DESIGN	FED.RD. DIV.NO.	STATE PROJECT NO.		HIGHWAY NO.
MF	6	C 92-6-105		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	1
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

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 92-6-105
CSJ: 0092-06-105

IH 45

NAVARRO COUNTY

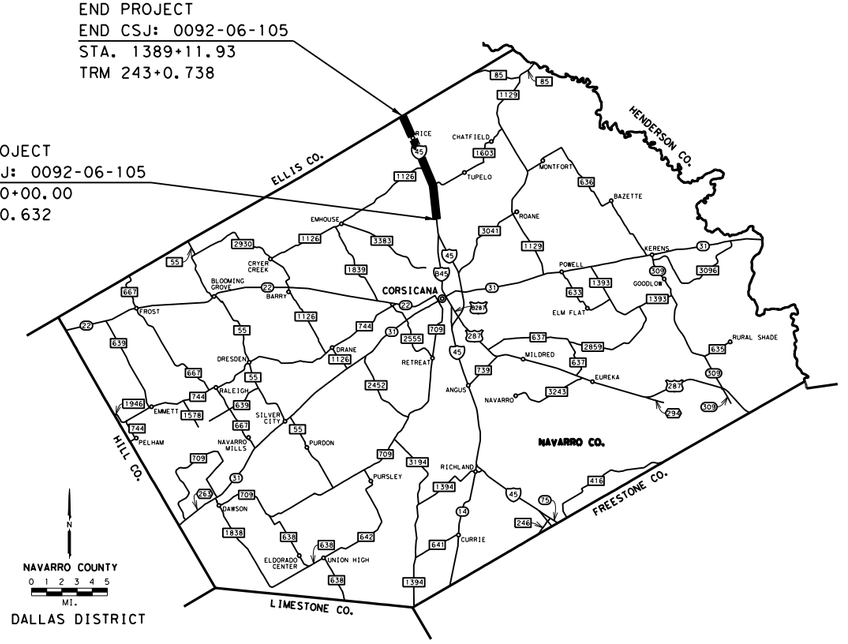
LIMITS: CHAMBERS CREEK TO ELLIS COUNTY LINE

ROADWAY	= 38,912 FT.	= 7.369 MI.
BRIDGE	= 0 FT.	= 0.000 MI.
TOTAL	= 38,912 FT.	= 7.369 MI.

FOR THE CONSTRUCTION OF RESTORATION
CONSISTING OF: PAVEMENT REPAIR, MILLING, OVERLAY, SEAL COAT AND PAVEMENT MARKINGS

END PROJECT
END CSJ: 0092-06-105
STA. 1389+11.93
TRM 243+0.738

BEGIN PROJECT
BEGIN CSJ: 0092-06-105
STA. 1000+00.00
TRM 236+0.632



DALLAS DISTRICT

FUNCTIONAL CLASSIFICATION: RURAL MAJOR COLLECTOR

ADT: 3,435 (2022)
4,735 (2042)

DESIGN SPEED: 60 MPH

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)

WORK WAS COMPLETED ACCORDING TO THE PLANS AND CONTRACT.

_____, P.E.
Signature of Registrant & Date

EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: NONE

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING — 2/28/2022
Docusigned by: _____, P.E.
55775DB552E44D0...
DESIGN ENGINEER

RECOMMENDED FOR LETTING — 2/28/2022
Docusigned by: _____, P.E.
CD61C5BE1C584F...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING — 2/28/2022
Docusigned by: Juan A. Paredes, P.E., P.E.
4A97FFA3D5054BC...
AREA ENGINEER

APPROVED FOR LETTING: — 2/28/2022
Docusigned by: _____, P.E.
E252765B5E0F4...
DISTRICT ENGINEER

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

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

Marlena Kelly ,P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45

INDEX OF SHEETS

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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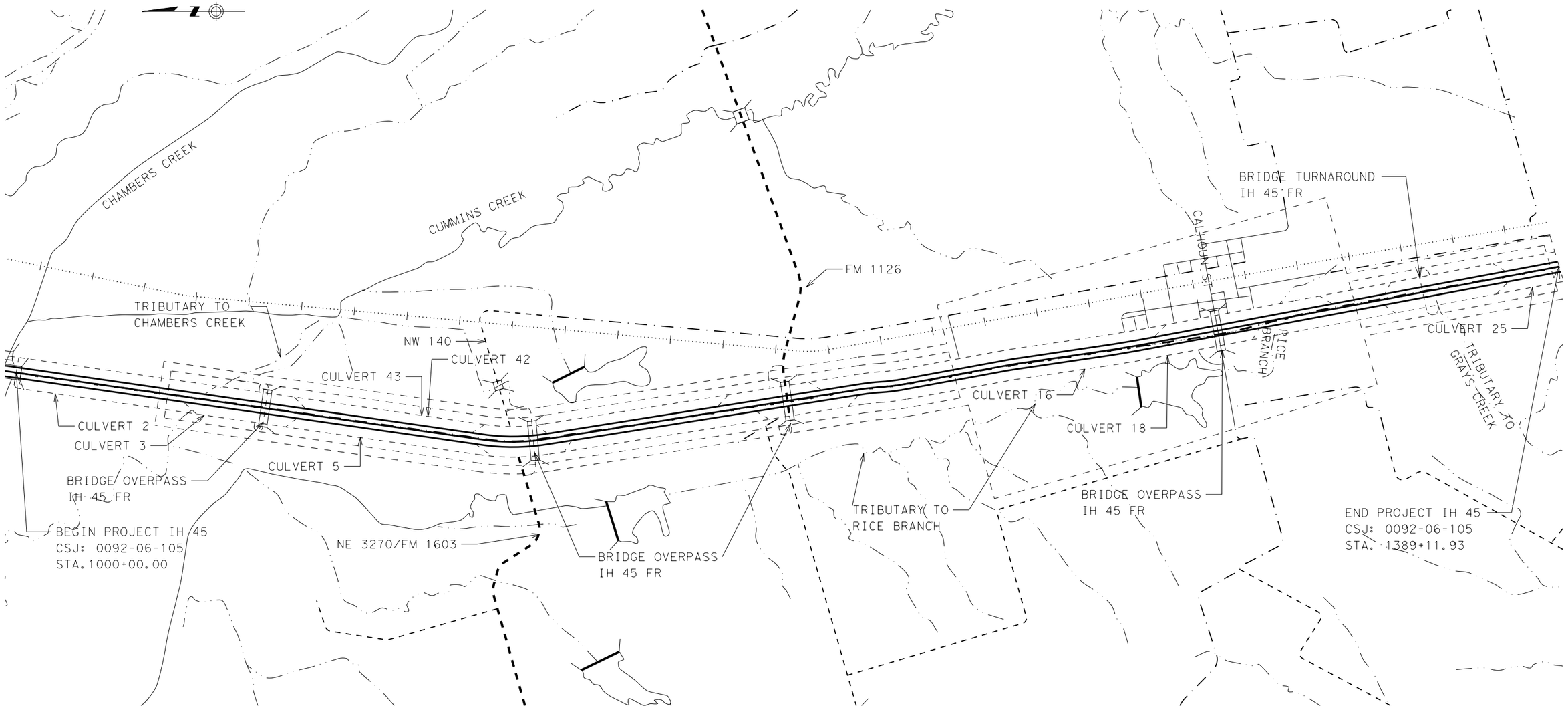
MJK	0092	06	105	
CHECK				
JAP				



LIMITS: FROM CHAMBERS CREEK TO ELLIS COUNTY LINE

CULVERT #	CULVERT ℄ STATION	CROSSING
2	2011+10.92	
3	2049+20.81	TRIBUTARY TO CHAMBERS CREEK
5	2087+82.56	
16	2270+36.62	
18	2290+84.93	
25	2383+90.84	
42	3103+60.41	
43	3103+21.98	

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & P.E. Date: 3/7/22

Texas Department of Transportation

IH 45

PROJECT LAYOUT

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS: MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: MJK	TEXAS	DAL	NAVARRO	3
CHECK: JP	CONTROL	SECTION	JOB	
	0092	06	105	

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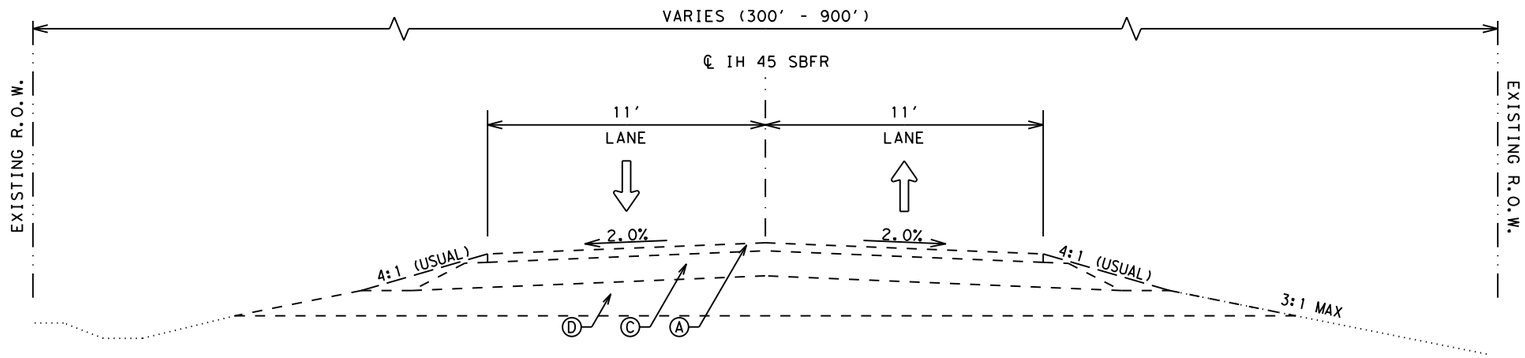
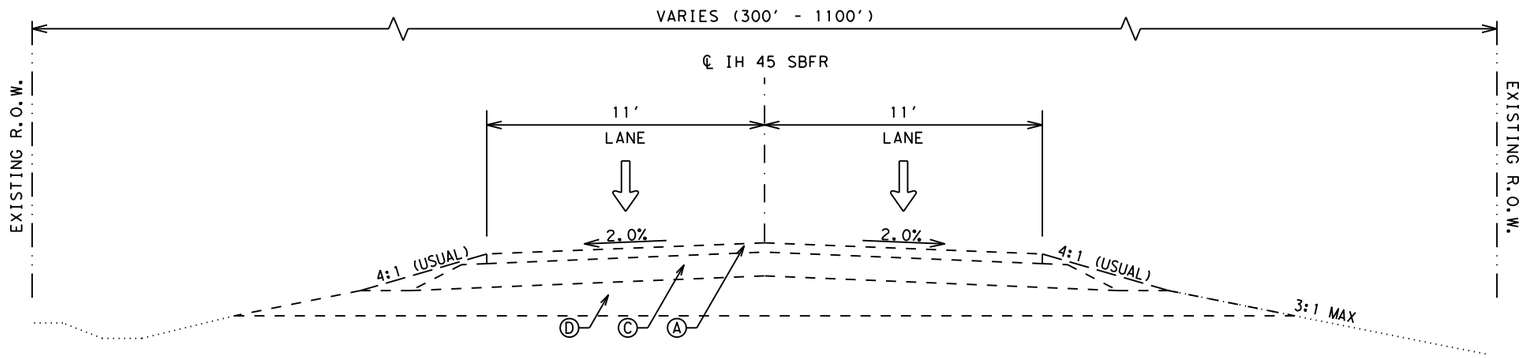
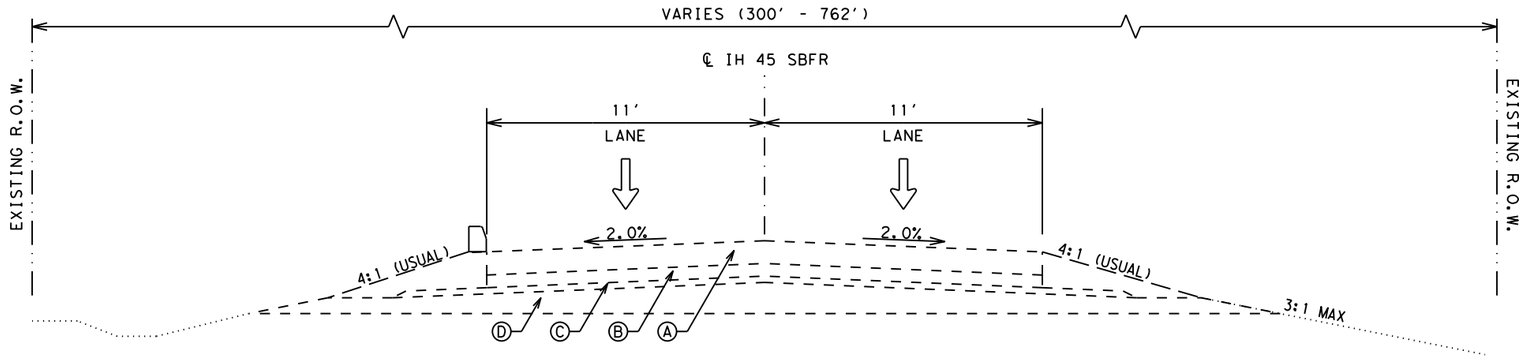


SOUTHBOUND FRONTAGE ROAD
TWO-WAY
STA. 3006+28.00 TO STA. 3061+34.00
(IH 45 STA. 1004+80.00 TO STA. 1059+83.00)



SOUTHBOUND FRONTAGE ROAD
ONE-WAY
STA. 3061+34.00 TO STA. 3220+80.00
(IH 45 STA. 1059+83.00 TO STA. 1201+59.00)
STA. 3319+41.00 TO STA. 3390+19.00
(IH 45 STA. 1317+73.00 TO STA. 1388+98.00)



SOUTHBOUND FRONTAGE ROAD
ONE-WAY
STA. 3220+80.00 TO STA. 3319+41.00
(IH 45 STA. 1201+59.00 TO STA. 1317+73.00)
EXISTING CURB FROM STA. 3248+50.00 TO STA 3304+26.00

LEGEND

- Ⓐ EXIST. ACP (3"-11")
- Ⓑ EXIST. CONCRETE (6")
- Ⓒ EXIST. FLEXBASE (8")
- Ⓓ EXIST. SUBGRADE

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly, P.E. 3/30/22
Signature of Registrant & Date

IH 45
TYPICAL SECTIONS
EXISTING

NOT TO SCALE SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	4
MJK	0092	06	105	
CHECK				
JAP				

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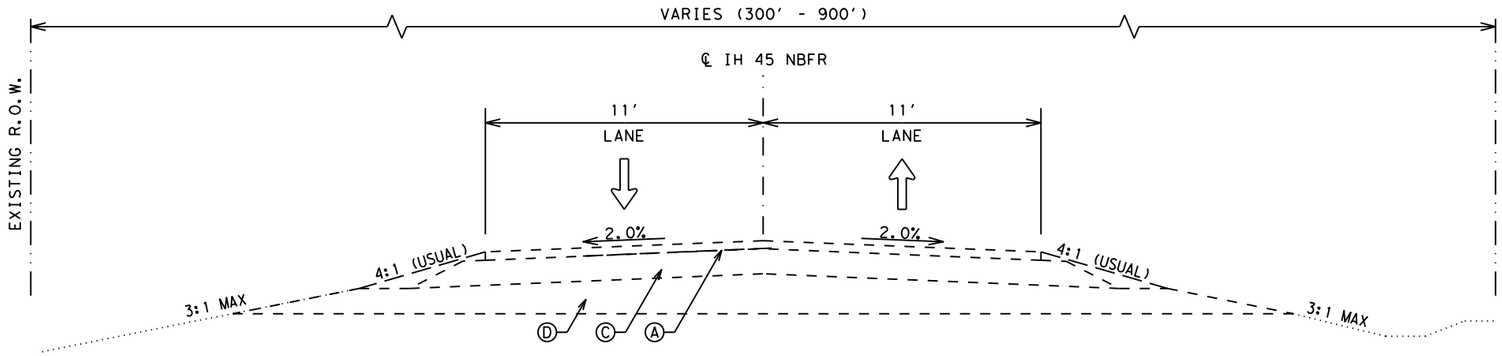

NORTHBOUND FRONTAGE ROAD
TWO-WAY
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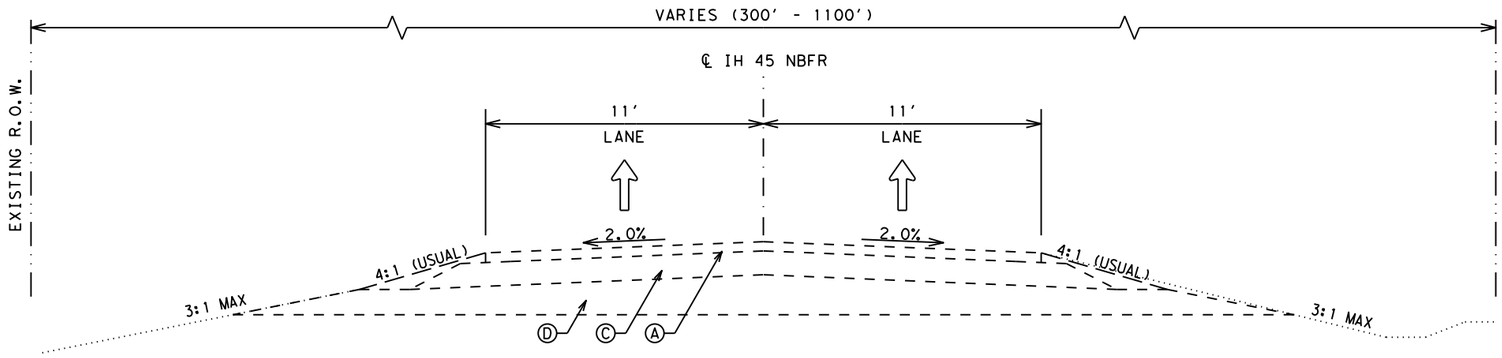
(IH 45 STA. 1004+74.00 TO STA. 1059+88.00)



NORTHBOUND FRONTAGE ROAD
ONE WAY
STA. 2061+00.00 TO STA. 2390+73.00
(IH 45 STA. 1059+88.00 TO STA. 1389+11.93)

LEGEND

Ⓐ EXIST. ACP (3"-11")
Ⓑ EXIST. CONCRETE (6")
Ⓒ EXIST. FLEXBASE (8")
Ⓓ EXIST. SUBGRADE

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Marlena Kelly, P.E. 3/30/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
TYPICAL SECTIONS
EXISTING

NOT TO SCALE SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	5
CHECK JAP	CONTROL 0092	SECTION 06	JOB 105	

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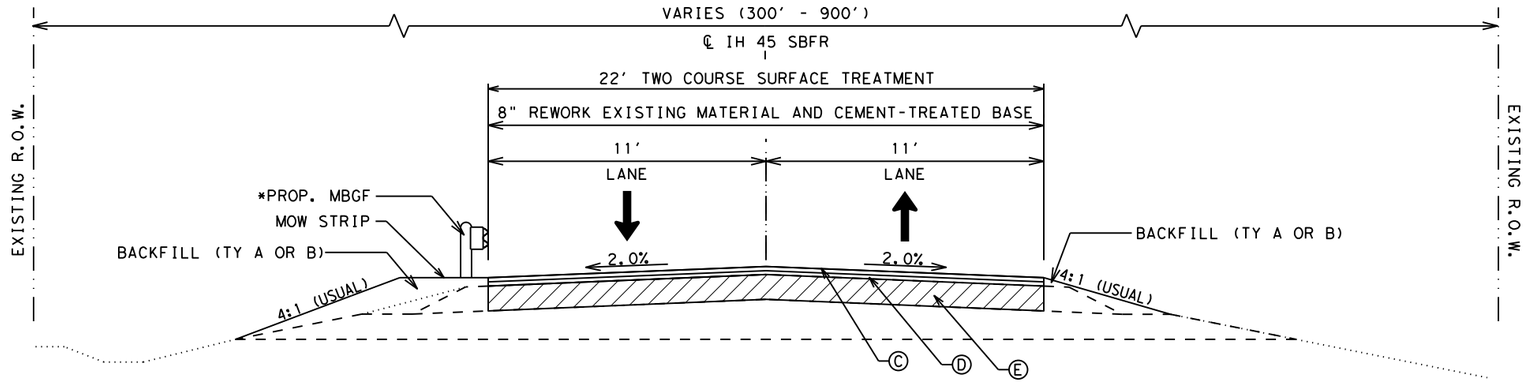

SOUTHBOUND FRONTAGE ROAD
TWO-WAY
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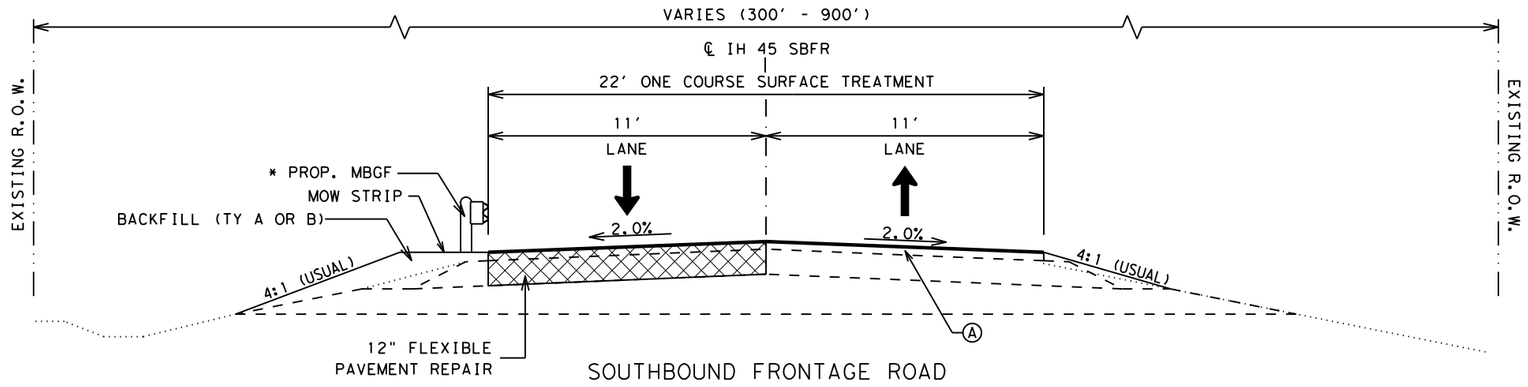

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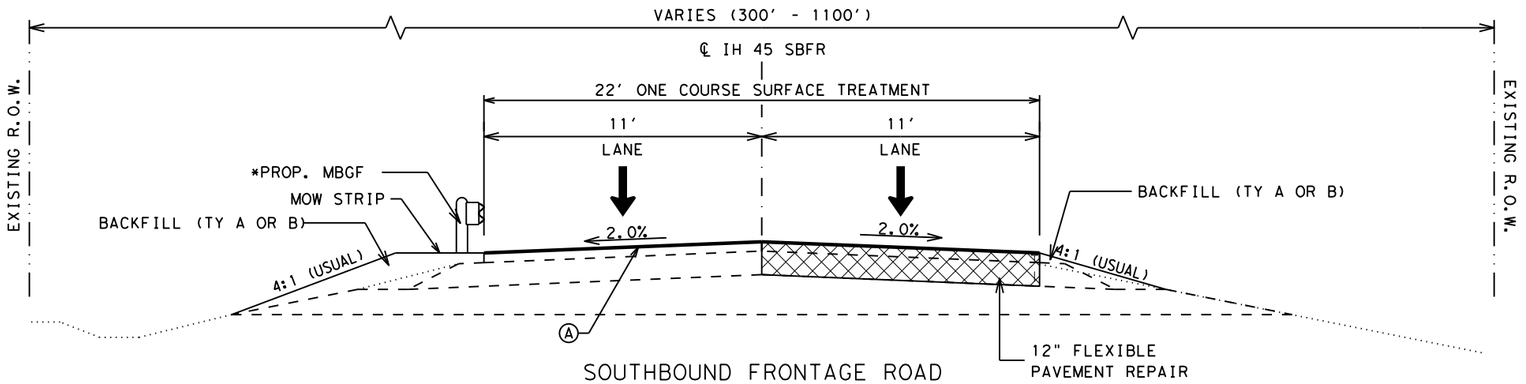
TWO-WAY
STA. 3050+00.00 TO STA. 3061+34.00



SOUTHBOUND FRONTAGE ROAD
ONE-WAY
STA. 3061+34.00 TO STA. 3181+00.00
STA. 3319+41.00 TO STA. 3390+19.00

LEGEND

Ⓐ ONE COURSE SURFACE TREATMENT

Ⓑ 2" SP MIXES SP-C SAC-B PG64-22
TACK COAT

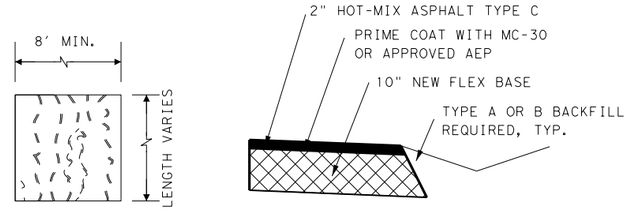
Ⓒ TWO COURSE SURFACE TREATMENT

Ⓓ EMULS ASPH (PRIME)(MS-2 OR SS-1)

Ⓔ 8" REWORK EXISTING MATERIAL AND CEMENT-TREATED BASE
(2% CEMENT BY WEIGHT)

NOTES:
1. NO CHANGE IN PGL OR CROSS SLOPE.
2. REWORK 8" OF EXISTING MATERIALS (ITEM 251)AND CEMENT-TREAT WITH 2% CEMENT BY WEIGHT (ITEM 275) OVER 22' WIDTH.
3. EXACT LOCATIONS OF FLEXIBLE PAVEMENT REPAIR AREAS TO BE MARKED AND DETERMINED IN THE FIELD BY THE ENGINEER.
4. ALL FLEXIBLE PAVEMENT REPAIR ITEMS ARE SUBSIDARY TO (ITEM 351-6008).
5. ENSURE NO TEMPORARY WORK ZONE PAVEMENT MARKINGS ARE ON THE ROADWAY PRIOR TO THE SURFACE OVERLAY.
6. APPLY PRIME (ITEM 314) & 1ST LAYER OF THE TWO COURSE SURFACE TREATMENT (ITEM 316).
7. APPLY ONE COURSE SURFACE TREATMENT (ITEM 316).
8. APPLY CELL FBR MLCH AND BACKFILL WHERE DIRECTED BY THE ENGINEER.

12" FLEXIBLE PAVEMENT STRUCTURE REPAIR (N.T.S.)
(ITEM 351-6008)



PLAN VIEW

12" FULL DEPTH REPAIR DETAIL

* FOR MBGF INSTALL LOCATIONS SEE IH 45 MBGF LAYOUT SHEET 62.

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & P.E. Date 3/30/22

Texas Department of Transportation
© 2022

IH 45
PROPOSED
TYPICAL SECTIONS

NOT TO SCALE — SHEET 1 OF 3

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS: MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: MJK	TEXAS	DAL	NAVARRO	6
CHECK: JAP	CONTROL	SECTION	JOB	
	0092	06	105	

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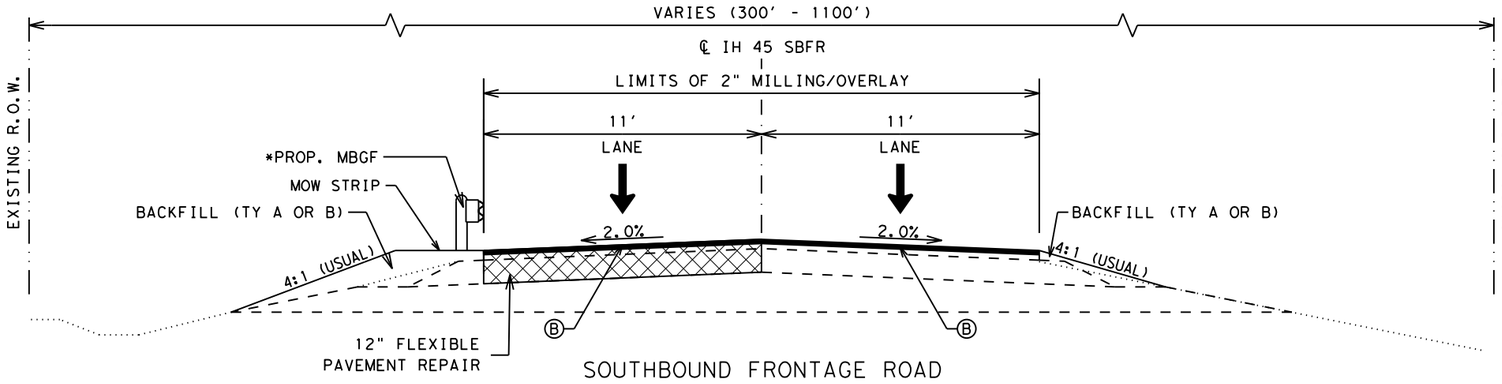
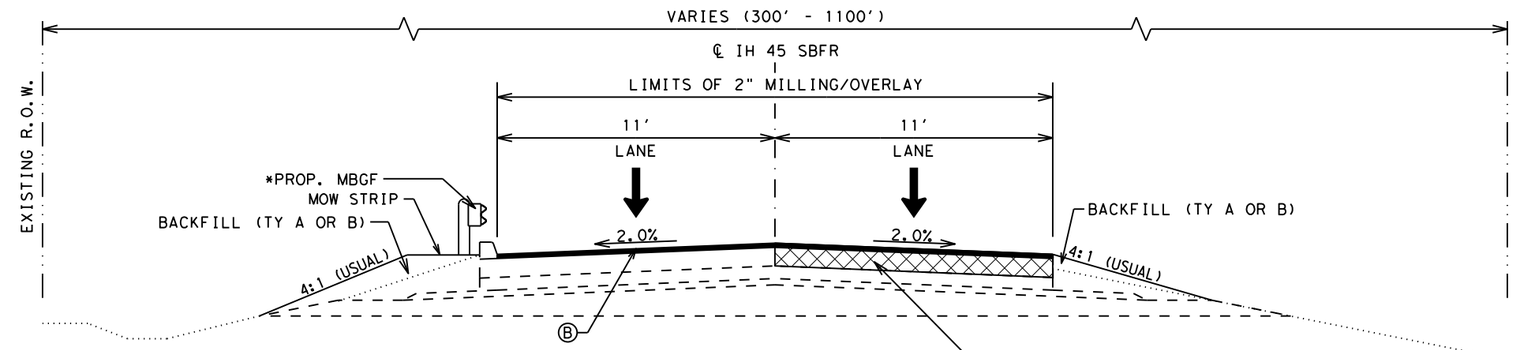
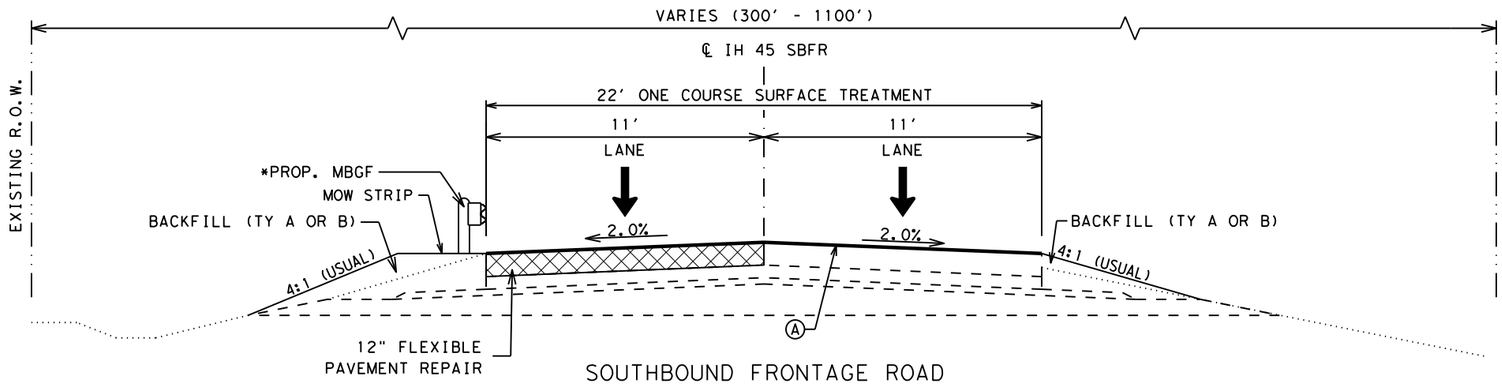


SOUTHBOUND FRONTAGE ROAD
ONE-WAY
STA. 3181+00.00 TO STA. 3220+80.00



SOUTHBOUND FRONTAGE ROAD
ONE-WAY
STA. 3220+80.00 TO STA. 3304+26.00
EXISTING CURB FROM STA. 3248+50.00 TO STA. 3304+26.00



SOUTHBOUND FRONTAGE ROAD
ONE-WAY
STA. 3304+26.00 TO STA. 3319+41.00

LEGEND

Ⓐ ONE COURSE SURFACE TREATMENT

Ⓑ 2" SP MIXES SP-C SAC-B PG64-22
TACK COAT

Ⓒ TWO COURSE SURFACE TREATMENT

Ⓓ EMULS ASPH (PRIME)(MS-2 OR SS-1)

Ⓔ 8" REWORK EXISTING MATERIAL AND CEMENT-TREATED BASE (2% CEMENT BY WEIGHT)

NOTES:
1. NO CHANGE IN PGL OR CROSS SLOPE.
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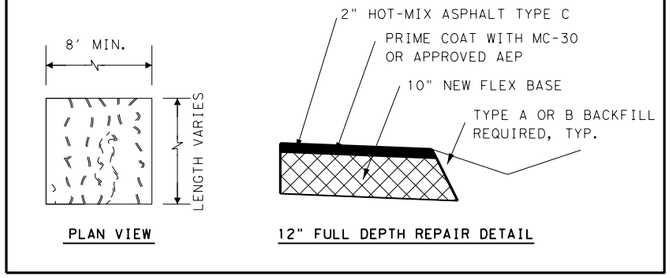
5. ENSURE NO TEMPORARY WORK ZONE PAVEMENT MARKINGS ARE ON THE ROADWAY PRIOR TO THE SURFACE OVERLAY.
6. APPLY PRIME (ITEM 314) & 1ST LAYER OF THE TWO COURSE SURFACE TREATMENT (ITEM 316).
7. APPLY ONE COURSE SURFACE TREATMENT (ITEM 316).
8. APPLY CELL FBR MLCH AND BACKFILL WHERE DIRECTED BY THE ENGINEER.

12" FLEXIBLE PAVEMENT STRUCTURE REPAIR (N.T.S.)
(ITEM 351-6008)



* FOR MBGF INSTALL LOCATIONS SEE IH 45 MBGF LAYOUT SHEET 62.

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Marlena Kelly, P.E. 3/30/22
Signature of Registrant & Date

Texas Department of Transportation
© 2022

IH 45
PROPOSED
TYPICAL SECTIONS

NOT TO SCALE — SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	7
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CHECK	0092	06	105	
JAP				

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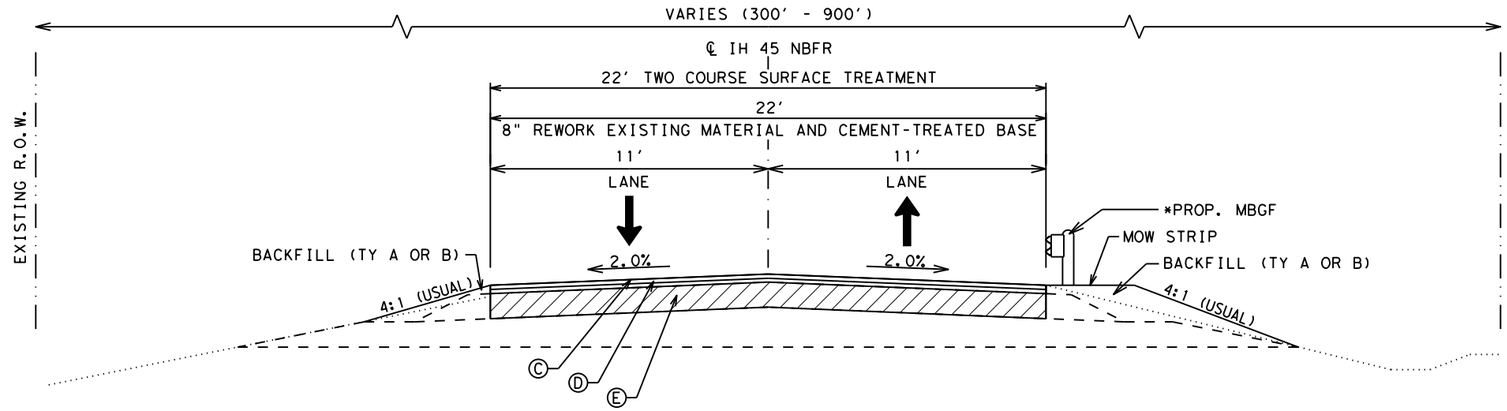
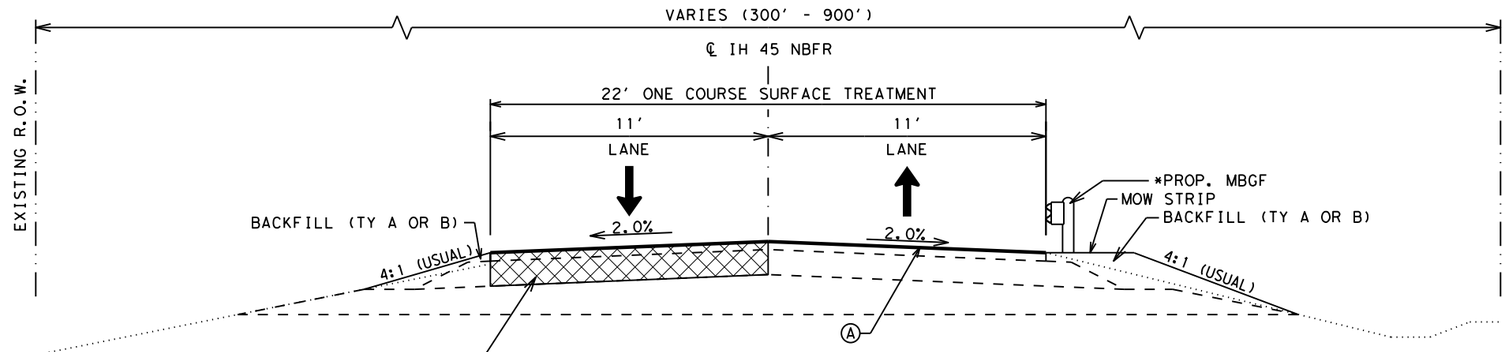


NORTHBOUND FRONTAGE ROAD
TWO-WAY
STA. 2005+85.00 TO STA. 2046+19.00



NORTHBOUND FRONTAGE ROAD
TWO-WAY
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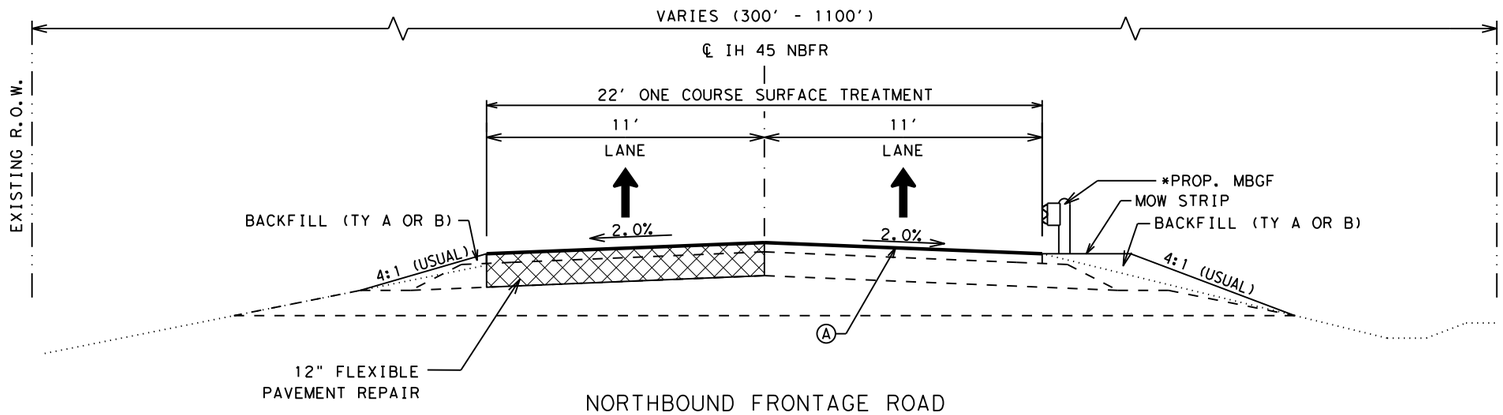

NORTHBOUND FRONTAGE ROAD
ONE WAY
STA. 2061+00.00 TO STA. 2390+73.00

LEGEND

Ⓐ ONE COURSE SURFACE TREATMENT

Ⓑ 2" SP MIXES SP-C SAC-B PG64-22
TACK COAT

Ⓒ TWO COURSE SURFACE TREATMENT

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Ⓔ 8" REWORK EXISTING MATERIAL AND CEMENT-TREATED BASE
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NOTES:
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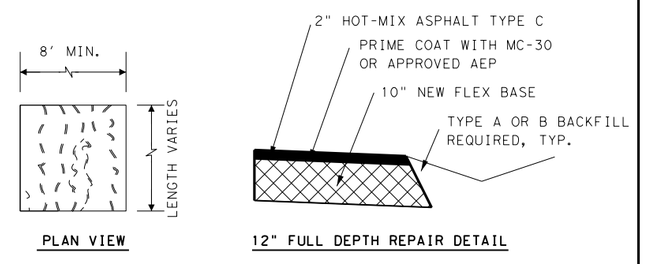
8. APPLY CELL FBR MLCH AND BACKFILL WHERE DIRECTED BY THE ENGINEER.

12" FLEXIBLE PAVEMENT STRUCTURE REPAIR (N.T.S.)
(ITEM 351-6008)



* FOR MBGF INSTALL LOCATIONS SEE IH 45 MBGF LAYOUT SHEET 62.

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant, P.E. & Date 3/30/22

Texas Department of Transportation

IH 45
PROPOSED
TYPICAL SECTIONS

NOT TO SCALE SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	8
MJK				
CHECK	0092	06	105	
JAP				

DATE: 3/30/2022 TIME: 4:28:08 PM
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SPECIFICATION DATA

Table 1: Soil Constants Requirements				
Item	Description	Plasticity Index		Note
		Max	Min	
132	EMBANKMENT (FINAL)(DC)(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
161	Compost Manuf Topsoil	4”			17,538 SY
162	Block Sod	N/A	See Specifications		244 SY
164	Drill Seed (Perm) (R) (C)	N/A	See Specifications		SY
166 *	Fertilizer (12-6-6)	N/A	500	Lbs./Ac	N/A
168	Vegetative Watering (Warm)**	N/A	12	MG/Ac/Day	2,614 MG
314	Prime Coat (MS-2 or SS-1)	N/A	0.20	Gal/SY	4,110 Gal
316	Asph (CRS-2P)	See Specifications Below			10,274 GAL
316	Asph (RC-250)	See Specifications Below			5,754 GAL
316	Asph (AC-15P, AC-20-5TR, AC-20XP)	See Specifications Below			81,826 GAL
316	Aggr (TY-B GR-5 or TY-L GR-5)	See Specifications Below			165 CY
316	Aggr (TY-PB GR-4 or TY-PL GR-4)(SAC-B)	See Specifications Below			172 CY
316	Aggr (TY-B GR-4 or TY-L GR-4) (SAC-B)	See Specifications Below			172 CY
316	Aggr (TY-B GR-3 or TY-L GR-3)(SAC-B)	See Specifications Below			196 CY
3077	SP MIXES SP-C SAC-B PG64-22	SP Plans	110	Lbs./SY/In	5,674 Ton
3077	Tack Coat (Undiluted Application Rate)	Milled HMA	0.11	Gal/SY	5,674 Gal

CSJ: 0092-06-105 **Sheet 9**

County: Navarro

Highway: IH 45

*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.
***Portland Concrete Cement

Note: (1) Base material weight based on 1.50 Ton/CY (dry- compacted)
(2) Asphalt weight based on 110 Lbs./SY/In
(3) Subgrade weight based on 1.5 Ton/CY (dry-compacted)
(4) Item 314 Residual Asphalt 0.20 Gal/SY

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

*For Contractor’s Information Only.
**Use Summer rate for calculation, adjust for Actual Field Conditions/Temperatures as Necessary. See Vegetation Establishment 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 1.20 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 required permits with environmental resources agencies. 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):

Name Juan.Parades@txdot.gov
Name 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/

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.

CSJ: 0092-06-105 **Sheet 9A**

County: Navarro

Highway: IH 45

Submit all shop drawings, working drawings, or other documents which require review sufficiently in advance of scheduled construction to allow no less than thirty (30) calendar days for review and response.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 7:
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 (5 am on December 31 thru 10:00 pm January 1)
- Easter Holiday weekend (5 am on Friday thru 10:00 pm Sunday)
- Memorial Day weekend (5 am on Friday thru 10:00pm Monday)
- Independence Day (5 am on July 3 thru 10:00 pm on July 5)
- Labor Day weekend (5 am on Friday thru 10:00 pm Monday)
- Thanksgiving Holiday (5 am on Wednesday thru 10:00 pm Sunday)
- Christmas Holiday (5 am 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.

Provide the engineer with a daily work schedule of planned work.

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.1000+00 to Sta.1389+12 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 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

Item 104:
In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planing or grinding is considered an acceptable method at these locations. Measurement and payment is in accordance with this item.

Sawing of concrete is not paid for directly, but is considered subsidiary to this item.

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County: Navarro

Highway: IH 45

Items 105, 251, 305, 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 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 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 161:
Provide tickets representing quantity of compost delivered to site.

Items 305 and 354:
Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at your own expense.

Slope longitudinal faces greater than 1 ¼" to a minimum of 1:1 slope at the end of the work period if traffic is able to traverse the joint. Slope transverse tapers to a minimum of 36:1 at the end of the workday. Remove the taper prior to continuing the milling.

For open shoulder sections, plane the asphalt so the flow of water is not impeded at the shoulder edge or across the surface. Added planing up to three feet in width outside the lines and grades of the plans, necessary to provide proper drainage, will be subsidiary to the bid item.

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.

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="4">REQUIRES INTERMEDIATE COURSE TO BE PLACED</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>FEBRUARY</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>MARCH</td><td></td><td rowspan="4">REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>APRIL</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>MAY</td><td></td><td rowspan="6">REFER TO STANDARD SPECIFICATIONS ITEM 316 FOR TEMPERATURE REQUIREMENTS</td><td></td></tr>
<tr><td>JUNE</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>JULY</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>AUGUST</td><td></td><td></td></tr>
<tr><td>SEPTEMBE
R</td><td></td><td rowspan="2">REFER TO STANDARD SPECIFICATIONS ITEM</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

<table>
<tr><td rowspan="2">OCTOBER</td><td></td><td rowspan="2">316 FOR TEMPERATURE REQUIREMENTS</td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">NOVEMBER</td><td></td><td></td><td rowspan="4">REQUIRES INTERMEDIATE COURSE TO BE PLACED</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">DECEMBER</td><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>

Do not begin rework or flexible base operations if a first course and intermediate surface treatment cannot be placed prior to October 31.

Field conditions and traffic may require the application of an additional (intermediate) surface treatment layer to preserve and sustain a particular project segment or phase. Typically, this will be prior to the project final AC asphalt surface treatment and will be meant to ensure that the pavement integrity is protected until hot season.

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.

<table>
<tr><th colspan="5">First Course</th></tr>
<tr><td rowspan="2">ITEM</td><td colspan="4">APPLICATION</td></tr>
<tr><td>Emul. Asphalt Treatment</td><td colspan="3">1st Course</td></tr>
<tr><td>*Asphalt Type</td><td>MS-2 or SS-1</td><td>CRS-2P</td><td>AC20-5TR, AC20-XP, AC15-P</td><td>RC-250 #</td></tr>
<tr><td>*Asph. Rate (Gal/SY)</td><td>0.20</td><td>0.50</td><td>0.42</td><td>0.28</td></tr>
<tr><td>Aggregate Type</td><td></td><td>B or L</td><td>B or L</td><td>B or L</td></tr>
<tr><td>Aggregate Grade</td><td></td><td>3</td><td>3</td><td>5</td></tr>
<tr><td>Aggr. Rate (CY/SY)</td><td></td><td>1:105</td><td>1:105</td><td>1:125</td></tr>
<tr><td>Min. Cure Time</td><td>24 hrs</td><td colspan="3">14 days (Emulsion)</td></tr>
</table>

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.

<table>
<tr><th colspan="2">Intermediate Seal</th></tr>
<tr><td rowspan="2">ITEM</td><td>APPLICATION</td></tr>
<tr><td>Intermediate Course</td></tr>
<tr><td>*Asphalt Type</td><td>CRS-2P</td></tr>
<tr><td>*Asph. Rate (Gal/SY)</td><td>0.44</td></tr>
</table>

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 316:

The Engineer will retrieve a minimum of one asphalt sample from the job site for each type of asphalt used for each particular reference for quality control purposes.

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.

Table 1: Rates for District Seal Coat Projects	
ITEM	APPLICATION (GR 3)
	1st Course
Asphalt Type	AC20-5TR, AC20-XP, AC15-P
*Asph. Rate (Gal/SY)	0.44
Aggregate Type	PB or PL
Aggregate Grade	3
*Aggr. Rate (CY/SY)	1:105

*The information above is intended to provide general guidance and a Basis of Estimate.

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County: Navarro

Highway: IH 45

In addition to the temperature requirements of this Item, AC Asphalts used in Surface Treatments and Sealcoats must be placed between May 1 and August 31.

At all joints where the newly installed HMA meets the seal coat, over-lap the seal coat 2ft past the joint, on top of the HMA, so the joint between the existing roadway and new HMA is sealed and protected.

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 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 351:

Existing asphalt to be removed will be sawed full depth along neat lines where portions are to be left in place temporarily or permanently.

Do not expose any location that cannot receive, at a minimum, a single surface treatment or the final pavement surface in any one day.

Coarse aggregates to be used in the surface course will have a minimum surface aggregate classification of "B".

Cutouts must have Superpave SP-B PG 64-22, Dense Graded Hot Mix Asphalt PG-64-22, Cement Stabilized Base, or Flexible Base TY "D" placed by the end of each day with proper slope protection.

Furnish MS-2 or SS-1 Emulsified Asphalt in accordance with Item 300, "Asphalt, Oils and Emulsions," for tack coat.

Provide surface course Superpave SP-C PG 64-22 when hot mix is specified, 1 Course Surface Treatment or a 2 Course Surface Treatment as shown in the plans. Asphalt edges will be beveled to eliminate pavement drop offs.

Slope any vertical or near vertical longitudinal face exceeding 1 1/4 in. in height in the pavement surface open to traffic at the end of a work period to a minimum of 1:1. Taper transverse faces in a manner acceptable to the Engineer.

The surface of the pavement after compaction will be smooth and true to the established line, grade, and cross section. When tested with a 10-ft. straight edge placed parallel to the centerline of the roadway or tested by other equivalent means, the maximum deviation will not exceed 1/8 in. within 10 ft., unless otherwise approved by the Engineer.

Occasional repair requests for various areas may arise.

Begin “Finishing” as soon as possible behind surface course operations.

Provide Short Term Work Zone Pavement Markings where striping is eliminated.

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 420:
Apply an ordinary surface finish to all concrete surfaces within 30 days after form removal.

Item 496:
Concrete pavement removed as a result of removing the inlets will not be paid for directly but will be considered as subsidiary to Item 496.

Salvage all existing inlet grates and manhole covers being removed.

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

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County: Navarro

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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.

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

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.

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 540:
Furnish one type of post throughout the project except as specifically noted in the plans.

Item 542:
Salvage metal beam guard fence removed from this project and haul to and stockpile at TxDOT Navarro County Office. The work involved in hauling this material will not be paid for directly, but will be considered subsidiary to this item.

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

Use Surface Test Type B pay adjustment schedule 3 on the service roads.

Items 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.

A 3 inch strip of red reflective sheeting shall be placed on all Do Not Enter sign assemblies. This sheeting shall be placed directly below the Do Not Enter sign for the entire length of the sign post facing wrong way traffic. This work will be considered subsidiary to Item 644.

Item 677:
A water blasting method approved by the Engineer will be the only method allowed for the removal of permanent and temporary pavement markings except on a sealcoat surface. A 2 foot wide sealcoat will be required on sealcoat surfaces to eliminate permanent and temporary pavement markings.

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 SAC B.

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

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County: Navarro

Highway: IH 45

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 / (1-5)-18		1

TCP 2 Series	Scenario	Required TMA/TA
(2-2)-18 / (2-4)-18	All	1

TCP 3 Series	Scenario	Required TMA/TA
(3-2)-13	All	3
(3-3)-14	A, B, D	2
	C	3
(3-4)-13	All	1, unless working inside a twltl, then 2.

TCP 6 Series	Scenario	Required TMA/TA
(6-2)-12 / (6-3)-12	All	1
(6-4)-12	A	1
	B	2
(6-8)-14	All	1

TCP 7 Series	Scenario	Required TMA/TA
(7-1)-13	All	1

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 0092-06-105 **DISTRICT** Dallas **COUNTY** Navarro
HIGHWAY IH 45

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0092-06-105**			
		PROJECT ID		**A00066922**			
		COUNTY		**Navarro**			
		HIGHWAY		**IH 45**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	389.120		389.120	
	104-6009	REMOVING CONC (RIPRAP)	SY	27.000		27.000	
	110-6001	EXCAVATION (ROADWAY)	CY	43.000		43.000	
	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	CY	17.000		17.000	
	134-6004	BACKFILL (TY A OR B)	STA	778.240		778.240	
	161-6017	COMPOST MANUF TOPSOIL (4")	SY	17,538.000		17,538.000	
	162-6002	BLOCK SODDING	SY	244.000		244.000	
	164-6023	CELL FBR MLCH SEED(PERM)(RURAL)(CLAY)	SY	17,294.000		17,294.000	
	168-6001	VEGETATIVE WATERING	MG	2,614.000		2,614.000	
	251-6034	REWORK BS MTL (TY C) (8") (ORD COMP)	SY	20,548.000		20,548.000	
	275-6001	CEMENT	TON	137.000		137.000	
	275-6011	CEMENT TREAT(EXIST MATL)(8")	SY	20,548.000		20,548.000	
	314-6021	EMULS ASPH (PRIME)(MS-2 OR SS-1)	GAL	4,110.000		4,110.000	
	316-6024	ASPH (CRS-2P)	GAL	10,274.000		10,274.000	
	316-6029	ASPH (RC-250)	GAL	5,754.000		5,754.000	
	316-6255	AGGR(TY-PL GR-3LW SAC-B)	CY	1,426.000		1,426.000	
	316-6403	AGGR (TY-B GR-5 OR TY-L GR-5)	CY	165.000		165.000	
	316-6419	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	GAL	81,826.000		81,826.000	
	316-6434	AGGR (TY-PB GR-4 OR TY-PL GR-4 (SAC-B)	CY	172.000		172.000	
	316-6435	AGGR (TY-B GR-4 OR TY-L GR-4 SAC-B)	CY	172.000		172.000	
	316-6440	AGGR (TY-B GR-3 OR TY-L GR-3)(SAC-B)	CY	196.000		196.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	35,000.000		35,000.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	51,576.000		51,576.000	
	401-6001	FLOWABLE BACKFILL	CY	10.000		10.000	
	420-6009	CL A CONC (COLLAR)	EA	8.000		8.000	
	432-6009	RIPRAP (CONC) (CL B) (4")	CY	10.000		10.000	
	432-6024	RIPRAP (STONE COMMON)(DRY)(12 IN)	CY	7.000		7.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	642.000		642.000	
	464-6003	RC PIPE (CL III)(18 IN)	LF	4.000		4.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	8.000		8.000	
	466-6007	HEADWALL (CH - FW - 0) (DIA= 30 IN)	EA	1.000		1.000	
	466-6056	HEADWALL (CH - FW - 45) (DIA= 48 IN)	EA	1.000		1.000	
	467-6356	SET (TY II) (18 IN) (RCP) (3: 1) (C)	EA	1.000		1.000	
	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)	EA	2.000		2.000	
	480-6001	CLEAN EXIST CULVERTS	EA	14.000		14.000	
	496-6004	REMOV STR (SET)	EA	3.000		3.000	
	496-6006	REMOV STR (HEADWALL)	EA	2.000		2.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0092-06-105 **DISTRICT** Dallas **COUNTY** Navarro
HIGHWAY IH 45

			CONTROL SECTION JOB		**0092-06-105**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00066922**		
			COUNTY		**Navarro**		
			HIGHWAY		**IH 45**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	496-6007	REMOV STR (PIPE)	LF	12.000		12.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	12.000		12.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	90.000		90.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	90.000		90.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	9,595.000		9,595.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	9,595.000		9,595.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	200.000		200.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	200.000		200.000	
	529-6002	CONC CURB (TY II)	LF	24.000		24.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	10,500.000		10,500.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	2.000		2.000	
	540-6007	MTL BEAM GD FEN TRANS (TL2)	EA	2.000		2.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	28.000		28.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	10,500.000		10,500.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	9.000		9.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	39.000		39.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	39.000		39.000	
	636-6001	ALUMINUM SIGNS (TY A)	SF	11.000		11.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	206.000		206.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	91.000		91.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	2.000		2.000	
	644-6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)	EA	4.000		4.000	
	644-6064	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA	19.000		19.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	303.000		303.000	
	644-6077	REMOVE BRDG MNT CLEARANCE SIGN ASSM	EA	19.000		19.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	59.000		59.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	12.000		12.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	48.000		48.000	
	658-6100	INSTL OM ASSM (OM-2Z)(WFLX)GND(BI)	EA	15.000		15.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	9,308.000		9,308.000	
	662-6110	WK ZN PAV MRK SHT TERM (TAB)TY Y	EA	5,241.000		5,241.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	285.000		285.000	
	666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	10.000		10.000	
	666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	10.000		10.000	
	666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	3.000		3.000	
	666-6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	5,252.000		5,252.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0092-06-105 **DISTRICT** Dallas **COUNTY** Navarro
HIGHWAY IH 45

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0092-06-105**			
		PROJECT ID		**A00066922**			
		COUNTY		**Navarro**			
		HIGHWAY		**IH 45**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	1,851.000		1,851.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	14,630.000		14,630.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	39,819.000		39,819.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	1,187.000		1,187.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	33,179.000		33,179.000	
	666-6342	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL)	LF	46,481.000		46,481.000	
	666-6345	REF PROF PAV MRK TY I(Y)4"(SLD)(100MIL)	LF	47,548.000		47,548.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	993.000		993.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	732.000		732.000	
	730-6107	FULL - WIDTH MOWING	CYC	2.000		2.000	
	764-6001	DRAIN INLET CLEANING	EA	7.000		7.000	
	3077-6013	SP MIXESSP-CSAC-B PG64-22	TON	5,674.000		5,674.000	
	3077-6075	TACK COAT	GAL	5,674.000		5,674.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	40.000		40.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	160.000		160.000	
	08	CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF ROADWAY QUANTITIES

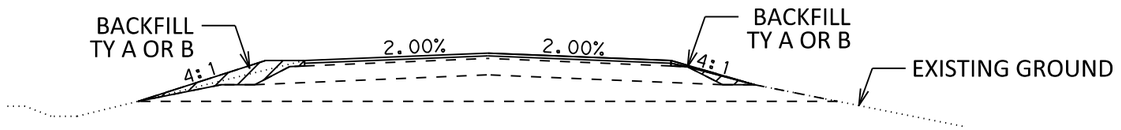
ITEM	100	104	110	132	134	251	275	275	314	316
CODE	6002	6009	6001	6005	6004	6034	6001	6011	6021	6024
DESCRIPTION	PREPARING ROW	REMOVING CONC (RIPRAP)	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL)(ORD COMP) (TY C)	BACKFILL (TY A OR B)	REWORK BS MTL (TY C)(8") (ORD COMP)	CEMENT	CEMENT TREAT (EXIST MATL)(8")	EMULS ASPH (PRIME)(MS-2 OR SS-1)	ASPH (CRS-2P)
UNIT	STA	SY	CY	CY	STA	SY	TON	SY	GAL	GAL
QUANTITY	389.12	27.00	43.00	17.00	778.24	20548.00	137.00	20548.00	4110.00	10274.00

ITEM	316	316	316	316	316	316	316	351	354
CODE	6029	6255	6403	6419	6434	6435	6440	6008	6045
DESCRIPTION	ASPH (RC-250)	AGGR (TY-PL GR-3LW SAC-B)	AGGR (TY-B GR-5 OR TY-L GR-5)	ASPH (AC-15P, AC-20-5TR OR AC-20XP)	AGGR (TY-PB GR-4 OR TY-PL GR-4 (SAC-B)	AGGR (TY-B GR-4 OR TY-L GR-4 SAC-B)	AGGR (TY-B GR-3 OR TY-L GR-3)(SAC-B)	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	PLANE ASPH CONC PAV (2")
UNIT	GAL	CY	CY	GAL	CY	CY	CY	SY	SY
QUANTITY	5754.00	1426.00	165.00	81826.00	172.00	172.00	196.00	35000.00	51576.00

ITEM	432	500	502	529	540	540	540	540	542	542	544
CODE	6045	6001	6001	6002	6001	6006	6007	6016	6001	6002	6001
DESCRIPTION	RIPRAP (MOW STRIP) (4 IN)	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONC CURB (TY II)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	MTL BEAM GD FEN TRANS (TL2)	DOWNSTREAM ANCHOR TERMINAL SECTION	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (INSTALL)
UNIT	CY	LS	MO	LF	LF	EA	EA	EA	LF	EA	EA
QUANTITY	642.00	1.00	12.00	24.00	10500.00	2.00	2.00	28.00	10500.00	9.00	39.00

ITEM	544	636	644	644	644	644	644	644	644	658	658
CODE	6003	6001	6001	6004	6033	6036	6064	6076	6077	6061	6062
DESCRIPTION	GUARDRAIL END TREATMENT (REMOVE)	ALUMINUM SIGNS (TY A)	IN SM RD SN SUP&AM TY 10 BWG(1) SA(P)	IN SM RD SN SUP&AM TY 10BWG(1)SA(T)	IN SM RD SN SUP&AM TY S80(1)SA(U)	IN SM RD SN SUP&AM TY S80(1)SA(U-BM)	IN BRIDGE MNT CLEARANCE SGN ASSM (TY N)	REMOVE SM RD SN SUP&AM	REMOVE BRDG MNT CLEARANCE SGN ASSM (TY N)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)
UNIT	EA	SF	EA	EA	EA	EA	EA	EA	EA	EA	EA
QUANTITY	39.00	11.00	206.00	91.00	2.00	4.00	19.00	303.00	19.00	59.00	12.00

ITEM	658	658	3077	3077	6001	6185	6185
CODE	6064	6100	6013	6075	6002	6002	6003
DESCRIPTION	INSTL DEL ASSM (D-SY) SZ 1 (BRF) GF2	INSTL OM ASSM (OM-2Z) (WFLX)GND(BI)	SP MIXESSP-CSAC-B PG64-22	TACK COAT	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
UNIT	EA	EA	TON	GAL	EA	DAY	HR
QUANTITY	48.00	15.00	5674.00	5674.00	2.00	40.00	160.00



EARTHWORK TYPICAL SECTION

Texas Department of Transportation
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IH 45

SUMMARY SHEETS

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	11
MJK	0092	06	105	
CHECK				
JAP				

SUMMARY OF PAVEMENT MARKINGS

ITEM	662	662	666	666	666	666	666	666	666	666	666
CODE	6109	6110	6048	6081	6084	6102	6138	6147	6300	6303	6312
DESCRIPTION	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y	REFL PAV MRK TY I (W)24" (SLD)(100MIL)	REFL PAC MRK TY I (W)(ENTR GORE) (100MIL)	REFL PAV MRK TY I (W)(EXIT GORE) (100MIL)	REF PAV MRK TY I (W)36"(YLD TRI) (100MIL)	REFL PAV MRK TY I (Y)8"(SLD) (100MIL)	REFL PAV MRK TY I (Y)24"(SLD) (100MIL)	RE PM W/RET REQ TY I(W)4"(BRK) (100MIL)	RE PM W/RET REQ TY I(W)4"(SLD) (100MIL)	RE PM W/RET REQ TY I(Y)4"(BRK) (100MIL)
UNIT	EA	EA	LF	EA	EA	EA	LF	LF	LF	LF	LF
QUANTITY	9308.00	5241.00	285.00	10.00	10.00	3.00	5252.00	1851.00	14630.00	39819.00	1187.00

ITEM	666	666	666	672	672
CODE	6315	6342	6345	6009	6010
DESCRIPTION	RE PM W/RET REQ TY I(Y)4"(SLD) (100MIL)	REF PROF PAV MRK TY I (W) 4"(SLD)(100MIL)	REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
UNIT	LF	LF	LF	EA	EA
QUANTITY	33179.00	46481.00	47548.00	993.00	732.00

SUMMARY OF DRAINAGE

ITEM	401	420	432	432	464	464	466	466	467	467	480
CODE	6001	6009	6009	6024	6003	6005	6007	6056	6356	6388	6001
DESCRIPTION	FLOWABLE BACKFILL	CL A CONC (COLLAR)	RIPRAP (CONC) (CL B)(4")	RIPRAP (STONE COMMON)(DRY) (12 IN)	RC PIPE (CL III)(18 IN)	RC PIPE (CL III)(24 IN)	HEADWALL (CH-FW-0) (DIA = 30 IN)	HEADWALL (CH-FW-45) (DIA= 48 IN)	SET (TY II) (18 IN)(RCP) (3:1)(C)	SET (TY II) (24 IN)(RCP) (3:1)(C)	CLEAN EXIST CULVERTS
UNIT	CY	EA	CY	CY	LF	LF	EA	EA	EA	EA	EA
QUANTITY	10.00	8.00	10.00	7.00	4.00	8.00	1.00	1.00	1.00	2.00	14.00

ITEM	496	496	496	764
CODE	6004	6006	6007	6001
DESCRIPTION	REMOV STR (SET)	REMOV STR (HEADWALL)	REMOV STR (PIPE)	DRAIN INLET CLEANING
UNIT	EA	EA	LF	EA
QUANTITY	3.00	2.00	12.00	7.00

IH 45

SUMMARY SHEETS

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	12
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

SUMMARY OF EROSION

ITEM	161	162	164	168	506	506
CODE	6017	6002	6023	6001	6001	6011
DESCRIPTION	COMPOST MANUF TOPSOIL (4")	BLOCK SODDING	CELL FBR MLCH SEED(PERM) (RURAL)(CLAY)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 1)	ROCK FILTER DAMS (REMOVE)
UNIT	SY	SY	SY	MG	LF	LF
QUANTITY	17538.00	244.00	17294.00	2614.00	90.00	90.00

ITEM	506	506	506	506	730
CODE	6038	6039	6041	6043	6107
DESCRIPTION	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL)(12")	BIODEG EROSN CONT LOGS (REMOVE)	FULL-WIDTH MOWING
UNIT	LF	LF	LF	LF	CYCLE
QUANTITY	9595.00	9595.00	200.00	200.00	2.00

IH 45

SUMMARY SHEETS

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	13
CHECK JAP	CONTROL 0092	SECTION 06	JOB 105	

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: 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	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X		(MOUNT BACK-TO-BACK)					
	2	W1-6L	<LARGE ARROW LEFT>	48 x 24	X		10BWG	1	SA	T		
	3	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X		(MOUNT BACK-TO-BACK)					
	4	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X		(MOUNT BACK-TO-BACK)					
	5	W1-1L	SYMBOL - HORIZ ALN TURN LEFT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	6	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	7	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X		(MOUNT BACK-TO-BACK)					
	8	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X		(MOUNT BACK-TO-BACK)					
	9	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
		W1-8L	<CHEVRON LEFT>	24 x 30	X		(MOUNT BACK-TO-BACK)					
	10	W1-1R	SYMBOL - HORIZ ALN TURN RIGHT	36 x 36	X		10BWG	1	SA	P		
		W13-1P	(SPEED) MPH <ADVISORY SPEED PLAQUE>	18 x 18	X							
	11	D1-2aT	RICE CITY LIMIT	3'-0" x 2'-0 "	X		10BWG	1	SA	T		
	12	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	P		
	13	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	P		
	14	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	T		
	15	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
2	1	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	T		
		M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		(MOUNT BACK-TO-BACK)					
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	2	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	3	R3-7	RIGHT LANE MUST TURN LEFT	36 x 36	X		10BWG	1	SA	P		
		R3-5hTP	300 FT	36 x 12	X							
	4	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	5	R6-1R	ONE WAY <IN RIGHT ARROW>	54X18	X		10BWG	1	SA	T		
		R1-1	STOP	36 x 36	X							
	6	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	7	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0092	06	105	IH 45
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	NAVARRO		14

18

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: 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
2	7	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
		R3-2	SYMBOL-NO LEFT TURN	36 x 36	X							
	8	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	9	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	10	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	11	W6-3	SYMBOL - TWO WAY TRAFFIC	36 x 36	X		10BWG	1	SA	P		
	12	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	P		
	13	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	14	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	15	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	16	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	17	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	P		
	18	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	19	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	20	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	21	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	22	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	23	W12-2a	(FEET) FT (INCHES) (IN)	84 x 24	X							TY N
	24	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	25	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		(MOUNT BACK-TO-BACK)					
	26	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	P		
	27	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	28	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		(MOUNT BACK-TO-BACK)					
	29	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	30	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	31	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	32	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	33	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		

DATE:
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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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4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	NAVARRO		15

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: 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
2	34	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	35	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	36	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	37	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
3	1	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	2	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	3	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	4	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	5	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	6	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	7	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	8	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	9	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1				
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	10	D1-1	CORSICANA →	7'-6" x 1'-6"	X		10BWG	1	SA	T		
	11	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	12	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	13	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	14	D1-1	CHATFIELD →	7'-0" x 1'-6"	X		10BWG	1	SA	T		
	15	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	16	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	17	M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X		10BWG	1	SA	P		
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	18	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	BACK-TO-BACK	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	19	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	20	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 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"
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8-16		DAL	NAVARRO		16

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: 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
3	21	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	22	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	23	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	24	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	25	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	26	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	27	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	28	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	29	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARROW>	12 x 18	X		10BWG	1	SA	P		
	30	D1-1	CHATFIELD →	7'-0" x 1'-6"	X		10BWG	1	SA	T		
	31	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	32	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	P		
	33	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	34	M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X		10BWG	1	SA	P		
		D10-7aT	<3 DIGIT VERTICAL NUMBER>	3 x 10	X							
	35	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	36	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	37	D2-2	← CHATFIELD DALLAS →	? x ?	X		10BWG	1	SA	T		
	38	M3-2	EAST <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	U		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
		M6-1L	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
		M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X							
		M1-1(2 dgt)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	39	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	40	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	41	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	42	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	43	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
4	1	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T	(MOUNT BACK-TO-BACK)	
		W13-2	EXIT / (SPEED) MPH	48 x 60	X		S80	1	SA	T		

DATE:
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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.	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
4	2	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	3	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	4	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	5	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	6	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	7	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	8	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	9	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	10	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	11	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	12	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	13	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	14	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	15	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
5	1	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	2	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	3	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	4	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	5	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	6	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	7	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	8	M3-3	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X							
	9	D1-2	← EMHOUSE ← BARRY	7'-0" x 2'-6"	X		S80	1	SA	U	BM	

ALUMINUM SIGN BLANKS THICKNESS	
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SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	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
5	10	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
		D1-2	EMHOUSE →	7'-0" x 2'-6"	X		(MOUNT BACK-TO-BACK)					
			BARRY →									
	12	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	11	M1-6F	<FM SHIELD> FARM ROAD (ROUTE #)	24 x 24	X		10BWG	1	SA	P		
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	13	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	14	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	15	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	16	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	17	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	18	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	19	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	20	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	21	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	22	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	23	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	24	D1-2	EMHOUSE 7 →	7'-0" x 2'-6"	X		S80	1	SA	U	BM	
			BARRY 15 →									
	25	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	26	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	27	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	28	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	29	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	30	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
	31	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
	32	W1-8R	<CHEVRON RIGHT>	24 x 30	X		10BWG	1	SA	P		
	33	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	34	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	X							
	35	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N

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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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 6 OF 13

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS		0092	06	105	IH 45
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	NAVARRO		19

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SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	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
5	36	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	37	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	38	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	39	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	40	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	41	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	42	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	43	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	44	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	45	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	46	S5-2	END SCHOOL ZONE <3 LINES>	24 x 30	X		10BWG	1	SA	P		
	47	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	48	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	49	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	50	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	51	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	52	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	53	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	T		
		M1-1(2 DGT)B	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	54	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	T		
		M1-1(2 DGT)B	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	55	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
6	1	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	2	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	3	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	4	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	5	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	6	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	7	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
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Texas Department of Transportation

Traffic Operations Division Standard

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REVISIONS		0092	06	105	IH 45
4-16		DIST	COUNTY		SHEET NO.
8-16		DAL	NAVARRO		20

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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)					BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		TY = TYPE
							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	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	TY N TY S
6	8	S5-1	SCHOOL / SPEED LIMIT (SPEED) WHEN FLASHING	24 x 48	X		11 SF TY A ALUMINUM PAID FOR UNDER ITEM 636-6001					
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	24 x 18	X							
	9	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	10	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
7	1	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	2	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	3	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	4	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	5	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	6	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	7	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	8	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	9	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		
	10	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	11	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	12	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	13	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	14	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	15	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	16	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	17	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	18	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	19	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	20	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <AUXILIARY SIGN>	21 x 15	X							
	21	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		
	22	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	23	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		
	24	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	25	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		

DATE:
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ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0092	06	105	IH 45
4-16	DIST	COUNTY		SHEET NO.
8-16	DAL	NAVARRO		21

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	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
7	26	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	27	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		
	28	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		
	29	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	30	R7-1D	NO PARKING ANY TIME <BI-DIRECTNAL ARRW>	12 x 18	X		10BWG	1	SA	P		
	31	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	32	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	33	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		S80	1	SA	U		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-3B	<ARROW - VERTICAL STRGHT> <BLUE AUX. SIGN>	21 x 15	X							
		M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X							
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <BLUE AUX SIGN>	21 x 15	X							
	34	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	35	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	36	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	37	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	38	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	39	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <BLUE AUX SIGN>	21 x 15	X							
	40	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	41	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	42	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	43	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	44	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	45	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	46	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	47	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	48	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	49	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	50	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	51	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		

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

PLAN SHEET NO.	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
7	52	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	53	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	54	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	55	D1-1	CALHOUN ST ➡	8'-0" x 1'-6"	X		10BWG	1	SA	T		
	56	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	57	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	58	D1-3	RICE CEMENTERY ➡	? x ?	X		10BWG	1	SA	P		
	59	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	60	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <BLUE AUX SIGN>	21 x 15	X							
	61	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	62	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	63	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	64	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	65	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <BLUE AUX SIGN>	21 x 15	X							
8	1	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	2	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	3	W3-1	SYMBOL - STOP AHEAD	30 x 30	X		10BWG	1	SA	P		
	4	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	5	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	6	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	7	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	8	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <BLUE AUX SIGN>	21 x 15	X							
	9	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	10	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	11	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		

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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	0092	06	105	IH 45
4-16 8-16	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		23

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: 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
8	12	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	13	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	14	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	15	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	16	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	17	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	18	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <BLUE AUX SIGN>	21 x 15	X							
	19	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	20	M3-3B	SOUTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <BLUE AUX SIGN>	21 x 15	X							
	21	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	22	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	23	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	24	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	25	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	26	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	27	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	28	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	29	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	30	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	31	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	32	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	33	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	34	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	35	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
9	1	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	2	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	3	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		

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8-16		DAL	NAVARRO		24

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9	4	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	5	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	6	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	7	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	8	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	9	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	10	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	11	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	12	W12-2	SYMBOL - LOW CLEARANCE (FT)-(IN)	36 x 36	X		10BWG	1	SA	P		
	13	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	14	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	15	R8-3aTL	NO PARKING <ARROW LEFT>	24 x 30	X		10BWG	1	SA	P		
	16	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	17	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	18	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	19	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	20	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	21	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	22	W12-2a	(FEET) FT (INCHES) IN	84 x 24	X							TY N
	23	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	24	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P		
	25	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2DGT)B	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-1B	<ARROW - HORIZ. STRGHT> <BLUE AUX SIGN>	21 x 15	X							
	26	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	27	R1-1	STOP	36 x 36	X		10BWG	1	SA	P		
	28	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	36 x 36	X		10BWG	1	SA	P		
	29	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	30	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	31	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <BLUE AUX SIGN>	21 x 15	X							

DISCLAIMER:
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18

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

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9	32	R8-3aTD	NO PARKING <BI-DIRECTIONAL ARROW>	24 x 30	X		10BWG	1	SA	P		
	33	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	34	R8-3aTD	NO PARKING <BI-DIRECTIONAL ARROW>	24 x 30	X		10BWG	1	SA	P		
	35	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	36	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	P	(MOUNT BACK-TO-BACK)	
		R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X							
	37	R5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	P		
	38	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	39	R4-3bT	DO NOT CROSS DOUBLE WHITE LINE	36 x 36	X		10BWG	1	SA	P		
	40	W4-3L	SYMBOL - ADDED LEFT LANE AHEAD	36 x 36	X		10BWG	1	SA	P		
	41	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	42	R6-1R	ONE WAY <IN RIGHT ARROW>	54 x 18	X		10BWG	1	SA	T		
	43	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	44	W9-2R	LANE ENDS MERGE RIGHT	36 x 36	X		10BWG	1	SA	P		
	45	M3-1B	NORTH <AUXILIARY SIGN>	24 x 12	X		10BWG	1	SA	P		
		M1-1(2 DGT)	INTERSTATE (ROUTE #)	24 x 24	X							
		M6-2LB	<ARROW - ANGLED UP LEFT> <BLUE AUX SIGN>	21 x 15	X							
	46	R2-1	SPEED LIMIT (SPEED)	30 x 36	X		10BWG	1	SA	P		
	47	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		
	48	W9-1L	LEFT LANE ENDS	36 x 36	X		10BWG	1	SA	P		

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SUMMARY OF SMALL SIGNS

SOSS

SHEET 13 OF 13

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8-16		DAL	NAVARRO		26

DATE: 02/18/2022 04:42 PM
FILE: DOCUMENT NAME

THE FOLLOWING SEQUENCE OF WORK IS THE SUGGESTED METHOD OF PROSECUTION OF THE CONSTRUCTION ACTIVITIES OF THIS PROJECT. THIS SEQUENCE OF WORK MAY BE REVISED WITH THE APPROVAL OF THE ENGINEER.

GENERAL

1. DAILY OPERATION ONLY. CONTRACTOR SHALL RESTORE EDGE CONDITIONS IN ACCORDANCE WITH EDGE CONDITION SHEET TE(HMAC)-11 AT THE END OF EACH WORKDAY.

2. ACCESS TO DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES AND CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

3. TRAFFIC CONTROL & LANE CLOSURES WILL BE IN ACCORDANCE WITH THE PLANS, BC, TCP, AND WZ STANDARDS AND AS DIRECTED BY THE ENGINEER. OVERNIGHT LANE CLOSURES WILL BE PERMITTED, AS APPROVED BY THE ENGINEER.

4. THE CONTRACTOR WILL PROVIDE AND MAINTAIN SKILLED FLAGGERS EQUIPPED WITH TWO-WAY RADIOS TO HANDLE TRAFFIC THROUGH THE WORK AREAS.

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

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

7. MAINTAIN POSITIVE DRAINAGE DURING CONSTRUCTION.

8. AT LEAST ONE-LANE SHALL REMAIN OPEN AT ALL TIMES.

9. THE CONTRACTOR SHALL COVER OR REMOVE ANY EXISTING SIGN OR PAVEMENT MARKING THAT CONFLICTS WITH TCP TO AVOID CONFUSION FOR THE TRAVELING PUBLIC. PAYMENT FOR THIS WORK SHALL BE SUBSIDIARY TO ITEM 502 BARRICADES.

10. TEMPORARY 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 IN EACH AREA WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS APPROVED BY THE ENGINEER.

PHASE 1

1. SET BARRICADES AND ADVANCE WARNING SIGNS.

2. INSTALL AND MAINTAIN STORM WATER POLLUTION PREVENTION PLAN (SW3P) ITEMS.

PHASE 2

1. REPLACE EXISTING SET AND HEADWALL AS SHOWN IN THE PLANS. SEE MISCELLANEOUS CULVERT DETAILS FOR LOCATIONS.

2. REMOVE AND INSTALL RIPRAP AROUND INLETS AS SHOWN IN THE PLANS. SEE MISCELLANEOUS CULVERT DETAILS FOR LOCATIONS.

PHASE 3
SOUTHBOUND FRONTAGE ROAD

1. PERFORM 2" MILLING AS SHOWN IN THE PLANS AND THEN FULL DEPTH PAVEMENT STRUCTURE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.

2. PERFORM OVERLAY ON SOUTHBOUND FRONTAGE ROAD FROM STA. 3181+00.00 TO STA. 3304+26.00 SUCH THAT THE ENTIRE LENGTH OF ONE LANE IS MILLED AND OVERLAYED TO COMPLETION PRIOR TO BEGINNING WORK IN THE OTHER LANE.

3. PERFORM 2" MILLING AND OVERLAY AT BRIDGE CROSSOVERS FROM THE INTERSECTION WITH FRONTAGE ROAD TO THE BRIDGE APPROACH SLAB AS SHOWN IN THE PLANS.

4. REWORK EXISTING MATERIAL AND PLACE CEMENT TREATMENT SUBGRADE MATERIAL FROM STA. 3006+28.00 TO STA. 3050+00.00.

5. PLACE THE FIRST LAYER OF THE TWO COURSE SURFACE TREATMENT FROM STA. 3006+28.00 TO STA. 3050+00.00.

6. BACKFILL PAVEMENT EDGES AT LOCATIONS AS DIRECTED BY THE ENGINEER.

7. INSTALL WORK ZONE PAVEMENT MARKINGS.

PHASE 4
NORTHBOUND FRONTAGE ROAD

1. PERFORM FULL DEPTH PAVEMENT STRUCTURE REPAIR AT LOCATIONS AS DIRECTED BY THE ENGINEER.

2. REWORK EXISTING MATERIAL AND PLACE CEMENT TREATMENT SUBGRADE MATERIAL FROM STA. 2005+85.00 TO STA. 2046+19.00.

3. PLACE THE FIRST LAYER OF THE TWO COURSE SURFACE TREATMENT FROM STA. 2005+85.00 TO STA. 2046+19.00.

4. PERFORM 2" MILL AND OVERLAY AT BRIDGE CROSSOVERS FROM THE INTERSECTION WITH FRONTAGE ROAD TO THE BRIDGE APPROACH SLAB AS SHOWN IN THE PLANS.

5. BACKFILL PAVEMENT EDGES AT LOCATIONS AS DIRECTED BY THE ENGINEER.

6. INSTALL WORK ZONE PAVEMENT MARKINGS.

PHASE 5

1. INSTALL METAL BEAM GUARD RAILS AS SHOWN IN THE PLANS. REMOVE AND REPLACE THE SIGNS THROUGHOUT THE PROJECT ON THE NORTHBOUND AND SOUTHBOUND FRONTAGE ROAD.

PHASE 6

1. PERFORM 1-COURSE SURFACE TREATMENT ON SOUTHBOUND FRONTAGE ROAD FROM STA. 3050+00.00 TO STA. 3181+00.00 AND FROM STA. 3304+26.00 TO STA. 3390+19.00.

2. PERFORM 1-COURSE SURFACE TREATMENT ON NORTHBOUND FRONTAGE ROAD FROM STA. 2046+19.00 TO STA. 2390+73.00.

3. INSTALL PERMANENT PAVEMENT MARKINGS. SHORT TERM PAVAEMENT MARKINGS SHALL BE REPLACED BY PERMANENT MARKINGS NO LATER THANK 14 CALENDAR DAYS FOLLOWING PLACEMENT OF THE SURFACE.

