

DATE: 11/1/2023 4:17:26 PM
 FILE: dw://twdot.projectwiseonline.com:1xd015/Documents/19 - ATL/Design Projects/021803094/4 - ATL/Design/Master Design Files/SETH'S FILES/001 TITLE SHEET

COUNTY: CASS
 PROJ. NO.: C 218-3-94
 HWY. NO.: US 59
 LETTING DATE: 01/04/2024
 DATE ACCEPTED: _____

INDEX OF SHEETS

SEE SHEET NO 2

**STATE OF TEXAS
 DEPARTMENT OF TRANSPORTATION**

**PLANS OF PROPOSED
 STATE HIGHWAY IMPROVEMENT**

STATE AID PROJECT NO. C 218-3-94

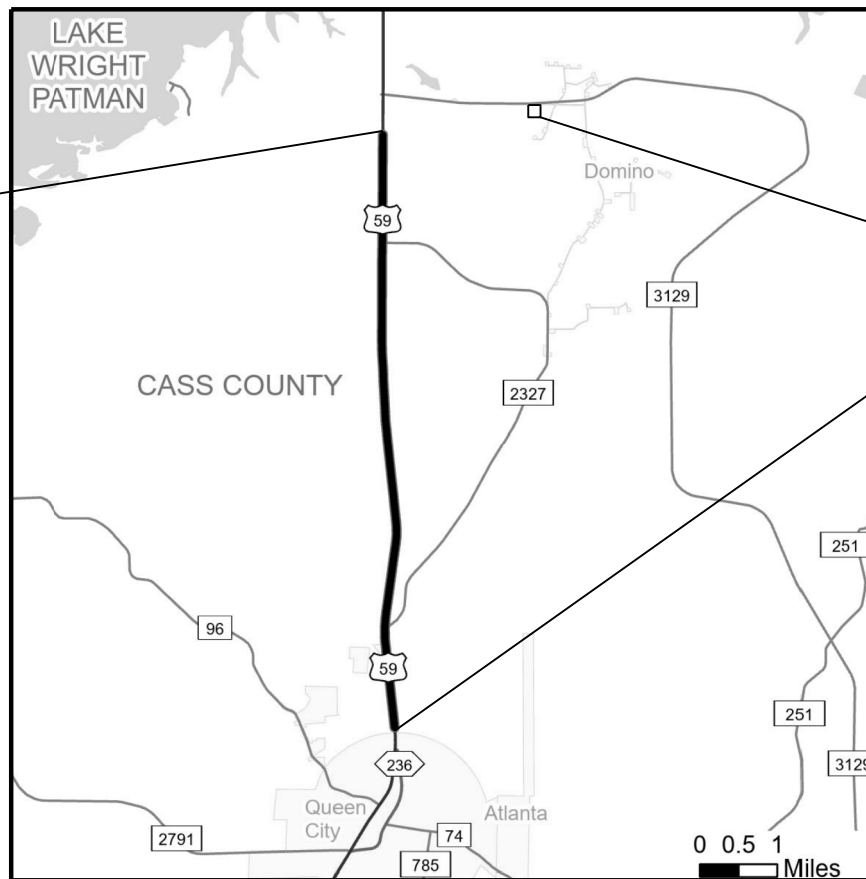
**US 59 (SB)
 CASS COUNTY**

NET LENGTH OF PROJECT= 33,299.29FT. 6.307 MI.
 LIMITS: 0.2 MI N OF SL 236 (SOUTHBOUND ONLY)
 TO 0.5 MI S OF FM 3129

FOR THE REHABILITATION OF THE EXISTING FOUR LANE ROADWAY
 CONSISTING OF PLANING, ACP SURFACE, SHOULDER TEXTURING, AND PAVEMENT MARKINGS

THE CONTRACTOR SHALL MAKE HIS OWN INVESTIGATIONS AND ARRANGEMENTS FOR DELIVERY OF MATERIALS.

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH THE CURRENT BARRICADE AND CONSTRUCTION OR BC SHEETS AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".



END PROJECT
 CSJ: 0218-03-094
 STA: 521+15
 REF MRK: 226+1.409

STOCK PILE
 APPROX. 2.10 MILES
 EAST FROM US 59
 (SOUTH)

BEGIN PROJECT
 CSJ: 0218-03-094
 STA: 187+00
 REF MRK: 232+1.731

EQUATIONS: STA. 252+72.04 (BK) = 252+79.67 (FWD) (-7.63')
 STA. 305+89.95 (BK) = 306+89.10 (FWD) (-99.15')
 STA. 412+80.77 (BK) = 412+82.50 (FWD) (-11.73')
 STA. 462+02.80 (BK) = 462+00.00 (FWD) (+2.80')

EXCEPTIONS: NONE
 RAILROAD CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS. (FORM FHWA 1273, OCTOBER 23, 2023)

STATE PROJECT NO.			
C 218-3-94			
CONT	SECT	JOB	HIGHWAY
0218	03	094	US 59
DIST	COUNTY		SHEET NO.
ATL	CASS		1

DESIGN SPEED = 60 MPH
 A.D.T. (2022)= 15,742
 A.D.T. (2042)= 20,150

FINAL PLANS

LETTING DATE: _____
 DATE CONTRACTOR BEGAN WORK: _____
 DATE WORK WAS COMPLETED & ACCEPTED: _____
 FINAL CONTRACT COST: \$ _____
 CONTRACTOR : _____
 CONTRACTOR ADDRESS: _____
 LIST OF APPROVED FIELD CHANGES: _____

THE CONSTRUCTION WORK WAS PERFORMED IN SUBSTANTIAL COMPLIANCE WITH THE CONTRACT.

 P. E. _____
 DATE



RECOMMENDED FOR LETTING: 11/2/2023

DocuSigned by:
 [Signature]
 3B337C5031074A4...

DISTRICT DIRECTOR OF TRANSPORTATION
 PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 11/2/2023

DocuSigned by:
 [Signature]
 23686C08B28F4A0
 DISTRICT ENGINEER

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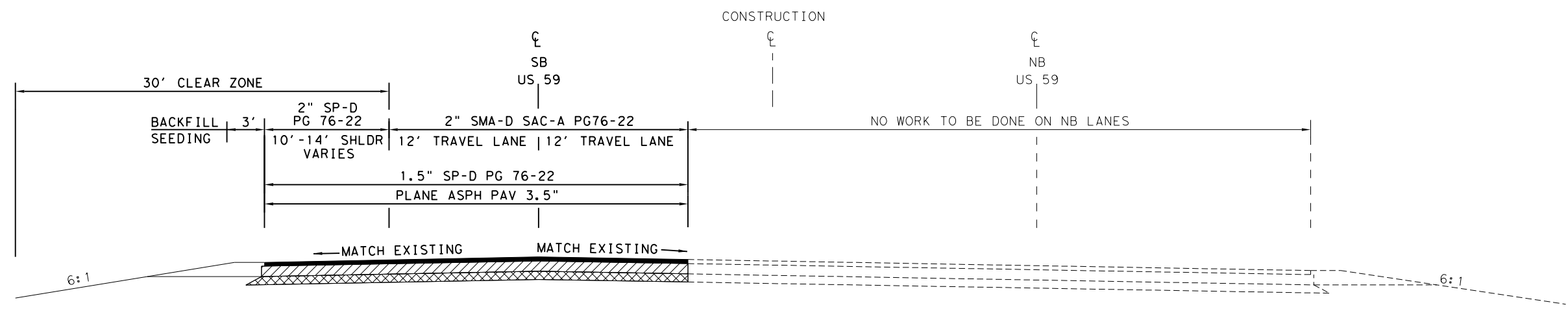
10-31-23

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

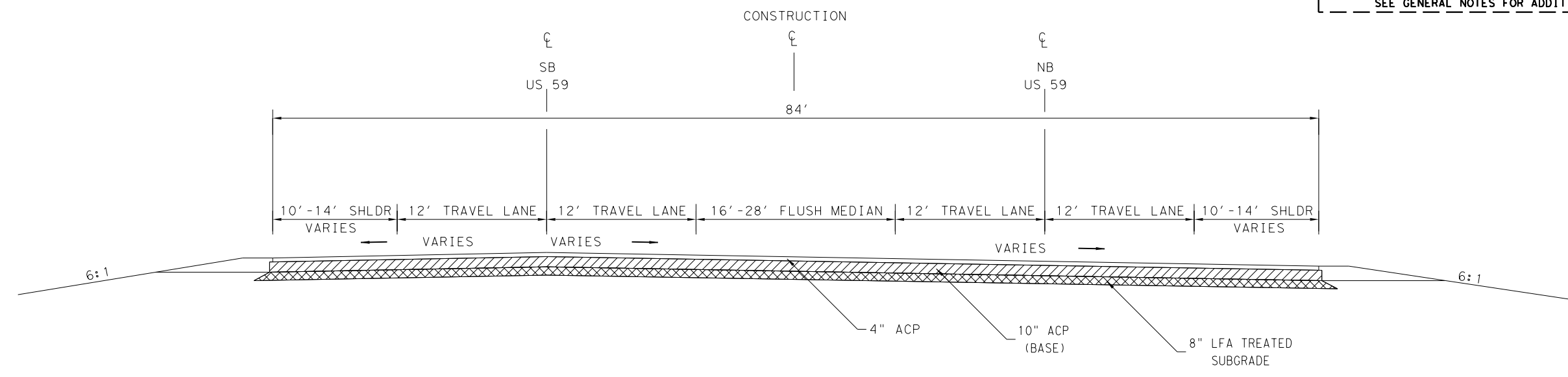
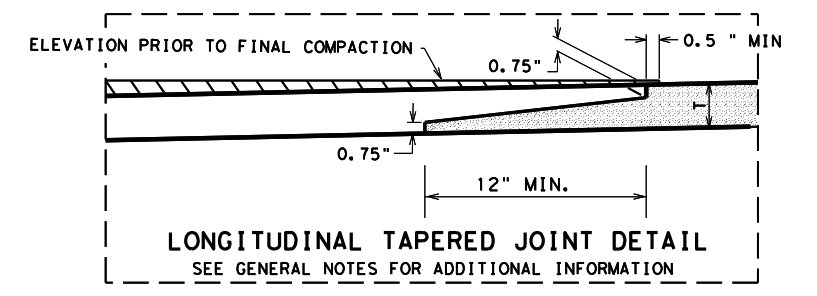
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<small>©2024 Texas Department of Transportation</small>			
FHWA TEXAS DIVISION	STATE PROJECT NO. C 218-3-94	SHEET NO. 2	
STATE TEXAS	DISTRICT ATL	COUNTY CASS	
CONTROL 0218	SECTION 03	JOB 094	HIGHWAY NO. US 59

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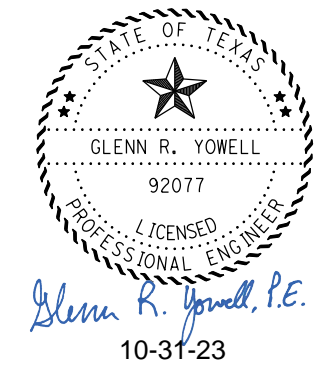


②
 PROPOSED SECTION
 STA. 187+00 TO 240+50



①
 EXISTING SECTION
 STA. 187+00 TO 240+50

TYPICAL SECTIONS

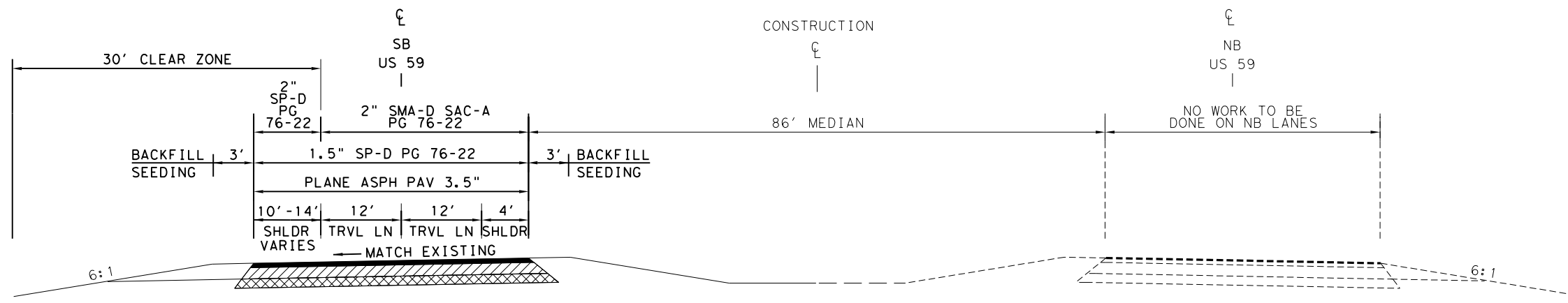


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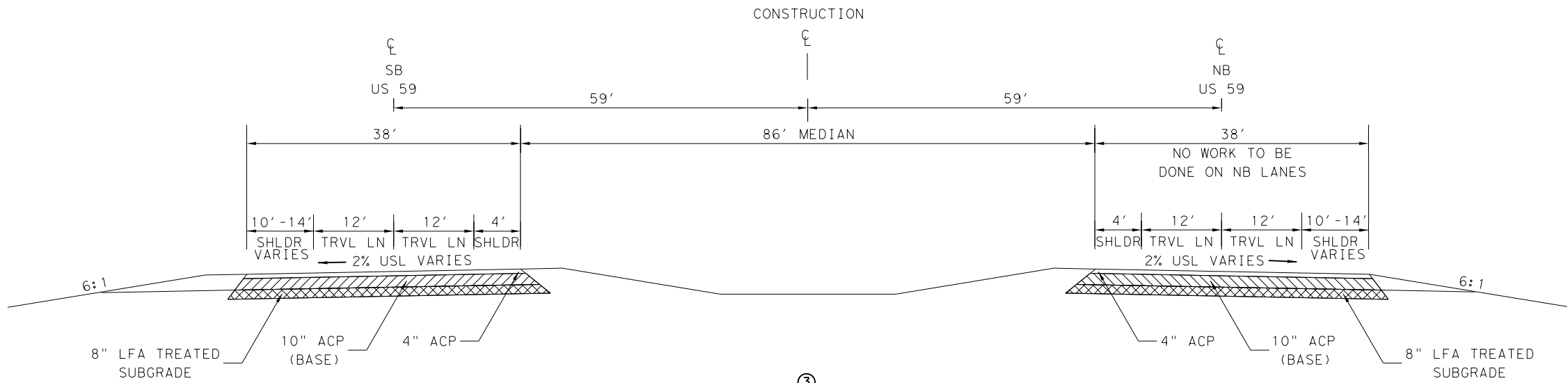
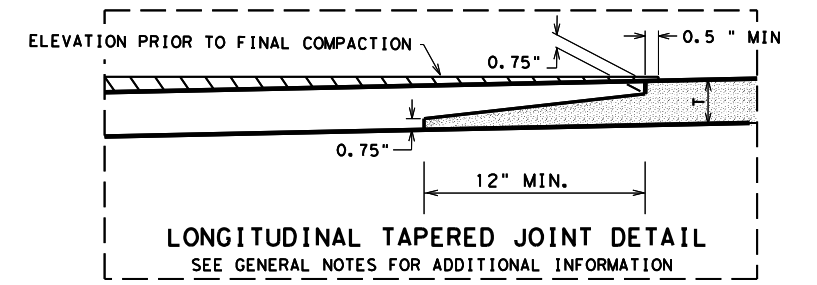
SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
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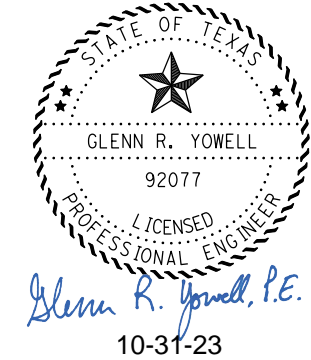
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 FILE: pw://ttdot.projectwiseonline.com:txdot15/Documents/19 - ATL/Design Projects/021803094/4 - Design/Master Design Files/01 PLANSHEETS/DGN FILES/SECTIONAL FILES/03 TYPICAL SECTIONS



④
 PROPOSED SECTION
 STA. 240+50 TO STA. 521+15



③
 EXISTING SECTION
 STA. 240+50 TO STA. 521+15



10-31-23

TYPICAL SECTIONS

SHEET 2 OF 2

		CONT	SECT	JOB	HIGHWAY
		0218	03	094	US 59
		DIST	COUNTY	SHEET NO.	
		ATL	CASS	4	

NOT TO SCALE

GENERAL NOTES:

General Requirements and Covenants:

Contractor questions on this project are to be addressed to the following individuals:

Tommy Bruce – Area Engineer

Tommy.Bruce@Txdot.gov

Dana Moore – Assistant Area Engineer

Dana.Moore@Txdot.gov

Questions may 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?%26>

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.

All roadside signs, mailbox supports, delineators, and object markers located within the project limits shall be plumbed as part of the final cleanup. This work will not be paid for separately but will be considered subsidiary to the various bid items.

ITEM 2

This project will use A+B bidding.

ITEM 5 – Control of the Work:

Place construction points, stakes, and marks at intervals of no more than 100 ft., or as directed. Place stakes and marks so as not to interfere with normal maintenance operations.

It is the contractor's responsibility to verify the accuracy of any department provided control points prior to use.

ITEM 6 - Control of Material:

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

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

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

ITEM 7 – Legal Relations and Responsibilities:

This project is considered a maintenance activity and is exempt from the Construction General Permit (CGP) coverage.

The Contractor will not remove active nests from bridges and other structures during nesting season of the birds associated with the nests.

Transmit copies of correspondence between Contractor and resource agencies as listed in Article 7.7 "Preservation of Cultural and Natural Resources and the Environment".

RAP material generated may be used for ingress and egress to drives and intersections or construction exits. When removed, stockpile this material separately from other RAP material.

No significant traffic generator events.

ITEM 8 – Prosecution and Progress:

Working days will be charged in accordance with Section 8.3.1.4 "Standard Workweek".

Road user cost will be \$20,440 per day for substantial completion of the project. 66 days will be the maximum number of days and 51 days will be the minimum number of days that will be accepted as a responsive bid for substantial completion.

8 days will be allowed for backfill pavement edges, seeding and clean up before final acceptance of the project after substantial completion.

Substantial completion of the project is defined as when all traffic is in its final configuration on the final surface with final pavement markings, metal beam guard fence and mow strip have been placed.

The max sum for incentive payment is \$306,600 or 15 days for early substantial completion of the project.

ITEM 100 – Preparing Right of Way:

Do not burn trash, debris, etc. within the City limits without prior written city approval.

ITEM 132 – Embankment:

Remove deleterious material, organic matter, and sediment, etc., from all ponds, lakes, sloughs, channels, and existing roadway ditches prior to placement of embankment. This work will be subsidiary to this item.

ITEM 164 – Seeding for Erosion Control:

PERMANENT PLANTING MIXTURE

Species and Rates
(lb. PLS/ac.)

(Season: February 1 to May 15)

Green Sprangletop	0.4
Bermudagrass	2.4
Sand Lovegrass	1.0
Lance-Leaf Coreopsis	1.25

(Season: September 1 to November 30)

Bermuda (Unhulled)	12
Crimson Clover	10

TEMPORARY SEEDING FOR EROSION CONTROL

Warm Season
(Season: May 15 to August 31)

Bermudagrass	6
Foxtail Millet	34

Cool Season
(Season: September 1 to November 30)

Tall Fescue	4.5
Oats	24
Wheat	34

Adjust the seeding mixture and rates if directed.

Inoculate crimson clover seed with a legume inoculant. Sow inoculated seed dry, with either hand operated or mechanical equipment, after the fertilizer is placed.

Do not use Bahia grass.

Use broadcast seeding for temporary erosion control, when and as directed. This will not be paid for directly but is subsidiary to the various bid items.

Use additional temporary seeding if permanent seeding is placed outside the optimum growing season shown for this item, if directed.

Finish slopes with a tracked vehicle running vertically up and down the slope.

Mow tall growing vegetation as directed, to provide optimum growing conditions for temporary or permanent seeded areas in accordance with Item 730 "Roadside Mowing" except for measurement and payment. This work will be subsidiary to pertinent bid items.

ITEM 166 - Fertilizer:

When seeding between September 1 and January 1, place one-half of the amount of fertilizer specified for seeding with the seeds and place the remainder the following spring unless otherwise directed. When seeding is placed between January 1 and June 1, place one-half the amount of fertilizer specified for seeding with the seeds and place the remainder 30 days later unless otherwise directed.

Apply fertilizer (13-13-13) at a rate of 300 lbs. /5000 sq. yds.

ITEM 301 – Asphalt Antistripping Agents:

Add hydrated lime to the aggregate by the following method only: mix in an approved pug mill mixer with damp aggregate containing water at least 2% above saturated surface dry conditions.

ITEM 320 – Equipment for Asphalt Concrete Pavement:

Provide a Material Transfer Device (MTD) with remixing capability.

Construct longitudinal joints so that the hot side overlaps the cold side by 0.5 inch minimum at the joint.

ITEM 354 – Planning and Texturing Pavement:

The Department shall retain ownership of material removed under this Item unless otherwise shown in the plans.

Stockpile planed ACP at the following location: FM 3129 Approx. 2.10 miles East of US 59 (South) on the Southeast side of the RR Overpass.

Latitude: 33°15'42.70"N; Longitude: 94° 7'0.00"W

Beginning with the final lift of embankment, measure the cross slope during pavement structure operations, at the completion of each land, and prior to covering with another course or lift to ensure that the cross slope is uniform and in compliance with the cross slope shown in the plans. Measure the cross slope at a minimum frequency of one measurement every 100 feet. The number of measurements may be reduced by demonstrating consistently acceptable results, with the approval of the Engineer. Furnish a digital measuring device approved by the Engineer for the measurement of cross slope. Make this measuring device available at the jobsite for the Engineer's use. Report the cross slope to the nearest 0.1%. Record all measurements on an approved form signed and dated certifying correct and submit to the Engineer the next working day for documentation. The Engineer will determine the number of verification measurements.

ITEM 356 – Fabric Underseal:

Apply PG 64-22 grade of asphalt. Apply asphalt binder at a rate of 0.2 gal/sy.

ITEM 432 - Riprap:

Provide ½” expansion joint material with an area equal to the area of contact between the two concrete surfaces. The joint material will be visually inspected for approval.

ITEM 502 – Barricades, Signs, and Traffic Handling:

No flexible pavement repairs to remain open overnight.

The distance that the planning operation is ahead of the ACP laydown operation may be adjusted by the engineer.

Restrict the movement of equipment across traffic lanes to an absolute minimum.

Use “TRAFFIC CONTROL PLAN (DEPRESSED MEDIAN)” for depressed median section and “TRAFFIC CONTROL PLAN (FLUSH MEDIAN)” for the flush median section for the planing, flexible pavement repair and placement of the surface.

Lane closures shall be limited to one direction of travel.

Construct crossovers in a manner that will cause a minimum disturbance to the traveling public, as approved by the engineer.

Maintain access to all intersecting roadways and driveways using methods and materials as approved by the engineer.

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 planing 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.

Install temporary rumble strips in accordance with WZ(RS) wherever short duration or short-term stationary lane closures are in place and workers are present.

The Contractor's responsible person (CRP) will be responsible for ensuring that the signs and traffic control devices are in place and functioning properly.

The CRP will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Notify the Engineer in writing of the name, address, and telephone number of this employee or these employees.

Use strobe lights or rotating beacons on all motorized equipment, operating on or adjacent to the road surface.

Place and maintain U.S. mailboxes within project limits in such a manner as to ensure continuous mail service. See BC Standard for more information.

passing and failing sections of roadway. The color-coded map should match the color-coded graphs generated by the data in the computer. The graphs should have a color-coded portion or shaded area representing failing and passing. The map should be standard Google earth maps or equal. Reports need to be in numerical order by reference number, concurrent with direction, labeled and separated by color, and include the posting date. The format will require prior acceptance by the Engineer.

Record the location of “passing” and “no passing” zones before beginning roadway work to re-establish these zones in their original location. Provide a copy of the record to the Engineer.

Place Type I pavement markings thirty days after the placement of the Type II pavement markings has been completed.

ITEM 677 – Eliminating Existing Pavement Markings and Markers:

Furnish a high-pressure water blasting system for removing paint, thermoplastic, epoxy, and preformed tape materials from the following surfaces without causing any grooves or trenching of that surface, including asphalt, concrete, friction coarse asphalt, grooved asphalt, and grooved concrete.

Use a high-pressure water blasting system that consist of a vacuum recovery system that must provide for a nearly dry surface eliminating the possibility of uncontained run-off blasting water and debris.

All components required for the complete operation of the water blasting system – Ultra High Pressure (UHP) pump, vacuum system, clean water supply, vacuum recovery storage, blasting components will be mounted and transported on a single, fully self-contained and supporting truck chassis, thereby eliminating the need for any additional water, vacuum, or other transport vehicles.

ITEM 3077 - Superpave Mixtures:

Use field sand with a sand equivalent value of at least 35 when sampled and tested in accordance with Tex-203-F.

The plant is the designated aggregate sampling location, unless otherwise approved by the Engineer.

Construct longitudinal joints in the surface course as shown in the plans. Construct longitudinal joints in all other courses by tapering the bituminous mat as shown in the plans or providing a 6-inch minimum offset from lift to lift. Extend the tapered portion of the mat beyond the normal

lane width. Construct the tapered portion of the mat using an approved strike-off device that will provide a uniform slope and will not restrict the main screed. Apply tack coat to the in-place taper before the adjacent mat is placed. Final density requirements for the entire pavement, including the taper area will not change. Compaction of the initial taper section will be required to be as near to final density as possible. Use a small static roller (approximately 200 lbs.) located immediately behind the paver for pre-compaction of the notched wedge joint.

Construct longitudinal joints so that the hot side overlaps the cold side by 0.5 inch minimum at the joint.

Furnish clean 5-gallon plastic buckets with lids and wire handles for sampling, transporting, and shipping aggregate and base to the District Lab.

For hot-mix items, in place of typical tack material shown in Table 18 under Item 300, use a tracking resistant asphalt interlayer (TRAIL) material as a tack coat. Approved TRAIL products are found on TxDOT’s Material Producer List under Asphalt Interlayer (Tracking Resistant) through <http://www.txdot.gov/business/resources/materials.html>.

There should be little to no evidence of tracking or pickup of the tack coat on the wheels of the equipment as determined by the Engineer. Use approved release agents or misters on equipment tires as necessary.

ITEM 3080 – Stone-Mix Asphalt:

Furnish clean 5-gallon plastic buckets with lids and wire handles for sampling, transporting, and shipping aggregate and base to the District Lab.

The Plant is the designated aggregate sampling location, unless otherwise approved by the Engineer.

Construct longitudinal joints in the surface course as shown in the plans. Construct longitudinal joints in all other courses by tapering the bituminous mat as shown in the plans or providing a 6 in. minimum offset from lift to lift. Extend the tapered portion of the mat beyond the normal lane width. Construct the tapered portion of the mat using an approved strike-off device that will provide a uniform slope and will not restrict the main screed. Apply tack coat to the in-place taper before the adjacent mat is placed. Final density requirements for the entire pavement, including the taper area will not change. Compaction of the initial taper section will be required to be as near to final density as possible. Use a small static roller (approximately 200 lbs) located immediately behind the paver for pre-compaction of the notched wedge joint.

ITEM 540 – Metal Beam Guard Fence:

Furnish round timber posts unless otherwise shown.

Place sufficient dry batch concrete mix in holes to ensure minimum of 2-inch embedment of tubes and posts.

ITEM 544 – Guardrail End Treatments:

Place sufficient dry batch concrete mix in holes to ensure minimum of 2-inch embedment of tubes and posts.

ITEM 585 – Ride Quality for Pavement Surfaces:

Use surface test Type B pay adjustment schedule 1 to evaluate ride quality of the travel lanes in accordance with this Item.

Before placing the final lift of ACP, profile the roadway for approval or corrective action if necessary, at no cost to the Department.

ITEM 636 - Signs:

Ensure the location and details of the fabrication, assembly and erection of the aluminum signs are in accordance with the details shown on the plans.

Transport signs in such a manner as to not damage the high intensity reflective sheeting. Carry signs in a standing position within a divider rack assembly.

ITEM 644 – Small Roadside Sign Assemblies:

Type A signs will be made of flat aluminum.

Existing sign assemblies will be removed after the proposed sign is installed. Contractor will leave existing sign in place while proposed sign goes up. The existing sign will be removed immediately after the proposed sign is installed.

For this project, the standard triangular slip base two bolt casting will be used. This casting must be furnished from an approved manufacturer.

Erect the proposed signs an appropriate distance from adjacent signs in accordance with the Texas MUTCD, as directed and as shown on the plans.

Verify the elevation difference between the edge of the travel lane and bottom of the sign.

Do not remove existing sign assemblies until signs are ready to be installed on new mounts.

Sign assemblies associated with warning signs or stop or yield signs will require Omni - Directional Post Wrap. Retroreflective sheeting wrapped around a warning sign is yellow. Stop or Yield signs will require red sheeting. Retroreflective sheeting wrapped around a sign has a height on the post of at least 12 inches. The bottom of the retroreflective sheeting will be placed two feet below the bottom of the sign. The Engineer will approve the retroreflective sheeting wrap prior to any installation. This work will not be paid for separately; but will be subsidiary to this Item.

Flat aluminum signs removed on the project will remain property of the State. The signs are to be delivered to the nearest Atlanta District Maintenance office yard, coordinate delivery with the Engineer. Mounting hardware and supports will remain property of the contractor to dispose of in accordance with federal, state and local regulations. This work will not be paid for separately but will be subsidiary to this Item.

ITEM 658 – Delineator and Object Marker Assemblies:

Install only round posts meeting the requirements of DMS-4400 or as directed.

ITEM 662 – Work Zone Pavement Markings:

Non-removable pavement markings may be paint and beads.

ITEM 666 - Reflectorized Pavement Markings:

Furnish and place a double drop of Type II and Type III drop-on glass beads.

Place pavement markings only after the surface treatment has cured to the satisfaction of the Engineer.

Place pavement markings within 14 days after completion of the final surface.

Mark the lateral locations of pavement markings with pilot lines. Obtain approval of the location and alignment of the pilot lines before application of permanent markings.

A mobile unit will be required to take reflectivity readings, readings will be taken on all lines in both directions. The mobile reflectivity readings will not be paid for separately but will be subsidiary to this bid item. Strict compliance with report output will be exercised in accordance to this general note. Information for each road must be together in the same file and submitted on a USB thumb drive. Submit a table of contents for each USB thumb drive. Each thumb drive will contain a customer interactive report that generates a color-coded map where the user can verify

For hot-mix items, in place of typical tack material shown in Table 18 under Item 300, use a tracking resistant asphalt interlayer (TRAIL) material as a tack coat. Approved TRAIL products are found on TxDOT's Material Producer List under Asphalt Interlayer (Tracking Resistant) through <http://www.txdot.gov/business/resources/materials.html>.

There should be little to no evidence of tracking or pickup of the tack coat on the wheels of the equipment as determined by the Engineer. Use approved release agents or misters on equipment tires as necessary.

Construct longitudinal joints so that the hot side overlaps the cold side by 0.5 inch minimum at the joint.

The use of RAP and RAS is not permitted in any layers.

ITEM 6001 – Portable Changeable Message Sign:

Portable Changeable Message signs will be used on this contract. The Portable Changeable Message Signs will be used in advance of signal work where changing conditions may warrant the use of message boards. They may also be required at other locations as directed by the Engineer. The Engineer will provide the Contractor with the location and the messages to be displayed for each specific event. The Engineer or his representative will inspect each location once the Contractor has placed the message boards to verify that the placement and message is correct. The Contractor will change the message board location and modify the message being displayed as directed before leaving the location to the satisfaction of the Engineer or his representative. The Engineer will notify the Contractor when the Portable Changeable Message Signs are needed, and the Contractor will have the Portable Changeable Message Signs on location and fully operational in 5 working days. In cases of emergency the Contractor will have the Portable Changeable Message Signs on location and fully operational in 3 working days. Refer to traffic control plan sheets for typical temporary portable changeable message sign layout.

Item 6056 – Preformed In-Lane (Transverse)/Centerline Rumble Strips:

Supply all equipment and materials necessary for placement of In-Lane or Transverse Rumble Strips.

Use transverse rumble strips as centerline rumble strips and edge line rumble strips. The rumble strips will be black in color.

Place rumble strips as 12-inch segments centered on 4-foot spacings as shown on the In-Lane or Transverse Rumble Strip Details Sheet.

Ensure strict placement for centering and aligning all centerline transverse rumble strips. Placement of material will be strictly enforced. Irregular bars not centered or aligned properly will not be accepted.

Do not place pavement markings until rumble strips are accepted by written acceptance.

Provide a 90-day performance period that begins the day following written acceptance for each separate location. The written acceptance does not constitute final acceptance.

Replacement of all In-Lane or Transverse Rumble Strips within a separate location will be required when 30% loss of an individual rumble strips exists on 20% of the length of a location or when 500 mil thickness is not maintained. Visual evaluation will be used for these determinations. Upon request, the Engineer will allow a Contractor representative to accompany the Engineer on these evaluations.

Replace all In-Lane or Transverse Rumble Strips identified during the performance period within 30 days after notification. The end of the performance period does not relieve the Contractor from the performance deficiencies requiring corrective action identified during the performance period.

No additional payment will be made for replacement of In-Lane or Transverse Rumble Strips failing to meet the performance requirements.

Item 6148 – Inverted Profile Pavement Marking (Audible):

Use a crew experienced in the application of the Audible Reflective Pavement Markings, capable of placing the marking in neat straight lines, and in a safe and timely manner. Place the reflective pavement markings in such a manner as to match the existing markings in location, spacing and length. Placement of markings in proper alignment will be strictly enforced. Irregular lines placed on both sides of the existing markings will not be accepted.

Ensure that all equipment will be capable of maintaining a continuous work schedule to the satisfactory completion of the project. Make certain that equipment used for the contract will be equipped with footage counters capable of measuring the linear footage placed. Calibrate counters prior to the beginning of striping operations.

ITEM 6149 – All-Weather Thermoplastic Pavement Markings:

A mobile unit will be required to take reflectivity readings, readings will be taken on all lines in both directions. The mobile reflectivity readings will not be paid for separately but will be subsidiary to this bid item. Strict compliance with report output will be exercised in accordance to this general note. Information for each road must be together in the same file and submitted on a USB thumb drive. Submit a table of contents for each USB thumb drive. Each thumb drive will contain a customer interactive report that generates a color-coded map where the user can verify passing and failing sections of roadway. The color-coded map should match the color-coded graphs generated by the data in the computer. The graphs should have a color-coded portion or shaded area representing failing and passing. The map should be standard Google earth maps or equal. Reports need to be in numerical order by reference number, concurrent with direction,

labeled and separated by color, and include the posting date. The format will require prior acceptance by the Engineer.

Use a mobile retroreflectometer that is prequalified at the Texas A&M Transportation Institute test facility. The prequalification is at the contractor's expense.

The required values of wet and dry readings will be strictly measured within this contract as per manufacturer's recommendations.

Adjustments to locations of no passing zones will be determined by the Department.

Install a seal coat RPM cover or any other method approved on any line having Raised Pavement Markers. Remove and dispose of the covers after the stripe is complete.

Placement of markings in proper alignment will be strictly enforced. Irregular lines placed on both sides of the existing markings or pilot line will not be accepted.

ITEM 6185--Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA):

The shadow vehicle with truck mounted attenuator (TMA) will not be optional but will be required as shown on the appropriate traffic control plan sheets.

A total of one (1) shadow vehicle with TMA will be required for work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA's needed for the project.

A total of two (2) shadow vehicles with TMA will be required for Pavement Marking Operations.

**SPECIFICATION DATA
TEST TO BE IN ACCORDANCE WITH DEPARTMENT OF
TRANSPORTATION TEST METHODS**

ITEM	DESCRIPTION	GRADING REQUIREMENTS				SOIL CONSTANTS		
		PERCENT RETAINED - SIEVES				L.L.	P.I.	
		2-1/2"	1-3/4"	No. 4	No. 40		MAX.	MAX.
132	Embankment (Type C)					50	25	4



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0218-03-094

DISTRICT Atlanta
HIGHWAY US 59

COUNTY Cass

CONTROL SECTION JOB				0218-03-094		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00176661			
COUNTY				Cass			
HIGHWAY				US 59			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	222.500		222.500	
	104-6054	REMOVING CONCRETE(MOW STRIP)	LF	475.000		475.000	
	132-6021	EMBANKMENT (VEHICLE)(ORD COMP)(TY C)	CY	14.000		14.000	
	134-6002	BACKFILL (TY B)	STA	334.100		334.100	
	164-6054	BOND FBR MTRX SEED (PERM)(RURAL)(SAND)	SY	148,335.000		148,335.000	
	164-6071	BROADCAST SEED (TEMP)(WARM OR COOL)	SY	148,335.000		148,335.000	
	168-6001	VEGETATIVE WATERING	MG	4,746.700		4,746.700	
	351-6075	FLEX PAVEMENT STRUCTURE REPAIR (2"-4")	SY	2,000.000		2,000.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	5,512.000		5,512.000	
	354-6065	PLANE ASPH CONC PAV (3 1/2")	SY	144,531.000		144,531.000	
	356-6007	ASPH BINDER(PG 64-22)	GAL	1,203.000		1,203.000	
	356-6017	FABRIC	SY	5,512.000		5,512.000	
	361-6080	FULL-DEPTH REPAIR CPCD (12"-14")	SY	287.000		287.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	29.000		29.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000		5.000	
	533-6003	RUMBLE STRIPS (SHOULDER) ASPHALT	LF	38,279.000		38,279.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	325.000		325.000	
	540-6002	MTL W-BEAM GD FEN (STEEL POST)	LF	50.000		50.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	2.000		2.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	325.000		325.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	3.000		3.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000		2.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6060	IN SM RD SN SUP&AM TYTWT(1)WS(P)	EA	6.000		6.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	10.000		10.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	6.000		6.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	34,189.000		34,189.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	36,971.000		36,971.000	
	662-6048	WK ZN PAV MRK REMOV (REFL) TY I-C	EA	418.000		418.000	
	662-6056	WK ZN PAV MRK REMOV (TRAF BTN) TY W	EA	510.000		510.000	
	662-6058	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	EA	510.000		510.000	
	662-6064	WK ZN PAV MRK REMOV (W)6"(BRK)	LF	8,355.000		8,355.000	
	662-6112	WK ZN PAV MRK SHT TERM RMV (W)(4")	LF	4,234.000		4,234.000	
	666-6227	PAVEMENT SEALER 10"	LF	1,338.000		1,338.000	
	668-6010	PREFAB PAV MRK TY B (W)(6")(BRK)CNTST	LF	8,375.000		8,375.000	

DISTRICT	COUNTY	CCSJ	SHEET
Atlanta	Cass	0218-03-094	6



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0218-03-094

DISTRICT Atlanta

COUNTY Cass

HIGHWAY US 59

CONTROL SECTION JOB				0218-03-094		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00176661			
COUNTY				Cass			
HIGHWAY				US 59			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	668-6070	PREFAB PAV MRK TY C (W) (8") (DOT)	LF	814.000		814.000	
	668-6072	PREFAB PAV MRK TY C (W) (8") (SLD)	LF	5,715.000		5,715.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	495.000		495.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	1.000		1.000	
	672-6007	REFL PAV MRKR TY I-C	EA	1,122.000		1,122.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	335.000		335.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	702.000		702.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	35,077.000		35,077.000	
	3077-6064	SP MIXES SP-D PG76-22	TON	17,637.740		17,637.740	
	3077-6075	TACK COAT	GAL	18,629.000		18,629.000	
	3080-6007	STONE-MTRX-ASPH SMA-D SAC-A PG76-22	TON	11,173.800		11,173.800	
	3080-6029	TACK COAT	GAL	10,159.000		10,159.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6056-6002	PREFORMED CENTERLINE RUMBLE STRIP	LF	5,350.000		5,350.000	
	6149-6004	REFL PAV MRK AWT (W) 6" (SLD) (100MIL)	LF	35,809.000		35,809.000	
	6149-6010	REFL PAV MRK AWT (Y) 6" (SLD) (100MIL)	LF	35,191.000		35,191.000	
	6149-6011	REFL PAV MRK AWT (Y) 6" (BRK) (100MIL)	LF	2,695.000		2,695.000	
	6185-6002	TMA (STATIONARY)	DAY	74.000		74.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	6.000		6.000	
	08	CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

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SUMMARY OF TREE TRIMMING AND REMOVAL DETAILS					
STATION	100 6002	164 6054	164 6071	¹ 166 6002	168 6001
	PREPARING ROW	BOND FBR MTRX SEED (PERM) (RURAL) (SAND)	BROADCAST SEED (TEMP) (WARM OR COOL)	FERTILIZER	VEGETATIVE WATERING
	STA	SY	SY	(300 LBS/ 5000 SY) TON	(80 MG/5000 SY) MG
196+50 - 199+00		1,667	1,667	0.10	53.34
208+100- 211+50		2,333	2,333	0.14	74.66
216+00 - 226+00		6,667	6,667	0.40	213.34
254+50 - 267+00		8,333	8,333	0.50	266.66
268+50 - 373+50		70,000	70,000	4.20	2,240.00
382+00 - 383+00		667	667	0.04	21.34
390+50 - 408+00		11,667	11,667	0.70	373.34
409+50 - 411+00		1,000	1,000	0.06	32.00
423+50 - 425+00	222.5	1,000	1,000	0.06	32.00
425+00 - 462+50		25,000	25,000	1.50	800.00
465+00 - 469+50		3,000	3,000	0.18	96.00
474+50 - 480+00		3,667	3,667	0.22	117.34
481+50 - 494+50		8,667	8,667	0.52	277.34
498+00 - 502+50		3,000	3,000	0.18	96.00
506+00 - 507+00		667	667	0.04	21.34
511+00 - 512+00		667	667	0.04	21.34
522+50 - 523+00		333	333	0.02	10.66
PROJECT TOTALS	222.5	148,335	148,335	8.90	4,746.70

¹ FOR CONTRACTOR INFORMATION ONLY


SUMMARY OF SIGNING ITEMS			
STATION	644 6004	644 6060	644 6076
	IN SM RD SN SUP&AM TY10BWG (1) SA (T)	IN SM RD SN SUP&AM TYTWT (1) WS (P)	REMOVE SM RD SN SUP&AM
	EA	EA	EA
194+98		1	1
240+47		1	1
242+68		1	1
300+06	1		1
457+69	1		1
462+42		1	1
489+60			1
491+66		1	1
495+40			1
502+39		1	1
PROJECT TOTALS	2	6	10

SUMMARY OF MBGF ITEMS											
STATION	104 6054	132 6021	432 6045	540 6001	540 6002	540 6016	542 6001	542 6002	544 6001	544 6003	658 6062
	REMOVING CONCRETE (MOW STRIP)	EMBANKMENT (VEHICLE) (ORD COMP) (TY C)	RIPRAP (MOW STRIP) (4 IN)	MTL W-BEAM GD FEN (TIM POST)	MTL W-BEAM GD FEN (STEEL POST)	DOWNSTREAM ANCHOR TERMINAL SECT	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
	LF	CY	CY	LF	LF	EA	LF	EA	EA	EA	EA
240+50 - 521+15	475	14	29	325	50	2	325	3	2	2	6
PROJECT TOTALS	475	14	29	325	50	2	325	3	2	2	6

² SEE MBGF LAYOUT FOR MORE INFORMATION

MISCELLANEOUS SUMMARIES

SHEET 1 OF 3



CONT	SECT	JOB	HIGHWAY
0218	03	094	US 59
DIST	COUNTY	SHEET NO.	
ATL	CASS	8	

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SUMMARY OF PAVEMENT MARKING ITEMS												
STATION	668 6010	668 6070	668 6072	668 6076	668 6085	672 6007	672 6009	672 6010	677 6002	6149 6004	6149 6010	6149 6011
	PREFAB PAV MRK TY B (W) 6" (BRK) CNTST	PREFAB PAV MRK TY C (W) (8") (DOT)	PREFAB PAV MRK TY C (W) (8") (SLD)	PREFAB PAV MRK TY C (W) (24") (SLD)	PREFAB PAV MRK TY C (W) (WORD)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	ELIM EXT PAV MRK & MRKS (6")	REFL PAV MRK AWT (W) 6" (SLD) (100MIL)	REFL PAV MRK AWT (Y) 6" (SLD) (100MIL)	REFL PAV MRK AWT (Y) 6" (BRK) (100MIL)
	LF	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF	LF
186+00 - 187+00	20				1				100	60		20
187+00 - 240+50	1,338	225	2,860	250		277	335		5,350	5,350	5,350	2,675
240+50 - 521+15	7,017	589	2,855	245		845		702	29,627	29,627	28,065	
¹ 521+15 - 543+70 (FR & RAMP)										772	1,776	
PROJECT TOTALS	8,375	814	5,715	495	1	1,122	335	702	35,077	35,809	35,191	2,695

¹ SEE ROADWAY DETAILS SHEET 37 FOR MORE INFORMATION


SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS											
STATION	662 6008	662 6037	662 6048	662 6056	662 6058	662 6064	662 6112	666 6227	6001 6002	6185 6002	³ 6185 6005
	WK ZN PAV MRK NON-REMOV (W) 6" (SLD)	WK ZN PAV MRK NON-REMOV (Y) 6" (SLD)	WK ZN PAV MRK REMOV (REFL) TY I-C	WK ZN PAV MRK REMOV (TRAF BTN) TY Y	WK ZN PAV MRK REMOV (TRAF BTN) TY W	WK ZN PAV MRK REMOV (W) 6" (BRK)	WK ZN PAV MRK SHT TERM RMV (W) 4"	PAVEMENT SEALER 10"	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LF	LF	EA	EA	EA	LF	LF	LF	EA	DAY	DAY
187+00 - 240+50	5,350	5,350	67	310	310	1,338	669	1,338	2	74	6
240+50 - 521+15	28,065	28,065	351	200	200	7,017	3,565				
² 521+15 - 543+70 (FR & RAMP)	774	3,556									
PROJECT TOTALS	34,189	36,971	418	510	510	8,355	4,234	1,338	2	74	6

² SEE ROADWAY DETAILS SHEET 37 FOR MORE INFORMATION

³ THIS QUANTITY IS FOR 2 TMAs. (SEE GENERAL NOTES FOR MORE INFORMATION)

MISCELLANEOUS SUMMARIES

SHEET 2 OF 3



CONT	SECT	JOB	HIGHWAY
0218	03	094	US 59
DIST	COUNTY	SHEET NO.	
ATL	CASS	9	

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SUMMARY OF ROADWAY ITEMS										
STATION	134 6002	132 6021	351 6075	354 6045	354 6065	356 6007	356 6017	361 6080	533 6003	6056 6002
	BACKFILL (TY B)	EMBANKMENT (VEHICLE) (ORD COMP) (TY C)	FLEXIBLE PAVEMENT STRUCTURE REPAIR (2"-4")	PLANE ASPH CONC PAV (2")	PLANE ASPH CONC PAV (3 1/2")	ASPH BINDER (PG 64-22)	FABRIC	FULL-DEPTH REPAIR CPCD (12"-14")	RUMBLE STRIPS (SHOULDER) ASPHALT	PERFORMED CENTERLINE RUMBLE STRIP
	STA	CY	SY	SY	SY	GAL 0.2 GAL/SY	SY	SY	LF	LF
186+00 - 187+00								287		
187+00 - 240+50	53.5				20,212				3,046	5,350
240+50 - 506+22	265.7	12			112,193				34,819	
506+22 - 521+15	14.9		2,000		6,304				414	
521+15 FR START - 543+70 FR END				5,512		1,203	5,512			
ACCEL/DECEL LANES (5)					1752					
ACCEL/DECEL LANES AT CROSSOVERS (20)					4070					
PROJECT TOTALS	334.1	12	2,000	5,512	144,531	1,203	5,512	287	38,279	5,350

1

SEE ROADWAY DETAILS SHEET 37 FOR MORE INFORMATION

2

SEE ROADWAY DETAILS SHEET 38 FOR MORE INFORMATION

SUMMARY OF ROADWAY ITEMS CONT.								
STATION	3077 6064			3077 6075			3080 6007	3080 6029
	SP MIXES SP-D PG76-22			TACK COAT			STONE-MTRX-ASPH SMA-D SAC-A PG76-22	TACK COAT
	TON			GAL			TON	GAL
	165 LBS/SY	220 LBS/SY	385 LBS/SY	0.10 GAL/SY	0.10 GAL/SY	0.10 GAL/SY	220 LBS/SY	0.10 GAL/SY
187+00 - 240+50	1,667.42	653.89		2,021	594		1,569.33	1,427
240+50 - 506+22	9,255.91	3,247.69		11,219	2,952		9,093.53	8,267
506+22 - 521+15	903.27	182.48		1,095	166		510.94	465
521+15 FR START - 543+70 FR END		606.34						
ACCEL/DECEL LANES (5)			337.26			175		
ACCEL/DECEL LANES AT CROSSOVERS (20)			783.48			407		
SUBTOTAL	11,826.60	4,690.40	1,120.74	14,335	3,712	582		
PROJECT TOTALS		17,637.74			18,629		11,173.80	10,159

1


SEE ROADWAY DETAILS SHEET 37 FOR MORE INFORMATION

2

SEE ROADWAY DETAILS SHEET 38 FOR MORE INFORMATION

MISCELLANEOUS SUMMARIES





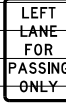



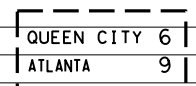





SHEET 3 OF 3



CONT	SECT	JOB	HIGHWAY
0218	03	094	US 59
DIST	COUNTY	SHEET NO.	
ATL	CASS	10	

SUMMARY OF SMALL SIGNS

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 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of any electronic files to a hard copy format.

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
8	1	W3-5	NEW 	STATION 194+98	36X36	X	TWT	1	WS	P		
8	2	R3-9b	NEW 	STATION 240+47	24X36	X	TWT	1	WS	P		
8	3	M3-3	NEW 	STATION 242+68	36X18	X	TWT	1	WS	P		
8	4	M1-4US	NEW 	STATION 242+68	36X36	X	TWT	1	WS	P		
8	5	R4-2aT	NEW 	STATION 300+06	36X54	X	10BWG	1	SA	T		
8	6	R2-1	NEW 	STATION 457+69	36X48	X	10BWG	1	SA	T		
8	7	M3-3	NEW 	STATION 462+42	36X18	X	TWT	1	WS	P		
8	8	M1-4US	NEW 	STATION 462+42	36X36	X	TWT	1	WS	P		
8	9		REMOVE 	STATION 489+60								
8	10	M1-4US	NEW 	STATION 491+66	36X36	X	TWT	1	WS	P		
8	11	D10-7aT	NEW 	STATION 491+66	3X10	X						
8	12		REMOVE 	STATION 495+40								
8	13	M3-3	NEW 	STATION 502+39	36X18	X	TWT	1	WS	P		
8	14	M1-4US	NEW 	STATION 502+39	36X36	X	TWT	1	WS	P		

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

- NOTE:**
- 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).

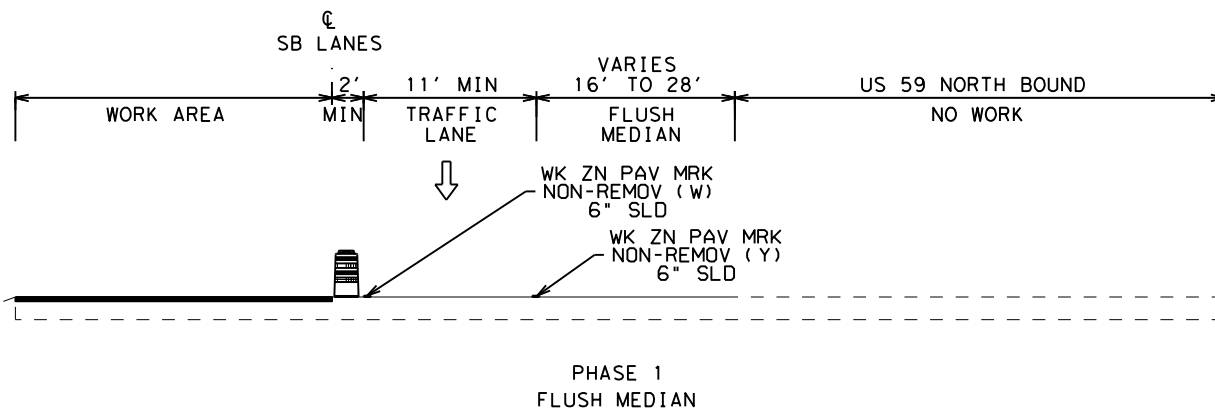
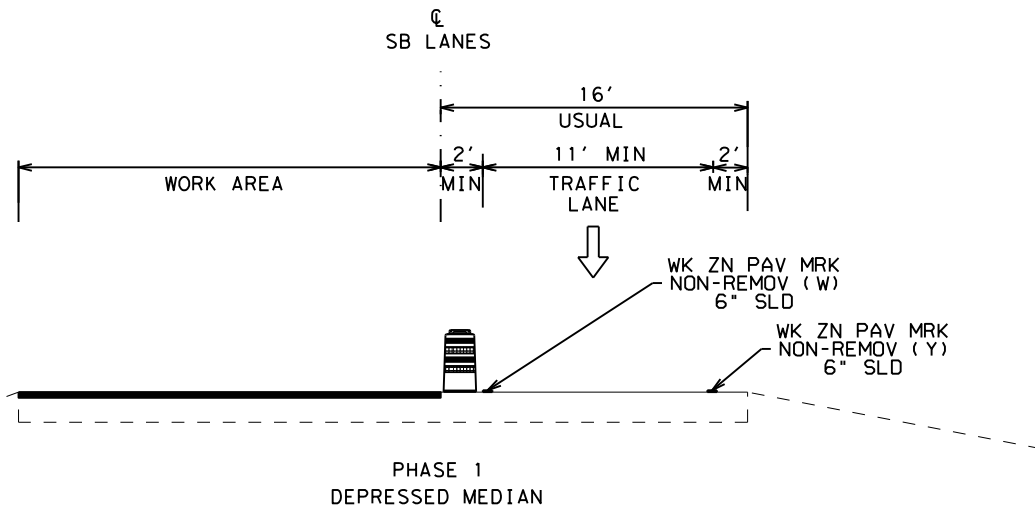
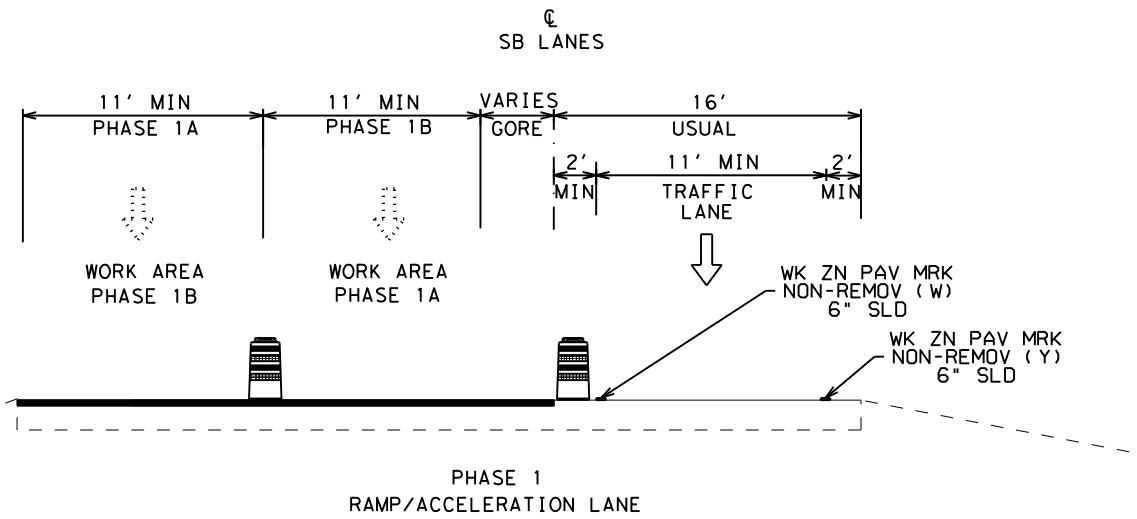


SUMMARY OF SMALL SIGNS

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TRAFFIC CONTROL PLAN NARRATIVE

PHASE 1:

1A. SET UP TRAFFIC CONTROL AS SHOWN IN "TCP(ATL-15)-15(MOD)" AND "TCP(ATL-16)-15(MOD)" EXCLUDING THE RAMP SECTION. CLOSE THE OUTSIDE LANE AND SHOULDER FOR THE ENTIRE LENGTH OF THE PROJECT. REMOVE ANY CONFLICTING PAVEMENT MARKINGS AND USE TRAFFIC BUTTONS ON CONCRETE PAVEMENT SECTIONS.

