



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6457-03-001 DISTRICT Dallas
 HIGHWAY FM1171 COUNTY Denton

CONTROL SECTION JOB		6457-03-001		TOTAL EST.	TOTAL FINAL
PROJECT ID		A00204663			
COUNTY		Denton			
HIGHWAY		FM1171			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	192-6100	VEGETATION BARRIER (TREE ROOT)	SY	125.000	125.000
	361-6033	FULL - DEPTH REPAIR CPCD (8")	SY	3,669.000	3,669.000
	500-6001	MOBILIZATION	LS	1.000	1.000
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000	3.000
	666-6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	1,375.000	1,375.000
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	5,500.000	5,500.000
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	31.000	31.000
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1,375.000	1,375.000
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	5,500.000	5,500.000
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	31.000	31.000
	672-6010	REFL PAV MRKR TY II-C-R	EA	69.000	69.000
	678-6002	PAV SURF PREP FOR MRK (6")	LF	6,906.000	6,906.000
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000	2.000
	6185-6002	TMA (STATIONARY)	DAY	38.000	38.000
	6185-6005	TMA (MOBILE OPERATION)	DAY	38.000	38.000

DISTRICT	COUNTY	CCSJ	SHEET
Dallas	Denton	6457-03-001	2

Project Number: RMC 6457-03-001

Control:6457-03-001

County: Denton

Highway: FM1171

GENERAL NOTES:

General:

This project consists of performing “Full Depth Concrete Repair” on various roadways as detailed on the Summary Sheet in Denton County Maintenance Section.

Sequence of work will be approved.

The Department reserves the right to revise schedule as it deems necessary.

Provide and maintain a dedicated email address for receipt of work orders and correspondence throughout the term of this contract. Acknowledgement of emailed work order/callouts is required no more than 12 hr. from notification.

Contractor’s attention is called to the fact that all adjoining pavement sections will be protected during all phases of construction and any damages incurred due to Contractor’s operation will be repaired and replaced at the Contractor’s expense.

Each contract awarded by the Department stands on its own as such, is separate from other contracts. A Contractor awarded multiple contracts, must be capable and sufficiently staffed to concurrently process any or all contracts at the same time.

Coordinate work through:

Wayne Powell
Denton County Maintenance Office
2624 W. Prairie
Denton, Texas 76201
940-387-1414

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

Amanda Miller, P.E. Amanda.Moser@txdot.gov
Wayne Powell Wayne.Powell@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.

General Notes

Sheet 3A

Project Number: RMC 6457-03-001

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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.

Attention is directed to the possible presence of underground utilities owned by the Texas Department of Transportation (irrigation, signal, illumination and surveillance, communication, and control) on the right of way. Call the Department for locates at 214-320-6682 and 214-320-6205 48 hr. in advance of excavation. Contact the appropriate department of the local city or town a minimum of 48 hr. in advance of excavation.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Cost associated with de-energizing the power lines or other protective measures required are at no expense to the Department.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Item 2 – Instructions to Bidders:

This project includes sheets that are not part of the bid proposal.

Order plans from any Reproduction Company listed at:

http://www.dot.state.tx.us/business/contractors_consultants/repro_companies.htm

View or download plans at:

<http://www.dot.state.tx.us/business/plansonline/plansonline.htm>

Item 3 – Award and Execution of Contract:

This contract is Site Specific.

After written notification, work will be continuously prosecuted to completion.

The work order letter will include all roadways contained on the Summary Sheet.

Notification to perform “Non-Site Specific” work at locations not presented on the Summary Sheet will be in writing.

General Notes

Sheet 3B

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“Non-Site Specific” minimum quantity is 100 SY per written notification.

Item 7 – Legal Relations and Responsibilities:

Pre-construction safety meeting will be conducted with Contractor’s personnel prior to work beginning on a continuously prosecuted contract or before each callout work request.

Attendance of this meeting will not be paid directly but considered subsidiary to the various bid items.

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

- New Year’s Eve and Day (noon on December 31 thru 10 P.M. January 1)
- Easter Holiday weekend (noon on Friday thru 10 P.M. Sunday)
- Memorial Day weekend (noon on Friday thru 10 P.M. Monday)
- Independence Day (noon on July 3 thru 10 P.M. on July 5)
- Labor Day weekend (noon on Friday thru 10 P.M. Monday)
- Thanksgiving Holiday (noon on Wednesday thru 10 P.M. Sunday)
- Christmas Holiday (noon on December 23 thru 10 P.M. December 26)

Roadway closures during the following key dates and/or special events are prohibited.

- The University of Texas vs. University of Oklahoma football game (no lane closures beginning 4 hr. prior to the event and ending 3 hr. following event completion).
- Texas Motor Speedway – NASCAR Series Races – April and November
- Texas Motor Speedway – INDY Series Races – June and September

The Contractor will plan his work such that no work is ongoing, and all lanes of traffic are available for the NASCAR series races at the Texas Motor Speedway starting the Thursday of race week through Sunday. These races are run usually in early April and Mid-November. The Contractor will not be allowed to have any lane closures on the day of the INDY car races, one of which is usually scheduled during the beginning of June and the other is usually scheduled during Mid-September. Scheduled events at Texas Motor Speedway may be reviewed at their website: <http://www.texasmotorspeedway.com>. All incomplete work activities will need to be shaped up prior to the race events as to pose no hazard to traffic. The above is applicable to each year the work is ongoing. Time will not be charged on these days.

General Notes

Sheet 3C

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Holiday restrictions for Independence Day, Thanksgiving Holiday and the Christmas Holiday may be extended for the “week of” due to the nature of work being performed and the work location at the discretion of the Engineer for safety of the traveling public.

Item 8 – Prosecution and Progress:

Working days will be charged in accordance with Section 8.3.1.4, “Standard Workweek”.

Liquidated damages will be charged for each working day exceeding the time allowed in the work order letter.

**TABLE 1
SCHEDULE OF WORK**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Site-Specific Work												
Non-Site-Specific Work												

For Non-Site-Specific items, Contractor may prosecute work after site specific locations are completed and approved by the Engineer. Otherwise, work for Non-Site-Specific locations is expected to take place within the identified timeline shown on this “Schedule of Work” Table and the call-out work request.

Item 361 – Repair of Concrete Pavement:

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department’s Construction Management System (Site Manager).

Mix Design templates may be downloaded at:

<http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html>.

The use of ready-mix concrete will be permitted.

General Notes

Sheet 3D

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Upon removal of the existing concrete slab, Contractor will excavate base material when necessary and repair base to match original grade before asphalt base and concrete are replaced. Concrete may not be used to repair existing base or replace asphalt base.

Placement of pavement markings will not be paid for directly but will be subsidiary to this bid item.

Provide Class HES concrete designed to attain a minimum average flexural strength of 255 psi or a minimum average compressive strength of 1,800 psi within the allowed lane closure time.

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

For joint pavement, provide dowel support assemblies in concrete pavement constructed of 0.306 in. diameter wire in the main vertical members. Rigidly support the dowels in parallel positions and weld them on one end to the support frame. Provide weld attachments alternately on opposite ends of successive dowels. The support assembly is subject to approval.

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager).

Provide grooved joints at 10 ft. intervals and 3/4 in. expansion joint material for doweled curb at the same locations as on the existing pavement.

Mix Design templates may be downloaded at:

For full depth repair, the amount of pavement removed will only be that amount which can be replaced during the daily allowable work schedule.

<http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html>.

Prior to the installation of tie bars, the hole will be thoroughly cleaned of all loose materials and blown clean with compressed air. An injection nozzle will be used to apply the epoxy the full length of the embedment depth to minimize all voids within the hole.

All test molds will be furnished by the Contractor and will be maintained in proper condition. Provide personnel to transport the test samples to a curing location as directed, remove from the mold to a curing tank. Concrete will not be placed when impending weather conditions arise, and it is determined rainfall may occur. If rainfall should begin after the placement operations begin, the Contractor will provide coverage to protect the work. If texture of the pavement is destroyed or damaged, Contractor will restore the pavement texture by grooving or as directed.

For joint pavement, provide tie bars in longitudinal joints but do not place them within 15 in. of transverse joints.

Item 500 – Mobilization:

Provide chairs for multiple piece tie bars, threaded connectors or other adequate devices, used in concrete paving, or tie them to the pavement reinforcing steel. Instead of multiple piece tie bars, drill holes into the pavement and grout straight tie bars in place with epoxy. Do not use impact drills for drilling holes for tie bars. A rotary, core type, bit is required to prevent damage to pavement that will remain in place. Do not bend the tie bars or insert them into plastic concrete without the approval of the Engineer.

Mobilization is lump sum.

Item 502 – Barricades, Signs, and Traffic Handling:

Tine texturing will be required unless otherwise directed.

Provide traffic control in compliance with the latest edition of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), the "Traffic Control Standard Sheets" (TCSS), and as directed.

Provide standby equipment at all times in order to ensure that possible delays caused by equipment breakdown are kept to a minimum.

Perform work Monday through Friday during daylight hours. Do not begin work until 30 minutes after sunrise and cease operations 30 minutes before sunset.

Place construction, sawed, and contraction joints in accordance with the pavement detail sheet and as directed.

If closing a lane is necessary, closure times will be Monday through Friday, 9 A.M. to 3:30 P.M. Close no more than 1 lane at a time, unless otherwise approved.

All permanent pavement markings which are removed during the removal of the existing concrete pavement are to be replaced as directed by the Engineer.

All work on traveled roadway surfaces will generally be performed during the day OR at night.

Maximum length of lane closure will be 2 miles.

General Notes

General Notes

Sheet 3F

Sheet 3E

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

Erect barricades and signs in locations not obstructing the traveling public's view of the normal roadway signing or necessary sight distance.

Provide sufficient and qualified staff and equipment to revise the traffic control as directed.

Trailer all slow-moving vehicles (designed to operate 25 mph or less) crossing freeway main lanes.

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

Equipment and materials will not be left within 30 ft. of the travel lane during non-working hours.

The work performed, materials furnished and all labor, tools, and equipment necessary to complete the work for Non-Site-Specific locations under this Item will not be measured or paid for directly but will be considered subsidiary to the various bid items of this contract.

The "Force Account – Safety Contingency" has been established for this project and is intended to be utilized for work zone enhancements to improve the effectiveness of the Traffic Control Plan that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly.

Item 512 – Portable Traffic Barrier:

Determine the location of any utilities lying within the median barrier. Repair all damage to utilities caused by Contractor forces at no expense to TxDOT. The Contractor must use a licensed electrician if utilities need to be repaired.

Item 585 – Ride Quality for Pavement Surfaces:

Provide a 10 ft. straightedge at all times. Measure and evaluate ride quality of repairs as directed by using Surface Test Type A. Correct surface areas as required.

General Notes

Sheet 3G

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Item 662 – Work Zone Pavement Markings:

Appropriate removable and short-term markings will be placed side to side to indicate the beginning and ending of no passing zones presently in place on the road in accordance with appropriate work zone standard sheet(s). WZ(STPM)-23.

Item 666 – Retroreflectorized Pavement Markings:

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

A gravity flow applicator will be used to funnel the beads onto the stripe. Truck speed will be slow enough to ensure that the beads drop onto the stripe and do not roll in the paint film.

All stripes will be applied in 1 coat.

Layout work will be required where markings have been obliterated, sealed, or overlaid.

All equipment will be capable of maintaining a continuous work schedule to the satisfactory completion of the project. Equipment used for the contract will be equipped with footage counters capable of measuring the linear footage placed. Counters must be calibrated prior to the beginning of striping operations.

Dispose of all empty marking material containers in accordance with all federal, state, and local regulations.

Item 672 – Raised Pavement Markers:

Place all pavement markers in proper alignment with the guides. The maximum deviation rate in alignment is 1 in. per 200 ft. of roadway. The maximum deviation is to not exceed 2 in. or be abrupt.

Removal of old existing adhesive material, bituminous or epoxy is required on concrete surfaces.

Removal is subsidiary to this Item.

Removed Raised Pavement Markers and adhesives are property of the Contractor and will be disposed of at a State approved site off Department property.

Bituminous adhesive will not be allowed on concrete pavement.

General Notes

Sheet 3H

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Item 6001 – Portable Changeable Message Sign:

Provide Portable Changeable Message Signs (PCMS) units as approve.

PCMS will be placed 7 days or as directed prior to the ramp/lane closures.

Item 6185 – Truck Mounted Attenuator:

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

TCP 1 Series	Scenario	Required TMA/TA
(1-1)-18 / (1-2)-18		1
(1-3)-18	A B	1 2
(1-4)-18 / (1-5)-18		1

TCP 2 Series	Scenario	Required TMA/TA
(2-1)-18 / (2-2)-18 / (2-4)-18 / (2-5)-18 / (2-6)-18	All	1
(2-3)-23	A B	1 2

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

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the each and must be available for use at any time as determined by the Engineer.

When TMAs are specified by the EACH, the unit of measure is for the duration of the contract, and the TMA will remain the property of the Contractor.

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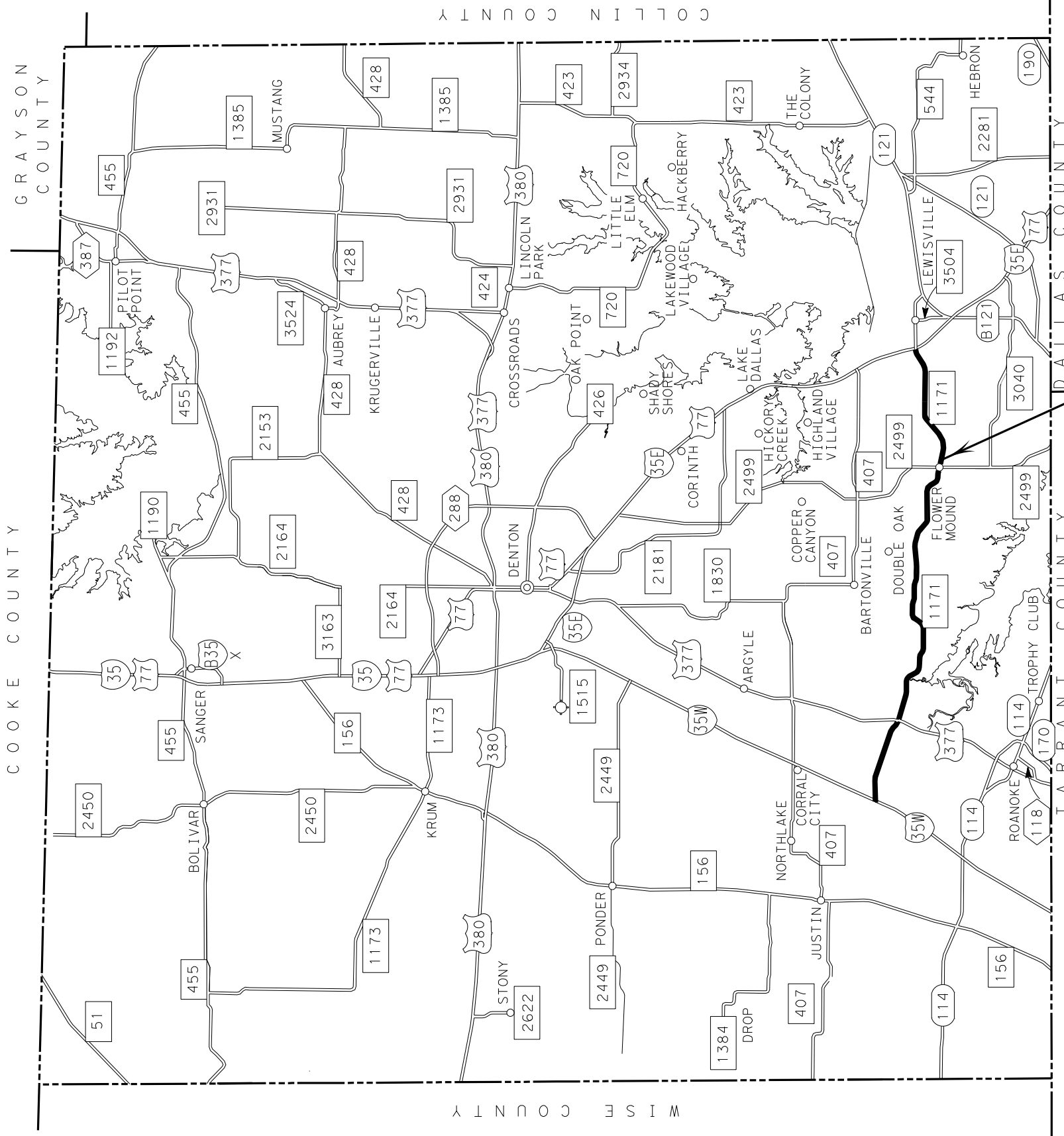
Highway: FM1171

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



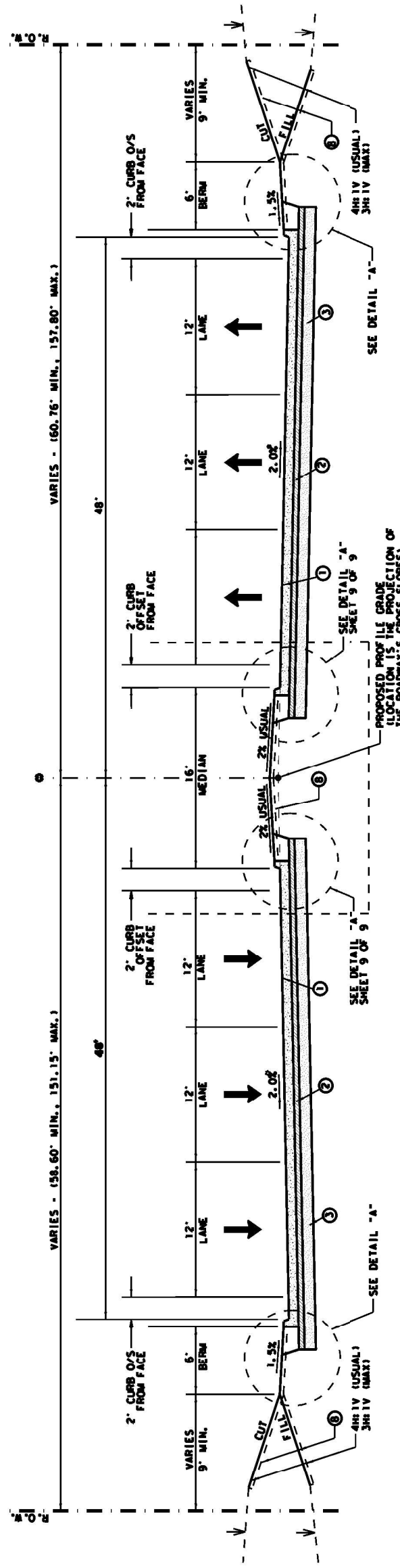
DENTON COUNTY
DALLAS DISTRICT
N. T. S.

1	Location FM1171	AADT 31562
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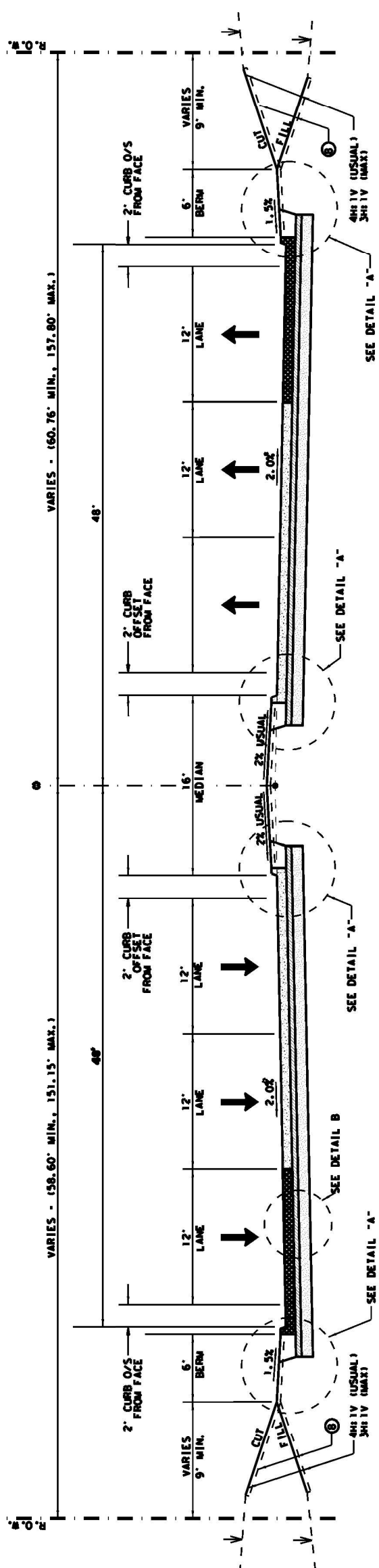


LOCATION MAP

DESIGN TG	FED. RD. DIV. NO.	MAINTENANCE PROJECT NO.	HIGHWAY NO.
GRAPHICS TG	6	RMC - 645703001	FM1171
CHECK KD	STATE TEXAS	DISTRICT DALLAS	COUNTY DENTON
CHECK KD	CONTROL 6457	SECTION 03	JOB 001
			SHEET NO. 4

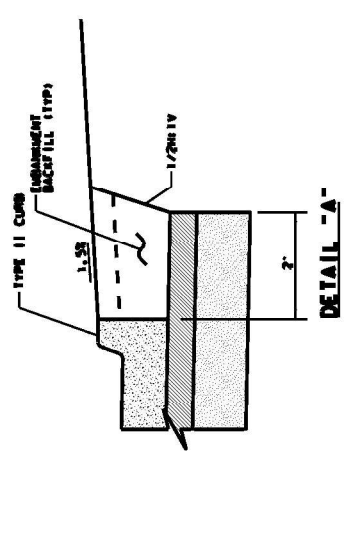


EXISTING TYPICAL SECTION - F.M. 1171

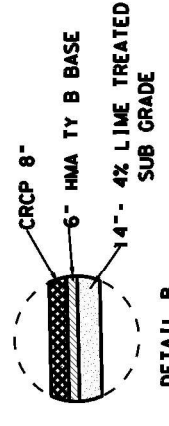


NOTE:
 RECOMPACT BASE MATERIALS TO THE SATISFACTION OF THE ENGINEER.
 LEVEL THE BASE LAYER WITH COLD-MIX ASPHALT/FLEX BASE TO THE ORIGINAL
 BOTTOM LINE AND GRADE OF THE CONCRETE SLAB BEFORE REPAIR CONCRETE IS
 PLACED WHEN SHOWN ON THE PLANS.

PROPOSED TYPICAL SECTION - F.M. 1171



PROPOSED FULL DEPTH CONCRETE REPAIR
 8" CONC. PVMT. (CECP)



DETAIL B
 PROPOSED PAVEMENT STRUCTURE REPAIR



DocuSigned by:
 Kareem Doucette 11/15/2023
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Texas Department of Transportation
 © 2023

FM1171
TYPICAL SECTIONS

DESTIN	FED. RD. DIV. NO.	PROJECT NO.	HIGHWAY NO.
TC	6	(See Title Sheet)	FM1171
GRAPHICS	STATE	DISTRICT	COUNTY
TC	TEXAS	DAL	DENTON
CHECK	CONTROL	SECTION	JOB
KKD	6457	03	001
KKD			5

SUMMARY OF ROADWAY ITEMS											
REF #	LOCATION	FROM	TO	START TRM	END TRM	192 6100	361 6033	666 6171	666 6174	666 6210	666 6306
1	FM1171	EAST OF IH 35W	WEST OF IH 35E	560	574	VEGETATION BARRIER (TREE ROOT)	FULL - DEPTH REPAIR CPCD (8")	REFL PAV MKR TY II (W) 6" (BRK)	REFL PAV MKR TY II (W) 6" (SLD)	REFL PAV MKR TY II (Y) 6" (SLD)	RE PM W/RET REQ TY I (W) 6" (BRK)(100MIL)
			NON-SITE SPECIFIC			SY	SY	LF	LF	LF	LF
						100	2934	1100	4400	25	1100
						25	734	275	1100	6	275
			PROJECT TOTALS			125	3668	1375	5500	31	1375

SUMMARY OF ROADWAY ITEMS											
REF #	LOCATION	FROM	TO	START TRM	END TRM	666 6309	666 6321	678 6002	672 6010		
1	FM1171	EAST OF IH 35W	WEST OF IH 35E	560	574	LF	LF	LF	EA	DAY	
			NON-SITESPECIFIC			4400	25	5525	55	30	
						1100	6	1381	14	8	
			PROJECT TOTALS			5500	31	6906	69	38	



SUMMARY SHEET

DESIGN TG		FED. RD. DIV. NO.	PROJECT NO.	SHEET 1 OF 1	
GRAPHICS TG		6	(See Title Sheet)	HIGHWAY NO. FM1171	
CHECK KKD		STATE TEXAS	DISTRICT DAL	SHEET NO. 6	
CHECK KKD		CONTROL 6457	SECTION 03	JOB 001	

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



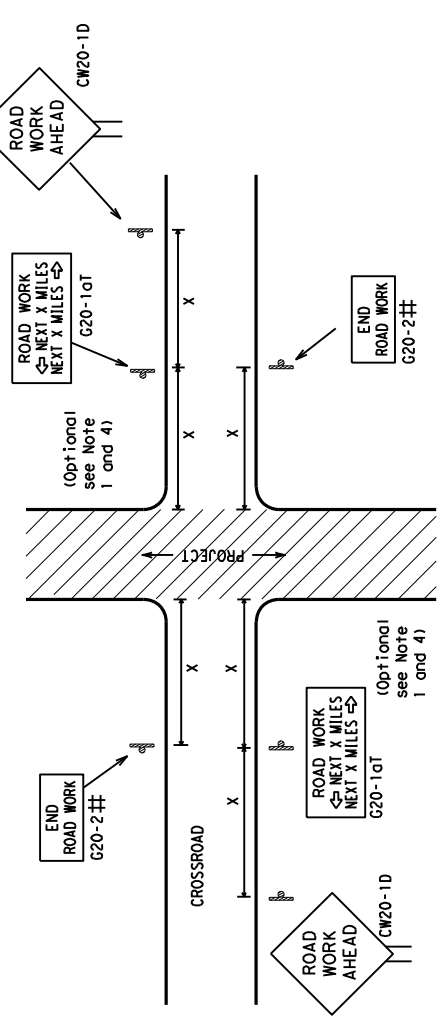
Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC (1) - 21

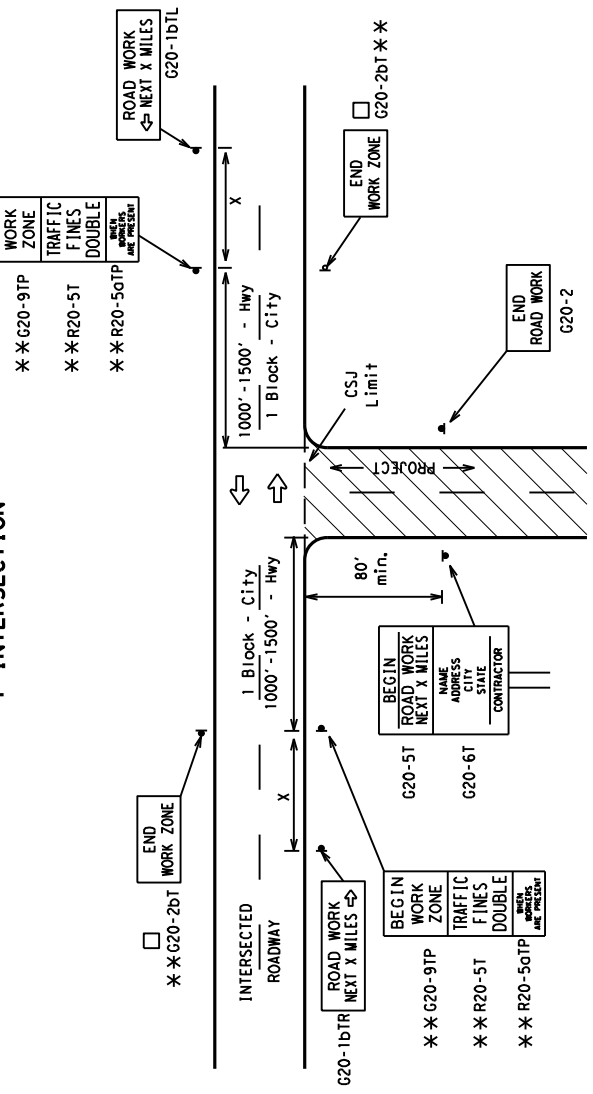
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① TxDOT	November 2002	CONT SECT	JOB						
		6-457	03	001					
4-03	7-13	REVISIONS							
9-07	8-14	DIST	COUNTY						
5-10	5-21	DAL	DENTON						
									SHEET NO. 7

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

T- INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

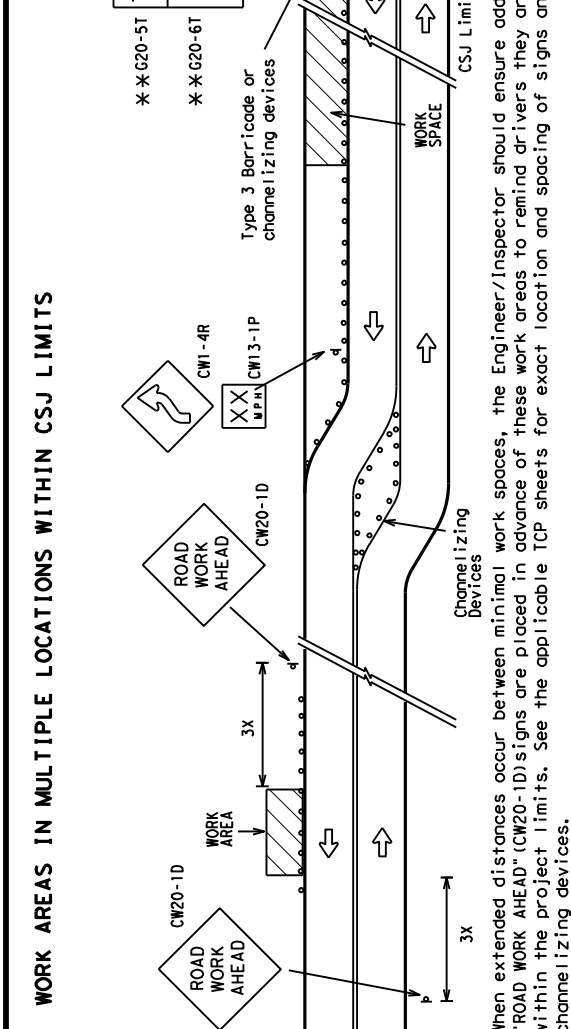
TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

Sign Number or Series	SIZE		Sign Spacing "x"
	Conventional Road	Expressway/Freeway	
CW20 ⁴			Posted Speed
CW21	48" x 48"	48" x 48"	MPH
CW22			Feet (Apprx.)
CW23			30
CW25			35
			40
			45
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50
			55
			60
			65
			70
			75
			80
			*
			*

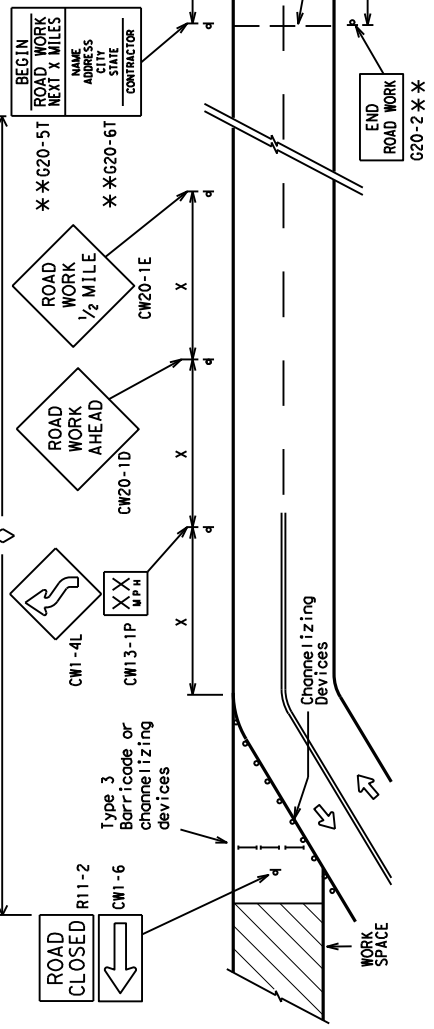
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

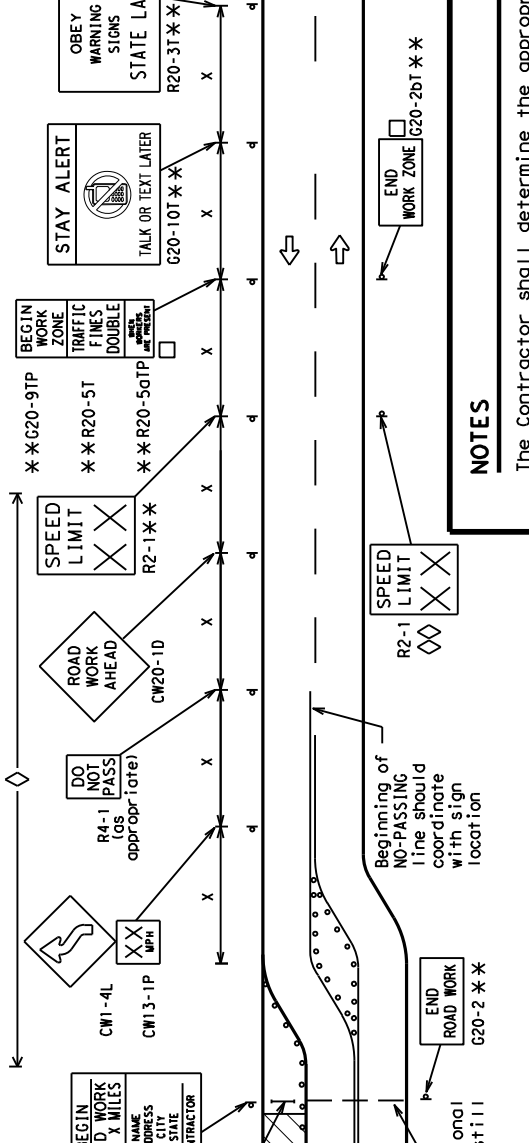
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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 sample layout 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.

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

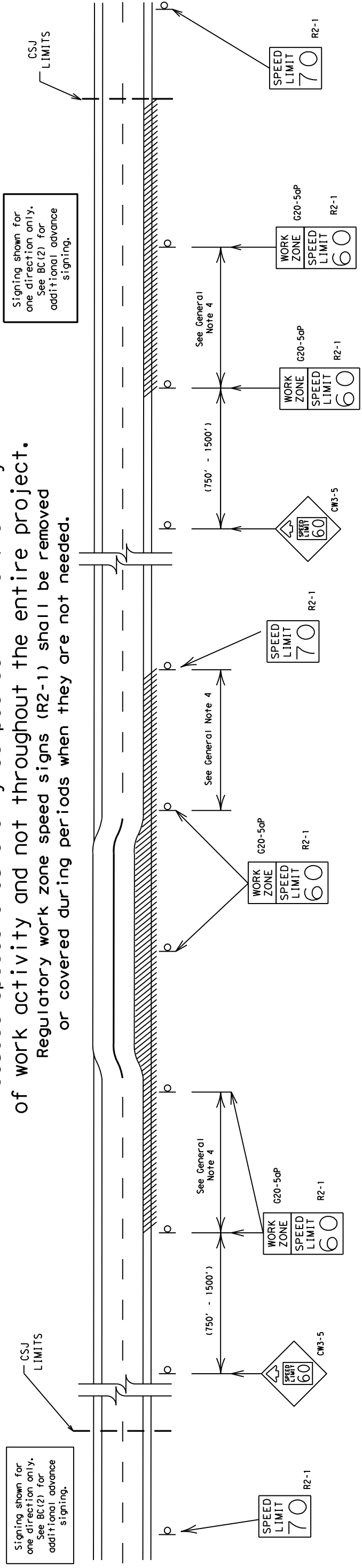
BC (2) - 21

FILE:	bc-21.dgn	DATE:	9-07	SHEET NO.:	8
DESIGNER:	bc-21.dgn	DATE:	7-13	SHEET NO.:	8
REVISIONS:	6-457 03	JOB:	FM1171		
	001	COUNTY:	DENTON		
		DIST:			

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.

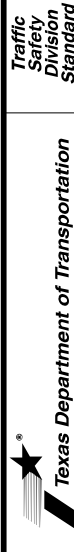
SHORT TERM WORK ZONE SPEED LIMITS

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.