4. REMOVE SW3P DEVICES.

5. FINAL CLEAN UP.

6. REMOVE BARRICADES AND WARNING SIGNS.

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & P.E. Date 3/7/22

Texas Department of Transportation

IH 45
TCP NARRATIVE

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	27
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/7/2022 TIME:5:44:31 AM
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\0092061054 - Design\Plan Set\2. TCP\TCP*Narrative.dgn

DATE:
FILE:

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

SHEET 1 OF 12

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
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REVISIONS	0092	06	105	IH 45
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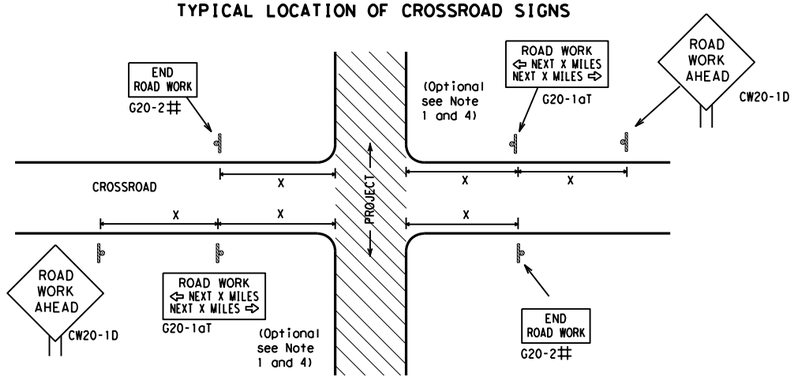
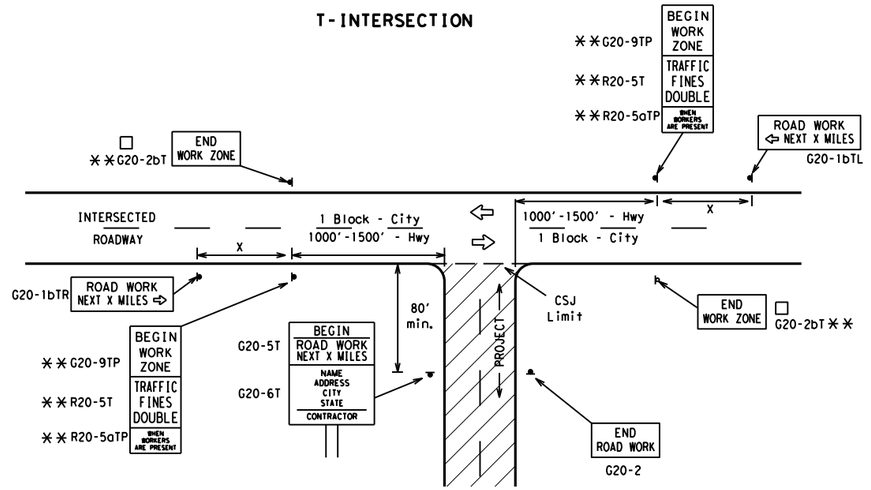
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

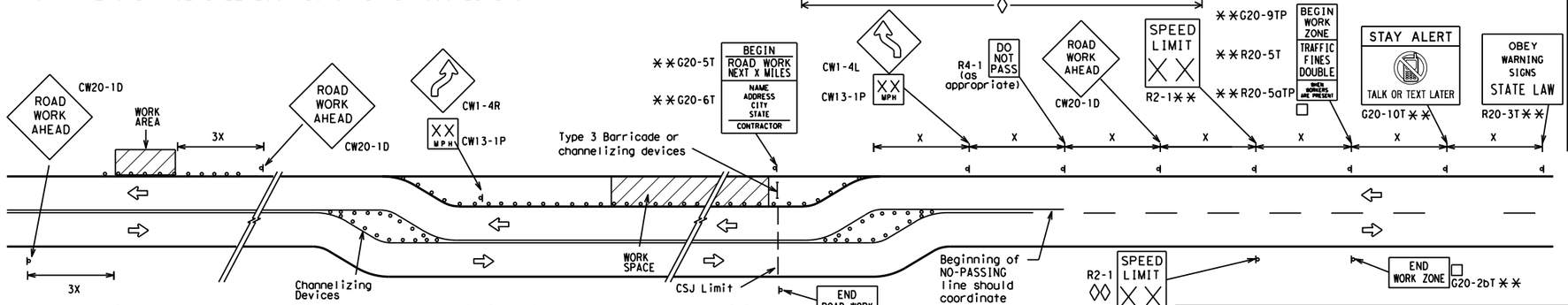
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

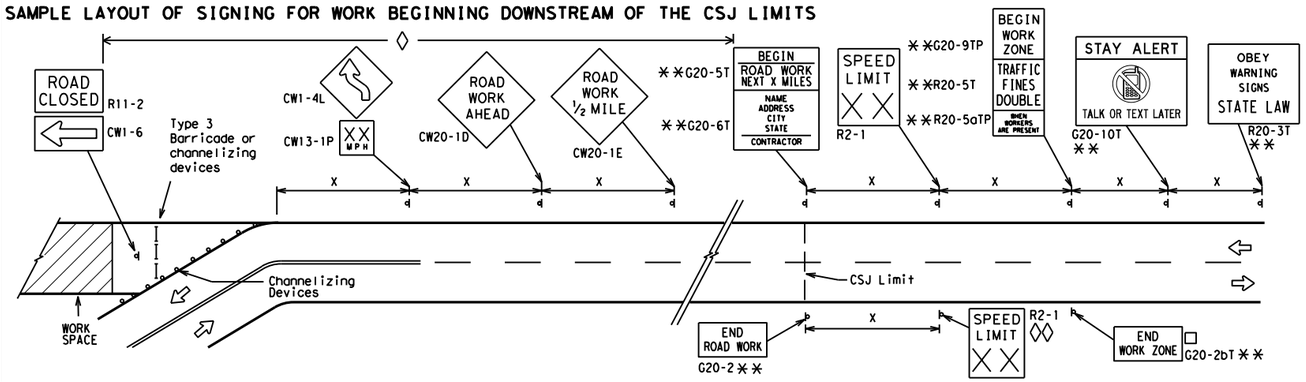
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

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

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

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

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

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

LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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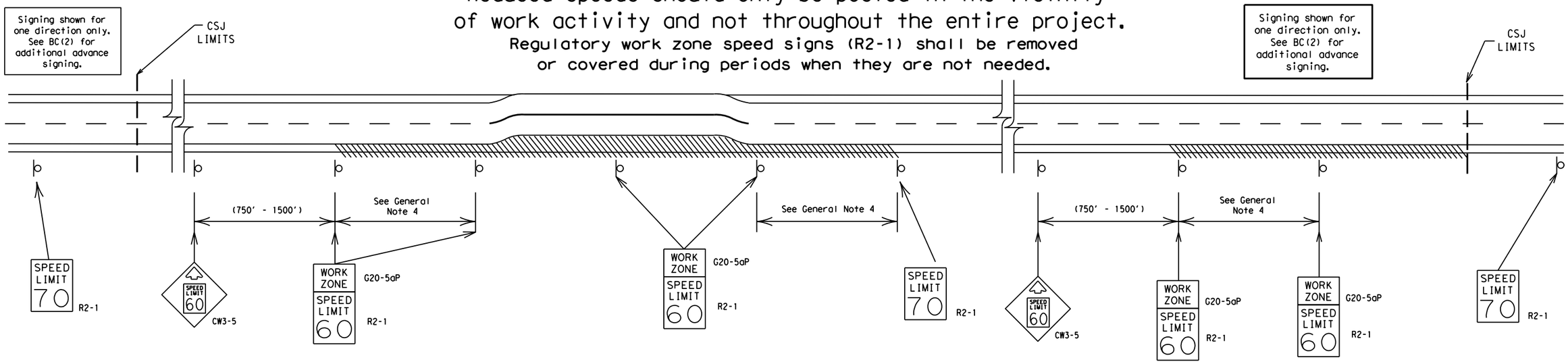
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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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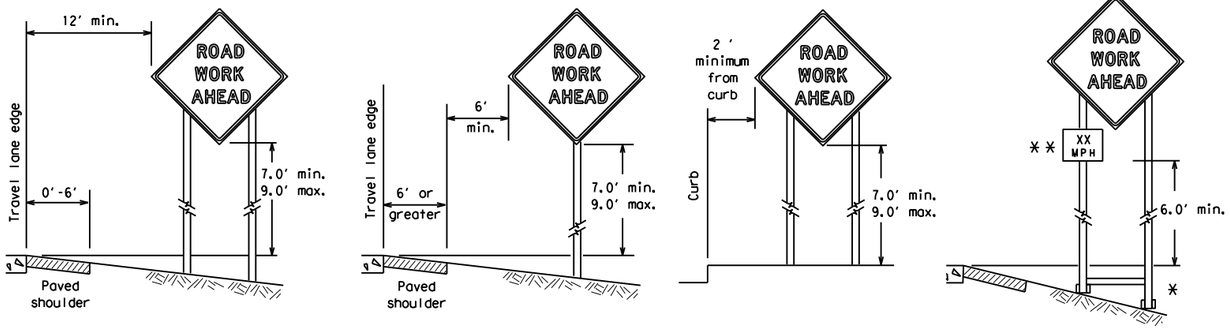
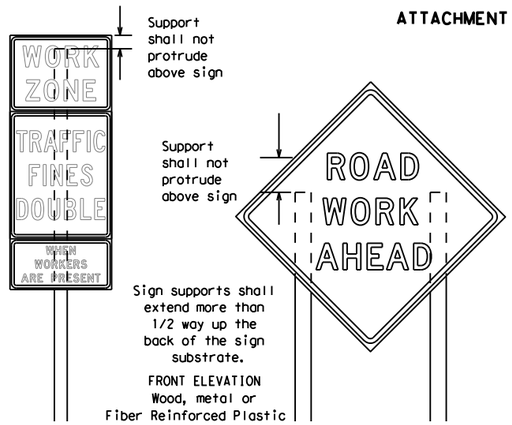
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

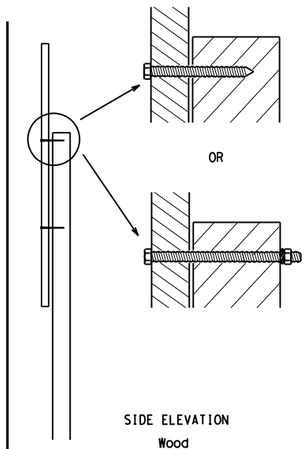


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





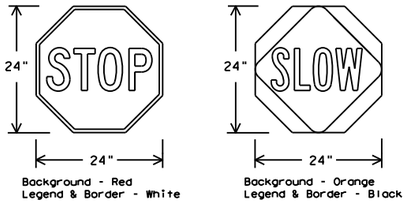
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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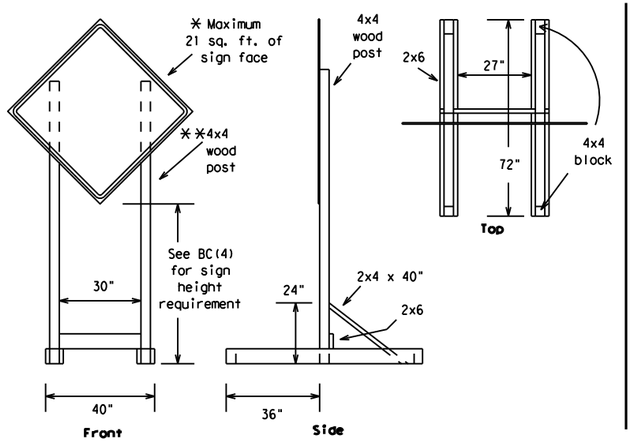
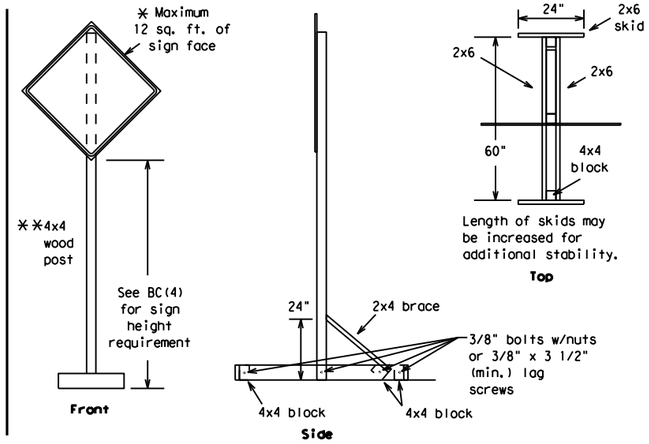
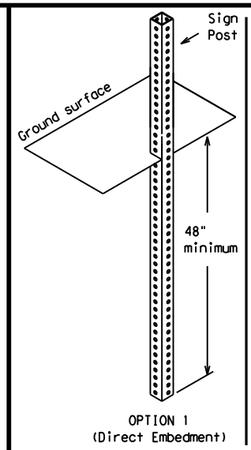
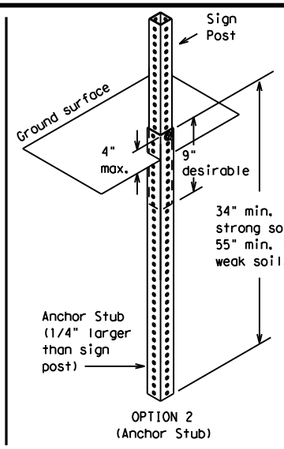


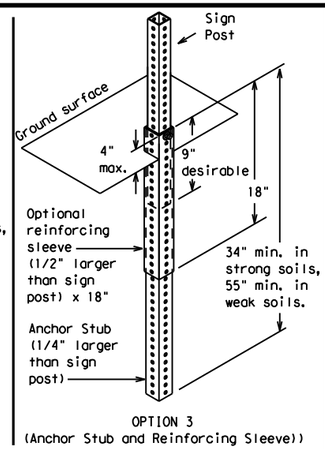


SKID MOUNTED WOOD SIGN SUPPORTS

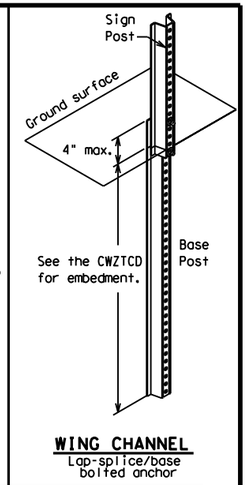
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







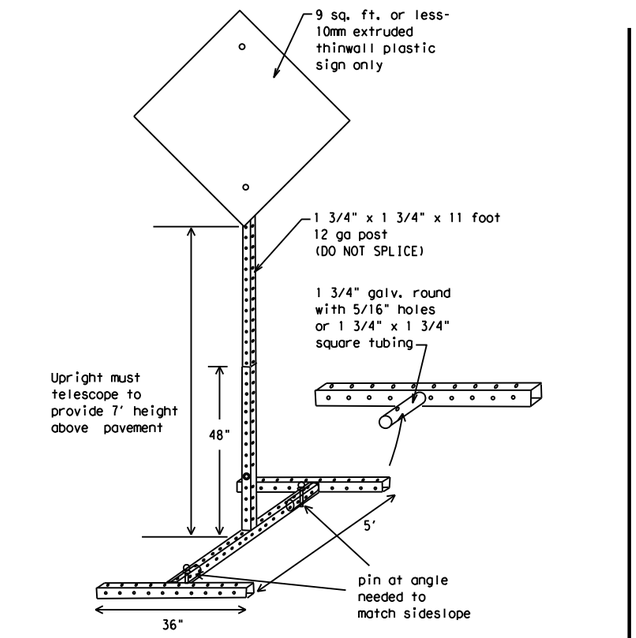
PERFORATED SQUARE METAL TUBING

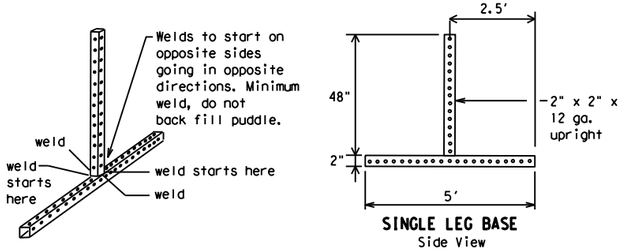


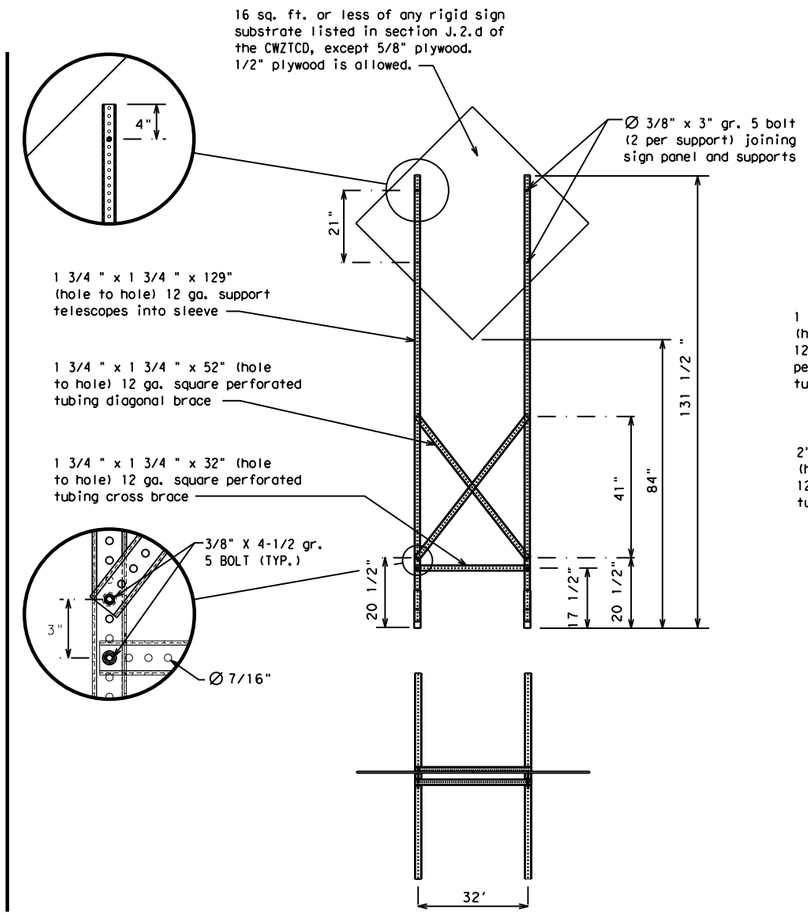
WING CHANNEL
Lap-splice/base bolted anchor

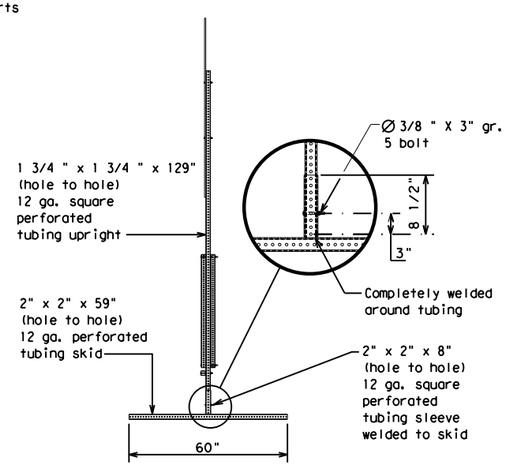
GROUND MOUNTED SIGN SUPPORTS

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









SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	NAVARRO		32

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic 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	0092	06	105	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	NAVARRO		33

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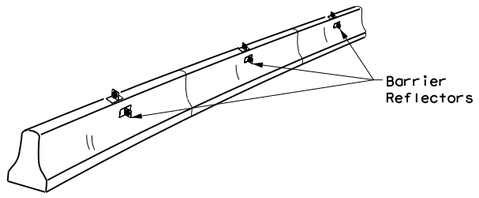
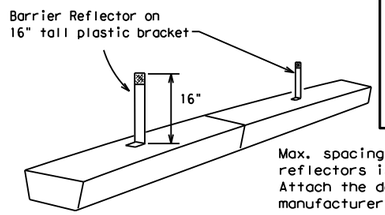
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

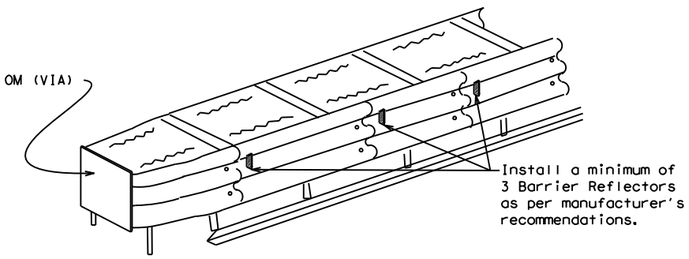


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

LOW PROFILE CONCRETE BARRIER (LPCB)

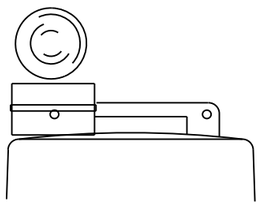


DELINEATION OF END TREATMENTS

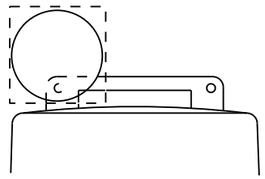
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

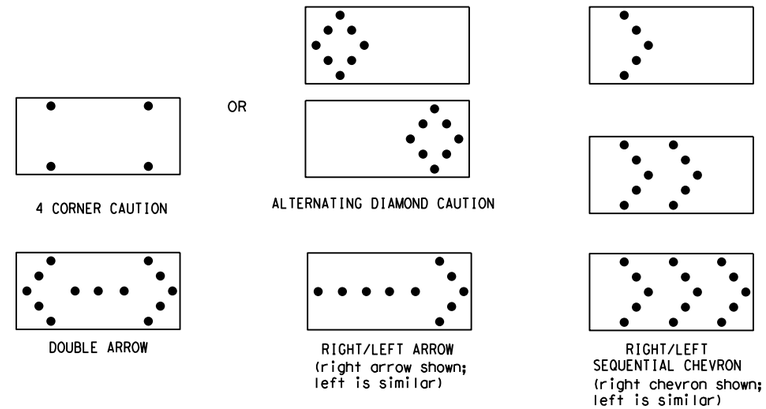
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

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REVISIONS	0092	06	105	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
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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:

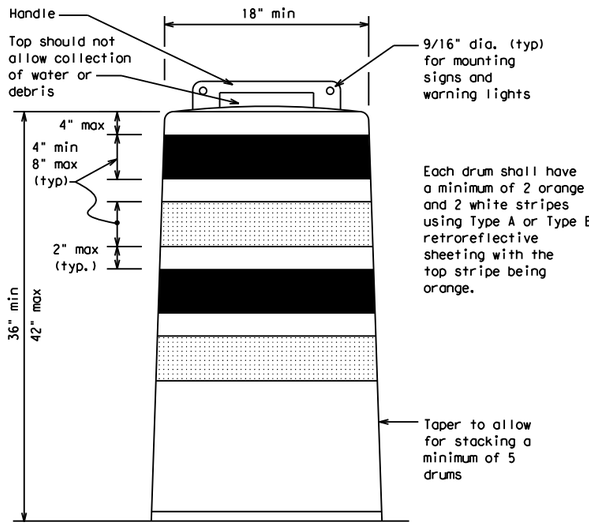
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

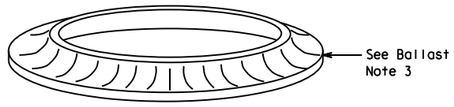
RETROREFLECTIVE SHEETING

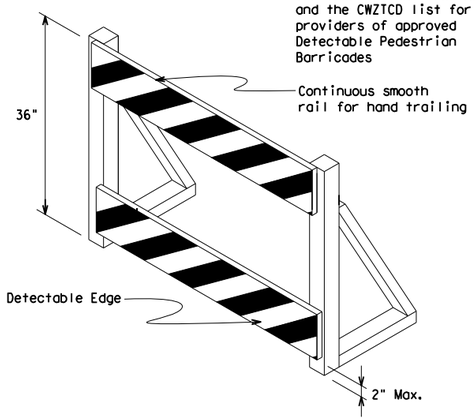
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

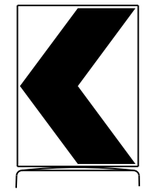




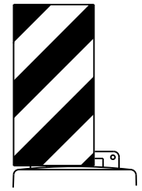


DETECTABLE PEDESTRIAN BARRICADES

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

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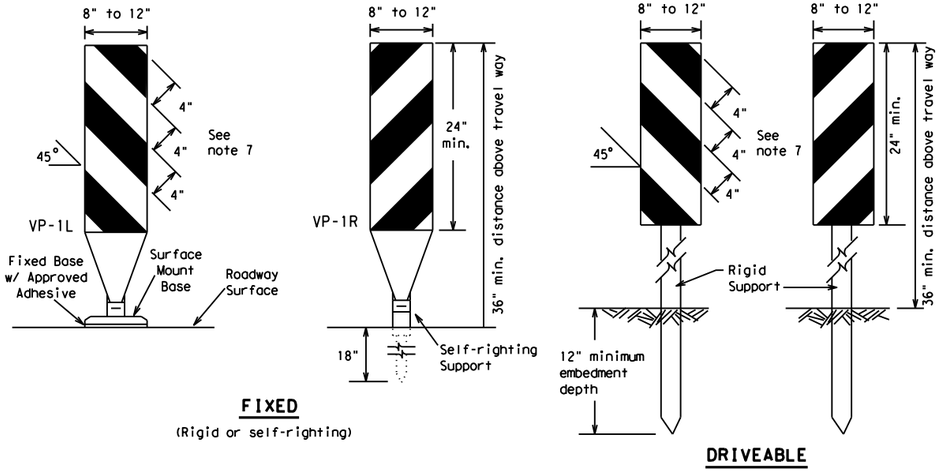
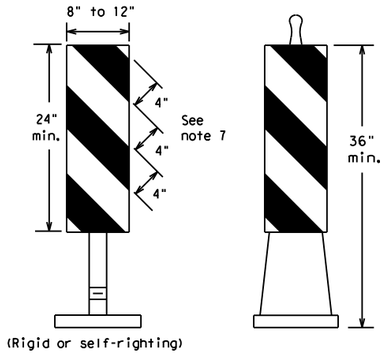


FIXED
(Rigid or self-righting)

DRIVEABLE

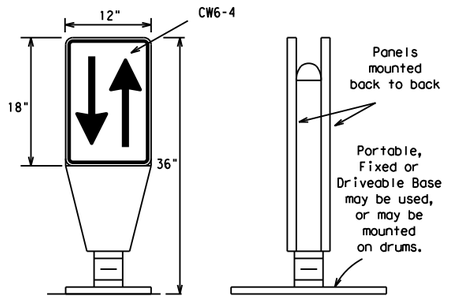


(Rigid or self-righting)

PORTABLE

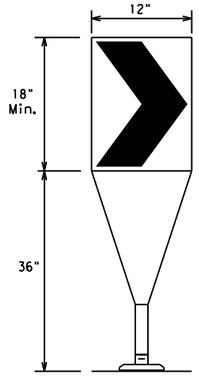
VERTICAL PANELS (VPs)

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual 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.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



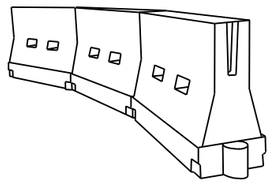
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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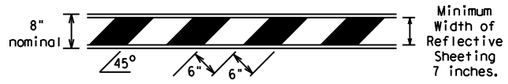
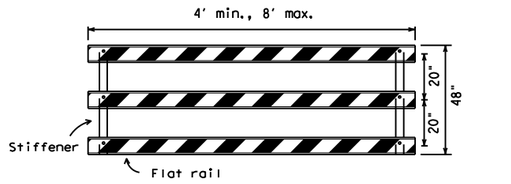
TYPE 3 BARRICADES

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.



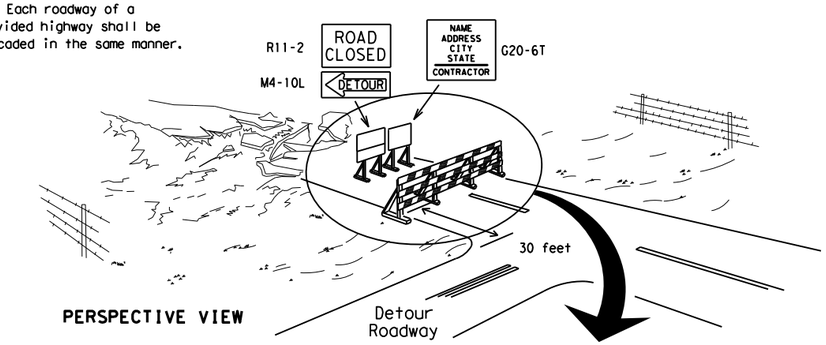
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

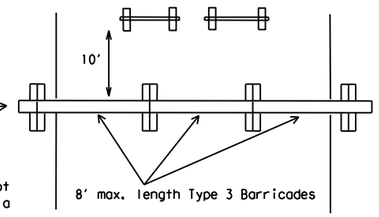
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

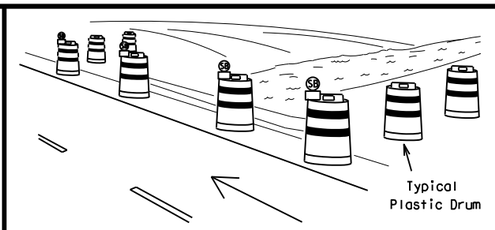
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

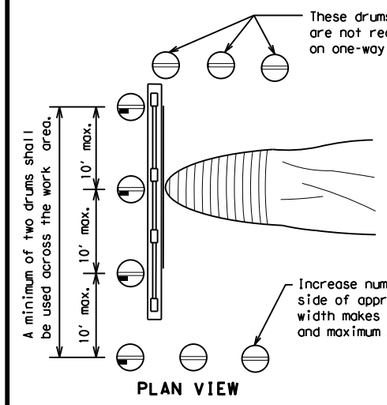
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

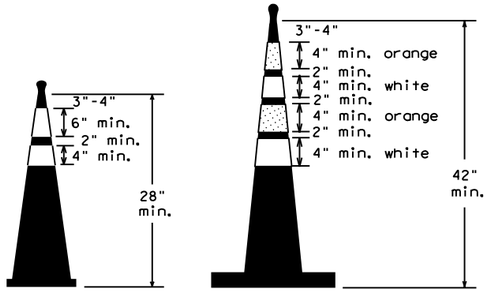
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.



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

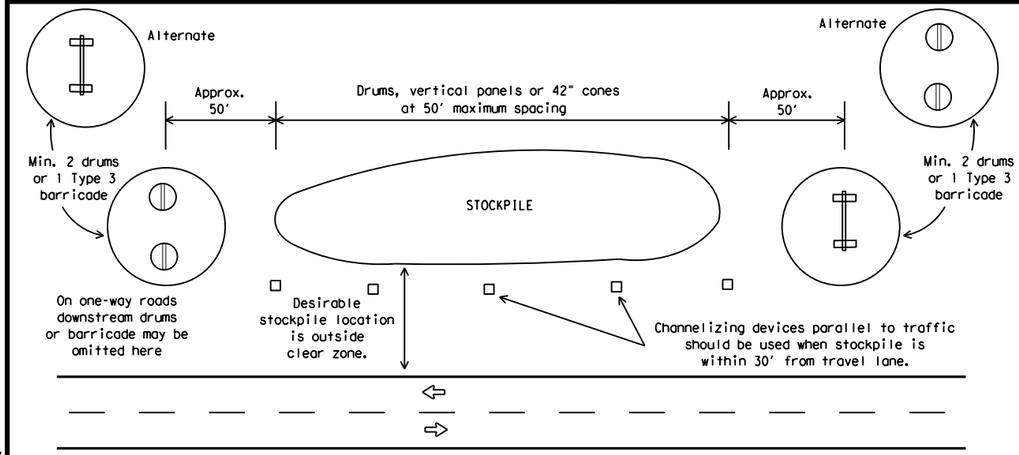
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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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	0092	06	105	IH 45
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	DAL	NAVARRO		37

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

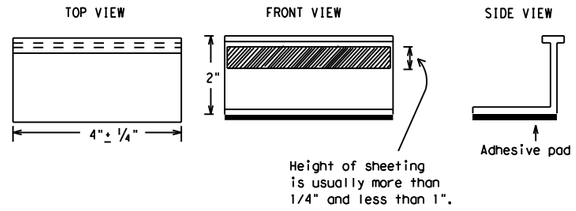
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0092	06	105	IH 45
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	DAL	NAVARRO		38
11-02 8-14				

105

DATE:
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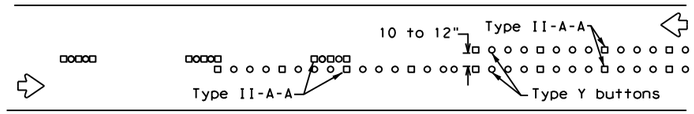
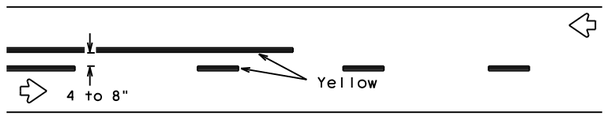
PAVEMENT MARKING PATTERNS

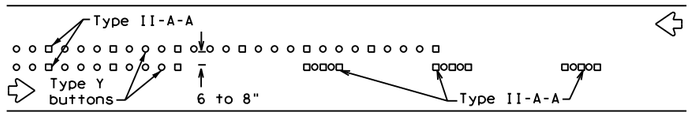
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



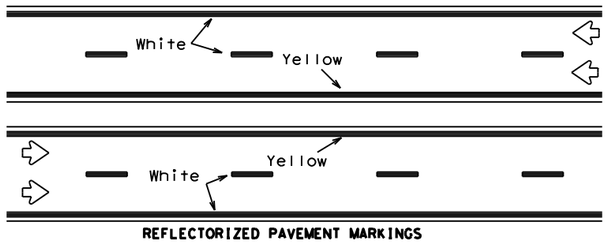
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



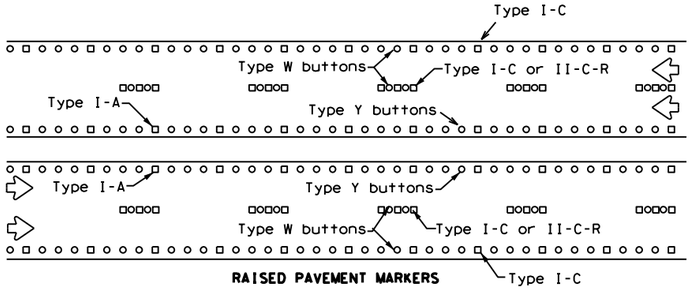
RAISED PAVEMENT MARKERS - PATTERN B

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

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



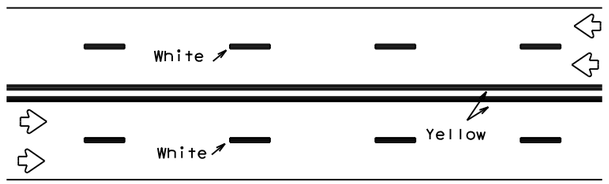
REFLECTORIZED PAVEMENT MARKINGS



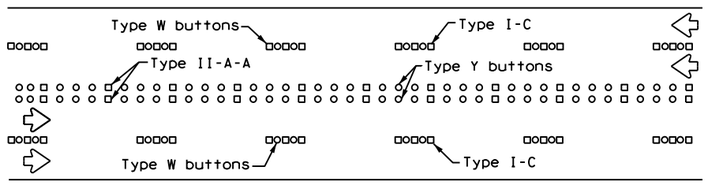
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



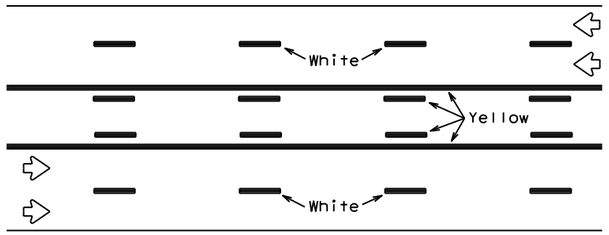
REFLECTORIZED PAVEMENT MARKINGS



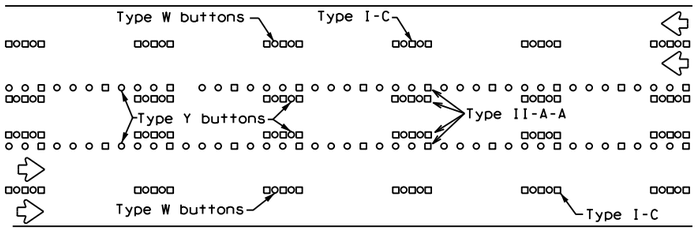
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

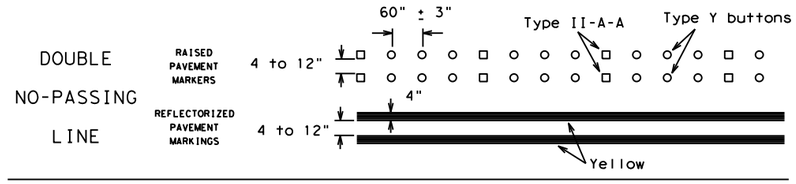
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

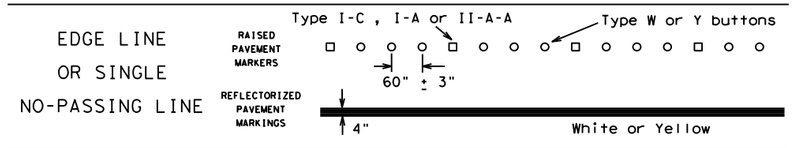
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

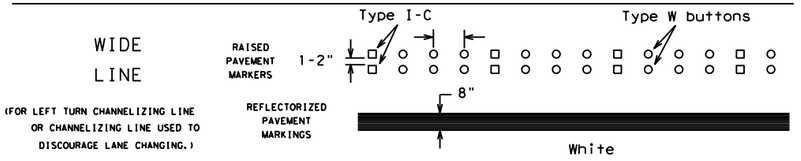


EDGE LINE OR SINGLE NO-PASSING LINE



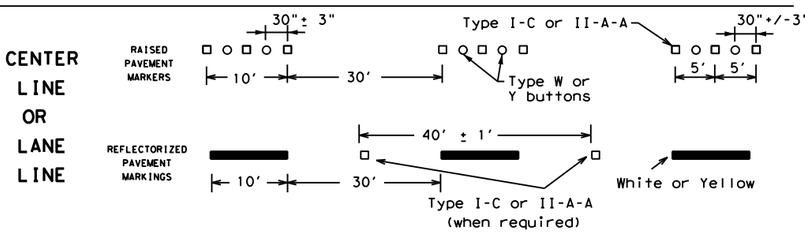
WIDE LINE

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

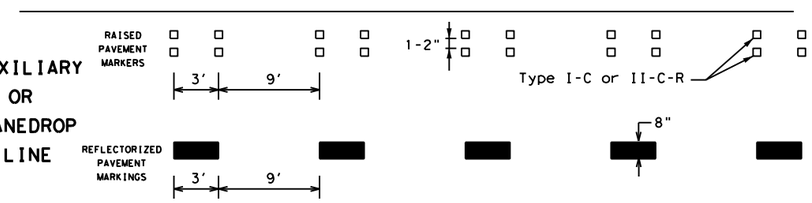


BROKEN LINES

CENTER LINE OR LANE LINE

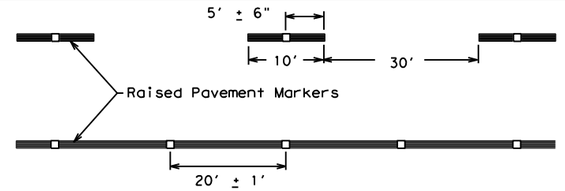


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

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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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	DAL	NAVARRO		39

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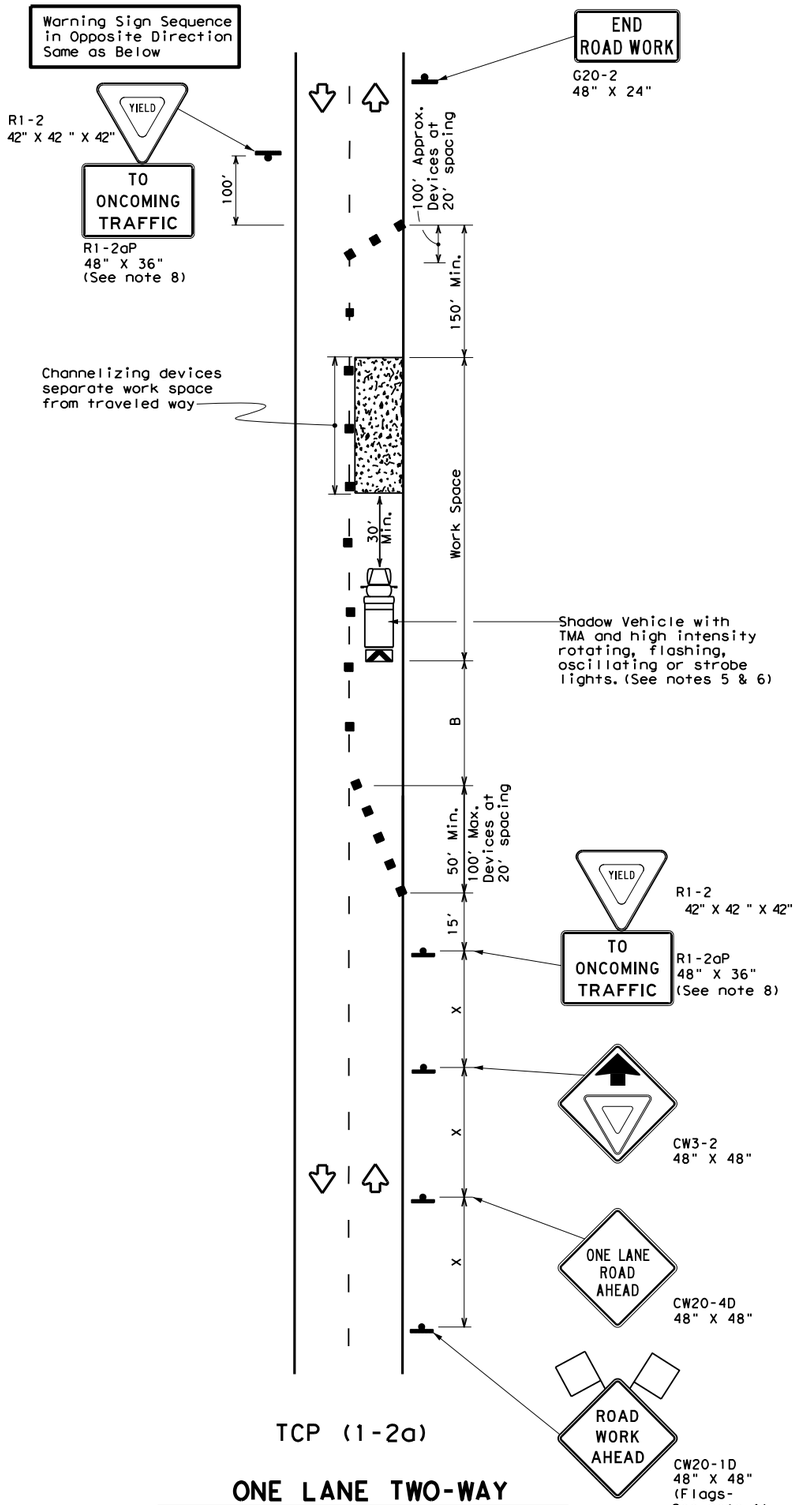
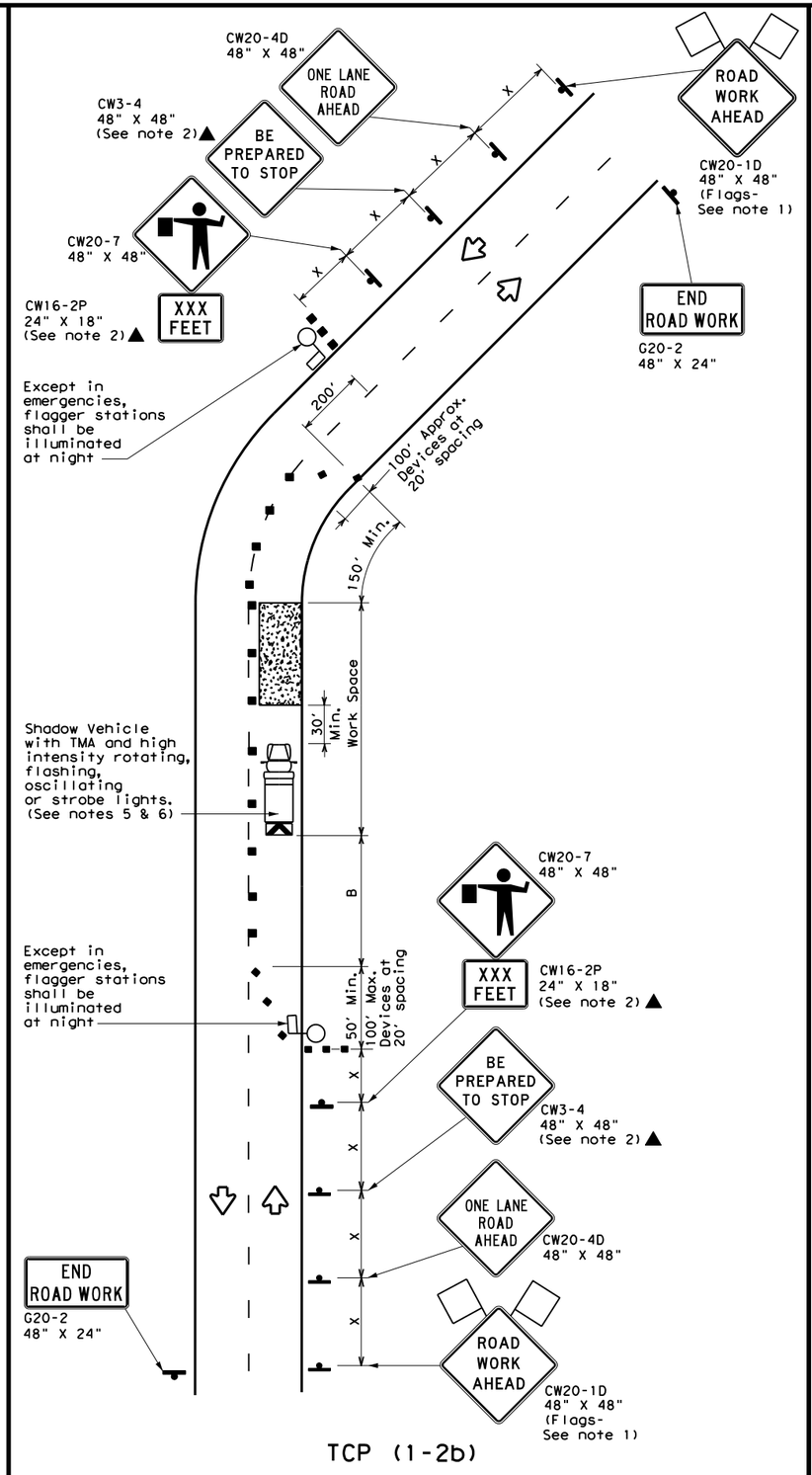


TCP (1-2a)

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:
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REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0092	06	105	IH 45
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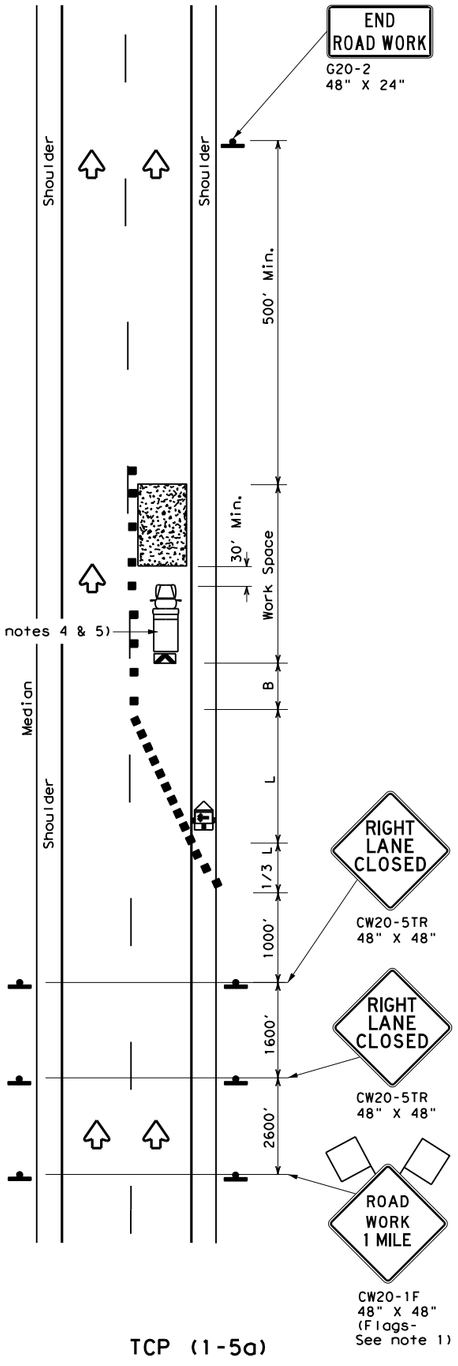
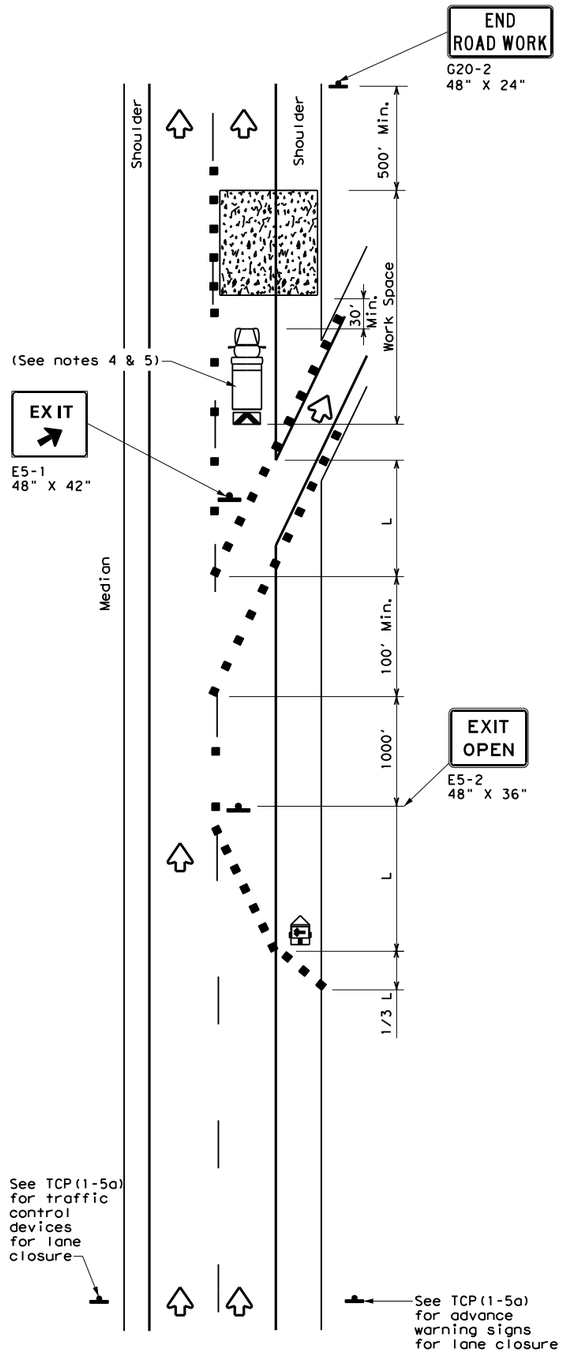


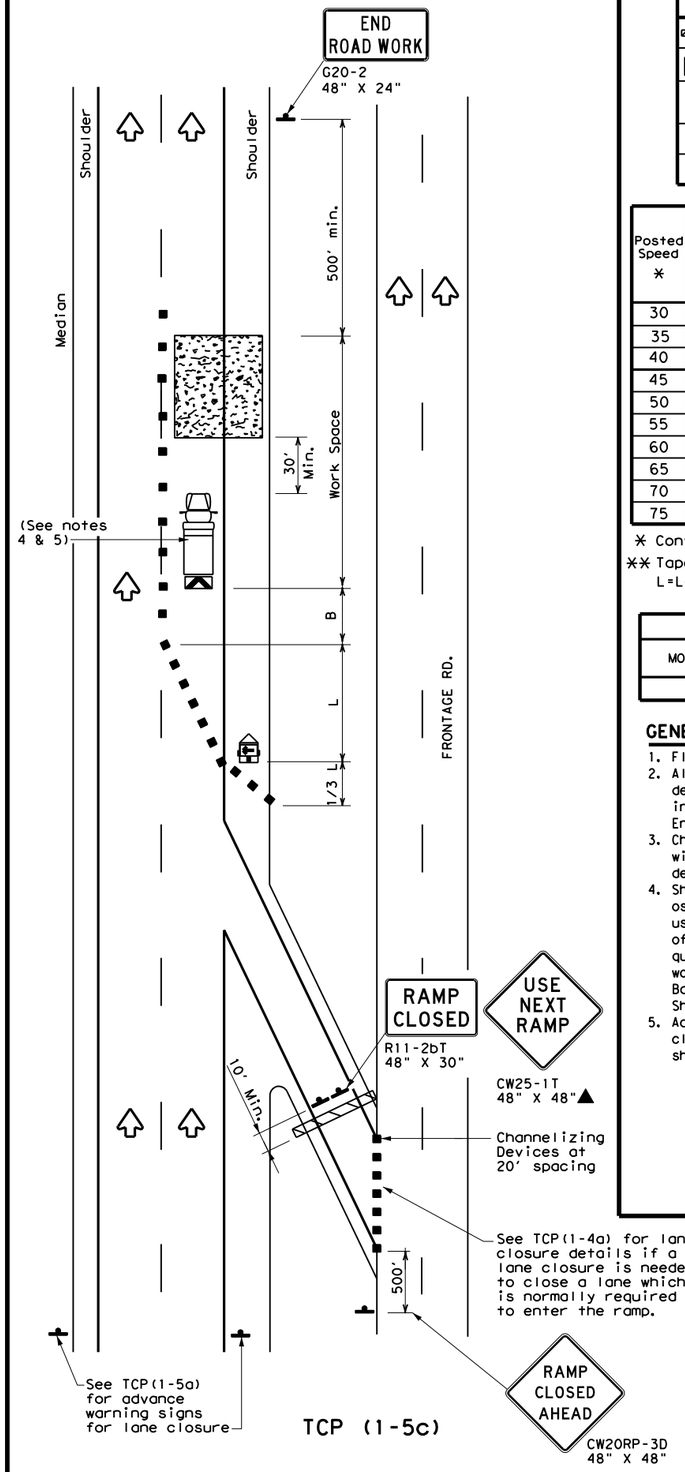
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		41

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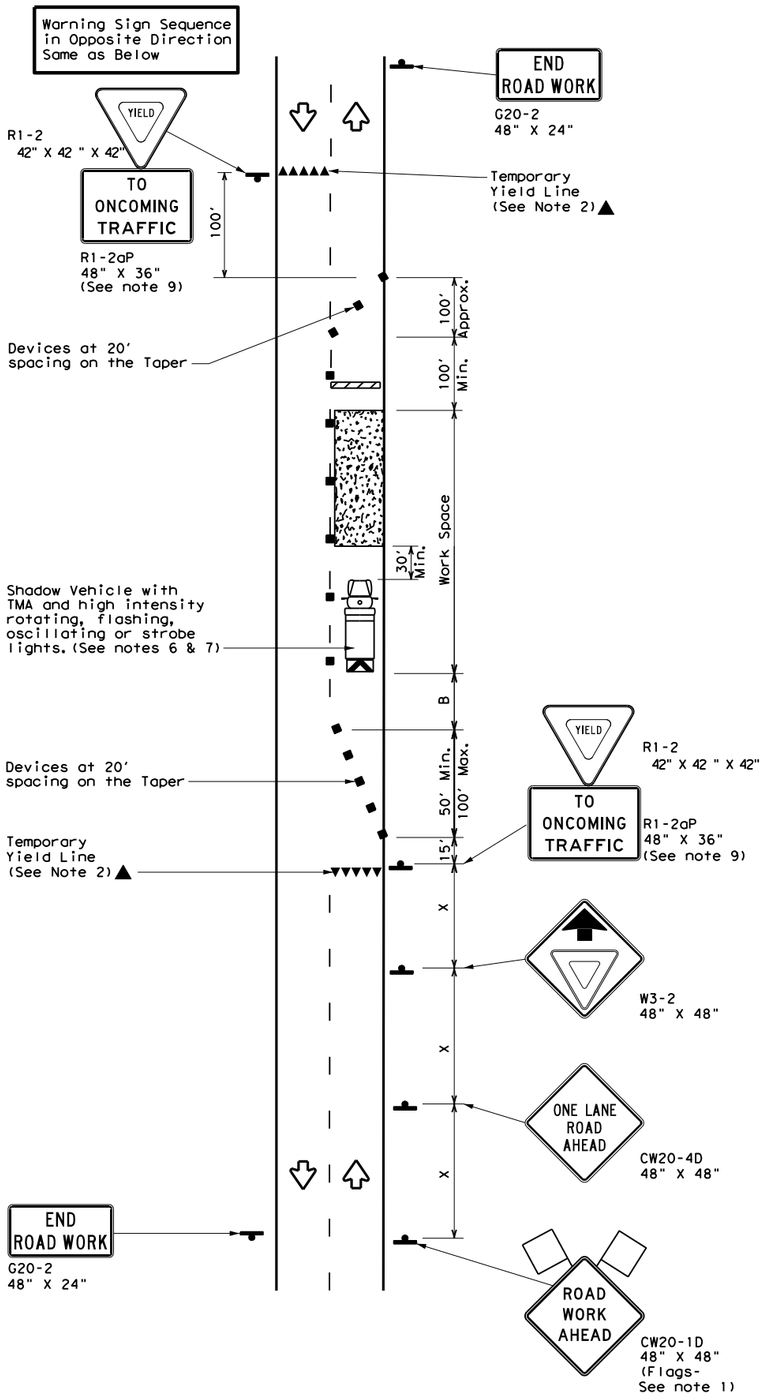
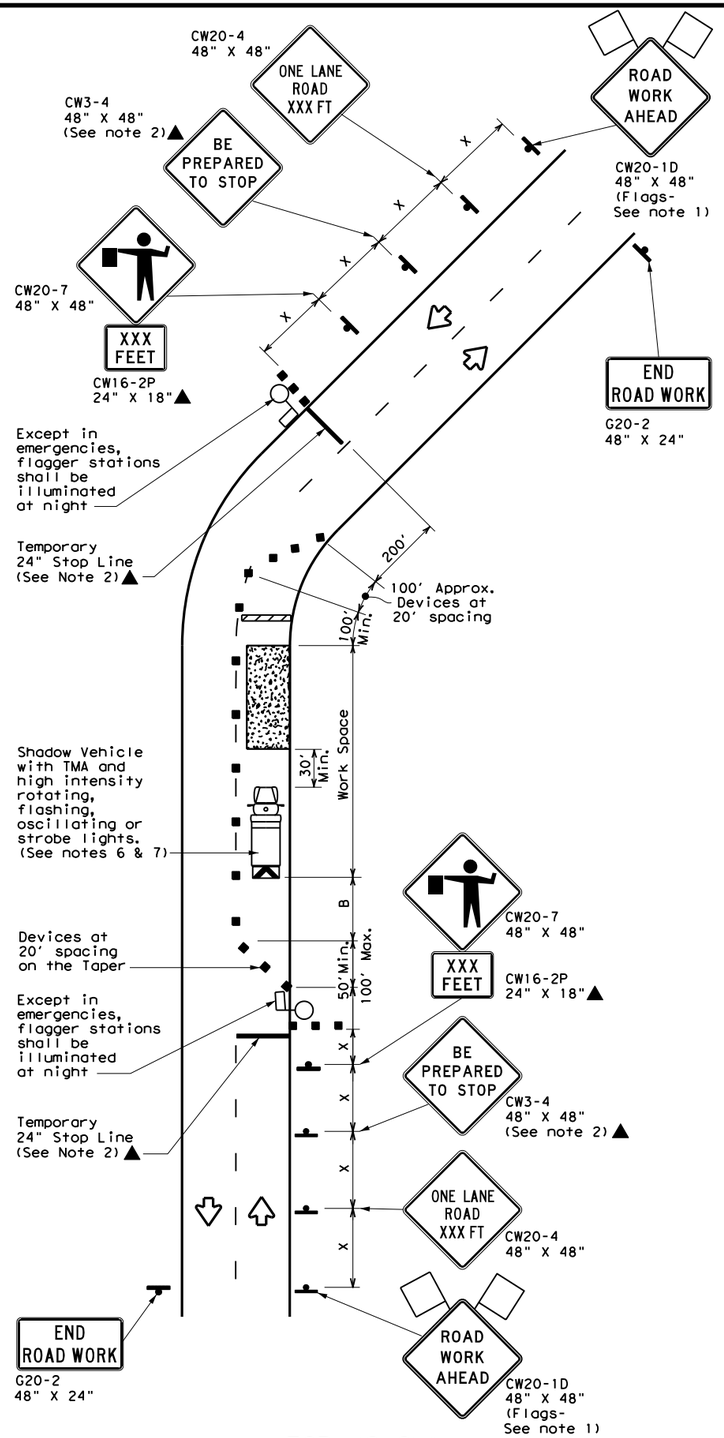


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation

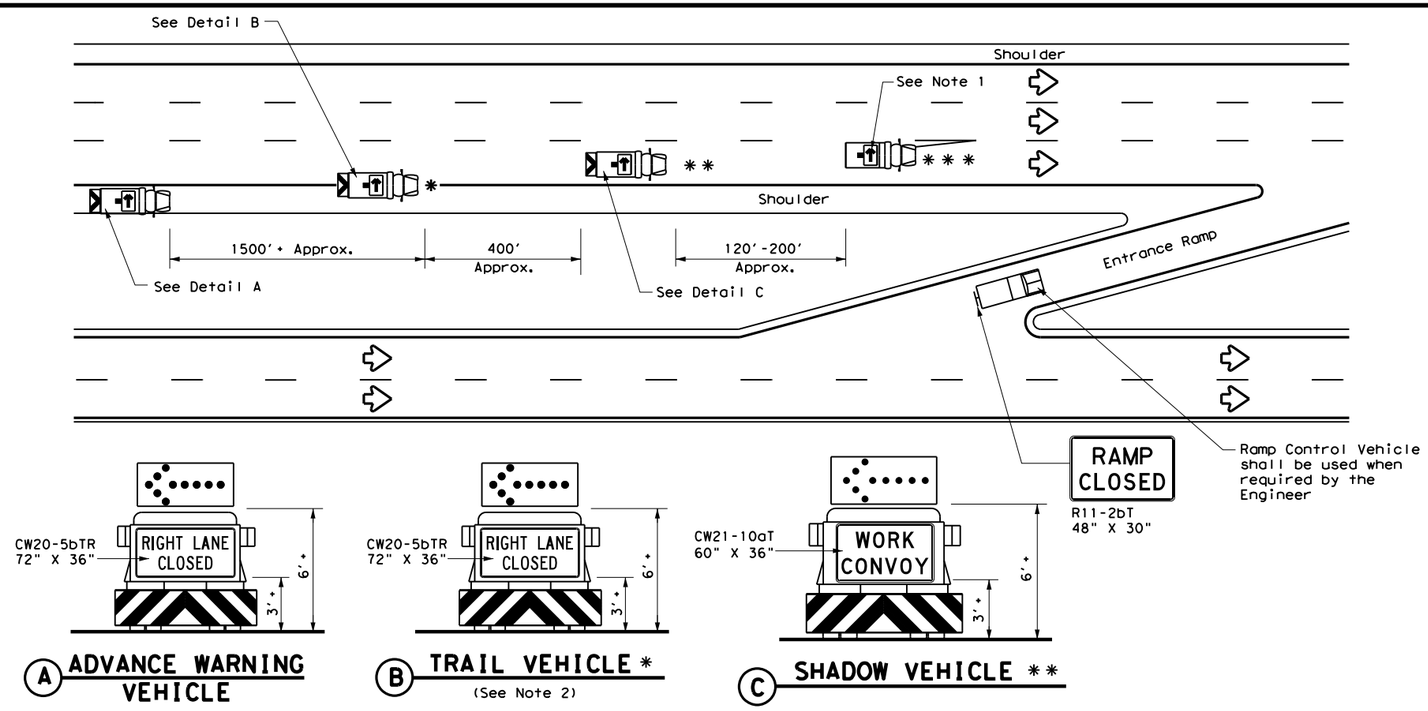
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

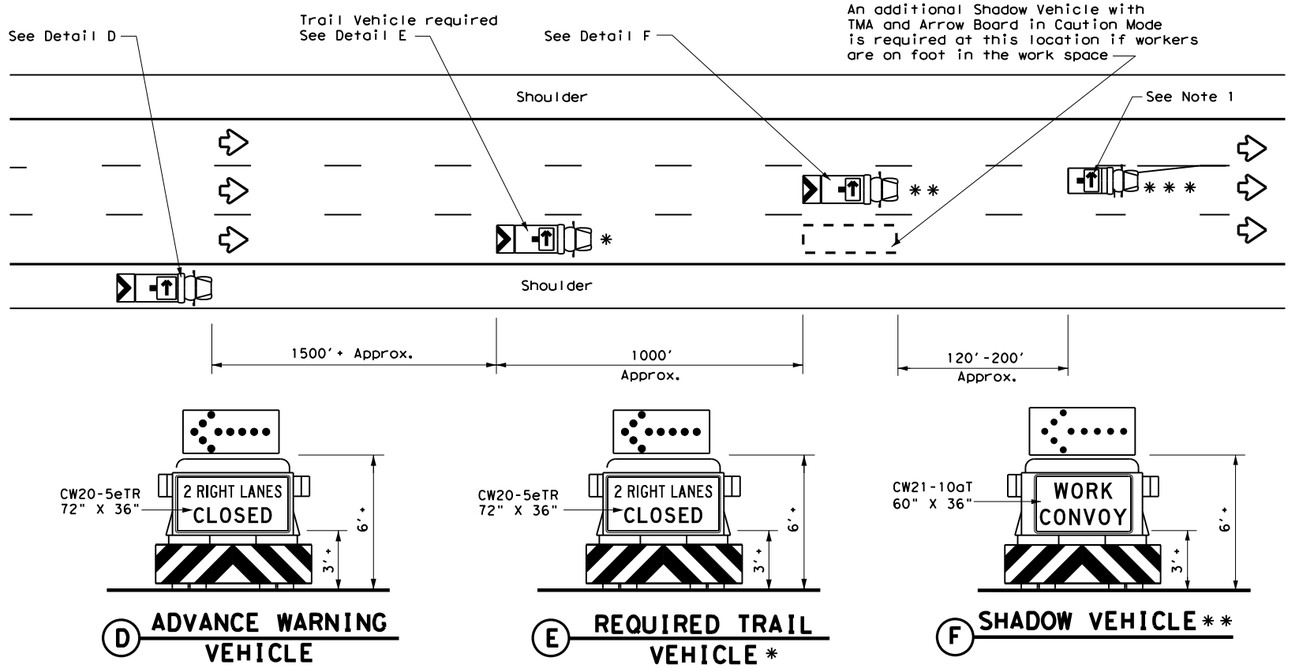
TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	DAL	NAVARRO		42
4-98 2-18				

DATE:
FILE:



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



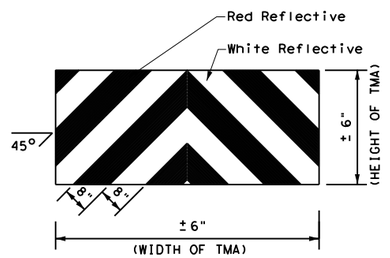
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

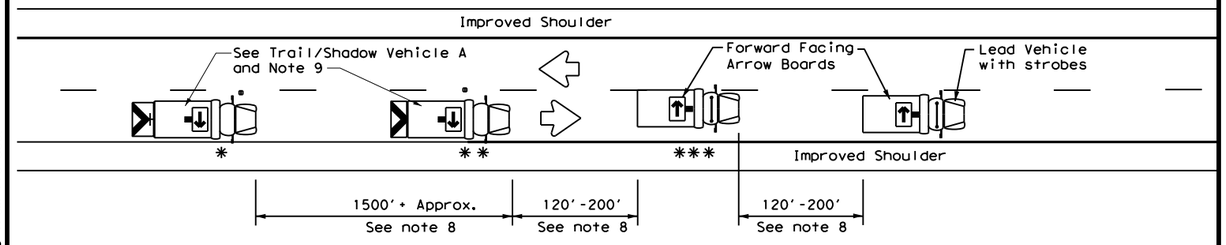
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

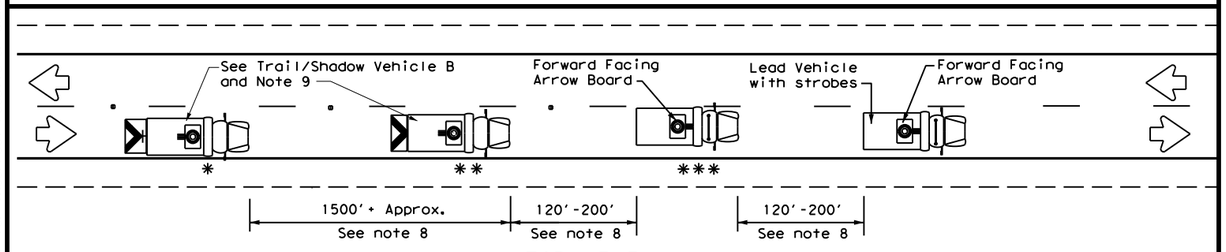
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	DAL	NAVARRO		43
1-97				

176



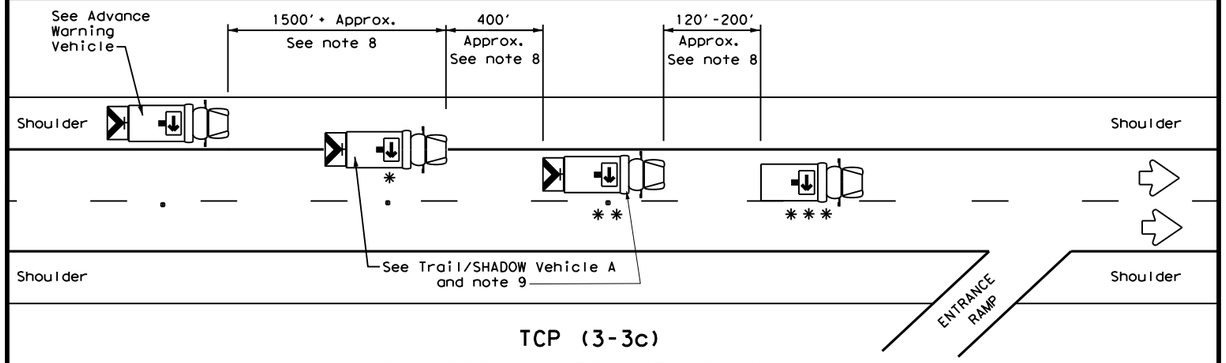
TCP (3-3a)

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



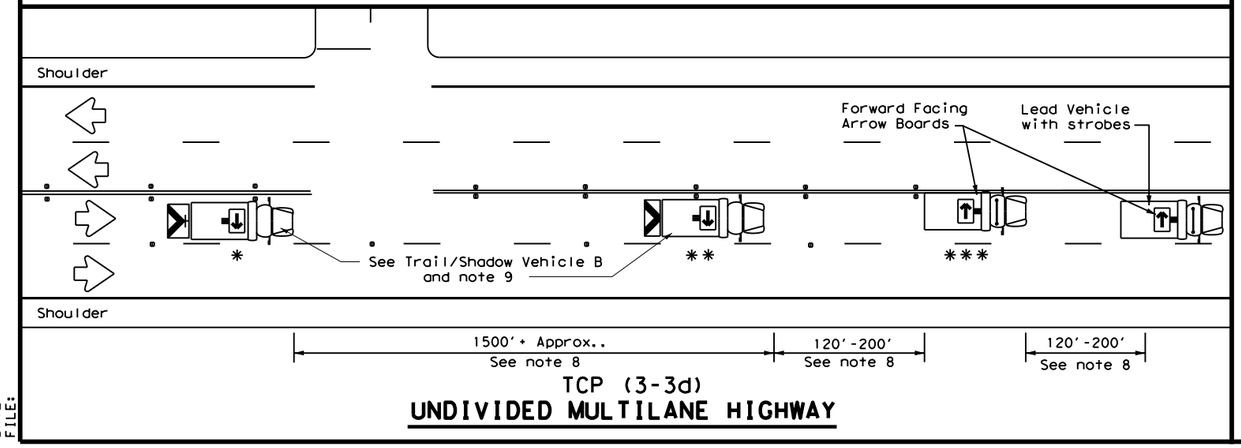
TCP (3-3b)

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



TCP (3-3c)

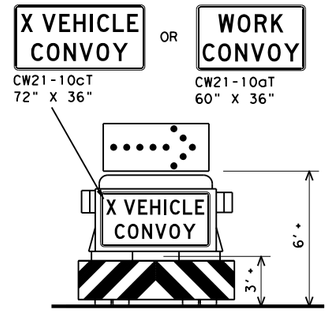
DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

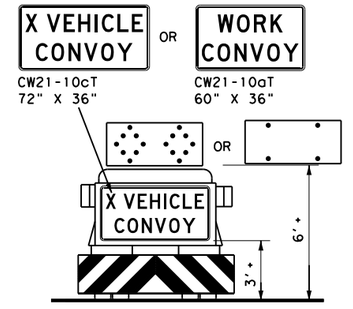
UNDIVIDED MULTILANE HIGHWAY

DATE:
FILE:



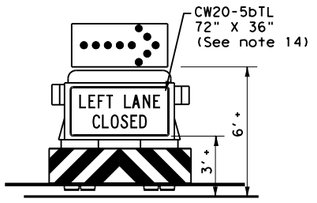
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

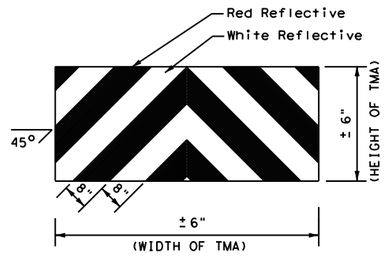


TRAIL/SHADOW VEHICLE B

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

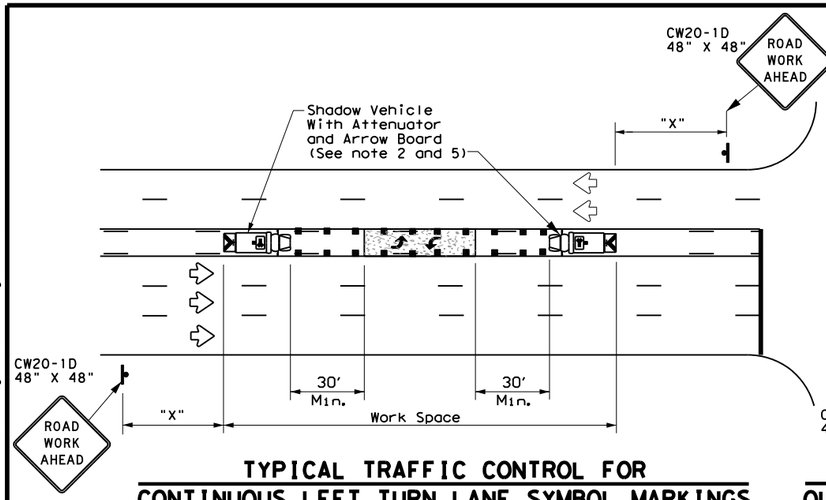
1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer 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

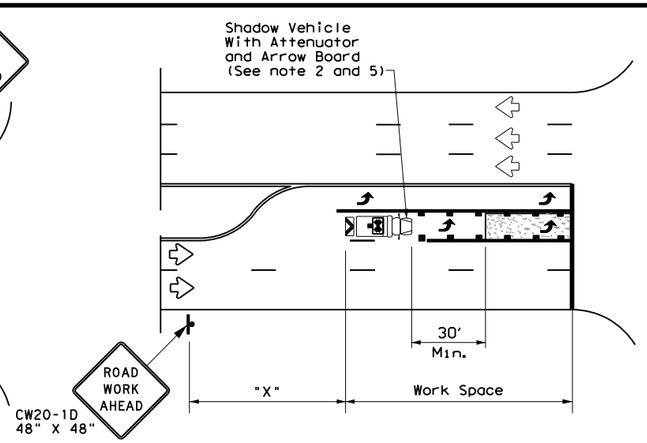
Traffic Operations Division Standard

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

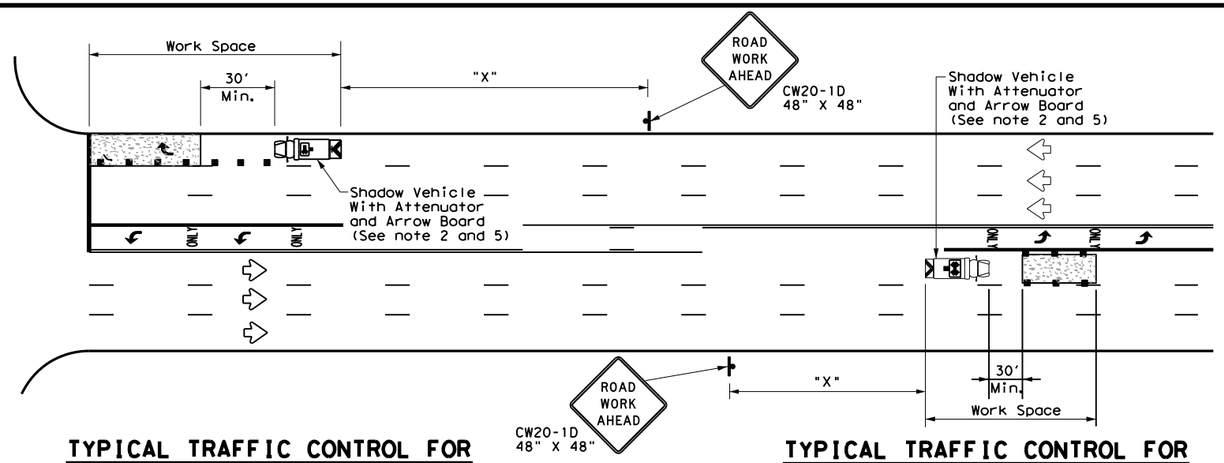
FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	DAL	NAVARRO		44
1-97 7-14				



TYPICAL TRAFFIC CONTROL FOR CONTINUOUS LEFT TURN LANE SYMBOL MARKINGS

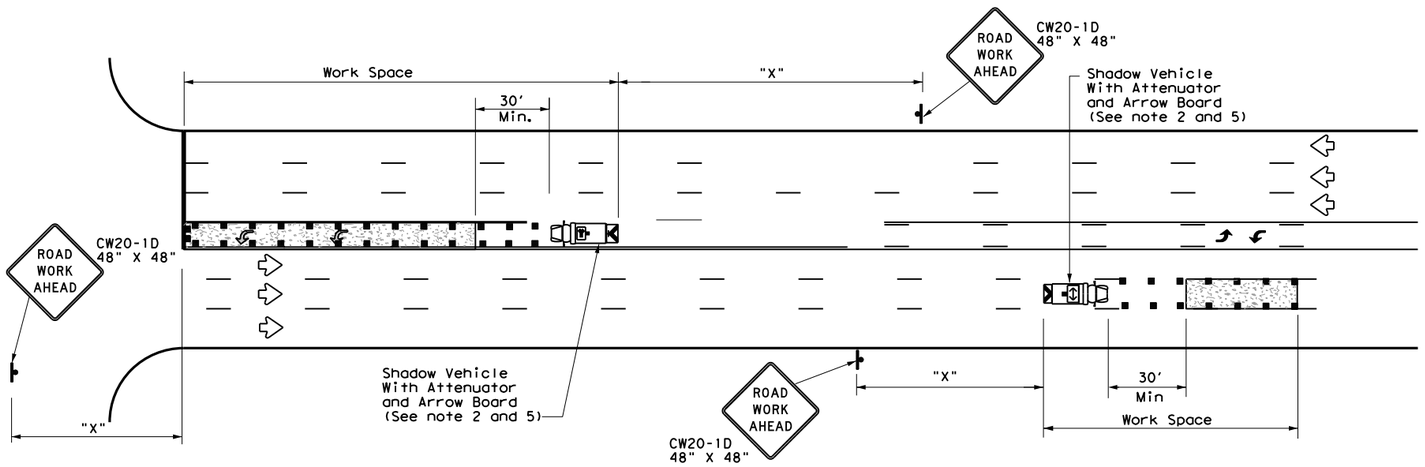


TYPICAL TRAFFIC CONTROL FOR OUTSIDE DUAL LEFT TURN LANE SYMBOL MARKINGS



TYPICAL TRAFFIC CONTROL FOR OUTSIDE LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR INSIDE LANE MARKINGS



TYPICAL TRAFFIC CONTROL FOR LEFT TURN LANE MARKINGS

TYPICAL TRAFFIC CONTROL FOR CENTER LANE MARKINGS

DATE:
FILE:

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		Channelizing Devices

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'

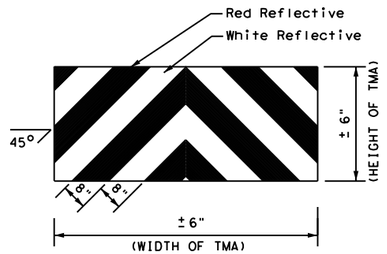
* Conventional Roads Only

** 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. This traffic control plan is for use on conventional roads posted at 45 mph or less and is intended for mobile operations that move continuously or intermittently (stopping up to approximately 15 minutes) such as short-line striping and in-lane rumble strips. When activities are anticipated to take longer amounts of time or traffic conditions warrant, a short duration or short-term stationary traffic control plan should be used.
2. A Truck Mounted Attenuator shall be used on Shadow Vehicle. Striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of departmental material specification DMS-8300, Type A.
3. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
4. The use of yellow rotating beacons or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the drivers side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
5. Flashing arrow board shall be used on Shadow Vehicle. Flashing arrow board shall be Type B or Type C as per BC Standards. The arrow board operation shall be controlled from inside the truck.



STRIPING FOR TMA

Texas Department of Transportation

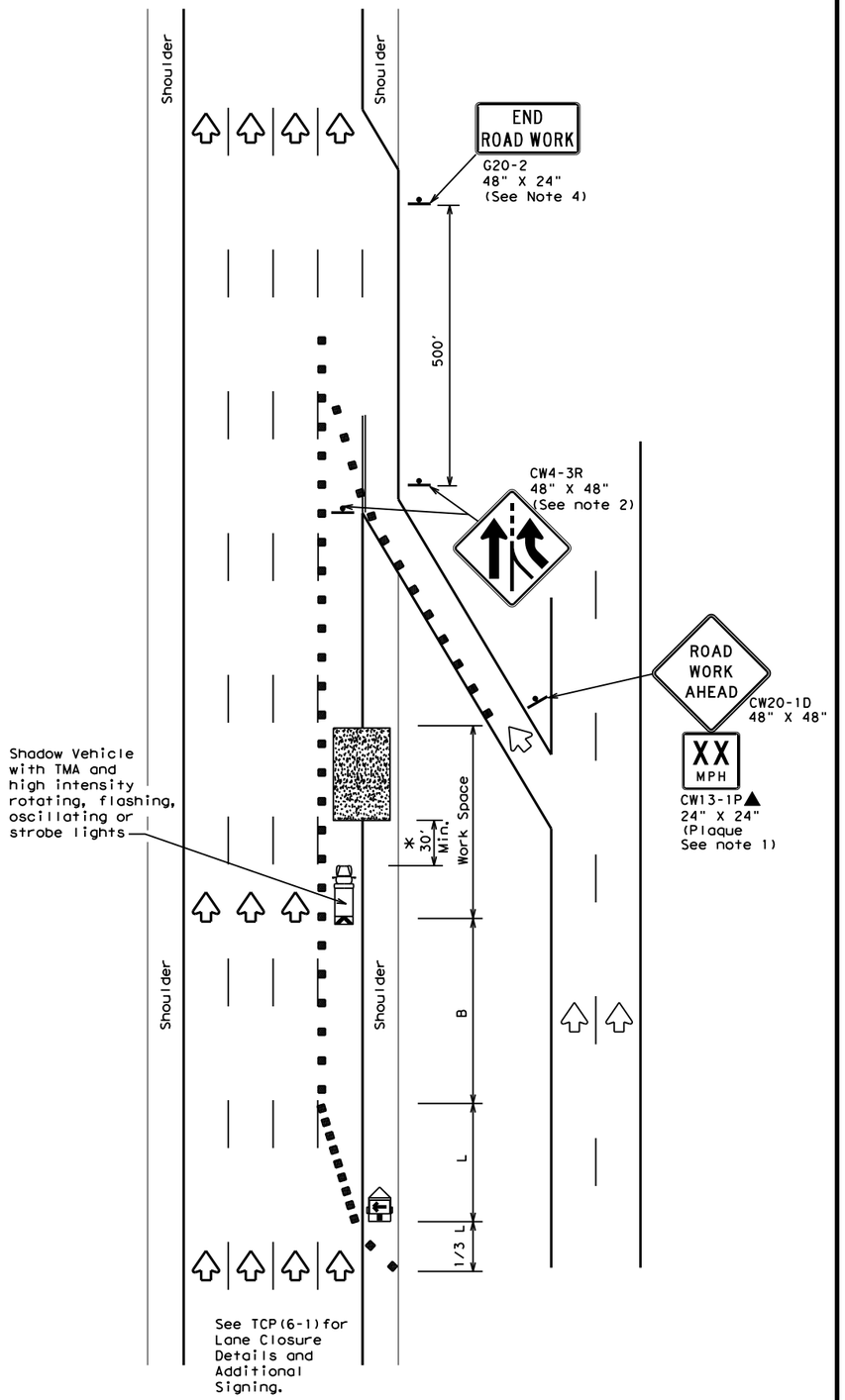
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS FOR ISOLATED WORK AREAS UNDIVIDED HIGHWAYS

TCP(3-4)-13

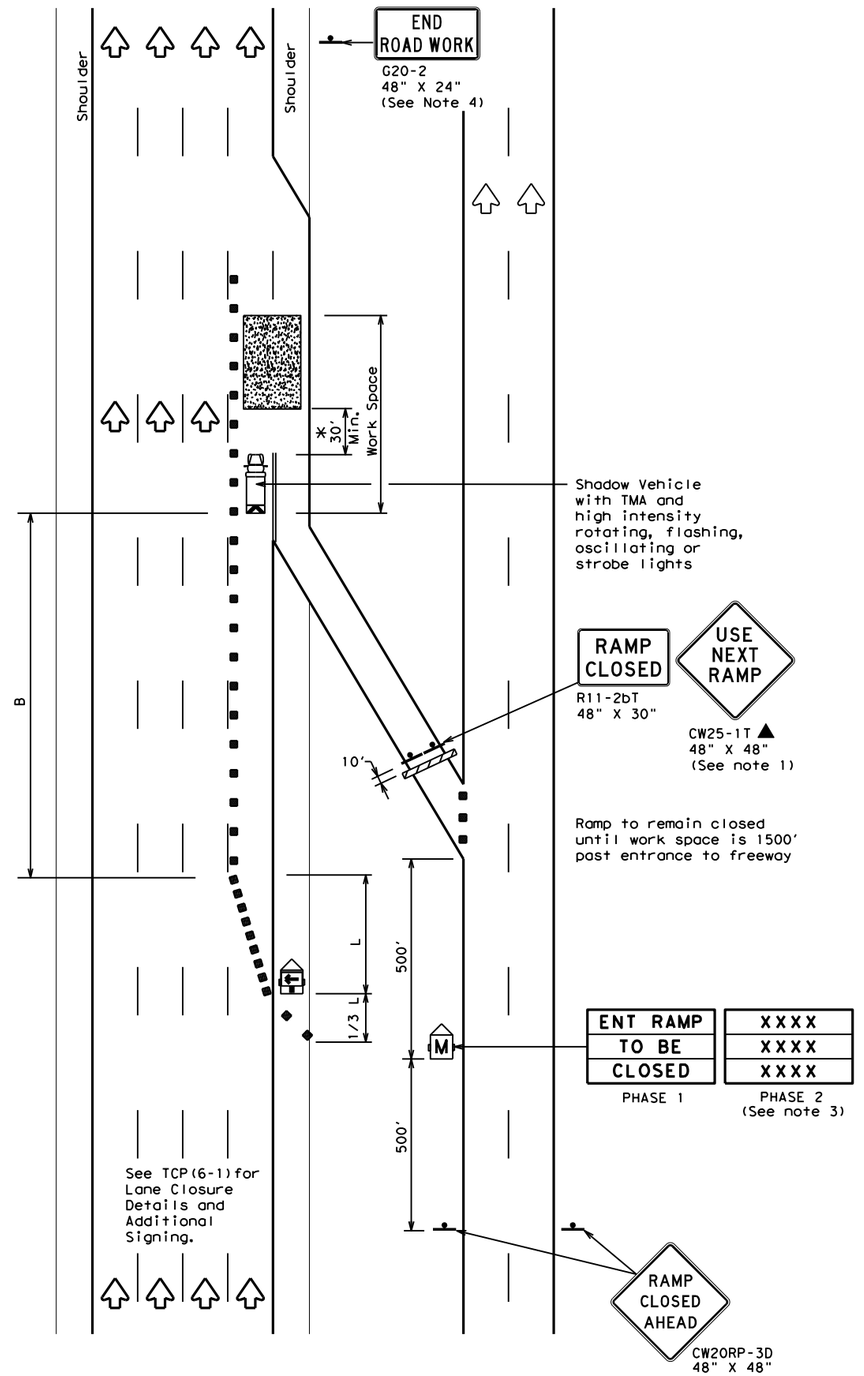
FILE: tcp3-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT July, 2013	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		45

DATE:
FILE:



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP CLOSED

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

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

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

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
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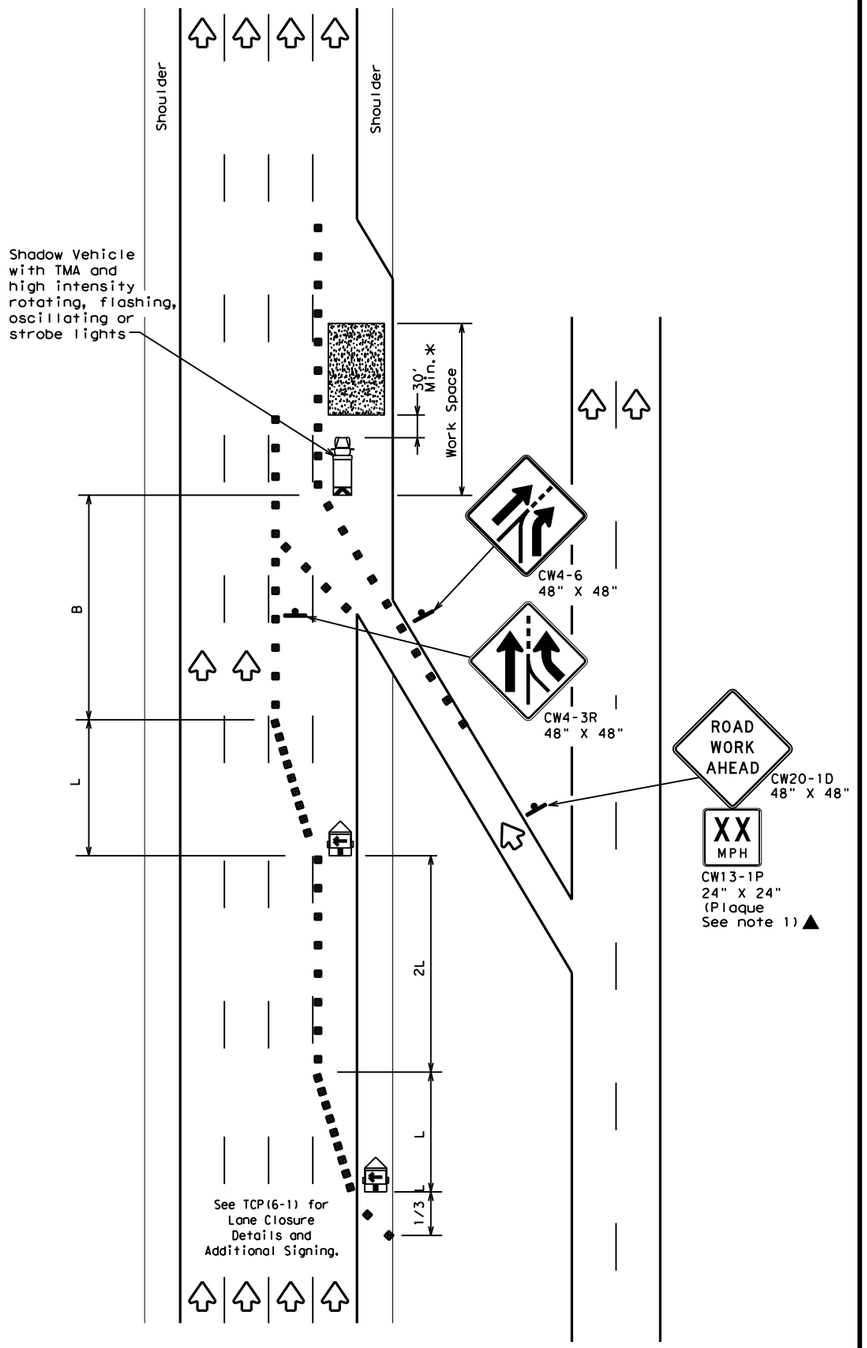
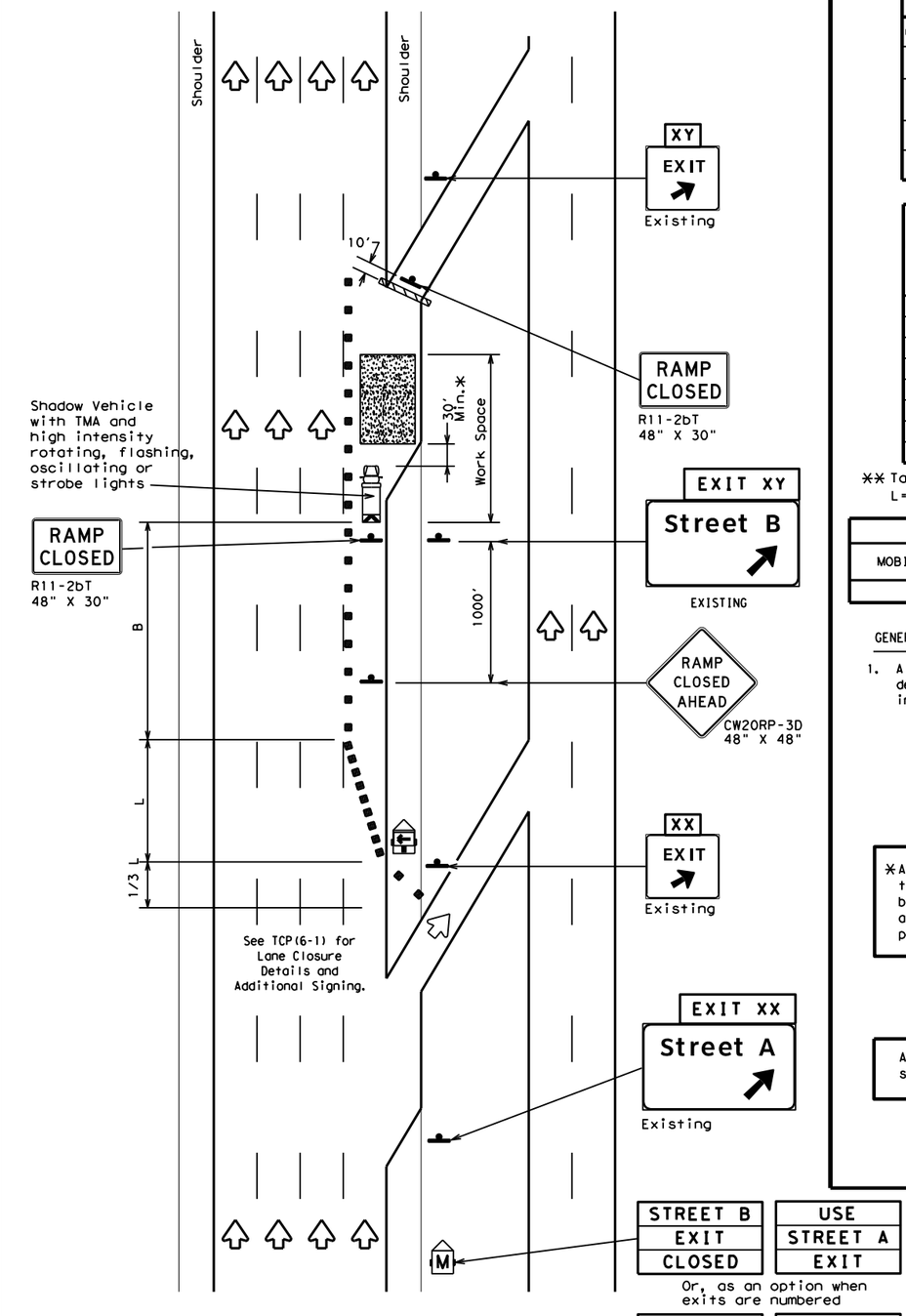
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	NAVARRO		46



TCP (6-3a)

ENTRANCE RAMP OPEN



STREET B EXIT CLOSED	USE STREET A EXIT

Or, as an option when exits are numbered

EXIT XY CLOSED	USE EXIT XX

Place 1 mile (approx.) in advance of Street A exit.

