STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

STATE AID PROJECT NUMBER C 2103-1-44 CSJ 2103-01-044 RM 2243

WILLIAMSON COUNTY

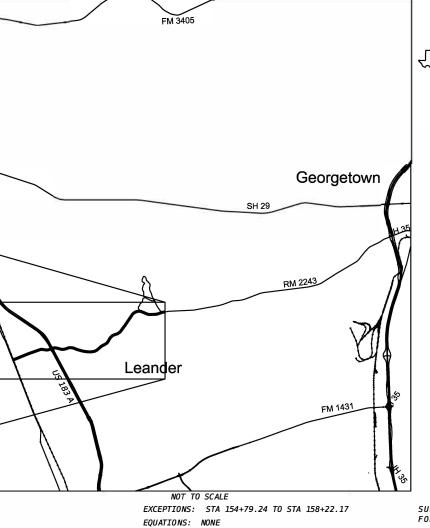
 NET LENGTH OF ROADWAY = 23,301.25 FT.=
 4.413 MI.

 NET LENGTH OF BRIDGE = 0.00 FT.=
 0.00 MI.

 NET LENGTH OF PROJECT = 23,301.25 FT.=
 4.413 MI.

FROM: US 183 TO: GAREY PARK

FOR THE CONSTRUCTION OF AN OVERLAY CONSISTING OF A MILL & INLAY WITH A BONDING COURSE AND THIN OVERLAY MIX (TOM)



RAILROAD CROSSINGS: CMTY 088.46 RRMP ~ STA 102+25

Texas Department of Transportation

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FOR LETTING:

DISTRICT DESIGN ENGINEER

Susana Ceballos P.E.

-F1816167B5C7414

N/A *A.D.T.:* 2021: 11,113 VPD 2041: 15,558 VPD

DESIGN SPEED:

2103 01

DIST

FINAL PLANS

WILLIAMSON

RM 2243

01

LETTING DATE:
DATE CONTRACTOR BEGAN WORK:
DATE WORK WAS COMPLETED & ACCEPTED:
ETNAL CONTRACT COST: ¢

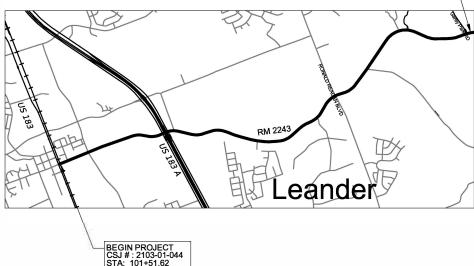
I CERTIFY THAT THIS PROJECT WAS CONSTRUCTED IN SUBSTANTIAL COMPLIANCE WITH THE FINAL AS-BUILT PLANS AND SPECIFICATIONS.

CONTRACTOR:

DATE

WAS SENT TO THE WILLIAMSON COUNTY FLOODPLAIN ADMINISTRATOR ON 7/16/2023.

NOTIFICATION OF OF WORK WITHIN FLOODLPLAIN



FND PROJECT: END PROJECT:
CSJ #: 2103-01-044
STA: 334+52.87
REF MRK: 532+0.669
MILE PT: 14.411
DFO: 4.41

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000---008).

SUBMITTED

AREA ENGINEER

11/28/2023

APPROVED FOR LETTING:

RECOMMENDED FOR LETTING:

11/28/2023

11/28/2023

DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

GENERAL TITLE SHEET INDEX OF SHEETS TYPICAL SECTIONS 3-6 7-16 PROJECT LAYOUT 17 MISCELLANEOUS DETAILS 18-18I GENERAL NOTES ESTIMATE & QUANTITY 19-20 QUANTITY SUMMARY 21-22 23 SEQUENCE OF WORK TRAFFIC CONTROL PLAN & WORK ZONE STANDARDS >> 24-35 BC (1)-21 THRU BC (12)-21 >> 36 TCP (2-2)-18 >> 37 TCP (2-4)-18 >> 38 >> 39 TCP (3-1)-13 TCP (3-2)-13 >> 40 TCP (3-3)-14 >> 41 TCP (3-4)-13 >> 42 >> 43 WZ (STPM)-23 WZ (BRK) -13 >> 44 WZ (RS)-22 ROADWAY STANDARDS >> 45 TE (HMAC)-11 >> 46 FLEXPAVE (3)-22 (AUS) PAVEMENT MARKINGS & RUMBLE STRIPS STANDARDS >> 47 PM (1)-22 >> 48 PM (2)-22 >> 49 PM (3)-22 >> 50 PM (4)-22A >> 51 >> 52 RS (2)-23 RS (4)-23 RAILROAD STANDARDS 53 RAILROAD SCOPE OF WORK >> 54-55 RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS >> 56-57 RCD (1 THRU 2) - 22 ENVIRONMENTAL ISSUES & STANDARDS 58 >> 59 ENVIRONMENTAL, PERMITS, ISSUES, & COMMITMENTS

EC (1)-16

EC (9)-16

>> 60-62



THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

Arthur Porto, P.E.

Austin District Georgetown Area Office



Texas Department of Transportation

RM 2243 INDEX OF SHEETS

C) 2024		CONT	SECT JOB			HIGHWAY		
:	CK:	2103 01		044	RM 2243			
:	CK:	DIST		COUNTY		SHEET NO.		
		AUS	١ ١	WILLIAMSON	2			

*NOTE: NO PAVEMENT STRUCTURE WORK

STA 154+79.24 TO STA 158+22.17 (US 183A Intersection)

STA 104+73.66 TO STA 115+53.40 (Horizon Lakes Development) (Pavement Marking Work Only)

NOT TO SCALE

2103 01

AUS

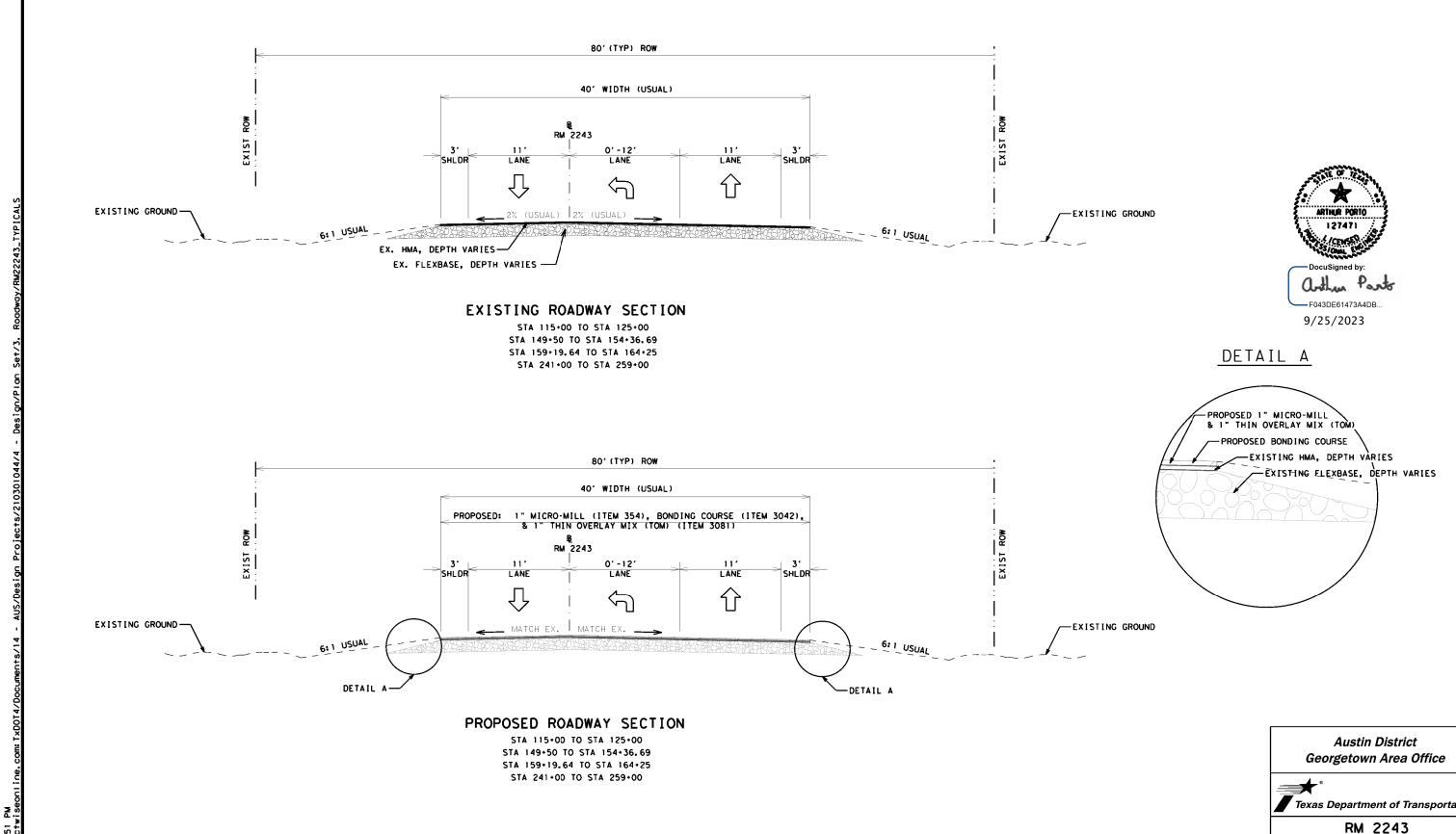
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SHEET 1 OF 4

044

WILLIAMSON

RM 2243



*NOTE: NO PAVEMENT STRUCTURE WORK STA 104+73.66 TO STA 115+53.40 (Horizon Lakes Development) (Pavement Marking Work Only) STA 154+79.24 TO STA 158+22.17 (US 183A Intersection)

Texas Department of Transportation

TYPICAL SECTIONS

NOT TO SCALE SHEET 2 OF 4 © 2024 RM 2243 2103 01 044 AUS WILLIAMSON

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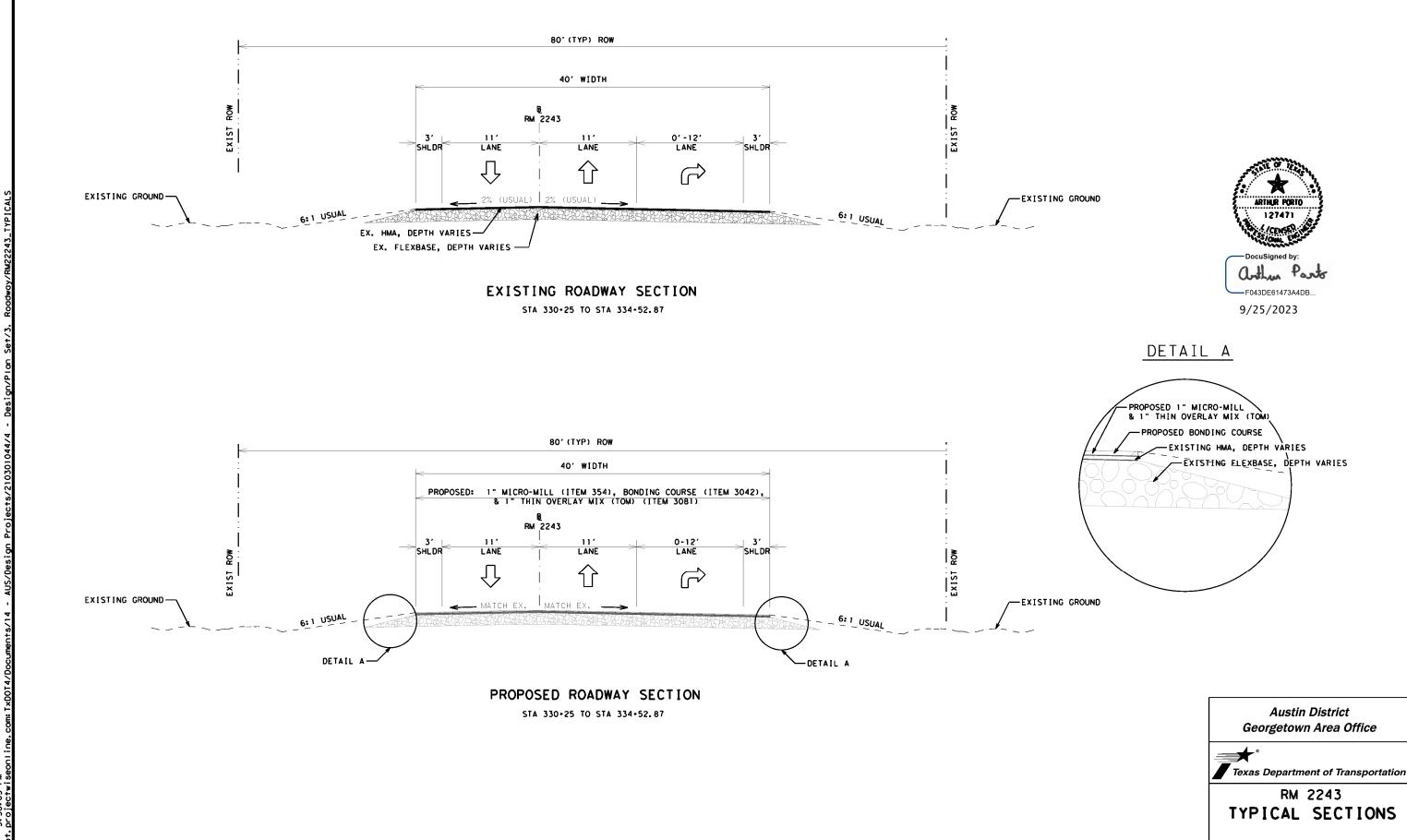
WILLIAMSON

RM 2243

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STA 154+79.24 TO STA 158+22.17 (US 183A Intersection)

NOT TO SCALE

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SHEET 4 OF 4

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WILLIAMSON

RM 2243

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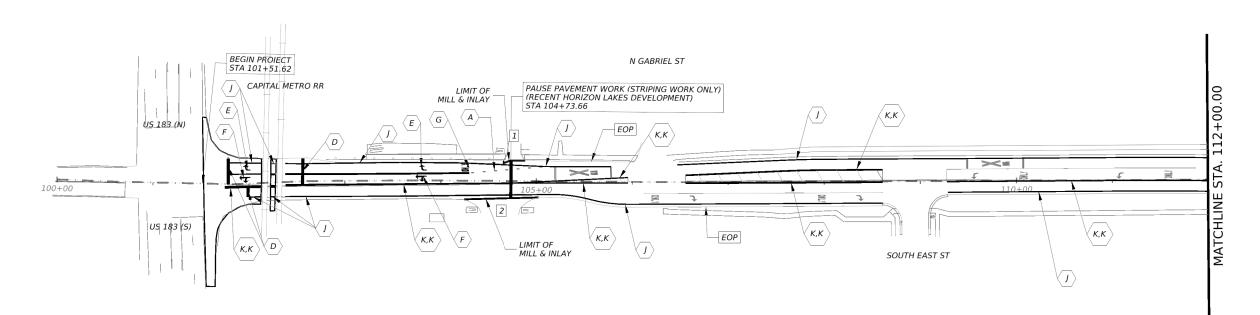


GENERAL NOTES:

* INSTALL PER STANDARDS

PRIVATE DRVWY

RESTRIPE OVER EXISTING STRIPING AT 60 MILLS FOR RECENT HORIZON LAKES DEVELOPMENT. TY II MARKINGS NOT REQUIRED FOR RESTRIPE.



	ITEM 666											ITEM 672		ITEM 6056				
	REFLECTIVE PAVEMENT MARKINGS TY I & TY II								RAISE	ED PVMT N	1RKRS	6002						
Α	В	С	D	E	F	G	Н	1	J	K	L	М	N	0	*	*	*	PREFORMED
8" WHITE DOT	8" WHITE SLD	12" WHITE SLD	24" WHITE SLD	ARROW (WHT)	DBL ARROW (WHT)	WORD (WHT)	24" YLW SLD	MEDIAN NOSE (YLW)	PROF 6" WHT SLD	PROF 6" YLW SLD	6" WHT SLD	6" YLW SLD	6" WHT BRK	36" YIELD TRI	REFL PAV MRKR TY II-A-A	MRKR	REFL PAV MRKR TY II-C-R	
LF	LF	LF	EA	EA	EA	EA	LF	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF
21	502	0	197	5	2	4	205	0	1930	1932	0	8	0	0	127	29	0	1170





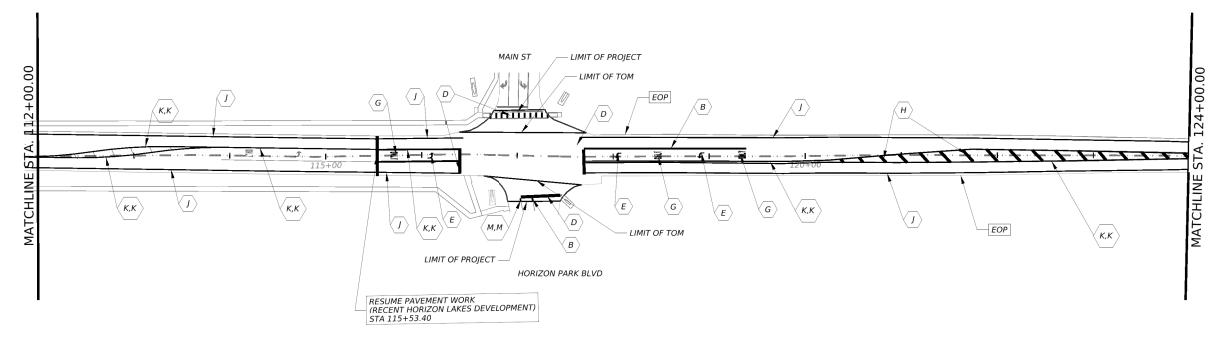
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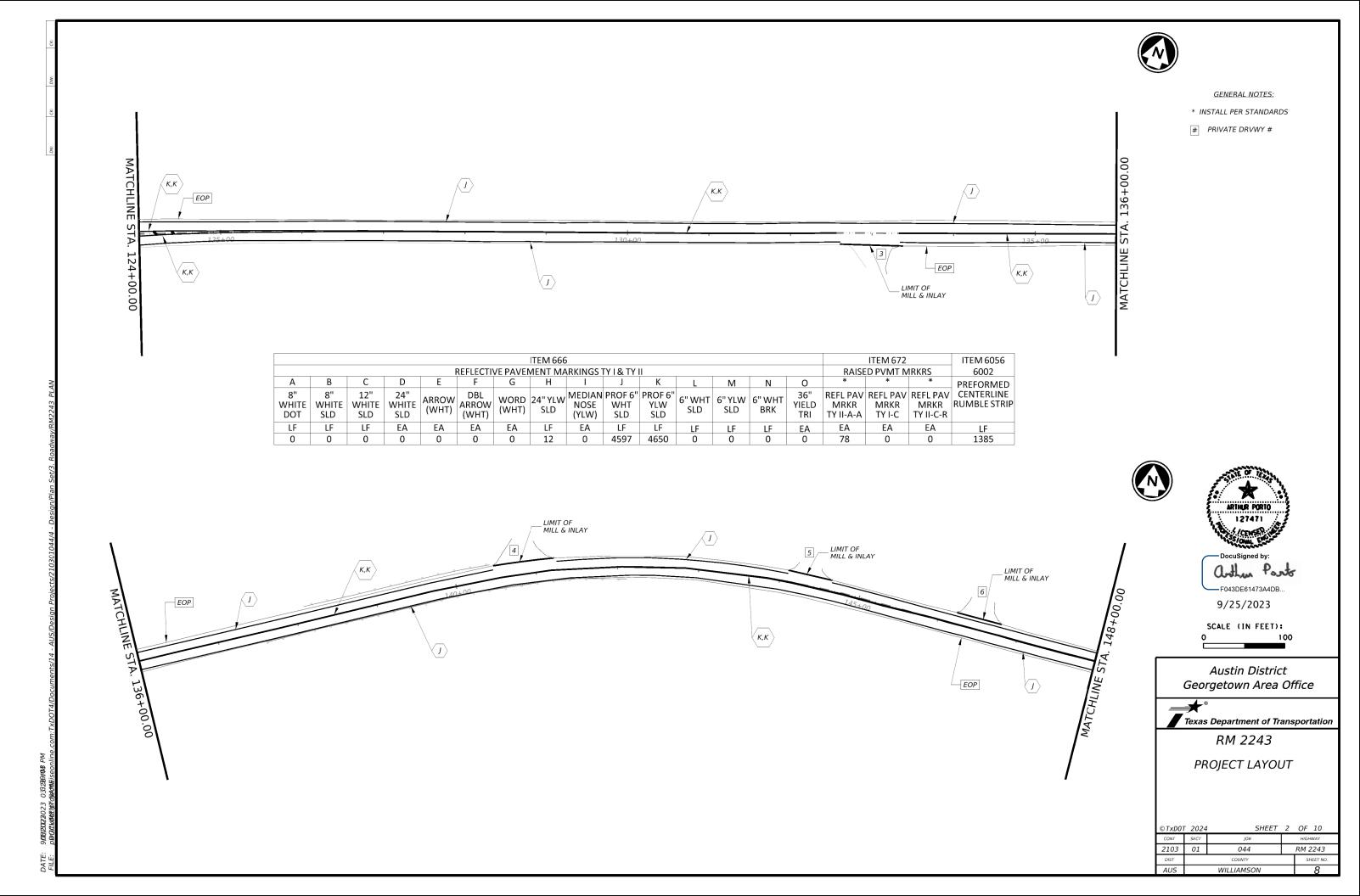
Austin District Georgetown Area Office

