7 ¼"	51	0.9
	36"	19' - 8"	401	4.0	5' - 3"	47	0.9	21' - 11"	422	4.5	5' - 10 ¾"	50	0.9	26' - 10"	517	5.5	7' - 2 ¼"	55	1.2
	42"	22' - 3"	476	5.0	6' - 0 ¾"	53	1.1	24' - 10"	528	5.6	6' - 8 ¾"	56	1.2	30' - 5"	634	6.9	8' - 3"	76	1.4
	48"	25' - 11"	577	6.6	6' - 9 ¾"	60	1.3	28' - 10"	637	7.3	7' - 7 ¼"	79	1.5	35' - 4"	791	9.0	9' - 3 ¾"	88	1.8
	54"	28' - 6"	711	7.8	7' - 9"	83	1.6	31' - 9"	781	8.7	8' - 8"	81	1.8	38' - 11"	958	10.7	10' - 7 ¼"	97	2.2
	60"	31' - 1"	805	9.2	8' - 6 ¼"	91	1.9	34' - 8"	881	10.2	9' - 6 ¼"	97	2.1	42' - 5"	1,113	12.5	11' - 8"	124	2.6
	66"	33' - 8"	907	10.6	9' - 0 ¾"	98	2.1	37' - 6"	1,028	11.8	10' - 1 ¼"	102	2.4	46' - 0"	1,235	14.5	12' - 4 ¼"	132	2.9
	72"	36' - 3"	1,071	12.1	9' - 8"	105	2.4	40' - 5"	1,207	13.5	10' - 9 ¼"	110	2.6	49' - 6"	1,446	16.6	13' - 2 ¼"	141	3.2
3:1	12"	13' - 6"	178	1.6	1' - 9 ¾"	15	0.2	15' - 0"	189	1.8	2' - 0"	15	0.2	18' - 5"	237	2.2	2' - 5 ¾"	17	0.2
	15"	15' - 3"	212	1.9	2' - 3"	17	0.2	17' - 0"	223	2.1	2' - 6"	17	0.3	20' - 10"	276	2.6	3' - 0 ¾"	20	0.3
	18"	17' - 1"	231	2.3	2' - 9"	19	0.3	19' - 1"	259	2.5	3' - 1"	29	0.3	23' - 4"	318	3.1	3' - 9 ¼"	32	0.4
	21"	18' - 11"	306	2.7	3' - 2 ¼"	31	0.4	21' - 1"	339	3.0	3' - 6 ¾"	33	0.4	25' - 10"	413	3.7	4' - 4 ¼"	36	0.5
	24"	20' - 8"	345	3.1	3' - 8 ¾"	35	0.4	23' - 1"	384	3.5	4' - 1 ¾"	36	0.5	28' - 3"	462	4.2	5' - 0 ¾"	40	0.6
	27"	22' - 6"	376	3.7	4' - 0 ¾"	38	0.5	25' - 1"	438	4.1	4' - 6 ¼"	39	0.6	30' - 9"	522	5.0	5' - 6 ¼"	44	0.7
	30"	24' - 4"	422	4.1	4' - 5 ¾"	40	0.6	27' - 2"	466	4.6	5' - 0"	42	0.6	33' - 3"	578	5.6	6' - 1 ¾"	47	0.8
	33"	26' - 2"	476	4.8	4' - 10"	43	0.6	29' - 2"	522	5.3	5' - 4 ¾"	46	0.7	35' - 9"	644	6.5	6' - 7 ¼"	51	0.9
	36"	27' - 11"	590	5.9	5' - 3"	47	0.8	31' - 2"	645	6.6	5' - 10 ¾"	50	0.9	38' - 2"	787	8.0	7' - 2 ¼"	56	1.2
	42"	31' - 7"	684	7.3	6' - 0 ¼"	53	1.1	35' - 3"	776	8.2	6' - 8 ¾"	56	1.2	43' - 2"	933	10.0	8' - 3"	79	1.4
	48"	36' - 9"	880	9.6	6' - 9 ¾"	61	1.3	41' - 0"	953	10.7	7' - 7 ¼"	81	1.5	50' - 2"	1,166	13.1	9' - 3 ¾"	88	1.8
	54"	40' - 5"	1,065	11.4	7' - 9"	85	1.6	45' - 0"	1,185	12.7	8' - 8"	89	1.8	55' - 2"	1,435	15.5	10' - 7 ¼"	97	2.2
	60"	44' - 0"	1,224	13.3	8' - 6 ¼"	93	1.9	49' - 1"	1,356	14.8	9' - 6 ¼"	96	2.1	60' - 1"	1,635	18.2	11' - 8"	124	2.6
	66"	47' - 7"	1,357	15.4	9' - 1"	98	2.1	53' - 1"	1,497	17.2	10' - 1 ¼"	103	2.3	65' - 1"	1,892	21.1	12' - 4 ¼"	130	2.9
	72"	51' - 3"	1,624	17.7	9' - 8"	105	2.3	57' - 2"	1,787	19.7	10' - 9 ¼"	109	2.6	70' - 0"	2,218	24.1	13' - 2 ¼"	139	3.2
4:1	12"	17' - 7"	232	2.1	1' - 9 ¾"	15	0.2	19' - 8"	259	2.4	2' - 0"	16	0.2	24' - 0"	314	2.9	2' - 5 ¾"	18	0.2
	15"	19' - 11"	272	2.5	2' - 3"	17	0.2	22' - 3"	301	2.8	2' - 6"	18	0.3	27' - 3"	361	3.5	3' - 0 ¾"	21	0.3
	18"	22' - 3"	313	3.0	2' - 9"	19	0.3	24' - 10"	344	3.3	3' - 1"	29	0.3	30' - 5"	427	4.0	3' - 9 ¼"	32	0.4
	21"	24' - 7"	407	3.6	3' - 2 ¼"	31	0.4	27' - 5"	446	4.0	3' - 6 ¾"	33	0.4	33' - 7"	549	4.9	4' - 4 ¼"	36	0.5
	24"	26' - 11"	455	4.1	3' - 8 ¾"	35	0.4	30' - 0"	499	4.5	4' - 1 ¾"	36	0.5	36' - 9"	609	5.6	5' - 0 ¾"	40	0.6
	27"	29' - 3"	514	4.8	4' - 0 ¾"	38	0.5	32' - 7"	562	5.4	4' - 6 ¼"	40	0.6	39' - 11"	703	6.6	5' - 6 ¼"	43	0.7
	30"	31' - 7"	568	5.4	4' - 5 ¾"	40	0.6	35' - 3"	620	6.0	5' - 0"	42	0.6	43' - 2"	768	7.4	6' - 1 ¾"	49	0.8
	33"	33' - 11"	634	6.2	4' - 10"	43	0.7	37' - 10"	710	7.0	5' - 4 ¾"	46	0.7	46' - 4"	848	8.5	6' - 7 ¼"	52	0.9
	36"	36' - 3"	776	7.7	5' - 3"	48	0.9	40' - 5"	868	8.6	5' - 10 ¾"	49	0.9	49' - 6"	1,058	10.6	7' - 2 ¼"	56	1.1
	42"	40' - 11"	921	9.6	6' - 0 ¼"	53	1.0	45' - 7"	1,022	10.7	6' - 8 ¾"	57	1.2	55' - 10"	1,262	13.1	8' - 3"	78	1.4
	48"	47' - 7"	1,152	12.6	6' - 10"	61	1.3	53' - 1"	1,268	14.0	7' - 7 ¼"	80	1.5	65' - 1"	1,587	17.2	9' - 3 ¾"	86	1.8
	54"	52' - 3"	1,416	14.9	7' - 9 ¼"	86	1.6	58' - 4"	1,589	16.6	8' - 8"	89	1.8	71' - 5"	1,924	20.4	10' - 7 ¼"	95	2.2
	60"	56' - 11"	1,606	17.5	8' - 6 ¾"	92	1.9	63' - 6"	1,806	19.5	9' - 6 ¼"	95	2.1	77' - 9"	2,192	23.9	11' - 8"	122	2.6
	66"	61' - 7"	1,819	20.2	9' - 0 ¾"	97	2.1	68' - 8"	2,019	22.5	10' - 1 ¼"	101	2.4	84' - 2"	2,472	27.6	12' - 4 ¼"	131	2.9
	72"	66' - 3"	2,150	23.2	9' - 8"	104	2.4	73' - 11"	2,379	25.9	10' - 9 ¼"	108	2.6	90' - 6"	2,937	31.7	13' - 2 ¼"	138	3.2
6:1	12"	25' - 11"	342	3.1	1' - 9 ¾"	15	0.2	28' - 10"	374	3.5	2' - 0"	16	0.2	35' - 4"	456	4.3	2' - 5 ¾"	17	0.2
	15"	29' - 3"	390	3.7	2' - 3"	17	0.2	32' - 7"	442	4.2	2' - 6"	18	0.2	39' - 11"	549	5.1	3' - 0 ¾"	20	0.3
	18"	32' - 7"	459	4.4	2' - 9"	20	0.3	36' - 4"	515	4.9	3' - 1"	29	0.3	44' - 7"	629	6.0	3' - 9 ¼"	33	0.4
	21"	36' - 0"	608	5.3	3' - 2 ¼"	31	0.4	40' - 2"	660	5.9	3' - 6 ¾"	33	0.4	49' - 2"	823	7.2	4' - 4 ¼"	38	0.5
	24"	39' - 4"	672	6.0	3' - 8 ¾"	35	0.4	43' - 11"	748	6.7	4' - 1 ¾"	36	0.5	53' - 9"	920	8.2	5' - 0 ¾"	42	0.6
	27"	42' - 8"	770	7.1	4' - 0 ¾"	38	0.5	47' - 8"	852	8.0	4' - 6 ¼"	41	0.5	58' - 4"	1,039	9.7	5' - 6 ¼"	45	0.7
	30"	46' - 1"	839	8.0	4' - 5 ¾"	40	0.6	51' - 5"	949	8.9	5' - 0"	44	0.6	62' - 11"	1,162	10.9	6' - 1 ¾"	48	0.8
	33"	49' - 5"	947	9.2	4' - 10"	45	0.7	55' - 2"	1,040	10.3	5' - 4 ¾"	48	0.7	67' - 6"	1,292	12.6	6' - 7 ¼"	50	0.9
	36"	52' - 10"	1,151	11.4	5' - 3"	49	0.8	58' - 11"	1,287	12.7	5' - 10 ¾"	51	1.0	72' - 1"	1,583	15.6	7' - 2 ¼"	55	1.1
	42"	59' - 6"	1,365	14.2	6' - 0 ¼"	55	1.0	66' - 5"	1,530	15.8	6' - 8 ¾"	57	1.2	81' - 4"	1,875	19.4	8' - 3"	76	1.4
	48"	69' - 4"	1,737	18.5	6' - 10"	59	1.3	77' - 4"	1,942	20.7	7' - 7 ¼"	79	1.5	94' - 9"	2,368	25.3	9' - 3 ¾"	86	1.8
	54"	76' - 1"	2,138	22.0	7' - 9 ¼"	83	1.6	84' - 10"	2,378	24.6	8' - 8"	87	1.8	103' - 11"	2,912	30.1	10' - 7 ¼"	95	2.2
	60"	82' - 10"	2,426	25.8	8' - 6 ¾"	90	1.9	92' - 5"	2,681	28.8	9' - 6 ¼"	94	2.1	113' - 2"	3,294	35.3	11' - 8"	122	2.6
	66"	89' - 7"	2,730	29.9	9' - 0 ¾"	96	2.1	99' - 11"	3,038	33.3	10' - 1 ¼"	101	2.4	122' - 4"	3,697	40.8	12' - 4 ¼"	130	2.9
	72"	96' - 3"	3,218	34.2	9' - 8"	102	2.4	107' - 5"	3,580	38.2	10' - 9 ¼"	108	2.6	131' - 6"	4,372	46.8	13' - 2 ¼"	139	3.2



ELEVATION



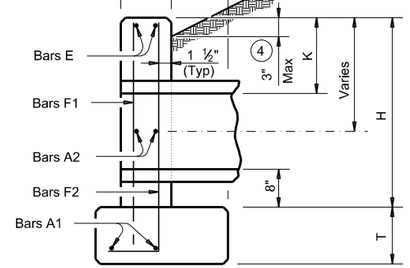
Lengths of wings based on SL:1 slope along this line.

3

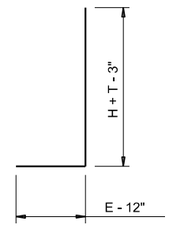
Toe of slope

PLAN OF SKEWED PIPES

Showing 30° skew.



SECTION AT CENTER OF PIPE



BARS F2

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' - 9"	1' - 0"	2' - 8"	0' - 9"	1' - 9"
15"	0' - 11"	1' - 0"	2' - 11"	0' - 9"	1' - 9"
18"	1' - 2"	1' - 0"	3' - 2"	0' - 9"	1' - 9"
21"	1' - 4"	1' - 0"	3' - 5"	0' - 9"	2' - 0"
24"	1' - 7"	1' - 0"	3' - 8"	0' - 9"	2' - 0"
27"	1' - 8"	1' - 0"	3' - 11"	0' - 9"	2' - 3"
30"	1' - 10"	1' - 0"	4' - 2"	0' - 9"	2' - 3"
33"	1' - 11"	1' - 0"	4' - 5"	0' - 9"	2' - 6"
36"	2' - 1"	1' - 0"	4' - 8"	1' - 0"	2' - 6"
42"	2' - 4"	1' - 0"	5' - 2"	1' - 0"	2' - 9"
48"	2' - 7"	1' - 3"	5' - 11"	1' - 0"	3' - 0"
54"	3' - 0"	1' - 3"	6' - 5"	1' - 0"	3' - 3"
60"	3' - 3"	1' - 3"	6' - 11"	1' - 0"	3' - 6"
66"	3' - 3"	1' - 3"	7' - 5"	1' - 0"	3' - 9"
72"	3' - 4"	1' - 3"	7' - 11"	1' - 0"	4' - 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' - 6"	~
E	#5	~	2
F	#5	1' - 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

(1) Total quantites include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

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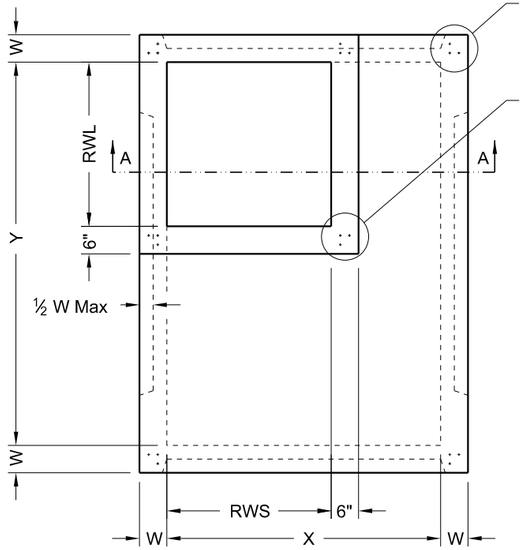
Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

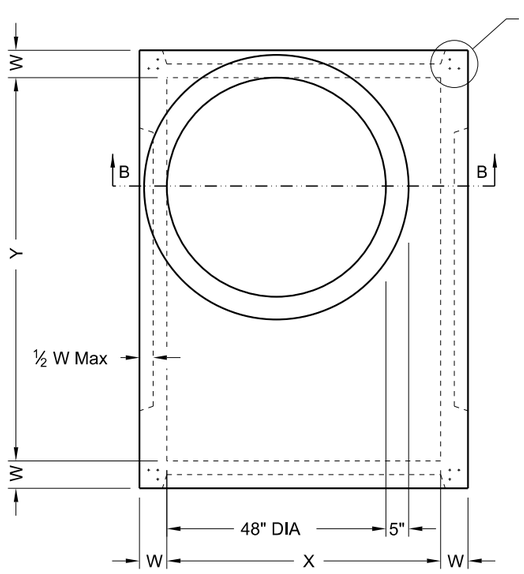
FILE: chpwsste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		103

DATE:
FILE:



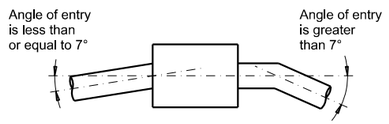
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



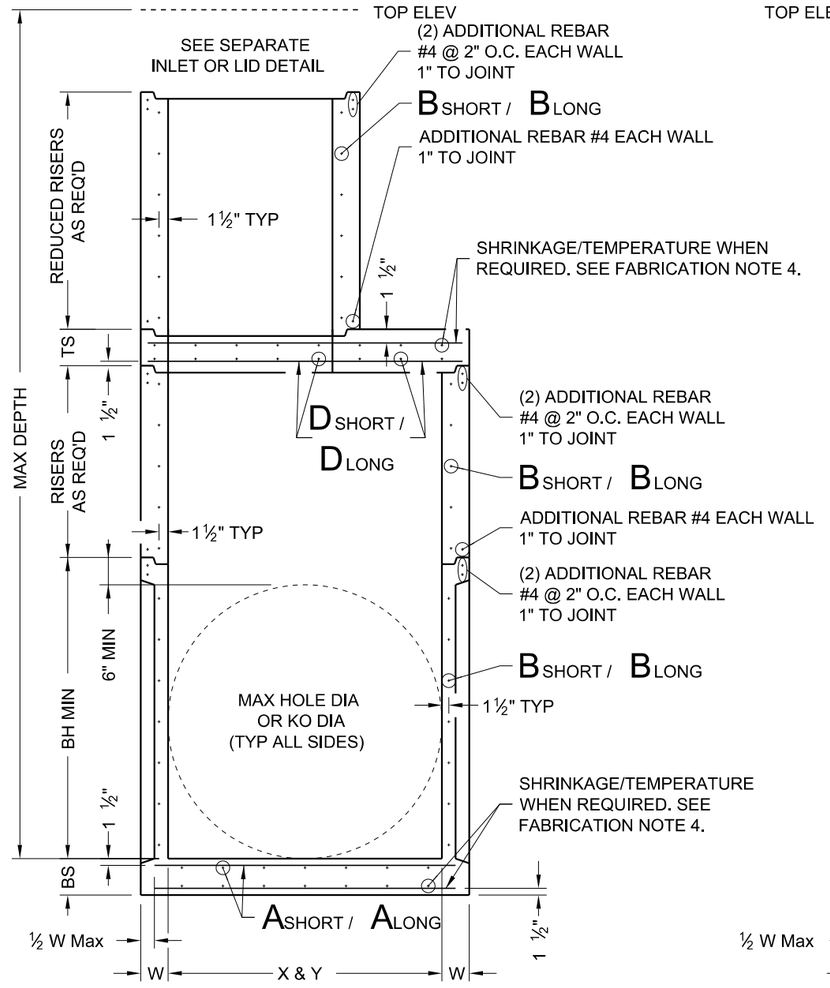
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



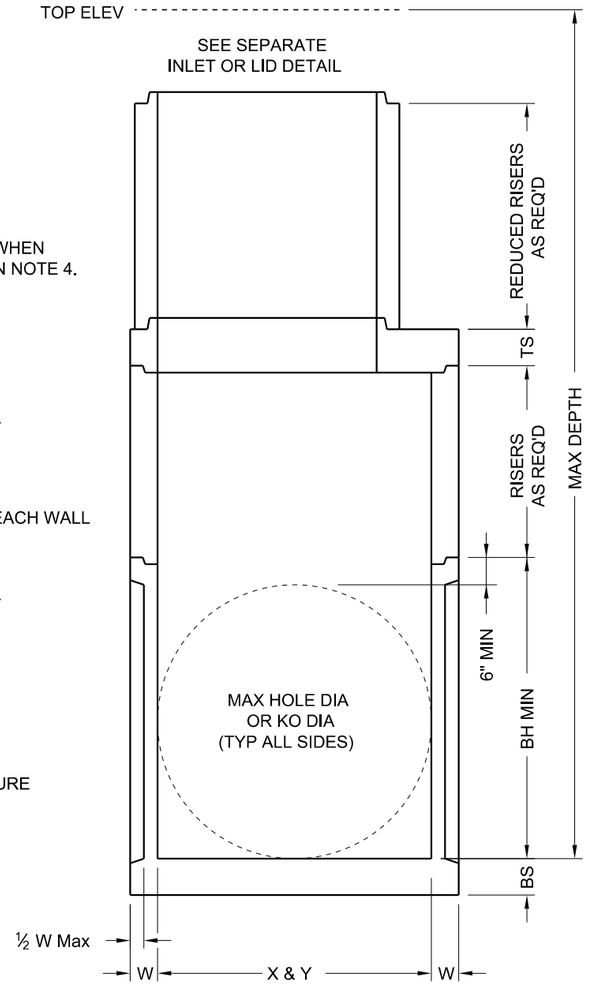
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

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Bridge Division Standard

PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		104

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in²/ft	in²/ft	in.	in²/ft	in²/ft	in.	ft. **	in²/ft	in²/ft	in.	in²/ft	in²/ft	in.	in²/ft	in²/ft	in.	ft. **	in²/ft	in²/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

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Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: prestd10-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		105

DATE:
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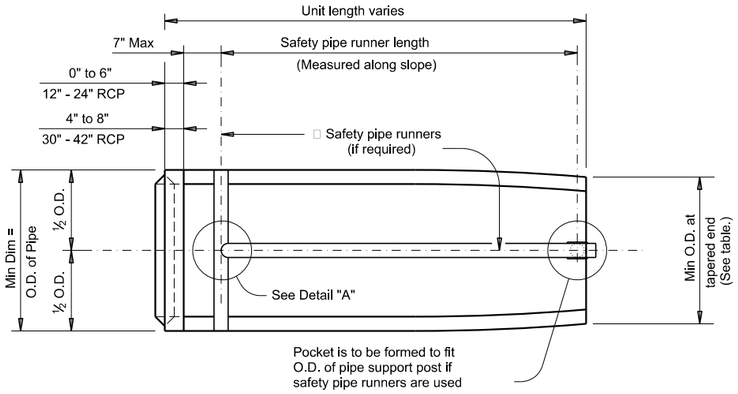
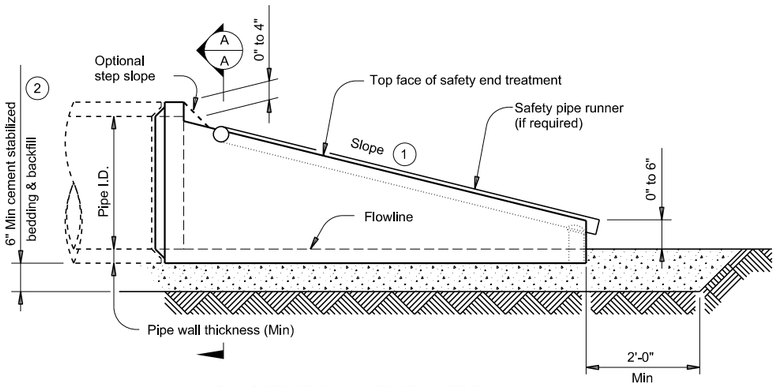


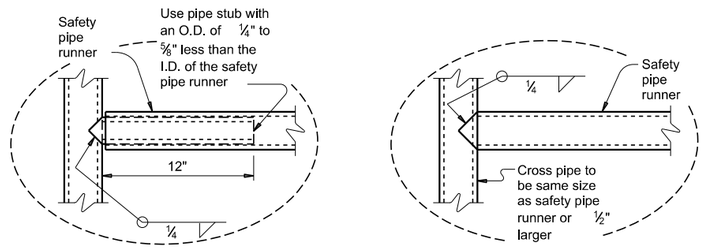
PLAN VIEW

(Showing spigot end connection.)



LONGITUDINAL ELEVATION

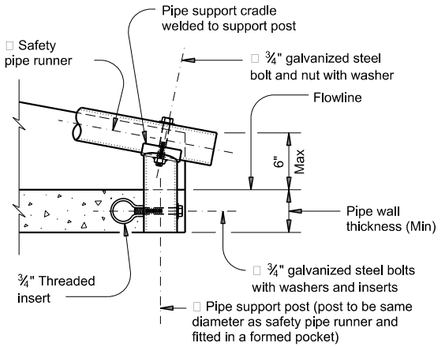
(Showing spigot end connection.)



OPTION A

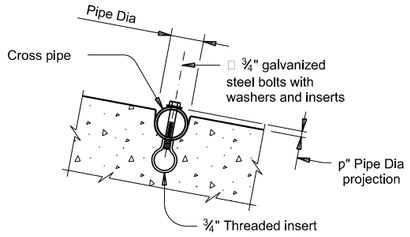
OPTION B

DETAIL A



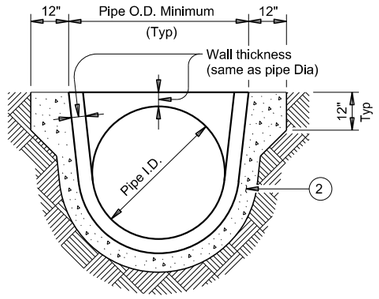
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

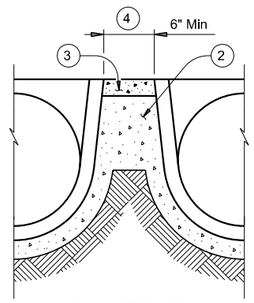


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



SECTION A-A



MULTIPLE PIPE INSTALLATION

MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES

Max 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. Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap be considered subsidiary to the Item "Safety End Treatment".
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min 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°	No	≤ 45°	No
					4:1	2' - 8"				
					6:1	4' - 0"				
15"	2 ¼"	19 ½"	19"	0.07 Circ.	3:1	2' - 10"	≤ 45°	No	≤ 45°	No
					4:1	3' - 9"				
					6:1	5' - 8"				
18"	2 ½"	23"	21 ½"	0.07 Circ.	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
					4:1	4' - 10"				
					6:1	7' - 3"				
24"	3"	30"	27"	0.07 Circ.	3:1	5' - 3"	≤ 45°	No	≤ 30°	No
					4:1	7' - 0"			> 30°	Yes
					6:1	10' - 6"				
30"	3 ½"	37"	31"	0.18 Circ.	3:1	6' - 3"	≤ 15°	No	≤ 15°	No
					4:1	8' - 2"	> 15°	Yes	> 15°	Yes
					6:1	12' - 1"				
36"	4"	44"	36"	0.19 Ellip.	3:1	7' - 10"	= 0°	No	≥ 0 °	Yes
					4:1	10' - 4"	> 0°	Yes		
					6:1	15' - 4"				
42"	4 ½"	51"	41 ½"	0.23 Ellip.	3:1	9' - 6"	≥ 0 °	Yes	≥ 0 °	Yes
					4:1	12' - 6"				
					6:1	18' - 7"				

MATERIAL NOTES:

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.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (CRP) may be used for TYPE II end treatment as specified in Item 467, "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.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, 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.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-RC

FILE: psetrcss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
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REVISIONS	1451	03	017	FM 55
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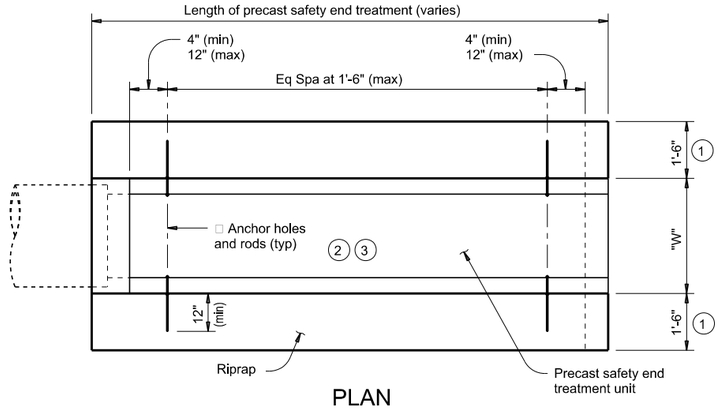
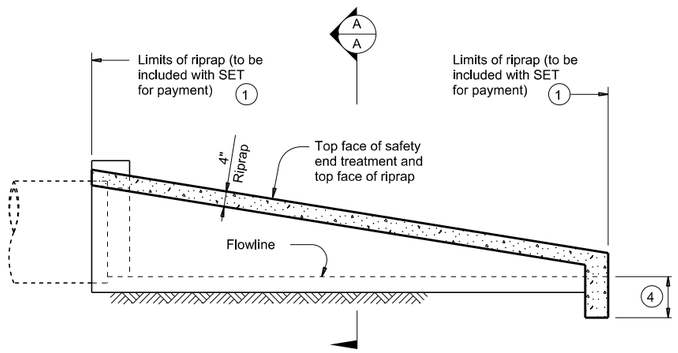
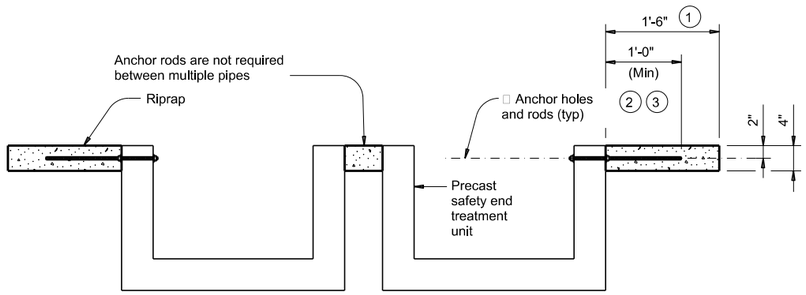


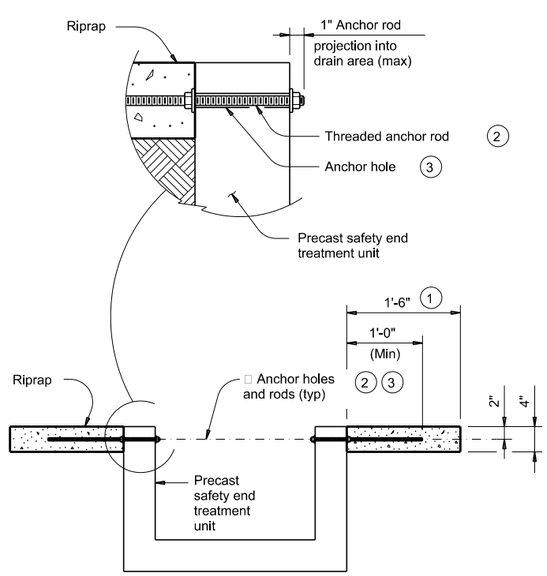
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards				PSET-RC and PSET-RP Standards			
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

(1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.

(2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.

(3) 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.

(4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.

(5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Saftey End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap".
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. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".
Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.
For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrprecast.com.
Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT
TYPE II
RIPRAP DETAILS

PSET-RR

FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF
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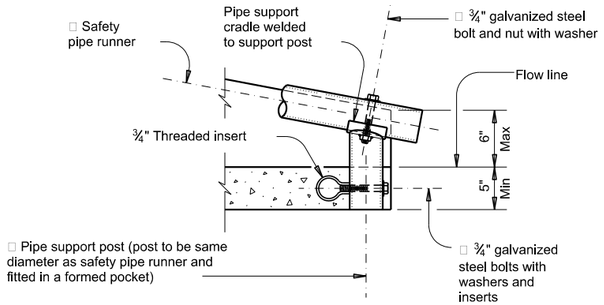
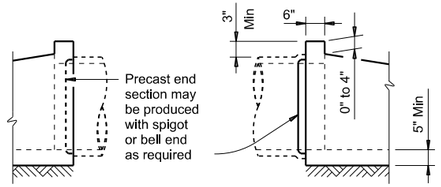
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe Skew	Single Pipe Pipe Runners Required	Multiple Pipes Skew	Multiple Pipes Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' - 11"	≤ 45°	No	≤ 45°	No
				4:1	3' - 6"				
				6:1	4' - 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' - 6"	≤ 45°	No	≤ 45°	No
				4:1	5' - 8"				
				6:1	8' - 0"				
24"	3"	1.95"	31.00"	3:1	6' - 2"	≤ 45°	No	= 30°	No
				4:1	7' - 10"			> 30°	Yes
				6:1	11' - 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"	> 15°	Yes	> 15°	Yes
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"	> 0°	Yes		
				6:1	17' - 11"				
42"	4 ½"	N/A	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				



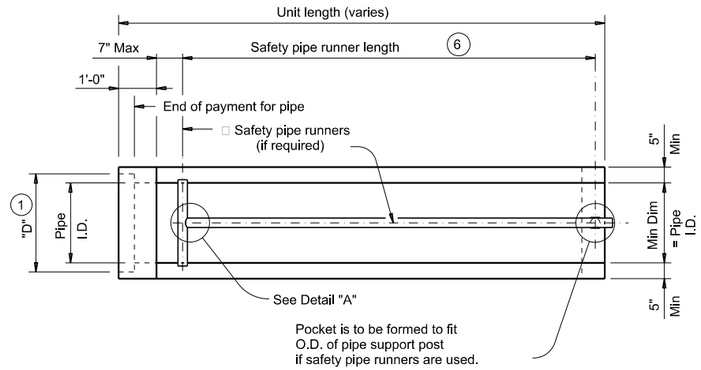
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



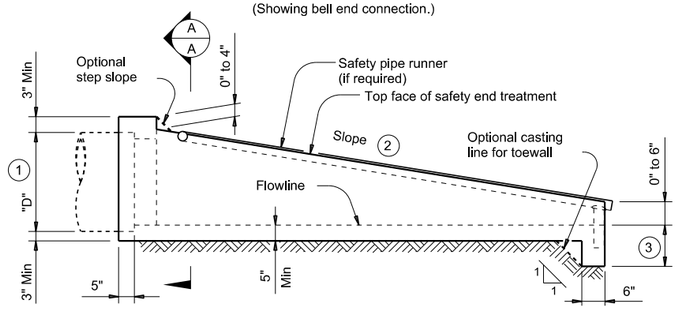
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



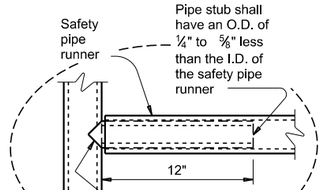
PLAN

(Showing bell end connection.)



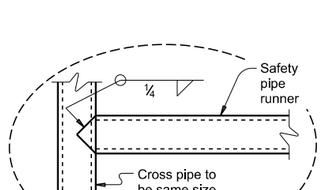
LONGITUDINAL ELEVATION

(Showing bell end connection.)



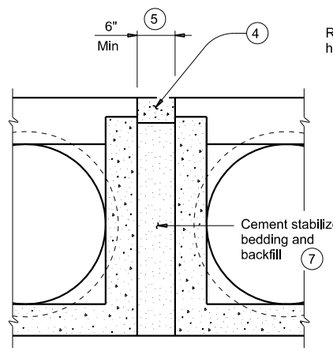
DETAIL A

(If required)

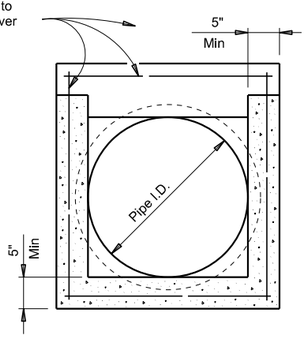


OPTION A

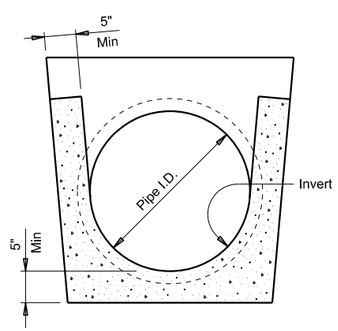
OPTION B



MULTIPLE PIPE INSTALLATION

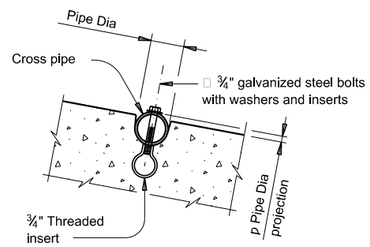


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max 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 reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(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) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) 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 this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 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.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See PBGC standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

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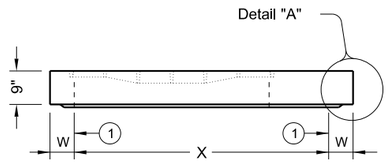
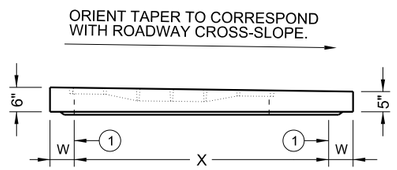
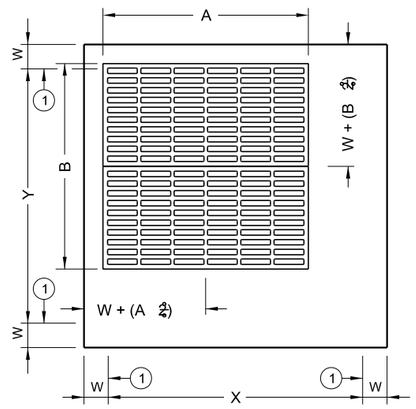


STYLE 'FG'



STYLE 'SFG'

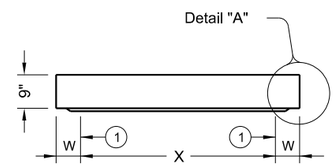
ELEVATION VIEW



PLAN VIEW

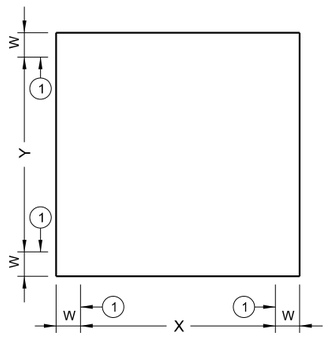
CAST-IN FRAME & GRATE

STYLES 'FG' & 'SFG'



ELEVATION VIEW

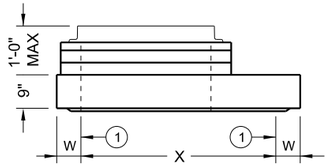
STYLE 'SL'



PLAN VIEW

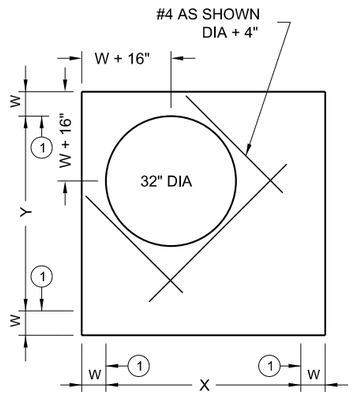
NO OPENINGS

STYLE 'SL'



ELEVATION VIEW

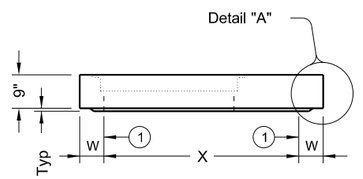
STYLE 'RH'



PLAN VIEW

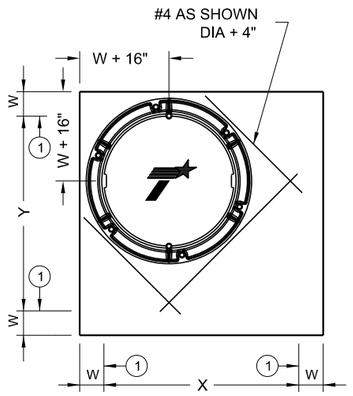
SHIP LOOSE RING & COVER

STYLE 'RH'



ELEVATION VIEW

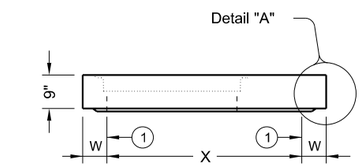
STYLE 'RC'



PLAN VIEW

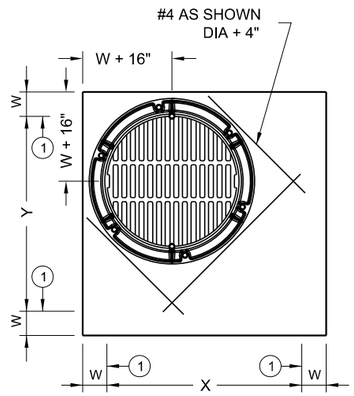
32" DIA CAST-IN RING & COVER

STYLE 'RC'



ELEVATION VIEW

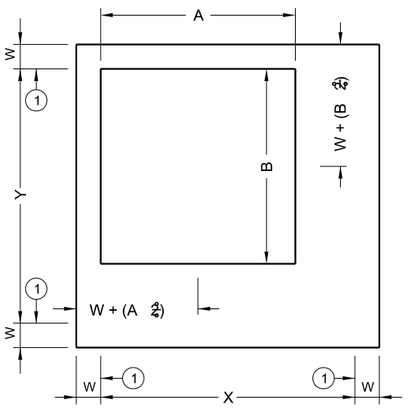
STYLE 'RG'



PLAN VIEW

32" DIA CAST-IN RING & GRATE

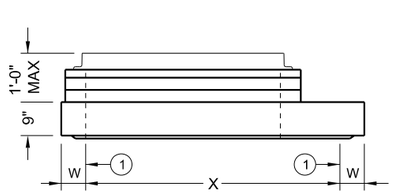
STYLE 'RG'



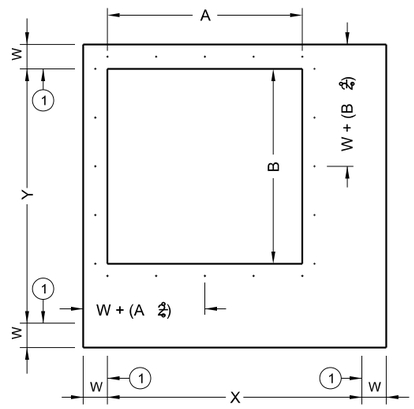
PLAN VIEW

SHIP LOOSE FRAME & GRATE

STYLE 'SH'



