

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY		SHEET NO.
CRP	SAN PATRICIO		1

DESIGN SPEED = 75 MPH
 A.D.T. (2021)= 11934
 A.D.T. (2041)=16708

FINAL PLANS

LETTING DATE: _____
 DATE CONTRACTOR BEGAN WORK: _____
 DATE WORK WAS COMPLETED & ACCEPTED: _____
 FINAL CONTRACT COST: \$ _____
 CONTRACTOR : _____

ADHERING TO NON-FREEWAY REHABILITATION (2R) DESIGN CRITERIA
 NO TDLR INSPECTION REQUIRED

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NO. F-2024 (689)

US 181 SAN PATRICIO COUNTY

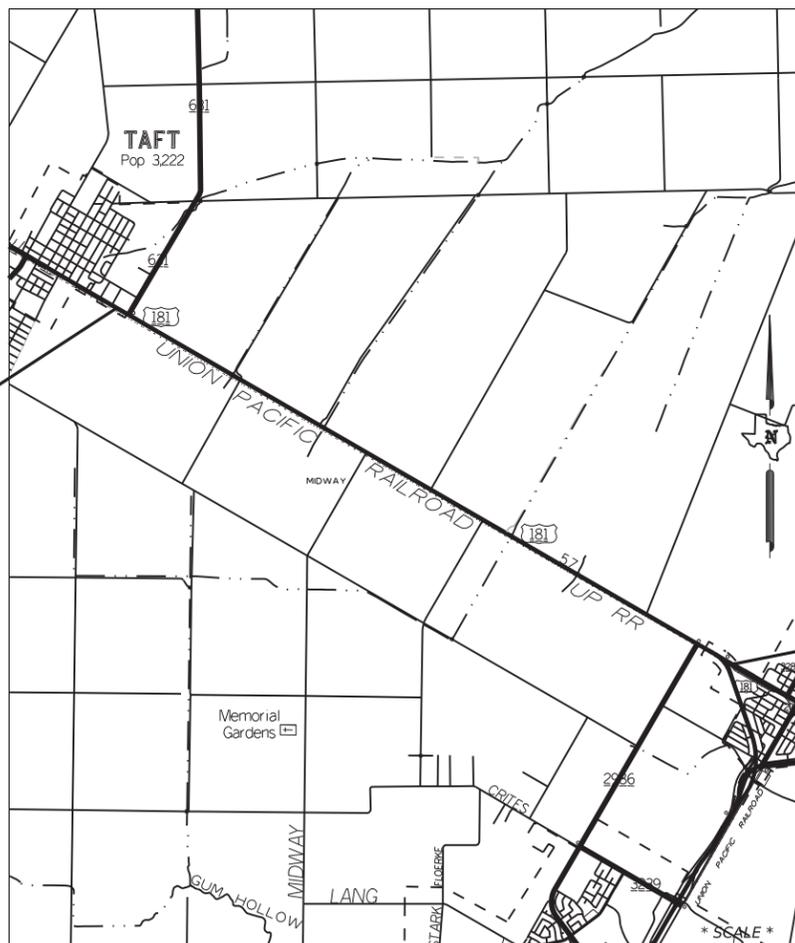
NET LENGTH OF ROADWAY = 32,055 FT. = 6.08 MI.
 NET LENGTH OF BRIDGE = 817 FT. = .15 MI.
 NET LENGTH OF PROJECT = 32,872 FT. = 6.23 MI.

LIMITS: FROM FM 631 TO FM 2986

FOR THE RESURFACING OF EXISTING ROADWAY CONSISTING OF MILLING, HOT MIX OVERLAY AND PAVEMENT MARKINGS

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
	SEE SHEET 2



BEGIN PROJECT
 CSJ: 0101-04-131
 STA: 231+28
 REF MRK: 630+0.882

END PROJECT
 CSJ: 0101-04-131
 STA: 560+00
 REF MRK: 636+1.085

EXCEPTIONS: NONE
 EQUATIONS: NONE
 RAILROAD CROSSINGS: STA 553+69 (A)



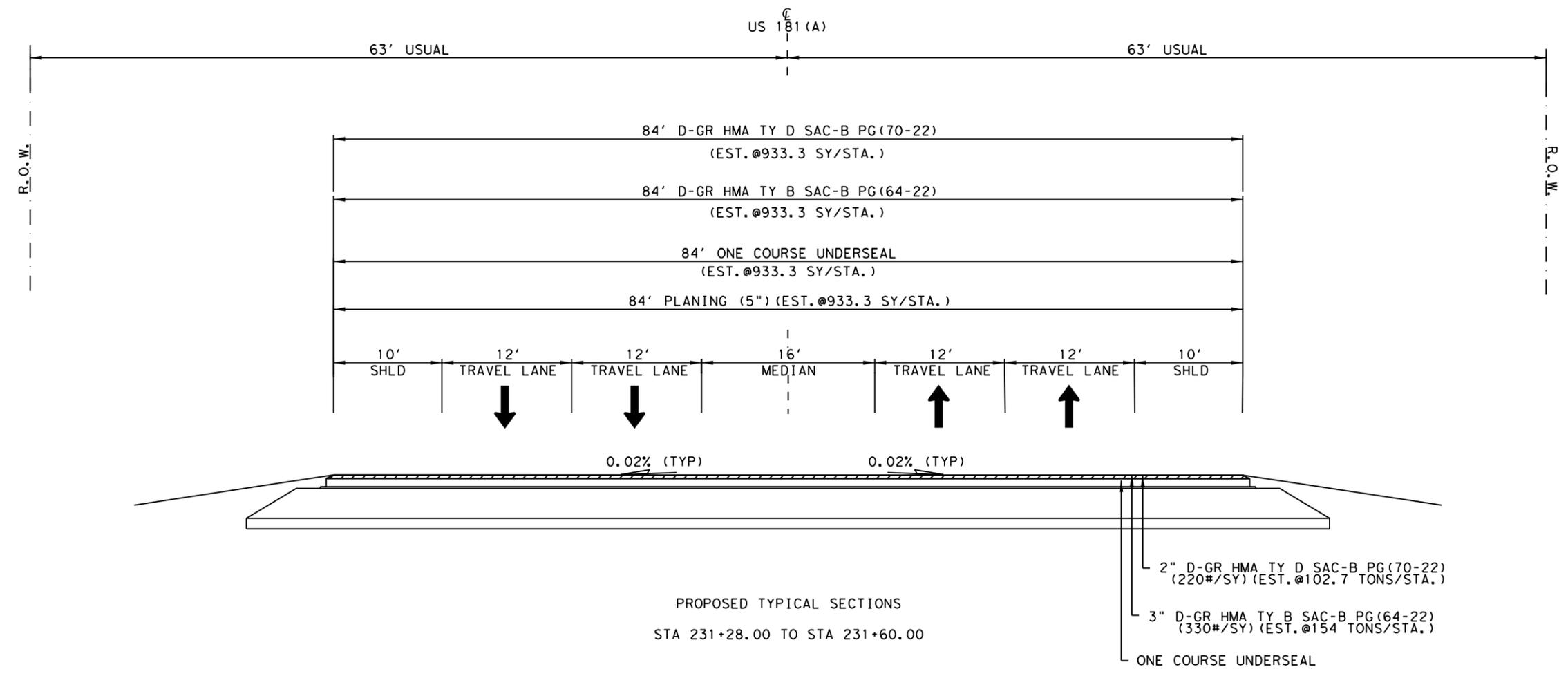
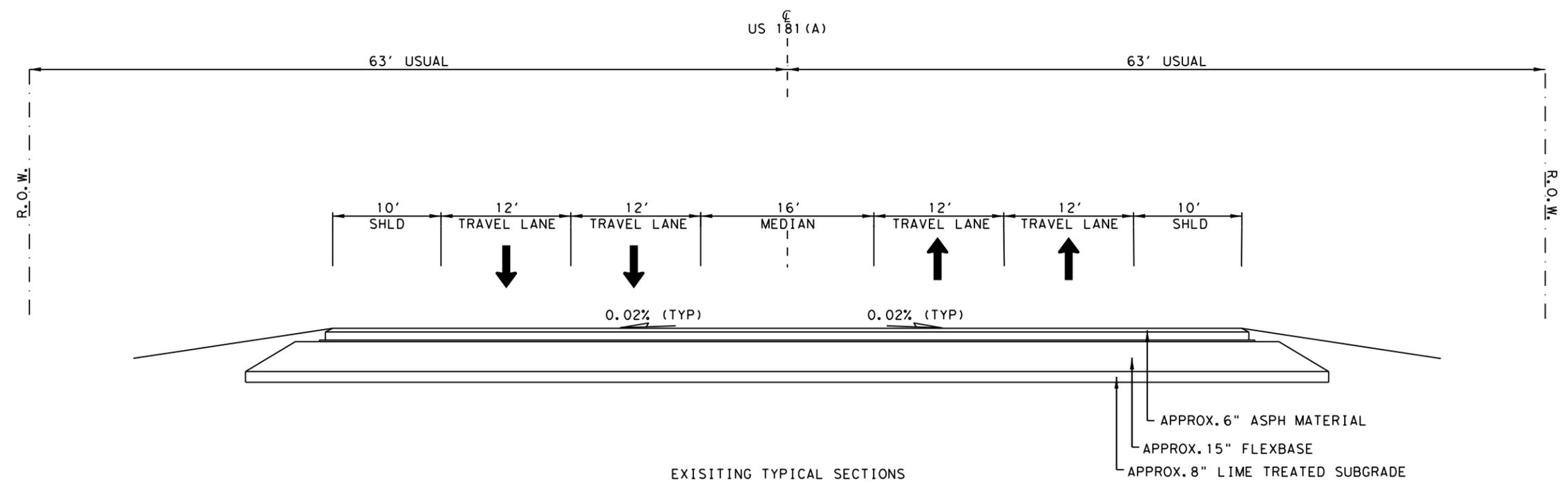
DocuSigned by: **Paula Sales-Evans, P.E.** 11/3/2023
 DocuSigned by: **Valente Olivarez** 11/3/2023
 5975450A18CC435... 303F64E8A9B44E0...
 PLANNING AND DEVELOPMENT

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023)

DATE: 11/03/2023 01:49 PM
 FILE: DOCUMENT NAME

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DATE: 10/30/2023 11:51 AM TM
FILE: pw://ttdot.projectwiseonline.com:TXDOT4/Documents/16 - CRP/Design Projects/010104131/4 - Design/Plan Set/1 - General/TYPICAL_SECTION 1



E. Martinez
11/03/2023

Texas Department of Transportation

US 181

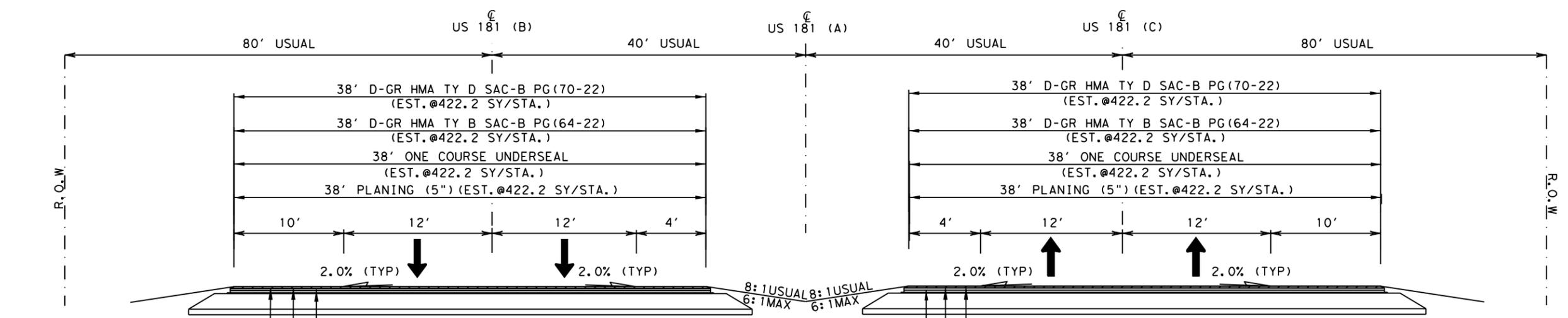
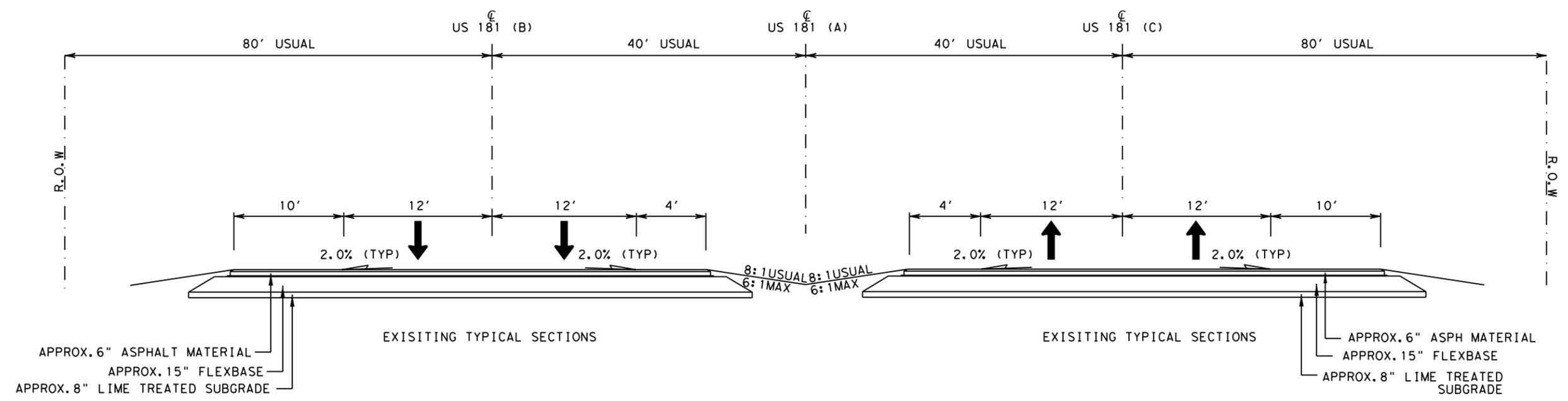
TYPICAL SECTIONS

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	3

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2" D-GR HMA TY D SAC-B PG(70-22)
(220#/SY) (EST. @46.4 TONS/STA.)
3" D-GR HMA TY B SAC-B PG(64-22)
(330#/SY) (EST. @69.7 TONS/STA.)
ONE COURSE UNDERSEAL

PROPOSED TYPICAL SECTIONS

STA 231+60.00 (B) TO STA 290+80.00 (B)
 STA 295+40.00 (B) TO STA 339+98.00 (B)
 STA 340+32.00 (B) TO STA 437+33.00 (B)
 STA 441+93.00 (B) TO STA 472+92.00 (B)
 STA 473+26.00 (B) TO STA 520+00.00 (B)
 STA 520+00.00 (B) TO STA 525+10.00 (B) 38' - 72'
 STA 525+10.00 (B) TO STA 537+26.00 (B)
 STA 539+69.00 (B) TO STA 552+39.00 (B)

PROPOSED TYPICAL SECTIONS

STA 231+60.00 (C) TO STA 289+64.00 (C)
 STA 295+04.00 (C) TO STA 339+97.00 (C)
 STA 340+31.00 (C) TO STA 436+00.00 (C)
 STA 441+30.00 (C) TO STA 472+87.00 (C)
 STA 473+22.00 (C) TO STA 518+50.00 (C)
 STA 518+50.00 (C) TO STA 522+20.00 (C) 38' - 78'
 STA 522+20.00 (C) TO STA 537+03.00 (C)
 STA 539+45.00 (C) TO STA 550+95.00 (C)

2" D-GR HMA TY D SAC-B PG(70-22)
(220#/SY) (EST. @46.4 TONS/STA.)
3" D-GR HMA TY B SAC-B PG(64-22)
(330#/SY) (EST. @69.7 TONS/STA.)
ONE COURSE UNDERSEAL



E. Martinez
11/03/2023

Texas Department of Transportation

US 181

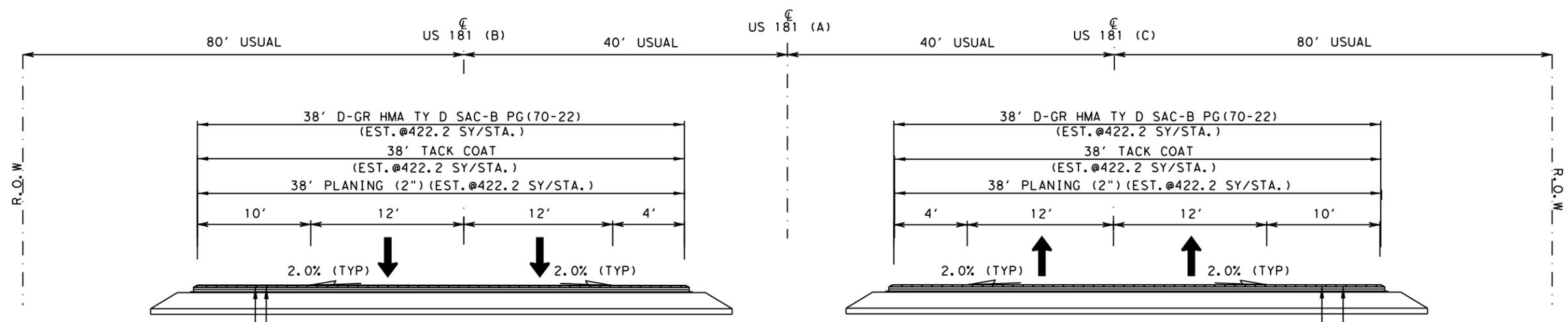
TYPICAL SECTIONS

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	4	

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2" D-GR HMA TY D SAC-B PG(70-22)
 (220#/SY) (EST. @46.4 TONS/STA.)
 TACK COAT

PROPOSED TYPICAL SECTIONS
 STA 339+98.00(B) TO STA 340+32.00(B)
 STA 472+92.00(B) TO STA 473+26.00(B)
 ALL CROSSOVER LOCATIONS (SEE SHEET 14)

PROPOSED TYPICAL SECTIONS
 STA 339+97.00(C) TO STA 340+31.00(C)
 STA 472+87.00(C) TO STA 473+22.00(C)
 ALL CROSSOVER LOCATIONS (SEE SHEET 14)

2" D-GR HMA TY D SAC-B PG(70-22)
 (220#/SY) (EST. @46.4 TONS/STA.)
 TACK COAT



Eric R. Martinez

11/03/2023

Texas Department of Transportation

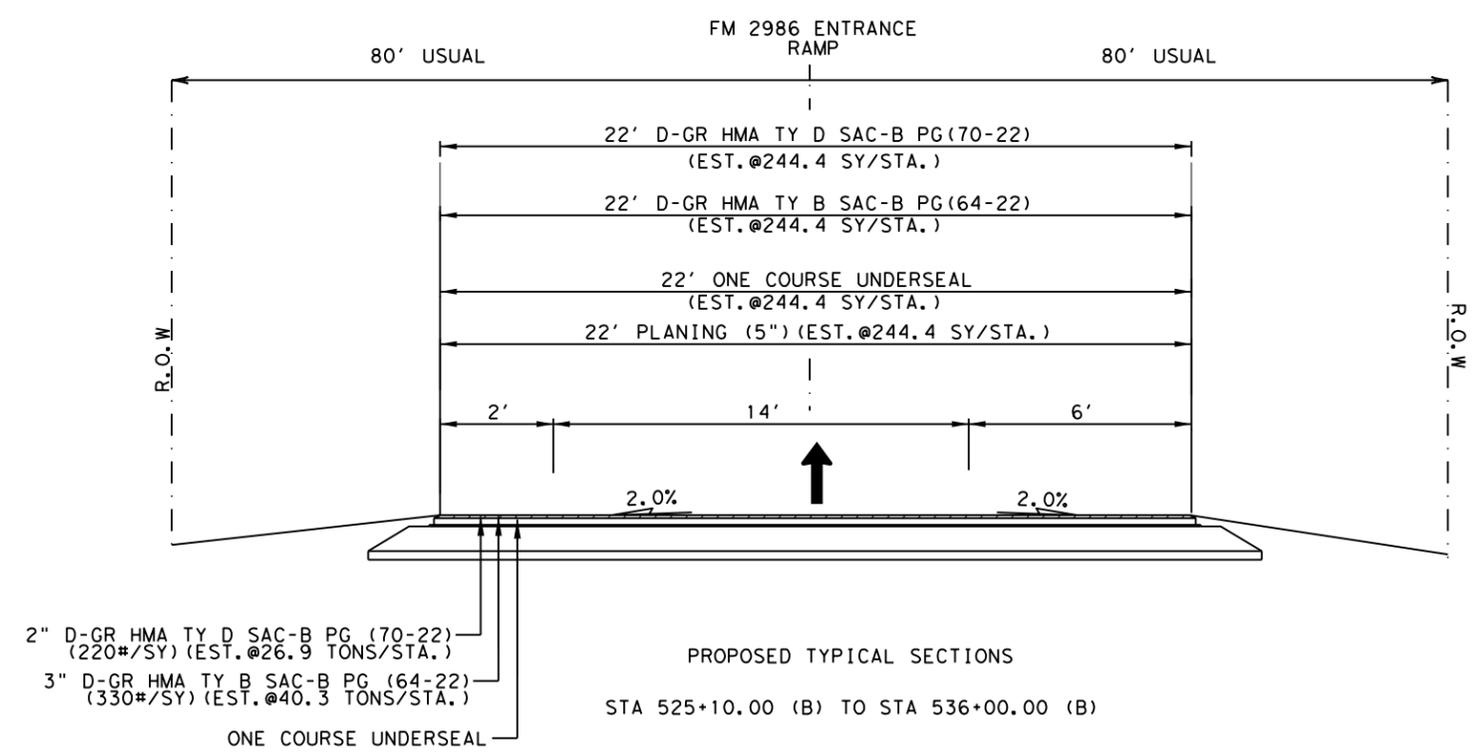
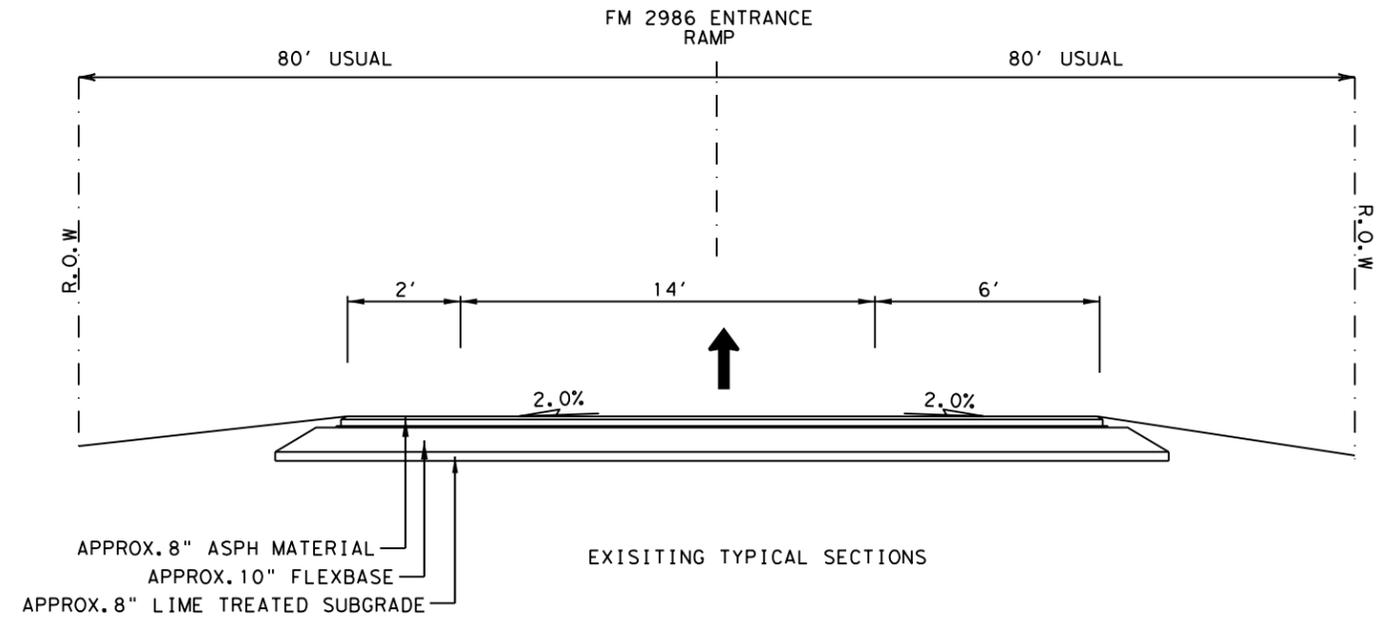
US 181

TYPICAL SECTIONS

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	5	

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Eric R. Martinez

11/03/2023

Texas Department of Transportation

US 181

TYPICAL SECTIONS

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	6	

County: San Patricio

Control: 0101-04-131

Highway: US 181

GENERAL NOTES:

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

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

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

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

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

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

Stencil the National Bridge Inventory (NBI) number on each bridge and bridge class culvert. Use 3" letters or numbers. Use stain and color as approved. Paint will not be permitted. Locate the NBI number on the outside beam immediately adjacent to the abutment on the downstream end, on the outside headwall upper right-hand corner, or as directed. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

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

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

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

Robert Isassi, P.E. Robert.Isassi@txdot.gov
Chandler Williams, P.E. Chandler.Williams@txdot.gov

County: San Patricio

Control: 0101-04-131

Highway: US 181

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

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

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

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

ITEM 2

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

ITEM 5

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

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

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

 GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			US 181
	STATE	DISTRICT	COUNTY	
	TEXAS	CRP	SAN PATRICO	
	CONTROL	SECTION	JOB	
	0101	04	131	
				SHEET NO.
				7

County: San Patricio

Control: 0101-04-131

Highway: US 181

The responsibility for the construction surveying on this contract will be in accordance with Item 5.9.3, "Method C".

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

ITEM 6

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

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

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

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

The Buy America Material Classification Sheet is located at the below link. <https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

ITEM 7

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

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

The total disturbed area for this project is 0 acres. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from

General Notes

Sheet C

County: San Patricio

Control: 0101-04-131

Highway: US 181

the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer.

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

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

No significant traffic generator events identified.

Submit charge summary and invoices for Law Enforcement Personnel using the Department forms.

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.

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 pre-determined by official policy of the officers governing authority.

ITEM 8

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

General Notes

Sheet D

 Texas Department of Transportation GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			US 181
	STATE	DISTRICT	COUNTY	SHEET NO.
	TEXAS	CRP	SAN PATRICO	
CONTROL	SECTION	JOB		
0101	04	131	7A	

County: San Patricio

Control: 0101-04-131

Highway: US 181

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

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

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

Work above traffic is not allowed.

Nighttime work is allowable.

Notify the Engineer at least 48 hours in advance of weekend or nighttime work.

ITEM 9

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

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

ITEM 134

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

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

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

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

General Notes

Sheet E

County: San Patricio

Control: 0101-04-131

Highway: US 181

ITEM 302

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

For precoated aggregate Type PB crushed gravel will not be used.

ITEM 310

Use MC-30 at a rate of 0.20 gallons per square yard or as directed.

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

ITEM 354

Reclaimable asphalt material (RAP) may be retained only if incorporated into the project. Incorporate the RAP into the pavement mix design, into the backfill for pavement edges, into temporary structures, or as approved. Any excess RAP will be stockpiled at a stockpile on US 181 and FM 631.

ITEM 500

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

ITEM 502

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

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

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

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

General Notes

Sheet F

 GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			US 181
	STATE	DISTRICT	COUNTY	
	TEXAS	CRP	SAN PATRICO	
	CONTROL	SECTION	JOB	
	0101	04	131	
			SHEET NO.	
			7B	

County: San Patricio

Control: 0101-04-131

Highway: US 181

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

Contractors attention is directed to a construction speed zone, signage is subsidiary to Item 502. (Use if there is a construction speed zone)

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

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

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

ITEM 506

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

ITEM 530

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

ITEM 533

Construct shoulder texturing at a distance of 6 inches from the edgeline in accordance to RS(1)-23.

ITEM 540

Complete each location during the working day. No exposed bridge rail or guard fence ends will be permitted at the end of the working day or unattended during the working day.

General Notes

Sheet G

County: San Patricio

Control: 0101-04-131

Highway: US 181

Mixing of wood post types and shapes will not be permitted at the same location.

Type II Galvanization coatings will be used.

ITEM 585

Use Surface Test Type B and Pay Adjustment Schedule 1 to evaluate ride quality of the travel lanes in accordance with Item 585, "Ride Quality for Pavement Surfaces."

ITEM 658

Furnish round delineators and object markers.

ITEM 662

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

ITEM 666

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

ITEM 712

Perform crack sealing utilizing lane closures and appropriate TCP standards.

TCP 3 Series Mobile operations are not allowed.

Sand shall be provided by the Contractor and shall be subsidiary to Item 712.

Protect raised pavement markers from damage. The work will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 3076

SAC requirements apply to aggregates used on all surfaces.

General Notes

Sheet H

 Texas Department of Transportation GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			US 181
	STATE	DISTRICT	COUNTY	
	TEXAS	CRP	SAN PATRICO	
	CONTROL	SECTION	JOB	
	0101	04	131	
				SHEET NO.
				7C

County: San Patricio

Control: 0101-04-131

Highway: US 181

Construct longitudinal joints with a joint maker providing a maximum one (1) inch vertical edge (1/2 inch desirable) with an adjacent 6:1 taper. Backfill edges within the same day.

The Engineer reserves the right to test all sources even if the source is listed in the Bituminous Source Rated Quality Catalog

Provide the testing lab samples to calibrate the ignition oven no later than five (5) working days prior to mix design verification.

Place HMA utilizing an automatic, dual, longitudinal-grade control system and automatic transverse-grade control system as specified under Item 320, unless otherwise approved by the Engineer.

Contractor shall temporarily cover all inlets during the milling and paving operations. Inlets shall be uncovered when milling and paving operations are complete. This shall be subsidiary to Item 3076 and not paid for directly.

ITEM 6001

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

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

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

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

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

Portable changeable message signs may be moved and message changed at any time as deemed necessary by the Engineer. This will be considered subsidiary to Item 6001.

ITEM 6185

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

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

General Notes

Sheet I

County: San Patricio

Control: 0101-04-131

Highway: US 181

SPECIFICATION DATA

UNIT WEIGHT ESTIMATES

ITEM 3076 – 2” D-GR HMA TY-D SAC-B PG70-22 -----220 LBS/SY
ITEM 3076 – 3” D-GR HMA TY-B SAC-B PG64-22-----330 LBS/SY

PRIME COAT

ASPHALT, TYPE -----MC-30
AVERAGE ASPHALT RATE (GAL/SY) -----0.20

TACK COAT

ASPHALT, TYPE -----SS-1H
AVERAGE ASPHALT RATE (GAL/SY) -----0.08

SURFACE TREATMENT DATA

ONE COURSE UNDERSEAL

ASPHALT TYPE -----ASPH (AC-5, AC-10, CRS-2, OR HFRS-2)
ASPHALT RATE (GAL/SY) -----0.35-0.43
AVERAGE ASPHALT RATE (GAL/SY) -----0.35
AGGREGATE RATE (CY/SY) -----1/110
AGGREGATE TYPE -----PB
AGGREGATE GRADE -----4 OR 4S SAC B

TWO COURSE SURFACE TREATMENT

FIRST COURSE

ASPHALT TYPE -----ASPH (AC-10, CRS-2, OR HFRS-2)
ASPHALT RATE (GAL/SY) -----0.35-0.43
AVERAGE ASPHALT RATE (GAL/SY) -----0.39
AGGREGATE RATE (CY/SY) -----1/85
AGGREGATE TYPE -----PB
AGGREGATE GRADE -----3 OR 3S SAC B

SECOND COURSE

ASPHALT TYPE -----ASPH (AC-15P, HFRS-2P, OR CRS-2P)
ASPHALT RATE (GAL/SY) -----0.28-0.36
AVERAGE ASPHALT RATE (GAL/SY) -----0.320
AGGREGATE RATE (CY/SY) -----1/110
AGGREGATE TYPE -----PB
AGGREGATE GRADE -----4 OR 4S SAC B

General Notes

Sheet J

 Texas Department of Transportation GENERAL NOTES	FED. RD. DIV. NO.			HIGHWAY NO.
	6			US 181
	STATE	DISTRICT	COUNTY	
	TEXAS	CRP	SAN PATRICO	
	CONTROL	SECTION	JOB	SHEET NO.
	0101	04	131	7D



CONTROLLING PROJECT ID 0101-04-131

DISTRICT Corpus Christi
HIGHWAY US 181

Estimate & Quantity Sheet

COUNTY San Patricio

ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	104-6009	REMOVING CONC (RIPRAP)	SY	1,117.000	
	104-6037	REMOVE CONC (RAIL)	LF	320.000	
	105-6046	REMOVING STAB BASE & ASPH PAV (0"-10")	SY	8,408.000	
	310-6009	PRIME COAT (MC-30)	GAL	1,440.000	
	316-6001	ASPH (MULTI OPTION)	GAL	99,696.000	
	316-6427	AGGR(TY-PB GR-4S OR TY-PB GR-4)(SAC-B)	CY	2,651.000	
	354-6022	PLANE ASPH CONC PAV(0" TO 3")	SY	272,928.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	286,507.000	
	420-6066	CL C CONC (RAIL FOUNDATION)	CY	139.000	
	420-6136	CL C CONC (RAC-R)	CY	80.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	141.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	640.000	
	450-6023	RAIL (TY SSTR)	LF	981.000	
	451-6024	RETROFIT RAIL (TY SSTR)	LF	355.000	
	451-6062	RETROFIT RAIL (TY T2P)	LF	320.000	
	500-6001	MOBILIZATION	LS	1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	4,395.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	4,395.000	
	512-6001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	965.000	
	512-6025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	13,940.000	
	512-6049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF	965.000	
	533-6001	RUMBLE STRIPS (SHOULDER)	LF	252,868.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	1,675.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	20.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	3,655.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	12.000	
	545-6003	CRASH CUSH ATTEN (MOVE & RESET)	EA	16.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	1.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	1.000	
	550-6003	CHAIN LINK FENCE (REMOVE)	LF	479.000	
	550-6008	CHAIN LINK FENCE (INSTALL) (8')	LF	479.000	
	658-6013	INSTL DEL ASSM (D-SW)SZ (BRF)CTB	EA	38.000	
	658-6026	INSTL DEL ASSM (D-SY)SZ (BRF)CTB	EA	39.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	86.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	31.000	
	658-6064	INSTL DEL ASSM (D-SY)SZ 1(BRF)GF2	EA	31.000	
	658-6095	INSTL DEL ASSM (D-DY)SZ 1(YFLX)GND	EA	30.000	
	662-6005	WK ZN PAV MRK NON-REMOV (W)6"(BRK)	LF	32,040.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	128,156.000	
	662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	5,227.000	

DISTRICT	COUNTY	CCSJ	SHEET
Corpus Christi	San Patricio	0101-04-131	8



CONTROLLING PROJECT ID 0101-04-131

DISTRICT Corpus Christi
HIGHWAY US 181

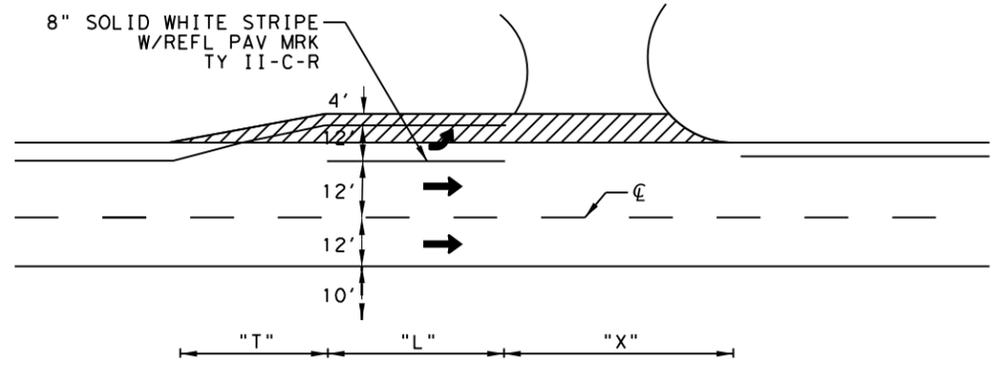
Estimate & Quantity Sheet

COUNTY San Patricio

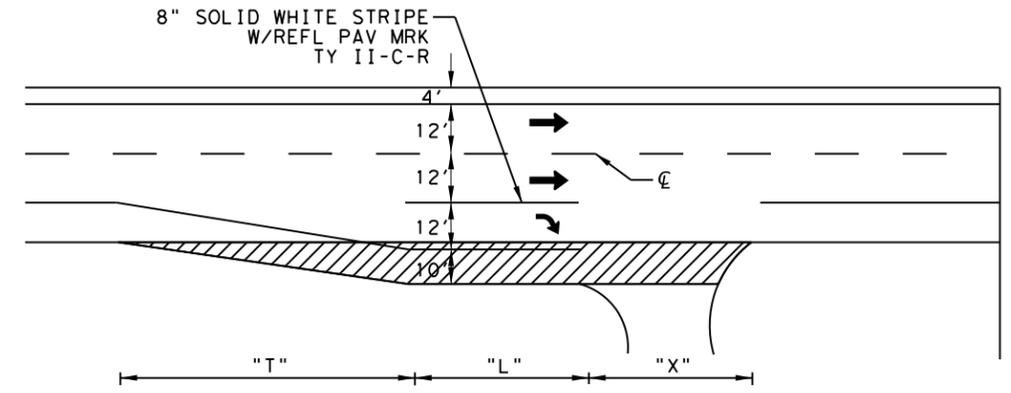
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	128,156.000	
	662-6046	WK ZN PAV MRK REMOV (REFL) TY I-A	EA	7,297.000	
	662-6048	WK ZN PAV MRK REMOV (REFL) TY I-C	EA	7,820.000	
	662-6052	WK ZN PAV MRK REMOV (REFL) TY II-C-R	EA	7,767.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	14,944.000	
	666-6035	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	5,547.000	
	666-6305	RE PM W/RET REQ TY I (W)6"(BRK)(090MIL)	LF	16,036.000	
	666-6308	RE PM W/RET REQ TY I (W)6"(SLD)(090MIL)	LF	63,217.000	
	666-6320	RE PM W/RET REQ TY I (Y)6"(SLD)(090MIL)	LF	61,054.000	
	668-6074	PREFAB PAV MRK TY C (W) (12") (SLD)	LF	156.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	34.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	28.000	
	668-6091	PREFAB PAV MRK TY C (W) (18")(YLD TRI)	EA	210.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	1,103.000	
	672-6016	TRAFFIC BUTTON TY W	EA	3,524.000	
	672-6017	TRAFFIC BUTTON TY Y	EA	2,647.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	22,220.000	
	3076-6002	D-GR HMA TY-B SAC-B PG64-22	TON	46,868.000	
	3076-6042	D-GR HMA TY-D SAC-B PG70-22	TON	31,572.000	
	3076-6066	TACK COAT	GAL	21,339.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	300.000	
	6185-6002	TMA (STATIONARY)	DAY	300.000	
18		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000	

CK: DW: CK: DN:

TYPICAL LEFT TURN LANE DETAIL



TYPICAL RIGHT TURN LANE DETAIL



LEGEND

➔ DIRECTION OF TRAFFIC

▨ TURNING LANE AREA

CSJ: 0101-04-131 US 181 TYPICAL LEFT TURN LANE DETAIL

STATION	"T"	"L"	"X"	SURFACE AREA	316	316	354	354	3076	3076
					6001	6427	6022	6045	6002	6042
	FT	FT	FT	SY	GAL	CY	SY	SY	TON	TON
235+32 (C)	216	174	150	658	231	6	658	658	109	73
296+95 (B)	146	278	114	529	186	5	529	529	88	59
363+65 (B)	178	302	165	675	237	7	675	675	112	75
393+79 (C)	202	222	141	586	206	6	586	586	97	65
425+00 (B)	148	912	140	1602	561	15	1602	1602	265	177
507+20 (C)	179	200	154	475	167	5	475	475	79	53
510+51 (B)	159	179	134	519	182	5	519	519	86	58
TOTAL:	1228	2267	998	5044	1770	49	5044	5044	836	560

*NOTE-SEE SHEET 4 TYPICAL SECTION

CSJ: 0101-04-131 US 181 TYPICAL RIGHT TURN LANE DETAIL

STATION	"T"	"L"	"X"	SURFACE AREA	316	316	354	354	3076	3076
					6001	6427	6022	6045	6002	6042
	FT	FT	FT	SY	GAL	CY	SY	SY	TON	TON
238+39 (B)	137	293	157	569	200	6	569	569	94	63
297+33 (B)	138	280	128	592	208	6	592	592	98	66
360+40 (C)	168	228	102	184	65	2	184	184	31	21
397+16 (B)	225	224	105	482	169	5	482	482	80	54
418+71 (C)	200	513	141	478	168	5	478	478	79	53
476+22 (C)	204	413	178	497	174	5	497	497	83	55
510+41 (B)	216	179	129	583	205	6	583	583	97	65
TOTAL:	1288	2130	940	3385	1189	35	3385	3385	562	377

*NOTE-SEE SHEET 4 TYPICAL SECTION



E. Martinez, P.E.

11/03/2023



US 181
TURN LANE QUANTITY
SUMMARY

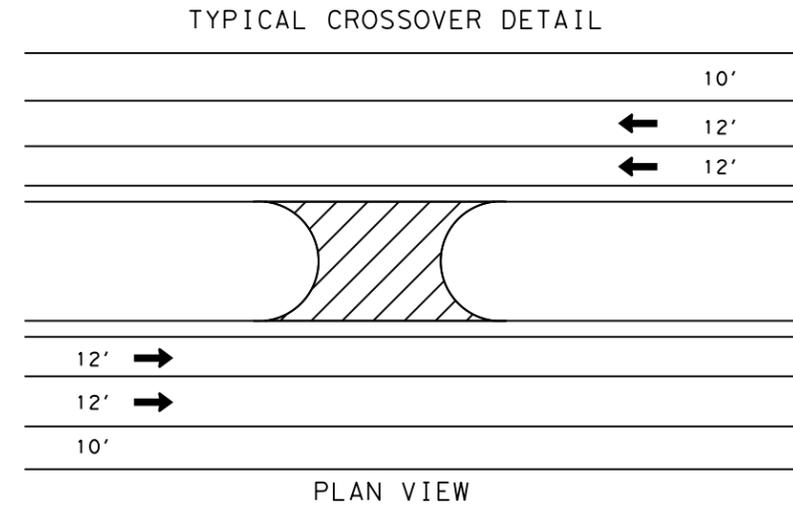
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	13	

DATE: 11/01/2023 10:25 AM
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CSJ: 0101-04-131 US 181 CROSSOVERS AND INTERSECTIONS					
STATION	SURFACE AREA	316	316	354	3076
		6001	6427	6045	6042
	ASPH (MULTI OPTION)	AGGR (TY-PB GR-4S OR TY-PB GR-4)	PLANE ASPH CONC PAV (2")	D-GR HMA TY-D SAC-B PG70-22	
	SY	GAL	CY	SY	TON
237+70 (A)	371	130	4	371	41
254+00 (A)	312	110	3	312	35
270+94 (A)	313	110	3	313	35
296+60 (A)	223	79	3	223	25
311+86 (A)	296	104	3	296	33
338+39 (A)	366	129	4	366	41
350+11 (A)	281	99	3	281	31
363+20 (A)	279	98	3	279	31
384+20 (A)	295	104	3	295	33
396+73 (A)	253	89	3	253	28
403+05 (A)	292	103	3	292	33
424+35 (A)	421	148	4	421	47
436+66 (A)	378	133	4	378	42
460+04 (A)	289	102	3	289	32
509+85 (A)	222	78	3	222	25
TOTAL:	4591	1616	49	4591	512

*NOTE-SEE SHEET 5 TYPICAL SECTION



LEGEND

← DIRECTION OF TRAFFIC

→ DIRECTION OF TRAFFIC

CROSSOVER AREA



E. Martinez

11/03/2023

Texas Department of Transportation

US 181

CROSSOVER QUANTITY SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	14	

DATE: 10/17/2023 11:53 AM
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CK: DW: CK: DN:

CSJ: 0101-04-131 US 181 SURFACE DETAIL SUMMARY																		
SHEET	STATION		533	658	658	658	658	658	658	666	666	666	666	668	668	668	668	672
	FROM	TO	6001	6060	6061	6064	6095	6013	6026	6035	6305	6308	6320	6074	6077	6085	6091	6010
			RUMBLE STRIPS (SHOULDER)	REMOVE DELIN & OBJECT MARKER ASSMS	INSTL DEL ASSM (D-SW)SZ 1 (BRF) GF2	INSTL DEL ASSM (D-SY)SZ 1 (BRF) GF2	INSTL DEL ASSM (D-DY)SZ 1 (YFLX) GND	INS DEL ASSM(D-SW)SZ 1 (BRF) CTB	INS DEL ASSM(D-SY)SZ 1 (BRF) CTB	REFL PAV MRK TY 1 (W)8" (SLD) (090MIL)	RE PM W/RET REQ TY I (W)6" (BRK) (090MIL) LF	RE PM W/RET REQ TY I (W)6" (SLD) (090MIL) LF	RE PM W/RET REQ TY I (Y)6" (SLD) (090MIL) LF	PREFAB PAV MRK TY C (W) (12") (SLD)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W) (18") (YLD TRI)	REFL PAV MRKR TY II-C-R
NB & SB MAINLANES			LF	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA
1	231+28 (A)	239+00 (A)	5384	2	0	0	2	0	0	245	386	1346	1082	0	3	2	14	41
	239+00 (A)	251+00 (A)	9600	0	0	0	0	0	0	210	600	2400	2400	0	1	1	0	41
2	251+00 (A)	263+00 (A)	9600	2	0	0	2	0	0	0	600	2400	2180	0	0	0	14	30
	263+00 (A)	275+00 (A)	9600	2	0	0	2	0	0	0	600	2400	2110	0	0	0	14	30
3	275+00 (A)	287+00 (A)	9600	0	0	0	0	0	0	0	600	2400	2400	0	0	0	0	30
	287+00 (A)	299+00 (A)	8824	23	8	8	2	10	10	492	600	2206	2160	0	2	2	14	54
4	299+00 (A)	311+00 (A)	9600	0	0	0	0	0	0	100	600	2400	2400	0	2	2	0	35
	311+00 (A)	323+00 (A)	9600	2	0	0	2	0	0	0	600	2400	2192	0	0	0	14	30
5	323+00 (A)	335+00 (A)	9600	0	0	0	0	0	0	0	600	2400	2400	0	0	0	0	30
	335+00 (A)	347+00 (A)	9240	15	6	7	2	10	10	0	600	2310	2180	0	0	0	14	29
6	347+00 (A)	359+00 (A)	9600	2	0	0	2	0	0	0	600	2400	2190	0	0	0	14	30
	359+00 (A)	371+00 (A)	9180	2	0	0	2	0	0	530	600	2295	2150	0	4	4	14	57
7	371+00 (A)	383+00 (A)	9600	0	0	0	0	0	0	0	600	2400	2400	0	0	0	0	30
	383+00 (A)	395+00 (A)	9600	2	0	0	2	0	0	120	600	2400	2190	0	1	1	14	36
8	395+00 (A)	407+00 (A)	9200	4	0	0	4	0	0	285	600	2300	1940	0	3	3	28	44
	407+00 (A)	419+00 (A)	9600	0	0	0	0	0	0	80	600	2400	2400	0	0	1	0	34
9	419+00 (A)	431+00 (A)	9180	2	0	0	2	0	0	1146	600	2295	2130	0	3	2	14	88
	431+00 (A)	443+00 (A)	9180	8	10	8	2	8	9	250	600	2295	2190	0	1	1	14	43
10	443+00 (A)	455+00 (A)	9600	0	0	0	0	0	0	0	600	2400	2400	0	0	0	0	30
	455+00 (A)	467+00 (A)	9600	2	0	0	2	0	0	0	600	2400	2200	0	0	0	14	30
11	467+00 (A)	479+00 (A)	9600	16	7	8	0	10	10	325	600	2400	2400	0	1	1	0	47
	479+00 (A)	491+00 (A)	9200	0	0	0	0	0	0	0	600	2300	2400	0	1	1	0	30
12	491+00 (A)	503+00 (A)	9600	0	0	0	0	0	0	0	600	2400	2400	0	0	0	0	30
	503+00 (A)	515+00 (A)	9000	2	0	0	2	0	0	560	600	2250	2115	0	6	3	14	58
13	515+00 (A)	527+00 (A)	11600	0	0	0	0	0	0	844	600	2900	2995	156	0	0	0	71
	527+00 (A)	539+00 (A)	9800	0	0	0	0	0	0	0	600	2450	2450	0	6	4	0	30
14	539+00 (A)	551+00 (A)	8280	0	0	0	0	0	0	330	600	2070	2400	0	0	0	0	55
	551+00 (A)	552+00 (A)	800	0	0	0	0	0	0	30	50	200	200	0	0	0	0	10
NB RAMP																		
13	525+10 (A)	527+00 (A)	1600	0	0	0	0	0	0	0	0	400	400	0	0	0	0	0
	527+00 (A)	536+00 (A)	3600	0	4	0	0	0	0	0	0	900	900	0	0	0	0	0
TOTAL:			252868	86	31	31	30	38	39	5547	16036	63217	61054	156	34	28	210	1103

US 181
SURFACE DETAIL SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	15

DATE: 10/21/2023 1:25:56 PM
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DN:
 CK:
 DW:
 CK:

CSJ: 0101-04-131 US 181 SWP3 SUMMARY					
STATION	STRUCTURE	506	506	INSTALL DATE	REMOVE DATE
		6041	6043		
		BIODEG EROSN CONT	BIODEG EROSN CONT LOGS		
		LF	LF		
237+70.00 (A)	EXIST RCP	100	100		
249+00.00 (A)	EXIST CROSS -SET	150	150		
262+00.00 (A)	EXIST CROSS-SET	150	150		
271+00.00 (A)	EXIST	100	100		
292+50.00 (A)	EXIST BRIDGE NB	150	150		
292+50.00 (A)	EXIST BRIDGE SB	150	150		
304+00.00 (A)	EXIST CROSS-SET	150	150		
312+00.00 (A)	EXIST	100	100		
325+00.00 (A)	EXIST CROSS-SET	150	150		
340+00.00 (A)	EXIST CULV NB	190	190		
340+00.00 (A)	EXIST CULV SB	110	110		
356+00.00 (A)	EXIST CROSS-SET	150	150		
362+00.00 (A)	EXIST	100	100		
363+00.00 (A)	EXIST	100	100		
373+00.00 (A)	EXIST CROSS-SET	150	150		
384+30.00 (A)	EXIST	100	100		
389+00.00 (A)	EXIST CROSS-SET	150	150		
403+00.00 (A)	EXIST	100	100		
417+00.00 (A)	EXIST CROSS-SET	150	150		
418+10.00 (A)	EXIST	100	100		
424+35.00 (A)	EXIST	100	100		
428+80.00 (A)	EXIST	100	100		
439+00.00 (A)	EXIST BRIDGE NB	150	150		
439+00.00 (A)	EXIST BRIDGE SB	150	150		
446+50.00 (A)	EXIST CULV NB	215	215		
446+50.00 (A)	EXIST CULV SB	110	110		
446+50.00 (A)	EXIST	100	100		
473+00.00 (A)	EXIST CULV NB	120	120		
473+00.00 (A)	EXIST CULV SB	120	120		
480+70.00 (A)	EXIST	100	100		
483+50.00 (A)	EXIST CROSS-SET	150	150		
509+80.00 (A)	EXIST	100	100		
514+20.00 (A)	EXIST	100	100		
515+20.00 (A)	EXIST	100	100		
516+80.00 (A)	EXIST INLET	80	80		
TOTAL:		4395	4395	0	0

 Texas Department of Transportation			
US 181			
SWP3 SUMMARY			
SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY		SHEET NO.
CRP	SAN PATRICIO		16

DATE: 11/02/2023 03:21 PM 1M
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CK: DW: CK: DN:

CSJ: 0101-04-131 US 181																				
SEQUENCE OF CONSTRUCTION	LOCATION	STATION/SHOULDER	LENGTH	512	512	512	545	545	545	662	662	662	662	662	662	662	672	672	677	
				6001	6025	6049	6001	6003	6005	6005	6008	6012	6037	6046	6048	6052	6109	6016	6017	6002
				PORT CTB (FUR & INST) (SGL)	PORT CTB (MOVE) (SGL SLP) (TY 1)	PORT CTB (REMOVE) (SGL SLP) (TY 1)	CRASH CUSH ATTN (INSTL)	CRASH CUSH ATTN (MOVE & RESET)	CRASH CUSH ATTN (REMOVE)	PAV MRK NON-RE MOV (W) 6" (BRK)	PAV MRK NON-RE MOV (W) 6" (SLD)	PAV MRK NON-RE MOV (W) 8" (SLD)	PAV MRK NON-RE MOV (Y) 6" (SLD)	PAV MRK REMOVE (REFL) TY I-A	PAV MRK REMOVE (REFL) TY I-C	PAV MRK REMOVE (REFL) TY II-C-R	PAV MRK SHT TERM (TAB) TY W	TRAFFIC BUTTON TY W	TRAFFIC BUTTON TY Y	ELIM EXT PAV MRK & MRKS (6")
				LF	LF	LF	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	LF
NORTHBOUND RAIL RETROFIT																				
LOCATION 1	NB RAMP	OUTSIDE SHOULDER		565			1													
LOCATION 2	MCKAMEY SWALE	OUTSIDE SHOULDER		300	865			1												
LOCATION 3	MCKAMEY SWALE	INSIDE SHOULDER	2190		865			1						110	110	165		438	329	2840
LOCATION 4	MUSTANG MOTT (NB)	OUTSIDE SHOULDER			865			1												
LOCATION 5	MUSTANG MOTT (NB)	INSIDE SHOULDER	2190		865			1						110	110	165		438	329	2840
LOCATION 6	PALM MEADOWS (NB)	OUTSIDE SHOULDER			865			1												
LOCATION 7	PALM MEADOWS (NB)	INSIDE SHOULDER	2190		865			1						110	110	165		438	329	2840
LOCATION 8	TERRE BONNIE (NB)	INSIDE SHOULDER	2290	100	865			1						115	115	172		458	344	3000
LOCATION 9	TERRE BONNIE (NB)	OUTSIDE SHOULDER			965	100		1												
NORTHBOUND RAIL RETROFIT TOTAL:				965	7020	100	1	8	0	0	0	0	0	445	445	667	0	1772	1331	11520
NORTHBOUND MILL AND FILL																				
LOCATION 10	MUSTANG MOTT (NB)	437+33 (B) TO 441+93 (B)	460							230	920		920	23	23	23	69			2070
LOCATION 11	TERRE BONNIE (NB)	290+80 (B) TO 295+40 (B)	460							230	920		920	23	23	23	69			2070
LOCATION 12	SOUTH SECTION	441+93 (B) TO 552+39 (B)	11046							5523	22092	360	22092	553	589	553	1657			50067
LOCATION 13	MIDDLE SECTION	295+40 (B) TO 437+33 (B)	14193							7097	28386	2436	28386	710	954	710	2130			66305
LOCATION 14	NORTH SECTION	231+28 (A) TO 290+80 (B)	5952							2976	11904	280	11904	298	326	326	893			27064
LOCATION 15	ALL NORTHBOUND	231+28 (A) TO 552+39 (B)	32111											1606	1606	1606	2716			
NORTHBOUND MILL AND FILL TOTAL:				0	0	0	0	0	0	16056	64222	3076	64222	3213	3521	3241	7534	0	0	147576
SOUTHBOUND RAIL RETROFIT																				
LOCATION 16	TERRE BONNIE (SB)	OUTSIDE SHOULDER			865			1												
LOCATION 17	TERRE BONNIE (SB)	INSIDE SHOULDER	2190		865			1						110	110	165		438	329	2620
LOCATION 18	PALM MEADOWS (SB)	OUTSIDE SHOULDER			865			1												
LOCATION 19	PALM MEADOWS (SB)	INSIDE SHOULDER	2190		865			1						110	110	165		438	329	2620
LOCATION 20	MUSTANG MOTT (SB)	OUTSIDE SHOULDER			865			1												
LOCATION 21	MUSTANG MOTT (SB)	INSIDE SHOULDER	2190		865			1						110	110	165		438	329	2620
LOCATION 22	MCKAMEY SWALE	OUTSIDE SHOULDER			865			1												
LOCATION 23	MCKAMEY SWALE	INSIDE SHOULDER	2190		865	865		1	1					110	110	165		438	329	2840
SOUTHBOUND RAIL RETROFIT TOTAL:				0	6920	865	0	8	1	0	0	0	0	440	440	660	0	1752	1316	10700
SOUTHBOUND MILL AND FILL																				
LOCATION 24	TERRE BONNIE (SB)	289+64 (C) TO 295+04 (C)	540							270	1080		1080	27	27	27	81			2430
LOCATION 25	MUSTANG MOTT (SB)	436+00 (C) TO 441+30 (C)	530							265	1060		1060	27	27	27	80			2385
LOCATION 26	NORTH SECTION	231+28 (A) TO 289+64 (C)	5836							2918	11672	180	11672	292	310	292	876			26442
LOCATION 27	MIDDLE SECTION	295+04 (C) TO 436+00 (C)	14096							7048	28192	960	28192	705	801	705	2115			64392
LOCATION 28	SOUTH SECTION	441+30 (C) TO 550+95 (C)	10965							5483	21930	1011	21930	549	650	549	1645			50354
LOCATION 29	ALL SOUTHBOUND	231+28 (A) TO 550+95 (C)	31967											1599	1599	1599	2613			
SOUTHBOUND MILL AND FILL TOTAL:				0	0	0	0	0	0	15984	63934	2151	63934	3199	3414	3199	7410	0	0	146003
PROJECT TOTAL:				965	13940	965	1	16	1	32040	128156	5227	128156	7297	7820	7767	14944	3524	2647	315799



US 181

TCP SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	17

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DN:
 CK:
 DW:
 CK:

LOCATION NO.	LOCATION	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
				PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTAL	REMOVE	MOVE/RESET		L N	L W	R N	R W	S N	S W
												MOVE/RESET	FROM LOC. #						
1	STA. 533+00 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"	1								*	
2	STA. 472+50 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	1					*	
3	STA. 472+50 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	2					*	
4	STA. 438+56 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	3					*	
5	STA. 438+56 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	4					*	
6	STA. 340+54 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	5					*	
7	STA. 340+54 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	6					*	
8	STA. 292+26 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	7					*	
9	STA. 292+26 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	8					*	
16	STA. 292+20 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	15					*	
17	STA. 292+20 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	16					*	
18	STA. 340+54 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	17					*	
19	STA. 340+54 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	18					*	
20	STA. 438+56 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	19					*	
21	STA. 438+56 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	20					*	
22	STA. 472+50 (LT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"			1	21					*	
23	STA. 472+50 (RT)	TL3	UNI	ACP	6"	PCTB (SSCB)	24"	42"	32"		1	1	22					*	


Texas Department of Transportation
US 181
CRASH CUSHION SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY		SHEET NO.
CRP	SAN PATRICIO		18

DATE: 11/17/2023 08:25:18 AM
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GENERAL NOTES FOR THE CONSTRUCTION SEQUENCE

1. ALL BEGINNING AND ENDING BARRICADES AND SIGNS ARE TO REMAIN IN PLACE FOR THE DURATION OF THE PROJECT.
2. ALL SIGNS, BARRICADES AND PAVEMENT MARKINGS SHALL CONFORM WITH THE BC STANDARD SHEETS, TCP SHEETS, AND THE LATEST EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
3. CW20-1D, G20-2A & EITHER G20-1bL or G20-1bR SIGNS WILL BE REQUIRED AT ALL PUBLIC ROADS, AND INTERSECTIONS WITHIN LIMITS. IG20-2A1 SIGNS MAY BE MOUNTED ON BACK OF CW20-1D, SEE BC(2)-21.
4. THE CONTRACTOR SHALL PROVIDE FOR SAFE AND CONVENIENT INGRESS AND EGRESS TO ABUTTING PROPERTY HIGHWAY, PUBLIC ROAD, AND STREET CROSSING FOR ALL VEHICLES. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL CROSSINGS IN A SAFE AND PASSABLE CONDITION.
5. REFER TO THE BARRICADE AND CONSTRUCTION STANDARD SHEETS FOR REQUIRED SPACING OF SIGNS AND BARRICADES.
6. THE CONTRACTOR MAY BE REQUIRED TO FURNISH ADDITIONAL BARRICADES, SIGNS, AND WARNING LIGHTS TO MAINTAIN TRAFFIC AND PROMOTE MOTORISTS SAFETY. ANY SUCH ADDITIONAL SIGNS AND BARRICADES SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
7. ALL SIGNS SHALL BE NEW OR FRESHLY PAINTED AND KEPT CLEAN FOR THE DURATION OF THE PROJECT.
8. ALL TRAFFIC BARRELS & EDGE LINE CHANNELIZERS SHALL BE USED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S RECOMMENDATIONS AND SHALL HAVE A 7" PRISMATIC REFLECTOR UNIT, AS APPROVED BY THE ENGINEER. ALL MATERIALS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
9. SIGNS, PAVEMENT MARKINGS, CHANNELIZING DEVICES, AND OTHER TRAFFIC CONTROL DEVICES THAT ARE INCONSISTENT WITH INTENDED TRAVEL PATHS THROUGH THE PROJECT AREA SHALL BE REMOVED IMMEDIATELY.
10. ALL TRAFFIC CONTROL DEVICES SHALL BE REMOVED WHEN NO LONGER NEEDED. WHEN WORK IS SUSPENDED FOR SHORT TIME PERIOD, ADVANCED WARNING SIGNS THAT ARE NO LONGER APPROPRIATE SHALL BE REMOVED FROM THE PROJECT AREA.
11. THE CONTRACTOR WILL BE RESPONSIBLE FOR MARKING THE LOCATION OF ALL TRAFFIC CONTROL STRIPING AND PERMANENT STRIPING AS DIRECTED BY THE ENGINEER.
12. SHORT TERM FLEXIBLE REFLECTIVE ROADWAY TABS SHALL BE USED TO DELINEATE THE CENTERLINE AND TURNING LANES FOR A MAXIMUM OF 14 DAYS. PERMANENT STRIPING SHALL THEN BE PLACED. PERMANENT STRIPING SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE STANDARDS. THE CONTRACTOR SHOULD BE AWARE, DEPENDING ON THE SEQUENCE OF CONSTRUCTION, THE STRIPING CREW MAY HAVE SEVERAL MOVE-INS. ALL SHORT TERM FLEXIBLE REFLECTIVE ROADWAY TABS SHALL BE REPLACED AS NEEDED WITHIN THAT 14 DAY PERIOD AT THE CONTRACTOR'S EXPENSE.
13. THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN AND/OR AN ALTERNATE SEQUENCE OF CONSTRUCTION, IN ADVANCE AND IN WRITING, SUBJECT TO THE APPROVAL OF THE ENGINEER. REFER TO ITEM 502.2 - CONSTRUCTION.

UNEVEN LANES

1. ANY VERTICAL OR NEAR VERTICAL LONGITUDINAL FACE EXCEEDING 2 INCHES IN HEIGHT IN THE PAVEMENT SURFACE- OPEN TO TRAFFIC AT THE END OF THE WORKDAY SHALL BE SLOPED A MINIMUM OF 3:1. TRANSVERSE FACES THAT ARE PRESENT AT THE END OF THE WORK DAY SHALL BE TAPERED IN A MANNER ACCEPTABLE TO THE ENGINEER.
2. SIGNING FOR UNEVEN LANES (CW8-11) SHALL BE INSTALLED IN ADVANCE TO THE CONDITION AND REPEATED EVERY 1 MILE. SIGNS INSTALLED ALONG THE UNEVEN LANE CONDITION SHOULD BE SUPPLEMENTED WITH THE "NEXT XX MILES" MILES SIGN (CW21-16) OR ADVISORY SPEED SIGN (SCW13-1). SEE WZ(UL)-03 FOR ADDITIONAL DETAILS.
3. UNEVEN LANE SIGNS (CWB-11) SHALL BE ERECTED ON BOTH ENDS ON THE AREA WHERE THERE IS A DIFFERENCE IN ELEVATION BETWEEN ADJACENT LANES GREATER THAN ONE INCH.

PAVEMENT DROP-OFF

1. MAXIMUM ELEVATION DROP-OFF ON PAVEMENT EDGE SHALL NOT EXCEED 1 INCH WHEN TRAFFIC IS ALLOWED ADJACENT TO THE DROP-OFF. THE SLOPE MUST BE COMPACTED MATERIAL CAPABLE OF SUPPORTING VEHICLES. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
2. SIGNING FOR PAVEMENT DROP-OFF (CW8-9a) SHOULD BE INSTALLED IN ADVANCE OF THE CONDITION AND REPEATED EVERY 1 MILE SIGNS INSTALLED ALONG THE PAVEMENT EDGE SHOULD BE SUPPLEMENTED WITH THE "NEXT XX MILES" SIGN (CW21-16) OR ADVISORY SPEED SIGN (SCW13-1).

GENERAL SUGGESTED SEQUENCE OF CONSTRUCTION

1. PLACE ADVANCE WARNING SIGNS BEFORE ANY WORK BEGINS IN ACCORDANCE WITH BC (2)-21, AT PROJECT LIMITS AND AT INTERSECTIONS. PLACE ALL REQUIRED EROSION CONTROL DEVICES AS SHOWN ON SW3P SUMMARY SHEET.

1. NB RETROFIT

1. INSTALL PCTB WITH CRASH CUSHIONS ON OUTSIDE SHOULDER FOR LOCATION #1. TRAFFIC SHOULD REMAIN ON SAME LANE CONFIGURATION.
2. COMPLETE RETROFIT RAIL AND MGBF WORK ON OUTSIDE SHOULDER.
3. SHIFT PCTB WITH CRASH CUSHIONS TO INSIDE SHOULDER FOR LOCATION #1. REMOVE AND REPLACE CONFLICTING PAVEMENT MARKINGS.
4. PLACE WORK ZONE TRAFFIC BUTTONS FOR WORK ON INSIDE SHOULDER. LANE CONFIGURATION SHALL SHIFT AS SHOWN.---
5. COMPLETE RETROFIT RAIL AND MGBF WORK ON OUTSIDE SHOULDER.
6. MOVE AND RESET TO SECOND LOCATION.
7. REPEAT FOR ALL LOCATIONS UNTIL ALL RETROFIT WORK IS COMPLETED.

2. NB MILL AND FILL

1. USING DAILY LANE CLOSURES, MILL TWO INCHES OF EXIST HMA TOP LAYER PAVEMENT SURFACE AS SHOWN ON DETAIL FOR SPAN BRIDGES AND THEIR APPROACH AND DEPARTURE SECTIONS (REFER TO PLANING DETAIL SHEET FOR SPAN BRIDGE LOCATIONS). HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
2. USING DAILY LANE CLOSURES, MILL LAYER OF EXISTING PAVEMENT ON SPAN BRIDGES AND THEIR APPROACH AND DEPARTURE SECTIONS. PRIME COAT EXPOSED FLEX BASE AND PLACE 3" HMA-TY B. (REFER TO PLANING DETAIL SHEET FOR BRIDGE LOCATIONS.) HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
3. CONTRACTOR TO SELECT WORK LIMITS TO ALLOW FOR THE COMPLETION OF STEPS 1 & 2. THE ROAD WILL OPEN TO TRAFFIC AT THE END OF EACH DAY. PLACE WORK ZONE TABS THEN NON- REMOVABLE WORKZONE PAVEMENT MARKINGS.
4. USING DAILY LANE CLOSURES, MILL TWO INCHES OF TOP PAVEMENT SURFACE FOR THE REMAINING SECTIONS OF ROADWAY AND RAMP USING WORK AREAS NO MORE THAN ONE MILE IN LENGTH (UNLESS APPROVED BY THE ENGINEER). THIS WORK WILL INCLUDE BRIDGE CLASS CULVERTS AND SHALL NOT INCLUDE BRIDGE, BRIDGE APPROACH/DEPARTURE SECTIONS WORKED ON STEPS 1 AND 2. HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
5. USING DAILY LANE CLOSURES, MILL 3 INCHES OF EXISTING PAVEMENT FOR ALL SECTIONS WORKED ON PREVIOUS STEP EXCEPT BRIDGE CLASS CULVERTS AND FILL WITH HMA-TY B AS SHOWN ON TYPICAL SECTIONS AND PLACE NON REMOVEABLE WORK ZONE PAVEMENT MARKINGS. HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
6. USING DAILY LANE CLOSURES, PLACE 2" OF HMA-TY D FOR FULL LENGTH OF NORTHBOUND LANES. FOR BRIDGE CLASS CULVERTS FIRST PLACE TACK COAT AND THEN PLACE 2" OF HMA TY-D. INSTALL WORK ZONE TABS BEFORE INSTALLING PERMANENT PAVEMENT MARKINGS.