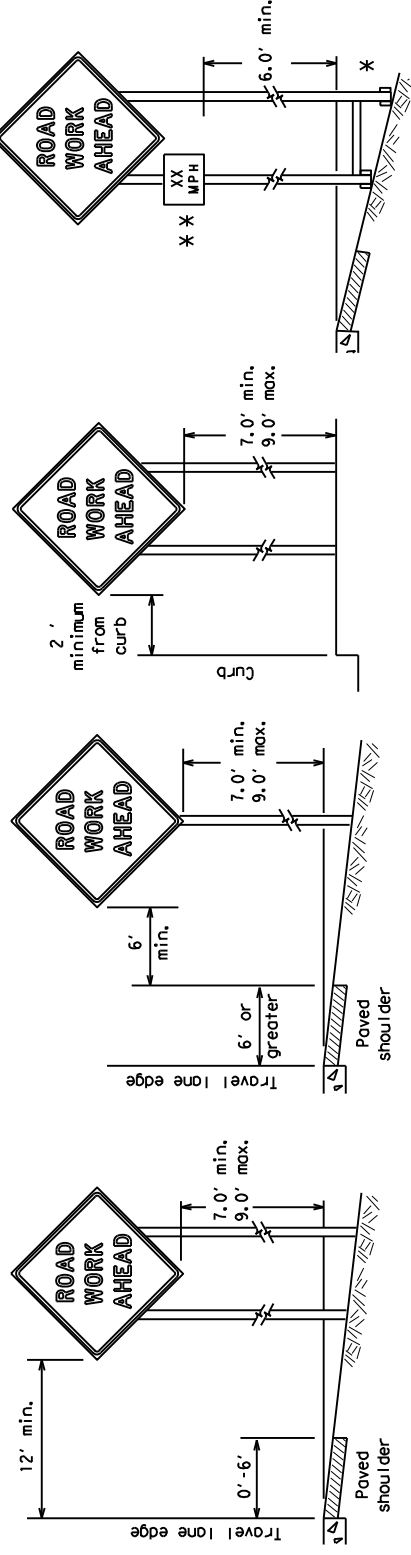


BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

FILE:	bc-21.dgn	DN:	TxDOT	DN:	TxDOT	CK:	TxDOT
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REV:	8-14	NO:	6457	03	001	FM1171	
DATE:	7-13	BY:	5-21	DIST:	COUNTY:		SHEET NO.:
				DAL:	DENTON		9

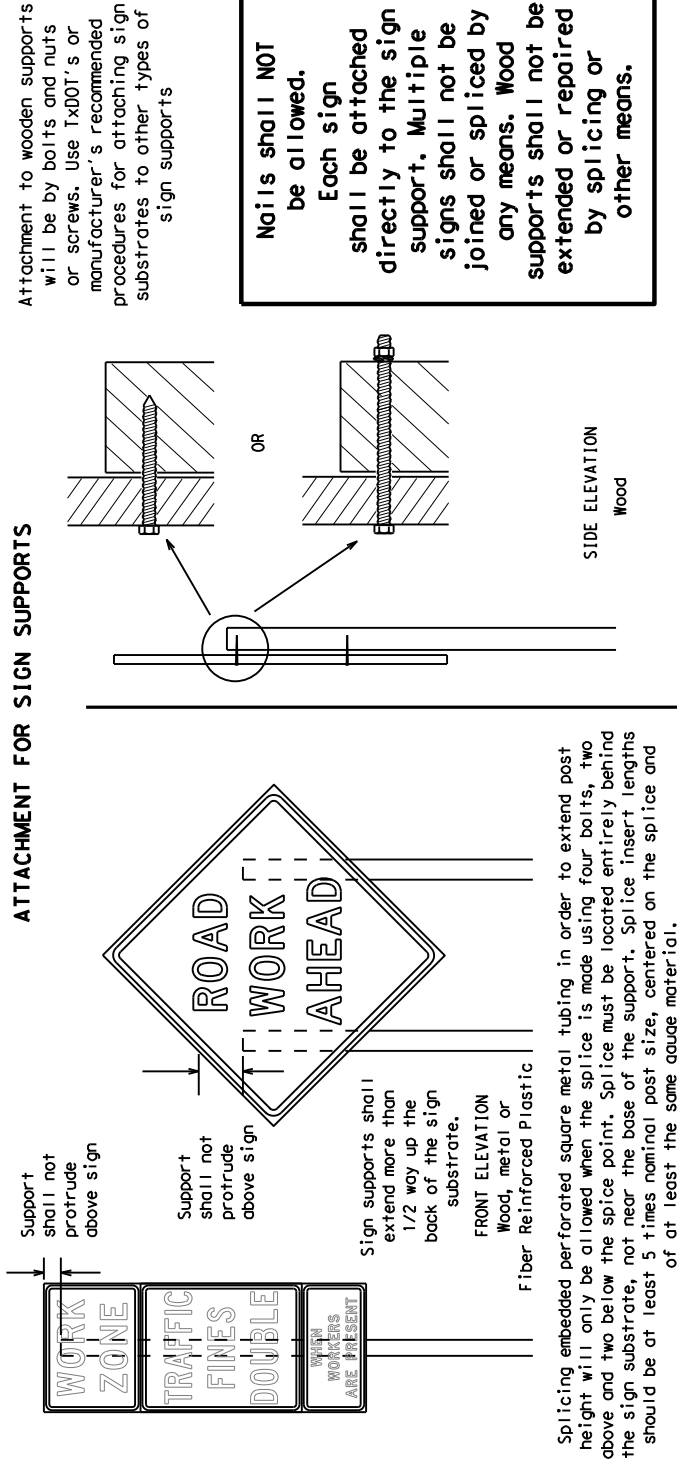
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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.

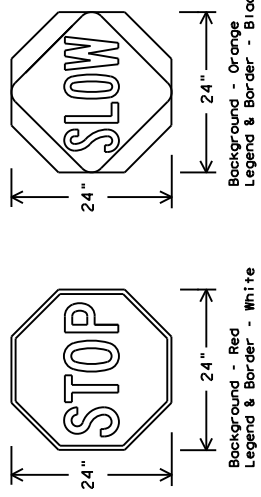
ATTACHMENT FOR SIGN SUPPORTS



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 _{PL} OR C _{PL} 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 TSCD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRs standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector 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_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

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

REMOVING OR COVERING

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

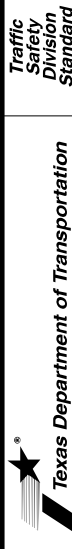
SIGN SUPPORT WEIGHTS

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 shall 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.

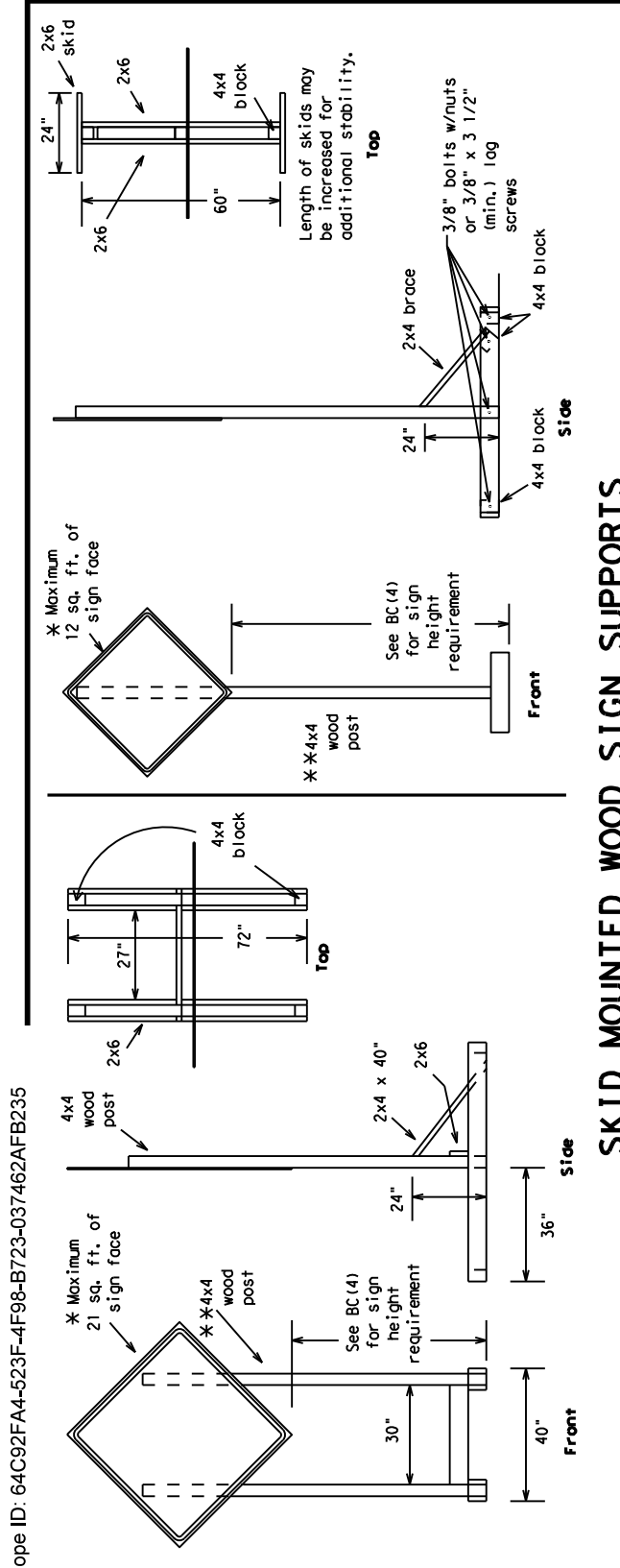
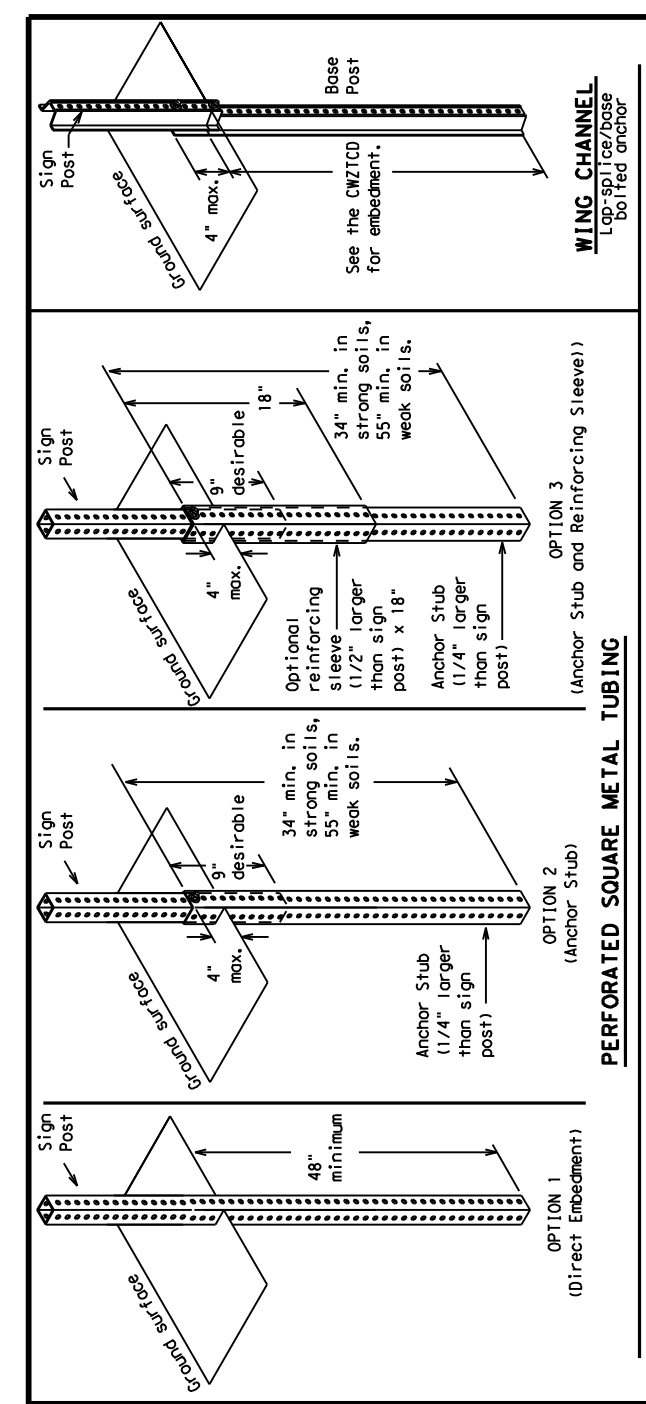
SHEET 4 OF 12



BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

FILE:	bc-21.dgn	DNK: TxDOT	CHK: TxDOT	DATE: TxDOT	CK: TxDOT
REVISED:	November 2002	CONTRACT:	6457 03	JOB:	HIGHWAY
DATE:	9-07	DIST:	001	FMI:	171
BY:	7-13	COUNTY:		SHEET NO.:	10
	5-21	DAL:	DENTON		



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SKID MOUNTED WOOD SIGN SUPPORTS

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

GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCO 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.

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 CWZTCO 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 and washers x 3 1/2" log screws must be used on every joint for a final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCO 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 CWZTCO for the type of sign substrate that can be used for each approved sign support.

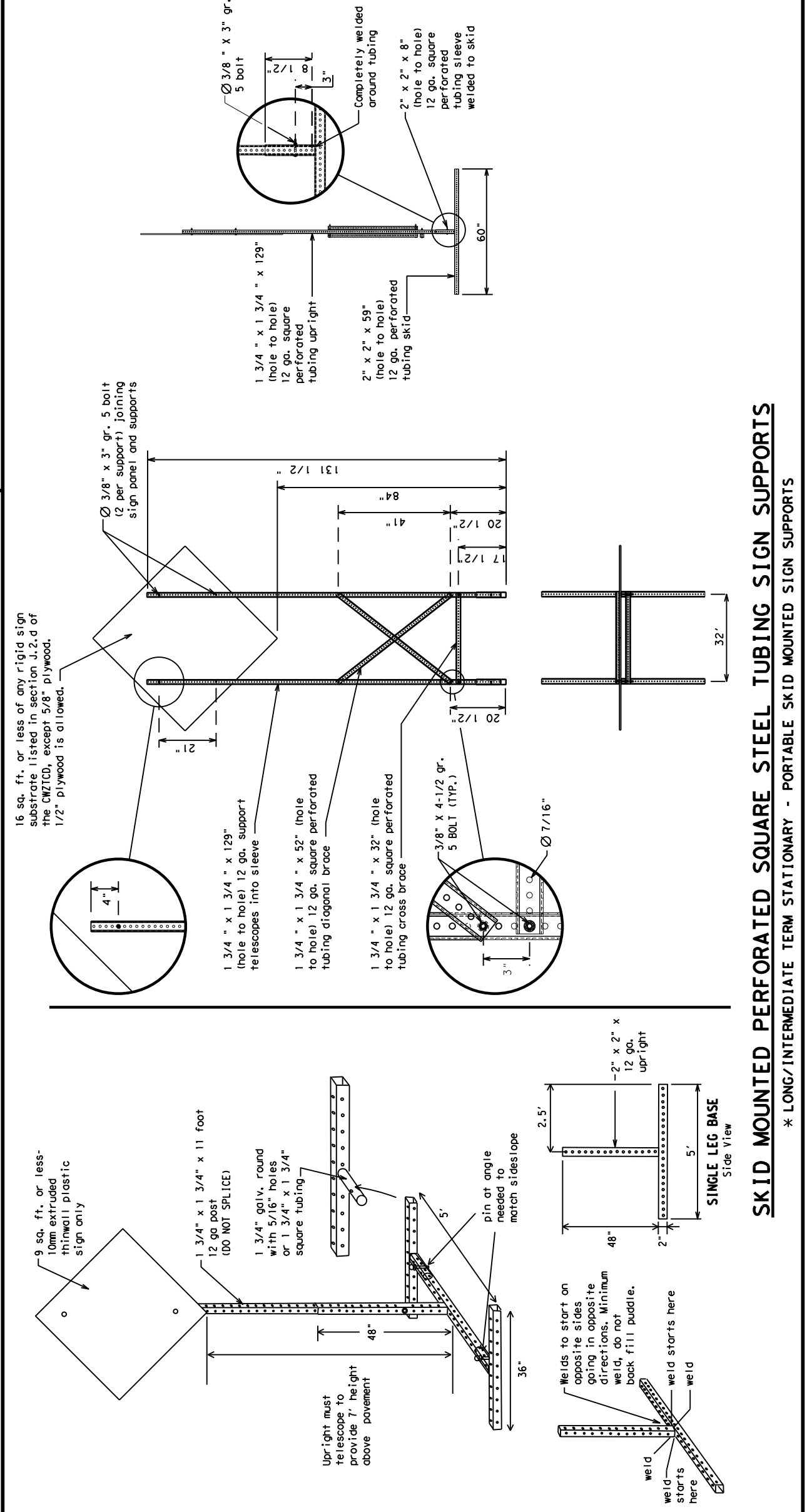
Texas Department of Transportation
Traffic Safety Division Standard

SHEET 5 OF 12

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC (5) - 21

FILE: bc-21.dgn	DATE: 11/01/03	JOB: FM171	COUNTY: DENTON
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NO. 5	NO. 6	NO. 7	NO. 8
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NO. 17	NO. 18	NO. 19	NO. 20
NO. 21	NO. 22	NO. 23	NO. 24
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NO. 93	NO. 94	NO. 95	NO. 96
NO. 97	NO. 98	NO. 99	NO. 100



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

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

* 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.

Phase 1: Condition Lists

Road/Lane/Ramp Closure List	Other Condition List
FRONTAGE ROAD CLOSED	ROADWORK XXX FT
SHOULDER CLOSED XXX FT	FLAGGER XXXX FT
RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT
RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT
DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT
I-XX SOUTH EXIT CLOSED	DETOUR X MILE
EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX
RIGHT LN TO BE CLOSED	BUMP XXXX FT
X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT

* 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.

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 phrase, or two phrases that alternate. Three-phrase 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 use "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.

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 phrase 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 List".
- 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.

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.

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.



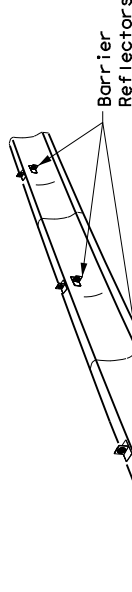
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 21

FILE: bc-21.dgn	DATE: 11/11/03	TIME: 10:00	USER: TxDOT	CHK: TxDOT
CONT: 6457	SECT: 03	JOB: 001	PROJECT: FMI171	SHEET NO.: 12
REV: 9-07	DATE: 8-14	DIST: COUNTY	DIST: DENTON	

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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 TxDOTCD. The color of the reflectors shall be considered subsidiary to Item 512.

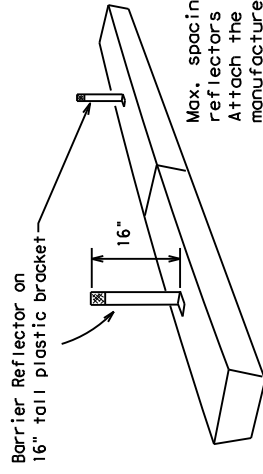


CONCRETE TRAFFIC BARRIER (CTB)

- 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.

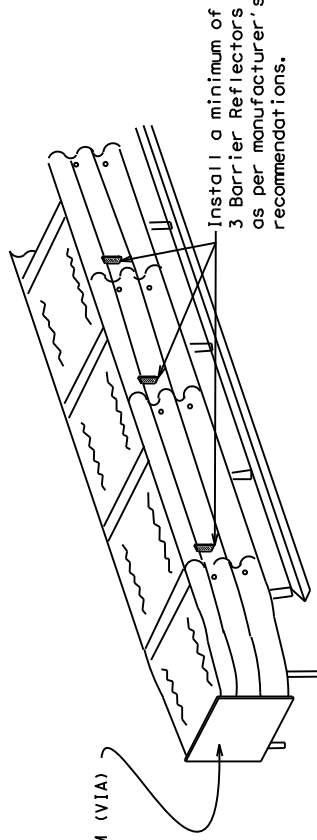
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

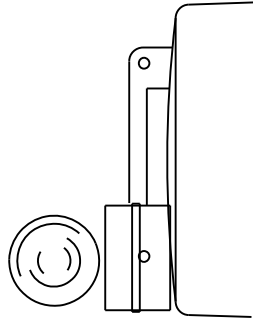
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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.

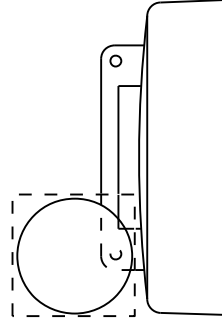
BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

- Warning lights shall meet the requirements of the TxDOTCD.
- 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 B₁ or C₁ 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.



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



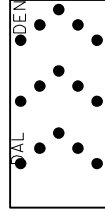
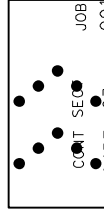
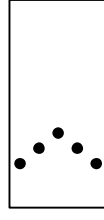
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

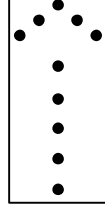
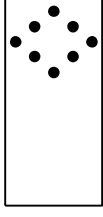
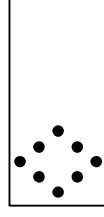
- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate 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.

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.

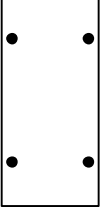
- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (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:



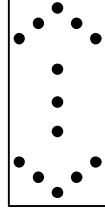
RIGHT/LEFT SEQUENTIAL CHEVRON (right chevron shown; left is similar)



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



4 CORNER CAUTION



DOUBLE ARROW

- 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 flashing 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 POMS 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.

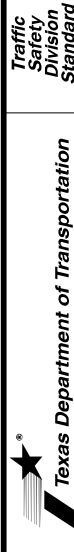
REQUIREMENTS		
TYPE	MINIMUM SIZE	MINIMUM VISIBILITY DISTANCE
B	30 x 60	3/4 mile
C	48 x 96	1 mile

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



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

BC (7) - 21

FILE:	bc-21.dgn	DATE:	10/11/02	DESIGNER:	TxDOT	CHECKER:	TxDOT
REVISED:	November 2002	DATE:	11/11/02	DESIGNER:	TxDOT	CHECKER:	TxDOT
REVISED:	8-14	DATE:	03/01	DESIGNER:	FH1171	CHECKER:	FH1171
REVISED:	7-13	DATE:	05-21	DESIGNER:	DAL	CHECKER:	DAL
PROJECT NO.:	6457-03	JOB NO.:	001	COUNTY:	DENTON	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.

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

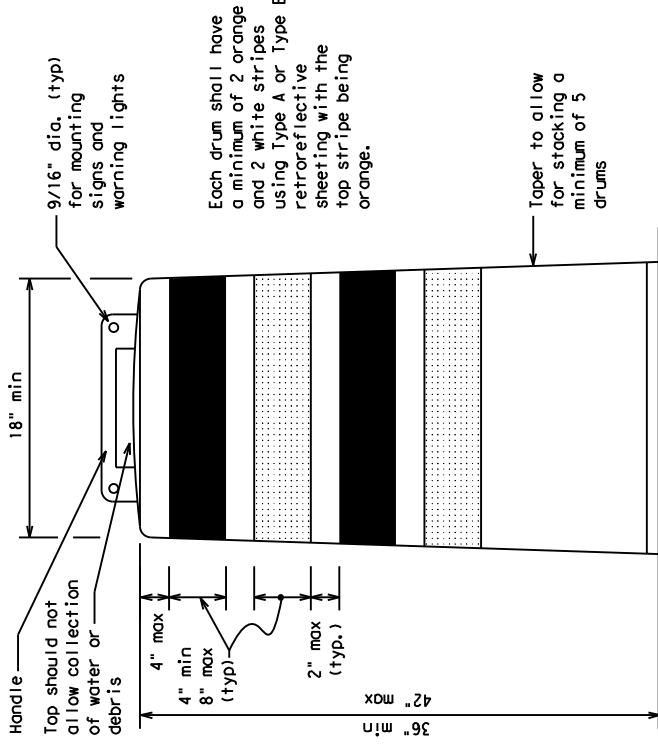
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

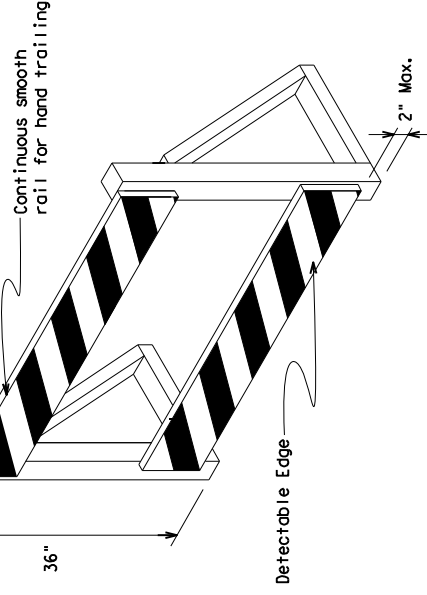
- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall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

BALLAST

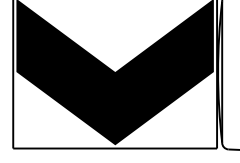
- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other 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

**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_{PL} or Type C_{PL} 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

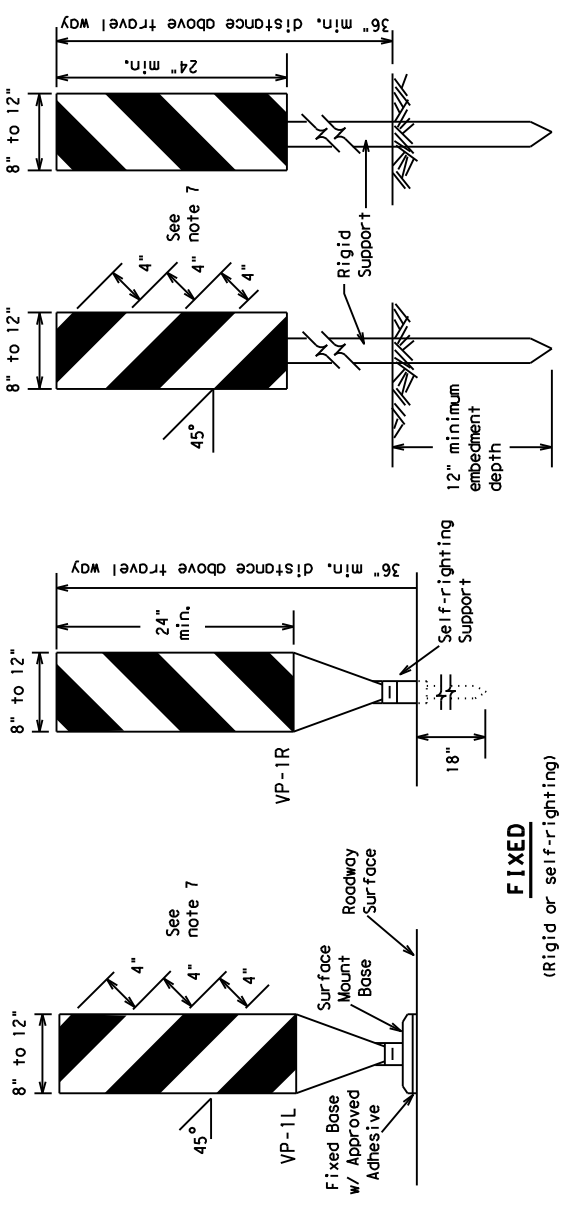
Traffic
Safety
Division
Standard**BARRICADE AND CONSTRUCTION
CHANNELIZING DEVICES**

BC (8) - 21

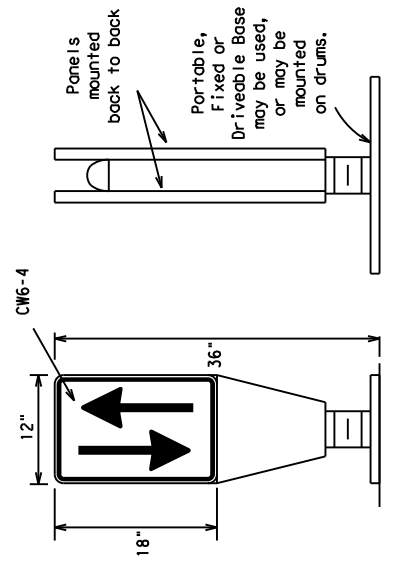
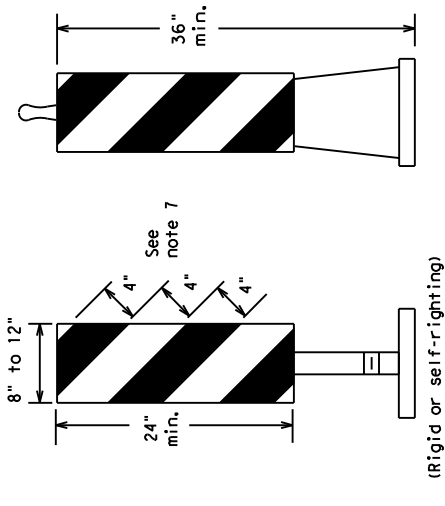
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REV:	6457	DATE:	03	BY:	FMI	DATE:	171		
REV:	4-03	DATE:	8-14	DIST:	COUNTY				
REV:	9-07	DATE:	5-21	DAL:	DENTON				
									14

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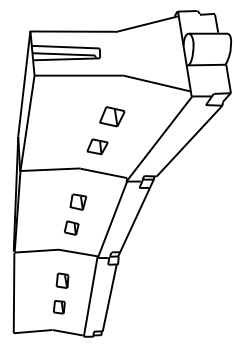


- VERTICAL PANELS (VPs)**
- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
 - VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and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



- Opposing Traffic Lane Dividers (OTLD) 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 B₁ or Type C₁ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for highway 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 B₁ or Type C₁ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.



CHEVRONS

- 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.

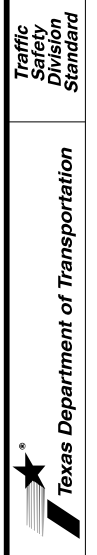
GENERAL NOTES

6457 03 001
FM117
SHEET NO. 15
DENON

Posted Speed	Formula	Minimum Desirable Taper Lengths *X*		Suggested Maximum Spacing of Channelizing Devices
		Offset	On a Taper	
30	WS ² L = 60	10'	12'	On a Taper
35		150'	180'	30'
40		205'	245'	35'
45	L = WS	265'	320'	40'
50		450'	540'	45'
55		500'	600'	50'
60	L = WS	550'	660'	55'
65		600'	720'	60'
70		650'	780'	65'
75	L = WS	700'	840'	70'
80		750'	900'	75'
85		800'	960'	80'

**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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

FILE:	bc-21.dgn	DATE:	11/07/02	DATE:	11/07/02
CONT:	November 2002	JOB:	6457 03 001	JOB:	6457 03 001
REV:	8-14	COUNTY:	DENTON	COUNTY:	DENTON
REV:	7-13	DIST:	DENTON	DIST:	DENTON
REV:	5-21	DAL:	DENTON	DAL:	DENTON

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR 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 specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

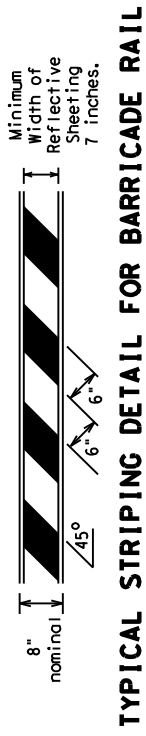
If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

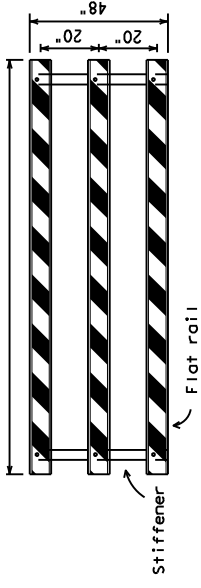
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.

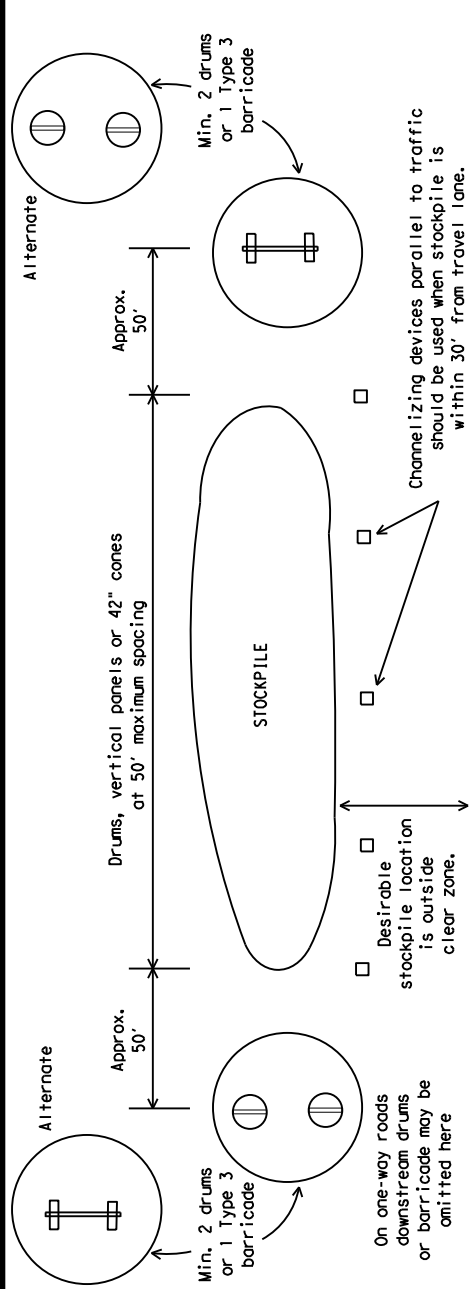


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



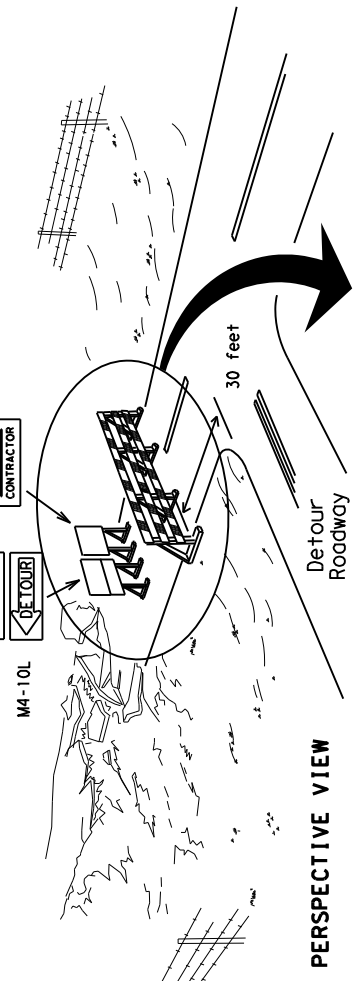
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

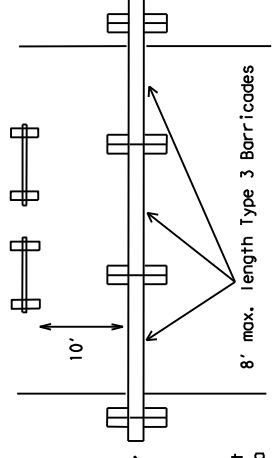


TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



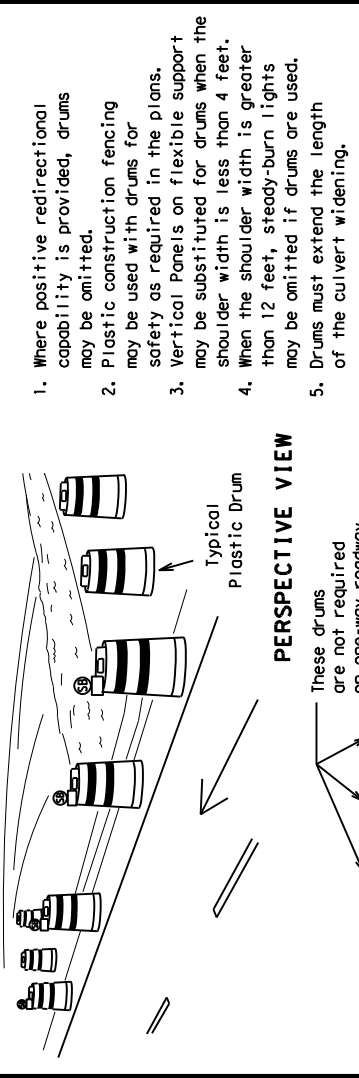
PERSPECTIVE VIEW



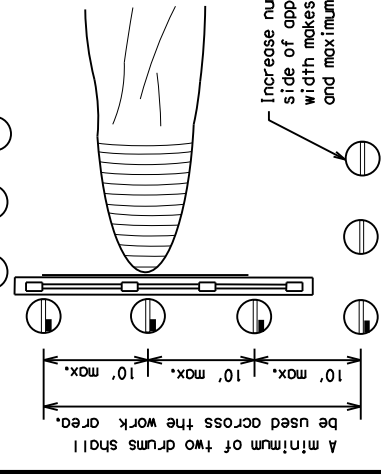
PLAN VIEW

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

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

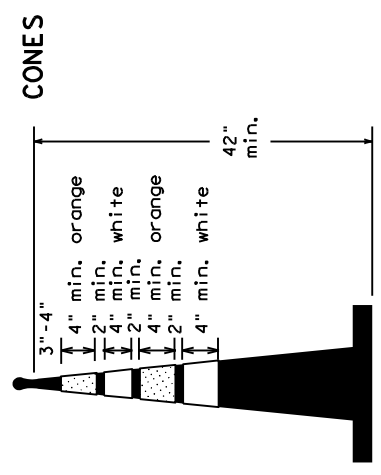


PLAN VIEW

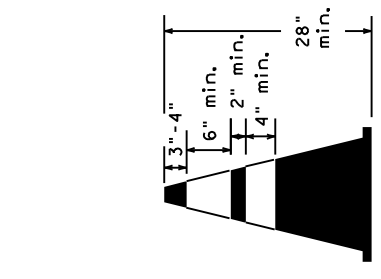
Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

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

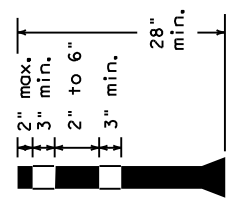
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones



Tubular Marker

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

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

Texas Department of Transportation
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

FILE:	bc-21.dgn	DATE:	10/01/03	BY:	CK	PROJECT:	TXDOT	CONTRACT:	CK	SECTION:	TXDOT
REVISIONS:	9-07	8-14	7-13	5-21	6457	03	001	FMI	T71	COUNTY:	DENTON
JOB:	HIGHWAY	SHEET NO.:	16								

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WORK ZONE PAVEMENT MARKINGS**GENERAL**

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

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(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

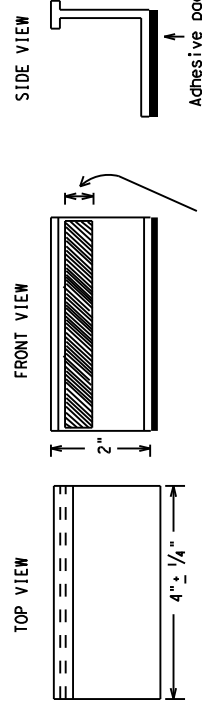
- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

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(1).

