

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		1

INDEX OF SHEETS

SEE SHEET 2

**STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION**

**PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT**

STATE PROJECT NO. C988-1-25

**FM 623
BEE COUNTY**

NET LENGTH OF ROADWAY = 3,200.00 FT. = 0.606 MI.
NET LENGTH OF BRIDGE = 0.00 FT. = 0.000 MI.
NET LENGTH OF PROJECT = 3,200.00 FT. = 0.606 MI.

LIMITS: FROM 0.5 MI N OF FM 883
TO 0.5 MI S OF FM 883

FOR THE WIDENING AND REALIGNING OF EXISTING FM ROAD
TO ADD RIGHT AND LEFT TURN BAYS

CONSISTING OF GRADING, BASE, STRUCTURES, SURFACING,
SIGNING, AND PAVEMENT MARKINGS

FM 623

DESIGN SPEED = 55 MPH

4R DESIGN GUIDELINES
MAJOR COLLECTOR

A.D.T. (2021) = 360
A.D.T. (2041) = 504
PERCENT TRUCKS IN ADT = 53.9

FM 883

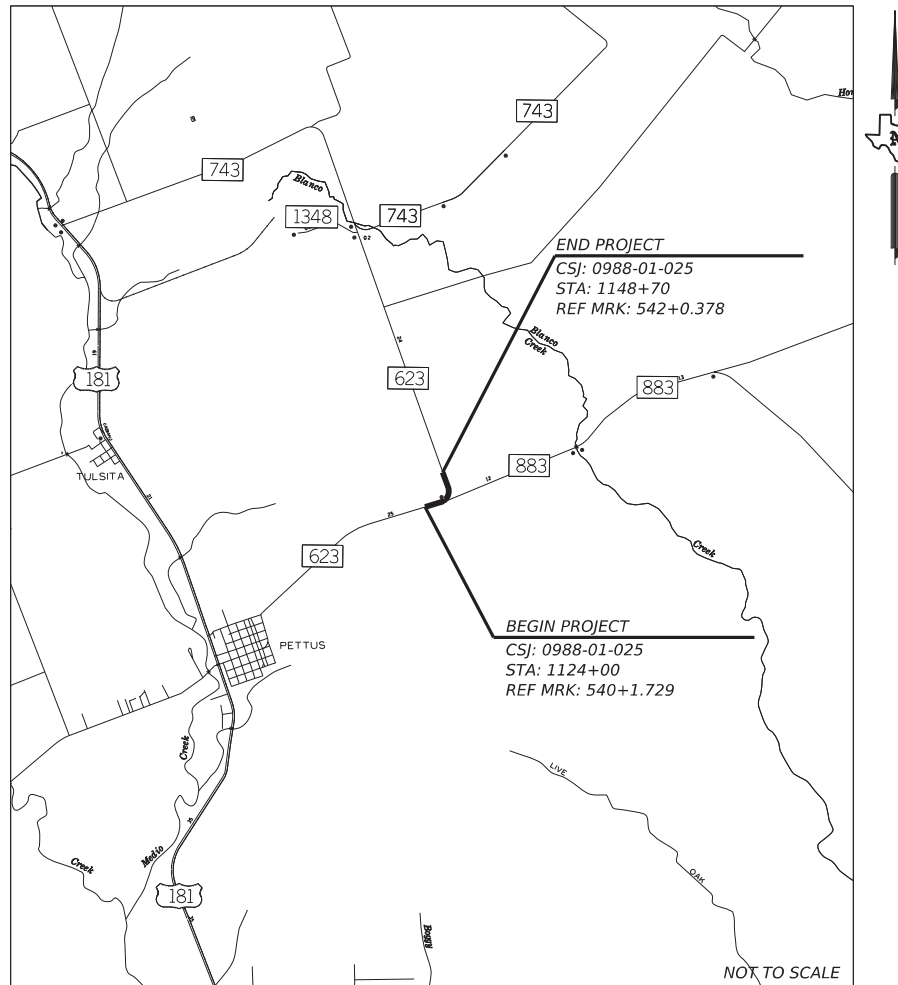
DESIGN SPEED = 70 MPH

4R DESIGN GUIDELINES
MAJOR COLLECTOR

A.D.T. (2022) = 275
A.D.T. (2042) = 385
PERCENT TRUCKS IN ADT = 20.2

NO TDLR INSPECTION REQUIRED

CONSTRUCTION SPEED ZONE REQUESTED



EXCEPTIONS: NONE
EQUATIONS: STA 99+40.80 (EX) = STA 1099+39.00 (A)
STA 146+05.30 (EX) = STA 1148+70.00 (A)
STA 1136+35.19 (A) = STA 834+35.11 (B)
RAILROAD CROSSINGS: NONE



RECOMMENDED FOR LETTING:

DocuSigned by:

Paula Sales-Evans, P.E.

5975450A18CC435

PLANNING AND DEVELOPMENT

8/7/2024

APPROVED FOR LETTING:

DocuSigned by:

Michael J. Walsh Jr., P.E.

6DF823F1D6384A8

DISTRICT ENGINEER

8/8/2024

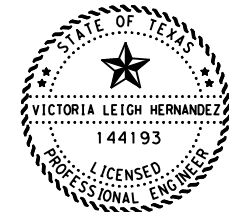
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION,
SEPTEMBER 1, 2024 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS,
SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000--005).

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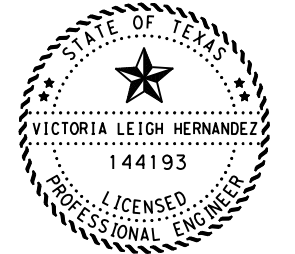
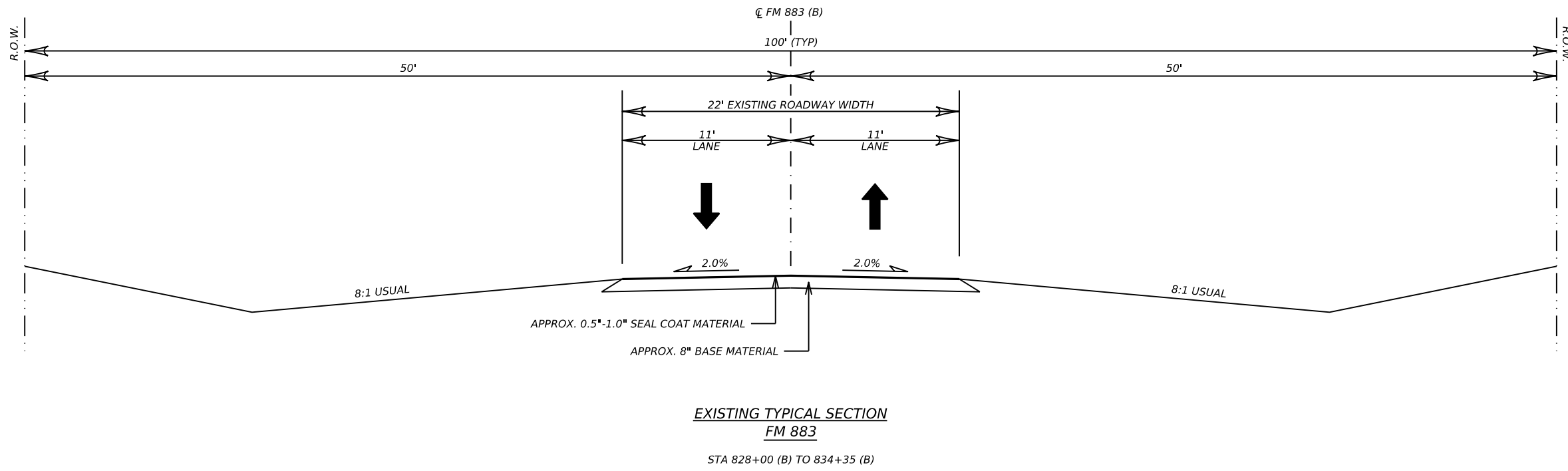
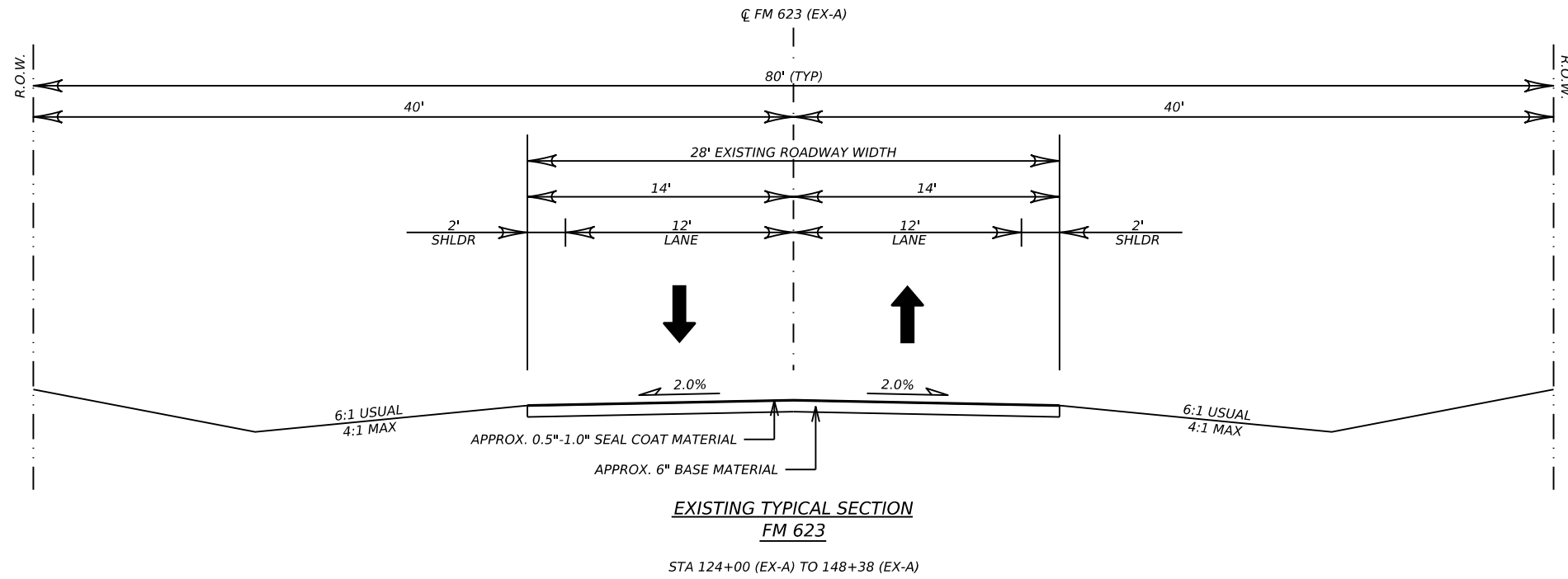


THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A "*" HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Victoria L Hernandez, P.E. 08/02/2024
 _____ DATE

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Victoria L Hernandez, P.E.

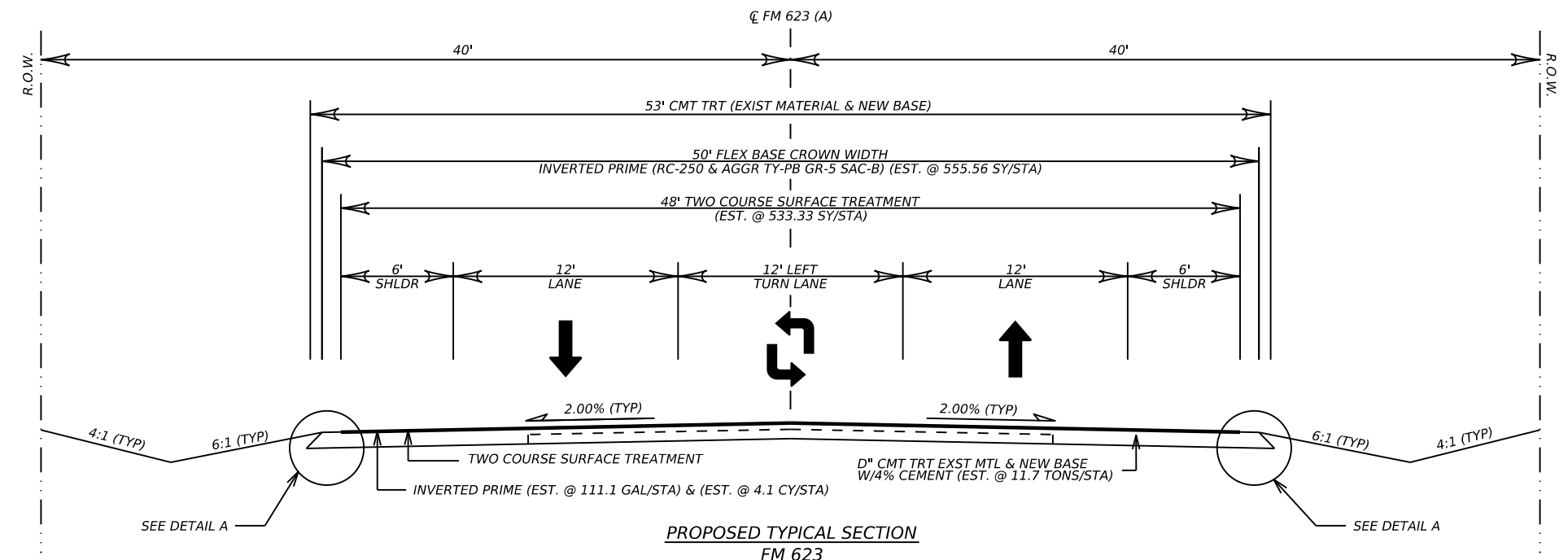
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FM 623
 TYPICAL SECTIONS

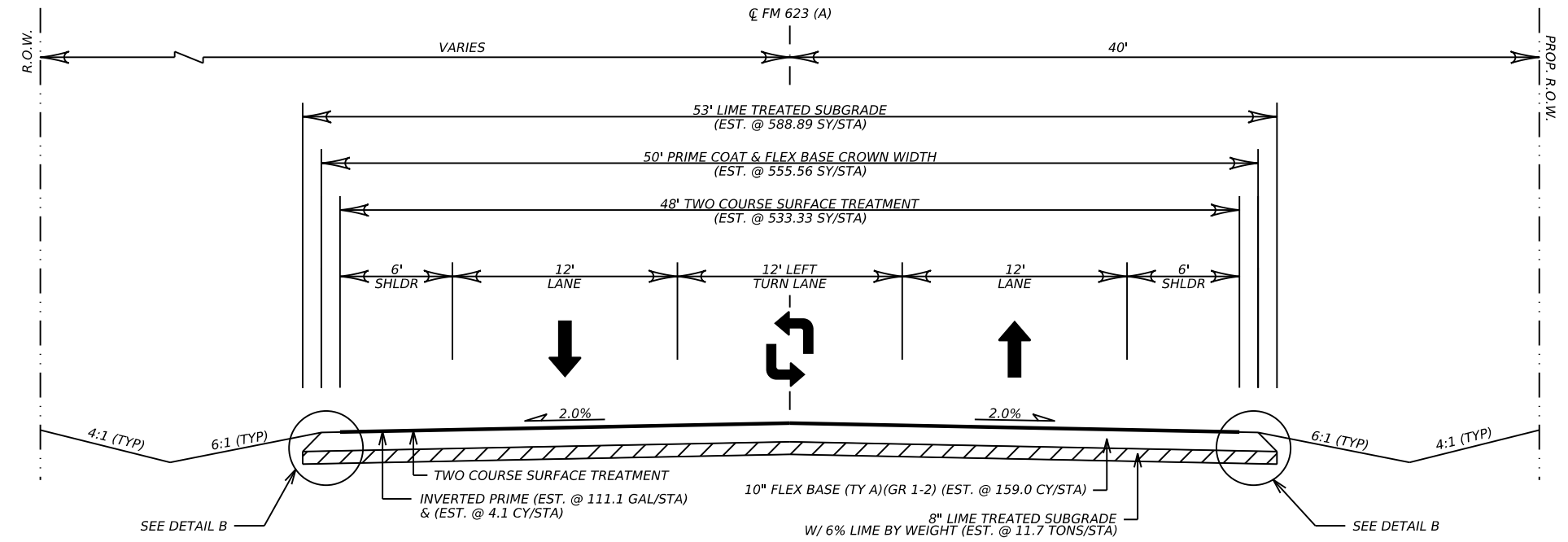
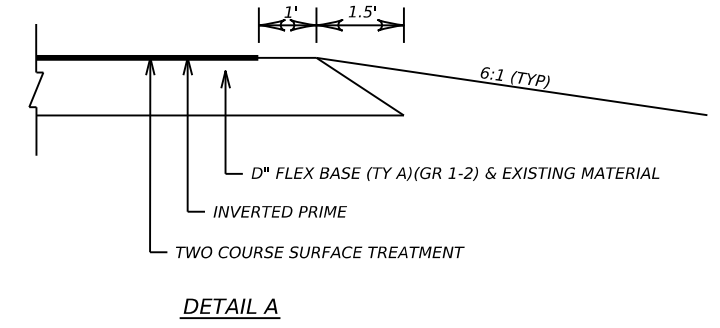
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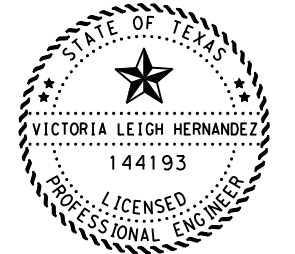
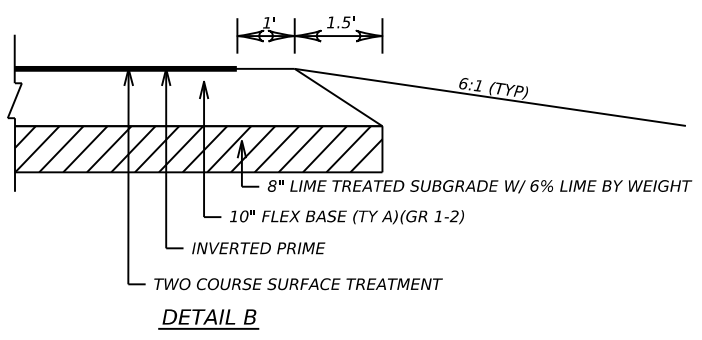
PROPOSED TYPICAL SECTION FM 623

STA 1124+00 (A) TO 1127+90 (A)	36' - 48'
STA 1127+90 (A) TO 1136+35 (A)	48'
STA 1140+24 (A) TO 1144+80 (A)	48'
STA 1144+80 (A) TO 1148+70 (A)	48' - 36'



PROPOSED TYPICAL SECTION FM 623

STA 1137+11 (A) TO 1140+24 (A)	48'
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08/01/2024



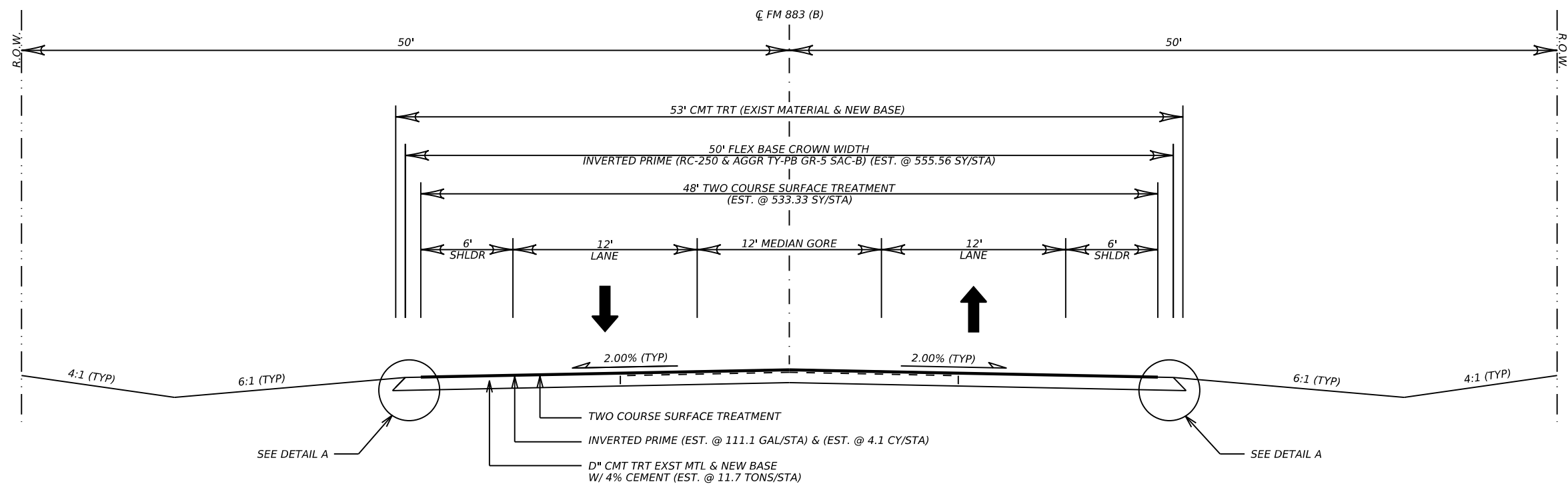
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TYPICAL SECTIONS

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D - TYPICAL BASE MATERIAL DEPTH OF 10" COMPRISED OF EXISTING BASE SPREAD & SCARIFIED TO 4" & 6" OF NEW BASE APPROXIMATLY. SEE ROADWAY CROSS SECTIONS FOR DETAILS.

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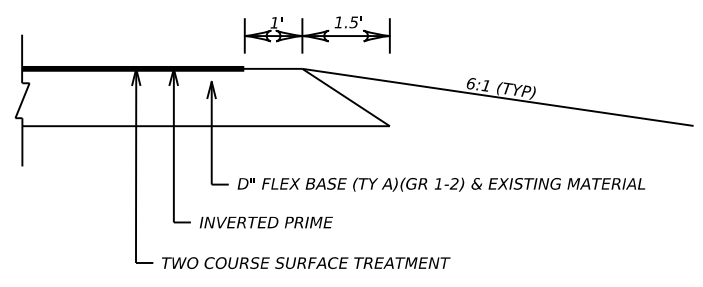
**PROPOSED TYPICAL SECTION
 FM 883**

STA 828+72 (B) TO 832+92 (B) 36' - 48'
 STA 832+92 (B) TO 834+35 (B) 48'



Victoria L Hernandez, P.E.

08/01/2024



DETAIL A

D - TYPICAL BASE MATERIAL DEPTH OF 10" COMPRISED OF EXISTING BASE SPREAD & SCARIFIED TO 4" & 6" OF NEW BASE APPROXIMATELY. SEE ROADWAY CROSS SECTIONS FOR DETAILS.



**FM 623
 TYPICAL SECTIONS**

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GENERAL NOTES:

Find, for your information and convenience, tools such as forms, software, materials, and various other information provided by the Department at <https://www.txdot.gov/business.html>. Please note that these tools are updated periodically, and your attention is directed to the latest edition.

In the event of a called evacuation, emergencies, impending adverse weather or as directed, do not perform any work without written authorization. The District reserves the right to suspend all work in support of evacuations or emergencies occurring from other parts of the state. Any work performed, other than work directed by the Department, is unauthorized work in accordance with Item 5.

Sweep, clean and remove any construction waste, surplus materials or debris from the roadway and right of way at the end of each day unless otherwise approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Asphalt application season will be established in accordance with Item 316.4.4 Adverse Weather Conditions or as directed by the Engineer.

Cut existing pavement using a saw or other approved method to ensure a neat transverse and/or longitudinal line to assure a smooth tie-in with new pavement. Cut to a minimum depth of the final lift thickness. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Promptly pick up and properly dispose of paper and other materials used for pavement joints.

All pavement markings shall be in accordance with the latest edition of Texas MUTCD.

In an effort to control the broomrape plant, clean all soil moving equipment with high-pressure water at an approved site before removing the equipment from the project.

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

Nick Novosad, P.E. Nick.Novosad@txdot.gov
Roberto Jimenez, P.E. Roberto.A.Jimenez@txdot.gov

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

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

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

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

ITEM 2

It is recommended that prospective bidders examine the specified work locations with the Engineer to view the nature of the work, the need for close coordination with the various utilities, traffic control considerations, and other factors influencing the prosecution of the work.

ITEM 5

Field verify all dimensions and notify Engineer prior to initiating any work.


Verify the locations of utilities, underground or overhead, shown within the limits of the right-of-way. Adhere to OSHA Standards when working within the vicinity of overhead power lines. Coordinate with the utility companies and notify the Engineer of any possible conflicts. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The 811 call services for a utility location does not include TxDOT facilities. Provide notification to the District Traffic Signal Shop by email at CRP_Utility_Locate@txdot.gov or call 361-739-6044 when planning, drilling, or excavating in areas where existing TxDOT underground utilities exist. Visual evidence of TxDOT underground utilities in the area include illumination poles, ground boxes, flashing beacons, traffic signals, etc. This notification must be provided 48 hours in advance of performing the work, but no earlier than 72 business hours before the work will commence. Drilled shaft locations or excavation areas must be staked prior to the notification so that the underground utilities can be located in relationship to the proposed work.

Notify the Engineer immediately of utility conflicts in accordance with Item 5.6. Refer to Item 4.5 for consideration of differing site conditions.

The responsibility for the construction surveying on this contract will be in accordance with Item 5.9.1, "Method A".

This project was developed using 3D design software and tools. A proposed 3D model of the project In Extensible Markup Language (XML) and 3d PDF format is available upon request. These models are specifically intended to aid the contractor in preparing bids and in the use of

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automated machine guidance equipment for the project construction. If discrepancies are found, numerical dimensions in the cross-sections and plan sheets govern over the 3D model.

ITEM 6

Inspection at Precast Concrete Fabrication Plants is as follows: TxDOT's Materials and Pavements Section will inspect any precast units at commercial fabrication yards and staging areas. The Area Engineer will inspect all other precast units.

For Department-furnished material, contact the Engineer or his designated representative to request material a minimum of one workday prior to pick up. Load material with contract personnel. Materials are to be stored in a safe location outside TXDOT property or right-of-way, {unless otherwise approved.} Use material furnished by the Department only on the project(s) intended. Return any unused material as soon as possible.

ITEM 7

The work performed for Item 7.2.4, "Public Safety and Convenience" will not be measured or paid for directly, but will be subsidiary to pertinent Items.

When working at street, farm-to-market, state highway, and county road intersections, schedule work to minimize intersection closures. During nonworking hours, all public road intersections will be open to the traveling public.

The total disturbed area for this project is 7.36 acres. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer.

Establish uniform perennial vegetative coverage with a density of at least 70% of the native background vegetative cover to achieve final stabilization.

Comply with the Texas Aggregate Quarry and Pit Safety Act for waste areas or material source areas resulting from this project.

No significant traffic generator events identified.

General Notes

Sheet C

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ITEM 8

Prepare the progress schedule using the Critical Path Method (CPM). Submit (2) two 11" x 17" hard copies and an electronic file of the original or updated progress schedule. Submit the original progress schedule seven (7) days before the Preconstruction Conference.

Asphalt application season will be considered to be May 1 to Sept 30, except as established in Item 316.4.4 Adverse Weather Conditions or as directed by the Engineer.

Submit an updated progress schedule as directed to show proposed major changes, changes affecting compliance with the contract requirements, or changes affecting the critical path/controlling item of work.

Working days will be computed and charge in accordance with Article 8.3.1.4, "Standard Workweek".

Work above traffic is not allowed.

ITEM 9

Monthly progress payments will be made for items of work completed by the 28th day of each month. Any work completed after the 28th will be included for payment in the subsequent monthly progress estimate.

Submit signed request for compensation of material-on-hand (MOH), including any requests from subcontractors, suppliers, or fabricators for MOH, at least two (2) working days prior to the end of the month on the Departments approved forms.

ITEM 100

Coordinate all right of way preparation activities with the project's Storm Water Pollution Prevention Plan (SWP3) and Environmental Permit Issues, and Commitments Sheet (EPIC) or as approved.


Prune trees and shrubs as directed. Use accepted pruning practices in accordance with Item 192 and as defined by the National Arborist Association. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 110

For earth cuts, manipulate and compact subgrade in accordance with Item 132.3.4.2, "Compaction Methods, Density and Moisture Control".

General Notes

Sheet D

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ITEM 132

Use embankment material with a plasticity index (PI) ranging from 10 to 40. Blend or treat approved materials to achieve the desired PI and pulverize the material so that 100% passes the 3-inch sieve. Retest materials as borrow sources change or when the material changes significantly. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Obtain approval to incorporate existing salvaged asphaltic surface and flexible base materials in the surface layer. If approved, incorporate existing materials no larger than 2 inches in the surface layer. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The estimated quantities for embankments adjacent to culverts and bridges were calculated using the average-end-area method.

ITEM 134

Backfill pavement edges with reclaimable asphalt material (R.A.P.).

Use backfill material with a plasticity index (PI) ranging from 10 to 40. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance.

If Contractor elects to use R.A.P. material for backfill pavement edges, the R.A.P. material must pass a 2" sieve. All material not passing sieve will be removed and disposed of properly. This shall be considered subsidiary to Item 134.

Windrow the existing topsoil and grass along the edge of the grading operations or as directed. After grading operations are completed, spread the topsoil and grass uniformly on all slopes and ditch lines. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Manipulate and compact backfill material in accordance with Item 132.3.4.1, "Ordinary Compaction". The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Apply SS-1 at a rate of application of 0.15 gallon per square yard. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

General Notes

Sheet E

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ITEM 164

Restore and seed areas not shown in the plans disturbed by the Contractor's operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Notify the Engineer of the unavailability of any seed mix. Make changes to the seed mix as approved.

Use a tacking agent of 50% SS-1 and 50% water and apply the agent at a rate of 0.10 gal/sy or as directed. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer's recommendations when approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 166

Furnish and apply slow-release nitrogen fertilizer with a rate of 60 pounds of nitrogen per acre.

ITEM 168

Distribute water to only those areas shown in the plans or as directed. Excessive overspray will not be permitted.

Water all areas of the project to be seeded or sodded every two (2) days for 90 days or as directed. Apply water in a manner to ensure adequate moisture but not to erode the soil in-place. During periods of adequate moisture, mechanical watering may not be required as approved. Upon final stabilization, the Engineer may require to continue watering as specified for a period not to exceed 30 days.

The Basis of Estimate below establishes the approximate quantity of water required to complete the 90-day watering cycle:

Rate	Water (Gal/Acre/Day)	Area (Acre)	Total Gallons (Min)
0.25 inch/week	1961	1	88,245


ITEM 247

For Table 1, "Material Requirements" a minimum plasticity index (PI) of 4 is required for Ty A Gr 1-2 Flex Base.

When requested, stake with blue tops, at 100-foot intervals, the lines and grade shown in the plans.

General Notes

Sheet F

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ITEM 275

Cement and/or asphalt stabilized base may be encountered in the existing pavement structure. Pulverize or scarify the existing material after shaping so that 100% passes a 2-1/2 inch sieve.

Use a mechanical mixer to mix the cement with the existing base material.

The three (3) day curing period is waived for roadways required to be opened to traffic the same day.

ITEM 302

Provide aggregates with a minimum surface aggregate classification (SAC) of "B" unless otherwise shown. The SAC for sources on the Department's Aggregate Quality Monitoring Program (AQMP) is listed in the Department's Bituminous Rated Source Quality Catalogue (BRSQC). SAC requirements apply to aggregates used on all final roadway surfaces, including shoulders.

ITEM 310

Use RC-250 at a rate of 0.20 gallons per square yard or as directed.

Use SS-1 at the rate of 0.15 gallons per square yard per inch or as directed. Use a mixture of 5% SS-1 and 95% water and work the mixture into the top 2 inches of the flexible base surface. The water will not be measured or paid for directly, but will be subsidiary to pertinent Items.

A minimum prime coat curing period shall be determined by the Engineer during the preconstruction meeting. This curing period may be revised by the Engineer throughout the duration of the project pending weather and observed performance.

ITEM 314

Reference the General Note for Item 310, "Prime Coat" for mixture and rates of application.

ITEM 316

Do not place surface treatment on exposed concrete structures unless directed.

Furnish a distributor equipped with a working hand hose.

General Notes

Sheet G

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Material rates shown are for estimating purposes only. Adjust actual rates based on the material used, the existing condition and type of roadway surface, and as approved.

When using asphalt emulsion, a minimum 24-hour curing period is required before placing any subsequent asphalt courses.

Remove vegetation and blade pavement edges prior to surfacing operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Broom and clean sealed sections of roadway and all adjacent paved surfaces, including the gutter line, of any surplus aggregate before opening to traffic or as directed.

A vacuum sweeper will be required for this project. This shall be considered subsidiary to Item 316. Vacuum sweeper must perform a test strip before use.

ITEM 320

Provide the type of windrow pick-up equipment for approval prior to beginning paving operations.

Use of motor grader will not be permitted unless approved.

ITEM 400

Use cement-stabilized backfill for culvert and storm drains located beneath the pavement structure.

ITEM 421

The Engineer will provide strength-testing equipment for acceptance testing.

Furnish curing facilities adequately sized for this project as approved.


Furnish test molds for cylindrical concrete specimens measuring four (4") inches in diameter by eight (8") inches in length.

ITEM 462

Use cold-applied, plastic asphalt sewer joint compound for all joints. Provide sandproof tape for all pipe placed in cohesionless backfill material as approved, or provide gaskets that conform to Item 464.2.7.3.

General Notes

Sheet H

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Cement stabilized backfill is not considered cohesionless for this item.

The work performed for concrete collars will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 464

The work performed for concrete collars will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 467

The flowline of the safety end treatment shall match the flowline of the culvert.

The work performed for concrete collars will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 496

Contractor shall provide a demolition plan to engineer for approval.

The structure(s) to be removed have surface coatings which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations.

Coordinate and identify the locations where the structure(s) will be cut at least 30 days prior to the demolition of the structure(s). If the surface coatings contain hazardous materials, the Department will arrange by separate Contract for the removal of a 4 inch wide strip around bearing attachments, at the anchor bolts, and as approved. Provide traffic control for the paint removal operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Notify the Engineer no later than 30 calendar days prior to the demolition of the structure(s) for coordination with the Texas Department of State Health Services.

Provide for approval a method of removal to prevent any materials from falling into water or traffic. The method used and work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

County: Bee

Control: 0988-01-025

Highway: FM 623

ITEM 500

"Materials on Hand" payments are not considered when determining partial payments.

ITEM 502

Furnish additional barricades, signs, and traffic handling as directed. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Traffic control for daytime lane closures shall be in accordance with applicable standards. Traffic control shall include temporary rumble strips in accordance with WZ (RS)-22.

When advanced warning flashing arrow panels are specified, furnish one (1) standby unit in good condition at the job site for immediate use.

Attach stop/slow paddle to a staff with a minimum length of 6 feet to the bottom of the sign.

The use of a pilot vehicle in conjunction with flaggers will be permitted. If used, provide positive and unrestricted communication between the driver of the pilot vehicle and the flaggers. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Contractors attention is directed to a construction speed zone, signage is subsidiary to 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.


All items marked as optional on all traffic control standards shall be required unless otherwise approved by an Engineer.

Trail vehicle shall be required on all mobile traffic control operations.

ITEM 503

Furnish the portable changeable message signs displaying the correct message at least seven (7) days prior to beginning work or as directed.

The Contractor's Responsible Person (CRP) will maintain full control of messages at all times.

 GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			FM 623
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	CRP	BEE	
CONTROL	SECTION	JOB		
0988	01	025	6D	

County: Bee

Control: 0988-01-025

Highway: FM 623

The Engineer will provide the sign message text to use at each sign.

A minimum of 3 PCMS will be required. However, additional units may be necessary depending on the work in progress.

Standby time will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Portable changeable message signs may be moved, and message changed at any time as deemed necessary by the Engineer. This will be considered subsidiary to Item 503.

Portable changeable message signs paid by the each apply to the full contract, regardless of the sub CSJs.

ITEM 504

No field office will be required for this project.

ITEM 505

A minimum of 2 TMAS will be required. However, additional units may be necessary depending on the work in progress.

Provide manufacturer's curb weight or certified scales weight ticket to the Engineer for approval.

ITEM 506

Designate in writing a Contractor Responsible Person (CRP) for implementing, maintaining, and reviewing environmental requirements.

ITEM 530

If conditions warrant, driveway locations, widths, or lengths may be adjusted as directed.

ITEM 636

All sign wraps are subsidiary to Item 636.

Field verify vertical clearance as directed by the online Texas Department of Transportation manual, "Sign Guidelines and Applications Manual" chapter 6 section 3. The Engineer's approval will be required prior to fabrication.

General Notes

Sheet K

County: Bee

Control: 0988-01-025

Highway: FM 623

Furnish new sign supports when replacing overhead signs. This will be subsidiary to pertinent items.

Disassemble, deliver and neatly stack salvageable materials as directed by the Engineer. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 644

Use crash worthy supports as shown on the BC sheets, the CWZTCD, or as directed for signs relocated using temporary supports. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

All slip bases and hardware including but not limited to nuts, bolts, screws and washers will be galvanized. All sign and housing components will be galvanized. Slip bases shall be clamp-style.

Disassemble, deliver and neatly stack salvageable materials as directed by the engineer. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 658

Furnish round delineators and object markers.

ITEM 662


Use temporary flexible-reflective roadway marker tabs at the beginning and end of no passing zones as shown on the TCP (7-1)-13 for seal coats and WZ(STPM)-23 for hot mix overlays.

ITEM 666

Establish and mark the location of existing standard pavement markings including but not limited to edge lines, transitions, passing and no passing zones, gore areas, etc.

General Notes

Sheet L

 Texas Department of Transportation GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			FM 623
	STATE	DISTRICT	COUNTY	
	TEXAS	CRP	BEE	
CONTROL	SECTION	JOB		SHEET NO.
0988	01	025		6E

County: Bee

Control: 0988-01-025

Highway: FM 623

SPECIFICATION DATA

UNIT WEIGHT ESTIMATES

EXISTING SUBGRADE ----- 110 LBS/CF
ITEM 260 - LIME TRT (SUBGRADE)(8")(6% BY WT) ----- 110 LBS/CF
ITEM 247 - FL BS (RDWY DEL)(TYA GR 1-2)(FNAL POS) ----- 136 LBS/CF
ITEM 275 - CEMENT TRT (EXIST MATL & NEW BASE)(10")(4% BY WT) --- 136 LBS/CF

COMPACTION REQUIREMENTS

ITEM 132 - EMBANKMENT (FNL)(DC)(TY C)
PLASTICITY INDEX ----- 40 MAX
PLASTICITY INDEX ----- 10 MIN
DENSITY ----- AS SHOWN ON TABLE 2 OF ITEM 132
LIFTS ----- ALL

COMPACTION REQUIREMENTS FOR BASE COURSE

ITEM 247 - FL BS (RDWY DEL)(TYA GR 1-2)(FNAL POS)
DENSITY ----- 100% MIN
LIFTS ----- ALL
ITEM 275 - CEMENT TRT (EXIST MATL & NEW BASE)(10")
DENSITY ----- 95% MIN
LIFTS ----- ALL

INVERTED PRIME COAT

ASPHALT TYPE ----- RC-250
AVERAGE ASPHALT RATE (GAL/SY) ----- 0.2
AGGREGATE TYPE ----- PB
AGGREGATE GRADE ----- GR-5 SAC B
AGGREGATE RATE (CY/SY) ----- 1/135

SURFACE TREATMENT DATA

1ST COURSE
ASPHALT TYPE ----- ASPH (CRS-2)
ASPHALT RATE (GAL/SY) ----- 0.35 - 0.43
AVERAGE ASPHALT RATE (GAL/SY) ----- 0.39
AGGREGATE RATE (CY/SY) ----- 1/85
AGGREGATE TYPE ----- PB
AGGREGATE GRADE ----- GR-3 OR 3S SAC B

General Notes

Sheet M

County: Bee

Control: 0988-01-025


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2ND COURSE

ASPHALT TYPE ----- ASPH (AC-15P, HFRS-2P OR CRS-2P)
ASPHALT RATE (GAL/SY) ----- 0.28 - 0.36
AVERAGE ASPHALT RATE (GAL/SY) ----- 0.32
AGGREGATE RATE (CY/SY) ----- 1/110
AGGREGATE TYPE ----- PB
AGGREGATE GRADE ----- GR-4 OR 4S SAC B

General Notes

Sheet N

 Texas Department of Transportation GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			FM 623
	STATE	DISTRICT	COUNTY	
	TEXAS	CRP	BEE	
CONTROL	SECTION	JOB		SHEET NO.
0988	01	025		6F



CONTROLLING PROJECT ID 0988-01-025

DISTRICT Corpus Christi
HIGHWAY FM 623

COUNTY Bee

Estimate & Quantity Sheet

CONTROL SECTION JOB				0988-01-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00176929			
COUNTY				Bee			
HIGHWAY				FM 623			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-7001	PREPARING ROW	AC	1.400		1.400	
	104-7007	REMOV CONC (RIPRAP)	CY	1.000		1.000	
	106-7002	OBLITERATING ABANDONED ROAD	SY	1,940.000		1,940.000	
	110-7001	EXCAV (ROADWAY)	CY	3,163.000		3,163.000	
	132-7006	EMBANK (FNL)(DC)(TY C)	CY	2,319.000		2,319.000	
	161-7002	COMPOST MANUF TOPSOIL (4")	SY	15,467.000		15,467.000	
	164-7010	DRILL SEED (PERM_RURAL_CLAY)	SY	15,467.000		15,467.000	
	168-7001	VEGETATIVE WATERING	TGL	284.000		284.000	
	247-7259	FL BS (RDWY DEL)(TY A GR 1-2)(FNAL POS)	CY	2,924.000		2,924.000	
	251-7054	REWORK BS MTL (TY C)(10")(DENS CONT)	SY	7,853.000		7,853.000	
	260-7005	LIME (COM OR QK)(SLURRY)	TON	37.000		37.000	
	260-7020	LIME TRT (SUBGRADE) (8")	SY	1,843.000		1,843.000	
	275-7001	CEMENT	TON	296.000		296.000	
	275-7008	CEMENT TRT (EXIST MATL & NEW BASE)(10")	SY	14,333.000		14,333.000	
	310-7006	PRIME COAT (RC-250)	GAL	3,128.000		3,128.000	
	316-7011	ASPH (CRS-2)	GAL	5,841.000		5,841.000	
	316-7070	ASPH(AC-15P, HFRS-2P OR CRS-2P)	GAL	4,796.000		4,796.000	
	316-7209	AGGR (TY-PB, GR-3 OR 35)(SAC-B)	CY	180.000		180.000	
	316-7212	AGGR (TY-PB, GR-45 OR 4)(SAC-B)	CY	139.000		139.000	
	316-7214	AGGR (TY-PB, GR-5)(SAC-B)	CY	119.000		119.000	
	400-7006	CUT & RESTORING PAV	SY	38.000		38.000	
	400-7010	CEM STABIL BKFL	CY	10.000		10.000	
	401-7001	FLOWABLE BACKFILL	CY	1.620		1.620	
	464-7003	RC PIPE (CL III)(18 IN)	LF	324.000		324.000	
	467-7306	SET (TY II) (18 IN) (RCP) (4: 1) (C)	EA	4.000		4.000	
	467-7307	SET (TY II) (18 IN) (RCP) (6: 1) (C)	EA	4.000		4.000	
	467-7308	SET (TY II) (18 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-7004	REMOV STR (SET)	EA	2.000		2.000	
	496-7007	REMOV STR (PIPE)	LF	40.000		40.000	
	496-7008	REMOV STR (BOX CULVERT)	LF	37.000		37.000	
	500-7001	MOBILIZATION	LS	1.000		1.000	
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6.000		6.000	
	503-7001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	288.000		288.000	
	505-7001	TMA (STATIONARY)	DAY	87.000		87.000	
	505-7003	TMA (MOBILE OPERATION)	DAY	18.000		18.000	
	506-7039	TEMP SEDMT CONT FENCE (INSTALL)	LF	320.000		320.000	
	506-7041	TEMP SEDMT CONT FENCE (REMOVE)	LF	320.000		320.000	



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Report Created On: Aug 7, 2024 2:28:12 PM

DISTRICT	COUNTY	CCSJ	SHEET
Corpus Christi	Bee	0988-01-025	7



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0988-01-025

DISTRICT Corpus Christi
HIGHWAY FM 623

COUNTY Bee

CONTROL SECTION JOB				0988-01-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00176929			
COUNTY				Bee			
HIGHWAY				FM 623			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	530-7005	INTERSECTIONS (SURF TREAT)	SY	396.000		396.000	
	644-7025	IN SM RD SN SUP&AM TYS80(1)SA(P)	EA	13.000		13.000	
	644-7028	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	9.000		9.000	
	644-7031	IN SM RD SN SUP&AM TYS80(1)SA(U)	EA	1.000		1.000	
	644-7073	REMOVE SM RD SN SUP&AM	EA	31.000		31.000	
	658-7056	INSTL OM ASSM (OM-2Y)(WC)GND	EA	6.000		6.000	
	662-7038	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	1,368.000		1,368.000	
	662-7114	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	608.000		608.000	
	666-7017	REFL PAV MRK TY I (W)8"(DOT)(090MIL)	LF	468.000		468.000	
	666-7023	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	200.000		200.000	
	666-7410	REFL PAV MRK TY I (W)6"(SLD)(090MIL)	LF	5,843.000		5,843.000	
	666-7422	REFL PAV MRK TY I (Y)6"(SLD)(090MIL)	LF	9,020.000		9,020.000	
	668-7089	PREFAB PM TY C (W)(24")(SLD)	LF	41.000		41.000	
	668-7091	PREFAB PM TY C (W)(ARROW)	EA	4.000		4.000	
	668-7103	PREFAB PM TY C (W)(WORD)	EA	4.000		4.000	
	668-7125	PREFAB PM TY C (Y)(12")(SLD)	LF	153.000		153.000	
	672-7002	REFL PAV MRKR TY I-C	EA	10.000		10.000	
	672-7004	REFL PAV MRKR TY II-A-A	EA	452.000		452.000	
	08	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (NON-PART)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (NON-PART)	LS	1.000		1.000	



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Report Created On: Aug 7, 2024 2:28:12 PM


DISTRICT	COUNTY	CCSJ	SHEET
Corpus Christi	Bee	0988-01-025	7A

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DW: CK: DW: CK: DW: CK:

FM 623 ROADWAY QUANTITIES													
LOCATION		LENGTH	SURF AREA	100	247	251	260	260	275	275			
				7001	7259	7054	7005	7020	7001	7008			
STA		TO	STA	FT	SY	AC	CY	SY	TON	SY	TON		
1124+00	(A)	TO	1127+90	(A)	390	1820		329	1214		41	1972	
1127+90	(A)	TO	1136+35	(A)	845	4507	0.2	842	2629		99	4836	
1137+11	(A)	TO	1140+24	(A)	313	1669	0.9	498		37	1843		
1140+24	(A)	TO	1144+80	(A)	456	2432	0.2	471	1419		54	2610	
1144+80	(A)	TO	1148+70	(A)	390	1820		329	1214		41	1972	
828+72	(B)	TO	832+92	(B)	420	1960		318	1027		44	2124	
832+92	(B)	TO	834+35	(B)	143	763	0.1	137	350		17	819	
CSJ 0989-014-025 TOTALS:							1.4	2924	7853	37	1843	296	14333

FM 623 ROADWAY QUANTITIES												
LOCATION		LENGTH	SURF AREA	310	316	316	316	316	316			
				7006	7011	7070	7209	7212	7214			
STA		TO	STA	FT	SY	GAL	GAL	GAL	CY	CY	CY	
1124+00	(A)	TO	1127+90	(A)	390	1820	382	710	583	22	17	15
1127+90	(A)	TO	1136+35	(A)	845	4507	939	1758	1443	54	41	35
1137+11	(A)	TO	1140+24	(A)	313	1669	348	651	535	20	16	13
1140+24	(A)	TO	1144+80	(A)	456	2432	507	949	779	29	23	19
1144+80	(A)	TO	1148+70	(A)	390	1820	382	710	583	22	17	15
828+72	(B)	TO	832+92	(B)	420	1960	411	765	628	24	18	16
832+92	(B)	TO	834+35	(B)	143	763	159	298	245	9	7	6
CSJ 0989-014-025 TOTALS:							3128	5841	4796	180	139	119



FM 623
ROADWAY QUANTITIES SUMMARY

2024 SHEET 1 OF 1

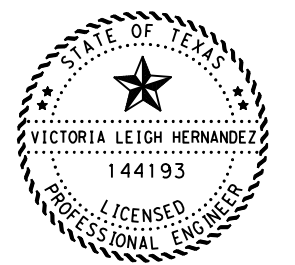
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0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	8	

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STATION	ALIGNMENT	EXCAVATION CY	EMBANKMENT CY	CUMULATIVE EXCAVATION CY	CUMULATIVE EMBANKMENT CY
1124+00.00	(A)	0	0	0	0
1125+00.00	(A)	20.852	10.266	20.852	10.266
1126+00.00	(A)	38.725	27.936	59.577	38.202
1127+00.00	(A)	34.242	44.15	93.819	82.352
1127+43.68	(A)	32.546	49.592	126.365	131.944
1128+00.00	(A)	30.359	56.607	156.724	188.551
1129+00.00	(A)	29.533	71.488	186.257	260.039
1130+00.00	(A)	36.443	92.357	222.7	352.396
1131+00.00	(A)	35.284	135.077	257.984	487.473
1132+00.00	(A)	105.444	167.845	363.428	655.318
1133+00.00	(A)	213.905	169.665	577.333	824.983
1134+00.00	(A)	155.572	128.452	732.905	953.435
1135+00.00	(A)	58.187	87.633	791.092	1041.068
1136+00.00	(A)	89.202	90.802	880.294	1131.87
1137+00.00	(A)	170.494	60.311	1050.788	1192.181
1137+42.03	(A)	229.324	41.097	1280.112	1233.278
1138+00.00	(A)	310.48	14.59	1590.592	1247.868
1139+00.00	(A)	393.939	0	1984.531	1247.868
1140+00.00	(A)	338.206	0.154	2322.737	1248.022
1141+00.00	(A)	168.147	65.296	2490.884	1313.318
1142+00.00	(A)	31.65	116.401	2522.534	1429.719
1143+00.00	(A)	25.387	84.002	2547.921	1513.721
1144+00.00	(A)	24.824	64.202	2572.745	1577.923
1145+00.00	(A)	21.139	60.568	2593.884	1638.491
1146+00.00	(A)	22.586	49.8	2616.47	1688.291
1147+00.00	(A)	21.198	43.818	2637.668	1732.109
1148+00.00	(A)	20.718	36	2658.386	1768.109
1148+70.00	(A)	8.333	9.012	2666.719	1777.121

STATION	ALIGNMENT	EXCAVATION CY	EMBANKMENT CY	CUMULATIVE EXCAVATION CY	CUMULATIVE EMBANKMENT CY
828+72.00	(B)	0	0	0	0
829+00.00	(B)	5.87	6.879	5.87	6.879
830+00.00	(B)	41.732	81.461	47.602	88.34
831+00.00	(B)	57.517	97.328	105.119	185.668
832+00.00	(B)	73.454	79.621	178.573	265.289
833+00.00	(B)	63.371	91.221	241.944	356.51
834+00.00	(B)	157.102	124.749	399.046	481.259
834+34.19	(B)	96.734	58.796	495.78	540.055

LOCATION				110	132
				7001	7006
				EXCAV (ROADWAY)	EMBANK (FNL)(DC) (TY C)
STA	TO	STA		CY	CY
1124+00	(A)	TO	1148+70	(A)	2667
828+72	(B)	TO	834+35	(B)	496
CSJ 0989-014-025 TOTALS:				3163	2319



Victoria L Hernandez, P.E.

08/01/2024

Texas Department of Transportation

FM 623

EARTHWORK QUANTITY SUMMARY

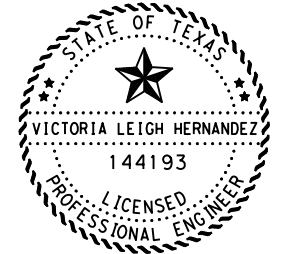
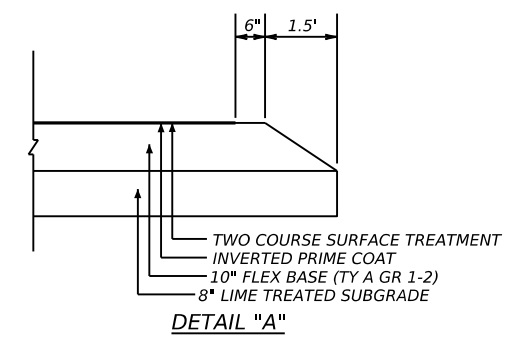
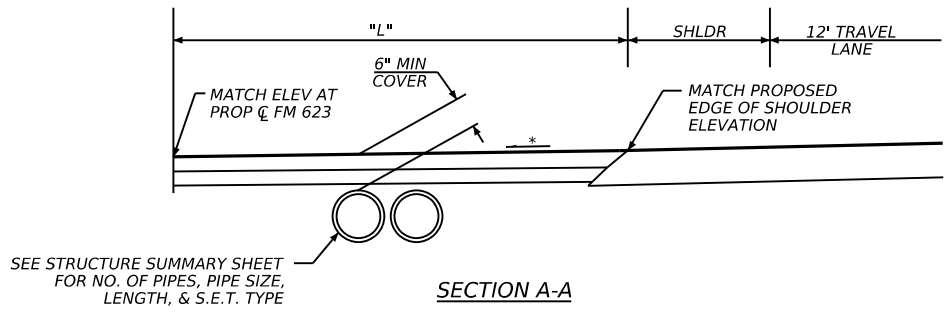
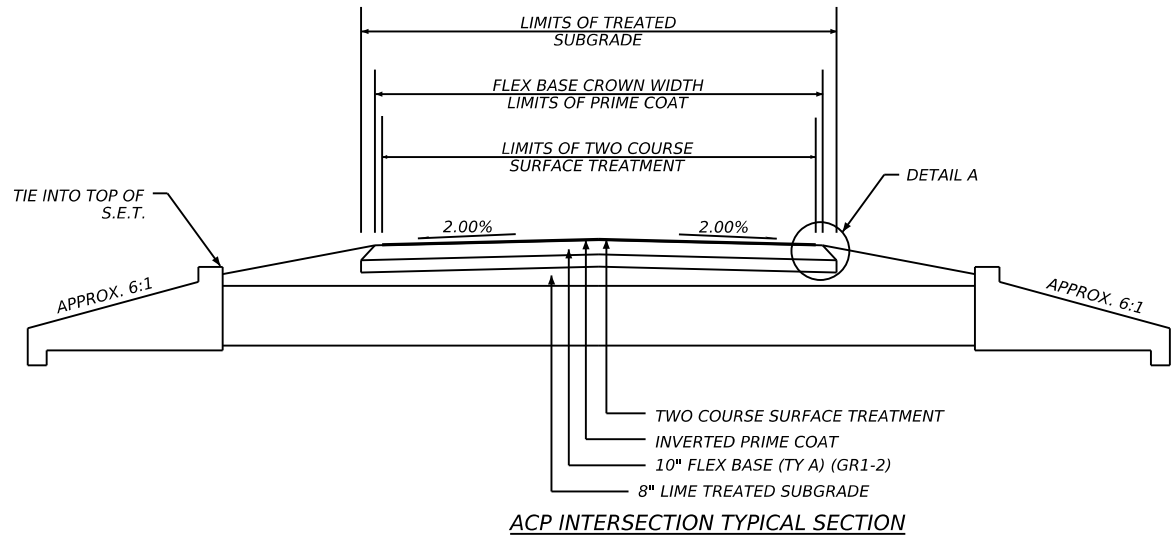
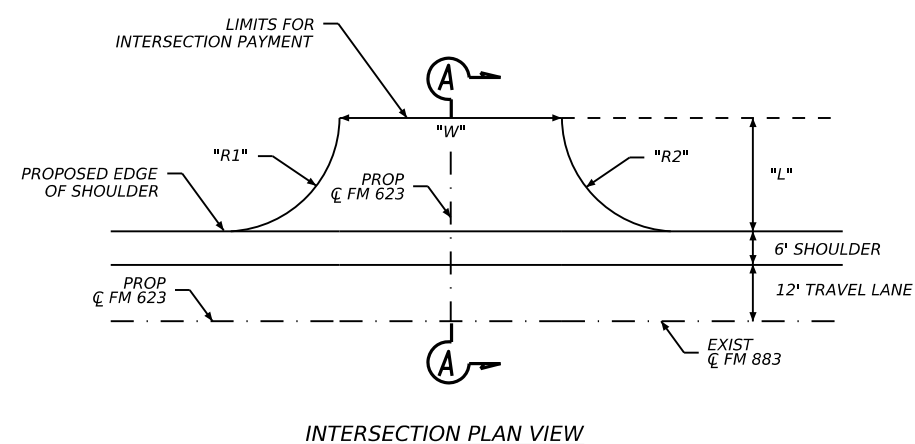
2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		9

DATE: 7/31/2024 10:12:43 PM
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FM 623 INTERSECTION SUMMARY														
STATION	W	L	R1	R2	*	*	*	*	*	*	*	*	*	530
					ASPH(AC-15P, HFRS-2P OR CRS-2P)	AGGR (TY-PB, GR-4 OR 4S)(SAC-B)	ASPH (CRS-2)	AGGR (TY-PB, GR-3 OR 3S)(SAC-B)	PRIME COAT (RC-250)	AGGR (TY-PB, GR-5)(SAC-B)	FL BS (CMP IN PLC) (TYA GR1-2)(FNAL POS)	LIME (COM OR QK)(SLURRY)	LIME TRT (SUBGRADE) (8")	INTERSECTIONS (SURF TREAT)
					GAL	CY	GAL	CY	GAL	CY	CY	TON	SY	(SY)
1136+59	48	53	50	50	127	4	154	5	79	3	114	8	423	396
0988-01-025 TOTALS:														396

*ITEMS PAID SUBSIDIARY TO ITEM 530. FOR CONTRACTOR INFORMATION PURPOSES ONLY.



Victoria L Hernandez, P.E.

08/01/2024

Texas Department of Transportation

FM 623
 INTERSECTION SUMMARY & DETAILS

2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	10	


DATE: 07/28/2024 04:21 PM
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DW: CK: DW: CK: DW: CK:

FM 623 SUMMARY OF SIGNS TO BE REMOVED				
APPROX. STATION			DESCRIPTION	644
				7073
				REMOVE SM RD SN SUP&AM
				EA
01	133+00	LT (EX)	M1-6F <FM SHIELD> FARM ROAD (623)	1
			M6-4 <ARROW-DUAL LEFT & RIGHT><AUX. SIGN>	
02	133+50	RT (EX)	W1-8L <CHEVRON RIGHT>	1
			M3-4 WEST<AUXILIARY SIGN>	
03	134+00	LT (EX)	M1-6F <FM SHIELD> FARM ROAD (883)	1
			M6-1L <ARROW-HORIZ.STRGHT><AUXILIARY SIGN>	
04	134+30	RT (EX)	W1-8L <CHEVRON RIGHT>	1
05	135+10	RT (EX)	W1-8L <CHEVRON RIGHT>	1
06	135+90	RT (EX)	W1-8L <CHEVRON RIGHT>	1
07	136+30	LT (EX)	D1-1 BERCLAIR<LEFT ARROW>	1
08	136+70	RT (EX)	W1-8L <CHEVRON RIGHT>	1
09	137+50	RT (EX)	W1-8L <CHEVRON RIGHT>	1
			M3-4 WEST<AUXILIARY SIGN>	
10	138+45	LT (EX)	M1-6F <FM SHIELD> FARM ROAD (623)	1
			D10-7aT <3-DIGIT VERTICAL NUMBER>(542)	
11	1123+80	RT (A)	M2-1 JCT<AUXILIARY SIGN>	1
			M1-6F <FM SHIELD> FARM ROAD (883)	
12	1126+14	LT (A)	R2-1 SPEED LIMIT (65)	1
13	1128+05	LT (A)	D2-1 PETTUS 2	1
14	1128+05	RT (A)	D1-1 BERCLAIR<ARROW-VERTICAL STRGHT>	1
15	1130+80	RT (A)	W1-8L <CHEVRON RIGHT>	1
			M3-4 WEST<AUXILIARY SIGN>	
16	1130+85	LT (A)	M1-6F <FM SHIELD> FARM ROAD (623)	1
			M1-6F <FM SHIELD> FARM ROAD (883)	
17	1131+50	RT (A)	M6-1R <ARROW-HORIZ.STRGHT><AUXILIARY SIGN>	1
18	1131+75	RT (A)	W1-8L <CHEVRON RIGHT>	1
19	1133+28	LT (A)	R1-1 STOP	1
20	1133+28	RT (A)	R12-1T WEIGHT LIMIT (GROSS 58420 LBS)	1
			M3-2 EAST<AUXILIARY SIGN>	
21	1134+20	RT (A)	M1-6F <FM SHIELD> FARM ROAD (883)	1
			D10-7aT <3-DIGIT VERTICAL NUMBER>(538)	
22	1135+59	RT (A)	D2-1 BERCLAIR 16	1
23	1141+65	RT (A)	W1-8L <CHEVRON RIGHT>	1
24	1142+35	RT (A)	W1-8L <CHEVRON RIGHT>	1
25	1143+42	RT (A)	W1-8L <CHEVRON RIGHT>	1
			M3-2 EAST<AUXILIARY SIGN>	
26	1145+56	RT (A)	M1-6F <FM SHIELD> FARM ROAD (623)	1
27	1147+95	RT (A)	R2-1 SPEED LIMIT (60)	1
28	1149+00	LT (A)	W1-2R(L) SYMBOL-HORIZ CURVE RIGHT	1
			W13-1P (30) MPH <ADVISORY SPEED PLAQUE>	
29	829+20	LT (B)	M2-1 JCT<AUXILIARY SIGN>	1
			M1-6F <FM SHIELD> FARM ROAD (623)	
30	833+00	LT (B)	W3-1 STOP SIGN AHEAD	1
31	834+00	RT (B)	R2-1 SPEED LIMIT (55)	1
CSJ 0988-01-025 TOTALS:				31

FM 623 REMOVAL QUANTITIES									
LOCATION					104	106	496	496	496
					7007	7002	7004	7007	7008
					REMOV CONC (RIPRAP)	OBLITERATING ABANDONED ROAD	REMOV STR (SET)	REMOV STR (PIPE) *	REMOV STR (BOX CULVERT) **
STA	TO	STA	TO	STA	CY	SY	EA	LF	LF
1124+00	(A)	TO	1148+36	(A)	1		2		37
828+73	(B)	TO	834+35	(B)				40	
132+15	(EX)	TO	138+15	(EX)		1940			
CSJ 0989-014-025 TOTALS:					1	1940	2	40	37

* EXISTING STRUCTURE 1 ~ 18" x 40' PIPE
 ** EXISTING STRUCTURE 1 ~ 4' x 2' x 37' BOX CULVERT



Texas Department of Transportation

FM 623

REMOVAL SUMMARY SHEET


2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	11	

DATE: 07/28/2024 04:24 PM
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DW: CK: DW: CK:

		FM 623 DRAINAGE QUANTITIES							
LOCATION	PROPOSED STRUCTURE	400	400	401	464	467	467	467	
		7006	7010	7001	7003	7306	7307	7308	
		CUT & RESTORING PAV	CEM STABIL BKFL	FLOWABLE BACKFILL	RC PIPE (CL III) (18 IN)	SET (TY II) (18 IN) (RCP) (4:1) (C)	SET (TY II) (18 IN) (RCP) (6:1) (C)	SET (TY II) (18 IN) (RCP) (6:1) (P)	
		SY	CY	CY	LF	EA	EA	EA	
1131+50	(A)	3 ~ 18" x 60' RCP w/ SETs	28	3	1.62	180	3	3	
1136+78.55	(A)	1 ~ 18" x 84' RCP w/ SETs		1		84		2	
832+75	(B)	1 ~ 18" x 60' RCP w/ SETs	10	6		60	1	1	
CSJ 0988-01-025 TOTALS:			38	10	1.62	324	4	4	2



FM 623
DRAINAGE SUMMARY
SHEET


2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		12

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DW: CK: DW: CK:

FM 623 SMALL SIGN MOUNTING SUMMARY (CSJ 0988-01-025)			
SUMMARY SHEET	644	644	644
	7025	7028	7031
	IN SM RD SN SUP&AM TYS80(1)SA(P)	IN SM RD SN SUP&AM TYS80(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U)
	EA	EA	EA
1	13	9	1
CSJ 0988-01-025 TOTALS:	13	9	1



FM 623
SIGN MOUNTING
SUMMARY

2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		13

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		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	TY = TYPE	
1	1	W2-2L	SYMBOL - SIDE ROAD AHEAD LEFT	30 x 30	x		S80	1	SA	T		
1	2	M2-1	JCT <AUXILIARY SIGN>	21 x 15	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (883)	24 x 24	x							
1	3	D1-1	(PETTUS) <UP ARROW>	66 x 18	x		S80	1	SA	T		
1	4	D2-1	(BERCLAIR) (16)	78 x 18	x		S80	1	SA	T		
1	5	R2-1	SPEED LIMIT (65)	30 x 36	x		S80	1	SA	P		
1	6	R12-1T	WEIGHT LIMIT/GROSS (58420) LBS	24 x 36	x		S80	1	SA	P		
2	7	M3-4	WEST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
		D10-7aT	<3 DIGIT VERTICAL NUMBER> (538)	3 x 10	x							
		D10-7aT	<3 DIGIT VERTICAL NUMBER> (538)	3 x 10	x							
2	8	M3-2	EAST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	x							
2	9	M3-2	EAST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	U		
		M1-6F	<FM SHIELD> FARM ROAD (883)	24 x 24	x							
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	x							
		M3-4	WEST <AUXILIARY SIGN>	24 x 12	x							
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	x							
2	10	R1-1	STOP	36 x 36	x		S80	1	SA	T		
		W4-4P	CROSS TRAFFIC DOES NOT STOP (PLAQUE)	24 x 12	x							
2	11	M3-2	EAST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
2	12	R2-1	SPEED LIMIT (65)	30 x 36	x		S80	1	SA	P		
2	13	D1-1	BERCLAIR <LEFT ARROW>	78 x 18	x		S80	1	SA	T		
2	14	W3-1	SYMBOL - STOP AHEAD	30 x 30	x		S80	1	SA	T		
3	15	M3-2	EAST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (883)	24 x 24	x							
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	x							
3	16	M2-1	JCT <AUXILIARY SIGN>	21 x 15	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
3	17	W2-4	SYMBOL - TEE INTERSECTION AHEAD	30 x 30	x		S80	1	SA	T		
3	18	W2-2R	SYMBOL - SIDE ROAD AHEAD RIGHT	30 x 30	x		S80	1	SA	T		
3	19	R2-1	SPEED LIMIT (55)	30 x 36	x		S80	1	SA	P		
2	20	M2-1	JCT <AUXILIARY SIGN>	21 x 15	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
2	21	M3-2	EAST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (883)	24 x 24	x							
2	22	M3-2	EAST <AUXILIARY SIGN>	24 x 12	x		S80	1	SA	P		
		M1-6F	<FM SHIELD> FARM ROAD (623)	24 x 24	x							
		M6-1	<ARROW - HORIZ. STRGHT> <AUXILIARY SIGN>	21 x 15	x							
		D10-7aT	<3 DIGIT VERTICAL NUMBER> (542)	3 x 10	x							
		D10-7aT	<3 DIGIT VERTICAL NUMBER> (542)	3 x 10	x							
2	23	W1-7T	<BI-DIRECTIONAL LRG ARRW w/ CHEVRONS>	96 x 36	x		S80	1	SA	T		

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or the use of this standard in any manner. The user of this standard is responsible for its use.

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



SUMMARY OF SMALL SIGNS


SOSS

FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
4-16	DIST	COUNTY	SHEET NO.	
8-16	CRP	BEE	14	

DATE: 8/1/2024 7:46:44 PM
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DW: CK: DW: CK: DW: CK:

FM 623 SW3P SUMMARY										
SHEET	LOCATION					161	164	168	506	506
						7002	7010	7001	7039	7041
	COMPOST MANUF TOPSOIL (4")	DRILL SEED (PERM_RURAL_ CLAY)	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)					
	STA	TO	STA		SY	SY	TGL	LF	LF	
1	1123+50	(A)	TO	1141+00	(A)	9353	9353	171	240	240
2	1141+00	(A)	TO	1153+00	(A)	3072	3072	57		
	821+50	(B)	TO	833+50	(B)	3042	3042	56	80	80
CSJ 0988-01-025 TOTALS:						15467	15467	284	320	320

 Texas Department of Transportation			
FM 623 SW3P SUMMARY SHEET			
2024		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		16

DATE: 8/1/2024 8:42:06 PM
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GENERAL NOTES FOR SEQUENCE OF CONSTRUCTION

- ALL BEGINNING AND ENDING BARRICADES AND SIGNS ARE TO REMAIN IN PLACE FOR THE DURATION OF THE PROJECT.
- ALL SIGNS, BARRICADES AND PAVEMENT MARKINGS SHALL CONFORM WITH THE BC STANDARD SHEETS, TCP SHEETS, AND THE LATEST EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
- CW20-1D, G20-2A & EITHER G20-1bL or G20-1bR SIGNS WILL BE REQUIRED AT ALL PUBLIC ROADS, AND INTERSECTIONS WITHIN LIMITS. IG20-2A! SIGNS MAY BE MOUNTED ON BACK OF CW20-1D, SEE BC(2)-21.
- THE CONTRACTOR SHALL PROVIDE FOR SAFE AND CONVENIENT INGRESS AND EGRESS TO ABUTTING PROPERTY, HIGHWAY, PUBLIC ROAD, AND STREET CROSSING FOR ALL VEHICLES. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL CROSSINGS IN A SAFE AND PASSABLE CONDITION.
- REFER TO THE BARRICADE AND CONSTRUCTION STANDARD SHEETS FOR REQUIRED SPACING OF SIGNS AND BARRICADES.
- THE CONTRACTOR MAY BE REQUIRED TO FURNISH ADDITIONAL BARRICADES, SIGNS, AND WARNING LIGHTS TO MAINTAIN TRAFFIC AND PROMOTE MOTORISTS SAFETY. ANY SUCH ADDITIONAL SIGNS AND BARRICADES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
- ALL SIGNS SHALL BE NEW OR FRESHLY PAINTED AND KEPT CLEAN FOR THE DURATION OF THE PROJECT.
- ALL TRAFFIC BARRELS & EDGE LINE CHANNELIZERS SHALL BE USED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S RECOMMENDATIONS AND SHALL HAVE A 7" PRISMATIC REFLECTOR UNIT, AS APPROVED BY THE ENGINEER. ALL MATERIALS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
- SIGNS, PAVEMENT MARKINGS, CHANNELIZING DEVICES, AND OTHER TRAFFIC CONTROL DEVICES THAT ARE INCONSISTENT WITH INTENDED TRAVEL PATHS THROUGH THE PROJECT AREA SHALL BE REMOVED IMMEDIATELY.
- CONSTRUCT THE ROADWAY WIDENING IN SEGMENTS AS NOTED IN THE PHASE NARRATIVE AND ON TCP SHEETS. FLEX BASE WIDENING SHALL BE COMPLETED ON ONE SIDE AT A TIME, UNLESS THERE IS PRIOR APPROVAL FROM THE ENGINEER. DO NOT PROCEED TO THE NEXT ROADWAY SEGMENT WITHOUT APPROVAL FROM THE ENGINEER.
- THE CONTRACTOR SHALL PROVIDE A PILOT CAR AND QUALIFIED FLAGGERS EQUIPPED WITH TWO-WAY COMMUNICATION TO HANDLE TRAFFIC THROUGH THE WORK AREAS. ALL SIGNS, EQUIPMENT, LABOR, AND INCIDENTALS SHALL BE SUBSIDIARY TO ITEM 502.
- PRIOR TO THE END OF WORK EACH DAY, THE ROADWAY MUST BE REOPENED TO TWO WAY TWO LANE TRAFFIC WITHIN THE ENTIRE PROJECT LIMITS, UNLESS A PORTABLE TRAFFIC SIGNAL IS IN PLACE. UNDER NO CIRCUMSTANCES SHALL ANY SECTION OF THE ROADWAY BE RESTRICTED TO ONE LANE WITHOUT QUALIFIED FLAGGERS PRESENT AT BOTH ENDS OF THE LANE CLOSURE, EQUIPPED WITH TWO-WAY COMMUNICATION DEVICES TO PROVIDE SAFE TRAFFIC CONTROL.
- ALL TRAFFIC CONTROL DEVICES SHALL BE REMOVED WHEN NO LONGER NEEDED. WHEN WORK IS SUSPENDED FOR SHORT TIME PERIOD, ADVANCED WARNING SIGNS THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED FROM THE PROJECT AREA.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR MARKING THE LOCATION OF ALL TRAFFIC CONTROL STRIPING AND PERMANENT STRIPING AS DIRECTED BY THE ENGINEER.
- SHORT TERM FLEXIBLE REFLECTIVE ROADWAY TABS SHALL BE USED TO DELINEATE THE CENTERLINE AND TURNING LANES FOR A MAXIMUM OF 14 DAYS. PERMANENT STRIPING SHALL THEN BE PLACED. PERMANENT STRIPING SHALL BE DONE IN ACCORDANCE WILL ALL APPLICABLE STANDARDS. THE CONTRACTOR SHOULD BE AWARE, DEPENDING ON THE SEQUENCE OF CONSTRUCTION, THE STRIPING CREW MAY HAVE SEVERAL MOVE-INS. ALL SHORT TERM FLEXIBLE REFLECTIVE ROADWAY TABS SHALL BE REPLACED AS NEEDED WITHIN THAT 14 DAY PERIOD AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN AND/OR AN ALTERNATE SEQUENCE OF CONSTRUCTION, IN ADVANCE AND IN WRITING, SUBJECT TO THE APPROVAL OF THE ENGINEER. REFER TO ITEM 502.2 - CONSTRUCTION.
- IN AREAS WHERE ROADWAY IS BEING WORKED ADJACENT TO UNWORKED ROADWAY, A 150' LONG TRANSITION WILL BE MADE TO ACCOUNT FOR ANY VERTICAL DROP OFFS OR CHANGES IN CROSS SLOPE. THE MATERIAL USED SHALL BE FLEX BASE OR ANY OTHER SUITABLE MATERIAL AS APPROVED BY THE ENGINEER.

UNEVEN LANES

- ANY VERTICAL OR NEAR VERTICAL LONGITUDINAL FACE EXCEEDING ONE INCHES IN HEIGHT IN THE PAVEMENT SURFACE- OPEN TO TRAFFIC AT THE END OF THE WORKDAY SHALL BE SLOPED A MINIMUM OF 3:1. TRANSVERSE FACES THAT ARE PRESENT AT THE END OF THE WORKDAY SHALL BE TAPERED IN A MANNER ACCEPTABLE TO THE ENGINEER.
- SIGNING FOR UNEVEN LANES (CW8-11) SHALL BE INSTALLED IN ADVANCE TO THE CONDITION AND REPEATED EVERY 1 MILE. SIGNS INSTALLED ALONG THE UNEVEN LANE CONDITION SHOULD BE SUPPLEMENTED WITH THE "NEXT XX MILES" MILES SIGN (CW21-16) OR ADVISORY SPEED SIGN (SCW13-1). SEE WZ(UL)-13 FOR ADDITIONAL DETAILS.
- UNEVEN LANE SIGNS (CWB-11) SHALL BE ERECTED ON BOTH ENDS ON THE AREA WHERE THERE IS A DIFFERENCE IN ELEVATION BETWEEN ADJACENT LANES GREATER THAN ONE INCH.

PAVEMENT DROP-OFF

- MAXIMUM ELEVATION DROP-OFF ON PAVEMENT EDGE SHALL NOT EXCEED ONE INCH WHEN TRAFFIC IS ALLOWED ADJACENT TO THE DROP-OFF. THE SLOPE MUST BE COMPACTED MATERIAL CAPABLE OF SUPPORTING VEHICLES. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
- SIGNING FOR PAVEMENT DROP-OFF (CW8-9a) SHOULD BE INSTALLED IN ADVANCE OF THE CONDITION AND REPEATED EVERY 1 MILE. SIGNS INSTALLED ALONG THE PAVEMENT EDGE SHOULD BE SUPPLEMENTED WITH THE "NEXT XX MILES" SIGN (CW21-16) OR ADVISORY SPEED SIGN (CW13-1).