1B. ALLOW FOR UNINTERRUPTED ACCESS TO SB LANES FROM THE RAMP LANE.

1C. COMPLETE PLANNING, FLEXIBLE PAVEMENT REPAIR, SP-D PLACEMENT, TY I PAVEMENT MARKING AND METAL BEAM GUARD FENCE.

PHASE 2:

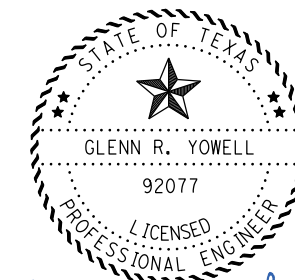
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2B. ALLOW FOR UNINTERRUPTED ACCESS TO SB LANES FROM THE RAMP LANE.

2C. COMPLETE PLANNING, FLEXIBLE PAVEMENT REPAIR, SP-D 1.5" AND 2" SMA PLACEMENT, AND WORK ZONE PAVEMENT MARKING.

PHASE 3:

3A. PLACE TRAFFIC BACK IN NORMAL CONFIGURATION AND REMOVE ANY CONFLICTING PAVEMENT MARKINGS. USE STANDARD TCP FOR DAYTIME OPERATIONS TO PLACE FINAL 2-INCH ACP SURFACE AND MOWSTRIP. USE MOBILE OPERATIONS TCP FOR STRIPING.



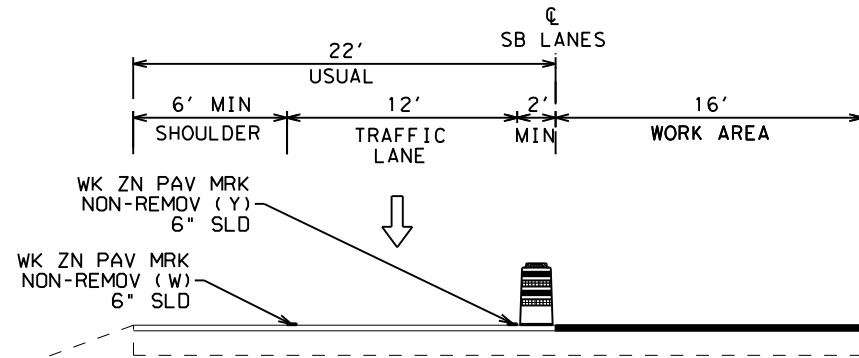
Glenn R. Yowell, P.E.

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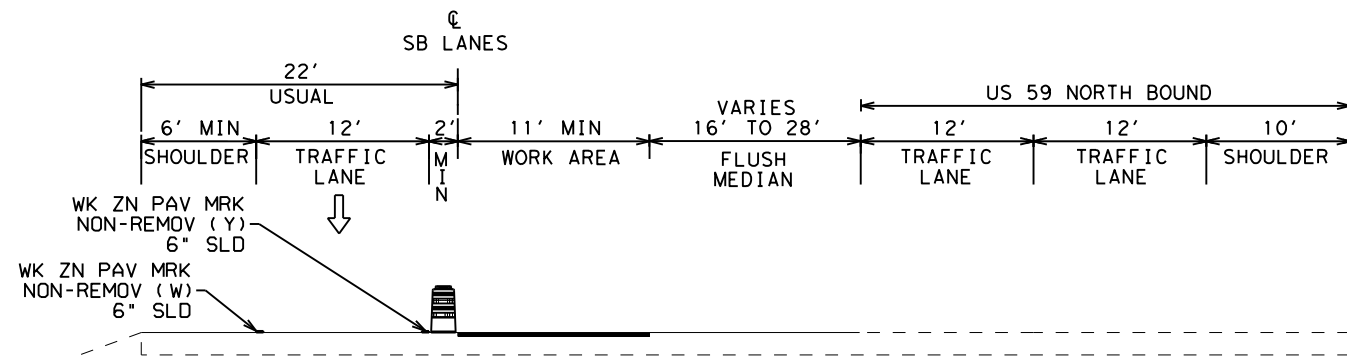
SEQUENCE OF WORK



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ATL	CASS	12	



PHASE 2
DEPRESSED MEDIAN AND ACCELERATION LANE



PHASE 2
FLUSH MEDIAN

TRAFFIC CONTROL PLAN NARRATIVE cont.

PHASE 1:

1A. SET UP TRAFFIC CONTROL AS SHOWN IN "TCP(ATL-15)-15(MOD)" AND "TCP(ATL-16)-15(MOD)" EXCLUDING THE RAMP SECTION. CLOSE THE OUTSIDE LANE AND SHOULDER FOR THE ENTIRE LENGTH OF THE PROJECT. REMOVE ANY CONFLICTING PAVEMENT MARKINGS AND USE TRAFFIC BUTTONS ON CONCRETE PAVEMENT SECTIONS.

1B. ALLOW FOR UNINTERRUPTED ACCESS TO SB LANES FROM THE RAMP LANE.

1C. COMPLETE PLANNING, FLEXIBLE PAVEMENT REPAIR, SP-D PLACEMENT, TY I PAVEMENT MARKING AND METAL BEAM GUARD FENCE.

PHASE 2:

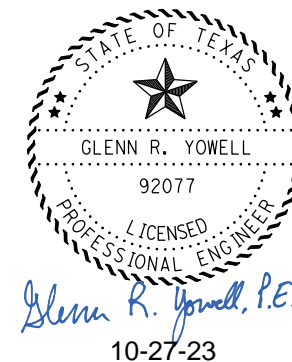
2A. SET UP TRAFFIC CONTROL AS SHOWN IN "TCP(ATL-15)-15(MOD)" AND "TCP(ATL-16)-15(MOD)" EXCLUDING THE RAMP SECTION. CLOSE THE INSIDE LANE AND SHOULDER FOR THE ENTIRE LENGTH OF THE PROJECT. REMOVE ANY CONFLICTING PAVEMENT MARKINGS AND USE TRAFFIC BUTTONS ON CONCRETE PAVEMENT SECTIONS.

2B. ALLOW FOR UNINTERRUPTED ACCESS TO SB LANES FROM THE RAMP LANE.

2C. COMPLETE PLANNING, FLEXIBLE PAVEMENT REPAIR, SP-D 1.5" AND 2" SMA PLACEMENT, AND WORK ZONE PAVEMENT MARKING.

PHASE 3:

3A. PLACE TRAFFIC BACK IN NORMAL CONFIGURATION AND REMOVE ANY CONFLICTING PAVEMENT MARKINGS. USING STANDARD TCP FOR DAYTIME OPERATIONS TO PLACE FINAL 2-INCH ACP SURFACE AND MOWSTRIP. USE MOBILE OPERATIONS TCP FOR STRIPING.



SEQUENCE OF WORK

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:


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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

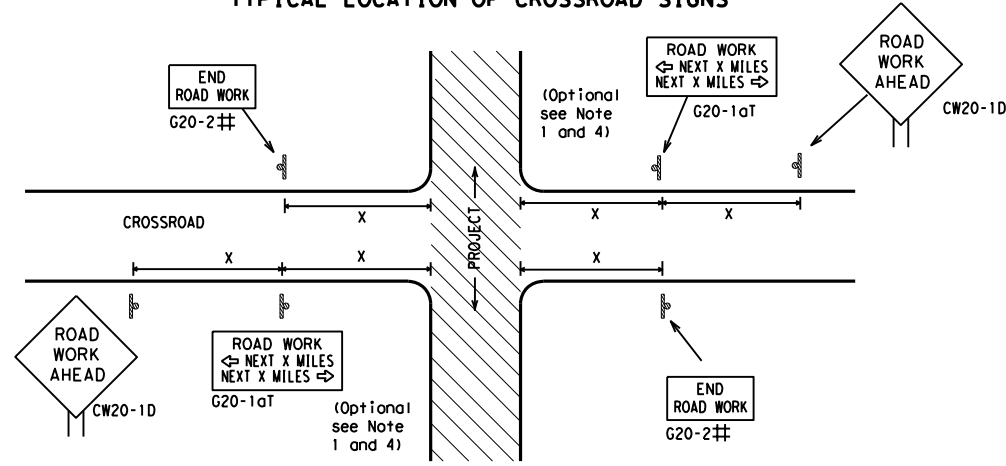
THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS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

SHEET 1 OF 12

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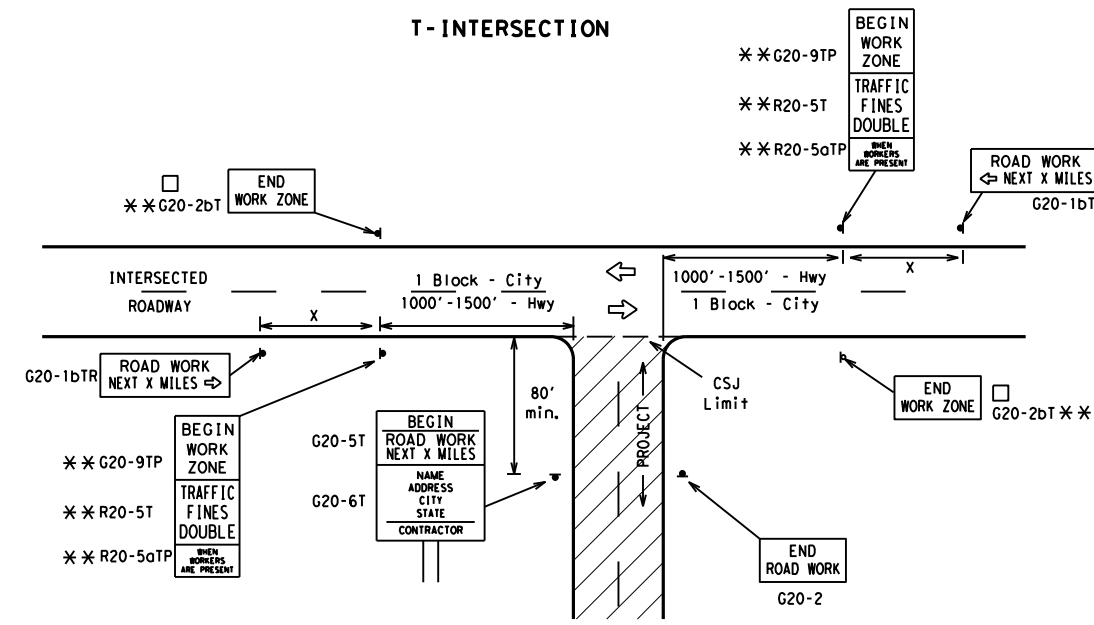
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## 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

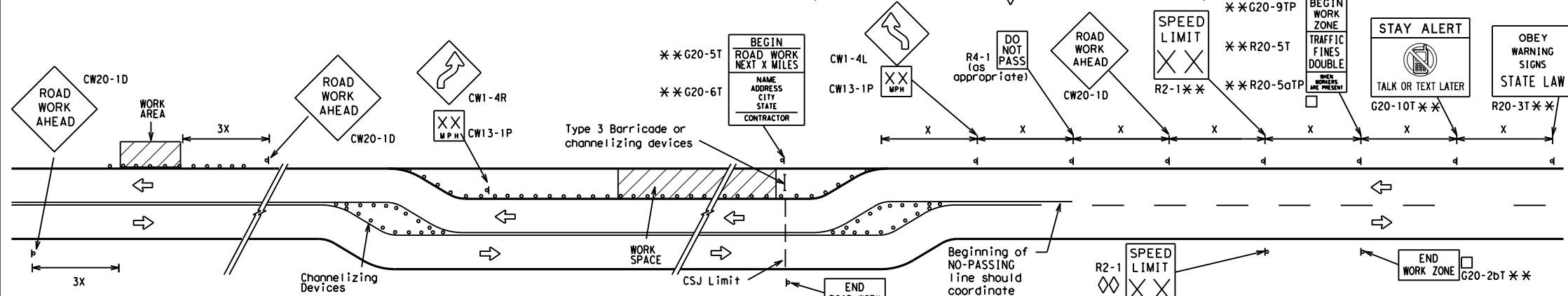
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

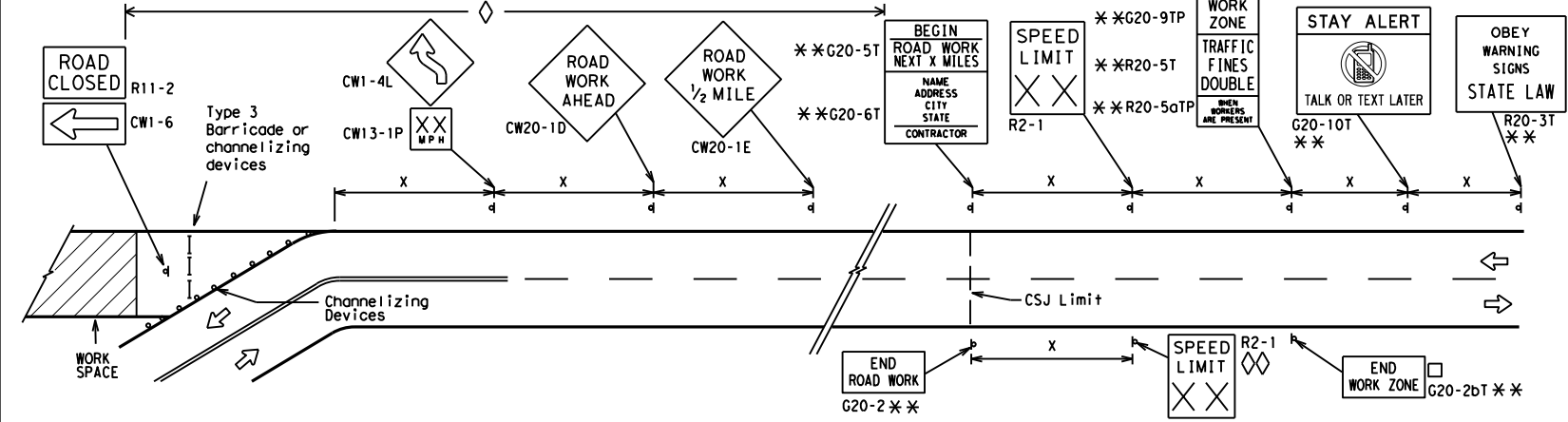
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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



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

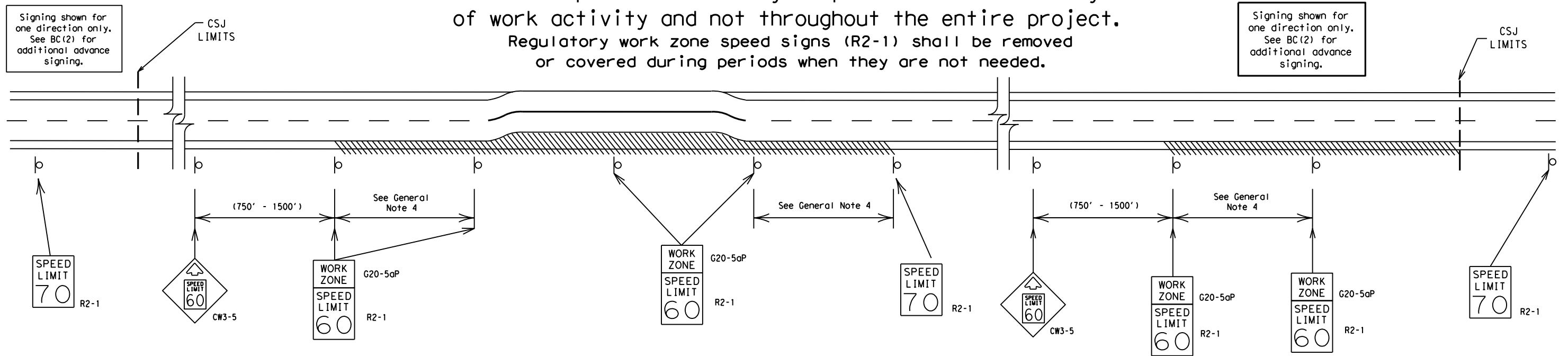
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

SHEET 3 OF 12



BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

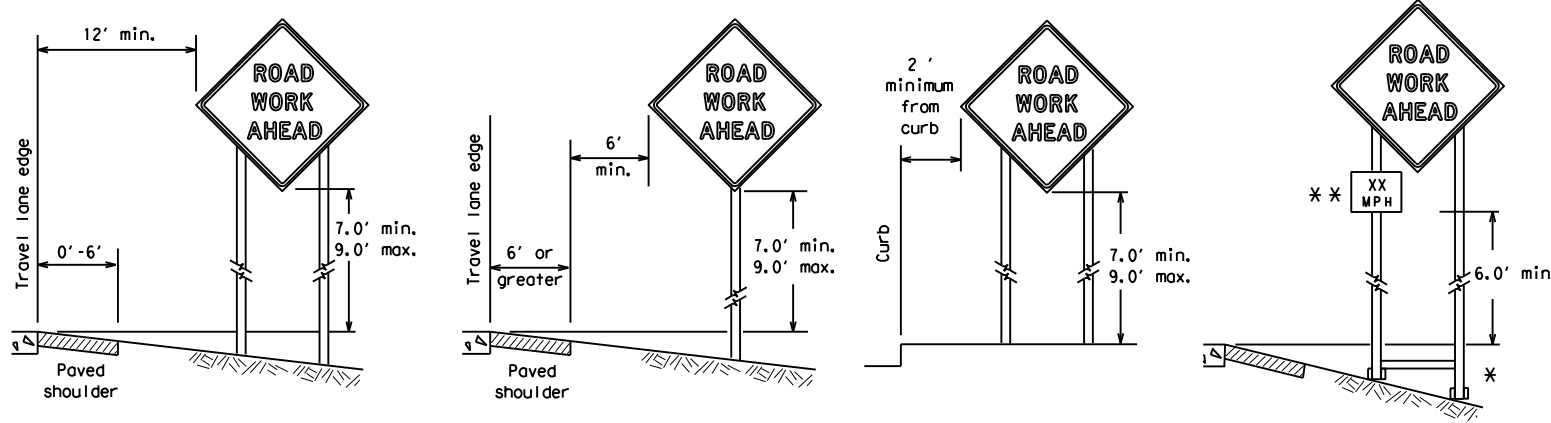
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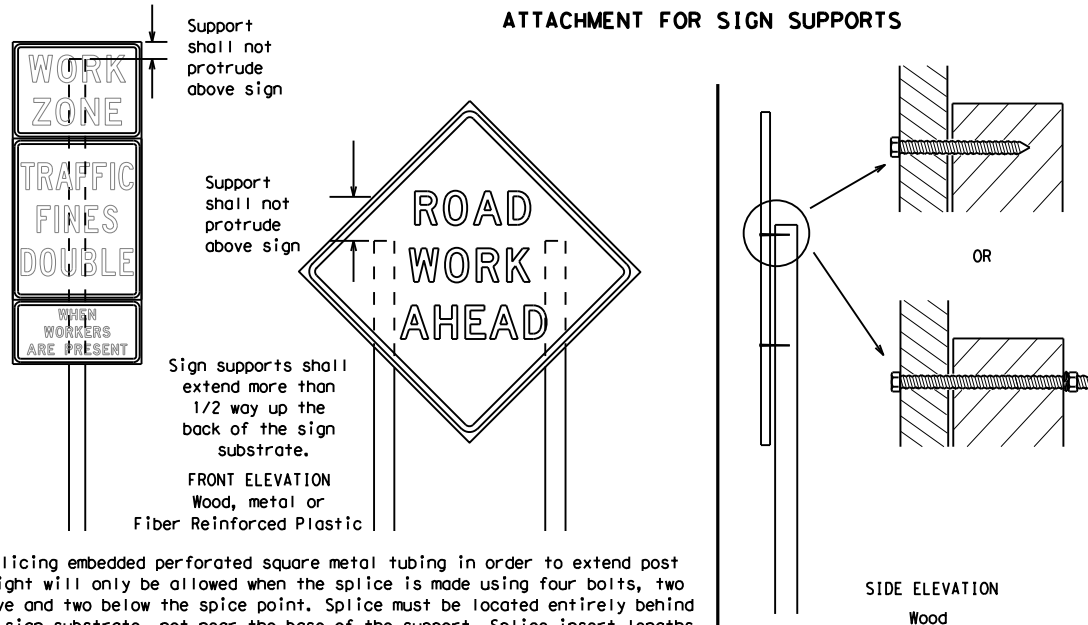
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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

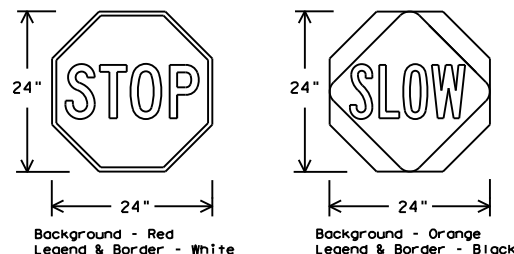
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not 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 retroreflective when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



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

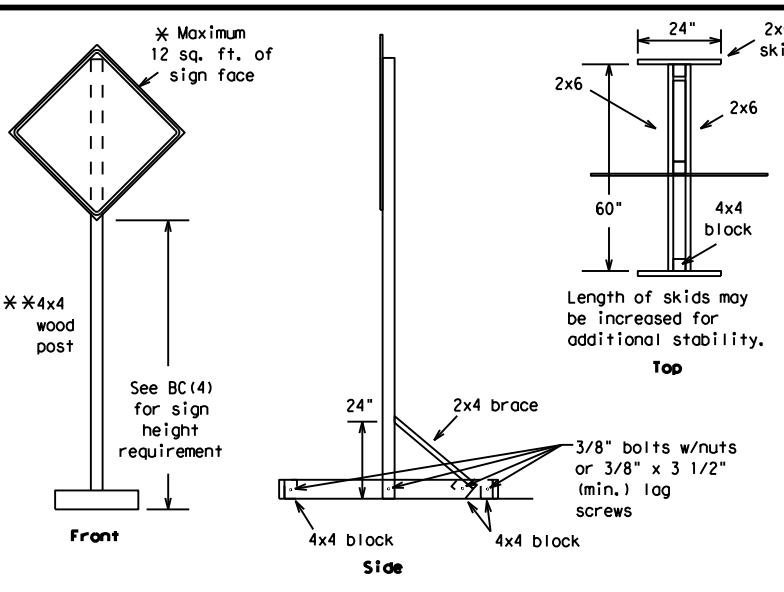
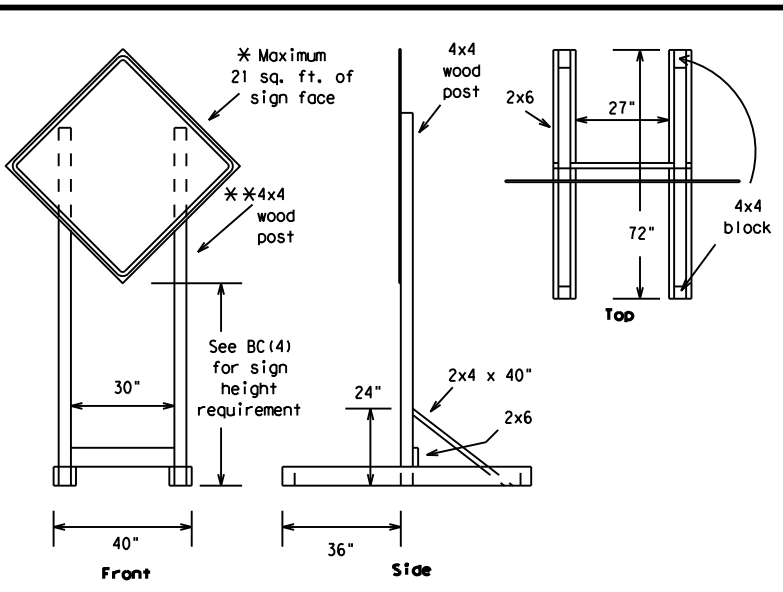


BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

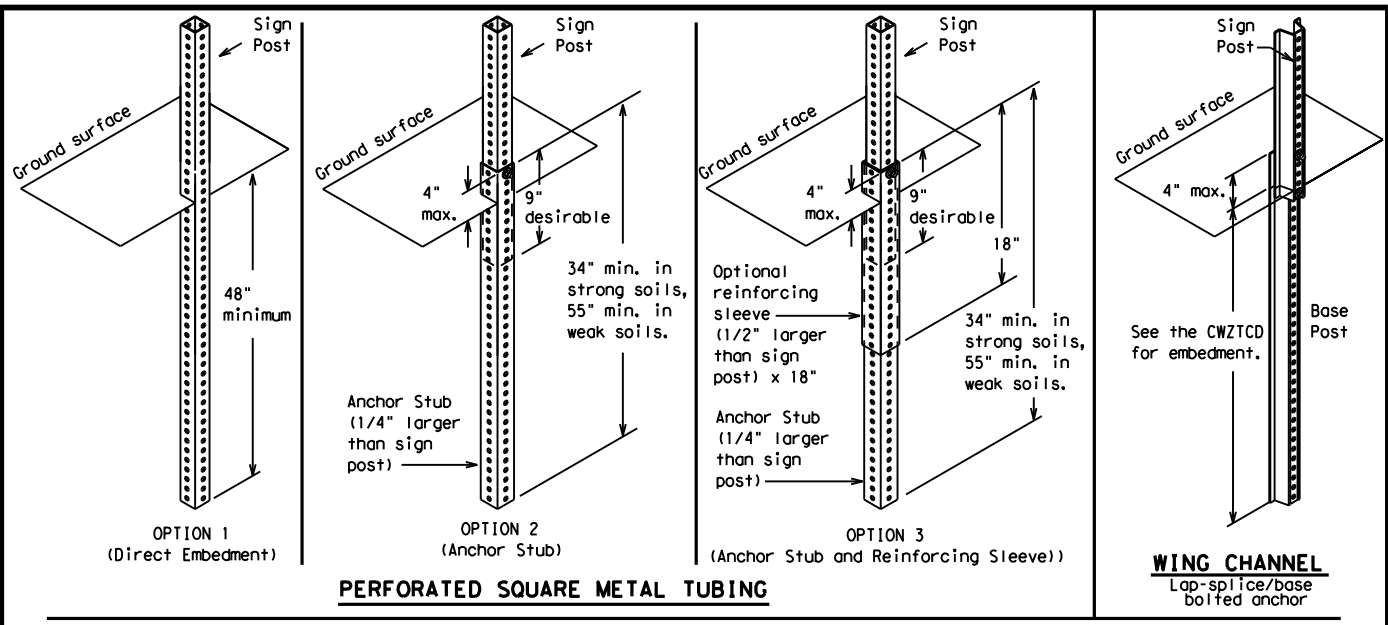
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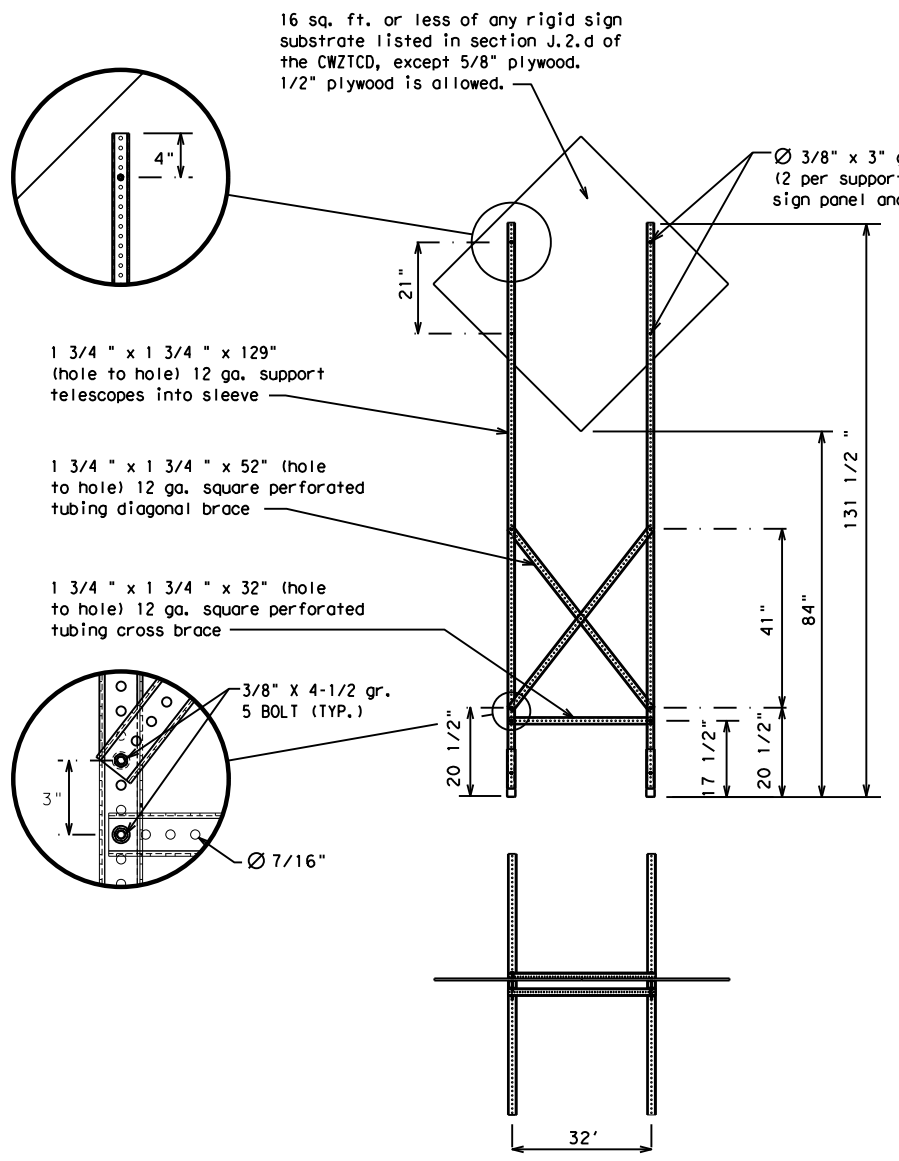
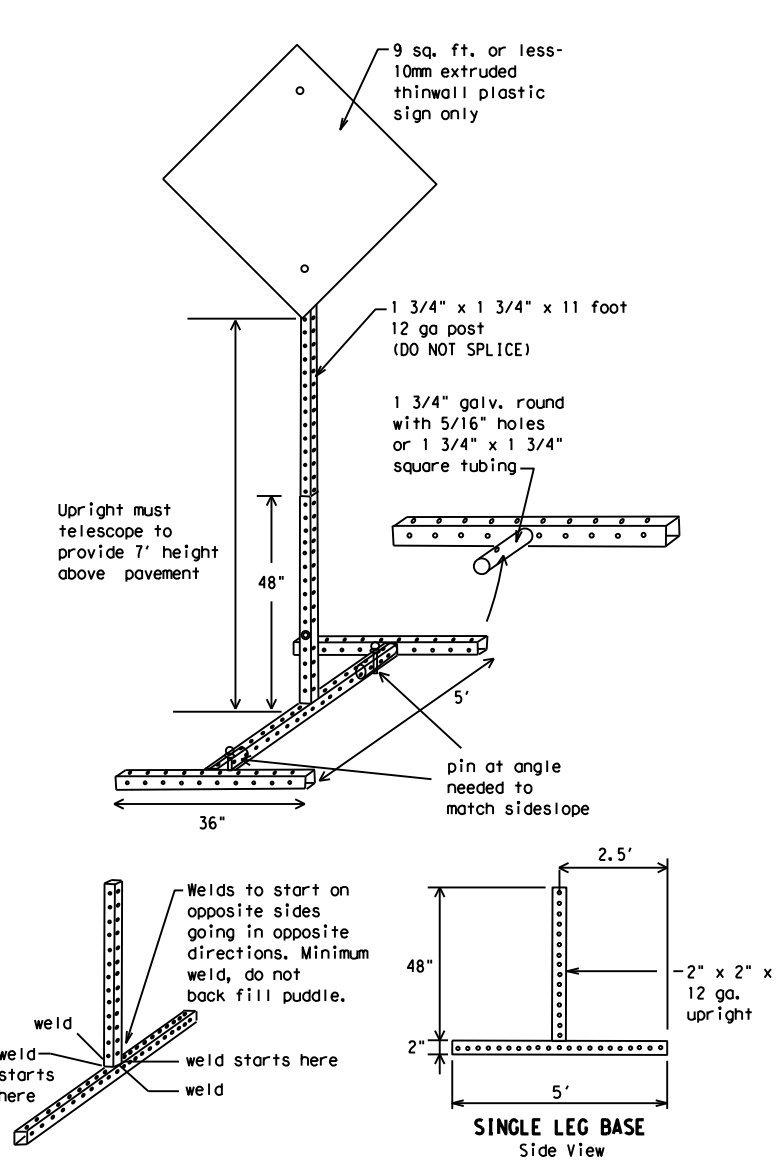
SKID MOUNTED WOOD SIGN SUPPORTS

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



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**
- 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.
 - No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
 - 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.

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT
 BC(5) - 21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

- 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.

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
Cannot	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	TRVLRs
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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI

Action to Take/Effect on Travel List

MERGE RIGHT
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- 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

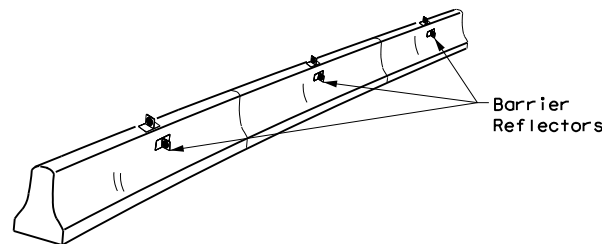
- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS 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.

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)			
BC (6) - 21			
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DISCLAIMER:

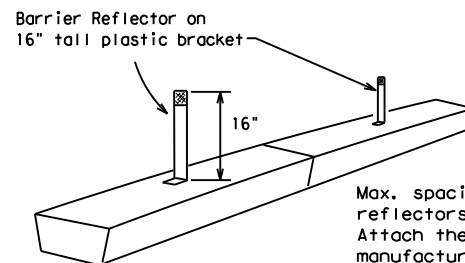
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors 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.

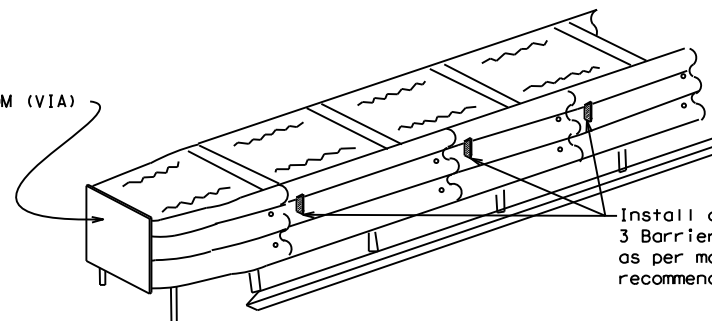


LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

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

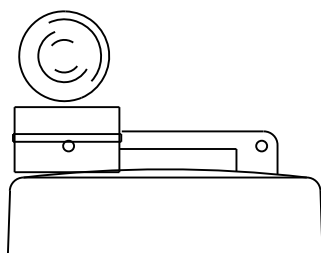
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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

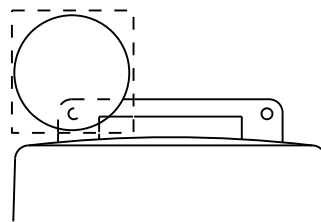
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.



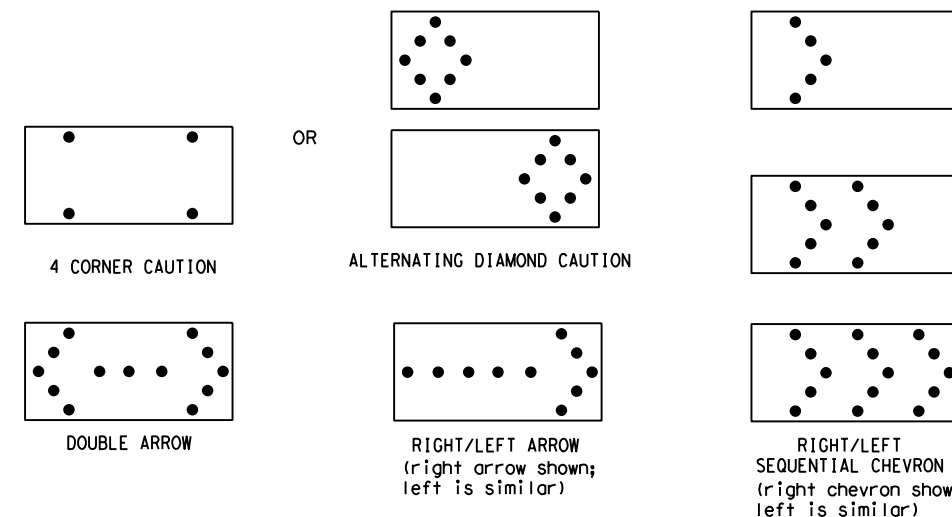
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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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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

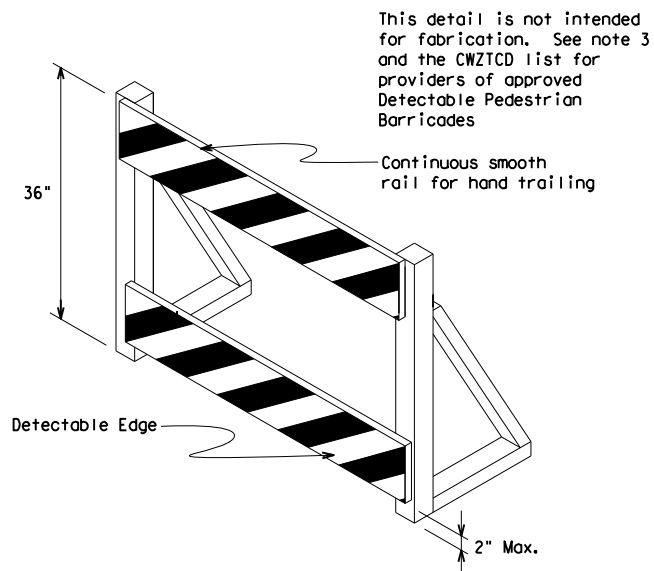
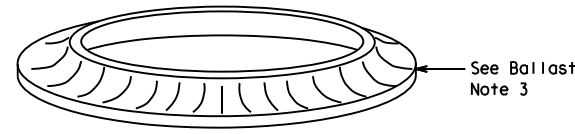
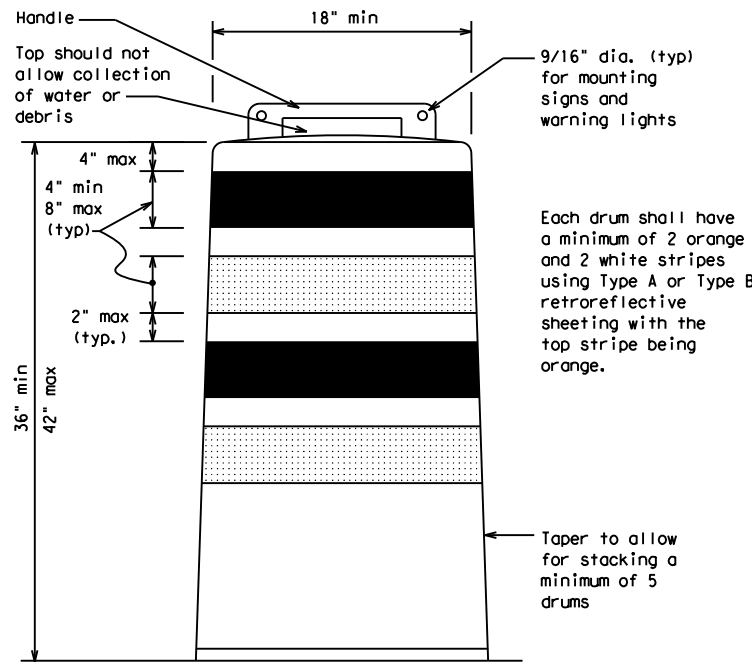
- Pre-qualified plastic drums shall meet the following requirements:
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
 - The body and base shall lock together in such a manner that the body separates from the base when impacted 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.

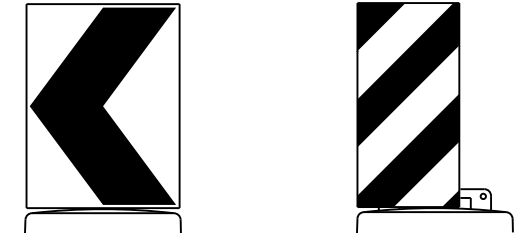
BALLAST

- 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

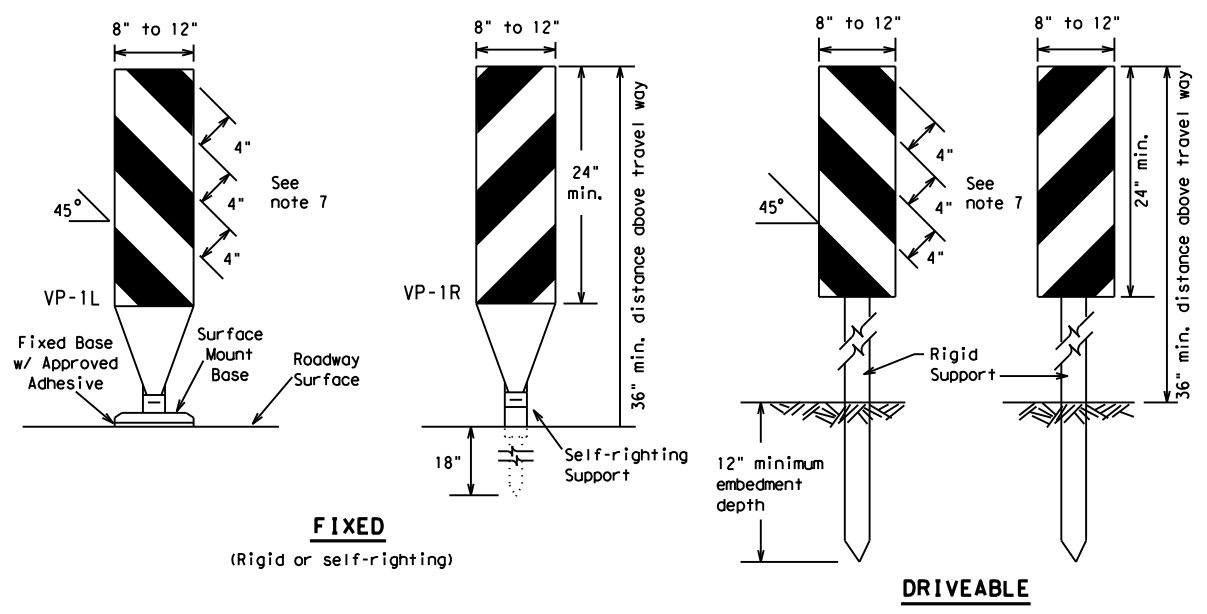


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

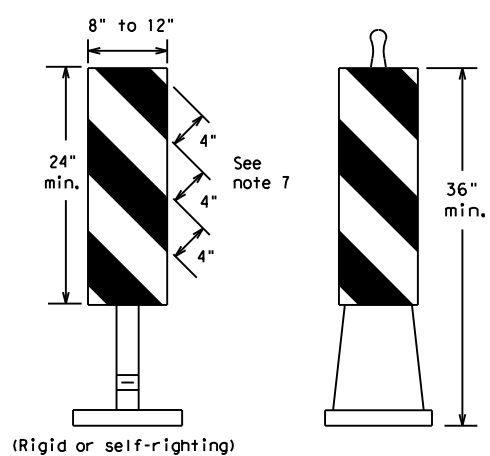
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FIXED
(Rigid or self-righting)

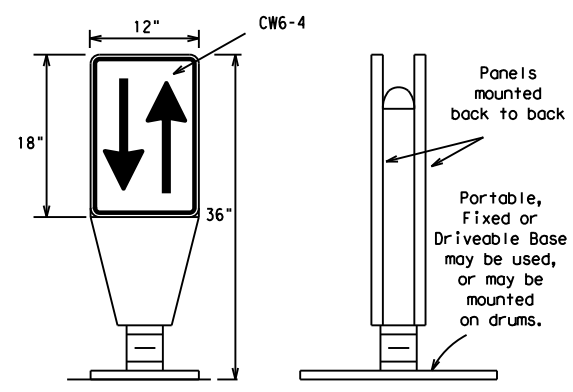
DRIVEABLE



PORTABLE

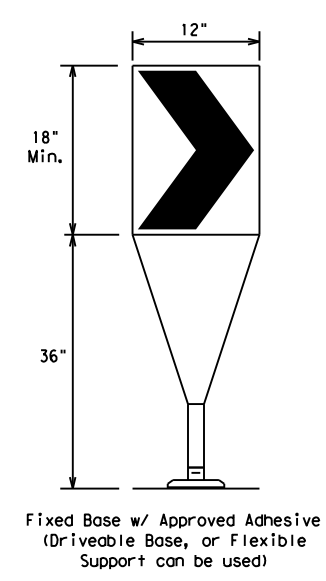
VERTICAL PANELS (VPs)

- 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.



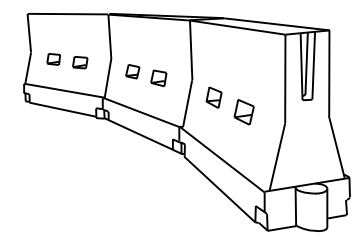
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- 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.

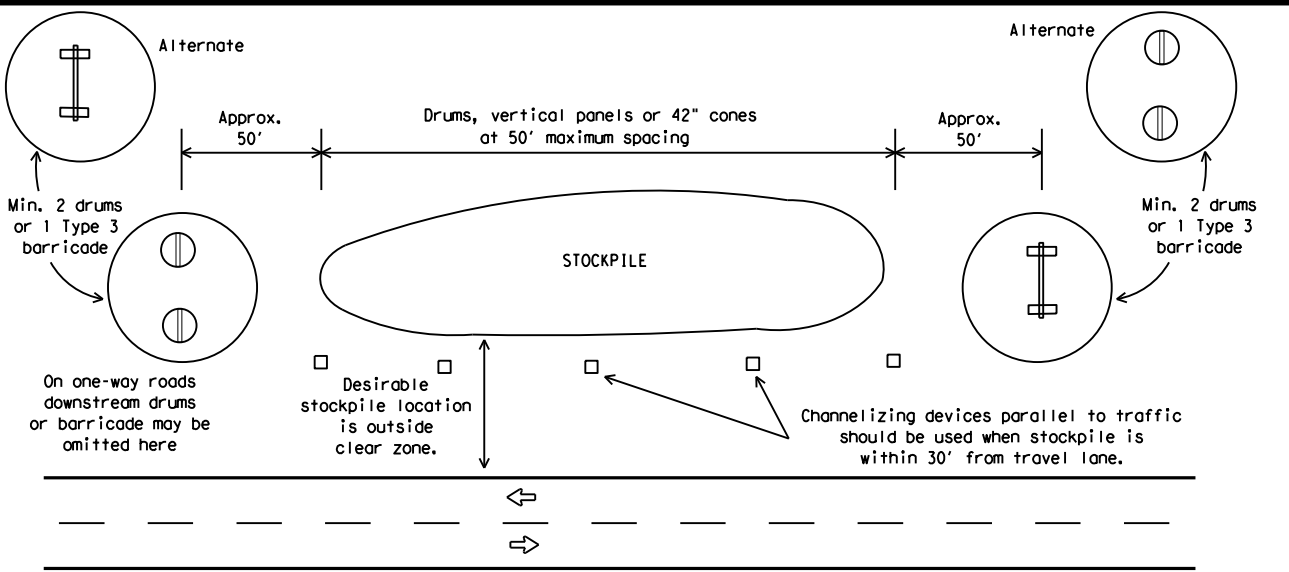


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



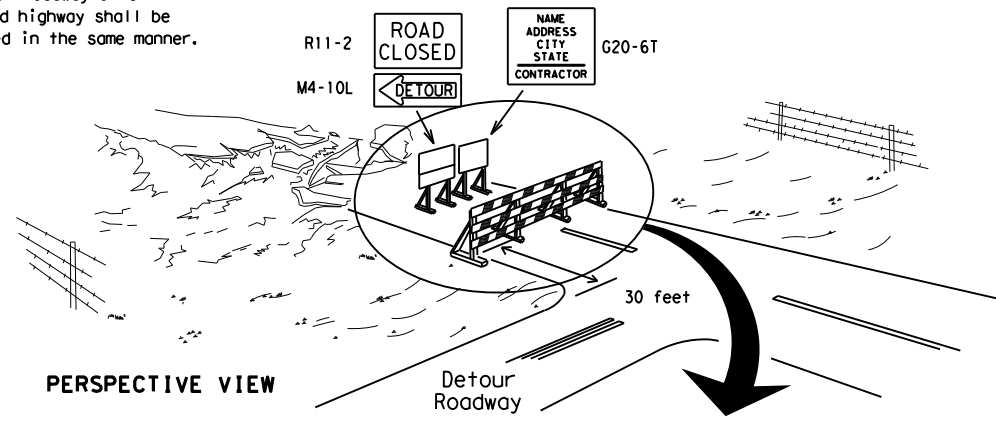
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



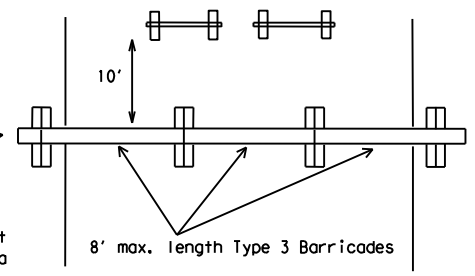
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



PERSPECTIVE VIEW

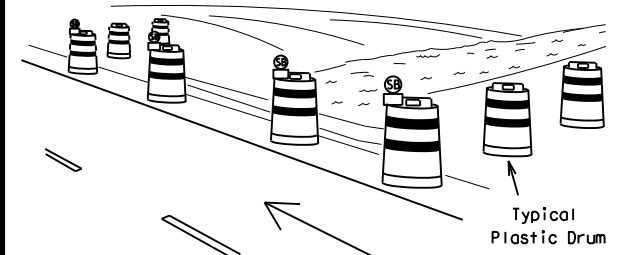
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



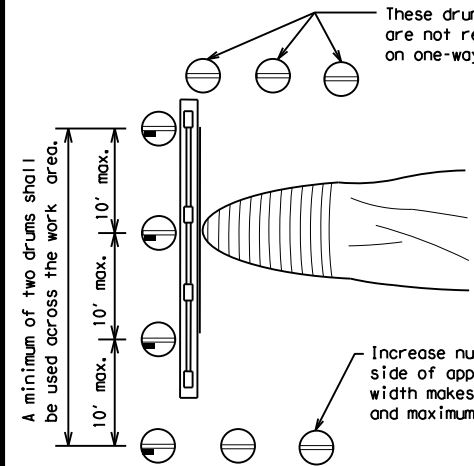
PLAN VIEW

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

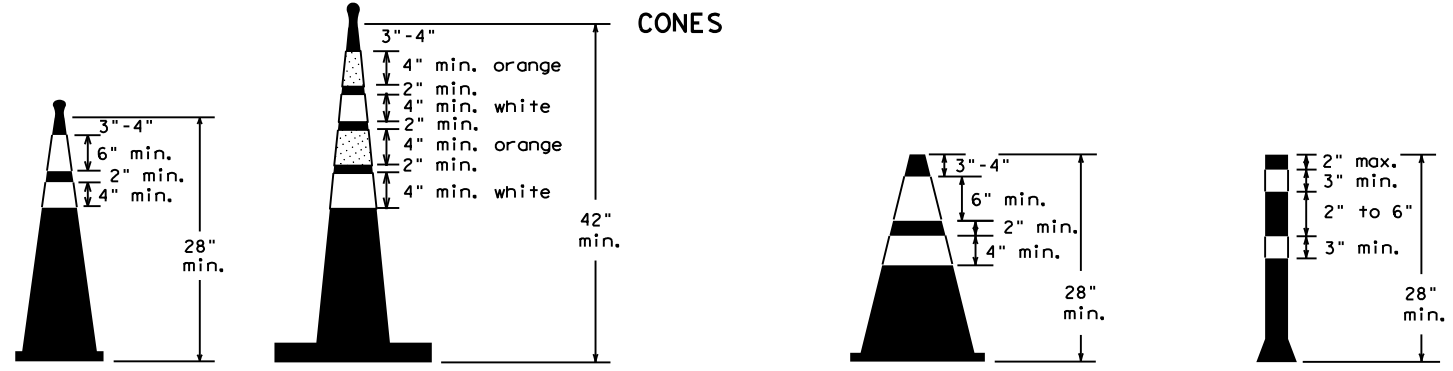


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

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



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

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9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	ATL	CASS	23	

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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.

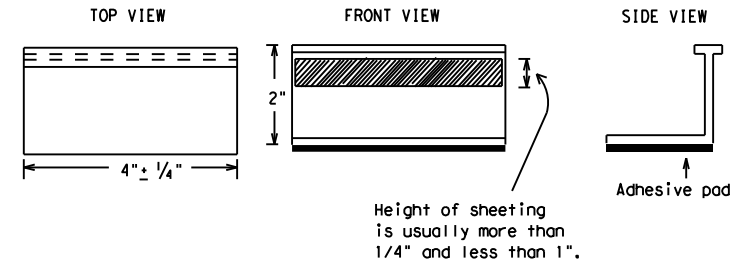
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- 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

Texas Department of Transportation	Traffic Safety Division Standard
BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS	
BC(11)-21	
FILE: bc-21.dgn © TxDOT February 1998	DN: TxDOT CONT: 0218 SECT: 03 JOB: 094 DIST: ATL COUNTY: CASS HIGHWAY: US 59 SHEET NO.: 24

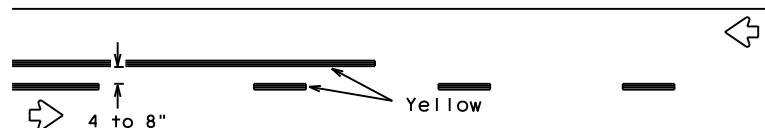
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PAVEMENT MARKING PATTERNS

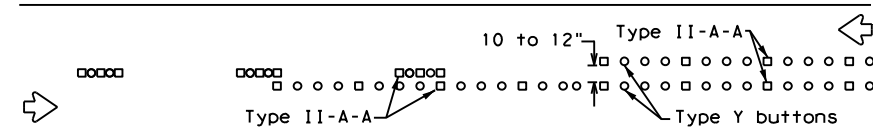


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

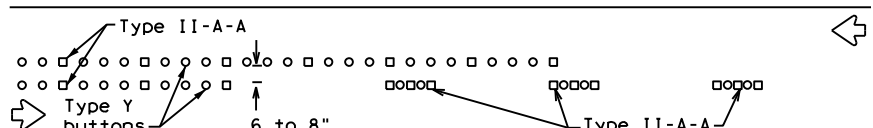


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.