3. SB RETROFIT

1. INSTALL PCTB WITH CRASH CUSHIONS ON OUTSIDE SHOULDER FOR LOCATION #1. TRAFFIC SHOULD REMAIN ON SAME LANE CONFIGURATION.
2. COMPLETE RETROFIT RAIL AND MGBF WORK ON OUTSIDE SHOULDER.
3. SHIFT PCTB WITH CRASH CUSHIONS TO INSIDE SHOULDER FOR LOCATION #1. REMOVE AND REPLACE CONFLICTING PAVEMENT MARKINGS.
4. PLACE WORK ZONE TRAFFIC BUTTONS FOR WORK ON INSIDE SHOULDER. LANE CONFIGURATION SHALL SHIFT AS SHOWN.
5. COMPLETE RETROFIT RAIL AND MGBF WORK ON OUTSIDE SHOULDER.
6. MOVE AND RESET TO SECOND LOCATION.
7. REPEAT FOR ALL LOCATIONS UNTIL ALL RETROFIT WORK IS COMPLETED.

4. SB MILL AND FILL

1. USING DAILY LANE CLOSURES, MILL TWO INCHES OF EXIST HMA TOP LAYER PAVEMENT SURFACE AS SHOWN ON DETAIL FOR SPAN BRIDGES AND THEIR APPROACH AND DEPARTURE SECTIONS (REFER TO PLANING DETAIL SHEET FOR SPAN BRIDGE LOCATIONS). HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
2. USING DAILY LANE CLOSURES, MILL LAYER OF EXISTING PAVEMENT ON SPAN BRIDGES AND THEIR APPROACH AND DEPARTURE SECTIONS. PRIME COAT EXPOSED FLEX BASE AND PLACE 3" HMA-TY B. (REFER TO PLANING DETAIL SHEET FOR BRIDGE LOCATIONS.) HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
3. CONTRACTOR TO SELECT WORK LIMITS TO ALLOW FOR THE COMPLETION OF STEPS 1 & 2. THE ROAD WILL OPEN TO TRAFFIC AT THE END OF EACH DAY. PLACE WORK ZONE TABS THEN NON- REMOVABLE WORKZONE PAVEMENT MARKINGS.
4. USING DAILY LANE CLOSURES, MILL TWO INCHES OF TOP PAVEMENT SURFACE FOR THE REMAINING SECTIONS OF ROADWAY AND RAMP USING WORK AREAS NO MORE THAN ONE MILE IN LENGTH (UNLESS APPROVED BY THE ENGINEER). THIS WORK WILL INCLUDE BRIDGE CLASS CULVERTS AND SHALL NOT INCLUDE BRIDGE, BRIDGE APPROACH/DEPARTURE SECTIONS WORKED ON STEPS 1 AND 2. HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
5. USING DAILY LANE CLOSURES, MILL 3 INCHES OF EXISTING PAVEMENT FOR ALL SECTIONS WORKED ON PREVIOUS STEP EXCEPT BRIDGE CLASS CULVERTS AND FILL WITH HMA-TY B AS SHOWN ON TYPICAL SECTIONS AND PLACE NON REMOVEABLE WORK ZONE PAVEMENT MARKINGS. HAUL RAP MATERIAL TO DESIGNATED STOCKPILE.
6. USING DAILY LANE CLOSURES, PLACE 2" OF HMA-TY D FOR FULL LENGTH OF NORTHBOUND LANES. FOR BRIDGE CLASS CULVERTS FIRST PLACE TACK COAT AND THEN PLACE 2" OF HMA TY-D. INSTALL WORK ZONE TABS BEFORE INSTALLING PERMANENT PAVEMENT MARKINGS.

RAILROAD FENCE SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL INFORM THE ENGINEER IN ADVANCE OF WORK BEING PERFORMED TO REPLACE EXISTING RAILROAD FENCE.
2. A TIMELINE SHALL BE PROVIDED REGARDING CONSTRUCTION WORK ON THE RAILROAD FENCE. CONTRACTOR SHALL REMOVE AND IMMEDIATELY INSTALL NEW FENCE TO MINIMIZE A FENCELESS CONDITION ON RAILROAD OVERPASS BRIDGES.

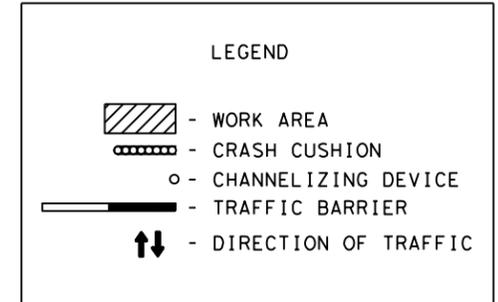
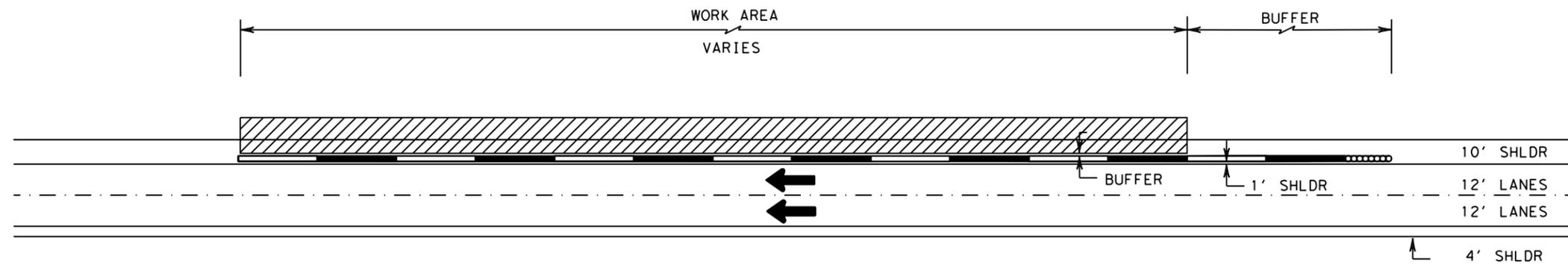


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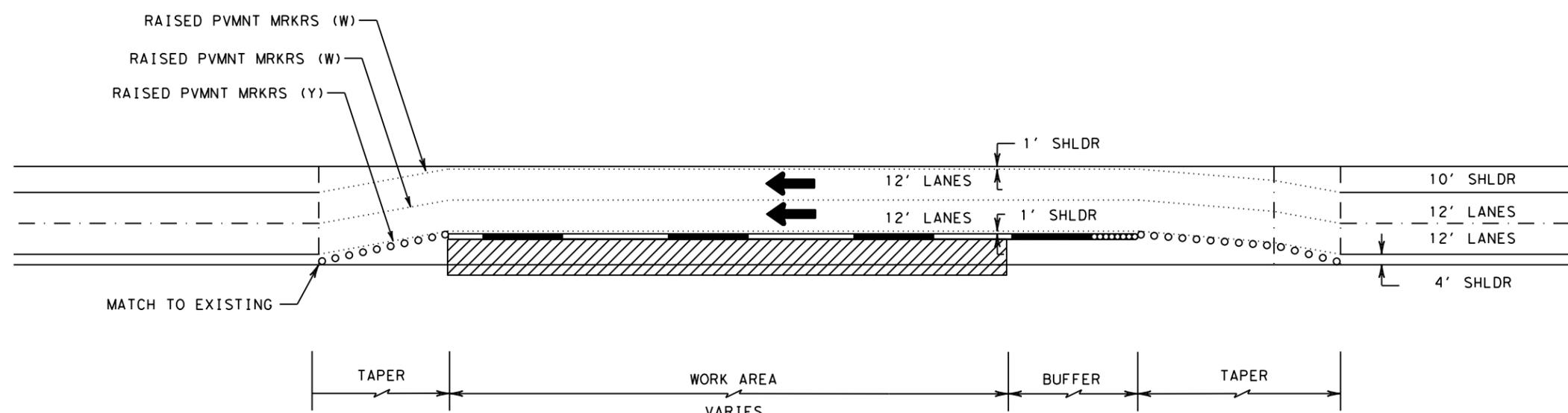
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US 181			
SEQUENCE OF CONSTRUCTION			
SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	19

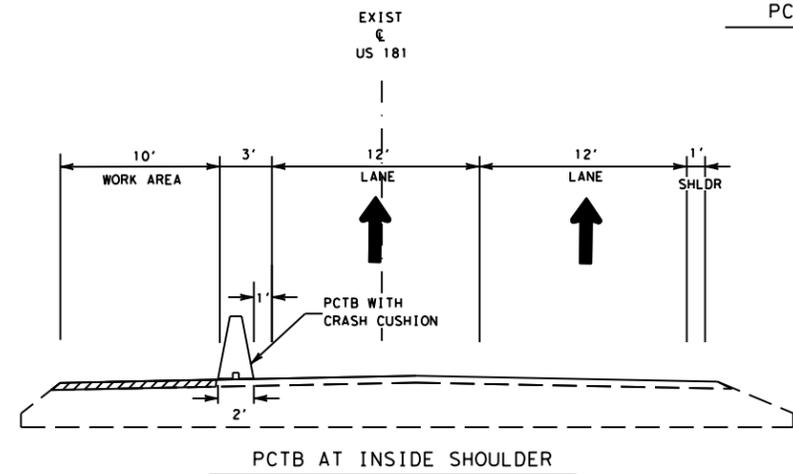
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PCTB AT OUTSIDE SHOULDER



PCTB AT INSIDE SHOULDER



NOTE:
 DETAILS DEPICT LANE WIDTH REQUIREMENTS AND BARRIER LOCATION ONLY. ALL SHIFT/BUFFER SPACING, SIGNAGE, AND RELATED TRAFFIC CONTROL DEVICES SHALL BE PLACED IN ACCORDANCE WITH TCP (2-6)-23 AND RELATED APPLICABLE STANDARDS.



E. Martinez

11/03/2023



US 181

PCTB
 DETAIL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	20

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

<p>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov</p>
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

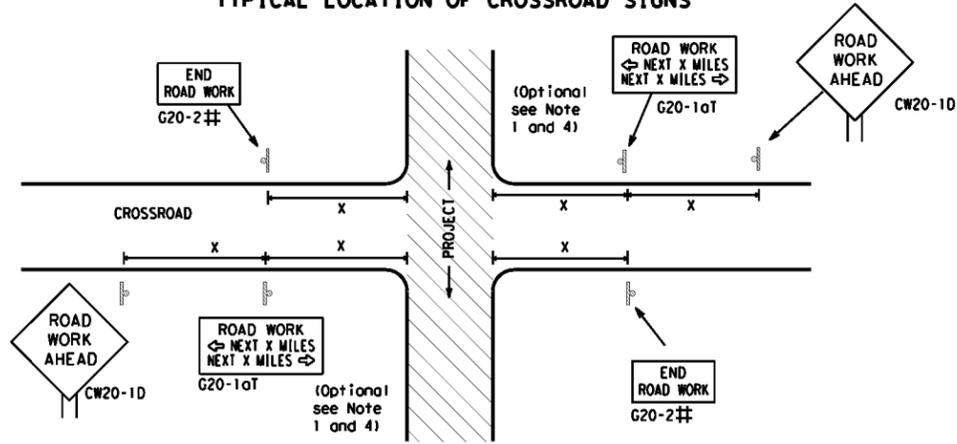
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SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard
<p>BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS</p> <p>BC (1) -21</p>		
FILE: bc-21.dgn	DWF: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT SECT	JOB HIGHWAY
REVISIONS	010104	131 US 181
4-03 7-13	DIST	COUNTY SHEET NO.
9-07 8-14	5-10 5-21	CRP SAN PATRICIO 21

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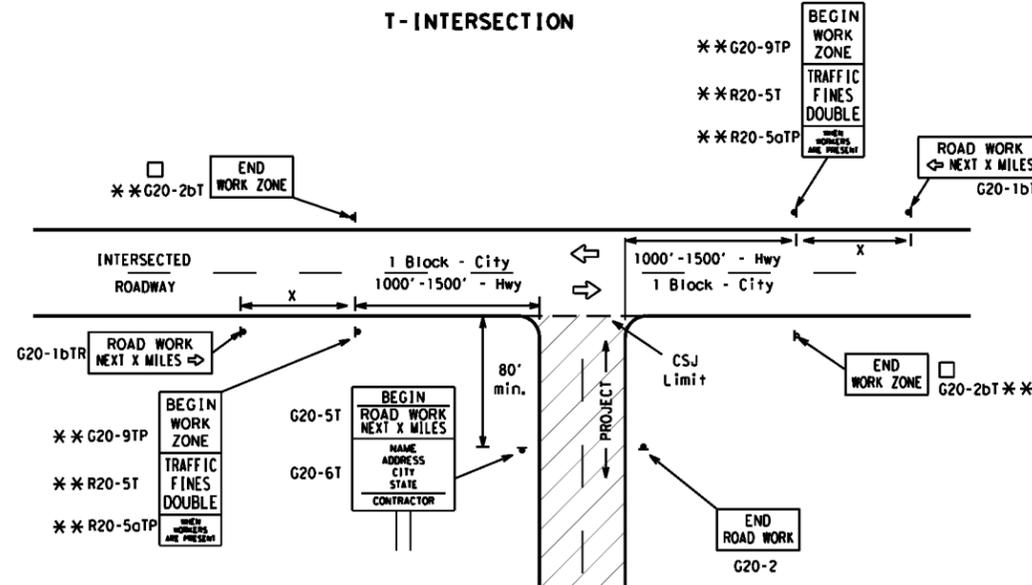
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

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

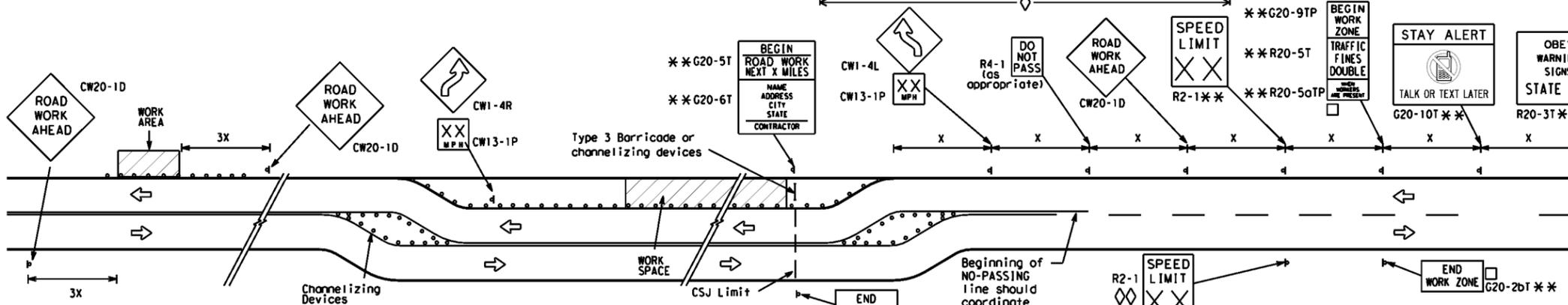
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

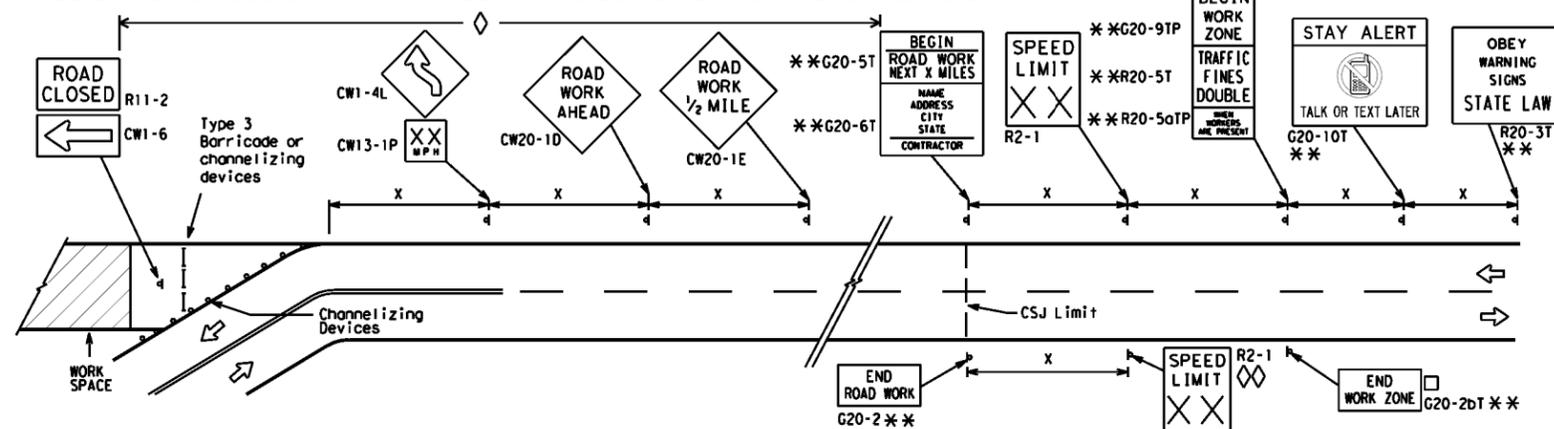
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

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

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

SHEET 2 OF 12

Texas Department of Transportation
 Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC (2) - 21

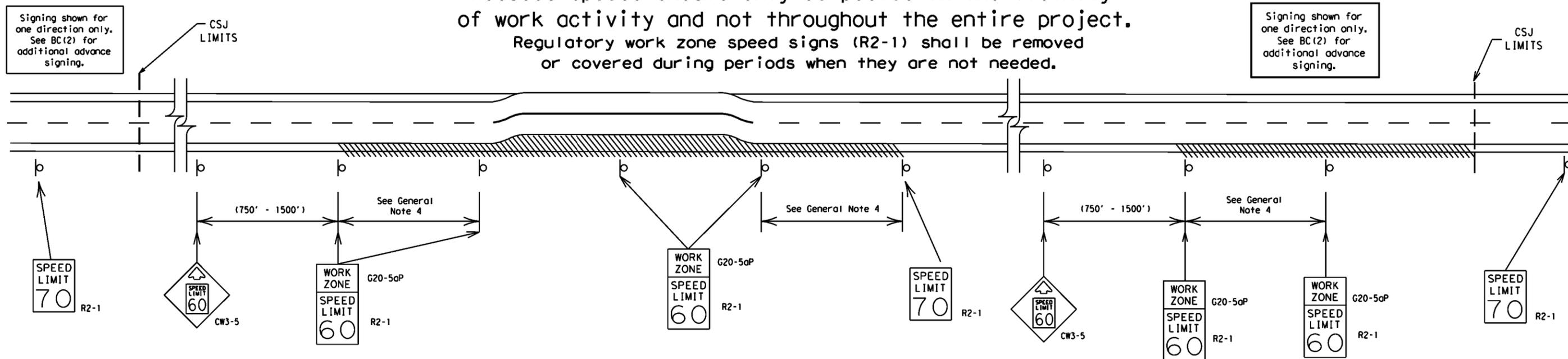
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© TxDOT November 2002	CONT: 010104	SECT: 131	JOB: US 181	HIGHWAY: CRP SAN PATRICIO
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present.

Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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SHEET 3 OF 12



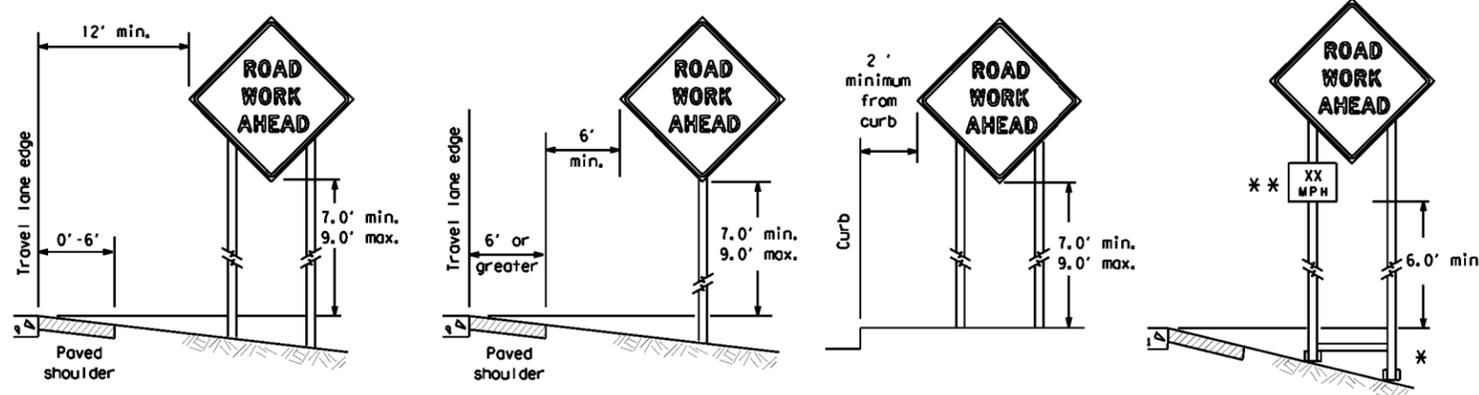
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

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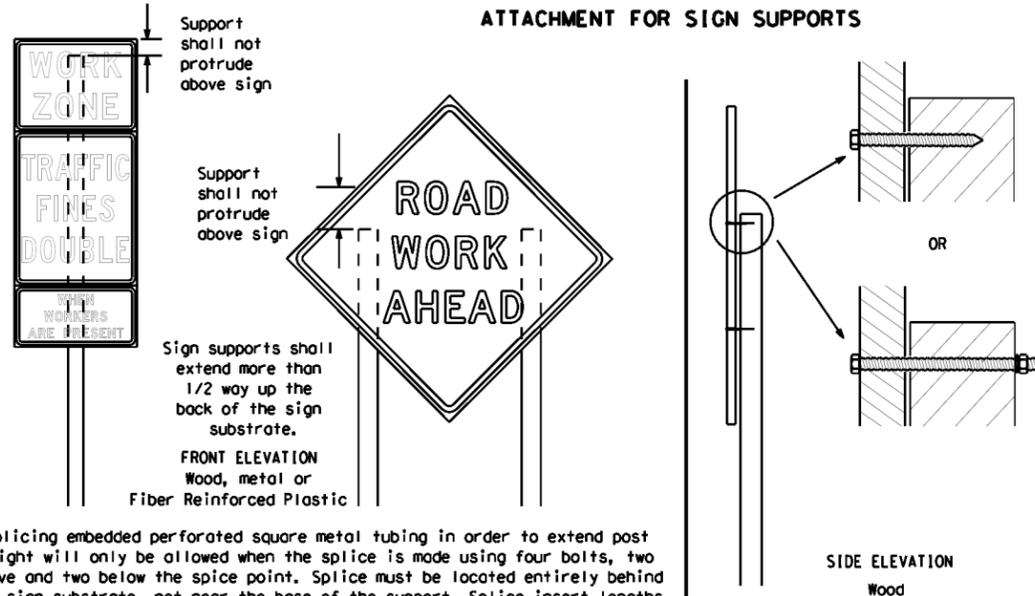
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



No nails shall NOT be allowed.
Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

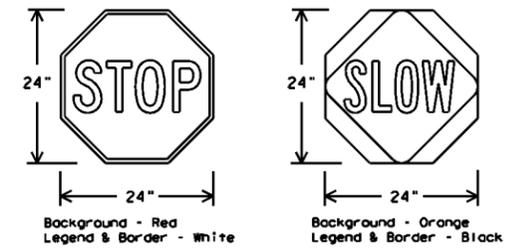
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not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

FLAGS ON SIGNS

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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



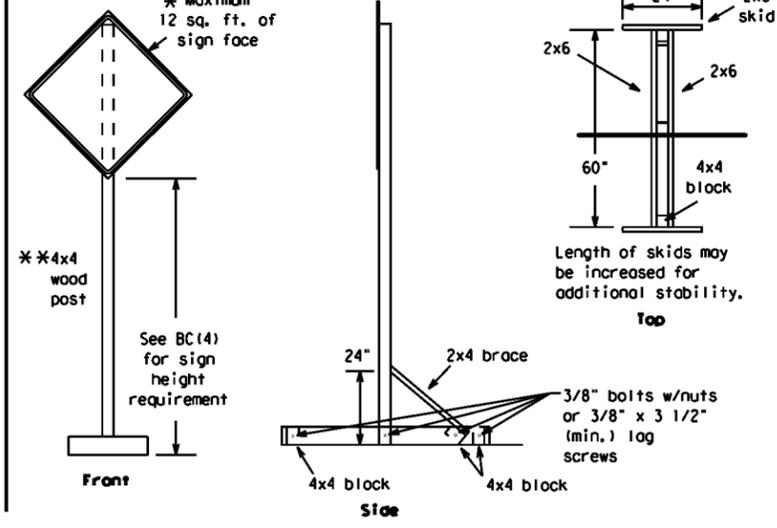
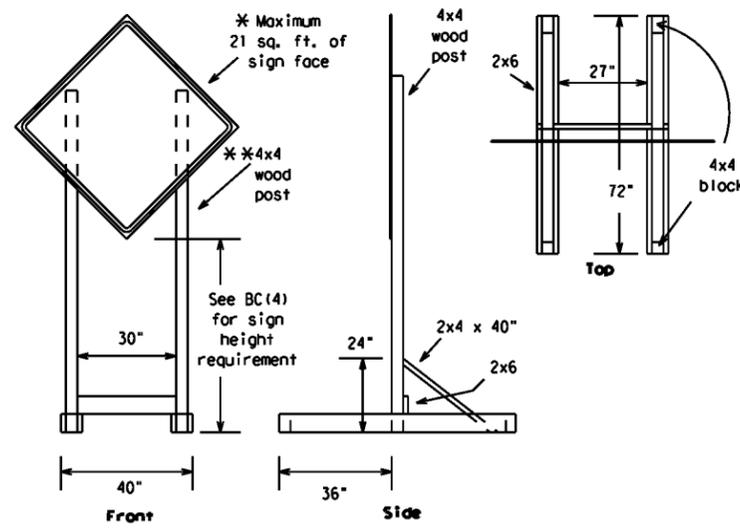
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

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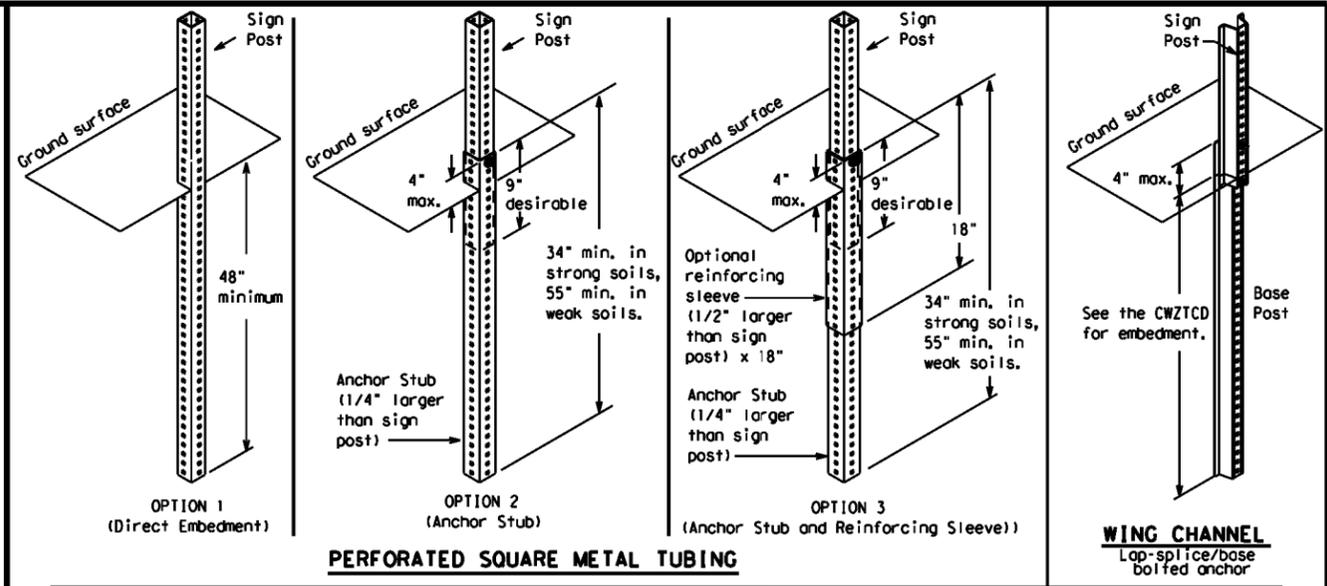
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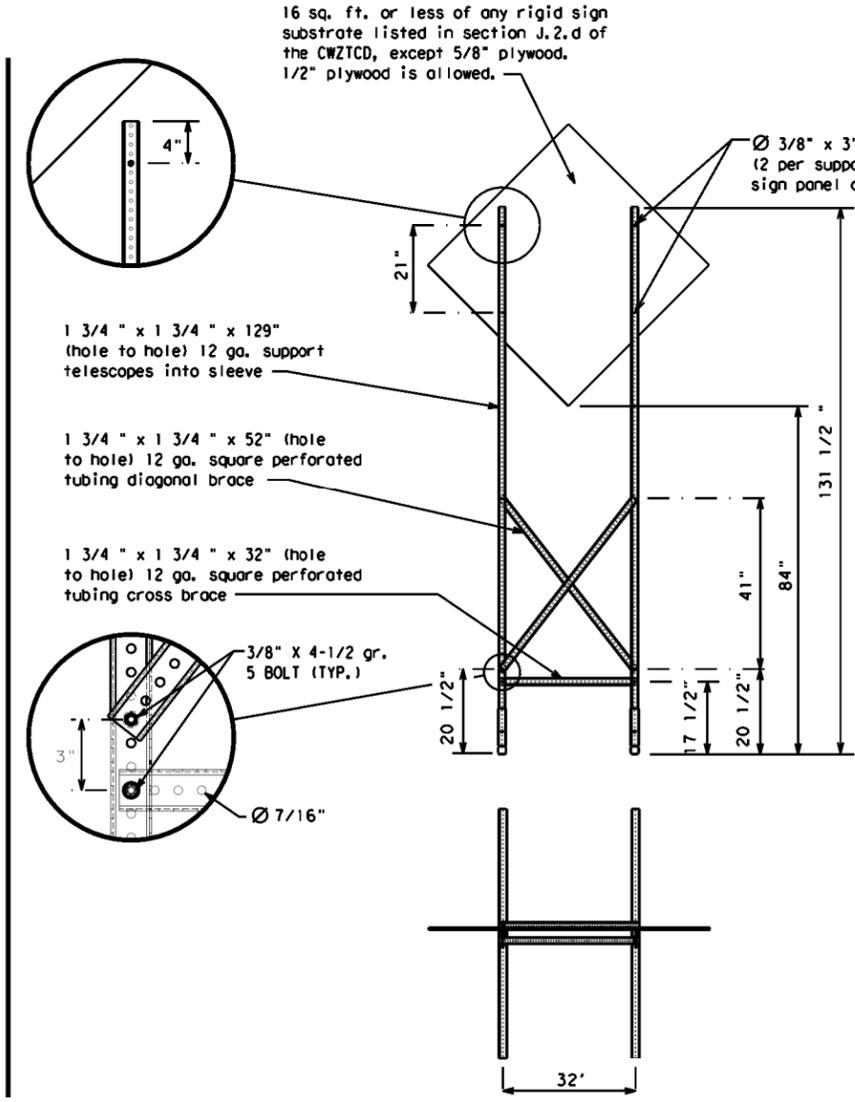
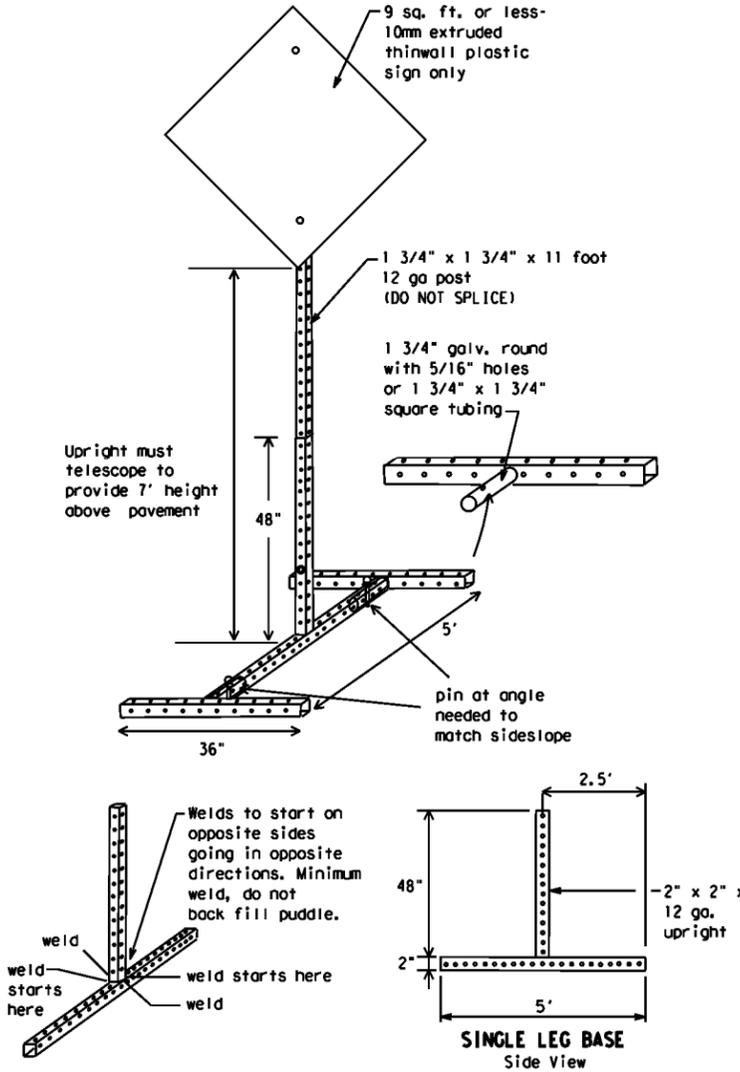
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

FORM X LINES RIGHT

USE XXXXX RD EXIT

USE EXIT I-XX NORTH

USE I-XX E TO I-XX N

WATCH FOR TRUCKS

EXPECT DELAYS

PREPARE TO STOP

END SHOULDER USE

WATCH FOR WORKERS

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

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

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

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

SHEET 6 OF 12



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

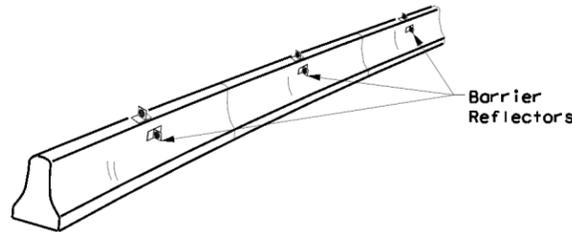
BC (6) - 21

FILE: bc-21.dgn	DWG: TxDOT	CHK: TxDOT	DRW: TxDOT	CRK: TxDOT
© TxDOT November 2002	CONT: 010104	SECT: 131	JOB: US 181	HIGHWAY
REVISIONS: 9-07 8-14	DIST: CRP	COUNTY: SAN PATRICIO	SHEET NO.: 26	
7-13 5-21				

DATE: 06/08/2023 04:47 PM
FILE: DOCUMENT NAME

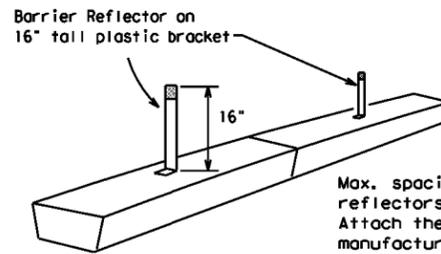
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

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

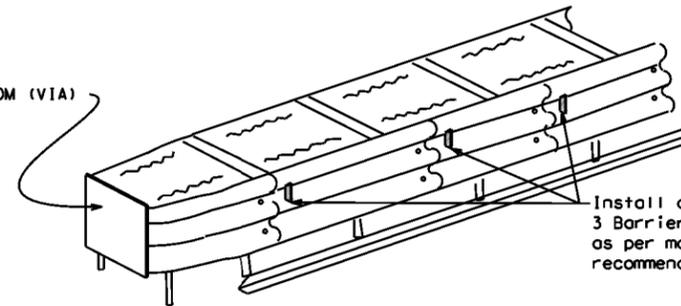


LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

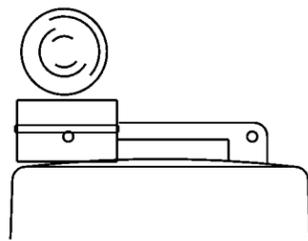
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

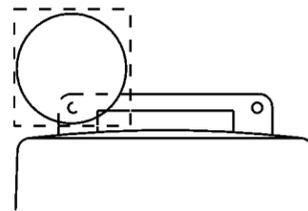
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



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

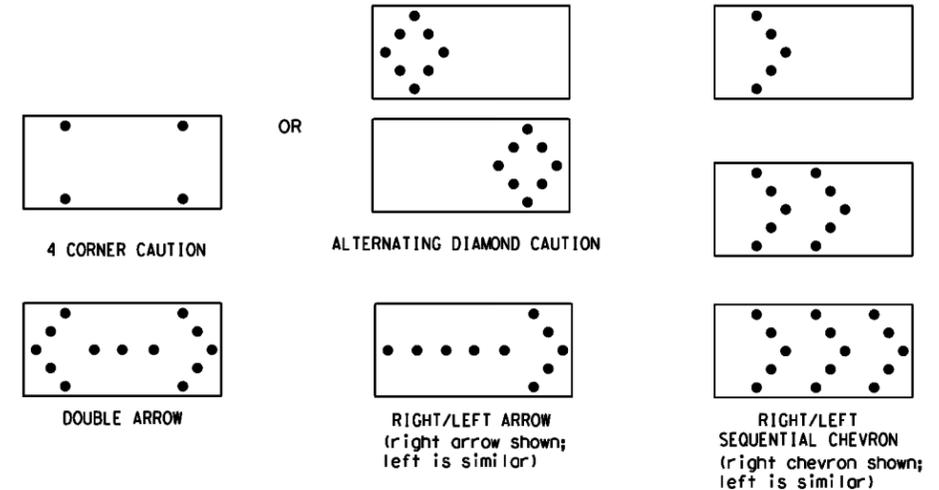


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

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



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

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

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

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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



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

BC (7) -21

FILE: bc-21.dgn	DWG: TxDOT	CR: TxDOT	DWG: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT: 01	SECT: 04	JOB: 131	HIGHWAY: US 181
REVISIONS: 9-07 8-14	DIST: 7-13	COUNTY: 5-21	SHEET NO.: CRP SAN PATRICIO	27

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

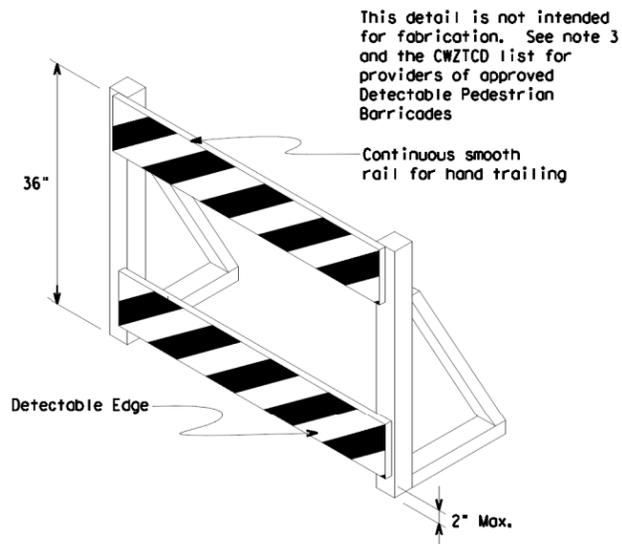
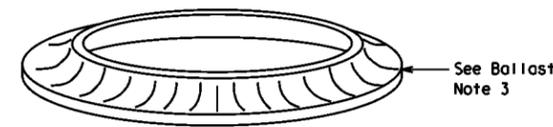
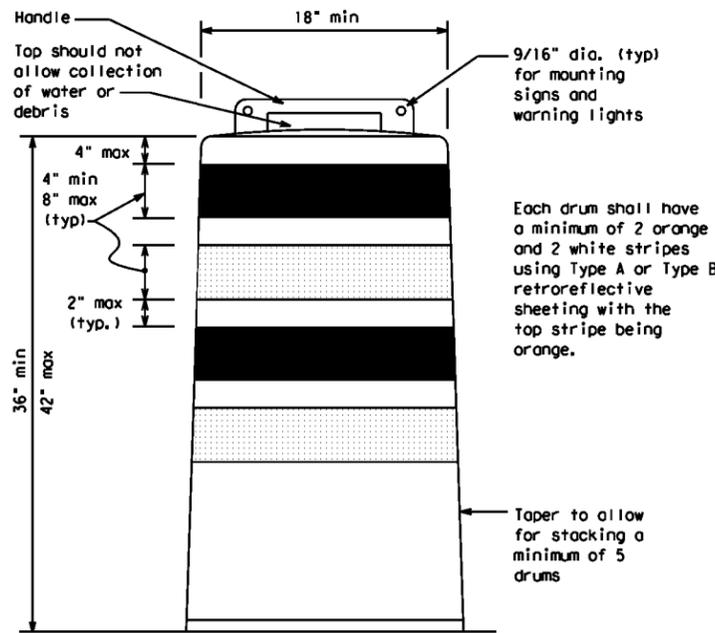
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

BALLAST

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



DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

SHEET 8 OF 12

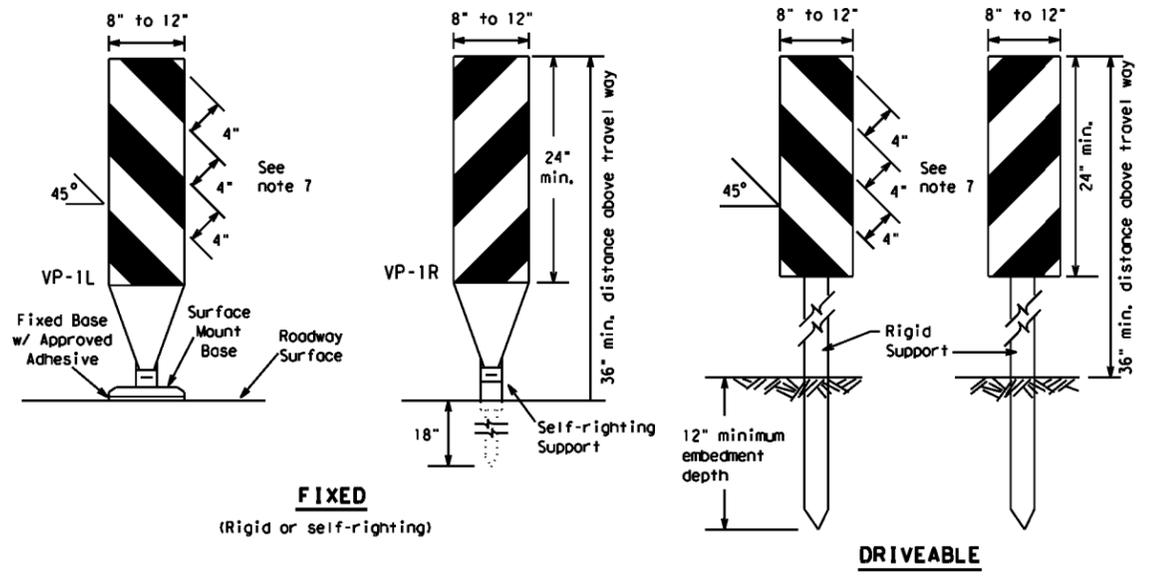


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

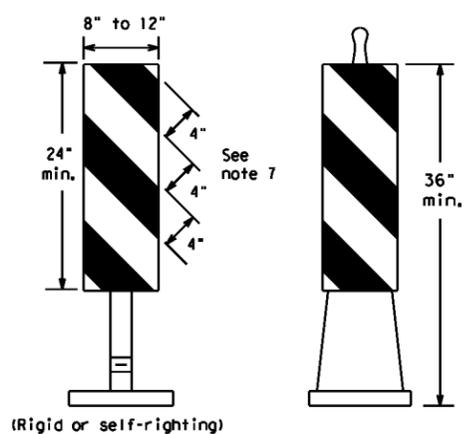
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© TxDOT	November 2002	CONT:	SECT:	JOB:	US 181	HIGHWAY:			
REVISIONS		010104	131	US 181					
4-03	8-14	DIST:	COUNTY:	SHEET NO.					
9-07	5-21	CRP	SAN PATRICIO	28					
7-13									

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FIXED
(Rigid or self-righting)

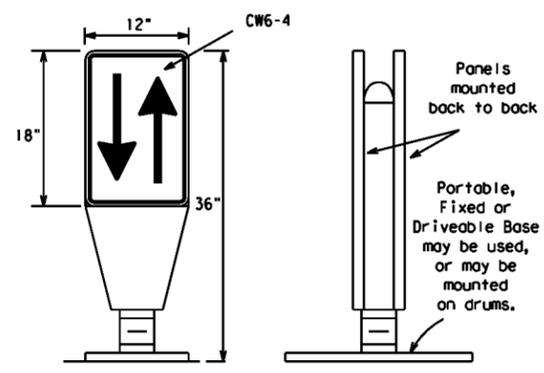
DRIVEABLE



PORTABLE

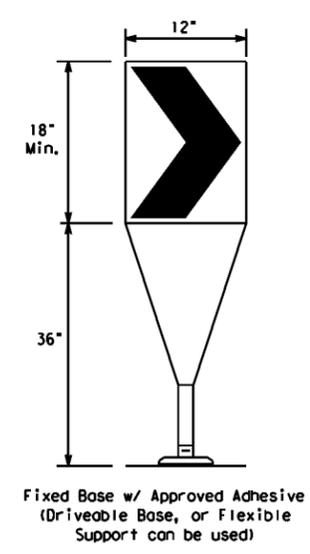
VERTICAL PANELS (VPs)

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



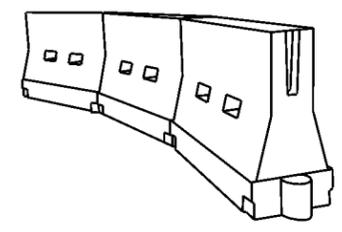
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

Posted Speed	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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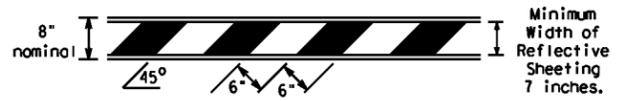
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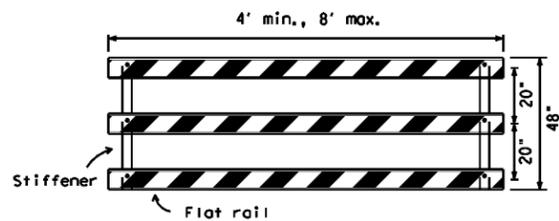
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



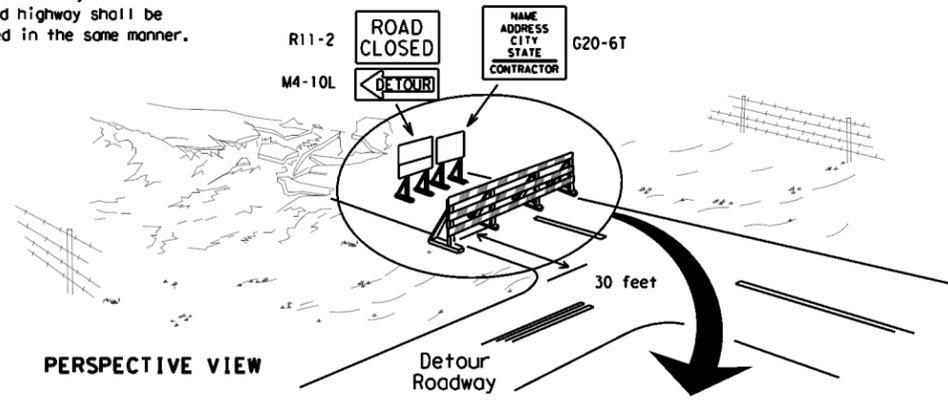
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

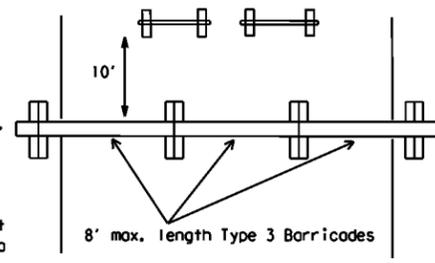
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

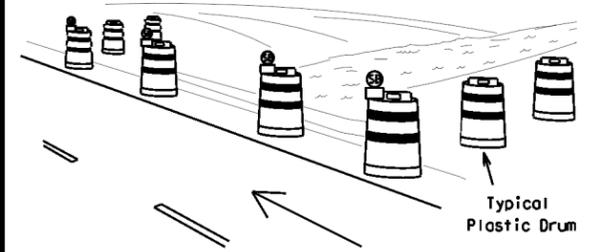
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



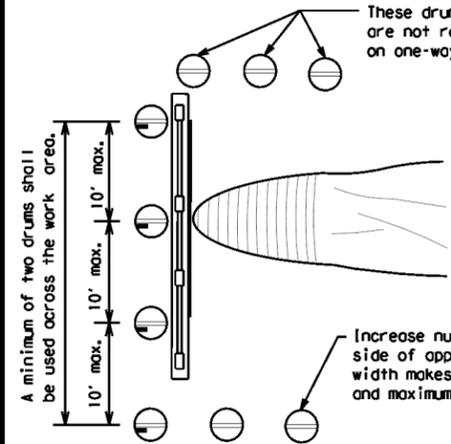
PLAN VIEW

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

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

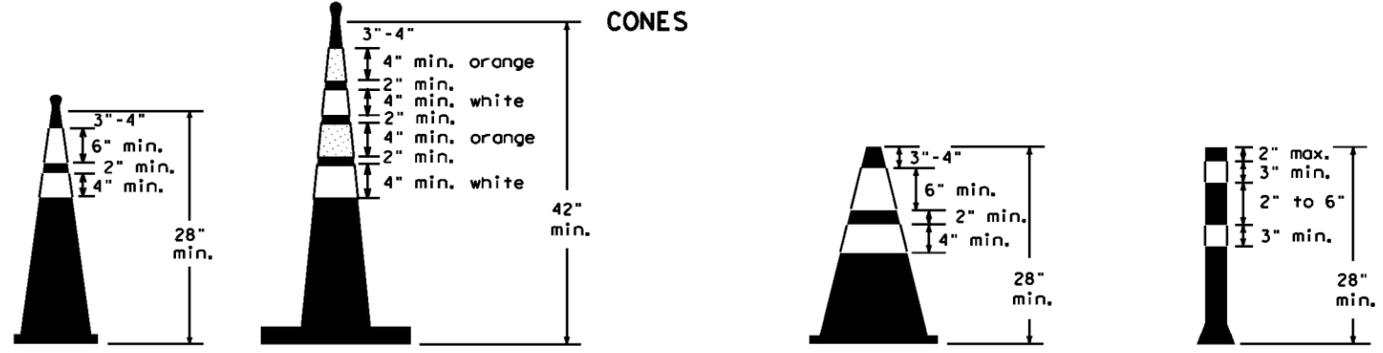


PLAN VIEW

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

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



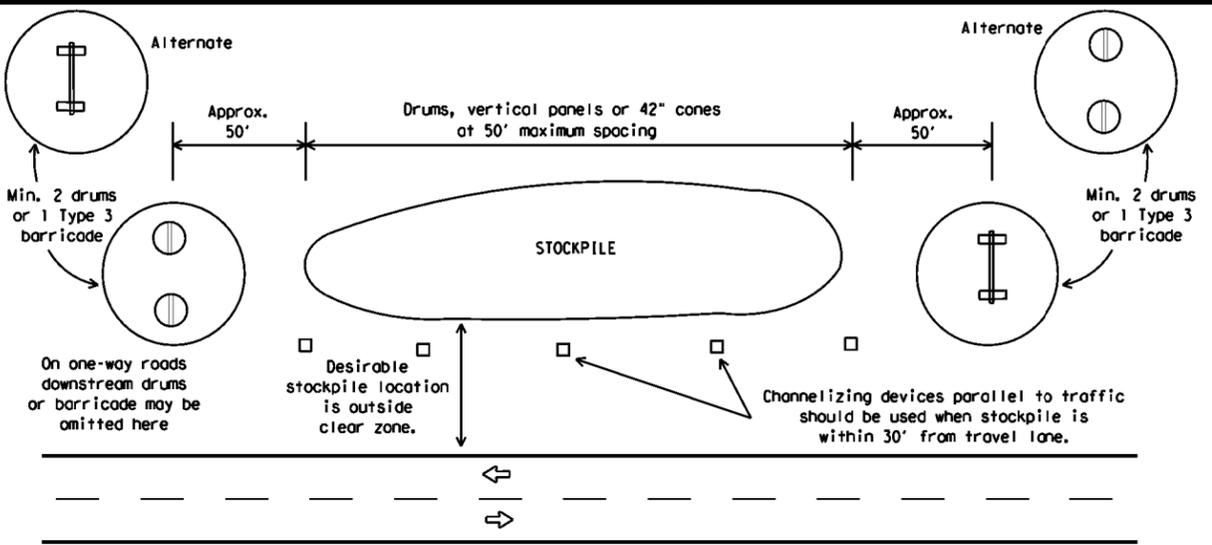
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

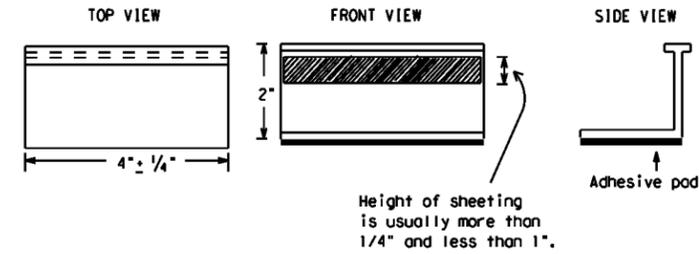
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

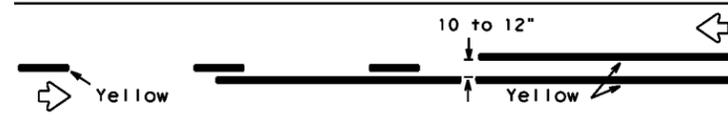
BC(11)-21

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11-02	8-14			
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	CRP	SAN PATRICIO		31

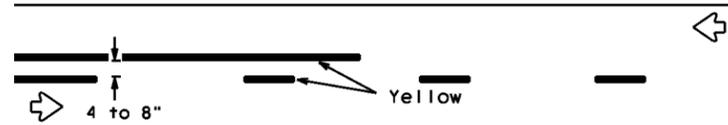
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PAVEMENT MARKING PATTERNS

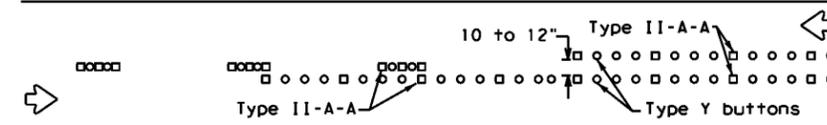


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

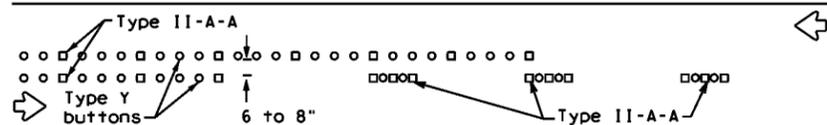


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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

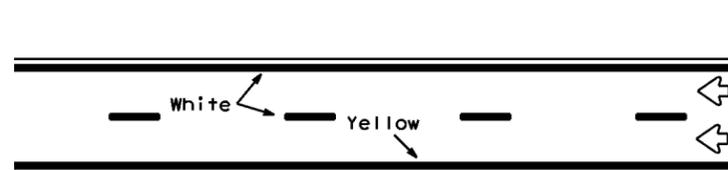


RAISED PAVEMENT MARKERS - PATTERN A



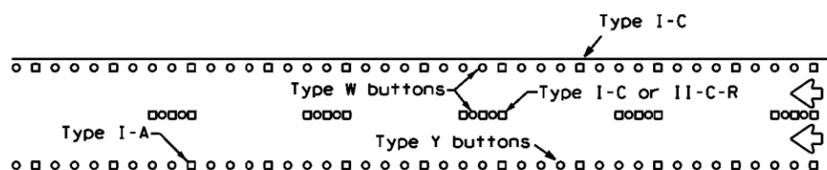
RAISED PAVEMENT MARKERS - PATTERN B

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



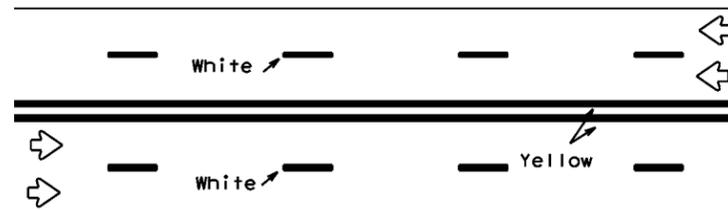
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



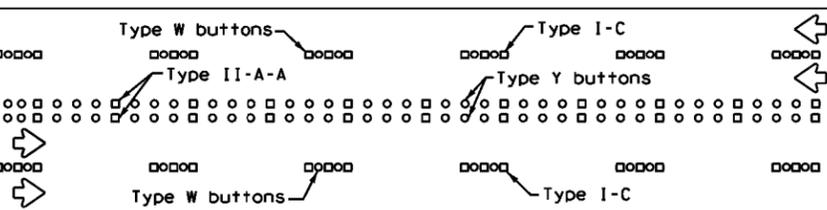
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



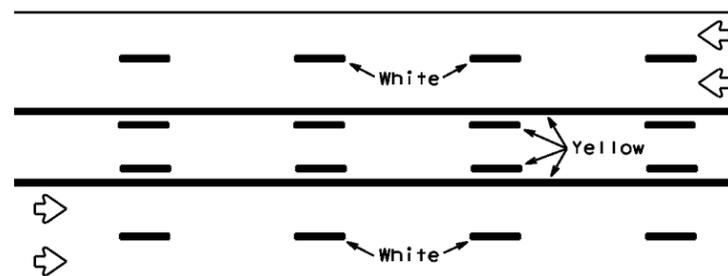
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



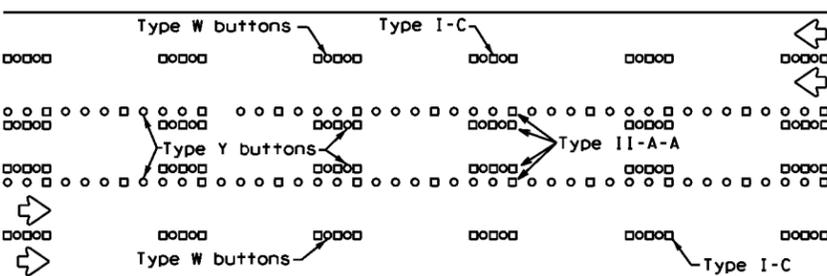
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

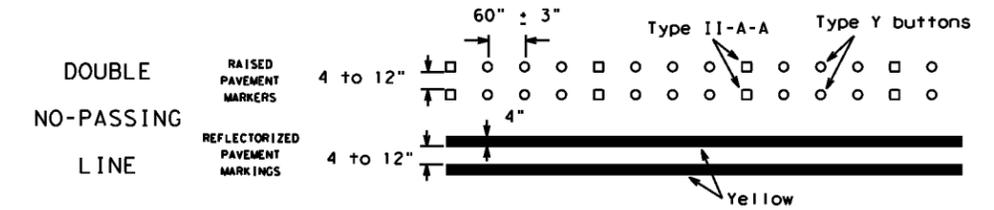
Prefabricated markings may be substituted for reflectORIZED pavement markings.