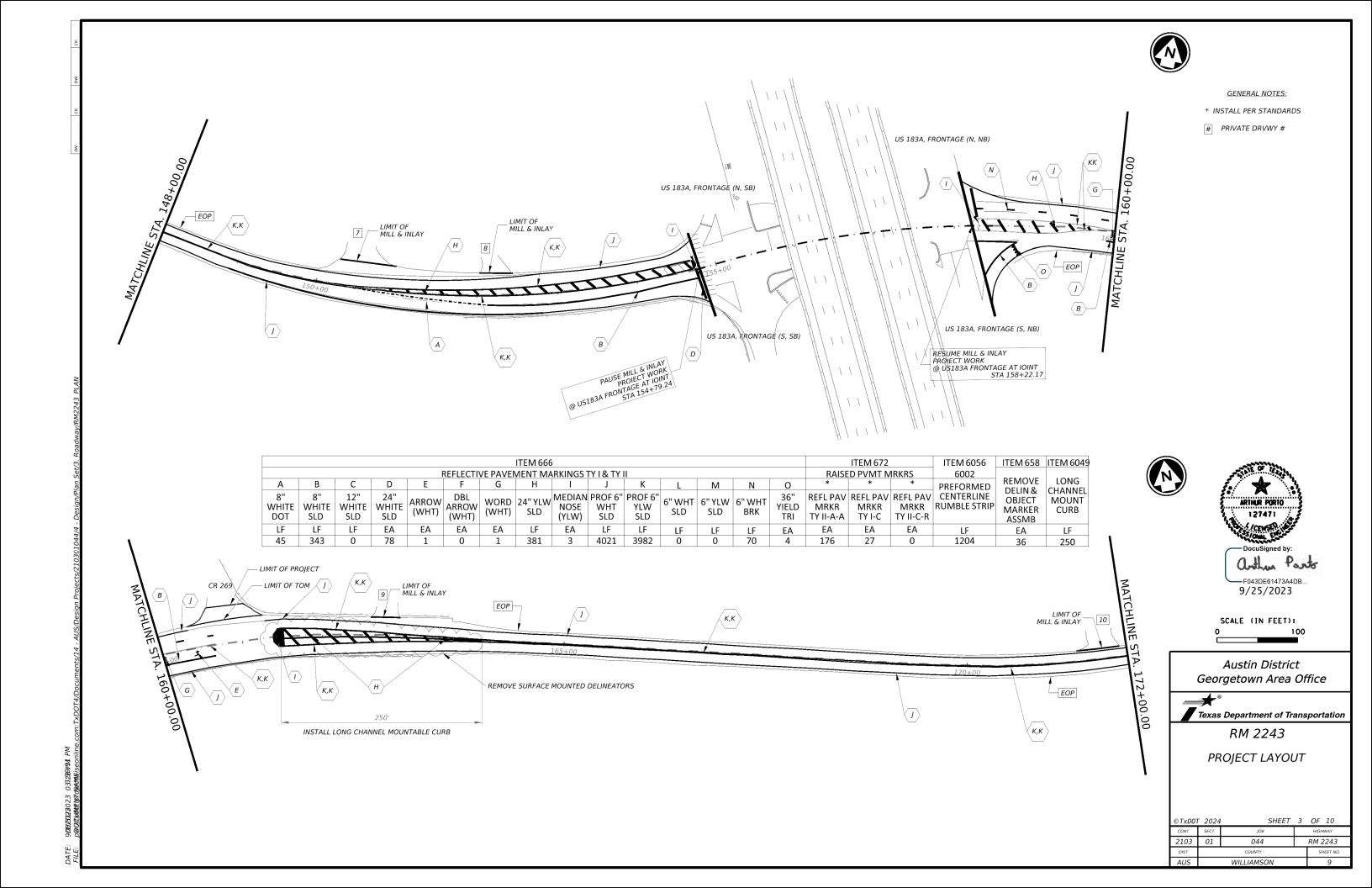


PROJECT LAYOUT

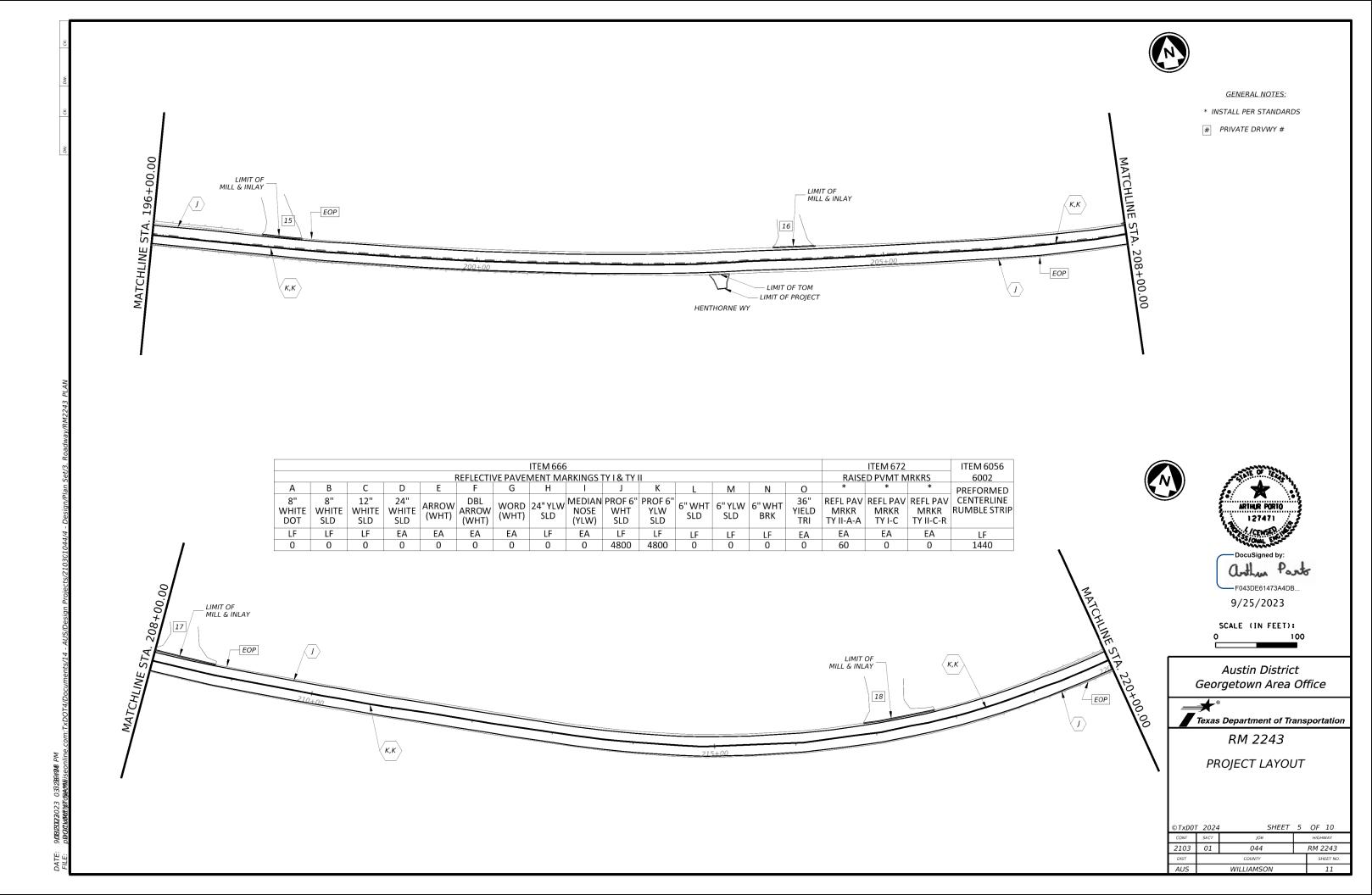
©TxD07	2024	SHEET	1	OF 10
CONT	SECT	JOB		HIGHWAY
2103	01	044		RM 2243
DIST		COUNTY		SHEET NO.
ALIS		MILLIAMSON		7

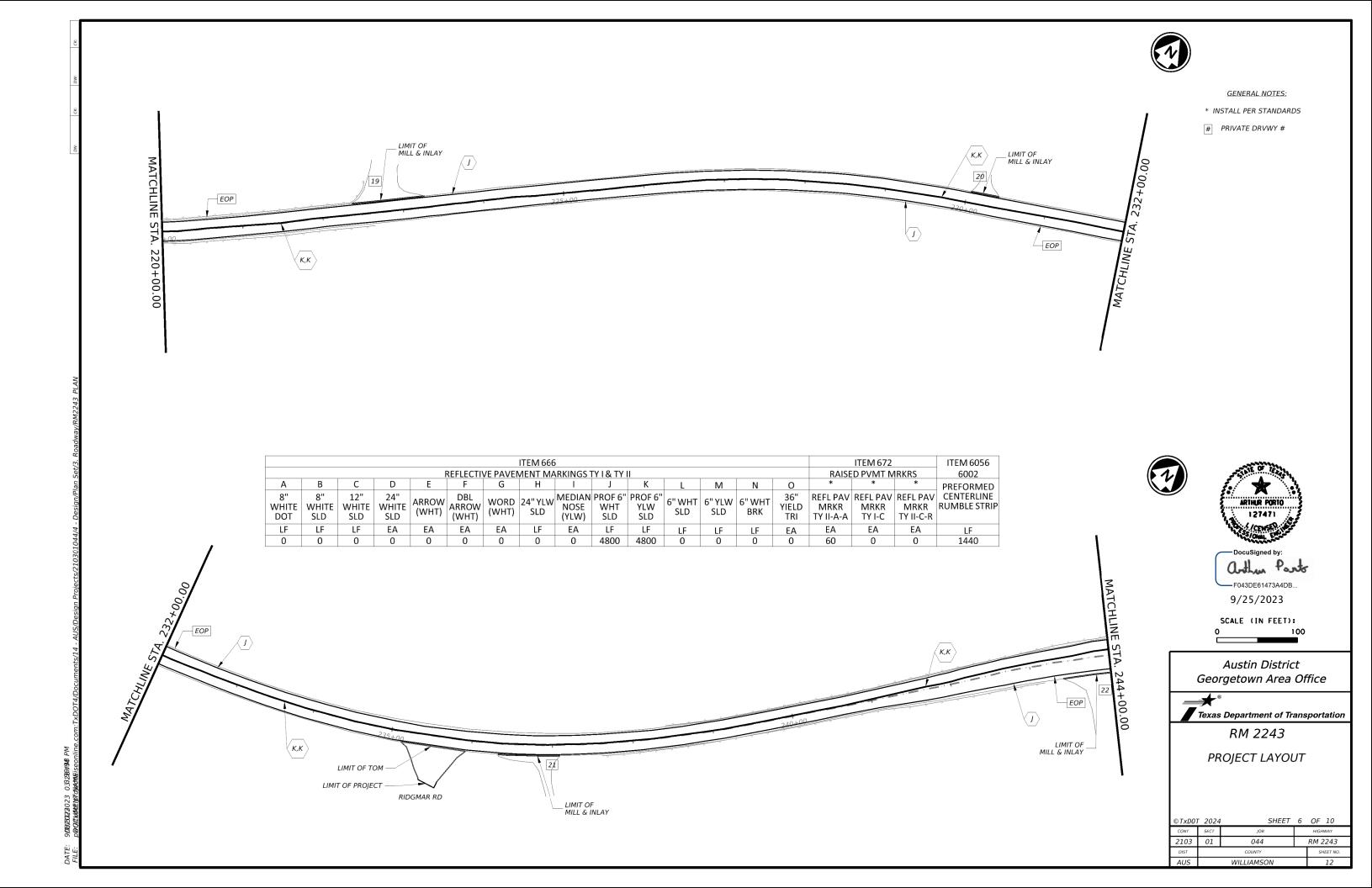


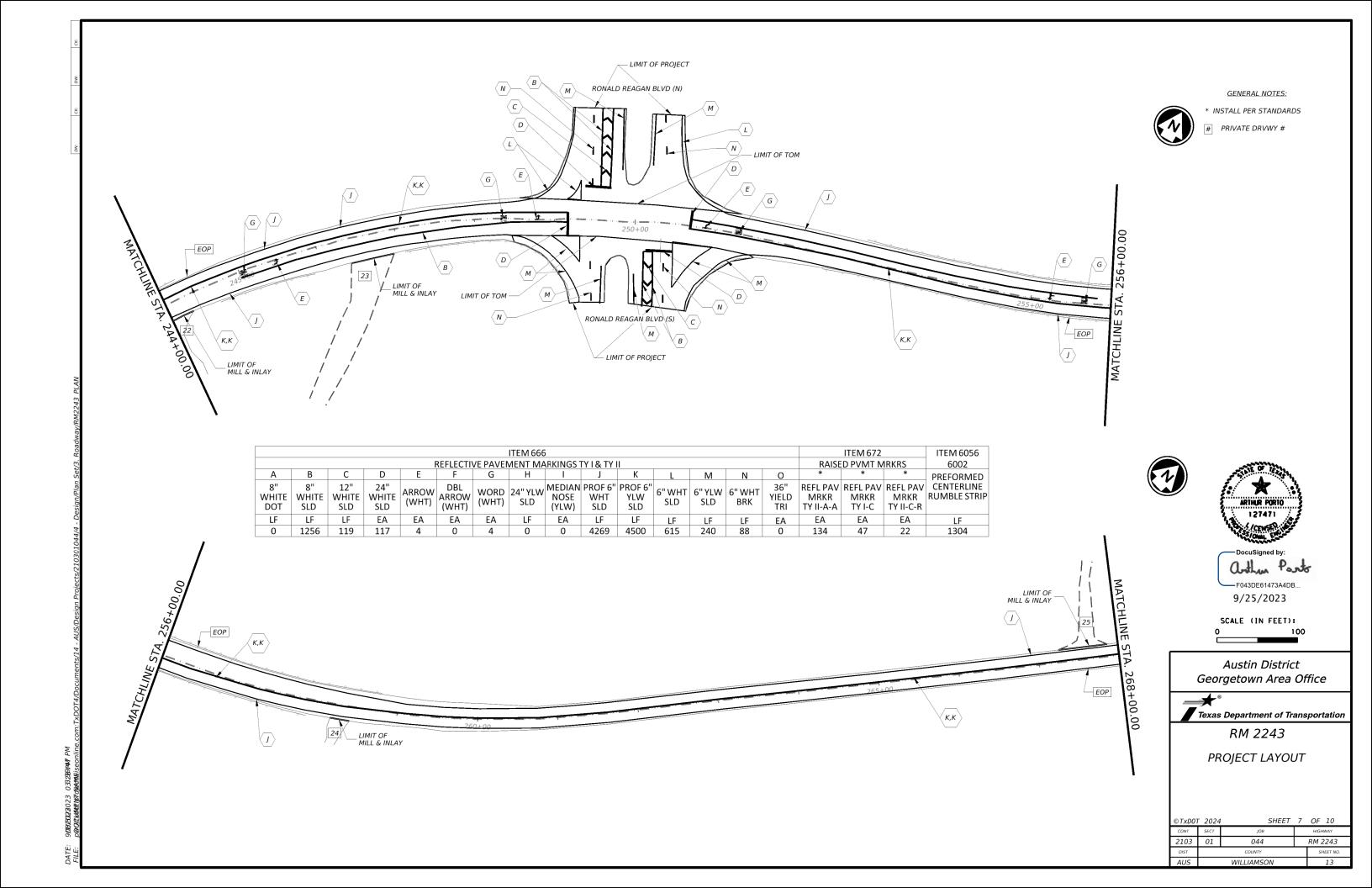


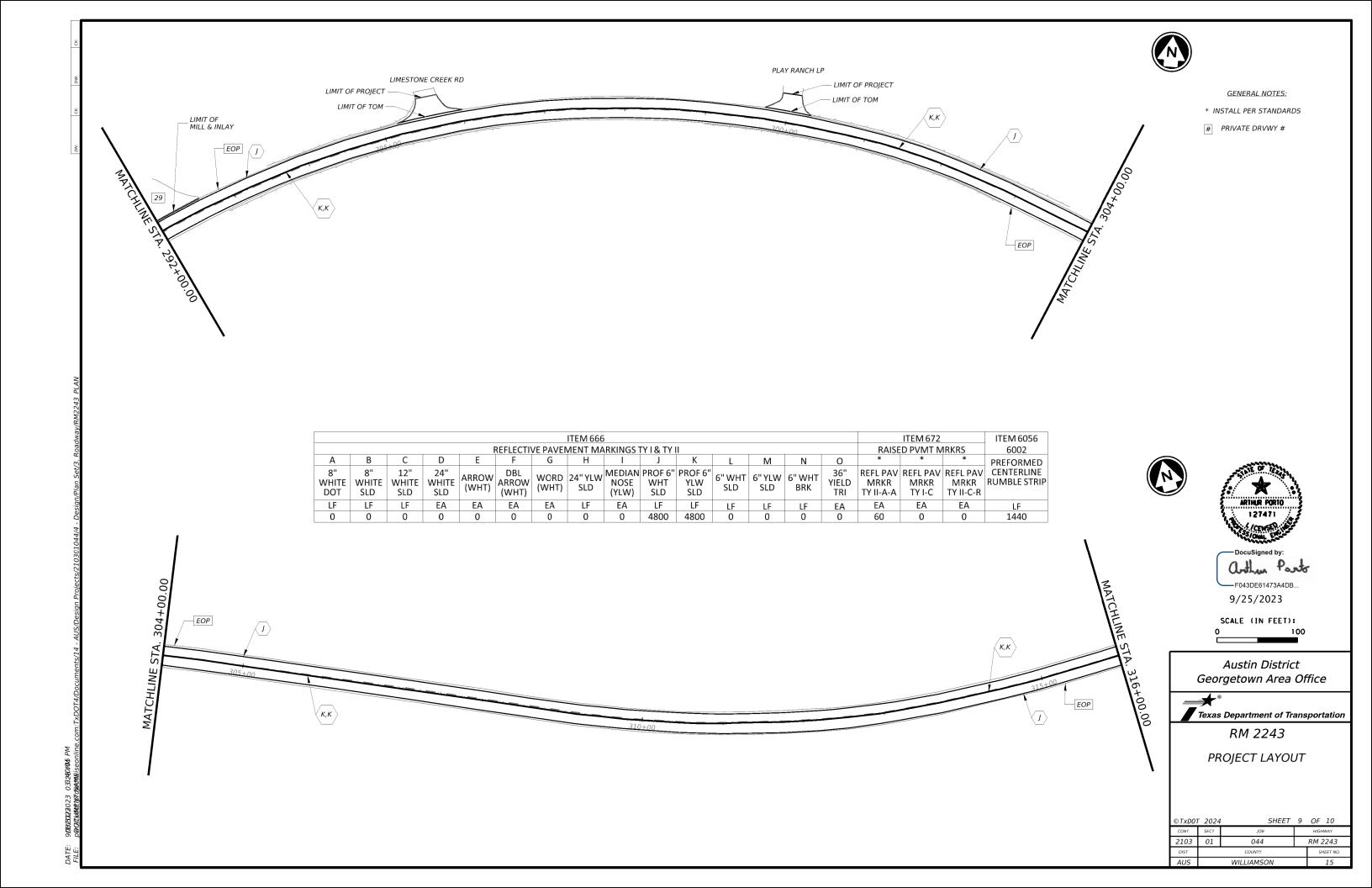


RM 2243







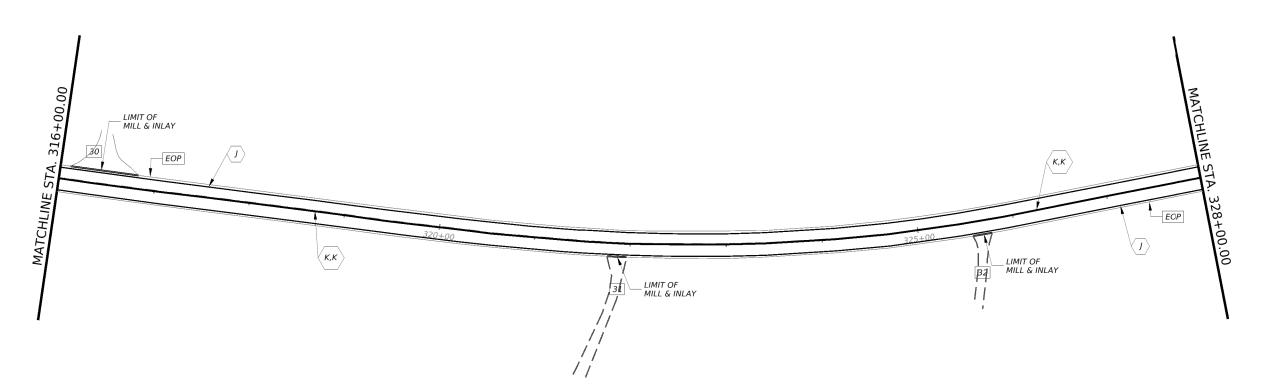




GENERAL NOTES:

* INSTALL PER STANDARDS

PRIVATE DRVWY



	ITEM 666 REFLECTIVE PAVEMENT MARKINGS TY I & TY II									ITEM 672 RAISED PVMT MRKRS			ITEM 6056 6002					
Α	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	*	*	*	PREFORMED
8" WHITE DOT	8" WHITE SLD	12" WHITE SLD	24" WHITE SLD	ARROW (WHT)	DBL ARROW (WHT)	WORD (WHT)	24" YLW SLD	MEDIAN NOSE (YLW)	PROF 6" WHT SLD	PROF 6" YLW SLD	6" WHT SLD	6" YLW SLD	6" WHT BRK	36" YIELD TRI	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY I-C		
LF	LF	LF	EA	EA	EA	EA	LF	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF
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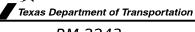




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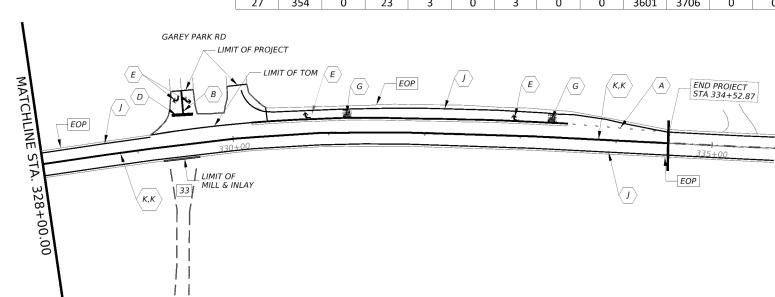
Austin District Georgetown Area Office

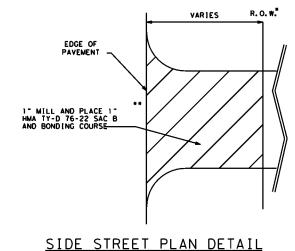


RM 2243

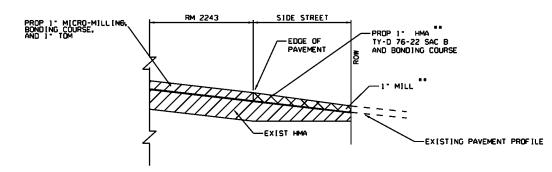
PROJECT LAYOUT

©TxD07	2024	SHEET	10	OF	10
CONT	SECT	JOB		HIGH	VAY
2103	01	044	RM 2243		
DIST		COUNTY		SH	EET NO.
AUS		WILLIAMSON			16



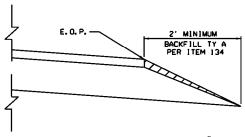


	ITEM 530-6	5011		
I	NTS, DRWYS, & TUR	NOUTS (ACP)		
SIDEROADS	AREA (SY)	STATION	SIDE	LAYOUT SHEET
N. GABRIEL ST	-	106+20	LT	1
SOUTH EAST ST		108+90	RT	1
MAIN ST	211	117+00	LT	1
Horizon Park Blvd	165	117+10	RT	1
US 183A, FRONTAGE (N. SB)	-	155+50	LT	3
US 183A, FRONTAGE (S. SB)	-	155+50	RT	3
US 183A, FRONTAGE (N. NB)	-	158+00	LT	3
US 183A, FRONTAGE (S. NB)		158+00	RT	3
CR 269	126	160+90	LT	3
HENTHORNE WY	33	203+00	RT	5
RIDGMAR RD	241	235+50	RT	6
RONALD REAGAN BLVD (N)	1755	249+90	LT	7
RONALD REAGAN BLVD (S)	1617	249+90	RT	7
CR 175	203	270+90	RT	8
DRVWY 26 TURNOUT ONLY	42	285 • 50	LT	8
DRVWY 28 TURNOUT ONLY	37	290.00	LT	8
LIMESTONE CREEK RD	111	295+50	LŤ	9
PLAY RANCH LP	82	300.00	RT	9
GAREY PARK RD	335	329+80	LT	10
ERALL PROJECT TOTAL	4, 958			•



TYPICAL PROFILE DETAIL FOR SIDE STREET

- *OR OTHERWISE SHOWN ON THE PLANS
- ALL ITEMS INCLUDING MILLING, BONDING COURSE, AND HMA TY-D ARE SUBSIDIARY TO ITEM 530



BACKFILL DETAIL"

AREA TO BE DETERMINED IN THE FIELD BY THE ENGINEER

Austin District Georgetown Area Office

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9/25/2023



RM 2243
MISC DETAILS

0	2024	CONT	SECT	JOB	HIGHWAY
S:	CK:	2103	01	044	RM 2243
W:	CK:	DIST		COUNTY	SHEET NO.
	1	AUS	1	WILL I AMSON	1 7

GENERAL NOTES: Version: October 19, 2023

Item	Description	**Rate
314	Emulsified Asphalt Treatment (SS-1 or MS-2)	0.30 GAL/SY
341/3076, 344/3077	Dense-Graded Hot-Mix Asphalt and Superpave	110 LB/SY/IN
347/3081	Thin Overlay Mixtures (TOM)	
	SAC B	113.0 LB/SY/IN
	SAC A	116.0LB/SY/IN
3084	Bonding Course	0.09 GAL/SY

^{**} For Informational Purposes Only

GENERAL

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

Georgetown Jason.Hudson@txdot.gov John.Peters@txdot.gov Georgetown

Questions and requests for documents will be accepted via the Letting Pre-Bid Q&A web page. All questions and any corresponding responses that are generated will be posted through the same 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

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 O&A for and click on the link in the window that pops up.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

The roadbed will be free of organic material prior to placing any section of the pavement structure.

Contact the supervisor for the passenger facility at Capital Metro and request the relocation of Capital Metro signs. Contact the supervisor at (512) 385-0190.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and that the system must remain operational throughout construction. The exact location of ITS **County:** Williamson Sheet:18 Highway: RM 2243 Control: 2103-01-044

Infrastructure is not known. Contact the TxDOT Area Engineer's or Inspection Team's Office for the location(s) at least 72 hours before commencing any work that might affect present ITS Infrastructure. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Refer to Item 6000 for additional details.

Provide a smooth, clean sawcut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Construct all manholes/valves to final pavement elevations prior to the placement of final surface. If the manholes/valves are going to be exposed to traffic, place temporary asphalt around the manhole/valve to provide a 50:1 taper. The asphalt taper is subsidiary to the ACP work.

Keep the roadway free of debris and sediment caused by construction activities. Dispose of all material in accordance with federal, state, and local regulations. This work is subsidiary.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

Coordinate and obtain approval for all bridgework over existing roadways.

Bridge Vertical Clearance and Traffic Handling.

Notify TxDOT project staff and the local bridge engineer 10 business days prior to the following: change in vertical clearance, placing beams/girders over traffic, opening or removing traffic from a bridge or portion of a bridge, and completion of bridge work. This requirement includes bridge class culverts. Provide vertical clearance for all structures (including signal mast arms, span wires, and overhead sign bridge structures) within the project limit. Submit information and notices to local bridge engineer at AUS BRG Notify@txdot.gov.

During evacuation periods for Hurricane events the Contractor will cooperate with Department for the restricting of Lane Closures and arranging for Traffic Control to facilitate Coastal Evacuation Efforts.

ITEM 5 – CONTROL OF THE WORK

Place construction or silt fence 2 ft. inside TxDOT ROW along the Railroad ROW. If work is to be performed inside the Railroad ROW, then the Contractor will coordinate with the Railroad for a Railroad Flagger. This work is subsidiary.

General Notes General Notes Sheet A Sheet B

Place construction stakes at intervals of no more than 100 ft. This work is subsidiary.

Provide a 72 hour advance email notice to <u>AUS_Locate@TxDOT.gov</u> to request illumination, traffic signal, ITS, or toll equipment utility locates. Provide <u>AUS_Locate@TxDOT.gov</u> an electronic pdf of as-builts within 21 calendar days of illumination, traffic signal, ITS, or toll equipment being placed into operation. As-built shall include GPS coordinates of manholes and junction boxes. Include final version of RFI's and revised plan sheets.

Electronic Shop Drawing Submittals.

Submit electronic shop drawing submittals according to the current <u>Guide to Electronic Shop Drawing Submittal</u> which can be found online at,

https://www.txdot.gov/business/resources/highway/bridge/shop-drawing-submittal-cycle.html.

Pre-approved producers can be found online at,

https://www.txdot.gov/business/resources/materials/material-producer-list.html.