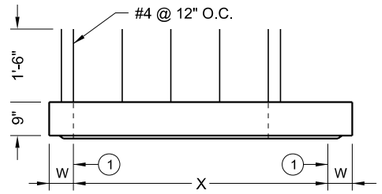
ELEVATION VIEW



PLAN VIEW

EXPOSED REBAR

STYLE 'S1'



ELEVATION VIEW

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

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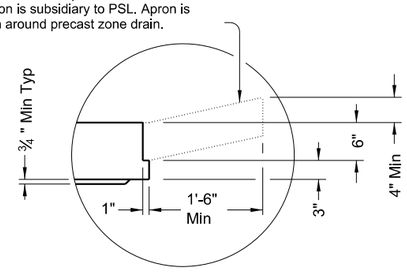
Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in□/ft	0.37 in□/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in□/ft	0.37 in□/ft
SFG	3'x3'	6"	3'x3'	0.32 in□/ft	0.32 in□/ft
SL	4'x4'	6"	n/a	0.34 in□/ft	0.34 in□/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in□/ft	0.41 in□/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in□/ft	0.41 in□/ft
SFG	4'x4'	6"	4'x4'	0.32 in□/ft	0.32 in□/ft
SL	3'x5'	6"	n/a	0.39 in□/ft	0.39 in□/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in□/ft	0.48 in□/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in□/ft	0.48 in□/ft
SFG	3'x5'	6"	3'x5'	0.32 in□/ft	0.32 in□/ft
SL	4'x5'	6"	n/a	0.42 in□/ft	0.42 in□/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in□/ft	0.42 in□/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in□/ft	0.63 in□/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in□/ft	0.66 in□/ft
SL	5'x5'	6"	n/a	0.36 in□/ft	0.36 in□/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in□/ft	0.43 in□/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in□/ft	0.63 in□/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in□/ft	0.63 in□/ft
SL	5'x6'	6"/8"	n/a	0.48 in□/ft	0.48 in□/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in□/ft	0.48 in□/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in□/ft	0.60 in□/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in□/ft	0.60 in□/ft
SL	6'x6'	6"/8"	n/a	0.43 in□/ft	0.43 in□/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in□/ft	0.56 in□/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in□/ft	0.56 in□/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in□/ft	0.59 in□/ft
SL	8'x8'	8"/10"	n/a	0.45 in□/ft	0.45 in□/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in□/ft	0.45 in□/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in□/ft	0.45 in□/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in□/ft	0.45 in□/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

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Bridge Division Standard

PRECAST SLAB LID

PSL

FILE: prestd05-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1451	03	017	FM 55
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	DAL	NAVARRO		110

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO. NBL	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
1	1	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
1	2	D1-2	⇦ CORSICANA / HILLSBORO ⇨	90 x 30	X		S80	1	SA	U		
1	3	W3-1		30 x 30	X		10BWG	1	SA	P		
1	4	I-2aT	BLOOMING GROVE / CITY LIMIT / POP 821	90 x 24	X		10BWG	1	SA	T		
		S4-3P	SCHOOL / SPEED LIMIT 35 WHEN FLASHING	24 x 8	X							
1	5	S5-1		24 x 48	X				RELOCATE EXISTING SCHOOL ZONE FLASHER PAID UNDER ITEM 685-6002			
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	36 x 18	X							
1	6	R2-1	SPEED LIMIT 40	30 x 36	X		10BWG	1	SA	P		
		M2-1	JCT	21 x 15	X							
1	7						10BWG	1	SA	P		
		M1-6T	22 TEXAS	24 x 24	X							
1	8	S1-1		36 x 36	X		10BWG	1	SA	P		
		M1-6F	FARM 55 ROAD	24 x 24	X							
1	9	D10-7aT	3 1 4	3 x 10	X		10BWG	1	SA	P		
		D10-7aT	3 1 4	3 x 10	X							
1	10	R12-1T	WEIGHT LIMIT GROSS 58420 LBS	24 x 36	X		10BWG	1	SA	P		

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:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

SHEET 1 OF 10

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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8-16	DAL	NAVARRO		111

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DATE:
FILE:

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO. NBL	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
		M3-1	NORTH	24 x 12	X							
1	11		FARM 55 ROAD				10BWG	1	SA	P		
		M1-6F		24 x 24	X							
1	12	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
1	13	R2-1	SPEED LIMIT 40	30 x 36	X		10BWG	1	SA	P		
1	14	S1-1		36 x 36	X		10BWG	1	SA	P		
1	15	D2-1	AVALON 10	72 x 18	X		10BWG	1	SA	T		
1	16	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES MEMBERS OF FIRST BAPTIST CHURCH BLOOMING GROVE	48 x 48	X		10BWG	1	SA	T		
		S4-3P	SCHOOL	24 x 8	X							
1	17	S5-1	SPEED LIMIT 35 WHEN FLASHING	24 x 48	X		RELOCATE EXISTING SCHOOL ZONE FLASHER PAID UNDER ITEM 685-6002					
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	36 x 18	X							
		W1-4L		36 x 36	X							
1	18						10BWG	1	SA	P		
		W13-1P	40 MPH	18 x 18	X							
1	19	R2-1	SPEED LIMIT 45	30 x 36	X		10BWG	1	SA	P		
		W1-8L		24 x 30	X							
1	20						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	21						10BWG	1	SA	P		
		W1-8R		24 x 30	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO. NBL	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
		W1-8L		24 x 30	X							
1	22						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	23						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	24						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
1	25	W3-5	SPEED LIMIT 40	36 x 36	X		10BWG	1	SA	P		
		W1-8L		24 x 30	X							
1	26						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	27						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	28						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	29						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	30						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	31						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	32						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	33						10BWG	1	SA	P		
		W1-8R		24 x 30	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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SUMMARY OF SMALL SIGNS

PLAN SHEET NO. (NBL)	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE (FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80)	POSTS (1 or 2)	ANCHOR TYPE (UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic)	MOUNTING DESIGNATION PREFABRICATED (P = "Plain" T = "T" U = "U")	MOUNTING DESIGNATION (1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels)	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE (TY N TY S)
1	34	R2-1	SPEED LIMIT 45	30 x 36	X		10BWG	1	SA	P		
		W1-4L		36 x 36	X							
1	35						10BWG	1	SA	P		
		W13-1P	40 MPH	18 x 18	X							
		W1-8L		24 x 30	X							
1	36						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
1	37						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
1	38	R2-1	SPEED LIMIT 55	30 x 36	X		10BWG	1	SA	P		
3	1	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES MEMBERS OF FIRST BAPTIST CHURCH BLOOMING GROVE	48 x 48	X		10BWG	1	SA	T		
3	2	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
3	3	W11-4		36 x 36	X		10BWG	1	SA	P		
		D3-3bTL	LONE OAK CEMETERY ⇦	54 x 36	X							
3	4						S80	1	SA	U		
		D3-3bTR	LONE OAK CEMETERY ⇨	54 x 36	X							
3	5	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W1-8L		24 x 30	X							
3	6						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
3	7						10BWG	1	SA	P		
		W1-8R		24 x 30	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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SUMMARY OF SMALL SIGNS

PLAN SHEET NO. NBL	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE (FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80)	POSTS (1 or 2)	ANCHOR TYPE (UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic)	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE (TY N, TY S)
		W1-8L		24 x 30	X							
3	8						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
3	9	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W1-8L		24 x 30	X							
3	10						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
3	11						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
3	12						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
3	13						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
3	14	W11-4		36 x 36			10BWG	1	SA	P		
3	15	W1-10cL	40 MPH	36 x 36	X		10BWG	1	SA	P		
3	16	W1-10bR	40 MPH	36 x 36	X		10BWG	1	SA	P		
3	17	W1-2L	40 MPH	36 x 36	X		10BWG	1	SA	P		
		M1-6F	FARM 55 ROAD	24 x 24	X							
3	18	D10-7aT	3 1 2	3 x 10	X		10BWG	1	SA	P		
		D10-7aT	3 1 2	3 x 10	X							

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

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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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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO. (NBL)	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
		W1-8L		24 x 30	X							
3	19						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
3	20						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-2R		36 x 36	X							
4	1						10BWG	1	SA	P		
		W13-1P	40 MPH	18 x 18	X							
		W1-8L		24 x 30	X							
4	2						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	3						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	4						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	5						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	6						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	7						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	8						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	9						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	10						10BWG	1	SA	P		
		W1-8R		24 x 30	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:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

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SHEET 6 OF 10

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1451	03	017	FM 55
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	NAVARRO		116

SUMMARY OF SMALL SIGNS

PLAN SHEET NO. (NBL)	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE (FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80)	POSTS (1 or 2)	ANCHOR TYPE (UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic)	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE (TY N, TY S)
		W1-8L		24 x 30	X							
4	11						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	12						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	13						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	14						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	15						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
4	16						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-4R		36 x 36	X							
4	17						10BWG	1	SA	P		
		W13-1P	35 MPH	18 x 18	X							
		M2-1	JCT	21 x 15	X							
4	18						10BWG	1	SA	P		
		M1-6F	FARM 2930 ROAD	24 x 24	X							
4	19	D1-2	⇧ AVALON CRYER CREEK ⇨	102 x 30	X		S80	1	SA	U	BM	
		M3-3	SOUTH	24 x 12	X							
5	1						10BWG	1	SA	P		
		M1-6F	FARM 55 ROAD	24 x 24	X							
5	2	R12-1T	WEIGHT LIMIT GROSS 58420 LBS	24 x 36	X		10BWG	1	SA	P		

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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

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	1451	03	017	FM 55
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	NAVARRO		117

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE
NBL							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
		M3-3	SOUTH	24 x 12	X							
		M1-6F	FARM 55 ROAD	24 x 24	X							
		M6-1		21 x 15	X							
5	3						S80	1	SA	U		
		M3-1	NORTH	24 x 12	X							
		M1-6F	FARM 55 ROAD	24 x 24	X							
		M6-1		21 x 15	X							
5	4	W1-7T		96 x 36	X		S80	1	SA	U	BM	
		M3-2	EAST	24 x 12	X							
5	5	M1-6F	FARM 2930 ROAD	24 x 24	X		10BWG	1	SA	P		
		M6-1		21 x 15	X							
5	6	D1-2	BLOOMING GROVE CRYER CREEK	126 x 30	X		S80	1	SA	U	BM	
		W1-4R		36 x 36	X							
5	7						10BWG	1	SA	P		
		W13-1P	35 MPH	18 x 18	X							
		M2-1	JCT	21 x 15	X							
5	8						10BWG	1	SA	P		
		M1-6F	FARM 2930 ROAD	24 x 24	X							
		W1-8L		24 x 30	X							
5	9						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
5	10						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
5	11						10BWG	1	SA	P		
		W1-8R		24 x 30	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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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO. NBL	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED (P = "Plain", T = "T", U = "U")	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
		M3-2	EAST	24 x 12	X							
5	12	M1-6F	FARM 2930 ROAD	24 x 24	X		10BWG	1	SA	P		
		M6-1		21 x 15	X							
5	13	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
		W1-8L		24 x 30	X							
5	14						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
5	15						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
5	16						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
5	17	R12-1T	WEIGHT LIMIT GROSS 58420 LBS	24 x 36	X		10BWG	1	SA	P		
		W1-8L		24 x 30	X							
5	18						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
5	19						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		M3-1	NORTH	24 x 12	X							
5	20						10BWG	1	SA	P		
		M1-6F	FARM 55 ROAD	24 x 24	X							
		W1-8L		24 x 30	X							
5	21						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
		W1-8L		24 x 30	X							
5	22						10BWG	1	SA	P		
		W1-8R		24 x 30	X							

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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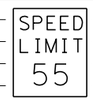
SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO. NBL	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	POSTS: 1 or 2	ANCHOR TYPE: UA=Universal Conc, UB=Universal Bolt, SA=Slipbase-Conc, SB=Slipbase-Bolt, WS=Wedge Steel, WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED: P = "Plain", T = "T", U = "U"	MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext, BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Channel, EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE: TY N, TY S
		W1-8L		24 x 30	X							
5	23						10BWG	1	SA	P		
		W1-8R		24 x 30	X							
5	24	R2-1		30 x 36	X		10BWG	1	SA	P		
5	25	D2-1		66 x 18	X		10BWG	1	SA	T		
6	1	R2-1		30 x 36	X		10BWG	1	SA	P		
6	2	I-2dT		60 x 24	X		10BWG	1	SA	T		
		M1-6F		24 x 24	X							
6	3	D10-7aT		3 x 10	X		10BWG	1	SA	P		
		D10-7aT		3 x 10	X							
6	4	I-2dT		48 x 24	X		10BWG	1	SA	T		
6	5	R12-1T		24 x 36	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

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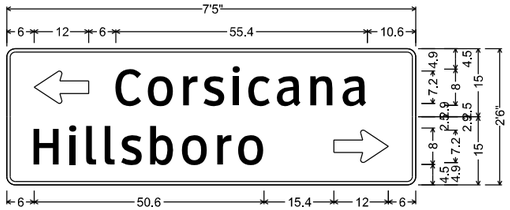
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	NAVARRO		120

11/18/2021 9:26:38 AM

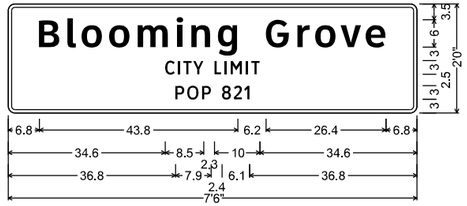


D1-2 8in LT-RT;

1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180';
"Corsicana", ClearviewHwy-3-W;

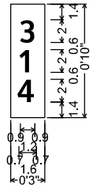
1.9" Radius, 0.8" Border, White on, Green;
"Hillsboro", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0';

SHEET 1 SIGN 2



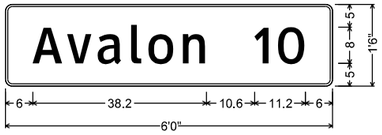
I-2aT 8in;
1.5" Radius, 0.8" Border, White on, Green;
"Blooming Grove", ClearviewHwy-5-W-R;
"CITY LIMIT", ClearviewHwy-3-W; "POP 821", ClearviewHwy-3-W;

SHEET 1 SIGN 4



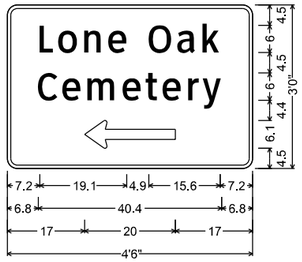
D10-7aT 3in;
No border, White on, Green;
"3", ClearviewHwy-4-W;
"1", ClearviewHwy-4-W;
"4", ClearviewHwy-4-W;

SHEET 1 SIGN 9



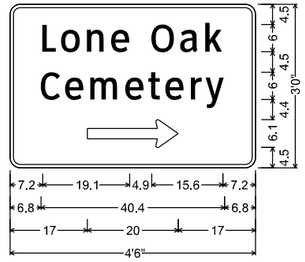
D2-1 8in;
1.5" Radius, 0.5" Border, White on, Green;
"Avalon", ClearviewHwy-3-W;
"10", ClearviewHwy-3-W;

SHEET 1 SIGN 15



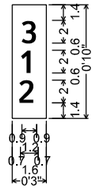
D3-3bTL_VARx36;
2.3" Radius, 0.8" Border, White on, Green;
"Lone Oak", ClearviewHwy-3-W;
"Cemetery", ClearviewHwy-3-W;
Standard Arrow Custom 20.0" X 6.1" 180';

SHEET 3 SIGN 4



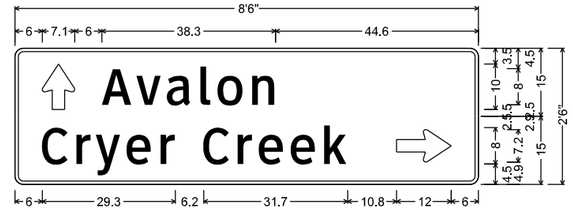
D3-3bTR_VARx36;
2.3" Radius, 0.8" Border, White on, Green;
"Lone Oak", ClearviewHwy-3-W;
"Cemetery", ClearviewHwy-3-W;
Standard Arrow Custom 20.0" X 6.1" 0';

SHEET 3 SIGN 4



D10-7aT 3in;
No border, White on, Green;
"3", ClearviewHwy-4-W;
"1", ClearviewHwy-4-W;
"2", ClearviewHwy-4-W;

SHEET 3 SIGN 18



D1-2 8in UP-RT;

1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 10.0" X 7.1" 90"; "Avalon", ClearviewHwy-3-W;

1.9" Radius, 0.8" Border, White on, Green;
"Cryer Creek", ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0';

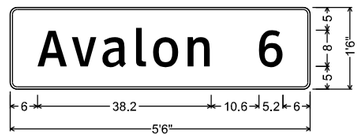
SHEET 4 SIGN 19

D1-2 8in UP-LT;

1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 10.0" X 7.1" 90"; "Blooming Grove", ClearviewHwy-3-W;

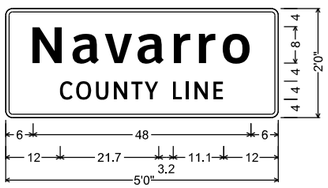
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180"; "Cryer Creek", ClearviewHwy-3-W;

SHEET 5 SIGN 6



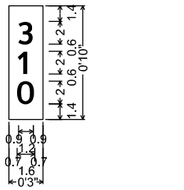
D2-1 8in;
1.5" Radius, 0.5" Border, White on, Green;
"Avalon", ClearviewHwy-3-W;
"6", ClearviewHwy-3-W;

SHEET 5 SIGN 25



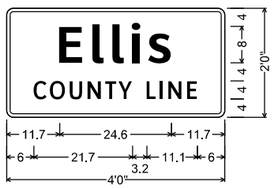
I-2dT 8in;
1.5" Radius, 0.8" Border, White on, Green;
"Navarro", ClearviewHwy-5-W-R;
"COUNTY LINE", ClearviewHwy-3-W;

SHEET 6 SIGN 2



D10-7aT 3in;
No border, White on, Green;
"3", ClearviewHwy-4-W;
"1", ClearviewHwy-4-W;
"0", ClearviewHwy-4-W;

SHEET 6 SIGN 3



I-2dT 8in;
1.5" Radius, 0.8" Border, White on, Green;
"Ellis", ClearviewHwy-5-W-R;
"COUNTY LINE", ClearviewHwy-3-W;

SHEET 6 SIGN 4

11-18-2021

Texas Department of Transportation

SMALL SIGN DETAILS

SCALE: NTS SHEET 1 OF 1

DESIGN/CK	FED. RD. DIV. NO.	STATE FUNDED PROJECT		HIGHWAY NO.
QLM	6	SEE TITLE SHEET		FM 55
CHECK QLM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BLS	TEXAS	DAL	NAVARRO	121
CHECK BA	CONTROL	SECTION	JOB	
	1451	03	017	

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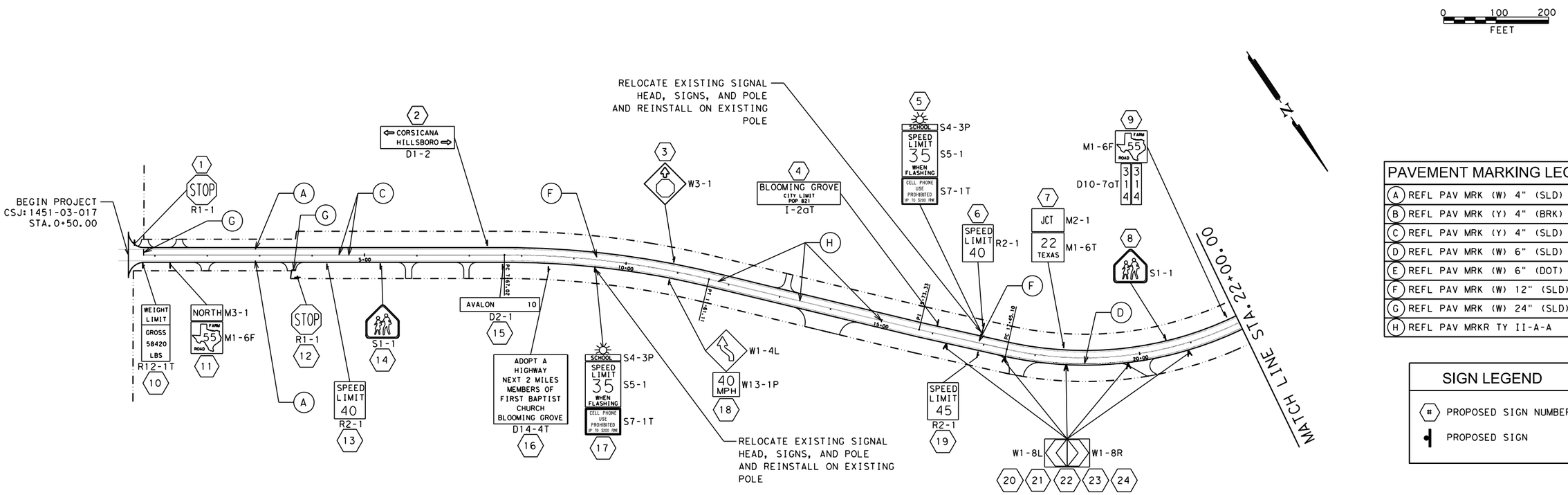

PAVEMENT MARKING LEGEND

A	REFL PAV MRK (W) 4" (SLD)
B	REFL PAV MRK (Y) 4" (BRK)
C	REFL PAV MRK (Y) 4" (SLD)
D	REFL PAV MRK (W) 6" (SLD)
E	REFL PAV MRK (W) 6" (DOT)
F	REFL PAV MRK (W) 12" (SLD)
G	REFL PAV MRK (W) 24" (SLD)
H	REFL PAV MRKR TY II-A-A

SIGN LEGEND

(#) PROPOSED SIGN NUMBER

PROPOSED SIGN

DOUBLE YELLOW	BROKEN YELLOW	SOLID YELLOW AND BROKEN YELLOW	
NO PASSING	PASSING ALLOWED	PASSING ALLOWED NB/NO PASSING SB	PASSING ALLOWED SB/NO PASSING NB
STA. 0+50 TO STA. 65+60			
		STA. 65+60 TO STA. 71+50	
	STA. 71+50 TO STA. 75+30		
			STA. 75+30 TO STA. 83+90
STA. 83+90 TO STA. 142+80			
		STA. 142+80 TO STA. 153+20	
STA. 153+20 TO STA. 185+40			
		STA. 185+10 TO STA. 193+50	
	STA. 193+50 TO STA. 216+50		
			STA. 216+50 TO STA. 228+50
		STA. 228+50 TO STA. 230+00	

STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55

SMALL SIGNS AND PAVEMENT MARKINGS

SCALE: 1"=200' SHEET 1 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	122
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:51:02
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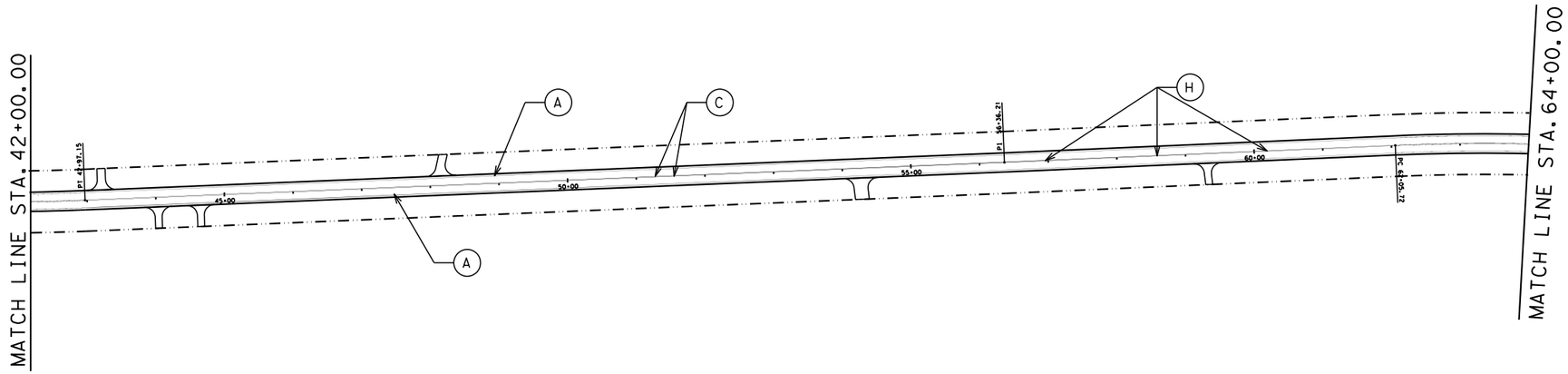

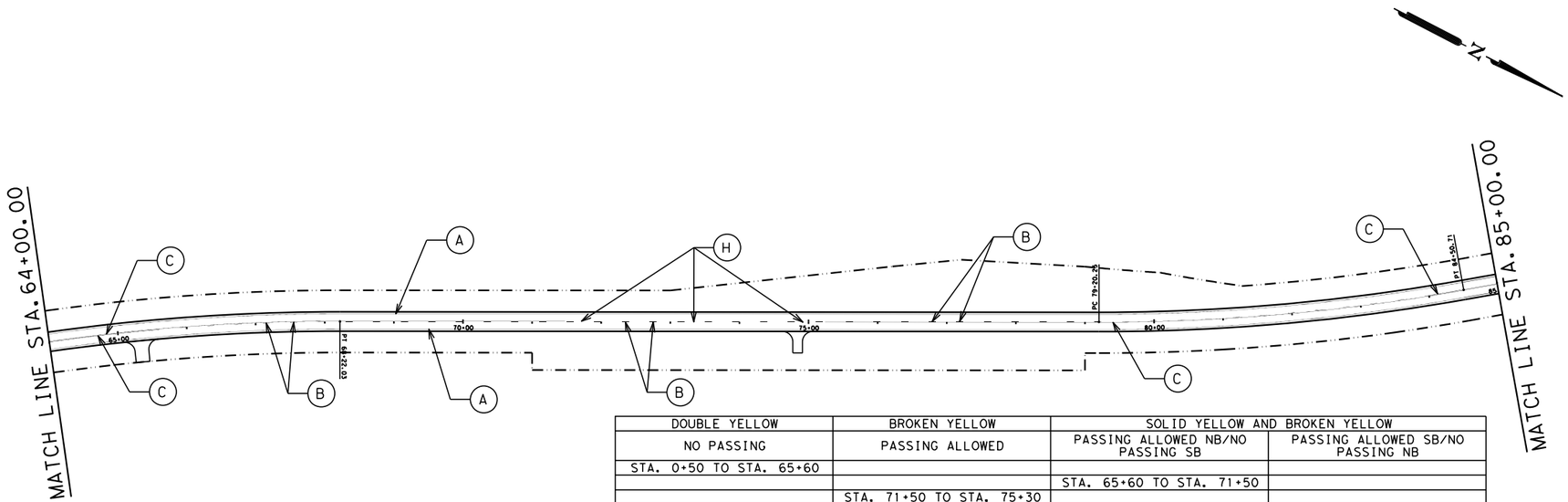

DOUBLE YELLOW	BROKEN YELLOW	SOLID YELLOW AND BROKEN YELLOW	
NO PASSING	PASSING ALLOWED	PASSING ALLOWED NB/NO PASSING SB	PASSING ALLOWED SB/NO PASSING NB
STA. 0+50 TO STA. 65+60			
		STA. 65+60 TO STA. 71+50	
	STA. 71+50 TO STA. 75+30		
			STA. 75+30 TO STA. 83+90
STA. 83+90 TO STA. 142+80			
		STA. 142+80 TO STA. 153+20	
STA. 153+20 TO STA. 185+40			
		STA. 185+10 TO STA. 193+50	
	STA. 193+50 TO STA. 216+50		
			STA. 216+50 TO STA. 228+50
		STA. 228+50 TO STA. 230+00	

0 100 200
FEET

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PAVEMENT MARKING LEGEND	
A	REFL PAV MRK (W) 4" (SLD)
B	REFL PAV MRK (Y) 4" (BRK)
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F	REFL PAV MRK (W) 12" (SLD)
G	REFL PAV MRK (W) 24" (SLD)
H	REFL PAV MRKR TY II-A-A

SIGN LEGEND

(#) PROPOSED SIGN NUMBER

PROPOSED SIGN

STATE OF TEXAS
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PROFESSIONAL ENGINEER

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FM 55

SMALL SIGNS AND PAVEMENT MARKINGS

SCALE: 1"=200' SHEET 2 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	123
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:51:02
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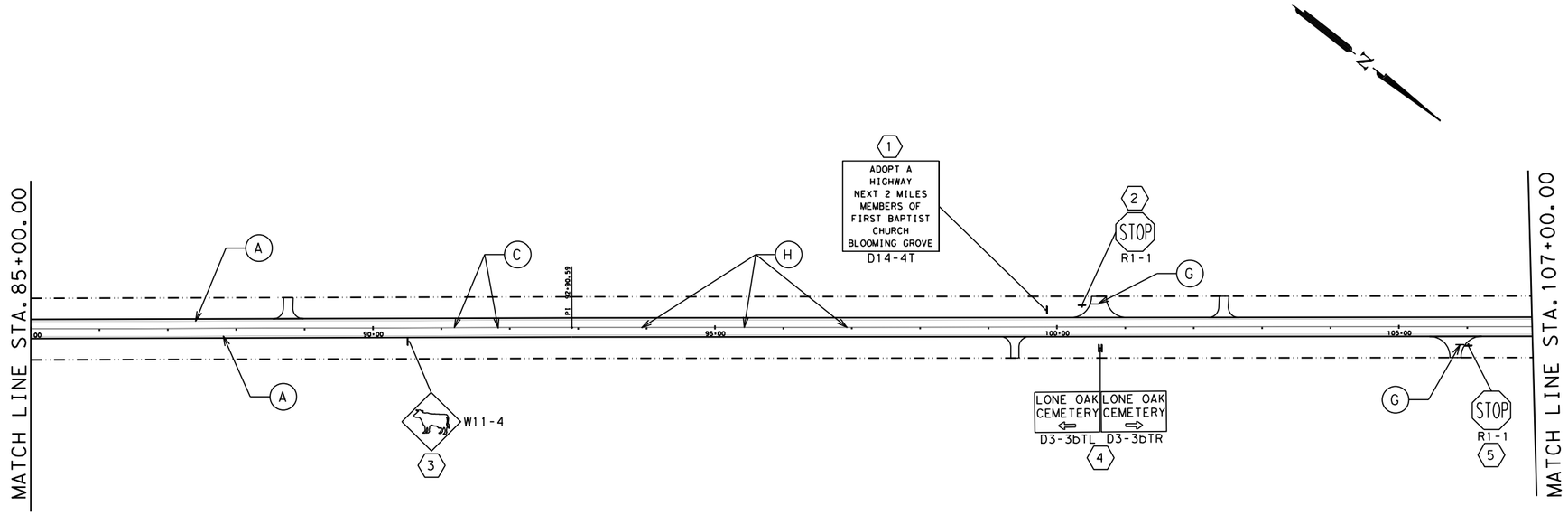

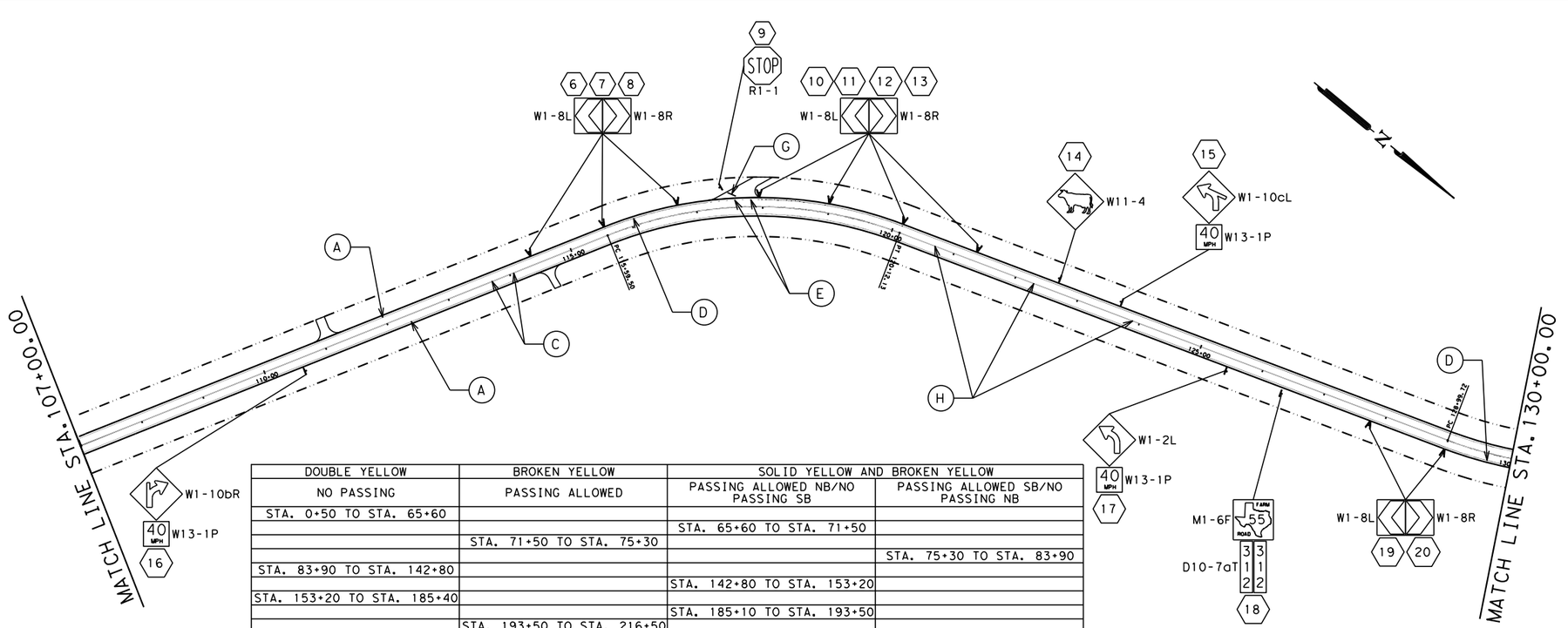

DOUBLE YELLOW	BROKEN YELLOW	SOLID YELLOW AND BROKEN YELLOW	
NO PASSING	PASSING ALLOWED	PASSING ALLOWED NB/NO PASSING SB	PASSING ALLOWED SB/NO PASSING NB
STA. 0+50 TO STA. 65+60			
		STA. 65+60 TO STA. 71+50	
	STA. 71+50 TO STA. 75+30		
			STA. 75+30 TO STA. 83+90
STA. 83+90 TO STA. 142+80			
		STA. 142+80 TO STA. 153+20	
STA. 153+20 TO STA. 185+40			
		STA. 185+10 TO STA. 193+50	
	STA. 193+50 TO STA. 216+50		
			STA. 216+50 TO STA. 228+50
		STA. 228+50 TO STA. 230+00	

0 100 200
FEET

PAVEMENT MARKING LEGEND

A	REFL PAV MRK (W) 4" (SLD)
B	REFL PAV MRK (Y) 4" (BRK)
C	REFL PAV MRK (Y) 4" (SLD)
D	REFL PAV MRK (W) 6" (SLD)
E	REFL PAV MRK (W) 6" (DOT)
F	REFL PAV MRK (W) 12" (SLD)
G	REFL PAV MRK (W) 24" (SLD)
H	REFL PAV MRKR TY II-A-A

SIGN LEGEND

(#) PROPOSED SIGN NUMBER

PROPOSED SIGN

STATE OF TEXAS
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Mitchell L. Randall, P.E. 2021-11-30
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Texas Department of Transportation

FM 55

SMALL SIGNS AND PAVEMENT MARKINGS

SCALE: 1"=200' SHEET 3 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	124
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:51:02
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DOUBLE YELLOW	BROKEN YELLOW	SOLID YELLOW AND BROKEN YELLOW	
NO PASSING	PASSING ALLOWED	PASSING ALLOWED NB/NO PASSING SB	PASSING ALLOWED SB/NO PASSING NB
STA. 0+50 TO STA. 65+60			
		STA. 65+60 TO STA. 71+50	
	STA. 71+50 TO STA. 75+30		
			STA. 75+30 TO STA. 83+90
STA. 83+90 TO STA. 142+80			
		STA. 142+80 TO STA. 153+20	
STA. 153+20 TO STA. 185+40			
		STA. 185+10 TO STA. 193+50	
	STA. 193+50 TO STA. 216+50		
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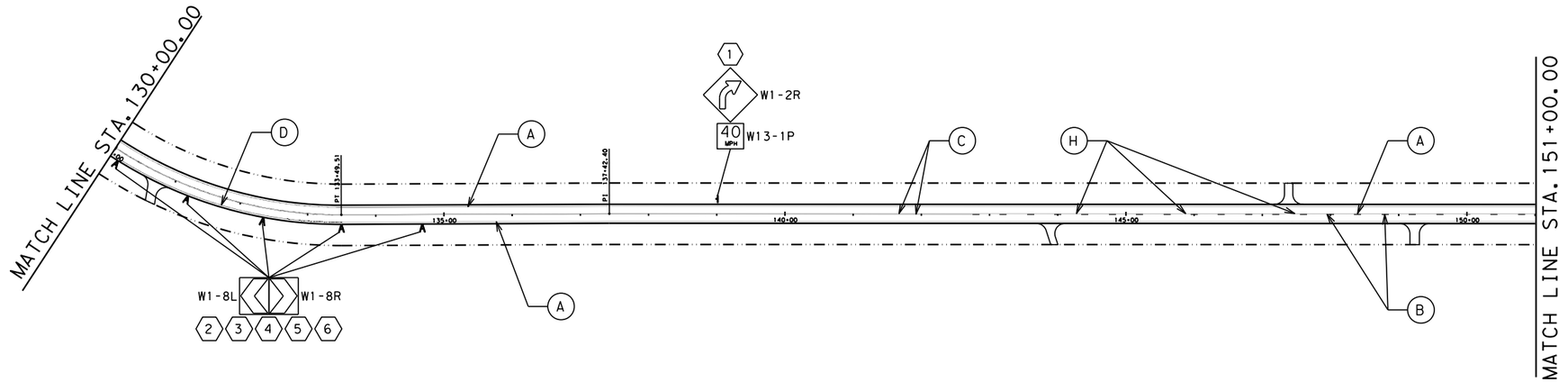
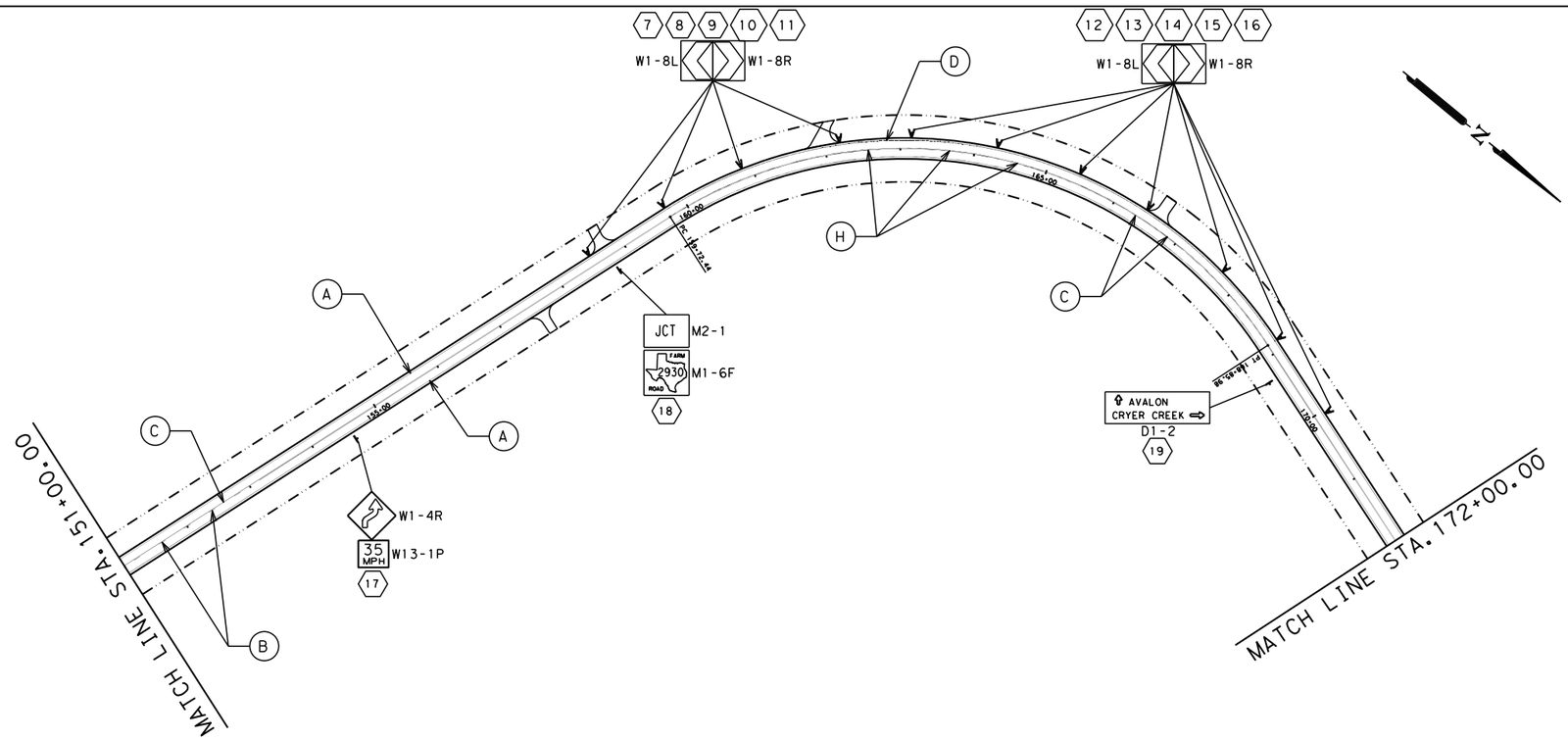
		STA. 228+50 TO STA. 230+00	