GENERAL SUGGESTED SEQUENCE OF CONSTRUCTION

- INSTALL PROJECT LIMIT AND ADVANCE WARNING SIGNS AS SHOWN IN THE PLANS, BC, TCP, AND WZ STANDARDS, AND AS DIRECTED BY THE ENGINEER.
- PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE SW3P LAYOUTS AND AS DIRECTED BY THE ENGINEER.
- FOLLOW PHASE NARRATIVE APPROPRIATE FOR WORK AS DESCRIBED ON THIS SHEET AND AS SHOWN ON THE TCP TYPICAL SHEETS.

PHASE 1

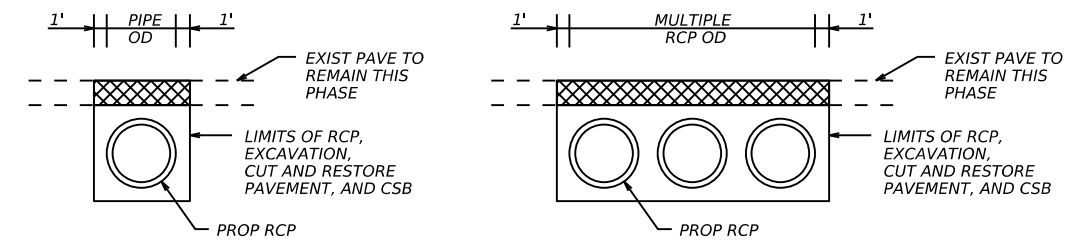
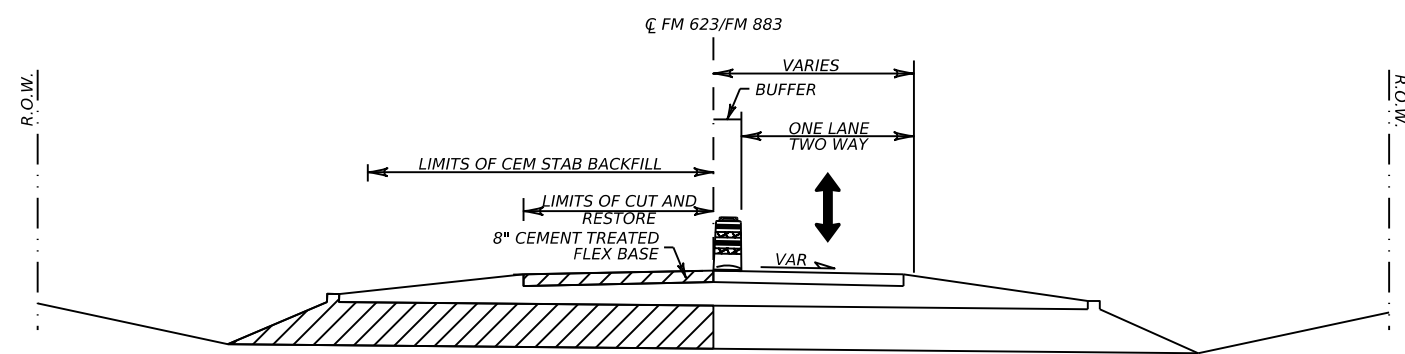
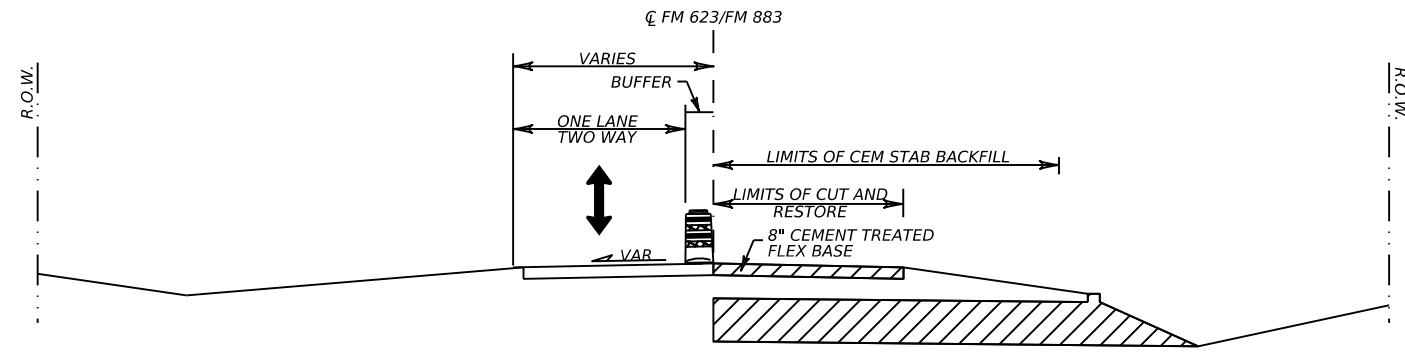
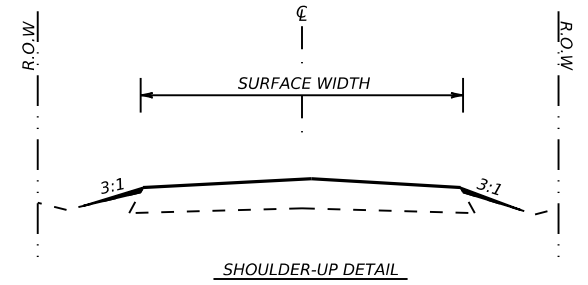
- PREPARE ROW, BLADE EXISTING TOPSOIL INTO NEAT WINDROWS AT RIGHT OF WAY LINE. KEEP CLEAN AND DO NOT CONTAMINATE WITH CEMENT TREATED CLIPPINGS, ETC. TOPSOIL TO BE REDISTRIBUTED ACROSS EMBANKMENT TO HELP REESTABLISH VEGETATION.
- CONSTRUCT FM623 (A) FROM STA 1136+59 (A) TO 1140+24 (A) UP TO INVERTED PRIME IN ACCORDANCE WITH TYPICAL SECTIONS, PLAN & PROFILE SHEETS, AND CULVERT LAYOUT SHEET.

PHASE 2

- RECONSTRUCT CULVERTS IN HALF WIDTHS USING TCP(2-2b)-18. OPEN ROADWAY TO UNRESTRICTED THRU TRAFFIC AT THE END OF EACH DAY.

LOCATIONS

CULVERT A - STA 1131+50 (A)
 CULVERT C - STA 832+75 (B)



- CEMENT TREATED FLEX BASE (8") (TY A)(GR 1-2) W/ 4% CEMENT BY WEIGHT



Victoria L Hernandez, P.E.

08/01/2024

Texas Department of Transportation

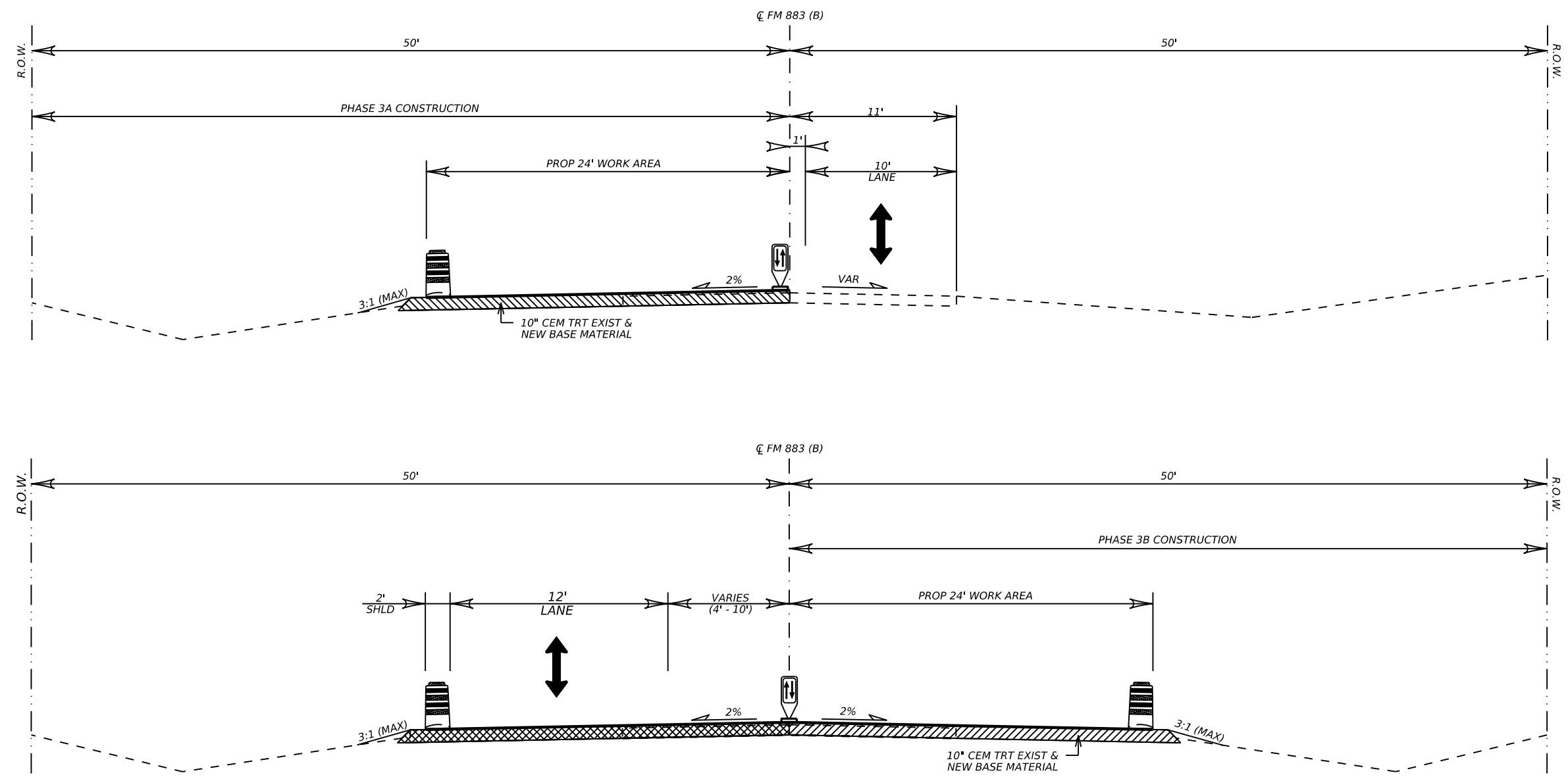
FM 623

SUGGESTED SEQUENCE OF CONSTRUCTION

2024 SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		17

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- LEGEND**
- ONE LANE TWO-WAY TRAFFIC
 - AREA OF CONSTRUCTION
 - WORK COMPLETE

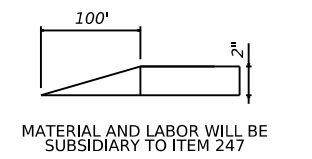
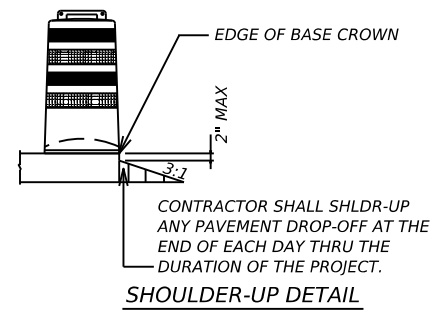
- NOTES**
1. CONSTRUCTION SHALL NOT EXCEED ON (1) MILE IN LENGTH.
 2. THE ROADWAY SHALL BE WORKED IN HALF WIDTHS WHILE UTILIZING APPROPRIATE TCP STANDARDS INCLUDING BUT NOT LIMITED TO TCP (2-2)-18, & WZ (RS)-16. AN APPROPRIATE ROADWAY LENGTH SHALL BE WORKED SO THAT AT THE END OF EACH DAY, BOTH HALVES OF THE ROADWAY SHALL BE OPEN TO TRAFFIC AND HAVE NO VERTICAL DROP OFFS.
 3. TWO LANE TWO-WAY TRAFFIC OPERATION TO BE USED AT THE END OF DAILY OPERATION. OPPOSING TRAFFIC LANE DIVIDERS SHALL BE PLACED ALONG CENTERLINE.
 4. DROP OFF SHALL NOT EXCEED 2". SEE SHOULDER-UP DETAIL.
 5. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE USED IN CONJUNCTION WITH APPLICABLE TCP STANDARDS.



Victoria L Hernandez, P.E.
 08/01/2024

PHASE 3A & 3B

1. USING TCP(2-2b)-18 FOR TRAFFIC CONTROL, SACRIFY EXISTING ROADWAY AND DISTRIBUTE EXISTING BASE MIXTURE TO PROPOSED WIDTH.
2. HAUL IN, PLACE NEW FLEX BASE, SPREAD TO PROPOSED PAVEMENT LIMITS, CEMENT TREAT NEW AND EXIST MATERIAL, AND SHAPE WITH 2% CROSS SLOPE ON ONE SIDE OF THE ROADWAY BEFORE MOVING TO THE OPPOSITE SIDE OF THE ROAD FOR A LENGTH NOT TO EXCEED 1 (ONE) MILE.
3. COMPACT AND FINISH SECTION TO CARRY TRAFFIC AT THE END OF EACH DAYS OPERATION. PROVIDE A SMOOTH AND TRAVERSABLE TRANSITION CONSTRUCTED ROADWAY TO EXISTING ROADWAY (SEE TAPER DETAIL).
4. PLACE INVERTED PRIME NO MORE THAN 5 DAYS AFTER CEMENT TREATMENT, PRIOR TO CONTINUING THE NEXT SECTION OF THE ROADWAY.
5. PLACE OTLD DIVIDERS AT THE END OF EACH DAYS OPERATIONS. (SEE BC(9)-21).
6. OPEN ROADWAY TO UNRESTRICTED THRU TRAFFIC AT THE END OF EACH WORKING DAY.



CROSS SLOPE AND VERTICAL TRANSITION TAPER DETAIL
 MATERIAL AND LABOR WILL BE SUBSIDIARY TO ITEM 247

Texas Department of Transportation

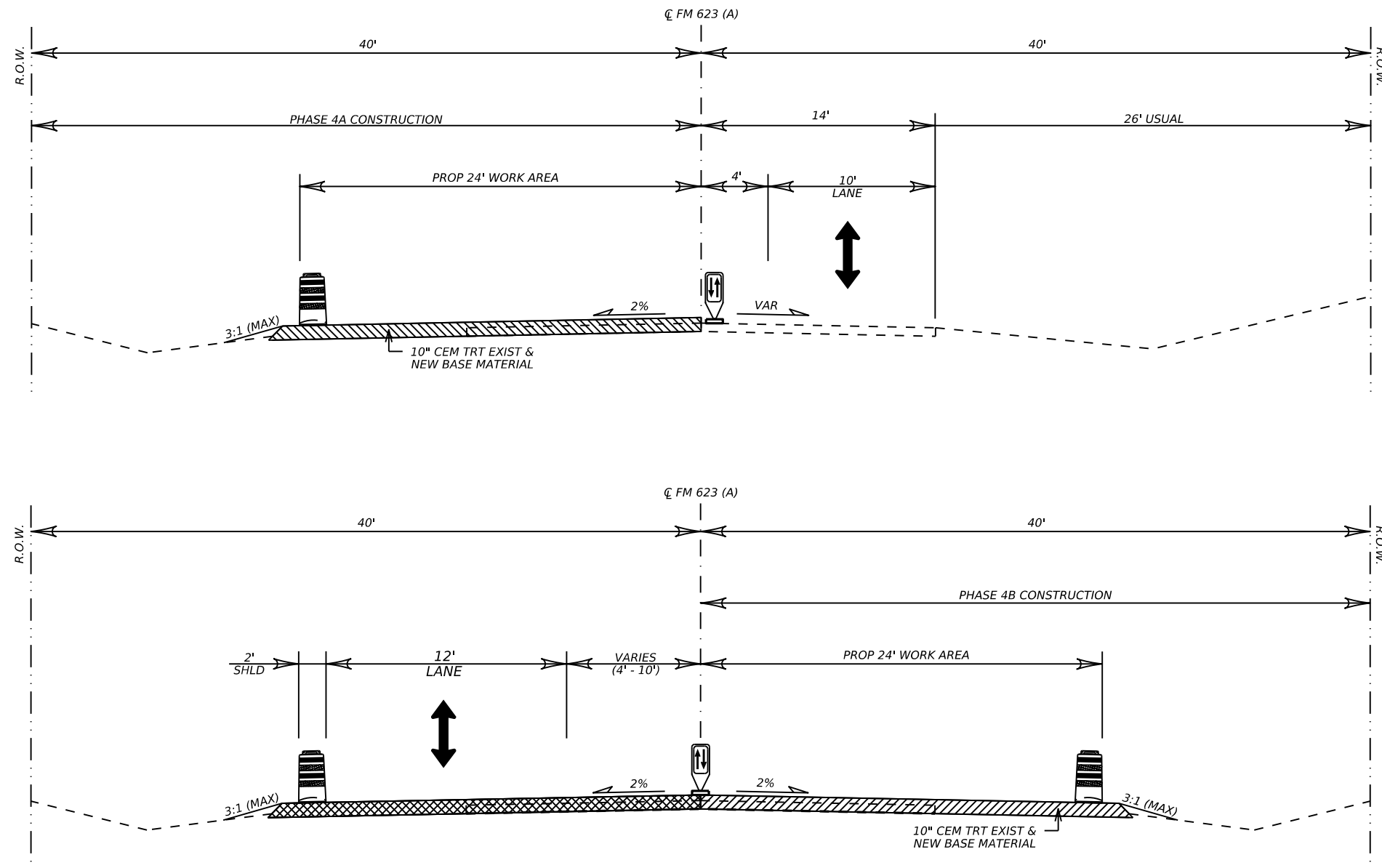
FM 623

SUGGESTED SEQUENCE OF CONSTRUCTION

2024 SHEET 2 OF 3

0988	01	025	FM 623
CRP	BEE		18

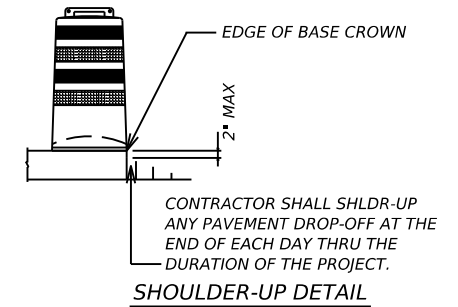
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LEGEND

ONE LANE TWO-WAY TRAFFIC
 AREA OF CONSTRUCTION
 WORK COMPLETE

- NOTES**
- CONSTRUCTION SHALL NOT EXCEED ON (1) MILE IN LENGTH.
 - THE ROADWAY SHALL BE WORKED IN HALF WIDTHS WHILE UTILIZING APPROPRIATE TCP STANDARDS INCLUDING BUT NOT LIMITED TO TCP (2-2)-18, & WZ (RS)-16. AN APPROPRIATE ROADWAY LENGTH SHALL BE WORKED SO THAT AT THE END OF EACH DAY, BOTH HALVES OF THE ROADWAY SHALL BE OPEN TO TRAFFIC AND HAVE NO VERTICAL DROP OFFS.
 - TWO LANE TWO-WAY TRAFFIC OPERATION TO BE USED AT THE END OF DAILY OPERATION. OPPOSING TRAFFIC LANE DIVIDERS SHALL BE PLACED ALONG CENTERLINE.
 - DROP OFF SHALL NOT EXCEED 2". SEE SHOULDER-UP DETAIL.
 - PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE USED IN CONJUNCTION WITH APPLICABLE TCP STANDARDS.

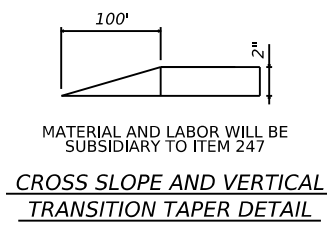


Victoria L Hernandez, P.E.

08/01/2024



FM 623
SUGGESTED SEQUENCE OF CONSTRUCTION



PHASE 4A & 4B

- USING TCP(2-2b)-18 FOR TRAFFIC CONTROL, SACRIFY EXISTING ROADWAY AND DISTRIBUTE EXISTING BASE MIXTURE TO PROPOSED WIDTH.
- HAUL IN, PLACE NEW FLEX BASE, SPREAD TO PROPOSED PAVEMENT LIMITS, CEMENT TREAT NEW AND EXIST MATERIAL, AND SHAPE WITH 2% CROSS SLOPE ON ONE SIDE OF THE ROADWAY BEFORE MOVING TO THE OPPOSITE SIDE OF THE ROAD FOR A LENGTH NOT TO EXCEED 1 (ONE) MILE.
- COMPACT AND FINISH SECTION TO CARRY TRAFFIC AT THE END OF EACH DAYS OPERATION. PROVIDE A SMOOTH AND TRAVERSABLE TRANSITION CONSTRUCTED ROADWAY TO EXISTING ROADWAY (SEE TAPER DETAIL).
- PLACE INVERTED PRIME NO MORE THAN 5 DAYS AFTER CEMENT TREATMENT, PRIOR TO CONTINUING THE NEXT SECTION OF THE ROADWAY.
- PLACE OTLD DIVIDERS AT THE END OF EACH DAYS OPERATIONS. (SEE BC(9)-21).
- OPEN ROADWAY TO UNRESTRICTED THRU TRAFFIC AT THE END OF EACH WORKING DAY.

PHASE 5

- PLACE THE FIRST SURFACE TREATMENT NO LATER THEN FOURTEEN (14) DAYS AFTER PLACEMENT OF INVERTED PRIME, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- PLACE NON-REMOVABLE WORK ZONE PAVEMENT MARKERS TO DELINEATE CENTERLINE IF FINAL SURFACE TREATMENT IS NOT PLACED WITHIN FOURTEEN DAYS.

PHASE 6

- PLACE FINAL SURFACE TREATMENT AND DELINEATE CENTERLINE USING WORKZONE PAVEMENT MARKINGS.
- PLACE FINAL PAVEMENT MARKINGS AND PAVEMENT MARKERS USING TCP(3-1)-13 & TCP(3-3)-14.
- OBLITERATE ABANDONED ROADWAY. EVENLY REDISTRIBUTE WINDROWED TOPSOIL, STABILIZE DISTURBED AREAS, REGRADE DITCHES, AND ESTABLISH VEGETATION.
- INSTALL NEW SIGNS, DELINEATORS AND OBJECT MARKERS.
- PREFORM FINAL SITE CLEAN UP, REMOVE SW3P DEVICES, AND REMOVE PROJECT LIMIT/ADVANCE WARNING SIGNS.

2024 SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- 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).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- 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:


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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

- Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
- Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

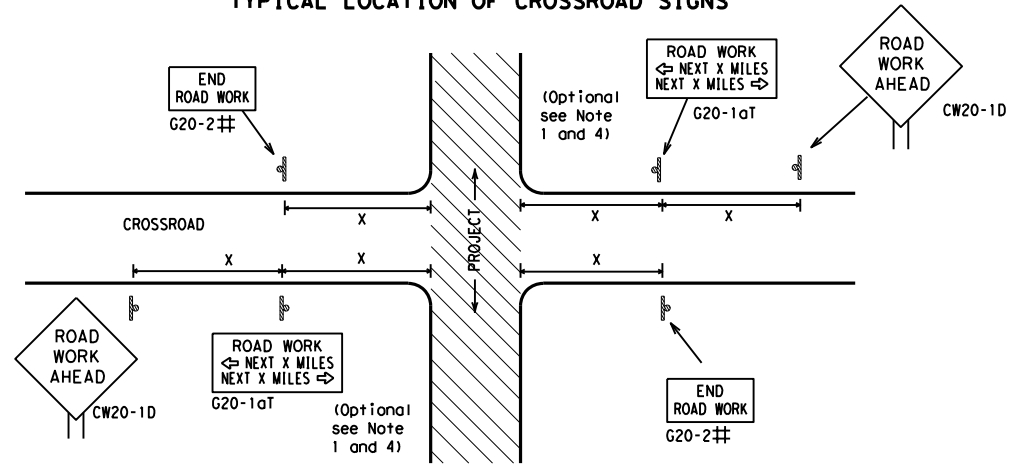
THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS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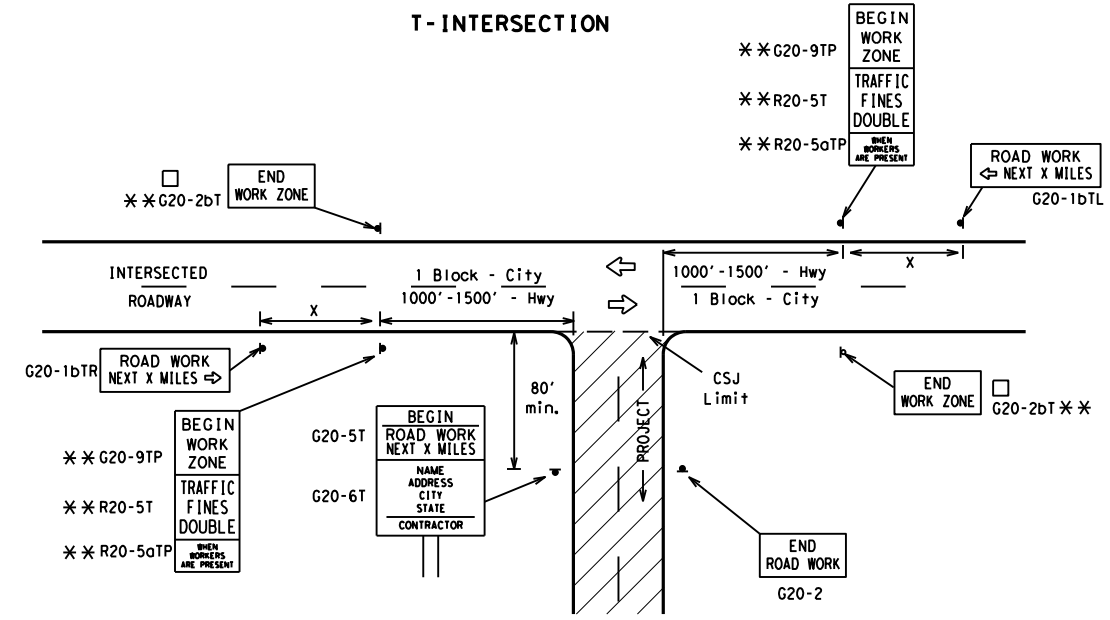
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TYPICAL LOCATION OF CROSSROAD SIGNS



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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

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

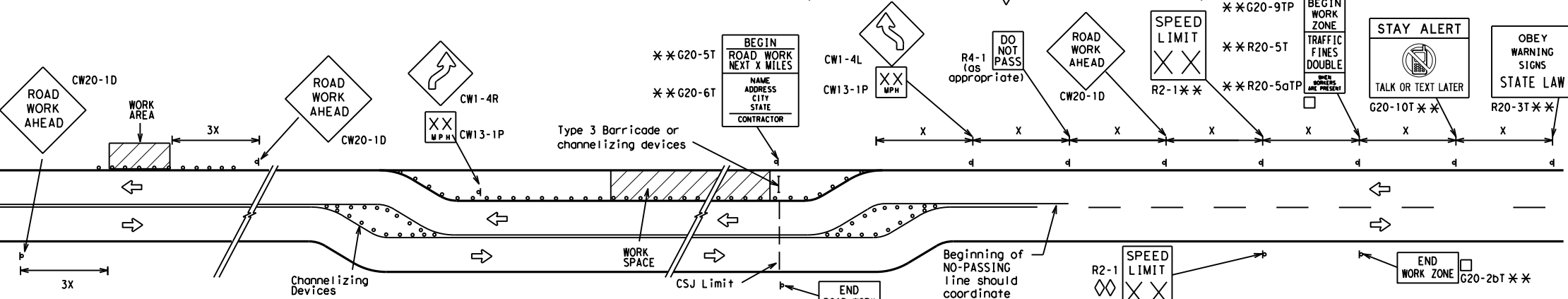
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

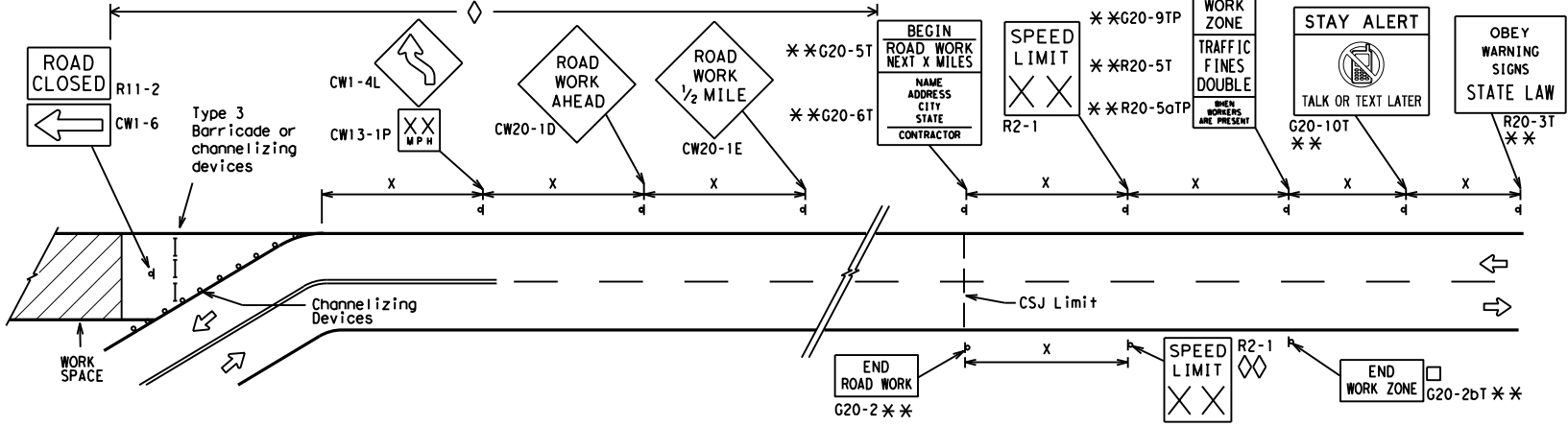
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

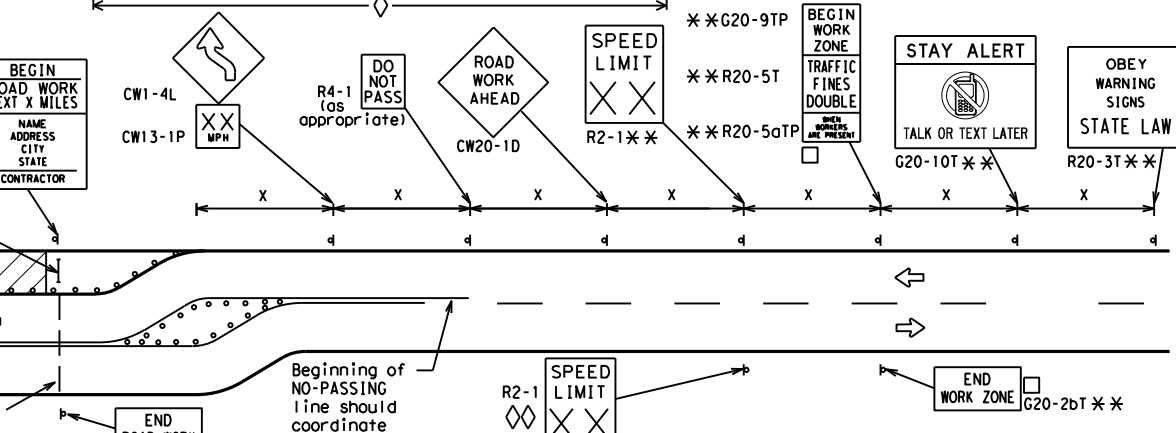


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

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

LEGEND

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

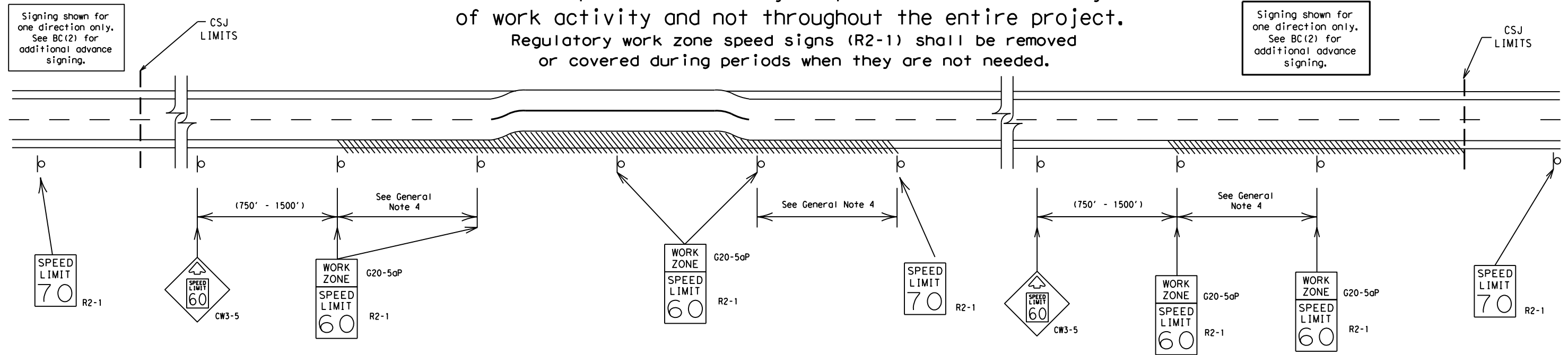
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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

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

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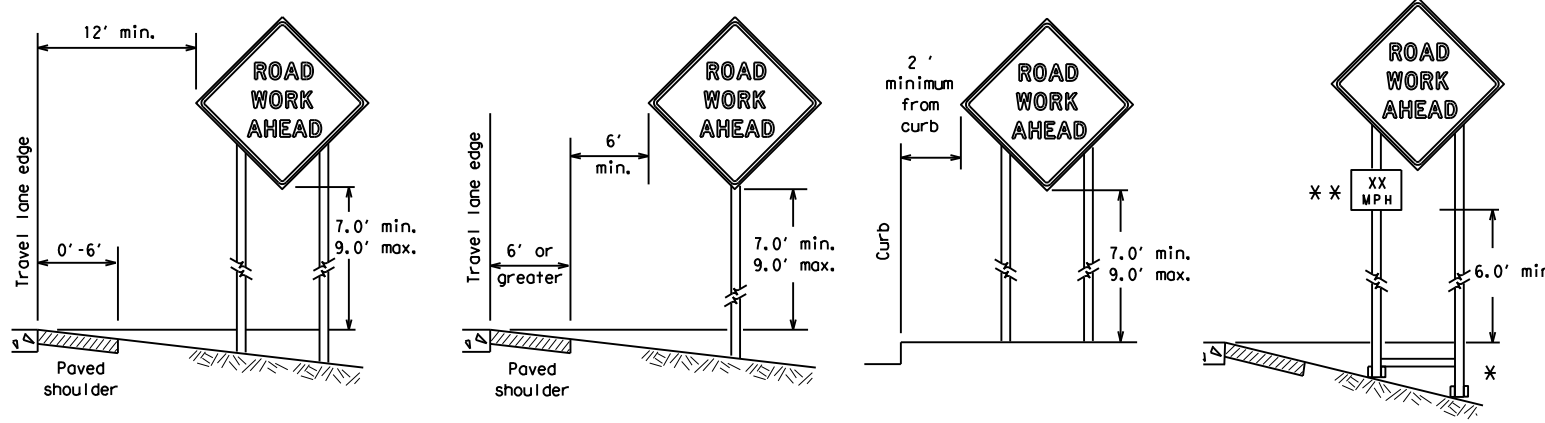
SHEET 3 OF 12

		Texas Department of Transportation		Traffic Safety Division Standard	
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<h3>BC (3) - 21</h3>					
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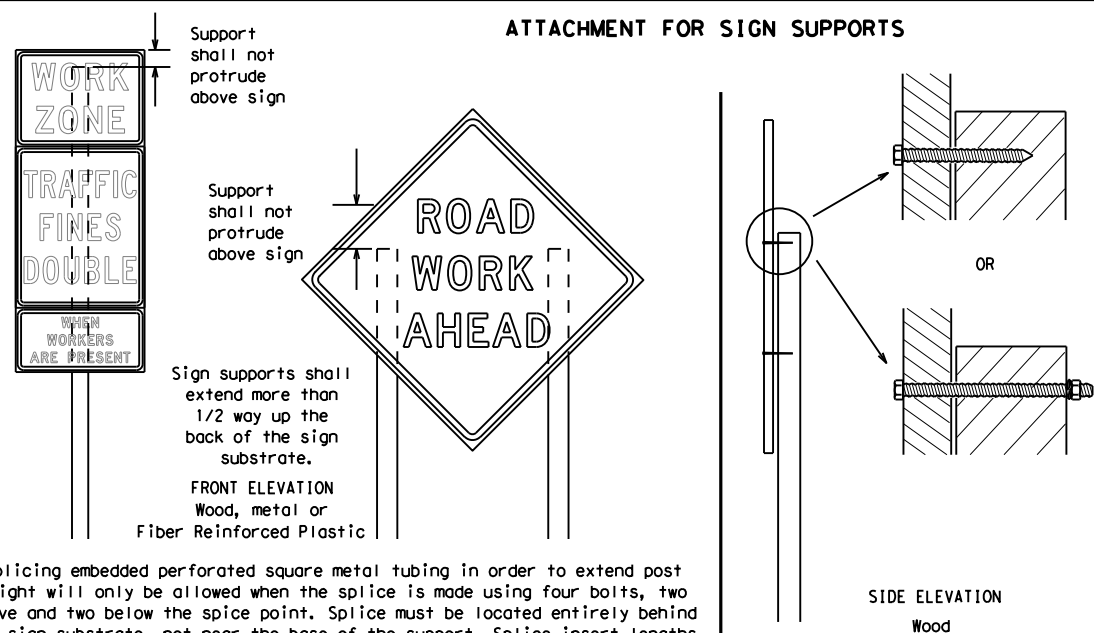
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

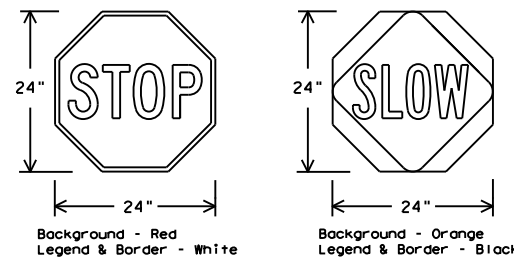
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not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

FLAGS ON SIGNS

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

STOP/SLOW PADDLES

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B _{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

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

SHEET 4 OF 12

Texas Department of Transportation
 Traffic Safety Division Standard

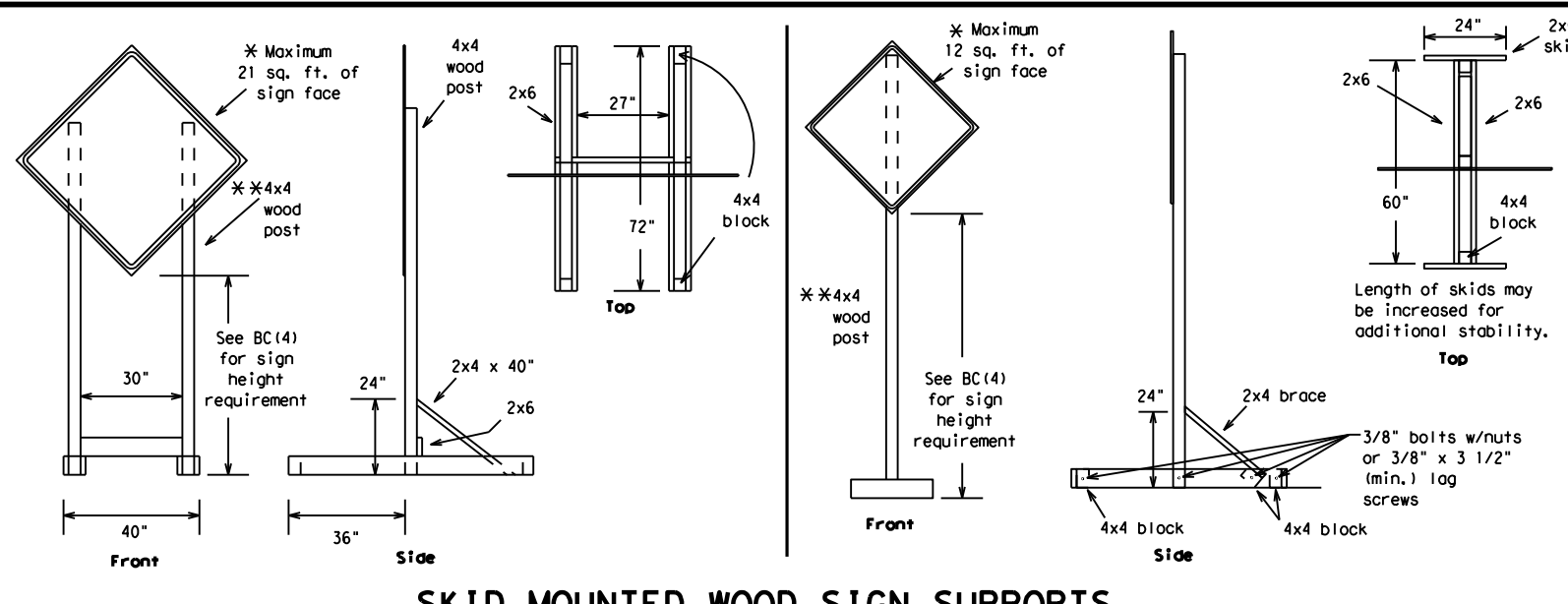
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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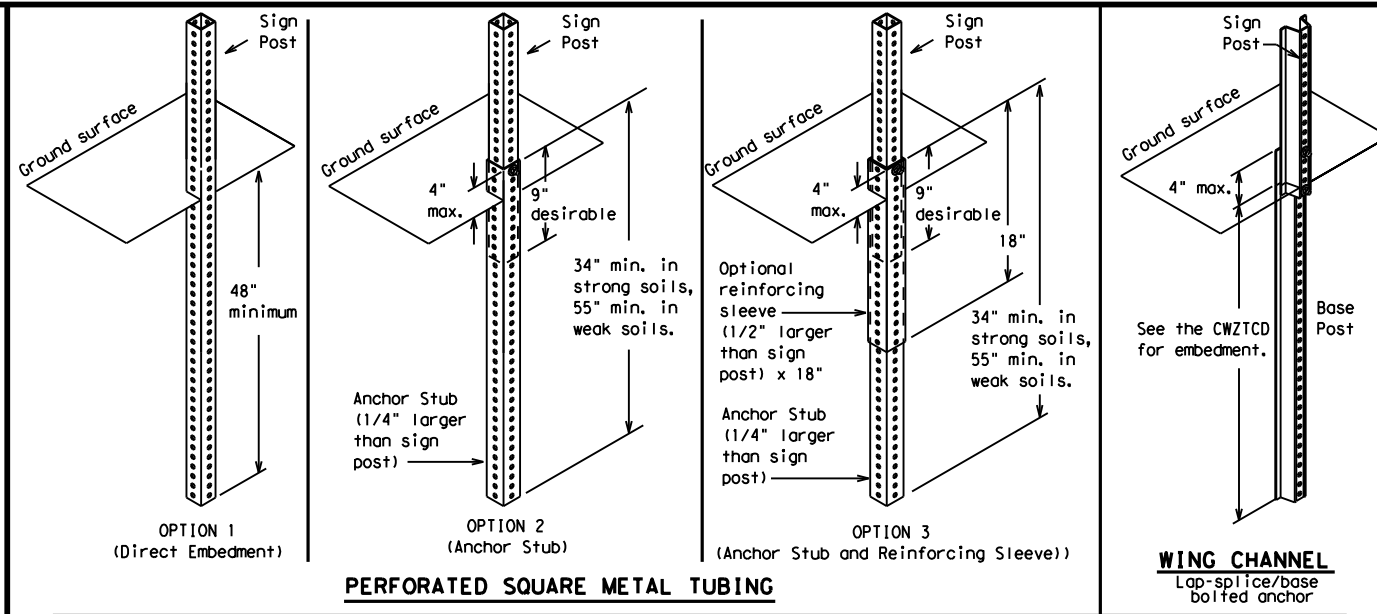
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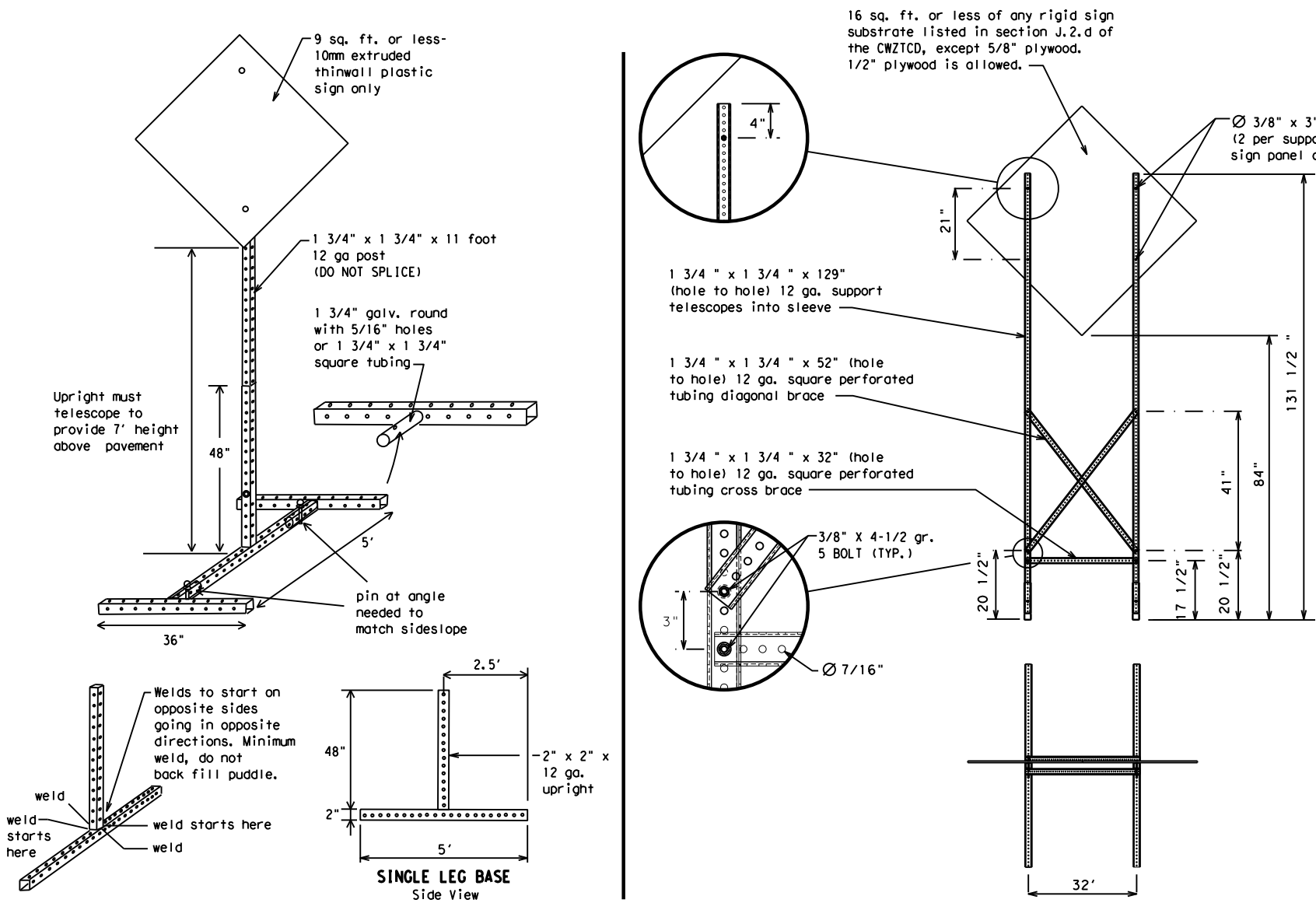
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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7-13 5-21	CRP	BEE	24	

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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

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



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

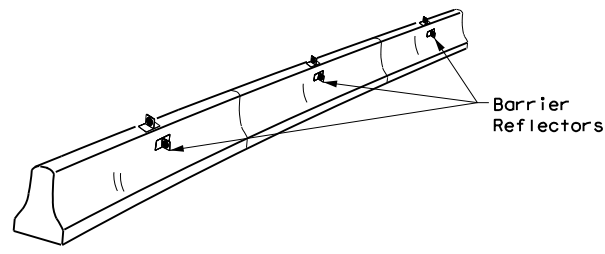
BC(6)-21

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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988 01	025	FM 623	
9-07 8-14	DIST	COUNTY	SHEET NO.	
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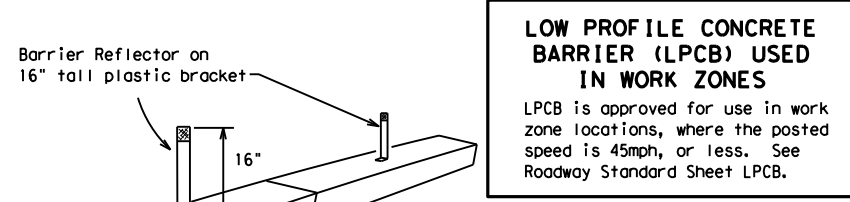
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



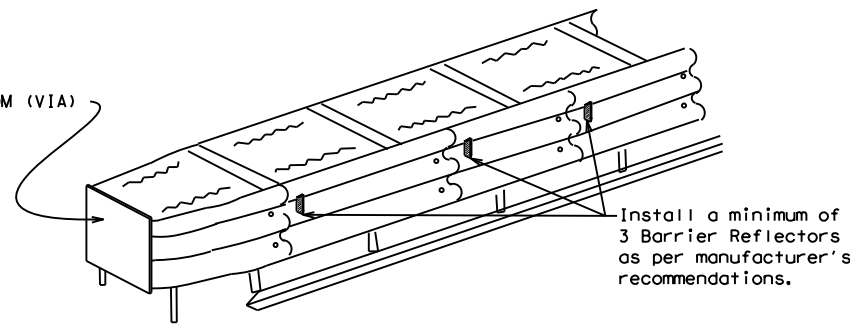
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES
 End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

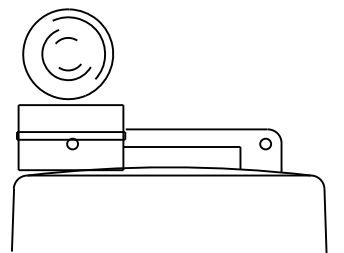
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

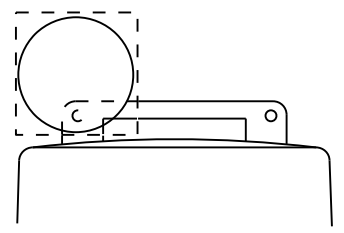
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



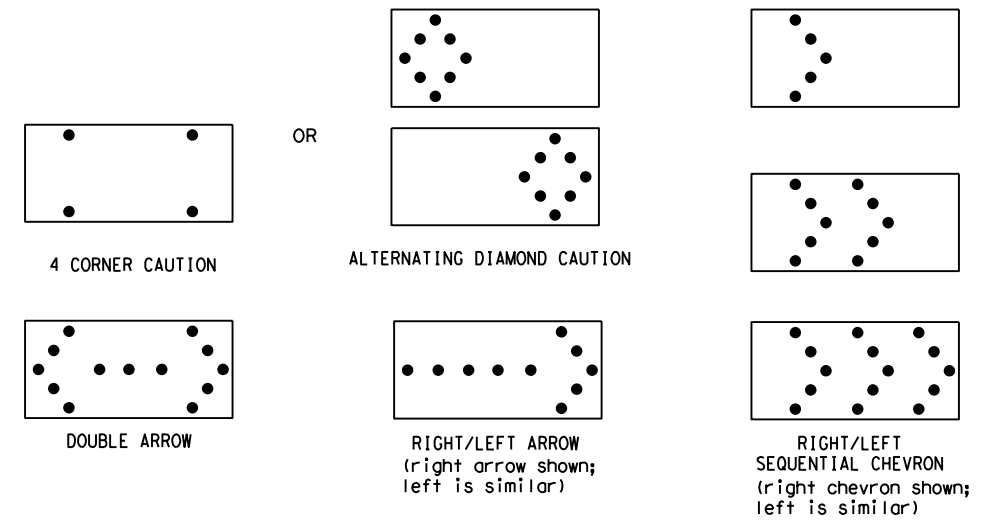
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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

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



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

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

ATTENTION
 Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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



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

BC (7) - 21

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9-07	8-14	DIST	COUNTY	SHEET NO.					
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

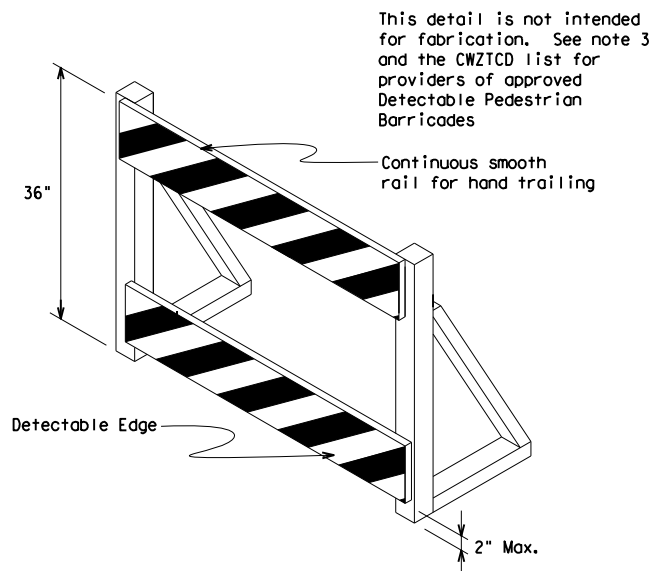
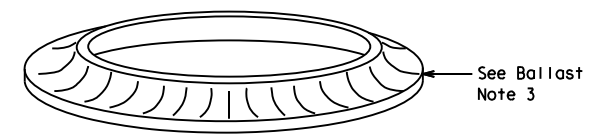
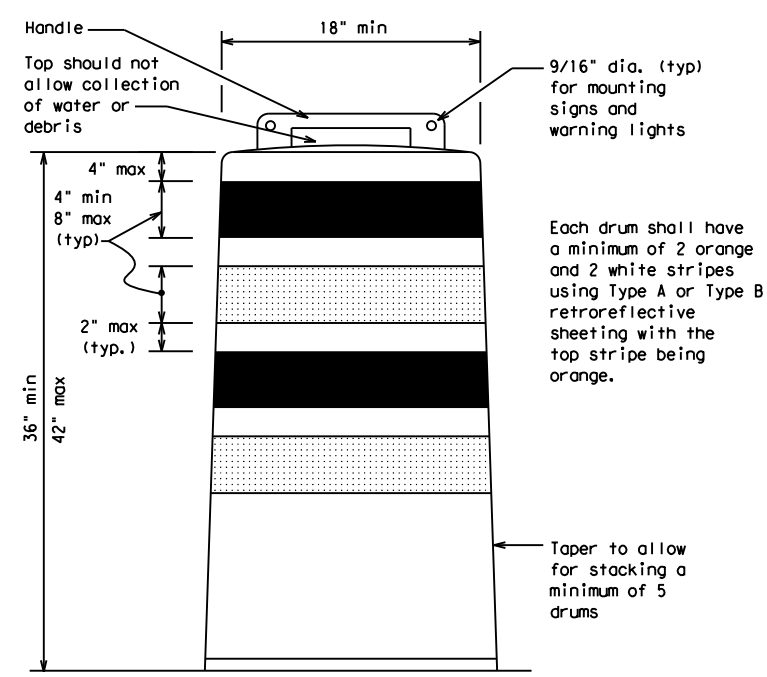
- Pre-qualified plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
 - The body and base shall lock together in such a manner that the body separates from the base when impacted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

RETROREFLECTIVE SHEETING

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

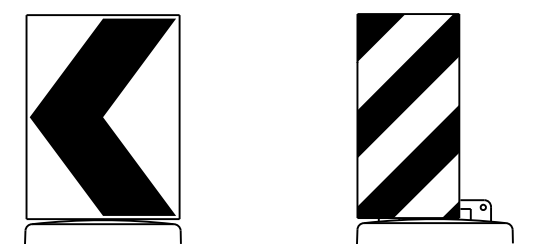
BALLAST

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



DETECTABLE PEDESTRIAN BARRICADES

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



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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12



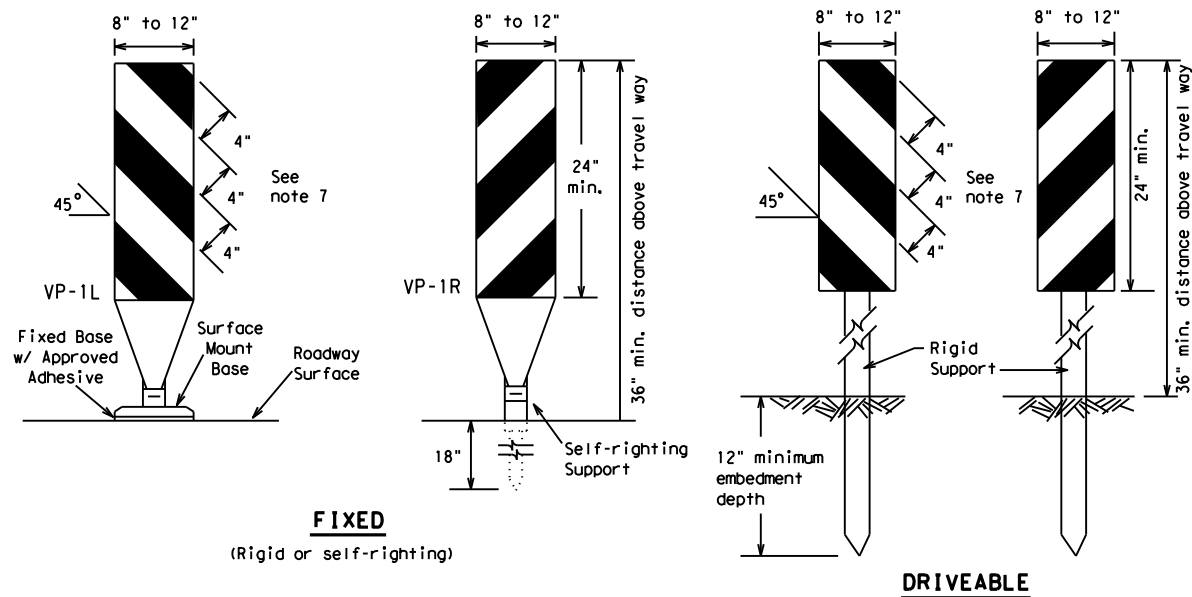
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

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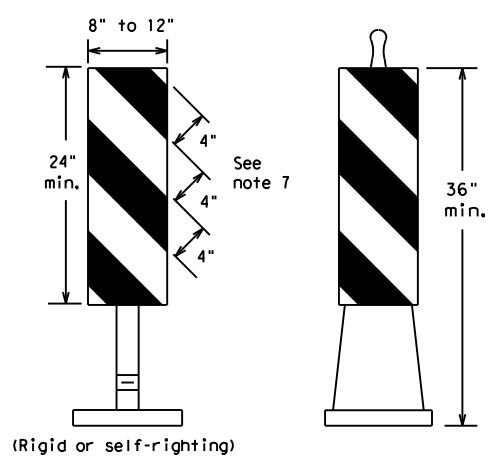
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FIXED
(Rigid or self-righting)

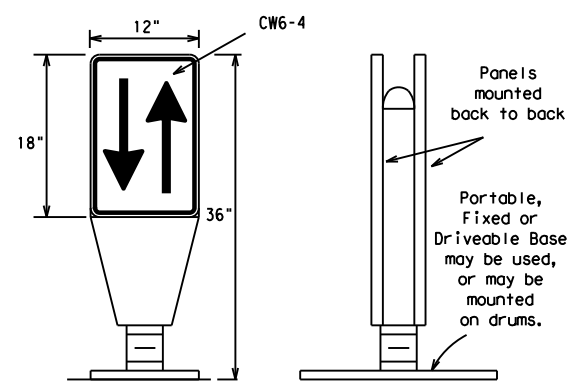
DRIVEABLE



PORTABLE

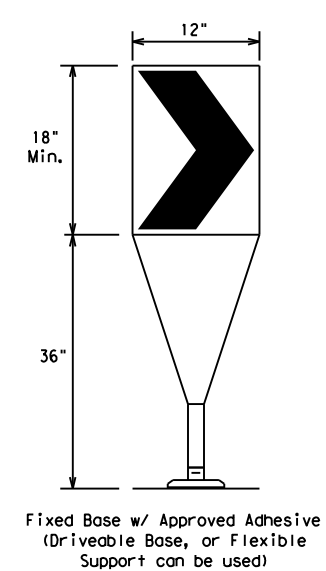
VERTICAL PANELS (VPs)

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



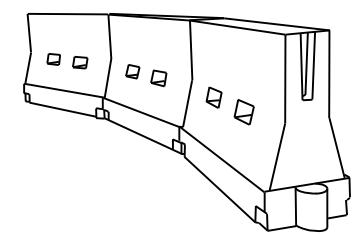
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

Posted Speed	Formula	Minimum Desirable Taper Lengths * *			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS 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



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.

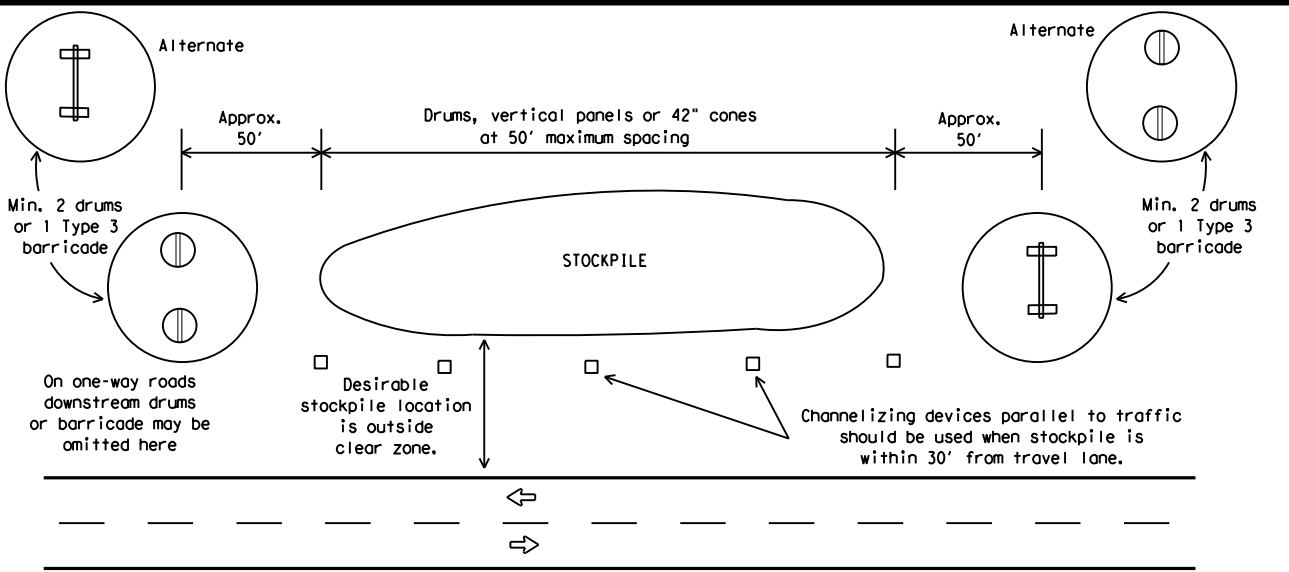


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



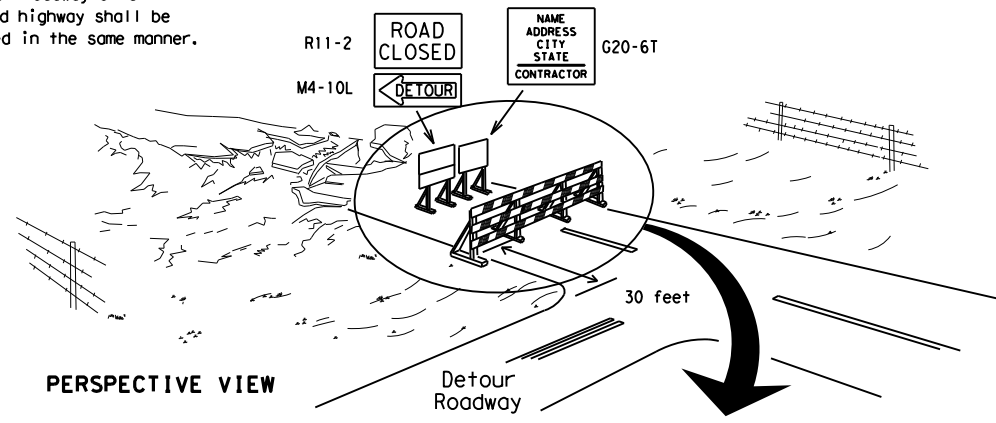
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



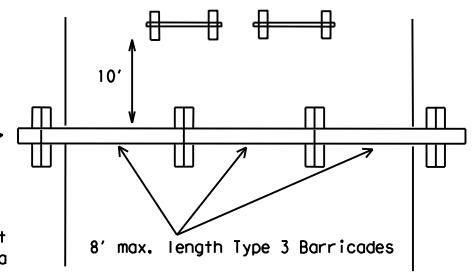
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



PERSPECTIVE VIEW

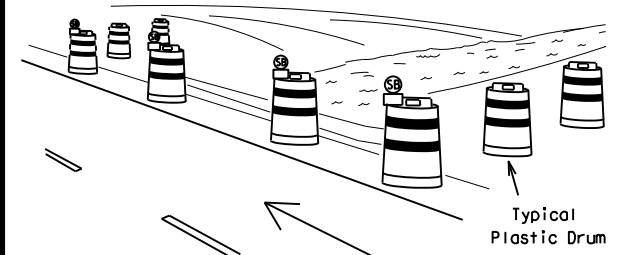
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



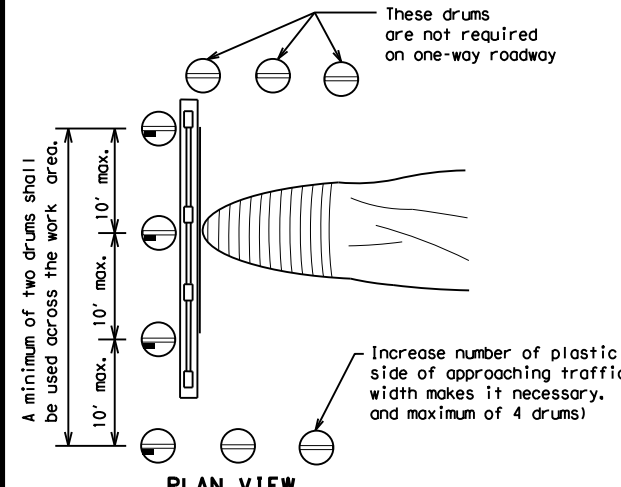
PLAN VIEW

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

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW



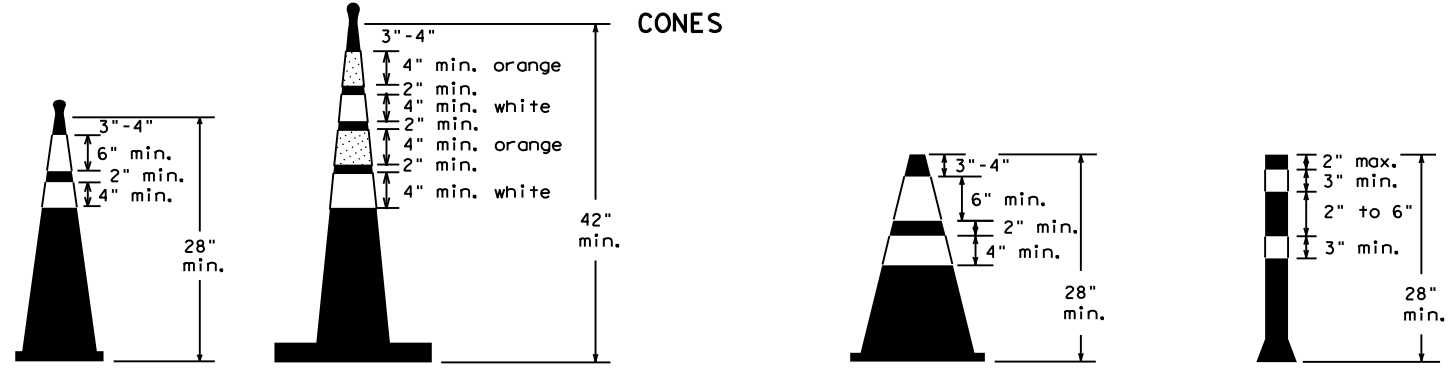
PLAN VIEW

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

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

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

One-Piece cones

Tubular Marker

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

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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	CRP	BEE	29	

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

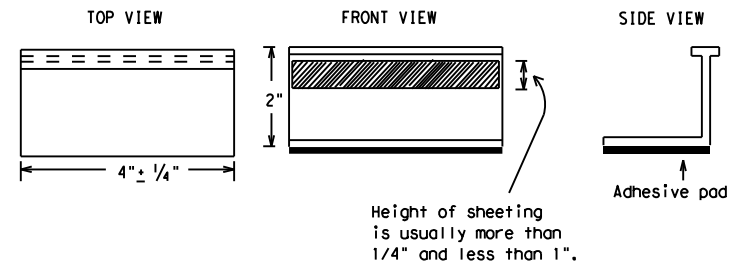
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

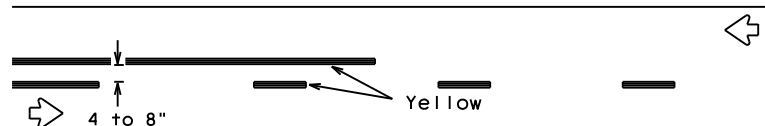
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11-02 8-14				

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PAVEMENT MARKING PATTERNS

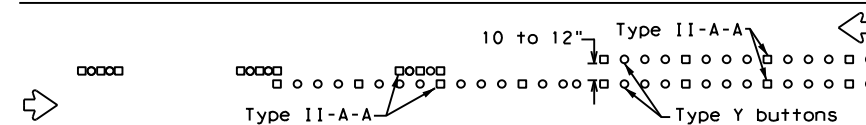


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

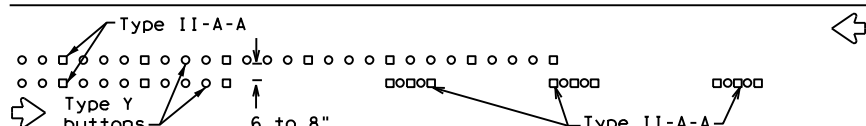


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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



RAISED PAVEMENT MARKERS - PATTERN A



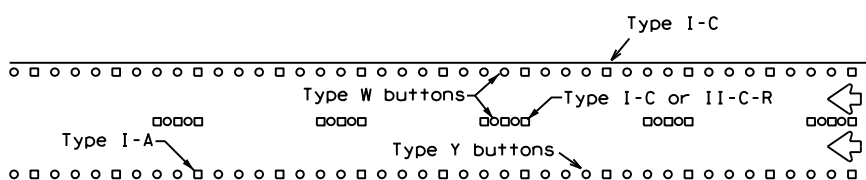
RAISED PAVEMENT MARKERS - PATTERN B

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



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



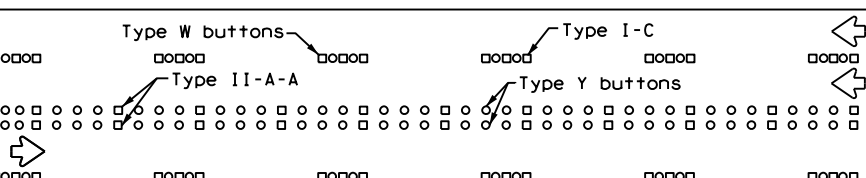
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



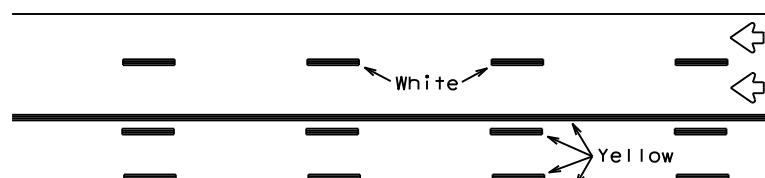
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



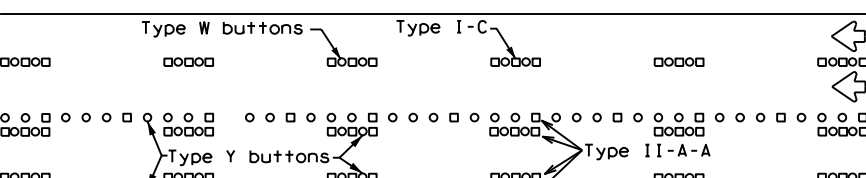
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

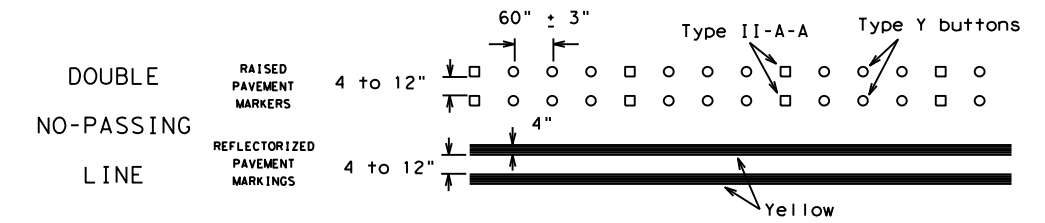
Prefabricated markings may be substituted for reflectORIZED pavement markings.