Use the following contact list for all submittals that are not required to be sent to Bridge Division and to copy the Engineer for all submittals to the Bridge Division.

Submittal Contact List

Georgetown

Jason.Hudson@txdot.gov

AUS GE-ShopReview@txdot.gov

Alignment and Profile.

Unless shown in the plans, profile and alignment data for roadways being overlaid or widened are for design verification only. Provide survey and construct the roadway in accordance with the typical section. Bid items and data may be provided to adjust cross slope and super elevations.

ITEM 6 - CONTROL OF MATERIALS

Give a minimum of 1 business day notice for materials, which require inspection at the Plant.

For structures with paint containing hazardous materials, provide locations of material removal 60 days prior to begin removal. For metal elements to be removed, mechanical shear or unbolting for removal and disposal does not require paint abatement but requires 60 day advance notice.

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES

County: Williamson
Highway: RM 2243
Control: 2103-01-044

TxDOT will coordinate with TDLR regarding pedestrian elements and sidewalks. The contractor will procure and provide all permits, licenses, and inspections; pay all charges, fees, and taxes regarding TDLR rules governing industrialized housing and buildings.

Roadway closures during key dates and/or special events are prohibited. See notes for Item 502 for the key dates and/or special events.

Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

PSL in Edwards Aquifer Recharge and Contributing Zone.

Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the PSL. TxDOT will coordinate with the necessary agencies. Approval of the PSL is not guaranteed. Un approved PSL is not a compensable impact.

Work within a USACE Jurisdictional Area.

Do not initiate activities within a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Obtain written approval from the Engineer for activities not specifically addressed in the plans. Provide a signed sketch and description of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Un approved work is not a compensable impact.

General Notes Sheet C General Notes Sheet D

Work over or near Bodies of Water (lakes, rivers, ponds, creeks, dry waterways, etc.).

Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into the ordinary high-water level (OHWL). Debris that falls into the OHWL must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. Install and maintain traffic control devices to maintain a navigable corridor for water traffic, except during bridge demo and beam placement. This work is subsidiary.

Obtain written approval from the Engineer for temporary fill or crossings not specifically addressed in the plans. Provide a signed sketch of the location 60 business days prior to begin work at the location. Complete and return any forms provided by TxDOT. Approval of the work is not guaranteed. Unapproved work is not a compensable impact.

DSHS Asbestos and Demolition Notification.

Complete and provide the Texas Department of State Health Services (DSHS) notification form to the Engineer and email to <u>AUS_BRG_Notify@txdot.gov</u> at least 30 calendar days prior to bridge removal or renovation for each phase or step of work. Notify the Engineer via email of any changes to the work start and end dates.

Migratory Birds and Bats.

Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

Tree and Brush Trimming and Removal.

Work will be conducted September 16 thru February 28. Work conducted outside this timeframe will require a bird survey. Submit a survey request to TxDOT 30 business days prior to begin work.

If within the removal time period, removal work may be conducted during delayed start period using proper traffic control per TCP standards.

Upon begin removal operations, all removal work for the project must be completed within 21 calendar days. Completion of removal includes removing from ROW or mulching of all debris.

No extension of time or compensation will be granted for a delay or suspension due to the above bird, bat, and tree/brush requirements.

Law Enforcement Personnel.

Submit charge summary and invoices using the Department forms.

County: Williamson

Highway: RM 2243

Sheet:18B

Control:2103-01-044

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed. If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of \$70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2. Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or "show up" fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual "show up" time to the event site due to cancellation will be on a case-by-case basis at a maximum of 2 hours per officer.

Alterations to the cancellation and maximum rate must be approved by the Engineer or predetermined by official policy of the officers governing authority.

ITEM 8 – PROSECUTION AND PROGRESS

In accordance with SP 008-005, the latest work start date is the August 1st immediately following the authorization to begin work.

Early Safety Completion No Excuse Incentive

Early safety completion no excuse incentive will be paid for the early safety completion of work. The deadline for the early safety completion will be 90 percent of the contract duration. A no excuse incentive for early safety incentive completion will be paid at daily rate shown in Table NE for each day prior to the deadline. The incentive will have a maximum of 30 working days for computing the credit. A disincentive will not be applied for late completion.

Early safety completion for the no excuse incentive occurs when traffic is following the lane arrangement as shown on the plans for the finish roadway; all pavement construction and pavement surfacing are complete; and signs, delineation, traffic signals, illumination, traffic control devices, raised pavement markers, and pavement markings are in their final position. The Engineer may make an exception for Type I permanent pavement markings and raised pavement markers provided the work can be completed with a mobile operation. Early safety completion will include the completed installation of all crash safety features such as crash cushions, cable barrier, safety end treatment, guard fence, guardrail end treatments, and their mow strips as shown on the plans for the finish roadway. All installed items must be operating as intended.

Table NE

	1
Dollar Amount of Original Contract	Daily Rate

General Notes Sheet E Sheet F

More Than	То	Early Safety Completion
0	5,000,000	3,000
5,000,001	10,000,000	6,000
10,000,001	Over 10,000,001	10,000

All no excuse incentives will not be adjusted for any reason including but not limited to impacts/delays caused by contract duration added by change order, suspension of work, time charge suspension, added work, changes in scope, third parties, holidays, third party damage, material supply shortage, design errors, TxDOT, utilities known and unforeseen, differing site conditions, overruns, added work, change orders, acts of God, weather, railroad, special event traffic accommodations, unforeseeable events, and right of way. At the sole discretion of TxDOT, the date may be adjusted due to Acts of God such as earthquake, tidal wave, tornado, hurricane, or other cataclysmic phenomena of nature. Contractor expenditures (overtime, equipment cost, etc.) in attempt to obtain the incentive are not reimbursable or a reason for payment of the incentive. This incentive will be separate and independent from other incentives.

ITEM 134 - BACKFILLING PAVEMENT EDGES

If seal coat is final surface, install backfill prior to placing seal coat.

For all backfill, compact using a light pneumatic roller, install at 3:1 slope to tie into existing terrain, and apply at rate of 0.12 GAL/SY a typical erosion control material per Item 300.

For TY A backfill, furnish flexible base meeting the requirement for any type or grade, except Grade 4, in accordance with Item 247. Compressive strengths and wet ball mill for flexible base are waived for this item. Alternate materials include RAP, salvaged material from Item 105, and salvaged material from Item 351. The alternate materials are not required to be tested but visually verified as 100% passing a 2.5 in. sieve.

The alternate material, RAP, will be required in lieu of TY A (flexible base) backfill.

ITEM 300s - SURFACE COURSES AND PAVEMENTS

Asphalt season is May 1 thru September 15. Emulsified Asphalt season is April 1 thru October 15. The latest work start date for asphalt season is August 1.

Overlay and seal coat projects must include placement of surface material on the existing mailbox turnouts, including turnouts that are worn paths without a pavement structure. Apply a new surface and material as necessary to create a mailbox turnout with a cross slope that matches the adjacent pavement. Payment of work will be in accordance with the item for the type of material placed.

County: Williamson

Highway: RM 2243

Sheet:18C

Control: 2103-01-044

If an under seal is not provided, furnish a tack coat. Apply tack coat at 0.08 GAL/SY (residual). Apply non-tracking tack coat using manufacturer recommend rates.

ITEM 310 – PRIME COAT

Apply blotter material to all driveways and intersections. This work is subsidiary.

When Multi Option is allowed, provide MC 30, EC 30 or AE-P. MC 30 is not allowed in Travis County.

Rolling to ensure penetration is required.

ITEM 314 - EMULSIFIED ASPHALT TREATMENT

Process the top 1.5 inches of base material. Use 30% of total volume emulsified asphalt in the mixture.

Use emulsified asphalt, AEP or equal, for dust control. This work is subsidiary.

ITEMS 341, 344, & 3076 THRU 348/3082 - HOT-MIX ASPHALT PAVEMENT

Core holes may be filled with an Asphaltic patching material meeting the requirements of DMS-9203 or with SCM meeting requirements of DMS-9202.

Remove and dispose of off the ROW the audible/profile markings, reflectorized markings, and raised markers.

Install transverse butt joints with 50 ft. H: 1 in. V transition from the new ACP to the existing surface. Install a butt joint with 24 in. H: 1 in. V transition from the new ACP to a driveway, pullout or intersection. Saw cut the existing pavement at the butt joints. This work is subsidiary.

Use a device to create a maximum 3H:1V notched wedge joint on all longitudinal joints of 2 in. or greater. This work is subsidiary.

Prior to milling, core the existing pavement to verify thickness. This work is subsidiary.

Ensure placement sequence to avoid excess distance of longitudinal joint lap back not to exceed one day's production rates.

Submit any proposed adjustments or changes to a JMF before production of the new JMF.

Tack every layer. Do not dilute tack coat. Apply it evenly through a distributor spray bar. Provide a minimum transition of 10' for intersections, 10' for commercial driveways, and 6' for residential driveways unless otherwise shown on the plans.

Irregularities will require the replacement of a full lane width using an asphalt paver. Replace the entire sublot if the irregularities are greater than 40% of the sublot area.

General Notes Sheet G Sheet H

Lime or an approved anti-stripping agent must be used when crushed gravel is utilized to meet a SAC "A" requirement.

When using RAP or RAS, include the management methods of processing, stockpiling, and testing the material in the QCP submitted for the project. If RAP and RAS are used in the same mix, the QCP must document that both of these materials have dedicated feeder bins for each recycled material. Blending of RAP and RAS in one feeder bin or in a stockpile is not permitted.

Asphalt content and binder properties of RAP and RAS stockpiles must be documented when recycled asphalt content greater than 20% is utilized.

No RAS is allowed in surface courses.

Department approved warm-mix additives is required for all surface mix application when RAP is used. Dosage rates will be approved during JMF approval.

The Hamburg Wheel Test will have a minimum rut depth of 3mm except for SMA with HPG or PG 76.

ITEMS 341/3076 - DENSE-GRADED HOT-MIX ASPHALT

Use the SGC for design and production testing of all mixtures. Design all Type D mixtures as a surface mix, maximum 15% RAP and no RAS. Contractor may not use a substitute PG binder for 76-22. When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

The Hamburg Wheel minimum number of passes for PG 64 or lower is reduced to 7,000. The Engineer may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

ITEMS 347/3081 - THIN OVERLAY MIXTURES (TOM)

For SAC A, blending SAC B aggregate with an RSSM greater than the SAC A rating or 10, whichever is greater, is prohibited.

When using a Thermal Imaging System follow the Weather Condition requirements for When Not Using a Thermal Imaging System.

Produce mixture with a Department approved WMA additive or process to facilitate compaction when the haul distance is greater than 40 miles or when the air temperature is 70°F and falling. WMA processes such as water or foaming processes are not allowed under these circumstances.

ITEM 351 – FLEXIBLE PAVEMENT STRUCTURE REPAIR

Use materials and lift thickness per SS3076. Type C and D mixes will receive an underseal per SS 3085 if the repair surface is the final surface. This work is subsidiary.

County: Williamson

Highway: RM 2243

Control 2103-01-044

Unless otherwise shown on the plans, use the following for repairs:

Type C and D mix will use PG 76 -22 and will be placed with a paver.

Type B mix will use PG 64 -22 and may use a blade to place the mix.

For up to 2 in. deep repairs use Type D PG 76-22 SAC B.

For up to 6 in. deep repairs use Type C PG 76-22 SAC B.

For greater than 6 in. deep repairs use 2 in. Type C or D surface and Type B for the bottom lifts. For greater than 6 in. deep repairs will be milled then overlaid, adjust the depth of the Type C or D to provide Type C or D to a depth 1.5 in. below the bottom of the milling.

ITEM 354 - PLANING AND TEXTURING PAVEMENT

Contractor retains ownership of salvaged materials.

Unless shown on the plans, mill and resurface the work area during each shift on roadways with ADT greater than 20,000 or if milling will expose the flex base or subgrade per the typical section. Unless shown on the plans, mill and resurface a work area within 5 days for roadways with ADT 20,000 or less.

Taper permanent transverse faces 50 ft. per 1 in. Taper temporary transverse faces 25 ft. per 1 in. Taper permanent longitudinal faces 6 ft. per 1 in. HMA may be used as temporary tapers. Provide minimum 1 in. butt joints at bridge ends and paving ends. This work is subsidiary.

Milled surfaces directly covered by a mat thickness of 1 in. or less shall produce a milled texture with a ridge to valley depth (RVD) no greater than 0.25 in. (6.5 mm).

Micro-milling equipment may use a drum narrower than 12 ft.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

	Table 1	
Roadway	Limits	Allowable Closure Time
IH 35	All (1 lane closed)	9 P to 5 A
IH 35	All (2 lanes closed, see allowable work below)	9 P to 5 A
IH 35	All (2 lanes closed, all work)	11 P to 5 A
SH 45	US 183 to SH130	8 P to 5 A
LP 1	William Cannon to Parmer Lane	8 P to 5 A
US 183	SH 29 to FM 1327	8 P to 5 A
SH 71	SH 130 to IH 35	8 P to 5 A
SH 71	SH 304 to Tahitian Drive	8 P to 5 A
SH 71	US 290 W to RM 3238	8 P to 5 A
US 290 W	IH 35 to Nutty Brown Rd	8 P to 5 A
US 290 E	IH 35 to SH 95	8 P to 5 A
FM 734	FM 1431 to US 290 E	8 P to 5 A
US 79	IH 35 to Bus 79 in Taylor	8 P to 5 A
RM 1431	Lohmans Ford Rd to IH 35	8 P to 5 A
SH 29	LP 332 western terminus to SH 130	8 P to 5 A
SH 80	Charles Austin to River Road	8 P to 5 A
RM 2222	All	8 P to 5 A

General Notes Sheet I General Notes Sheet J

RM 620	All	8 P to 5 A
RM 2244	All	8 P to 5 A
SPUR 69	All	8 P to 5 A
LP 360	All	8 P to 5 A
LP 343	All	8 P to 5 A
LP 275	All	8 P to 5 A
FM 1325	All	8 P to 5 A
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

Table 3 (Mobile Operations)

Roadway	Allowable Sun Night thru Fri Noon	Allowable Sat thru Sun Morn
Within Austin City Limits	10 A to 2 P and 7 P to 6 A	7 P to 10 A
Outside Austin City Limits	9 A to 3 P and 7 P to 7 A	6 P to 11 A
IH 35 main lanes	10 P to 5 A	9 P to 9 A
AADT over 50,000	8 P to 6 A	8 P to 10 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 8 P to 6 A.

Daytime or Friday night lane closures will not be allowed unless otherwise shown on the plans. One lane in each direction will remain open at all times for all roadways unless otherwise shown on the plans.

Two lanes closed on IH 35 allowed to begin at 9 P.M. for main lane (shoulder work not included) hotmix overlay or pavement repair operations (does not include bridge joint work).

Full closures only allowed Friday night thru Monday morning for bridge beam installation, bridge demolition, or OSB truss removal/installation. Full closures only allowed for roadways with frontage roads or if a designated detour route is provided in the plans.

No closures will be allowed on the weekends, working day prior, and working day after the National Holidays defined in the Standard Specifications, Good Friday, and Easter weekend. No closures will be allowed 1 P.M. to 11 P.M. the Sunday of the Super Bowl.

Time charges will not be suspended during the large and special events listed below. These events are provided in the contract to allow scheduling of work around these lane closure restrictions.

All lanes will be open by noon of the day before the large events listed in below table. No closures will be allowed on Friday and the weekends for projects within 20 miles of these large events:

Table 4 (Large Events)

Event	City	Dates		
Formula 1 @ COTA	Austin	Annually Website)	(See	Event

County: Williamson

Highway: RM 2243

Sheet:18E

Control: 2103-01-044

Moto GP @ COTA	Austin	Annually Website)	(See	Event
ACL Fest	Austin	Annually Website)	(See	Event
SXSW	Austin	Annually Website)	(See	Event
ROT Rally	Bastrop	Annually Website)	(See	Event
UT Football Games	Austin	Annually Website)	(See	Event
Sales Tax Holiday	All	Annually Website)	(See	Event
Rodeo Austin	Austin	Annually Website)	(See	Event

All lanes will be open by noon of the day before the special events listed in below table. No closures will be allowed on Friday and the weekends for projects within 10 miles of these special events:

Table 5 (Special Events)

Event	City	Dates
Wiener Dog Races	Buda	April 29-30, 2023
Founders Day Festival	Dripping Springs	April 28-30, 2023
Christmas on Mercer	Dripping Springs	Dec 2, 2023
Christmas Nights of FBG	Fredericksburg	Nov 21, 2023
Lights		
Lady of Guadalupe	Fredericksburg	Dec 12, 2023
Procession		
Eaker BBQ Competition	Fredericksburg	March 10, 2024
Founders Day Ceremony	Fredericksburg	2 nd Weekend in May
Crawfish Festival	Fredericksburg	Saturday before Memorial
		Day
Red Poppy Festival	Georgetown	April 26-28, 2024
Wine and Music Festival	Georgetown	Last Saturday of September
Fair and Rodeo	Liberty Hill	May 18, 2023
Lakefest Boat Races	Marble Falls	June 10-11, 2023
Pie in the Sky	Kyle	Sept 1-2, 2023
Texas State Graduation Fall	San Marcos	TBD
Texas State Graduation	San Marcos	TBD
Spring		

All the large and special events listed in the above tables occur annually. Coordinate with the Department and review the city/event website to plan around the future events.

General Notes Sheet K General Notes Sheet L

To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed.

One-way traffic control, including work performed under Item 510, must be set up to provide a maximum of 20 minutes of delay to the traveling public.

Submit an emailed request for a lane closure (LCN) to TxDOT. The email will be submitted in the format provided. Receive concurrence prior to implementation. Submit a cancellation of lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal.

Provide 2-hour notice prior to implementation and immediately upon removal of the closure.

For roadways listed in Table 1: Submit the request 96 hours prior to implementation.

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday.

For all roadways: Submit request for traffic detours and full roadway closures 168 hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.

Cancellations of accepted closures (not applicable to full closures or detours) due to weather will not require resubmission in accordance with the above restrictions if the work is completed during the next allowable closure time.

Closures that conflict with adjacent contractor will be prioritized according to critical path work per latest schedule. Conflicting critical path or non-critical work will be approved for first LCN submitted. Denial of a closure due to prioritization or other reasons will not be reason for time suspension, delay, overhead, etc.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify current and future traffic control, if at any time the queue becomes greater than 20 minutes.

Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

Cover, relocate, or remove existing small, large, and overhead signs that conflict with traffic control. Cover large and overhead signs to remain using latest standard TS-CD. This work is subsidiary.

Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

County: Williamson

Sheet:18F

Highway: RM 2243

Control: 2103-01-044

Place a 28-inch cone, meeting requirements of BC (10) and Ty III barricades, on top of foundations that have protruding studs. This work is subsidiary.

Vertical panels used on roadways with speed limit 55mph or greater must be round in shape or have a self-righting mechanism. The "flat" or "oblong" shaped vertical panels are not allowed.

A series of sequential flashing warning lights, per BC(7), must be installed in a merging taper for long term stationary TCP. This includes all TCP setups, such as those shown on the plans or TCP setups per the standards.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

To determine a speed limit or an advisory speed limit, submit a request to TxDOT 60 business days prior to manufacture of the sign.

For non-site-specific signal projects, 2 months of barricades will be paid per work order location.

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS

If SW3P plan sheets are not provided, place the control measures as directed.

Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil, stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

For routine or anticipated dewatering, notify the engineer 72 hours before beginning dewatering. Notify the Engineer within 1 hour of beginning emergency or recent rainfall dewatering. Water located within the ROW that will leave the ROW must appear free of pollutants such as suspended sediment, oil sheen, floating solids, etc. Dirty water must pass thru adequate BMPs prior to leaving the ROW to prevent discharge of dirty water. Bypass pumping of water found in a navigable waterway that enters from outside the ROW and is discharged downstream of the ROW will not require the use of BMPs. Dewatering BMPs will be paid for in conformance with the applicable bid items. However, if the necessary BMP item is not included in the Contract, payment for the BMP will be in accordance with Article 9.7., "Payment for Extra Work and Force Account Method."

General Notes Sheet M General Notes Sheet N

The act of dewatering and the equipment used to dewater will not be paid for directly but will be subsidiary to pertinent bid items.

Unless a specific pay item is provided in the plans, the installation of the 6:1 or flatter for RFD side slopes in the safety zone will be subsidiary to pertinent bid items.

ITEMS 528, 529, 530, 531, & 536 – MISCELLANEOUS CONSTRUCTION

Reinforcement will be in accordance with Section 432.3.1 unless shown on the plans. Fiber reinforcement is not allowed. GFRP is allowed reinforcement for all applications. Class A and B Concrete are allowed to use Coarse Aggregate Grades 1-8.

Unless shown on the plans, all concrete will be 5 in. thick and have 2 in. sand, base, or RAP bedding. Furnish base meeting the requirement for any type or grade in accordance with Item 247. Compressive strengths for flexible base are waived. RAP must be 100% passing a 1 in. sieve. Bedding and flexible base must be placed using ordinary compaction.

Expansion joints will be placed every 40 ft. Expansion joints must be 1 in. wide asphalt board and flush with the surface. The bottom of the asphalt board will be at half the depth of the concrete. The reinforcement will be continuous thru the expansion joint. Sidewalk cross slope must not exceed 1.5%.

If roots are encountered verify with the Engineer before accommodating or removing 2 in. diameter or larger roots. Root removal must be in accordance with Section 752.4.2. Roots may remain in the bedding or base. For improvements within 6 in. of a root, the concrete thickness may be reduced by 1 in. and the bedding increased by 1 in. to minimize impacts to the roots. Adjust bedding and surface profile to provide a 1 in. bedding cushion around the roots. The surface profile may be adjusted to the extent allowed by ADA. This work is subsidiary.

ITEM 530 – INTERSECTIONS, DRIVEWAYS, AND TURNOUTS

Notify property owners at least 48 hr. before beginning work on their driveway. Use a means and methods to construct the driveway while maintaining access to the property at all times. Full closure of a driveway is allowed for reconstruction if duration and alternate access are approved by Engineer. Install and maintain material across a work zone as temporary access. This work is subsidiary.

The following typical section notes apply to all driveways and turnouts:

For ACP or SURF TREAT, the pavement structure will match the adjacent roadway unless detailed on the plans. HMA, including surface, may use a maximum allowable quantity of 40% RAP and 5% RAS for private driveways, public driveways for 2-lane roadways or smaller, and turnouts. Blending of 2 or more sources is allowed.

For CONC, the pavement structure will be 6 in. thick and have 3 in. flexible base bedding unless detailed on the plans.

Driveways that are public (county road and city street) the pavement structure will match the adjacent roadway.

County: Williamson

Highway: RM 2243

Control: 2103-01-044

ITEM 585 - RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type B Pay Schedule <u>3</u> to evaluate ride quality of travel lanes, including service roads.

ITEMS 600s & 6000s – ITS, TOLLING, LIGHTING, SIGNING, MARKINGS, AND SIGNALS

Meet the requirements of the NEC, Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

Contractor shall provide all service, equipment and material required to provide a functional item and interface with existing equipment and software.

For signal shop contact Charles Vaughn Jr (<u>Charles.Vaughn@txdot.gov</u>) and Robert Bolin (Robert.Bolin@txdot.gov)

Use the TxDOT provided form to submit an electrical, illumination, and signal checklist prior to request for signal activation or a punch list.

Provide a 7-day advance email notice to the Engineer to request illumination or traffic signal punch list inspection.

Provide a 14-day advance email notice to the Engineer with signal technician contact information and signal locations prior to working or assuming operations of illumination or traffic signal.

Provide a 60-day advance email notice to the Engineer to request signal timing if timing is not provided in the plans.

Provide a 180-day advance email notice to the Engineer for equipment to be provided by TxDOT.

Provide equipment that requires TxDOT programming, etc. to TxDOT 180 day in advance.

Prior to relief of maintenance, a 30-day Test Period is required for signals and ITS equipment in accordance with Item 680.3.1.8. Response time to reported trouble calls shall be less than 2 hours. Complete repairs within 24 hours. Notify the Engineer and maintain a logbook in the controller cabinet of each trouble call. Do not clear the error log in the conflict monitor without approval.

Maintain the existing ITS equipment and HUB buildings operational during construction. ITS downtime is allowed from 12A to 4A. Downtime is restricted to one time per HUB or equipment.

Definitions of abbreviations used to designate ITS equipment, material, etc. can be provided by the Engineer.

General Notes Sheet O General Notes Sheet P

Provide email notice to TxDOT and toll road owner 60 business days prior to begin work that impacts tolling equipment. Attend a pre-construction meeting with TxDOT and toll road owner prior to begin work.

Coordinate with toll road owner during construction that impacts or installs tolling equipment. Toll owner will assist with inspection to ensure tolling equipment will operate correctly. Provide email notice to TxDOT and toll road owner 30 business days in advance of completion of toll equipment work. Once toll equipment work is complete, allow 60 calendar days for toll road owner to complete their portion of the work and testing.

Stakes or other physical method shall be installed to hold down conduit prior to placement of concrete/flow fill encasement.

Minimum distance between HDPE joints will be 200 ft.

For conduit mounted to bridges in hangers, fiberglass can be substituted for RMC. Furnish and install per Special Specification 6390.

ITEM 658 – DELINEATOR AND OBJECT MARKER ASSEMBLIES

Installation and maintenance of portable CTB reflectors will be subsidiary to the barrier.