TCP (6-3b)

EXIT RAMP CLOSED
TRAFFIC EXITS PRIOR TO CLOSED RAMP

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.

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

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

Texas Department of Transportation
Traffic Operations Division Standard

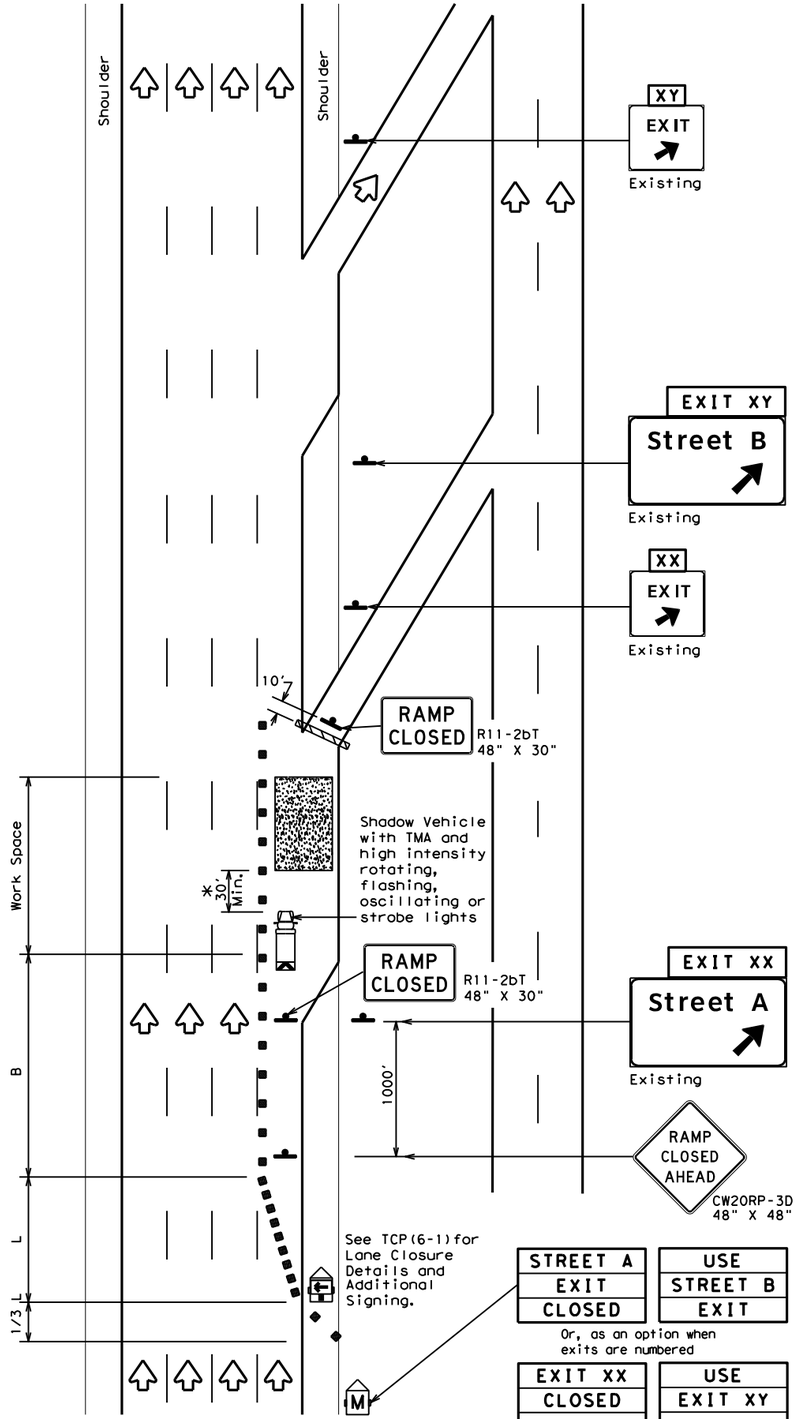
TRAFFIC CONTROL PLAN
WORK AREA BEYOND RAMP

TCP(6-3)-12

FILE: tcp6-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	NAVARRO		47

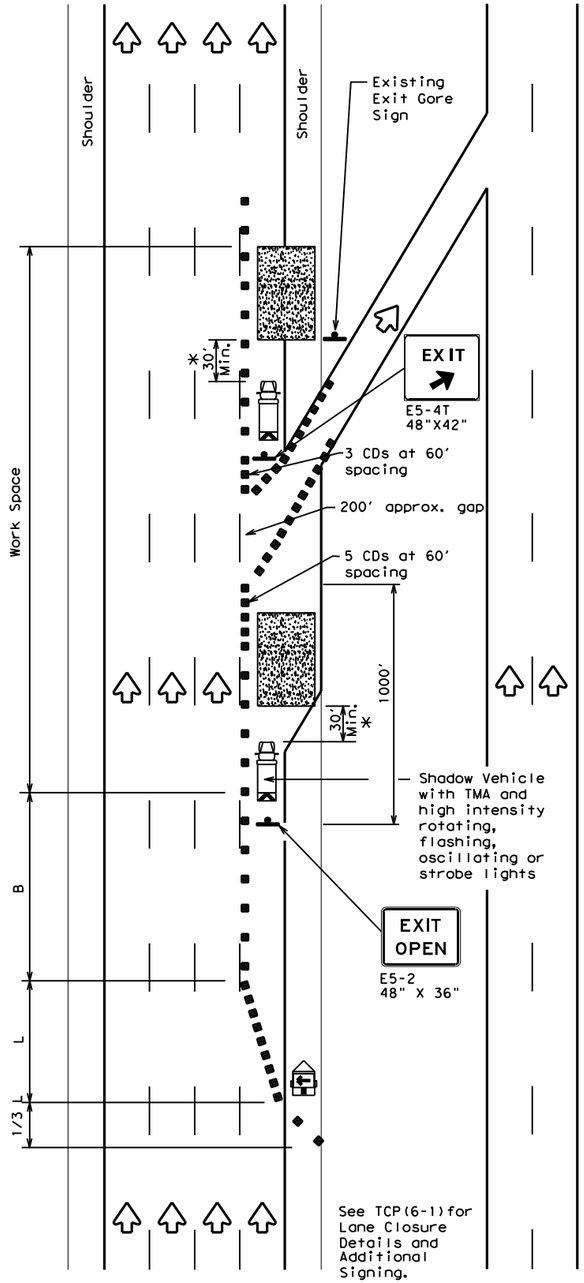
DATE:
FILE:

DATE:
FILE:



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Feburary 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	DAL	NAVARRO		48

DATE:
FILE:

TCP (6-8a)

TCP (6-8b)

TCP (6-8c)

LEGEND

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

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

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

TYPICAL USAGE

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

GENERAL NOTES

1. Place channelizing devices in the gore at 20′ spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

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©TxDOT February 2014	CONT	SECT	JOB	HIGHWAY
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	DAL	NAVARRO		49

DATE:
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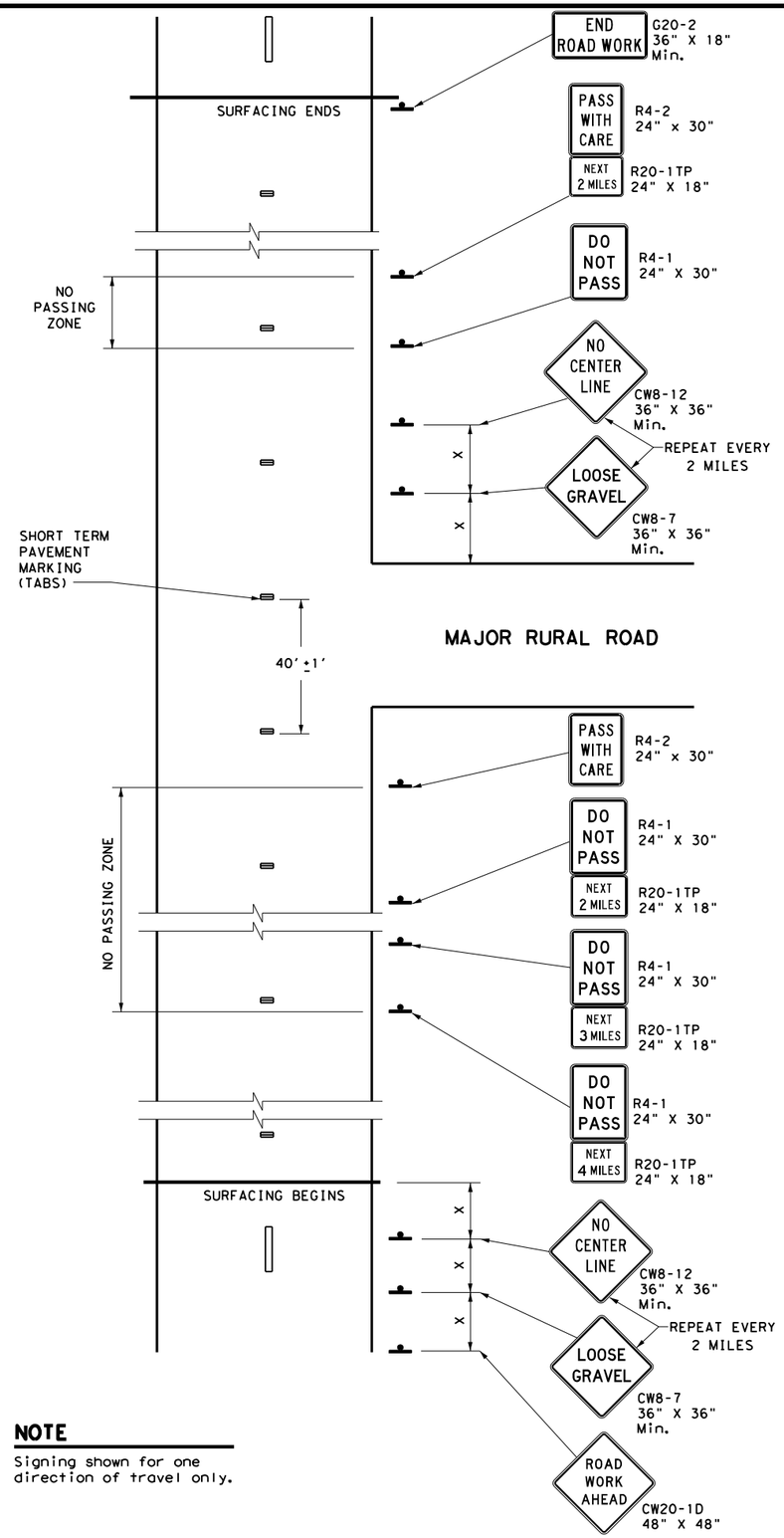
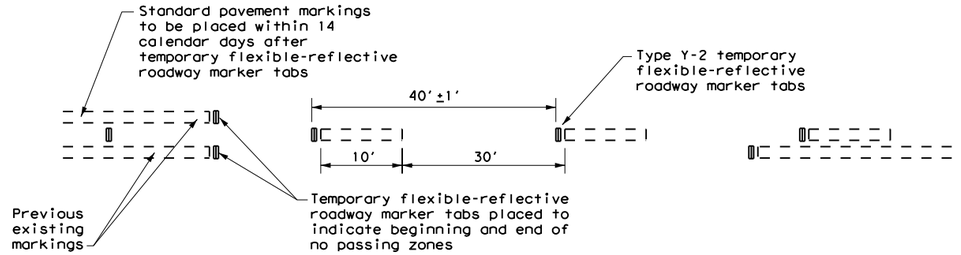


NOTE

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
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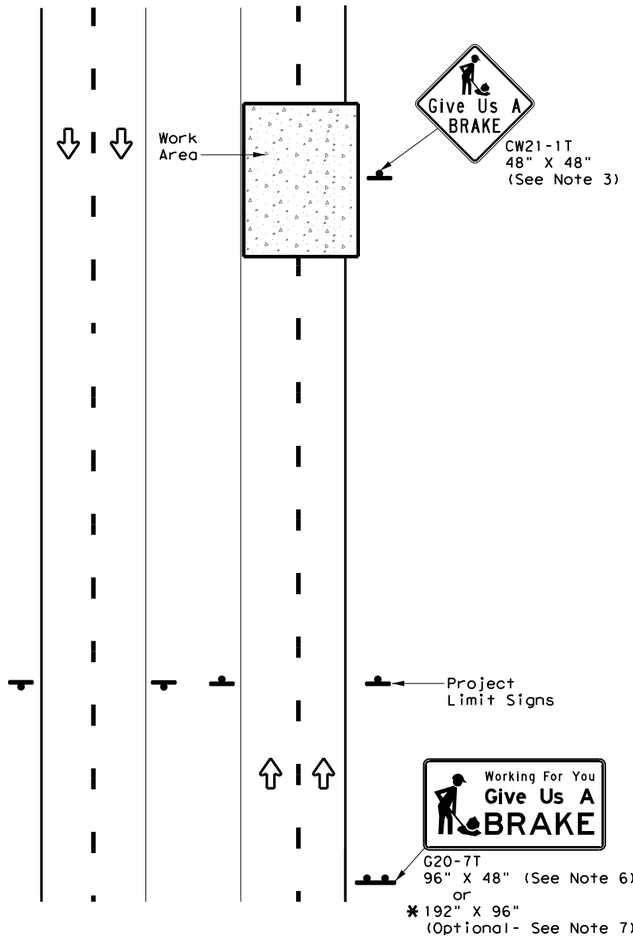
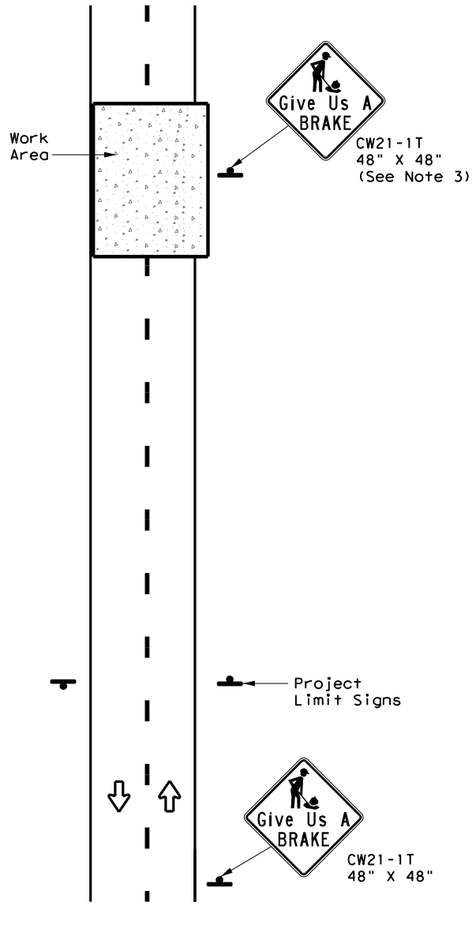
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13	DAL	NAVARRO		50

210



DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

DATE:
FILE:

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	DAL	NAVARRO		51

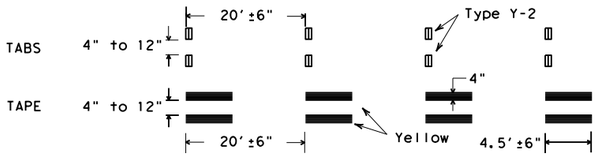
116

DATE:
FILE:

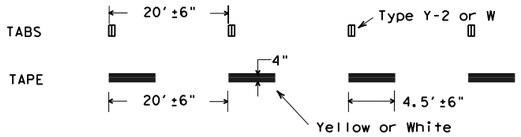
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

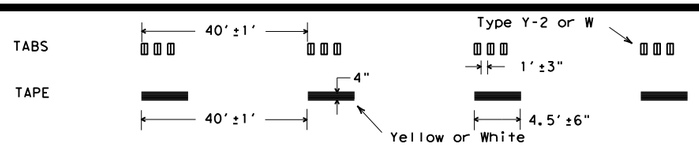


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



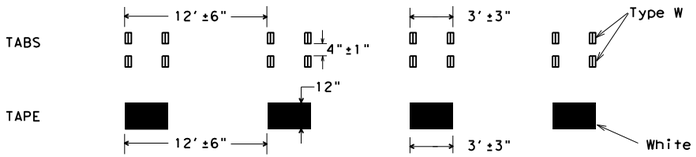
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

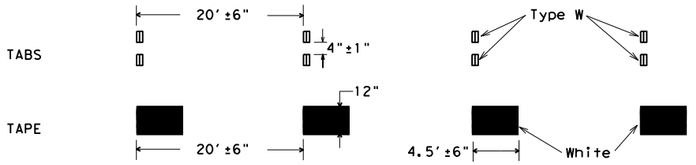


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



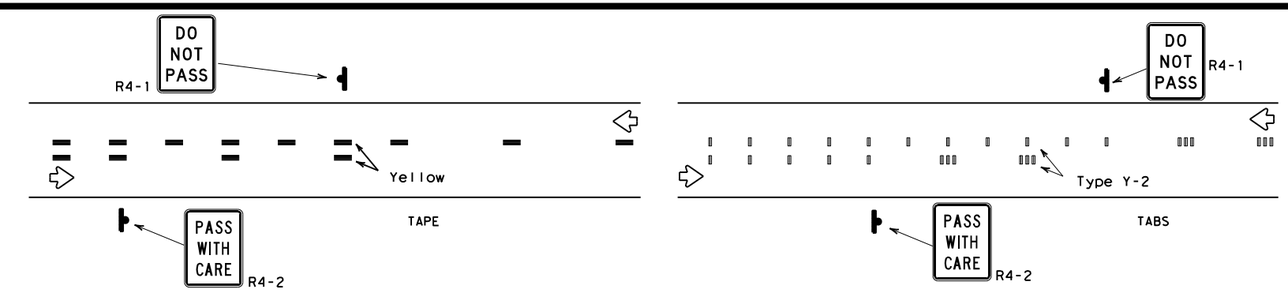
NOTES:

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

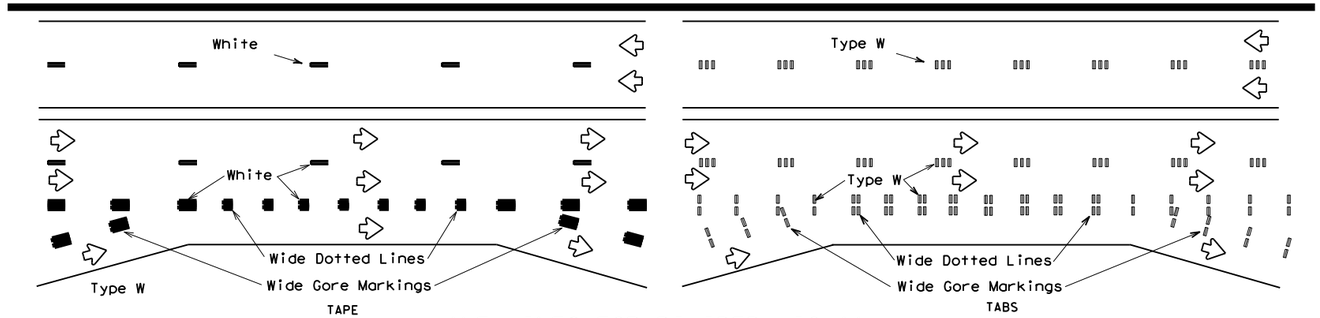
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

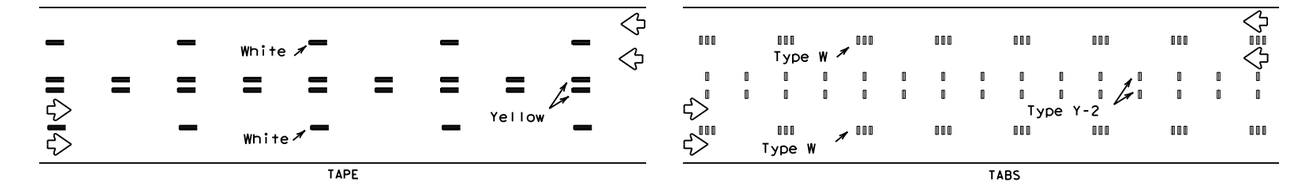
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



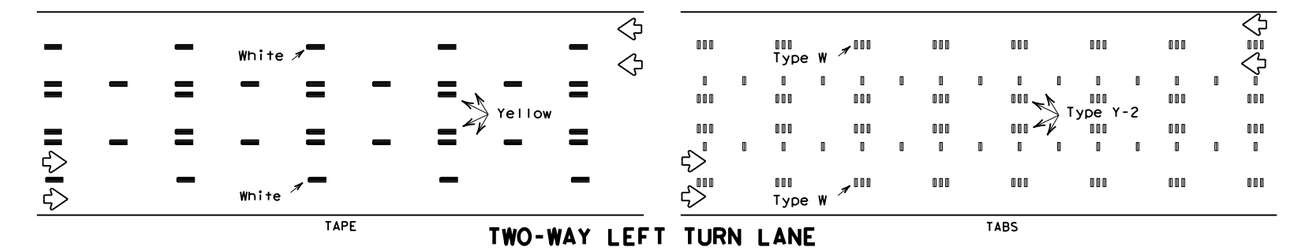
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



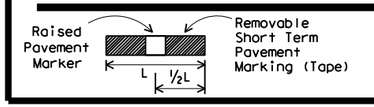
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

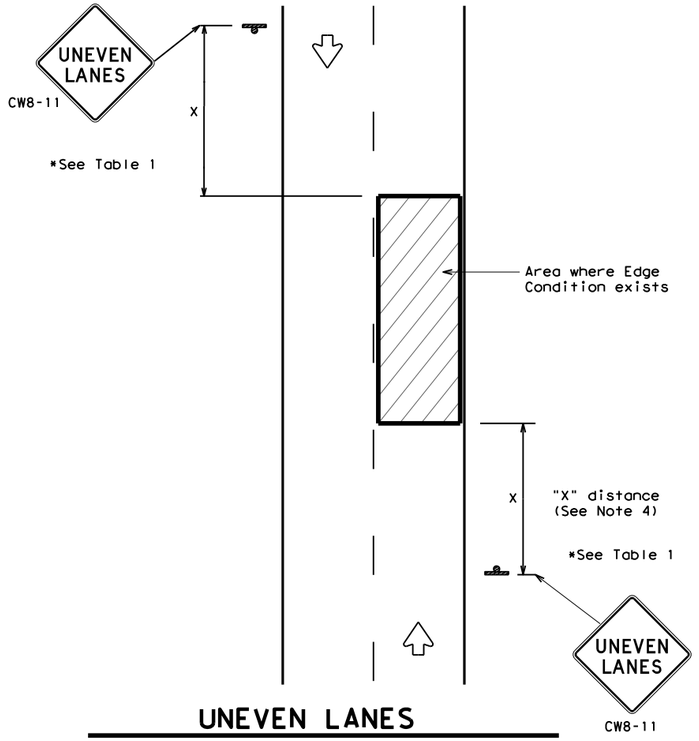
Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

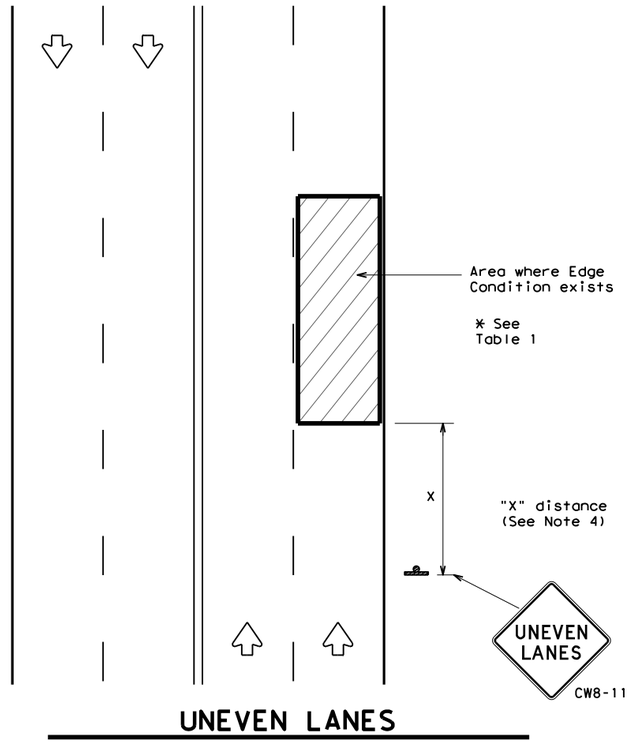
WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0092	06	105	IH 45
1-97		DIST	COUNTY		SHEET NO.
3-03		DAL	NAVARRO		52
7-13					

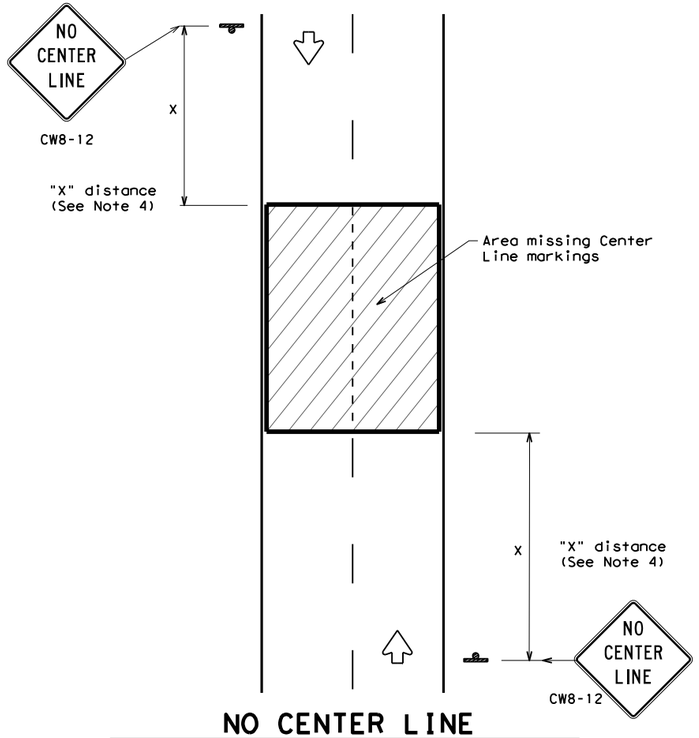
DATE:
FILE:



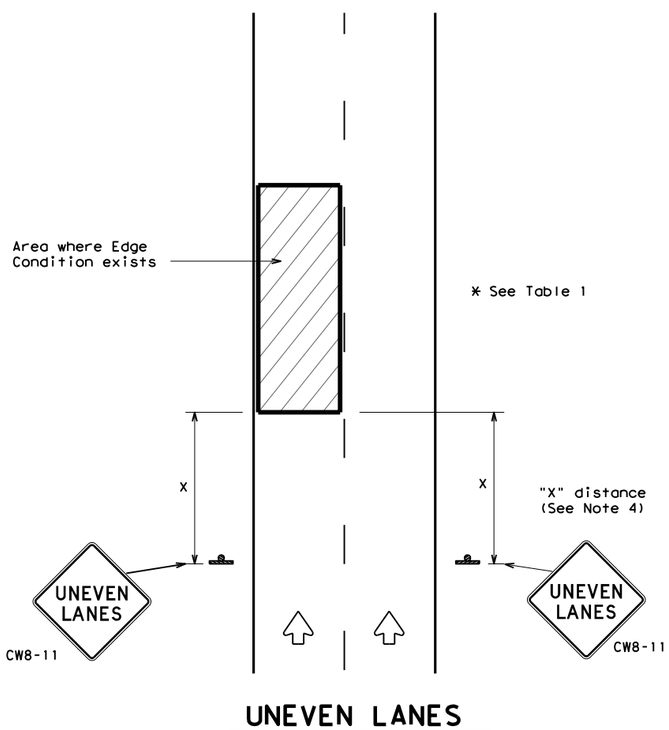
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

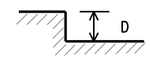
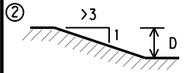
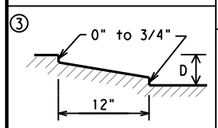
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

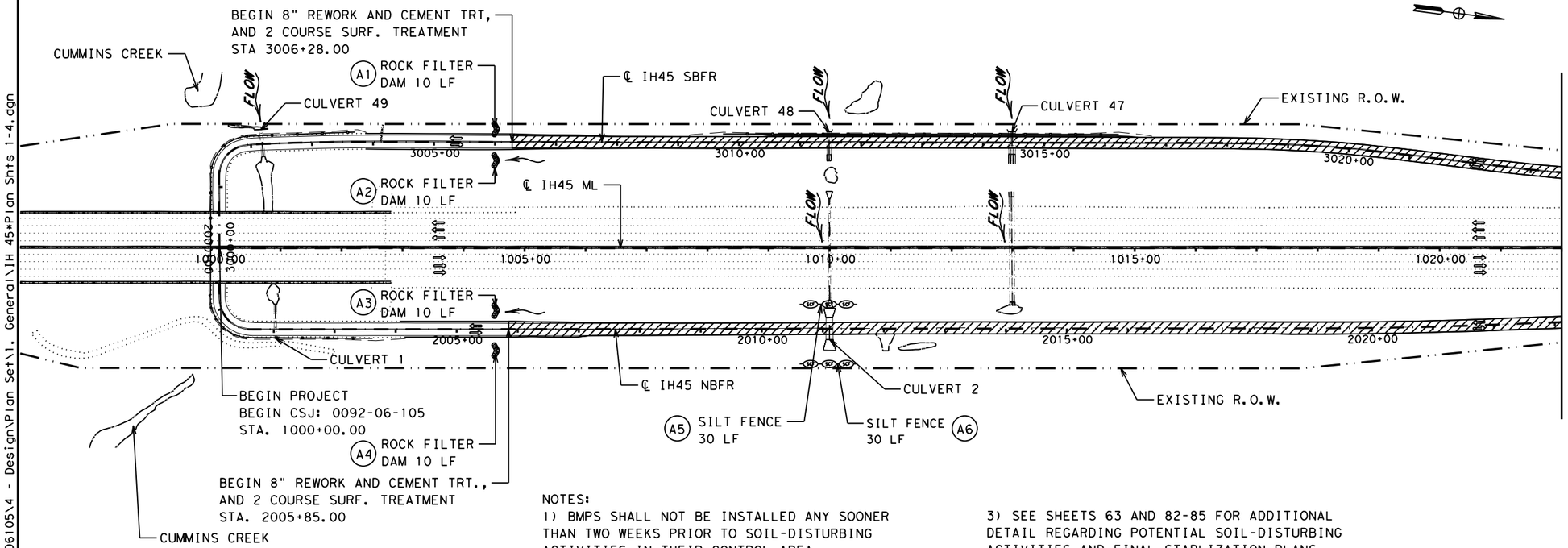
Traffic Operations Division Standard

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	0092	06	105	IH 45
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	DAL	NAVARRO		53

DISTURBED AREA: A
DATE DISTURBED: _____
DATE STABILIZED: _____



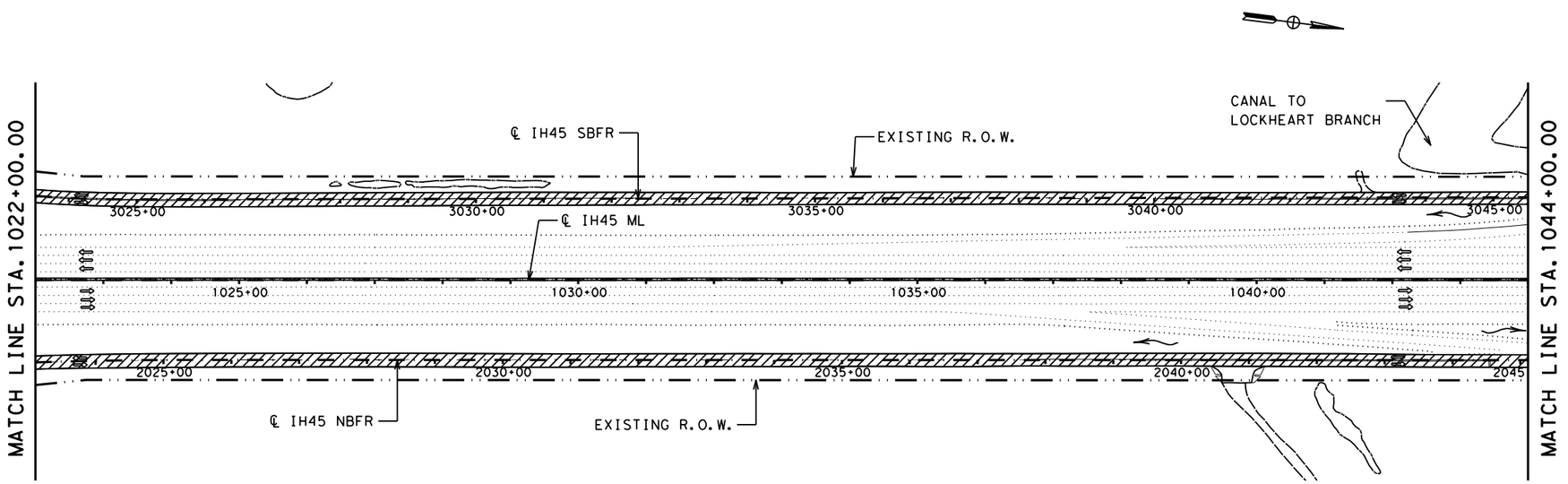
0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- SCF — SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
1 DRIVEWAY

NOTES:
1) BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL-DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3) SEE SHEETS 63 AND 82-85 FOR ADDITIONAL DETAIL REGARDING POTENTIAL SOIL-DISTURBING ACTIVITIES AND FINAL STABLIZATION PLANS.
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.



BMP	A1	A2	A3	A4	A5	A6
INSTALL DATE						
REMOVE DATE						

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & Date: Marlena Kelly, P.E. 3/30/22

Texas Department of Transportation

IH 45

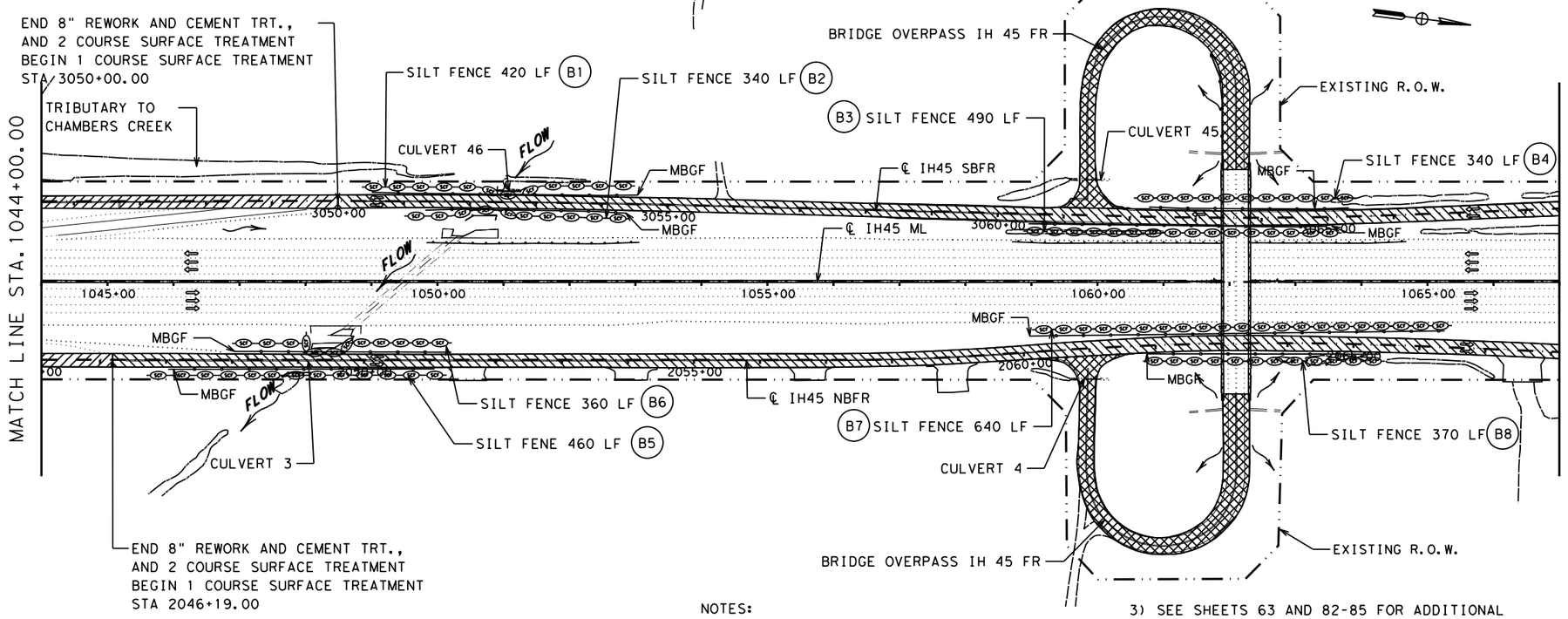
PLAN SHEETS

SCALE: 1"=200' SHEET 1 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS: MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: MJK	TEXAS	DAL	NAVARRO	54
CHECK: JAP	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/30/2022 TIME:4:28:44 PM
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\0092061054 - Design\Plan Set\1. General\IH 45*Plan Shts 1-4.dgn

DISTURBED AREA: B
DATE DISTURBED: _____
DATE STABILIZED: _____



0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- (SCF) SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
12 DRIVEWAY

NOTES:
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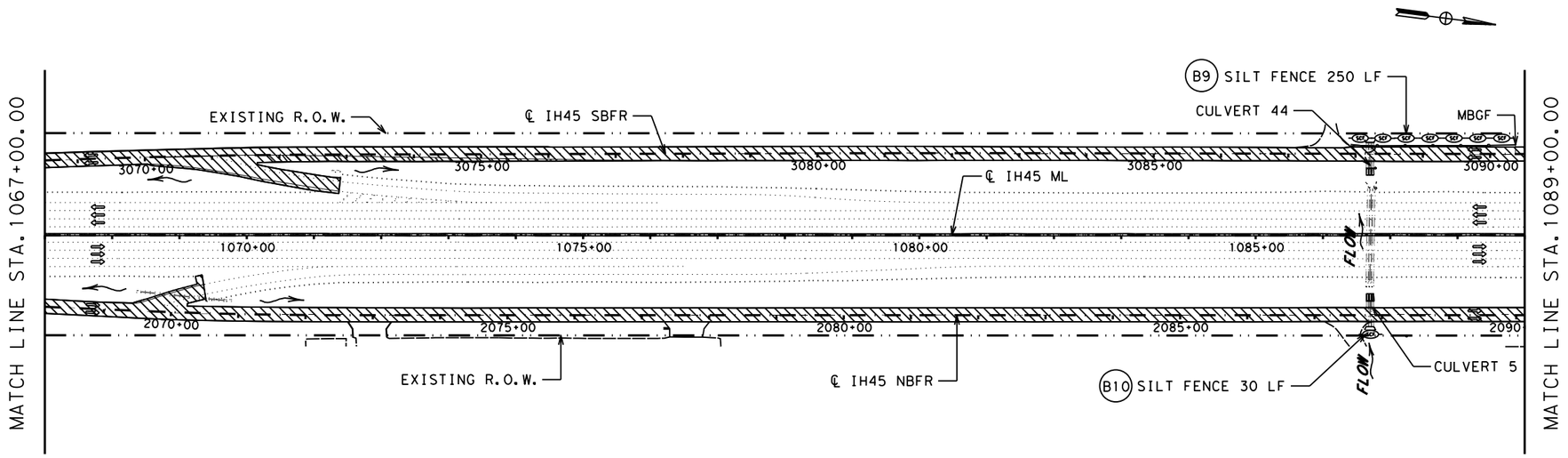
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

BMP	B1	B2	B3	B4
INSTALL DATE				
REMOVE DATE				



BMP	B5	B6	B7	B8	B9	B10
INSTALL DATE						
REMOVE DATE						

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & P.E. 3/30/22 Date

Texas Department of Transportation

IH 45

PLAN SHEETS

SCALE: 1"=200' SHEET 2 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	55
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/30/2022 TIME:4:28:44 PM
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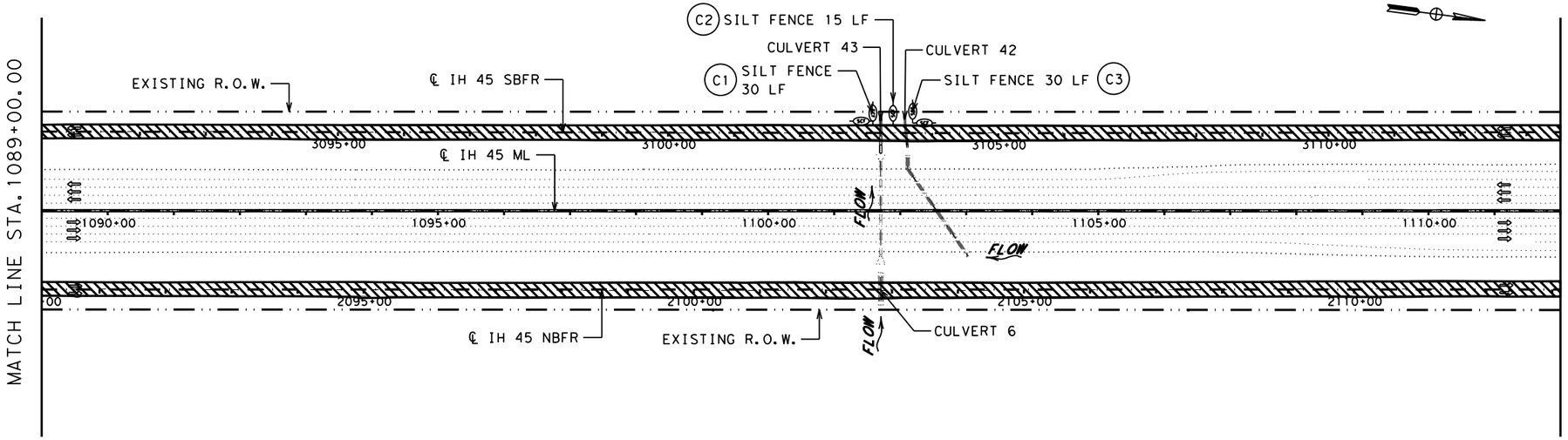
DISTURBED AREA: C
DATE DISTURBED: _____
DATE STABILIZED: _____

BMP	C1	C2	C3	C4	C5
INSTALL DATE					
REMOVE DATE					



NOTES:
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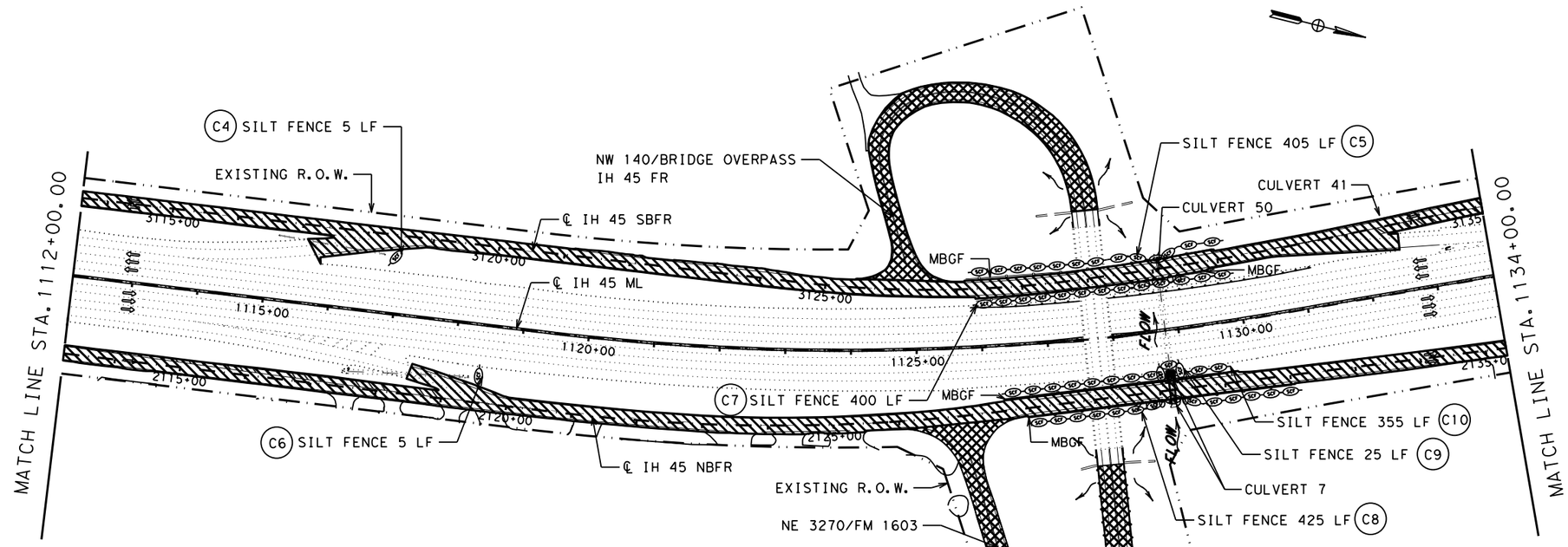
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- SCF — SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
18 DRIVEWAY



BMP	C6	C7	C8	C9	C10
INSTALL DATE					
REMOVE DATE					

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant & Date: P.E. 3/30/22

Texas Department of Transportation

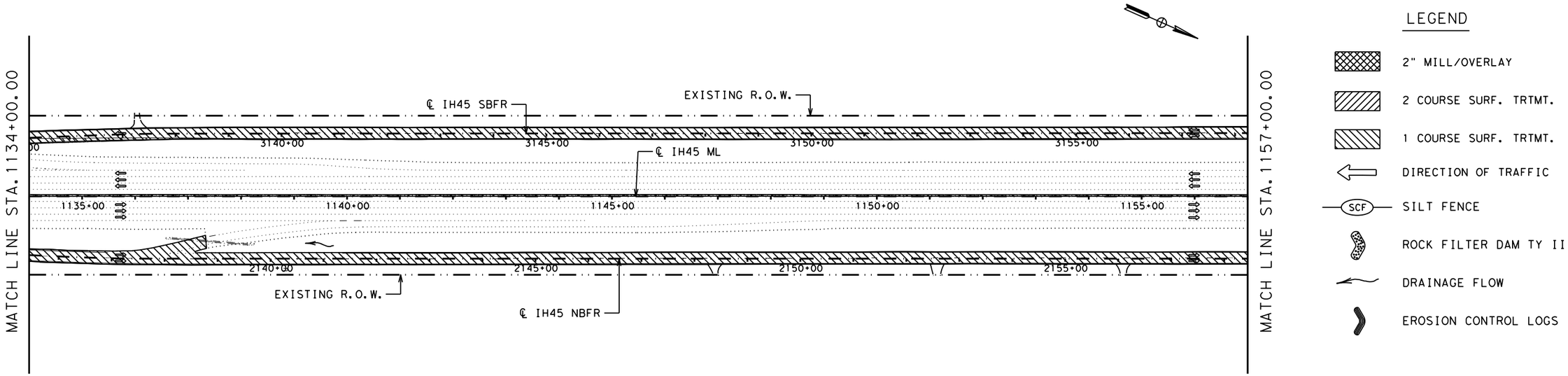
IH 45

PLAN SHEETS

SCALE: 1"=200'

SHEET 3 OF 9

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS: MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: MJK	TEXAS	DAL	NAVARRO	56
CHECK: JAP	CONTROL	SECTION	JOB	
	0092	06	105	



0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- SCF — SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
10 DRIVEWAY

NOTES:

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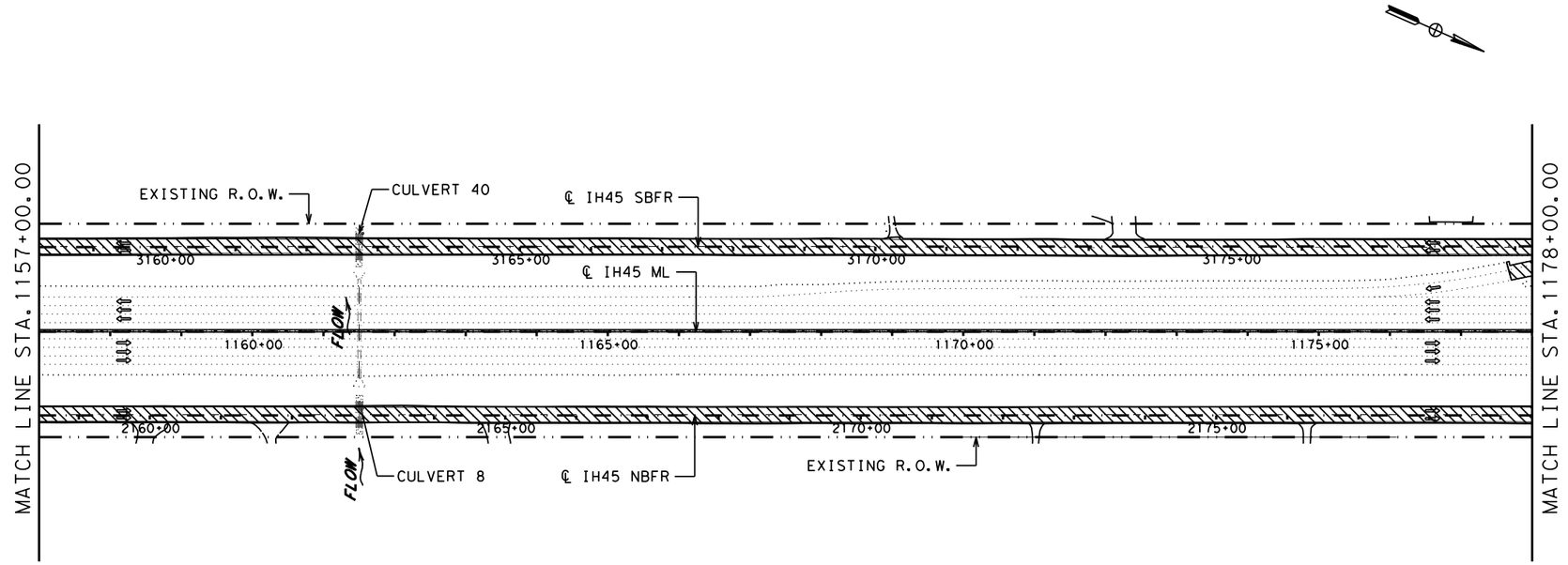
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.



STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & Date, P.E. 3/30/22

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IH 45

PLAN SHEETS

SCALE: 1"=200' SHEET 4 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	57
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

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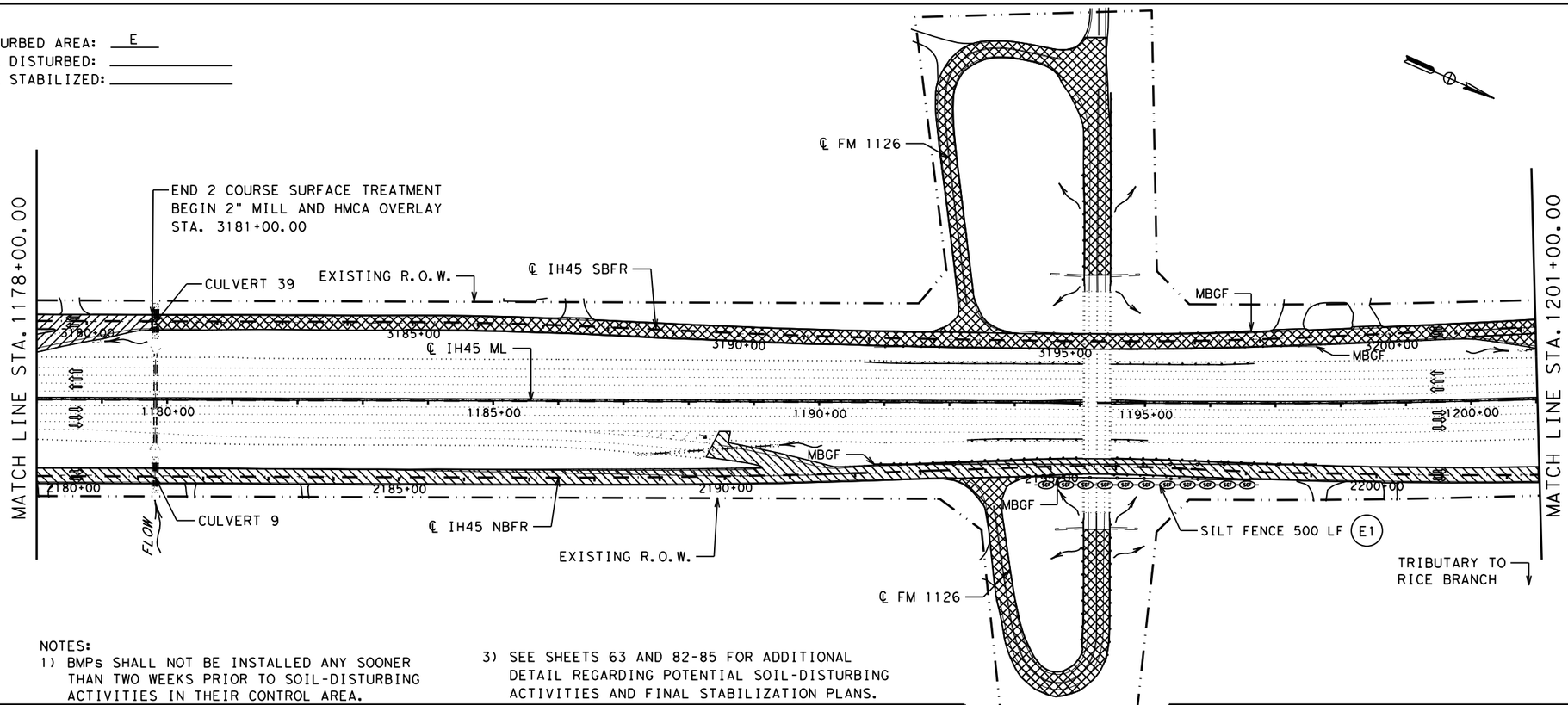
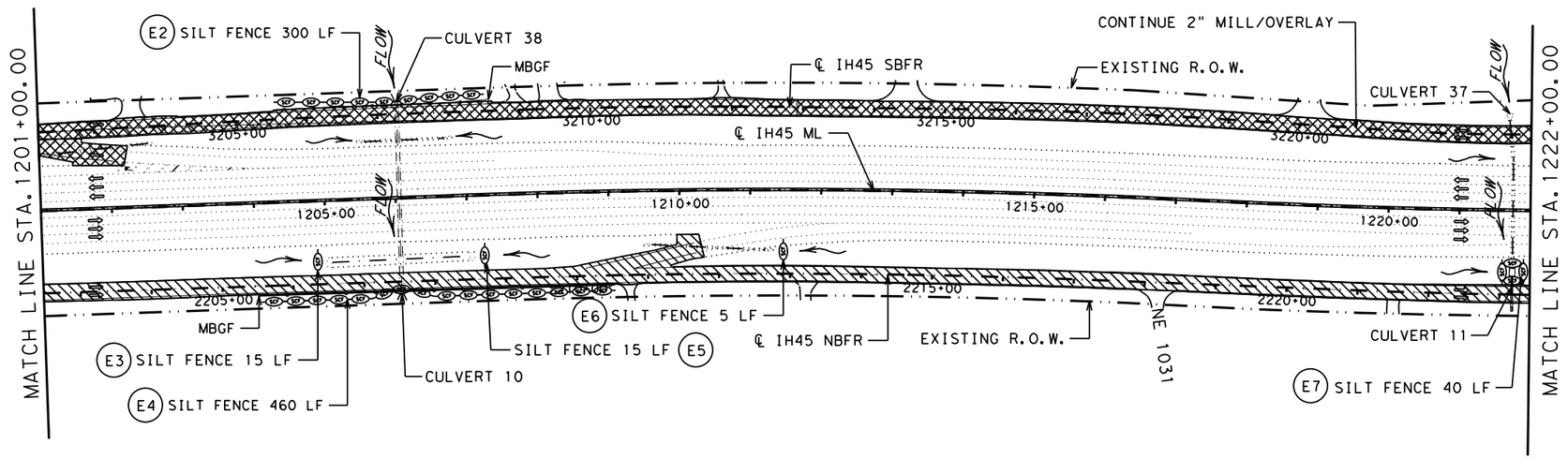
DATE DISTURBED: _____
DATE STABILIZED: _____





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BMP	E1	E2	E3	E4	E5	E6	E7
INSTALL DATE							
REMOVE DATE							

0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- (SCF) SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
15 DRIVEWAY

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & Date: P.E. 3/30/22

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IH 45
PLAN SHEETS

SCALE: 1"=200' SHEET 5 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	58
MJK				
CHECK	0092	06	105	
JAP				

DATE:3/30/2022 TIME:4:28:56 PM
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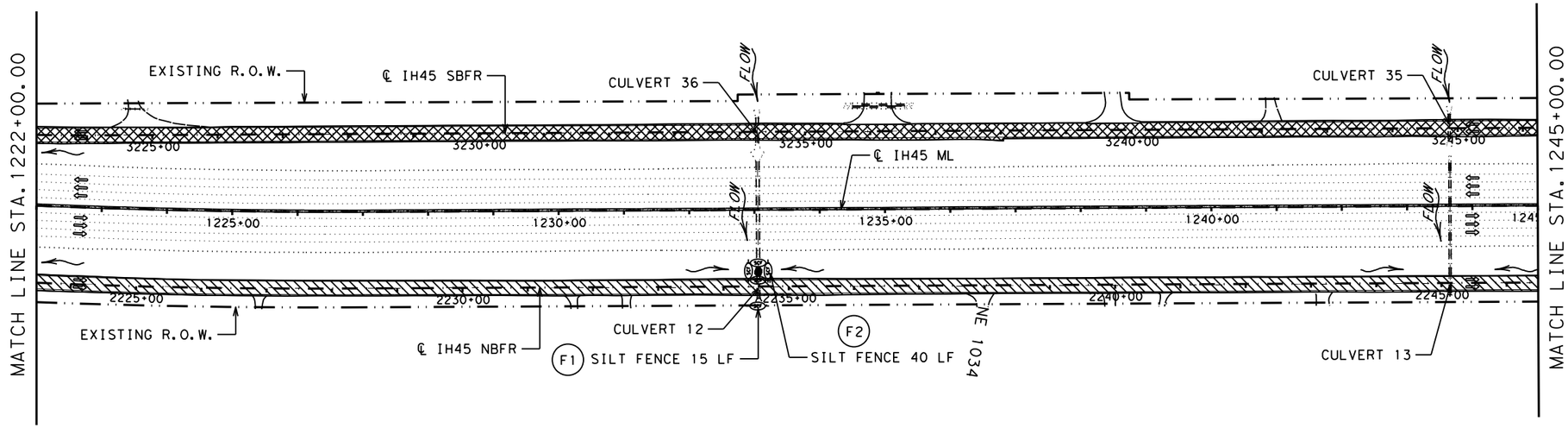
DATE DISTURBED: _____
DATE STABILIZED: _____



LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- SCF — SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
15 DRIVEWAY

NOTES:
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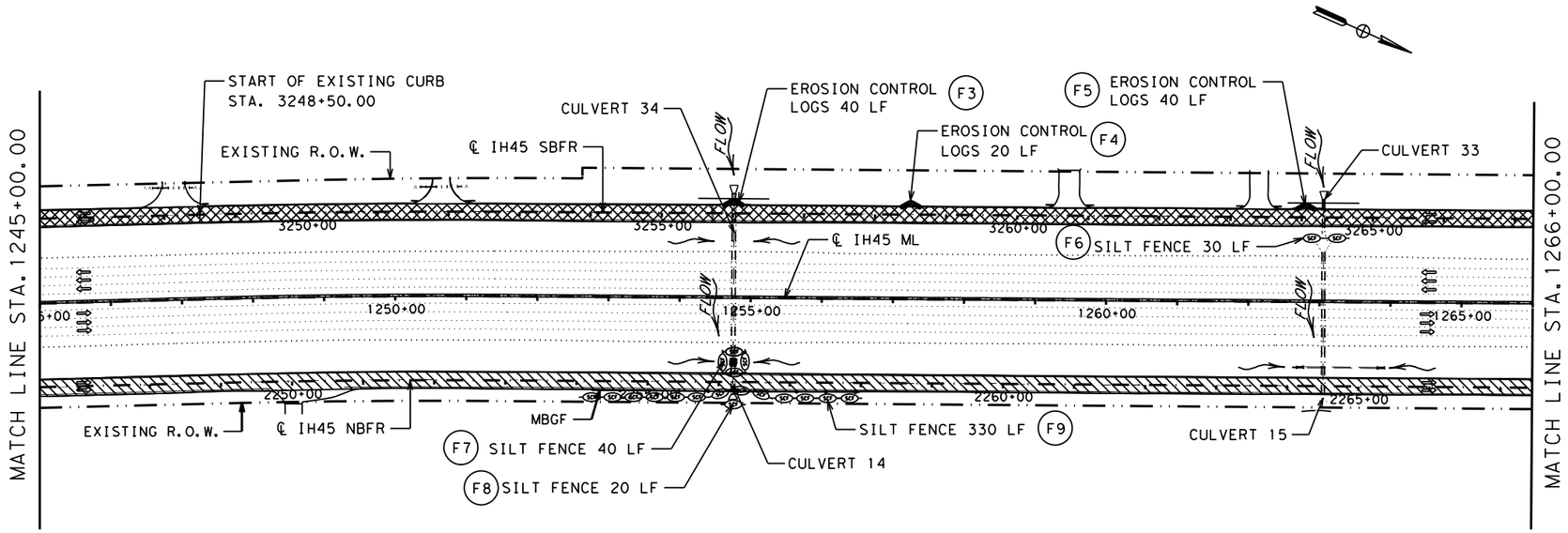
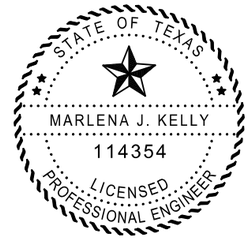


BMP	F1	F2	F3	F4	F5	F6	F7	F8	F9
INSTALL DATE									
REMOVE DATE									



Signature of Registrant & Date: P.E. 3/30/22

Texas Department of Transportation

IH 45

PLAN SHEETS

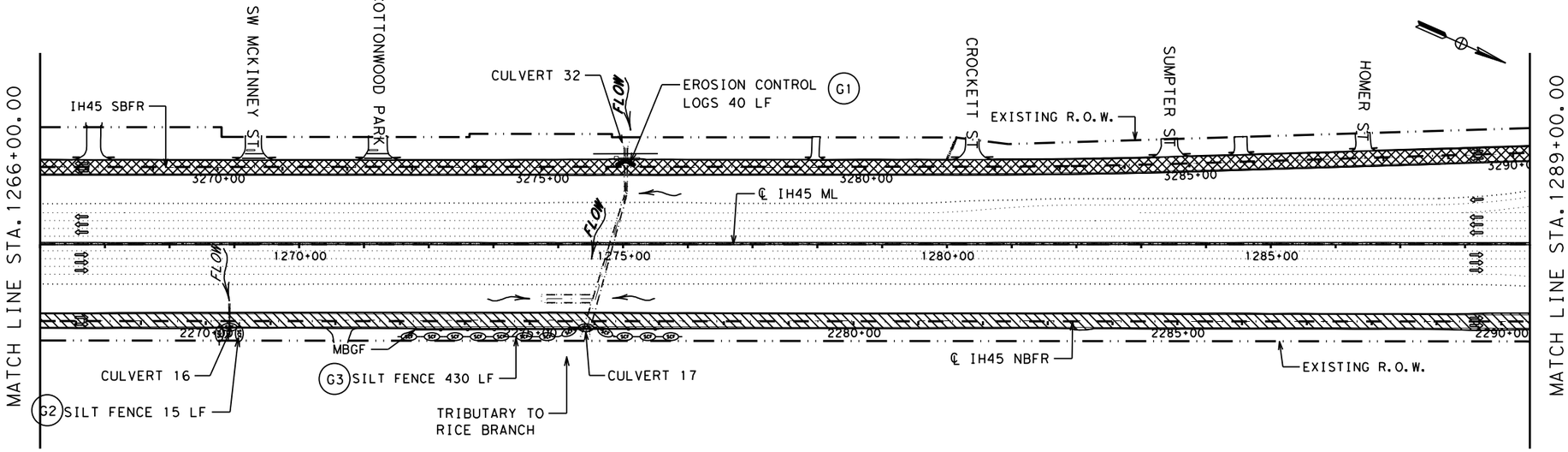
SCALE: 1"=200' SHEET 6 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	59
CHECK JAP	CONTROL 0092	SECTION 06	JOB 105	

DISTURBED AREA: G
DATE DISTURBED: _____
DATE STABILIZED: _____

BMP	G1	G2	G3	G4	G5	G6	G7	G8
INSTALL DATE								
REMOVE DATE								

0 100 200
SCALE IN FEET



LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- SCF — SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

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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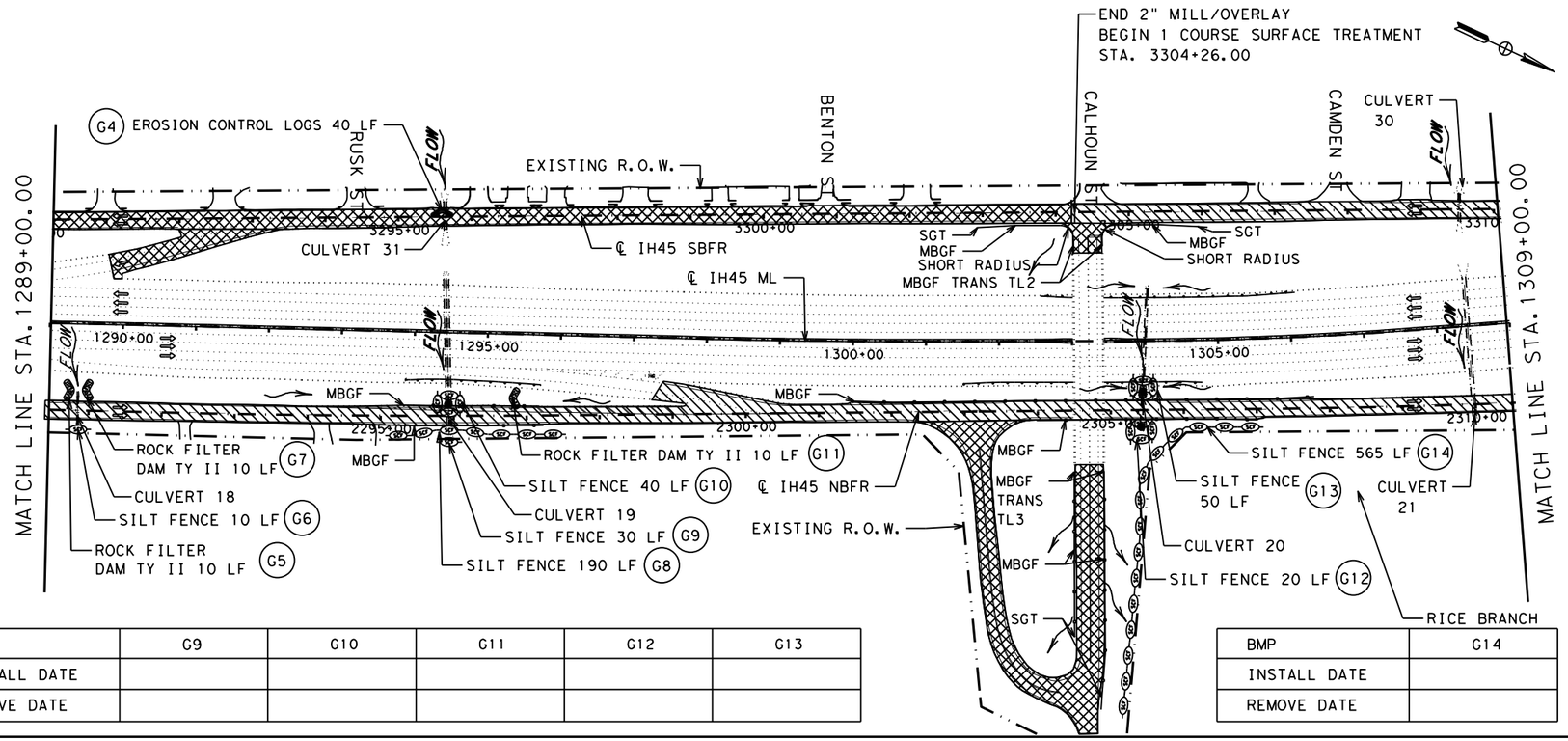
3) SEE SHEETS 63 AND 82-85 FOR ADDITIONAL DETAIL REGARDING POTENTIAL SOIL-DISTURBING ACTIVITIES AND FINAL STABILIZATION PLANS.
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.

NO. OF DRIVEWAYS
29 DRIVEWAY



BMP	G9	G10	G11	G12	G13
INSTALL DATE					
REMOVE DATE					

BMP	G14
INSTALL DATE	
REMOVE DATE	

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & Date: P.E. 3/30/22

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IH 45

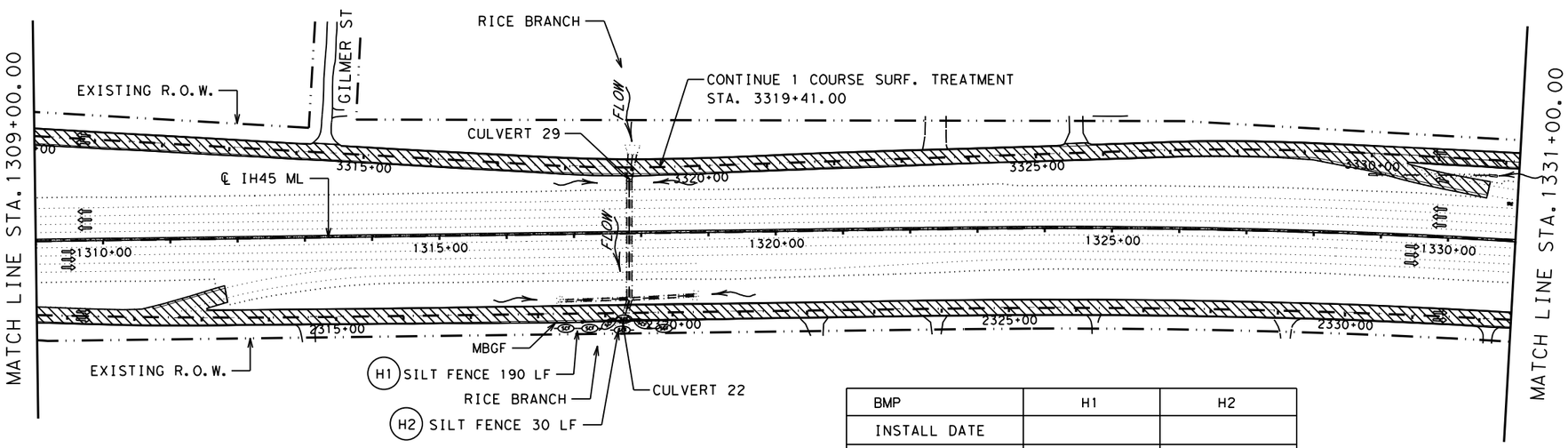
PLAN SHEETS

SCALE: 1"=200' SHEET 7 OF 9

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	60
CHECK	CONTROL	SECTION	JOB	
MJK	0092	06	105	
CHECK				
JAP				

DATE:3/30/2022 TIME:4:28:57 PM
FILE:pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\18 - DAL\Design Projects\0092061054 - Design\Plan Set\1. General\IH 45*Plan Shts 5-9.dgn

DISTURBED AREA: H
DATE DISTURBED: _____
DATE STABILIZED: _____



BMP	H1	H2
INSTALL DATE		
REMOVE DATE		

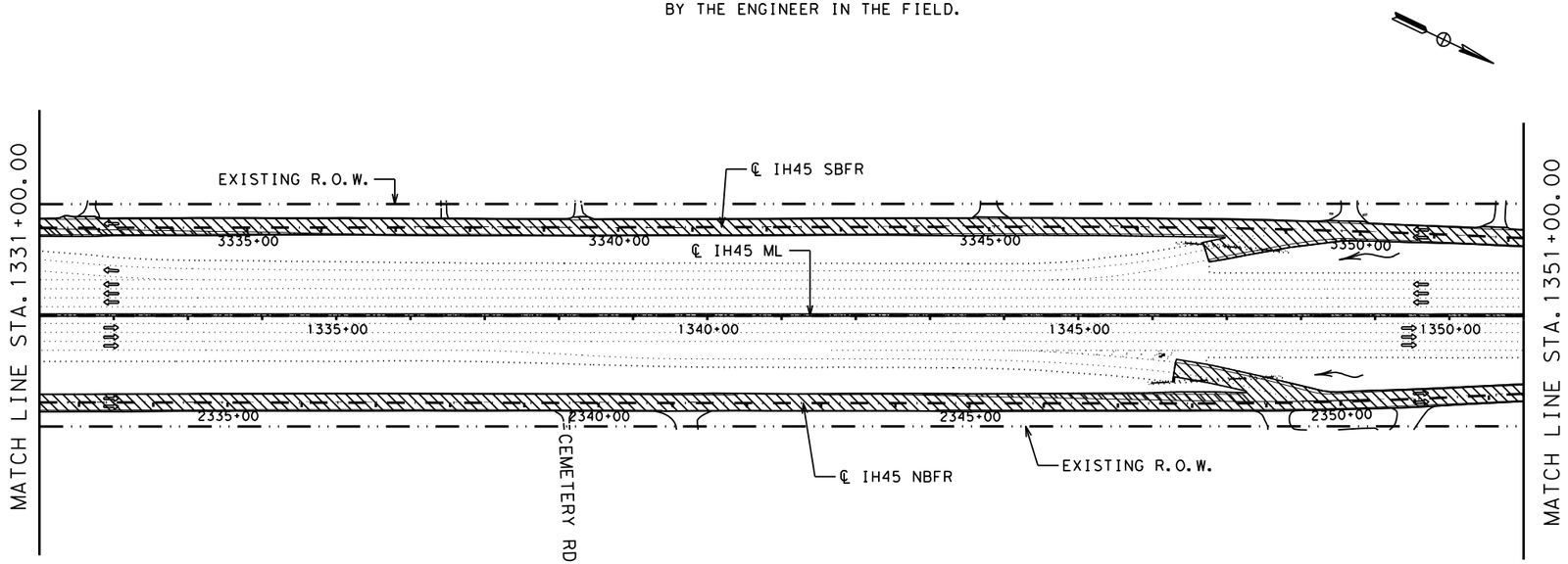
0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- (SCF) SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
19 DRIVEWAY

NOTES:
1) BMPs SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL-DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3) SEE SHEETS 63 AND 82-85 FOR ADDITIONAL DETAIL REGARDING POTENTIAL SOIL-DISTURBING ACTIVITIES AND FINAL STABILIZATION PLANS.
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.



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MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & Date: P.E. 3/30/22

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IH 45

PLAN SHEETS

SCALE: 1"=200' SHEET 8 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	61
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

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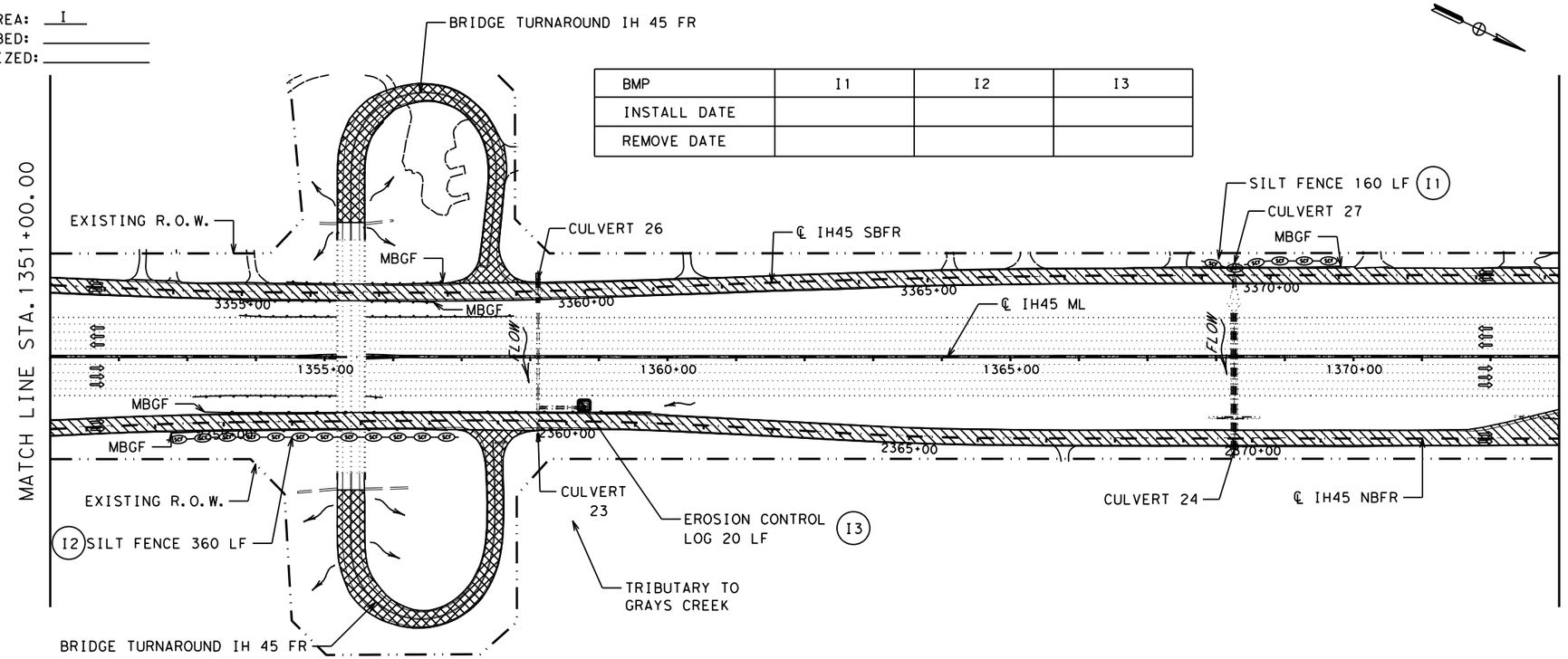
DATE DISTURBED:
DATE STABILIZED:



BMP	I1	I2	I3
INSTALL DATE			
REMOVE DATE			

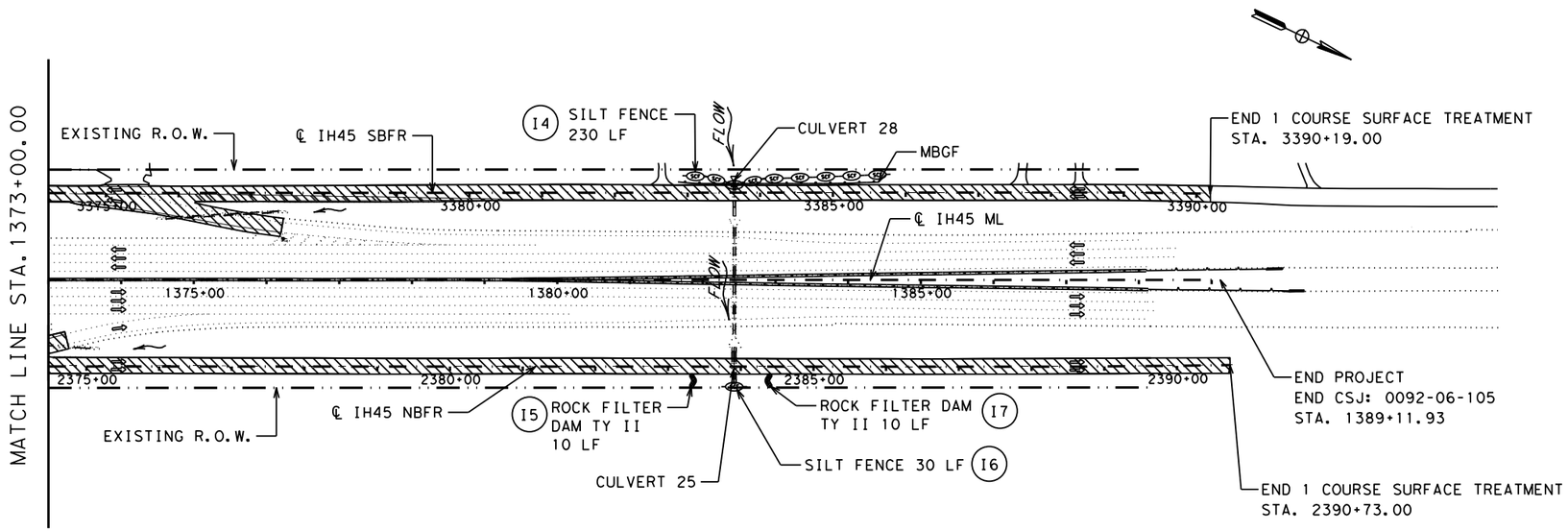
0 100 200
SCALE IN FEET

LEGEND

- 2" MILL/OVERLAY
- 2 COURSE SURF. TRTMT.
- 1 COURSE SURF. TRTMT.
- DIRECTION OF TRAFFIC
- SCF — SILT FENCE
- ROCK FILTER DAM TY II
- DRAINAGE FLOW
- EROSION CONTROL LOGS

NO. OF DRIVEWAYS
8 DRIVEWAY

NOTES:
1) BMPs SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL-DISTURBING ACTIVITIES IN THEIR CONTROL AREA.
2) SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIMEFRAMES.
3) SEE SHEETS 63 AND 82-85 FOR ADDITIONAL DETAIL REGARDING POTENTIAL SOIL-DISTURBING ACTIVITIES AND FINAL STABILIZATION PLANS.
4) EXACT LOCATION OF ROCK FILTER DAM AND TEMPORARY SEDIMENT CONTROL FENCE TO BE DETERMINED BY THE ENGINEER IN THE FIELD.



