

# STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

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## PLANS OF PROPOSED HIGHWAY ROUTINE MAINTENANCE

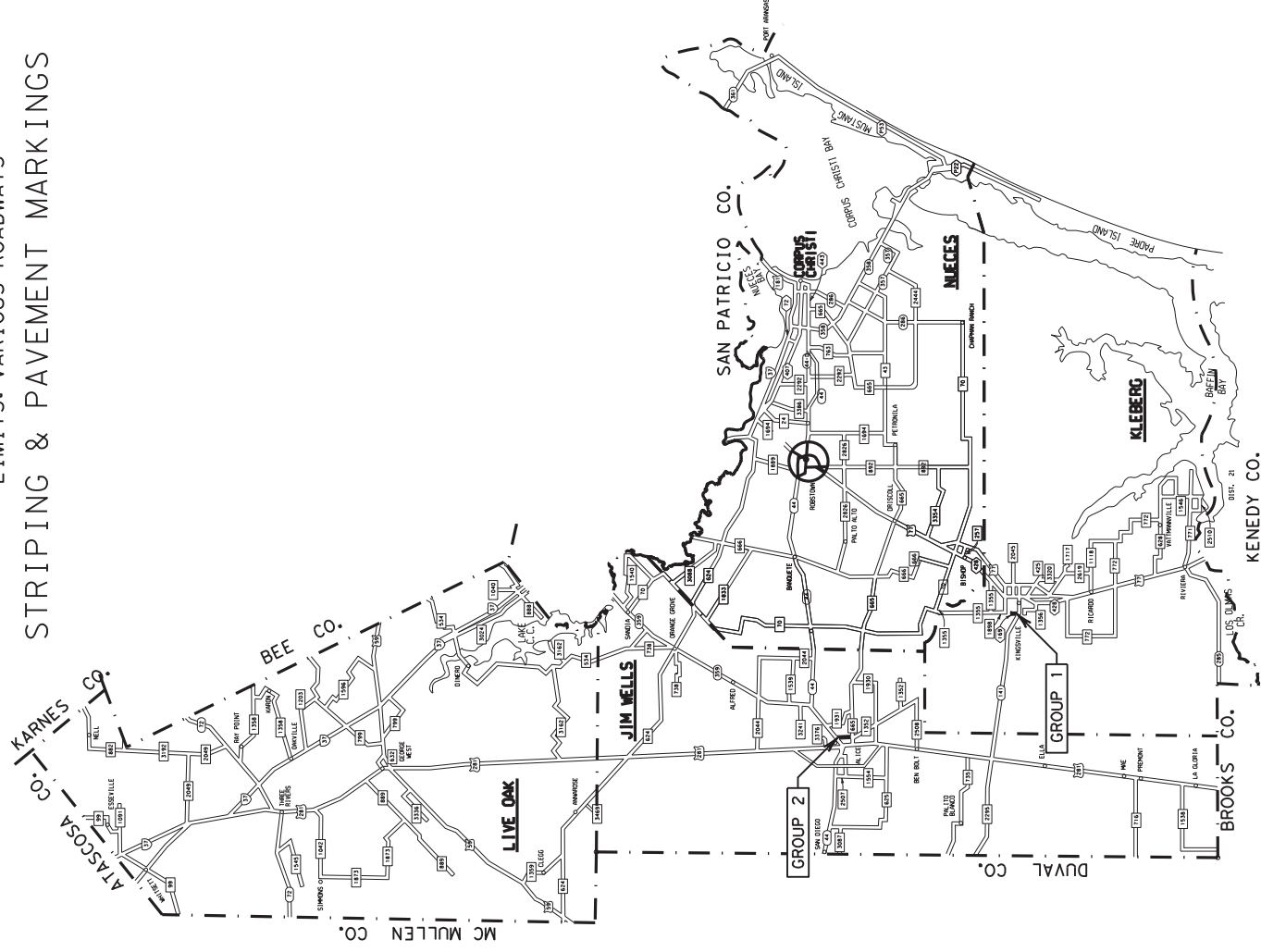
MAINTENANCE PROJECT NO.: RMC 6469-76-001

COUNTY: LIVE OAK, ETC.

HWY: US 281, ETC.

LIMITS: VARIOUS ROADWAYS

STRIPING & PAVEMENT MARKINGS



THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE WITH AN (\*) HAVE BEEN ISSUED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

DocuSigned by:  
**Armando Bosquez, P.E.** 6/6/2024  
DATE: 6/6/2024  
FILE: #11E\$

EQUATIONS: N/A  
EXCEPTIONS: N/A  
RAILROAD CROSSING: N/A

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

SECTION	DISTRICT	MAINTENANCE PROJECT NO.	SHEET
GRAPHTICS	6	RMC 6469-76-001	1
CHECKED	STATE	DIST. NO.	COUNTY
CHECKED	TEXAS	CRP	LIVE OAK, ETC
	CONT.	SECT.	JOB
	6469	76	001
			US281, ETC

AREA OF DISTURBED SOIL = 0.00 ACRES



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APPROVED FOR LETTING: 6/6/2024

DocuSigned by:  
**Jama Harris**  
E2942450264E4E8...

APPROVED FOR LETTING: 6/6/2024

DocuSigned by:  
**Armando Bosquez, P.E.**  
B8B23CC13362472...

County: Live Oak, etc

Control: 6469-76-001

County: Live Oak, etc

Control: 6469-76-001

Highway: US 281, etc

Highway: US 281, etc

**GENERAL NOTES:**

**General**

This contract shall commence upon the issuance of a work order by the Director of Maintenance or his representative and shall continue for 730 calendar days. This project consists of described maintenance work defined with the 2014 Texas Standard Specifications, General Notes and Plans.

The Contractor is to visit the site(s), and make his/her own examination of the site(s) where work is to be performed. Examine the proposal form, plans and specifications and work areas if identified. The Contractor shall carefully examine these specifications and secure from the State any additional information that may be essential for a clear and full understanding of the work.

All work will be scheduled and directed by the following named Area Engineer or their pre-authorized representative:

Eric Martinez, P.E. [Eric.Martinez@txdot.gov](mailto:Eric.Martinez@txdot.gov)

The limits of this contract shall be any state highways maintained by the San Patricio, Aransas, Refugio, Bee, Goliad, and Karnes Maintenance Sections.

The Contractor shall contact the following named Maintenance Supervisors when commencing work within their respective area:

COUNTY	SUPERVISOR	SUPERVISOR E-MAIL	WORK DAYS
E. Nueces County:	David Franco	<a href="mailto:David.Franco@txdot.gov">David.Franco@txdot.gov</a>	Monday – Thursday
W. Nueces County:	George Cavazos	<a href="mailto:George.Cavazos@txdot.gov">George.Cavazos@txdot.gov</a>	Monday – Thursday
Live Oak County:	Ricardo Martinez	<a href="mailto:Ricardo.Martinez@txdot.gov">Ricardo.Martinez@txdot.gov</a>	Monday – Thursday
Jim Wells County:	Cal Mora	<a href="mailto:Cal.Mora@txdot.gov">Cal.Mora@txdot.gov</a>	Monday – Thursday
Kleberg County:	Alfredo Gaona	<a href="mailto:Alfredo.Gaona@txdot.gov">Alfredo.Gaona@txdot.gov</a>	Monday – Thursday

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

Each project location shall be opened to traffic at the end of each workday.

Equipment that remains in the ROW after working hours must be parked outside of the clear zone and in a way that does not obstruct sight distance for the traveling public.

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

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

The Contractor will be issued work orders on an “as-needed” basis. Written notification will be sent to the Contractor by fax or e-mail. Each work order may contain multiple roadways and multiple counties. Once received, the Contractor shall have **72 hours to begin work**. The Contractor shall have a **maximum of 14 calendar days to complete the work** before liquidated damages will be assessed. Work orders will be issued monthly, and work orders shall be a minimum of 25,000 LF of total striping and no more than 250,000 LF to allow the Contractor sufficient time to complete the work. A work order may be required to be issued at times for lesser quantities to replace missing striping, or other immediate needs as directed by the Engineer.

The Contractor shall verbally notify the Engineer 24 hours in advance of beginning work. The Contractor shall verbally notify the Engineer by 8:15 AM whether work will be performed as scheduled or if they are unable to work that day.

**ITEM 2: Instructions to Bidders**

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

Eric Martinez, P.E. [Eric.Martinez@txdot.gov](mailto:Eric.Martinez@txdot.gov)  
Lucia Adame, P.E. [Lucia.Adame@txdot.gov](mailto:Lucia.Adame@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>

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.

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

**County:** Live Oak, etc

**Control:** 6469-76-001

**County:** Live Oak, etc

**Control:** 6469-76-001

**Highway:** US 281, etc

**Highway:** US 281, etc

**ITEM 5: Control of the Work**

Questions regarding the plan work limits should be brought to the Engineer's attention prior to commencing work. Measuring equipment will be in working condition and calibrated to the manufacturer's specifications.

Verify all work order quantities to ensure correctness of quantities and work locations prior to initiating any work.

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

**ITEM 7: Legal Relationships and Responsibilities**

The total disturbed area for this project is 0.0 acre. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The State will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer.

**ITEM 8: Prosecution and Progress**

Prepare a progress schedule for each work order and submit before start of work detailed on work order.

Working days will be computed and charged in accordance with Item 8.3.1.5, "Calendar Day."

Weekend and night time work may be allowed when approved by the Engineer. Notify the Engineer at least 48 hours in advance of weekend or nighttime work.

The Engineer reserves the right to change working hours as working conditions warrant.

Unless otherwise approved, no lanes will be closed, and no mobile operations will be allowed during peak traffic periods. Peak times for each roadway will be determined by the Engineer.

**ITEM 500: Mobilization**

Mobilization shall be considered subsidiary to the items of work.

**ITEM 502: Barricades, Signs, and Traffic Handling**

Traffic control shall be considered subsidiary to the items of work.

The Contractor shall furnish and maintain all barricades, signs, and traffic handling devices.

Traffic Control Plan (TCP) items listed in standard sheets as optional, such as arrow panels and TMAs, are required.

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

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

The Contractor's Responsible Person (CRP) or his representative(s) shall be located within one hour of traveling time to the project site(s). The Contractor shall notify the Engineer in writing of the name, physical address, and telephone number of this employee or these employees. The Engineer may furnish this information to local law enforcement officials.

Maintain traffic control devices by taking corrective action as soon as possible. Complete corrective action **within forty-eight (48) hours of written notification** regardless of the day of the week involved, unless otherwise directed.

All signs shall be erected in a manner that they shall not obstruct the traveling public's view of the normal roadway signing. Signs, stands and safety flags shall not be furnished by TxDOT if required on this contract.

The road shall be open at all times. Access to all drives and side roads, both public and private, shall be maintained.

The Contractor shall coordinate the sequence of construction and TCP with any adjacent construction projects to ensure the uninterrupted flow of traffic.

**County:** Live Oak, etc

**Control:** 6469-76-001

**Highway:** US 281, etc

**ITEM 666: ReflectORIZED Pavement Markings**

Establish and mark the location of existing standard pavement markings including but not limited to edge lines, transitions, passing and no passing zones, gore areas, etc. Pavement markings that are found to be incorrect such as passing zones, gore areas, turn lanes, width, reflectivity, etc. shall be removed and/or remarked if deemed necessary by the Engineer at the Contractor's expense.

Pavement surface preparation for markings and markers shall conform to the requirements of Item 678, except for measurement and payment.

Striping quantities shown in the plans are approximate. Additional striping may be required as field conditions warrant. Inform the Engineer of any discrepancies in the striping details, or of any additional striping required, before placement of permanent pavement markings.

The minimum thickness for Type I markings shall be 0.060 in. (60 mils) for retracing.

All debris generated under this contract shall become the property of the Contractor and shall be removed from the project site as directed by the Engineer.

**ITEM 668: Prefabricated Pavement Markings**

Pavement surface preparation for markings shall conform to the requirements of Item 678, except for measurement and payment.

All material used for this project shall be Type C. Place these markings on top of existing markings unless otherwise directed by the Engineer.

**ITEM 672: Raised Pavement Markings**

The Contractor, at his expense, shall perform the removal of existing markers.

Existing pavement markers shall be removed from the road prior to, or during the placement of new pavement markers. Existing markers shall not remain once new markers have been placed.

The pavement at each location where markers are to be placed shall be cleaned in such a manner as to remove all dirt and loose debris before application. This will not be paid for directly, but shall be subsidiary to Item 672.

Bituminous adhesive shall be used on bituminous pavements. Epoxy adhesive shall be used on hydraulic cement concrete pavement.



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6469-76-001

DISTRICT Corpus Christi  
HIGHWAY US0281

COUNTY Live Oak

CONTROL SECTION JOB		6469-76-001		TOTAL EST.	TOTAL FINAL
PROJECT ID		A00210607			
COUNTY		Live Oak			
HIGHWAY		US0281			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	500-6033	MOBILIZATION (CALLOUT)	EA	12.000	12.000
	666-6016	REFL PAV MRK TY I (W)6"(DOT)(060MIL)	LF	1.000	1.000
	666-6017	REFL PAV MRK TY I (W)6"(DOT)(090MIL)	LF	100.000	100.000
	666-6019	REFL PAV MRK TY I (W)6"(LNDP)(060MIL)	LF	1.000	1.000
	666-6020	REFL PAV MRK TY I (W)6"(LNDP)(090MIL)	LF	1.000	1.000
	666-6028	REFL PAV MRK TY I (W)8"(DOT)(060MIL)	LF	1.000	1.000
	666-6029	REFL PAV MRK TY I (W)8"(DOT)(090MIL)	LF	3,700.000	3,700.000
	666-6031	REFL PAV MRK TY I (W)8"(LNDP)(060MIL)	LF	20,000.000	20,000.000
	666-6034	REFL PAV MRK TY I (W)8"(SLD)(060MIL)	LF	45,000.000	45,000.000
	666-6037	REFL PAV MRK TY I (W)12"(LNDP)(060MIL)	LF	400.000	400.000
	666-6040	REFL PAV MRK TY I (W)12"(SLD)(060MIL)	LF	7,000.000	7,000.000
	666-6046	REFL PAV MRK TY I (W)24"(SLD)(060MIL)	LF	300.000	300.000
	666-6070	REFL PAV MRK TY (W)(LNDP ARW)(060MIL)	EA	1.000	1.000
	666-6071	REFL PAV MRK TY (W)(LNDP ARW)(090MIL)	EA	1.000	1.000
	666-6103	REFL PAV MRK TY I (W)(BIKE ARW)(060MIL)	EA	30.000	30.000
	666-6109	REFL PAV MRK TY (W)(BIKE SYML)(060MIL)	EA	30.000	30.000
	666-6167	REFL PAV MRK TY II (W) 4" (BRK)	LF	5,000.000	5,000.000
	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	LF	5,000.000	5,000.000
	666-6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	1.000	1.000
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	1.000	1.000
	666-6205	REFL PAV MRK TY II (Y) 4" (BRK)	LF	5,000.000	5,000.000
	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	LF	5,000.000	5,000.000
	666-6208	REFL PAV MRK TY II (Y) 6" (BRK)	LF	1.000	1.000
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	1.000	1.000
	666-6225	PAVEMENT SEALER 6"	LF	5,000.000	5,000.000
	666-6284	REF PROF PAV MRK TY (W)6"(SLD)(060MIL)	LF	1.000	1.000
	666-6285	REF PROF PAV MRK TY (W)6"(SLD)(090MIL)	LF	1.000	1.000
	666-6288	REF PROF PAV MRK TY (Y)6"(SLD)(060MIL)	LF	1.000	1.000
	666-6289	REF PROF PAV MRK TY (Y)6"(SLD)(090MIL)	LF	1.000	1.000
	666-6292	REF PROF PAV MRK TY (Y)6"(BRK)(060MIL)	LF	1.000	1.000
	666-6293	REF PROF PAV MRK TY (Y)6"(BRK)(090MIL)	LF	1.000	1.000
	666-6304	RE PM W/RET REQ TY I (W)6 "(BRK)(060MIL)	LF	80,000.000	80,000.000
	666-6305	RE PM W/RET REQ TY I (W)6"(BRK)(090MIL)	LF	1,500.000	1,500.000
	666-6307	RE PM W/RET REQ TY I (W)6 "(SLD)(060MIL)	LF	900,000.000	900,000.000
	666-6308	RE PM W/RET REQ TY I (W)6 "(SLD)(090MIL)	LF	275,000.000	275,000.000
	666-6316	RE PM W/RET REQ TY I (Y)6"(BRK)(060MIL)	LF	150,000.000	150,000.000
	666-6317	RE PM W/RET REQ TY I (Y)6"(BRK)(090MIL)	LF	7,000.000	7,000.000

DISTRICT	COUNTY	CCSJ	SHEET
Corpus Christi	Live Oak	6469-76-001	5



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6469-76-001 DISTRICT Corpus Christi COUNTY Live Oak  
HIGHWAY US0281

ALT		BID CODE	DESCRIPTION	UNIT	EST.	FINAL	TOTAL EST.	TOTAL FINAL
CONTROL SECTION JOB				6469-76-001				
PROJECT ID				A00210607				
COUNTY				Live Oak				
HIGHWAY				US0281				
666-6319	RE PM W/RET REQ TY I (Y)6"(SLD)(060MIL)	LF	450,000.000		450,000.000		450,000.000	
666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF	200,000.000		200,000.000		200,000.000	
666-6348	REFL PAV MRK TY I (W)12"(DOT)(060MIL)	LF	1.000		1.000		1.000	
666-6349	REFL PAV MRK TY I (W)12"(DOT)(090MIL)	LF	1.000		1.000		1.000	
668-6010	PREFAB PAV MRK TY B (W)(6")(BRK)CNTST	LF	3,000.000		3,000.000		3,000.000	
668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)	LF	5,000.000		5,000.000		5,000.000	
668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	150.000		150.000		150.000	
668-6078	PREFAB PAV MRK TY C (W) (DBL ARROW)	EA	30.000		30.000		30.000	
668-6079	PREFAB PAV MRK TY C (W) (TPL ARROW)	EA	30.000		30.000		30.000	
668-6080	PREFAB PAV MRK TY C (W) (UTURN ARROW)	EA	30.000		30.000		30.000	
668-6083	PREFAB PAV MRK TY C (W) (LNDP ARROW)	EA	20.000		20.000		20.000	
668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	100.000		100.000		100.000	
668-6089	PREFAB PAV MRK TY C (W) (RR XING)	EA	20.000		20.000		20.000	
668-6090	PREFAB PAV MRK TY C (W) (SYMBOL)	EA	1.000		1.000		1.000	
668-6091	PREFAB PAV MRK TY C (W) (18")(YLD TRI)	EA	50.000		50.000		50.000	
668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)	EA	70.000		70.000		70.000	
668-6108	PREFAB PAV MRK TY C (Y) (24") (SLD)	LF	1,700.000		1,700.000		1,700.000	
668-6116	PREFAB PAV MRK TY C(EVAC SYM, BLUE/WHT)	EA	1.000		1.000		1.000	
672-6007	REFL PAV MRKR TY I-C	EA	1,800.000		1,800.000		1,800.000	
672-6009	REFL PAV MRKR TY II-A-A	EA	5,000.000		5,000.000		5,000.000	
672-6010	REFL PAV MRKR TY II-C-R	EA	7,000.000		7,000.000		7,000.000	
672-6016	TRAFFIC BUTTON TY W	EA	20.000		20.000		20.000	
677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	20,000.000		20,000.000		20,000.000	
677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	1,000.000		1,000.000		1,000.000	
677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	1,000.000		1,000.000		1,000.000	
677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	1,000.000		1,000.000		1,000.000	
677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	500.000		500.000		500.000	
677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	40.000		40.000		40.000	
677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	30.000		30.000		30.000	
677-6016	ELIM EXT PAV MRK & MRKS (RR XING)	EA	4.000		4.000		4.000	
677-6028	ELIM EXT PV MRK & MRKS (RUMBLE STRIP)	LF	250.000		250.000		250.000	
678-6002	PAV SURF PREP FOR MRK (6")	LF	15,000.000		15,000.000		15,000.000	
6056-6001	PREFORMED IN-LANE(TRANS) RUMBLE STRIP	LF	600.000		600.000		600.000	



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

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

**WORKER SAFETY NOTES:**

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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

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

**THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT**

<http://www.txdot.gov>

COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12



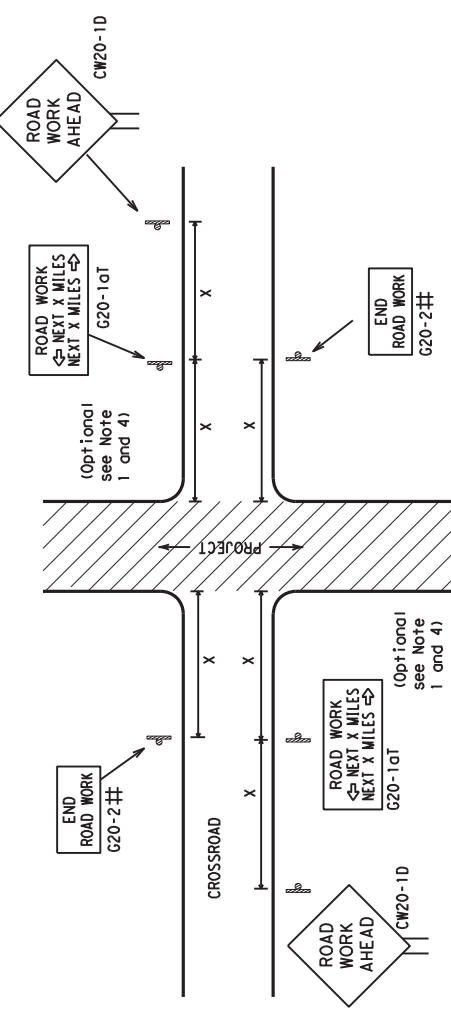
Texas Department of Transportation  
Traffic Safety Division Standard

## BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC (1) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DM:	TxDOT	CK:	TxDOT
① TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
4-03	7-13	6469	76	001	US281, ETC.				
9-07	8-14								
5-10	5-21								
		CRP	JIM WELLS, ETC.						7

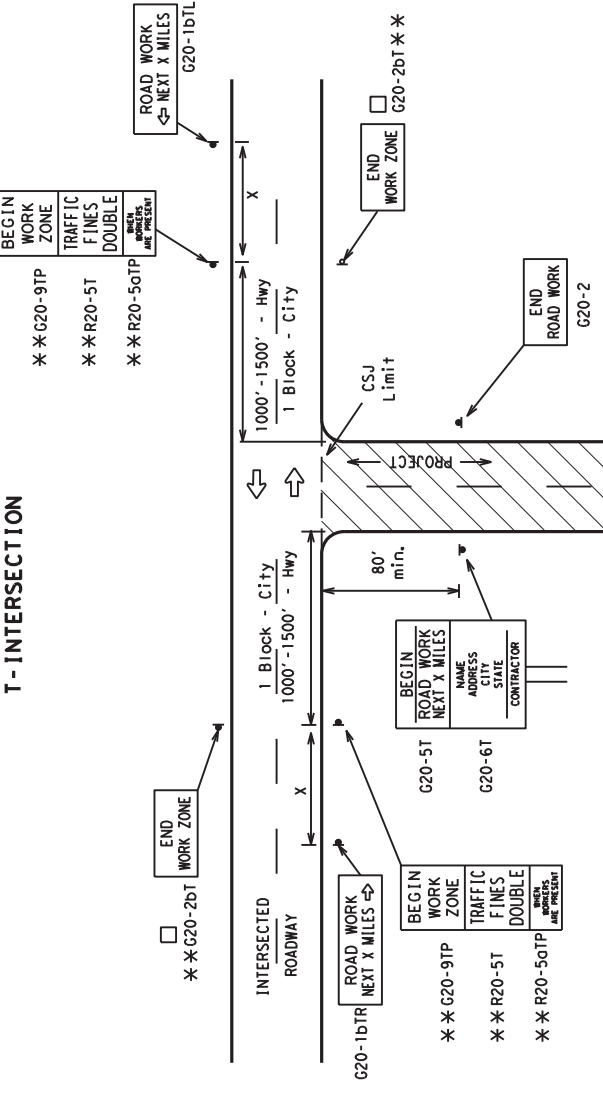
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T- INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

Sign Number or Series	SIZE		Sign Spacing "x"
	Conventional Road	Expressway/Freeway	
CW204			Posted Speed
CW21			Feet (Apprx.)
CW22	48" x 48"	48" x 48"	30
CW23			35
CW25			40
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	45
			50
			55
			60
			65
			70
			75
			80
			*
			*

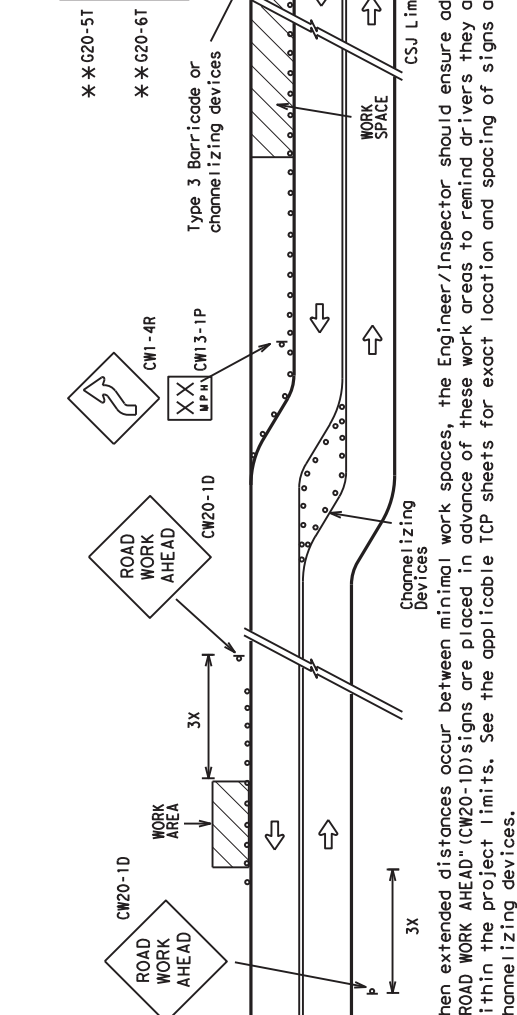
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

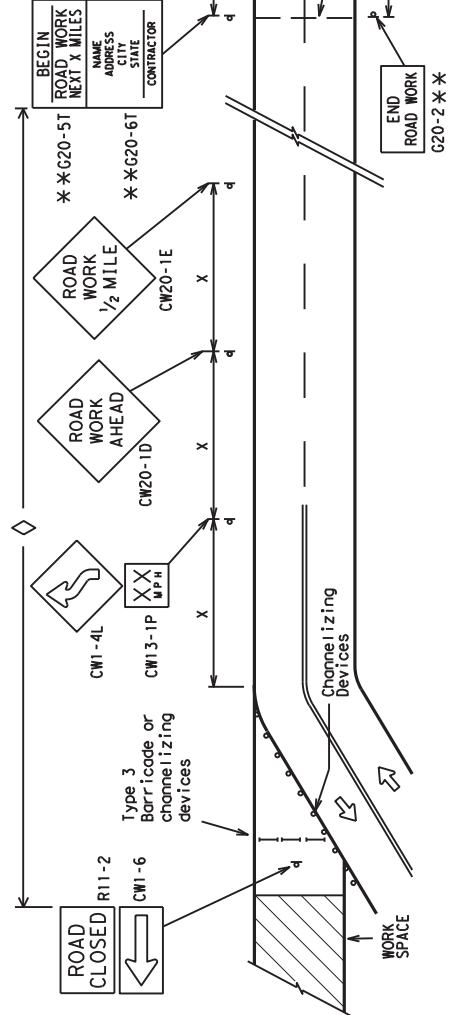
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

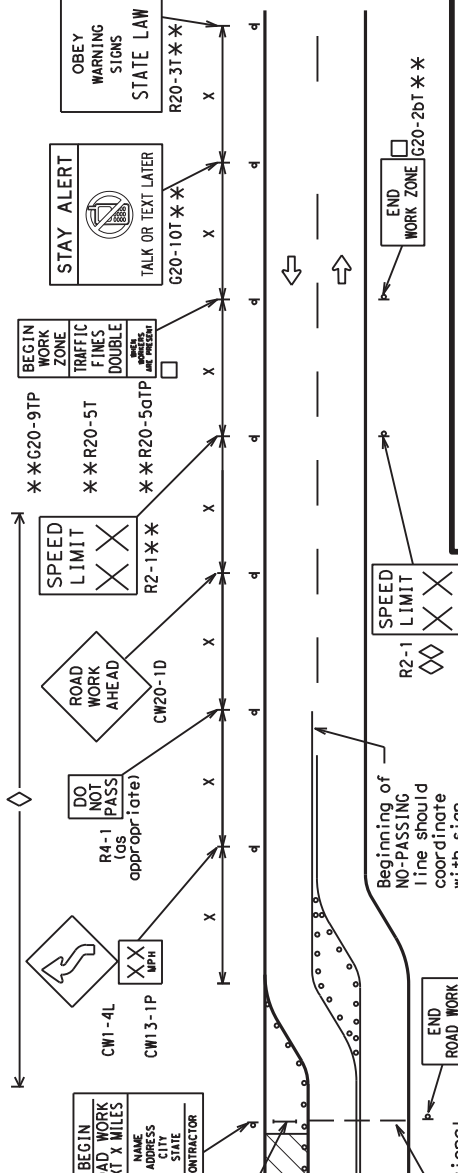


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

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

LEGEND

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC (2) - 21

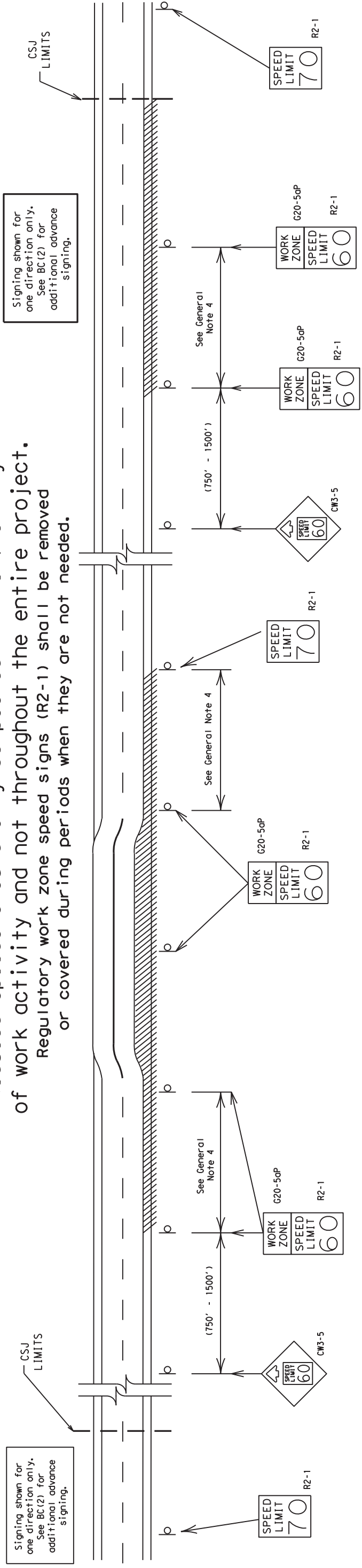
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DATE:	November 2002	CONT:	SECT:	JOB:	US281, ETC.	DIST:	001
REVISED:	9-07	DATE:	8-14	COUNTY:		CRP:	JIM WELLS, ETC.
SHEET NO.:	7-13		5-21				8



# 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

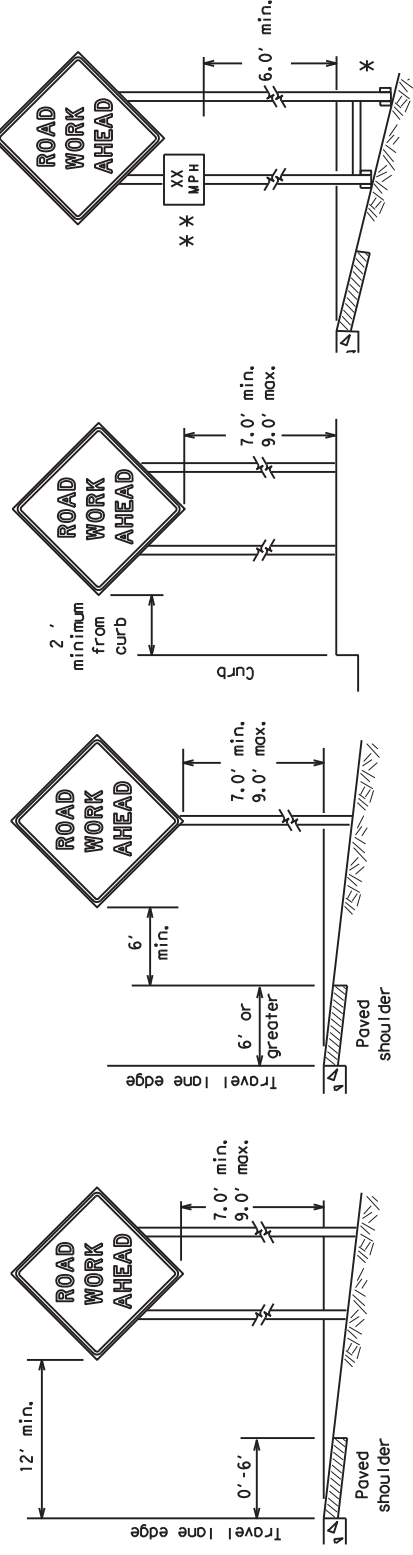
1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of 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.



# BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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CONT:	November 2002	SECT:		JOB:	HIGHWAY		
REV:	9-07	REV:	8-14	DIST:	6469	76	001
	7-13		5-21	COUNTY:	US281		ETC.
				CRP:	JIM WELLS, ETC.		9

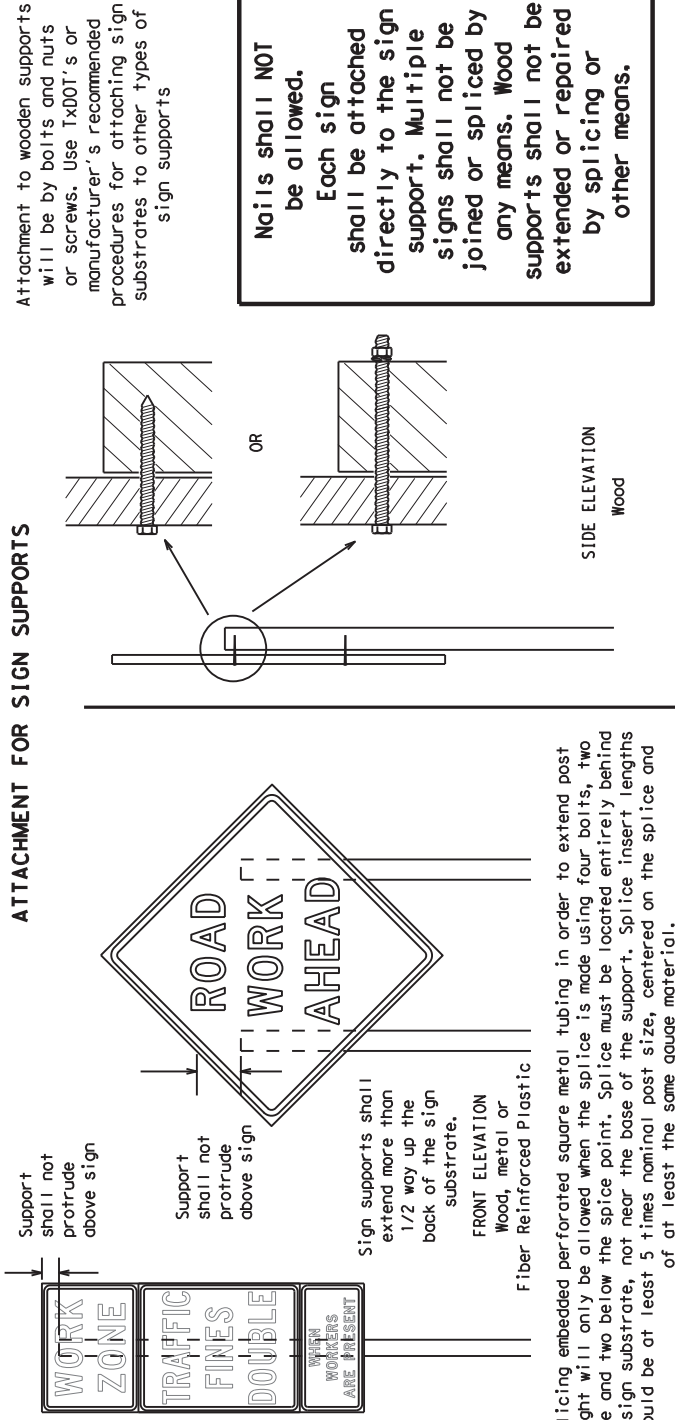
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



\* 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.

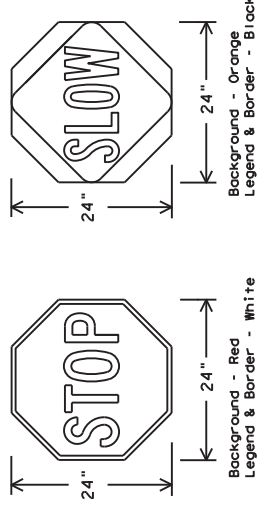
**ATTACHMENT FOR SIGN SUPPORTS**



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.

**STOP/SLOW PADDLES**

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



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)	
USAGE	SIGN FACE MATERIAL
BACKGROUND	TYPE B OR C SHEETING
BACKGROUND & BORDER	TYPE B <sub>PL</sub> OR C <sub>PL</sub> SHEETING
LEGEND & BORDER	TYPE B OR C SHEETING
LEGEND & BORDER	ACRYLIC NON-REFLECTIVE FILM

**CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS**

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

**GENERAL NOTES FOR WORK ZONE SIGNS**

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

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

The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.

- a. Long-term stationary - work that occupies a location more than 3 days.
- b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
- c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
- d. Short, duration - work that occupies a location up to 1 hour.
- e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

**SIGN MOUNTING HEIGHT**

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

**SIZE OF SIGNS**

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

**SIGN SUBSTRATES**

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

**REFLECTIVE SHEETING**

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

**SIGN LETTERS**

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

**REMOVING OR COVERING**

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

**SIGN SUPPORT WEIGHTS**

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

**FLAGS ON SIGNS**

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

SHEET 4 OF 12

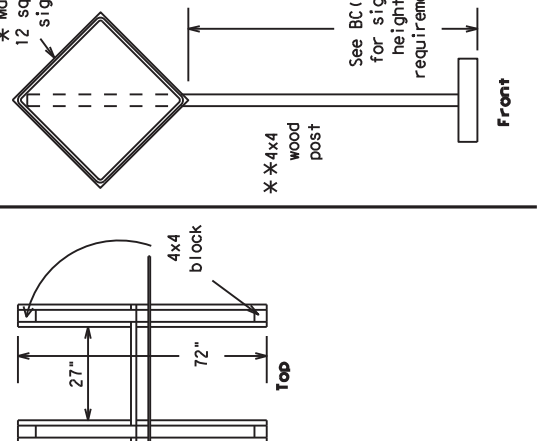
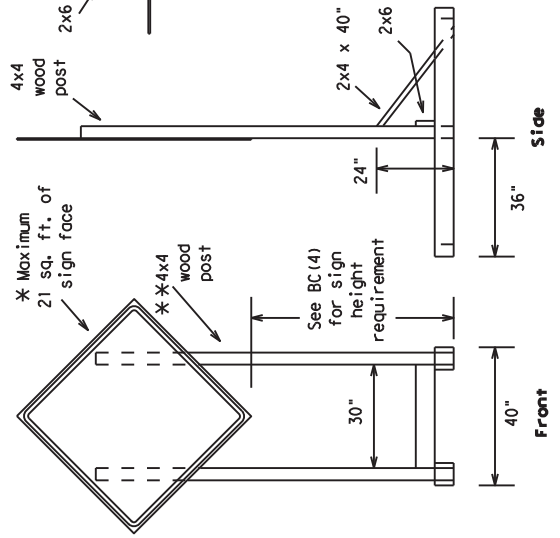


**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

BC (4) - 21

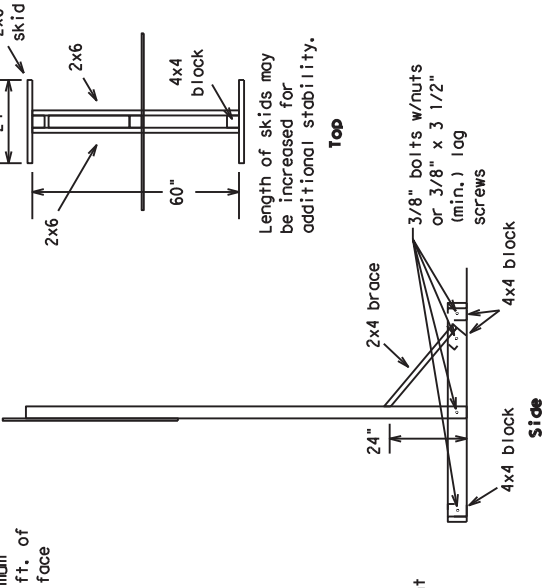
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DATE:	9-07 8-14	PROJECT NO.:	CRP JIM WELLS, ETC.
	7-13 5-21	SHEET NO.:	10



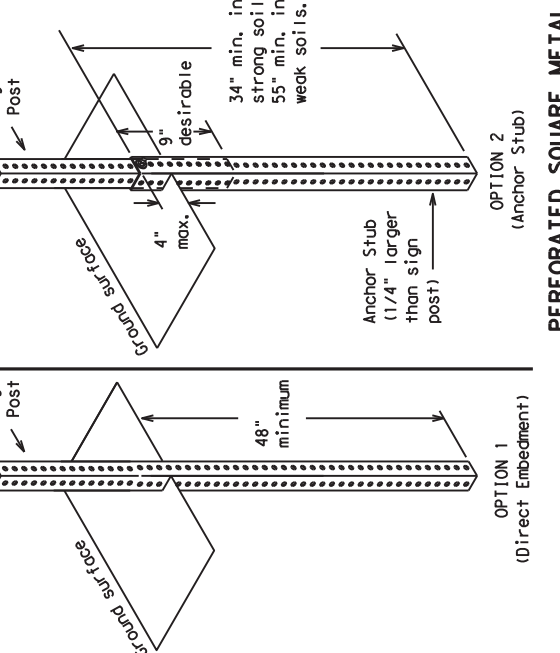


### SKID MOUNTED WOOD SIGN SUPPORTS

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



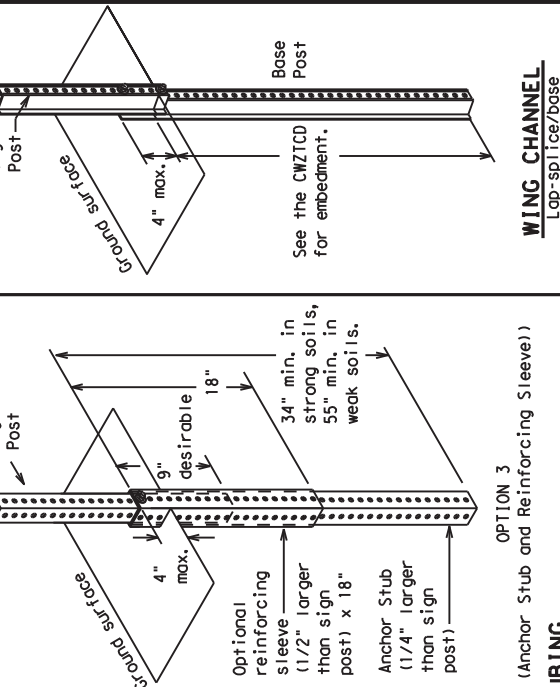
Length of skids may be increased for additional stability.