Flexible posts YFLX and WFLX must be tubular in shape. The "flat" flexible posts are not allowed.

CTB delineators must be placed on top of the CTB.

ITEM 662 - WORK ZONE PAVEMENT MARKINGS

Notify the Engineer at least 24 hours in advance of work for this item.

Maintain removable and short-term markings daily. Remove within 48 hours after permanent striping has been completed.

Item 668 is not allowed for use as Item 662.

Roadways with existing profile pavement markings or rumble strips must supplement work zone solid lines with traffic buttons spaced at 12 in. Traffic buttons used to supplement the work zone markings will be paid by the each in addition to the work zone item.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS

Notify the Engineer at least 24 hr. before beginning work.

The center-to-center minimum width for double yellow solid stripes must be 18 in. for all roadways.

Place longitudinal markings nightly for IH 35 main lanes or roadways with AADT greater than 100,000. Use of temporary flexible reflective roadway marker tabs is subsidiary and at the Contractor's option. Replace missing or damaged tabs nightly. If using tabs, place longitudinal markings weekly by 5 AM Friday for all weekday work and by 5 AM Monday for all weekend

County: Williamson

Sheet:18H

Highway: RM 2243

Control: 2103-01-044

work. Failure to maintain tabs or place longitudinal markings by deadline will require nightly placement of longitudinal markings.

Place longitudinal markings no later than 7 calendar days after placement of the surface for roadways with AADT greater than 20,000.

When the raised portion of a profile marking is placed as a separate operation from the pavement marking, the raised portion must be placed first then covered with TY I.

When using black shadow to cover existing stripe apply a non-retroreflective angular abrasive bead drop. The marking color shall be adjusted to resemble the pavement color. If Item 677 is not used prior to placement of black shadow, scrape the top of the marking with a blade or large piece of equipment unless surface is a seal coat. The scraping of the marking is subsidiary.

ITEM 3084 – BONDING COURSE

The minimum application rates are listed in Table BC. Miscellaneous Tack is allowed for use with dense-graded Type B HMA. If a tack bid item is not provided, use bonding course item.

The target shear bond strengths are listed in Table BCS. The informational test cores shall be taken once a shift for first 5 lots of placement or a change to placement method of bonding course, bonding material, or hot mix material. The remaining informational test cores shall be taken once every 3 lots for surface mix. Informational tests are not required for non-surface mix beyond the first 5 lots unless there is a change to placement method of bonding course, bonding material, or hot mix material. Results from these informational tests will not be used for specification compliance.

Table BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Emulsified Asphalt	0.06
TRAIL – Hot Asphalt	0.12
Spray Applied Underseal Membrane	0.10

<u>Table BCS (For Informational Tests)</u>

Material	Target Shear Bond Strength
	(Tex-249-F psi)
SMA – Stone-Matrix Asphalt	60.0
PFC – Permeable Friction Course	N/A
All Other Materials	40.0

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN

Provide 2 PCMS. Provide a replacement within 12 hours. PCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

General Notes Sheet O General Notes Sheet R

Control: 2103-01-044 **County:** Williamson Highway: RM 2243

Sheet:18I

Place PCMS 10 calendar days prior to begin work stating "Road Work Begin Soon, Contact 832-7000 For Info".

Place PCMS at time of LCN request. Place the PCMS at the expected end of queue caused by the closure. When the closure is active, revise the message to reflect the actual condition during the closure, such as "RIGHT LN CLOSED XXX FT".

ITEM 6056 – PREFORMED IN-LANE/CENTERLINE RUMBLE STRIPS

For centerline applications, use option 3 for all roadways.

For edgeline applications, use option 7 unless option 8 required due to shoulder width.

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work. TMA/TAs paid by the day is full compensation for all worksite locations during an entire day.

TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

> General Notes Sheet S



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2103-01-044

DISTRICT Austin HIGHWAY RM 2243

COUNTY Williamson

CONTROL SECTION JOB				2103-01	L-044		
	PROJECT ID		A00197	7291	1		
		C	COUNTY		nson	TOTAL EST.	TOTAL
			HWAY	RM 22			FINAL
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	134-6001	BACKFILL (TY A)	STA	117.400		117.400	
	351-6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	7,000.000		7,000.000	
	354-6043	PLANE ASPH CONC PAV (1")	SY	1,086.000		1,086.000	
	354-6188	PLANE ASPH CONC PAV(MICRO-MLLING)(1")	SY	73,854.000		73,854.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	МО	3.000		3.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	100.000		100.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	100.000		100.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	100.000		100.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	100.000		100.000	
	530-6011	INTRSCT, DRVWAYS, & TURNOUT (ACP)	SY	4,851.000		4,851.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	36.000		36.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	274.000		274.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	2,250.000		2,250.000	
	666-6029	REFL PAV MRK TY I (W)8"(DOT)(090MIL)	LF	93.000		93.000	
	666-6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	2,415.000		2,415.000	
	666-6041	REFL PAV MRK TY I (W)12"(SLD)(090MIL)	LF	119.000		119.000	
	666-6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	415.000		415.000	
	666-6053	REFL PAV MRK TY I (W)(ARROW)(090MIL)	EA	13.000		13.000	
	666-6056	REFL PAV MRK TY I(W)(DBL ARROW)(090MIL)	EA	2.000		2.000	
	666-6077	REFL PAV MRK TY I (W)(WORD)(090MIL)	EA	12.000		12.000	
	666-6101	REF PAV MRK TY I(W)36"(YLD TRI)(090MIL)	EA	4.000		4.000	
	666-6146	REFL PAV MRK TY I (Y)24"(SLD)(090MIL)	LF	598.000		598.000	
	666-6155	REFL PAV MRK TY I(Y)(MED NOSE)(090MIL)	EA	3.000		3.000	
	666-6171	REFL PAV MRK TY II (W) 6" (BRK)	LF	88.000		88.000	
	666-6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	42,318.000		42,318.000	
	666-6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	93.000		93.000	
	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	2,455.000		2,455.000	
	666-6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	119.000		119.000	
	666-6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	415.000		415.000	
	666-6184	REFL PAV MRK TY II (W) (ARROW)	EA	13.000		13.000	
	666-6185	REFL PAV MRK TY II (W) (DBL ARROW)	EA	2.000		2.000	
	666-6192	REFL PAV MRK TY II (W) (WORD)	EA	12.000		12.000	
	666-6199	REFL PAV MRK TY II (W) 36" (YLD TRI)	EA	4.000		4.000	
	666-6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	43,018.000		43,018.000	
	666-6214	REFL PAV MRK TY II (Y) 24" (SLD)	LF	598.000		598.000	
	666-6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	3.000		3.000	

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DISTRICT	COUNTY	CCSJ	SHEET
Austin	Williamson	2103-01-044	19



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2103-01-044

DISTRICT Austin HIGHWAY RM 2243

COUNTY Williamson

CONTROL SECTION JOB 2103-01-044					1-044		
PROJECT ID		ECT ID	A0019	7291			
	COUNTY		Williar	nson	TOTAL EST.	TOTAL FINAL	
		HIG	HWAY	RM 2	RM 2243		TINAL
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	666-6284	REF PROF PAV MRK TY I(W)6"(SLD)(060MIL)	LF	2,020.000		2,020.000	
	666-6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	42,318.000		42,318.000	
	666-6288	REF PROF PAV MRK TY I(Y)6"(SLD)(060MIL)	LF	1,860.000		1,860.000	
	666-6289	REF PROF PAV MRK TY I(Y)6"(SLD)(090MIL)	LF	42,770.000		42,770.000	
	666-6305	RE PM W/RET REQ TY I (W)6"(BRK)(090MIL)	LF	158.000		158.000	
	666-6308	RE PM W/RET REQ TY I (W)6"(SLD)(090MIL)	LF	615.000		615.000	
	666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF	248.000		248.000	
	672-6007	REFL PAV MRKR TY I-C	EA	1,009.000		1,009.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	119.000		119.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	24.000		24.000	
	3076-6051	D-GR HMA TY-D PG76-22 (LEVEL-UP)	TON	412.000		412.000	
	3076-6070	D-GR HMA TY-D PG 76-22 SAC-B (EXEMPT)	TON	60.000		60.000	
	3081-6008	TOM-C PG76-22 SAC-B	TON	4,234.000		4,234.000	
	3084-6001	BONDING COURSE	GAL	6,745.000		6,745.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	94.000		94.000	
	6049-6001	LONG CHANNEL MOUNT CURB SYS (INSTALL)	LF	250.000		250.000	
	6056-6002	PREFORMED CENTERLINE RUMBLE STRIP	LF	13,335.000		13,335.000	
	6185-6002	TMA (STATIONARY)	DAY	73.000		73.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	108.000		108.000	
	08	CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	



DISTRICT	COUNTY	CCSJ	SHEET
Austin	Williamson	2103-01-044	20

SUMMARY OF ROADWAY ITEMS			1 564		300.	3004	5656	5052	554
LOCATION	134 6001	351 6002	354 6188	530 6011	3081 6008	3084 6001	3076 6051	3076 6070	354 6043
	BACKFILL (TY A)	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	PLANE ASPH CONC PAV (MICRO-MLL IN G) (1")	INTRSCT, DRVWAYS, & TURNOUT (ACP)	TOM-C PG76-22 SAC-B	BONDING COURSE	D-GR HMA TY-D PG76-22 (LEVEL-UP)	D-GR HMA TY-D SAC-B PG 76-22 IEXEMPT)	PLANE ASPH CONC PAV (1")
	STA	SY	SY	SY	TON	GAL	TON	TON	SY
CSJ 2103-01-044									
SHEET 1 OF 10	9. 4	•	3969	376	285. 7	455		60	1086
SHEET 2 OF 10	12	•	7543		426.2	679	•	•	
SHEET 3 OF 10	12	•	8589	126	485.3	773		•	-
SHEET 4 OF 10	12	-	7169	-	405. 1	645		-	-
SHEET 5 OF 10	12	•	7332	33	414, 3	660		•	
SHEET 6 OF 10	12		7483	241	422.8	673			-
SHEET 7 OF 10	12	•	10266	3344	580.0	924	•	•	-
SHEET 8 OF 10	12	-	7662	203	432.9	690	-	-	-
SHEET 9 OF 10	12	-	7387	193	417,4	665	•	-	-
SHEET 10 OF 10	12	-	6452	335	364.5	581			-
SPOT REPAIRS	-	7000	-	-	-	-	412	-	-
PROJECT TOTALS	117,4	7,000	73, 854	4, 851	4, 234	6, 745	412	60	1086

SUMMARY OF MOBILIZATION ITEMS	
LOCATION	502 6001
	BARRICADES, SIGNS AND TRAFFIC HANDLING
	МО
CSJ 2103-01-044	3

SUMMARY OF WORKZONE TRAFFIC CONTROL	ITEMS				
LOCATION	6001 6001	6185 6002	6185 6003	662 6109	662 6111
	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y-2
	DAY	DAY	нR	EA	EA
CSJ 2103-01-044	94	73	108	274	2250

LOCATION	506 6038	506 6039	506 6041	506 6043
	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	LF	LF	LF	LF
CSJ 2103-01-044	100	100	100	100
PROJECT TOTALS	100	100	100	100

Austin District Georgetown Area Office



Texas Department of Transportation

RM 2243
QUANTITY SUMMARY
SHEET 1 OF 2

		AUS	1	WILL I AMSON		21
DW:	CK;	DIST		COUNTY		SHEET NO.
DS:	CK:	2103	01	044		RM 2243
	2024	CONT	SECT	JOB		HIGHWAY
_					_	

LAMARY OF PAVENENT WARKING ITEMS	1														
LOCATION	666 6029	666 6035	666 6041	666 6047	666 6053	666 6056	666 6077	666 6146	666 6155	666 6285	666 6289	666 6308	666 6320	666 6305	666 6101
	REFL PAY MRK TY [R (W)8"(DOT)(090M	EFL PAV MRK TY I	REFL PAV MRK TY I	REFL PAV MRK TY	REFL PAV MRK TY (REFL PAV MRK TY	REFL PAV MRK TY		I REFL PAV MRK TY	REF PROF PAV MRK	1 11	RE PM W/RET REQ	RE PM W/RET REQ	RE PM W/RET REQ TY 1 (W)6-(BRK) (090M IL)	REF PAV MRK TY
	LF	LF	LF	LF	EA	EA	EA	LF	EA	LF	LF	LF	LF	LF	EA
CSJ 2103-01-044															
SHEET 1 OF 10	21	502	0	197	5	2	4	205	0	1930	1932	0	8	0	0
SHEET 2 OF 10	0	0	0	0	0	0	0	12	0	4597	4650	0	0	0	0
SHEET 3 OF 10	45	343	0	78	1	0	1	381	3	4021	3982	0	0	70	4
SHEET 4 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	0	0	0
SHEET 5 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	0	0	0
SHEET 6 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	0	0	0
SHEET 7 OF 10	0	1256	119	117	4	0	4	0	0	4269	4500	615	240	88	0
SHEET 8 OF 10	0	0	0	0	0	0	0	0	0	4700	4800	0	0	0	0
SHEET 9 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	0	0	0
SHEET 10 OF 10	27	354	0	23	3	0	3	0	0	3601	3706	0	0	0	0
PROJECT TOTALS	93	2, 455	119	415	13	2	12	598	3	42, 318	42,770	615	248	158	4

LOCATION	666	666	666	666	666	666	666	666 6214	666	666	666	666	666	666 6288	666
	6176	666 6178	6180	6182	6184	666 6185	666 6192	6214	666 6217	6174	6210	666 6171	6284	6288	666 6199
	REFL PAV MRK TY II (W) 8" (DOT)		REFL PAV MRK TY 11 (W) 12" (SLD)		REFL PAV MRK IY	REFL PAV MRK TY 11 (W) (DBL ARROW)	REFL PAV MRK TY II (W) (WORD)		REFL PAV MRK TY				ΤΥ	REF PROF PAV MRK TY 1(Y)6" (SLD) (060 MIL)	REFL PAV MI
	LF	LF	LF	LF	EA	EA	EA	LF	EA	LF	LF	LF	LF	LF	EA
CSJ 2103-01-044															
SHEET 1 OF 10	21	502	0	197	5	2	4	205	0	1930	1940	0	2020	1860	0
SHEET 2 OF 10	0	0	0	0	0	0	0	12	0	4597	4650	0	-	-	0
SHEET 3 OF 10	45	343	0	78	1	0	1	381	3	4021	3982	0	-	-	4
SHEET 4 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	-	-	0
SHEET 5 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	-	-	0
SHEET 6 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0		-	0
SHEET 7 OF 10	0	1256	119	117	4	0	4	0	0	4269	4740	88	-	-	0
SHEET 8 OF 10	0	0	0	0	0	0	0	0	0	4700	4800	0	-	-	0
SHEET 9 OF 10	0	0	0	0	0	0	0	0	0	4800	4800	0	-	-	0
SHEET 10 OF 10	27	354	0	23	3	0	3	0	0	3601	3706	0	-	-	0
PROJECT TOTALS	93	2, 455	119	415	13	-	12	598	_	42, 318	43,018	88	2020	1860	-

LOCATION	672 6007	672 6009	672 6010	658 6060	6049 6001	6056 6002
	REFL PAV MRKR TY 1-C	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	REMOVE DELIN & OBJECT MARKER ASSMS	LONG CHANNEL MOUNT CURB SYS (INSTALL)	PREFORMED CENTERLINE RUMBLE STRII
	EA	EA	EA	EA	LF	LF
CSJ 2103-01-044						
SHEET 1 OF 10	29	274	0	-	-	1170
SHEET 2 OF 10	0	78	0	-	-	1385
SHEET 3 OF 10	27	176	0	-	-	1204
SHEET 4 OF 10	0	60	0	-	-	1440
SHEET 5 OF 10	0	60	0	-	-	1440
SHEET 6 OF 10	0	60	0	36	250	1440
SHEET 7 OF 10	47	134	22	-	-	1304
SHEET 8 OF 10	0	60	0	-	-	1420
SHEET 9 OF 10	0	60	0	-	-	1440
SHEET 10 OF 10	22	47	2	-	-	1092
PROJECT TOTALS	125	1009	24	36	250	13335

Austin District Georgetown Area Office



RM 2243
QUANTITY SUMMARY
SHEET 2 OF 2

DW:	CK:	AUS		WILLIAMSON		22
		DIST		COUNTY		SHEET NO.
DS:	CK:	2103	01	044	ı	RM 2243
© 2024		CONT	CONT SECT JOB		HIGHWAY	

SEQUENCE OF CONSTRUCTION

- 1) INSTALL PROJECT BARRICADES ACCORDING TO APPROPRIATE BC STANDARD SHEETS AND NECESSARY EROSION CONTROL DEVICES AS DIRECTED BY THE ENGINEER.
- 2) SET ELECTRONIC PORTABLE CHANGEABLE MESSAGE SIGN 10 DAYS PRIOR TO BEGINNING WORK.

UTILIZE APPLICABLE TCP STANDARD SHEETS TO PERFORM THE FOLLOWING WORK:

- 3) PERFORM 6" FULL DEPTH PAVEMENT REPAIRS. REPAIR LOCATIONS TO BE DETERMINED AND MARKED IN THE FIELD BY THE ENGINEER. CONTRACTOR SHALL BE PRESENT WHEN AREAS ARE MARKED. PROVIDE ANY NECESSARY TRAFFIC CONTROL AND CONSIDER SUBSIDARY TO THE VARIOUS ITEMS.
- 4.) A.)PERFORM 1" MILL, APPLY BONDING COURSE, AND PLACE 1" HMA TY D AT SECTION BY US 183 & HORIZON LAKES DEVELOPMENT IN ONE CONTINUOUS OPERATION PER THE PLANS.

 B.)PERFORM 1" MICRO-MILLING, APPLY BONDING COURSE, AND PLACE 1" THIN-OVERLAY MIX (TOM) IN ONE CONTINUOUS OPERATION PER THE PLANS.

 DO NOT APPLY BONDING COURSE BEYOND THE LIMITS OF PAVING OPERATIONS EACH WORK DAY. DO NOT MILL BEYOND THE LIMITS THAT CAN BE PAVED IN A WORKING DAY. PAVE SIDE ROADS AS SHOWN IN THE PLANS.

 BACKFILL TO BE PLACED AFTER PAVING OPERATIONS AT AREAS AS DIRECTED BY THE ENGINEER.
- 5) APPLY TYPE II PAVEMENT MARKINGS ONCE WEEKLY. FAILURE TO PERFORM STRIPING WITHIN THE ALLOTTED TIME PERIODS WILL RESULT IN THE CEASING OF ALL OPERATIONS UNTIL STRIPING IS ACCOMPLISHED.
- 6) APPLY REFLECTIVE PAVEMENT MARKINGS TY I AND RAISED PAVEMENT MARKINGS A MINIMUM OF 10 DAYS AFTER TY II PAVEMENT MARKINGS. REFERENCE STRIPING LAYOUT PRIOR TO COMMENCING WORK.
- 7) PERFORM ANY NECESSARY CLEANUP OPERATIONS AND COMPLETE FINAL PUNCH-LIST. MAINTAIN BARRICADES THROUGH PUNCH-LIST. REMOVE BARRICADES AS DIRECTED BY THE ENGINEER.

***NOTES:

THE ABOVE SEQUENCE IS ESTABLISHED AS THE MOST APPROPRIATE METHOD TO CONSTRUCT THIS PROJECT. THE CONTRACTOR WILL BE REQUIRED TO GAIN THE ENGINEER'S APPROVAL PRIOR TO DEVIATION FROM THE ABOVE ESTABLISHED METHOD.

MAINTAIN POSITIVE DRAINAGE DURING CONSTRUCTION.



Austin District Georgetown Area Office



Texas Department of Transportation

RM 2243
SEQUENCE OF WORK

) 20	24	CONT	SECT	JOB		HIGHWAY				
	CK:	2103	01 044			RM 2243				
		DIST		COUNTY		SHEET NO.				
		AUS	1	WILL TAMSON		23				

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

SHEET 1 OF 12



BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE:	bc-21.dgn	DN: T	×D0T	ск: TxDOT	DW:	T×DOT	ck: TxDOT
© T×DOT	November 2002	CONT	SECT	JOB		HIC	SHWAY
4-03	REVISIONS 7-13	2103	01	044		RM	2243
	8-14	DIST		COUNTY			SHEET NO.
5-10	5-21	AUS	ì	VILLIAM	SOI	N	24
A.F							

xas Engineering Practice Act". No warranty of any TXDOI assumes no responsibility for the conversion results or dangges resulting fram its use.

- 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 port 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-laT) 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.

the plans or as determined by the Engineer/Inspector, shall be in place.

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

BEGIN T-INTERSECTION WORK ZONE * * G20-9TP * * R20-5T FINES DOURI I * * R20-5aTP ROAD WORK <>> NEXT X MILES END * * G20-26T WORK ZONE G20-1bTI \Leftrightarrow INTERSECTED 1000'-1500' - Hwy 1 Block - City 1000'-1500' - Hwy 1 Block - City ROADWAY \Rightarrow ROAD WORK G20-16TR NEXT X MILES => WORK ZONE G20-2bT ** min. BEGIN G20-5T WORK * * G20-9TP ZONE TDACE G20-6T * * R20-5T FINES DOUBLE END ROAD WORK * * R20-50TP G20-2

CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING 1.5.6

SIZE

SPACING

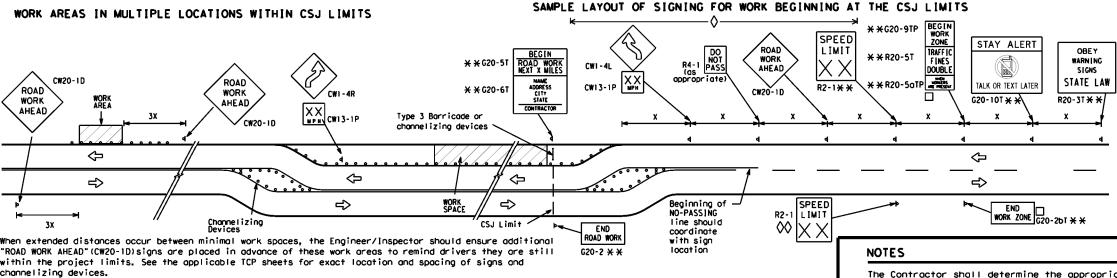
Sign onventional Expressway/ Number Road Freeway or Series CW204 CW21 48" × 48" 48" x 48" CW22 CW23 CW25 CW1, CW2, 48" x 48' CW7. CW8. 36" x 36' CW9, CW11 CW14 CW3, CW4, CW5. CW6. 48" x 48' 48" x 48' CW8-3, CW10, CW12

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

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

GENERAL NOTES

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



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

ZONE STAY ALERT OBEY SPEED ROAD WORK * *G20-5T ROAD LIMIT ROAD ROAD X XR20-5T SIGNS WORK CLOSED R11-2 CW1 - 4 WORK DOUBL STATE LAW /っ MILE ALK OR TEXT LATER AHEAD X X R20-5aTP MEN MICHIERS * *G20-6T R20-3T R2-1 CW20-1D G20-10 Barricade or CW13-1P CW20-1E channelizing 3:41:44 projectw devices -CSJ Limi Channelizing Devices ➾ SPEED R2-1 END ROAD WORK LIMIT END | WORK ZONE G20-25T * G20-2 * *

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded

to the nearest whole mile with the approval of the Engineer.

No decimals shall be used.

The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2b) 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

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

	LEGEND
ш	Type 3 Barricade
000	Channelizing Devices
-	Sign
x	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



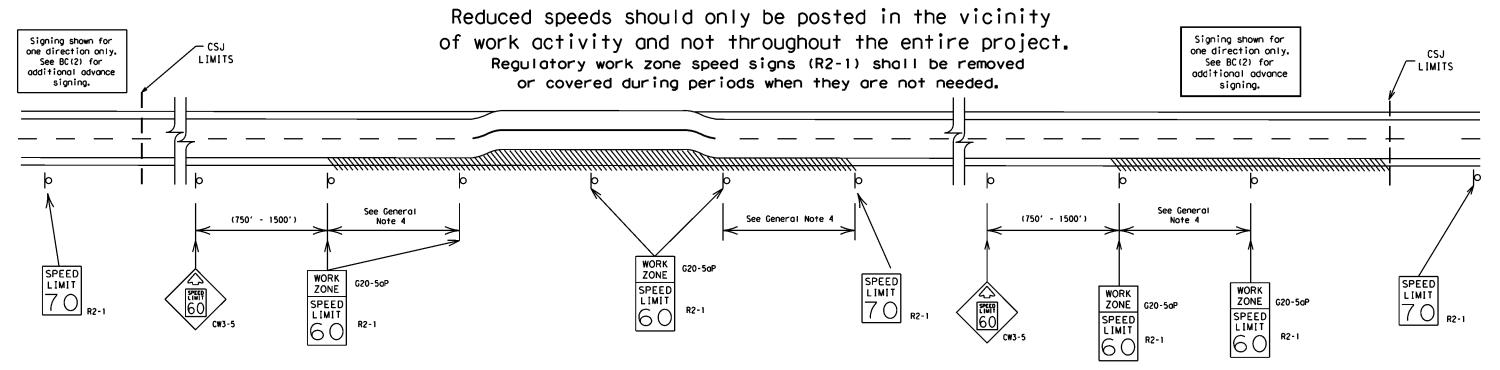
BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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9-07	8-14	DIST	COUNTY				SHEET NO.		
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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



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)).