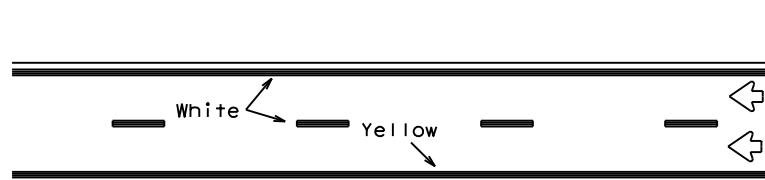


RAISED PAVEMENT MARKERS - PATTERN A



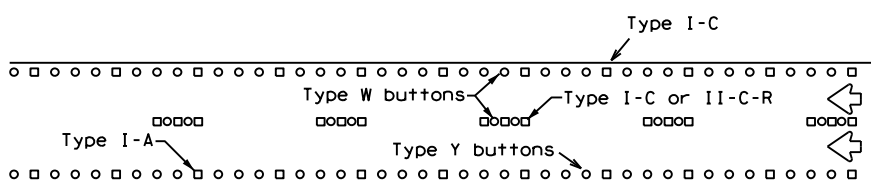
RAISED PAVEMENT MARKERS - PATTERN B

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



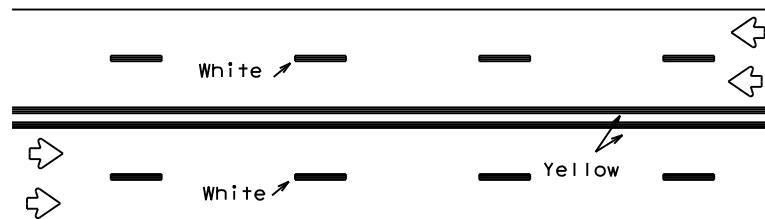
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



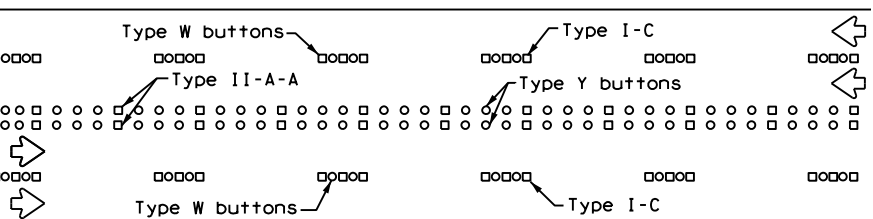
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



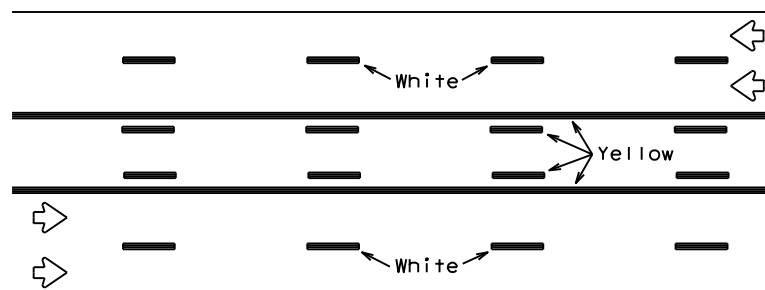
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.



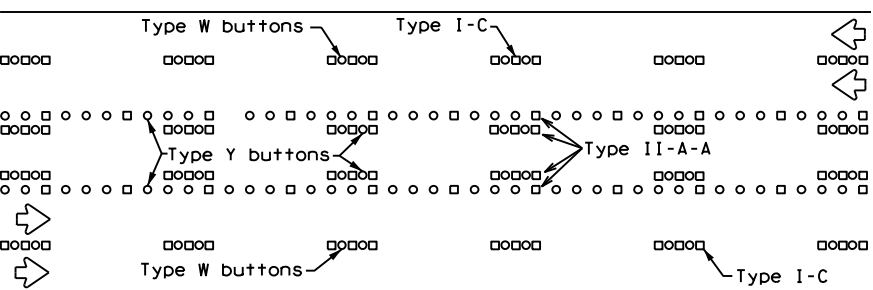
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

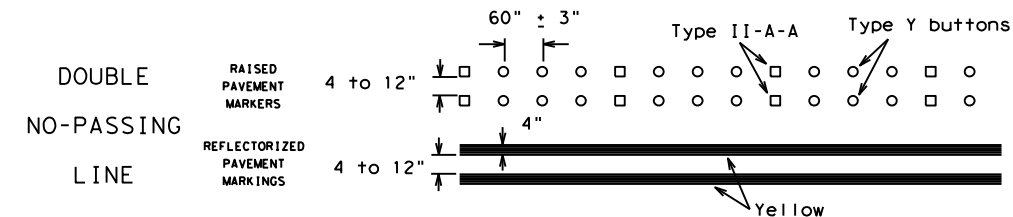
Prefabricated markings may be substituted for reflectorized pavement markings.



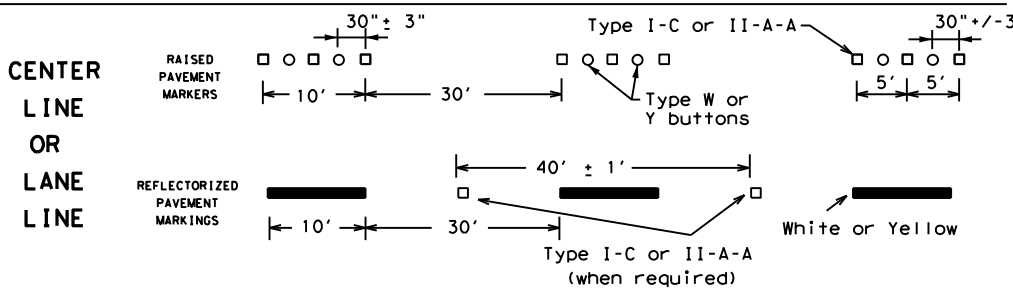
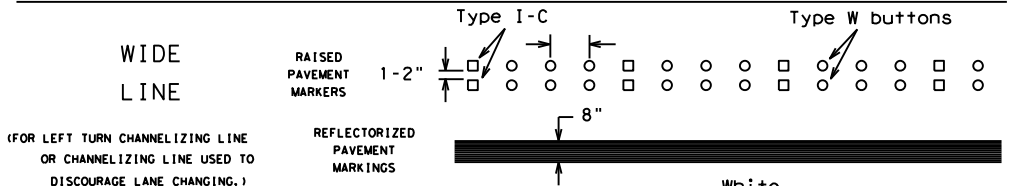
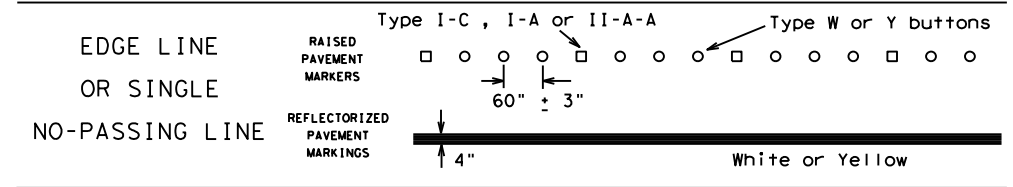
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

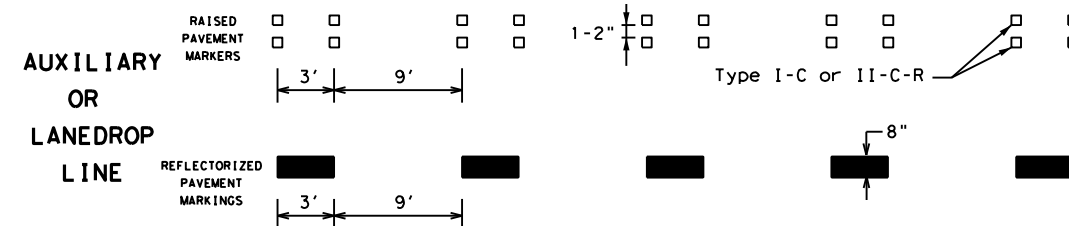
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

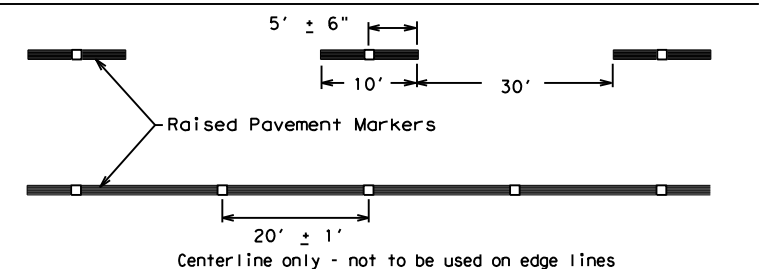


BROKEN LINES



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

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."



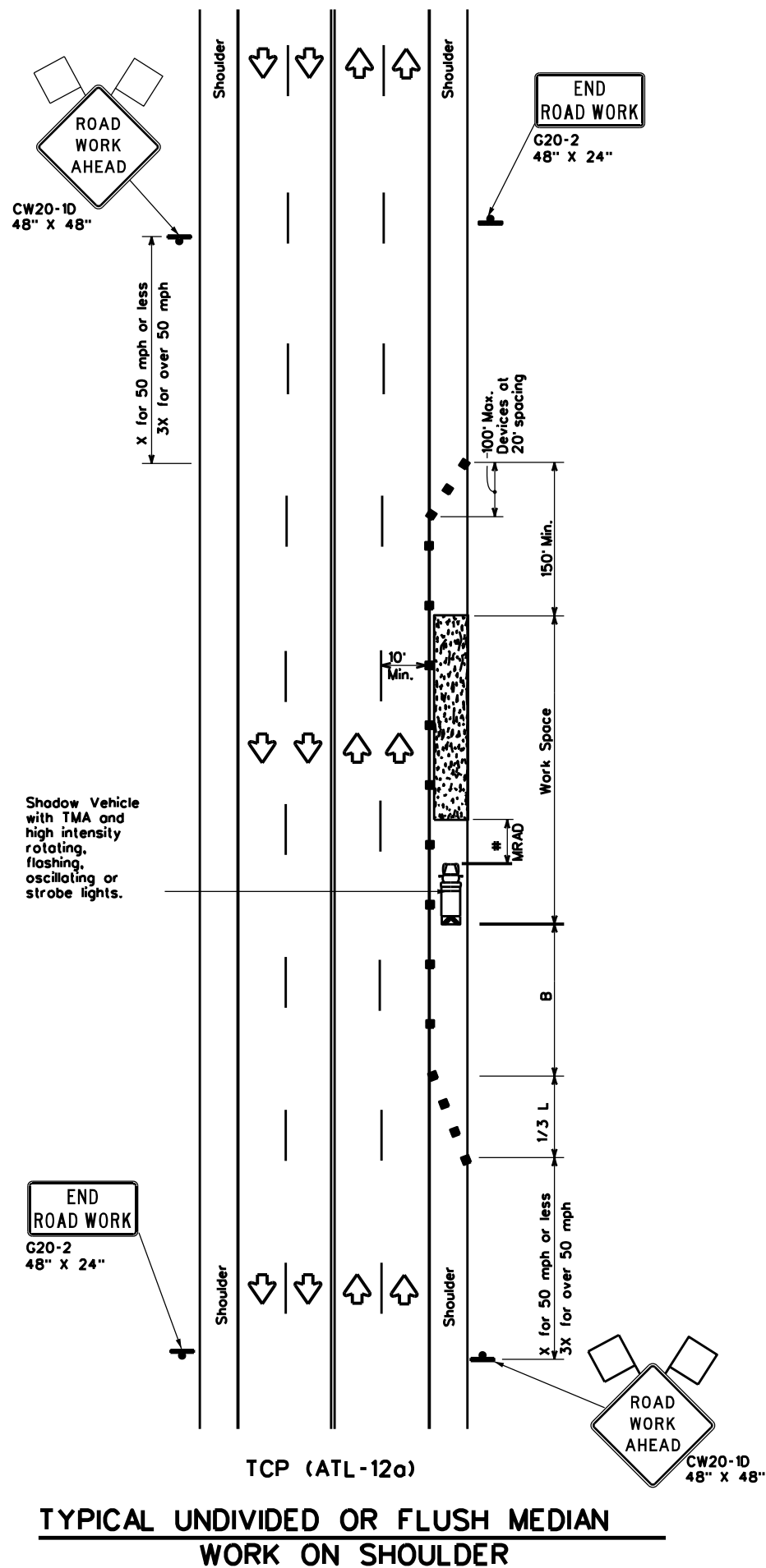
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DW: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218	03	094	US 59
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	ATL	CASS	25	
11-02 8-14				

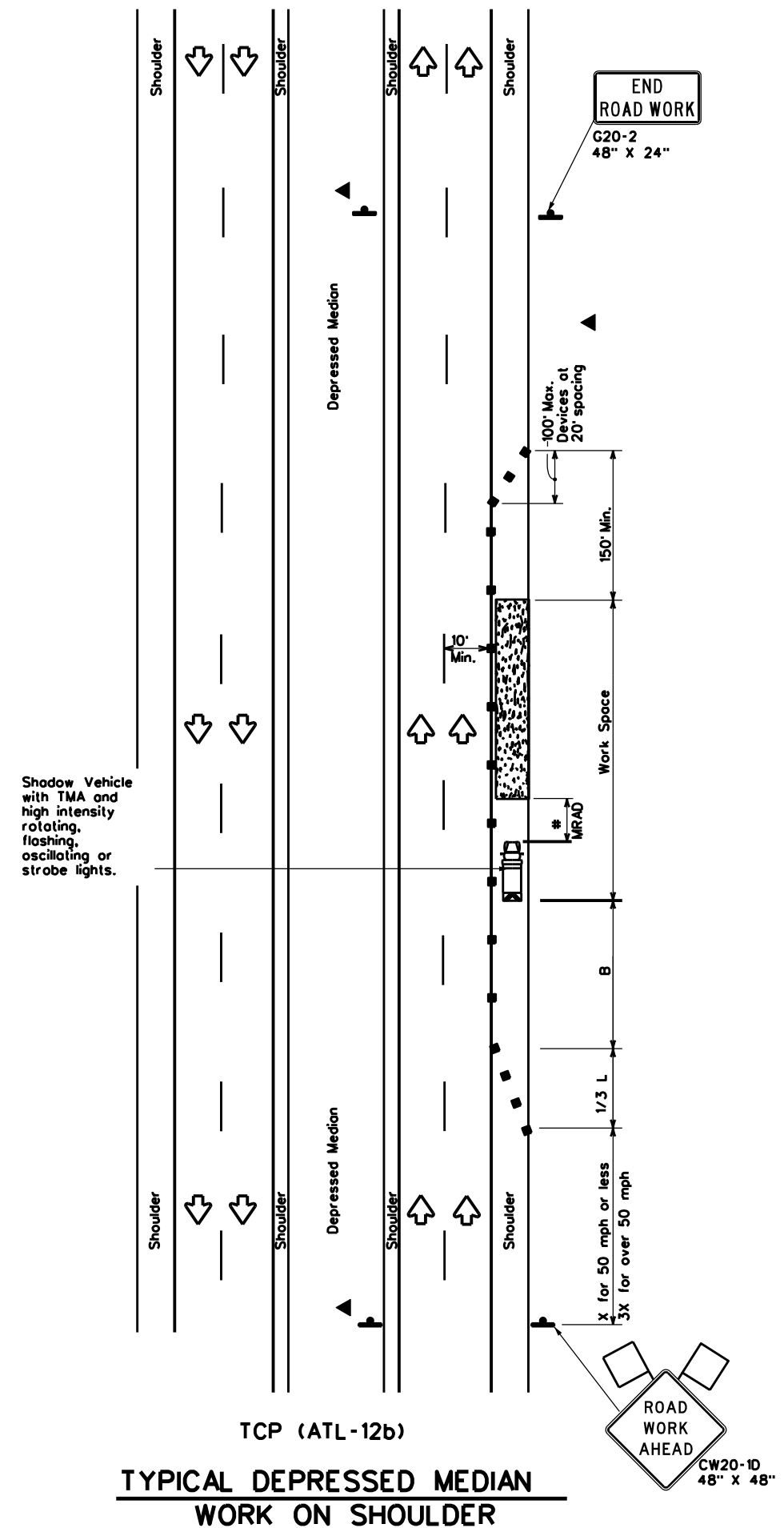
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DATE: \$DATE\$
 FILE: \$FILE\$
 \$TIME\$



TCP (ATL-12a)

**TYPICAL UNDIVIDED OR FLUSH MEDIAN
 WORK ON SHOULDER**



TCP (ATL-12b)

**TYPICAL DEPRESSED MEDIAN
 WORK ON SHOULDER**

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		Drum

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

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

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

GENERAL NOTES

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans or when approved by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- High level warning flags should be used on advance warning signs during daytime operations. Warning lights may be used to add emphasis to advance warning signs during nighttime operations.
- Duplicate construction warning signs should be erected on the median side where median width will permit and traffic volume justifies the signing.
- See BC Standards for additional sign details.
- Drums are the typical channelizing device. Cones or other devices may be used if approved by the Engineer. Drums shall be used during nighttime operations. Channelizing devices shall also be placed in accordance with "WORKSHEET FOR EDGE CONDITION TREATMENT TYPES."
- Neither work activity nor storage of equipment, vehicles, or materials shall occur within the buffer space.
- Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used and positioned per the Manufacturer's Roll Ahead Distance (MRAD) in advance of the area of crew exposure without adversely affecting the work performance.

If workers are no longer present but road or work conditions require the traffic control remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.

Texas Department of Transportation
Atlanta District Standard

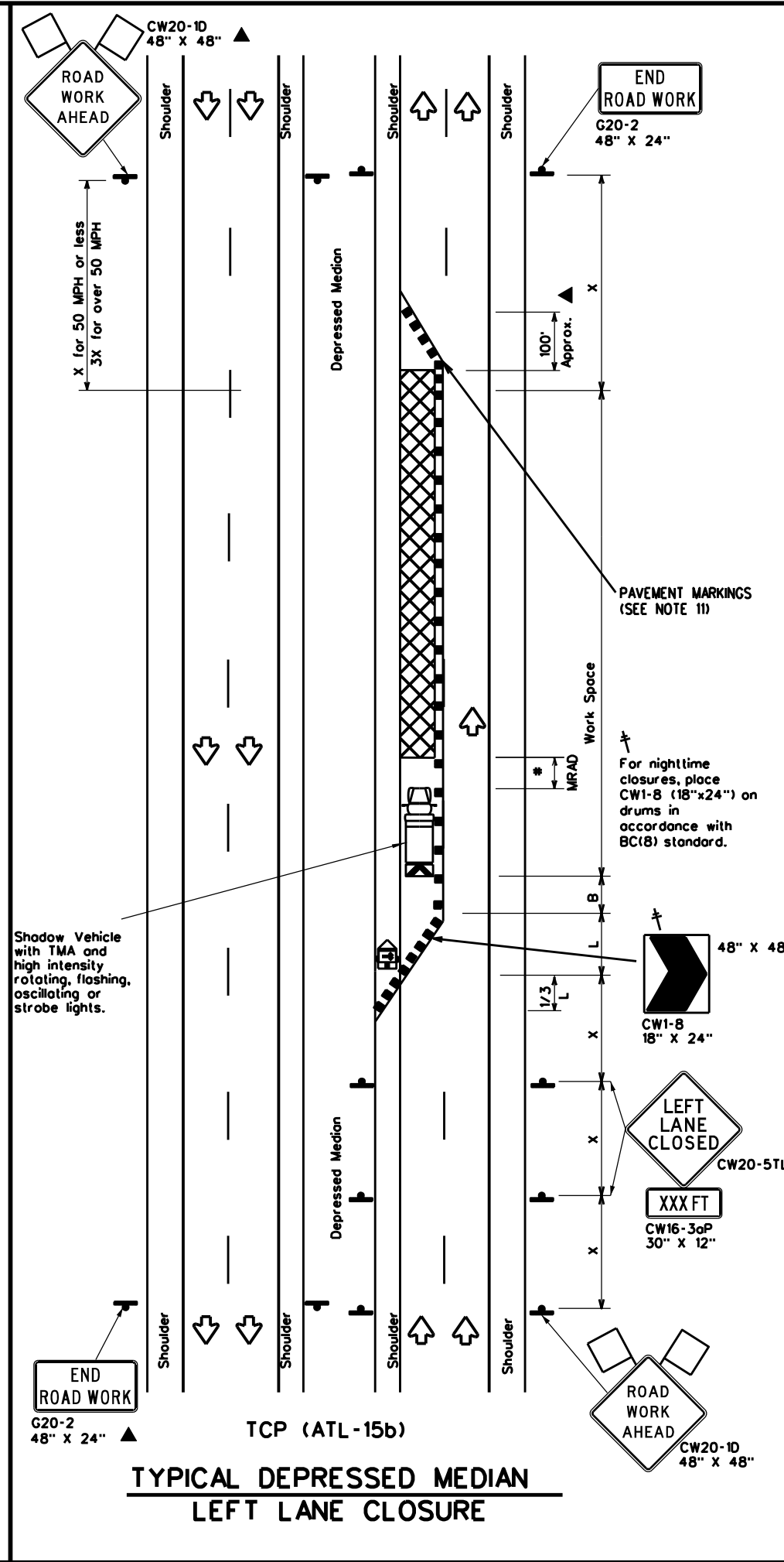
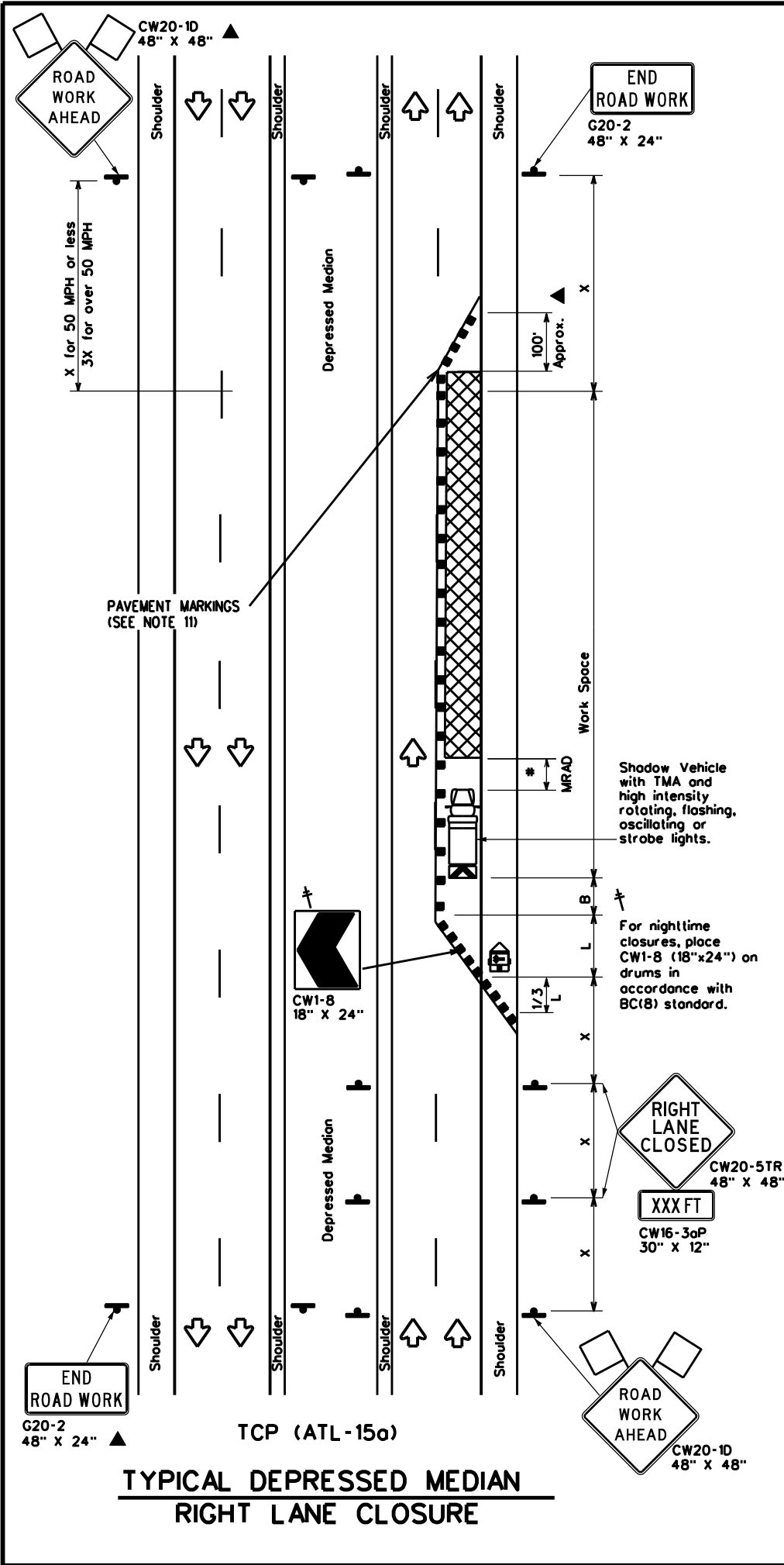
**TRAFFIC CONTROL PLAN
 WORK ON SHOULDER**

TCP (ATL-12)-14

FILE: atl-12.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2014	CONT: 0218	SECT: 03	JOB: 094	HIGHWAY: US 59
REVISIONS	DIST: ATL	COUNTY: CASS	SHEET NO. 26	

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\$TIME\$
\$DATE\$
\$FILE\$



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		Drum

Posted Speed x	Formula	Minimum Desirable Taper Lengths x x			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		
70	L - WS	700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

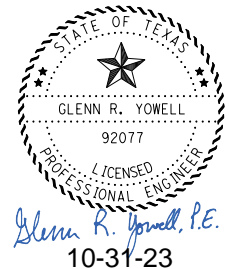
x Conventional Roads Only
 x x Taper lengths have been rounded off.
 L-Length of Taper(FT) W-Width of Offset(FT) S-Posted Speed(MPH)

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

GENERAL NOTES

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans or when approved by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- High level warning flags should be used on advance warning signs during daytime operations. Warning lights may be used to add emphasis to advance warning signs during nighttime operations.
- Duplicate construction warning signs should be erected on the median side where median width will permit and traffic volume justifies the signing.
- See BC Standards for additional sign details.
- Drums are the typical channelizing device. Cones or other devices may be used if approved by the Engineer. Drums shall be used during nighttime operations. Channelizing devices shall also be placed in accordance with "WORKSHEET FOR EDGE CONDITION TREATMENT TYPES."
- Neither work activity nor storage of equipment, vehicles, or materials shall occur within the buffer space.
- When signs are mounted at 1 height for short term stationary, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.
- The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.

- MODIFICATIONS:**
- OMITTED SHORT TERM AND INTERMEDIATE TERM STATIONARY CHECK MARK.
 - PAVEMENT REPAIRS REMOVED FROM TITLE BLOCK.
 - PAVEMENT MARKING USAGE TO DELINEATE WORK ZONE, INCLUDING GENERAL NOTE 11.
 - OMITTED GENERAL NOTE 9.



A shadow vehicle equipped with a Truck Mounted Attenuator is required. A shadow vehicle equipped with a TMA shall be used and positioned per the Manufacturer's Roll Ahead Distance (MRAD) in advance of the area of crew exposure without adversely affecting the work performance.

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.

NOT TO SCALE

Texas Department of Transportation

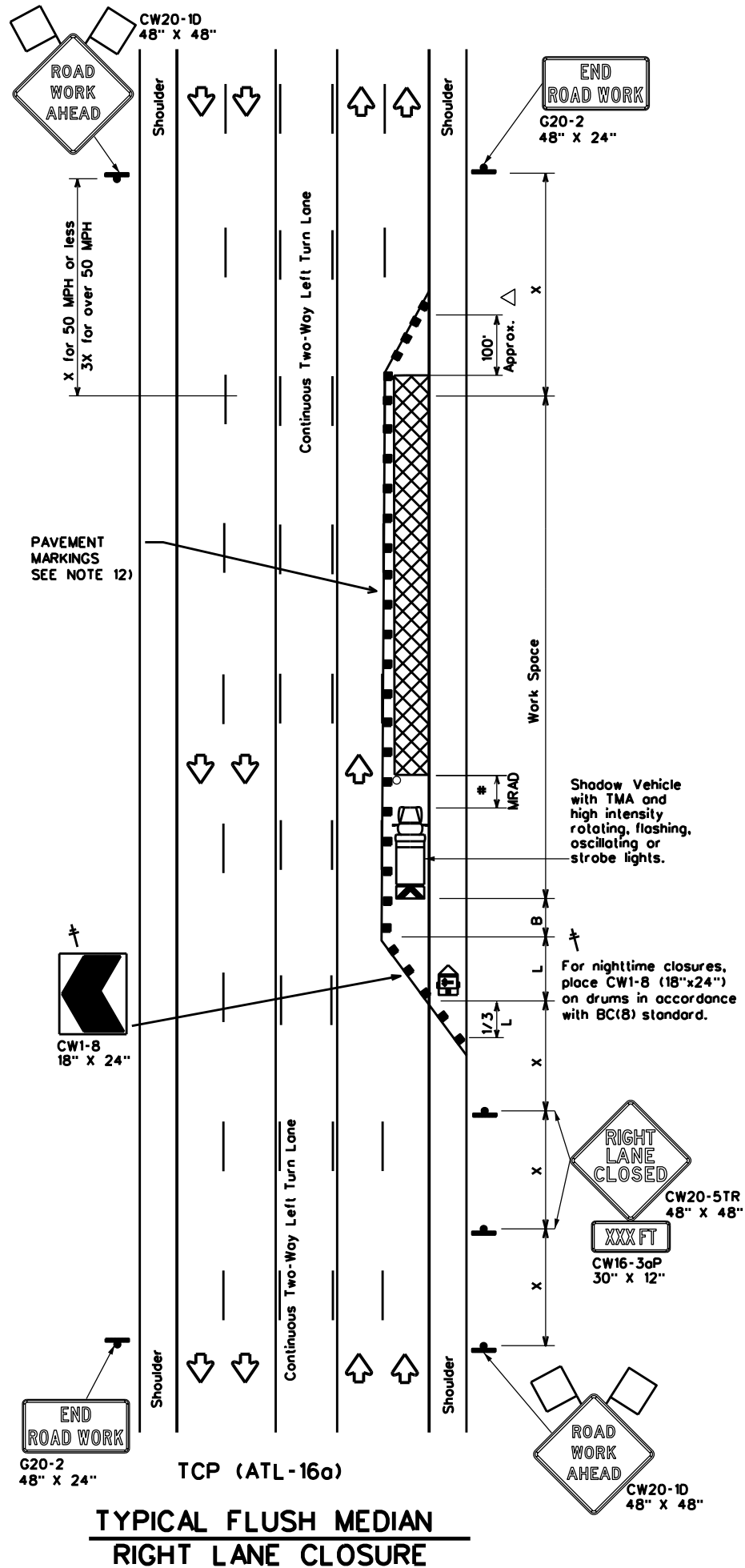
TRAFFIC CONTROL PLAN (DEPRESSED MEDIAN)

TCP (ATL-15)-15 (MOD)

FILE: atl-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT January 2014	CONT: 0218	SECT: 033	JOB: 094	HIGHWAY: US 59
4-15	DIST: ATL	COUNTY: CASS	SHEET NO. 27	

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DATE: \$DATE\$
FILE: \$FILES\$



TYPICAL FLUSH MEDIAN
RIGHT LANE CLOSURE

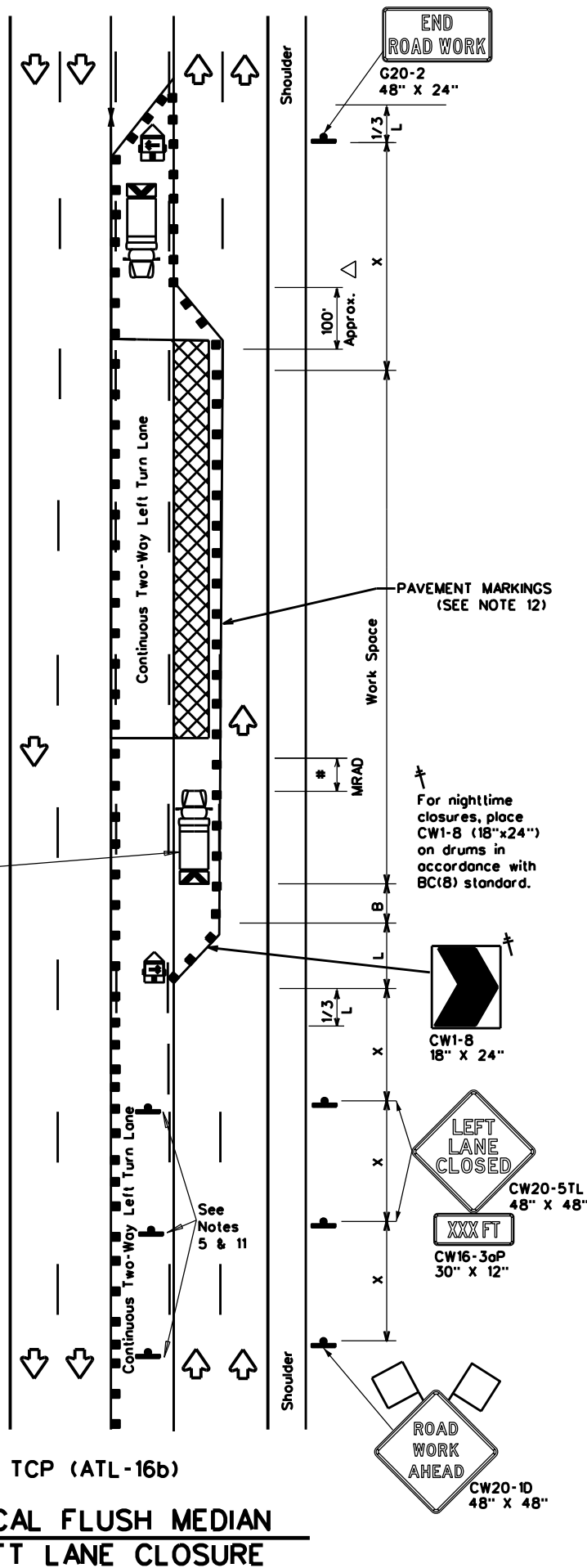
NOTE: TRAFFIC CONTROL DEVICES FOR LANE CLOSURE IN THIS DIRECTION SHALL BE THE SAME AS SHOWN FOR THE OTHER DIRECTION.

WHEN WORKERS ARE NO LONGER PRESENT BUT ROAD OR WORK CONDITIONS REQUIRE THE TRAFFIC CONTROL TO REMAIN IN PLACE AND WHEN APPROVED BY THE ENGINEER, TRAFFIC CONTROL DEVICES MAY BE SET TO ONLY CLOSE THE CONTINUOUS TWO-WAY LEFT TURN LANE, ALLOWING TRAFFIC IN THIS DIRECTION TO TRAVEL IN INSIDE LANE. (FOR SHORT TERM AND INTERMEDIATE STATIONARY ONLY)

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights.

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights.

For nighttime closures, place CW1-8 (18"x24") on drums in accordance with BC(8) standard.



TYPICAL FLUSH MEDIAN
LEFT LANE CLOSURE

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		Drum				

Posted Speed x	Formula	Minimum Desirable Taper Lengths x x			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		
60	L = WS	600'	660'	720'	60'	120'	600'	350'
70		700'	770'	840'	70'	140'	800'	475'

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

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

GENERAL NOTES

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans or when approved by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- High level warning flags should be used on advance warning signs during daytime operations. Warning lights may be used to add emphasis to advance warning signs during nighttime operations.
- Duplicate construction warning signs shall be erected on the median side.
- See BC Standards for additional sign details.
- Drums are the typical channelizing device. Cones or other devices may be used if approved by the Engineer. Drums shall be used during nighttime operations. Channelizing devices shall also be placed in accordance with "WORKSHEET FOR EDGE CONDITION TREATMENT TYPES."
- Neither work activity nor storage of equipment, vehicles, or materials shall occur within the buffer space.
- When signs are mounted at 7' height for short term stationary, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.
- For TCP (ATL-16b) Flush Median, median side signs shall be mounted at 7' height.
- The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.

MODIFICATIONS:

- OMITTED SHORT TERM AND INTERMEDIATE TERM STATIONARY CHECK MARK.
- PAVEMENT REPAIRS REMOVED FROM TITLE BLOCK.
- PAVEMENT MARKING USAGE TO DELINEATE WORK ZONE, INCLUDING GENERAL NOTE 12.
- OMITTED GENERAL NOTE 9.
- ADDED NOTE 12

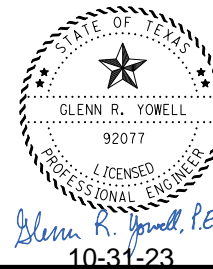
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Texas Department of Transportation

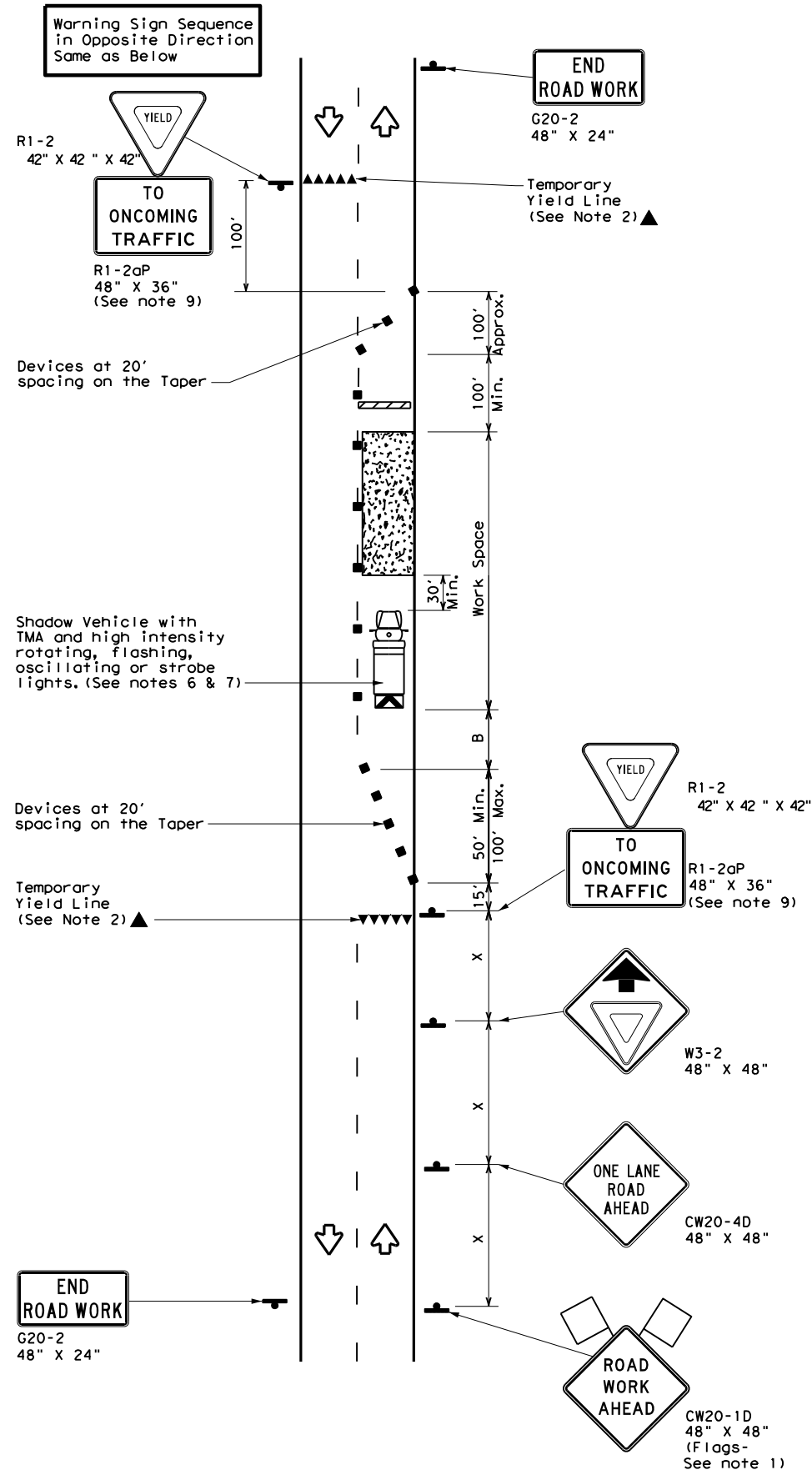
TRAFFIC CONTROL PLAN (FLUSH MEDIAN)

TCP (ATL-16)-15(MOD)

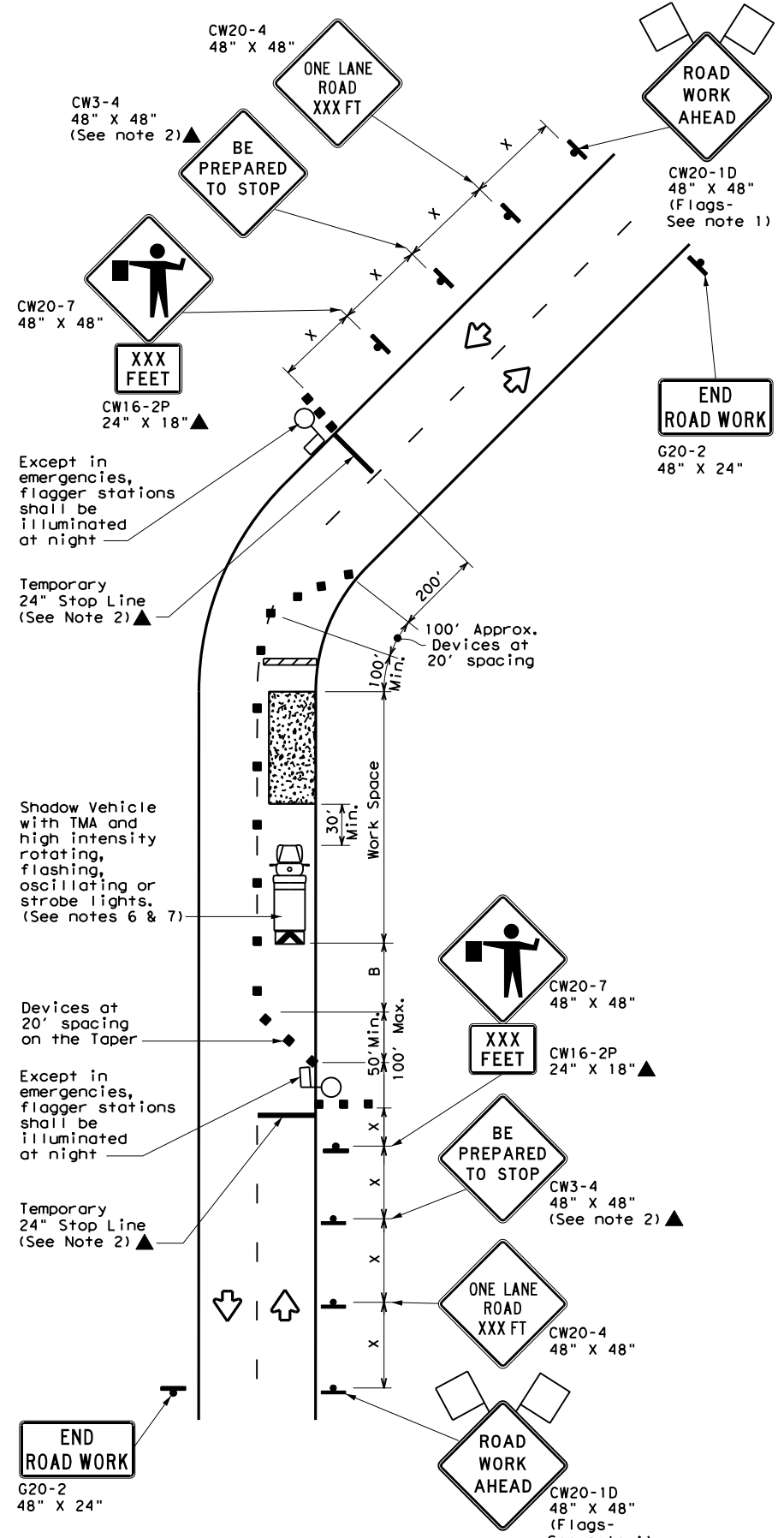
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© TxDOT January 2014	CONT	SECT	JOB	HIGHWAY
4-15	0218	03	094	US 59
DIST	COUNTY	SHEET NO.		
ATL	CASS	28		



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



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

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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 CW20-4 "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.
 - The channelization must be made dominant by using a very close spacing.

Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 ONE-LANE TWO-WAY
 TRAFFIC CONTROL**

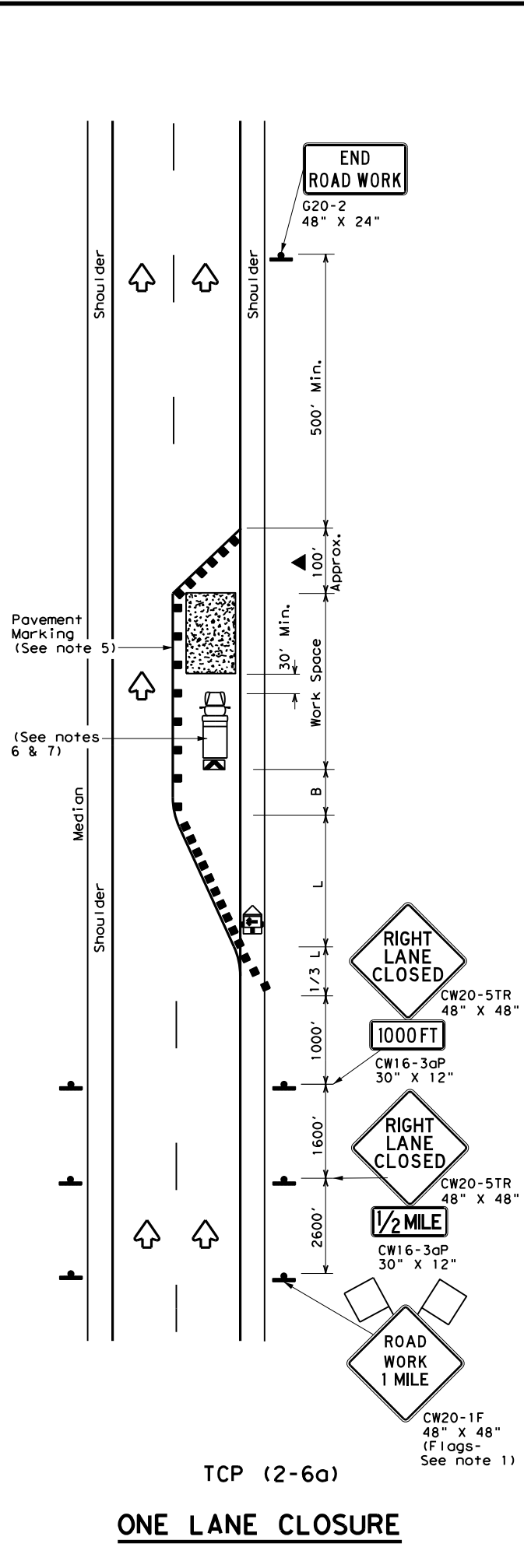
TCP (2-2) - 18

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1-97 2-12	ATL	CASS	29	
4-98 2-18				

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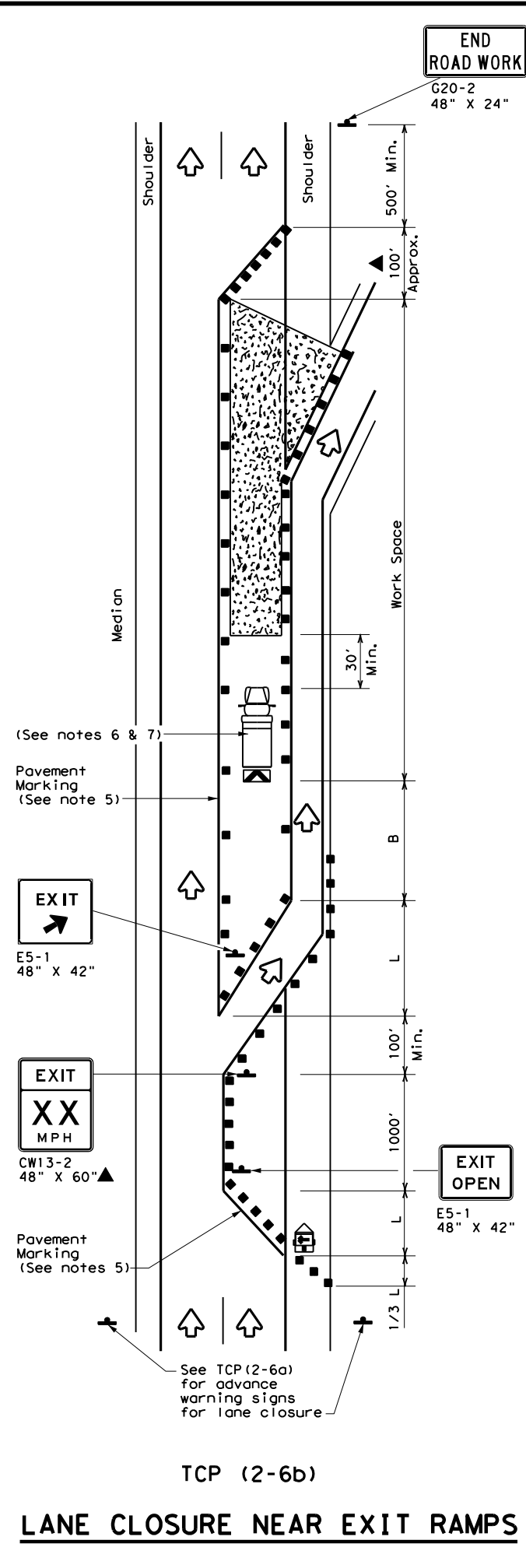
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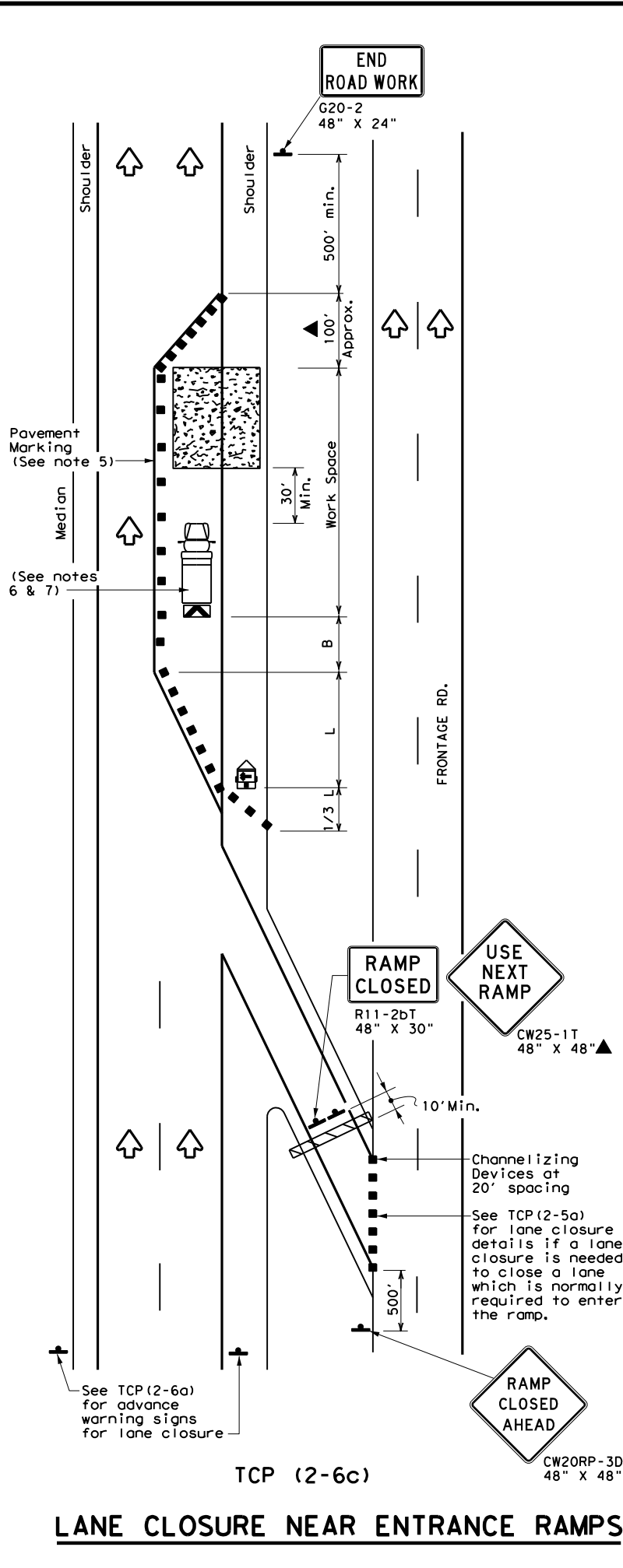
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMP



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMP

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

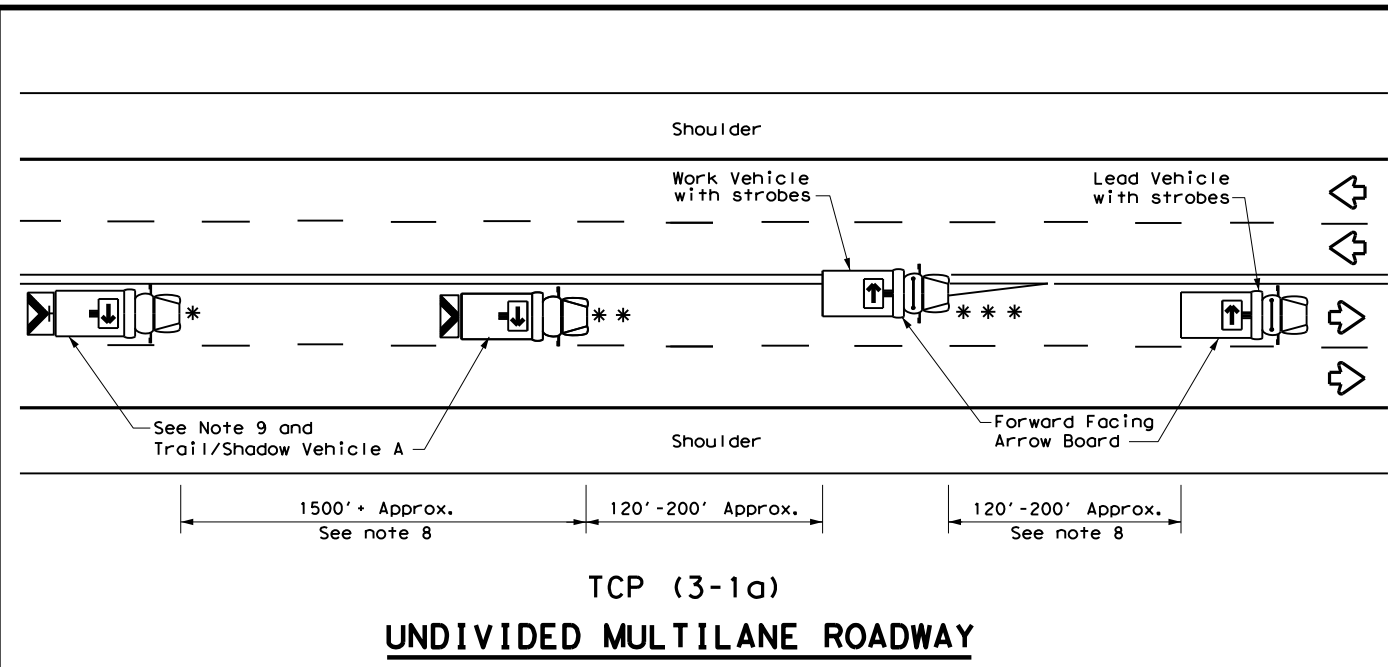
TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP (2-6) - 18