### PERFORATED SQUARE METAL TUBING

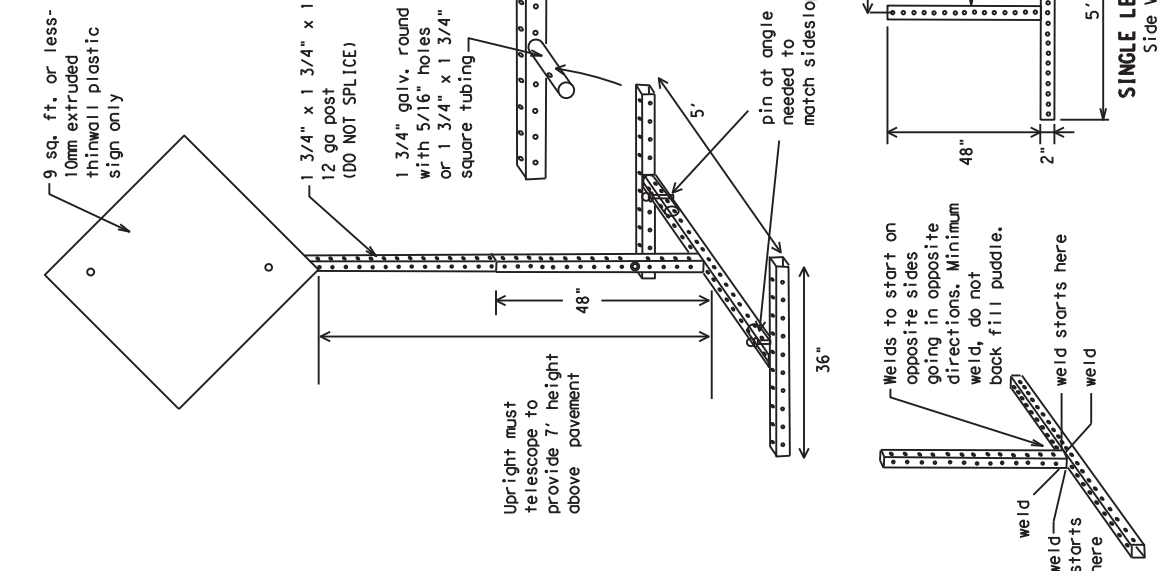
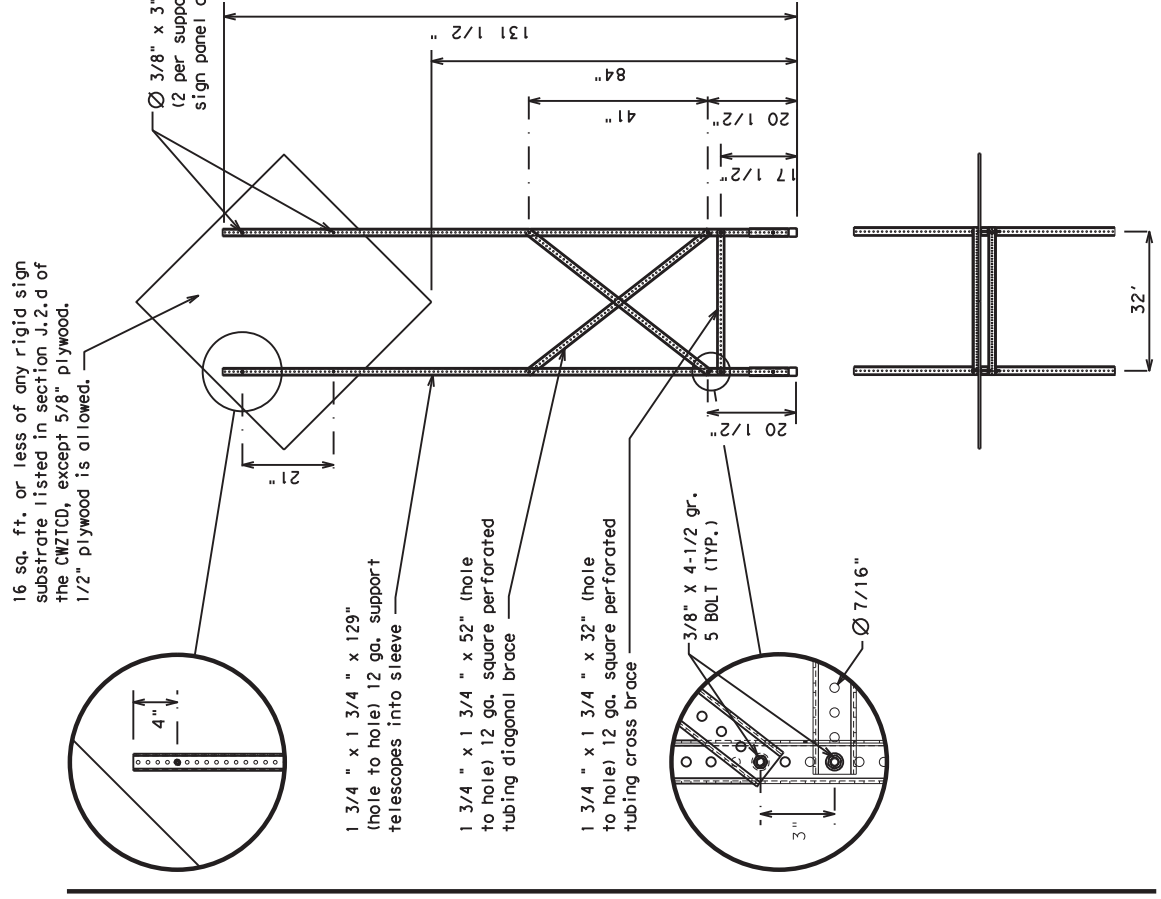
### GROUND MOUNTED SIGN SUPPORTS

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



### WING CHANNEL

16 sq. ft. or less of any rigid sign substrate listed in section J.2.d of the CWZTCD, except 5/8" plywood. 1/2" plywood is allowed.



### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

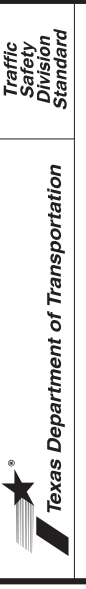
**WEDGE ANCHORS**  
Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering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



SHEET 5 OF 12

## BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC (5) - 21

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CONT: NOVEMBER 2002	REV: 001	US281, ETC.
6469 76	9-07 8-14	7-13 5-21
CRP: JIM WELLS, ETC.		

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 TMTUCD.
- 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	CONST AHD	Parking	PKING
Ahead		Road	RD
CROSSING	XING	Right Lane	RT LN
Detour Route	DETOUR RTE	Saturday	SAT
Do Not	DONT	Service Road	SERV RD
East	E	Shoulder	SHLDR
Eastbound	(route) E	Slippery	SLIP
Emergency	EMER	South	S
Emergency Vehicle	EMER VEH	Southbound	(route) S
Entrance, Enter	ENT	Speed	SPD
Express Lane	EXP LN	Street	ST
Expressway	EXPWY	Sunday	SUN
XXXX Feet	XXXX FT	Telephone	PHONE
Fog Ahead	FOG AHD	Temporary	TEMP
Freeway	FRWY, FWY	Thursday	THURS
Freeway Blocked	FRWY BLKD	To Downtown	TO DWTN
Frigid	FRI	Traffic	TRAF
Hazardous Driving	HAZ DRIVING	Travelers	TRVLRS
Hazardous Material	HAZMAT	Tuesday	TUES
High-Occupancy	HOV	Time Minutes	TIME MIN
Vehicle	HWY	Upper Level	UPR LEVEL
Hours(s)	HR, HRS	Vehicles (s)	VEH, VEHS
Information	INFO	Warning	WARN
It Is	ITS	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Lane Closed	LN CLOSED	Wet Pavement	WET PVMT
Lower Level	LWR LEVEL	Will Not	WONT
Maintenance	MAINT		

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	Other Condition List
FREEWAY CLOSED X MILE	ROADWORK XXX FT
ROAD CLOSED AT SH XXX	FLAGGER XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN NARROWS XXXX FT
RIGHT X LANES CLOSED	MERGING TRAFFIC XXXX FT
CENTER LANE CLOSED	LOOSE GRAVEL XXXX FT
NIGHT LANE CLOSURES	DETOUR X MILE
VARIOUS LANES CLOSED	ROADWORK PAST SH XXXX
EXIT CLOSED	BUMP XXXX FT
MALL DRIVEWAY CLOSED	TRAFFIC SIGNAL XXXX FT
XXXXXXXX BLVD CLOSED	

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

**Phase 2: Possible Component Lists**

Action to Take/Effect on Travel List	Location List	Warning List	** Advance Notice List
MERGE RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM-XX PM
DETOUR NEXT X EXITS	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX PM-X AM
USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	XXXXXXX TO XXXXXX	RIGHT LANE EXIT	MAY X-X XX PM-XX AM
WATCH FOR TRUCKS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP	DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE	DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS		TONIGHT XX PM-XX AM
STAY IN LANE			

\*\* See Application Guidelines Note 6.

**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.

**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.

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)**

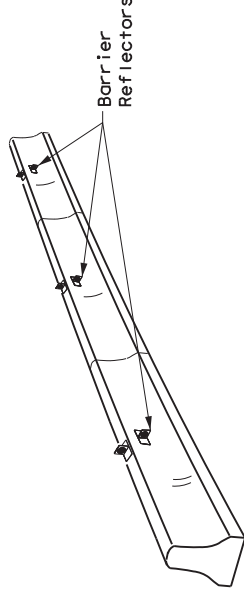
BC (6) - 21

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REV: 9-07	REV: 8-14	DIST: COUNTY	CRP: JTM WELLS, ETC.	SHEET NO: 12

DATE: 6/4/2024 9:08:38 AM  
 FILE: T:\CRPMINT\RMCP\PLAN SETS\5-17\p\ng\FY2024\CA0-A0 6469-76-001\STANDARD\bc-21.dgn  
 This standard is governed by the Texas Engineering Practice Act. TxDOT assumes no responsibility for the conversion of this standard to other formats or for damages resulting from its use.  
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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(11).
- Color of Barrier Reflectors shall be as specified in the TMTUCD. The color of the reflectors shall be considered subsidiary to Item 512.

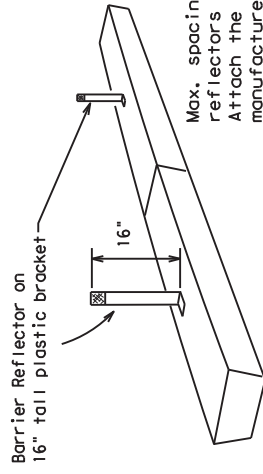


### CONCRETE TRAFFIC BARRIER (CTB)

- 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 edge line 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.

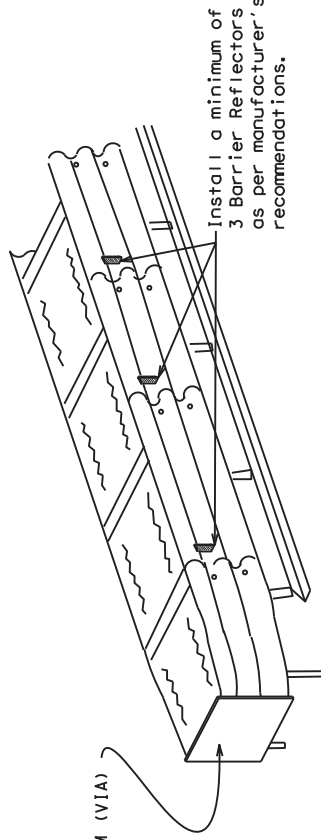
### LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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)



See D & OM (VIA)

### DELINEATION OF END TREATMENTS

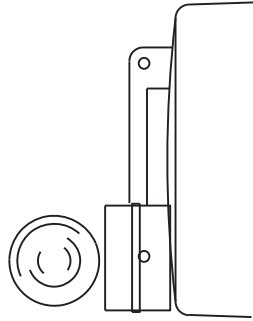
#### END TREATMENTS FOR CTB'S USED IN WORK ZONES

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 TMTUCD.
- 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<sub>1</sub> or C<sub>1</sub> 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.

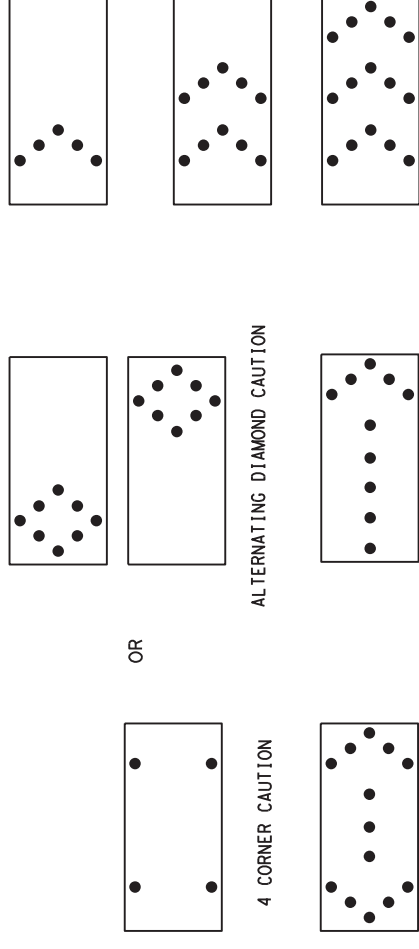
### WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- 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.

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:



DOUBLE ARROW

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

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

- 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
B	30 x 60	13
C	48 x 96	15
		MINIMUM VISIBILITY DISTANCE
		3/4 mile
		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



Traffic Safety Division Standard

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

BC (7) - 21

FILE:	bc-21.dgn	DWG:	TxDOT	CHK:	TxDOT	DATE:	06/2002
REV:	001	DATE:	08-14	BY:	JIM WELLS, ETC.	SHEET NO.:	13
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REV:	001	DATE:	08-14	BY:	JIM WELLS, ETC.	SHEET NO.:	13

### 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 on extended distance from the TMA.

**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:

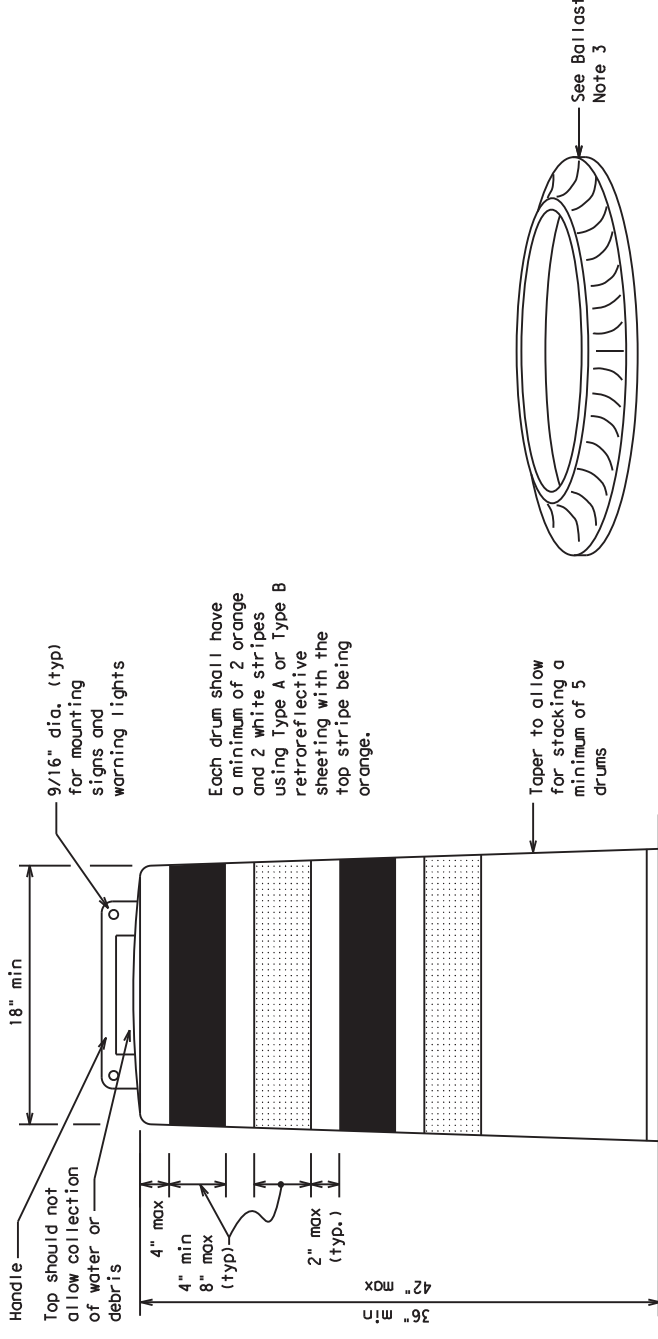
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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



This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

Continuous smooth rail for hand trailing

36"

Detectable Edge

2" Max.

**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(BIS-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 CWI-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<sub>PL</sub> or Type C<sub>PL</sub> 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



Texas Department of Transportation

Traffic  
Safety  
Division  
Standard

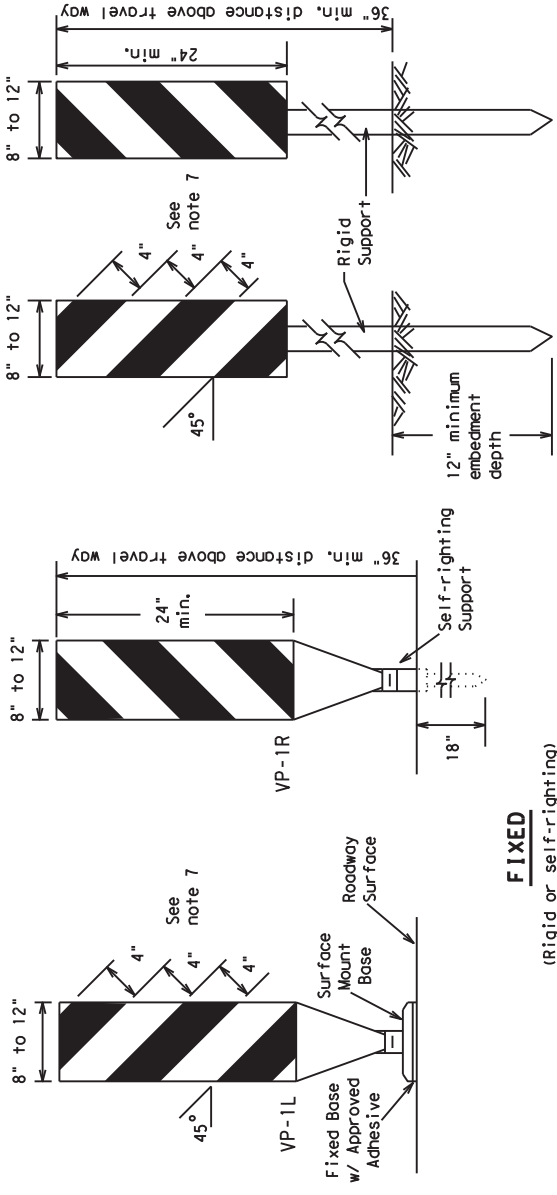
**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

BC (8) - 21

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REVISED:	4-03 8-14	NO.	6469176	001	US281, ETC.		
REVISED:	9-07 5-21	DIST:		COUNTY:		SHEET NO.:	
							CRP JIM WELLS, ETC. 14



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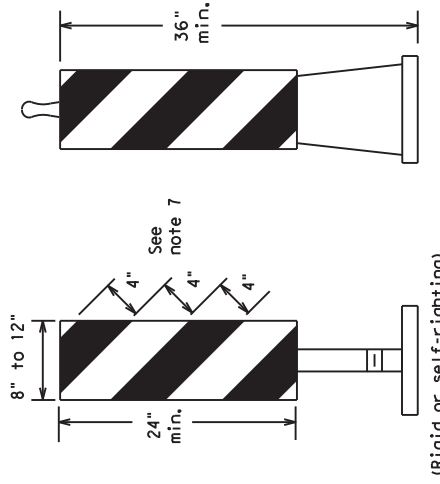


**FIXED**

(Rigid or self-righting)

**DRIVEABLE**

- 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.

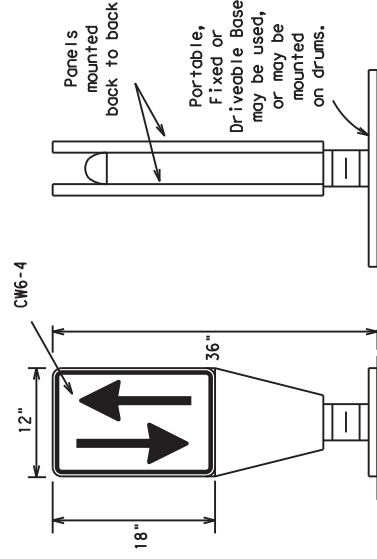


**PORTABLE**

(Rigid or self-righting)

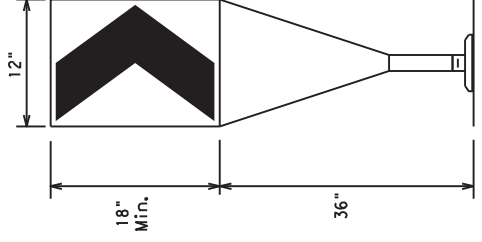
**VERTICAL PANELS (VPS)**

- 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<sub>1</sub> or Type C<sub>1</sub> conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



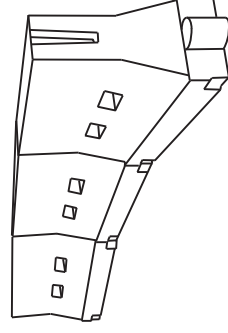
**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

- 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<sub>1</sub> or Type C<sub>1</sub> 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.



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

**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 cones and the top of the unit shall not be less than 32 inches in height.

**GENERAL NOTES**

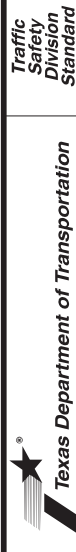
- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control 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 *X*		Suggested Maximum Spacing of Channelizing Devices
		Offset/Offset	On a Taper	
30	WS <sup>2</sup> L = 60	10'	12'	On a Taper
35		150'	180'	30'
40		205'	245'	35'
45	L = WS	265'	295'	40'
50		450'	495'	45'
55		500'	550'	50'
60	L = WS	600'	660'	55'
65		600'	720'	60'
70		650'	715'	65'
75	L = WS	700'	770'	70'
80		750'	825'	75'
85		800'	880'	80'

\*X\* 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

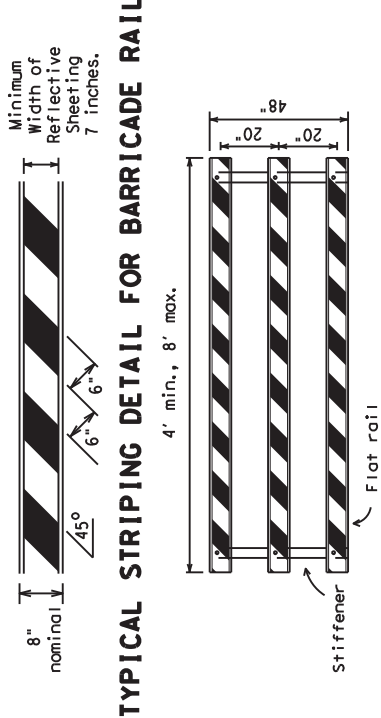
FILE:	bc-21.dgn	DATE:	11/07/2002	BY:	JIM WELLS, ETC.
CONT:	NOVEMBER 2002	JOB:	US281, ETC.	COUNTY:	
REVISITONS:		DIST:		SHEET NO.:	
9-07	8-14	CRP:	JIM WELLS, ETC.	T5	
7-13	5-21				

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

**TYPE 3 BARRICADES**

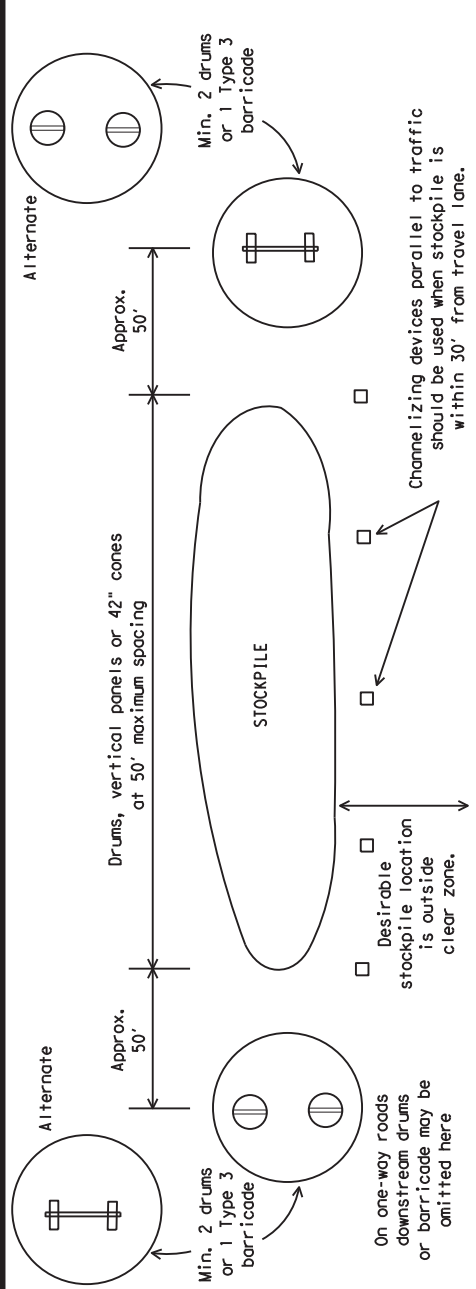
1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending 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.



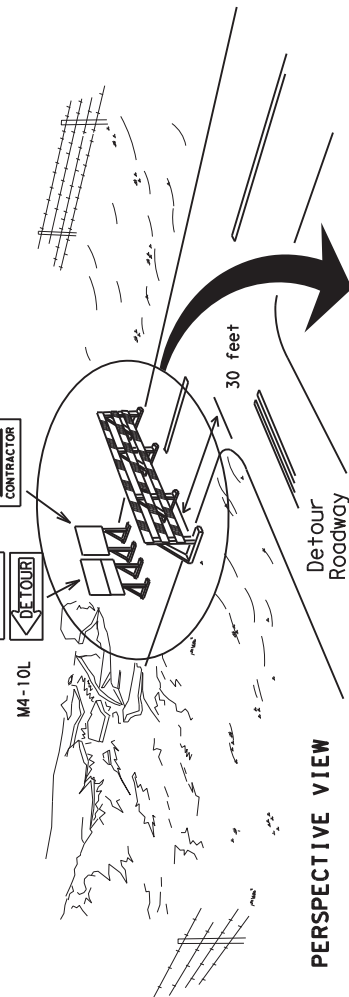
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

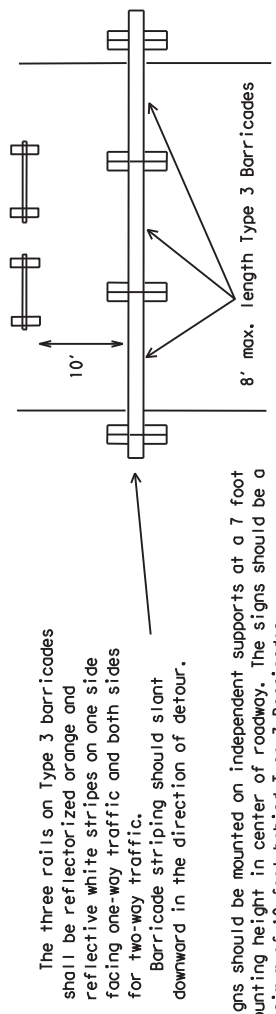


**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

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



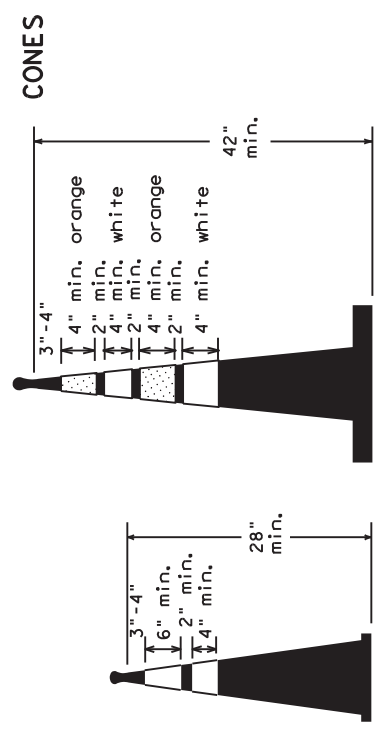
**PERSPECTIVE VIEW**



**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**

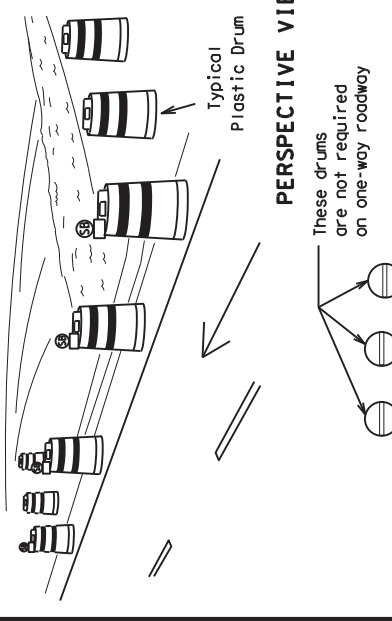


**Two-Piece cones**

**One-Piece cones**

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.



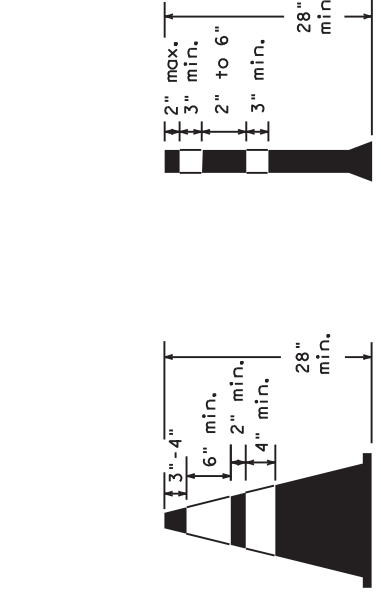
**PERSPECTIVE VIEW**

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

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

**PLAN VIEW**

**CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS**



**Tubular Marker**

Texas Department of Transportation  
Traffic Safety Division Standard

**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) - 21**

FILE: bc-21.dgn	DATE: 11/14/2002	BY: TXDOT	CHK: TXDOT	HWY: HIGHWAY
CONT: NOVEMBER 2002	SECT: 001	JOB: 6469 76	US281, ETC.	
REV: 9-07	REV: 8-14	DIST: 7-13	COUNTY: CRP	SHEET NO.: JIM WELLS, ETC. 16



**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(112).
- 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**

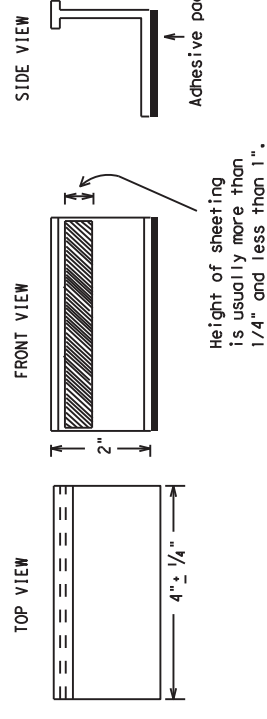
- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

**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(11).

SHEET 11 OF 12



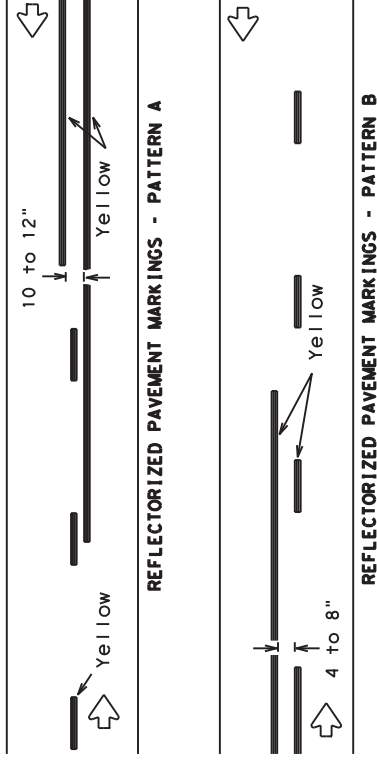
Texas Department of Transportation

**BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS**

BC(11) - 21

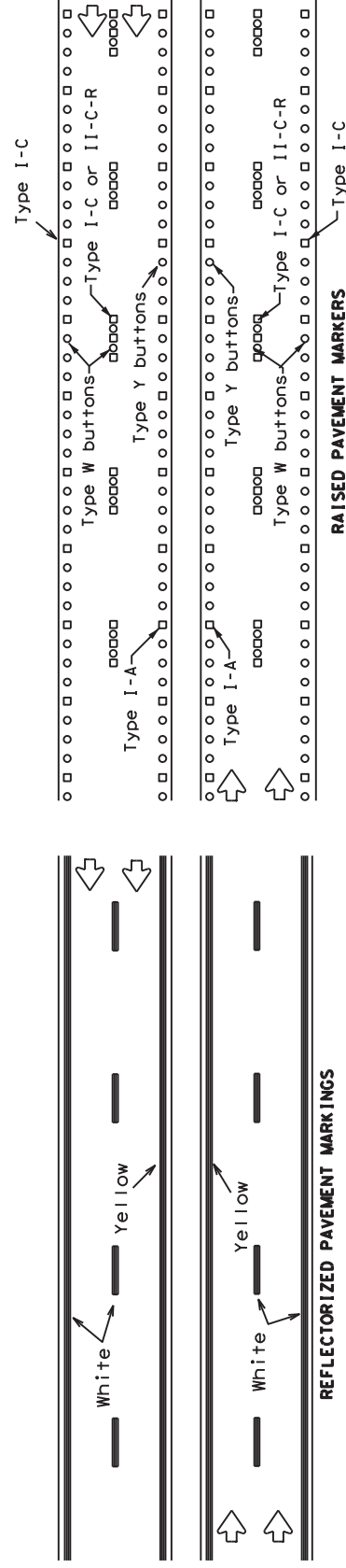
FILE:	bc-21.dgn	DWG:	TxDOT	CHK:	TxDOT	CRK:	TxDOT
CONT:	February 1998	SECT:	JOB	HIGHWAY:			
REVISONS:							
2-98	9-07	6469	76	001	US281	ETC.	
1-02	7-13						
11-02	8-14						
		CRP	JIM WELLS, ETC.				17

### PAVEMENT MARKING PATTERNS



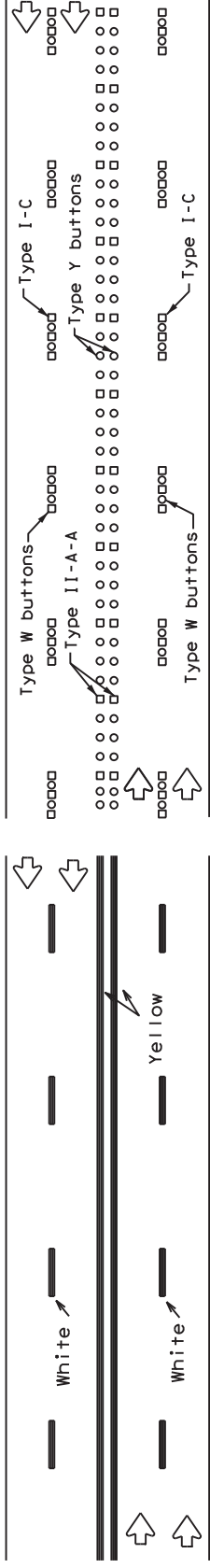
Pattern A is the TxDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

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



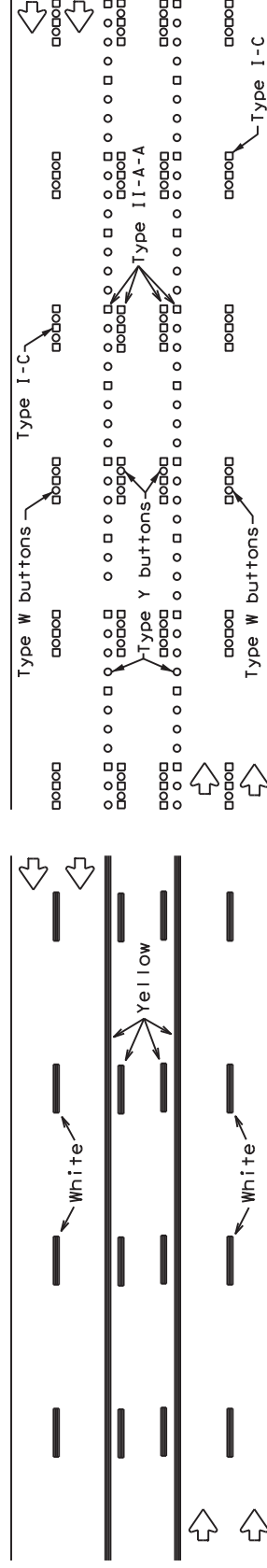
Prefabricated markings may be substituted for reflectorized pavement markings.

### EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

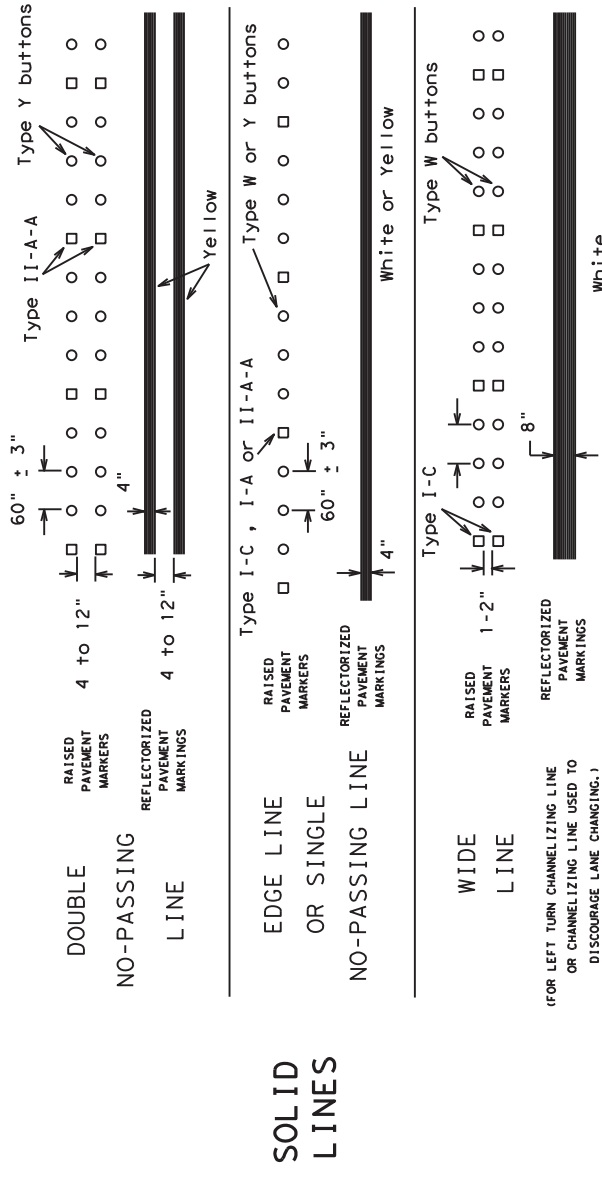
### LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



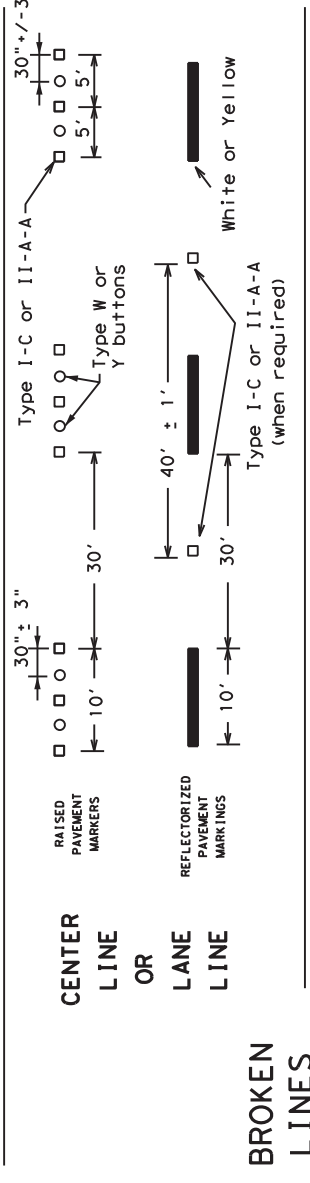
Prefabricated markings may be substituted for reflectorized pavement markings.