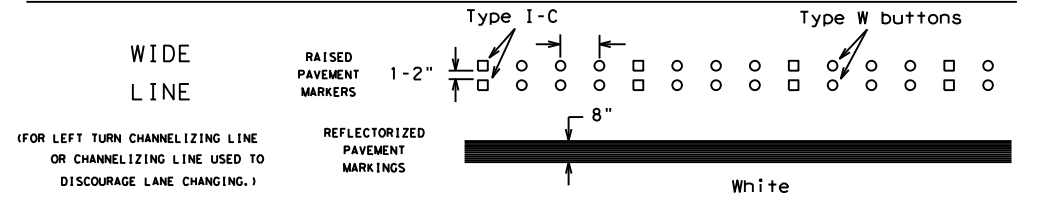
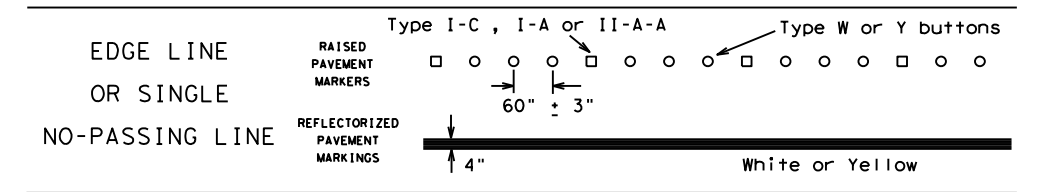
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

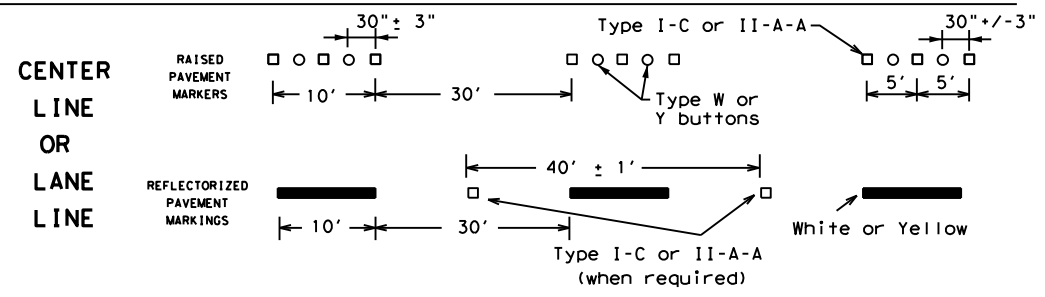
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



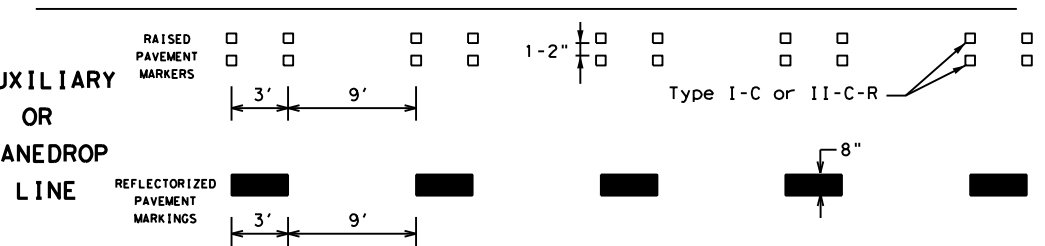
SOLID LINES



BROKEN LINES

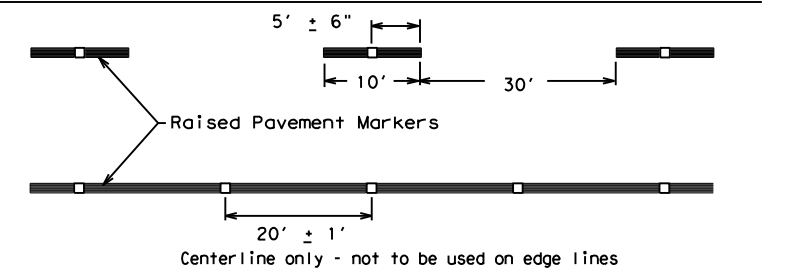


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

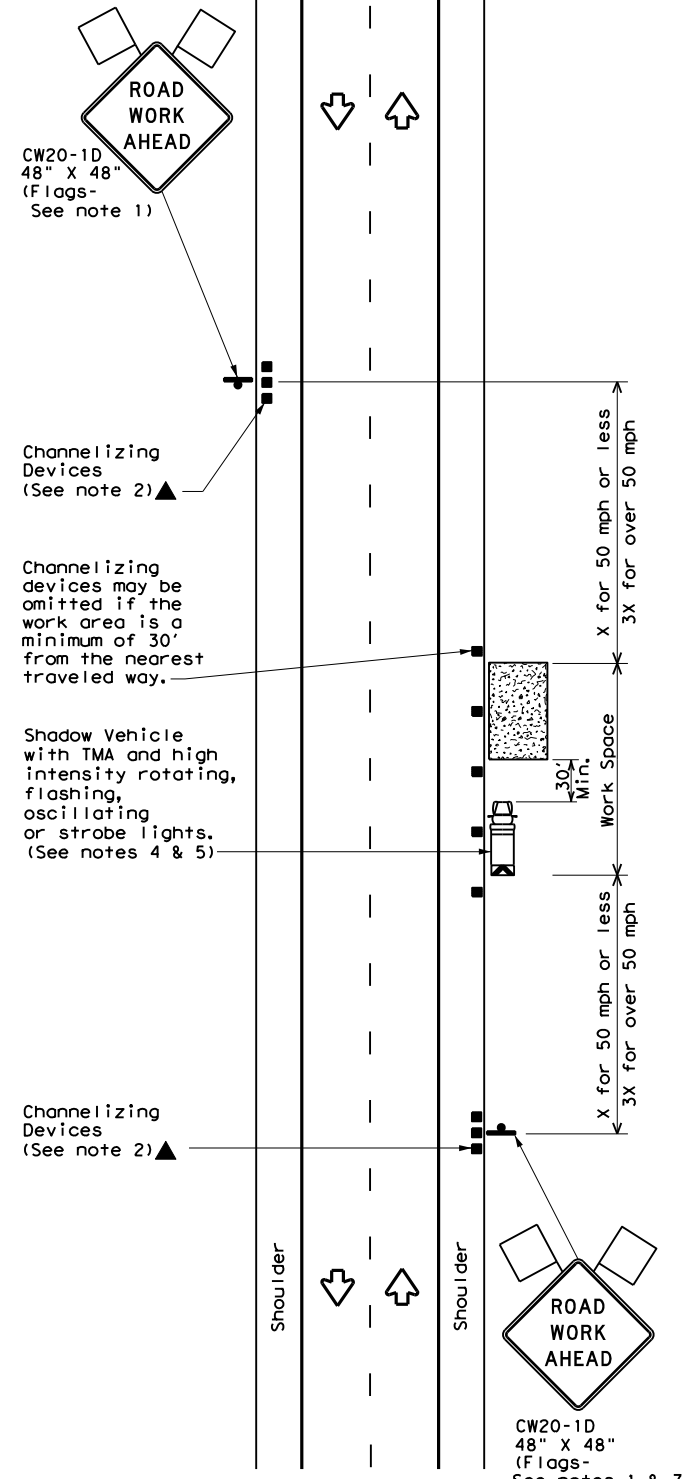
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	CRP	BEE	31	
11-02 8-14				

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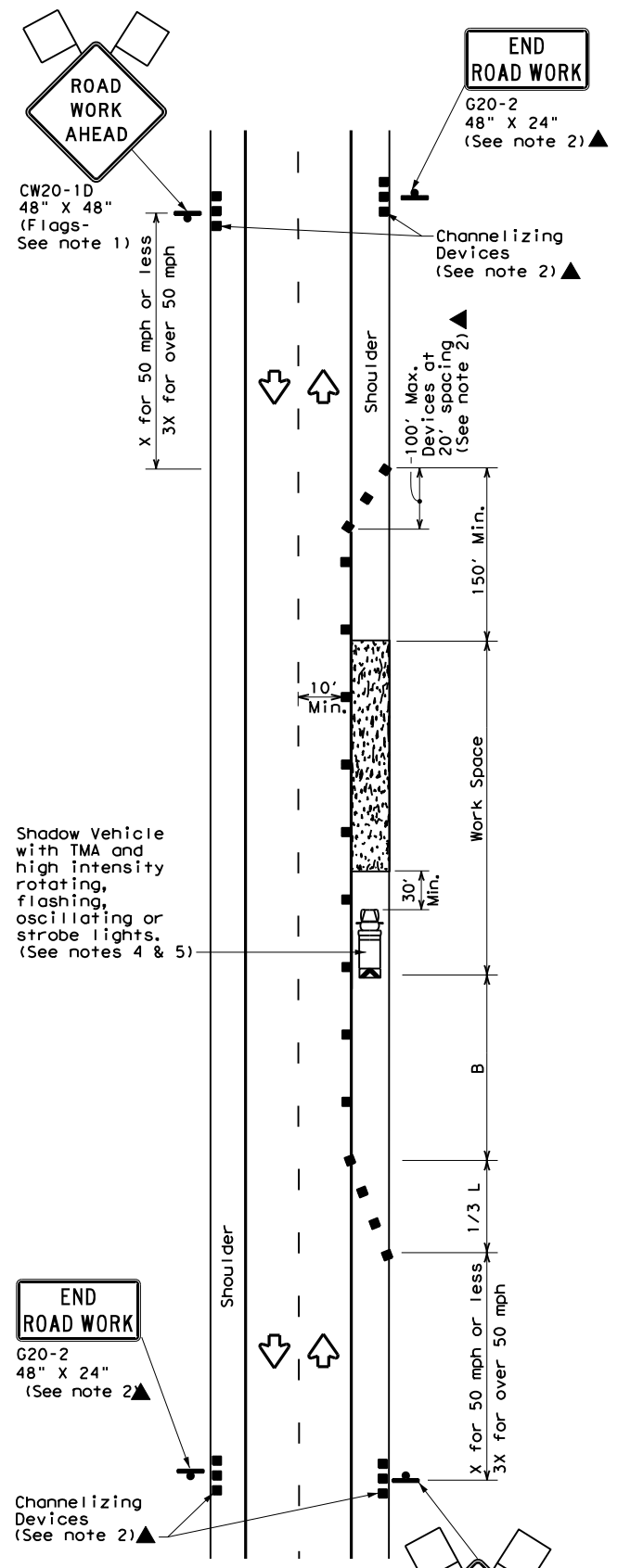
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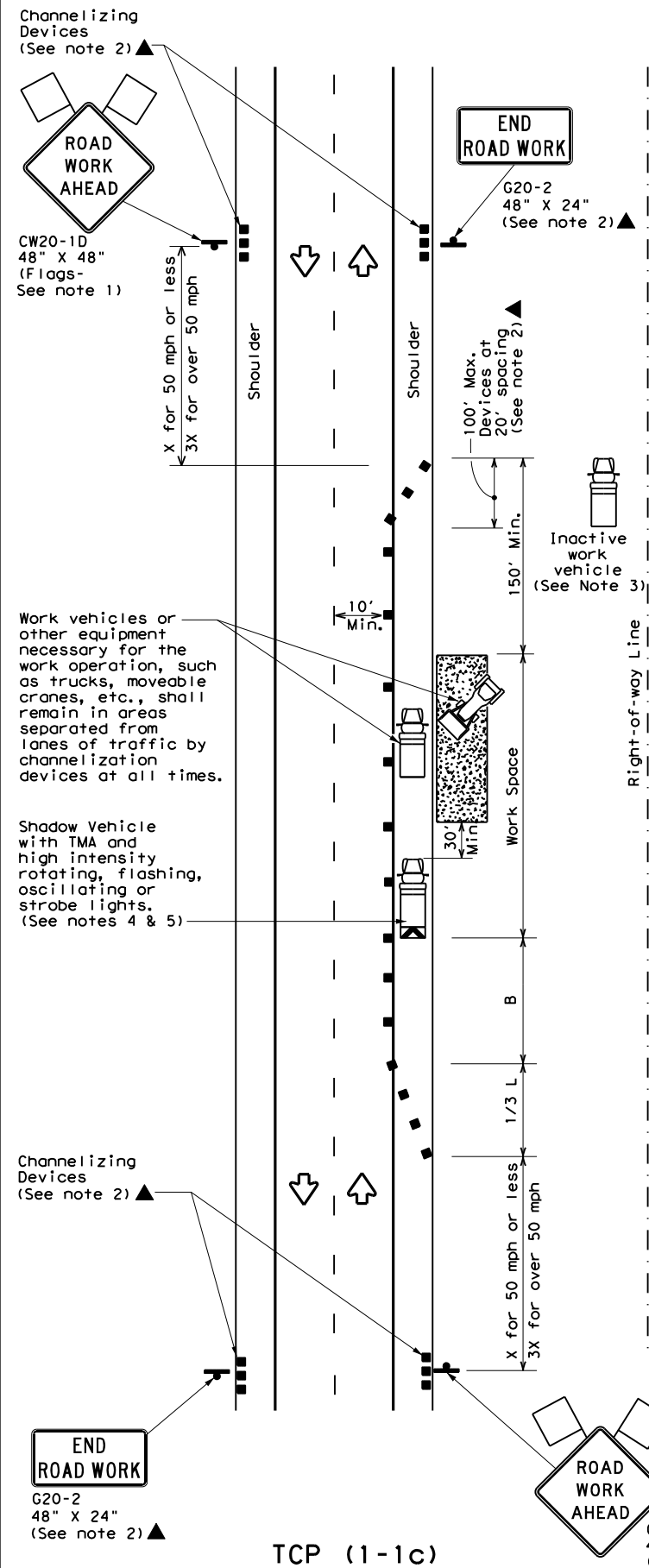
TCP (1-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

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

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

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

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

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

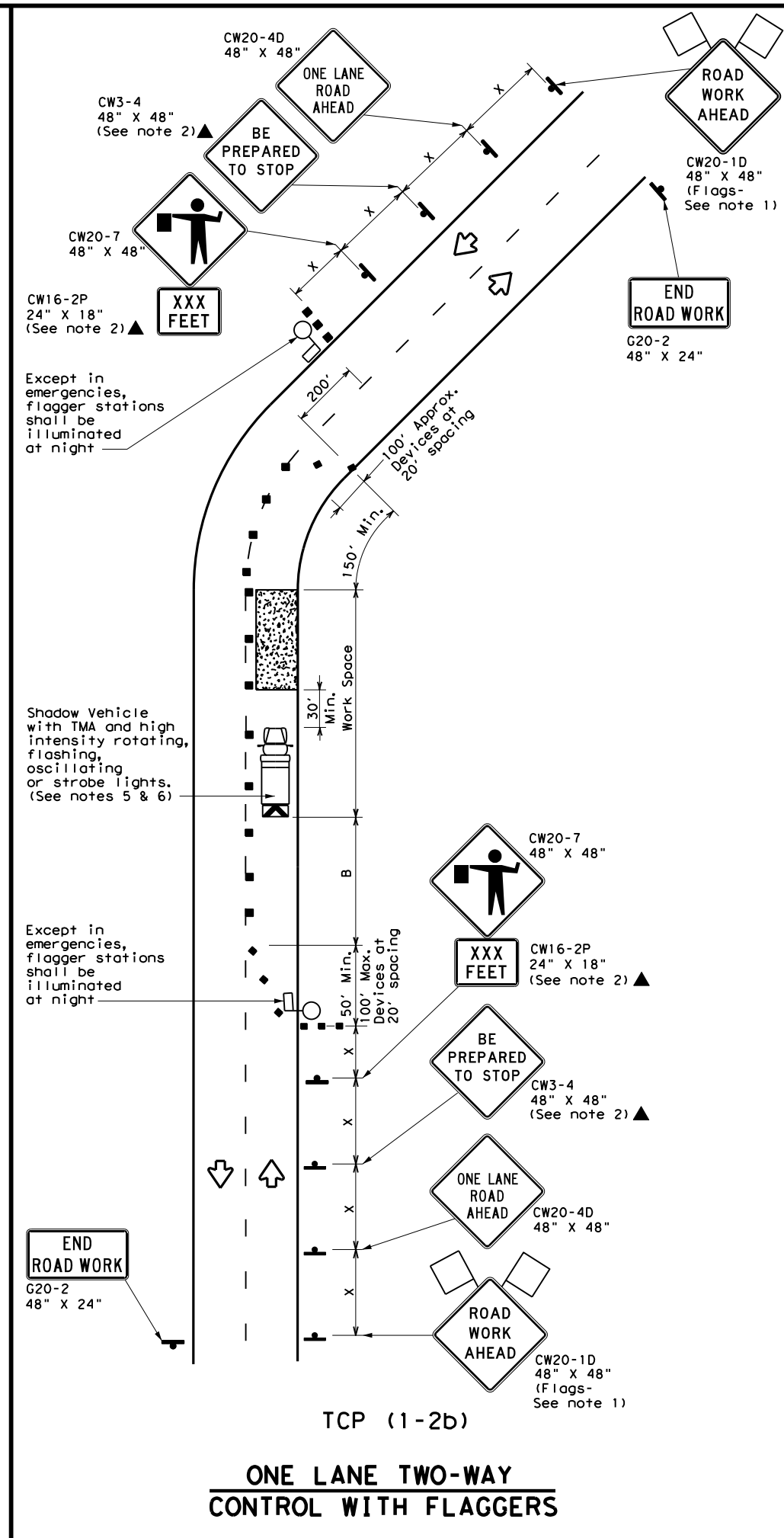
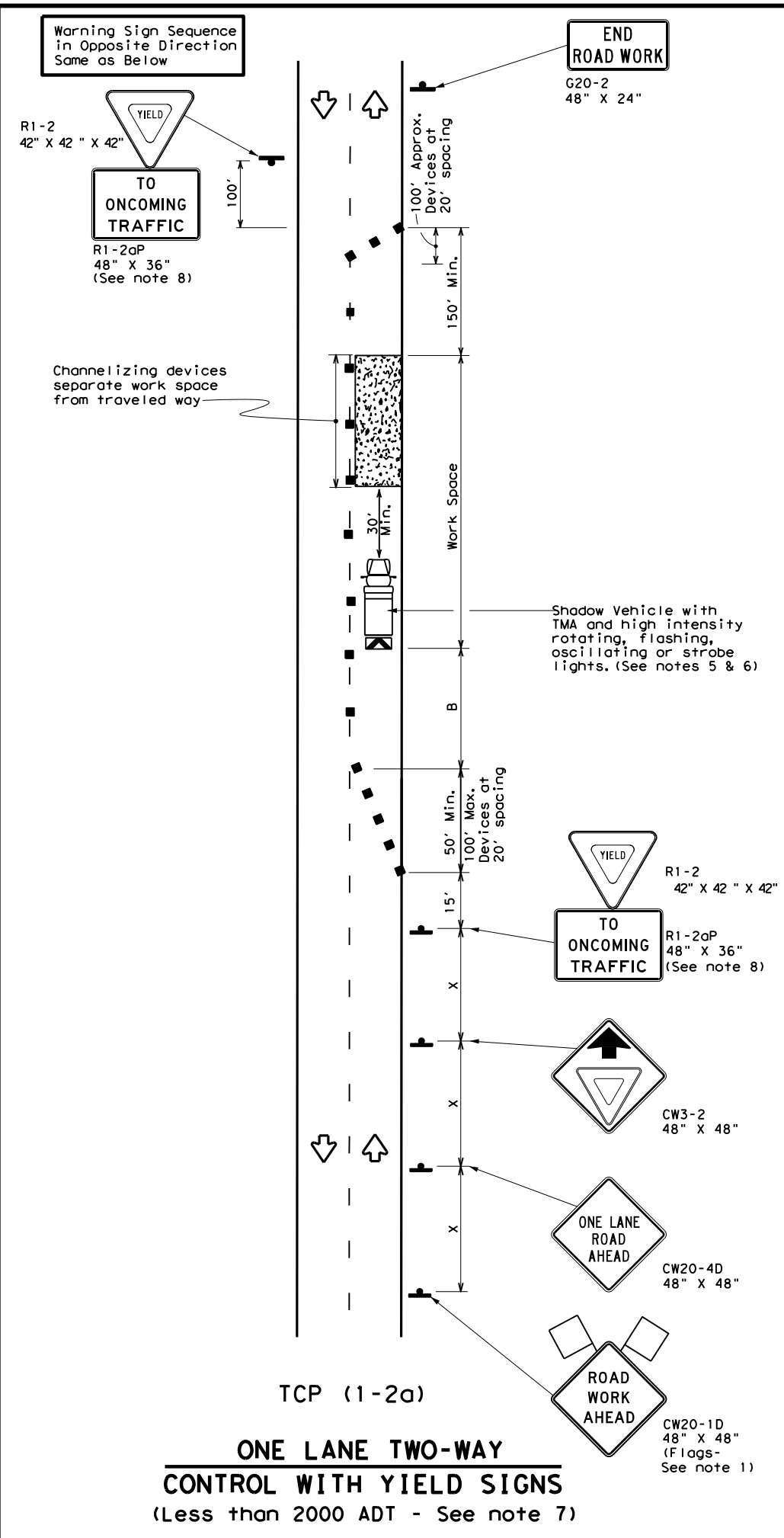


TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (1-1) - 18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988 01	025	FM	623
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	CRP	BEE		32
1-97 2-18				

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = 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
	✓	✓		

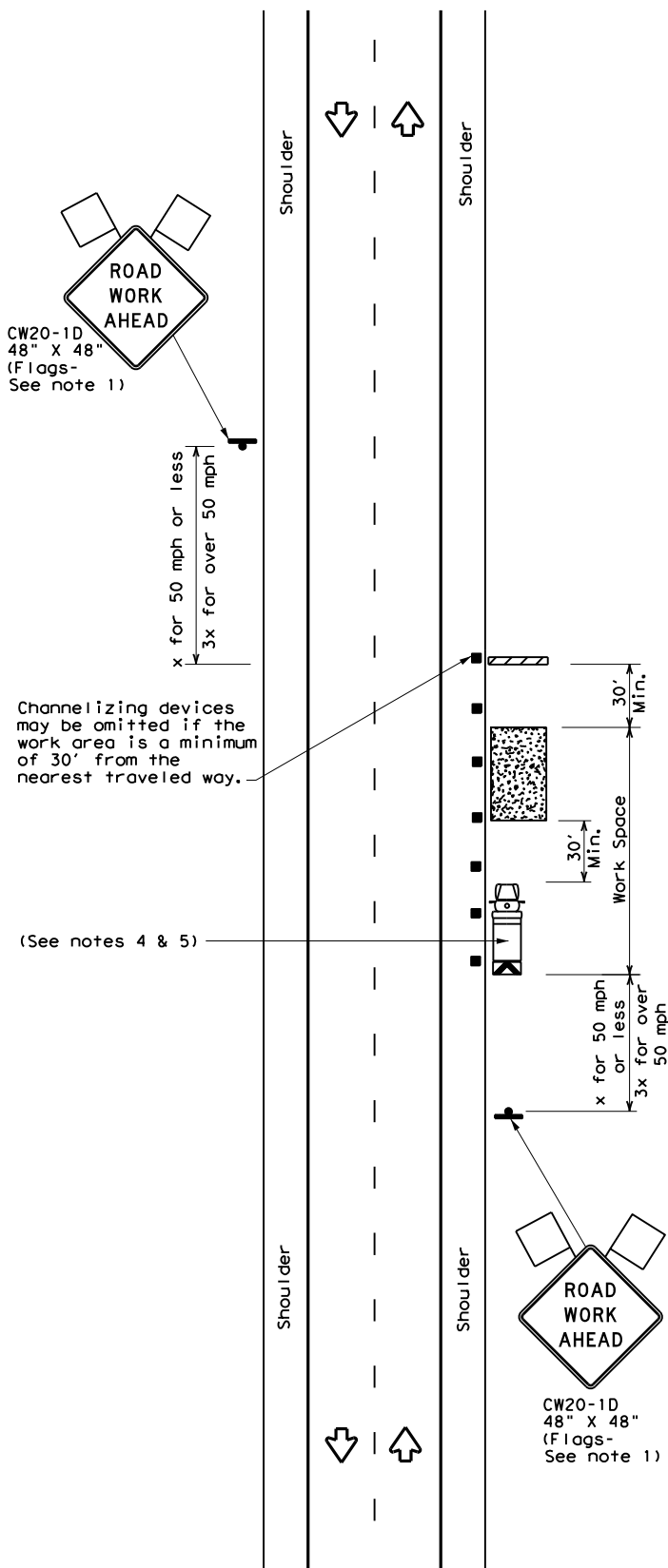
GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - 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.
 - 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.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- TCP (1-2a)**
- 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.
 - 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)**
- Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - 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).
 - Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

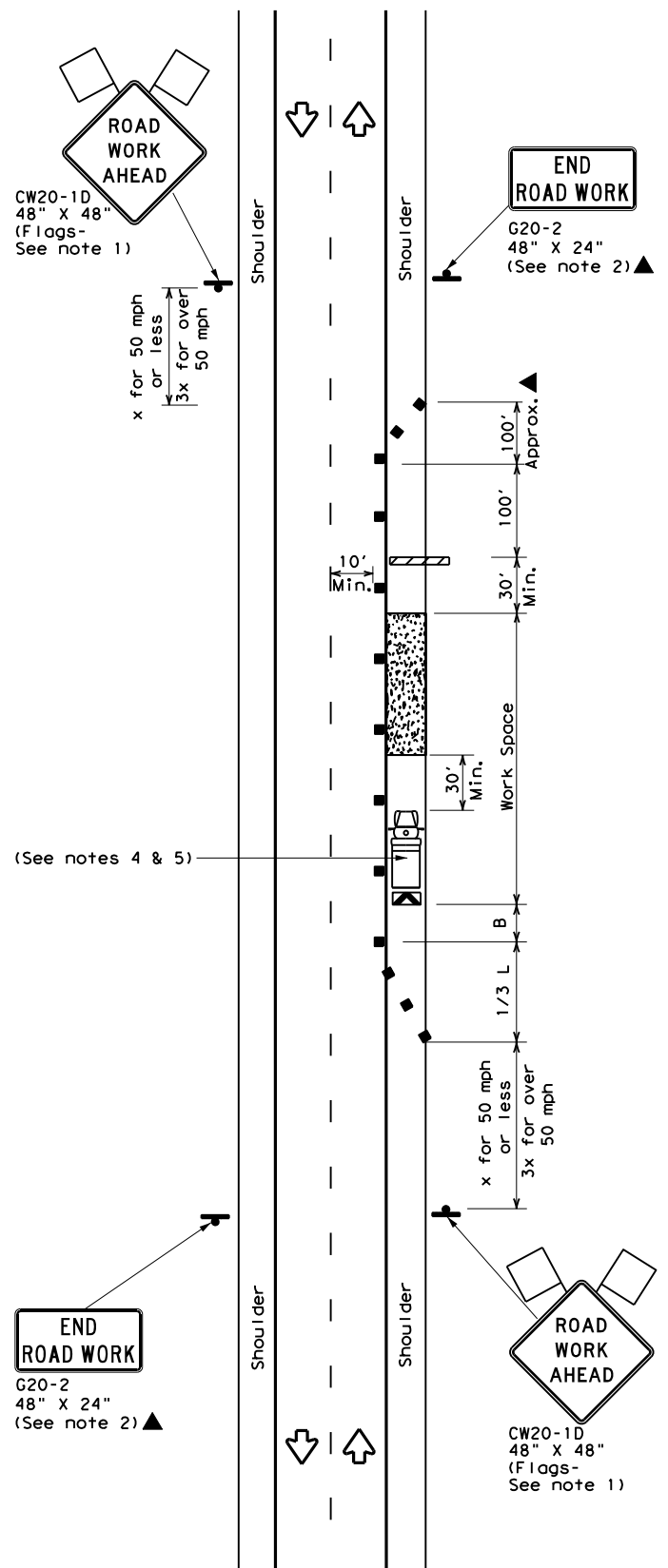
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TRAFFIC CONTROL PLAN			
ONE-LANE TWO-WAY			
TRAFFIC CONTROL			
TCP (1-2) - 18			
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2-94 2-12			
1-97 2-18			
	DIST:	COUNTY:	SHEET NO.:
	CRP	BEE	33

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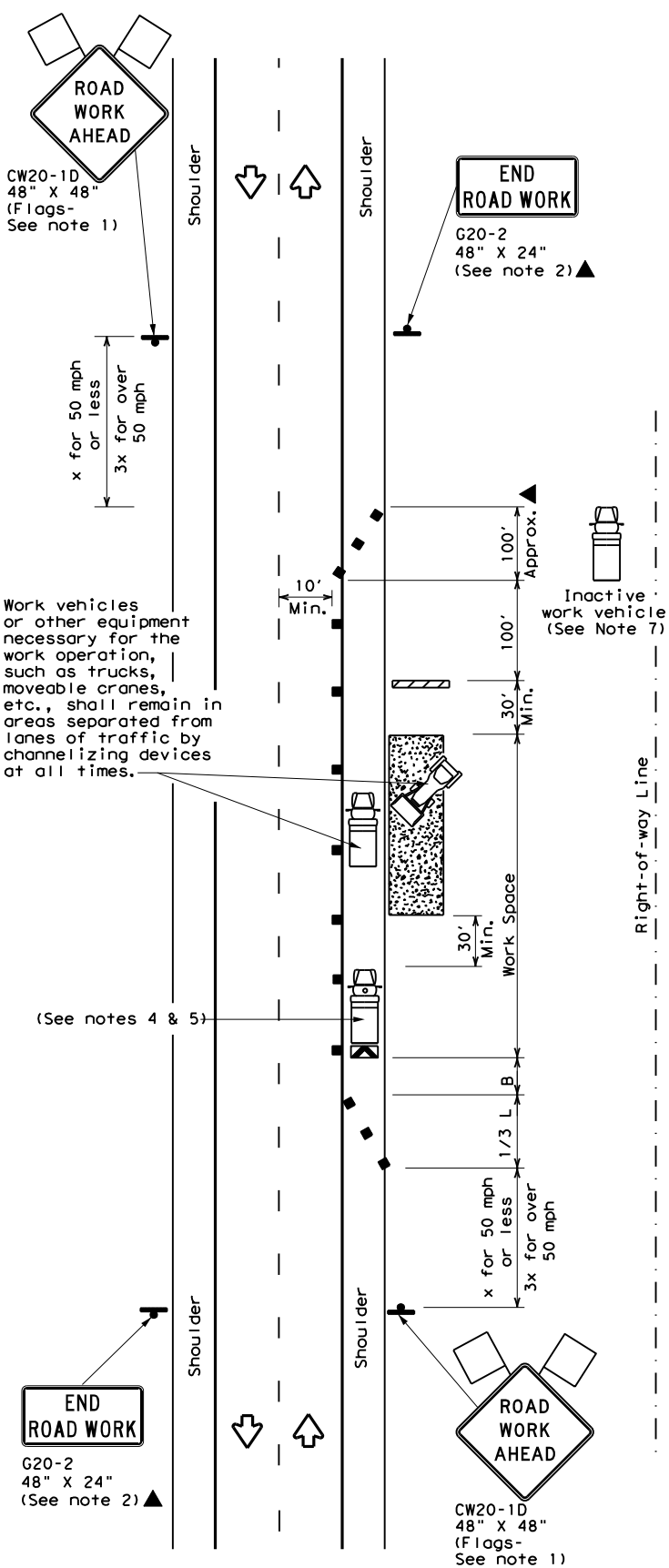
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TCP (2-1a)
WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (2-1b)
WORK SPACE ON SHOULDER
 Conventional Roads



TCP (2-1c)
WORK VEHICLES ON SHOULDER
 Conventional Roads

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

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

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

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

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

Texas Department of Transportation
 Traffic Operations Division Standard

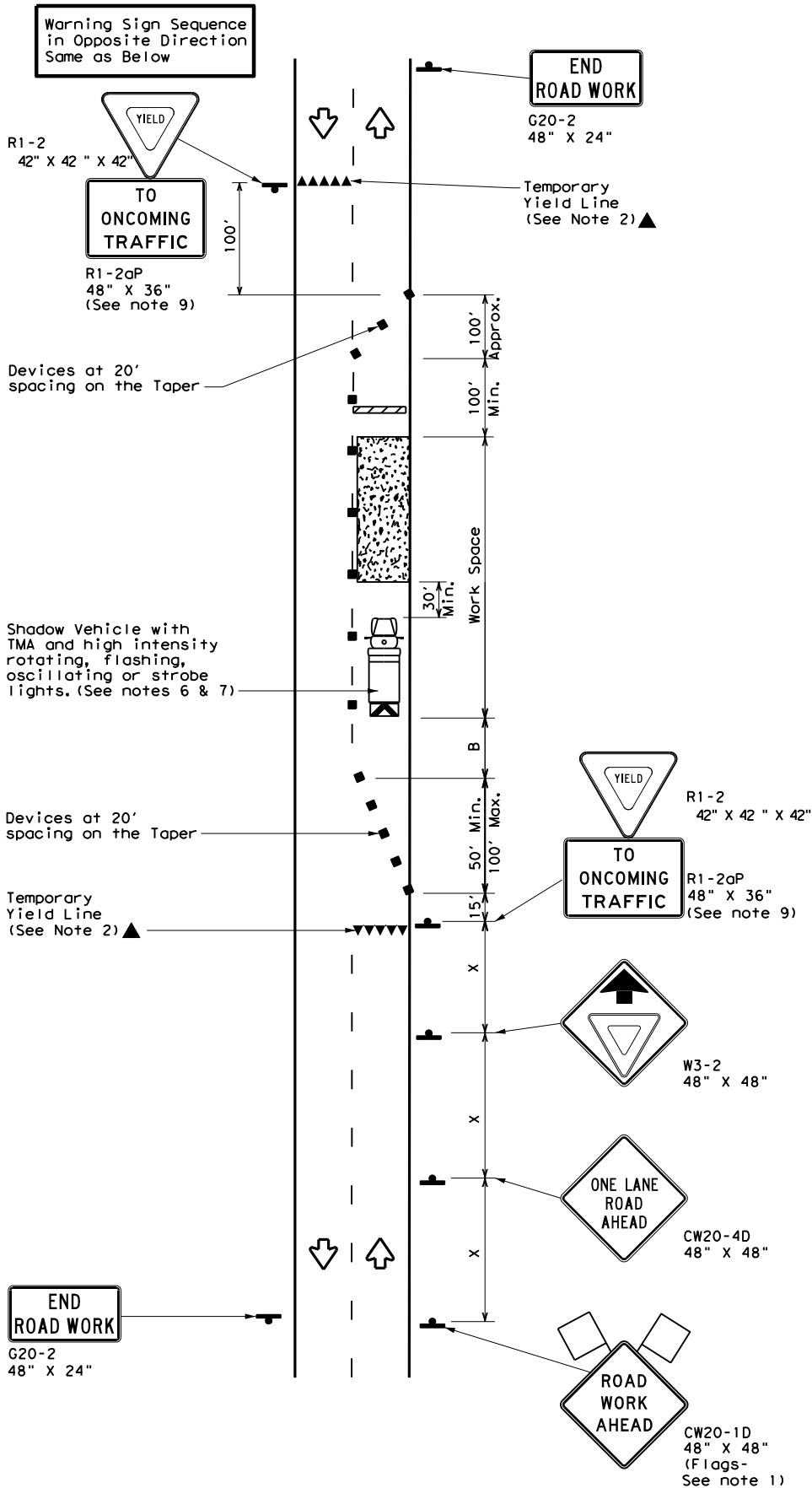
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

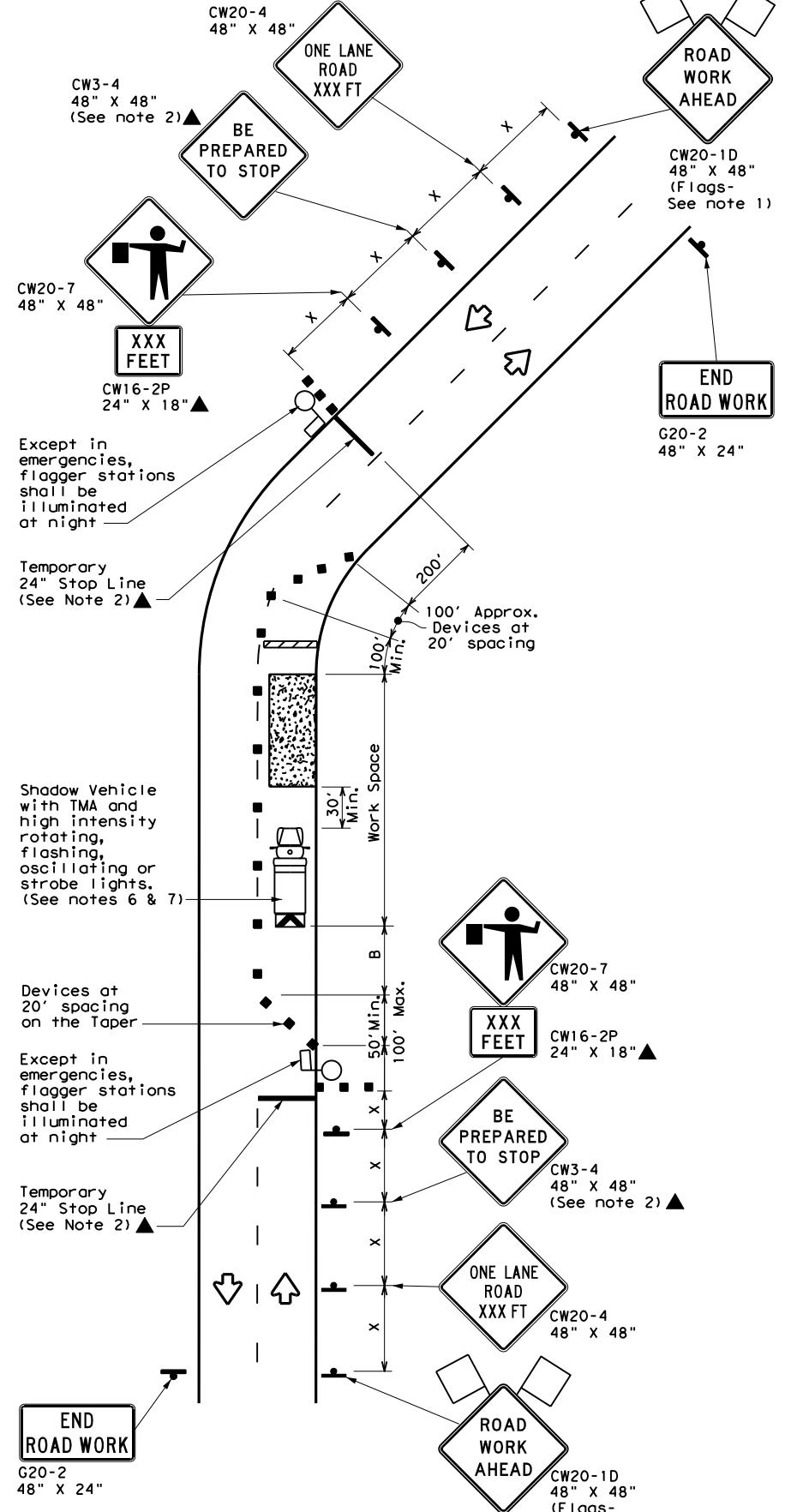
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8-95 2-12	CRP	BEE	34	
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TCP (2-2a)
 2-LANE ROADWAY WITHOUT PAVED SHOULDERS
 ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
 (Less than 2000 ADT - See Note 9)



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

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

Posted Speed * X	Formula L = $\frac{WS^2}{60}$	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30		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		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)

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
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- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - 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.
 - Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-2a)**
- 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.
 - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - 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).
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

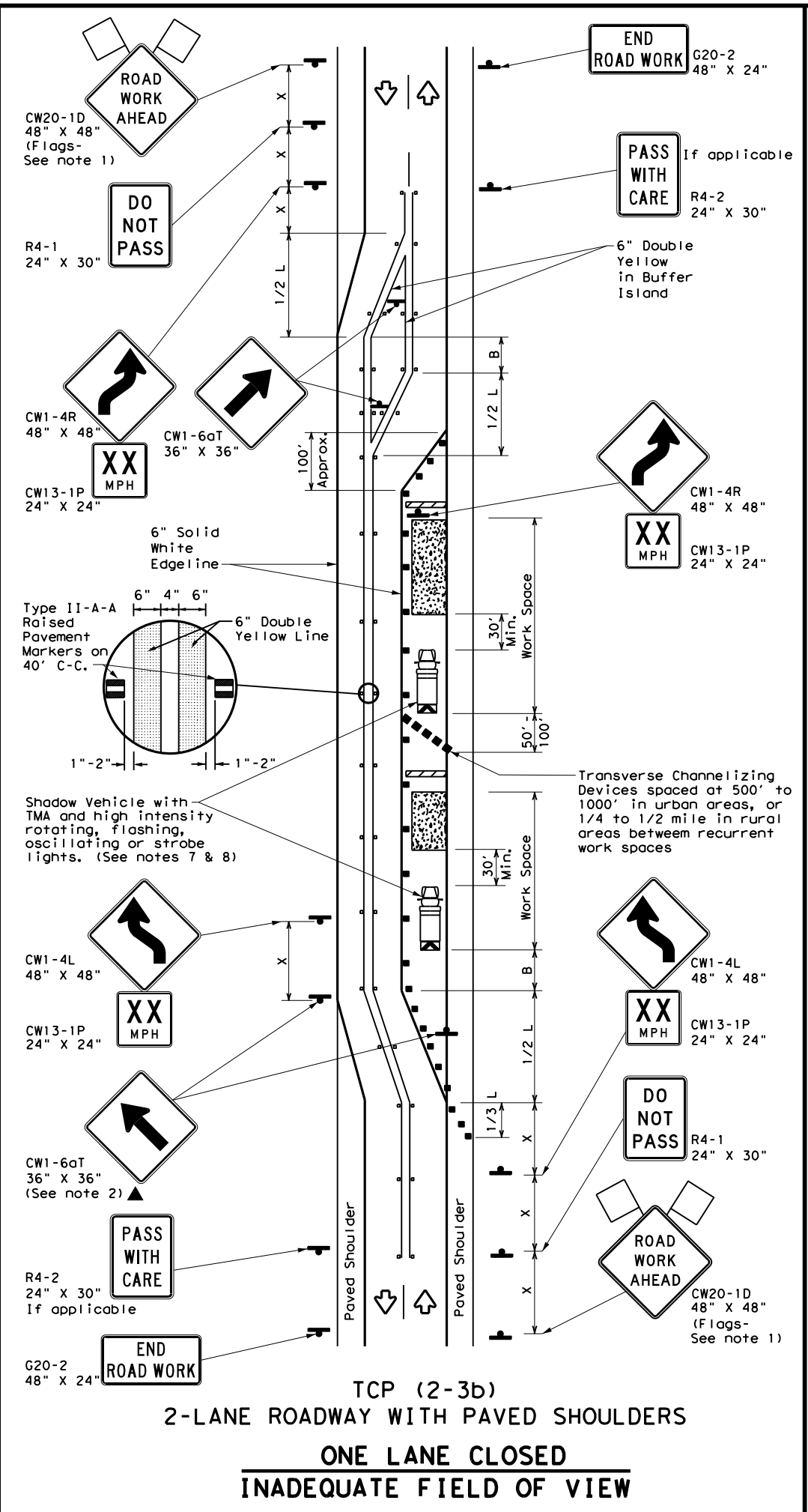
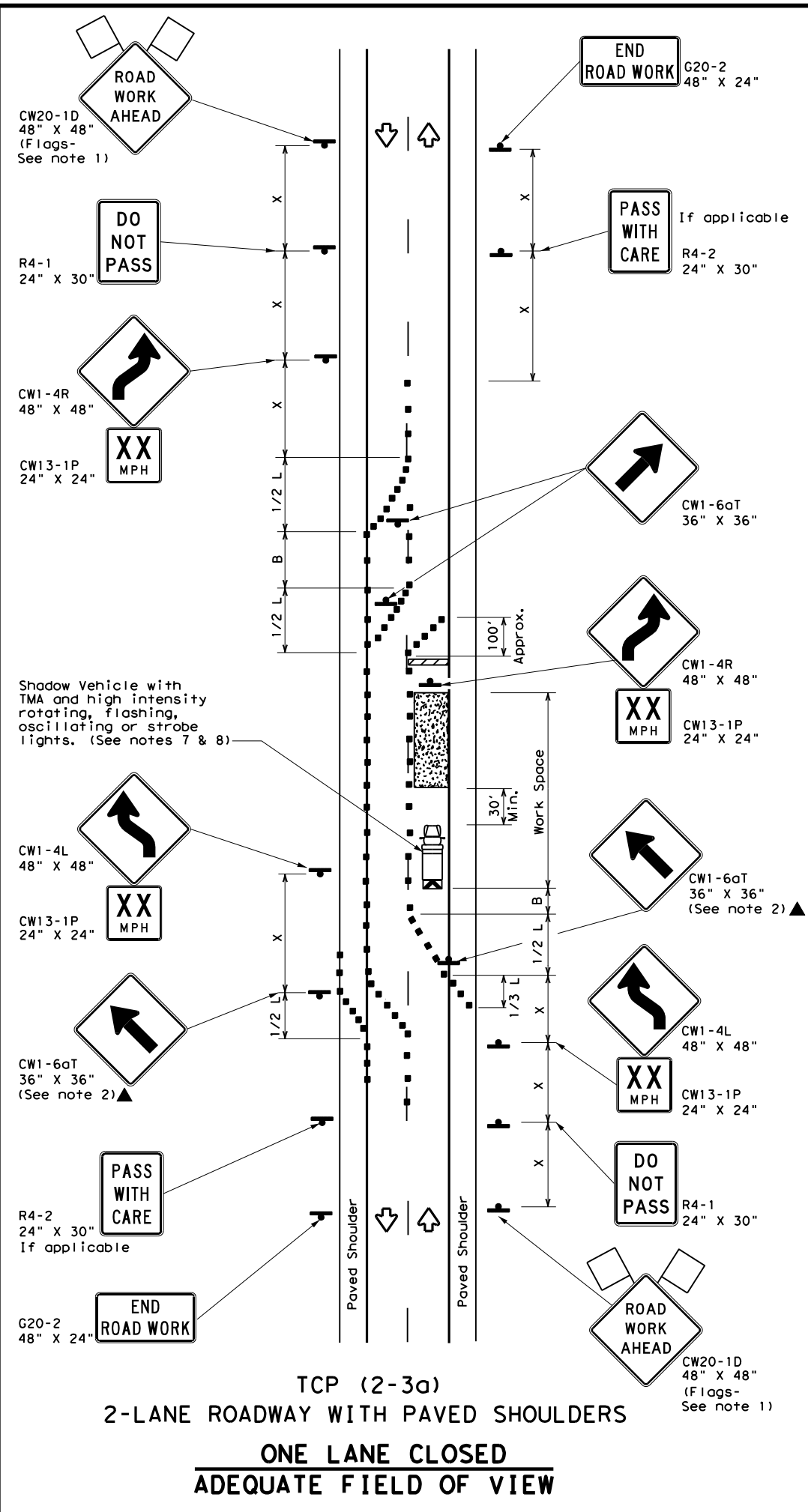
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP (2-2) - 18

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© TxDOT December 1985		CONT	SECT	JOB	HIGHWAY
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8-95	3-03				
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4-98	2-18				
		DIST	COUNTY	SHEET NO.	
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LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
 - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement marking shall be removed for long term projects.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Traffic Safety Division Standard

TEXAS DEPARTMENT OF TRANSPORTATION

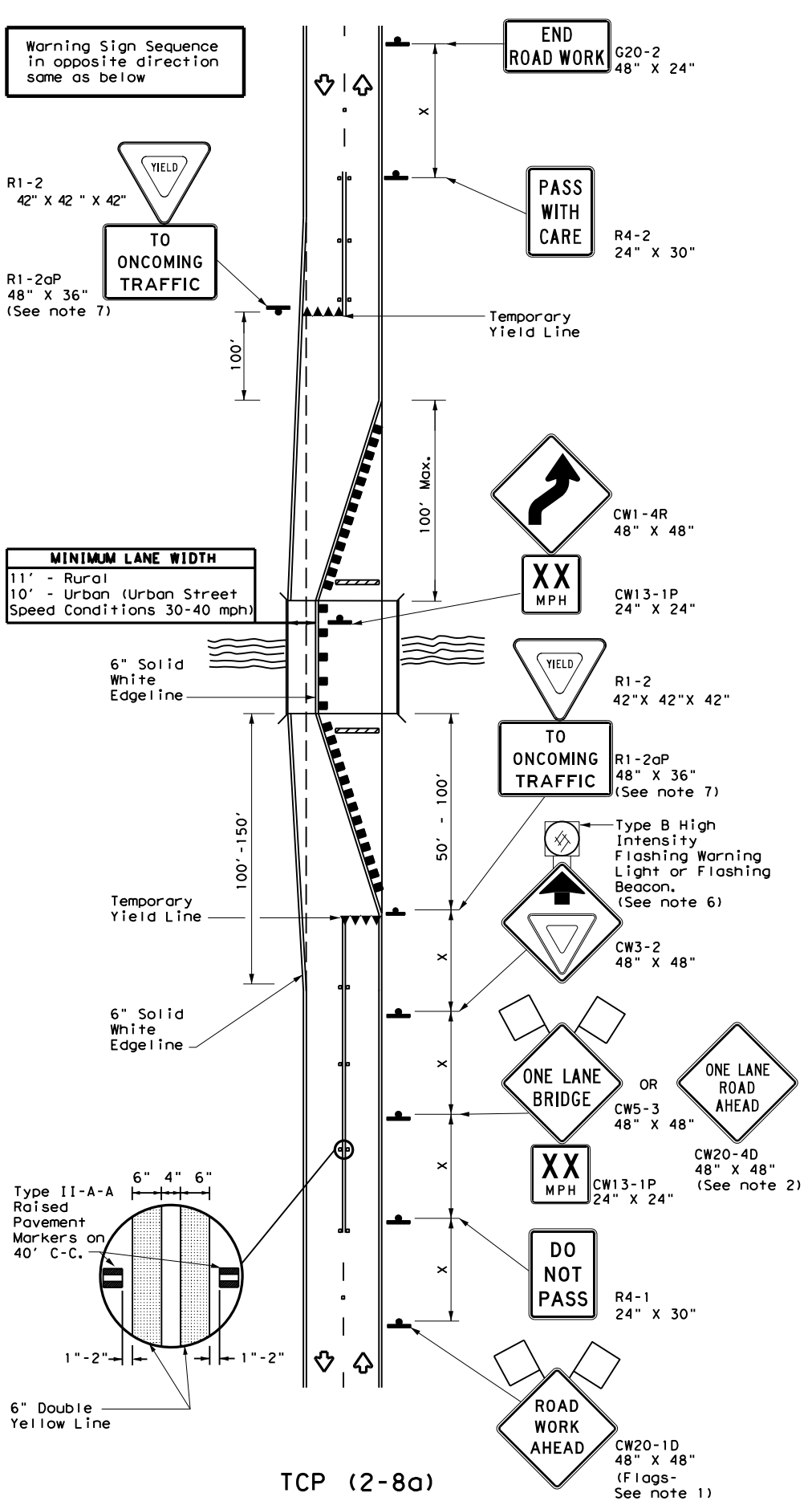
TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS

TCP (2-3) - 23

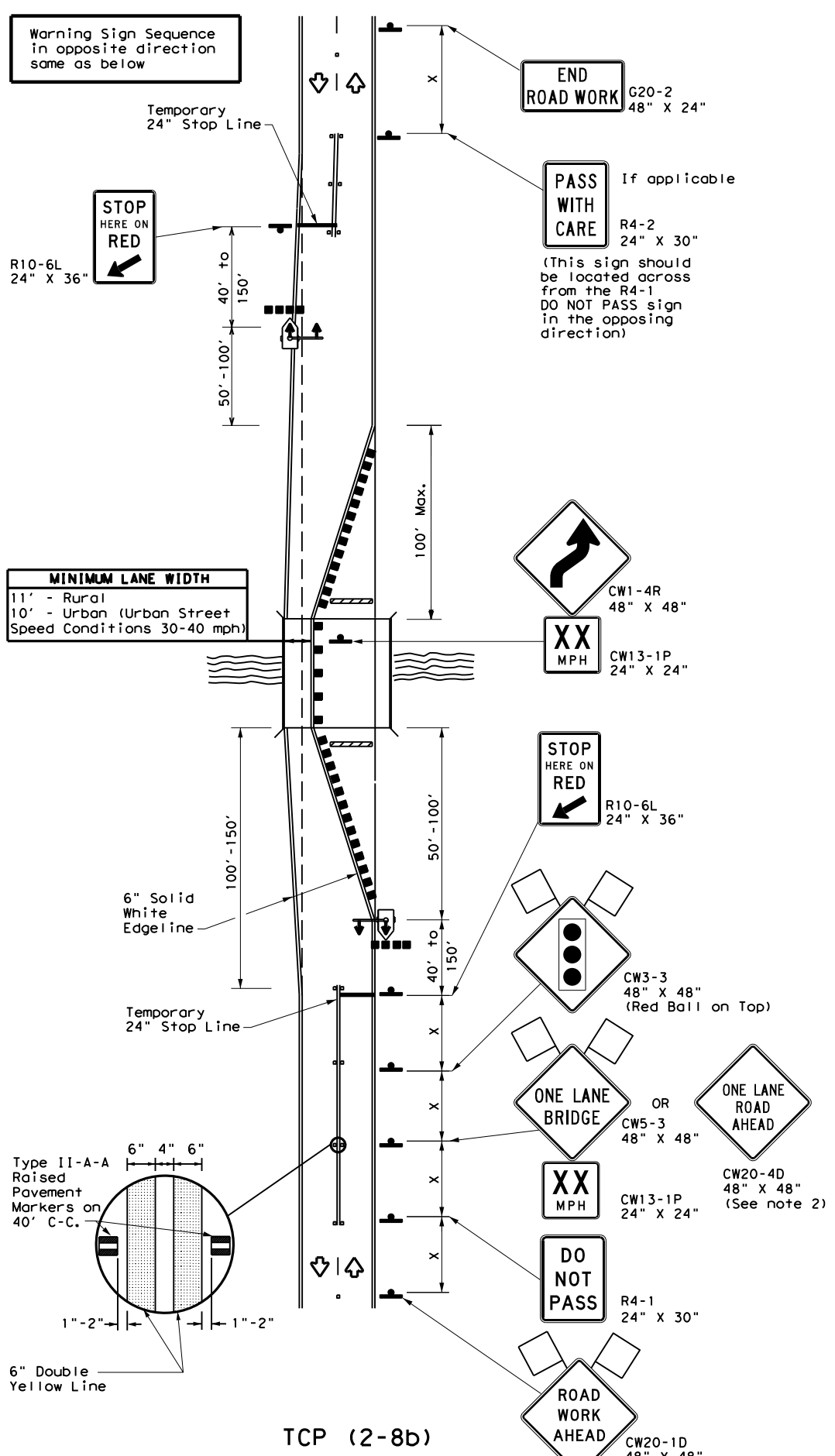
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163

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TCP (2-8a)
ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
 (Less Than 2000 ADT-See Note 5)



TCP (2-8b)
ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND

	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = 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	L = WS	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	L = WS	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

- Flags attached to signs where shown are REQUIRED.
 - When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
 - Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
 - For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
- TCP (2-8a)**
- Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
 - If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
 - The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.
- TCP (2-8b)**
- A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
 - Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

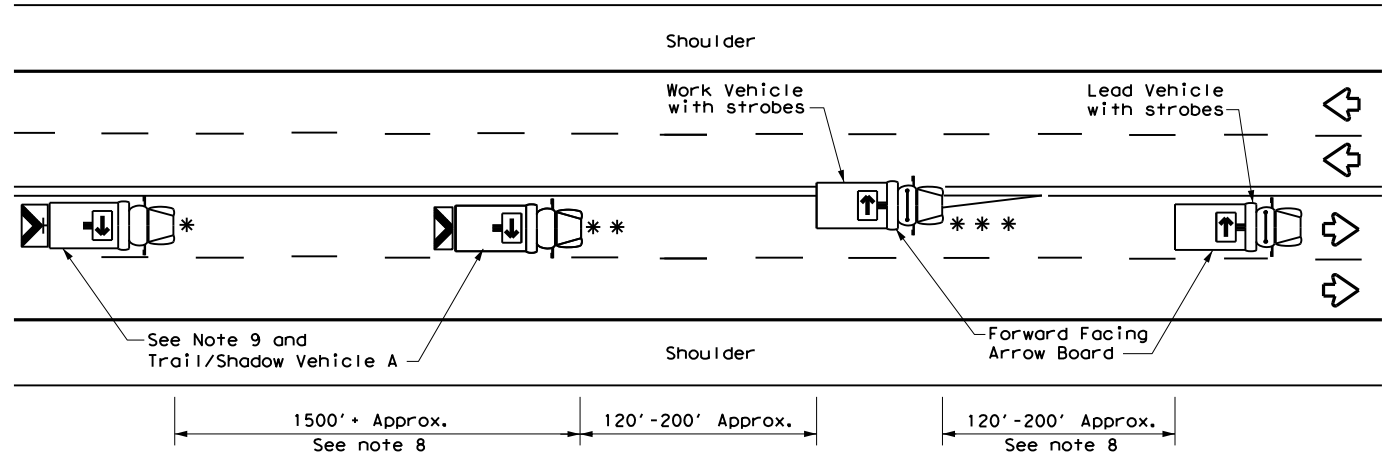
Texas Department of Transportation
Traffic Safety Division Standard

TRAFFIC CONTROL PLAN
LONG TERM ONE-LANE
TWO-WAY CONTROL
TCP (2-8) -23

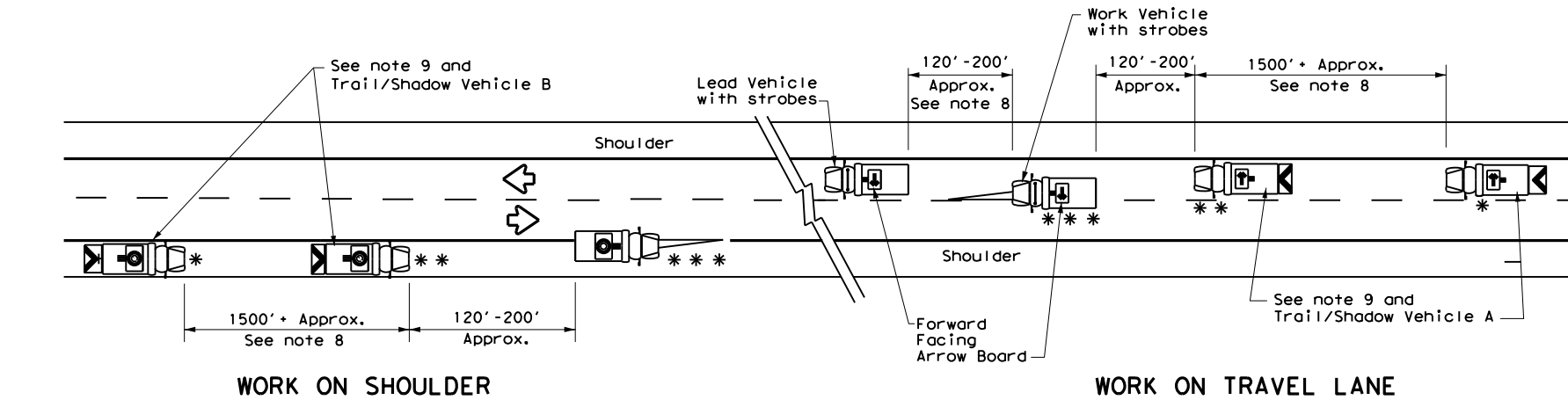
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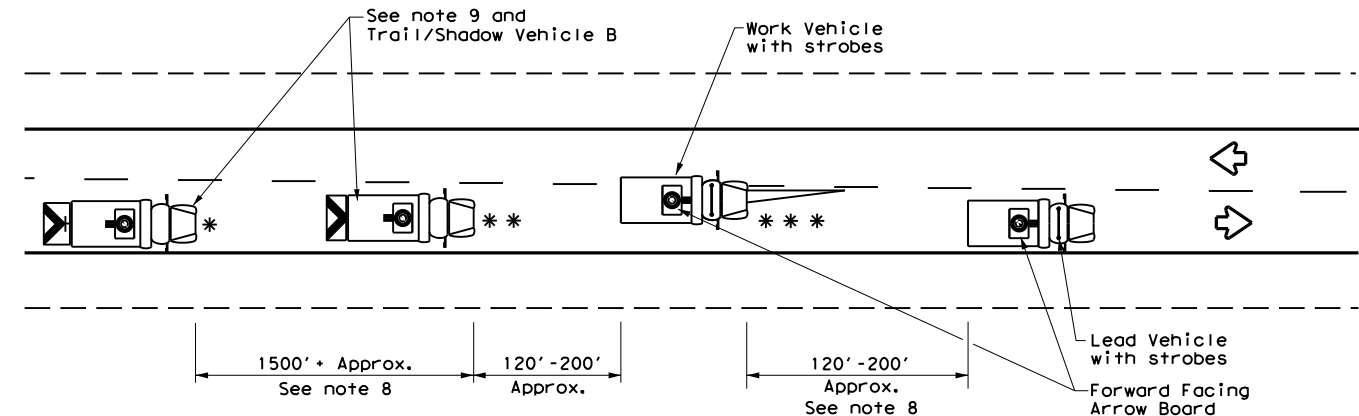
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TCP (3-1a)
UNDIVIDED MULTILANE ROADWAY

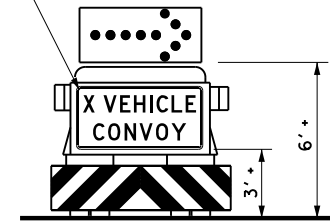


TCP (3-1b)
TWO-WAY ROADWAY WITH PAVED SHOULDERS



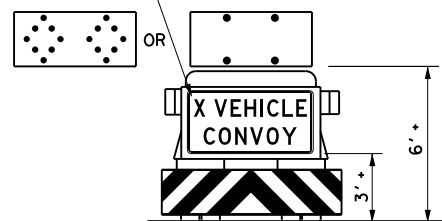
TCP (3-1c)
TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS

X VEHICLE CONVOY OR **WORK CONVOY**
 CW21-10cT 72" X 36" CW21-10aT 60" X 36"



TRAIL/SHADOW VEHICLE A
with RIGHT Directional display Flashing Arrow Board

X VEHICLE CONVOY OR **WORK CONVOY**
 CW21-10cT 72" X 36" CW21-10aT 60" X 36"



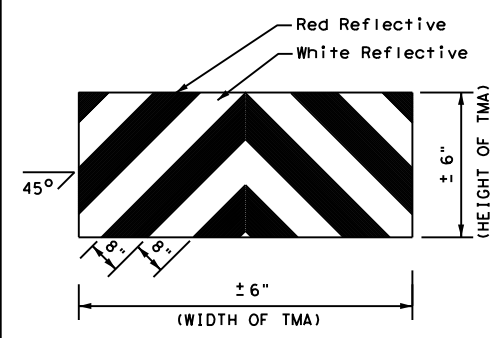
TRAIL/SHADOW VEHICLE B
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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

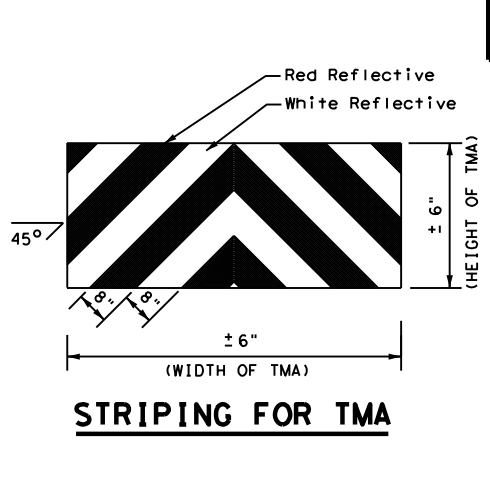
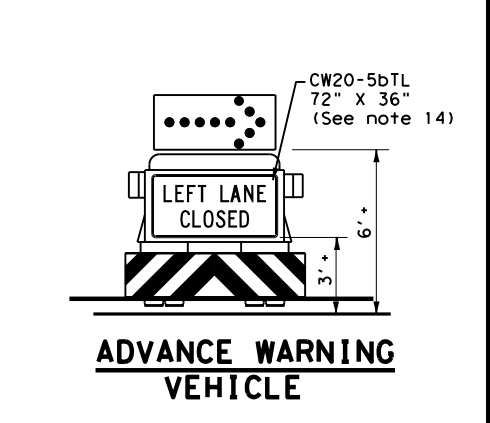
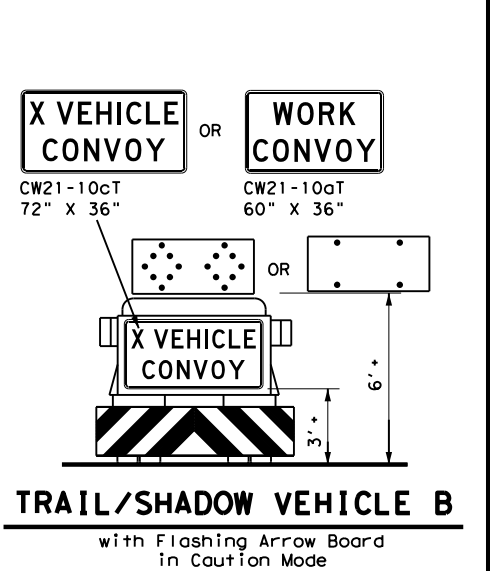
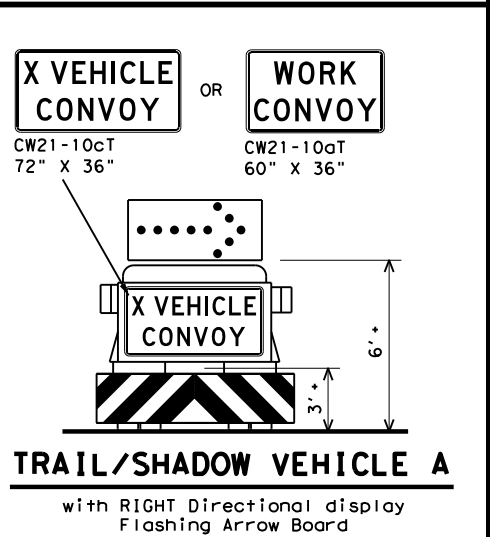
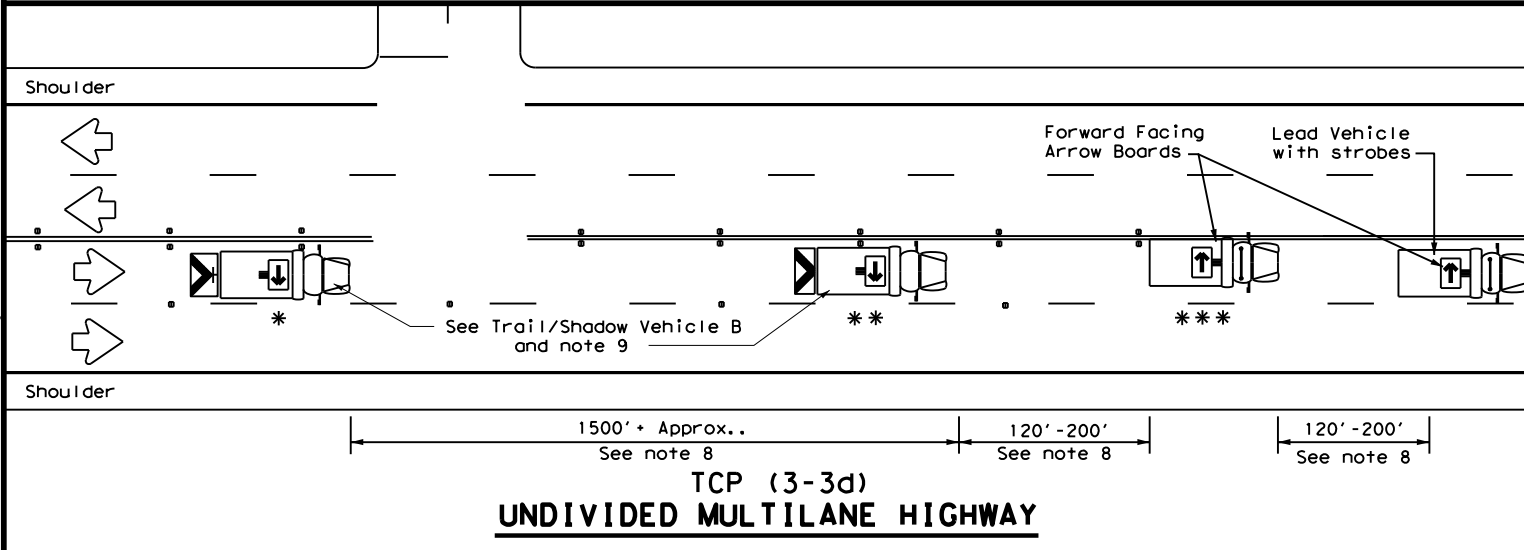
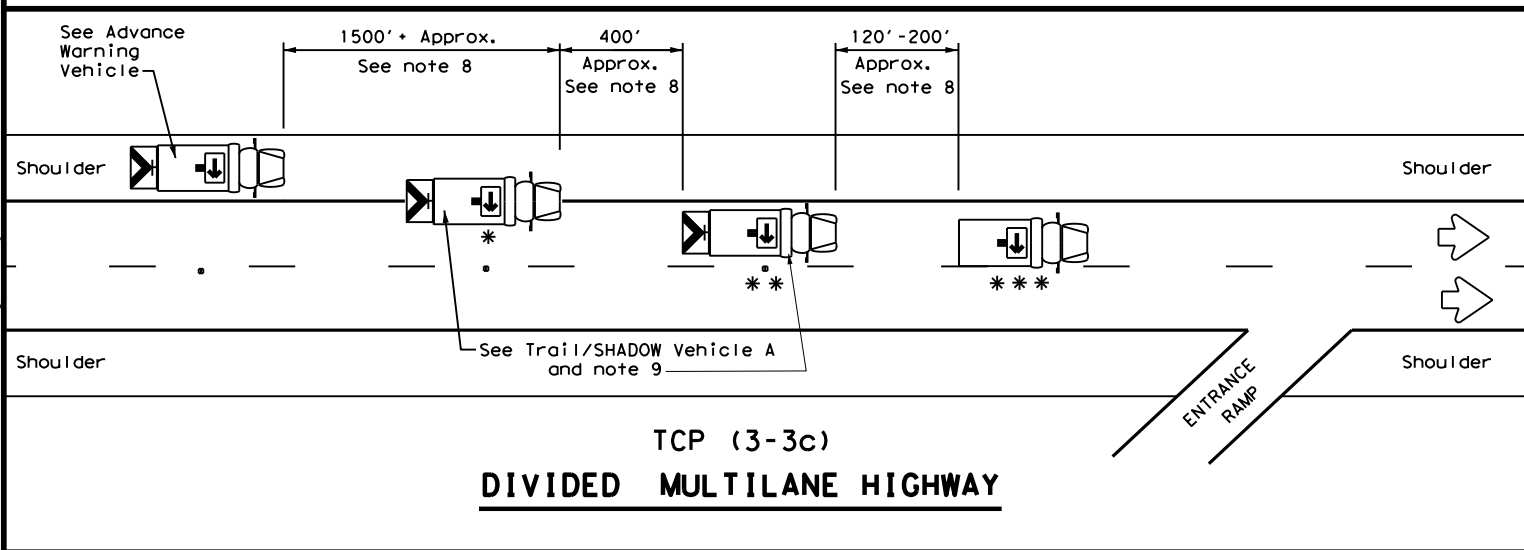
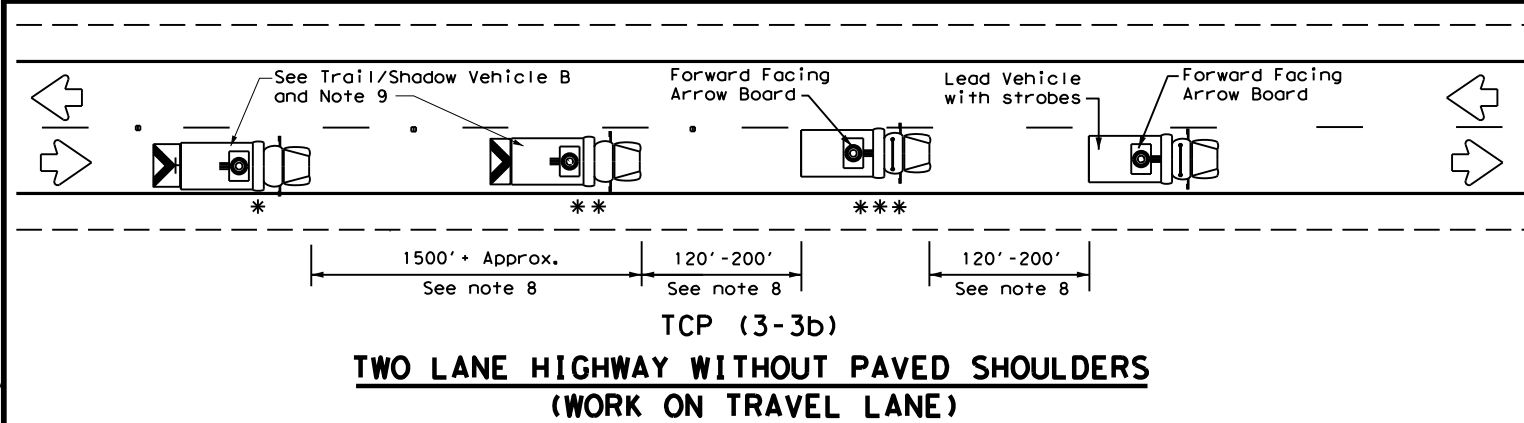
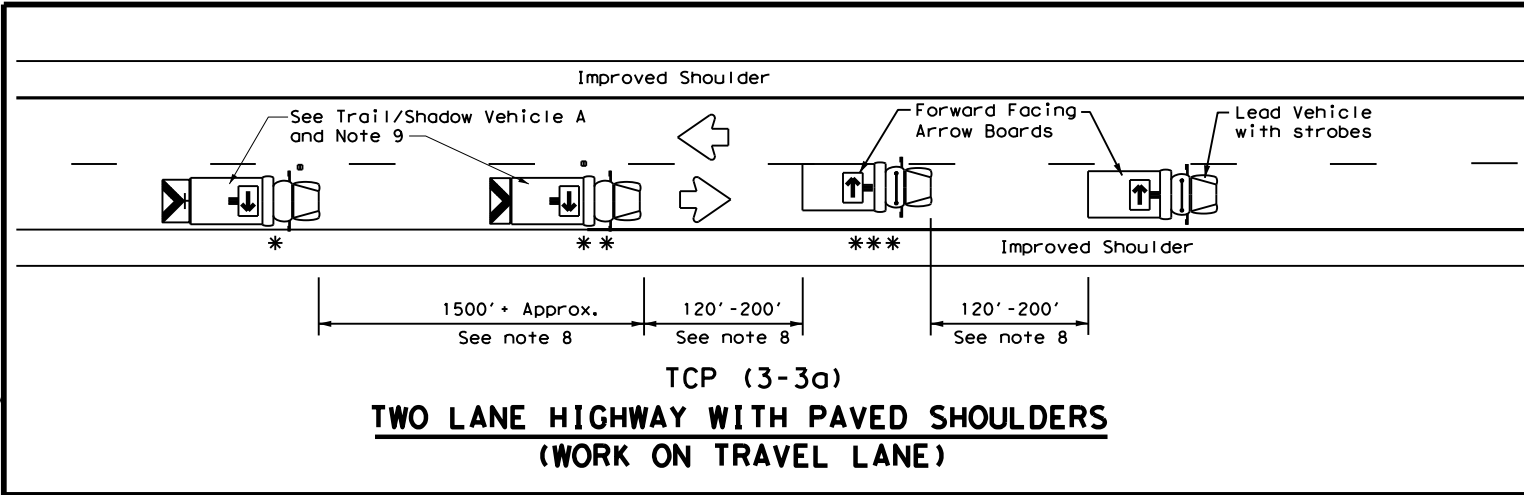


STRIPING FOR TMA

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

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

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

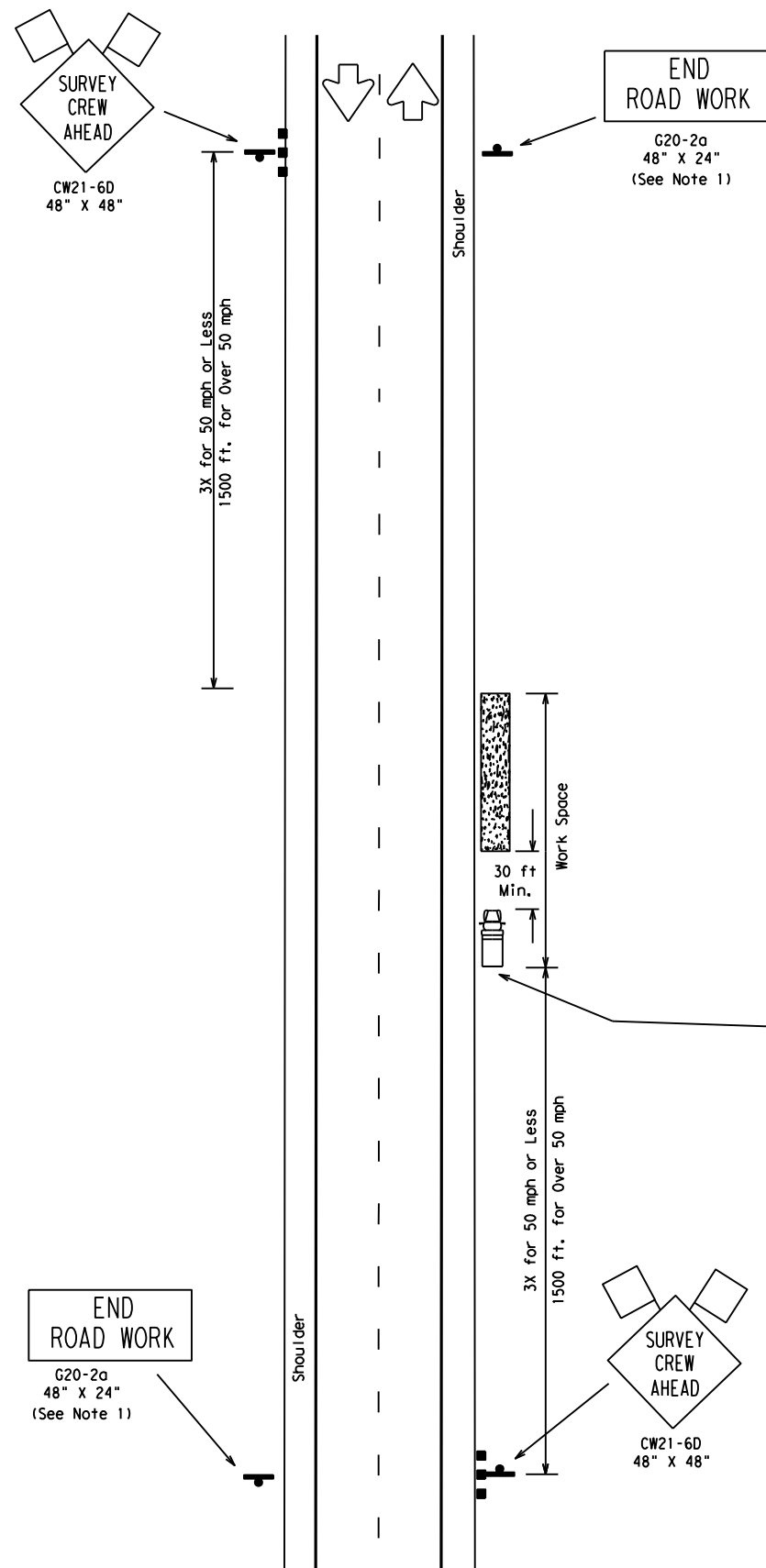
Texas Department of Transportation
Traffic Operations Division Standard

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

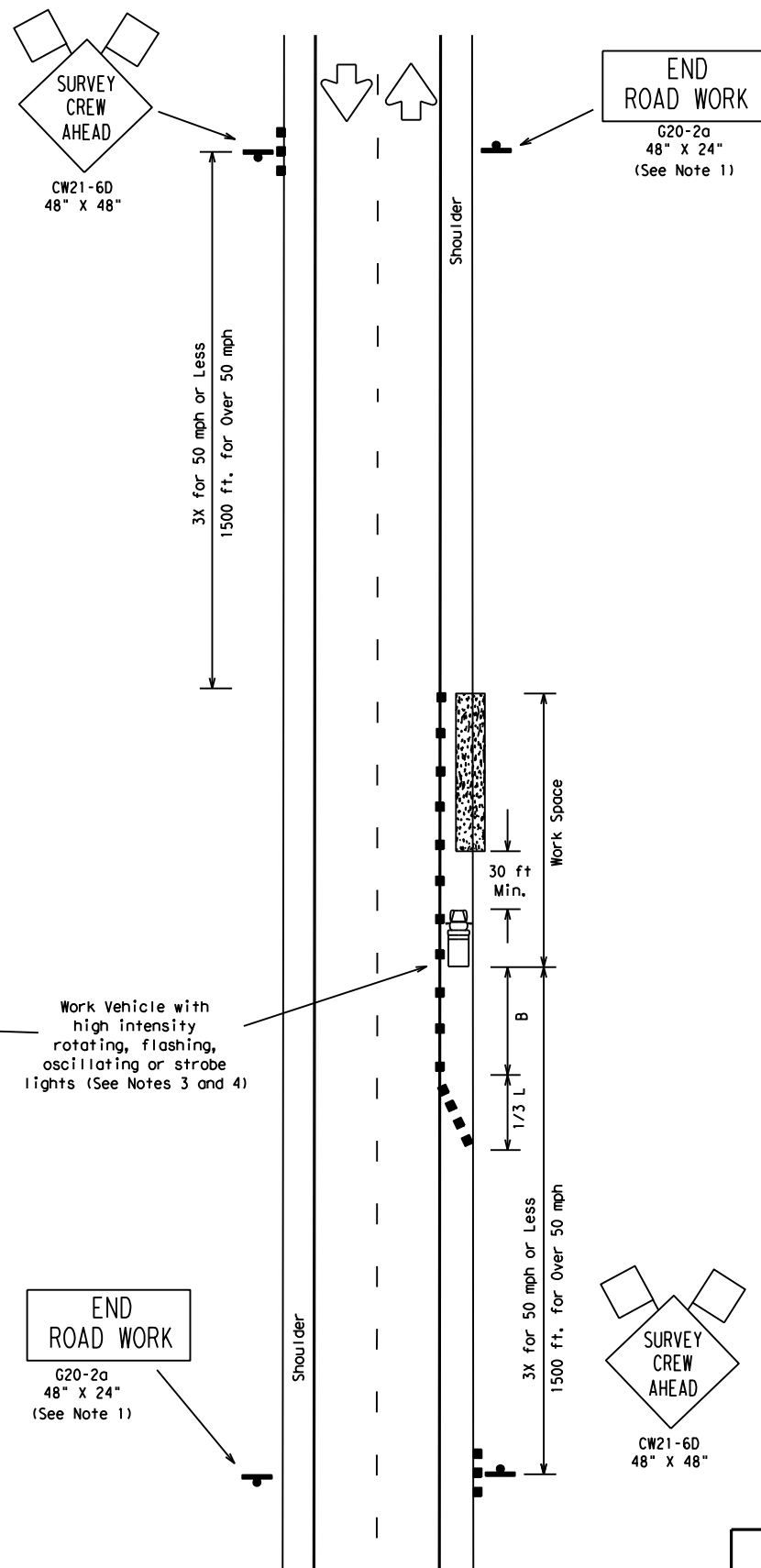
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© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	CRP	BEE	39	
1-97 7-14				

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TCP (S-1a)
 WORK OFF SHOULDER
 OR PAVED SURFACE



TCP (S-1b)
 WORK ON SHOULDER

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
 Corrected misspelling.