0 100 200
FEET

PAVEMENT MARKING LEGEND	
A	REFL PAV MRK (W) 4" (SLD)
B	REFL PAV MRK (Y) 4" (BRK)
C	REFL PAV MRK (Y) 4" (SLD)
D	REFL PAV MRK (W) 6" (SLD)
E	REFL PAV MRK (W) 6" (DOT)
F	REFL PAV MRK (W) 12" (SLD)
G	REFL PAV MRK (W) 24" (SLD)
H	REFL PAV MRKR TY II-A-A

SIGN LEGEND

(#) PROPOSED SIGN NUMBER

PROPOSED SIGN

STATE OF TEXAS
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LICENSED
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Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

FM 55

SMALL SIGNS AND PAVEMENT MARKINGS

SCALE: 1"=200' SHEET 4 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	125
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:51:03
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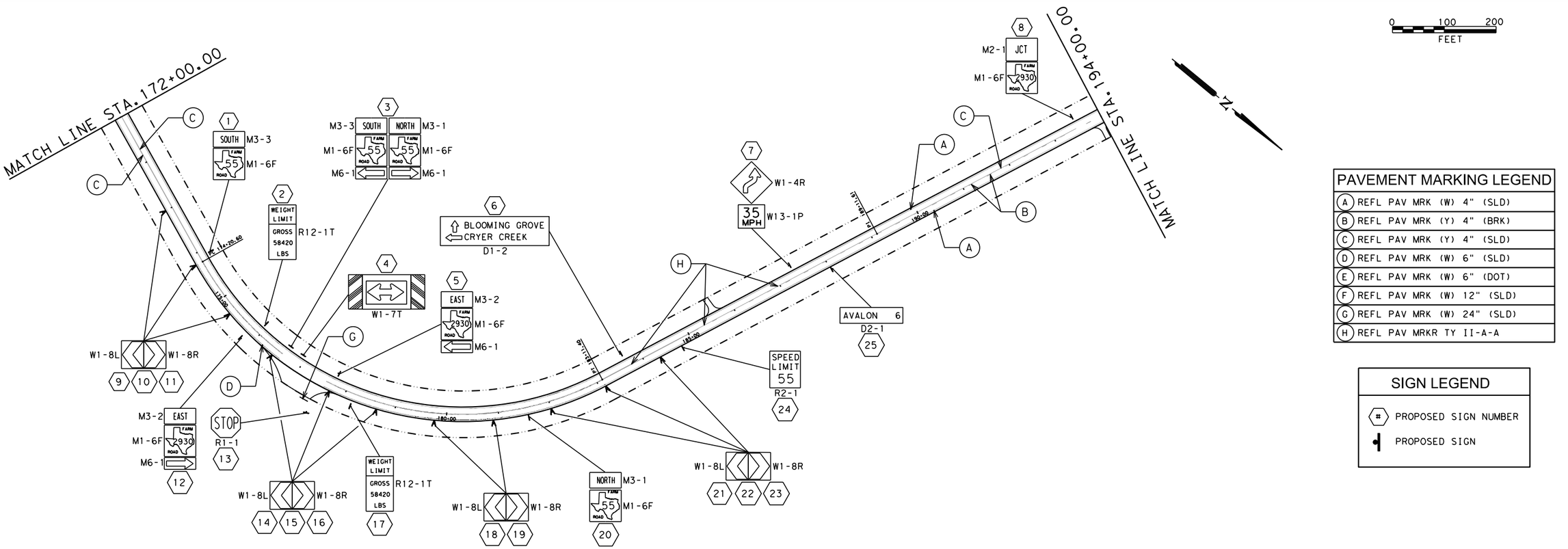
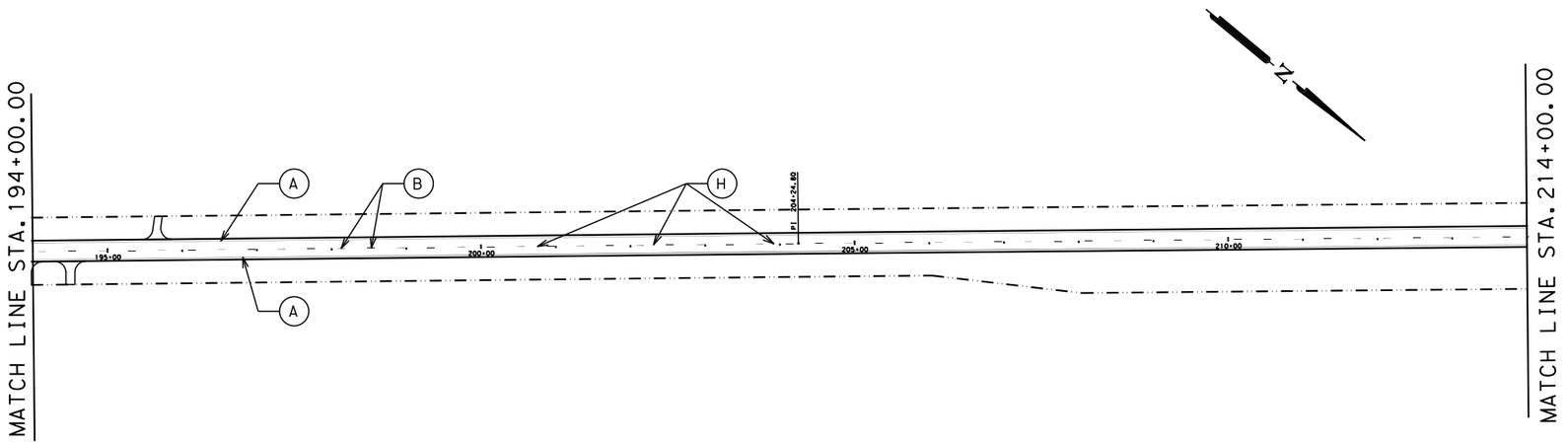


PAVEMENT MARKING LEGEND

A	REFL PAV MRK (W) 4" (SLD)
B	REFL PAV MRK (Y) 4" (BRK)
C	REFL PAV MRK (Y) 4" (SLD)
D	REFL PAV MRK (W) 6" (SLD)
E	REFL PAV MRK (W) 6" (DOT)
F	REFL PAV MRK (W) 12" (SLD)
G	REFL PAV MRK (W) 24" (SLD)
H	REFL PAV MRKR TY II-A-A

SIGN LEGEND

- (#) PROPOSED SIGN NUMBER
- PROPOSED SIGN



DOUBLE YELLOW	BROKEN YELLOW	SOLID YELLOW AND BROKEN YELLOW	
NO PASSING	PASSING ALLOWED	PASSING ALLOWED NB/NO PASSING SB	PASSING ALLOWED SB/NO PASSING NB
STA. 0+50 TO STA. 65+60			
		STA. 65+60 TO STA. 71+50	
	STA. 71+50 TO STA. 75+30		
			STA. 75+30 TO STA. 83+90
STA. 83+90 TO STA. 142+80			
		STA. 142+80 TO STA. 153+20	
STA. 153+20 TO STA. 185+40			
		STA. 185+10 TO STA. 193+50	
	STA. 193+50 TO STA. 216+50		
			STA. 216+50 TO STA. 228+50
		STA. 228+50 TO STA. 230+00	

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Texas Department of Transportation

FM 55

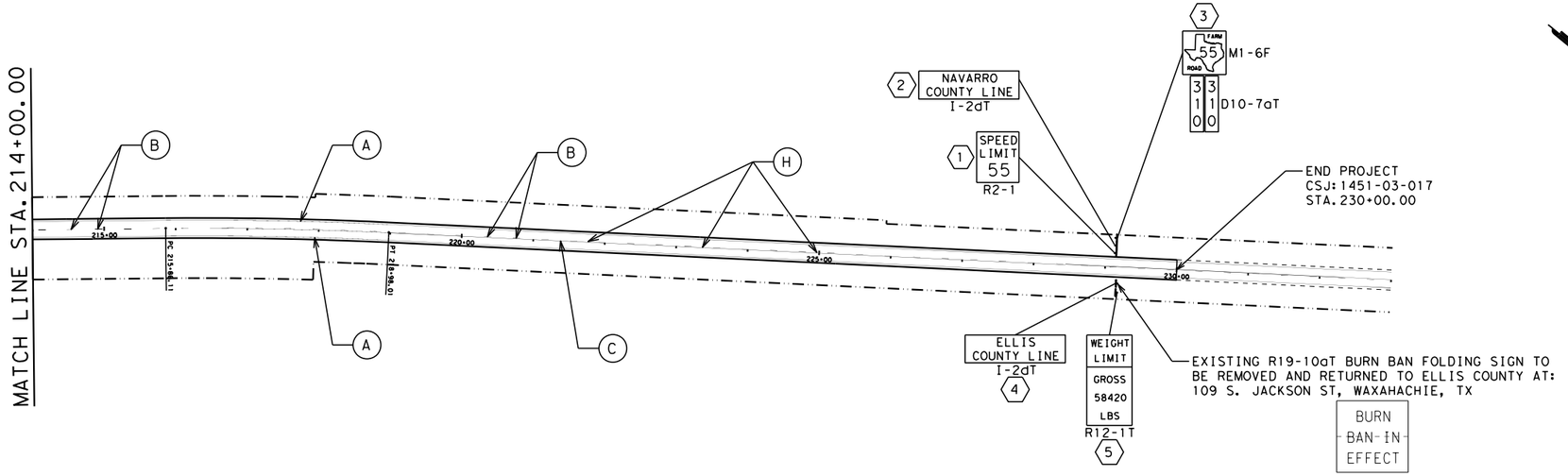
SMALL SIGNS AND PAVEMENT MARKINGS

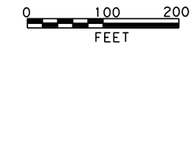
SCALE: 1"=200'

SHEET 5 OF 6

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	126
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:51:03
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017X4 - Design\Plan Set\8. Traffic\FM 55 SMALL SIGNS AND PAVEMENT MARKINGS.dgn





PAVEMENT MARKING LEGEND	
A	REFL PAV MRK (W) 4" (SLD)
B	REFL PAV MRK (Y) 4" (BRK)
C	REFL PAV MRK (Y) 4" (SLD)
D	REFL PAV MRK (W) 6" (SLD)
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G	REFL PAV MRK (W) 24" (SLD)
H	REFL PAV MRKR TY II-A-A

DOUBLE YELLOW	BROKEN YELLOW	SOLID YELLOW AND BROKEN YELLOW	
NO PASSING	PASSING ALLOWED	PASSING ALLOWED NB/NO PASSING SB	PASSING ALLOWED SB/NO PASSING NB
STA. 0+50 TO STA. 65+60			
		STA. 65+60 TO STA. 71+50	
	STA. 71+50 TO STA. 75+30		
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		STA. 142+80 TO STA. 153+20	
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		STA. 185+10 TO STA. 193+50	
	STA. 193+50 TO STA. 216+50		
			STA. 216+50 TO STA. 228+50
		STA. 228+50 TO STA. 230+00	

SIGN LEGEND

- (#) PROPOSED SIGN NUMBER
- PROPOSED SIGN

STATE OF TEXAS
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Texas Department of Transportation

FM 55

SMALL SIGNS AND PAVEMENT MARKINGS

SCALE: 1"=200' SHEET 6 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		FM 55
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	127
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:51:03
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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

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Texas Department of Transportation
Traffic Operations Division Standard

ELECTRICAL DETAILS
CONDUITS & NOTES

ED(1)-14

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© TxDOT October 2014 | CONT 1451 | SECT 03 | JOB 017 | HIGHWAY FM 55
REVISIONS | DIST DAL | COUNTY NAVARRO | SHEET NO. 128

71A

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

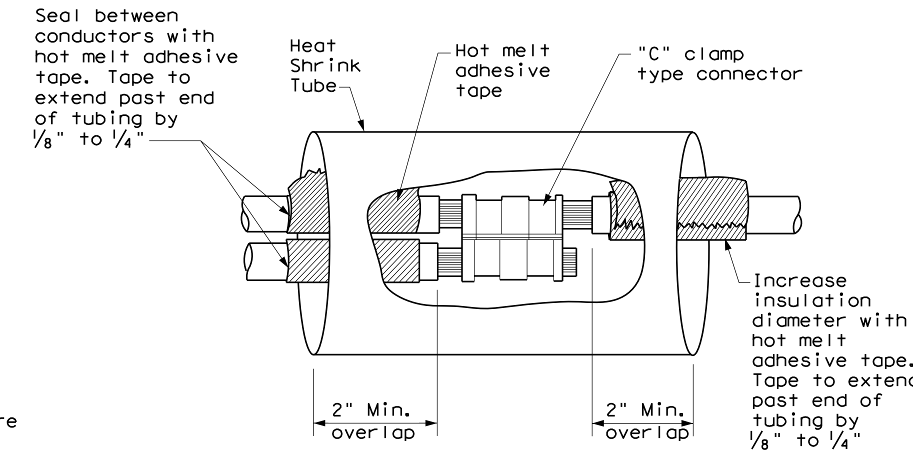
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

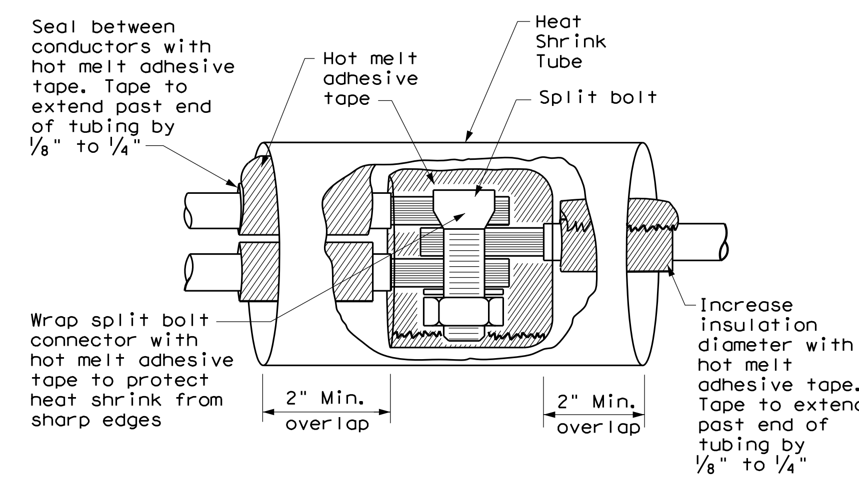
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

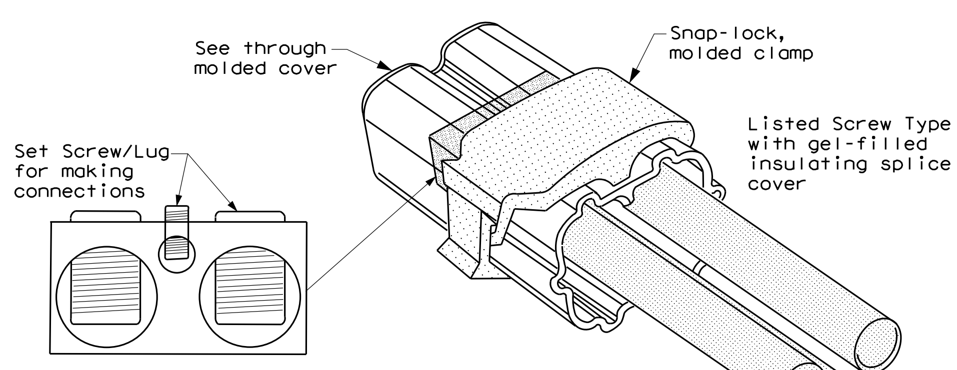
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST		COUNTY	SHEET NO.
	DAL		NAVARRO	129

71C

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)

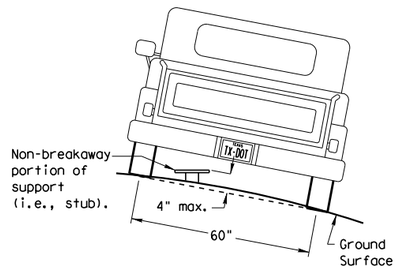
Anchor Type

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

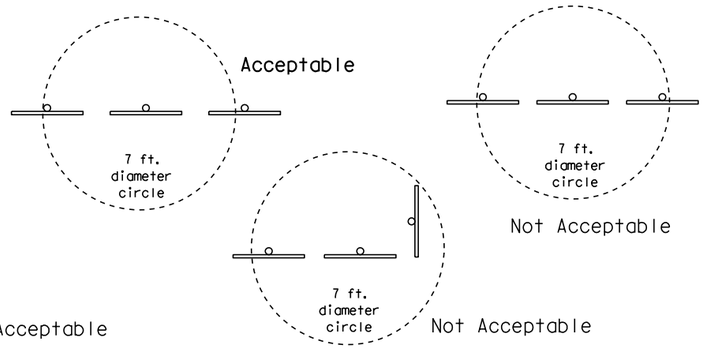
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
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



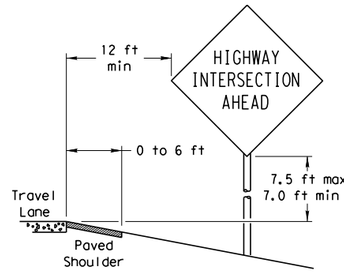
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



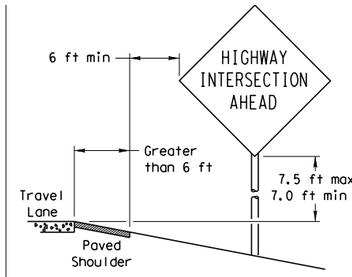
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

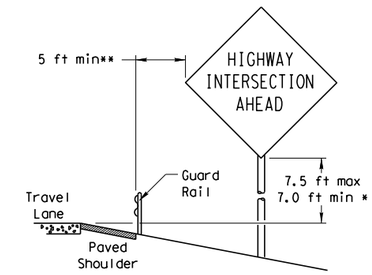
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



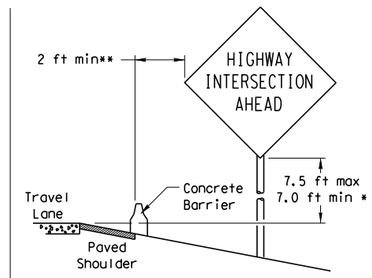
GREATER THAN 6 FT. WIDE

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.

BEHIND BARRIER



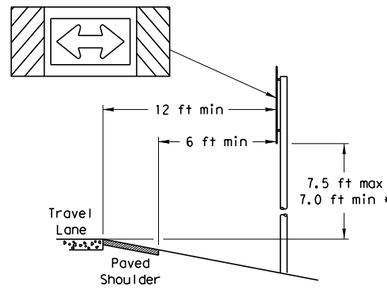
BEHIND GUARDRAIL



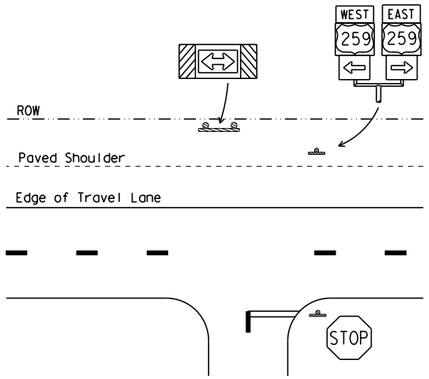
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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.



* 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.

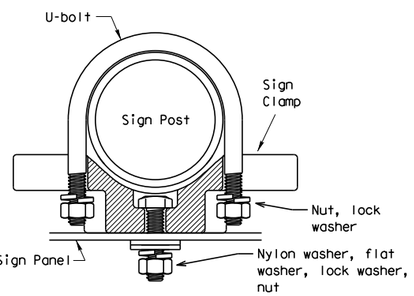
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

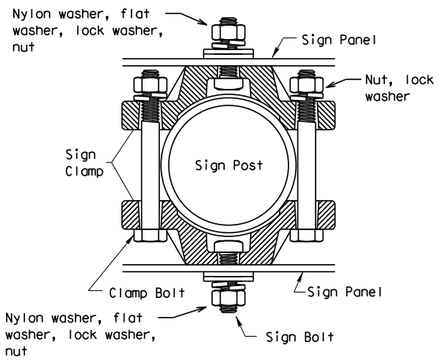
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



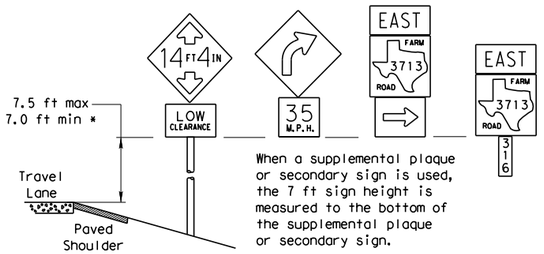
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

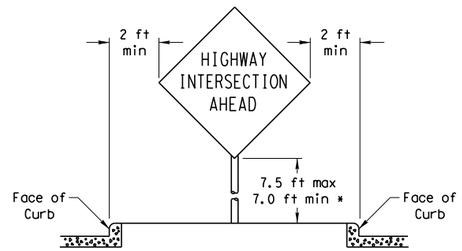
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



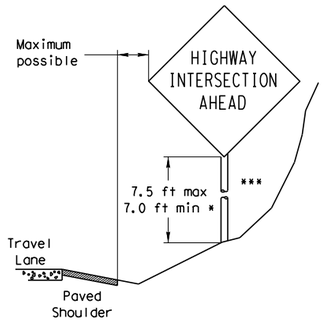
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		130

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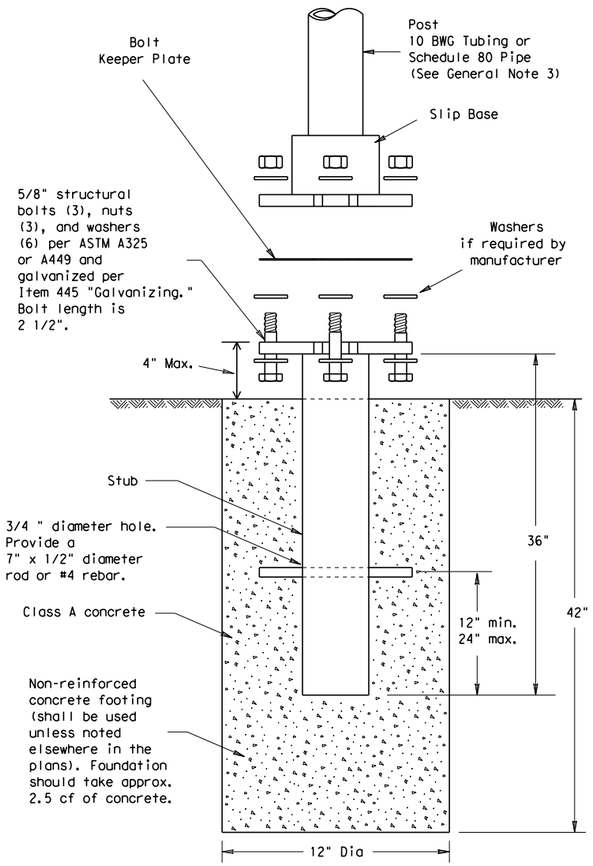
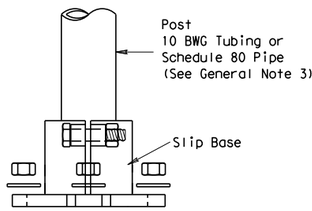
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

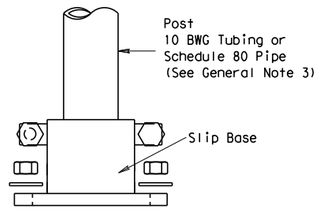


SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

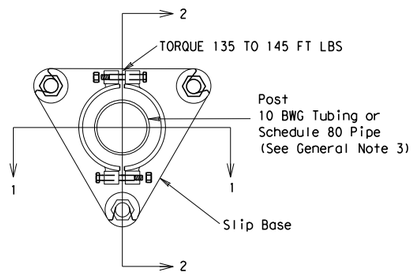
NOTE
The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.



SIDE VIEW 1-1



SIDE VIEW 2-2



TOP VIEW

DETAIL A

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.

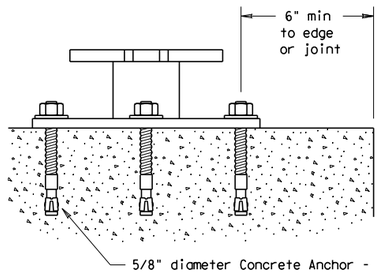
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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.

ADDED DETAIL A FOR CLAMP BASE
10-2010

Texas Department of Transportation
Dallas District Standard

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08(DAL)

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	1451	03	017	FM 55
12-10 (DISTRICT) ADDED CLAMP BASE DETAIL FOR SLIP BASE INSTALLATION	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		131

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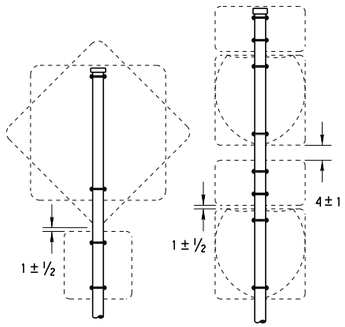
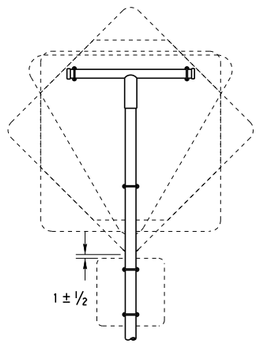
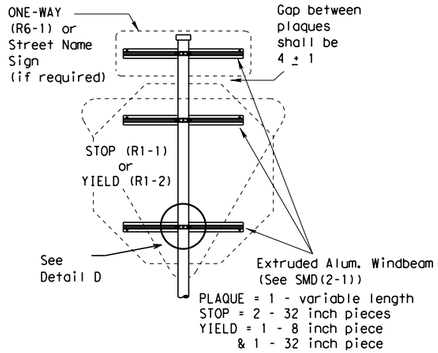
DATE:
FILE:



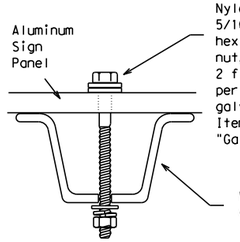
SM RD SGN ASSM TY XXXXX(1)XX(P)



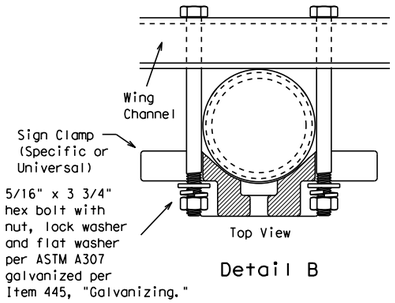
SM RD SGN ASSM TY XXXXX(1)XX(T)



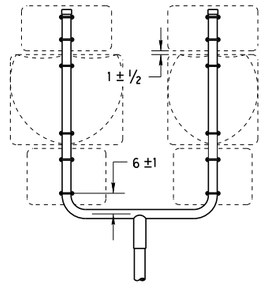
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



Detail B



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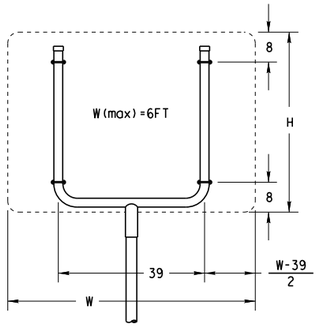
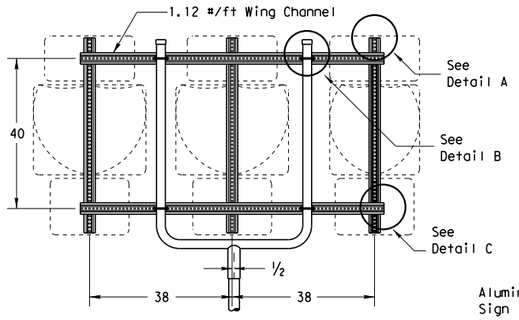
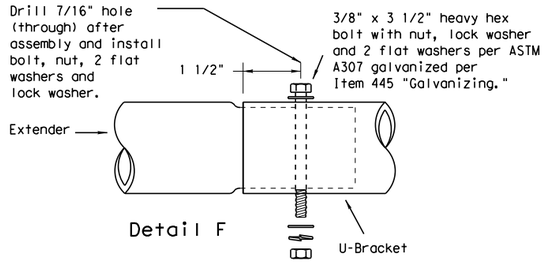


SM RD SGN ASSM TY XXXXX(1)XX(U)

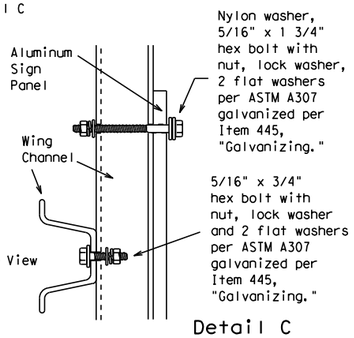


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

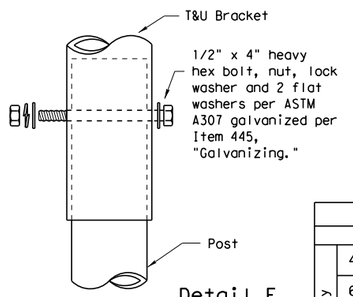


Detail F

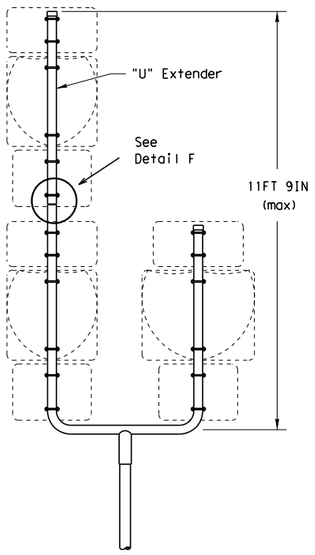
Splices shall only be allowed behind the sign substrate.



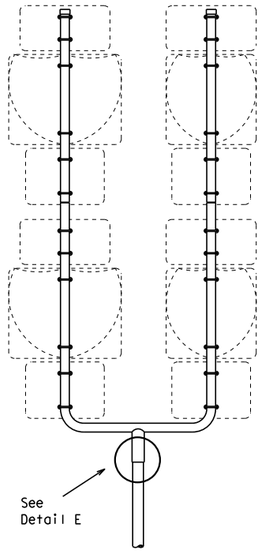
Detail C



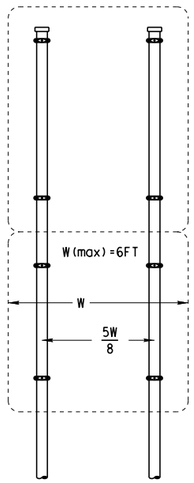
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

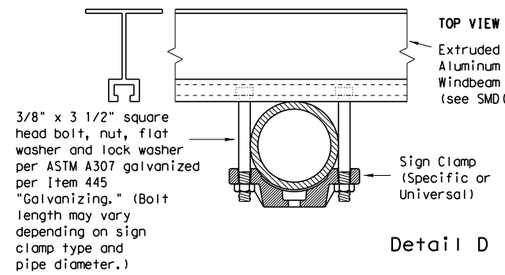


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

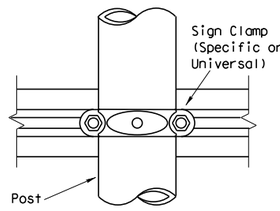


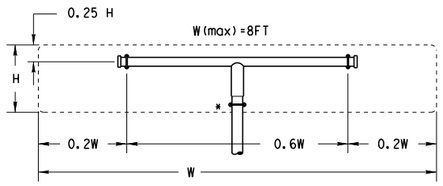
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

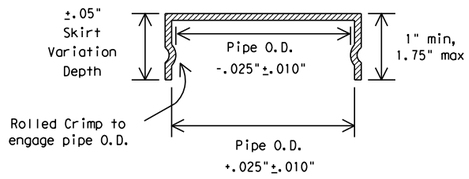




All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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.

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)

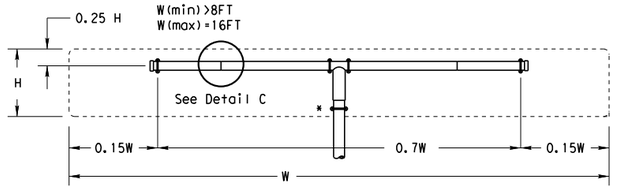
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

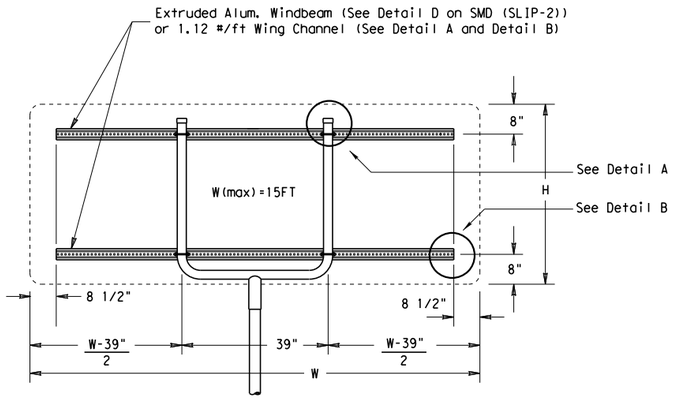
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		132

26C

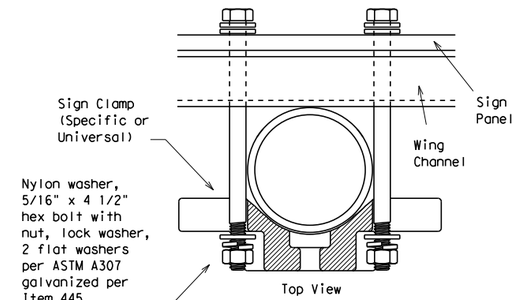


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

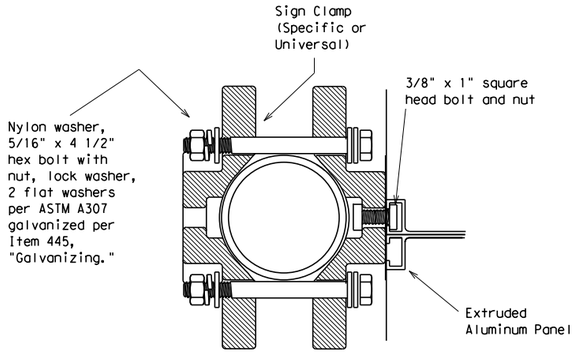
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

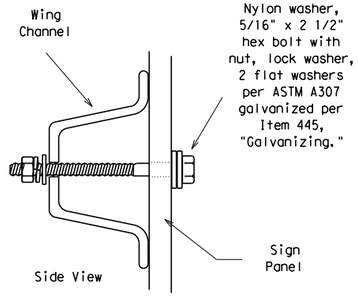


Detail A

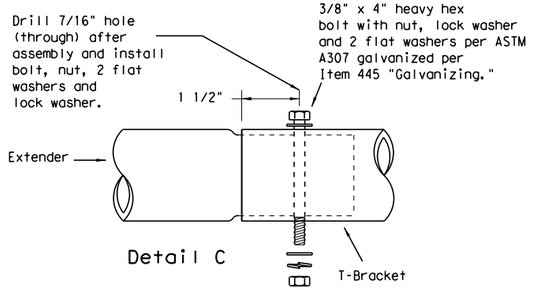


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

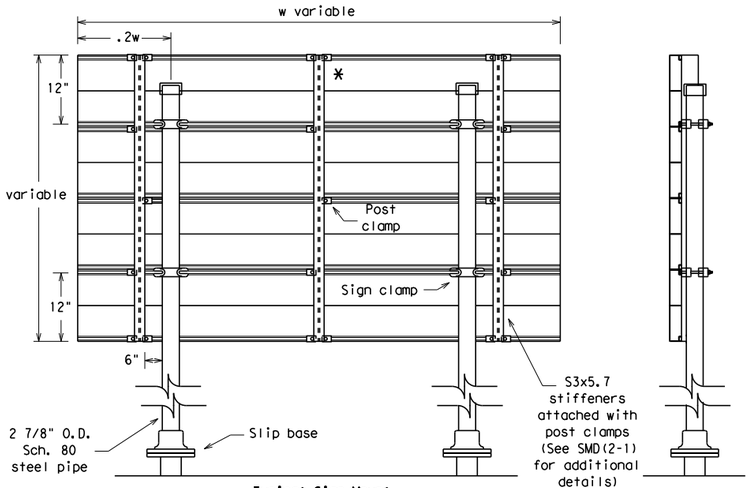


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

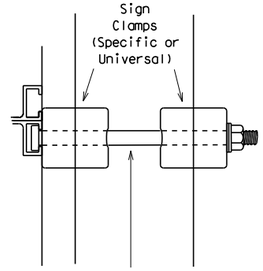


Typical Sign Mount

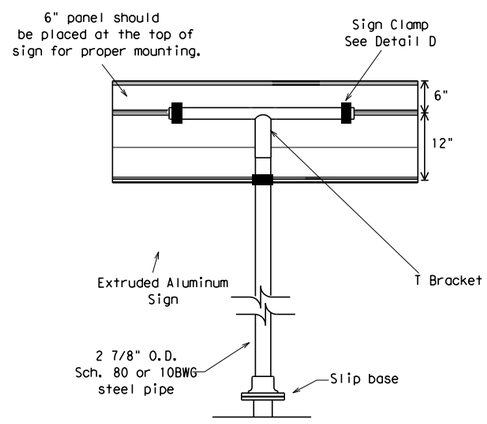
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

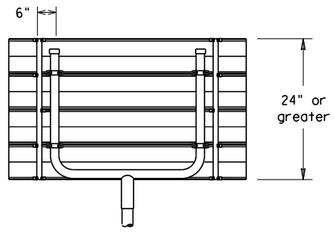
See Detail E
for clamp installation



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	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		133

DATE:
FILE:

DATE:
FILE:

GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.

2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.

3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.

4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.

5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".

6. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.

7. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."

8. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.

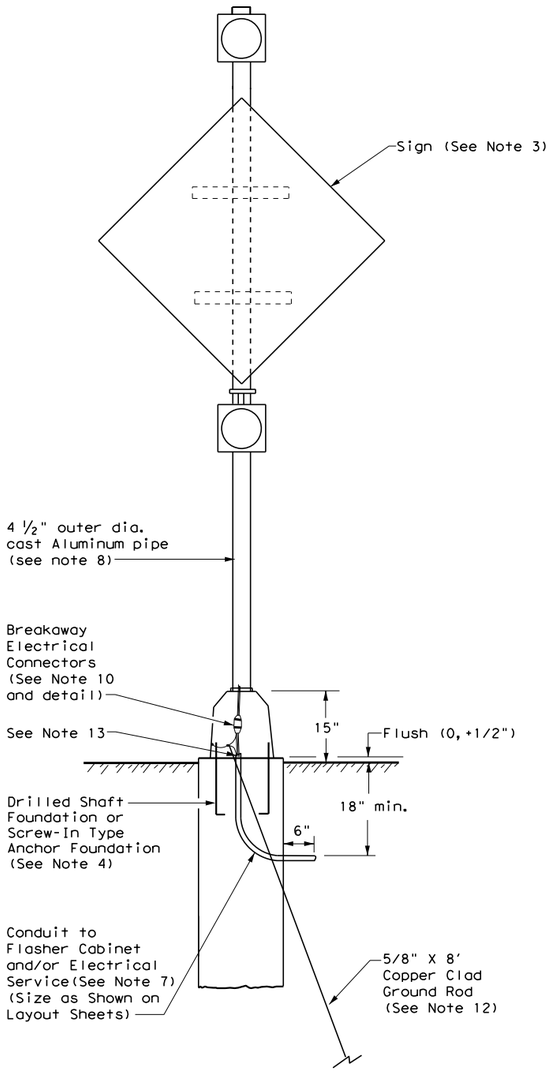
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening of connection.

10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

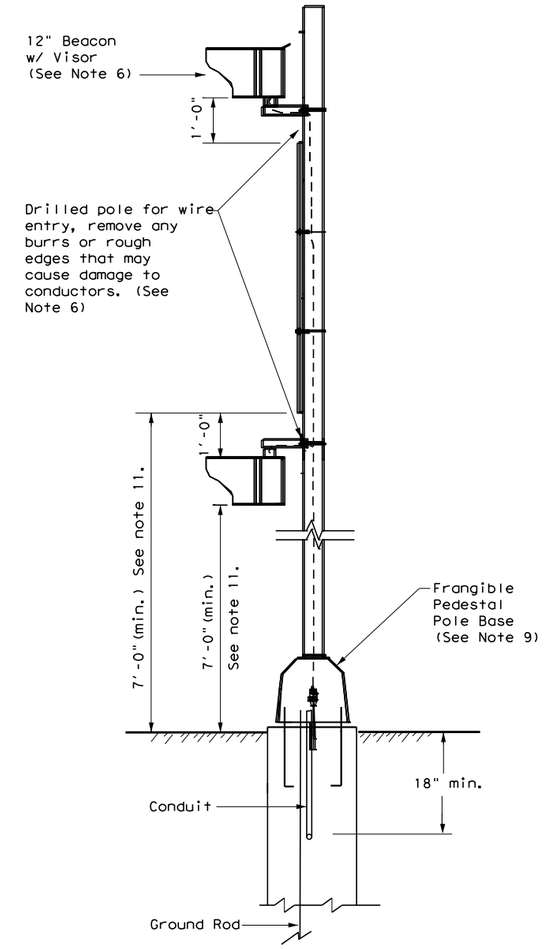
11. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.

12. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

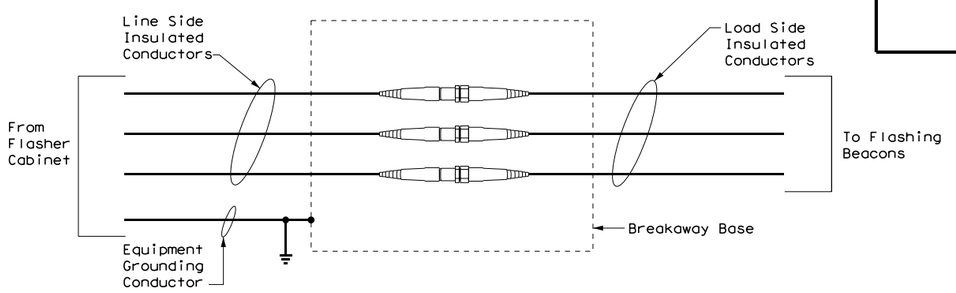
13. Ensure height of conduit and ground rod is below top of anchor bolts.



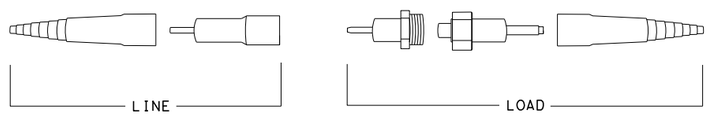
FRONT



SIDE



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

ROADSIDE FLASHING BEACON ASSEMBLY

RFBA-13

FILE: rfba-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
5-93 12-04	DIST	COUNTY		SHEET NO.
10-93 3-13	DAL	NAVARRO		134
4-98				

DATE:
FILE:

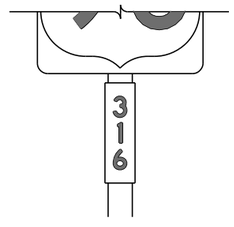
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

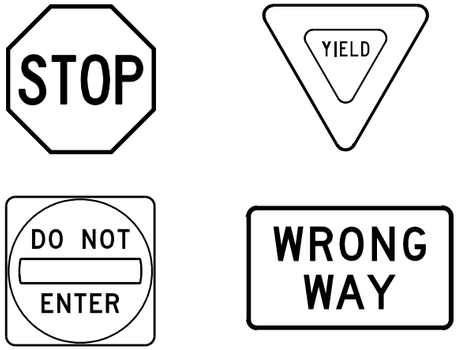
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	NAVARRO		135

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

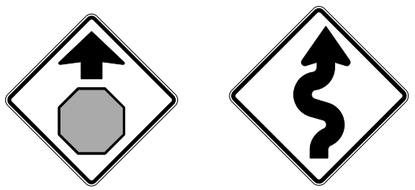
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

http://www.txdot.gov/

Texas Department of Transportation

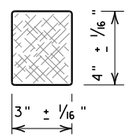
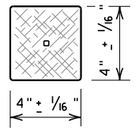
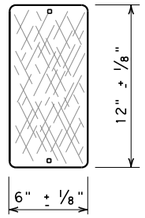
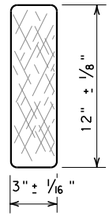
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

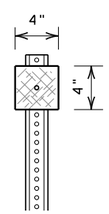
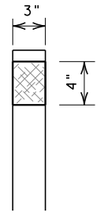
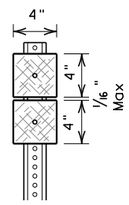
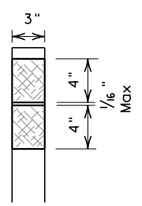
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		136

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

DELINEATORS

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

D & OM DESCRIPTIVE CODES

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

NUMBER OF REFLECTORS
- S = Single
- D = Double

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

REFLECTOR UNIT SIZE
- 1 or 2

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

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

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

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

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

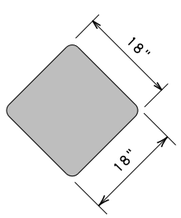
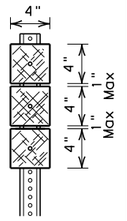
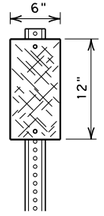
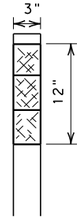
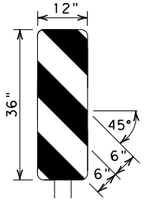
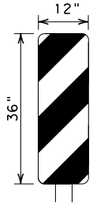
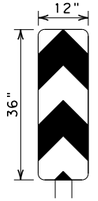
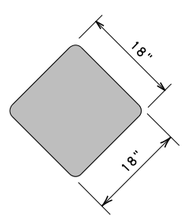
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker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

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

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

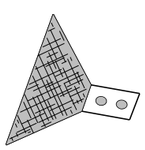
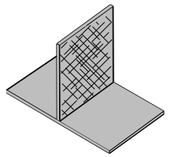
DIRECTION
If Required
- BI = Bi-Directional

OBJECT MARKERS

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

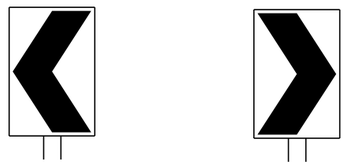
DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

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

CHEVRONS

DEVICE



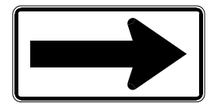
W1-8

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"	

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

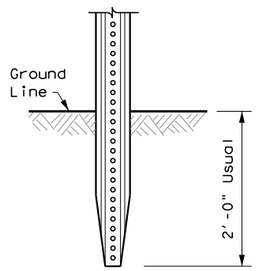
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	DAL	NAVARRO		137

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

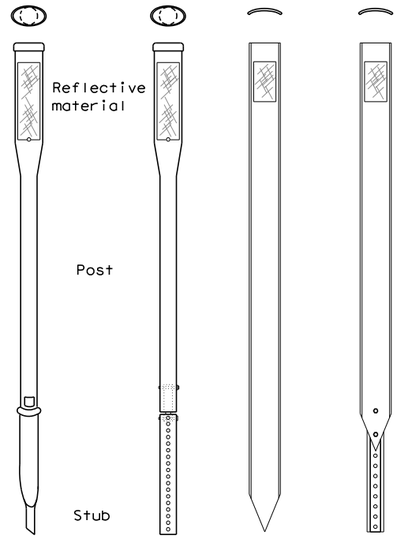


NOTES

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.

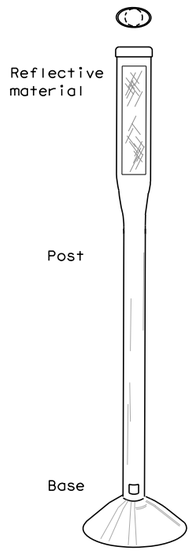
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



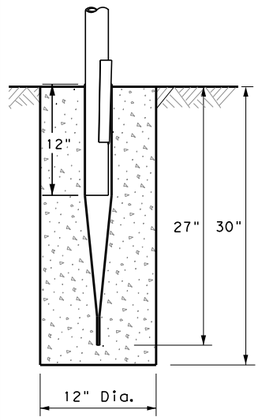
SURFACE MOUNT

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.

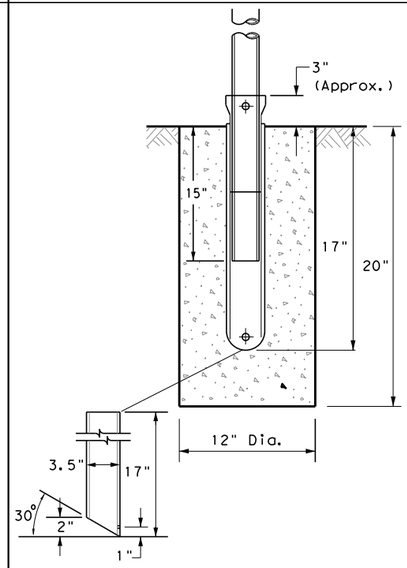
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

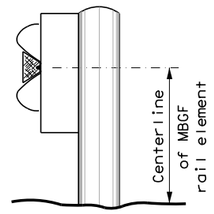
NOTE

1. Install per manufacturer's recommendations.

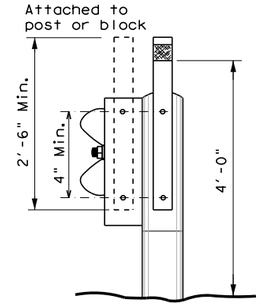
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

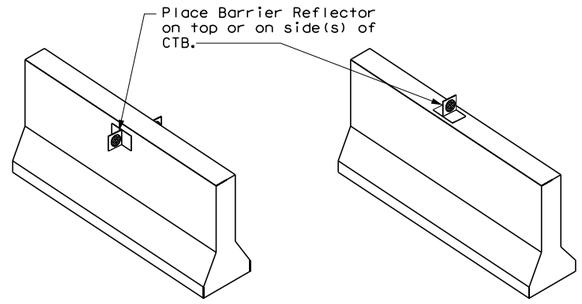
GF1



GF2



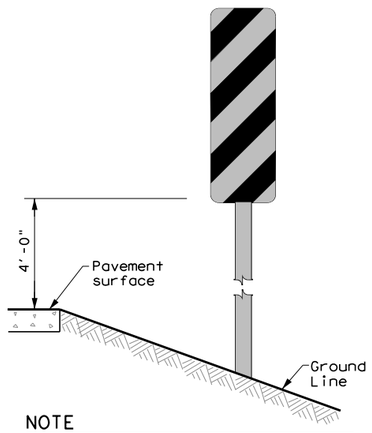
CONCRETE TRAFFIC BARRIER (CTB)



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.

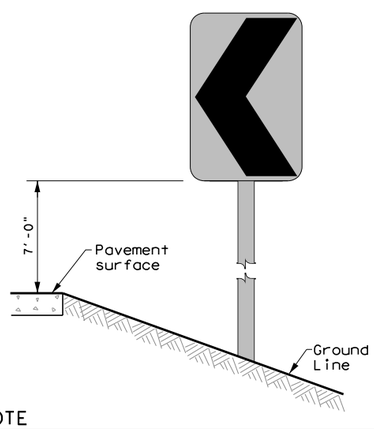
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

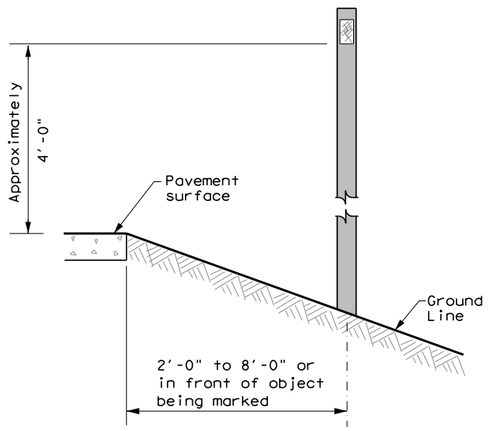
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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
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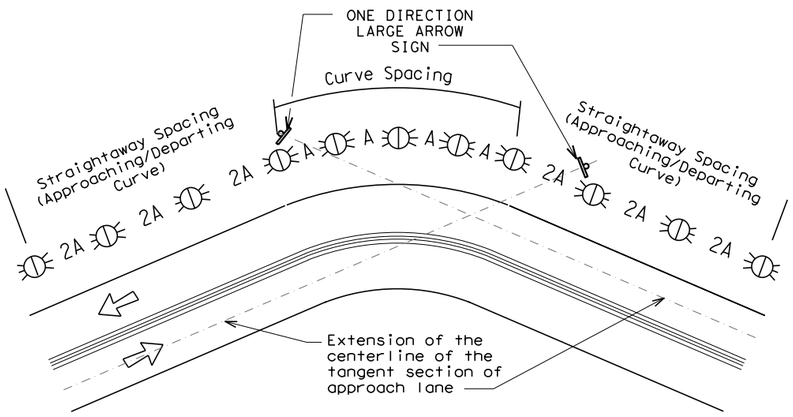
MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

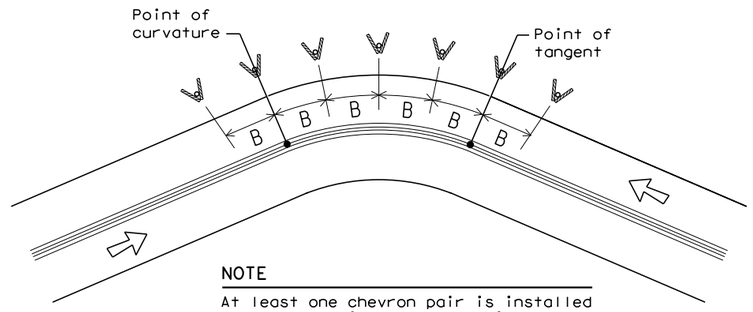
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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DATE:
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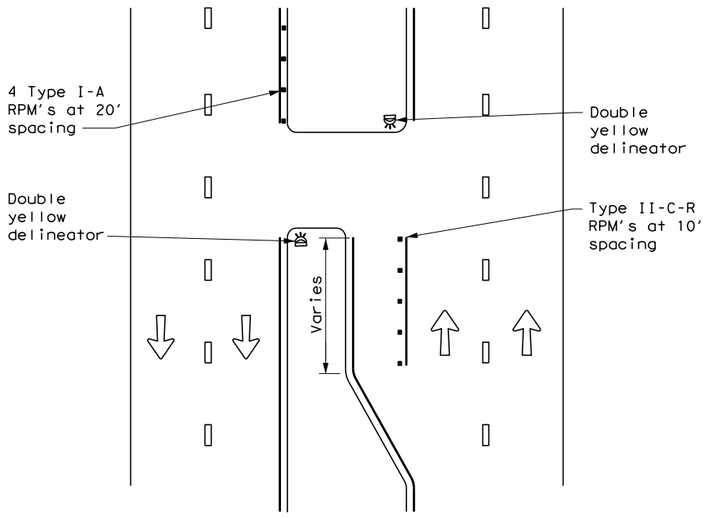
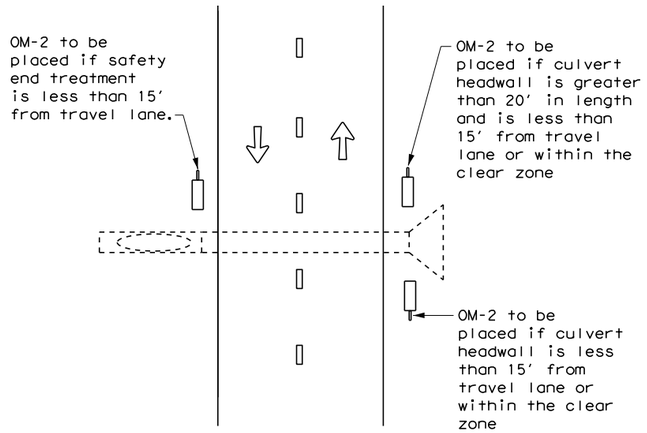
CROSSOVERS



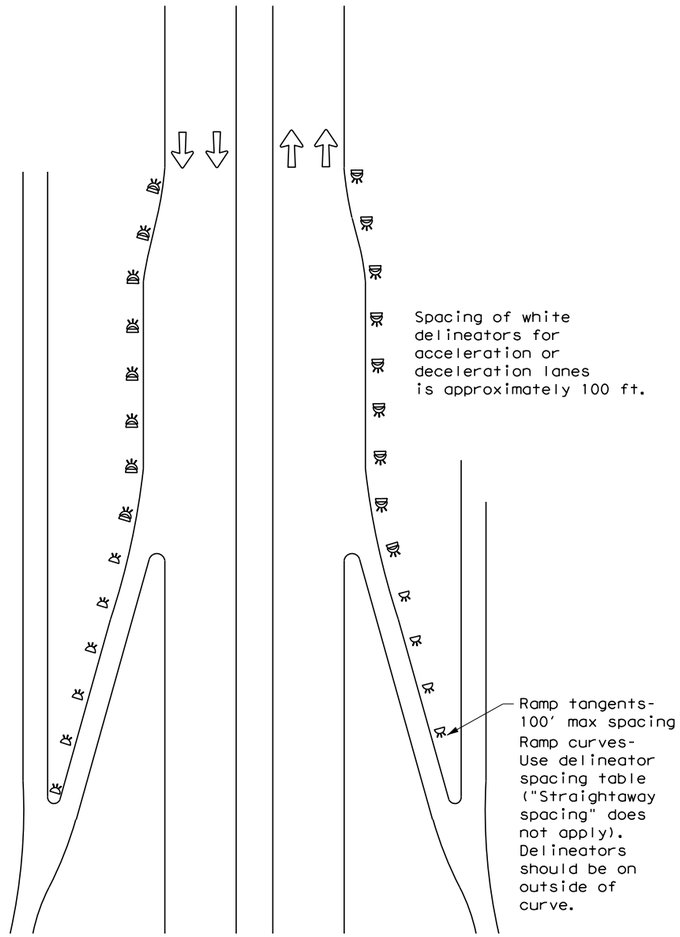
DETAIL 1

FOR CULVERTS WITHOUT MBGF



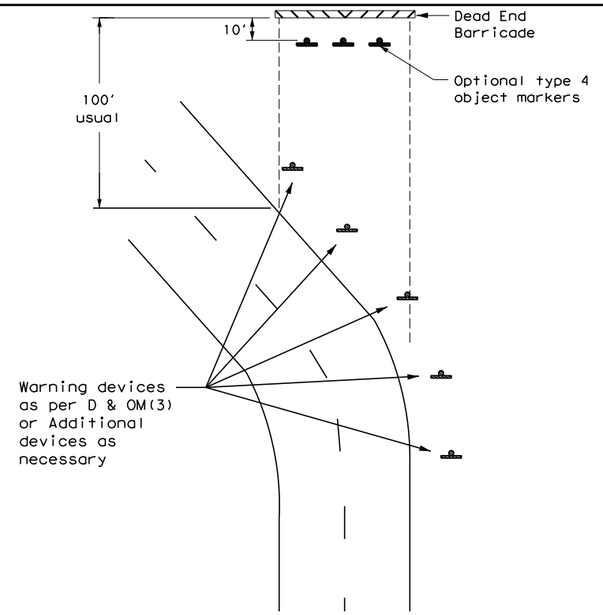
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



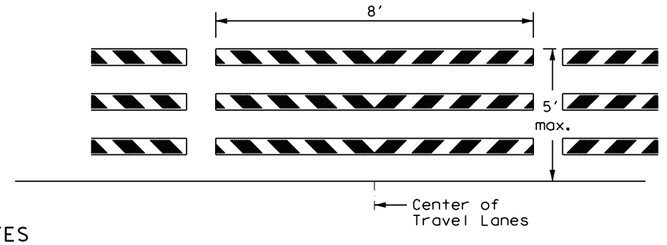
DETAIL 3

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

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DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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REVISIONS	1451	03	017	FM 55
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20D

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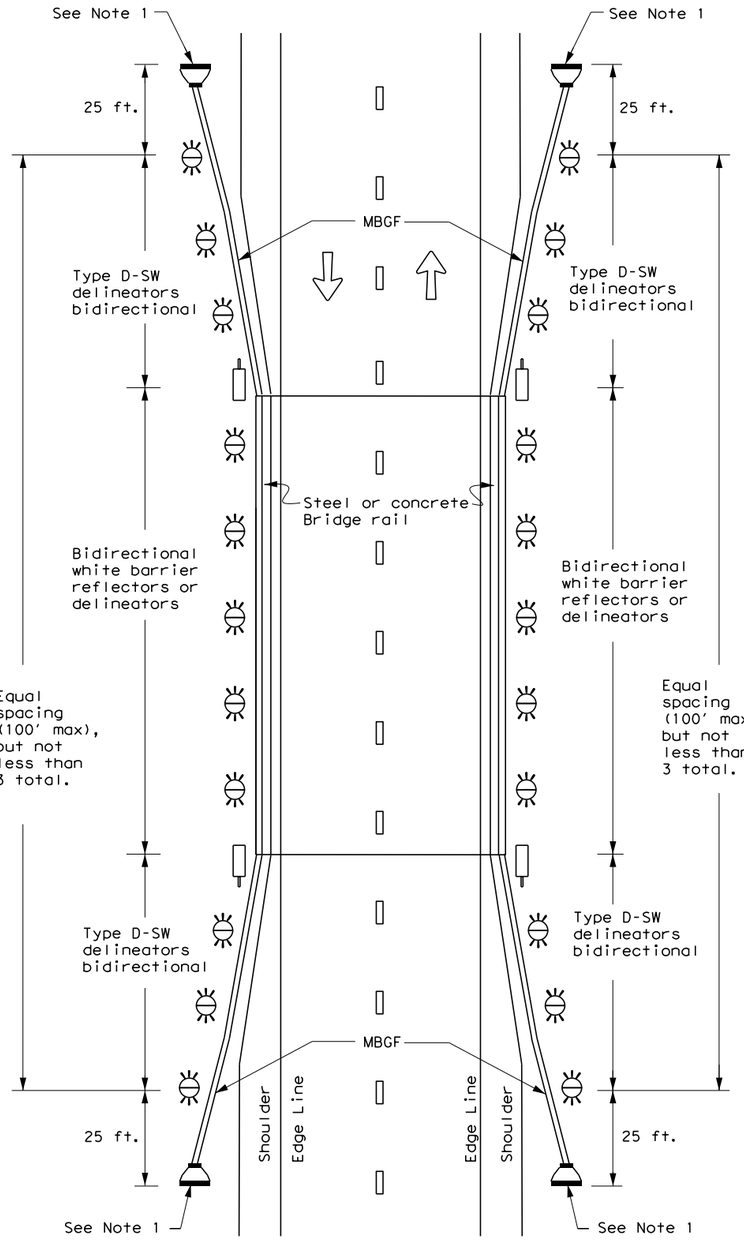
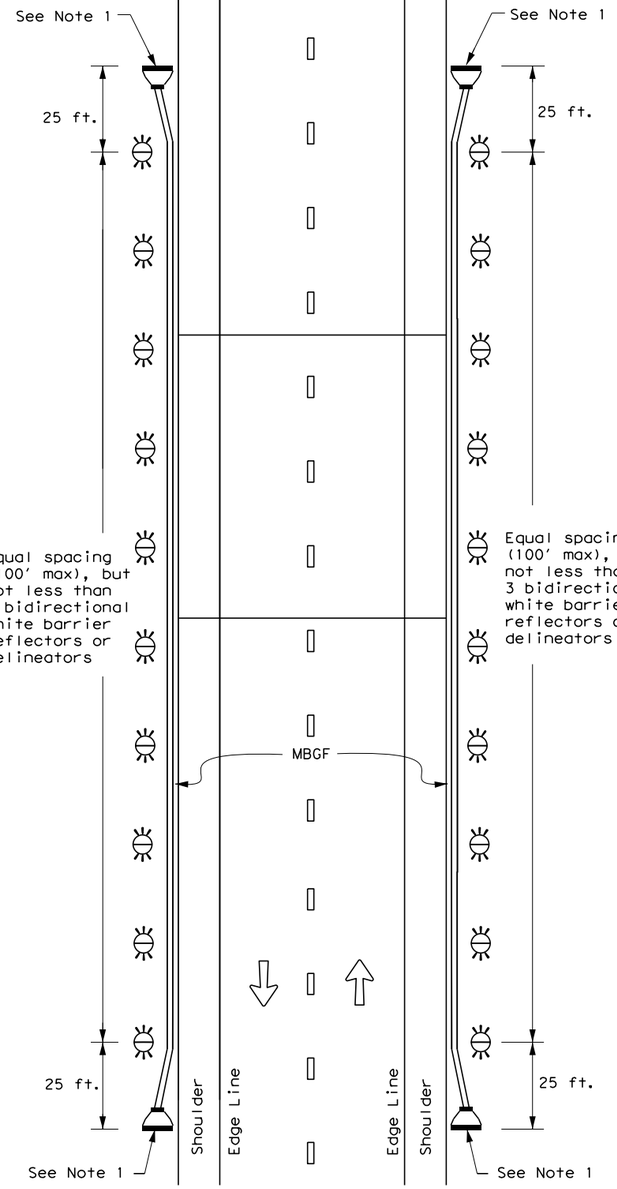
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

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

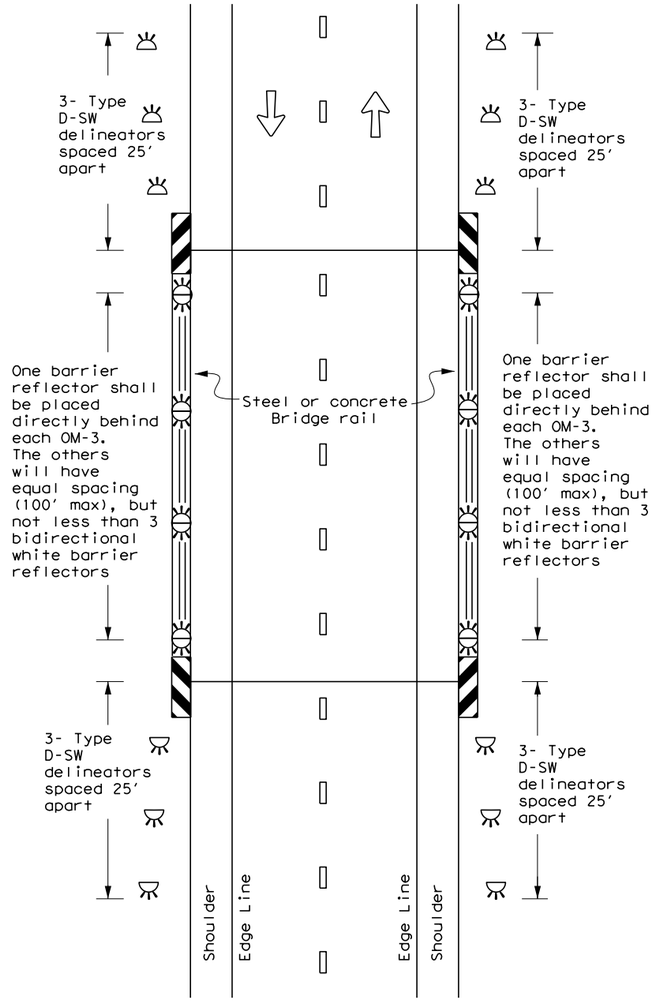
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

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

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



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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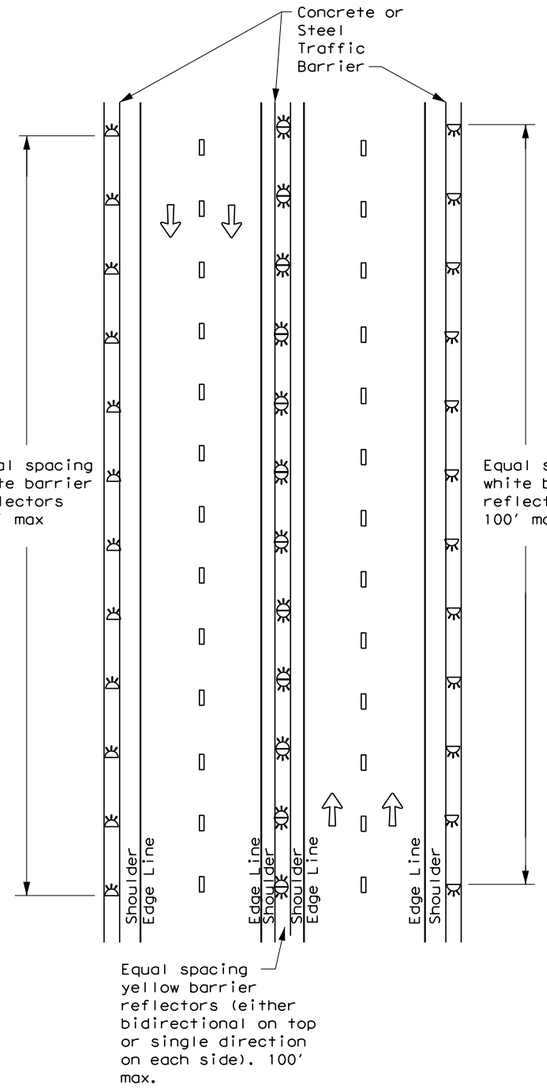
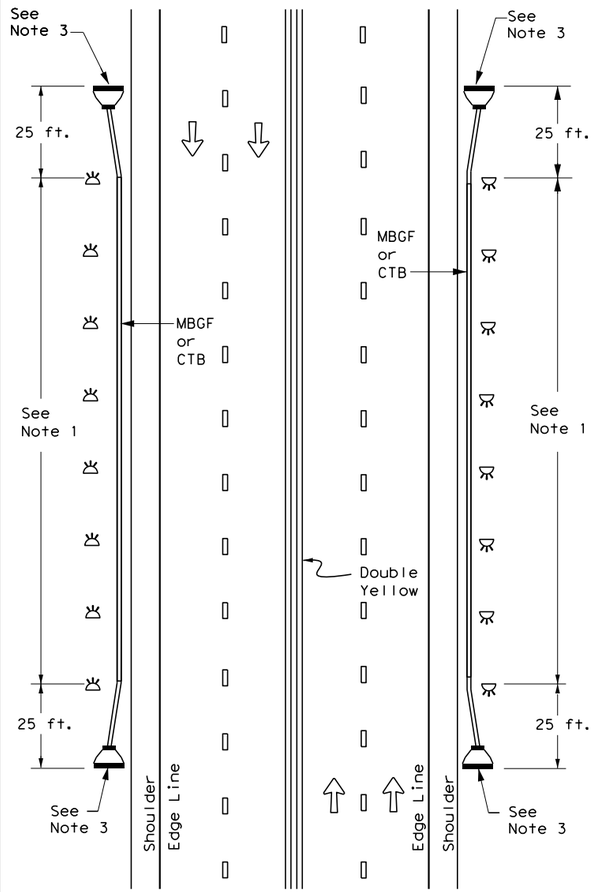
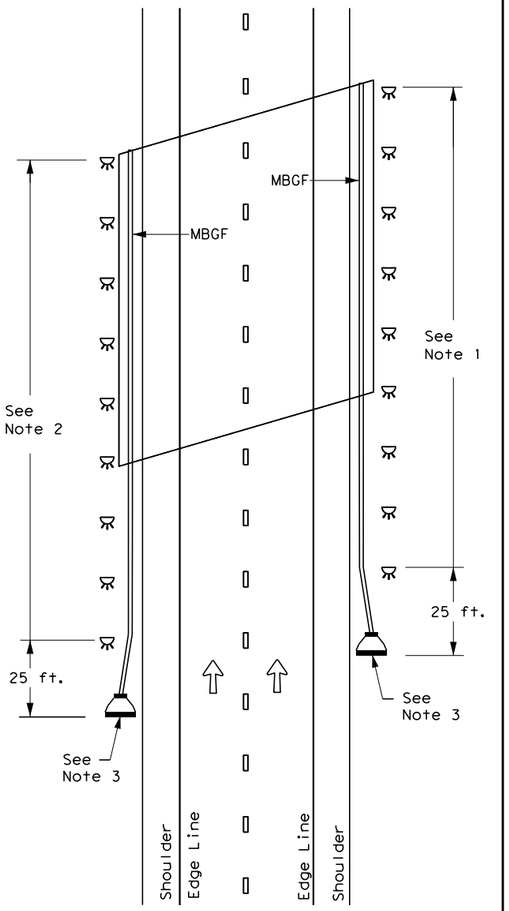
CONTINUOUS CONCRETE OR STEEL BARRIER



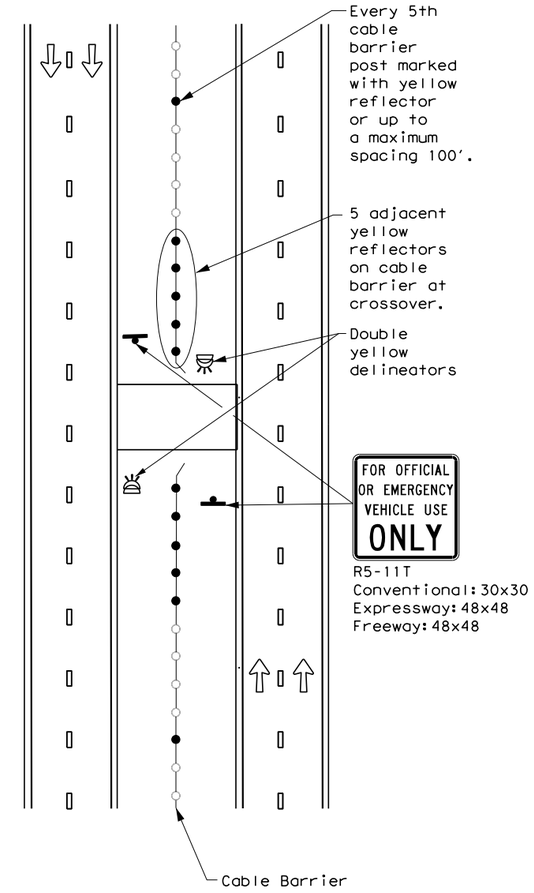
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

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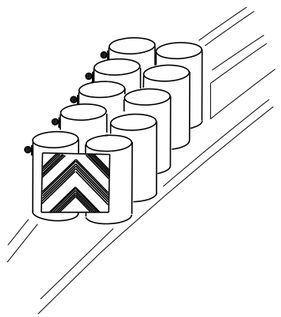
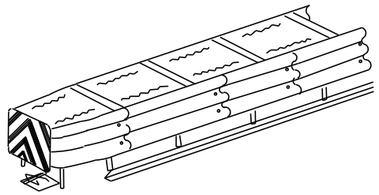
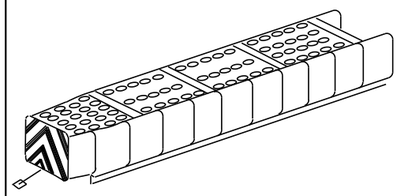
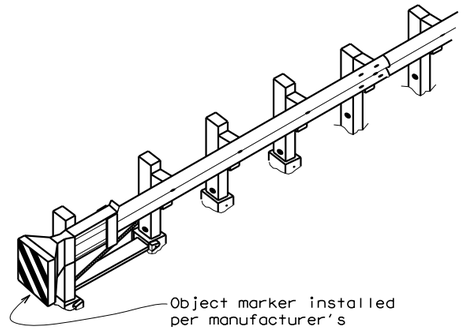
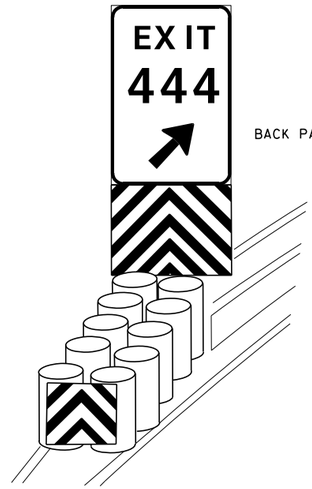
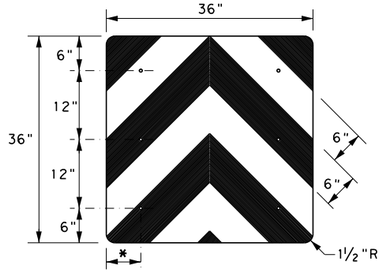


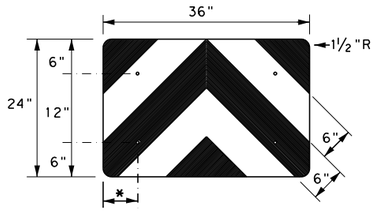




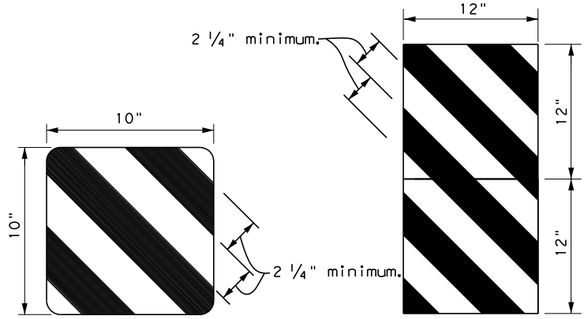




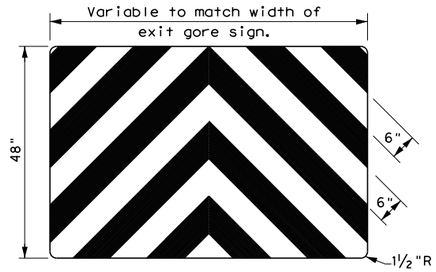


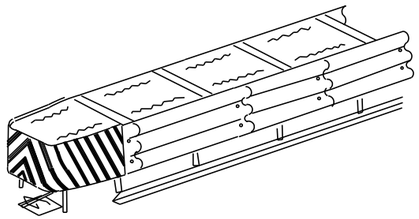


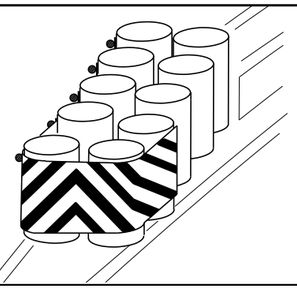
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

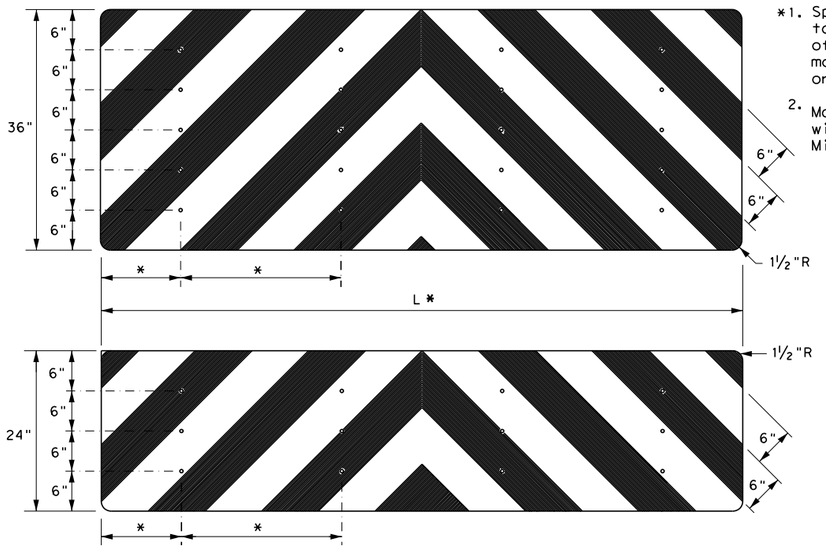


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

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DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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8-95 3-15	DAL	NAVARRO		143
4-98 7-20				

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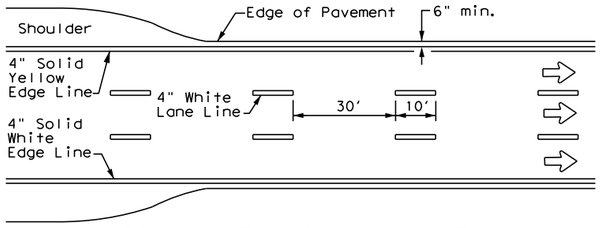
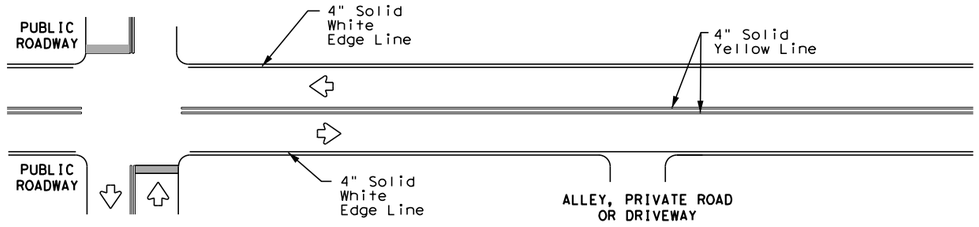
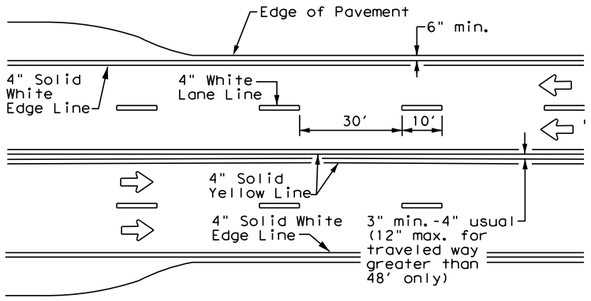


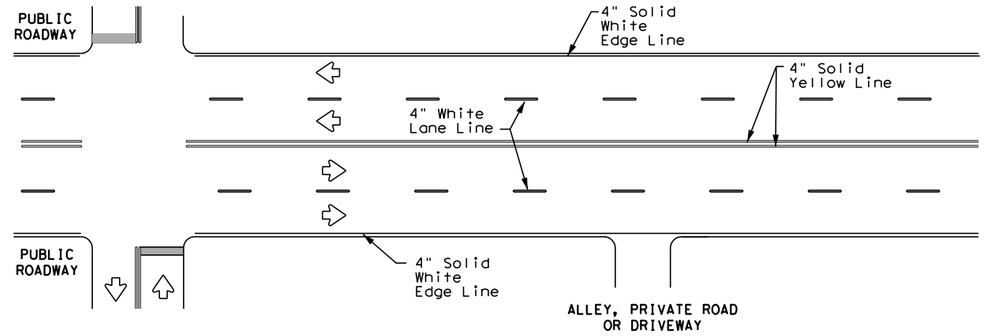
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