### TWO-WAY LEFT TURN LANE

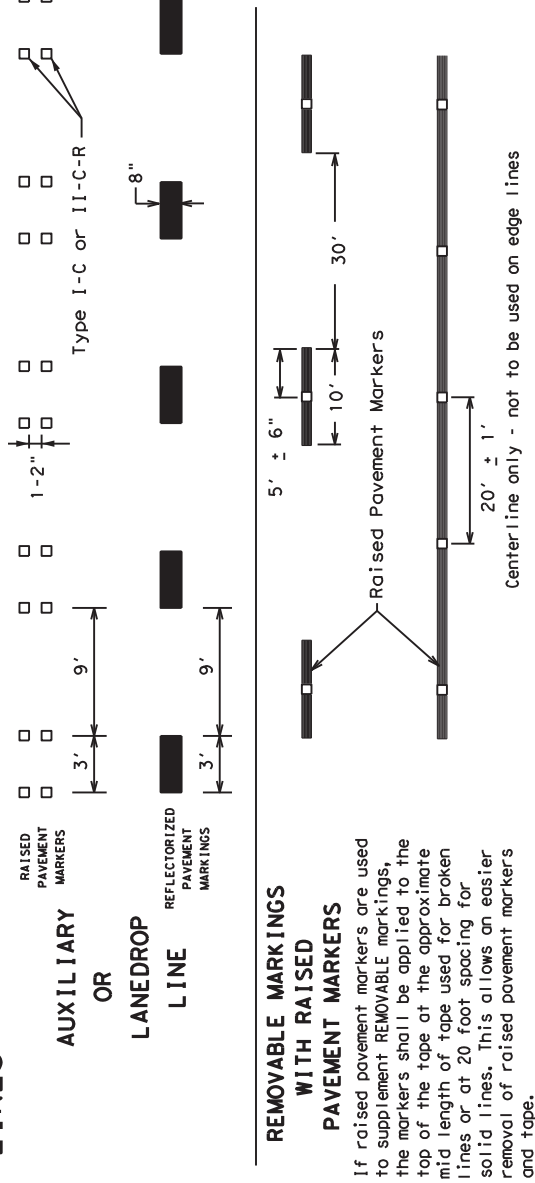
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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



### BROKEN LINES



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

SHEET 12 OF 12

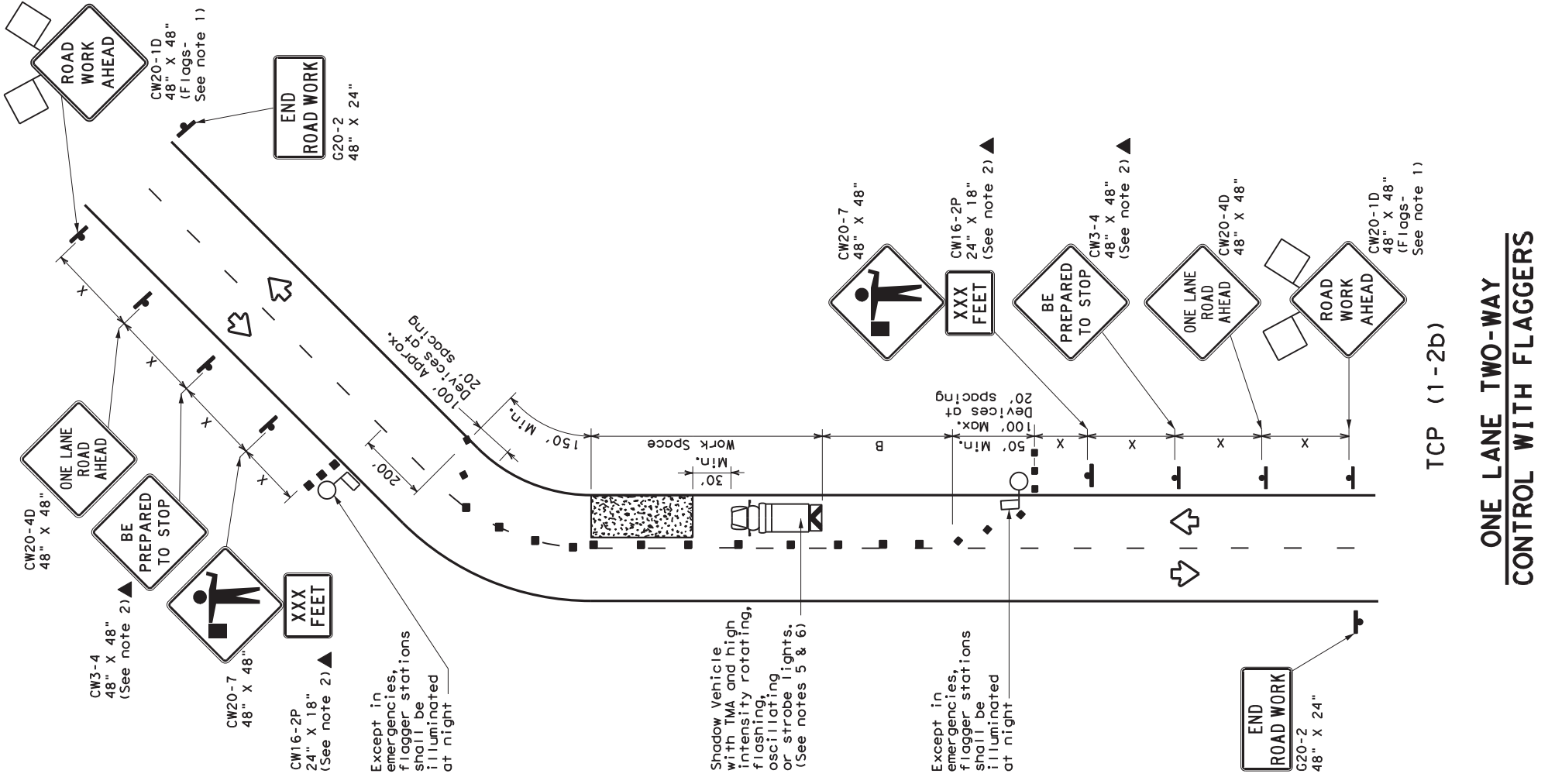
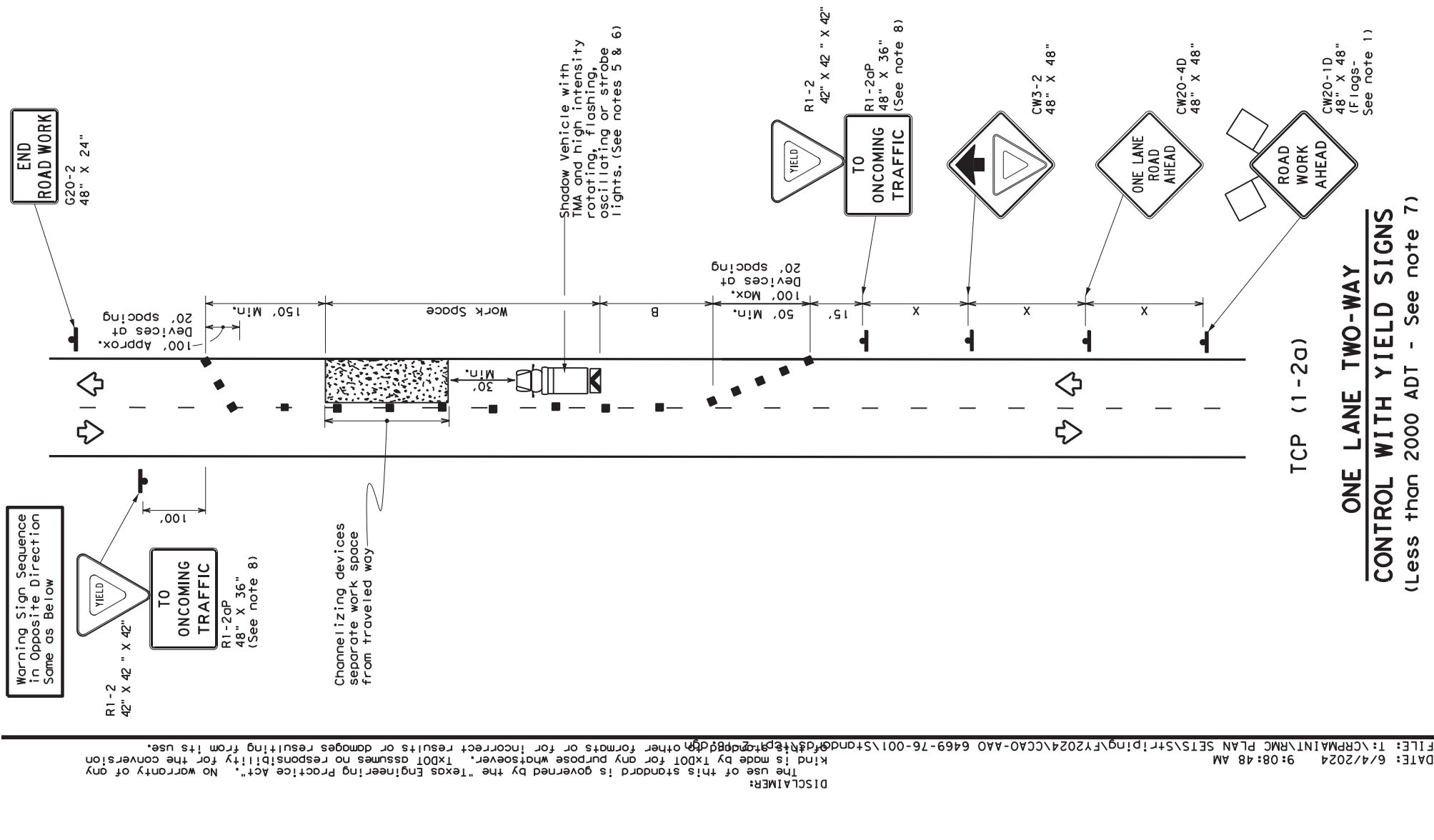


## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

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."

BC (12) - 21

FILE: bc-21.dgn	DNK: TxDOT	CHK: TxDOT	DRW: TxDOT	CHK: TxDOT
DATE: 6/4/2024 9:08:46 AM	CONT: TxDOT	SECT: TxDOT	JOB: HIGHWAY	REVISIONS
	1-97	9-07	5-21	6469176
	2-98	7-13	001	US281, ETC.
	11-02	8-14		CRP JIM WELLS, ETC.
				SHEET NO. 18



**LEGEND**

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

Posted Speed * *	Minimum Desirable Taper Lengths **		Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing Distance "X"	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
	10' Offset	12' Offset				
30	150'	165'	180'	30'	60'	200'
35	205'	225'	245'	35'	70'	250'
40	265'	295'	320'	40'	80'	305'
45	450'	495'	540'	45'	90'	360'
50	500'	550'	600'	50'	100'	425'
55	550'	605'	660'	55'	110'	495'
60	600'	660'	720'	60'	120'	570'
65	650'	715'	780'	65'	130'	645'
70	700'	770'	840'	70'	140'	730'
75	750'	825'	900'	75'	150'	820'

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

**TYPICAL USAGE**

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

**GENERAL NOTES**

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

**TCP (1-2a)**

R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.

R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

**TCP (1-2b)**

Flaggers should use two-way radios or other methods of communication to control traffic. Length of work space should be based on the ability of flaggers to communicate. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).

Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.

Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

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

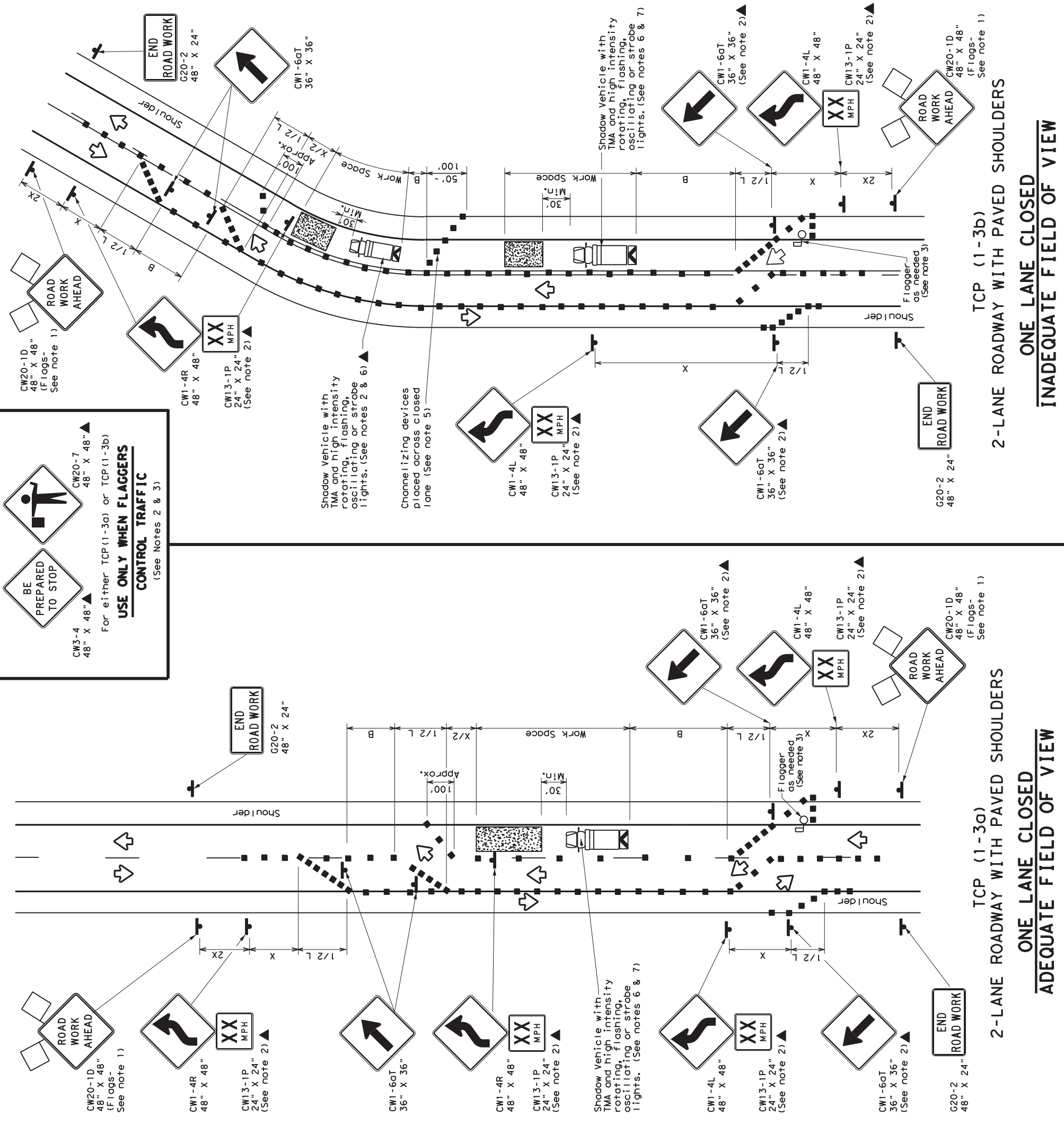
**TCP (1-2) - 18**

FILE: tcp1-2-18.dgn  
DNR: CK: DWR: CK:  
CONT: December 1985  
REV: TxDOT  
REV: 4-90  
REV: 2-94  
REV: 2-12  
REV: 1-97  
REV: 2-18

CRP: JIM WELLS, ETC. 19



**BE PREPARED TO STOP**  
 CW3-4 48" X 48"  
 For either TCP(1-3a) or TCP(1-3b)  
**USE ONLY WHEN FLAGGERS**  
**CONTROL TRAFFIC**  
 (See Notes 2 & 3)



**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 * X		Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		On a Taper	On a Tangent	On a Taper	On a Tangent	
30		10'	11'	30'	60'	90'
35	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	120'
40		205'	225'	245'	35'	160'
45		265'	295'	320'	40'	240'
50		450'	495'	540'	45'	320'
55	$L = WS$	500'	550'	600'	50'	400'
60		550'	605'	660'	55'	500'
65		600'	660'	720'	60'	600'
70		650'	715'	780'	65'	700'
75		700'	770'	840'	70'	800'
		750'	825'	900'	75'	900'

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

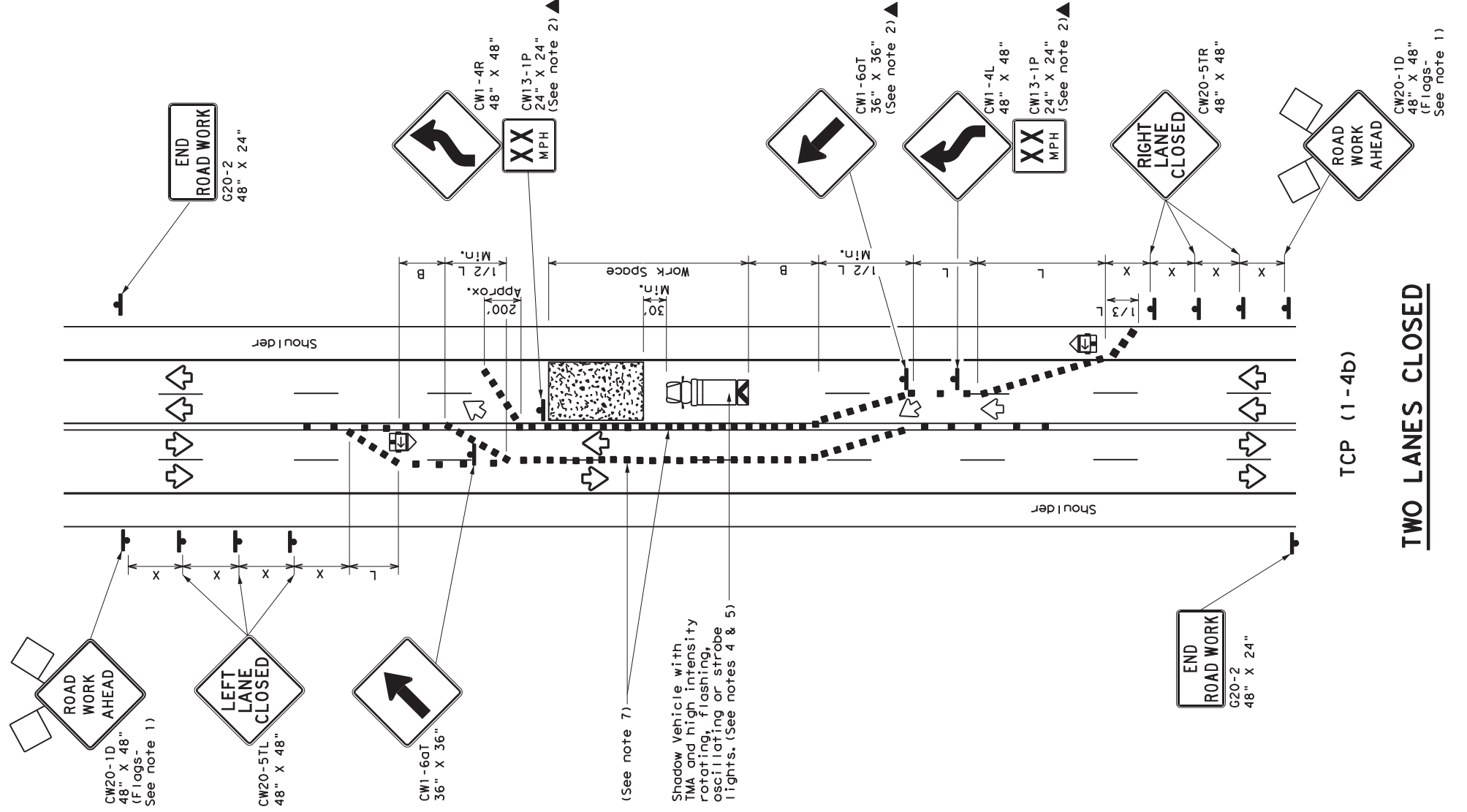
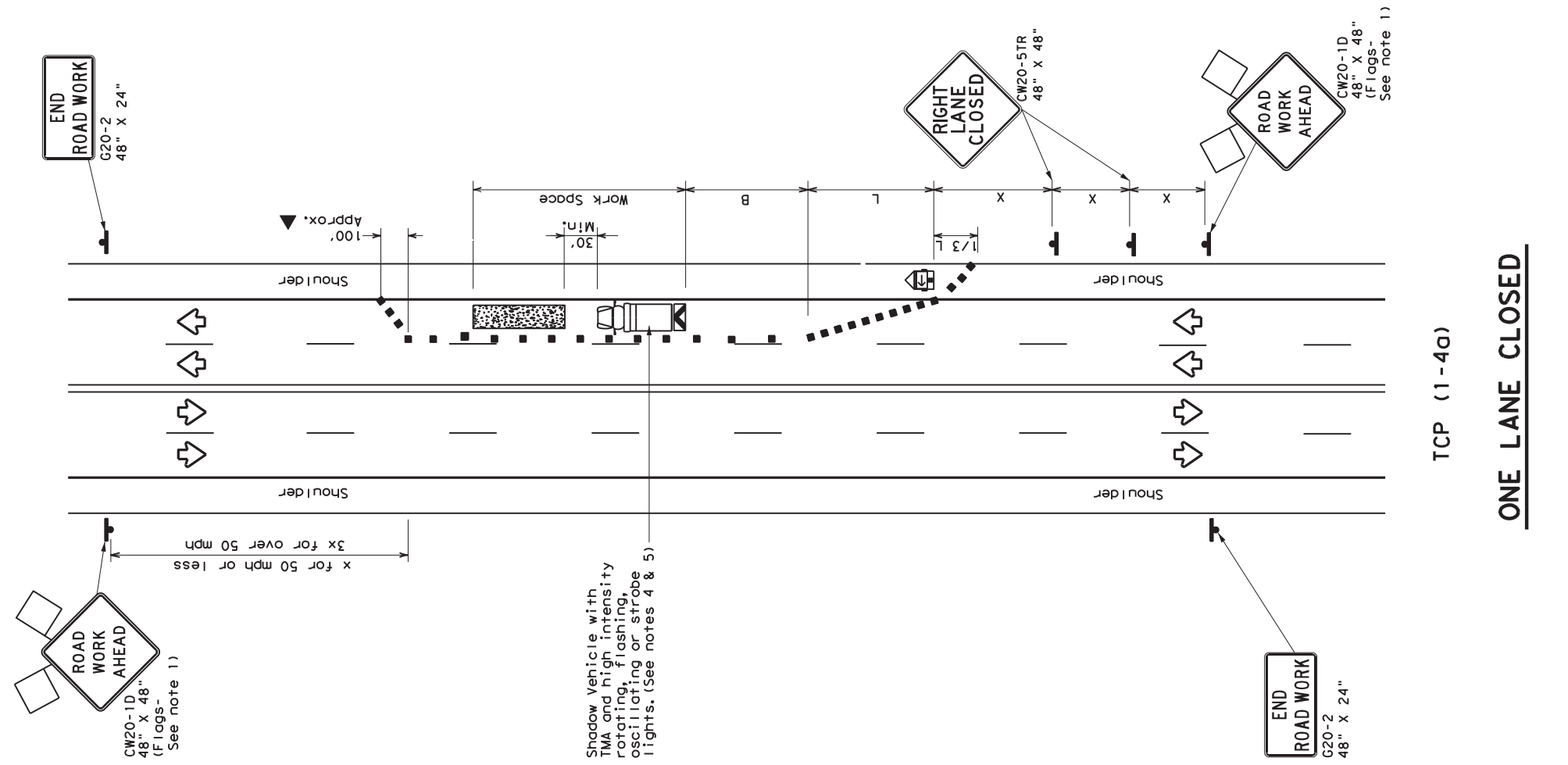
Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN**  
**TRAFFIC SHIFTS ON**  
**TWO LANE ROADS**

**TCP (1-3) - 18**

FILE: Tcpl-3-18.dgn DNR: CK: DWR: CK:  
 TxDOT December 1985 CONT SECT JOB HIGHWAY  
 2-94 4-98 REVISONS 6469 76 001 US281, ETC.  
 8-95 2-12 DIST COUNTY SHEET NO.  
 1-97 2-18 CRP JIM WELLS, ETC. 20





**LEGEND**

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

Posted Speed * *	Formula	Minimum Desirable Taper Lengths **		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x"	Suggested Longitudinal Buffer Space "B"
		Offset	Tangent	On a Taper	Distance		
30	$WS^2$	10'	11'	12'	30'	60'	90'
35	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'
40		205'	225'	245'	35'	70'	120'
45		265'	295'	320'	40'	80'	155'
50		450'	495'	540'	45'	90'	195'
55	$L = WS$	500'	550'	600'	50'	100'	240'
60		550'	605'	660'	55'	110'	295'
65		600'	660'	720'	60'	120'	350'
70		650'	715'	780'	65'	130'	410'
75		700'	770'	840'	70'	140'	475'
		750'	825'	900'	75'	150'	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.
- The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

**TCP (1-4a)**

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

**TCP (1-4b)**

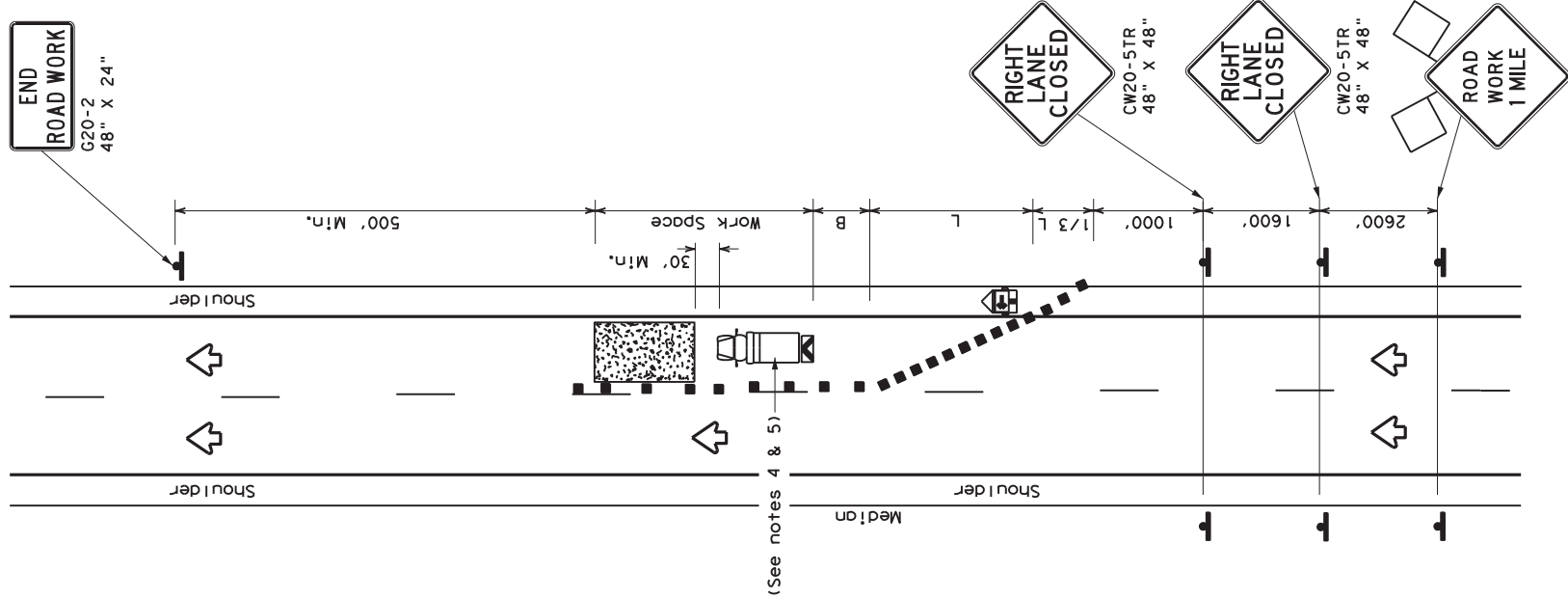
7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
 LANE CLOSURES ON MULTILANE  
 CONVENTIONAL ROADS**

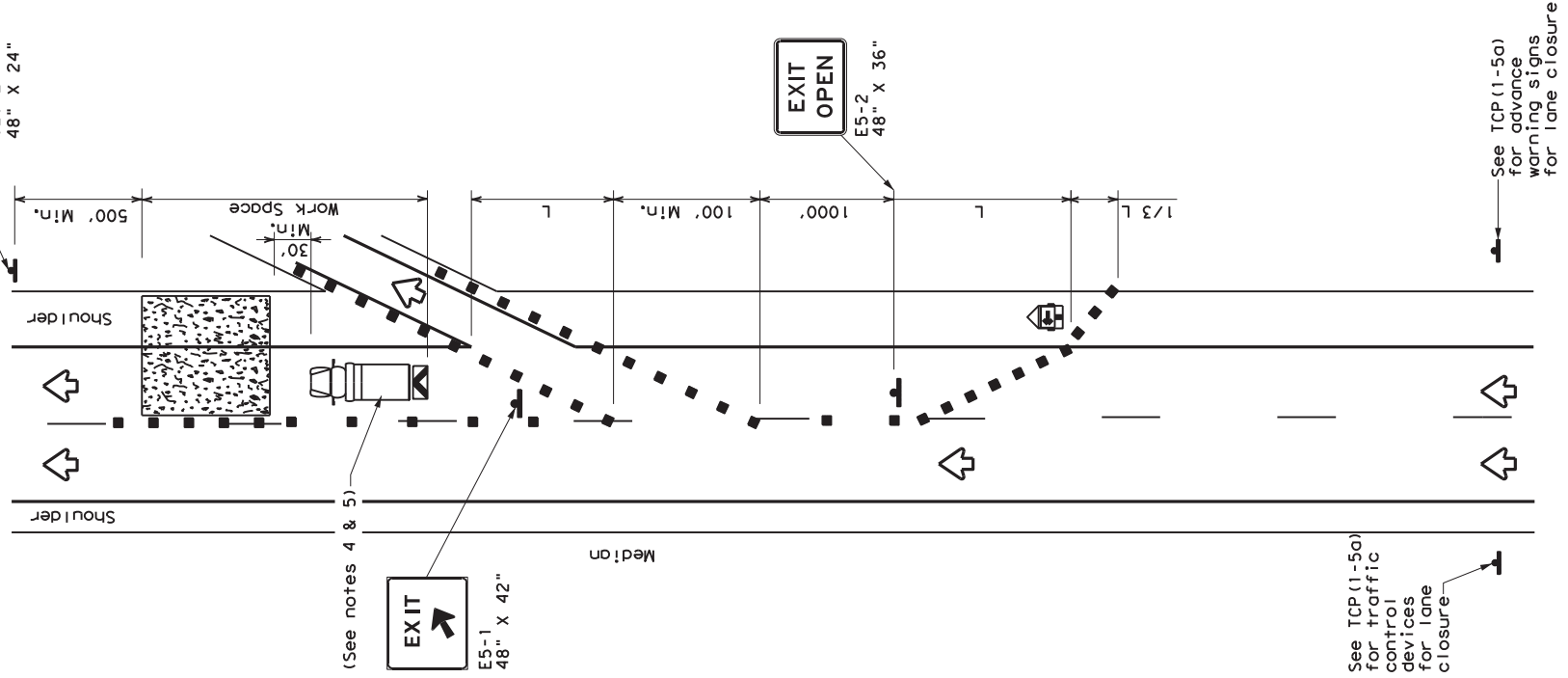
**TCP (1-4) - 18**

FILE:	TCP1-4-18.dgn	DN:	CK:	DW:	CK:
CONT:	December 1985	SECT:	JOB:	REV:	US281, ETC.
2-94	4-98	REVISONS:	6469	76	001
8-95	2-12	DIST:	COUNTY:	CRP	JIM WELLS, ETC.
1-97	2-18				21



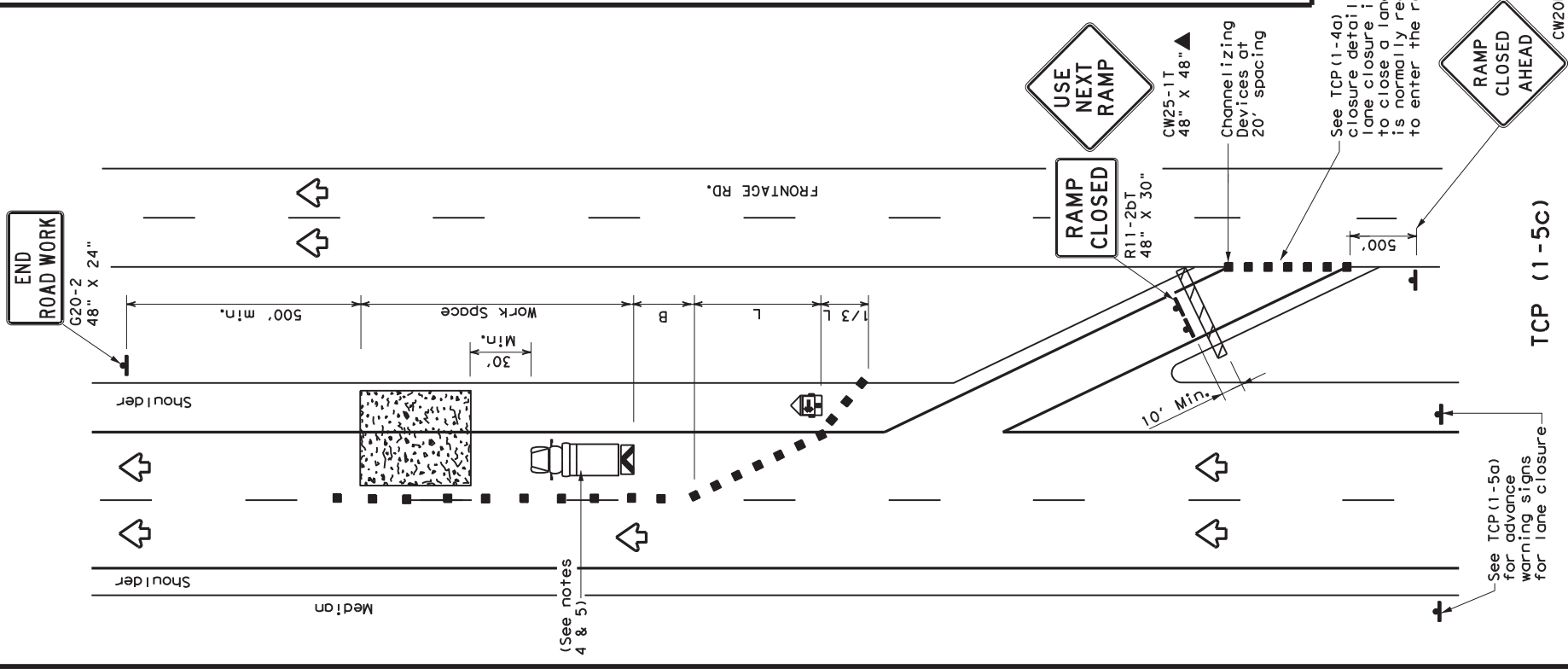
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

**LEGEND**

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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' to 12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	160'	120'
40	$L = \frac{WS^2}{60}$	265'	295'	320'	40'	80'	240'	155'
45	$L = WS$	450'	495'	540'	45'	90'	320'	195'
50	$L = WS$	500'	550'	600'	50'	100'	400'	240'
55	$L = WS$	550'	605'	660'	55'	110'	500'	295'
60	$L = WS$	600'	660'	720'	60'	120'	600'	350'
65	$L = WS$	650'	715'	780'	65'	130'	700'	410'
70	$L = WS$	700'	770'	840'	70'	140'	800'	475'
75	$L = WS$	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.
- 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.

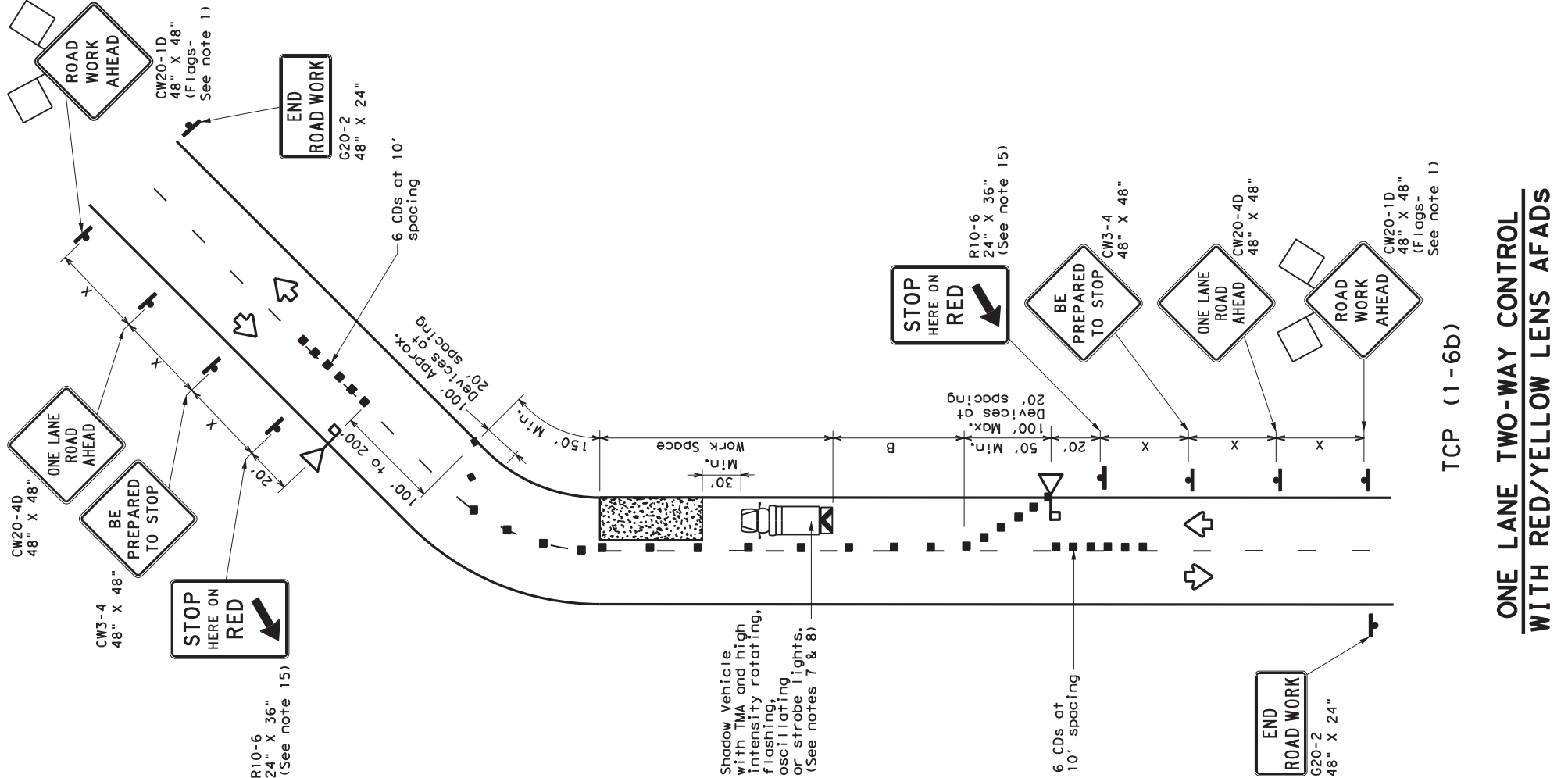
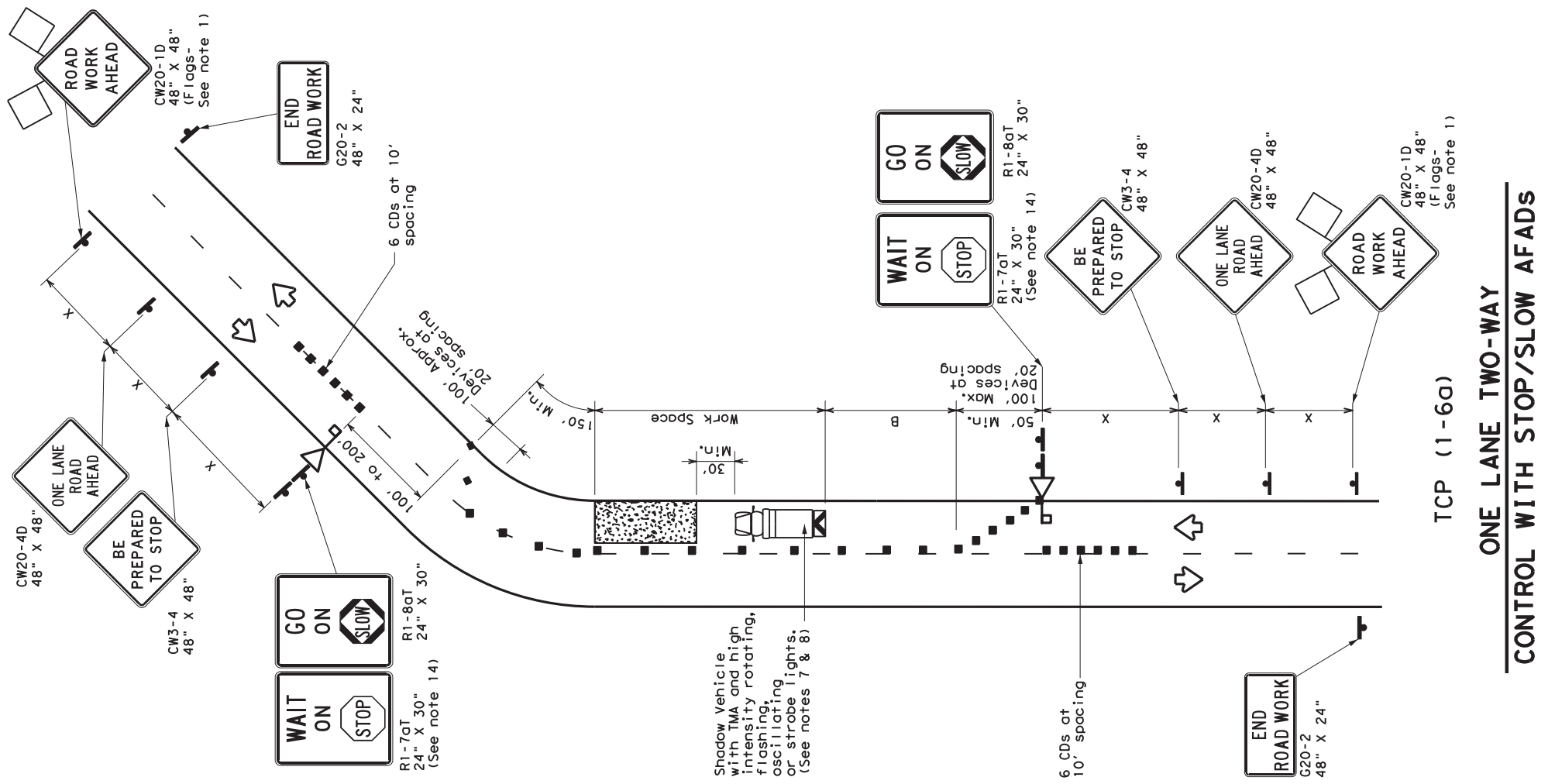


**TRAFFIC CONTROL PLAN**  
**LANE CLOSURES FOR**  
**DIVIDED HIGHWAYS**

TCP (1-5) - 18

FILE:	TCPI-5-18.dgn	DWG:	CK:
CONT:	FEBRUARY 2012	REV:	001
REVISIONS:	6469 76	JOB:	US281, ETC.
DIST:	2-18	COUNTY:	
CRP:	JIM WELLS, ETC.	SHEET NO.:	22

DISCLAIMER:



**LEGEND**

	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Automated Flagger Assistance Device (AFAD)		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 Buffering Space "B"	Stopping Sight Distance
		10' Offset	12' Offset	On a Taper	Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'	200'
35	$L = \frac{WS^2}{60}$	205'	225'	245'	35'	70'	120'	250'
40	$L = \frac{WS^2}{60}$	265'	295'	320'	40'	80'	155'	305'
45	$L = \frac{WS^2}{60}$	450'	495'	540'	45'	90'	195'	360'
50	$L = \frac{WS^2}{60}$	500'	550'	600'	50'	100'	240'	425'
55	$L = \frac{WS^2}{60}$	550'	605'	660'	55'	110'	295'	495'
60	$L = \frac{WS^2}{60}$	600'	660'	720'	60'	120'	350'	570'
65	$L = \frac{WS^2}{60}$	650'	715'	780'	65'	130'	410'	645'
70	$L = \frac{WS^2}{60}$	700'	770'	840'	70'	140'	475'	730'
75	$L = \frac{WS^2}{60}$	750'	825'	900'	75'	150'	540'	820'

\* Conventional Roads Only  
 \*\* 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.
- AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
- Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
- Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
- One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
- When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
- All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
- 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 other channelizing devices require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the AFAD.
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
- The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