SHEET 11 OF 12



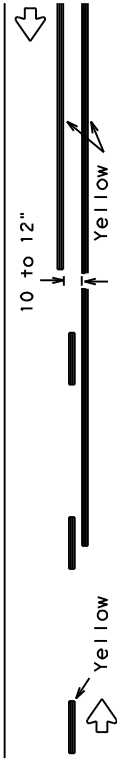
Texas Department of Transportation

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

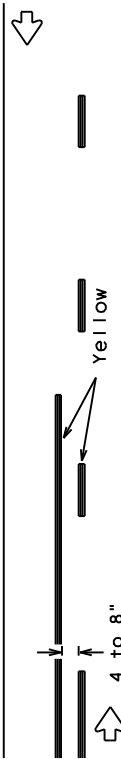
BC(11)-21

FILE:	bc-21.dgn	DWG:	TxDOT	CHK:	TxDOT	DATE:	TxDOT
CONT:	February 1998	SECTION:	JOB	DATE:	HIGHWAY		
REV:	REVISIONS	NO:	03	DATE:	FM1171		
2-98	9-07	5-21	DIST:	COUNTY	SHEET NO.		
1-02	7-13		DAL:	DENTON	17		
11-02	8-14						

PAVEMENT MARKING PATTERNS



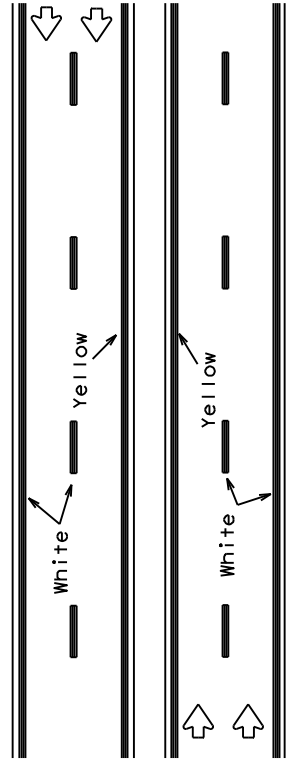
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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

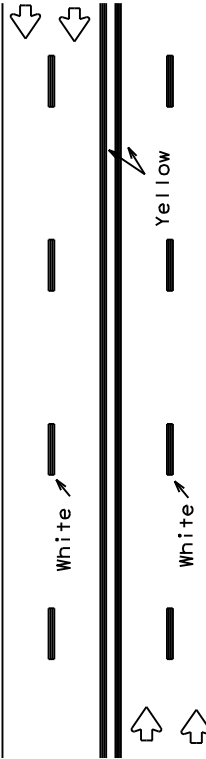
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.

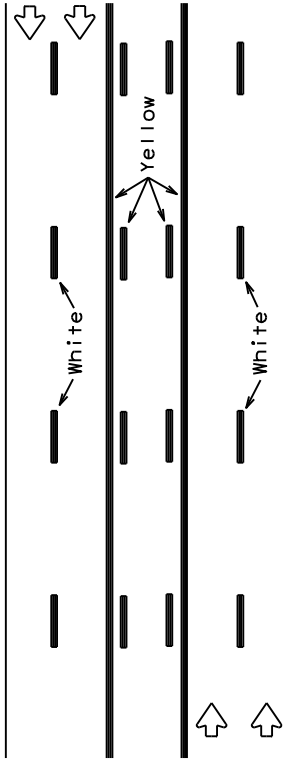
EDGE & LANE LINES FOR DIVIDED HIGHWAY



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.

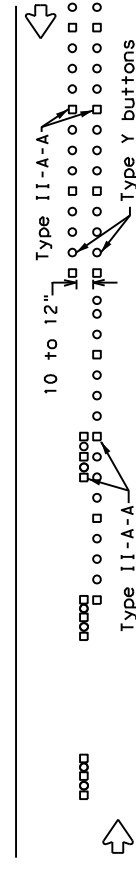
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



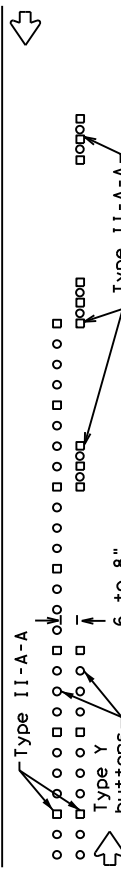
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectorized pavement markings.

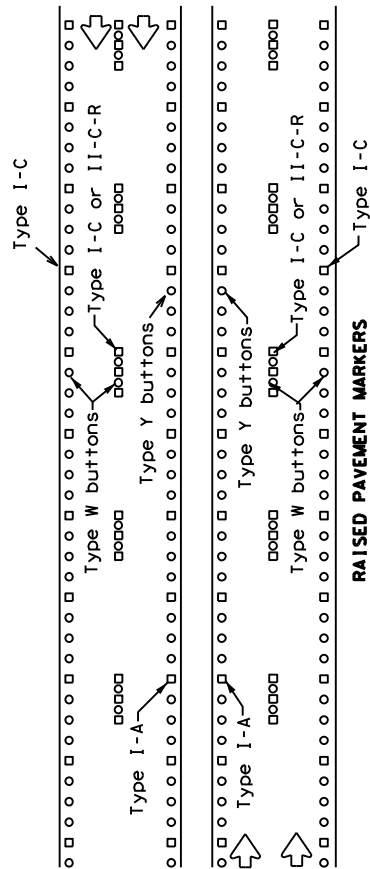
TWO-WAY LEFT TURN LANE



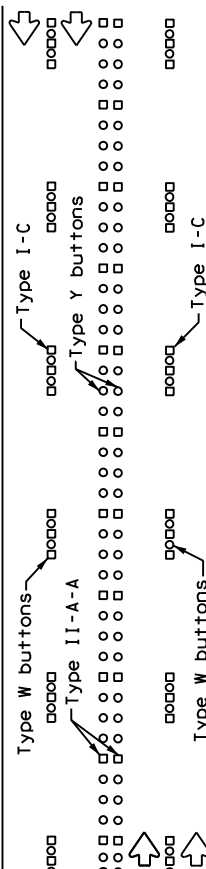
RAISED PAVEMENT MARKERS - PATTERN A



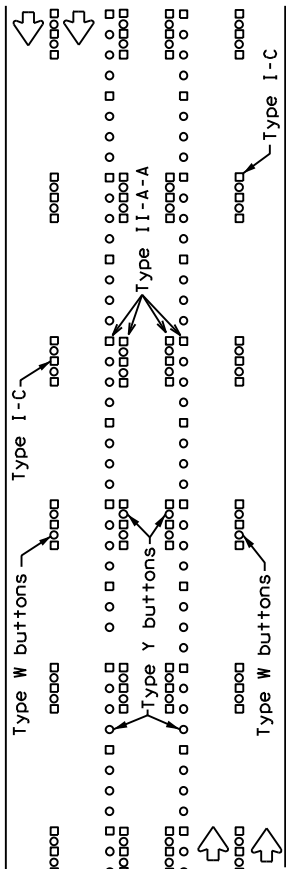
RAISED PAVEMENT MARKERS - PATTERN B



RAISED PAVEMENT MARKERS

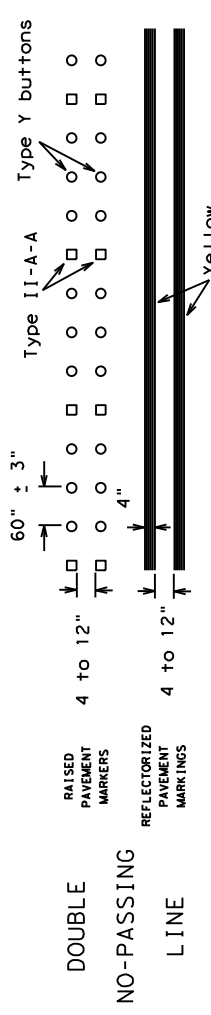


RAISED PAVEMENT MARKERS



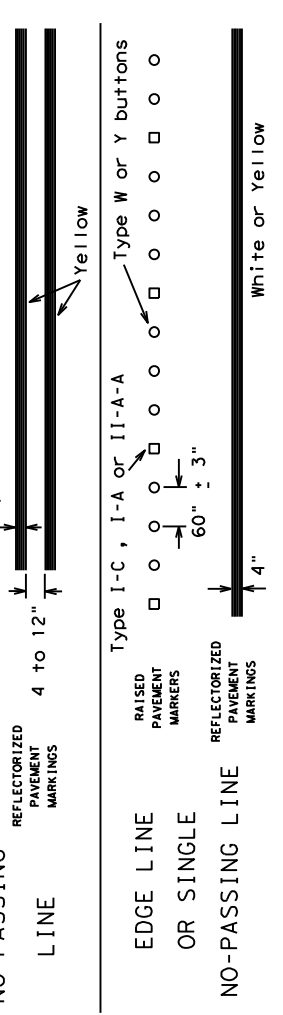
RAISED PAVEMENT MARKERS

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



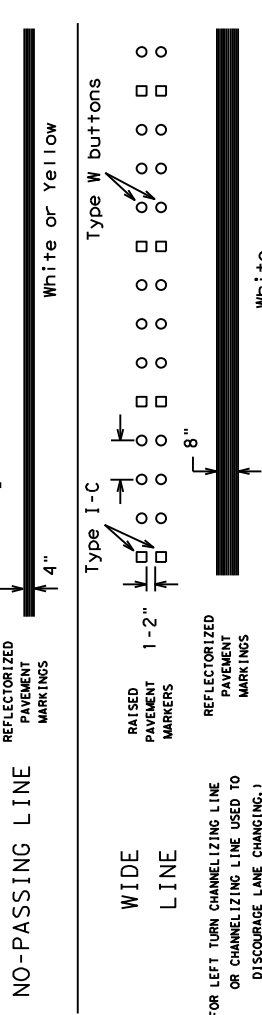
DOUBLE

NO-PASSING LINE



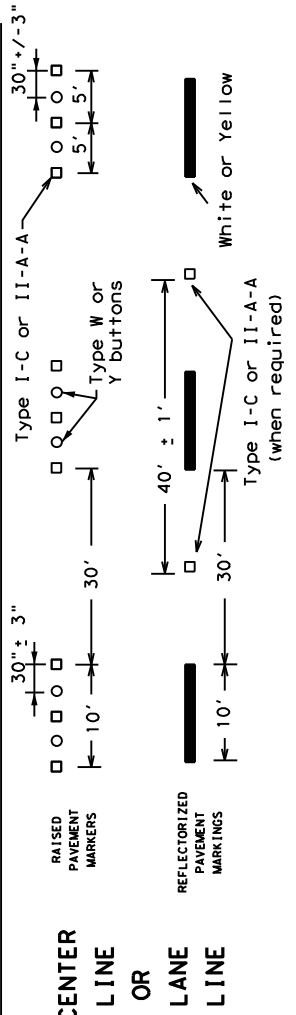
EDGE LINE OR SINGLE LINE

SOLID LINES



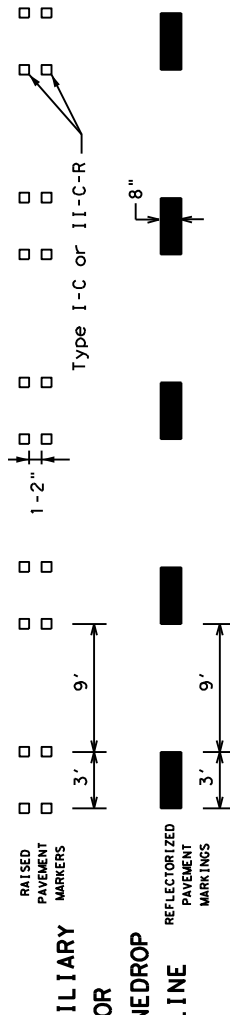
WIDE LINE

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

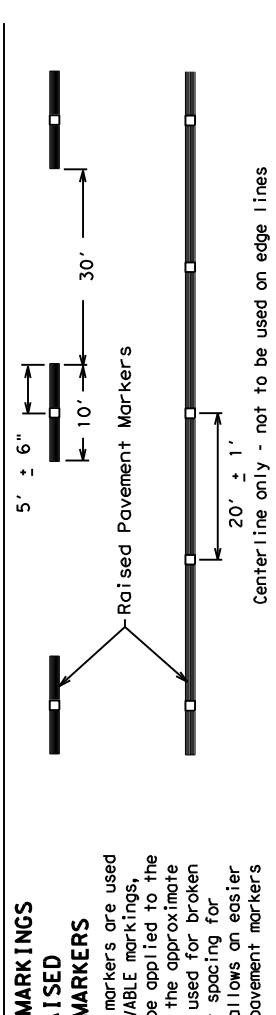


CENTER LINE OR LANE LINE

BROKEN LINES



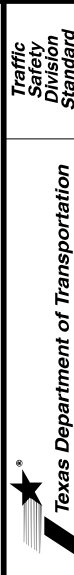
AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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

Centerline only - not to be used on edge lines

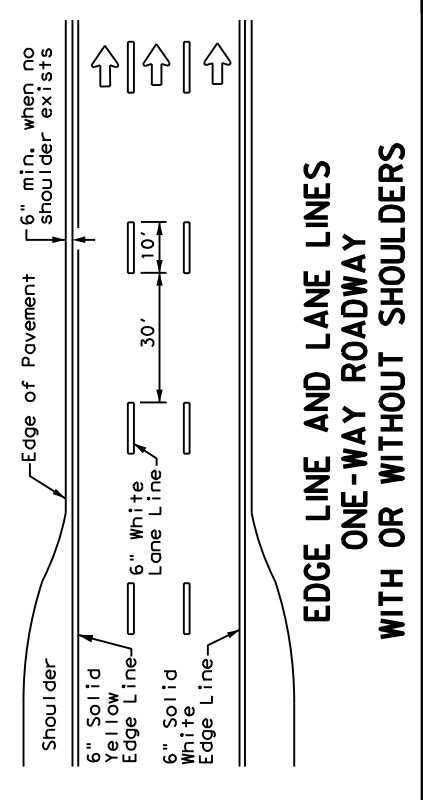


BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

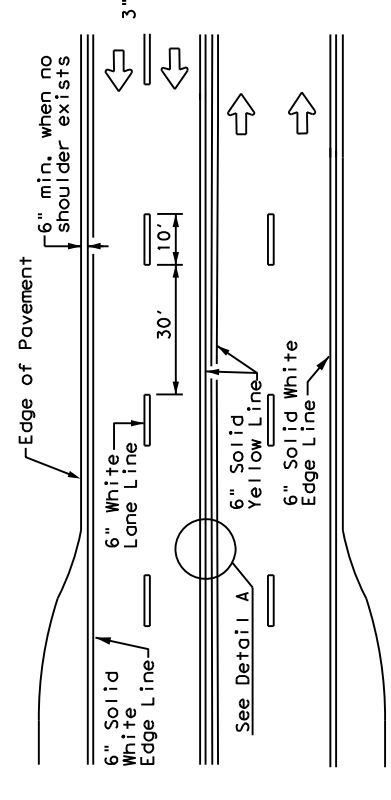
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

FILE:	bc-21.dgn	DNK	TxDOT	CK:	TxDOT	DM:	TxDOT	CK:	TxDOT
CONTRACT NO.:	February 1998	CONT	SECT	JOB	HIGHWAY				
REVISIONS	6-457 03	001	FMI	T 71					
DATE	1-97 9-07 5-21	DIST	COUNTY	SHEET NO.					
	2-98 7-13	DAL	DENTON	18					
	11-02 8-14								

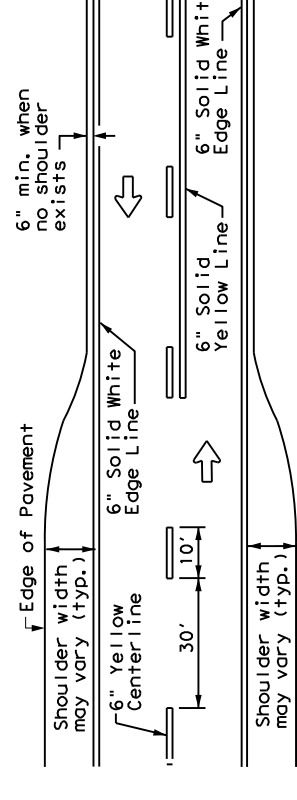
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



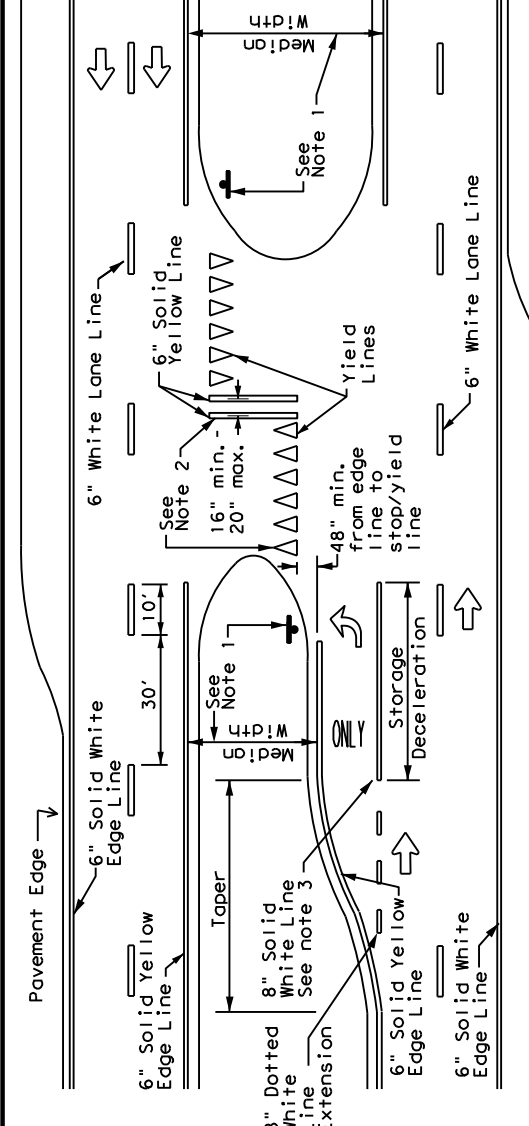
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



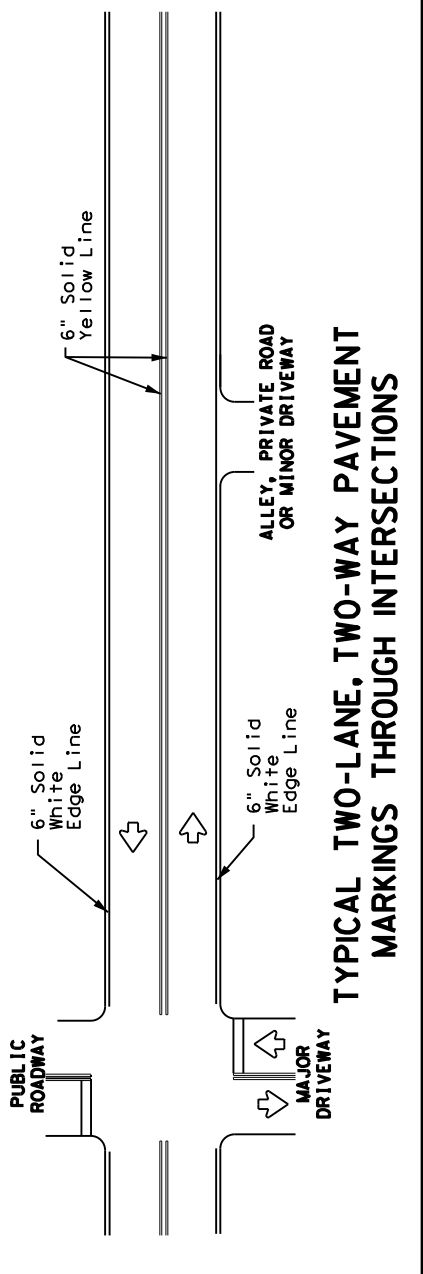
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



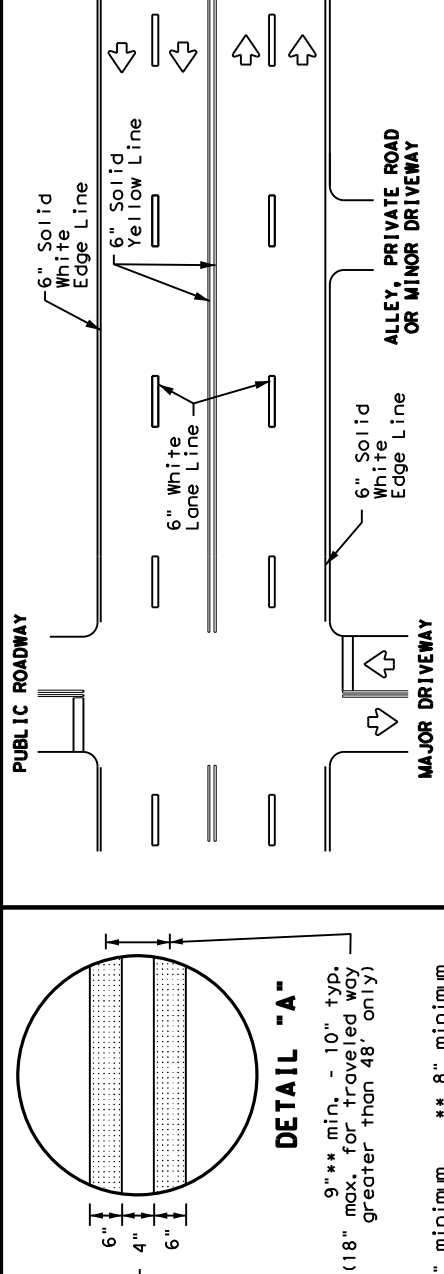
**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



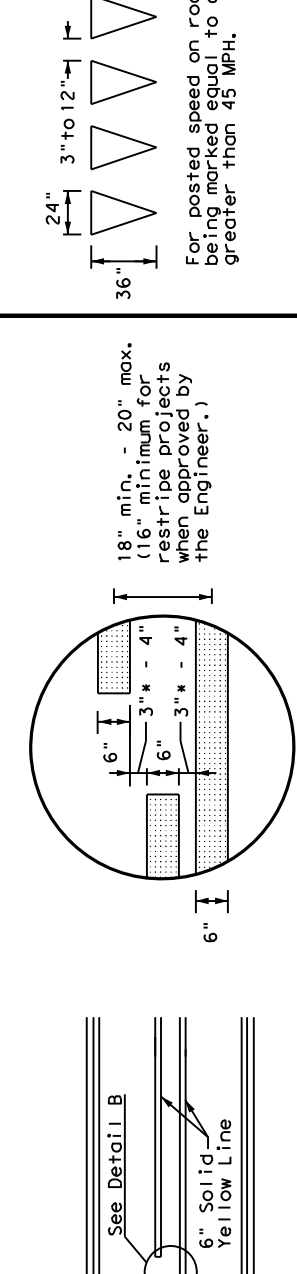
FOUR LANE DIVIDED ROADWAY CROSSOVERS



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

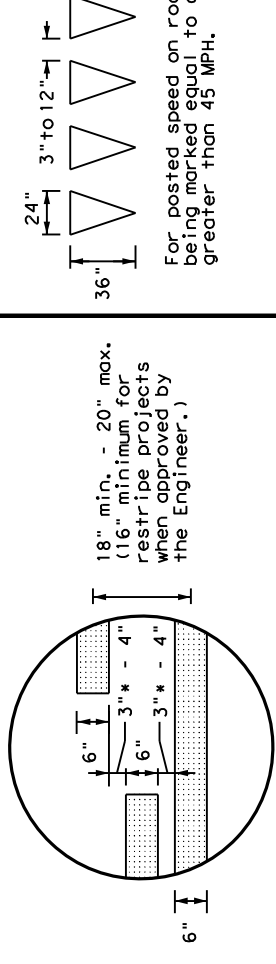


**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



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.

NOTES

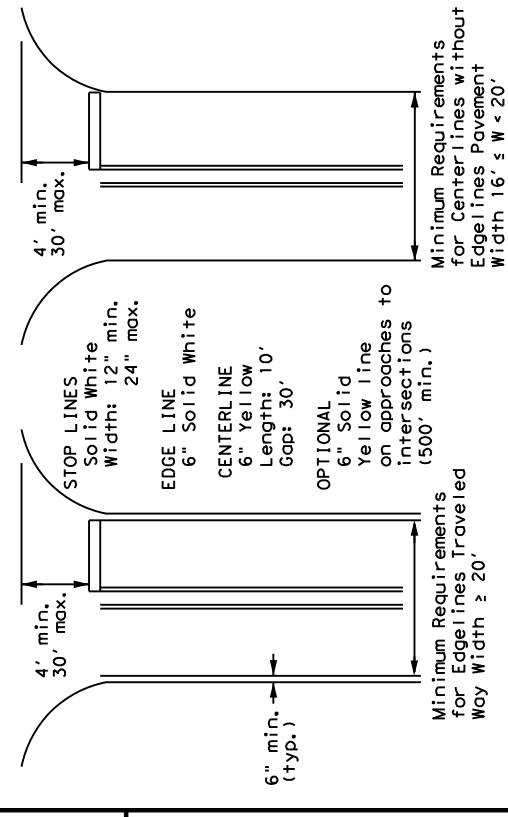
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

GENERAL NOTES

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

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

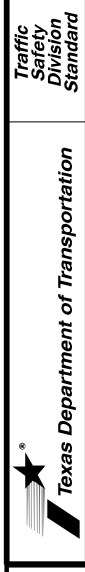
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



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

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

Based on Traveled Way and Pavement Widths for Undivided Roadways



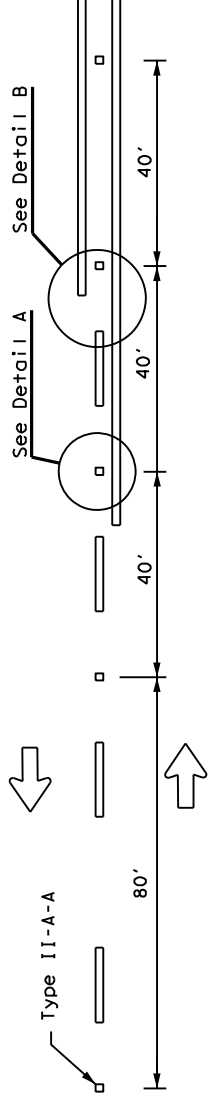
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1) - 22

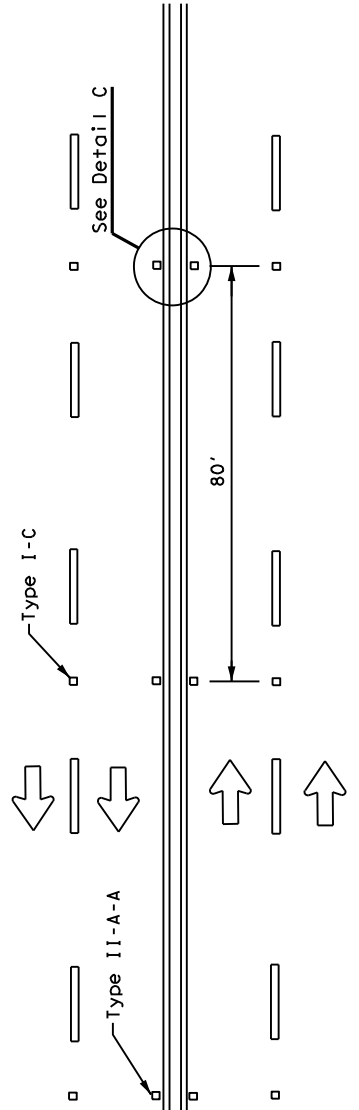
FILE:	pm1-22.dgn	DWG:	CK:	CHK:
CONT:	December 2022	JOB:	HIGHWAY	
REV:	03	001	FMI1171	
DATE:	11-78	8-00	6-20	
	8-95	3-03	12-22	
	5-00	2-12		
DIST:	COUNTY:	DAL:	DENTON:	19

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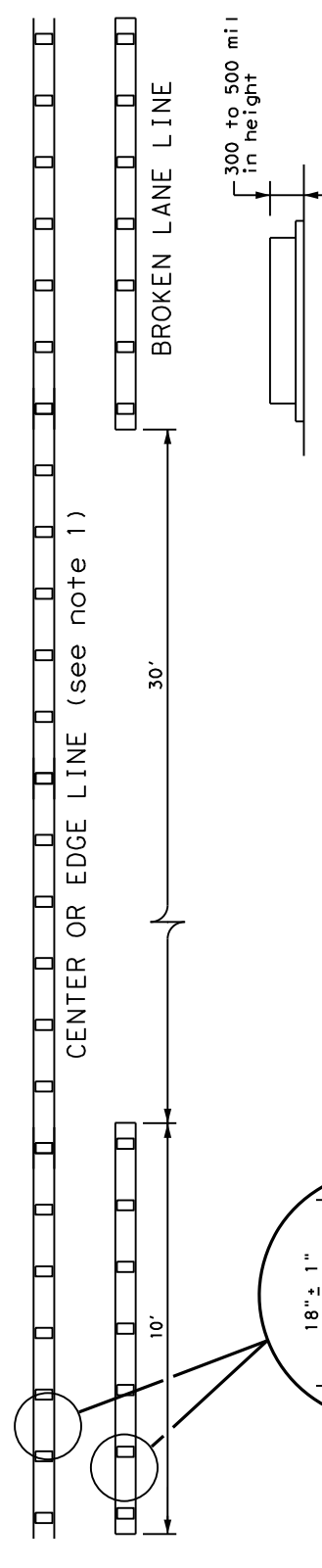
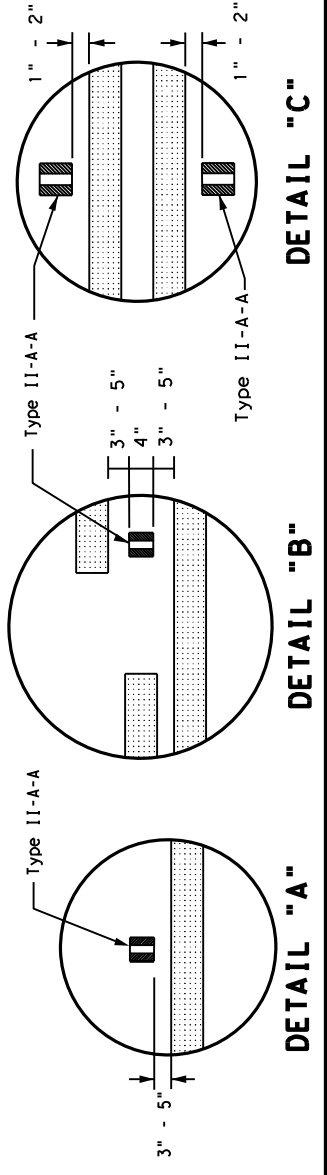
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



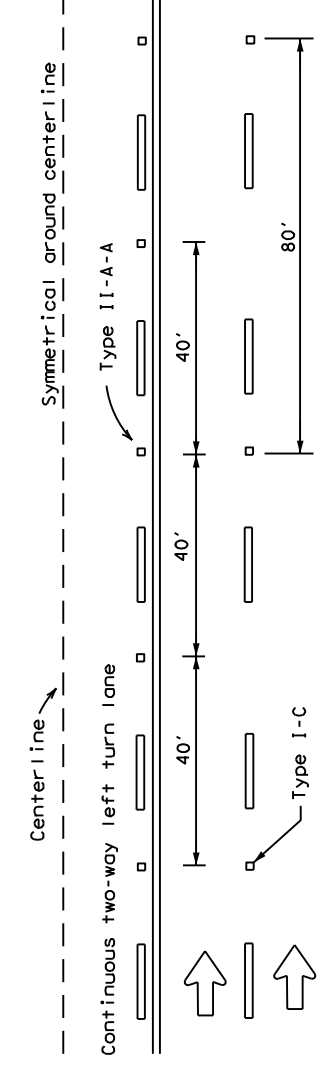
REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

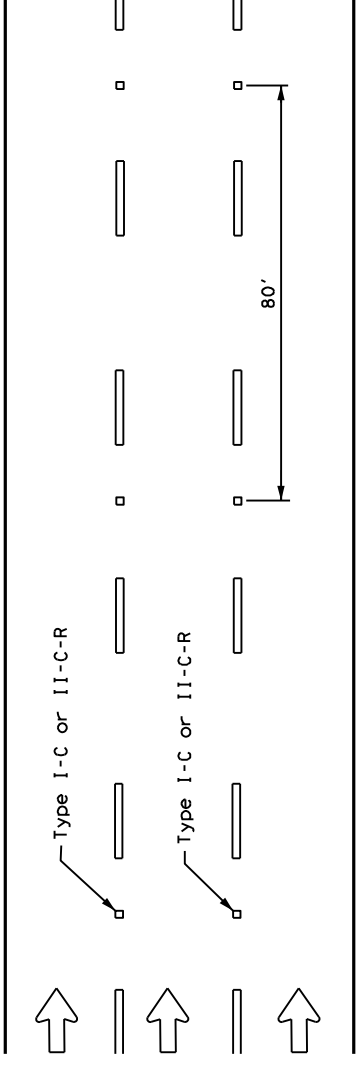
6" EDGE LINE, 6" CENTERLINE
OR 6" LANE LINE

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)

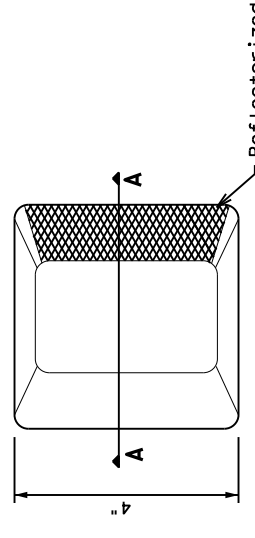
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.
See Note 3.