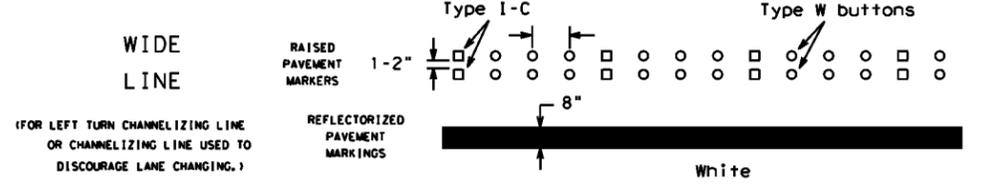
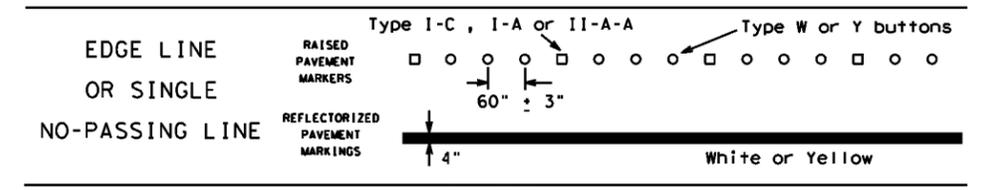
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

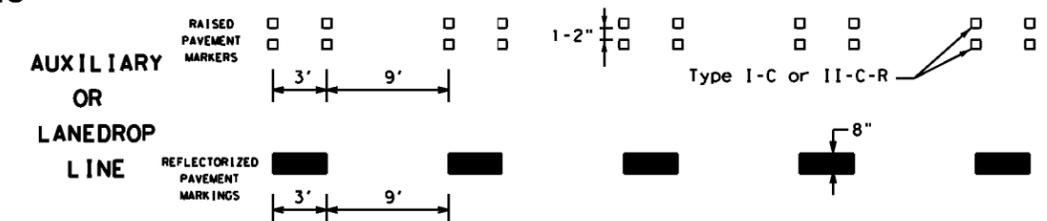
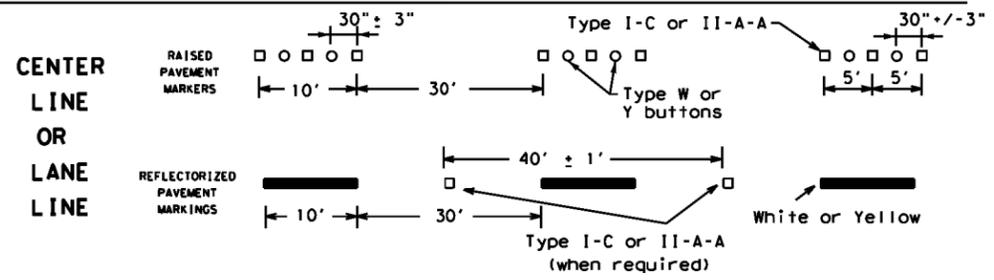
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

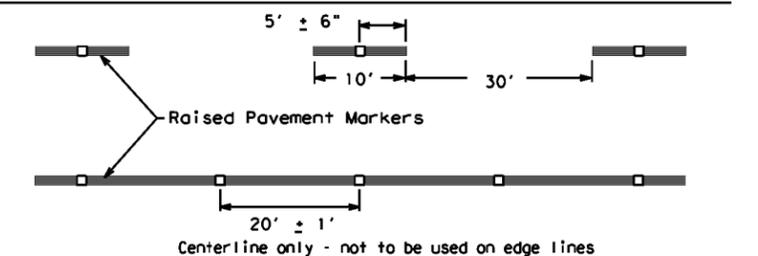


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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11-02 8-14				

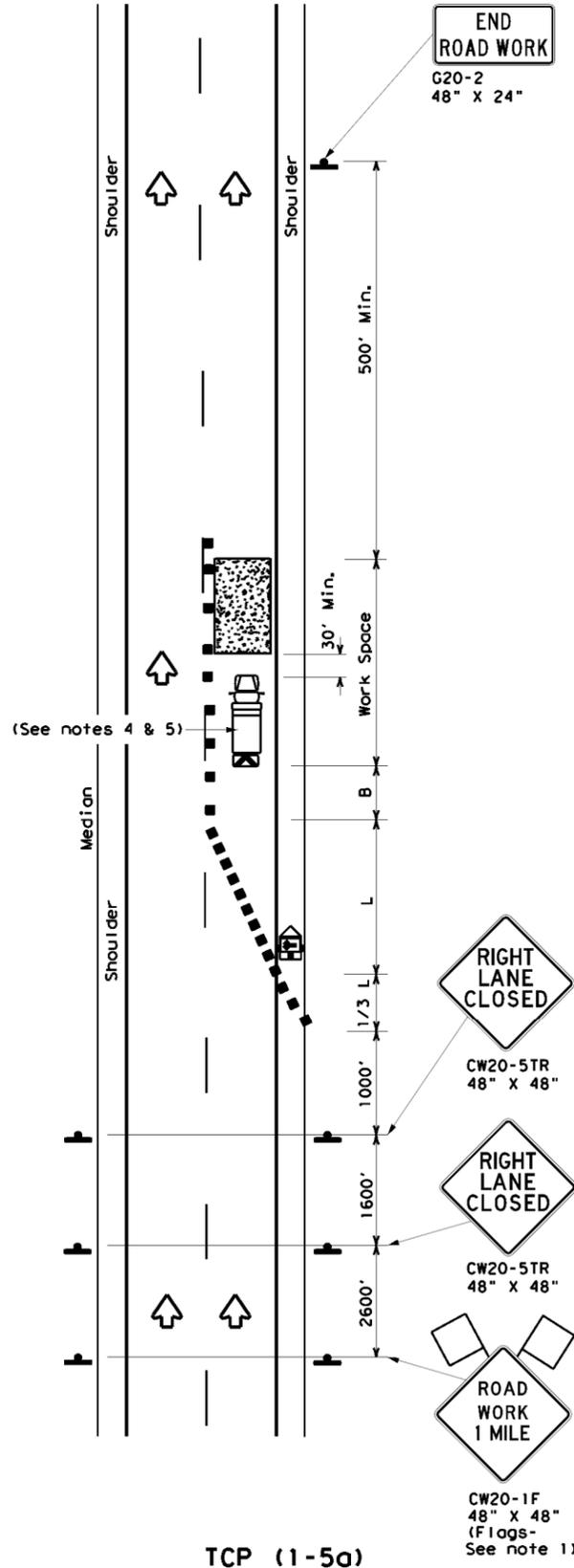
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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DATE: 08/2023 04:47 PM
FILE: DOCUMENT NAME

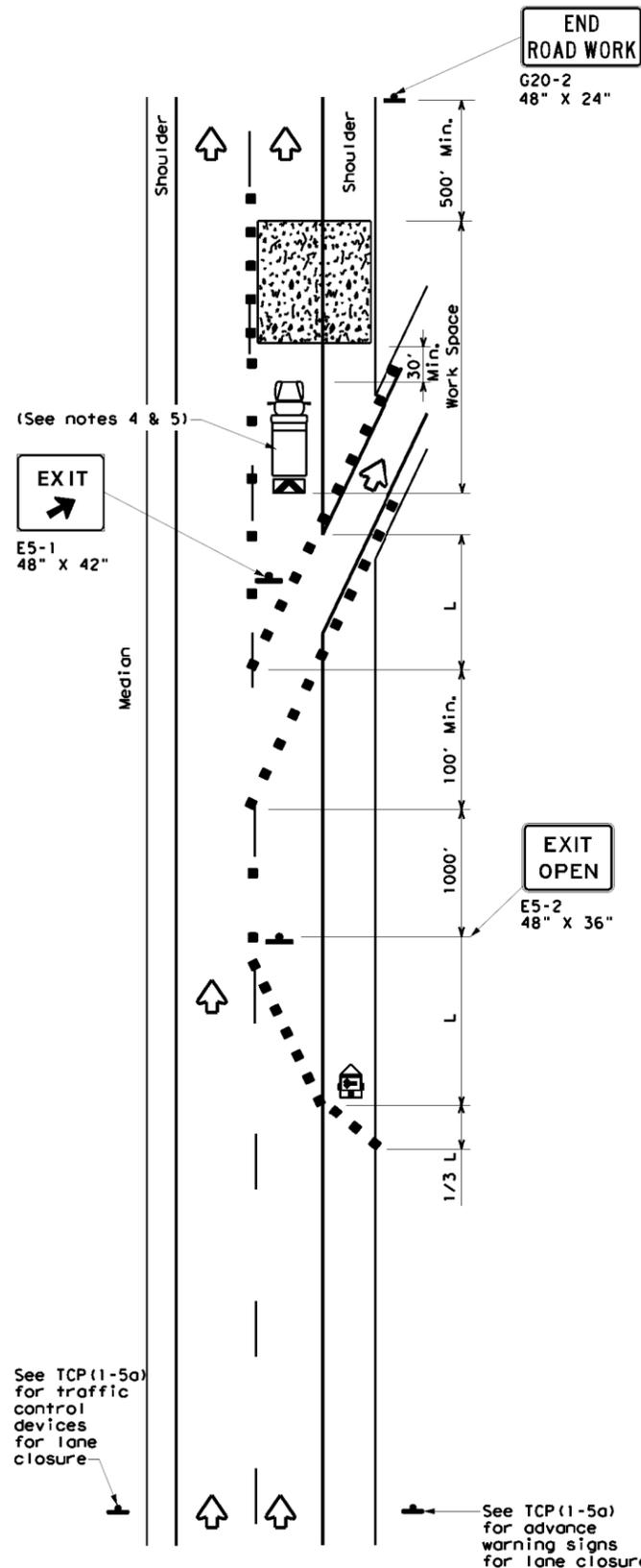
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DATE: 08/2023 04:53 PM
FILE: DOCUMENT NAME



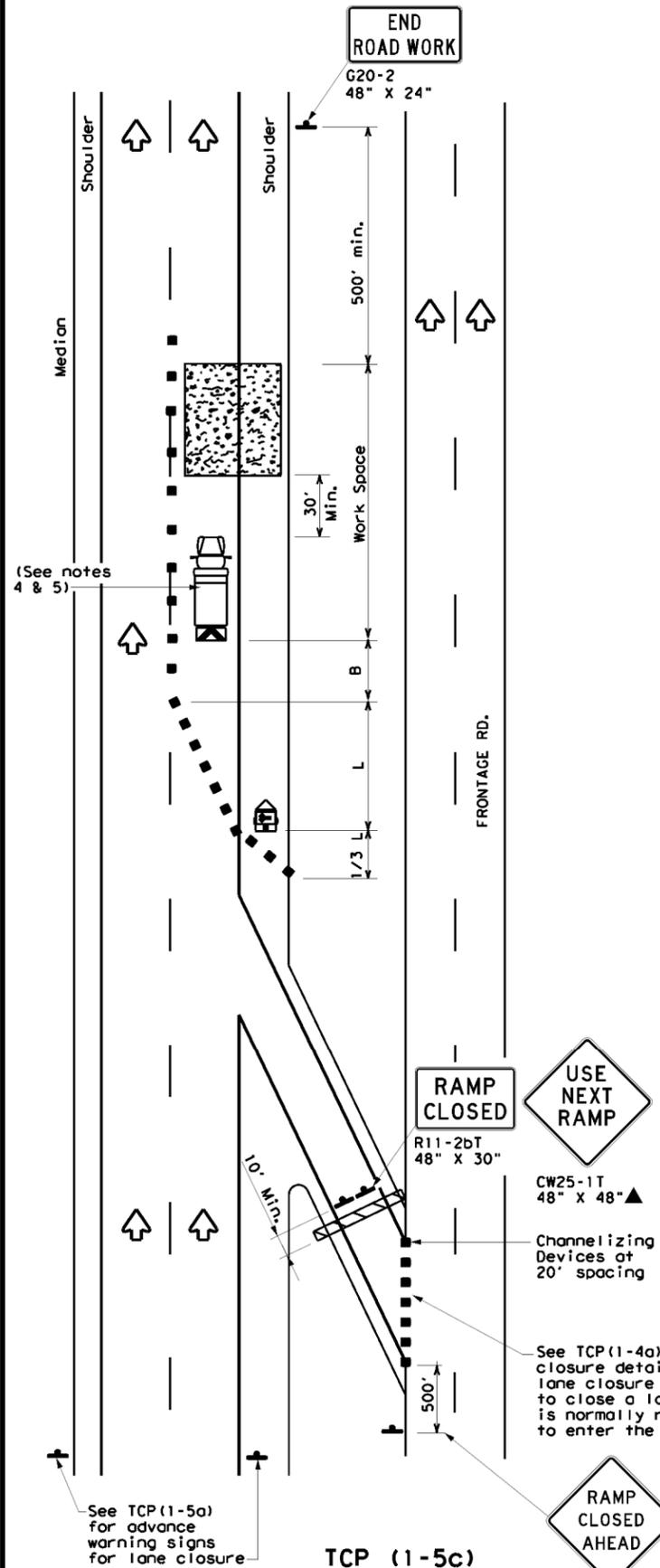
ONE LANE CLOSURE

TCP (1-5a)



LANE CLOSURE NEAR EXIT RAMP

TCP (1-5b)



LANE CLOSURE NEAR ENTRANCE RAMP

TCP (1-5c)

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

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

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

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

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

Texas Department of Transportation
Traffic Operations Division Standard

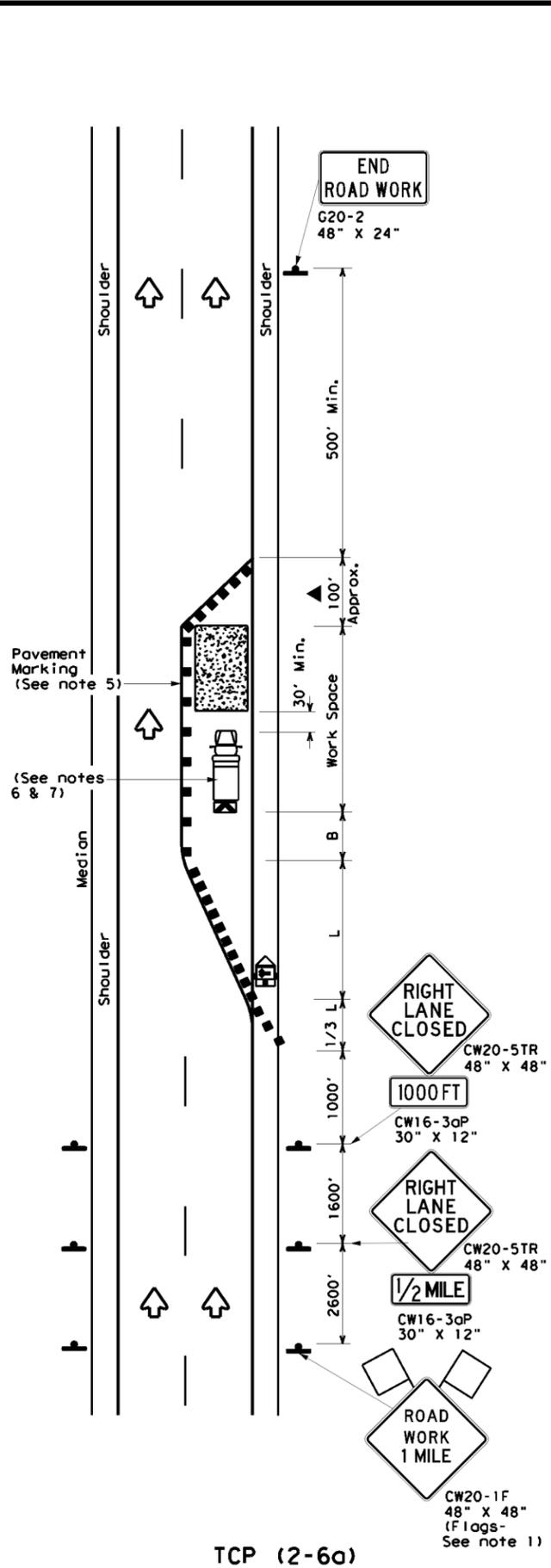
**TRAFFIC CONTROL PLAN
LANE CLOSURES FOR
DIVIDED HIGHWAYS**

TCP (1-5) - 18

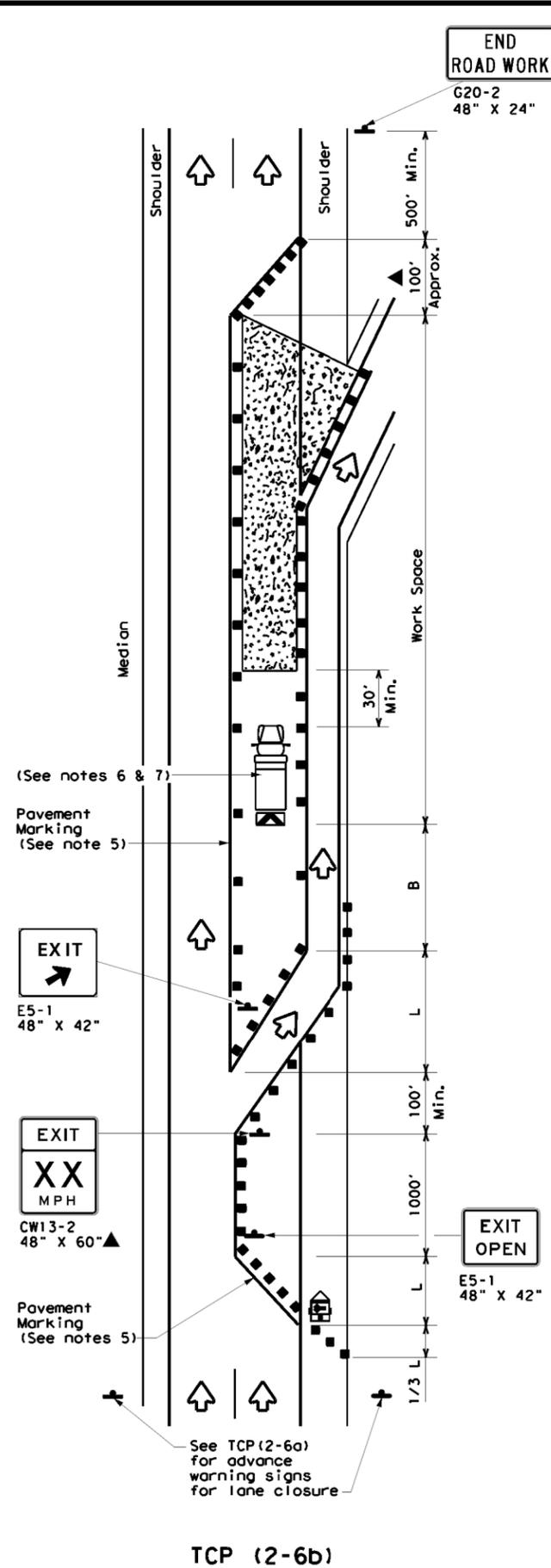
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© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
2-18	REVISIONS	010104	131	US 181
	DIST	COUNTY		SHEET NO.
	CRP SAN PATRICIO			33

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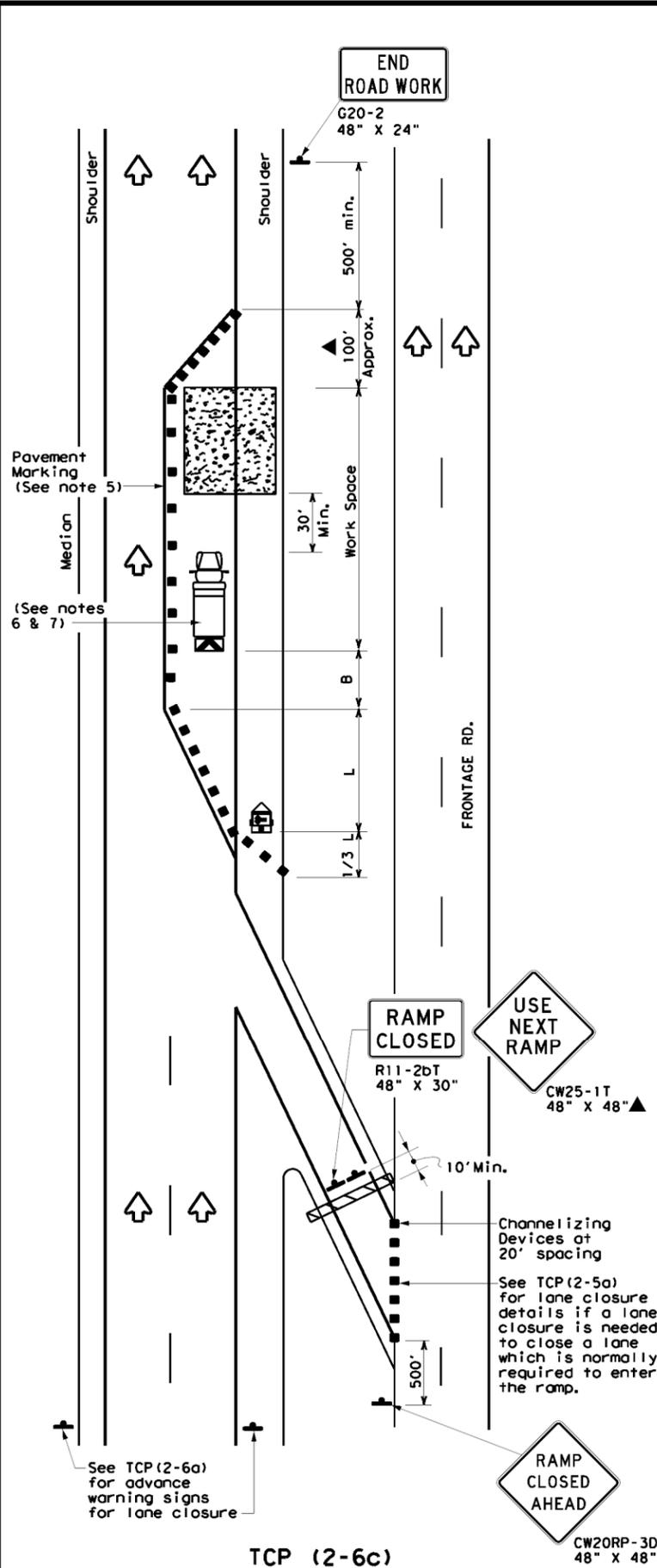
DATE: 08/2023 04:55 PM
FILE: DOCUMENT NAME



TCP (2-6a)
ONE LANE CLOSURE



TCP (2-6b)
LANE CLOSURE NEAR EXIT RAMP



TCP (2-6c)
LANE CLOSURE NEAR ENTRANCE RAMP

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

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

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

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

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

Traffic Operations Division Standard

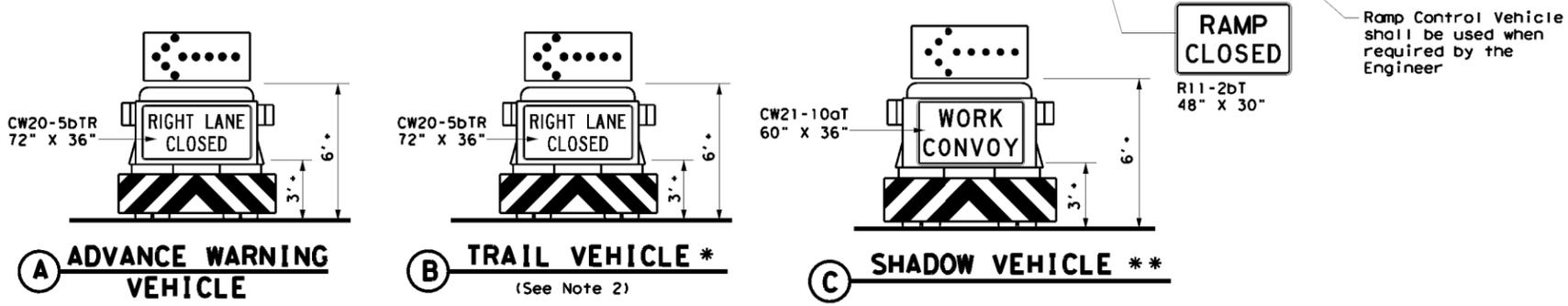
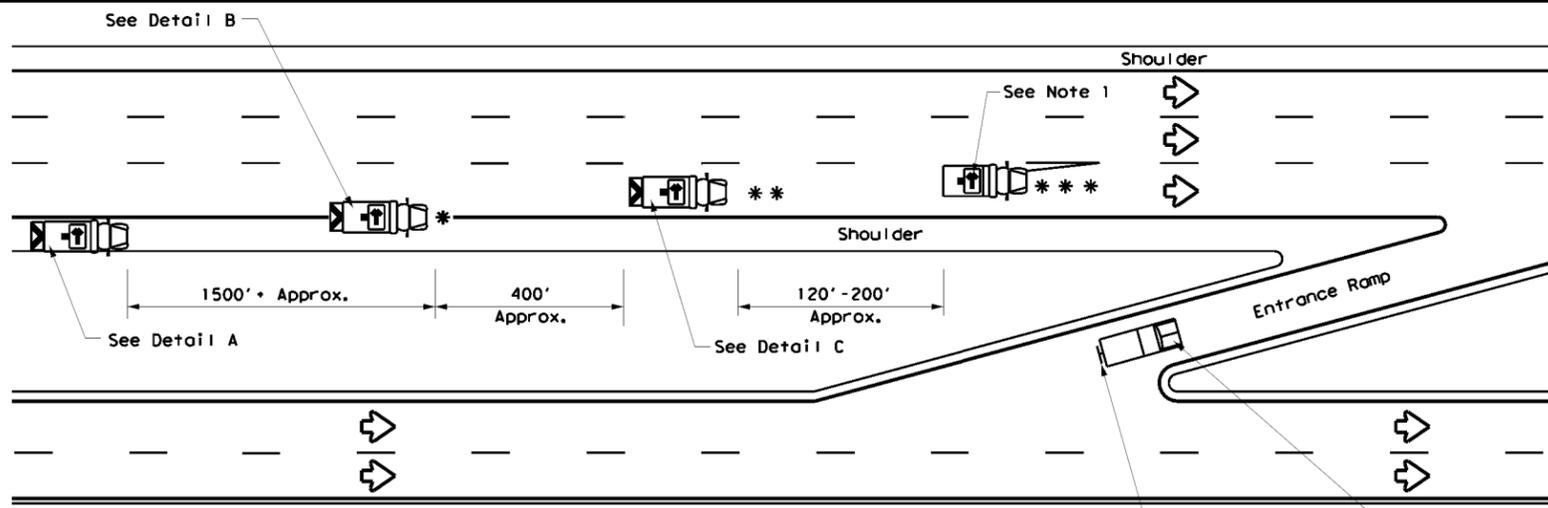
TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP (2-6) - 18

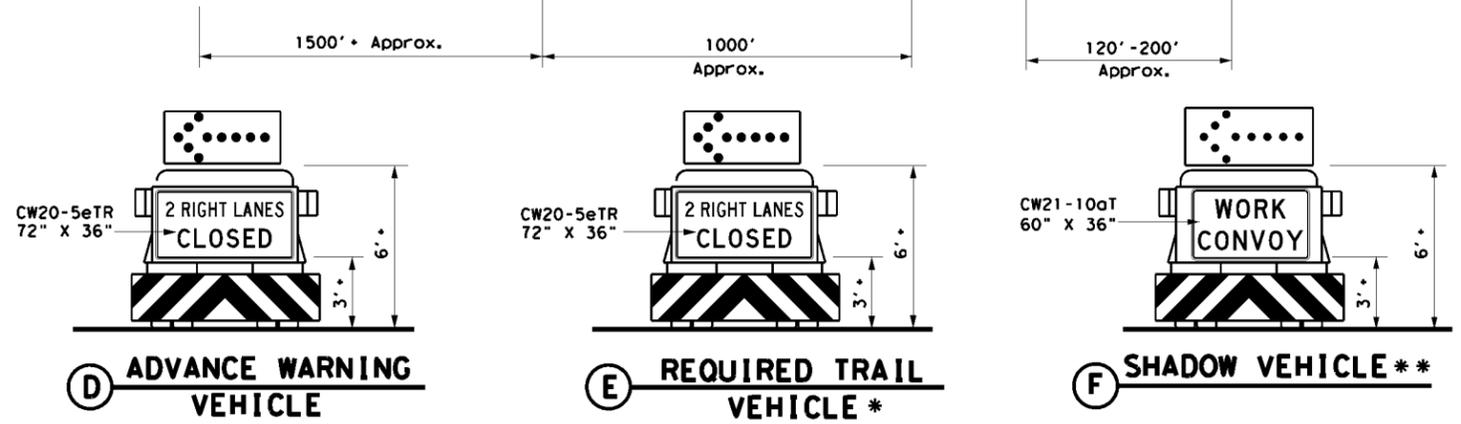
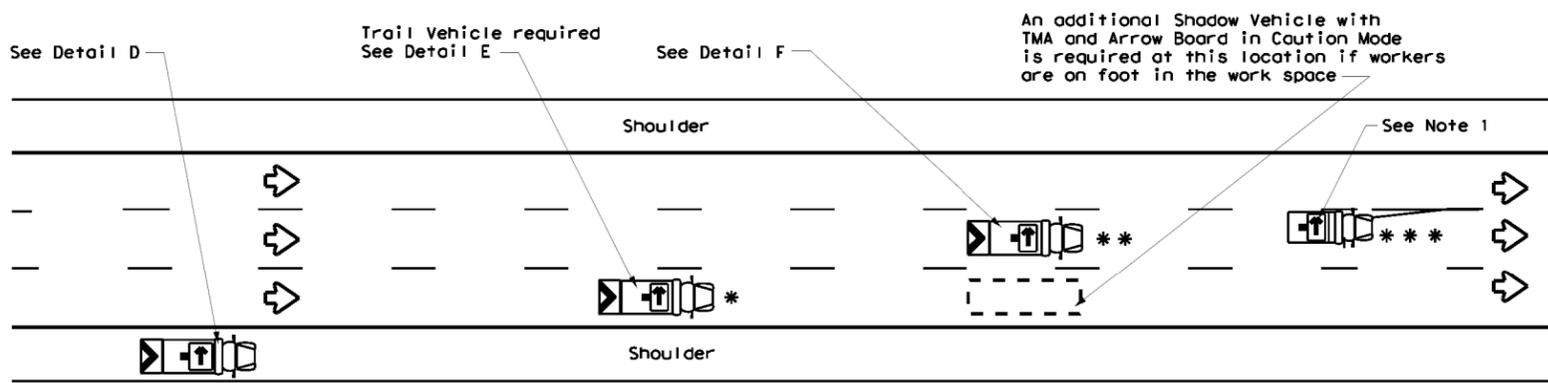
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© TxDOT December 1985	CONT:	SECT:	JOB:	HIGHWAY:
REVISIONS	010104	131	US 181	
2-94 4-98	DIST:	COUNTY:	SHEET NO.:	
8-95 2-12	CRP SAN PATRICIO		34	
1-97 2-18				

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



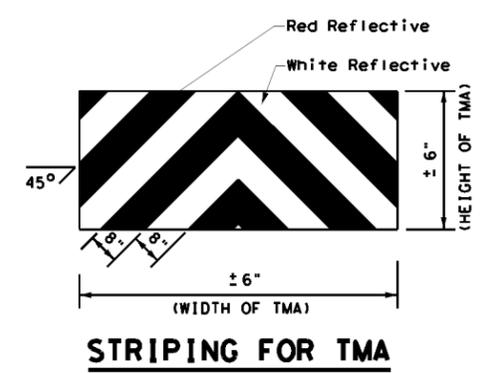
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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

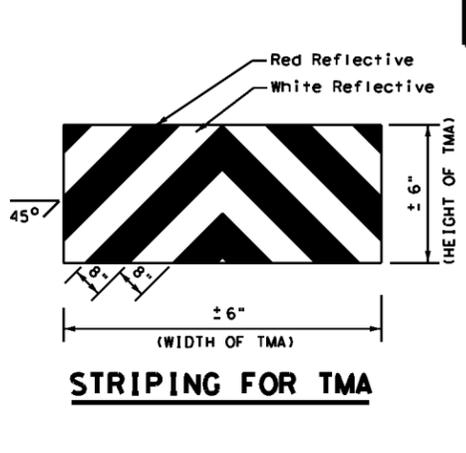
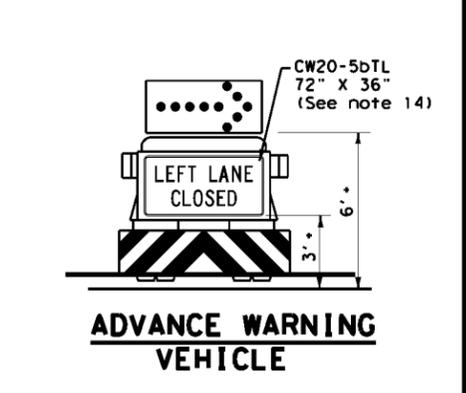
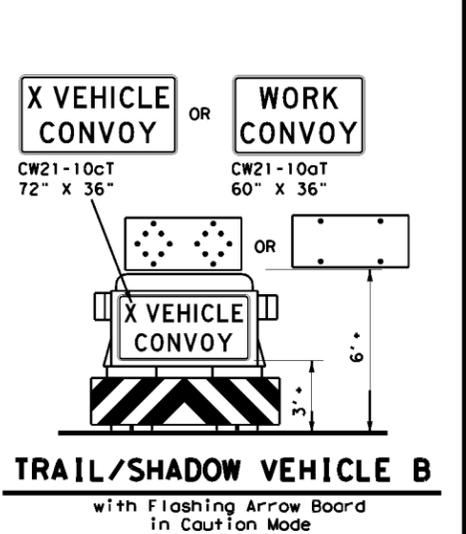
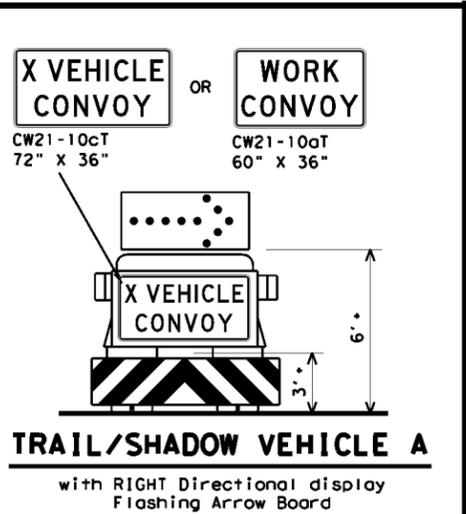
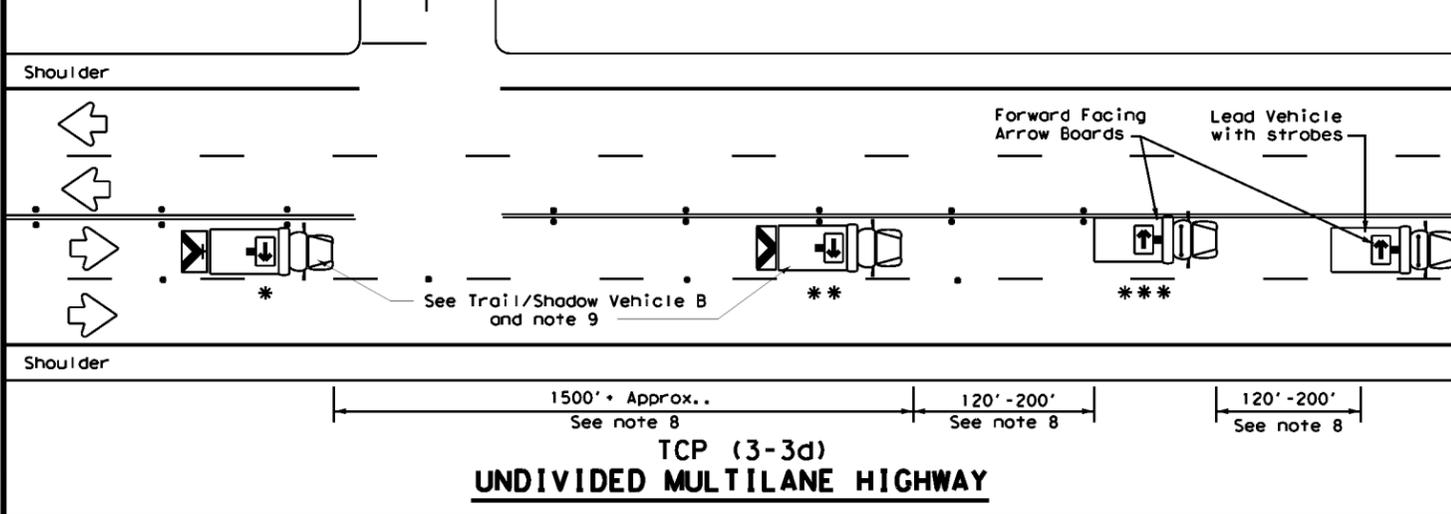
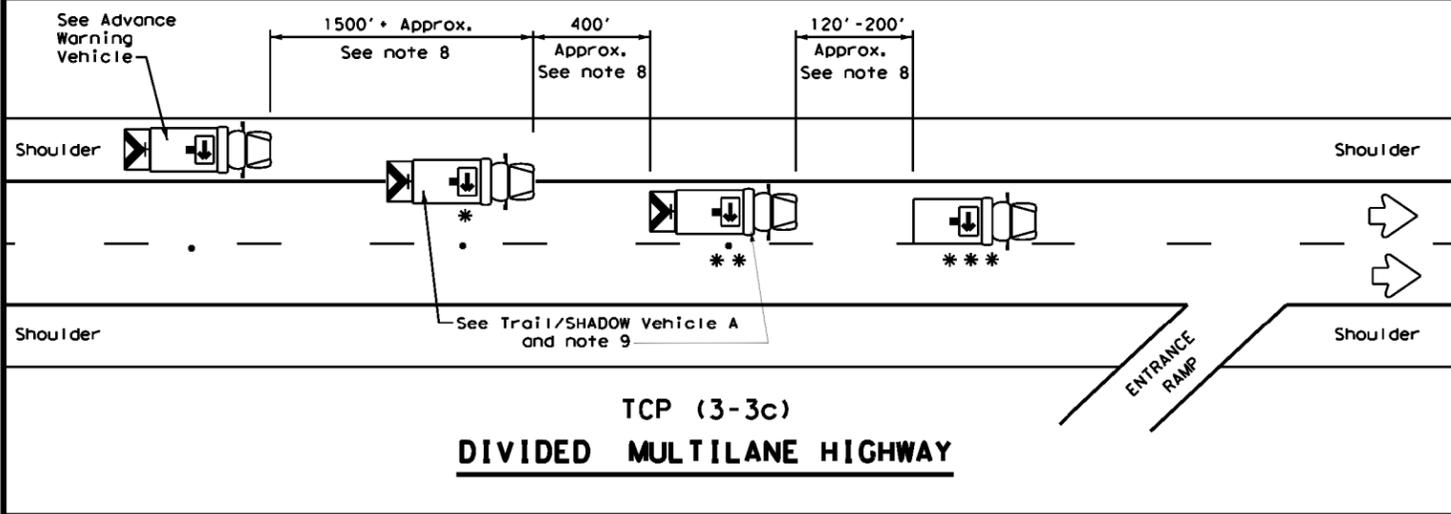
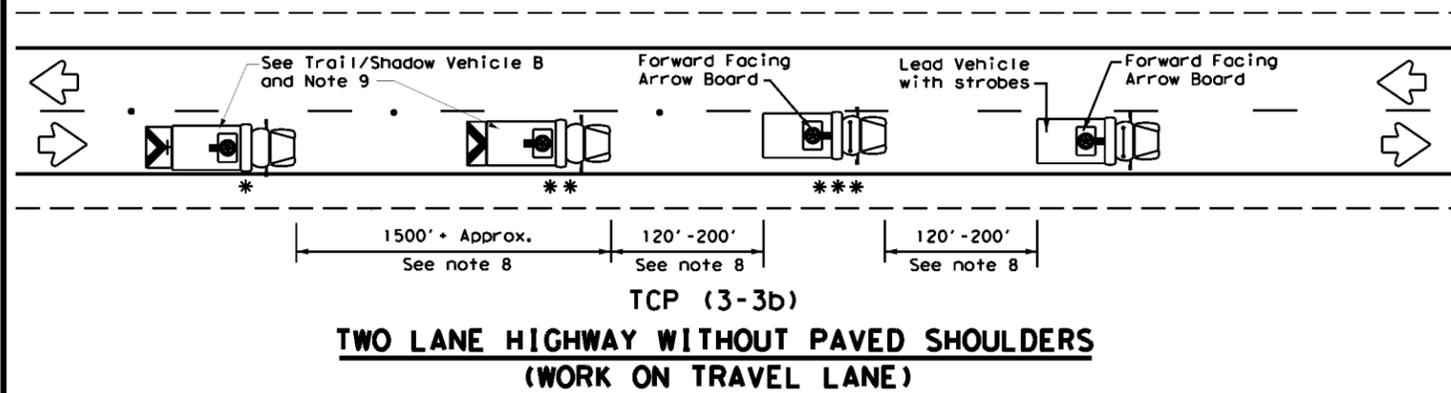
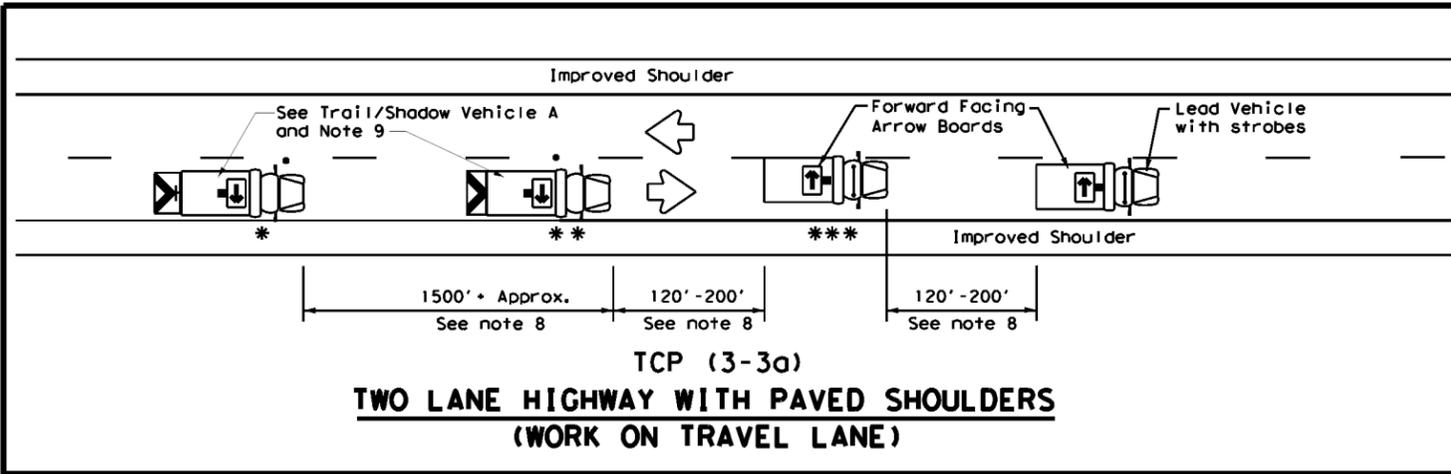


STRIPING FOR TMA

		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS			
TCP(3-2)-13			
FILE: tcp3-2.dgn	DWG: TxDOT	CHK: TxDOT	DWG: TxDOT
© TxDOT December 1985	CONT: 010104	JOB: 131	HIGHWAY: US 181
REVISIONS	DIST: CRP	COUNTY: SAN PATRICIO	SHEET NO.: 35
2-94 4-98			
8-95 7-13			
1-97			

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

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

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.
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, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
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 necessary.
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.

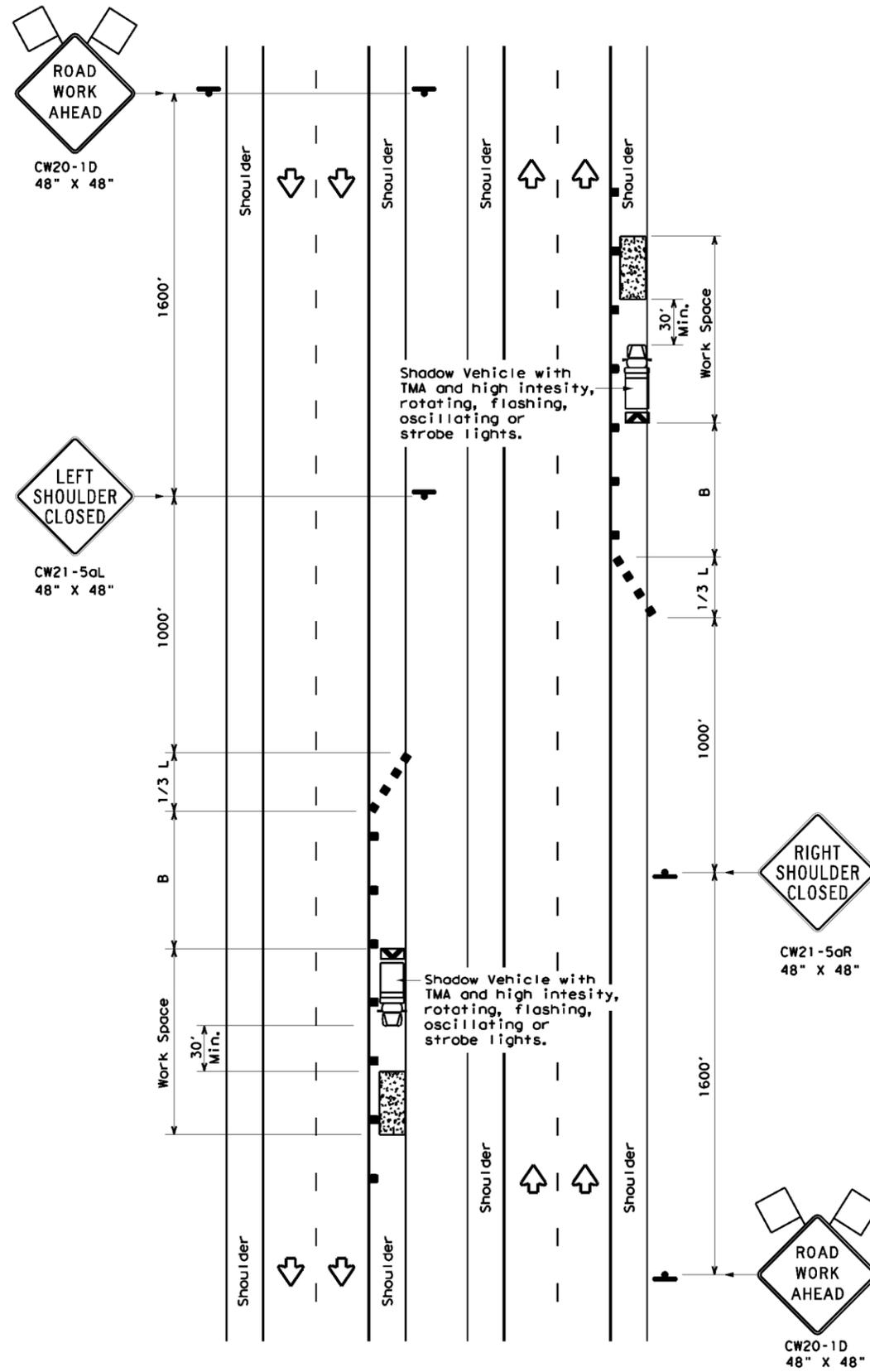
Texas Department of Transportation
Traffic Operations Division Standard

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

FILE: tcp3-3.dgn	DWG: TxDOT	CHK: TxDOT	REV: TxDOT	CR: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181	
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	CRP SAN PATRICIO		36	
1-97 7-14				

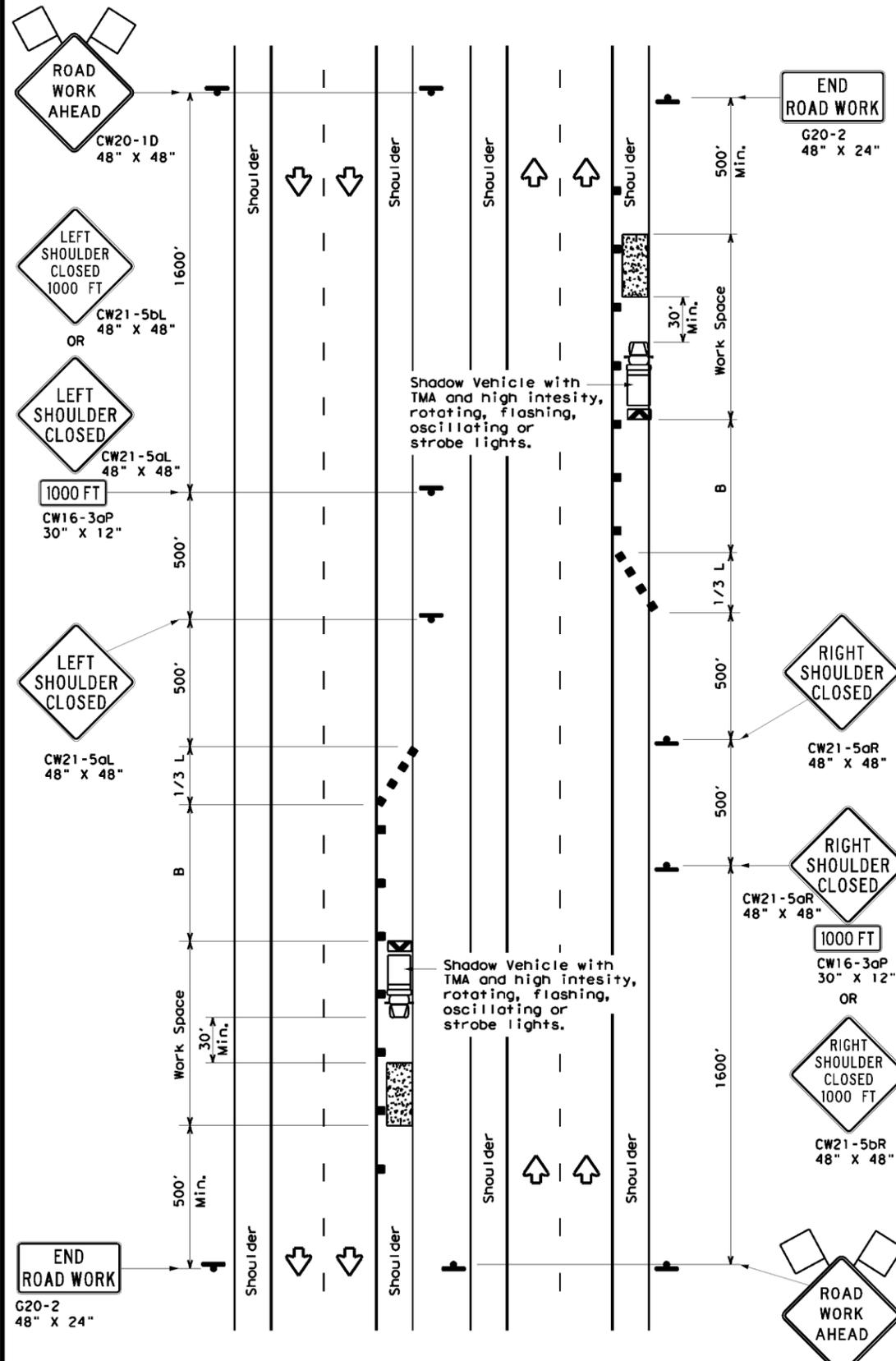
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TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	L = WS ² / 60	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L = WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70	700'	770'	840'	70'	140'	475'	
75	750'	825'	900'	75'	150'	540'	
80	800'	880'	960'	80'	160'	615'	

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP (5-1a)	TCP (5-1b)	TCP (5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.



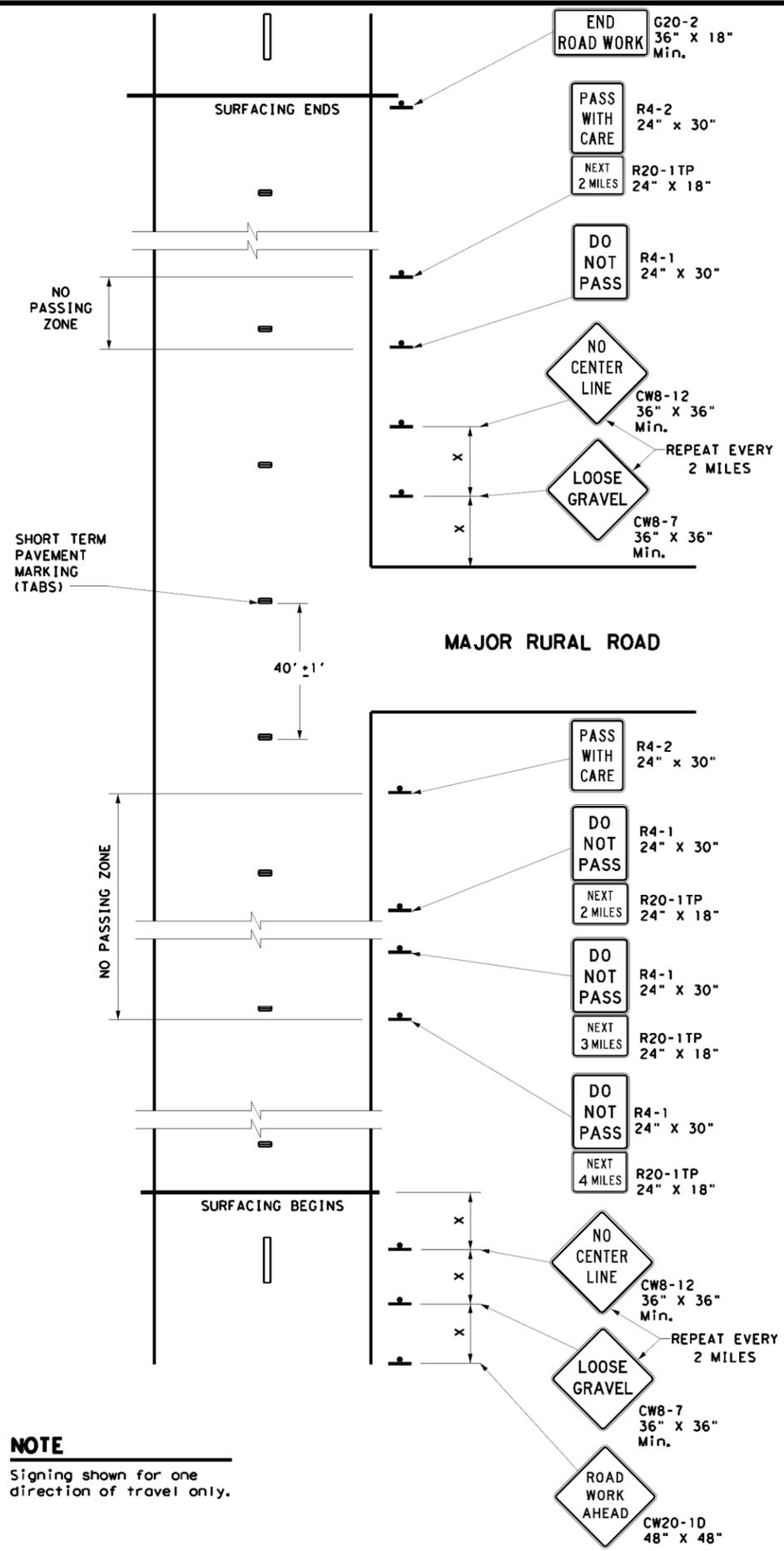
**TRAFFIC CONTROL PLAN
SHOULDER WORK FOR
FREEWAYS / EXPRESSWAYS**

TCP (5-1) - 18

FILE: tcp5-1-18.dgn	DN:	CK:	DR:	CK:
© TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
2-18	REVISIONS	010104	131	US 181
	DIST	COUNTY	SHEET NO.	
	CRP SAN PATRICIO		37	

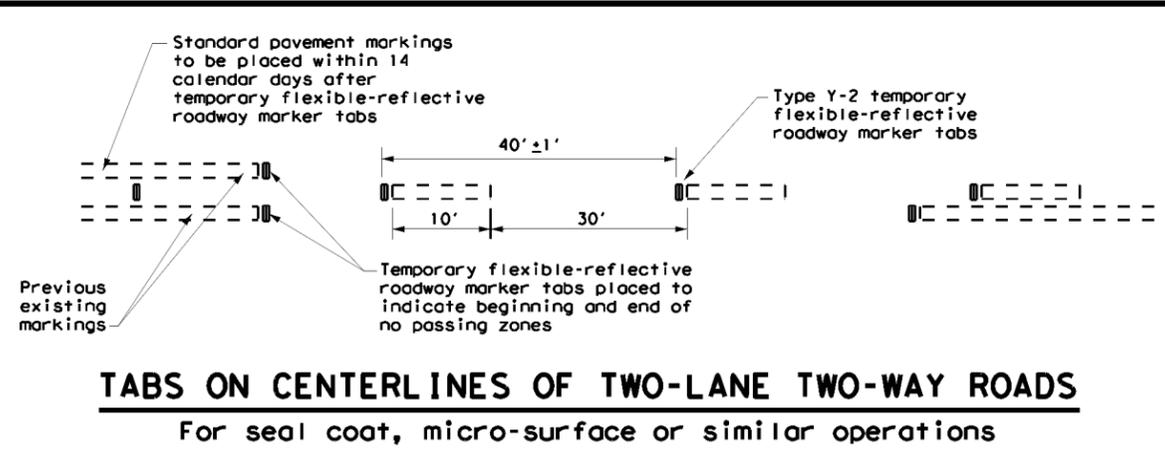
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DATE: 05/09/2023 08:31 AM
FILE: DOCUMENT NAME



NOTE
Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS
For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

- A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.
- B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.
- C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.
- D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

- A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.
- B. At the time construction activity obliterates the existing center line markings (low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.
- C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

- A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.
- B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

- A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.
- B. Tabs shall not be used to simulate edge lines.
- C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

- A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.
- B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T) sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

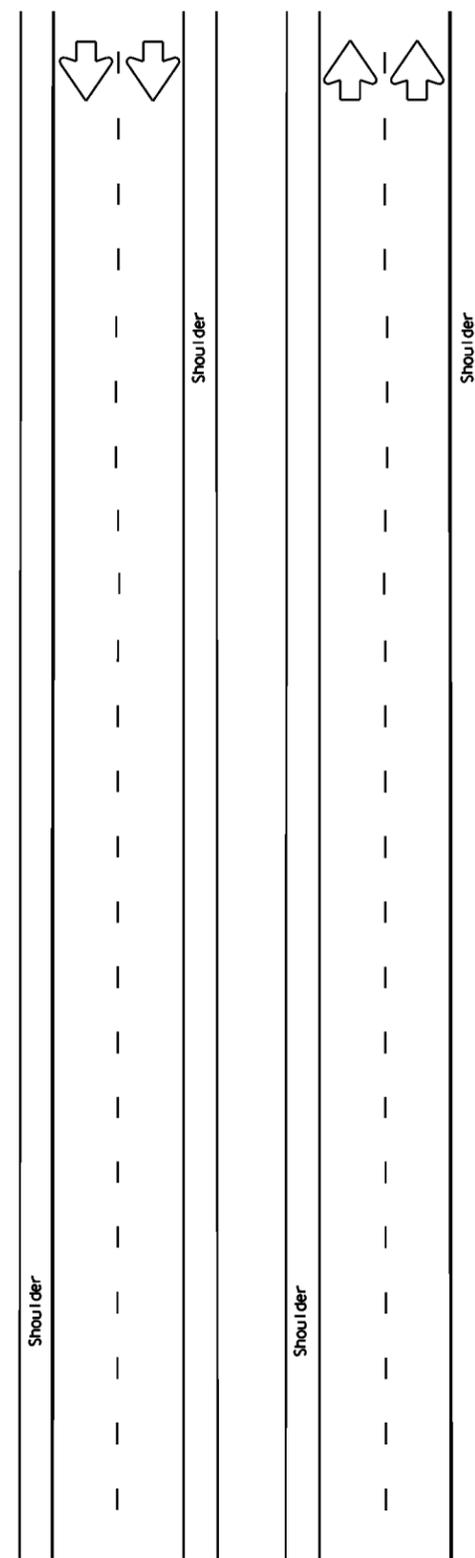


TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS
TCP (7-1) - 13

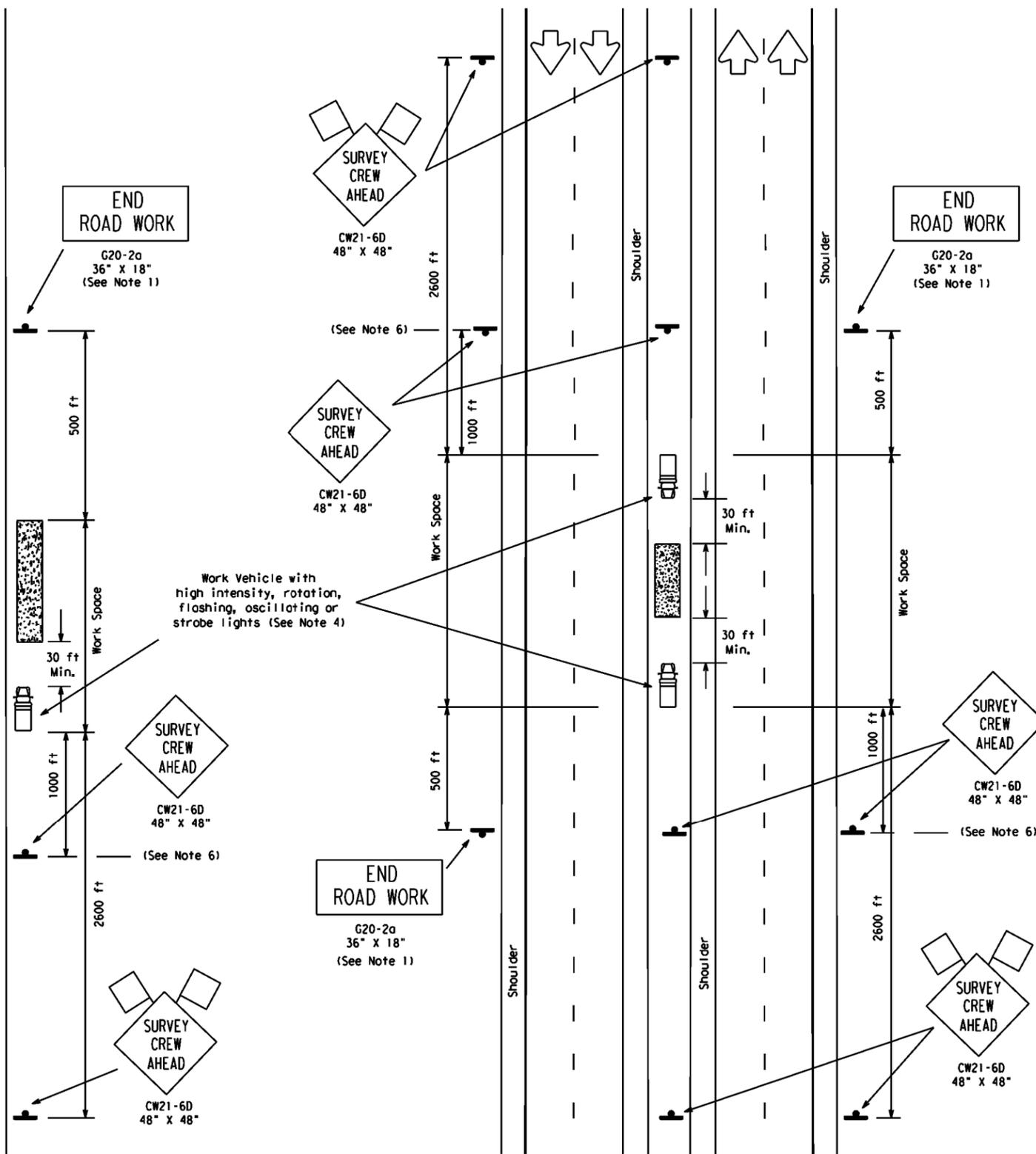
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4-92 4-98	DIST	COUNTY	SHEET NO.	
1-97 7-13	CRP	SAN PATRICIO	38	

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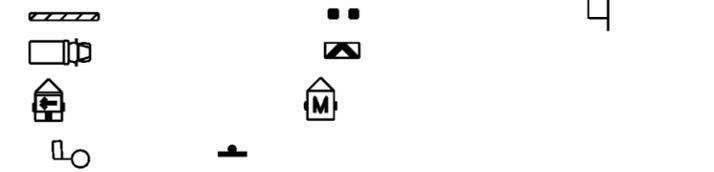
TCP (S-4a)
 WORK OFF RIGHT SHOULDER
 OF DIVIDED ROADWAYS



TCP (S-4b)
 WORK IN MEDIAN
 OF DIVIDED ROADWAYS

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

8-18-08 Revision
 Corrected misspelling.



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

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

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

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

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
 - When median work is protected on one side by existing median barriers, signing and protection vehicle may be omitted for the protected direction only.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for "SURVEY CREW AHEAD" signs.
 - A Shadow Vehicle with a TMA and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.
 - The CW21-6D "SURVEY CREW AHEAD" sign placed at 1000' ahead of the work space is optional, at the discretion of the Engineer. The signs shown at 2600' from the work space are required.
 - Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

Texas Department of Transportation
 Traffic Operations Division

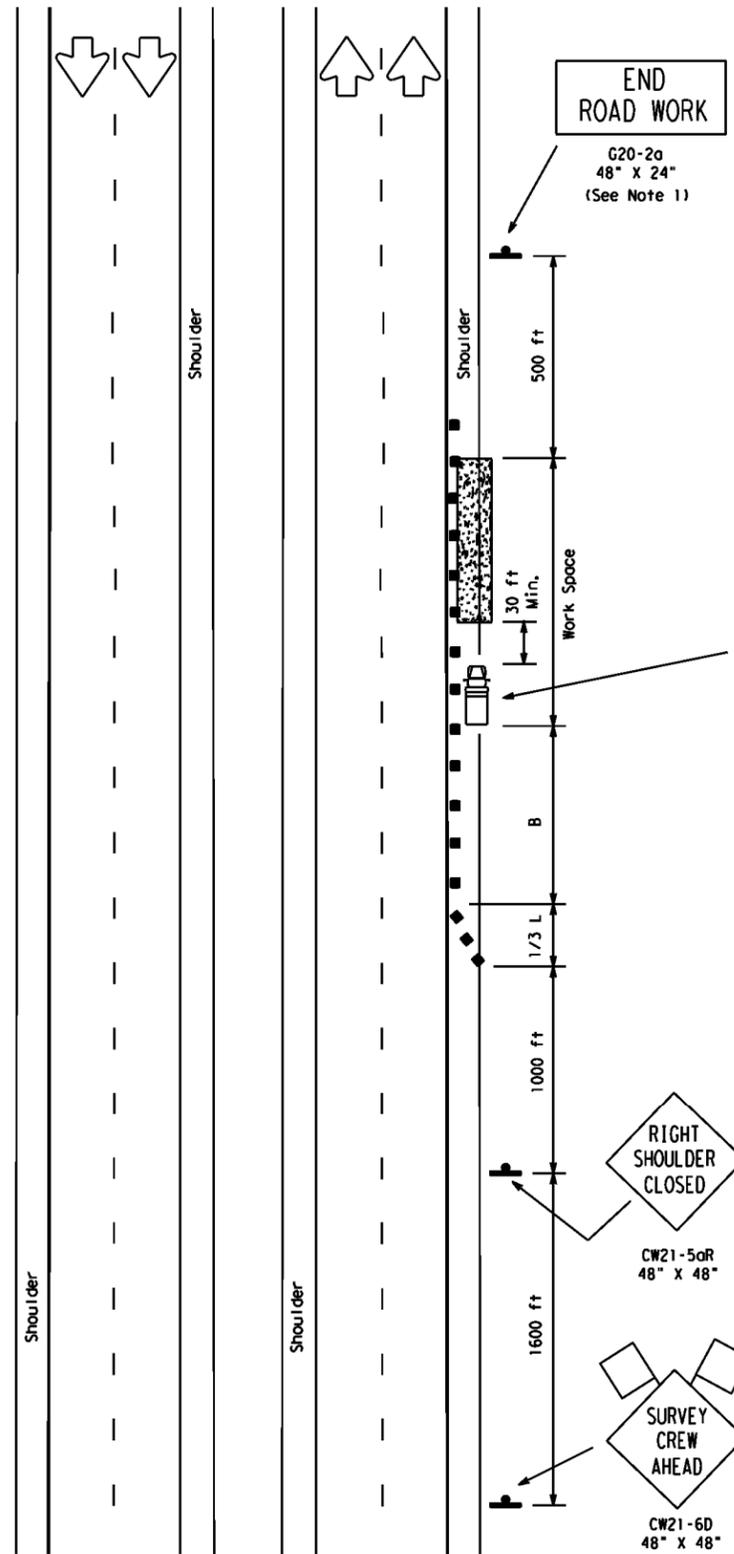
TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP (S-4) - 08A

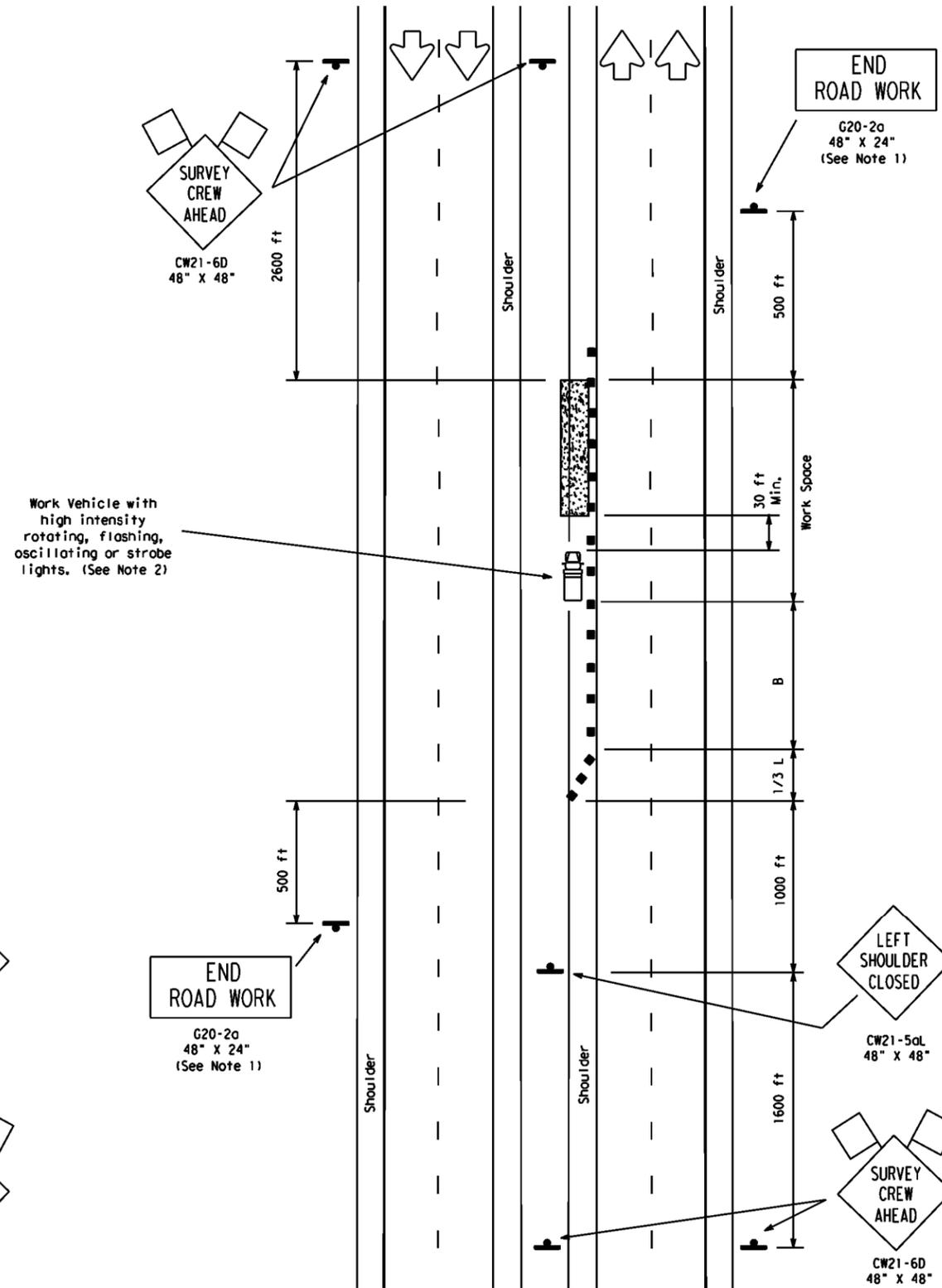
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TCP (S-5a)
 WORK ON RIGHT SHOULDER
 OF DIVIDED ROADWAYS



TCP (S-5b)
 WORK ON MEDIAN SHOULDER
 OF DIVIDED ROADWAYS

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

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

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

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

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

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
 - For short duration work, the Shadow Vehicle with TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
 - Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
 - If shoulders are not present, the 1/3L shoulder taper is to be omitted and four channelizing devices shall be placed in front of the arrow panel, perpendicular to traffic.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

Texas Department of Transportation
 Traffic Operations Division

**TRAFFIC CONTROL PLAN
 FOR SURVEYING
 OPERATIONS**

TCP (S-5) -08

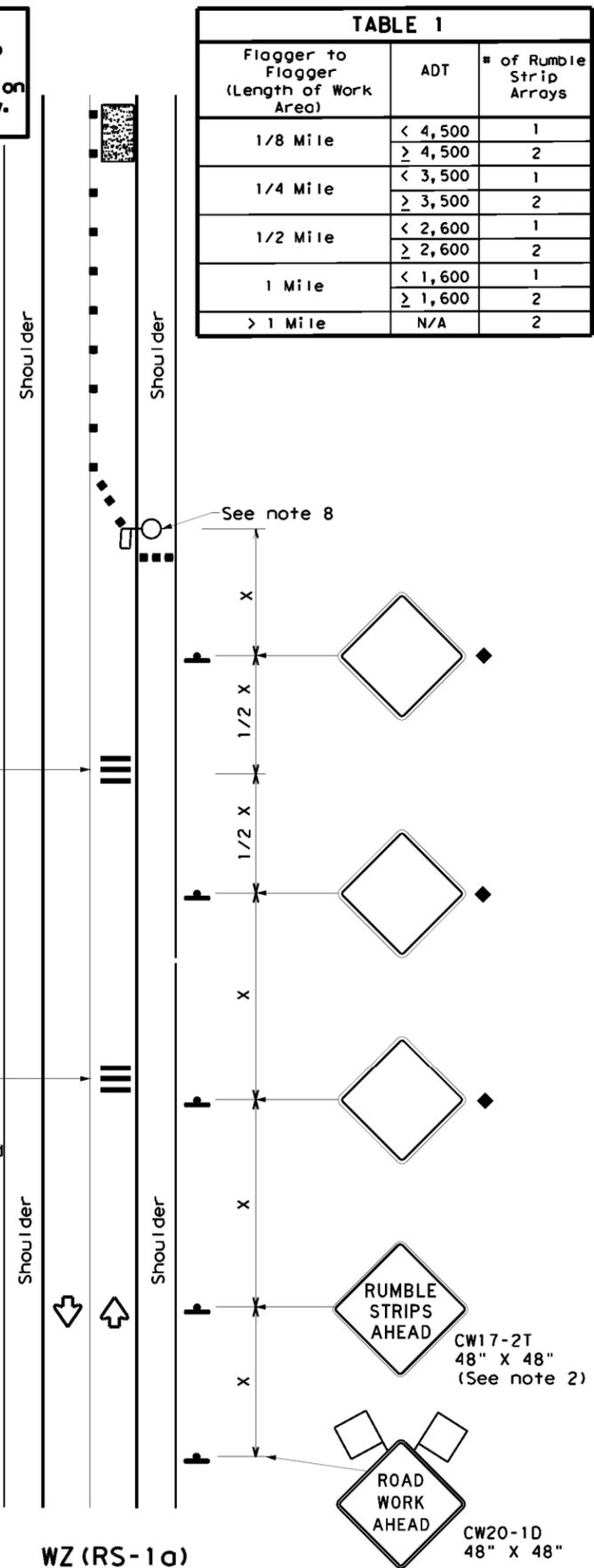
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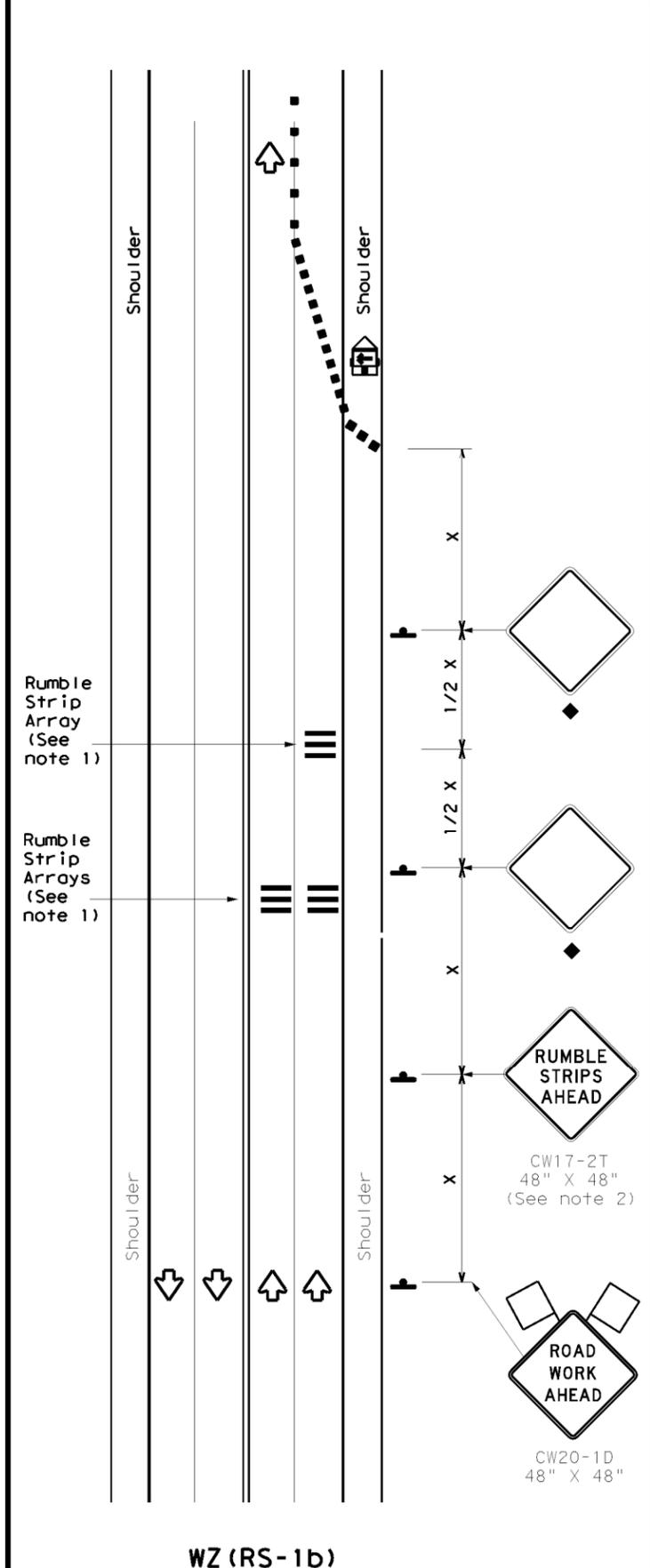
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Warning sign and rumble strip sequence in opposite direction is same as below.