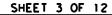
GENERAL NOTES

- 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).
- 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.
- Speeds shown on details above are for illustration only.
 Work Zone Speed Limits should only be posted as approved for each project.
- 10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.





BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

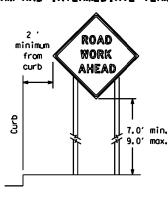
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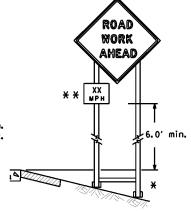
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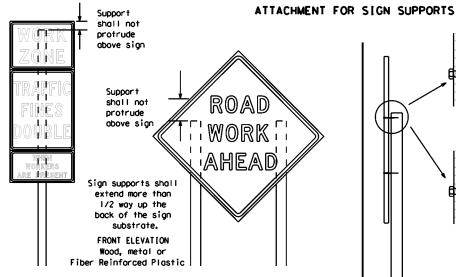
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- * When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.
 - * * When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.



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

manufacturer's recommended procedures for attaching sign substrates to other types of

SIDE ELEVATION

Wood

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by ony means. Wood supports shall not be extended or repaired by splicing or other means.

Attachment to wooden supports

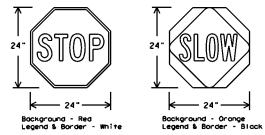
will be by bolts and nuts

or screws. Use TxDOT's or

sign supports

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".
- STOP/SLOW paddles shall be retroreflectorized when used at night. 3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- 4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL} , shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

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

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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.

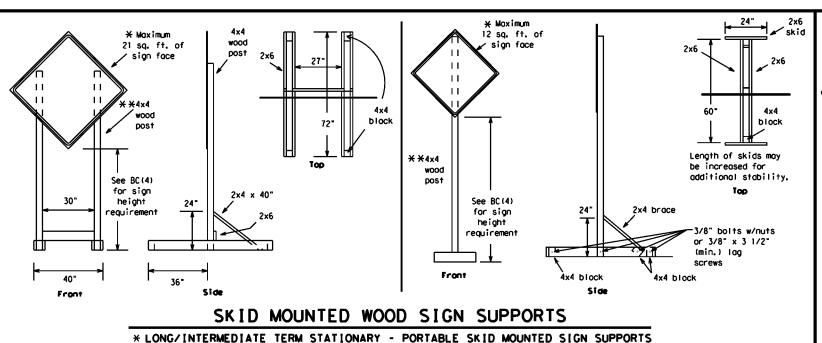
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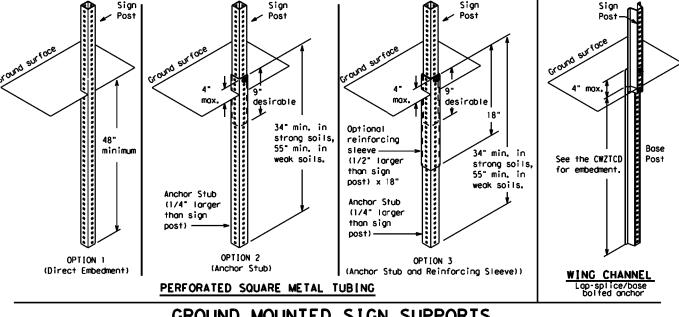
Texas Department of Transportation

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) -21

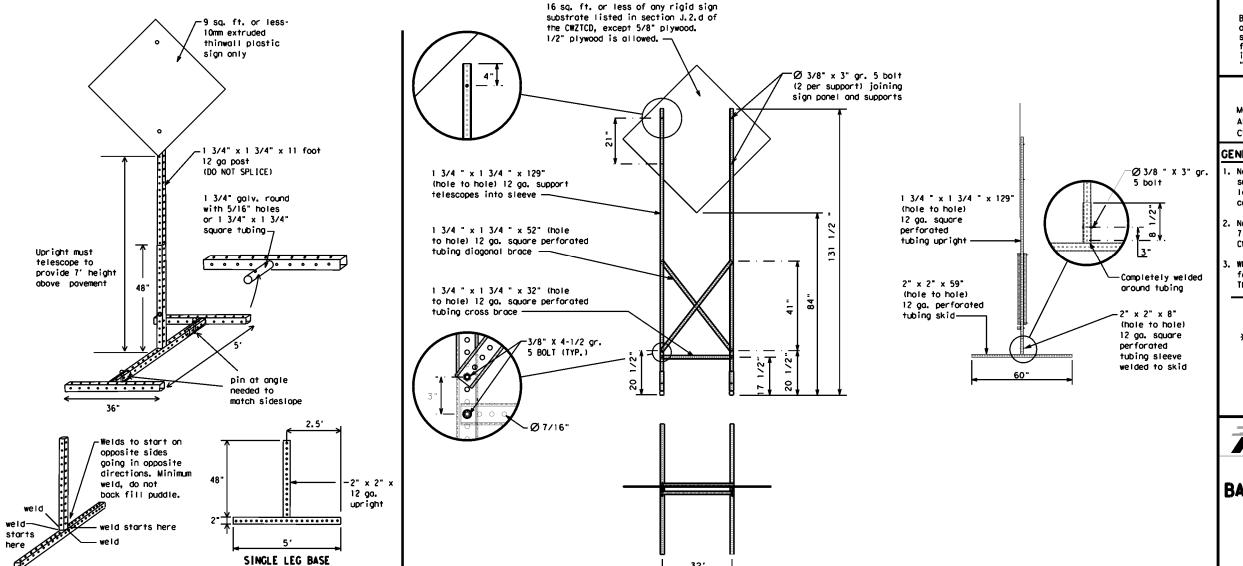
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GROUND MOUNTED SIGN SUPPORTS

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



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.
 - See BC(4) for definition of "Work Duration."
 - Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
 - ☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC (5) -21

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SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS * LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

32'

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Nor thbound	(route) N
Construction	CONST AHD	Parkina	PKING
Ahead	CONST AND	Road	RD
CROSSING	XING	Right Lane	RT LN
Detour Route	DETOUR RTE	Saturday	SAT
Do Not	DONT	Service Road	SERV RD
East	E	Shoulder	SHLDR
Eastbound	(route) E	Slippery	SLIP
Emergency	EMER	South	S
Emergency Vehicle	EMER VEH	Southbound	(route) S
Entrance, Enter	ENT	Speed	SPD
Express Lone	EXP LN	Street	ST
Expressway	EXPWY	Sunday	SUN
XXXX Feet	XXXX FT	Telephone	PHONE
Fog Ahead	FOG AHD	Temporary	TEMP
Freeway	FRWY, FWY	Thursday	THURS
Freeway Blocked	FWY BLKD	To Downtown	TO DWNTN
Friday	FRI	Traffic	TRAF
Hazardous Driving		Travelers	TRVLRS
Hazardous Material		Tuesday	TUES
High-Occupancy	HOV	Time Minutes	TIME MIN
Vehicle	HWY	Upper Level	UPR LEVEL
Highway		Vehicles (s)	VEH. VEHS
Hour (s)	HR, HRS	Warning	WARN
Information	INFO	Wednesday	WED
It is	ITS	Weight Limit	WT LIMIT
Junction	JCT	West	W
Left	LFT	Westbound	(route) W
Left Lane	LFT LN	Wet Povement	WET PVMT
Lane Closed	LN CLOSED	Will Not	WONT
Lower Level	LWR LEVEL		1
Maintenance	MAINT		

Roadway

designation # [H-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT

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

Phase 2: Possible Component Lists

	Æffect on Travel	Location List	Warning List	* * Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX- XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	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	*	* * Se	e Application Guidelin	es Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

BLVD

CLOSED

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

SHEET 6 OF 12

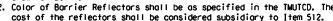


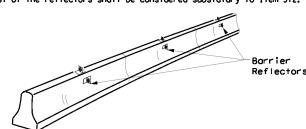
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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CONCRETE TRAFFIC BARRIER (CTB)

Practice Act". No warranty of any responsibility for the conversion es resulting from its use.

- 3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- 5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- 6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- 7. Maximum spacing of Barrier Reflectors is forty (40) feet.

Type C Warning Light or approved substitute mounted on a

drum adjacent to the travel way.

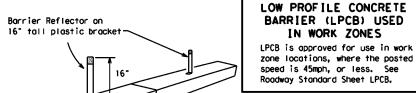
Warning reflector may be round

or square. Must have a yellow

reflective surface area of at least

30 square inches

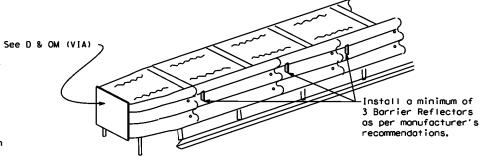
- 8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- 9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's
- 10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer
- 11. Single slope barriers shall be delineated as shown on the above detail.



speed is 45mph, or less. See Roadway Standard Sheet LPCB. Max. spacina of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

IN WORK ZONES

LOW PROFILE CONCRETE BARRIER (LPCB)



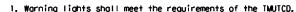
DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

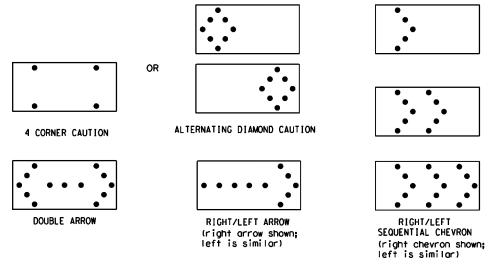
- 1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- 2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series,
- 3. A series of sequential flashing warning lights placed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

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

- 1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- 2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed
- 3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- 4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- 8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- 9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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

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



- 5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- 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.

 9. The sequential arrow display is NOT ALLOWED.

 10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.

- 11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.

 12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.

 13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility,
- flash rate and dimming requirements on this sheet for the same size arrow.

 14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS									
TYPE	M[N[MUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MIN[MUM VISIBILITY DISTANCE						
В	30 × 60	13	3/4 mile						
С	48 × 96	15	1 mile						

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

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for
- Assessing Sofety Hordwore (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.
- 4. TMAs are required on freeways unless otherwise noted in the plans
- 5. A TMA should be used poytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



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

BC(7)-21

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

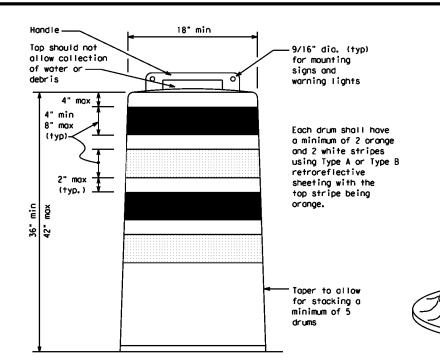
- 1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- 2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but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

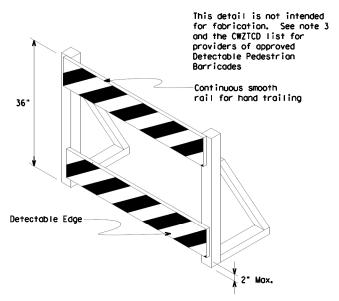
RETROREFLECTIVE SHEETING

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

BALLAST

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





DETECTABLE PEDESTRIAN BARRICADES

- 1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk
- Diversions, Sidewalk Detours and Crosswalk Closures.

 2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- 3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian
- 4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian
- 5. Warning lights shall not be attached to detectable pedestrian barricades.
- 6. Detectable pedestrian barricades should use 8" naminal 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

See Ballast



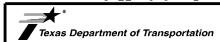
12" x 24" Vertical Page mount with diagonals sloping down towards travel way

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12

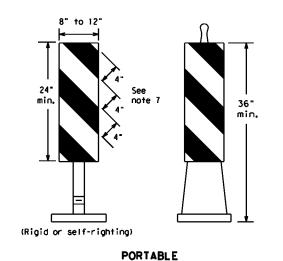


Traffic Safety

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

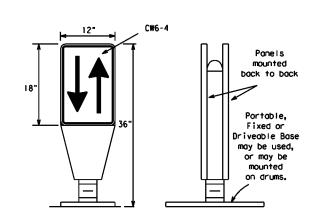
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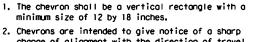
- 1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

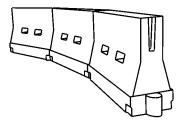


- 2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- 3. Chevrons, when used, shall be erected on the outside of a sharp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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

36

Fixed Base w/ Approved Adhesive

(Driveable Base, or Flexible

Support can be used)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

- 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.

 3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements
- specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

Posted Speed	osted Formula Speed		Minimur esirab er Len **	l e	Suggested Maximum Spacing of Channelizing Devices		
		10' Offset	11' Offset	12' Offset	O∩ a Taper	On a Tangent	
30	2	150′	1651	1801	30′	60'	
35	L = WS2	2051	2251	2451	35′	70′	
40	0	2651	295′	3201	40′	80′	
45		450′	495′	540'	45′	90'	
50		5001	5501	6001	50 <i>°</i>	100′	
55	L=WS	550′	6051	660′	55°	110'	
60	_ "5	600'	6601	720'	60'	120'	
65		650′	715′	7801	65′	130′	
70		700′	7701	8401	70′	140'	
75		750′	8251	9001	75′	150′	
80		8001	8801	960'	80′	160′	

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



Texas Department of Transportation

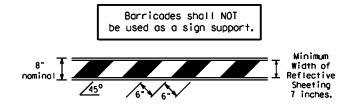
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

RC (9) - 21

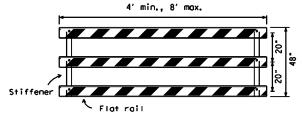
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© T×D0T	November 2002	CONT	SECT	JOB		HIG	SHWAY
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9-07	8-14	DIST	T COUNTY			SHEET NO.	
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TYPE 3 BARRICADES

- 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.
- 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.
- 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".
- Borricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
- . Warning lights shall NOT be installed on barricades.
- 7. Worthing lights shall woll 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.
- Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

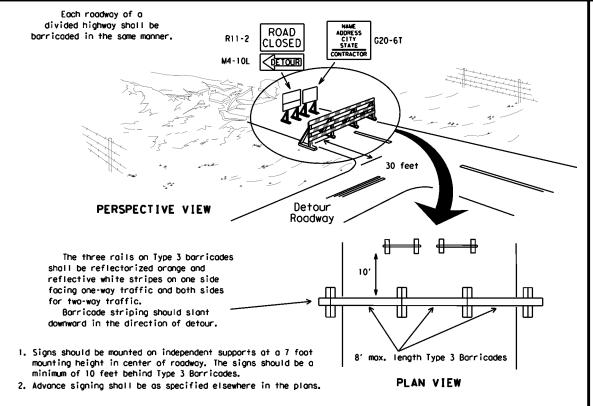


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



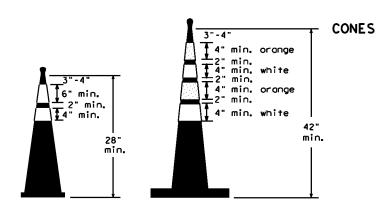
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

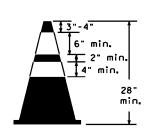


TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION

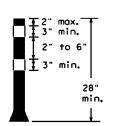
1. Where positive redirectional capability is provided, drums may be omitted. 2. Plastic construction fencing may be used with drums for safety as required in the plans. 3. Vertical Panels on flexible support may be substituted for drums when the Typical shoulder width is less than 4 feet. Plastic Drum 4. When the shoulder width is greater than 12 feet, steady-burn lights PERSPECTIVE VIEW may be omitted if drums are used. 5. Drums must extend the length These drums are not required of the culvert widening. on one-way roadway LEGEND Plastic drum Plastic drum with steady burn light two drums s ss the work or yellow warning reflector Steady burn warning light or yellow warning reflector minimum of e used ocros increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums) PLAN VIEW





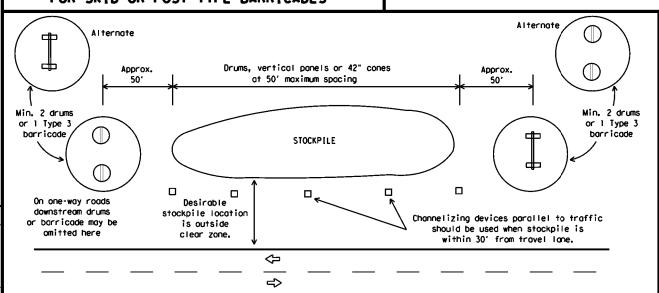


One-Piece cones



CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

Tubular Marker

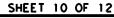


TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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.

- Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
- 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.
- 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 an 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.
- 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
- Cones or tubular markers used on each project should be of the same size and shape.





BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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) T×DOT	November 2002	CONT	SECT	JOB		HI	GHWAY
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- 1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- 2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- 3. Additional supplemental pavement marking details may be found in the plans or specifications.
- 4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- 6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing
- 7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

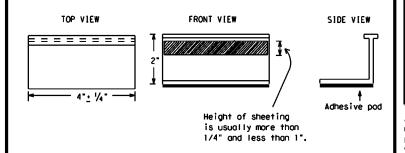
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- 1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- 2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for quidemarks 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 SPECIFICATIO	NS
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 pregualified reflective raised pavement markers. non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

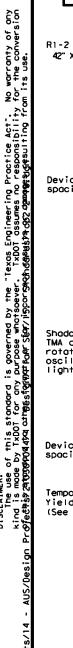
SHEET 11 OF 12

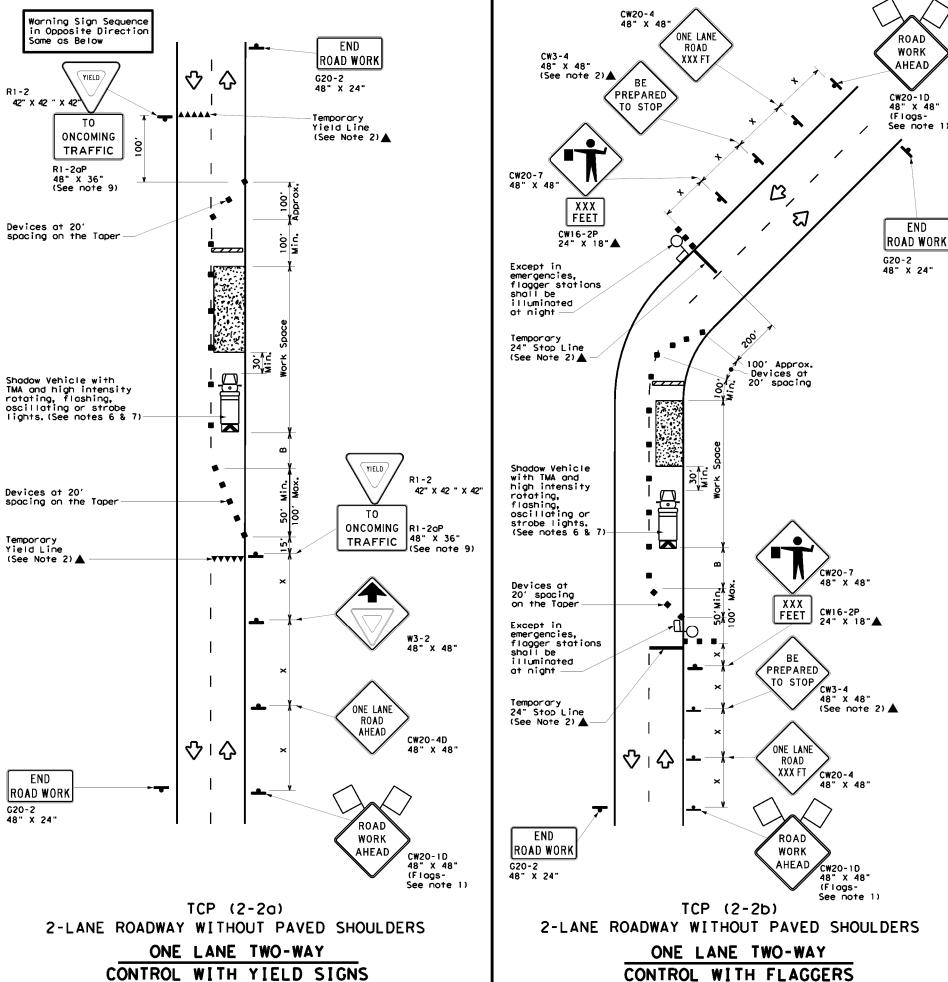


BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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1-02 7-13	2-98 9-07 5-21			COUNTY			SHEET NO.
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(Less than 2000 ADT - See Note 9)