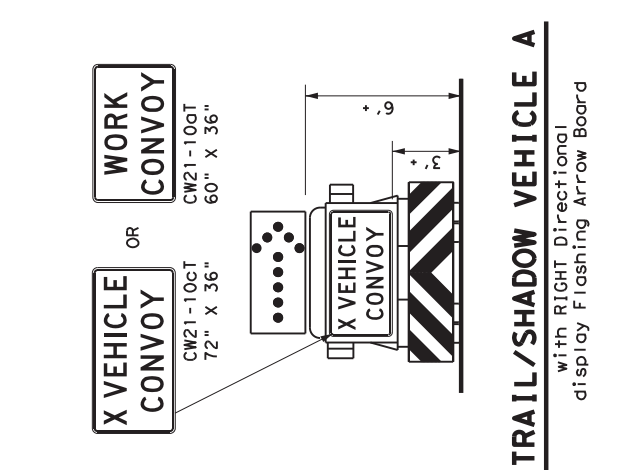
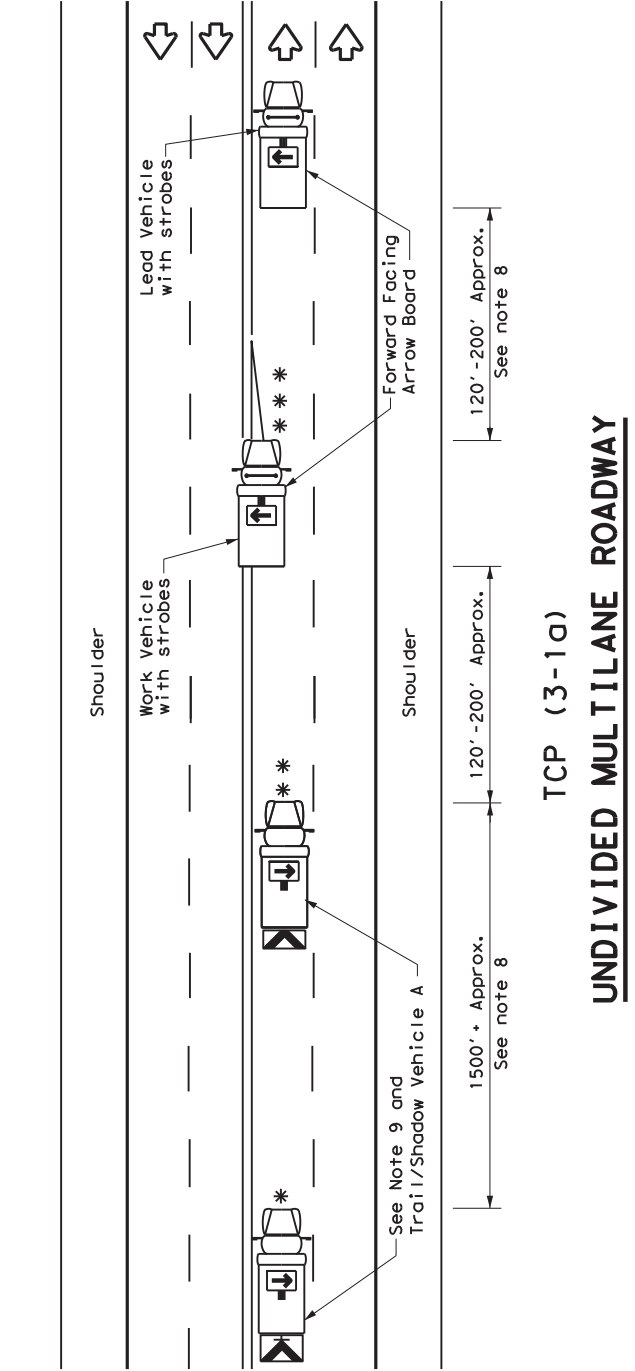
Texas Department of Transportation  
 Traffic Operations Division  
 Standard

**TRAFFIC CONTROL PLAN  
 AUTOMATED FLAGGER  
 ASSISTANCE DEVICES  
 (AFADs)**

**TCP (1-6) - 18**

FILE: tcp1-6-18.dgn  
 DWT: CKK  
 CONT: FEBRUARY 2012  
 REV: 001  
 DIST: 6469 76  
 COUNTY: JIM WELLS, ETC.  
 SHEET NO.: 23





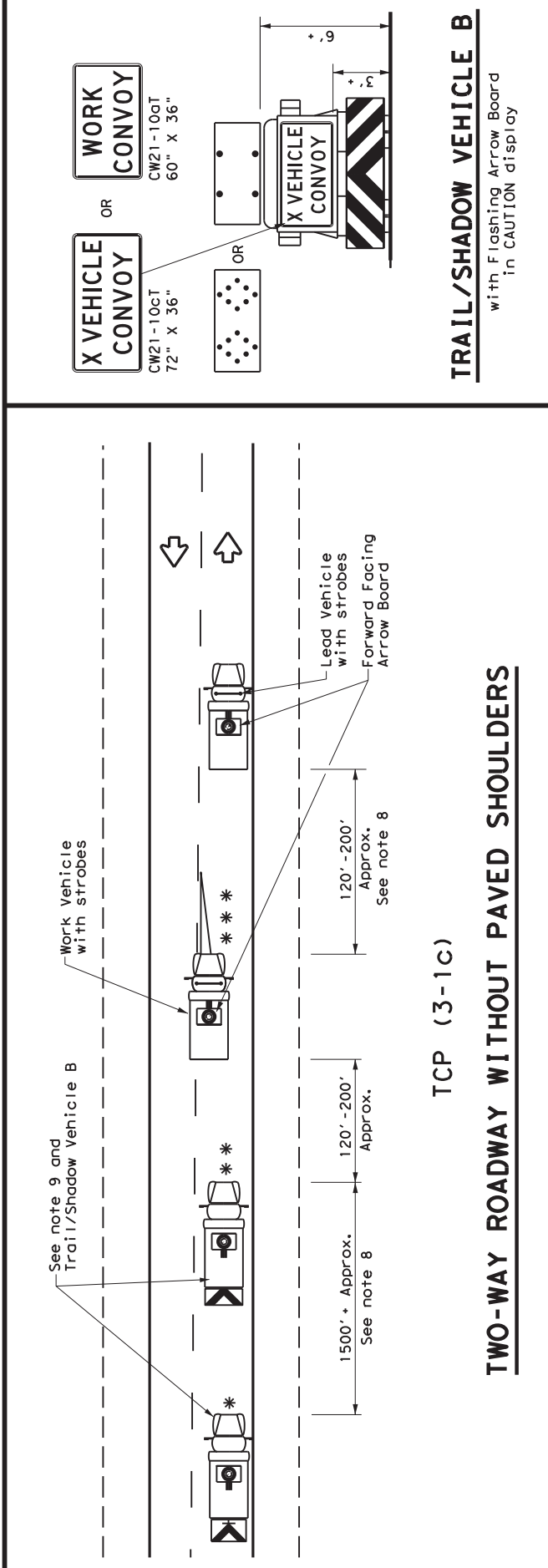
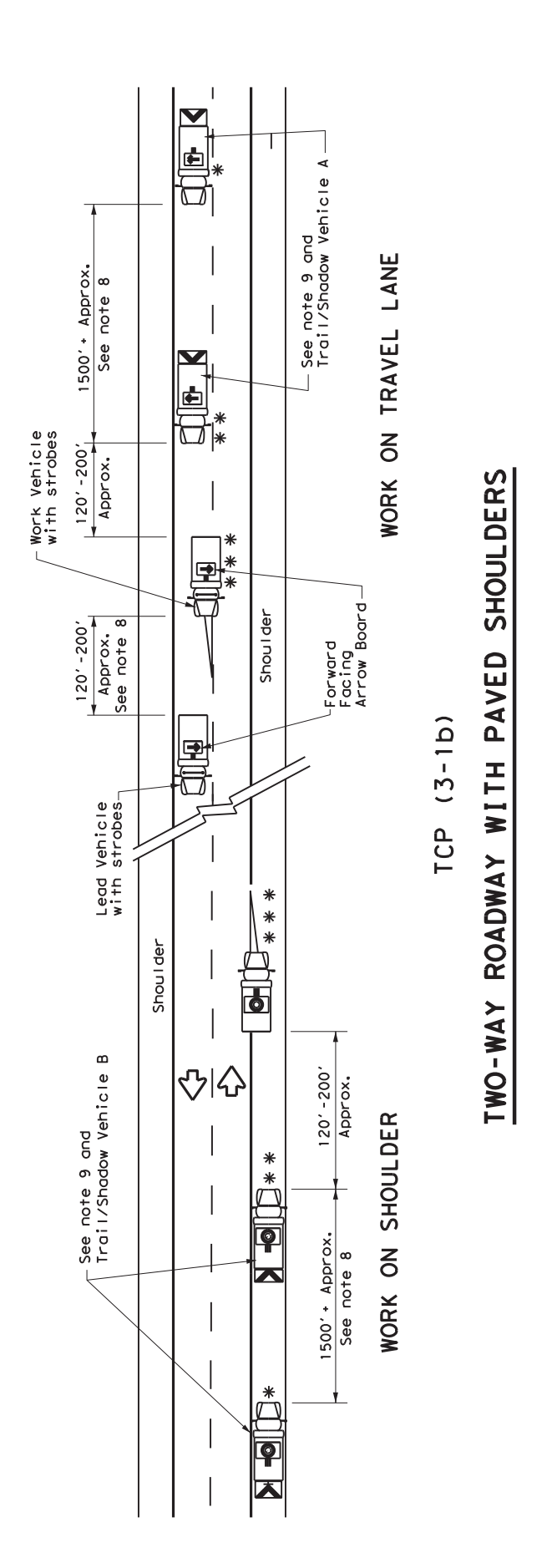
LEGEND		ARROW BOARD DISPLAY	
* Trail Vehicle			
** Shadow Vehicle			
** Work Vehicle		RIGHT Directional	
** Heavy Work Vehicle		LEFT Directional	
Truck Mounted Attenuator (TMA)		Double Arrow	
Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)	

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

**GENERAL NOTES**

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



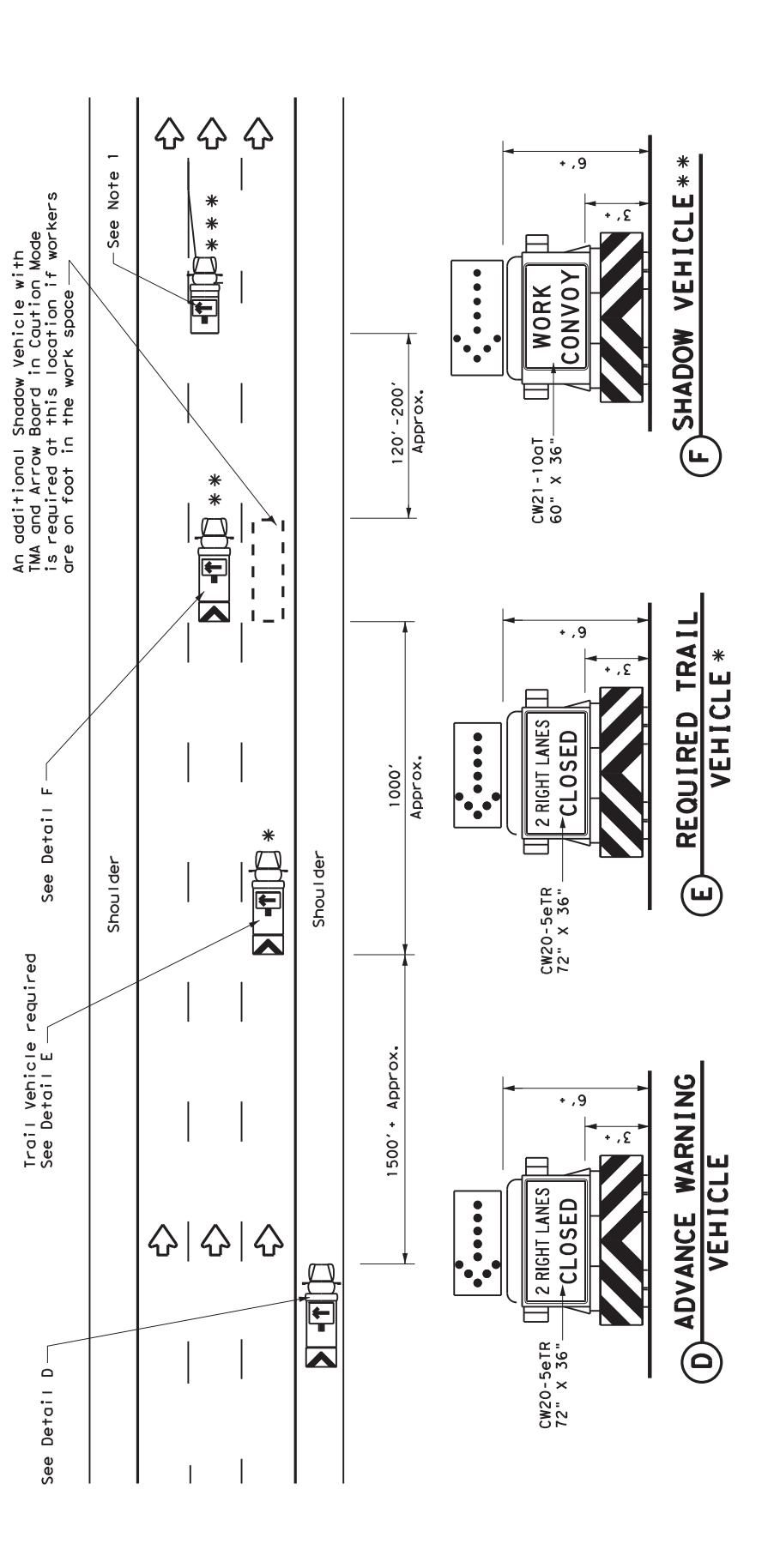
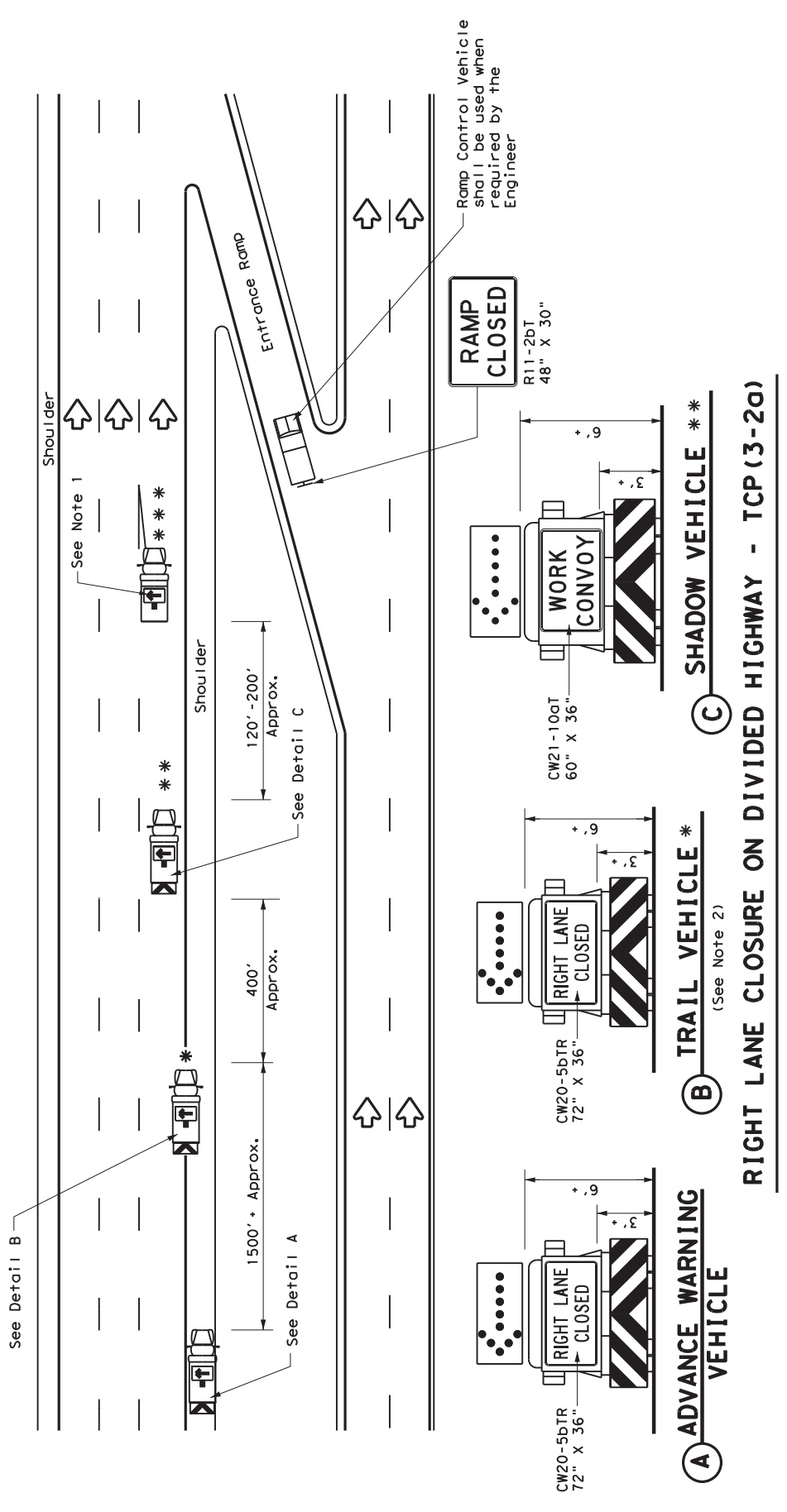
**TRAFFIC CONTROL PLAN  
MOBILE OPERATIONS  
UNDIVIDED HIGHWAYS**

**TCP (3-1) - 13**

FILE: T03-1.dgn	DWG: TxDOT	CHK: TxDOT	DATE: TxDOT	CK: TxDOT
① TxDOT	December 1985	CONT: 6469	SECT: 76	JOB: 001
2-94	4-98	REVISIONS		US281, ETC.
8-95	7-13	DIST:	COUNTY:	SHEET NO.
1-97		CRP	JIM WELLS, ETC.	<b>24</b>

**STRIPING FOR TMA**





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	INTERMEDIATE TERM	LONG TERM STATIONARY
✓			

**GENERAL NOTES**

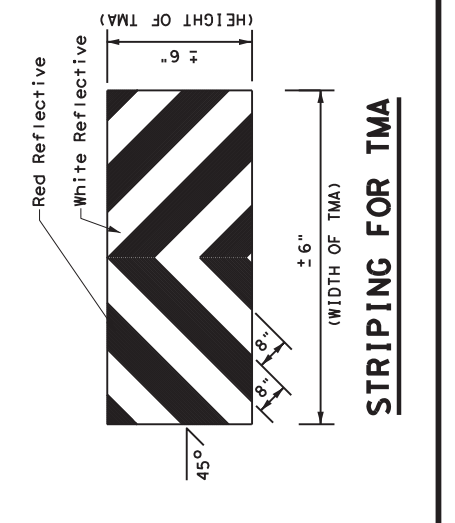
1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the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

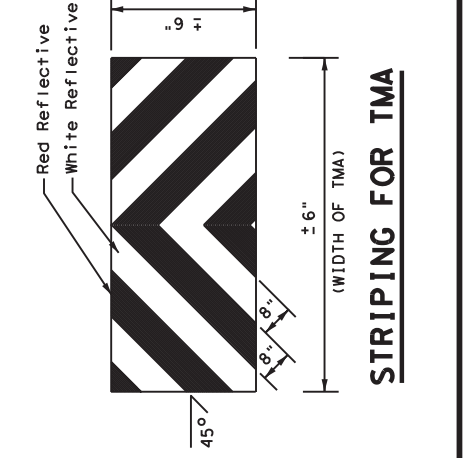
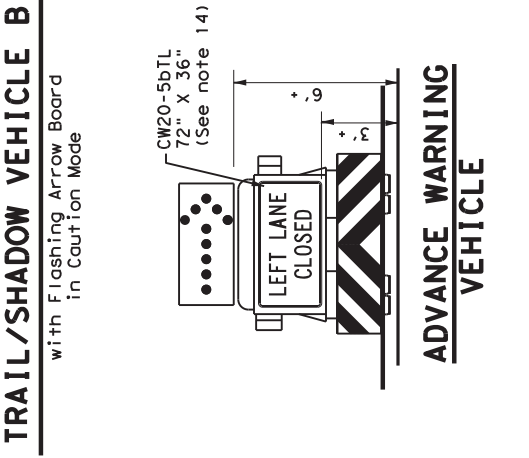
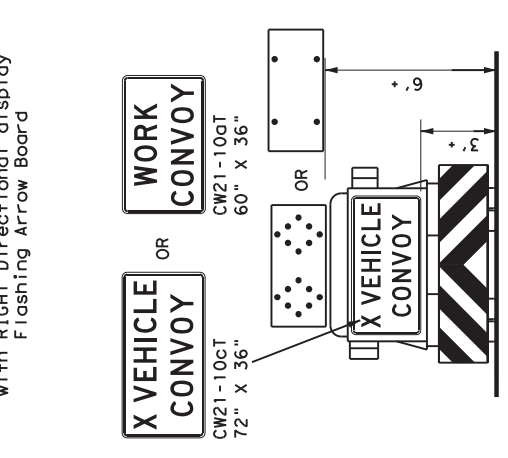
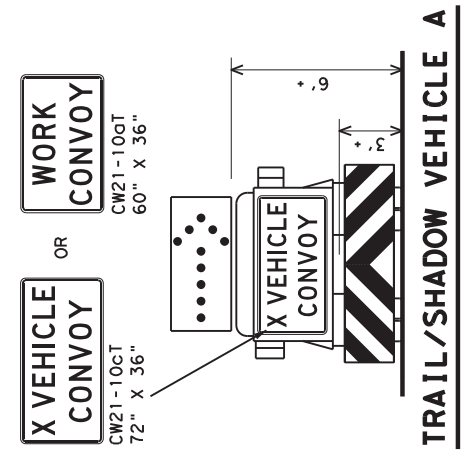
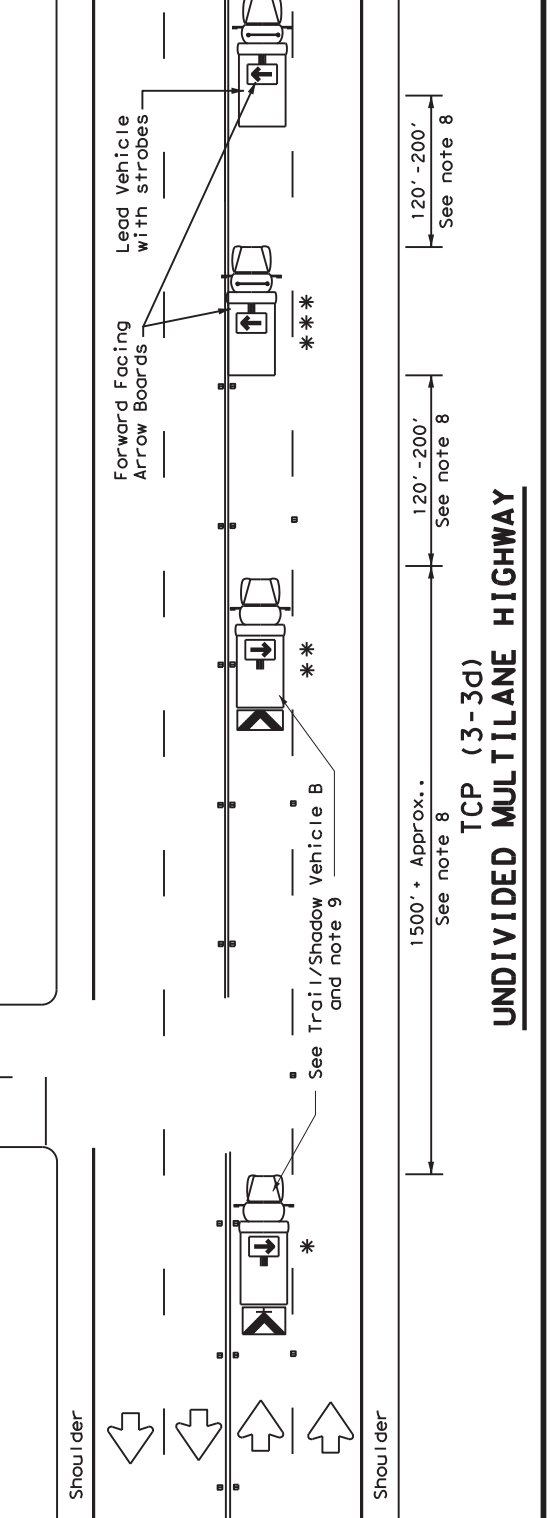
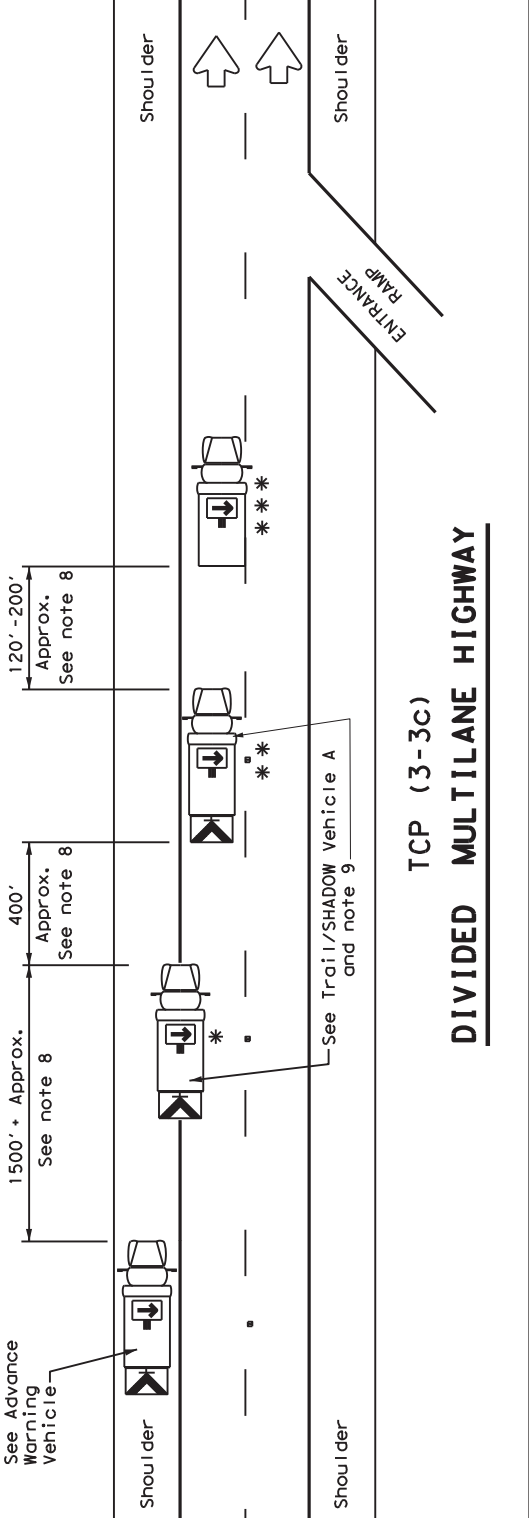
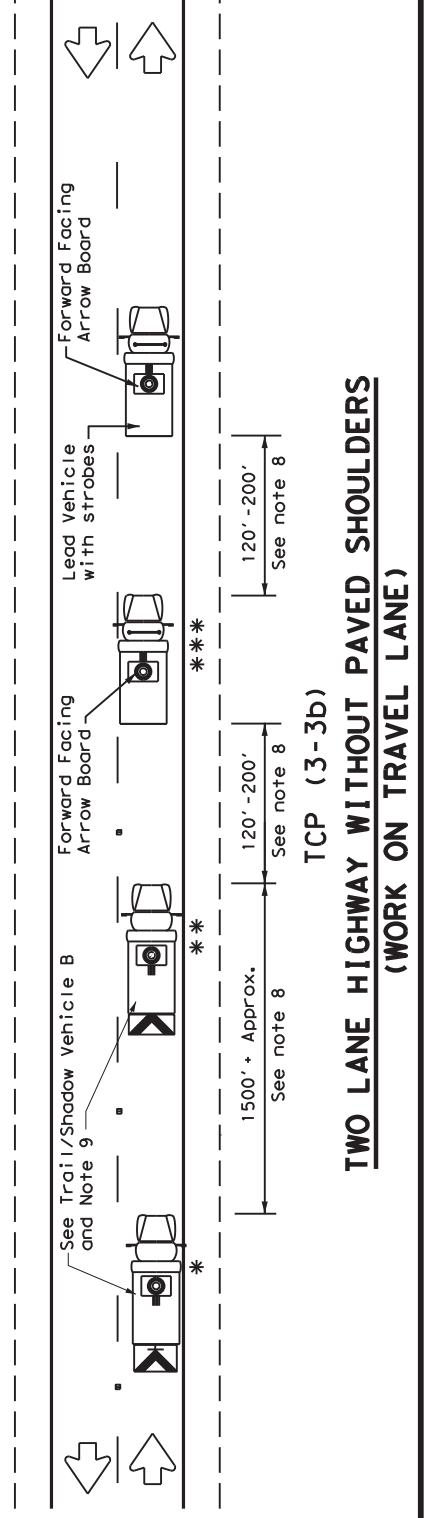
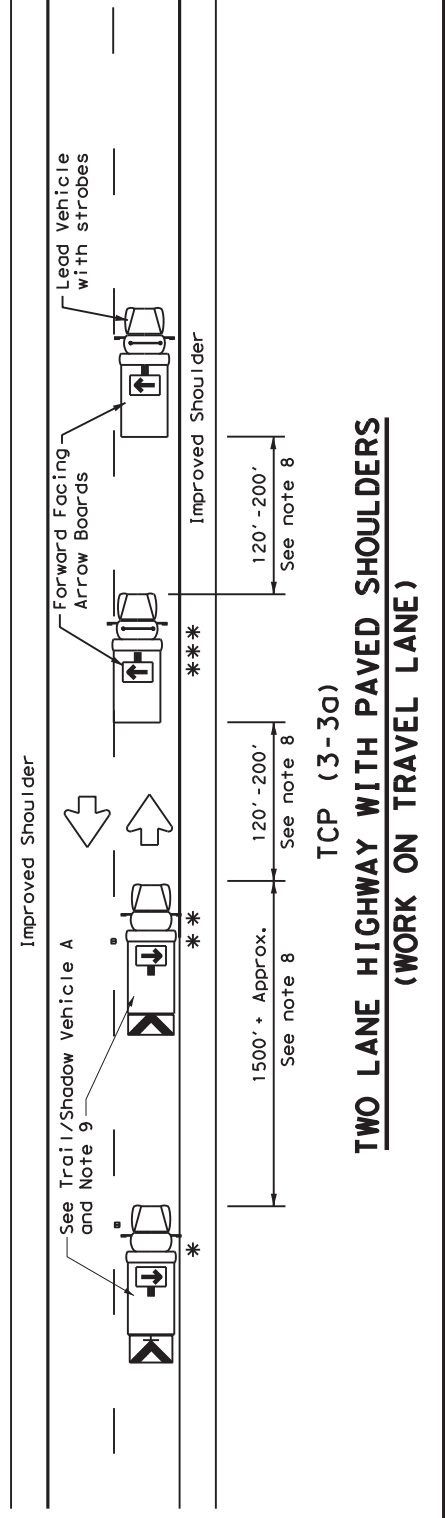
**Texas Department of Transportation**

**TRAFFIC CONTROL PLAN  
MOBILE OPERATIONS  
DIVIDED HIGHWAYS**

**TCP(3-2) - 13**

FILE:	Tcp3-2.dgn	DN:	TxDOT	DR:	TxDOT	CK:	TxDOT
CONT:	December 1985	SECT:		JOB:			
REVISONS:	6469 76	001	US281, ETC.				
2-94	4-98						
8-95	7-13						
1-97							
CRP:	JIM WELLS, ETC.	SHEET NO.:	25				





**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	LONG TERM STATIONARY
✓			

**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 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 (CW20-5dTL) 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.

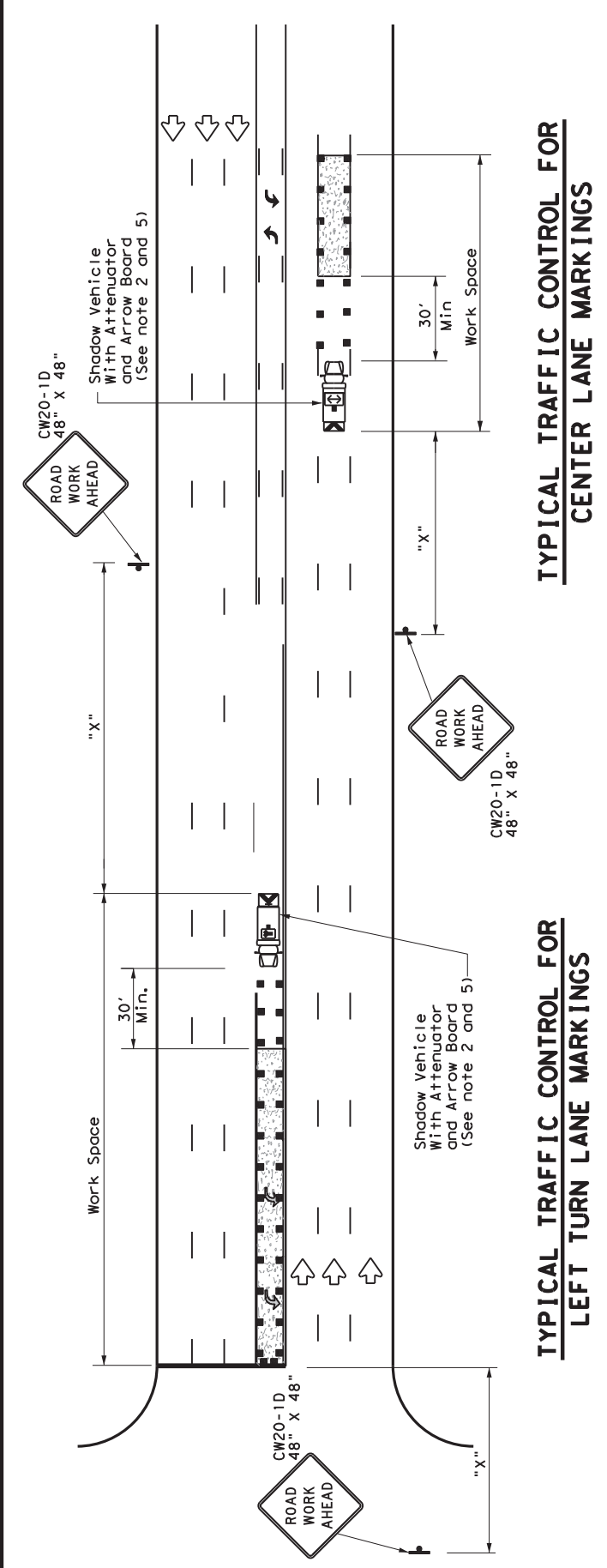
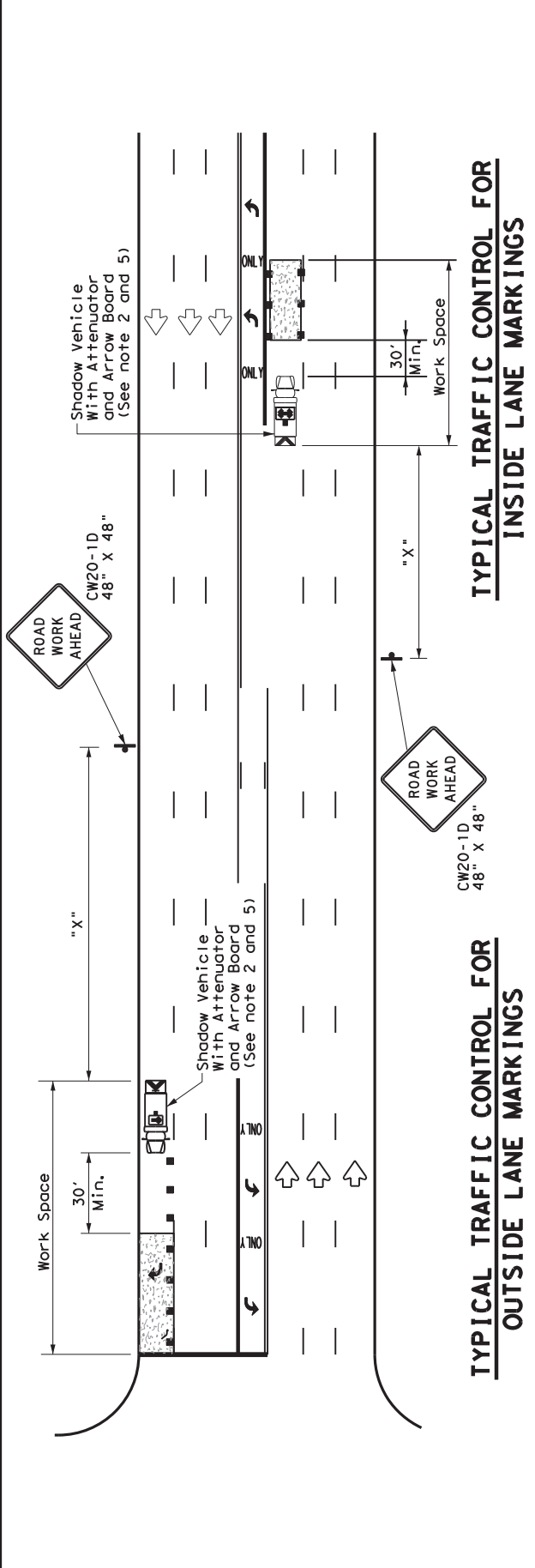
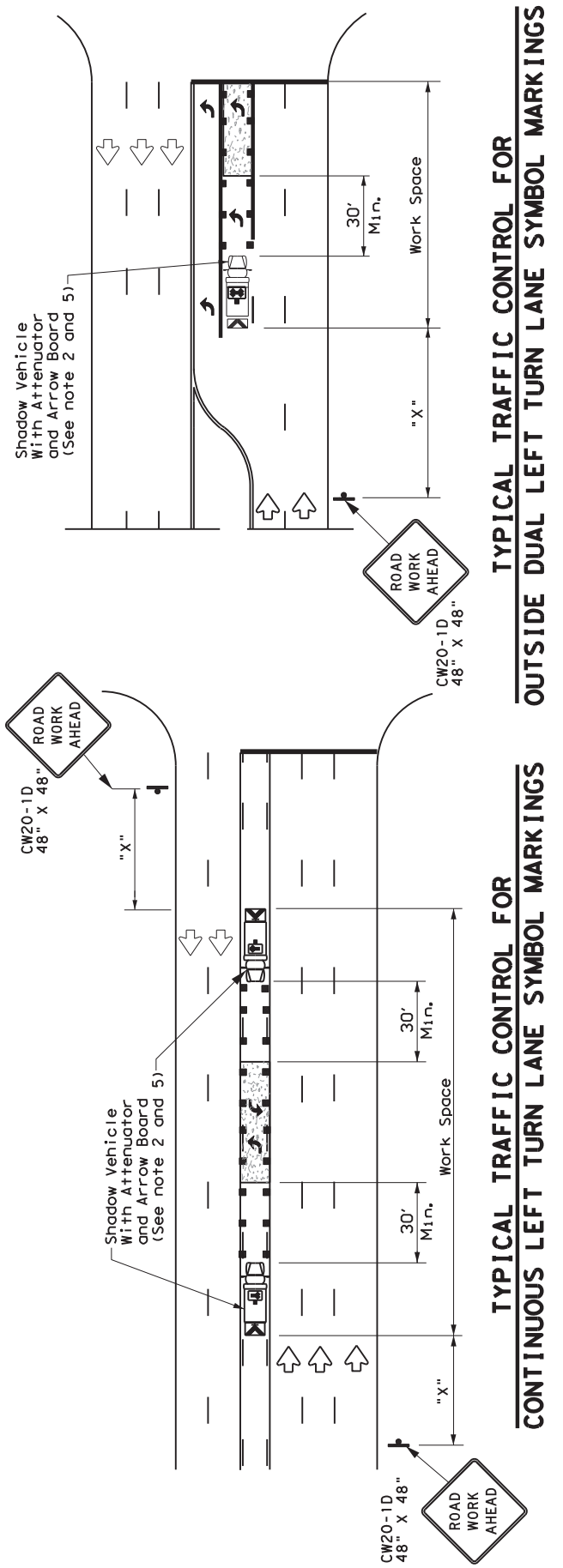
Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
 MOBILE OPERATIONS  
 RAISED PAVEMENT  
 MARKER INSTALLATION/  
 REMOVAL**

**TCP (3-3) - 14**

FILE:	Tcp3-3.dgn	DN:	TxDOT	CK:	TxDOT	HW:	CK:	TxDOT
CONT:	September 1987	SECT:		JOB:		HIGHWAY:		
REVISONS:	2-94 4-98			6469 76	001	US281, ETC.		
	8-95 7-13							
	1-97 7-14							
DIST:		COUNTY:		CRP:	JIM WELLS, ETC.	SHEET NO.:		26

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**LEGEND**

* Trail Vehicle	ARROW BOARD DISPLAY
** Shadow Vehicle	
*** Work Vehicle	RIGHT Directional
Truck Mounted Attenuator (TMA)	LEFT Directional
Traffic Flow	Double Arrow
	Channelizing Devices

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

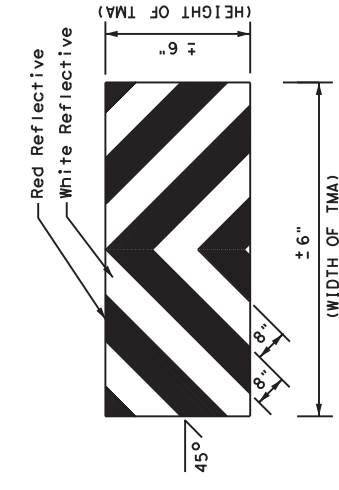
\* Conventional Roads Only  
 \*\* Taper lengths have been rounded off.  
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

**TYPICAL USAGE**

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

**GENERAL NOTES**

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



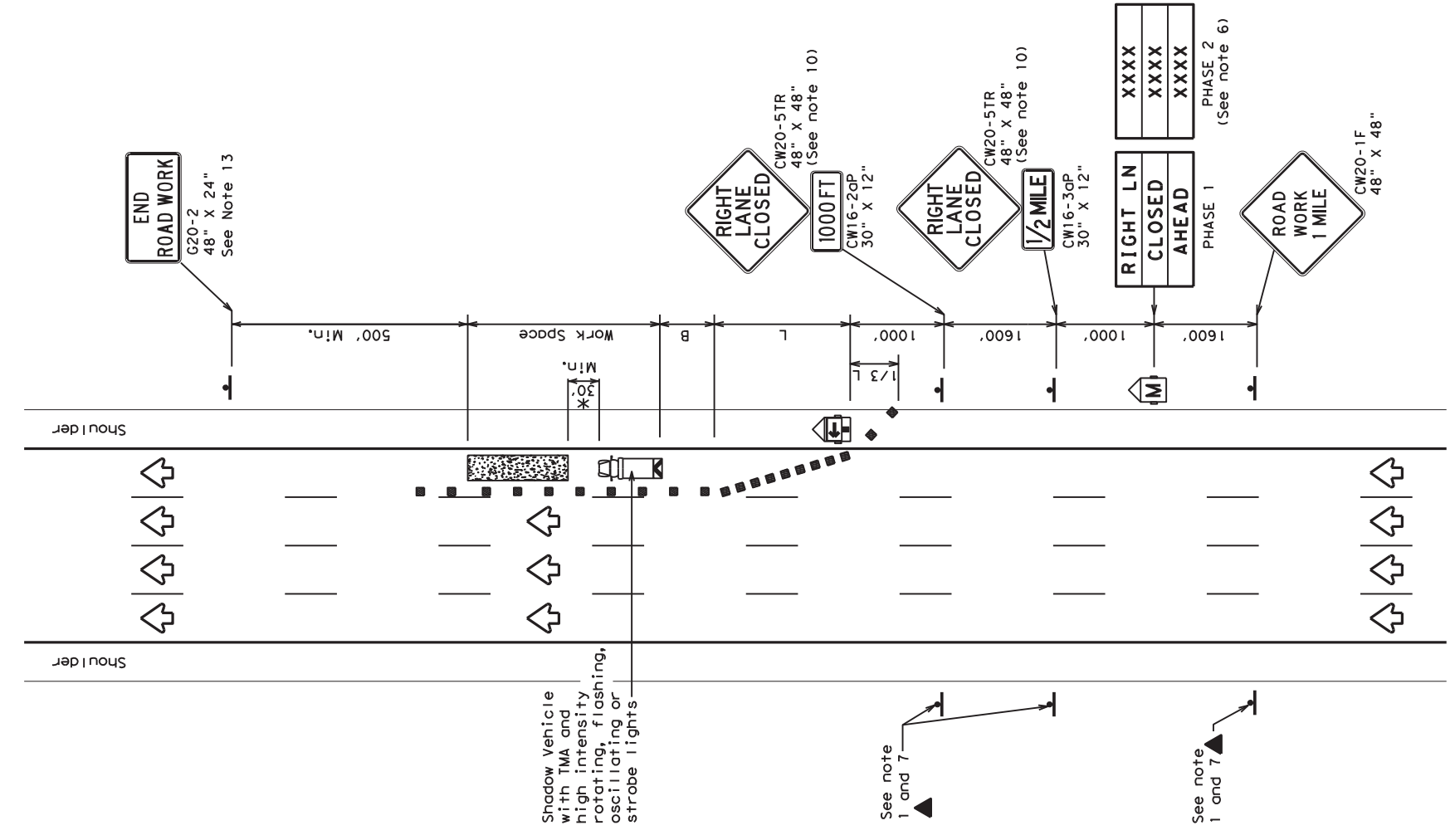
Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
 MOBILE OPERATIONS FOR  
 ISOLATED WORK AREAS  
 UNDIVIDED HIGHWAYS**

**TCP (3-4) - 13**

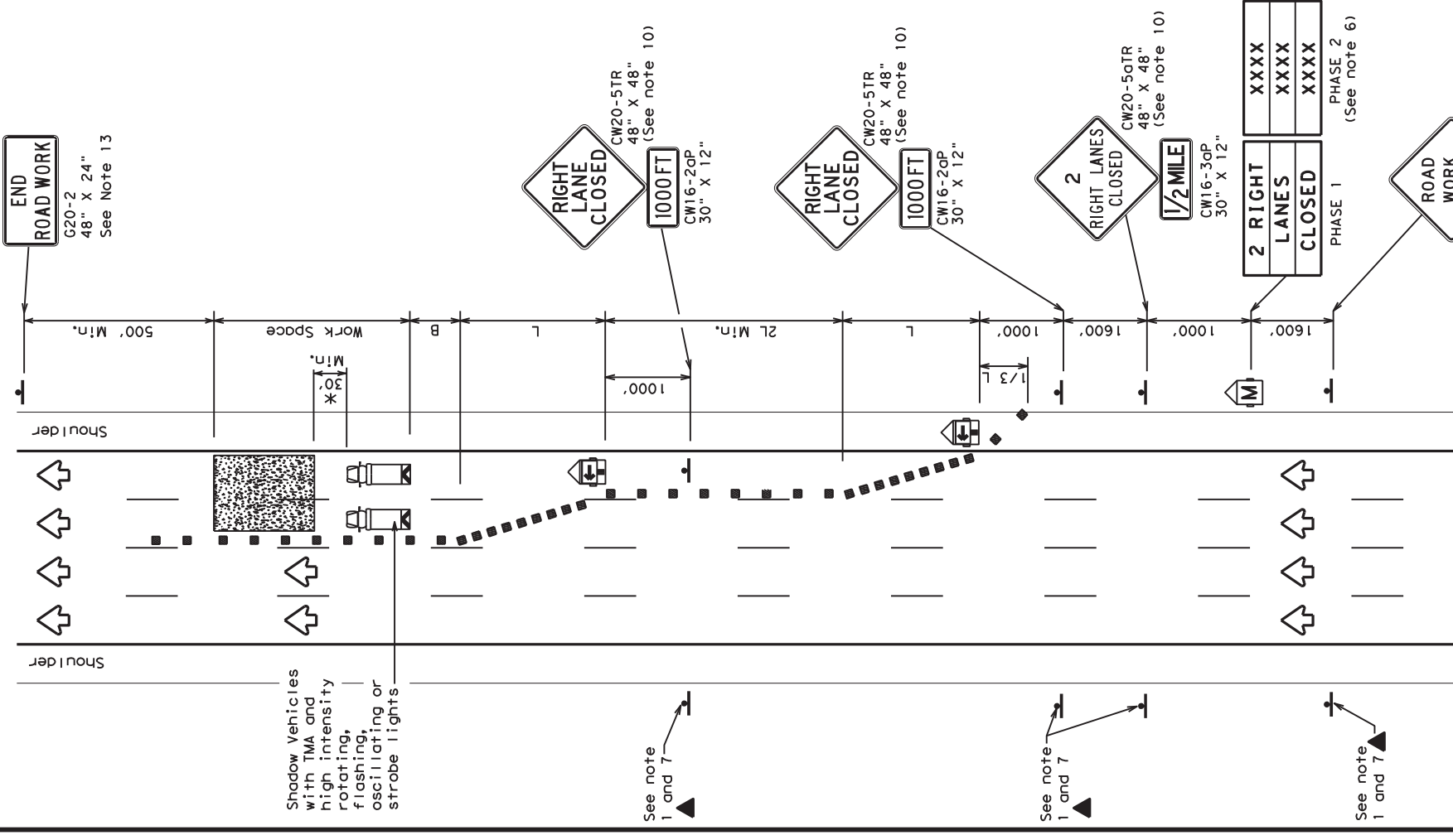
FILE:	TCP3-4.dgn	DN:	TxDOT	DR:	TxDOT	CK:	TxDOT
CONT:	JULY, 2013	REVISIONS					
JOB:	001	HIGHWAY:	US281, ETC.				
SHEET NO.:	6469 76	DIST:		COUNTY:			
SHEET NO.:		CRP:	JIM WELLS, ETC.				