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



RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

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

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

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

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

Texas Department of Transportation Traffic Safety Division Standard

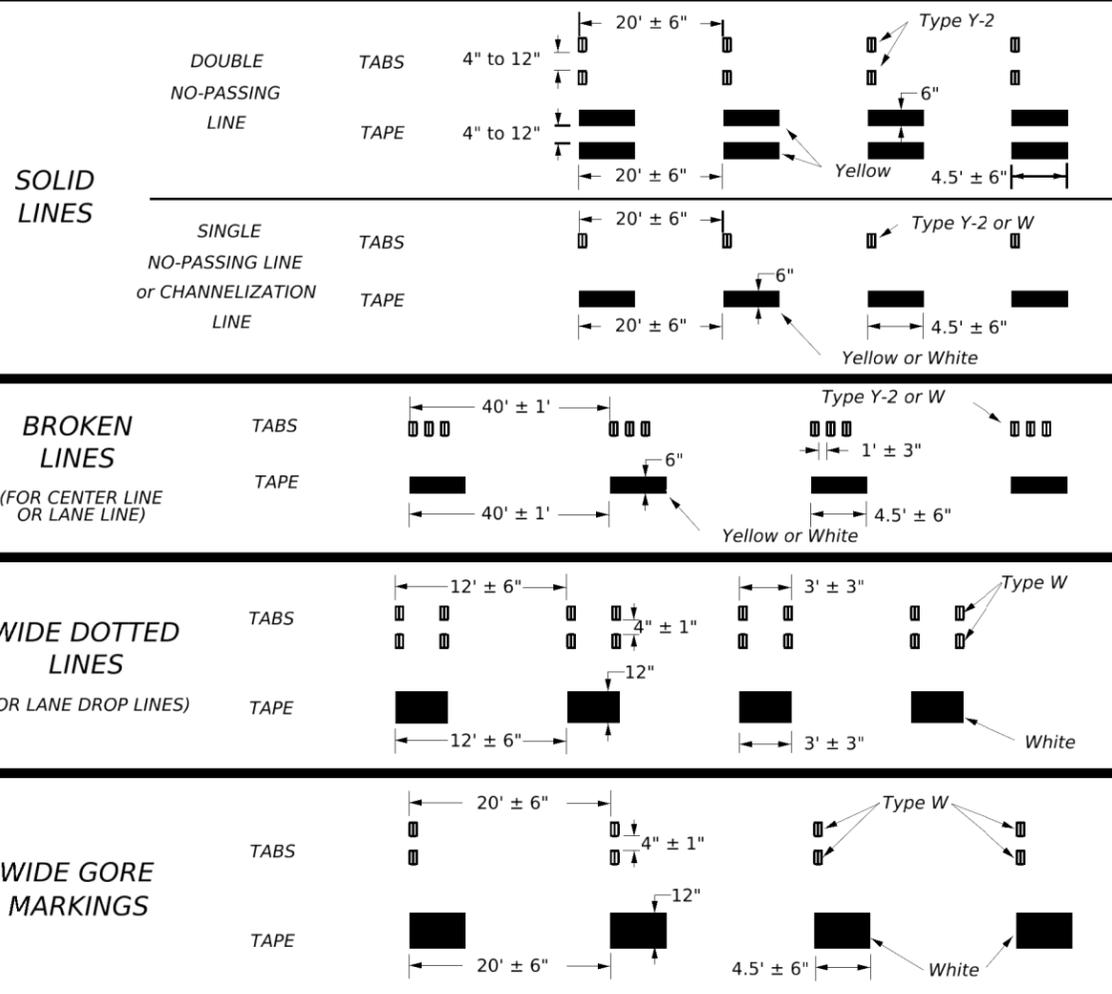
TEMPORARY RUMBLE STRIPS

WZ (RS) - 22

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2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	CRP	SAN PATRICIO	41	

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



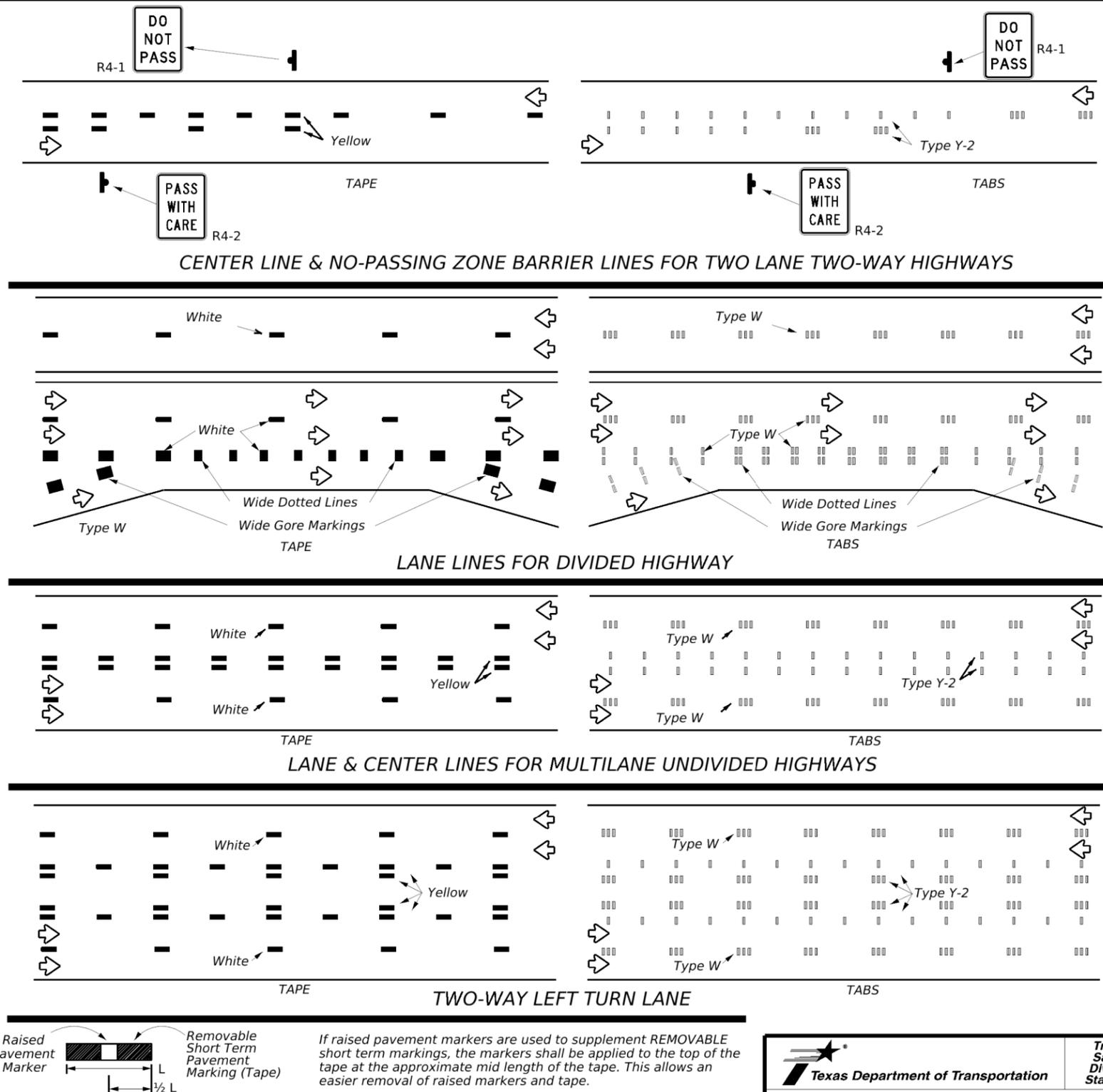
NOTES:

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

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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



WORK ZONE SHORT TERM PAVEMENT MARKINGS

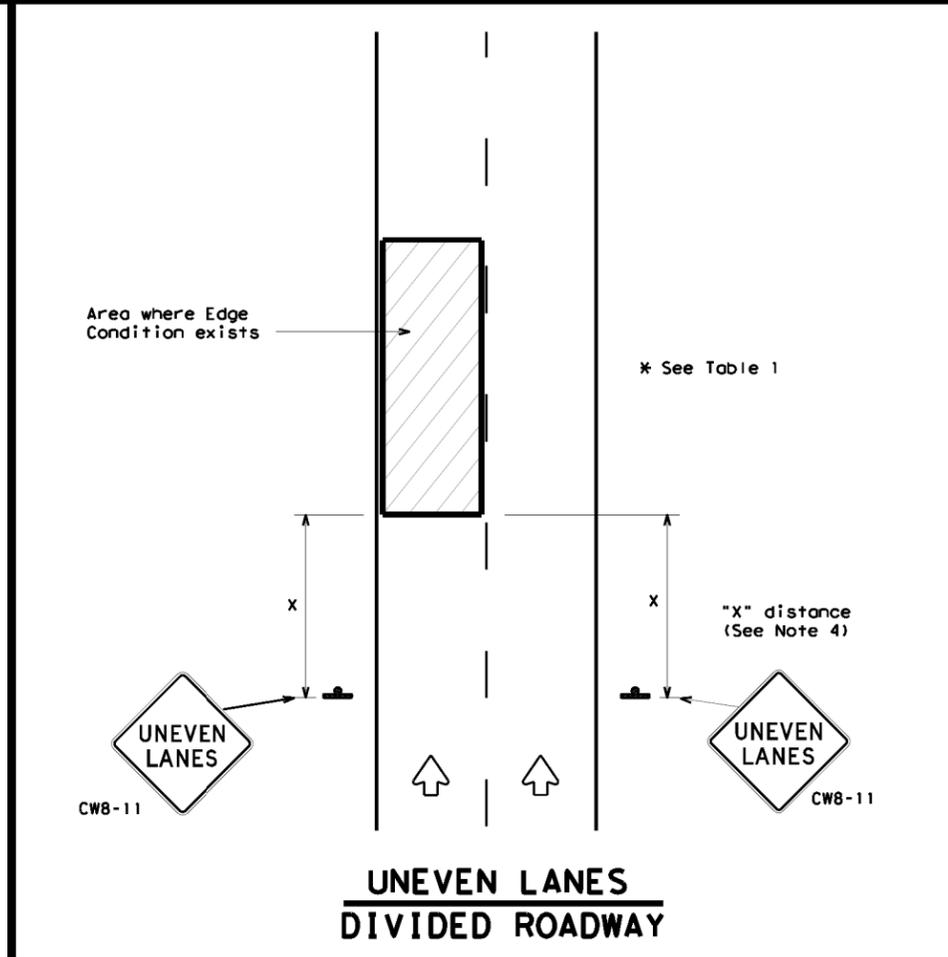
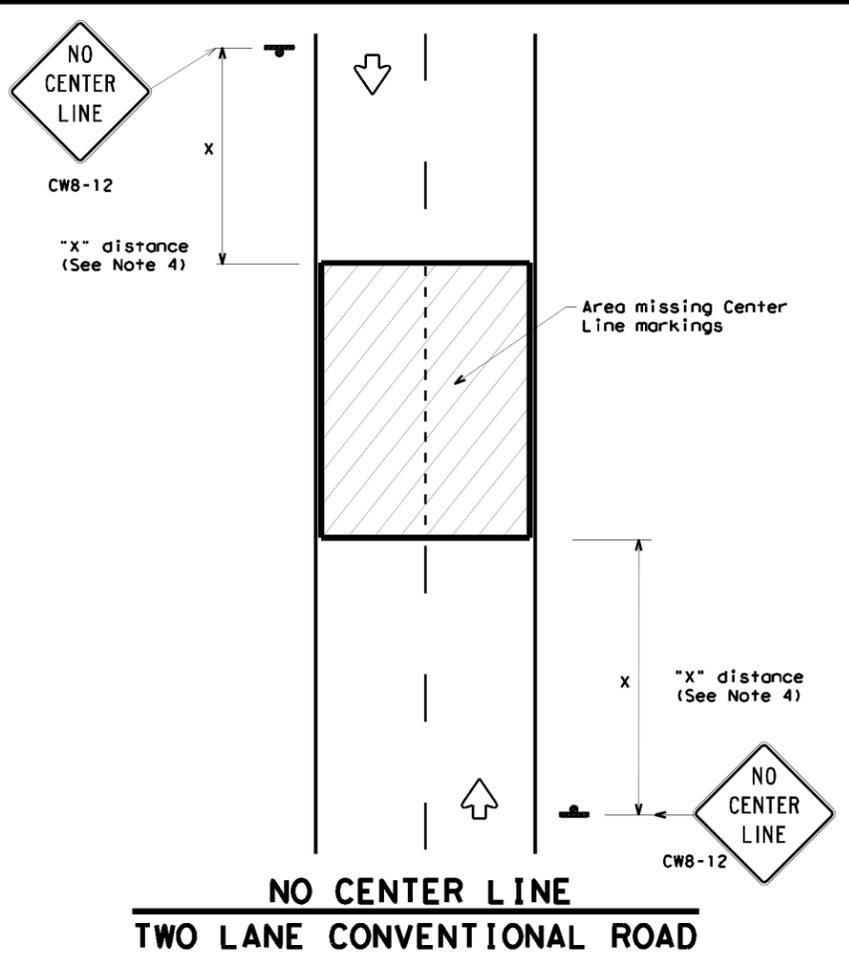
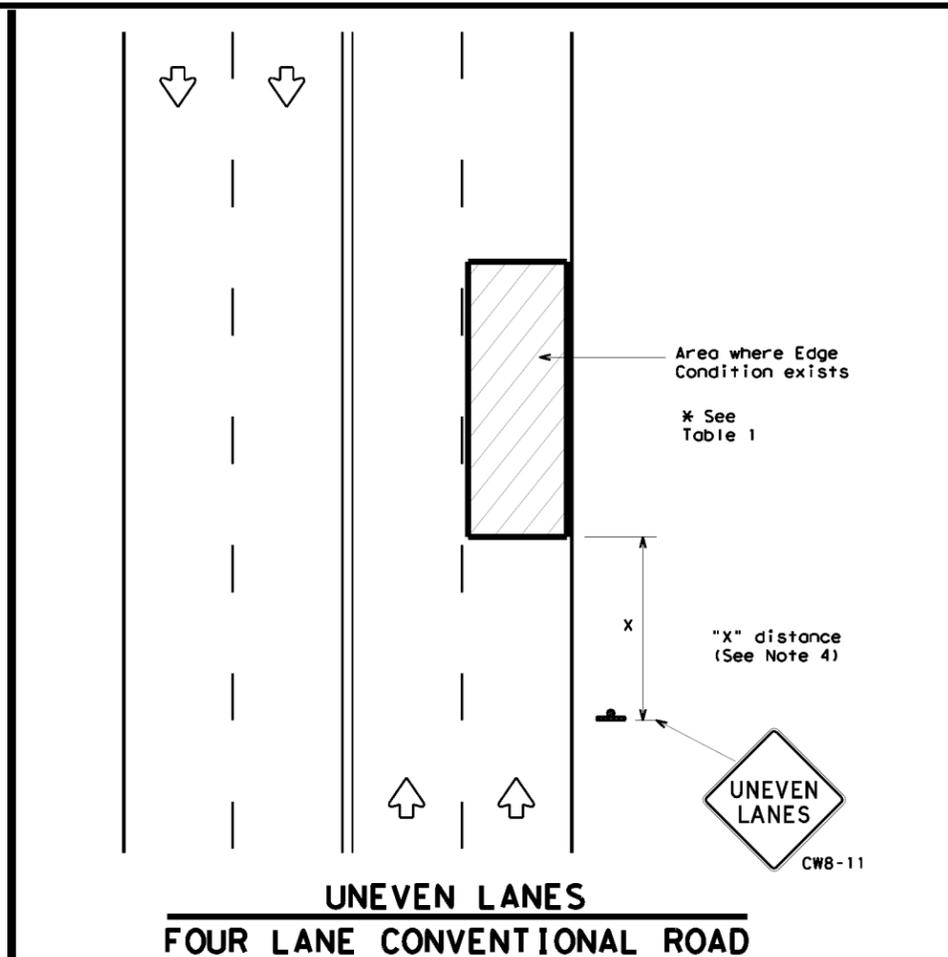
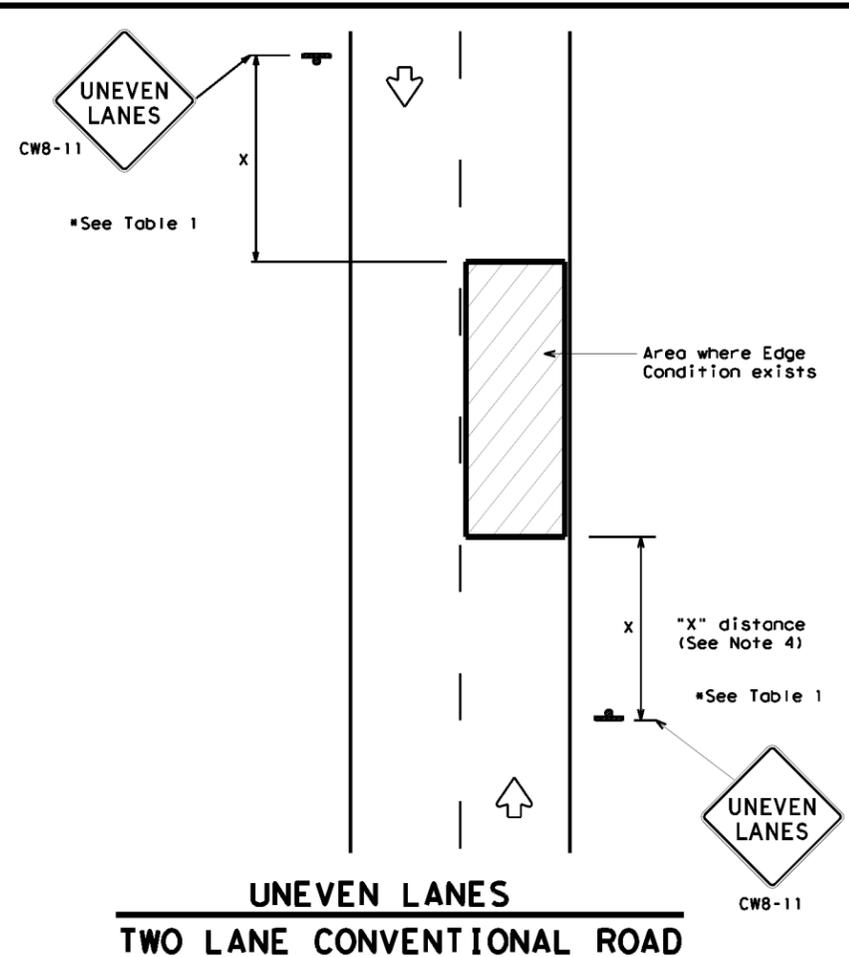
WZ(STPM)-23

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DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1		
Edge Condition	Edge Height (D)	* Warning Devices
①	Less than or equal to: 1/4" (maximum-planing) 1/2" (typical-overlay)	Sign: CW8-11
②	Less than or equal to 3"	Sign: CW8-11
③	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"



SIGNING FOR UNEVEN LANES

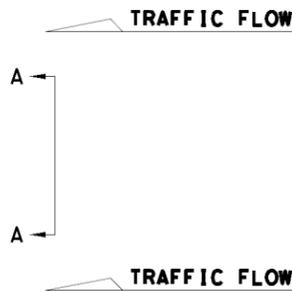
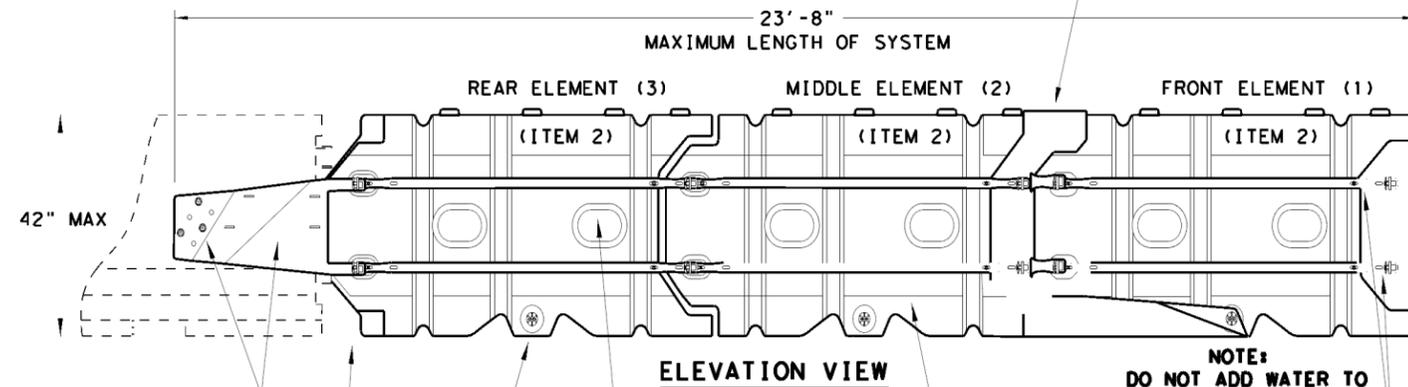
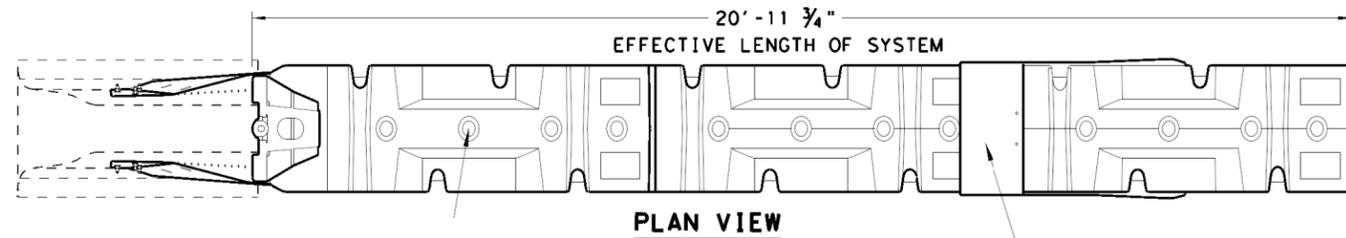
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8-95 2-98 7-13	DIST	COUNTY	SHEET NO.	
1-97 3-03	CRP SAN PATRICIO		43	

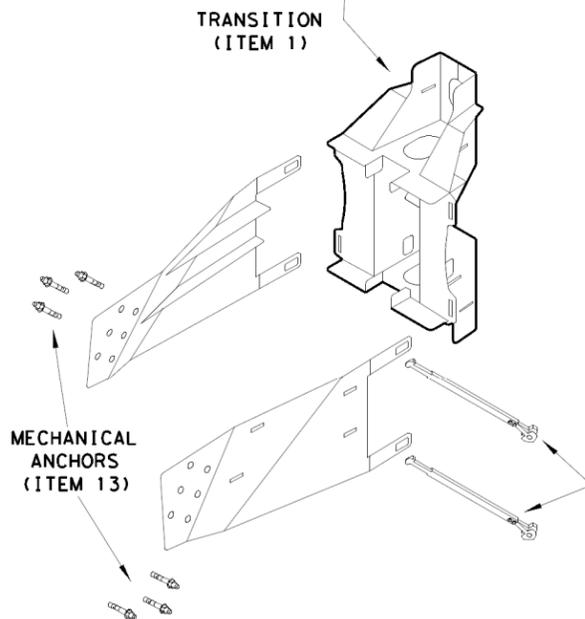
DISCLAIMER: THIS STANDARD IS COVERED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TxDOT FOR ANY PURPOSE WHATSOEVER. TxDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE:
FILE:

SYSTEM SHOWN - ABSORB-M TL-3



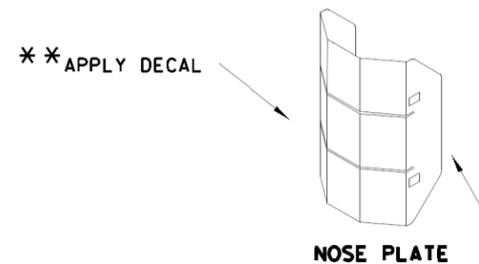
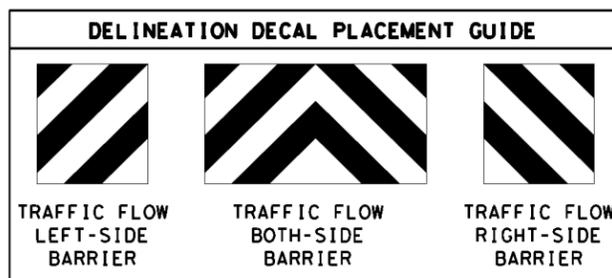
NOTE:
DO NOT ADD WATER TO
FRONT ELEMENT
TL-2 OR TL-3 UNITS



TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14' - 7 3/4"	17' - 4"
TL-3	3	20' - 11 3/4"	23' - 8"

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION - (GALV)	1	1
2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
3	BSI-4004598	FILL CAPS	8	12
4	BSI-4004599	DRAIN PLUGS	2	3
5	BSI-1809053-00	TENSION STRAP - (GALV)	8	12
6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE - (GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND) - (GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND) - (GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

* COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY



NOTE:
APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE.
DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

** NOTE: (PROVIDED BY OTHERS)
ENGINEER OR CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE CORRECT DECAL PER TRAFFIC FLOW, LEFT, RIGHT OR BOTH-SIDES.

GENERAL NOTES

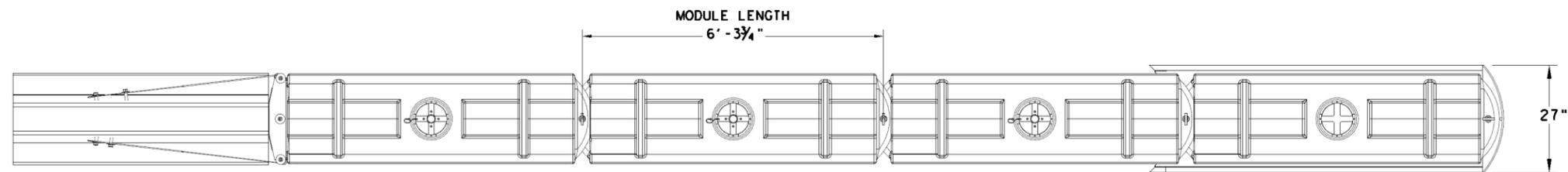
- FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
- THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
- THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
- MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
- THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
- THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
- DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

SACRIFICIAL

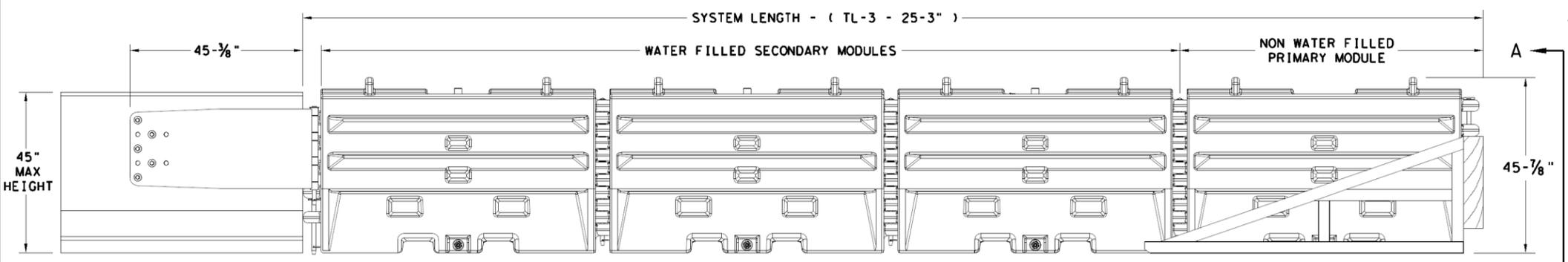
		Design Division Standard	
LINDSAY TRANSPORTATION SOLUTIONS CRASH CUSHION (MASH TL-3 & TL-2) TEMPORARY - WORK ZONE ABSORB (M) - 19			
FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2019	CONT SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	44	

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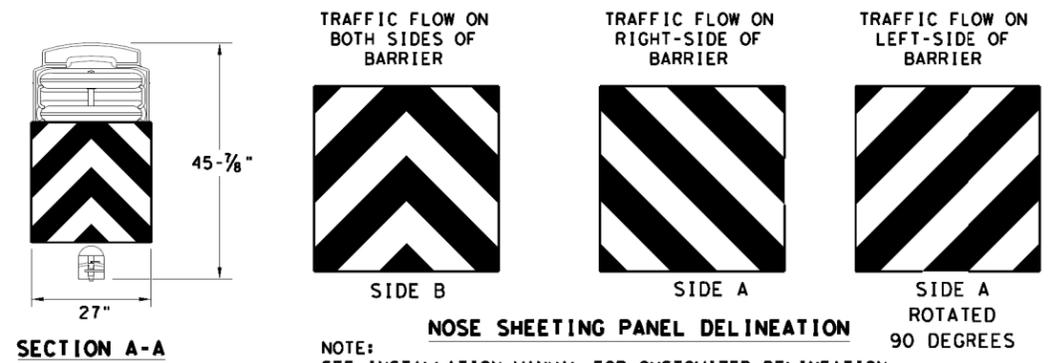
DATE: FILE:



PLAN VIEW



ELEVATION VIEW



SECTION A-A

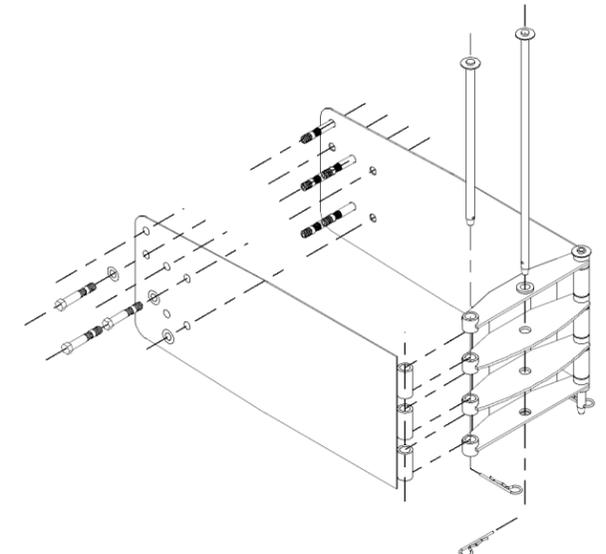
NOSE SHEETING PANEL DELINEATION
 NOTE: SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25' 3"

GENERAL NOTES

- REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
- THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
- MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
- THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
- THE SLED SYSTEM CAN BE ATTACHED TO:
 - CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
 - STEEL BARRIER
 - PLASTIC BARRIER
 - CONCRETE BRIDGE ABUTMENTS
 - W-BEAM GUARD RAIL
 - THRIE BEAM GUARD RAIL

BILL OF MATERIAL		
PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE: SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

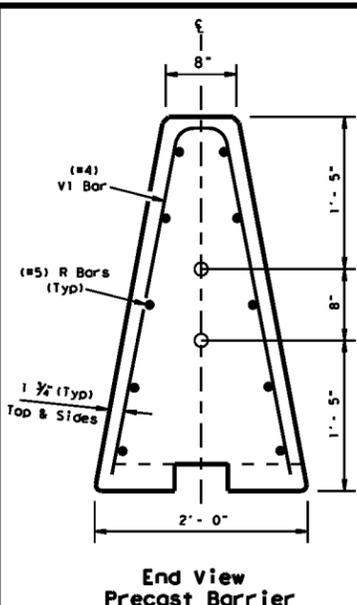
Design Division Standard

SLED CRASH CUSHION TL-3 MASH COMPLIANT (TEMPORARY, WORK ZONE) SLED-19

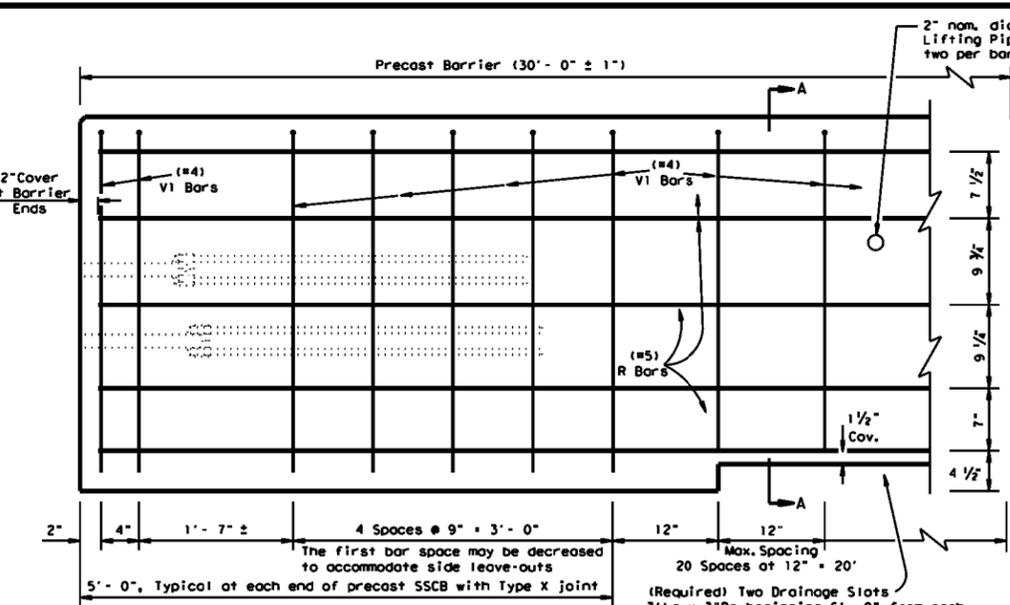
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© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181	
	DIST	COUNTY	SHEET NO.	
	CRP	SAN PATRICIO	45	

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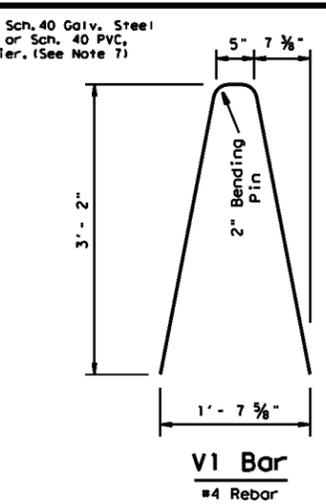
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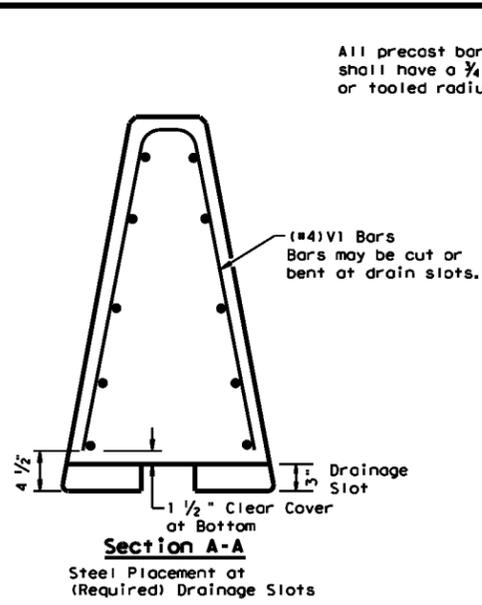
End View Precast Barrier
Pipe locations for Joint Type X connection



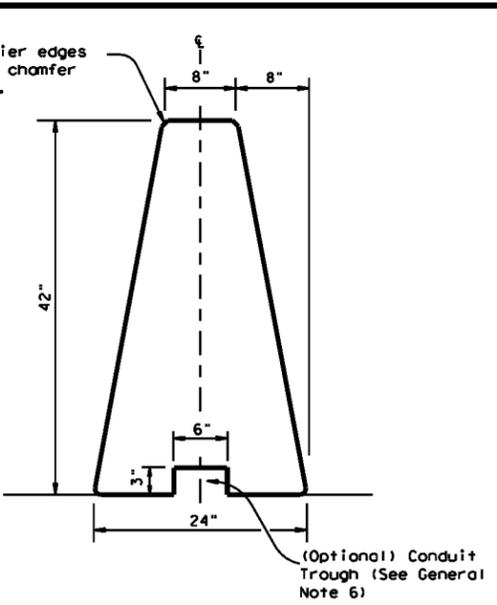
Reinforcement for Precast (SSCB) Single Slope Concrete Barrier (Type 1)
Showing reinforcement for Joint Connection (Type X)



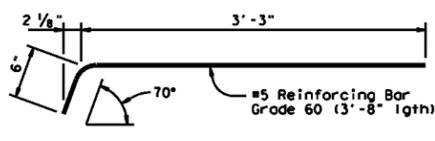
V1 Bar
#4 Rebar
Note: V1 Bars above the drainage slots may be bent to accommodate 1 1/2 inch clear cover as directed by the Engineer.



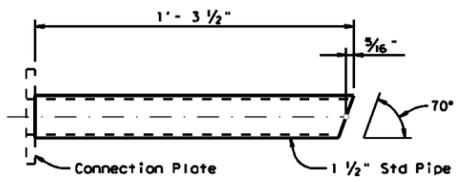
Section A-A
Steel Placement at (Required) Drainage Slots



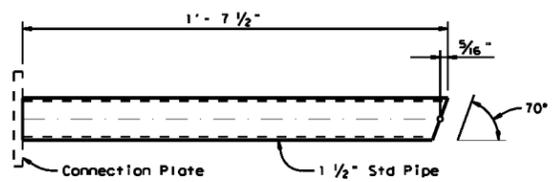
Single Slope Concrete Traffic Barrier
Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



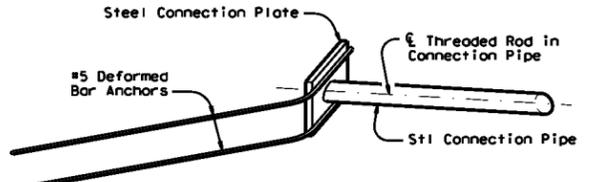
DEFORMED BAR ANCHOR DETAILS
Two (2) Bars required per assembly. Eight (8) required per Joint.



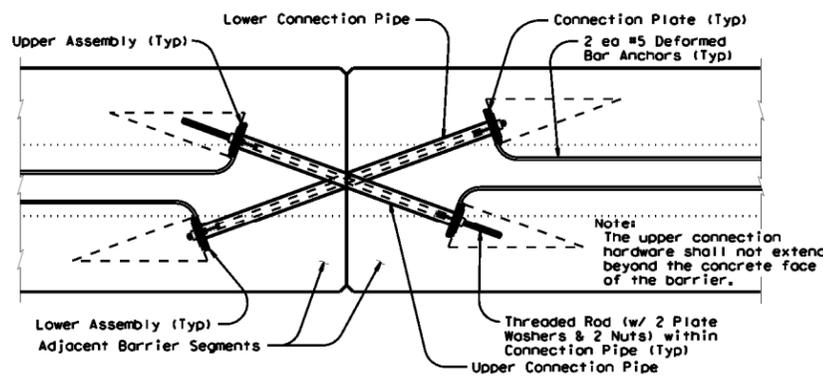
UPPER CONNECTION PIPE DETAILS
One (1) Steel Pipe required per Upper Assembly. Two (2) required per Joint.



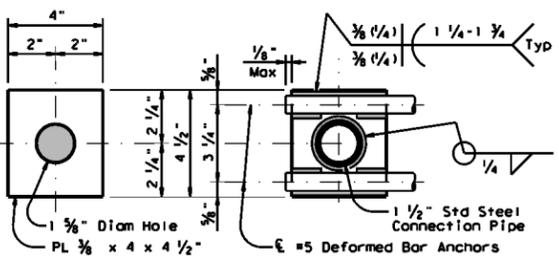
LOWER CONNECTION PIPE DETAILS
One (1) Steel Pipe required per Lower Assembly. Two (2) required per Joint.



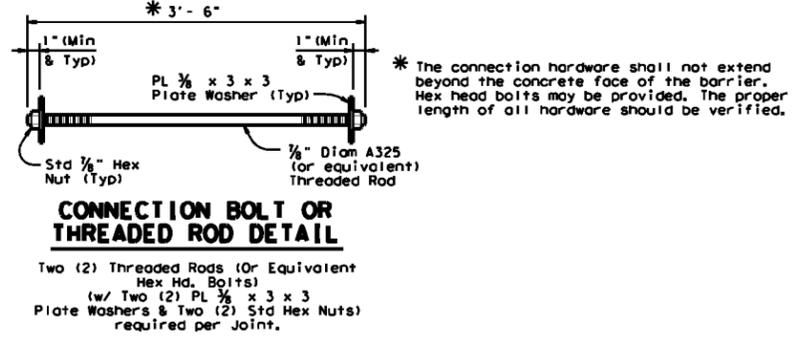
ISOMETRIC OF TYPICAL WELDED ASSEMBLY
Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.



TYPE X JOINT INSTALLATION DETAIL
Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

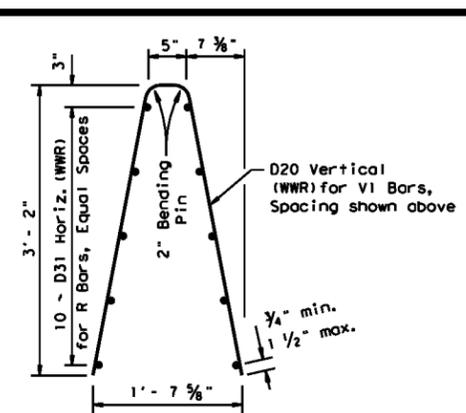


CONNECTION BOLT OR THREADED ROD DETAIL
One (1) Plate required per assembly. Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



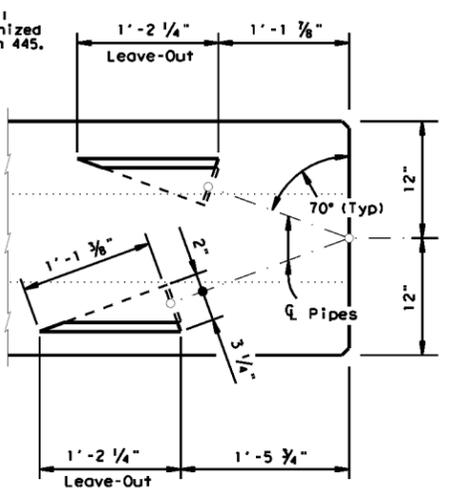
CONNECTION BOLT OR THREADED ROD DETAIL
Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts) (w/ Two (2) PL 3/8 x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.



Welded Wire Reinforcement (WWR) Option for Bars R and V1

- (WWR) General Notes**
- Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
 - Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
 - All reinforcement shall comply with Item 440, "Reinforcing Steel."
 - Combinations of reinforcing steel and WWR will be permitted, as directed by the Engineer. The dimension from the end of the barrier section to the first wire shall not exceed 3".



BARRIER PLAN AT JOINT

General Notes

- Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
- Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
- Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
- All precast barrier edges shall have a 1/4 inch chamfer or a tooled radius.
- All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier pavement.
- Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
- Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
- Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
- All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."

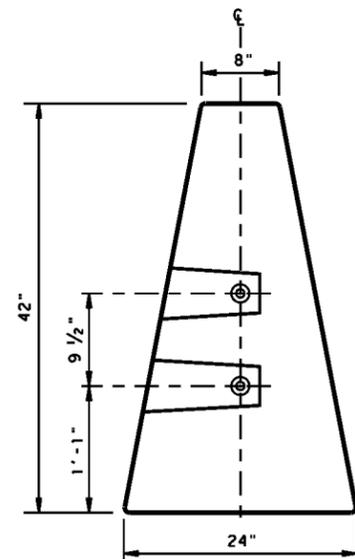
SHEET 1 OF 2

Texas Department of Transportation
Design Division Standard

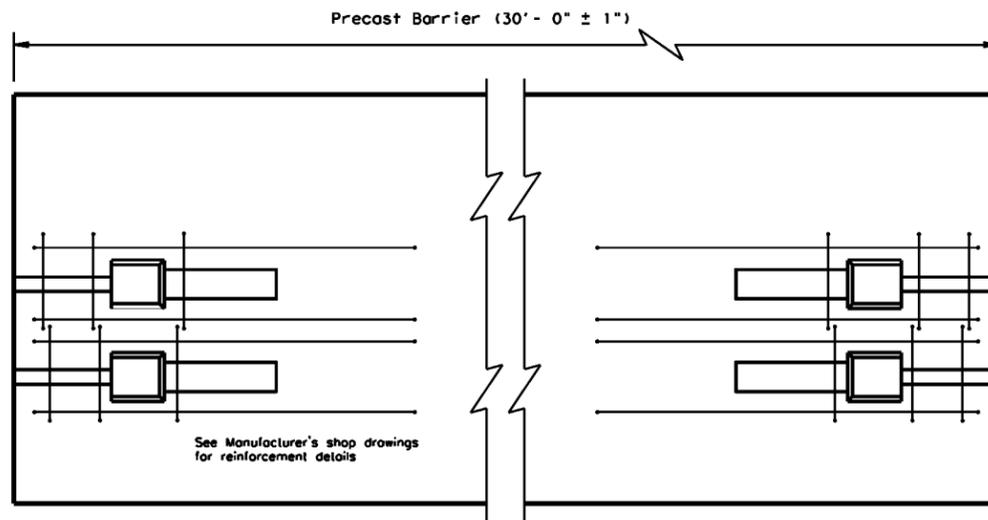
SINGLE SLOPE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
SSCB(2)-10

FILE: sscb210.dgn	DNR TxDOT	CR: AM	DNR BD	CR:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY	SHEET NO.	
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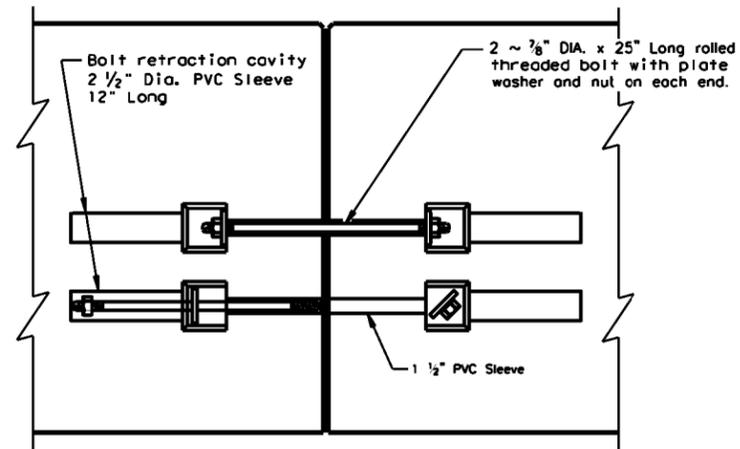
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END VIEW
"QUICK-BOLT" POCKET LOCATIONS

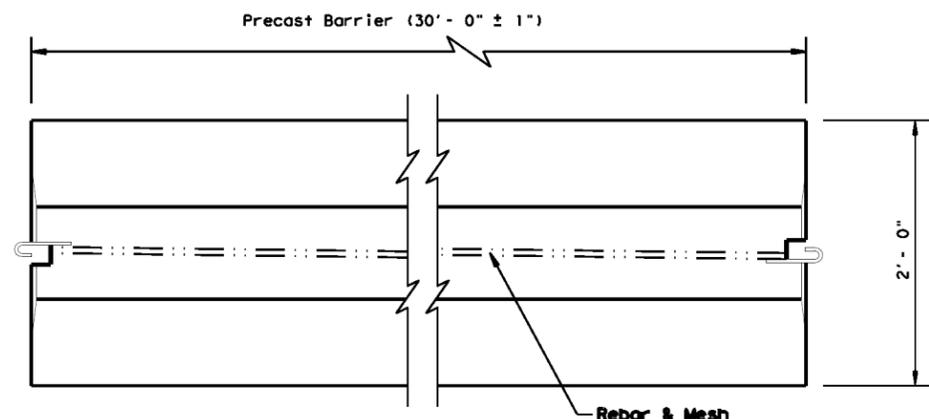


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

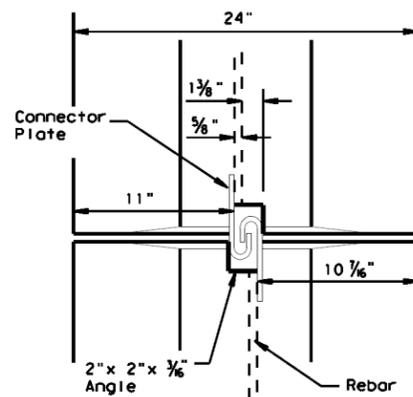


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

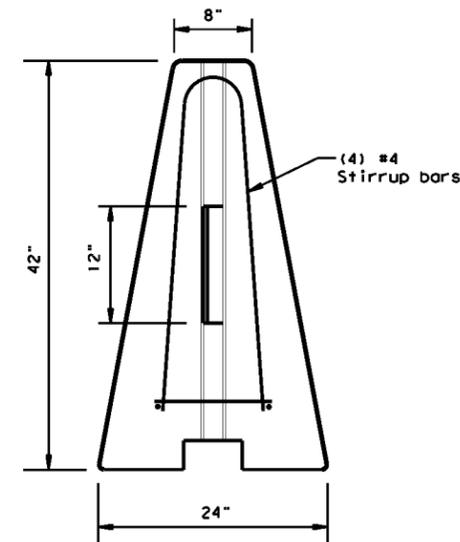
Joint Connection (Type Q)



TOP VIEW
PRECAST (SSCB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



VIEW FROM ABOVE
J-J HOOK CONNECTION



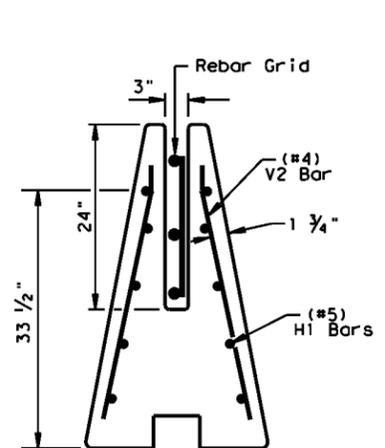
END VIEW

Proprietary Joint Connections (SSCB)

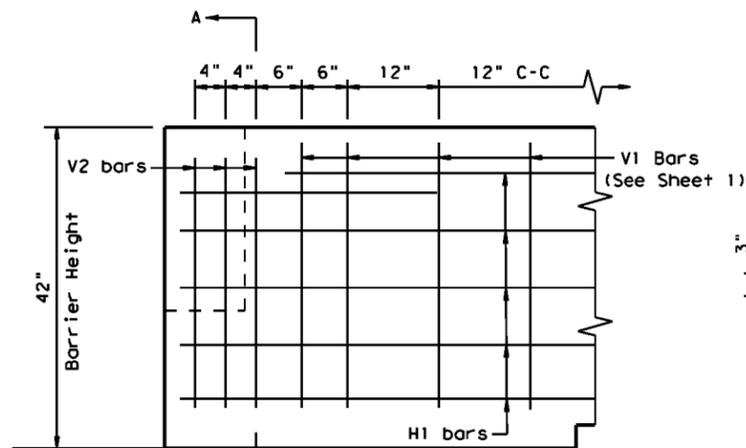
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexor Concrete, (210)497-3773

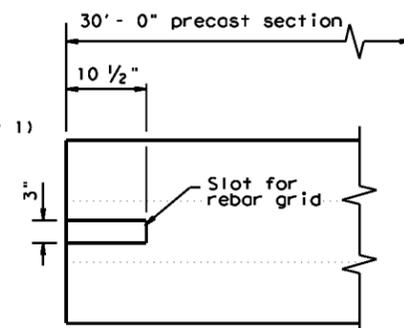
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



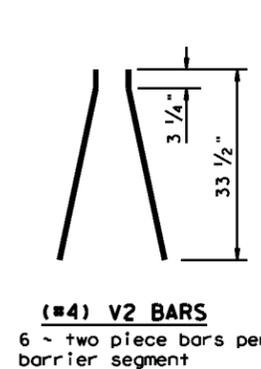
SECTION A-A
Showing (Type R)
Rebar Grid



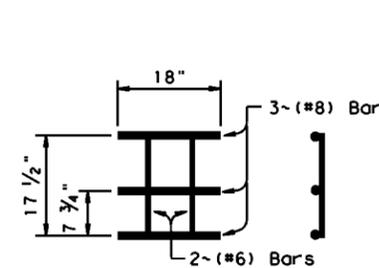
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per
barrier segment



WELDED REBAR GRID

Joint Connection (Type R)

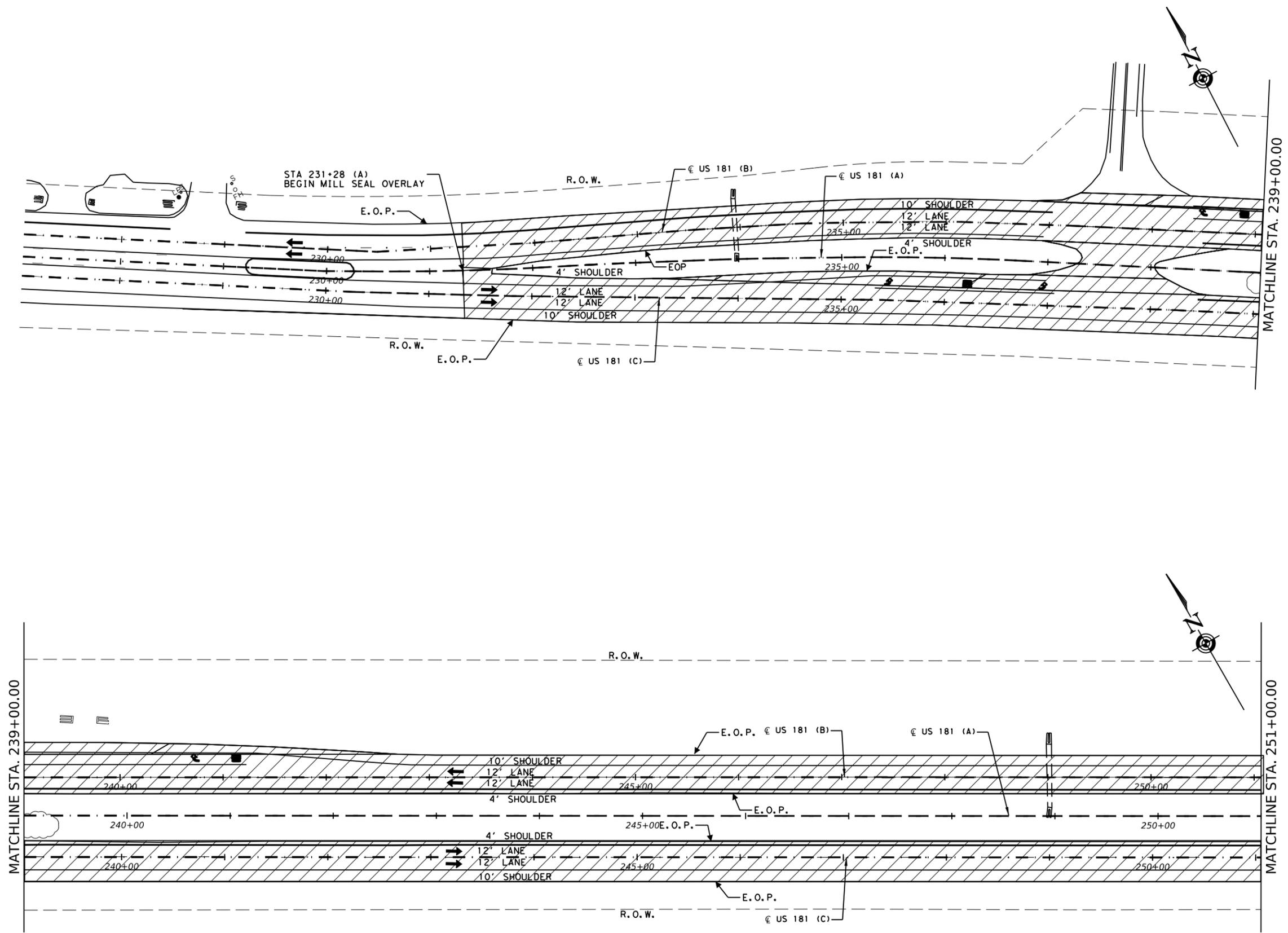
SINGLE SLOPE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
SSCB(2) - 10

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© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181	
	DIST	COUNTY	SHEET NO.	
	CRP SAN PATRICIO		47	

DATE:
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LEGEND

5" PLANE UNDERSEAL
 3" HMA TY-B
 2" HMA TY-D

SEE PLAINING DETAIL SHEET

DIRECTION OF TRAFFIC



E. Martinez

11/03/2023



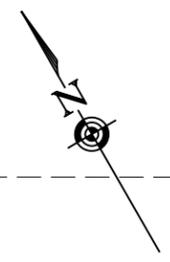
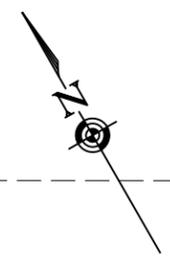
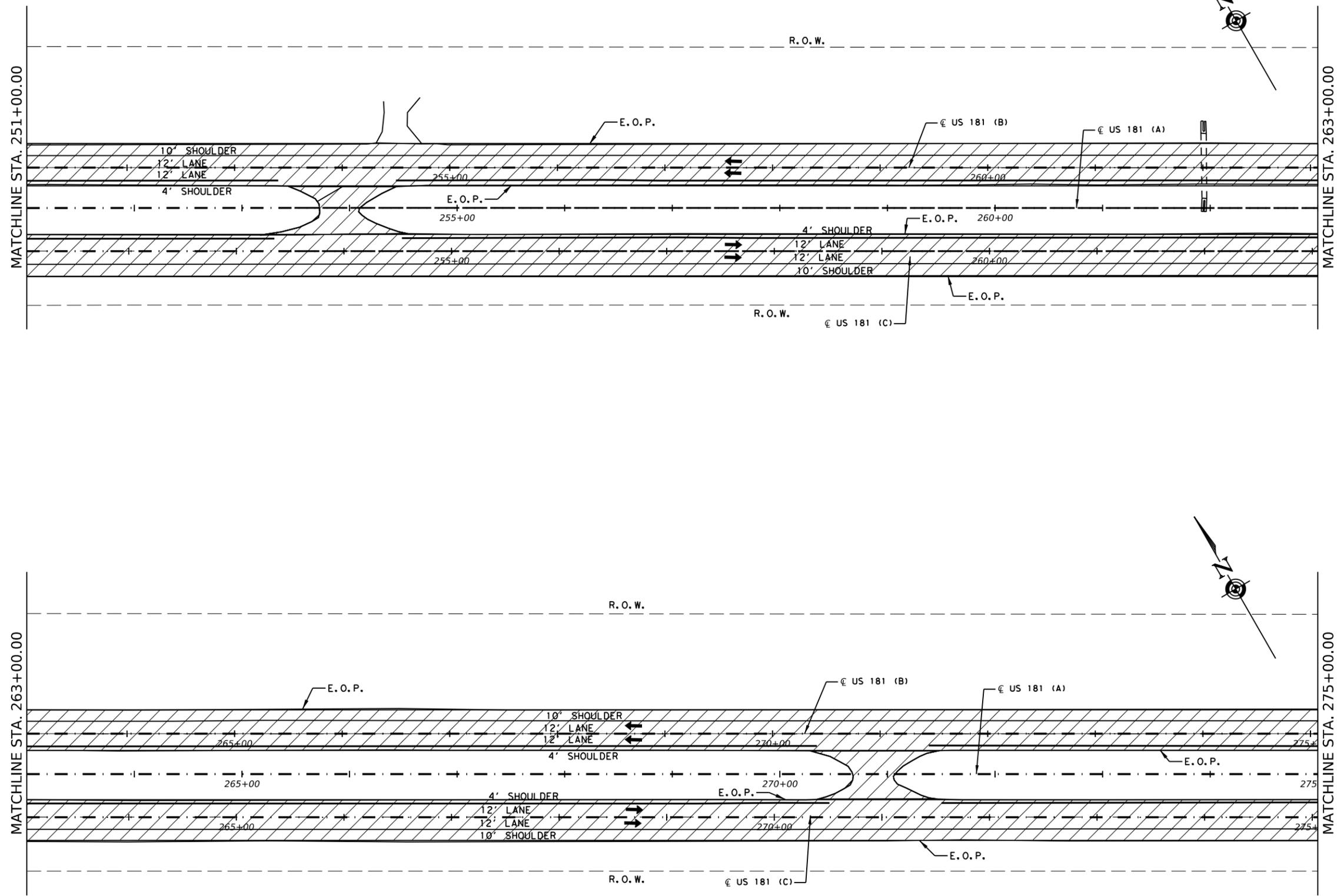
US 181
 ROADWAY LAYOUTS

SHEET 1 OF 14

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0101	04	131	US 181
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CK: _____
 DW: _____
 CK: _____
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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



E. Martinez

11/03/2023

Texas Department of Transportation

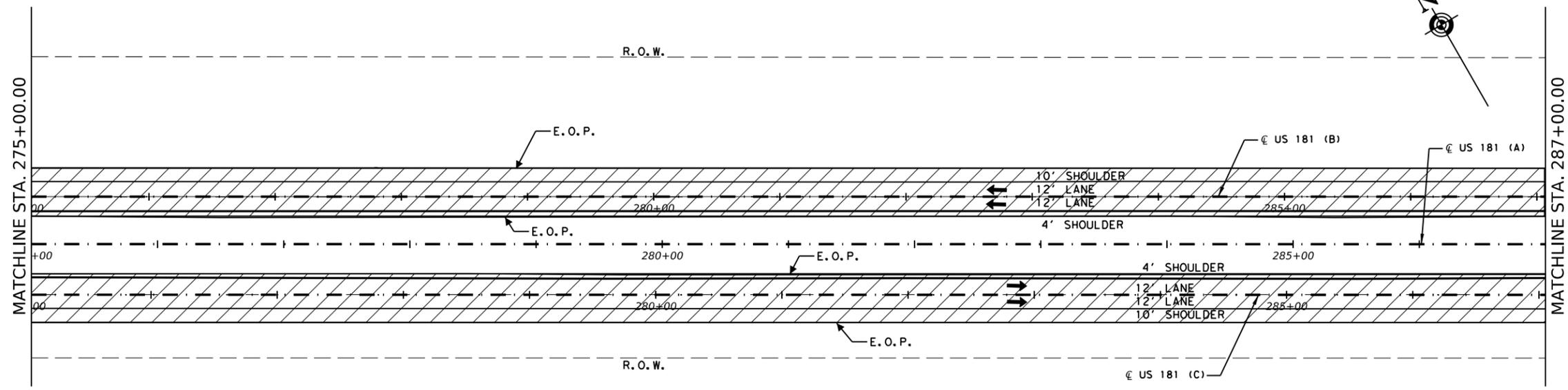
US 181

ROADWAY LAYOUTS

SHEET 2 OF 14

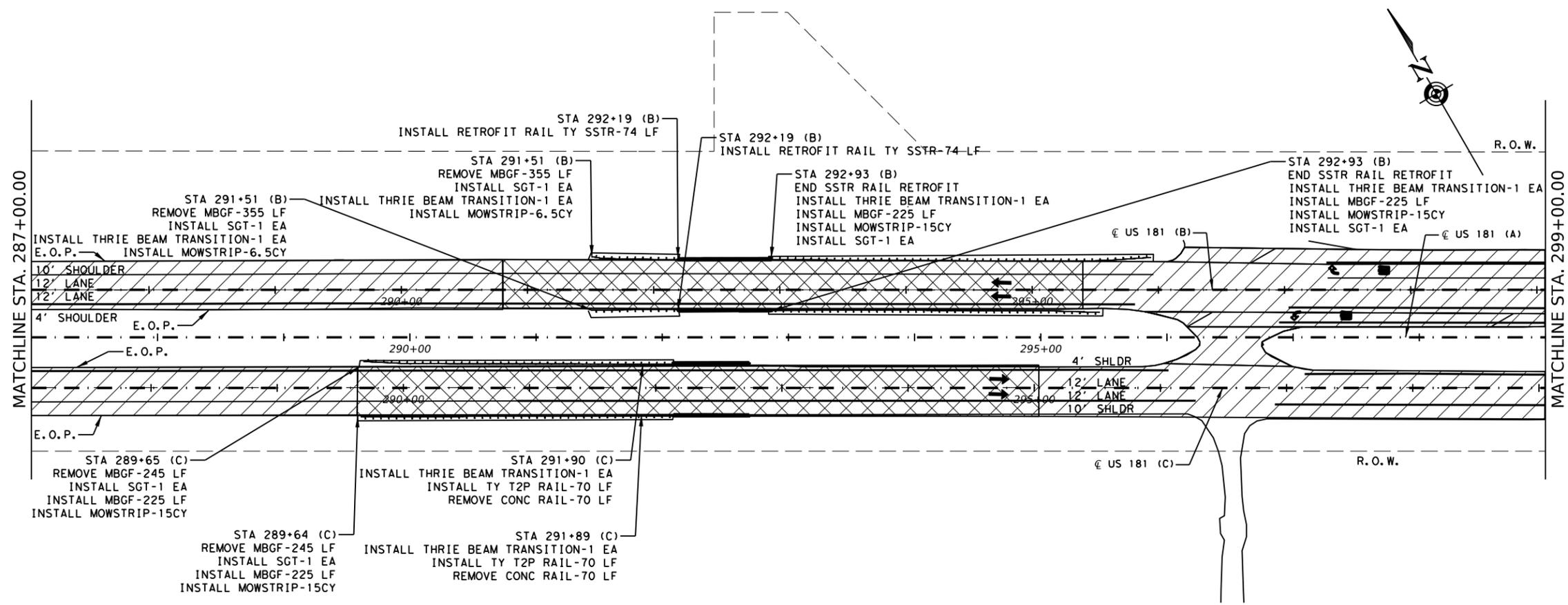
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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