LEGEND

	Type III Barricade		Channelizing Devices		Flag
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)		
	Trailer Mounted Flashing Arrow Panel		Portable Changeable Message Sign (PCMS)		
	Flagger		Sign Post		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Device		Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'	90'
35		205'	225'	245'	35'	70' - 90'	160'	120'
40		265'	295'	320'	40'	80' - 100'	240'	155'
45		450'	495'	540'	45'	90' - 110'	320'	195'
50		500'	550'	600'	50'	100' - 125'	400'	240'
55		550'	605'	660'	55'	110' - 140'	500'	295'
60		600'	660'	720'	60'	120' - 150'	600'	350'
65	650'	715'	780'	65'	130' - 165'	700'	410'	
70	700'	770'	840'	70'	140' - 175'	800'	475'	
75	750'	825'	900'	75'	150' - 185'	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
	✓	✓		

DEFINITIONS:
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - Channelizing devices on the shoulder taper and tangent section may be omitted for short duration (less than 1 hour) work.
 - If line-of-sight requirements for surveying operations will preclude the placement of the Work Vehicle to protect workers, the channelizing devices mentioned in Note 2 are required.
 - A Shadow Vehicle with a Truck Mounted Attenuator and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
 - The CW20-1D "ROAD WORK AHEAD" sign may be substituted for the CW21-6D "SURVEY CREW AHEAD" sign.
 - This plan may also be used for shoulder work or off shoulder work for multilane undivided roadways.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP(S-1a)
 8. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

Texas Department of Transportation
 Traffic Operations Division

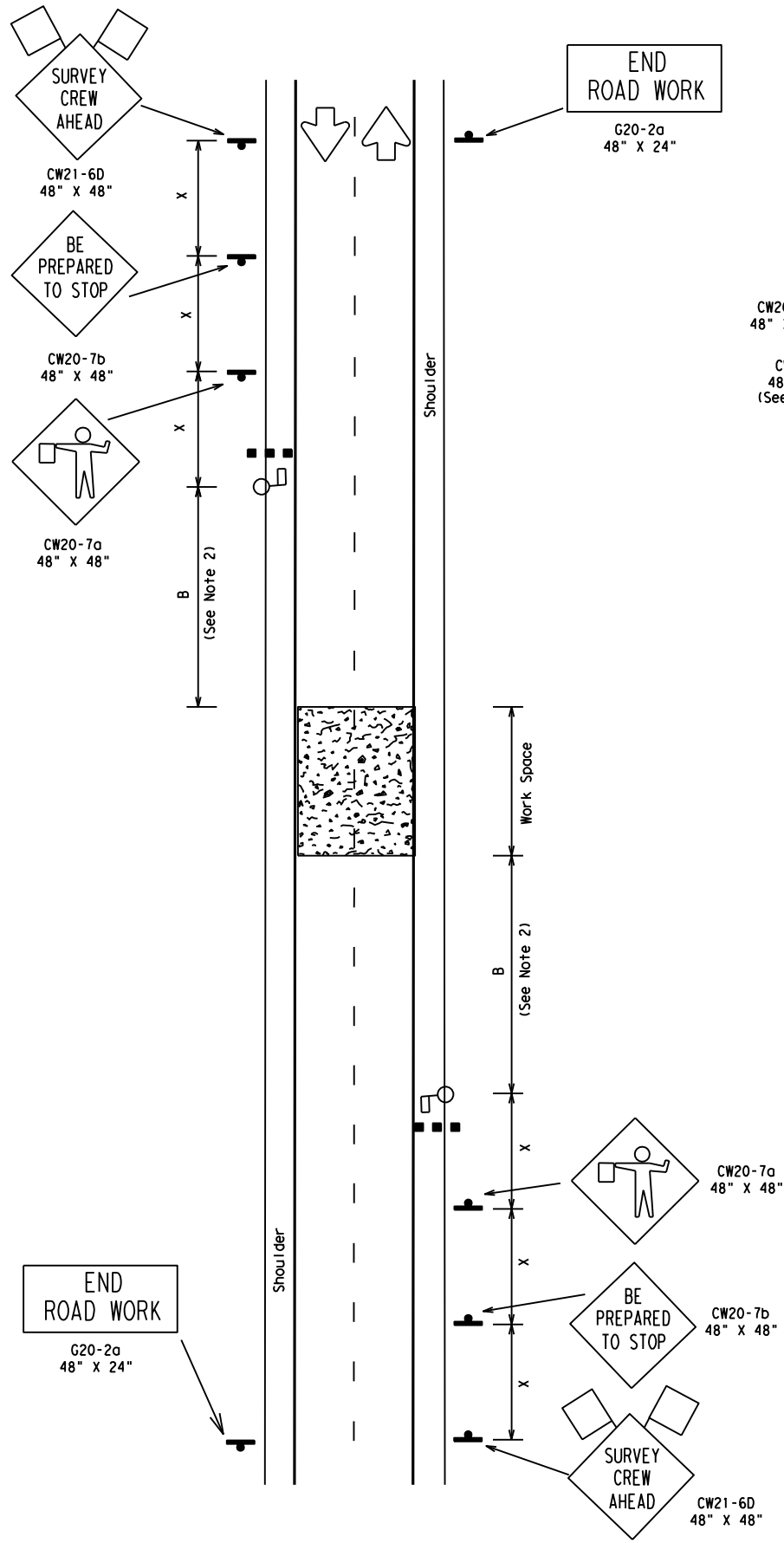
**TRAFFIC CONTROL PLAN
 FOR SURVEYING
 OPERATIONS**

TCP (S-1) -08A

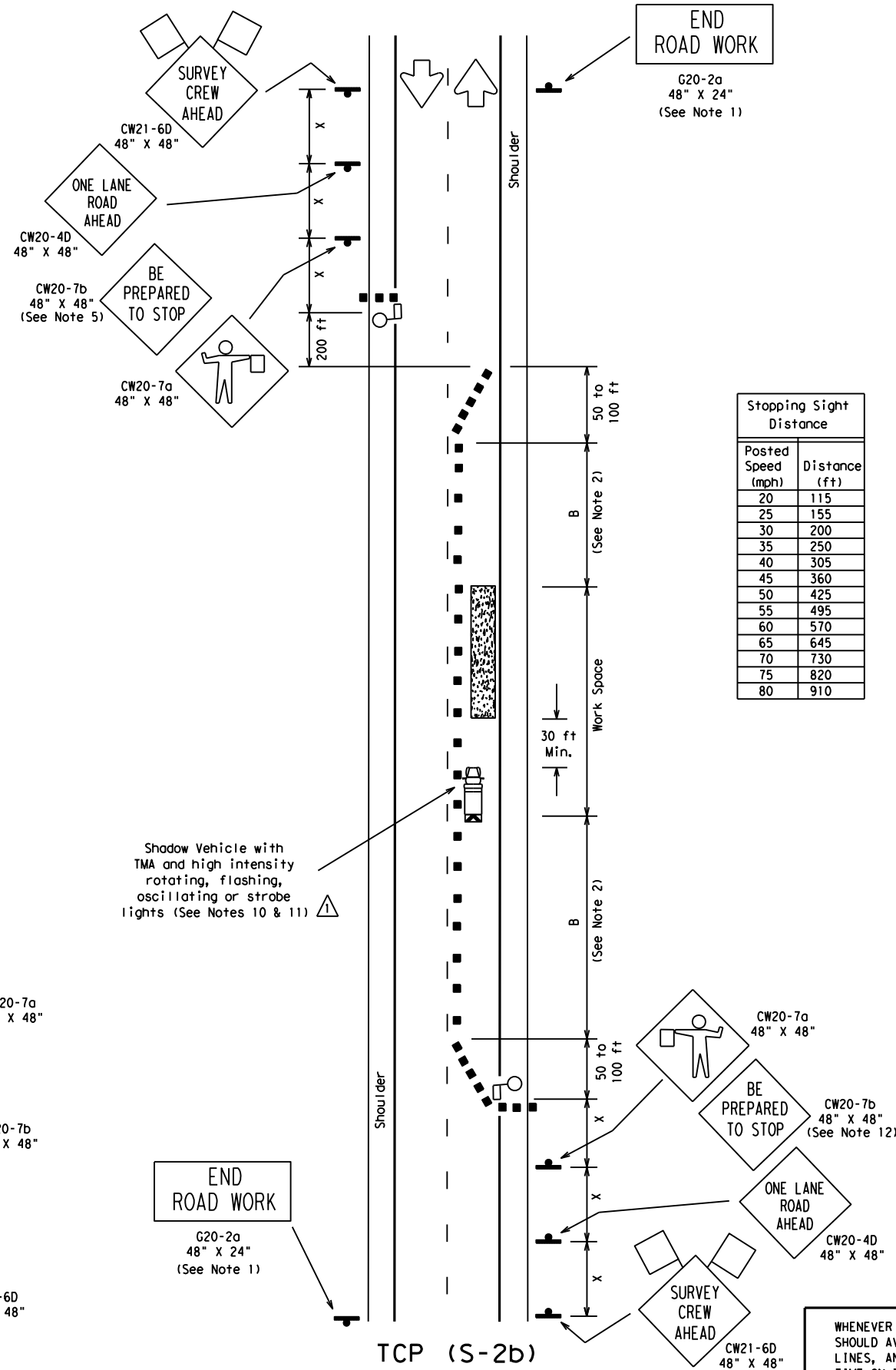
© TXDOT August 2008		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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		DIST	COUNTY	SHEET NO.	
		CRP	BEE	41	

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TCP (S-2a)
 ROAD CLOSED FOR LESS THAN 20 MINUTES -
 OFF PEAK TRAFFIC HOURS
 WITH OR WITHOUT SHOULDERS



TCP (S-2b)
 WORK IN ROADWAY
 OFF PEAK TRAFFIC HOURS
 WITH OR WITHOUT SHOULDERS

Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Heavy Work Vehicle
- Truck Mounted Attenuator (TMA)
- Trailer Mounted Flashing Arrow Panel
- Portable Changeable Message Sign (PCMS)
- Flagger
- Sign Post

Posted Speed \times	Formula	Minimum Desirable Taper Lengths \times			Suggested Maximum Spacing of Device		Min. Sign Spacing "x" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45		450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55	$L = WS$	550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	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
	✓	✓		

DEFINITIONS:
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - Adequate Stopping Sight Distance (see Stopping Sight Distance table) should be maintained from approaching traffic to the flagger or a queue of stopped vehicles. The Buffer Space "B" should be extended around curves or other obstacles, when necessary, to have adequate Stopping Sight Distance to the flagger station.
 - Flaggers should use two-way radios or other means of communication while flagging.
 - The length of the work space should be based on the ability of the flaggers to communicate.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

- TCP (S-2a)
- Road closures shall be less than 20 minutes. Closures less than 5 minutes are desirable.
 - Sign spacing should be increased if traffic repeatedly queues past the CW20-7b "BE PREPARED TO STOP" sign.
 - The surveying instrument should not be located on the paved surface.
- TCP (S-2b)
- For short duration work the Shadow Vehicle with a TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
 - Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
 - The CW20-7b "BE PREPARED TO STOP" sign is optional. When used, it should be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
 Corrected reference to notes.

Texas Department of Transportation
 Traffic Operations Division

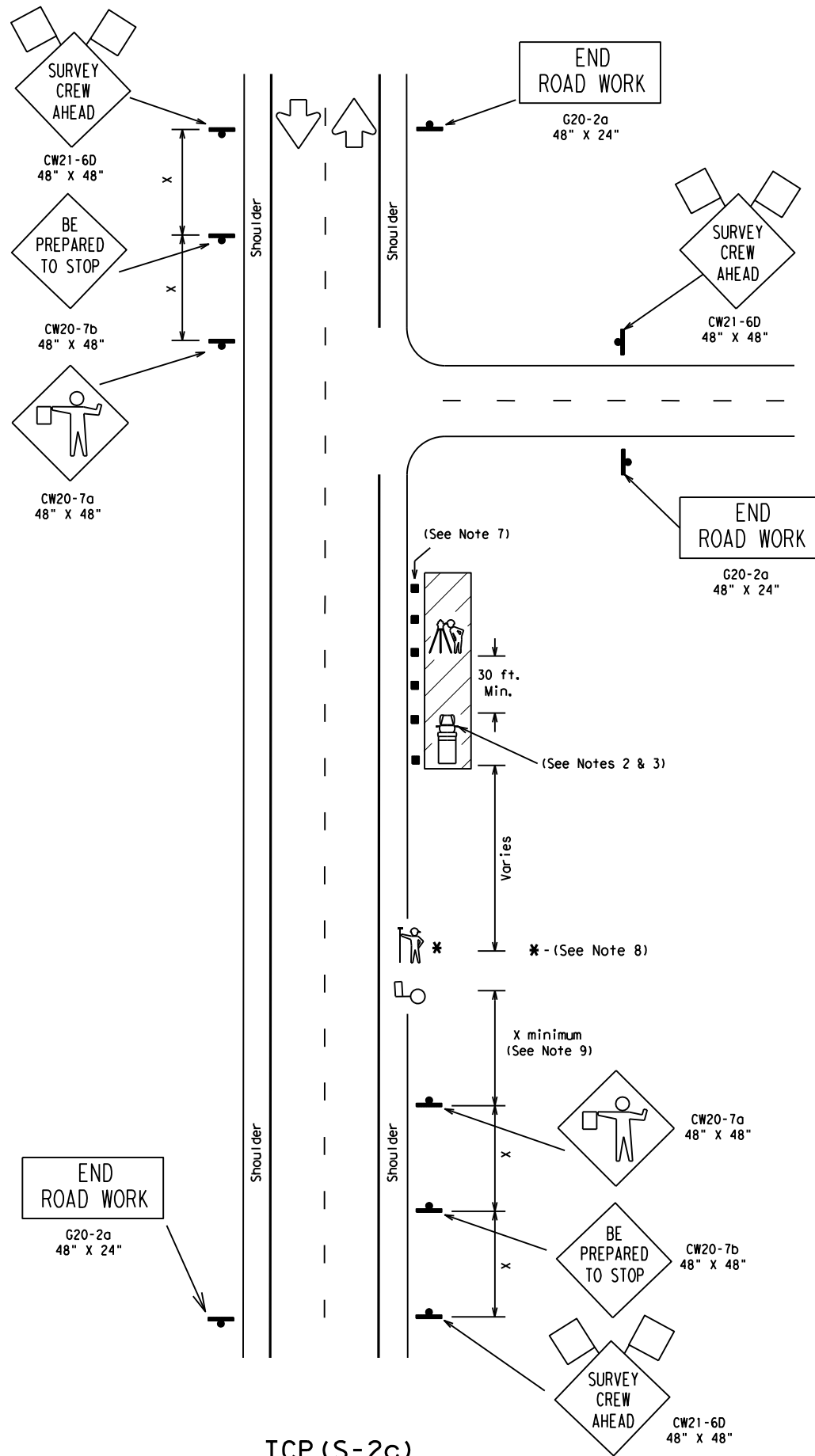
TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP (S-2) -08A

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8-08	REVISONS	CON: SECT	JOB	HIGHWAY
		098801	025	FM 623
		DIST	COUNTY	SHEET NO.
		CRP	BEE	42

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TCP (S-2c)

Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Work Vehicle
- Truck Mounted Attenuator (TMA)
- Flagger
- Sign Post
- Survey Rodman
- Instrument Person

Posted Speed %	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Device		Min. Sign Spacing "x" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'	90'
35		205'	225'	245'	35'	70' - 90'	160'	120'
40		265'	295'	320'	40'	80' - 100'	240'	155'
45	L=WS	450'	495'	540'	45'	90' - 110'	320'	195'
50		500'	550'	600'	50'	100' - 125'	400'	240'
55		550'	605'	660'	55'	110' - 140'	500'	295'
60		600'	660'	720'	60'	120' - 150'	600'	350'
65		650'	715'	780'	65'	130' - 165'	700'	410'
70		700'	770'	840'	70'	140' - 175'	800'	475'
75		750'	825'	900'	75'	150' - 185'	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)

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

DEFINITIONS:
 MOBILE - work that moves continuously or intermittently (stopping up to approximately 15 minutes).
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - Work Vehicle with high intensity rotating, flashing, oscillating or strobe lights should be used to protect work space.
 - When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Heavy Work Vehicle.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" SIGNS.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads may be omitted when approved by the Engineer.
 - The Surveying Instrument shall not be located on the paved surface.
 - Cones at edge of pavement adjacent to instrument person may be omitted when approved by the Engineer.
 - Rodman may only enter roadway when accompanied by flagger and as traffic allows.
 - The distance between the advance warning signs and the work should not exceed a two mile maximum.
 - Flaggers and Survey Crew should use two-way radios or other means of communication.
 - Survey Crew and Flaggers shall wear high-visibility apparel meeting the ANSI 107-2007 standard performance for Class 2 or Class 3 risk exposure.
 - Additional traffic control devices may be required to address local site conditions.
 - Stopping Sight Distance shall be maintained from approaching traffic to the flagger. See "Stopping Sight Distance" table.

SURVEY PARTIES SHOULD AVOID ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

This TCP is to cover two lane rural type roadways as determined by the Engineer. All other type roadways will be covered by other established Survey TCP'S.

Texas Department of Transportation
 Traffic Operations Division

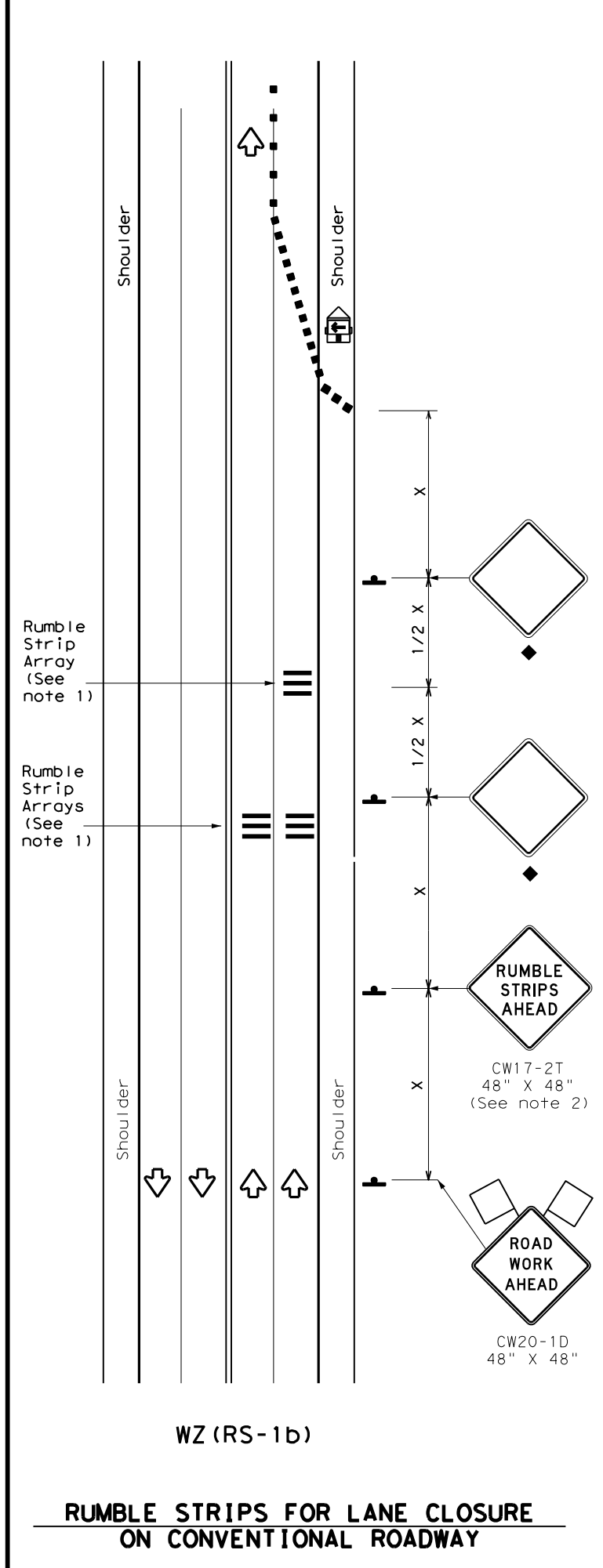
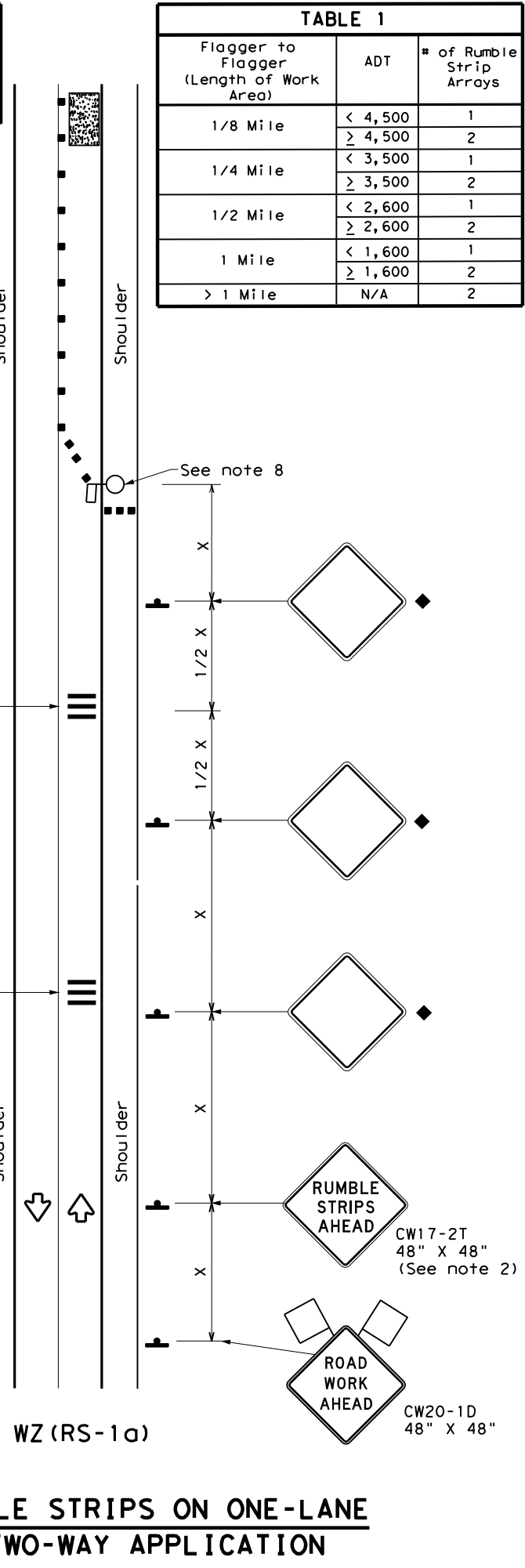
TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP (S-2c) - 10

© TxDOT January 2010		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
		098801	025	FM	623
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Warning sign and rumble strip sequence in opposite direction is same as below.



GENERAL NOTES

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

LEGEND

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

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

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

TYPICAL USAGE

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

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.
 * For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2

Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

Texas Department of Transportation Traffic Safety Division Standard

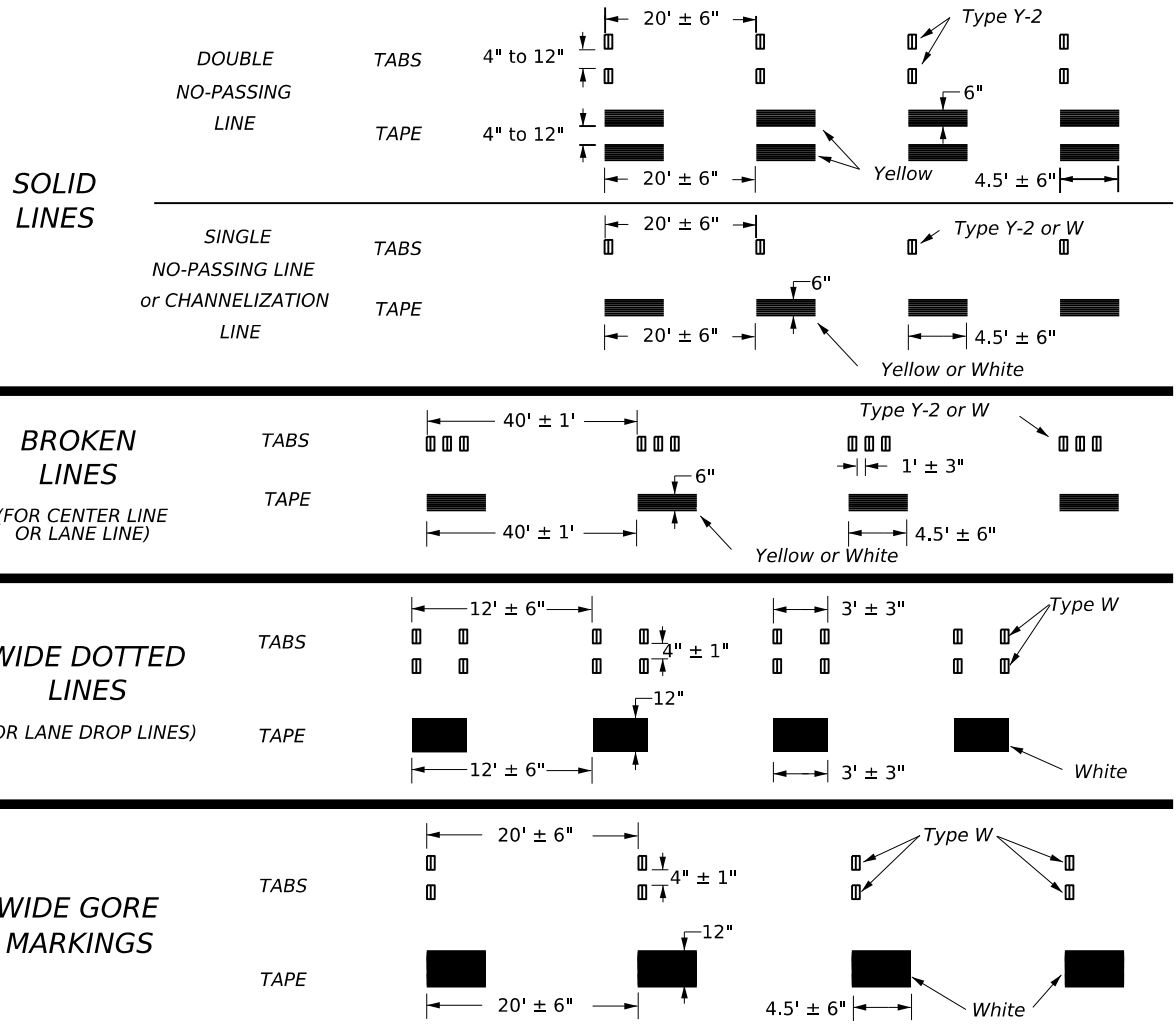
TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

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2-14 1-22 4-16	DIST	COUNTY	SHEET NO.	
CRP	BEE		45	

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



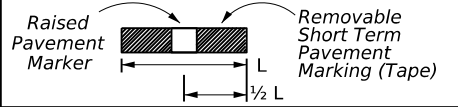
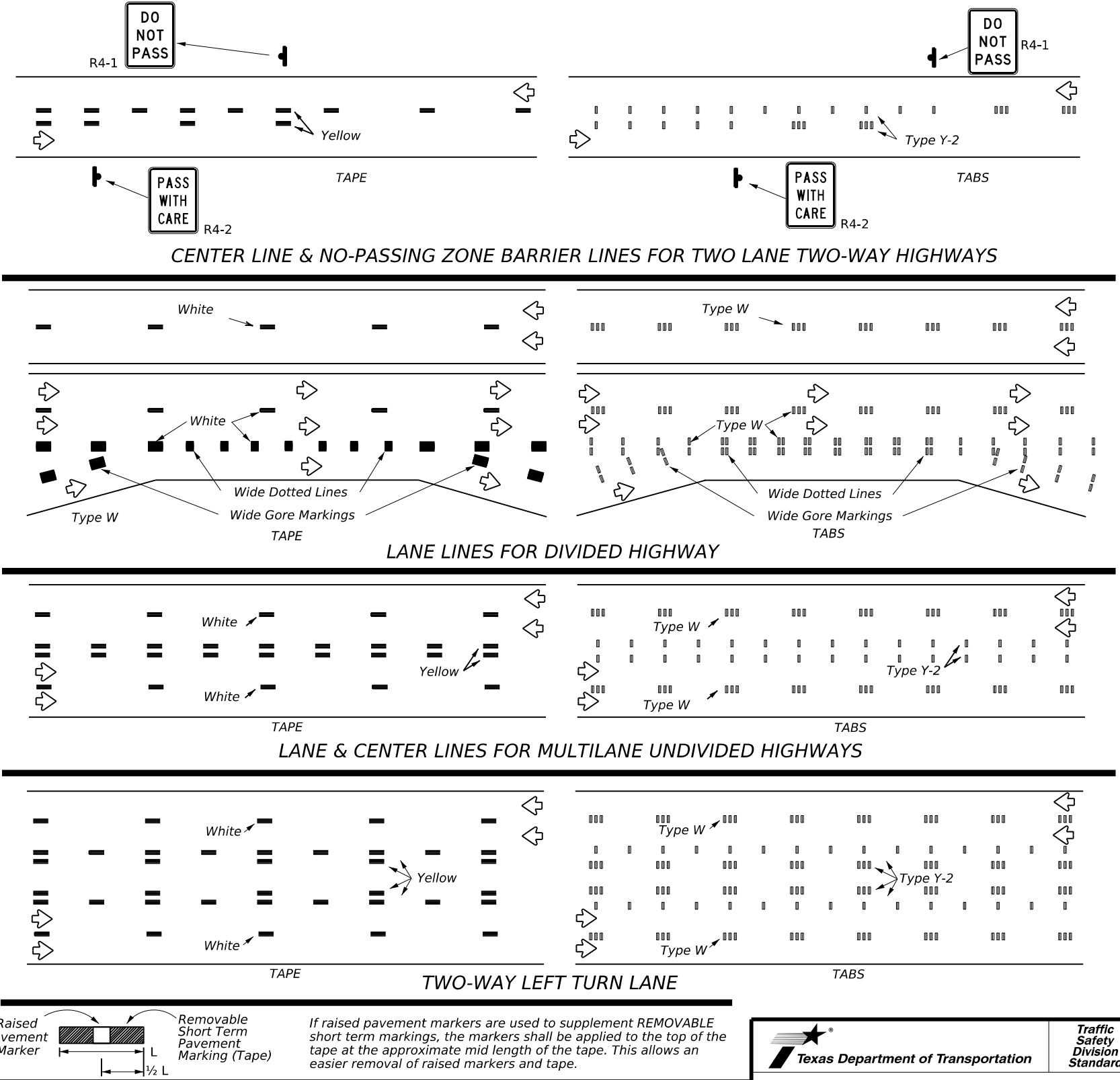
NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- 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.
- 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.
- 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.
- 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.
- 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).
- 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)

- 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).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- 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.
- 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



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

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

RAISED PAVEMENT MARKERS

- 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)

- 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



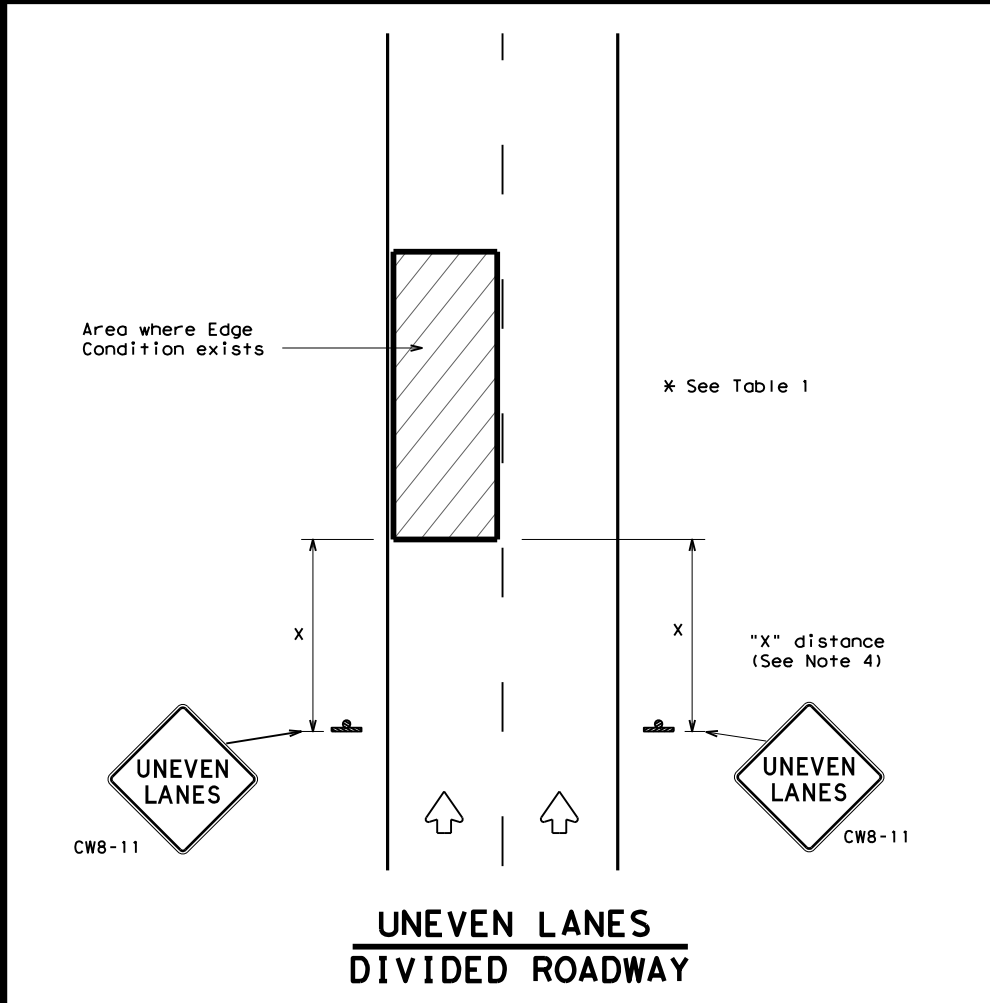
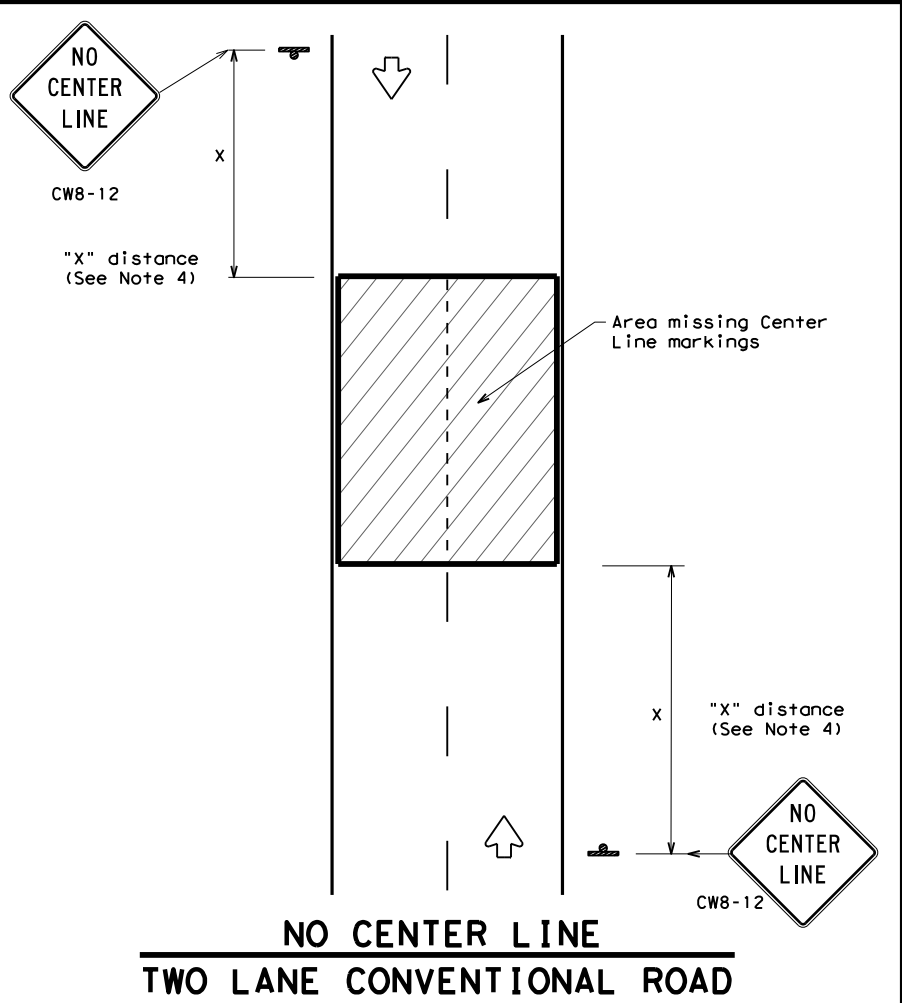
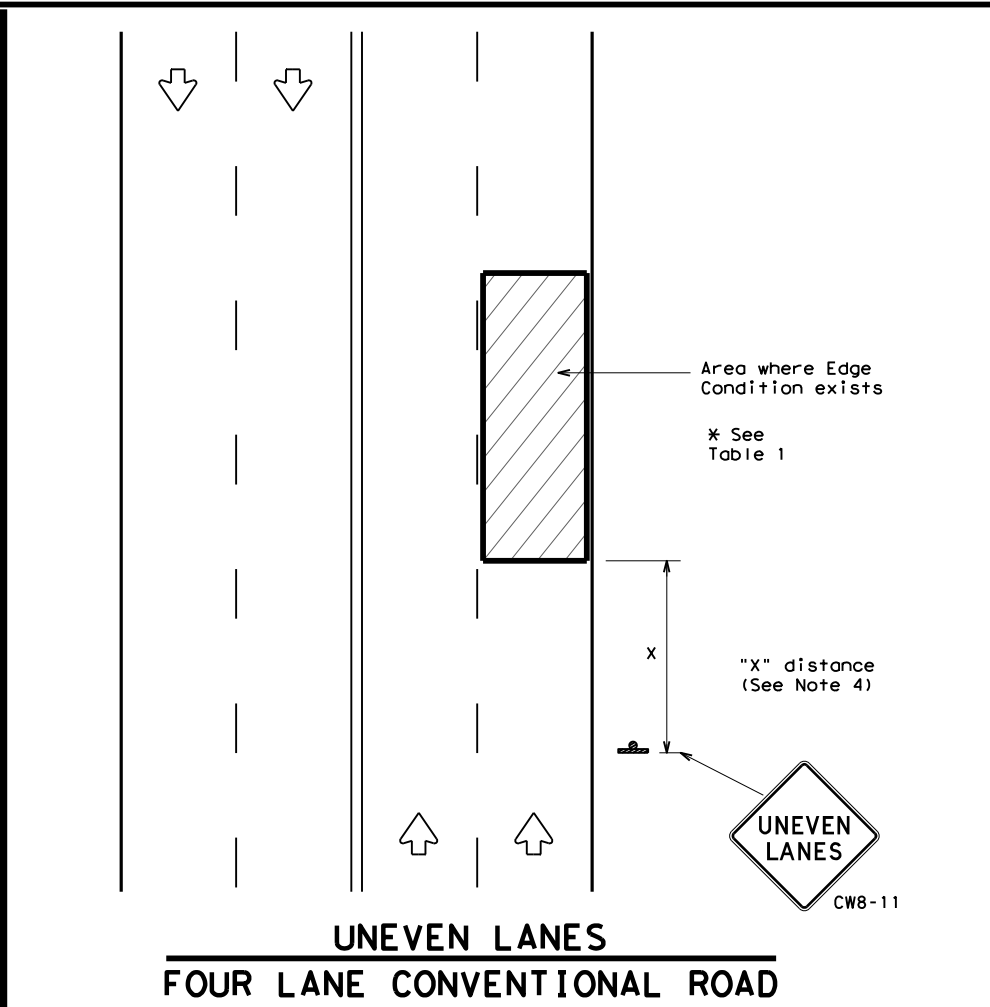
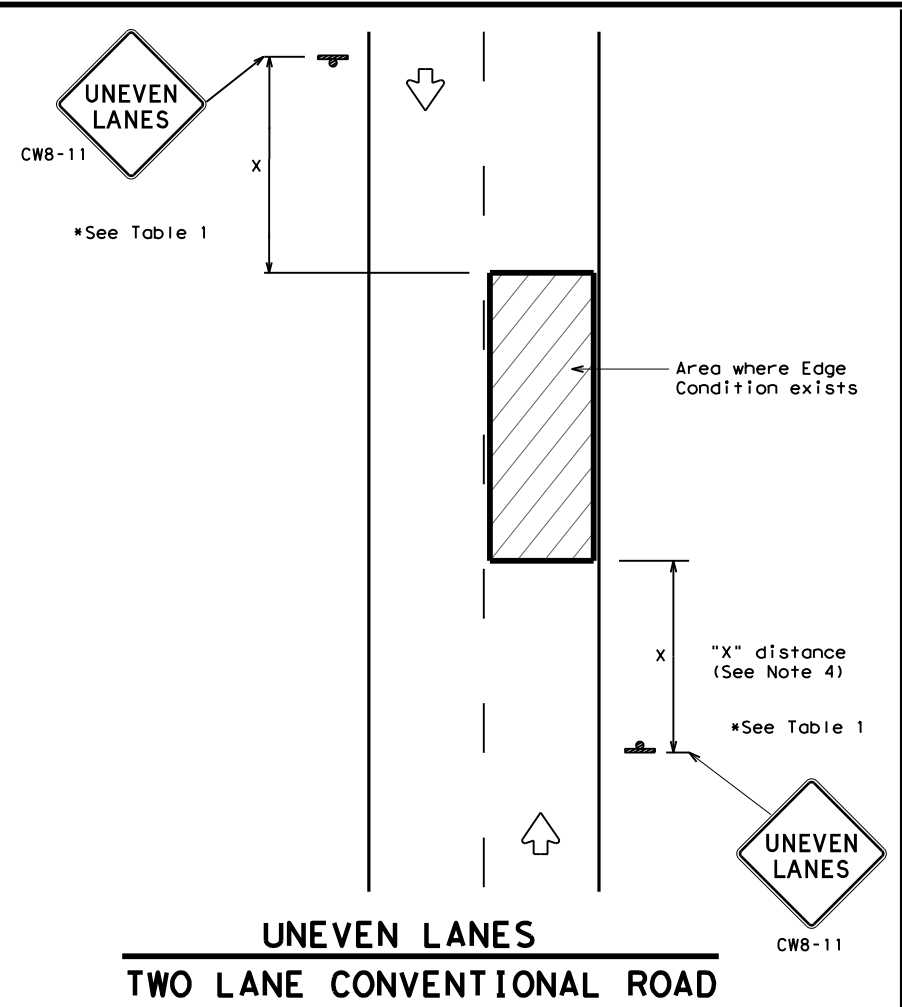
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzsstpm-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONTRACT	SECTION	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
4-92	7-13	DIST	COUNTY	SHEET NO.
1-97	2-23	CRP	BEE	46
3-03				

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or the accuracy of the information contained herein. The user of this standard is advised to verify the accuracy of the information contained herein.

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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

- 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.
- 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.
- 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.
- Signs shall be spaced at the distances recommended as per BC standards.
- 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."
- 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.
- Short term markings shall not be used to simulate edge lines.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

Edge Condition	Edge Height (D)	* Warning Devices
①	Less than or equal to: 1/4" (maximum-planing) 1/2" (typical-overlay)	Sign: CW8-11
②	Less than or equal to 3"	Sign: CW8-11
③	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

SIGNING FOR UNEVEN LANES

WZ (UL) - 13

FILE: wzu1-13.dgn DNE: TxDOT CK: TxDOT DW: TxDOT CK: TxDOT
 © TxDOT April 1992 CONT SECT JOB HIGHWAY
 REVISIONS 0988 01 025 FM 623
 8-95 2-98 7-13 DIST COUNTY SHEET NO.
 1-97 3-03 CRP BEE 47

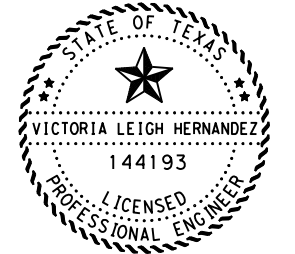
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DW: CK: DW: CK:

FM 623 PROJECT CONTROL

NAD 83 (2011) Epoch 2010.00, TX South Central Zone (4204), US Survey Feet, Surface Adjustment Factor 1.00008

POINT NAME	NORTHING	EASTING	ELEVATION	DESCRIPTION
AD623P01	13418043.23	2360043.587	369.31	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD623P02	13418369.78	2361078.171	387.01	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD623P03	13418767.94	2362340.613	380.01	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD623P04	13420885.93	2362228.829	358.74	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD623P05	13421404.71	2362044.633	359.74	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD623P06	13424002.93	2361125.165	397.24	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD883P01	13418936.66	2363053.174	376.98	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
AD883P02	13419393.66	2364288.462	373.51	SET 5/8" REBAR W/ ALUMINUM CAP STAMPED "TEXAS DEPARTMENT OF TRANSPORTATION CONTROL MARK"
T1	13417888.76	2359590.056	383.99	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T2	13418266.09	2360796.084	385.09	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T4	13419424.6	2362763.35	382.56	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T5	13419095.53	2363471.71	380.39	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T6	13419784.2	2365093.366	385.56	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T7	13420293.87	2366237.751	379.17	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T9	13421640.82	2361997.68	364.56	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T10	13423123.02	2361459.82	395.36	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
T11	13424349.93	2361036.864	402.18	PAINTED AERIAL PANEL W/ MAG NAIL SET IN THE CENTER
MIDLAND	13417546.65	2358672.411	396.94	3' STAINLESS STEEL SECTIONAL RODS DRIVEN TO REFUSAL W/ BRASS CAP STAMPED "MIDLAND"
ZOIL	13419230.41	2363687.656	379.34	3' STAINLESS STEEL SECTIONAL RODS DRIVEN TO REFUSAL W/ BRASS CAP STAMPED "ZOIL"
KA623B	13423961.75	2361144.79	398.75	4" BRONZE DISK SET IN HEADWALL STAMPED "KA623B"
KA623A	13420978.23	2362194.258	361.04	4" BRONZE DISK SET IN HEADWALL STAMPED "KA623A"
KA883A	13421262.17	2368422.139	321.04	4" BRONZE DISK SET IN HEADWALL STAMPED "KA883A"



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FM 623
HORIZONTAL AND VERTICAL
CONTROL SHEET

2024		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	48	

DATE: 7/31/2024 10:21:15 PM FILE: \\txdot\projectwiseonline.com\TXDOT4\Documents\16 - CRP\Design Projects\098801025\4 - Design\Plan Set\3 - Roadway\HORIZONTAL ALIGNMENT DATA

**HORIZONTAL ALIGNMENT LIST
FOR PROP FM623 CENTERLINE (A)**

Alignment Name: FM623_CL
Alignment Description: FM 623 PROPOSED ALIGNMENT
Alignment Style: Alignment\Baseline

	Station	Northing	Easting
Element: Linear			
POT (POT)	1099+39.00 R1	13417831.8490	2359422.1370
PI (PI)	1124+00.00 R1	13418563.2570	2361771.9376
Tangential Direction: N72°42'37.88"E			
Tangential Length: 2460.9999			
Element: Linear			
PI (PI)	1124+00.00 R1	13418563.2570	2361771.9376
PI (PI)	1136+35.19 R1	13418932.5490	2362950.6330
Tangential Direction: N72°36'14.14"E			
Tangential Length: 1235.1921			
Element: Linear			
PI (PI)	1136+35.19 R1	13418932.5490	2362950.6330
POT (POT)	1166+64.70 R1	13421788.0450 2	361938.6850
Tangential Direction: N19°30'49.02"W			
Tangential Length: 3029.5043			

**HORIZONTAL ALIGNMENT LIST
FOR EXIST FM623 CENTERLINE (EX-A)**

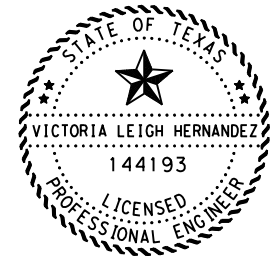
Alignment Name: FM623_CL_Ext
Alignment Description: FM 623 EXISTING ALIGNMENT
Alignment Style: Linear\Existing\Geometry\E_Road_Centerline

	Station	Northing	Easting
Element: Linear			
POT (POT)	99+40.80 R1	13417831.8494	2359422.1367
PC (PC)	130+41.37 R1	13418753.1731	2362382.6578
Tangential Direction: N72°42'49.28"E			
Tangential Length: 3100.5681			
Element: Circular			
PC (PC)	130+41.37 R1	13418753.1731	2362382.6578
PI (PI)	136+37.09 R1	13418930.1892	2362951.4694
CC (CC)		13419300.2918	2362212.3927
PT (PT)	139+63.71 R1	13419491.6915	2362752.4808
Radius: 573.0000			
Delta: 92°13'38.29" Left			
Degree of Curvature (Arc): 09°59'57.35"			
Length: 922.3410			
Tangent: 595.7191			
Chord: 825.9409			
Middle Ordinate: 175.7791			
External: 253.5654			
Back Tangent Direction: N72°42'49.28"E			
Back Radial Direction: S17°17'10.72"E			
Chord Direction: N26°36'00.13"E			
Ahead Radial Direction: N70°29'10.99"E			
Ahead Tangent Direction: N19°30'49.01"W			
Element: Linear			
PT (PT)	139+63.71 R1	13419491.6915	2362752.4808
POT (POT)	249+87.16 R1	13429881.9764	2359070.3091
Tangential Direction: N19°30'49.01"W			
Tangential Length: 11023.4482			

**HORIZONTAL ALIGNMENT LIST
FOR EXIST FM883 CENTERLINE (B)**

Alignment Name: FM883_EXIST
Alignment Description: FM 883 EXISTING ALIGNMENT
Alignment Style: Alignment\Baseline

	Station	Northing	Easting
Element: Linear			
POT (POT)	804+56.11 R1	13420051.0780	2365708.9230
PC (PC)	819+31.65 R1 1	3419452.3870	2364360.2940
Tangential Direction: S66°03'44.42"W			
Tangential Length: 1475.5443			
Element: Circular			
PC (PC)	819+31.65 R1	13419452.3899	2364360.3005
PI (PI)	825+86.54 R1	13419186.6710	2363761.7360
CC (CC)		13429926.0413	2359710.7649
PT (PT)	832+40.01 R1	13418990.8748	2363136.7961
Radius: 11459.3000			
Delta: 06°32'30.27" Right			
Degree of Curvature (Arc): 00°29'59.98"			
Length: 1308.3646			
Tangent: 654.8939			
Chord: 1307.6541			
Middle Ordinate: 18.6677			
External: 18.6982			
Back Tangent Direction: S66°03'44.20"W			
Back Radial Direction: N23°56'15.80"W			
Chord Direction: S69°19'59.33"W			
Ahead Radial Direction: N17°23'45.53"W			
Ahead Tangent Direction: S72°36'14.47"W			
Element: Linear			
PT (ERC12)	832+40.01 R1	13418990.8770	2363136.8030
PC (PC)	836+27.19 R1	13418875.1226	2362767.3411
Tangential Direction: S72°36'14.20"W			
Tangential Length: 387.1707			
Element: Circular			
PC (PC)	836+27.19 R1	13418875.1226	2362767.3411
PI (PI)	837+30.89 R1	13418844.1177	2362668.3804
CC (CC)		13419447.1024	2362588.1367
PT (PT)	838+32.56 R1	13418848.1630	2362564.7554
Radius: 599.3957			
Delta: 19°37'53.88" Right			
Degree of Curvature (Arc): 09°33'32.13"			
Length: 205.3749			
Tangent: 103.7040			
Chord: 204.3718			
Middle Ordinate: 8.7746			
External: 8.9050			
Back Tangent Direction: S72°36'14.20"W			
Back Radial Direction: N17°23'45.80"W			
Chord Direction: S82°25'11.14"W			
Ahead Radial Direction: N02°14'08.08"E			
Ahead Tangent Direction: N87°45'51.92"W			



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FM 623			
HORIZONTAL ALIGNMENT DATA			
2024		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		49

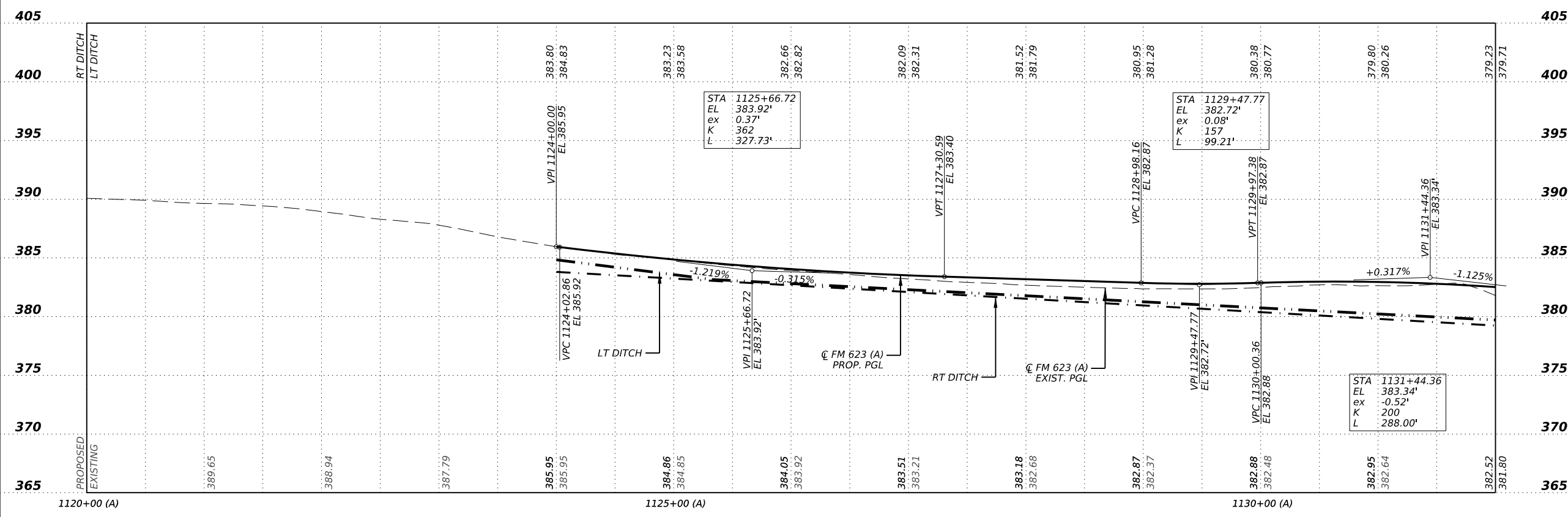
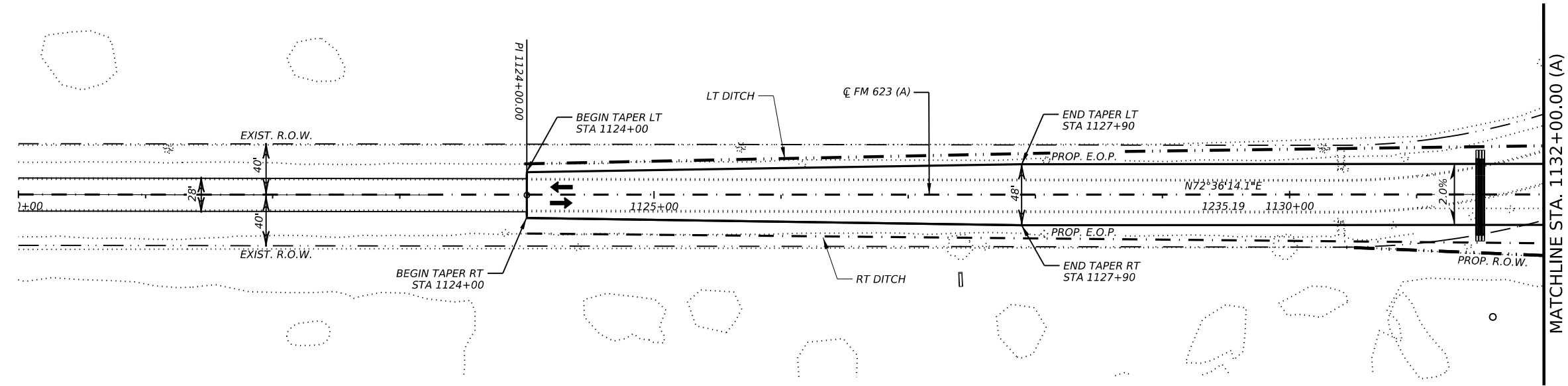
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Texas Department of Transportation

FM 623

PLAN AND PROFILE SHEETS

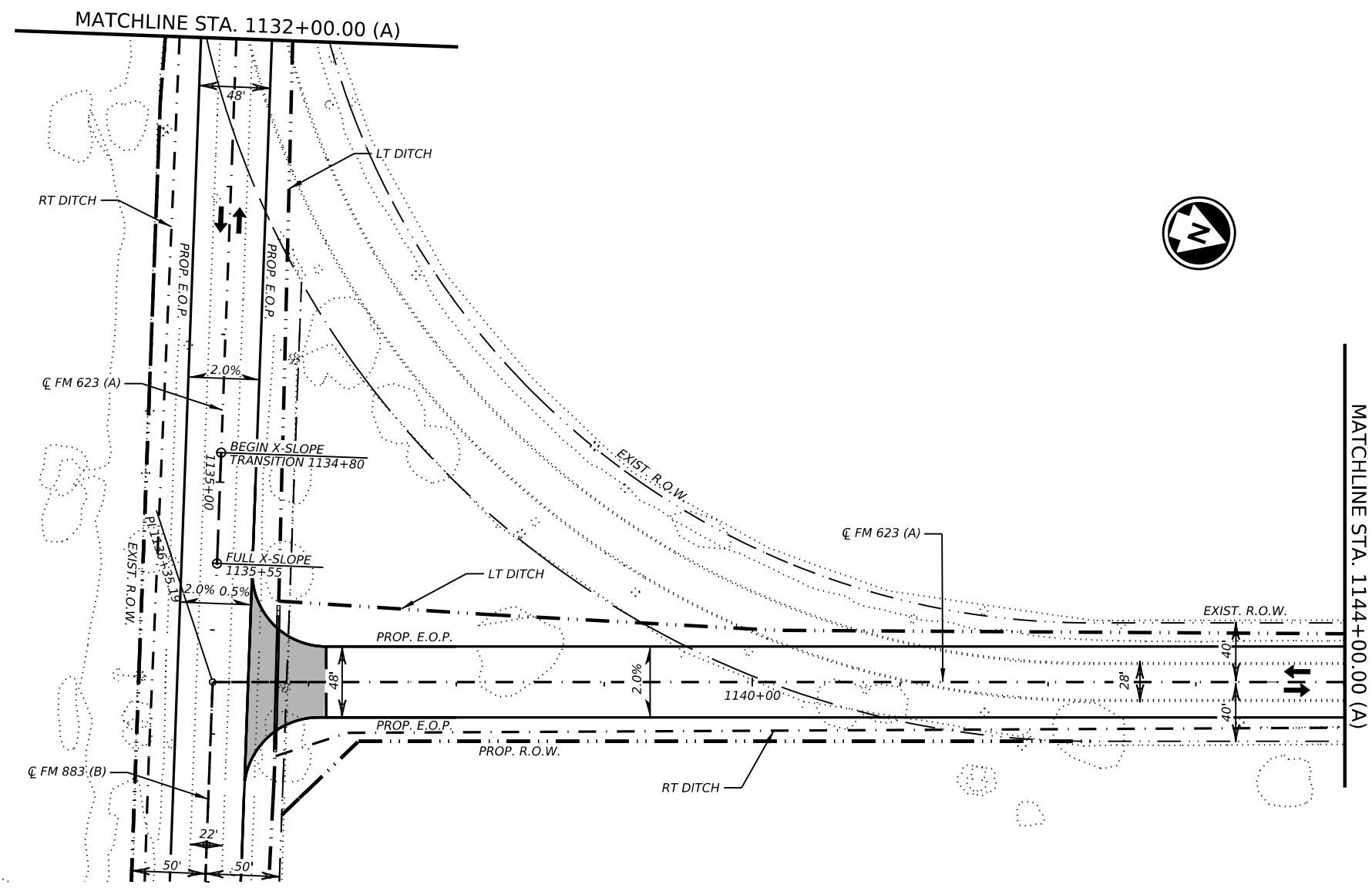
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2024 SHEET 1 OF 3

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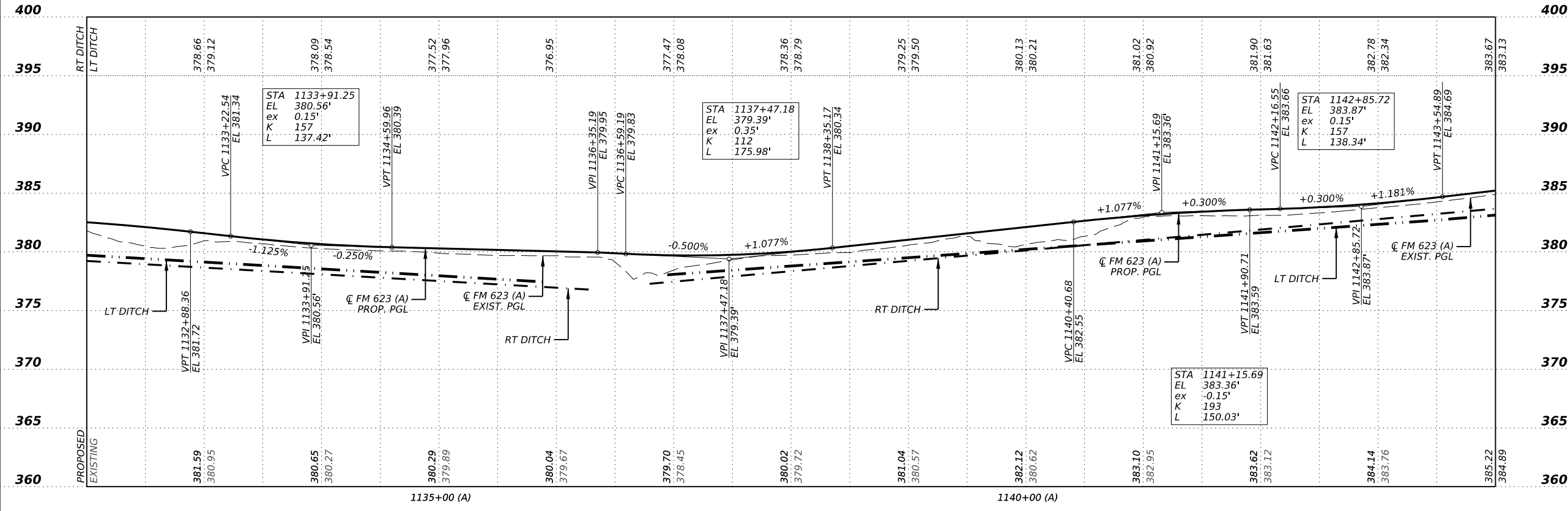
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LEGEND

↔ DIRECTION OF TRAFFIC

■ INTERSECTION, ITEM 530



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08/01/2024

FM 623

PLAN AND PROFILE SHEETS

ALIGNMENT "A"

2024		SHEET 2 OF 3	
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY		SHEET NO.
CRP	BEE		51

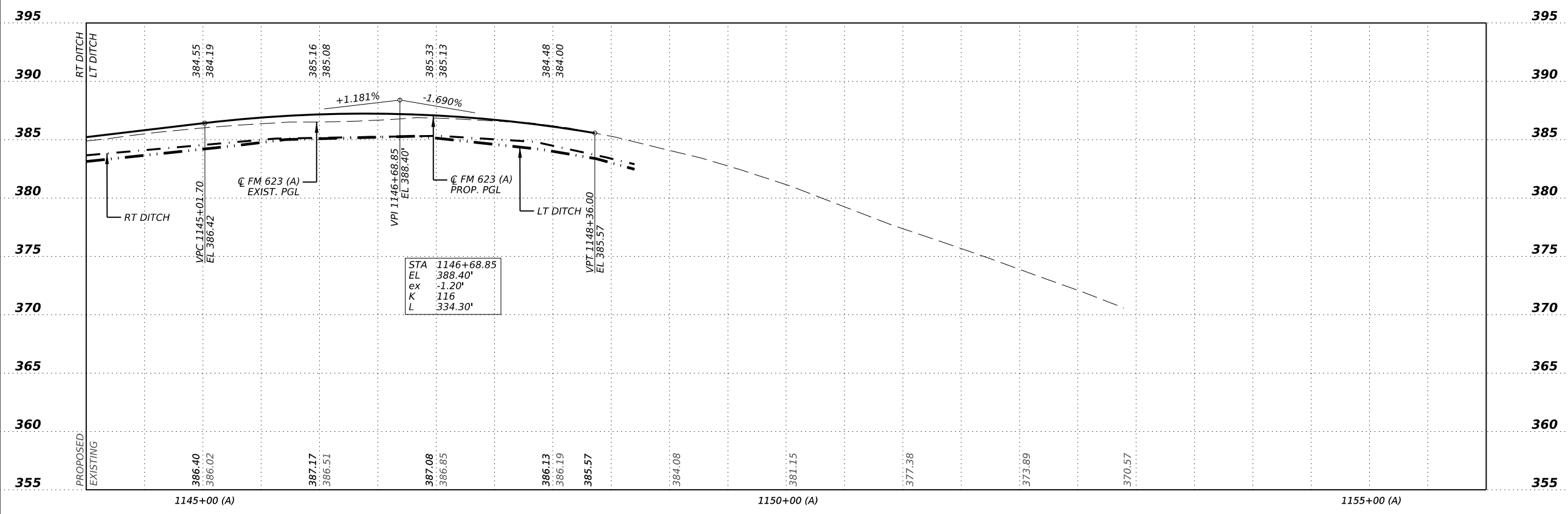
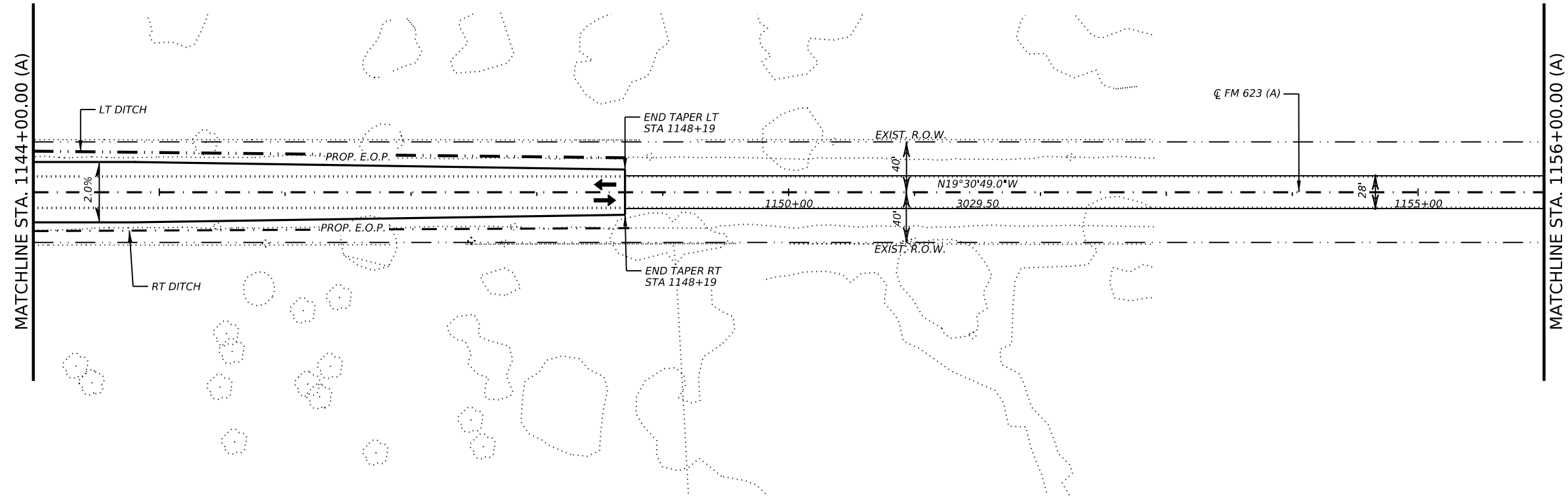
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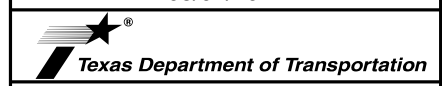
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↔ DIRECTION OF TRAFFIC