GENERAL NOTES

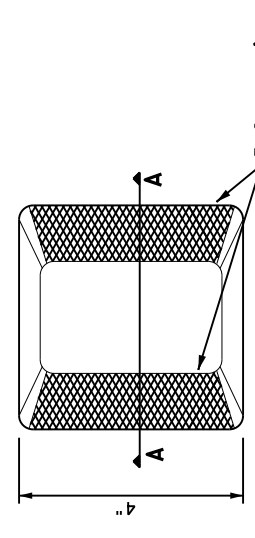
- All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
- Use raised pavement marker Type I-C with undivided roadways, flush medians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

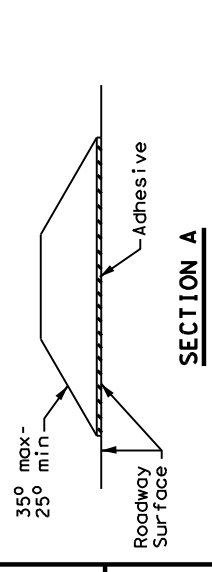
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

FILE: pm2-22.dgn	DWG: CK:	CHK:
TXDOT December 2022	CONT SECT: JOB	HIGHWAY:
REVIEWS	6457 03 001	FM1171
4-77 8-00 6-20	DIST: COUNTY	SHEET NO.
4-92 2-10 12-22	DAL: DENTON	20
5-00 2-12		

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NOTES

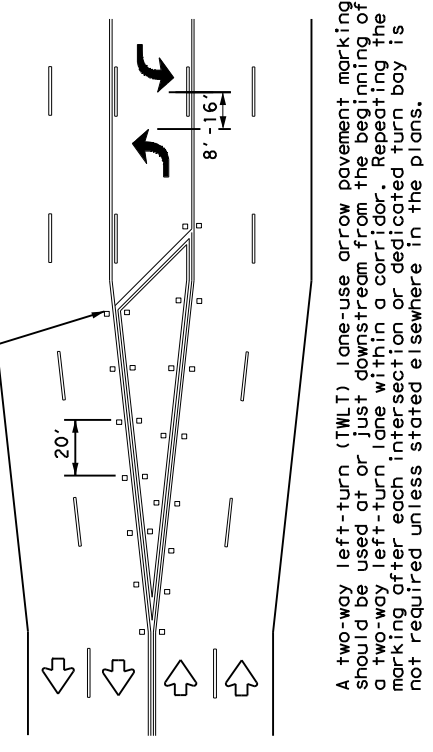
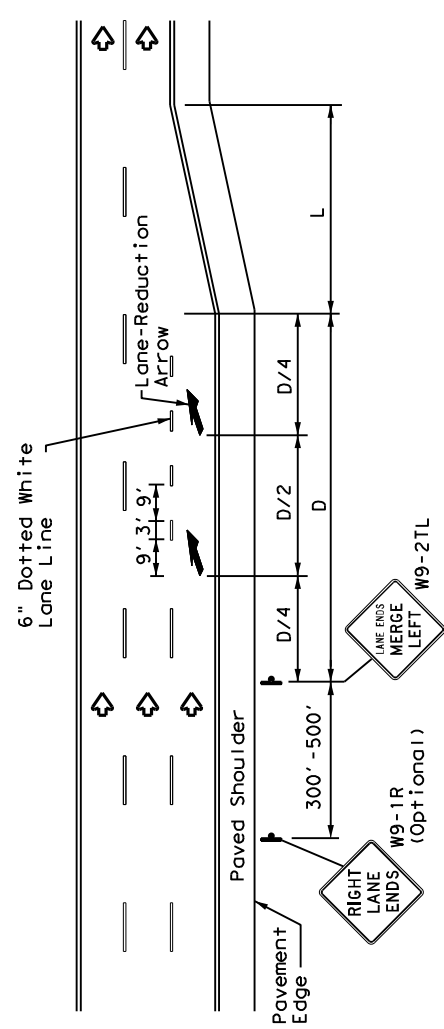
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see T52(PL) standard sheets.
- On divided highways, an 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)	L/WS
30 MPH	460		
35 MPH	565		$L = \frac{WS^2}{60}$
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



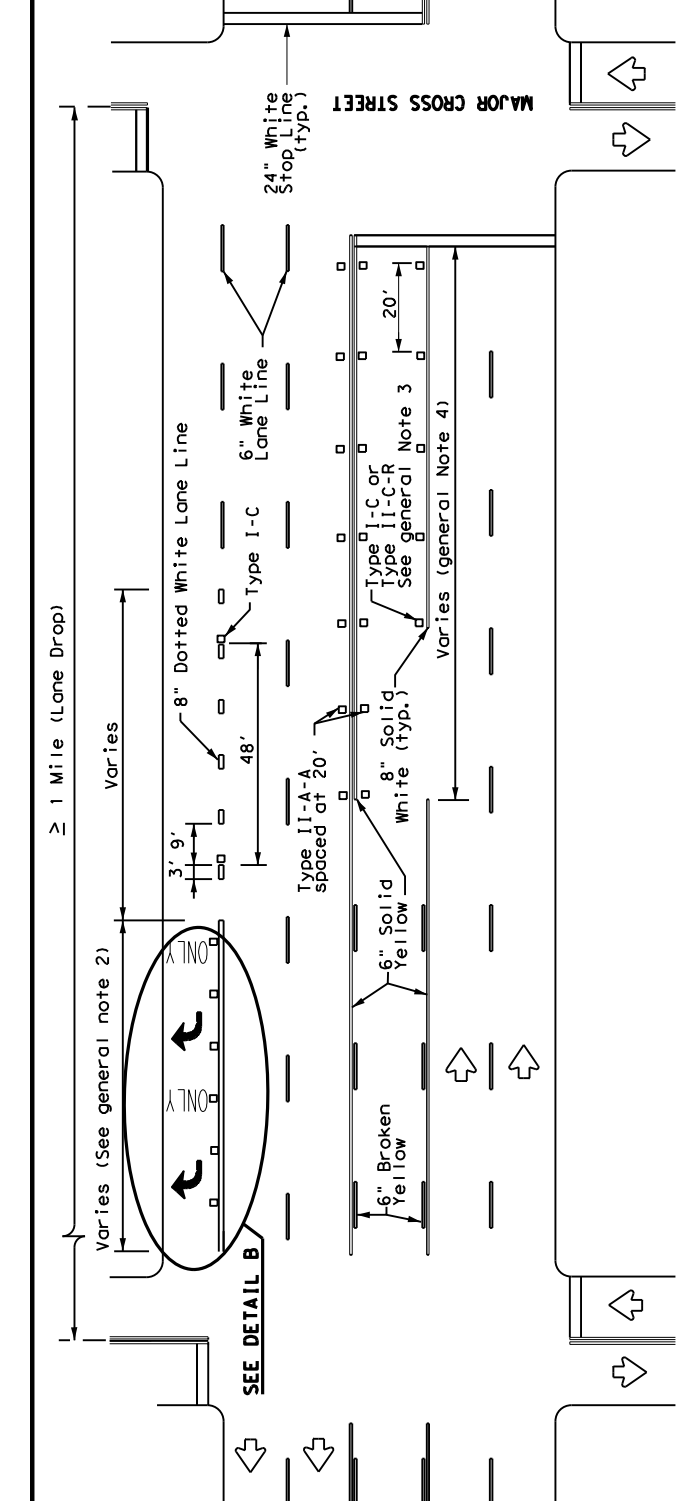
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

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

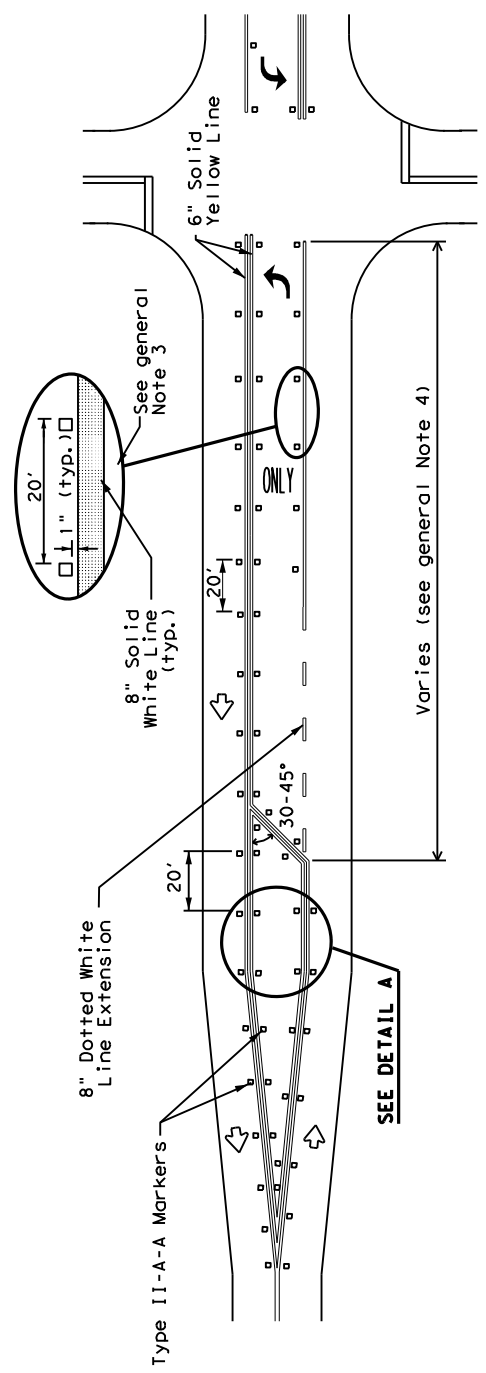
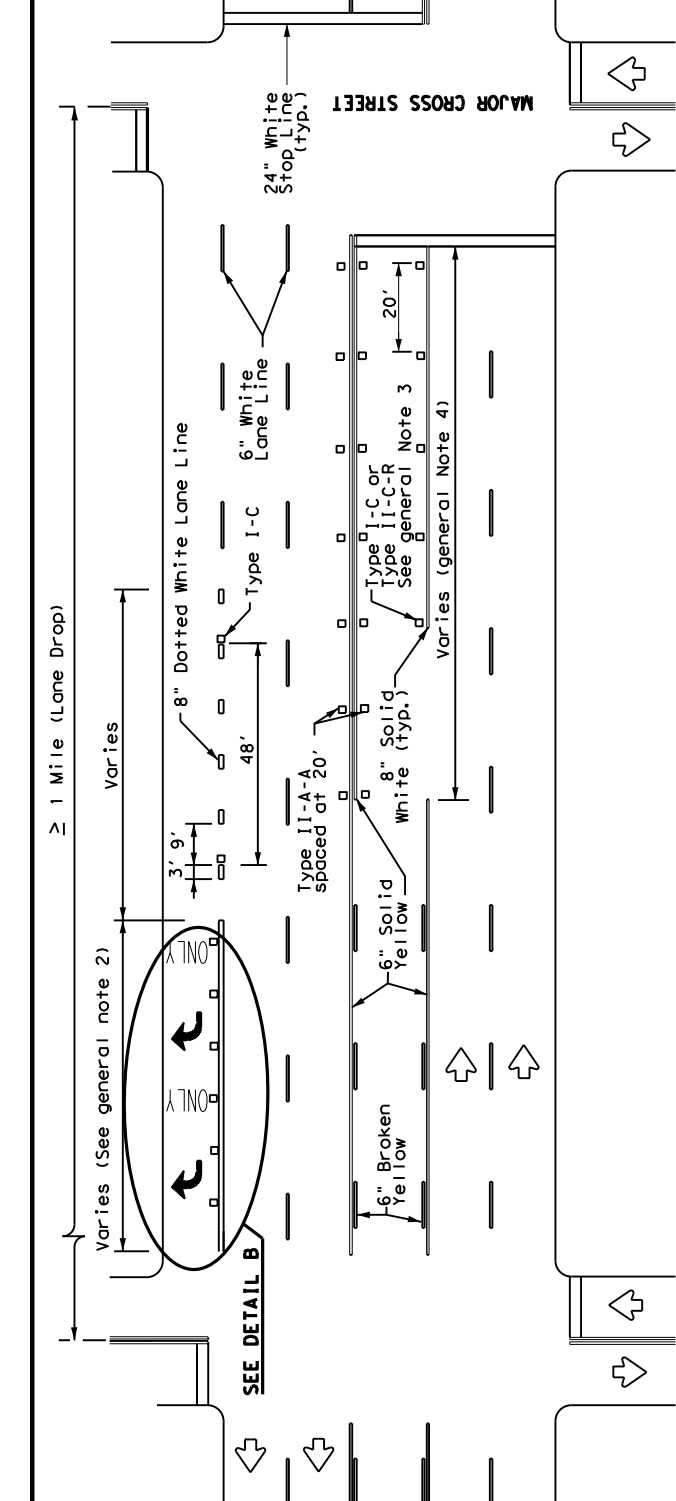
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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

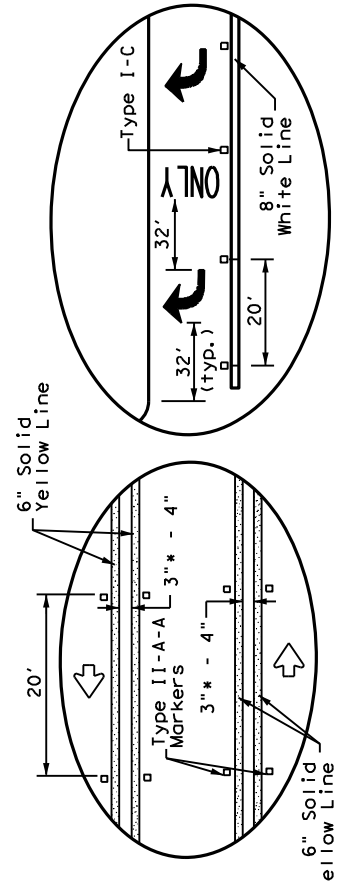
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A

DETAIL B

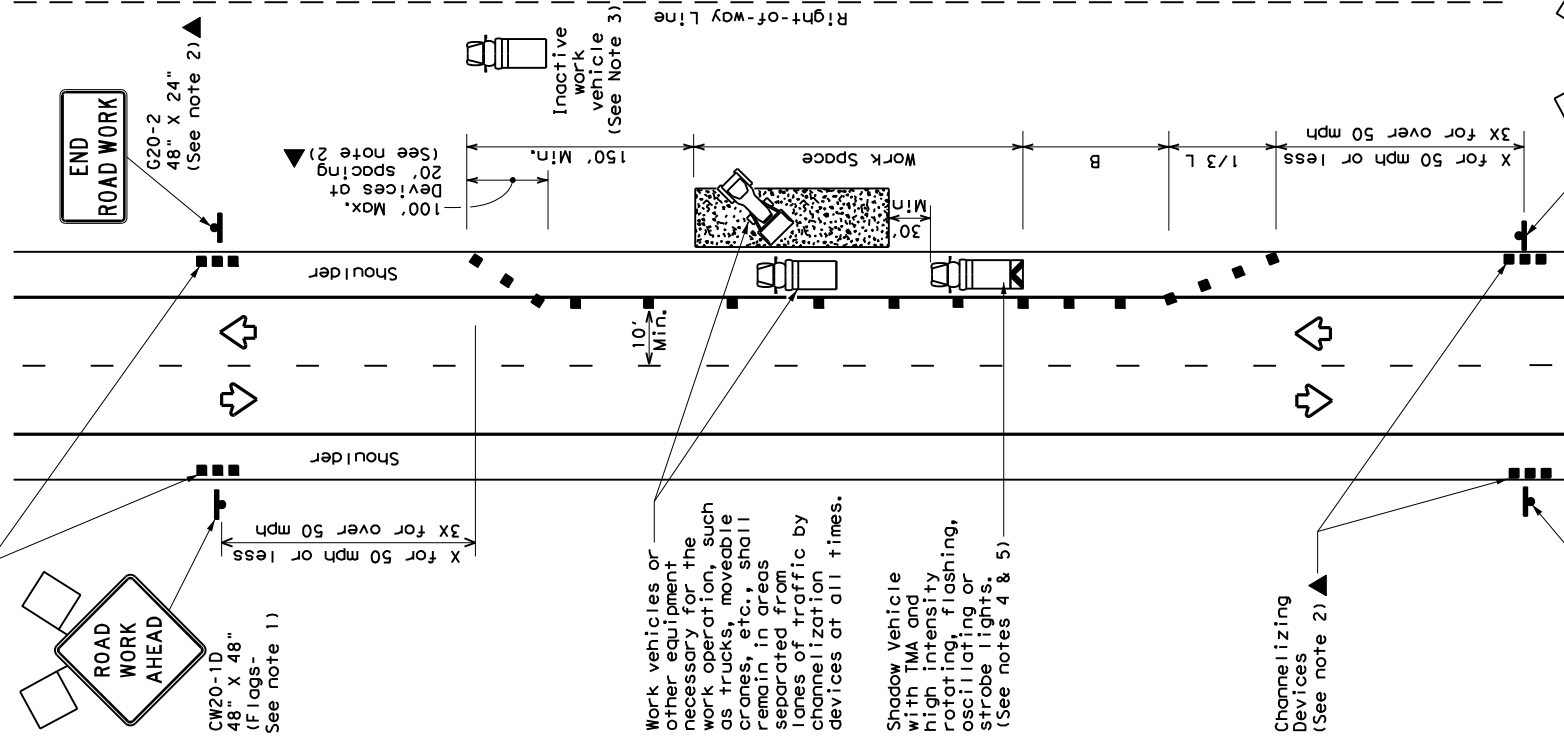
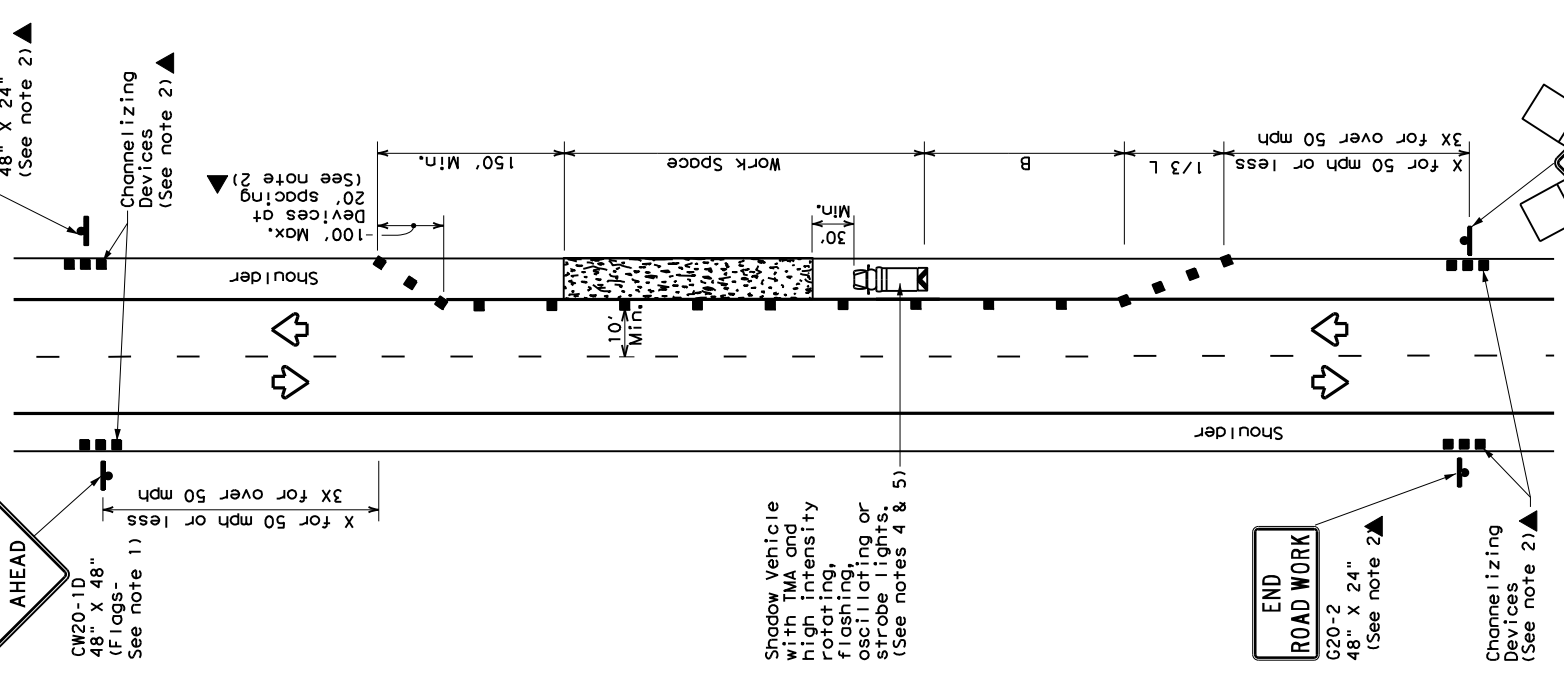
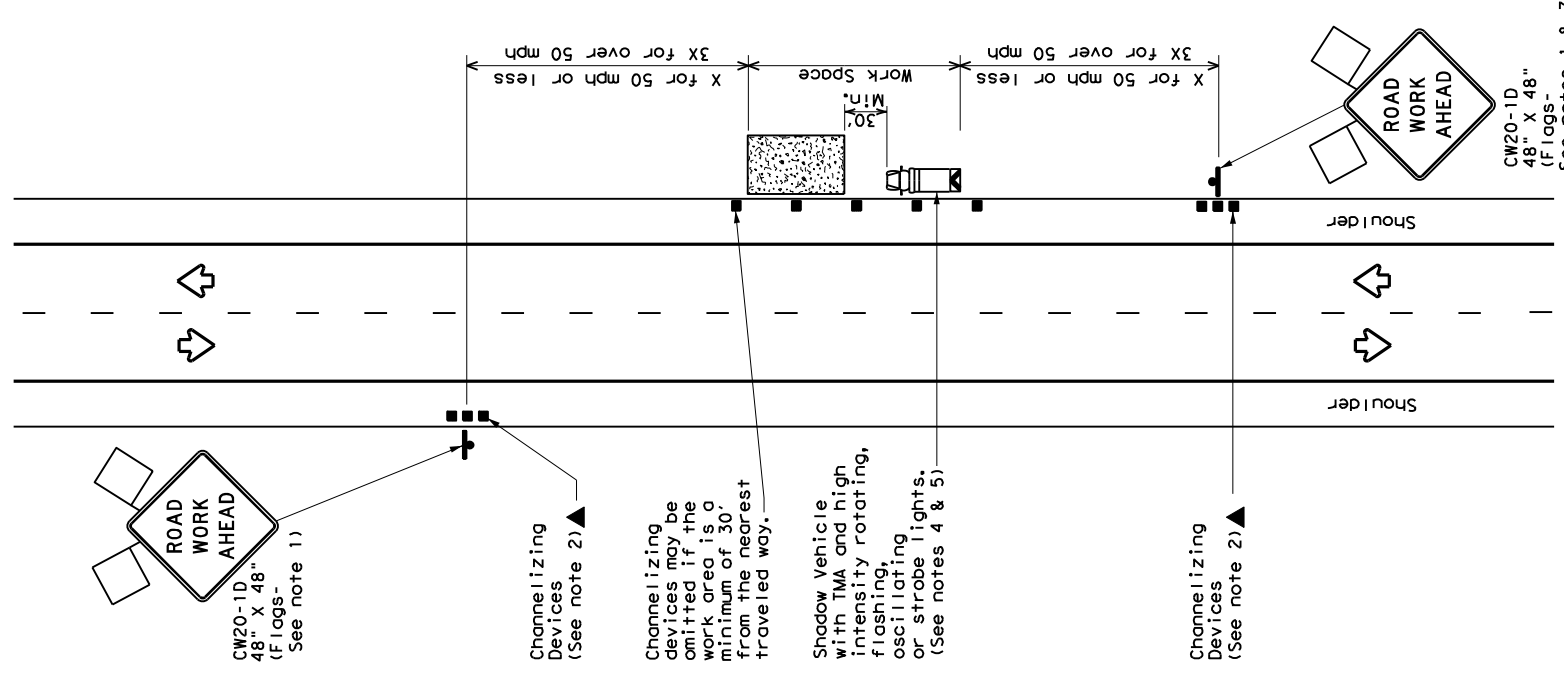
* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

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

FILE: pm3-22.dgn DWF: CK: HIGHWAY
 CONT/SECT: 6457/03 JOB: FM1171
 TxDOT: December 2022 REVISIONS: 4-98 3-03 6-20
 5-00 2-10 12-22 DIST: COUNTY SHEET NO.
 8-00 2-12 DAL DENTON 21

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 DATE: 11/14/2023 12:09:16 PM
 FILE: T:\DENMANT\M01nt Projects\004 RMC\1-6457-03-001 FDCR site specific\CP 01-18.dgn



LEGEND

	Type 3 Barricade		Channelizing Devices
	Truck Mounted Attenuator (TMA)		Truck Mounted Attenuator (TMA)
	Portable Changeable Message Sign (PCMS)		Traffic Flow
	Sign		Flagger
	Flag		

Posted Speed * *	Formula	Minimum Desirable Taper Lengths * X	Suggested Maximum Spacing of Channelizing Devices "X"	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	10', 11', 12', 150', 165', 180'	On a Taper: 30'	On a Tangent: 60'	90'
35		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		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 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.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - 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.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

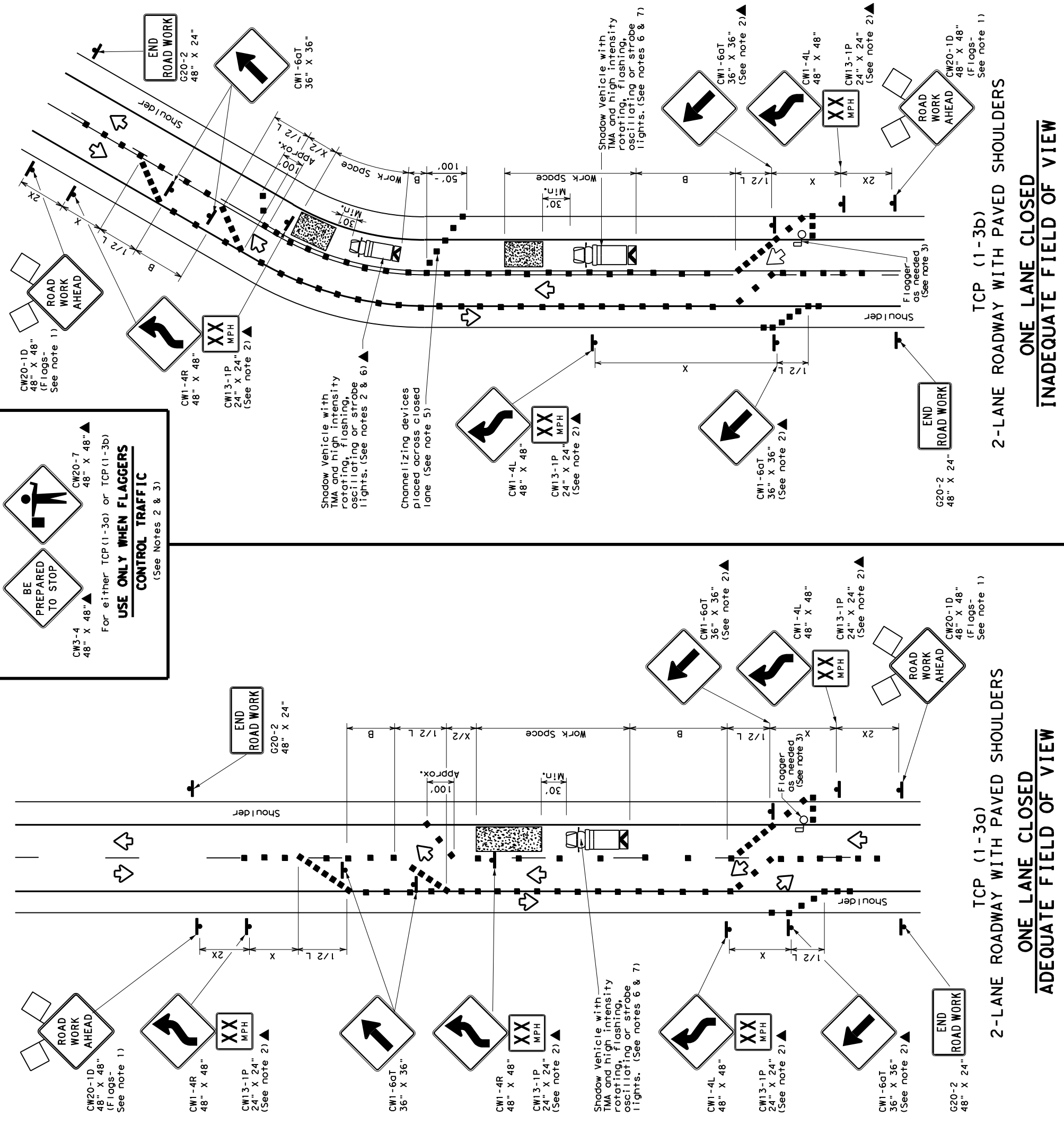
Texas Department of Transportation
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN
 CONVENTIONAL ROAD
 SHOULDER WORK**

TCP (1-1) - 18

FILE: TCP(1-1)-18.dgn
 DNE: CK: DWE: CK:
 (C) TxDOT December 1985 CONT SECT JOB HIGHWAY
 2-94 4-98 REVISITONS 6457 03 001 FMI 171
 8-95 2-12 DIST COUNTY COUNTY SHEET NO.
 1-97 2-18 DAL DENTON 22

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		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	On a Taper	On a Tangent		
30		150'	165'	180'	30'	60'	90'
35	$L = \frac{WS^2}{60}$	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

- 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

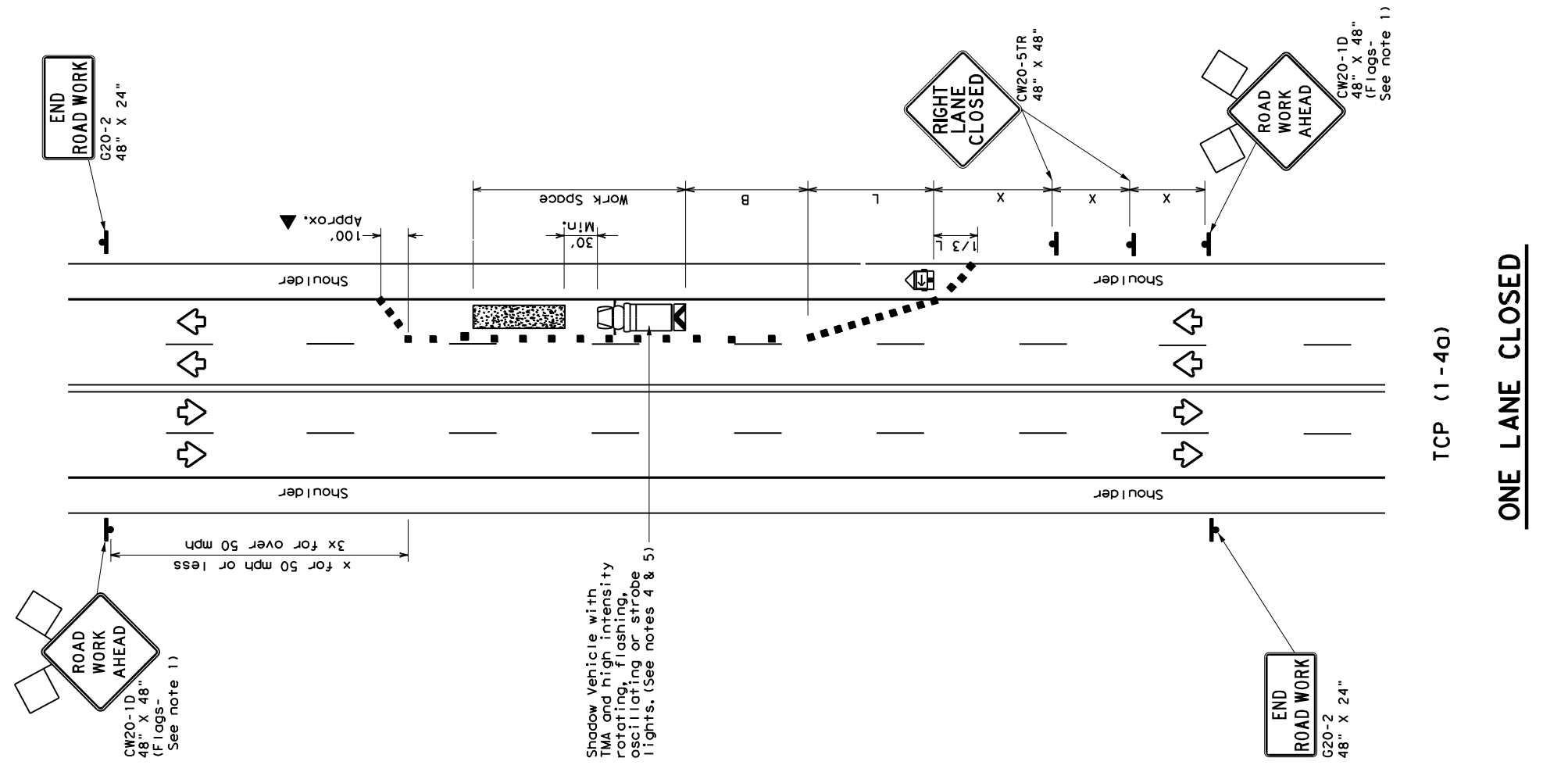
TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO LANE ROADS

TCP (1-3) - 18

FILE: Tcpl-3-18.dgn DNE: CK: DWE: CK:
 (T) TxDOT December 1985 CONT SECT JOB HIGHWAY
 2-94 4-98 REVISIONS 6457 03 001 FM1171
 8-95 2-12 DIST COUNTY SHEET NO.
 1-97 2-18 DAL DENTON **24**

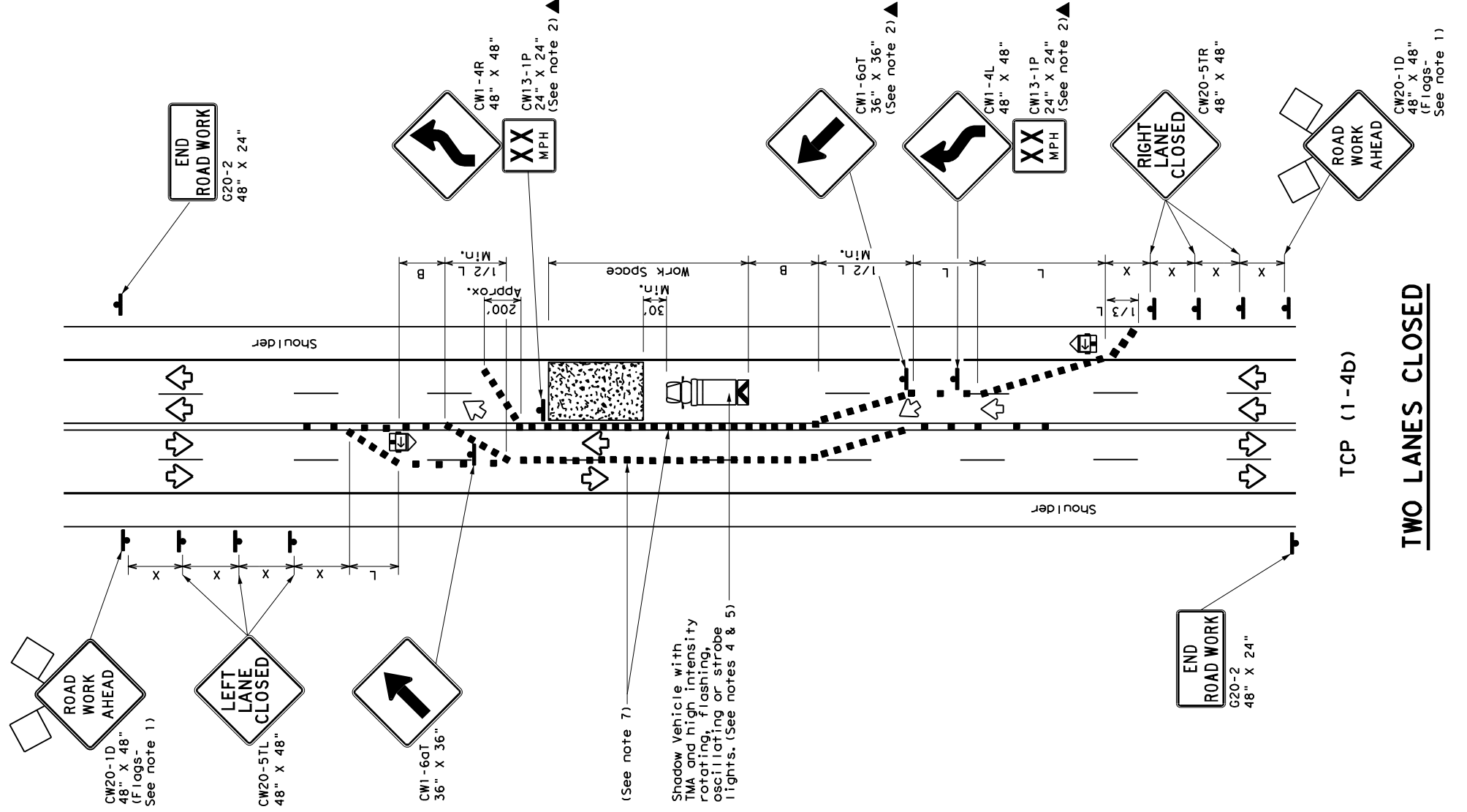
TCP (1-3a)
 2-LANE ROADWAY WITH PAVED SHOULDERS
 ONE LANE CLOSED
 ADEQUATE FIELD OF VIEW

TCP (1-3b)
 2-LANE ROADWAY WITH PAVED SHOULDERS
 ONE LANE CLOSED
 INADEQUATE FIELD OF VIEW



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES 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 **		Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"	
		Offset	Tangent	On a Taper	On a Tangent		
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 replaced 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.