BMP	I4	I5	I6	I7
INSTALL DATE				
REMOVE DATE				

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IH 45

PLAN SHEETS

SCALE: 1"=200' SHEET 9 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	62
CHECK JAP	CONTROL 0092	SECTION 06	JOB 105	

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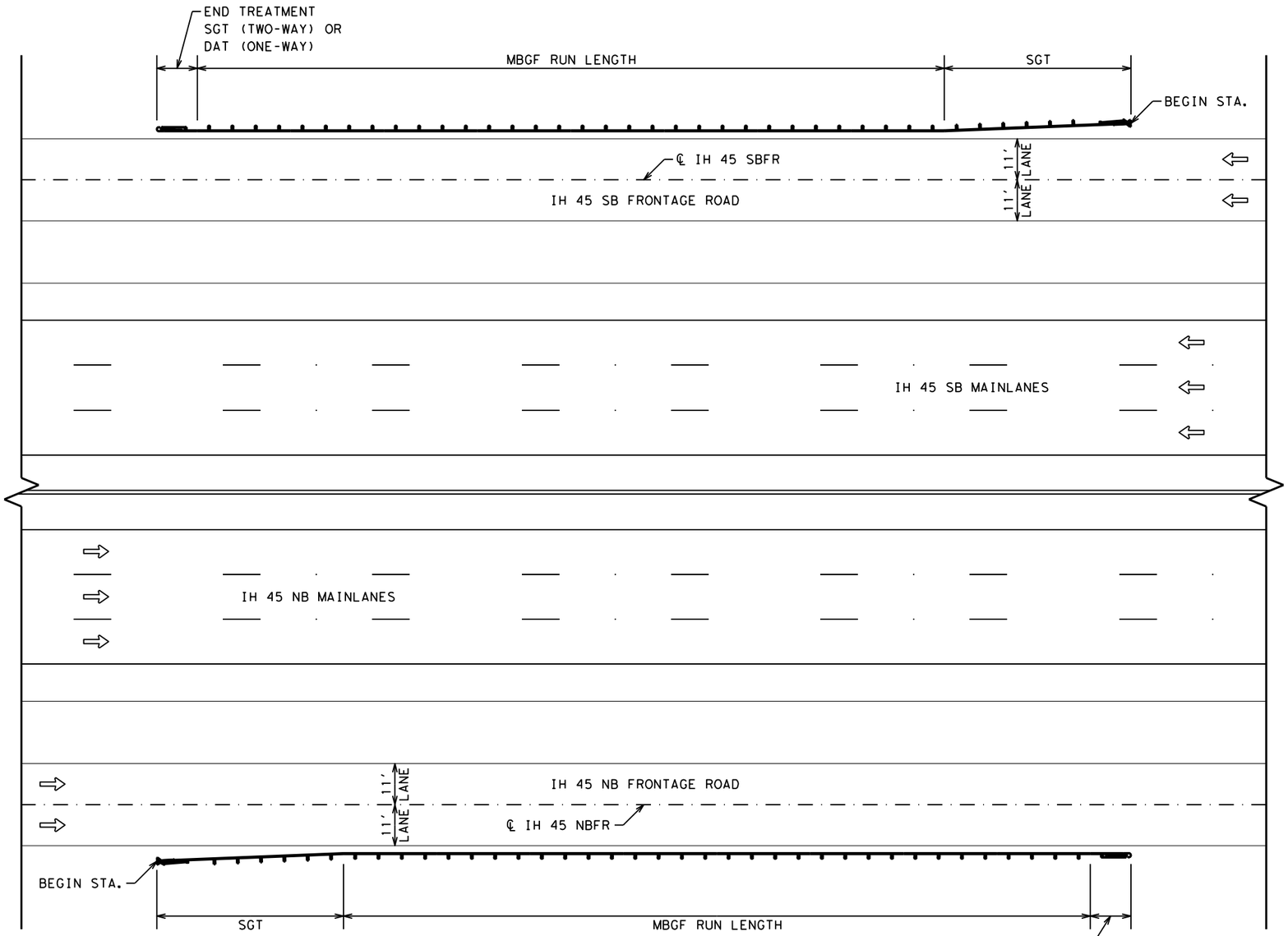

MBGF LIMITS

NORTHBOUND			
BEGIN STA.	RT/LT	RUN LENGTH	END TREATMENT
2047+03	RT	325 LF	2 SGT
2048+04	LT	250 LF	2 SGT
2060+10	LT	575 LF	1 SGT & 1 DAT
2061+87	RT	300 LF	1 SGT & 1 DAT
2127+64	LT	300 LF	1 SGT & 1 DAT
2127+97	RT	350 LF	1 SGT & 1 DAT
2192+30	LT	625 LF	1 SGT & 1 DAT
2194+79	RT	275 LF	1 SGT & 1 DAT
2205+51	RT	450 LF	1 SGT & 1 DAT
2254+21	RT	325 LF	1 SGT & 1 DAT
2273+23	RT	325 LF	1 SGT & 1 DAT
2295+32	LT	150 LF	1 SGT & 1 DAT
2295+46	RT	125 LF	1 SGT & 1 DAT
2301+50	LT	575 LF	1 SGT & 1 DAT
2303+98	RT	250 LF	1 SGT & 1 DAT
2304+71	LT	175 LF	1 SGT & 1 TL2
2304+71	RT	275 LF	1 SGT & 1 TL2
2318+26	RT	125 LF	1 SGT & 1 DAT
2354+23	RT	350 LF	1 SGT & 1 DAT
2354+73	LT	600 LF	1 SGT & 1 DAT

SOUTHBOUND			
BEGIN STA.	RT/LT	RUN LENGTH	END TREATMENT
3054+37	RT	225 LF	2 SGT
3054+54	LT	325 LF	2 SGT
3064+99	RT	400 LF	1 SGT & 1 DAT
3065+32	LT	250 LF	1 SGT & 1 DAT
3090+38	LT	200 LF	1 SGT & 1 DAT
3130+81	RT	300 LF	1 SGT & 1 DAT
3130+95	LT	325 LF	1 SGT & 1 DAT
3197+87	LT	300 LF	1 SGT & 1 DAT
3198+86	RT	625 LF	1 SGT & 1 DAT
3208+57	LT	250 LF	1 SGT & 1 DAT
3304+24	RT	100 LF	1 SGT & 1 THRIE-BEAM
3305+95	RT	100 LF	1 SGT & 1 THRIE-BEAM
3357+80	RT	225 LF	1 SGT & 1 DAT
3357+93	LT	175 LF	1 SGT & 1 DAT
3371+03	LT	150 LF	1 SGT & 1 DAT
3385+63	LT	225 LF	1 SGT & 1 DAT

METAL BEAM GUARD FENCE LAYOUT DETAILS

STATE OF TEXAS
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114354
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PROFESSIONAL ENGINEER

Signature of Registrant & P.E. Date: 3/7/22

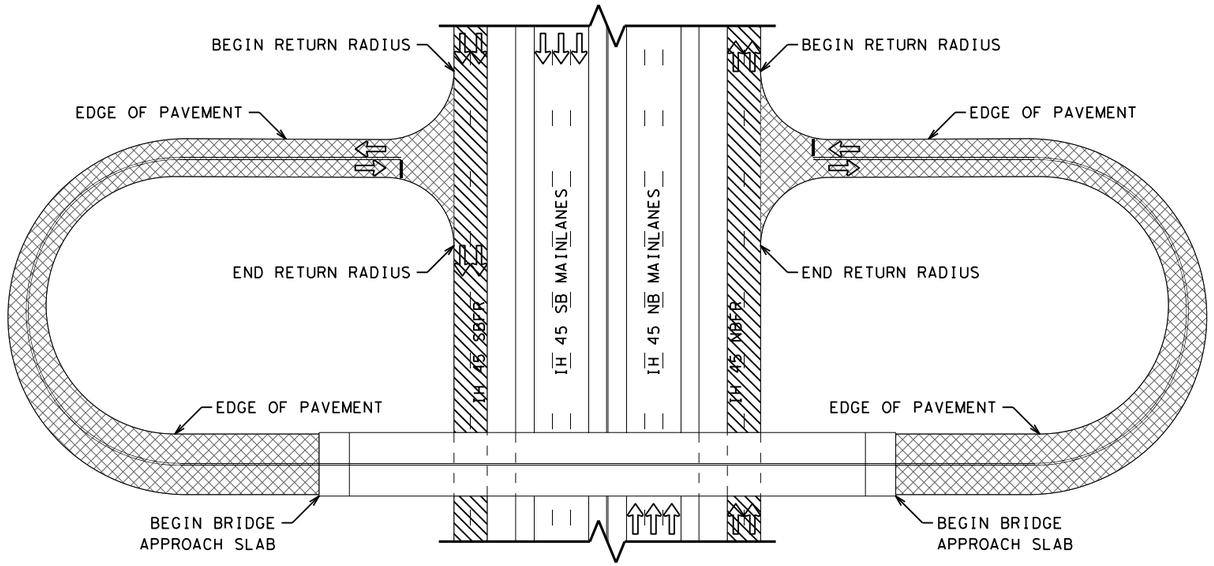
Texas Department of Transportation

IH 45

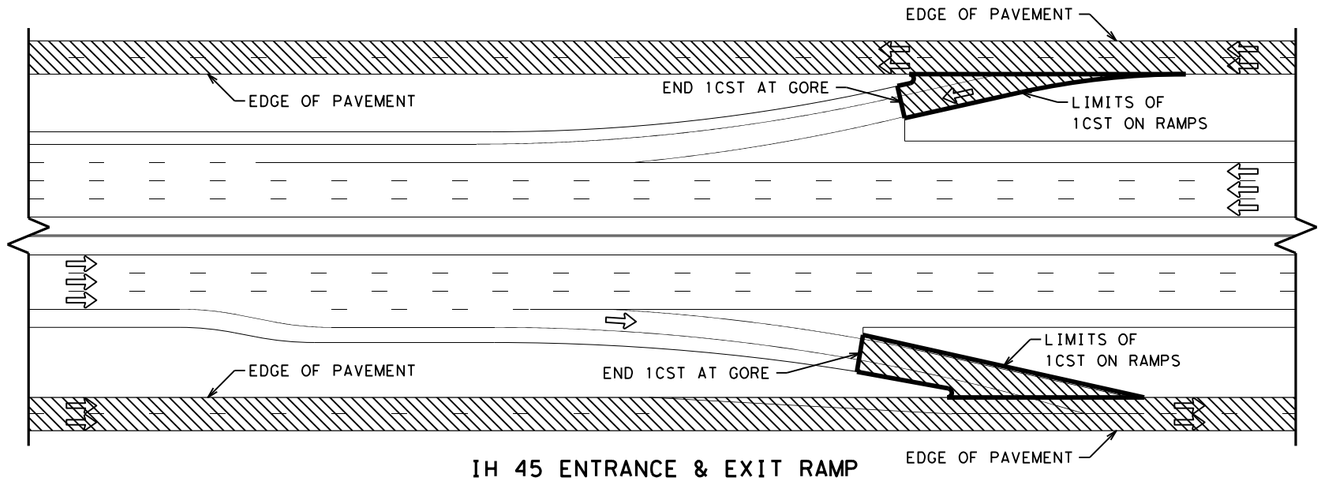
MBGF LAYOUT

NOT TO SCALE — SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	63
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	



IH 45 FRONTAGE ROAD
LIMITS AT BRIDGE OVERPASS



IH 45 ENTRANCE & EXIT RAMP
LIMITS OF SEAL COAT

LEGEND

1 COURSE SURF. TREATMENT

2" MILL & OVERLAY
(HMAC SP-C SAC-B PG64-22)

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
LIMITS AT
RAMPS AND BRIDGES

NOT TO SCALE SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK	CONTROL	SECTION	JOB	64
MJK				
CHECK	0092	06	105	
JP				

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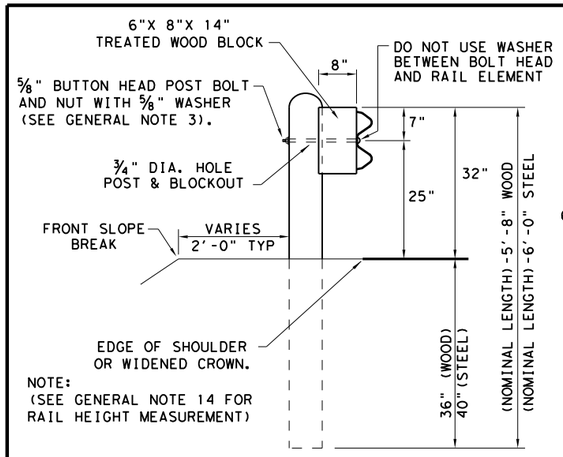
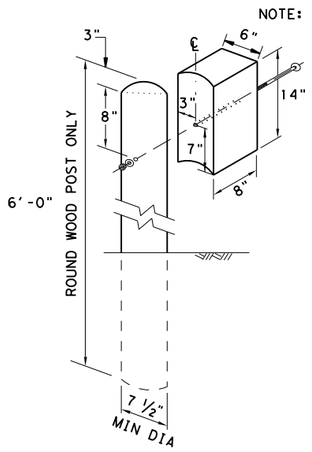
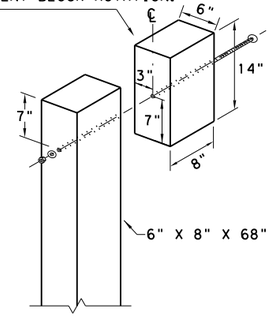


TYPICAL POST PLACEMENT

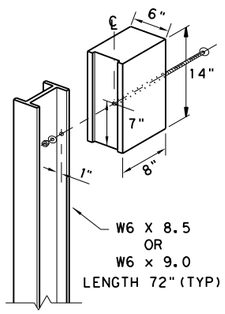


WOOD BLOCK TO ROUND WOOD POST

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

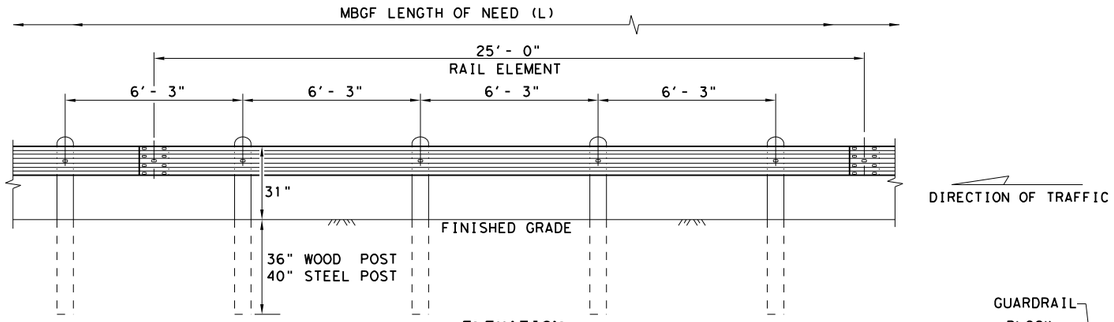


WOOD BLOCK TO RECTANGULAR WOOD POST



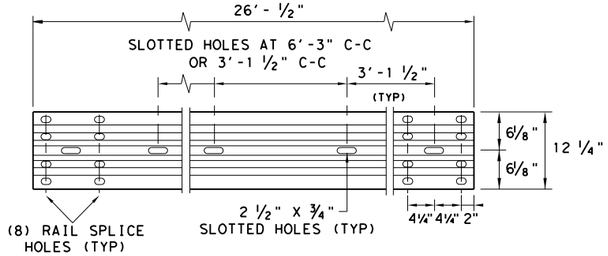
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION
MID-SPAN RAIL SPLICE

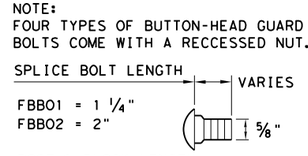
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

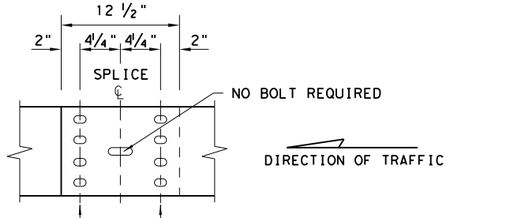
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



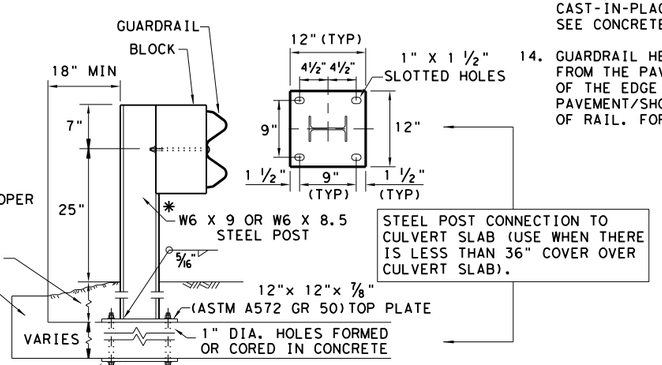
BUTTON HEAD BOLT

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: TWO INSTALLATION OPTIONS.

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

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

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

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.

GENERAL NOTES

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

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
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		65

DATE:
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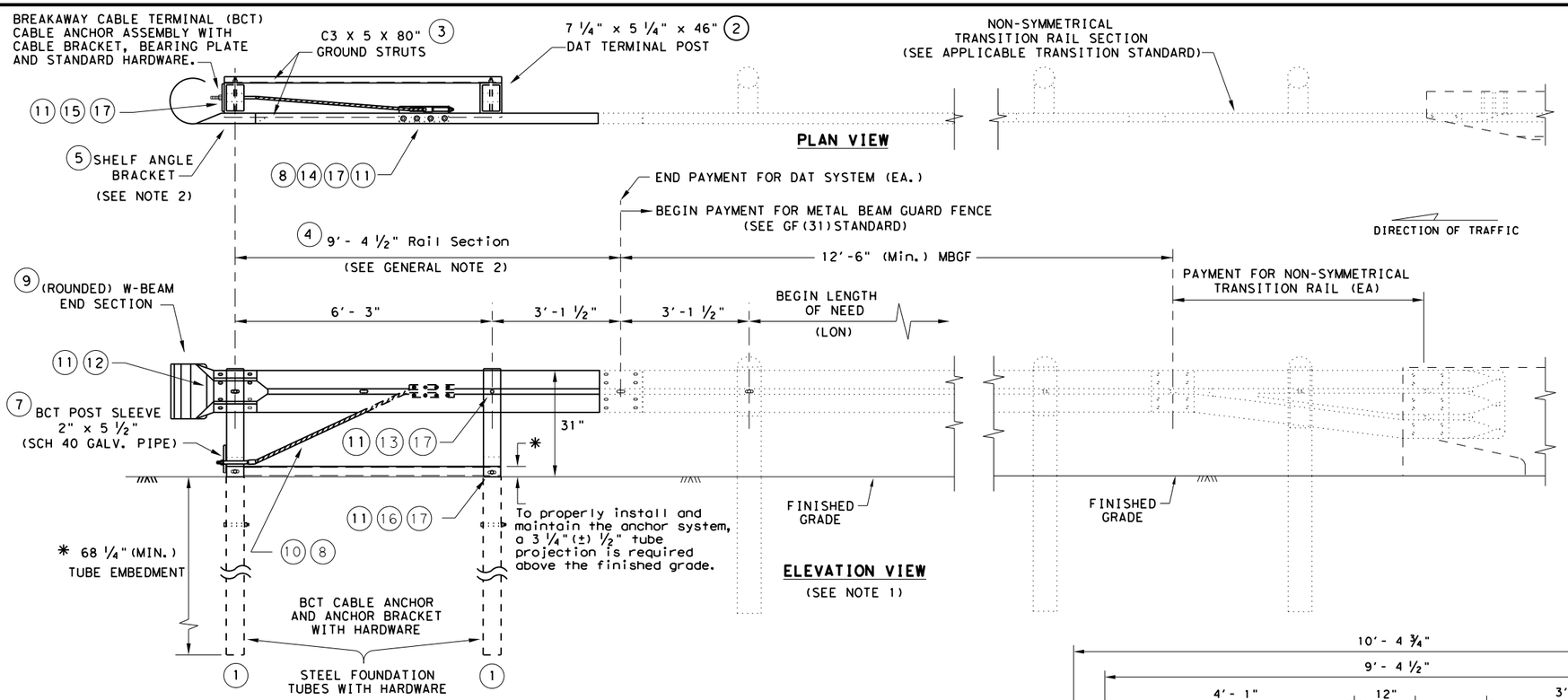


DOWNSTREAM ANCHOR TERMINAL (DAT)

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

GENERAL NOTES

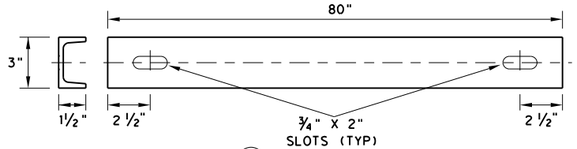
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN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

MOW STRIP INSTALLATION

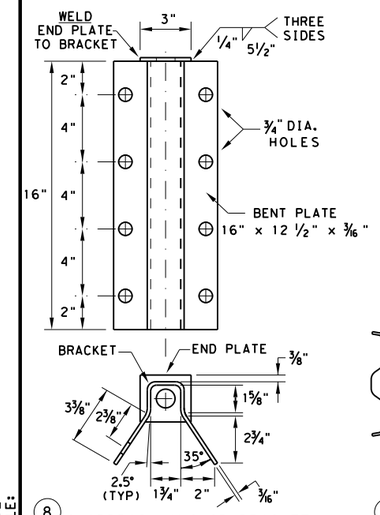
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

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

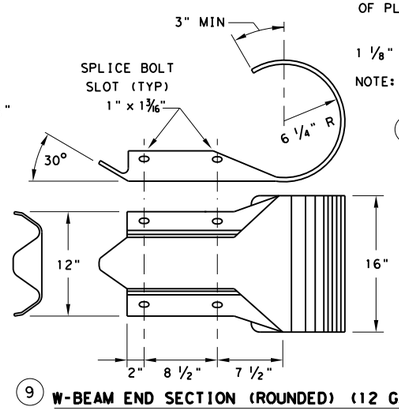
(4) **TERMINAL RAIL ELEMENT FOR DAT**



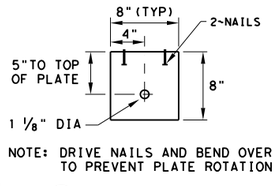
(3) **CHANNEL STRUT**
C3 X 5 X 80", GRADE A36



(8) **GUARDRAIL ANCHOR BRACKET**

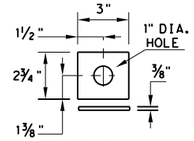


(9) **W-BEAM END SECTION (ROUNDED) (12 GA.)**

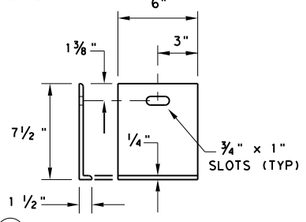


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

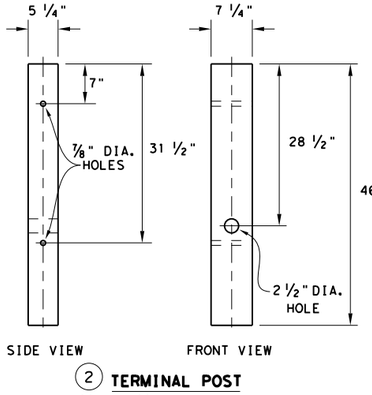
(6) **BEARING PLATE**
8"x 8"x 5/8" R



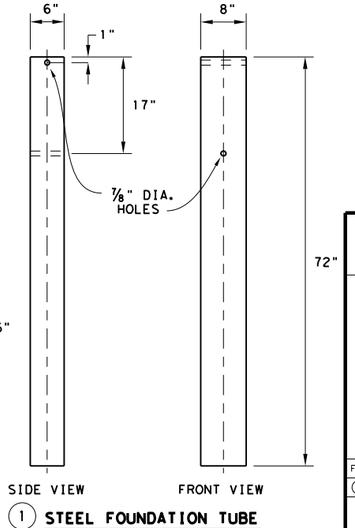
END PLATE



(5) **SHELF ANGLE BRACKET**



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



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

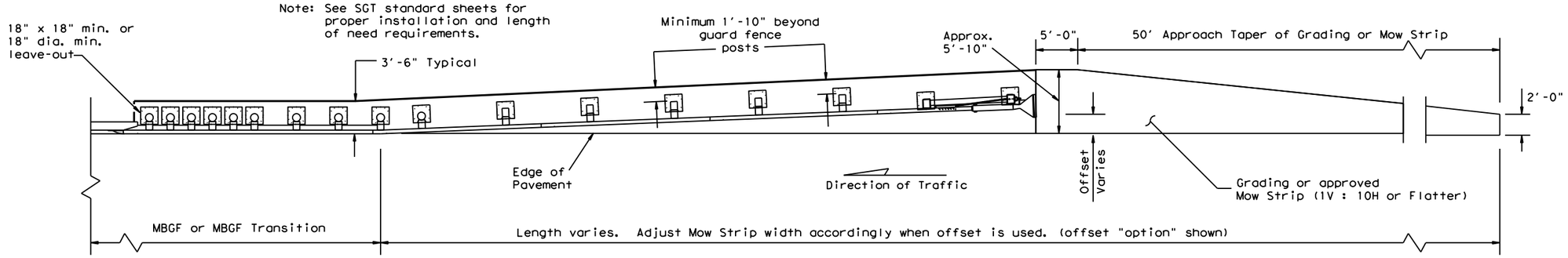
Texas Department of Transportation — Design Division Standard

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

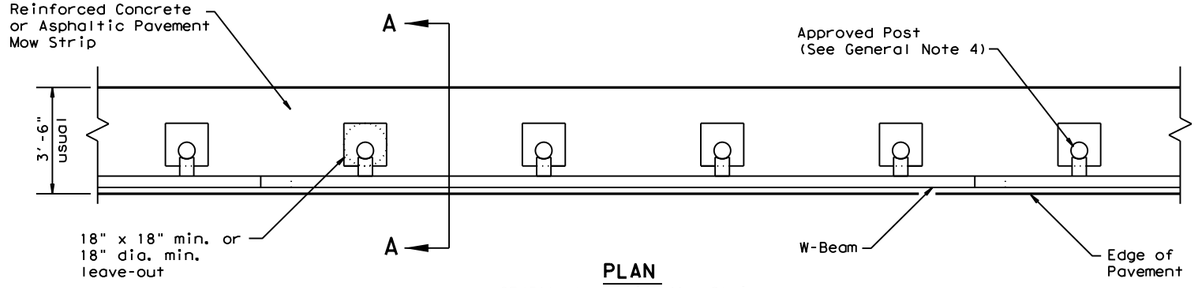
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		66

DATE:
FILE:

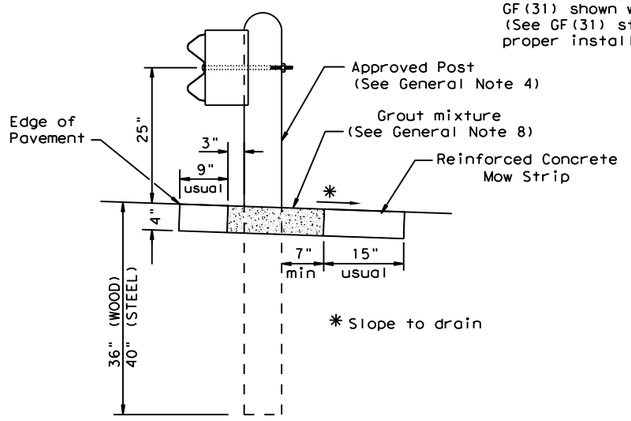


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



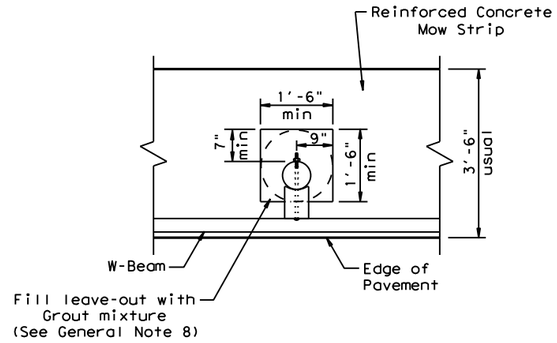
PLAN

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



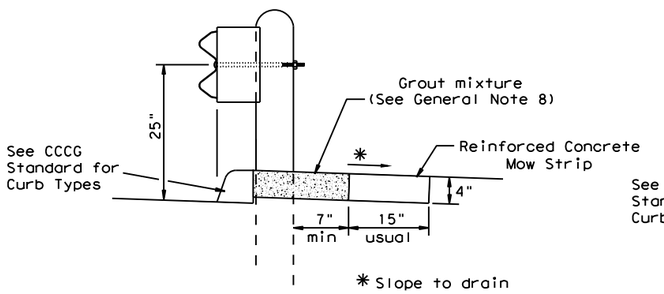
SECTION A-A

Typical



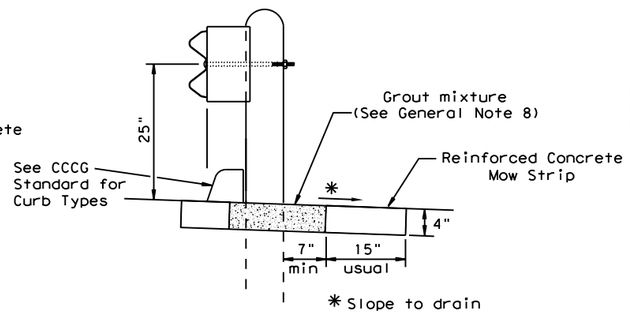
MOW STRIP DETAIL

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



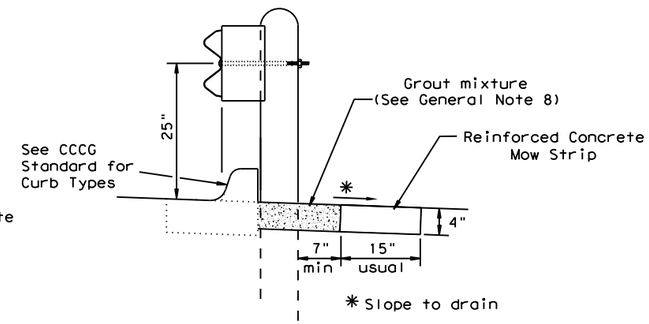
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

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

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

GENERAL NOTES

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

Texas Department of Transportation

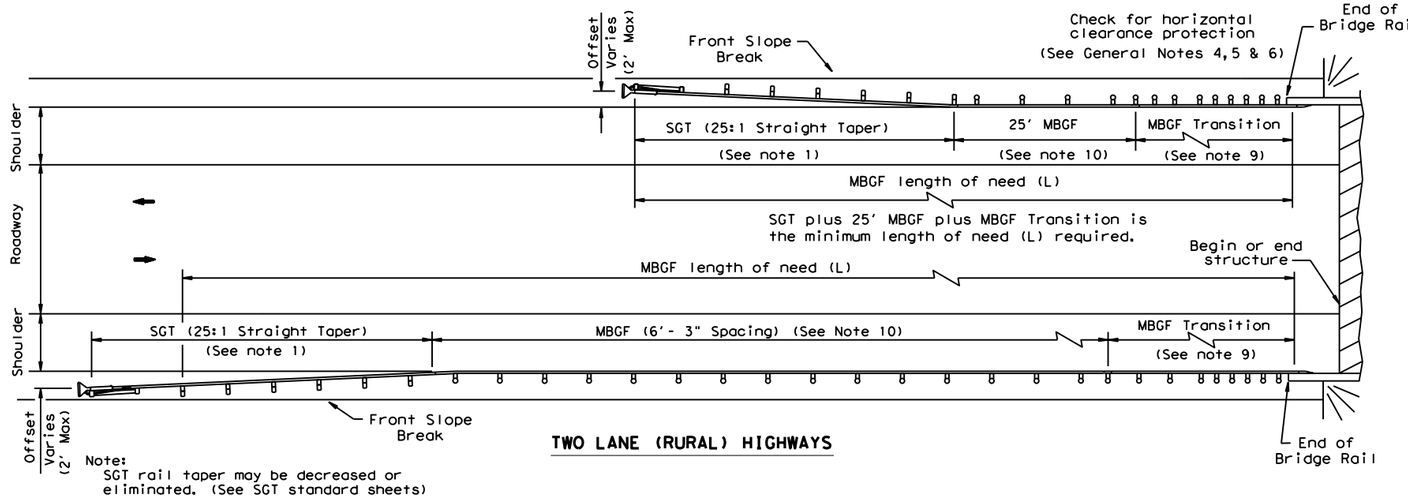
Design Division Standard

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

GF(31)MS-19

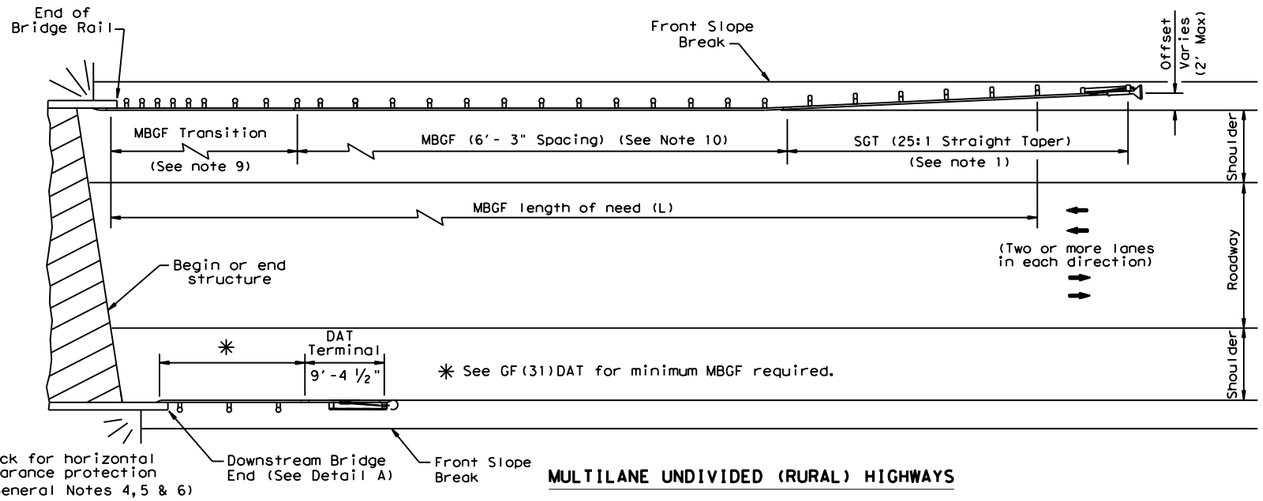
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		67

DATE:
FILE:

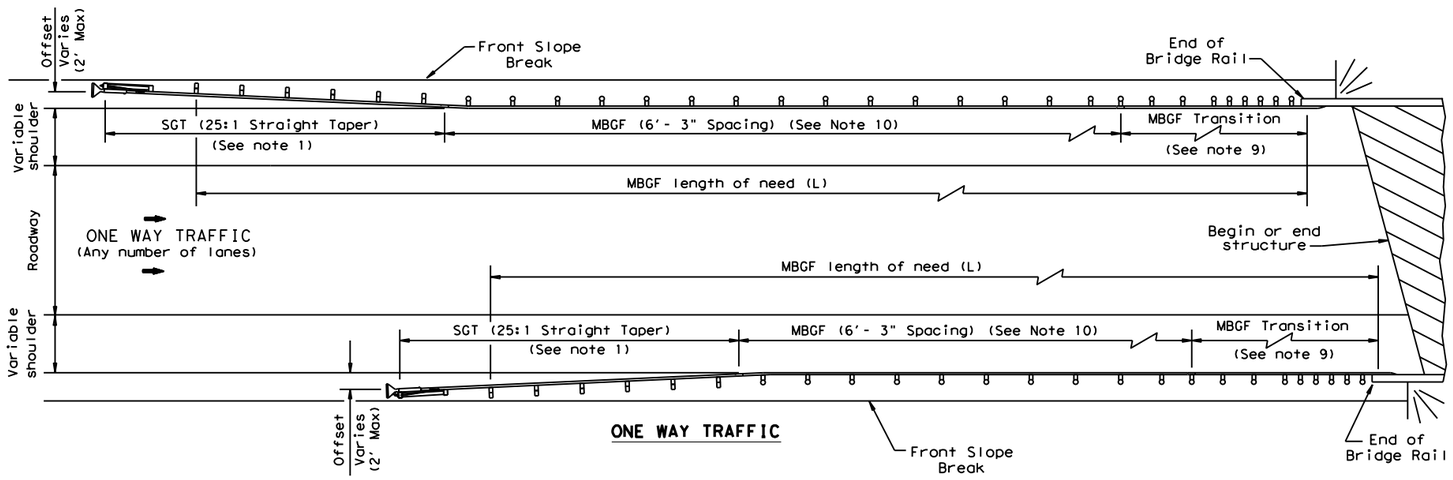


TWO LANE (RURAL) HIGHWAYS

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



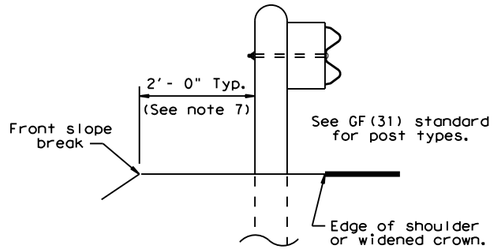
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF

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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

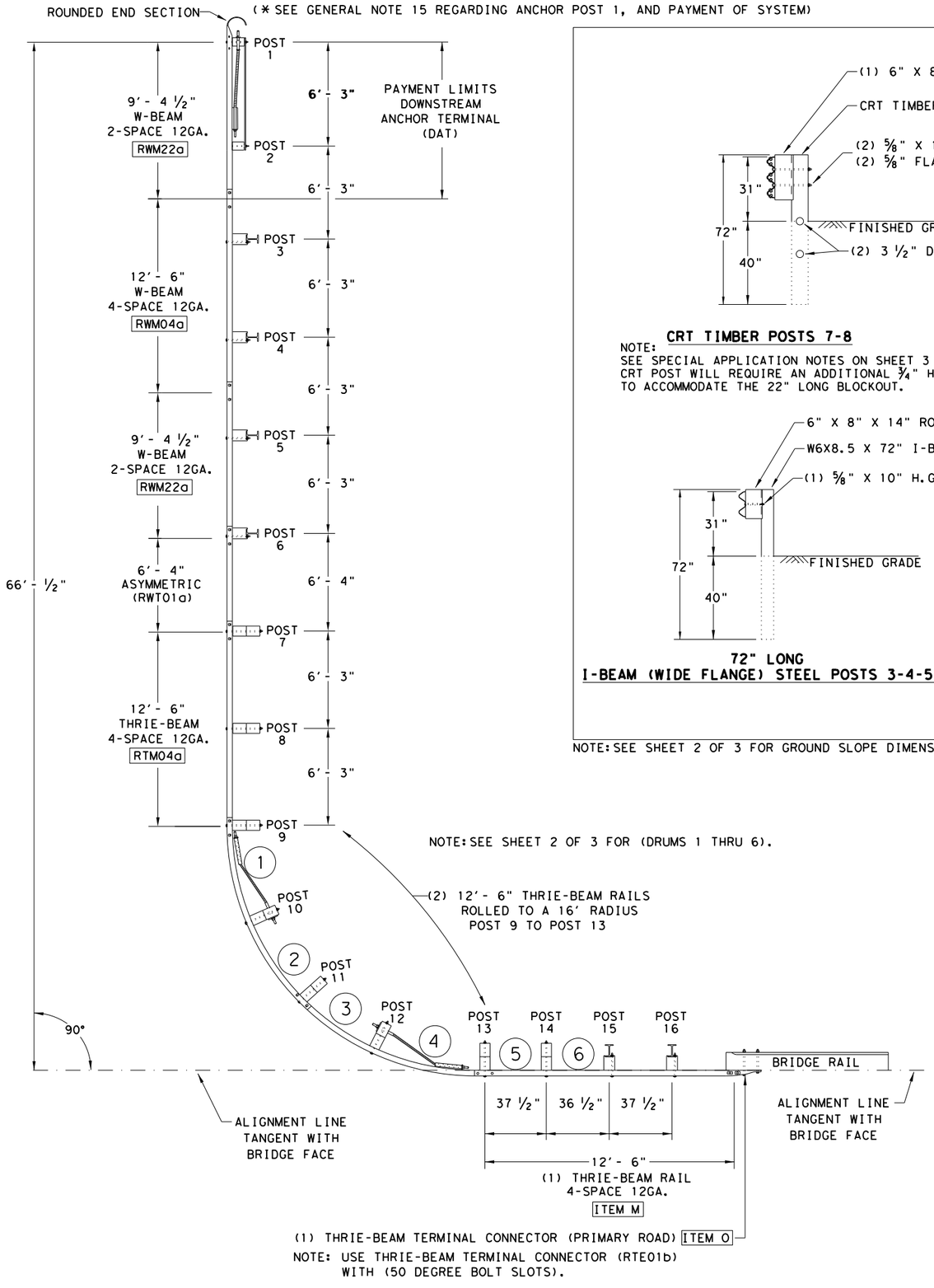
BRIDGE END DETAILS

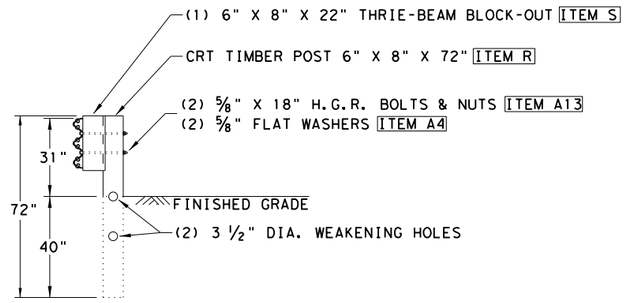
(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
REVISED APRIL 2014 SEE (MEMO 0414)	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		68

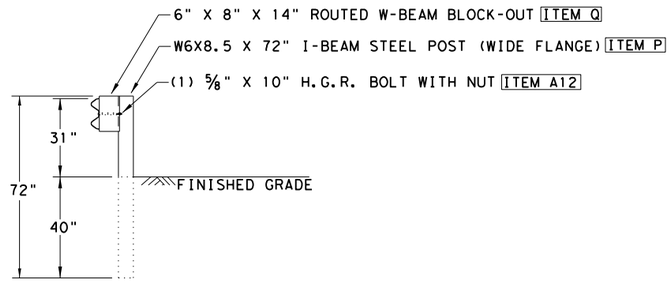
DATE:
FILE:



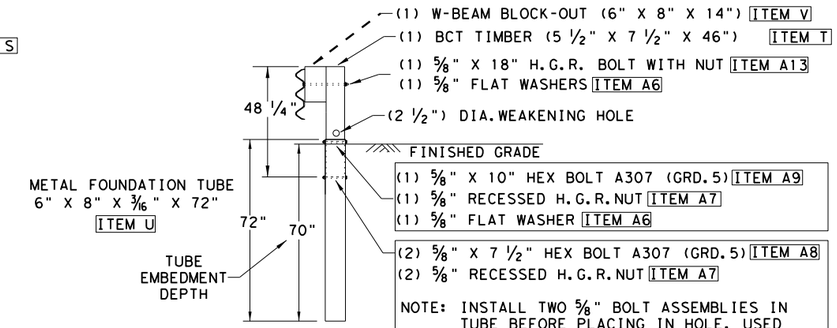


CRT TIMBER POSTS 7-8

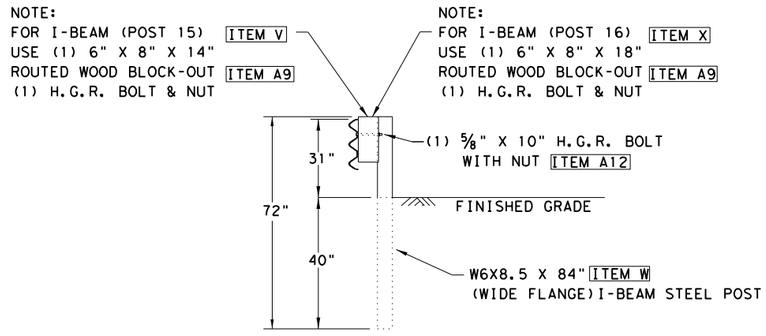
NOTE:
SEE SPECIAL APPLICATION NOTES ON SHEET 3 OF 3.
CRT POST WILL REQUIRE AN ADDITIONAL ¾" HOLE TO ACCOMMODATE THE 22" LONG BLOCKOUT.



72" LONG
I-BEAM (WIDE FLANGE) STEEL POSTS 3-4-5-6

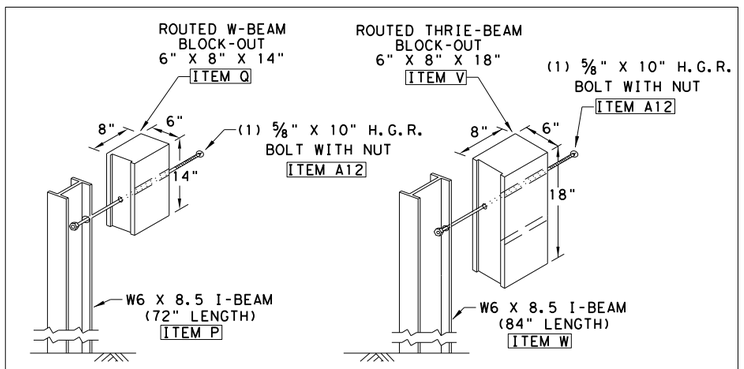


BCT TIMBER POSTS WITH METAL FOUNDATION TUBES
9-10-11-12-13-14



84" LONG
I-BEAM WIDE FLANGE STEEL POSTS 15-16

NOTE: SEE SHEET 2 OF 3 FOR GROUND SLOPE DIMENSIONS.



POST 3-4-5-6-15 **POST 16**

INSTALLATION DETAIL
ROUTED WOOD BLOCK-OUT WITH WIDE FLANGE STEEL POST

NOTE:
POST SYSTEM USES TWO TYPES OF 14" WOOD BLOCK-OUTS.
FOR CRT & BCT WOOD POSTS USE: (PDB01a)
FOR I-BEAM STEEL POSTS USE: (PDB01b)

POST (3-4-5-6)	USE: 14" BLOCK-OUT (PDB01b)
POST (7-8)	USE: 22" BLOCK-OUT (PDB02)
POST (9 THRU 14)	USE: 14" BLOCK-OUT (PDB01a)
POST (15)	USE: 14" BLOCK-OUT (PDB01b)
POST (16)	USE: 18" BLOCK-OUT (PDB01)

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

SHEET 1 OF 3

Texas Department of Transportation

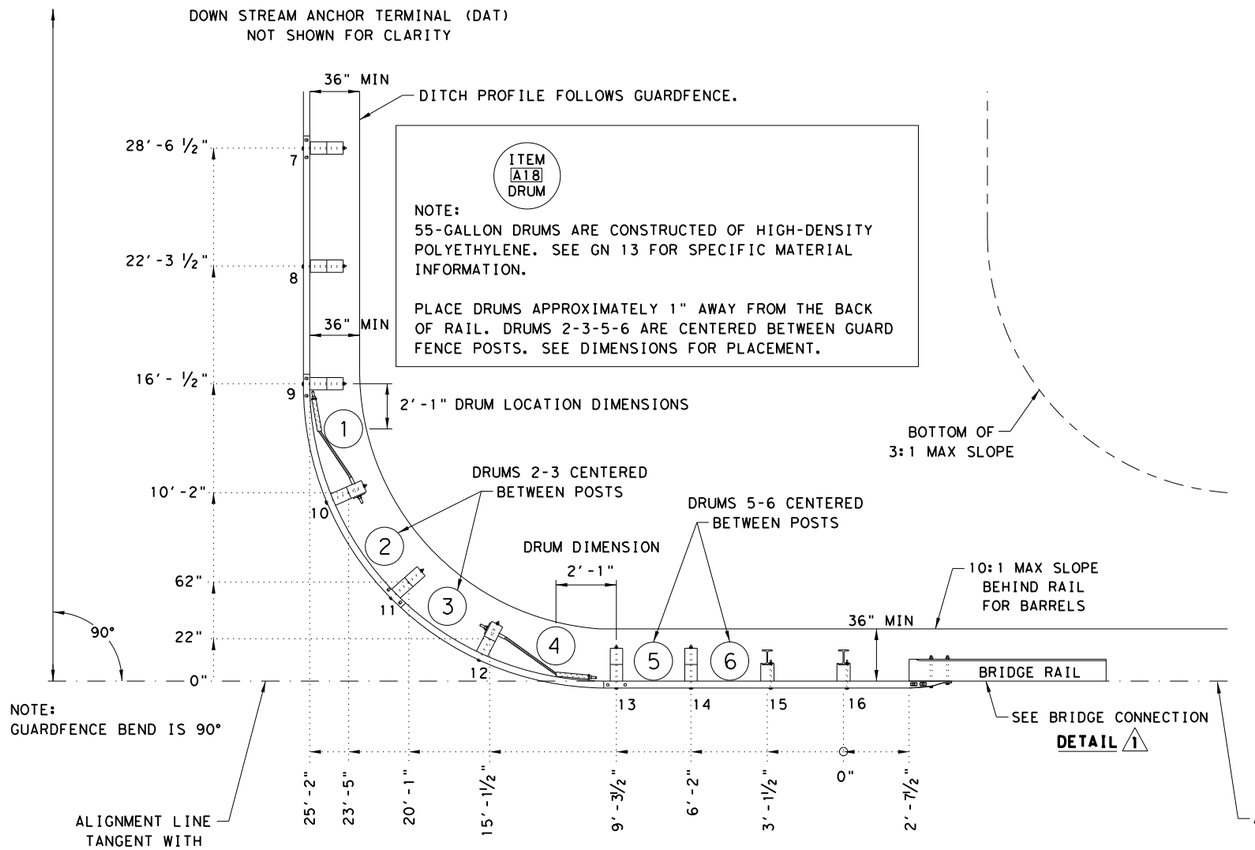
Design Division Standard

TL-2
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-2)-21

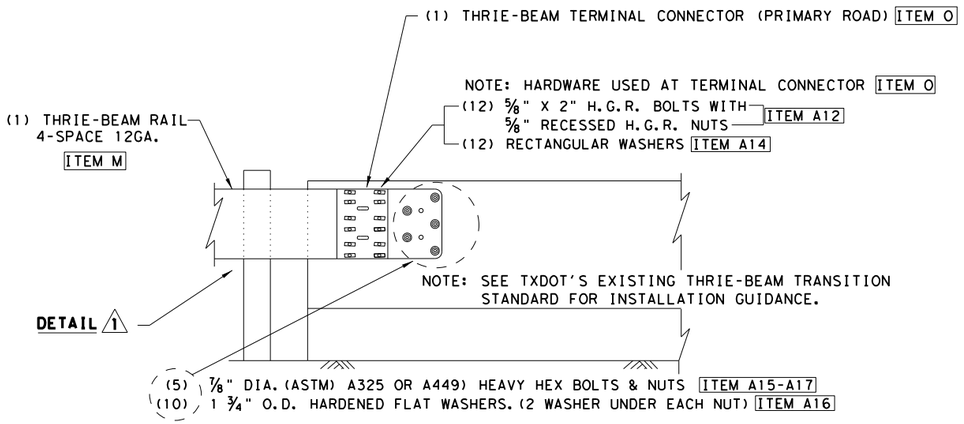
FILE: srgt1221	TxDOT	CK:KM	DN:VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		69

DATE:
FILE:



POST PLACEMENT DETAILS

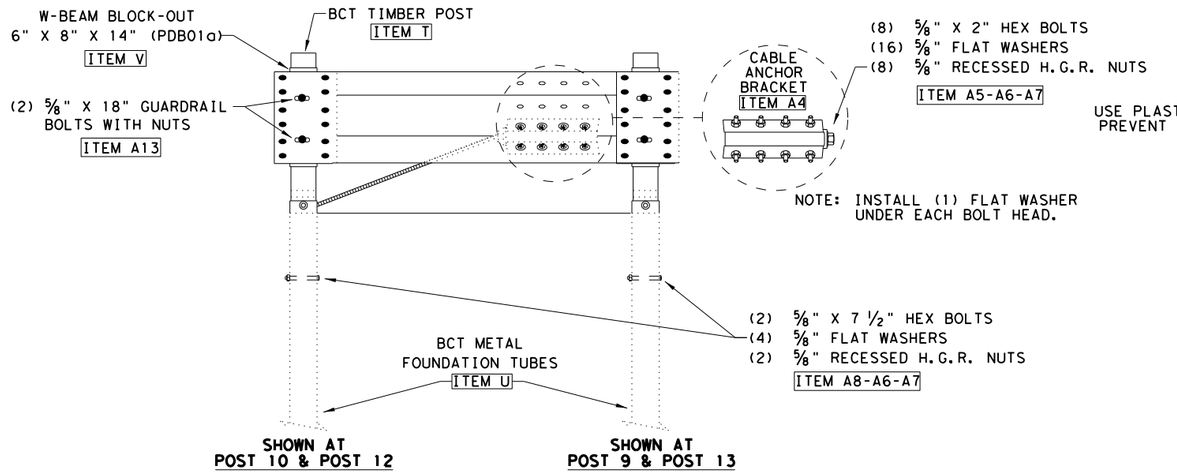
NOTE: USE THRIE-BEAM TERMINAL CONNECTOR (RTE01b) WITH (50 DEGREE BOLT SLOTS).

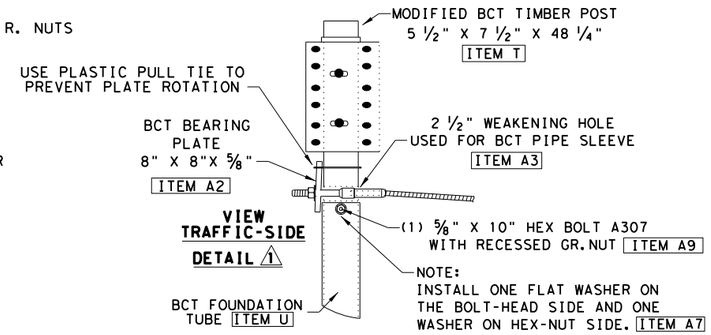


NOTE: TO ACCOMMODATE THE THRIE-BEAM TERMINAL CONNECTOR AT THE ROADWAY BRIDGE RAIL. DRILL (5) 1" DIA. HOLES. USE CONNECTOR PLATE FOR HOLE LOCATION TEMPLATE.

NOTE: BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE BRIDGE-RAIL, WASHER & HEX NUT. INSTALL WITH BOLT HEADS ON TRAFFIC-SIDE. (LENGTH OF THE BOLTS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING.)

PRIMARY ROADWAY BRIDGE-RAIL DETAIL





SHOWN AT POST 10 & POST 12

BCT TIMBER POST WITH METAL FOUNDATION TUBE

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

Texas Department of Transportation | Design Division Standard

TL-2
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-2)-21

FILE: srgt1221	TxDOT	CK:KM	DN:VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		70

DATE:
FILE:

ITEM	ALL LARGE & SMALL COMPONENT DESCRIPTIONS	TL-2 DOWNSTREAM ANCHOR TERMINAL (DAT) ☐ (PAYABLE BY EA.) ITEM	QTY	TL-2 SHORT RADIUS GUARDRAIL COMPLETE SYSTEM (INCL DAT) △ (ALL PAY ITEMS) ITEM	TOTAL QTY
A	POST 1 & 2 BCT TIMBER (5 ½" X 7 ½" X 48 ¼") (PDF01)	A	2	A	2
B	POST 1 & 2 BCT TUBE (6" X 8" X 3/16" X 72" LENGTH) (PTE05)	B	2	B	2
C	POST 1 & 2 CHANNEL STRUTS (C3 X 5 X 80") A36	C	2	C	2
D	POST 1 SHELF ANGLE BRACKET (6" X 7 ½" X ¼") SEE DAT DETAIL	D	1	D	1
E	POST 1 BCT POST SLEEVE (FMM02a)	E	1	E	1
F	POST 1 BCT CABLE BEARING PLATE (⅝" X 8" X 8") (FPB01)	F	1	F	1
G	BCT CABLE ANCHOR ASSEMBLIES (¾" X 6'-6 ¾" LENGTH) (FCA01)	G	1	G	1
H	W-BEAM RAIL (ROUNDED END ANCHOR-TYPE) 12GA. (RWE03a)	H	1	H	1
I	W-BEAM RAIL (LENGTH 9'-4 ½") 12GA. (RWM22a)	I	2	I	2
J	W-BEAM RAIL (LENGTH 12'-6") 12GA.(4 SPACE) (RWM04a)			J	1
K	W-BEAM RAIL (LENGTH 9'-4 ½") 12GA. (RWM22a)			K	1
L	W-BEAM TO THRIE-BEAM ASYMMETRIC RAIL (RWT01a). (LENGTH 6'-4")			L	1
M	THRIE-BEAM RAIL (LENGTH 12'-6") 12GA. (4 SPACE) (RTM04a)			M	1
N	THRIE-BEAM RAIL (LENGTH 12'-6") 12GA. (16' RADIUS) (RTM02a)			N	2
O	THRIE BEAM RAIL (TERMINAL CONNECTOR) (BRIDGE-RAIL) (RTE01b)			O	1
P	POSTS 3,4,5,6 I-BEAM POSTS (LENGTH W6X8.5 X 72") (PWE01)			P	4
Q	POSTS 3,4,5,6,15 ROUTED W-BEAM BLOCK-OUTS (6" X 8" X 14") (PDB01b)			Q	5
R	POSTS 7,8 CRT TIMBER POSTS (LENGTH 6" X 8" X 72") (PDE09)			R	2
S	POSTS 7,8 THRIE-BEAM BLOCK-OUTS (6" X 8" X 22") (PDB02a)			S	2
T	POSTS 9,10,11,12,13,14 BCT TIMBER (5 ½" X 7 ½" X 46") (PDF04)			T	6
U	POSTS 9,10,11,12,13,14 BCT TUBE (6" X 8" X 3/16" X 72") (PTE05)			U	6
V	POSTS 9,10,11,12,13,14, W-BEAM BLOCK-OUTS (6" X 8" X 14") (PDB01a)			V	6
W	POSTS 15,16 I-BEAM POSTS (LENGTH W6X8.5 X 84") (PWE07)			W	2
X	POSTS 16 ROUTED THRIE-BEAM BLOCK-OUT (6" X 8" X 18") (PDB01)			X	1
A1	MODIFIED BCT CABLE ANCHOR ASSEMBLIES (¾" X LENGTH 5'-5")			A1	2
A2	BCT CABLE BEARING PLATE (⅝" X 8" X 8") (POST 10 & POST 12) (FPB01)			A2	2
A3	BCT CABLE POST SLEEVE (POST 10 & POST 12) (FMM02)			A3	2
A4	BCT CABLE ANCHOR BRACKET (AT POST 9 & POST 13) (FPA01)			A4	2
A5	⅝" X 2" HEX BOLTS A307 GRD.5 (FOR CABLE ANCHOR BRACKETS)	A5	8	A5	24
A6	⅝" FLAT WASHER A307 GRD.5 (1 WASHER UNDER BOLT & 1 WASHER UNDER NUT)	A6	18	A6	48
A7	⅝" RECESSED H.G.R. NUTS (FOR ALL ⅝" BOLTS)	A7	20	A7	152
A8	⅝" X 7 ½" HEX BOLTS A307 GRD.5 BCT POSTS (9-10-11-12-13-14)	A8	4	A8	12
A9	⅝" X 10" HEX BOLTS A307 GRD.5 BCT POSTS (9-10-11-12-13-14)	A9	2	A9	6
A10	⅝" X 1 ¼" H.G.R. BOLTS SPLICES AT POST (2-3-4-5-6-7-9-11-13) (FBB01)	A10	4	A10	72
A11	⅝" X 2" H.G.R. BOLTS (ROUND TERM-POST 10-END SPLICE) (FBB02)			A11	18
A12	⅝" X 10" H.G.R. BOLTS (I-BEAM POSTS RAIL & BLOCKOUT) (FBB03)	A12	2	A12	10
A13	⅝" X 18" H.G.R. BOLTS (POSTS 9,10,11,12,13,14) (FBB04)			A13	10
A14	RECTANGULAR WASHERS (FWR03) (FOR TERMINAL CONNECTOR RTE01b)			A14	12
A15	⅞" X (LENGTH VARIES) HEX BOLTS A325 OR A449 GR.5			A15	5
A16	1 ¾" O.D. HARDENED FLAT WASHER A325			A16	10
A17	⅞" HEX NUT GR.5 A325			A17	5
A18	55 GALLON DRUM - FILLED WITH SAND 700-715lbs.			A18	6

GENERAL NOTES

1. FOR ADDITIONAL INSTALLATION INFORMATION AND GUIDANCE CONTACT: TEXAS DEPARTMENT OF TRANSPORTATION, (TXDOT'S DESIGN DIVISION). (512) 416-2678. THE EXACT POSITION OF MBGF SHALL BE SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE SIGHT DISTANCE OF THE INSTALLATION WILL NEED TO BE VERIFIED WITH RESPECT TO THE SPECIFIC SITE PLACEMENT.

2. STEEL POSTS ARE NOT PERMITTED AT CRT OR BCT POST POSITIONS.

3. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12 ½" OR 25 FOOT NOMINAL LENGTHS.

4. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND TYPE A (1 ¾" O.D.) WASHER AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE ⅝" X 1 ¼" OR 2" LONG AT TRIPLE RAIL SPLICES WITH A DOUBLE RECESSED NUT (ASTM A563).

5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.

6. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.

7. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A SLOPE RATE OF NOT MORE THAN 1V:10H.

8. IT IS NOT RECOMMENDED THAT GUARD FENCE BE PLACED IN THE VICINITY OF CURBS.

9. GUARDRAIL POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.

10. SPECIAL RAIL FABRICATION WILL BE REQUIRED FOR THRIE BEAM RAIL RADIUS (ITEM J).

11. ALL MATERIAL AND WORK INVOLVED IS SUBSIDIARY TO SHORT RADIUS BID ITEM, INCLUDING, BUT NOT LIMITED TO FOUNDATIONS, GRADING, THRIE BEAM RAIL, SAND DRUMS, AND OTHER PARTS.

12. ALL CABLE ASSEMBLIES SHOULD BE TAUT AFTER INSTALLATION. WHEN CABLES ARE MANIPULATED BY HAND THE CABLES SHOULD NOT MOVE MORE THAN 1" IN ANY DIRECTION PERPENDICULAR TO THE CABLE.

13. THE DRUMS ARE EAGLE MODEL 1656 FILLED WITH 715 LB (+/-15) SAND WITH THE PLASTIC LEVER-LOCK; OR AN APPROVED EQUIVALENT. THE APPROXIMATE HEIGHT OF THE DRUM IS 37" (+/-).

14. WHEN THE SHORT RADIUS SYSTEM IS TERMINATED BY A DAT, REFER TO THE LATEST DAT STANDARD FOR INSTALLATION OF THE DAT SYSTEM. IF THE SYSTEM IS TERMINATED BY ANOTHER END TERMINAL SYSTEM, REFER TO THE CORRESPONDING END TERMINAL STANDARD.

* 15. WHEN THE PLANNED LOCATION OF POST (1) IS WITHIN THE RIGHT-OF-WAY AND WITHIN THE CLEAR ZONE OF THE DIRECTION OF THE OPPOSING TRAFFIC, AN APPROPRIATE CRASHWORTHY END TERMINAL SHALL BE INSTALLED IN PLACE OF THE DOWNSTREAM ANCHOR TERMINAL (DAT). THE PAYMENT OF THE COMPLETE SHORT RADIUS SYSTEM WITH A DAT AT THE TERMINUS WILL BE WITH BID ITEMS: 540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION, AND 540 6046 TL-2 31" SHORT RADIUS (W/O DAT). THE PAYMENT OF THE SYSTEM TERMINATED BY A CRASHWORTHY END TERMINAL (IN LIEU OF THE DAT) WILL BE WITH BID ITEMS: 540 6046 TL-2 31" SHORT RADIUS (W/O DAT), AND 544 6001 GUARDRAIL END TREATMENT (INSTALL).

16. TESTED TO MASH WITH A 3:1 SLOPE OR SHALLOWER IS PREFERABLE IN THE LIMITS OF THE TOP AND BOTTOM OF THE SLOPE AS SHOWN IN THE PLAN VIEW. IF FIELD CONDITIONS REQUIRE A STEEPER SLOPE,THIS MAY BE ALLOWABLE UP TO A 2:1 SLOPE. CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE.

NOTE: SEE SHEET 1 OF 3.

SPECIAL APPLICATION NOTES.

1. THIS IS A MASH COMPLIANT TL-2 SHORT RADIUS GUARDRAIL SYSTEM 31 INCHES TALL. THE SYSTEM REQUIRES A MINIMUM PLACEMENT FOOTPRINT OF 35' ALONG THE PRIMARY ROAD AND 30' ALONG THE SECONDARY DRIVEWAY.

2. THE SYSTEM ALSO REQUIRES A MINIMUM 3' WIDE (WORK ZONE) DIRECTLY BEHIND THE GUARDRAIL SYSTEM, WITH A SLOPE AT 1V:10H, FROM THERE A 3:1 SLOPE IS RECOMMENDED. SEE SHEET 2 OF 3 FOR SLOPE DETAILS.

3. NOTE FOR INSTALLER: THE TWO (2) CRT POSTS ITEM (R), AT POST LOCATIONS 7 & 8.), WILL REQUIRE THE FOLLOWING FIELD ADJUSTMENT. USING A ¾" X 10" LONG SPADE BIT DRILL ONE (1) ADDITIONAL HOLE 7-⅞" DIRECTLY BELOW THE EXISTING TOP HOLE TO ACCOMMODATE THE HARDWARE FOR THE 22" LONG BLOCKOUT.

   OPTION FOR ADDITIONAL ¾" HOLE. THE 22" LONG BLOCKOUT (PDB01a) IS MANUFACTURED WITH TWO ¾" DRILLED HOLES FOR THE POST HARDWARE, THEREFORE THE BLOCKOUT CAN BE USED AS A TEMPLATE GUIDE FOR THE BOTTOM ¾" HOLE. AFTER INSTALLING THE CRT POST USE THE TOP HOLE TO MOUNT THE 22" LONG BLOCKOUT TO POST, USE THE BLOCKOUT'S PRE-DRILLED HOLE AS A GUIDE FOR THE BOTTOM ¾" HOLE.

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

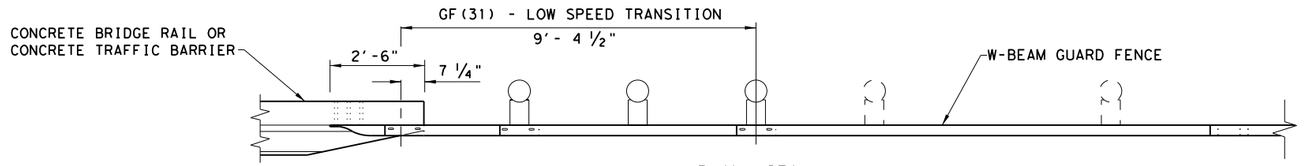
Texas Department of Transportation — Design Division Standard

TL-2 SHORT RADIUS GUARDRAIL MASH COMPLIANT

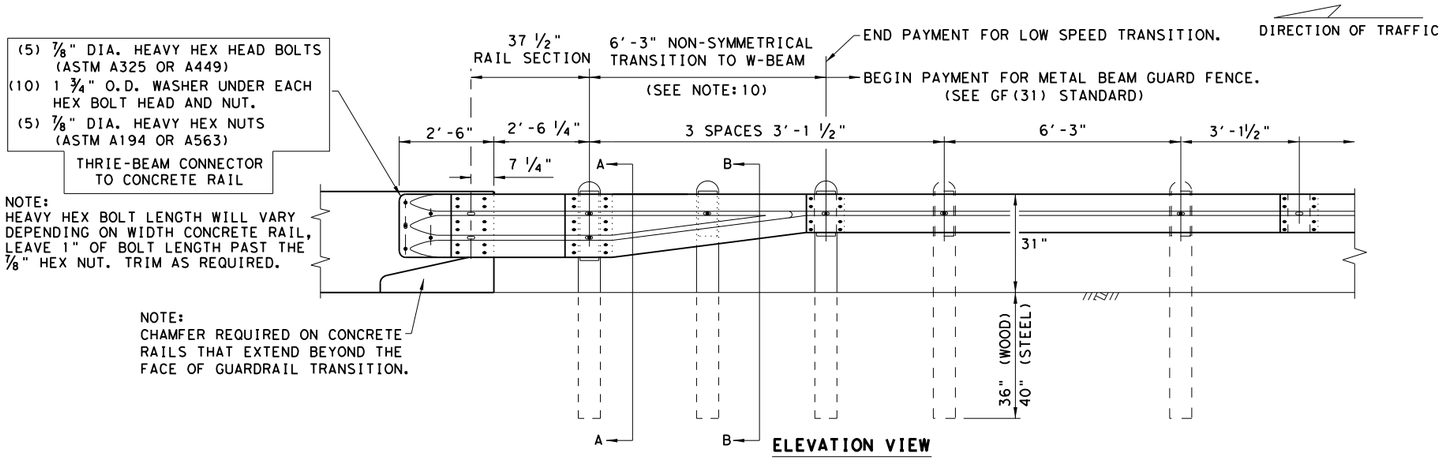
SRG(TL-2)-21

FILE: srgt1221	TxDOT	CK:KM	DN:VP	CK:CGL
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		71

DATE:
FILE:



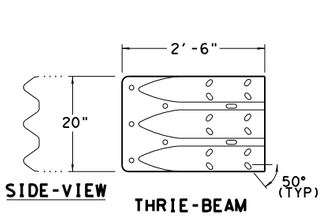
PLAN VIEW



ELEVATION VIEW

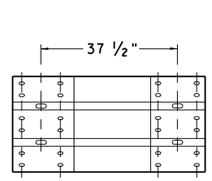
GENERAL NOTES

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 TRANSITIONS SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REFER TO GF(31)STANDARD SHEET.
2. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS.
3. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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 NOT MORE THAN 1" BEYOND IT. TRIM BOLT LENGTH TO MEET REQUIRED LENGTH.
5. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
7. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
8. 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 CAN FURNISH COMPOSITE MATERIAL BLOCKS.
9. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
10. FOR ROUND WOOD POSTS SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE TRANSITION.

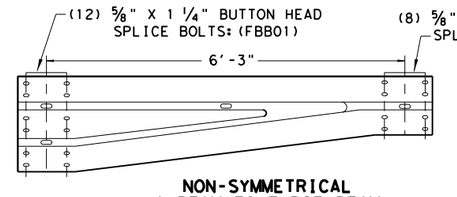


SIDE-VIEW

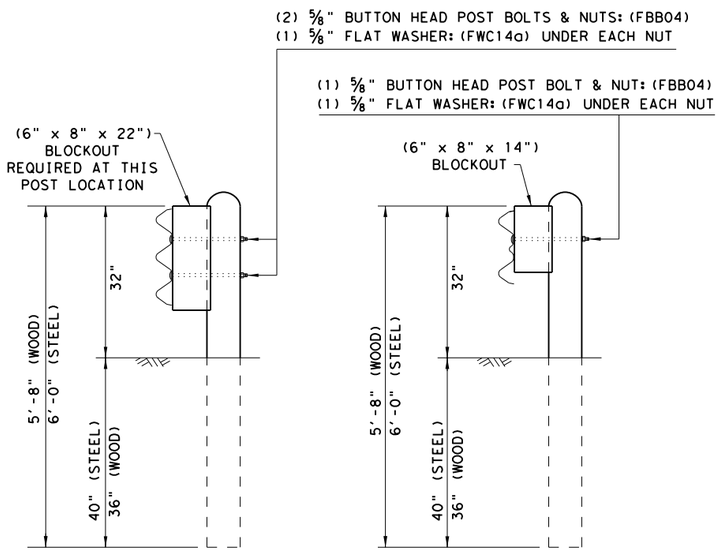
THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b



THRIE-BEAM RAIL SHORT SECTION 10GA.
PART DESIGNATOR RTM01a



NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSISTION 10GA.
PART DESIGNATOR RWT02a OR RWT02b

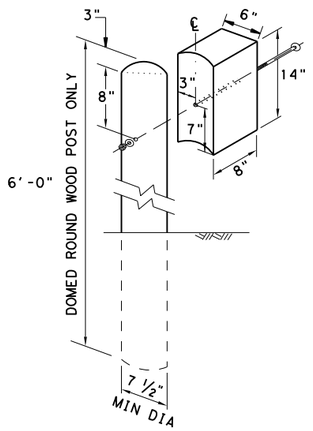


SECTION A-A

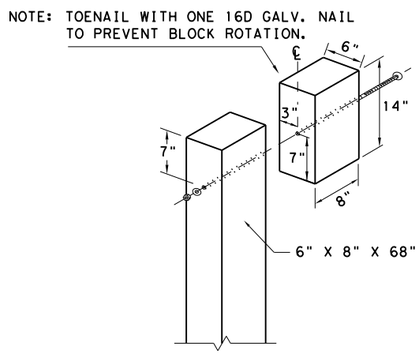
SECTION B-B

PLATE WASHER INSTRUCTIONS

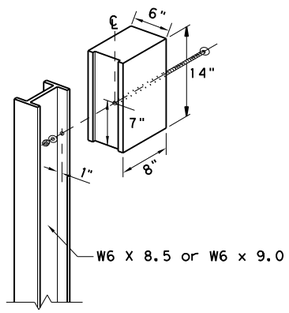
BRIDGE APPROACH - UPSTREAM: THE SHORT RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



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.

LOW-SPEED TRANSITION

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-2 MASH COMPLIANT

GF(31)TR TL2-19

FILE: gf31tr1219.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
	DAL	NAVARRO		72	

DATE:
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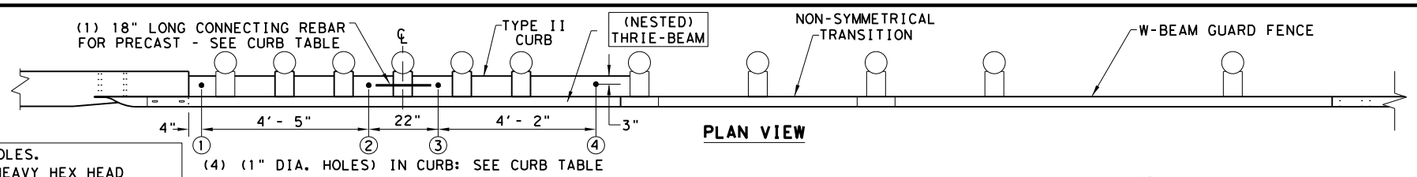


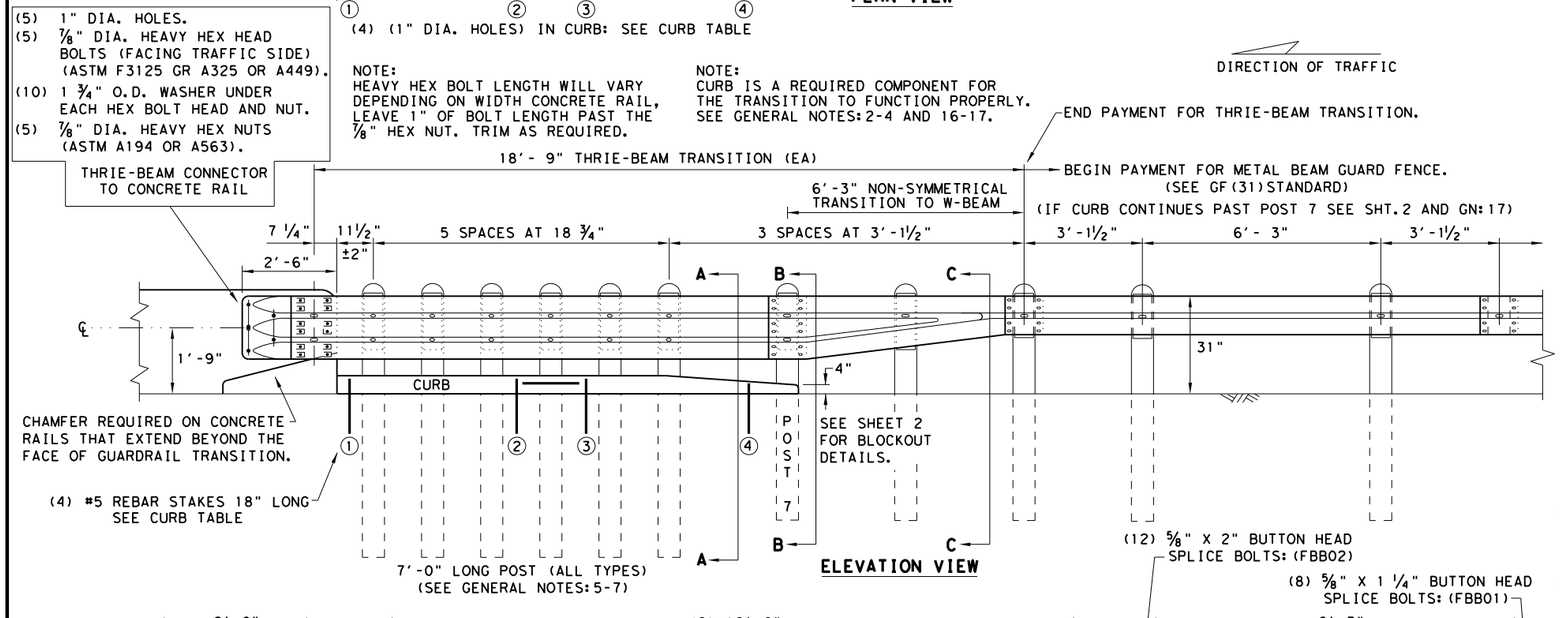
PLAN VIEW

(5) 1" DIA. HOLES.
(5) ⅞" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
(10) 1 ¾" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
(5) ⅞" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

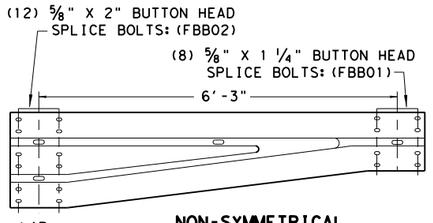
NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE ⅞" HEX NUT. TRIM AS REQUIRED.