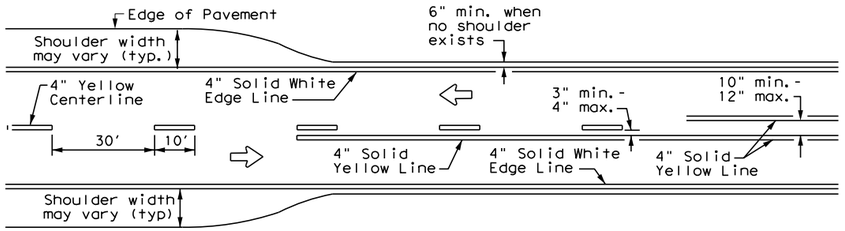
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



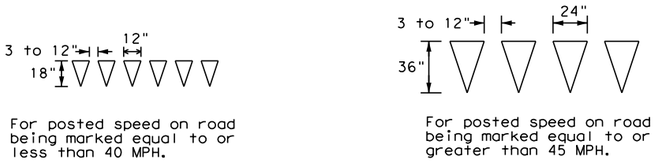
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



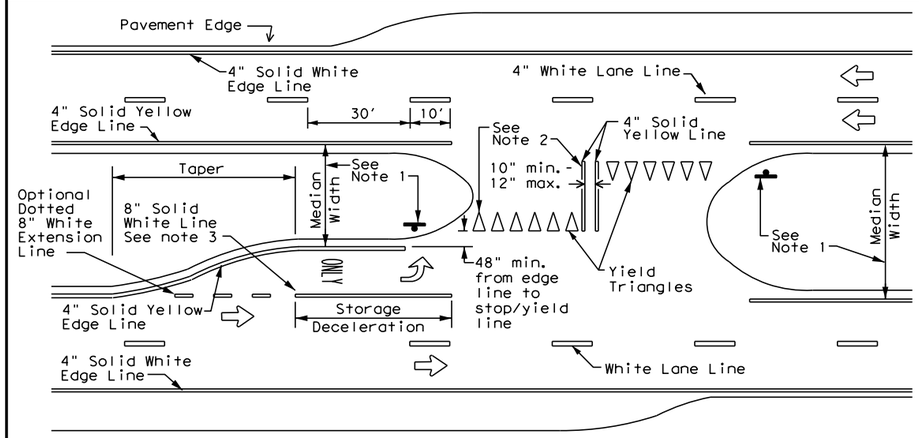
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

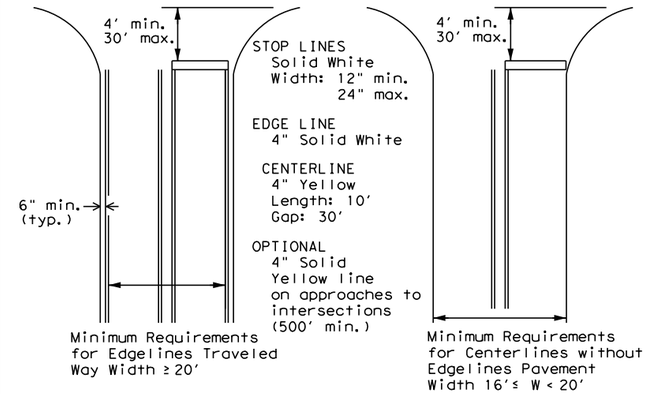
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

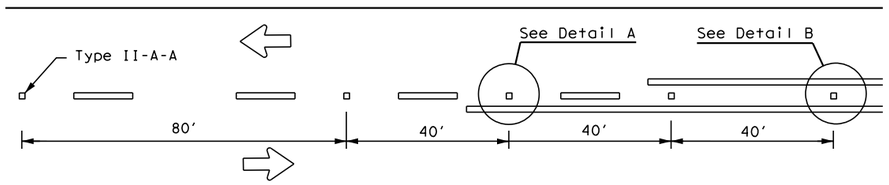
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	1451	03	017	FM 55
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	DAL	NAVARRO		144

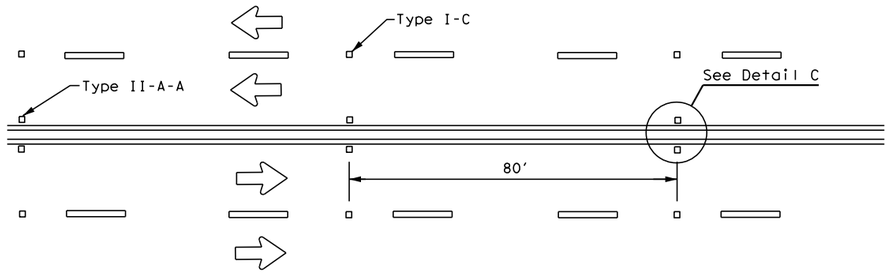
22A

DATE:
FILE:

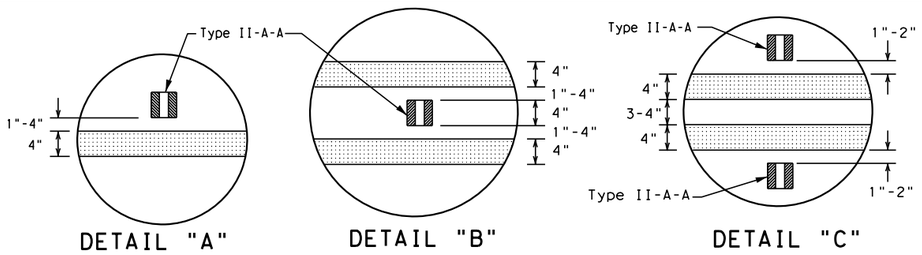
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



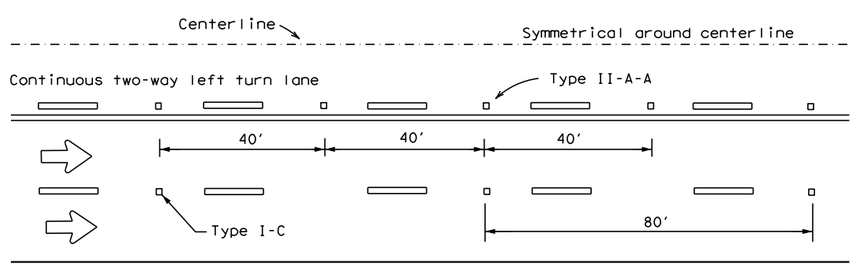
CENTERLINE FOR ALL TWO LANE ROADWAYS



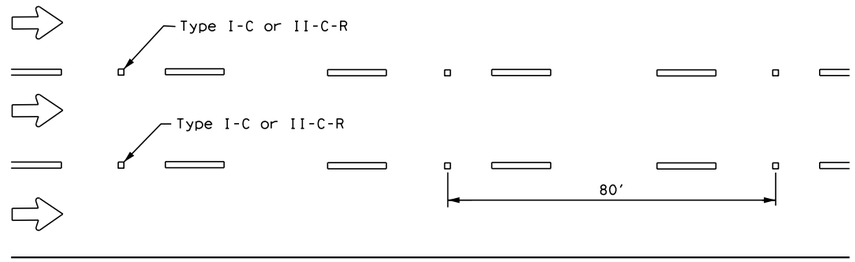
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

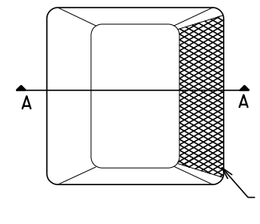


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

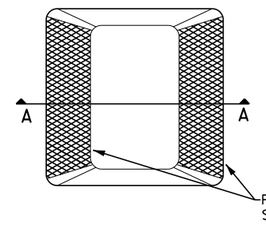
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

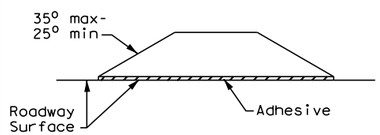
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

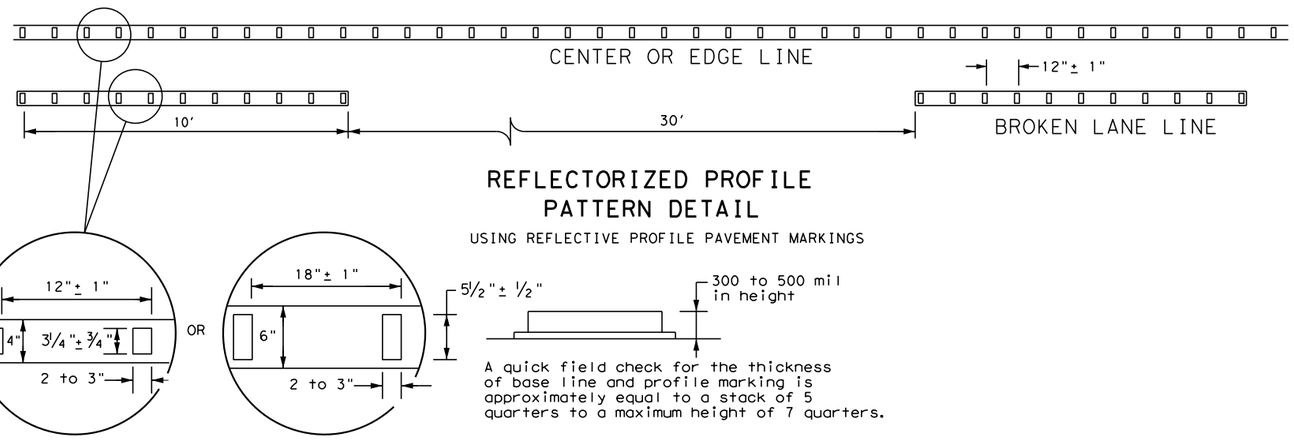


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

Texas Department of Transportation

Traffic Safety Division Standard

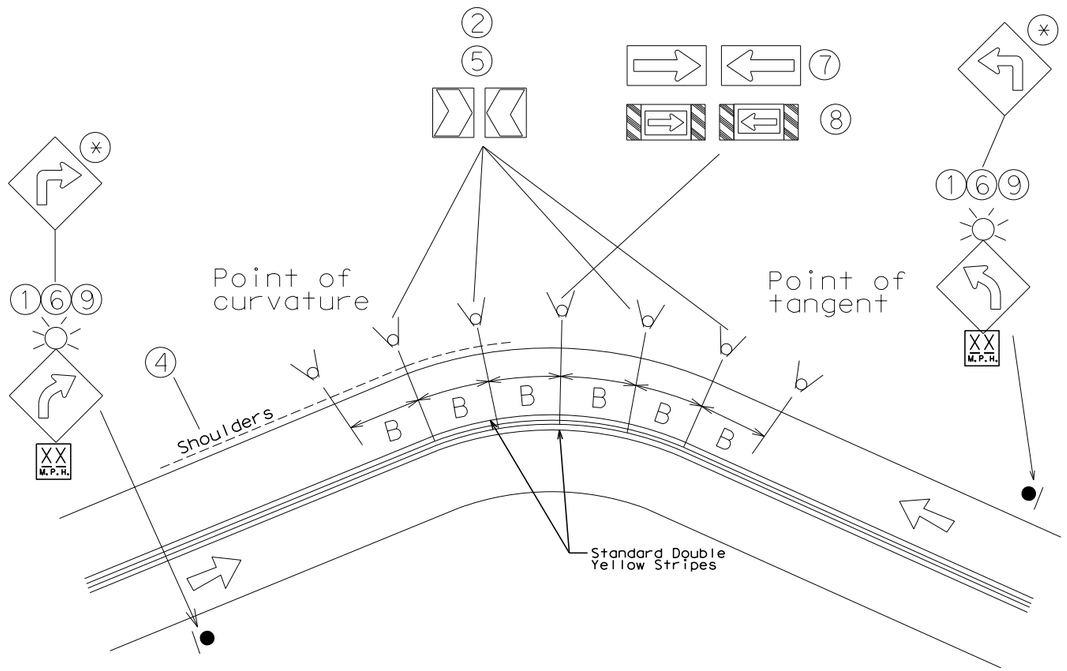
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	1451	03	017	FM 55
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	DAL	NAVARRO		145

22B

DATE:
FILE:

Dallas District Standard for Two-Lane Highway Curve Signing/Markings



Curve Safety Sequence

Applicable Minimum Measures

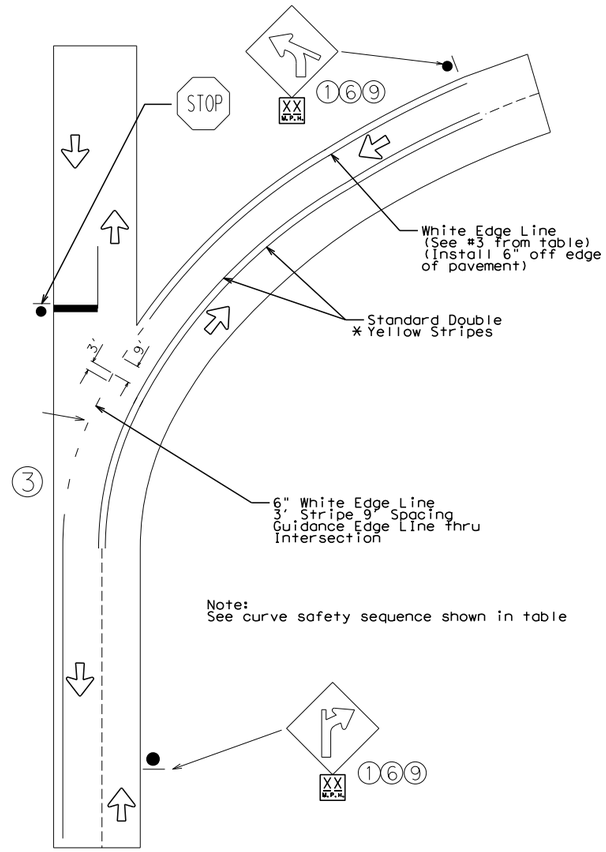
Advisory Speed 55 mph or higher	Advisory Speed 40-50 mph	Advisory speed 35 mph or less		Curve signing, delineation and pavement markings (listed in order from minimum to maximum level of treatment as needed)
+	+	+	1	Advance warning (36" x 36") and advisory mph (18" x 18")
+	+	+	2	Chevron alignment signs if advisory speed is 15 mph or greater than posted speed
	+	+	3	Edge lines
			3a	Pavement width 24' or greater 6" solid white edge line
			3b	Pavement width 20' - 24' 4" solid white edge line
			3c	Pavement width 20' or less no edge line
		Supplemental Measures		
		#	4	Add shoulders and edge line (see #3a)
		#	5	Yellow high intensity flourescent chevron alignment signs - add reflective sheeting to sign support from bottom edge of sign
#	#	#	6	Large advance warning (48" x 48") and advisory mph (30" x 30")
#	#	#	7	Arrow sign (48" x 24")
		#	8	Large arrow sign with diagonals (96" x 36")
		#	9	Add flashers to advance warning signs
#	#	#	10	Surface treatment to improve friction
			**	The W1-1R or L sign shall only be used when the advisory speed is
				30 mph or less

+ = required
# = optional

Applications 4 - 10 are additional supplemental applications which may be added as directed by the Area Engineer.

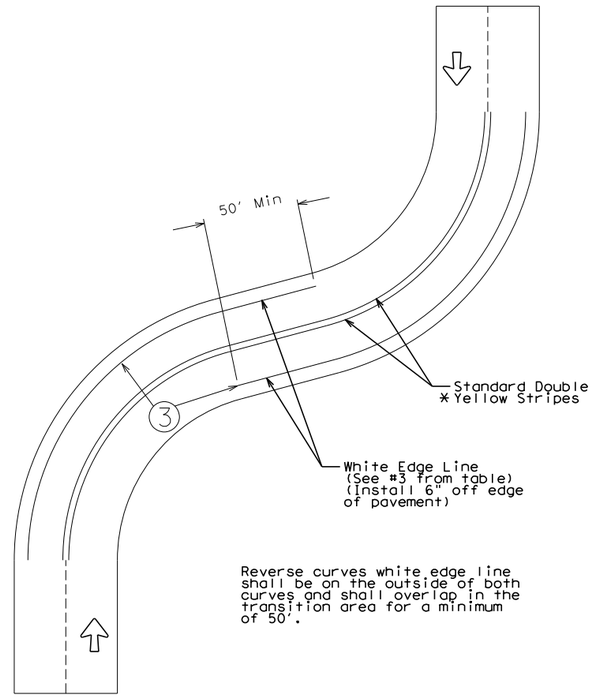
Note:
"B" - Chevron Spacing
referenced from D&OM(3)-15B

Typical Curve Treatment with Intersection



Note:
See curve safety sequence shown in table

Typical Reverse Curve Edge Line Treatment



Reverse curves white edge line shall be on the outside of both curves and shall overlap in the transition area for a minimum of 50'.

* Standard Double Yellow Stripes shall be dropped through a non-signalized intersection within the city limit. Outside the city limit, the Standard Double Yellow Strip shall be carried through all non-signalized intersections.

Notes:
1. Two methods will be used to determine the appropriate advisory speed for curves, the GPS Method(existing curves) and the Design Method (new curves).
2. Notify the Traffic Engineering Section for all requests on advisory speeds for existing curves.

OCT-2014 UPDATED NOTES
JAN-2016 NOTE ADDED
SEPT-2016 NOTE ADDED FOR STRIPING IN CURVE
MAR-2017 REMOVED REFERENCE TO DELINEATORS
MAY-2019 MODIFIED SIGN SIZE

Texas Department of Transportation

TWO-LANE HIGHWAY CURVE SIGNING & MARKINGS

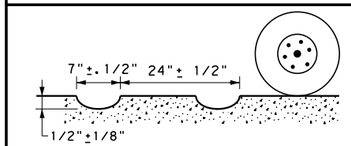
DALLAS DISTRICT STANDARD

SCALE: NTS SHEET 1 OF 1

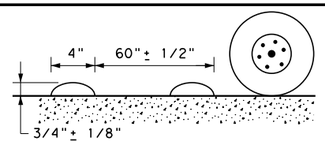
DESIGN/CK	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
BLS	6	SEE TITLE SHEET		FM 55
CHECK BLS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK FRC	TEXAS	DALLAS	NAVARRO	146
CHECK ARO	CONTROL 1451	SECTION 03	JOB 017	

DATE:
FILE:

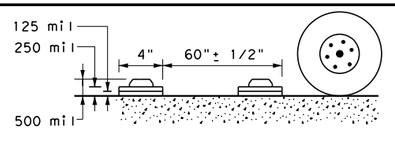
CENTERLINE RUMBLE STRIPS



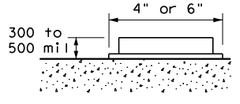
MILLED RUMBLE STRIPS



RAISED TRAFFIC BUTTONS

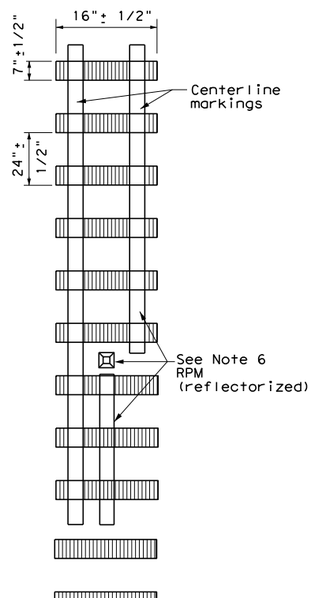


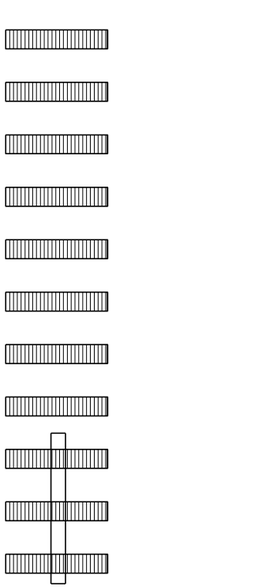
PREFORMED THERMOPLASTIC STRIPS



PROFILE MARKINGS

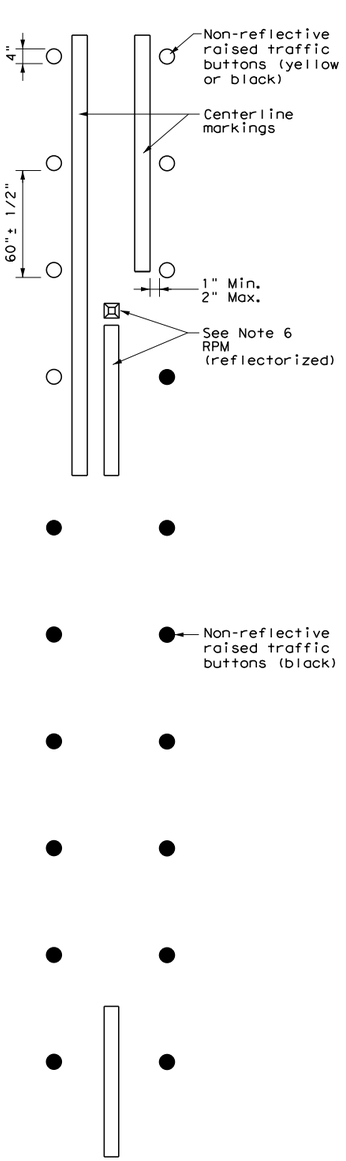
PROFILE VIEW





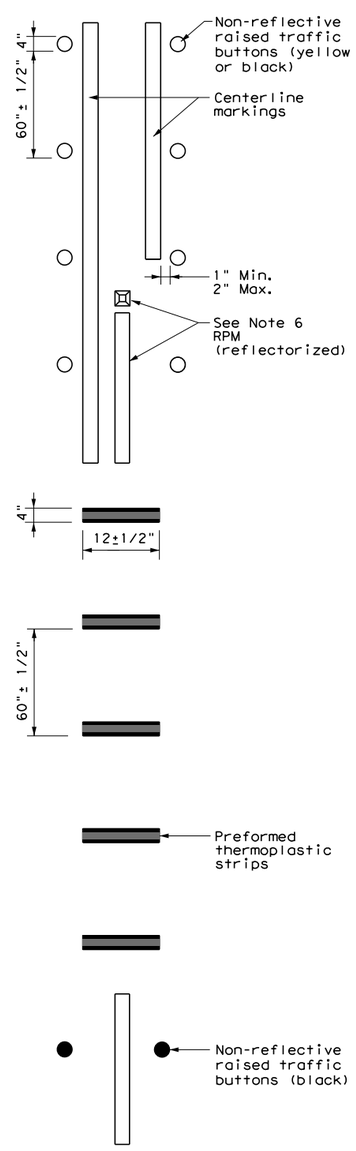
PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS



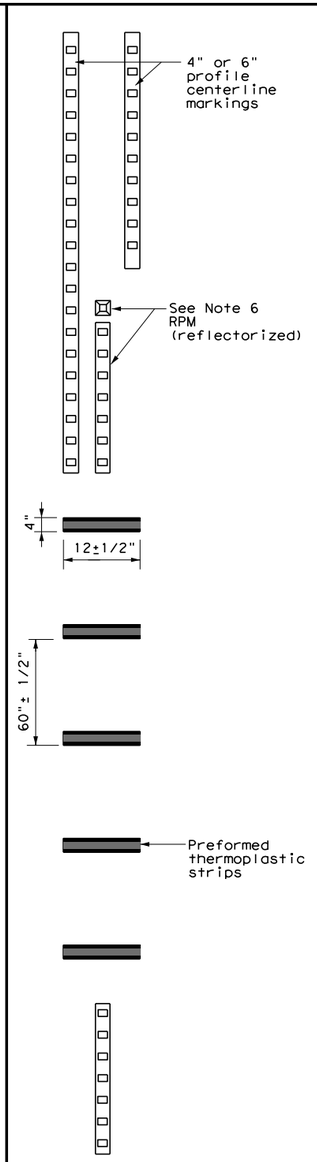
PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS



PLAN VIEW
OPTION 3

RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC STRIPS

GENERAL NOTES

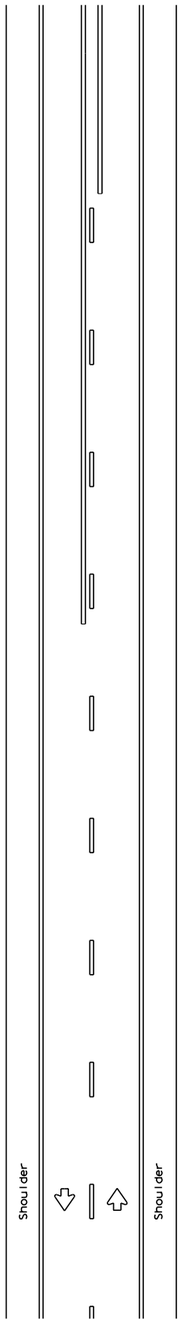
1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(4).



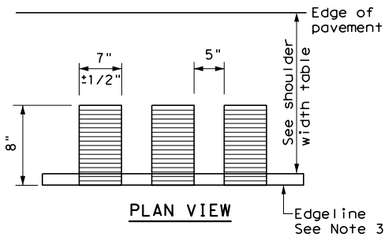
TWO LANE TWO-WAY ROADWAYS

Texas Department of Transportation®
Traffic Operations Division Standard

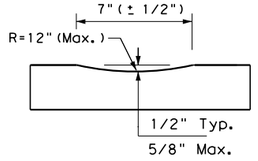
CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3)-13

FILE: rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		147

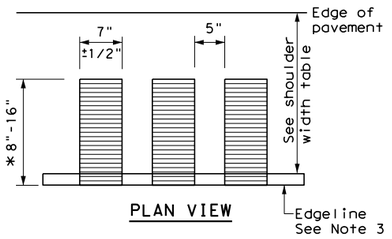


PLAN VIEW

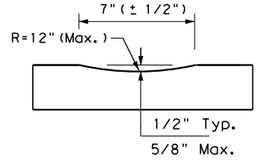


PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



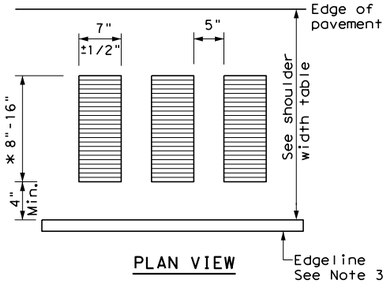
PLAN VIEW



* This distance may vary based on width of shoulder

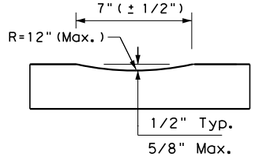
PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



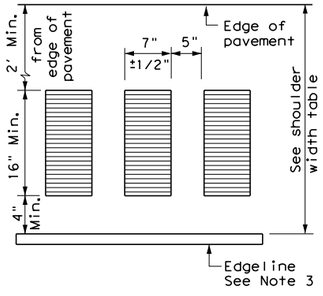
PLAN VIEW

* This distance may vary based on width of shoulder

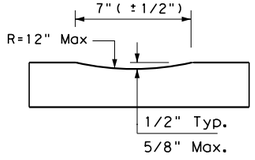


PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

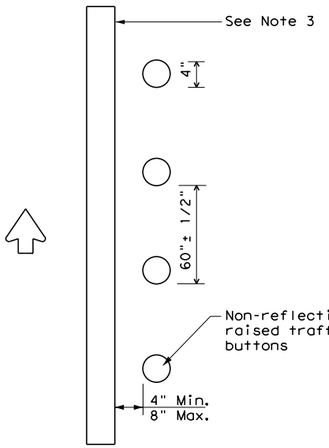


PLAN VIEW



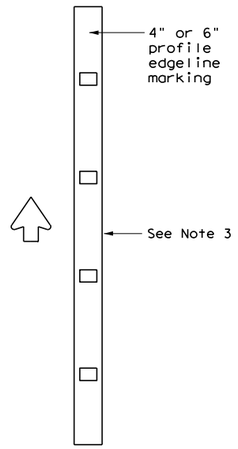
PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3 5 OR 6	Option 2, 4, 5 OR 6

GENERAL NOTES

1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.

Texas Department of Transportation

Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(4)-13

FILE: rs(4)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		148

DATE:
FILE:

A. GENERAL SITE DATA

1. PROJECT LIMITS: *FM 55 FROM SH 22 TO ELLIS COUNTY LINE*

Begin Project Coordinates : Latitude (N): 32.092759° Longitude (W): -96.722019°
End Project Coordinates : Latitude (N): 32.146496° Longitude (W): -96.749865°

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet and Project Layout (Sheet 3)*
- *Drainage Patterns: Drainage Area Map (Sheet 79-80) & SW3P Site Plan (Sheet 154-164)*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections (Sheet 5-6)*
- *Location of Erosion and Sediment Controls: SW3P Site Map (Sheet 154-164)*
- *Surface Waters and Discharge Locations: Project Layout (Sheet 3)*
- *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:

Reconstructing existing pavement and widening shoulders.

4. MAJOR SOIL DISTURBING ACTIVITIES:

Excavation, pavement widening, backfilling pavement edges, culvert replacement, culvert extension, grading and revegetation of ditch foreslopes.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

Existing soil consists of primarily clay and fine sandy loam with some clay loam. Vegetative cover consists of grasses and weeds with scattered growths of trees. Existing grasses are in good condition with approximately 98% density (thick soil cover).

6. TOTAL PROJECT AREA: *48.87* Acres

7. TOTAL AREA TO BE DISTURBED: *35.29* Acres (72.2%)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: *0.35*
AFTER CONSTRUCTION: *0.36*

9. NAME OF RECEIVING WATERS:

Carroll Branch which flows to SCS Reservoir 123, unnamed tributary which flows to SCS Reservoir 104A and then to Mill Creek, unnamed tributary which flows to SCS Reservoir 104B and then to Mill Creek, Mill Creek (0814A) which flows to Chamber Creek (0814). Receiving waters flow to Richland-Chambers Reservoir [(Segment 0836; impaired by bacteria in water (recreational use)].

10. PROJECT SW3P Binder:

A. For projects disturbing one to five acres, TxDOT will maintain a SW3P Binder at the project field office (If there is not a project field office, should be kept at the Area Office) which contains the following: Index Sheet, TCEQ Signature Authority, TxDOT's and Contractor's Small Construction Site Notice, SW3P Inspector Qualification Statements, EPIC Sheet, SW3P Sheet, Site Location Maps, Inspection and Maintenance Reports (Form 2118), Construction Stage Gate Checklists(s) (CSGC), Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, TxDOT and Contractor MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.

B. For projects disturbing 5 acres or more, TxDOT will follow the actions listed in (10.A.) above with the addition of the following: TxDOT and Contractor Notice Of Intent (N.O.I.) and Fee Payment Form, TxDOT and Contractor 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 Area To Be Disturbed Acres on project (See #7 above) and the PSL(s) acreage located within one mile of project.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

T	TEMPORARY SEEDING	P	PRESERVATION OF NATURAL RESOURCES
___	MULCHING (Hay or Straw)	___	FLEXIBLE CHANNEL LINER
___	BUFFER ZONES	___	RIGID CHANNEL LINER
___	PLANTING	___	SOIL RETENTION BLANKET
P	SEEDING	P	COMPOST MANUFACTURED TOPSOIL
P	SODDING	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
T	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:

Storm water drainage will be provided by ditches 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.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

1. *See construction progress schedule for schedule and duration of relevant soil disturbance and stabilization activities.*
2. *To the extent practicable, preserve existing vegation, maintain a vegetative buffer along receiving waters, and phase construction activities to minimize exposure of disturbed soils.*
3. *Due to limited space within the R.O.W. retention ponds will not be used. Alternate BMPs are included in the plans to provide equivalent sedimentation control.*
4. *Avoid storing portable sanitary units, concrete washouts, or chemicals within 50 feet upgradient of receiving waters or drainage conveyance systems without adequate pollution controls in place.*
5. *Install SW3P control devices (BMPs) to protect receiving waters, downslope perimters, and active roadways prior to soil disturbance and construction activities in the vicinity per the SW3P Site Map, as needed, or as directed by the Engineer. Do not install BMPs in any control area unless soil disturbing acitivites are to take place within two weeks.*
6. *Where work has temporarily ceased in a disturbed area (i.e. will exceed 14 days before next soil disturbance activity or initiation of final stabilization measures), temporarily stabilize soils per TXR150000 with vertical tracking, temporary seeding and/or other soil cover as appropriate or as directed by the Engineer.*
7. *Revegetate disturbed soils in completed areas of the project as soon as practicable or as directed by the Engineer.*
8. *When construction activities are completed and all project areas are stabilized with approval, remove all temporary structural controls and seed any areas disturbed by the removal. Do not remove perimeter controls until final stabilization of the area upstream.*

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.

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 construct 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 on project, abutting and 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
MITCHELL L. RANDALL
129397
LICENSED PROFESSIONAL ENGINEER

Mitchell L. Randall P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation

DALLAS DISTRICT ENVIRONMENTAL

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

TEMPLATE REVISION DATE: 02/07/18

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	(SEE TITLE SHEET)		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	NAVARRO	
CHECK	CONTROL	SECTION	JOB	149
	1451	03	017	

FILE NAME
DATE
DESIGNER

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

Notes To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from its relative position.
3. All areas should be addressed thoroughly and verify the necessary pay items are set up to support actions needed.

Filled Out: XX/XX/XXXX
Prepared by: Name/Section

I. STORMWATER POLLUTION PREVENTION PLAN-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 adjacent MS 4 Operator(s) that receive discharges from this project. They need to be notified prior to construction activities.
(Note: Leave blank only if no adjacent MS 4 Operator(s) are affected.)

1.

2.

☐ No Action Required ☒ Required Action

Action Number:

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. No equipment is allowed in any sream channel below the ordinary High Water Mark except on approved temporary stream crossings or drill pads.

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# 3(a)

Required Actions: List Waters of the US Permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.
1. Culvert#5 Sta. 49+20.48 Unnamed Tributary to Mill Creek Stream Impact
2. Culvert#6 Sta. 64+30.03 Unnamed Tributary to Mill Creek Stream Impact
3. Culvert#12 Sta. 149+05.93 Unnamed Tributary to Mill Creek Stream Impact
4. Culvert#18 Sta. 217+93.93 Unnamed Tributary to Mill Creek Stream Impact

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 for applicable 401 General Conditions:
(Note: If CORP Permit not required, do not check boxes.)

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ 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 Number:
1.
2.
3.

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 Number:
1.
2.
3.

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

☐ No Action Required ☒ Required Action

Action Number:

1. The following species could occur in the project area: Wood Stork, southern crawfish frog, Strecker's chorus frog, Woodhouse's toad, eastern spotted skunk, long-tailed weasel, and western box turtle. Follow the BMP's and Special Notes listed below to protect these species.

2. Contractor to implement the following BMPs from "Beneficial Management Practices: Avoiding, Minimizing, and Mitigating Impacts of Transportation Projects on State Natural Resources" available at https://ftp.txdot.gov/pub/txdot-info/env/tookit/300-01-bmp.pdf
a. Minimize impacts to wetland habitats including isolated ephemeral pools.
b. Section 2.2.1 Bird BMP
c. Section 2.6.1 Aquatic Amphibian and Reptile BMP (barrier fencing not required)
d. Section 2.6.2 Terrestrial Amphibian and Reptile BMP
e. Section 1.4 Water Quality BMP
f. Section 1.2 Vegetation BMP

Special Notes:

1. Avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.

2. 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 immediated area, and contact the Engineer immediately.

3. The Migratory Bird Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade or transport any migratory bird, nest, young, feather or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure or trees where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

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 Corp 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 Safety Data Sheets (SDS) 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 SDS. In the event of a spill, take actions to mitigate the spill as indicated in the SDS, 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, canisters, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation(s) or replacement(s) (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

Action Number:

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action Number:

1.

GENERAL NOTE:

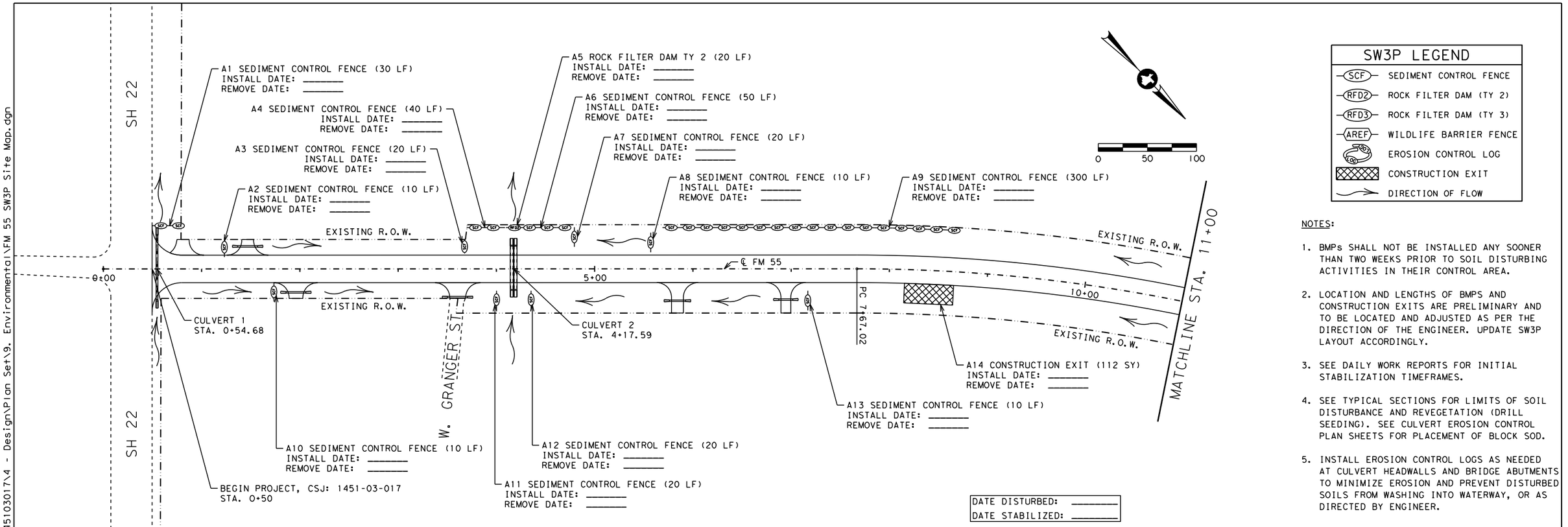
Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

LAST REVISION: 1/15/15

 Texas Department of Transportation
Dallas District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 55
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	Navarro	
CONTROL	SECTION	JOB	SHEET NO.
1451	03	017	150

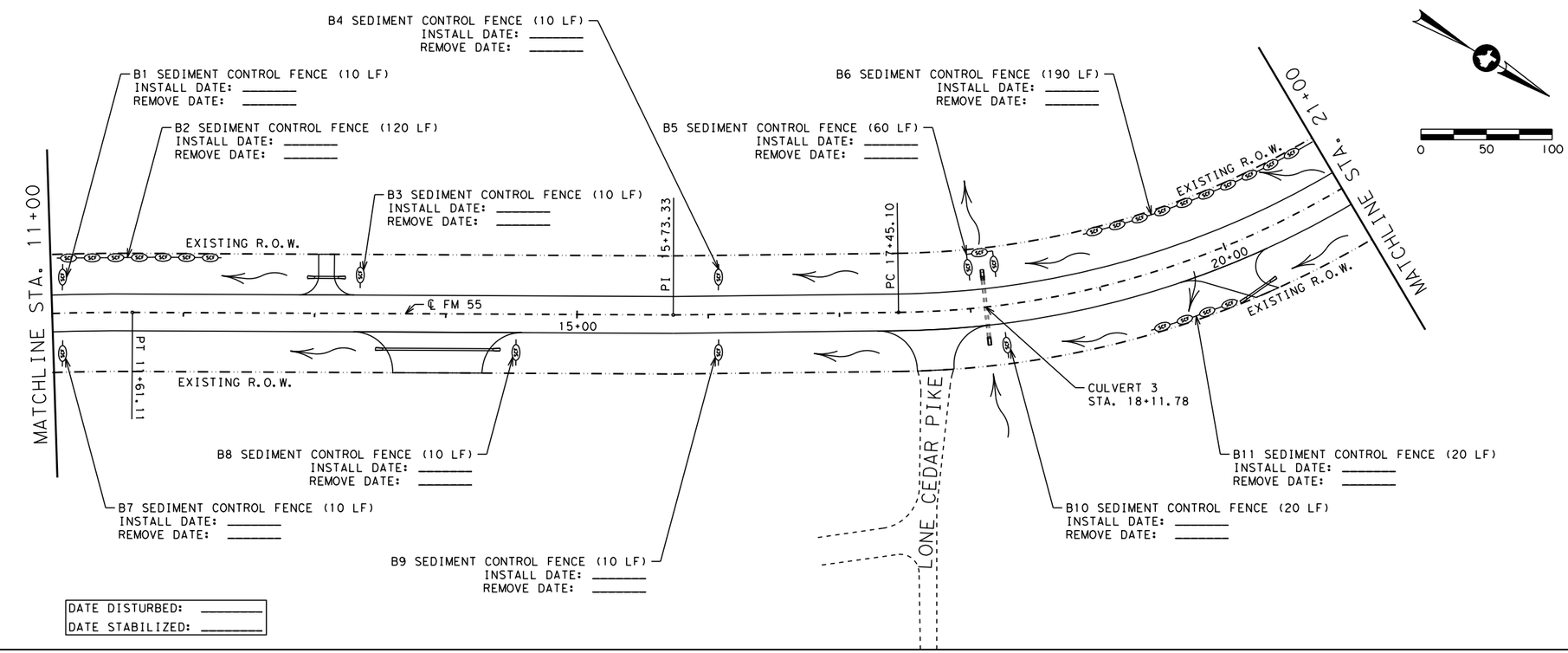


SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

NOTES:

1. BMPs SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. LOCATION AND LENGTHS OF BMPS AND CONSTRUCTION EXITS ARE PRELIMINARY AND TO BE LOCATED AND ADJUSTED AS PER THE DIRECTION OF THE ENGINEER. UPDATE SW3P LAYOUT ACCORDINGLY.
3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
4. SEE TYPICAL SECTIONS FOR LIMITS OF SOIL DISTURBANCE AND REVEGETATION (DRILL SEEDING). SEE CULVERT EROSION CONTROL PLAN SHEETS FOR PLACEMENT OF BLOCK SOD.
5. INSTALL EROSION CONTROL LOGS AS NEEDED AT CULVERT HEADWALLS AND BRIDGE ABUTMENTS TO MINIMIZE EROSION AND PREVENT DISTURBED SOILS FROM WASHING INTO WATERWAY, OR AS DIRECTED BY ENGINEER.



STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation
© 2021

FM 55
SW3P SITE PLAN

SCALE: 1"=100' SHEET 1 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	151
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:09
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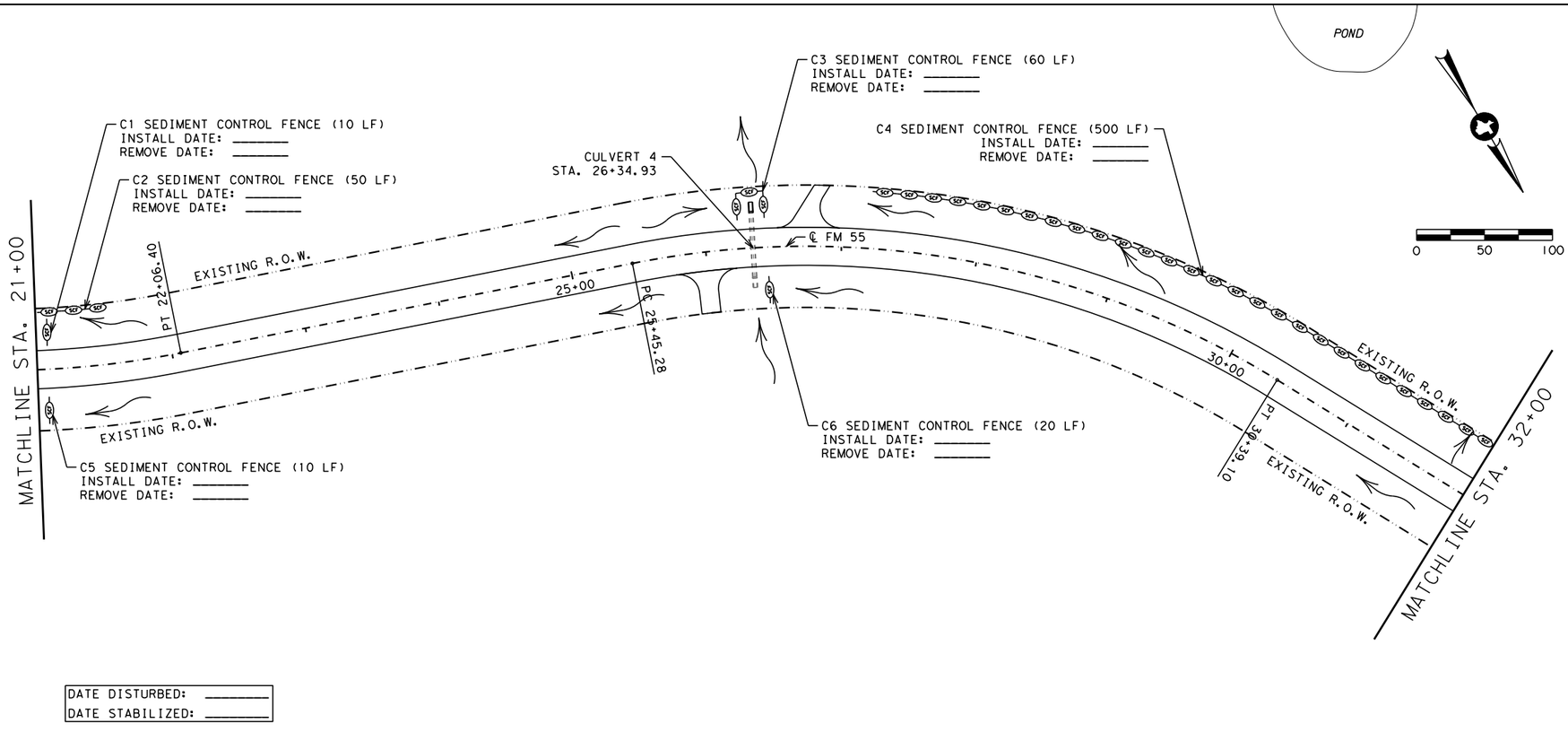

DATE DISTURBED: _____
DATE STABILIZED: _____

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
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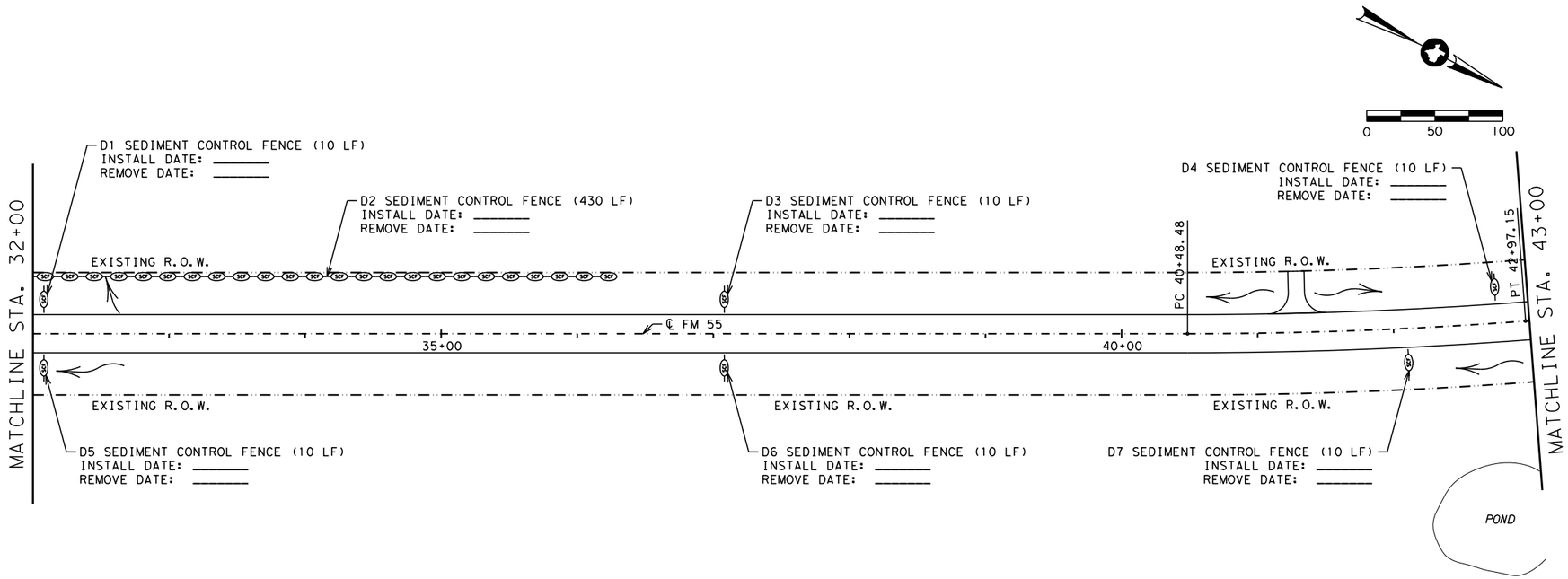
5. INSTALL EROSION CONTROL LOGS AS NEEDED AT CULVERT HEADWALLS AND BRIDGE ABUTMENTS TO MINIMIZE EROSION AND PREVENT DISTURBED SOILS FROM WASHING INTO WATERWAY, OR AS DIRECTED BY ENGINEER.



DATE DISTURBED: _____
DATE STABILIZED: _____

STATE OF TEXAS
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FM 55
SW3P SITE PLAN

SCALE: 1"=100'

SHEET 2 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	152
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:09
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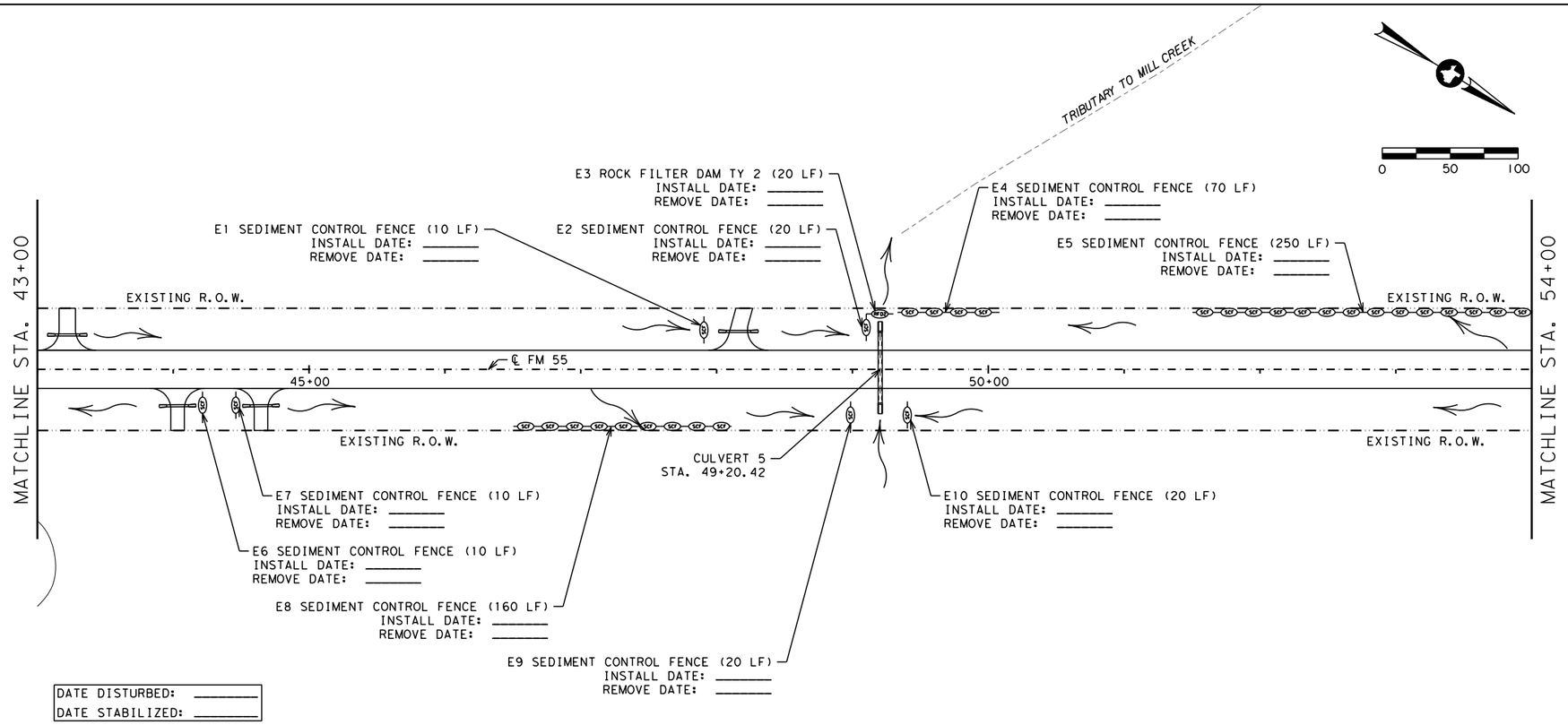

SW3P LEGEND

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
AREF	WILDLIFE BARRIER FENCE
	EROSION CONTROL LOG
	CONSTRUCTION EXIT
	DIRECTION OF FLOW

NOTES:

1. BMPs SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2. LOCATION AND LENGTHS OF BMPS AND CONSTRUCTION EXITS ARE PRELIMINARY AND TO BE LOCATED AND ADJUSTED AS PER THE DIRECTION OF THE ENGINEER. UPDATE SW3P LAYOUT ACCORDINGLY.
3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
4. SEE TYPICAL SECTIONS FOR LIMITS OF SOIL DISTURBANCE AND REVEGETATION (DRILL SEEDING). SEE CULVERT EROSION CONTROL PLAN SHEETS FOR PLACEMENT OF BLOCK SOD.
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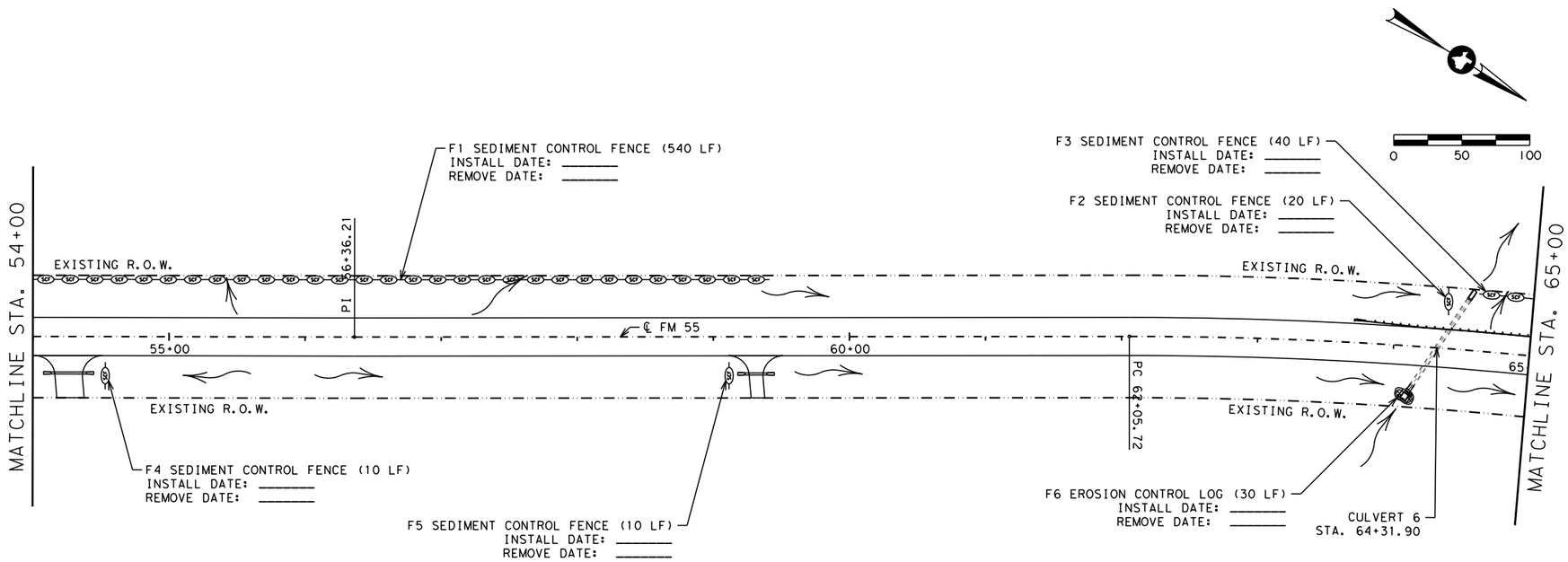

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SW3P SITE PLAN

SCALE: 1"=100' SHEET 3 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	153
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:53:09
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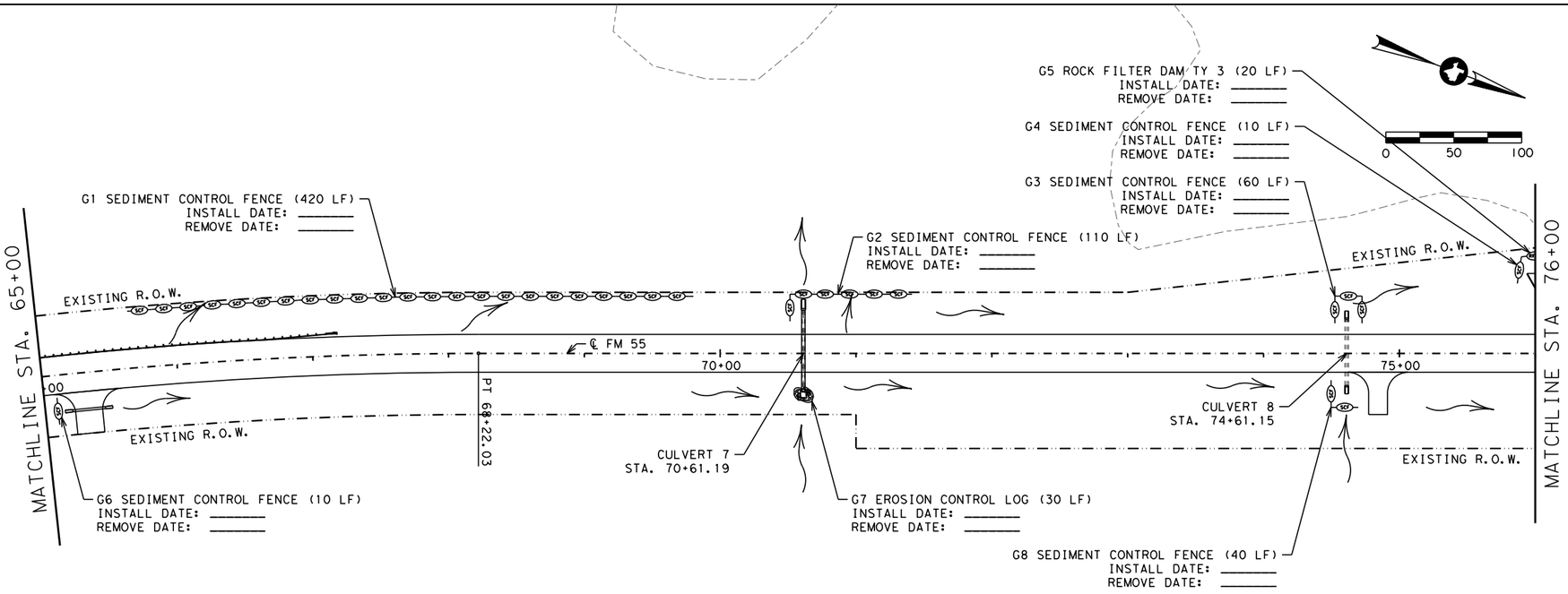

DATE DISTURBED: _____
DATE STABILIZED: _____

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

NOTES:

1. BMPs SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
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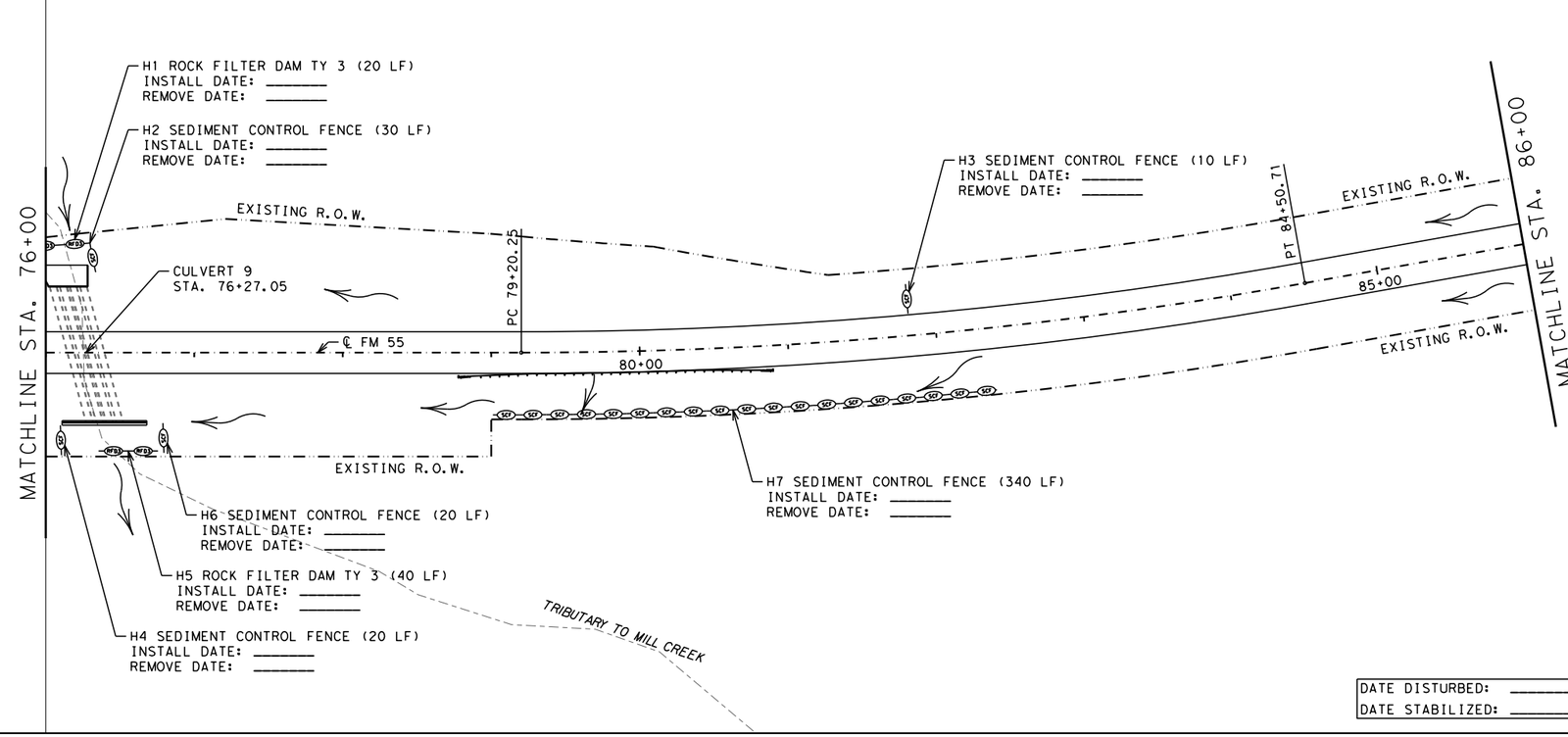

DATE DISTURBED: _____
DATE STABILIZED: _____

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SW3P SITE PLAN

SCALE: 1"=100'

SHEET 4 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS: MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	154
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:53:10
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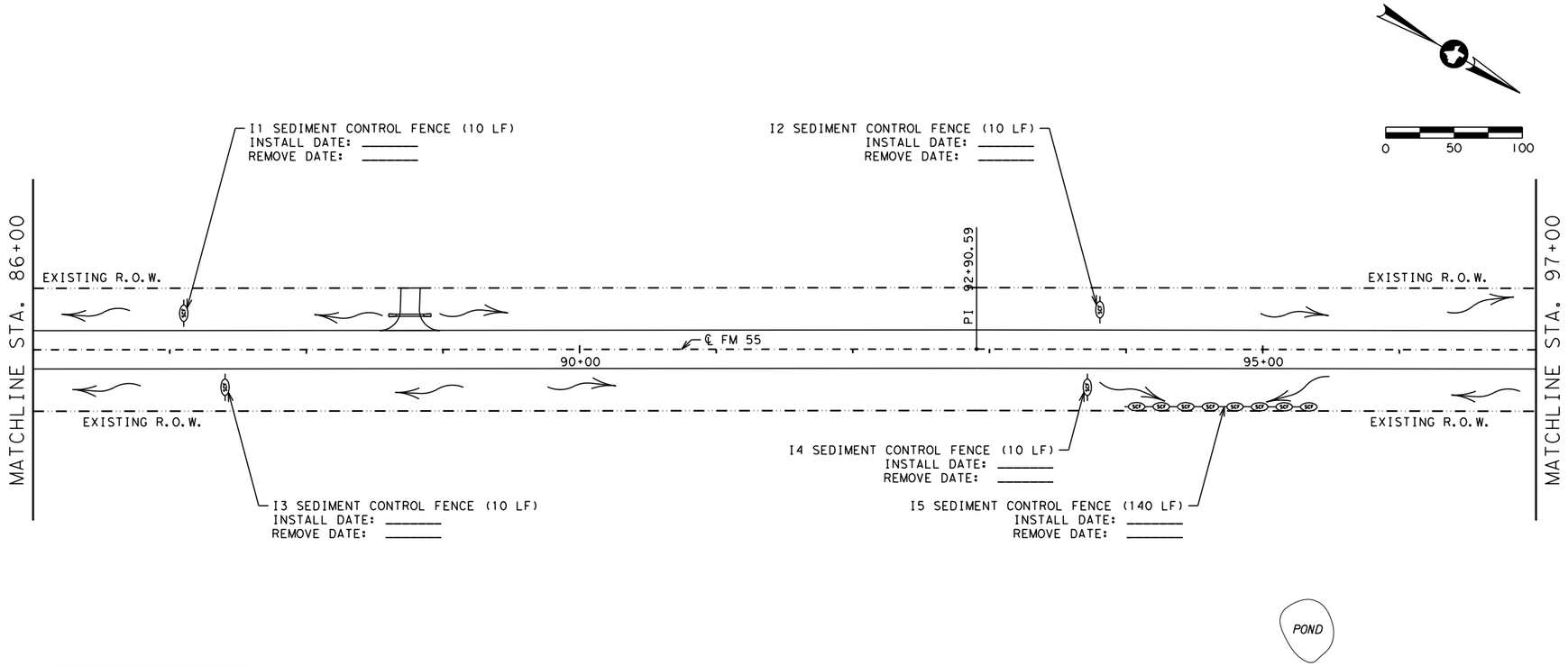

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

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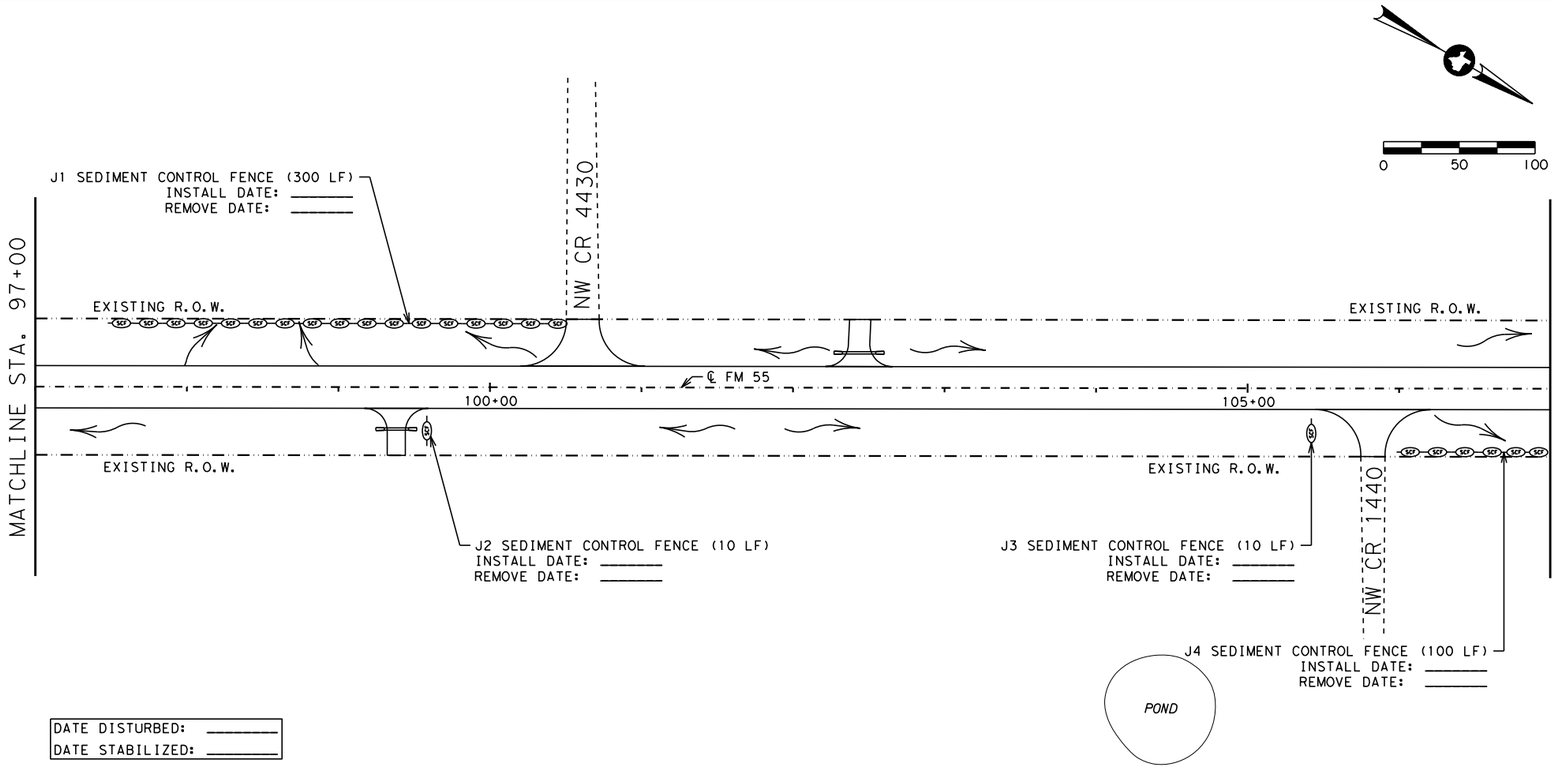

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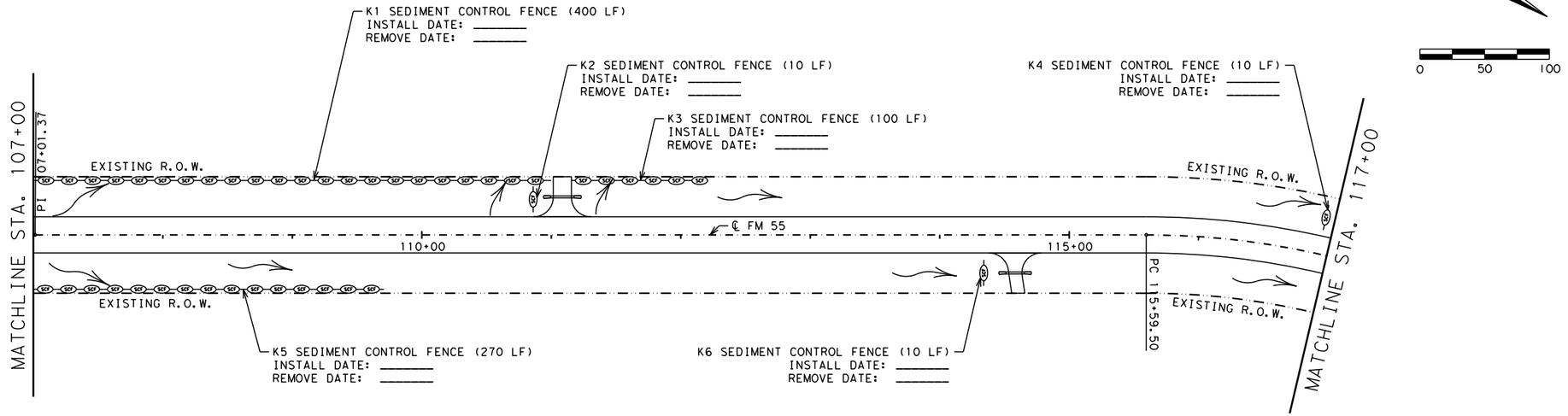
SW3P SITE PLAN

SCALE: 1"=100'

SHEET 5 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	155
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:10
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\9. Environmental\FM 55 SW3P Site Map.dgn



DATE DISTURBED: _____
DATE STABILIZED: _____

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

NOTES:

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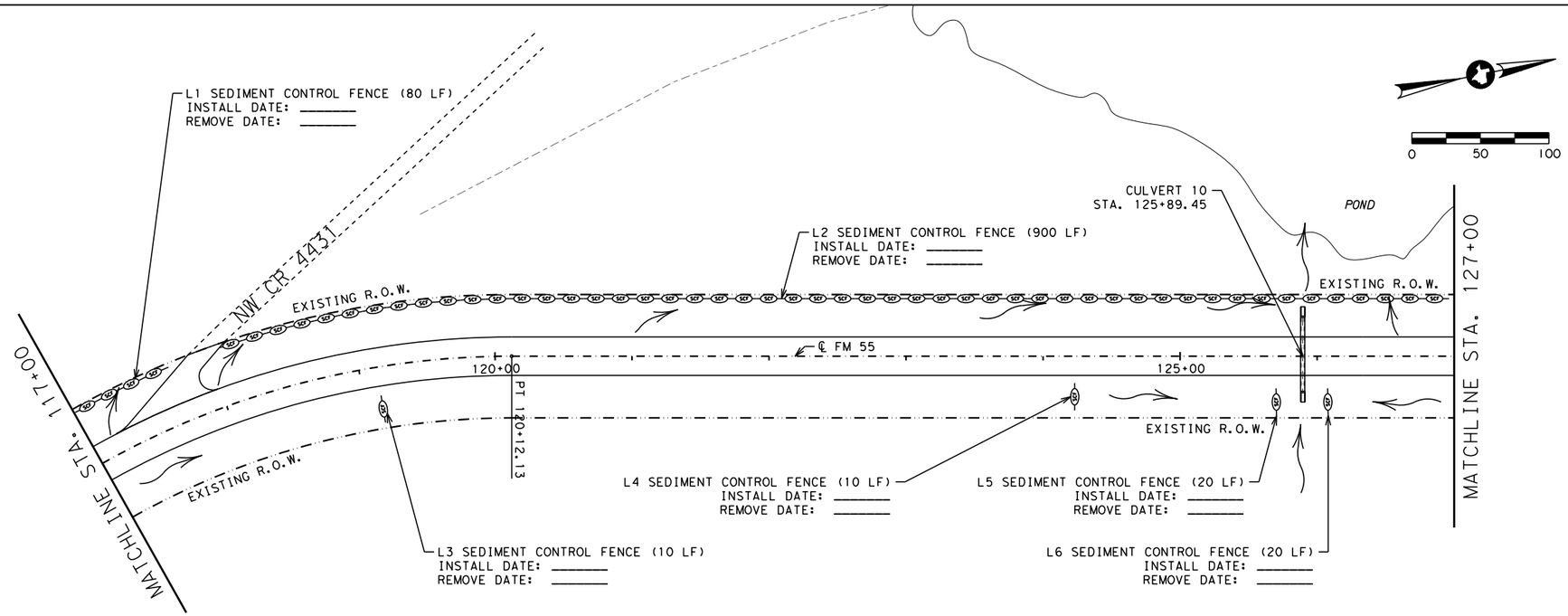

DATE DISTURBED: _____
DATE STABILIZED: _____

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SW3P SITE PLAN

SCALE: 1"=100' SHEET 6 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS: MLR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	156
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE:11/30/2021 TIME:10:53:10
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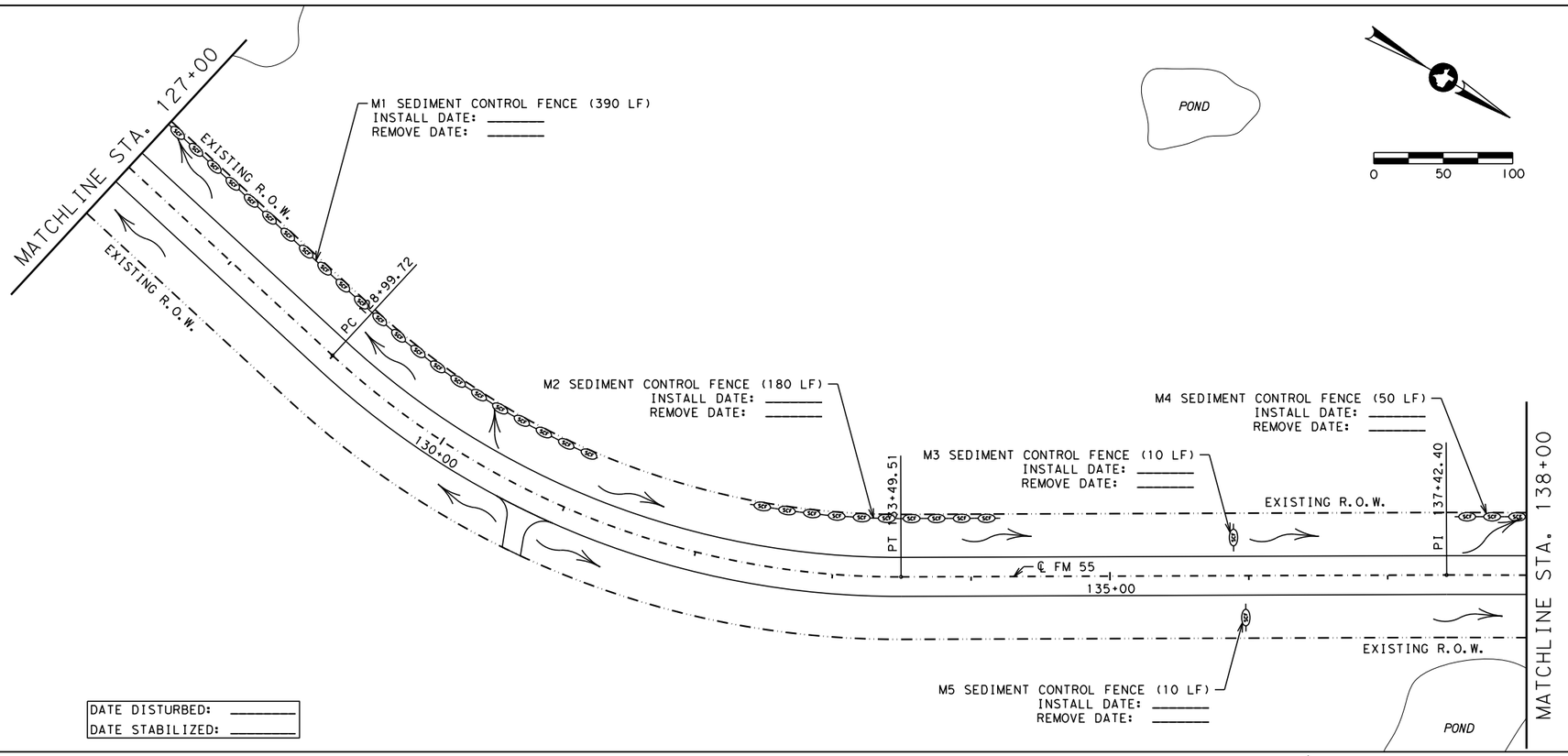

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

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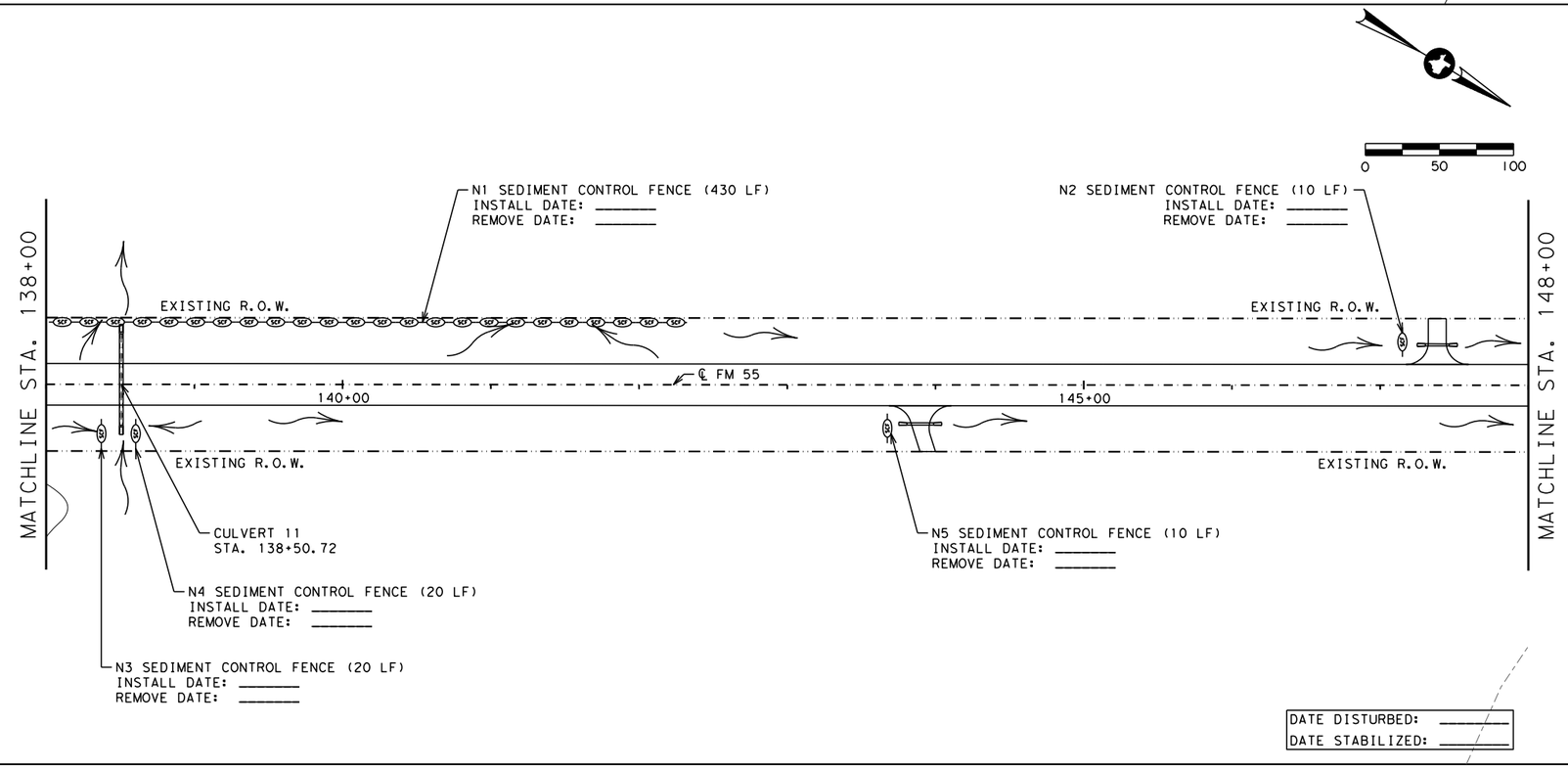