TCP (6-1a)

**TYPICAL FREEWAY ONE LANE CLOSURE**



TCP (6-1b)

**TYPICAL FREEWAY TWO LANE CLOSURE**

**LEGEND**

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L"		Suggested Maximum Spacing of Channelizing Devices	Suggested Longitudinal Buffer Space "B"
		On a Taper	On a Tangent		
45	L = WS	10' 11"	12' 0"	45'	195'
50		450'	495'	540'	240'
55		500'	550'	600'	295'
60		600'	660'	720'	350'
65		650'	715'	780'	410'
70	700'	770'	840'	470'	
75	750'	825'	900'	530'	
80	800'	880'	960'	590'	

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

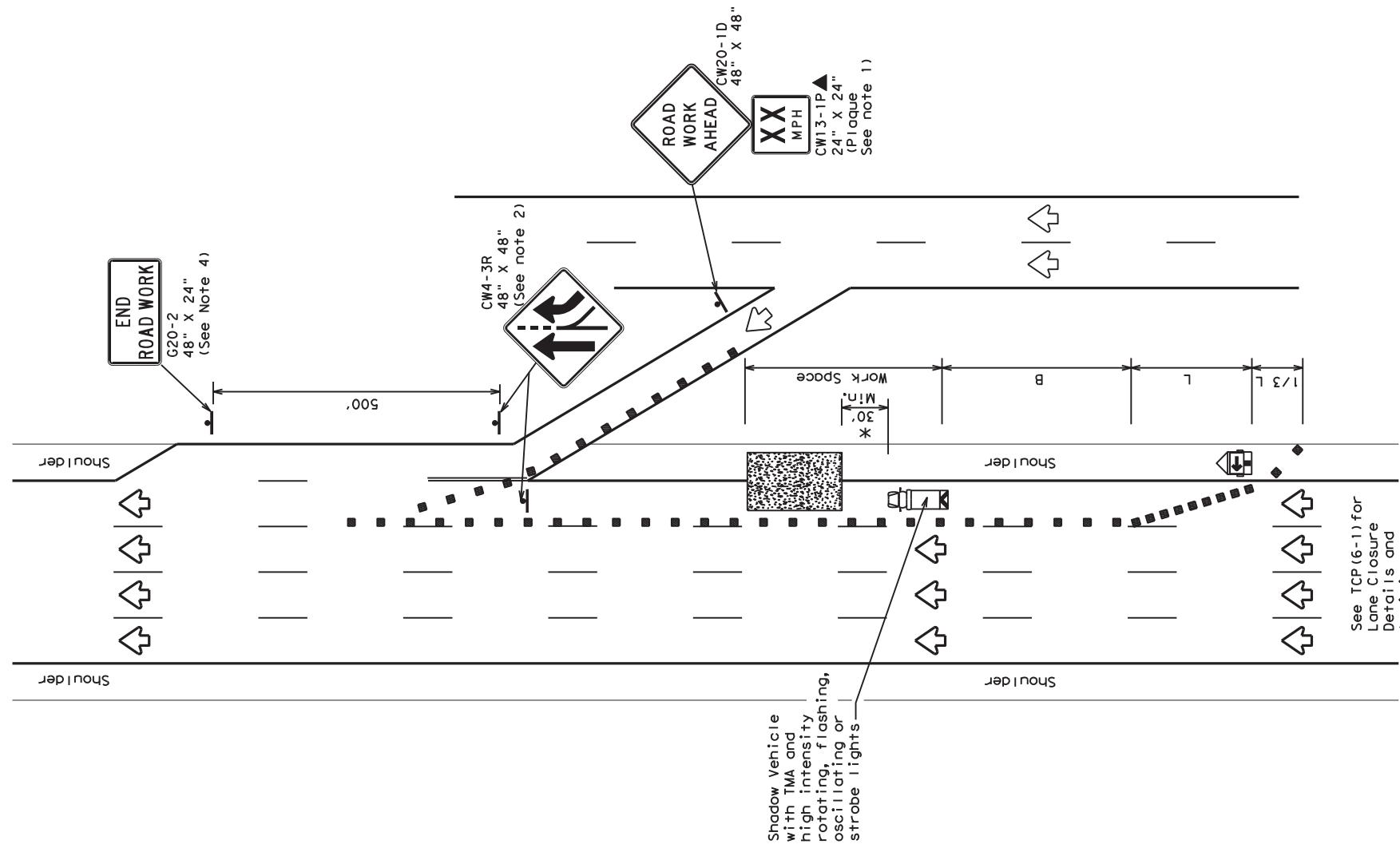
\* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.



**TRAFFIC CONTROL PLAN  
 FREEWAY LANE CLOSURES**

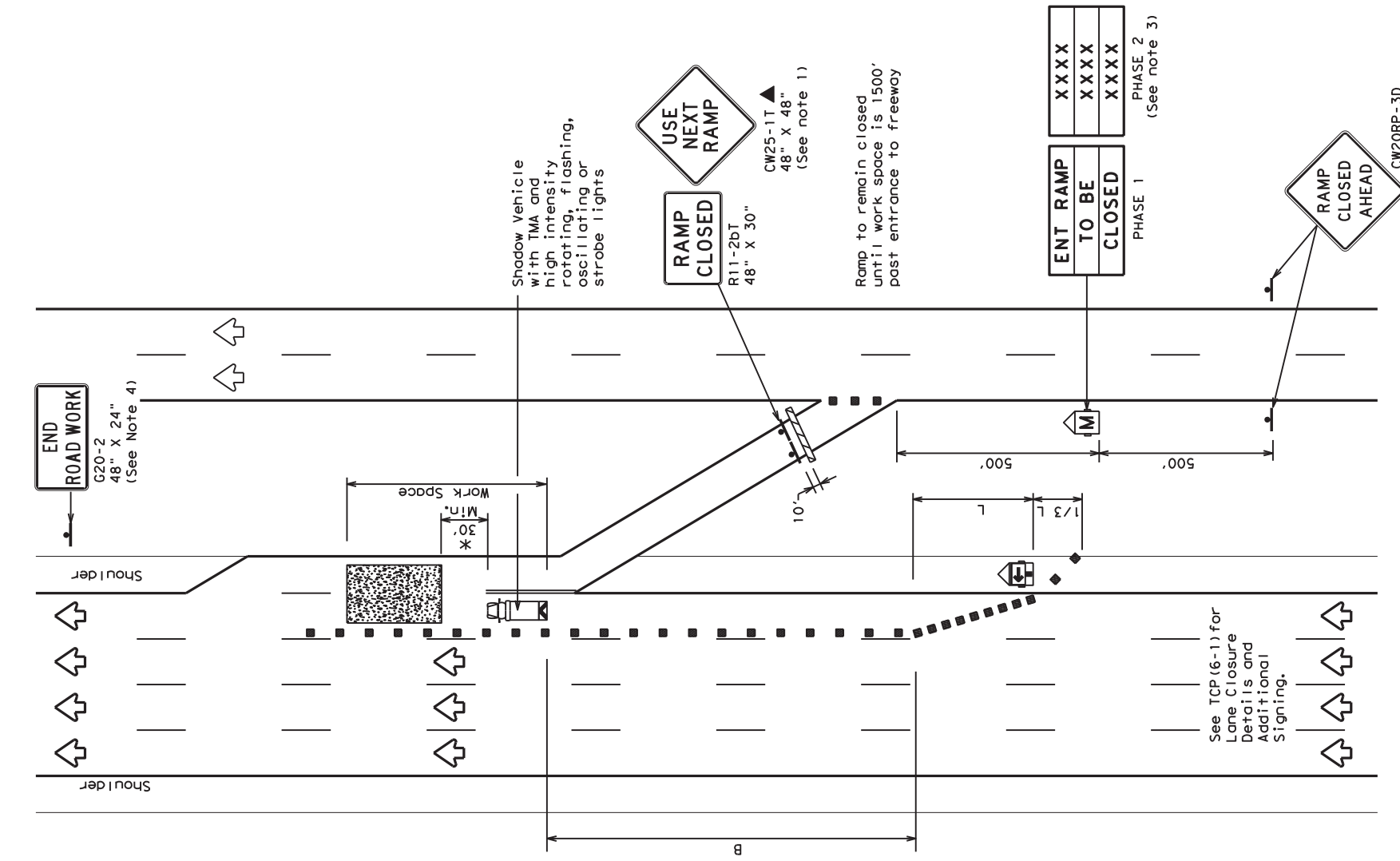
TCP (6-1) - 12

FILE: tcp6-1.dgn	DN: TXDOT	CR: TXDOT	DR: TXDOT	CK: TXDOT
8-12	CONT: FEBRUARY 1998	SECT: 001	JOB: US281, ETC.	HIGHWAY
	REVISIONS	6469 76		
	DIST:	COUNTY:		SHEET NO.:
	CRP: JIM WELLS, ETC.			28



TCP (6-2a)

**ENTRANCE RAMP OPEN  
 WORK WITHIN 500' OF RAMP**



TCP (6-2b)

**ENTRANCE RAMP CLOSED**

**LEGEND**

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

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

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

**TYPICAL USAGE**

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

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

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

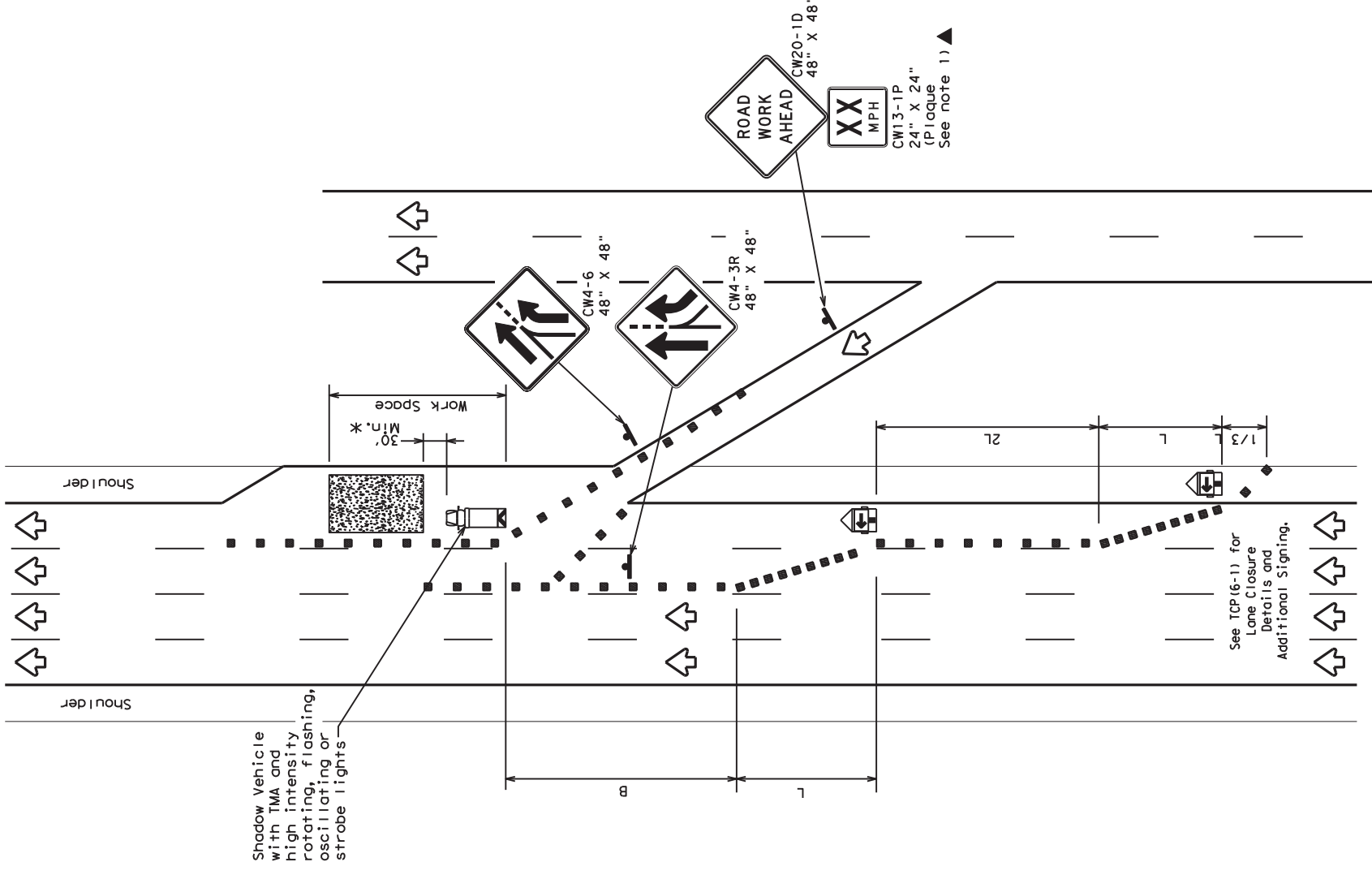
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.



**TRAFFIC CONTROL PLAN  
 WORK AREA NEAR RAMP**

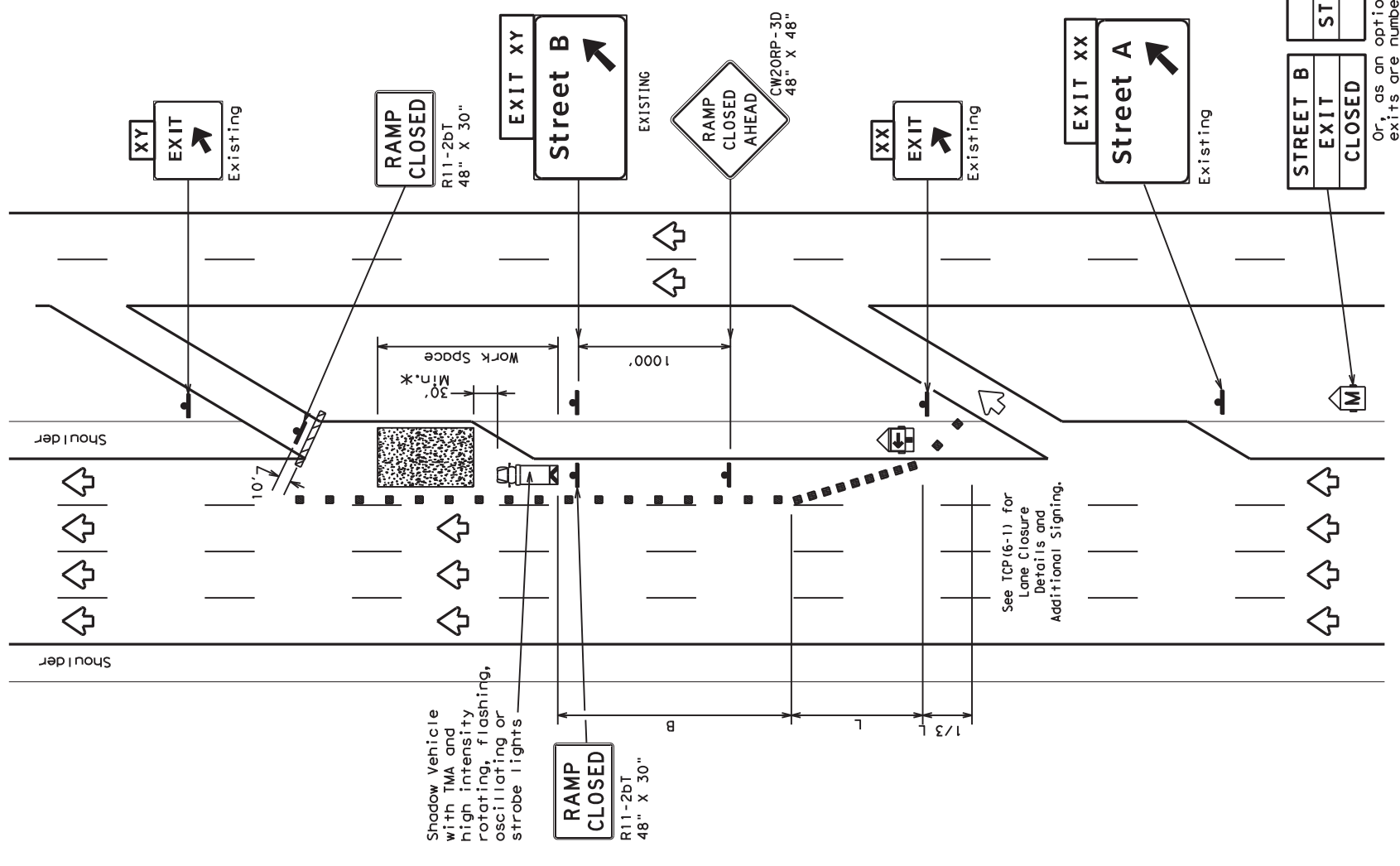
TCP (6-2) - 12

FILE:	Tcp6-2.dgn	DWG:	TxDOT	CHK:	TxDOT
DATE:	Feb 01 1994	CONT:	SECT	JOB:	HIGHWAY
REVISED:	1-97 8-98	NO.:	6469 76	001	US281, ETC.
DATE:	4-98 8-12	DIST:		COUNTY:	
		CRP:	JIM WELLS, ETC.	SHEET NO.:	29



TCP (6-3a)

**ENTRANCE RAMP OPEN**



TCP (6-3b)

**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PRIOR TO CLOSED RAMP**

**LEGEND**

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

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

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

**TYPICAL USAGE**

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

**GENERAL NOTES:**

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

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

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



**TRAFFIC CONTROL PLAN**  
**WORK AREA BEYOND RAMP**

USE STREET A EXIT	USE STREET B EXIT
USE EXIT XX	USE EXIT XY
USE EXIT XX	USE EXIT XY

Or, as an option when exits are numbered

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

**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PRIOR TO CLOSED RAMP**

TCP (6-3b)

TCP (6-3a)

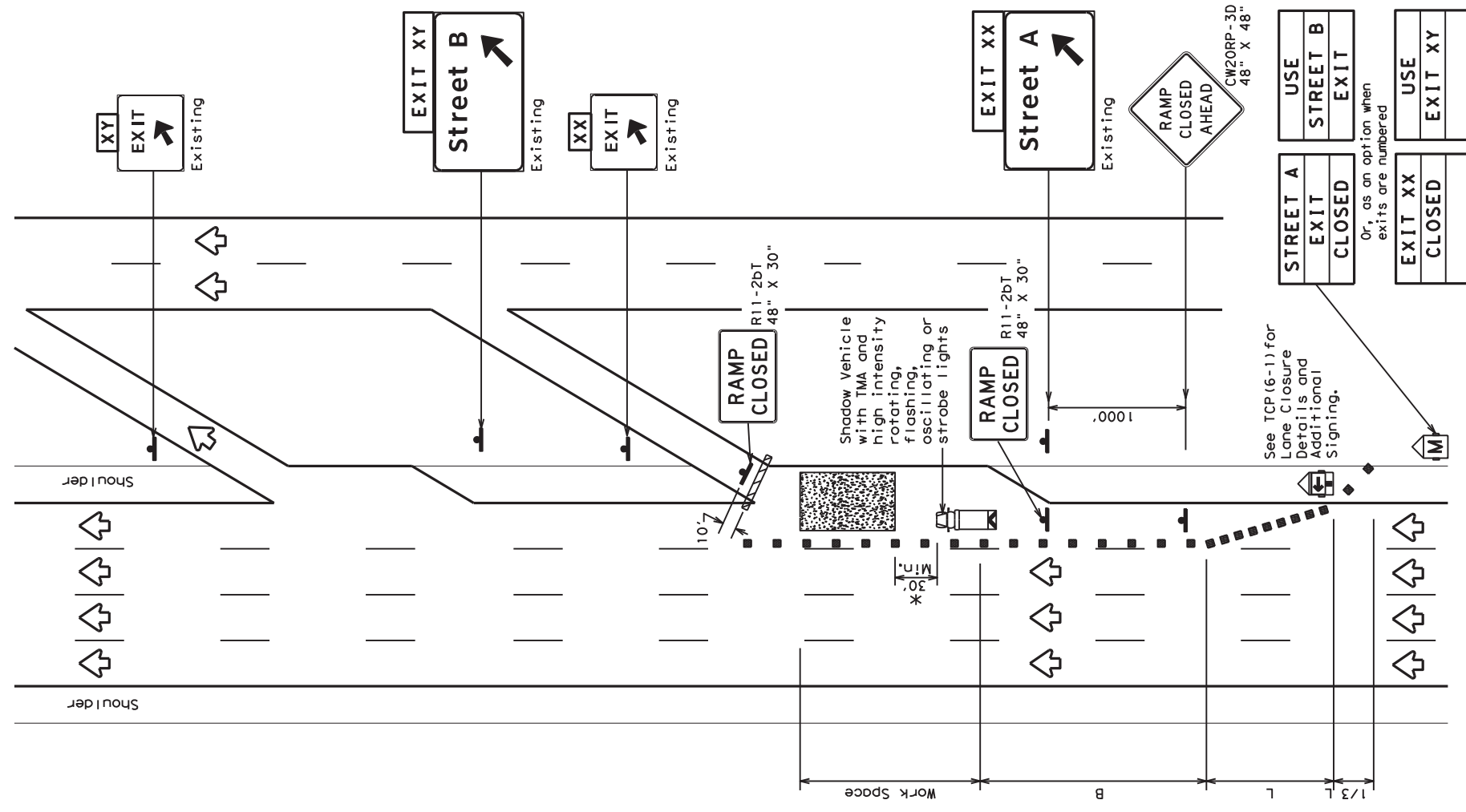
**ENTRANCE RAMP OPEN**

TCP (6-3)

**TCP (6-3) - 12**

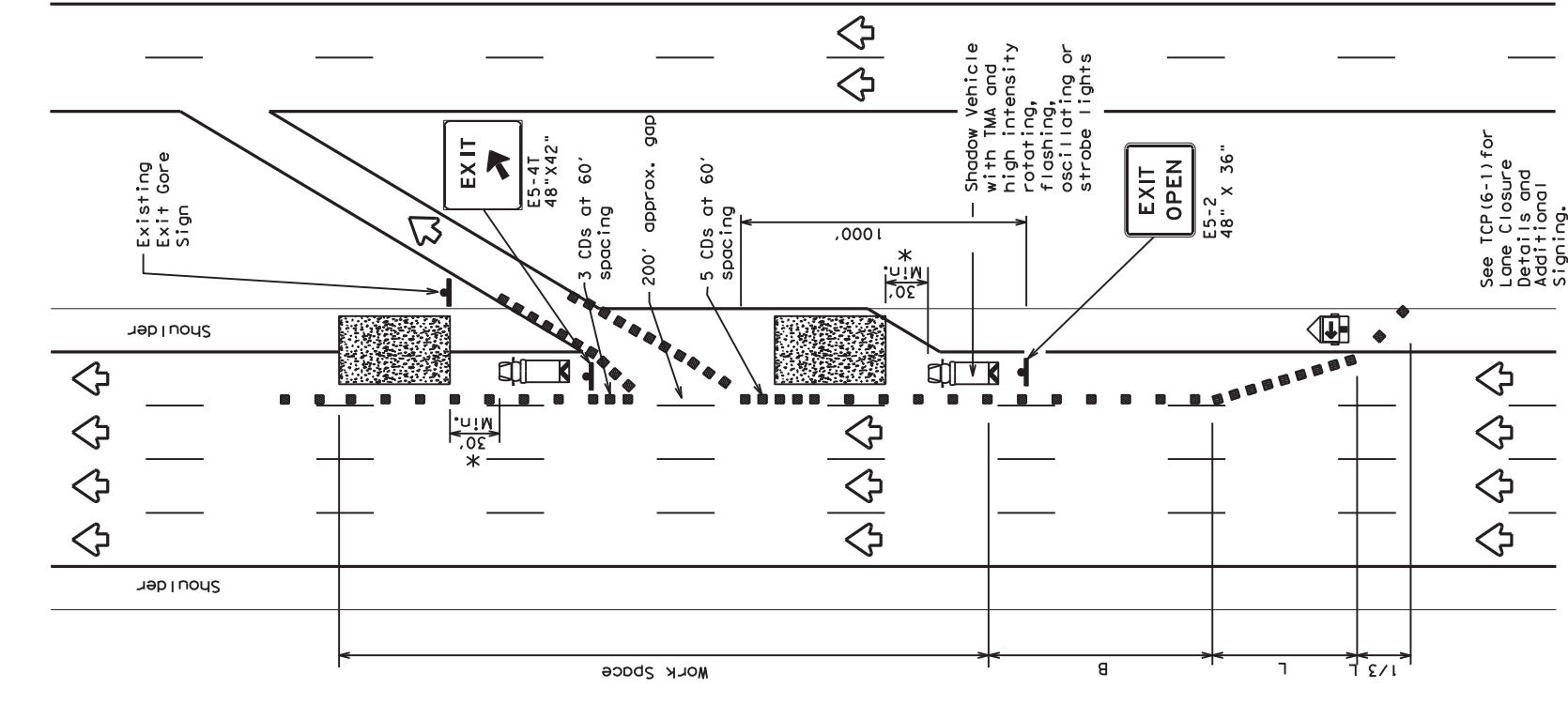
FILE: tcp6-3.dgn	DN: TXDOT	CK: TXDOT	CK: TXDOT
① TXDOT	FEBRUARY 1994	CONT SECT	JOB
1-97 8-98	REVISIONS	6469 76	001
4-98 8-12		US281, ETC.	
	DIST	COUNTY	SHEET NO.
	CRP	JIM WELLS, ETC.	30





TCP (6-4a)

**EXIT RAMP CLOSED**  
**TRAFFIC EXITS PAST CLOSED RAMP**



TCP (6-4b)

**EXIT RAMP OPEN**

**LEGEND**

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

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

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

**TYPICAL USAGE**

MOBILE	SHORT 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.
- See BC Standards for sign details.

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

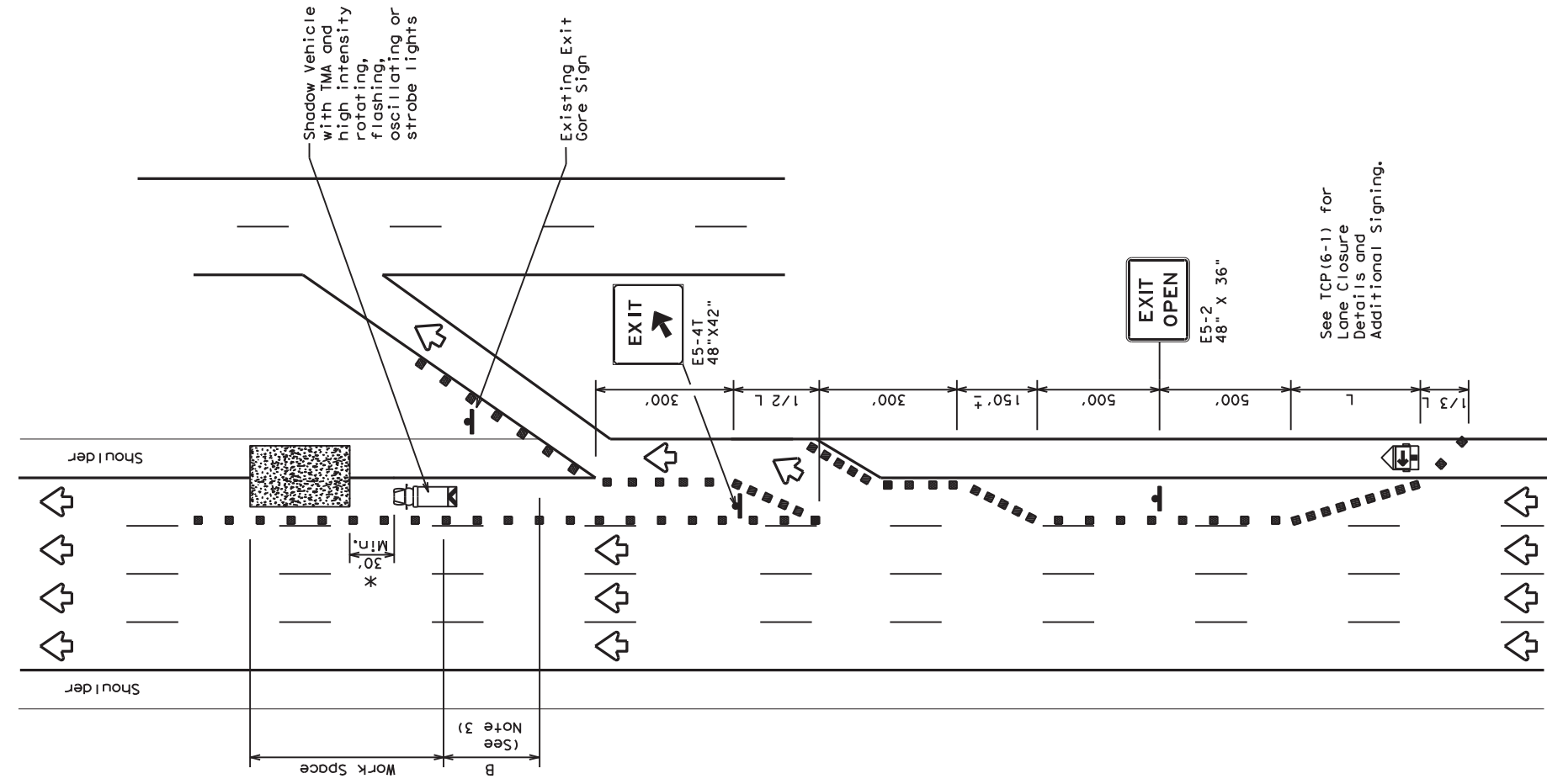
Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.



**TRAFFIC CONTROL PLAN**  
**WORK AREA AT EXIT RAMP**

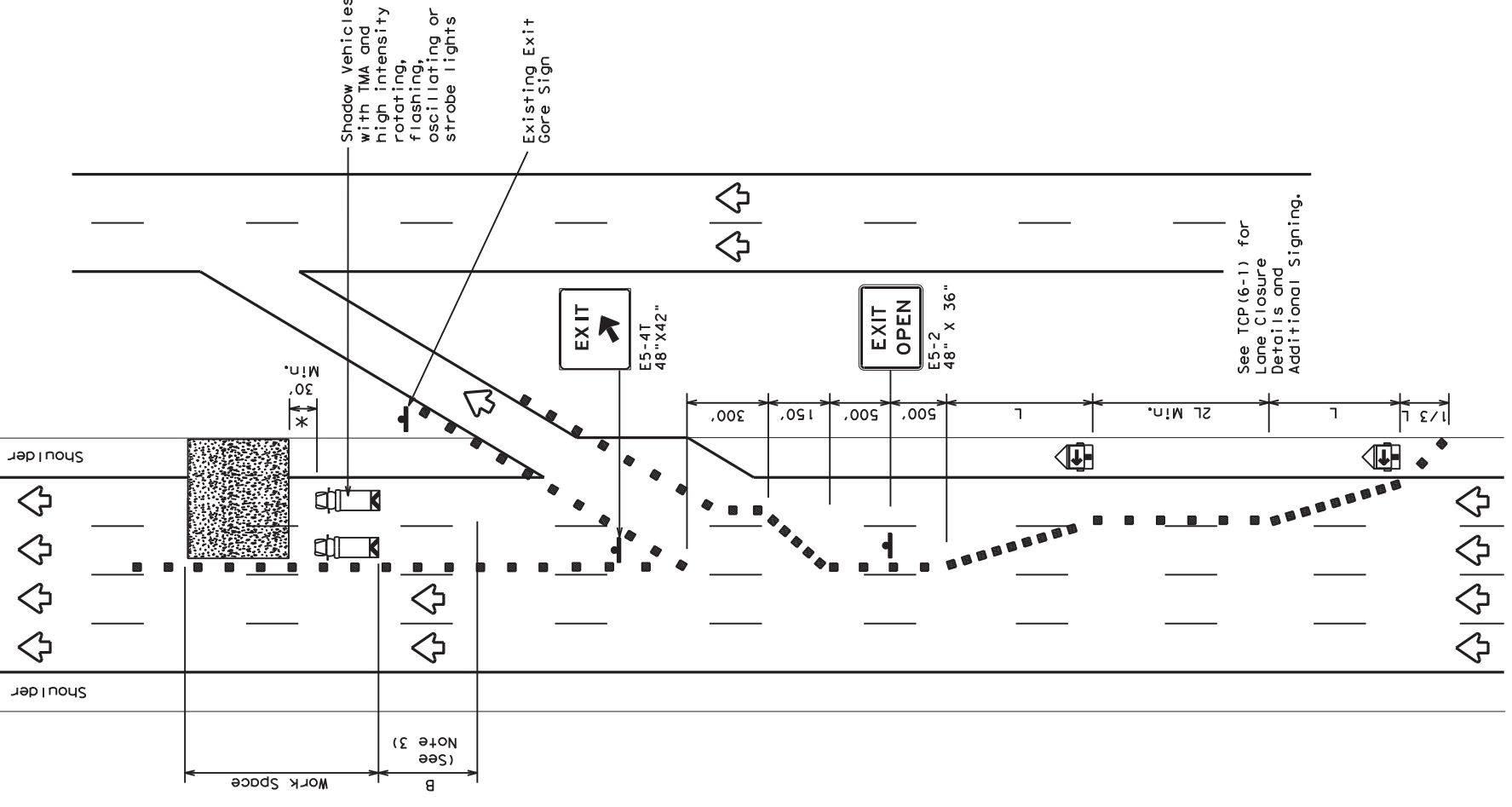
TCP (6-4) - 12

FILE: T:\CP-1000\CP-1000.dgn	DWG: TxDOT	CHK: TxDOT	CHK: TxDOT
DATE: 1-97 8-98	REVISED BY: FEBURDARY 1994	CONT: TxDOT	SEC: TxDOT
4-98 8-12	REVISIONS: 6469 76	JOB: 001	US281, ETC.
	DIST: CRP	COUNTY: JIM WELLS, ETC.	SHEET NO: 31



TCP (6-5a)

**EXIT RAMP OPEN**



TCP (6-5b)

**EXIT RAMP OPEN**

**TWO LANE CLOSURE WITHIN 1500' PAST EXIT 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 "L"		Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	12' Tangent	On a Taper	On a Tangent	
45	L = WS	450'	540'	45'	90'	195'
50		500'	600'	50'	100'	240'
55	L = WS	550'	660'	55'	110'	295'
60		600'	720'	60'	120'	350'
65	L = WS	650'	780'	65'	130'	410'
70		700'	840'	70'	140'	475'
75	L = WS	750'	900'	75'	150'	540'
80		800'	960'	80'	160'	615'

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

**TYPICAL USAGE**

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

**GENERAL NOTES**

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- See BC standards for sign details.
- If adequate longitudinal buffer length "B" does not exist between the work space and the exit ramp, consideration should be given to closing the ramp.