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08/01/2024



**FM 623
 PLAN AND PROFILE
 SHEETS
 ALIGNMENT "A"**

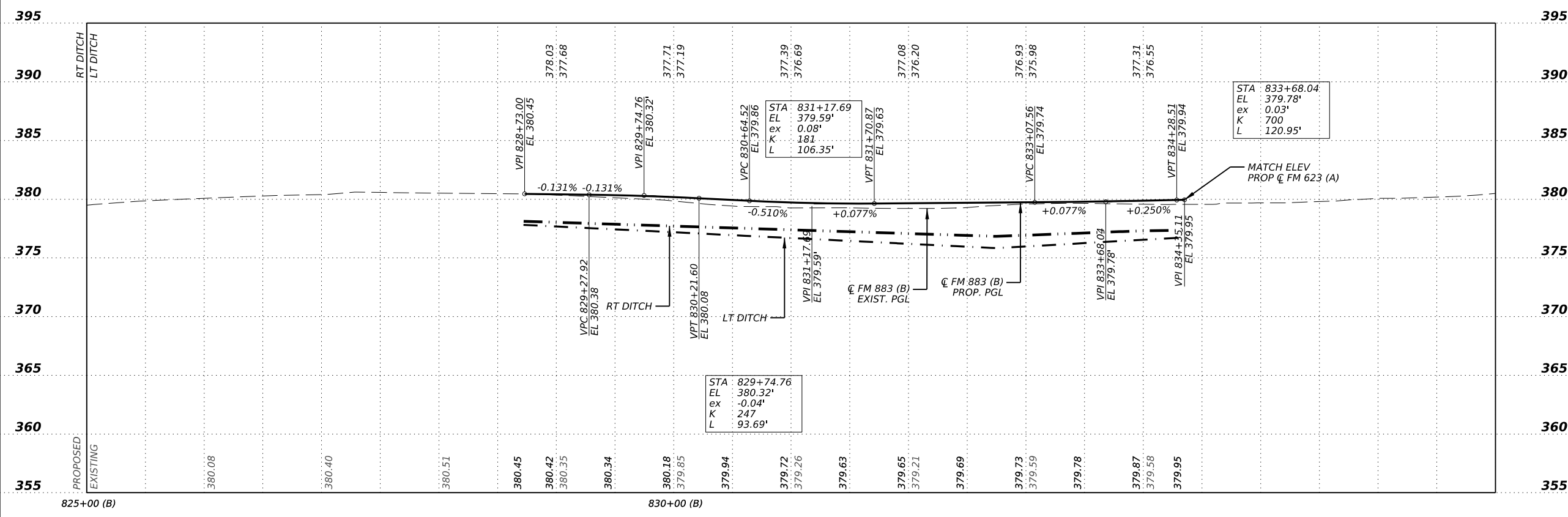
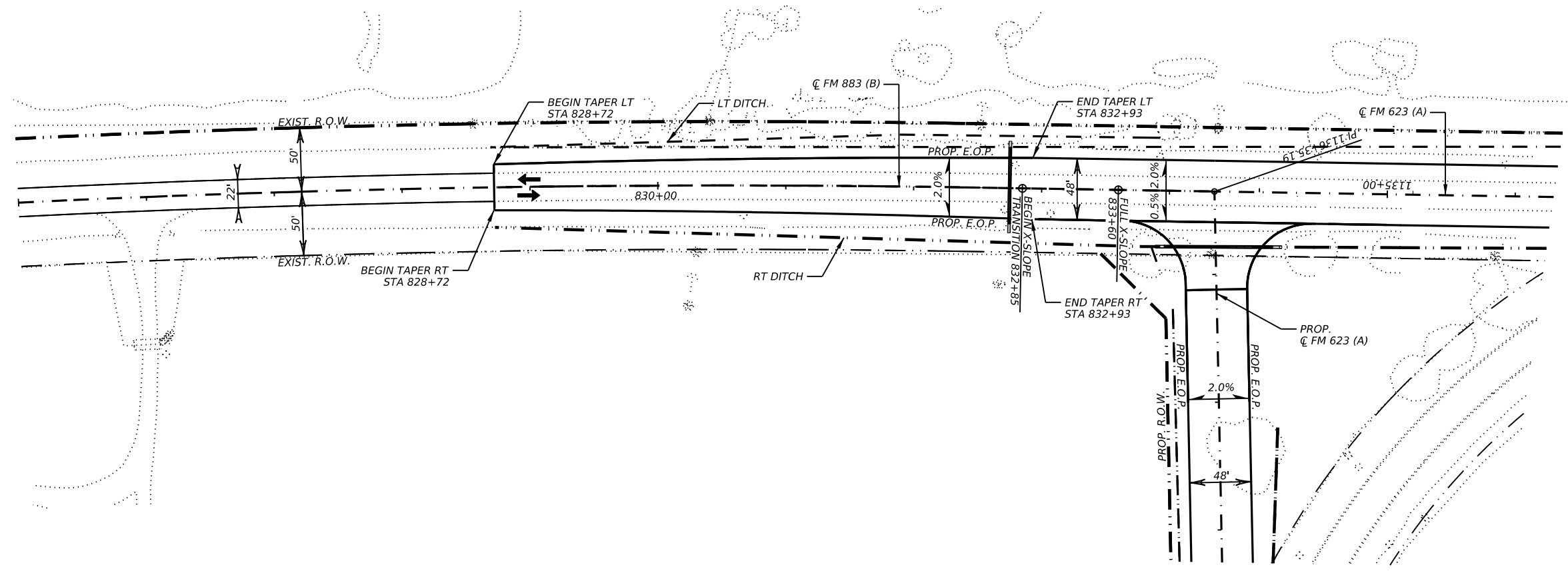
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DIST	COUNTY	SHEET NO.	
CRP	BEE	52	

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LEGEND

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08/01/2024



**FM 623
PLAN AND PROFILE
SHEETS
ALIGNMENT "B"**

2024		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
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CRP	BEE	53	

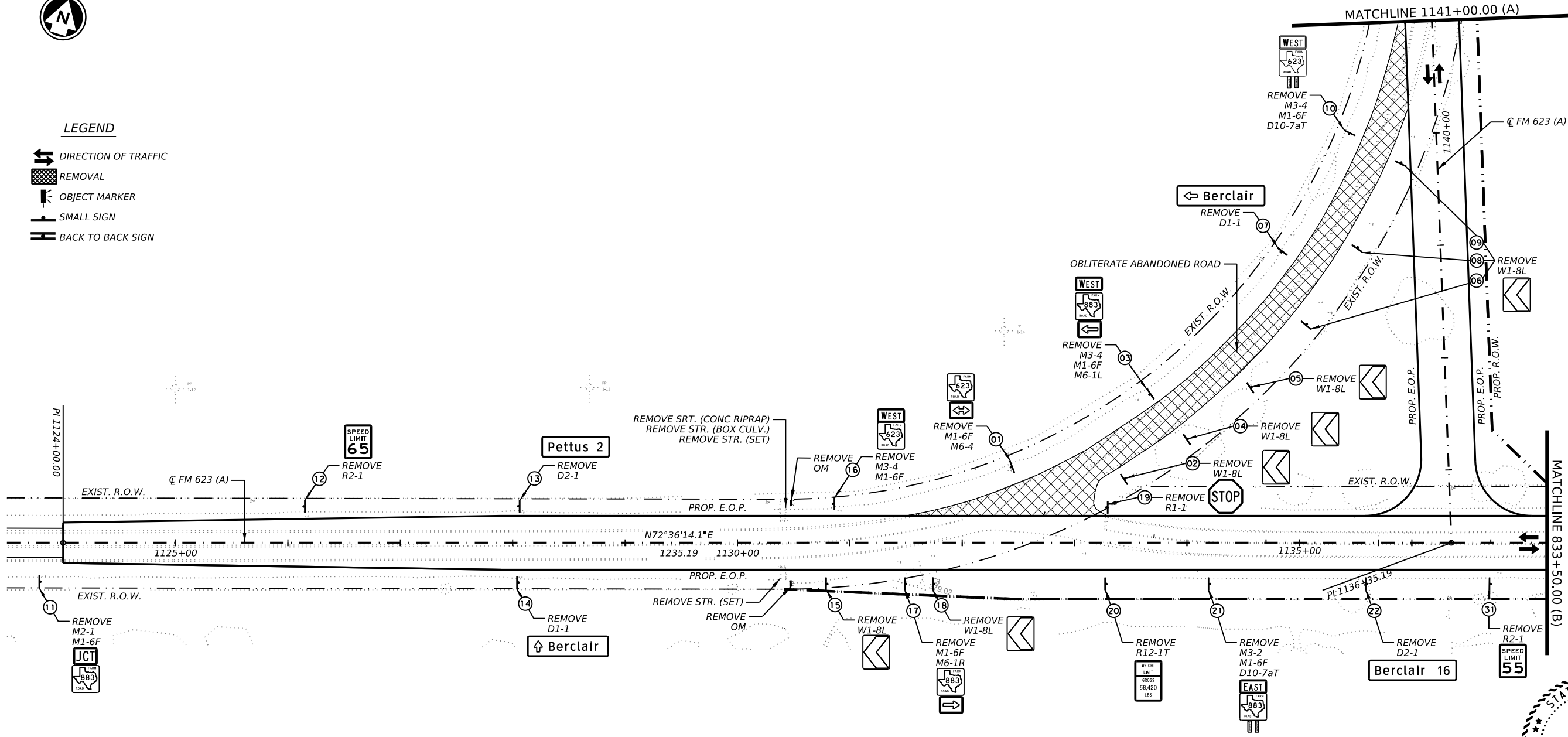
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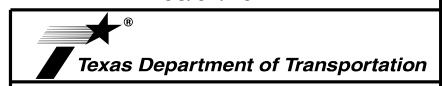
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- DIRECTION OF TRAFFIC
- REMOVAL
- OBJECT MARKER
- SMALL SIGN
- BACK TO BACK SIGN



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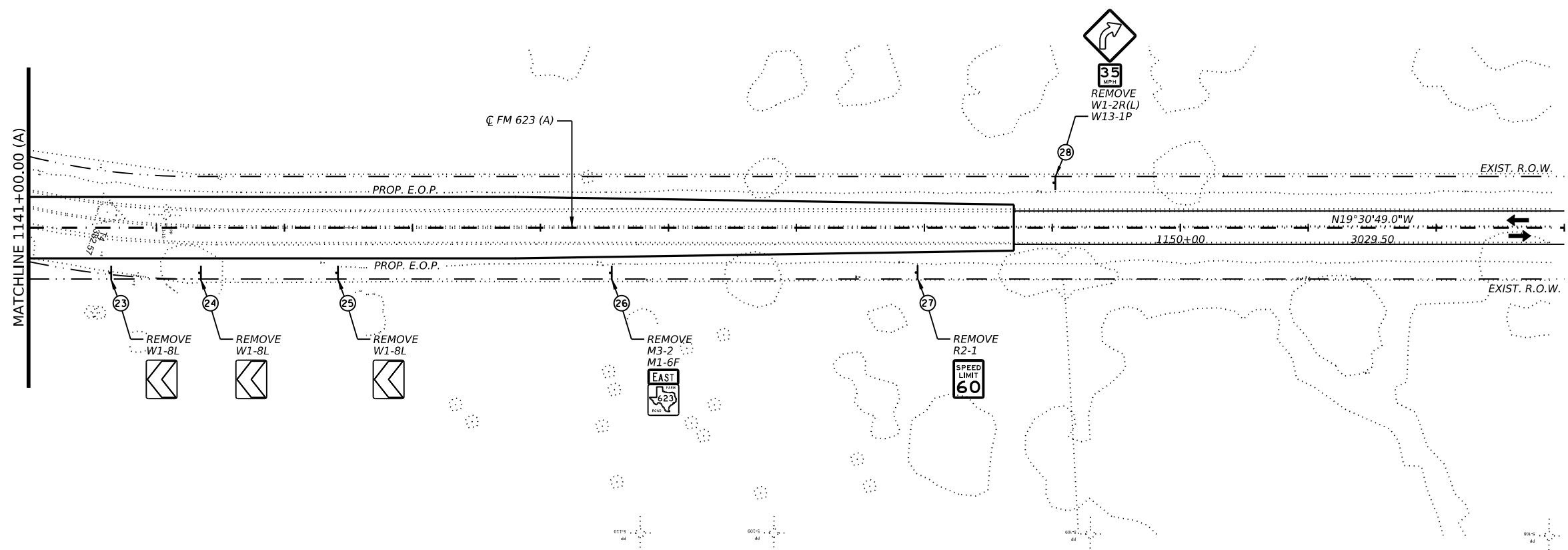


**FM 623
 REMOVAL LAYOUT
 SHEETS**

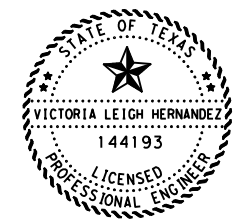
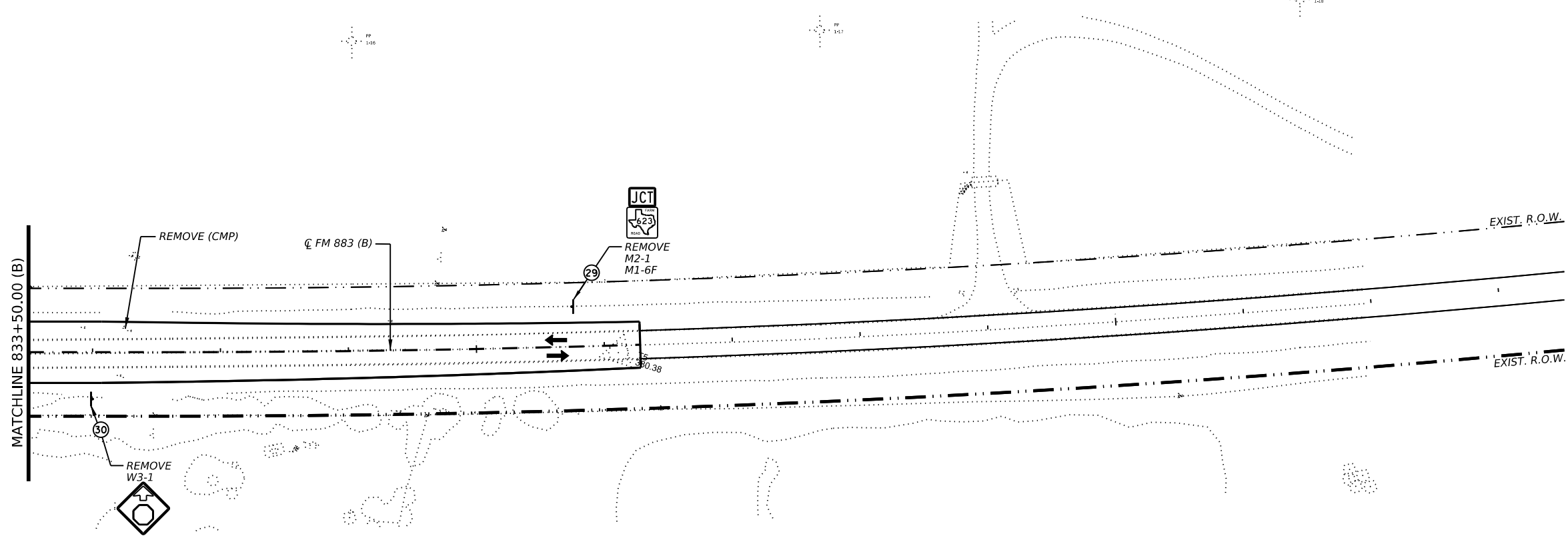
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CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	54	

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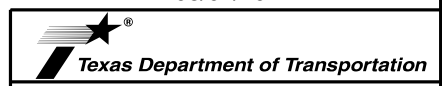


- LEGEND**
- DIRECTION OF TRAFFIC
 - REMOVAL
 - OBJECT MARKER
 - SMALL SIGN
 - BACK TO BACK SIGN



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08/01/2024



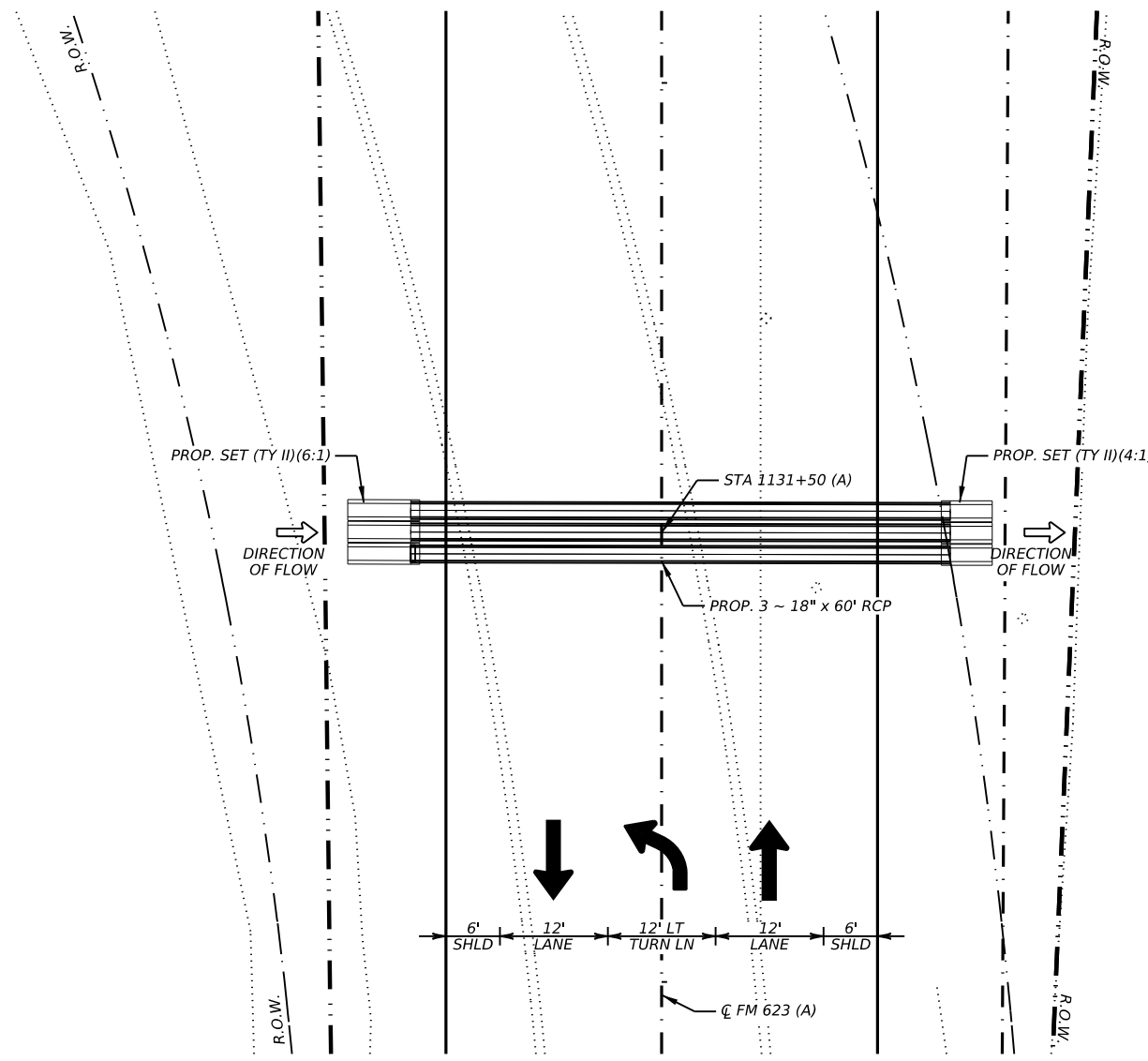
**FM 623
 REMOVAL LAYOUT
 SHEETS**

2024		SHEET 2 OF 2	
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0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	55	

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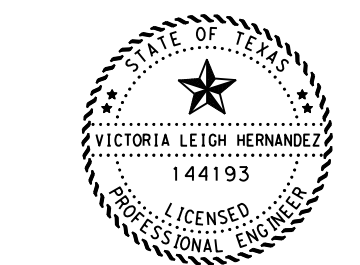
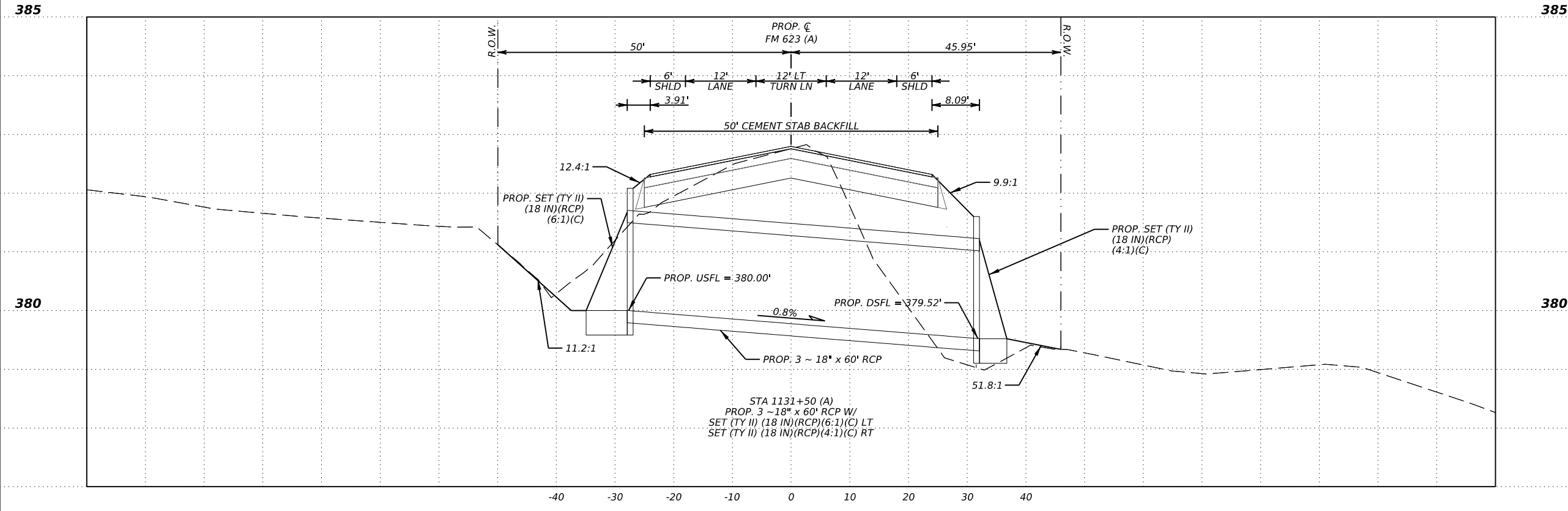


- NOTES:
1. ELEVATIONS SHOWN ARE TRUE ELEVATIONS.
 2. RESHAPING AROUND PROPOSED SETS TO ENSURE POSITIVE DRAINAGE SHALL BE CONSIDERED SUBSIDIARY TO ITEM 467.
 3. UPON APPROVAL OF THE ENGINEER, CULVERTS MAY BE EXTENDED WITH ZERO SLOPE.



SCALE:
HORIZ: 1:20
VERT: 1:2

DATE: 8/1/2024 5:20:58 PM
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08/01/2024



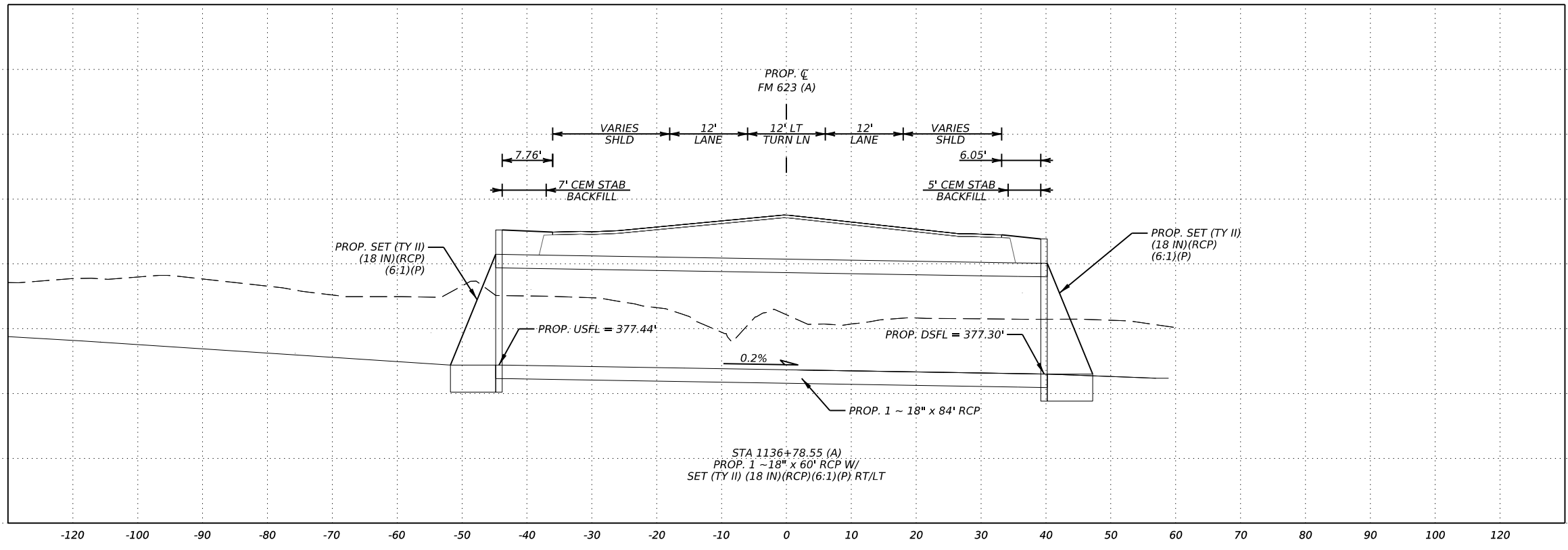
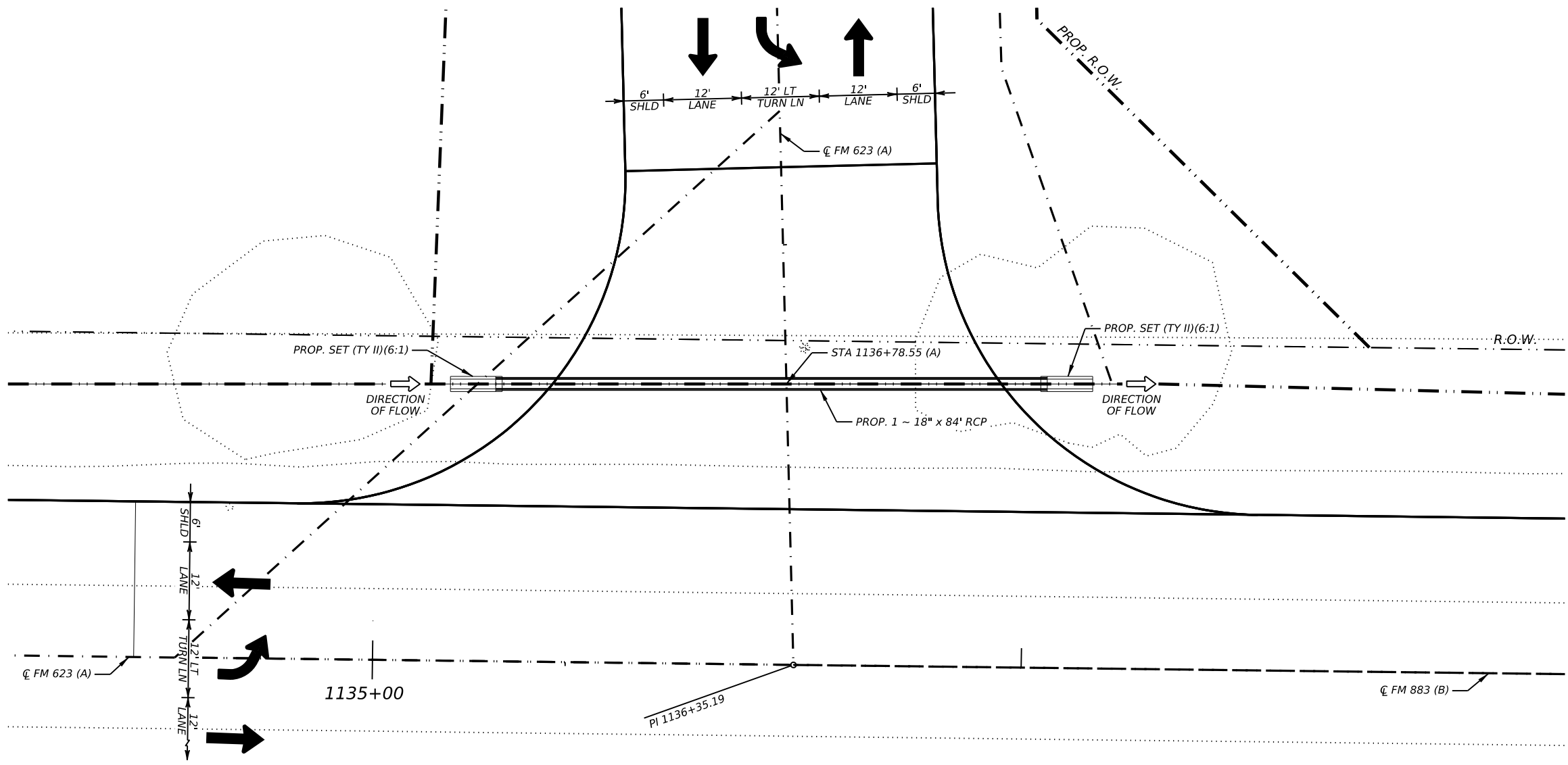
FM 623
CULVERT
LAYOUT A

2024		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	56	

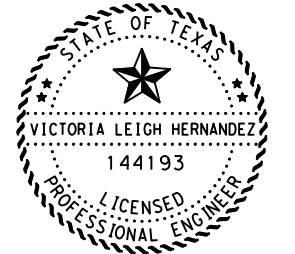
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- NOTES:
- ELEVATIONS SHOWN ARE TRUE ELEVATIONS.
 - RESHAPING AROUND PROPOSED SETS TO ENSURE POSITIVE DRAINAGE SHALL BE CONSIDERED SUBSIDIARY TO ITEM 467.
 - UPON APPROVAL OF THE ENGINEER, CULVERTS MAY BE EXTENDED WITH ZERO SLOPE.



SCALE:
 HORIZ: 1:20
 VERT: 1:2



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FM 623
 CULVERT
 LAYOUT B

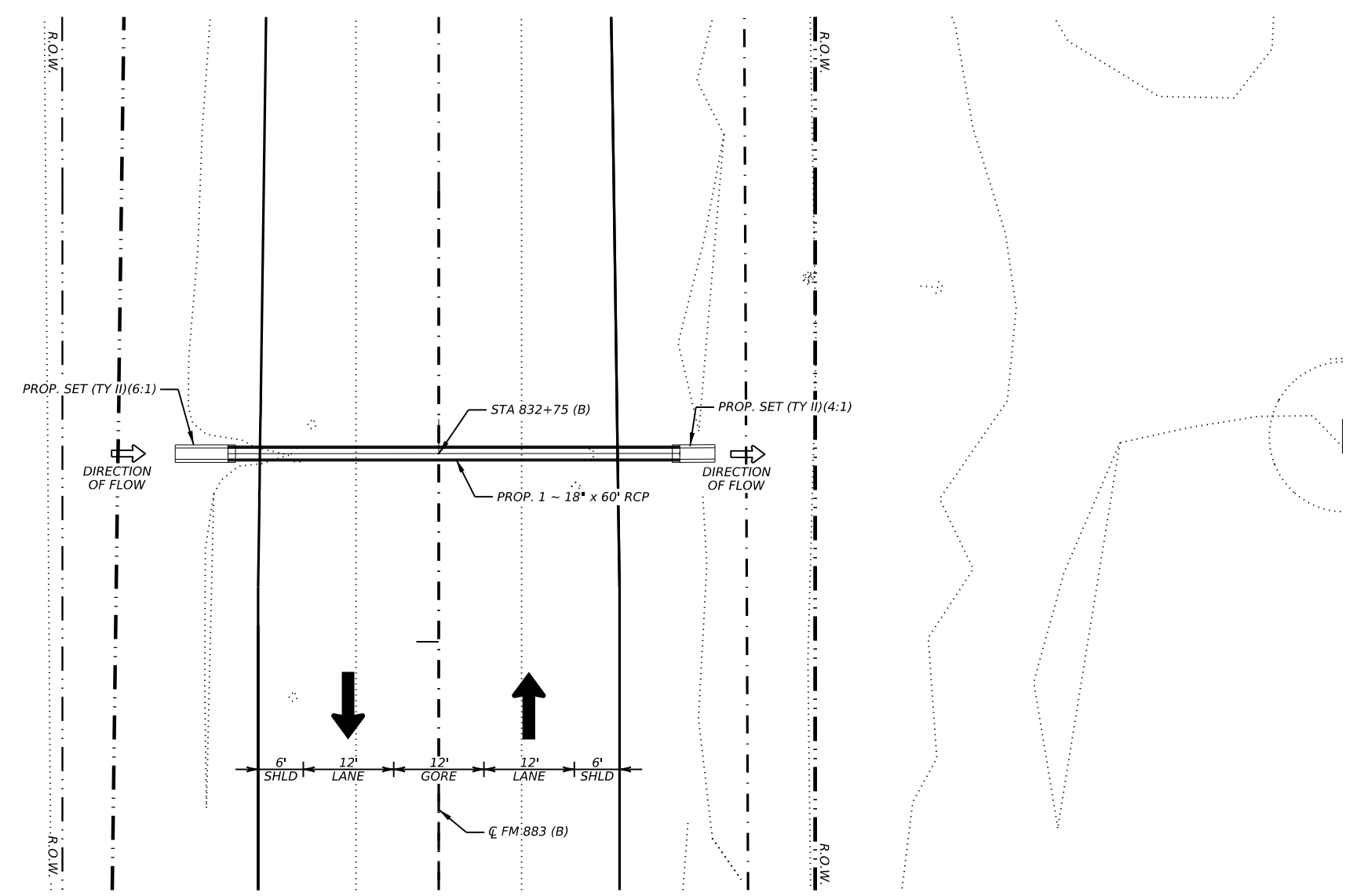
2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	57	

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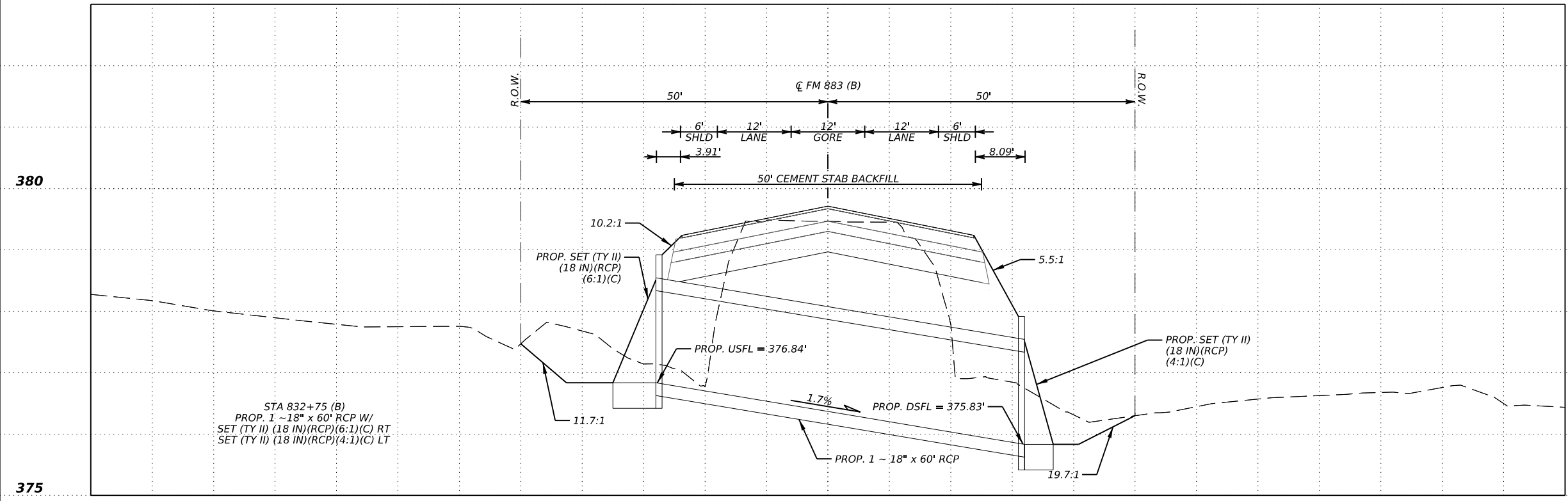


- NOTES:
1. ELEVATIONS SHOWN ARE TRUE ELEVATIONS.
 2. RESHAPING AROUND PROPOSED SETS TO ENSURE POSITIVE DRAINAGE SHALL BE CONSIDERED SUBSIDIARY TO ITEM 467.
 3. UPON APPROVAL OF THE ENGINEER, CULVERTS MAY BE EXTENDED WITH ZERO SLOPE.



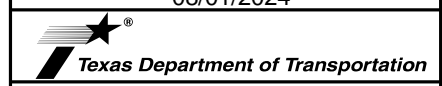
SCALE:
HORIZ: 1:20
VERT: 1:2

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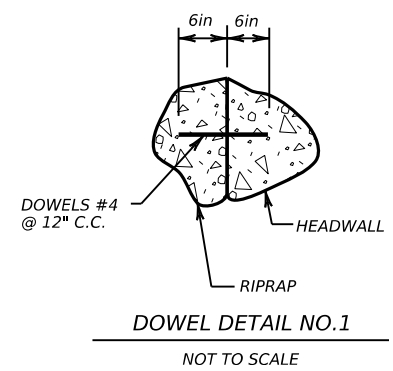
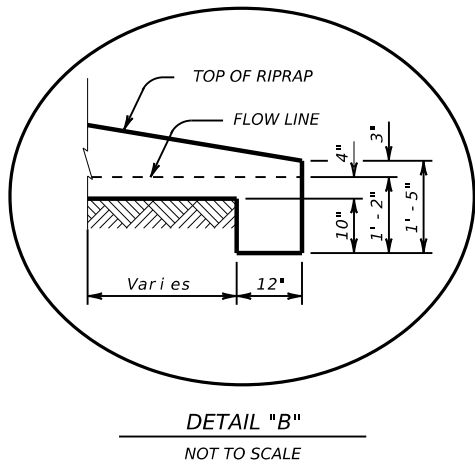
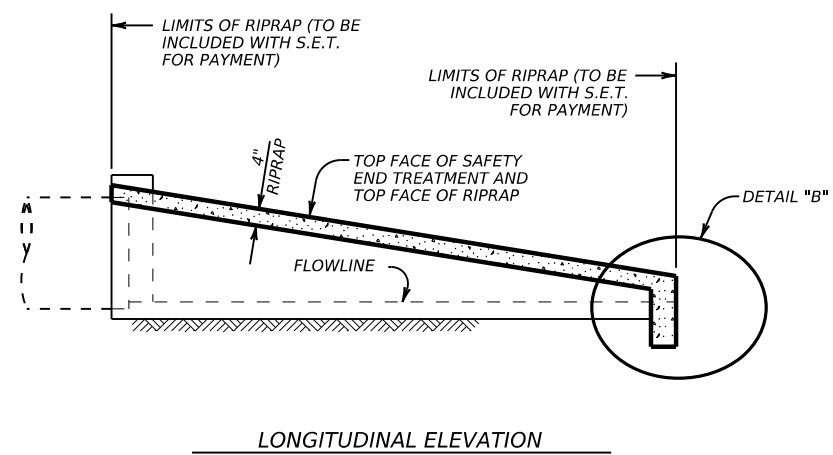
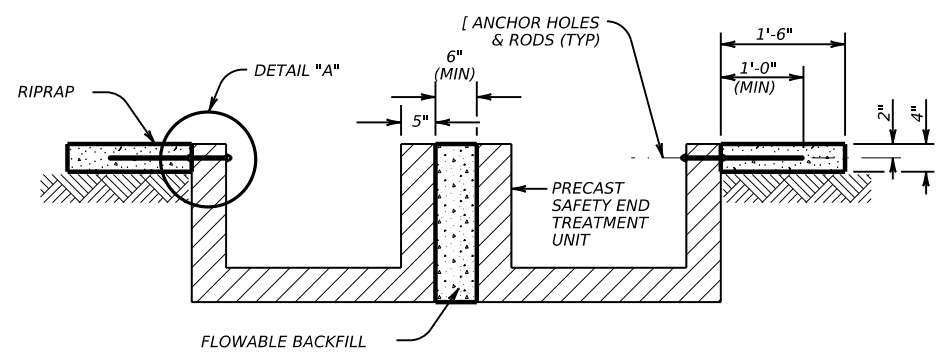
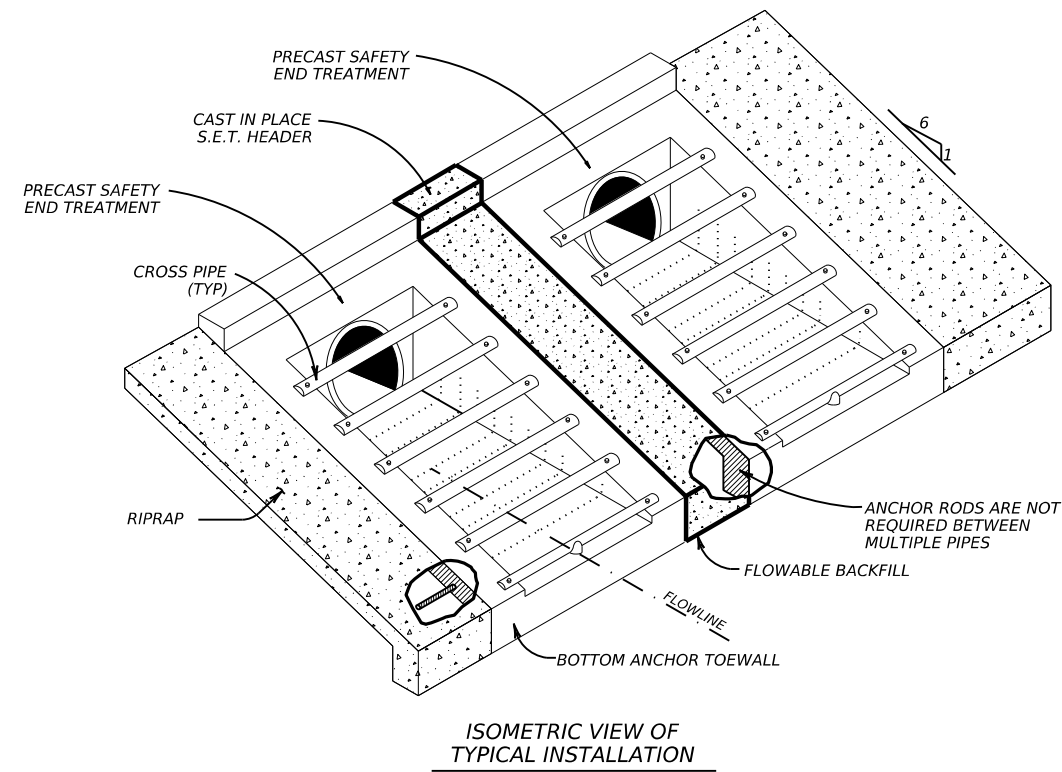
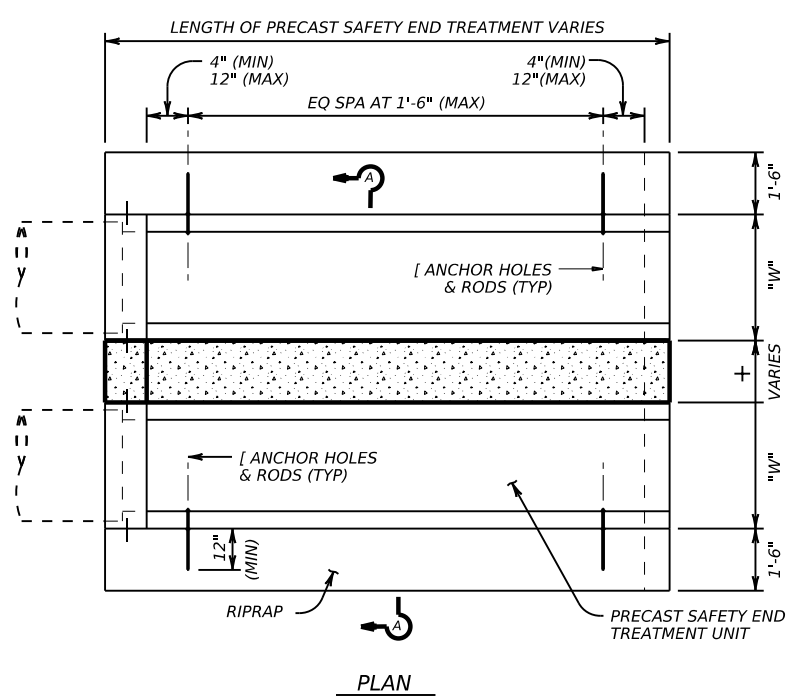
FM 623

CULVERT
LAYOUT C

2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST	COUNTY	SHEET NO.	
CRP	BEE	58	

DATE: 8/1/2024
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PIPE I.D.	PIPE WALL "B" THICKNESS	"D"	MAXIMUM SLOPE		MINIMUM LENGTH OF UNIT		FLOWABLE BACKFILL
			IN	RISE	FT	IN	
12	2.00	17.0	6	1	4	9	0.16
15	2.25	20.5	6	1	6	5	0.23
18	2.50	24.0	6	1	8	0	0.31
24	3.00	31.0	6	1	11	3	0.50
30	3.50	38.5	6	1	14	8	0.75
36	4.00	45.5	6	1	17	11	1.01
42	4.50	52.5	6	1	21	2	1.32

PIPE I.D.	PIPE WALL "B" THICKNESS	"D"	MAXIMUM SLOPE		MINIMUM LENGTH OF UNIT		FLOWABLE BACKFILL	
			IN	RISE	FT	IN	IN	CY
12	2	17	3	1	2	11	0.10	
			4	1	3	6	0.12	
			6	1	4	9	0.16	
15	2.25	20.5	3	1	3	8	0.14	
			4	1	4	7	0.17	
			6	1	6	5	0.23	
18	2.5	24	3	1	4	6	0.18	
			4	1	5	8	0.23	
			6	1	8	0	0.31	
24	3	31	3	1	6	2	0.28	
			4	1	7	10	0.36	
			6	1	11	3	0.50	
30	3.5	38.5	3	1	7	10	0.41	
			4	1	10	1	0.52	
			6	1	14	8	0.75	
36	4	45.5	3	1	9	5	0.55	
			4	1	12	3	0.70	
			6	1	17	11	1.01	
42	4.5	52.5	3	1	11	1	0.71	
			4	1	14	5	0.91	
			6	1	21	2	1.32	

* Dimension "D" is based on ASTM C-76, Class III, Wall "B" thickness. If any other wall thickness is used, dimension "D" must be adjusted accordingly.
 + TY B CONCRETE MAY BE USED IN LIEU OF FLOWABLE BACKFILL



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08/01/2024

FM 623
FLOWABLE BACKFILL
DETAILS

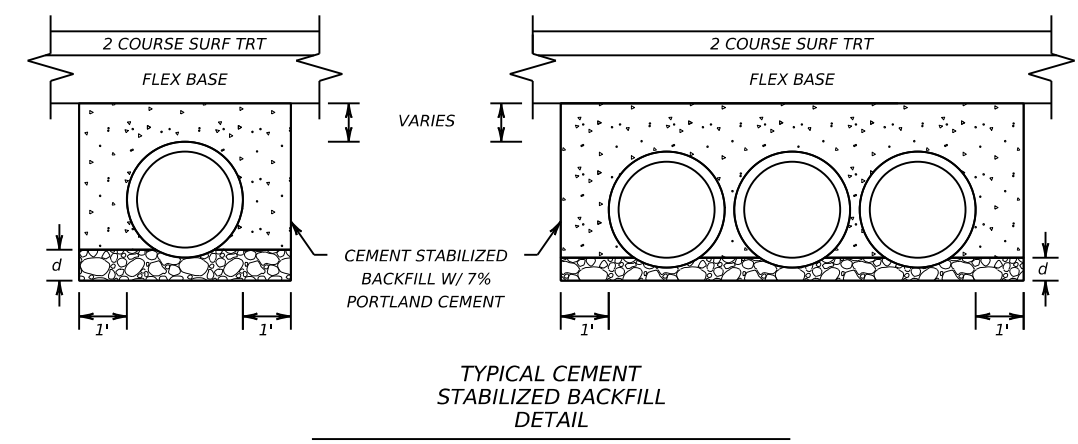
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 CONT SECT JOB HIGHWAY
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 DIST COUNTY SHEET NO.
 CRP BEE 59

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D or S	d
≤ 27"	3"
30" to 60"	4"
≥ 66"	6"

D - INSIDE DIAMETER OF PIPE
 S - BOX CULVERT SPAN LENGTH
 d - MIN. BEDDING MATERIAL BELOW PIPE/BOX



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08/01/2024

NOTES

1. FOR PAYMENT OF CEMENT STABILIZED BACKFILL REFER TO DRAINAGE SUMMARY SHEET - ITEM 400 CEM STABIL BKFL.
2. PAVEMENT STRUCTURE QUANTITIES ARE PAID UNDER ROADWAY ITEMS. FOR DEPTHS REFER TO PROPOSED TYPICAL SECTIONS.
3. THE LENGTH LIMITS FOR CEMENT STABILIZED BACKFILL SHALL EXTEND 1' BEYOND THE PAVEMENT EDGE.
4. ANY EXCAVATION WIDTH EXCEEDING THE LIMITS SHOWN SHALL BE BACKFILLED IN ACCORDANCE WITH THIS SHEET.
5. FOR CUT AND RESTORE, PAVEMENT STRUCTURE QUANTITIES SHALL BE SUBSIDIARY TO ITEM 400-7006 CUT & RESTORE PAV.
6. BEDDING SHALL BE SUBSIDIARY TO ITEMS 462 & 464.
7. ANY LABOR, EQUIPMENT AND MATERIALS REQUIRED FOR CONSTRUCTION EXCEEDING THE WIDTHS SHOWN ARE SUBSIDIARY TO PERTINENT ITEMS.

FM 623			
BACKFILL DETAILS			
2024		SHEET 1 OF 1	
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST		COUNTY	SHEET NO.
CRP		BEE	60

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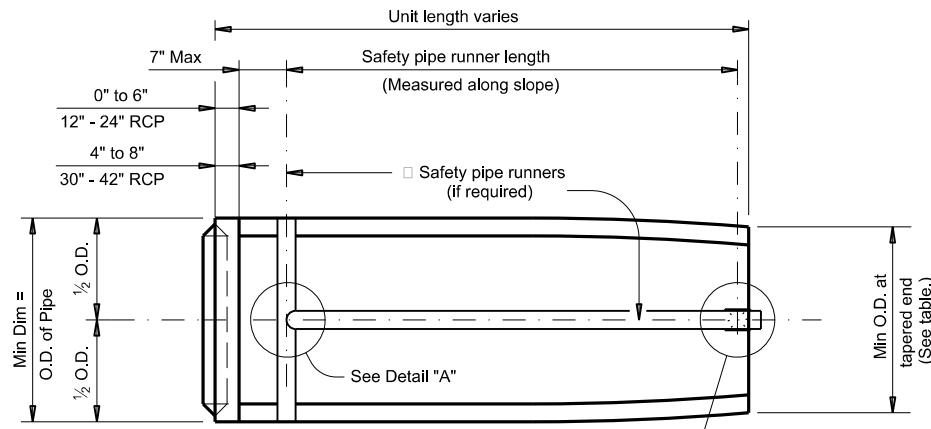
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MAX SAFETY PIPE RUNNER LENGTHS AND REQUIRED SAFETY PIPE RUNNER SIZES

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 1/2" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

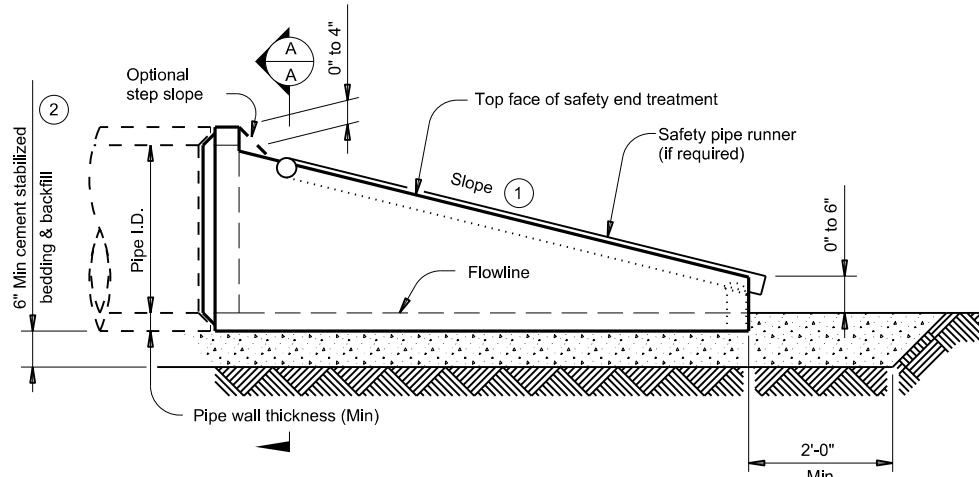
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

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
						2' - 8"				
						4' - 0"				
15"	2 1/4"	19 1/2"	19"	0.07 Circ.	3:1	2' - 10"	≤ 45°	No	≤ 45°	No
						3' - 9"				
						5' - 8"				
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
						4' - 10"				
						7' - 3"				
24"	3"	30"	27"	0.07 Circ.	3:1	5' - 3"	≤ 45°	No	≤ 30°	No
						4' - 10"			> 30°	Yes
						10' - 6"				
30"	3 1/2"	37"	31"	0.18 Circ.	3:1	6' - 3"	≤ 15°	No	≤ 15°	No
						8' - 2"			> 15°	Yes
						12' - 1"				
36"	4"	44"	36"	0.19 Ellip.	3:1	7' - 10"	= 0°	No	≥ 0°	No
						10' - 4"			> 0°	Yes
						15' - 4"				
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	3:1	9' - 6"	≥ 0°	Yes	≥ 0°	Yes
						12' - 6"				
						18' - 7"				

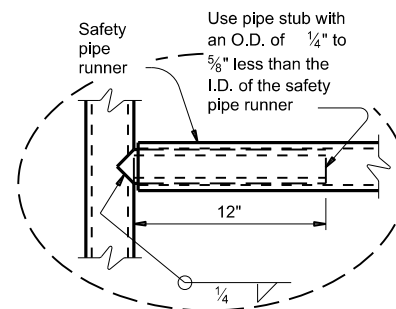


PLAN VIEW
(Showing spigot end connection.)

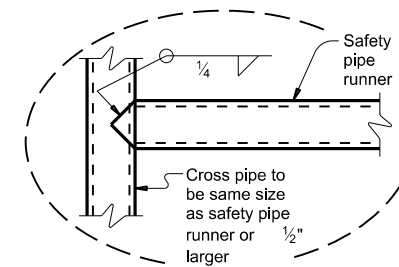
- Slope as shown elsewhere in the plans. Slope of 3:1 or flatter is required for vehicle safety.
- Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures." Bedding and backfill is considered subsidiary to the Item "Safety End Treatment." When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
- Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap be considered subsidiary to the Item "Safety End Treatment."
- Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.



LONGITUDINAL ELEVATION
(Showing spigot end connection.)

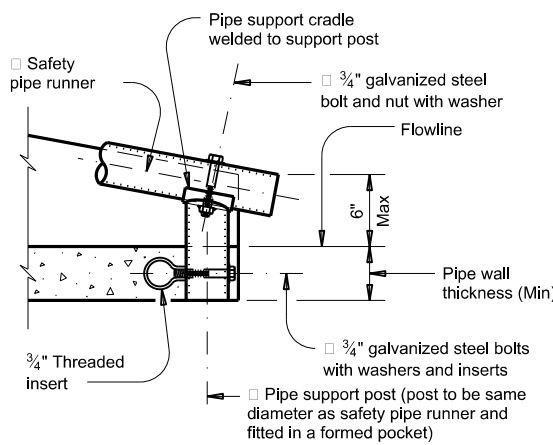


OPTION A

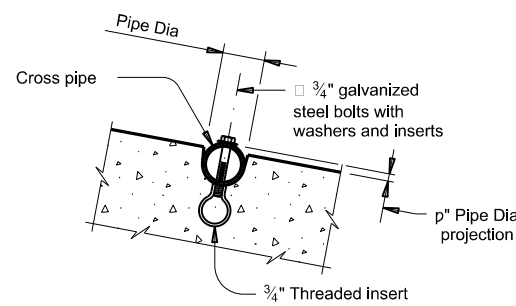


OPTION B

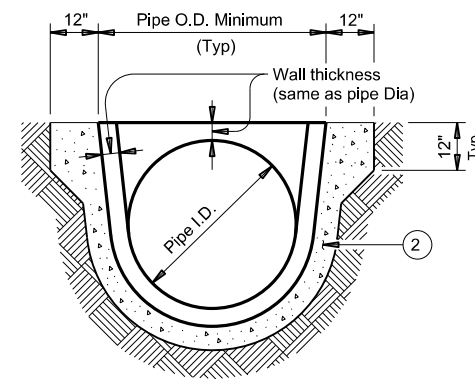
DETAIL A



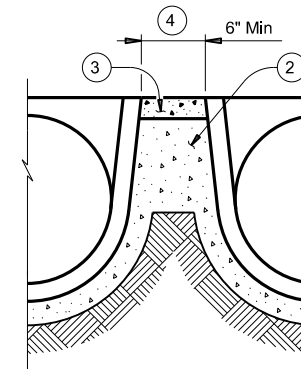
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS
(If required)



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS
(If required)



SECTION A-A



MULTIPLE PIPE INSTALLATION

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.

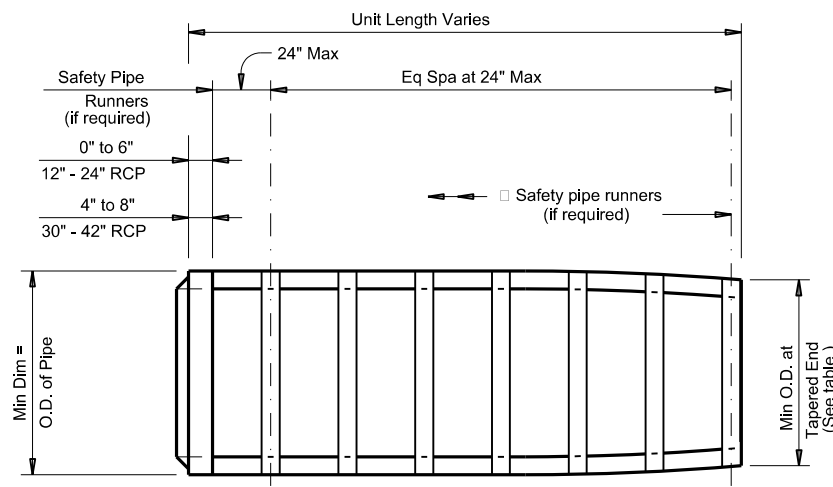
GENERAL NOTES:

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.

				Bridge Division Standard	
<h2>PRECAST SAFETY END TREATMENT</h2> <h3>TYPE II ~ CROSS DRAINAGE</h3>					
<h2>PSET-RC</h2>					
FILE: PSET-RC.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF	
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0988	01	025	FM 623	
DIST	COUNTY		SHEET NO.		
CRP	BEE		61		

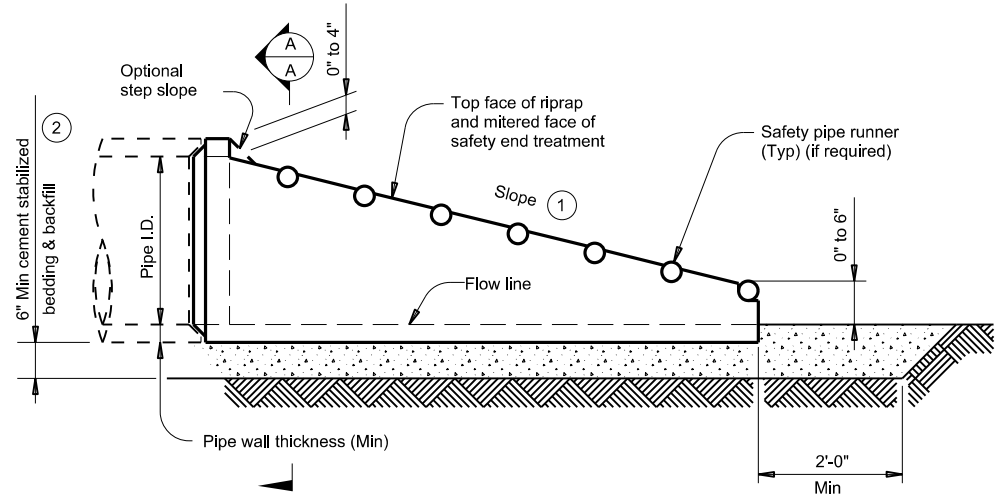
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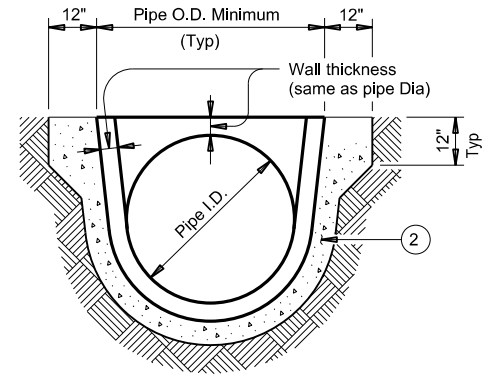
PLAN VIEW - 12" THRU 24"

(Showing spigot end connection.)

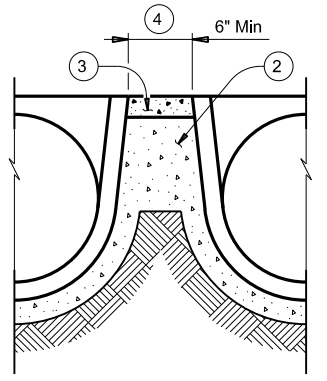


LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)

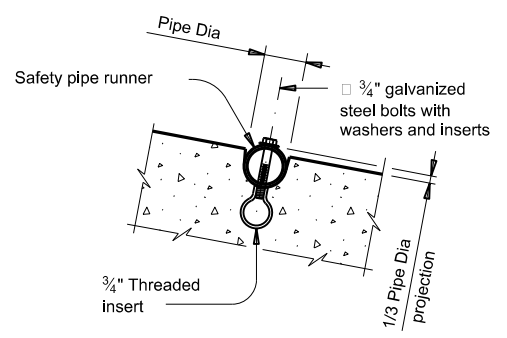


SECTION A-A



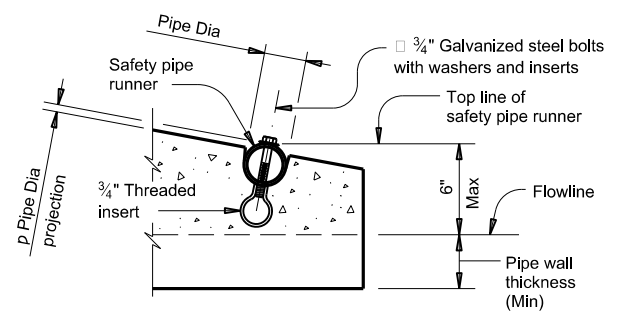
MULTIPLE PIPE INSTALLATION

- ① Slope as shown elsewhere in the plans. Slope of 6:1 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 467, "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 is considered subsidiary to the Item 467, "Safety End Treatment."
- ④ Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
- ⑤ Safety pipe runners are required for multiple pipe culverts with more than two pipes.

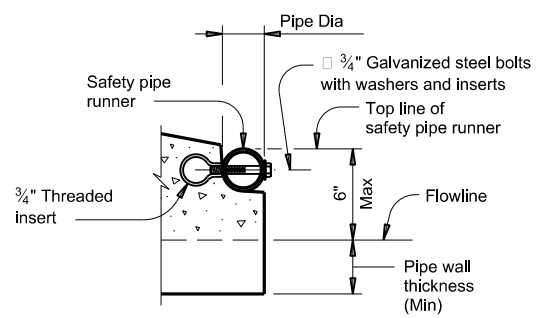


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

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. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4' - 0"	No	⑤	3" STD	3.500"	3.068"
15"	2 1/4"	19 1/2"	19"	0.07 Circ.	6:1	5' - 8"	No	⑤	3" STD	3.500"	3.068"
18"	2 1/2"	23"	21 1/2"	0.07 Circ.	6:1	7' - 3"	No	⑤	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10' - 6"	No	⑤	3" STD	3.500"	3.068"
30"	3 1/2"	37"	31"	0.18 Circ.	6:1	12' - 1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15' - 4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 1/2"	51"	41 1/2"	0.23 Ellip.	6:1	18' - 7"	Yes	Yes	4" STD	4.500"	4.026"

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 pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Galvanize 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 (RCP) 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 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.



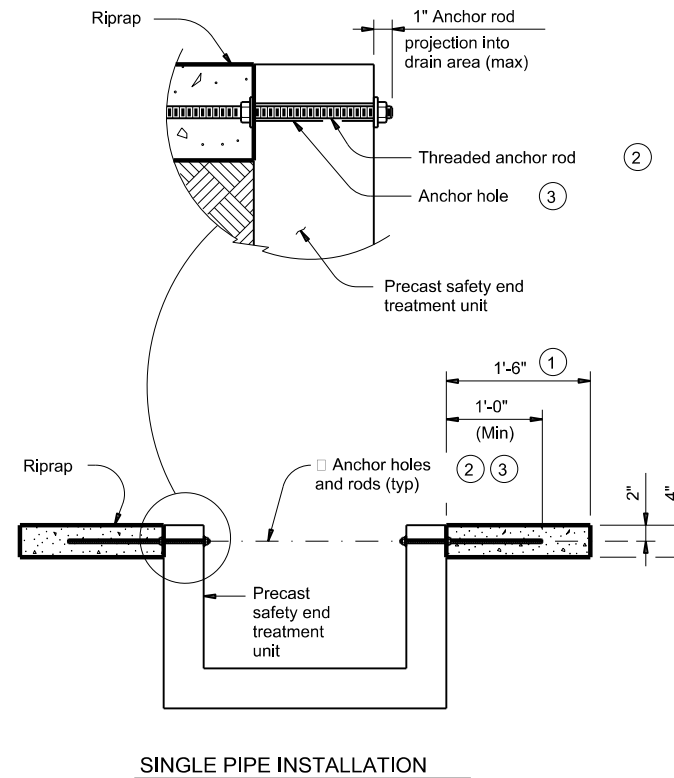
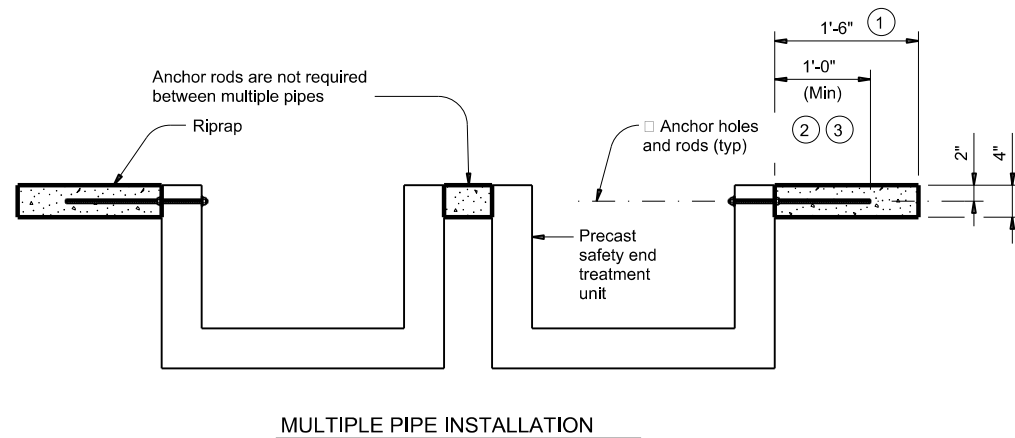
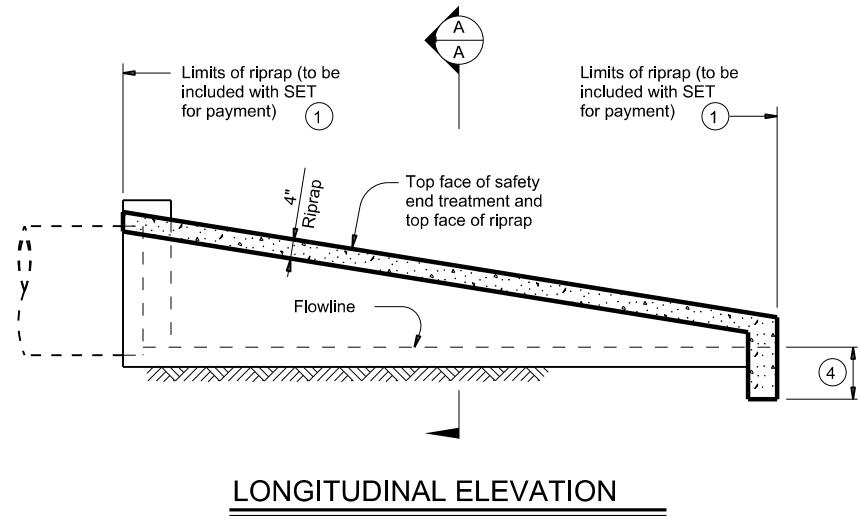
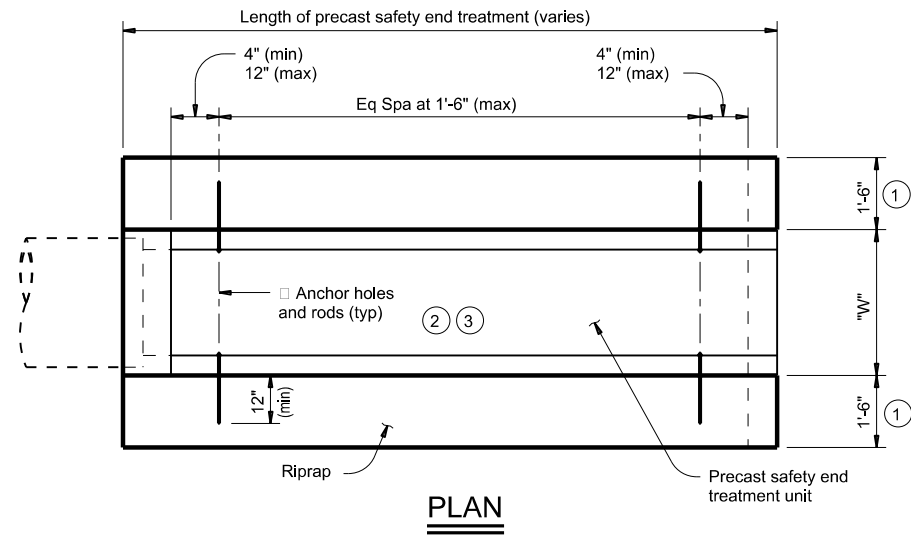
PRECAST SAFETY END TREATMENT TYPE II ~ PARALLEL DRAINAGE

PSET-RP

FILE: PSET-RP.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
	DIST	COUNTY		SHEET NO.
	CRP	BEE		62

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SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)								
Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards					PSET-RC and PSET-RP Standards		
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

- (1) Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap." When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.
- (2) 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing." Repair galvanizing that is damaged during transport or construction in accordance with the specifications.
- (3) 3/4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.
- (4) Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.
- (5) Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Safety End Treatment (SET) standard sheets.

MATERIAL NOTES:
 Provide Class "B" riprap in accordance with Item 432, "Riprap."
 Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:
 Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment."
 Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown.
 For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrpccast.com. Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.
 Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

				Bridge Division Standard	
PRECAST SAFETY END TREATMENT TYPE II RIPRAP DETAILS PSET-RR					
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	REVISIONS	0988	01	025	FM 623
		DIST	COUNTY		SHEET NO.
		CRP	BEE		63

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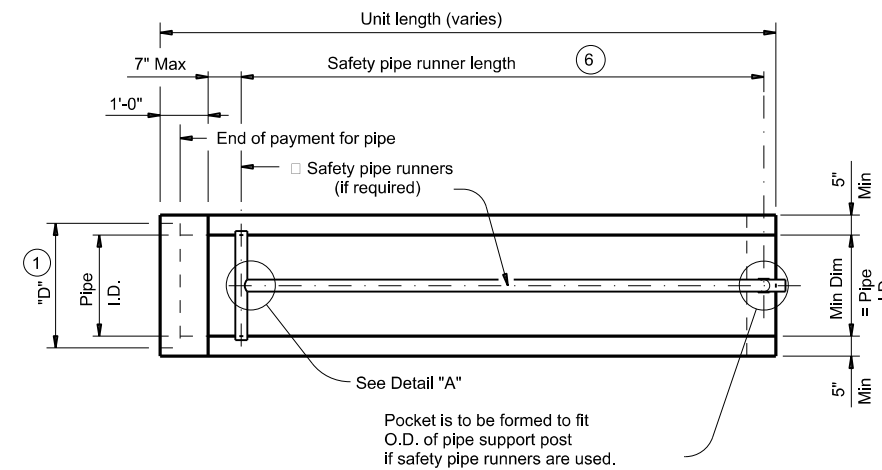
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REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe		Multiple Pipes	
						Skew	Pipe Runners Required	Skew	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 1/4"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 1/2"	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"				
				6:1	11' - 3"				
30"	3 1/2"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"				
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"				
				6:1	17' - 11"				
42"	4 1/2"	2.7"	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				

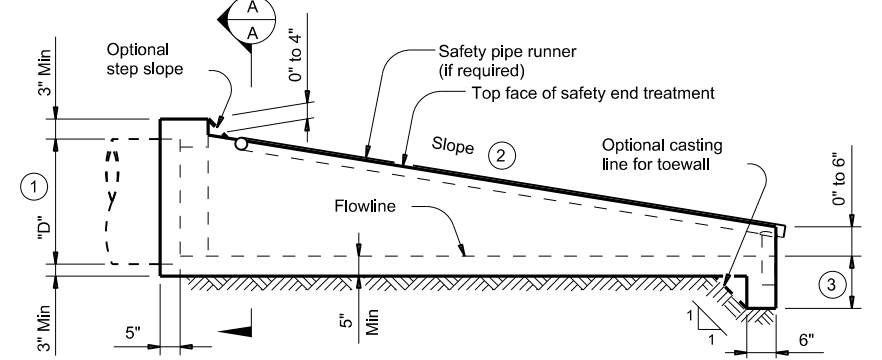
SAFETY PIPE RUNNER DIMENSIONS

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 1/2" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"



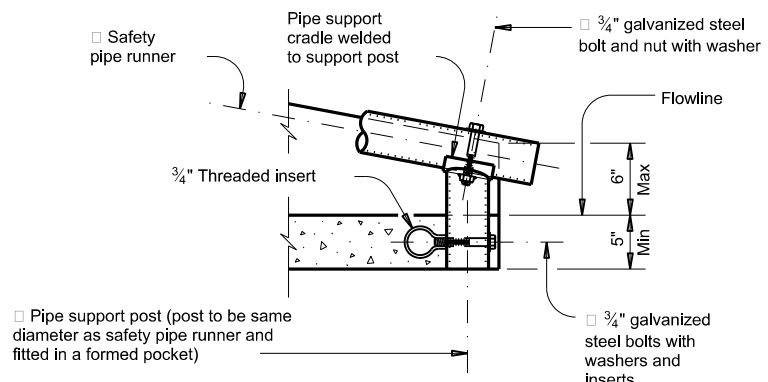
PLAN

(Showing bell end connection.)



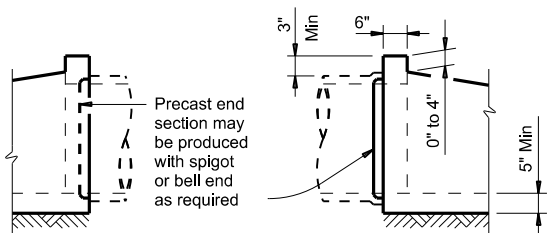
LONGITUDINAL ELEVATION

(Showing bell end connection.)