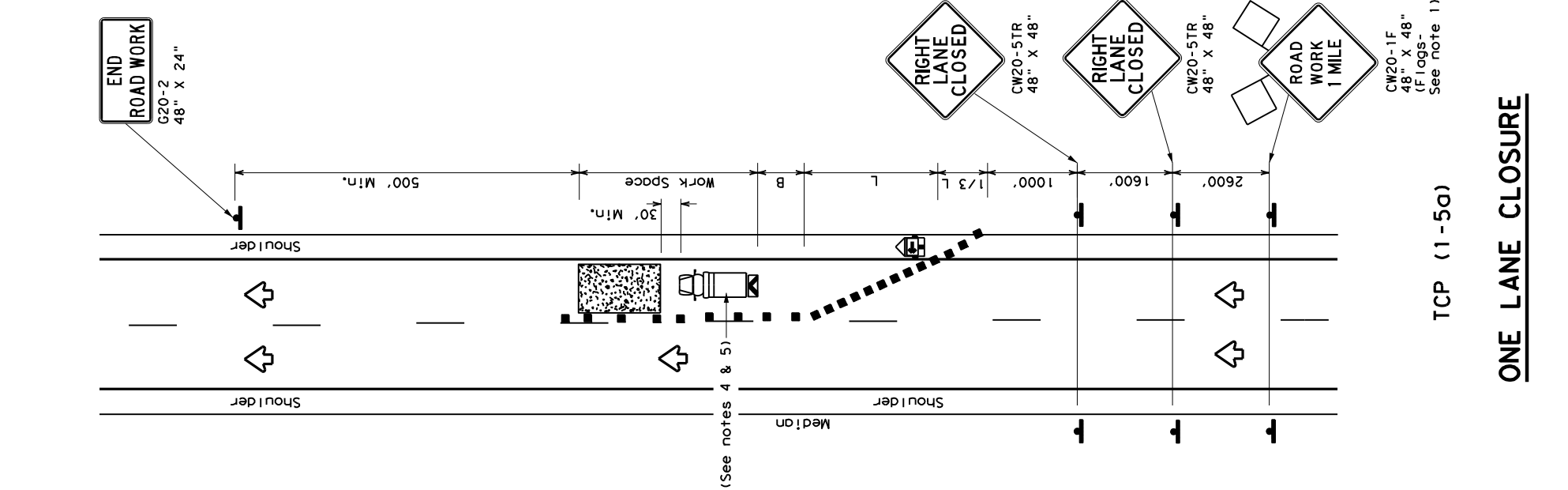
Texas Department of Transportation
 Traffic Operations Division Standard

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

TCP (1-4) - 18

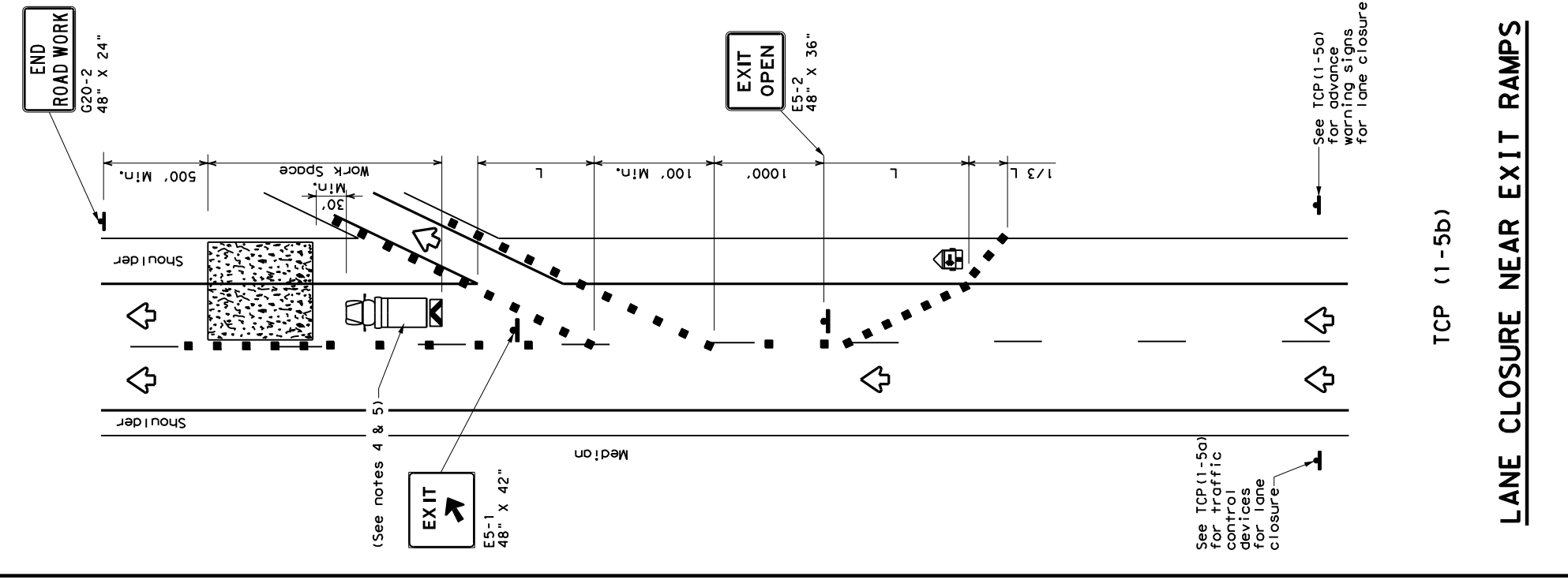
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 DWT: CK:
 CONT: 1985
 SECT: 001
 JOB: FMI171
 REV: 03
 DIST: 6457
 DATE: 2-94
 COUNTY: DENTON
 SHEET NO.: 25

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FILE: T:\DENMANT\M01nt Projects\004 RMC\1-6457-03-001 FDCR site specific\CP Print and sign\030109.dwg
DATE: 11/14/2023 12:09:21 PM



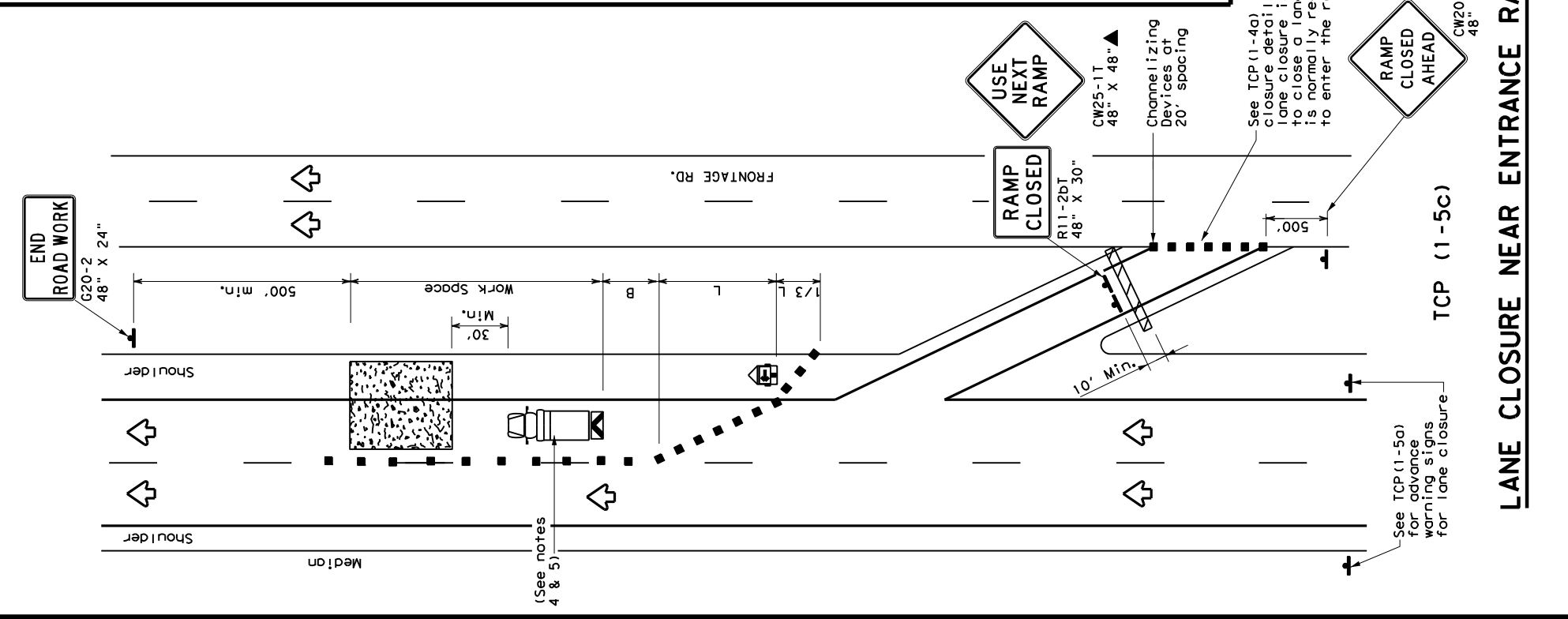
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMP



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMP

LEGEND

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

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

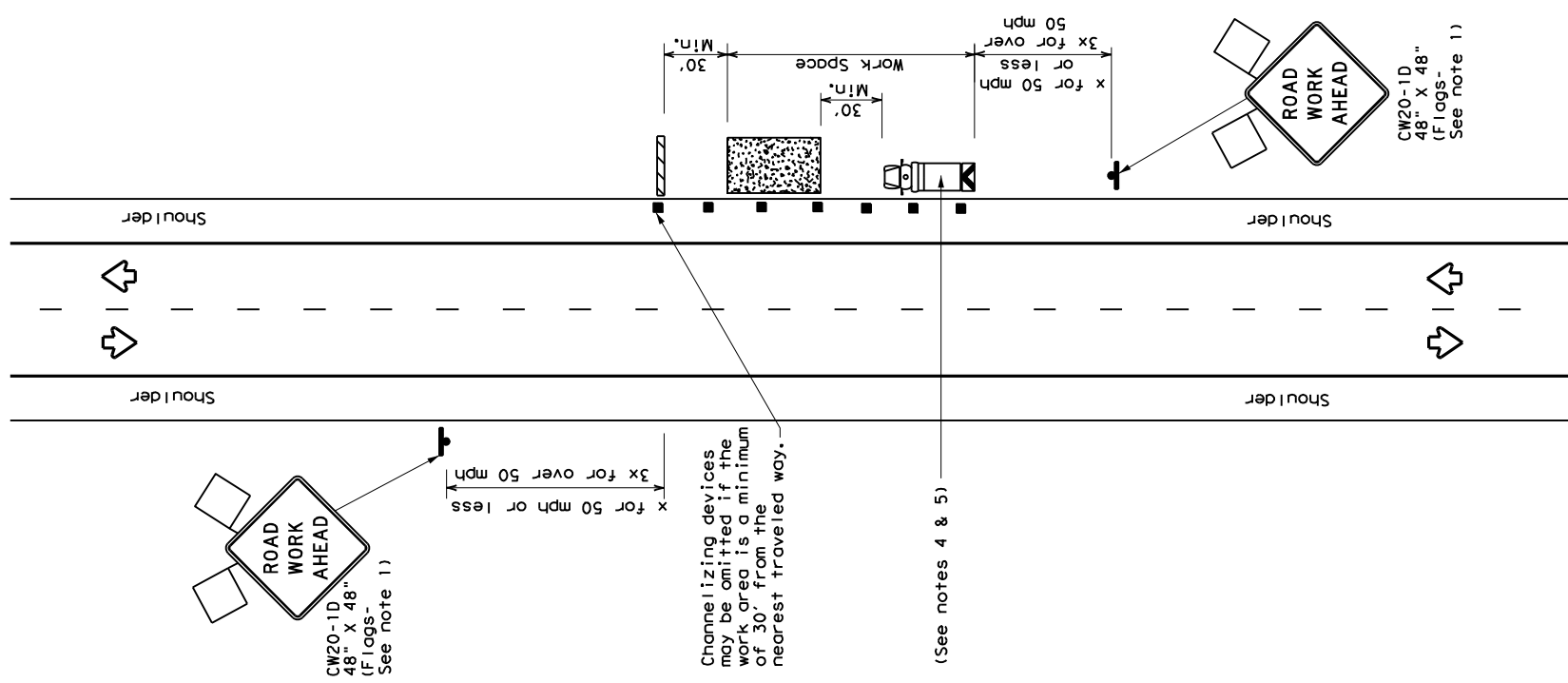
Texas Department of Transportation
Traffic Operations Division Standard

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

TCP (1-5) - 18

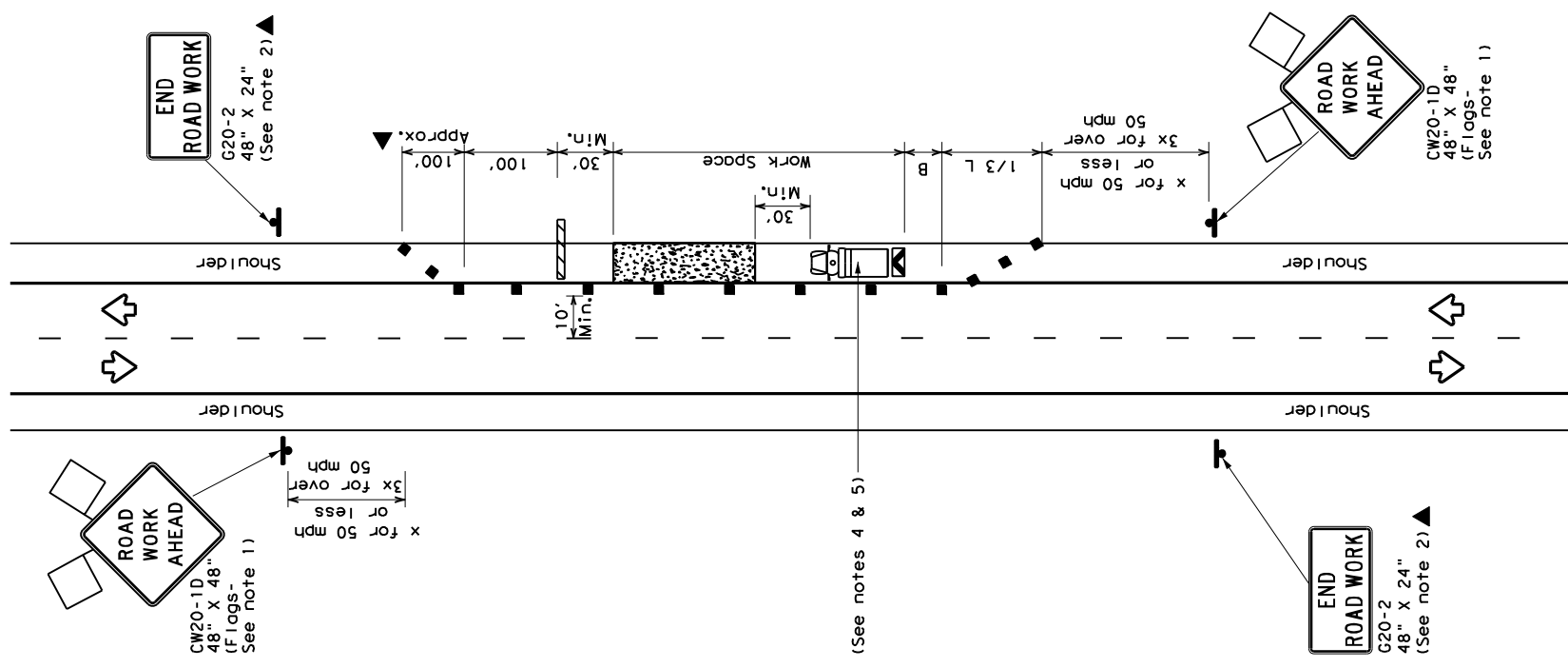
FILE: TCP1-5-18.dgn DWE: CK: CK:
 CONT: FEBRUARY 2012 SECT: JOB: HIGHWAY:
 6457 03 001 FM1171
 2-18 REVIEWS: DIST: COUNTY: DENTON SHEET NO: 26

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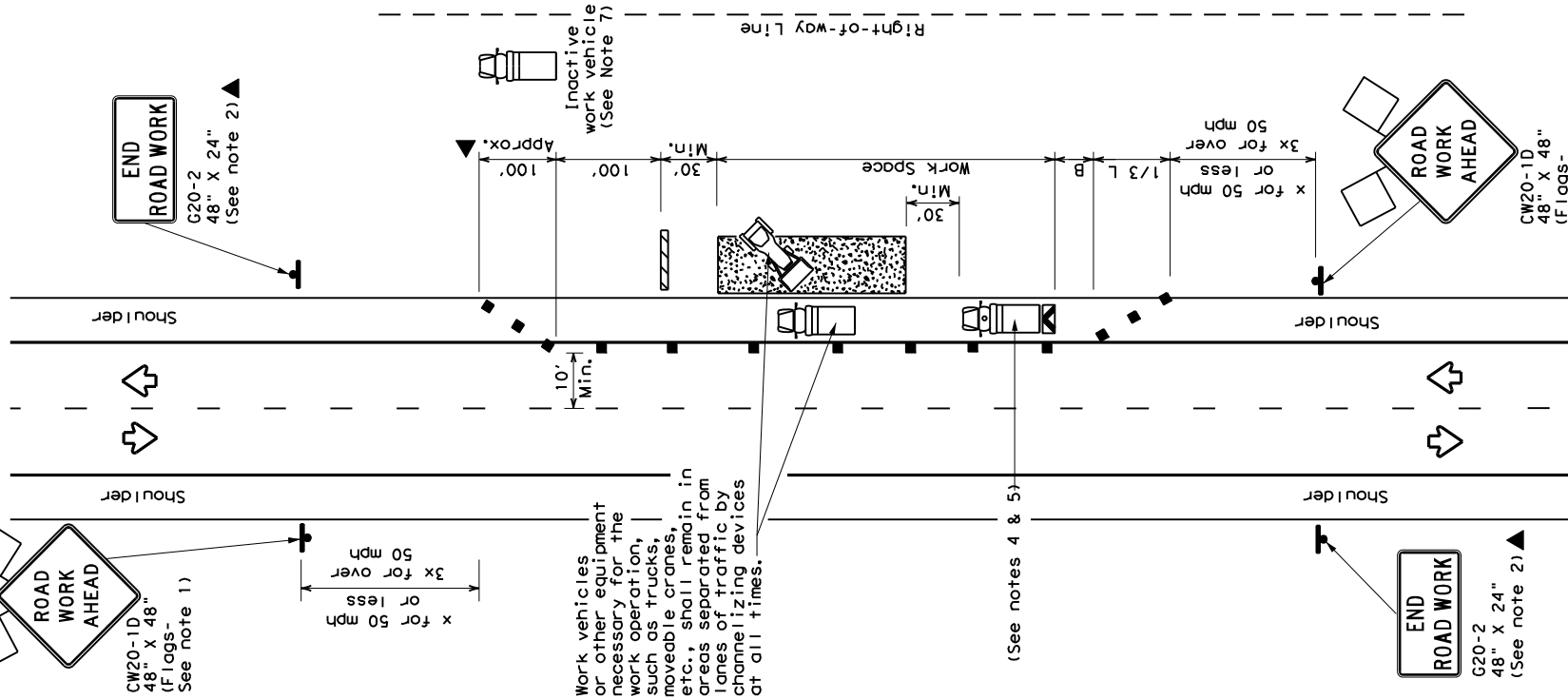
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND

Type 3 Barricade	Channelizing Devices
	Truck Mounted Attenuator (TMA)
	Portable Changeable Message Sign (PCMS)
	Traffic Flow
	Flagger

Posted Speed * *	Formula	Minimum Desirable Taper Lengths **		Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		Offset/Offset	On a Tangent	On a Tangent	Distance	
30	WS^2	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		500'	550'	600'	50'	400'
60	$L = WS$	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

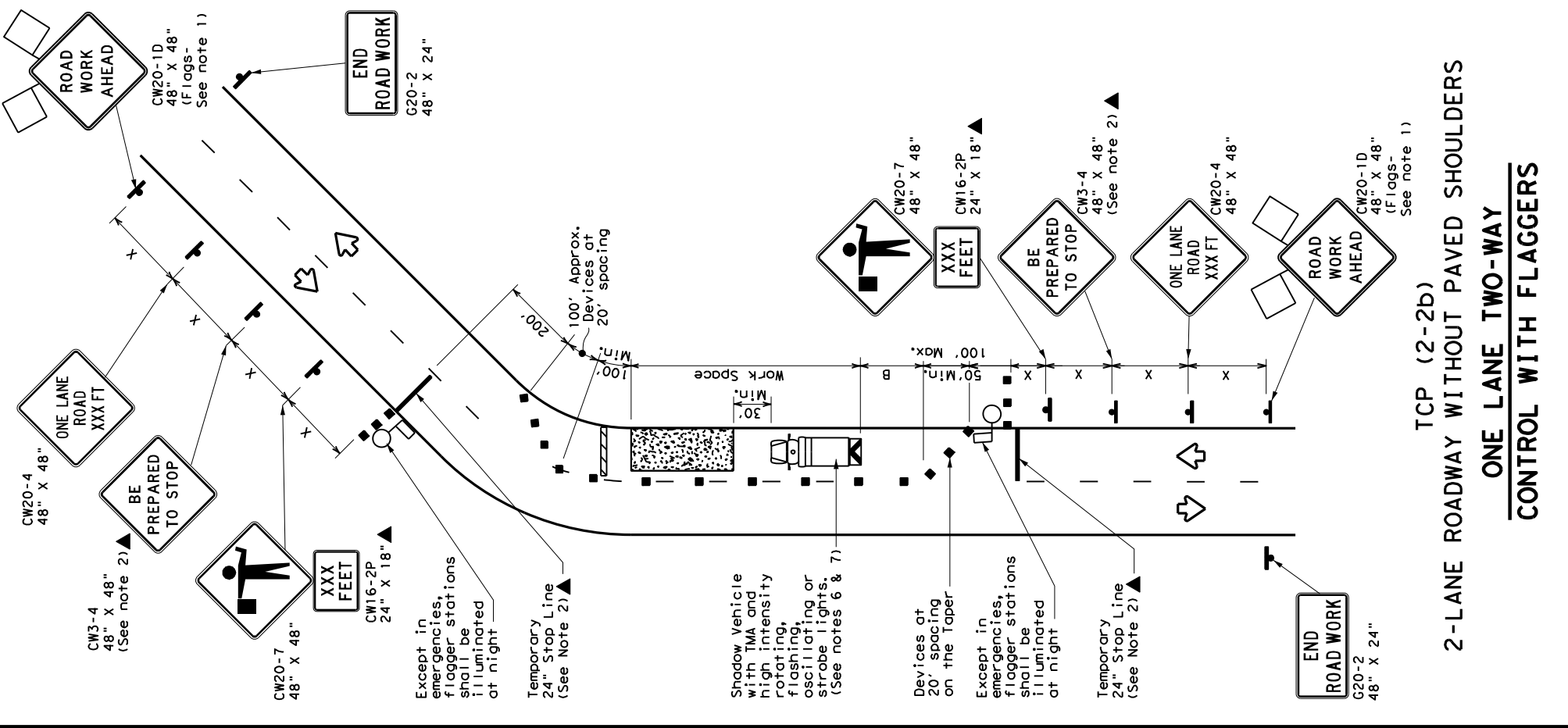
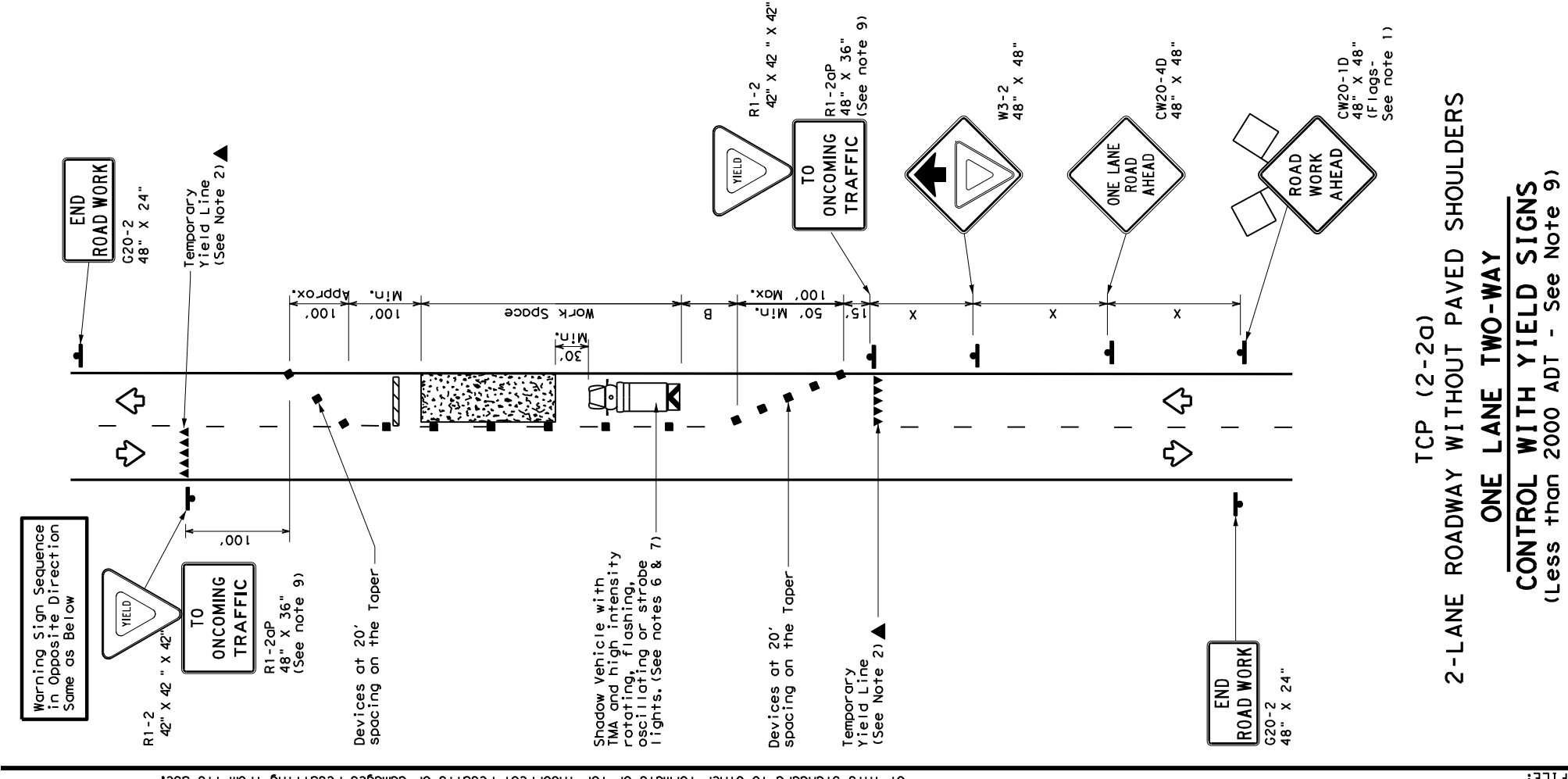
- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

FILE:	Tcp2-1-18.dgn	DN:	CK:
REVISED:	December 1985	CONT:	SECT:
2-94	4-98	6457	03
8-95	2-12	DIST:	COUNTY:
1-97	2-18	DAL:	DENTON
		JOB:	HIGHWAY
		001	FM1171
		SHEET NO.:	27



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

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

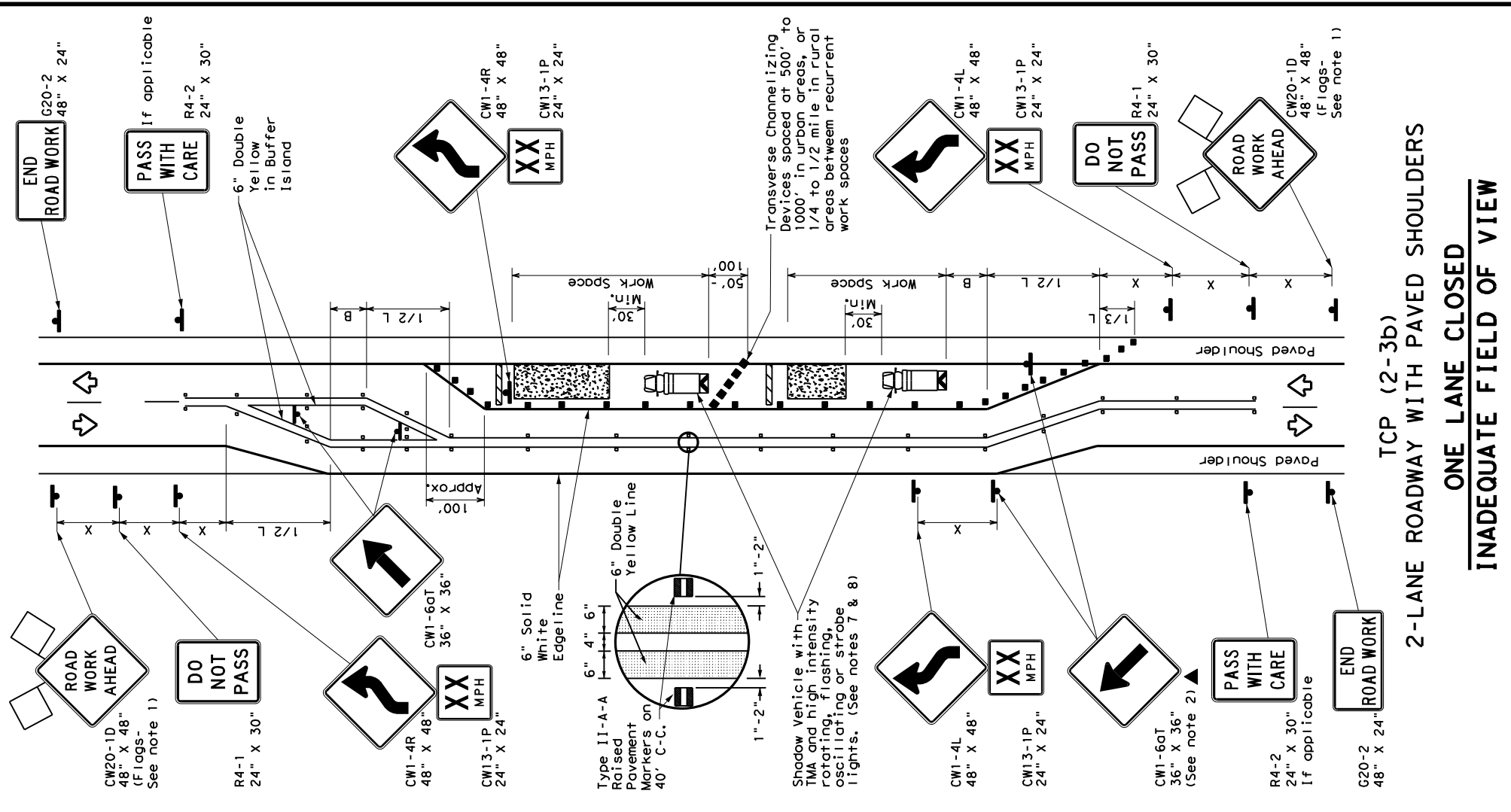
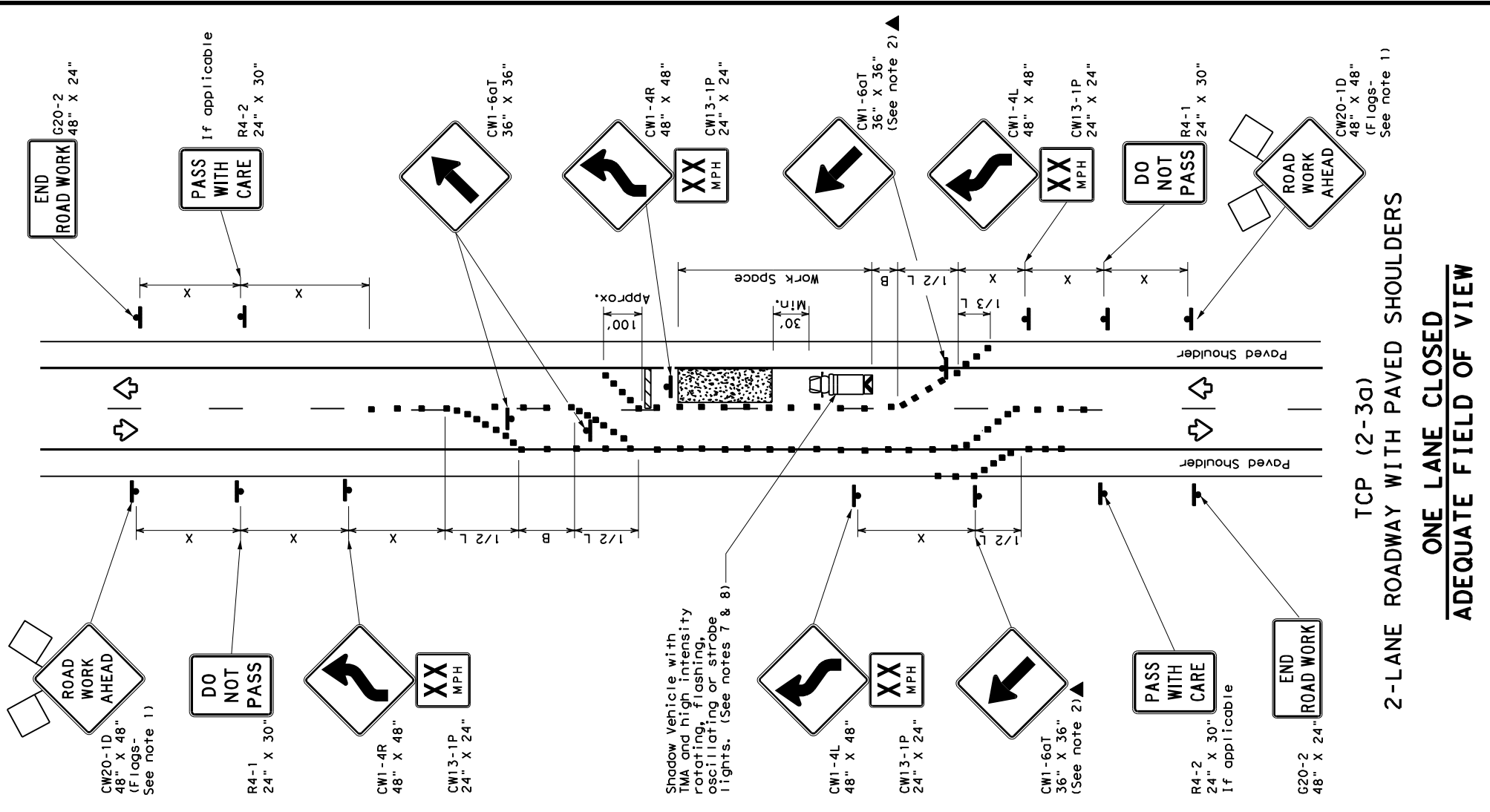
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue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

Texas Department of Transportation
 Operations Division
 Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP (2-2) - 18

FILE: Tcd2-2-18.dgn DNE: CK: CK:
 CONT SECT: 1985 JOB: HIGHWAY
 6457 03 001 FM1171
 8-95 3-03 REVISIONS
 1-97 2-12 DIST: COUNTY: SHEET NO.:
 4-98 2-18 DAL: DENTON: 28



LEGEND

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

Posted Speed * *	Formula	Minimum Desirable Taper Lengths *x*		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing *x*	Suggested Longitudinal Buffer Space *B*
		10' Offset	12' Offset	On a Taper	On a Tangent		
30		150'	165'	180'	30'	60'	120'
35	$L = \frac{WS^2}{60}$	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
				TCP (2-3b) ONLY

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the Plans, or for routine maintenance work, when approved by the Engineer.
- When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
- Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
- The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-ID "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
- Conflicting pavement marking shall be removed for long term projects.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer in place, Type 3 Barricades or other channelizing devices may be substituted. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

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

Texas Department of Transportation
 Traffic Safety Division Standard

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

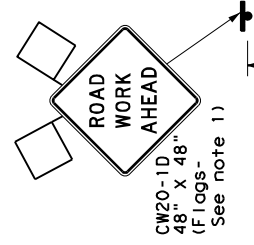
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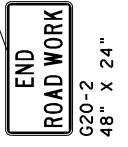
REVISED: Apr 11, 2023 CONT SECT JOB 6457 03 001 FM 171

12-85 4-98 2-18 DIST COUNTY DAL DENTON SHEET NO. 1-97 2-12

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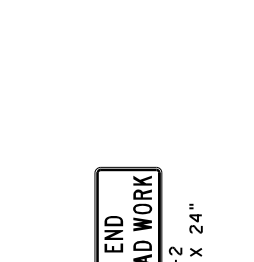


Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 5 & 6)



TCP (2-4a)

ONE LANE CLOSED

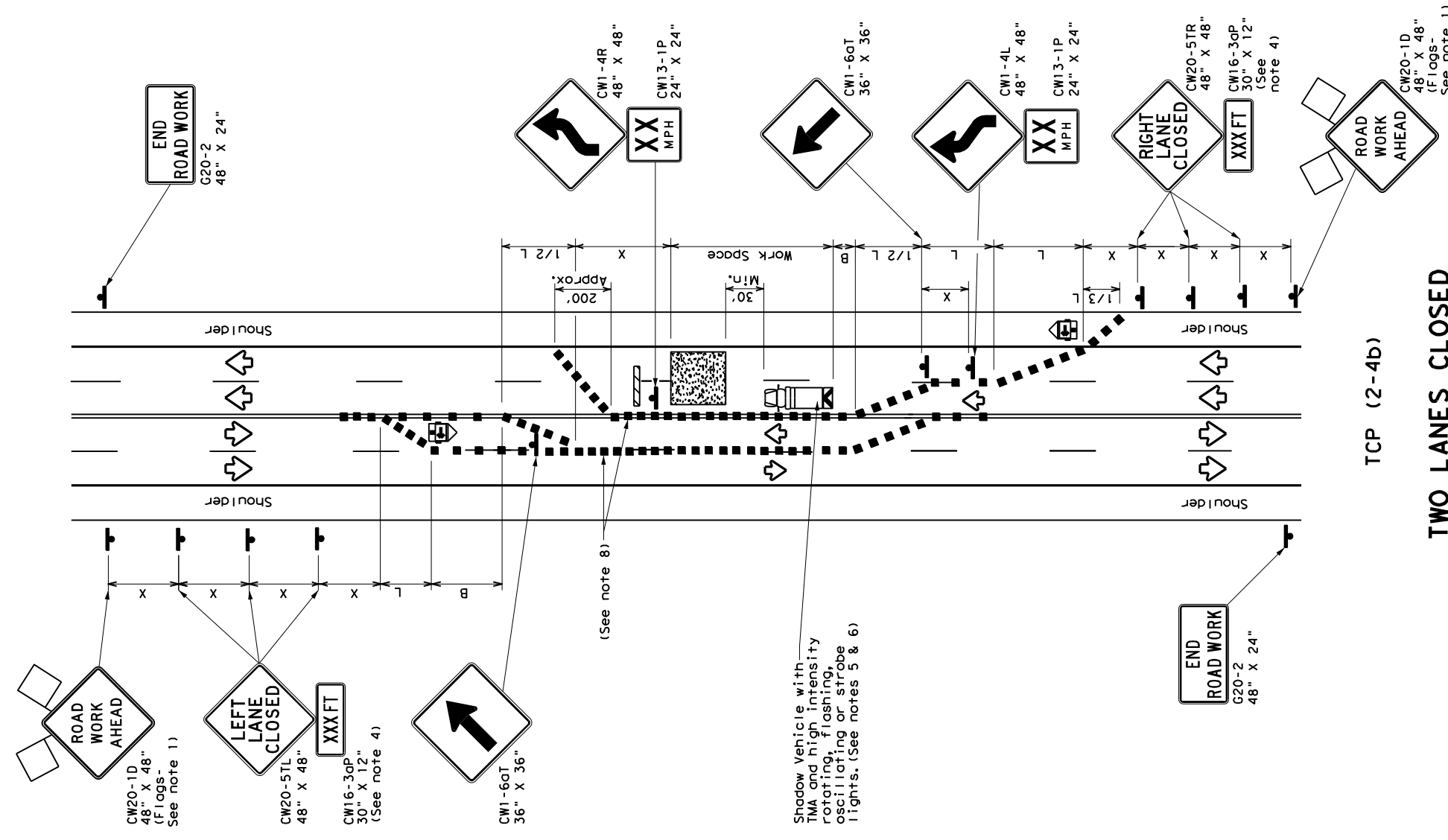


Shadow vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 5 & 6)



TCP (2-4b)

TWO LANES 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 **		Suggested Maximum Spacing of Channelizing Devices "X"	Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space "B"
		10' Offset	12' Offset			
30	$WS^2/60$	150'	165'	30'	60'	90'
35	$L=60$	205'	225'	35'	70'	120'
40		265'	295'	40'	80'	155'
45		450'	495'	45'	90'	195'
50		500'	550'	50'	100'	240'
55	$L=WS$	550'	605'	55'	110'	295'
60		600'	660'	60'	120'	350'
65		650'	715'	65'	130'	410'
70		700'	770'	70'	140'	475'
75		750'	825'	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 TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓		✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. 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 to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

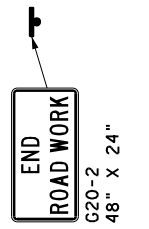
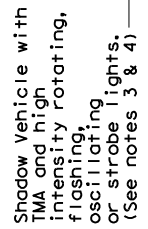
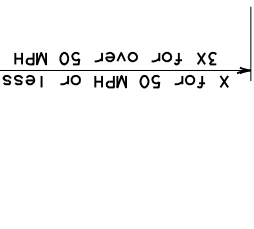
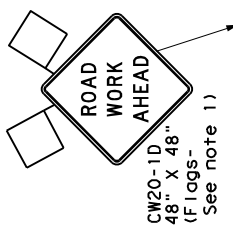
8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

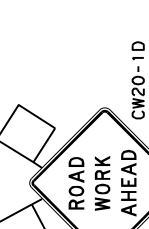
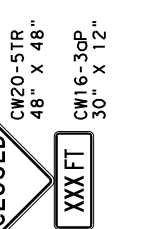
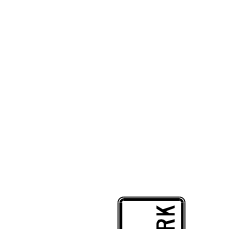
TCP (2-4) - 18

FILE: tcp2-4-18.dgn	DW: _____	CK: _____
① TxDOT	December 1985	CONT SECT JOB
8-95 3-03	REVIEWS	6457 03 001
1-97 2-12		FM1171
4-98 2-18	DIST	COUNTY
	DAL	DENTON
		SHEET NO. 30



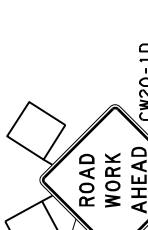
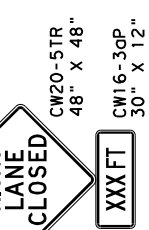
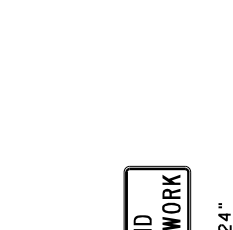
TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED



TCP (2-5b)

MULTILANE CONVENTIONAL RDS.