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

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

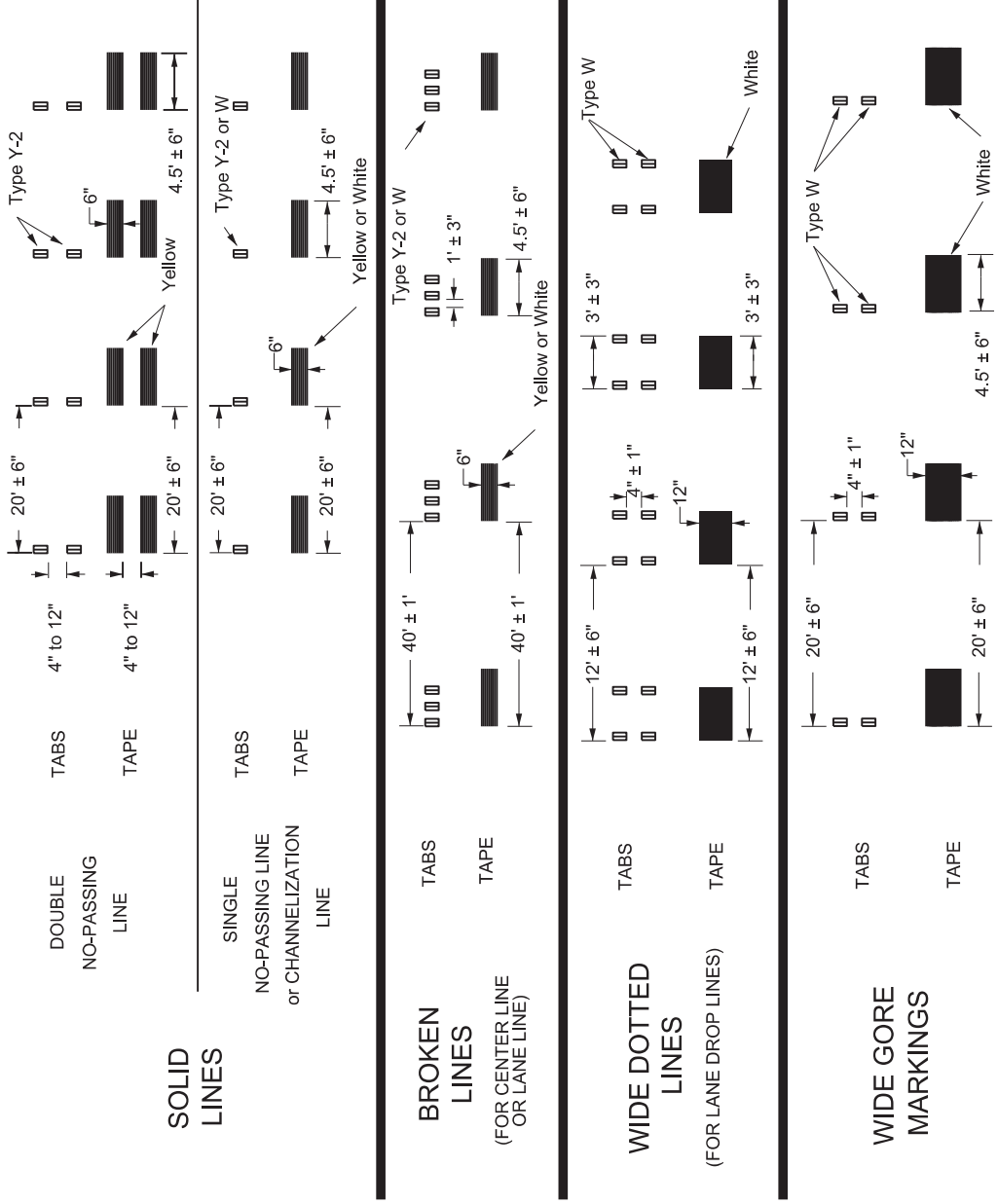


**TRAFFIC CONTROL PLAN  
 WORK AREA BEYOND EXIT RAMP**

TCP (6-5) - 12

FILE:	tcp6-5.dgn	DN:	TxDOT	DR:	TxDOT	CK:	TxDOT
CONT:	REVISIONS	SECT:	6469	JOB:	001	US281, ETC.	
DIST:	4-98	COUNTY:					
CRP:	JIM WELLS, ETC.	SHEET NO.:	32				

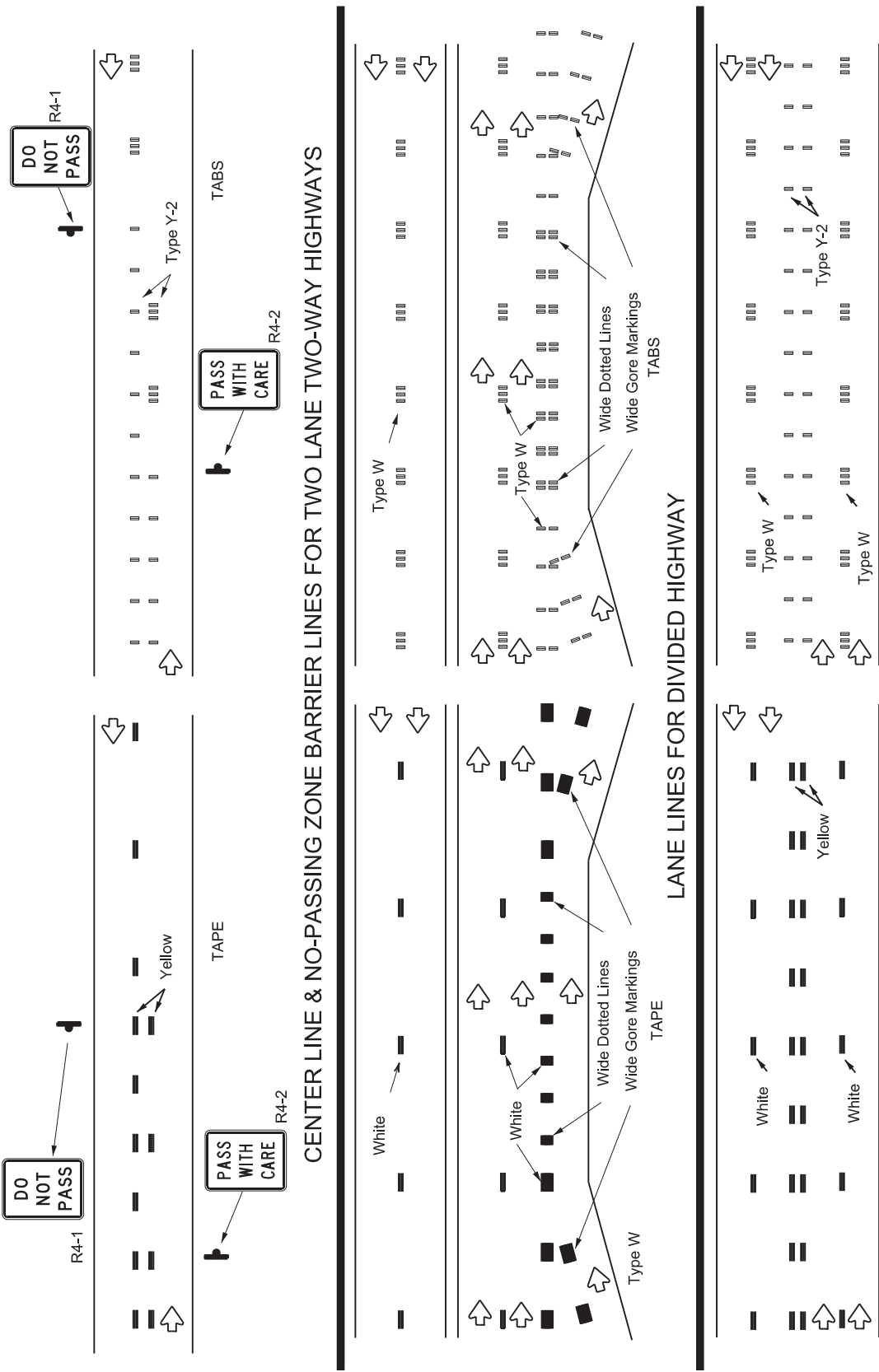
## WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



### NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible reflective roadway marker tabs unless otherwise specified elsewhere in plans.
  - Short term pavement markings shall NOT be used to simulate edge lines.
  - Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
  - Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
  - No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
  - For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
  - For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
  - For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.
- TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)**
- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
  - TABS shall meet requirements of Departmental Material Specification DMS-8242.
  - When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
  - No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

## WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



### 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](http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm)

**Texas Department of Transportation**

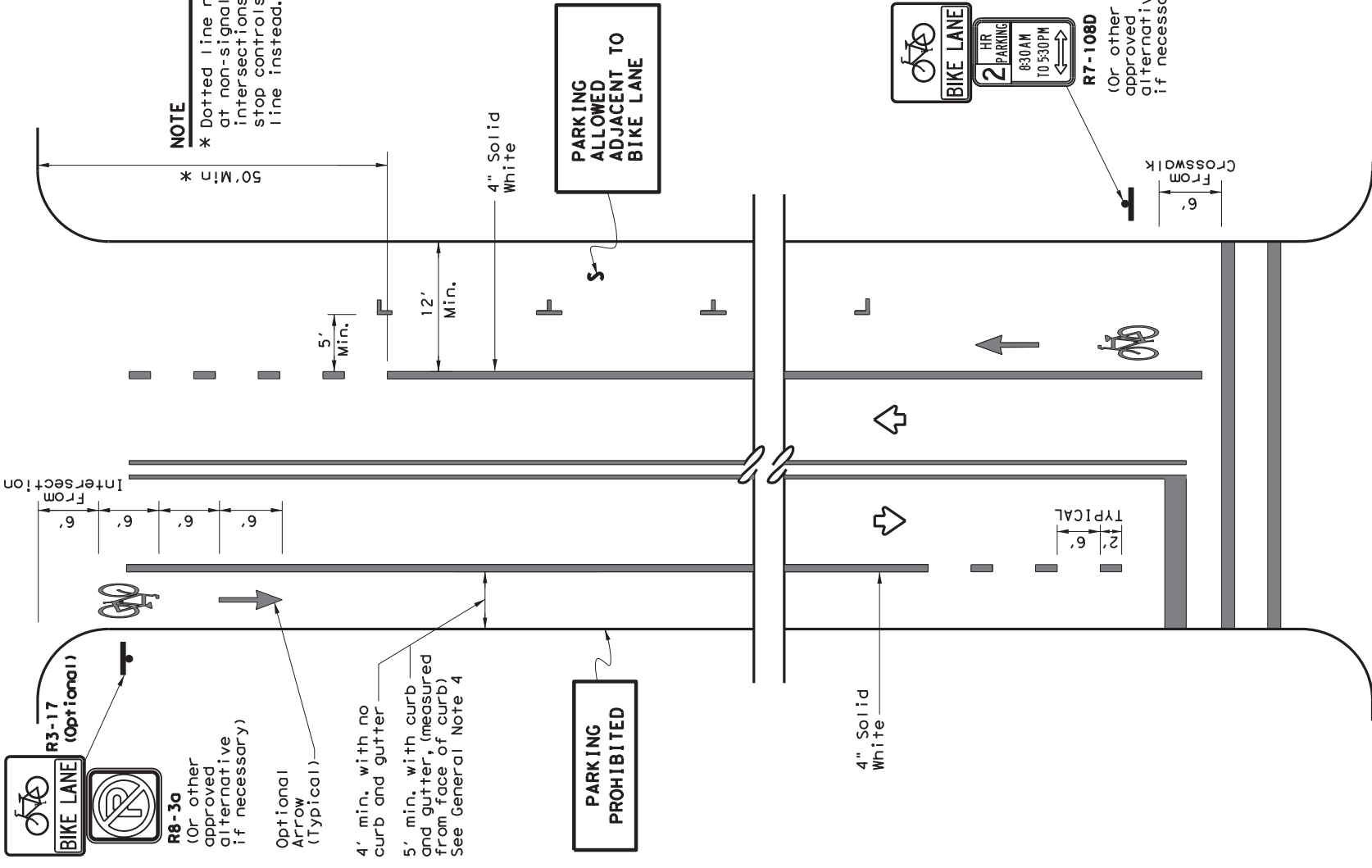
**WORK ZONE SHORT TERM PAVEMENT MARKINGS**

**WZ(STPM)-23**

FILE:	wzstpm-23.dgn	DNK:	OK
© TXDOT	February 2023	REVISED:	6469 76
4-82	7-13	DIST:	001
1-87	2-23	CRP:	JIM WELLS, ETC.
SHEET NO.		33	



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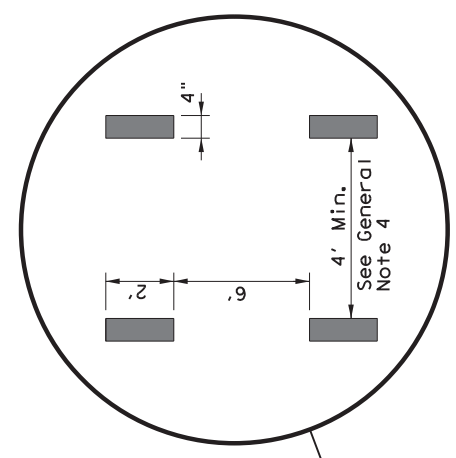
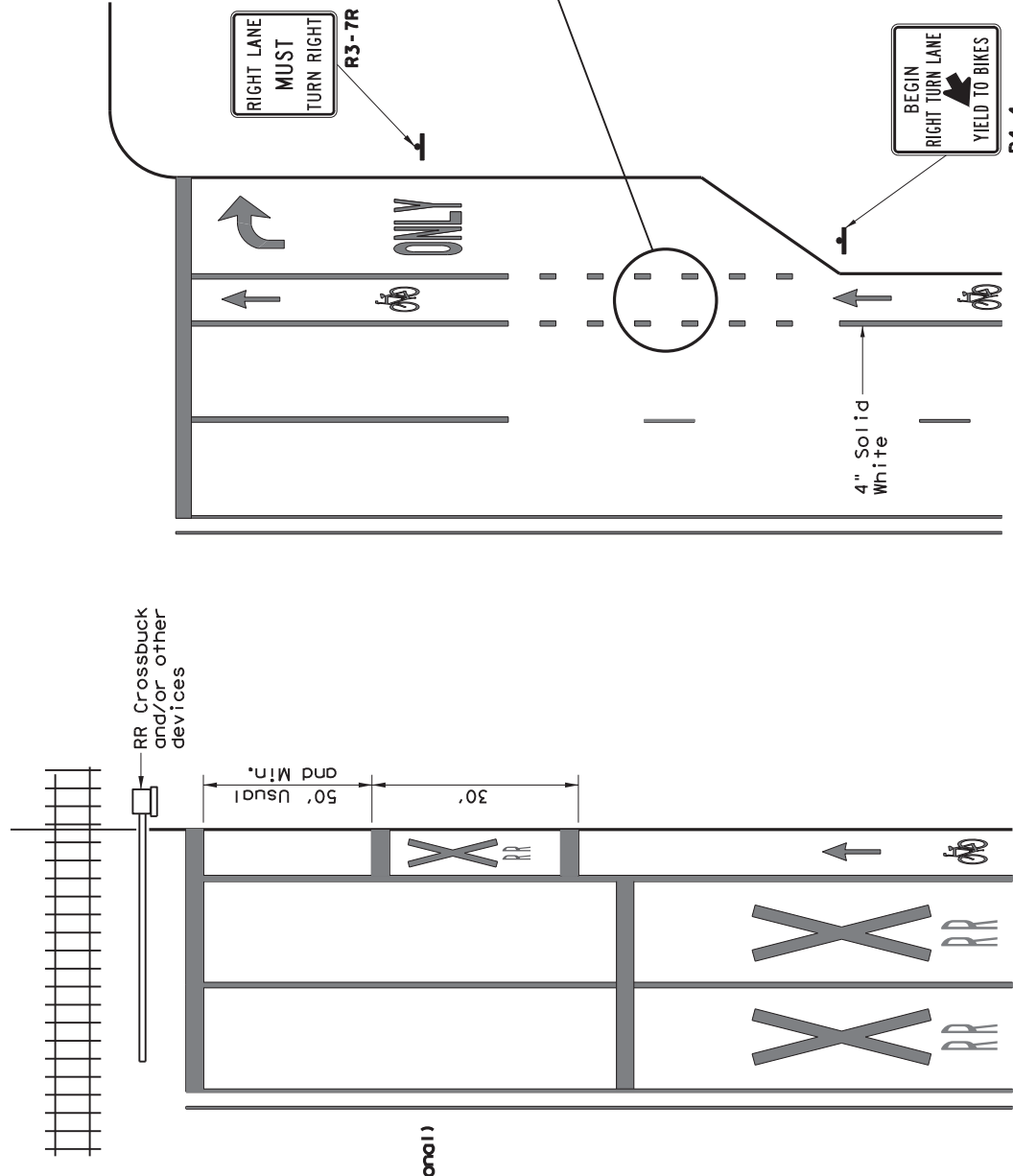


**GENERAL NOTES**

- All bicycle lane pavement markings shall be white unless otherwise noted.
- All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
- Exact sign placement and details are shown elsewhere in the plans.
- The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
- Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
- The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
- The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290

LEGEND	
	Sign
	Traffic Flow



(See RCPM Standard for travel lane details)

Texas Department of Transportation  
Traffic Operations Division

## BICYCLE LANE PAVEMENT MARKINGS

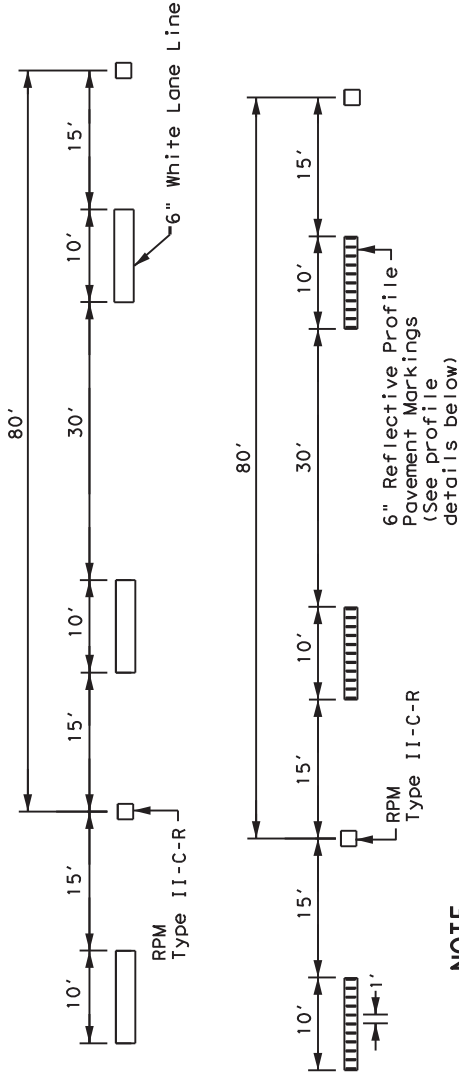
BLPM-10

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© TxDOT	May 2010	REVISONS
DN: TxDOT	CK: TxDOT	DM: TxDOT
CRP	JIM WELLS, ETC.	SHEET NO. 34
CONT	SECT	JOB
6469 76	001	US281, ETC.
DIST	COUNTY	

**RAILROAD CROSSING APPROACH**

**RIGHT TURN ONLY LANE**

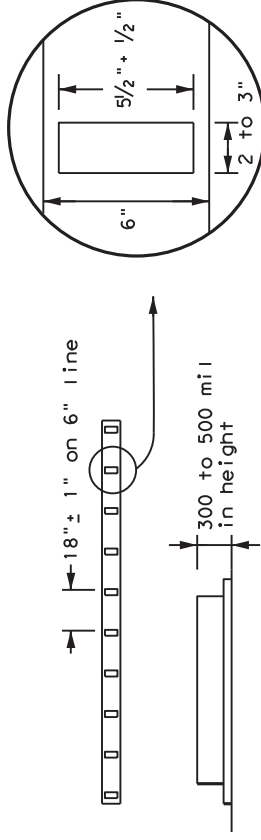
**TWO-WAY STREET**



**NOTE**

ReflectORIZED raised pavement markers Type II-C-R shall be spaced on 80' centers with the clear face toward normal traffic and the red face toward wrong way traffic. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.

**TRAFFIC LANE LINES PAVEMENT MARKING**

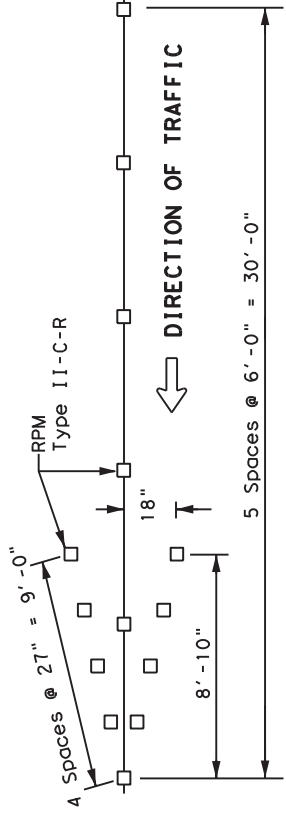


Standard 6" Profile Detail

**NOTE**

Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

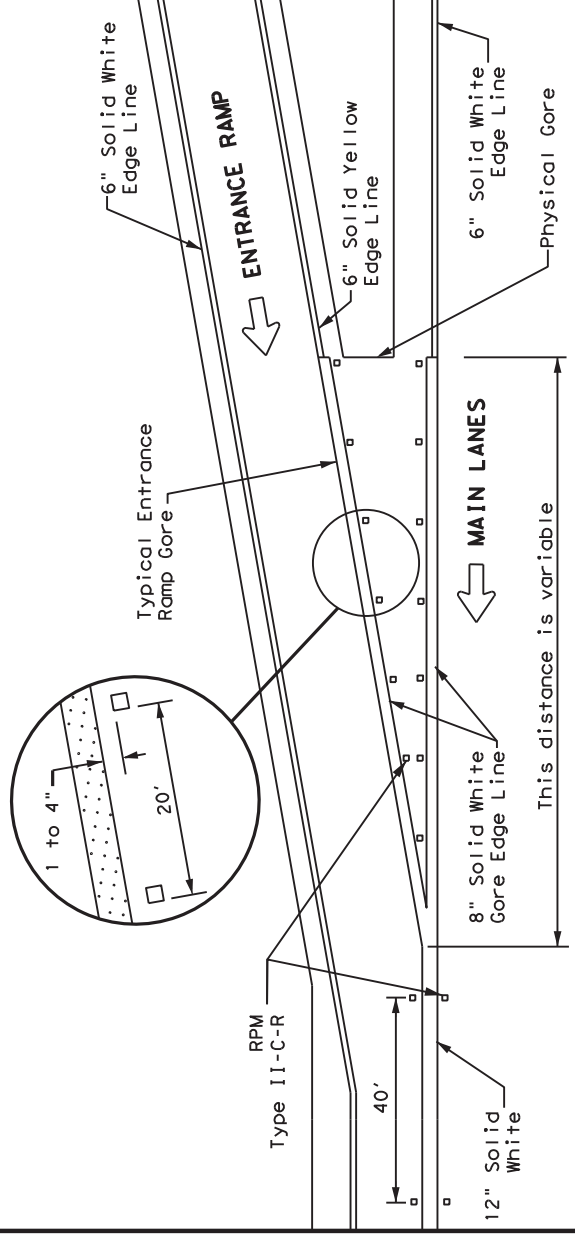
**EDGE LINE PAVEMENT MARKINGS**



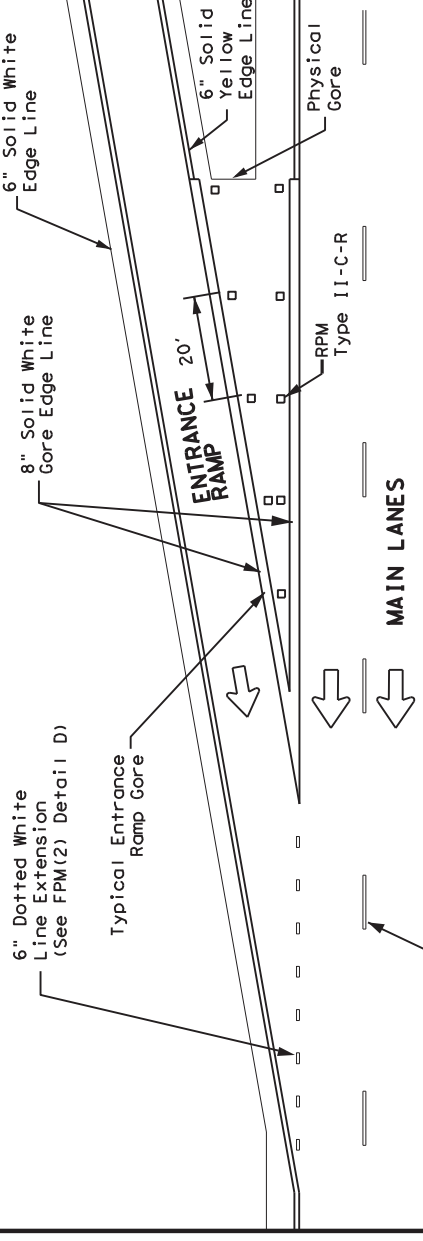
**NOTES**

1. ReflectORIZED raised pavement markers Type-II-C-R in the wrong way arrow shall have the clear face toward normal traffic and the red face toward the wrong way traffic.
2. Red reflectORIZED wrong way arrows, not to exceed two, may be placed on exit ramps. Locations of the arrows shall be as shown in the plans or as directed by the engineer.

**WRONG WAY ARROW**



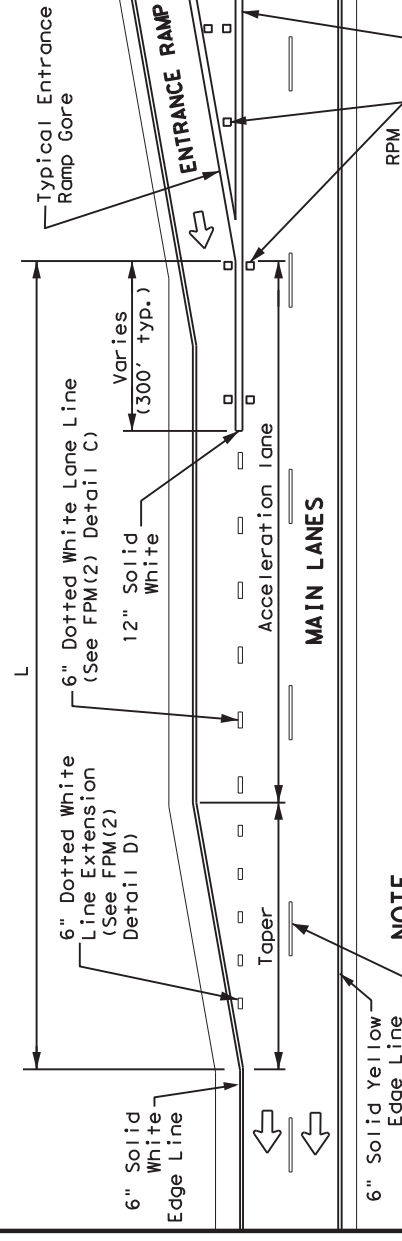
**TYPICAL ENTRANCE RAMP GORE MARKING**



**NOTE**

See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

**TAPERED ACCELERATION LANE**



**NOTE**

See the Roadway Design Manual Chapter 3 to determine lengths of the acceleration lane and taper.

**PARALLEL ACCELERATION LANE**

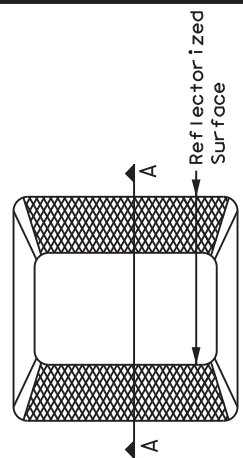
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

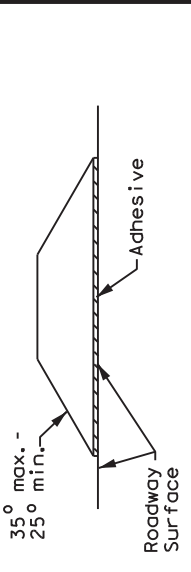
LEGEND	
	Traffic flow
	Pavement marking arrows (white)
	ReflectORIZED Raised Markers (RPM) Type II-C-R

**GENERAL NOTE**

On concrete pavements the raised pavement markers shall be placed to one side of the longitudinal joints.



Type II (Top View)



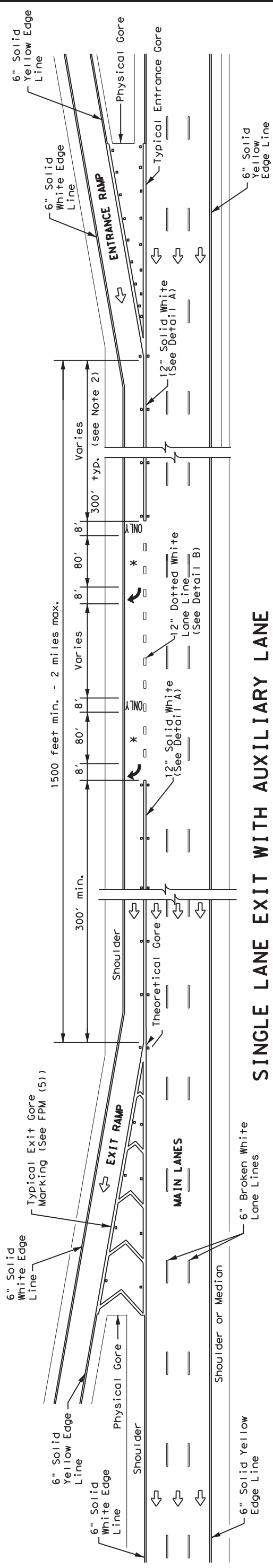
**SECTION A**

**REFLECTORIZED RAISED PAVEMENT MARKER (RPM)**



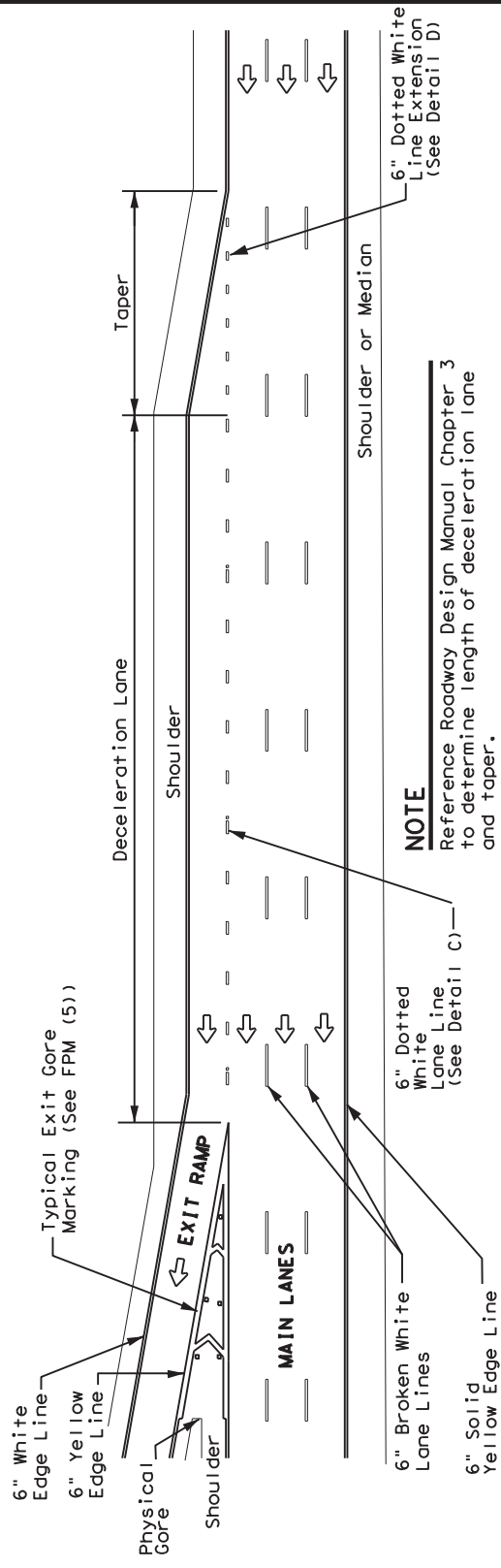
**TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS FPM(1) -22**

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CONT: TxDOT	SECT: 001	JOB: 6469 76	HIGHWAY: US281, ETC.
REV: 5-74	REV: 8-00	REV: 2-12	REV: 10-22
DIST: 4-92	DIST: 2-08	DIST: 10-22	DIST: 5-00
CITY: 5-00	CITY: 2-10	CITY: 5-00	CITY: 2-10
COUNTY: CRP	COUNTY: JIM WELLS, ETC.	COUNTY: CRP	COUNTY: JIM WELLS, ETC.
SHEET NO.: 23A	SHEET NO.: 35	SHEET NO.: 23A	SHEET NO.: 35



### SINGLE LANE EXIT WITH AUXILIARY LANE

(See Note 2)



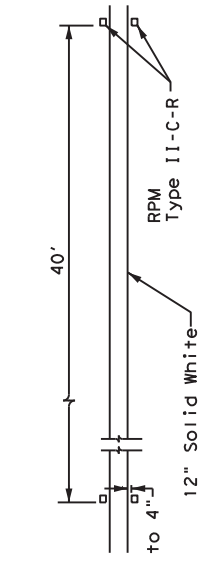
### PARALLEL DECELERATION LANE

#### NOTE

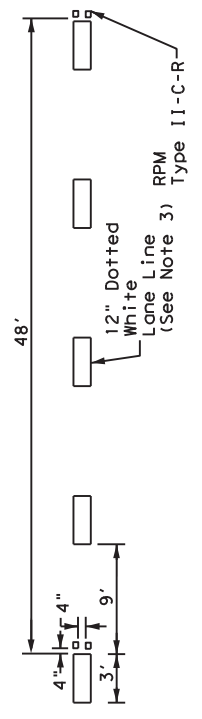
Reference Roadway Design Manual Chapter 3 to determine if tapered deceleration lane may be used.

#### NOTE

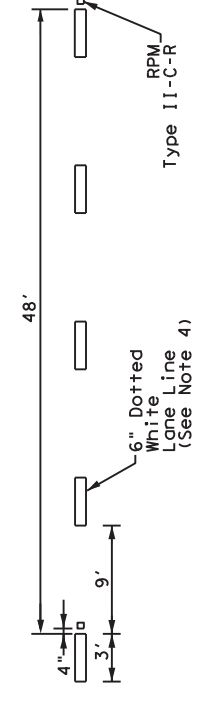
Reference Roadway Design Manual Chapter 3 to determine length of deceleration lane and taper.



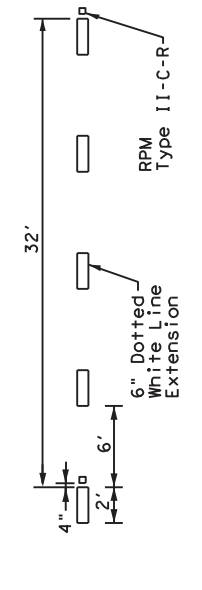
### DETAIL A



### DETAIL B



### DETAIL C



### DETAIL D

#### GENERAL NOTES

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Normal (6") dotted lane line (see Detail C) is used at parallel acceleration and deceleration lanes.
5. See FPM(1) for traffic lane line pavement marking details.

#### LEGEND

↔	Traffic flow
↘	Pavement marking arrows (white)
□	ReflectORIZED Raised Markers (RPM) Type II-C-R
*	Arrow markings are optional, however "ONLY" is required if arrow is used

#### 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.

Texas Department of Transportation  
Traffic Safety Division Standard

## TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS ENTRANCE AND EXIT RAMP

### FPM(2) - 22

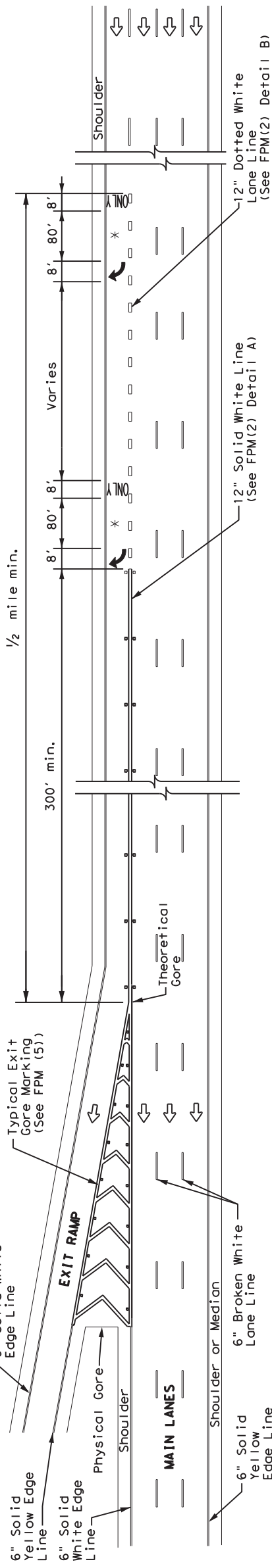
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 DWT: CK: DMR: CK:  
 TXDOT October 2022  
 CONT SECT JOB HIGHWAY  
 6469 76 001 US281, ETC.  
 REVISIONS  
 2-77 5-00 2-12  
 4-92 8-00 10-22  
 CRP JIM WELLS, ETC. SHEET NO. 36



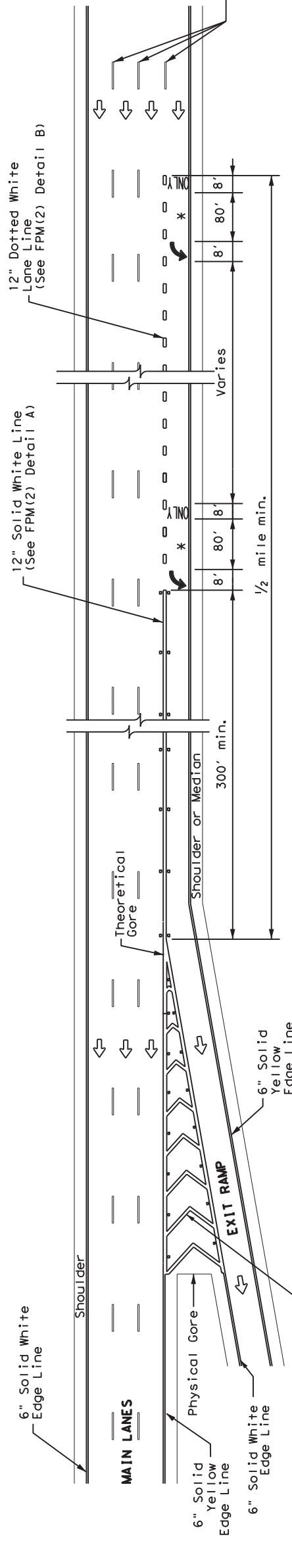
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

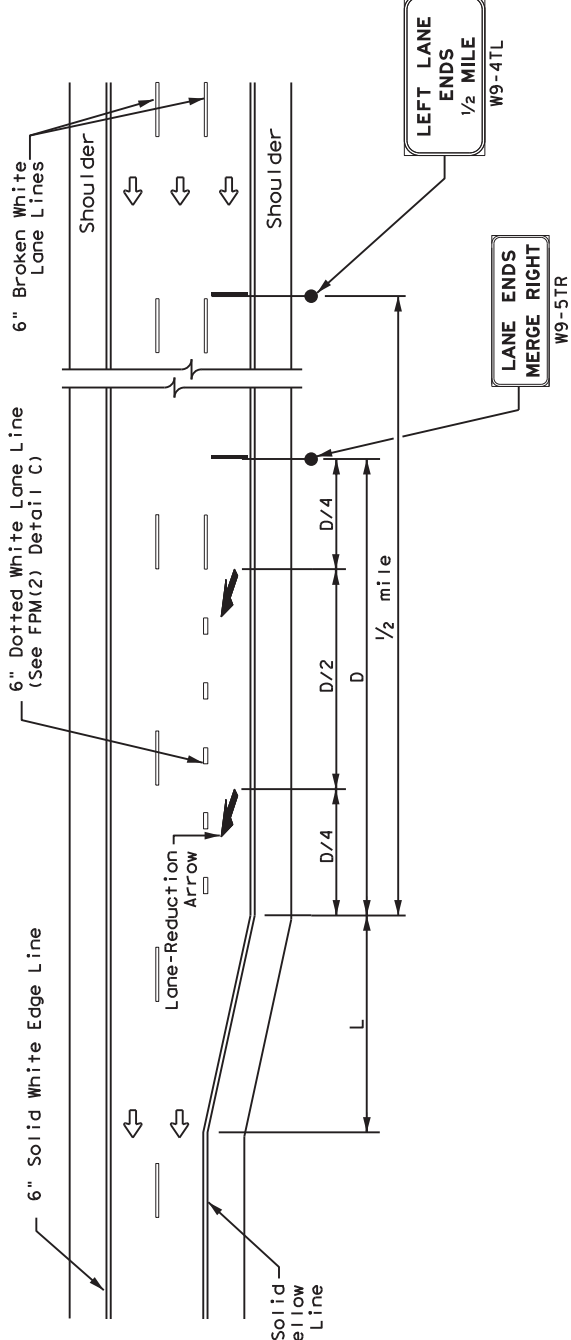
LEGEND	
↔	Traffic flow
↗	Pavement marking arrows (white)
□	ReflectORIZED Raised Markers (RPM) Type II-C-R
*	Arrow markings are optional, however "ONLY" is required if arrow is used



**SINGLE LANE EXIT - LANE DROP OR EXIT ONLY**



**SINGLE LANE EXIT - LANE DROP OR EXIT ONLY (LEFT SIDE)**



**FREEWAY LANE REDUCTION**

**GENERAL NOTES**

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
5. See FPM(1) for traffic lane line pavement marking details.



**TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS SINGLE LANE DROP (EXIT ONLY) AND LANE REDUCTION DETAILS**

**FPM(3) - 22**

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PROJECT: TxDOT October 2022	SECTION: 6469 76	COUNTY: 001	DIST: 001
DATE: 4-92	REV: 2-10	DATE: 5-00	REV: 2-12
DATE: 8-00	REV: 10-22	DATE: 8-00	REV: 10-22
PROJECT: CRP	DESIGNER: JIM WELLS, ETC.	SHEET NO: 37	TOTAL SHEETS: 37

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
45 MPH	775	
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	L=WS
70 MPH	1,250	
75 MPH	1,350	
80 MPH	1,500	
85 MPH	1,625	

**NOTES**

1. Large Guide signs shall conform to the TxDOT Freeway Signing Handbook.
2. 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.
3. Arrows and sign details can be found in the Standard Highway Sign Designs for Texas (SHSD) at <http://www.txdot.gov>.
4. These guidelines may also be applied to the design of a right side lane reduction. Use LANE ENDS MERGE LEFT (W9-5TL) and RIGHT LANE ENDS 1/2 MILE (W9-4TR) signs in lieu of what is shown on drawing.

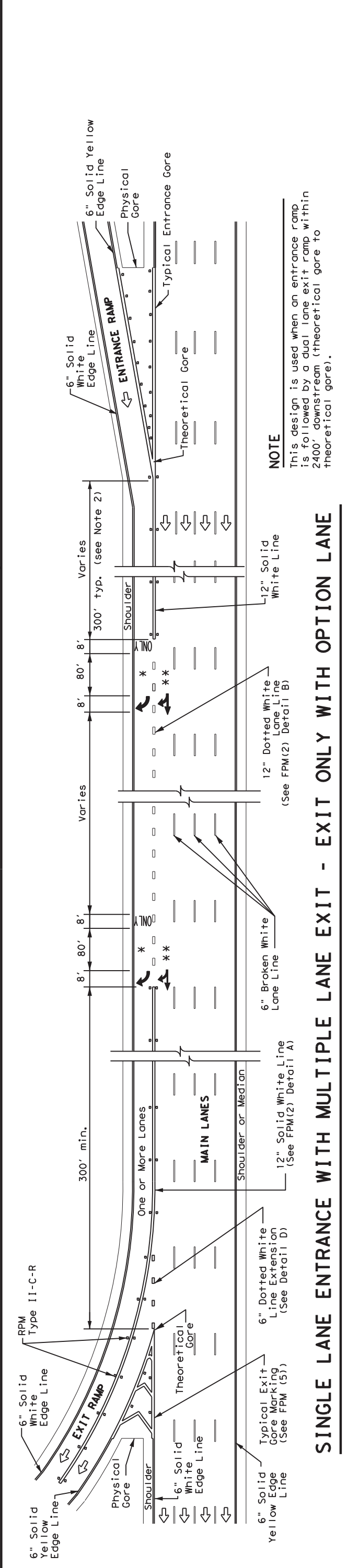
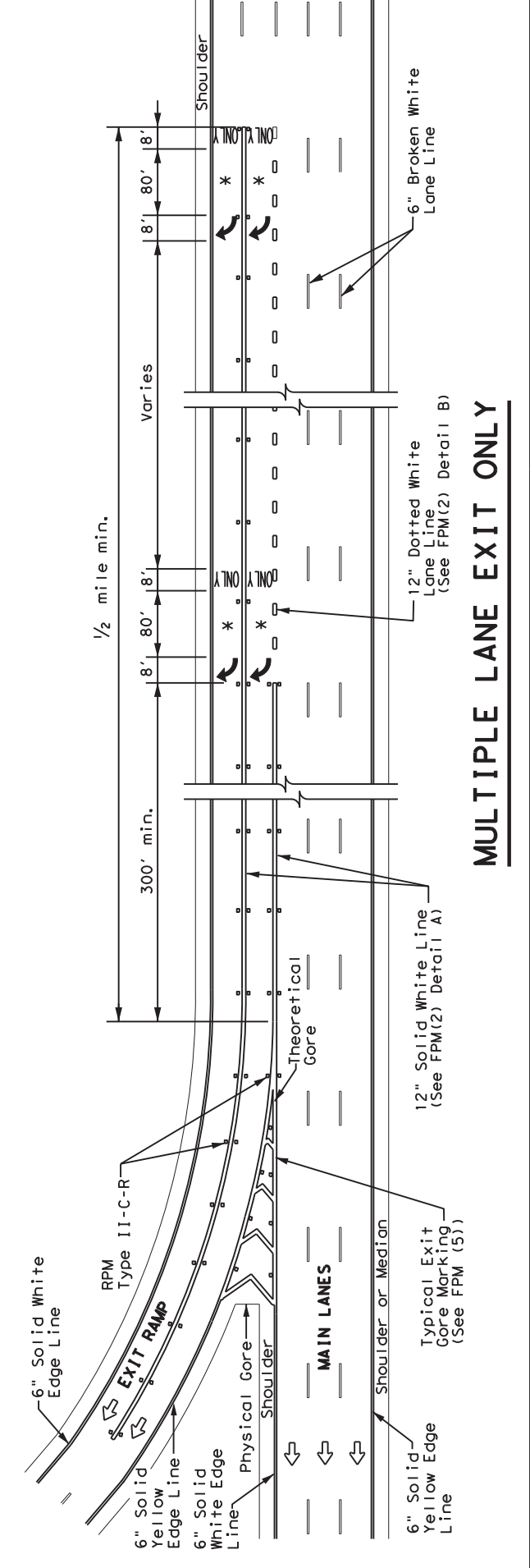
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

LEGEND	
↔	Traffic Flow
◻	ReflectORIZED Raised Markers (RPM) Type II-C-R
↶	Pavement marking arrow (white)
*	Arrow markings are optional, however "ONLY" is required if arrow is used
**	Arrow markings are optional

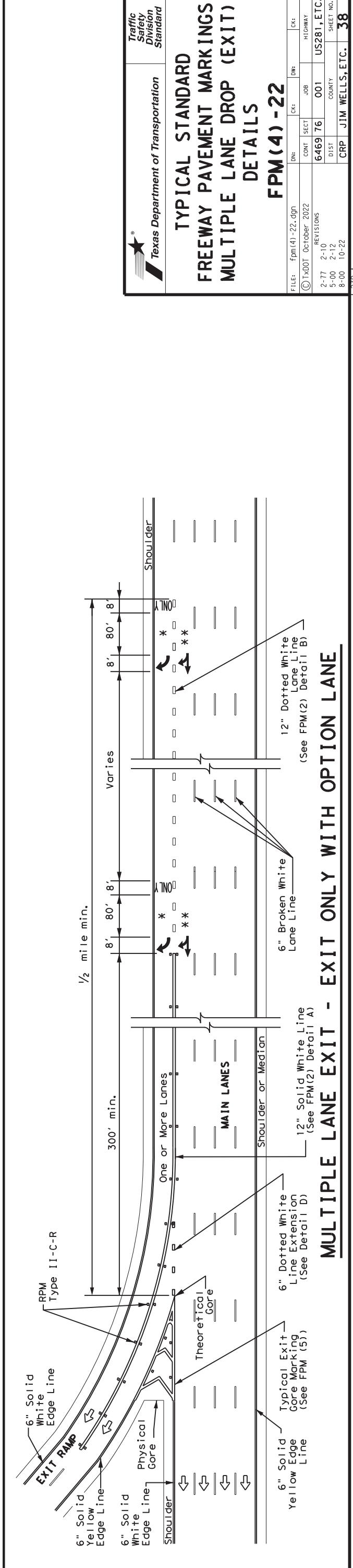
**GENERAL NOTES**

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
5. See FPM(1) for traffic lane line pavement marking details.