	LEGEND								
~~~	Type 3 Barricade	••	Channelizing Devices						
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)						
(III)	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)						
4	Sign	♡	Traffic Flow						
$\Diamond$	Flag	Д	Flagger						

		`				$\overline{}$			J
Speed	Formula	Desirable Spac Taper Lengths Chann		Spacing of		Minimum Sign Spacing "x"	Suggested Longitudinal Buffer Space	Stopping Sight Distance	
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"8"	
30	2	1501	1651	1801	30′	60,	1201	90,	200'
35	L= WS2	2051	225′	245'	35′	70'	160'	120'	250′
40	b	2651	295′	3201	40′	80′	240′	155′	305′
45		450′	495′	540'	45′	90,	3201	195′	360'
50		500′	550′	600'	50′	100′	400'	240′	425′
55	L=WS	550′	6051	660'	55′	110'	500′	295′	495′
60	L-#3	6001	660'	7201	60′	120'	600,	350′	570′
65		6501	7151	7801	65′	130′	700′	410′	645'
70		7001	770′	8401	701	140'	800'	475′	730′
75		7501	8251	900′	75′	150′	900′	540′	820′

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Toper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE									
MOBILE	MOBILE SHORT SHORT TERM INTERMEDIATE LONG TERM DURATION STATIONARY TERM STATIONARY STATIONARY								
	1	1	1						

## GENERAL NOTES

- 1. 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.
- 4. Flaggers should use two-way radios or other methods of communication to control traffic.
- 5. Length of work space should be based on the ability of flaggers to communicate.
- 6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown
  in order to protect a wider work space.

## TCP (2-2a)

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

## TCP (2-2b)

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



TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

Traffic Operations Division Standard

TCP(2-2)-18

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1-97	2-12	DIST		COUNTY		SHEET NO.
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	LEGEND								
•	Type 3 Barricade	••	Channelizing Devices						
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)						
Ê	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)						
4	Sign	∿	Traffic Flow						
$\Diamond$	Flag	Ф	Flagger						

		lag			ПC		Flagge	er		
Posted Speed	Formule	D	Desiroble			ing of		Minimum Sign Spacing "x"	Sugges Longitud Buffer S	linal
*		10' Offset	11' Offset	12' Offset	On a Taper		On a ongent	Distance	-B-	
30	ws	1501	1651	1801	30′		60′	120'	90′	
35	L = WS	- 205′	2251	245'	351		701	1601	120	,
40	60	265′	295′	3201	40'		80,	240'	155	•
45		4501	4951	540'	45′		90′	3201	195	•
50	]	500′	550′	600'	50'		100'	4001	240	•
55	L=ws	5501	6051	660,	55′		110′	5001	295	,
60	] - " " 3	600'	660′	7201	60′		120′	600'	350	,
65	]	650′	715′	7801	65′		130′	700′	410	•
70	]	7001	770′	840'	701		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						
		1	1							

## 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.
- 3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
- 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.
- 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.

## 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.

## CP (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.

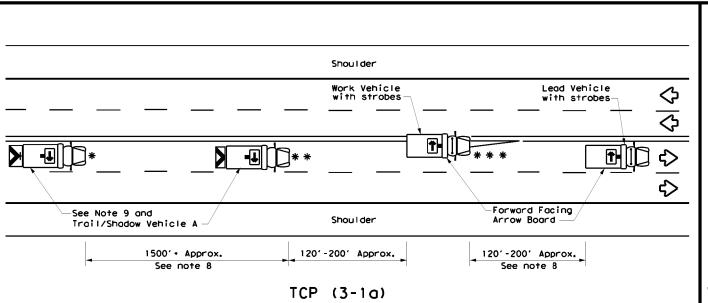


TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

Traffic Operations Division Standard

TCP(2-4)-18

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8-95 3-03	2103	01	044	R	M 2243
1-97 2-12	DIST		COUNTY	-	SHEET NO.
4-98 2-18	AUS	1	WILLIAN	ISON	37



UNDIVIDED MULTILANE ROADWAY

## TRAIL/SHADOW VEHICLE A with RIGHT Directional

X VEHICLE

CONVOY

CW21-10cT

•••••

X VEHICLE CONVOY

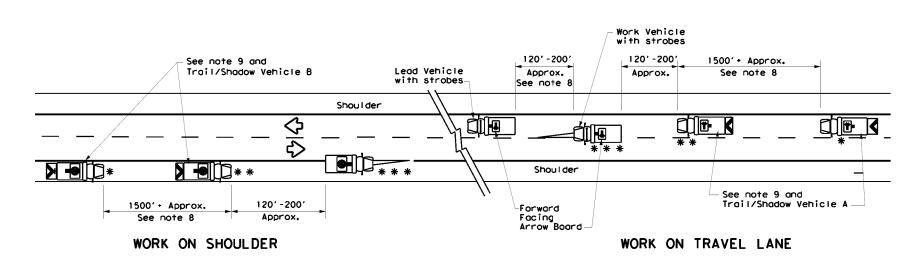
display Flashing Arrow Board

WORK

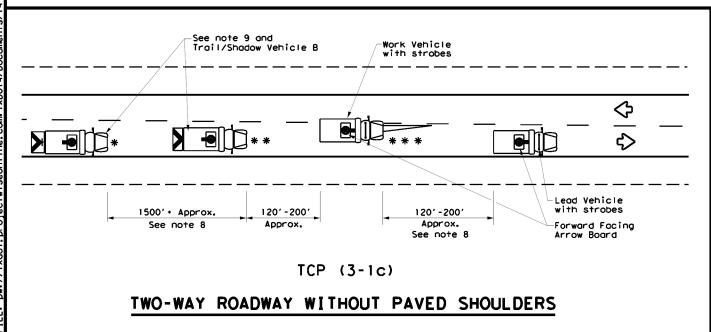
CONVOY

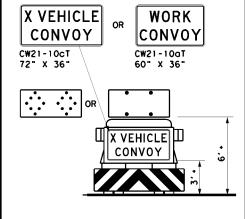
CW21-10aT

OR



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





## TRAIL/SHADOW VEHICLE B

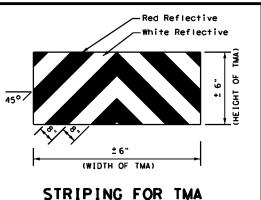
with Flashing Arrow Board in CAUTION display

LEGEND								
Trail Vehicle		ADDOW BOADD DIGDLAY						
Shadow Vehicle	ARROW BOARD DISPLAY							
Work Vehicle	<b></b>	RIGHT Directional						
Heavy Work Vehicle	<b>-</b>	LEFT Directional						
Truck Mounted Attenuator (TMA)	<b>#</b>	Double Arrow						
Traffic Flow	•	CAUTION (Alternating Diamond or 4 Corner Flash)						
	Trail Vehicle Shadow Vehicle Work Vehicle Heavy Work Vehicle Truck Mounted Attenuator (TMA)	Trail Vehicle  Shadow Vehicle  Work Vehicle  Heavy Work Vehicle  Truck Mounted Attenuator (TMA)						

TYPICAL USAGE									
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY					
4									

## GENERAL NOTES

- 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.
- 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 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.
- "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY" (CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
- 10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



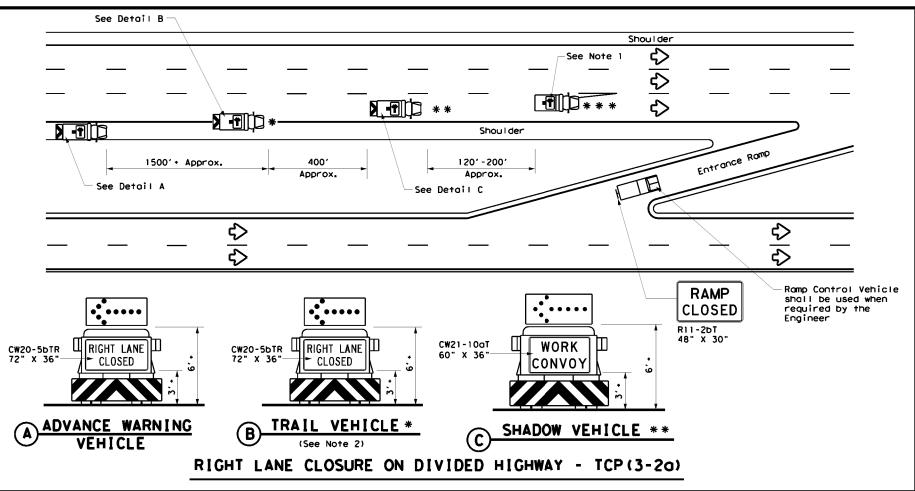


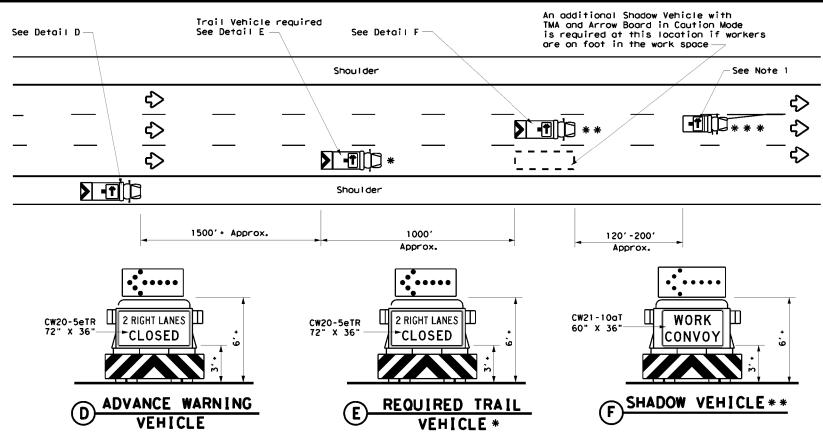
## TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

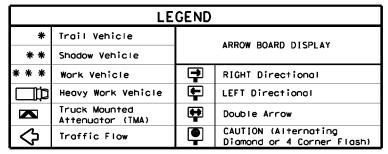
Traffic Operations Division Standard

tcp3-1.dgn C)TxDOT December 1985 RM 2243 2103 01 044 AUS WILLIAMSON





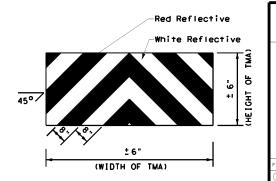
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)



TYPICAL USAGE									
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY					
1									

### **GENERAL NOTES**

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



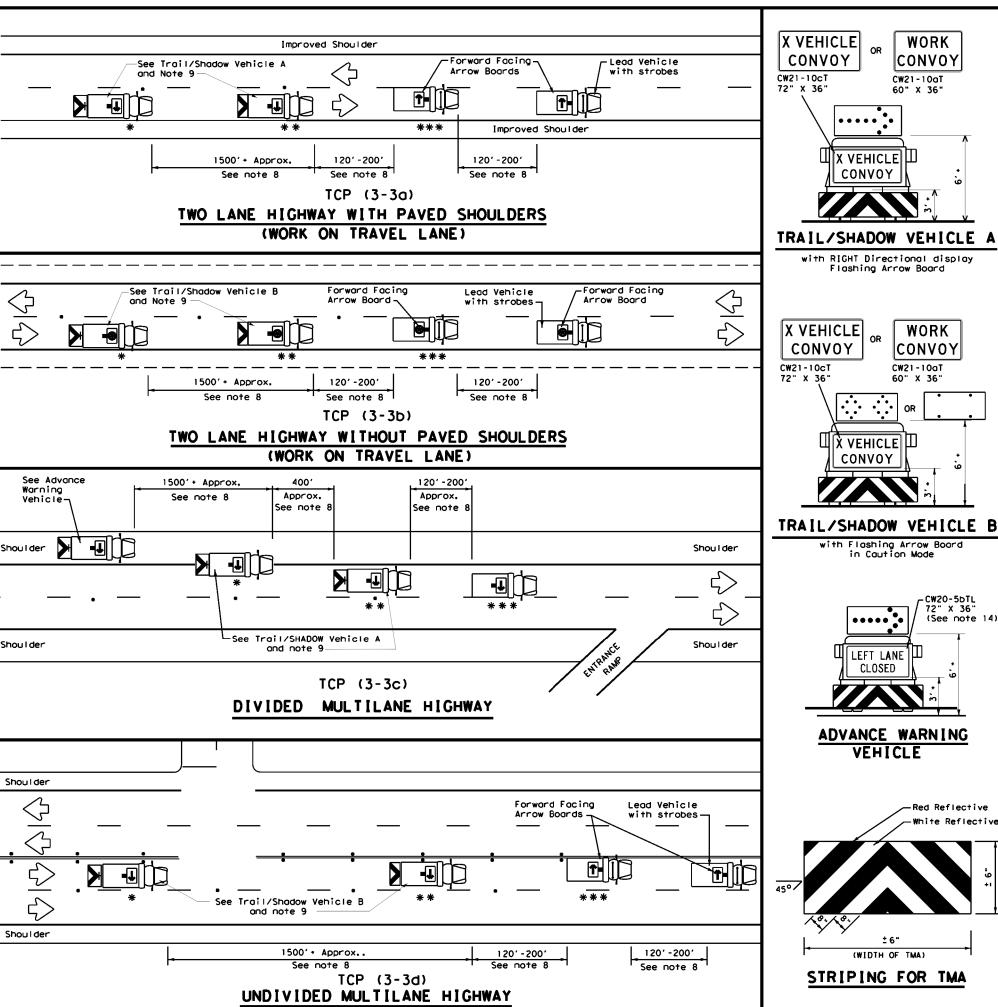
STRIPING FOR TMA

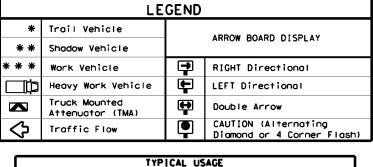


## TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP (3-2) -13

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TxDOT December 1985	CONT	SECT	JOB		Н	IGHWAY	
REVISIONS 2-94 4-98	2103	01	044		RM 2243		
1-95 7-13	DIST	COUNTY			SHEET NO.		
-97	AUS	Y	VILLIAM	SOI	V	39	





		TYPICAL U	JSAGE	
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
4				

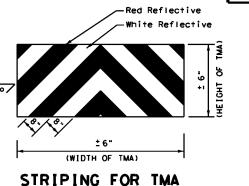
## GENERAL NOTES

- 1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on
- prevailing roadway conditions, traffic volume, and sight distance restrictions. 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 omber begons 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
- 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

- 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 (CW21-10CT) or Spacing between WORK VEHICLE and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10DT) 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.
- used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.

  10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. Warning Vehicle. the arrow board will not be required on the Advance Warning Vehicle.
- 11.A double arrow shall not be displayed on the arrow board on the Advance Warning
- 12. For divided highways with three or four lanes in each direction, use TCP(3-2),
- 13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- 14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessory.
- 15.On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.



WORK

CONVOY

CW21-10aT

60" X 36"

X VEHICLE

Flashing Arrow Board

X VEHICLE

with Flashing Arrow Board in Caution Mode

LEFT LANE CLOSED

ADVANCE WARNING

VEHICLE

CW20-5bTL 72" X 36" (See note 14)

CONVOY

WORK

CONVOY

CW21-10aT

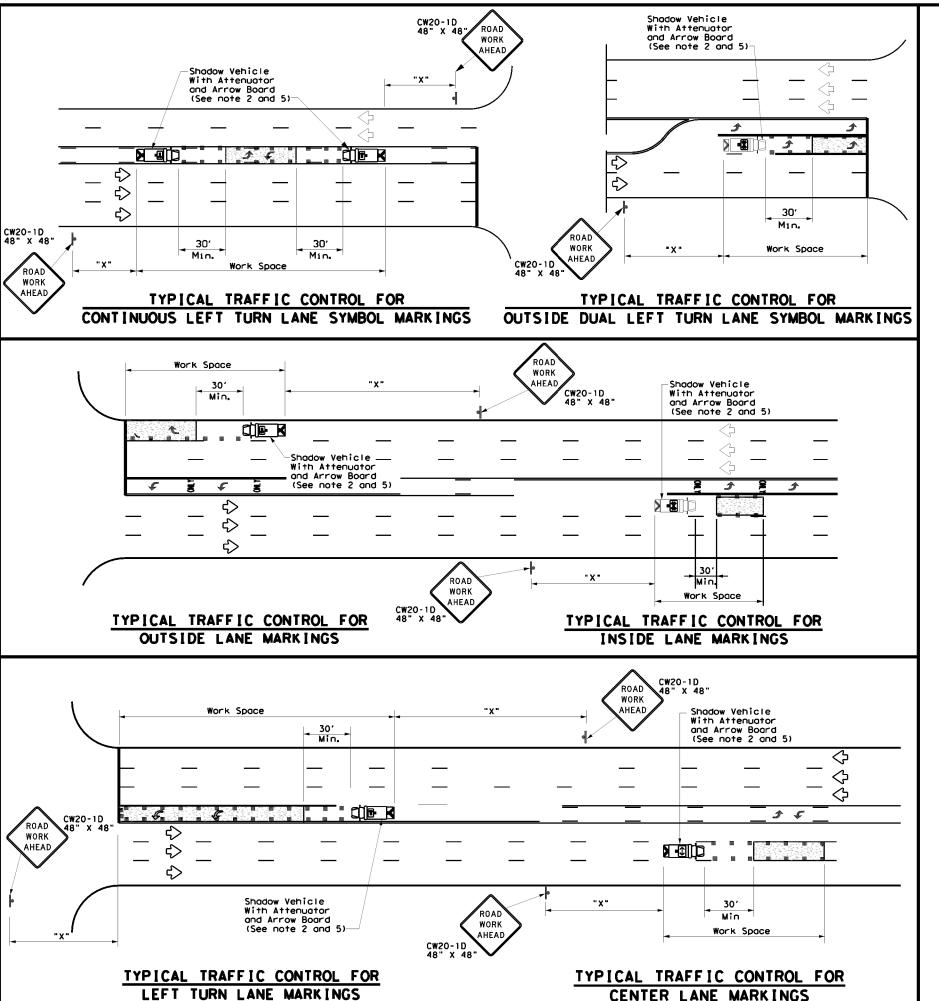
CONVOY

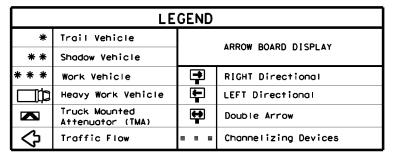
Texas Department of Transportation

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

Traffic Operations Division Standard

1-97 7-14		AUS	_	VILLIAM			40
8-95 7-13		DIST		COUNTY			SHEET NO.
2-94 4-98	REVISIONS	2103	01	044		RM	2243
© TxDOT	September 1987	CONT	SECT	JOB		HI	GHWAY
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Posted Speed	Formula	D	Minimur esirab er Lend **	le	Spacin Channe		Minimum Sign Spacing "x"	Suggested Longitudinal Buffer Space
×		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	-B
30	2	150′	165'	180'	30′	60′	120′	90,
35	L= WS2	2051	2251	2451	35′	701	160'	120'
40	80	265'	2951	3201	40′	801	240′	1551
45		450′	4951	5401	45′	90'	320'	195′
50		5001	5501	6001	50′	100'	4001	240'
55	L=WS	550′	6051	660′	55′	110'	500′	295′
60	L-,,5	600'	660'	720'	60′	120'	600,	350′
65		650′	715′	780′	65′	130′	700′	410'
70		7001	770′	840'	70′	140′	800,	475′
75		750'	8251	9001	75′	150'	900'	540′

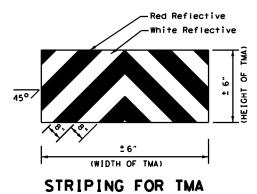
- * Conventional Roads Only
- ** Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

		TYPICAL U	JSAGE	
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
1				

## GENERAL NOTES

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





UNDIVIDED HIGHWAYS

TCP (3-4) -13

		AUS	1	WILL I AM	SON	۱	41
		DIST		COUNTY			SHEET NO.
	REVISIONS	2103	01	044		RM	2243
) T×DOT	July, 2013	CONT	SECT	JOB		HIGHWAY	
LE:	tcp3-4.dgn	DN: T:	×D0T	ck: TxDOT	DW:	T×DOT	ck: TxDOT

178

78 |

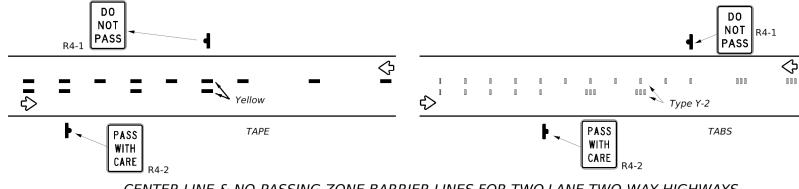
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS **DOUBLE** TABS NO-PASSING LINE TAPE **SOLID** → 20' ± 6" 4.5' ± 6" LINES SINGLE TABS NO-PASSING LINE or CHANNELIZATION TAPE LINE Yellow or White Type Y-2 or W  $40' \pm 1$ **BROKEN** TABS 000 mmm 000 → 1' ± 3' LINES TAPE (FOR CENTER LINE OR LANE LINE) Yellow or White **---**12' ± 6" Type W **TABS WIDE DOTTED LINES** (FOR LANE DROP LINES) TAPE —12' ± 6" White 20' ± 6" TABS WIDE GORE **MARKINGS** TAPE 20' ± 6"

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

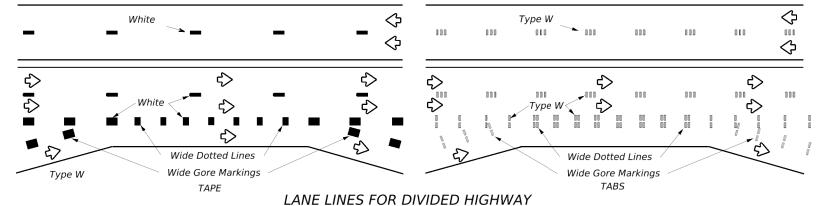
## TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

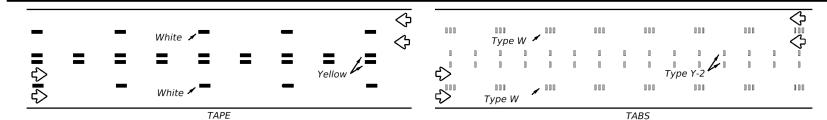
- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may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

## WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS

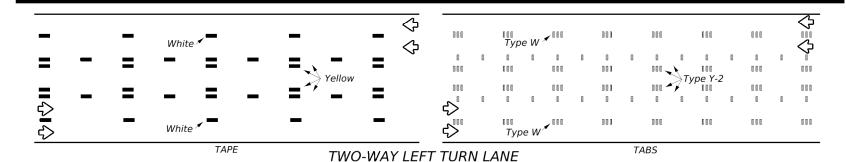


## CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS





## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Removable Short Term Raised Pavement Pavement Marker Marking (Tape)

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

Texas Department of Transportation

Traffic Safety Division

## PREFABRICATED PAVEMENT MARKINGS

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

## RAISED PAVEMENT MARKERS

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

## **WORK ZONE SHORT TERM** PAVEMENT MARKINGS

WZ(STPM)-23

FILE:	WZ	stpm-23.dgn	DN:		CK:	DW:	CK:
© TxD	ОТ	February 2023	CONT	SECT	JOB		HIGHWAY
		REVISIONS	2103	01	044	F	RM 2243
4-92 1-97	7-13 2-23		DIST		COUNTY		SHEET NO.
3-03			AUS		WILLIAMS	SON	42

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Work Area

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

elsewhere in the plans.

CW21-1T

48" X 48"

Work

Area

		SU	MMARY OF	LARGE SIGN	S				
BACKGROUND COLOR	SIGN DESIGNATION	C I CAI		SIGN REFLECTIVE DIMENSIONS SHEETING		GAL VA STRUC ST			DRILLED Shaft
COLON	DESTONATION		DIMENSIONS	3EE . [140		Size	ž O		24" DIA. (LF)
Orange	G20-7T	Give Us A	96" X 48"	Type B _{FL} or C _{FL}	32	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>
Orange	G20-7T	Working For You Give Us A	192" X 96"	Type B _{FL} or C _{FL}	128	W8×18	16	17	12

▲ See Note 6 Below

LEGEND				
4	Sign			
4	Large Sign			
ŷ	Traffic Flow			

CW21-1T

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

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

## GENERAL NOTES

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

Item 636 - Aluminum Signs

Item 647 - Large Roadside Sign Supports and Assemblies.

Item 416 - Drilled Shaft Foundations

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

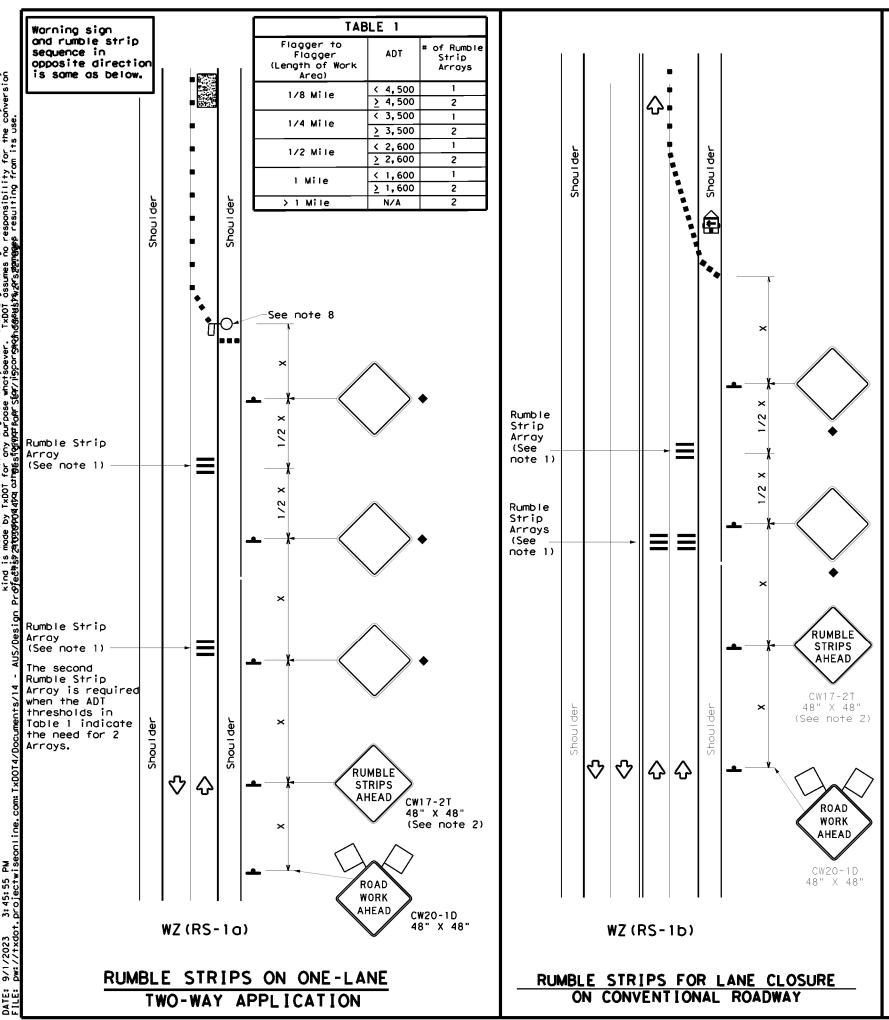


Traffic Operations Division Standard

WORK ZONE
"GIVE US A BRAKE"
SIGNS

WZ (BRK) -13

REVISIONS 210	01	044	RM	2243
6-96 5-98 7-13 DIST		COUNTY		SHEET NO.



## 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.
- 2. 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.
- 4. 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 povements or unpaved surfaces.
- Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
- 7. 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.
- 10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

	LEGEND						
	Type 3 Barricade	••	Channelizing Devices				
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)				
Ê	Trailer Mounted Flashing Arrow Panel	(M	Portable Changeable Message Sign (PCMS)				
-	Sign	Ŷ	Traffic Flow				
$\Diamond$	Flag	9	Flagger				

Posted Speed	peed		Minimur Desirab Der Lend **	le	Spacir Channe		Minimum Sign Spacing "x"	Suggested Longitudinal Buffer Space
*		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	Distance	"В-
30	2	1501	1651	1801	30′	60,	1201	90′
35	L = WS2	2051	2251	2451	35′	70'	160'	120'
40	60	2651	2951	320'	40′	80'	240'	155′
45		4501	495′	540′	45′	90'	320′	195′
50		5001	550′	6001	50′	100′	4001	240′
55	L=WS	5501	605′	6601	55′	110′	5001	295′
60	- " -	6001	6601	720'	60′	120'	600'	350′
65		6501	7151	780′	65′	1301	700'	410′
70		7001	7701	8401	70′	140′	800'	475′
75		750′	8251	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			
	1	✓					

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

TABLE 2						
Speed	Approximate distance between strips in an array					
≤ 40 MPH	10′					
> 40 MPH & <u>≤</u> 55 MPH	15′					
= 60 MPH	20′					
<u>&gt;</u> 65 MPH	* 35′+					

Texas Department of Transportation

TEMPORARY RUMBLE STRIPS

WZ (RS) -22

	_			_		
LE: wzrs22.dgn	DN: TX	DOT	ck: TxD0T	DW:	TxDOT	ck: TxDOT
TxDOT November 2012	CONT	SECT	JOB		Н	HIGHWAY
REVISIONS	2103	01	044		RM	1 2243
2-14 1-22 4-16	DIST		COUNTY			SHEET NO.
4 10	AUS	ľ	WILLIAM	ISOI	N	44

11

## GENERAL NOTES

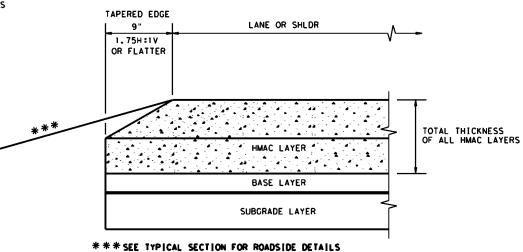
- UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS
- 2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
- PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
- 4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR
- 5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

## CONDITION - 2 OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"

LANE OR SHLDR

EXISTING PAVEMENT