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		Minimum Sign Spacing *X*	Suggested Longitudinal Buffer Space "B"
	10' Offset	12' Offset	On a Taper	On a Tangent		
30 $L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35	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	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

- 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.
- 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.
- The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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 to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation
 Traffic Operations Division Standard

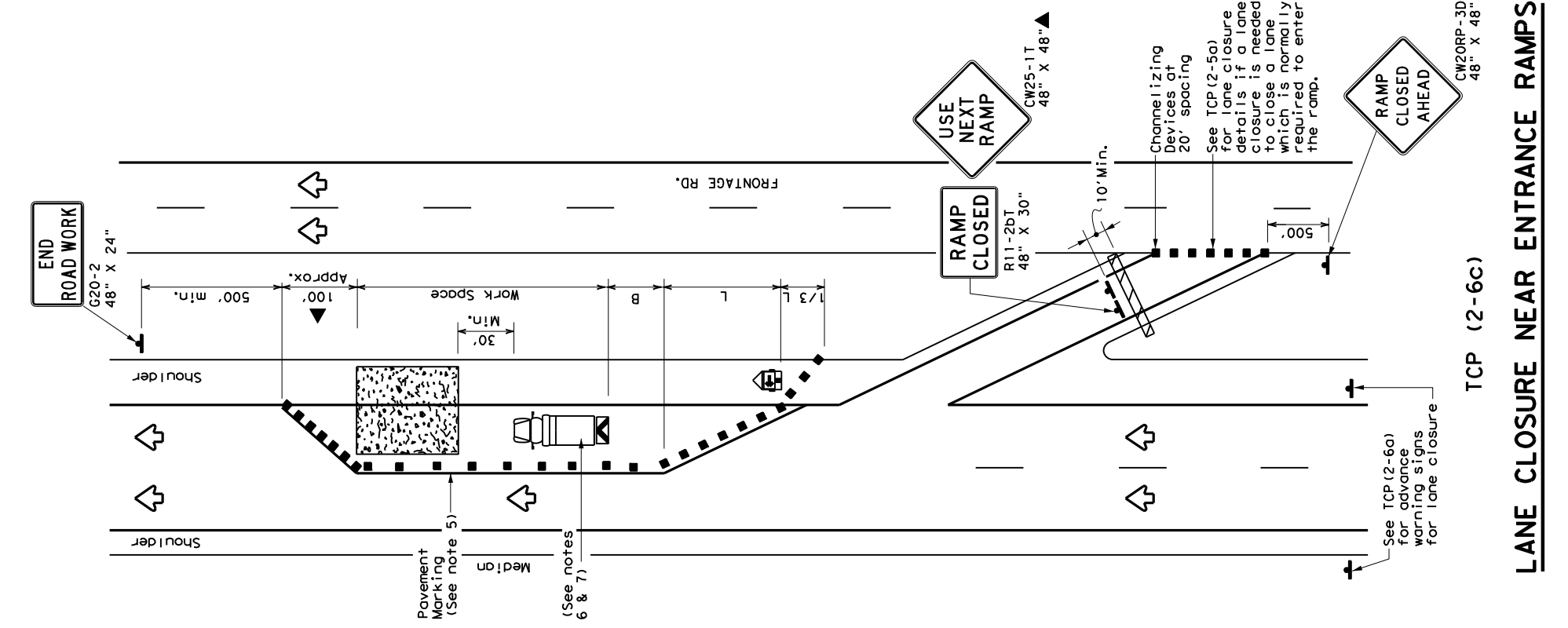
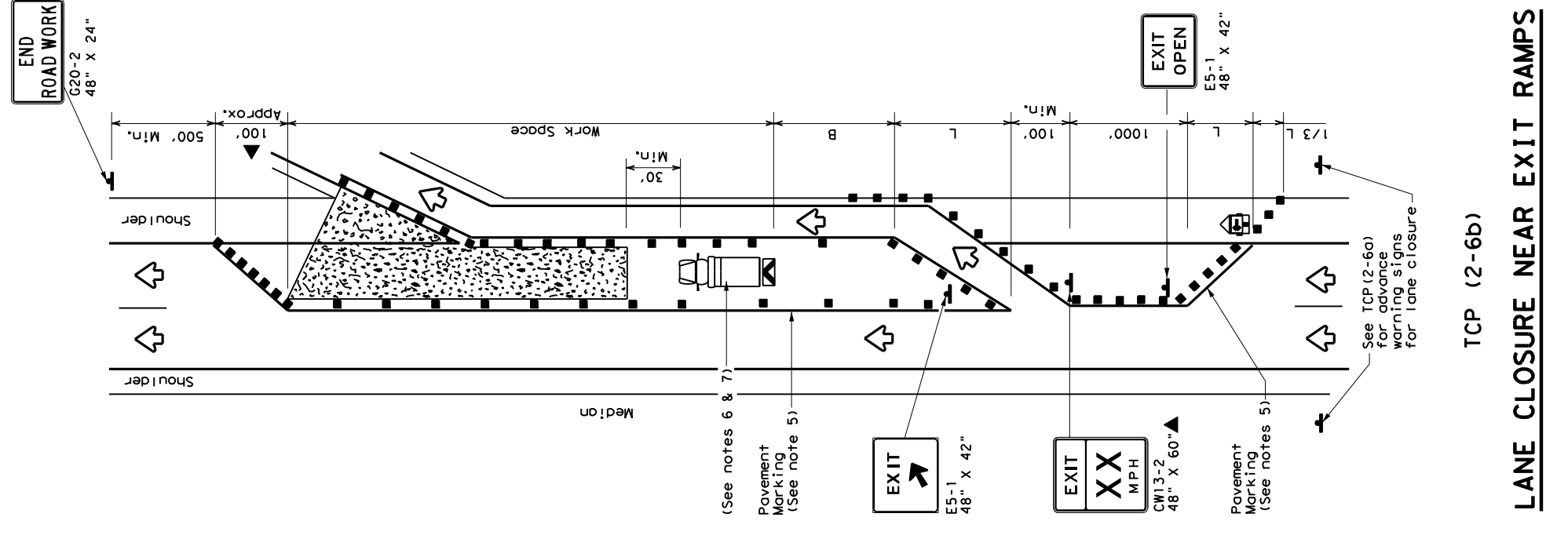
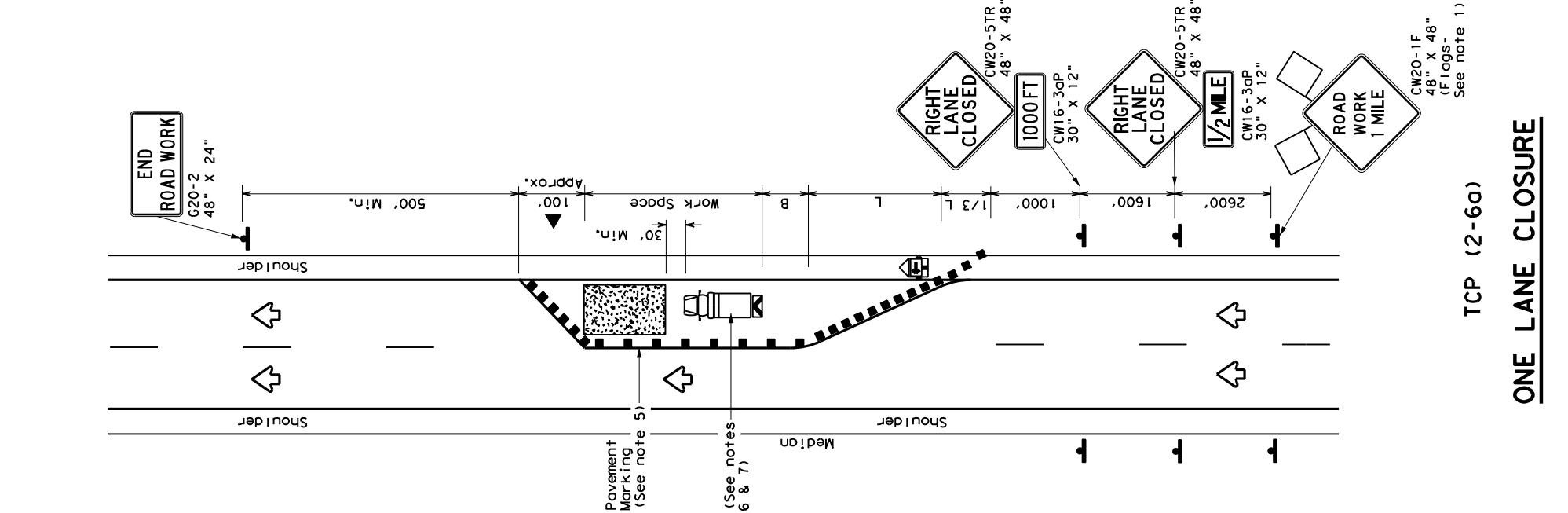
**TRAFFIC CONTROL PLAN
 LONG TERM LANE CLOSURES
 MULTILANE CONVENTIONAL RDS.**

TCP (2-5) - 18

FILE: Tcd2-5-18.dgn DWE: CK: CK:
 (C) TXDOT December 1985 CONT SECT JOB HIC/MAY
 8-95 2-12 REVIEWS 6457 03 001 FMI 171
 1-91 3-03 DIST COUNTY DIST COUNTY SHEET NO.
 4-98 2-18 DAL DENTON 31

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LEGEND

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

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

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

TYPICAL USAGE

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

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

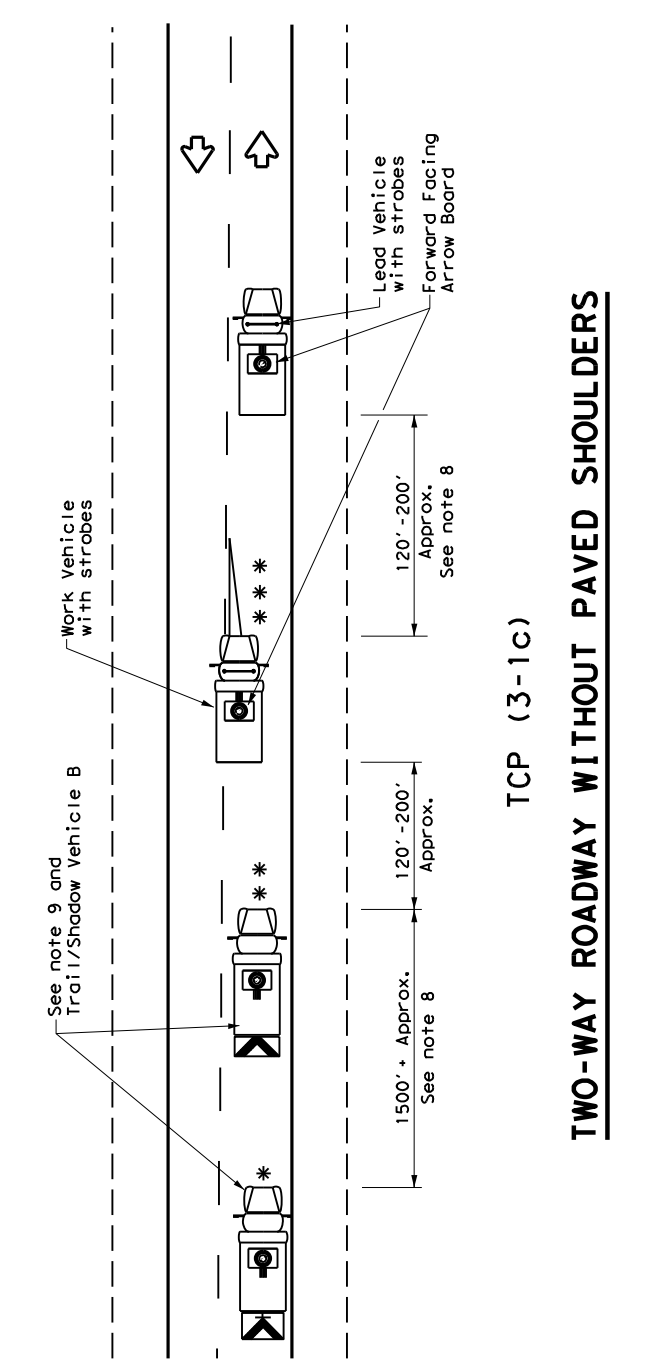
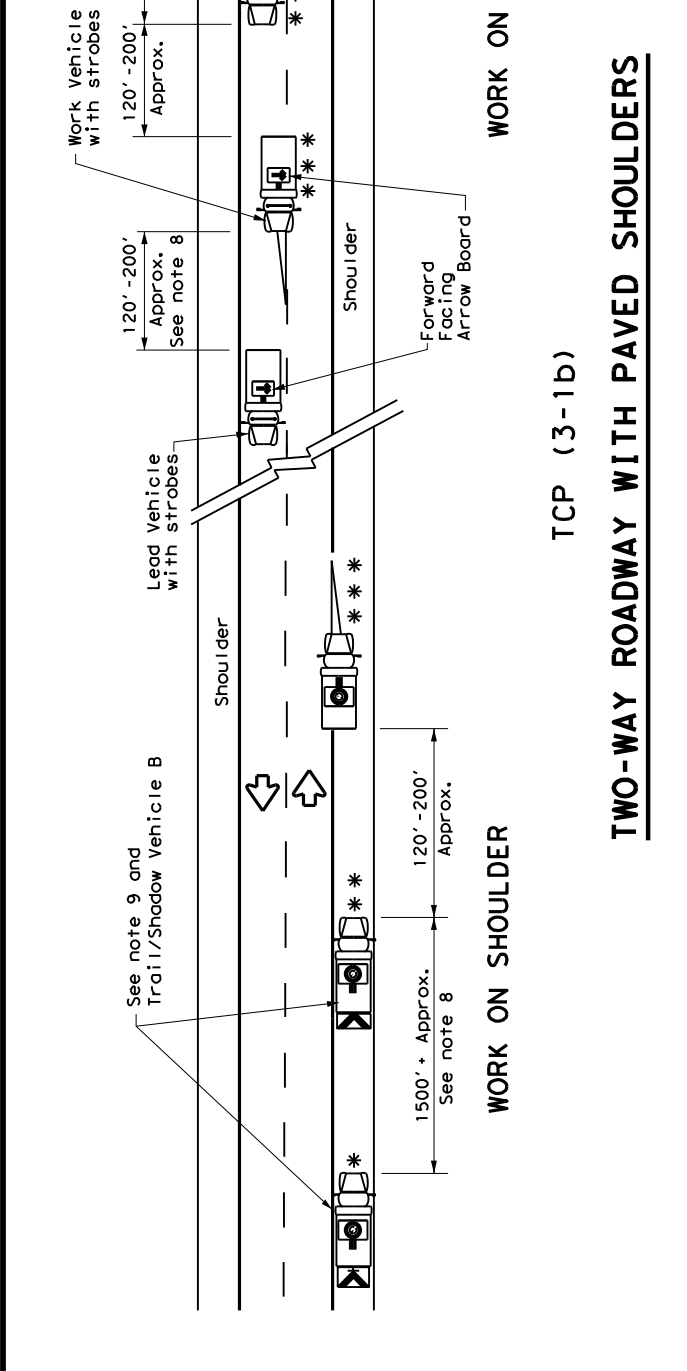
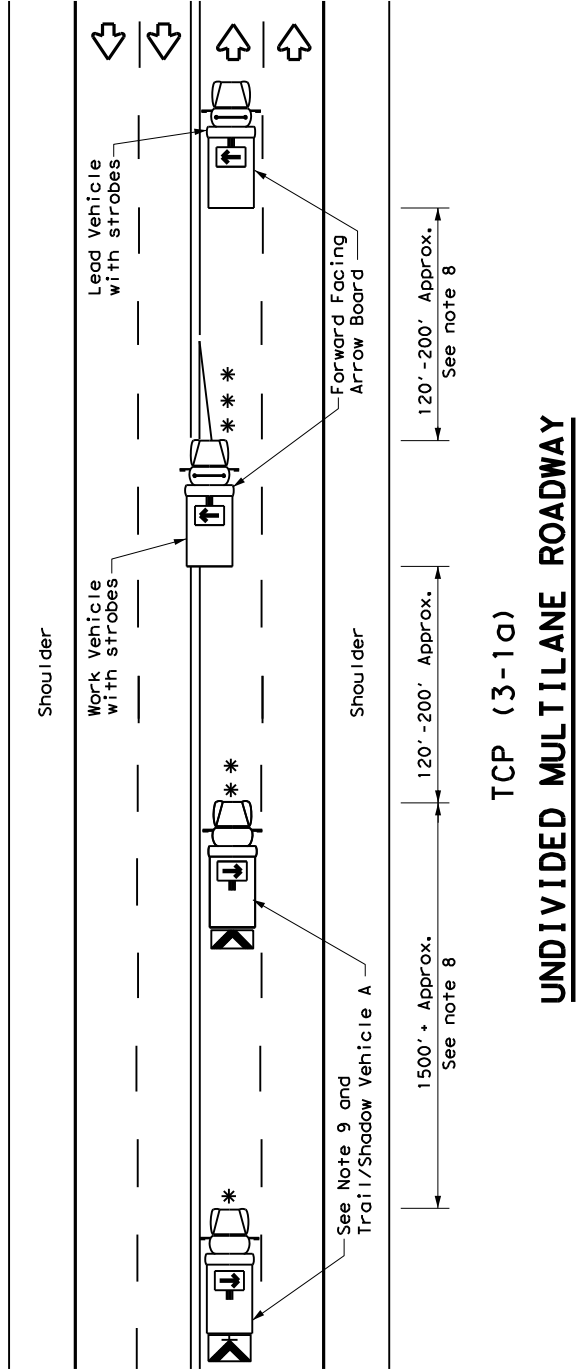
Texas Department of Transportation

TRAFFIC CONTROL PLAN
LANE CLOSURES ON
DIVIDED HIGHWAYS

TCP (2-6) - 18

FILE: tcp2-6-18.dgn
DWT: CK: DWT: CK:
CONT: December 1985
REV: 6457 03 001
JOB: FMT171
HIGHWAY: FMT171
DIST: 2-94 4-98
REV: 8-95 2-12
COUNTY: DENTON
SHEET NO.: 32

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LEGEND

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

TYPICAL USAGE		
MOBILE	SHORT 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.

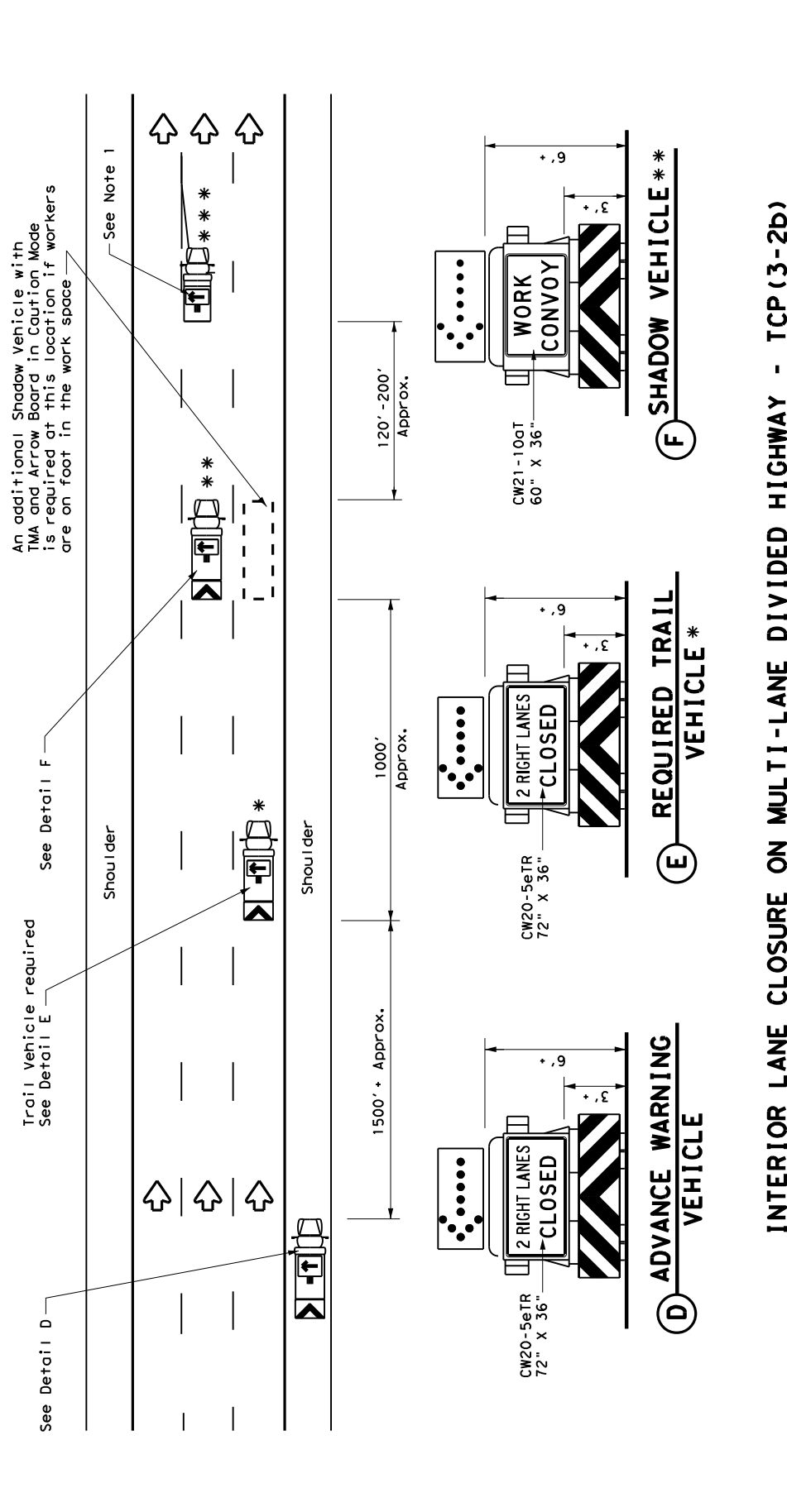
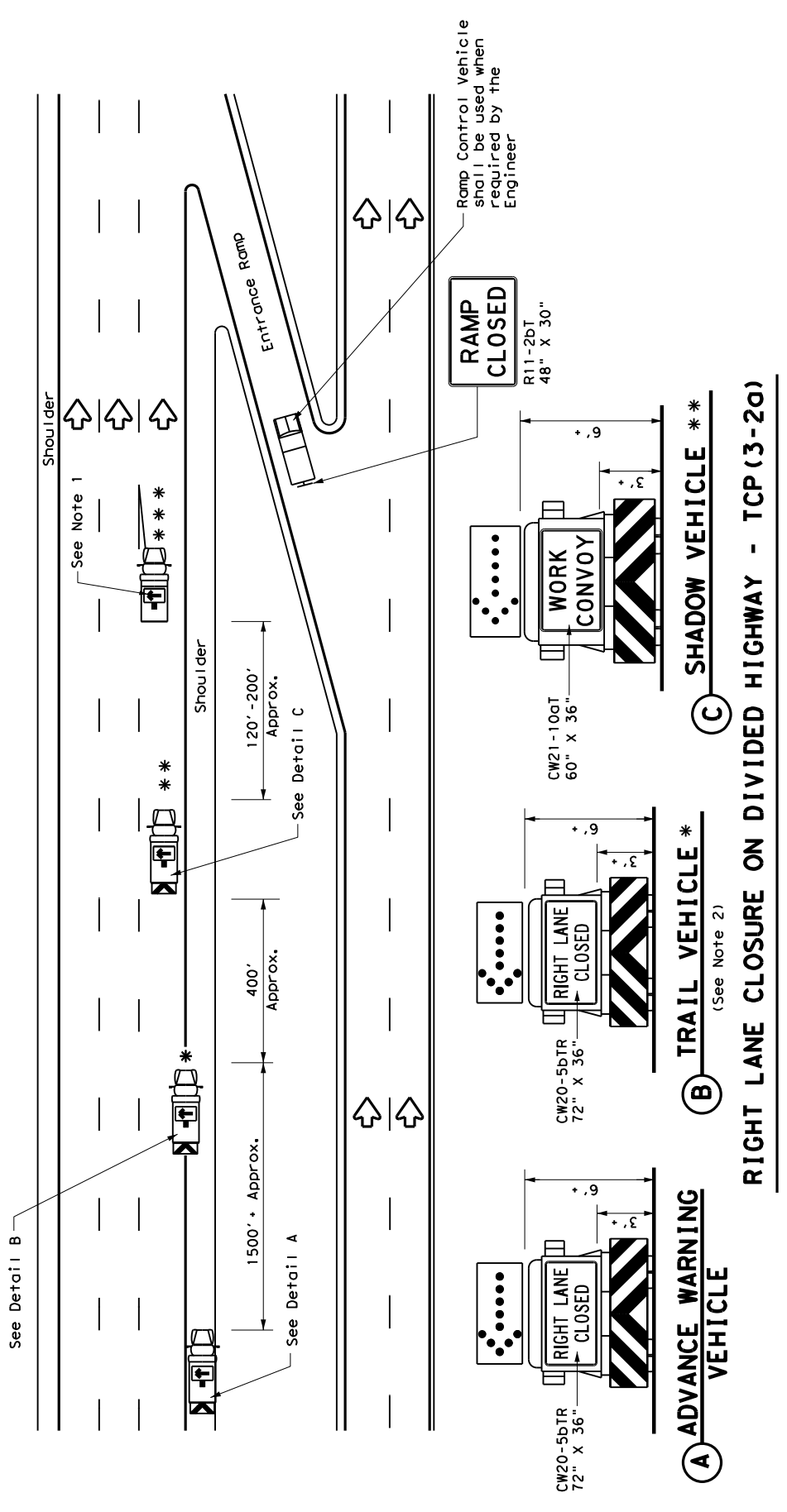
Texas Department of Transportation

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
UNDIVIDED HIGHWAYS

TCP (3-1) - 13

FILE: T033-1.dgn
DNE: TxDOT | CK: TxDOT
REVISED: December 1985
JOB: FM1171
DIST: COUNTY
SHEET NO.: 1-97

STRIPING FOR TMA



LEGEND

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

TYPICAL USAGE

MOBILE	SHORT DURATION	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.

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
DIVIDED HIGHWAYS

TCP (3-2) - 13

FILE: tcp3-2.dgn

DATE: 12/01/98

DESIGNER: 6457 03

CHECKER: 6457 03

DATE: 12/01/98

PROJECT: FM1171

REVISIONS: 2-94 4-98

8-95 7-13

1-97

Department of Transportation

Traffic Operations Division Standard

DATE: 12/01/98

PROJECT: FM1171

PROJECT NO.: 1-97

SHEET NO.: 34

HEIGHT OF TMA

10"

45°

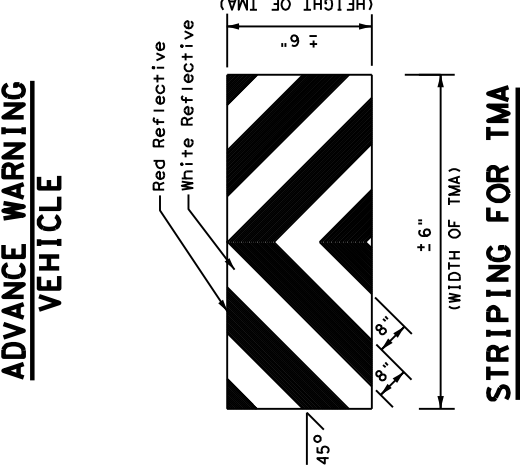
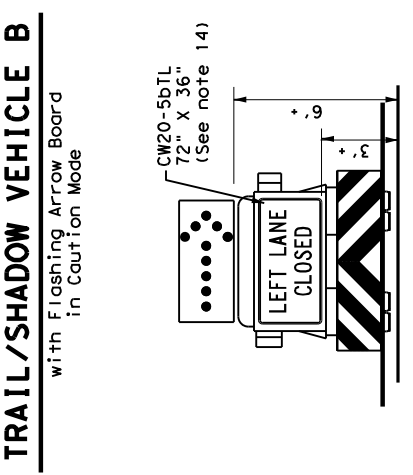
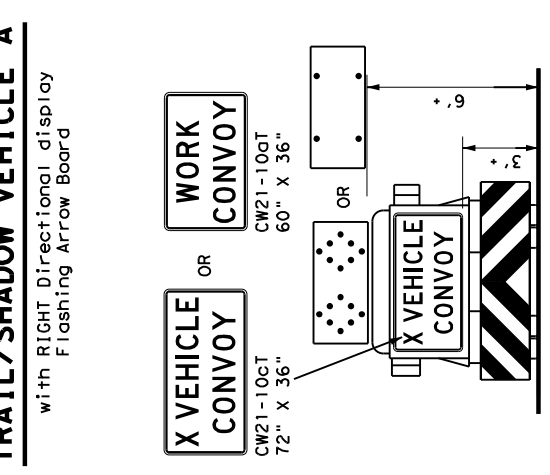
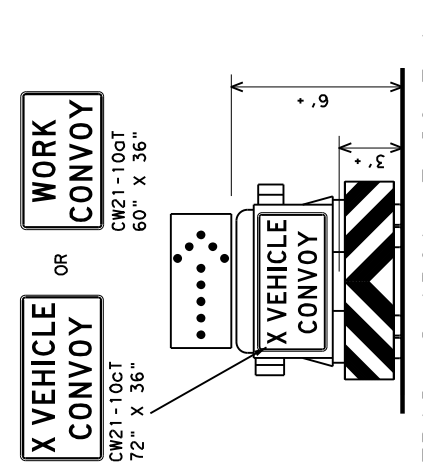
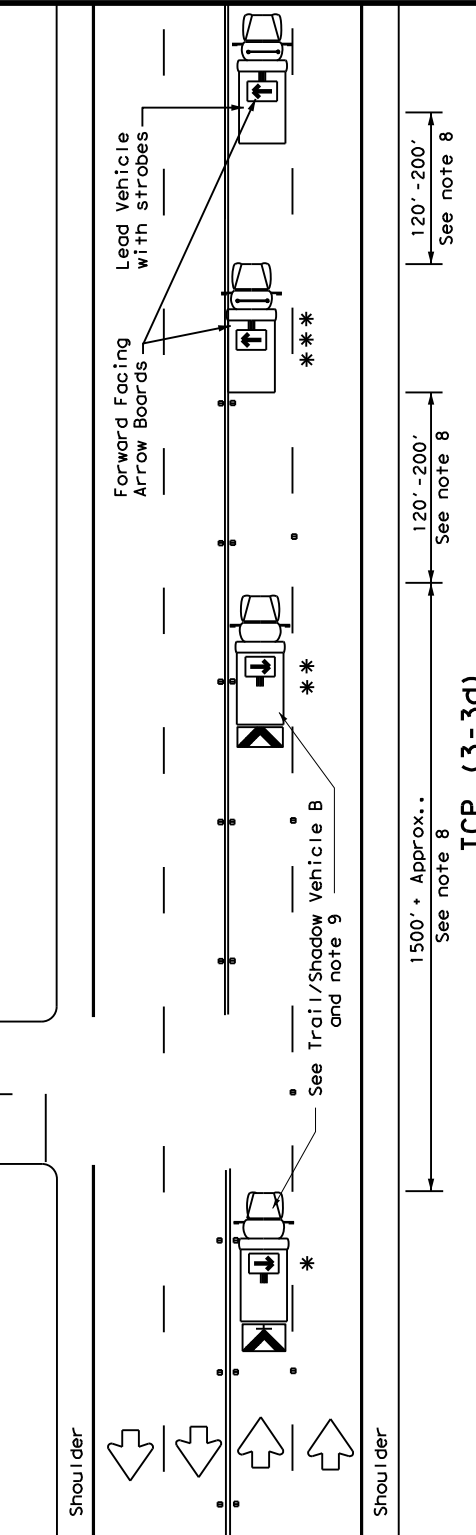
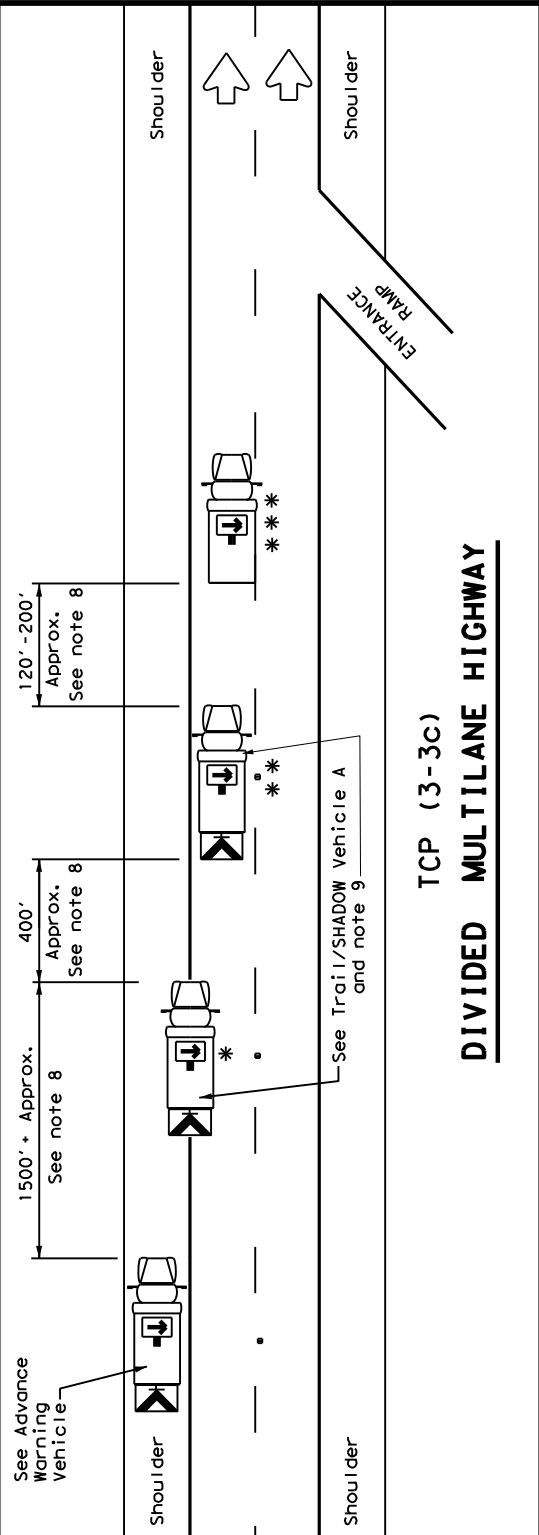
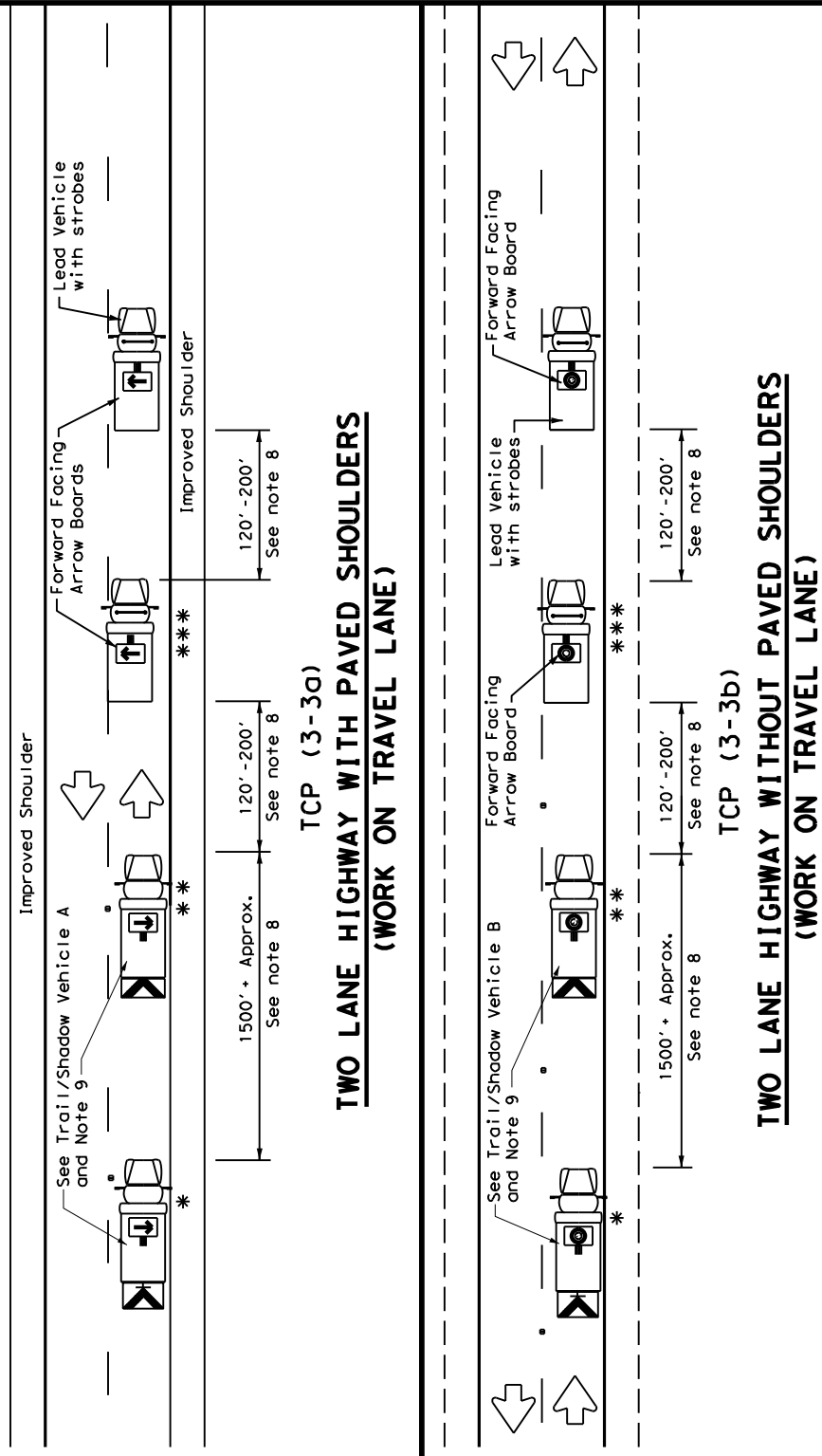
6"