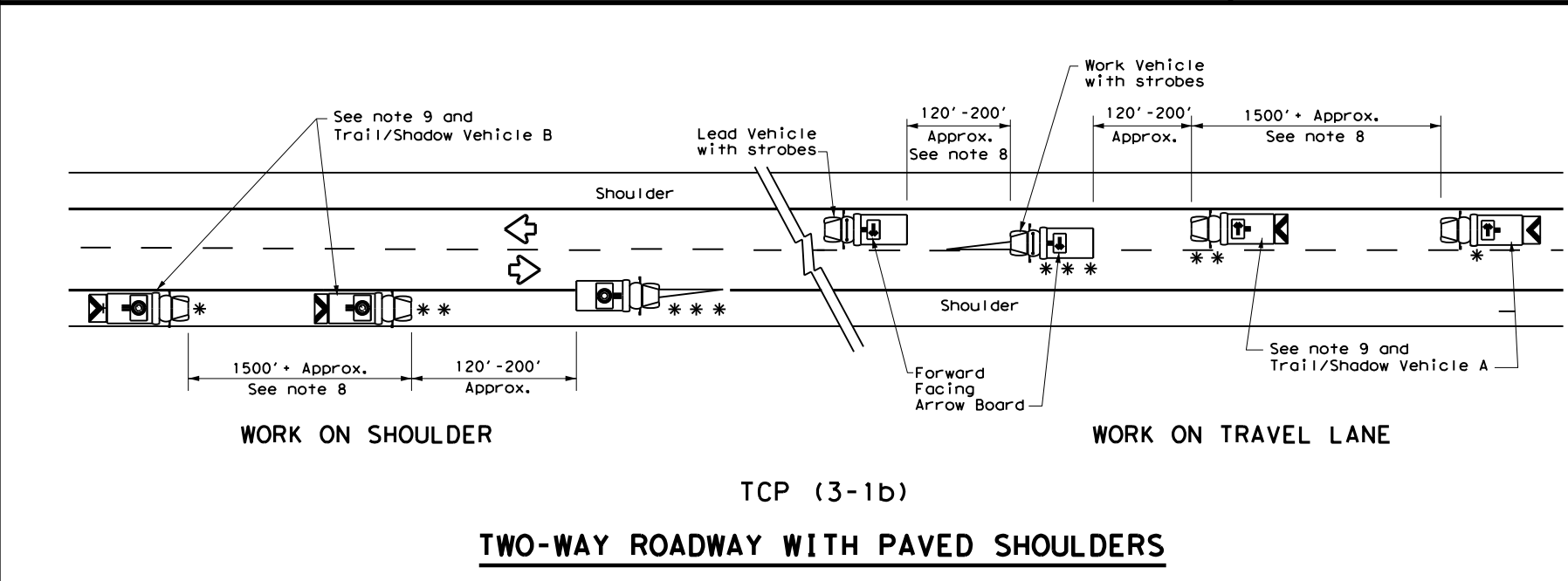
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1-97 2-18				

166

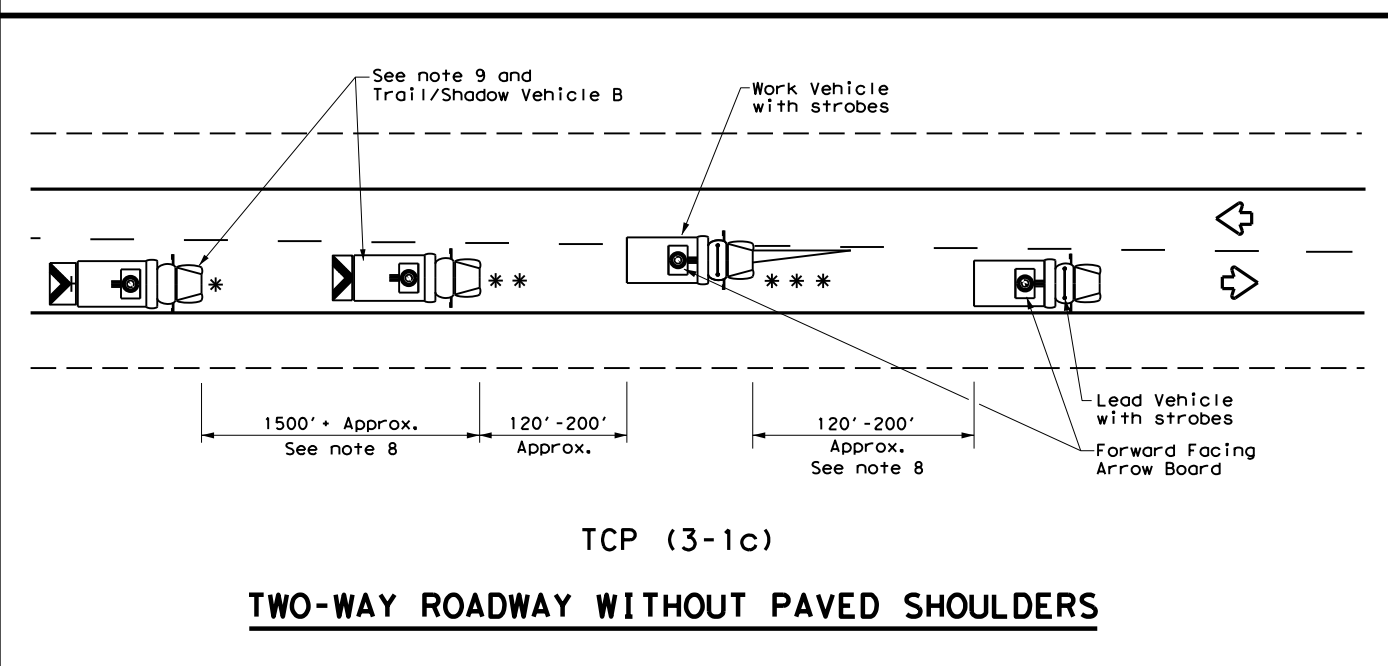
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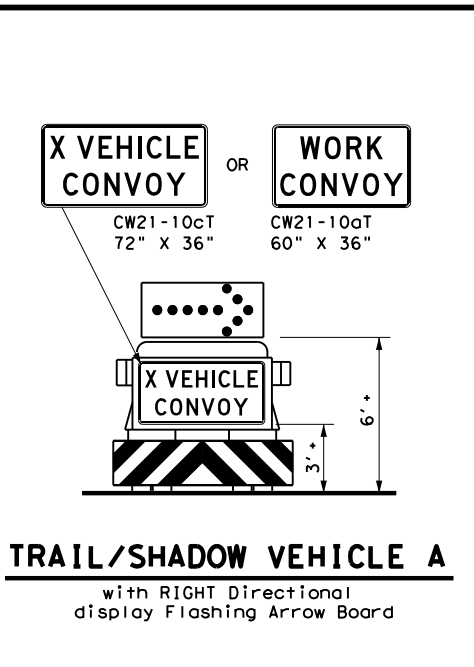
TCP (3-1a)
UNDIVIDED MULTILANE ROADWAY



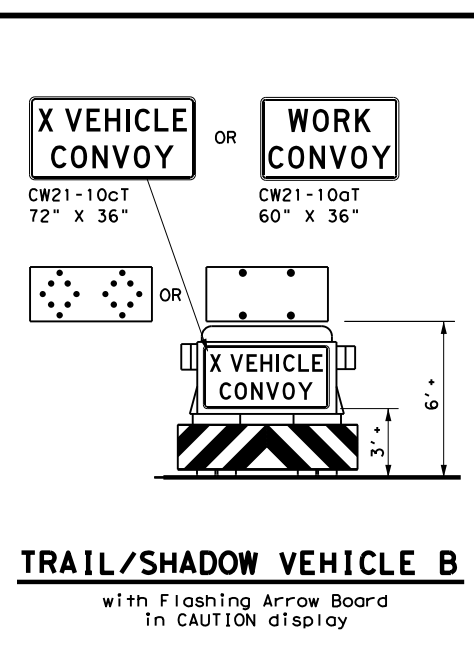
TCP (3-1b)
TWO-WAY ROADWAY WITH PAVED SHOULDERS



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



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



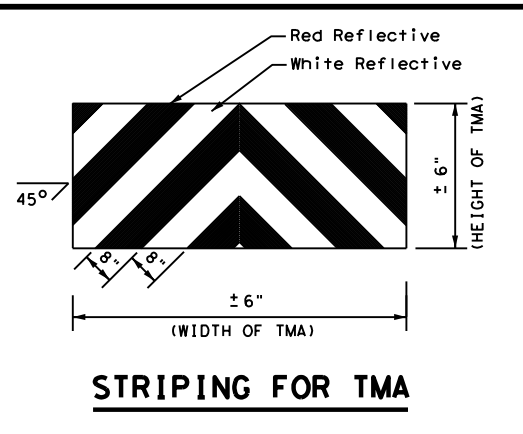
TRAIL/SHADOW VEHICLE B
with Flashing Arrow Board in CAUTION display

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation
 Traffic Operations Division Standard

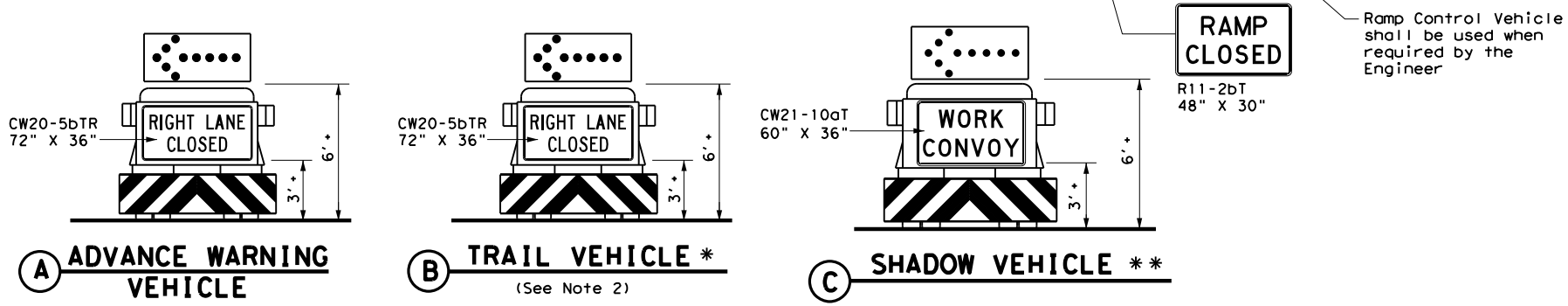
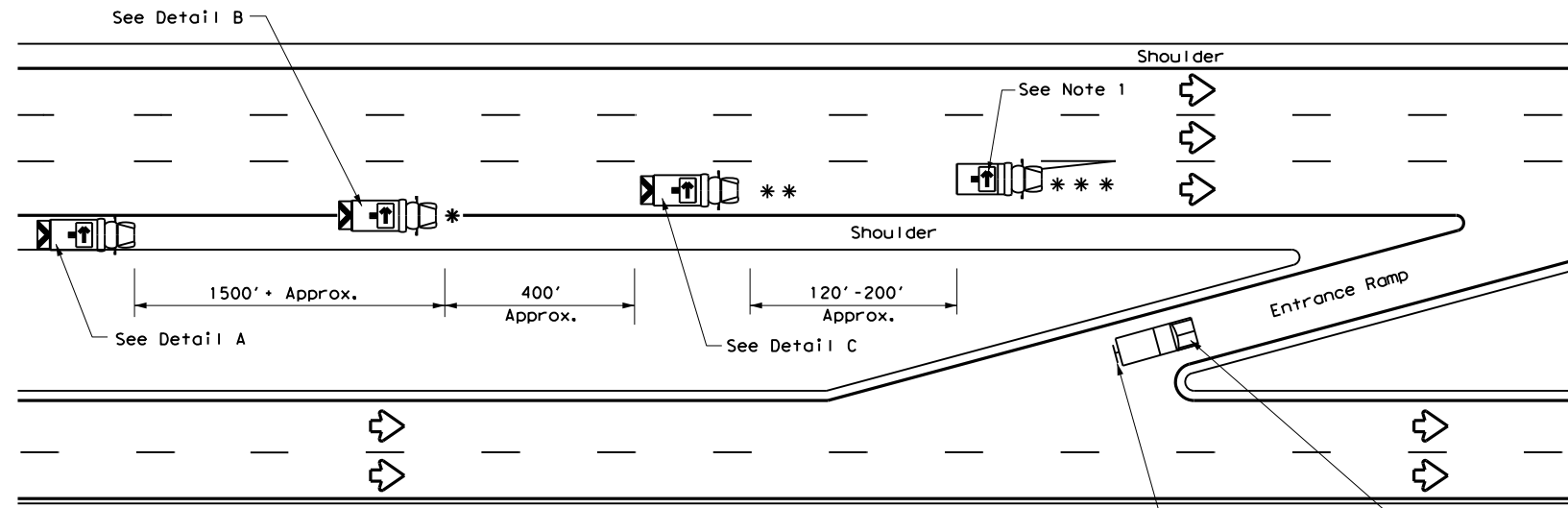
TRAFFIC CONTROL PLAN
 MOBILE OPERATIONS
 UNDIVIDED HIGHWAYS

TCP(3-1)-13

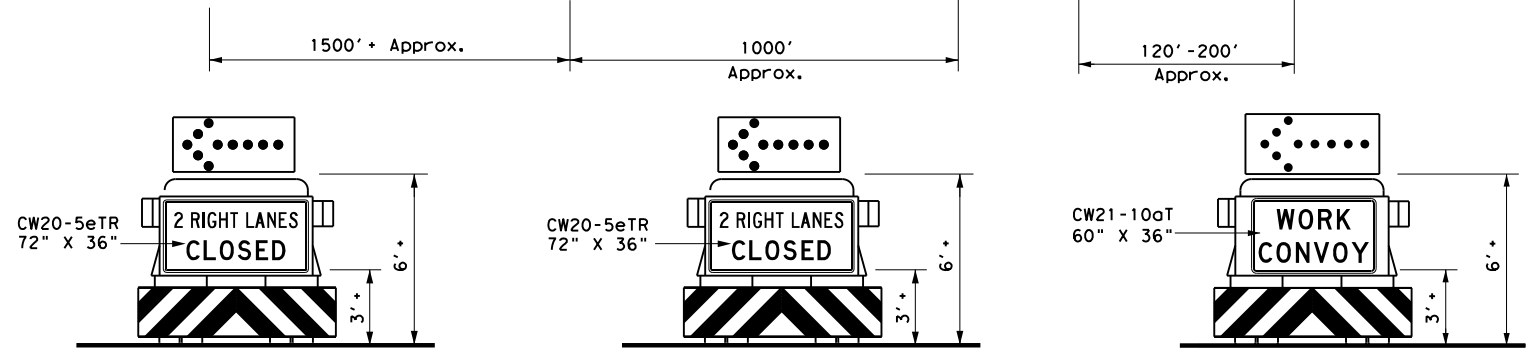
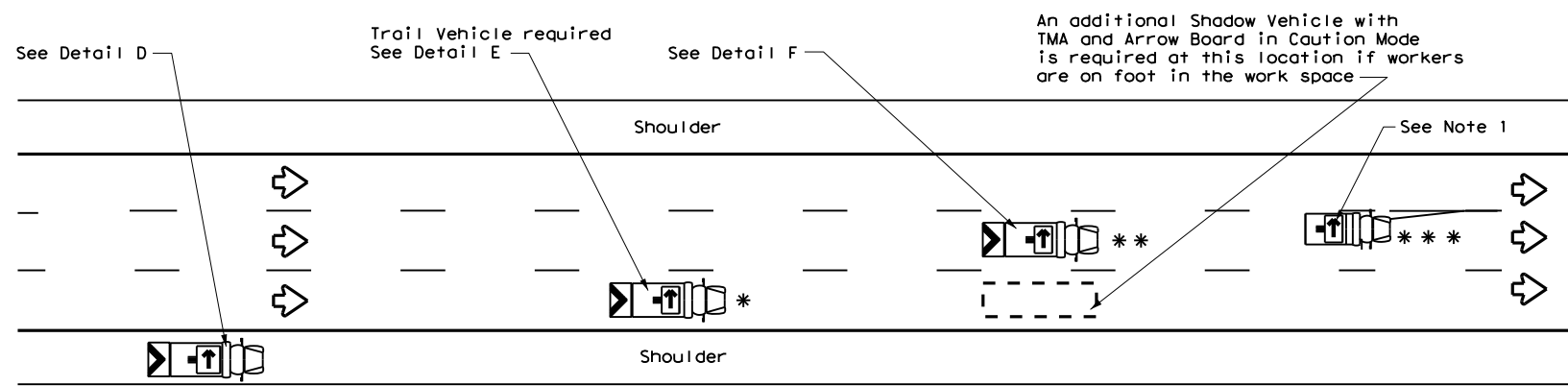
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98				
8-95 7-13				
1-97				
	DIST	COUNTY		SHEET NO.
	ATL	CASS		31

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



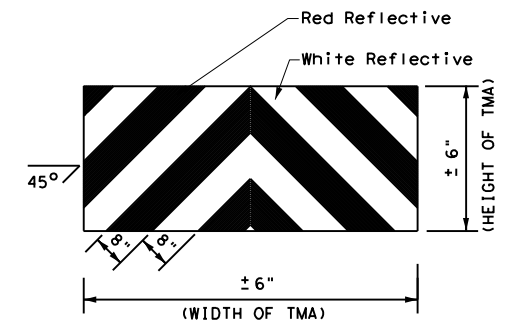
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

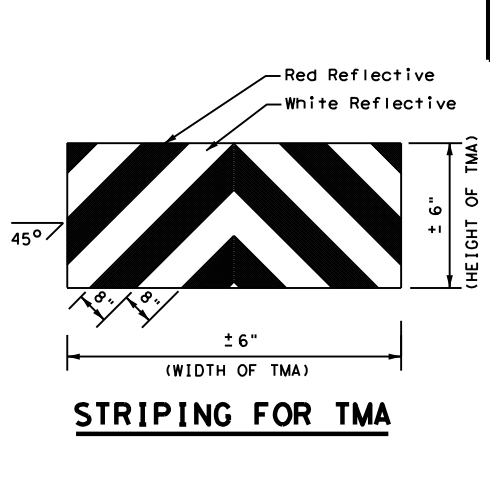
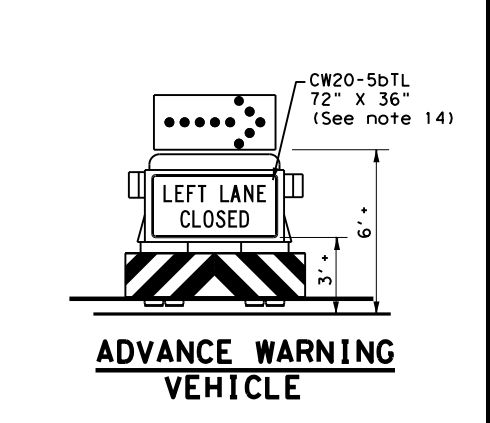
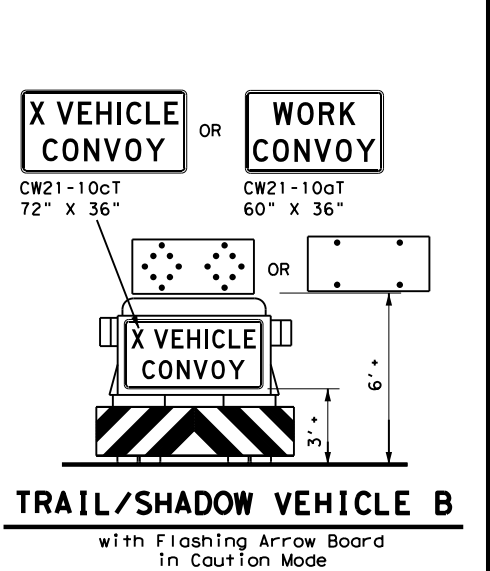
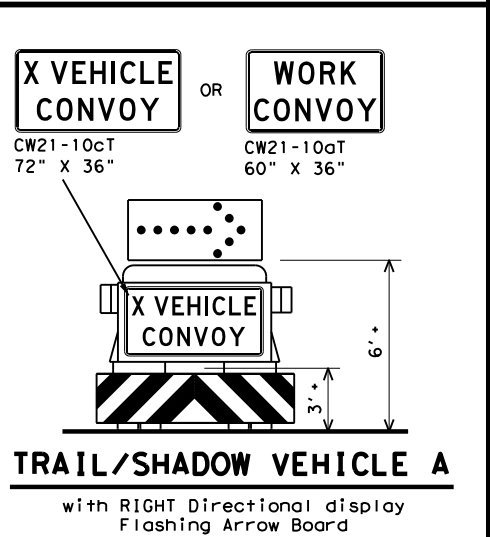
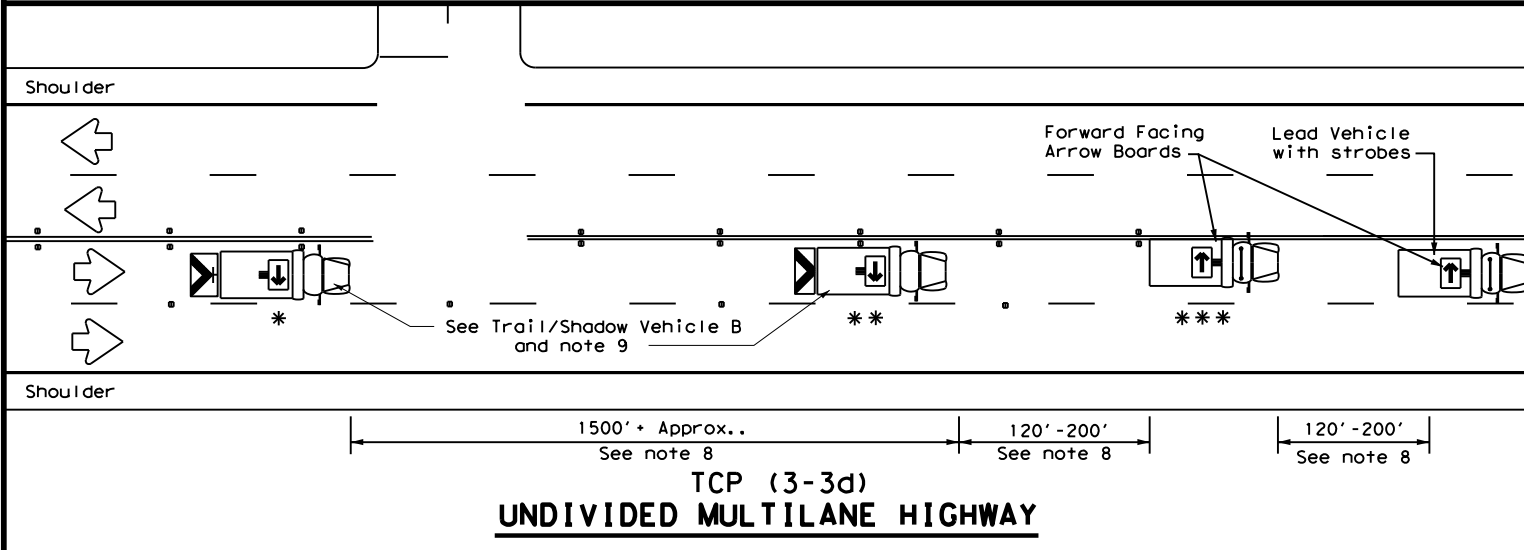
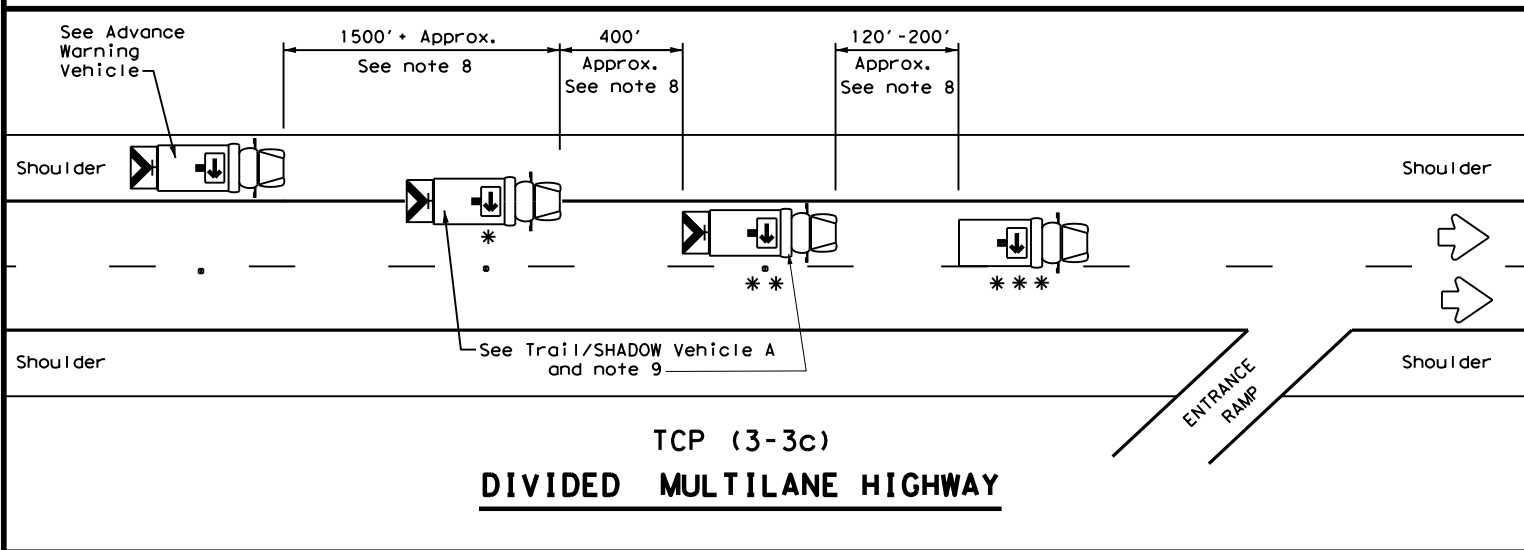
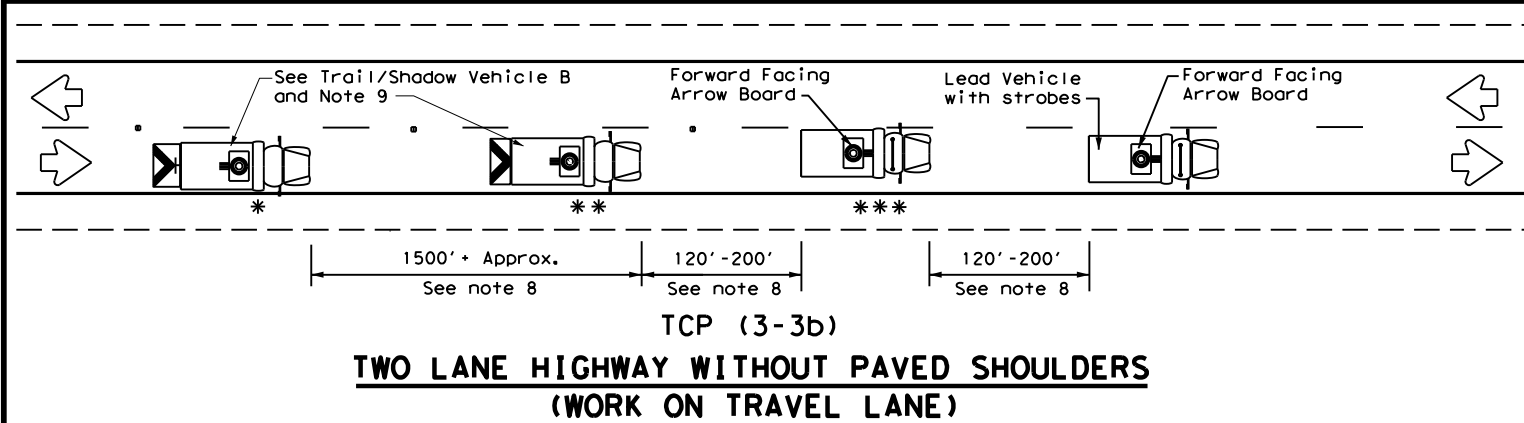
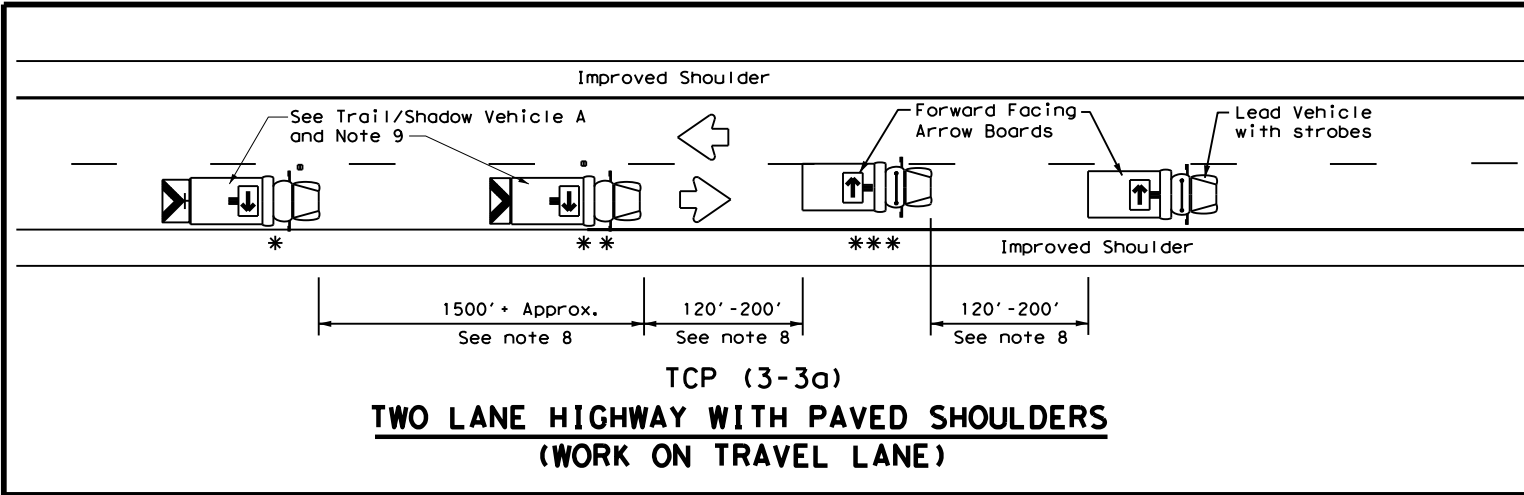
TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	ATL	CASS	32	
1-97				

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DATE: \$DATE\$
 FILE: \$FILE\$
 \$TIME\$



LEGEND		
* Trail Vehicle	ARROW BOARD DISPLAY	
** Shadow Vehicle		
*** Work Vehicle		RIGHT Directional
		LEFT Directional
		Double Arrow
		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTES

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

Texas Department of Transportation

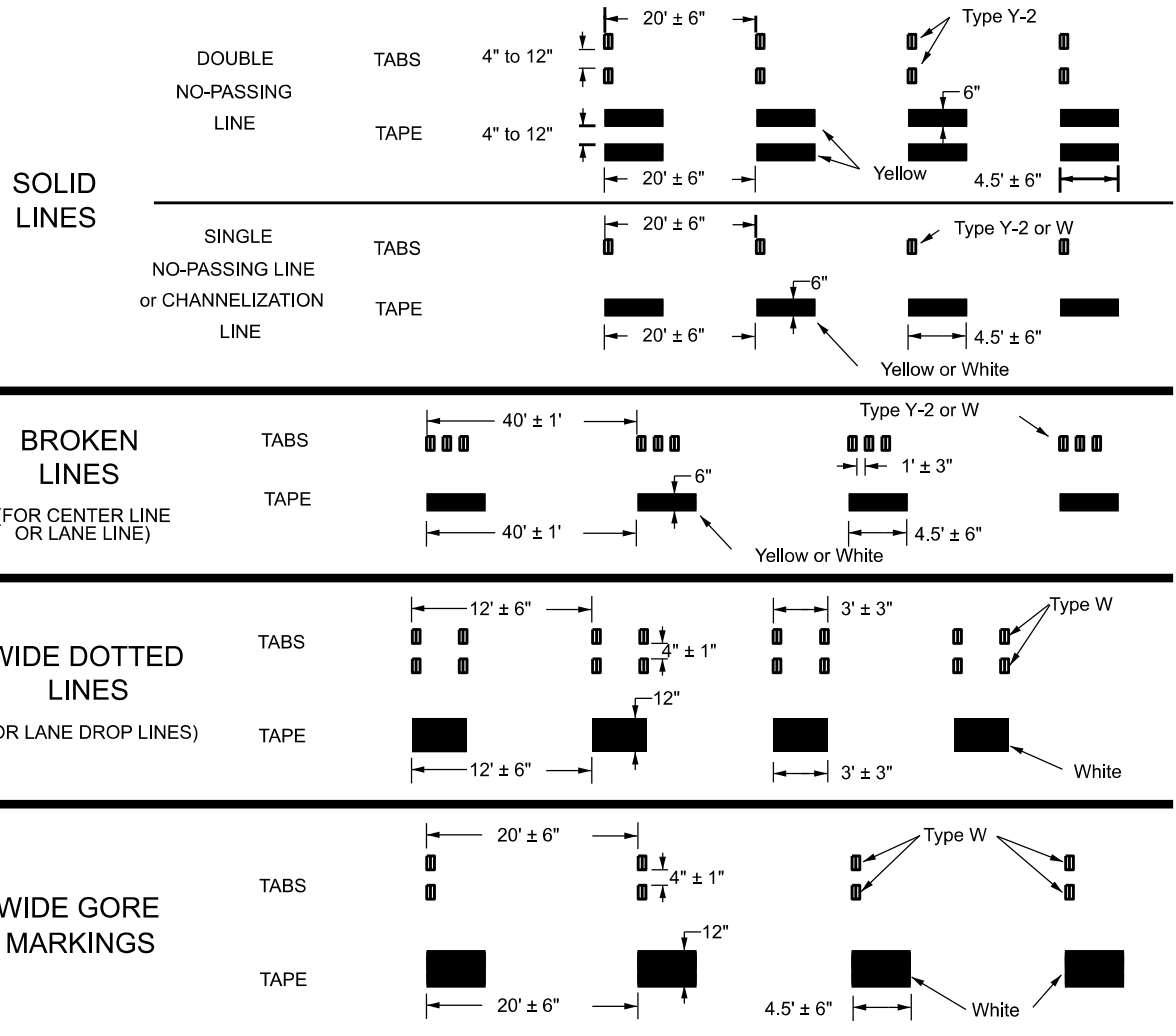
Traffic Operations Division Standard

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

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218	03	094	US 59
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	ATL	CASS	33	
1-97 7-14				

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



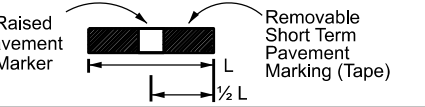
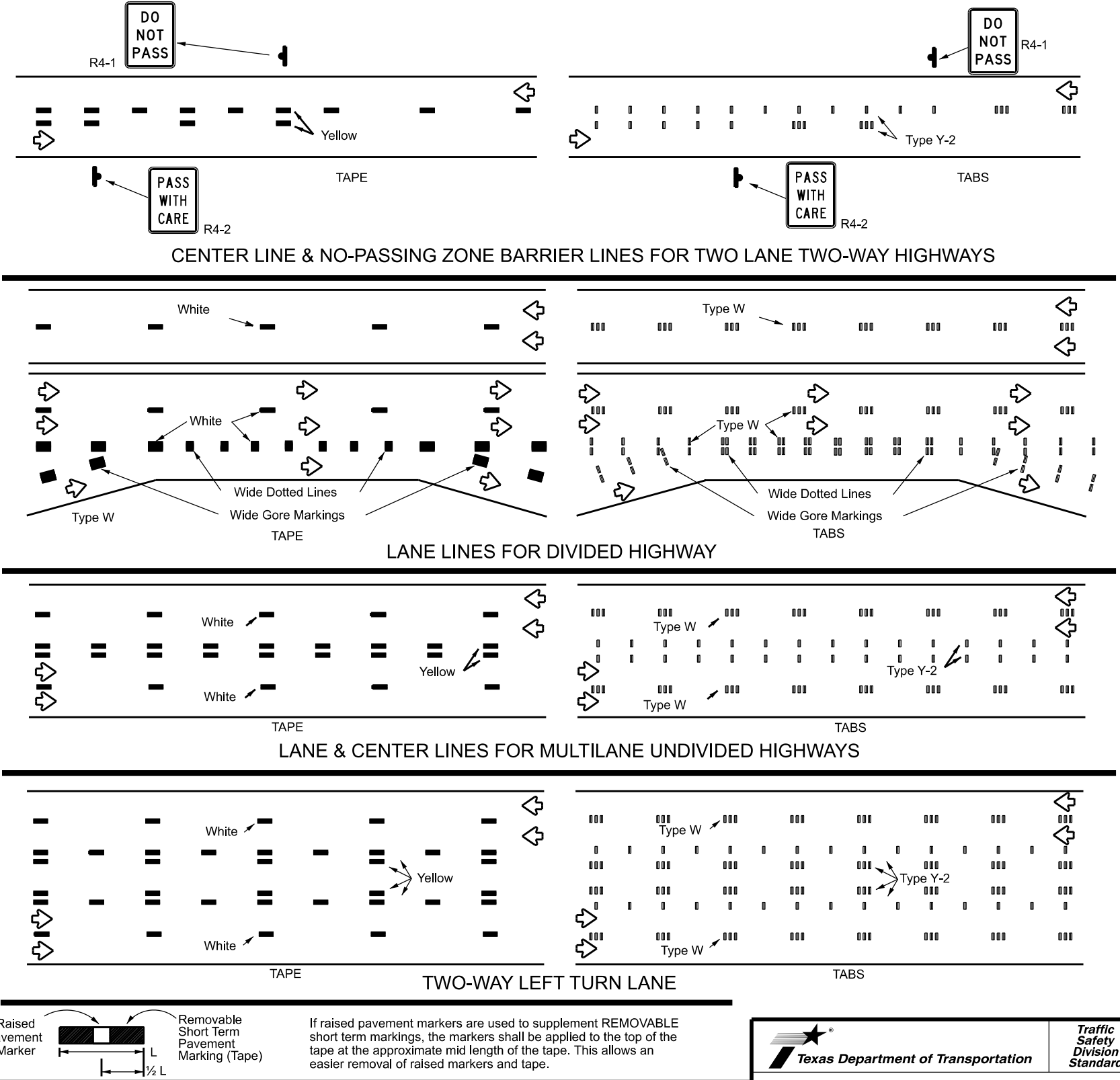
NOTES:

- 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. 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

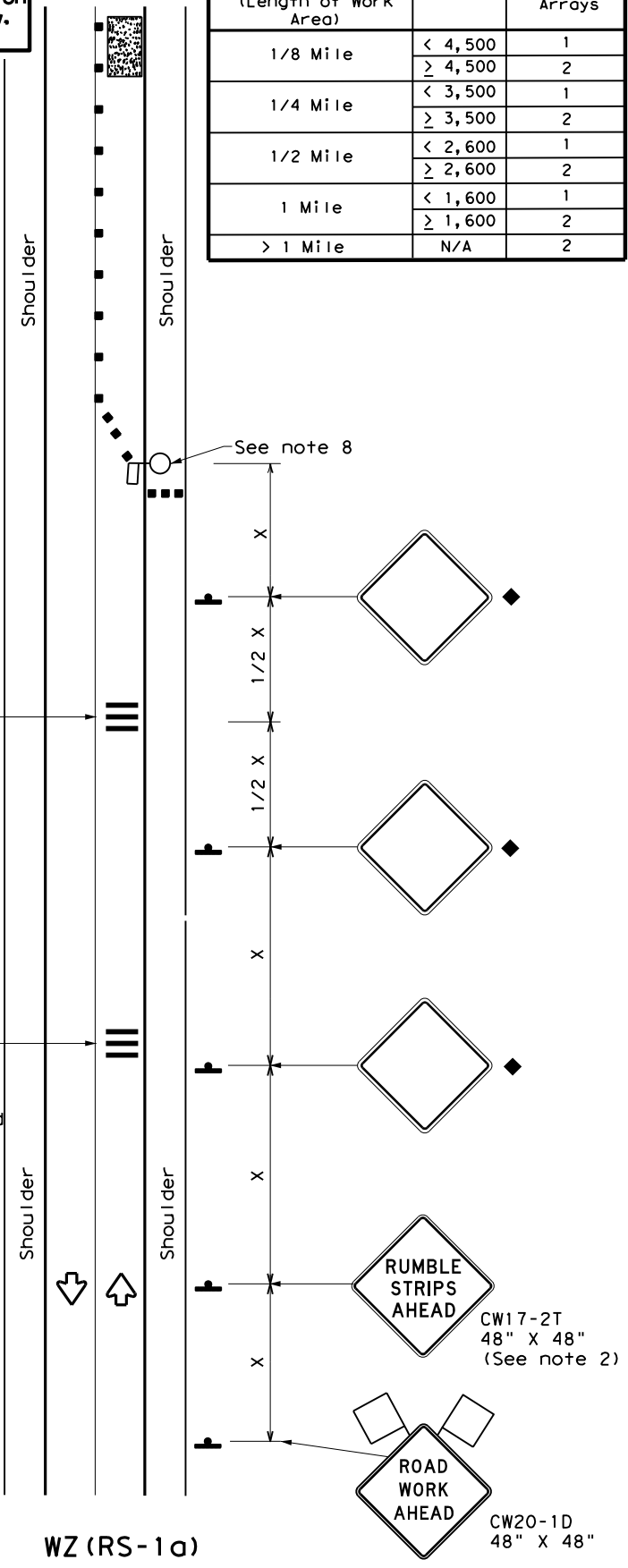
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© TxDOT February 2023	CONT: 0218	SECT: 03	JOB: 094	HIGHWAY: US 59
4-92 7-13 1-97 2-23 3-03	REVISIONS:	DIST: ATL	COUNTY: CASS	SHEET NO.: 34

DATE: \$DATE\$
 FILE: \$FILES\$
 \$TIMES\$

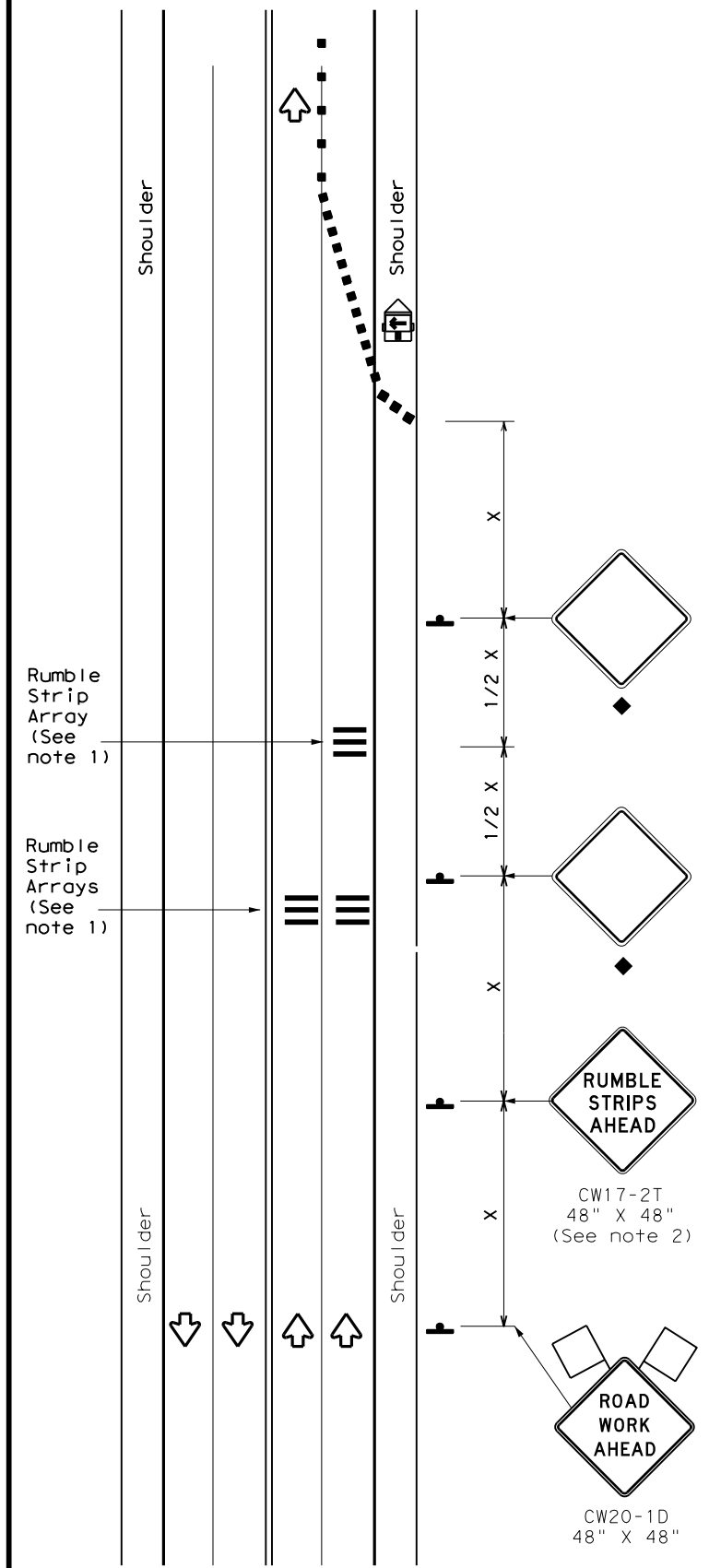
DATE: 10/16/2023 1:50:16 PM
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 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of any information from one format to another.

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

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



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

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.

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

	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)

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.

Texas Department of Transportation
 Traffic Safety Division Standard

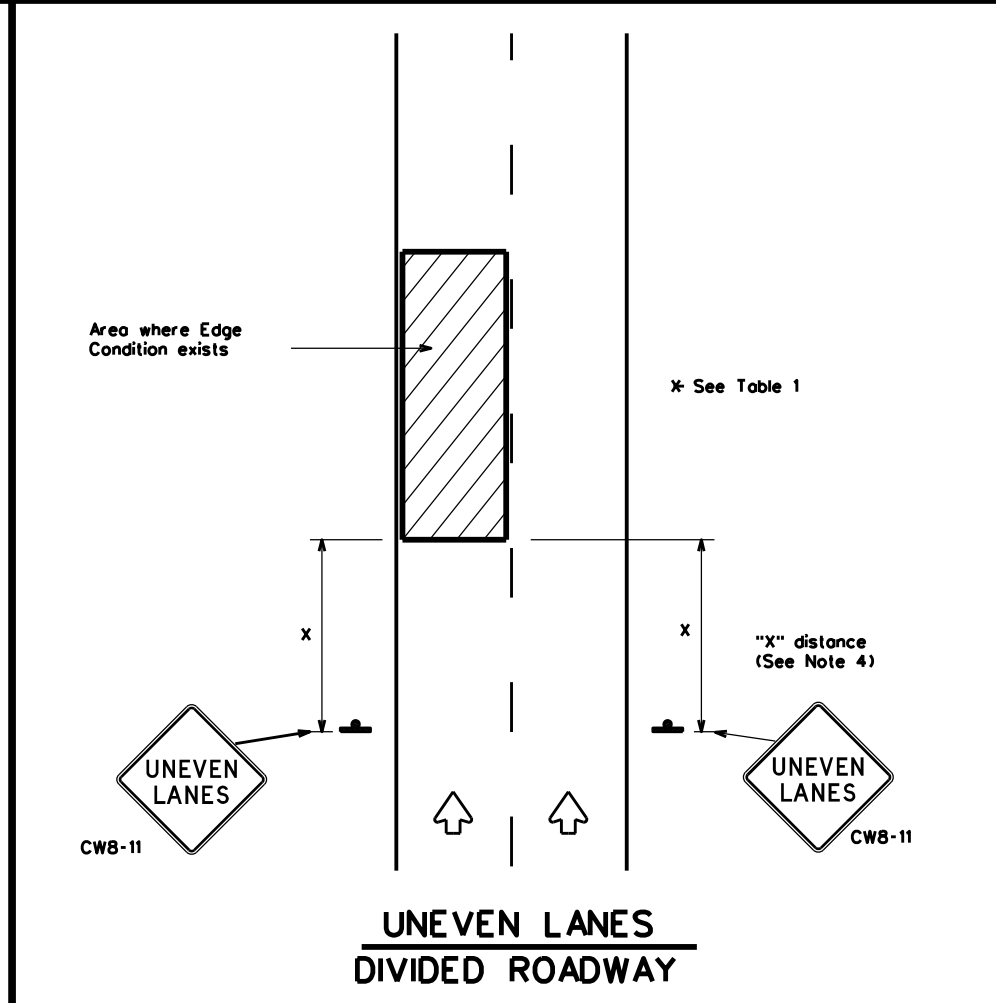
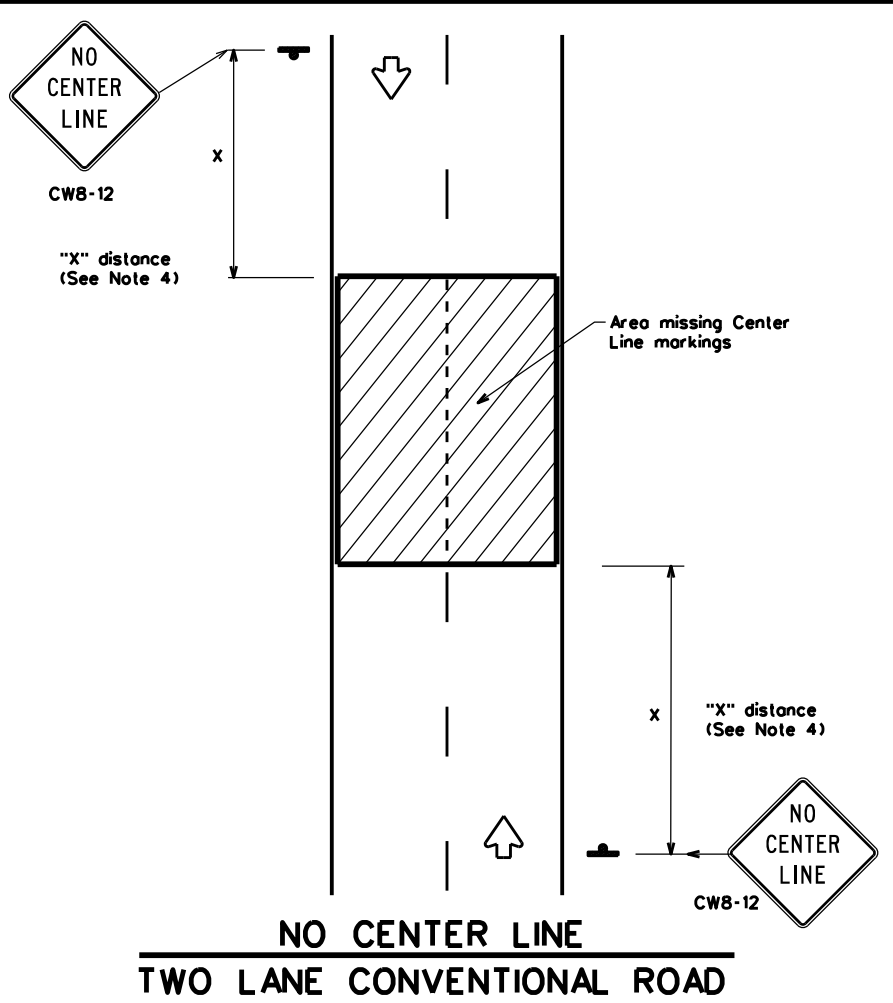
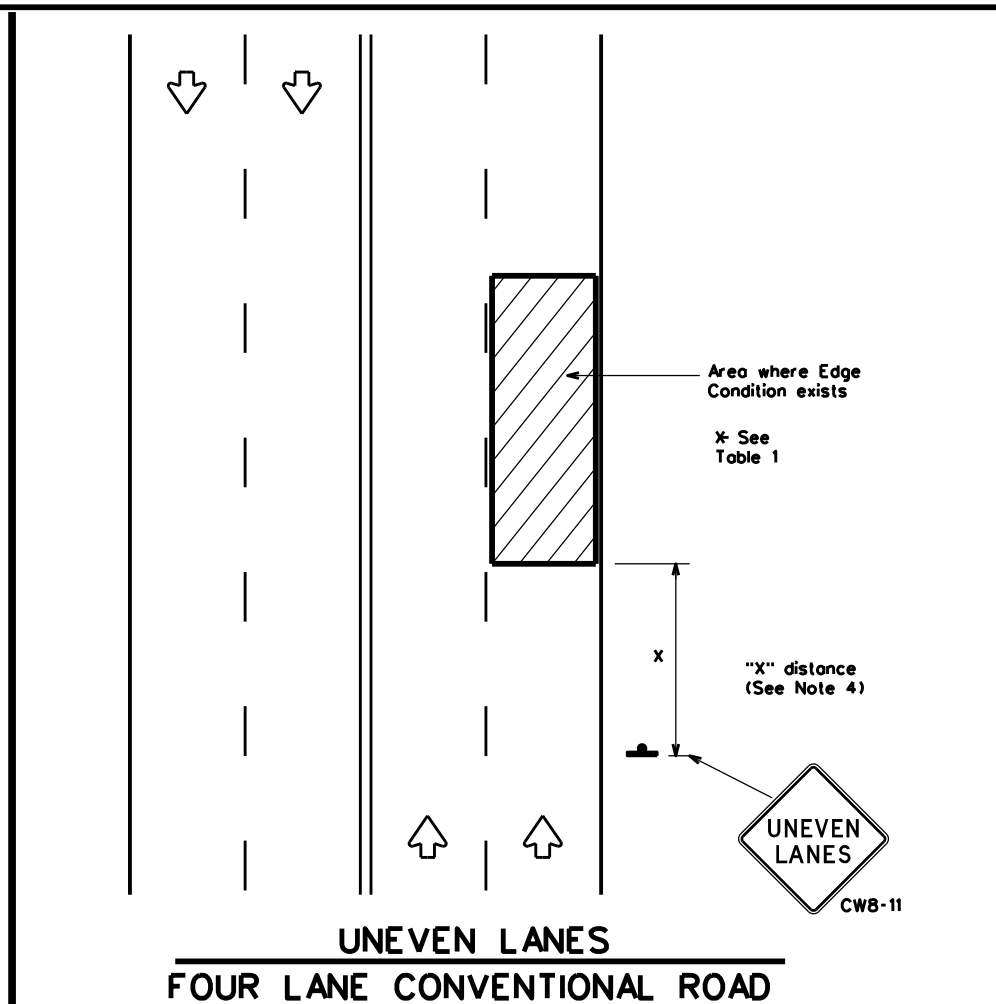
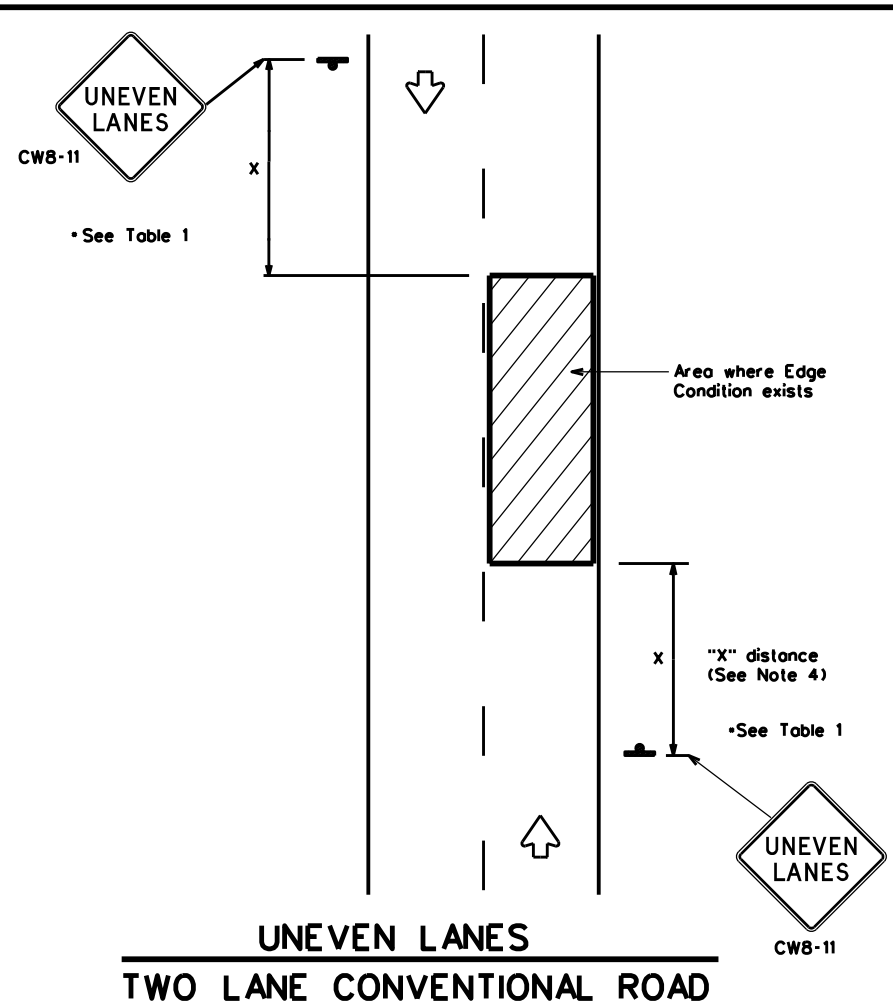
TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218	03	094	US 59
2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	ATL	CASS	35	