TOTAL THICKNESS OF ALL HMAC LAYERS



## CONDITION - 4

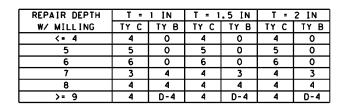
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

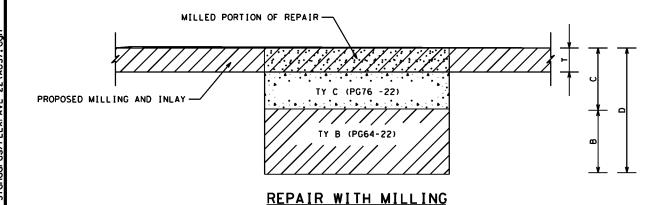


## TAPERED EDGE DETAILS HMAC PAVEMENT

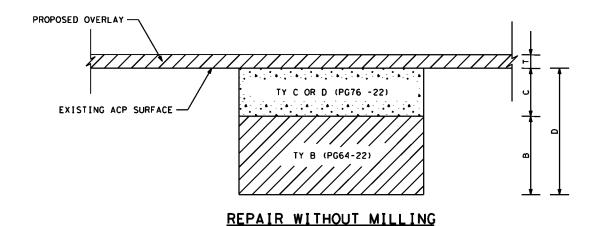
TE (HMAC) - 11

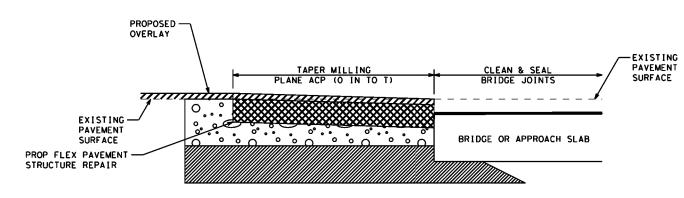
ILE: tehmac11.dgn	DN: TX[	)OT	ck: RL	ow: KB		CK:
©TxDOT January 2011	CONT	SECT	JOB		HIC	SHWAY
REVISIONS	2103	01	044		RM	2243
	DIST		COUNTY			SHEET NO.
	AUS	Y	VILLIAM	SON	4	45





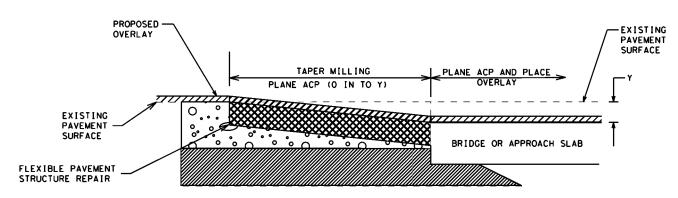
REPAIR DEPTH	TY D	TY C	TY B
W/O MILLING			
2	2	0	0
3	0	3	0
4	0	4	0
5	0	5	0
6	0	6	0
7	2	0	5
8	2	0	6
>- 9	2	0	D-4



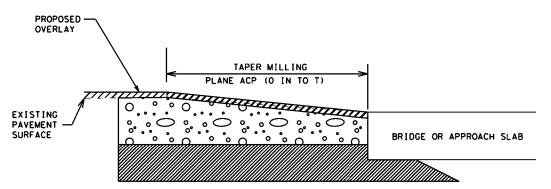


## BRIDGE APPROACH/DEPARTURE TRANSITION

MATCHING EXISTING ACP ON BRIDGE



# BRIDGE APPROACH/DEPARTURE TRANSITION REMOVING EXISTING ACP ON BRIDGE



# BRIDGE APPROACH/DEPARTURE TRANSITION MATCH EXISITING BRIDGE DECK

## FLEX PAV REPAIR NOTES

- T = OVERLAY/INLAY THICKNESS (IN)
- D REPAIR DEPTH
- C = TY C/D ACP DEPTH
- B TY B ACP DEPTH

TY B MAY BE BLADE LAID.

TY C/D MUST BE PAVER LAID.

TY C/D MAX LIFT THICKNESS 3 IN

TY B MAX LIFT THICKNESS 5 IN

ALL ACP PER ITEM 3076.

FOLLOWING WORK IS SUBSIDIARY: -SAW CUT ALL EDGES

-TACK ALL ACP SURFACES AND LAYERS

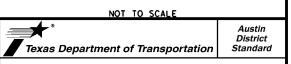
## BRIDGE APPROACH MILLING NOTES

- T = OVERLAY/INLAY THICKNESS (IN)
- Y DEPTH OF MILLING ON BRIDGE

TAPER LENGTH = 100 FT PER 1 IN OF T OR Y

ENGINEER SHOULD INCLUDE WORK TO ADJUST MBGF TO MEET STANDARD HEIGHT. ADJUSTMENT TO MBGF WILL BE PAID USING APPROPRIATE BID ITEMS.

ENGINEER MUST INCLUDE WORK TO ADJUST MOWSTRIP TO ELIMINATE PONDING.



# FLEXIBLE PAVEMENT DETAILS

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FLEXPAVE(3)-22 (AUS)

AUS	LLIAMSON	46
DIST	COUNTY	SHEET NO
2103 01	044	RM 2243
CONT SECT	JOB	HIGHWAY

DATE: 9/1/2023 3:46:36 PM

FOUR LANE DIVIDED ROADWAY CROSSOVERS

### GENERAL NOTES

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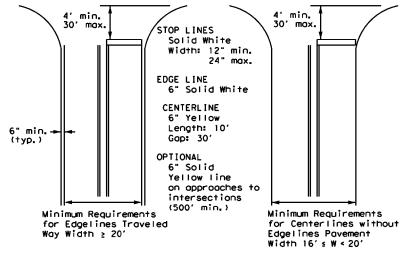
shall be as shown on the plans or as directed by the Engineer.

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- 1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 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.
- 2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

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

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



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

## GUIDE FOR PLACEMENT OF STOP LINES. EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

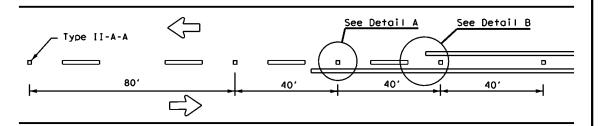


Traffic Safety Division Standard

pm1-22.dgn C)TxDOT December 2022 RM 2243 2103 01 044 8-95 3-03 12-22 5-00 2-12 WILLIAMSON

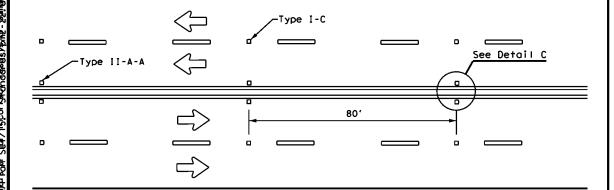
PM(1)-22

## REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

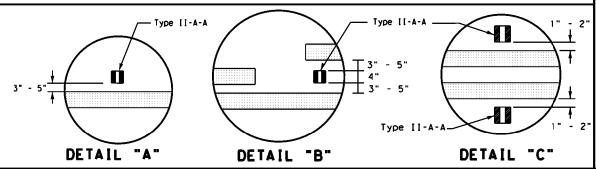


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## CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

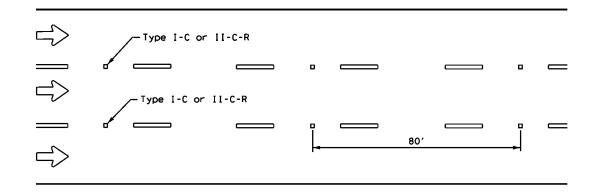


## CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



## Centerline Symmetrical around centerline Continuous two-way left turn lane 40' 401 80' Type I-C

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



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

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

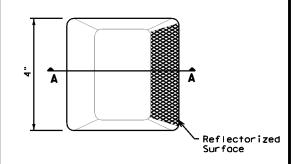
## CENTER OR EDGE LINE (see note 1) 10' 301 BROKEN LANE LINE 300 to 500 mil in height 18"± 1" A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters. REFLECTORIZED PROFILE 51/2"± 1/2 PATTERN DETAIL 2 to 3"---NOTES USING REFLECTIVE PROFILE PAVEMENT MARKINGS 1. Edge lines should typically be 6" wide and the materials shall be specified in the plans. 6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE 2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

## GENERAL NOTES

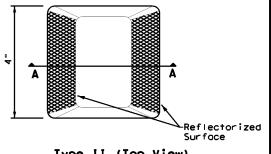
- All raised pavement markers placed along broken lines shall be placed in line with and midway between
- 2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal
- Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left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

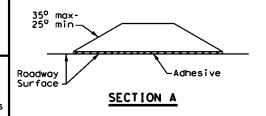
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



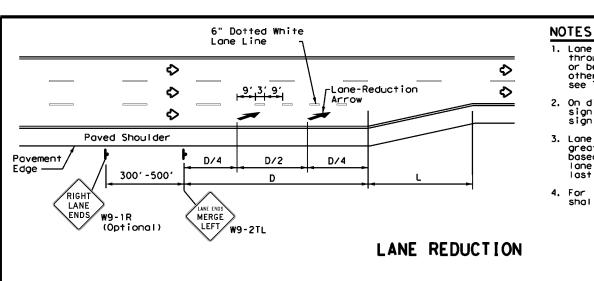
## RAISED PAVEMENT MARKERS



Traffic Safety Division Standard

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

FILE: pm2-22.dgn	DN:		CK:	DW:		CK:
© TxDOT December 2022	CONT	SECT	JOB		HIG	HWAY
REVISIONS 4-77 8-00 6-20	2103	01	044		RM	2243
4-92 2-10 12-22	DIST		COUNTY			SHEET NO.
5-00 2-12	AUS	١	WILLIAN	ISON		48



Varies (See general note 2)

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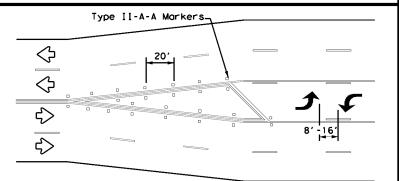
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## Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.

- 2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-IR sign on the right side of the highway.
- 3. 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.

l" White top Line (typ.)

	D WARNING	
Posted Speed	D (ft)	L (ft)
30 MPH	460	" _" 2
35 MPH	565	L = WS ²
40 MPH	670	00
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	



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 boy is not required unless stated elsewhere in the plans.

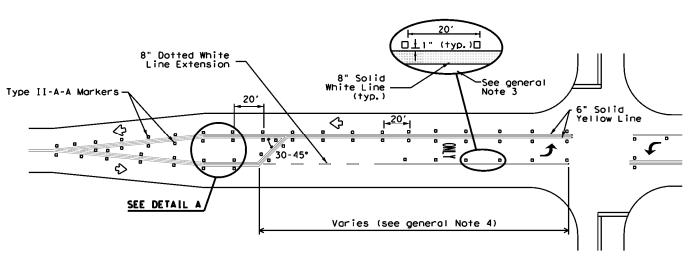
## TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

## GENERAL NOTES

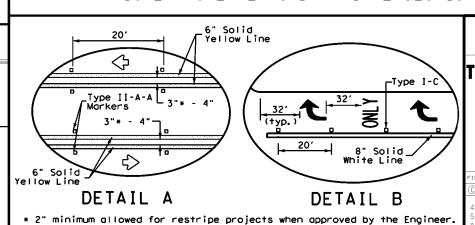
- 1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- 2. 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.
- 3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn Use raised pavement marker Type II-C-R with divided highways and raised medians.
- 4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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

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



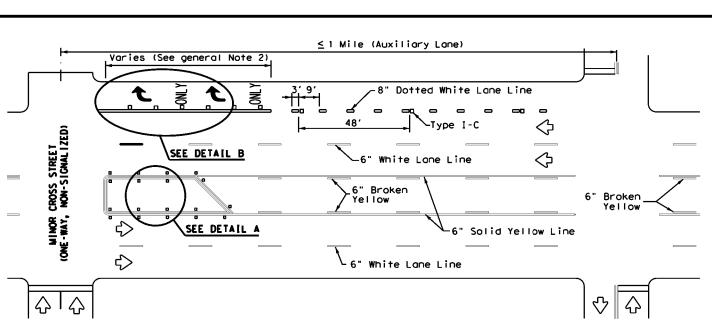
## TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS





'WO-WAY LEFT TURN LANES. RURAL LEFT TURN BAYS. AND LANE REDUCTION PAVEMENT MARKINGS PM(3) - 22

FILE: pm3-22.dgn	DN:		CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB		HIGHWAY
REVISIONS 4-98 3-03 6-20	2103	01	044	R	RM 2243
5-00 2-10 12-22	DIST		COUNTY		SHEET NO.
8-00 2-12	AUS	١	WILLIAN	ISON	49



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

Vories

≥ 1 Mile (Lane Drop)

8" Dotted White Lane Line

Type II-C or Type II-C-R See general

Varies (general Note 4)

general Note 3

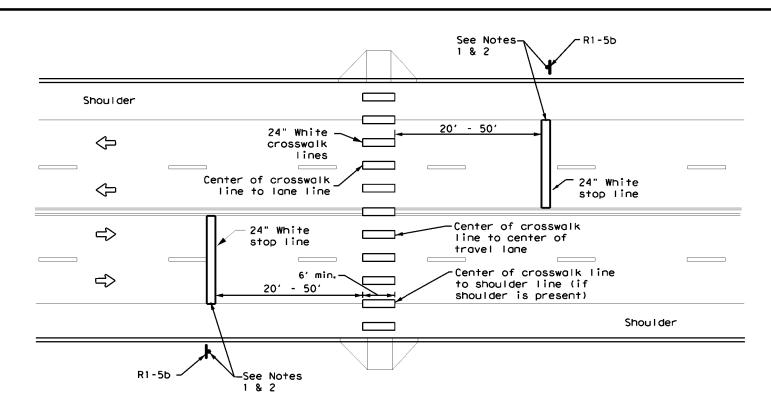
SEE DETAIL

Š¢.

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

Type II-A-A spaced at 20

No warranty of any for the conversion on its use.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

## GENERAL NOTES

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

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

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

## NOTES:

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

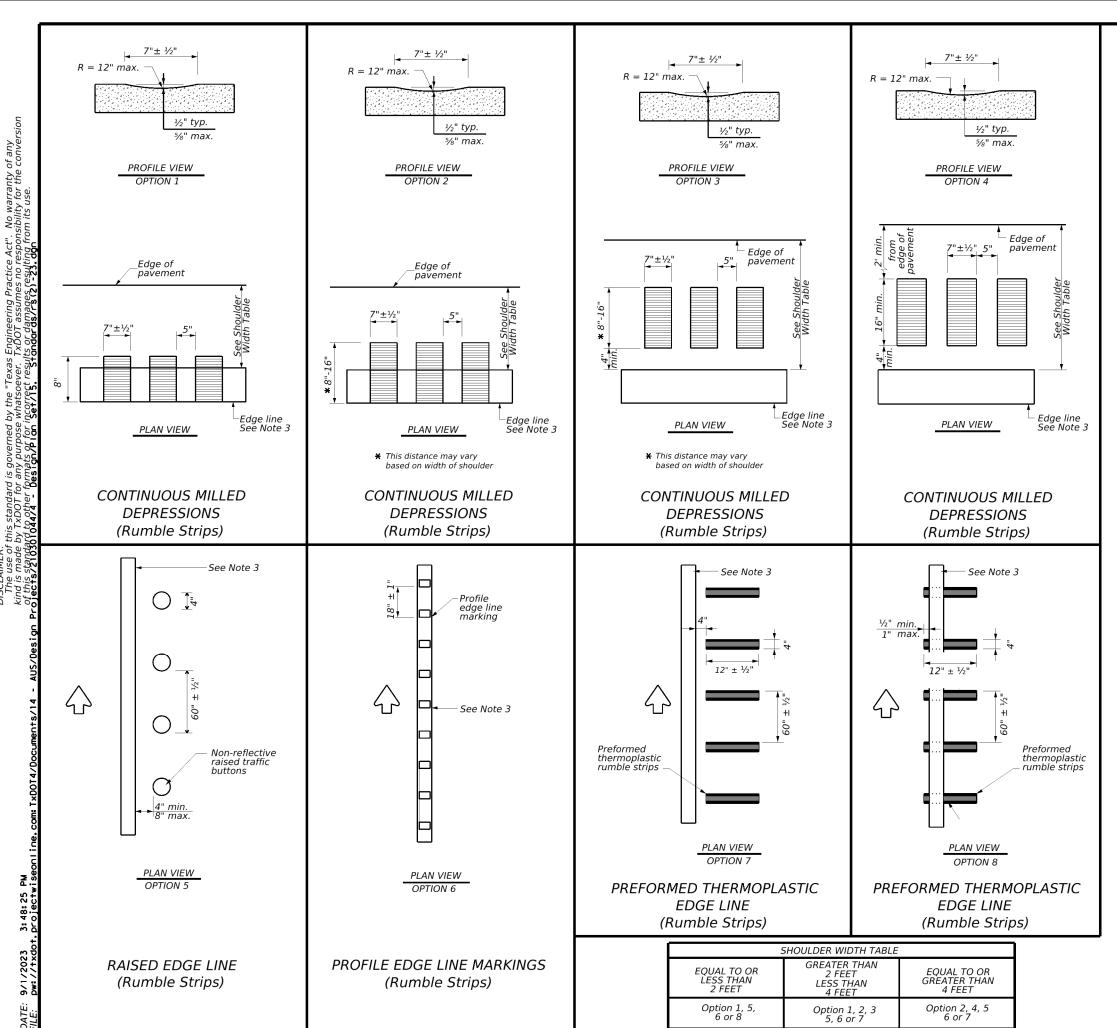


# CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:		CK:	DW:		CK:
© TxDOT December 2022	CONT	SECT	JOB		HIG	HWAY
REVISIONS 6-20	2103	01	044		RM	2243
6-22	DIST		COUNTY		9	SHEET NO.
12-22	AUS	١	WILLIAN	ISON		50

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### **GENERAL NOTES**

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

### WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

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

## WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

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



FILE:	rs(2)-23.dgn	DN: T	(DOT	CK: TXDOT DW:	TxD0	T CK:TXDOT
© TxDOT	January 2023	CONT	SECT	JOB	HIGHWAY	
10.13	REVISIONS	2103	01	044	R	M 2243
10-13 1-23		DIST	COUNTY			SHEET NO.
		AUS WILLIAMSON		51		

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### **GENERAL NOTES**

- 1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
- 2. Centerline and edge line rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
- Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
- 4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Safety Division.
- 5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections or driveways with high usage of large trucks.
- Use standard sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings and profile markings.
- Consideration should be given to noise levels when centerline rumble strips are to be installed near residential areas, schools, churches, etc. A 3/8 inch deep (minimum) milled rumble strip may be considered in these areas.
- 8. Pavement markings must be applied over milled centerline rumble strips.

### WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

- Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
- 10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
- 11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.
- 12. Consideration shall be given to bicyclists. See RS(6).

WHEN INSTALLING EDGE LINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

13. See standard sheet RS(2).



Traffic Safety Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS RS(4)-23

| FILE: rs(4)-23.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXD

☐ This project DOT No.: 74	ect is adjacent or parallel work, not within RR ROW: 14819J
Crossing Typ	e: AT GRADE
RR Company	Operating Track at Crossing: CMTY, ATCX, AWRR
RR Company	Owning Track at Crossing: CMTY
RR MP: 086	.46
	on: CENTRAL
City: LEAND	
County: WIL	
	Crossing: <u>2103-01-044</u>
Latitude: 30	
Longitude: _	97.8525696
Scope of Wo	rk, including any TCP, to be performed by State Contractor:
TCP 2-2, TC IF CONTRAC CAUSES VE	AY CONSISTING OF 1" MILL, BONDING COURSE, & 1" THIN OVERLAY MIX (TOM) P 3-1 THRU 3-4, ETC., AND FLAGGING CTOR PERFORMS WORK THAT CREATES A TRAFFIC CONTRA-FLOW CONDITION THAT HICLES TO CROSS THE RAILROAD TRACKS. A RAILROAD FLAGGER IS REQUIRED TO BE R THE DURATION OF THE CONTRA-FLOW TRAFFIC CONTROL PLAN WITHIN RAILROAD
Scope of Wo	rk to be performed by Railroad Company:
II. FLAG	GING & INSPECTION
	GING & INSPECTION  of Railroad Flagging Expected: 6
No. of Days	
No. of Days	of Railroad Flagging Expected: 6 ect, night or weekend flagging is:
No. of Days On this proje	of Railroad Flagging Expected: 6 ect, night or weekend flagging is:
No. of Days On this proje □ Expected ☑ Not Expe	of Railroad Flagging Expected: 6 ect, night or weekend flagging is:
No. of Days On this proje □ Expected ☑ Not Expe Flagging ser □ Railroad	of Railroad Flagging Expected: 6 ect, night or weekend flagging is: cted vices will be provided by: Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be
No. of Days On this proje Expected Not Expe Flagging ser Railroad needed c	of Railroad Flagging Expected: 6 ect, night or weekend flagging is: cted vices will be provided by: Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be r, 2) Permitted crossing. Railroad company to provide flagging.
No. of Days On this proje Expected Not Expe Railroad needed c Outside F Contractor r requires a 3	of Railroad Flagging Expected: 6 ect, night or weekend flagging is: cted vices will be provided by: Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be r, 2) Permitted crossing. Railroad company to provide flagging. Party: Contractor will pay flagging invoices to be reimbursed by TxDOT must incorporate flaggers into anticipated construction schedule. The Railroad 0-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due negligence and is not ready for scheduled flaggers, any flagging charges will be paid
No. of Days On this proje Expected Not Expe Railroad needed c Outside F Contractor r requires a 3 to their own by Contractor	of Railroad Flagging Expected: 6 ect, night or weekend flagging is: cted vices will be provided by: Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be r, 2) Permitted crossing. Railroad company to provide flagging. Party: Contractor will pay flagging invoices to be reimbursed by TxDOT must incorporate flaggers into anticipated construction schedule. The Railroad 0-day notice if their flaggers are to be utilized. If Contractor falls behind schedule du negligence and is not ready for scheduled flaggers, any flagging charges will be paid
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Contractor must incorporate railroad construction insp  ☑ Not Required ☐ Required. Contact Information for Construction In								
III. CONSTRUCTION WORK TO BE PERFORM  ☐ Required. ☐ Not Required Railroad Point of Contact:	MED BY THE RAILROAD							
Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.								
IV. RAILROAD INSURANCE REQUIREMENTS	<b>5</b>							
The Contractor shall confirm the insurance requirement are subject to change without notice.	ents with the Railroad as the insurance limits							
Insurance policies and corresponding certificates of on behalf of the Railroad. Separate insurance policie than one Railroad Company is operating on the same Companies are involved and operate on their own se	es and certificates are required when more e right of way, or when several Railroad							
No direct compensation will be made to the Contract shown below or any deductibles. These costs are inc								
Escalated L	imits							
Type of Insurance	Amount of Coverage (Minimum)							
Workers Compensation	\$500,000 / \$500,000 / \$500,000							
Commercial General Liability	\$2,000,000 / \$4,000,000							
Business Automobile	\$2,000,000							

Business Automobile	\$2,000,000
Railroad Protective Liabil	lity Limits
☐ Not Required	
<ul> <li>□ Non - Bridge/Typical Maintenance Projects.</li> <li>Includes repairs to overpass/underpass and culvert structures</li> </ul>	\$2,000,000 / \$6,000,000
☐ Bridge Structure Projects. Includes new construction or replacement of overpass/ underpass structures	\$5,000,000 / \$10,000,000
☑ Other: \$5,000,000 / \$5,000,000	

### V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

( )
☐ Not Required
☐ Required: UPRR Maintenance Consent Letter. TxDOT to assist