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

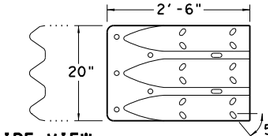
DIRECTION OF TRAFFIC



ELEVATION VIEW

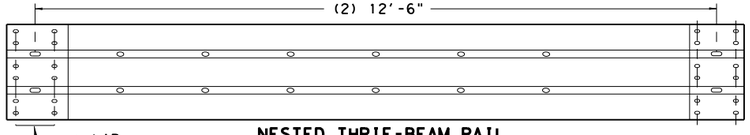


NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION 10GA.
PART DESIGNATOR RWT02a OR RWT02b



SIDE-VIEW

THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b
NOTE: SEE GENERAL NOTE: 9

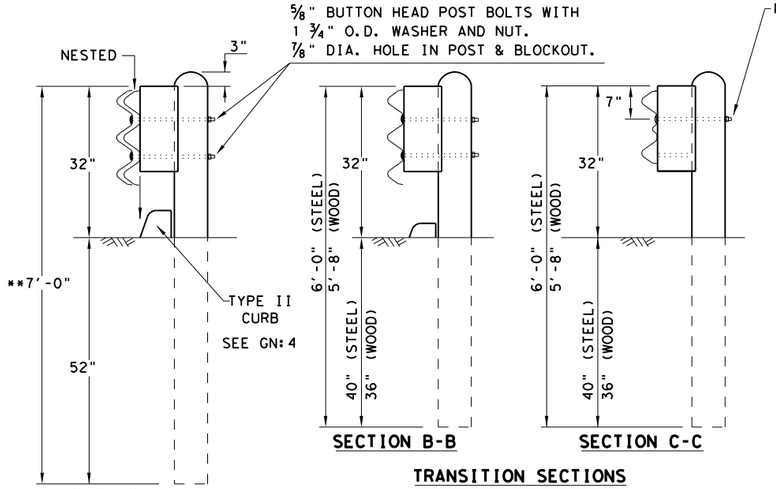


NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10a

(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

PLATE WASHER INSTRUCTIONS

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



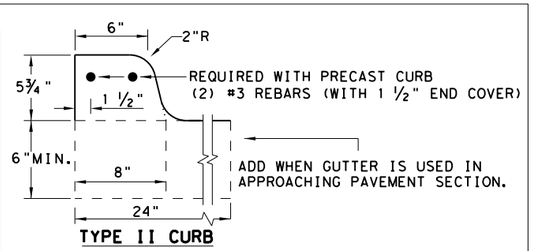
SECTION A-A
SECTION B-B
SECTION C-C

TRANSITION SECTIONS
NOTE: ALL POST TYPES, SEE GENERAL NOTE: 5 & 6

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

THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

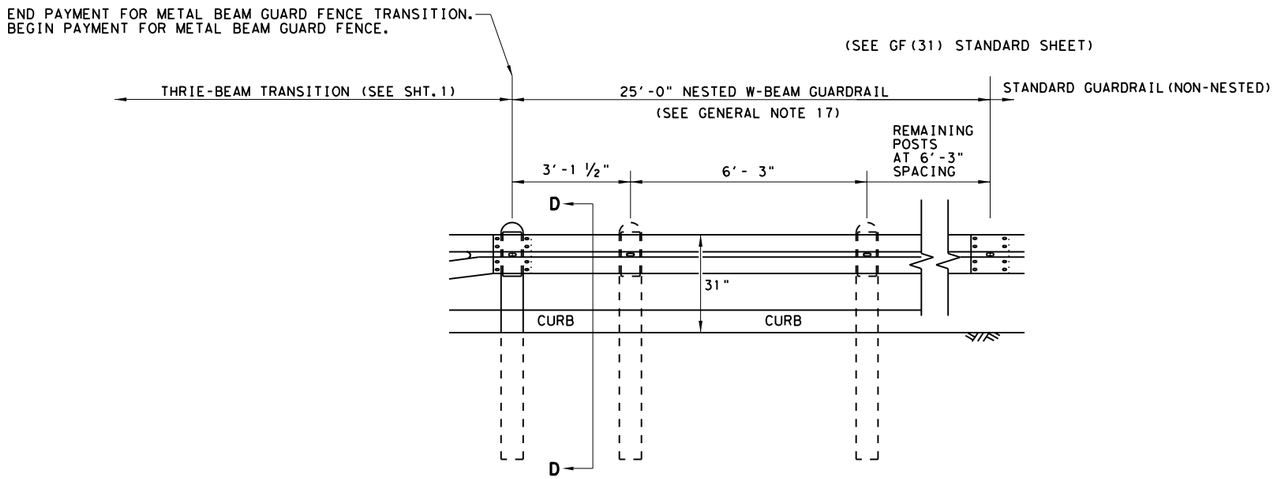
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

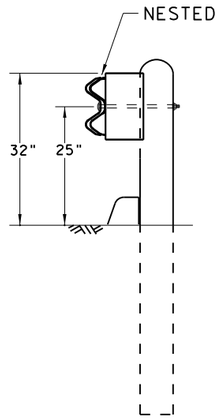
FILE: gf31trtl320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		73

DATE:
FILE:

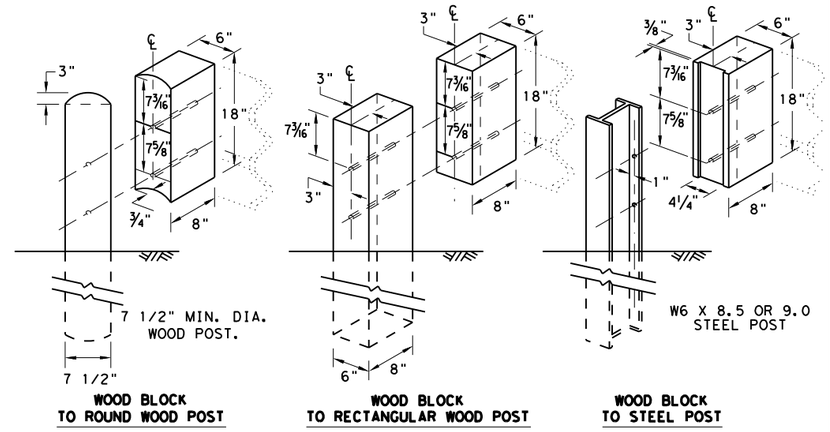
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

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

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG
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	DAL	NAVARRO		74

DATE:
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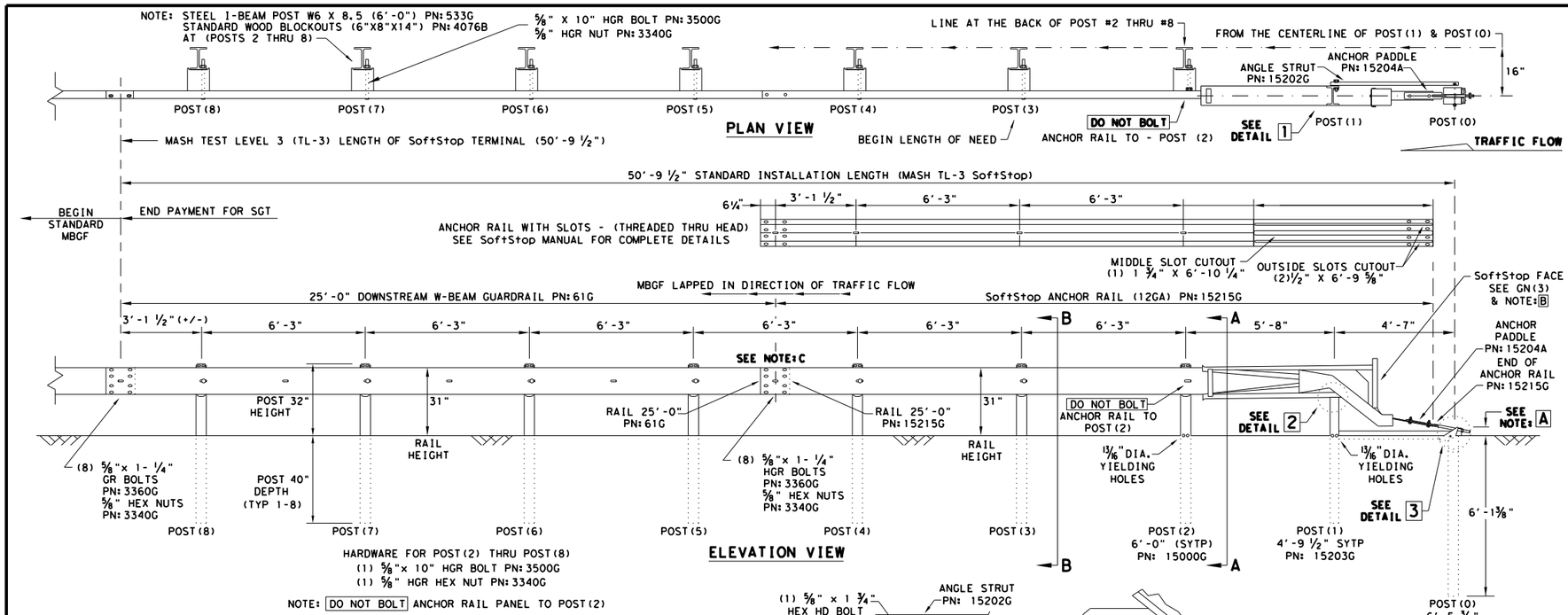

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt10s3116	DN: TxDOT		CK: KM	DW: VP		CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
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	DAL	NAVARRO				75

DATE:
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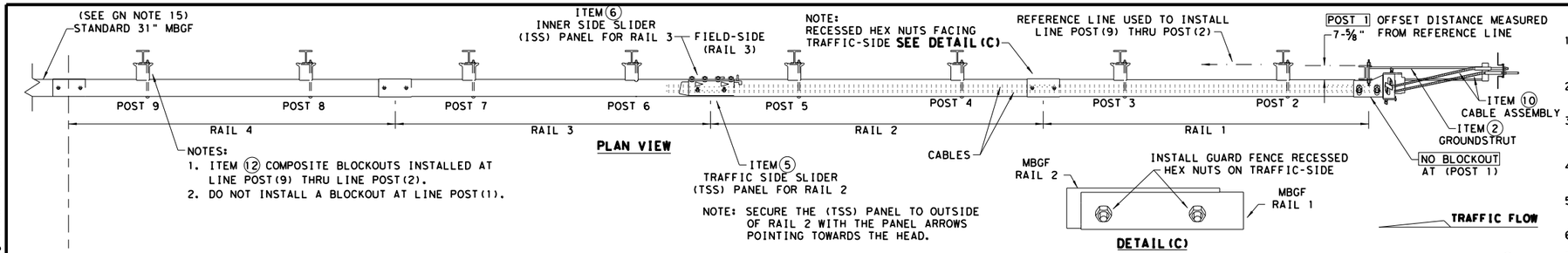
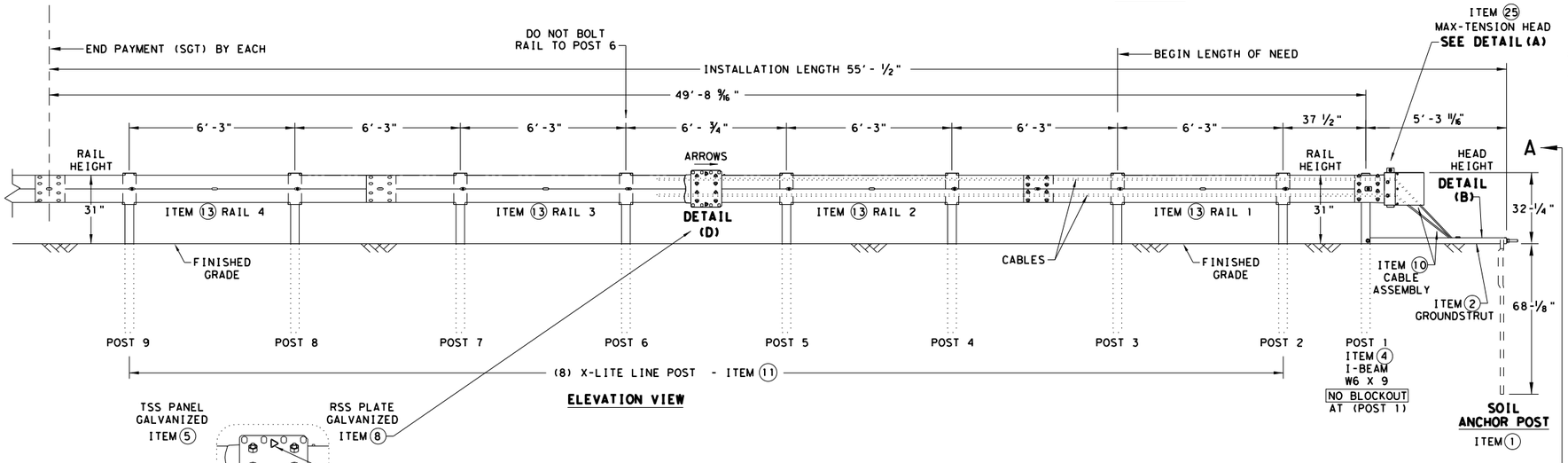
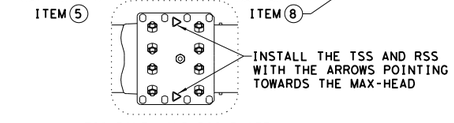


PLAN VIEW

DETAIL (C)

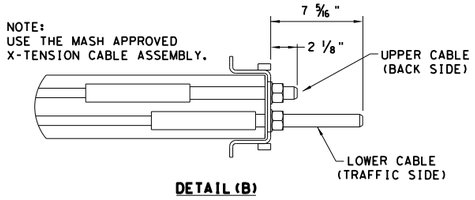


ELEVATION VIEW



TSS PANEL AND RSS PLATE

DETAIL (D)



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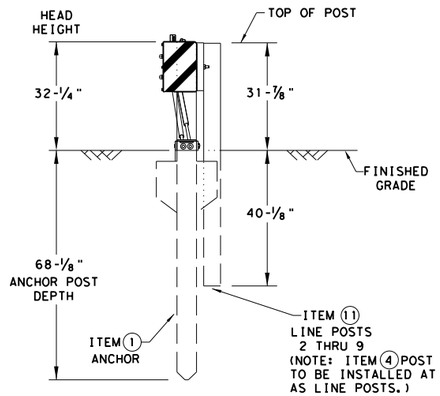
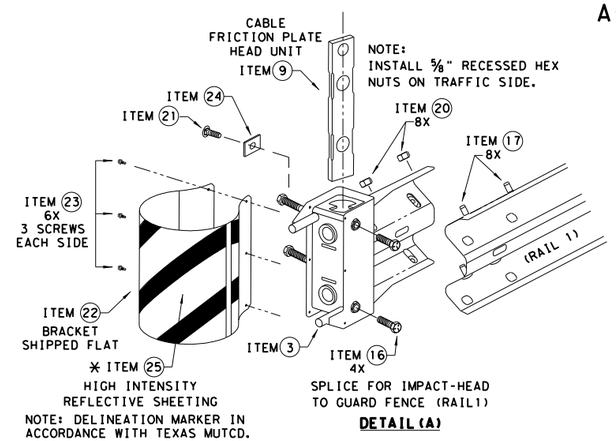
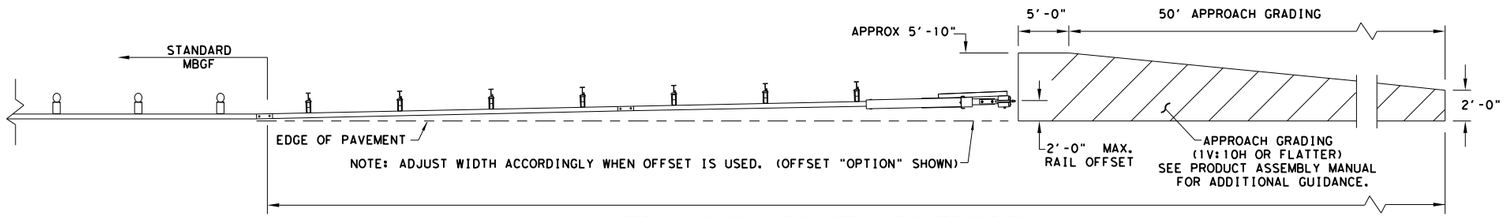


SOIL ANCHOR, POST 1
& LINE POST 2 THRU 9

SECTION VIEW A-A



DETAIL (A)



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

APPROACH GRADING AT GUARDRAIL 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	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

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

Texas Department of Transportation

Design Division Standard

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

FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
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	DAL	NAVARRO		76

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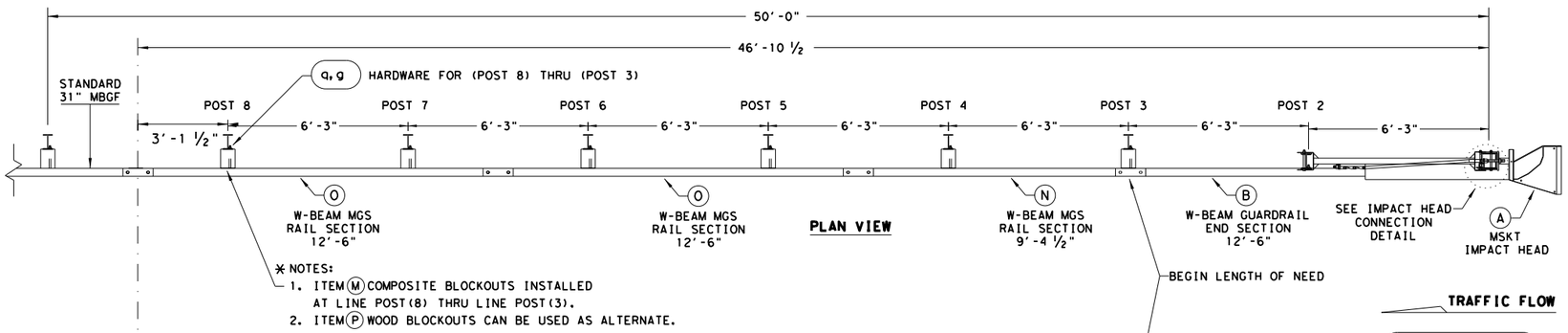
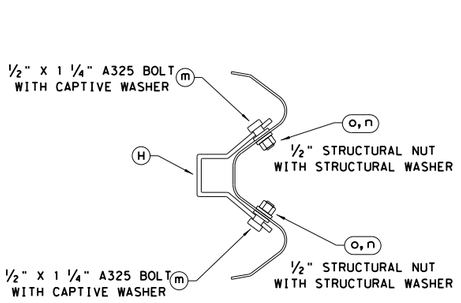
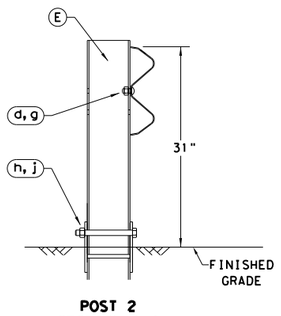


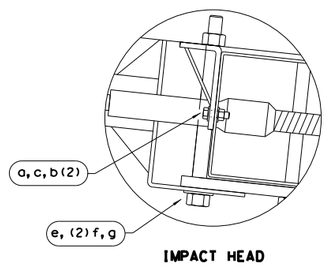
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



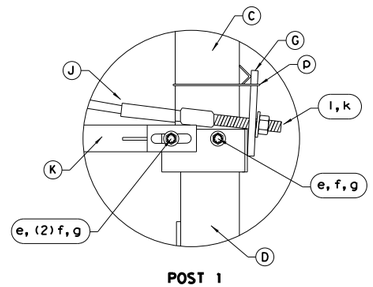
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

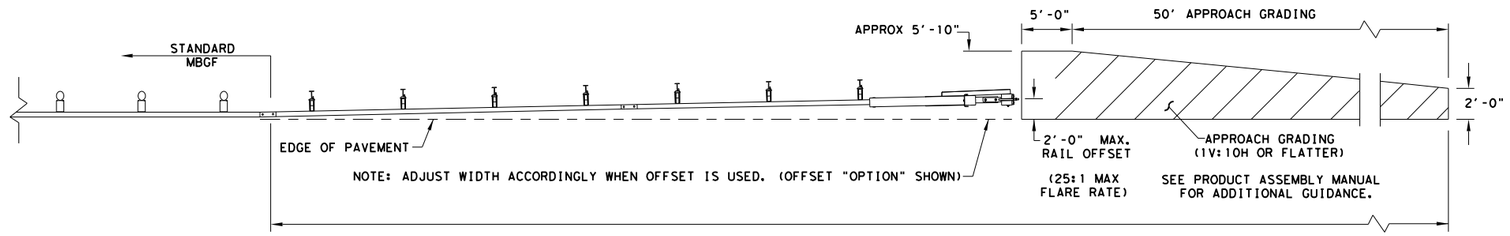
GENERAL NOTES

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

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

SEE NOTES: *

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



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

Design Division Standard

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

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

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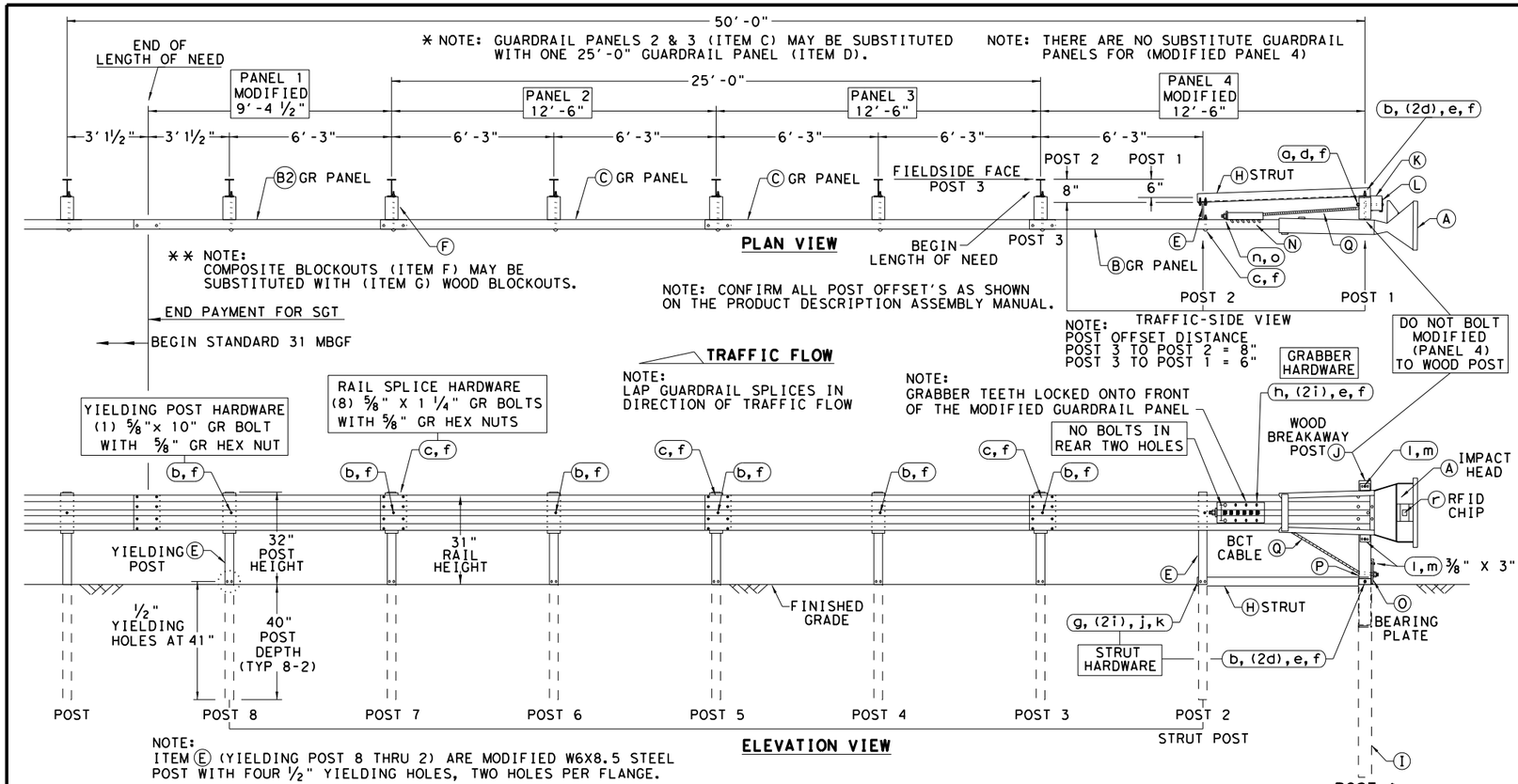
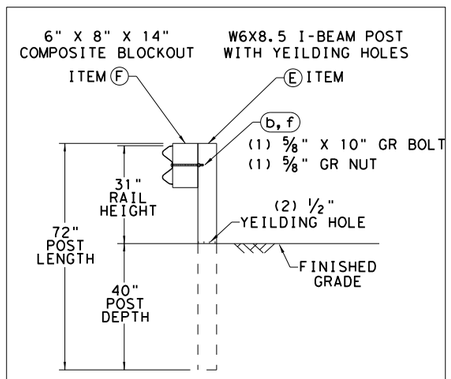


GENERAL NOTES

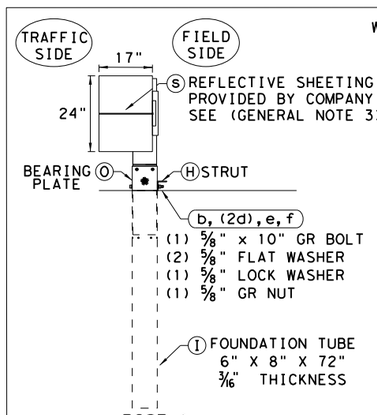
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY 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

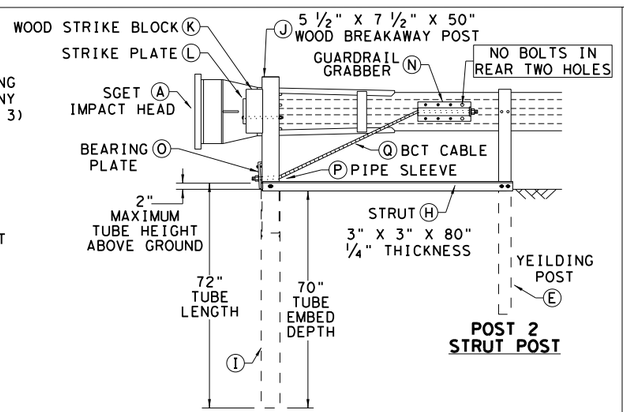
ALTERNATIVE ITEMS NOTE: * ** SEE PLAN VIEW



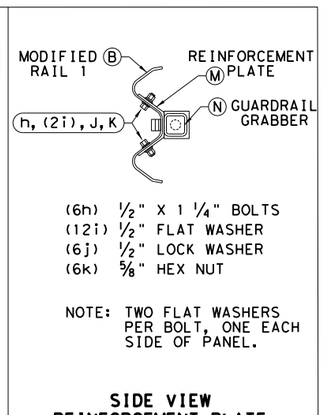
SIDE VIEW
POST 8 - POST 3 (TYP)



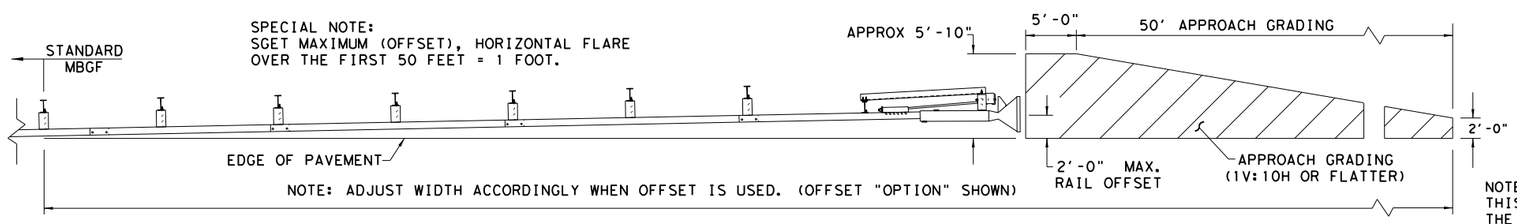
POST 1
FRONT END VIEW



POST 1
FIELD SIDE VIEW



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.

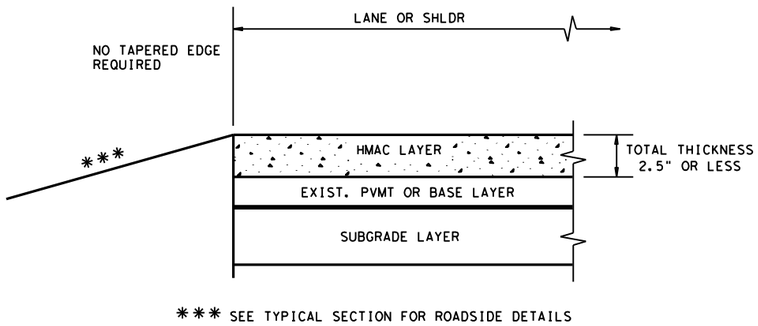
Texas Department of Transportation

Design Division Standard

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

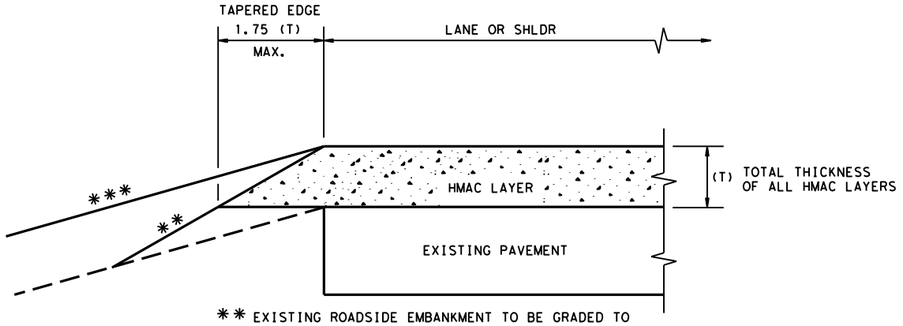
FILE: sgt153120.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP		
©TxDOT: APRIL 2020	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0092	06	105	IH 45		
	DIST	COUNTY		SHEET NO.		
	DAL	NAVARRO		78		

DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

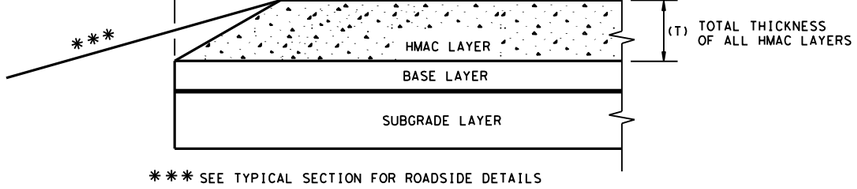
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** 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.

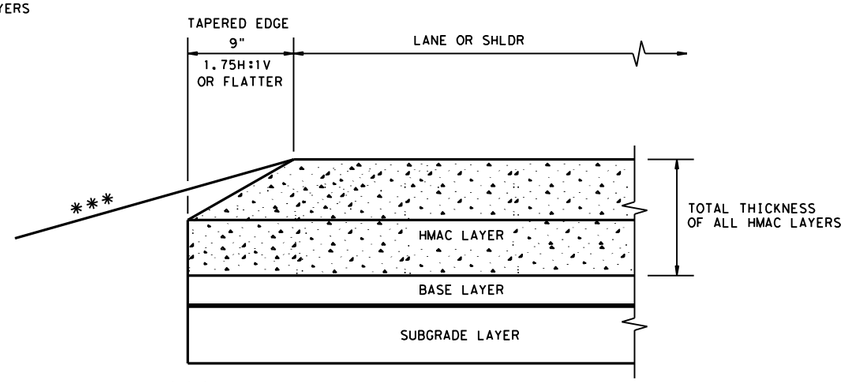
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

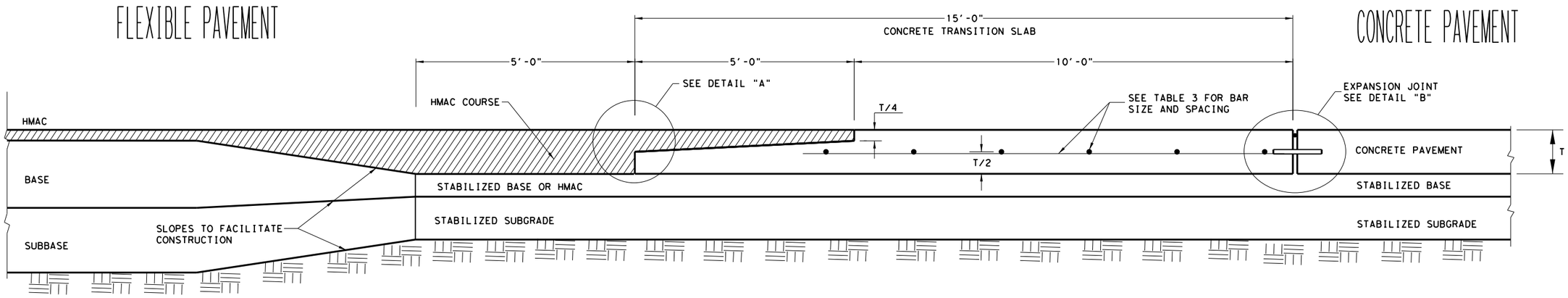
Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

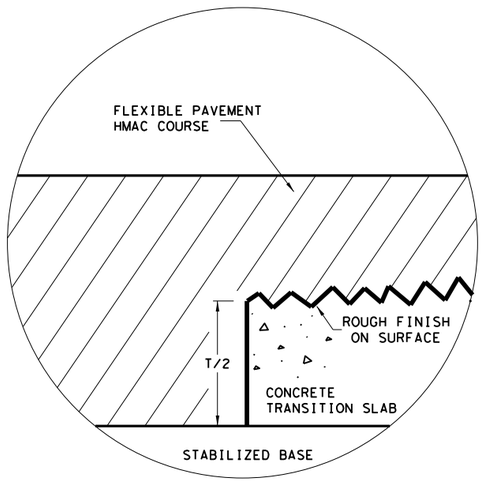
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:			
© TxDOT January 2011	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0092	06	105		IH 45		
	DIST	COUNTY			SHEET NO.		
	DAL	NAVARRO			79		

DATE:
FILE:

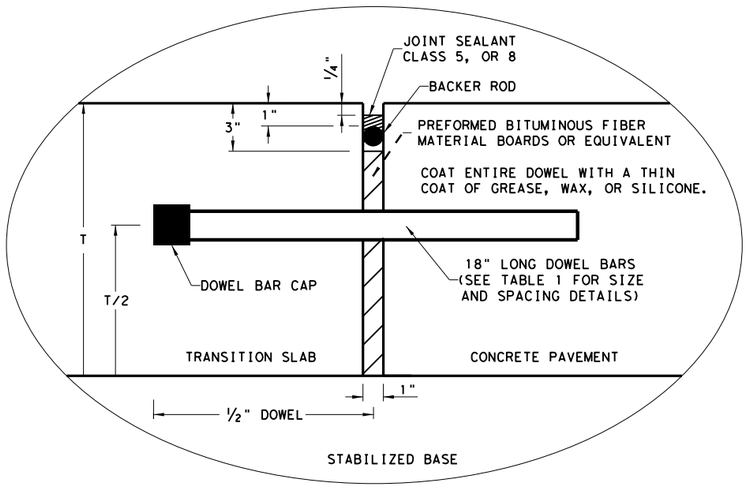


TYPICAL JUNCTION OF CONCRETE PAVEMENT WITH FLEXIBLE PAVEMENT

(NOT TO SCALE)



DETAIL "A"



DETAIL "B"

GENERAL NOTES

1. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
2. DETAILS FOR PAVEMENT WIDTH AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS.
3. MATCH THE LONGITUDINAL JOINTS OF THE CONCRETE TRANSITION SLAB WITH ADJOINING CONCRETE PAVEMENT. PROVIDE EQUIVALENT TIEBARS OR TRANSVERSE BARS AT THESE LONGITUDINAL JOINTS, SEE TABLE NO. 2.
4. REFER TO DMS-6310, "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
5. TRANSITION SLABS WILL BE PAID UNDER ITEM 360, "CONCRETE PAVEMENTS."

TABLE NO. 1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	SPACING (IN.)
7 TO 7.5	1" X 18"	12
8 TO 10	1 1/4" X 18"	12
10 TO 13	1 1/2" X 18"	12

TABLE NO. 2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.)
7 TO 7.5	#5	24
8 TO 13	#6	24

TABLE NO. 3 TRANSITION SLAB STEEL (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	SPACING (IN.) TRANSVERSE DIRECTION	SPACING (IN.) LONGITUDINAL DIRECTION
7 TO 7.5	#5	24	12
8 TO 13	#6	24	12

ADJUST SPACING OF LONGITUDINAL BARS AS NEEDED TO ACCOMDATE DOWEL BAR SPACING.

Texas Department of Transportation

Design Division Standard

CONCRETE PAVEMENT DETAILS TRANSITION SLAB

T-7 to 13 INCHES

TRANS-20

FILE: transitslab20.dgn	DN: TxDOT	DN: TxDOT	DW: AN	CK: KM
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
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	DAL	NAVARRO		80

DATE:
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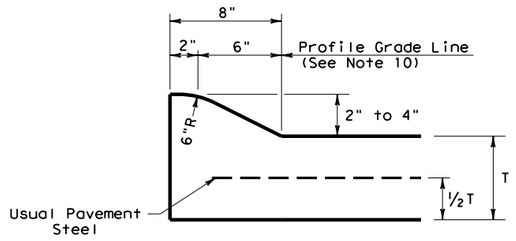
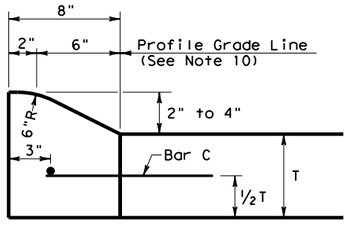


TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



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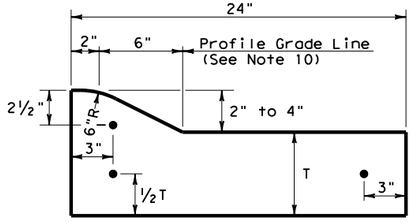
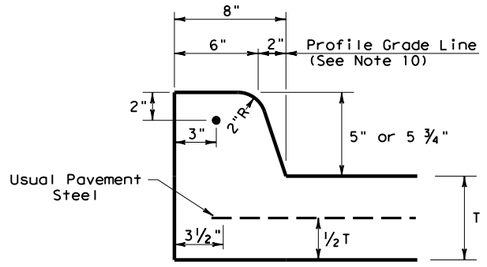
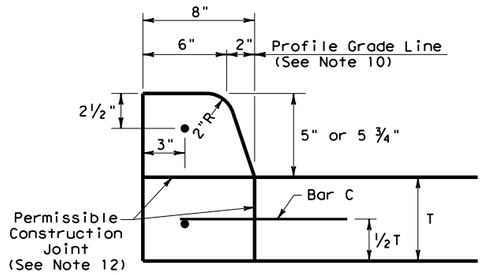


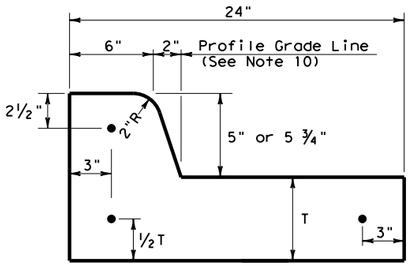
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



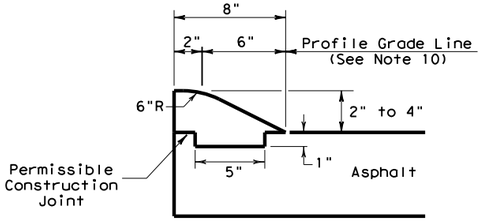
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



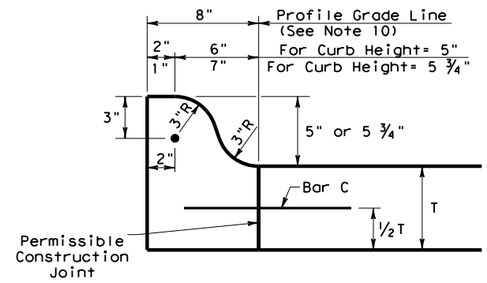
TYPE II CURB
5" - 5 ¾" HEIGHT



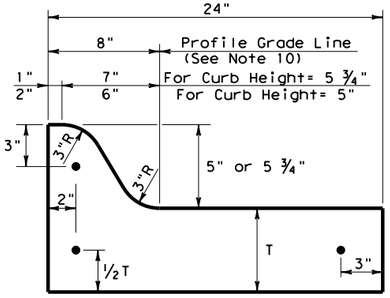
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



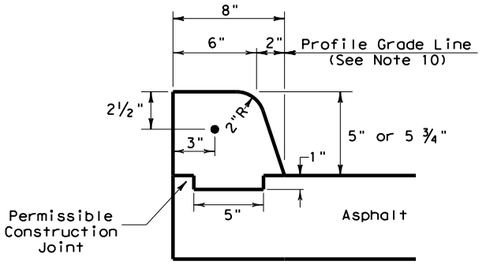
TYPE III CURB (KEYED)
2" - 4" HEIGHT



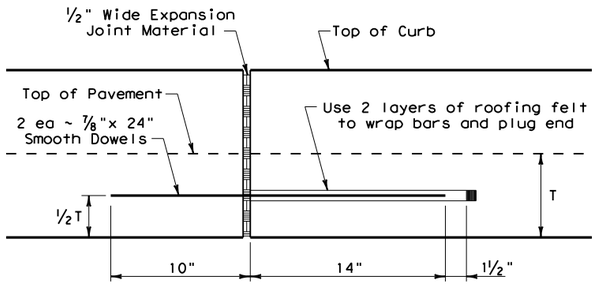
TYPE IIa CURB
5" - 5 ¾" HEIGHT



TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

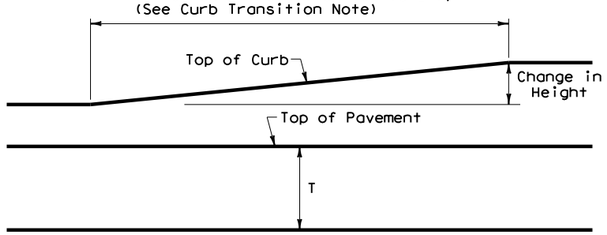


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

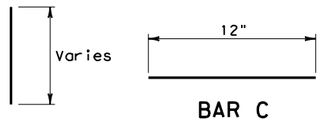
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B used as needed to support curb reinforcing steel during concrete placement.



BAR B

BAR C

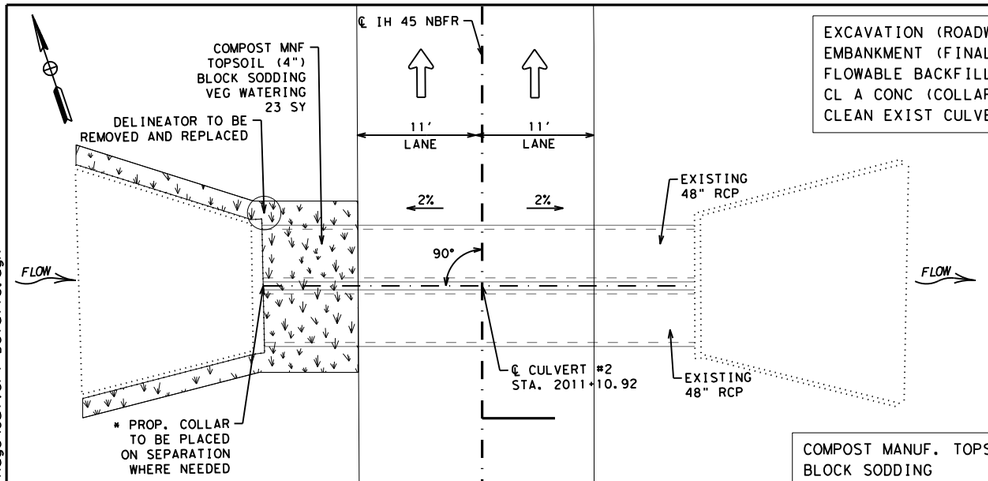
Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
© TxDOT: FEBRUARY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		81

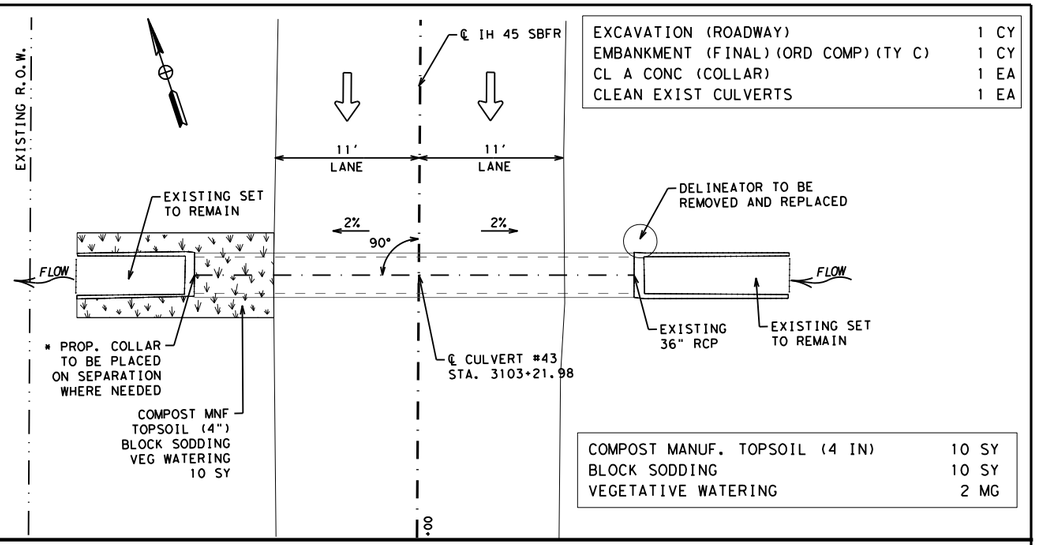


EXCAVATION (ROADWAY)	6 CY
EMBANKMENT (FINAL)(ORD COMP)(TY C)	1 CY
FLOWABLE BACKFILL	7 CY
CL A CONC (COLLAR)	2 EA
CLEAN EXIST CULVERTS	1 EA

COMPOST MANUF. TOPSOIL (4 IN)	23 SY
BLOCK SODDING	23 SY
VEGETATIVE WATERING	4 MG

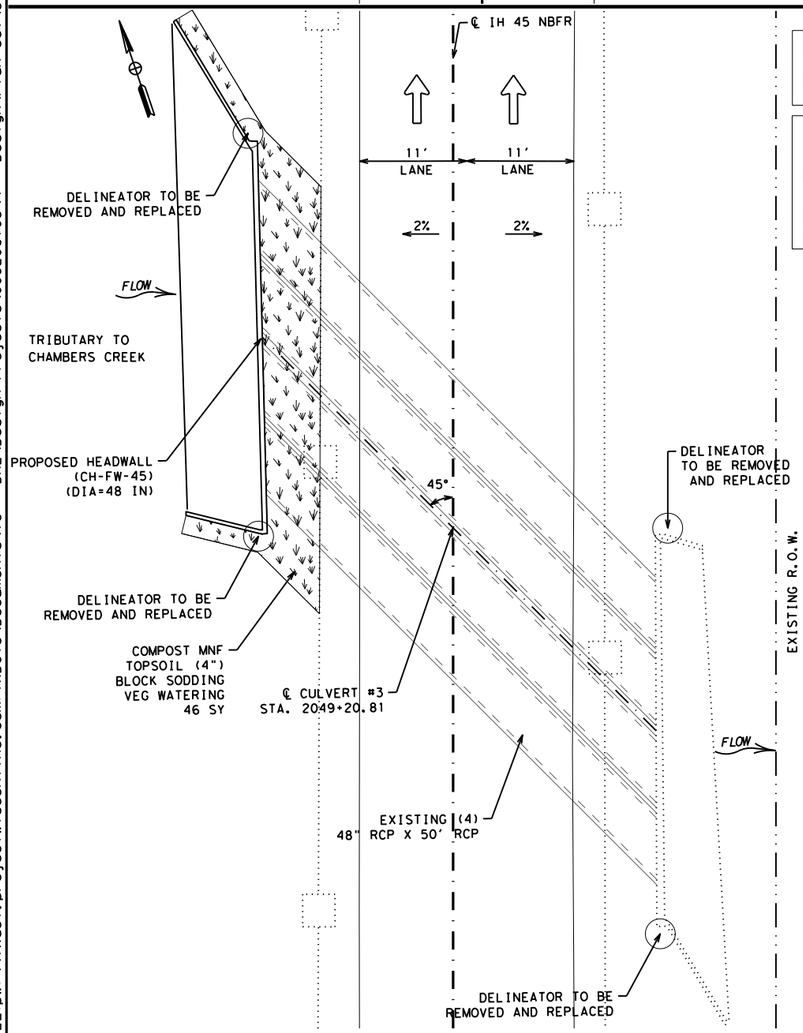
EXISTING R.O.W.

EXISTING R.O.W.



EXCAVATION (ROADWAY)	1 CY
EMBANKMENT (FINAL)(ORD COMP)(TY C)	1 CY
CL A CONC (COLLAR)	1 EA
CLEAN EXIST CULVERTS	1 EA

COMPOST MANUF. TOPSOIL (4 IN)	10 SY
BLOCK SODDING	10 SY
VEGETATIVE WATERING	2 MG

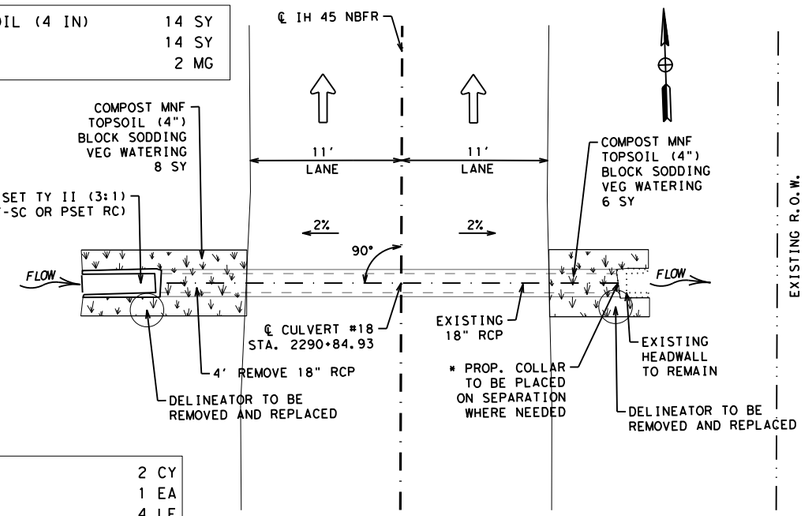


COMPOST MANUF. TOPSOIL (4 IN)	46 SY
BLOCK SODDING	46 SY
VEGETATIVE WATERING	7 MG

EXCAVATION (ROADWAY)	24 CY
EMBANKMENT (FINAL)(ORD COMP)(TY C)	12 CY
CL A CONC (COLLAR)	4 EA
HEADWALL (CH-FW-45)(DIA=48 IN)	1 EA
CLEAN EXIST CULVERTS	1 EA
REMOV STR (HEADWALL)	1 EA

NOTE: PLEASE SEE STANDARD FOR COLLAR DETAIL.
REFER TO STANDARD SHEET PSET-SC OR
PSET-RC FOR SET TY-II DETAILS NOT SHOWN.
REFER TO STANDARD SHEET CH-FW-45 FOR
HEADWALL DETAILS NOT SHOWN.

COMPOST MANUF. TOPSOIL (4 IN)	14 SY
BLOCK SODDING	14 SY
VEGETATIVE WATERING	2 MG



EXCAVATION (ROADWAY)	2 CY
CL A CONC (COLLAR)	1 EA
RC PIPE (CL III)(18 IN)	4 LF
SET(TY II)(18 IN)(RCP)(3:1)(C)	1 EA
CLEAN EXIST CULVERTS	1 EA
REMOV STR (SET)	1 EA
REMOV STR (PIPE)	4 LF

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & P.E. Date 3/7/22

Texas Department of Transportation
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IH 45
MISCELLANEOUS DETAILS
DRAINAGE

NOT TO SCALE SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		IH 45
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	82
	0092	06	105	

DATE:3/7/2022 TIME:6:00:33 AM
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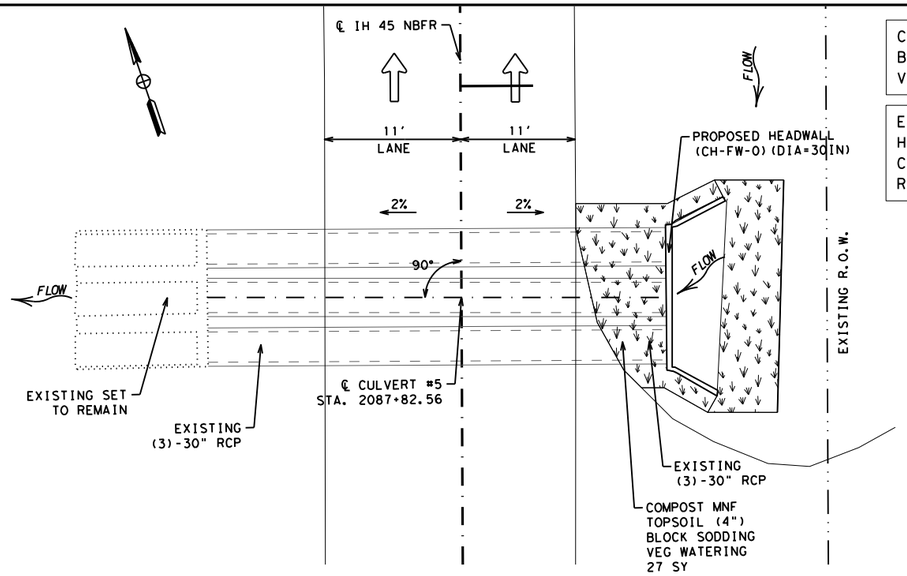
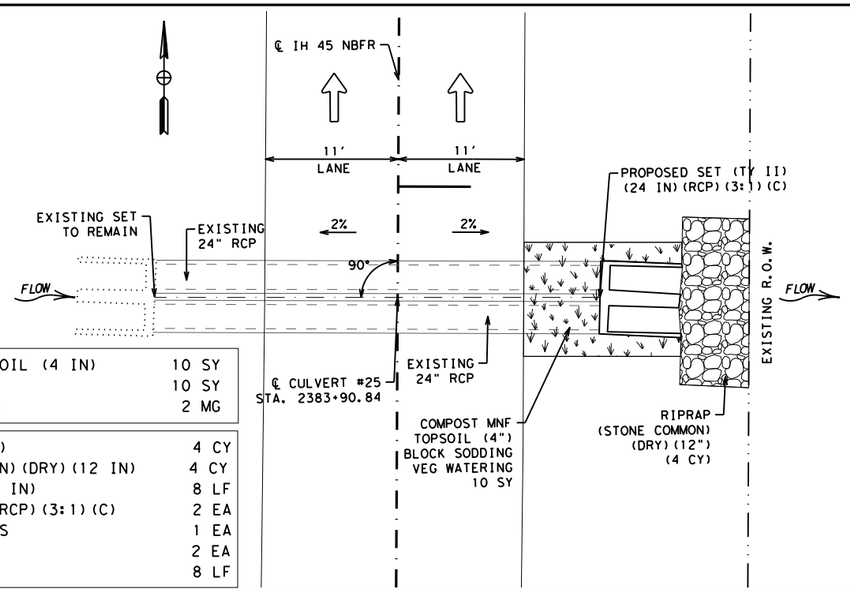


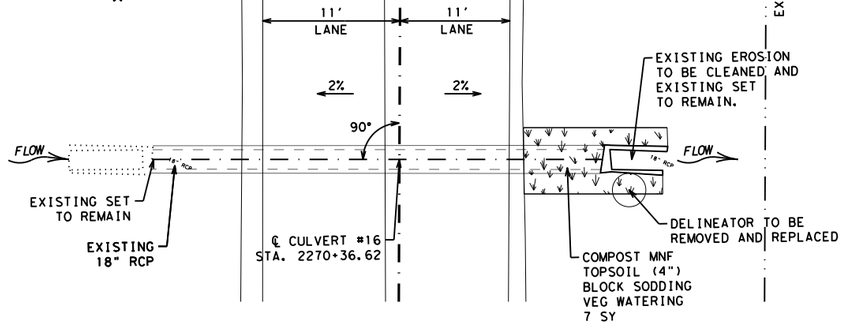
COMPOST MANUF. TOPSOIL (4 IN)	27 SY
BLOCK SODDING	27 SY
VEGETATIVE WATERING	4 MG

EXCAVATION (ROADWAY)	4 CY
HEADWALL (CH-FW-0)(DIA=30 IN)	1 EA
CLEAN EXIST CULVERTS	1 EA
REMOV STR (HEADWALL)	1 EA



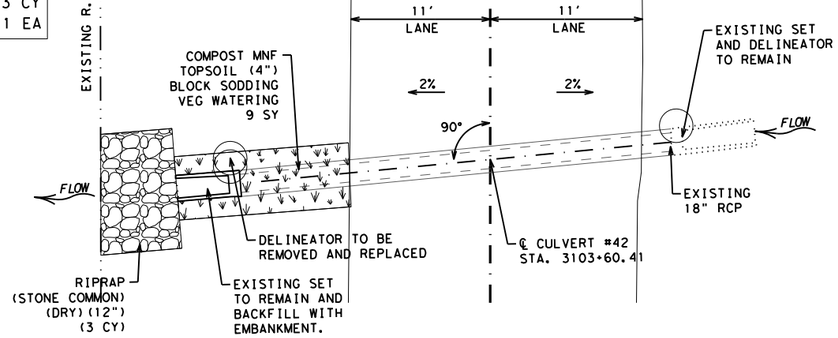
COMPOST MANUF. TOPSOIL (4 IN)	10 SY
BLOCK SODDING	10 SY
VEGETATIVE WATERING	2 MG

EXCAVATION (ROADWAY)	4 CY
RIPRAP (STONE COMMON)(DRY)(12 IN)	4 CY
RC PIPE (CL III)(24 IN)	8 LF
SET (TY II)(24 IN)(RCP)(3:1)(C)	2 EA
CLEAN EXIST CULVERTS	1 EA
REMOV STR (SET)	2 EA
REMOV STR (PIPE)	8 LF



COMPOST MANUF. TOPSOIL (4 IN)	9 SY
BLOCK SODDING	9 SY
VEGETATIVE WATERING	2 MG

EMBANKMENT (FINAL)(ORD COMP)(TY C)	1 CY
RIPRAP (STONE COMMON)(DRY)(12 IN)	3 CY
CLEAN EXIST CULVERTS	1 EA



COMPOST MANUF. TOPSOIL (4 IN)	7 SY
BLOCK SODDING	7 SY
VEGETATIVE WATERING	1 MG

EXCAVATION (ROADWAY)	2 CY
EMBANKMENT (FINAL)(ORD COMP)(TY C)	2 CY
FLOWABLE BACKFILL	3 CY
CLEAN EXIST CULVERTS	1 EA

NOTE: REFER TO STANDARD SHEET PSET-SC OR PSET-RC FOR SET TY-II DETAILS NOT SHOWN. REFER TO STANDARD SHEET CH-FW-0 FOR HEADWALL DETAILS NOT SHOWN.

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED
PROFESSIONAL ENGINEER

Marlena Kelly P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
MISCELLANEOUS DETAILS
DRAINAGE

NOT TO SCALE SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		IH 45
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	83
CHECK	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/7/2022 TIME:6:01:06 AM
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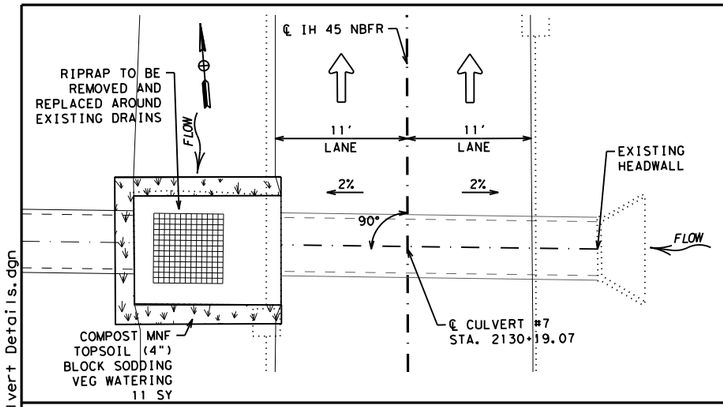
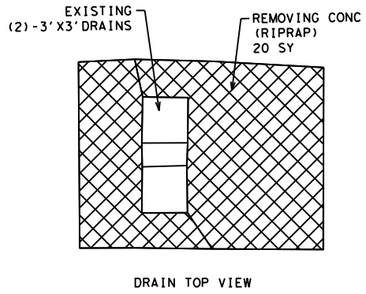
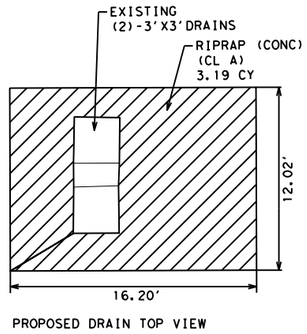




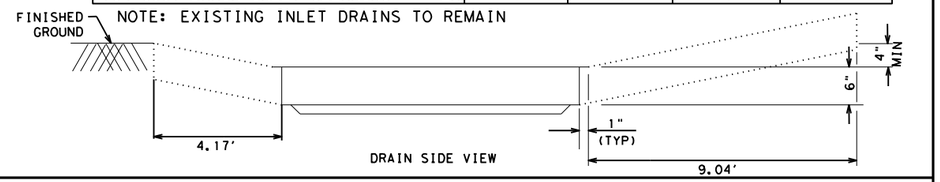
DRAIN TOP VIEW



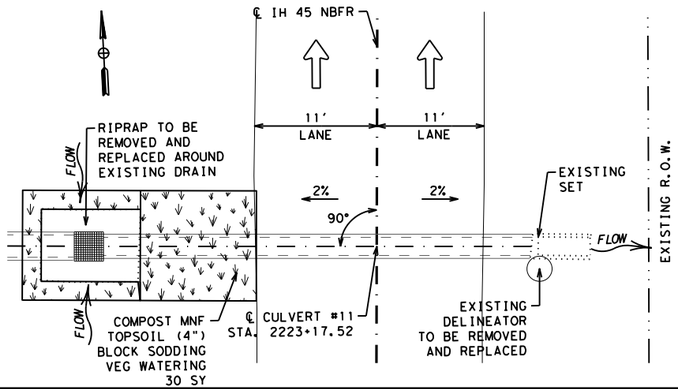
PROPOSED DRAIN TOP VIEW

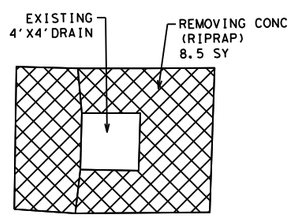
ITEMS		LOCATION			
		2130+19.07	2223+17.52	2234+53.67	2256+20.30
104-6009 REMOVING CONC (RIPRAP)	SY	20	8.5	9	10
161-6017 COMPOST MANUF TOPSOIL(4")	SY	11	30	15	21
162-6002 BLOCK SODDING	SY	11	30	15	21
168-6001 VEGETATIVE WATERING	MG	2	5	3	4
432-6009 RIPRAP (CONC)(CL B)(4")	CY	3.19	1.5	1.6	1.6
480-6001 CLEAN EXIST CULVERTS	EA	1	1	1	1
764-6001 DRAIN INLET CLEANING	EA	1	1	1	1

NOTE: EXISTING INLET DRAINS TO REMAIN

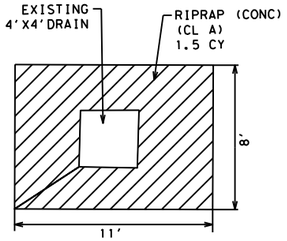


DRAIN SIDE VIEW

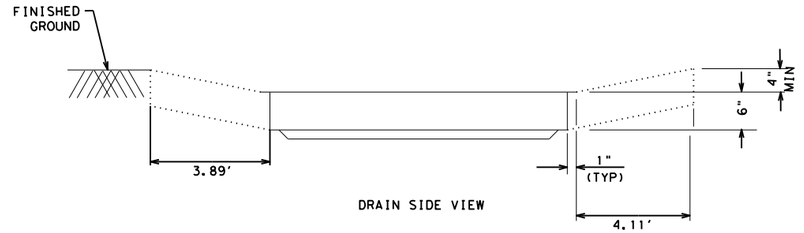




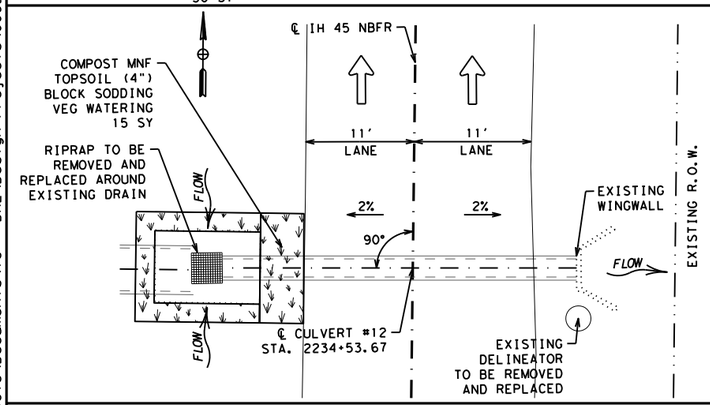
DRAIN TOP VIEW

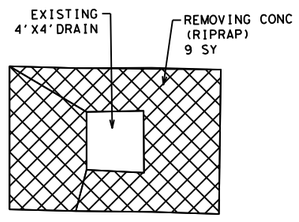


PROPOSED DRAIN TOP VIEW

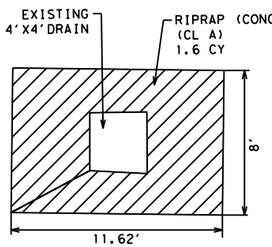


DRAIN SIDE VIEW

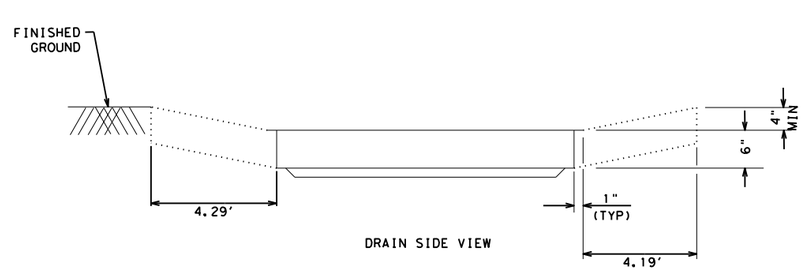




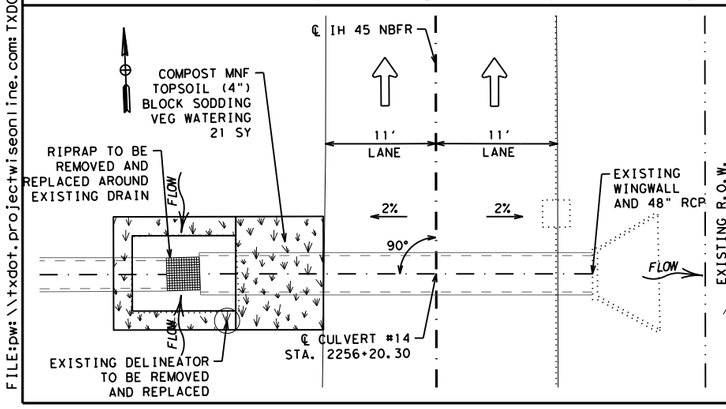
DRAIN TOP VIEW

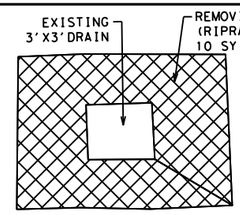


PROPOSED DRAIN TOP VIEW

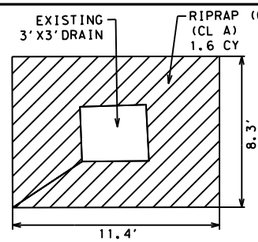


DRAIN SIDE VIEW

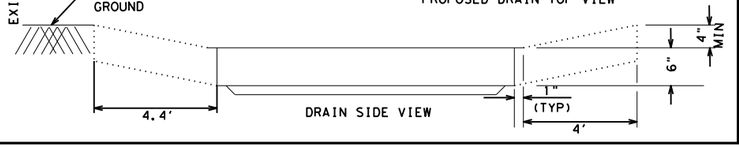




EXISTING DRAIN TOP VIEW



PROPOSED DRAIN TOP VIEW



DRAIN SIDE VIEW

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
MISCELLANEOUS DETAILS
DRAINAGE

NOT TO SCALE — SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
GRAPHICS	6	SEE TITLE SHEET		IH 45
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DAL	NAVARRO	84
CHECK	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/7/2022 TIME:5:48:57 AM
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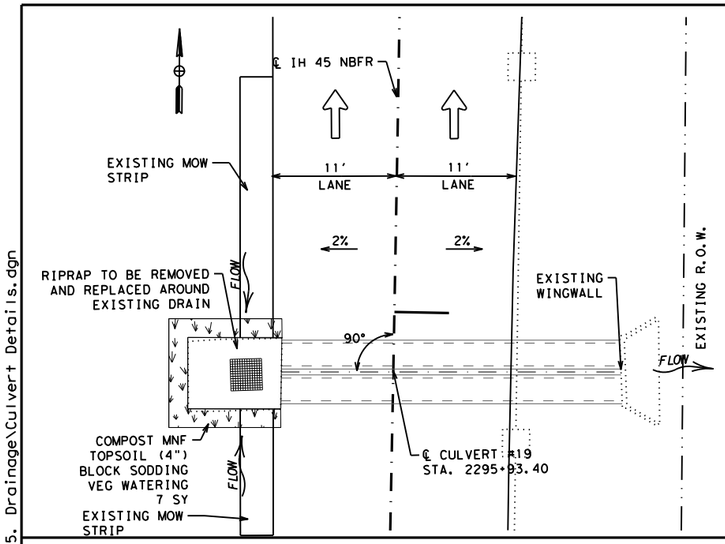
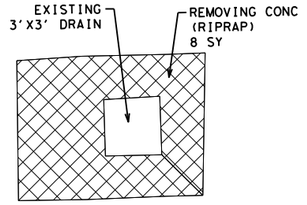
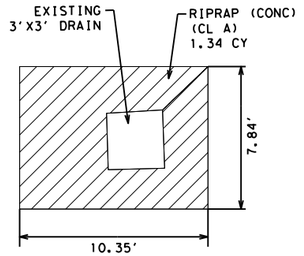




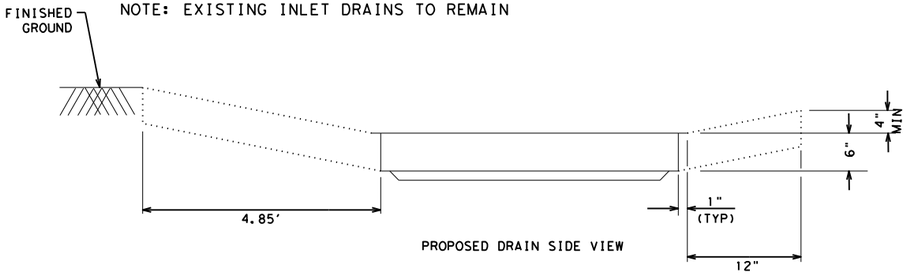
EXISTING DRAIN TOP VIEW



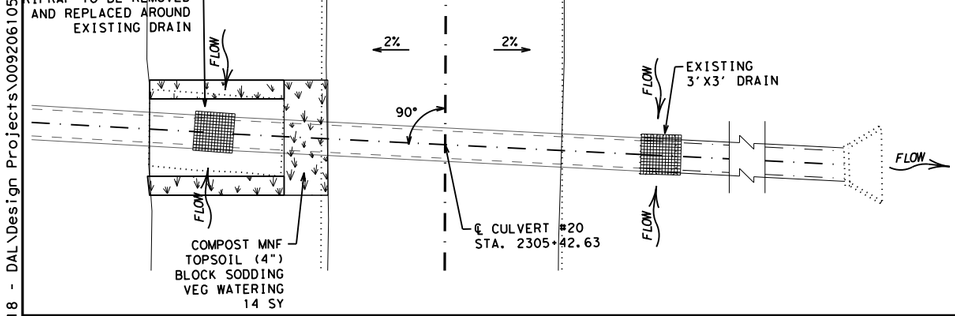
PROPOSED DRAIN TOP VIEW

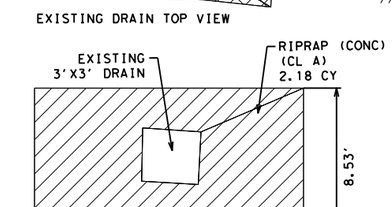
ITEMS		LOCATION		
		2295+93.40	2305+42.63	3318+98.82
104-6009 REMOVING CONC (RIPRAP)	SY	8	13	0
161-6017 COMPOST MANUF TOPSOIL(4")	SY	7	14	0
162-6002 BLOCK SODDING	SY	7	14	0
168-6001 VEGETATIVE WATERING	MG	1	2	0
432-6009 RIPRAP (CONC)(CL B)(4")	CY	1.34	2.18	0
480-6001 CLEAN EXIST CULVERTS	EA	1	0	1
764-6001 DRAIN INLET CLEANING	EA	0	2	1

NOTE: EXISTING INLET DRAINS TO REMAIN



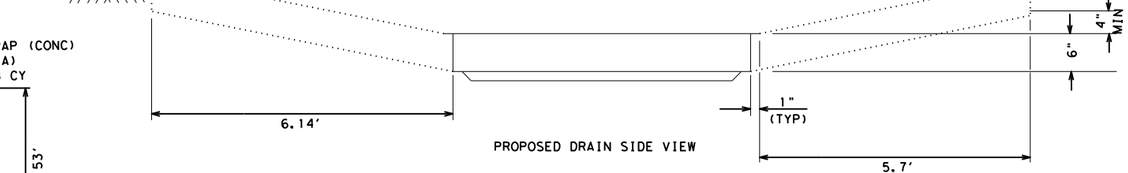
PROPOSED DRAIN SIDE VIEW



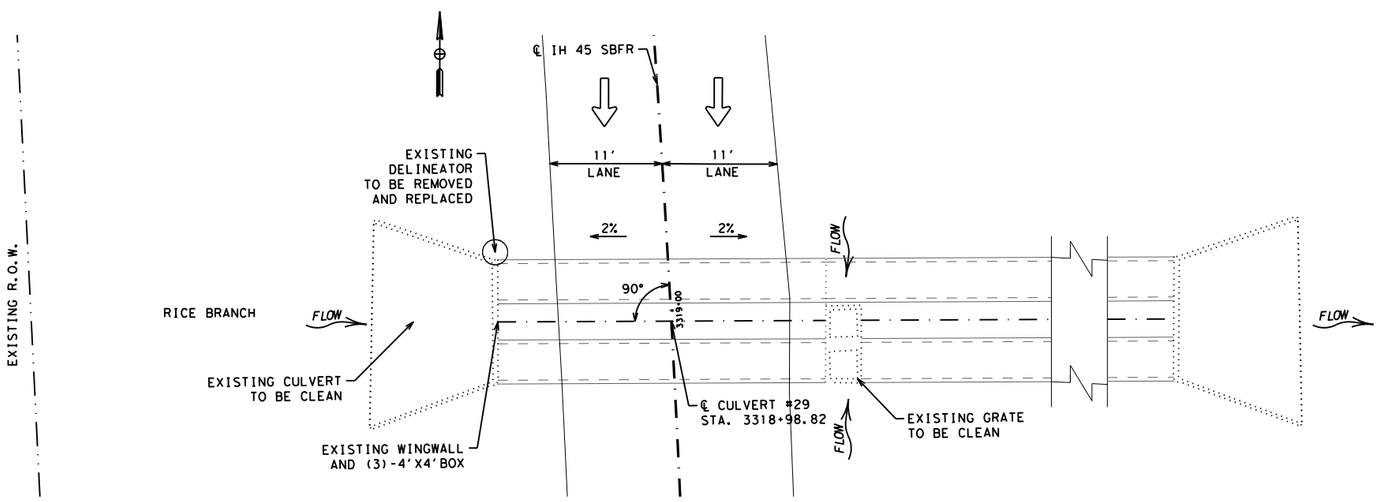


EXISTING DRAIN TOP VIEW

PROPOSED DRAIN TOP VIEW



PROPOSED DRAIN SIDE VIEW



STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly, P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
MISCELLANEOUS DETAILS
DRAINAGE

NOT TO SCALE

SHEET 4 OF 4

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	85
CHECK JAP	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/7/2022 TIME:5:48:57 AM
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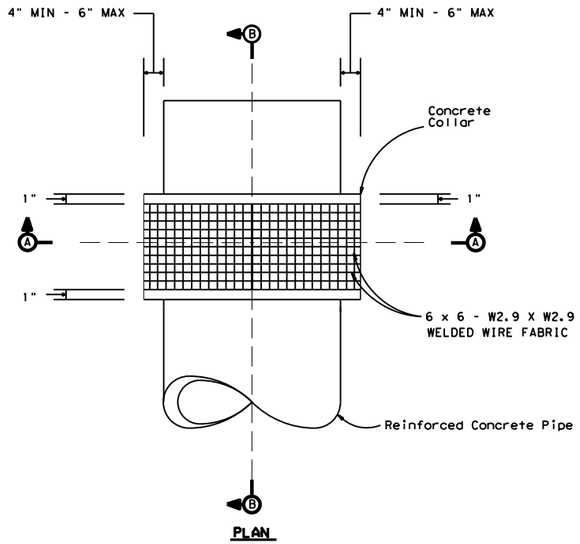
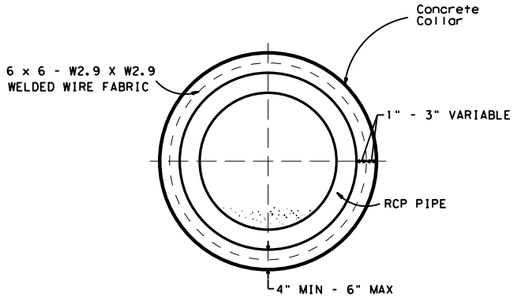
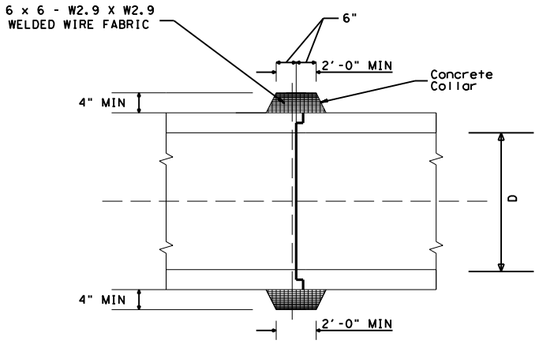


PLAN



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.

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CONCRETE COLLAR DETAILS

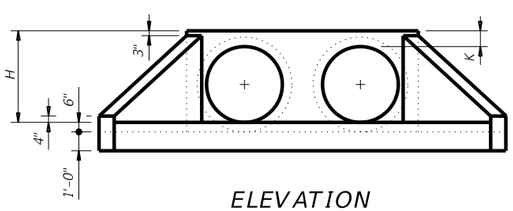
SCALE: NTS SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DALLAS	NAVARRO	86
CHECK JP	CONTROL 0092	SECTION 06	JOB 105	

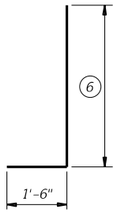
DATE:
FILE:

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

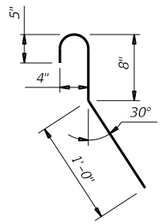
Slope	Dia of Pipe (D)	Values for One Pipe W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be Added for Each Addt'l Pipe X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4' - 7 1/2"	2' - 6"	2' - 10"	3' - 3 1/4"	88	0.6	1' - 9"	20	0.2
	15"	5' - 5 3/4"	2' - 9 1/2"	3' - 4"	3' - 10 1/4"	103	0.7	2' - 2"	24	0.3
	18"	6' - 4 1/4"	3' - 1"	3' - 10"	4' - 5"	124	0.9	2' - 8"	32	0.3
	21"	7' - 2 3/4"	3' - 4 1/2"	4' - 4"	5' - 0"	143	1.1	3' - 1"	43	0.4
	24"	8' - 2 1/2"	3' - 9 1/2"	4' - 10"	5' - 7"	164	1.3	3' - 7"	50	0.5
	27"	9' - 1"	4' - 1"	5' - 4"	6' - 2"	179	1.5	3' - 11"	56	0.6
	30"	9' - 11 1/2"	4' - 4 1/2"	5' - 10"	6' - 8 3/4"	203	1.7	4' - 4"	65	0.8
	33"	10' - 10"	4' - 8"	6' - 4"	7' - 3 3/4"	224	2.0	4' - 8"	71	0.9
	36"	11' - 8 1/4"	4' - 11 1/2"	6' - 10"	7' - 10 3/4"	249	2.2	5' - 1"	81	1.0
	42"	13' - 5 1/4"	5' - 6 1/2"	7' - 10"	9' - 0 1/2"	298	2.8	5' - 10"	97	1.3
	48"	15' - 9"	6' - 1 1/2"	9' - 4"	10' - 9 1/4"	360	3.8	6' - 7"	117	1.7
	54"	17' - 5 3/4"	6' - 8 1/2"	10' - 4"	11' - 11 1/4"	427	4.5	7' - 6"	151	2.1
	60"	19' - 2 3/4"	7' - 3 1/2"	11' - 4"	13' - 1"	481	5.3	8' - 3"	174	2.5
	66"	20' - 11 1/2"	7' - 10 1/2"	12' - 4"	14' - 3"	544	6.2	8' - 9"	194	2.9
	72"	22' - 8 1/2"	8' - 5 1/2"	13' - 4"	15' - 4 3/4"	601	7.1	9' - 4"	213	3.3
3:1	12"	6' - 3"	2' - 6"	4' - 3"	4' - 11"	118	0.8	1' - 9"	22	0.2
	15"	7' - 5"	2' - 9 1/2"	5' - 0"	5' - 9 1/4"	137	1.1	2' - 2"	28	0.3
	18"	8' - 6 3/4"	3' - 1"	5' - 9"	6' - 7 3/4"	170	1.3	2' - 8"	37	0.5
	21"	9' - 8 3/4"	3' - 4 1/2"	6' - 6"	7' - 6"	195	1.6	3' - 1"	48	0.6
	24"	11' - 0"	3' - 9 1/2"	7' - 3"	8' - 4 1/2"	227	2.0	3' - 7"	58	0.7
	27"	12' - 2"	4' - 1"	8' - 0"	9' - 2 3/4"	251	2.3	3' - 11"	67	0.8
	30"	13' - 4"	4' - 4 1/2"	8' - 9"	10' - 1 1/4"	293	2.7	4' - 4"	77	1.0
	33"	14' - 5 3/4"	4' - 8"	9' - 6"	10' - 11 3/4"	318	3.1	4' - 8"	84	1.2
	36"	15' - 7 3/4"	4' - 11 1/2"	10' - 3"	11' - 10"	351	3.5	5' - 1"	96	1.4
	42"	17' - 11 1/2"	5' - 6 1/2"	11' - 9"	13' - 6 3/4"	432	4.5	5' - 10"	119	1.7
	48"	21' - 1 3/4"	6' - 1 1/2"	14' - 0"	16' - 2"	537	6.1	6' - 7"	146	2.3
	54"	23' - 5 1/2"	6' - 8 1/2"	15' - 6"	17' - 10 3/4"	630	7.3	7' - 6"	186	2.9
	60"	25' - 9 1/4"	7' - 3 1/2"	17' - 0"	19' - 7 1/2"	719	8.7	8' - 3"	219	3.4
	66"	28' - 1"	7' - 10 1/2"	18' - 6"	21' - 4 1/4"	811	10.1	8' - 9"	242	3.9
	72"	30' - 4 3/4"	8' - 5 1/2"	20' - 0"	23' - 1 1/4"	924	11.7	9' - 4"	272	4.4
4:1	12"	7' - 10 3/4"	2' - 6"	5' - 8"	6' - 6 1/2"	148	1.1	1' - 9"	24	0.3
	15"	9' - 4"	2' - 9 1/2"	6' - 8"	7' - 8 1/2"	181	1.5	2' - 2"	32	0.4
	18"	10' - 9 1/2"	3' - 1"	7' - 8"	8' - 10 1/4"	221	1.9	2' - 8"	42	0.5
	21"	12' - 2 3/4"	3' - 4 1/2"	8' - 8"	10' - 0"	260	2.3	3' - 1"	57	0.7
	24"	13' - 9 1/2"	3' - 9 1/2"	9' - 8"	11' - 2"	301	2.8	3' - 7"	67	0.9
	27"	15' - 3"	4' - 1"	10' - 8"	12' - 3 3/4"	334	3.3	3' - 11"	77	1.0
	30"	16' - 8 1/4"	4' - 4 1/2"	11' - 8"	13' - 5 3/4"	385	3.8	4' - 4"	89	1.3
	33"	18' - 1 3/4"	4' - 8"	12' - 8"	14' - 7 1/2"	425	4.5	4' - 8"	101	1.4
	36"	19' - 7"	4' - 11 1/2"	13' - 8"	15' - 9 1/4"	472	5.1	5' - 1"	115	1.7
	42"	22' - 5 3/4"	5' - 6 1/2"	15' - 8"	18' - 1"	583	6.5	5' - 10"	141	2.1
	48"	26' - 6 1/4"	6' - 1 1/2"	18' - 8"	21' - 6 3/4"	730	8.9	6' - 7"	175	2.8
	54"	29' - 5"	6' - 8 1/2"	20' - 8"	23' - 10 1/4"	875	10.7	7' - 6"	226	3.6
	60"	32' - 3 3/4"	7' - 3 1/2"	22' - 8"	26' - 2"	996	12.7	8' - 3"	264	4.3
	66"	35' - 2 1/2"	7' - 10 1/2"	24' - 8"	28' - 5 3/4"	1,140	14.9	8' - 9"	300	4.9
	72"	38' - 1 1/4"	8' - 5 1/2"	26' - 8"	30' - 9 1/2"	1,297	17.3	9' - 4"	334	5.6
6:1	12"	11' - 2"	2' - 6"	8' - 6"	9' - 9 3/4"	224	1.9	1' - 9"	28	0.4
	15"	13' - 2 1/4"	2' - 9 1/2"	10' - 0"	11' - 6 1/2"	268	2.5	2' - 2"	37	0.5
	18"	15' - 2 1/2"	3' - 1"	11' - 6"	13' - 3 1/4"	330	3.2	2' - 8"	50	0.7
	21"	17' - 2 3/4"	3' - 4 1/2"	13' - 0"	15' - 0 1/4"	387	3.9	3' - 1"	69	0.9
	24"	19' - 4 1/2"	3' - 9 1/2"	14' - 6"	16' - 9"	453	4.8	3' - 7"	80	1.2
	27"	21' - 4 3/4"	4' - 1"	16' - 0"	18' - 5 3/4"	512	5.7	3' - 11"	96	1.4
	30"	23' - 5 1/4"	4' - 4 1/2"	17' - 6"	20' - 2 1/2"	593	6.7	4' - 4"	110	1.7
	33"	25' - 5 1/2"	4' - 8"	19' - 0"	21' - 11 1/4"	675	7.8	4' - 8"	127	2.0
	36"	27' - 5 3/4"	4' - 11 1/2"	20' - 6"	23' - 8"	735	9.0	5' - 1"	144	2.3
	42"	31' - 6 1/4"	5' - 6 1/2"	23' - 6"	27' - 1 1/2"	922	11.5	5' - 10"	179	3.0
	48"	37' - 3 1/2"	6' - 1 1/2"	28' - 0"	32' - 4"	1,191	15.9	6' - 7"	231	4.0
	54"	41' - 4 1/4"	6' - 8 1/2"	31' - 0"	35' - 9 1/2"	1,424	19.2	7' - 6"	300	5.0
	60"	45' - 4 3/4"	7' - 3 1/2"	34' - 0"	39' - 3"	1,631	22.9	8' - 3"	353	6.0



ELEVATION
(Showing dimensions.)



BARS V



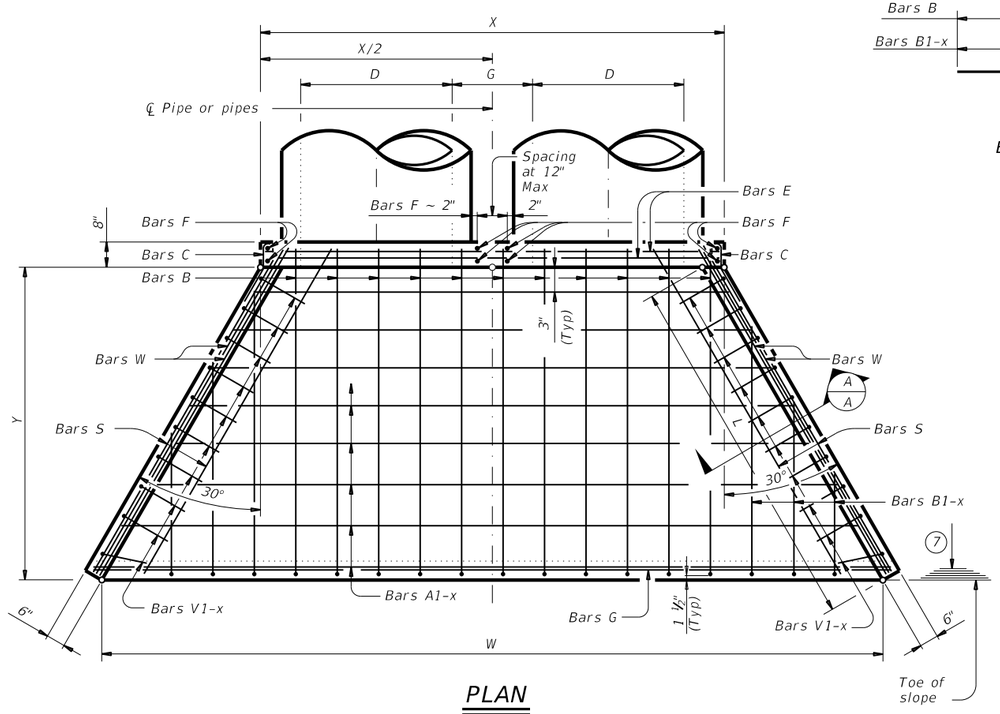
BARS CL
(Length = 2'-5")

TABLE OF (5) REINFORCING STEEL

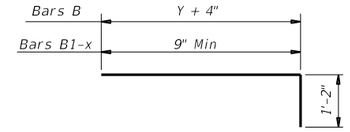
Bar	Size	Spa	No.
A	#4	1' - 0"	~
B	#3	1' - 6"	~
C	#4	1' - 0"	~
D	#3	1' - 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
S	#4	~	6
V	#4	1' - 0"	~
W	#5	~	4

TABLE OF CONSTANT DIMENSIONS

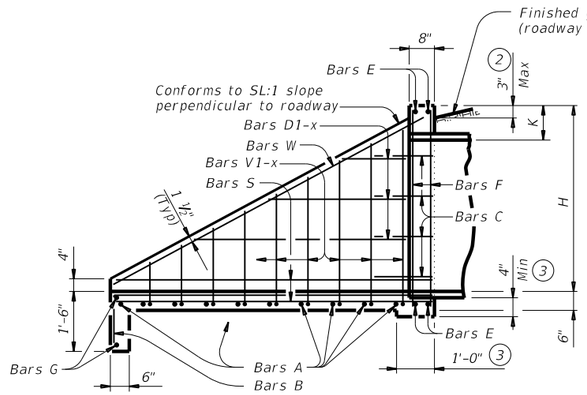
Dia of Pipe (D)	G	K (4)	H
12"	0' - 9"	1' - 0"	2' - 0"
15"	0' - 11"	1' - 0"	2' - 3"
18"	1' - 2"	1' - 0"	2' - 6"
21"	1' - 4"	1' - 0"	2' - 9"
24"	1' - 7"	1' - 0"	3' - 0"
27"	1' - 8"	1' - 0"	3' - 3"
30"	1' - 10"	1' - 0"	3' - 6"
33"	1' - 11"	1' - 0"	3' - 9"
36"	2' - 1"	1' - 0"	4' - 0"
42"	2' - 4"	1' - 0"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



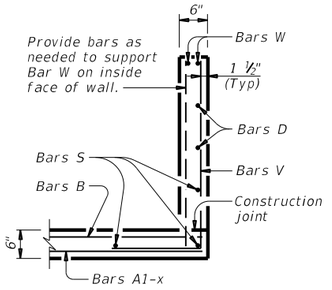
PLAN



BARS B and B1-x



TYPICAL WING ELEVATION



SECTION A-A

(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 = $6" + 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = $12 \times H - 3" \times \left(\frac{12 \times H - 7}{12 \times L}\right) - 1"$

(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 0° SKEW PIPE CULVERTS

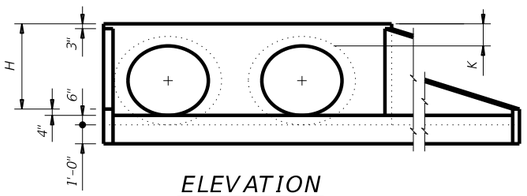
CH-FW-0

FILE: chfw00se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		87

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"	7' – 7 ¾"	4' – 3"	2' – 10"	5' – 8"	119	0.9	2' – 5 ¾"	26	0.3
	15"	8' – 10 ½"	4' – 7 ¼"	3' – 4"	6' – 8"	135	1.1	3' – 0 ¾"	32	0.4
	18"	10' – 1 ¼"	4' – 11 ½"	3' – 10"	7' – 8"	167	1.3	3' – 9 ¼"	48	0.5
	21"	11' – 3 ¾"	5' – 3 ¾"	4' – 4"	8' – 8"	187	1.6	4' – 4 ¼"	54	0.6
	24"	12' – 6 ½"	5' – 8"	4' – 10"	9' – 8"	214	1.8	5' – 0 ¾"	67	0.8
	27"	13' – 9"	6' – 0 ¼"	5' – 4"	10' – 8"	231	2.1	5' – 6 ½"	73	0.9
	30"	14' – 11 ¾"	6' – 4 ½"	5' – 10"	11' – 8"	265	2.5	6' – 1 ½"	86	1.1
	33"	16' – 3"	6' – 9 ½"	6' – 4"	12' – 8"	292	2.8	6' – 7 ¼"	92	1.2
	36"	17' – 6 ¼"	7' – 2 ¼"	6' – 10"	13' – 8"	324	3.2	7' – 2 ¼"	107	1.4
	42"	20' – 1"	8' – 0 ½"	7' – 10"	15' – 8"	391	4.0	8' – 3"	138	1.8
	48"	23' – 6"	8' – 10 ¼"	9' – 4"	18' – 8"	478	5.4	9' – 3 ¾"	167	2.4
	54"	26' – 0 ¾"	9' – 8"	10' – 4"	20' – 8"	561	6.4	10' – 7 ¼"	198	3.0
	60"	28' – 7 ½"	10' – 6"	11' – 4"	22' – 8"	632	7.5	11' – 8"	243	3.6
	66"	31' – 2 ¼"	11' – 3 ¾"	12' – 4"	24' – 8"	724	8.8	12' – 4 ½"	269	4.0
	72"	33' – 8 ¾"	12' – 1 ¾"	13' – 4"	26' – 8"	803	10.1	13' – 2 ½"	303	4.6
3:1	12"	10' – 1 ¼"	4' – 3"	4' – 3"	8' – 6"	158	1.3	2' – 5 ¾"	28	0.3
	15"	11' – 9 ¼"	4' – 7 ¼"	5' – 0"	10' – 0"	188	1.6	3' – 0 ¾"	37	0.5
	18"	13' – 5"	4' – 11 ½"	5' – 9"	11' – 6"	229	2.0	3' – 9 ¼"	55	0.6
	21"	15' – 0 ¾"	5' – 3 ¾"	6' – 6"	13' – 0"	260	2.4	4' – 4 ¼"	62	0.8
	24"	16' – 8 ¾"	5' – 8"	7' – 3"	14' – 6"	297	2.8	5' – 0 ¾"	77	1.0
	27"	18' – 4 ½"	6' – 0 ¼"	8' – 0"	16' – 0"	335	3.3	5' – 6 ½"	88	1.2
	30"	20' – 0 ¼"	6' – 4 ½"	8' – 9"	17' – 6"	383	3.9	6' – 1 ½"	103	1.4
	33"	21' – 8 ¾"	6' – 9 ½"	9' – 6"	19' – 0"	421	4.4	6' – 7 ¼"	111	1.6
	36"	23' – 5 ½"	7' – 2 ¼"	10' – 3"	20' – 6"	470	5.1	7' – 2 ¼"	126	1.9
	42"	26' – 10 ½"	8' – 0 ¼"	11' – 0"	23' – 6"	579	6.4	8' – 3"	168	2.4
	48"	31' – 7 ¼"	8' – 10 ¼"	14' – 9"	28' – 0"	722	8.7	9' – 3 ¾"	210	3.2
	54"	35' – 0 ¼"	9' – 8"	15' – 6"	31' – 0"	842	10.5	10' – 7 ¼"	249	4.0
	60"	38' – 5 ¼"	10' – 6"	17' – 0"	34' – 0"	966	12.4	11' – 8"	306	4.8
	66"	41' – 10 ¼"	11' – 3 ¾"	18' – 6"	37' – 0"	1,106	14.5	12' – 4 ½"	338	5.5
4:1	12"	12' – 6 ¾"	4' – 3"	5' – 8"	11' – 4"	207	1.7	2' – 5 ¾"	32	0.4
	15"	14' – 7 ¾"	4' – 7 ¼"	6' – 8"	13' – 4"	246	2.2	3' – 0 ¾"	43	0.6
	18"	16' – 8 ¾"	4' – 11 ½"	7' – 8"	15' – 4"	300	2.8	3' – 9 ¼"	61	0.8
	21"	18' – 9 ¾"	5' – 3 ¾"	8' – 8"	17' – 4"	349	3.4	4' – 4 ¼"	73	1.0
	24"	20' – 10 ¾"	5' – 8"	9' – 8"	19' – 4"	400	4.0	5' – 0 ¾"	90	1.3
	27"	23' – 0"	6' – 0 ¼"	10' – 8"	21' – 4"	451	4.8	5' – 6 ½"	103	1.5
	30"	25' – 1"	6' – 4 ½"	11' – 8"	23' – 4"	516	5.5	6' – 1 ½"	120	1.8
	33"	27' – 2 ¾"	6' – 9 ½"	12' – 8"	25' – 4"	580	6.4	6' – 7 ¼"	134	2.0
	36"	29' – 4 ½"	7' – 2 ¼"	13' – 8"	27' – 4"	639	7.3	7' – 2 ¼"	152	2.4
	42"	33' – 8"	8' – 0 ¼"	15' – 8"	31' – 4"	789	9.4	8' – 3"	198	3.0
	48"	39' – 8"	8' – 10 ¼"	18' – 8"	37' – 4"	1,001	12.8	9' – 3 ¾"	255	4.0
6:1	12"	17' – 5 ¾"	4' – 3"	8' – 6"	17' – 0"	299	2.9	2' – 5 ¾"	38	0.5
	15"	20' – 5"	4' – 7 ¼"	10' – 0"	20' – 0"	371	3.7	3' – 0 ¾"	51	0.8
	18"	23' – 4 ½"	4' – 11 ½"	11' – 6"	23' – 0"	449	4.7	3' – 9 ¼"	73	1.0
	21"	26' – 4"	5' – 3 ¾"	13' – 0"	26' – 0"	537	5.8	4' – 4 ¼"	89	1.3
	24"	29' – 3 ¼"	5' – 8"	14' – 6"	29' – 0"	611	7.0	5' – 0 ¾"	110	1.7
	27"	32' – 2 ¾"	6' – 0 ¼"	16' – 0"	32' – 0"	708	8.3	5' – 6 ½"	129	2.0
	30"	35' – 2 ¼"	6' – 4 ½"	17' – 6"	35' – 0"	807	9.7	6' – 1 ½"	150	2.4
	33"	38' – 2 ¼"	6' – 9 ½"	19' – 0"	38' – 0"	921	11.3	6' – 7 ¼"	170	2.8



ELEVATION

(Showing dimensions.)