**NOTE**

This design is used when an entrance ramp is followed by a dual lane exit ramp within 2400' downstream (theoretical gore to theoretical gore).



Texas Department of Transportation  
Traffic Safety Division Standard

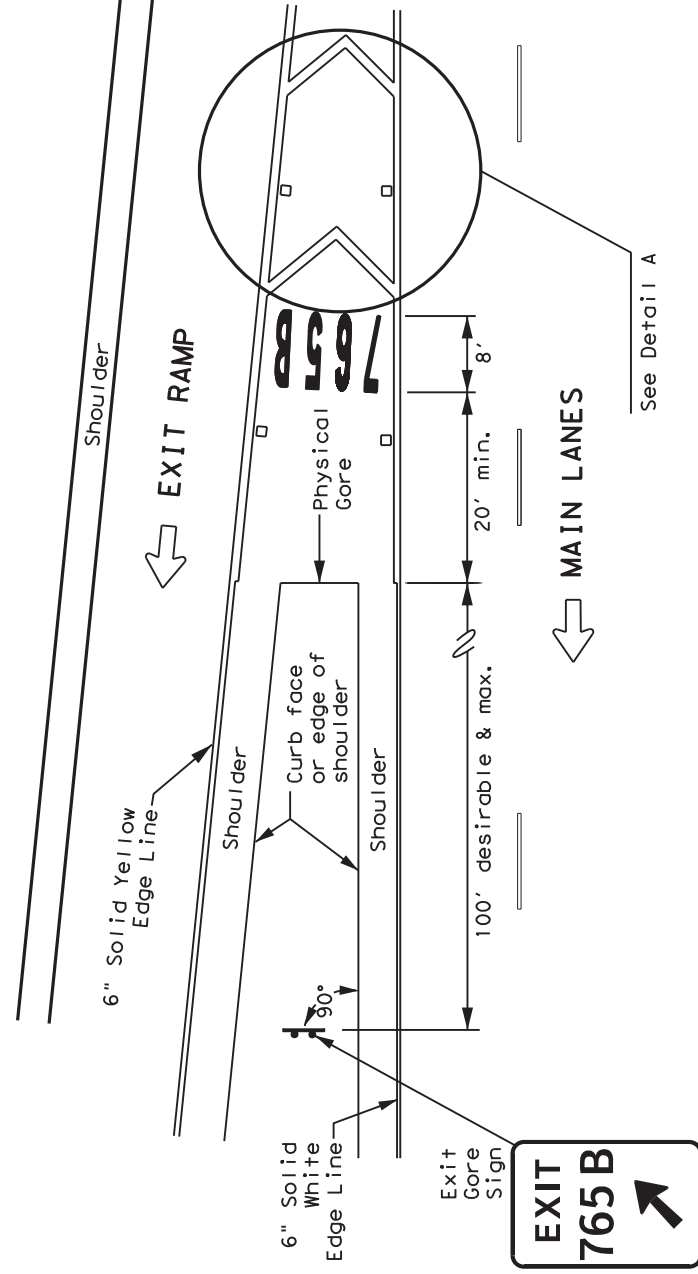
**TYPICAL STANDARD FREEWAY PAVEMENT MARKINGS MULTIPLE LANE DROP (EXIT) DETAILS**

**FPM(4) - 22**

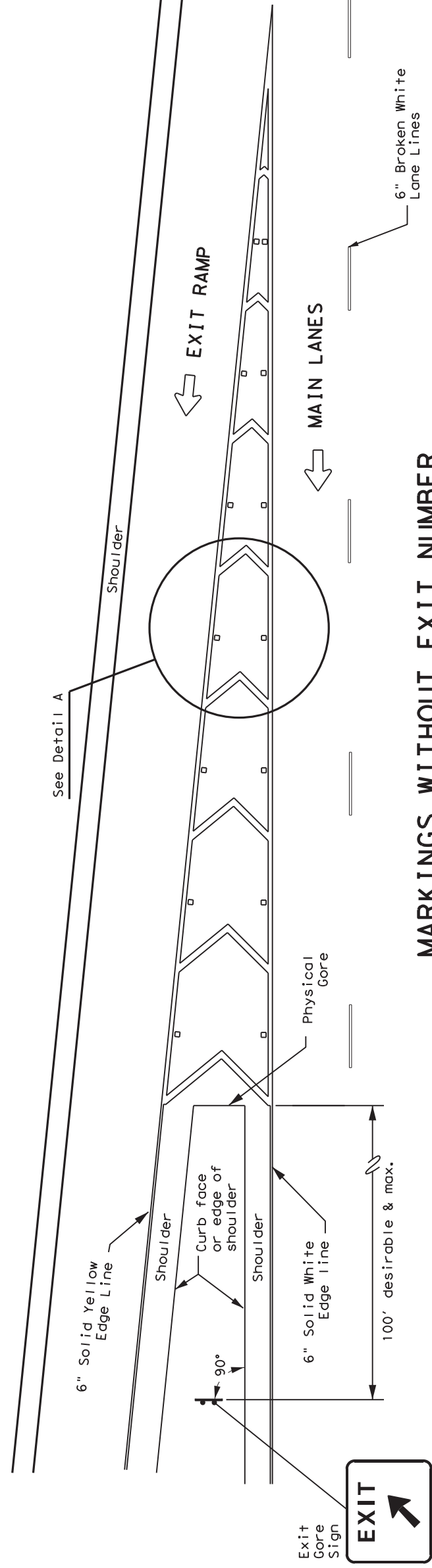
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	8-00		10-22	DIST:	001
				COUNTY:	
				CRP:	JIM WELLS, ETC.
				SHEET NO.:	<b>38</b>

**EXIT NUMBER PAVEMENT MARKING NOTES**

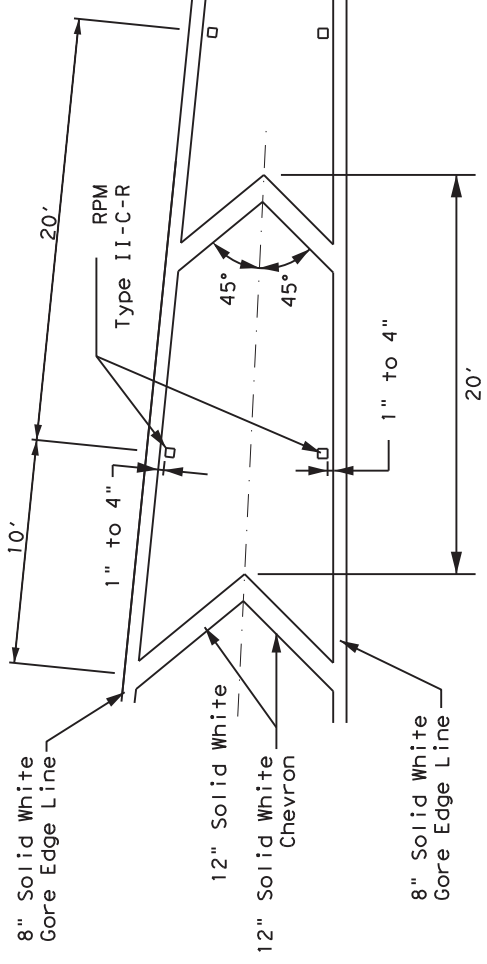
1. Minimum 8 foot white exit number pavement markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Section 12 at <http://www.txdot.gov>



**MARKINGS WITH EXIT NUMBER**



**MARKINGS WITHOUT EXIT NUMBER**



**NOTES**

1. Raised pavement markers shall be centered between each chevron or neutral area line.
2. For more information, see ReflectORIZED Raised Pavement Marker Detail.

**DETAIL A**

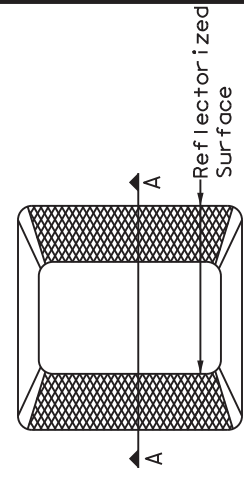
**MATERIAL SPECIFICATIONS**

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

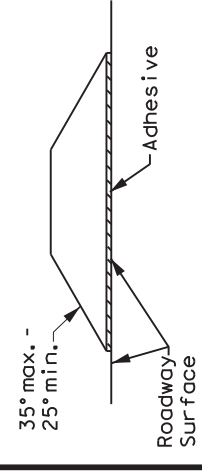
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

**LEGEND**

	Traffic flow
	ReflectORIZED Raised Markers (RPM) Type II-C-R



Type II (Top View)



**SECTION A**

**REFLECTORIZED RAISED PAVEMENT MARKER (RPM)**

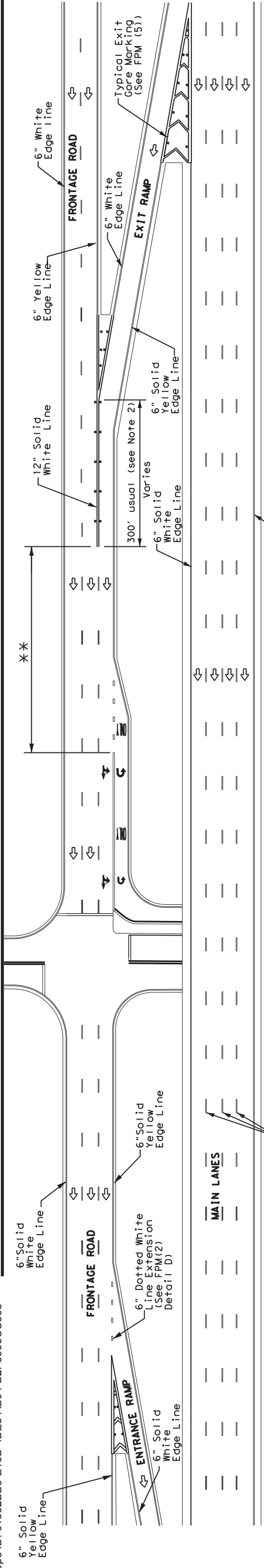


**EXIT GORE PAVEMENT MARKINGS**

FPM(5) - 22

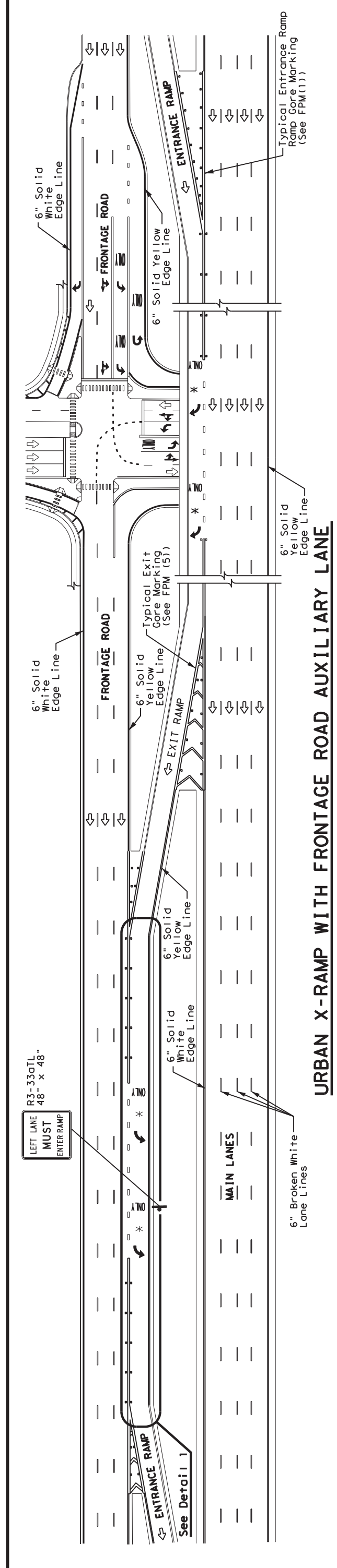
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DATE:	October 2022	REVISED:	DATE:	10-22
PROJECT:	6469 76	JOB:	001	US281, ETC.
DIST:		COUNTY:		
CRP:	JIM WELLS, ETC.	SHEET NO.:	39	





\*\* Broken white lane lines may be substituted for a dotted line when distance between solid lines is < 300'. Use 8" white dotted lines with 3' segments and 9' gaps.

**DIAMOND INTERCHANGE**



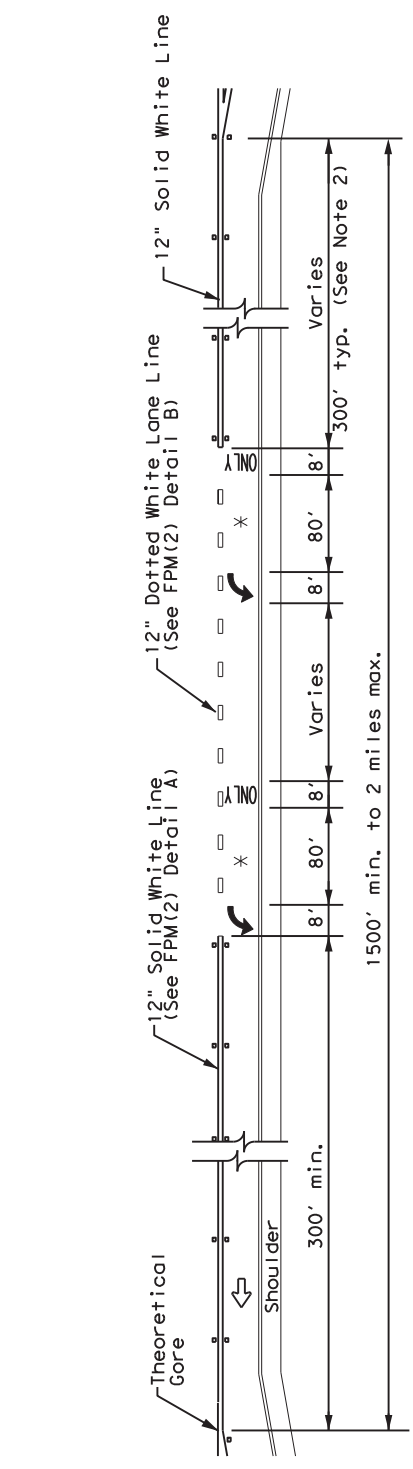
**URBAN X-RAMP WITH FRONTAGE ROAD AUXILIARY LANE**

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.

**GENERAL NOTES**

1. Pavement markings shall be white except as otherwise noted.
2. Length of 12" white line may vary depending on location.
3. Wide (12") dotted lane line (see FPM(2) Detail B) is used to separate a through lane that continues beyond the interchange from an adjacent mandatory exit lane.
4. Edge lines are not required in curb and gutter sections of frontage roads.
5. See FPM(1) for traffic lane line pavement marking details.



**LEGEND**

↔	Traffic flow
↖ ↗	Pavement marking arrows (white)
□	ReflectORIZED Raised Markers (RPM) Type II-C-R
*	Arrow markings are optional, however "ONLY" is required if arrow is used

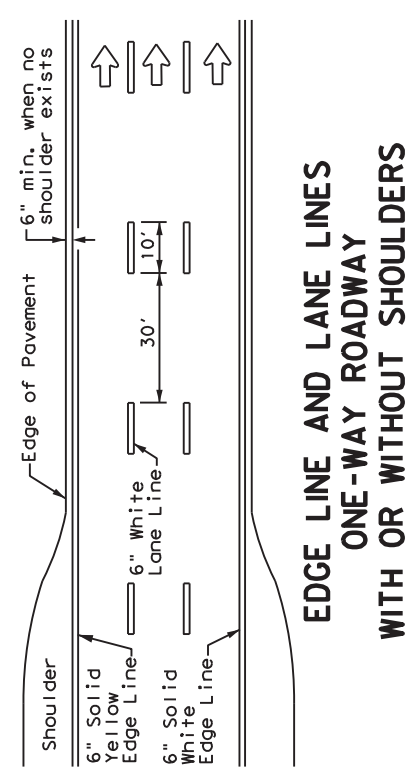
Texas Department of Transportation  
Traffic Safety Division Standard

**TYPICAL STANDARD  
FREEWAY AND FRONTAGE  
ROAD PAVEMENT MARKINGS**

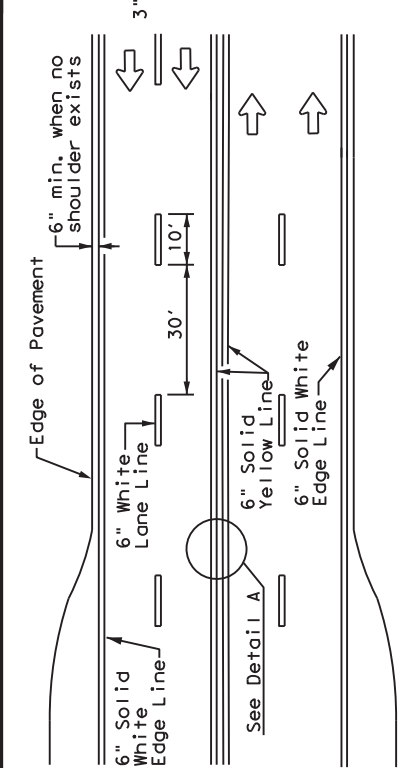
**FPM(6) - 22**

FILE: fpm(6) - 22.dgn	DN:	CK:	DWR:	CK:
TXDOT October 2022	CONT:	SECT:	JOB:	HIGHWAY:
10-22	REVIEWS:	6469	76	001
		US281,		ETC.
		COUNTY:		SHEET NO.:
		CRP	JIM WELLS, ETC.	<b>40</b>

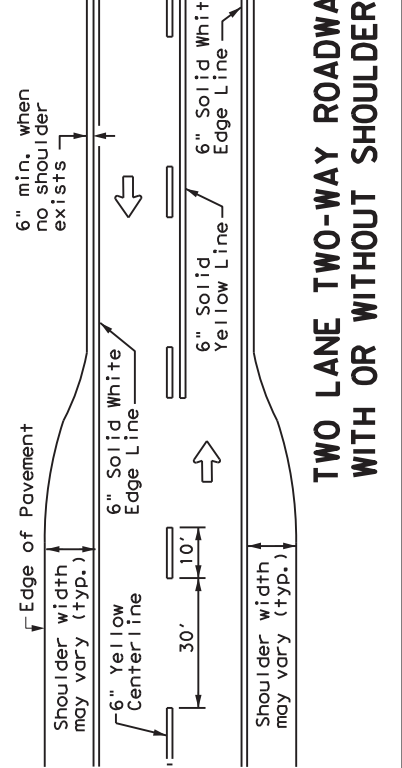
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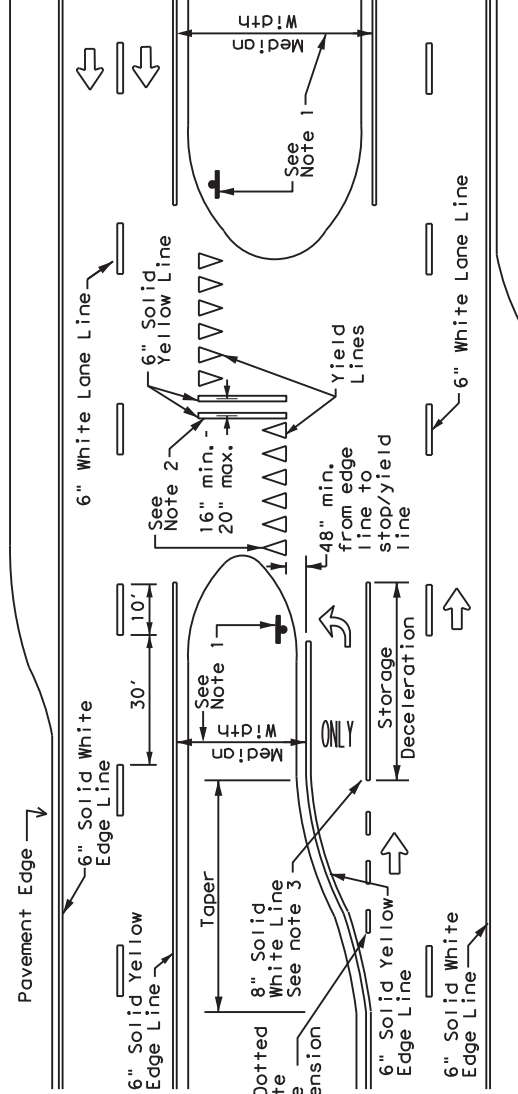
**EDGE LINE AND LANE LINES  
ONE-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



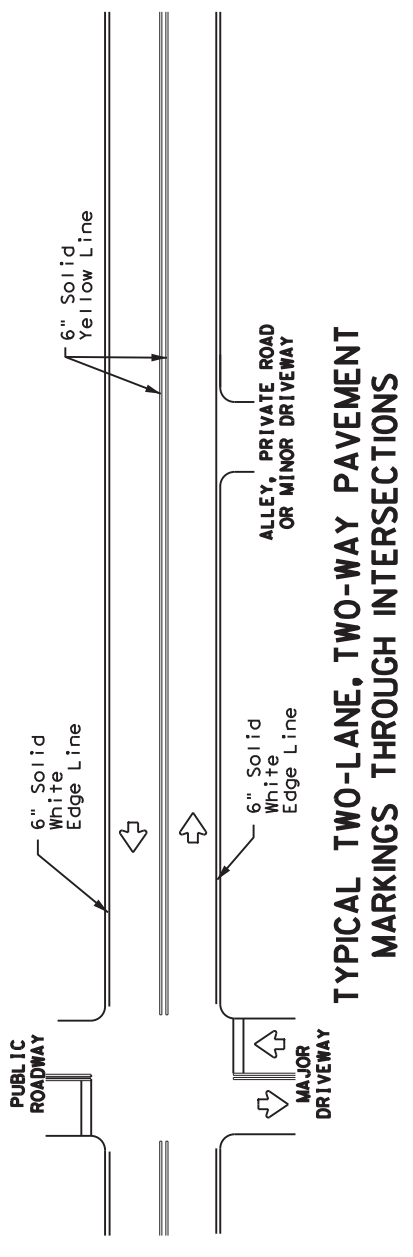
**CENTERLINE AND LANE LINES  
FOUR LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



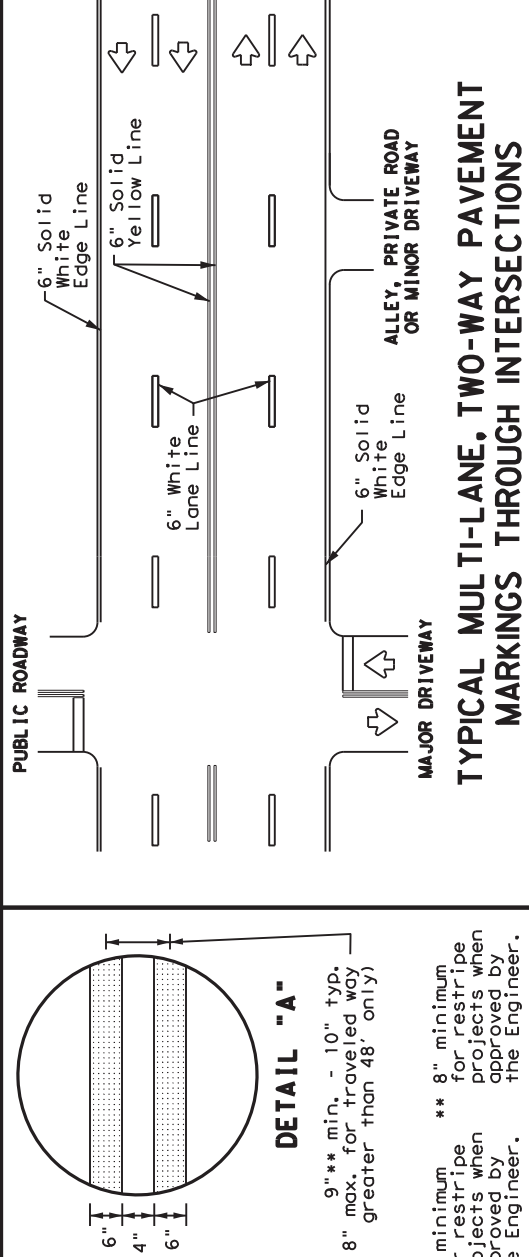
**TWO LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



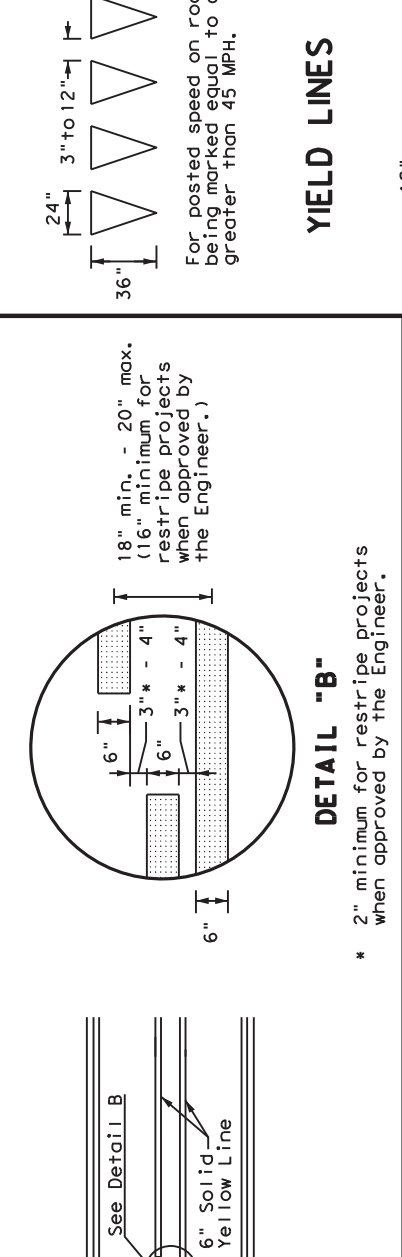
**FOUR LANE DIVIDED ROADWAY CROSSOVERS**



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

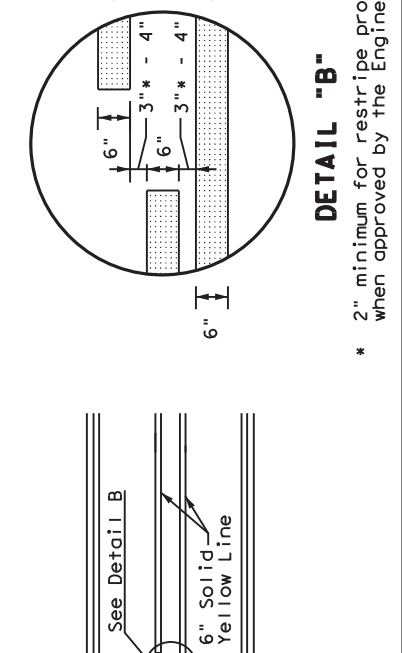


**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**

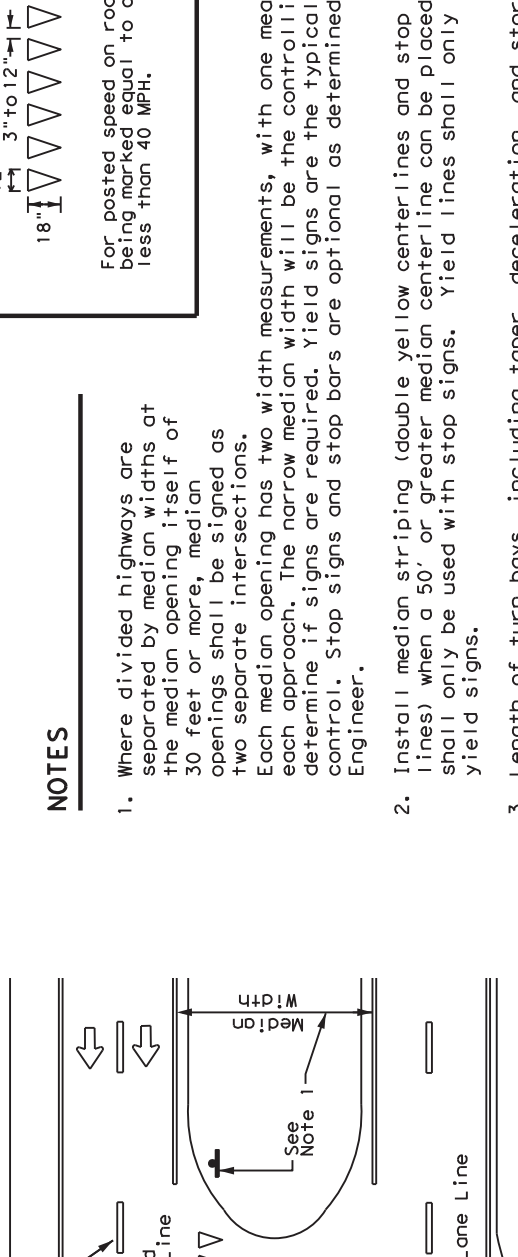


**DETAIL "A"**  
9" min. - 10" typ.  
(18" max. for traveled way  
greater than 48' only)

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



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



**YIELD LINES**

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

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

**NOTES**

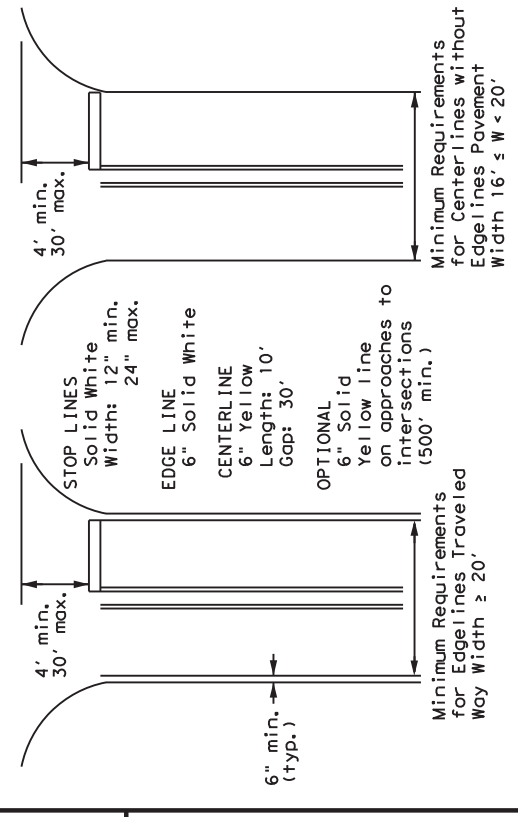
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

**GENERAL NOTES**

- Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

**GUIDE FOR PLACEMENT OF STOP LINES,  
EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Roadways

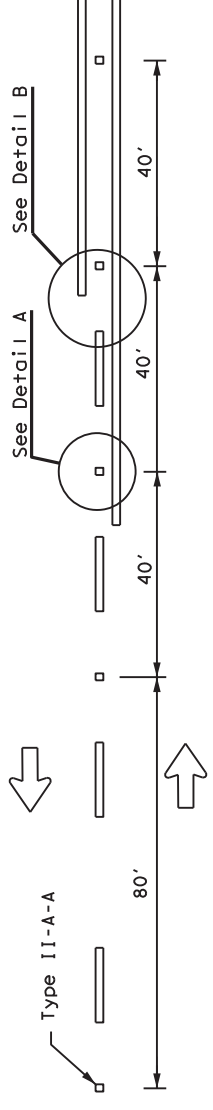
Texas Department of Transportation  
Traffic Safety Division Standard

**TYPICAL STANDARD PAVEMENT MARKINGS**

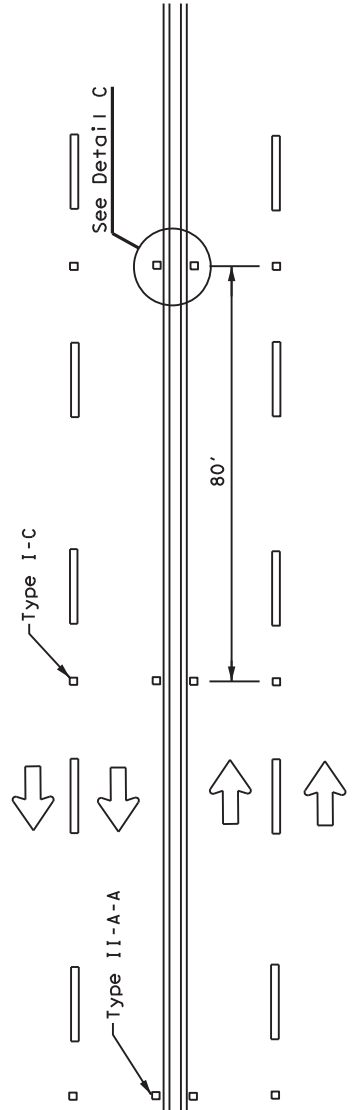
**PM(1) - 22**

FILE: pm1-22.dgn  
DN: CK: DWR: CK:  
CONT: SECT: JOB: HIGHWAY:  
① TXDOT December 2022 6469 76 001 US281, ETC.  
REVIEWS: 11-78 8-00 6-20 8-95 3-03 12-22  
DIST: COUNTY: SHEET NO.:  
CRP JIM WELLS, ETC. 41

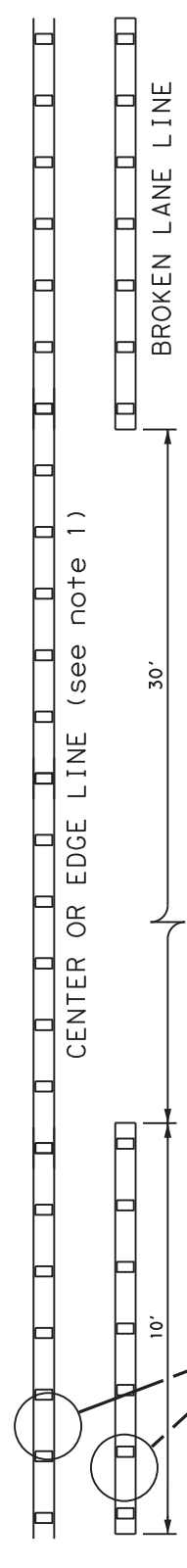
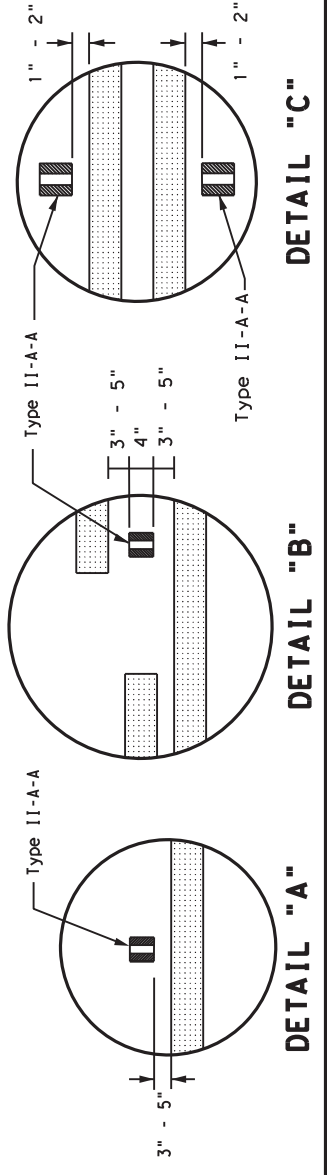
## REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



### CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



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

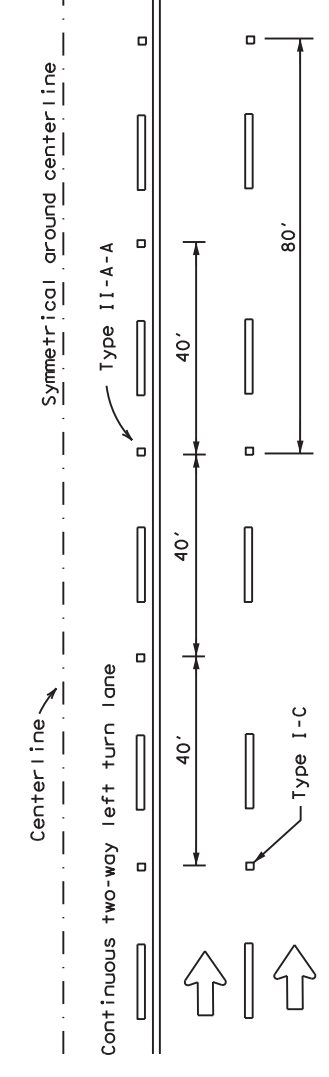


### REFLECTORIZED PROFILE PATTERN DETAIL

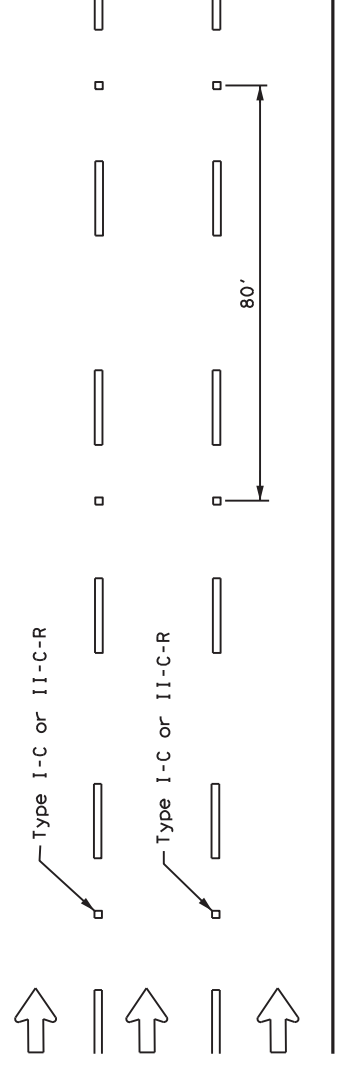
USING REFLECTIVE PROFILE PAVEMENT MARKINGS

#### NOTES

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



### CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

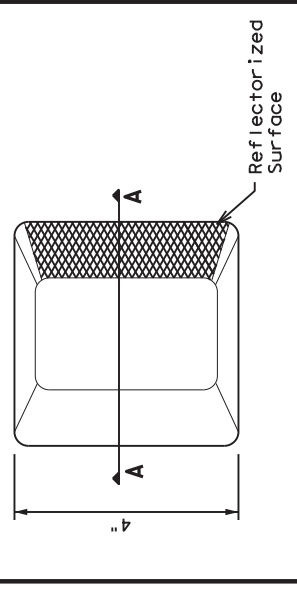
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.  
See Note 3.

#### GENERAL NOTES

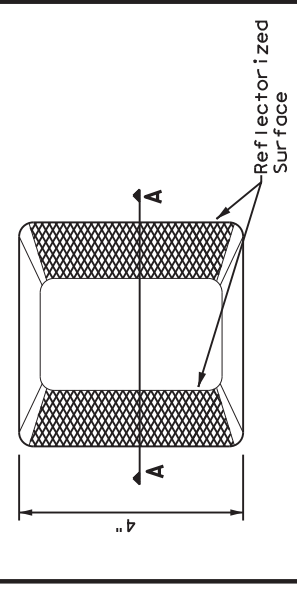
- All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
- Use raised pavement marker Type I-C with undivided roadways, flush medians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

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

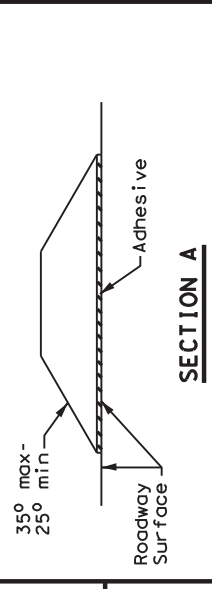
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

## RAISED PAVEMENT MARKERS



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

FILE: pm2-22.dgn	DWG: 001	CK: 001	DATE: 12-22-2022
CONT: 6469	SECT: 76	JOB: 001	PROJECT: US281, ETC.
REV: 4-77	REV: 8-00	REV: 6-20	REV: 12-22
4-92	2-10	5-00	2-12
CRP: JIM WELLS, ETC.		SHEET NO: 42	



**NOTES**

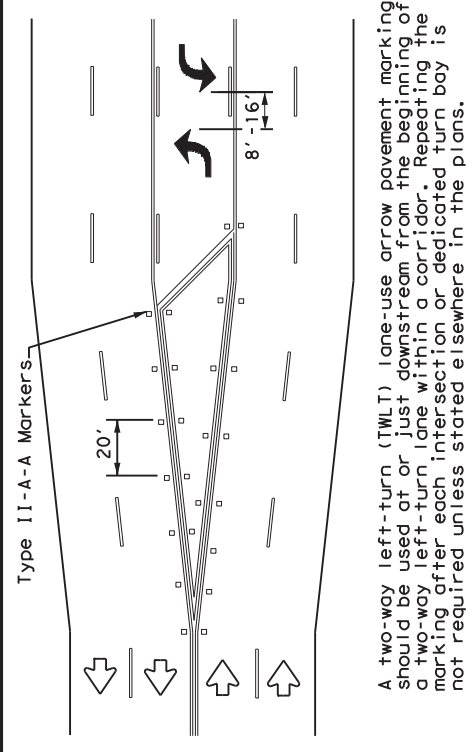
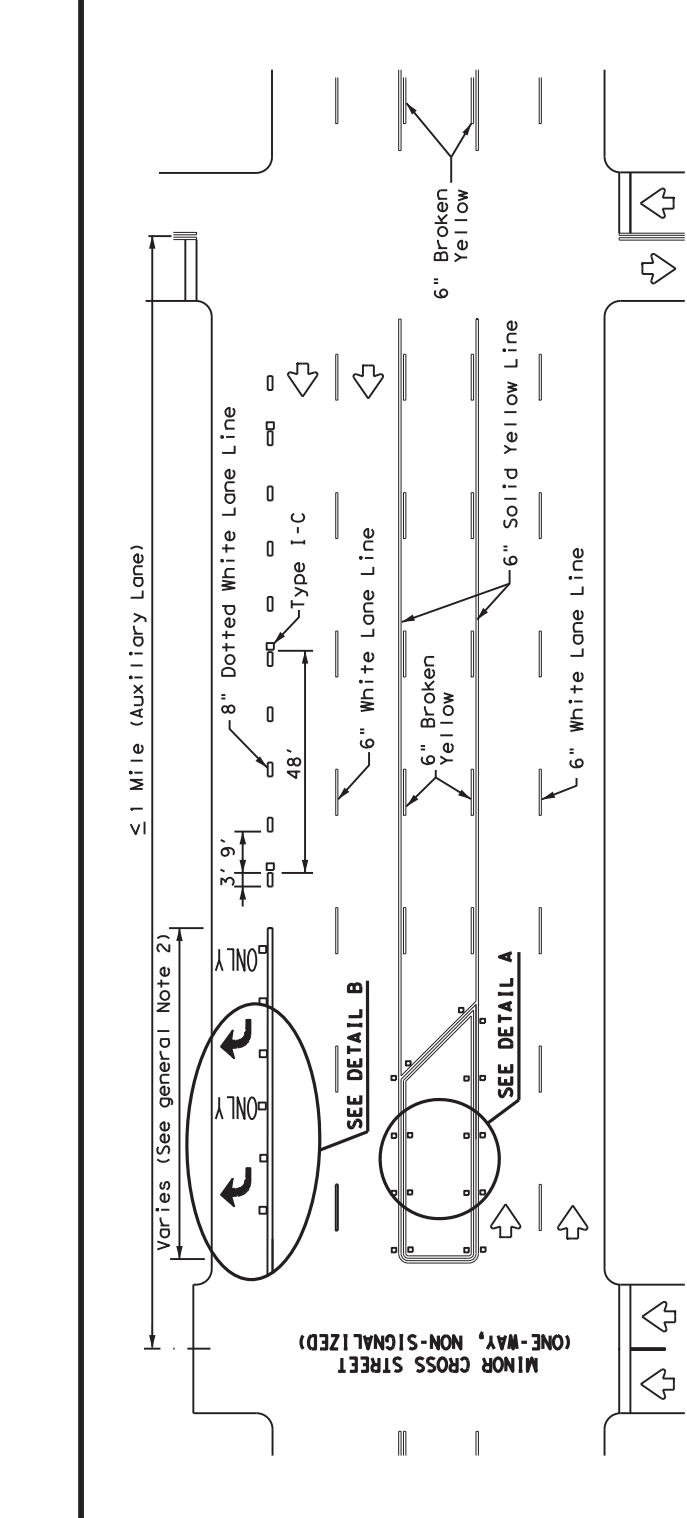
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see T52(PL) standard sheets.
- On divided highways, an 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 = WS <sup>2</sup>	
35 MPH	565	L = 60	
40 MPH	670		
45 MPH	775		
50 MPH	885		
55 MPH	990		
60 MPH	1,100		L=WS
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.