E. Martinez

11/03/2023

Texas Department of Transportation

US 181

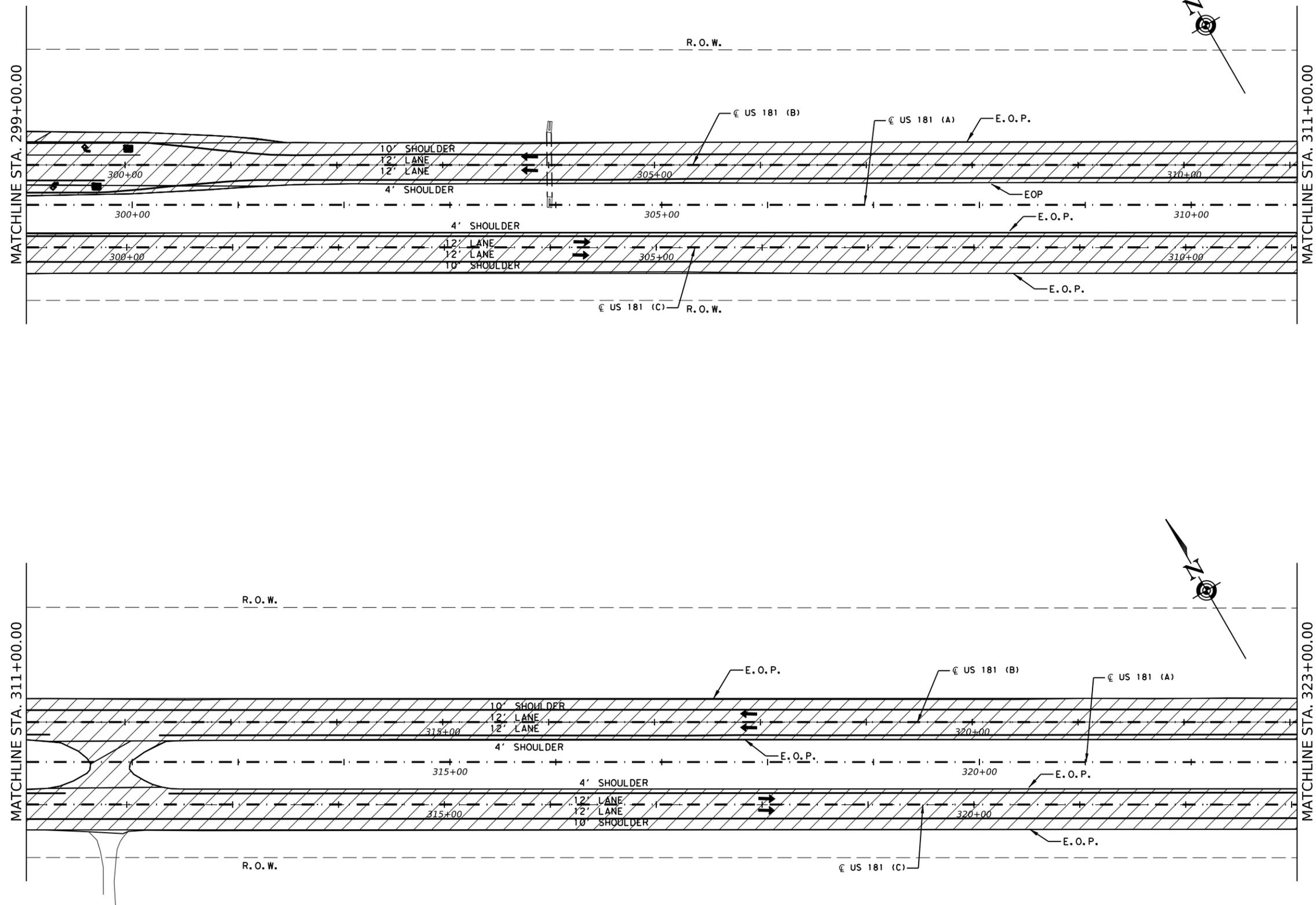
ROADWAY LAYOUTS

SHEET 3 OF 14

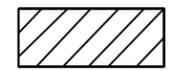
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DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	52	

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LEGEND

-  5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
-  SEE PLAINING DETAIL SHEET
-  DIRECTION OF TRAFFIC



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11/03/2023

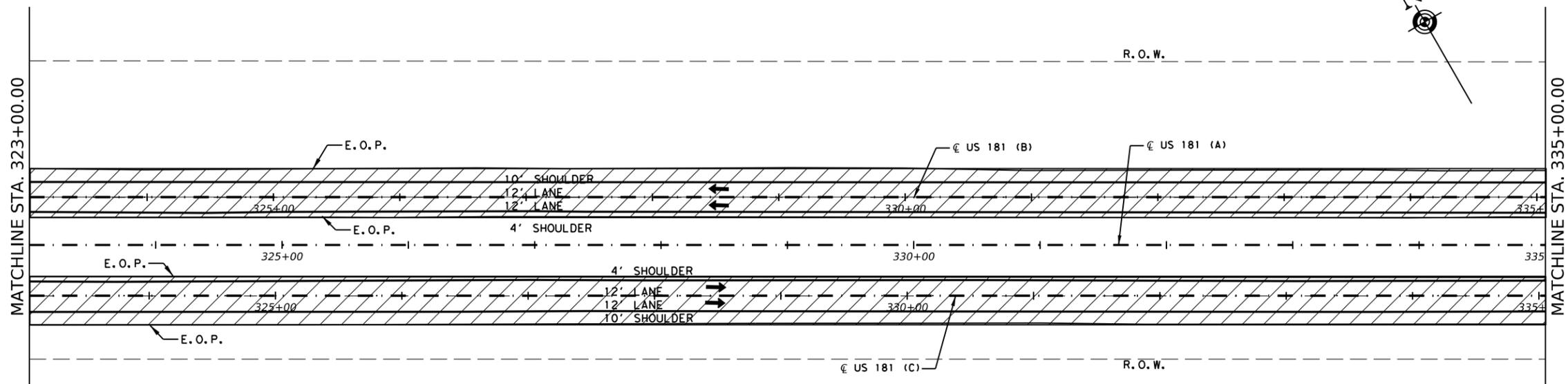


**US 181
 ROADWAY
 LAYOUTS**

SHEET 4 OF 14

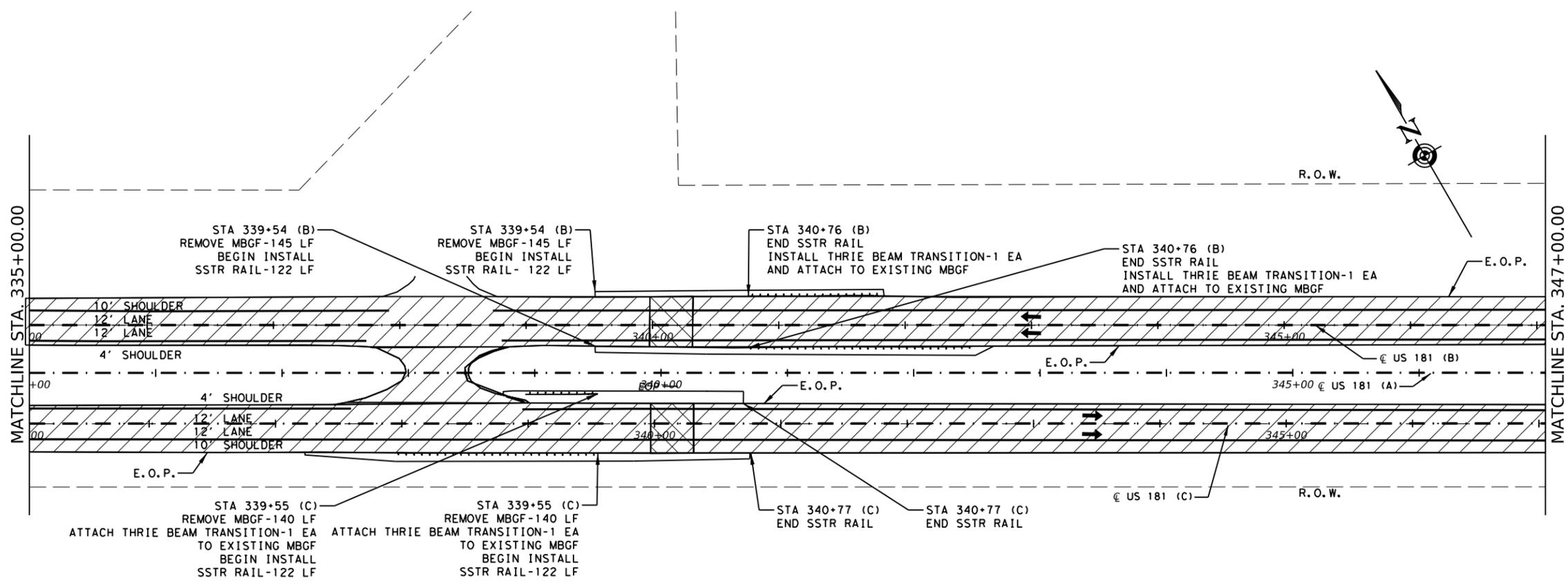
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0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	53

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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



E. Martinez

11/03/2023



**US 181
ROADWAY
LAYOUTS**

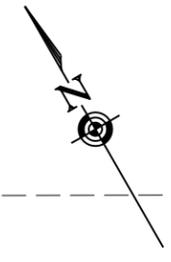
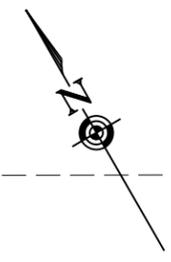
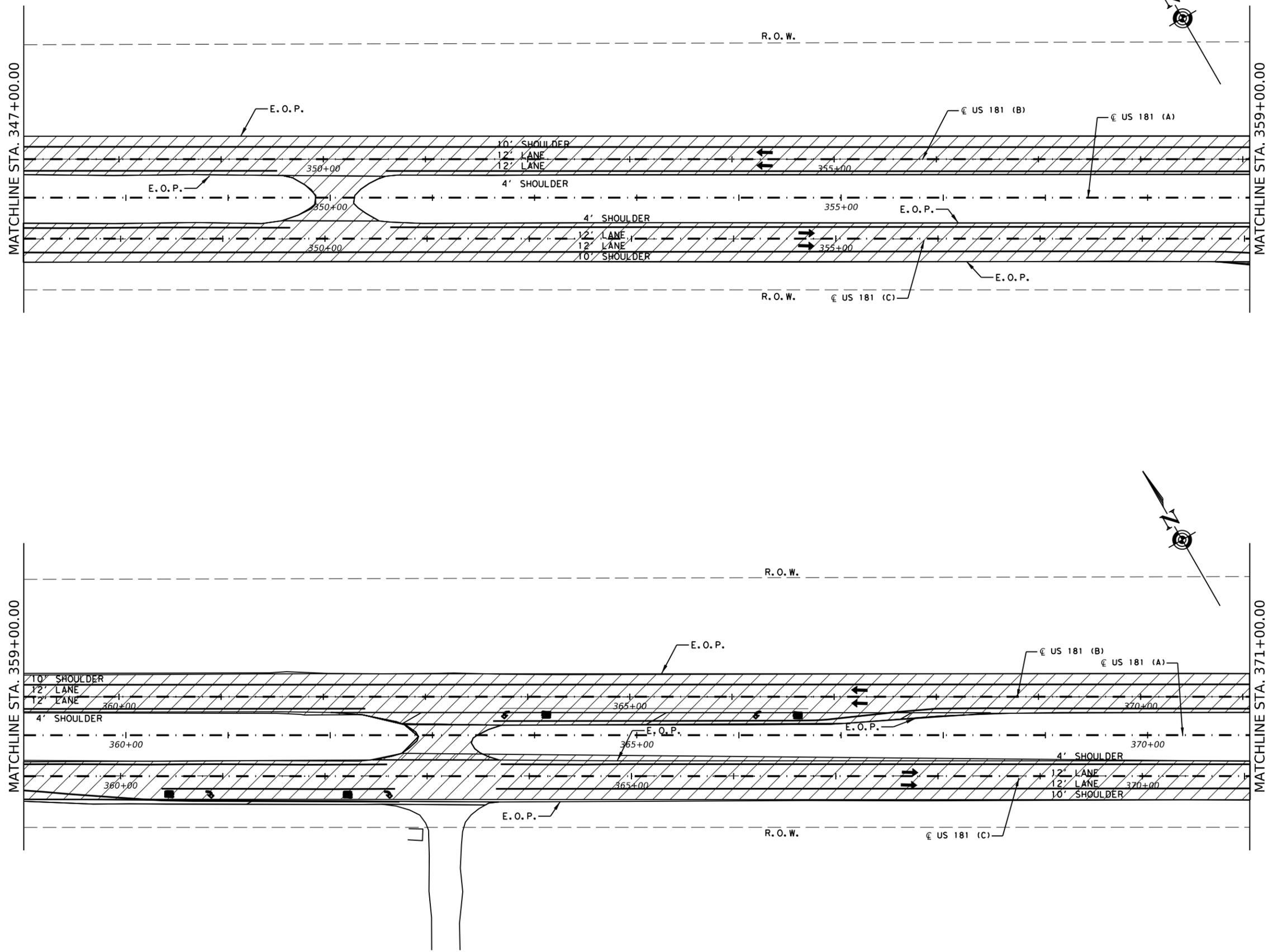
SHEET 5 OF 14

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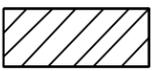
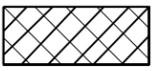
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DATE: 10/06/2023 01:18 PM
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LEGEND

-  5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
-  SEE PLAINING DETAIL SHEET
-  DIRECTION OF TRAFFIC



E. Martinez

11/03/2023



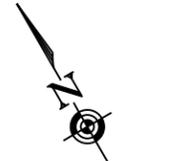
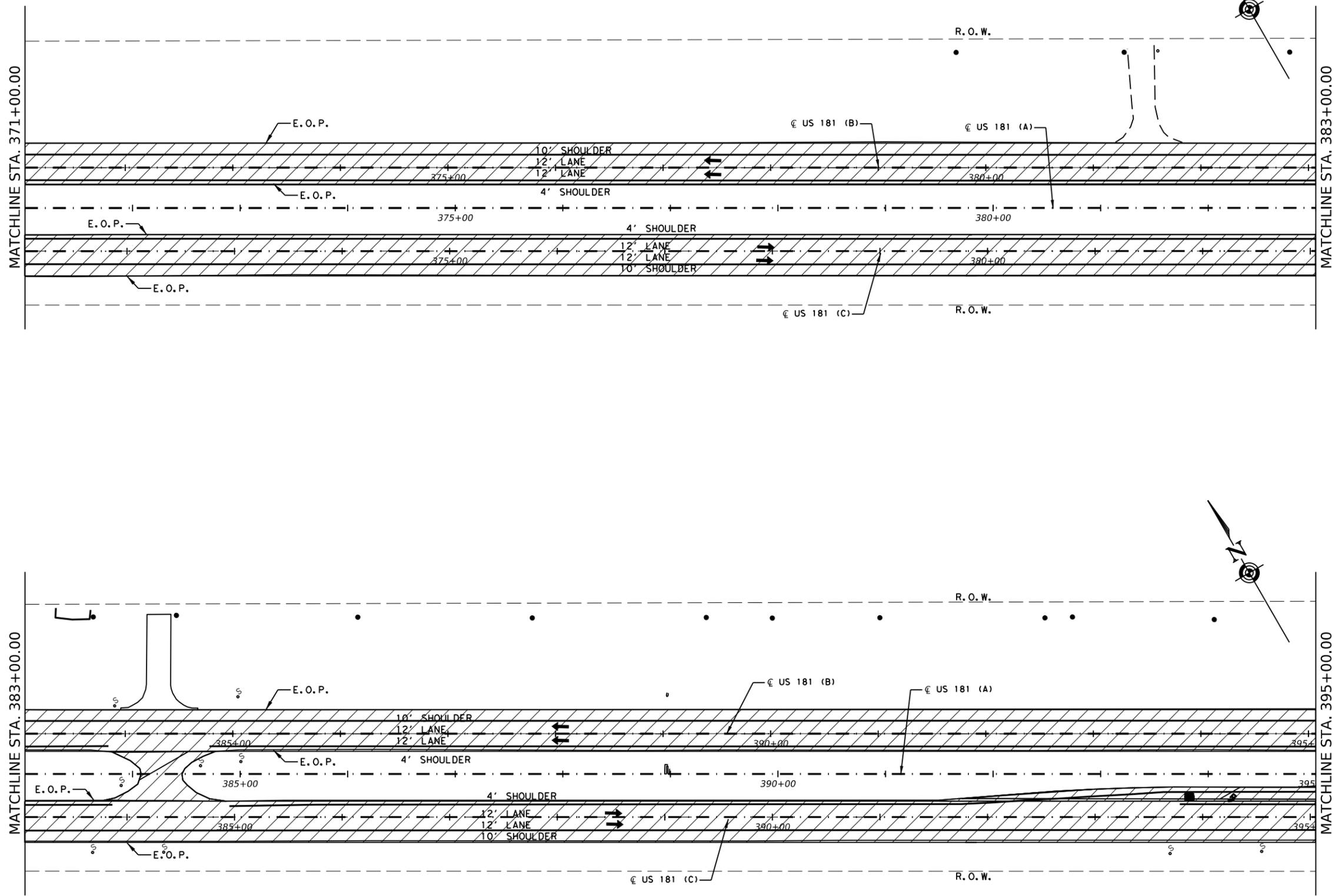
**US 181
ROADWAY
LAYOUTS**

SHEET 6 OF 14

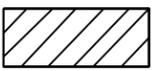
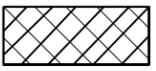
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LEGEND

-  5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
-  SEE PLAINING DETAIL SHEET
-  DIRECTION OF TRAFFIC



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11/03/2023

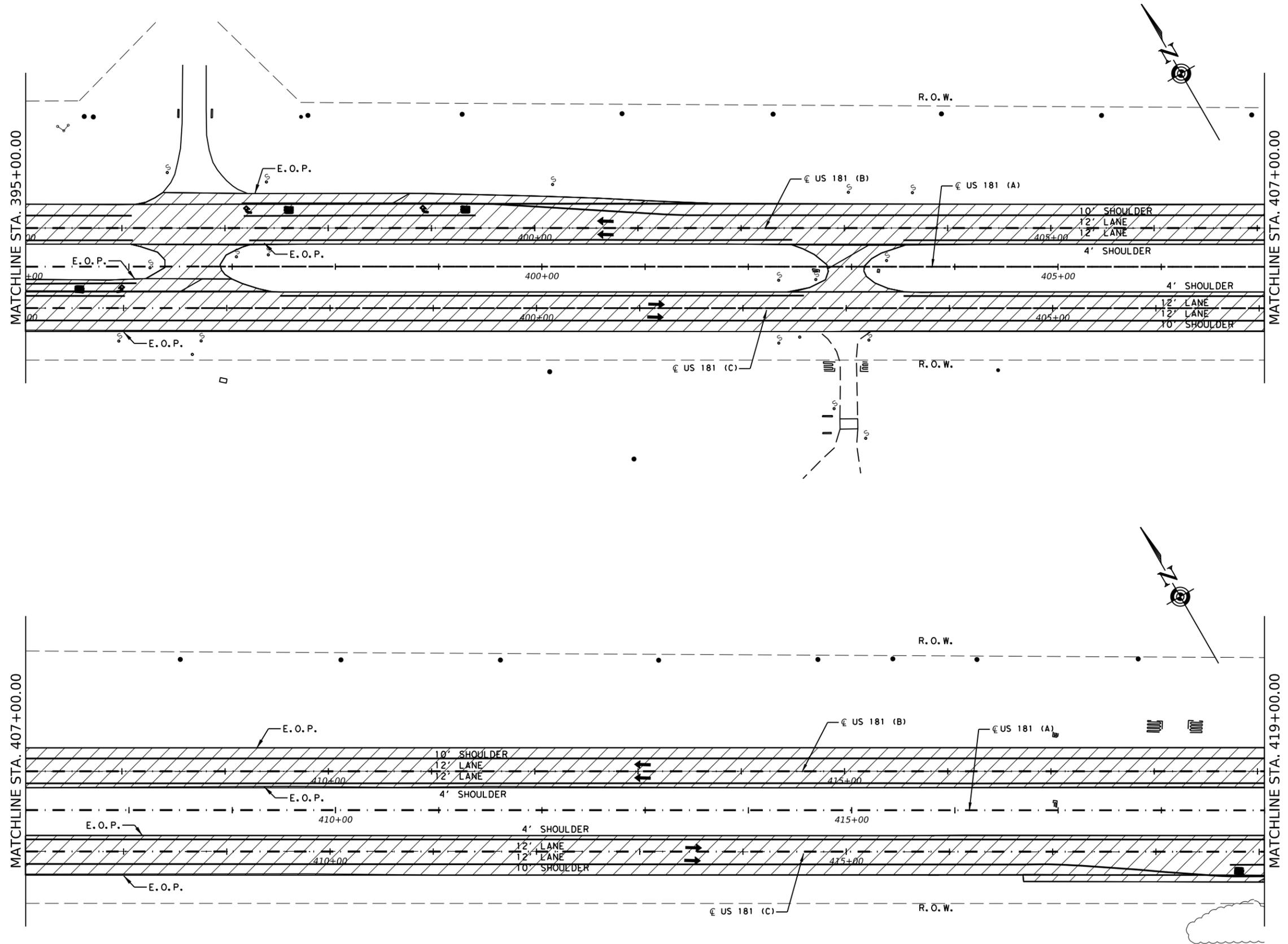


**US 181
ROADWAY
LAYOUTS**

SHEET 7 OF 14

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	56

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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



E. Martinez

11/03/2023



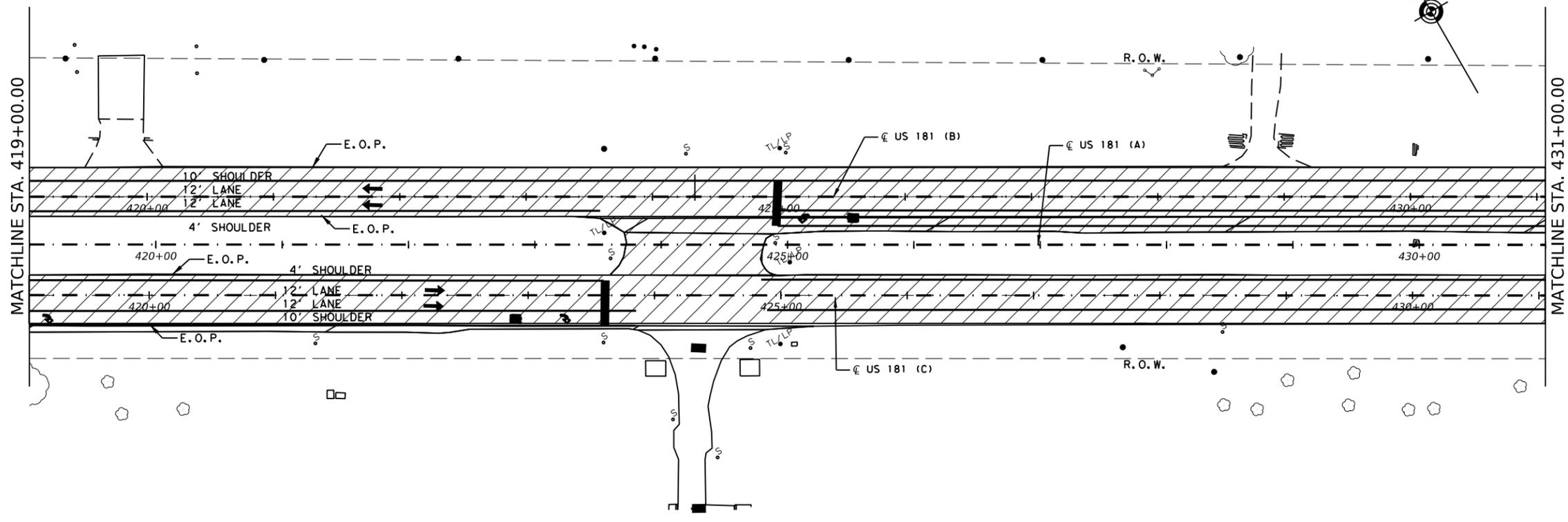
**US 181
ROADWAY
LAYOUTS**

SHEET 8 OF 14

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CRP		SAN PATRICIO	57

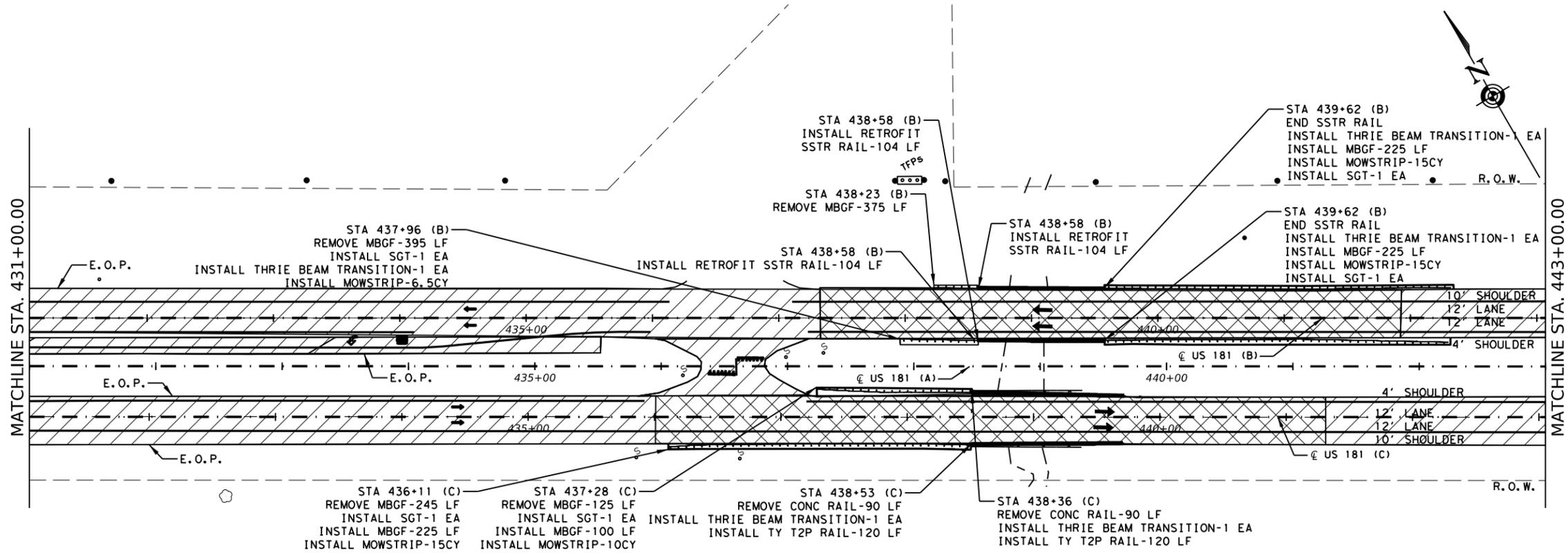
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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



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11/03/2023



US 181

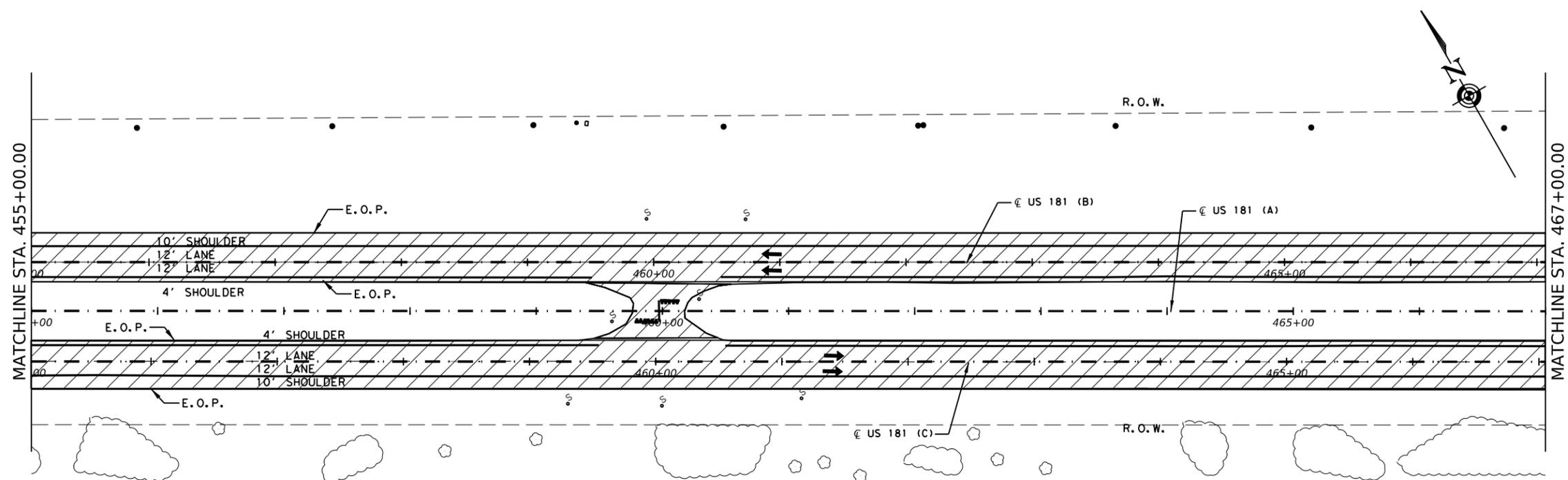
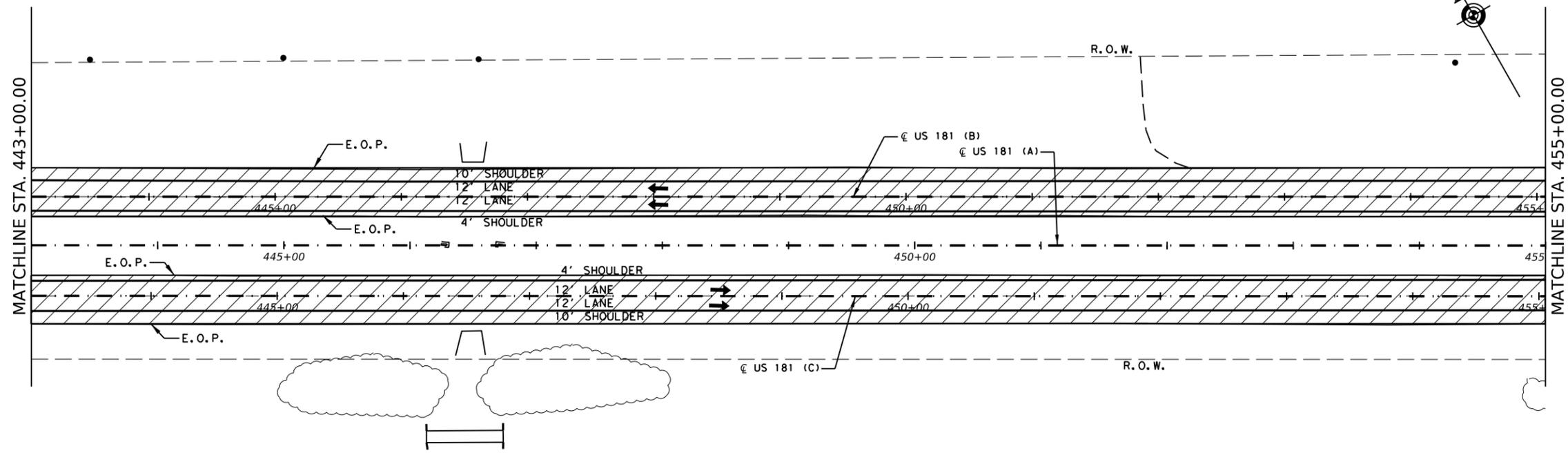
ROADWAY LAYOUTS

SHEET 9 OF 14

CONT	SECT	JOB	HIGHWAY
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DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	58

DATE: 10/27/2023 04:06 PM
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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



E. Martinez

11/03/2023



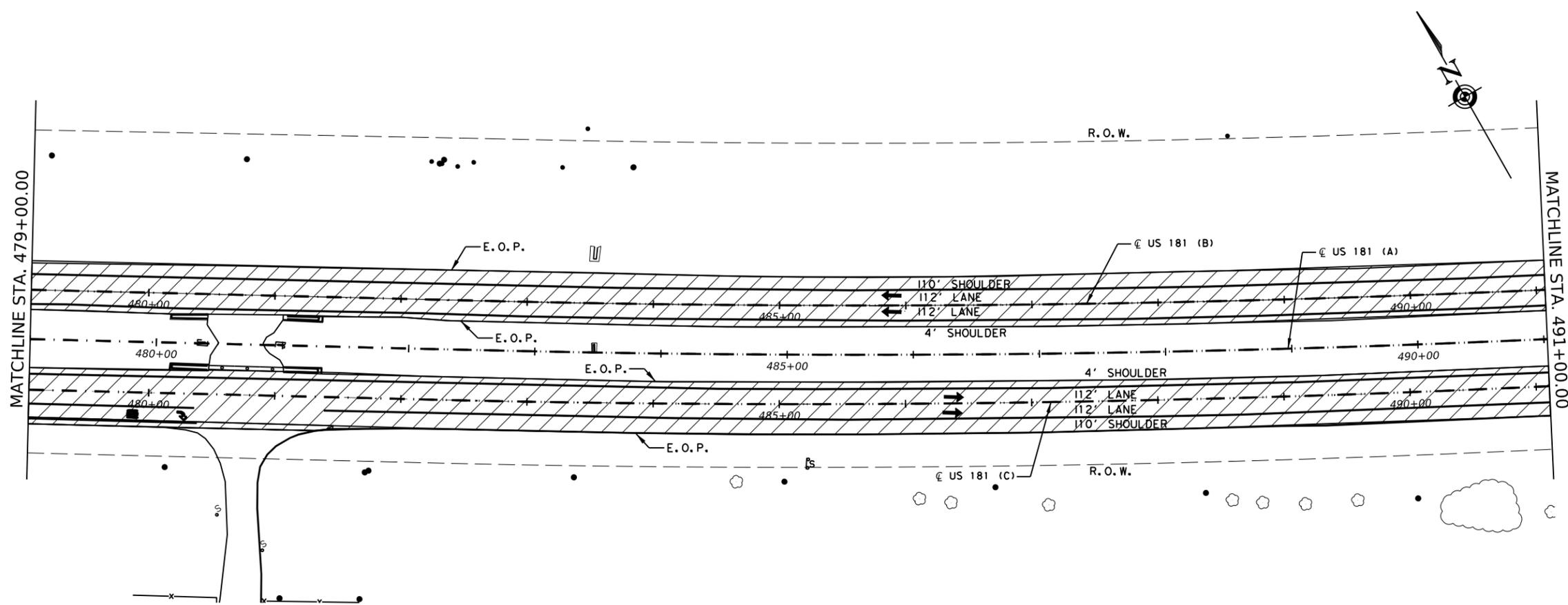
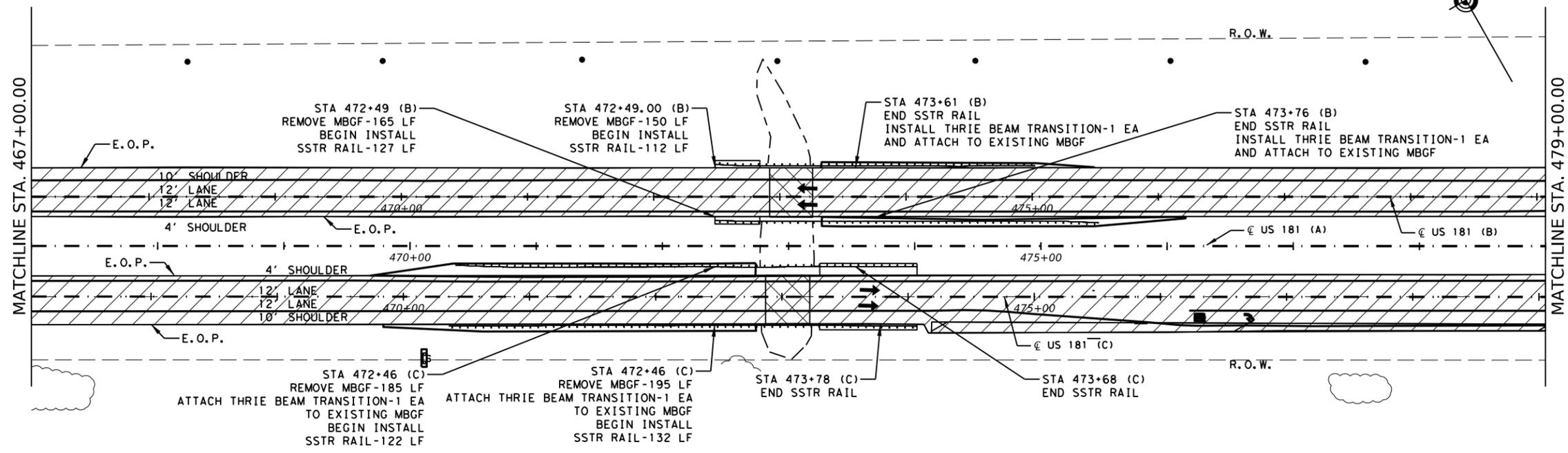
**US 181
ROADWAY
LAYOUTS**

SHEET 10 OF 14

CONT	SECT	JOB	HIGHWAY
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CRP		SAN PATRICIO	59

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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



ERM

11/03/2023

Texas Department of Transportation

US 181

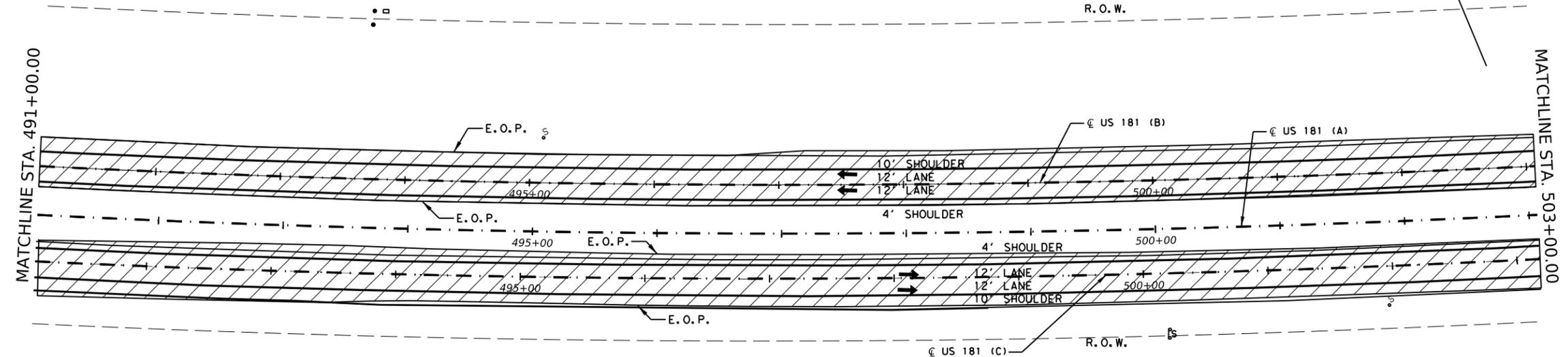
ROADWAY LAYOUTS

SHEET 11 OF 14

CONT	SECT	JOB	HIGHWAY
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CRP		SAN PATRICIO	60

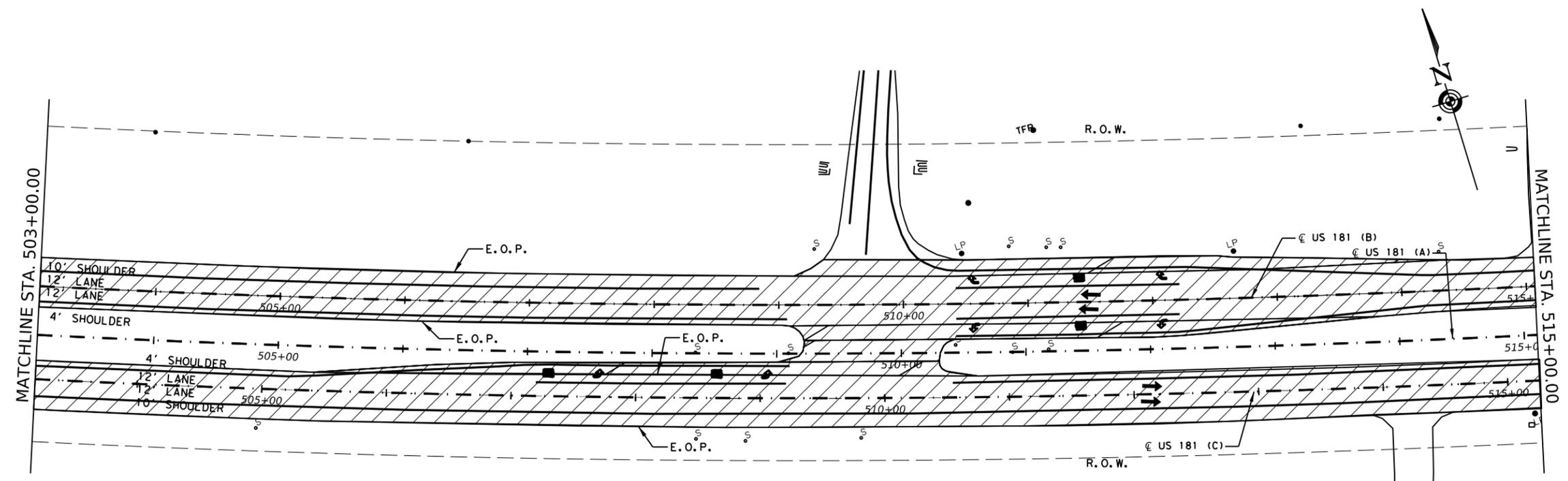
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LEGEND

- 5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
- SEE PLAINING DETAIL SHEET
- DIRECTION OF TRAFFIC



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11/03/2023

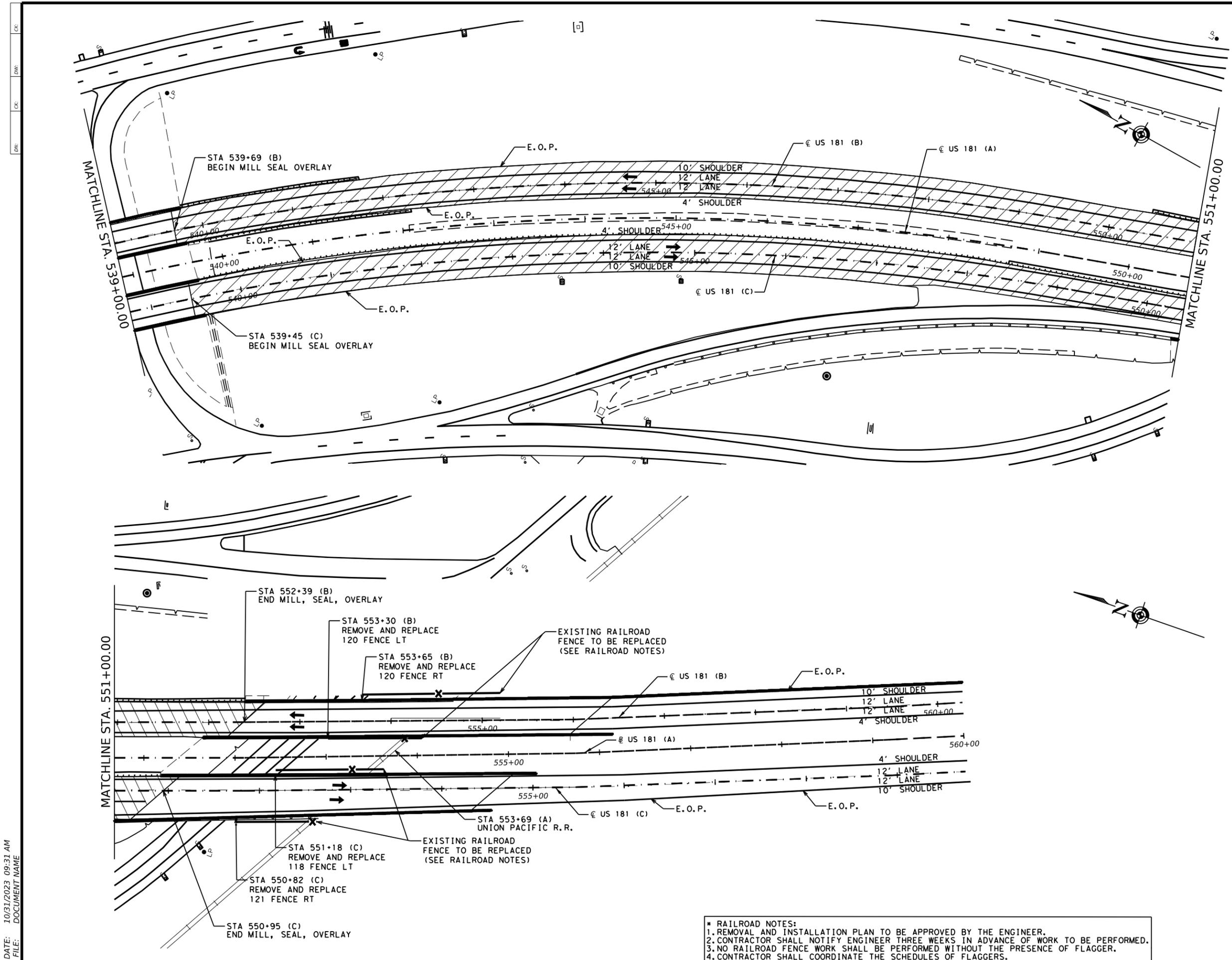


**US 181
ROADWAY
LAYOUTS**

SHEET 12 OF 14

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST		COUNTY	SHEET NO.
CRP		SAN PATRICIO	61

DATE: 10/06/2023 01:31 PM
FILE: DOCUMENT NAME



LEGEND

-  5" PLANE UNDERSEAL
3" HMA TY-B
2" HMA TY-D
-  RAILROAD FENCE
-  DIRECTION OF TRAFFIC



E. Martinez

11/03/2023



**US 181
ROADWAY
LAYOUTS**

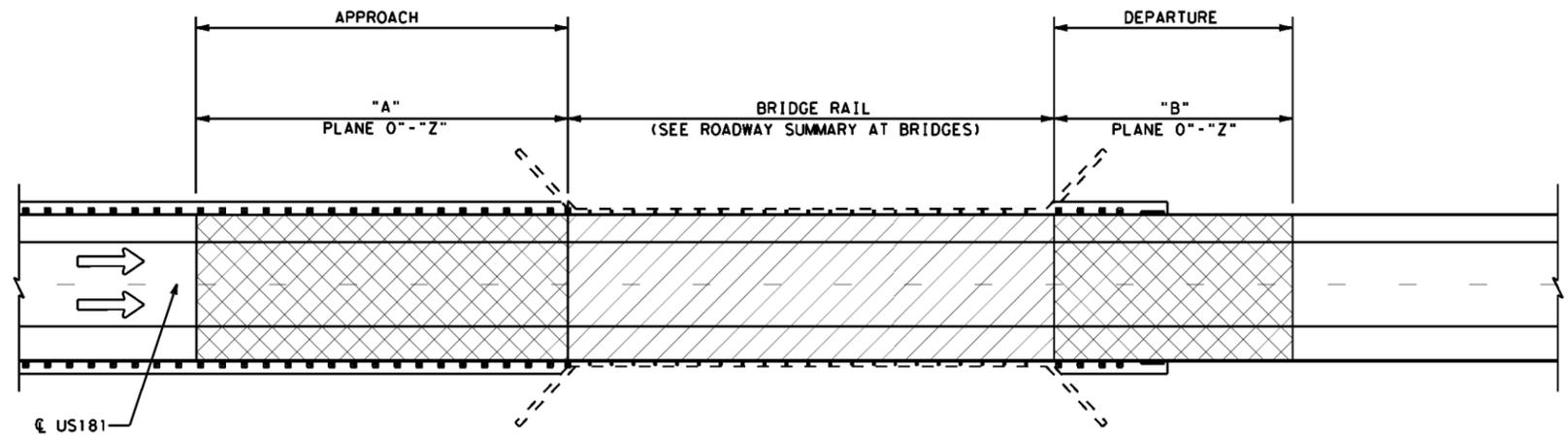
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CRP		SAN PATRICIO	63

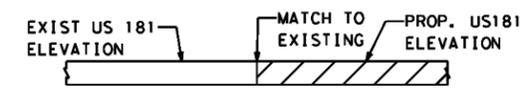
- * RAILROAD NOTES:**
1. REMOVAL AND INSTALLATION PLAN TO BE APPROVED BY THE ENGINEER.
 2. CONTRACTOR SHALL NOTIFY ENGINEER THREE WEEKS IN ADVANCE OF WORK TO BE PERFORMED.
 3. NO RAILROAD FENCE WORK SHALL BE PERFORMED WITHOUT THE PRESENCE OF FLAGGER.
 4. CONTRACTOR SHALL COORDINATE THE SCHEDULES OF FLAGGERS.

DATE: 10/31/2023 09:31 AM
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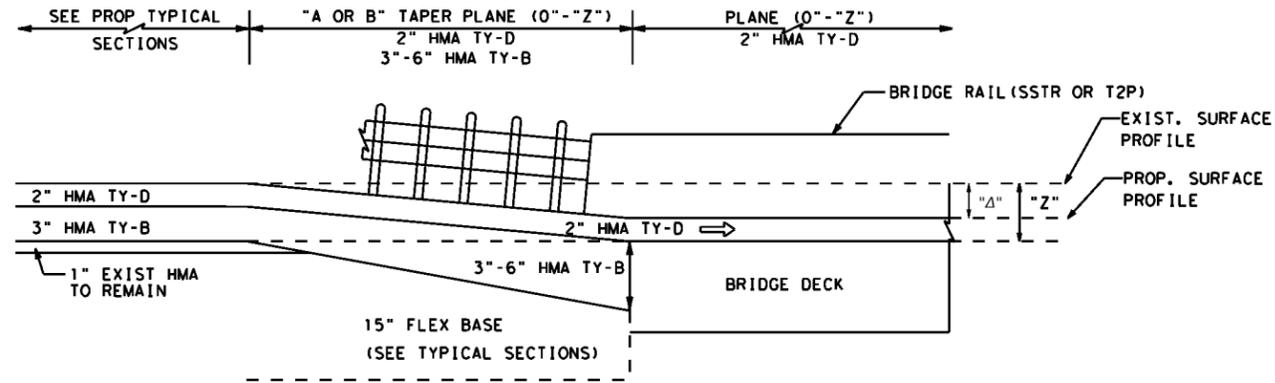
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PLAN VIEW
PLANING AT BRIDGE LOCATIONS



PLANING DETAIL
AT BEGINNING/END OF PROJECT

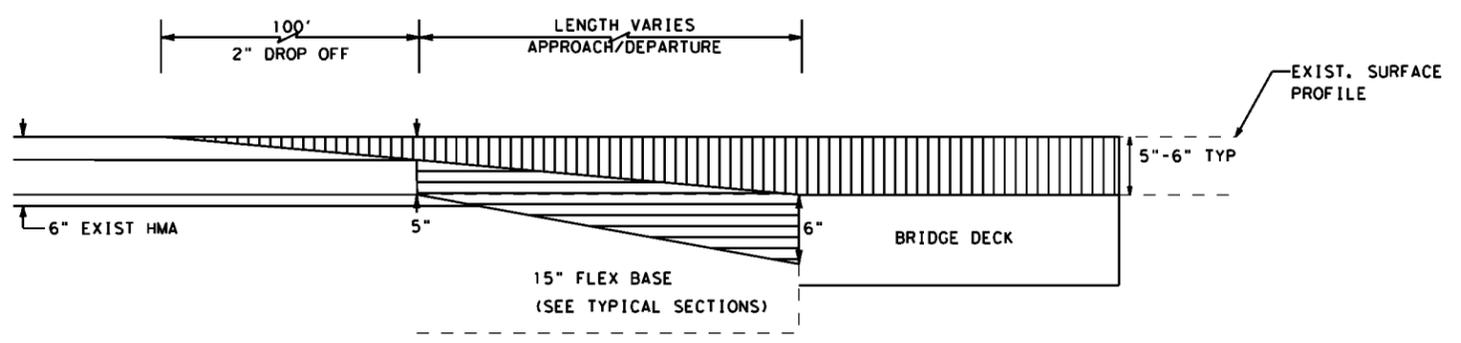


ELEVATION VIEW
PLANING AT BRIDGE LOCATIONS

STRUCTURE	STA	APPROACH TAPER PLANING		DEPARTURE TAPER PLANING		SEE NOTE 1
		"A" (LF)	"Z" (IN)	"B" (LF)	"Z" (IN)	"Δ" (IN)
TERRIE BONNIE (NB)	292+30 (B)	250	5	150	5	3
TERRIE BONNIE (SB)	292+14 (C)	250	6	200	6	4
MUSTANG MOTT (NB)	438+83 (B)	250	5	150	5	3
MUSTANG MOTT (SB)	438+50 (C)	250	6	200	6	4

* NOTE 1: DIFFERENCE BETWEEN PROPOSED SURFACE PROFILE AND EXISTING SURFACE PROFILE AT BRIDGE.

- LEGEND**
- DIRECTION OF TRAFFIC
 - AREA TO BE PLANED @ DEPTH SHOWN
 - AREA TO BE PLANED @ TAPER SHOWN
 - 0"-6" PLANING
 - 3-6" PLANE AND HMA TY-B



DETAIL A



Eric R. Martinez

11/03/2023



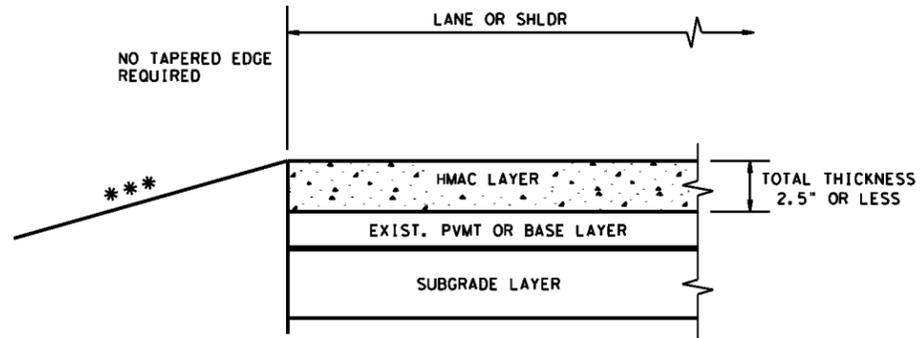
US 181
PLANING DETAILS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	64	

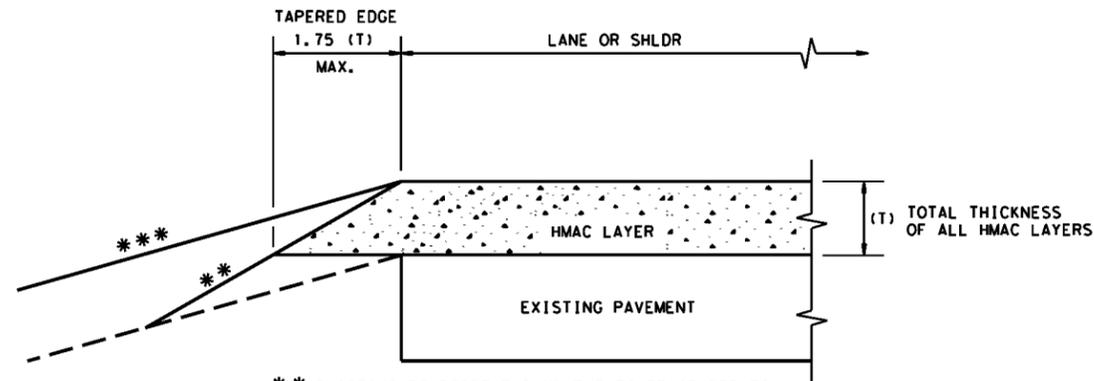
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DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

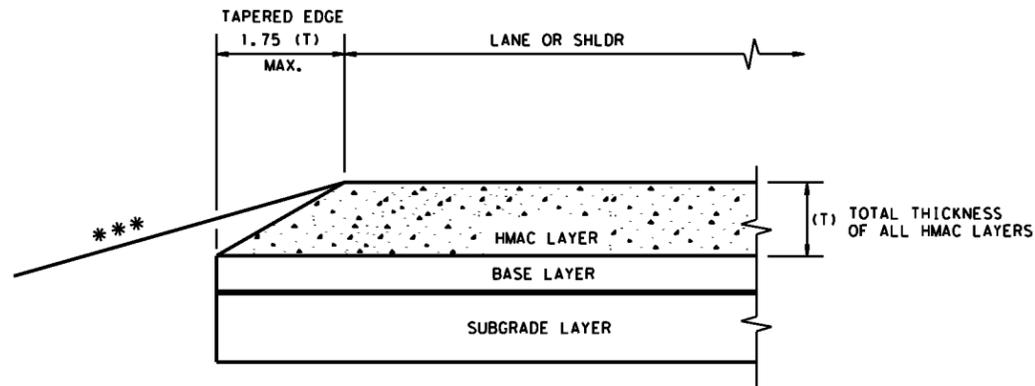
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

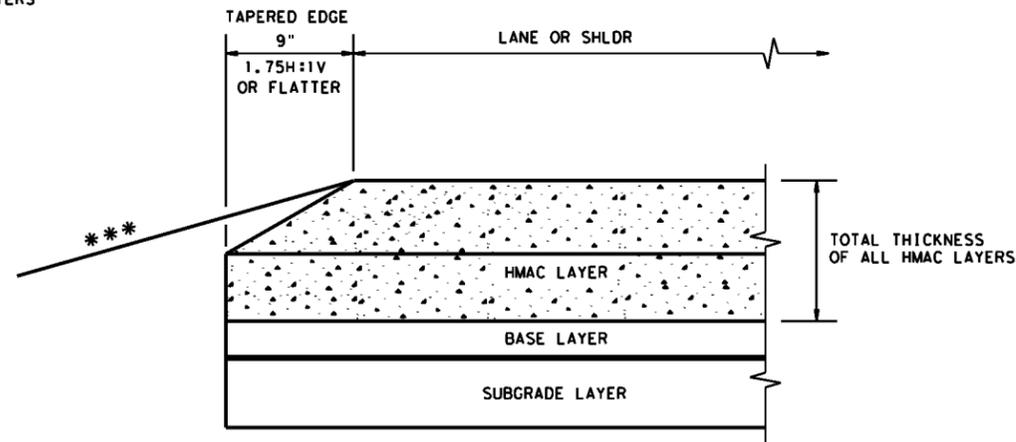
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

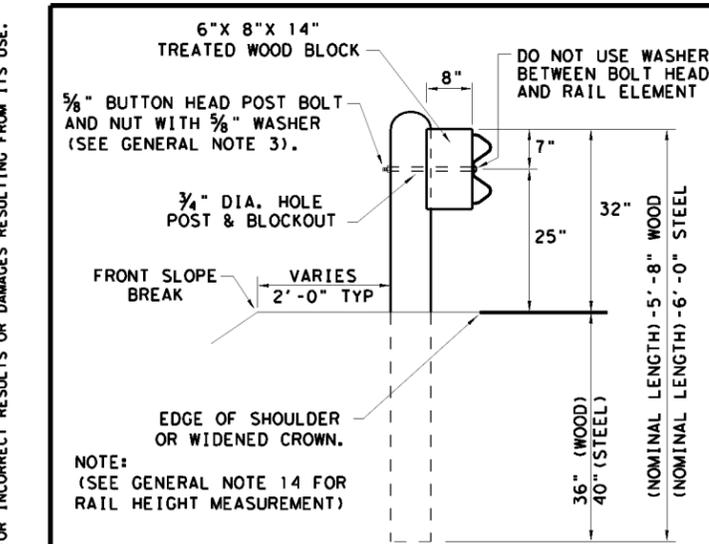
GENERAL NOTES

- 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 THAN 2.5".
- 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.
- THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
- 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.

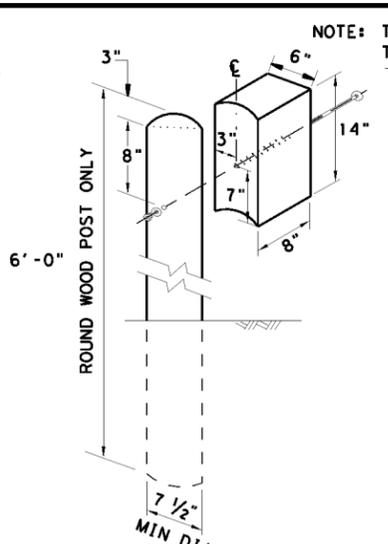
(NOT TO SCALE)

					Design Division Standard
TAPERED EDGE DETAILS HMAC PAVEMENT					
TE (HMAC) - 11					
FILE: tehmac11.dgn	DNR TxDOT	CR: RL	DWR: KB	CR:	
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY	
REVISIONS		010104	131	US 181	
DIST	COUNTY	SHEET NO.			
CRP	SAN PATRICIO	65			

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TYPICAL POST PLACEMENT

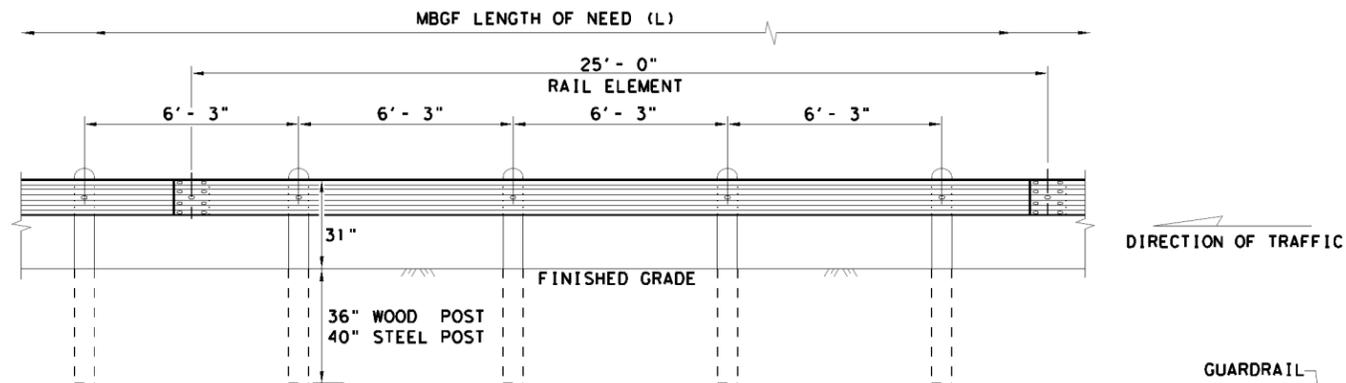


WOOD BLOCK TO ROUND WOOD POST

WOOD BLOCK TO RECTANGULAR WOOD POST

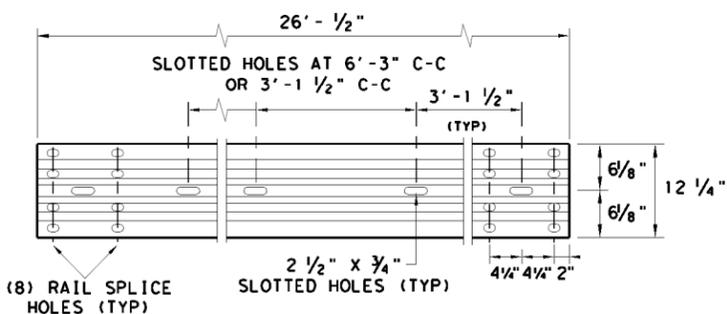
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION MID-SPAN RAIL SPLICE

SHOWING A 25'-0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



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

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

NOTE: FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECESSED NUT.

SPLICE BOLT LENGTH VARIES

FBB01 = 1 1/4"

FBB02 = 2"

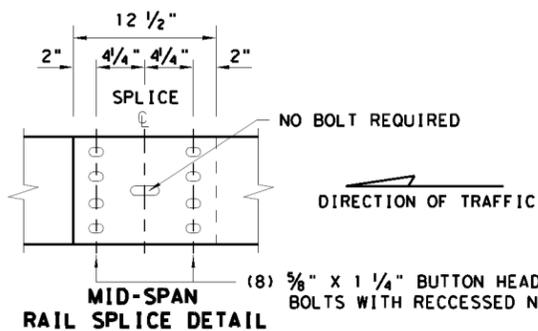
POST & BLOCK LENGTH

FBB03 = 10"

FBB04 = 18"

BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

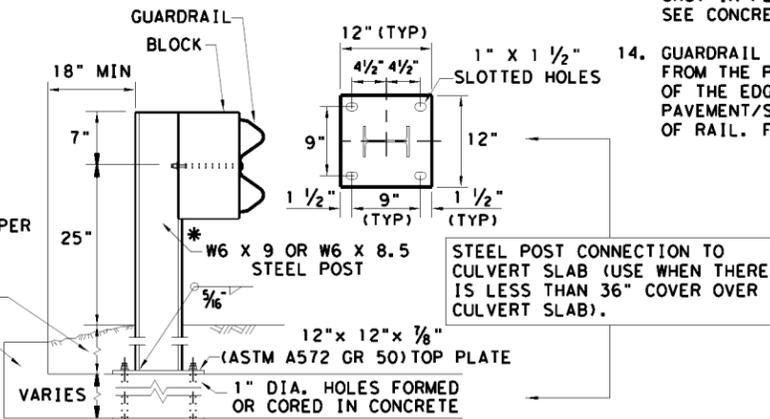
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

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

9" MIN. FILL DEPTH CULVERT SLAB

12" X 12" X 1/4" (ASTM A36) STEEL BOTTOM PLATE WITH 1" DIA. HOLES REQUIRED WITH BOLT-THROUGH INSTALLATION.

LOW FILL CULVERT POST



NOTE: TWO INSTALLATION OPTIONS.

1. **BOLT-THROUGH OPTION:** REQUIRES A 6" MIN. SLAB THICKNESS. 5/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

2. **EPOXY ANCHOR OPTION:** THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE 5/8" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS 1/4" MIN. BEYOND NUT.