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SW3P SITE PLAN

SCALE: 1"=100' SHEET 7 OF 11

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	157
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:11
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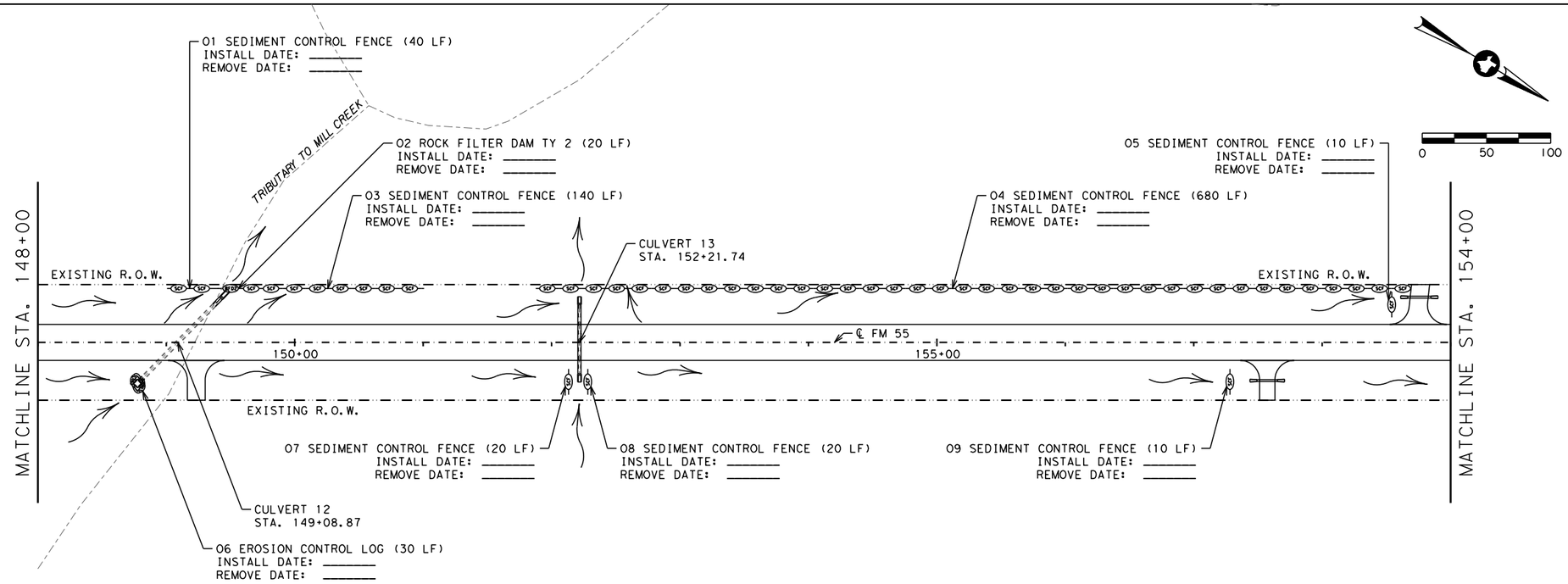

DATE DISTURBED: _____
DATE STABILIZED: _____

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

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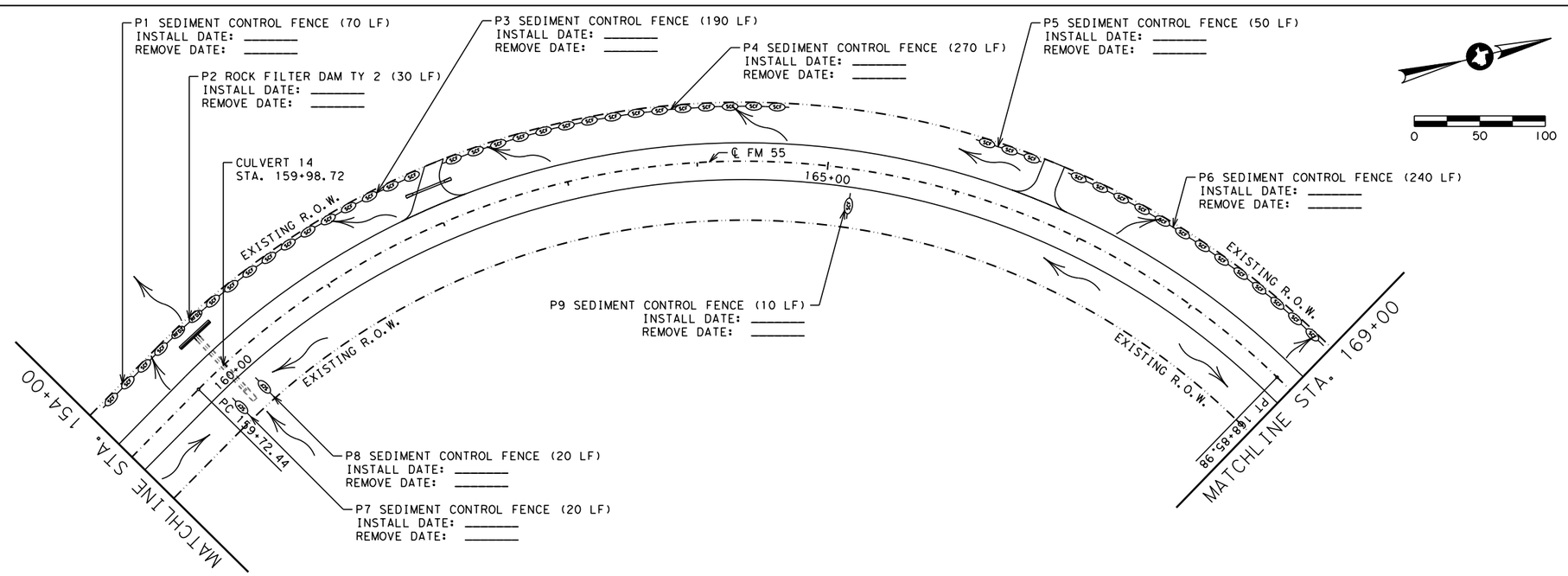

DATE DISTURBED: _____
DATE STABILIZED: _____

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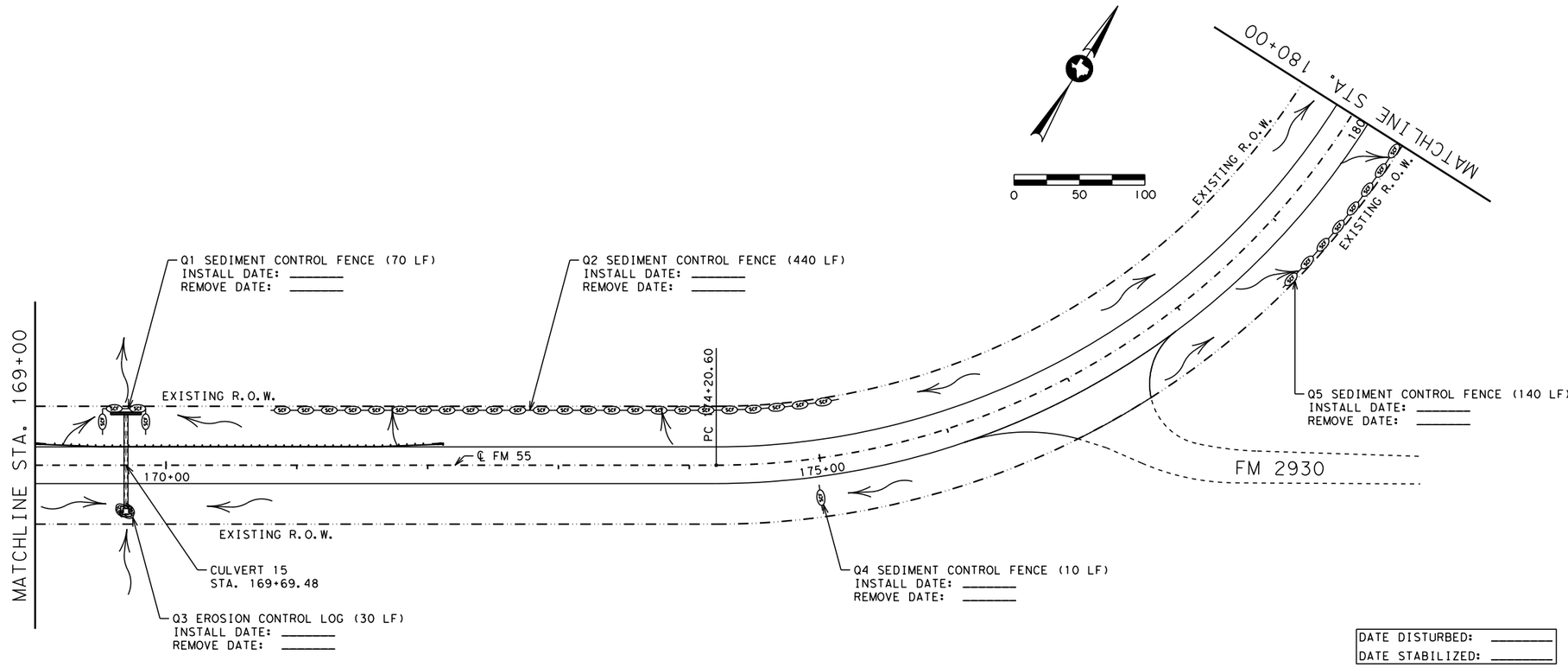
SW3P SITE PLAN

SCALE: 1"=100' SHEET 8 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	158
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:11
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\9. Environmental\FM 55 SW3P Site Map.dgn



SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

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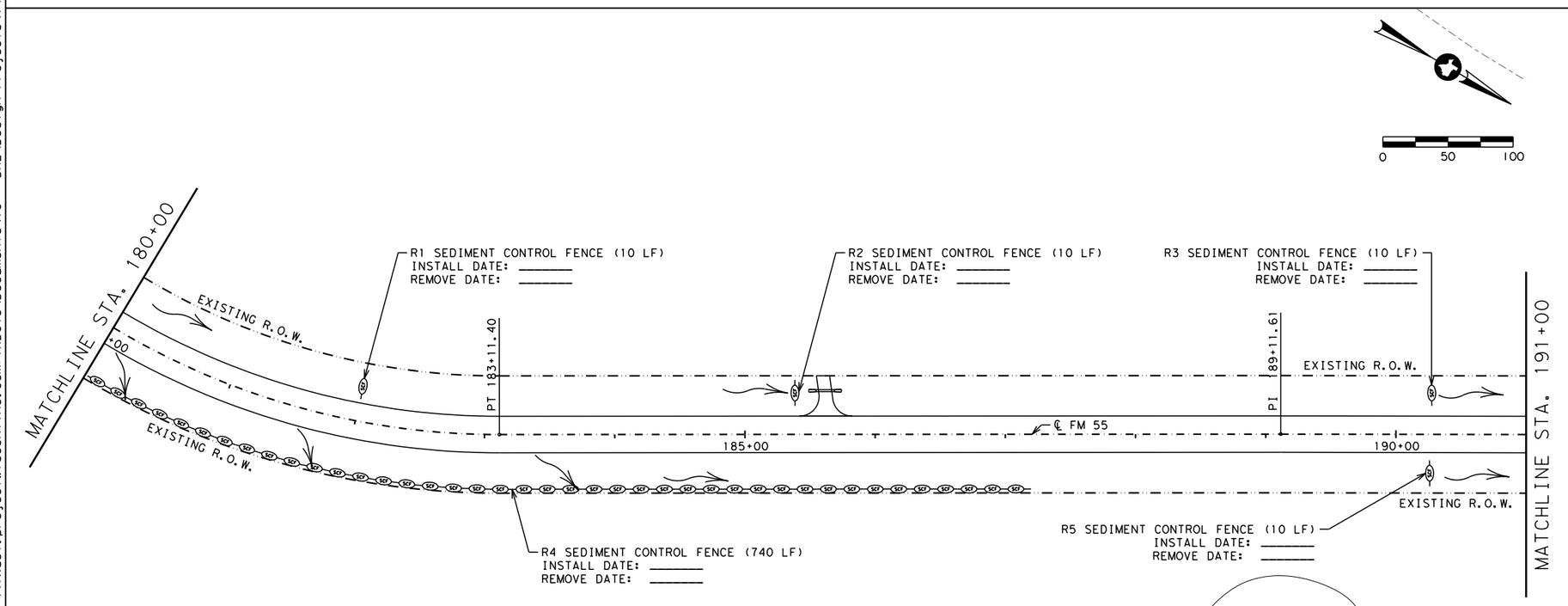

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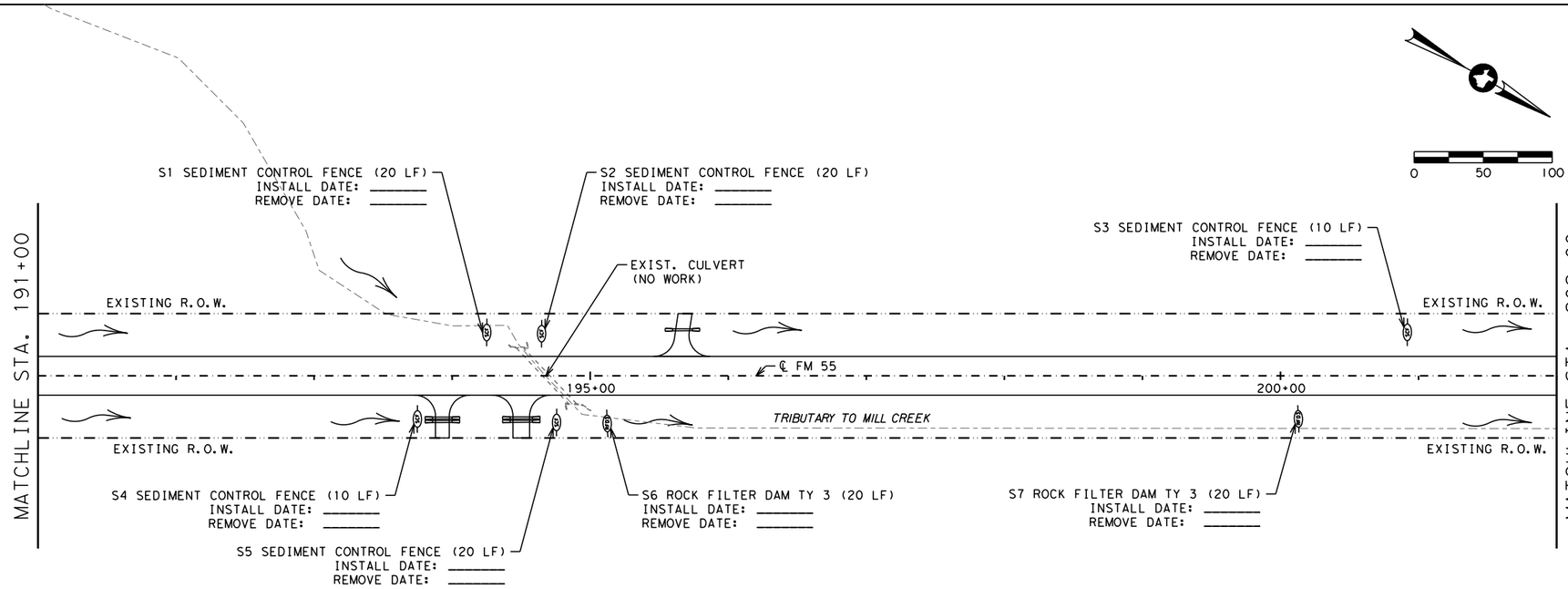
SW3P SITE PLAN

SCALE: 1"=100' SHEET 9 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	159
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:11
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\9. Environmental\FM 55 SW3P Site Map.dgn



DATE DISTURBED: _____
DATE STABILIZED: _____

SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

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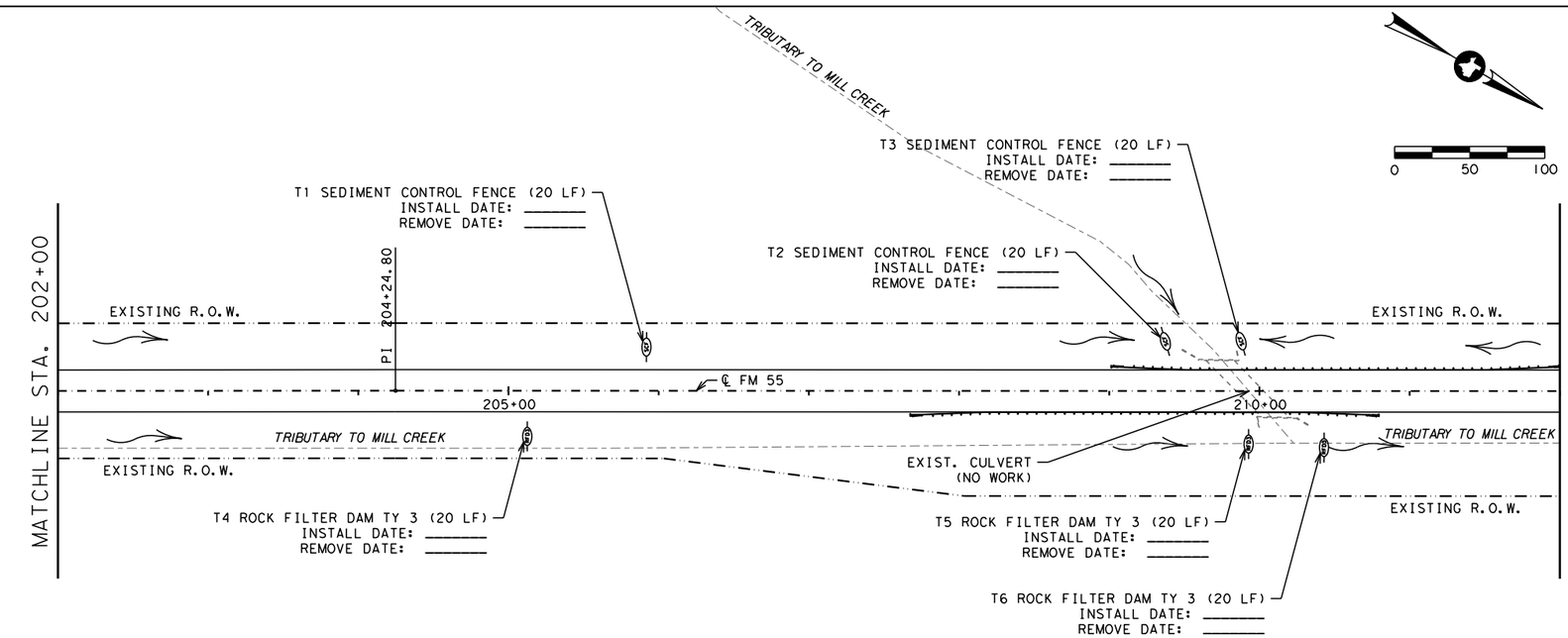

DATE DISTURBED: _____
DATE STABILIZED: _____

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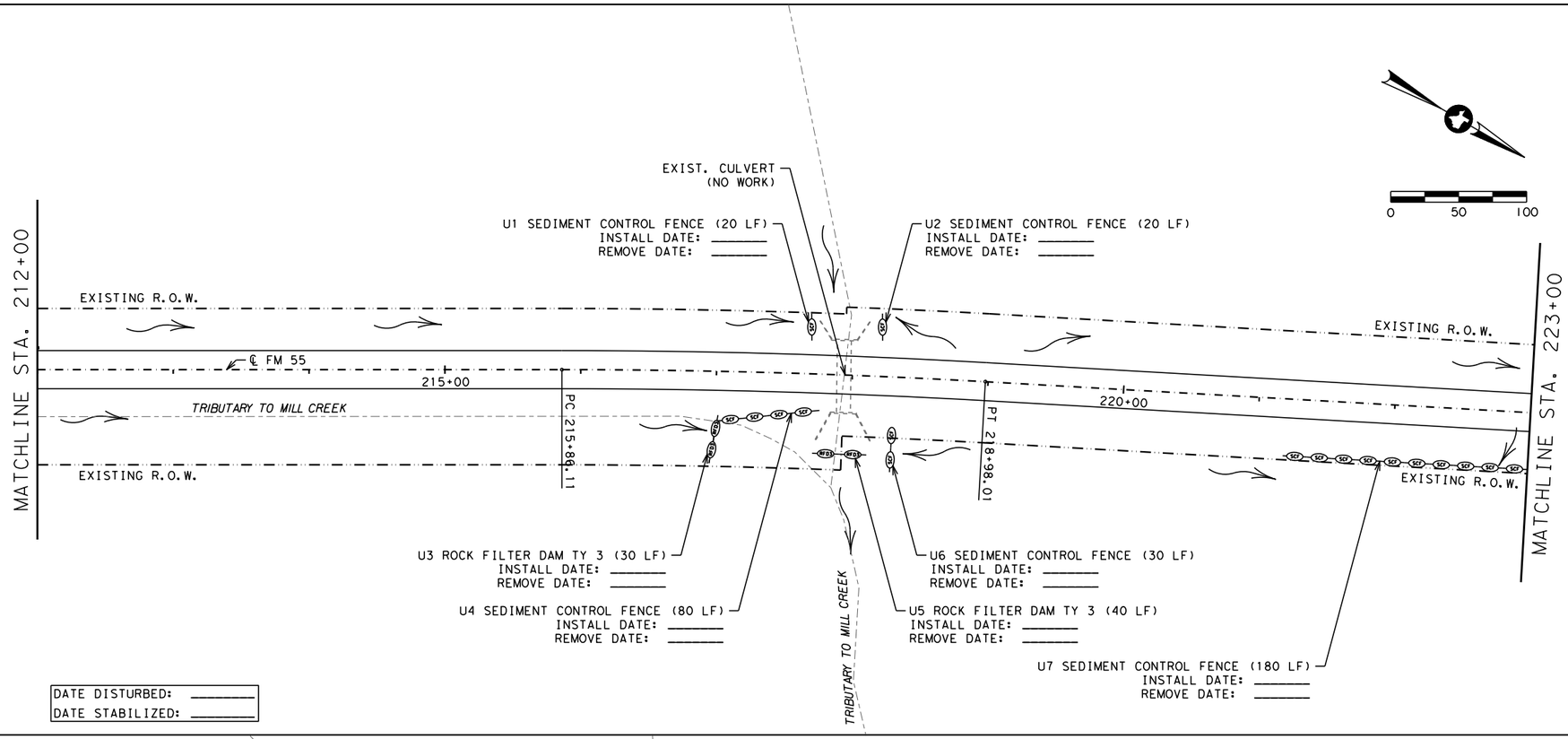
SW3P SITE PLAN

SCALE: 1"=100'

SHEET 10 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	160
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:11
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\145103017\4 - Design\Plan Set\9. Environmental\FM 55 SW3P Site Map.dgn



SW3P LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY 2)
- RFD3 — ROCK FILTER DAM (TY 3)
- AREF — WILDLIFE BARRIER FENCE
- EROSION CONTROL LOG
- CONSTRUCTION EXIT
- DIRECTION OF FLOW

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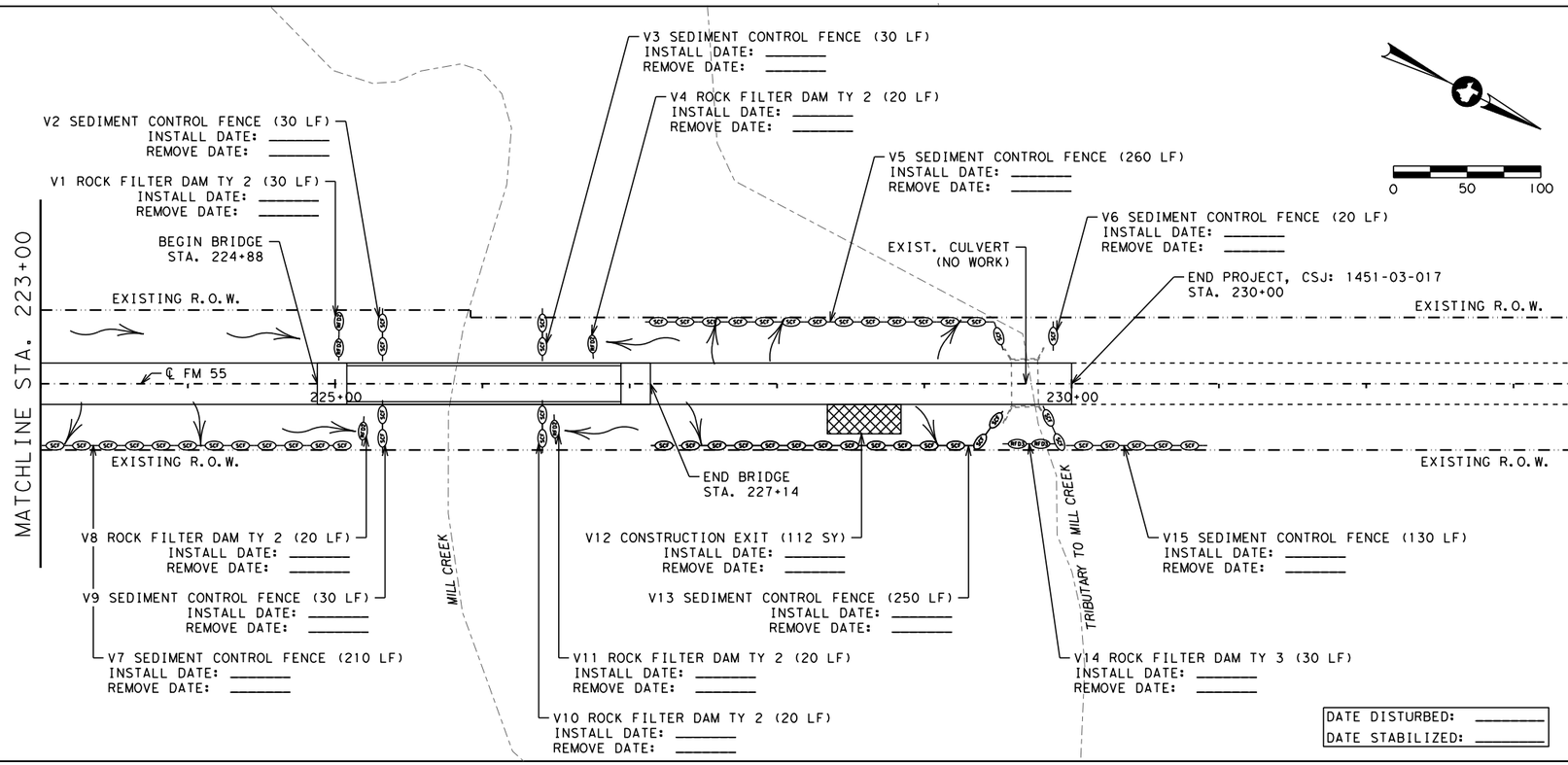
2. LOCATION AND LENGTHS OF BMPS AND CONSTRUCTION EXITS ARE PRELIMINARY AND TO BE LOCATED AND ADJUSTED AS PER THE DIRECTION OF THE ENGINEER. UPDATE SW3P LAYOUT ACCORDINGLY.
3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
4. SEE TYPICAL SECTIONS FOR LIMITS OF SOIL DISTURBANCE AND REVEGETATION (DRILL SEEDING). SEE CULVERT EROSION CONTROL PLAN SHEETS FOR PLACEMENT OF BLOCK SOD.
5. INSTALL EROSION CONTROL LOGS AS NEEDED AT CULVERT HEADWALLS AND BRIDGE ABUTMENTS TO MINIMIZE EROSION AND PREVENT DISTURBED SOILS FROM WASHING INTO WATERWAY, OR AS DIRECTED BY ENGINEER.



STATE OF TEXAS
MITCHELL L. RANDALL
129397
LICENSED
PROFESSIONAL ENGINEER

Mitchell L. Randall, P.E. 2021-11-30
Signature of Registrant & Date

Texas Department of Transportation
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FM 55
SW3P SITE PLAN

SCALE: 1"=100' SHEET 11 OF 11

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
MLR	6	SEE TITLE SHEET		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MLR	TEXAS	DAL	NAVARRO	161
CHECK	CONTROL	SECTION	JOB	
CHECK	1451	03	017	

DATE:11/30/2021 TIME:10:53:12
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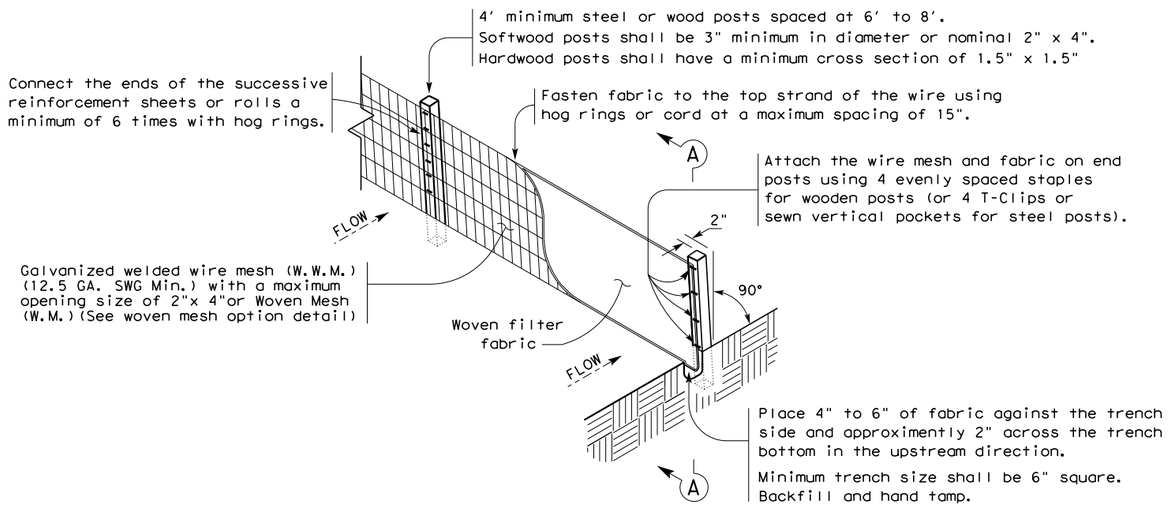
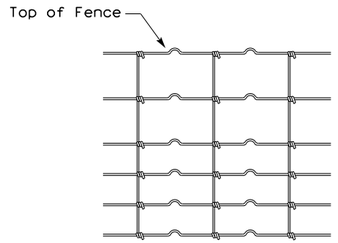
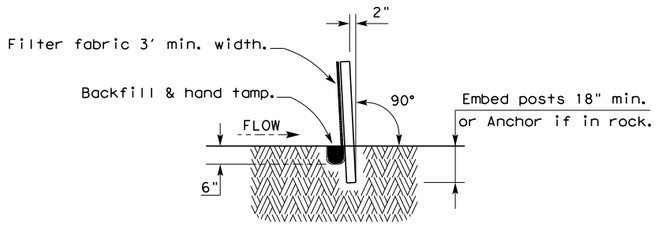


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

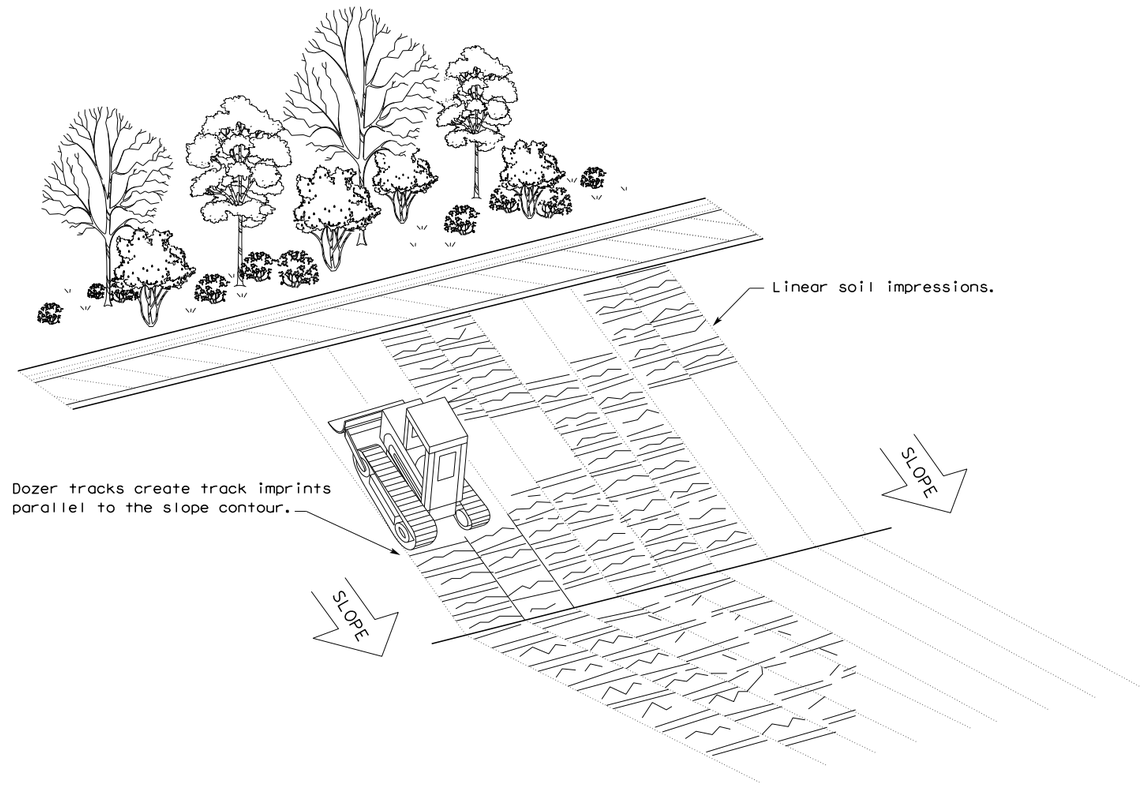
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	1451	03	017		FM 55		
	DIST	COUNTY			SHEET NO.		
	DAL	NAVARRO			162		

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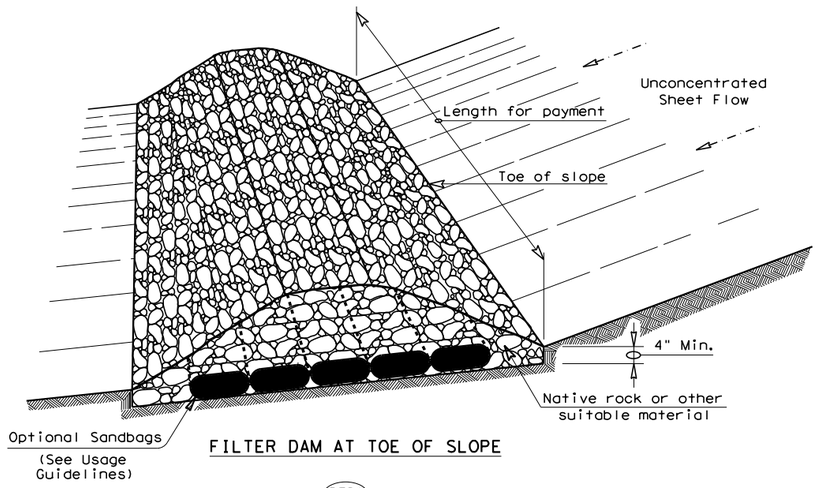
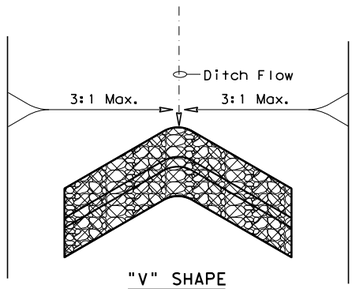
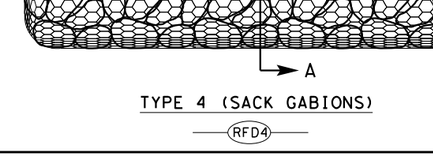


FILTER DAM AT TOE OF SLOPE

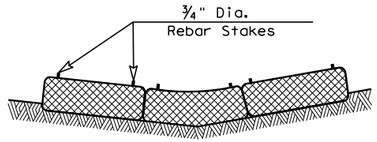
RFD1



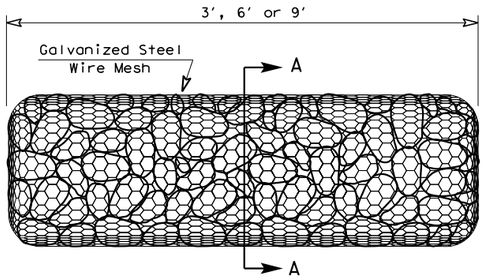
"V" SHAPE
PLAN VIEW



PLAN VIEW

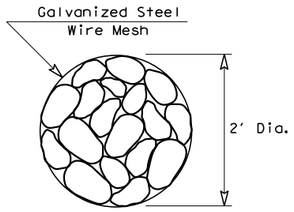


SECTION B-B

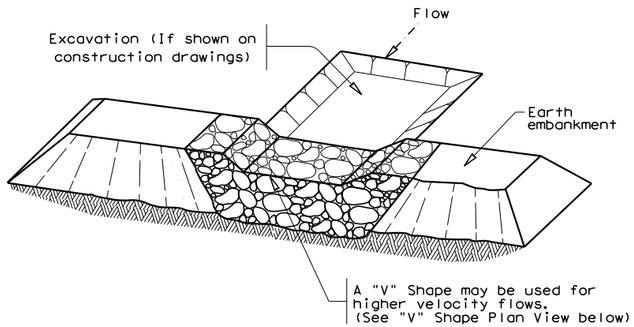


TYPE 4 (SACK GABIONS)

RFD4

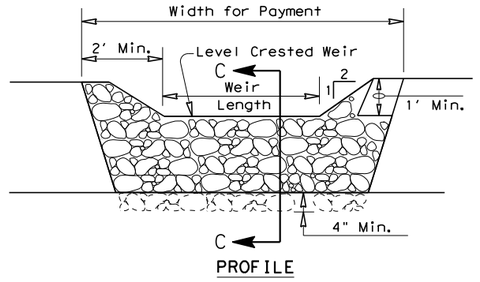


SECTION A-A

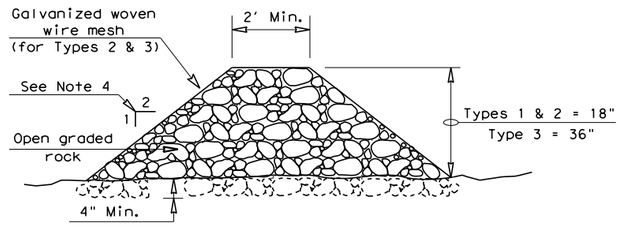


FILTER DAM AT SEDIMENT TRAP

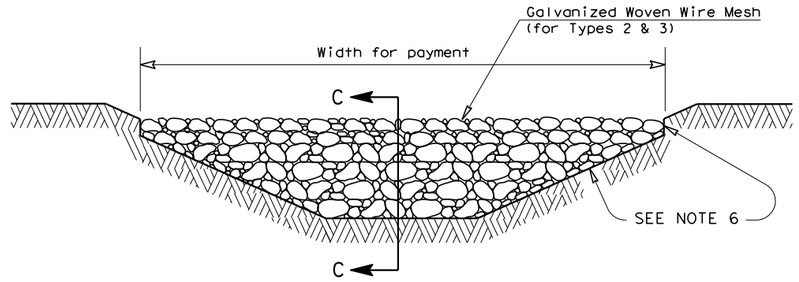
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		163

DATE: 11/30/2021
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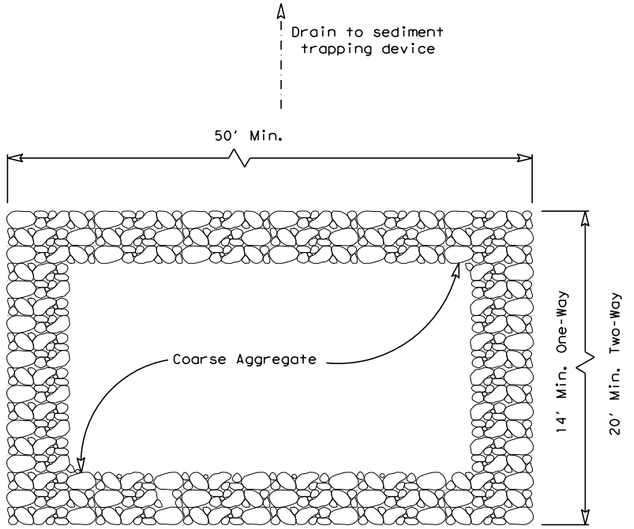
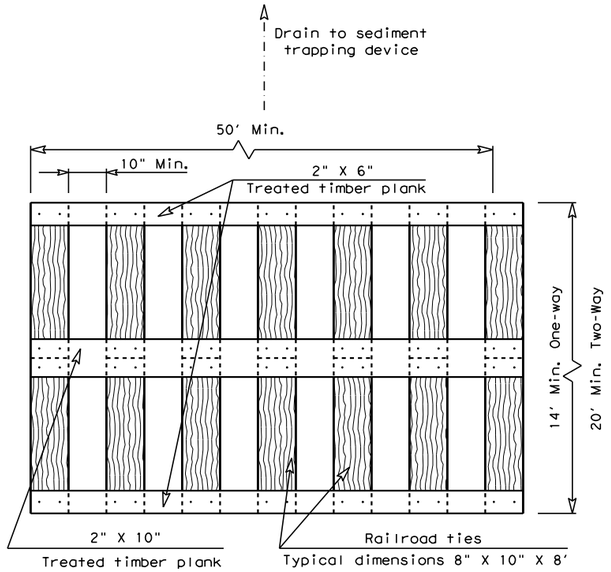