(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 $\left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = 12 x H – 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$ – 1"

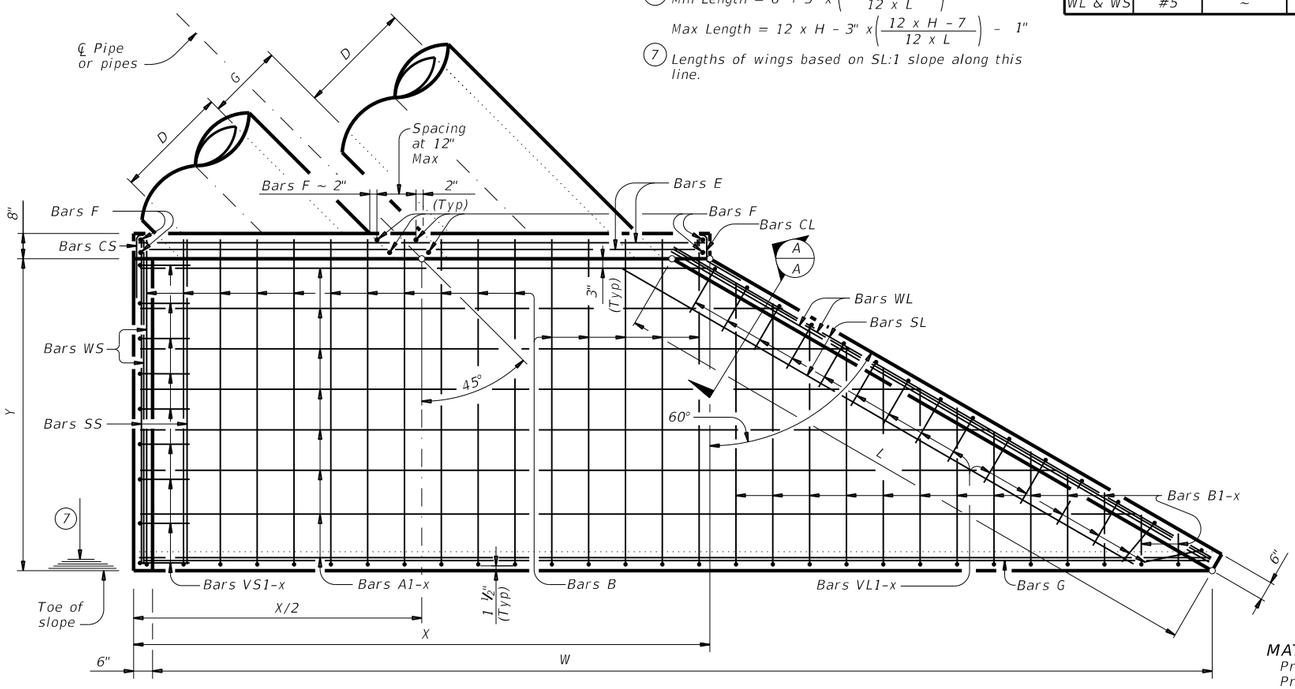
(7) Lengths of wings based on SL:1 slope along this line.

TABLE OF REINFORCING STEEL (5)

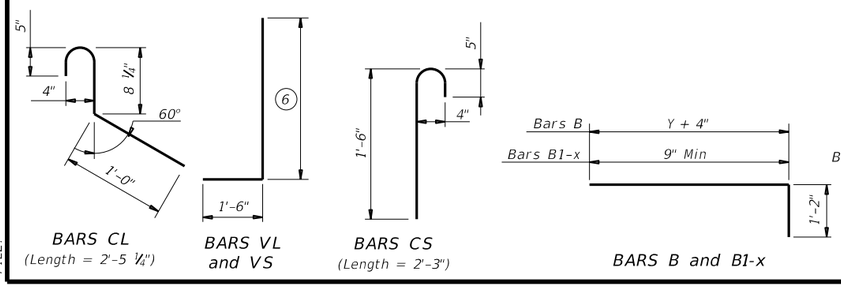
Bar	Size	Spa	No.
A	#4	1' – 0"	~
B	#3	1' – 6"	~
CL & CS	#4	1' – 0"	~
D	#3	1' – 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
SL & SS	#4	~	6
VL & VS	#4	1' – 0"	~
WL & WS	#5	~	4

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"



PLAN

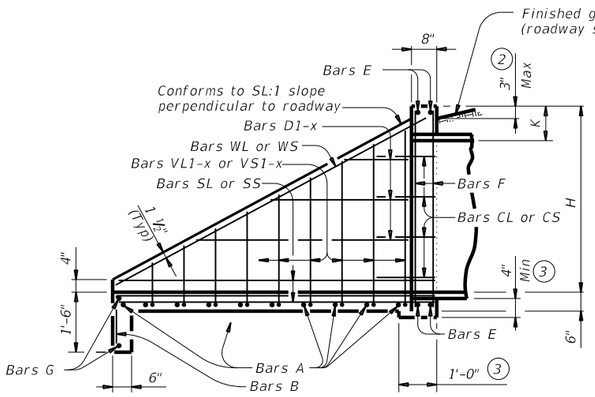


BARS CL (Length = 2'–5 ¼")

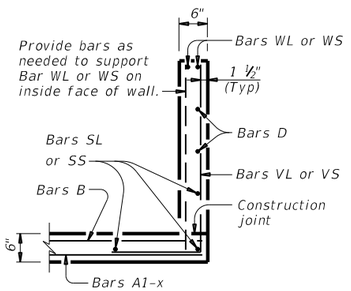
BARS VL and VS

BARS CS (Length = 2'–3")

BARS B and B1-x



TYPICAL WING ELEVATION



SECTION A-A

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 45° SKEW PIPE CULVERTS

CH-FW-45

FILE: chfw45se-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		88

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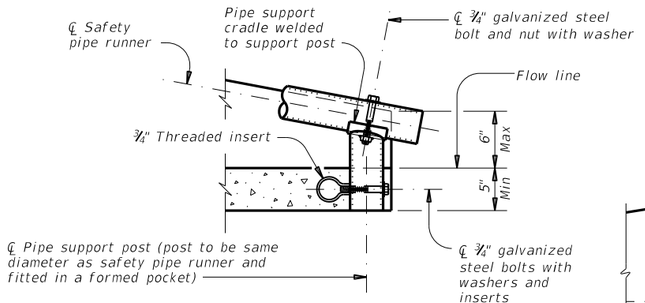
DATE:
FILE:

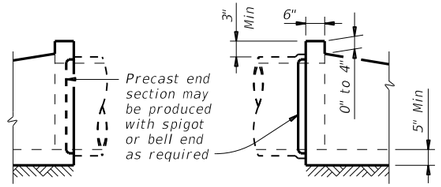
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

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"				



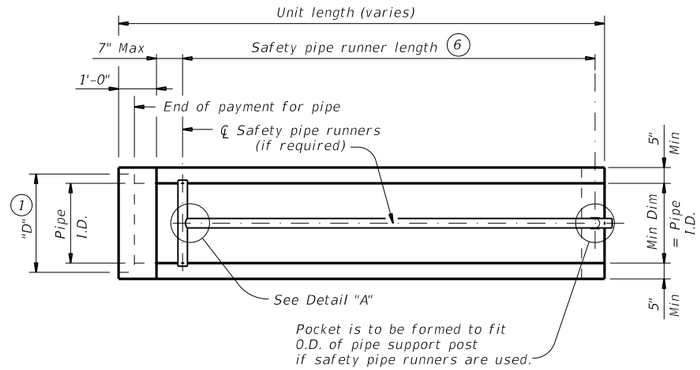
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



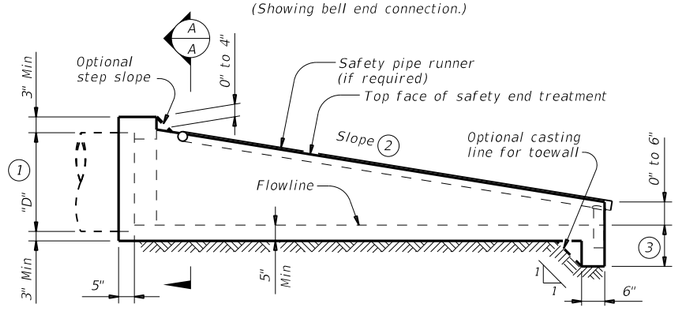
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



PLAN

(Showing bell end connection.)



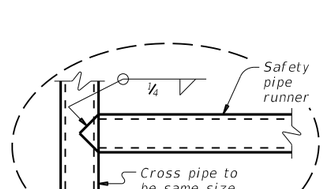
LONGITUDINAL ELEVATION

(Showing bell end connection.)

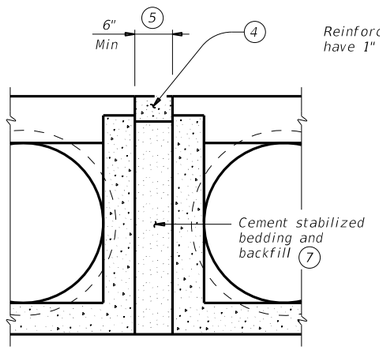
OPTION A

DETAIL A

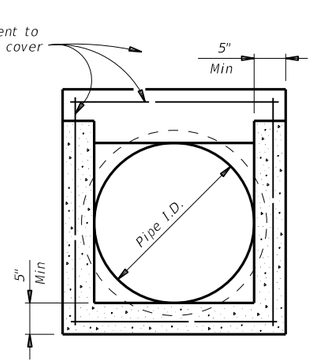
(If required)



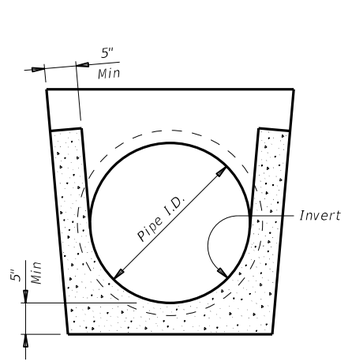
OPTION B



MULTIPLE PIPE INSTALLATION

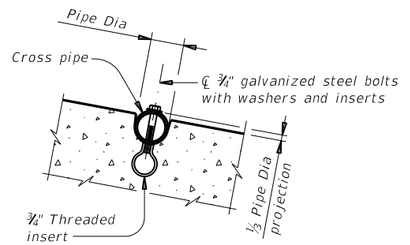


OPTION WITH SQUARE BOTTOM



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

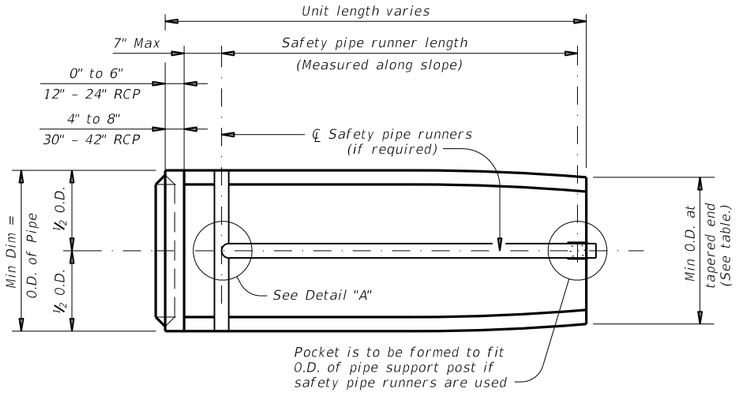
PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

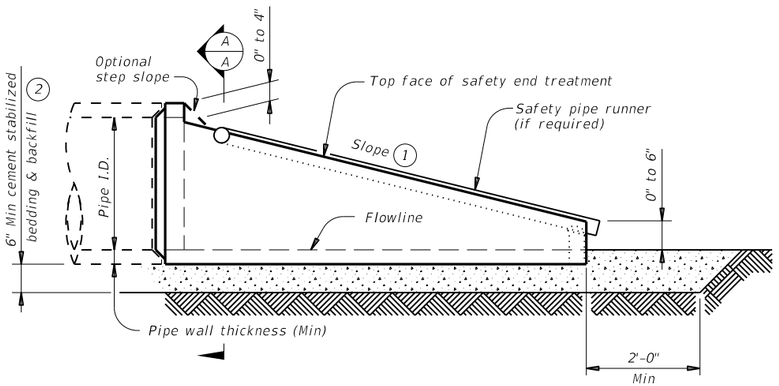
FILE: psetscss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		89

DATE:
FILE:



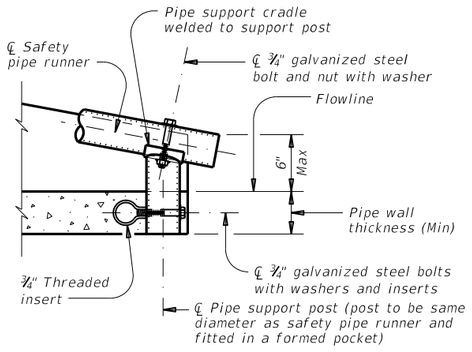
PLAN VIEW

(Showing spigot end connection.)



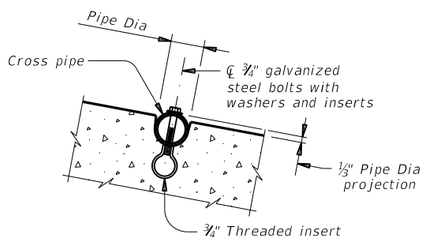
LONGITUDINAL ELEVATION

(Showing spigot end connection.)



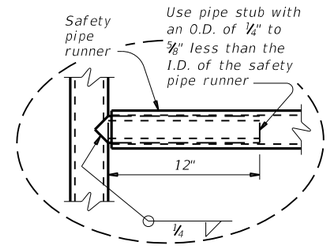
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

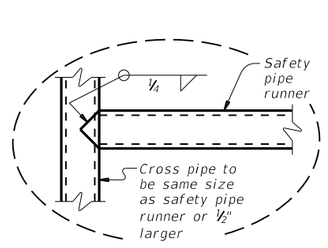


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

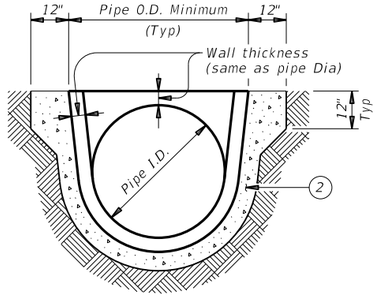


OPTION A

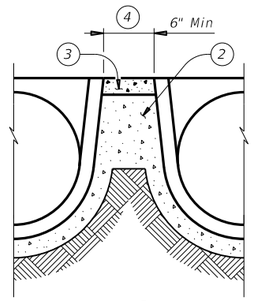


OPTION B

DETAIL A



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
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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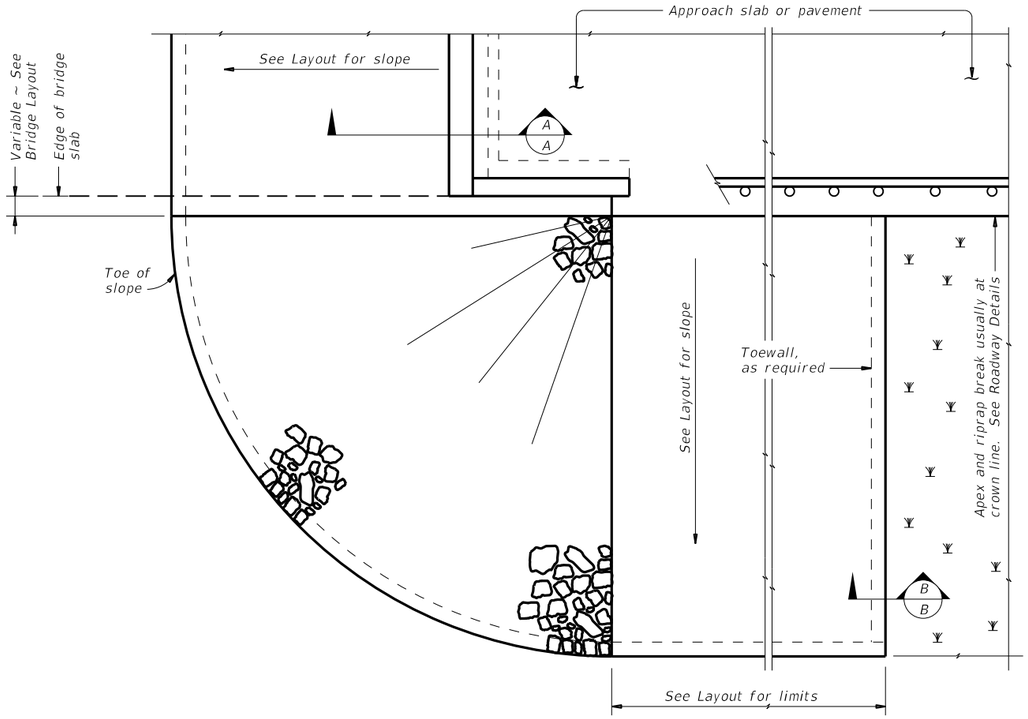
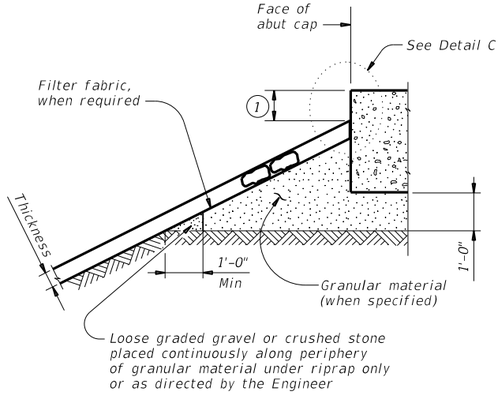
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		90

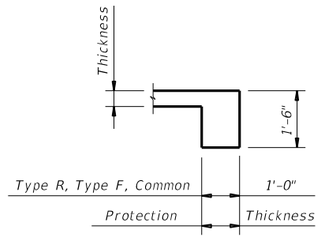
DATE:
FILE:



PLAN

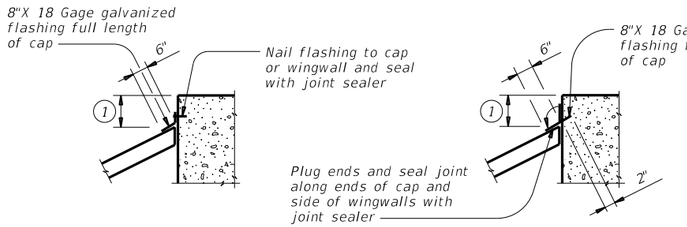


SECTION A-A AT CAP



SECTION B-B

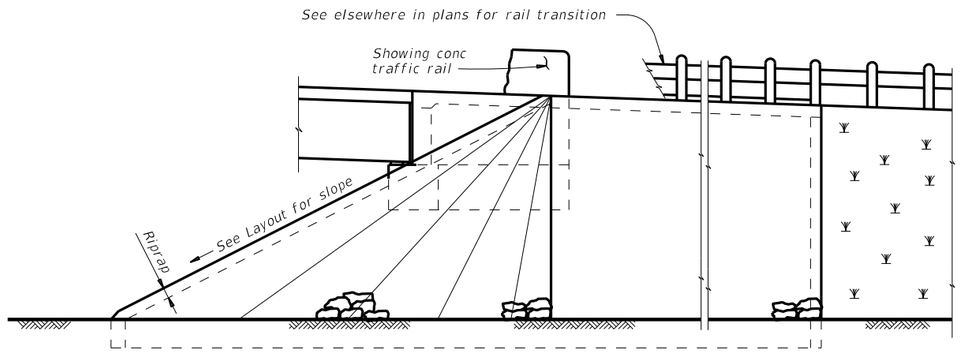
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

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

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES		CK: JGD	DW: BWH		CK: AES	
©TxDOT April 2019	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0092	06	105		IH 45		
	DIST	COUNTY				SHEET NO.	
	DAL	NAVARRO				91	

DATE:
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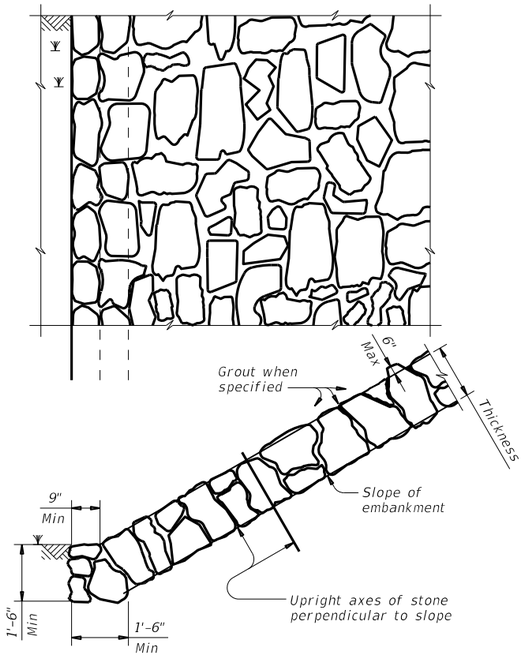


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

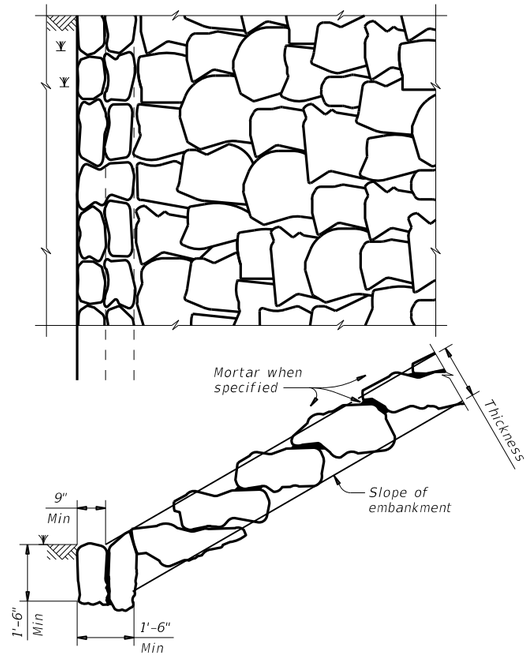


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

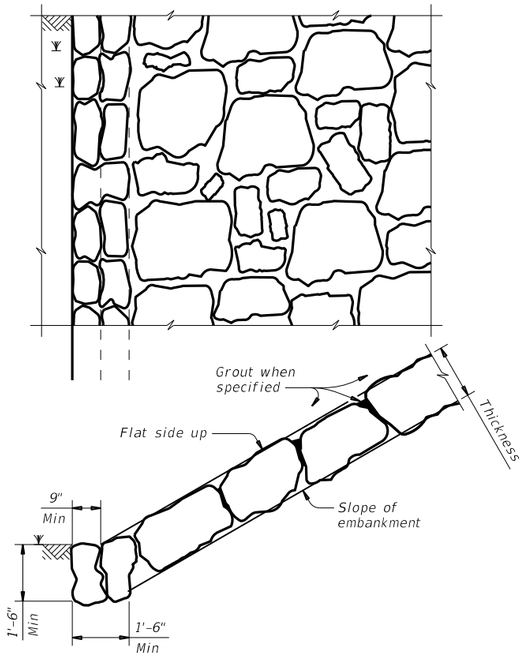


FIGURE 3 ~ TYPE F STONE RIPRAP

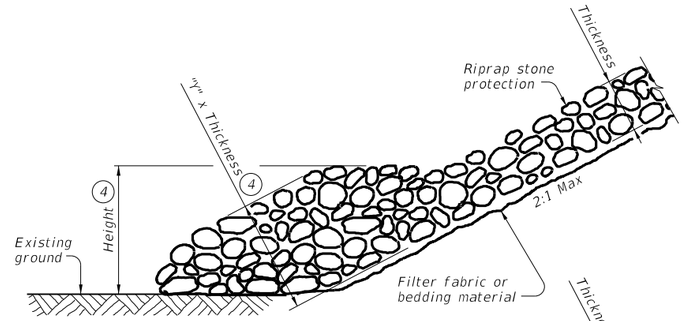
grouted

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

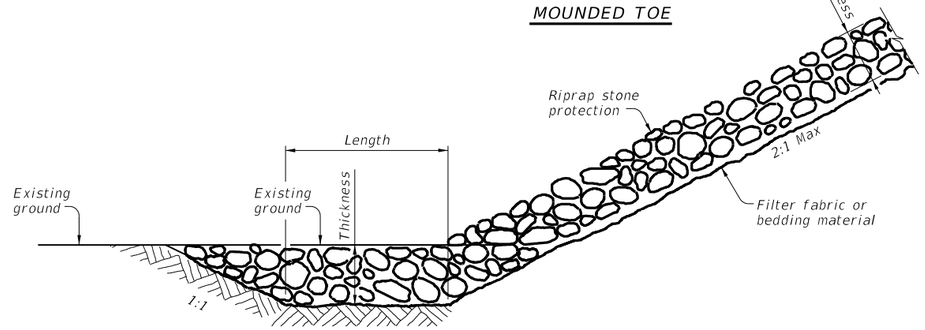
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

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

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



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

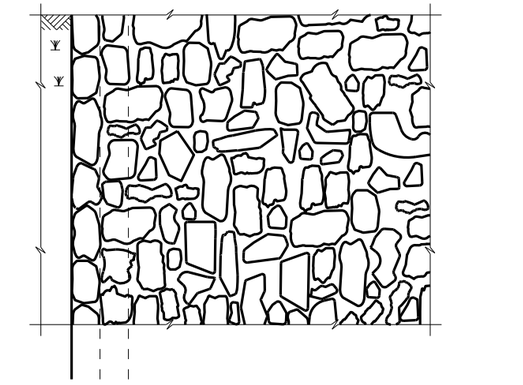


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

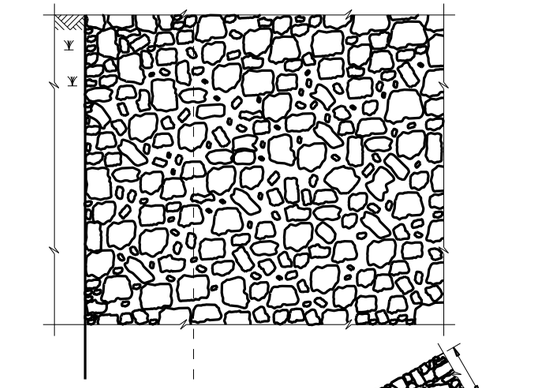


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

Texas Department of Transportation

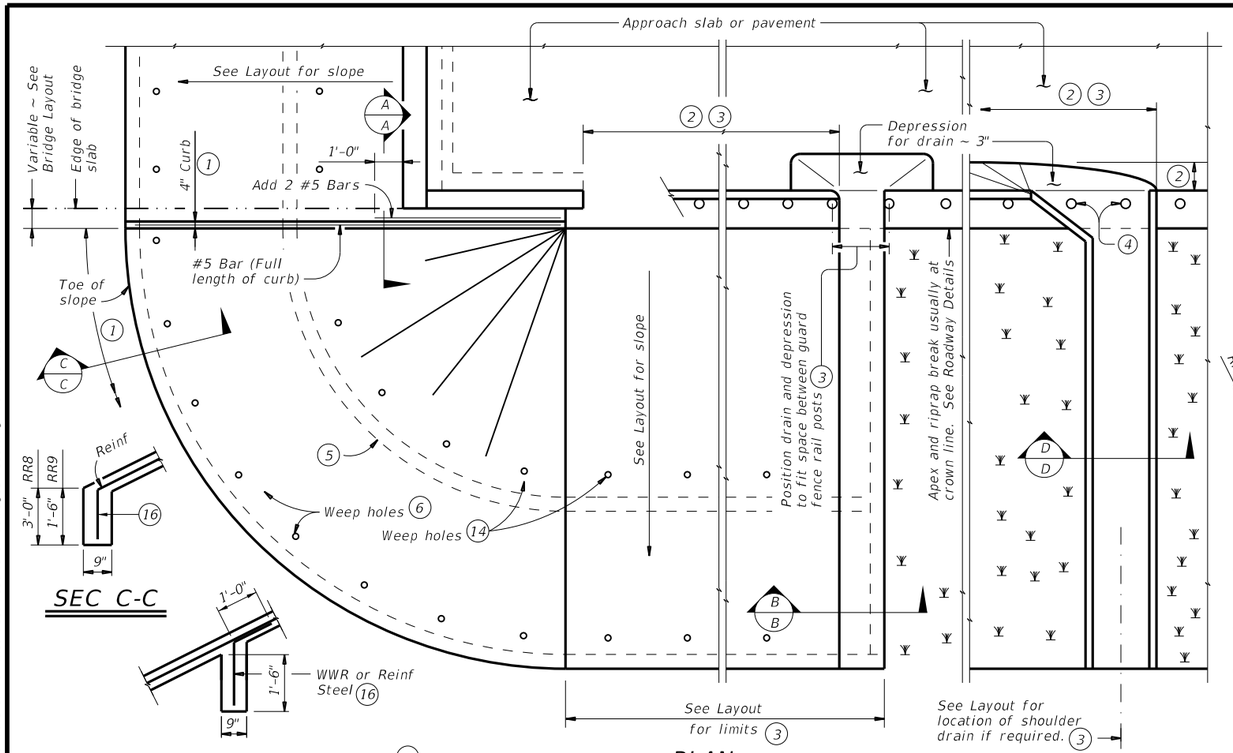
Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		92

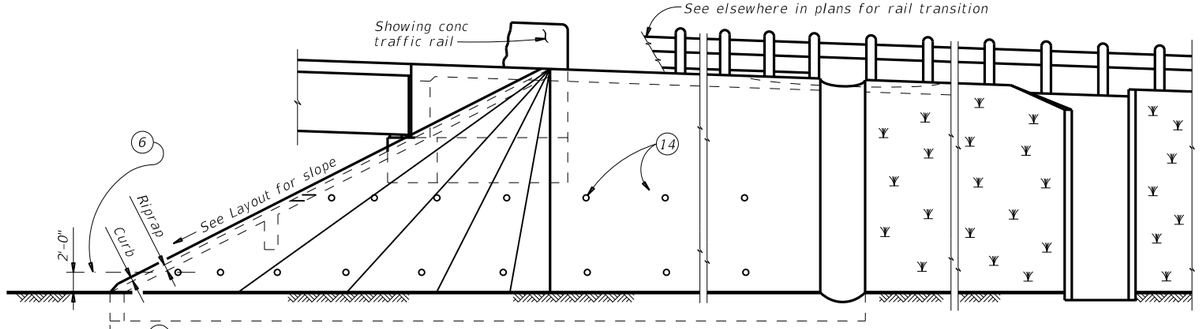
DATE:
FILE:



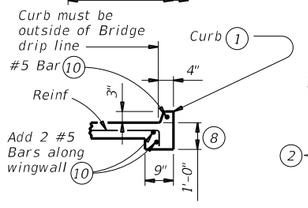
PLAN

SEC C-C

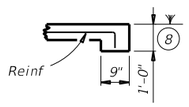
INTERMEDIATE TOEWALL



ELEVATION

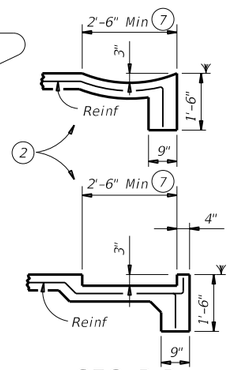


SEC A-A



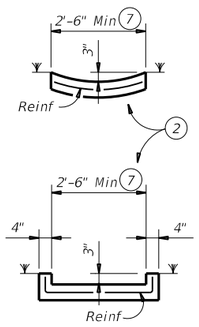
SEC B-B

(No drain)



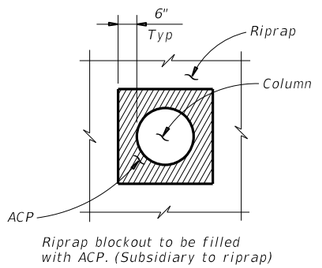
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

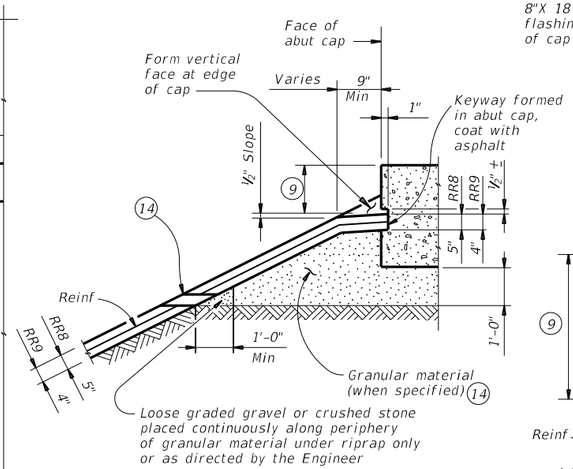
(Shoulder drain)



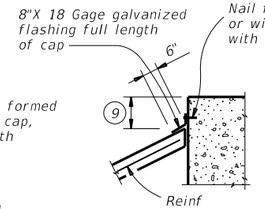
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

(As directed by the Engineer)



SHOWING KEYWAY OPTION



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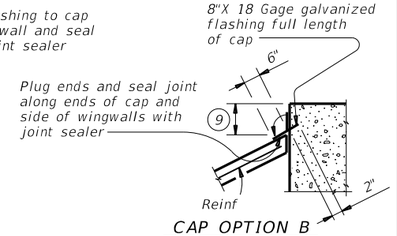

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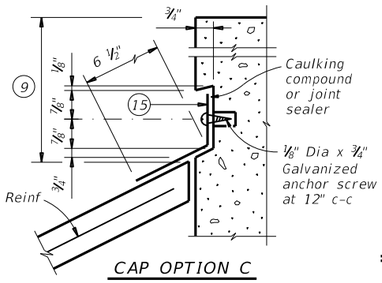
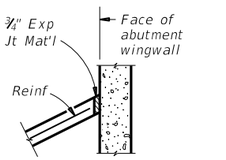
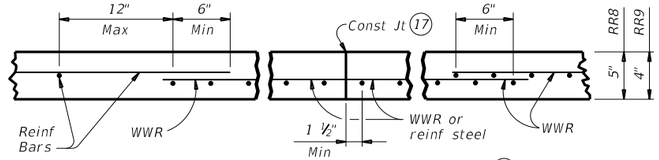


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

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

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

GENERAL NOTES:

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

Provide Grade 60 reinforcing steel.

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

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

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

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

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

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

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

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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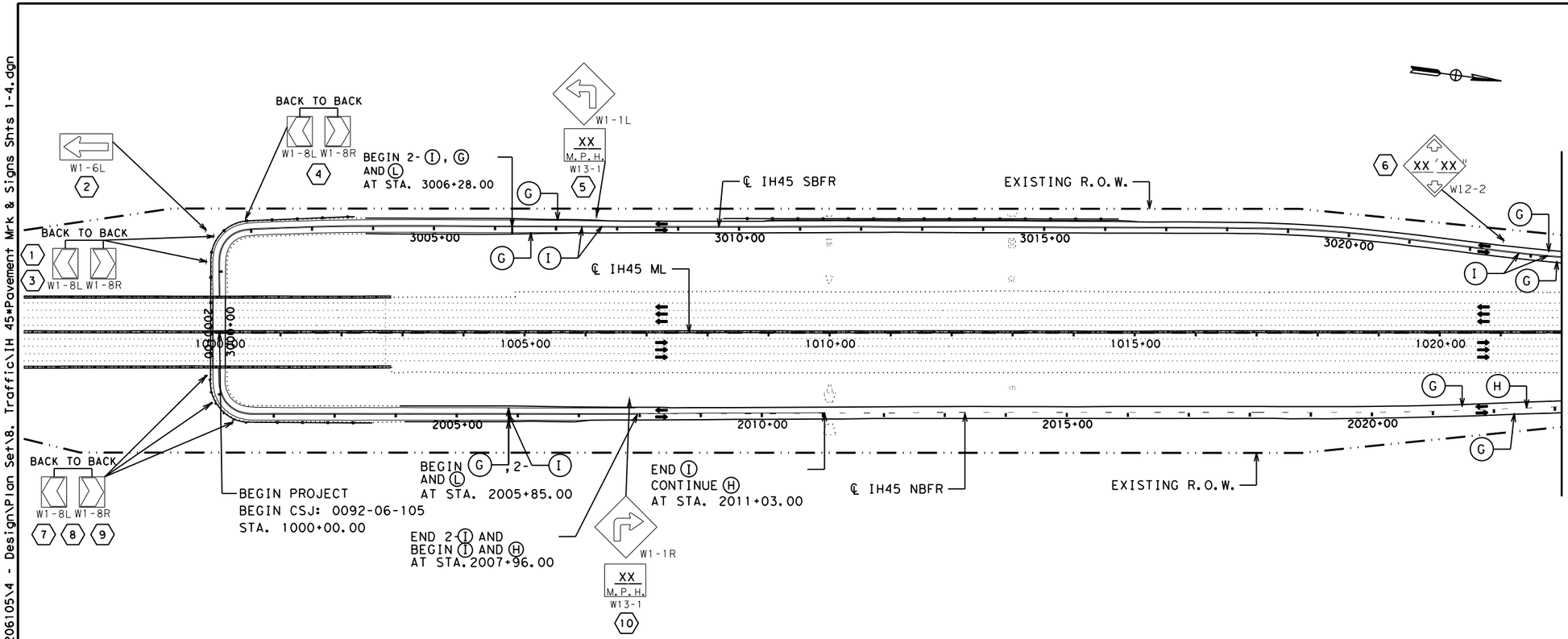
	DAL	NAVARRO		93

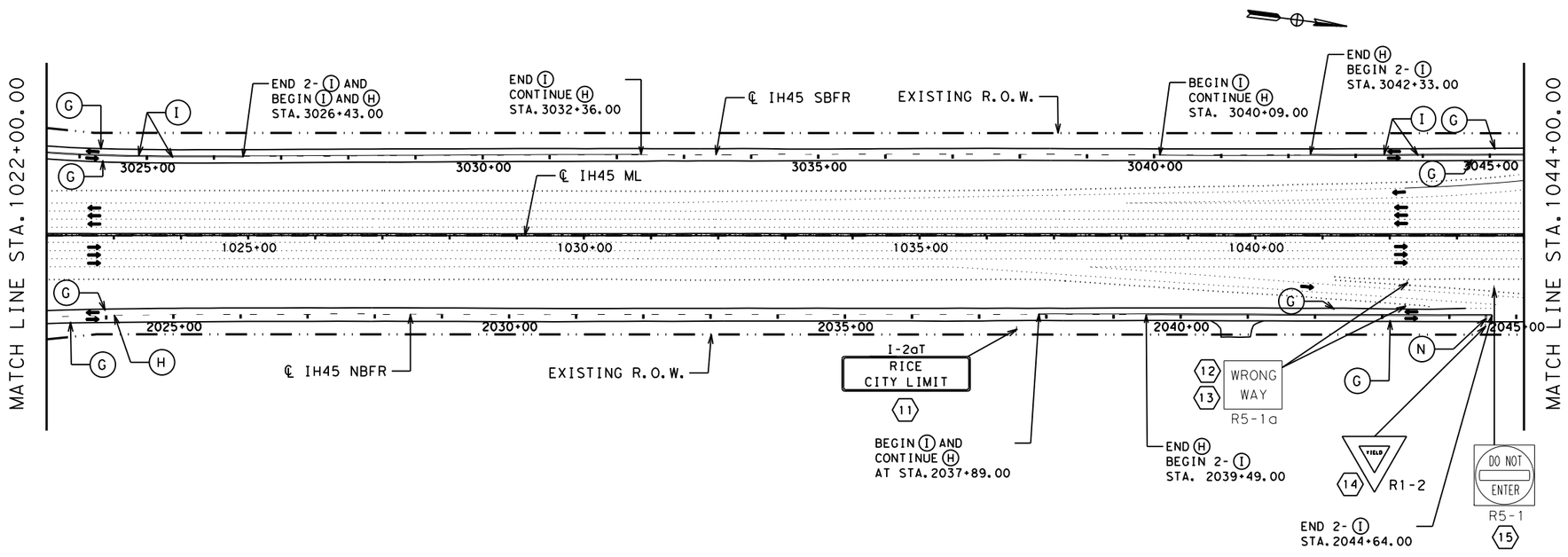


PAVEMENT MARKING LEGEND

A	REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
B	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
C	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
D	REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
E	REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
F	RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
G	RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
H	RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
I	RE PM W/RET REQ TY I(Y) 4" (SLD)(100MIL)
J	REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
K	REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
L	REFL PAV MRKR TY II-A-A (@ 40' C-C)
M	REFL PAV MRKR TY II-C-R (@ 80' C-C)
N	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)

SIGNING LEGEND

(#) PROP. SIGN NUMBER



STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant & P.E. 3/7/22 Date

Texas Department of Transportation

IH 45
PAVEMENT MARKINGS
SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 1 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
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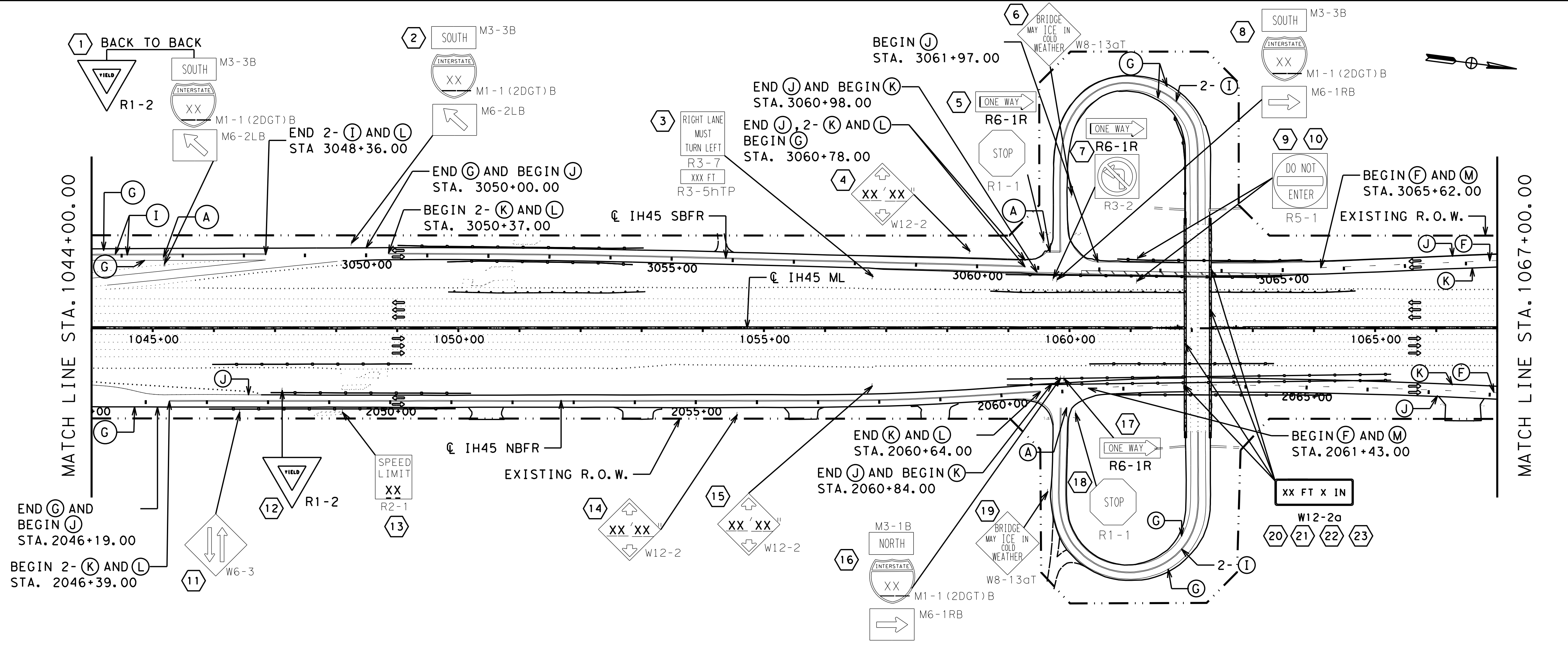

PAVEMENT MARKING LEGEND

A	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)
B	REFL PAV MRK TY I (W) (ENTR GORE) (100MIL)
C	REFL PAV MRK TY I (W) (EXIT GORE) (100MIL)
D	REFL PAV MRK TY I (Y) 8" (SLD) (100MIL)
E	REFL PAV MRK TY I (Y) 24" (SLD) (100MIL)
F	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)
G	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)
H	RE PM W/RET REQ TY I (Y) 4" (BRK) (100MIL)
I	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)
J	REF PROF PAV MRK TY I (W) 4" (SLD) (100MIL)
K	REF PROF PAV MRK TY I (Y) 4" (SLD) (100MIL)
L	REFL PAV MRKR TY II-A-A (@ 40' C-C)
M	REFL PAV MRKR TY II-C-R (@ 80' C-C)
N	REF PAV MRK TY I (W) 36" (YLD TRI) (100MIL)

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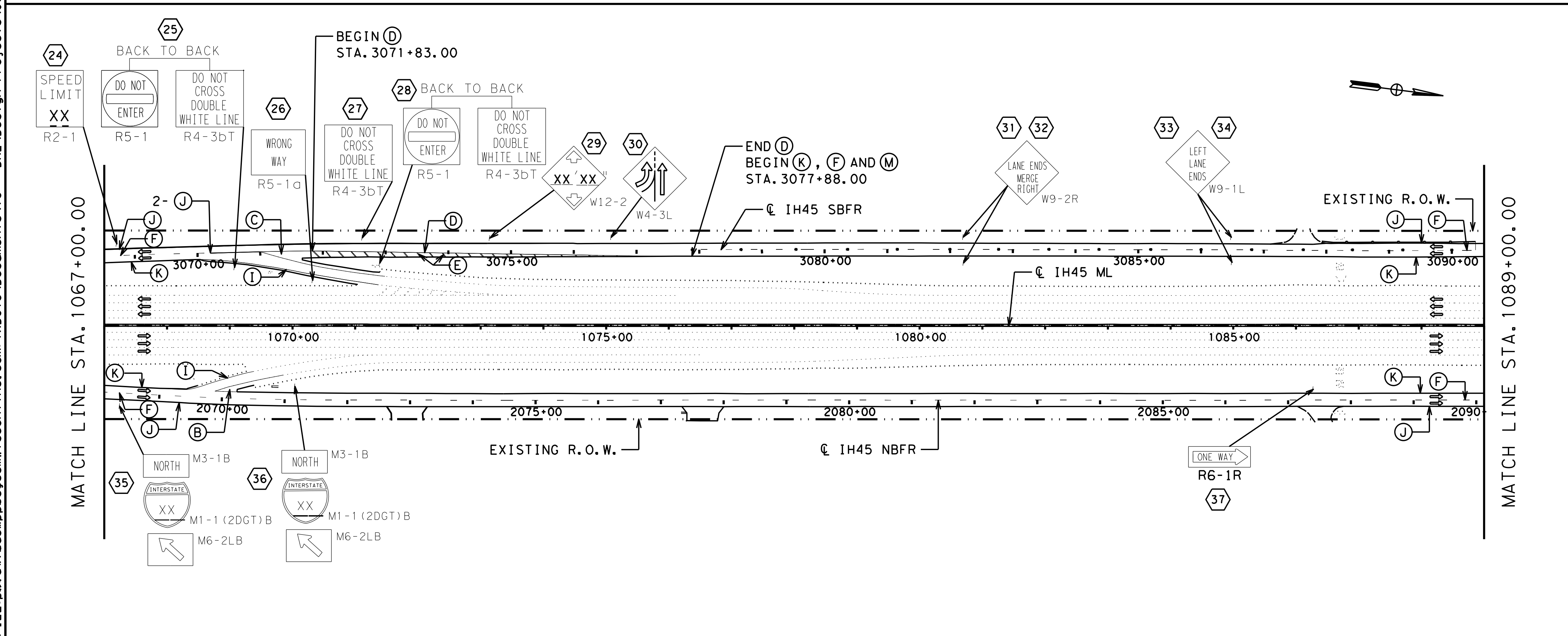
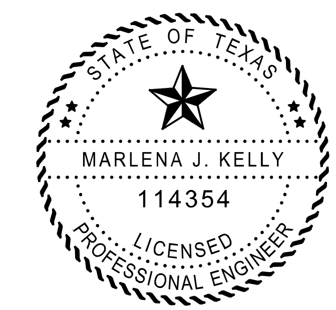
SIGNING LEGEND

PROP. SIGN NUMBER





Marlena Kelly, P.E. 3/7/22
Signature of Registrant & Date

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IH 45 PAVEMENT MARKINGS SMALL SIGN LAYOUTS

SCALE: 1"=200'   SHEET 2 OF 9

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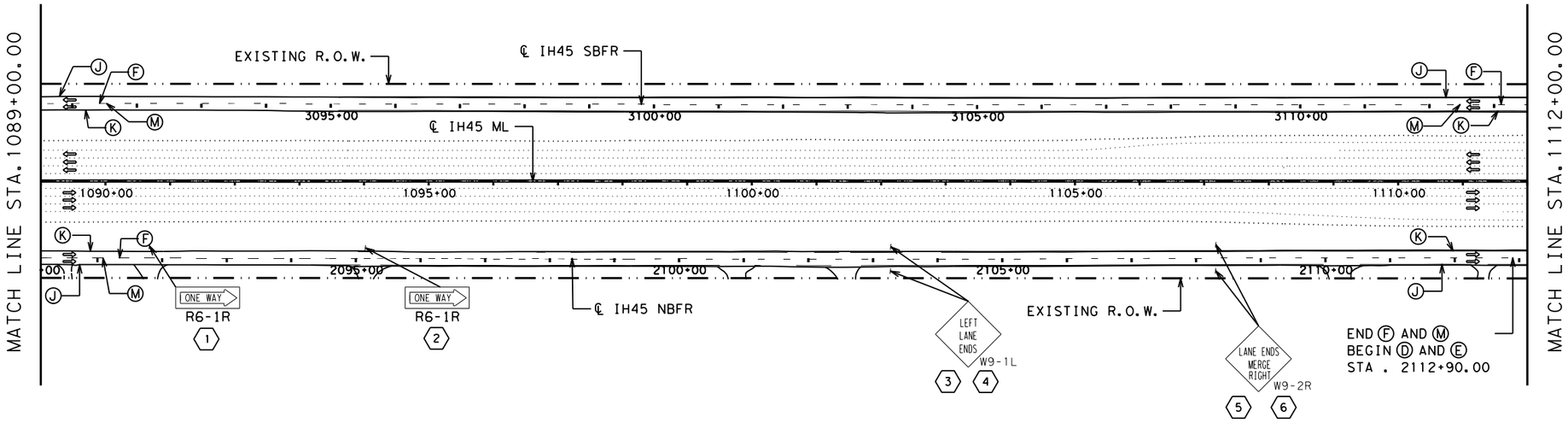

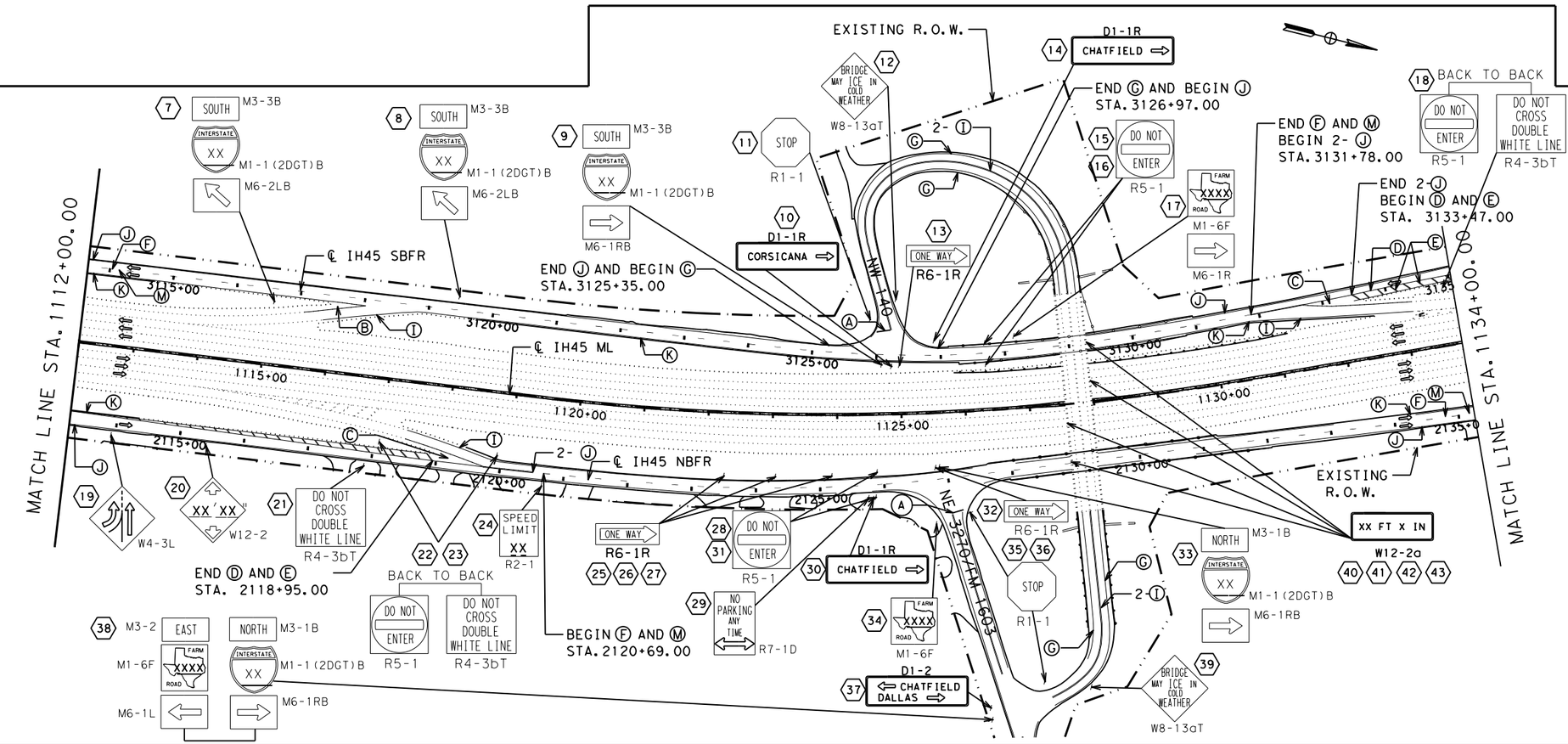

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PAVEMENT MARKING LEGEND

A	REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
B	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
C	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
D	REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
E	REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
F	RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
G	RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
H	RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
I	RE PM W/RET REQ TY I(Y) 4" (SLD)(100MIL)
J	REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
K	REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
L	REFL PAV MRKR TY II-A-A (@ 40' C-C)
M	REFL PAV MRKR TY II-C-R (@ 80' C-C)
N	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)

SIGNING LEGEND

(#) PROP. SIGN NUMBER

STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly, P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
PAVEMENT MARKINGS
SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 3 OF 9

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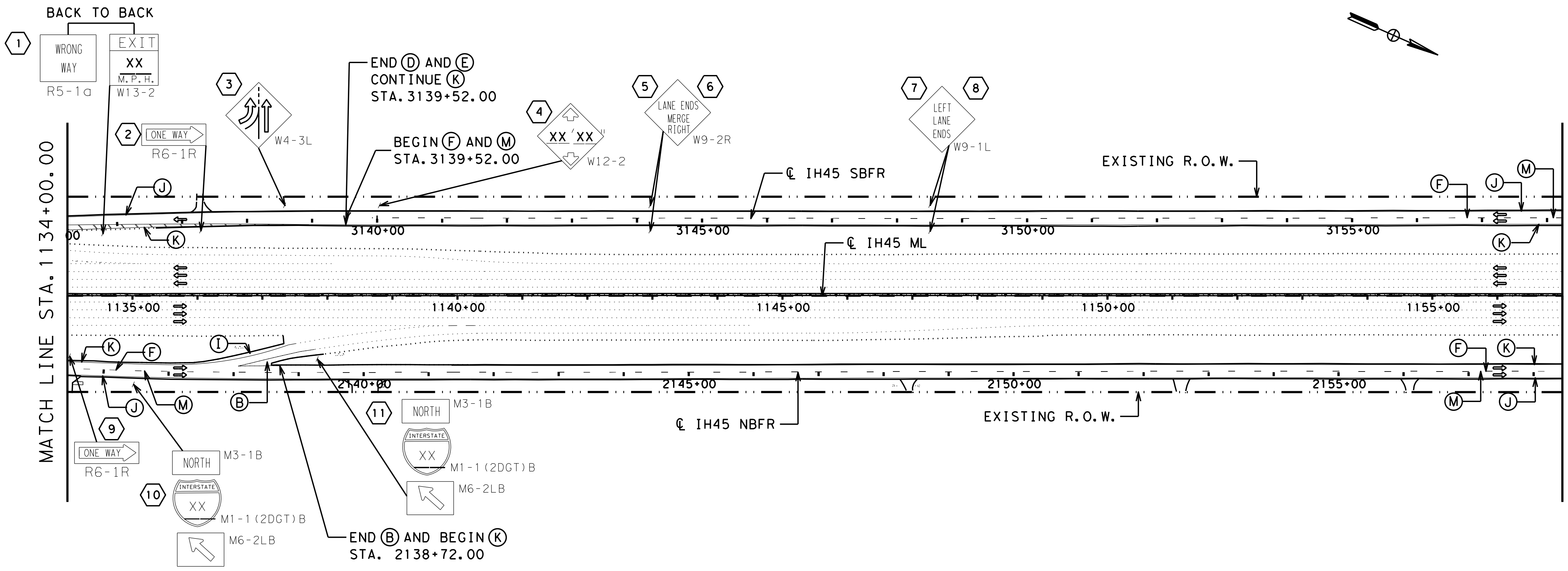

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(B) REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
(C) REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
(D) REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
(E) REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
(F) RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
(G) RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
(H) RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
(I) RE PM W/RET REQ TY I(Y) 4" (SLD)(100MIL)
(J) REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
(K) REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
(L) REFL PAV MRKR TY II-A-A (@ 40' C-C)
(M) REFL PAV MRKR TY II-C-R (@ 80' C-C)
(N) REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)

SIGNING LEGEND

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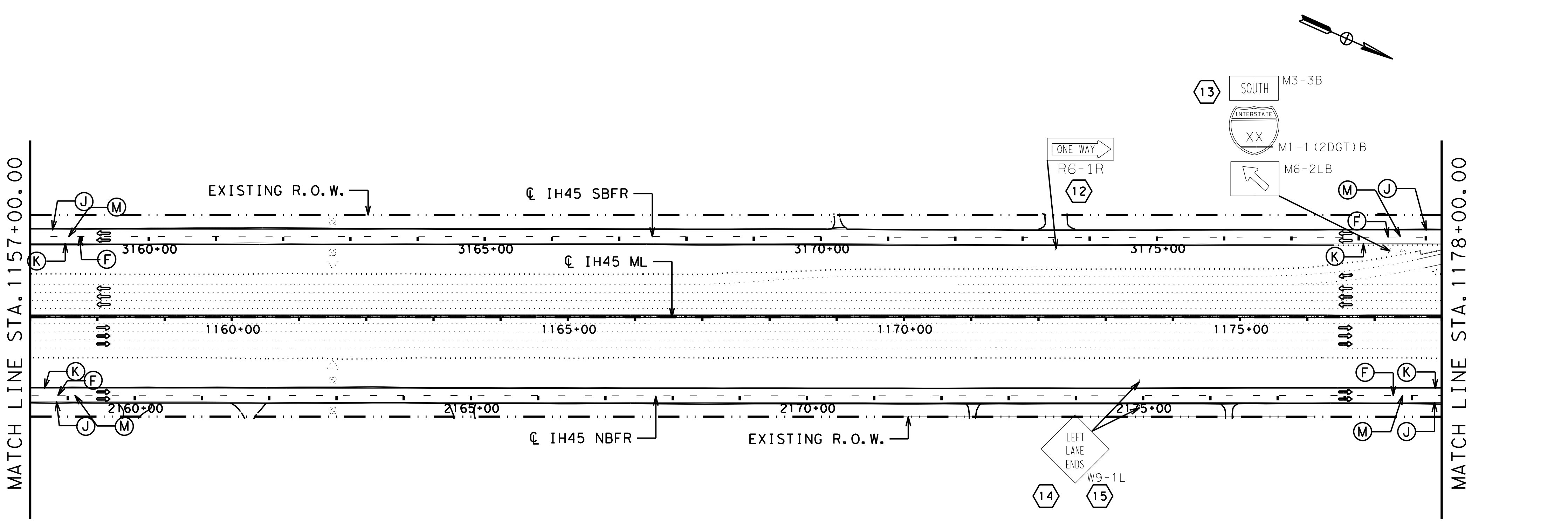

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IH 45 PAVEMENT MARKINGS SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 4 OF 9

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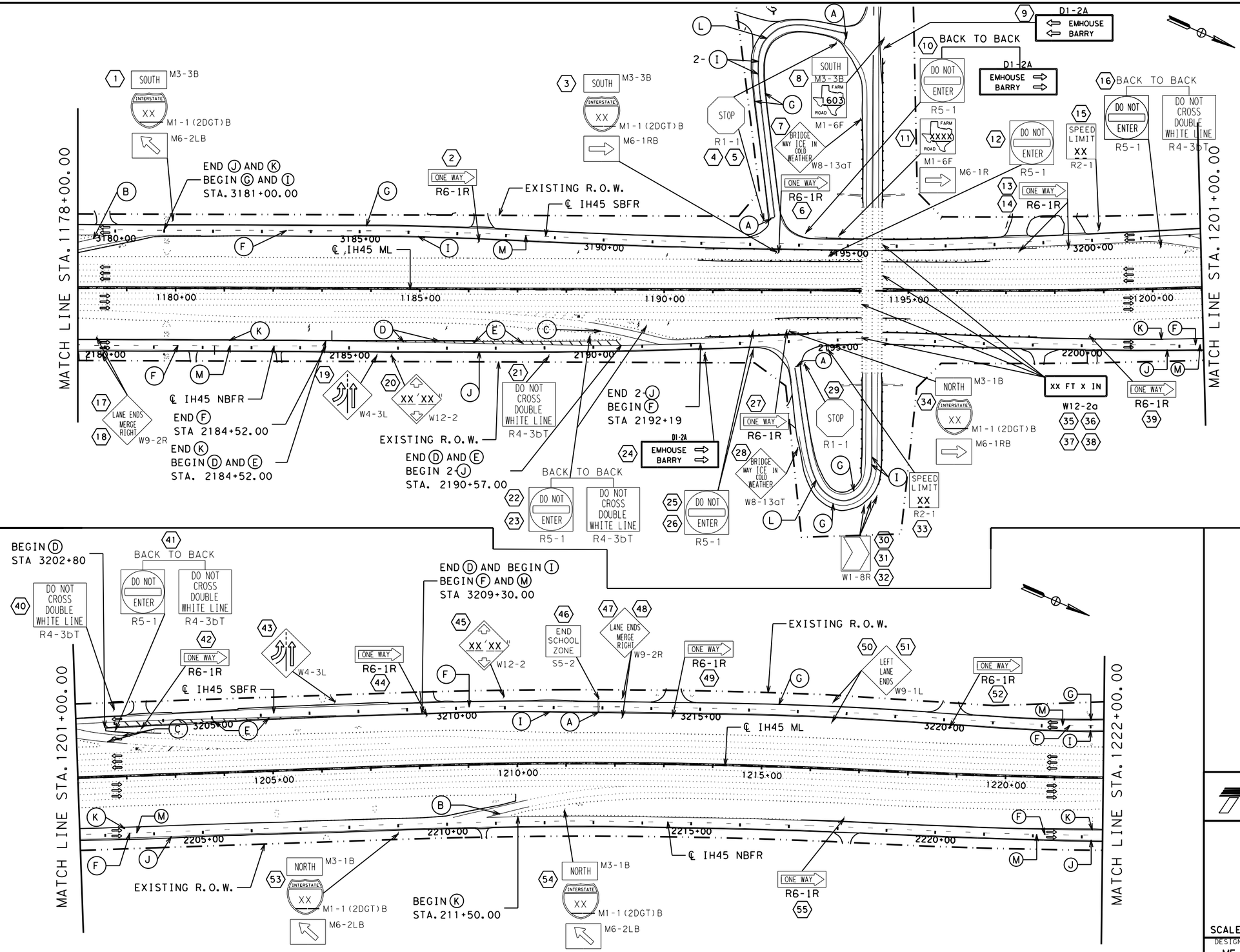

PAVEMENT MARKING LEGEND

A	REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
B	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
C	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
D	REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
E	REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
F	RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
G	RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
H	RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
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J	REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
K	REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
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IH 45
PAVEMENT MARKINGS
SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 5 OF 9

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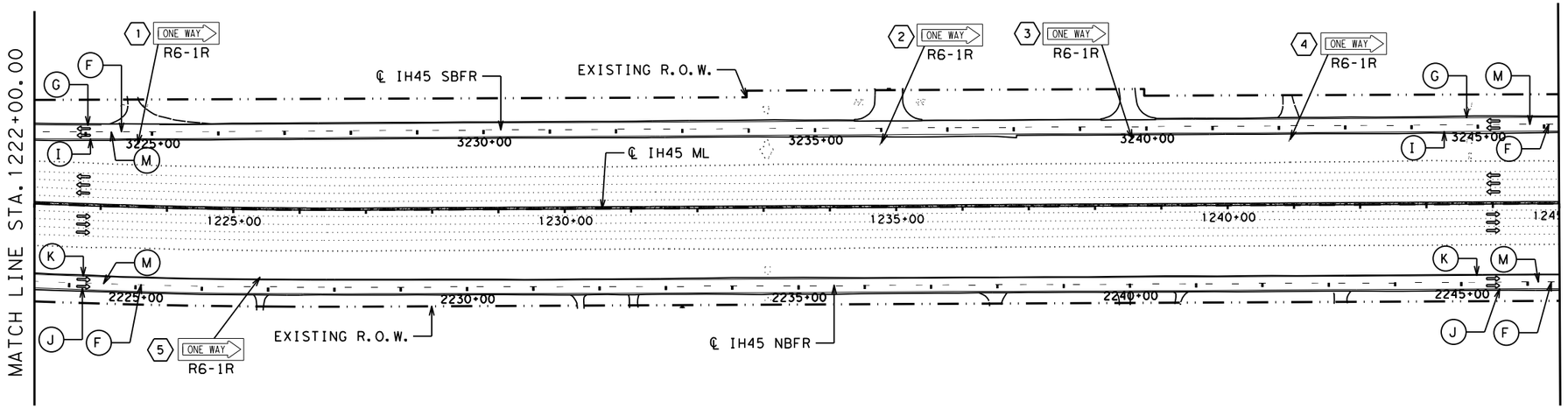

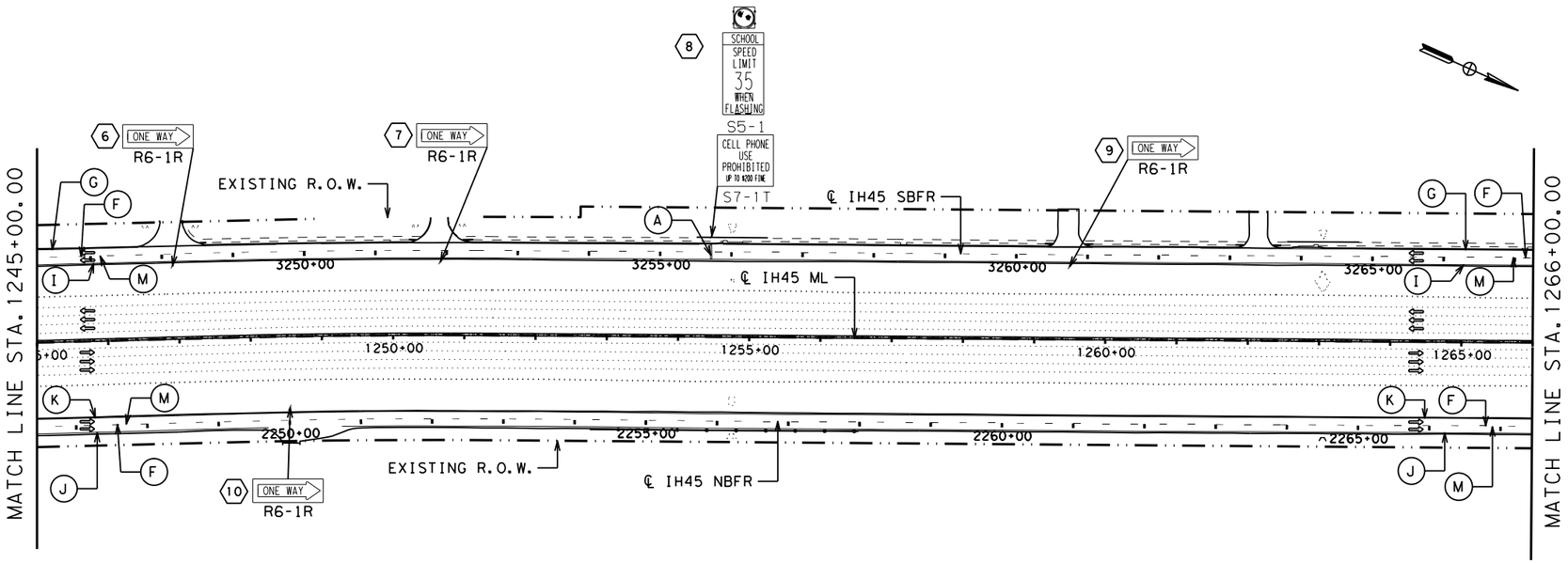

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SCALE IN FEET

PAVEMENT MARKING LEGEND

A	REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
B	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
C	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
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SIGNING LEGEND

⬡ PROP. SIGN NUMBER

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114354
LICENSED
PROFESSIONAL ENGINEER

Marlena Kelly, P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45
PAVEMENT MARKINGS
SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 6 OF 9

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
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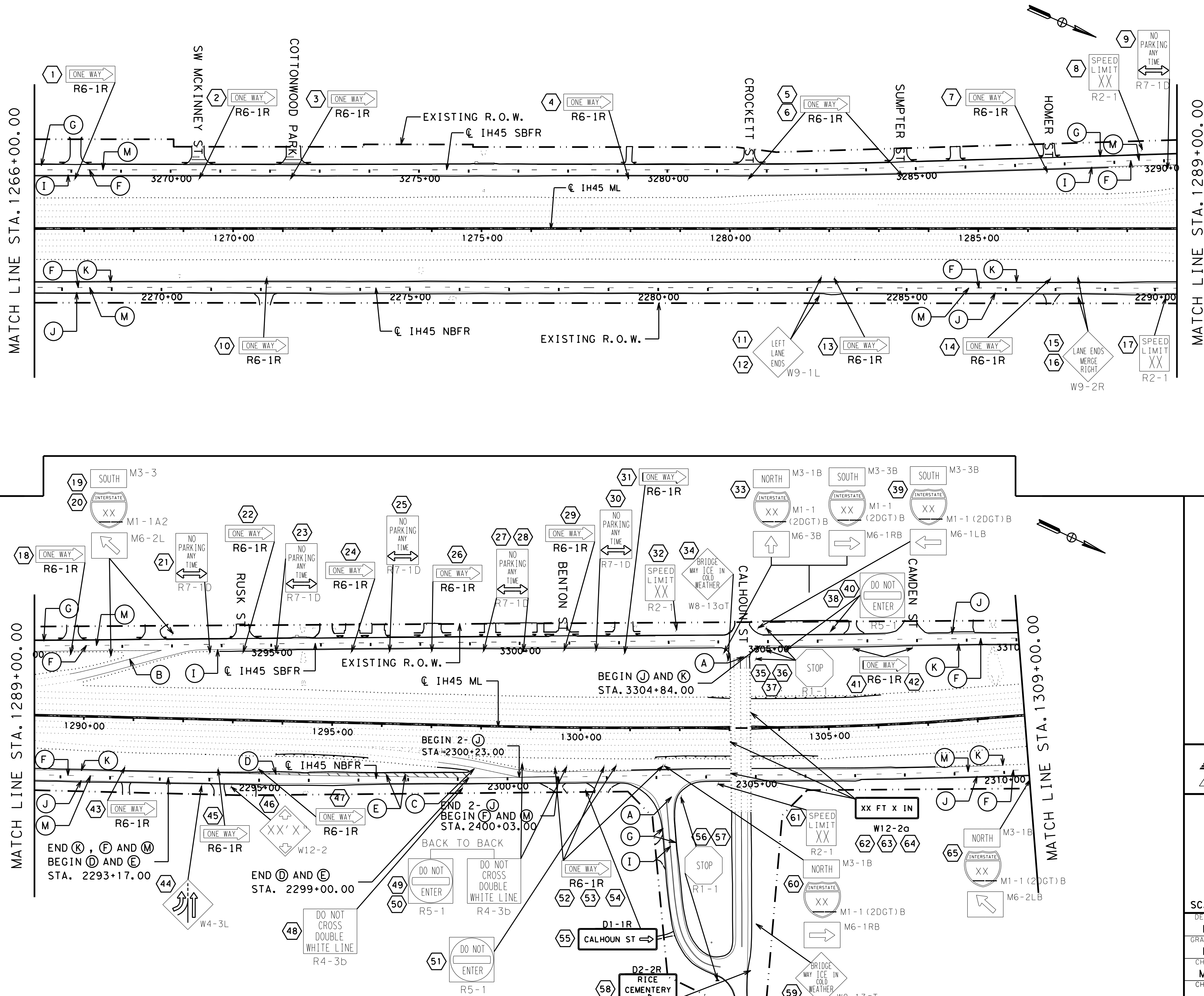

PAVEMENT MARKING LEGEND

Ⓐ	REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
Ⓑ	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
Ⓒ	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
Ⓓ	REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
Ⓔ	REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
Ⓕ	RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
Ⓖ	RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
Ⓗ	RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
Ⓘ	RE PM W/RET REQ TY I(Y) 4" (SLD)(100MIL)
Ⓙ	REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
Ⓚ	REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
Ⓛ	REFL PAV MRKR TY II-A-A (@ 40' C-C)
Ⓜ	REFL PAV MRKR TY II-C-R (@ 80' C-C)
Ⓝ	REFL PAV MRK TY I(W)36"(YLD TRI)(100MIL)

SIGNING LEGEND

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STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45 PAVEMENT MARKINGS SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 7 OF 9

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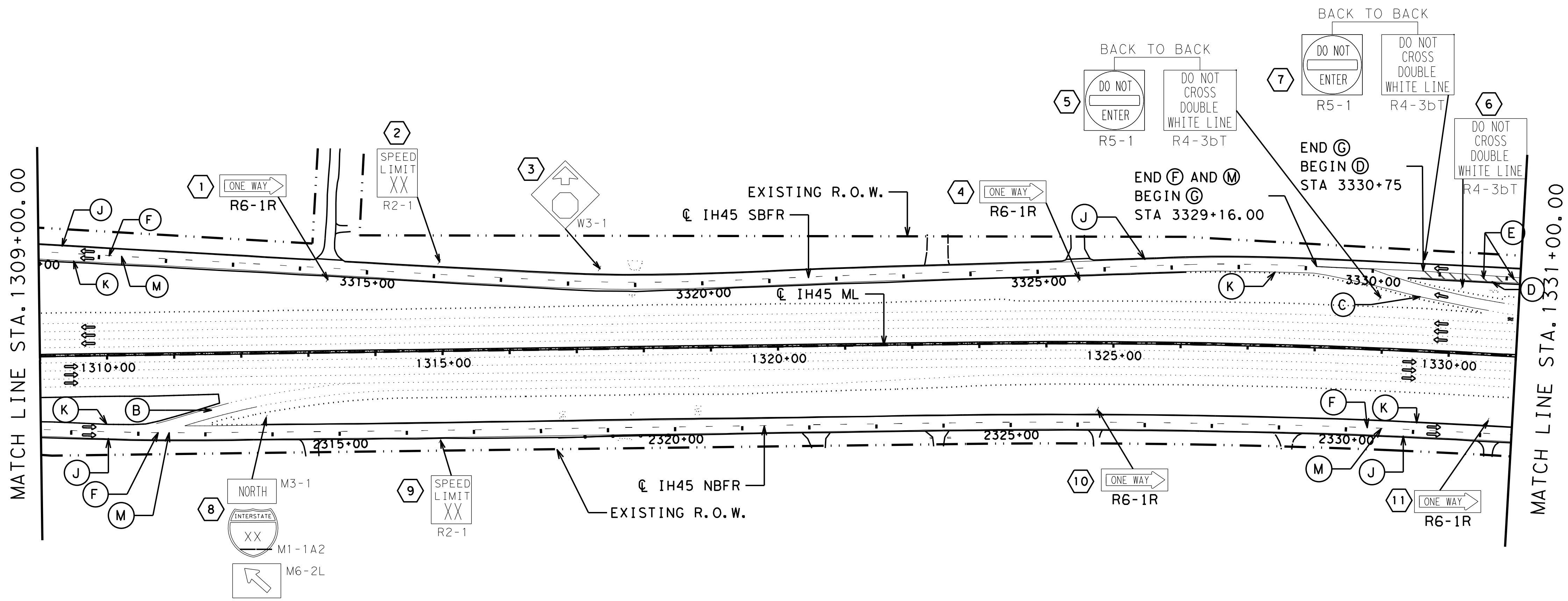
CHECK MJK	CONTROL 0092	SECTION 06	JOB 105	
CHECK JAP				

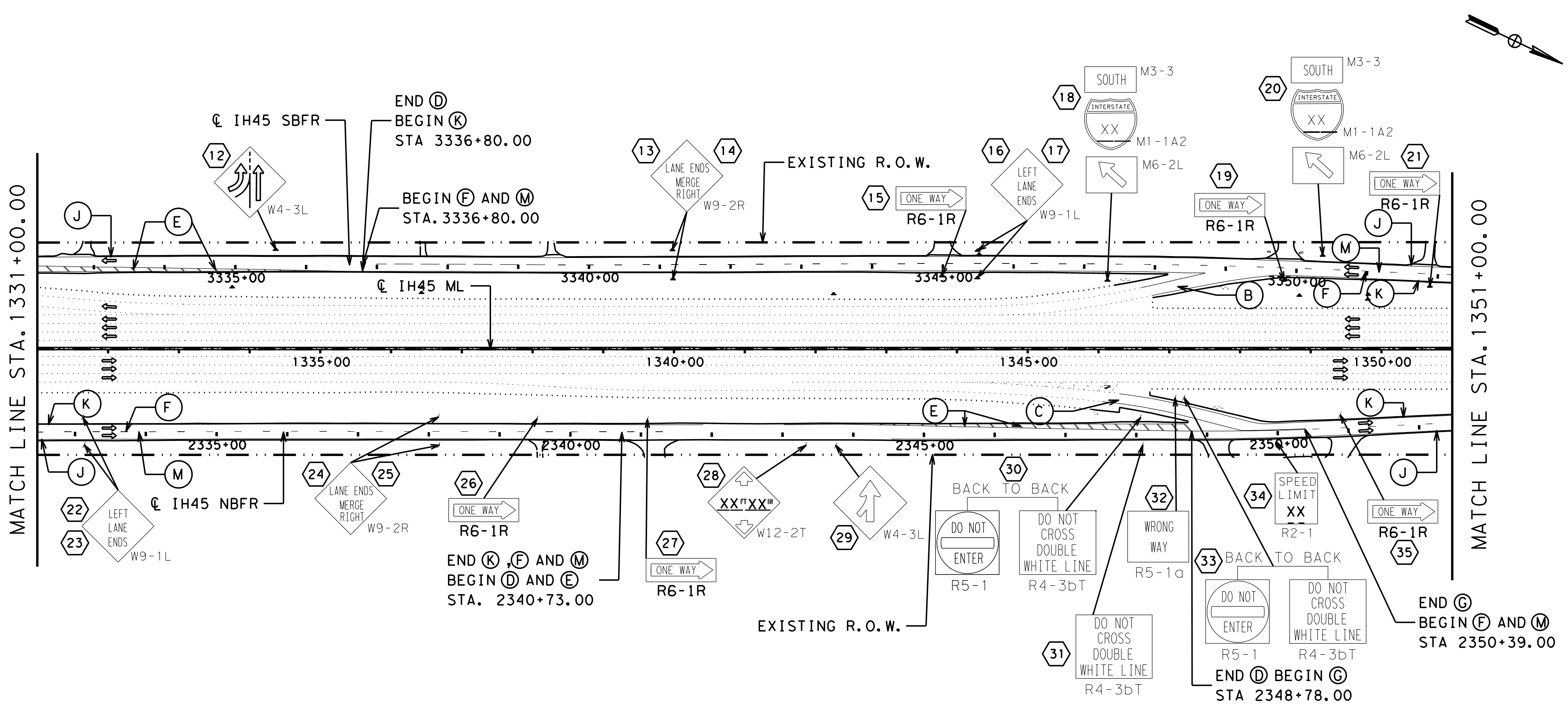


0 100 200
SCALE IN FEET

PAVEMENT MARKING LEGEND
Ⓐ REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
Ⓑ REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
Ⓒ REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
Ⓓ REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
Ⓔ REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
Ⓕ RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
Ⓖ RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
Ⓗ RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
Ⓘ RE PM W/RET REQ TY I(Y) 4" (SLD)(100MIL)
Ⓙ REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
Ⓚ REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
Ⓛ REFL PAV MRKR TY II-A-A (@ 40' C-C)
Ⓜ REFL PAV MRKR TY II-C-R (@ 80' C-C)
Ⓝ REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)

SIGNING LEGEND

(#) PROP. SIGN NUMBER



STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly P.E. 3/7/22
Signature of Registrant & Date

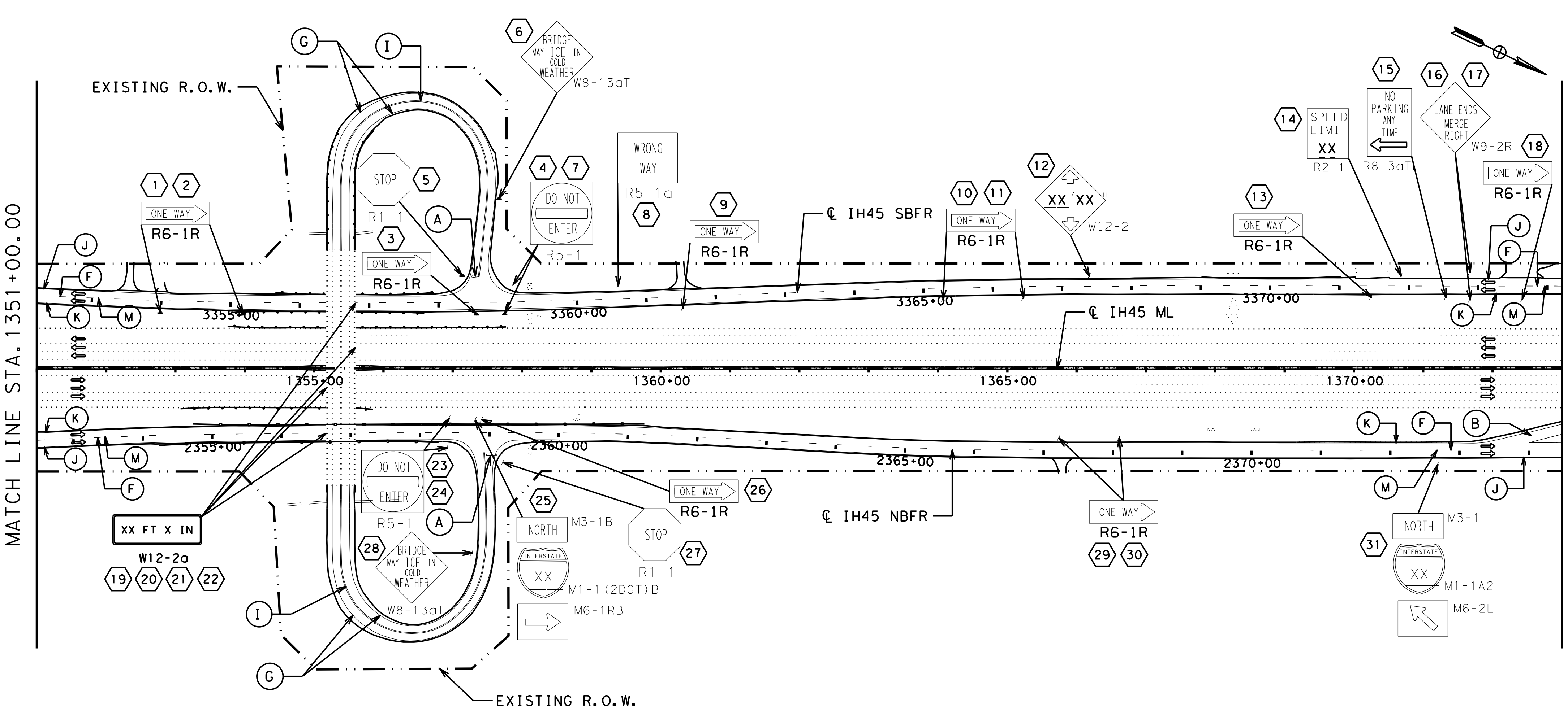
Texas Department of Transportation

IH 45 PAVEMENT MARKINGS SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 8 OF 9

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS MF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK MJK	TEXAS	DAL	NAVARRO	101
CHECK JAP	CONTROL 0092	SECTION 06	JOB 105	

DATE: 3/7/2022 TIME: 15:50:06 AM
FILE: pw:\\txdot.pw.bentley.com:TXDOT5\Documents\18 - DAL\Design Projects\009206105\4 - Design\Plan Set\8. Traffic\IH 45\Pavement Mrk & Signs Shts 5-9.dgn