$\ \square$ Required: TxDOT to assist in obtaining the UPRR CROE
☐ Required: Contractor to obtain
☐ BNSF:
☐ CPKCR https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
☑ Other Railroads:  https://www.capmetro.org/railrow

To view previously approved CROE templates agreed upon between the State and Railroad, see: https://www.txdot.gov/business/resources/railroad-highway-crossing/sample-right-of-entryagreements.html

Approved CROE templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed CROE between the Contractor and the Railroad if required on project.

### VI. RAILROAD COORDINATION MEETING

A Railroad Coordination Meeting is required. See item 5, Article 8.1, of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges Manual for more details.

### **VII. RAILROAD SAFETY ORIENTATION**

A. Complete the Railroad's course "Orientation for Contractor's Safety," and maintain registration prior to working on the Railroad's property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

UPRR, BNSF, CPKCR will not accept on-track safety training certificates from other Railroads. Refer to each Railroad's specific contractor right of entry for training information.

Know and follow the Contractor's Right of Entry Agreement EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

## VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are subject to the same insurance requirements as the Prime Contractor.

## IX. EMERGENCY NOTIFICATION

Call: CAP N	METRO	
	nergency Line at: 1 (844) 592-8046	
	OT 744819J	
RR Milepos	nt: 086.46	
	CENTRAL	

**RRD Review Only** Initials: Date: ___08/23/2023



Division

# **RAILROAD SCOPE OF WORK**

PROJECT SPECIFIC DETAILS

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6/2023		DIST		COUNTY			SHEET NO.
		AUS	WILLIAMSON			53	

### PART 1 - GENERAL

### DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT standard Specifications, Pailroad Cuidalines and APEMA recommendations of matificial by these Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

### 1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

### 1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

### PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

### PART 3 - CONSTRUCTION

### GENERAL

- A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other
- B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.
- C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.
- D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.
- E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.
- F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.
- G. All permanent clearances shall be verified before project closing.

### 3. 02 RAILROAD OPERATIONS

- A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.
- B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.
- C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:
  - 1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.
  - 2. Absolute Work Window: An Absolute Work Window is a period of Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

### 3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

- A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.
- B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.
- C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad.
  Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.
- D. Make requests in writing for both Absolute and Conditional Work Windows. at least 30 days in advance of any work. Include in the written request:
  - Exactly what the work entails.
  - The days and hours that work will be performed.

    The exact location of work, and proximity to the tracks.
- The type of window requested and the amount of time requested.
- The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

### INSURANCE 3.04

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

### RAILROAD SAFETY ORIENTATION 3.05

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR,BNSF,KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

### 3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

### MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER **TEMPORARY STRUCTURES**

Abide by the following minimum temporary clearances during the course of construction: A. 15' - 0" (BNSF) (UPRR) and 14'-0" (KCS) horizontal from

centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

### APPROVAL OF REDUCED CLEARANCES

- A. Maintain minimum track clearances during construction as specified in Section 3.07.
- B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.
- C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

SHEET 1 OF 2



FOR NON-BRIDGE CONSTRUCTION PROJECTS

DN: TXDOT CK: TXDOT DW: TXDOT CK: TXDO TxDOT October 2018 2103 01 044 RM 2243 AUS WILLIAMSON

### 3.09 MAINTENANCE OF RAILROAD FACILITIES

- A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.
- B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.
- C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site.
  Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

### 3.10 SITE INSPECTIONS BY RAILROAD'S DESIGNATED REPRESENTATIVE

- A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
- Pre-construction meetings.
   Pile driving/drilling of caissons or drilled shafts.
   Reinforcement and concrete placement for railroad bridge
- substructure and/or superstructure.
- Erection of precast concrete or steel bridge superstructure.
   Placement of waterproofing (prior to placing ballast on bridge deck). 6. Completion of the bridge structure.
- B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.
- C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. the anticipated dates when the above listed events will occur.

  Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

### 3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

- A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- B. For any excavation below elevation of track subgrade if, in the opinion the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.
- C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.
- D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

## 3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOI. This work by the Railroad will be done by its own forces and it is not a part of the Work worder this Contract. Work under this Contract.

## 3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

### 3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

- A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad Guidelines for Temporary Shoring".
- B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193 7:00 AM to 9:00 PM CST Monday-Friday except holidays, staffed 24 hrs/day for emergencies 48 hrs notice required

BNSF 1-800-533-2891 24 hour number 5 working days notice required

KCS 1-800-344-8377 Texas One Call, a 24 hour number 48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of  $\frac{1}{4}$  inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding,

### 3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

### 3.16 CLEANING OF RIGHT-OF-WAY

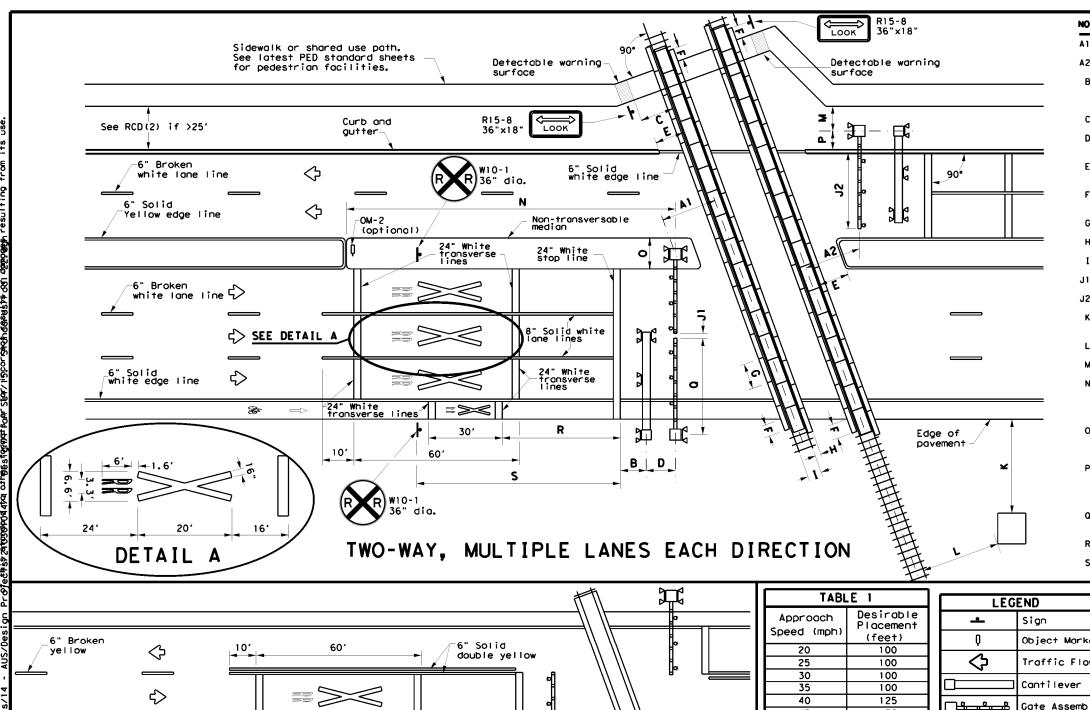
When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

SHEET 2 OF 2



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CONSTRUCTION PROJECTS

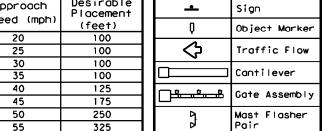


В

TWO LANES, TWO-WAY

## NOTES

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



400

475

550

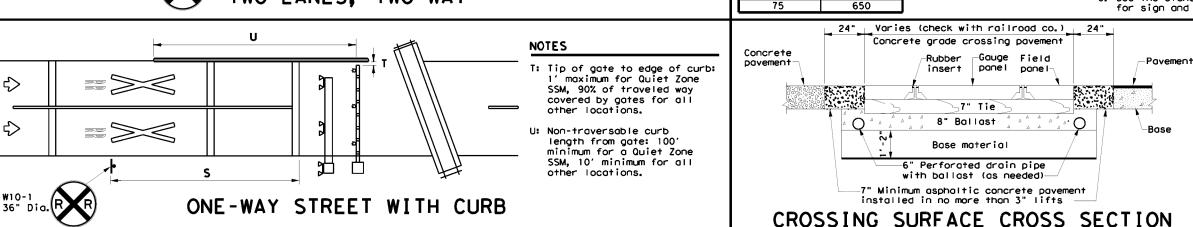
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### GENERAL NOTES

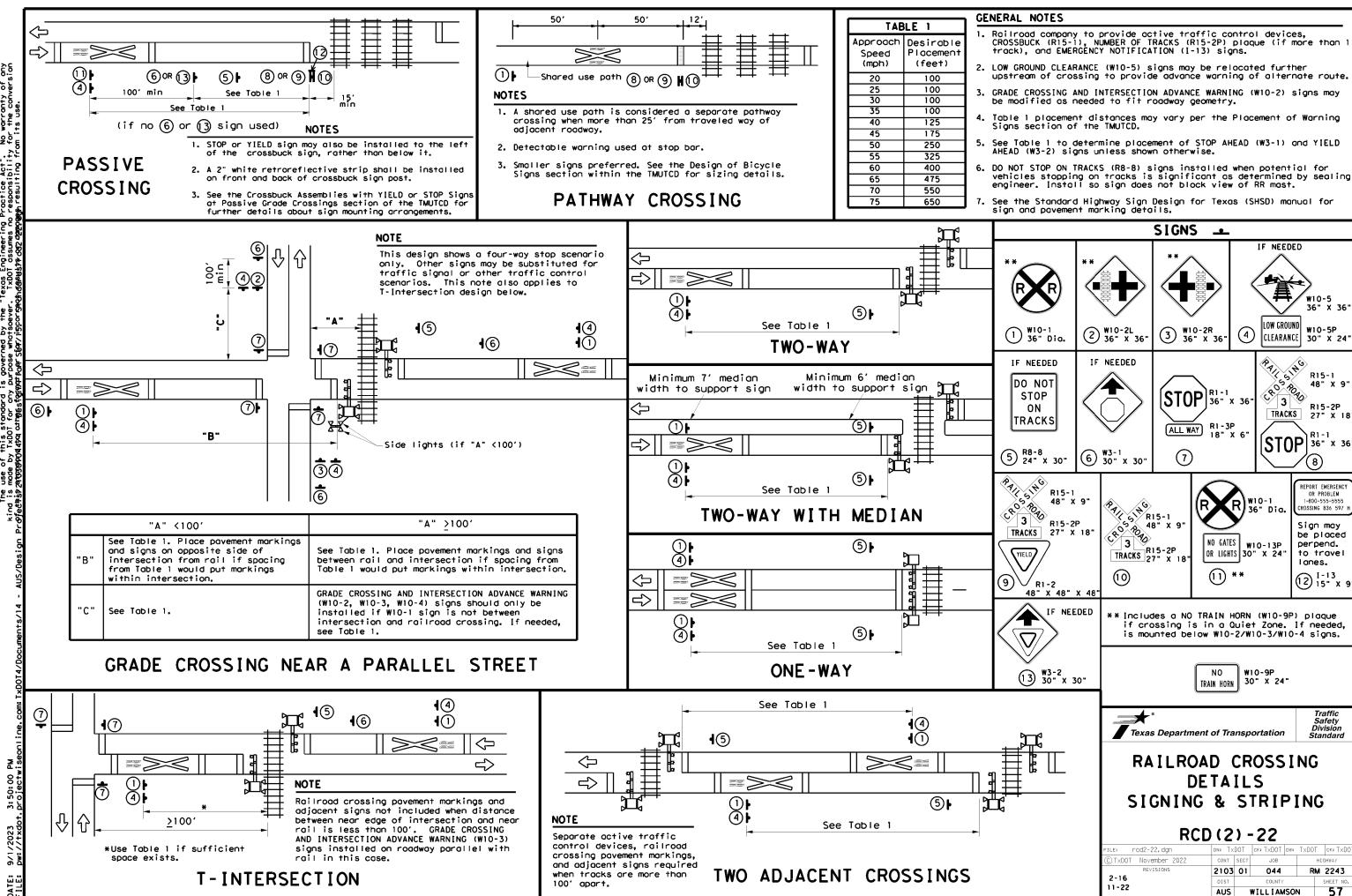
- Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
- Raised pavement markers may be used to supplement striping. See PM(2) and PM(3)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

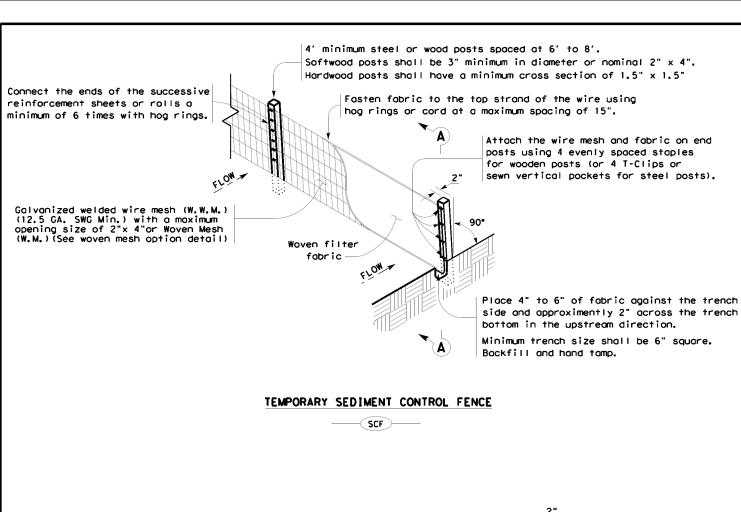


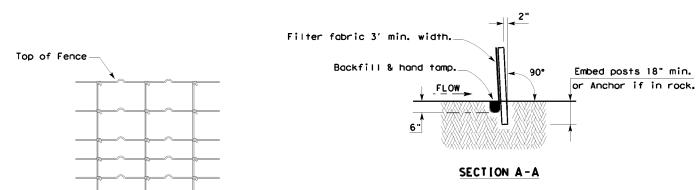
Texas Department of Transportation

RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT RCD(1)-22

TxDOT November 2022 2103 01 044 RM 2243 11-22 WILLIAMSON







## HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

## SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

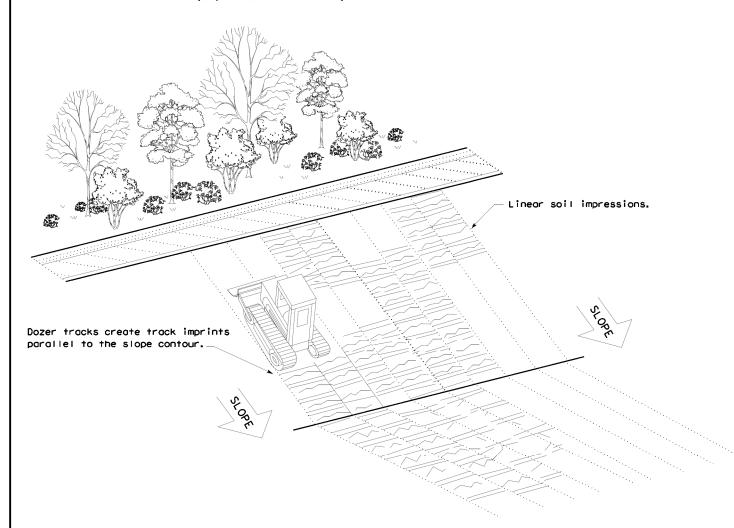
Sediment control fence should be sized to filter a maximum flow through rate of 100  ${\sf GPM/FT}^2$ . Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

## **LEGEND**

Sediment Control Fence

### GENERAL NOTES

- Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
- 2. Perform vertical tracking on slopes to temporarily stabilize soil.
- 3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
- 4. Do not exceed 12" between track impressions.
- 5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING



Design Division Standard

TEMPORARY EROSION,
SEDIMENT AND WATER
POLLUTION CONTROL MEASURES
FENCE & VERTICAL TRACKING

EC(1)-16

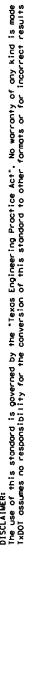
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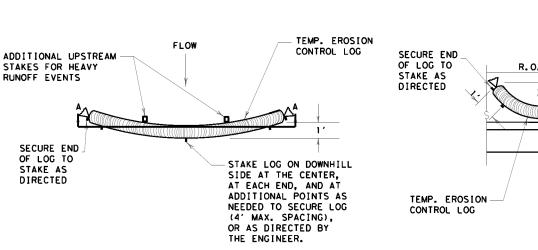
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STAKE LOG ON DOWNHILL

R. O. W.

SIDE AT THE CENTER,

AT EACH END, AND AT

AS DIRECTED BY THE

ENGINEER.

ADDITIONAL POINTS AS

NEEDED TO SECURE LOG

(4' MAX. SPACING), OR

ADDITIONAL UPSTREAM

STAKES FOR HEAVY

RUNOFF EVENTS

## -ADDITIONAL UPSTREAM STAKES FOR HEAVY FLOW RUNOFF EVENTS DISTURBED AREA BACK OF CURB LIP OF GUTTER STAKE ON DOWNHILL SIDE OF LOG AT 8' (ON CENTER) MAX. AS NEEDED TO SECURE LOG, OR AS DIRECTED BY THE ENGINEER.

PLAN VIEW

TEMP. EROSION

COMPOST CRADLE

UNDER EROSION

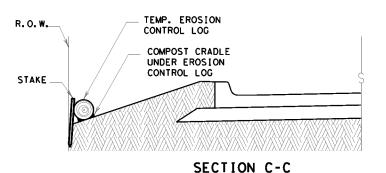
CONTROL LOG

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CONTROL LOG

### STAKE ON DOWNHILL SIDE OF LOG AT 8' (ON CENTER) MAX. AS NEEDED TO SECURE LOG, (TYP.) OR AS DIRECTED BY THE ENGINEER. R. O. W. TEMPORARY EROSION CONTROL LOG FLOW DISTURBED AREA SECURE END BACK OF CURB OF LOG TO STAKE AS DIRECTED - LIP OF GUTTER ADDITIONAL UPSTREAM STAKES FOR HEAVY RUNOFF EVENTS

## PLAN VIEW



EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

# CL-ROW

## SECTION A-A **EROSION CONTROL LOG DAM**

PLAN VIEW

Z



## **LEGEND**

 $\vdash$  EROSION CONTROL LOG DAM CL-D (cL-BOC)— EROSION CONTROL LOG AT BACK OF CURB

TEMP. EROSION

CONTROL LOG

1' (TYP.)

COMPOST CRADLE UNDER EROSION

CONTROL LOG

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

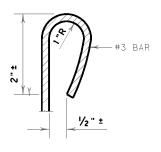
EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING (CL-SST

EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING (CL-SSL)

(cl-di)— EROSION CONTROL LOG AT DROP INLET

(cl-ci)— EROSION CONTROL LOG AT CURB INLET

CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

(CL-BOC)

REBAR STAKE DETAIL

## SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

The drainage area for a sediment trap should not exceed Log Traps: the drainage area).

Control logs should be placed in the following locations:

- 1. Within drainage ditches spaced as needed or min. 500' on center
- 3. Just before the drainage enters a water course
- limits where drainage flows away from the project.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

## SHEET 1 OF 3

DIAMETER MEASUREMENTS OF EROSION

CONTROL LOGS SPECIFIED IN PLANS

**GENERAL NOTES:** 1. EROSION CONTROL LOGS SHALL BE INSTALLED

IN ACCORDANCE WITH MANFACTURER'S

2. LENGTHS OF EROSION CONTROL LOGS SHALL

UNLESS OTHERWISE DIRECTED, USE

BIODEGRADABLE OR PHOTODEGRADABLE

USE RECYCLABLE CONTAINMENT MESH.

STAKES SHALL BE 2" X 2" WOOD OR

SIZE TO HOLD LOGS IN PLACE.

10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL

LOG FROM FOLDING IN ON ITSELF.

THE PURPOSE INTENDED.

ENGINEER.

DEFORMATION.

THE ENGINEER.

MINIMUM COMPACTED

DIAMETER

RECOMMENDATIONS, OR AS DIRECTED BY THE

BE IN ACCORDANCE WITH MANUFACTURER'S

RECOMMENDATIONS AND AS REQUIRED FOR

CONTAINMENT MESH ONLY WHERE LOG WILL

SYSTEM. FOR TEMPORARY INSTALLATIONS,

REMAIN IN PLACE AS PART OF A VEGETATIVE

FILL LOGS WITH SUFFICIENT FILTER MATERIAL

TO ACHIEVE THE MINIMUM COMPACTED DIAMETER

SPECIFIED IN THE PLANS WITHOUT EXCESSIVE

#3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT

2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY

DO NOT PLACE STAKES THROUGH CONTAINMENT

COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.

SANDBAGS USED AS ANCHORS SHALL BE PLACED

ON TOP OF LOGS & SHALL BE OF SUFFICIENT

TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE

UPSTREAM STAKES MAY BE NECESSARY TO KEEP

TO PREVENT RUNOFF FROM FLOWING AROUND THE



MINIMUM

COMPACTED DIAMETER

TEMPORARY EROSION. SEDIMENT AND WATER POLLUTION CONTROL MEASURES

**EROSION CONTROL LOG** 

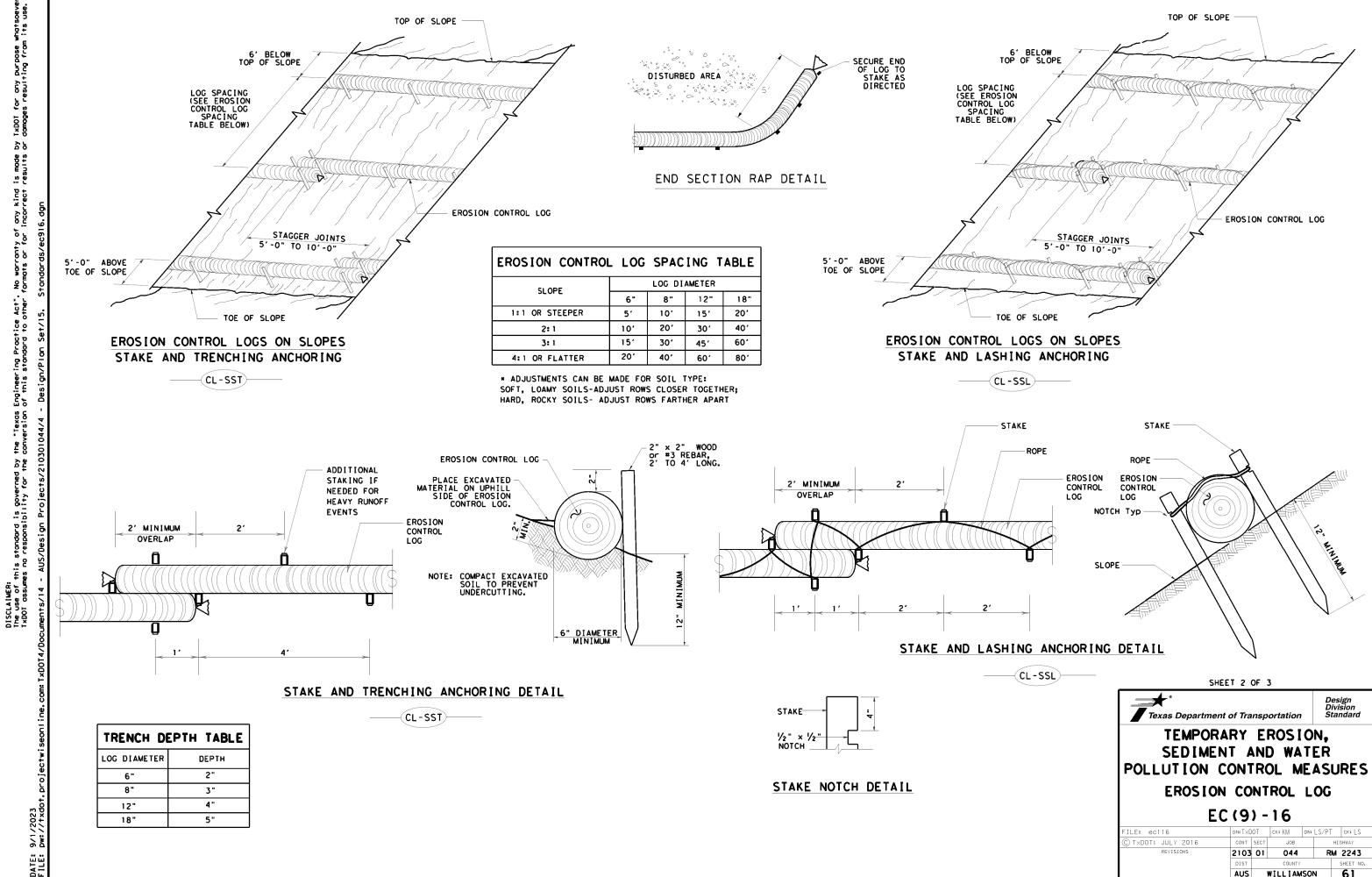
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	ALIC	WILLIAMSON				60	

5 acres. The trap capacity should be 1800 CF/Acre (0.5" over

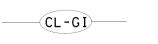
- 2. Immediately preceding ditch inlets or drain inlets
- 4. Just before the drainage leaves the right of way
- 5. Just before the drainage leaves the construction

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

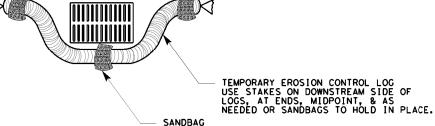


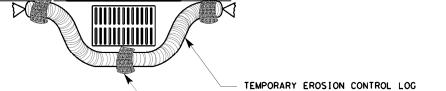
AUS WILLIAMSON

(CL-GI)









OVERLAP ENDS TIGHTLY 24" MINIMUM

COMPLETELY SURROUND DRAINAGE ACCESS TO AREA DRAIN INLETS WITH EROSION CONTROL LOG

FLOW

STAKE OR USE SANDBAGS
ON DOWNHILL SIDE OF
LOG AS NEEDED TO HOLD
IN PLACE (TYPICAL)

24"

EROSION CONTROL LOG AT DROP INLET

(CL-DI)

CURB AND GRATE INLET

SECURE END OF LOG TO STAKE AS DIRECTED

TEMP. EROSION CONTROL LOG

FLOW



CURB

FION

TEMP. EROSION CONTROL LOG

SANDBAG

EROSION CONTROL LOG AT CURB INLET

2 SAND BAGS

(CL - C I)

(CL -CI)

NOTE: EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

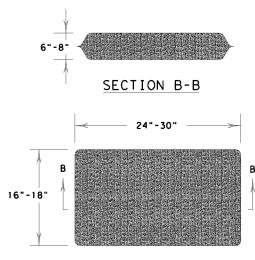
USE STAKES ON DOWNSTREAM SIDE OF LOGS, AT ENDS, MIDPOINT, & AS NEEDED OR SANDBAGS TO HOLD IN PLACE.

6" CURB-

ROADWAY

2 SAND BAGS

TEMP. EROSION CONTROL LOG



SANDBAG DETAIL

SHEET 3 OF 3 Texas Department of Transportation

CURB INLET _INLET EXTENSION

TEMPORARY EROSION. SEDIMENT AND WATER POLLUTION CONTROL MEASURES **EROSION CONTROL LOG** 

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