±6"

(WIDTH OF TMA)

STRIPING FOR TMA

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LEGEND

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

TYPICAL USAGE

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

- 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 DWE: TxDOT CK: TxDOT CK: TxDOT

September 1987 CONT SECT JOB HIGHWAY
6457 03 001 FM1171

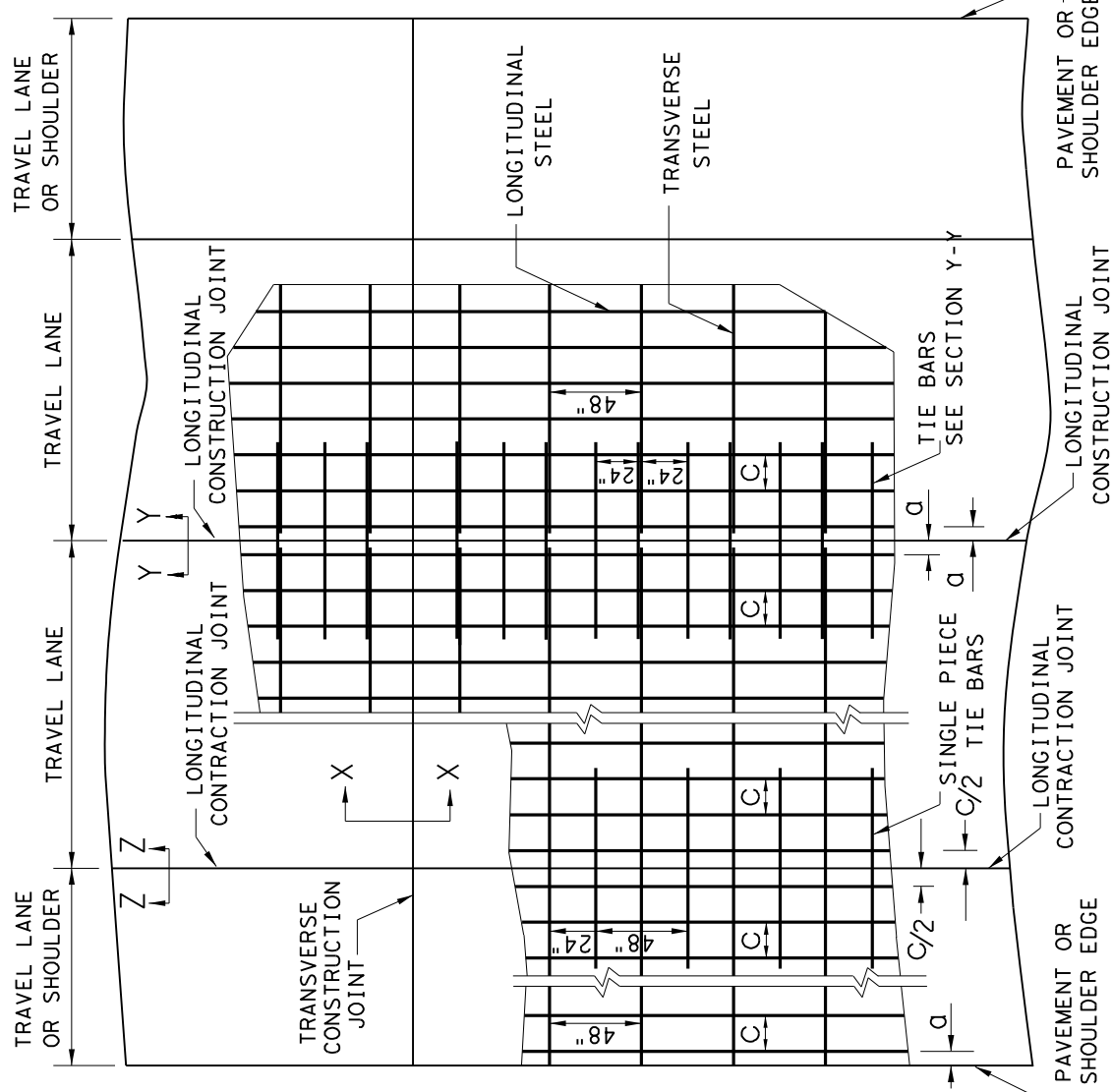
2-94 4-98 REVISIONS
8-95 7-13
1-97 7-14

DIST COUNTY COUNTY SHEET NO.
DAL DENTON 35

177

GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. FOR PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT, ADDITIONAL DETAIL MAY BE SHOWN ELSEWHERE IN THE PLANS.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (COTE) OF NOT MORE THAN 5.5×10^{-6} IN/IN/°F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO.1 AND TABLE NO.2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE ± 1 IN. HORIZONTALLY AND ± 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO. 1.
5. ADJUST REINFORCING STEEL VERTICALLY USING SHIMS OR OTHER METHODS, AS APPROVED, TO MEET VERTICAL TOLERANCES PRIOR TO CONCRETE PLACEMENT.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE MINIMUM PROJECTION OF TIE BARS INTO THE ADJACENT PLACEMENT IS 22.5 IN. FOR #6 BARS AND 18.5 IN. FOR #5 BARS.
8. SEE STANDARD SHEET "CONCRETE CURB AND GUTTER AND GUTTER," FOR DETAILS WHEN TYING CONCRETE CURB OR CURB GUTTER AT A LONGITUDINAL JOINT.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN.10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

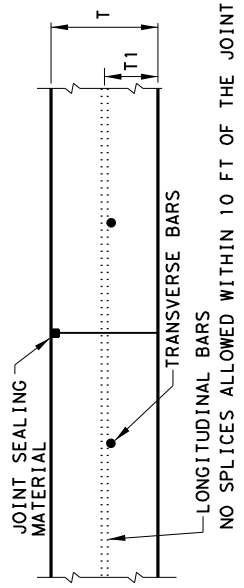


TYPICAL PAVEMENT LAYOUT
PLAN VIEW (NOT TO SCALE)

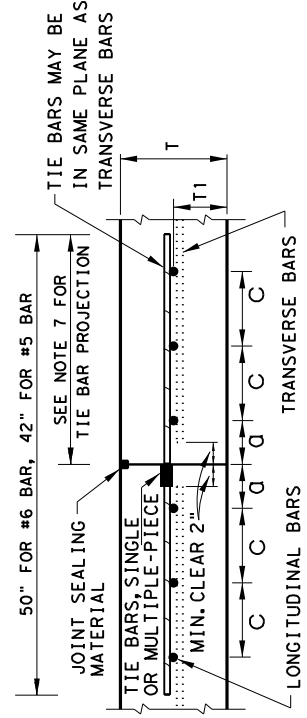
SLAB THICKNESS AND BAR SIZE	LONGITUDINAL STEEL BARS	FIRST SPACING AT EDGE OR JOINT	LONG. STEEL VERTICAL POSITION FROM BOTTOM OF PAVEMENT
T (IN.)	BAR SIZE (IN.)	SPACING (IN.)	T1 (IN.)
7.0	#5	3 TO 4	3.5
7.5	#5	3 TO 4	3.75
8.0	#6	3 TO 4	4.0
8.5	#6	3 TO 4	4.25
9.0	#6	3 TO 4	4.5
9.5	#6	3 TO 4	4.75
10.0	#6	3 TO 4	5.0
10.5	#6	3 TO 4	5.5
11.0	#6	3 TO 4	6.0
11.5	#6	3 TO 4	6.5
12.0	#6	3 TO 4	7.0
12.5	#6	3 TO 4	7.5
13.0	#6	3 TO 4	8.0

SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE (IN.)	SPACING (IN.)	BAR SIZE (IN.)	SPACING (IN.)	BAR SIZE (IN.)	SPACING (IN.)
7.0 - 7.5	#5	48	#5	48	#5	24
8.0 - 13.0	#5	48	#6	48	#6	24

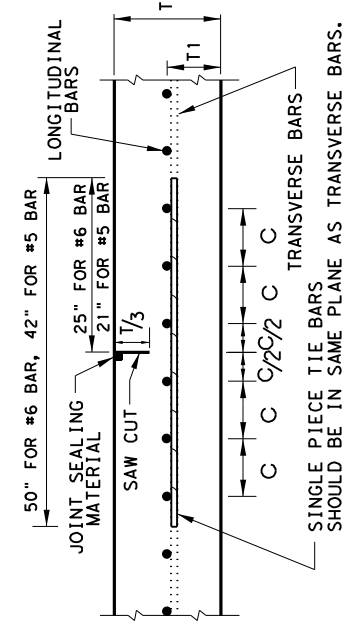
*CONTRACTOR MAY USE #6 REINFORCING STEEL INSTEAD OF #5 REINFORCING STEEL OR COMBINATION OF EACH SIZE



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

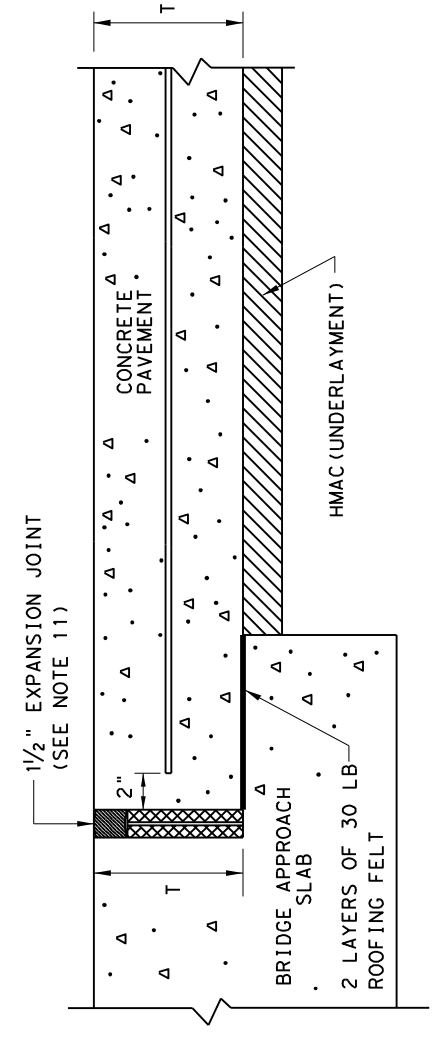
Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

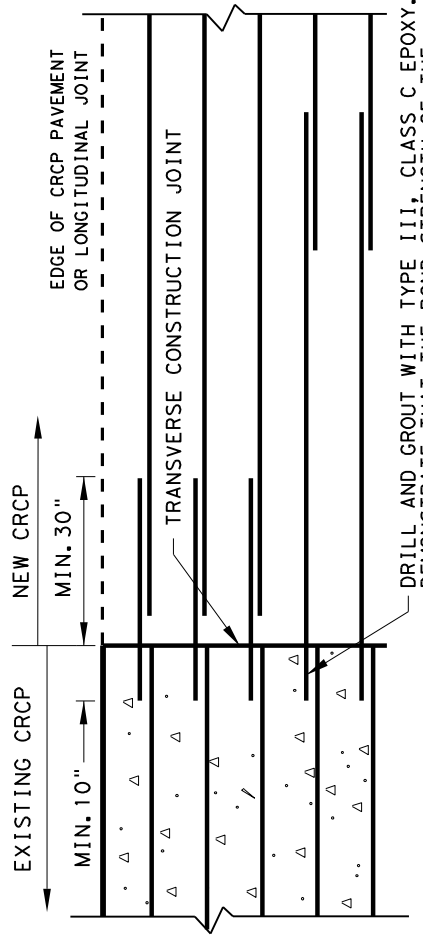
CRCP (1) - 23

FILE: crcp123.dgn	DATE: APRIL 2023	CK: KM	DWG: CES	CK:
CONT: APRIL 2023	REVISIONS: 6457 03 001	SECT: 001	JOB: FM1171	HIGHWAY:
APRIL 2023	REVISED LONG. STEEL VERTICAL LOCATION	DIST: COUNTY	DATE: COUNTY	SHEET NO.:
DESIGNED BY: [Name]	DESIGNED BY: [Name]	DAL	DENTON	36

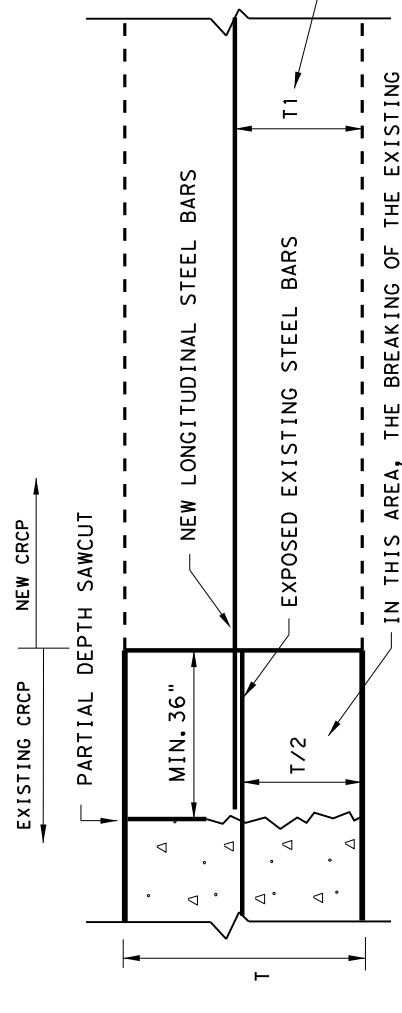
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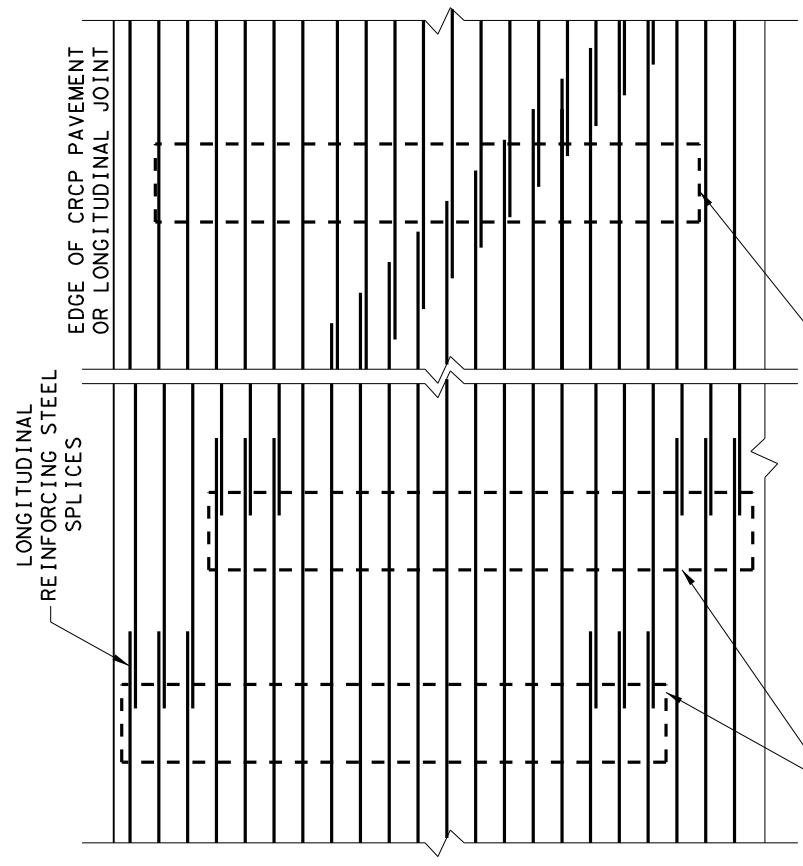
**TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH**



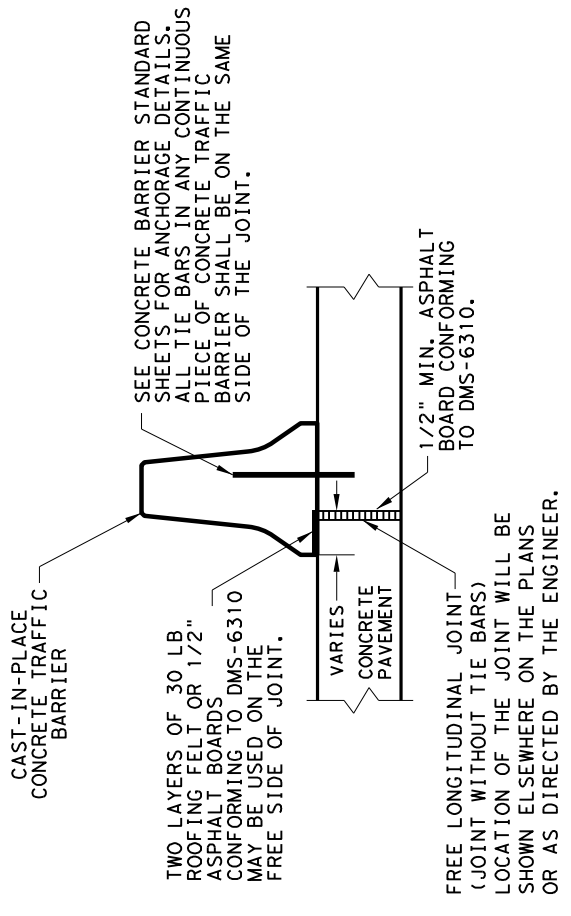
**OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)**



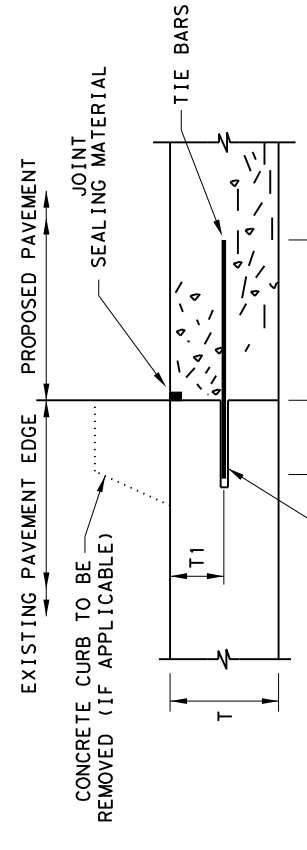
**OPTION B: BREAKBACK AND LAP
TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP**



**EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)**



CENTERLINE FREE LONGITUDINAL JOINT DETAIL



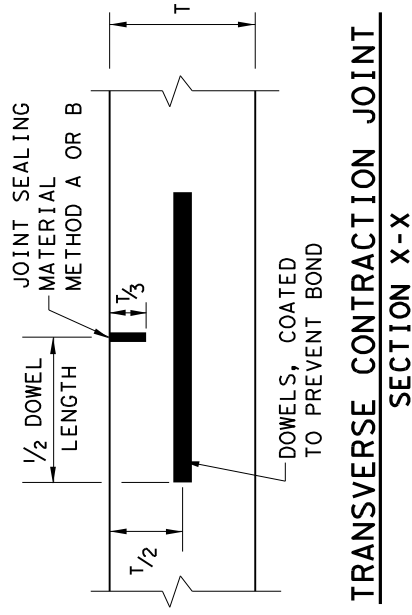
LONGITUDINAL WIDENING JOINT DETAIL

TRANSITION STEEL BARS FROM T/2 TO T1 POSITION WITHIN 60 FT. AS NEEDED.

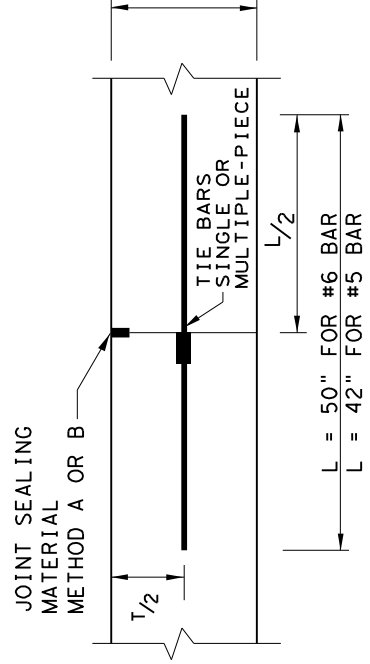
Design Division Standard
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES
CRCP (1) - 23

FILE: crcp123.dgn	DN: TXDOT	CK: KM	DW: CES	CK:
DATE: APRIL 2023	CONT SECT	JOB	HIGHWAY	
REVISIONS	6457	03	001	FMT171
APRIL 2024	REVISED EXPANSION JOINT DETAIL AT BRIDGE APPROACH	DIST	COUNTY	SHEET NO.
		DAL	DENTON	37

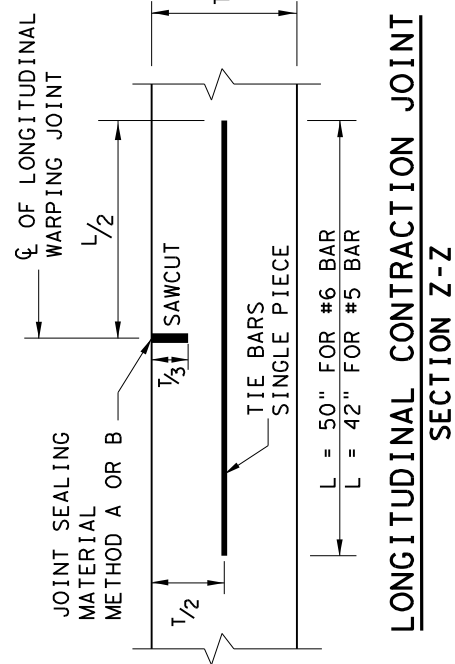
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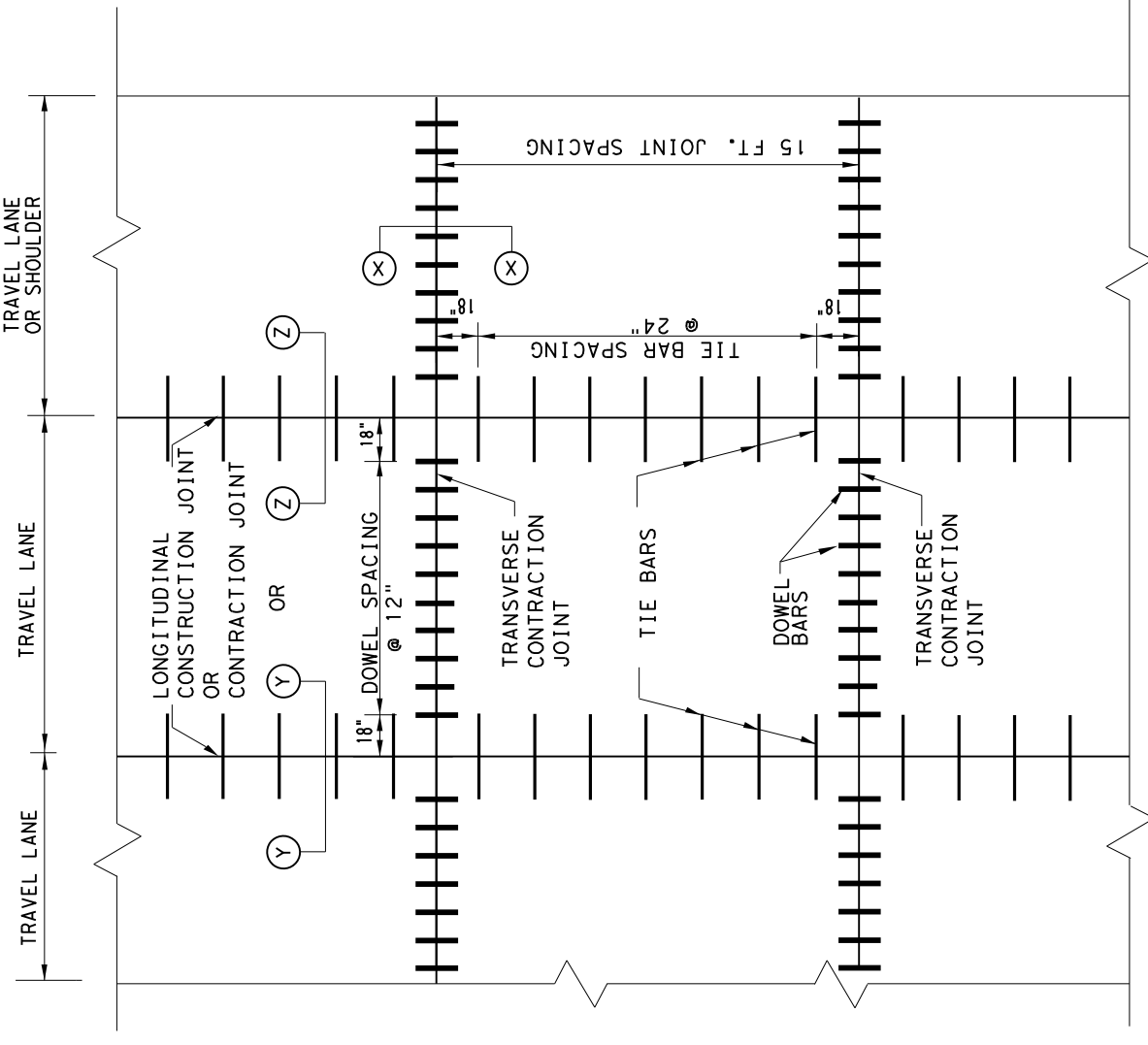
TRANSVERSE CONTRACTION JOINT
SECTION X-X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y-Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z-Z



TYPICAL PAVEMENT LAYOUT
PLAN VIEW (NOT TO SCALE)

SLAB THICKNESS (IN.)	BAR DIA. AND LENGTH	AVERAGE SPACING (IN.)
6 to 7.5	1" X 18"	12
8 to 10	1 1/4" X 18"	12
>= 10.5	1 1/2" X 18"	12

SLAB THICKNESS (IN.)	BAR SIZE	AVERAGE SPACING (IN.)
6 to 7.5	#5	24
>= 8	#6	24

GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATION FOR "CONCRETE PAVEMENT".
3. THE SPACING BETWEEN TRANSVERSE CONTRACTION JOINTS SHALL BE 15 FT. UNLESS OTHERWISE SHOWN IN THE PLANS.
4. TRANSVERSE CONSTRUCTION JOINTS MAY BE FORMED BY USE OF METAL OR WOOD FORMS EQUAL IN DEPTH TO THE DEPTH OF PAVEMENT, OR BY METHODS APPROVED BY THE ENGINEER.
5. USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL THE FORMED JOINTS.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE JOINT BETWEEN OUTSIDE LANE AND SHOULDER SHALL BE A LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) UNLESS OTHERWISE SHOWN IN THE PLANS. THE SAW CUT DEPTH FOR THE LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLABTHICKNESS (T/3).
8. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN. 10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. WHEN AN MONOLITHIC CURB IS SPECIFIED, THE JOINT IN THE CURB SHALL COINCIDE WITH PAVEMENT JOINTS AND MAY BE FORMED BY ANY MEANS APPROVED BY THE ENGINEER.
11. DOWEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1/4 IN. HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED. WHERE DOWEL BAR BASKETS ARE USED, REMOVE THE SHIPPING WIRES.
12. THE DETAIL FOR JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

SHEET 1 OF 2



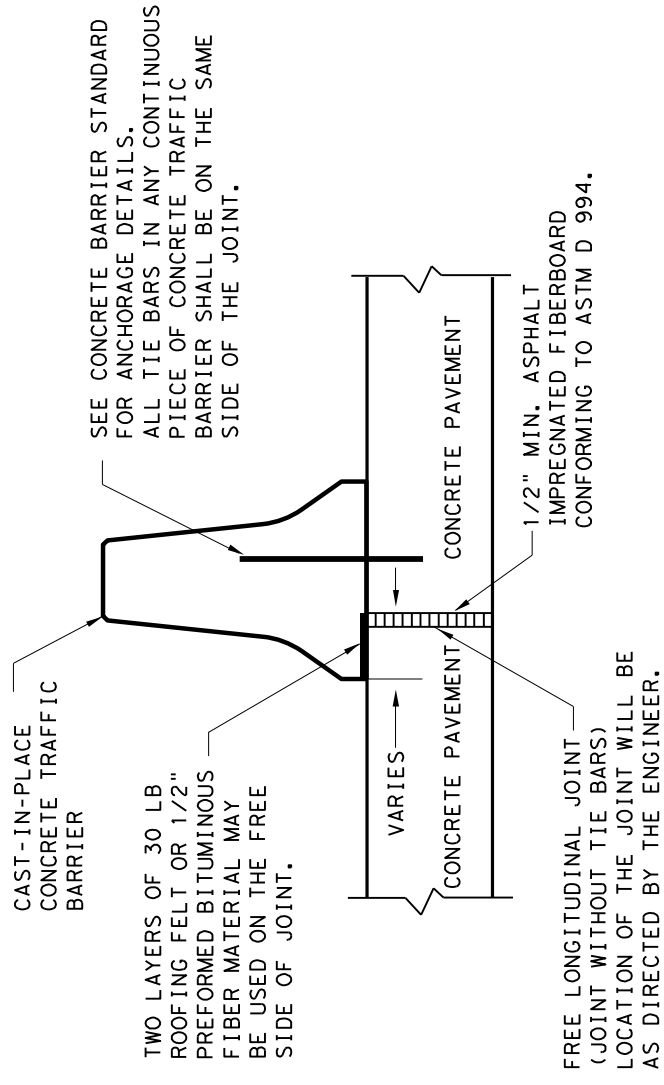
Design Division Standard

CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN

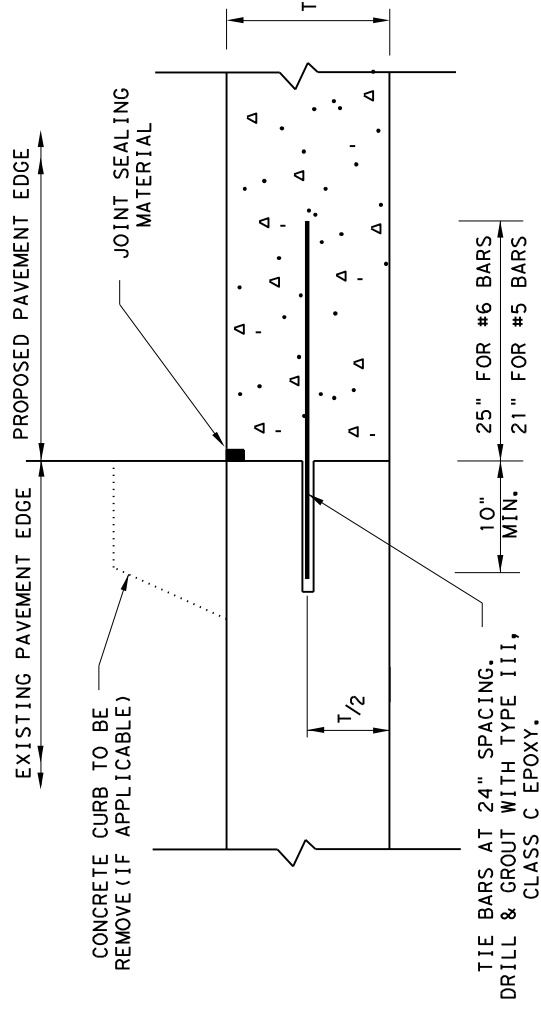
T-6 to 12 INCHES

CPCD-14

FILE: cpcd14.dgn	DN: TxDOT	DN: HC	DN: HC	CK: AN
© TxDOT: DECEMBER 2014	CONT: SECT	JOB	HIGHWAY	
REVISIONS	6457	03	001	FM1171
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON		38

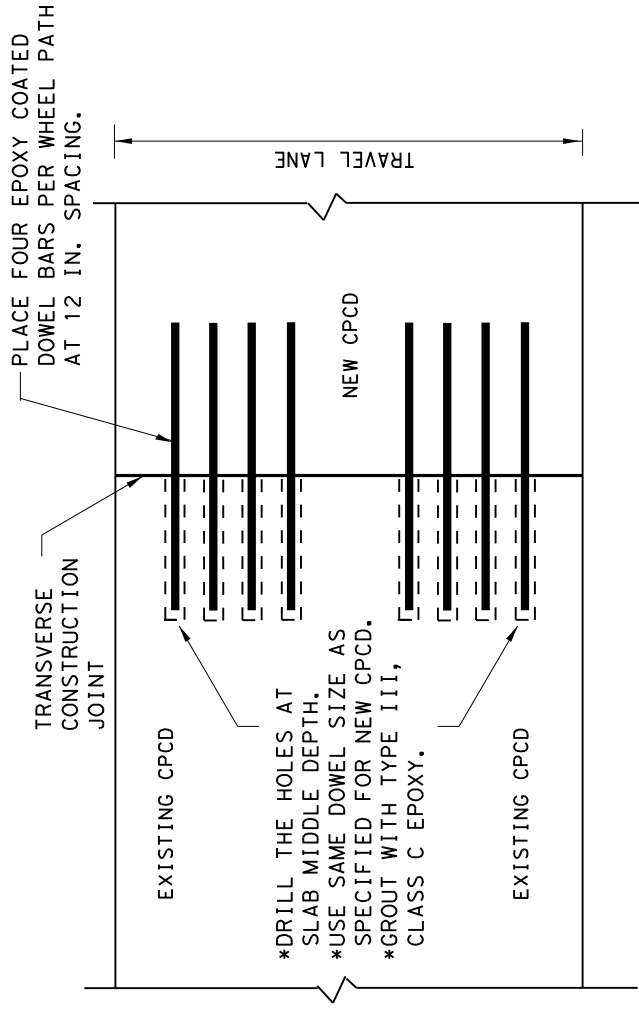


FREE LONGITUDINAL JOINT DETAIL

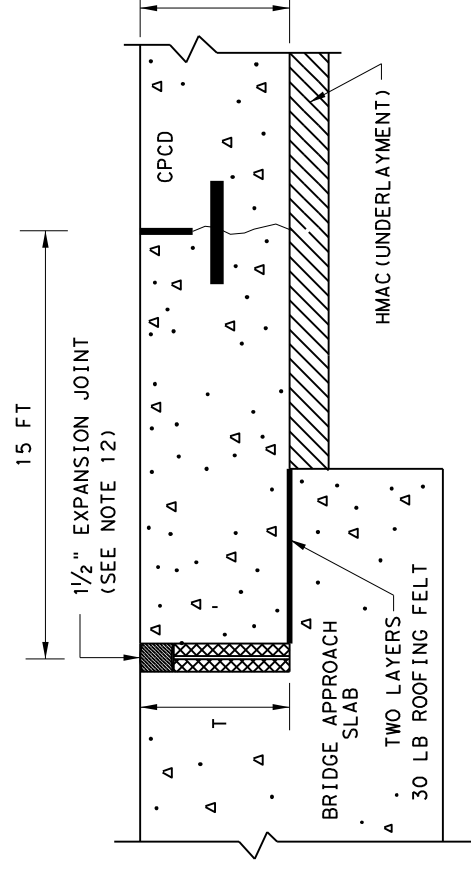


1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 BARS FOR 8" AND THICKER SLABS, USE #5 BARS FOR LESS THAN 8" THICK SLABS.
3. THE TRANSVERSE JOINTS OF PROPOSED PAVEMENT SHALL COINCIDE WITH EXISTING PAVEMENT JOINTS UNLESS OTHERWISE SHOWN ON THE PLANS.