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

GENERAL NOTES

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

		Design Division Standard	
<h1>METAL BEAM GUARD FENCE</h1> <h2>TL-3 MASH COMPLIANT</h2> <h3>GF(31)-19</h3>			
FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP
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REVISIONS	010104	131	US 181
	DIST	COUNTY	SHEET NO.
	CRP	SAN PATRICIO	66

DATE: FILE:

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DATE: FILE:

BREAKAWAY CABLE TERMINAL (BCT) CABLE ANCHOR ASSEMBLY WITH CABLE BRACKET, BEARING PLATE AND STANDARD HARDWARE.

C3 X 5 X 80" (3) GROUND STRUTS

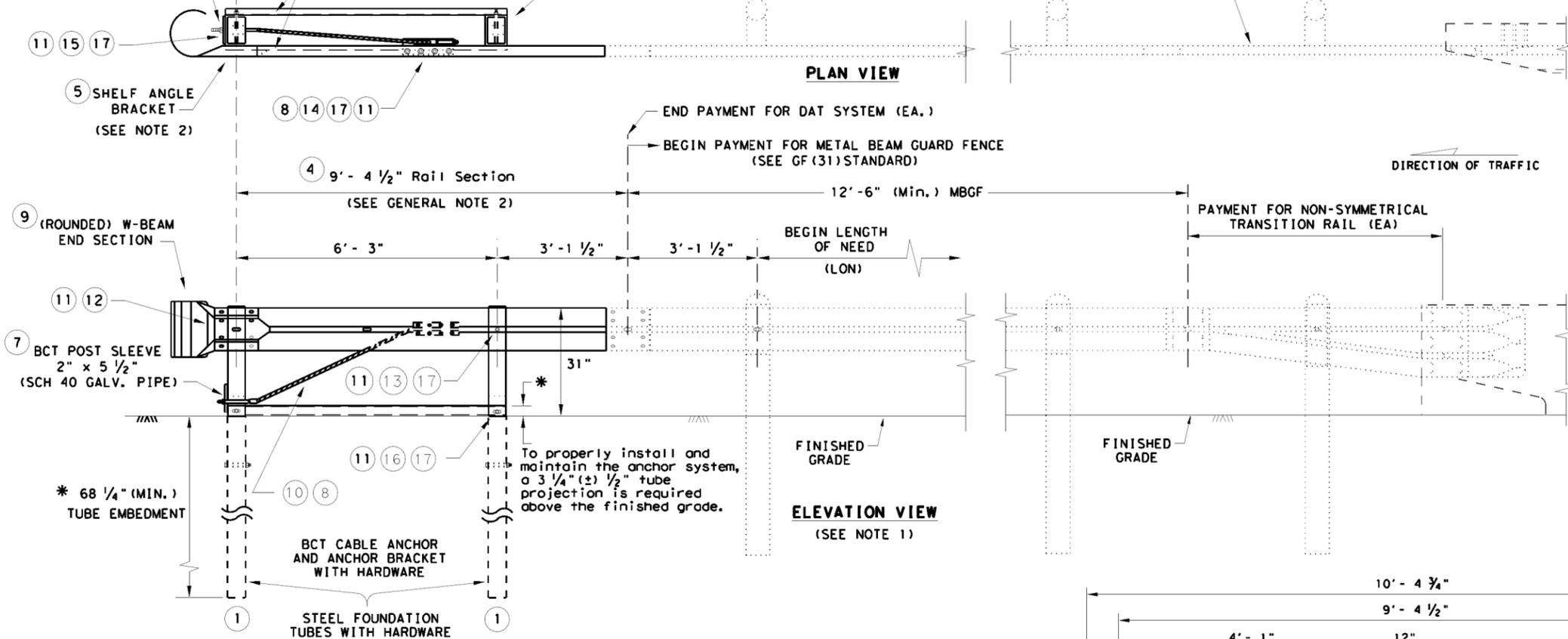
7 1/4" X 5 1/4" X 46" (2) DAT TERMINAL POST

NON-SYMMETRICAL TRANSITION RAIL SECTION (SEE APPLICABLE TRANSITION STANDARD)

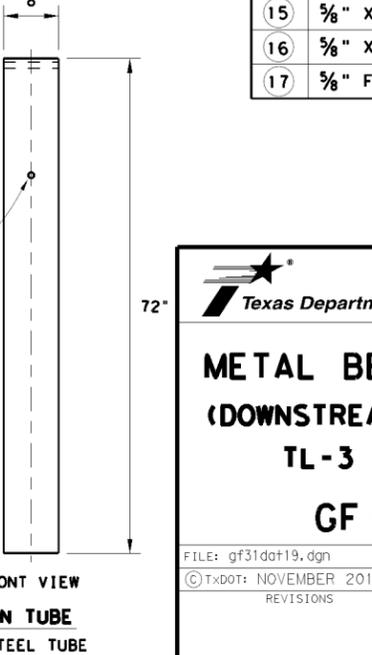
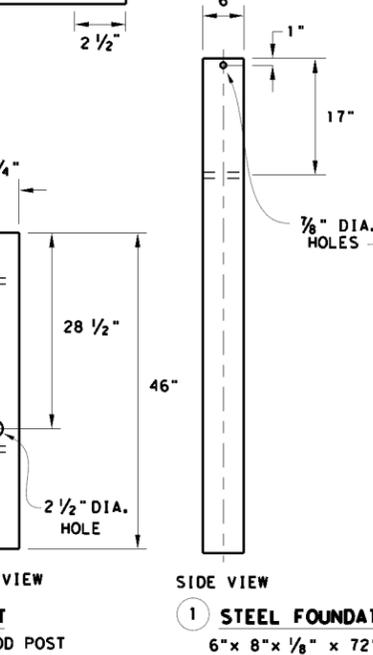
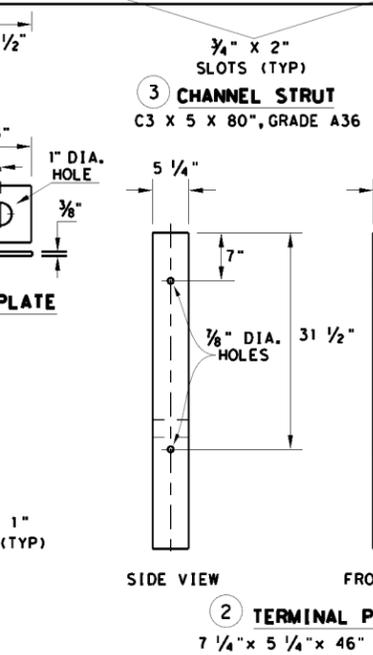
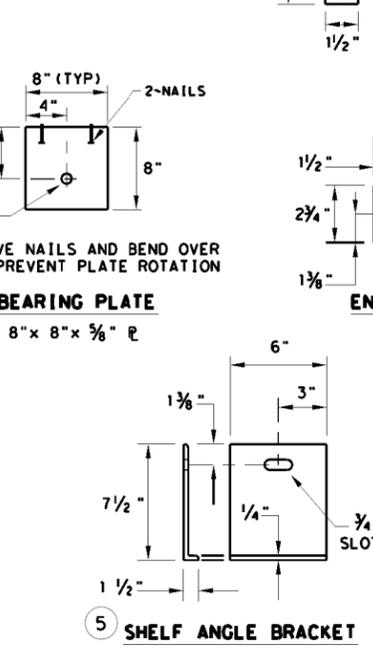
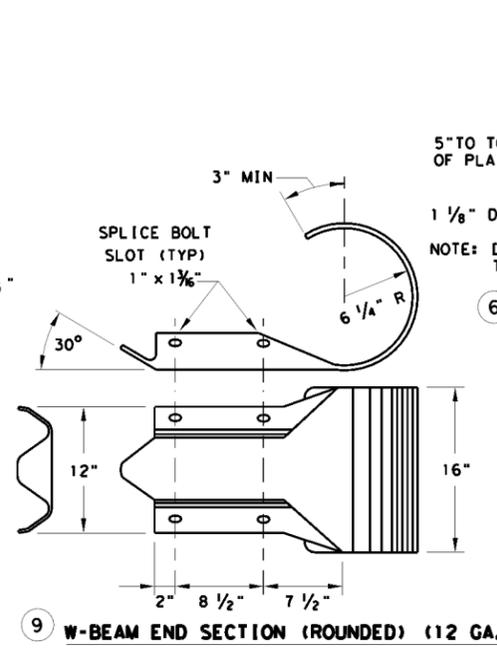
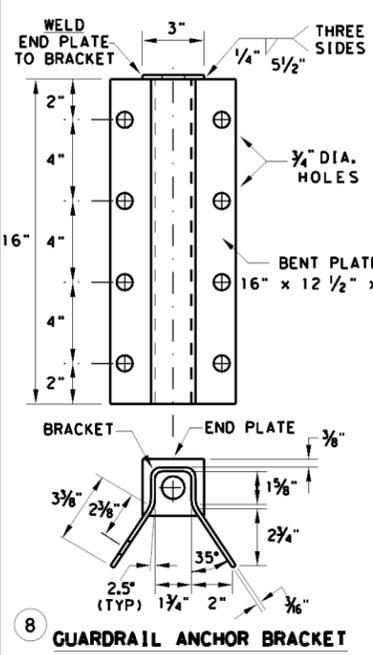
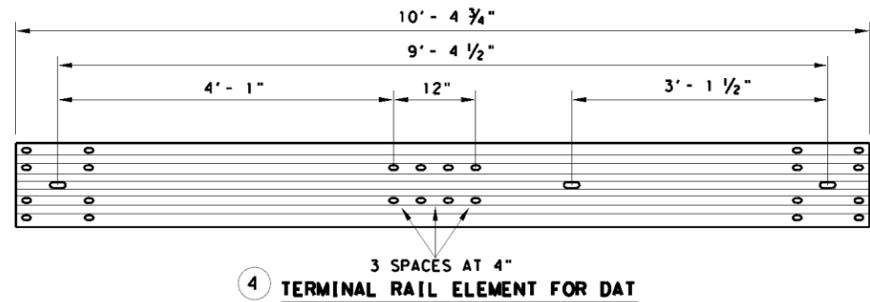
GENERAL NOTES

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

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



DOWNSTREAM ANCHOR TERMINAL (DAT)
 NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.



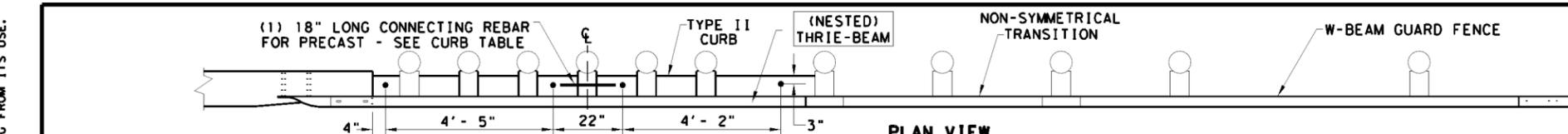
#	(DAT) PARTS LIST	QTY
1	STEEL FOUNDATION TUBE	2
2	DAT TERMINAL POST	2
3	CHANNEL STRUT	2
4	TERMINAL RAIL ELEMENT	1
5	SHELF ANGLE BRACKET	1
6	BCT BEARING PLATE	1
7	BCT POST SLEEVE	1
8	GUARDRAIL ANCHOR BRACKET	1
9	(ROUNDED) W-BEAM END SECTION	1
10	BCT CABLE ANCHOR	1
11	RECESSED NUT, GUARDRAIL	20
12	1 1/4"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

Texas Department of Transportation
 Design Division Standard

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

FILE: gf31dat19.dgn DN: TxDOT CK: KM DW: VP CK: CGL/AG
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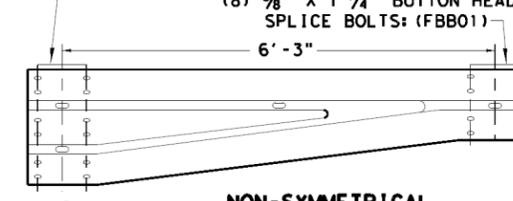
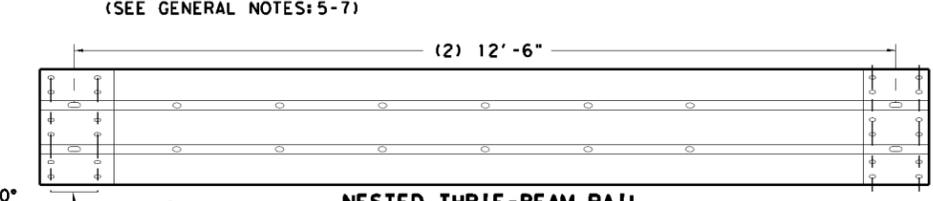
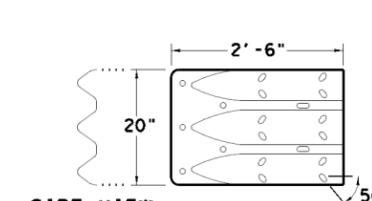
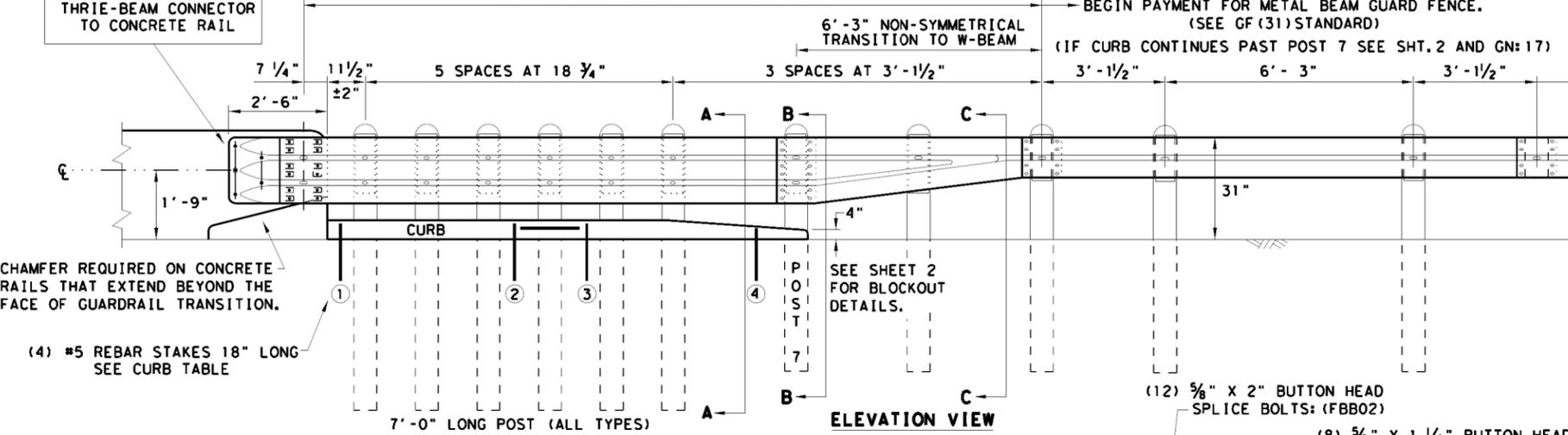
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- (5) 1" DIA. HOLES.
- (5) 3/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
- (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (5) 3/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 3/8" HEX NUT. TRIM AS REQUIRED.

NOTE:
CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.

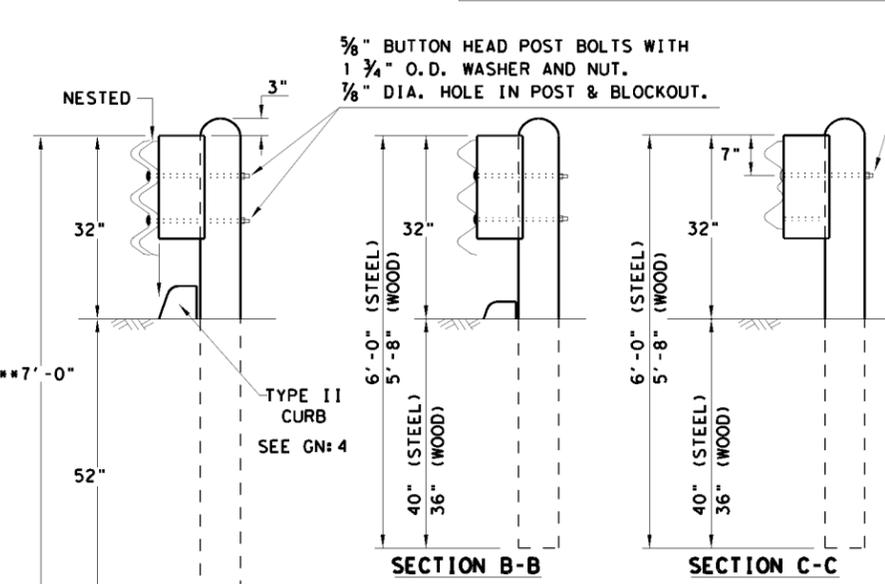


THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01D
NOTE: SEE GENERAL NOTE: 9

NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10G
(12) 3/8" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)

NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION 10GA.
PART DESIGNATOR RWT02G OR RWT02B
(12) 3/8" X 2" BUTTON HEAD SPLICE BOLTS: (FBB02)
(8) 3/8" X 1 1/4" BUTTON HEAD SPLICE BOLTS: (FBB01)

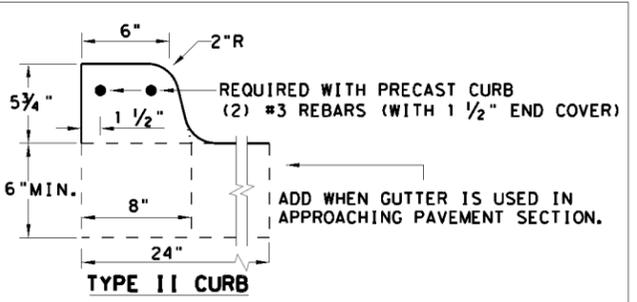
BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.



NOTE: ONLY (1) 3/8" BOLT REQUIRED AT THIS POST LOCATION.

THRIE-BEAM TERMINAL - CURB TABLE	
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.	
CURB (1)	LENGTH 5'- 8"
CURB (2)	LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7	
CONNECTING PRECAST CURB SECTIONS (1) & (2):	
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.	
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE * :	
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND 1/2" BELOW TOP OF CURB.	
FILL HOLES WITH APPROVED GROUT MIXTURE.	

* NOTES: NOT NEEDED FOR CAST-IN-PLACE. SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS. PERCUSSION DRILLING IS NOT PERMITTED WITH: TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.



NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); SEE CURRENT CCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 1/2" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST 3/8" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND 3/8" WASHER (FWC16G) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TxDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

**HIGH-SPEED TRANSITION
SHEET 1 OF 2**

		Design Division Standard	
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT			
GF(31)TR TL3-20			
FILE: gf31tr+1320.dgn	DN: TxDOT	CK: KM	DW: VP
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REVISIONS	010104	131	US 181
DIST	COUNTY	SHEET NO.	
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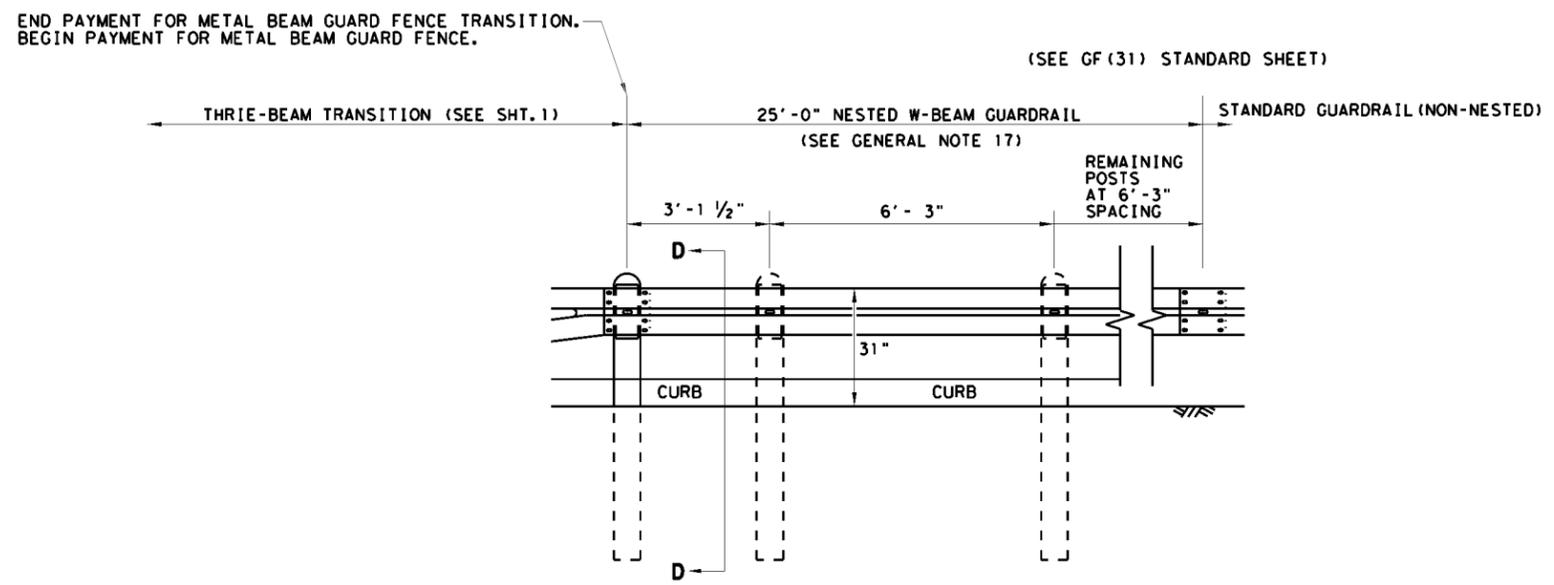
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NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

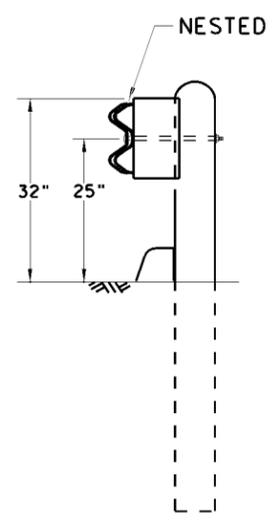
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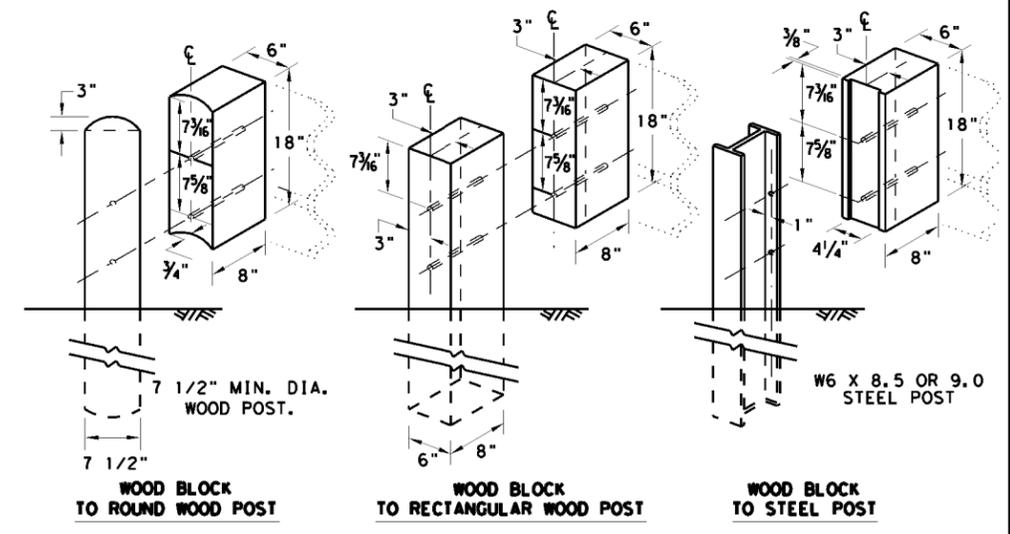
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THREE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

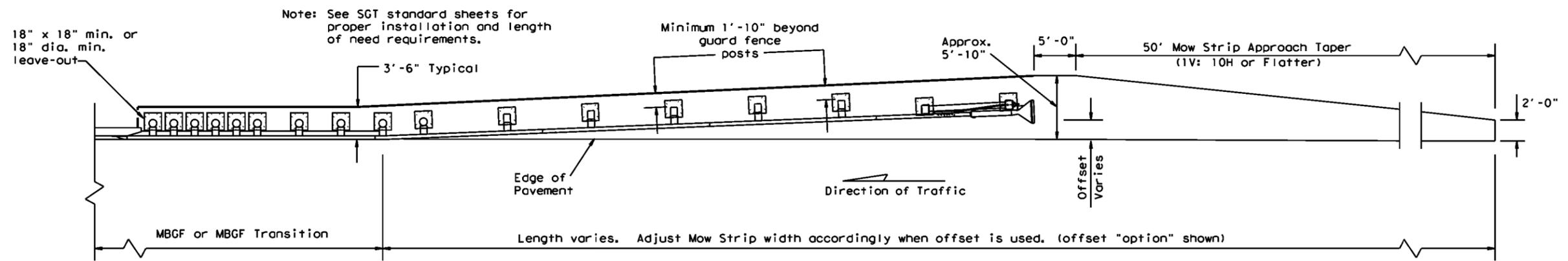
SHEET 2 OF 2



METAL BEAM GUARD FENCE
 THREE-BEAM TRANSITION
 TL-3 MASH COMPLIANT
 GF (31) TR TL3-20

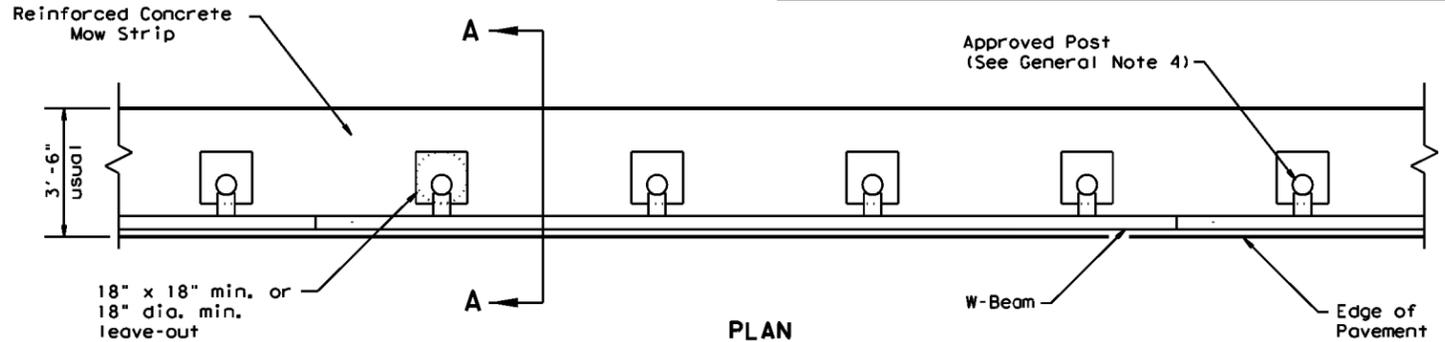
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REVISIONS	010	04	131	US 181
	DIST	COUNTY	SHEET NO.	
	CRP	SAN PATRICIO	69	

DATE: 10/31/2023
 FILE: pw://txdot.projectwiseonline.com:TXDOT4/Documents/16 - CRP/Design Projects/010104131/4 - Design/Plan Set/13 - Standards/ROADWAY DETAILS STANDARDS/CRP-gf31ms19.dgn
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Note: See SGT standard sheets for proper installation and length of need requirements.

GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

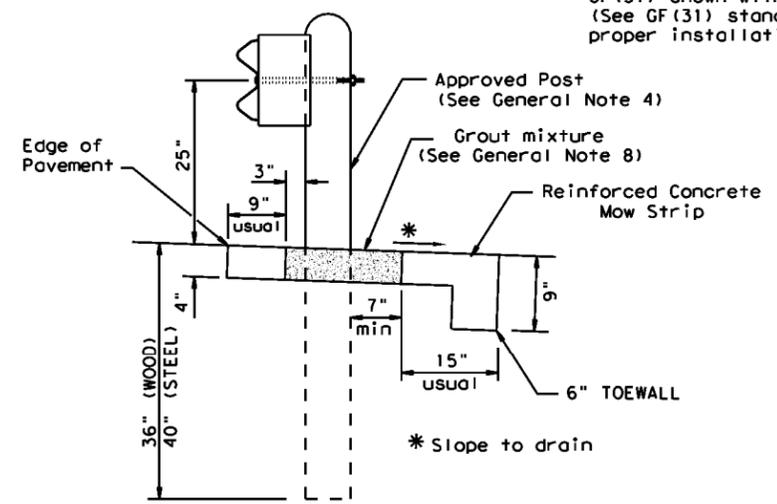
GF(31) shown with Mow Strip (See GF(31) standard sheet for proper installation)

Note: Site Condition(s)

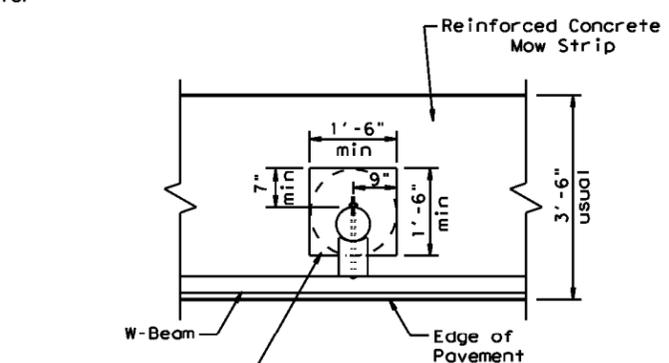
Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments. Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

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

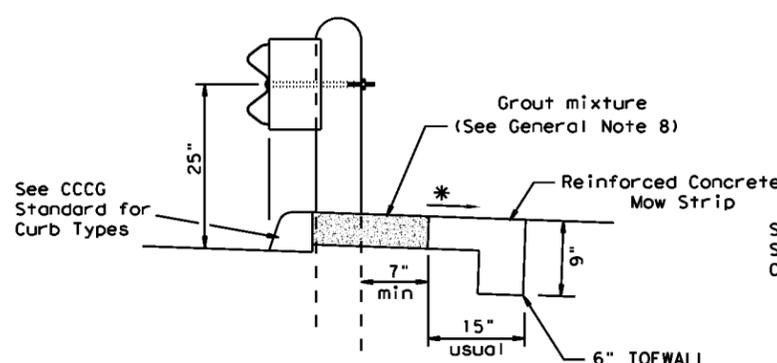


SECTION A-A
Typical



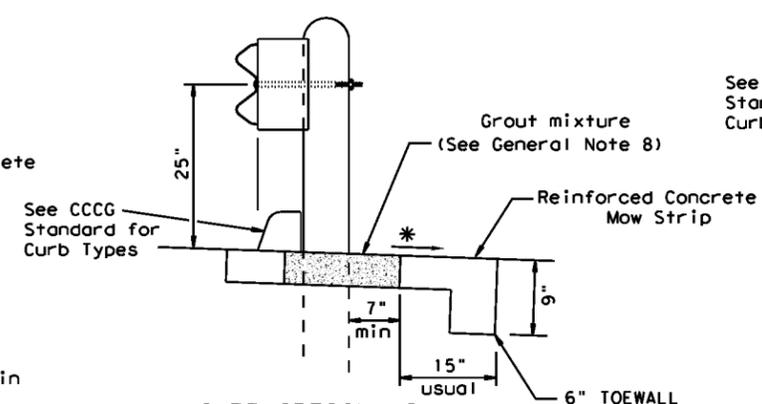
MOW STRIP DETAIL

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



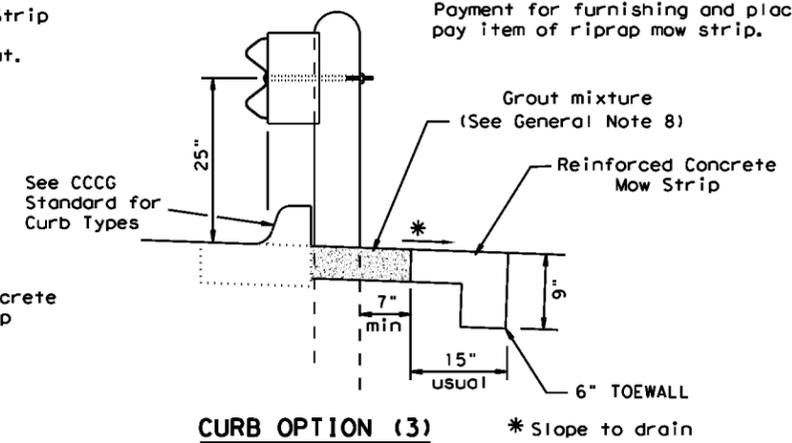
CURB OPTION (1)

This option will increase the post embedment through out the system.



CURB OPTION (2)

Curb shown on top of mow strip * Slope to drain



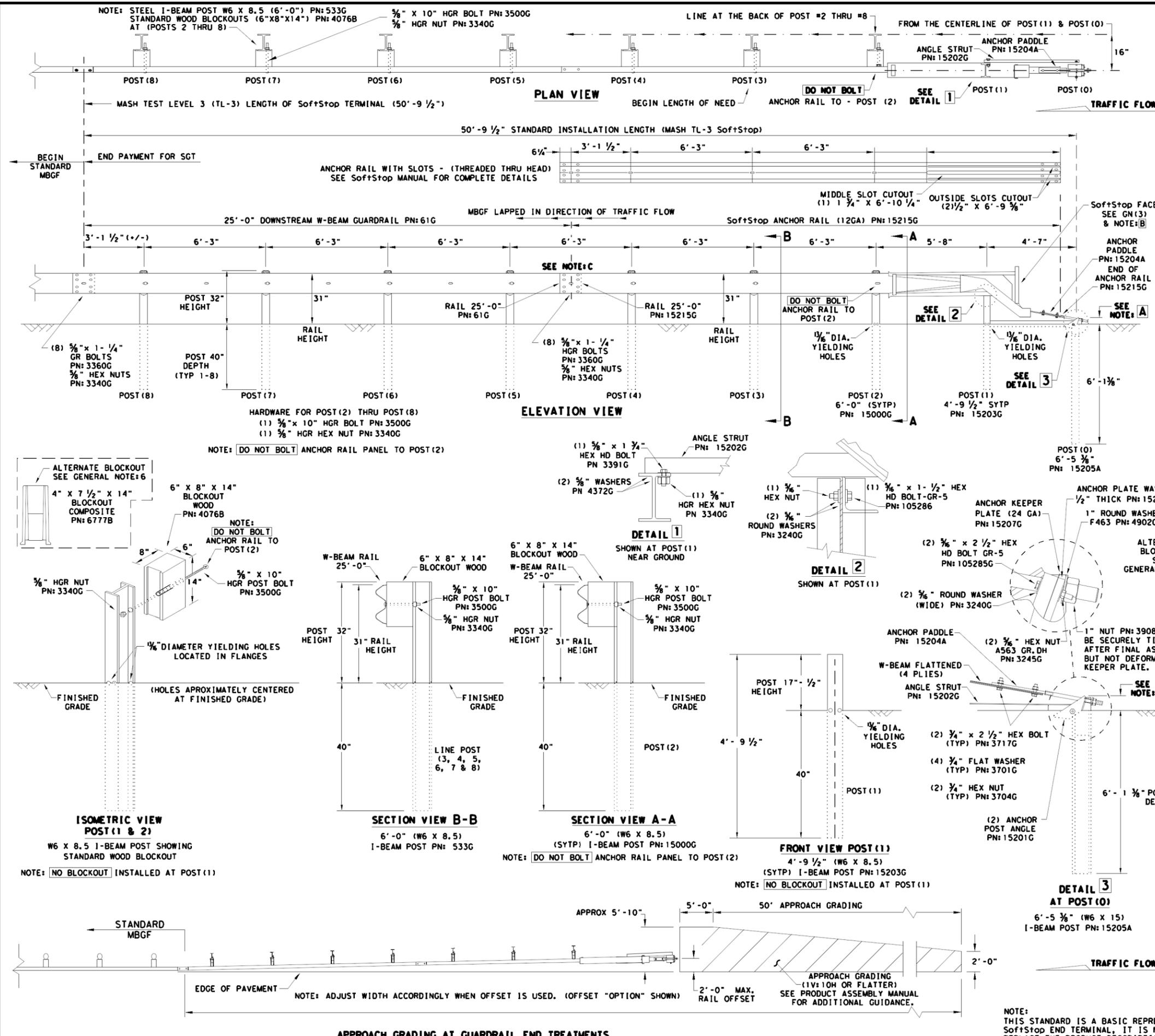
CURB OPTION (3)

Texas Department of Transportation
 Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP)
CRP-GF(31)MS-19

FILE: gf31ms19.dgn	DWG: TXDOT	CR: KM	DW: TXDOT	CR: CL
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REVISIONS	010104	131	US	181
Revised 11, 2019 KM	DIST	COUNTY	SHEET NO.	
	CRP	SAN PATRICIO	70	

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

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

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

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

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'-0")
15205A	1	POST #0 - ANCHOR POST (6'-5 3/8")
15203G	1	POST #1 - (SYTP) (4'-9 1/2")
15000G	1	POST #2 - (SYTP) (6'-0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 X 8.5) (6'-0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" X 8" X 14")
6777B	7	BLOCKOUT - COMPOSITE (4" X 7 1/2" X 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
HARDWARE		
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	5/8" X 2 1/2" HEX BOLT A325
3701G	4	5/8" ROUND WASHER F436
3704G	2	5/8" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" X 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" X 10" HGR POST BOLT A307
3391G	1	5/8" X 1 1/4" HEX HD BOLT A325
4489G	1	5/8" X 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" X 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" X 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

Texas Department of Transportation
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**TRINITY HIGHWAY
 SOFTSTOP END TERMINAL
 MASH - TL-3
 SGT (10S) 31-16**

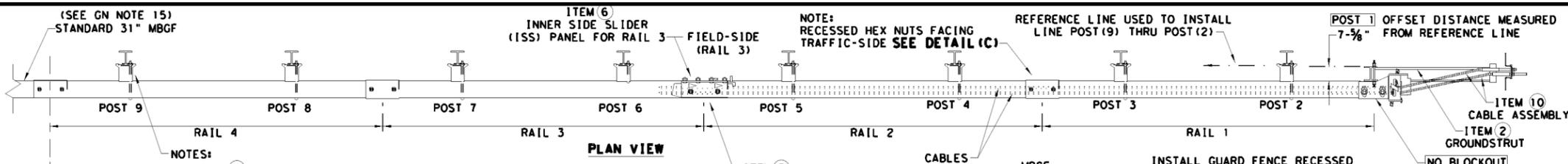
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	CRP SAN PATRICIO		71	

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

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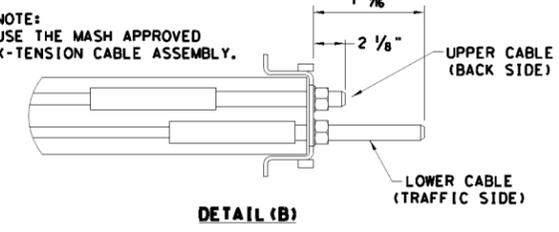
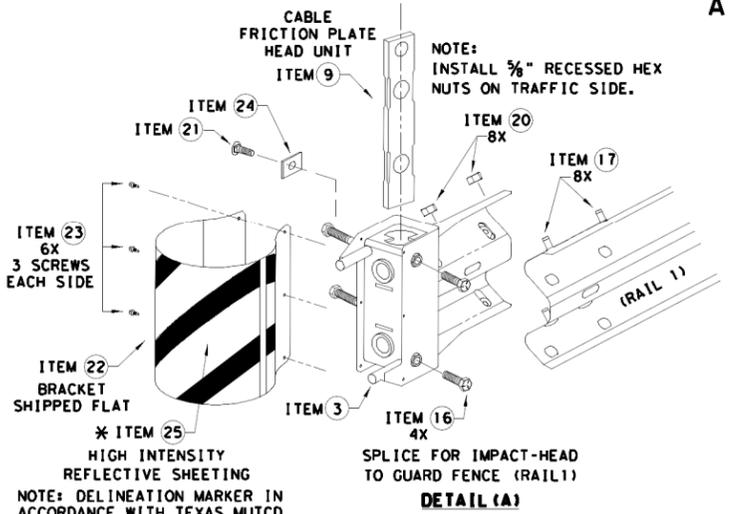
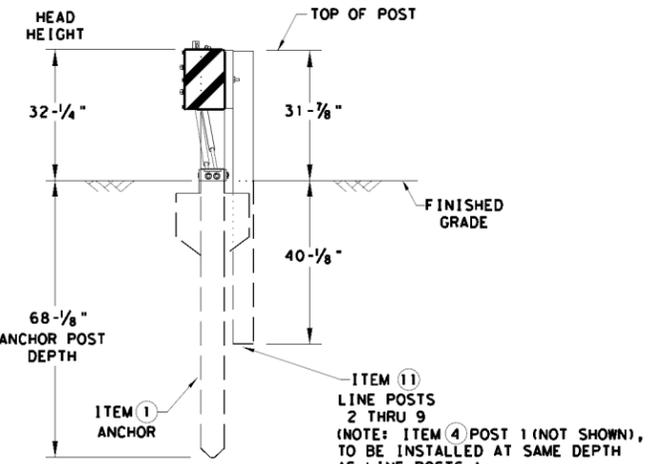
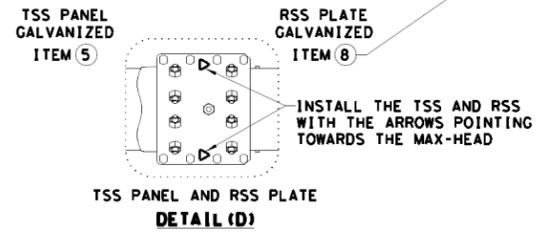
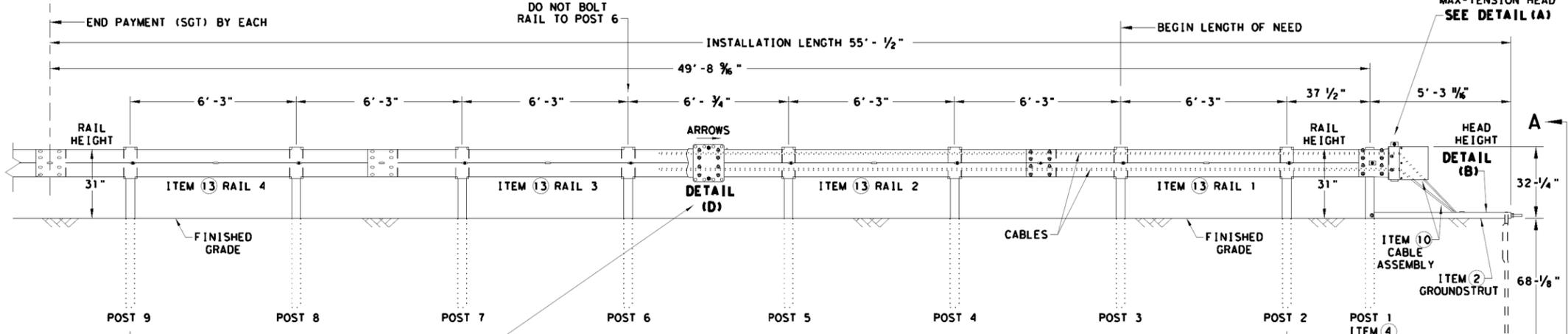
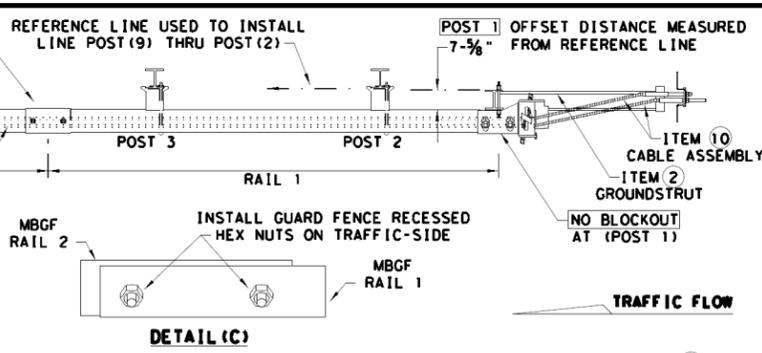
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DATE: FILE:



- NOTES:
- ITEM (2) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (9) THRU LINE POST (2).
 - DO NOT INSTALL A BLOCKOUT AT LINE POST (1).

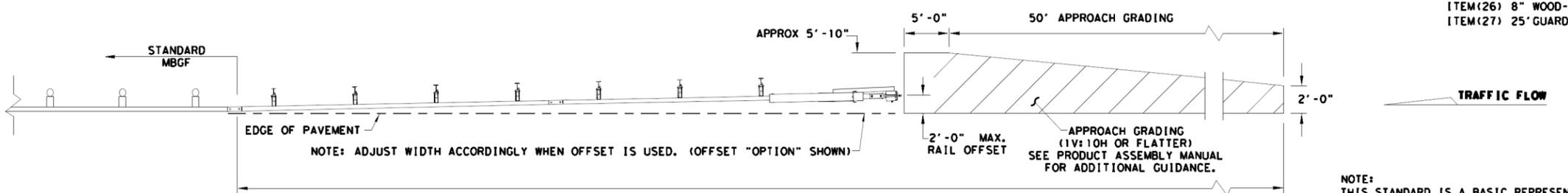
NOTE: SECURE THE (TSS) PANEL TO OUTSIDE OF RAIL 2 WITH THE PANEL ARROWS POINTING TOWARDS THE HEAD.



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

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

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



NOTE: TxDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

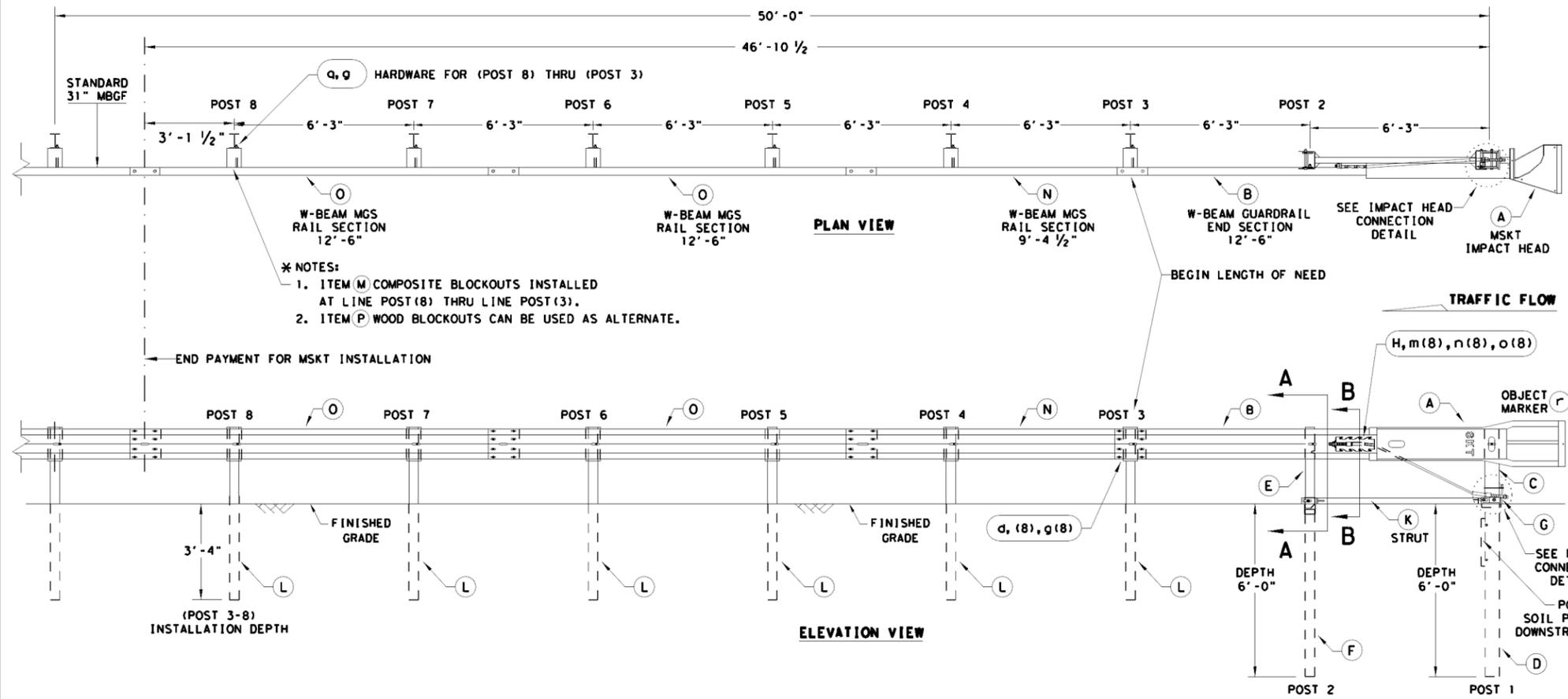
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MAX-TENSION END TERMINAL MASH - TL-3

SGT (11S) 31-18

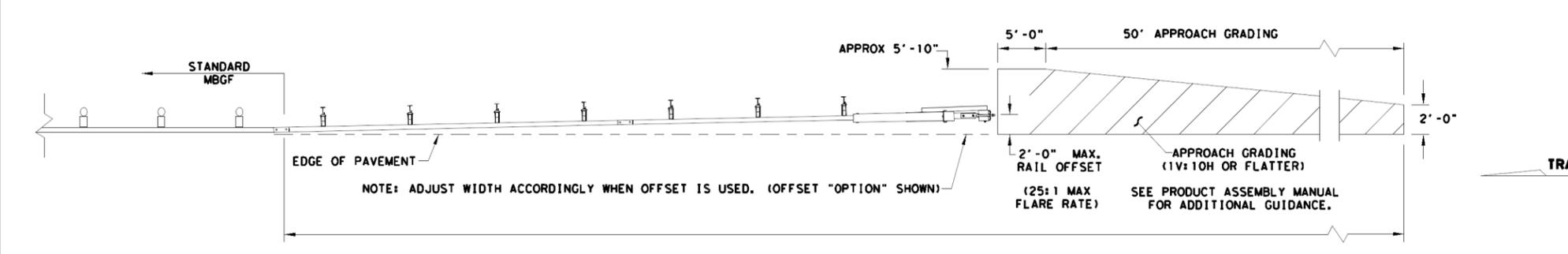
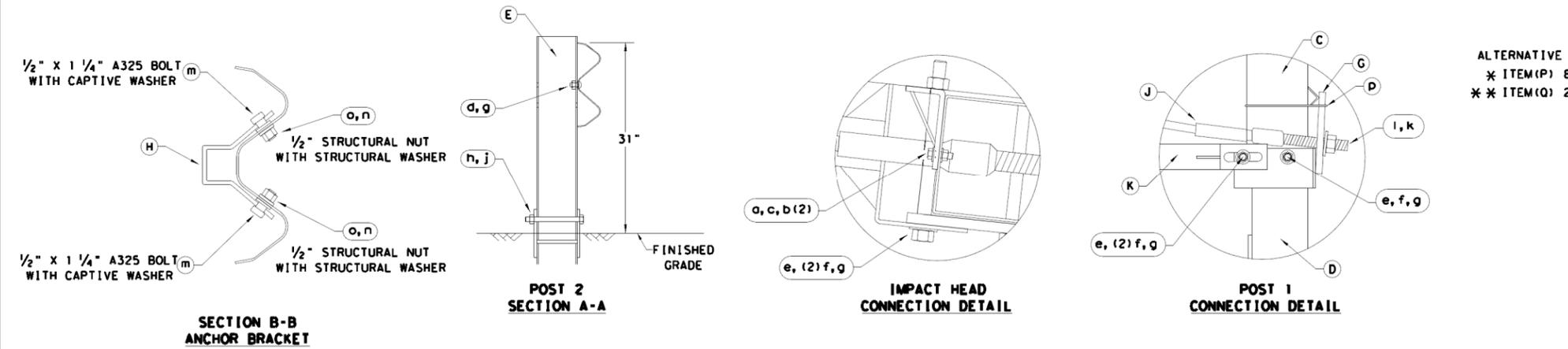
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- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER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

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



NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

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Design Division Standard

SINGLE GUARDRAIL TERMINAL

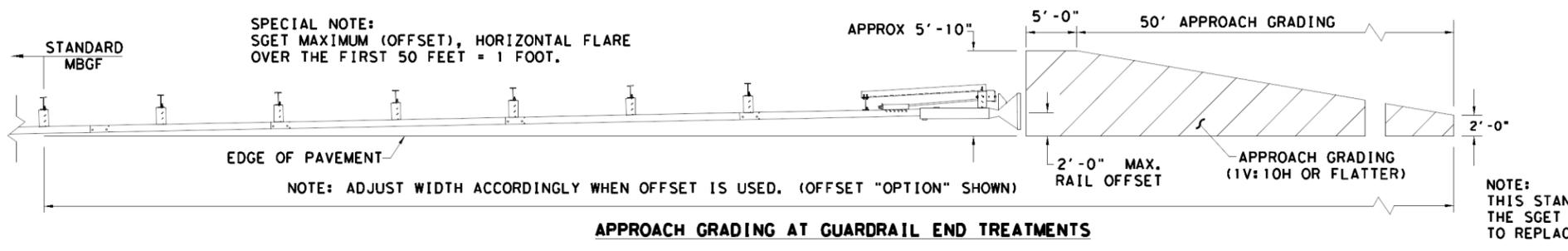
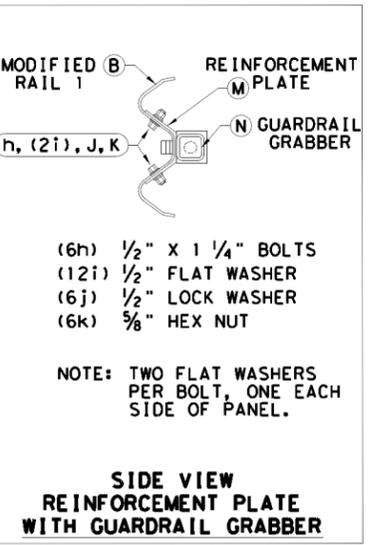
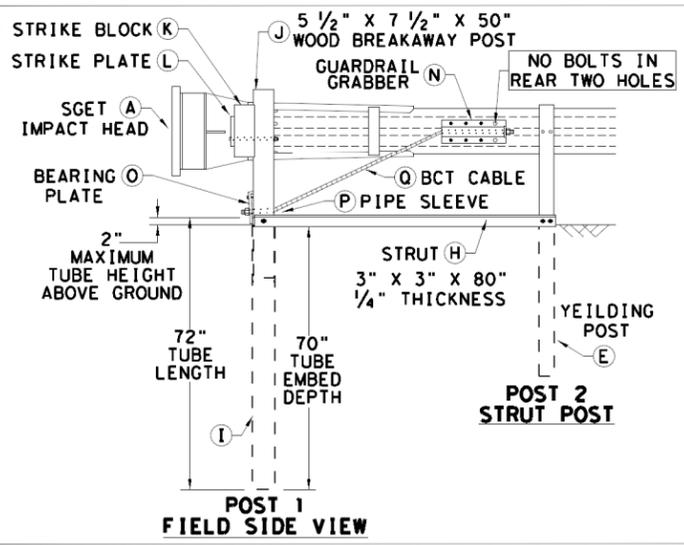
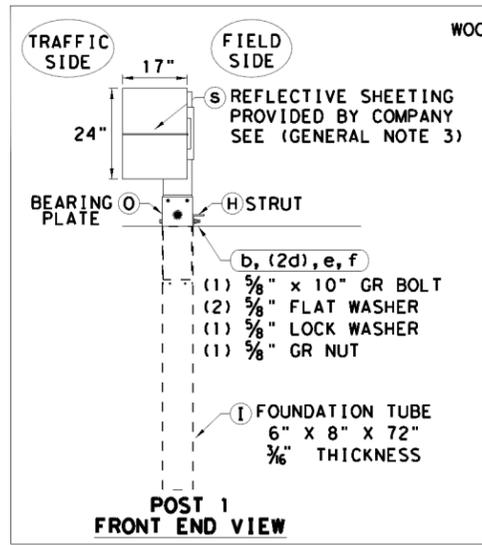
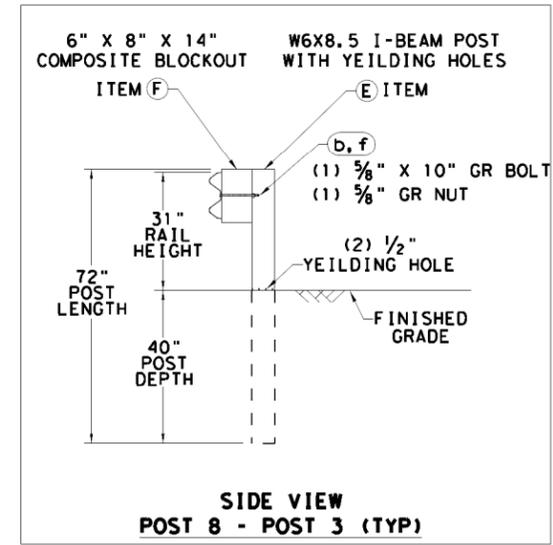
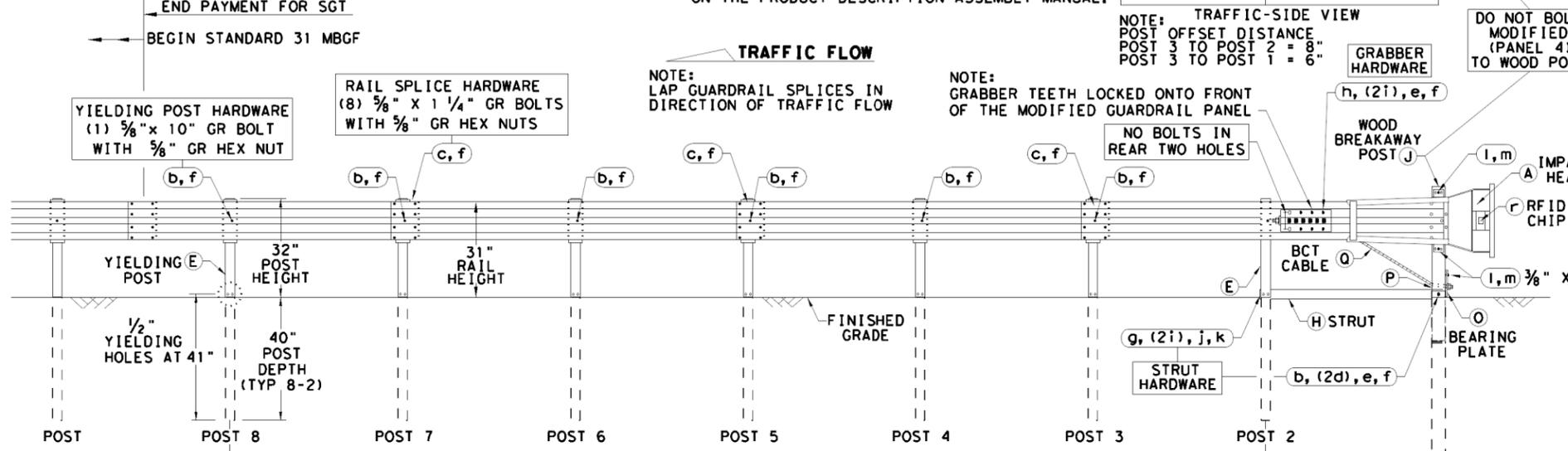
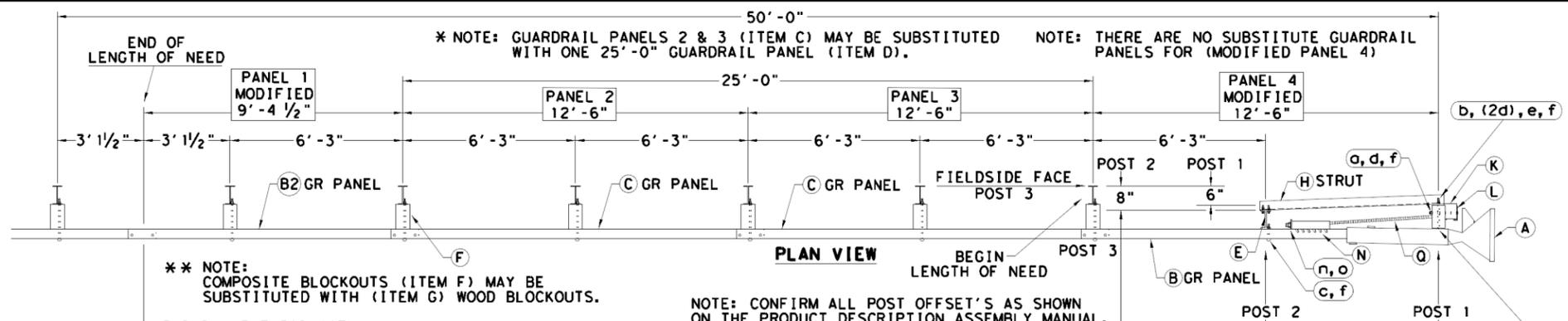
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SGT (12S) 31-18

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6"	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2"	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6"	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0"	GP25
E	7	MODIFIED YEILDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CB08
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WB08
H	1	STRUT 3" X 3" X 80" X 1/4" A36 ANGLE	STR80
I	1	FOUNDATION TUBE 6" X 8" X 72" X 3/8"	FNDT6
J	1	WOOD BREAKAWAY POST 5 1/2" X 7 1/2" X 50"	WBRK50
K	1	WOOD STRIKE BLOCK	WSBLK14
L	1	STRIKE PLATE 1/4" A36 BENT PLATE	SPLT8
M	1	REINFORCEMENT PLATE 12 GA. GR55	REPLT17
N	1	GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2"	GGR17
O	1	BEARING PLATE 8" X 8 5/8" X 5/8" A36	BPLT8
P	1	PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.)	PSLV4
Q	1	BCT CABLE 3/4" X 81" LENGTH	CBL81
SMALL HARDWARE			
o	1	5/8" X 12" GUARDRAIL BOLT 307A HDG	12GRBLT
b	7	5/8" X 10" GUARDRAIL BOLT 307A HDG	10GRBLT
c	33	5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG	1GRBLT
d	3	5/8" FLAT WASHER F436 A325 HDG	58FW436
e	1	5/8" LOCK WASHER HDG	58LW
f	39	5/8" GUARDRAIL HEX NUT HDG	58HN563
g	2	1/2" X 2" STRUT BOLT A325 HDG	2BLT
h	6	1/2" X 1 1/4" PLATE BOLT A325 HDG	125BLT
i	16	1/2" FLAT WASHER F436 A325 HDG	12FWF436
j	8	1/2" LOCK WASHER HDG	12LW
k	8	1/2" HEX NUT A563 HDG	12HN563
l	4	3/8" X 3" HEX LAG SCREW GR5 HDG	38LS
m	4	3/8" FLAT WASHER F436 A325 HDG	38FW844
n	2	1" FLAT WASHER F436 A325 HDG	1FWF436
o	2	1" HEX NUT A563DH HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M

Design Division Standard

SPIG INDUSTRY, LLC

SINGLE GUARDRAIL TERMINAL

SGET - TL-3 - MASH

SGT (15) 31-20

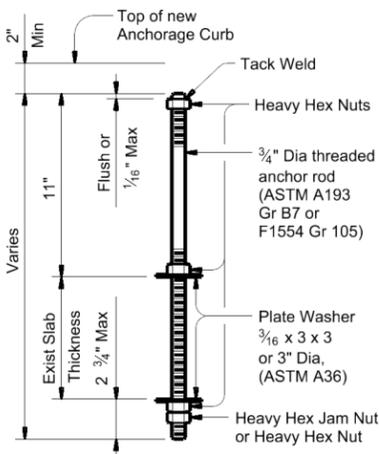
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© TXDOT: APRIL 2020	CONT: SGT	JOB: HIGHWAY		
REVISIONS	010104	131	US 181	
	DIST: CRP	COUNTY: SAN PATRICIO	SHEET NO. 74	

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

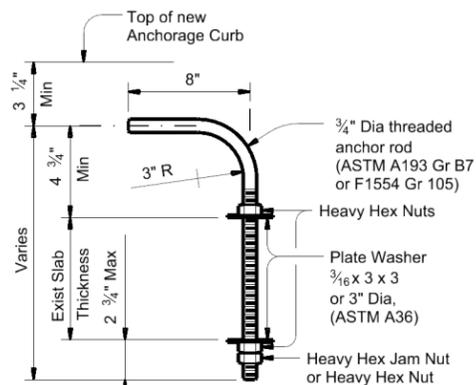
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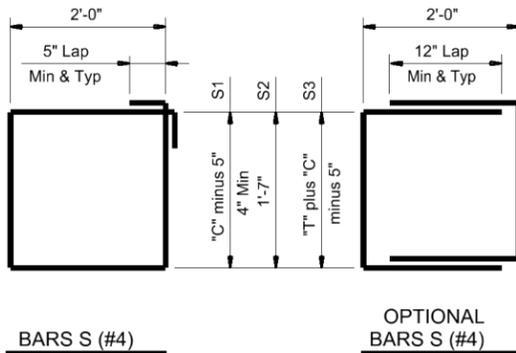


STRAIGHT ANCHOR 9



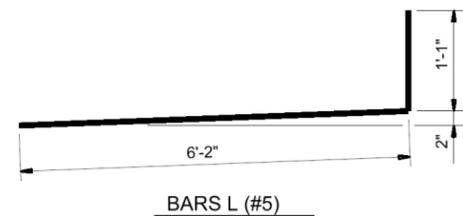
HOOKED ANCHOR 9

ANCHOR DETAILS

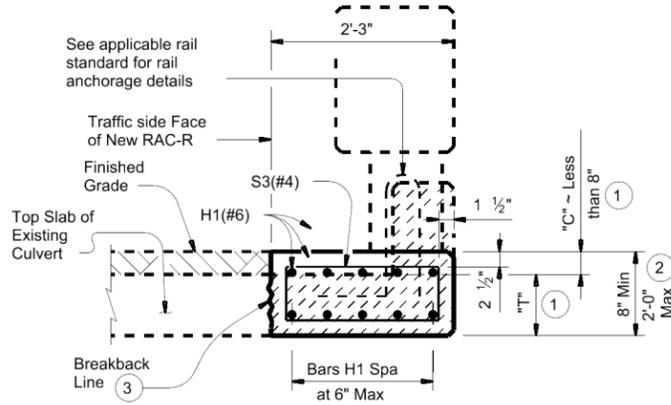


BARS S (#4)

OPTIONAL BARS S (#4)

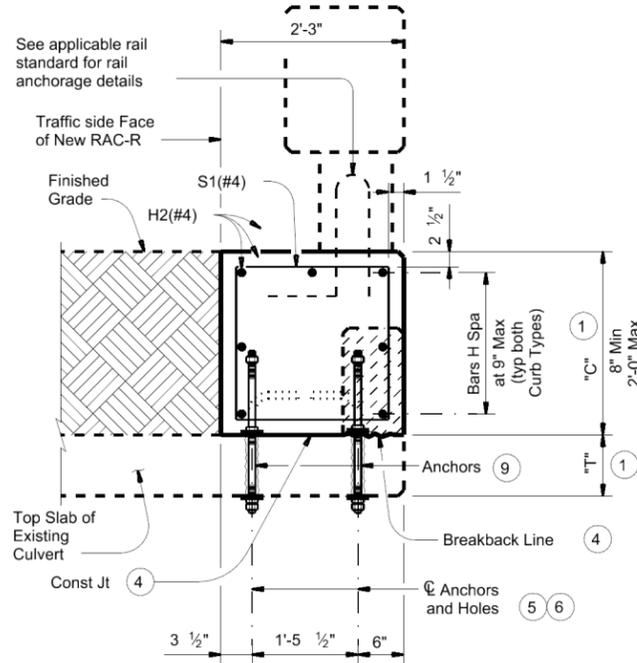


BARS L (#5)



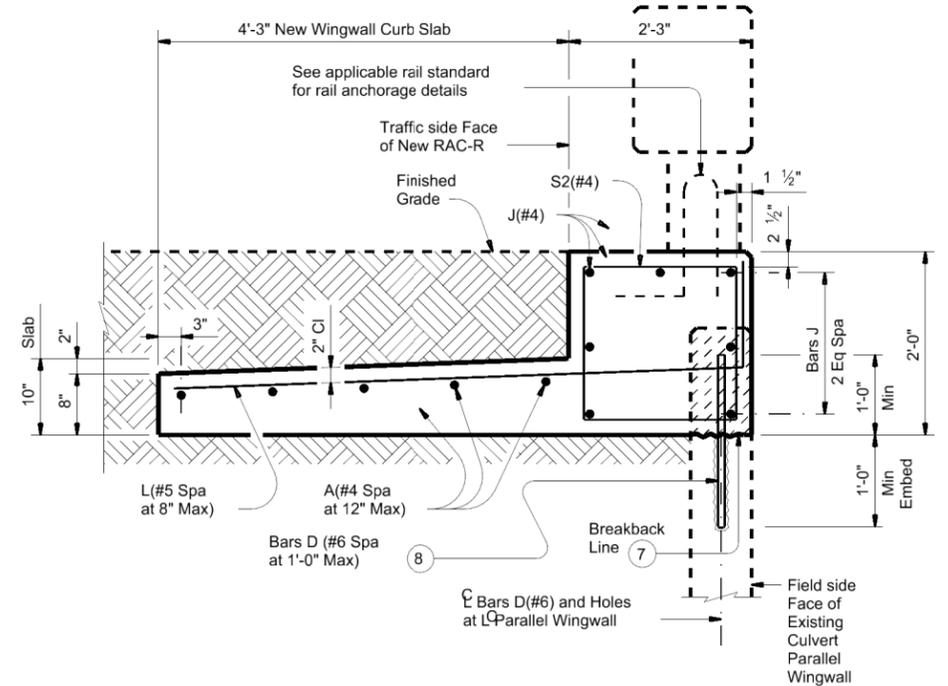
TYPICAL SECTION ~ TYPE 1

Used when the top of the Retrofit Curb is less than 8" above existing slab. Showing T223 Rail other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC-R standard.