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DATE: FILE:



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"



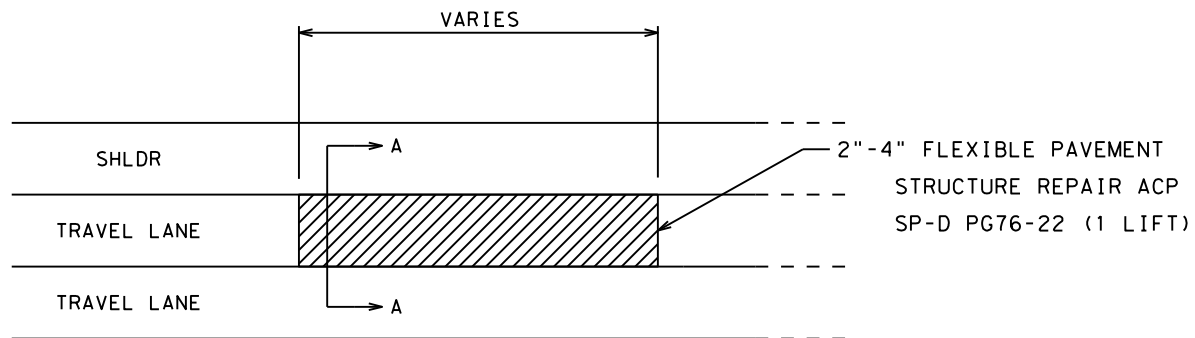
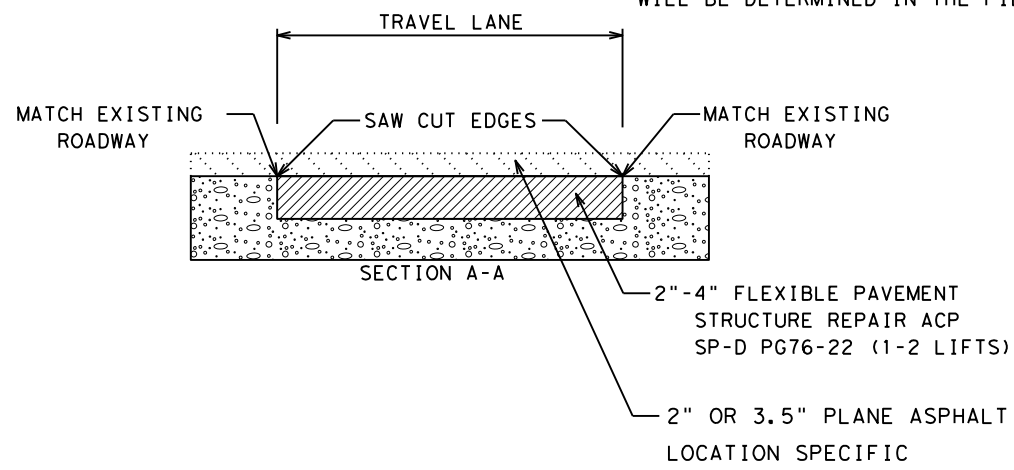
SIGNING FOR UNEVEN LANES

WZ(UL)-13

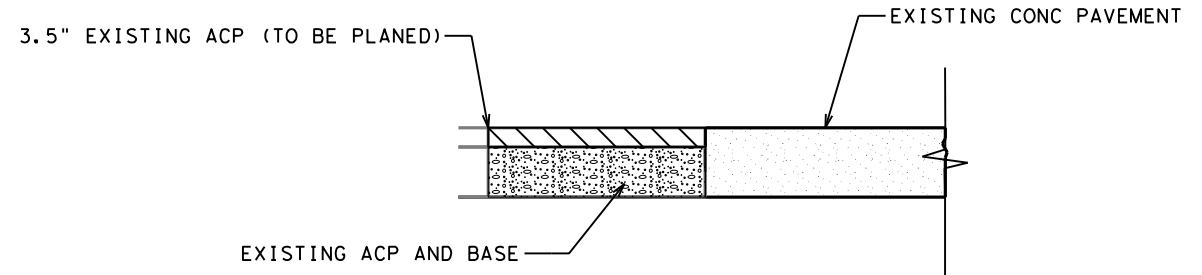
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© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218	03	094	US 59
8-95 2-98 7-13	DIST	COUNTY	SHEET NO.	
1-97 3-03	ATL	CASS	36	

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NOTES:
 THE EXACT LIMITS OF PAVEMENT REPAIRS
 WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

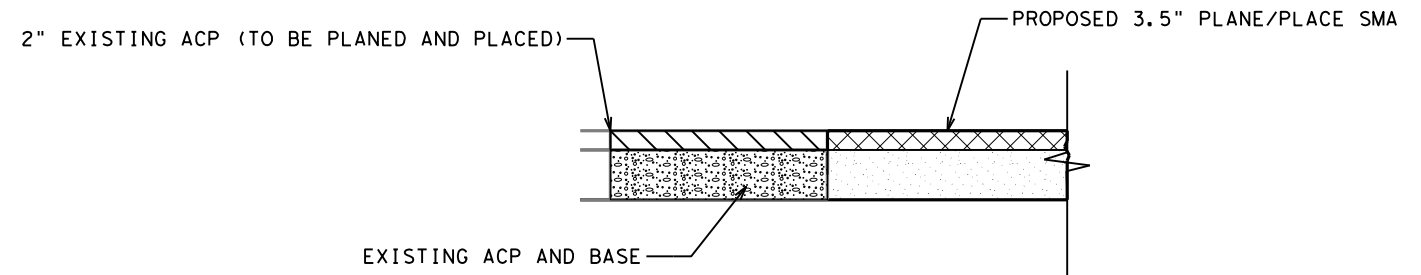


2" FLEXIBLE PAVEMENT REPAIR DETAIL



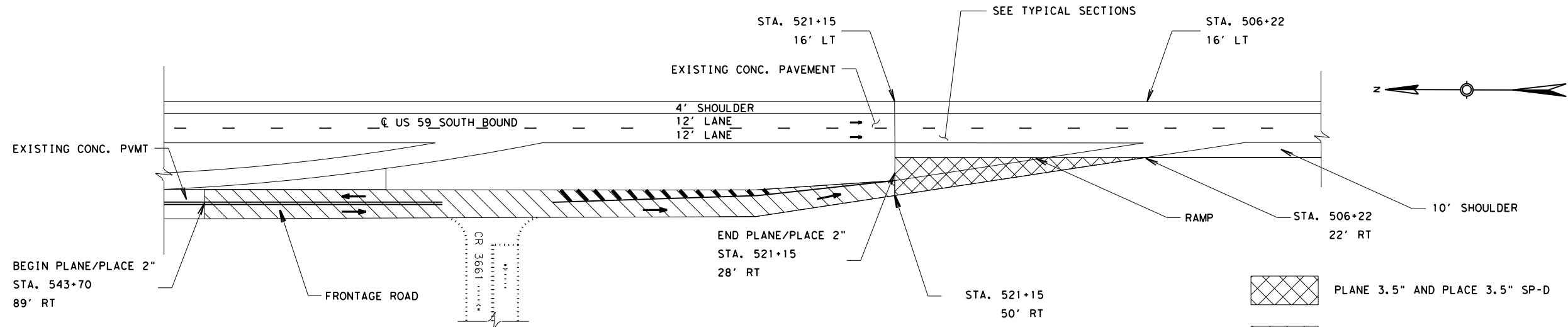
TIE-IN TO EXISTING CONCRETE PAVEMENT

STA 187+00 (BEGIN WORK)
 STA 521+15 (END WORK)
 STA 543+70 89' RT (BEGIN WORK FOR FRONTAGE ROAD)



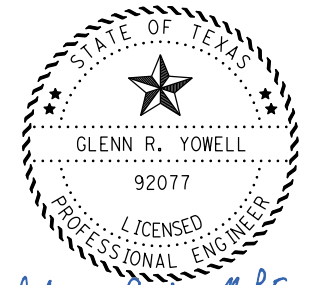
TIE-IN TO PROPOSED PAVEMENT AT RAMP

STA 521+15



ENTRANCE RAMP FROM FRONTAGE ROAD

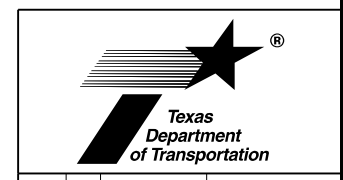
- PLANE 3.5" AND PLACE 3.5" SP-D
- PLANE 2" AND PLACE 2" SP-D



Glenn R. Yowell, P.E.
 11-9-23

ROADWAY DETAILS

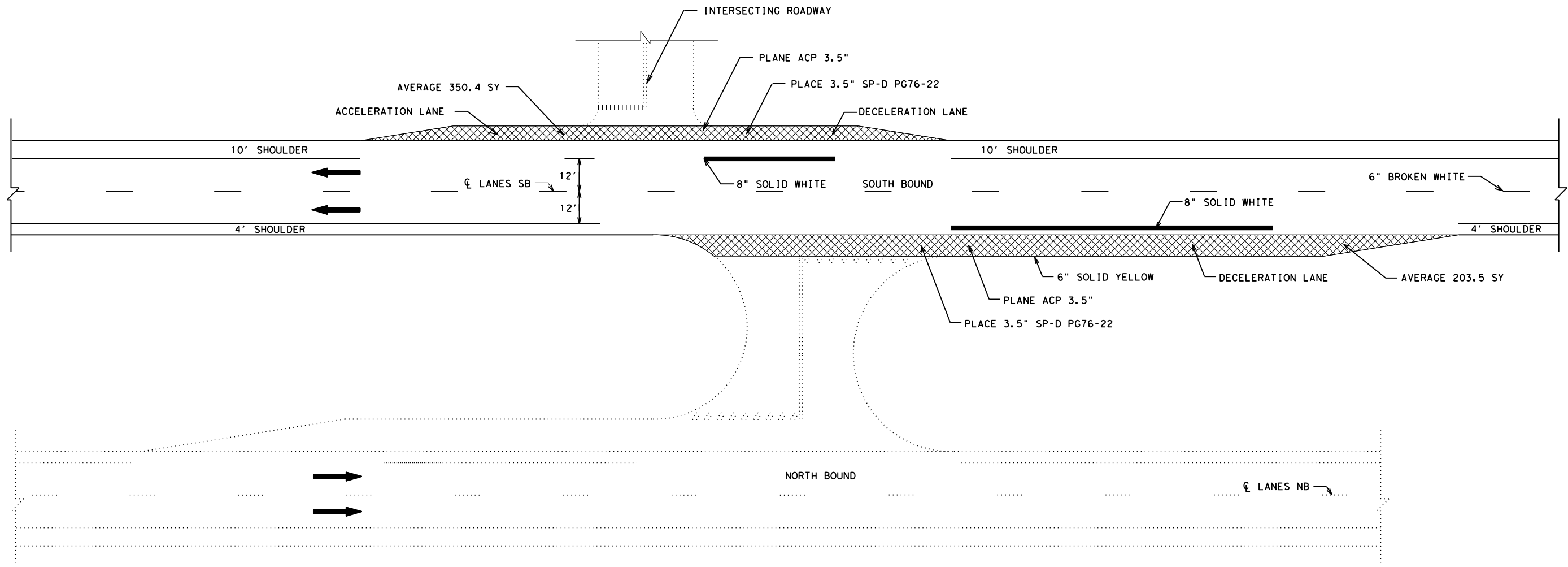
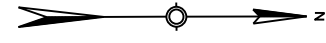
SHEET 1 OF 2



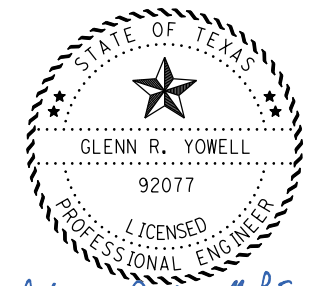
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DIST	COUNTY	SHEET NO.	
ATL	CASS	37	

NOT TO SCALE

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ACCELERATION/DECELERATION LANE DETAIL



Glenn R. Yowell, P.E.
 10-27-23

ROADWAY DETAILS

SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0218	03	094	US 59
DIST	COUNTY	SHEET NO.	
ATL	CASS	38	

NOT TO SCALE

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VERTICAL CURVE DATA - FLUSH MEDIAN SECTION

VPI	ELEV	LENGTH	G1	G2	K-VALUE	K-VALUE
ST	FT	FT	%	%	CREST	SAG
190+55.00	358.58	450.00	-2.4255	1.9435	102.8	-
200+94.90	378.79	1,050.00	1.9435	-3.2020	-	-203.8
209+45.00	351.57	350.00	-3.2020	-1.3583	189.8	-
220+00.00	337.24	0.00	-1.3583	-1.2600	0.0	*
224+00.00	332.20	0.00	-1.2600	-1.3533	0.0	*
230+00.00	324.08	0.00	-1.3533	-1.3000	0.0	*

* COMPLIES WITH THE 0.5% OR LESS FOR DESIGN SPEEDS GREATER THAN 45 MPH

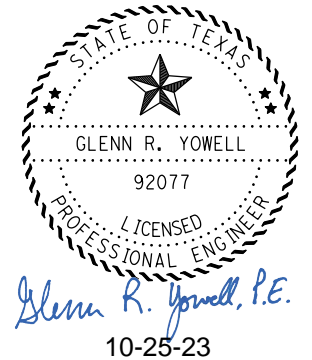
VERTICAL CURVE DATA - DEPRESSED MEDIAN SECTION

VPI	ELEV	LENGTH	G1	G2	K-VALUE	K-VALUE
ST	FT	FT	%	%	CREST	SAG
235+84.00	316.51	800.00	-1.3000	1.6638	269.9	-
250+00.00	340.07	1,600.00	1.6638	-1.3396	-	-532.7
260+13.00	326.50	350.00	-1.3396	0.0000	261.3	-
282+00.00	326.50	800.00	0.0000	3.0000	266.7	-
300+40.00	381.70	1,600.00	3.0000	-2.4085	-	-295.8
331+00.00	308.00	800.00	-2.4085	1.1176	226.9	-
348+00.00	327.00	1,200.00	1.1176	-1.6445	-	-434.4
363+50.00	301.51	1,000.00	-1.6445	3.0233	214.2	-
384+50.00	365.00	1,800.00	3.0233	-3.0000	-	-298.8
404+00.00	306.50	800.00	-3.0000	0.7374	214.1	-
413+00.00	313.00	400.00	0.7374	0.6792	-	-6878.2
426+25.00	322.00	1,000.00	0.6792	-2.8530	-	-283.1
436+25.00	293.47	800.00	-2.8530	1.0614	204.4	-
447+00.00	304.88	400.00	1.0614	0.4715	-	-678.1
464+75.00	313.25	1,000.00	0.4715	-3.0023	-	-287.9
486+75.00	247.20	1,100.00	-3.0023	1.5826	239.9	-
504+00.00	274.50	1,300.00	1.5826	-0.8021	-	-545.1
513+50.00	266.88	600.00	-0.8021	0.7446	387.9	-

THIS PROJECT MEETS THE BASIC SAFETY REQUIREMENTS OF THE 3R DESIGN CRITERIA. THE PROPOSED GUARD FENCE (INCLUDING CONNECTIONS TO STRUCTURES, POST SPACING AND END TREATMENTS), SIGNING AND PAVEMENT MARKINGS MEET CURRENT STANDARDS. CROSS DRAINAGE BOX AND PIPE CULVERTS, PARALLEL AND DRIVEWAY CULVERTS, MAILBOX SUPPORTS, LUMINAIRE SUPPORTS, AND SIGN SUPPORTS WITHIN THE REQUIRED OBSTRUCTION CLEARANCE OF 30 FEET HAVE BEEN TREATED OR UPGRADED TO STANDARD.

INFORMATION TAKEN FROM CSJ 0218-03-052, DATED COMPLETE ON JUNE 1988.

DESIGN SPEED 60 MPH
 MINIMUM CREST CURVE: K=151
 MINIMUM SAG CURVE: K=136
 WITHOUT SUPERELEVATION: R=11,100'



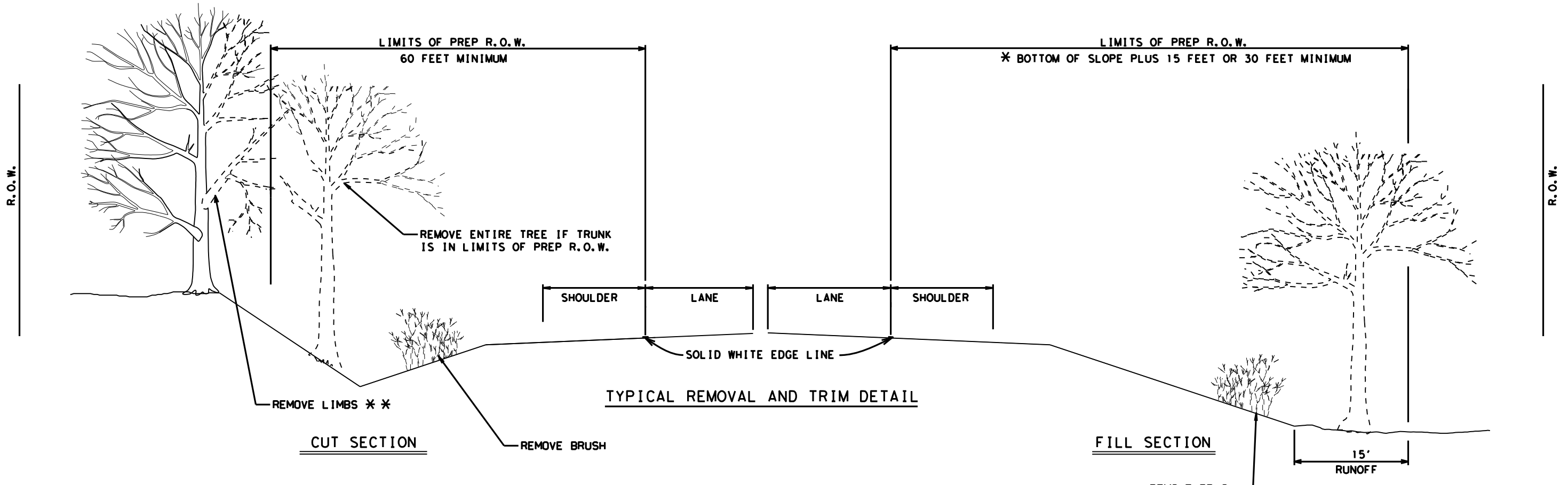
HORIZONTAL CURVE DATA - SOUTHBOUND LANES (LT)

PC	PI	PT	DELTA	D	R	L	T	e (SUPERRATE)
235+56.46	245+00.10	254+34.23	14° 05'	45.00	7,639.44	1,877.78	954.93	2.00
291+83.34	298+90.07	305+89.85	13° 55'	59.37	5,790.70	1,406.51	706.84	2.66
357+68.22	364+01.71	370+34.88	3° 10'	15.00	22,918.33	1,266.67	635.21	NORMAL CROWN
400+19.25	406+52.74	412+85.91	3° 10'	15.00	22,918.33	1,266.67	635.21	NORMAL CROWN

CURVE DATA SHEET

CONT	SECT	JOB	HIGHWAY
021803		094	US 59
DIST	COUNTY	SHEET NO.	
ATL	CASS	39	

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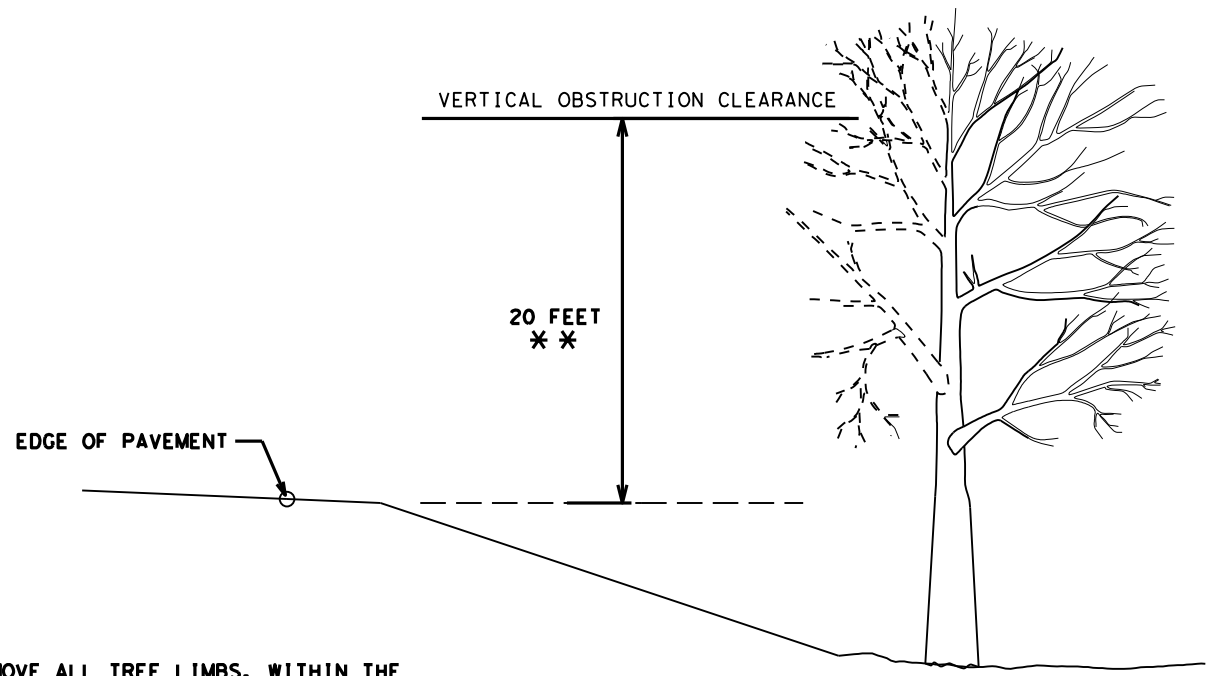
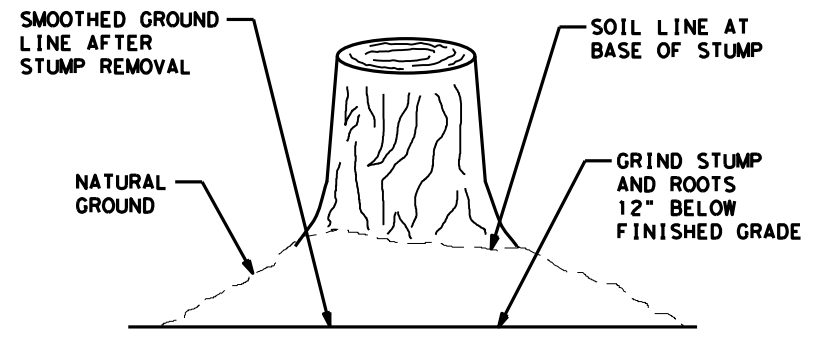


NOTE: AREAS THAT ARE DISTURBED DURING TREE REMOVAL OR TRIMMING SHALL BE SEEDING WITH THE SAME SEED FOUND ELSEWHERE IN THE PLANS.

DO NOT TRIM OR REMOVE LIMBS OR BRUSH PAST THE R.O.W. WITH OUT RIGHT-OF-ENTRY PERMIT.

EXACT LIMITS AND QUANTITIES TO BE VERIFIED IN THE FIELD.

* WHICH EVER IS THE GREATEST DISTANCE



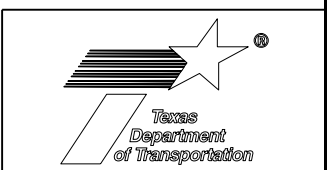
** TRIM AND REMOVE ALL TREE LIMBS, WITHIN THE OBSTRUCTION CLEARANCE ON THE PAVEMENT SIDE OF THE TRUNK 20 FEET ABOVE THE PAVEMENT ELEVATION REMOVE TO TRUNK.



Glenn R. Yowell, P.E.
10-25-23

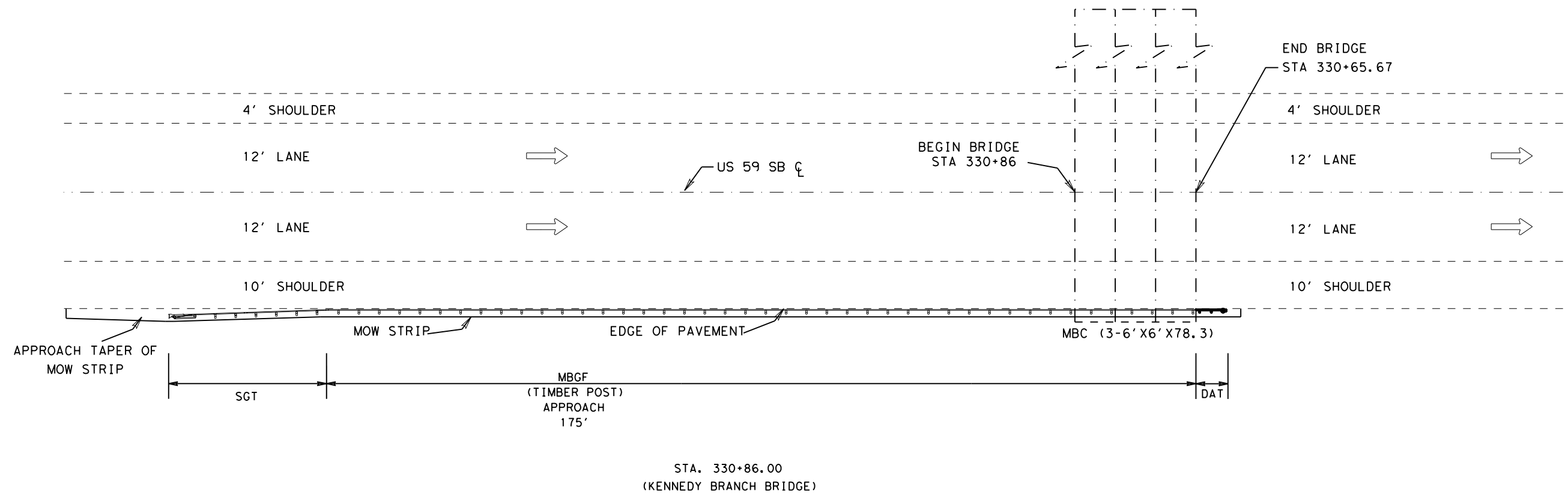
TREE REMOVAL AND TRIMMING DETAILS

NOT TO SCALE



CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
ATL	CASS	40	

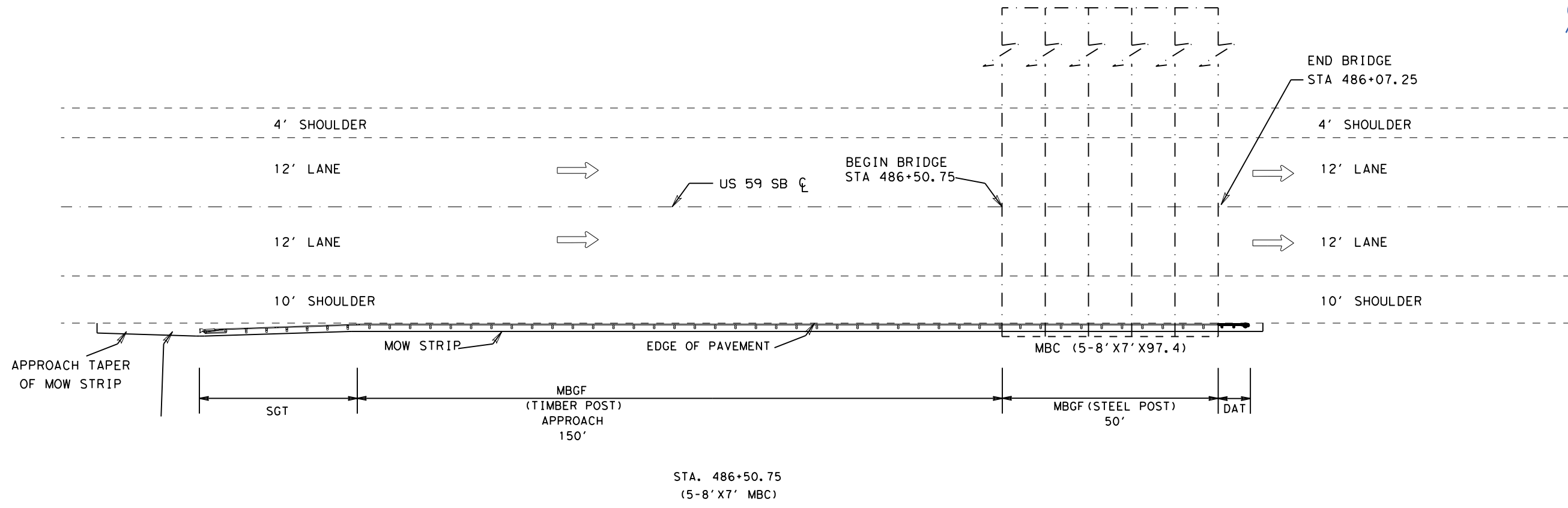
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STA. 330+86.00
 (KENNEDY BRANCH BRIDGE)

STATE OF TEXAS

 GLENN R. YOWELL
 92077
 LICENSED PROFESSIONAL ENGINEER
Glenn R. Yowell, P.E.
 10-31-23



STA. 486+50.75
 (5-8' X 7' MBC)

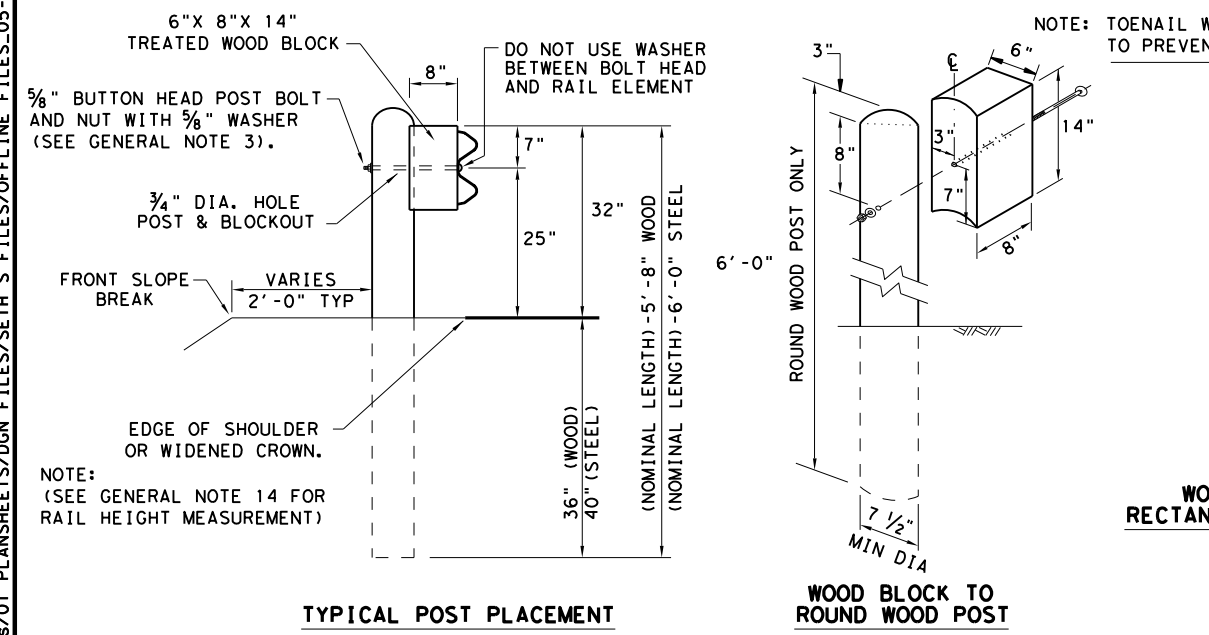
MBGF LAYOUT

- NOTES:**
- 1) SEE APPLICABLE STANDARDS FOR ADDITIONAL INFORMATION.
 - 2) CONTRACTOR TO FIELD VERIFY STEEL POST LENGTHS AND LOCATIONS.
 - 3) CONCRETE MOW STRIP TO BE INSTALLED AFTER FINAL SURFACE.
 - 4) 7CY EMBANKMENT PER SGT LOCATION TO ENSURE CROWN ACCOMODATES SGT AS SHOWN ON STANDARDS

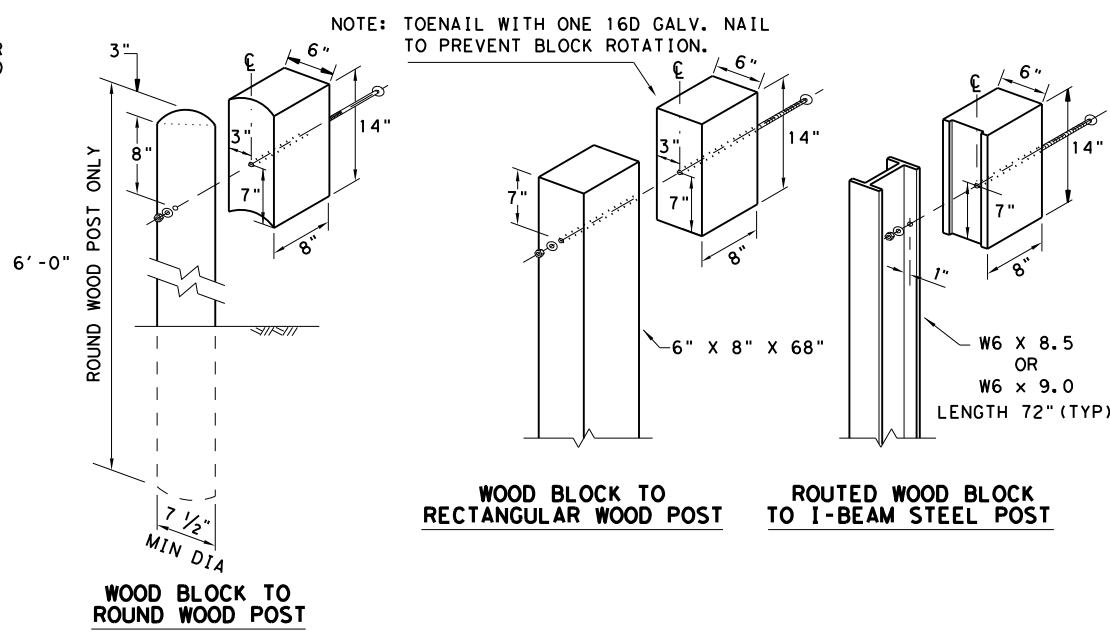
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ATL	CASS	41

NOT TO SCALE

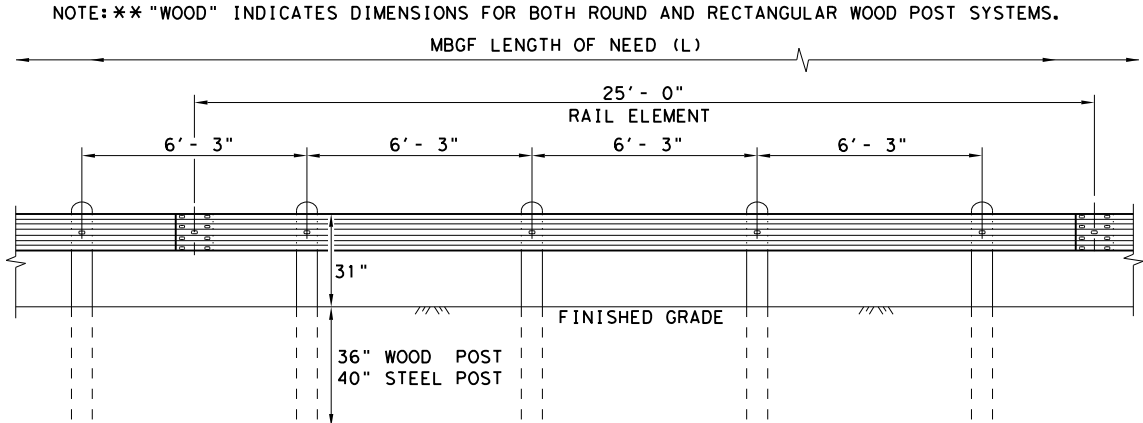
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TYPICAL POST PLACEMENT

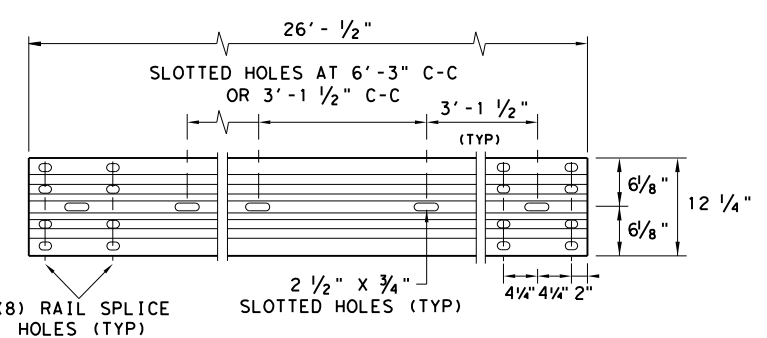


WOOD BLOCK TO ROUND WOOD POST **ROUTED WOOD BLOCK TO I-BEAM STEEL POST**



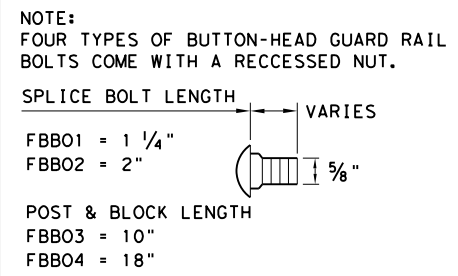
ELEVATION MID-SPAN RAIL SPLICE

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



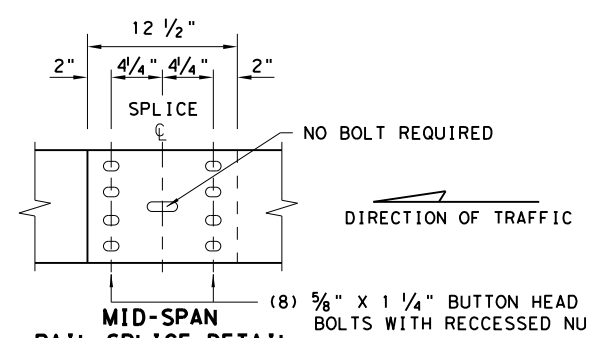
ELEVATION 25'-0 (NOM.) W-BEAM SECTION

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



BUTTON HEAD BOLT

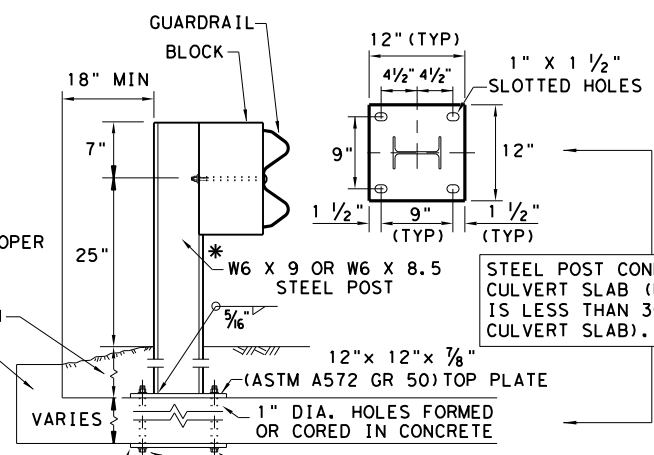
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

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

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

GENERAL NOTES

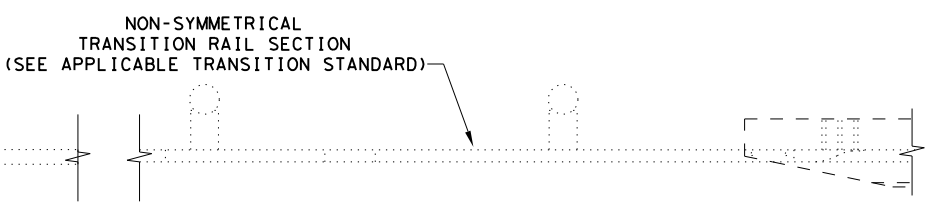
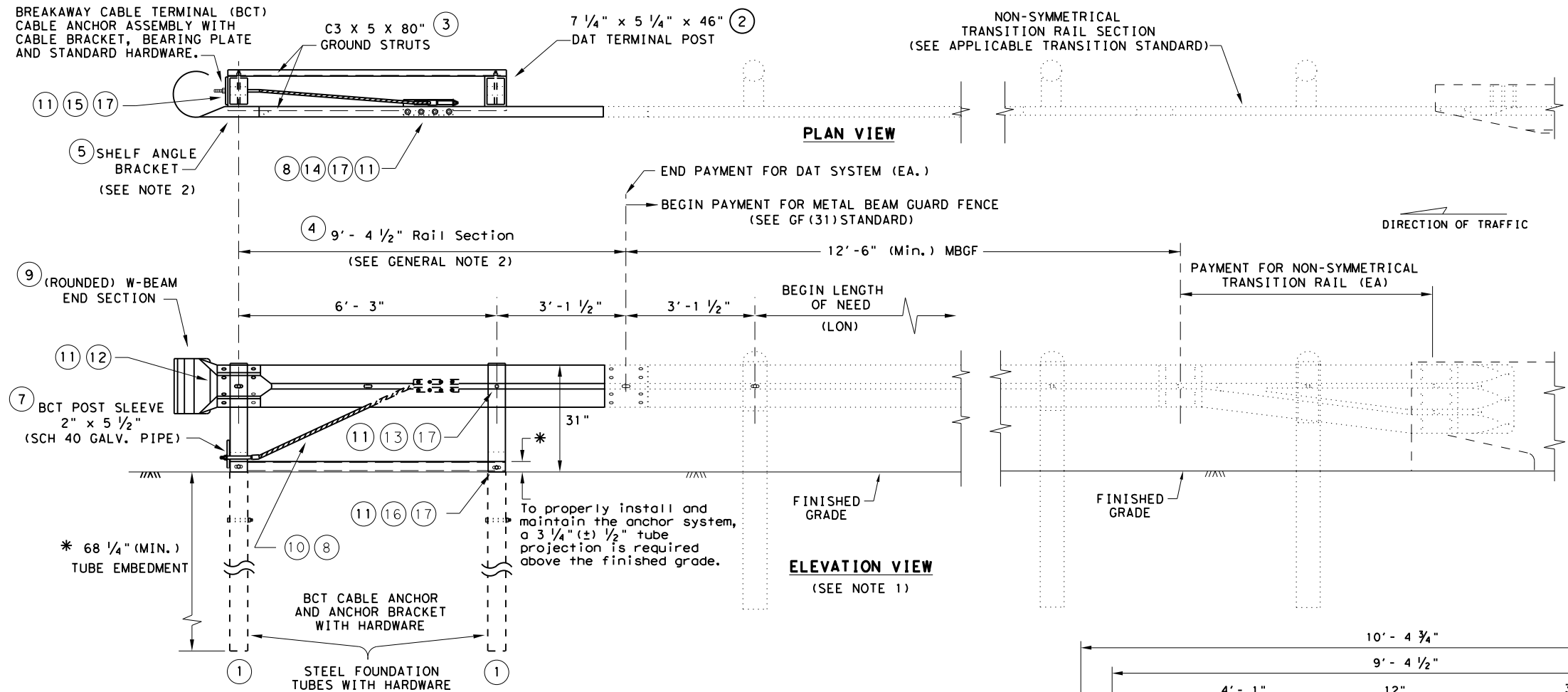
- THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
- RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'-0", OR 12'-6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 1/2" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
- BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 5/8" WASHER (FWC160) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
- FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
- CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
- THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
- IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
- UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
- APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
- POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
- SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
- UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
- FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
- GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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

		Design Division Standard	
METAL BEAM GUARD FENCE TL-3 MASH COMPLIANT GF(31)-19			
FILE: gf3119.dgn	DN: TXDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	0218	03	094
DIST	COUNTY	SHEET NO.	
ATL	CASS	42	

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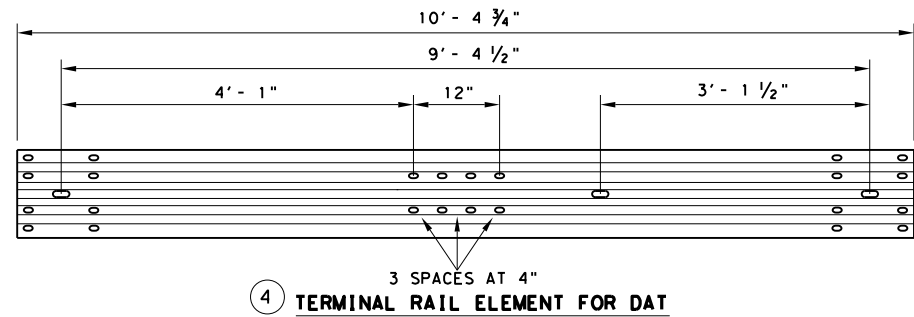
- GENERAL NOTES**
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
 2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
 3. THE FOUNDATION TUBES SHALL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

MOW STRIP INSTALLATION

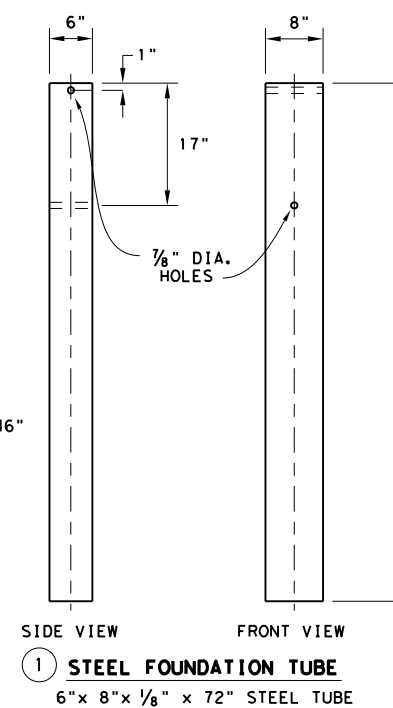
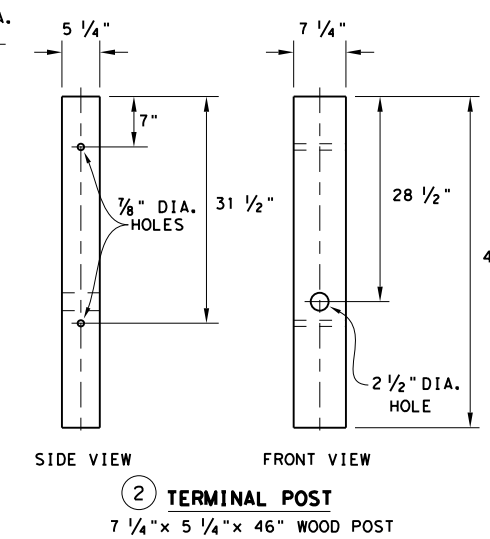
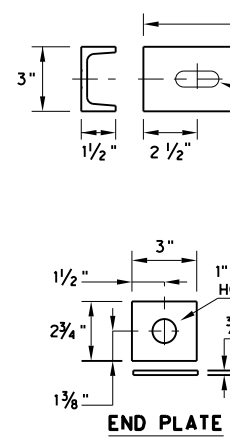
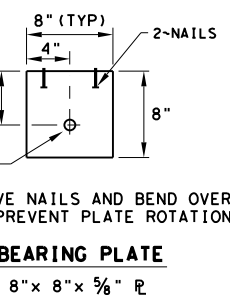
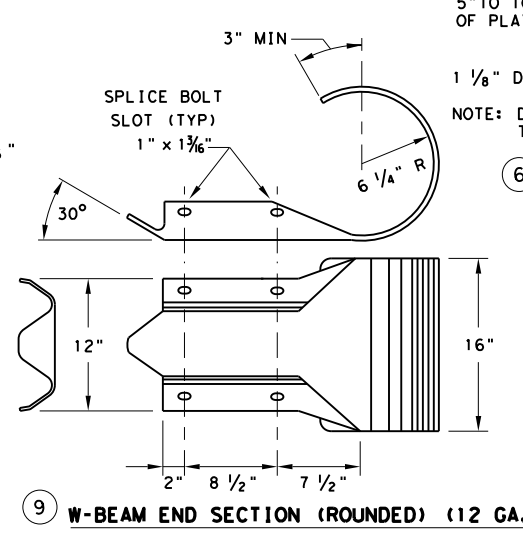
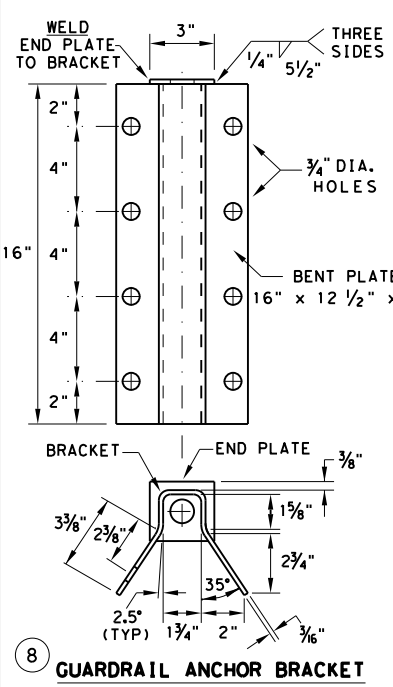
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

DOWNSTREAM ANCHOR TERMINAL (DAT)

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



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

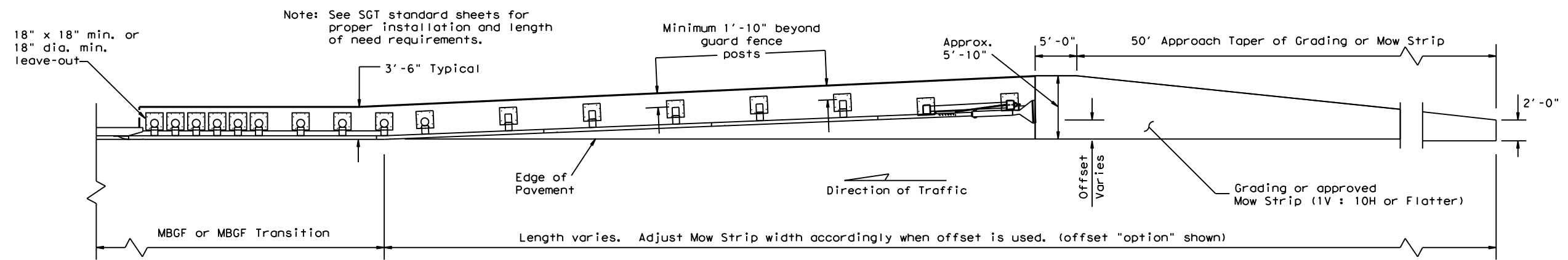


Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT
GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CGL/AG
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218	03	094	US 59
	DIST	COUNTY	SHEET NO.	
	ATL	CASS	43	

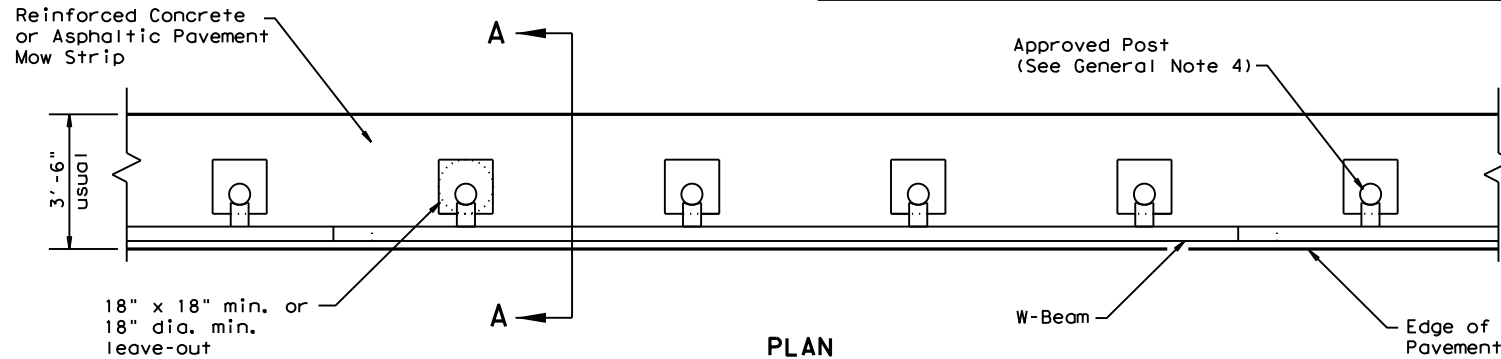
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Note: See SGT standard sheets for proper installation and length of need requirements.

GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)
 Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.
 Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

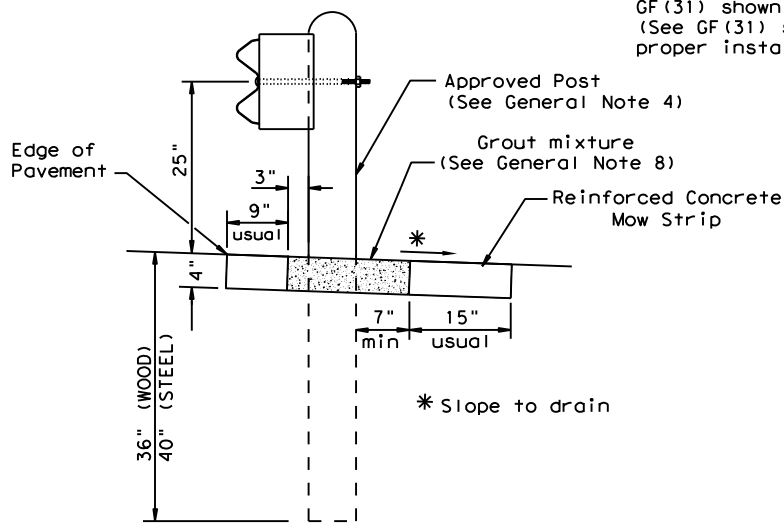


PLAN

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

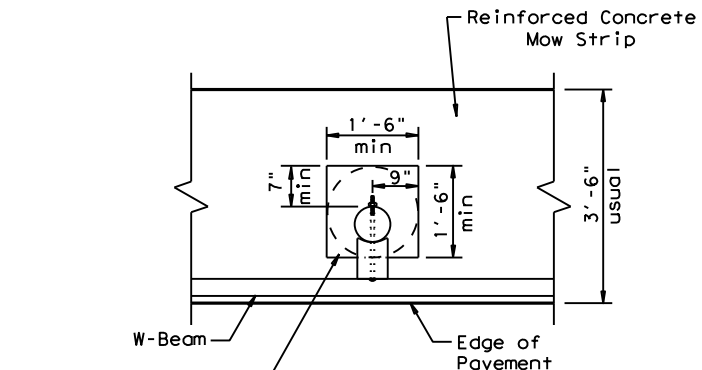
GENERAL NOTES

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



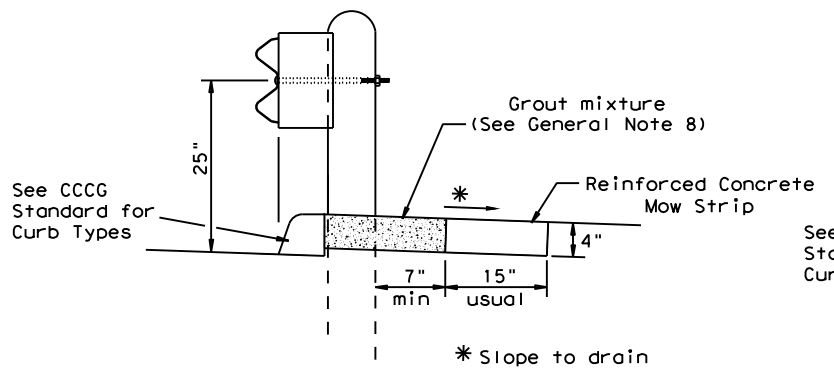
SECTION A-A

Typical



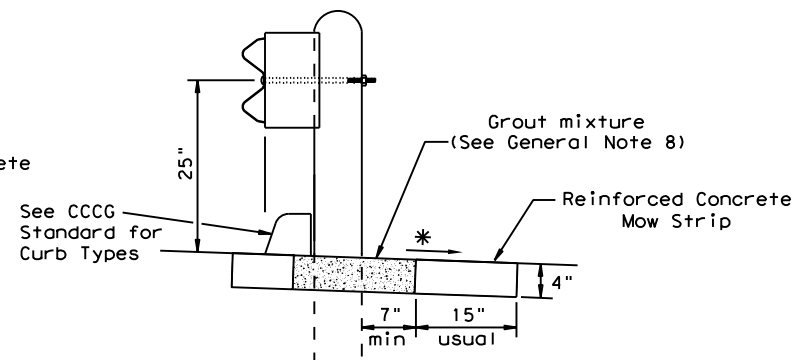
MOW STRIP DETAIL

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



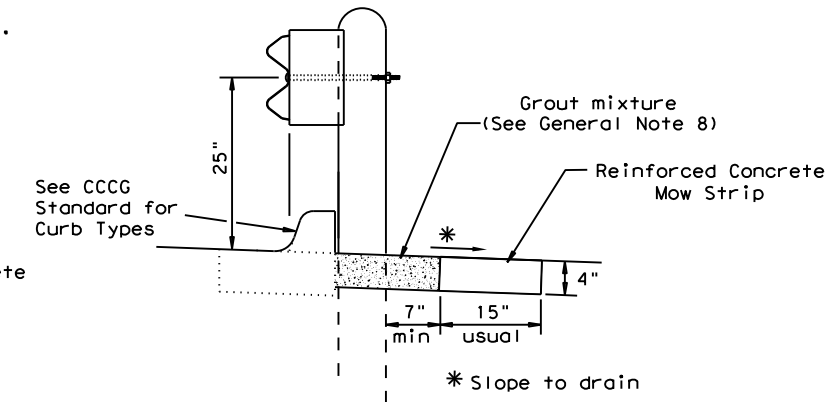
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

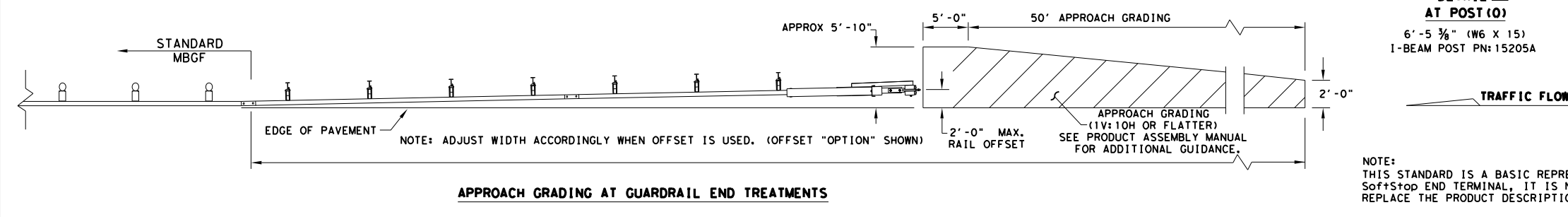
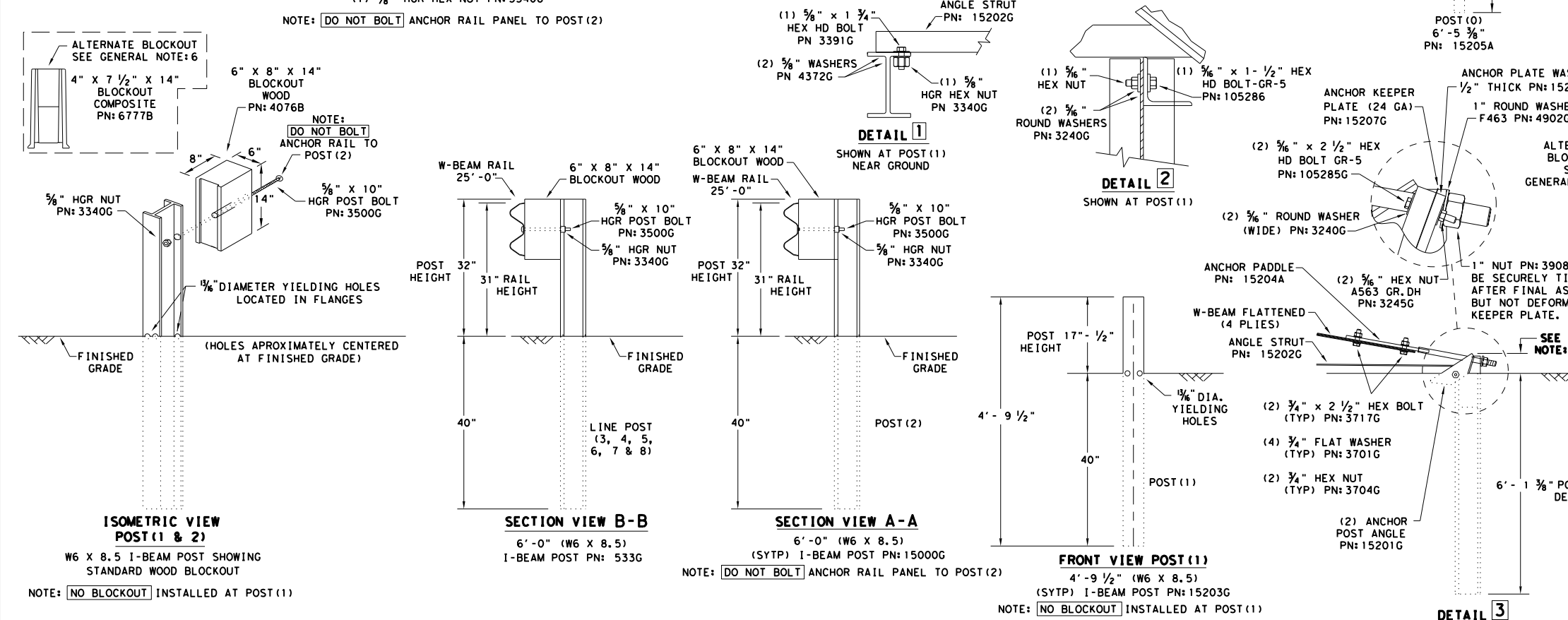
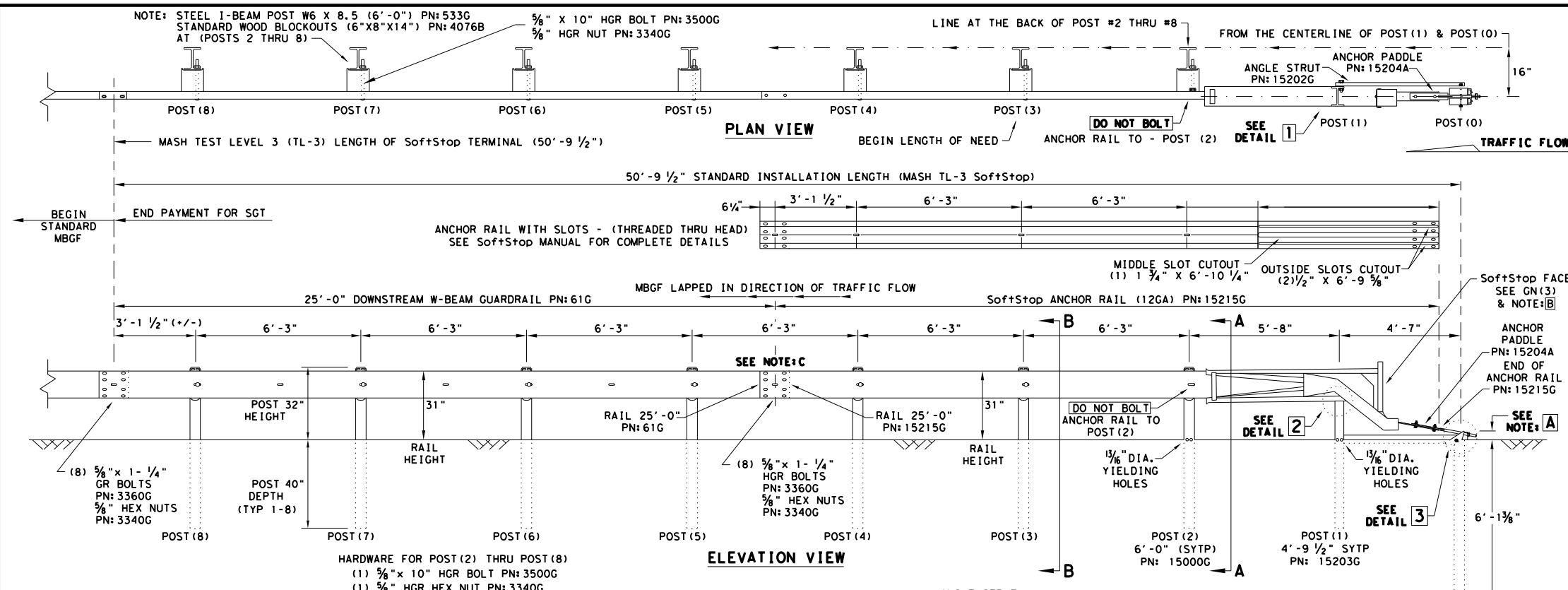
Curb shown on top of mow strip



CURB OPTION (3)

		Design Division Standard	
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT GF(31)MS-19			
FILE: gf31ms19.dgn	DN:TxDOT	CK:KM	DW:VP
©TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	0218	03	094
	DIST	COUNTY	SHEET NO.
	ATL	CASS	44

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

NOTE: A THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-3/4" MIN. TO 4" MAX. ABOVE FINISHED GRADE.

NOTE: B PART PN:5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
 PART PN:5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)

NOTE: C W-BEAM SPLICE LOCATED BETWEEN LINE POST (4) AND LINE POST (5)
 GUARDRAIL PANEL 25'-0" PN:61G
 ANCHOR RAIL 25'-0" PN:15215G
 LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25' - 0")
15205A	1	POST #0 - ANCHOR POST (6' - 5 3/8")
15203G	1	POST #1 - (SYTP) (4' - 9 1/2")
15000G	1	POST #2 - (SYTP) (6' - 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 X 8.5) (6' - 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" X 8" X 14")
6777B	7	BLOCKOUT - COMPOSITE (4" X 7 1/2" X 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT

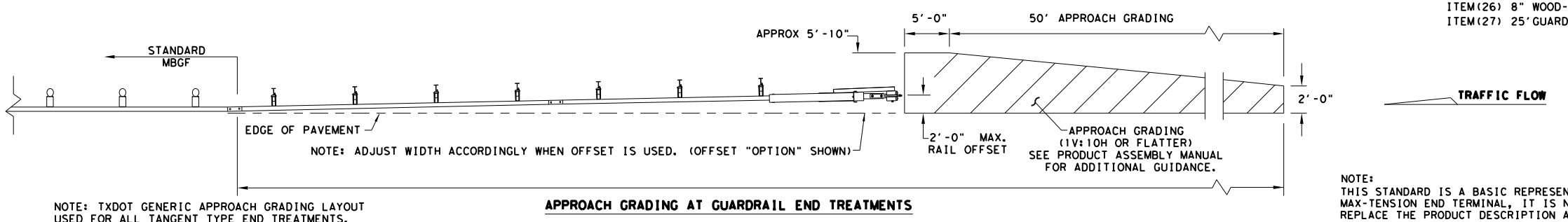
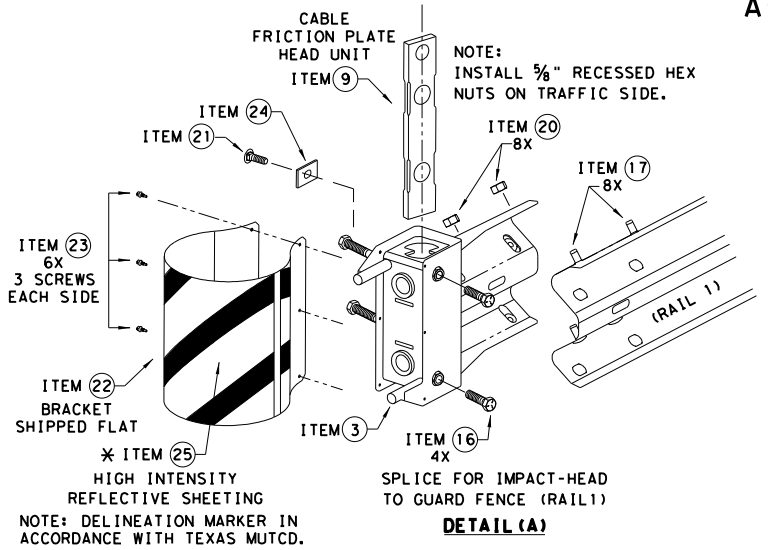
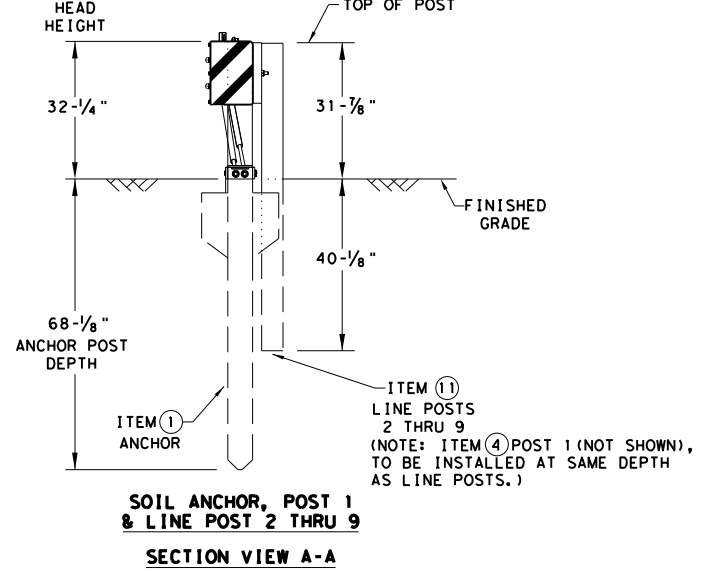
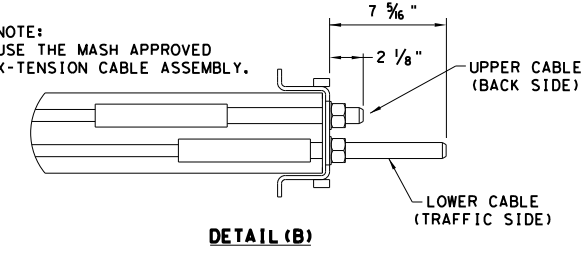
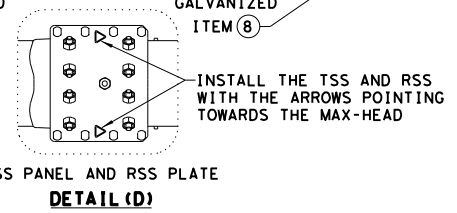
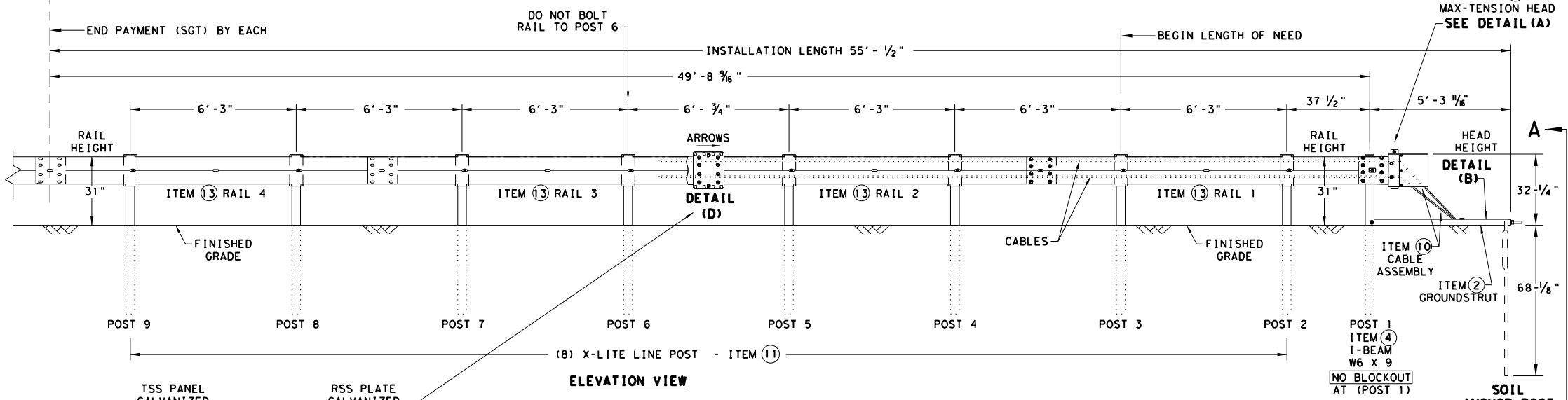
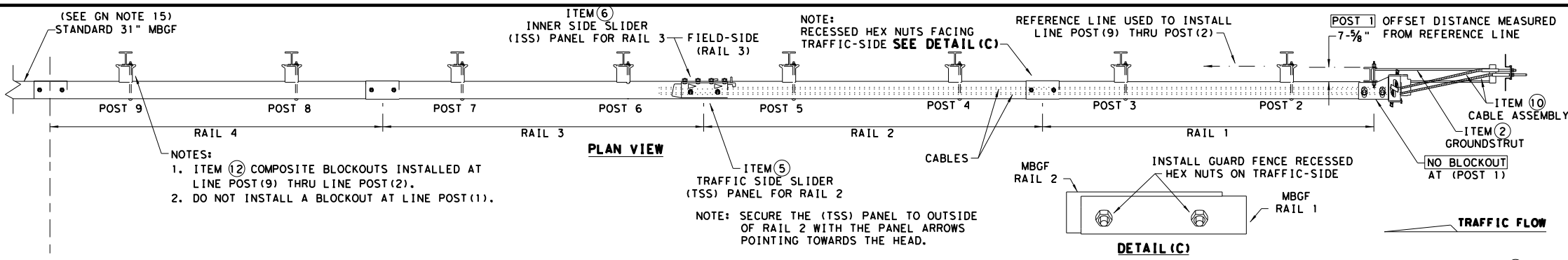
HARDWARE		
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	3/4" X 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" X 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" X 10" HGR POST BOLT A307
3391G	1	5/8" X 1 3/4" HEX HD BOLT A325
4489G	1	5/8" X 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" X 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" X 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B



TRINITY HIGHWAY		SOFTSTOP END TERMINAL	
MASH - TL-3		SGT (10S) 31-16	
FILE: sgt10s3116	DW: TxDOT	CK: KM	DW: VP
©TxDOT: JULY 2016	CON: 0218	SECT: 03	JOB: 094
REVISIONS			HS 59
	DIST: ATL	COUNTY: CASS	SHEET NO. 45

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

DATE: 10/16/2023
 FILE: pw://tcdot.projectwiseonline.com:txdot5/Documents/19 - ATL/Design Projects/19-113-011/19-113-011.dwg
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 DRAWING: 19-113-011.dwg
 SHEET: 19-113-011.dwg
 TITLE: MAX-TENSION END TERMINAL MASH - TL-3 SGT (11S) 31-18
 DRAWN BY: JLM
 CHECKED BY: JLM
 APPROVED BY: JLM
 PROJECT WISE ONLINE



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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT. - GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST - GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	3/8" X 7" THREAD BOLT HH (GR.5) GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5) GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2) MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2) MGAL	59
21	BSI-2001888	3/8" X 2" ALL THREAD BOLT (GR.5) GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWRO3	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL, 8-SPACE, 12GA.	2
28	MANMAX Rev- (D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.
 ** ALTERNATIVE ITEMS NOT SHOWN. ITEM (26) 8" WOOD-BLOCKOUTS ITEM (27) 25' GUARD FENCE PANELS

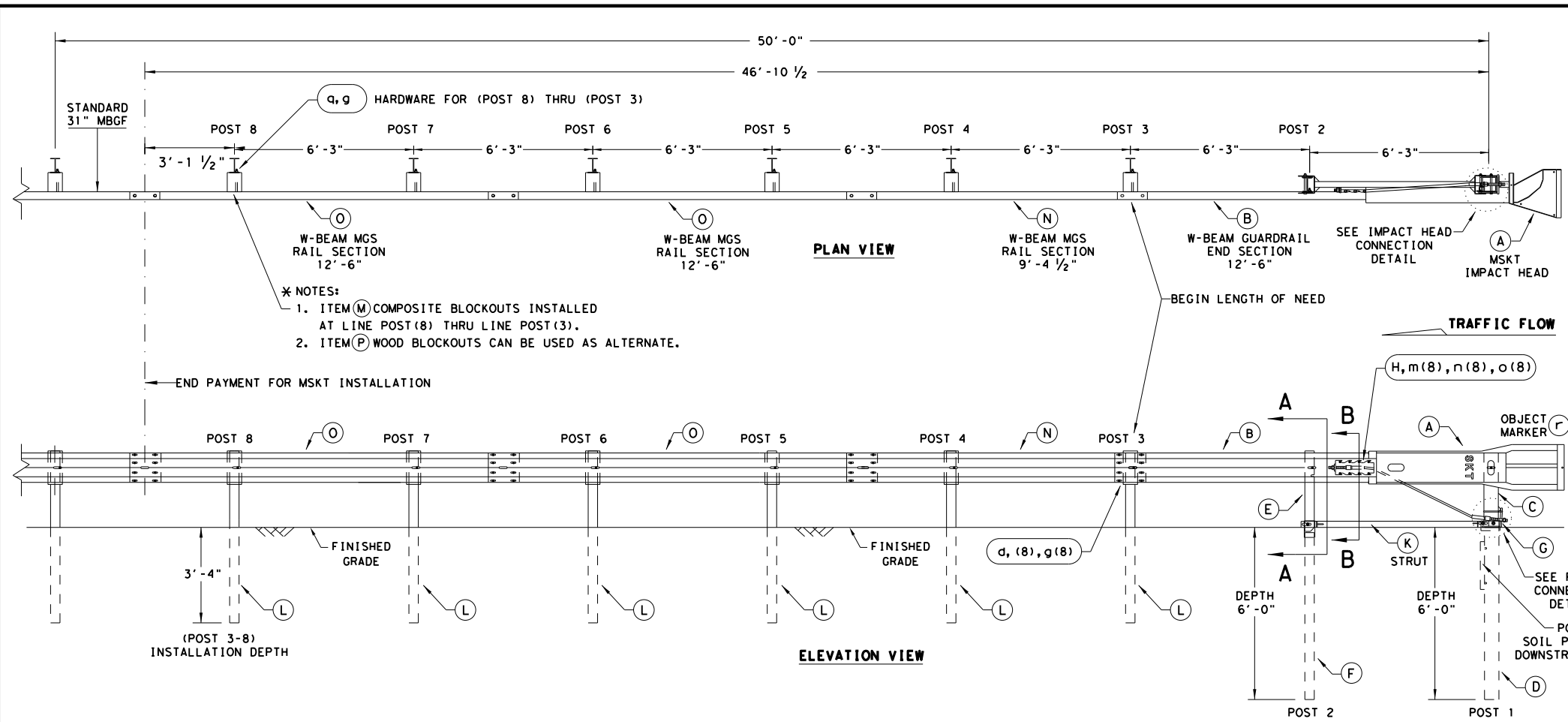
MAX-TENSION END TERMINAL
MASH - TL-3
SGT (11S) 31-18

FILE: sg11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218 03	094	US 59	
	DIST	COUNTY	SHEET NO.	
	ATL	CASS	46	

Texas Department of Transportation
Design Division Standard

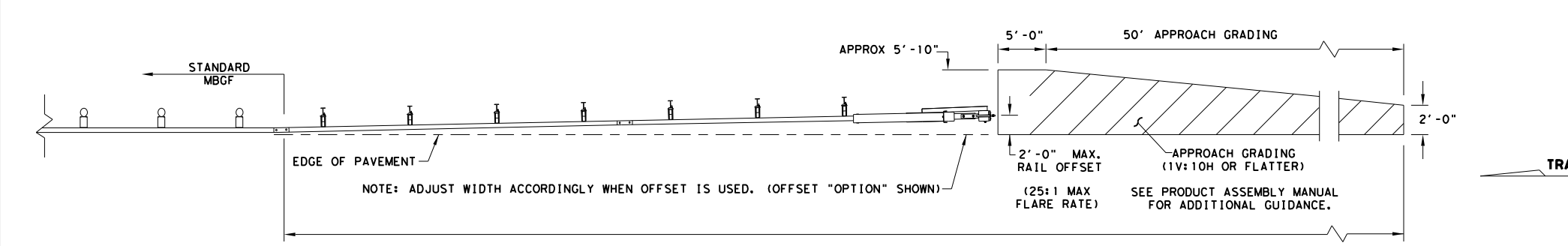
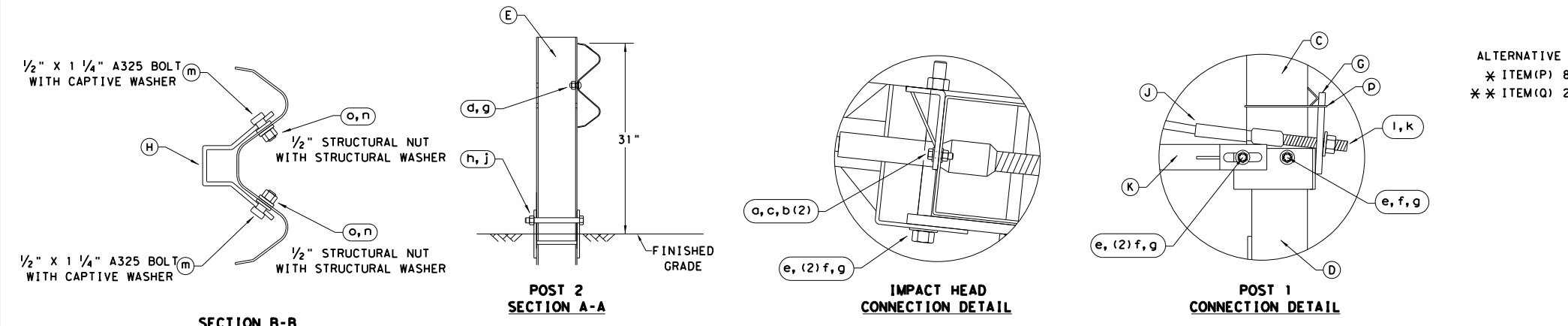
NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

DATE: 10/16/2023
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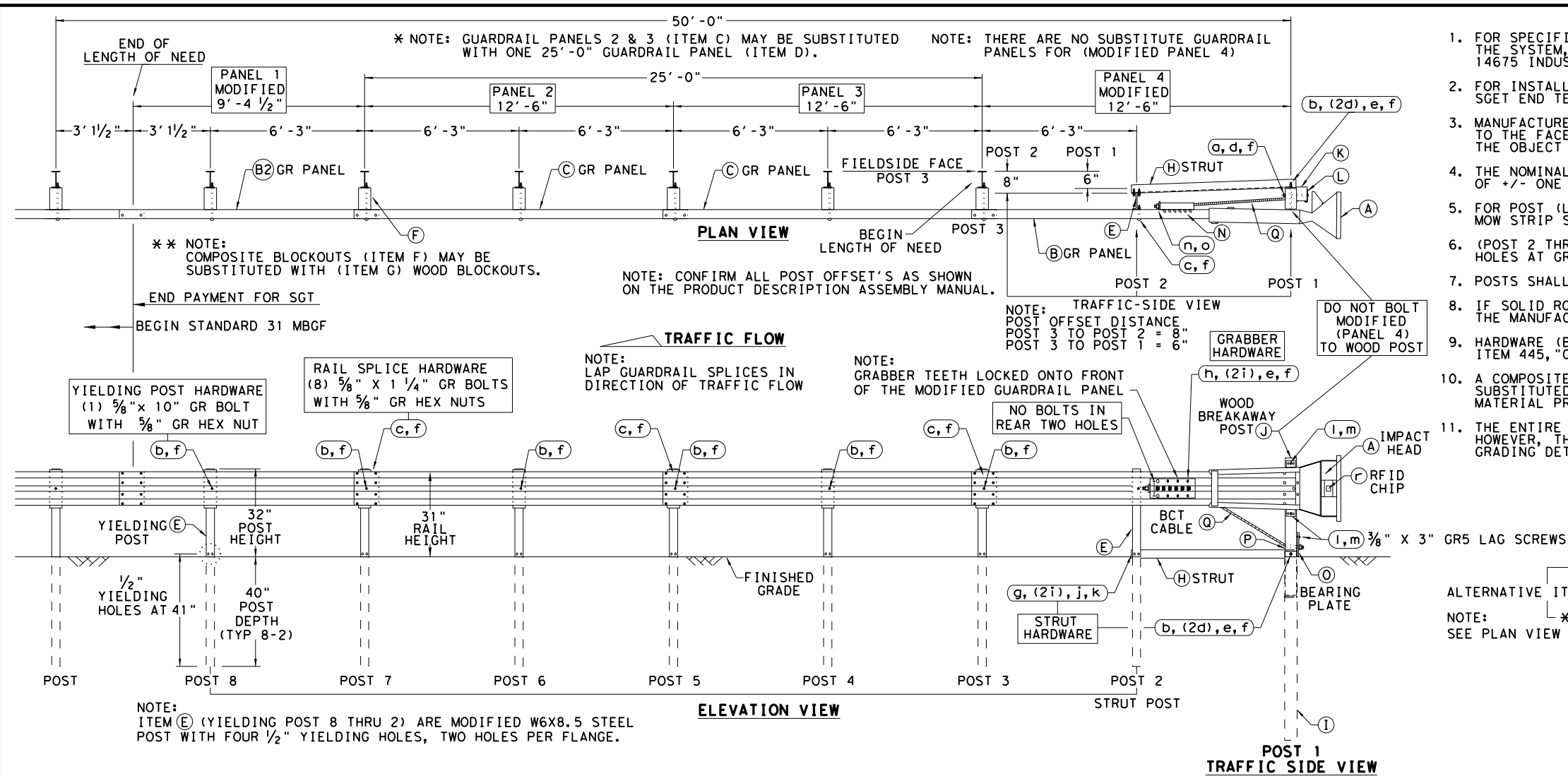


- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Go.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6X9 OR W6X8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
SMALL HARDWARE			
o	2	3/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	3/8" WASHER	W0516
c	2	3/8" HEX NUT	N0516
d	25	3/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	3/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	3/8" WASHER	W050
g	33	3/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
i	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/8" O.D. x 3/8" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	3/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

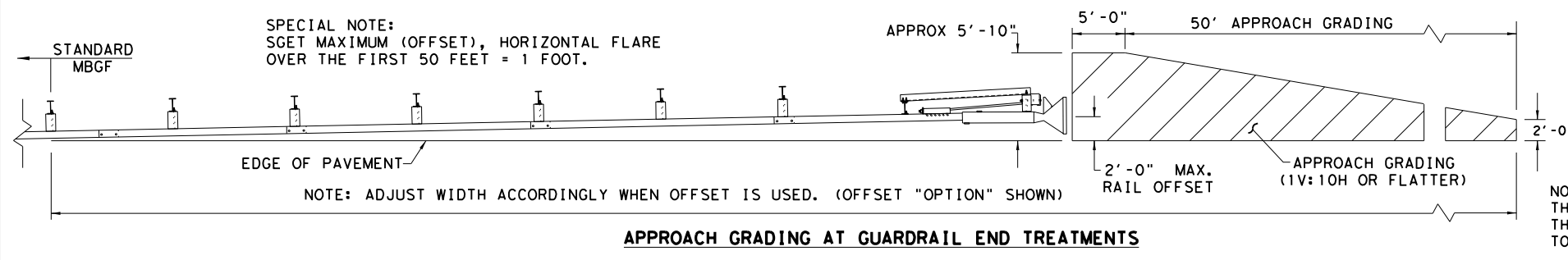
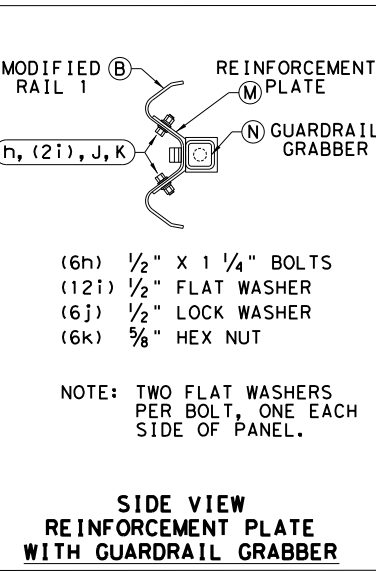
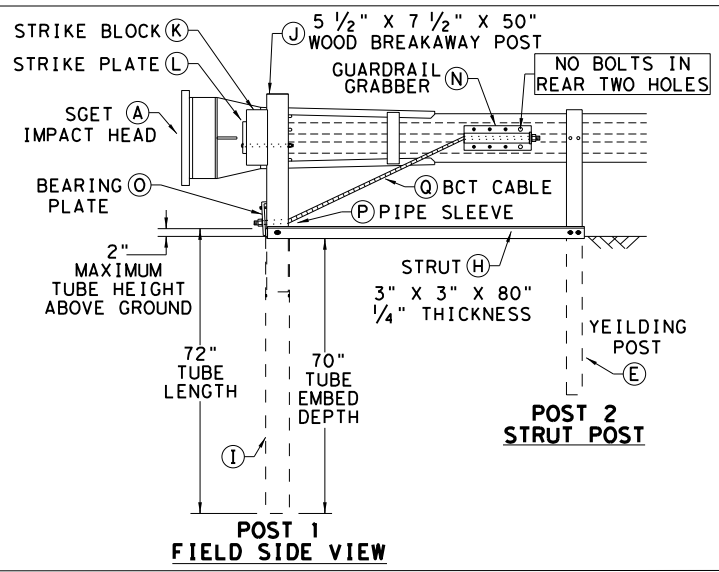
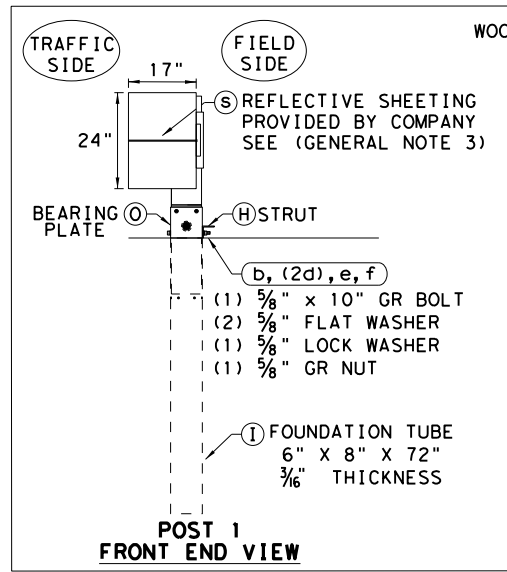
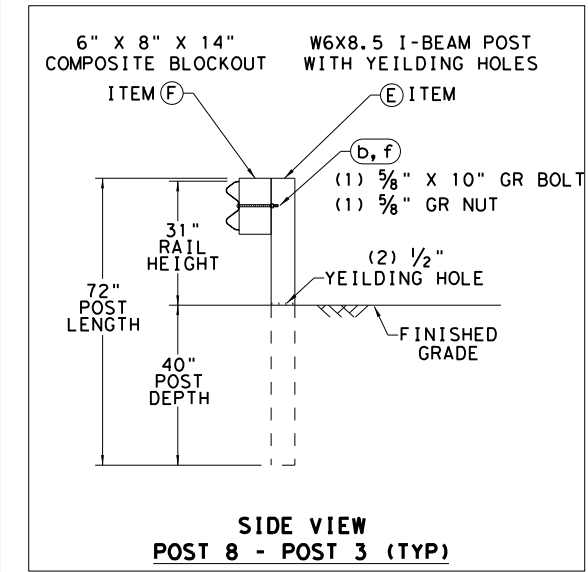


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- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WB08
H	1	STRUT 3" X 3" X 80" X 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" X 3/8"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" X 7 1/2" X 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
SMALL HARDWARE			
o	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	3/8" X 1 1/4" GR SPlice BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563HD HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

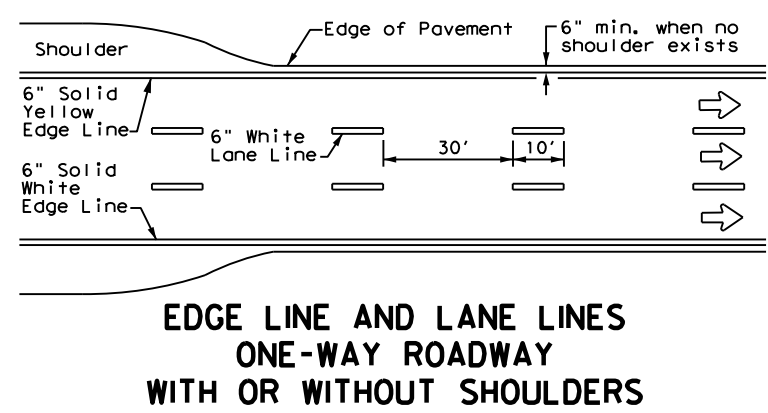


NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

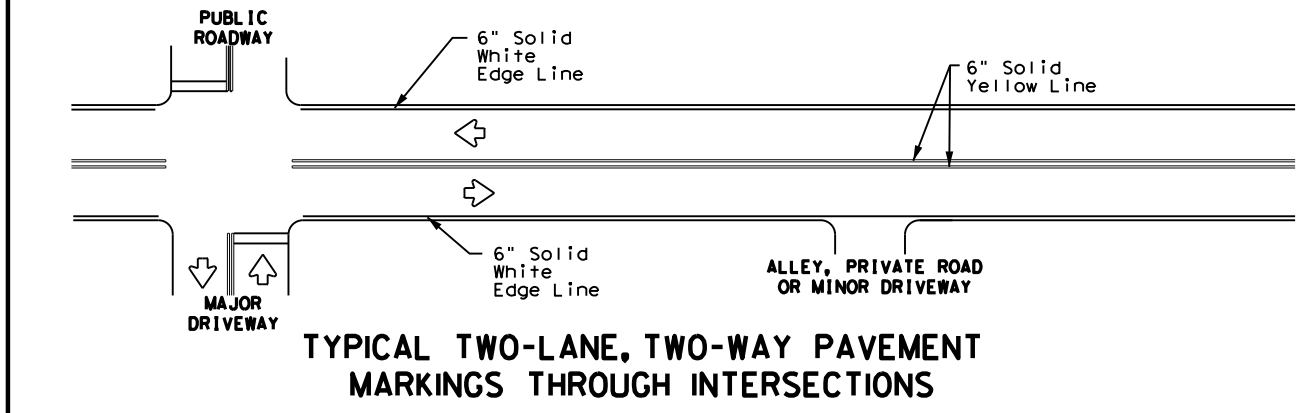
SPIG INDUSTRY, LLC
SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT (15) 31-20

FILE: sg153120.dgn	DN: TXDOT	CK: KM	DW: VP	CK: VP
© TXDOT: APRIL 2020	CONT: 0218	SECT: 03	JOB: 094	HIGHWAY: US 59
REVISIONS				
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DATE: 10/16/2023 2:25:09 PM
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 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of any drawings or specifications to any other format.



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

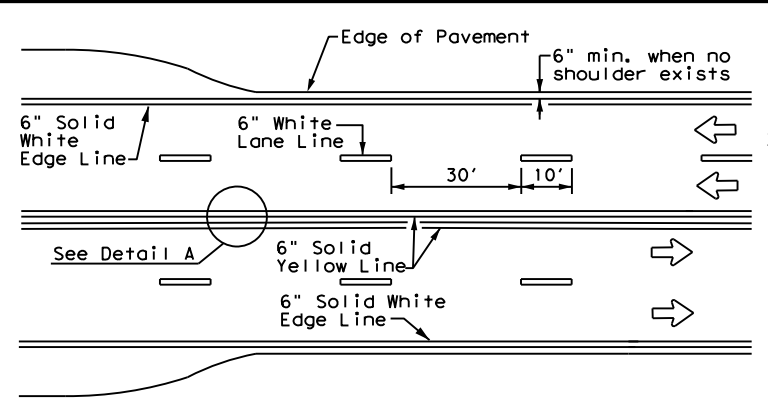


**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**

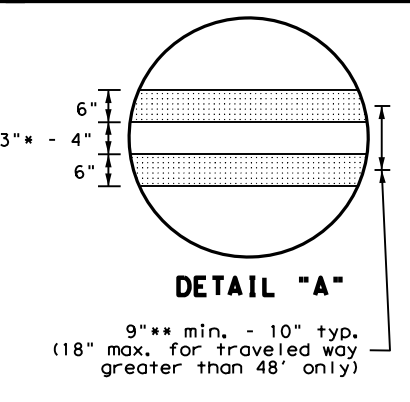
- GENERAL NOTES**
- Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections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

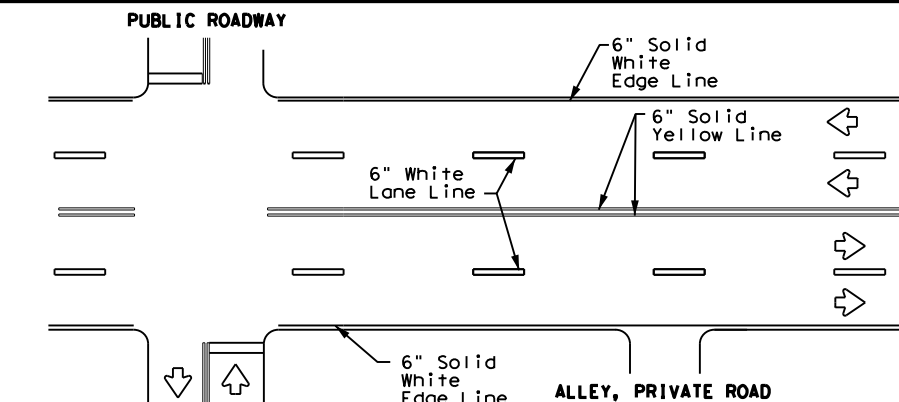


**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

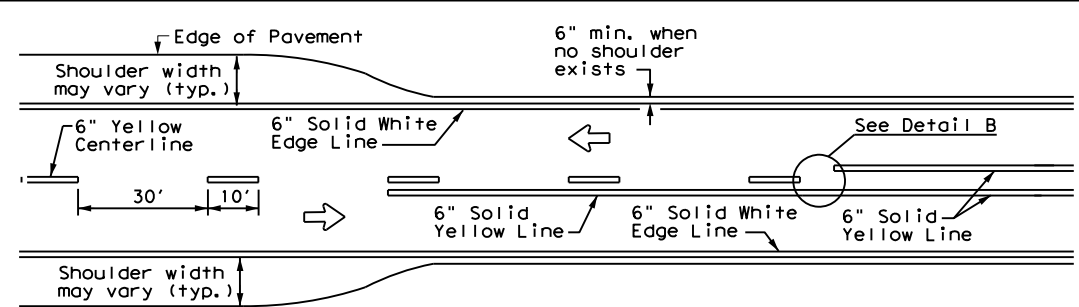


DETAIL "A"
 9" min. - 10" typ.
 (18" max. for traveled way greater than 48' only)

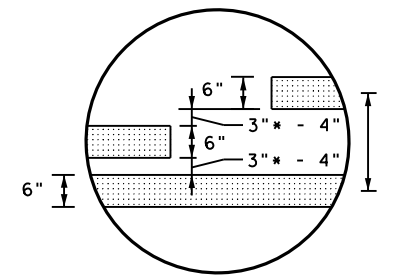
* 2" minimum for restripe projects when approved by the Engineer.
 ** 8" minimum for restripe projects when approved by the Engineer.



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

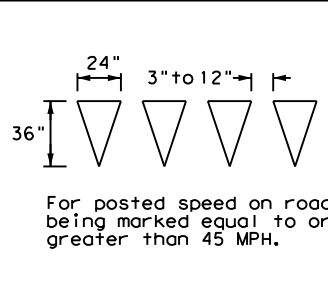


**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

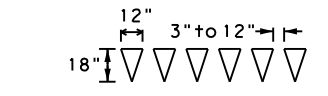


DETAIL "B"
 18" min. - 20" max.
 (16" minimum for restripe projects when approved by the Engineer.)

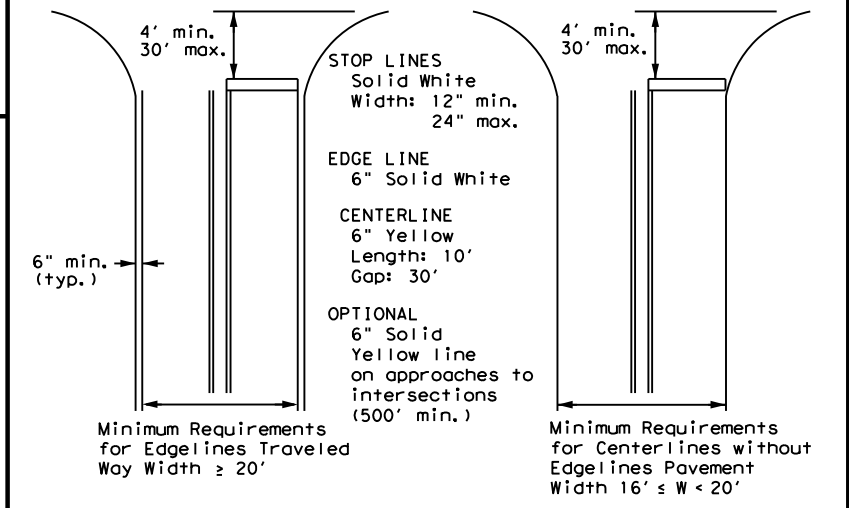
* 2" minimum for restripe projects when approved by the Engineer.



YIELD LINES



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

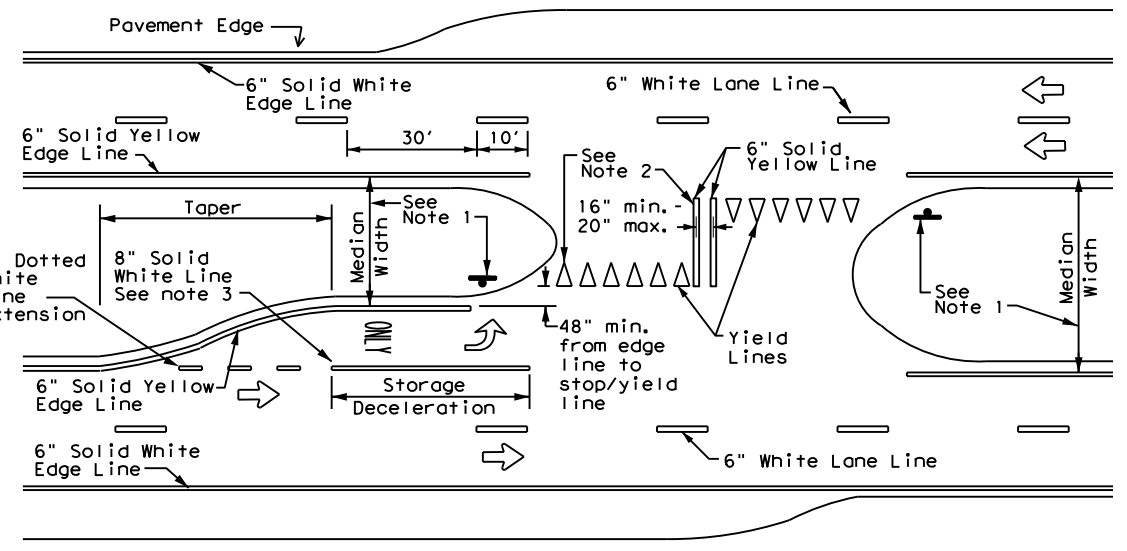


NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

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

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.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

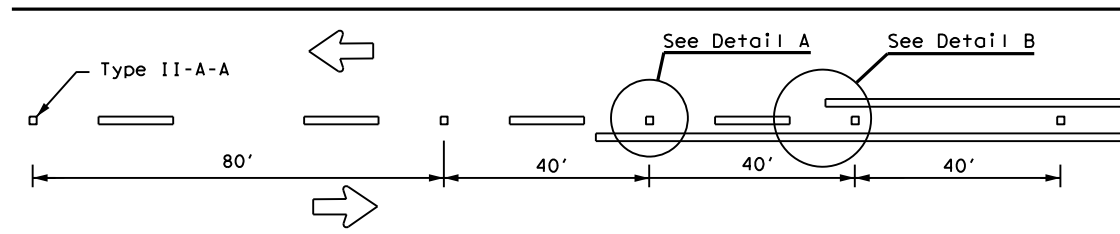
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1) - 22

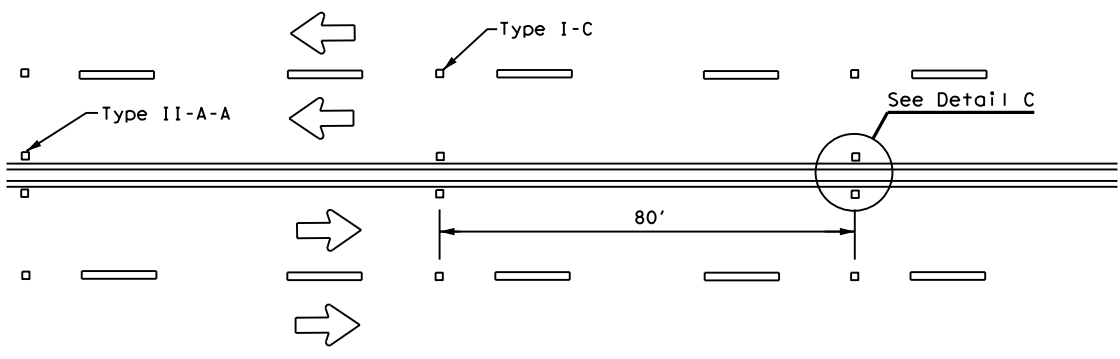
FILE:	pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
11-78	8-00 6-20	0218	03	094	US 59
8-95	3-03 12-22	DIST	COUNTY		SHEET NO.
5-00	2-12	ATL	CASS		49

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

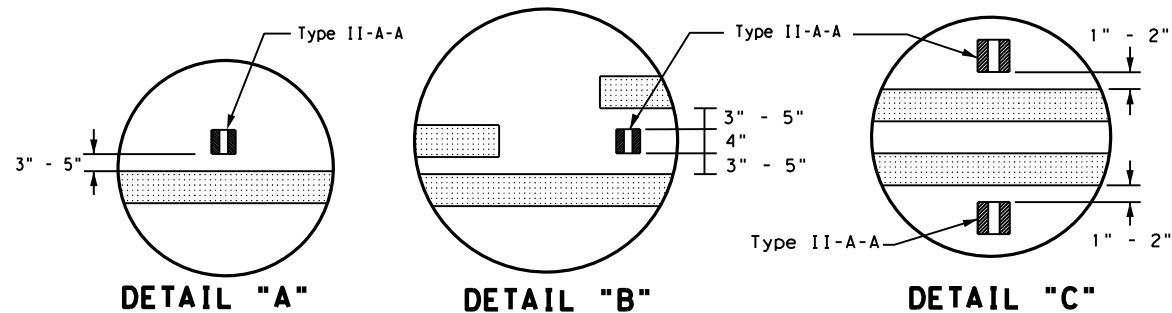
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CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



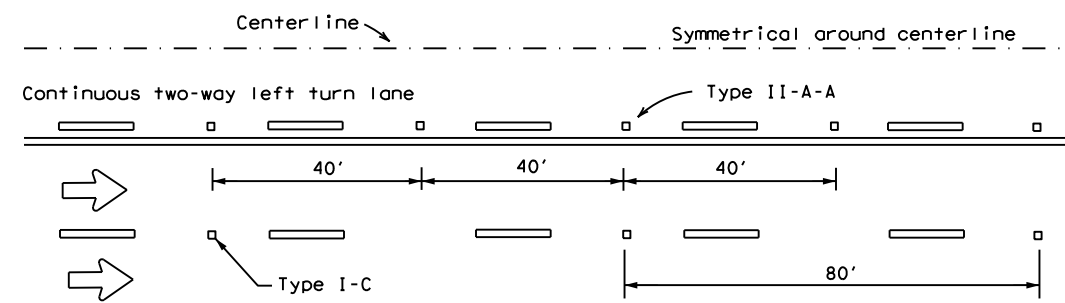
**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS**



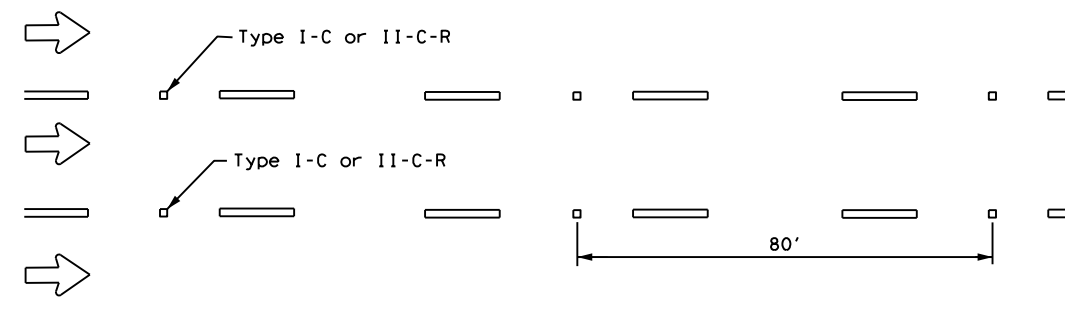
DETAIL "A"

DETAIL "B"

DETAIL "C"

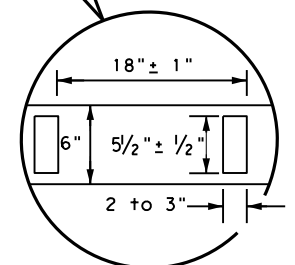
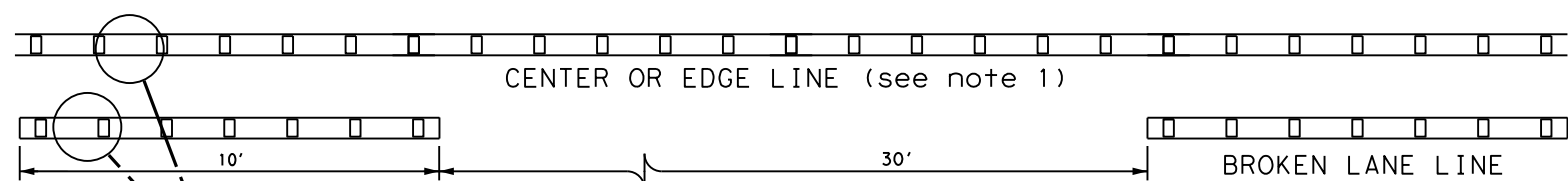


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

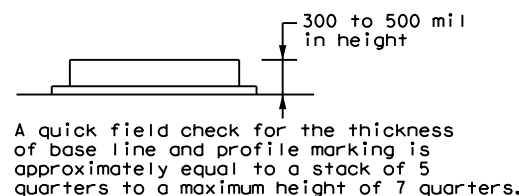
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.
See Note 3.