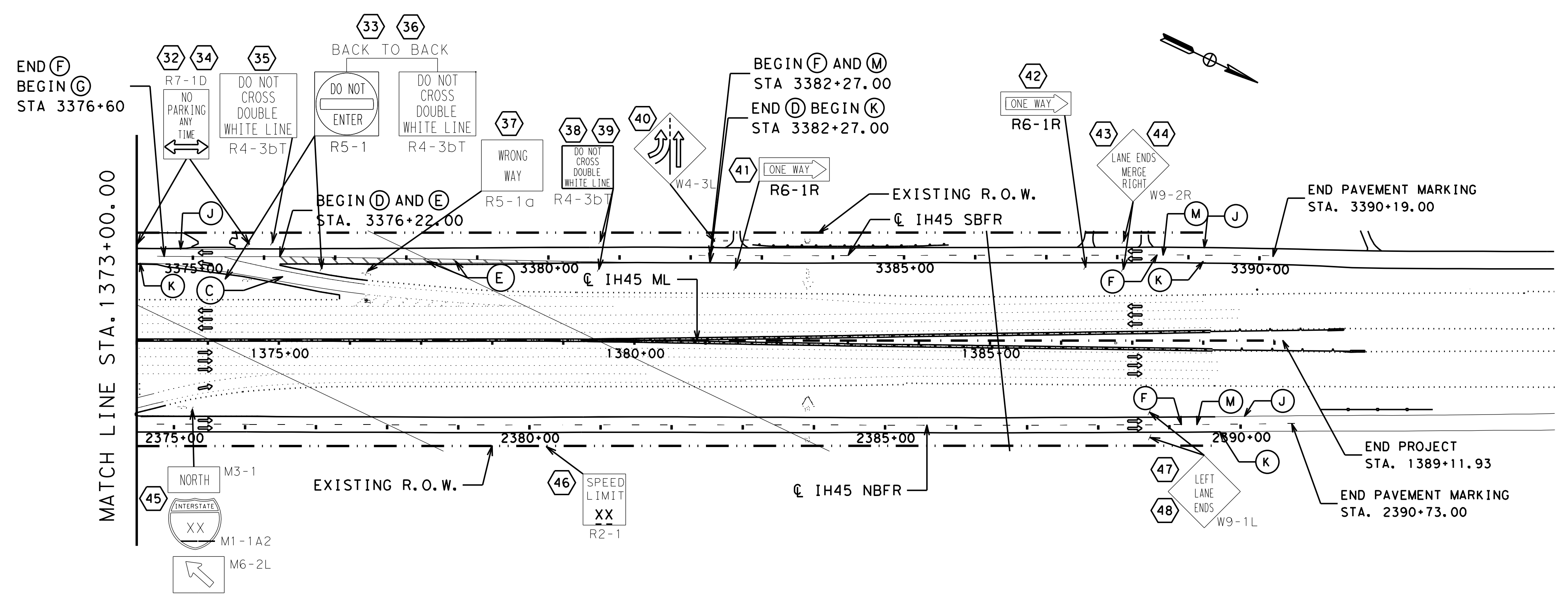


SCALE IN FEET 0 100 200

PAVEMENT MARKING LEGEND
(A) REFL PAV MRK TY I(W) 24" (SLD)(100MIL)
(B) REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)
(C) REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)
(D) REFL PAV MRK TY I(Y) 8" (SLD)(100MIL)
(E) REFL PAV MRK TY I(Y) 24" (SLD)(100MIL)
(F) RE PM W/RET REQ TY I(W) 4" (BRK)(100MIL)
(G) RE PM W/RET REQ TY I(W) 4" (SLD)(100MIL)
(H) RE PM W/RET REQ TY I(Y) 4" (BRK)(100MIL)
(I) RE PM W/RET REQ TY I(Y) 4" (SLD)(100MIL)
(J) REF PROF PAV MRK TY I(W) 4"(SLD)(100MIL)
(K) REF PROF PAV MRK TY I(Y) 4"(SLD)(100MIL)
(L) REFL PAV MRKR TY II-A-A (@ 40' C-C)
(M) REFL PAV MRKR TY II-C-R (@ 80' C-C)
(N) REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)

SIGNING LEGEND

(#) PROP. SIGN NUMBER



STATE OF TEXAS
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly P.E. 3/7/22
Signature of Registrant & Date

Texas Department of Transportation

IH 45 PAVEMENT MARKINGS SMALL SIGN LAYOUTS

SCALE: 1"=200' SHEET 9 OF 9

DESIGN	FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DAL	NAVARRO	
CHECK	CONTROL	SECTION	JOB	
MJK				
CHECK				
JAP	0092	06	105	102

DATE: 3/7/2022 TIME: 5:50:07 AM
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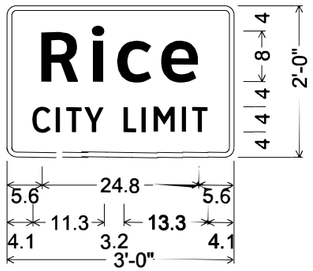
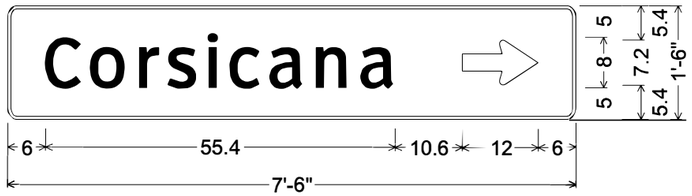


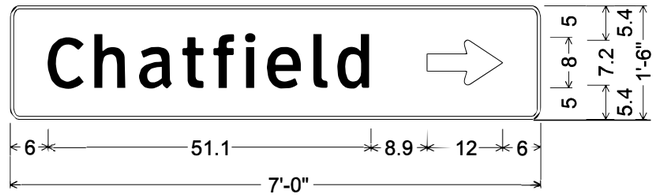
I-2aT 8in;
1.5" Radius, 0.8" Border, White on, Green;
"Rice", ClearviewHwy-5-W-R;
"CITY LIMIT", ClearviewHwy-3-W;

SHEET 1 SIGN 11



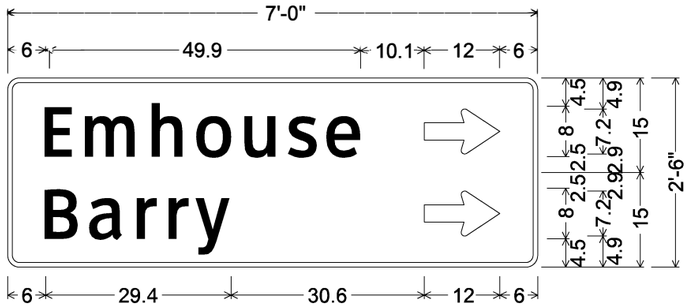
D1-1 8in RT;
1.5" Radius, 0.5" Border, White on, Green;
"Corsicana", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0';

SHEET 3 SIGN 10



D1-1 8in RT;
1.5" Radius, 0.5" Border, White on, Green;
"Chatfield", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0';

SHEET 3 SIGN 14
SHEET 3 SIGN 30

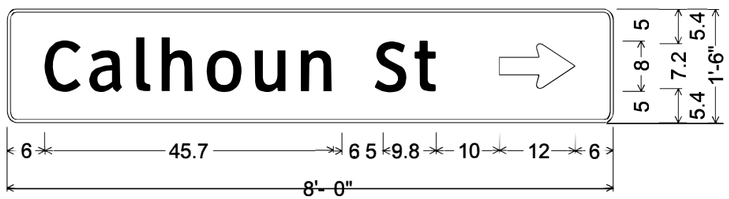


D1-2 8in RT-RT;

1.9" Radius, 0.8" Border, White on, Green;
"Emhouse", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0';

1.9" Radius, 0.8" Border, White on, Green;
"Barry", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0';

SHEET 5 SIGN 10
SHEET 5 SIGN 24



D1-1 8in RT;
1.5" Radius, 0.5" Border, White on, Green;
"Calhoun St", ClearviewHwy-3-W;
Standard Arrow Custom 12.0" X 7.1" 0';

SHEET 7 SIGN 55

Signature of Registrant — P.E. — Date: 03/07/2022

Texas Department of Transportation

IH 45

SIGN DETAILS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
AB	6	SEE TITLE SHEET		IH 45
GRAPHICS: AB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: MA	TEXAS	DAL	NAVARRO	103
CHECK: BA	CONTROL	SECTION	JOB	
	0092	06	105	

DATE:3/7/2022 TIME:6:15:57 AM
FILE:$FILE$

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)

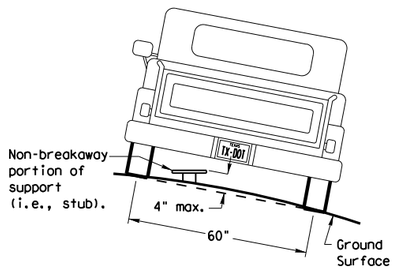
Anchor Type

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-3))

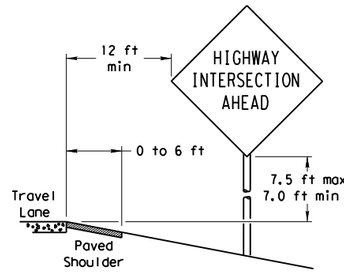
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

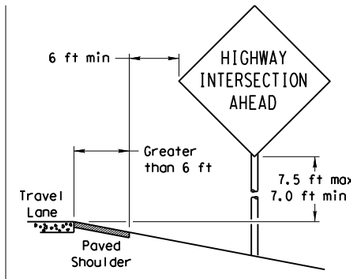
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

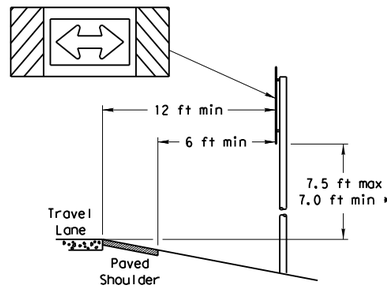
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



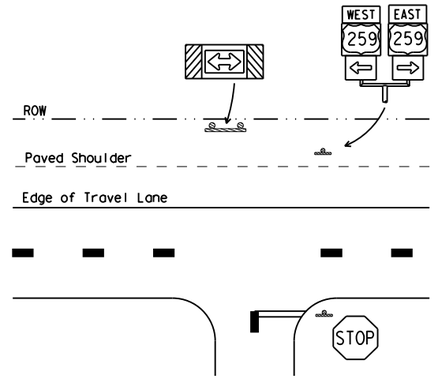
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

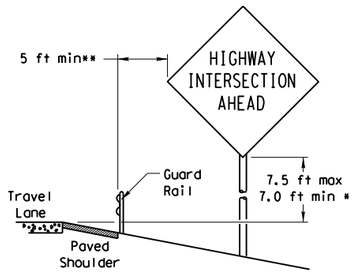
T-INTERSECTION



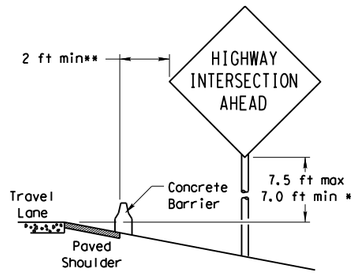
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER

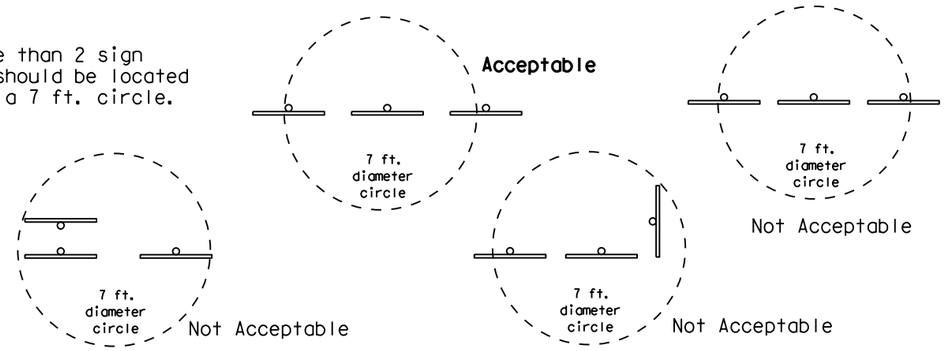


BEHIND GUARDRAIL



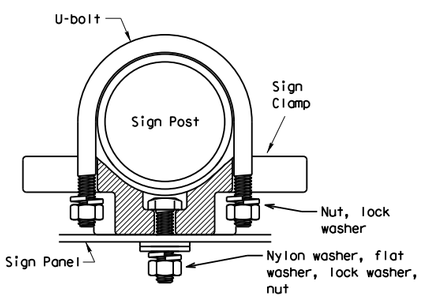
BEHIND CONCRETE BARRIER

****Sign clearance based on distance required for proper guard rail or concrete barrier performance.**



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

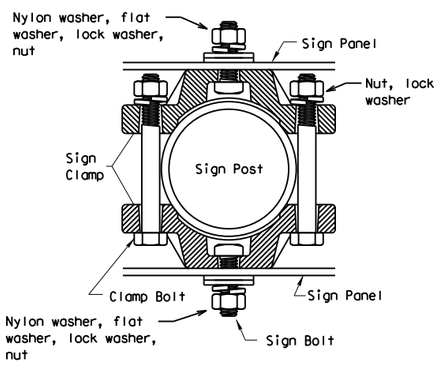


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

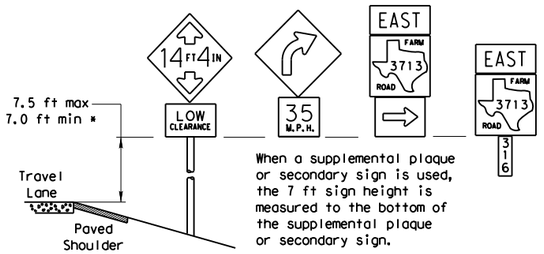
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



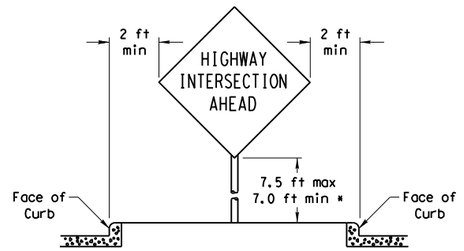
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



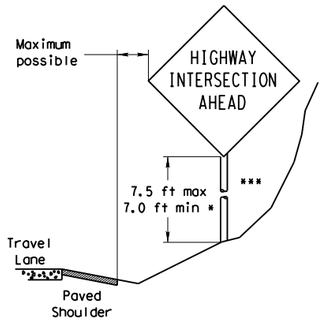
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

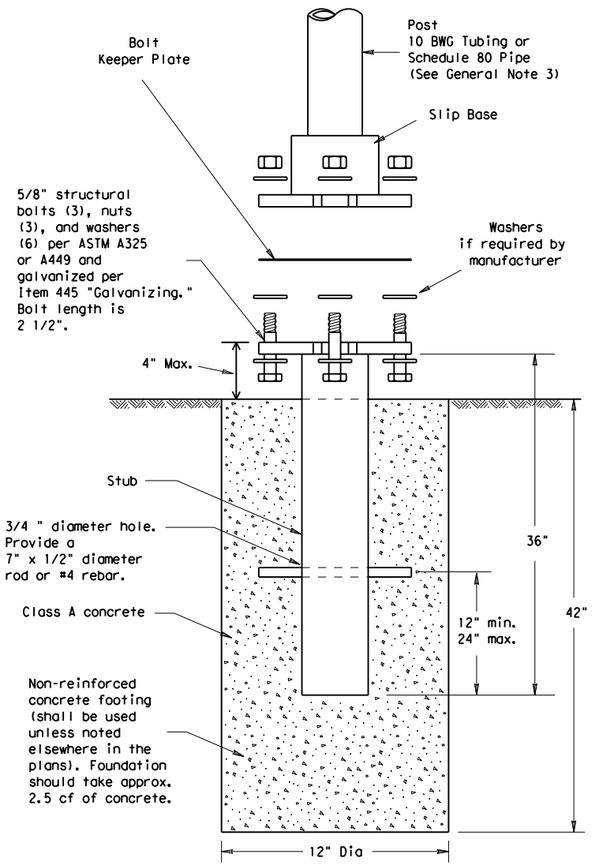
SMD(GEN)-08

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		104

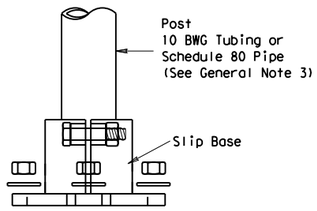
DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

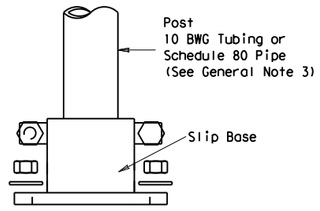


SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

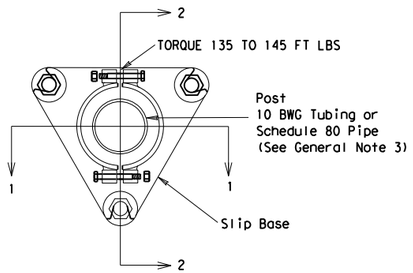
NOTE
The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.



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

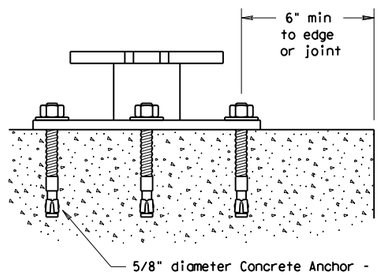
Foundation

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

DATE:
FILE:

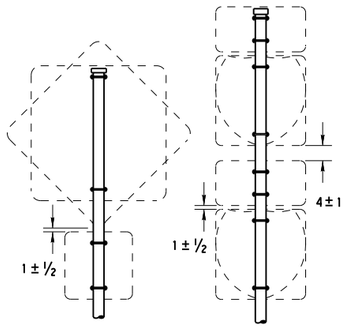
Texas Department of Transportation
Dallas District Standard

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

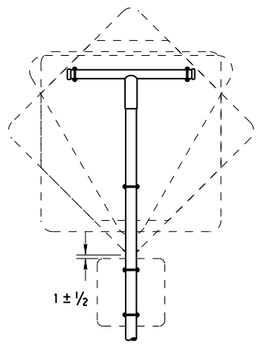
SMD(SLIP-1)-08(DAL)

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

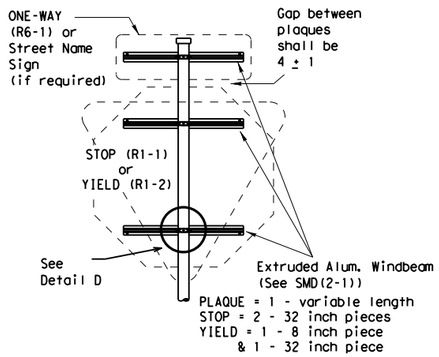
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
12-10 (DISTRICT) ADDED CLAMP BASE DETAIL FOR SLIP BASE INSTALLATION	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		105



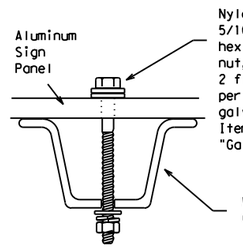
SM RD SGN ASSM TY XXXXX(1)XX(P)



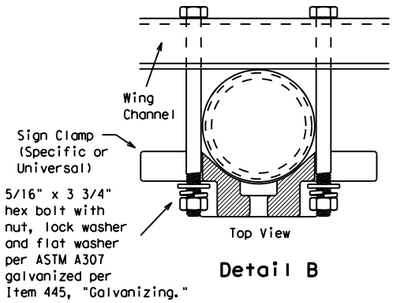
SM RD SGN ASSM TY XXXXX(1)XX(T)



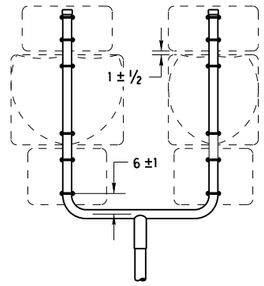
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



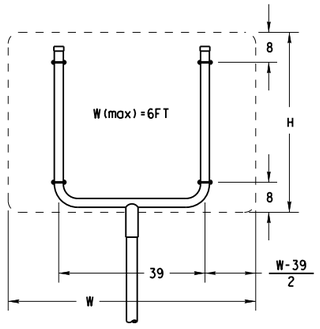
Detail A



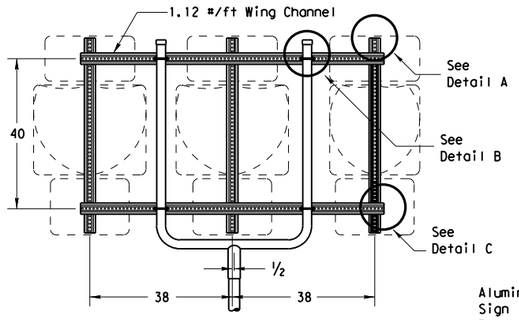
Detail B



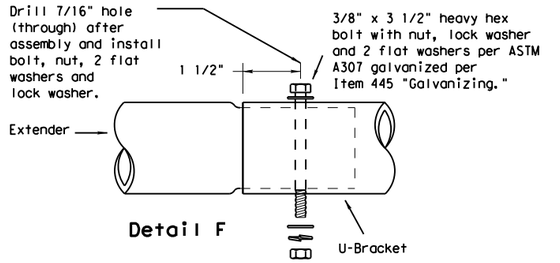
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

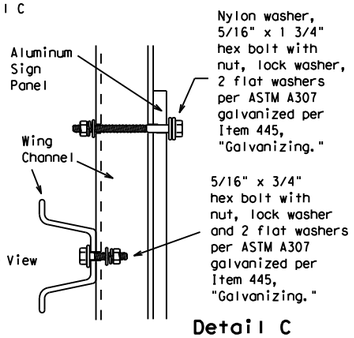


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

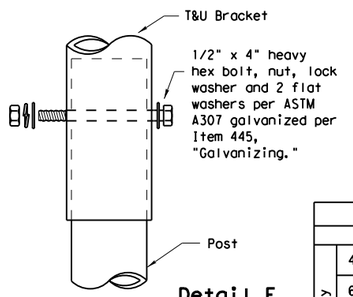


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



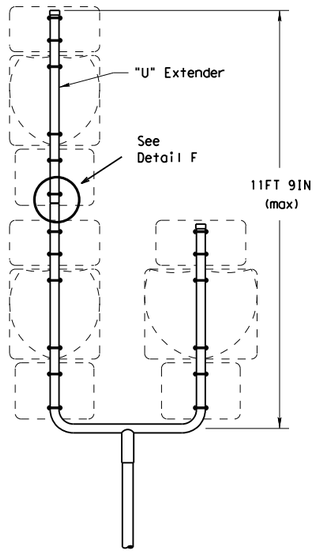
Detail E

GENERAL NOTES:

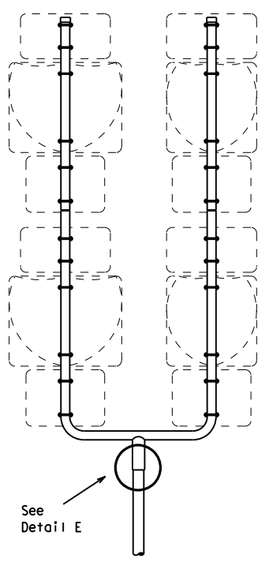
1.

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

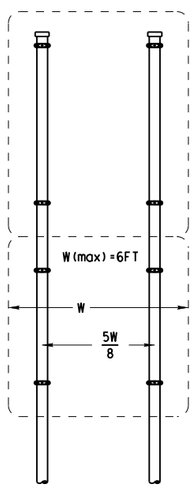
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material 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.



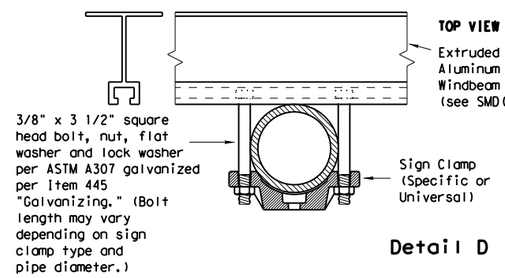
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



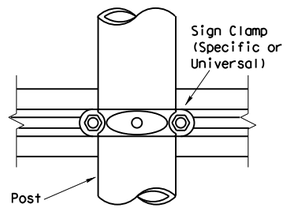
SM RD SGN ASSM TY S80(1)XX(U-2EXT)



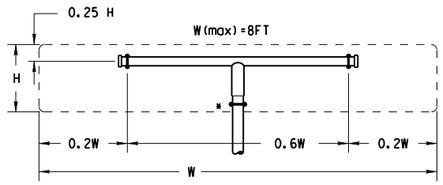
SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D



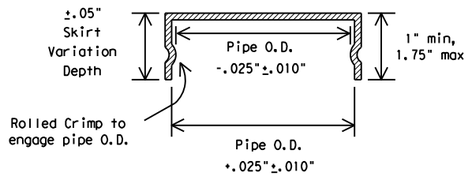
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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)



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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

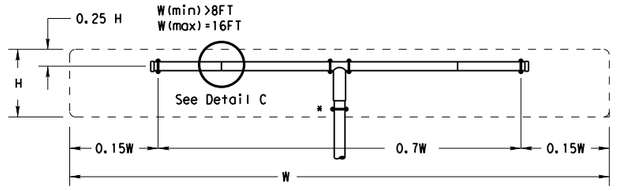
SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0092	06	105	IH 45
DIST	COUNTY		SHEET NO.
DAL	NAVARRO		106

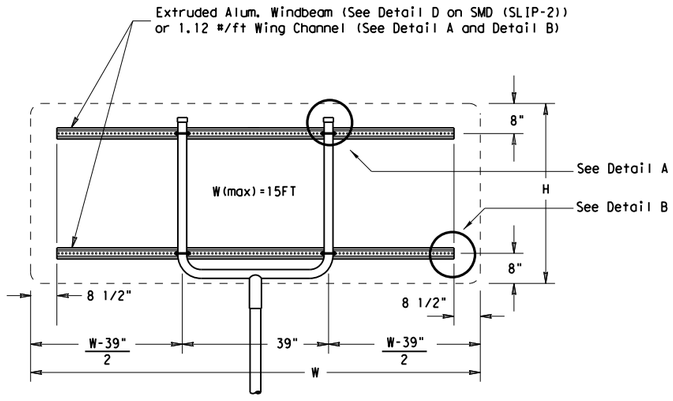
9-08 REVISIONS

DATE:
FILE:

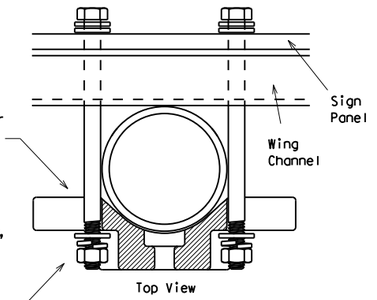
DATE:
FILE:



SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)

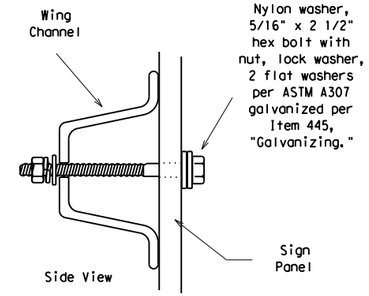


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

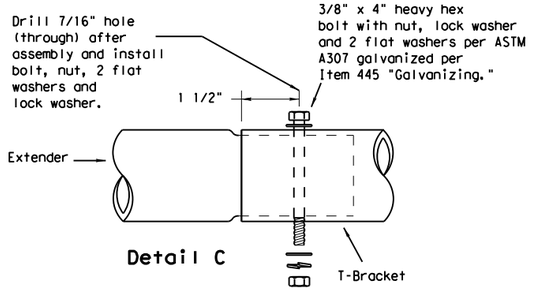


Top View

Detail A

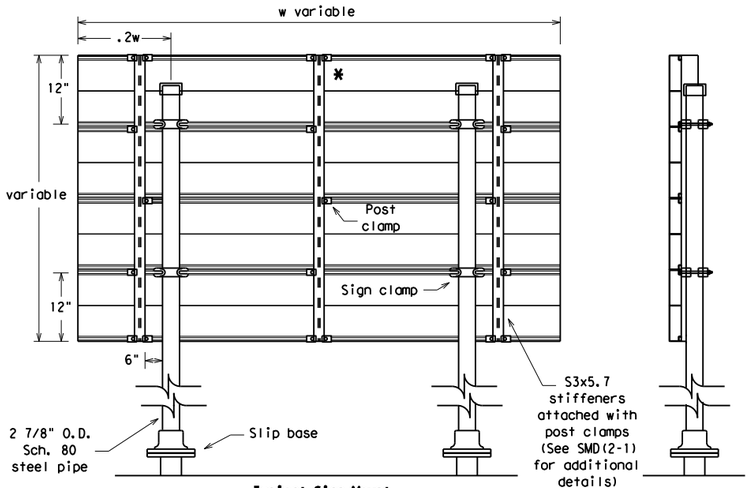


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

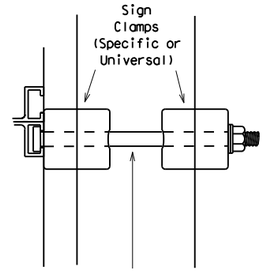


Typical Sign Mount

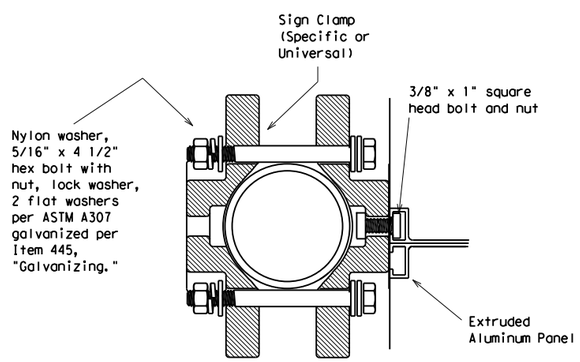
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

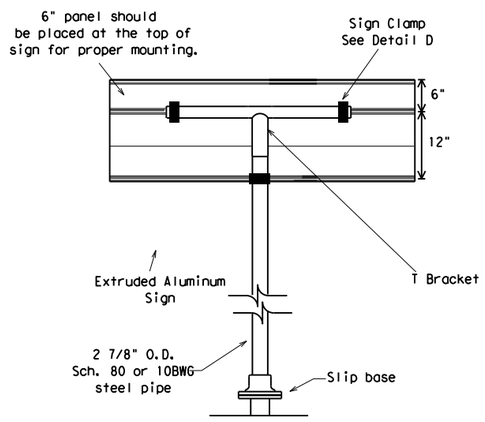
See Detail E
for clamp installation



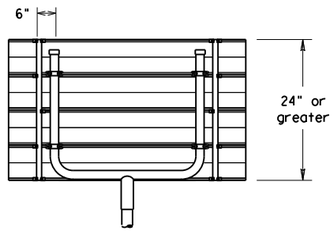
Detail E



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



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. See table above.
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. Sign blanks shall be the sizes and shapes shown on the plans.
11. 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.
12. 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

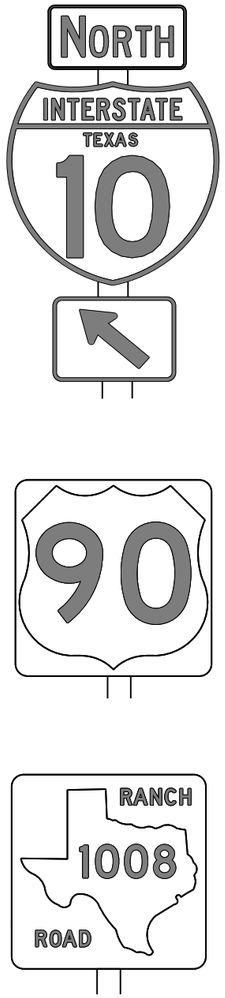
SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		107

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

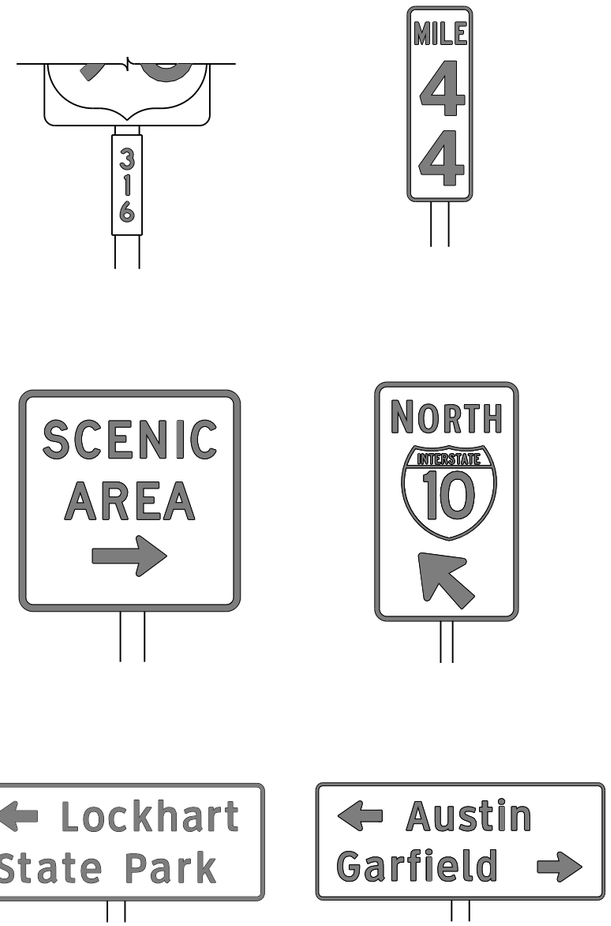
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

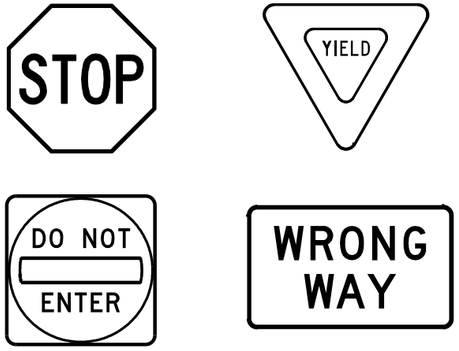
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	NAVARRO		108

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

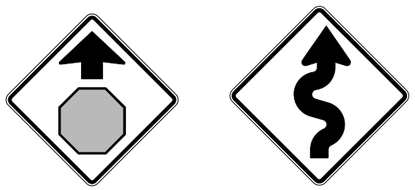
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(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	0092	06	105	IH 45
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	NAVARRO		109

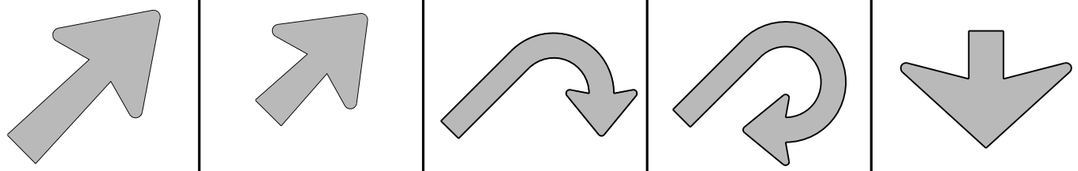
4

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

DATE:
FILE:

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

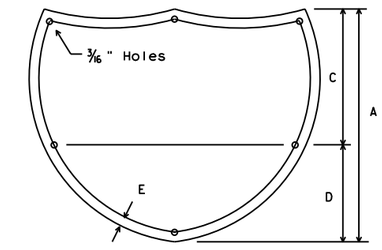
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

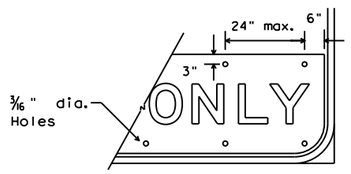
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

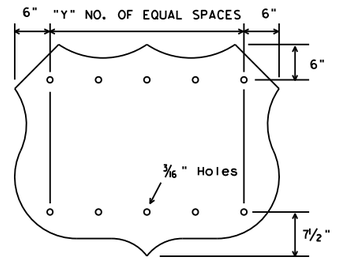


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

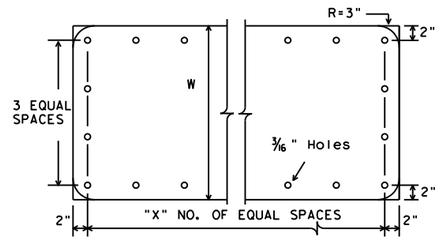


EXIT ONLY PANEL



U.S. ROUTE MARKERS

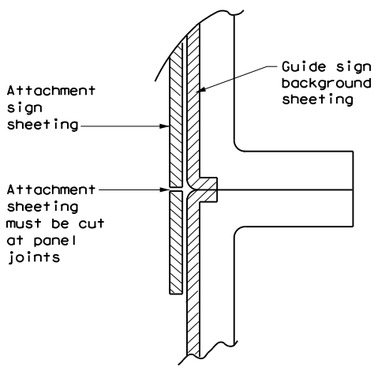
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

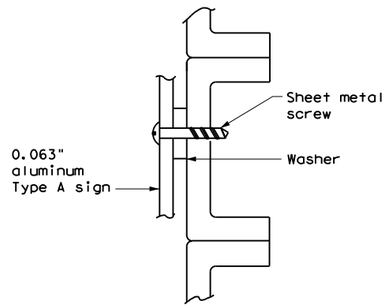
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



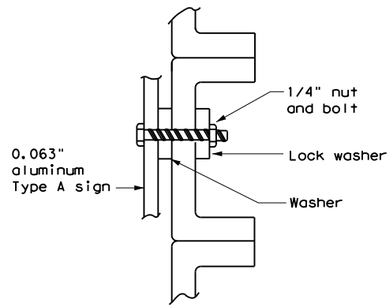
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



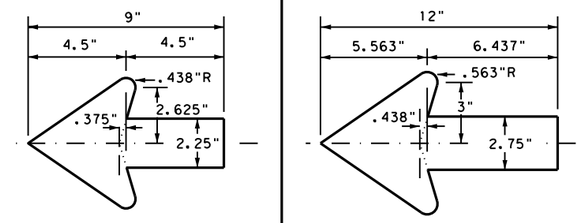
NUT/BOLT ATTACHMENT

NOTE:

Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.

Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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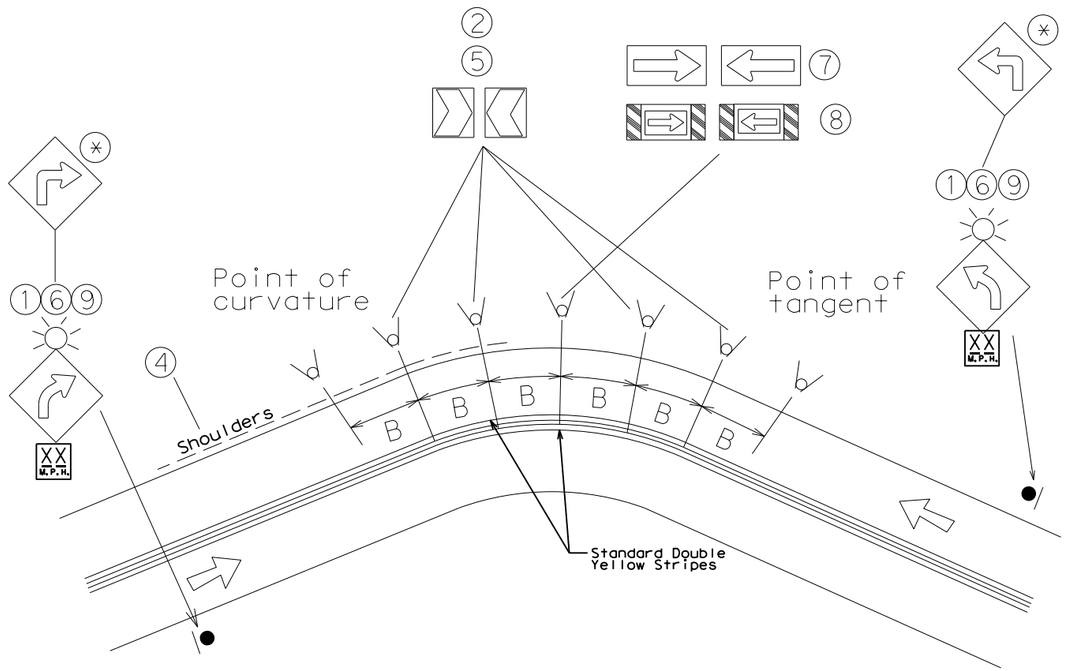
REVISIONS	0092	06	105	IH 45
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	DAL	NAVARRO		110

5

Dallas District Standard for Two-Lane Highway Curve Signing/Markings



Curve Safety Sequence

Applicable Minimum Measures

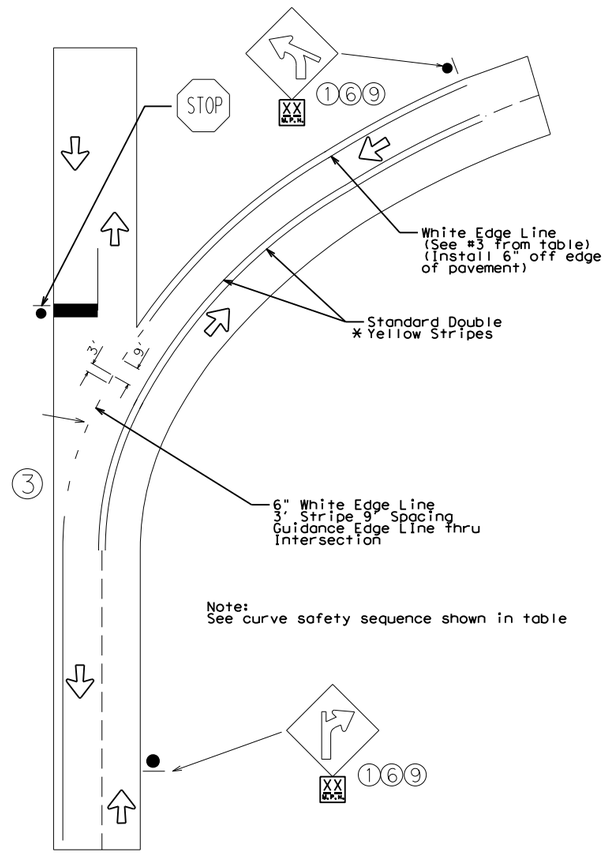
Advisory Speed 55 mph or higher	Advisory Speed 40-50 mph	Advisory speed 35 mph or less		Curve signing, delineation and pavement markings (listed in order from minimum to maximum level of treatment as needed)
+	+	+	1	Advance warning and advisory mph (36" x 36")
+	+	+	2	Chevron alignment signs if advisory 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 48")
		#	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.

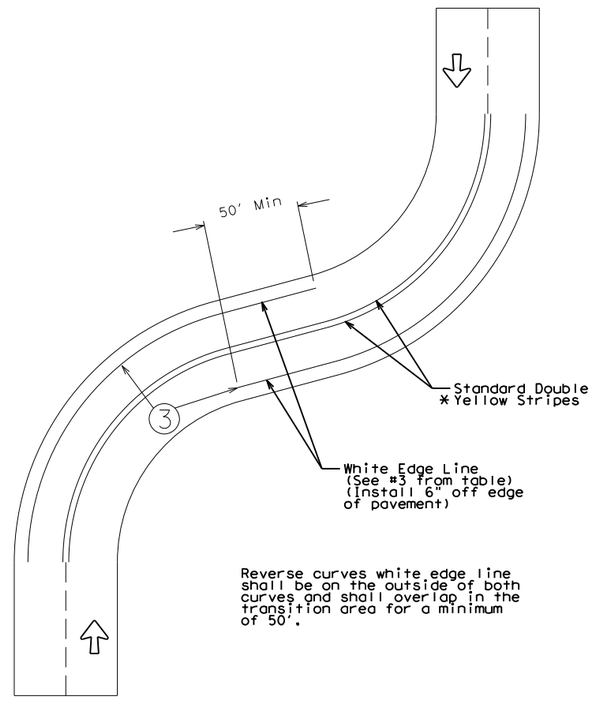
Note:
"B" - Chevron Spacing referenced from D&OM(3)-15B

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

Texas Department of Transportation

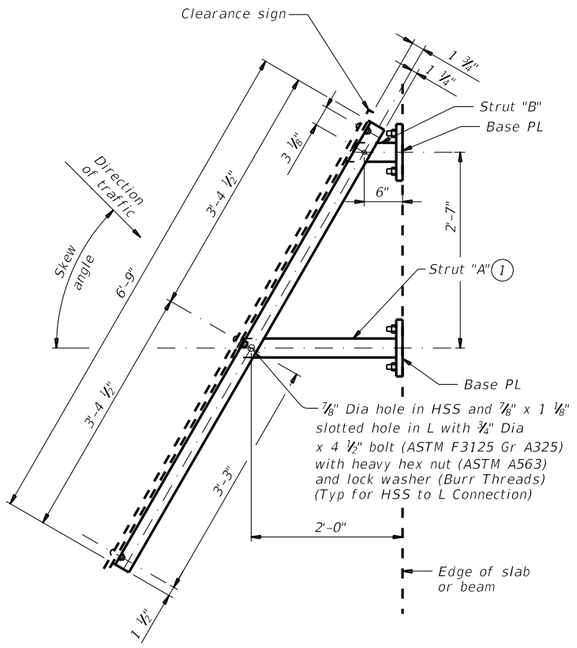
TWO-LANE HIGHWAY CURVE SIGNING & MARKINGS

DALLAS DISTRICT STANDARD

SCALE: NTS SHEET 1 OF 1

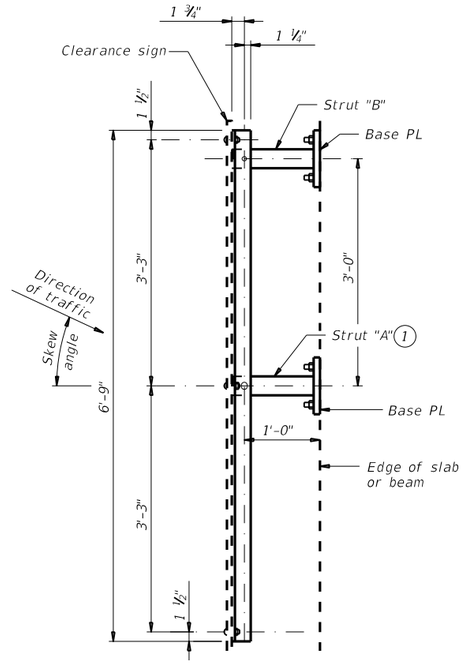
DESIGN/CK	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
BLS	6	SEE TITLE SHEET		IH 45
CHECK BLS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK FRC	TEXAS	DAL	NAVARRO	111
CHECK ARO	CONTROL 0092	SECTION 06	JOB 105	

DATE:
FILE:



PLAN OF TYPE S MOUNT

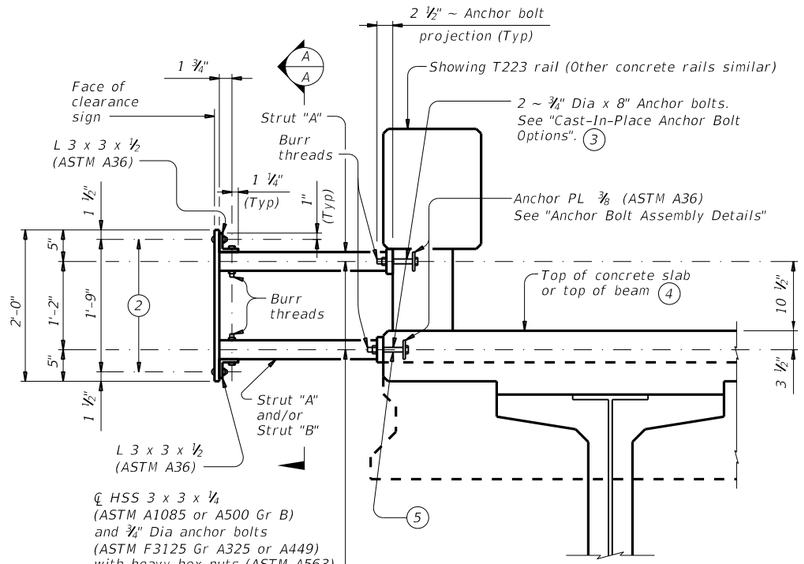
(Used for skews over 30°)



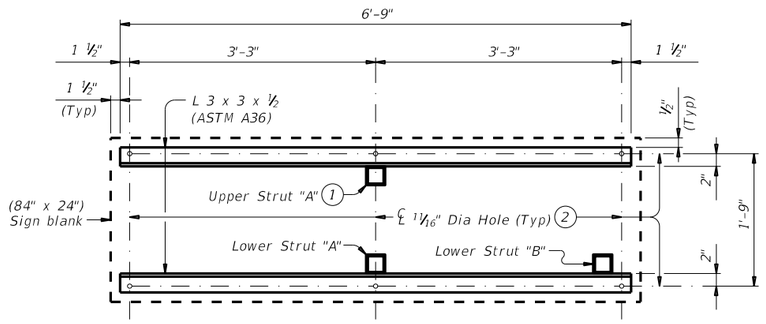
PLAN OF TYPE N MOUNT

(Used for 0° to 30° skews)

1. Locate centerline of Strut A no closer than 12" from a vertical concrete edge.
2. ℄ ⅝" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.
3. At the Contractor's option fully threaded adhesive anchors may be use instead of cast–in–place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
4. For decked slab beams topped with a 2 course surface treatment and ACP overlay.
5. Anchor bolts to be cast into decked slab beams topped with a 2 course surface treatment or ACP overlay. Anchor bolts with heavy hex nuts, regular lock washers, hardened washers and anchor plate that is embedded in the beam will be provided by the beam Fabricator.



SECTION



SECTION A-A

CONSTRUCTION NOTES:

Install the vertical face of clearance sign plumb unless otherwise approved by the Engineer.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 1 anchor per bridge mounted clearance sign installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components after fabrication unless otherwise noted.

GENERAL NOTES:

This standard provides details to mount a vertical clearance sign (84" x 24") to bridges. Rail Types T631, T631LS, PR11, PR22 and PR3 are not accommodated.

The Engineer will furnish the clearance to be shown on the sign.

See Bridge Layout for sign location and mounting type (Type N or S).

Cost of furnishing, installing, relocating or removing a clearance sign, including structural steel for sign mount, is included in unit price bid for Item 644, "Small Roadside Sign Assemblies".

One Sign Blank (84" x 24") is 14 SF.

Average steel weight for one complete Type N Mount is 219 Lb.

Average steel weight for one complete Type S Mount is 233 Lb.

SHEET 1 OF 3

Texas Department of Transportation

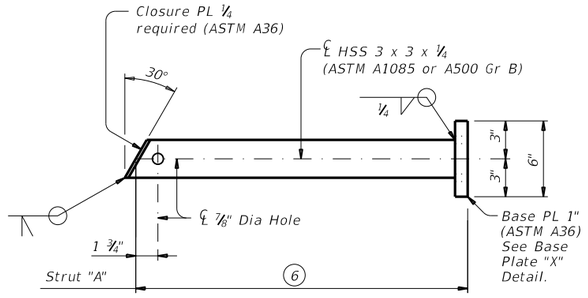
Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

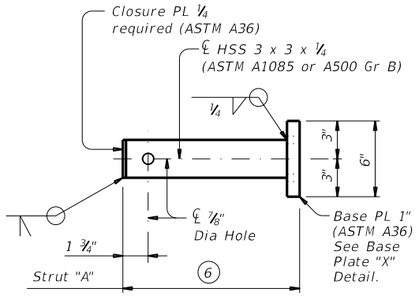
BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		112

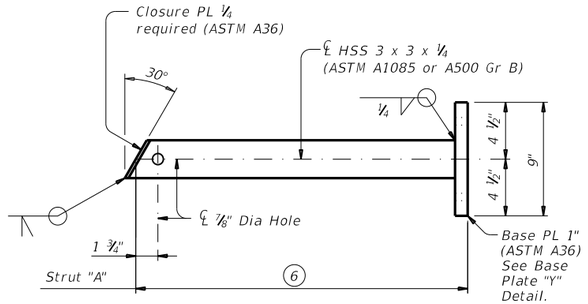
DATE:
FILE:



FOR T411 AND C411 RAIL TYPES



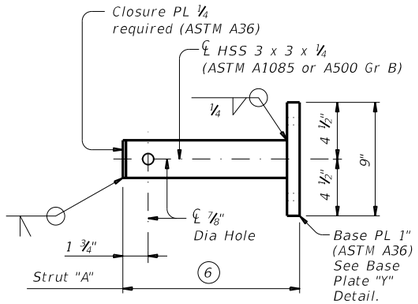
FOR T411 AND C411 RAIL TYPES



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

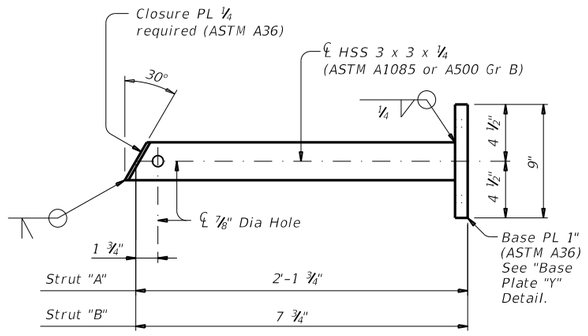
(Used for skews over 30°)



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

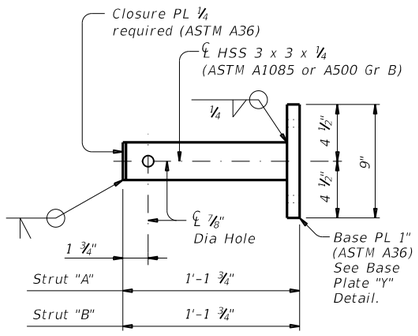
UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



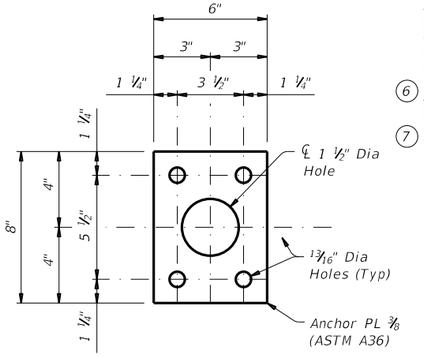
LOWER STRUT DETAILS FOR (TYPE S MOUNT)

(Used for skews over 30°)

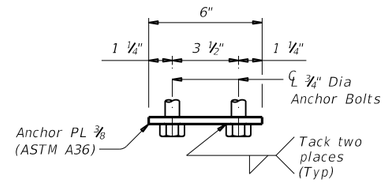


LOWER STRUT DETAILS FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



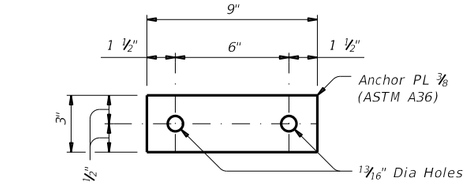
PLAN OF ANCHOR PLATE



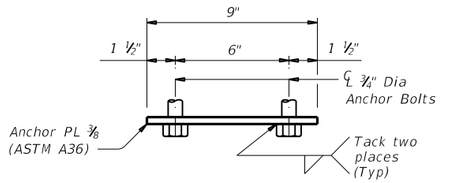
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

(Used on Base Plate "X" with T411 and C411 rail types.)



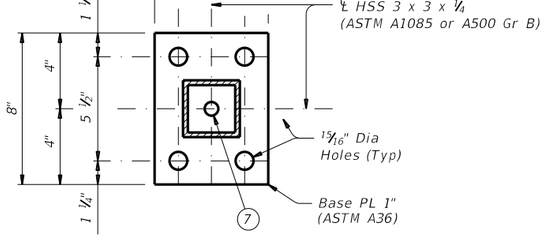
PLAN OF ANCHOR PLATE



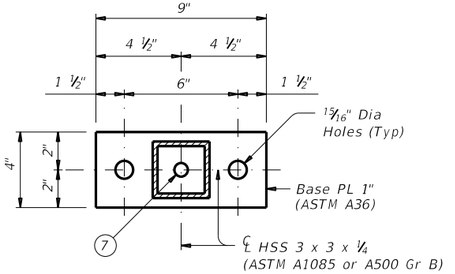
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

(Used on Base Plate "Y" and with T1F, T2P, C2P, T1W, C1W, T66 and C66 rail types.)

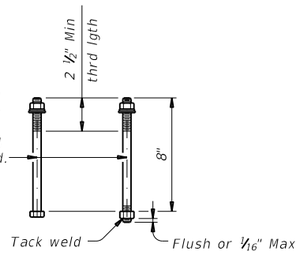


BASE PLATE "X" DETAIL



BASE PLATE "Y" DETAIL

℄ ¾" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened washer and one regular lock washer placed under heavy hex nut (ASTM A563). Furnish one additional heavy hex nut for each threaded rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (3)

(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(7) Hole required to drain zinc from base plate during galvanizing.

Texas Department of Transportation

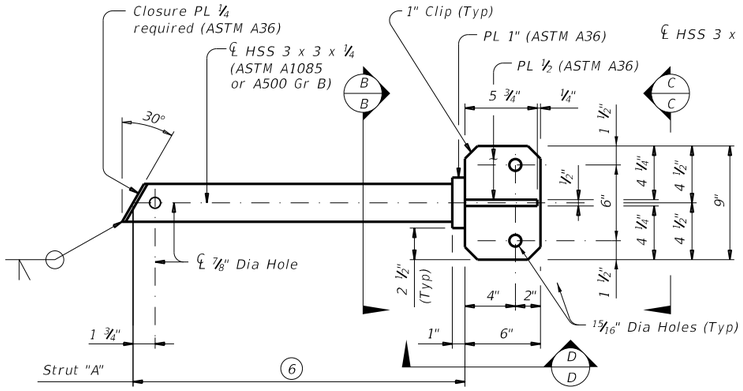
Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		113

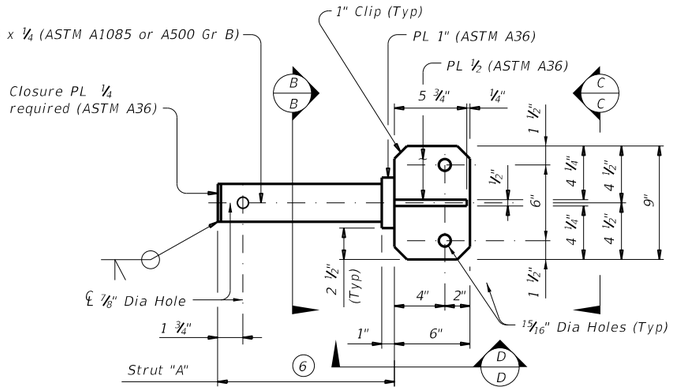
DATE:
FILE:



FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

(Used for skews over 30°)



FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)

(2) ℄ ⅞" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.

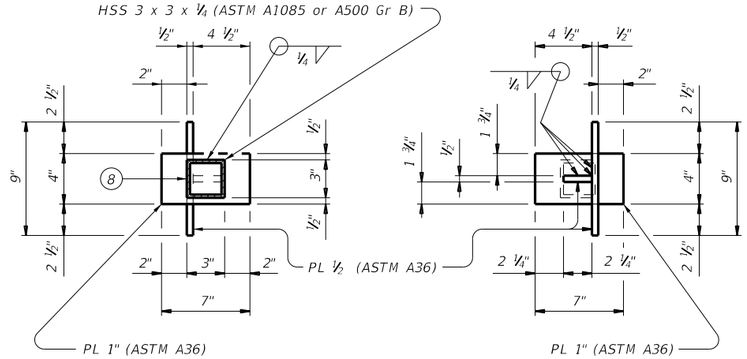
(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(4) For decked slab beams topped with a 2 course surface treatment and ACP overlay.

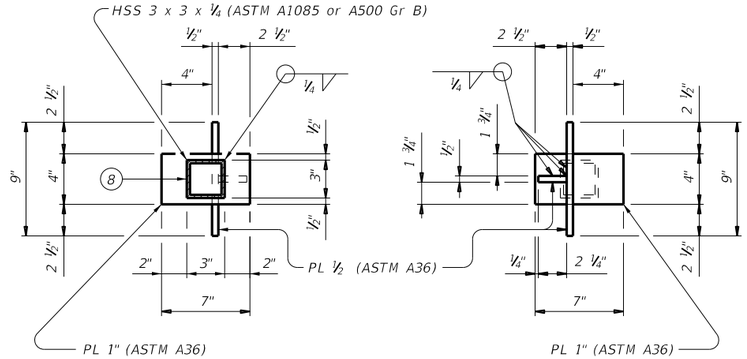
(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(8) Hole required in bottom of HSS to drain zinc during galvanizing.

(9) 11" curb is for structures with 2" ACP overlay.



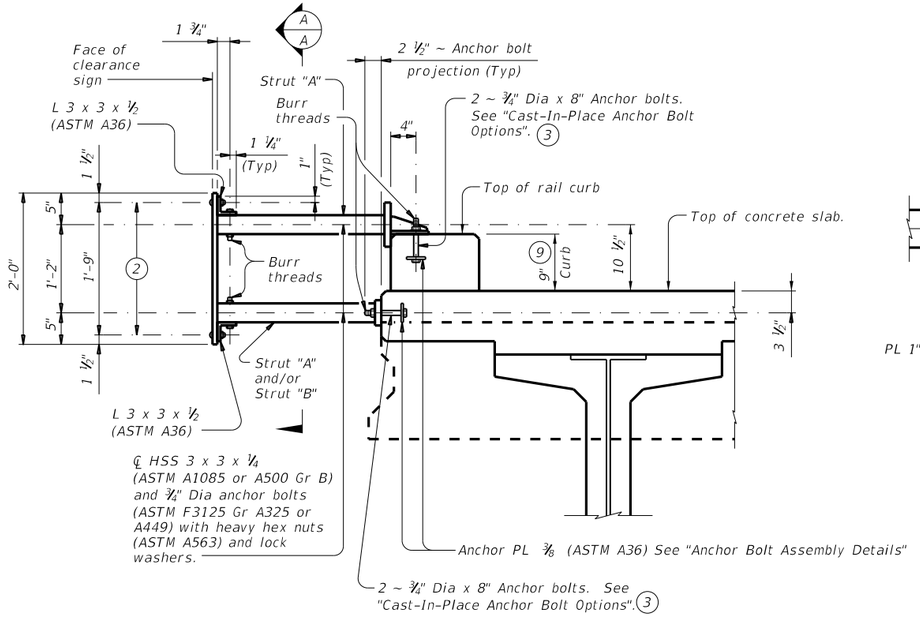
FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

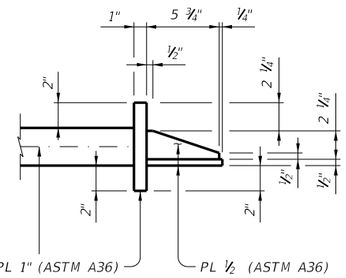
SECTION B-B

VIEW C-C

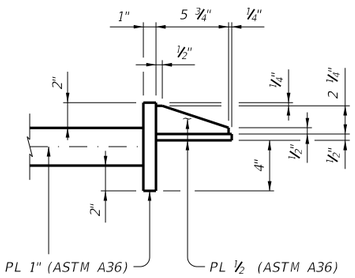


SECTION THRU T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL CURB

Showing sign mount on a 9" high curb, 11" high curb similar.



FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

VIEW D-D

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		114

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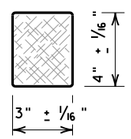
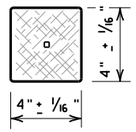
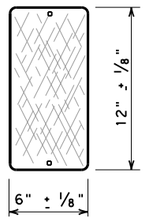
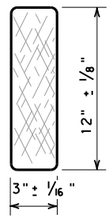
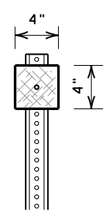
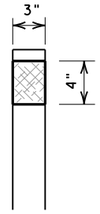
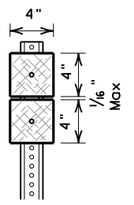
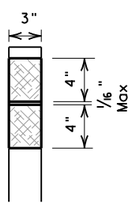
DATE:
FILE:

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

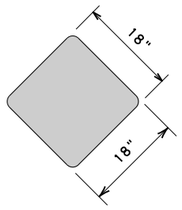
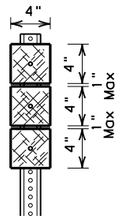
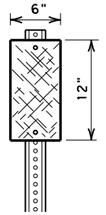
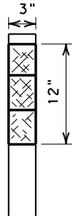
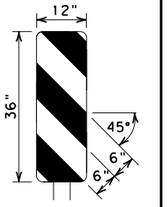
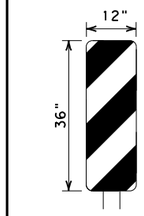
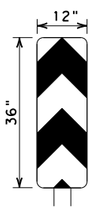
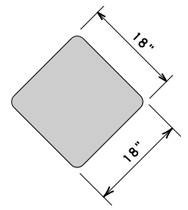
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

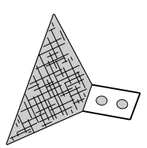
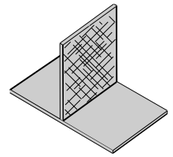
OBJECT MARKERS

	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

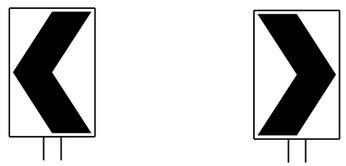
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

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



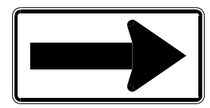
W1-8

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

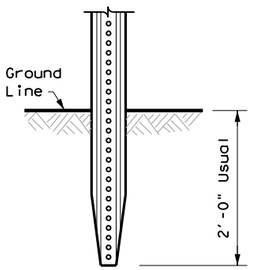
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	DAL	NAVARRO		115

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

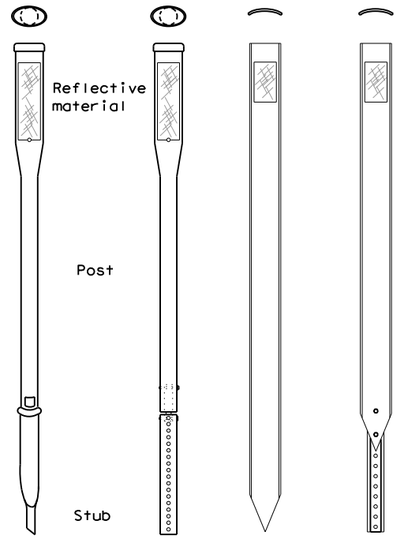


NOTES

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

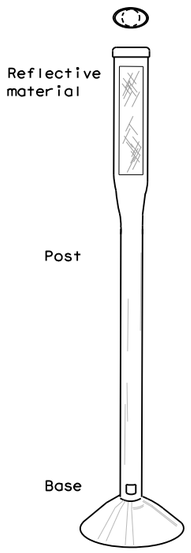
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



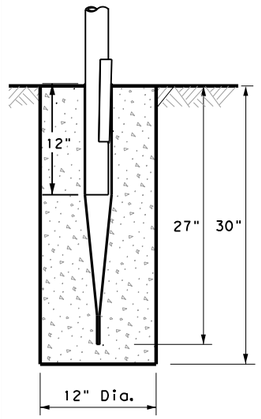
SURFACE MOUNT

NOTES

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

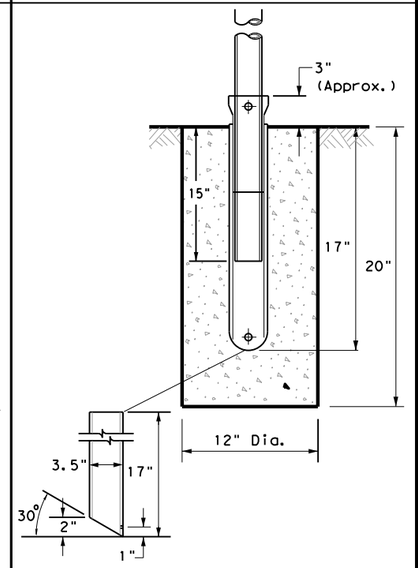
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

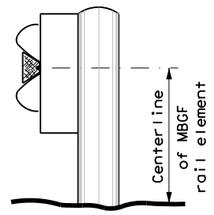
NOTE

1. Install per manufacturer's recommendations.

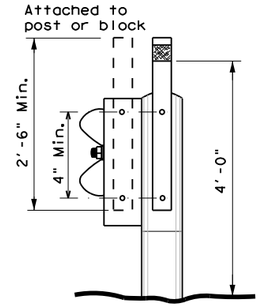
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

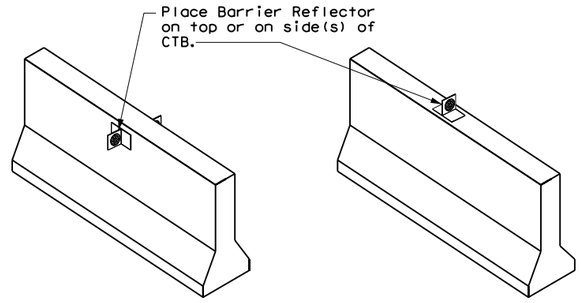
GF1



GF2



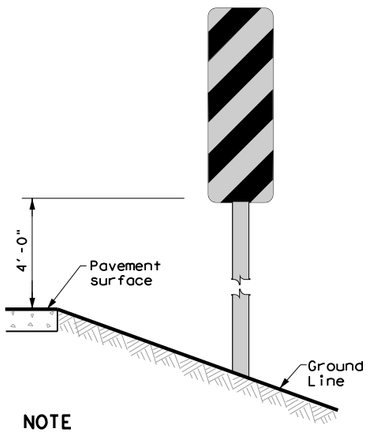
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

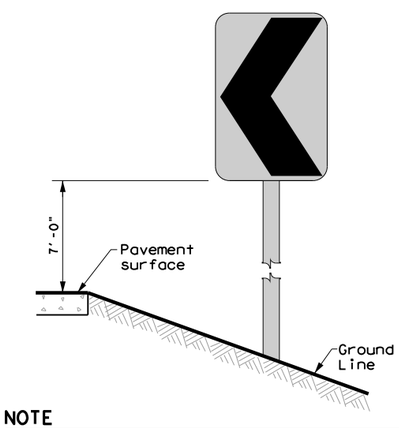
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

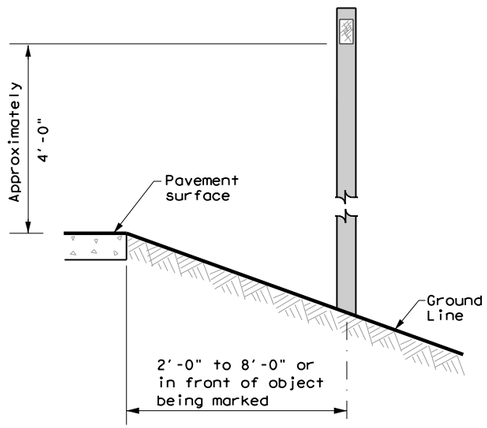
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	DAL	NAVARRO		116

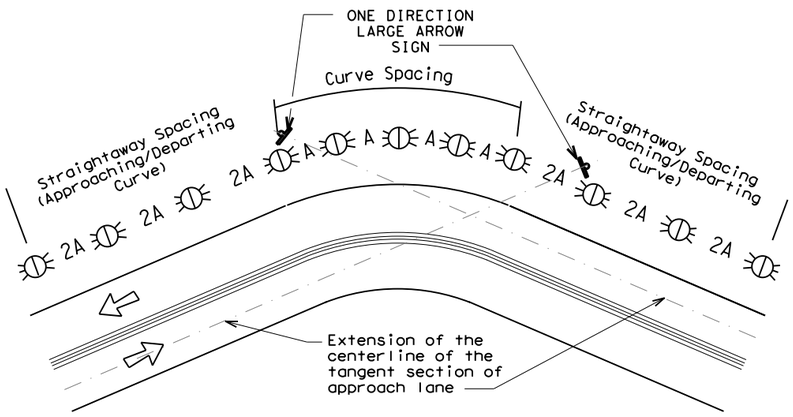
20B

DATE:
FILE:

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

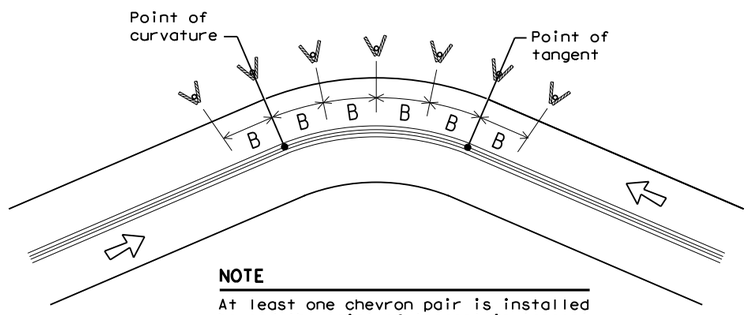
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

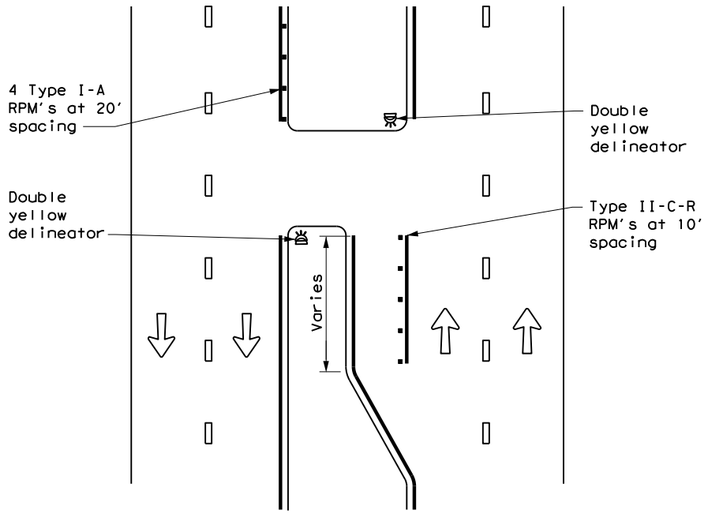
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	DAL	NAVARRO		117

20C

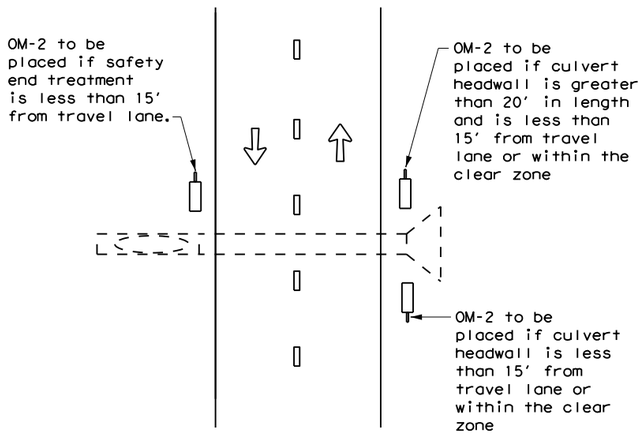
DATE:
FILE:

CROSSOVERS



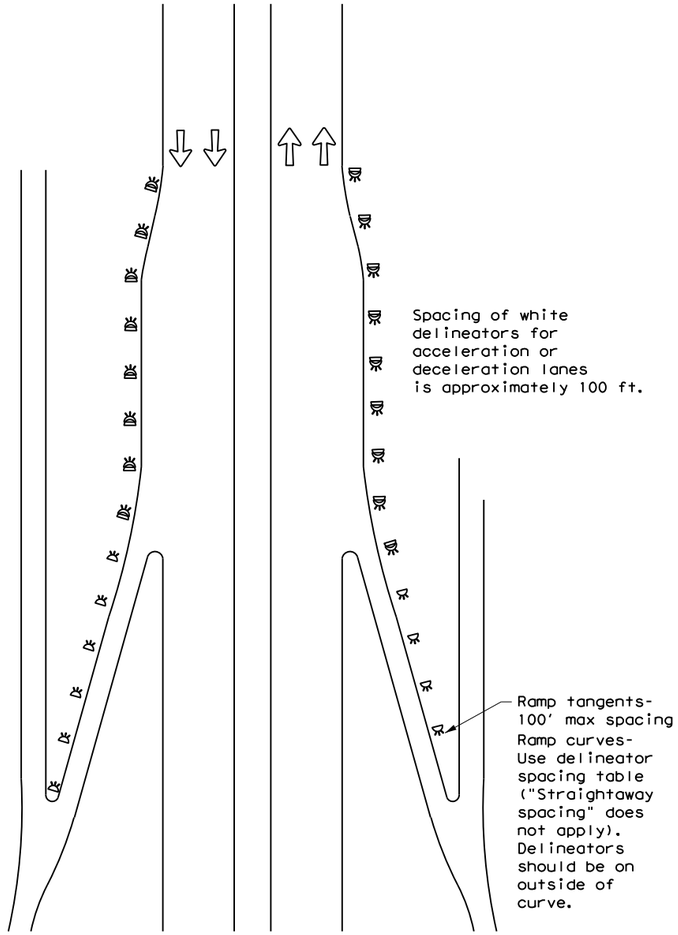
DETAIL 1

FOR CULVERTS WITHOUT MBGF



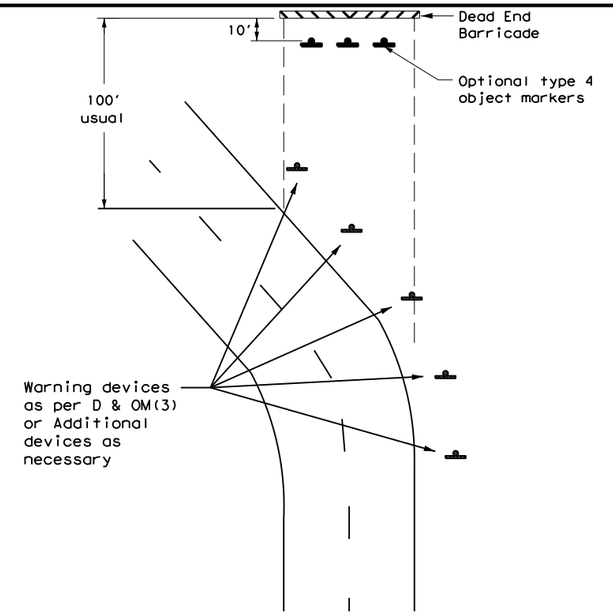
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



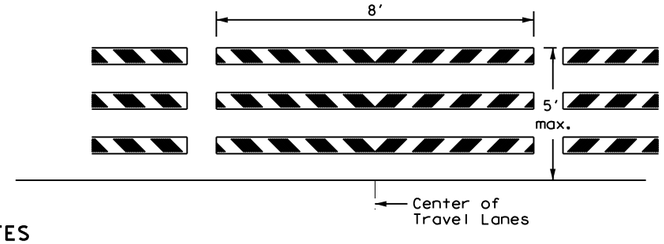
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

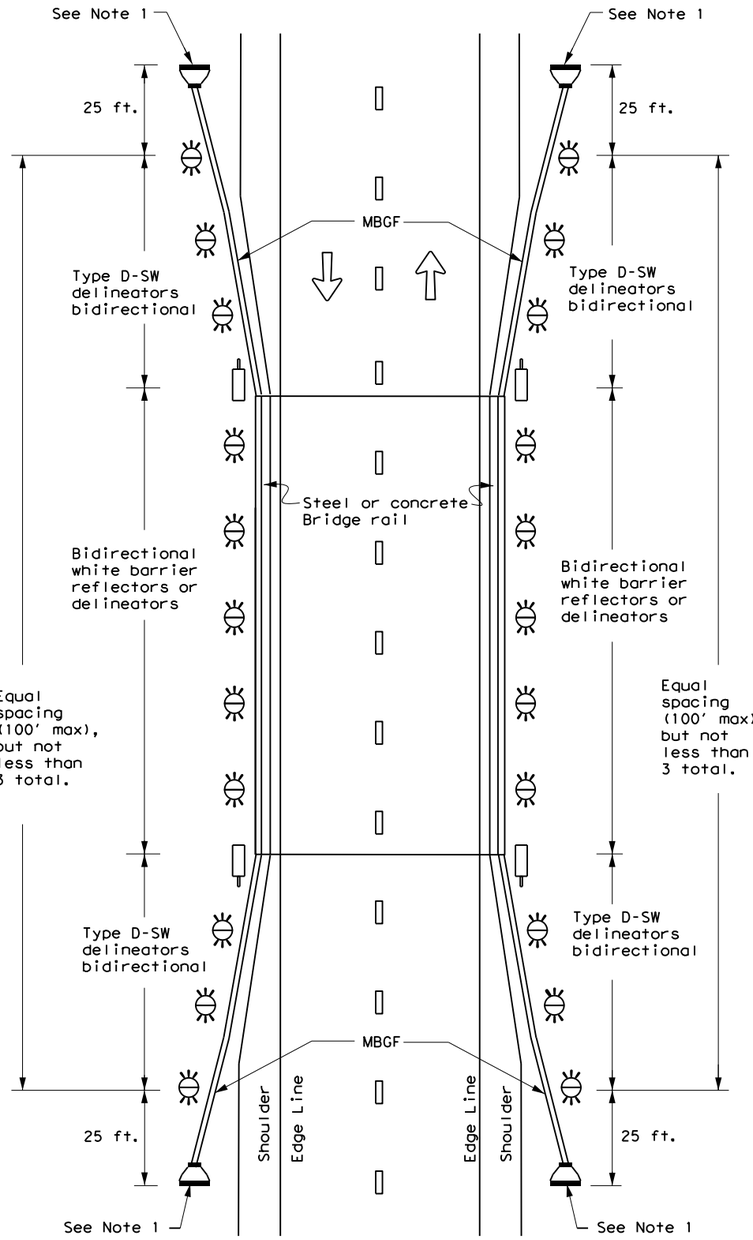
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
3-15	DIST	COUNTY		SHEET NO.
7-20	DAL	NAVARRO		118

DATE:
FILE:

20D

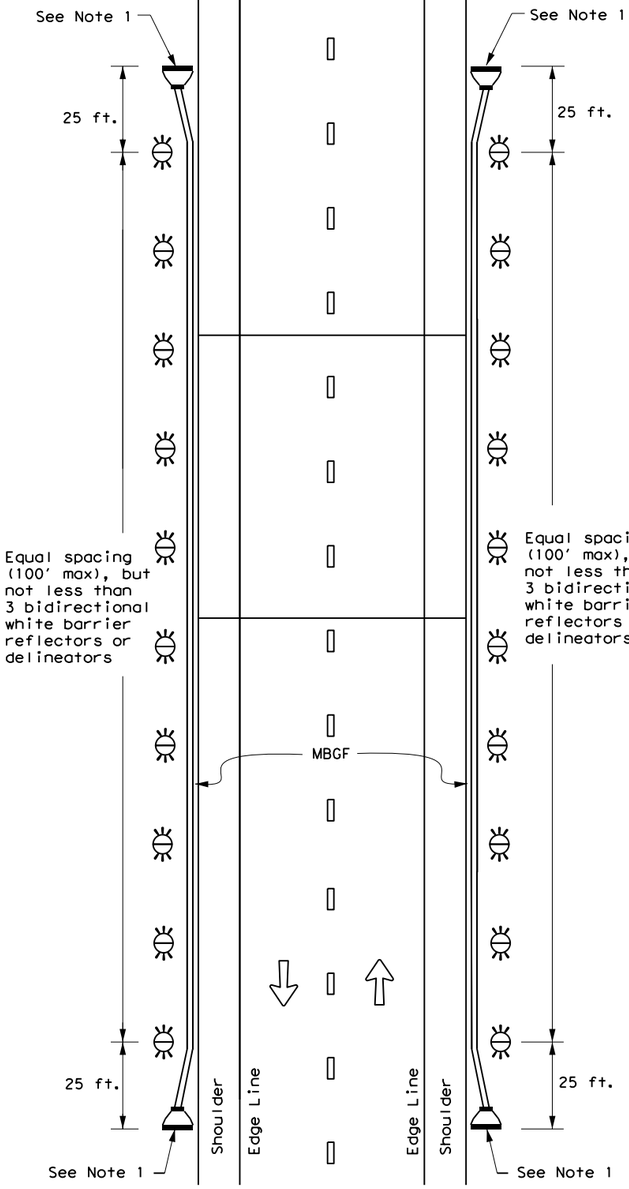
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

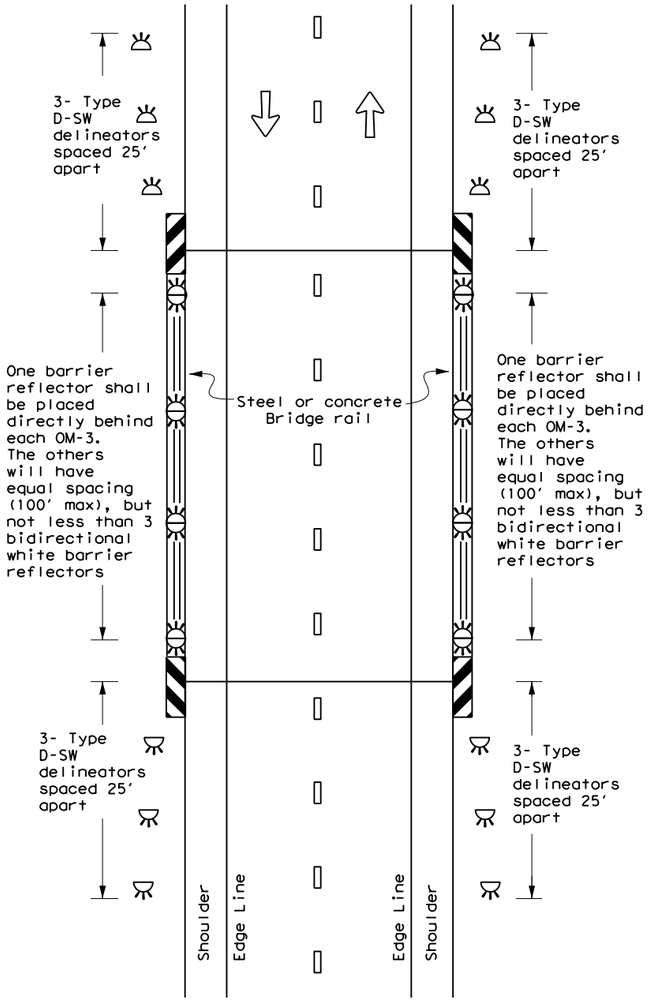
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
7-20	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		119

DATE:
FILE:

20E

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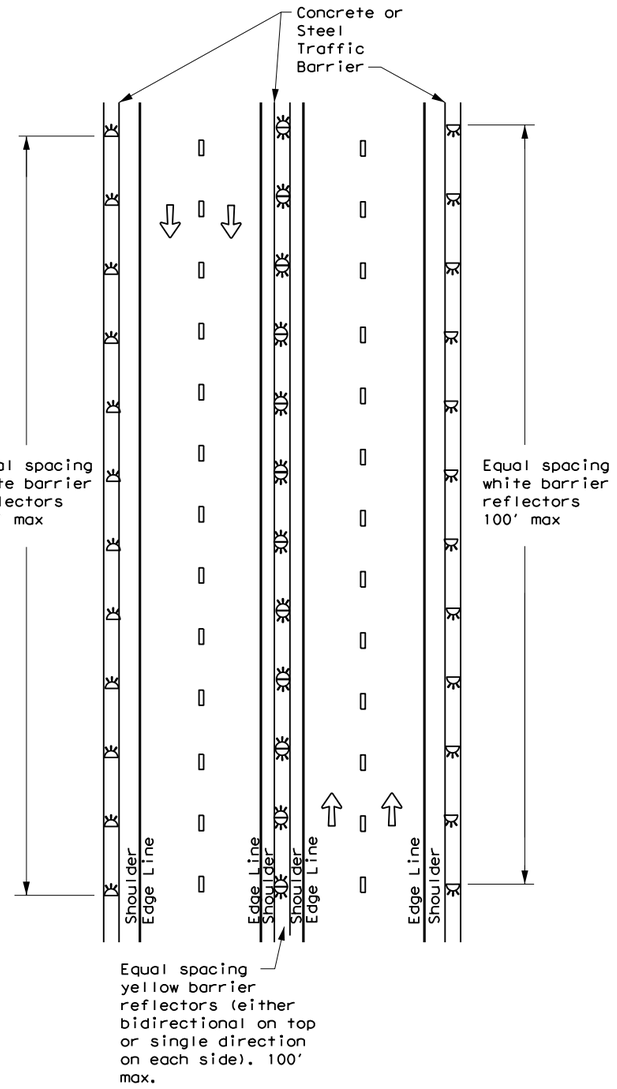
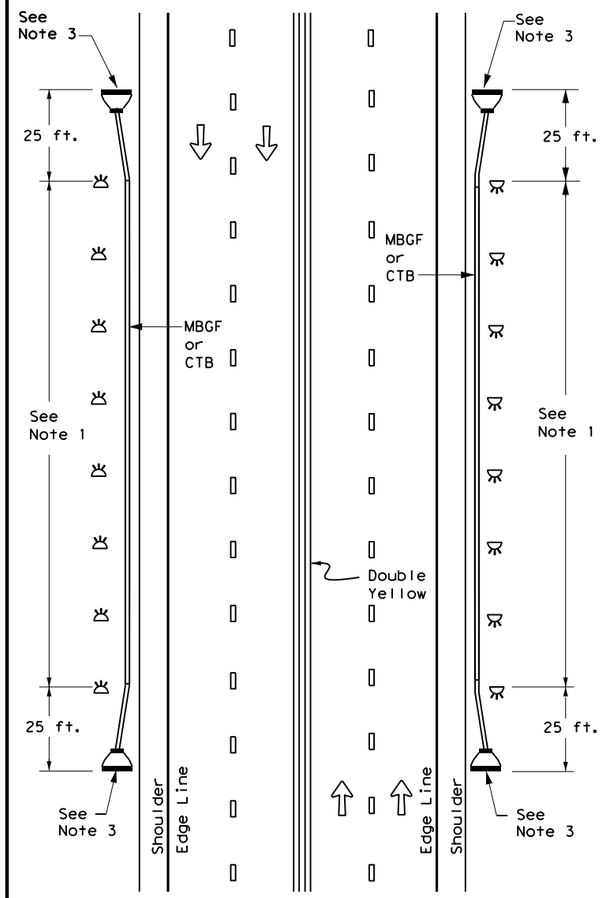
DATE:
FILE:

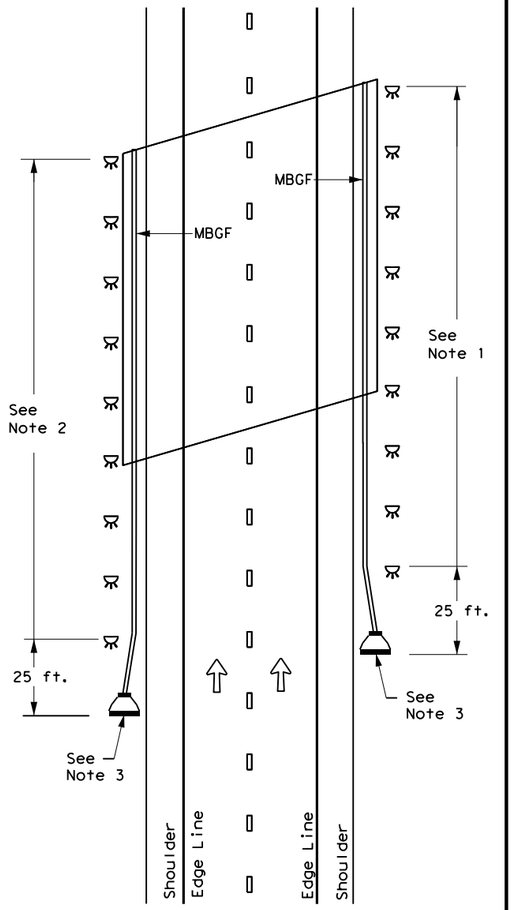
CONTINUOUS CONCRETE OR STEEL BARRIER



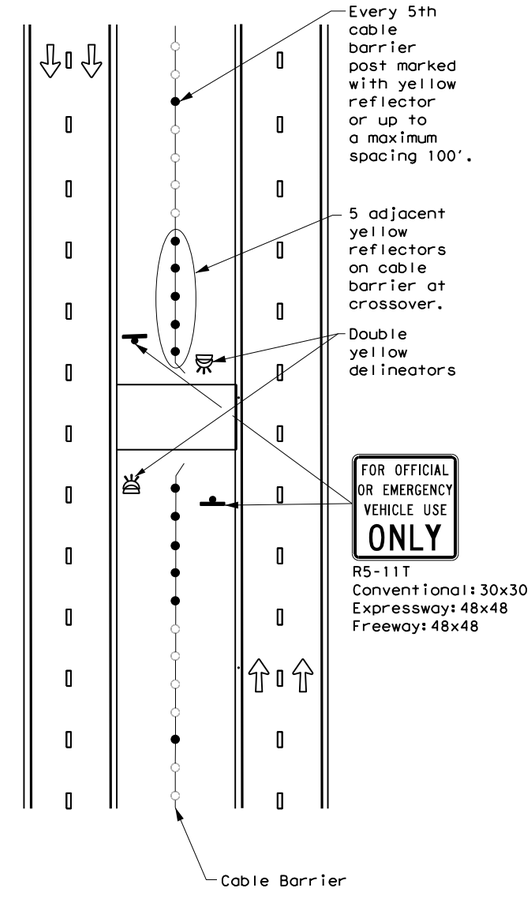
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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

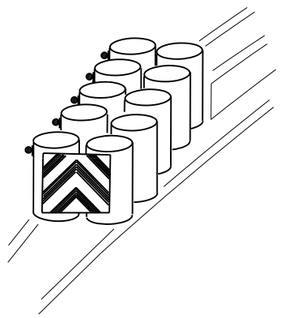
Texas Department of Transportation

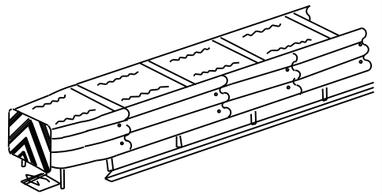
Traffic Safety Division Standard

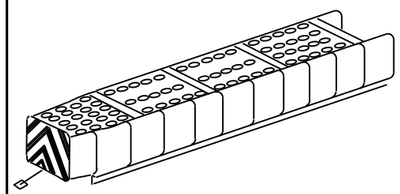
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

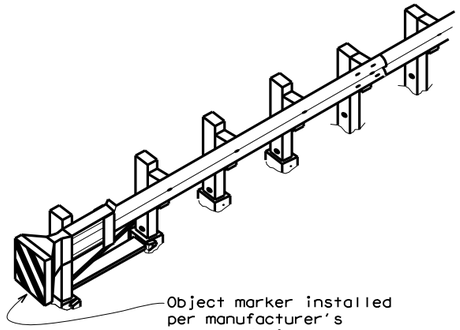
D & OM(6)-20

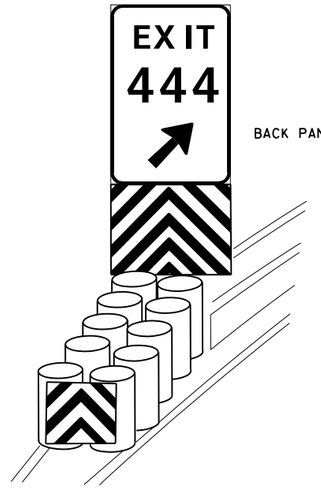
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
7-20	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		120

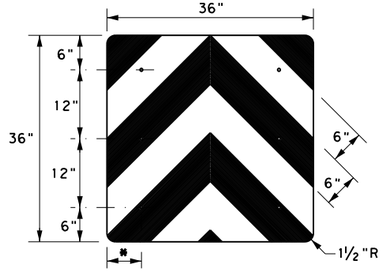


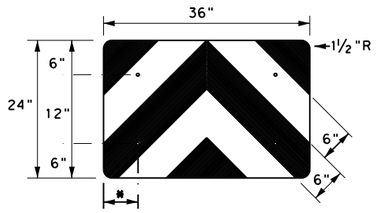




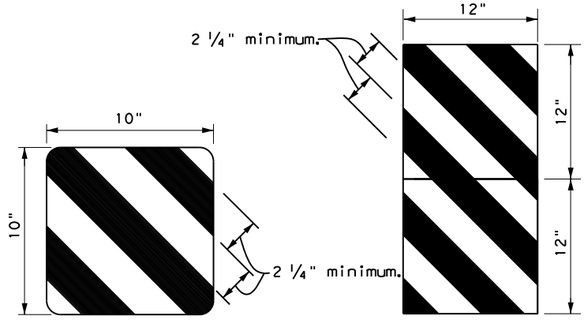




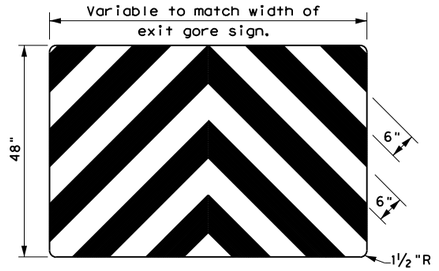


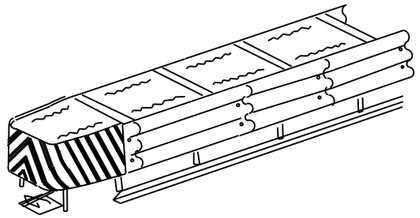


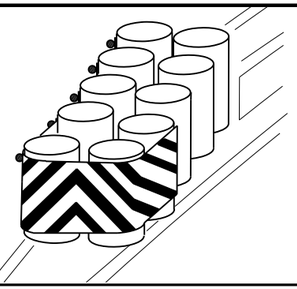
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

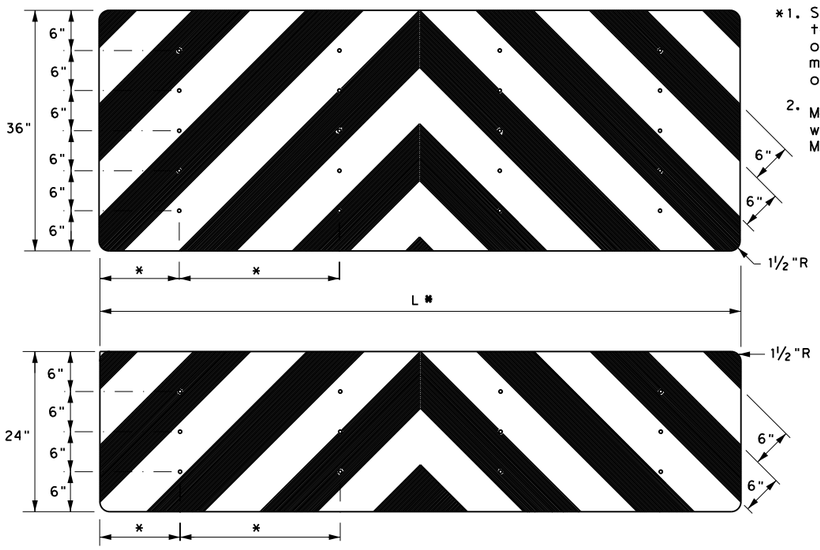


OBJECT MARKERS SMALLER THAN 3 FT^2









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.