LONGITUDINAL WIDENING JOINT DETAIL



TRANSVERSE JOINT DETAIL
EXISTING CPCD TO NEW CPCD
PLAN VIEW (NOT TO SCALE)



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

SHEET 2 OF 2



Design Division Standard

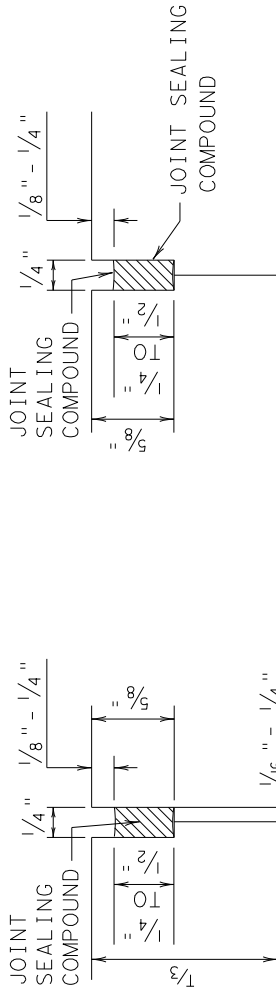
CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN

T-6 to 12 INCHES

CPCD-14

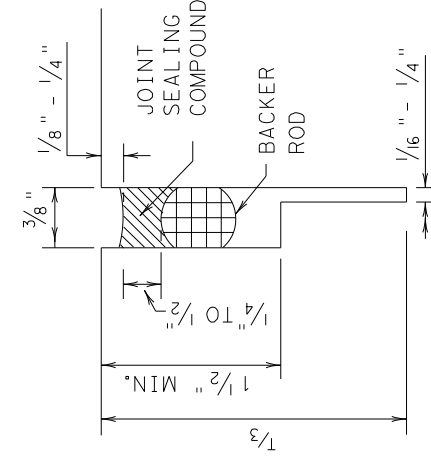
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© TxDOT: DECEMBER 2014	CONT: SECT	JOB	HIGHWAY	
REVISIONS	6457	03	001	FM1171
	DIST	COUNTY	SHEET NO.	
	DAL	DENTON		39

METHOD B: JOINT SEALING COMPOUND

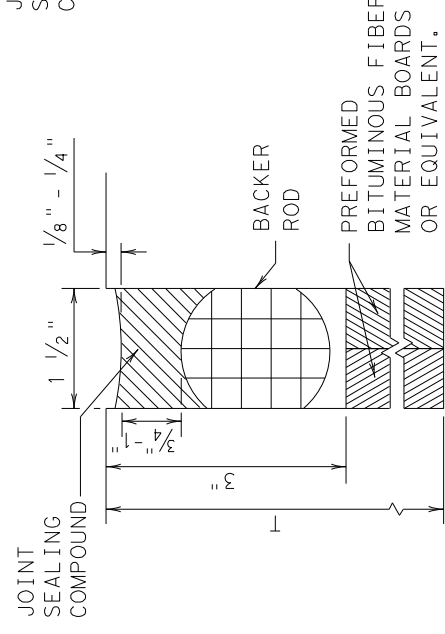


LONGITUDINAL SAWED CONTRACTION JOINT

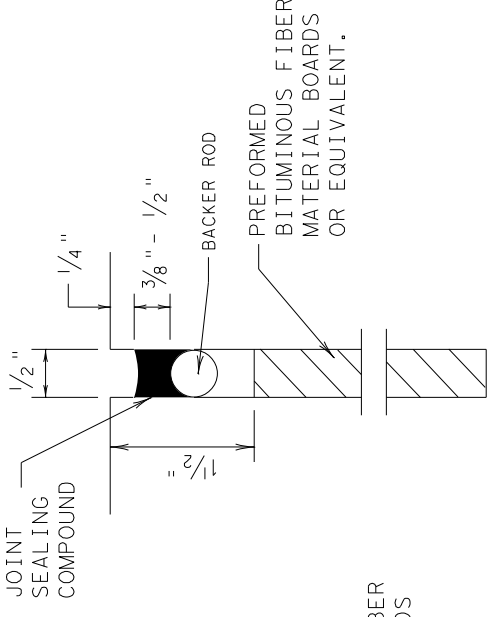
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

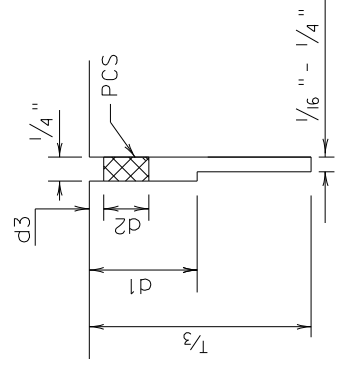


TRANSVERSE FORMED EXPANSION JOINT

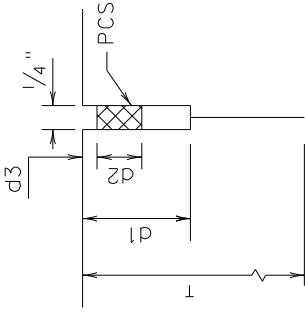


FORMED ISOLATION JOINT

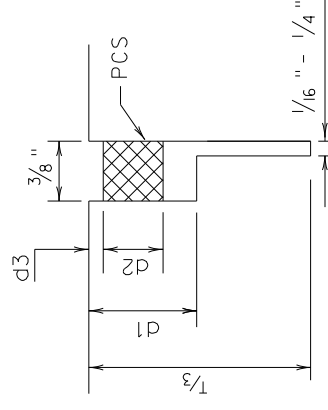
METHOD A: PREFORMED COMPRESSION SEALS (PCS) (DMS-6310 CLASS 6)



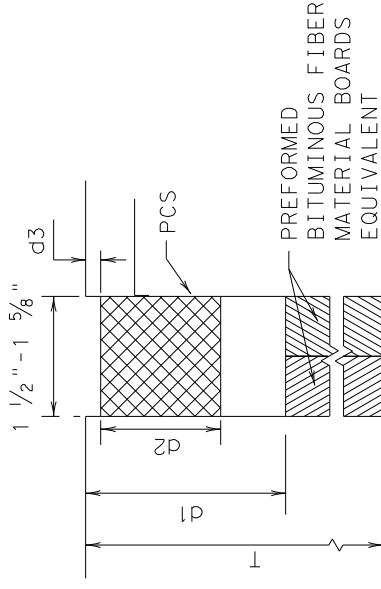
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.



Design Division Standard

CONCRETE PAVING DETAILS
JOINT SEALS

JS-14

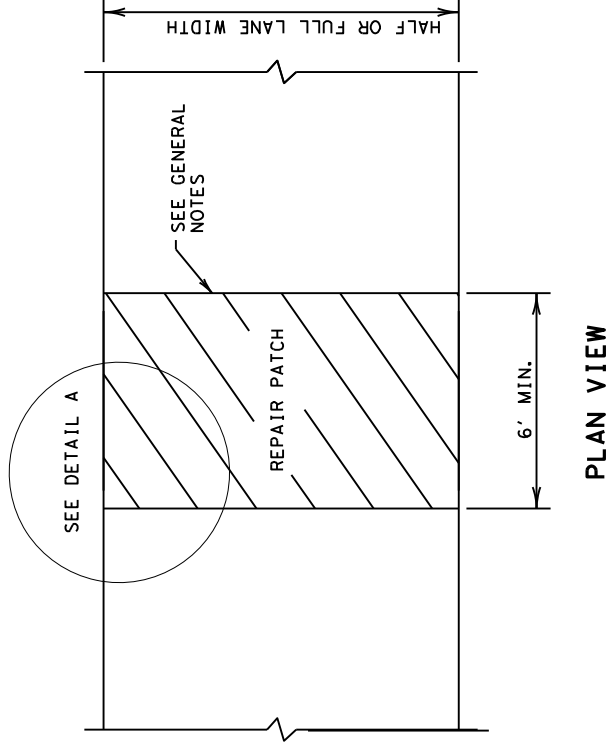
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REVISIONS	6457	03	001	FMT171
	DIST	COUNTY		SHEET NO.
	DAL	DENTON		40

GENERAL NOTES

- ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
- MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.
- FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
- AT LEAST ONE LONGITUDINAL FULL DEPTH SAW CUT SHALL BE AT AN EXISTING LONGITUDINAL JOINT.
- ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
- THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
- EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

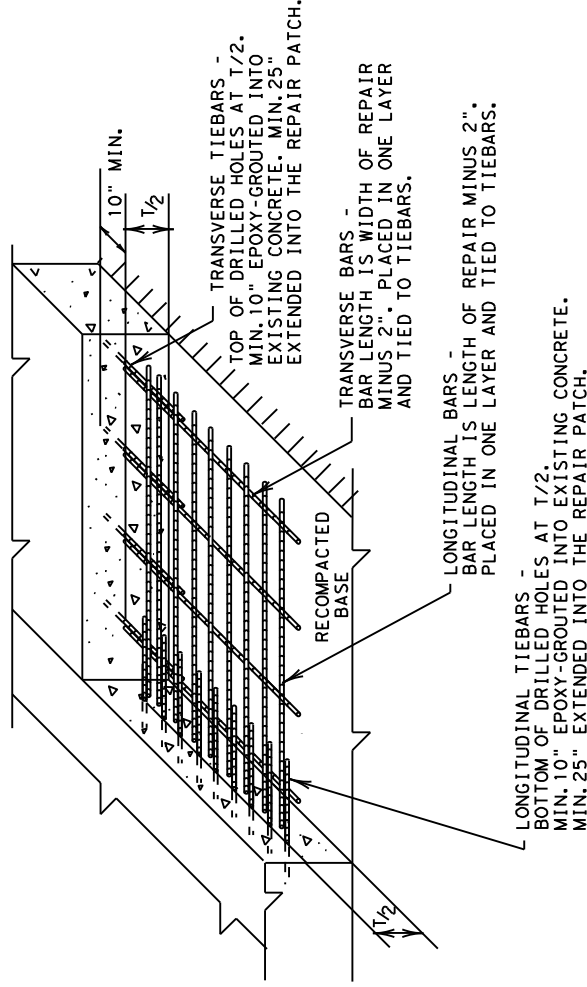
TYPE PAVEMENT	SLAB THICKNESS AND BAR SIZE		LONGITUDINAL*		TRANSVERSE*	
	T (IN.)	BAR SIZE	REGULAR BARS SPACING (IN.)	TIEBARS SPACING (IN.)	BARS SPACING (IN.)	TIEBARS SPACING (IN.)
CRCP	6.0	#5	7.5	7.5	24	24
	6.5		7.0			
	7.0		6.5			
	7.5	6.0	6.0	#6	24	24
	8.0	9.0	9.0			
	8.5	8.5	8.5			
	9.0	8.0	8.0			
	9.5	7.5	7.5	24	24	24
	10.0	7.0	7.0			
	10.5	6.75	6.75			
JRCP	11.0	6.5	6.5	24	24	24
	11.5	6.25	6.25			
	≥12.0	6.0	6.0			
	<8.0	24.0	12.0			
	≥8.0	24.0	12.0			
CPCD	<8.0	#5	NONE	12.0	NONE	24
	≥8.0	#6	NONE	12.0	NONE	24

* USE 12" SPACING AS FIRST AND LAST SPACING AT END OR SIDE FOR ALL BARS.



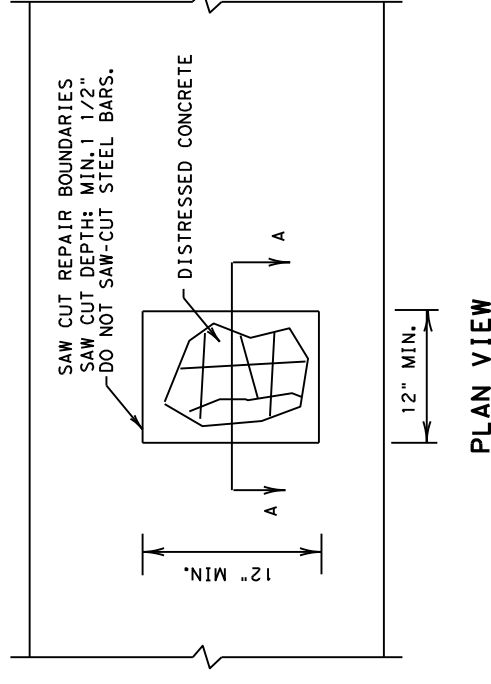
PLAN VIEW

DETAIL A
GROUTED TIEBARS & REINFORCEMENT

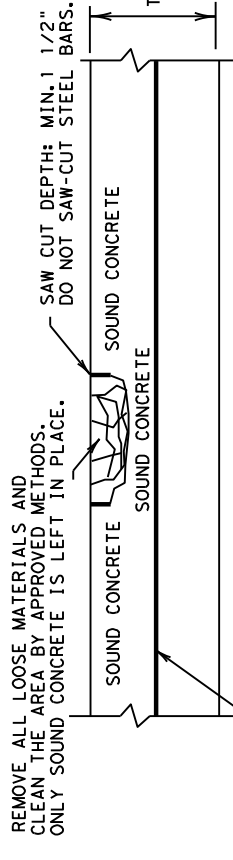


GENERAL NOTES

- ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
- THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
- EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



PLAN VIEW



SECTION A-A

HALF-DEPTH REPAIR

LONGITUDINAL STEEL BARS:
 *REPAIR AREAS MAY BE ADJUSTED AFTER REMOVING DISTRESSED CONCRETE. SWITCH THE HALF-DEPTH REPAIR TO FULL-DEPTH REPAIR IF EXPOSED EXISTING LONGITUDINAL BARS ARE DEFICIENT, AS APPROVED. COMPENSATION WILL BE MADE FOR UNEXPECTED VOLUMES OF REPAIR AREAS OR CHANGES IN SCOPE OF WORK.

*INCREASE THE REPAIR AREA AND PERFORM A FULL-DEPTH REPAIR AS DIRECTED IF LONGITUDINAL STEEL BARS WERE DAMAGED BY THE REMOVAL OPERATIONS. NO ADDITIONAL COMPENSATION WILL BE MADE.

SHEET 1 OF 2



Department of Transportation

Design Division Standard

REPAIR OF CONCRETE PAVEMENT

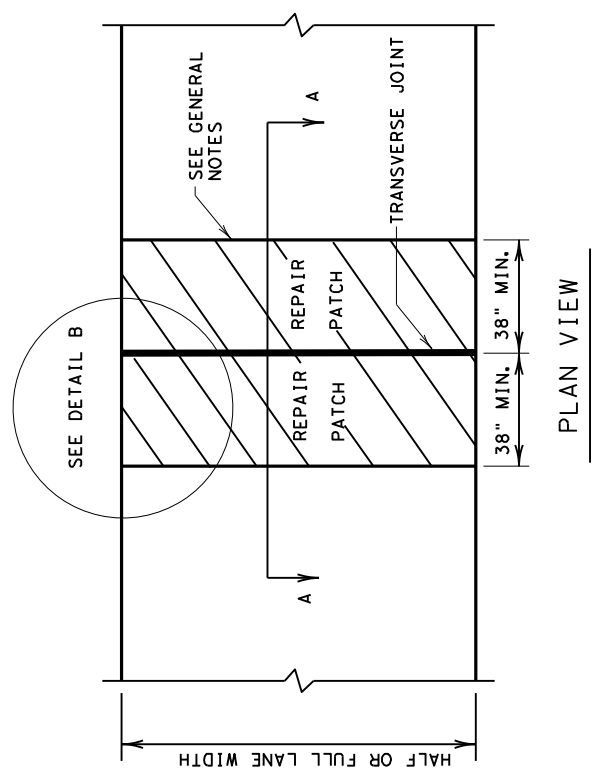
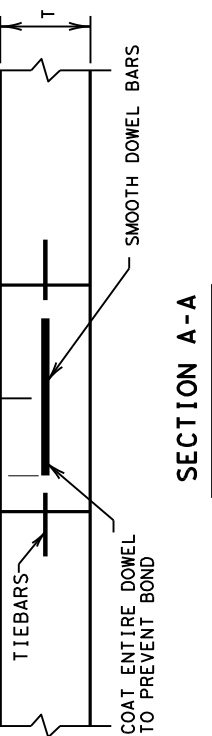
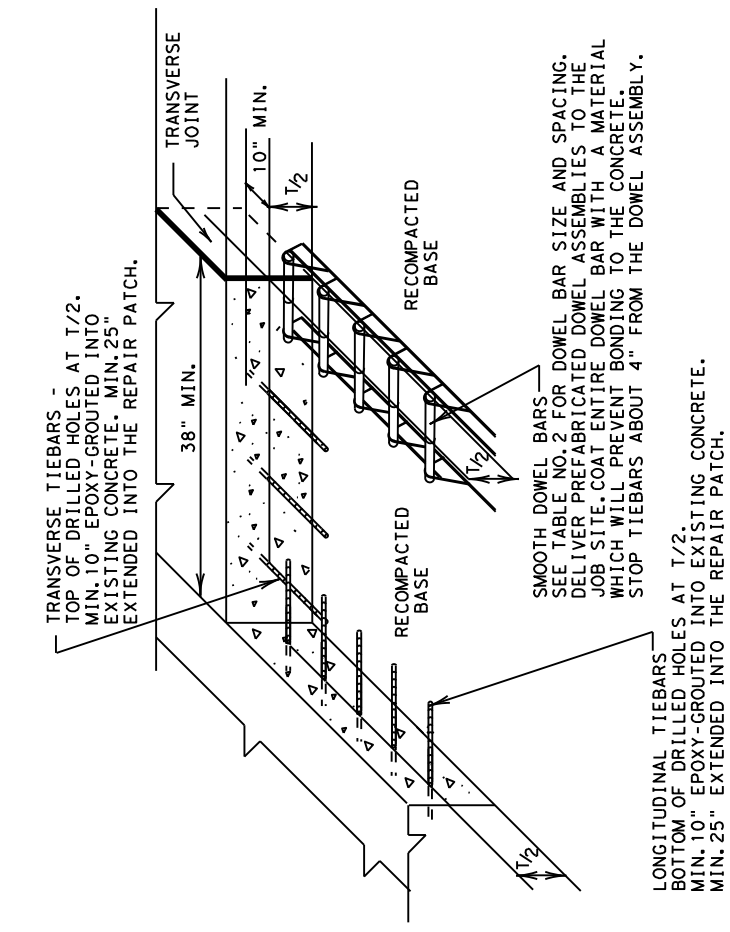
REPCP-14

FILE: repcp14.dgn	DN: TXDOT	DN: HC	DN: HC	CK: AN
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REVISIONS	6457 03	001	FMT 171	
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	DAL	DENTON		41

FULL-DEPTH REPAIR OF CRCP, JRCP, AND CPCD

GENERAL NOTES

1. ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
2. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.
3. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
4. AT LEAST ONE LONGITUDINAL FULL DEPTH SAW CUT SHALL BE AT AN EXISTING LONGITUDINAL JOINT.
5. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
6. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
7. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."
8. DOWEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1/4 IN. HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED. WHERE DOWEL BAR BASKETS ARE USED, REMOVE THE SHIPPING WIRES.



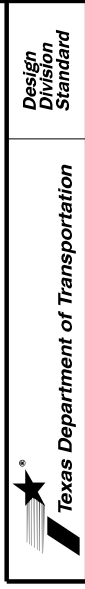
**DETAIL B
GROUTED TIEBARS & DOWELS**

REPAIR OF TRANSVERSE JOINT OF CPCD

TABLE NO. 2 DOWELS (SMOOTH BARS)

PAVEMENT THICKNESS (INCHES)	SIZE AND DIA.	LENGTH (IN.)	SPACING (IN.)
<10	#8 (1 IN.)	18.0	12.0
≥10	#10 (1 1/4 IN.)		

SHEET 2 OF 2



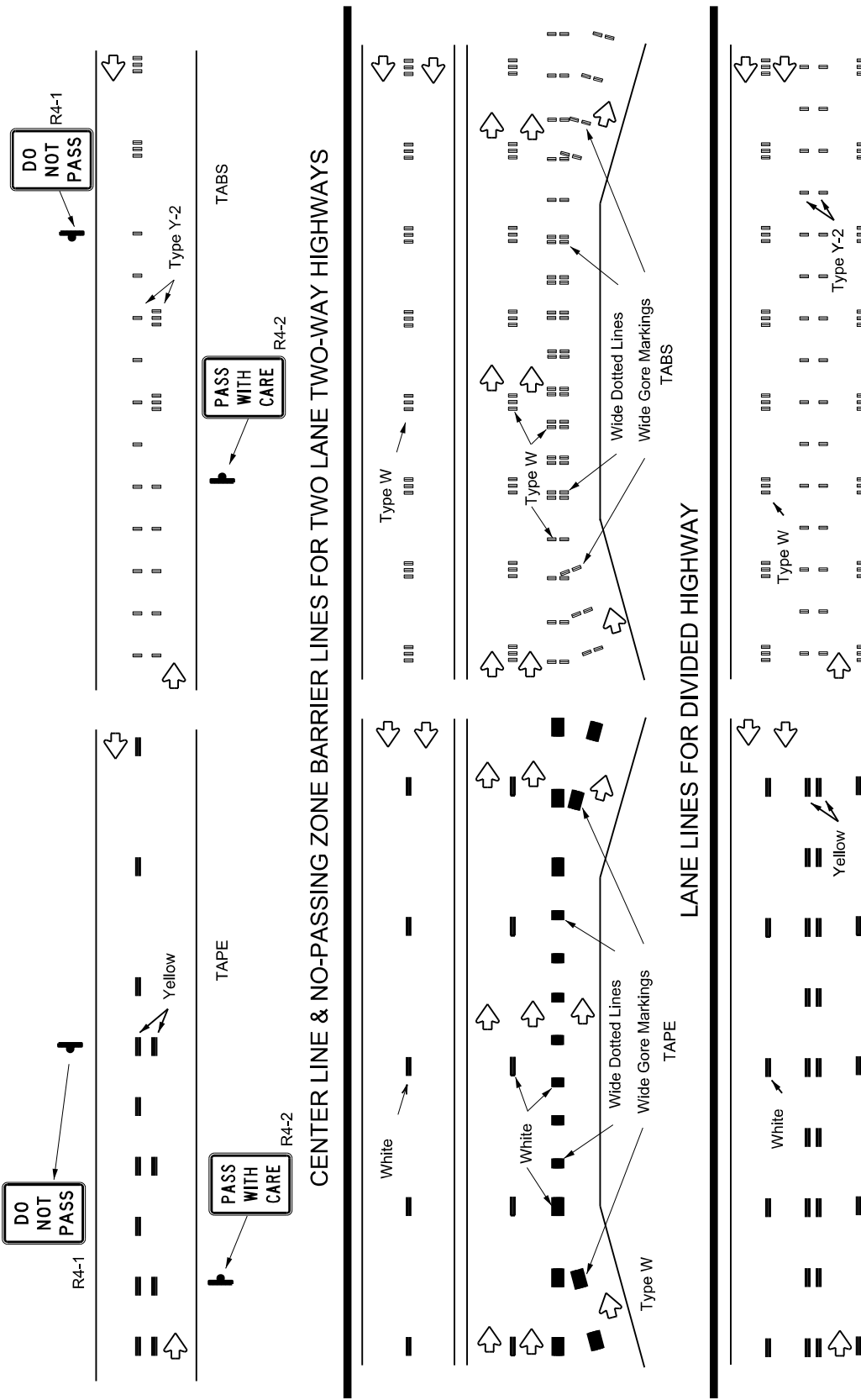
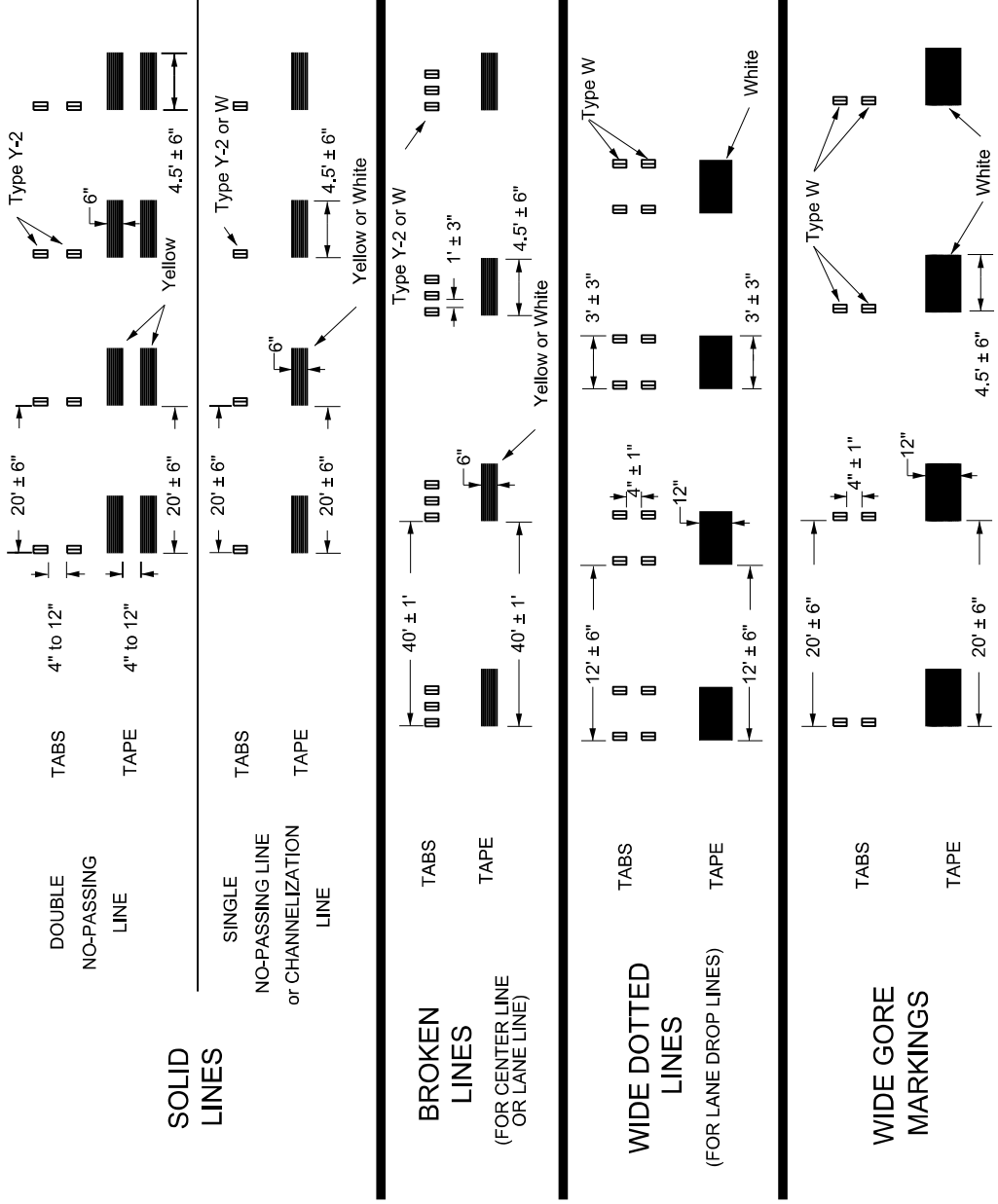
REPAIR OF CONCRETE PAVEMENT

REPCP-14

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	DIST	COUNTY	SHEET NO.
	DAL	DENTON	42

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



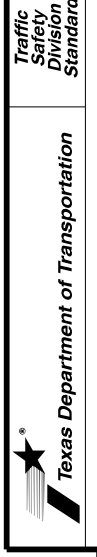
NOTES:

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

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WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

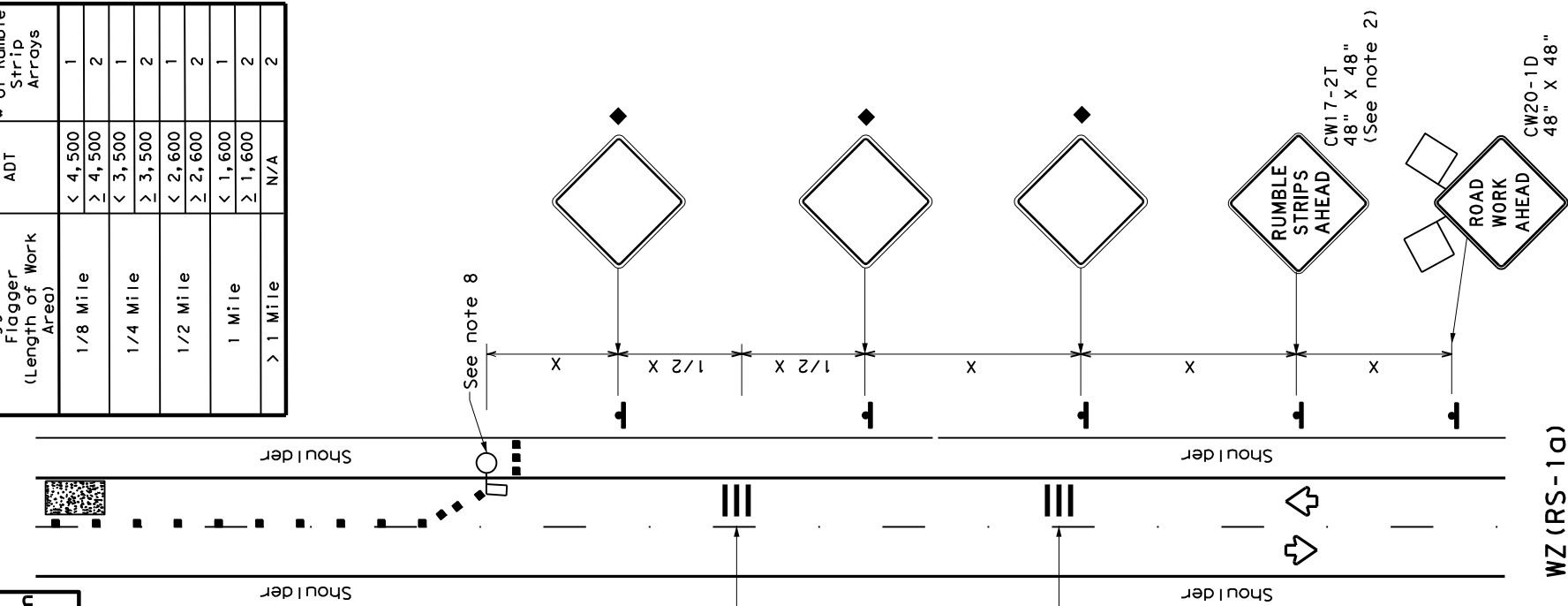


FILE:	wzstpm23.dgn	DN:	OK	BY:	OK
TXDOT:	February 2023	CONT:	SECT	JOB:	HIGHWAY
REV:	REVISIONS	6457	03	001	FM1171
4-82	7-13	DIST:	COUNTY		SHEET NO.
1-87	2-23	DAL	DENTON		43

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

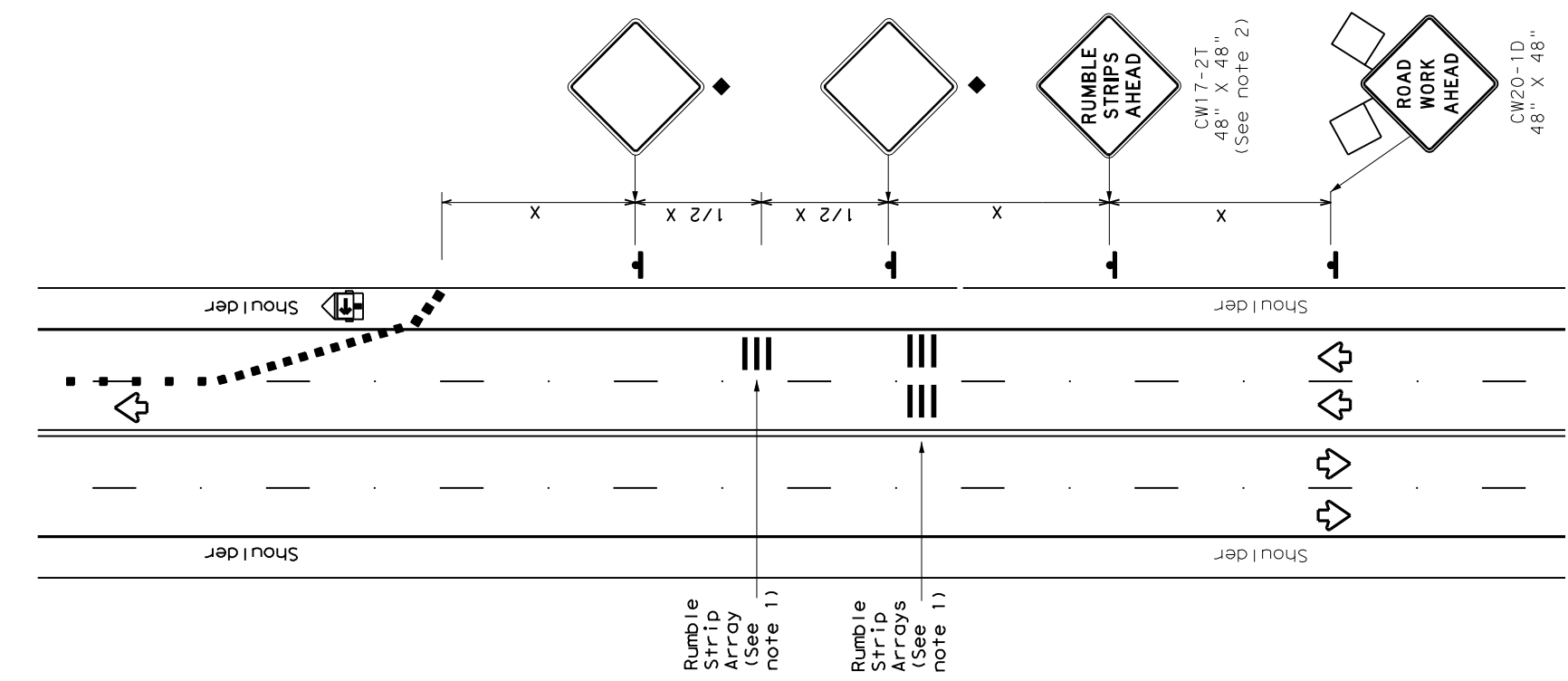
TABLE 1

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



WZ (RS - 1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ (RS - 1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

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

TABLE 2

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

LEGEND

Symbol	Description
ZZZZZZ	Type 3 Barricade
Truck	Heavy Work Vehicle
Trailer	Trailer Mounted Flashing Arrow Panel
Sign	Sign
Flag	Flag

Posted Speed *	Formula	Minimum Desirable Taper Lengths **		Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x"	Distance	Suggested Longitudinal Buffer Space "B"
		Offset	Offset/Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	10'	11'	12'	15'	30'	60'	90'
35		150'	165'	180'	240'	35'	70'	120'
40		265'	295'	320'	40'	40'	80'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

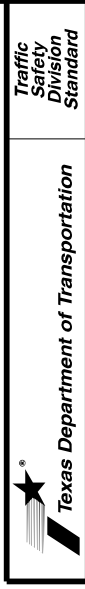
* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper(FT) W=Width of Offset(FT)
 S=Posted Speed(MPH)

TYPICAL USAGE

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

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

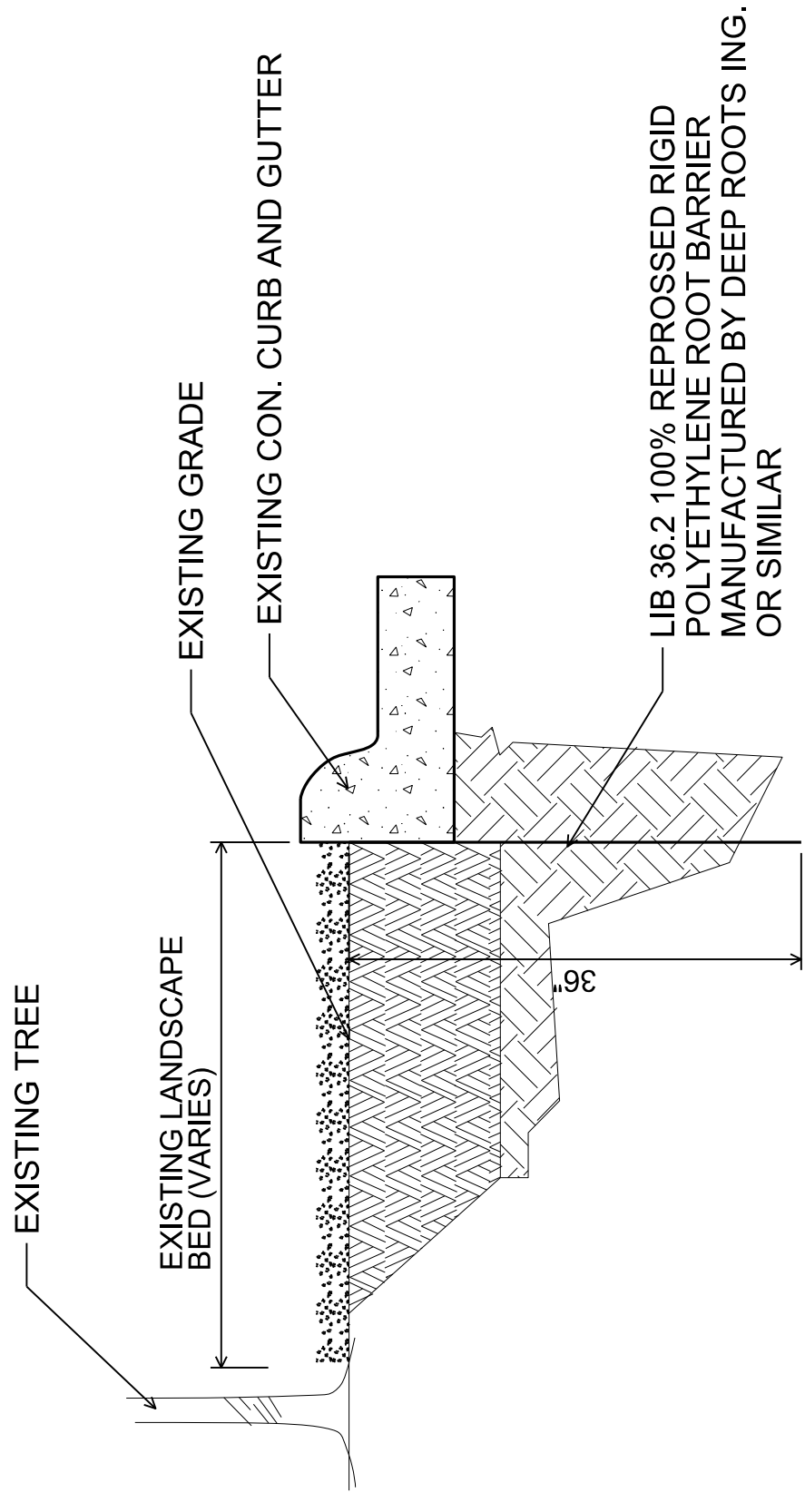
* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.



TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

FILE: WZrs22.dgn	DN: TXDOT	CK: TXDOT	DM: TXDOT	CK: TXDOT
TXDOT November 2012	CONT SECT	JOB	HIGHWAY	
REVIEWS	6457	03	001	FM1171
2-14	DIST	COUNTY	SHEET NO.	44
4-16	DAL	DENTON		



ROOT BARRIER DETAIL

DESIGN		FED. RD. DIV. NO.	PROJECT NO.	SHEET 1 OF 1	
TC	TG	6	(See Title Sheet)	FM1171	HIGHWAY NO.
GRAPHICS	TG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	KKD	TEXAS	DAL	DENTON	
CHECK	KKD	CONTROL	SECTION	JOB	
		6457	03	001	45