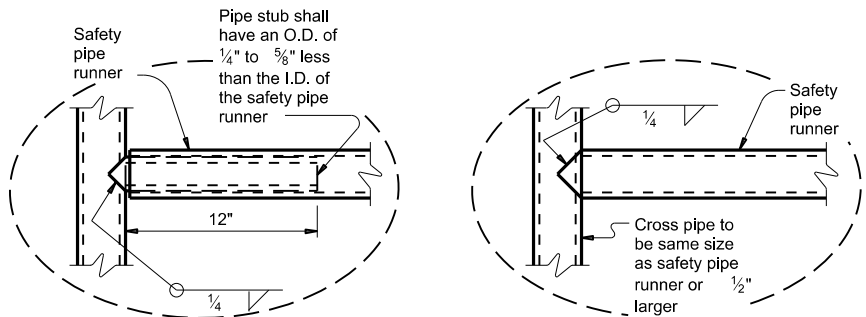
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)

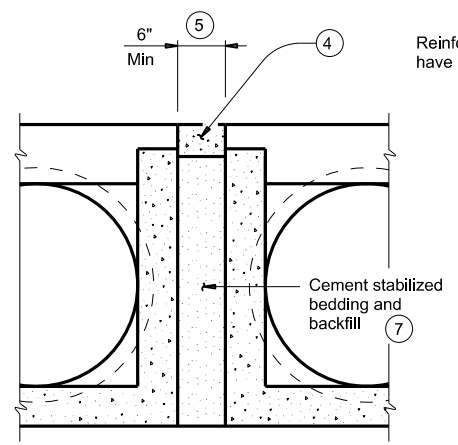


OPTION A

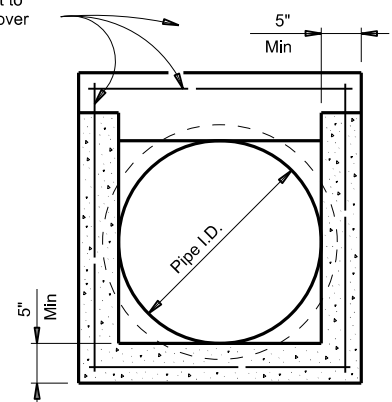
DETAIL A

(If required)

OPTION B

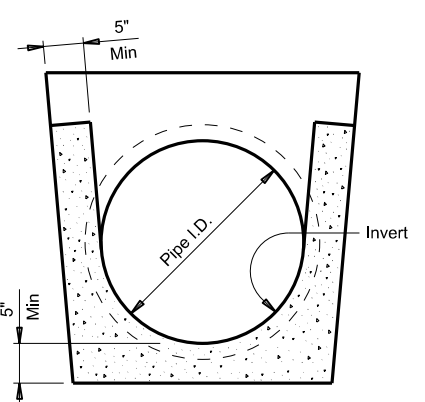


MULTIPLE PIPE INSTALLATION

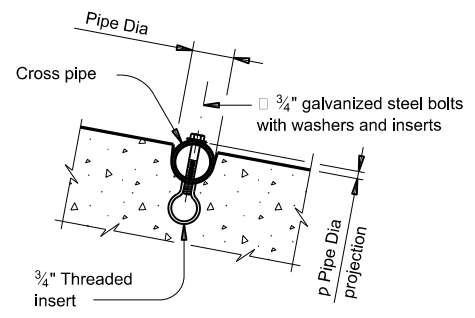


OPTION WITH SQUARE BOTTOM

SECTION A-A



OPTION WITH INVERT BOTTOM



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

- 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 Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Bridge Division Standard

PRECAST SAFETY END TREATMENT

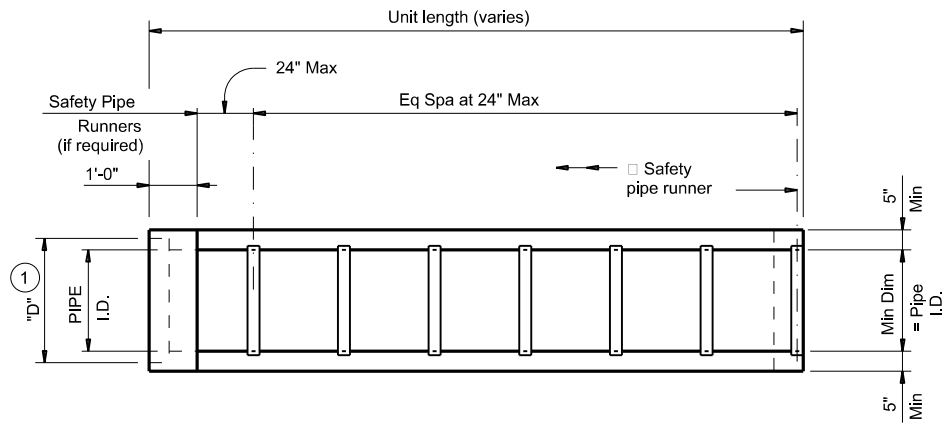
TYPE II ~ CROSS DRAINAGE

PSET-SC

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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12-21: Added 42" TP	DIST	COUNTY	SHEET NO.	
CRP	BEE		64	

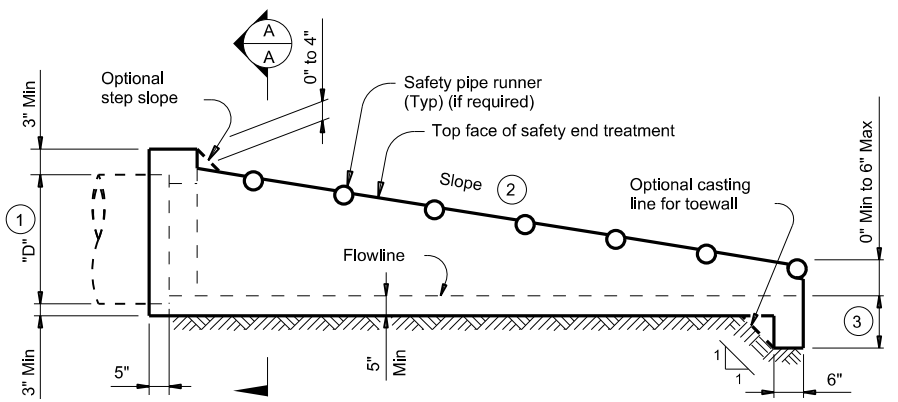
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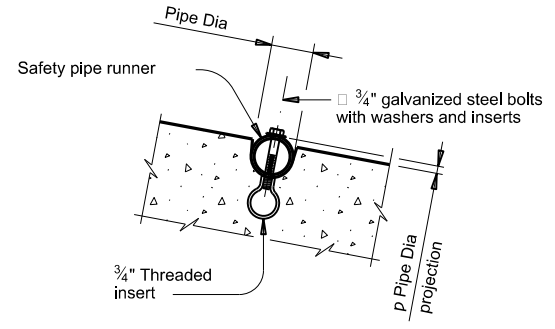
PLAN

(Showing bell end connection.)



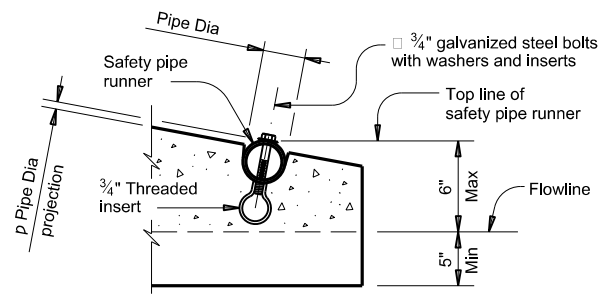
LONGITUDINAL ELEVATION

(Showing bell end connection.)

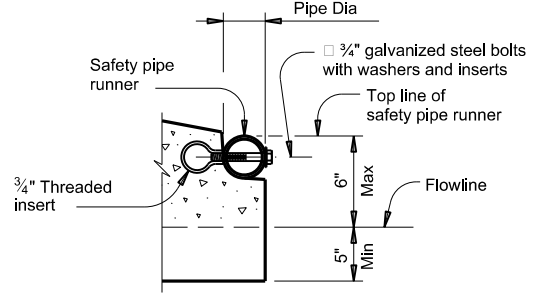


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



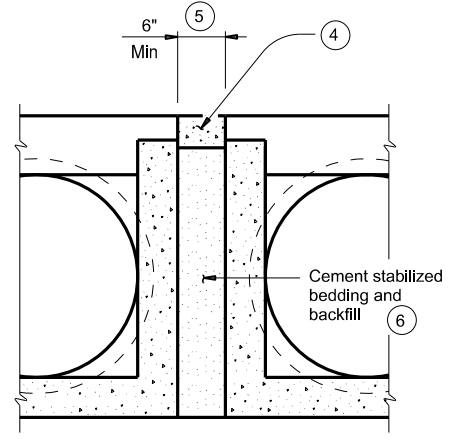
OPTION A



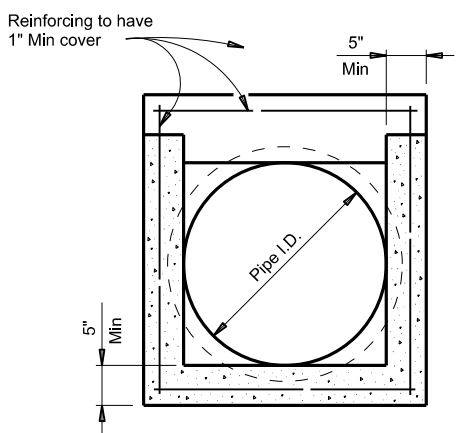
OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

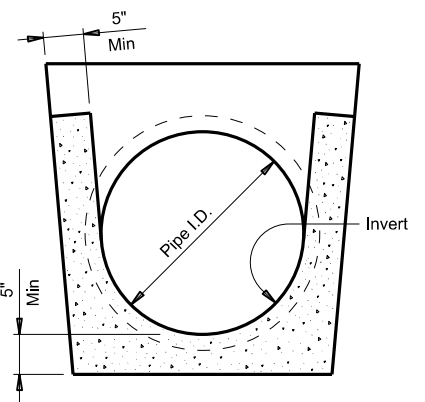


MULTIPLE PIPE INSTALLATION

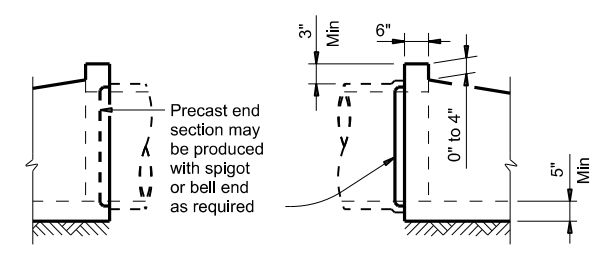


OPTION WITH SQUARE BOTTOM

SECTION A-A



OPTION WITH INVERT BOTTOM



OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness ⑦	"D" ①	Slope	Min Length	Pipe Runners Required		Required Pipe Runner Size		
						Single Pipe	Multiple Pipe	Nominal Dia.	O.D.	I.D.
12"	2"	1.15"	17.00"	6:1	4' - 9"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
15"	2 1/4"	1.30"	20.50"	6:1	6' - 5"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
18"	2 1/2"	1.60"	24.00"	6:1	8' - 0"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
24"	3"	1.95"	31.00"	6:1	11' - 3"	No	Yes, for > 2 pipes	3" STD	3.500"	3.068"
30"	3 1/2"	2.65"	38.50"	6:1	14' - 8"	No	Yes	4" STD	4.500"	4.026"
36"	4"	2.75"	45.50"	6:1	17' - 11"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 1/2"	2.7"	52.50"	6:1	21' - 2"	Yes	Yes	4" STD	4.500"	4.026"

- 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 the plans. Slope of 6:1 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 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.
- ⑦ 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 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
 Provide pipe runners 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 Pipe and Box Grouted Connections (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 ~ PARALLEL DRAINAGE

PSET-SP

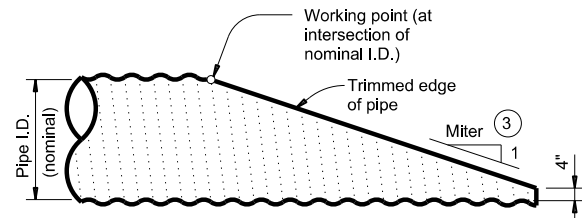
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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12-21: Added 42" TP	DIST	COUNTY	SHEET NO.	
CRP	BEE		65	

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CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS

① ②

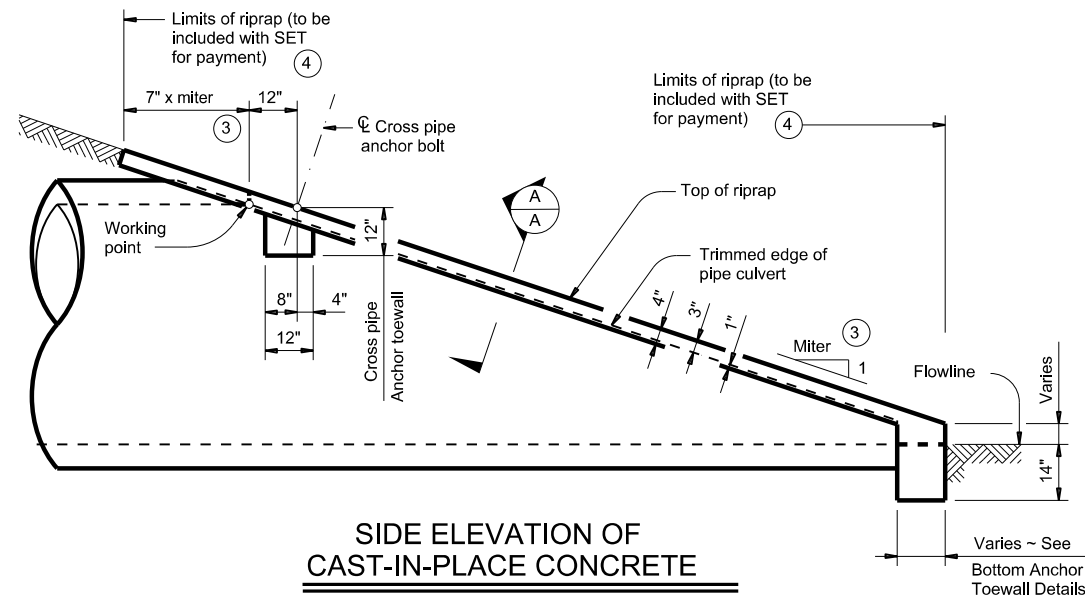
Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert. Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details of corrugated metal pipe (CMP) culvert are similar. Pipe runners not shown for clarity)

TYPICAL PIPE CULVERT MITERS

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED

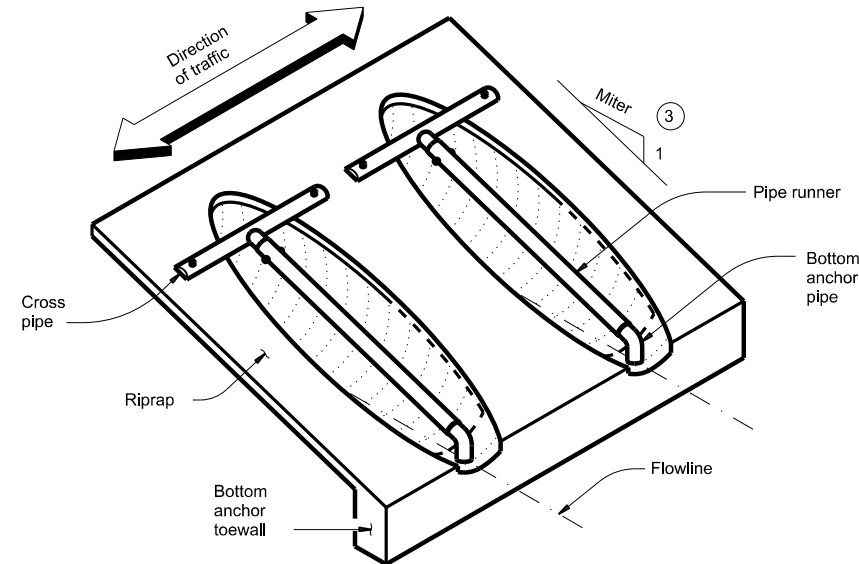
Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS

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

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

- ① Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.
- ② This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

 For 60" culvert pipes, the skew must not exceed 0°.
 For 54" culvert pipes, the skew must not exceed 15°.
 For 48" culvert pipes, the skew must not exceed 30°.
 For all culvert pipe sizes 42" and less, the skew must not exceed 45°.
- ③ Miter = slope of mitered end of pipe culvert.
- ④ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."
- ⑤ Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

SHEET 1 OF 2

Bridge Division Standard

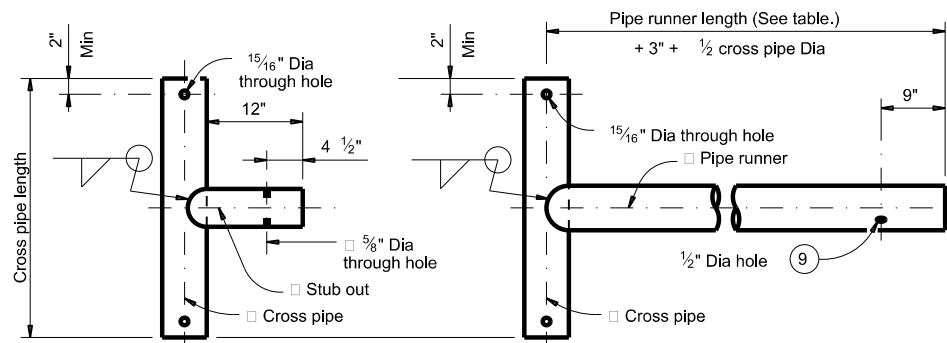
SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

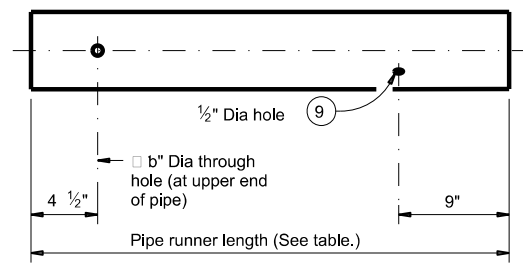
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988 01	025	FM 623	
	DIST	COUNTY	SHEET NO.	
	CRP	BEE	66	

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DATE: 8/1/2024 10:43:15 AM
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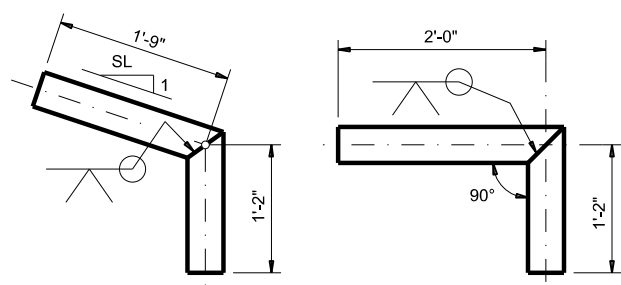


OPTION A1
 OPTION A2
CROSS PIPE AND CONNECTIONS DETAILS

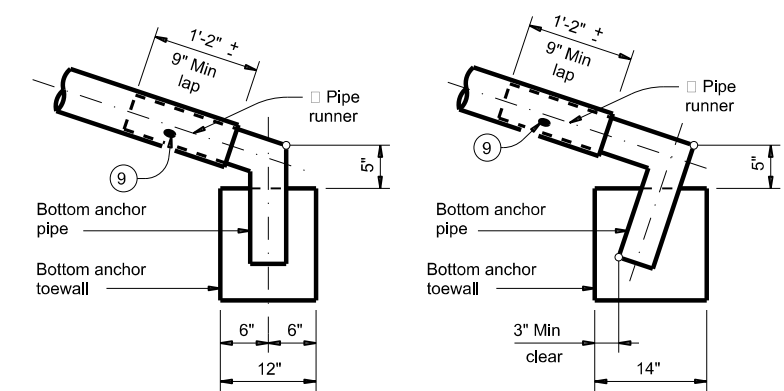


NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

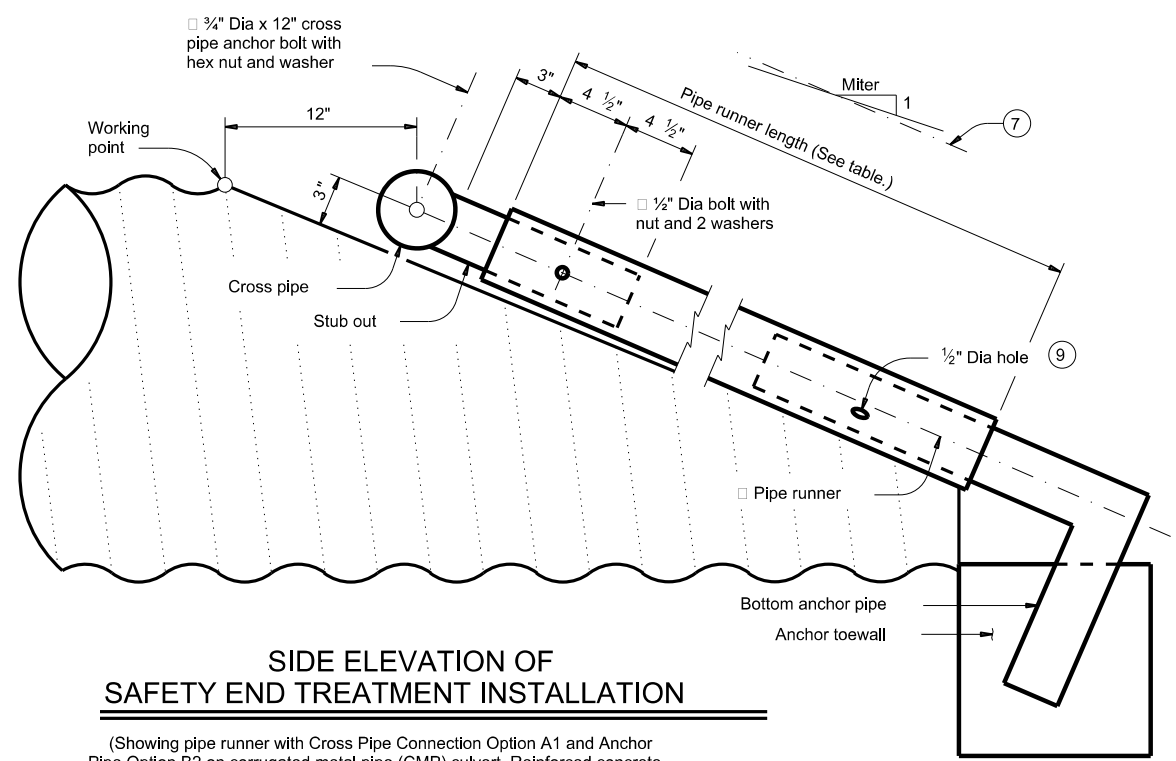


OPTION B1
 OPTION B2
BOTTOM ANCHOR PIPE DETAILS ⑩



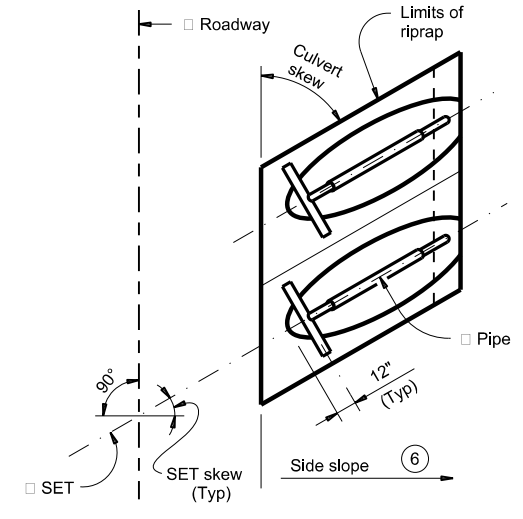
OPTION B1
 OPTION B2
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)

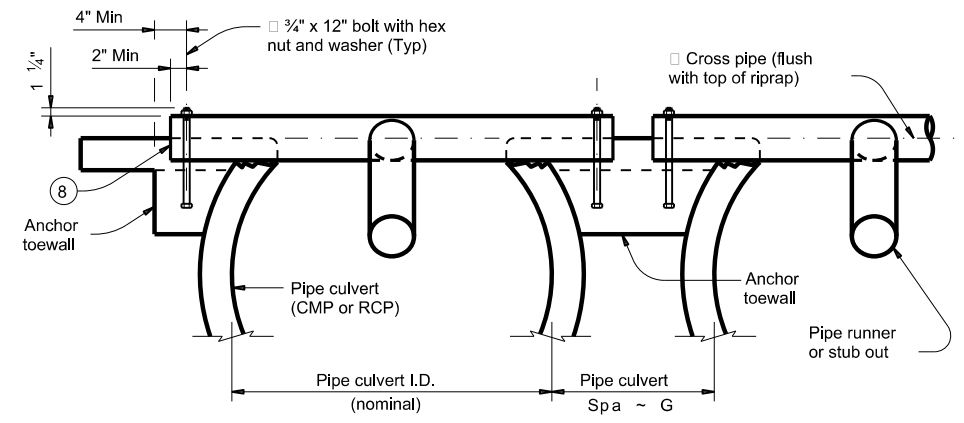


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

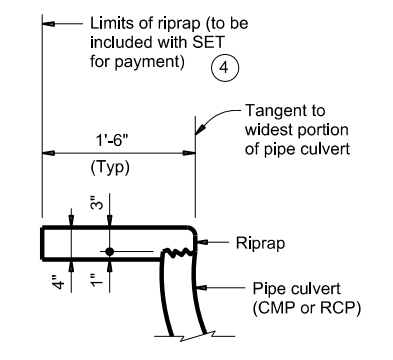
(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity.)



PLAN OF SKEWED INSTALLATION



SECTION A-A
 SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

- ④ Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."
- ⑥ Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.
- ⑦ Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.
- ⑧ Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- ⑨ After installation, inspect the 1/2 inch hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.
- ⑩ At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

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 pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts and nuts.
 Galvanize all steel components, except concrete reinforcing, after fabrication.
 Repair galvanizing damaged during transport or construction in accordance with the specifications.

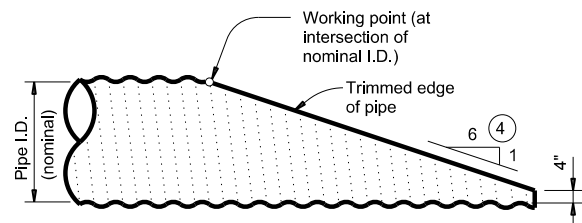
GENERAL NOTES:
 Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
 Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
 Payment for riprap and toewall is included in the price bid for each safety end treatment.
 Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap."

SHEET 2 OF 2

		Bridge Division Standard	
SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE			
SETP-CD			
FILE: SETP-CD.dgn	DN: GAF	CK: CAT	DW: JRP
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS	0988	01	025
DIST	COUNTY	SHEET NO.	
CRP	BEE	67	

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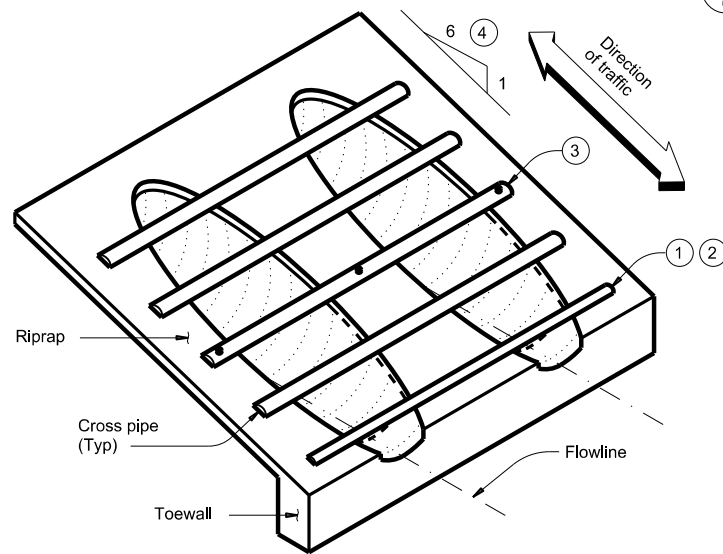
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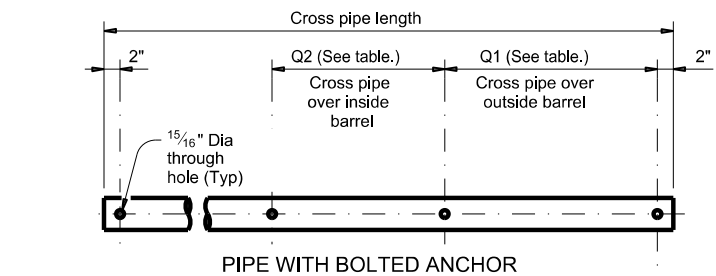
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

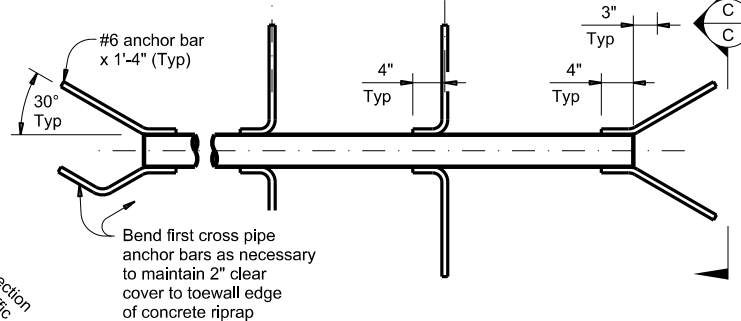
(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)



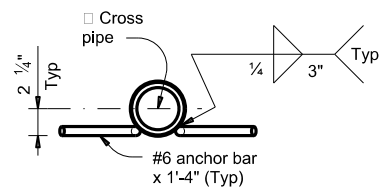
ISOMETRIC VIEW OF TYPICAL INSTALLATION



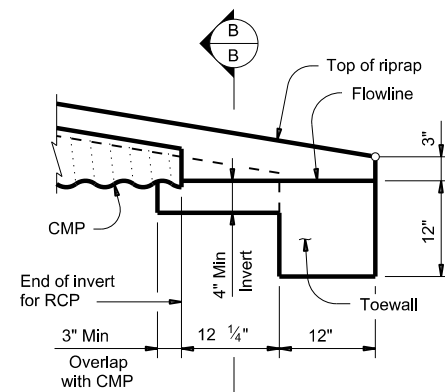
PIPE WITH BOLTED ANCHOR



PIPE WITH ANCHOR BARS

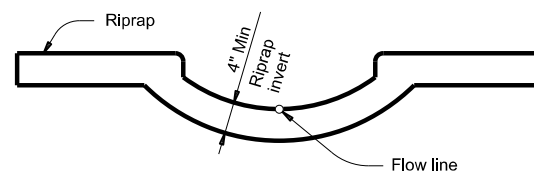


CROSS PIPE DETAILS



DETAIL "A"

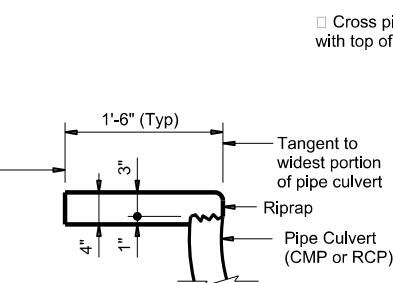
(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



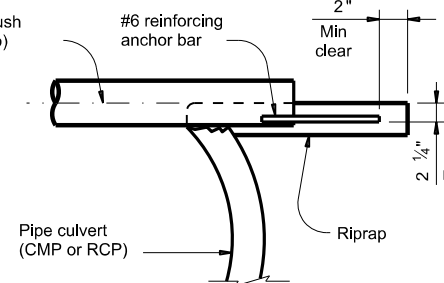
SECTION B-B

(Cross pipes not shown for clarity.)

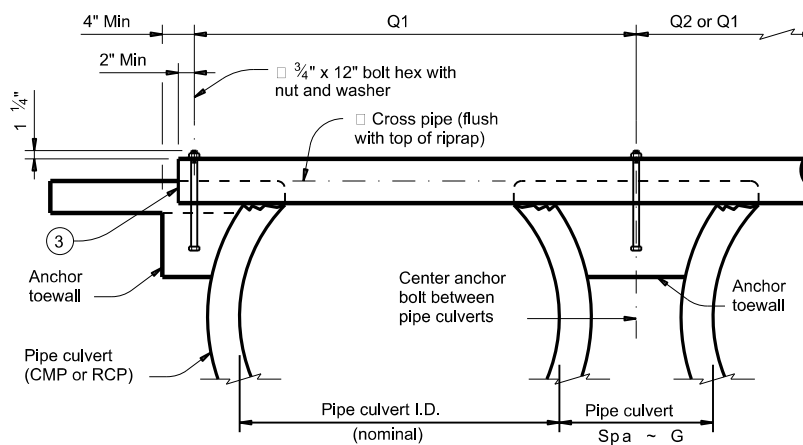
Limits of riprap (to be included with SET for payment)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	2 or more pipe culverts	4" Std (4.500" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	All pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	4" Std (4.500" O.D.)
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"		
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"	All pipe culverts	5" Std (5.563" O.D.)
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"		
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"	All pipe culverts	5" Std (5.563" O.D.)
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

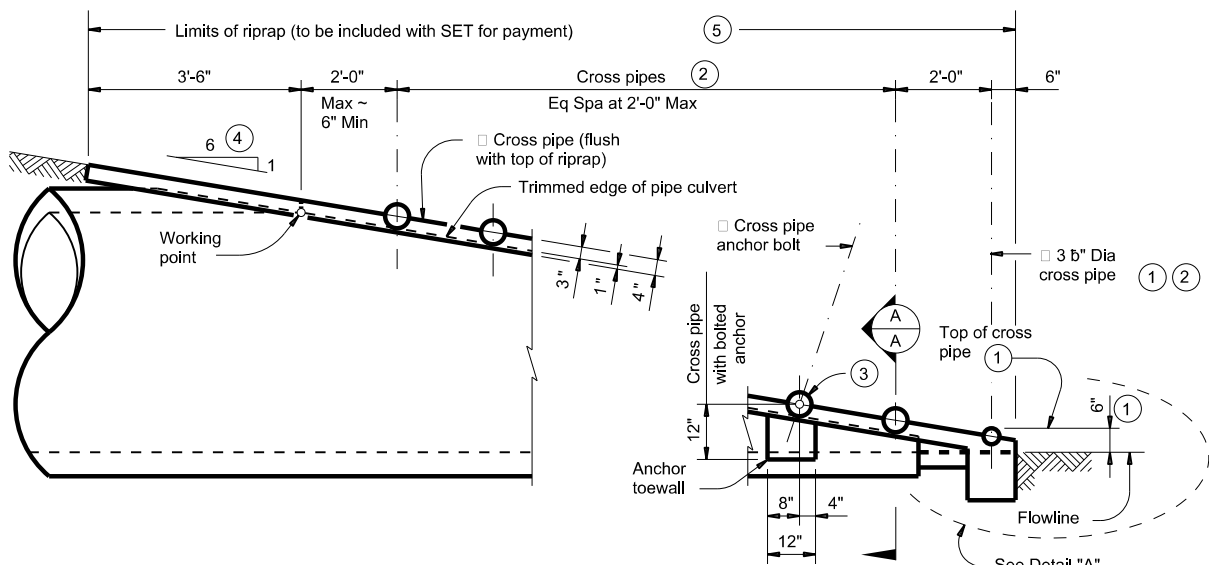
- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1/2" standard pipe (4" O.D.) for the first bottom pipe.
- Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."
- Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

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 cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52. Provide ASTM A307 bolts and nuts. Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981. Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes. Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap." Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)

Texas Department of Transportation
 Bridge Division Standard

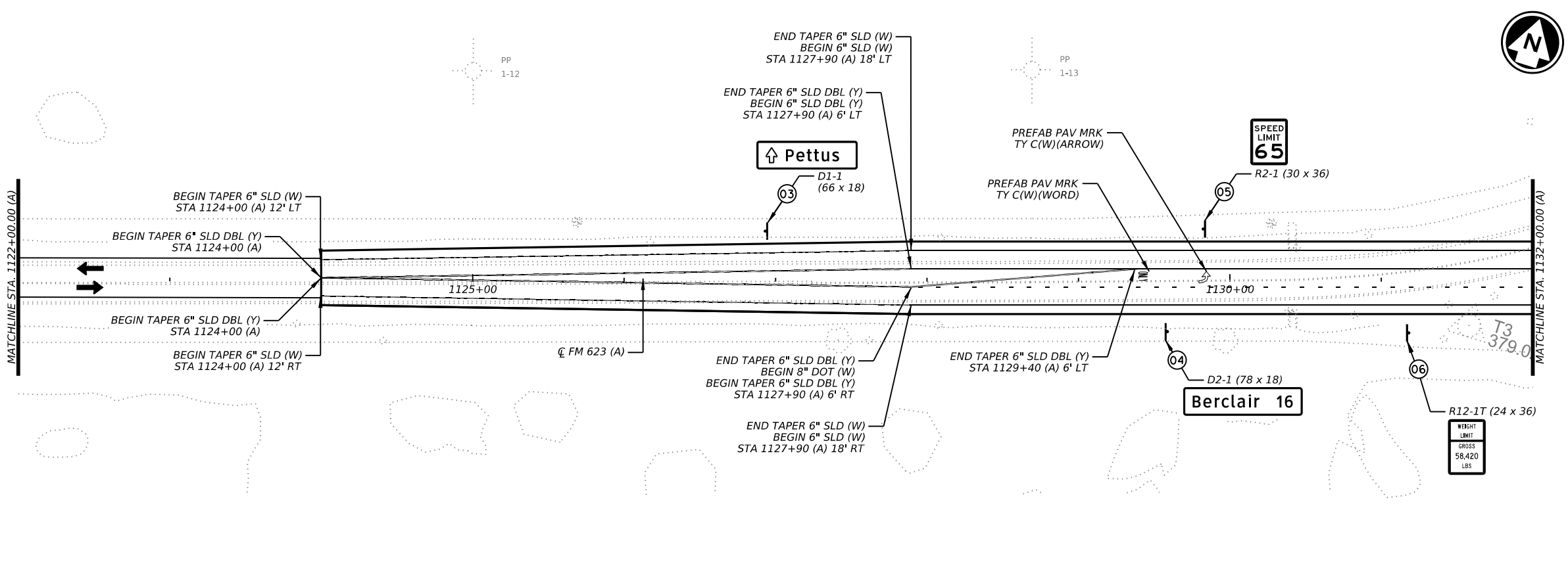
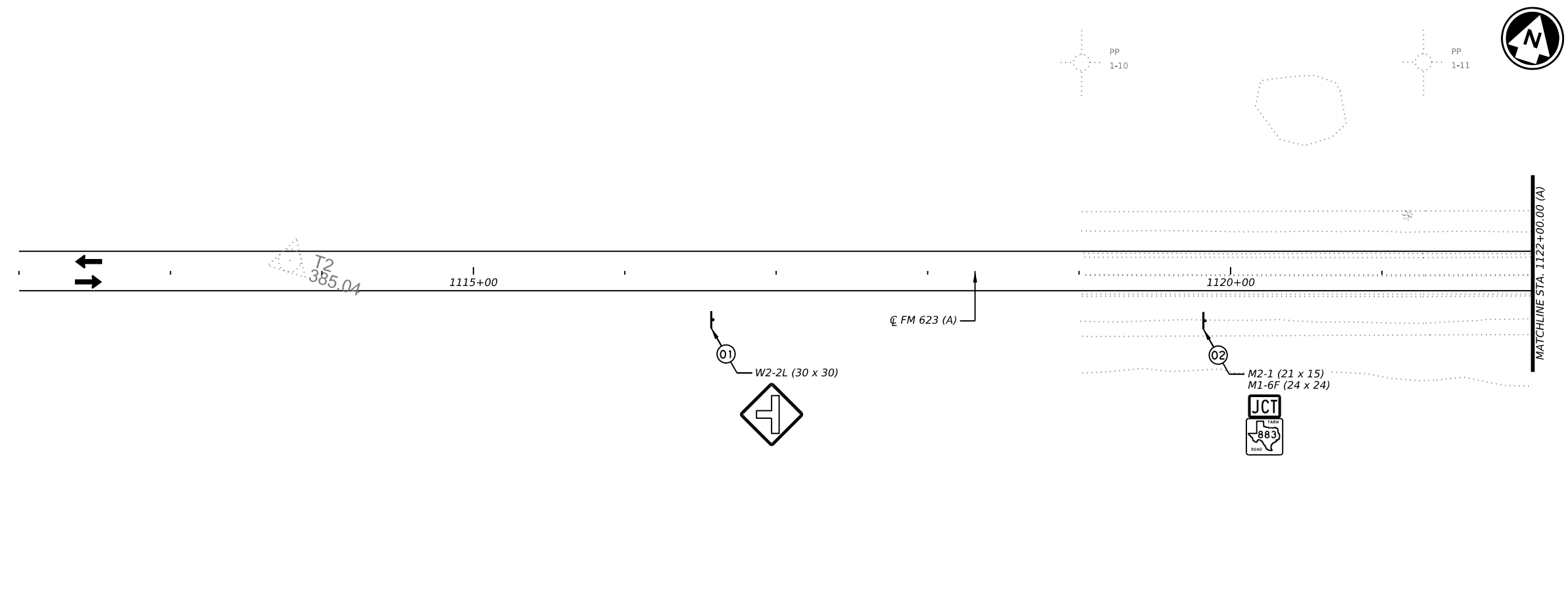
SAFETY END TREATMENT FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE SETP-PD

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CRP	BEE	68		

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LEGEND

- OBJECT MARKER
- DIRECTION OF TRAFFIC
- SMALL SIGN
- BACK TO BACK SIGN
- PREFAB PAV MRK TY C (ARROW)
- PREFAB PAV MRK TY C (WORD)



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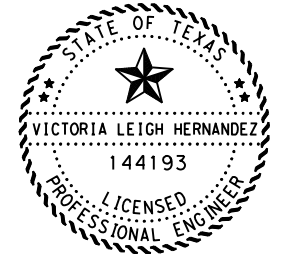
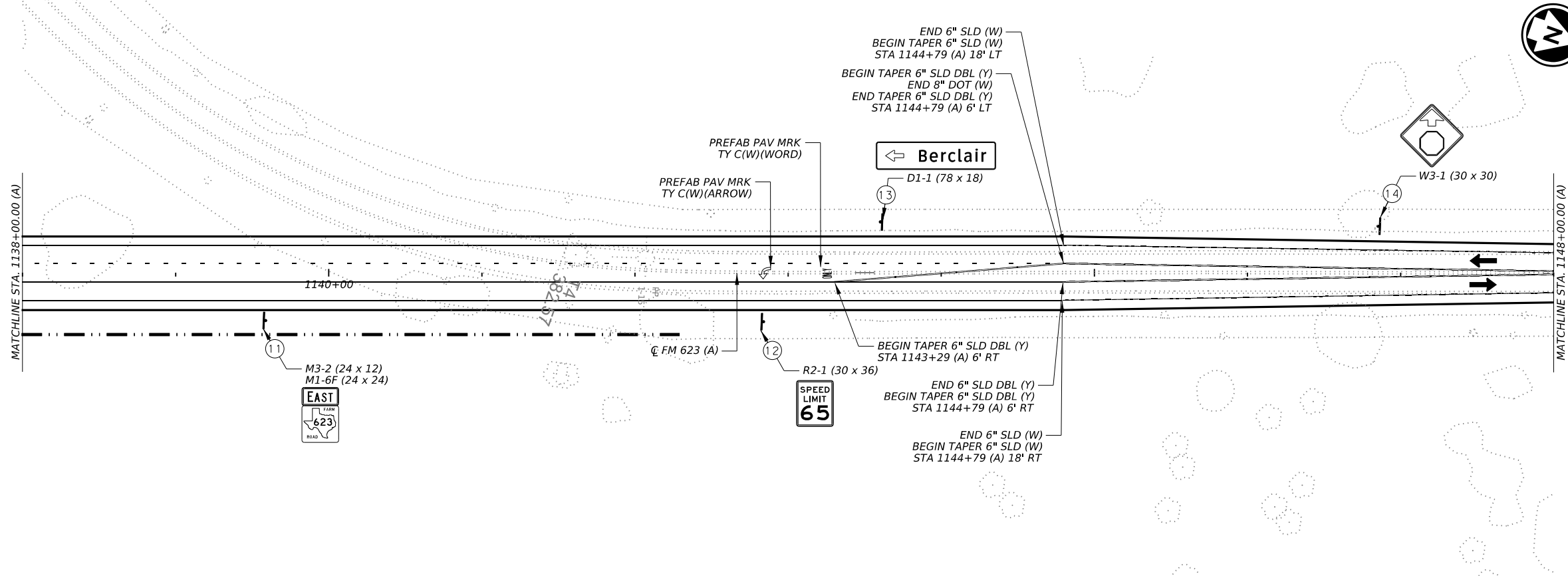
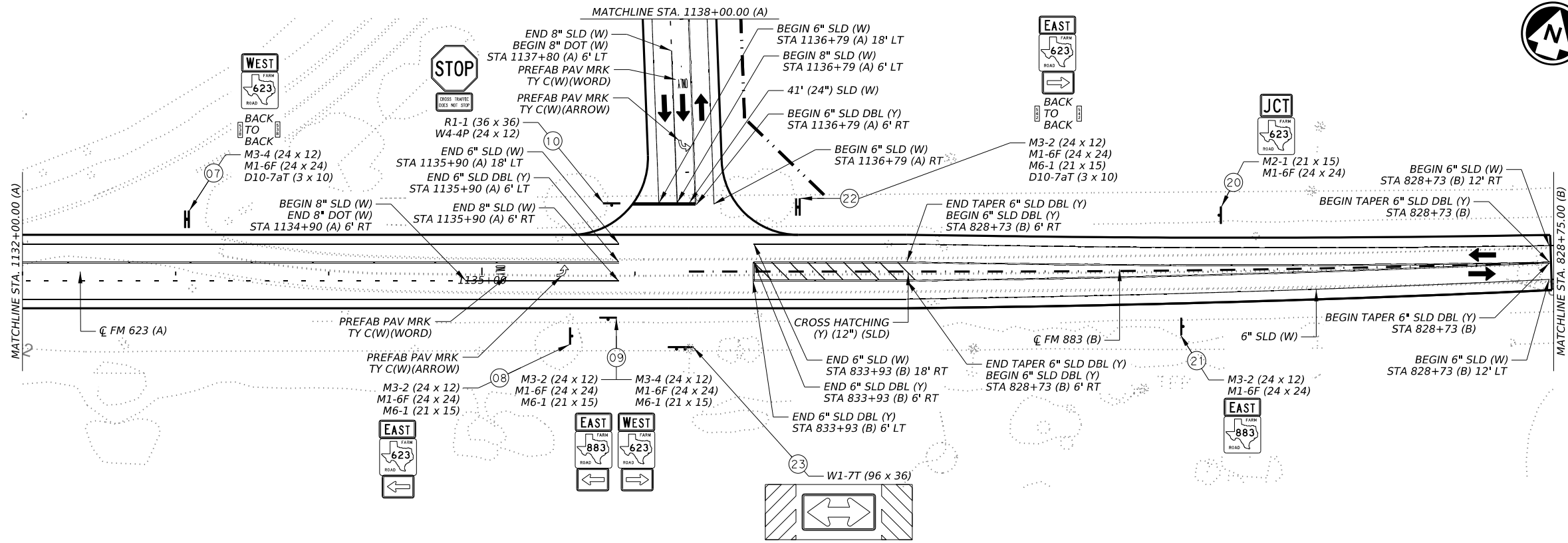
TRAFFIC LAYOUT SHEETS

2024 SHEET 1 OF 3

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CRP		BEE	69

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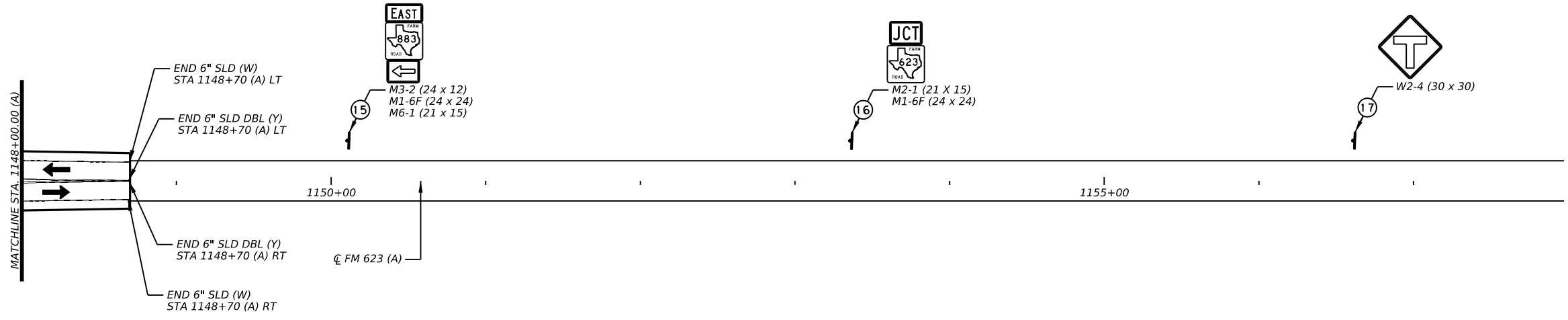


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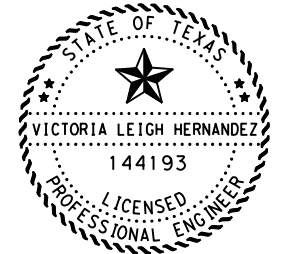
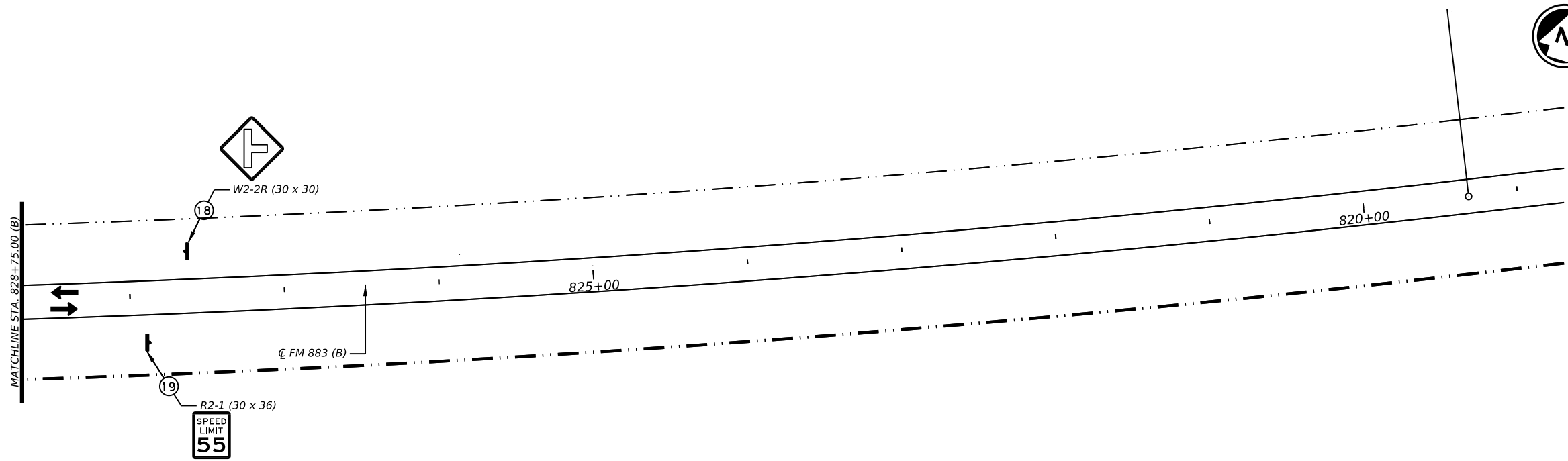
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- LEGEND**
- OBJECT MARKER
 - DIRECTION OF TRAFFIC
 - SMALL SIGN
 - BACK TO BACK SIGN
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 - PREFAB PAV MRK TY C (WORD)



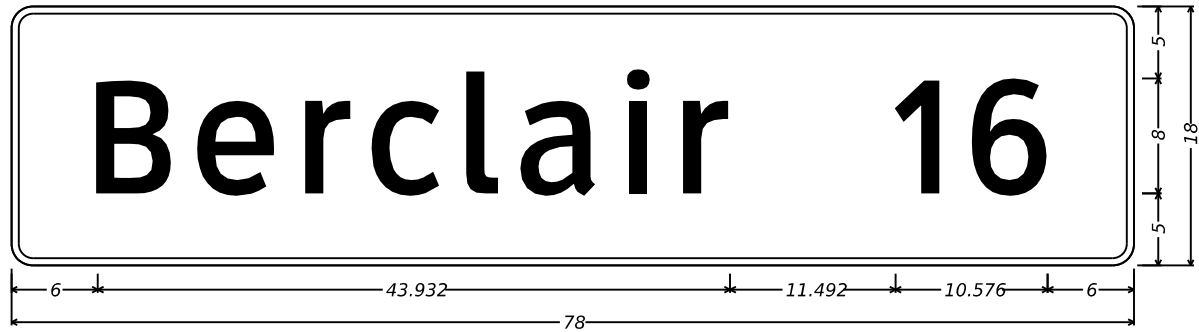
Victoria L Hernandez, P.E.
 08/01/2024



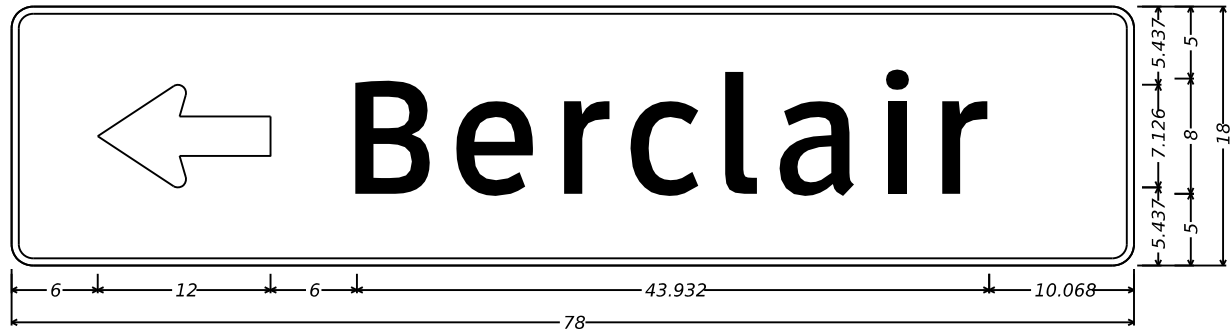
FM 623
TRAFFIC LAYOUT SHEETS

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CRP	BEE	71	

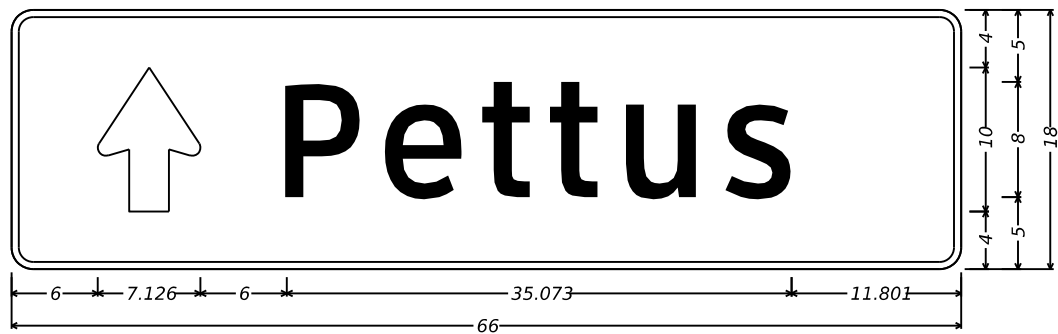
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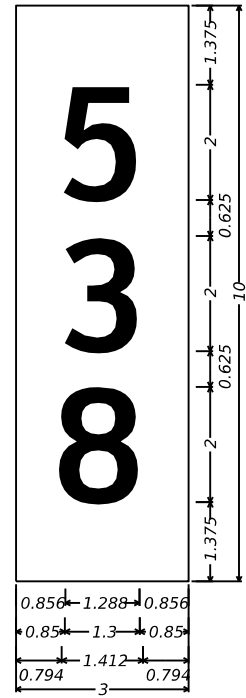
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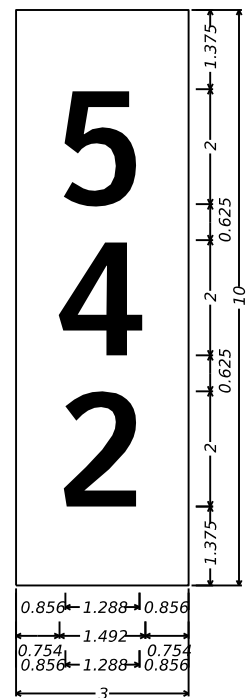
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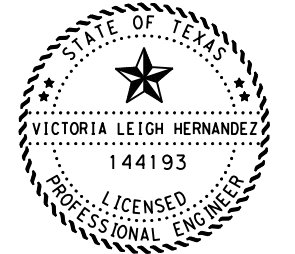
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 Standard Arrow Custom 10.000" X 7.126" 90°; "Pettus", ClearviewHwy-3-W;



D10-7aT 3in;
 No border, White on Green;
 "5", ClearviewHwy-4-W;
 "3", ClearviewHwy-4-W;
 "8", ClearviewHwy-4-W;



D10-7aT 3in;
 No border, White on Green;
 "5", ClearviewHwy-4-W;
 "4", ClearviewHwy-4-W;
 "2", ClearviewHwy-4-W;



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08/01/2024

Texas Department of Transportation

FM 623

SMALL SIGN
DETAILS

2024 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST		COUNTY	SHEET NO.
CRP		BEE	72

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

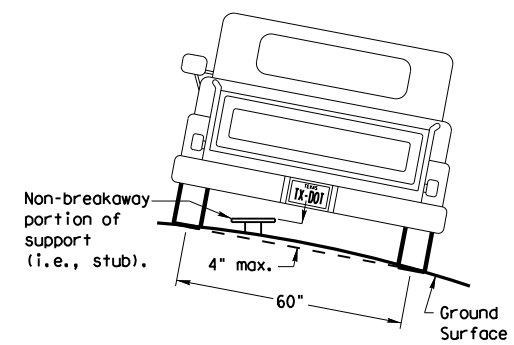
SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

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))

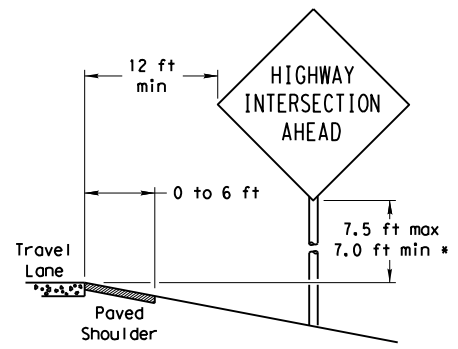
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

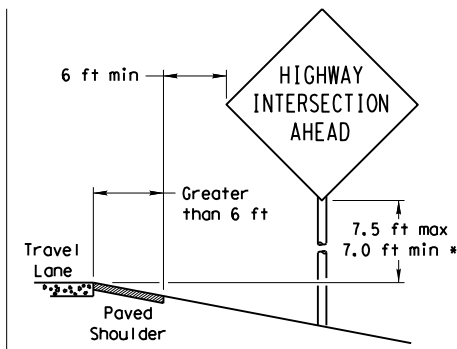
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

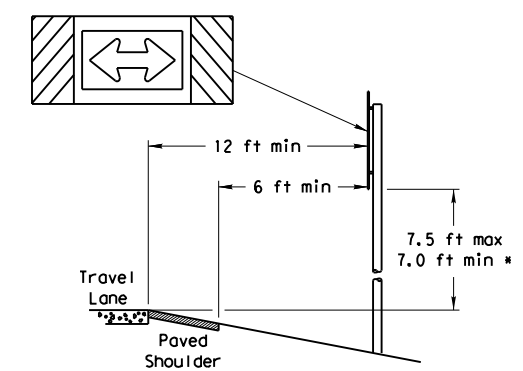
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

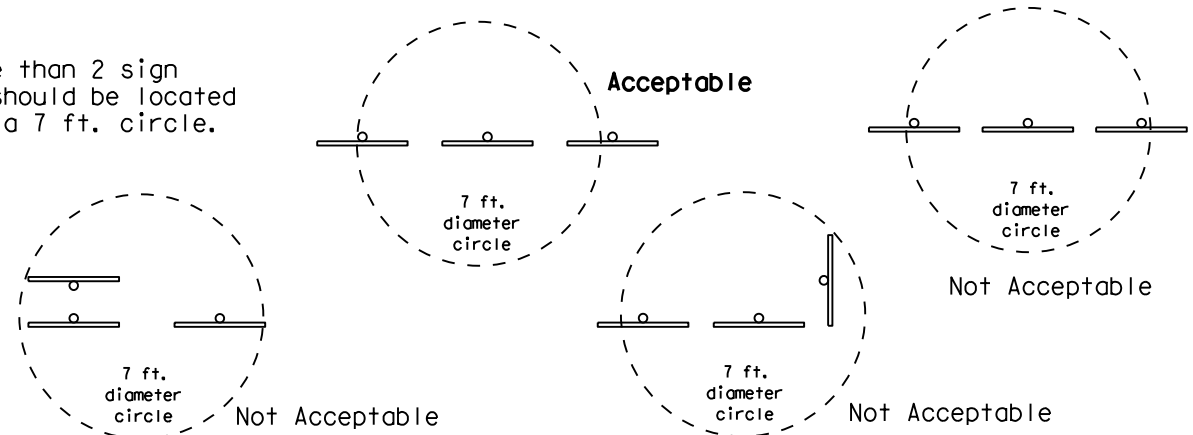
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

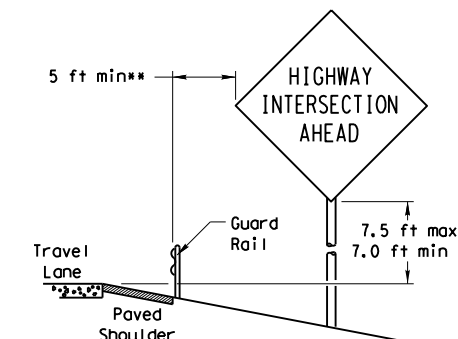


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

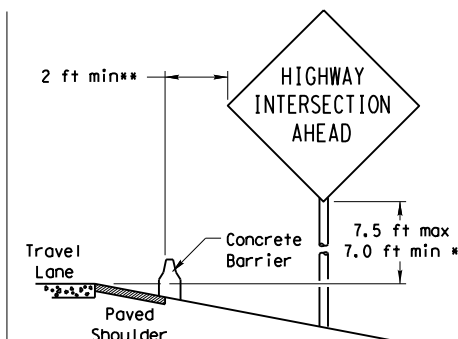
No more than 2 sign posts should be located within a 7 ft. circle.



BEHIND BARRIER

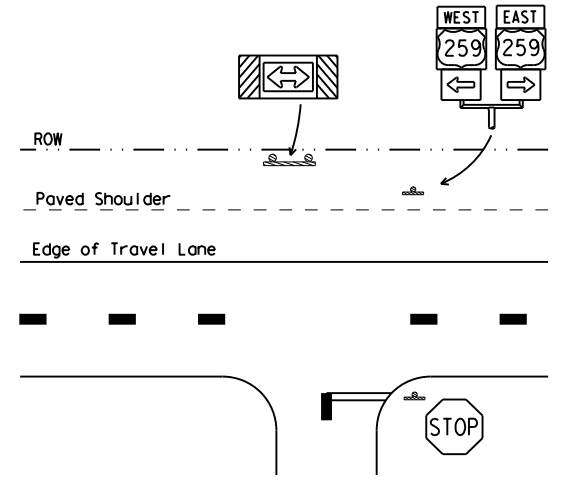


BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

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



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

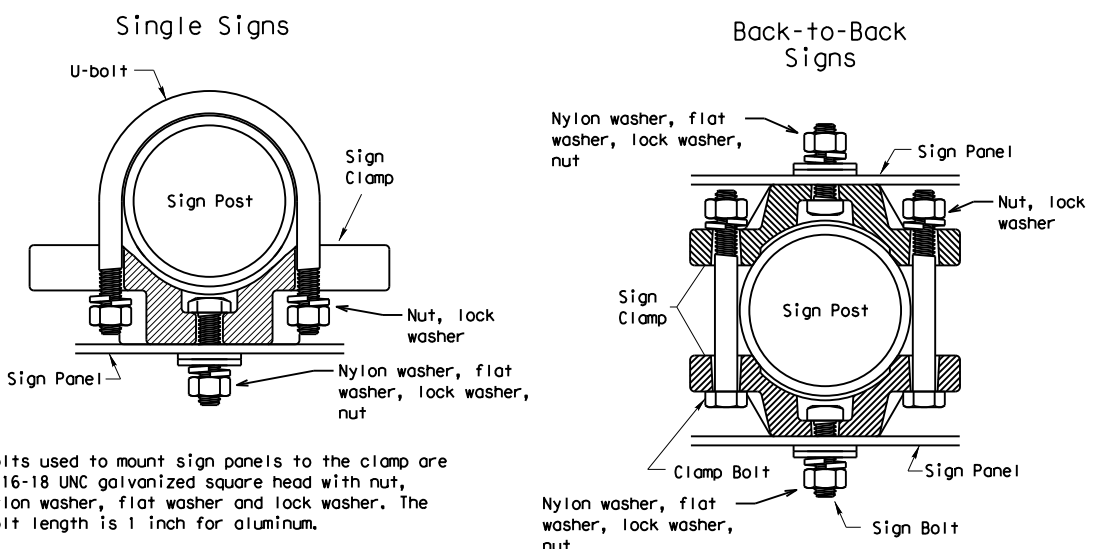
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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

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

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

TYPICAL SIGN ATTACHMENT DETAIL



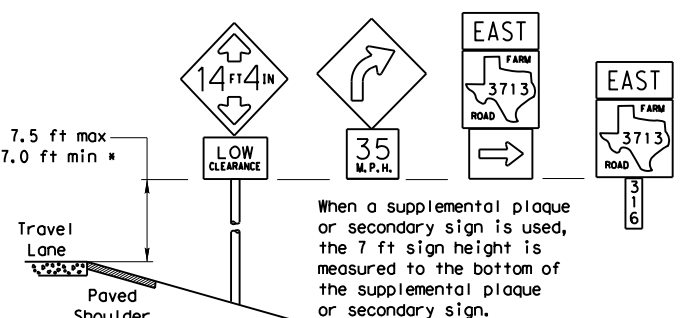
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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

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

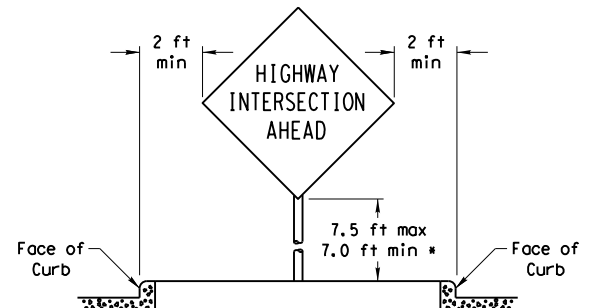
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

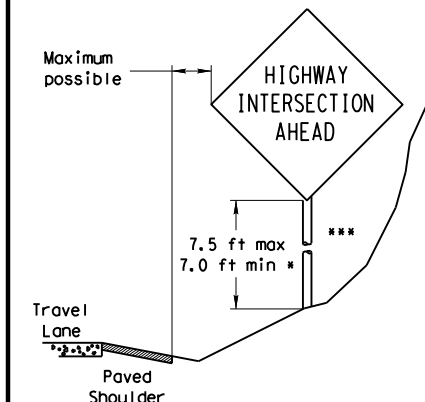


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



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

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

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

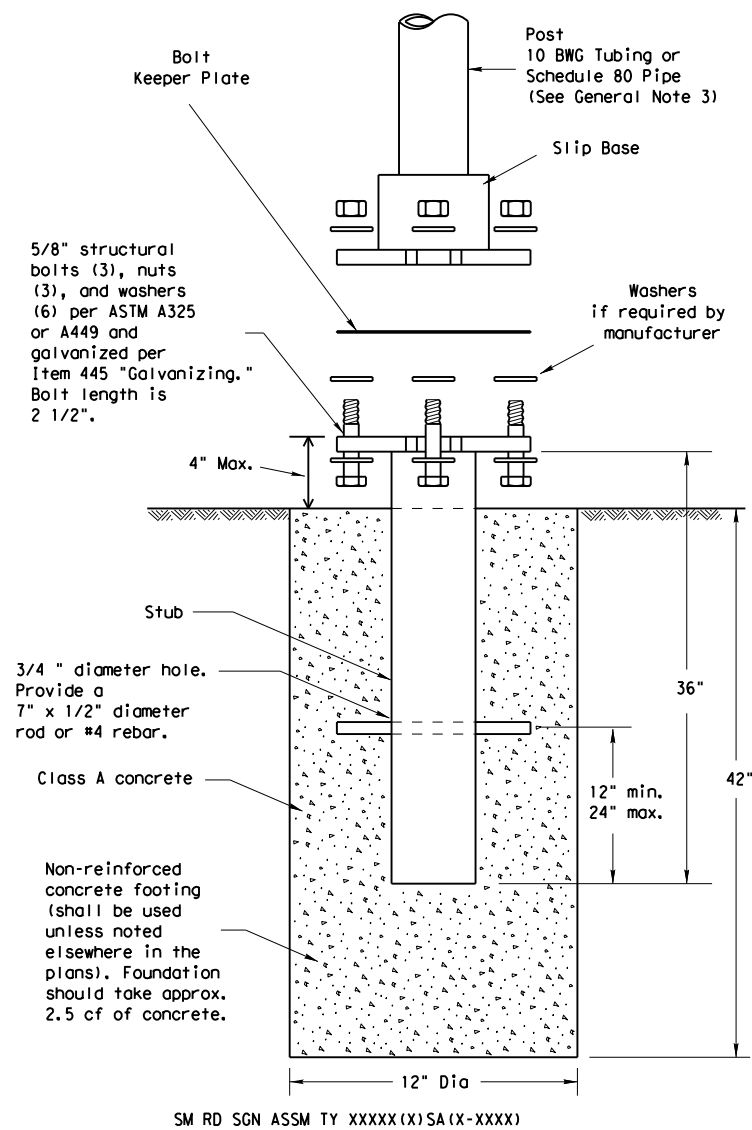
Texas Department of Transportation
 Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN)-08

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9-08	REVISIONS	CONTRACT	SECTION	JOB
		0988	01	025
		DIST	COUNTY	SHEET NO.
		CRP	BEE	73

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

- 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.
- 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
- 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>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

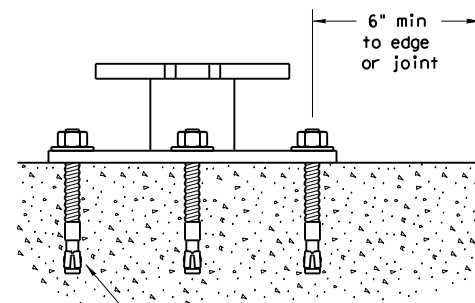
Foundation

- 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.
- 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.
- 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.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- 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.
- 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



5/8" diameter Concrete Anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

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, "Epoxyes 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.