Texas Department of Transportation

Traffic Safety Division Standard

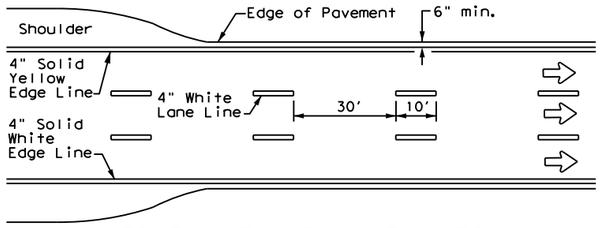
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

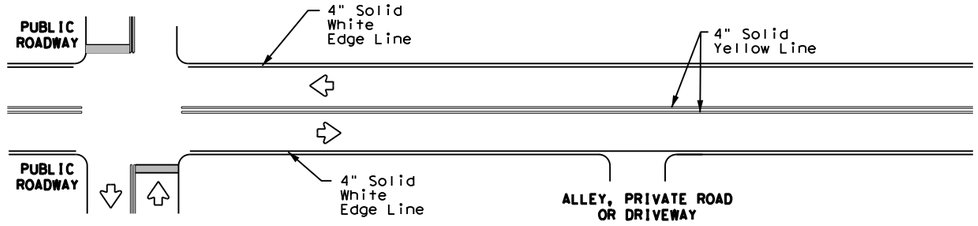
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	DAL	NAVARRO		121
4-98 7-20				

20G

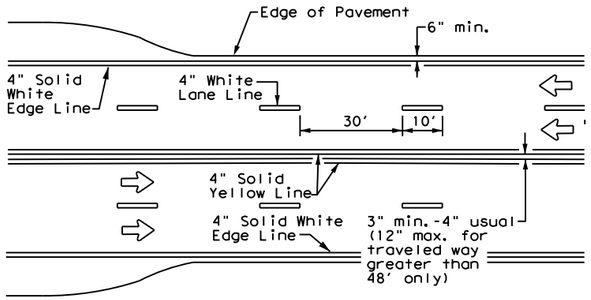
DATE:
FILE:



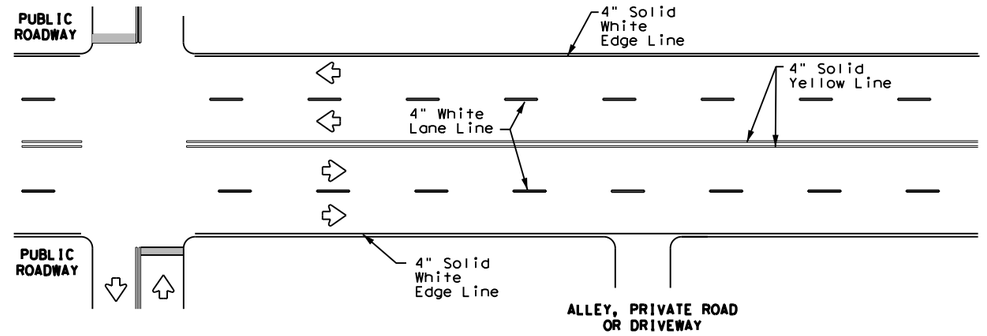
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



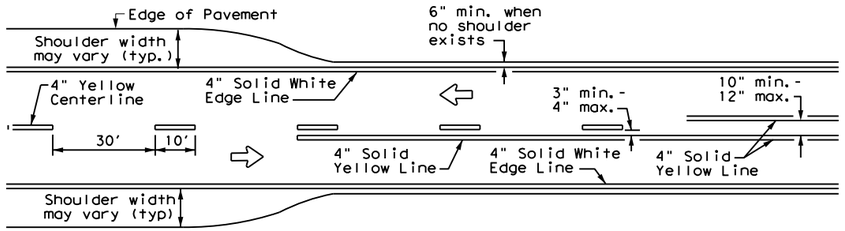
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



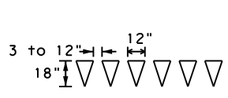
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



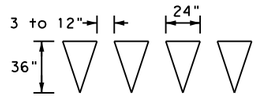
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

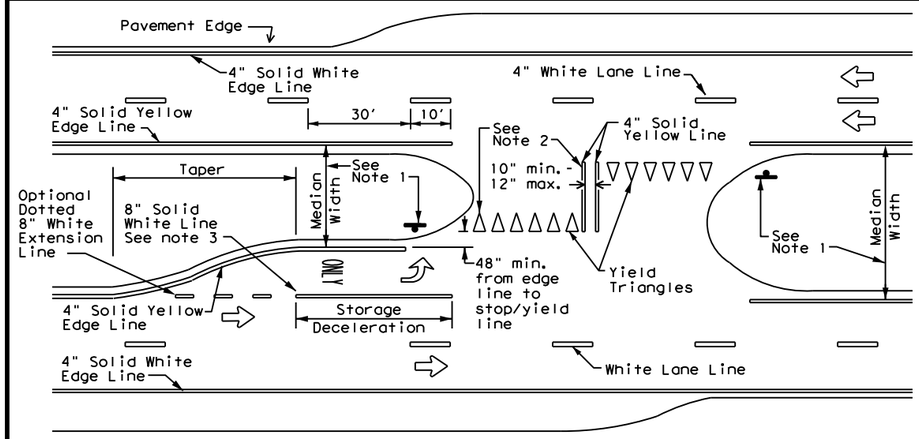


For posted speed on road being marked equal to or less than 40 MPH.



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

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

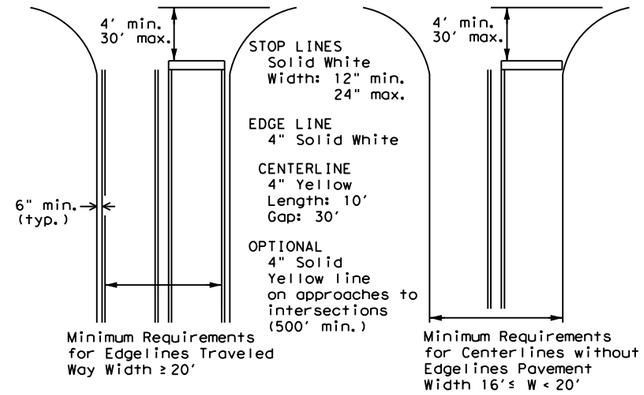
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

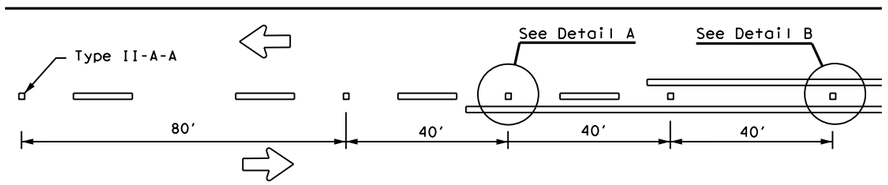
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0092	06	105	IH 45
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	DAL	NAVARRO		122

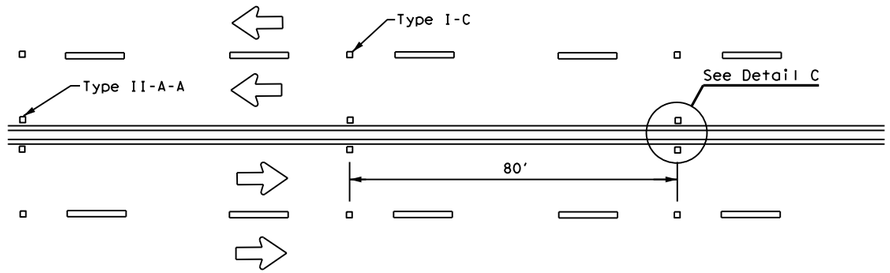
DATE:
FILE:

22A

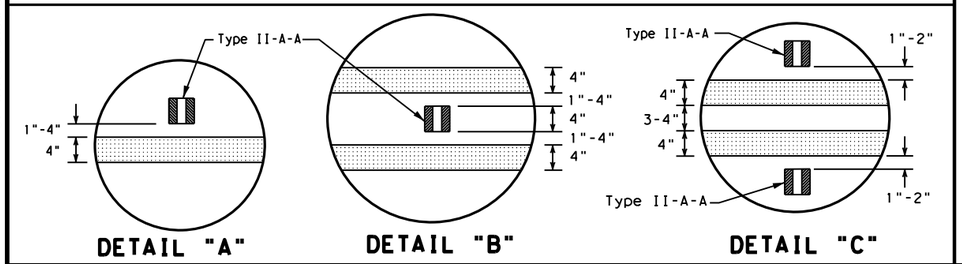
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



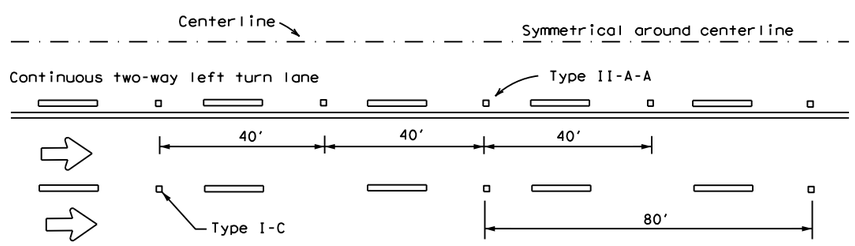
CENTERLINE FOR ALL TWO LANE ROADWAYS



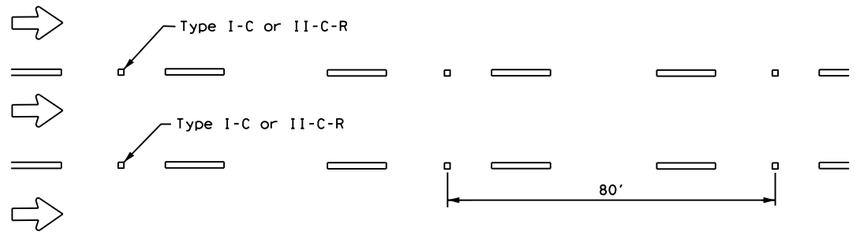
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

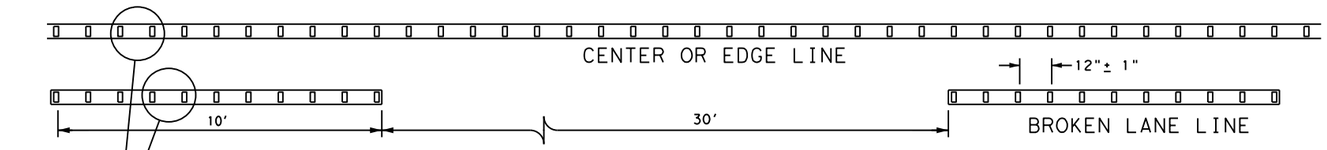


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



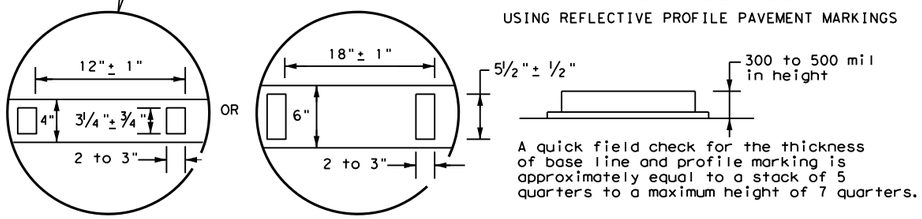
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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



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

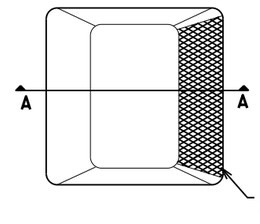
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

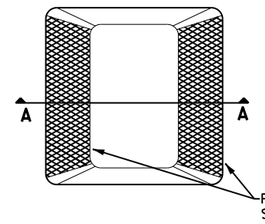
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

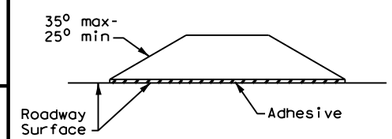
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

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 5-00 2-12 8-00 6-20	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		123

22B

DATE:
FILE:

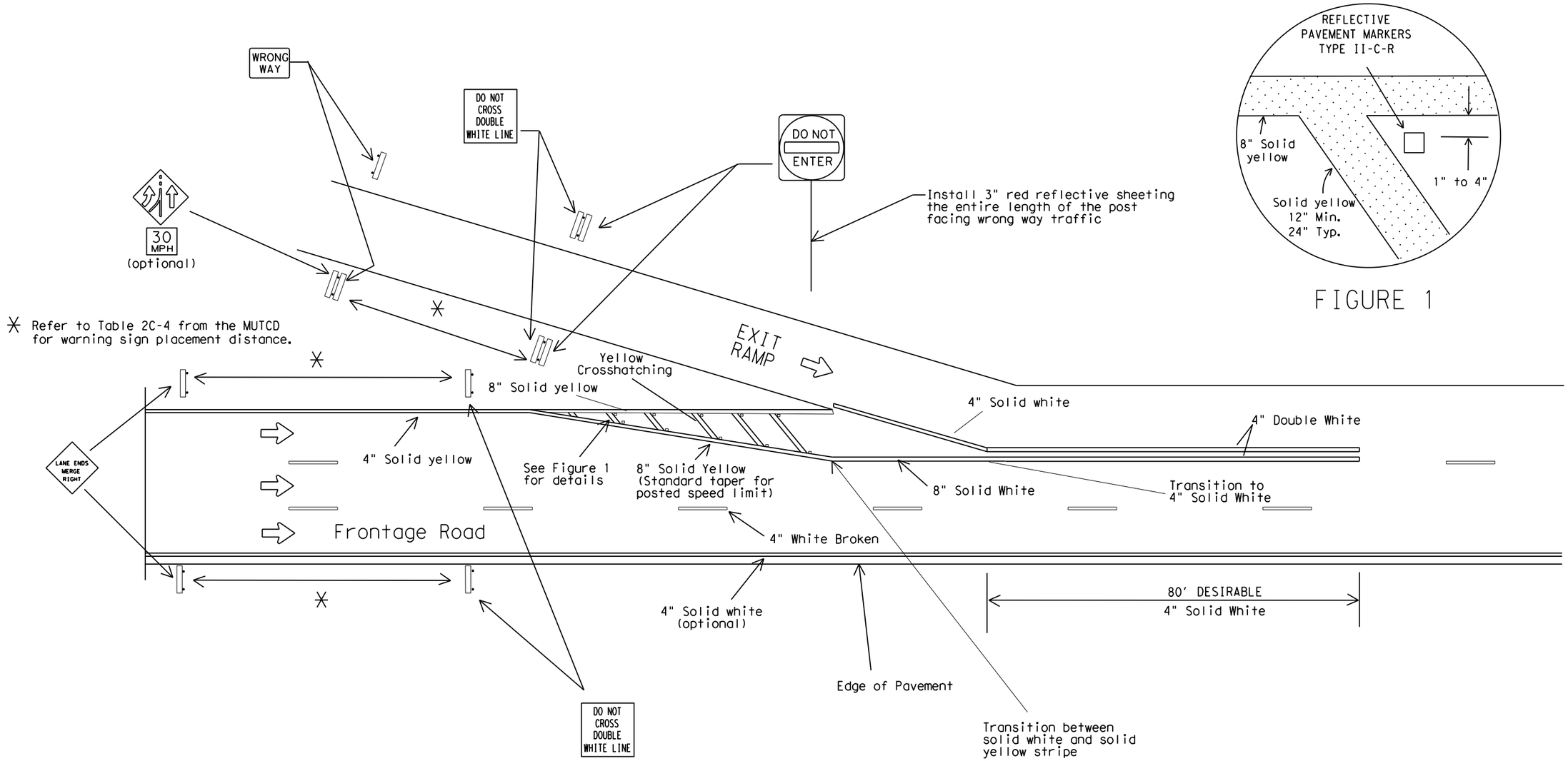


FIGURE 1

TYPICAL PAVEMENT MARKINGS FREEWAY EXIT TO 3 LANE FRONTAGE RD.

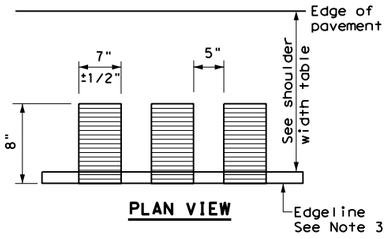
NOTE

FOR 2 LANE FRONTAGE ROADS, EXITING VOLUME VERSUS FRONTAGE ROAD VOLUME WITH A 2:1 RATIO SHALL HAVE THE SAME PAVEMENT MARKINGS. ALL OTHER CONDITIONS SHALL BE SIGNED AS A YIELD CONDITION.

NOT TO SCALE

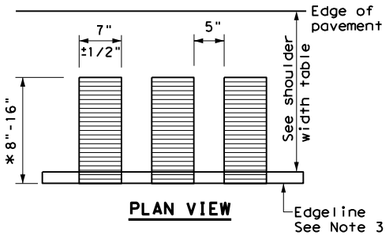
PAVEMENT MARKINGS
(EXIT TO FRONTAGE ROAD)
DALLAS DISTRICT STANDARD

DESIGN	FED.RD. DIV.NO.	FEDERAL-AID PROJECT NO.		HIGHWAY NO.
GRAPHICS	6			IH 45
	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	DALLAS	Navarro	124
CHECK	CONTROL	SECTION	JOB	
	0092	06	105	



PROFILE VIEW
OPTION 1

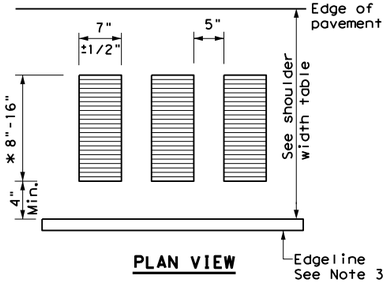
CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



* This distance may vary based on width of shoulder

PROFILE VIEW
OPTION 2

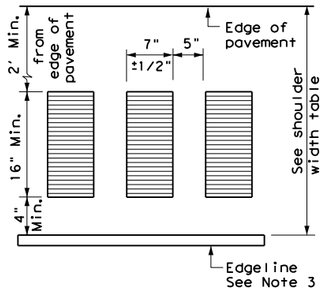
CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



* This distance may vary based on width of shoulder

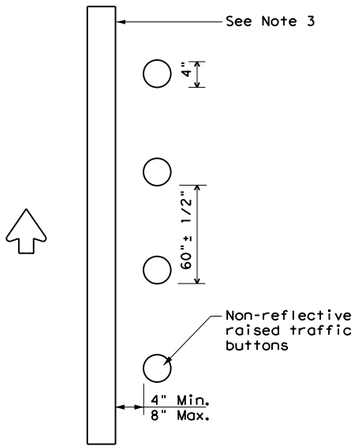
PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



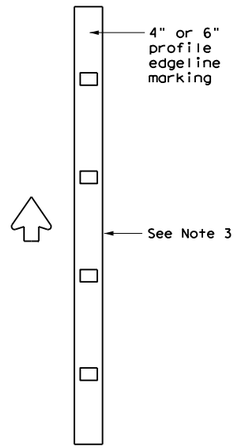
PROFILE VIEW
OPTION 4

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	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		125

DATE:
FILE:

A. GENERAL SITE DATA

1. PROJECT LIMITS: *IH 45 From Chambers Creek Rd to Ellis County LIne*

Begin Project Coordinates : Latitude (N): 32.16535 Longitude (W): - 96.469308

End Project Coordinates : Latitude (N): 32.26585 Longitude (W): - 96.50823

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet*
- *Drainage Patterns: Drainage Area Maps N/A*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections N/A*
- *Location of Erosion and Sediment Controls: SW3P Site Maps (Sheets 48-56)*
- *Surface Waters and Discharge Locations: Drainage and Culvert Layouts (Sheets 76-79)*
- *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:

Pavement Repair, Seal Coat, Overlay and Pavement Markings

4. MAJOR SOIL DISTURBING ACTIVITIES:

Replacing Guardrail, Adding Mow Strip And Cleaning Existing Culverts. Removal And Placement Of Structure Components.

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

The Soil Type Is Mostly Sandy Clay. The Existing Vegetation Is Comprised Of Grass, Weeds And A Few Trees. The Existing Grass Cover The Soil 98%.

6. TOTAL PROJECT AREA: *111.00* Acres

7. TOTAL AREA TO BE DISTURBED: *1.20* Acres (*1.1 %*)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: *0.66*
AFTER CONSTRUCTION: *0.66*

9. NAME OF RECEIVING WATERS:

Cummins Creek, Tributary to Chambers Creek, drainage to Rice Branch, Tributary to Rice Branch, and Rice Branch. All flow to Chambers Creek above Richland-Chambers Reservior [Segment 0814; Impaired by bacteria in water (recreation use)]. Also, Tributary to Gray's Creek which flows to Trinity River (Segment 0805).

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 Checklist(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)

- ___ TEMPORARY SEEDING
- ___ MULCHING (Hay or Straw)
- ___ BUFFER ZONES
- ___ PLANTING
- ___ SEEDING
- P SODDING
- T PRESERVATION OF NATURAL RESOURCES
- ___ FLEXIBLE CHANNEL LINER
- ___ RIGID CHANNEL LINER
- ___ SOIL RETENTION BLANKET
- P COMPOST MANUFACTURED TOPSOIL
- ___ VERTICAL TRACKING
- ___ OTHER: *(Specify Practice)*

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- T SILT FENCES
- T EROSION CONTROL LOGS
- ___ EROSION CONTROL COMPOST BERMS (Low Velocity)
- T ROCK FILTER DAMS
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ___ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ___ DIVERSION DIKE AND SWALE COMBINATIONS
- ___ PIPE SLOPE DRAINS
- ___ PAVED FLUMES
- ___ ROCK BEDDING AT CONSTRUCTION EXIT
- ___ TIMBER MATTING AT CONSTRUCTION EXIT
- ___ CHANNEL LINERS
- ___ SEDIMENT TRAPS
- ___ SEDIMENT BASINS
- ___ STORM INLET SEDIMENT TRAP
- ___ STONE OUTLET STRUCTURES
- ___ CURBS AND GUTTERS
- ___ STORM SEWERS
- ___ VELOCITY CONTROL DEVICES
- ___ OTHER: *(Specify Practice)*

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: *(Example Below - May be used as applicable, or revised)*

A. Storm water drainage will be provided by ditches, inlets, and storm water systems which carry drainage within the R.O.W. to the lows within the roadway and project site which drains to natural facilities.

B. Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4 :1 or flatter slopes with permanent vegetative cover.

4. STORM WATER MANAGEMENT ACTIVITIES: (Sequence of Construction)

See construction progress schedule and durations of relevant soil disturbance and stabilization activities.

To the extent practicable, preserve existing vegetation, maintain a vegetative buffer along receiving waters, and phase construction activities to minimize exposure of disturbed soils.

Install SW3P control devices to protect adjacent and downgradient strom inlets and other drainage features as needed to protect stormwater quality or as directed by the Engineer, but no sooner than two weeks prior to construction activities in their control areas.

Implement good housekeeping measures.

Use wet-cutting methods and capture any powders or slurry when saw-cutting existing facility.

Properly contain and dispose of concrete washout materials. Avoid staging portable sanitary units within 50' of a stormwater drainage feature or receiving water without adequate protection.

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, and velocity and downslope perimeter controls, as appropriate and/or as directed by Engineer.

Re-vegetate disturbed soils in completed project areas as soon as practicable or as directed by Engineer.

Remove temporary SW3P control devices after completion of work in each area (after materials have cured) or as directed by the Engineer.

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
MARLENA J. KELLY
114354
LICENSED PROFESSIONAL ENGINEER

Marlena Kelly P.E. 3/7/22
Signature of Registrant & Date

DALLAS DISTRICT ENVIRONMENTAL

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

TEMPLATE REVISION DATE: 02/07/18

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
MF	6	SEE TITLE SHEET		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
MF	TEXAS	DALLAS	NAVARRO	
CHECK	CONTROL	SECTION	JOB	126
MJK	0092	06	105	
CHECK				
JAP				

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.

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.

2.

3.

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.

4.

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. Southern crawfish frog - 1) Minimize impacts to wetland habitats including isolated ephemeral pools; 2) Water Quality BMPs; 3) Amphibian BMPs

2. Strecker's chorus frog and Woodhouse's toad - Amphibian BMPs

CONTINUED ON SHEET 2 OF 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.

Special Note: 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) - Sheet 1 of 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		IH 45
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	NAVARRO	
CONTROL	SECTION	JOB	SHEET NO.
0092	06	105	127

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

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

CONTINUED FROM SHEET 1 OF 2

3. Water Quality BMPs - In addition to BMPs required for a TCEQ Storm Water Pollution Prevention Plan and/or 401 water quality permit: a) Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges. b) When temporary stream crossings are unavoidable, remove stream crossings once they are no longer needed and stabilize banks and soils around the crossing.

4. Amphibian BMPs - a) Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered. b) Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats. c) Maintain hydrologic regime and connections between wetlands and other aquatic features. d) Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species. e) Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, using erosion control blankets or mats that contain no netting or only contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable. f) Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features. g) When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and overwinter sites (e.g., brush and debris piles, crayfish burrows) where feasible. h) Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible. i) N/A

5. Wood stork - In addition to complying with the Migratory Bird Treaty Act (MBTA) perform the following BMPs: a) Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. b) Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season; c) Avoid the removal of unoccupied, inactive nests, as practicable; d) Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair; e) Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

6. Eastern spotted skunk - Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered, and to avoid unnecessary imapcts to dens.

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
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LAST REVISION: 1/15/15

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC) - Sheet 2 of 2

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		IH 45
STATE	DISTRICT	COUNTY	
TEXAS	DALLAS	NAVARRO	
CONTROL	SECTION	JOB	SHEET NO.
0092	06	105	128

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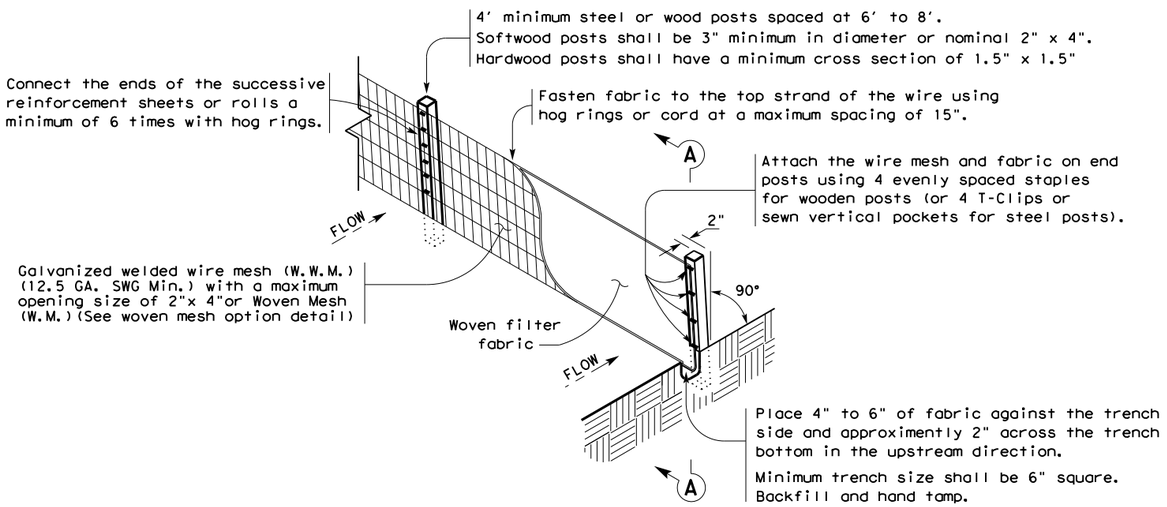
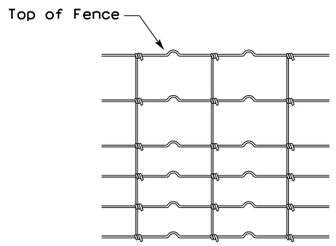
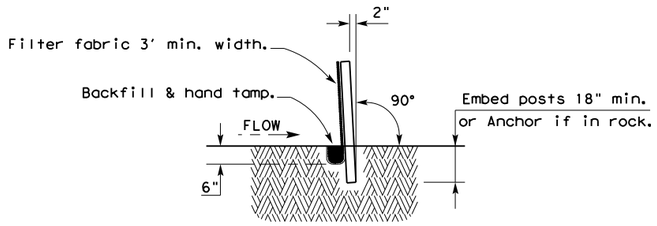
Filled Out: XX/XX/XXXX
Prepared by: Name/Section



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.

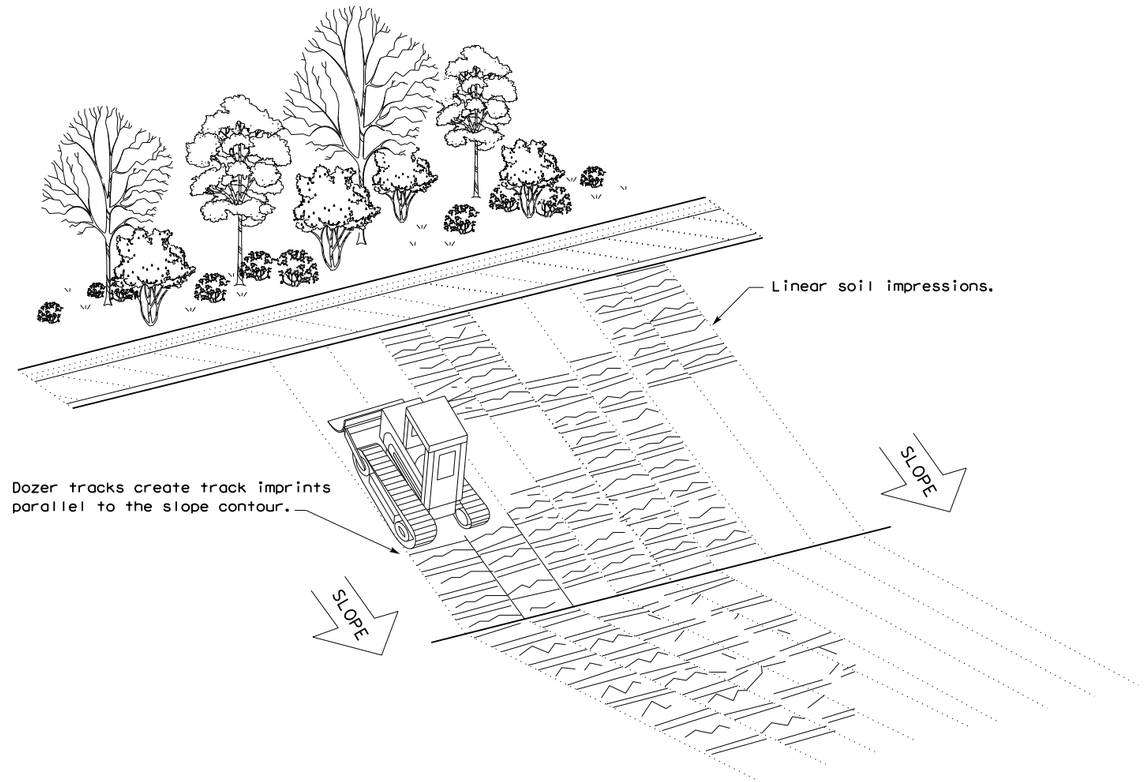
LEGEND

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	0092	06	105		IH 45	
	DIST	COUNTY			SHEET NO.	
	DAL	NAVARRO			129	

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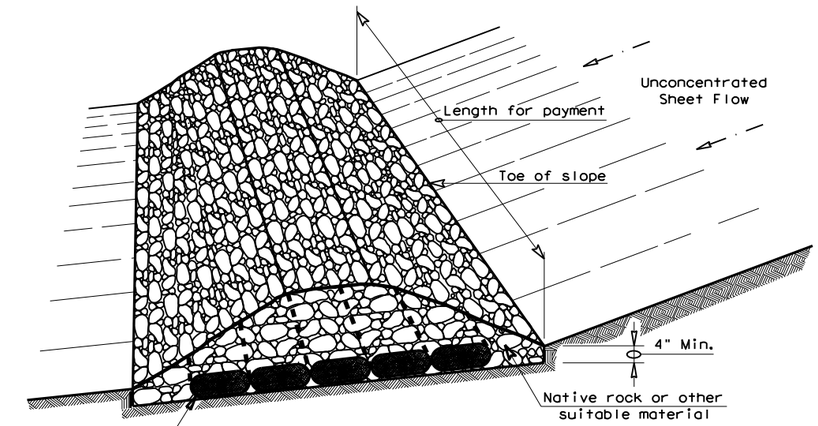
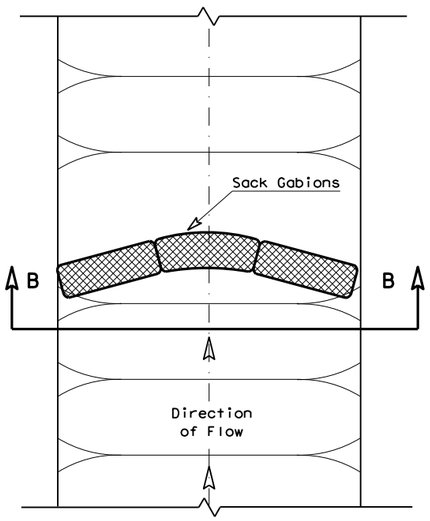
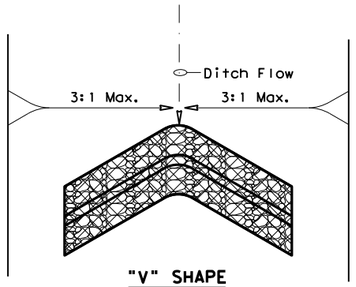


FILTER DAM AT TOE OF SLOPE

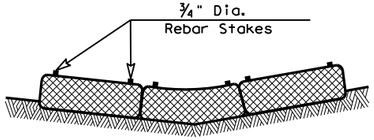
RFD1



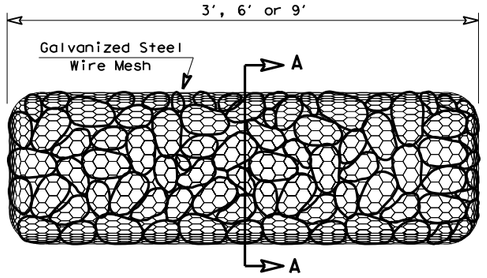
PLAN VIEW



"V" SHAPE PLAN VIEW

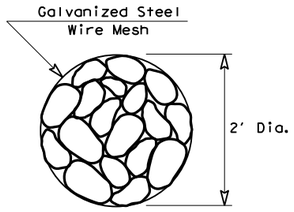


SECTION B-B

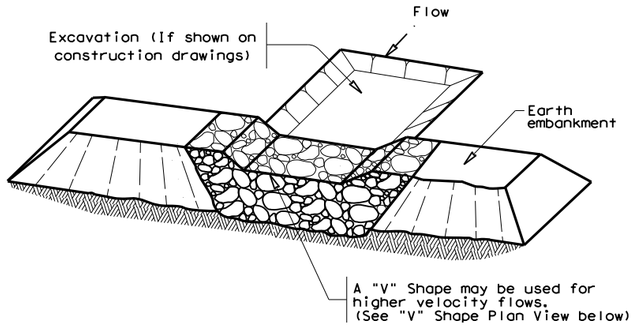


TYPE 4 (SACK GABIONS)

RFD4

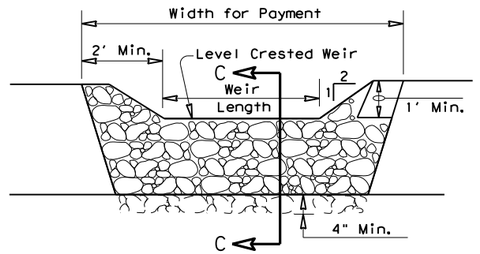


SECTION A-A

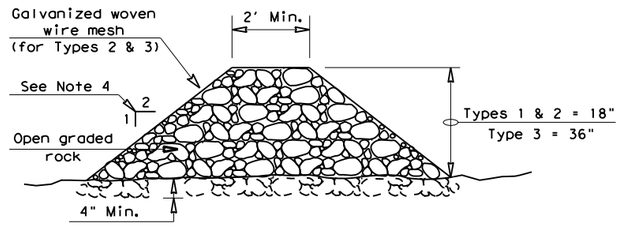


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

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.

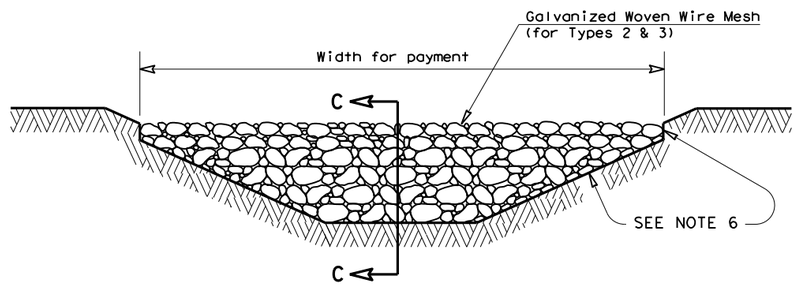
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

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	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		130

DATE:
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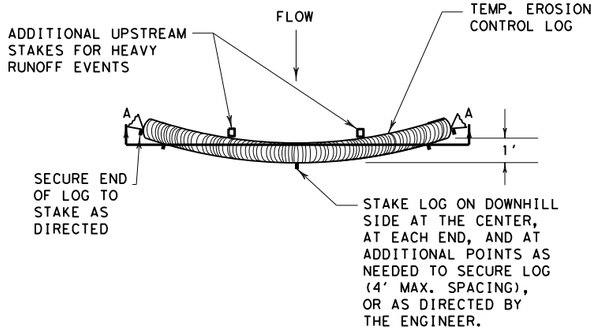
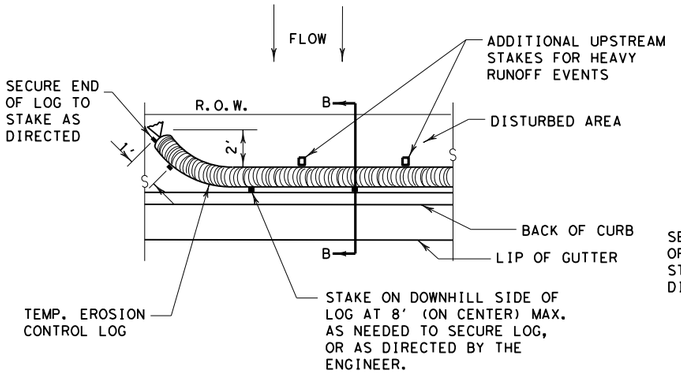


PLAN VIEW



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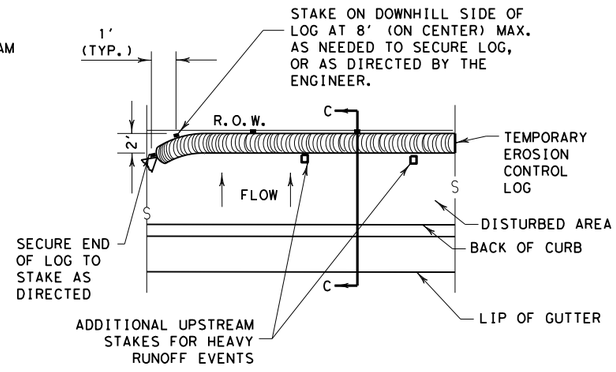
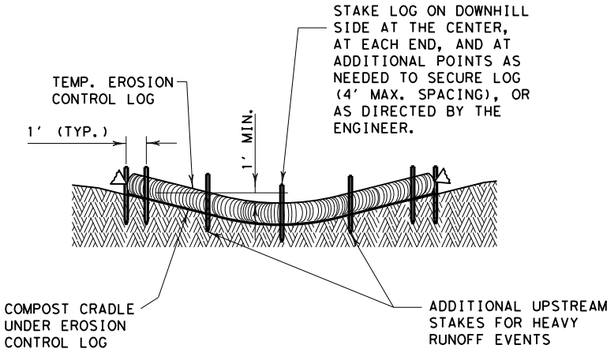


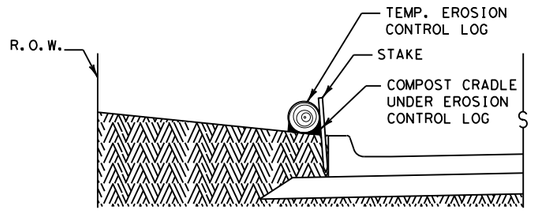
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

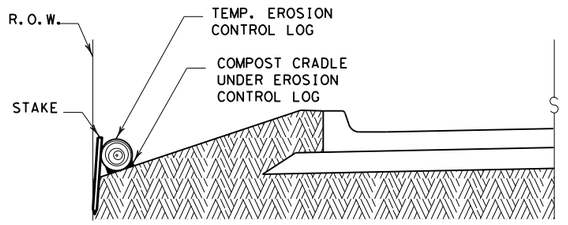
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

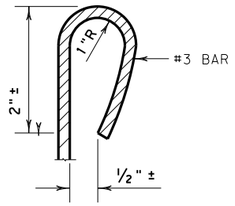
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

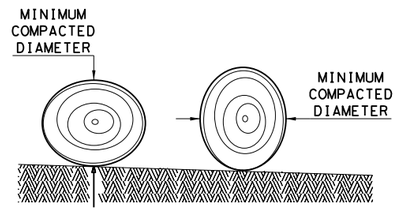
CL-ROW



REBAR STAKE DETAIL

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.



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

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

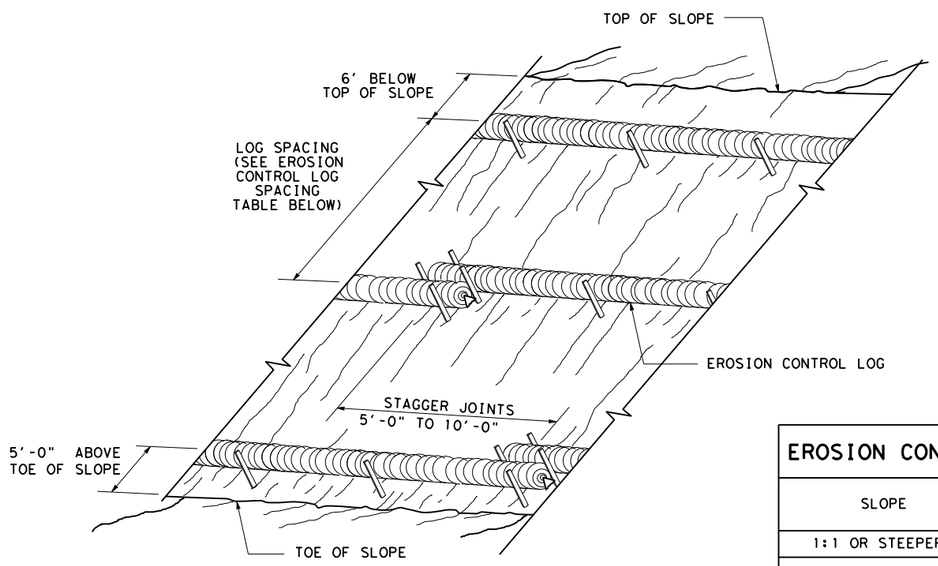
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

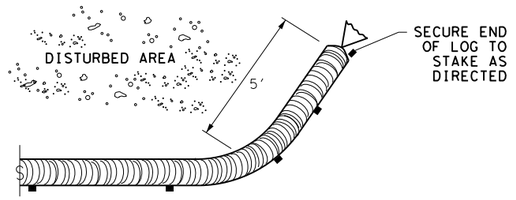
FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0092	06	105		IH 45		
	DIST	COUNTY					SHEET NO.
	DAL	NAVARRO					131

DATE:
FILE:



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

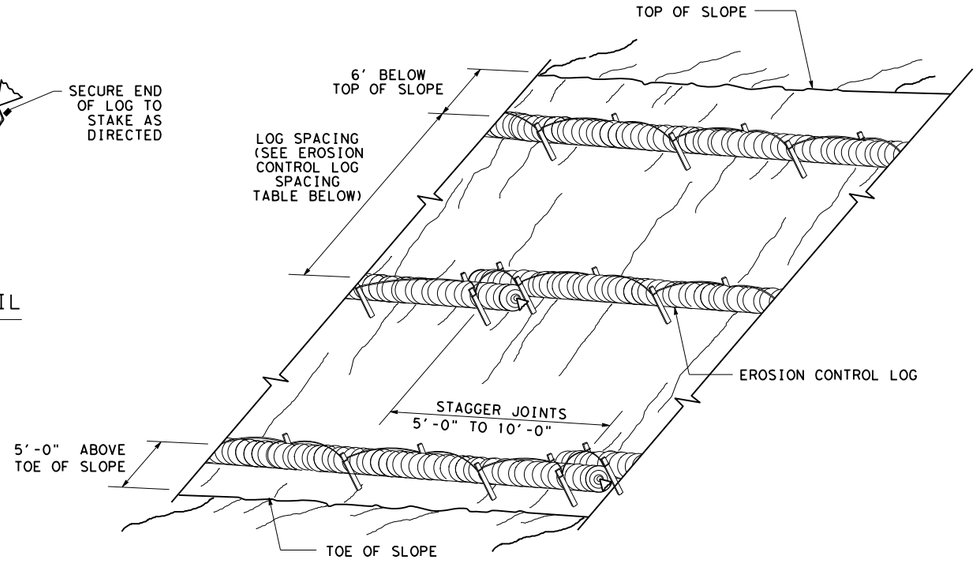
CL-SST



END SECTION RAP DETAIL

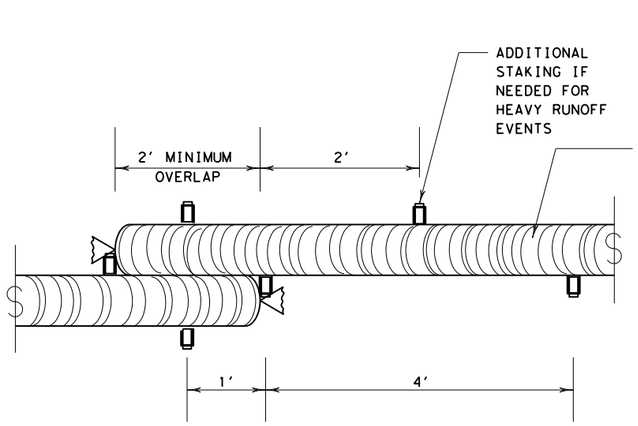
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

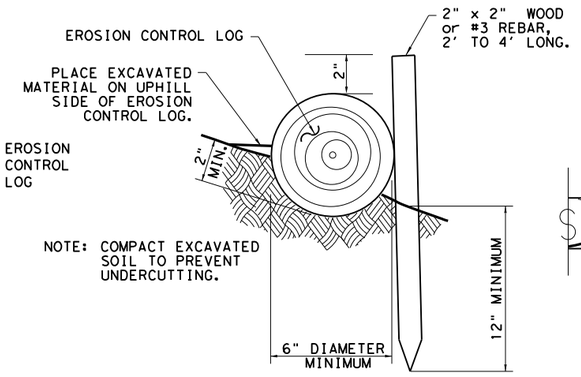
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

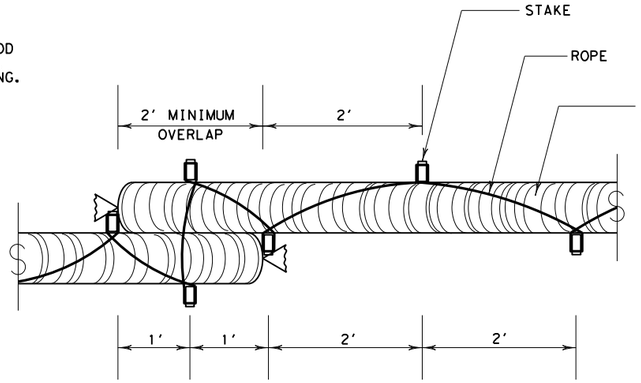


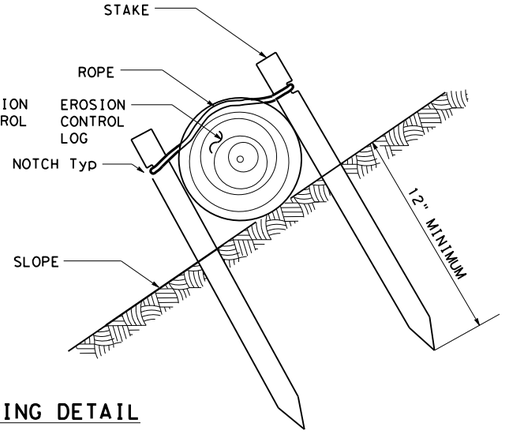


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

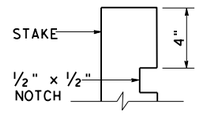
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

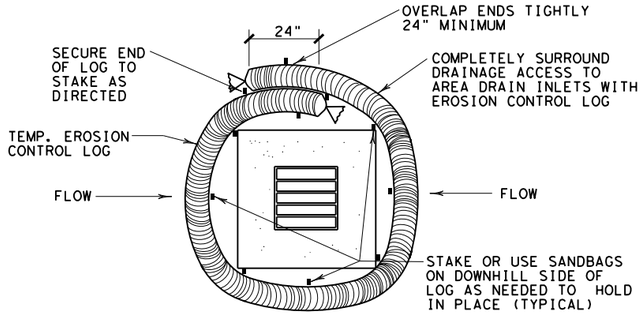
Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

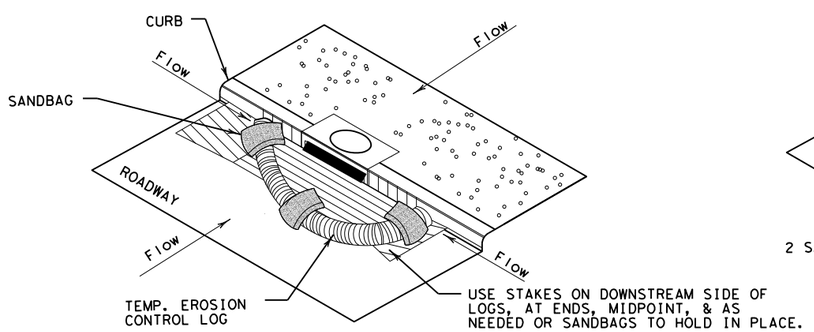
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		132

DATE:
FILE:



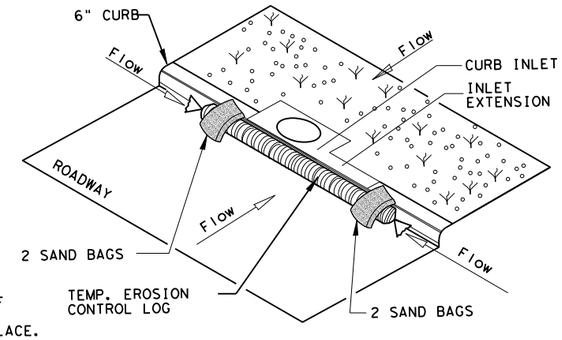
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

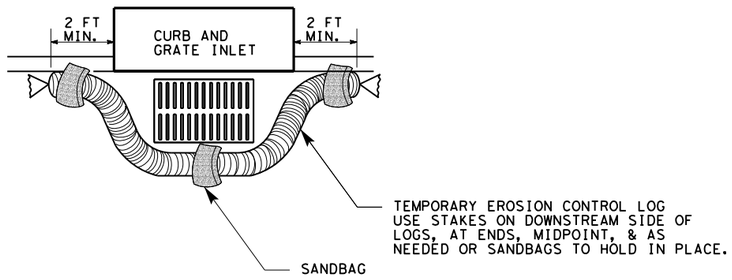
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

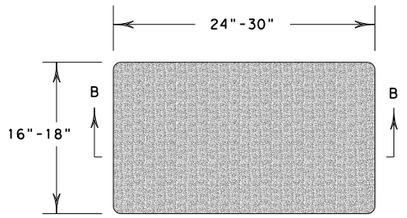
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

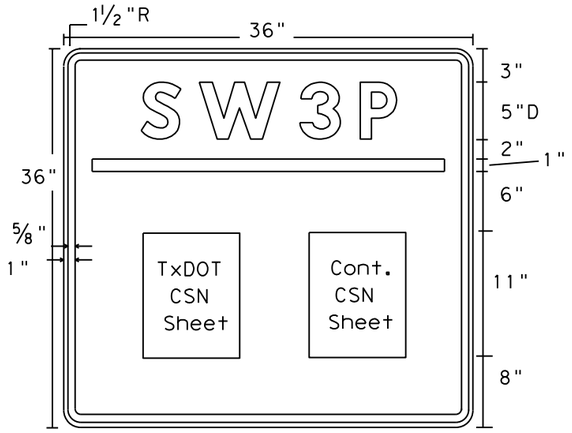
Design Division Standard

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	0092	06	105		IH 45	
	DIST	COUNTY				SHEET NO.
	DAL	NAVARRO				133



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.

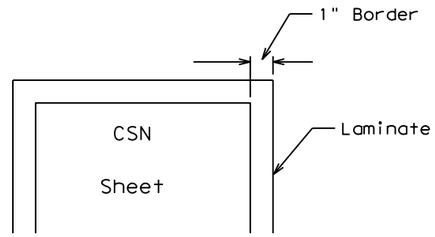
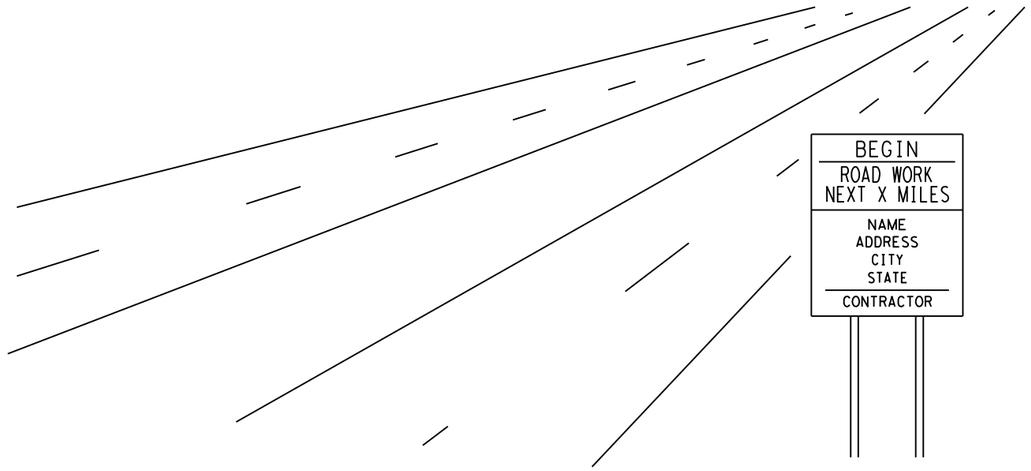
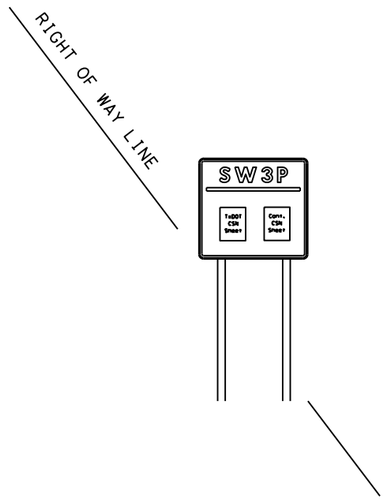


Figure 1





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: TxDOT	CK:	DW:	CK:	
©TxDOT 2016	DISTRICT	PROJECT NO.			SHEET
	18	SEE TITLE SHEET			134
REVISION DATE: 10-16-15	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	NAVARRO		0092	06	105	IH 45

LEVELS DISPLAYED
PATH:

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)	Pure Live Seed Rate**	PERMANENT URBAN SEED MIX ITEM 164 - DRILL SEEDING (PERM) (URBAN)(CLAY)	Pure Live Seed Rate**	TEMPORARY DRILL SEED MIX ITEM 164 - DRILL SEEDING (TEMP) (WARM OR COOL)	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					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.

Texas Department of Transportation

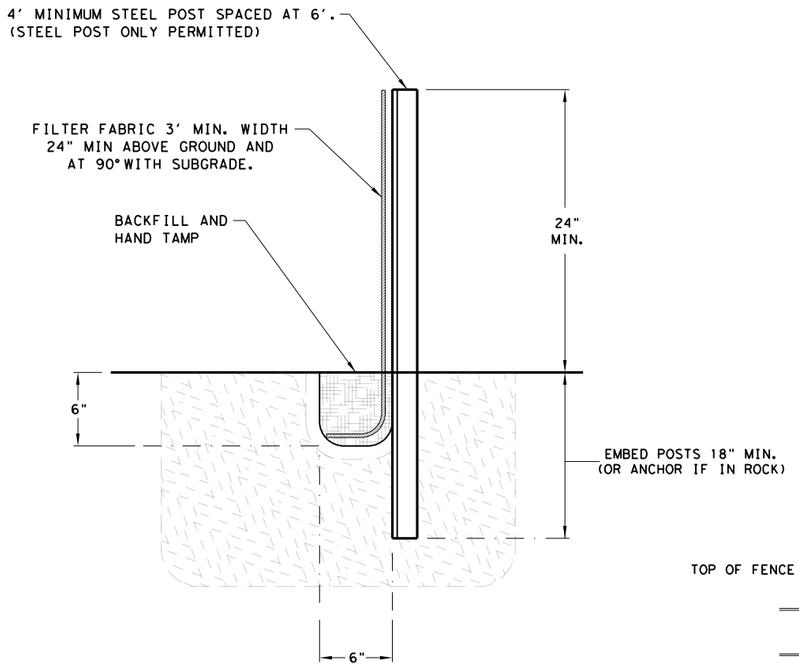
VEGETATION ESTABLISHMENT SHEET
(DALLAS DISTRICT)

TEMPLATE REVISION DATE: 02/21/19

DESIGN	FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
CPB	6	(See Title Sheet)		IH 45
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
XXX	TEXAS	DALLAS	NAVARRO	
CHECK	CONTROL	SECTION	JOB	135
XXX	0092	06	105	
CHECK				
XXX				

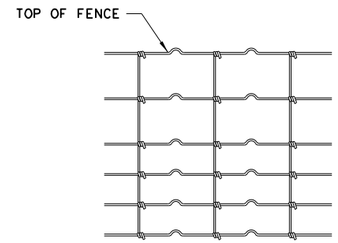
DATE

DATE:
FILE:



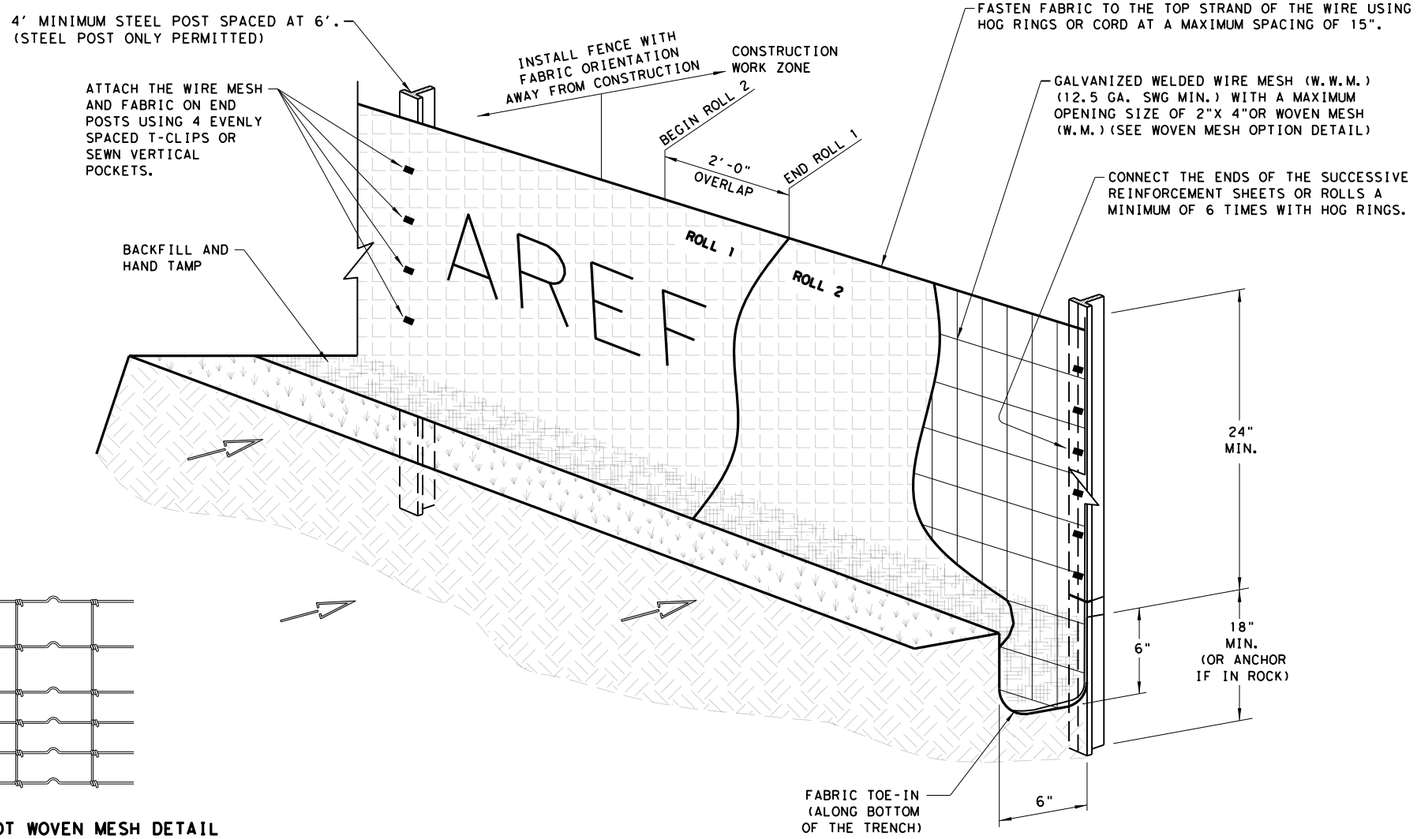
TRENCH SIDE VIEW DETAIL

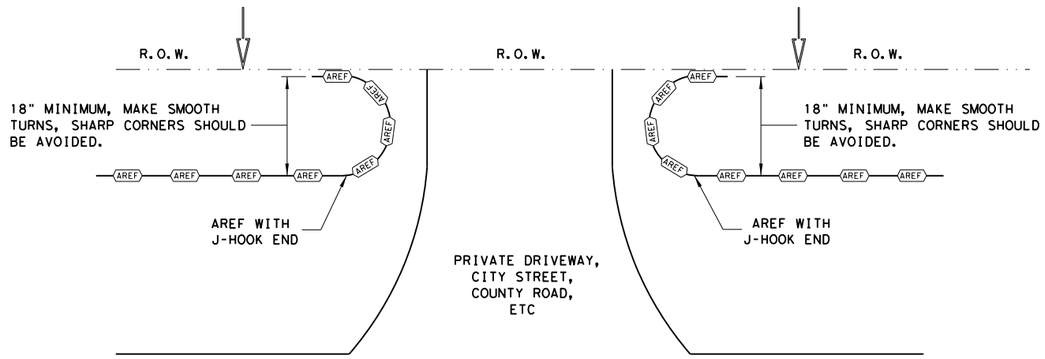
FABRIC TOE-IN IS TO RUN DOWN THE TRENCH
AND ALONG THE BOTTOM OF THE TRENCH



HINGE JOINT KNOT WOVEN MESH 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.





J-HOOK END OF FENCE DETAIL (TOP VIEW)

TRENCH IS TO STAY 6 IN DEEP AND 6 IN WIDE WITH
FABRIC TOE-IN TO MATCH TRENCH DETAIL.

J-HOOK APPLIES AT DRIVEWAY BREAKS, ROADWAY
BREAKS, AND AT ANY LOCATION AS DIRECTED BY
THE ENGINEER.

GENERAL NOTES

1. REMOVE ALL ROOTS AND OTHER OBSTRUCTIONS FROM THE TRENCH BEFORE FABRIC PLACEMENT.
2. AMPHIBIAN AND REPTILE EXCLUSION FENCE MUST BE CHECKED DAILY, INCLUDING DAYS DURING RAINFALL SHUTDOWN PERIODS.
3. ANY DAMAGE TO FENCE, INCLUDING SMALL HOLES, MUST BE REPAIRED THE DAY IT IS OBSERVED BEFORE DARK.
4. SMALL HOLES (WITH THE ENGINEER'S DISCRETION) MAY BE REPAIRED WITH TAPE AS DIRECTED BY THE ENGINEER.
5. AS DIRECTED BY THE ENGINEER, SECTIONS OF FENCE WHERE THE DAMAGE IS DEEMED DETRIMENTAL TO THE FENCE WILL BE REPLACED RATHER THAN REPAIRED.
6. A MINIMUM OF 2' SHOULD BE OVERLAPPED WHEN JOINING FABRIC SECTIONS.
7. PAINT "AREF" OR "TEF" ON THE FABRIC IN BRIGHT COLOR EVERY 50' AND AT BREAKS.
8. REMOVE SEDIMENT, VEGETATION, OR OTHER DEBRIS TO MAINTAIN THE 24" AREF CLEARANCE.
9. FOR PAYMENT AND ADDITIONAL INFORMATION FOR AREF, SEE SPEC. 5116 (AMPHIBIAN AND REPTILE EXCLUSION FENCE).

LEGEND

AREF — AMPHIBIAN AND REPTILE EXCLUSION FENCE

AMPHIBIAN AND REPTILE DIRECTION OF TRAVEL

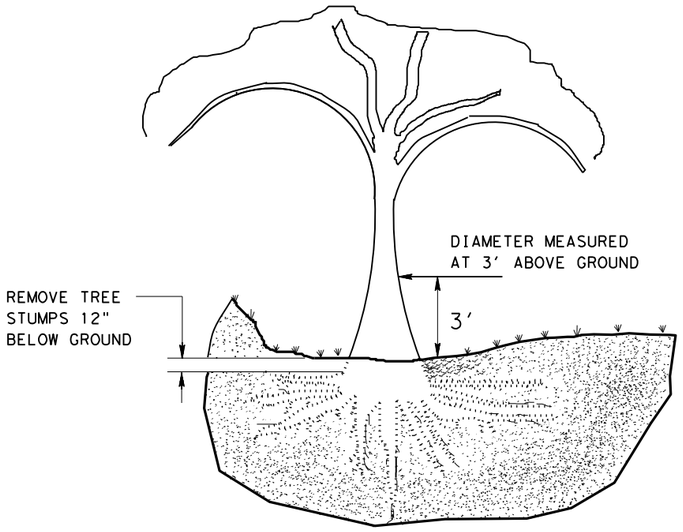
Texas Department of Transportation

Design Division Standard

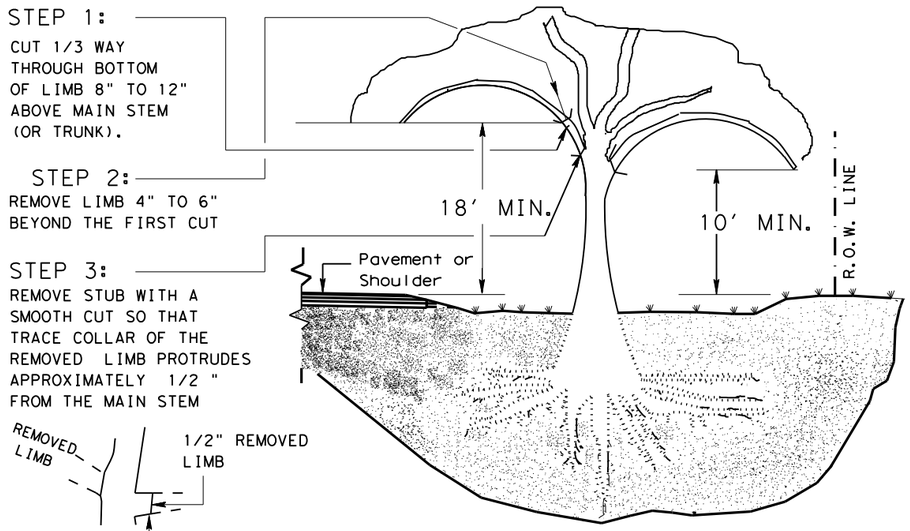
AMPHIBIAN AND REPTILE EXCLUSION FENCE

AREF-21

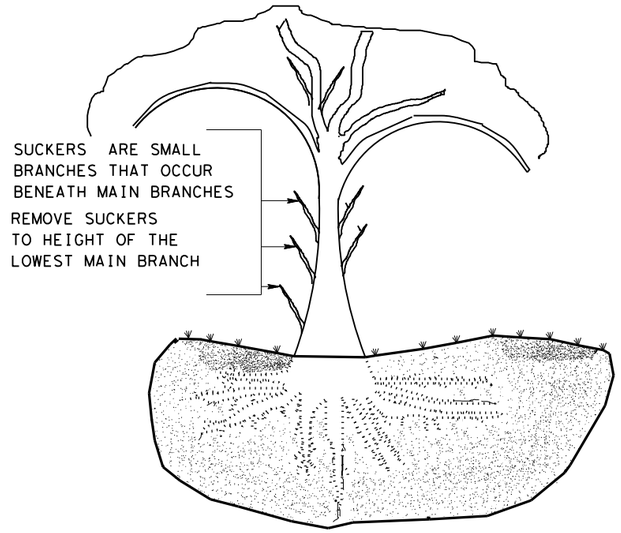
FILE: aref21.dgn	DN: TJ	CK: KM	DW: SS	CK: AG
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		136



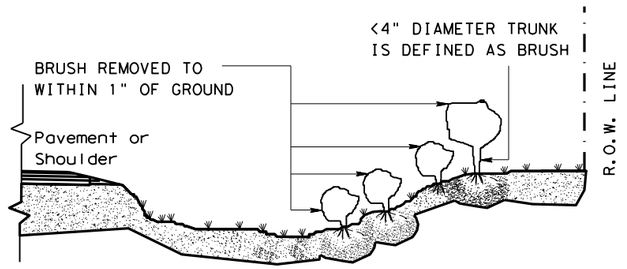
TREE REMOVAL



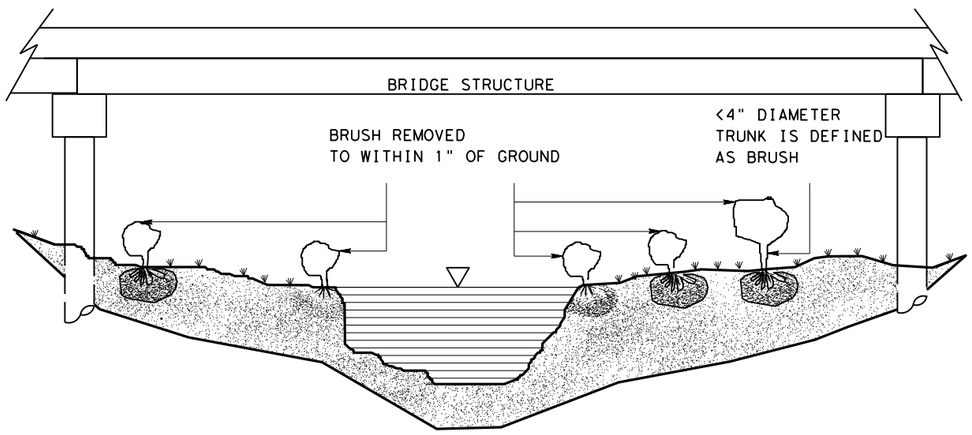
TREE TRIMMING



STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



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, UNLESS OTHERWISE SHOWN ON THE PLANS.

2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' 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 OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.

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

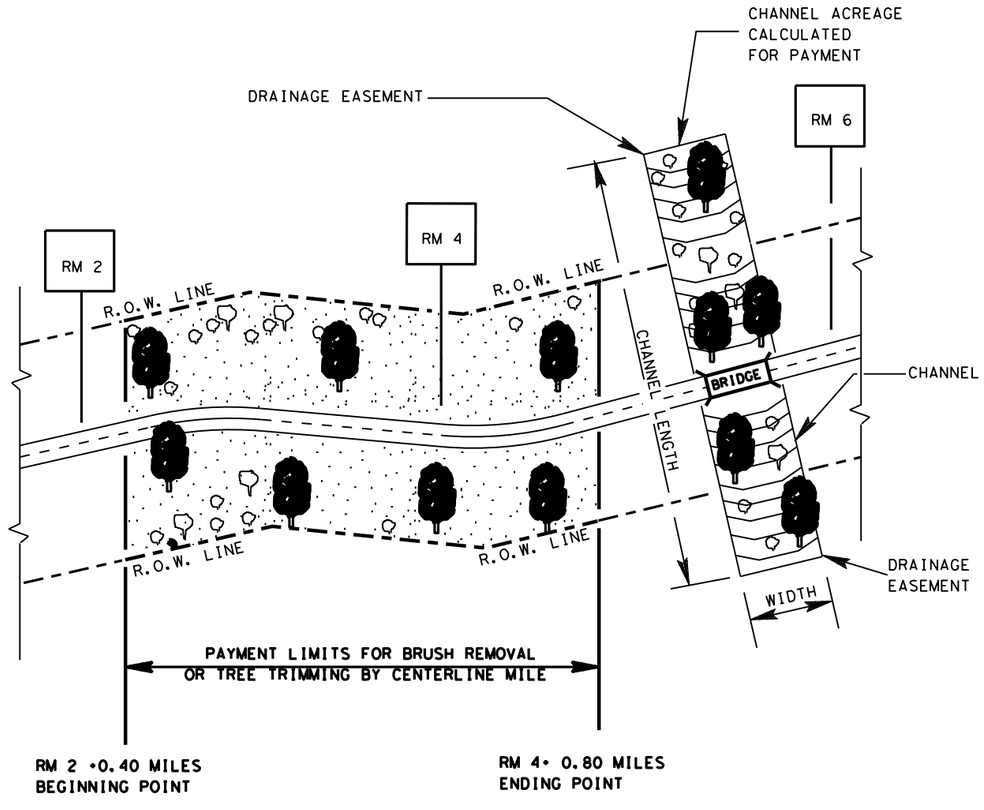
***SEE GENERAL NOTE *3.**

Texas Department of Transportation — Maintenance Division Standard

TREE AND BRUSH REMOVAL

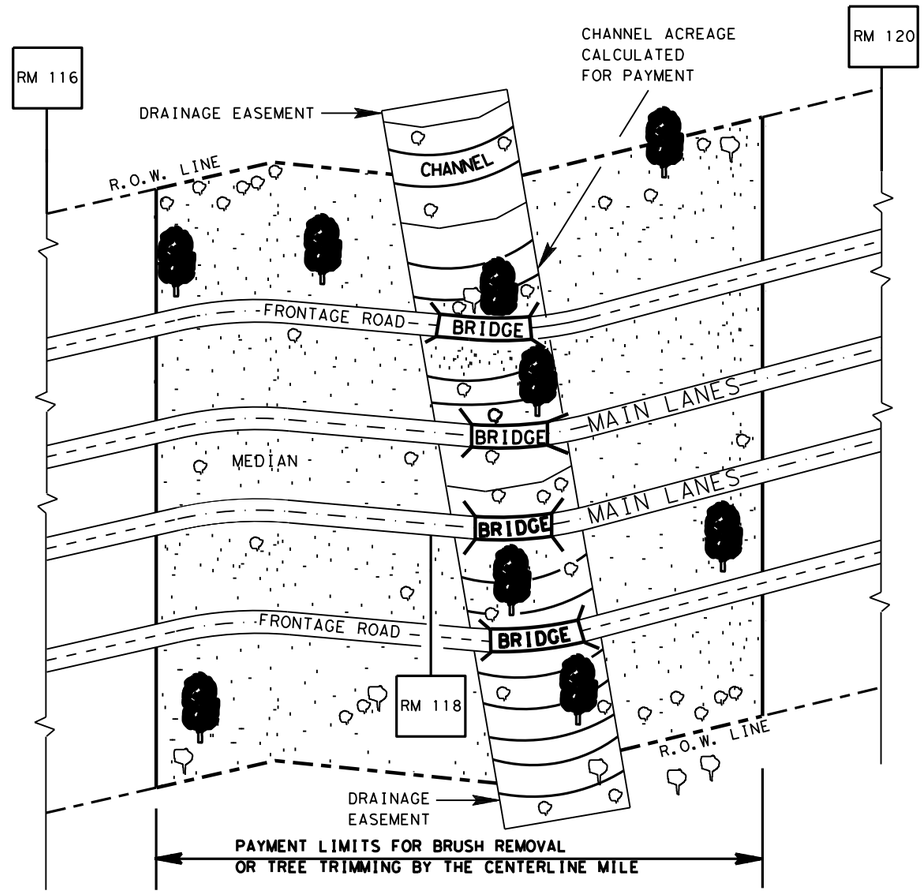
TRB-15(1)

FILE:	DN: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0092	06	105	IH 45
Revised table 1 to 2014 Specification	DIST	COUNTY		SHEET NO.
	DAL	NAVARRO		137



BRUSH REMOVED TO
WITHIN 1" OF GROUND
<4" DIAMETER TRUNK
IS DEFINED AS BRUSH
UNLESS OTHERWISE DIRECTED

EXAMPLE: UNDIVIDED HIGHWAY



BRUSH REMOVED TO
WITHIN 1" OF GROUND
<4" DIAMETER TRUNK
IS DEFINED AS BRUSH
UNLESS OTHERWISE DIRECTED

EXAMPLE: DIVIDED HIGHWAY WITH FRONTAGE ROADS

LEVELS DISPLAYED
1

GENERAL NOTES:

TREE TRIMMING AND BRUSH REMOVAL

1. PAYMENT BY THE CENTERLINE MILE IS MADE TO THE NEAREST 1/100 (0.01) MILE.
2. LIMITS OF WORK ARE SHOWN AS DISTANCES FROM REFERENCE MARKERS (RM).
3. PAY ITEMS BY THE CENTERLINE MILE INCLUDE ALL TREE TRIMMING OR BRUSH REMOVAL IN THE RIGHT OF WAY ON BOTH SIDES OF THE HIGHWAY. FOR DIVIDED HIGHWAYS, THE MEDIAN IS INCLUDED. FOR HIGHWAYS WITH FRONTAGE ROADS, THE AREAS BETWEEN THE FRONTAGE ROADS AND MAIN LANES, AND THE AREAS OUTSIDE OF THE FRONTAGE ROADS ARE INCLUDED.
4. BRUSH REMOVAL AND TREE TRIMMING UNDER BRIDGES, IN AND ALONG CHANNELS AND EASEMENTS ARE PAID FOR BY THE ACRE FOR AREAS DESIGNATED ON THE PLANS.

Texas Department of Transportation
Maintenance Division
Standard Plans

TREE AND BRUSH REMOVAL

TRB-15(2)

NOT TO SCALE — SHEET 2 OF 2

FILE: TRB-15(2).DGN		DRAWN: JEO		CHECKED: DM; LJB	DW: -	CK: -	NEG NO.:		
		MODIFIED:							
© TxDOT APRIL 2015		STATE DISTRICT	FEDERAL REGION	PROJECT NO.					SHEET
REVISED: 5/13/2004	LJB	DAL	6	SEE TITLE SHEET					138
REVISED: 9/24/2004	LJB	COUNTY				CONTROL	SECTION	JOB	HIGHWAY
REVISED: APRIL 2015	JEO	NAVARRO				0092	06	105	IH 45