**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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



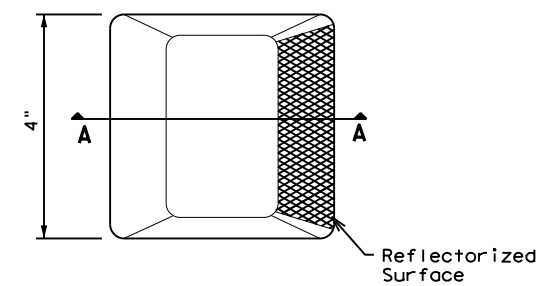
A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

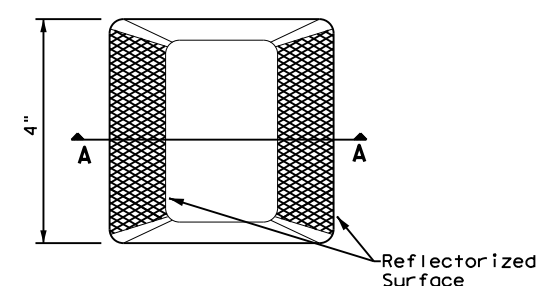
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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

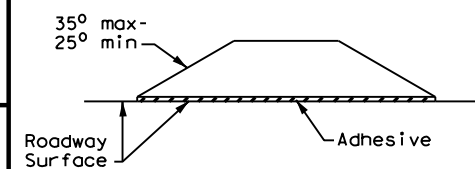
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

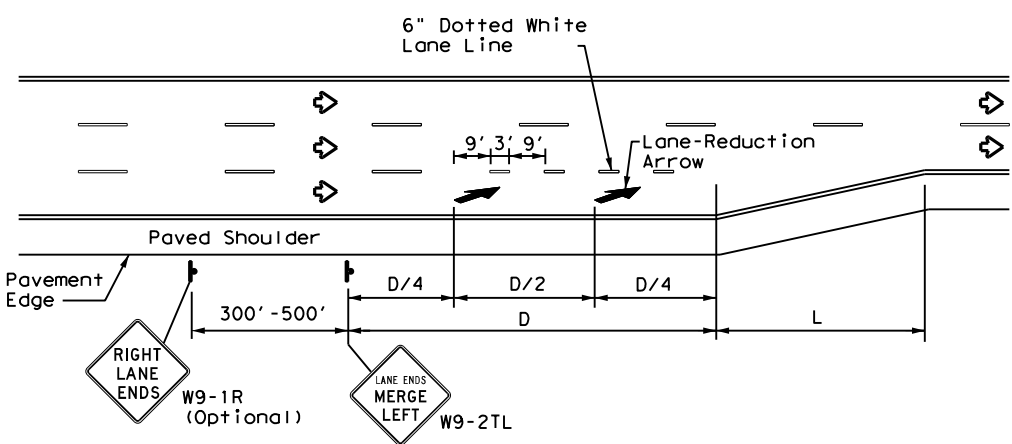
RAISED PAVEMENT MARKERS



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

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
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4-77 8-00 6-20	DIST	COUNTY	SHEET NO.	
4-92 2-10 12-22	ATL	CASS	50	
5-00 2-12				

DATE: 10/16/2023 2:36:47 PM
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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.

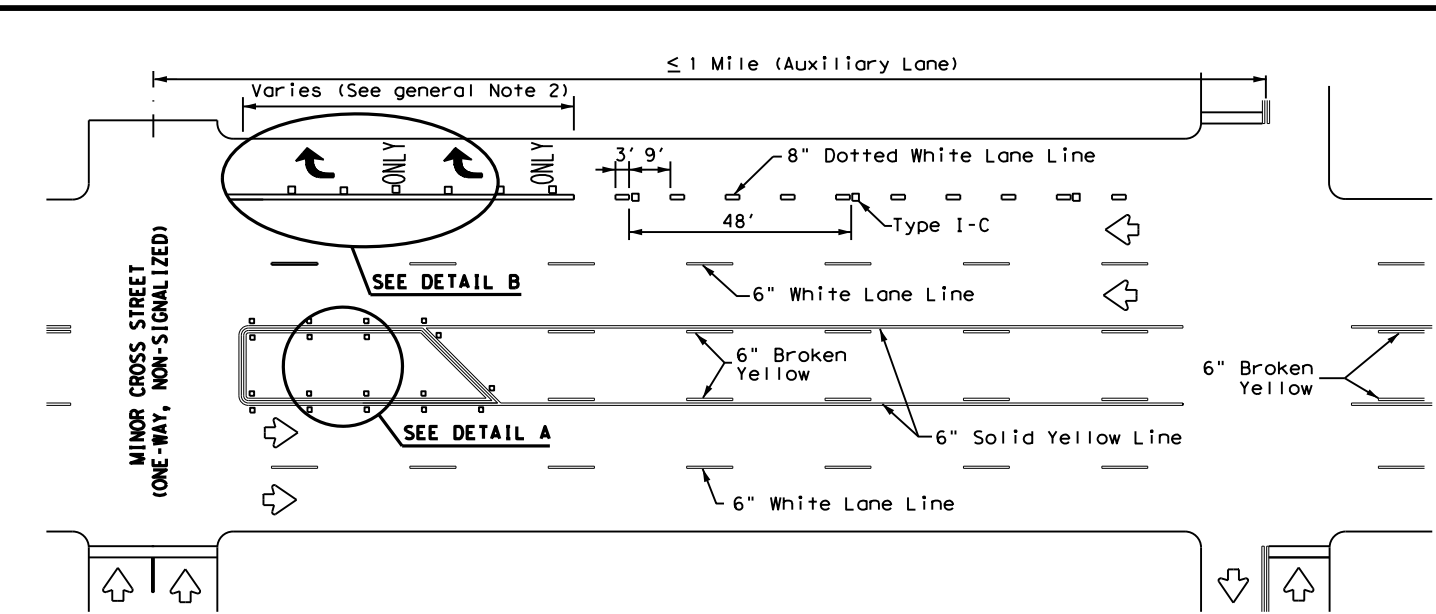
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

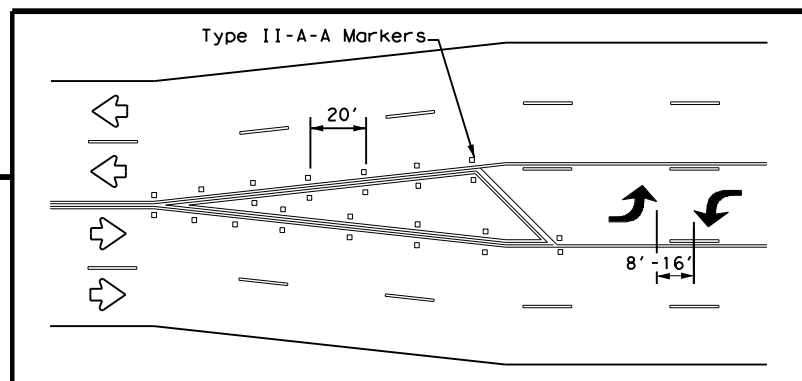
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn 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.

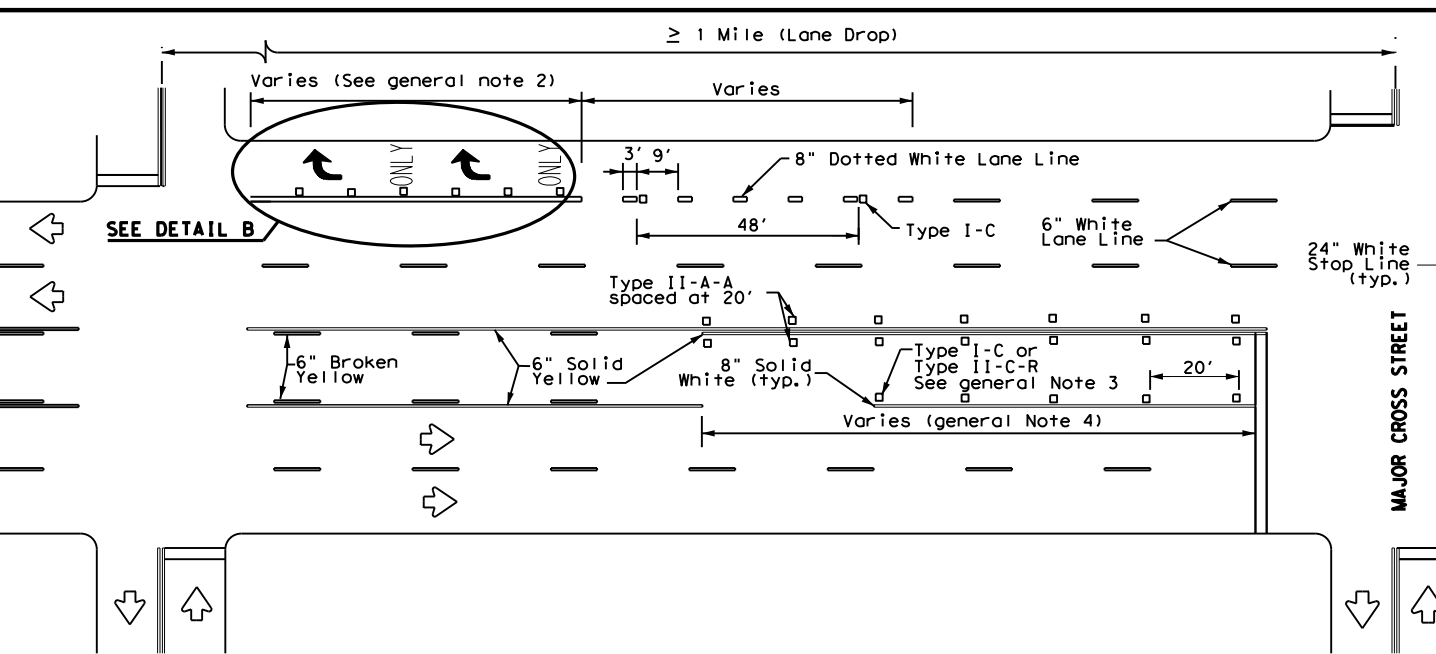


TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE

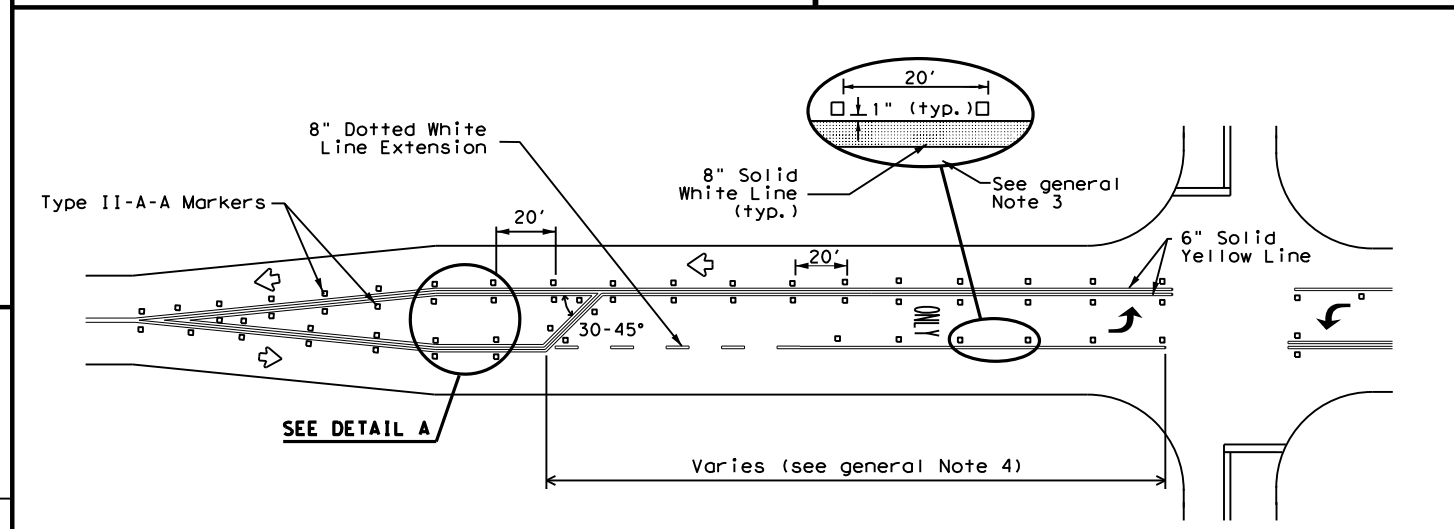


TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

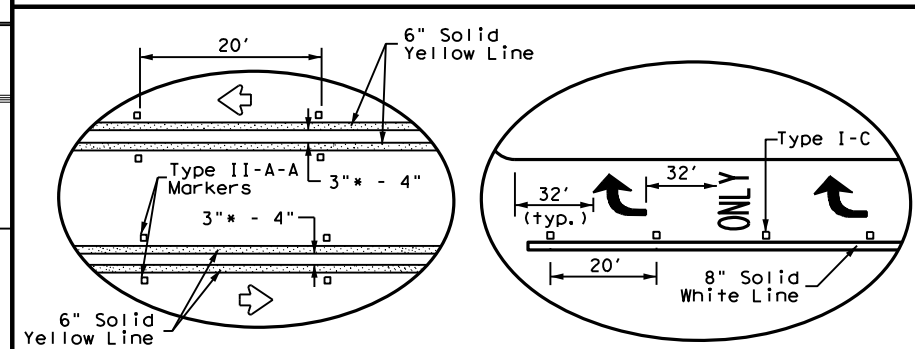
A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.



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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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
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4-98 3-03 6-20	DIST	COUNTY	SHEET NO.	
5-00 2-10 12-22	ATL	CASS		51
8-00 2-12				

DATE: 10/16/2023 2:58:56 PM
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 PROJECTWISE ONLINE.COM: TXDOT15\Documents\19 - ATL\Design Projects\09094\chgs\09094\09094.dwg
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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	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										D & OM DESCRIPTIVE CODES	
DEVICE	Type 1 (OM-1)		Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)		INSTL OM ASSM (OM-XX) (XXXX)XXX(XX) TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector units (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional
		SHEETING: Yellow-Type B _{FL} or C _{FL} Sheeting		SHEETING: Yellow - Type B or C Sheeting			SHEETING: Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			SHEETING: Red -Type B _{FL} or C _{FL} Sheeting	
	POST TYPE: TWT		POST TYPE: WC			POST TYPE: WFLX			POST TYPE: TWT		
	MOUNT TYPE: WAS, WAP		MOUNT TYPE: GND			MOUNT TYPE: GND, SRF			MOUNT TYPE: 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										
	SHEETING: Yellow, White, Red		SHEETING: Yellow, White, Red				SHEETING: Yellow, White, Red			
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).				1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.			
	SIZE (W x L)		18" x 24" (Conventional)		24" x 30" (Conventional Oversize)		30" x 36" (Expressway)		36" x 48" (Freeway)	
	MOUNTING HEIGHT		4'-0" or 7'-0"		7'-0" Only		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
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10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ATL	CASS		52

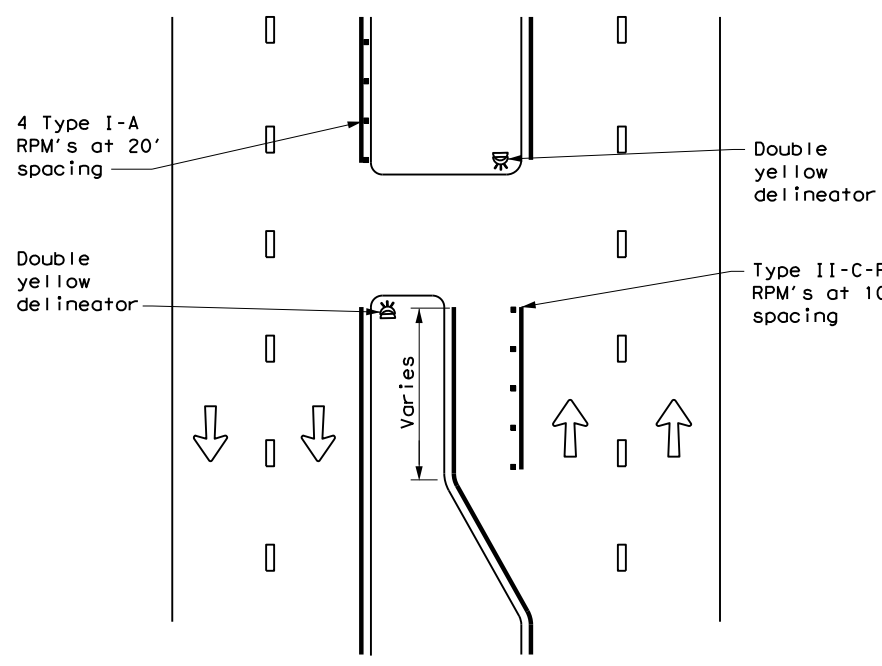
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 TITLE: DELINEATOR & OBJECT MARKER INSTALLATION
 SHEET NO.: 20B
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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS																										
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT																									
GND	GND	SRF	WAS	WAP	GF 1																									
<p>Ground Line</p> <p>2'-0" Usual</p>	<p>Reflective material</p> <p>Post</p> <p>Stub</p> <p>Post</p> <p>Base</p>	<p>Reflective material</p> <p>Post</p> <p>Base</p>	<p>12" Dia.</p> <p>27" 30"</p>	<p>3" (Approx.)</p> <p>15"</p> <p>17" 20"</p> <p>12" Dia.</p> <p>3.5"</p> <p>17"</p> <p>30°</p> <p>2"</p> <p>1"</p>	<p>Centerline of MBCF rail element</p>	<p>Attached to post or block</p> <p>2'-6" Min.</p> <p>4" Min.</p> <p>4'-0"</p>																								
	EMBEDDED		SURFACE MOUNT	STEEL	PLASTIC																									
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.																											
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS		CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN		DELINEATORS AND TYPE 2 OBJECT MARKERS																										
<p>4'-0"</p> <p>Pavement surface</p> <p>Ground Line</p>		<p>7'-0"</p> <p>Pavement surface</p> <p>Ground Line</p>		<p>Approximately 4'-0"</p> <p>Pavement surface</p> <p>Ground Line</p> <p>2'-0" to 8'-0" or in front of object being marked</p>																										
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.		NOTE See general notes 1, 2 and 3.																										
CONCRETE TRAFFIC BARRIER (CTB)																														
<p>Place Barrier Reflector on top or on side(s) of CTB.</p>																														
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.																														
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>Texas Department of Transportation</p> </div> <div style="text-align: right;"> <p>Traffic Safety Division Standard</p> </div> </div>																														
DELINEATOR & OBJECT MARKER INSTALLATION																														
D & OM(2) -20																														
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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY																										
REVISIONS	0218	03	094	US 59																										
10-09 3-15	DIST	COUNTY		SHEET NO.																										
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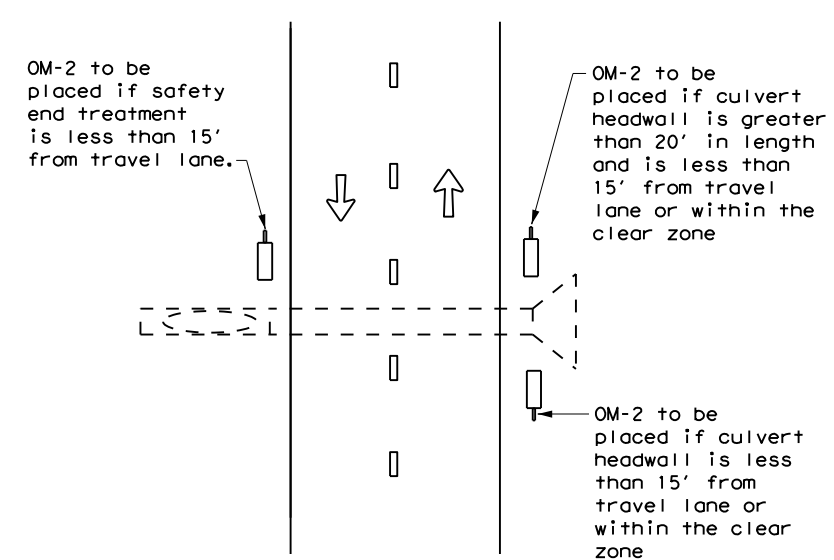
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CROSSOVERS



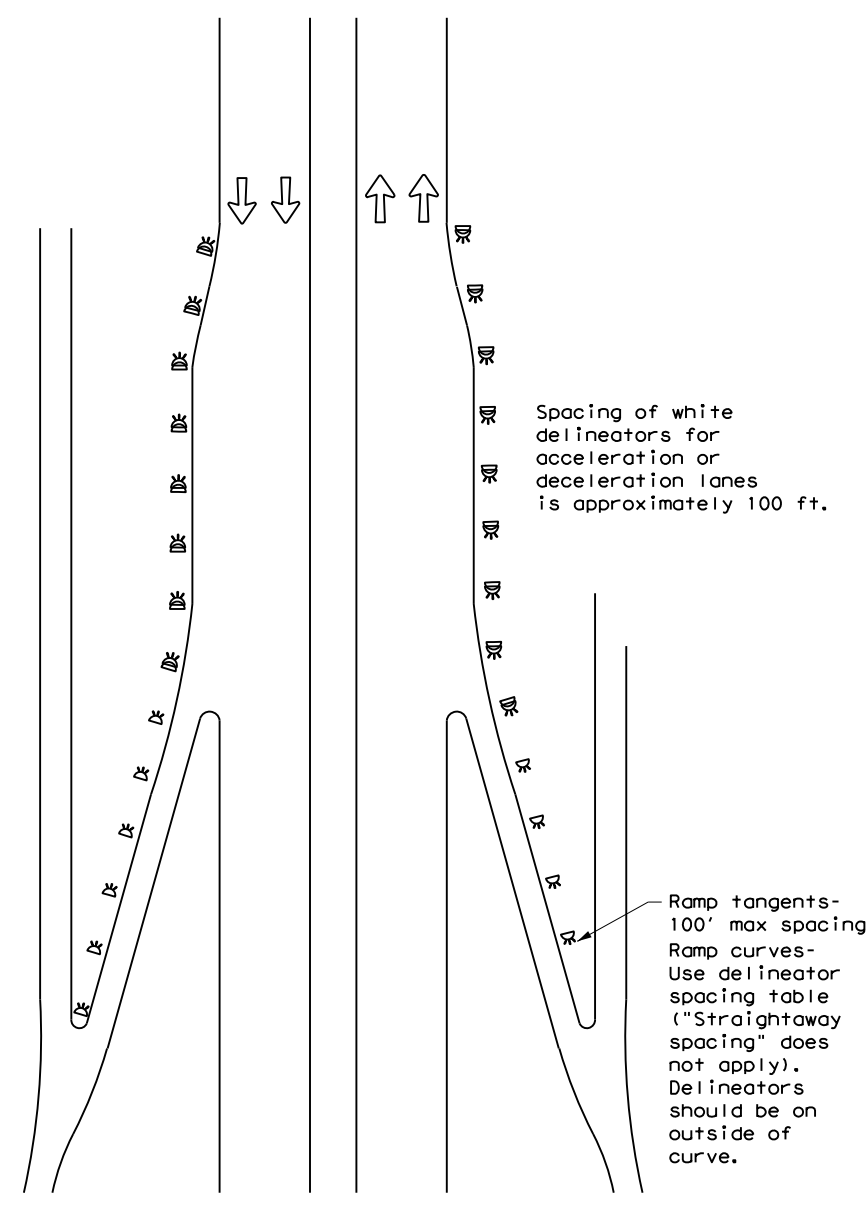
DETAIL 1

FOR CULVERTS WITHOUT MBGF



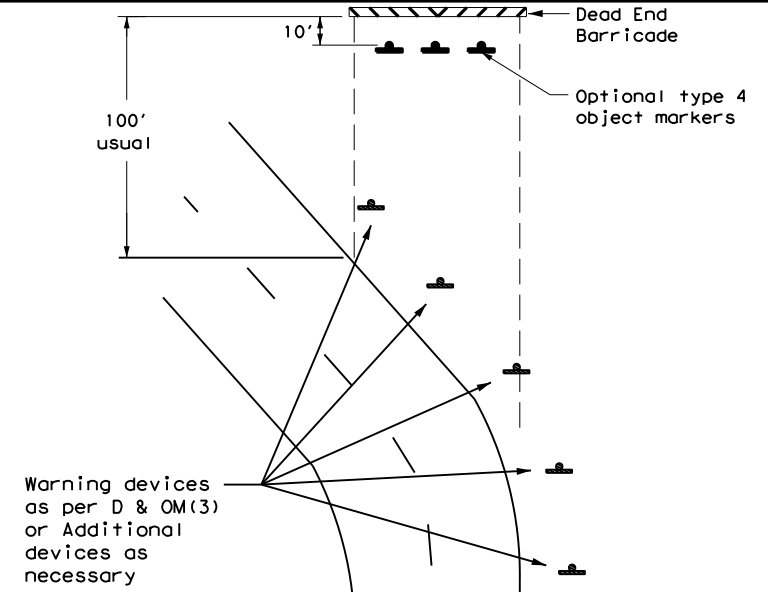
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



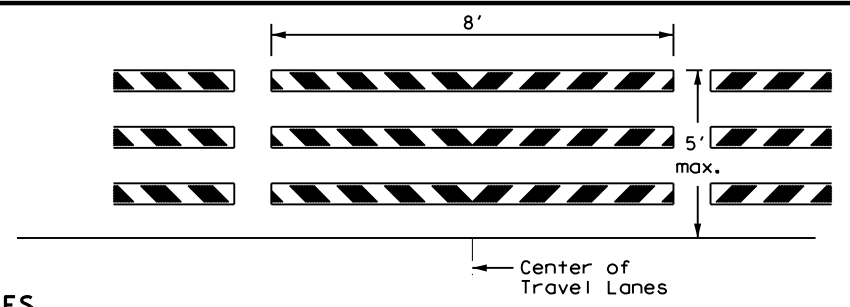
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

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

DETAIL 5

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

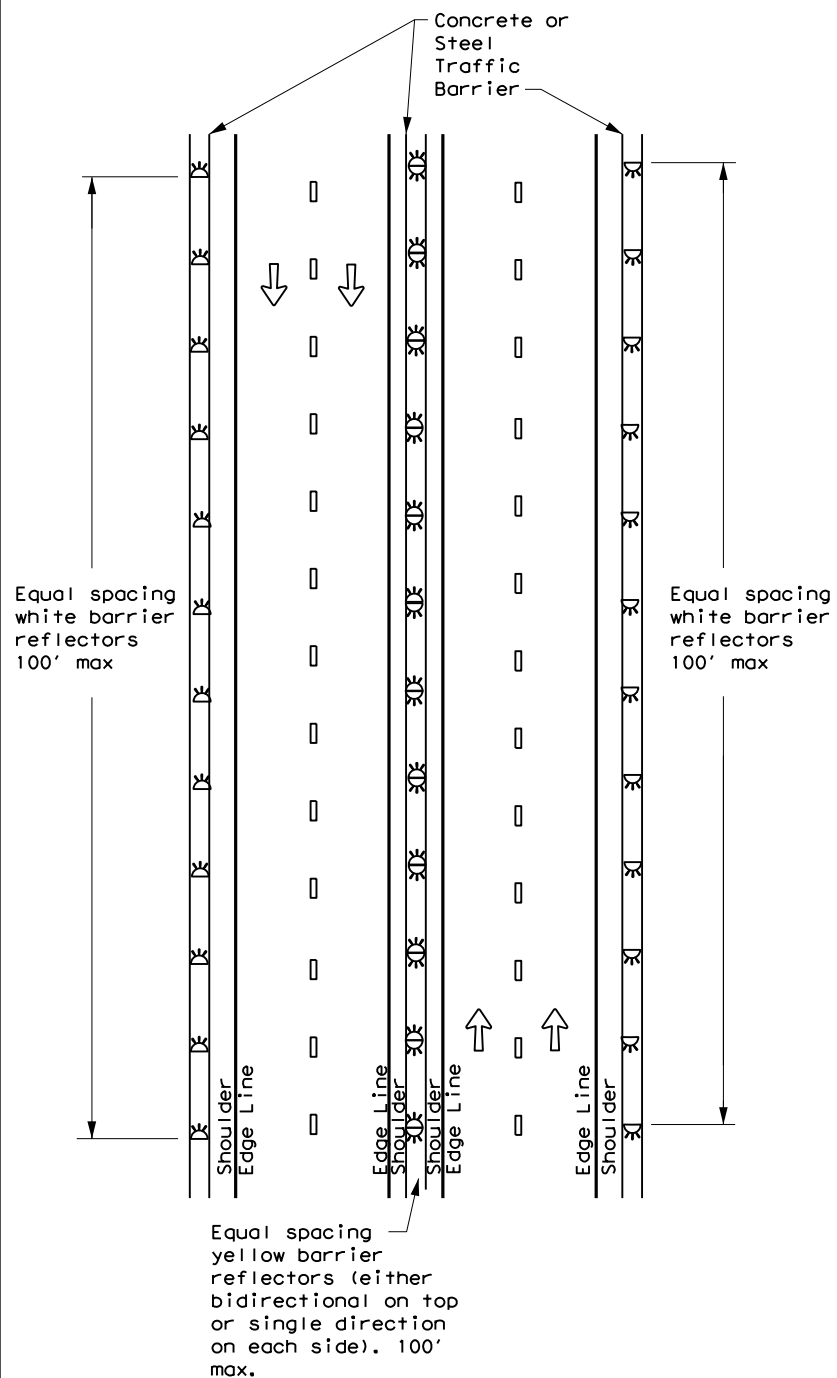


DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

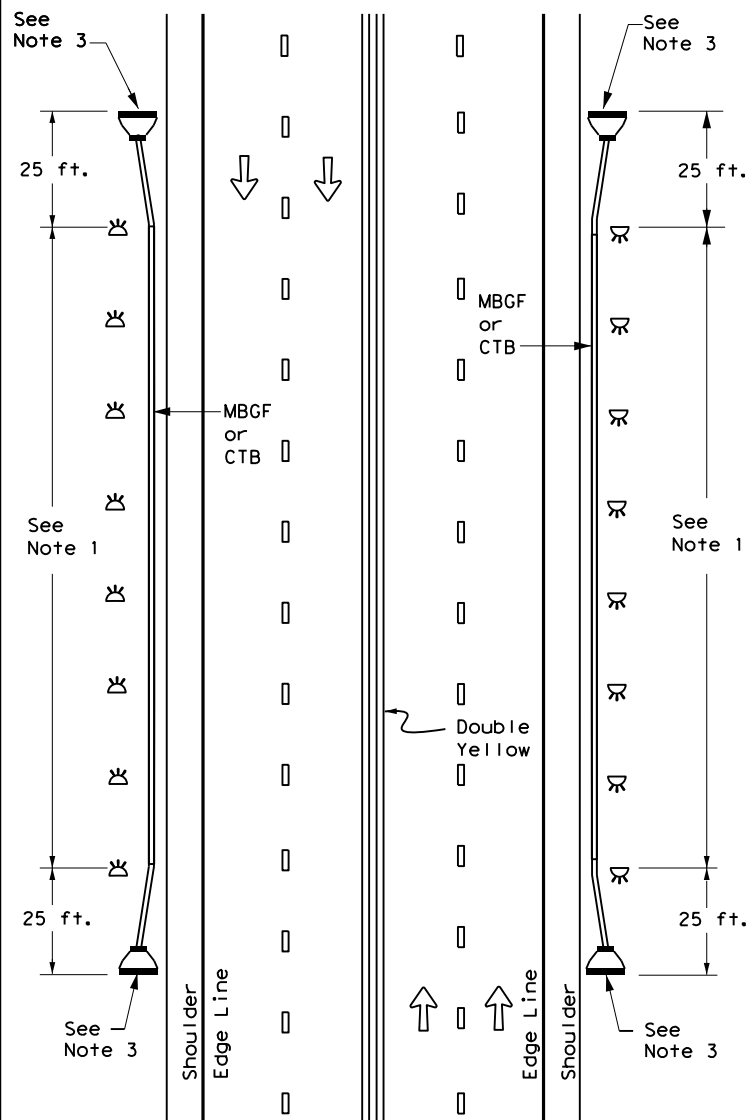
D & OM(4) -20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	OW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0218	03	094	US 59
3-15	DIST	COUNTY	SHEET NO.	
7-20	ATL	CASS	54	

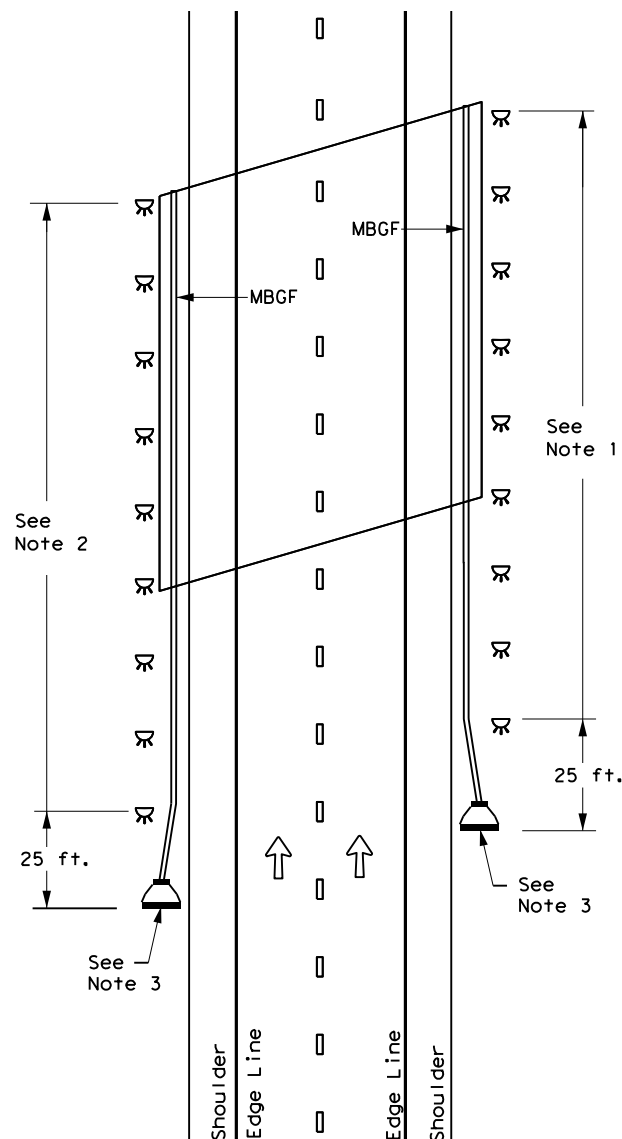
CONTINUOUS CONCRETE OR STEEL BARRIER



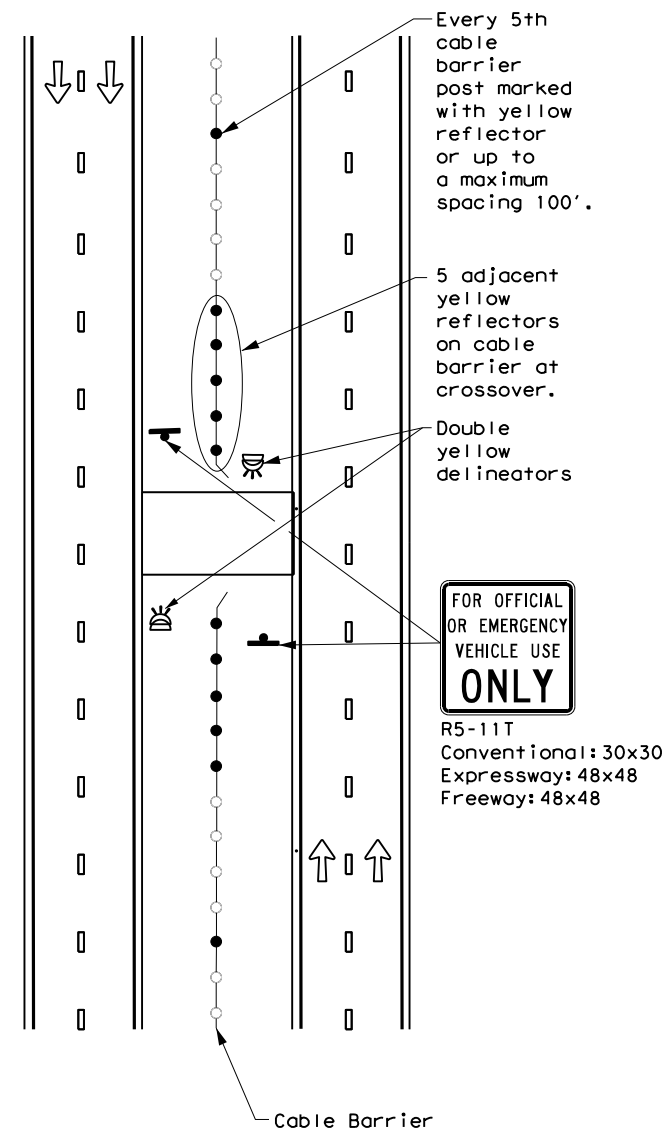
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

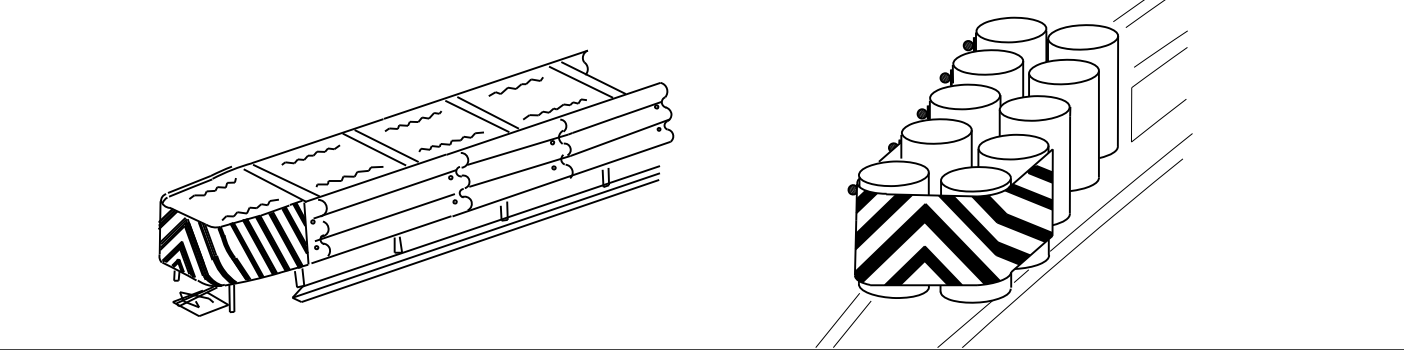
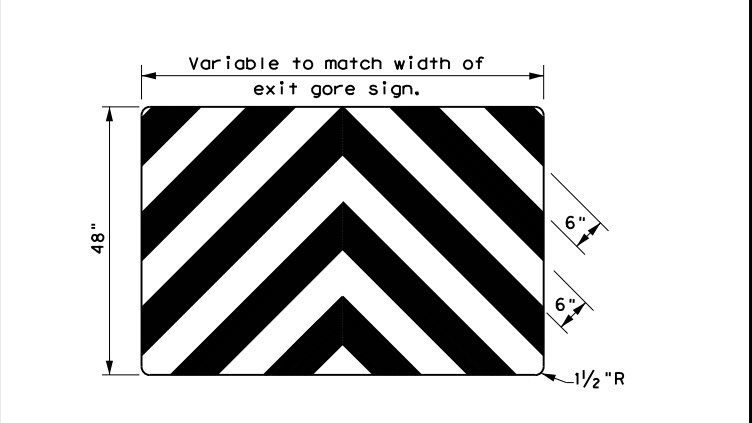
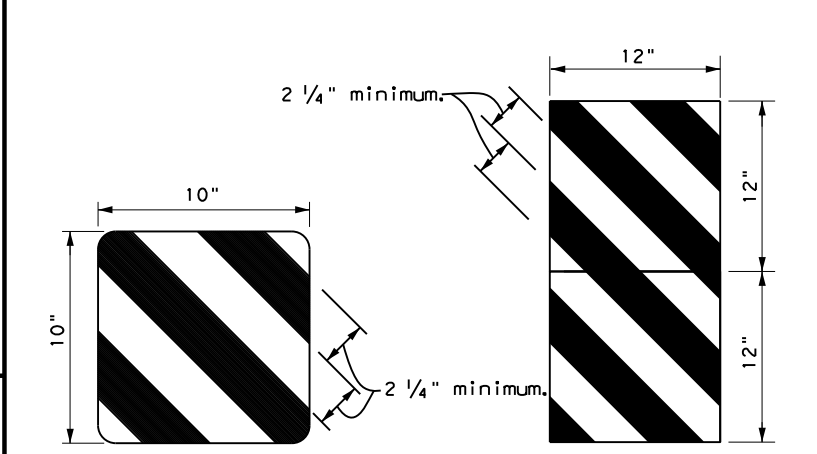
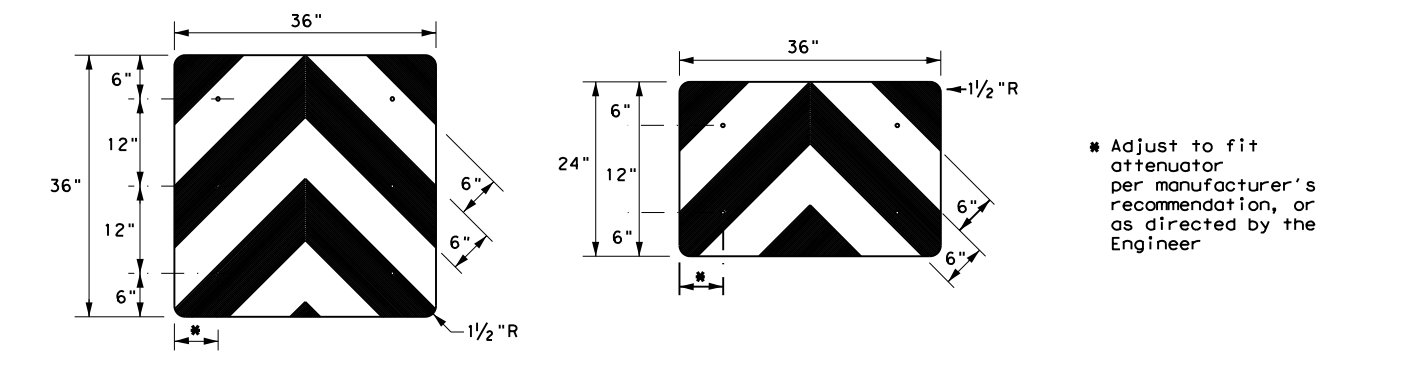
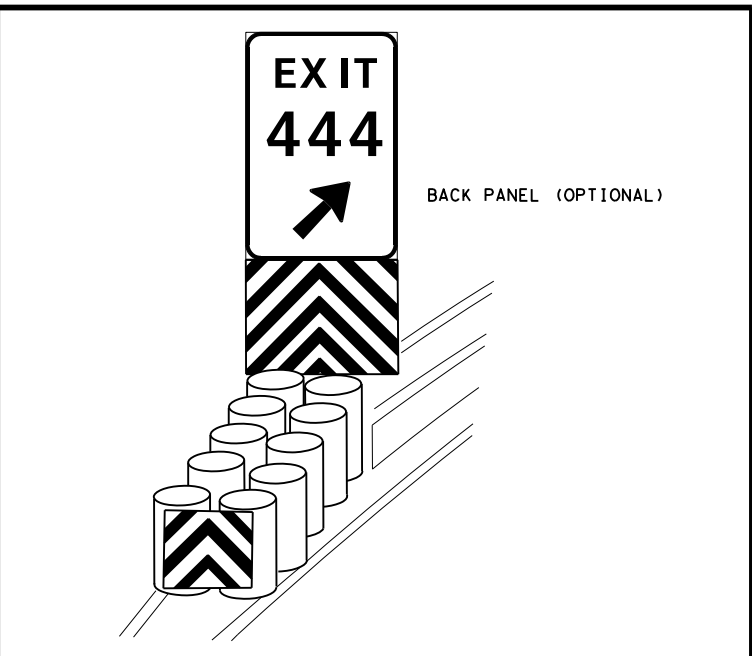
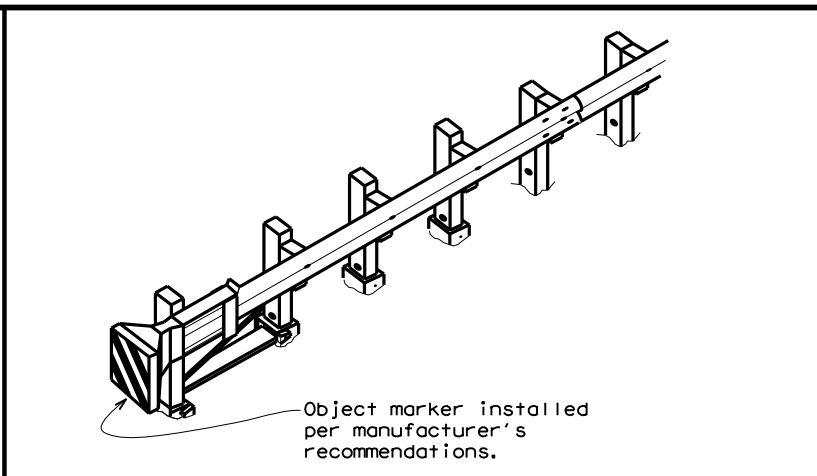
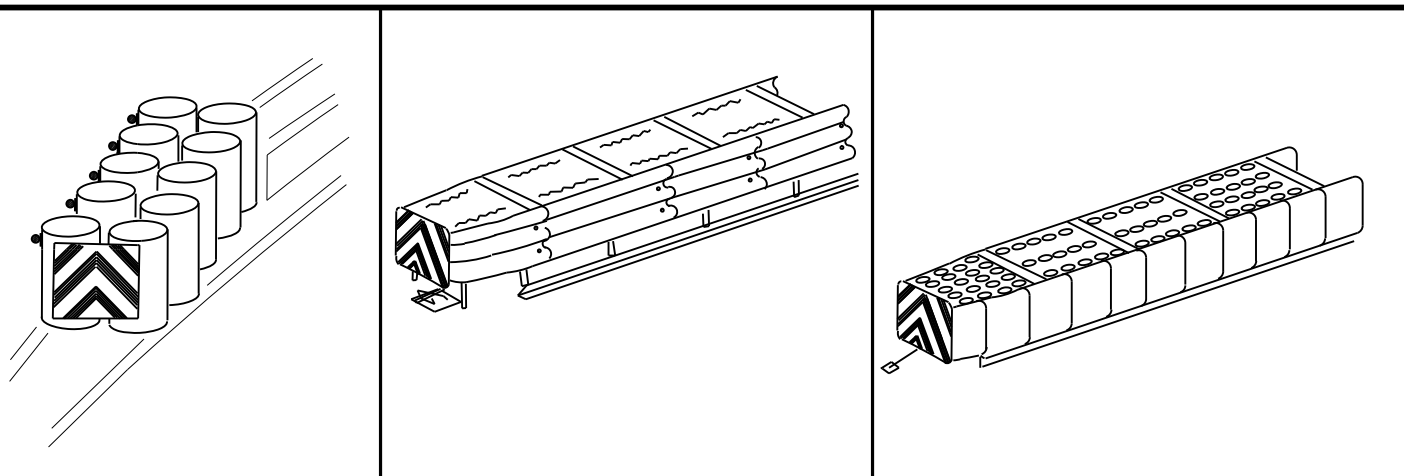
	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

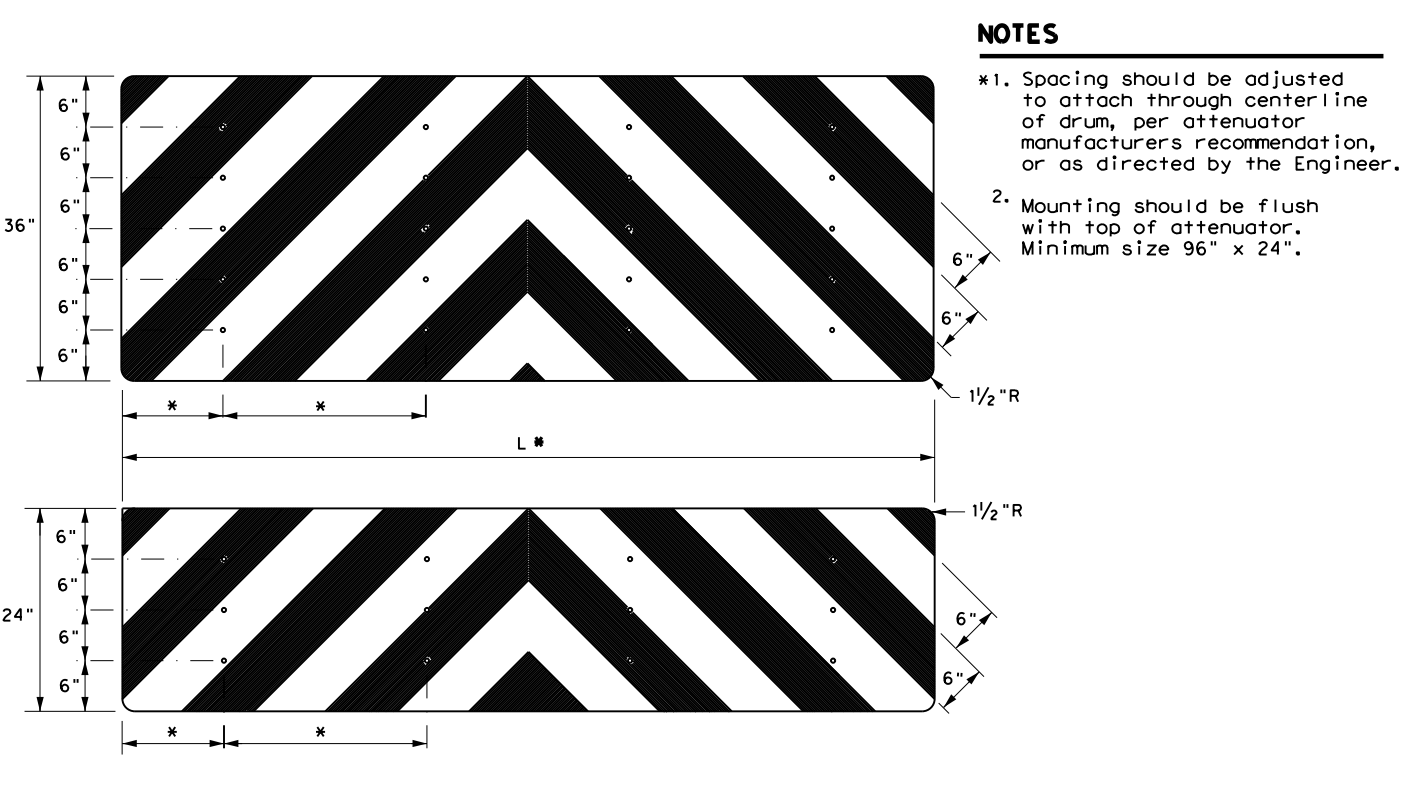
D & OM(6)-20

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© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
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OBJECT MARKERS SMALLER THAN 3 FT²



NOTES

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

		Traffic Safety Division Standard	
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) -20			
FILE: domvia20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT December 1989	CONT	SECT	JOB
REVISIONS		0218 03	094 US 59
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	ATL	CASS	56
4-98 7-20			
20G			

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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)

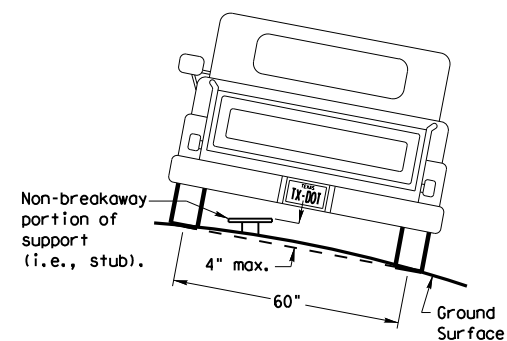
Post Type
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

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))

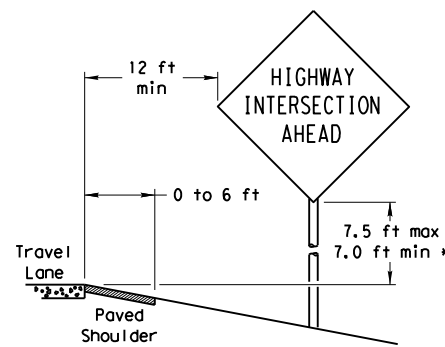
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

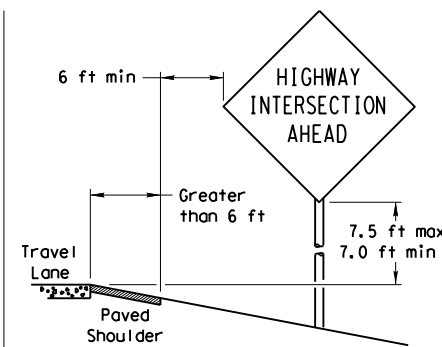
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

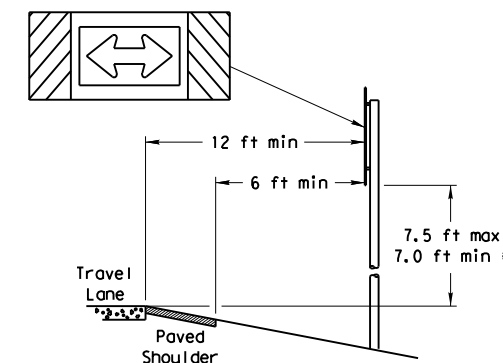
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

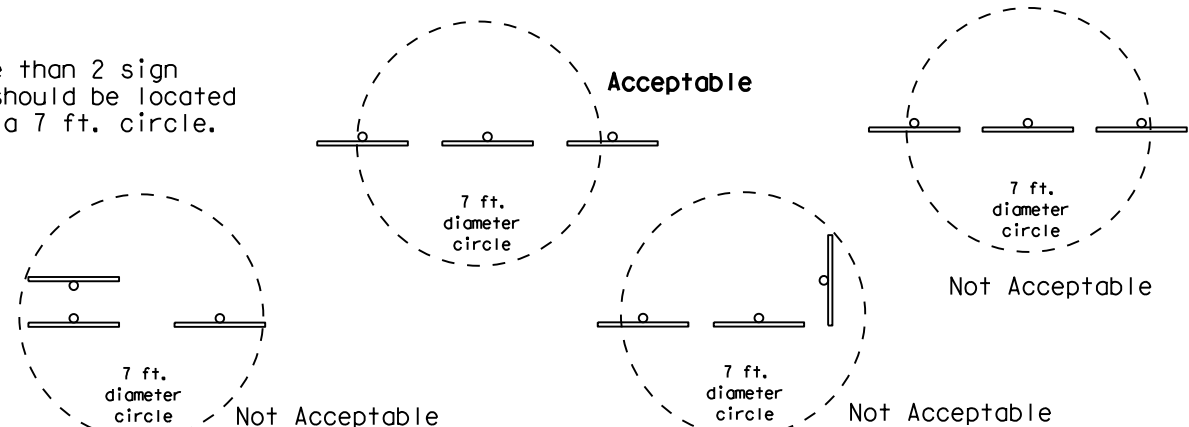
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

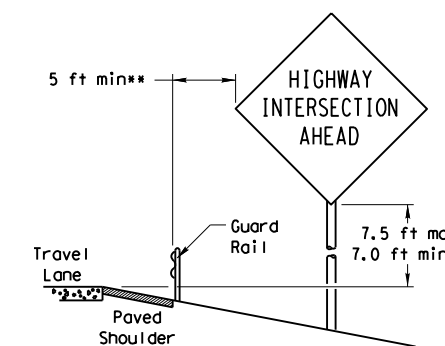


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

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

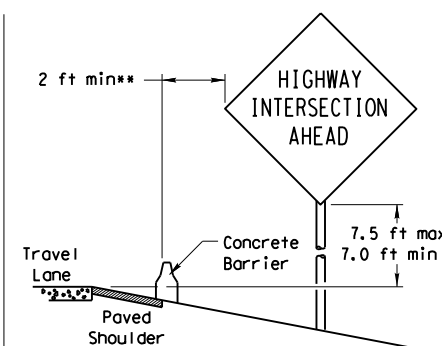


BEHIND BARRIER



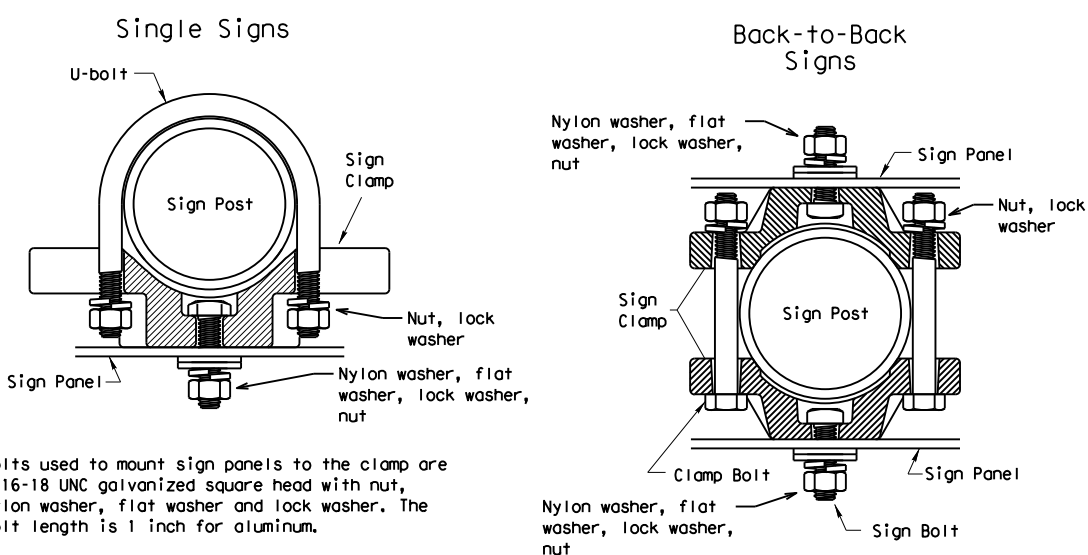
BEHIND GUARDRAIL

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



BEHIND CONCRETE BARRIER

TYPICAL SIGN ATTACHMENT DETAIL



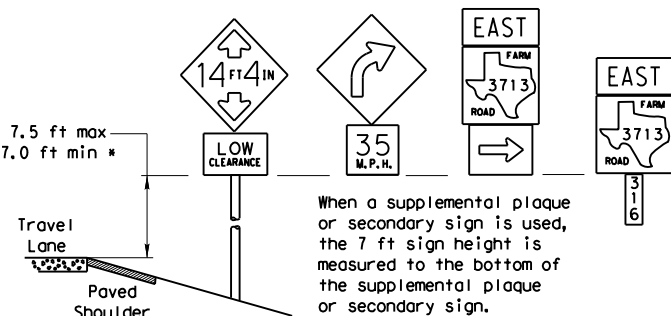
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

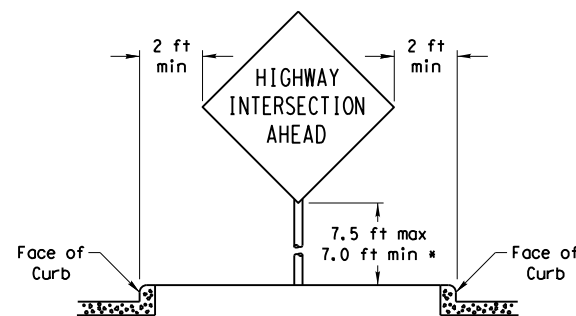
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

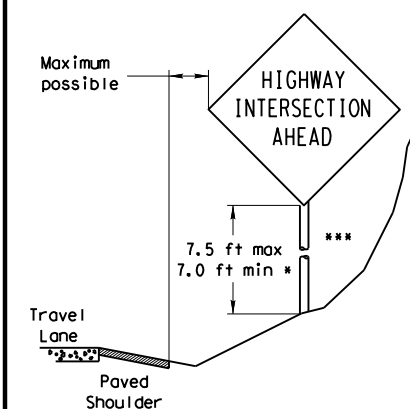


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



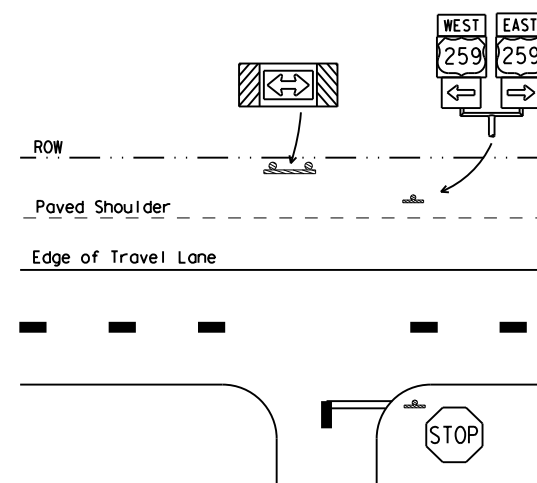
RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



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.