DATE:
FILE:

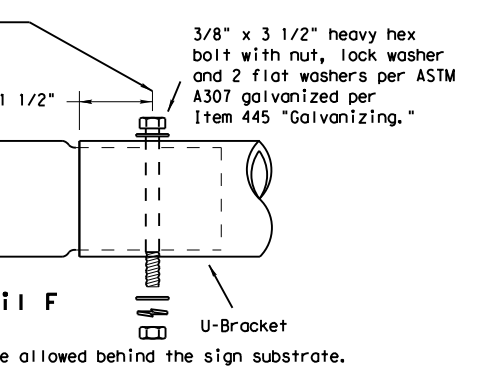
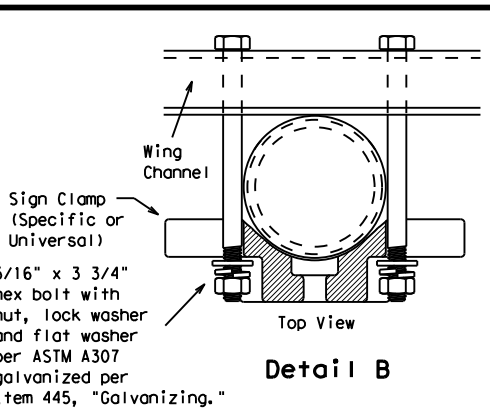
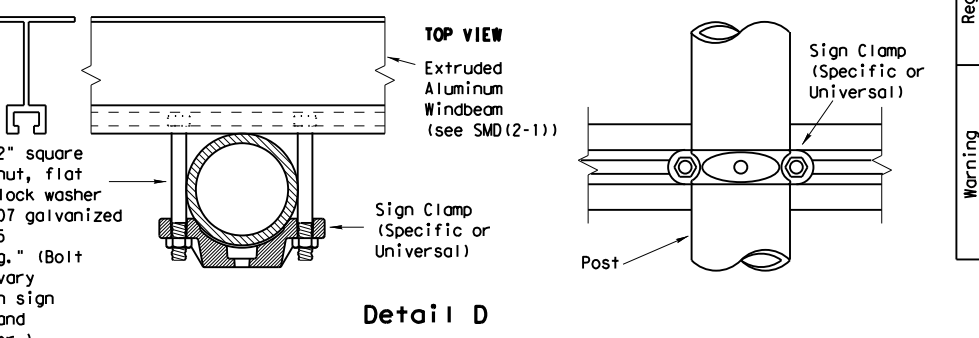
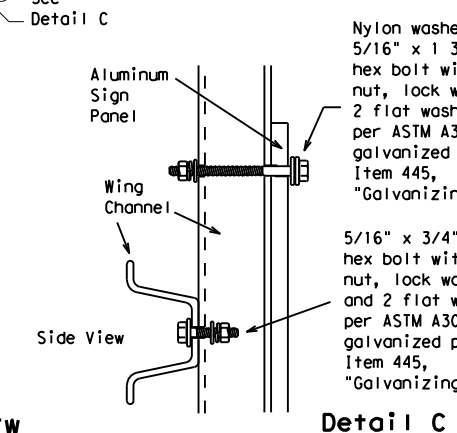
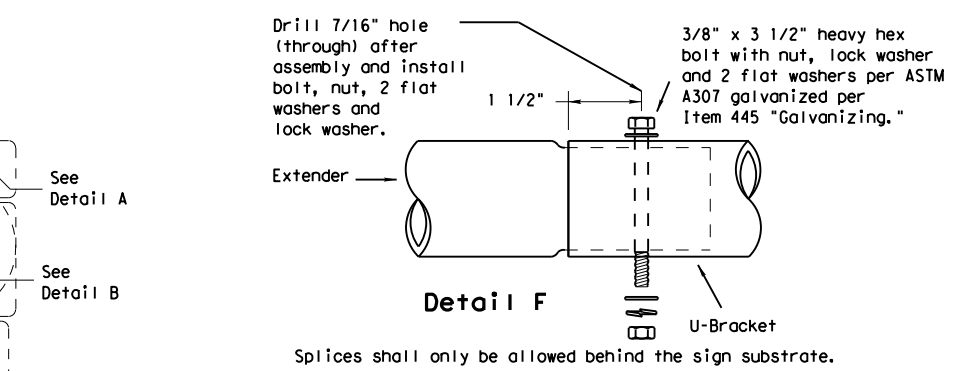
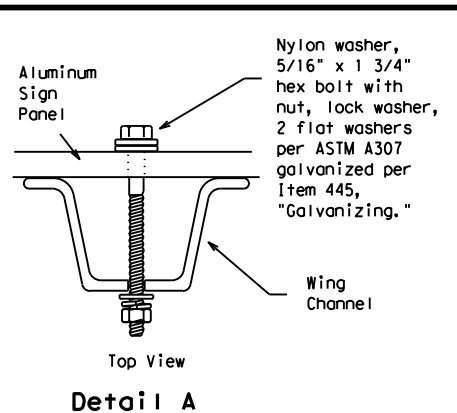
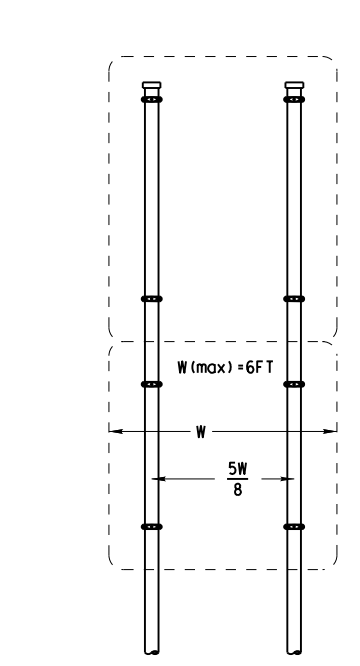
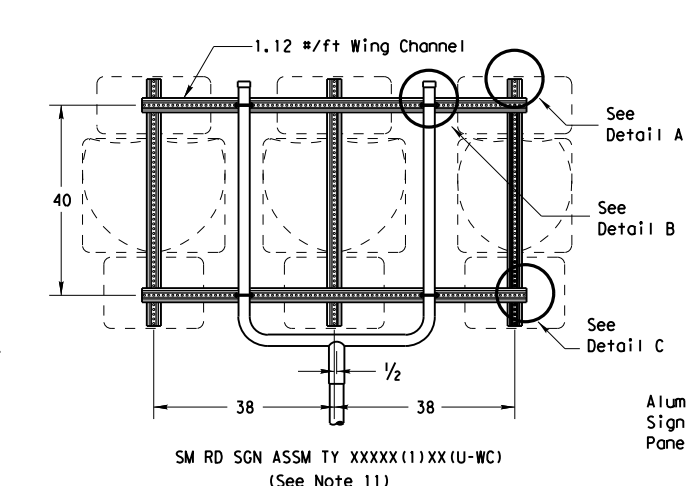
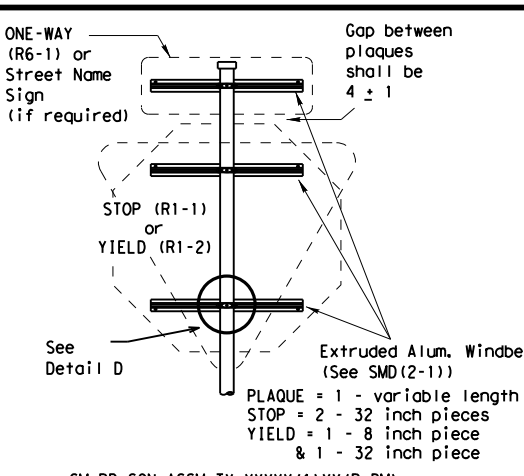
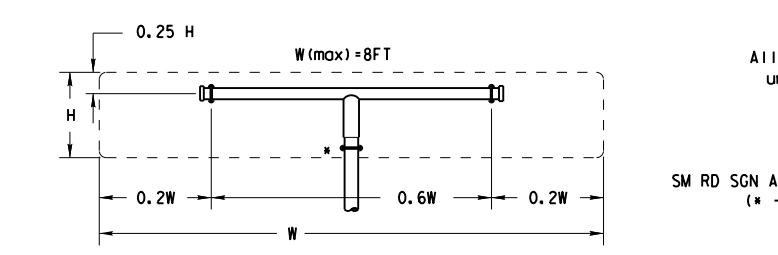
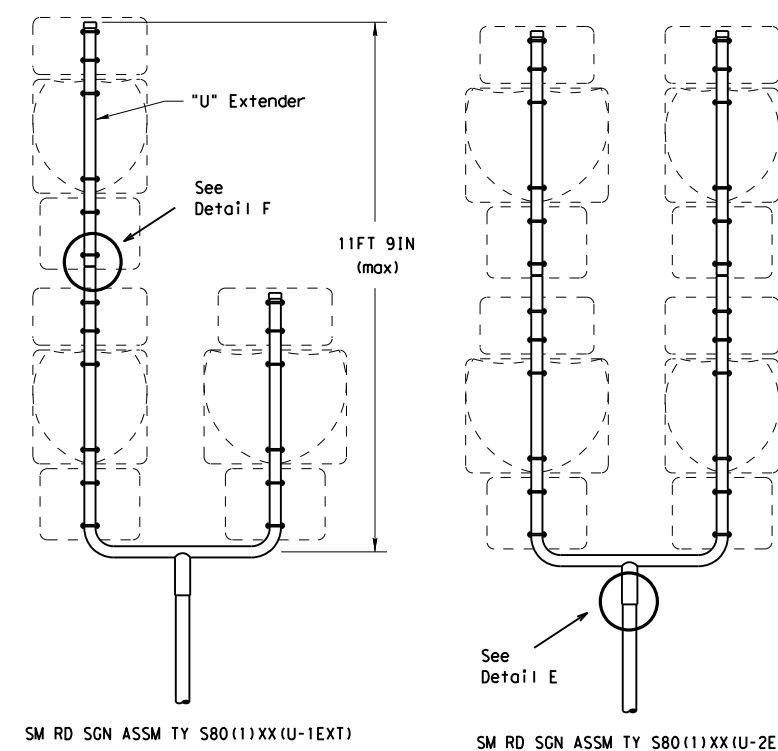
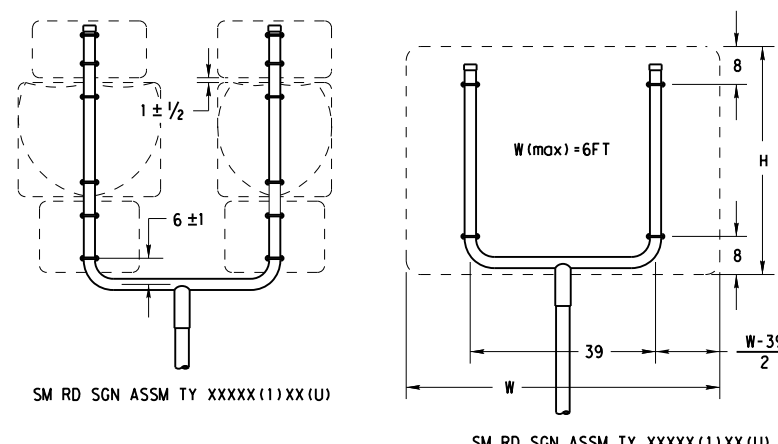
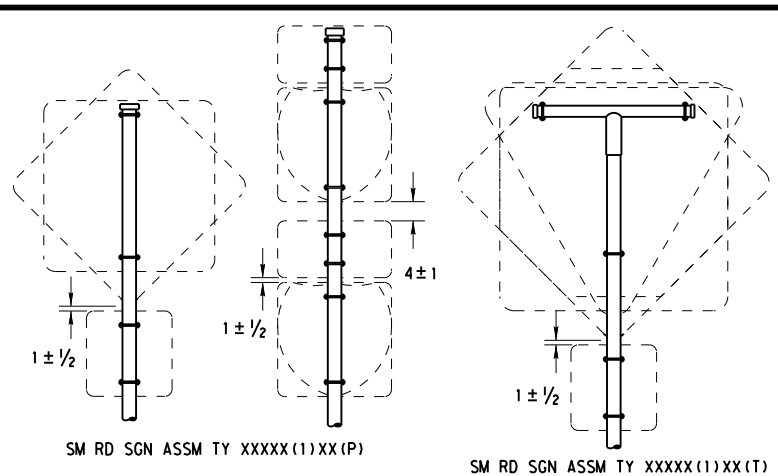


SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0988	01	025	FM 623
		DIST	COUNTY	SHEET NO.	
	CRP	BEE	74		

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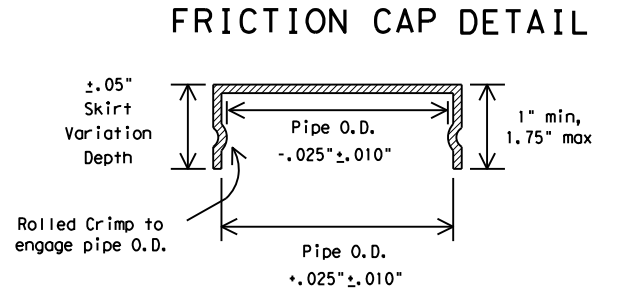
GENERAL NOTES:

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

- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
- 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.
- Post open ends shall be fitted with Friction Caps.
- Sign blanks shall be the sizes and shapes shown on the plans.

	REQUIRED SUPPORT	
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	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.



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

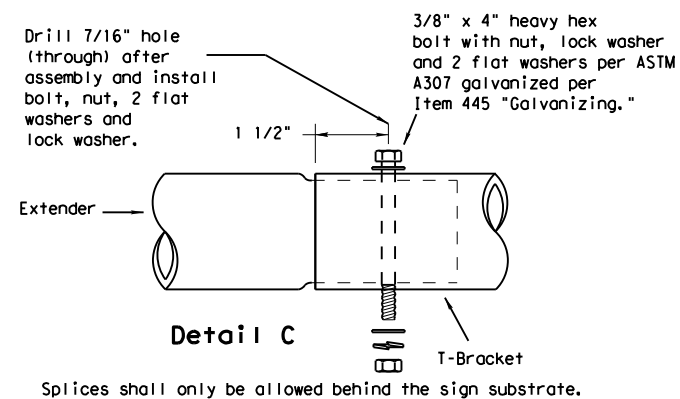
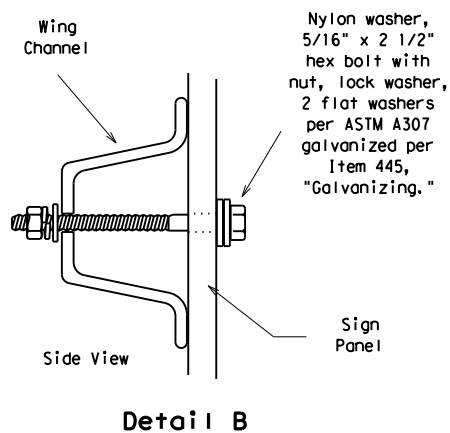
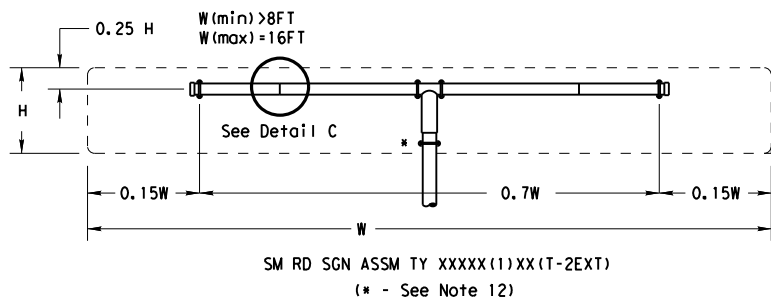
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2)-08

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9-08	REVISIONS	CON: 0988	SECT: 01	JOB: 025
		DIST: CRP	COUNTY: BEE	HIGHWAY: FM 623
				SHEET NO.: 75

DATE:
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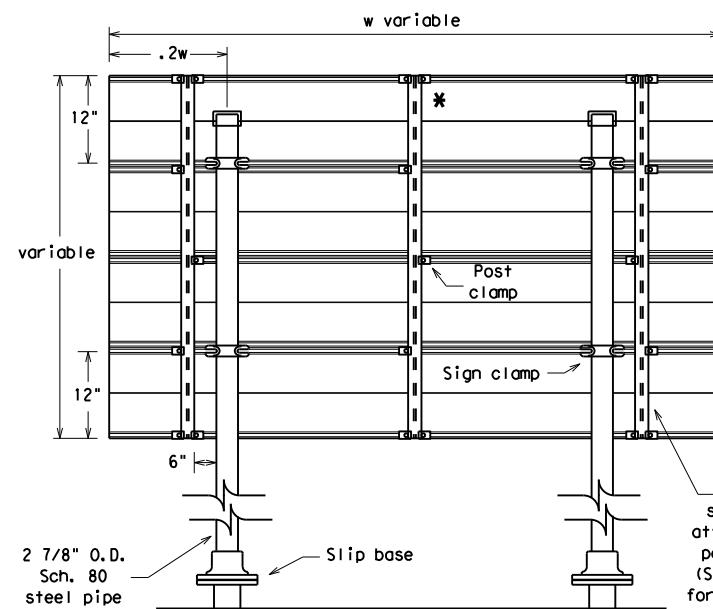
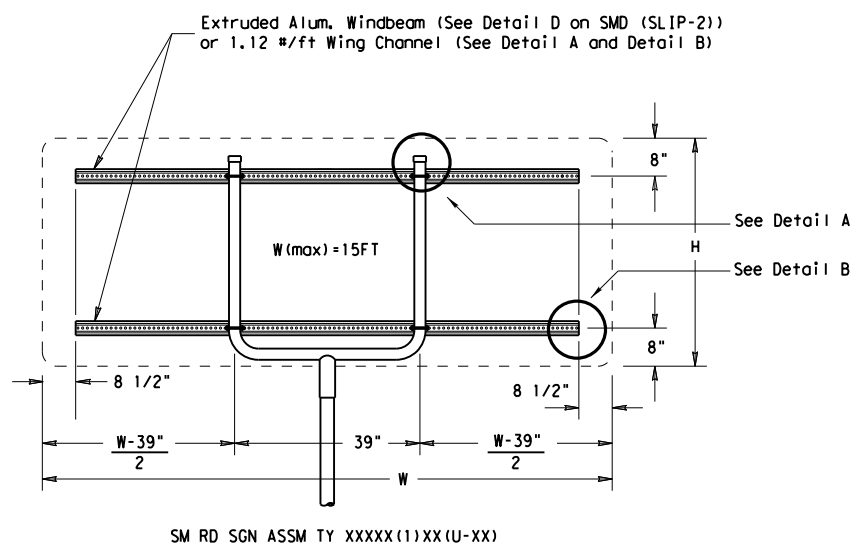
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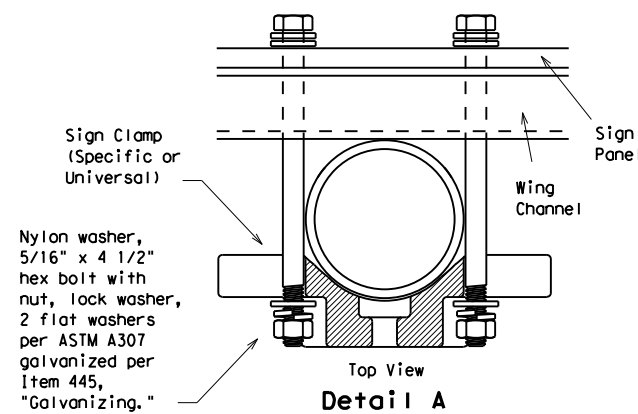
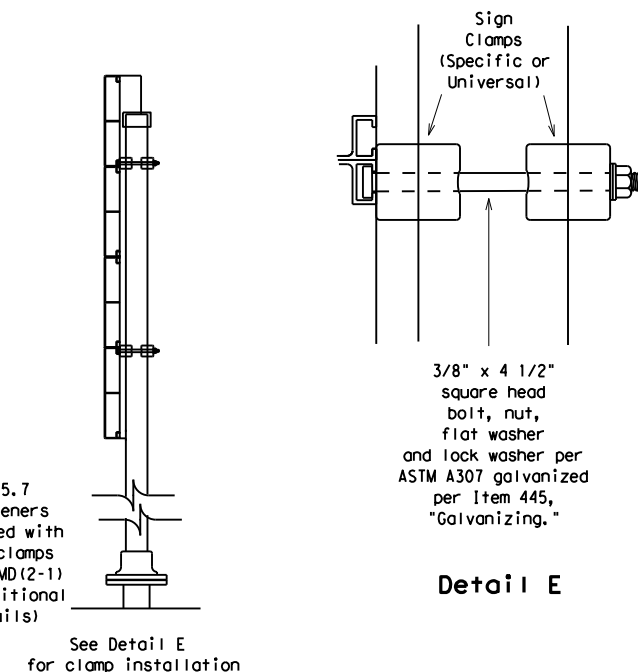


GENERAL NOTES:

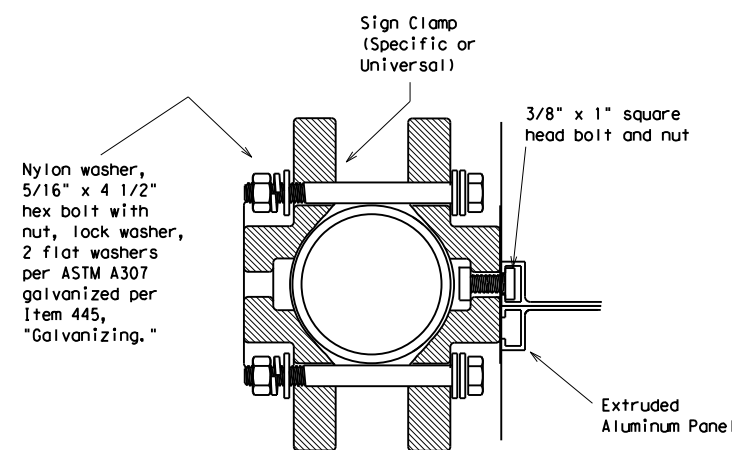
- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Sign blanks shall be the sizes and shapes shown on the plans.
- 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.
- Post open ends shall be fitted with Friction Caps.



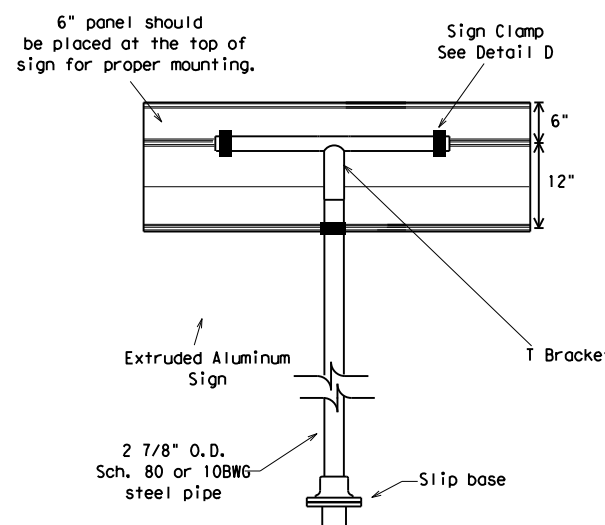
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(IP-EXAL)
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



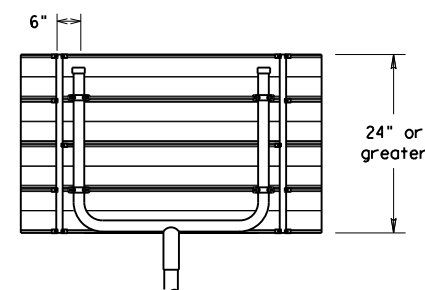
Detail A



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

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)
Warning	48x60-inch signs	TY S80(1)XX(T)
	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**

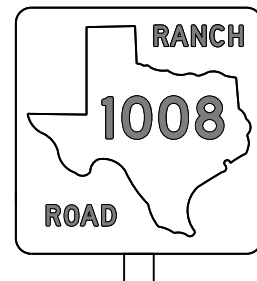
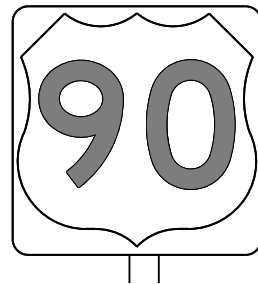
© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0988	01	025	FM 623
		DIST	COUNTY		SHEET NO.
		CRP	BEE		76

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REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

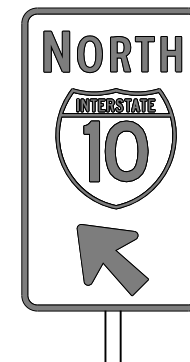
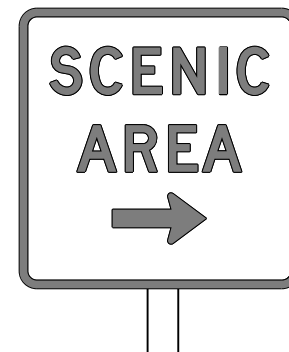
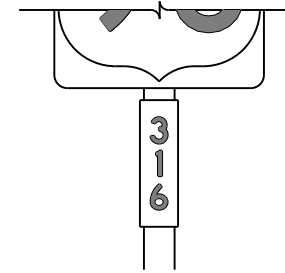
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

- 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).
- 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

- 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).
- 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.
- 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.
- 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.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- 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/>



TYPICAL SIGN REQUIREMENTS

TSR(3) - 13

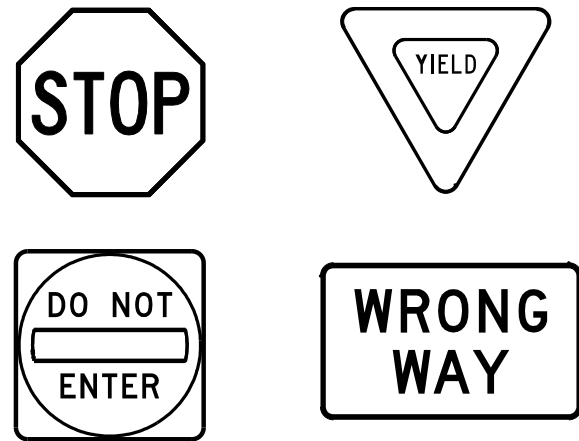
FILE:	tsr3-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
©TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0988	01	025	FM 623				
12-03	7-13	DIST	COUNTY	SHEET NO.					
9-08		CRP	BEE	77					

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DATE: 7/31/2024 10:29:53 PM
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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

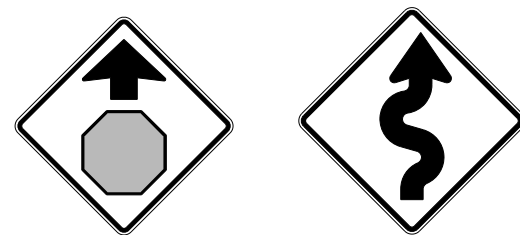
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



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

- 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).
- Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
- 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.
- Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
- 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.
- 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.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- 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/>



TYPICAL SIGN REQUIREMENTS

TSR (4) - 13

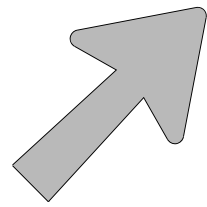
FILE:	tsr4-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY				
REVISIONS	0988	01	025	FM	623				
12-03	7-13	DIST	COUNTY	SHEET NO.					
9-08		CRP	BEE	78					

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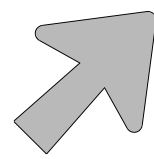
DATE: 7/31/2024 10:30:10 PM
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ARROW DETAILS

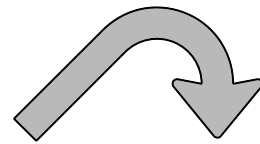
for Large Ground-Mounted and Overhead Guide Signs



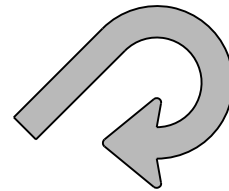
Type A



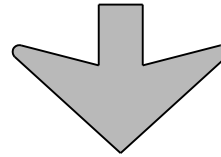
Type B



E-3



E-4



Down Arrow

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

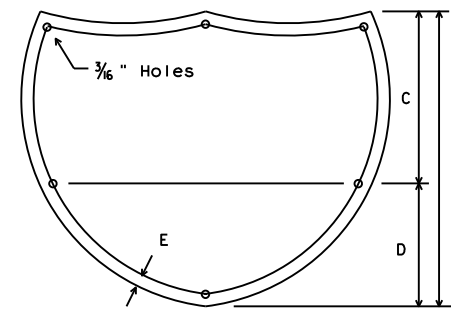
NOTE

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.

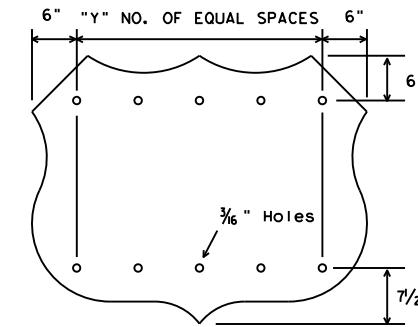
<http://www.txdot.gov/>

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



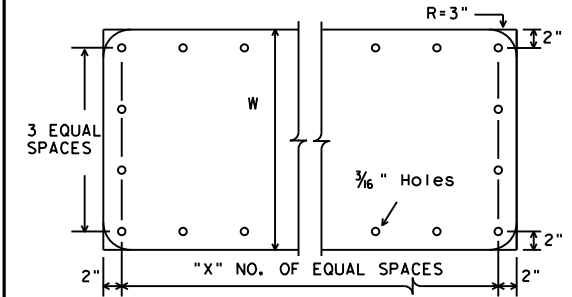
INTERSTATE ROUTE MARKERS

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



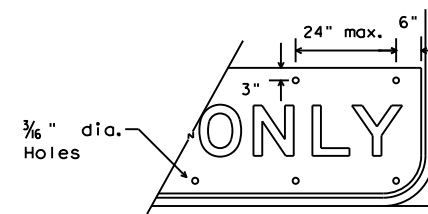
U.S. ROUTE MARKERS

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



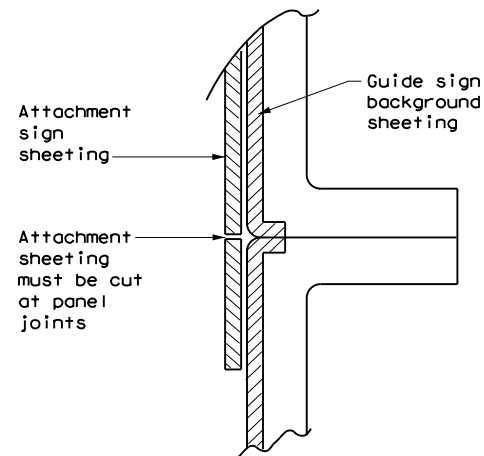
STATE ROUTE MARKERS

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



EXIT ONLY PANEL

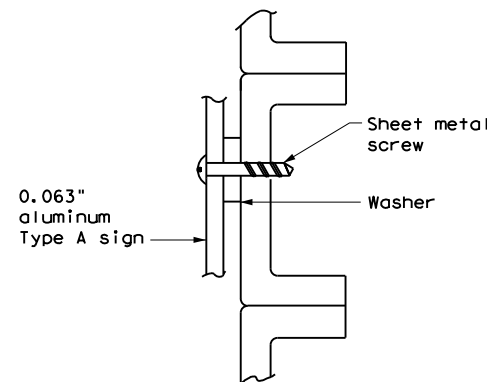
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



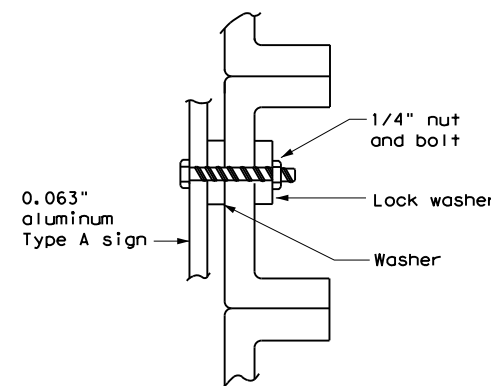
DIRECT APPLIED ATTACHMENT

NOTE:

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



SCREW ATTACHMENT

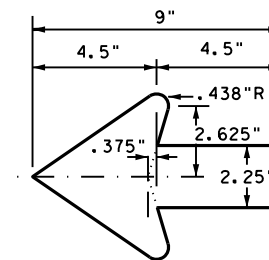


NUT/BOLT ATTACHMENT

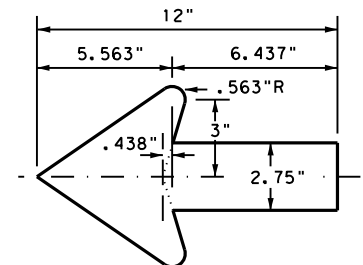
NOTE:

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.



TYPICAL SIGN REQUIREMENTS

TSR (5) - 13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
12-03 7-13	DIST	COUNTY	SHEET NO.	
9-08	CRP	BEE	79	

DATE: 7/31/2024 10:30:30 PM
 FILE: //txdot.projectwiseonline.com:TXDOT4/Docs/16 - CRP/Design Projects/0224/0224-0001/0224-0001-0001.dgn
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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE	DOUBLE	INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX (XX)	
								NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRF = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount DIRECTION If Required BI = Bi-Directional BR = Bi-Directional with red on back	
SHEETING	Yellow, White or Red Type B or C reflective sheeting				SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.				POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

OBJECT MARKERS									
DEVICE	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	
SHEETING	Yellow-Type B _{FL} or C _{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective 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)			CHEVRONS				ONE DIRECTION LARGE ARROW		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.		
DEVICE	GF1	GF2	CTB	W1-8				W1-6			
SHEETING	Yellow, White, Red			NOTE							
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.			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).							
				SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
				MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only		MOUNTING HEIGHT	7'-0"	

Texas Department of Transportation
 Traffic Safety Division Standard

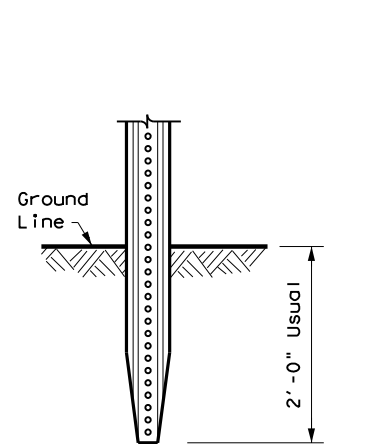
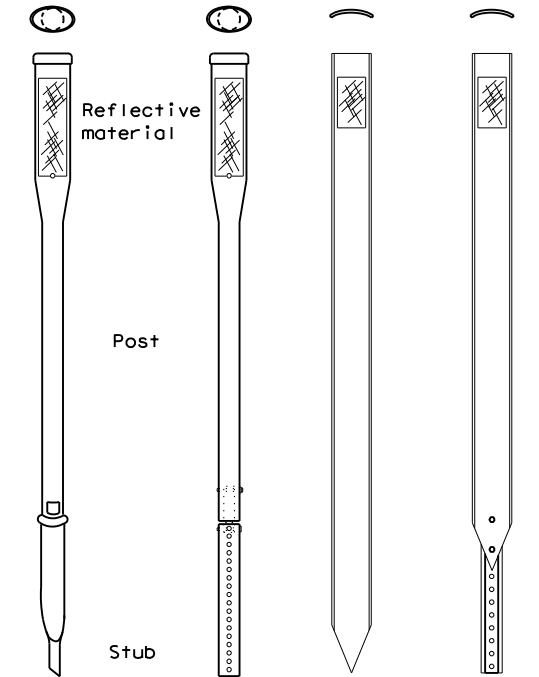
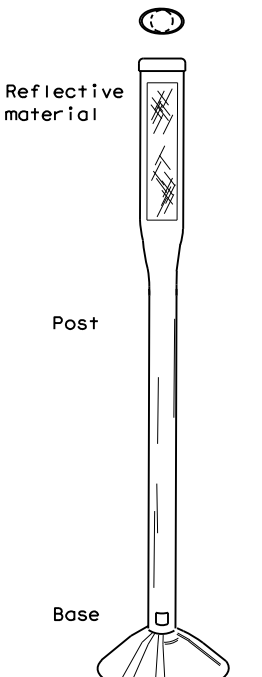
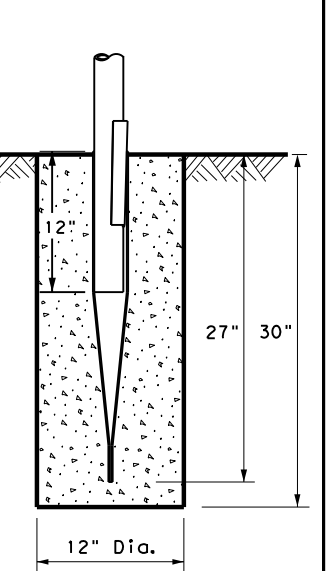
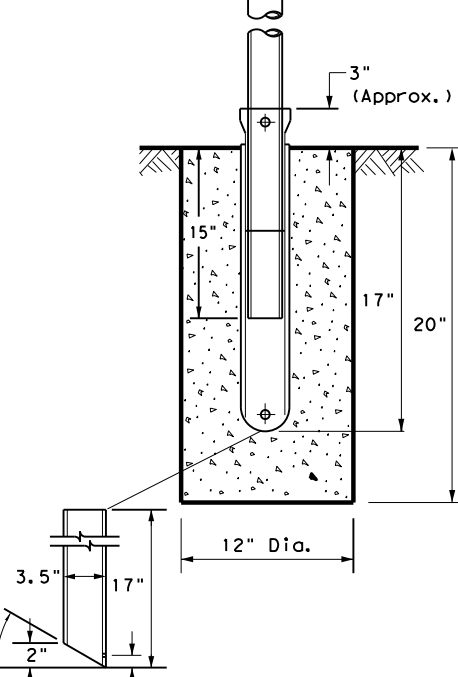
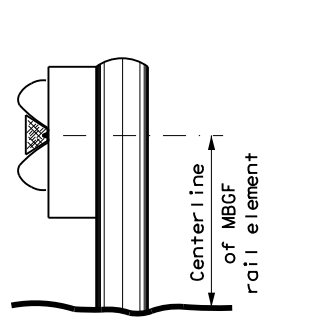
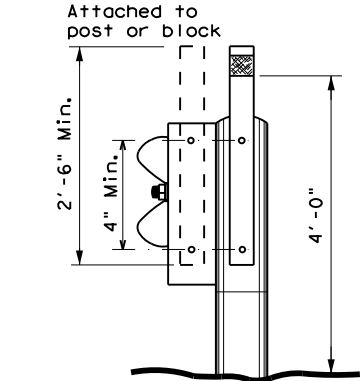
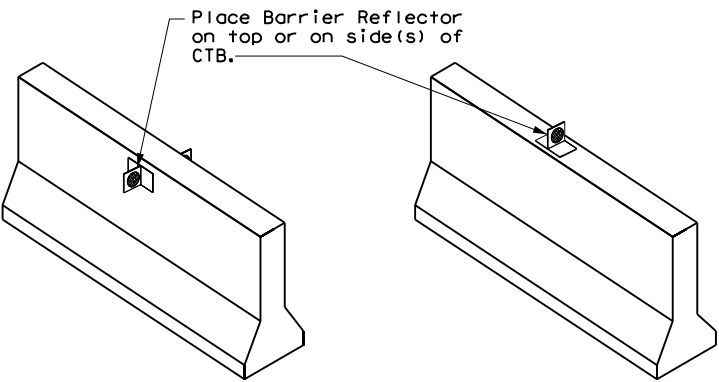
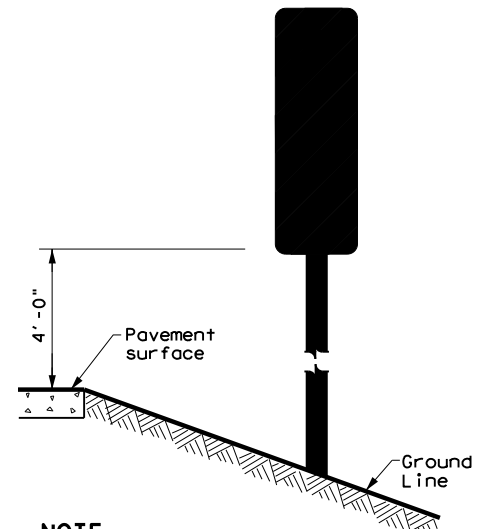
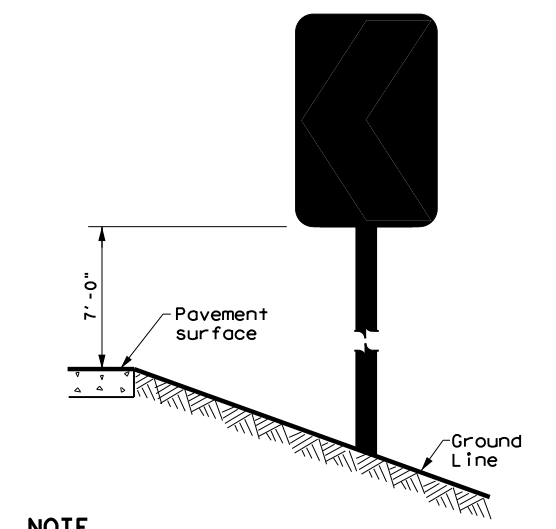
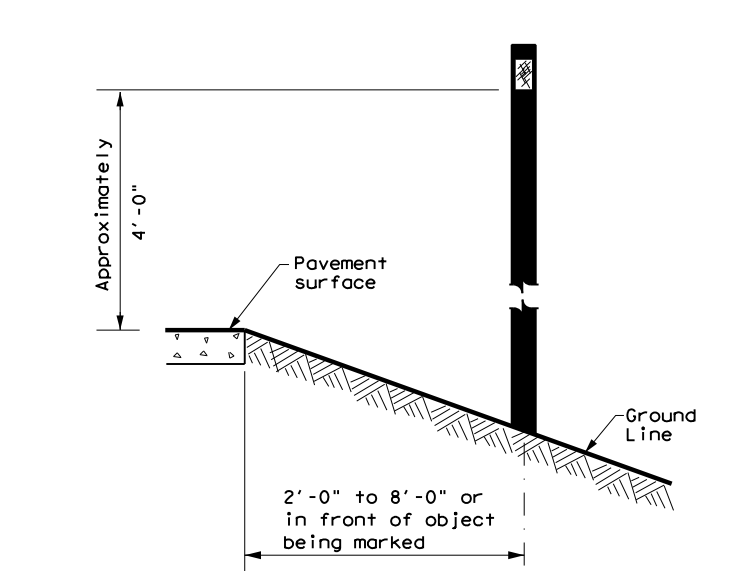
DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION


D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	CRP	BEE	80	

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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS		
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT	
GND	GND	SRF	WAS	WAP	GF 1	
						
	EMBEDDED		SURFACE MOUNT	STEEL	PLASTIC	CONCRETE TRAFFIC BARRIER (CTB) 
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.		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.		NOTE 1. Install per manufacturer's recommendations.		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 	CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN 	DELINEATORS AND TYPE 2 OBJECT MARKERS 				
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)		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.		See general notes 1, 2 and 3.		



Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	CRP	BEE		81

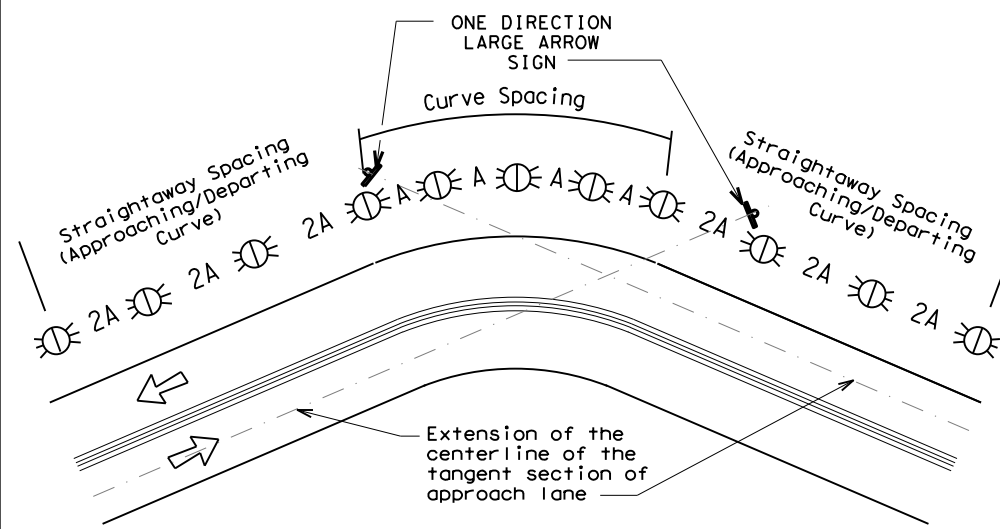
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

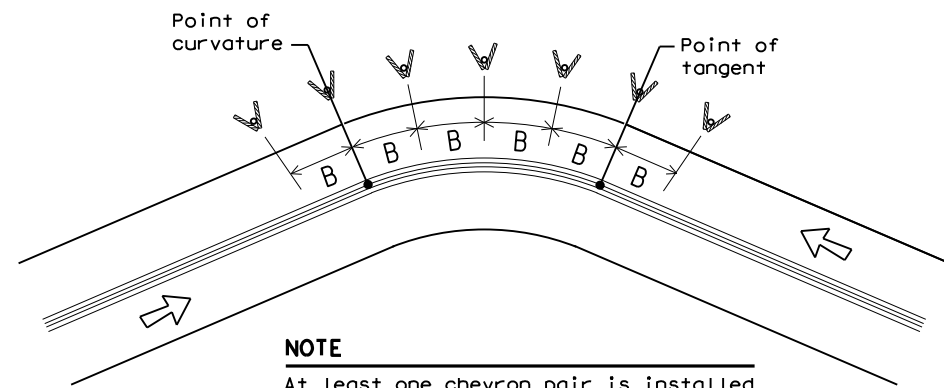
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN			
Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

- 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.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

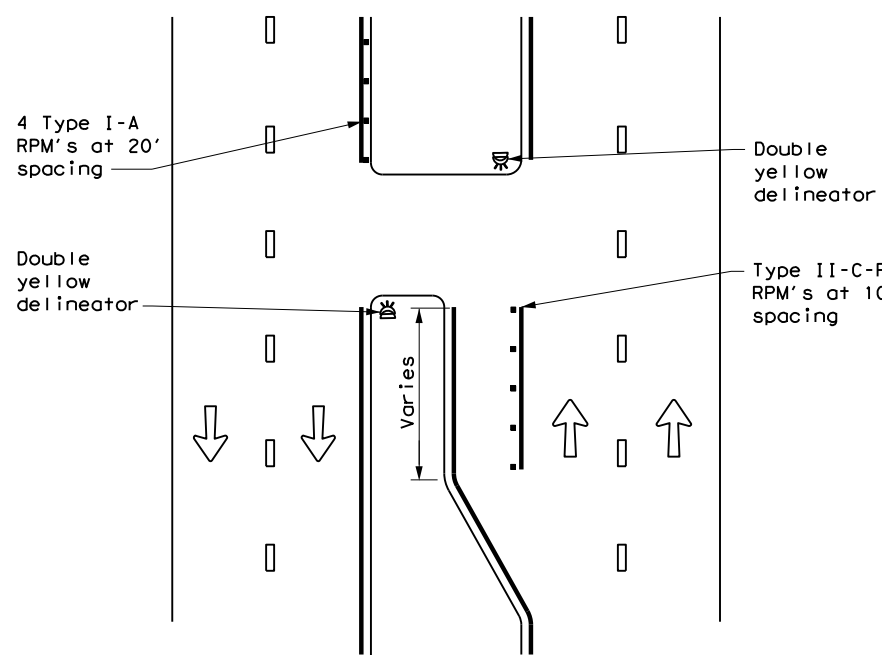
D & OM(3)-20

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© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988 01		025	FM 623
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	CRP	BEE		82

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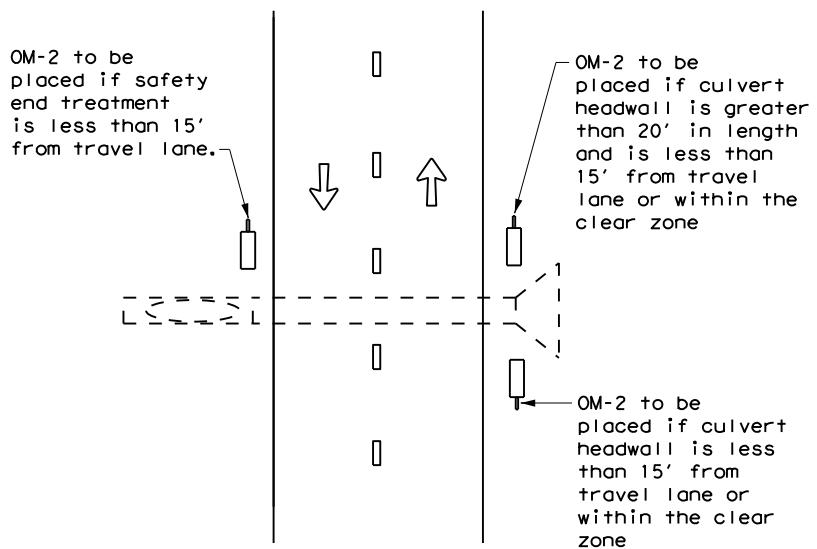
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CROSSOVERS



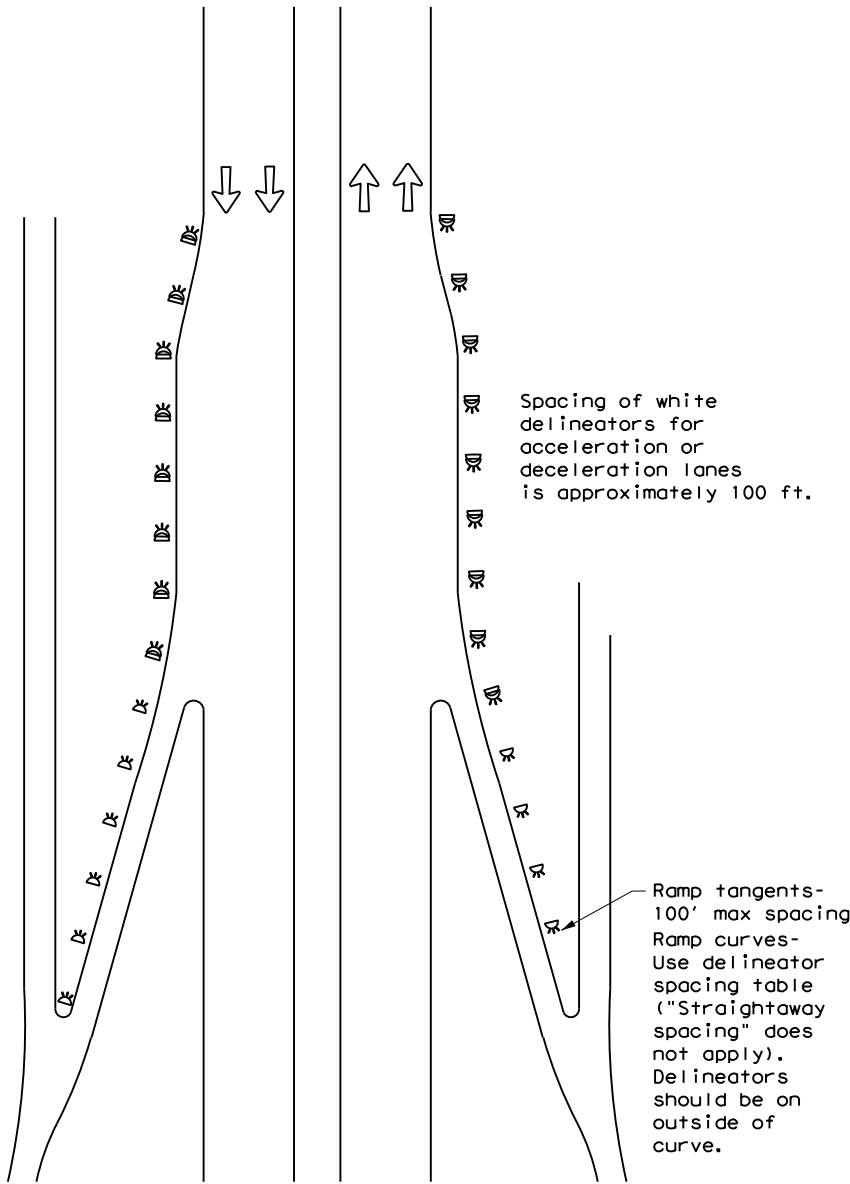
DETAIL 1

FOR CULVERTS WITHOUT MBGF



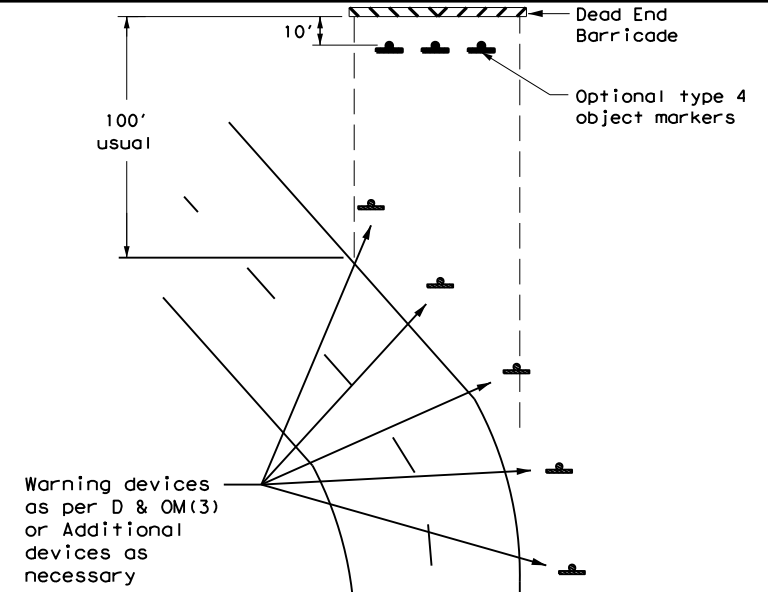
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



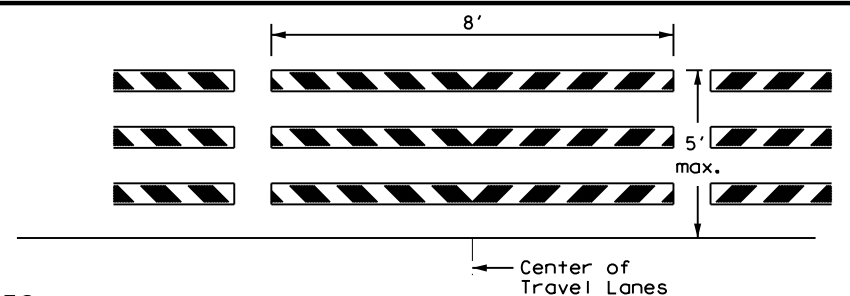
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

- Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- Barricade striping is red and white sloping toward the center of the roadway.
- 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

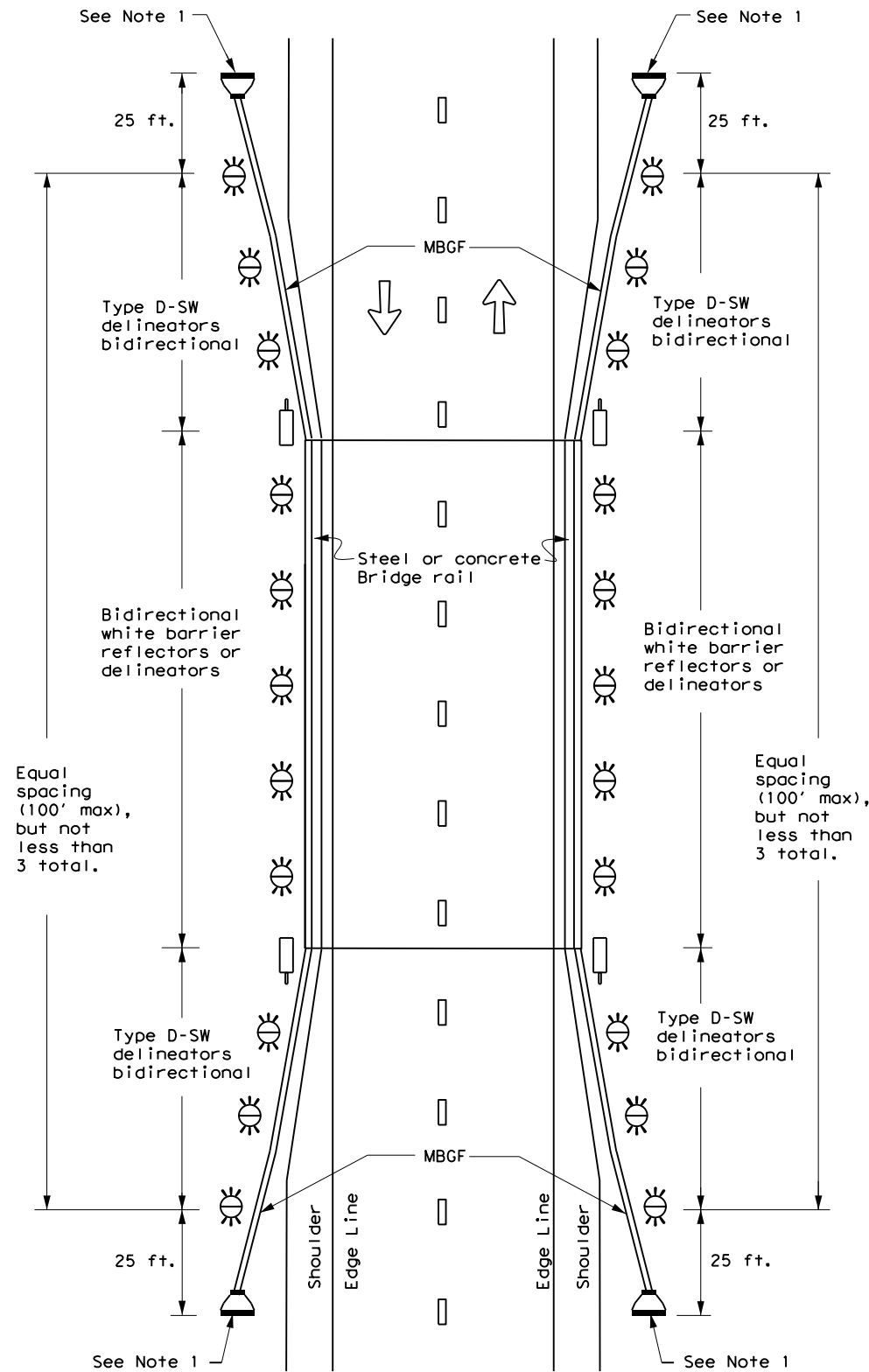


DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) -20

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3-15	DIST	COUNTY	SHEET NO.	
7-20	CRP	BEE	83	

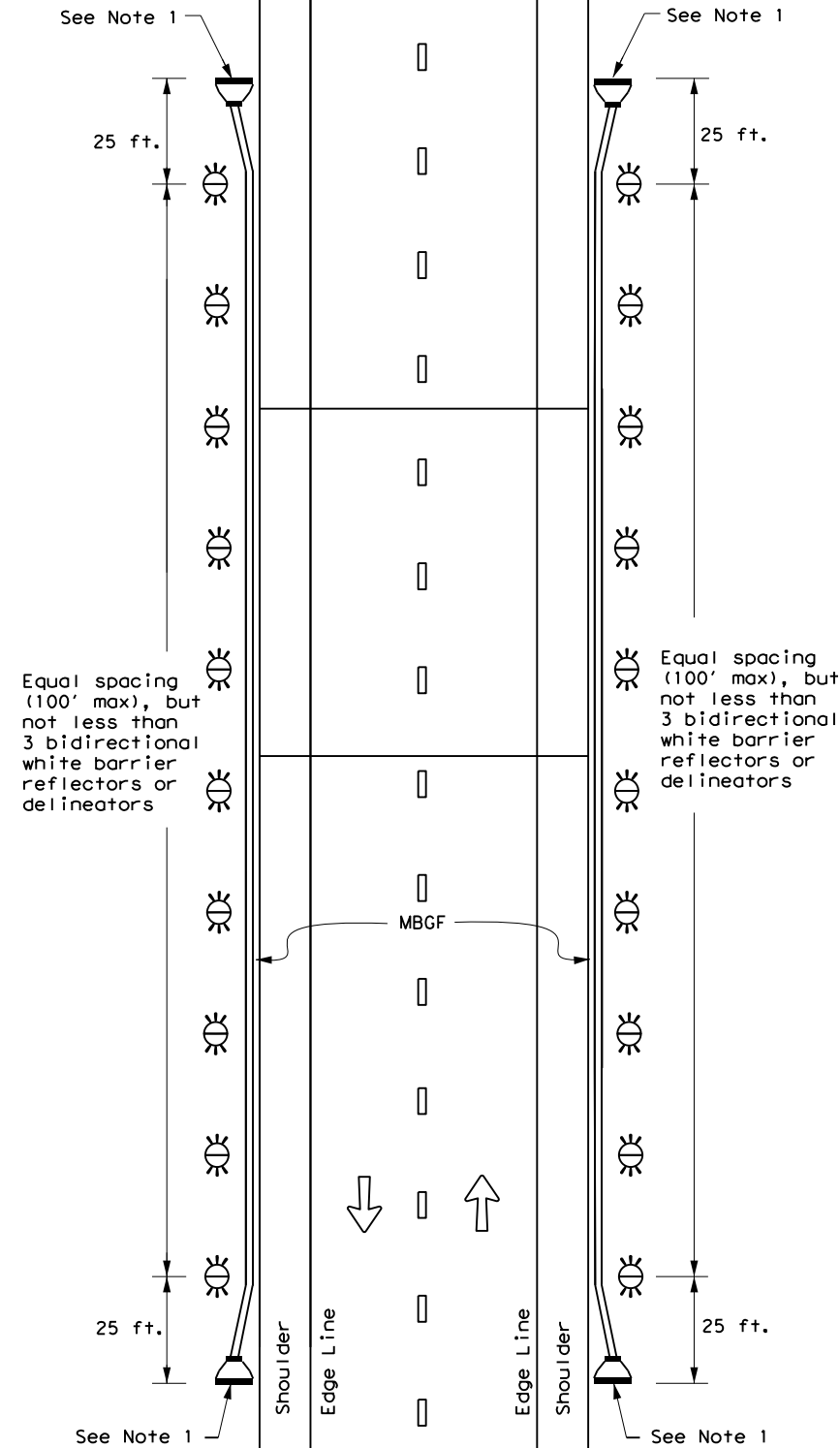
**TWO-WAY, TWO LANE ROADWAY
WITH REDUCED WIDTH APPROACH RAIL**



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.

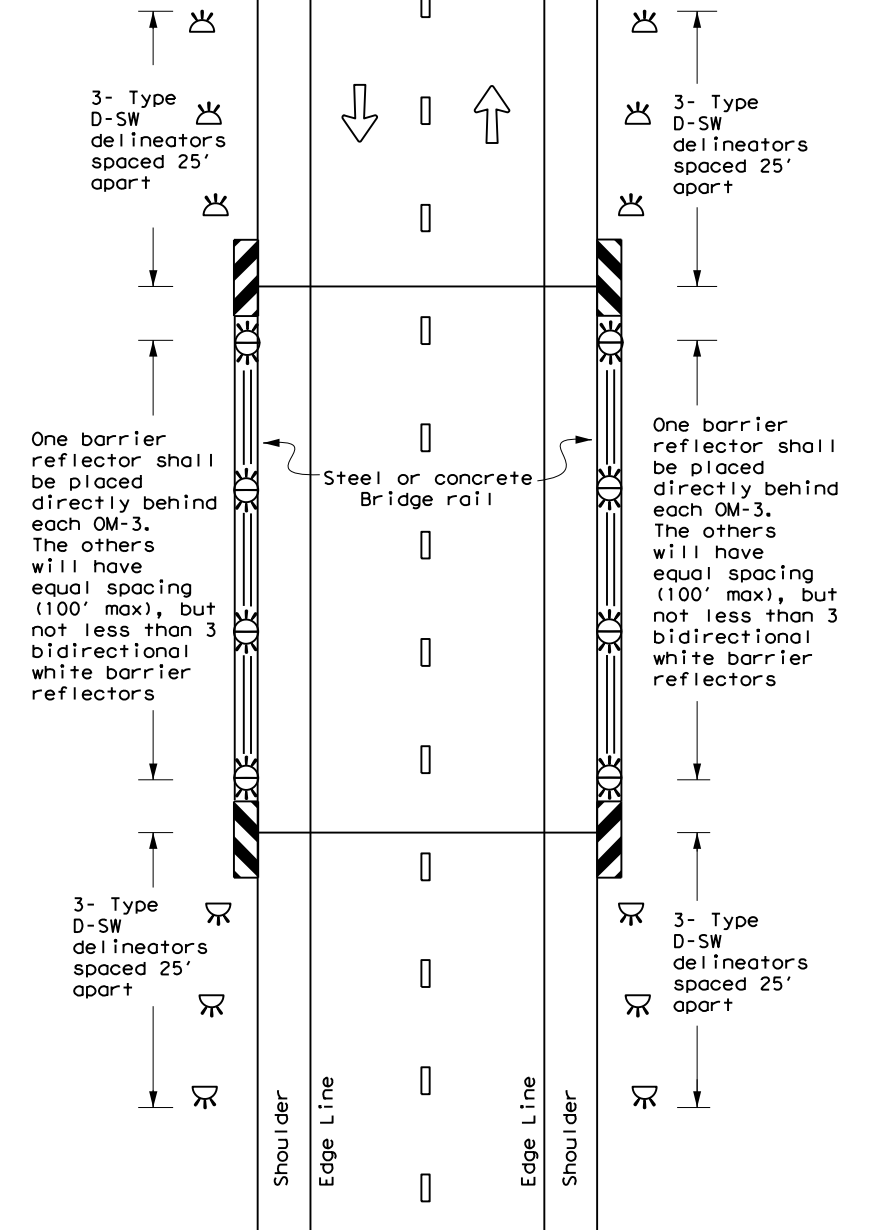
**TWO-WAY, TWO LANE ROADWAY
WITH METAL BEAM GUARD FENCE (MBGF)**



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



**DELINEATOR &
OBJECT MARKER
PLACEMENT DETAILS**

D & OM(5)-20

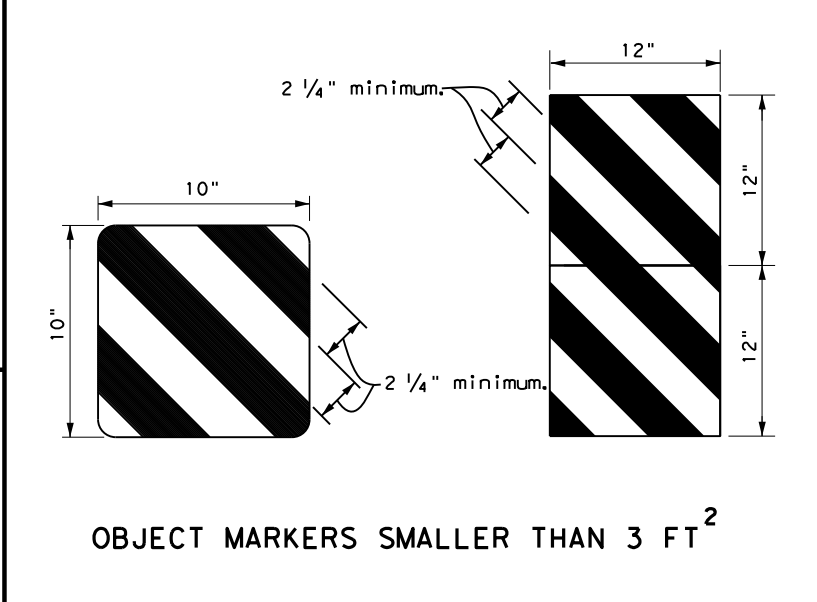
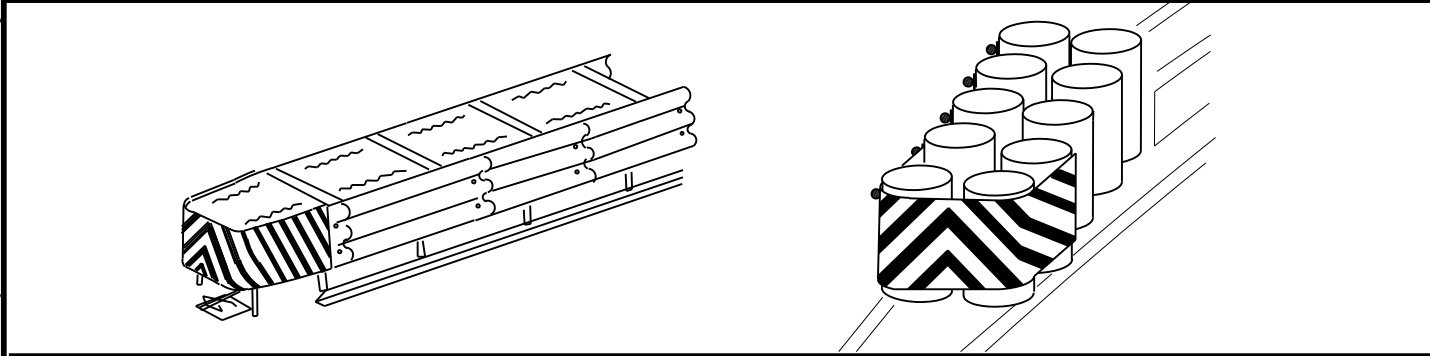
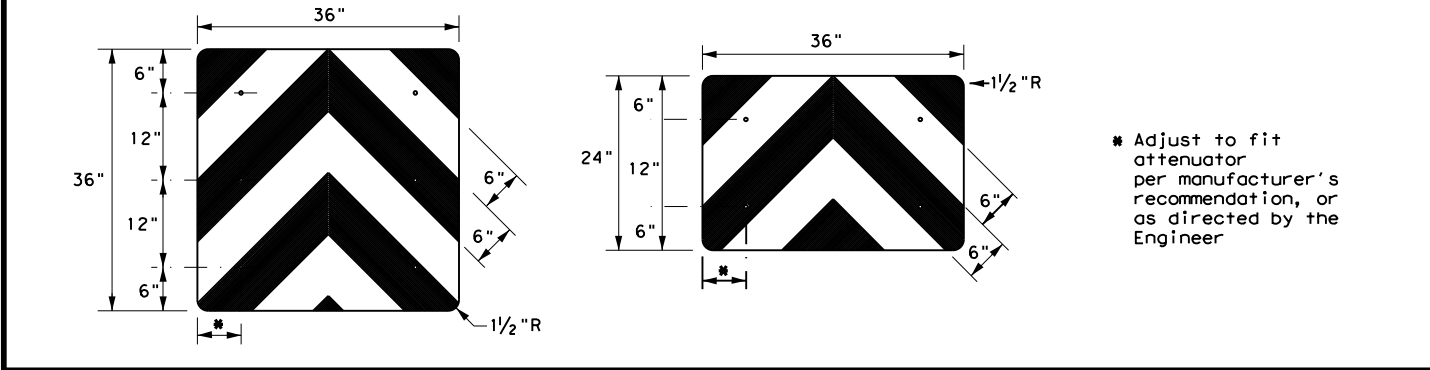
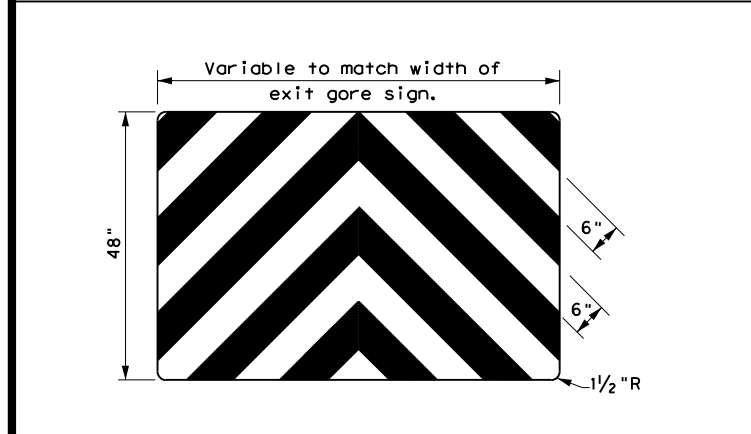
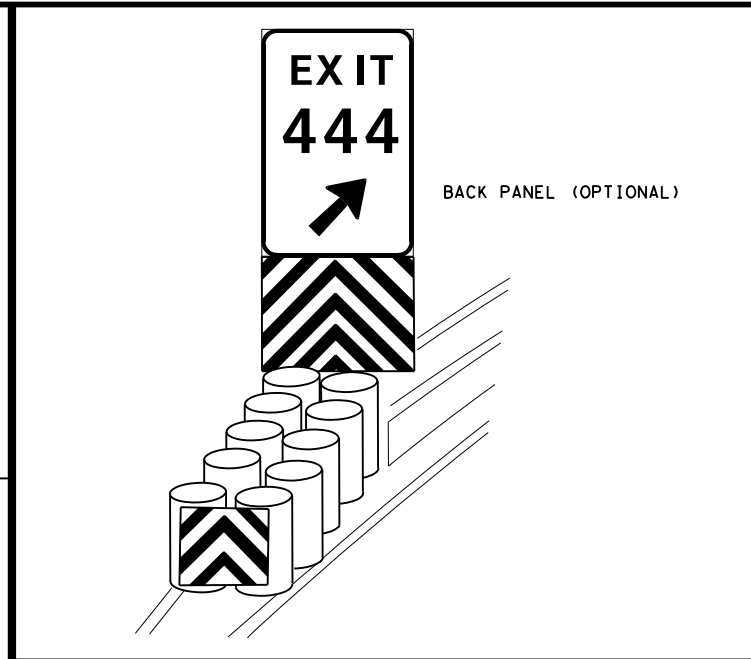
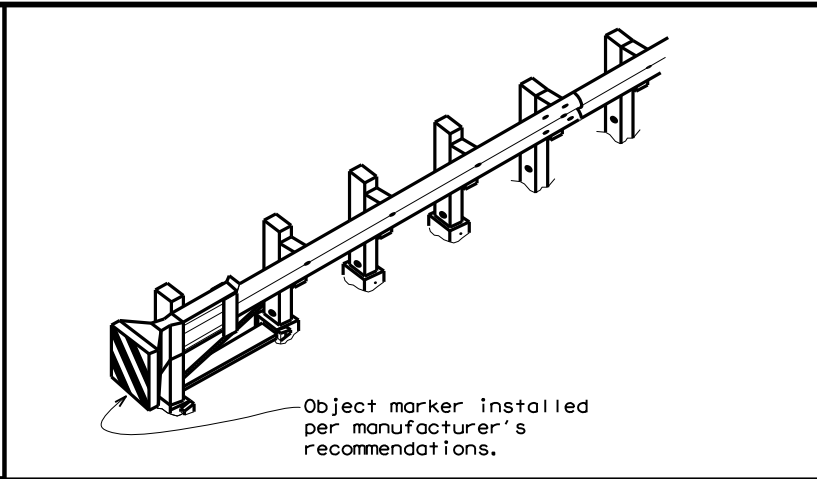
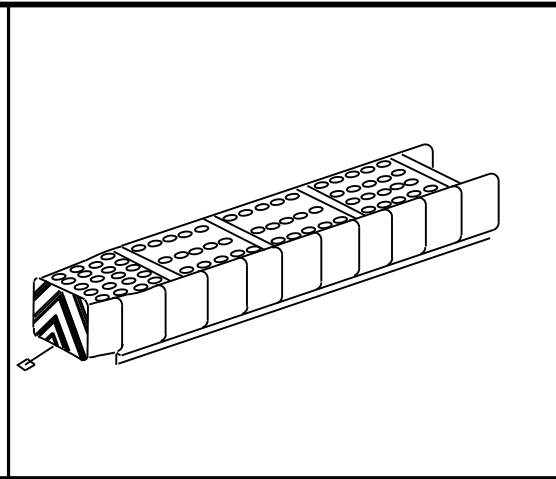
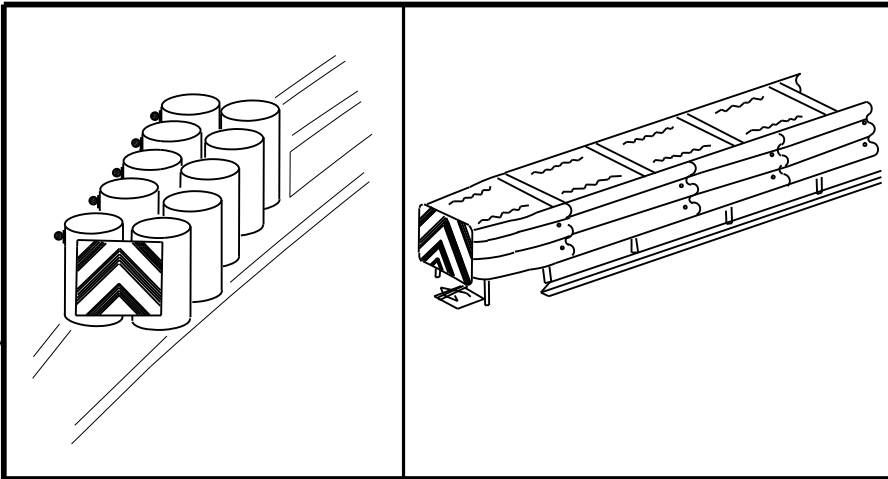
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7-20	DIST	COUNTY	SHEET NO.	
	CRP	BEE	84	

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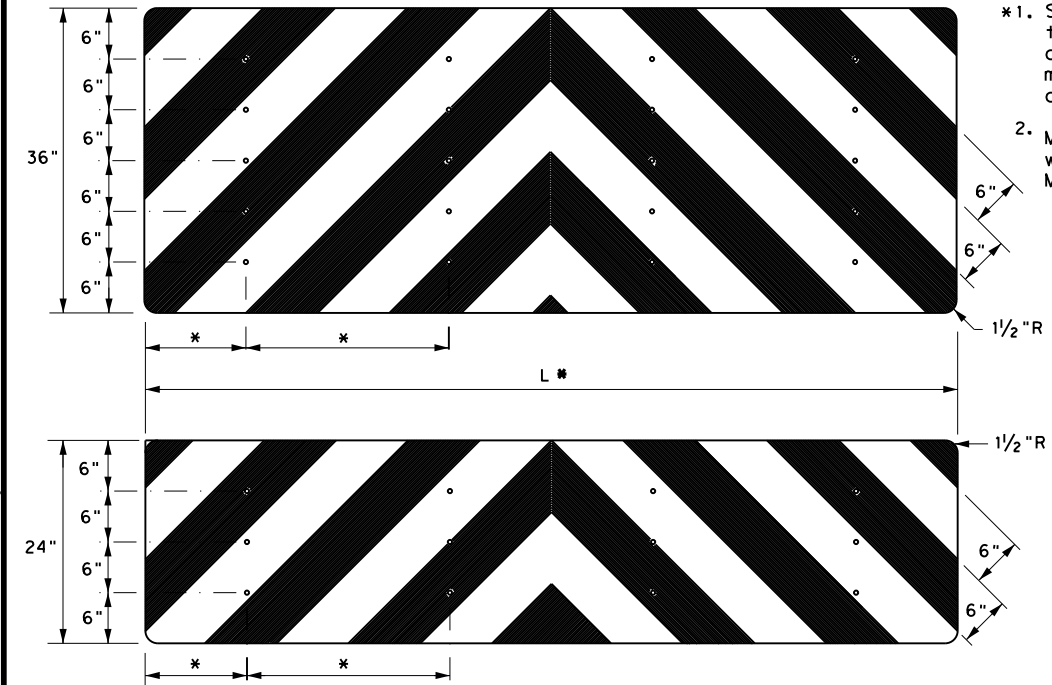


NOTES

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 1/4".
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.

NOTES

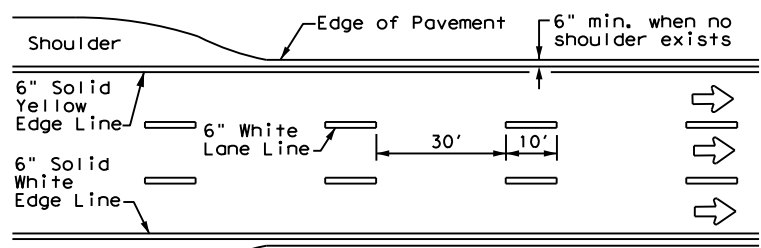
- *1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.
2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".