TYPICAL SECTION ~ TYPE 2

Used when the Retrofit Curb is 8" in height or greater. Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with the RAC-R standard.



TYPICAL SECTION ~ PARALLEL WINGWALL

Wingwall Anchorage Curb is required on Parallel Wingwalls only. Omit Wingwall Anchorage Curb on Flared and Straight Wingwalls. Showing T223 Rail, other rails similar. (Bars L(#5) on T223 and C223 Rails are not used for this structure). Bars RH(#5) required on standards T80HT, T80SS and T224 are not required when used with RAC-R standard.

- "T" is equal to the existing culvert top slab thickness. If "T" is less than 6", a special design will be required. "C" is equal to the Retrofit Rail Anchorage Curb thickness.
- The total thickness ("T" plus "C") must be 8" minimum in order to properly install the railing anchorage reinforcing.
- Remove shaded portion of existing concrete to Breakback Line shown. Care must be taken so as to not damage existing reinforcing. Replace damaged reinforcing with new, like reinforcing. Clean existing reinforcing and incorporate into new concrete construction.
- Saw cut (score) 1" deep flush with top of existing culvert slab, on the field side face of existing curb, if present. After scoring, remove shaded portion of existing concrete to Breakback Line shown. Do not damage existing reinforcing. Clean, bend and incorporate existing reinforcing into new concrete construction. Note that new anchors, as shown in the detail, are required even when existing reinforcing remains in use. Remove existing overlay and/or base material to flush with top of culvert in areas of new construction. Care must be taken to not damage the existing slab. In order to prevent existing asphalt remnants from acting as a bond breaker between the exposed, existing concrete and the retrofitted concrete curb, clean the newly exposed concrete with abrasive blasting or shot blasting. Remove all loose debris prior to placing new anchorage curb.
- Core drill 1" diameter holes through existing slab. Percussion drilling is not permitted. Patch spalls, when directed by the Engineer, in accordance with Item 429, "Concrete Structure Repair", at the Contractor's expense. Tighten nuts snug tight.
- Space field side anchors at 36" maximum. Space traffic side anchors at 11" maximum. Do not align field side and traffic side anchors transversely.
- Retrofit Wingwall Anchorage Curb must always be 2'-0" in height. Breakback existing wingwall as needed in order to properly align the wingwall Anchorage Curb with that placed on the existing culvert. Saw cut (score) 1" deep on field side face of the existing wingwall prior to breakback. Care must be taken so as to not damage existing reinforcing. Clean and extend existing reinforcing into new construction. Note that new Bars D(#6), as shown in the detail, are required even when existing reinforcing remains in use.

- Embed bars D(#6) into existing wingwall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 12". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." If existing parallel wingwall thickness is less than 8", a special design will be required.
- Use straight anchors if retrofit anchorage curb is 1'-2" or greater in thickness. Use hooked anchors for retrofit anchorage curb less than 1'-2" thick.

This sheet is intended to be used as a guide for retrofitting existing box culverts with traffic railing. Details with appropriate notes taken from this guide should be prepared for the specific application. Dimensions of existing culvert top slab thickness, wingwall thickness, fill height at traffic side face of rail anchorage curb retrofit etc. should be shown. Particular care should be taken in identifying the box culvert wingwall conditions, and providing for proper railing post anchorage and approach guard fence post positioning. This sheet may not be used without modification. The details shown may need to be amended if the exact existing condition is not covered. In all cases details and notes not required must be crossed out or eliminated, "(MOD)" added, the phrase "(Not to be used as a standard)" removed and the sheet sealed and signed.

- CONSTRUCTION NOTES:**
Field verify dimensions before commencing work and ordering materials.
- MATERIAL NOTES:**
Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere in the plans.
Chamfer all exposed corners 3/4" unless shown otherwise.
Provide Grade 60 reinforcing steel.
Galvanize all reinforcing steel if required elsewhere.
Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-11"
Galvanize 3/4" Dia threaded rods, heavy hex nuts and plate washers, unless otherwise shown on plans.

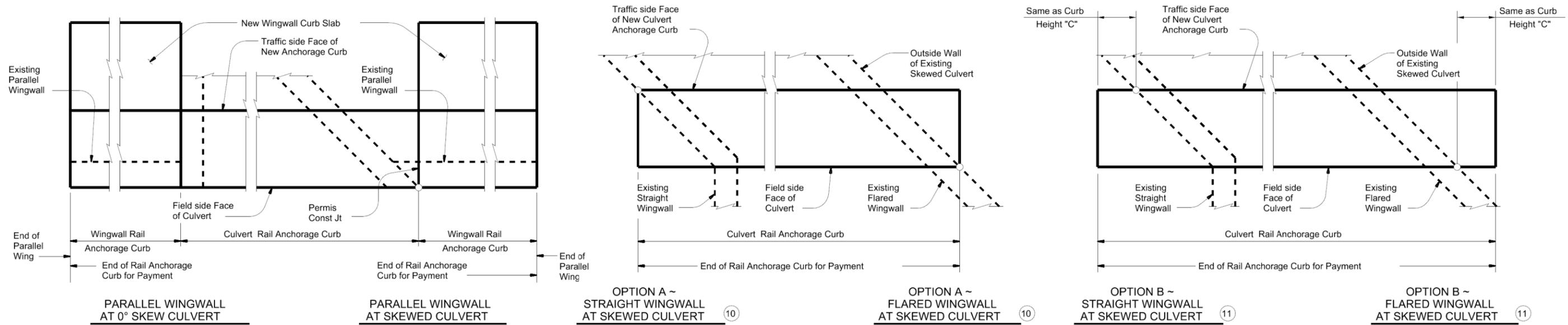
- GENERAL NOTES:**
Designed according to AASHTO LRFD Bridge Design Specifications.
The rail anchorage curb details have sufficient strength for use with all standard rail types. See appropriate rail standard for approved speed restrictions, notes and details not shown. For vehicle safety, the top of the new curb must be flush with the finished grade. These details are for use with curbs with a maximum height of 2'-0" only. Curb heights greater than 2'-0" will require special design.
Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the rail anchorage curb.
Payment for rail anchorage curb (including wingwall curb slab) will be by CY of Class "C" or Class "C" (HPC) concrete.
Not all possible combinations of existing box culverts, curbs, wingwalls etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this sheet.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

		Bridge Division Standard	
RAIL ANCHORAGE CURB RETROFIT GUIDE BOX CULVERT RAIL MOUNTING DETAILS (CURBS 2'-0" TALL AND LESS ONLY) (NOT TO BE USED AS A STANDARD)			
RAC-R			
FILE: racts02-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
CONT: February 2020	SECT:	JOB:	HIGHWAY:
REVISIONS:	010104	131	US 181
DIST:	COUNTY:	SHEET NO.	
CRP	SAN PATRICIO	75	

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PARALLEL WINGWALL AT 0° SKEW CULVERT

PARALLEL WINGWALL AT SKEWED CULVERT

OPTION A ~ STRAIGHT WINGWALL AT SKEWED CULVERT 10

OPTION A ~ FLARED WINGWALL AT SKEWED CULVERT 10

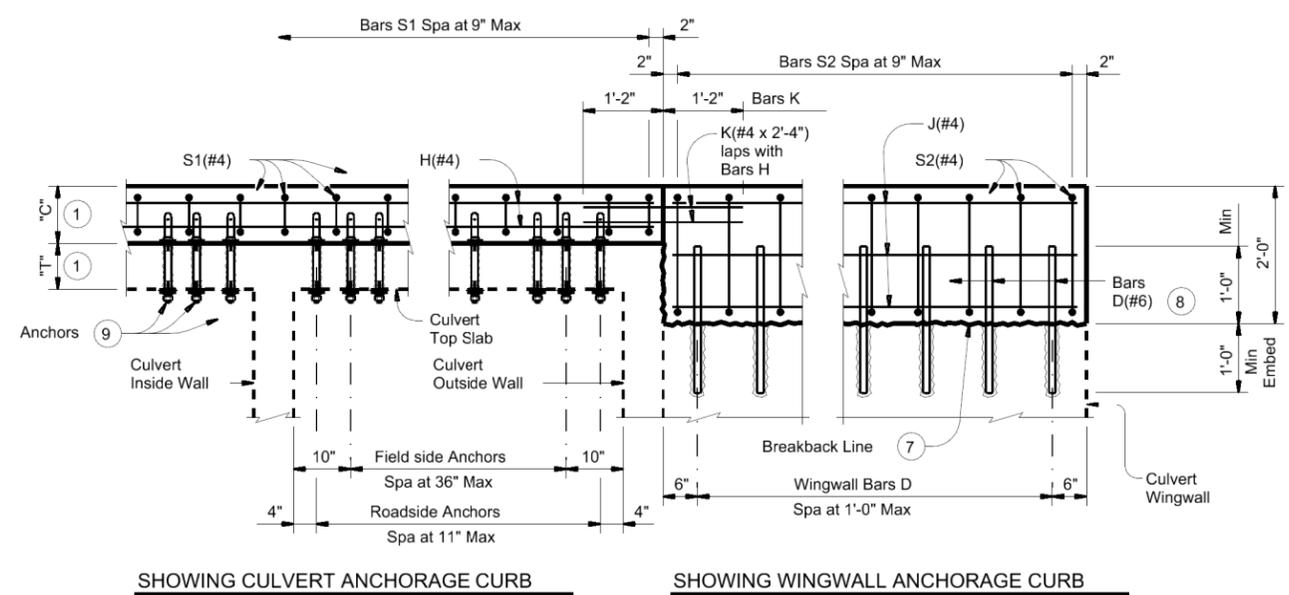
OPTION B ~ STRAIGHT WINGWALL AT SKEWED CULVERT 11

OPTION B ~ FLARED WINGWALL AT SKEWED CULVERT 11

Note that Wingwall Rail Anchorage Curb is used only at culverts with parallel wingwalls.

TYPICAL CURB PLANS

Showing Geometry only. Reinforcing, Curb Anchors, and Railing not shown for clarity.



SHOWING CULVERT ANCHORAGE CURB

Showing Anchorage Curb Type 2. Anchor and Bars S spacing are the same for Anchorage Type 1.

SHOWING WINGWALL ANCHORAGE CURB

Curb Slab and Slab reinforcing not shown for clarity.

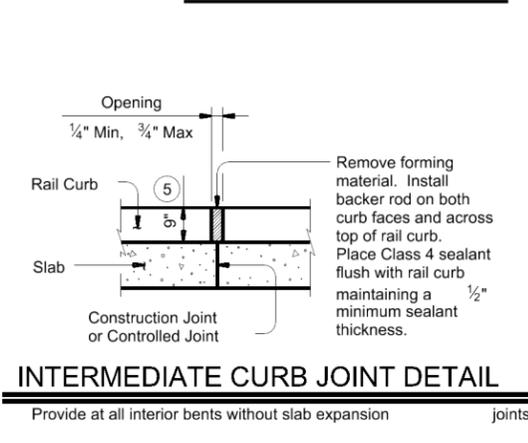
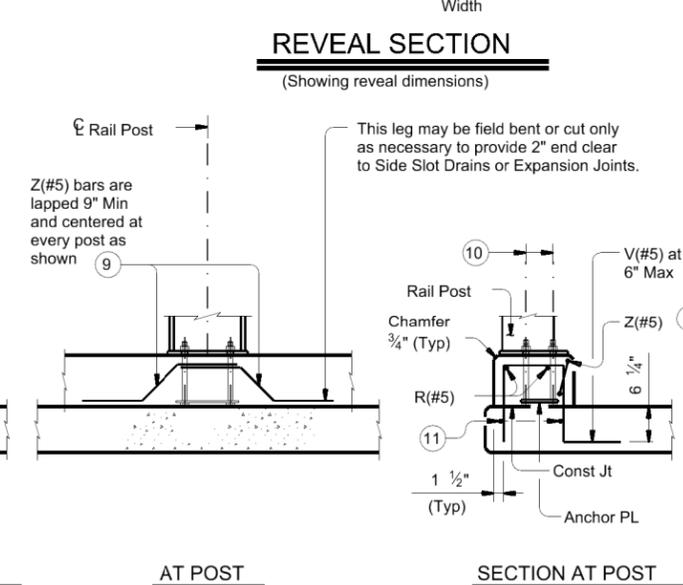
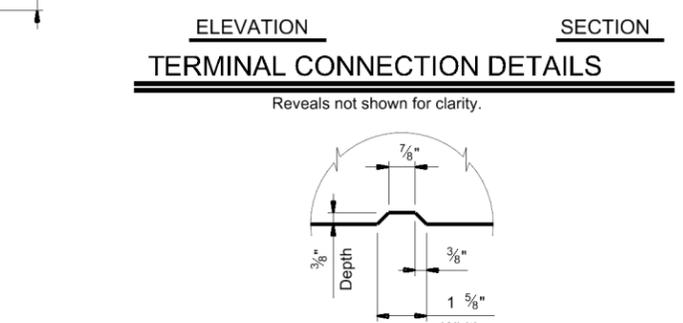
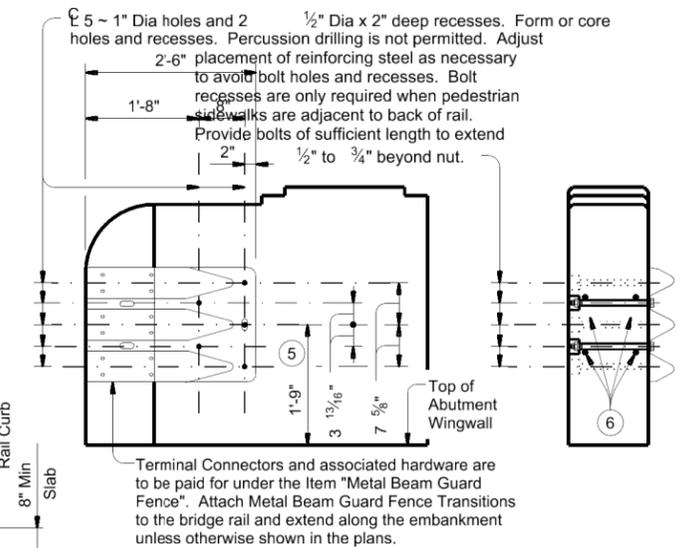
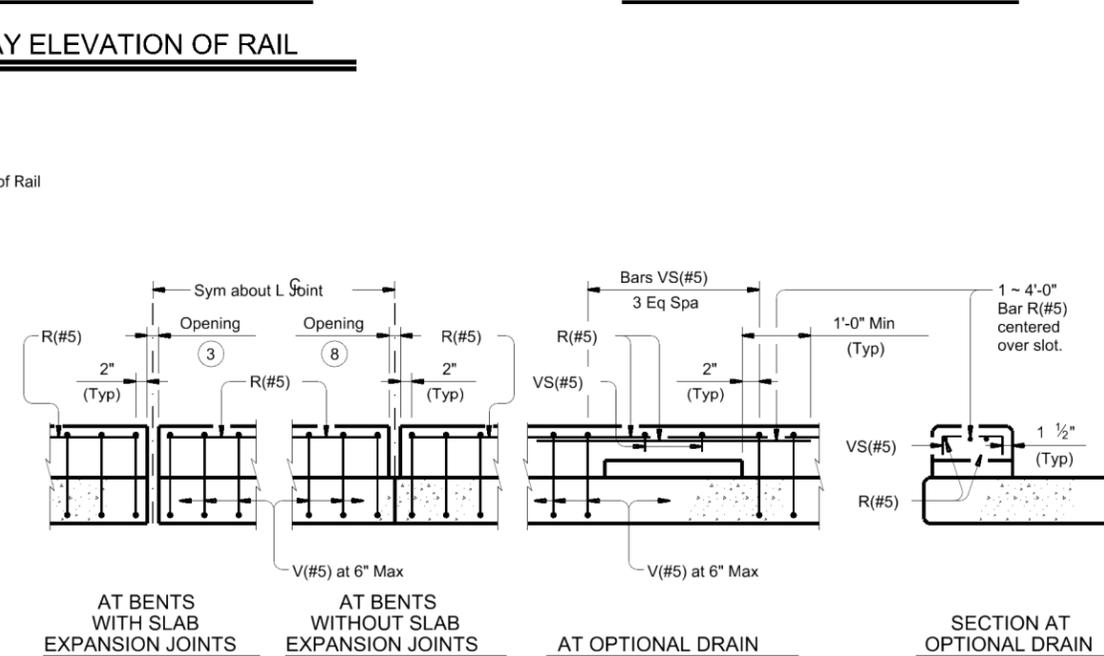
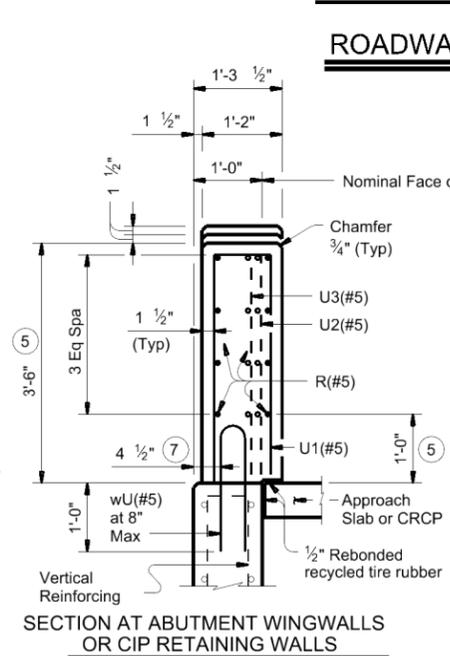
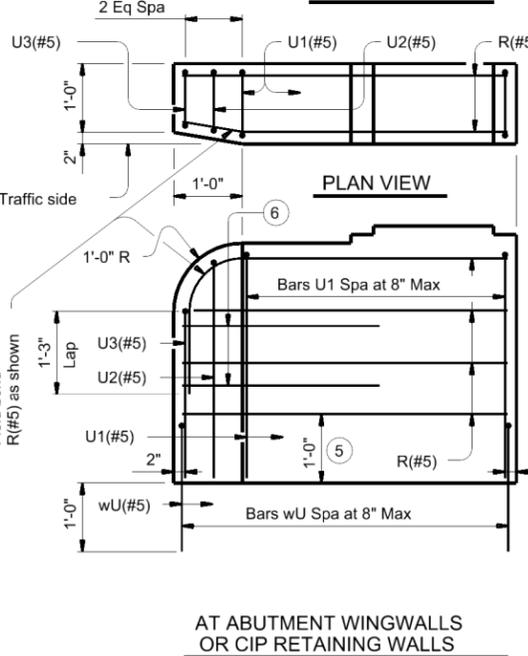
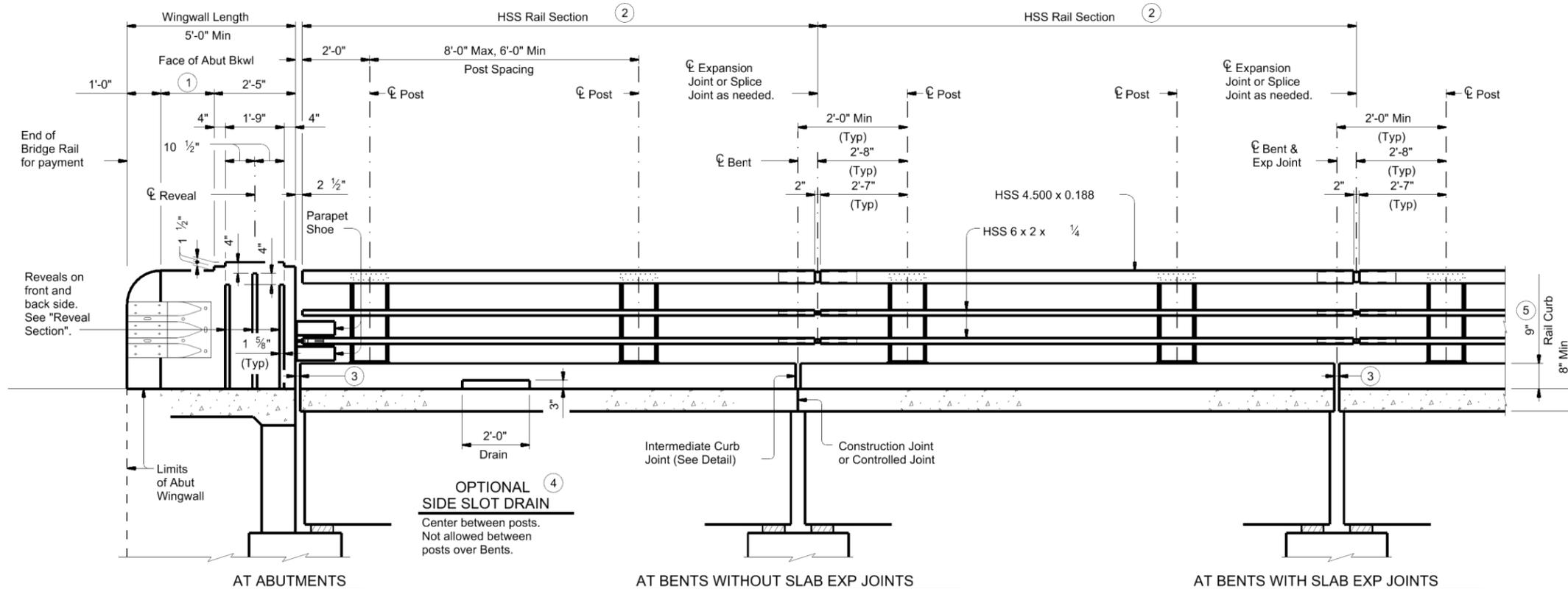
TYPICAL ELEVATIONS OF INSTALLATION

- 1 "T" is equal to the existing culvert top slab thickness. If "T" is less than 6", a special design will be required. "C" is equal to the Retrofit Rail Anchorage Curb thickness.
- 7 Retrofit Wingwall Anchorage Curb must always be 2'-0" in height. Breakback existing wingwall as needed in order to properly align the wingwall Anchorage Curb with that placed on the existing culvert. Saw cut (score) 1" deep on field side face of the existing wingwall prior to breakback. Care must be taken so as to not damage existing reinforcing. Clean and extend existing reinforcing into new construction. Note that new Bars D(#6), as shown in the detail, are required even when existing reinforcing remains in use.
- 8 Embed bars D(#6) into existing wingwall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 12". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." If existing parallel wingwall thickness is less than 8", a special design will be required.
- 9 Use straight anchors if retrofit anchorage curb is 1'-2" or greater in thickness. Use hooked anchors for retrofit anchorage curb less than 1'-2" thick.
- 10 Use Option A if finished grade at face of rail anchorage curb remains unchanged, or if both wingwalls and rail anchorage curb will be vertically raised. Existing wingwalls must be checked for suitability of vertically raising.
- 11 Use Option B if wingwalls will not be vertically raised when the curb height is increased. Verify adequacy of existing or proposed finished grade between end of rail anchorage curb and wingwall. Extension of rail anchorage curb beyond wingwall may need to be greater than "C" depending on side slope conditions.

				Bridge Division Standard	
RAIL ANCHORAGE CURB RETROFIT GUIDE BOX CULVERT RAIL MOUNTING DETAILS (CURBS 2'-0" TALL AND LESS ONLY) (NOT TO BE USED AS A STANDARD)					
RAC-R					
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REV:	February 2020	CON:	SECT	JOB	HIGHWAY
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DIST:	COUNTY	SHEET NO.			
CRP	SAN PATRICIO	76			

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- ① Wingwall length minus 3'-5" (Variable) 1'-7" Min.
- ② HSS rail sections must have at least two posts but not more than four.
- ③ Same as slab joint opening. (5" Max Expansion Joint)
- ④ Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway and a sidewalk, side slot drains are not permitted.
- ⑤ Increase 2" for structures with overlay.
- ⑥ Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
- ⑦ 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑧ 1/4" Min, 3/4" Max.
- ⑨ Adjust Bars Z(#5) as necessary to avoid Bars V(#5).
- ⑩ 7/8" Dia Anchor Bolts. See "Anchor Bolt Assembly Details".
- ⑪ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

SHEET 1 OF 4

Bridge Division Standard

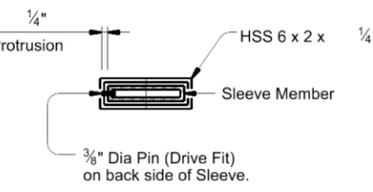
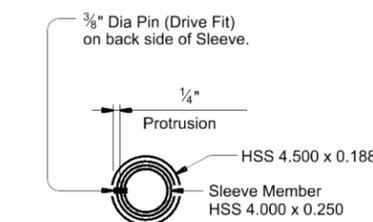
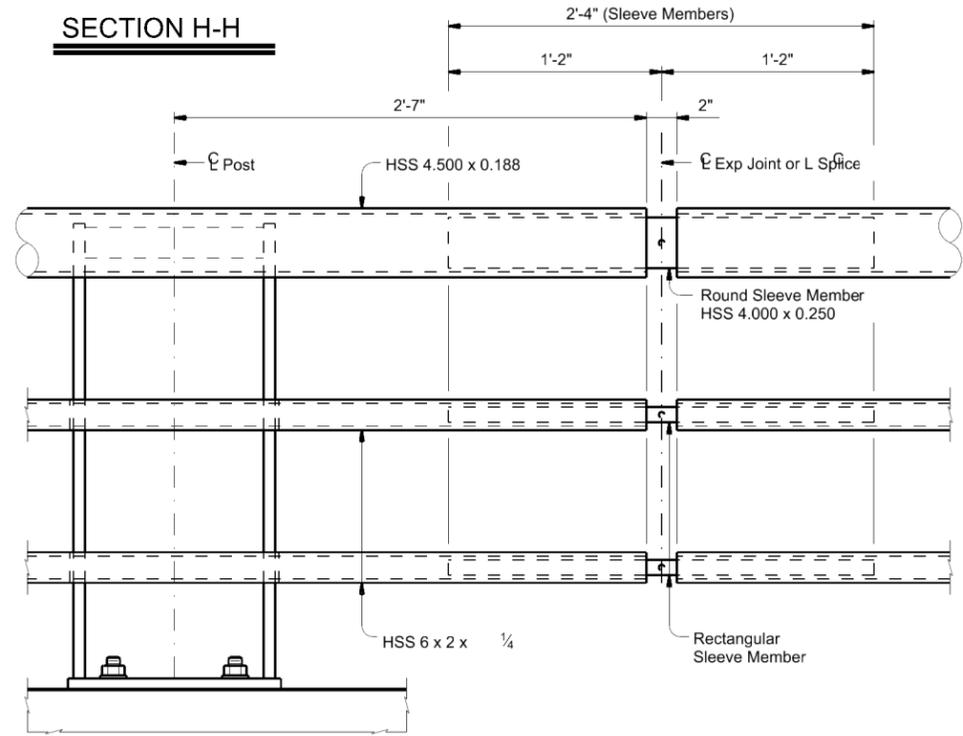
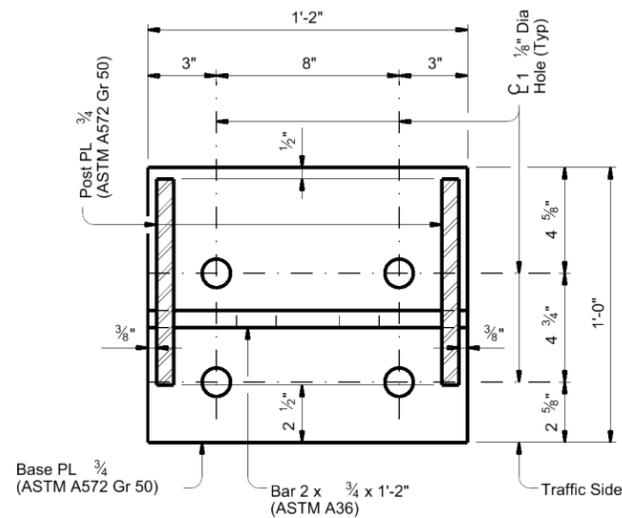
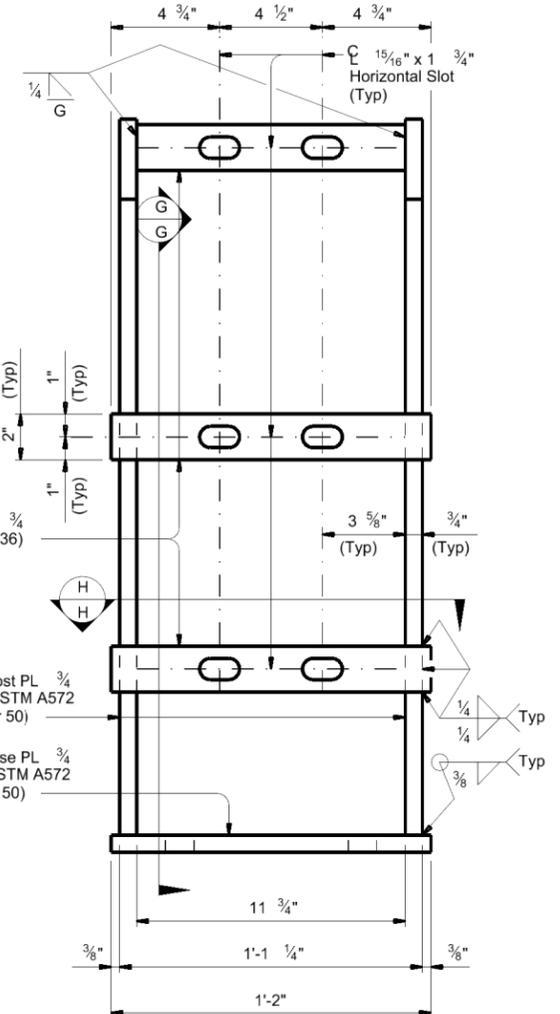
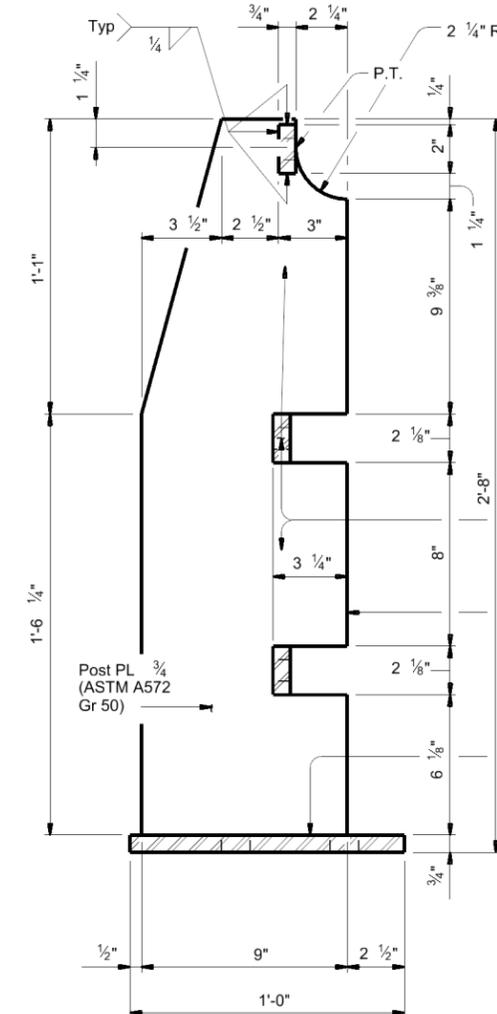
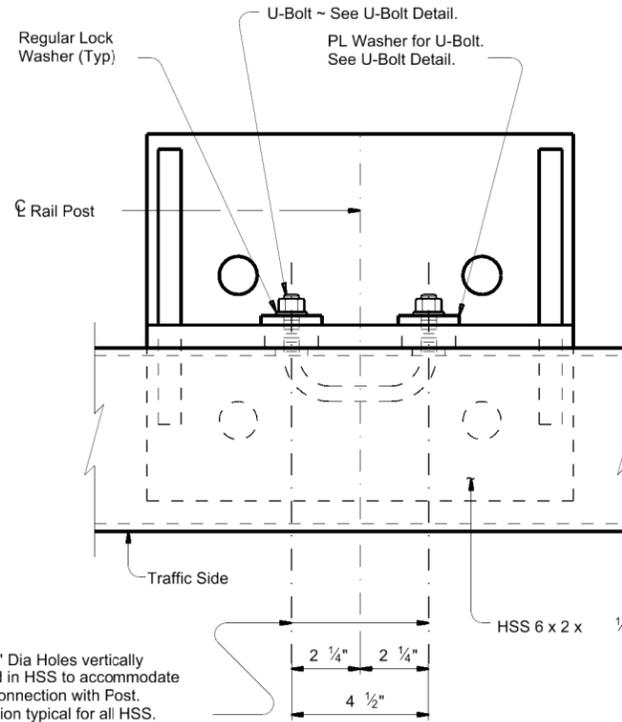
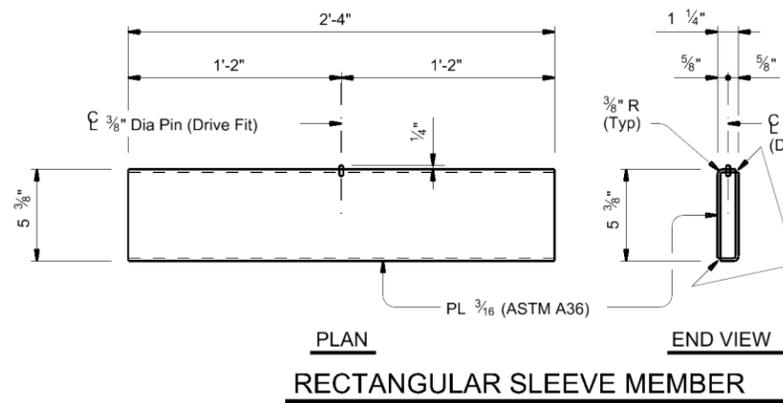
TRAFFIC RAIL

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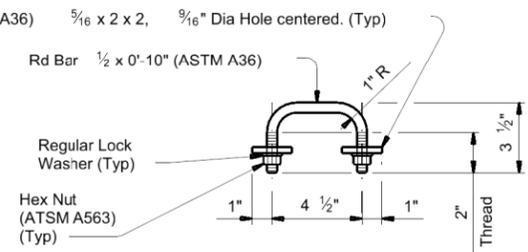
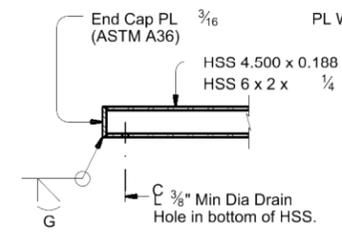
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SECTIONS THRU SLEEVE MEMBERS
(Sections shown at L Exp Jt or L Splice)



SHEET 3 OF 4

Texas Department of Transportation Bridge Division Standard

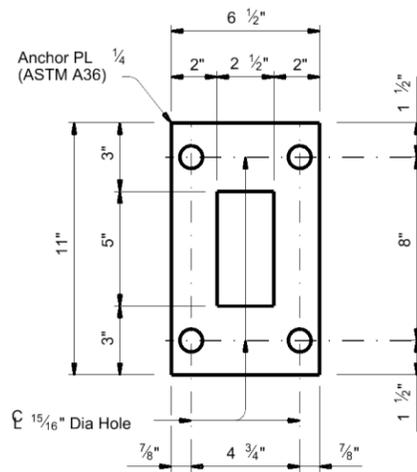
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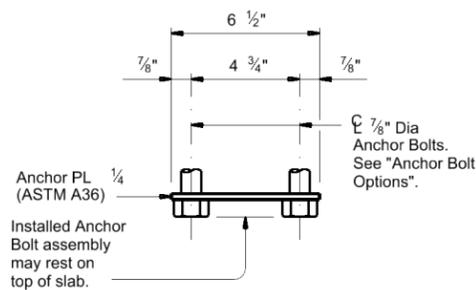
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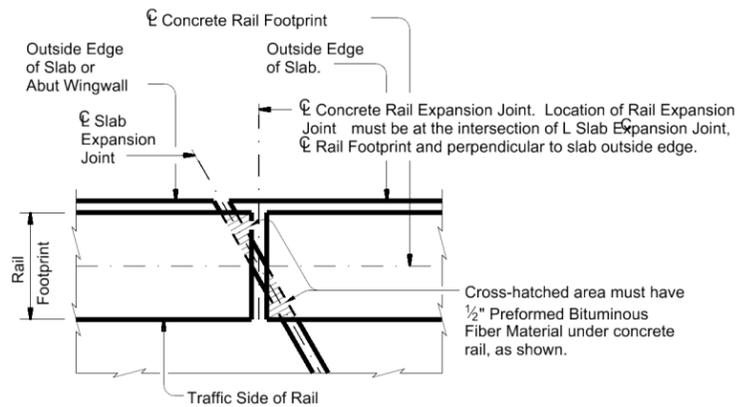


PLAN OF ANCHOR PLATE



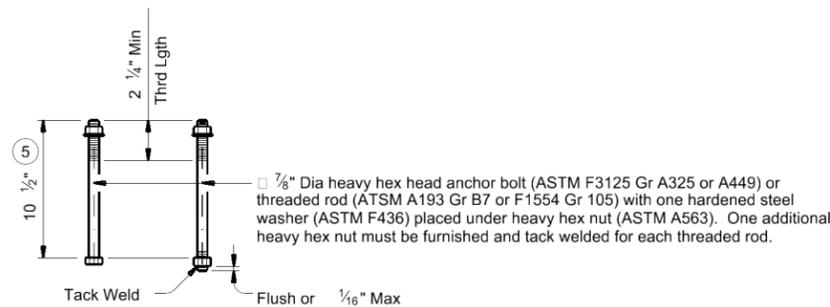
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.



ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for Base Plate)

5 Increase 2" for structures with overlay.

CONSTRUCTION NOTES:

The face of tubular sections and rail curb must be plumb unless otherwise approved by the Engineer. Steel posts must be square to the top of curb. Use epoxy mortar under post base plates if gaps larger than 1/16" exist. Bend tubes to required radius for curved rails. Shop drawings for approval are required for curved rails. One shop splice per rail member section is permitted with minimum 85 percent penetration. The weld may be square groove or single V groove. Grind smooth. Cap all ends of HSS at parapet. Round or chamfer exposed edges of rail members and rail posts to approximately 1/16" by grinding. Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide ASTM A1085 or A500 Gr B for all HSS. Provide Grade 60 reinforcing steel. Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized. Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require paint over galvanizing, follow the requirements for painting galvanized steel in Item 445, "Galvanizing" and when field painting, Item 446, "Field Cleaning and Painting Steel." Sleeve members and anchor bolts must receive galvanization prior to installation and only field paint after installation unless directed otherwise by Engineer. Provide 7/8" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Provide 1/2" Dia round bar U-bolts (ASTM A36) with plate washers (ASTM A36) and regular lock washers placed under hex nuts that conform to ASTM A563 requirements. See "U-Bolt Detail." Provide Class "S" concrete. When Class "S" concrete for slab is HPC, include a minimum of 3 gallons of calcium nitrite inorganic corrosion inhibitor per cubic yard of Class "S" concrete.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less. This railing cannot be used on bridges with expansion joints providing more than 5" movement or on cast-in-place retaining walls, unless otherwise noted. Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Submit erection drawings showing panel lengths, rail post spacing, and anchor bolt setting, to the Engineer for approval.

Average weight of railing with no overlay: 192 plf total
131 plf (Conc)
61 plf (Steel).

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

SHEET 4 OF 4



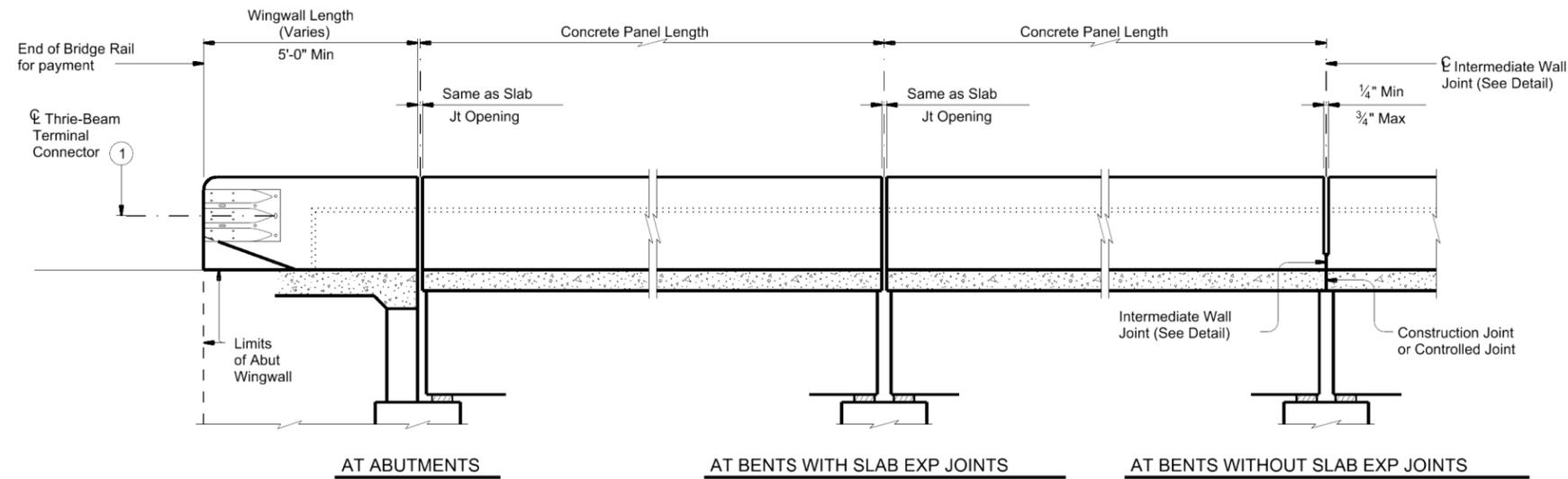
TRAFFIC RAIL

TYPE T2P

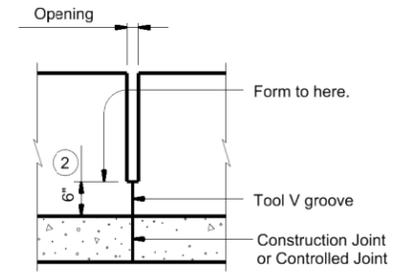
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REVISIONS	0101	04	131	US 181
DIST	COUNTY	SHEET NO.		
CRP	SAN PATRICIO	80		

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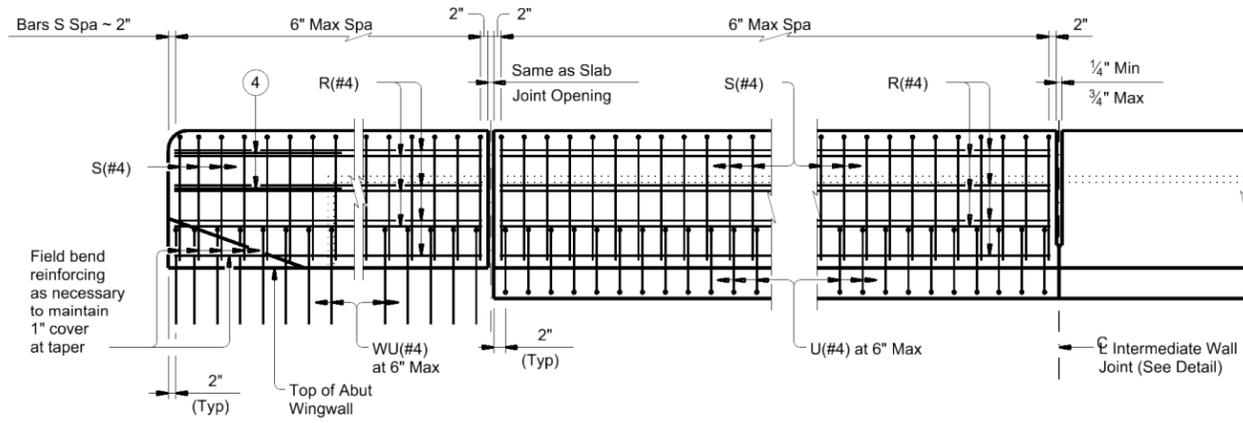


ROADWAY ELEVATION OF RAIL

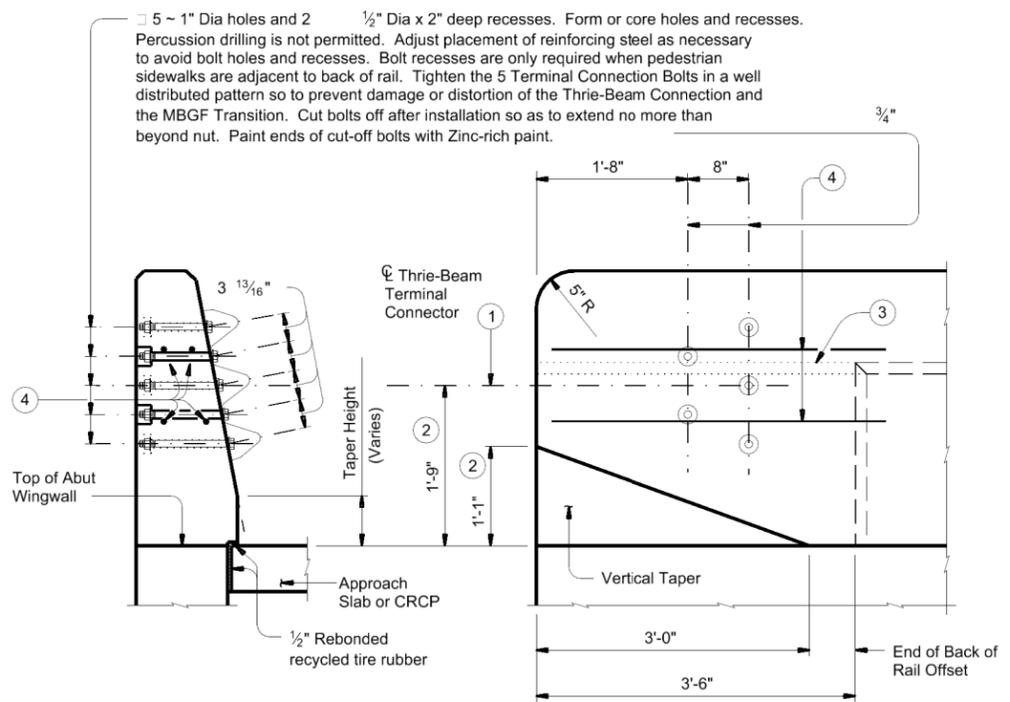


INTERMEDIATE WALL JOINT DETAIL

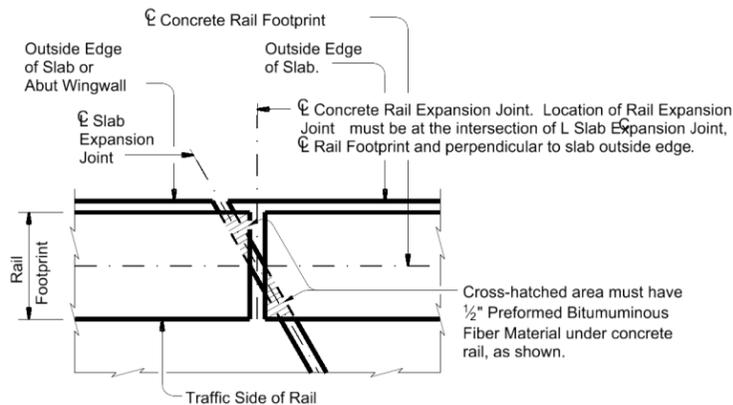
Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



SECTION
ELEVATION
TERMINAL CONNECTION DETAILS



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

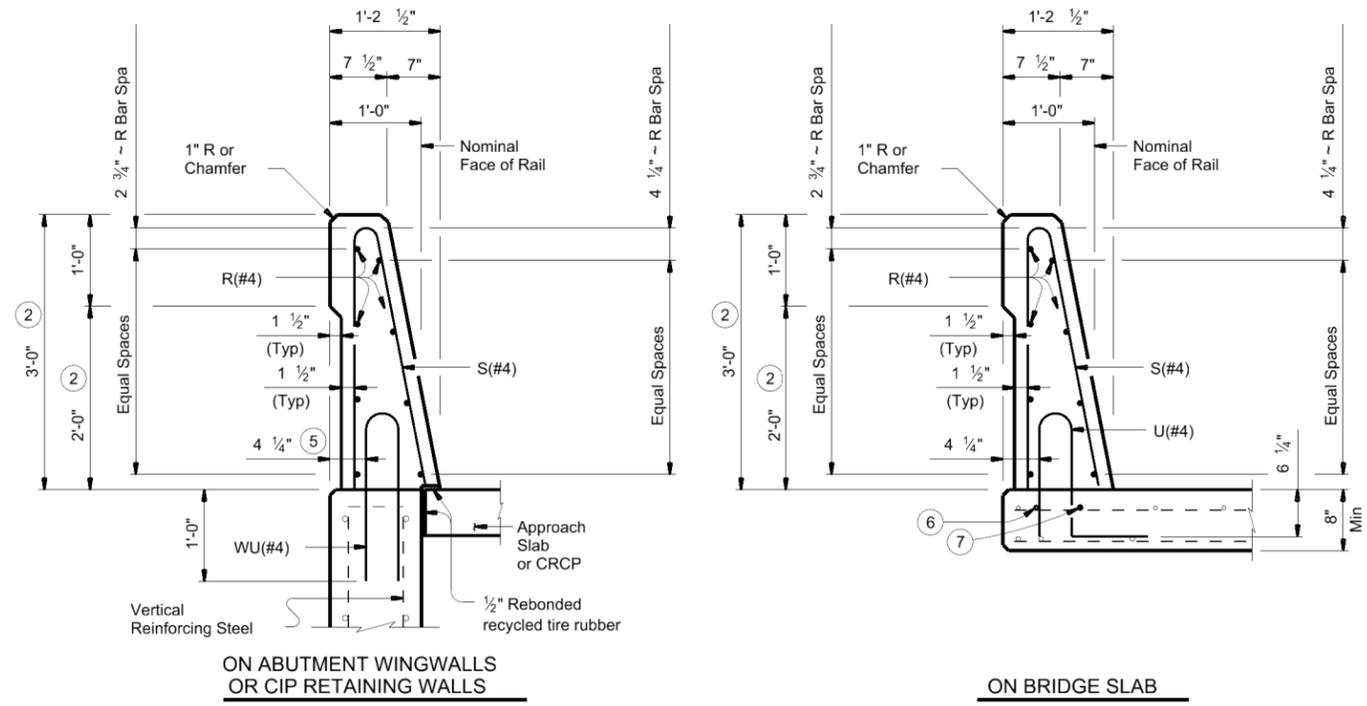
- 1 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- 2 Increase 2" for structures with Overlay.
- 3 Back of rail offset may, with Engineer's approval, be continued to the end of the railing.
- 4 Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

SHEET 1 OF 2

		Bridge Division Standard	
TRAFFIC RAIL SINGLE SLOPE			
TYPE SSTR			
FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	HIGHWAY
	010104	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	81	

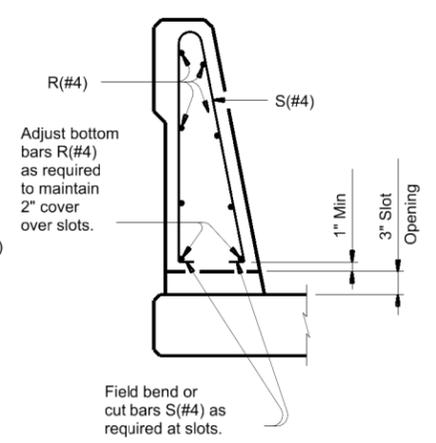
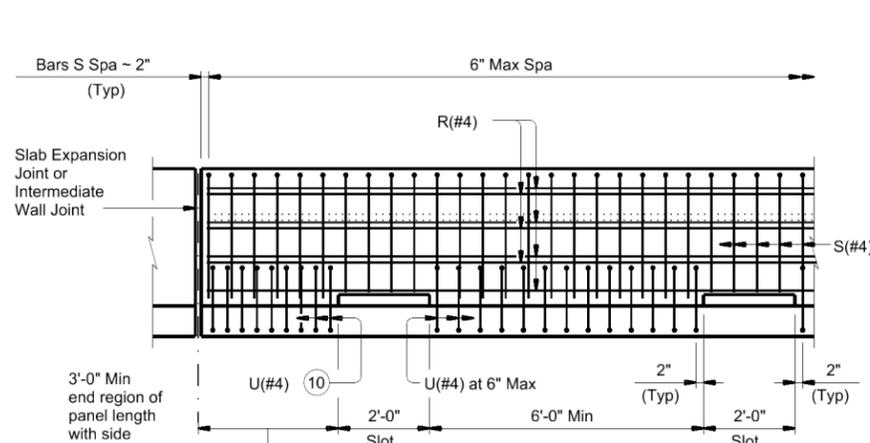
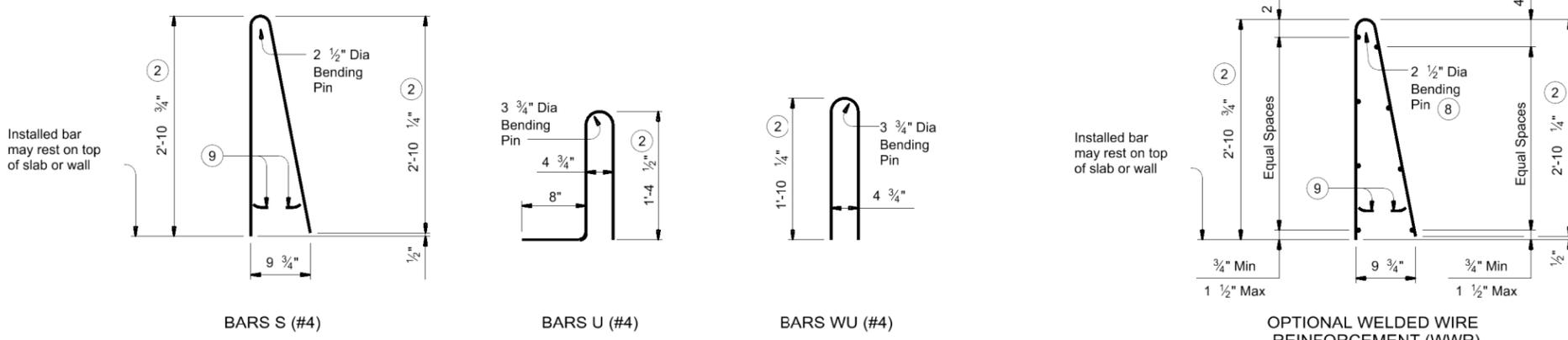
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 08/2023 04:16 PM
FILE: DOCUMENT NAME



- 2 Increase 2" for structures with Overlay.
- 5 5/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- 6 As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.
- 7 Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- 8 No longitudinal wires may be within upper bend.
- 9 Bend or cut as required to clear drain slots.
- 10 Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

SECTIONS THRU RAIL



DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
Minimum	No. of Wires	Spacing
Maximum	8	4"
	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a 3/8" width x 1/4" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

Average weight of railing with no overlay is 376 pcf.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation Bridge Division Standard

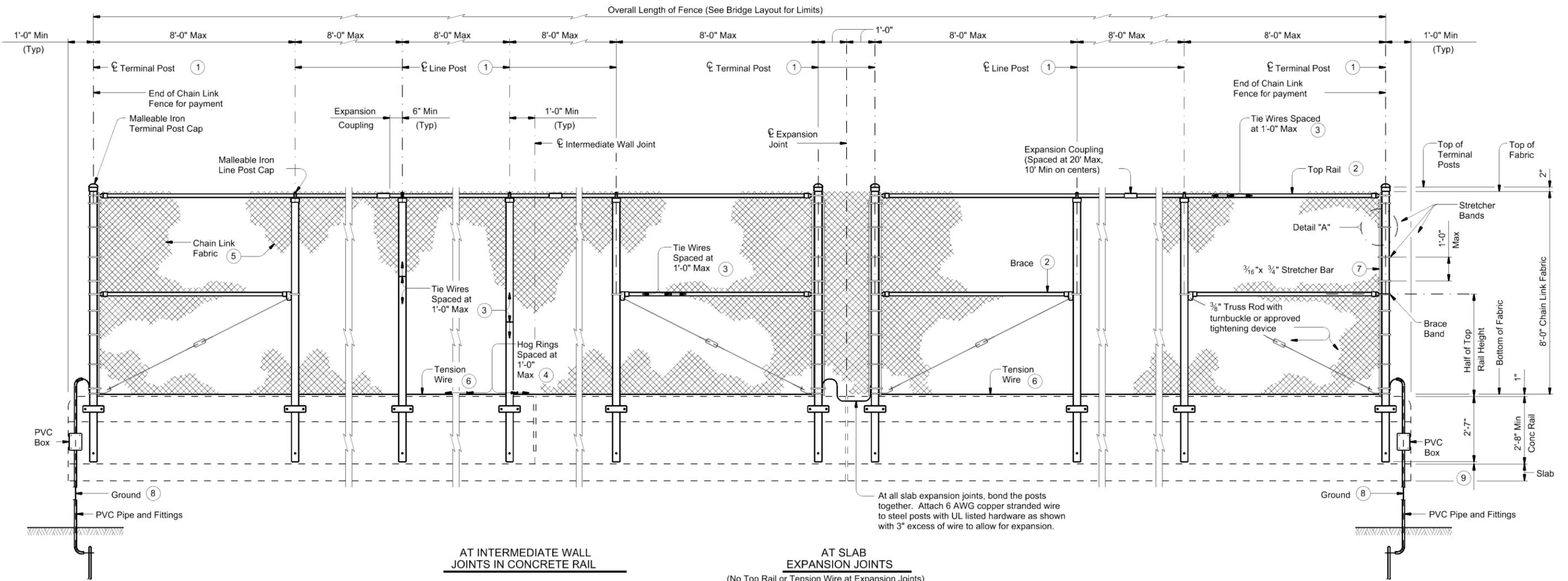
TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: r1std014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
C/TxDOT September 2019		CONT	SECT	JOB
REVISIONS		010104	131	US 181
		DIST	COUNTY	SHEET NO.
		CRP SAN PATRICIO		82

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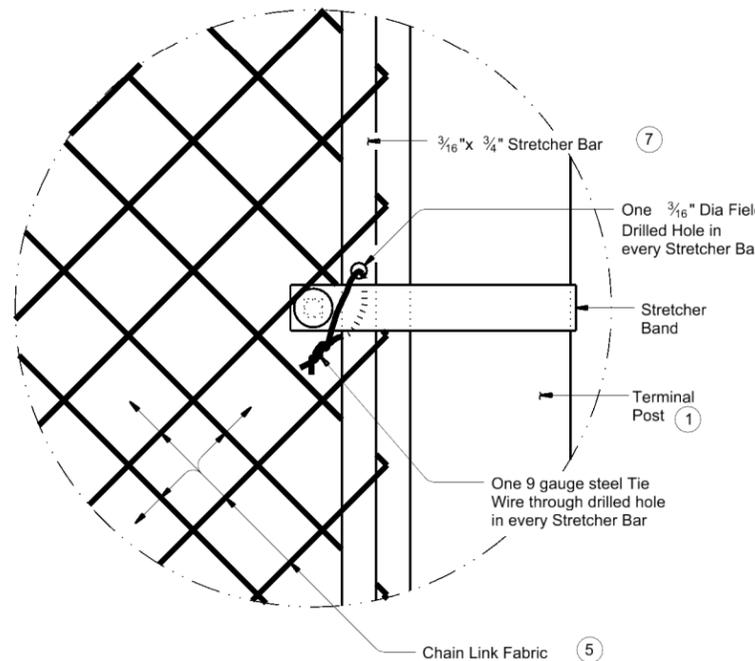
DATE: 08/04/2023 04:22 PM
FILE: DOCUMENT NAME



AT INTERMEDIATE WALL JOINTS IN CONCRETE RAIL

AT SLAB EXPANSION JOINTS
(No Top Rail or Tension Wire at Expansion Joints)

OUTSIDE ELEVATION OF CHAIN LINK FENCE



DETAIL "A"

- ① HSS 3.500 x 0.216 ASTM A1085 or A500 Gr B.
- ② HSS 1.660 x 0.140 ASTM A500 Gr B or A53 Gr B.
- ③ 9 gauge steel Tie Wires attach chain link fabric to HSS.
- ④ 9 gauge steel Hog Rings attach chain link fabric to tension wire.
- ⑤ 9 gauge steel Chain Link Fabric, 2" Mesh, knuckle selvage top and bottom.
- ⑥ 7 gauge steel Tension Wire.
- ⑦ Contractor must field drill one 3/16" Dia hole in every stretcher bar and use a 9 gauge steel tie wire to tie one stretcher band and chain link fabric together. Locate drilled hole for tie wire at approximate mid-height of fence.
- ⑧ Ground terminal post at the beginning and end of fence and down the nearest bent. Attach 6 AWG copper stranded wire to steel post with UL listed hardware and run other end of copper stranded wire to 5/8" Dia minimum copper-clad steel rod 8 ft in length. Install ground rod as per Item 550 and this sheet. The 6 AWG copper stranded wire must run through 1/2" Schedule 40 PVC pipe, fittings and PVC box attached to the back of rail.
- ⑨ Dimension varies on rail types and superstructure type. T551, T221 and C221 Rails = 1" with no overlay, T222 Rail and SSTR Rail = 5" with no overlay, increased 2" for overlay. On bridges with significant beam camber variable length in dimension may be anticipated.

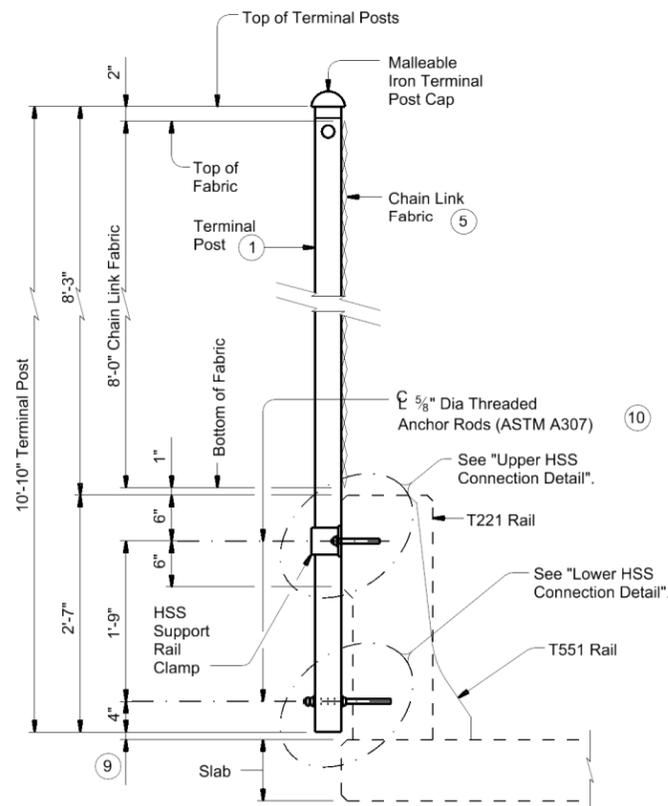
SHEET 1 OF 2

		Bridge Division Standard	
8 FT CHAIN LINK FENCE FOR RAILROAD OVERPASS			
CLF-RO			
FILE: rlst032-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONTRACT: 0101 04	SECTION: 131	HIGHWAY: US 181
DIST: CRP	COUNTY: SAN PATRICIO	SHEET NO. 83	

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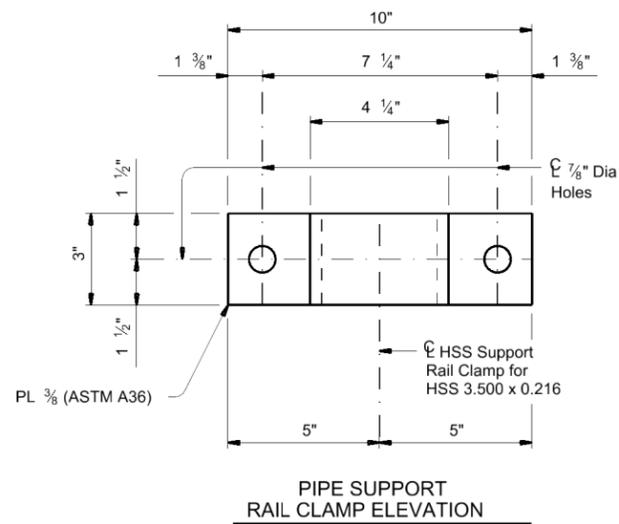
DATE: 08/04/2023 04:22 PM
FILE: DOCUMENT NAME

- ① HSS 3.500 x 0.216 ASTM A1085 or A500 Gr B.
- ⑤ 9 gauge steel Chain Link Fabric, 2" Mesh, knuckle selvage top and bottom.
- ⑨ Dimension varies on rail types and superstructure type. T551, T221 and C221 Rails = 1" with no overlay, T222 Rail and SSTR Rail = 5" with no overlay, increased 2" for overlay. On bridges with significant beam camber variable length in dimension may be anticipated.
- ⑩ See "Material Notes" for threaded anchor rod information.

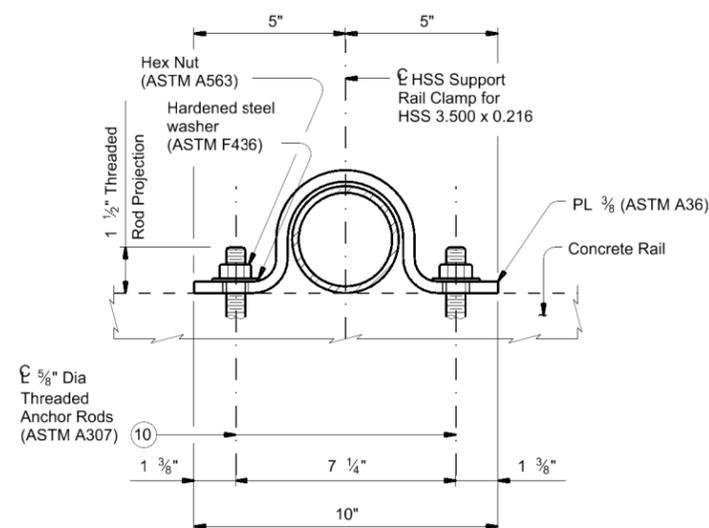


CHAIN LINK FENCE SECTION

(Showing Terminal Post on a T551 or T221 Rail, Line Post, T222 Rail and SSTR Rail similar.)