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

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

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

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

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

Texas Department of Transportation
 Traffic Operations Division

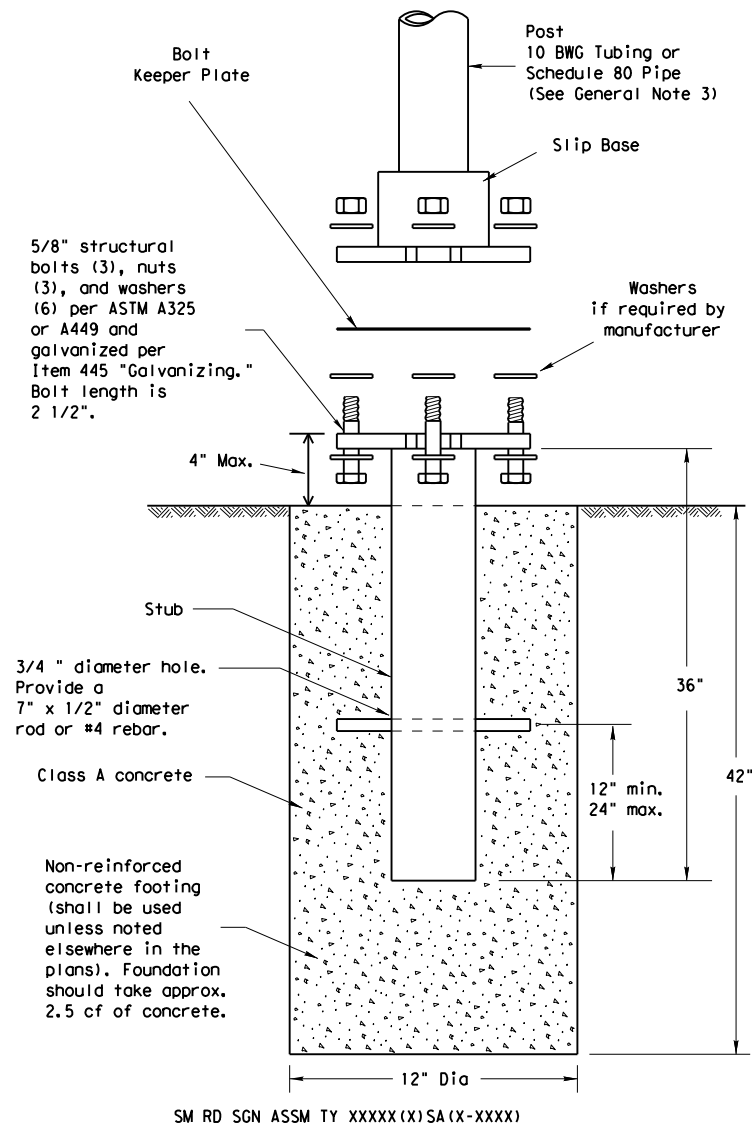
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN) - 08

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9-08	REVISIONS	CON: 0218	SECT: 03	JOB: 094	US 59
		DIST: ATL	COUNTY: CASS	SHEET NO.: 57	

19-2
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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

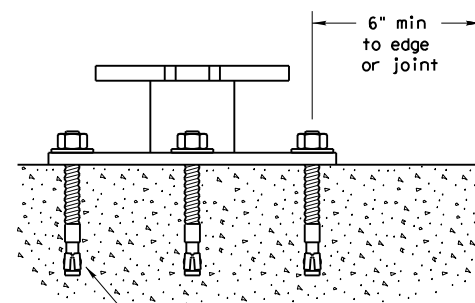
Foundation

- 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



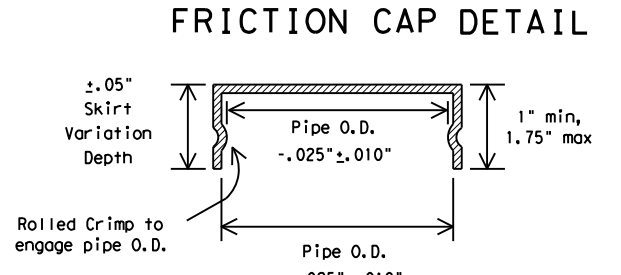
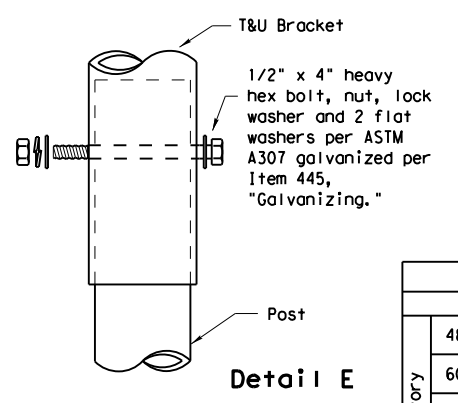
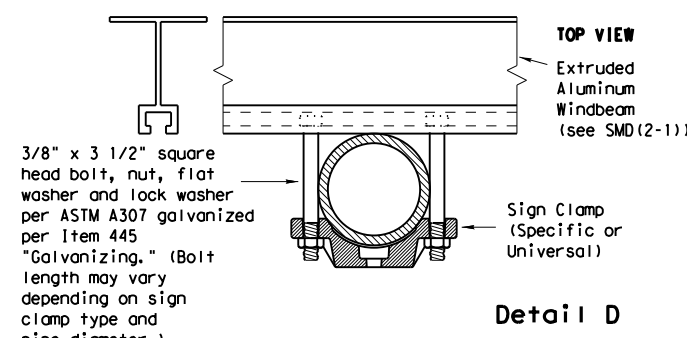
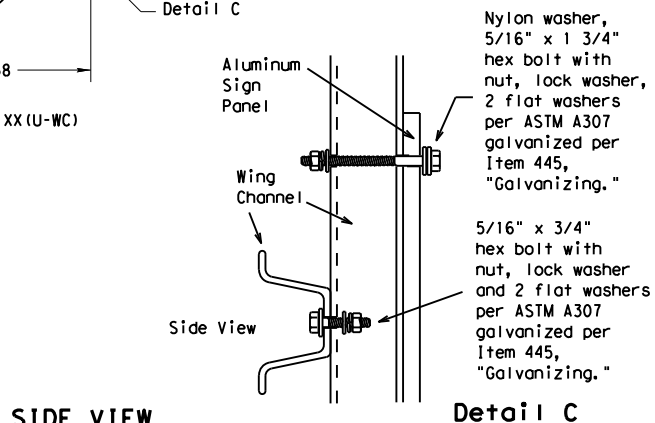
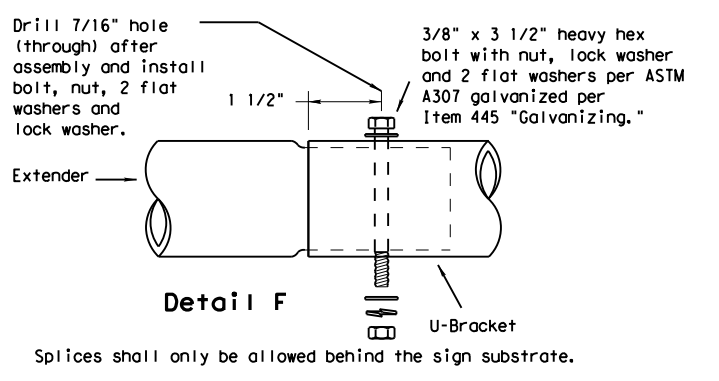
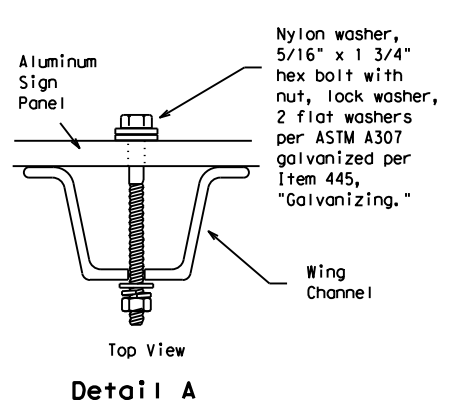
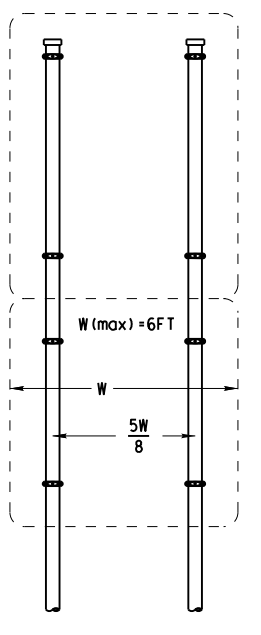
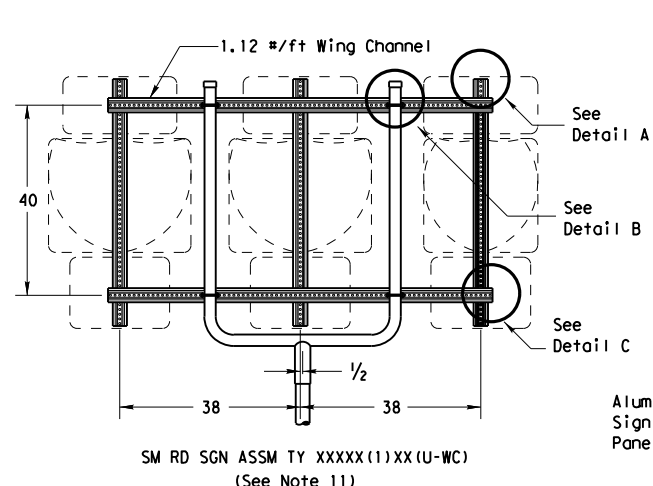
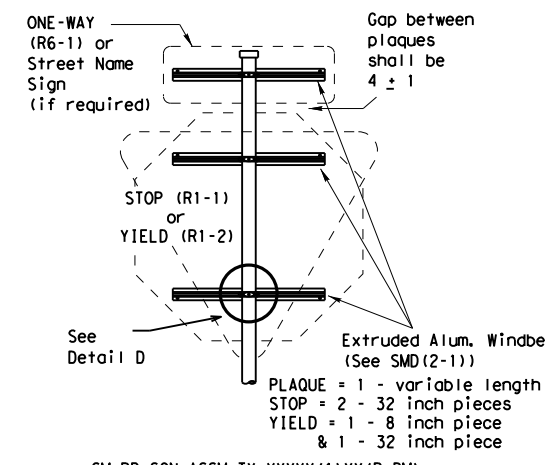
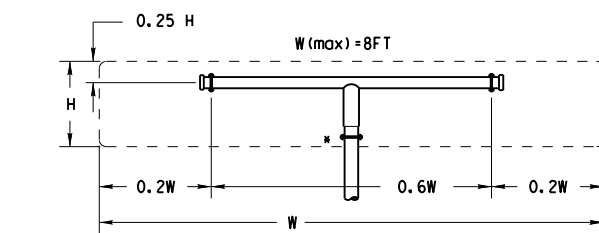
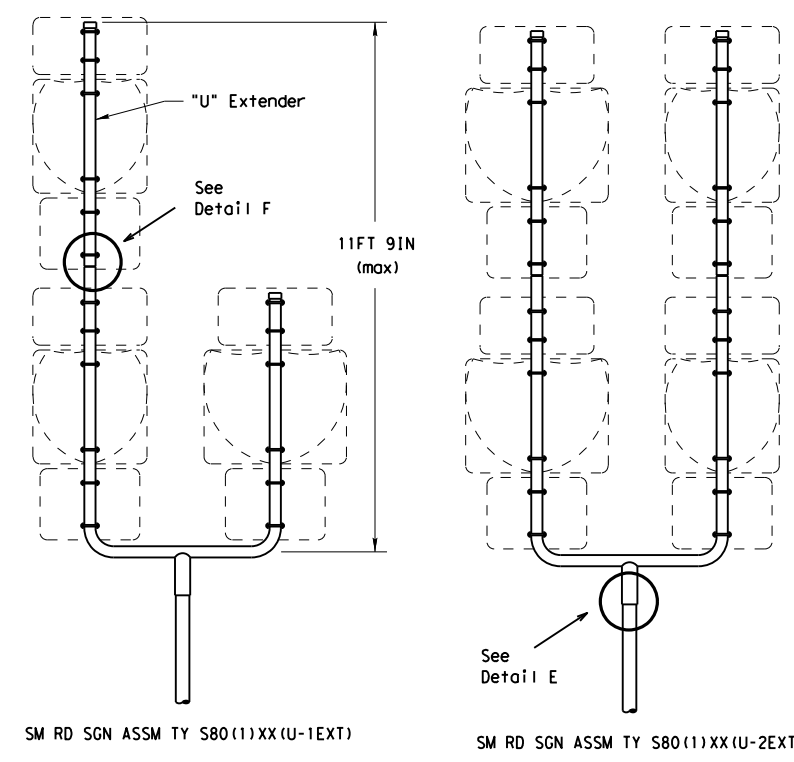
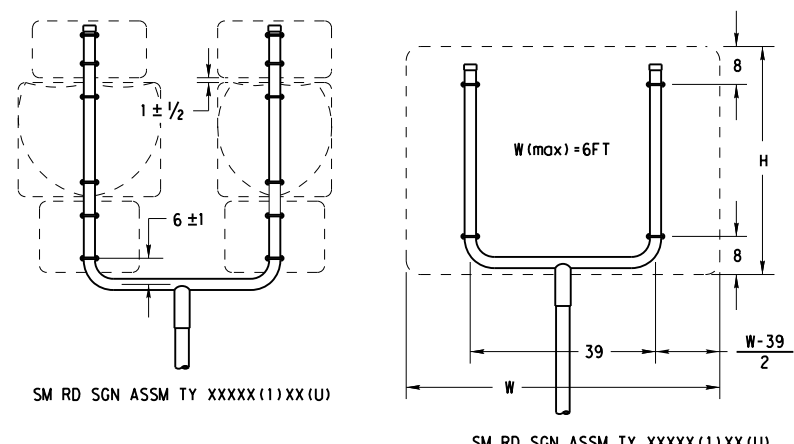
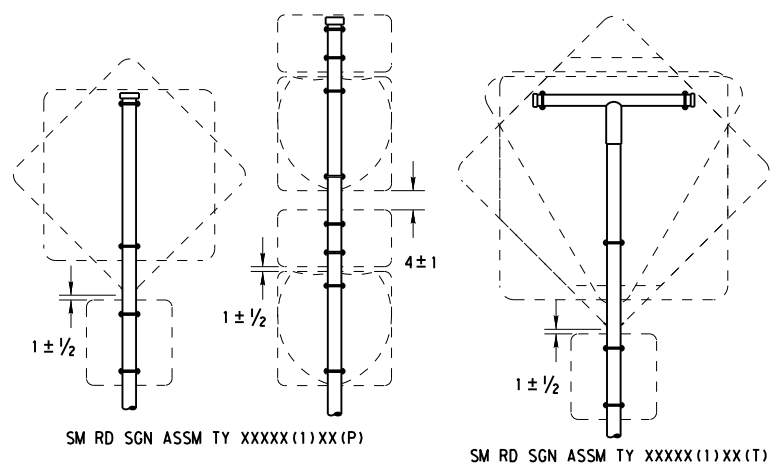
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized 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.

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 Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM SMD(SLIP-1)-08

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9-08	REVISIONS		CONTRACT	SECTION	JOB	HIGHWAY
	0218	03	094	US 59		
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Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

- | 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.

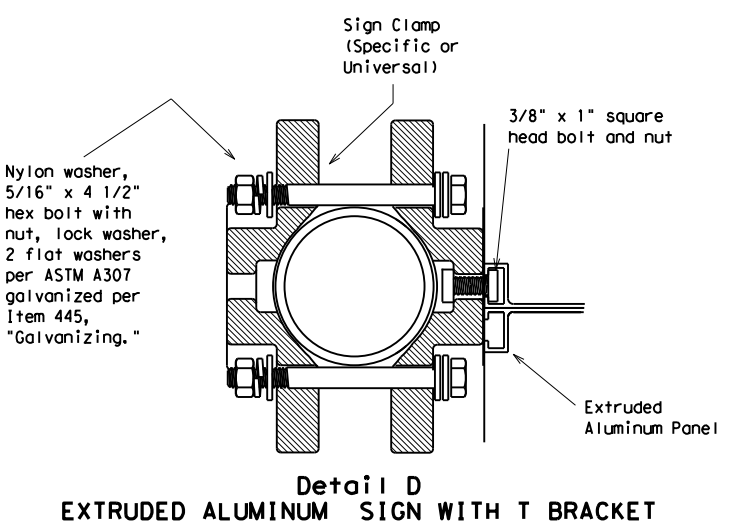
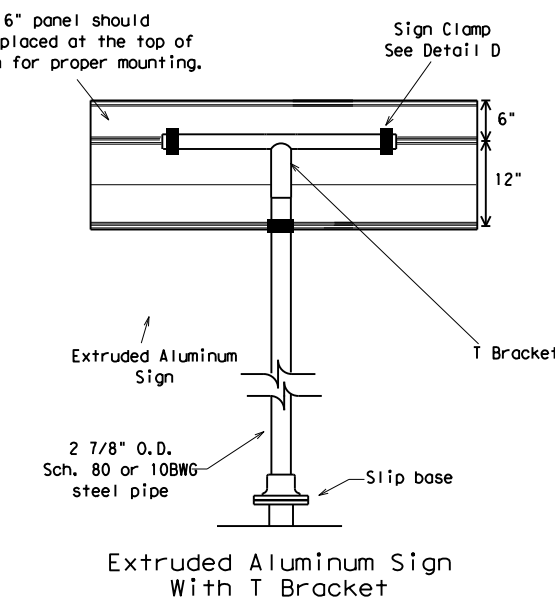
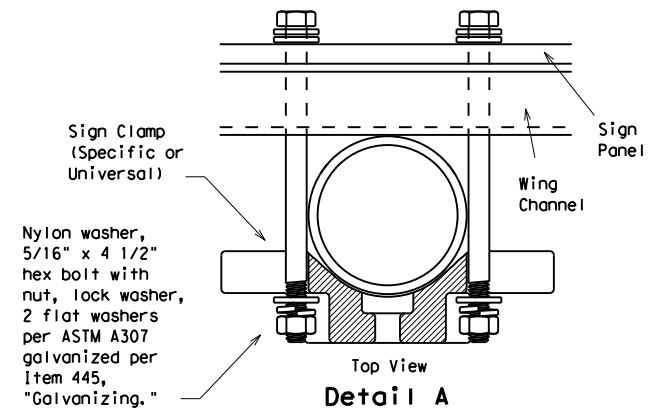
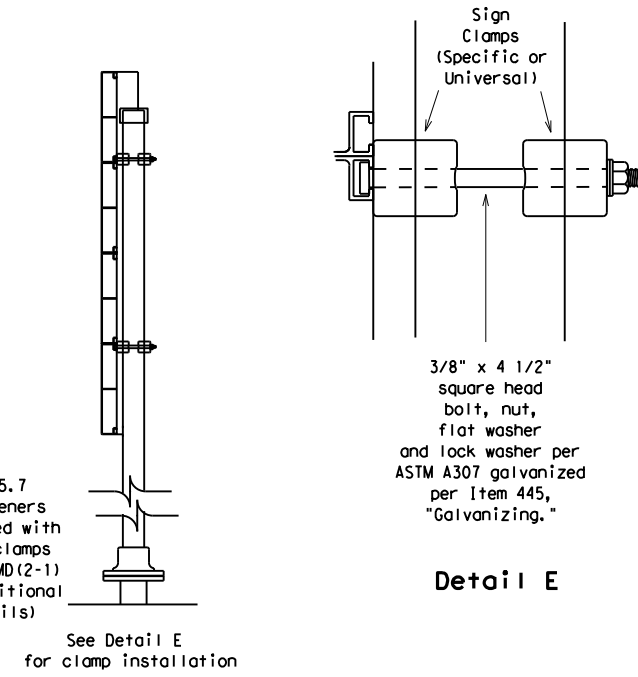
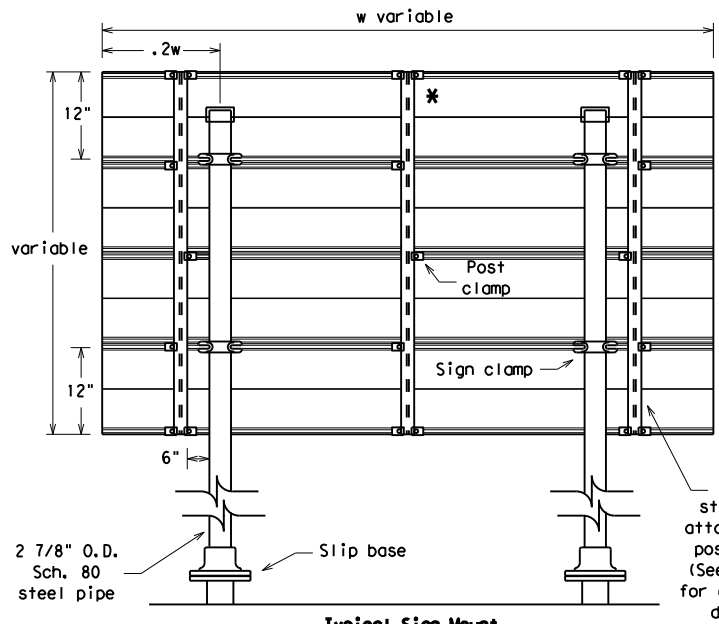
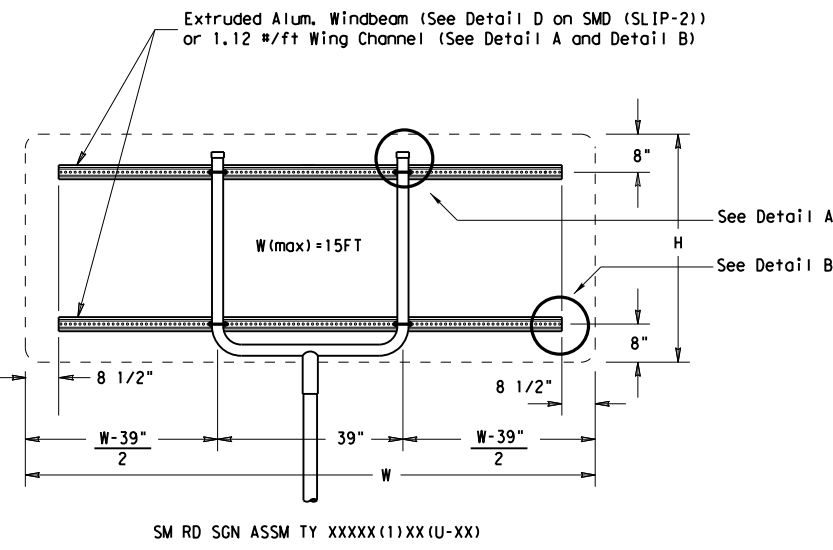
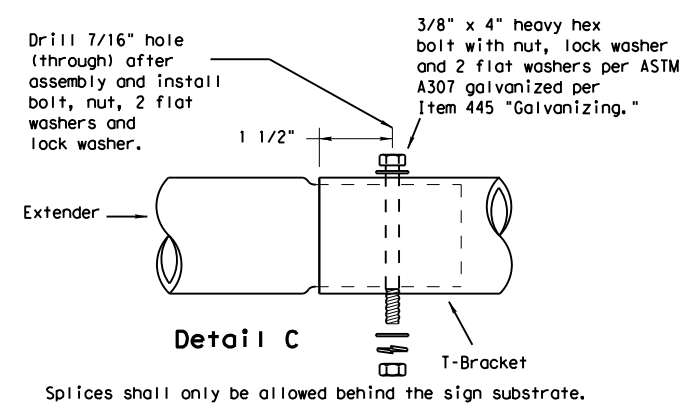
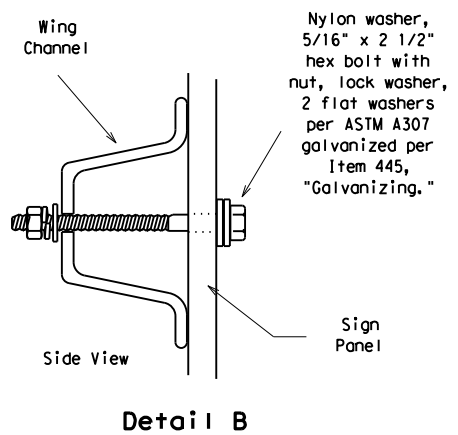
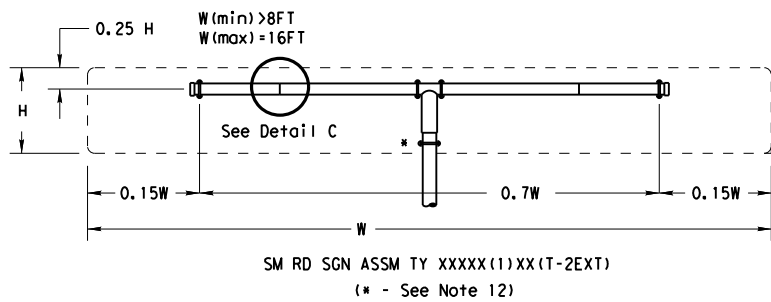
REQUIRED SUPPORT		
SIGN DESCRIPTION	SUPPORT	
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Warning	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)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



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

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
9-08	REVISIONS	CON: 021803	SECT: 094	JOB: US 59	HIGHWAY
		DIST: ATL	COUNTY: CASS		SHEET NO. 59

DATE: 10/16/2023 3:34:19 PM
 FILE: pw://ttdot.projectwiseonline.com:txdot.projects/021803094/4 - Design/Master Design Files/01 PLANSHEETS/DGN FILES/SETH'S FILES/OFFLINE FILES#05-19-2
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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.

REQUIRED SUPPORT

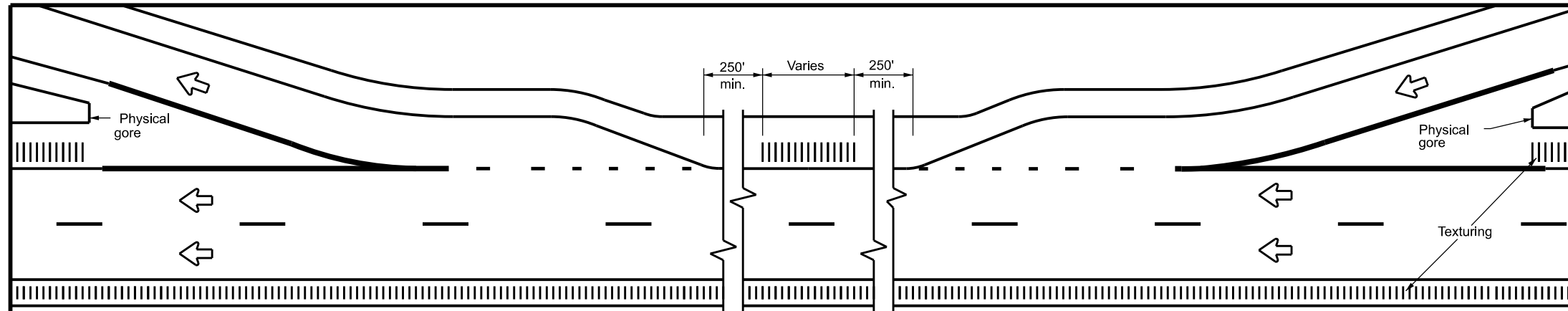
	REQUIRED SUPPORT	
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



**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
		0218	03	094	US 59
		DIST	COUNTY		SHEET NO.
		ATL	CASS		60

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TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS

GENERAL NOTES

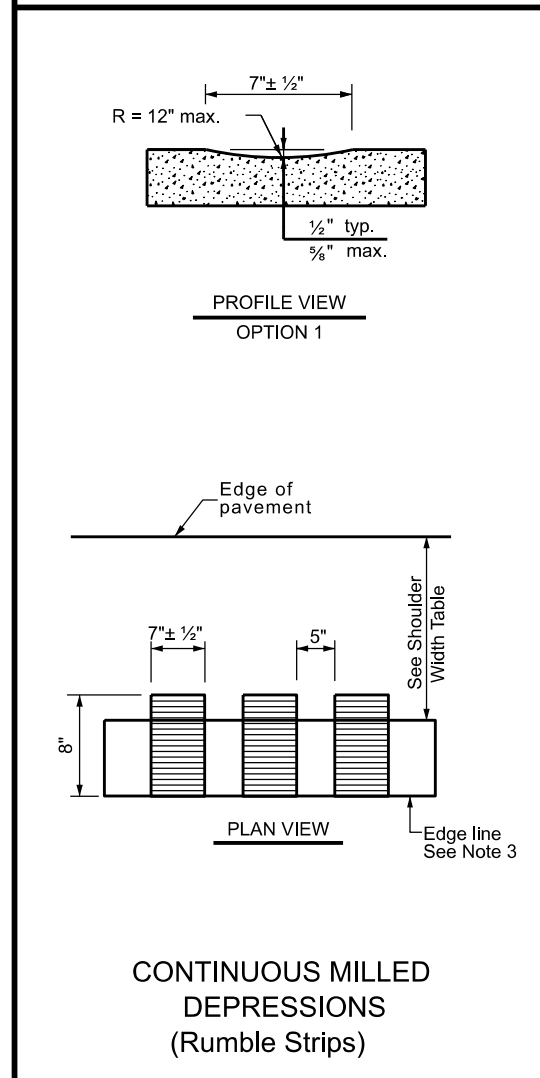
- Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
- Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
- Use standard sheets PM(2) and FPM(1) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
- See the Shoulder Width Table below for determining what options may be used for edge line rumble strips.
- Breaks in edge line rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections, or driveways with high usage of large trucks when installed on conventional highways.
- Rumble strips shall not be placed across exit or entrance ramps, acceleration or deceleration lanes, crossovers, gore areas, or intersections with other roadways.
- Consideration should be given to noise levels when edge line rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
- Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

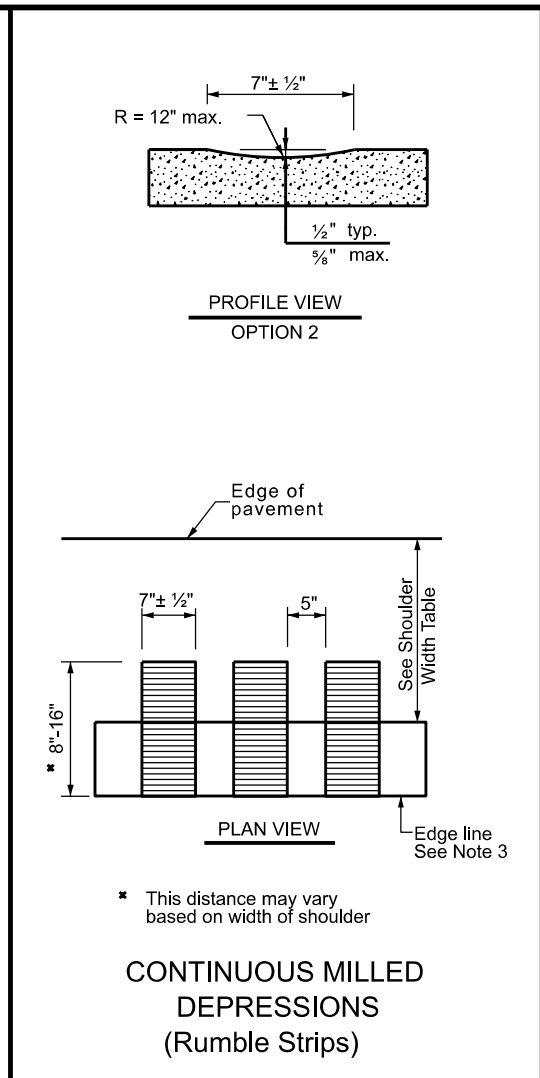
- See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
- Pavement markings can be applied over milled shoulder rumble strips to create an edge line rumble stripe.

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

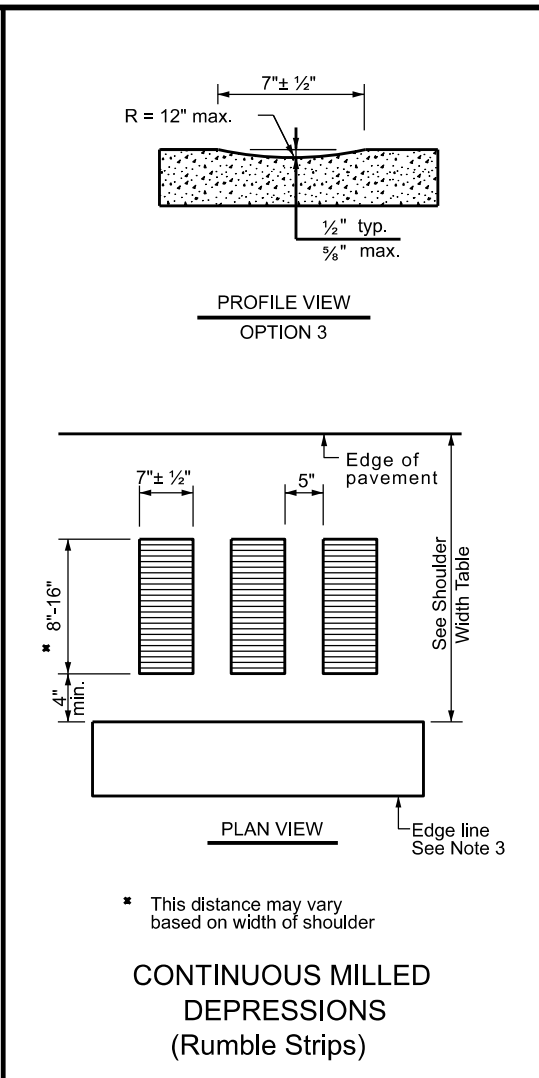
- Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
- Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edge line when used as a rumble strip. The color of the button should match the color of the adjacent edge line marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
- Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
- The minimum distance between the edge line and the buttons should be used if the shoulder is less than 8 feet in width.
- Raised profile thermoplastic markings used as edge lines may substitute for buttons.



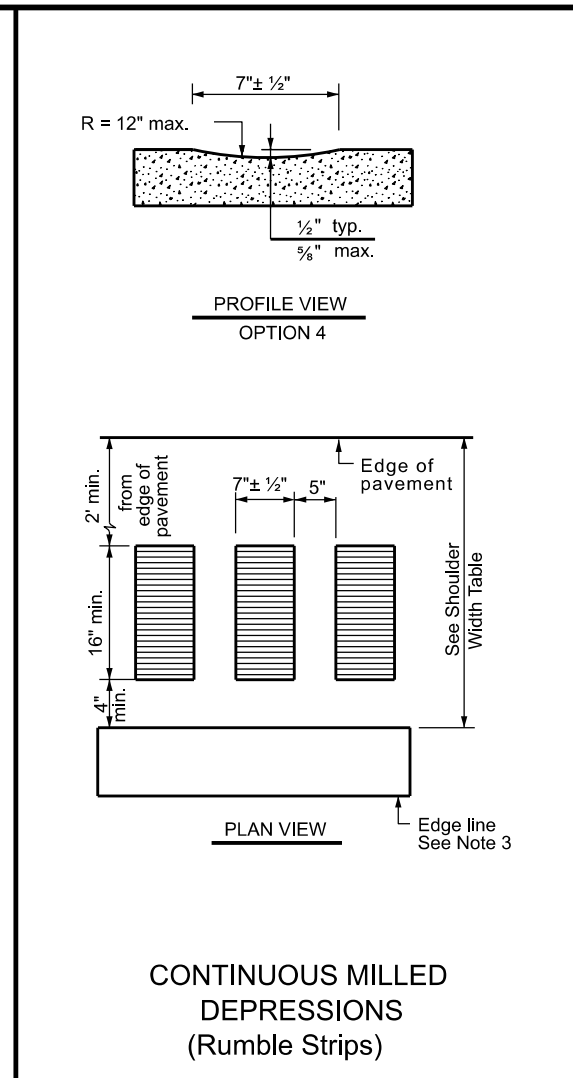
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



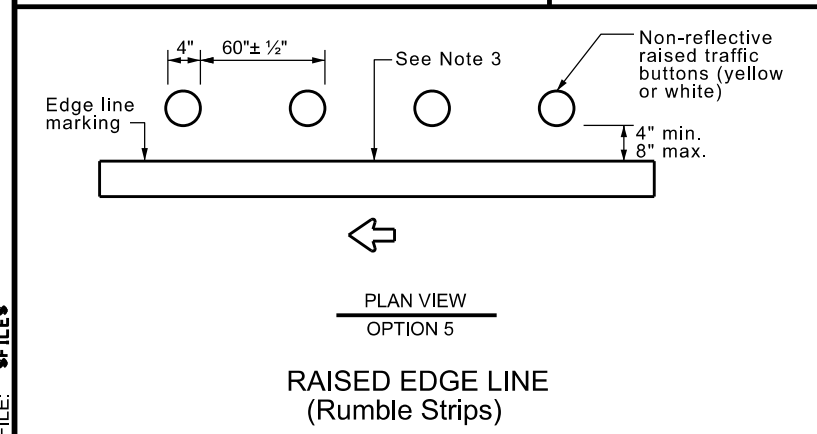
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



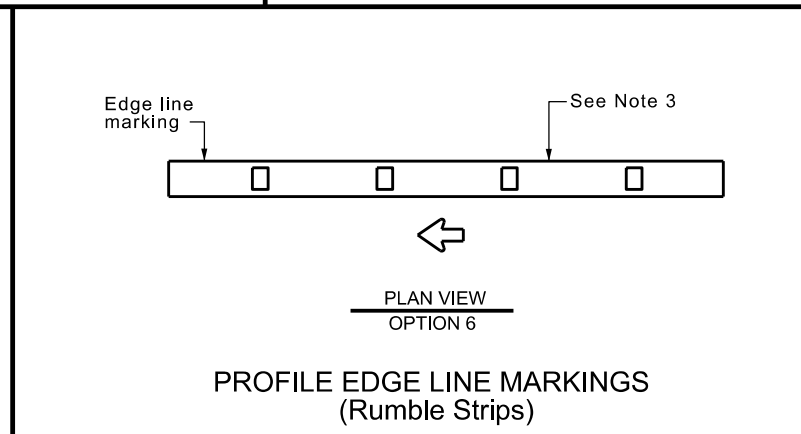
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



RAISED EDGE LINE (Rumble Strips)



PROFILE EDGE LINE MARKINGS (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, or 6	Option 1, 2, 3, 5, or 6	Option 2, 4, 5, or 6

Texas Department of Transportation

Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS

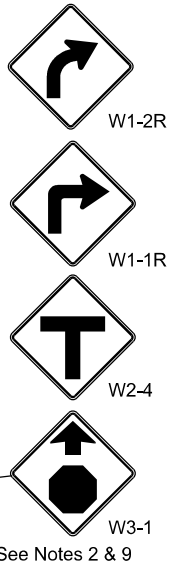
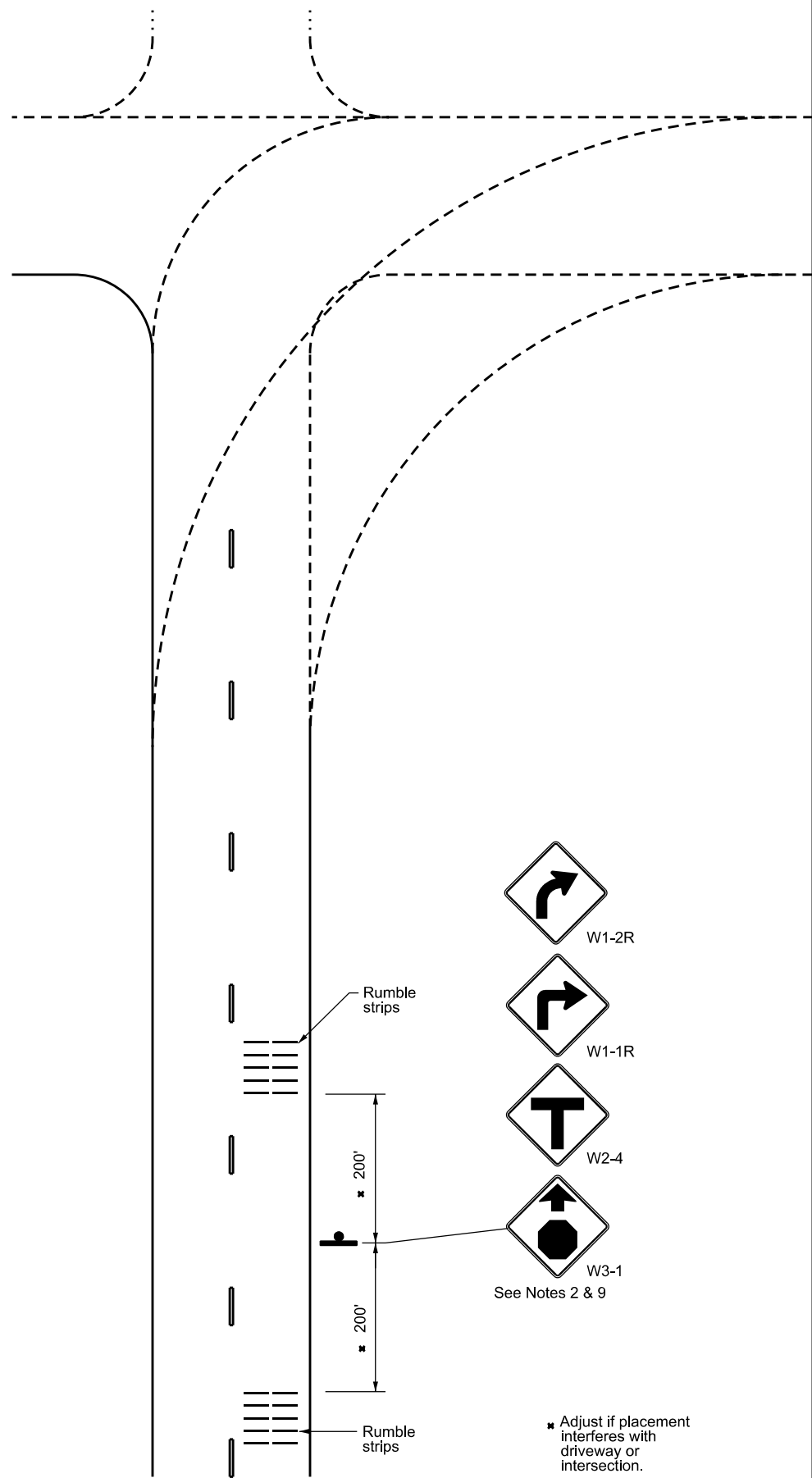
RS(1)-23

FILE: rs(1)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	January 2023	CONT	SECT	JOB
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2-10				US 59
10-13		DIST	COUNTY	SHEET NO.
		ATL	CASS	61

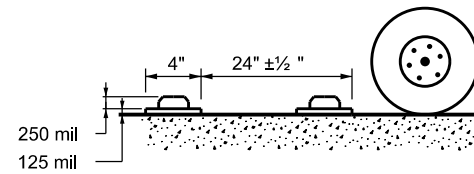
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RUMBLE STRIP TYPICAL APPLICATION

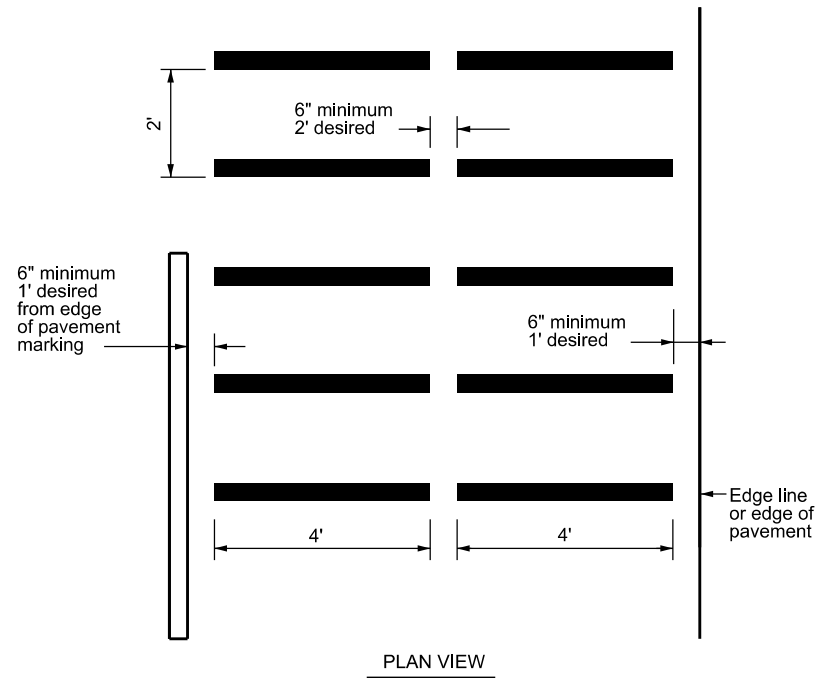
See Note 1



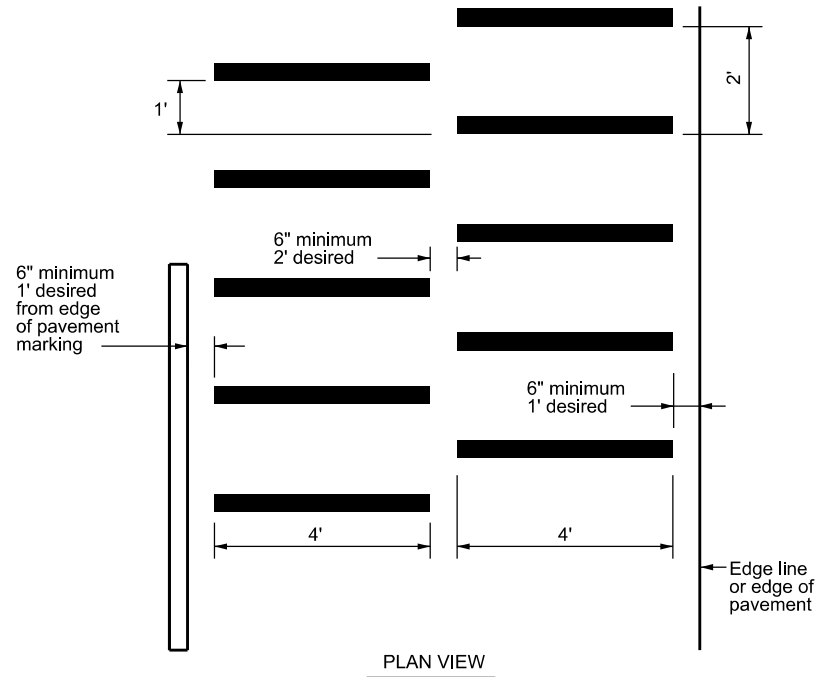
* Adjust if placement interferes with driveway or intersection.



RUMBLE STRIP STANDARD PATTERN



RUMBLE STRIP ALTERNATIVE PATTERN



GENERAL NOTES

- Transverse or in-lane rumble strips should only be used at high incident and special geometric locations. These special geometric locations may include: approaches to rural, high speed signalized or stop-controlled intersections with sight restrictions and/or high crash rates, approaches to unexpected urban intersections, approaches to newly installed stop or signalized controlled intersections, approaches to toll plazas, approaches to hazardous horizontal curves, and approaches to railroad grade crossings.
- When used, the rumble strips shall be placed 200 feet upstream and downstream of the warning sign.
- The use of rumble strips should not be widespread or indiscriminate.
- Preformed black raised rumble strips should be used. They should be installed in accordance with the manufacturer's recommendations.
- Please reference the TxDOT Material Producers List for approved rumble strips (transverse); <http://www.txdot.gov/>
- Consideration should be given to noise levels when in-lane or transverse rumble strips are to be installed near residential areas, schools, churches, etc.
- The RUMBLE STRIPS AHEAD (W17-2T) sign may be used in advance of in-lane or transverse rumble strips, based on engineering judgement. This sign is typically not necessary for rumble strip installations built to the guidelines on this standard sheet. When used, this sign should be spaced in advance of the rumble strips based on the Guidelines for Advance Placement of Warning Signs table of the Texas Manual on Uniform Traffic Control Devices.
- Consideration shall be given to bicyclists. See RS(6).
- Other signs can be used as conditions warrant.



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DATE: \$DATES\$ FILE: \$FILES\$

				Traffic Safety Division Standard	
<h2>TRANSVERSE OR IN-LANE RUMBLE STRIPS</h2> <h3>RS(5)-23</h3>					
FILE:	rs(5)-23.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	January 2023	CONT:	0218	SECT:	03
4-06	1-12	REVISIONS		JOB:	094
2-10				DIST:	CASS
10-13				COUNTY:	CASS
				HIGHWAY:	US 59
				SHEET NO.:	62

DATE: 10/16/2023
 FILE: p:\w\7\txdot.projectwiseonline.com:TxDOT15/Documents/19 - ATL/Design Projects/021803/094/01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES).epic.dgn
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1. There are no MS4 Operators in the project area.

No Action Required Required Action

Action No.

1. This project is considered a maintenance activity and is exempt from the requirements of TPDES TXR 150000.

Commitment No.

1. Refer to the SWP3 Plan Sheet, BMPs, and Detail. It will address sweeping, chemical storage, sanitary waste, and all other management practices.

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.

- 1.
- 2.
- 3.
- 4.

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 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.

- 1.
- 2.
- 3.
- 4.

IV. VEGETATION RESOURCES

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

No Action Required Required Action

Action No.

- 1.
- 2.
- 3.
- 4.

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

No Action Required Required Action

Action No.

- 1.
- 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	SWSP: 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.

- 1.


VII. OTHER ENVIRONMENTAL ISSUES

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

No Action Required Required Action

Action No.

- 1.
- 2.
- 3.

 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	0218	03	094	US 59
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.	ATL	CASS	63	