**LANE REDUCTION**

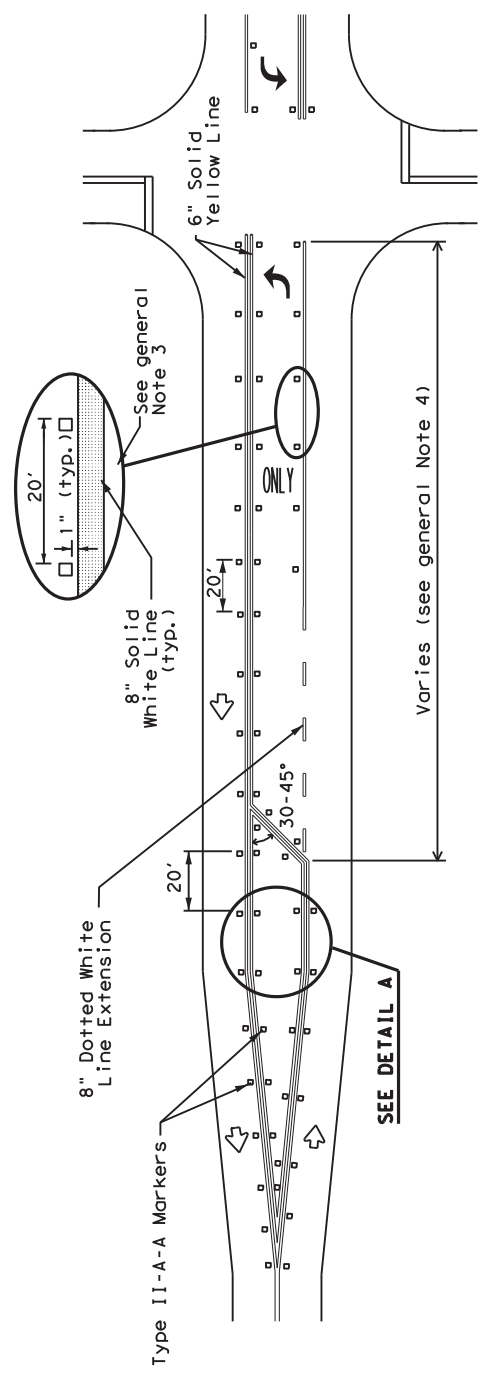
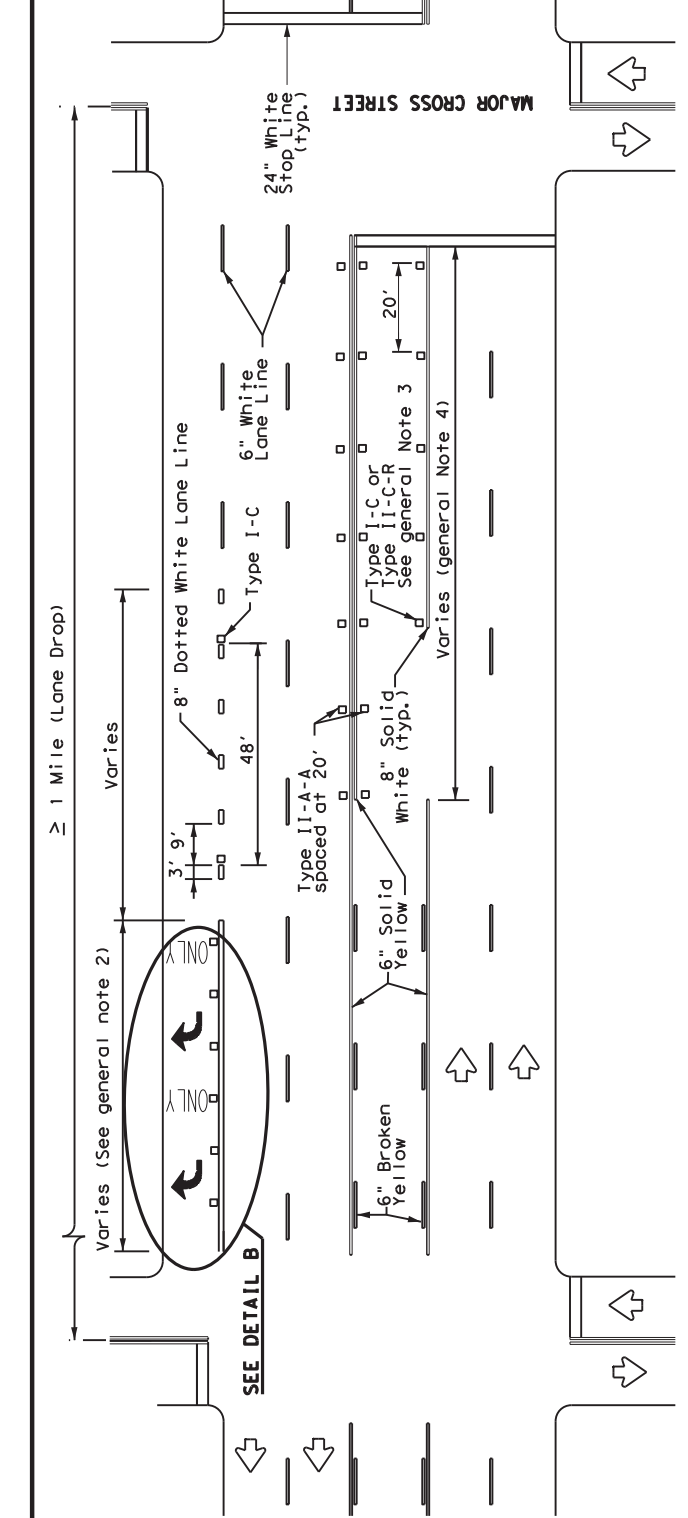


**TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY**

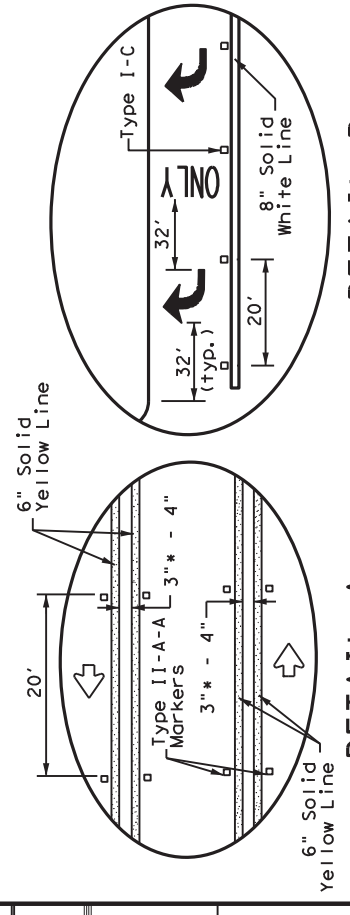
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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 TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS**



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



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

Texas Department of Transportation  
Traffic Safety Division Standard

FILE: pm3-22.dgn DNR: CK: HIGHWAY

CONT SECT JOB 6469 76 001 US281, ETC.

REVIEWS  
4-98 3-03 6-20  
5-00 2-10 12-22  
8-00 2-12

CRP JIM WELLS, ETC. SHEET NO. 43

### GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

#### 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.

### NOTES:

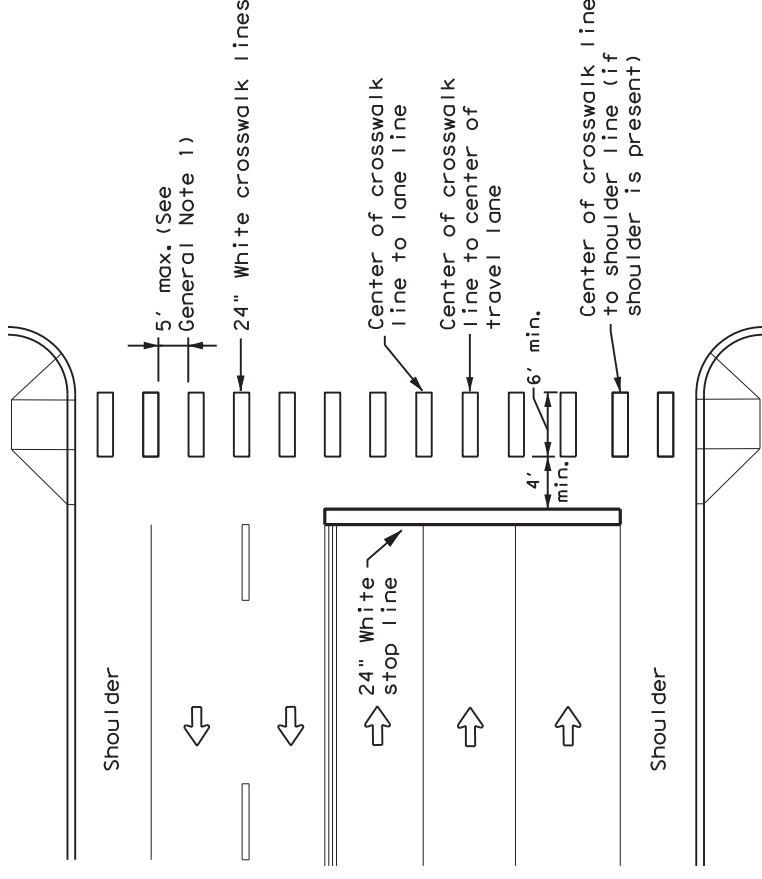
1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.



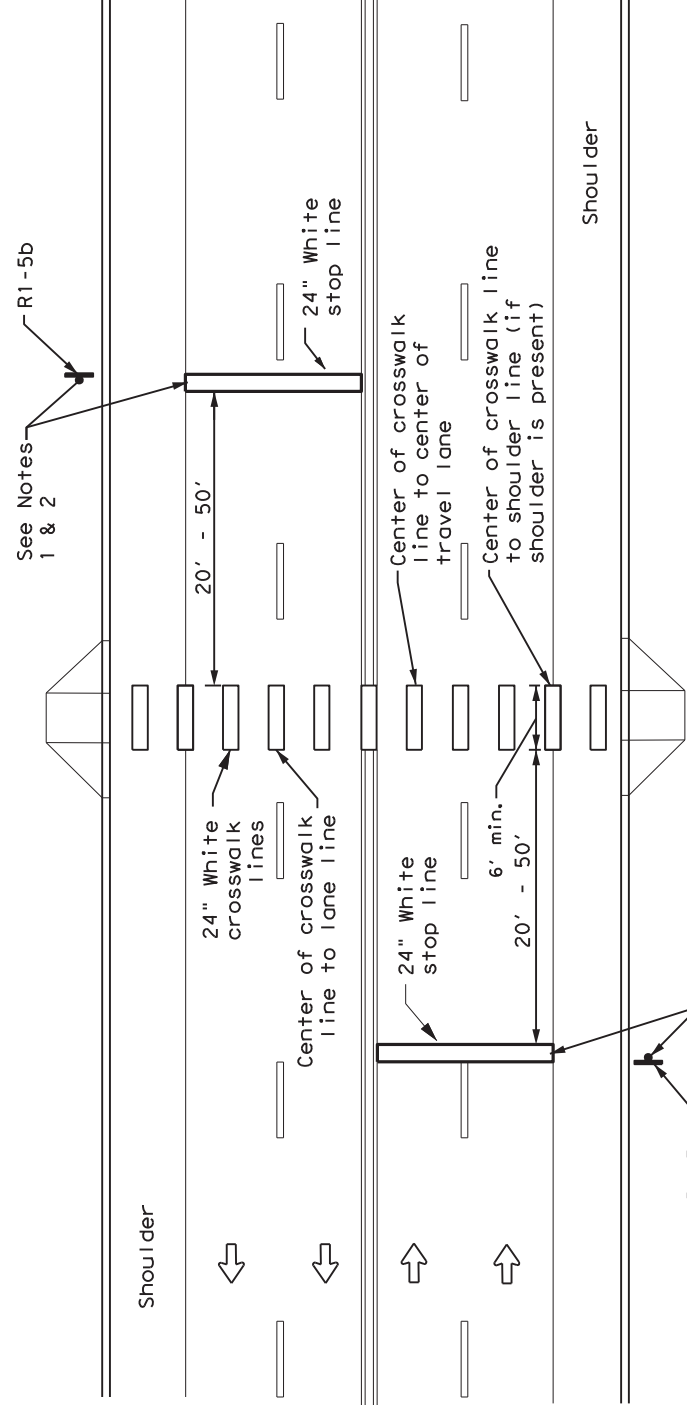
## CROSSWALK PAVEMENT MARKINGS

PM(4) - 22A

FILE: pm4-22a.dgn	DWG: CK:	CHK:
① TXDOT December 2022	CONT SECT	JOB
6-20	6469 76	001
6-22	REVISONS	US281, ETC.
12-22	DIST	COUNTY
	CRP	JIM WELLS, ETC.
		SHEET NO. 44



### HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH



### UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

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

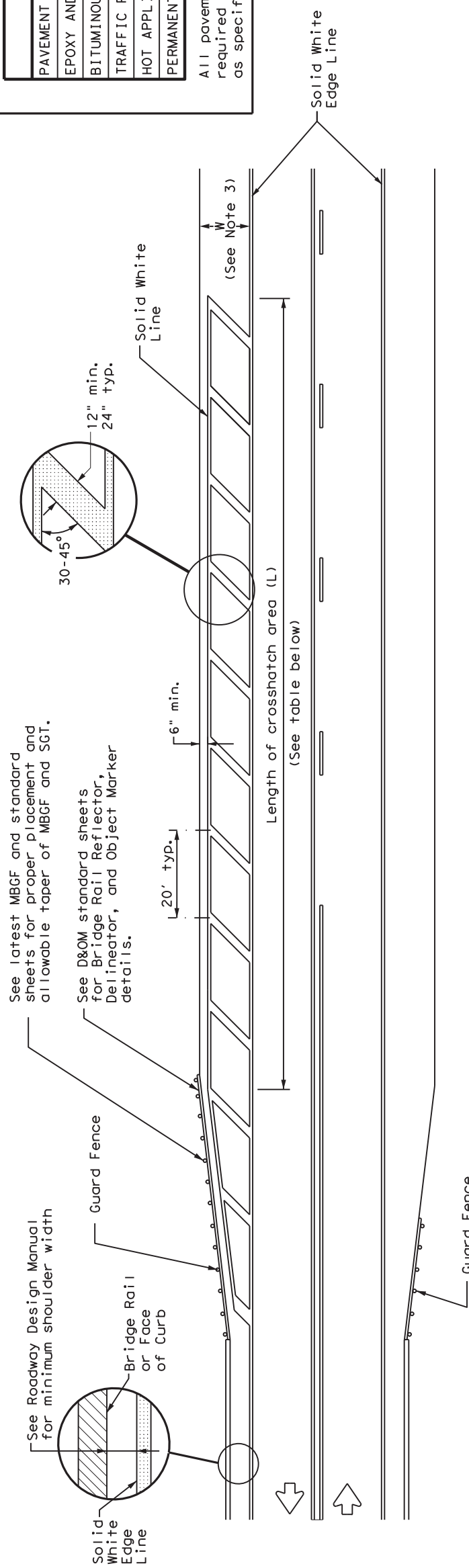
DATE: 6/4/2024 9:09:34 AM  
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**NOTES**

1. 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 4 inches from the bridge rail or face of curb or 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions.
2. No-passing zone on bridge approach is optional. If used, the no-passing zone shall be a minimum 500 feet long from the beginning of the bridge.
3. The crosshatching should be required if the shoulder width in advance of the bridge is 4 feet or wider and a reduction of at least 3 feet in shoulder width across the bridge occurs.
4. On divided highways, review both the right and left shoulder widths for the need for narrow bridge pavement markings.

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.



**ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT**

CROSSHATCH LENGTH (L)	
Posted Speed (MPH)	L (ft)
30	300 ft
35	
40	
45	
50	500 ft
55	
60	
65	
70	
75	

Texas Department of Transportation  
 Traffic Safety Division Standard

**PAVEMENT MARKINGS FOR ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT**

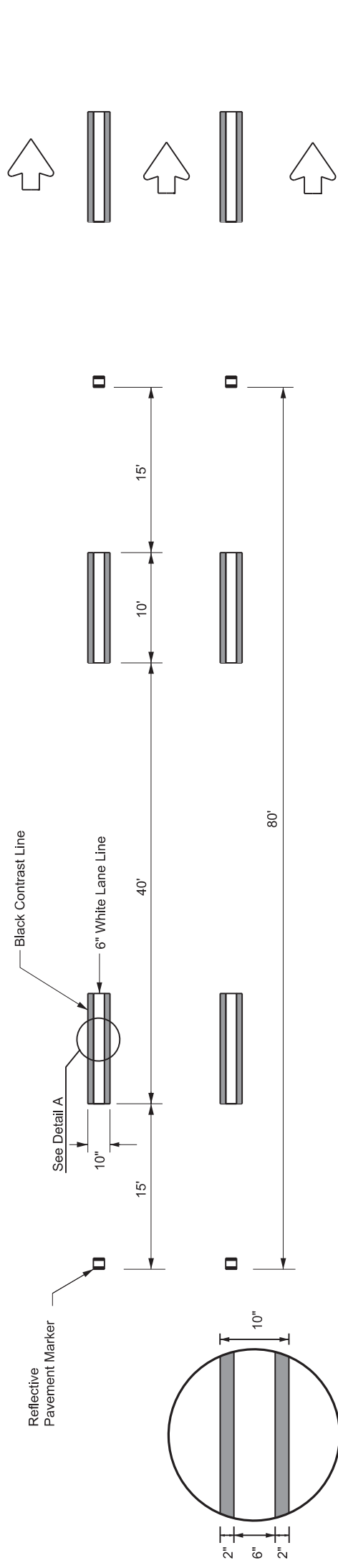
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FILE: pm5-22.dgn  
 DWT: TxDOT | DW: TxDOT | CWT: TxDOT  
 CONT: December 2022 | REVISIOMS  
 DIST: 6469 | JOB: 001 | COUNTY: CRP | SHEET NO.: 45

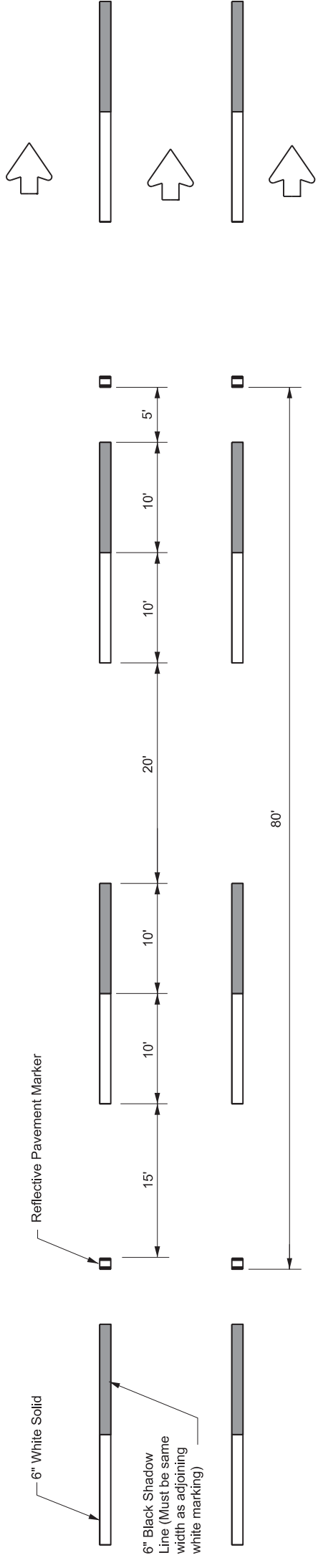


DATE: 6/4/2024 9:09:18 AM  
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 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

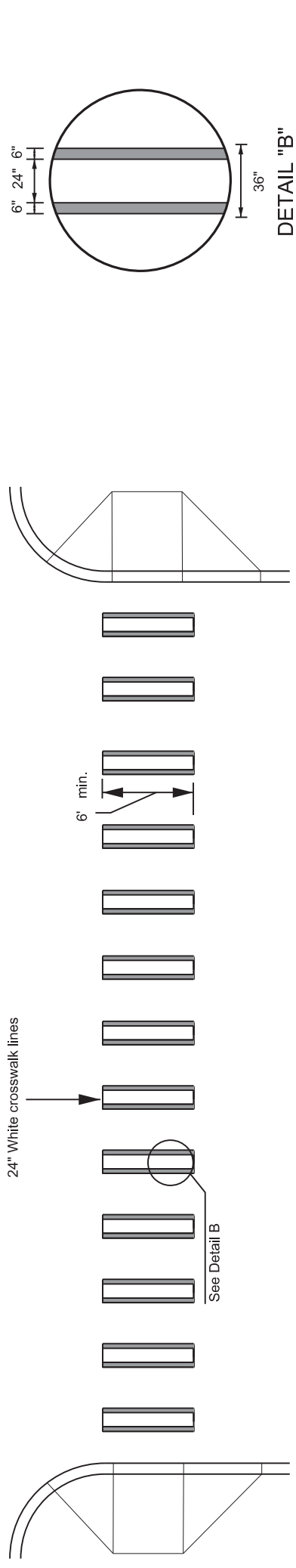
DISCLAIMER:



**CONTRAST LANE LINE DESIGN**



**SHADOW LANE LINE DESIGN**



**CONTRAST CROSSWALK DESIGN**

(See PM(4) for crosswalk line placement details)

**GENERAL NOTES**

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.

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.



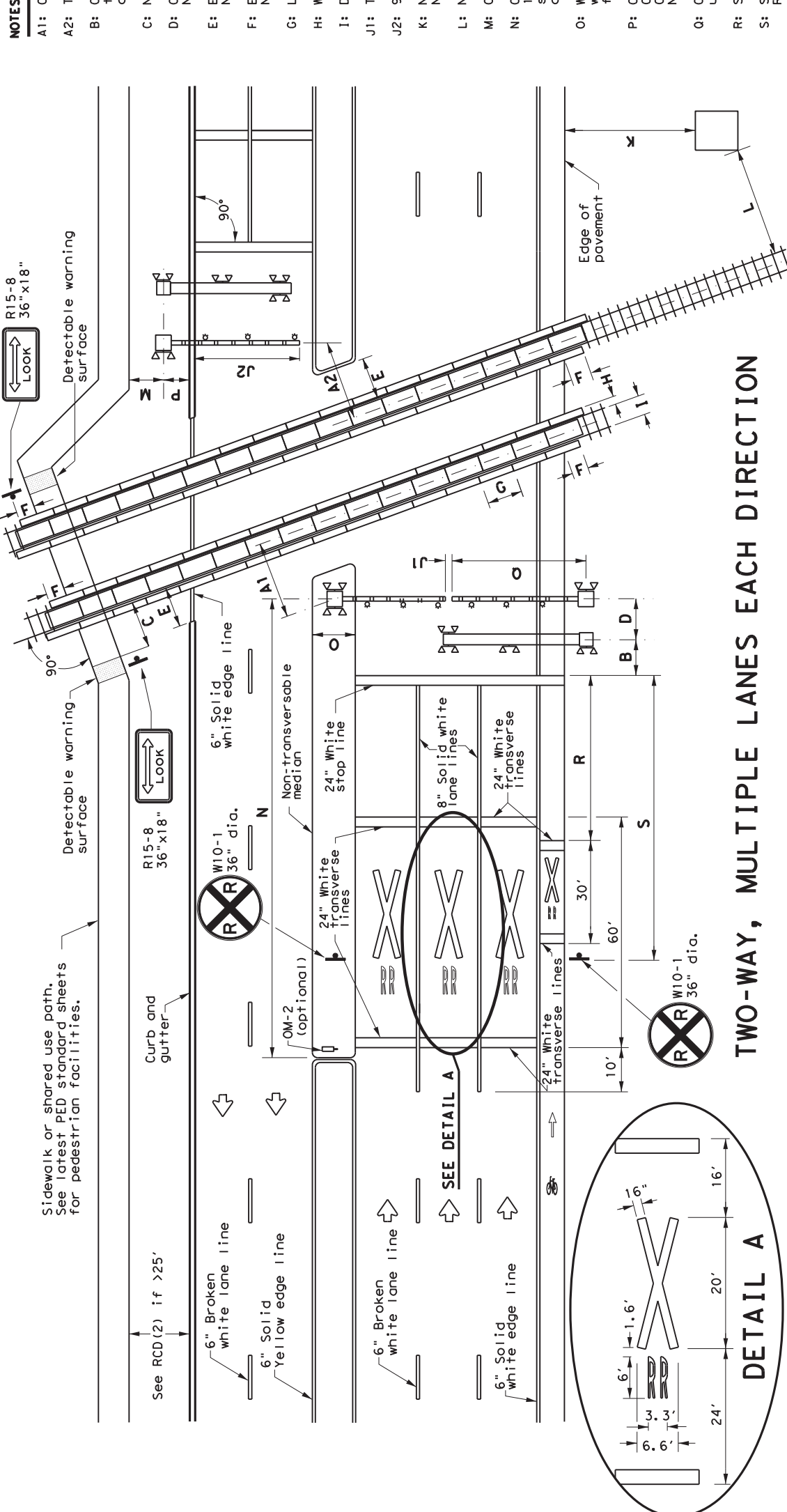
Texas Department of Transportation

Traffic Safety Division Standard

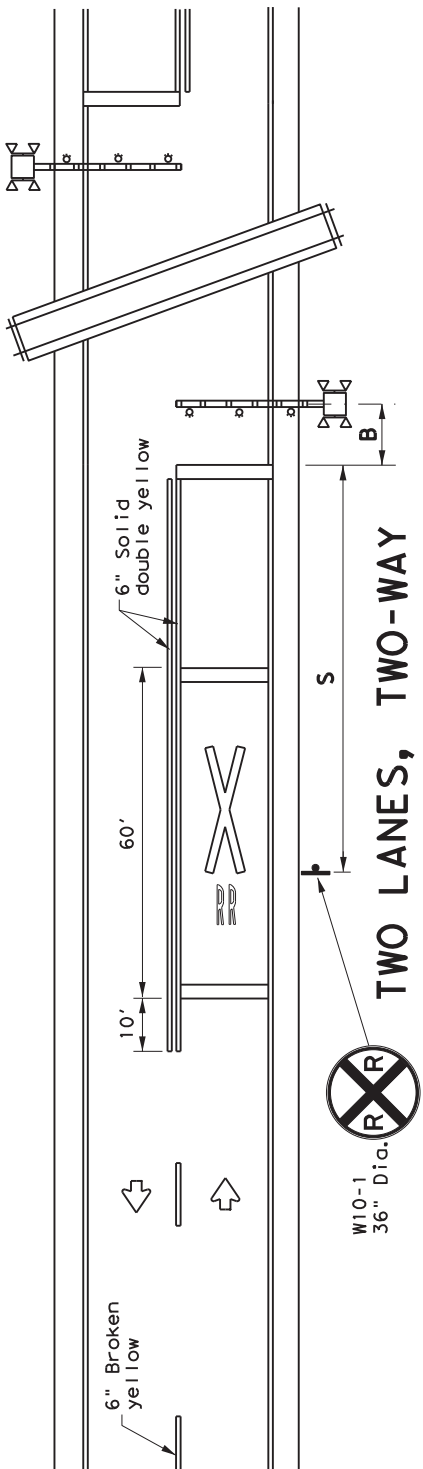
**CONTRAST AND SHADOW PAVEMENT MARKINGS**

CPM(1)-23

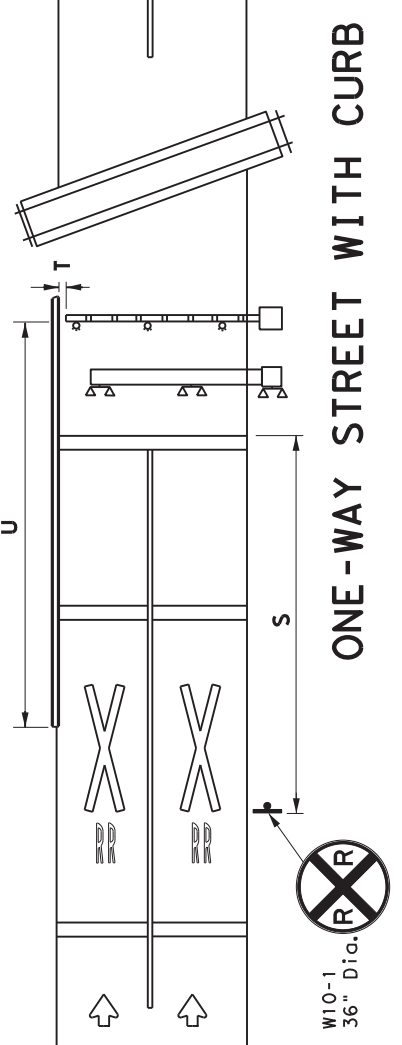
FILE:	CPM(1)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT	February 2023	CONT	SECT	JOB	HIGHWAY
5-14	REVISIONS	6469	76	001	US281 ETC.
2-23		DIST	COUNTY		SHEET NO.
		CRP	JIM WELLS, ETC.		46



**TWO-WAY, MULTIPLE LANES EACH DIRECTION**



**TWO LANES, TWO-WAY**



**ONE-WAY STREET WITH CURB**

- NOTES**
- A1: Center of RR mast to center of rail: 12' minimum, 15' typical.
  - A2: Tip of gate to center of rail: 12' minimum, 15' typical.
  - B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).
  - C: Near edge of detectable warning surface to nearest rail: 12' minimum.
  - D: Center of gate mast to center of cantilever mast: 6' typical. NOTE: Cantilever may be located in front or behind gates.
  - E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.
  - F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.
  - G: Length of panels along rail: 8' typical.
  - H: Width of field panel: 2' typical (check with railroad company).
  - I: Distance between rails: 4' - 8' 1/2".
  - J1: Tip of gate to tip of gate: 2' maximum.
  - J2: 90% of traveled roadway to be covered by gate.
  - K: Nearest edge of RR cabinet from edge of pavement: 30' typical. NOTE: Cabinet not required to be parallel to edge of pavement.
  - L: Nearest edge of RR cabinet from nearest rail: 25' typical.
  - M: Center of RR mast to edge of sidewalk: 6' minimum.
  - N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60' will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.
  - O: Width of median for RR gate assembly: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.
  - P: Center of RR mast to face of curb: 5'-3" minimum. Center of RR mast to edge of pavement (with shoulder): 7' minimum. Center of RR mast to edge of pavement (no shoulder): 9'-3" minimum. NOTE: Final location determined by the railroad company.
  - Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.
  - R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.
  - S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.

**TABLE 1**

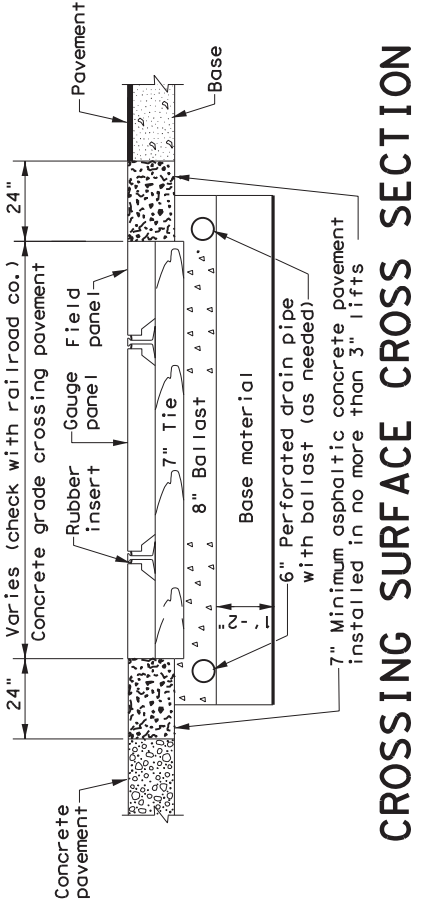
Approach Speed (mph)	Desirable Placement (feet)
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550
75	650

**LEGEND**

Sign	→
Object Marker	↓
Traffic Flow	⇄
Cantilever	□
Gate Assembly	⊞
Mast Flasher Pair	⊞

**GENERAL NOTES**

- Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
- Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
- Medians preferred whenever possible to prevent vehicles from driving around gates.
- Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
- See SMD standard sheets for sign mounting details.
- See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.



**CROSSING SURFACE CROSS SECTION**

Texas Department of Transportation

**RAILROAD CROSSING DETAILS**

**SIGNING, STRIPING, AND DEVICE PLACEMENT**

**RCD(1) - 22**

FILE: rcd1-22.dgn  
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 CK: TXDOT  
 DW: TXDOT  
 CK: TXDOT

DATE: 6/4/2024 9:09:35 AM  
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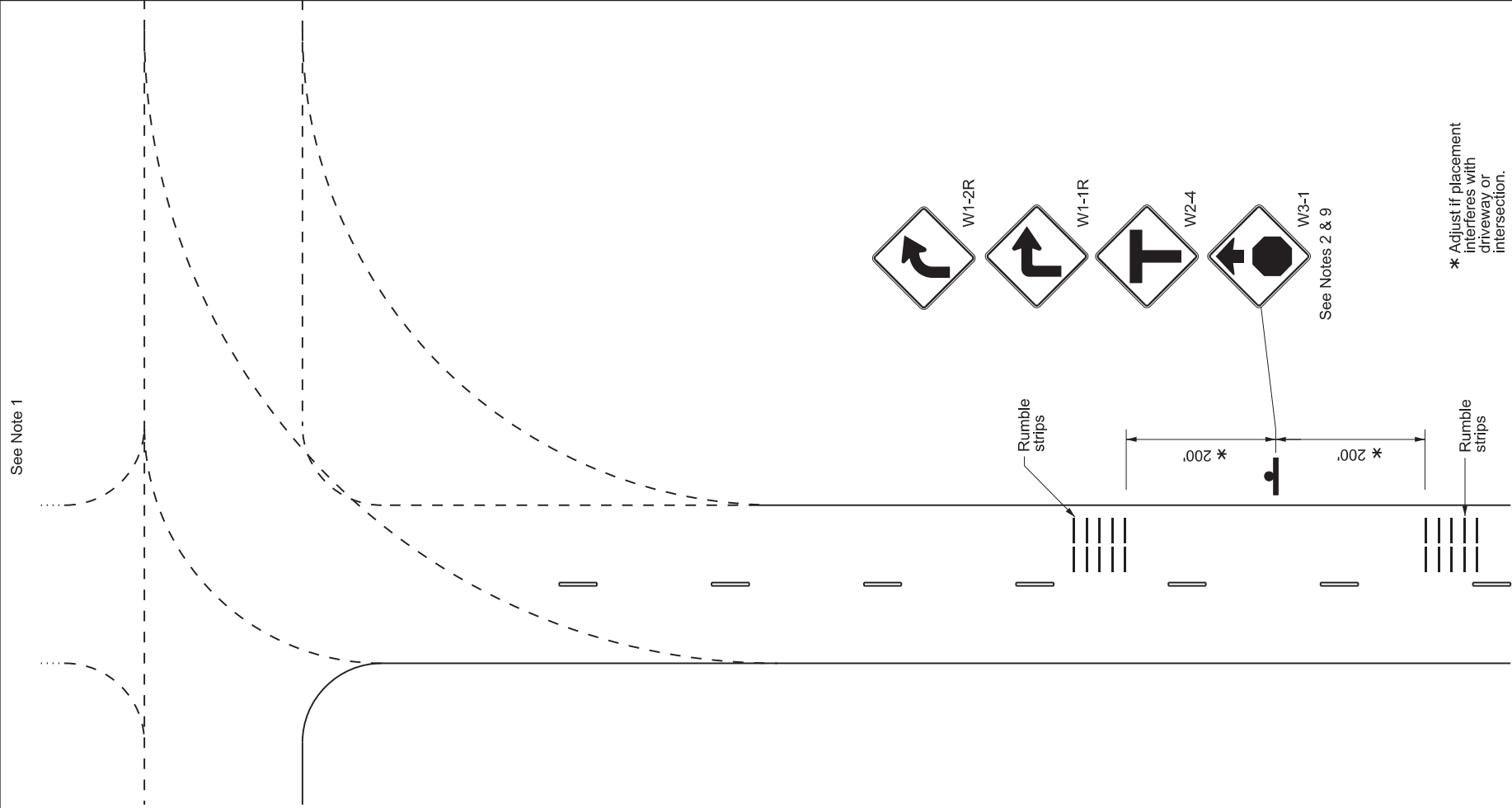
REVISONS

NO.	DATE	BY	REVISION
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2	11-22		
3	11-22		
4	11-22		
5	11-22		
6	11-22		
7	11-22		
8	11-22		
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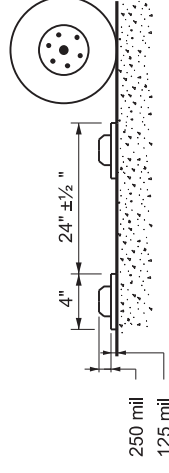
CRP: JIM WELLS, ETC.

Traffic Safety Division Standard

# RUMBLE STRIP TYPICAL APPLICATION

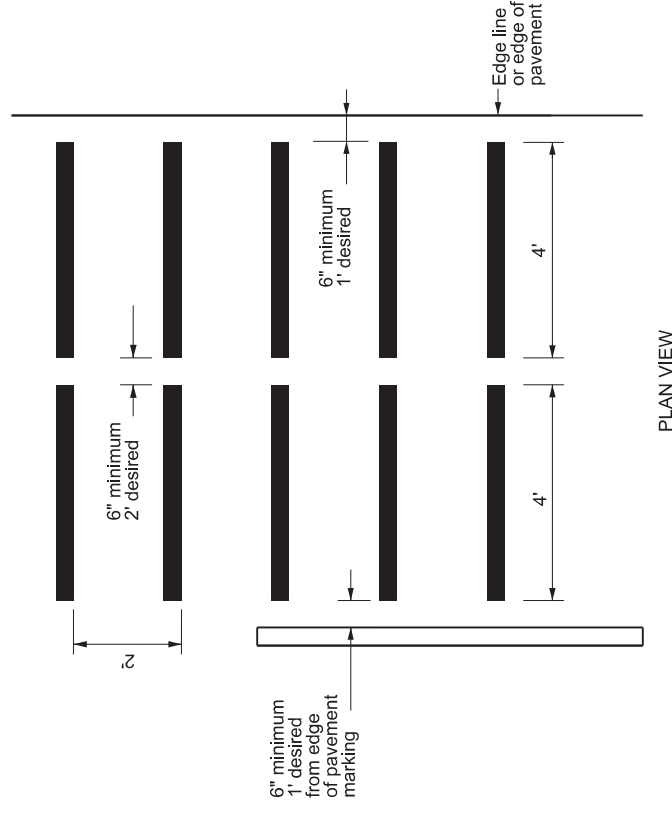


See Note 1



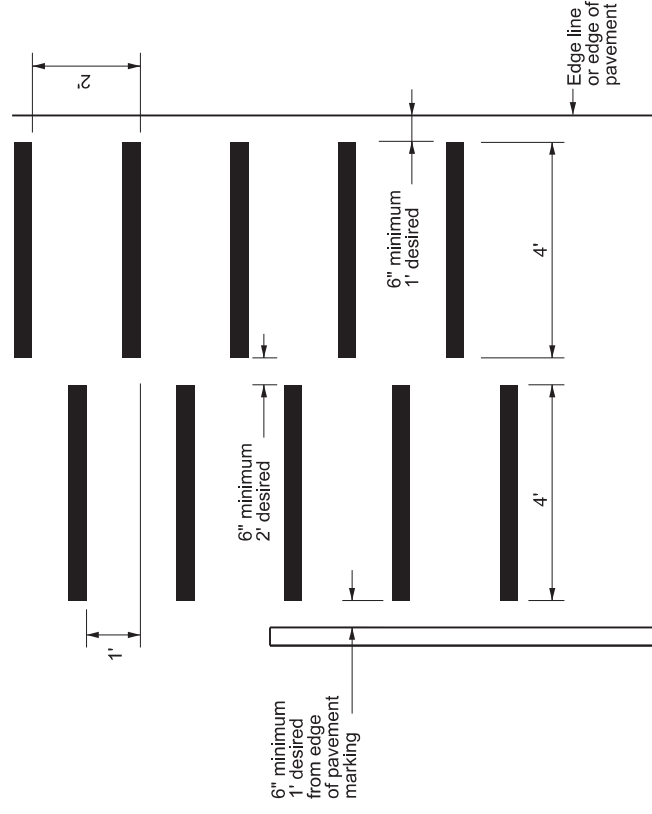
PROFILE VIEW

## RUMBLE STRIP STANDARD PATTERN



PLAN VIEW

## RUMBLE STRIP ALTERNATIVE PATTERN



PLAN VIEW

### GENERAL NOTES

1. 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.
2. When used, the rumble strips shall be placed 200 feet upstream and downstream of the warning sign.
3. The use of rumble strips should not be widespread or indiscriminate.
4. Performed black raised rumble strips should be used. They should be installed in accordance with the manufacturer's recommendations.
5. Please reference the TxDOT Material Producers List for approved rumble strips (transverse): <http://www.txdot.gov>
6. Consideration should be given to noise levels when in-lane or transverse rumble strips are to be installed near residential areas, schools, churches, etc.
7. 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.
8. Consideration shall be given to bicyclists. See RS(6).
9. Other signs can be used as conditions warrant.



W17-2T

Texas Department of Transportation

**TRANSVERSE  
OR IN-LANE  
RUMBLE STRIPS**

**RS(5)-23**

FILE: rs(5)-23.dgn    DN: TxDOT    CK: TxDOT    DW: TxDOT    CK: TxDOT

CONT: January 2023    SECT:    JOB:    HIGHWAY:    SHEET NO.:

4-06 1-12 REVISIONS    6469 76 001    US281 ETC.    COUNTY:    48

2-10    DIST:    CRP: JIM WELLS, ETC.

10-13