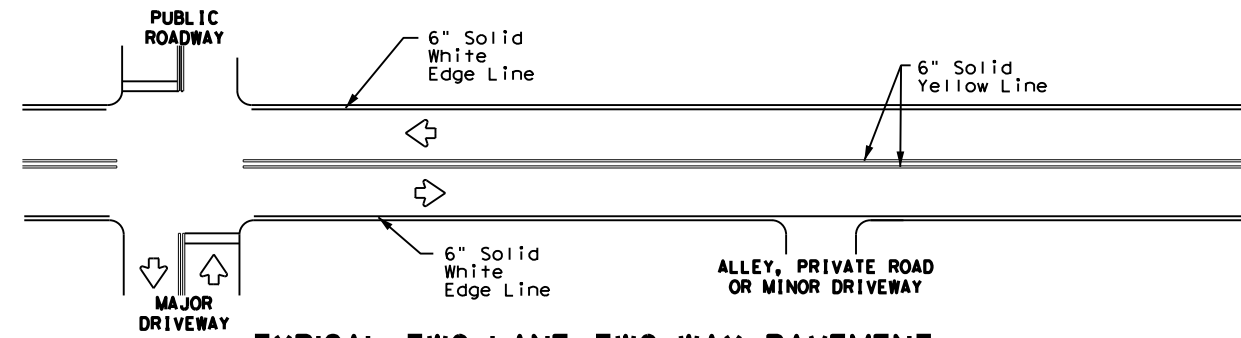
			Traffic Safety Division Standard		
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) - 20					
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© TXDOT December 1989	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0988	01	025	FM 623	
4-92 8-04	DIST	COUNTY	SHEET NO.		
8-95 3-15	CRP	BEE	85		
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20G					

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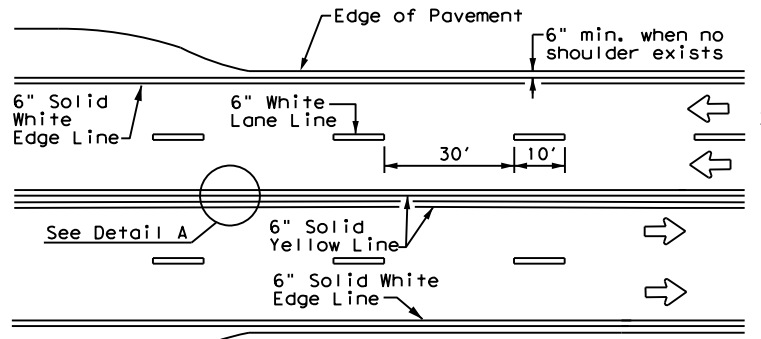
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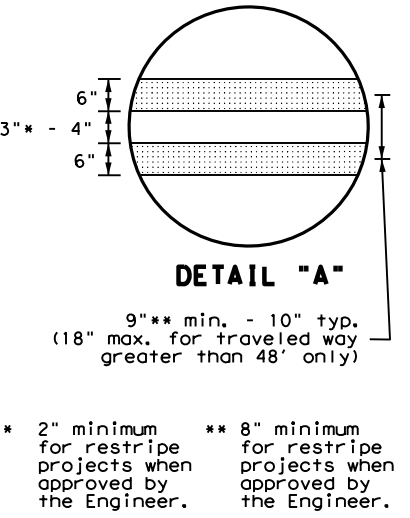
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



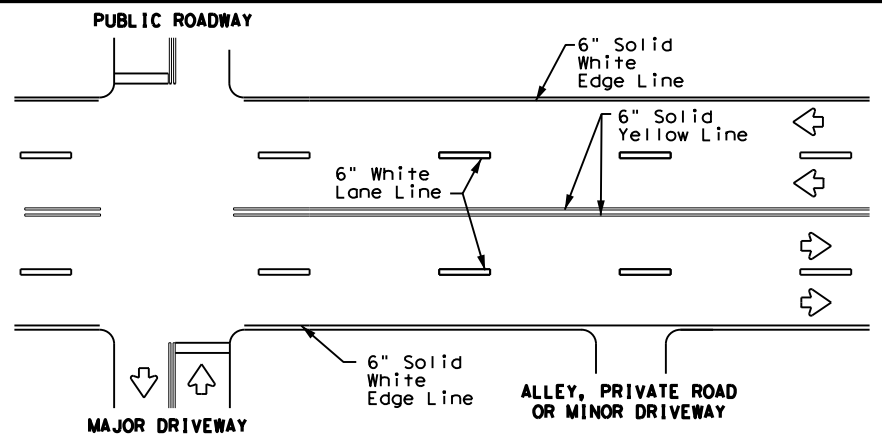
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



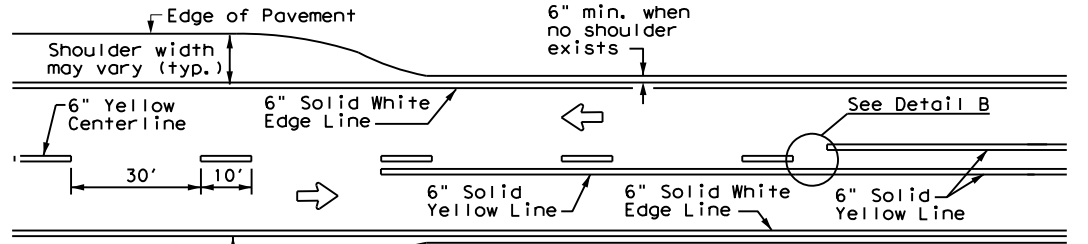
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



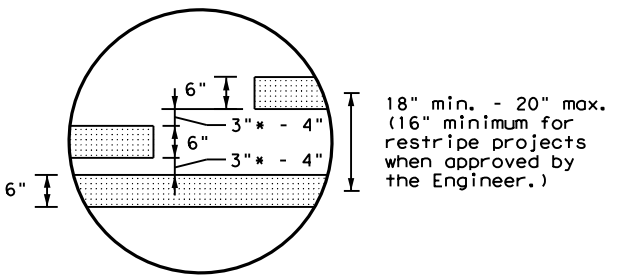
DETAIL "A"
9" min. - 10" typ.
(18" max. for traveled way greater than 48' only)



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

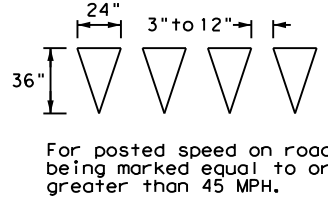


**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



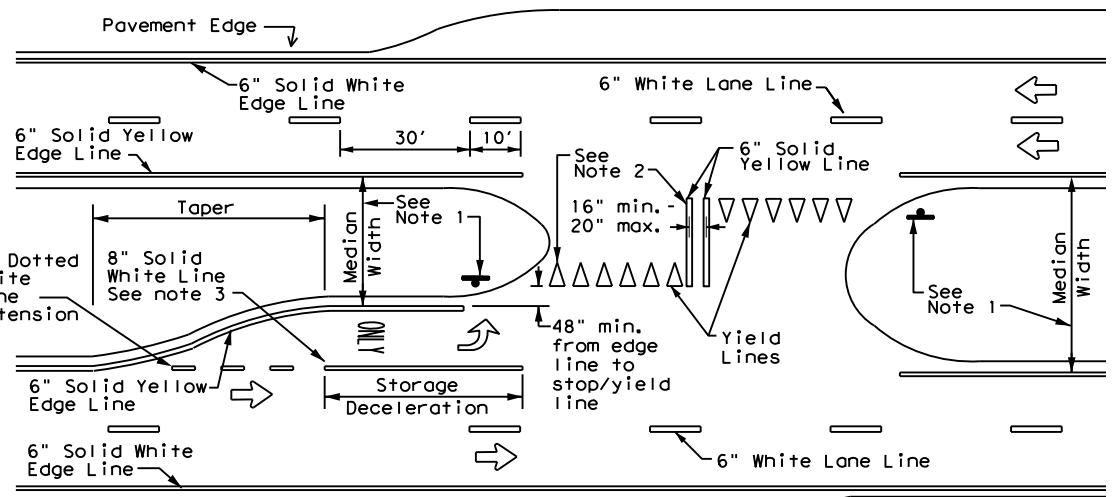
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.



YIELD LINES

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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

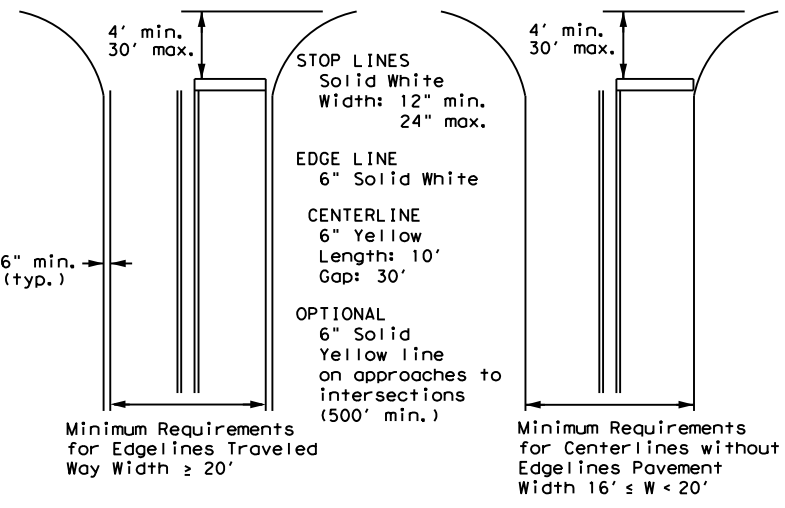
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
- Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
- 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

- Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
- 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 center of edge line to the center of edge line 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.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**
Based on Traveled Way and Pavement Widths for Undivided Roadways



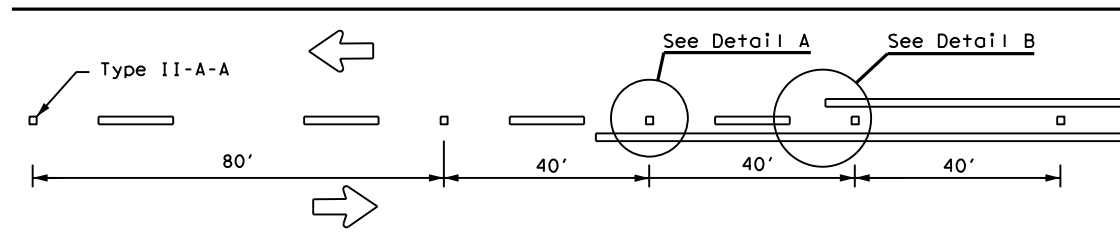
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1) - 22

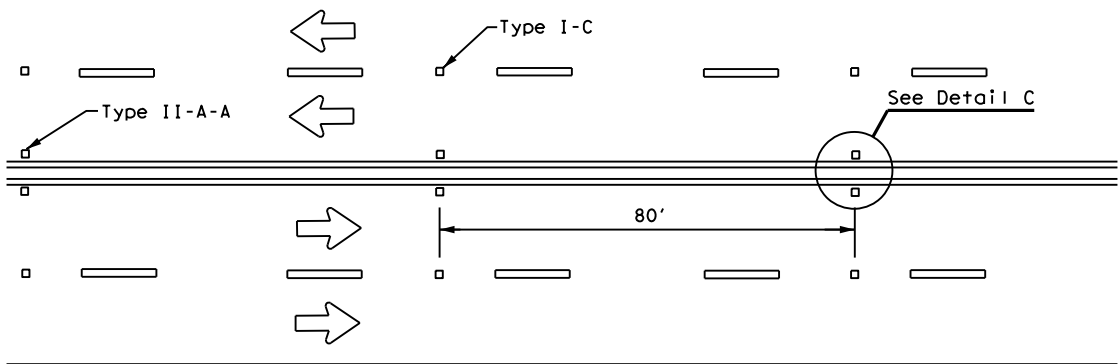
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
11-78 8-00 6-20	DIST	COUNTY	SHEET NO.	
8-95 3-03 12-22	CRP	BEE	86	
5-00 2-12				

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

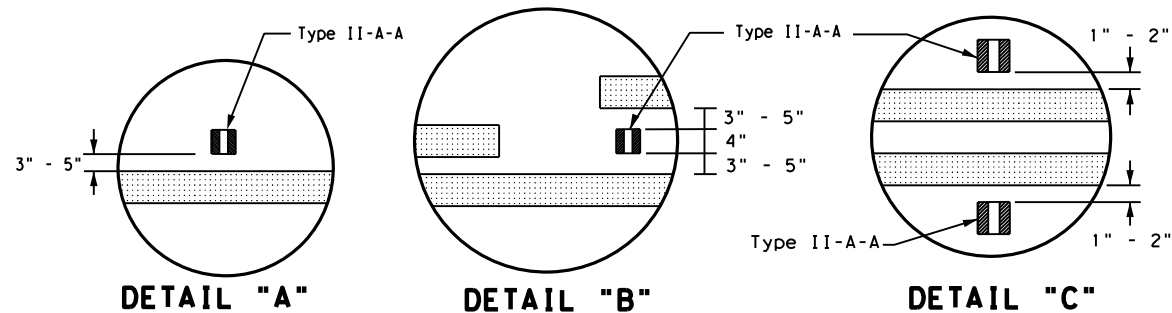
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or the accuracy of the information provided herein. This standard is subject to change without notice.



CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



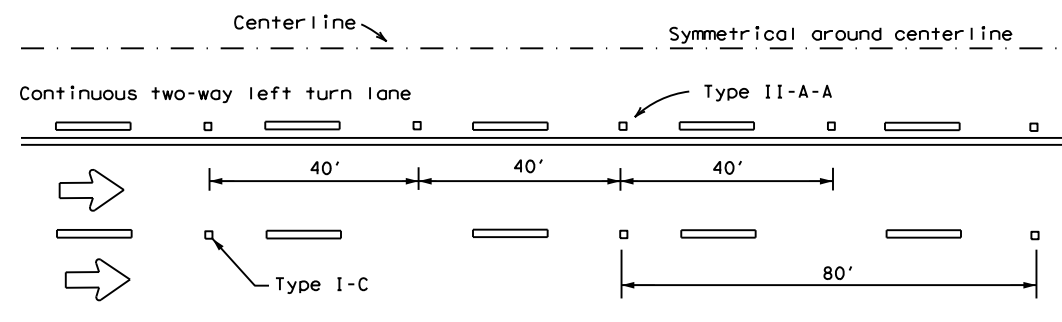
**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS**



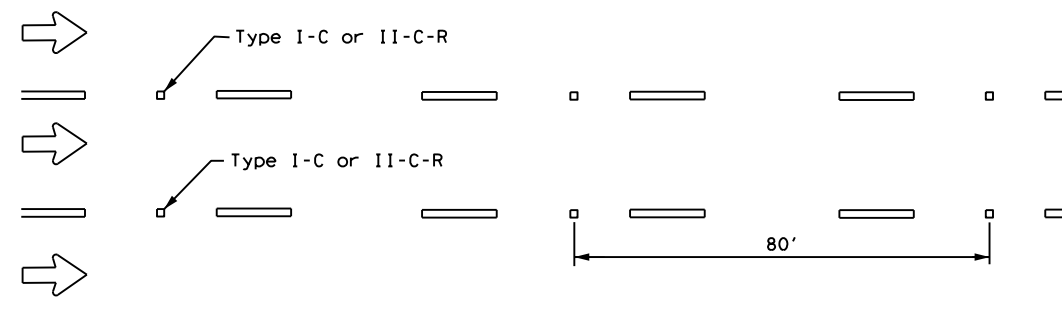
DETAIL "A"

DETAIL "B"

DETAIL "C"

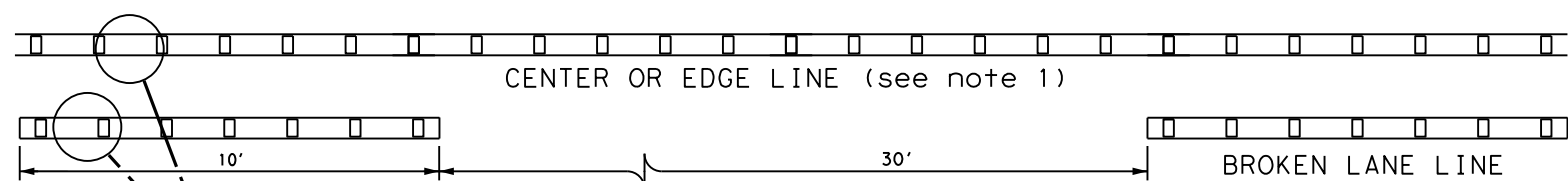


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



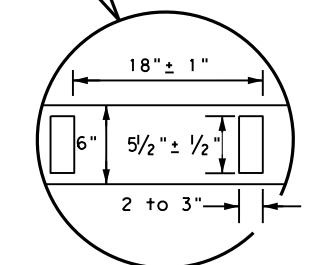
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.
 See Note 3.



CENTER OR EDGE LINE (see note 1)

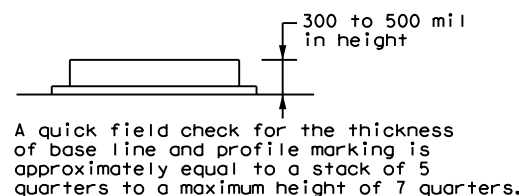
BROKEN LANE LINE



**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

6" EDGE LINE, 6" CENTERLINE
OR 6" LANE LINE



NOTES

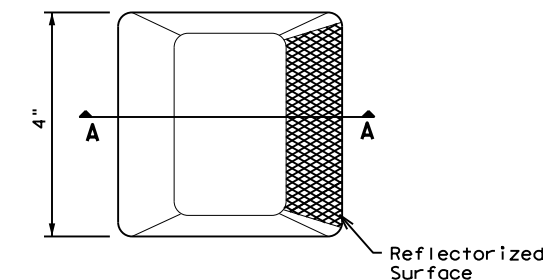
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

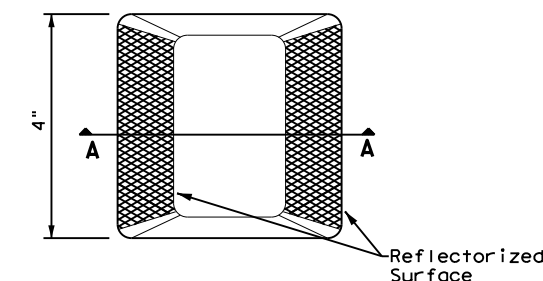
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

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

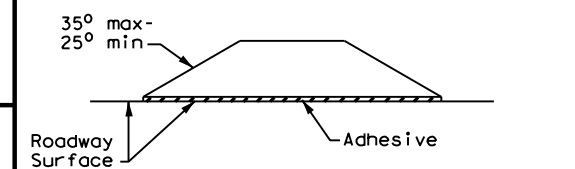
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

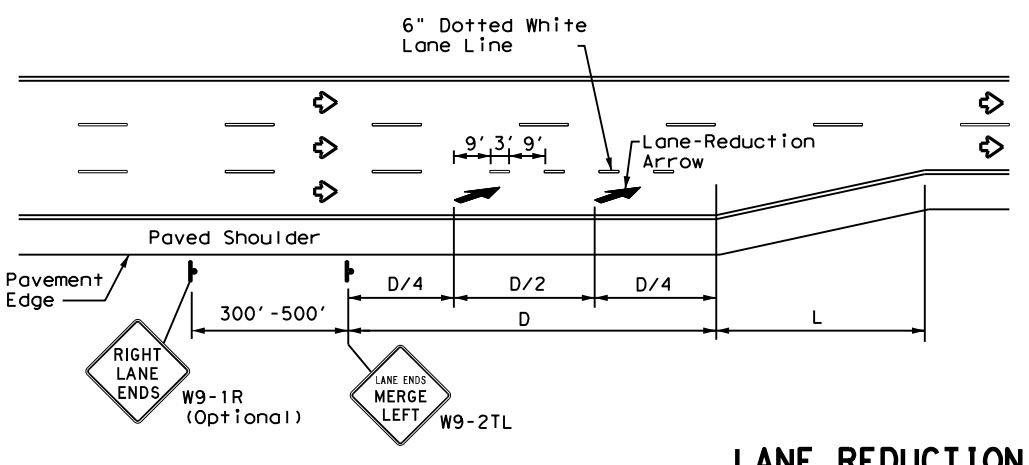


**POSITION GUIDANCE USING
RAISED MARKERS
REFLECTORIZED PROFILE
MARKINGS
PM(2) - 22**

FILE: pm2-22.dgn	DW: December 2022	CK: 0988	DW: 01	CK: 025	CK: FM 623
REVISIONS		CONT	SECT	JOB	HIGHWAY
4-77	8-00	6-20	0988	01	025
4-92	2-10	12-22	DIST	COUNTY	SHEET NO.
5-00	2-12		CRP	BEE	87

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DATE: 7/31/2024 10:32:50 PM
 FILE: \\txdot.projectwiseonline.com:TXDOT4\Documents\16 - CRP\Design Projects\09280902.dwg



LANE REDUCTION

NOTES

- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
- Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

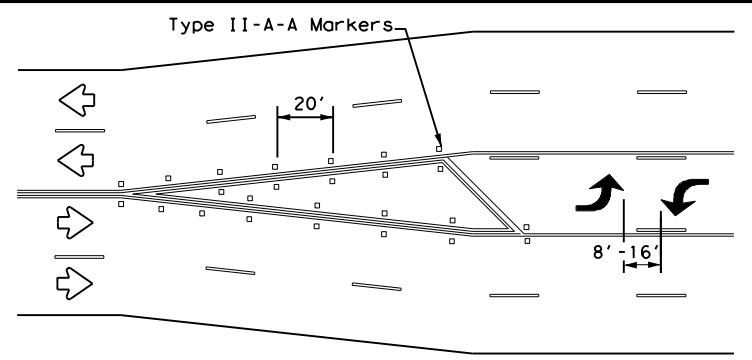
Posted Speed	D (ft)	L (ft)
30 MPH	460	L = WS ² / 60
35 MPH	565	
40 MPH	670	L = WS
45 MPH	775	
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
- Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
- Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

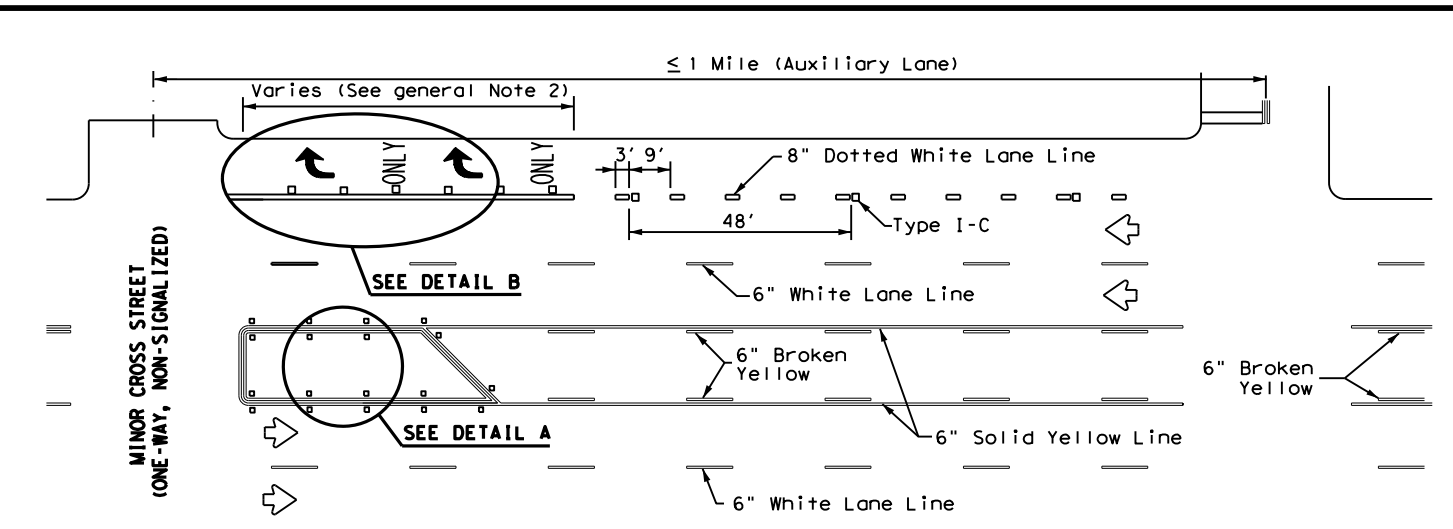
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

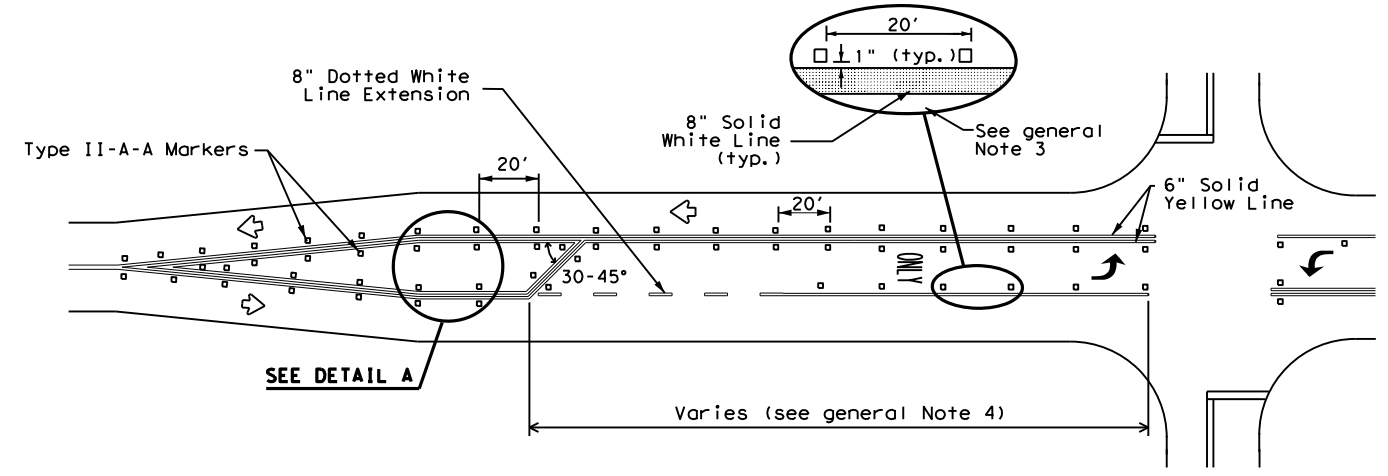


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

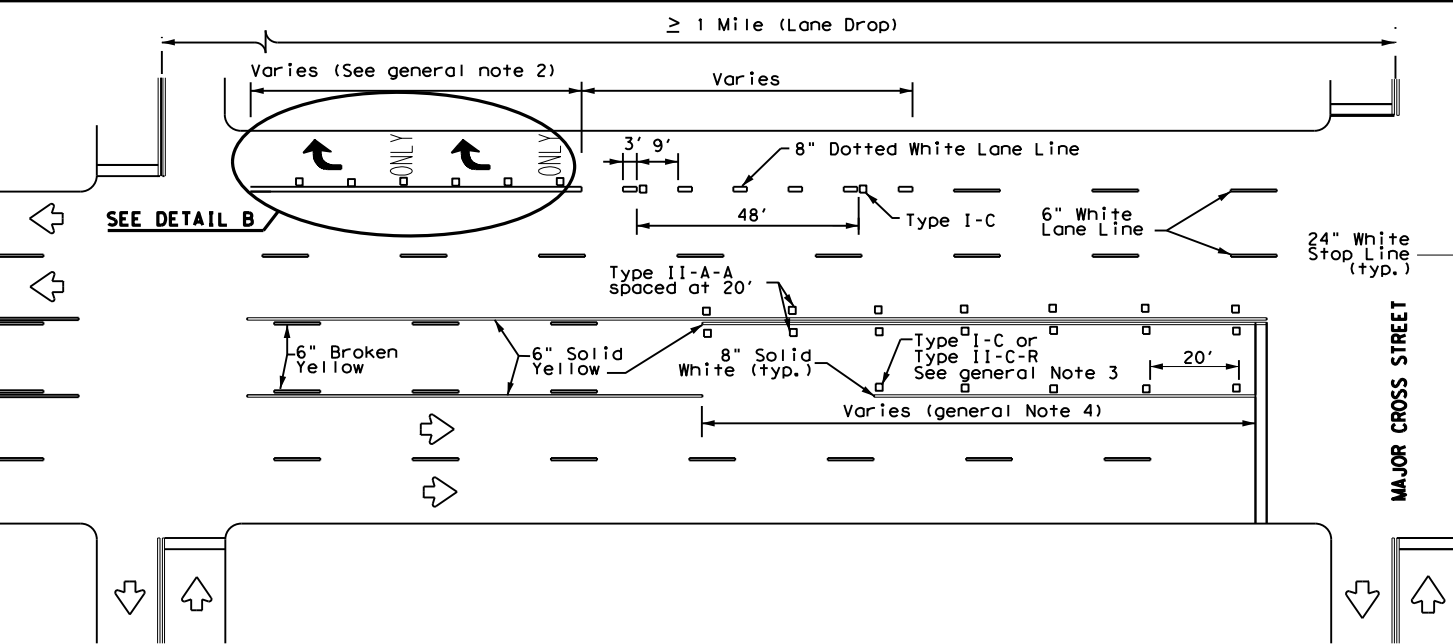
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



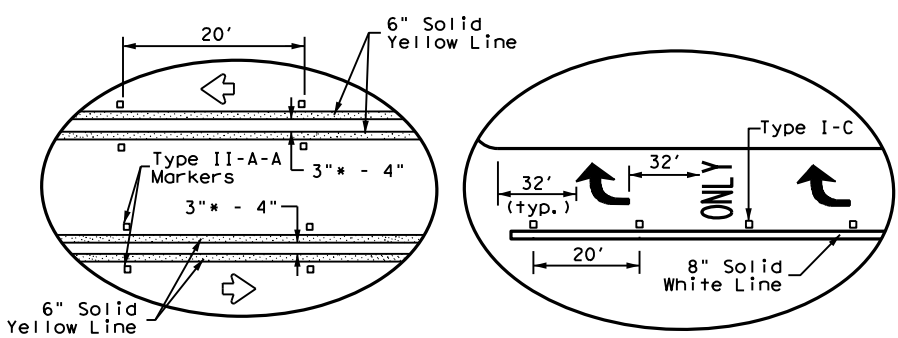
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



DETAIL A

DETAIL B

* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
4-98 3-03 6-20	DIST	COUNTY		SHEET NO.
5-00 2-10 12-22	CRP	BEE		88
8-00 2-12				

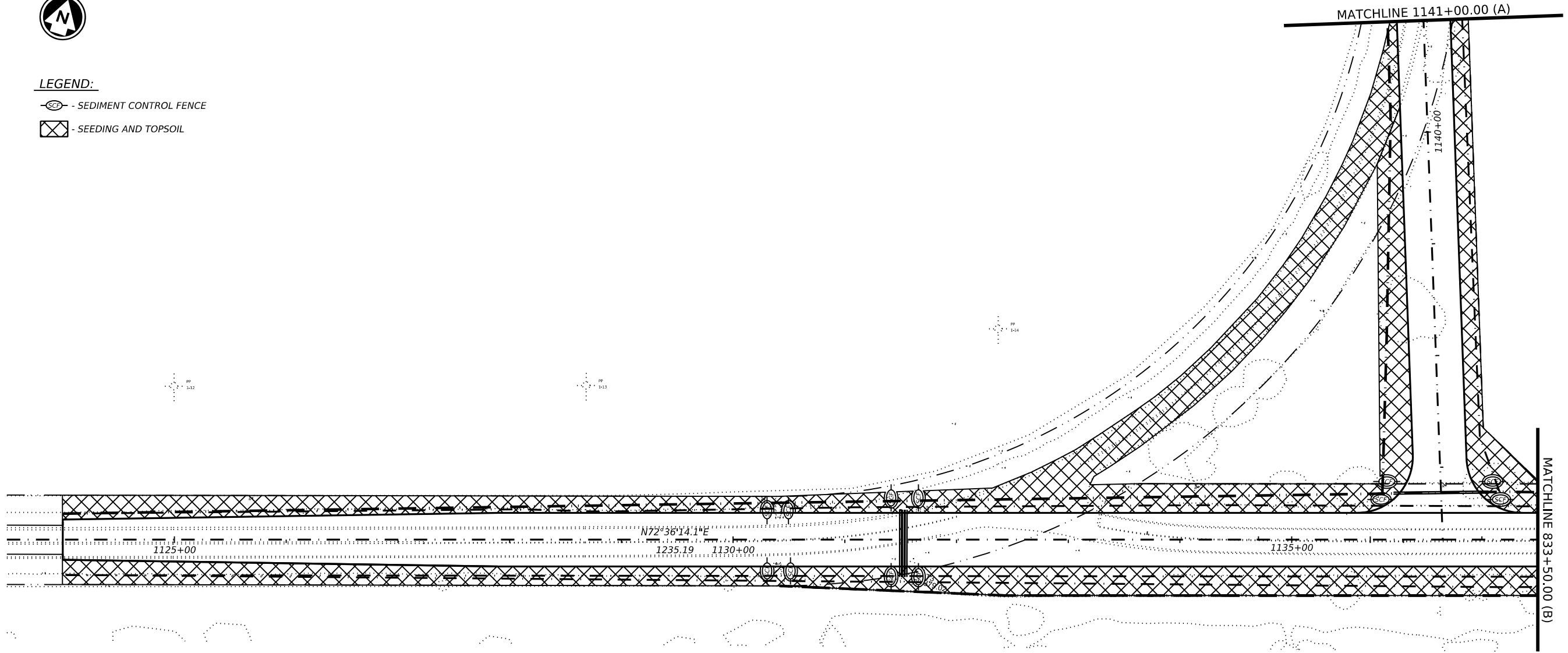
22C

DATE: 8/1/2024 7:35:57 PM
 FILE: pw://txdot.projectwiseonline.com:TXDOT4/Documents/16 - CRP/Design Projects/098801025/4 - Design/Plan Set/9 - Environmental/SW3P LAYOUT SHEETS



LEGEND:

- SEDIMENT CONTROL FENCE
- SEEDING AND TOPSOIL



Victoria L Hernandez, P.E.

08/01/2024



FM 623
 SW3P LAYOUT
 SHEETS

2024 SHEET 1 OF 2

NOTE: SEDIMENT CONTROL FENCE IN DITCHES SHALL BE APPROX. 20' IN LENGTH.

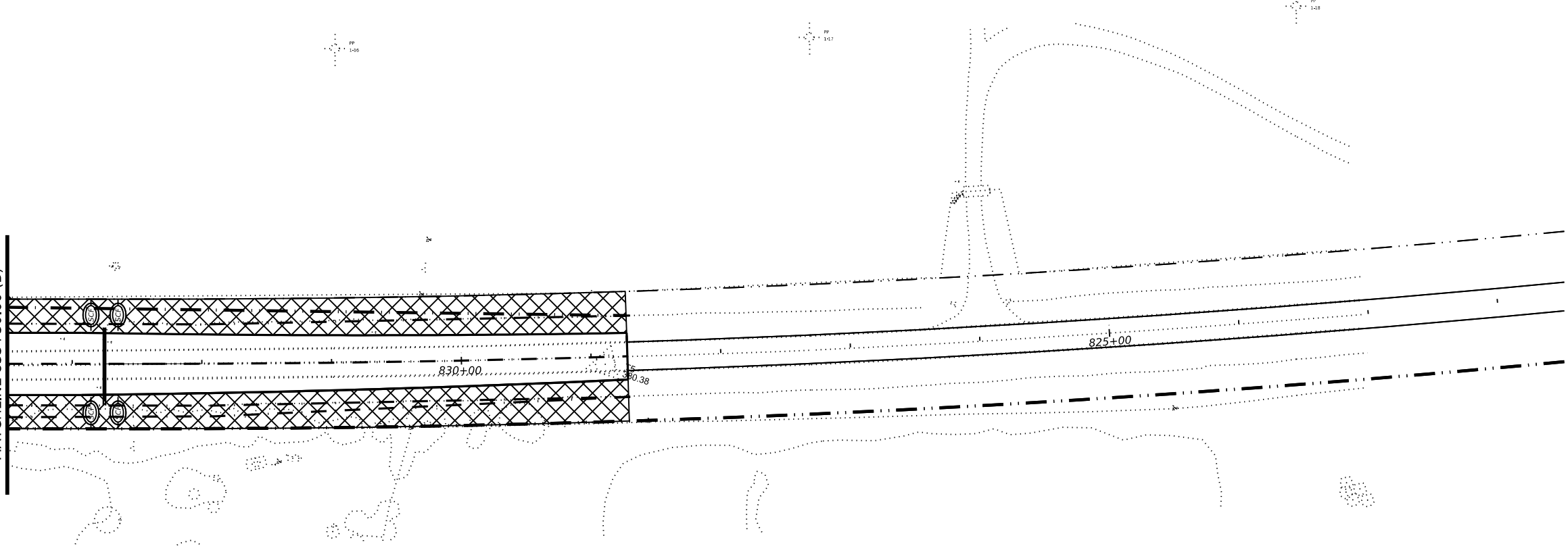
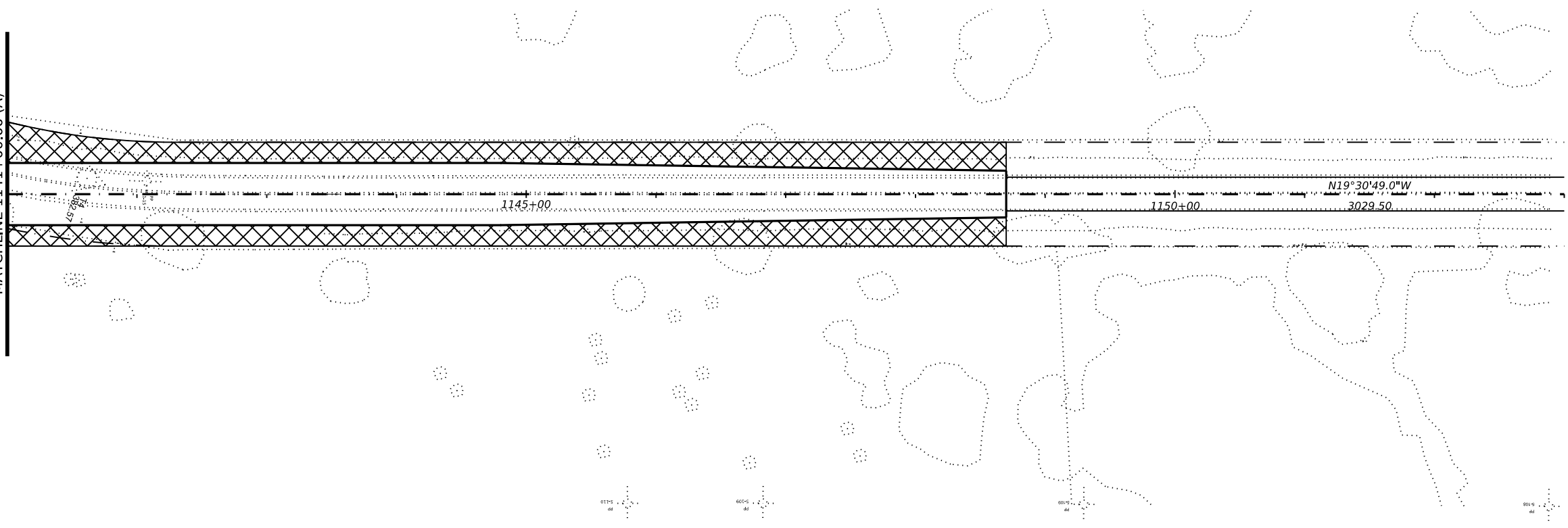
CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST		COUNTY	SHEET NO.
CRP		BEE	89

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DW: CK: DW: CK: CK:

MATCHLINE 1141+00.00 (A)

MATCHLINE 833+50.00 (B)



- LEGEND:**
- SCT- - SEDIMENT CONTROL FENCE
 - ▨ SEEDING AND TOPSOIL



Victoria L Hernandez, P.E.

08/01/2024



FM 623
SW3P LAYOUT
SHEETS

2024 SHEET 2 OF 2

NOTE: SEDIMENT CONTROL FENCE IN DITCHES SHALL BE APPROX. 20' IN LENGTH.

CONT	SECT	JOB	HIGHWAY
0988	01	025	FM 623
DIST		COUNTY	SHEET NO.
CRP		BEE	90

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with soil disturbing activity and for projects that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0988-01-025

1.2 PROJECT LIMITS:

From:0.5 MILES NORTH OF FM883

To:0.5 MILES SOUTH OF FM883

1.3 PROJECT COORDINATES:

BEGIN: (Lat)28.6366709 (N) ,(Long)-97.7744830 (W)

END: (Lat)28.6440758 (N) ,(Long)-97.7733539 (W)

1.4 TOTAL PROJECT AREA (Acres): 7.36

1.5 TOTAL AREA TO BE DISTURBED (Acres): 7.36

1.6 NATURE OF CONSTRUCTION ACTIVITY:

WIDENING & REALIGNING OF EXIST. FM ROAD TO ADD RIGHT & LEFT TURN BAYS CONSISTING OF GRADING, BASE, STRUCT., SURFACING, SIGNING, & PAVEMENT MARKINGS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
WEESATCHE SANDY CLAY LOAM 1 TO 3 PERCENT SLOPES	AREA COMPOSED OF 51 PERCENT
PARRITA-OLMOS 0 ASSOCIATION 1 TO 8 PERCENT SLOPES	AREA COMPOSED OF 34 PERCENT
WEESATCHE FINE SANDY LOAM 1 TO 3 PERCENT SLOPES	AREA COMPOSED OF 15 PERCENT

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- PSLs determined during preconstruction meeting
- PSLs determined during construction
- No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

- Mobilization
- Install sediment and erosion controls
- Blade existing topsoil into windrows, prep ROW, clear and grub
- Remove existing pavement
- Grading operations, excavation, and embankment
- Excavate and prepare subgrade for proposed pavement widening
- Remove existing culverts, safety end treatments (SETs)
- Remove existing metal beam guard fence (MBGF), bridge rail
- Install proposed pavement per plans
- Install culverts, culvert extensions, SETs
- Install mow strip, MBGF, bridge rail
- Place flex base
- Rework slopes, grade ditches
- Blade windrowed material back across slopes
- Revegetation of unpaved areas
- Achieve site stabilization and remove sediment and erosion control measures
- Other: _____
- Other: _____
- Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- Sediment laden stormwater from stormwater conveyance over disturbed area
- Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- Solvents, paints, adhesives, etc. from various construction activities
- Transported soils from offsite vehicle tracking
- Construction debris and waste from various construction activities
- Contaminated water from excavation or dewatering pump-out water
- Sanitary waste from onsite restroom facilities
- Trash from various construction activities/receptacles
- Long-term stockpiles of material and waste
- Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities.

- Other: _____
- Other: _____
- Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
Blanco Creek (2002C)	Mission River Above Tidal (2002)

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- Development of plans and specifications
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years
- Other: _____
- Other: _____
- Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- Day To Day Operational Control
- Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
- Post Construction Site Notice
- Submit NOI/CSN to local MS4
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Complete and submit Notice of Termination to TCEQ
- Maintain SWP3 records for 3 years
- Other: _____
- Other: _____
- Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity
N/A

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				91
STATE	STATE DIST.	COUNTY		
TEXAS	CRP	BEE		
CONT.	SECT.	JOB	HIGHWAY NO.	
0988	01	025	FM 623	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- Protection of Existing Vegetation
- Vegetated Buffer Zones
- Soil Retention Blankets
- Geotextiles
- Mulching/ Hydromulching
- Soil Surface Treatments
- Temporary Seeding
- Permanent Planting, Sodding or Seeding
- Biodegradable Erosion Control Logs
- Rock Filter Dams/ Rock Check Dams
- Vertical Tracking
- Interceptor Swale
- Riprap
- Diversion Dike
- Temporary Pipe Slope Drain
- Embankment for Erosion Control
- Paved Flumes
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- Biodegradable Erosion Control Logs
- Dewatering Controls
- Inlet Protection
- Rock Filter Dams/ Rock Check Dams
- Sandbag Berms
- Sediment Control Fence
- Stabilized Construction Exit
- Floating Turbidity Barrier
- Vegetated Buffer Zones
- Vegetated Filter Strips
- Other: _____
- Other: _____
- Other: _____
- Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- Sediment Trap
 - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
 - 3,600 cubic feet of storage per acre drained
- Sedimentation Basin
 - Not required (<10 acres disturbed)
 - Required (>10 acres) and implemented.
 - Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
 - 3,600 cubic feet of storage per acre drained
 - Required (>10 acres), but not feasible due to:
 - Available area/Site geometry
 - Site slope/Drainage patterns
 - Site soils/Geotechnical factors
 - Public safety
 - Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
	<i>PROJECT LIMITS</i>	

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- Excess dirt/mud on road removed daily
- Haul roads dampened for dust control
- Loaded haul trucks to be covered with tarpaulin
- Stabilized construction exit
- Daily street sweeping
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- Chemical Management
- Concrete and Materials Waste Management
- Debris and Trash Management
- Dust Control
- Sanitary Facilities
- Other: _____
- Other: _____
- Other: _____
- Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- Fire hydrant flushings
- Irrigation drainage
- Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- Potable water sources
- Springs
- Uncontaminated groundwater
- Water used to wash vehicles or control dust
- Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				92
STATE	STATE DIST.	COUNTY		
TEXAS	CRP	BEE		
CONT.	SECT.	JOB	HIGHWAY NO.	
0988	01	025	FM 623	

DATE: 7/31/2024
 FILE: p:\w\txdot.projectwiseonline.com:TXDOT4\Documents\16 - CRP/Design Projects\098801025\4 - Design\Plan Set\9. Environmental\ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

-
- No Action Required Required Action

Action No.

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

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

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

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

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

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

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

- No Action Required Required Action

Action No.

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-

IV. VEGETATION RESOURCES

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

- No Action Required Required Action

Action No.

- Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided to the greatest extent practicable.
-
-
-

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

- No Action Required Required Action

Action No.

- SEE SHEET 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 immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

Contact the Engineer if any of the following are detected:

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

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

- Yes No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

- Yes No

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

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

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

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

- No Action Required Required Action

Action No.

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VII. OTHER ENVIRONMENTAL ISSUES

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

- No Action Required Required Action

Action No.

-
-
-

 Texas Department of Transportation		Design Division Standard		
<h2>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS</h2> <h1>EPIC</h1>				
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	0988	01	025	FM 623
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	CRP	BEE	93	

DATE: 7/31/2024
 FILE: pwt//txdot.projectwiseonline.com:TXDOT4/Documents/16 - CRP/Design Projects/098801025/4 - Design/Plan Set/9. Environmental/ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS-2.dgn
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Amphibians

1. Be advised of the potential occurrence of the black-spotted newt in the project area. This species prefers warm shallow watered areas with vegetative cover such as arroyos, canals, ditches, or even shallow depressions. During dry seasons, the newt lays dormant underground. Ensure that SW3P and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
2. Be advised of the potential occurrence of sheep frog in the project area. This species prefers subterranean burrows, such as those of pack rats. They will also burrow under fallen tree limbs. Although this species will remain in its burrow for most of the year, they may emerge with heavy rains in the late summer season. Breeding takes place in August and September. Minimize disturbance to downed woody debris. Ensure that SW3P and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
3. Be advised of the potential occurrence of South Texas siren in the project area. This species prefers warm shallow waters with vegetative cover such as ponds, ditches, and swamps. This is a nocturnal species that burrows during the day. Ensure that SWPPP and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
4. Be advised of the potential occurrence of the Strecker's chorus frog in the project area. This species prefers sandy substrates and can be found in wooded floodplains and flats, prairies, cultivated fields and marshes. Ensure that SW3P and 401 BMPs are implemented and maintained during construction. Avoid harming this species if encountered.
5. Minimize impacts to wetland, temporary and permanent open water features, including depressions, and riverine habitats. Maintain hydrologic regime and connections between wetlands and other aquatic features. 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.
6. Consider applying 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.
7. Project Specific Locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features. 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, crawfish burrows), where feasible. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter, which may be refugia for terrestrial amphibians, where feasible.

Birds

8. The Federal Migratory Bird Treaty Act (MBTA) states that it is unlawful to pursue, hunt, take, 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. This project does not have a federal permit; therefore, in accordance with this regulation, the Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, etc. Typical breeding season occurs from March through August; therefore, tree trimming and other vegetation clearing activities that may disturb breeding birds should be done in the non-breeding season (September-February), when possible. If work must be performed during the breeding season, the Contractor shall have a qualified biologist conduct a survey of the right of way to determine if bird nests are present. In the event that active nests are encountered on-site during construction, the Contractor shall notify the Engineer and measures shall be taken to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the MBTA. Phasing of work during construction may be necessary to stay in compliance with the MBTA. The Contractor can discuss other preventative measures with the Project Engineer and/or District Environmental Staff.
9. 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. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

Insects

1. Be advised of the potential occurrence of Monarch Butterfly in the project area. This species can inhabit a variety of habitats including native prairies, pastures, open woodlands and savannas, desert scrub, roadsides, and other habitats with abundant nectar plants, including urbanized areas. Although adults may be present year-round, they are primarily observed between March and November (Caterpillars; April and September). Common host plants in Texas are milkweeds, milkweed vines, climbing milkweed, swallowworts, and Angledod.

Reptiles


11. Be advised of the potential occurrence of slender glass lizard in the project area. This species prefers sandy soil and relatively dry microhabitats, usually associated with grassy areas such as open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, areas near streams and ponds and roadways. Avoid harming this species if encountered.
12. Due to the increased activity (mating) of reptiles during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (April - May) season. It is also encouraged to conduct ground disturbing activities before October to prevent disturbing reptiles that become less active and may be using burrows in the project area.
13. 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, utilize erosion control blankets or mats that contain no netting or contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.
14. If reptiles are found on project site allow species to safely leave the project area. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.
15. Minimize the use of equipment in streams and riparian areas during construction. When possible, equipment access should be from banks, bridge decks, or barges. When temporary stream crossings are unavoidable, remove stream crossing once they are no longer needed and stabilize banks and soil around the crossings.
16. Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.

Plants

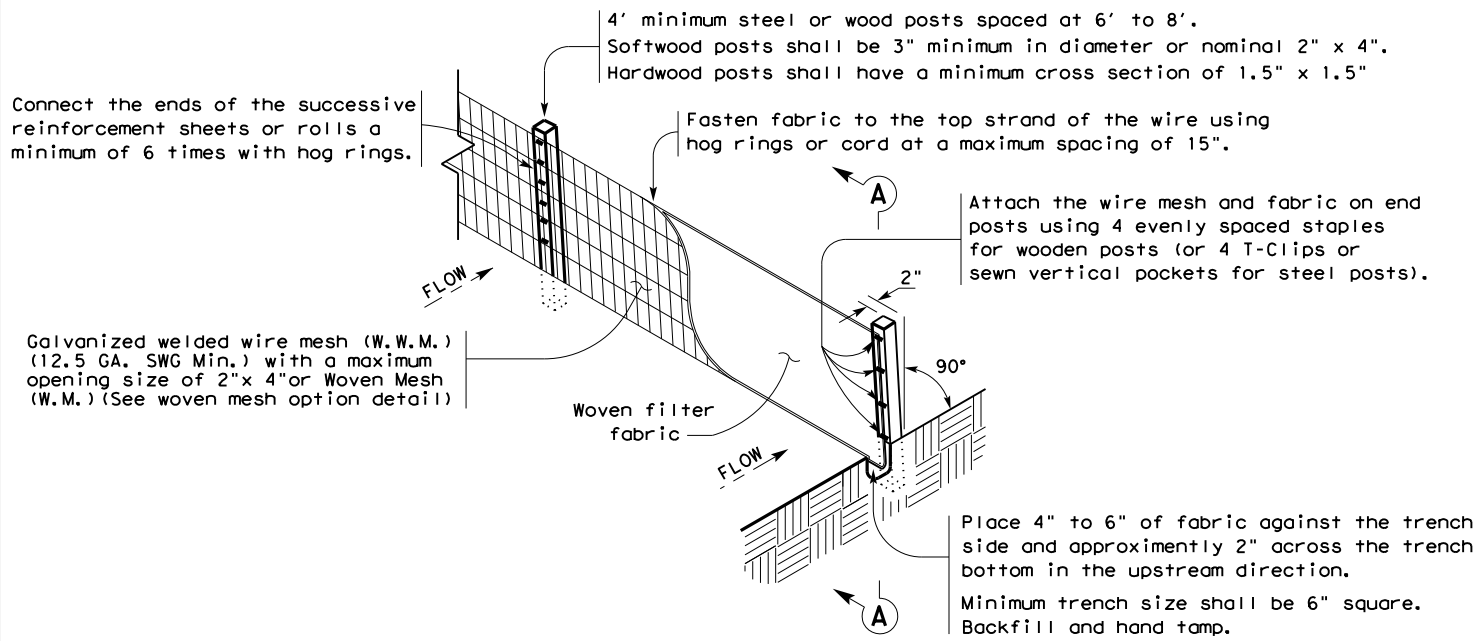
17. Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided to the greatest extent practicable. Wherever practicable, impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation. The use of seed mix that contains seeds from only locally adapted native species is recommended.
18. Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse impacts to birds.

Other

19. Do not attempt to handle or catch any of these species. Report all sightings and/or impacts to the TxDOT-Corpus Christ District Environmental Section.

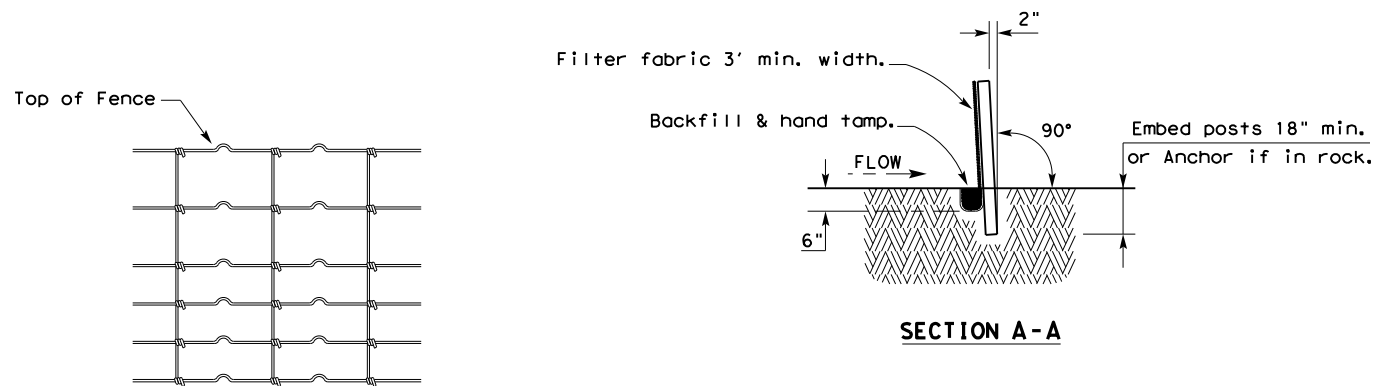
 Texas Department of Transportation		Design Division Standard		
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC				
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	0988	01	025	FM 623
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	CRP	BEE		94

7/25/2024
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TEMPORARY SEDIMENT CONTROL FENCE

SCF



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/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

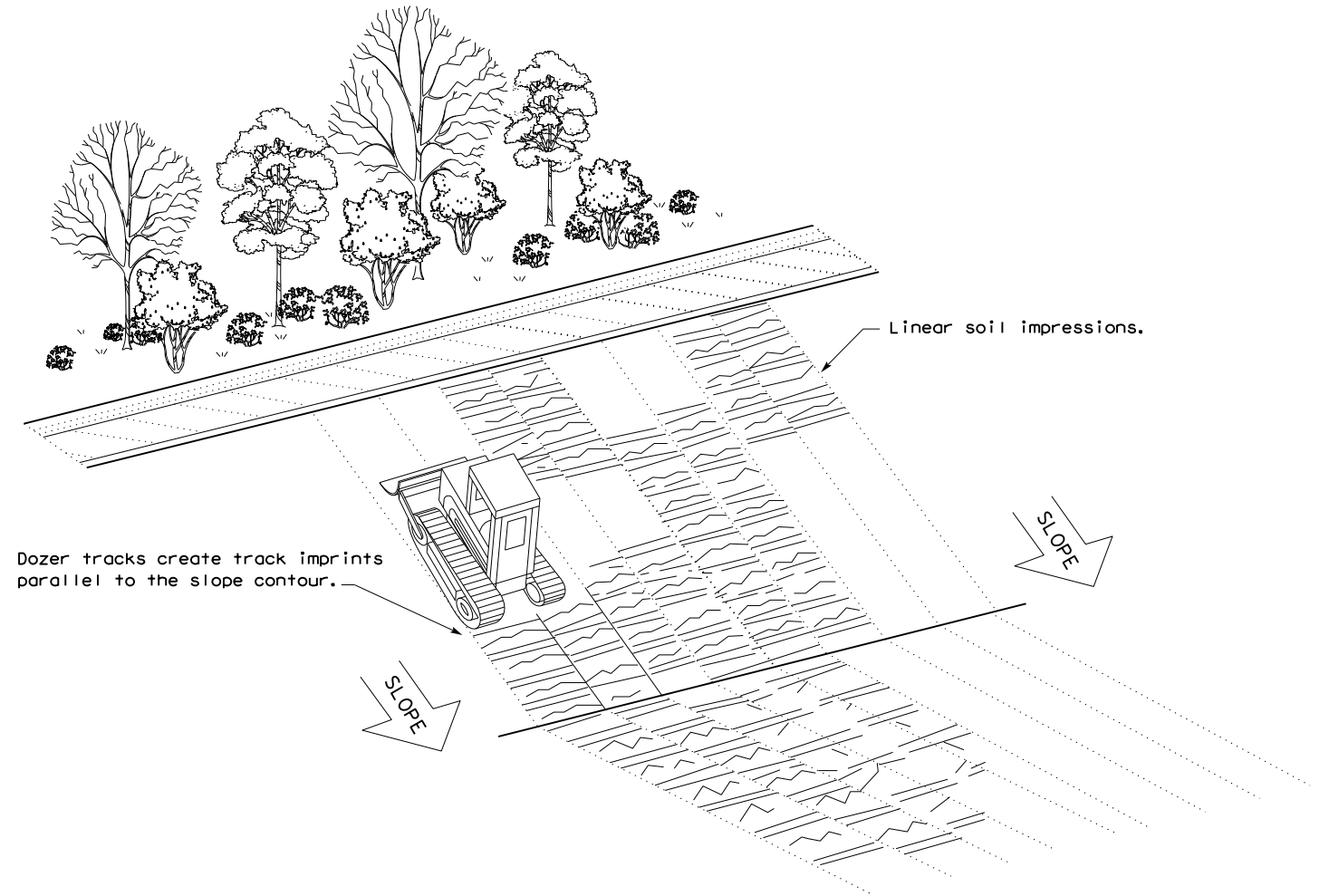
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

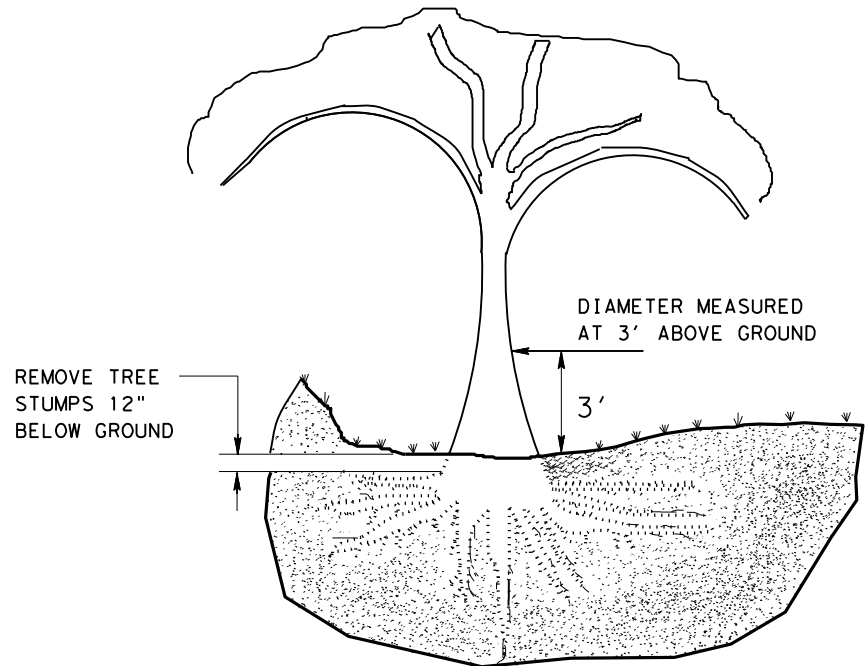
1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum 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 continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

				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	0988	01	025	FM 623	
	DIST	COUNTY		SHEET NO.	
	CRP	BEE		95	

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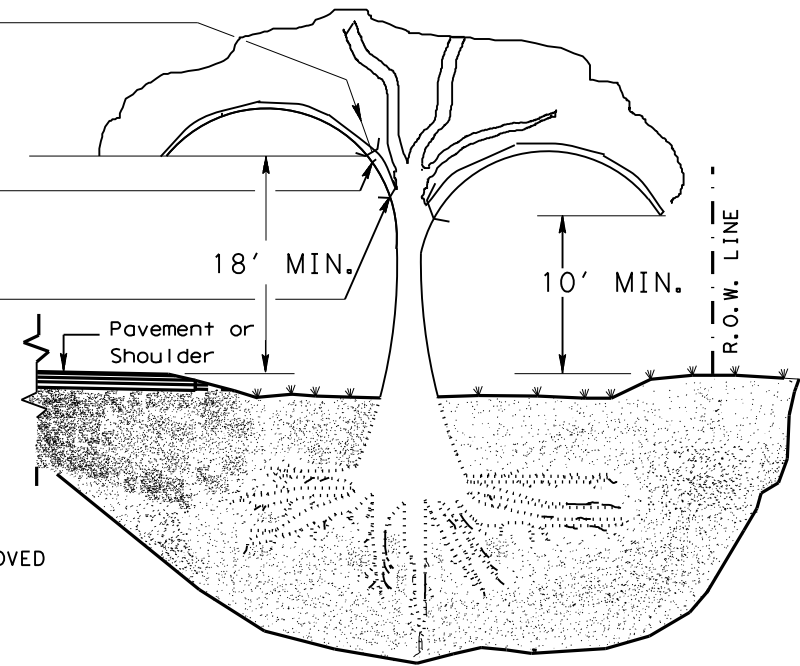
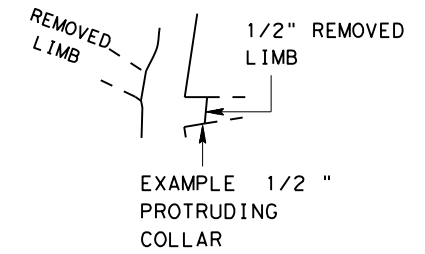


TREE REMOVAL

STEP 1:
 CUT 1/3 WAY THROUGH BOTTOM OF LIMB 8" TO 12" ABOVE MAIN STEM (OR TRUNK).

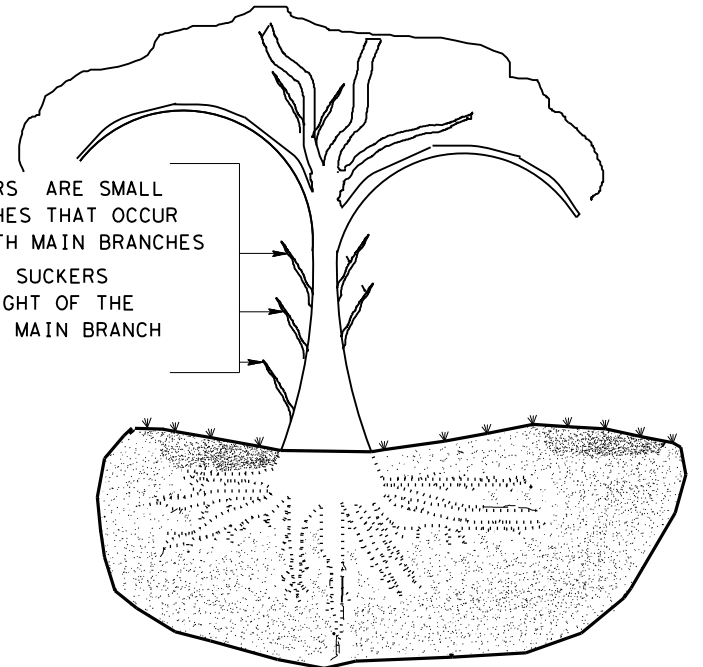
STEP 2:
 REMOVE LIMB 4" TO 6" BEYOND THE FIRST CUT

STEP 3:
 REMOVE STUB WITH A SMOOTH CUT SO THAT TRACE COLLAR OF THE REMOVED LIMB PROTRUDES APPROXIMATELY 1/2" FROM THE MAIN STEM

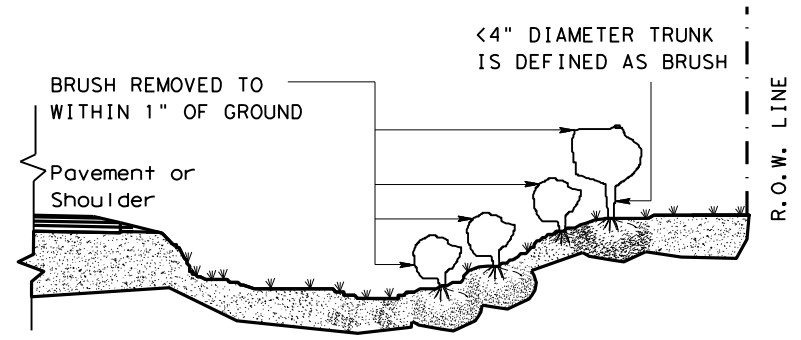


TREE TRIMMING

SUCKERS ARE SMALL BRANCHES THAT OCCUR BENEATH MAIN BRANCHES. REMOVE SUCKERS TO HEIGHT OF THE LOWEST MAIN BRANCH



STEPS 1, 2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL

GENERAL NOTES:

TREE TRIMMING

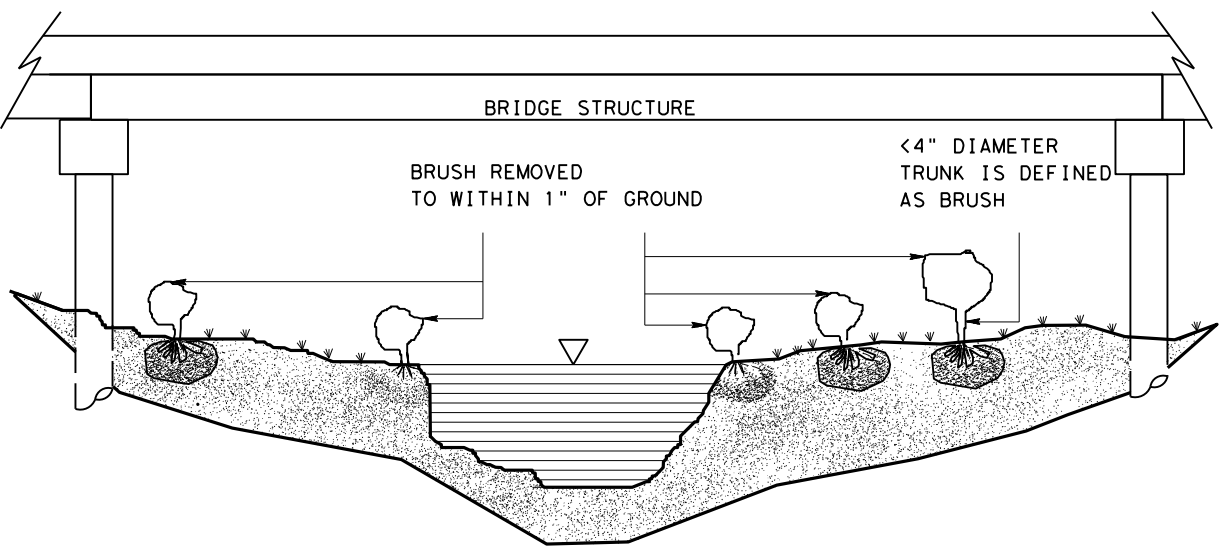
1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.
2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE 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.



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

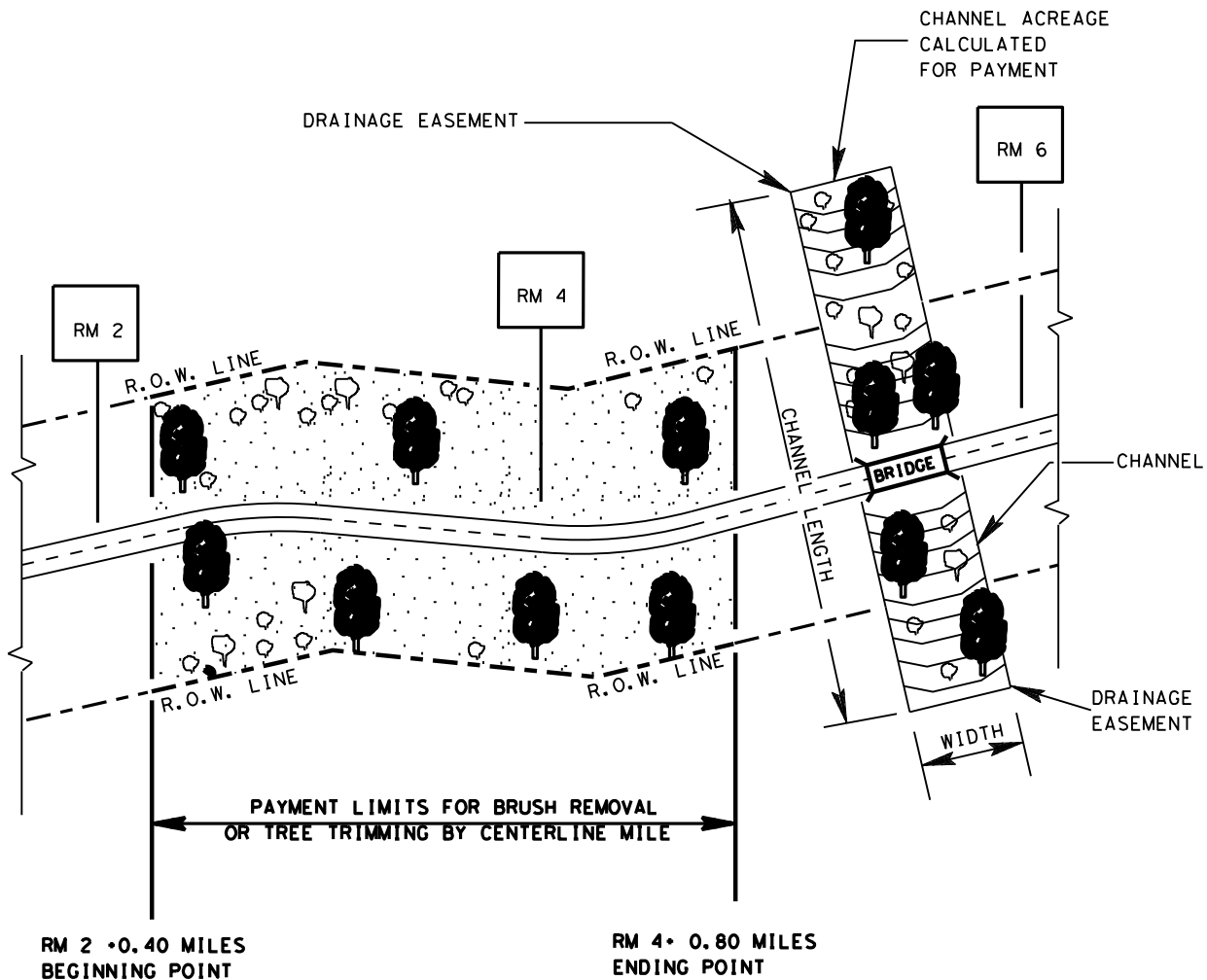
Maintenance Division Standard

TREE AND BRUSH REMOVAL

TRB-15(1)

FILE:	DW: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0988	01	025	FM 623
Revised table 1 to 2014 Specification	DIST	COUNTY	SHEET NO.	
CRP	BEE		96	

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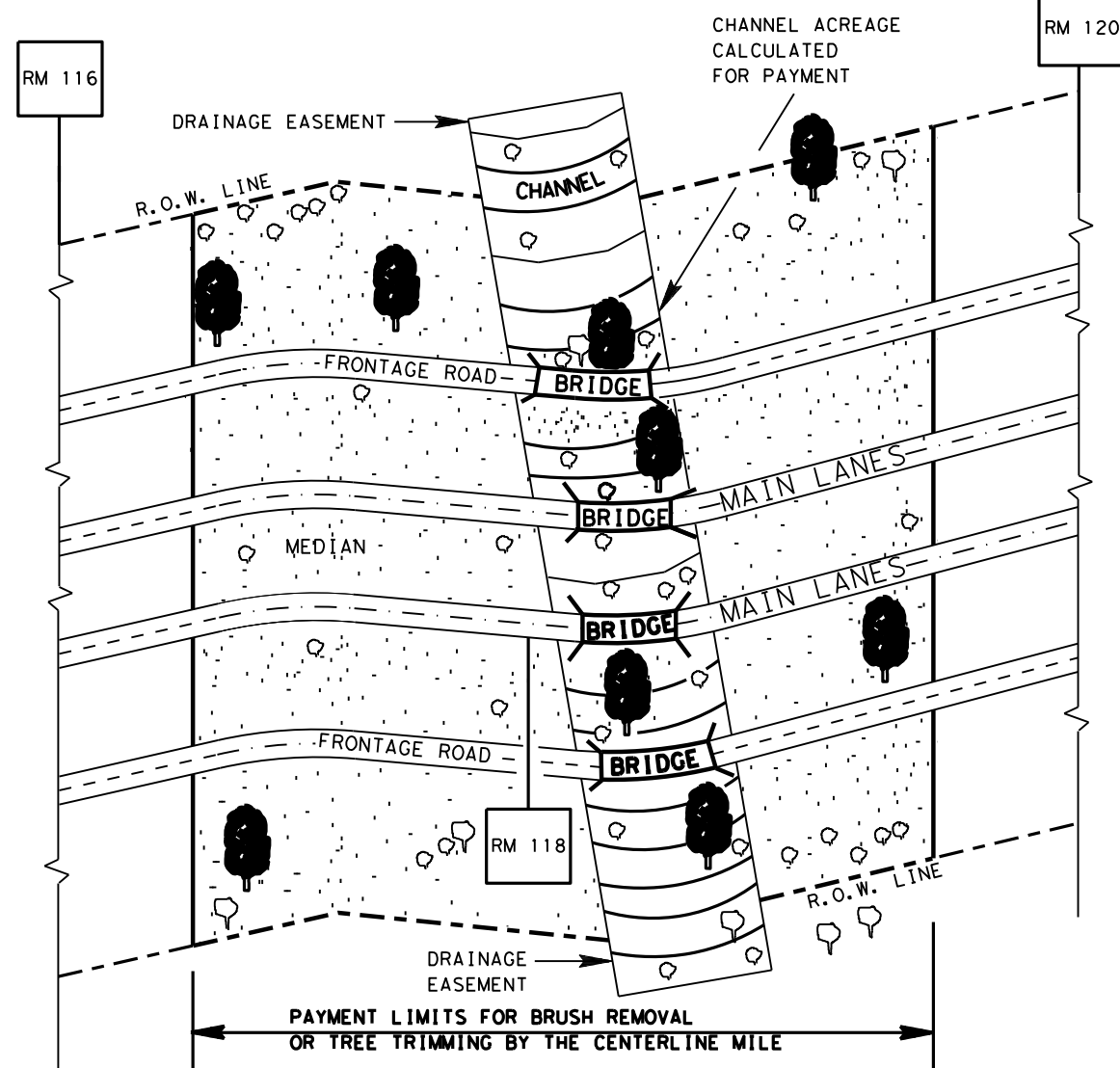


RM 2 + 0.40 MILES
 BEGINNING POINT

RM 4 + 0.80 MILES
 ENDING POINT

BRUSH REMOVED TO
 WITHIN 1" OF GROUND
 <4" DIAMETER TRUNK
 IS DEFINED AS BRUSH
 UNLESS OTHERWISE DIRECTED

EXAMPLE: UNDIVIDED HIGHWAY



RM 116 + 0.40 MILES
 BEGINNING POINT

RM 118 + 1.50 MILES
 ENDING POINT

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

- PAYMENT BY THE CENTERLINE MILE IS MADE TO THE NEAREST 1/100 (0.01) MILE.
- LIMITS OF WORK ARE SHOWN AS DISTANCES FROM REFERENCE MARKERS (RM).
- 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.
- 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

FILE: TRB-15(2).DGN	DRAWN: JEO	CHECKED: DM/LJB	DW: -	CK: -	NEG NO.:
© TxDOT APRIL 2015	MODIFIED:	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
REVISED: 5/13/2004	LJB	CRP			97
REVISED: 9/24/2004	LJB		COUNTY	CONTROL SECTION JOB	HIGHWAY
REVISED: APRIL 2015	JEO	BEE	0988	01 025	FM 623