PLAN VIEW



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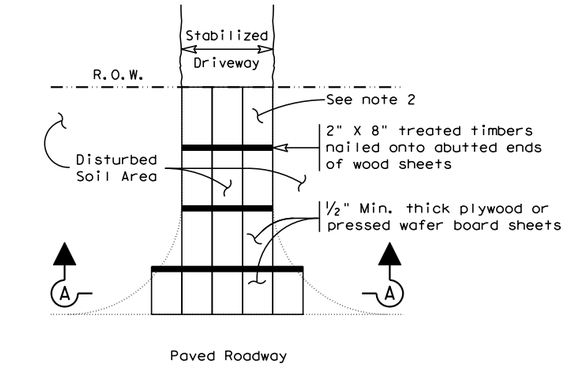

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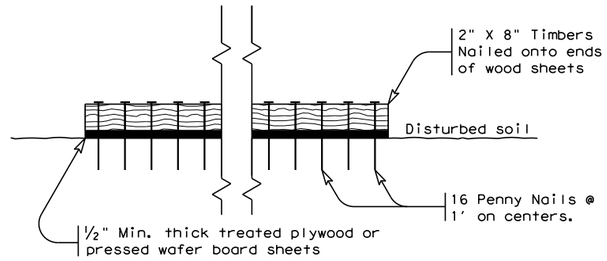
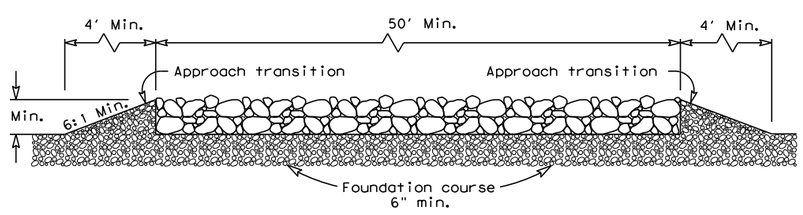


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

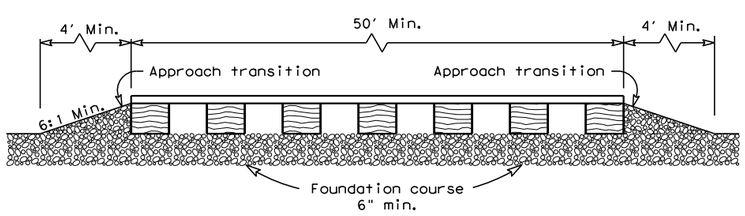
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT		CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
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	DIST	COUNTY			SHEET NO.
	DAL	NAVARRO			164

DATE:
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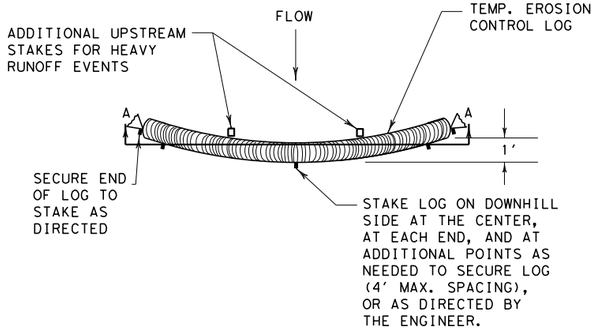
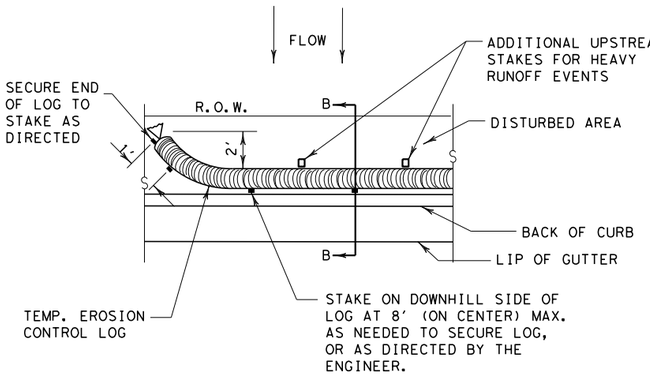


PLAN VIEW



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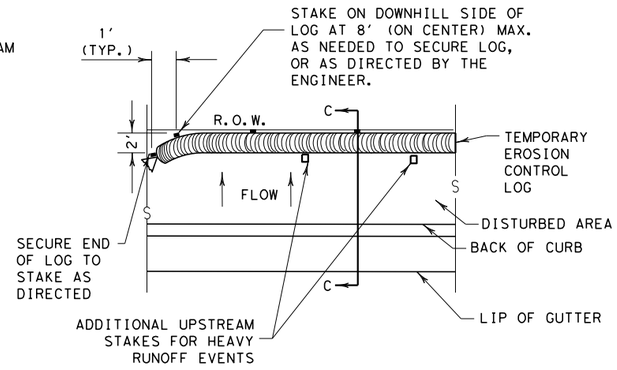

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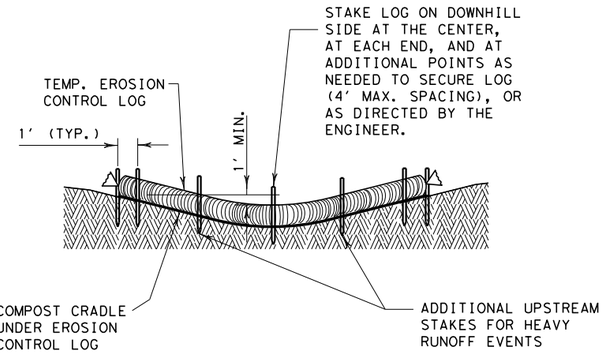
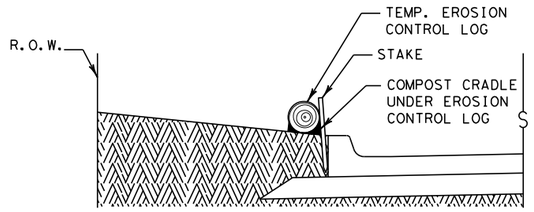


SECTION A-A

EROSION CONTROL LOG DAM

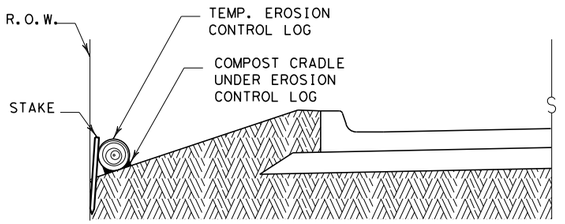
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

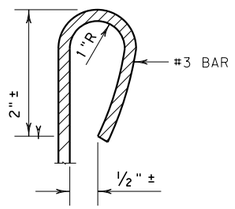
CL-BOC



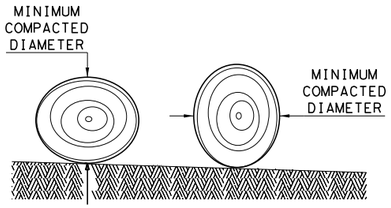
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

LEGEND

CL-D	EROSION CONTROL LOG DAM
CL-BOC	EROSION CONTROL LOG AT BACK OF CURB
CL-ROW	EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
CL-SST	EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
CL-SSL	EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
CL-DI	EROSION CONTROL LOG AT DROP INLET
CL-CI	EROSION CONTROL LOG AT CURB INLET
CL-GI	EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

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	
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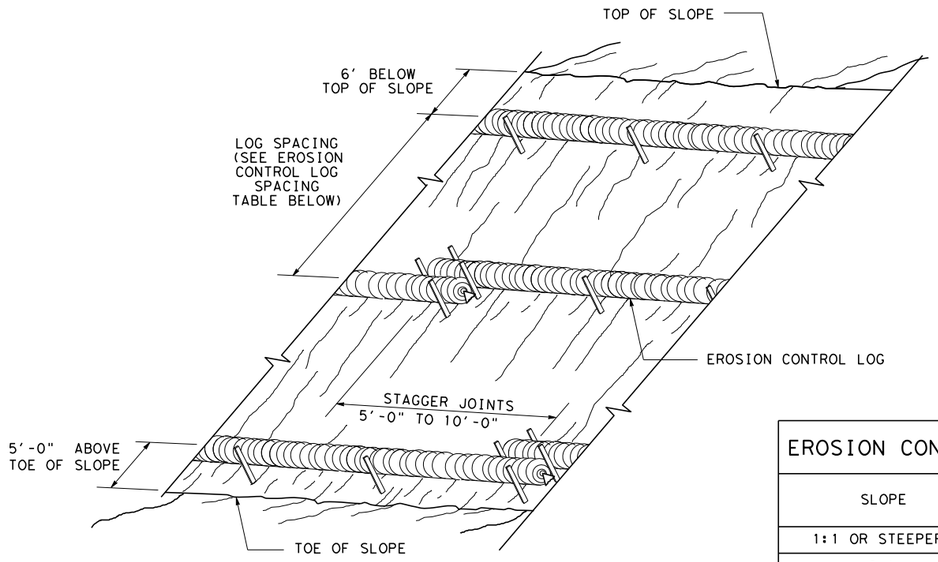
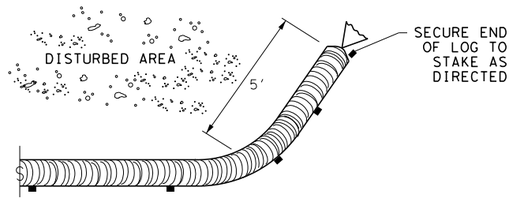


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

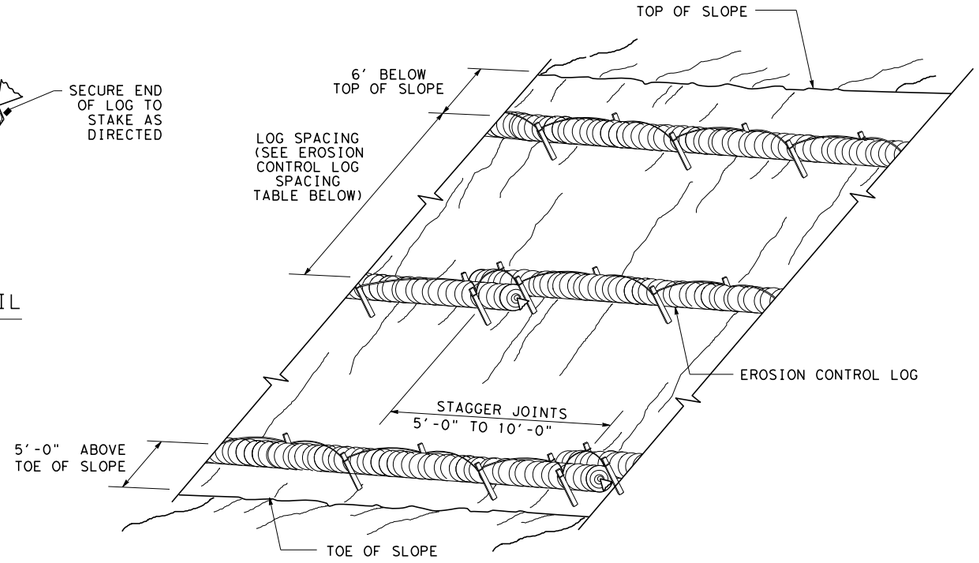
CL-SST



END SECTION RAP DETAIL

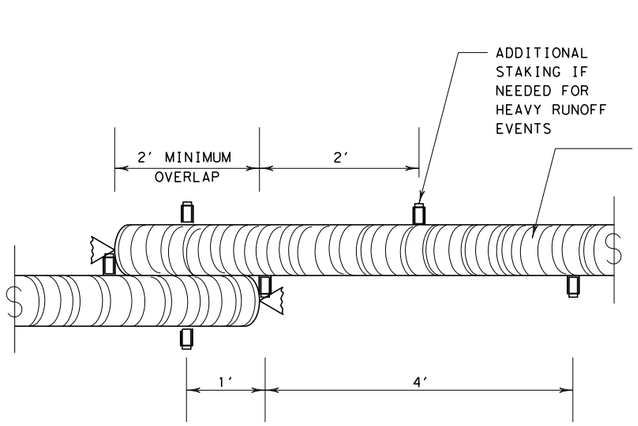
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

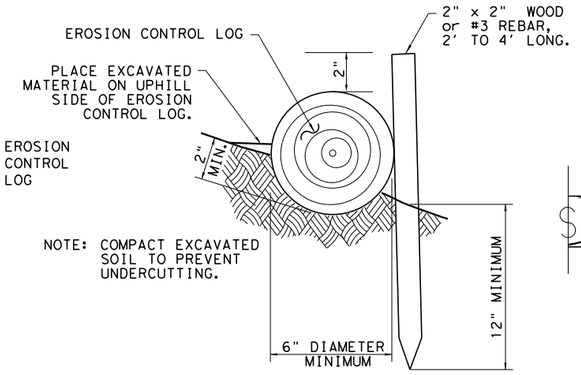
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

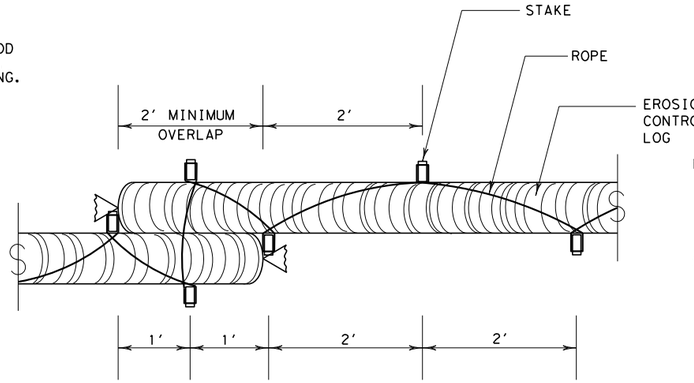


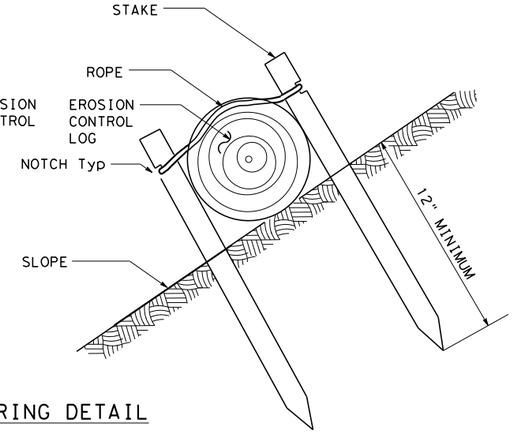


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

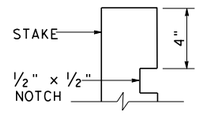
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

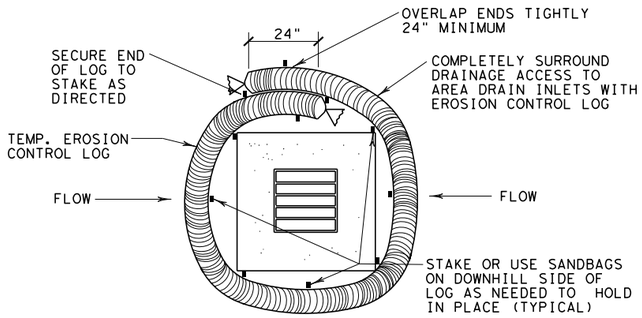
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

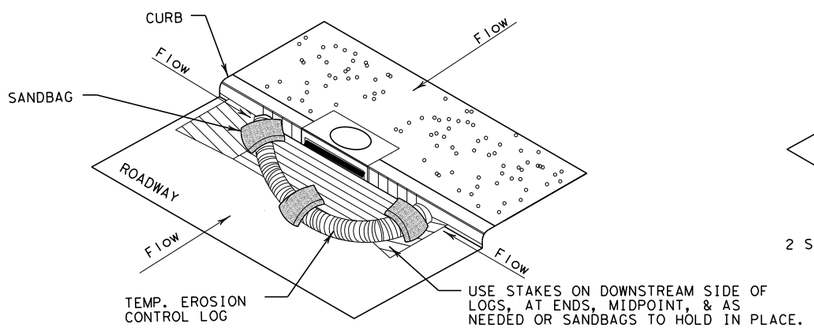
FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	145	03	017		FM 55	
	DIST		COUNTY			SHEET NO.
	DAL		NAVARRO			166

DATE:
FILE:



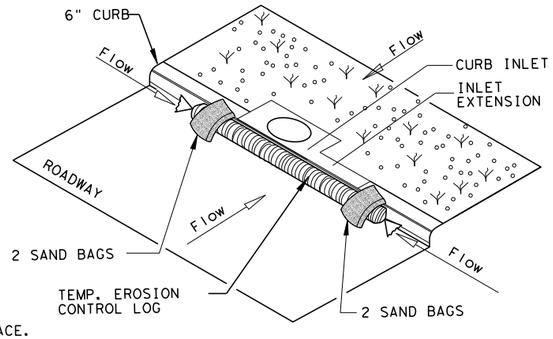
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

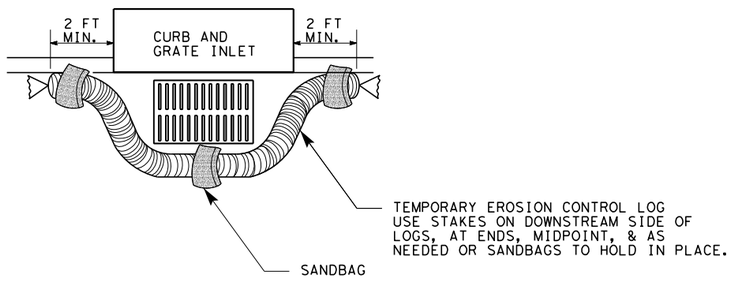
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

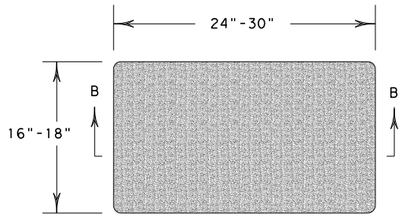
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

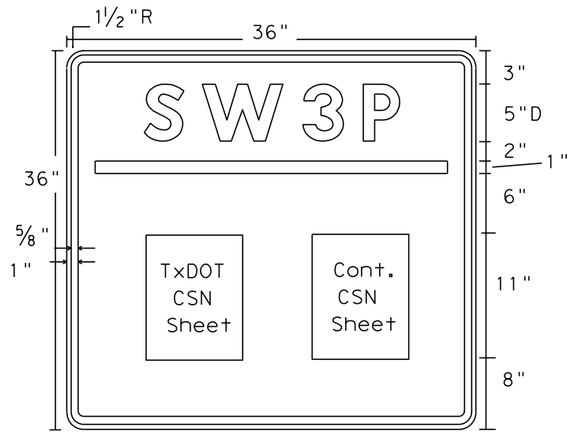
Design Division Standard

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	1451	03	017	FM 55	
	DIST	COUNTY		SHEET NO.	
	DAL	NAVARRO		167	



SW3P SIGN

TxDOT & Contractor Construction Site Note (CSN)

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 Sheets will be laminated and attached to the sign with an adhesive. Ensure sheets remain dry. (See Figure 1).
4. SW3P Signs should be placed just inside the ROW line at the project limits at a readable height. It may be placed perpendicular or parallel to ROW line. If the sign cannot be placed outside the clear zone, it will be mounted per TMUTCD requirements.
5. Final location of the signs will be as approved by the Engineer.

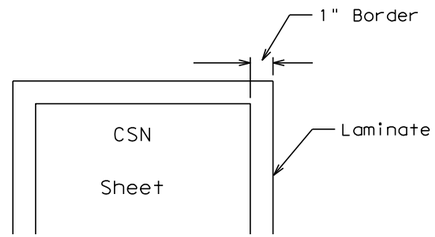
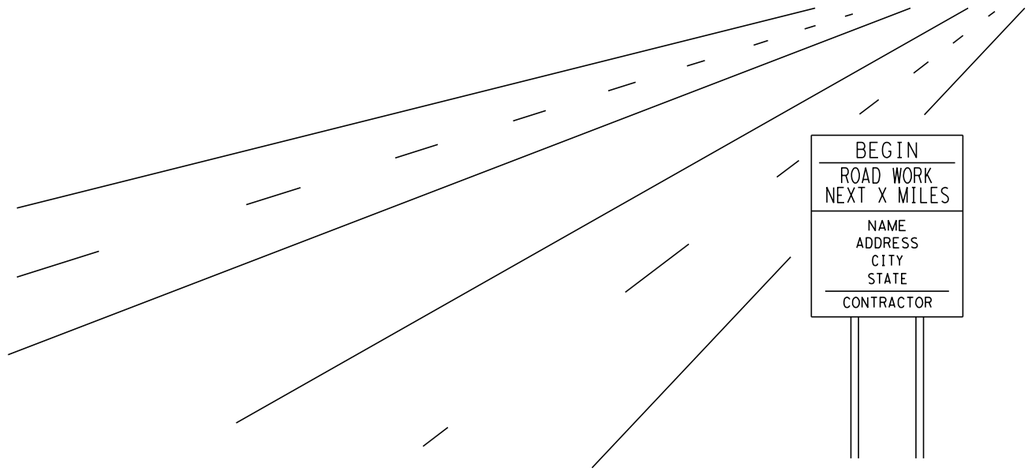
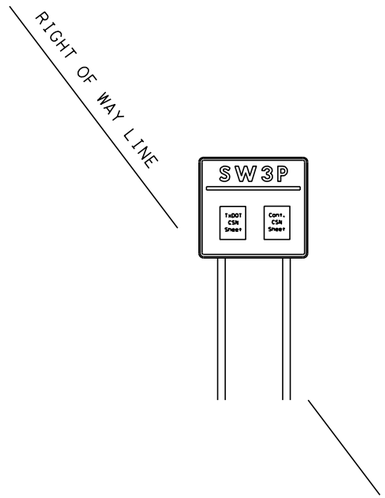


Figure 1





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
DALLAS DISTRICT STANDARD

SW3P SIGN SHEET

FILE:	DN: IxDOT	CK:	DW:	CK:
©TxDOT 2016	DISTRICT	FEDERAL AID PROJECT		SHEET
	DAL	SEE TITLE SHEET		168
REVISION DATE: 10-16-15	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	NAVARRO	1451	03	017	FM 55

PATH:

LEVELS DISPLAYED

USER ID

SURFACE PREPARATION ITEM 160* TOPSOIL SY / ITEM 161* COMPOST MANUF. TOPSOIL (BOS) (4") SY

SURFACE PREPARATION

Prepare planting area surface BEFORE placing Topsoil, Compost, Fertilizer, Seed and/or Sod.
Once project area has been completed to final lines, grade and compaction, remove objectionable materials from planting area surface and cultivate existing surface to a depth of 4 inches, unless otherwise specified or directed.

Refer to Items 160 and 161 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.

TOPSOIL NOTES:
1. When Topsoil is specified under Item 160, use suitable material salvaged from the project ROW in accordance with Item 160 specifications, and/or secure additional good material from approved sources.
2. Topsoil shall include only the top 6 inches of its native surface, and be easily cultivated, fertile, erosion-resistant and free of objectionable materials.
3. Topsoil obtained from sites outside of the ROW must come from approved sources and have a pH between 5.5 and 8.5 su.
4. Place Topsoil on pre-cultivated surface, spread to a uniform loose cover at thickness specified, and shape per plans. Water and roll the finished surface with a light roller or other suitable equipment per Item 160.3; do not over-compact.

COMPOST NOTES:
1. When Compost Manufactured Topsoil (4") is specified under Item 161, use compost meeting all requirements of Item 161.2 and Table 1. Provide quality control (QC) documentation and obtain Engineer approval prior to compost delivery.
2. Contractor shall provide tickets/invoices that document material type, quantity and placement for all compost delivered.
3. Additional topsoil may be required to be imported to achieve the compost/topsoil mix ratio. Topsoil must meet Item 160 specifications.

APPLICATION OF COMPOST MANUFACTURED TOPSOIL (4")

AFTER Surface Preparation, uniformly spread a 1-inch layer of compost on-grade with 3 inches topsoil over pre-cultivated planting area. (25% compost and 75% topsoil = 1" compost and 3" topsoil.)
Then mix compost and topsoil together by cultivating the compost into the topsoil (by till or disk) to a 4-inch (4") depth.
Roll the finished surface with a light corrugated drum; do not over-compact.

FERTILIZER ITEM 166* FERTILIZER AC

SOIL ANALYSIS FOR FERTILIZER APPLICATION RATE

Unless otherwise stated in the plans, Contractor shall perform at least one soil analysis on each project before fertilization, and submit results to Engineer with recommended fertilizer rates based on soil analysis.
Engineer may direct sample location(s). Soil analysis may be waived if both compost and sod are used on entire project.

FERTILIZER NOTES:
1. Refer to Item 166 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Apply fertilizer BEFORE seeding, or AFTER placing sod.
3. Use fertilizer containing nitrogen (N), phosphoric acid (P) and potash (K) nutrients, unless otherwise specified. At least 50% of the Nitrogen component shall be a slow-release sulfur-coated urea as described in Item 166.3. Do not apply more than 60 lbs Nitrogen per acre without Engineer concurrence.
4. Deliver fertilizer in bags, clearly labeled to show contents, unless otherwise specified or approved prior to delivery. When non-bagged, loose fertilizer is approved, provide documentation for each load of material delivered, to validate authenticity of the material.
5. Apply fertilizer uniformly, as a dry, granular material, essentially dust-free, and do not mix with water for application as a slurry.
6. When both temporary and permanent seeding are specified for the same area, apply half of the required fertilizer before the temporary seeding operation and the other half before the permanent seeding operation.

SEEDING FOR EROSION CONTROL ITEM 164* DRILL SEEDING AC

RECOMMENDED PLANTING SEASON	PERMANENT RURAL SEED MIX ITEM 164 - DRILL SEEDING (PERM) (RURAL)(CLAY)		PERMANENT URBAN SEED MIX ITEM 164 - DRILL SEEDING (PERM) (URBAN)(CLAY)		TEMPORARY DRILL SEED MIX ITEM 164 - DRILL SEEDING (TEMP) (WARM OR COOL)	
		Pure Live Seed Rate**		Pure Live Seed Rate**		Pure Live Seed Rate**
WARM SEASON Mar.15th, April, May, June, July, August, Sept. 15th	Green Sprangletop (Van Horn)	- 1.0 lbs/AC	Green Sprangletop (Leptochloa dubia)	- 0.3 lbs/AC	Foxtail Millet (Setaria italica)	- 34 lbs/AC
	Sideoats Grama (Haskell)	- 1.0 lbs/AC	Sideoats Grama (El Reno)(Bouteloua curtipendula)	- 3.6 lbs/AC		
	Texas Grama (Atascosa)	- 1.0 lbs/AC	Buffalograss (Texoka)(Buchloe dactyloides)	- 1.6 lbs/AC		
	Hairy Grama (Chaparral)	- 0.4 lbs/AC	Bermudagrass (Cynodon dactylon)	- 2.4 lbs/AC		
	Shortspike Windmillgrass (Welder)	- 0.2 lbs/AC				
	Little Bluestem (OK Select)	- 0.8 lbs/AC				
	Purple Prairie Clover (Cuero)	- 0.6 lbs/AC				
	Engelmann Daisy (Eldorado)	- 0.75lbs/AC				
	Illinois Bundleflower	- 1.3 lbs/AC				
	Awnless Bushsunflower (Plateau)	- 0.2 lbs/AC				
COOL SEASON Sept 16th, Oct, Nov, Dec, Jan, Feb, Mar 14th						Pure Live Seed Rate**
					Tall Fescue (Festuca arundinaceae)	- 4.5 lbs/AC
					Western Wheatgrass (Agropyron smithii)	- 5.6 lbs/AC
					Red Winter Wheat (Triticum aestivum)	- 34 lbs/AC
					Cereal Rye	- 34 lbs/AC

SEEDING NOTES:
1. When seeding is specified under Item 164, refer to TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown. Materials and construction shall meet specifications.
2. Conduct seeding upon completion of each applicable construction stage (dependent upon planting season requirements), without compensation for additional move-ins.
3. Place seed AFTER preparing planting area surface. Refer to Surface Preparation detail this sheet, as well as Topsoil Item 160 and Compost Manufactured Topsoil Item 161 when specified. Apply fertilizer per Item 166 BEFORE seeding, per specifications and this sheet, to help drill the fertilizer into the soil.
4. When temporary grasses are well-established and more than 2 inches tall, mow planting area before seeding permanent grasses; mowing for this purpose will be subsidiary. When vegetation is not already well-established, cultivate planting area to a depth as described in Item 164.3, before temporary seeding and before permanent seeding.
5. Seed material must be appropriate to the location, soil type and season. Use the seed mix species and pure live seed rates designated in Tables 1-4 of the TxDOT 2014 Standard Specifications* for Item 164, unless otherwise specified.
6. All seed shall meet labeling, delivery, analysis, and testing requirements described in Item 164.2.1. Deliver seed in labeled, unopened bags or containers to Engineer prior to planting.
7. Uniformly plant seed over the designated planting area, along the contour of slopes, and drill seed to a depth as described in Item 164.3.4.
8. Hydroseeding may be allowed, when specified or Engineer concurs.
9. Implement and continue Vegetative Watering per the schedule, rate and volume specified under Item 168.

TXDOT REFERENCE MATERIALS:
- * "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES" 2014
- "A GUIDANCE TO ROADSIDE VEGETATION ESTABLISHMENT" 2004
- ONLINE TRAINING COURSE: MNT415 REVEGETATION DURING CONSTRUCTION
- DALLAS DISTRICT "VEGETATION ESTABLISHMENT GUIDELINES"

SODDING FOR EROSION CONTROL ITEM 162* BLOCK SOD (BERMUDA) SY

BLOCK OR ROLL SOD	COMMON NAME	BOTANICAL NAME
	Common Bermuda Grass	Cynodon dactylon

SODDING NOTES:
1. Refer to Item 162 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Place sod between the average date of the last freeze in the Spring and 6 weeks before the average date of the first freeze in the Fall, per the Texas Almanac for the project area.
3. Place sod only AFTER soil surface preparation is complete as detailed in this sheet. Dry soil may require pre-watering.
4. Place all sod (blocks or rolls) within 24 hours of delivery to the site, and keep moist from the time it is dug up until it is planted. Sod with dried roots will not be accepted.
5. Place sod with joints alternating on each row to prevent all joints from lining up, and place blocks firmly against adjacent blocks. Roll, tamp and trim sod per Item 162.3.
6. Place fertilizer promptly AFTER sodding operation is complete in each area.
7. Water sod immediately following placement, and continue Vegetative Watering per Item 168.

VEGETATIVE WATERING FOR ESTABLISHING SEED AND SOD ITEM 168* VEGETATIVE WATERING MG

WATERING SCHEDULE

SEASON (Usual Months)	RATE	TIME SCHEDULE	TOTAL WATER ESTIMATE
SPRING & FALL (March, April, May, October)	7,000 gallons/acre per working day	Vegetative watering for seed shall begin on the day after rainfall described below and continue for 60 consecutive working days; vegetative watering for sod shall begin on the day the sod is placed and continue for a minimum of 15 consecutive working days.	420,000 gallons/acre (60 working days)
SUMMER (June, July, August, September)	12,000 gallons/acre per working day		720,000 gallons/acre (60 working days)
WINTER (November through February)	1,000 gallons/acre per working day	Vegetative watering for seed and/or sod shall begin on the day after placement for 15 consecutive working days	15,000 gallons/acre (15 working days)

Notes: Rate and frequency may be adjusted, with the approval of the Engineer, to meet site conditions (especially with sod).
For informational purposes only: 1,000 gallons equals 1 MG

VEGETATIVE WATERING NOTES:
1. Refer to Item 168 of TxDOT 2014 Standard Specifications* for specifications, dimensions, volumes, and measurements that have been modified or not shown in plans. Materials and construction shall meet all specifications.
2. Use clean water free of industrial waste and other substances harmful to vegetation growth, per Item 168.2.
3. Use Vegetative Watering to keep the seed bed moist during germination; not to provide initial watering. After drill seeding, postpone watering operations until site receives at least 1/2-inch of natural rainfall in a single day. Delay watering operations for warm season grasses until soil temperature exceeds 70 degrees F.
4. For sod, water immediately.
5. All water distribution equipment shall be furnished and operated to provide water at a uniform and controllable rate. Use a metering device on all watering equipment.
6. Evenly distribute water over entire area designated for seeding and/or sodding, using even spray patterns that do not disturb seed bed and/or dislodge seed from seed bed.
7. Do not water between the hours of 12:00 p.m. and 6:00 p.m. when daytime temperatures exceed 95 degrees F.
8. After initial establishment period, continue intermittent watering of newly established seed or sod at a rate of approximately 1-inch water/week, during summer months until end of contract.
9. If 1/4-inch or more of rainfall occurs on site on any given working day, no vegetative watering will be needed on that working day. (Note: 1/4-inch rain equals 7,000 gallons of water per acre.)
10. Should the Contractor fail to apply the specified amount of water within the time allowed, any seed or sod in poor condition shall be replaced, fertilized, and watered at Contractor's expense.

**Note: The amount of Pure Live Seed (PLS) in one pound of bulk seed is based on three factors: % Purity, % Germination, and % Dormant. Use the following formula to calculate PLS in bulk seed: PLS = % Purity X (% Germination + % Dormant) Ensure that the specified amount of pure live seed is placed.

ROADSIDE MOWING ITEM 730* PROJECT MAINTENANCE AC

MOWING NOTES:
1. During project construction, once seed is established, use mowing to promote permanent grasses by mowing any remaining temporary grasses.
2. Also mow established turf and ROW grasses in designated areas of project limits as specified or directed by Engineer.
3. Remove litter and debris prior to mowing.
4. Do not mow on wet ground when soil rutting can occur.
5. Hand-trim around obstructions and stormwater control devices as needed.
6. Maintain paved surfaces free of tracked soils and clipped vegetation.

SEQUENCE OF WORK:
- CULTIVATE SURFACE SOIL.
- PREPARE / PLACE TOPSOIL, OR
- PREPARE / PLACE COMPOST MANUFACTURED TOPSOIL.
- APPLY FERTILIZER AND THEN PLACE SEEDING, OR
- PLACE SOD AND THEN APPLY FERTILIZER.
- CONDUCT VEGETATIVE WATERING.
- CONDUCT ROADSIDE MOWING, AS DIRECTED.

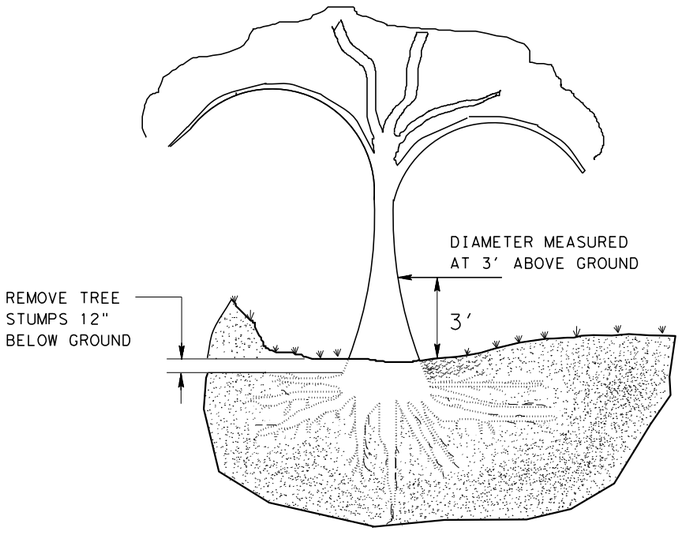
VEGETATION ESTABLISHMENT SHEET

(DALLAS DISTRICT)

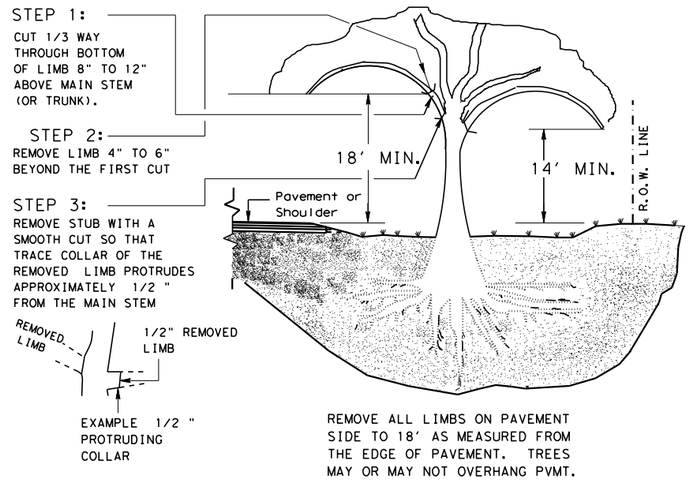
TEMPLATE REVISION DATE: 02/21/19

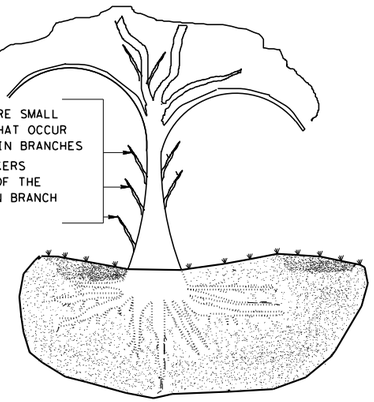
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
CPB	6	(See Title Sheet)		FM 55
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	NAVARRO	169
CHECK	CONTROL	SECTION	JOB	
	1451	03	017	

DATE

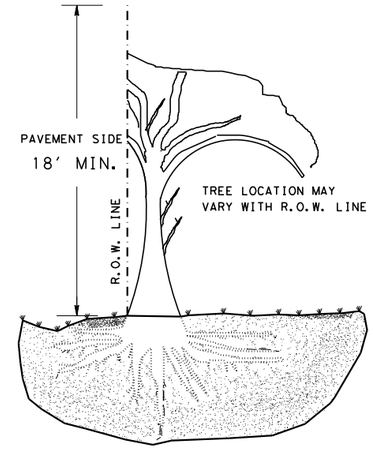


TREE REMOVAL



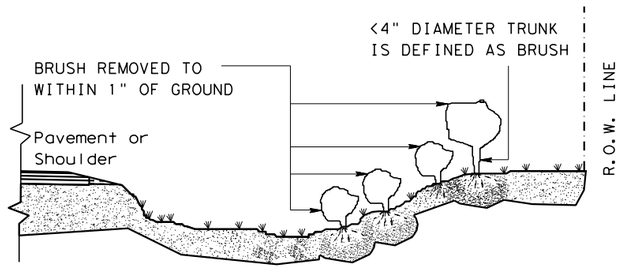


STEPS 1,2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.

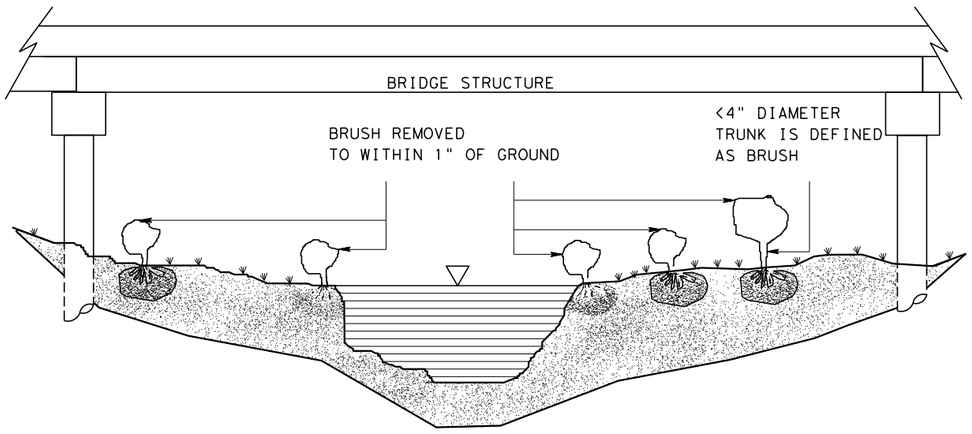


REMOVE ALL LIMBS ON PAVEMENT SIDE TO 18' ABOVE SURROUNDING NATURAL GROUND WHEN TREE IS AT R.O.W.

TREE TRIMMING



BRUSH REMOVAL



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

GENERAL NOTES:

TREE TRIMMING

1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, OVER HANGING THE ROADWAY OR NOT, UNLESS OTHERWISE SHOWN ON THE PLANS.

2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 14' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.

4. MEASUREMENTS FOR PAYMENT ARE PRESENTED IN TABLE 1: RANGE FOR PAY ITEMS.

TABLE 1
TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT

PAY ITEM	RANGE FOR PAY ITEMS			
	TRUNK DIAMETER *		TRUNK CIRCUMFERENCE	
	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO	LOWER LIMIT IS GREATER THAN	UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

*SEE GENERAL NOTE #3.

Texas Department of Transportation | Maintenance Division Standard

TREE AND BRUSH REMOVAL

TRB-15(1)(DAL)

FILE:	DN: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	1451	03	017	FM 55
Revised to clarify work at the R.O.W. and General Note 1.	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		170