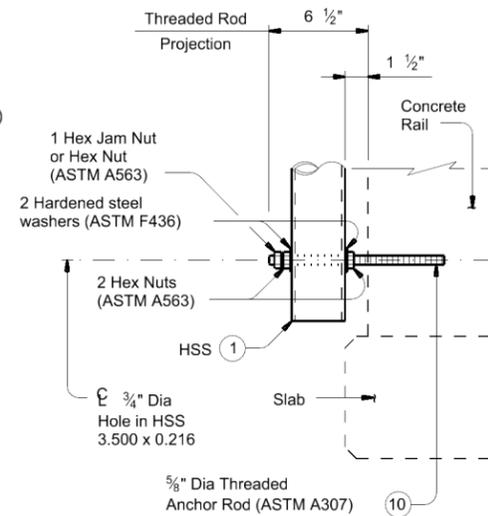
PIPE SUPPORT RAIL CLAMP ELEVATION



HSS SUPPORT RAIL CLAMP ASSEMBLY

UPPER HSS CONNECTION DETAIL

(Dimensions may vary according to Manufacturer's specifications.)



LOWER HSS CONNECTION DETAIL

(Showing Terminal Post or Line Post)

CONSTRUCTION NOTES:

Chain link fence post must be plumb unless otherwise approved.
Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

All Chain Link Fence materials must conform to standard specifications. Item "Chain Link Fence" unless shown otherwise. Galvanize all steel components unless noted otherwise. Provide ASTM A1085, A500 Gr B for HSS 3.500 x 0.216. Provide ASTM A500 Gr B or A53 Gr B for HSS 1.660 x 0.140. Provide ASTM A36 for steel plates. Anchor bolts must be 3/8" Dia ASTM A307 Gr A fully threaded rods. Hex nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 6 kips each anchor (edge distance and anchor spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

GENERAL NOTES:

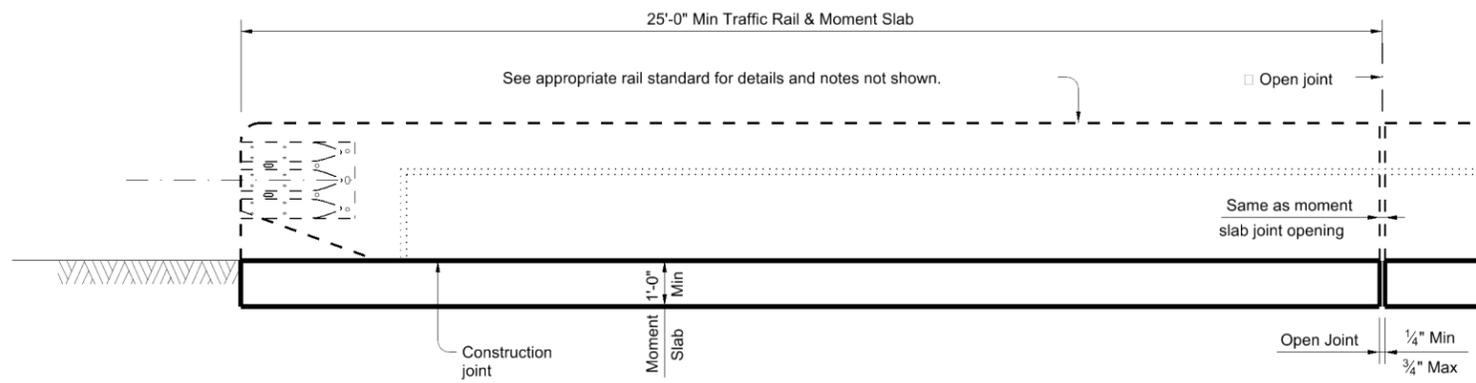
This sheet must be used with a concrete Traffic or Combination Rail. Rails that can be used with this sheet are T551, SSTR, T221, T222, and C221 Rails. Chain link fence details shown on this standard are adequate for all speeds. If used, optional side slot drains shown on rail standards must not be any closer than 6" from chain link post to edge of side slot drains. This railing cannot be used on bridges with expansion joints providing more than 5" movement. Payment for materials, fabrication, and installation of this assembly are to be included in unit price bid in accordance with Item 450, "Rail (CLF-RO)". Approximate weight of fence = 20 plf.

SHEET 2 OF 2

		Bridge Division Standard	
8 FT CHAIN LINK FENCE FOR RAILROAD OVERPASS			
CLF-RO			
FILE: r1std032-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
REVISIONS	CONT	SECT	HIGHWAY
	0101	04	131
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	84	

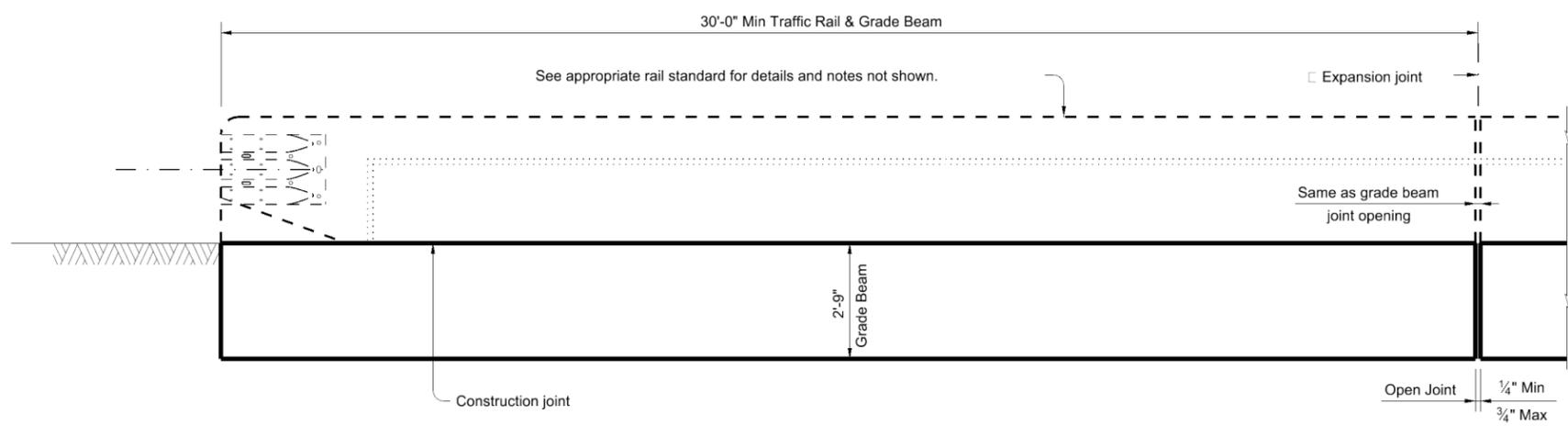
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DATE: 07/25/2023 01:59 PM
FILE: DOCUMENT NAME



ROADWAY ELEVATION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

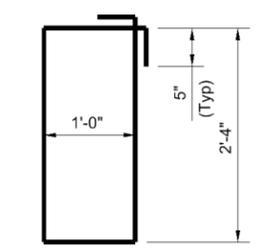
(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)



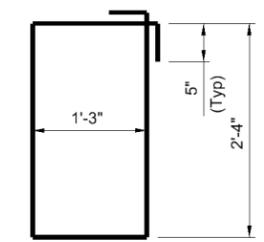
ROADWAY ELEVATION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar. Reinforcing not shown for clarity.)

- 1 See applicable bridge rail standard.
- 2 MA(#5) space longitudinally along moment slab at 12" Max. (Spaced 2 1/2" longitudinally from outside edge of moment slab).
- 3 Approximate moment slab concrete = 0.19 CY/LF and reinforcement = 22.4 LB/LF.
- 4 S1(#4) or S2(#4) spaced longitudinally along grade beam at 8" Max. (Spaced 2 1/2" longitudinally from outside edge of grade beam).
- 5 Use bar S1(#4) with 1'-4" grade beam width and bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. Approximate grade beam concrete = 0.14 CY/LF and reinforcement = 13.8 LB/LF. Use bar S2(#4) with 1'-7" grade beam width and bridge rail types: T66 and C66. Approximate grade beam concrete = 0.16 CY/LF and reinforcement = 14.2 LB/LF.
- 6 1'-6" for bridge rail types: All rails except for T224, C412, T66, C66, T80HT and T80SS. 1'-9" bridge rail types: T66 and C66.
- 7 Modify reinforcing on standard bridge rail anchorage if necessary by extending rail anchorage 12" Min, vertically into traffic rail



BARS S1(#4)



BARS S2(#4)

CONSTRUCTION NOTES:

Align moment slab (TRF-MS) or grade beam (TRF-GB) open joints with rail open joints maintaining no less than minimum rail length. Provide moment slab (TRF-MS) or grade beam (TRF-GB) with open joints at no greater than 100' spacing unless otherwise shown on the plans or approved by the Engineer.

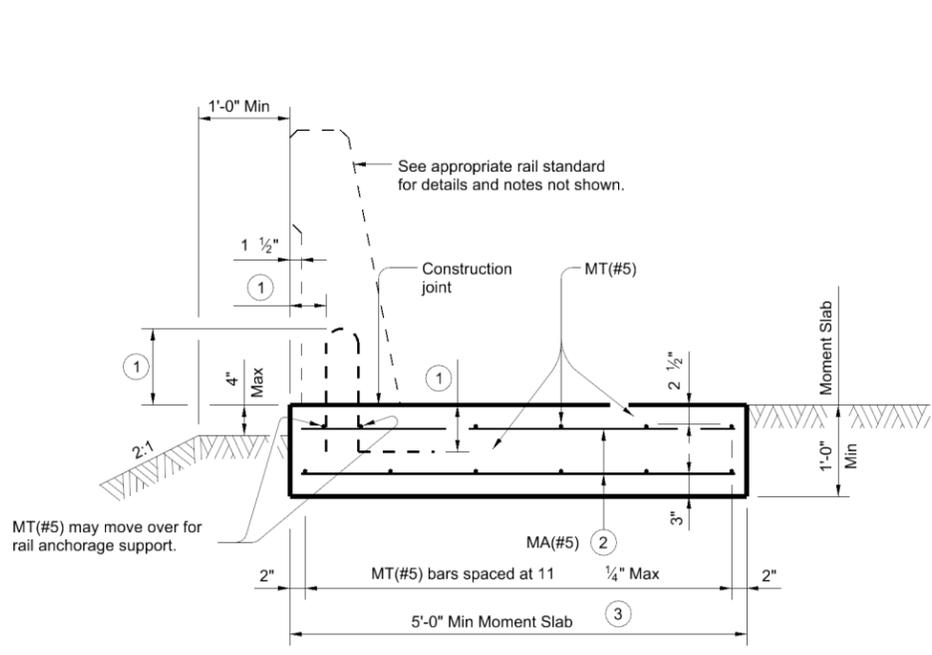
MATERIAL NOTES:

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere. Provide Grade 60 reinforcing steel. Epoxy coat or galvanize all reinforcing steel if required elsewhere. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for bars S1(#4), S2(#4) and H(#5) unless noted otherwise. Provide the same laps as required for reinforcing bars. Provide bar laps, where required, as follows:
Uncoated or galvanized ~ #5 = 2'-4"
Epoxy coated ~ #5 = 3'-6"

GENERAL NOTES:

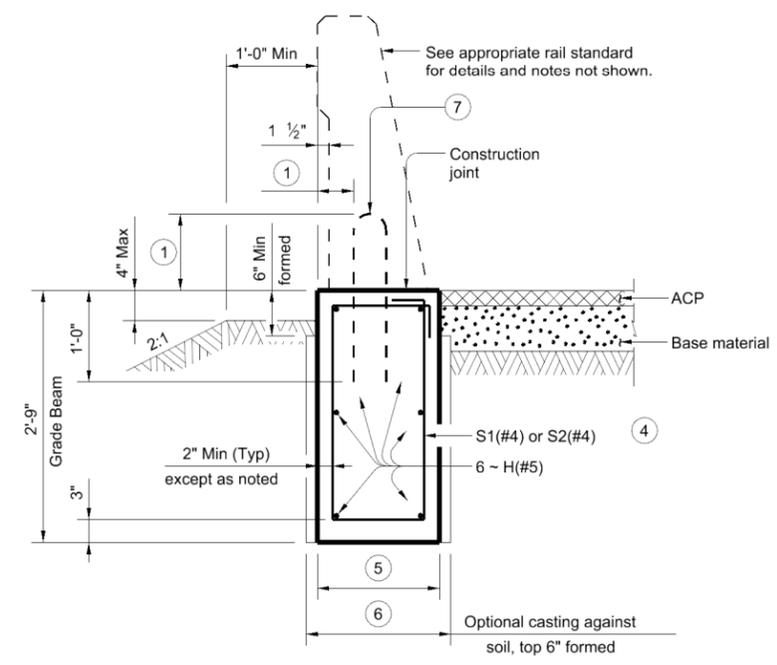
Use of these details will result in a moment slab (TRF-MS) or grade beam (TRF-GB) foundation that is acceptable for traffic rails which are MASH TL-2, TL-3, or TL-4 compliant. See elsewhere in the plans for selected options between moment slab (TRF-MS) and/or grade beam (TRF-GB). The foundation design resistance is based on the current AASHTO bridge railing requirements with the assumption of fair to good soil support conditions. Poor soil conditions will require suitably deeper and/or wider foundations. See appropriate rail standard for details and notes not shown. This detail is intended for use as a guide to unusual railing anchorage situations but may be included in the plans, modified as necessary to apply to specific installations required on the project. Payment for moment slab (TRF-MS) and/or grade beam (TRF-GB) will be by Class "C" concrete or Class "C" (HPC) concrete for rail foundations. The associated bridge railing will be paid for by the linear foot which includes the concrete and reinforcement. Excavation will be subsidiary to other items.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.



SECTION OF TRAFFIC RAIL ON MOMENT SLAB (TRF-MS)

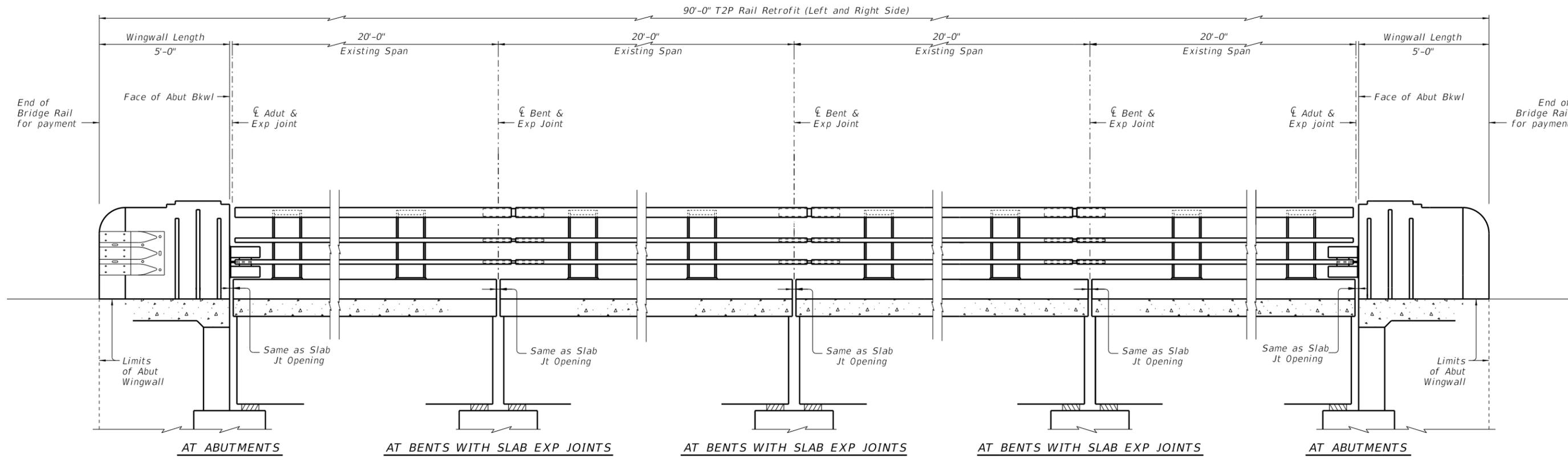
(Showing SSTR rail other rails are similar.)



SECTION OF TRAFFIC RAIL ON GRADE BEAM (TRF-GB)

(Showing SSTR rail other rails are similar.)

		Bridge Division Standard	
TRAFFIC RAIL FOUNDATIONS FOR MASH TL-2, TL-3 & TL-4 BRIDGE RAILS			
TRF			
FILE: r1std027-20.dgn	DN: TxDOT	CK: TAR	DW: JTR
REVISIONS	CONT	SECT	JOB
07-20: Added moment slab with rail foundation lengths.	010104	131	US 181
DIST	COUNTY	SHEET NO.	
CRP SAN PATRICIO		85	



ROADWAY ELEVATION OF T2P RAIL

CONSTRUCTION NOTES:
 Field verify dimensions before commencing work and ordering materials.
 Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:
 Provide Class "C" concrete.
 Provide Grade 60 reinforcing steel.
 Epoxy coat or galvanize all reinforcing steel if required elsewhere.
 (#5) and (#6) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:
 Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.
 Payment for a rail retrofit will be as per Item 451, "Retrofit Rail (Ty T2P)".

Reinforcing bar dimensions shown are out-to-out of bar.

BID ITEM	0451 6062
BRIDGE ELEMENT	RETROFIT RAIL (TY T2P)
	LF
1 - RETROFIT RAIL	180.0
OVERALL TOTALS:	180.0

SHEET 1 OF 2



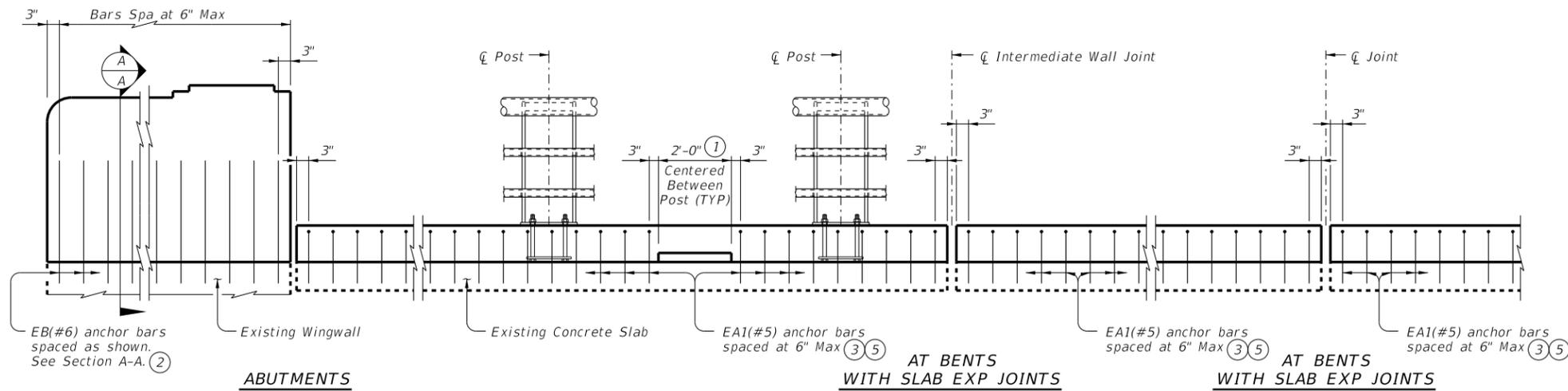
**T2P RAIL
RETROFIT DETAILS**

NBI #:16-205-0-0101-04-031
 US 181 SB @ MUSTANG MOTT DITCH

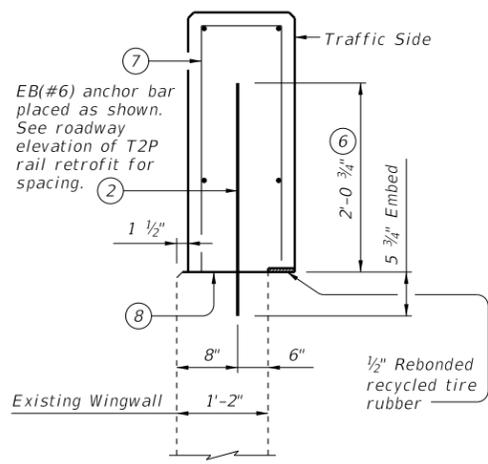
10/11/2023

FILE: US181_RL502-505.dgn	DN: RY	CK: EFC	DW: AER	CK: RY
©TXDOT	Sept 2023	CONT	SECT	JOB
REVISIONS	0101	04	131	US181
	DIST	COUNTY	SHEET NO.	
	CRP	SAN PATRICIO	86	

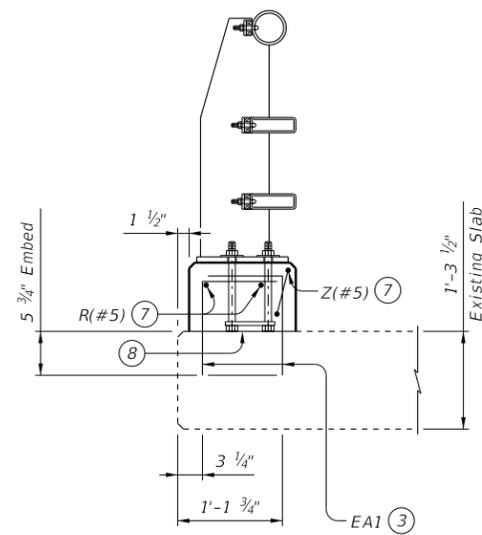
DATE: 10/5/2023 2:41:27 PM
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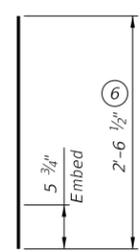
ROADWAY ELEVATION OF T2P RAIL RETROFIT



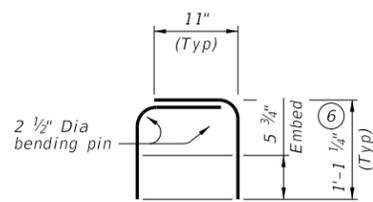
SECTION A-A
(Showing rail parapet retrofit at end of T2P Rail)



RAIL RETROFIT SECTIONS ON CONCRETE SLABS USING ADHESIVE ANCHORS



ANCHOR BAR EB (#6)



ANCHOR BAR EA1 (#5)
Showing one complete bar.

- ① Place side slot drains as shown, see TYPE T2P rail standard for details and notes not shown. Before casting T2P rail retrofit, cut and grind existing exposed reinforcing steel flush with deck. Water blast area on deck where new drain slots will be placed. Paint exposed ends of cut reinforcing steel with two coats of zinc-rich paint conforming to item 445 "Galvanizing" in the new side slot drain footprint. Apply a Type X epoxy waterproofing conforming to DMS-6100 to deck surface in drain slot footprint.
- ② Embed EB(#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 3/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- ③ Use drill equipped with depth gauge stop device to keep from drilling through bottom of slab. If hole extends through to bottom of slab, plug bottom of hole prior to placing adhesive anchorage system. Do not drill substitute hole next to drill through hole. Embed EA1(#5) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 3/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- ④ Showing spacing of adhesive anchors in a rail retrofit condition. Reinforcing steel and terminal connections not shown for clarity. See TYPE T2P rail standard for details and notes not shown.
- ⑤ See T2P Rail Section in "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors."
- ⑥ Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- ⑦ See TYPE T2P rail standard for reinforcing steel.
- ⑧ Do not cast rails or parapet rails on top of overlays/seal coats.
- ⑨ Showing location(s) of anchor bars in a rail retrofit condition. See TYPE T2P rail standard for details and notes not shown.

SHEET 2 OF 2



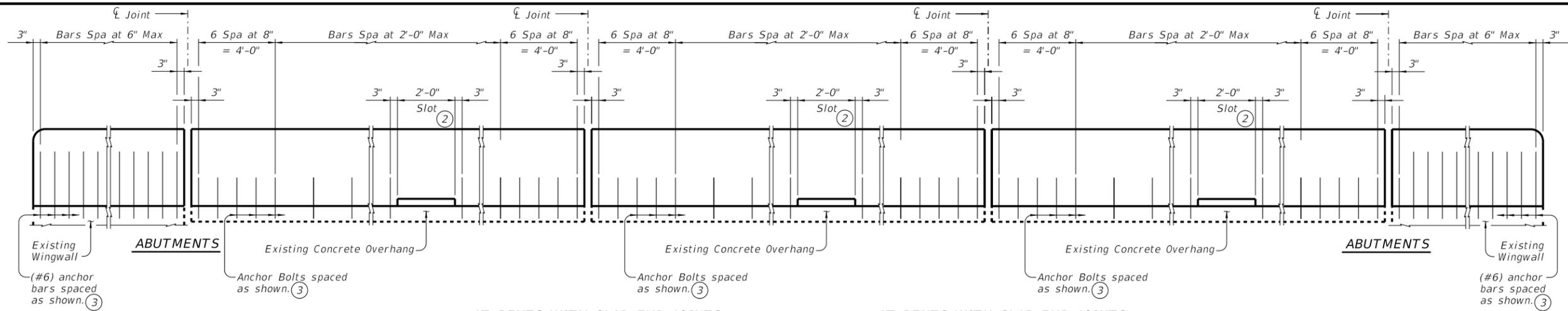
T2P RAIL RETROFIT DETAILS

NBI #:16-205-0-0101-04-031
US 181 SB @ MUSTANG MOTT DITCH

FILE: US181_RL502-505.dgn	DN: RY	CK: EFC	DW: AER	CK: RY
0101	04	131	US181	
CRP	SAN PATRICIO			87

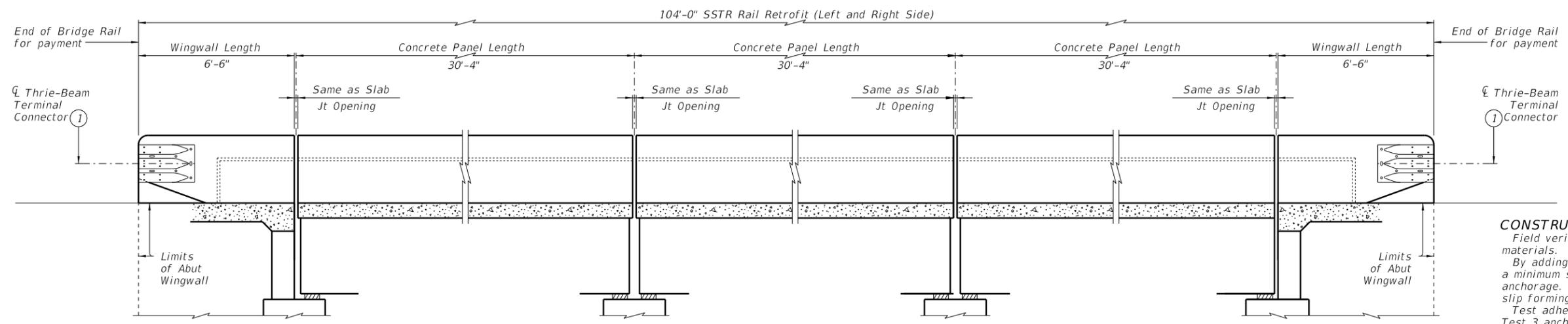
DATE: 10/5/2023 2:41:27 PM
FILE: US181_RL502-505.dgn

10/11/2023



AT BENTS WITH SLAB EXP JOINTS AT BENTS WITH SLAB EXP JOINTS

ROADWAY ELEVATION OF SSTR RAIL RETROFIT ③



AT ABUTMENTS

AT BENTS WITH SLAB EXP JOINTS

AT BENTS WITH SLAB EXP JOINTS

AT ABUTMENTS

ROADWAY ELEVATION OF SSTR RAIL

CONSTRUCTION NOTES:
 Field verify dimensions before commencing work and ordering materials.
 By adding additional anchorage, welding can be performed at a minimum spacing of 3 ft between the cage and additional anchorage. By satisfying additional anchorage requirements slip forming is allowed. Do not weld to the required anchorage.
 Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:
 Provide Class "C" concrete.
 Provide Grade 60 reinforcing steel.
 Epoxy coat or galvanize all reinforcing steel if required elsewhere.
 (#4) and (#6) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:
 Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.
 Payment for a rail retrofit will be as per Item 451, "Retrofit Rail (Ty SSTR)".

Reinforcing bar dimensions shown are out-to-out of bar.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment. See elsewhere in the plans.
- ② Provide 8'-0" Min clear spacing between drain slots.
- ③ Showing spacing of (#6) anchor bars and anchor bolts in a rail retrofit condition. Secondary (#4) adhesive anchor in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See SSTR rail standard for details and notes not shown.

BID ITEM	0451 6024
BRIDGE ELEMENT	RETROFIT RAIL (TY SSTR)
	LF
1 - RETROFIT RAIL	208.0
OVERALL TOTALS:	208.0

SHEET 1 OF 2



**SSTR RAIL
RETROFIT DETAILS**

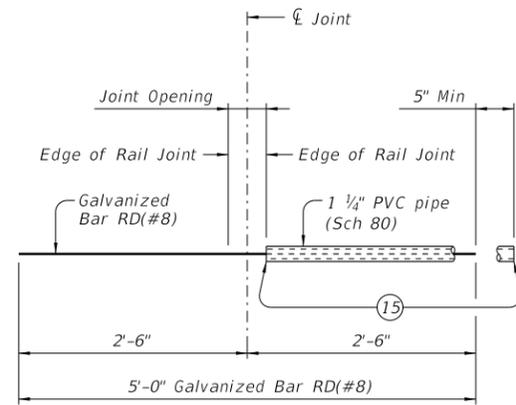
NBI #:16-205-0-0101-04-052

US 181 NB @ MUSTANG MOTT DITCH

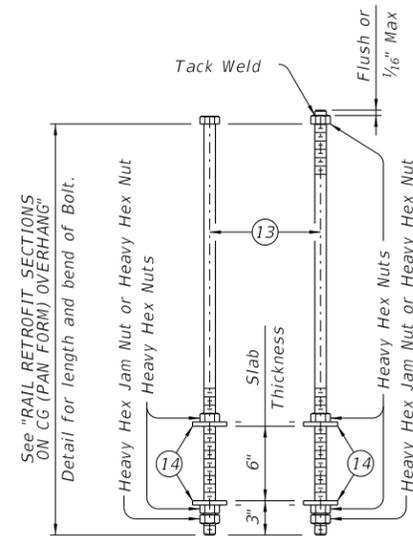
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© TXDOT Sept 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0101	04	131	US181
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CRP	SAN PATRICIO	88		

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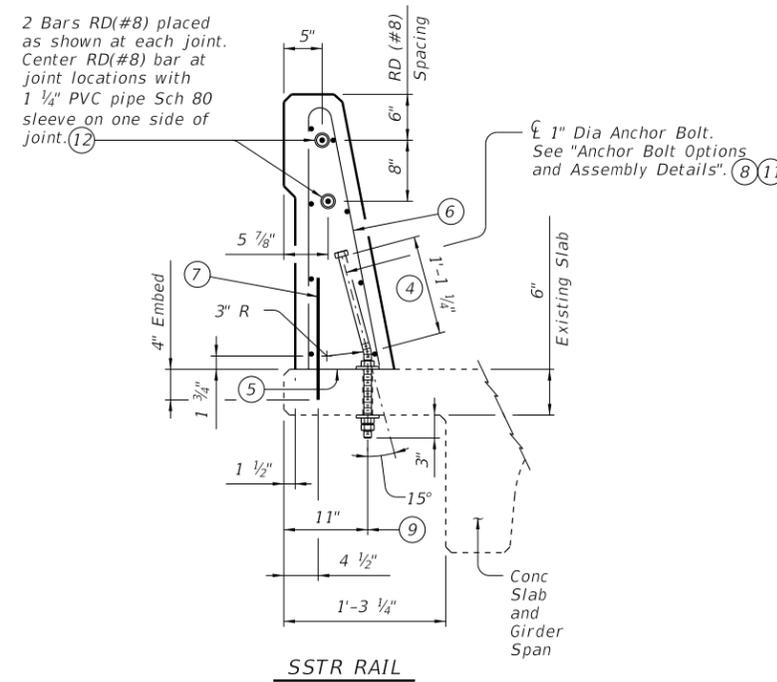
10/11/2023



BAR RD(#8) ASSEMBLY DETAIL



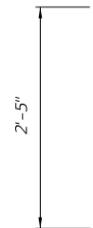
ANCHOR BOLT OPTIONS AND ASSEMBLY DETAILS



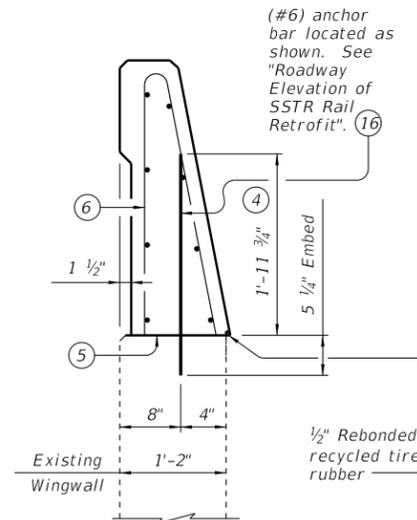
RAIL RETROFIT SECTIONS ON CG (PAN FORM) OVERHANG



ANCHOR BAR (#4)



ANCHOR BAR (#6)



RAIL RETROFIT SECTIONS ON WINGWALLS USING ADHESIVE ANCHORS

- 4 Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- 5 Do not cast rails or parapet walls on top of overlays/seal coats.
- 6 See SSTR rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.
- 7 Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).
- 8 1" Dia Anchor Bolt Spaced longitudinally along rail at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).
- 9 1 1/16" to 1 1/4" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding 1/2" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.
- 10 Showing location of anchor bars and anchor bolts in a rail retrofit condition. See SSTR rail standard for details and notes not shown.
- 11 Galvanize anchor bolts, nuts and plate washers.
- 12 See "Bar RD(#8) Assembly Detail".
- 13 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.
- 14 Plate Washer 3/8 x 3 x 3 ASTM A36 with 1 1/16" Dia Hole centered.
- 15 Tape ends of 1 1/4" PVC pipe Sch 80 to prevent concrete or mortar from seeping in.
- 16 Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 1/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

SHEET 2 OF 2



SSTR RAIL RETROFIT DETAILS

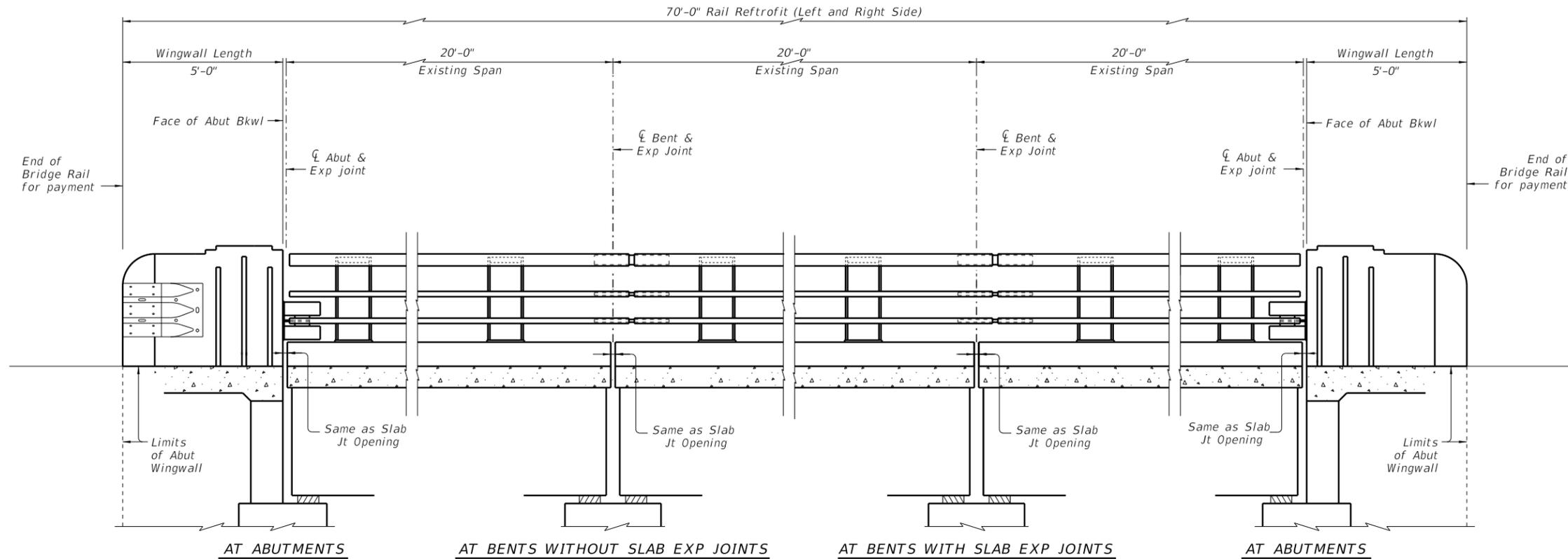
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US 181 NB @ MUSTANG MOTT DITCH

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CRP	SAN PATRICIO			89

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FILE: US181_RL502-505.dgn

10/11/2023



ROADWAY ELEVATION OF T2P RAIL

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.
 Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Provide Class "C" concrete.
 Provide Grade 60 reinforcing steel.
 Epoxy coat or galvanize all reinforcing steel if required elsewhere.
 (#5) and (#6) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.
 Payment for a rail retrofit will be as per Item 451, "Retrofit Rail (Ty T2P)".

Reinforcing bar dimensions shown are out-to-out of bar.

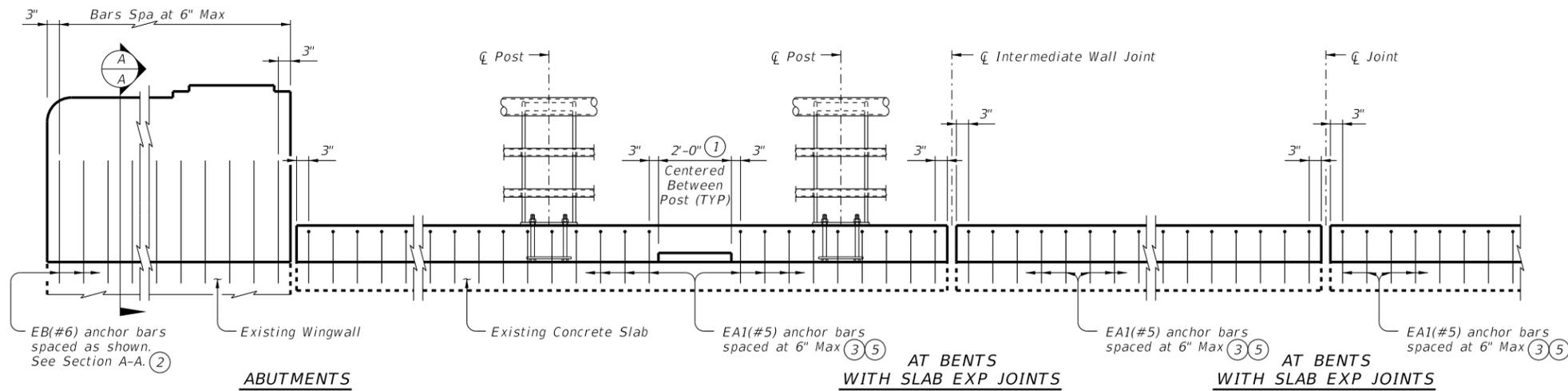
BID ITEM	0451 6062
BRIDGE ELEMENT	RETROFIT RAIL (TY T2P)
	LF
1 - RETROFIT RAIL	140.0
OVERALL TOTALS:	140.0

SHEET 1 OF 2

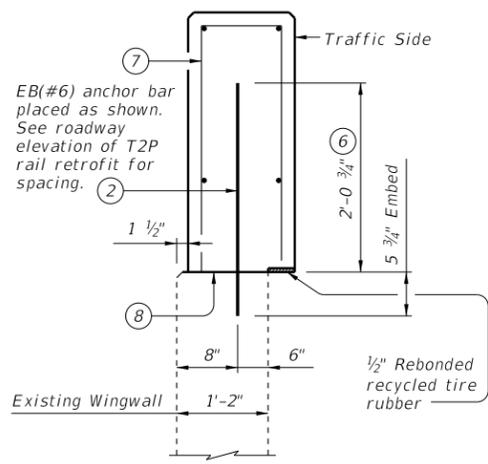
		Bridge Division Standard	
T2P RAIL RETROFIT DETAILS			
NBI #:16-205-0-0101-04-029			
US 181 SB @ TERRIE BONNIE DITCH			
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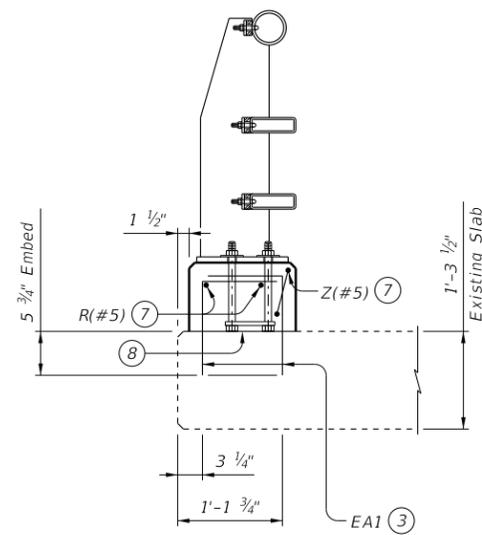


ROADWAY ELEVATION OF T2P RAIL RETROFIT

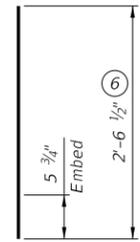


SECTION A-A

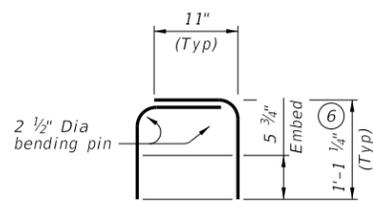
(Showing rail parapet retrofit at end of T2P Rail)



RAIL RETROFIT SECTIONS ON CONCRETE SLABS USING ADHESIVE ANCHORS



ANCHOR BAR EB (#6)



ANCHOR BAR EA1 (#5)

Showing one complete bar.

- ① Place side slot drains as shown, see TYPE T2P rail standard for details and notes not shown. Before casting T2P rail retrofit, cut and grind existing exposed reinforcing steel flush with deck. Water blast area on deck where new drain slots will be placed. Paint exposed ends of cut reinforcing steel with two coats of zinc-rich paint conforming to item 445 "Galvanizing" in the new side slot drain footprint. Apply a Type X epoxy waterproofing conforming to DMS-6100 to deck surface in drain slot footprint.
- ② Embed EB(#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 3/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- ③ Use drill equipped with depth gauge stop device to keep from drilling through bottom of slab. If hole extends through to bottom of slab, plug bottom of hole prior to placing adhesive anchorage system. Do not drill substitute hole next to drill through hole. Embed EA1(#5) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 3/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- ④ Showing spacing of adhesive anchors in a rail retrofit condition. Reinforcing steel and terminal connections not shown for clarity. See TYPE T2P rail standard for details and notes not shown.
- ⑤ See T2P Rail Section in "Rail Retrofit Section on Concrete Slabs using Adhesive Anchors."
- ⑥ Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- ⑦ See TYPE T2P rail standard for reinforcing steel.
- ⑧ Do not cast rails or parapet rails on top of overlays/seal coats.
- ⑨ Showing location(s) of anchor bars in a rail retrofit condition. See TYPE T2P rail standard for details and notes not shown.



T2P RAIL RETROFIT DETAILS

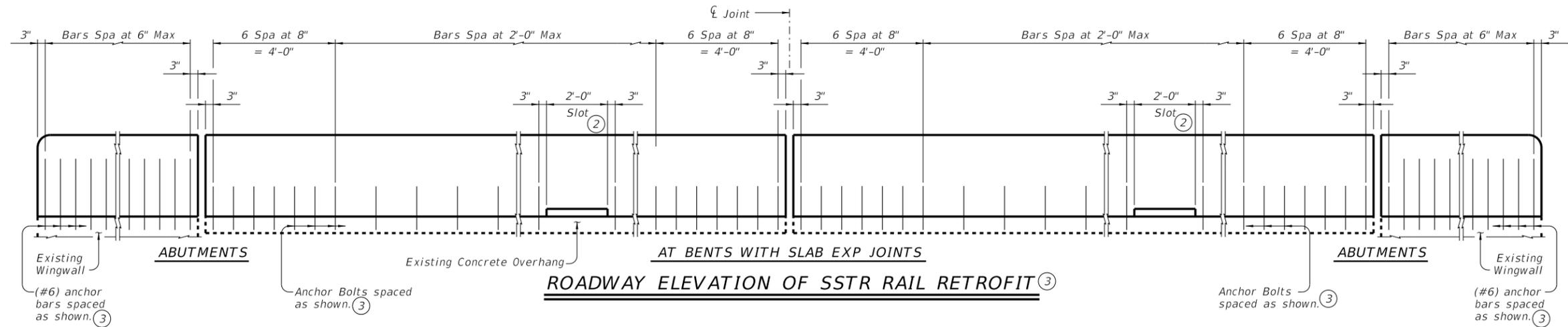
NBI #:16-205-0-0101-04-029

US 181 SB @ TERRIE BONNIE DITCH

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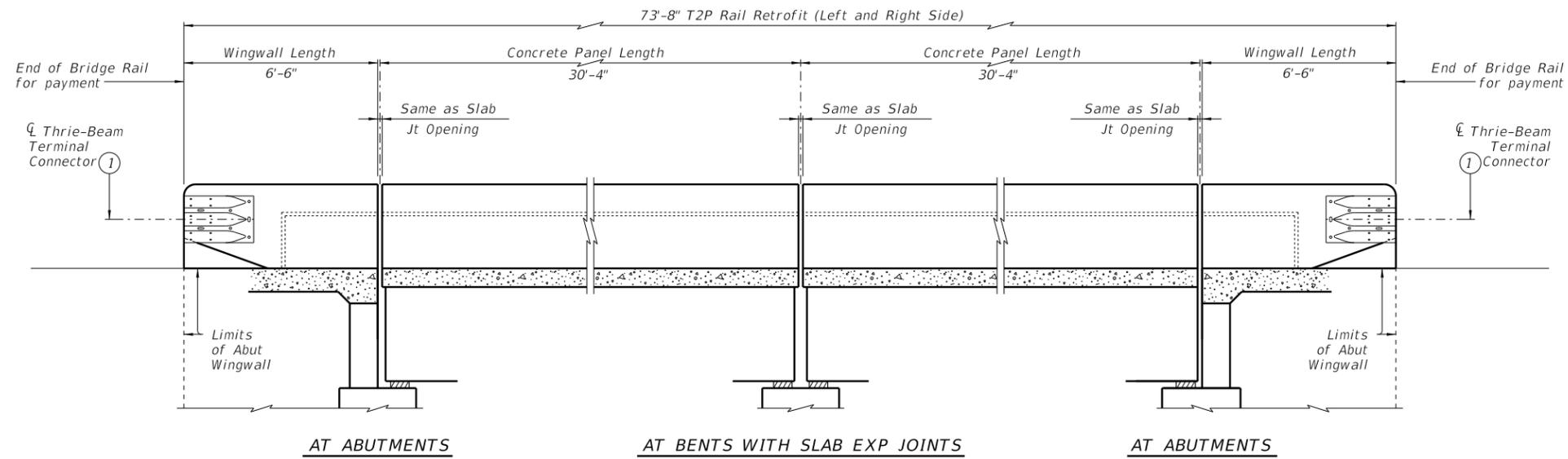


Existing Wingwall
(#6) anchor bars spaced as shown. (3)

Anchor Bolts spaced as shown. (3)

Anchor Bolts spaced as shown. (3)

Existing Wingwall
(#6) anchor bars spaced as shown. (3)



AT ABUTMENTS

AT BENTS WITH SLAB EXP JOINTS

AT ABUTMENTS

ROADWAY ELEVATION OF SSTR RAIL

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.
By adding additional anchorage, welding can be performed at a minimum spacing of 3 ft between the cage and additional anchorage. By satisfying additional anchorage requirements slip forming is allowed. Do not weld to the required anchorage.
Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Provide Class "C" concrete.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if required elsewhere.
(#4) and (#6) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

GENERAL NOTES:

Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.
Payment for a rail retrofit will be as per Item 451, "Retrofit Rail (Ty SSTR)".

Reinforcing bar dimensions shown are out-to-out of bar.

- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment. See elsewhere in the plans
- ② Provide 8'-0" Min clear spacing between drain slots.
- ③ Showing spacing of (#6) anchor bars and anchor bolts in a rail retrofit condition. Secondary (#4) adhesive anchor in a rail retrofit not shown for clarity. Reinforcing steel and terminal connections not shown for clarity. See SSTR rail standard for details and notes not shown.

BID ITEM	0451 6024
BRIDGE ELEMENT	RETROFIT RAIL (TY SSTR)
	LF
1 - RETROFIT RAIL	147.3
OVERALL TOTALS:	147.3

SHEET 1 OF 2

Bridge Division Standard

SSTR RAIL RETROFIT DETAILS

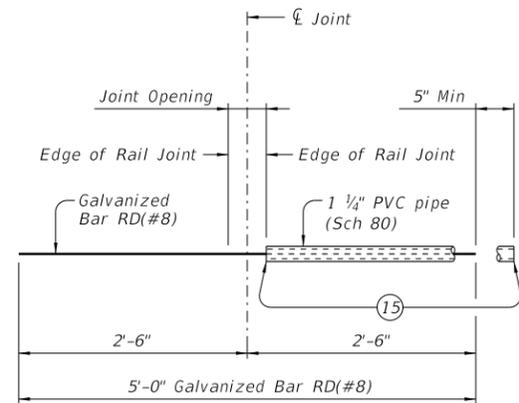
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US 181 NB @ TERRIE BONNIE DITCH

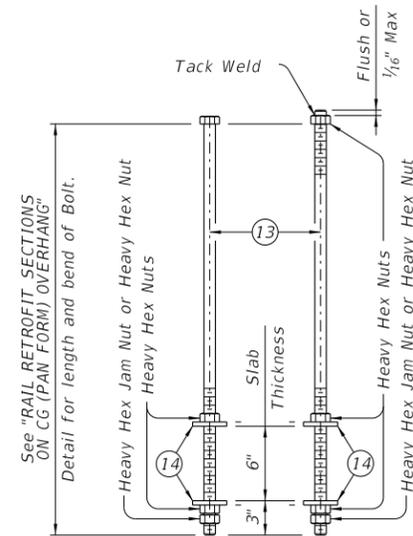
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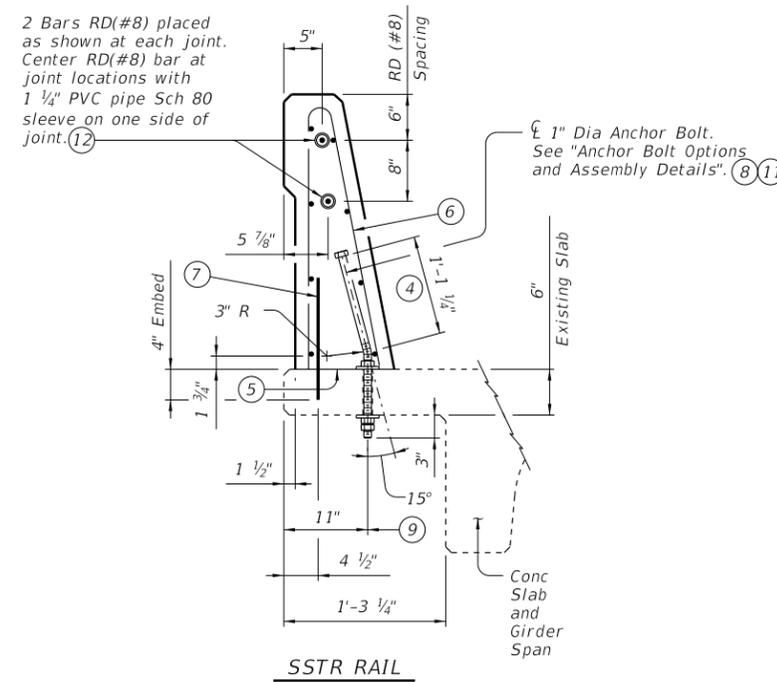
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BAR RD(#8) ASSEMBLY DETAIL



ANCHOR BOLT OPTIONS AND ASSEMBLY DETAILS



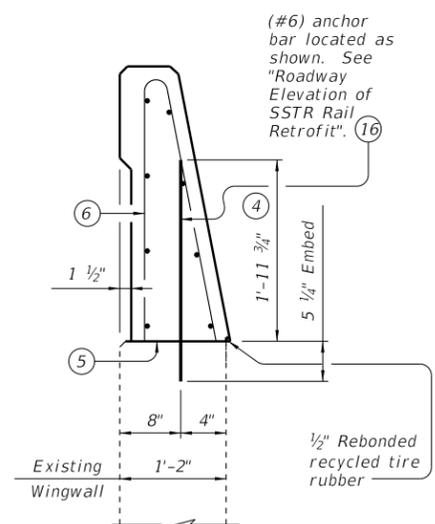
RAIL RETROFIT SECTIONS ON CG (PAN FORM) OVERHANG



ANCHOR BAR (#4)



ANCHOR BAR (#6)



RAIL RETROFIT SECTIONS ON WINGWALLS USING ADHESIVE ANCHORS

- 4 Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay/seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- 5 Do not cast rails or parapet walls on top of overlays/seal coats.
- 6 See SSTR rail standard for reinforcing steel. Modify length of vertical reinforcing bars as required to fit existing structure. Longitudinal reinforcing bars may be removed only if their position puts them in conflict with un-removed portions of existing structure.
- 7 Embed secondary (#4) anchor bars 1'-4" in length with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 10 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing". (#4) anchor bars spaced longitudinally along rail at 4 ft Max (Spaced 3" longitudinally from outside edge and edge of side slot drains).
- 8 1" Dia Anchor Bolt Spaced longitudinally along rail at 24" Max (Spaced 6" longitudinally from outside edge and edge of optional side slot drains, if required).
- 9 1 1/16" to 1 1/4" Dia holes. Core drill holes through existing deck (percussion drilling not permitted). Concrete spalls in the bottom of the deck exceeding 1/2" from edge of holes will be patched in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense.
- 10 Showing location of anchor bars and anchor bolts in a rail retrofit condition. See SSTR rail standard for details and notes not shown.
- 11 Galvanize anchor bolts, nuts and plate washers.
- 12 See "Bar RD(#8) Assembly Detail".
- 13 1" Dia ASTM F1554 Gr 55 Anchor Bolt or Threaded Rod. Nuts must conform to ASTM A563 requirements.
- 14 Plate Washer 3/8 x 3 x 3 ASTM A36 with 1 1/16" Dia Hole centered.
- 15 Tape ends of 1 1/4" PVC pipe Sch 80 to prevent concrete or mortar from seeping in.
- 16 Embed (#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 1/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".



SSTR RAIL RETROFIT DETAILS

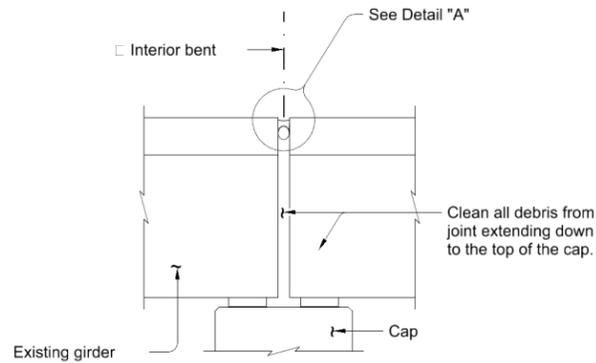
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US 181 NB @ TERRIE BONNIE DITCH

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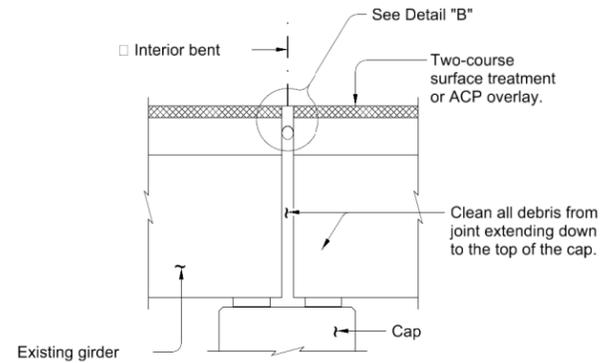
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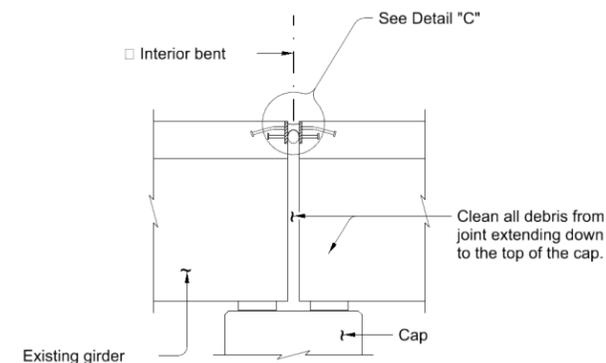
JOINT WITH SILICONE SEAL

(Used without ACP overlay)



JOINT W/ HOT-POURED RUBBER SEAL

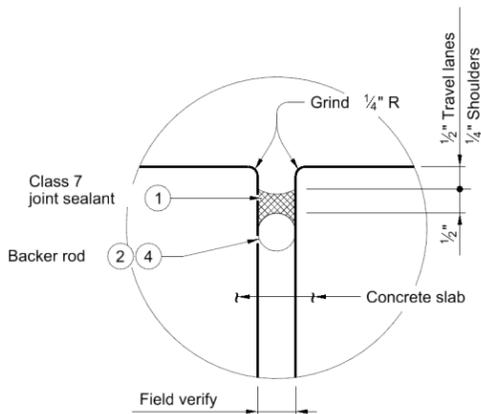
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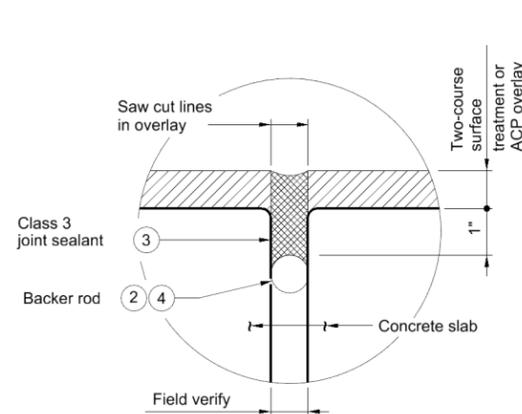
ARMOR JOINT

(Used with ACP overlay)

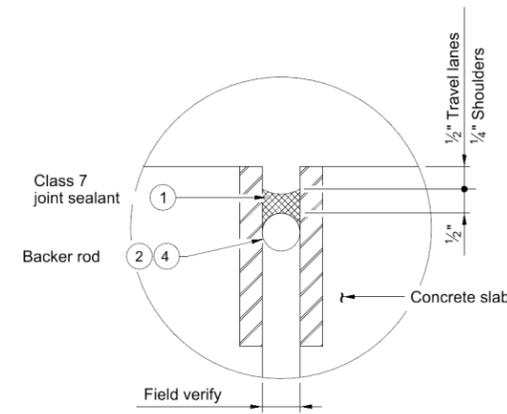
NOTE TO DESIGNER:
This sheet is to be used as a guide for cleaning and sealing existing bridge joints. Additionally, it includes procedures for minor repair work to existing header type joints. Details with appropriate notes from this guide should be prepared for the specific application. Particular care should be taken in identifying existing joint conditions and properly sizing joint sealant systems.
Use Item 438-6002 when specifying Class 3 joint sealant.
Use Item 438-6004 when specifying Class 7 joint sealant.
Use Item 438-6011 when specifying precompressed foam and silicone seal.
These sheets may not be used without modification. In all cases, details and notes not required must be crossed out or eliminated, and the phrase "Not to be used as a standard" must be removed. Sheet must be signed and sealed.



DETAIL "A"



DETAIL "B"



DETAIL "C"

(Stud anchors not shown for clarity.)

- 1 Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
- 2 Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- 3 Use Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
- 4 Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

GENERAL NOTES:
Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting asphalt overlay, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" and measured by the linear foot. Obtain approval for all tools, equipment, materials and techniques proposed to clean and seal the joint.
Provide Class 3 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in asphalt overlay.
Provide Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers" for joints in concrete.
Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 joint sealant cannot be effectively placed in the vertical position, a Class 4 joint sealant compatible with the Class 7 joint sealant is allowed for the extension of the seal into the curb or rail. Prepare surfaces where sealant is to be placed in accordance with Manufacturer's specifications.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH SILICONE SEAL:

- 1) Clean joint opening of all existing expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 4) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING JOINT WITH HOT-POURED RUBBER SEAL:

- 1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a 1/2" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 4) Seal the joint opening with a Class 3 joint sealant. Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING ARMOR JOINTS:

- 1) Remove existing seal, if present. Clean joint opening of all dirt and other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Abrasive blast clean existing steel surface where silicone seal is to be placed.
- 3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 4) Place backer rod into joint opening 1" below the top of concrete. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 5) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.



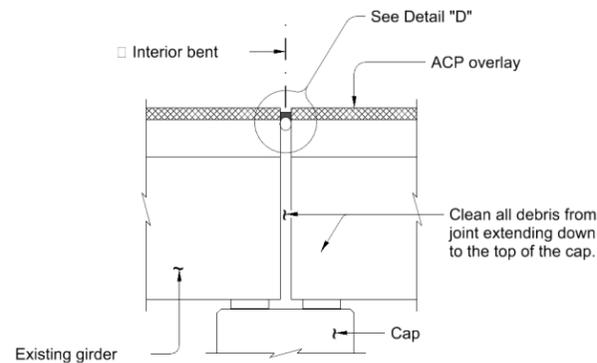
11/03/2023

SHEET 1 OF 3

		Bridge Division	
CLEANING AND SEALING EXISTING BRIDGE JOINTS			
NBI: 16-205-0-0101-04-050 16-205-0-0101-04-029 16-205-0-0101-04-052 16-205-0-0101-04-031			
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CRP	SAN PATRICIO	94	

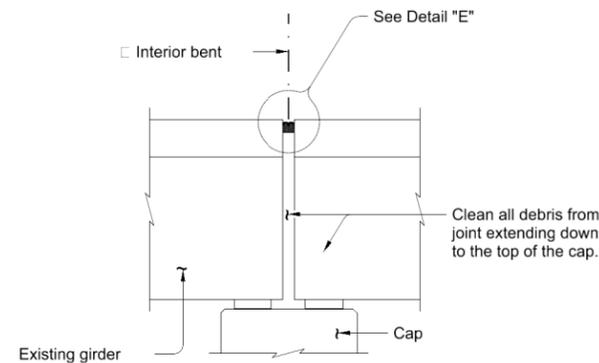
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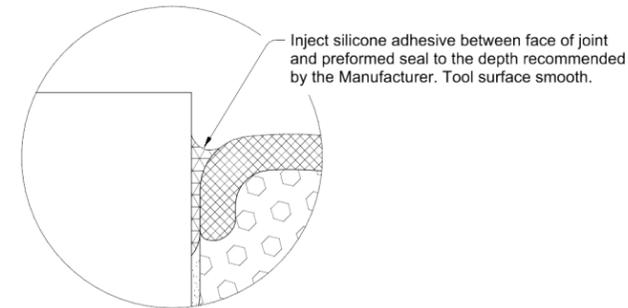
HEADER JOINT WITH SILICONE SEAL

(used with ACP overlay with joints more than 100 ft apart)

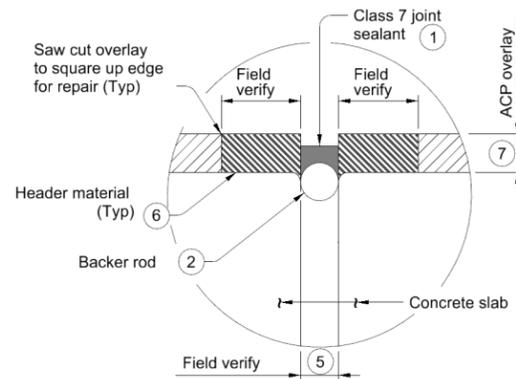


JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL

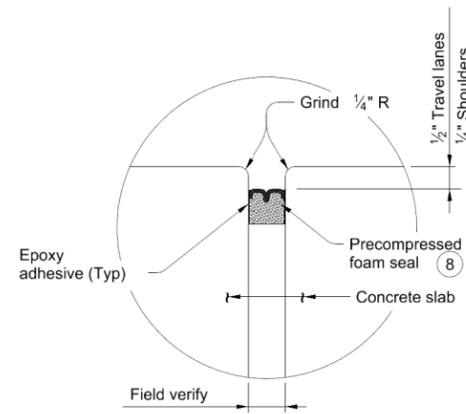
(used without ACP overlay)



SILICONE INJECTION



DETAIL "D"



DETAIL "E"

PROCEDURE FOR CLEANING AND SEALING HEADER JOINT WITH SILICONE SEAL AND HEADER JOINT REPAIR

- 1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints."
- 2) Saw cut and remove damaged portions of existing header material to neat lines. Repair deck joint spalls greater than 2" deep in accordance with Item 785, "Bridge Joint Repair or Replacement." Shallower spalls may be filled with header material.
- 3) Clean the voided region of all materials that could inhibit the bond between header material and concrete or steel.
- 4) Form the joint opening to the required width and place header material to fill voided region. Repair header material in accordance with Item 785, "Bridge Joint Repair or Replacement."
- 5) Place backer rod into joint opening 1" below the top of header material. When sealing joints for slab spans, slab beam spans, or box beam spans, fill void below backer rod with extruded polystyrene foam before placing backer rod.
- 6) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of header in travel lanes and 1/4" below top of header in shoulders.

PROCEDURE FOR CLEANING AND SEALING JOINT WITH PRECOMPRESSED FOAM AND SILICONE SEAL

- 1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." When sealing joints for slab spans, slab beam spans, pan girder spans, or box beam spans, fill void below proposed seal with extruded polystyrene foam.
- 2) Correctly size joint seal based on field measurement and in accordance with Manufacturer's specifications. Multiple seal widths may be required. Ensure proper seal is selected for each joint.
- 3) Abrasive blast clean existing joint surfaces where seal is to be applied.
- 4) Wipe down joint surfaces to remove contaminants.
- 5) Mask areas adjacent to joint opening sufficiently to keep epoxy off deck surface.
- 6) Apply epoxy to joint opening side surfaces.
- 7) While epoxy is still tacky, remove shrink wrap from seal and install in joint opening.
- 8) Recess top of joint seal 1/2" in travel lanes and 1/4" in shoulders.
- 9) Inject silicone adhesive along top interface of seal with joint side surface according to Manufacturer's recommendations. Tool to spread adhesive as necessary. See Silicone Injection detail.

- 1) Use Class 7 joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers." Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints."
- 2) Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- 5) Match existing joint opening or set at a minimum:
 - a. 1" at 70°F when the distance between joints is 150 ft or less
 - b. 2" at 70°F when the distance between joints is greater than 150 ft.
 - c. As directed by the Engineer.
- 6) Cleaning and sealing existing header joints does not necessitate replacement of existing header material. If replacement of header material is necessary, as determined by the Engineer, use header material in accordance with DMS-6140, "Polymer Concrete for Bridge Joint Systems." Match the thickness of the header material with the thickness of the overlay as shown in the plans, but do not exceed 4". Place header material flush with roadway surface. Do not cantilever header material over the joint opening. Repair of header material will be paid for in accordance with Item 785-6006, "Bridge Joint Repair (Header)."
- 7) Maximum thickness is 4".
- 8) See table of Approved Precompressed Foam Seal Manufacturers on Sheet 3 of 3.



11/03/2023

SHEET 2 OF 3

<h2>CLEANING AND SEALING EXISTING BRIDGE JOINTS</h2>			
NBI: 16-205-0-0101-04-050 16-205-0-0101-04-029 16-205-0-0101-04-052 16-205-0-0101-04-031			
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REVISIONS		010104	131
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	95	

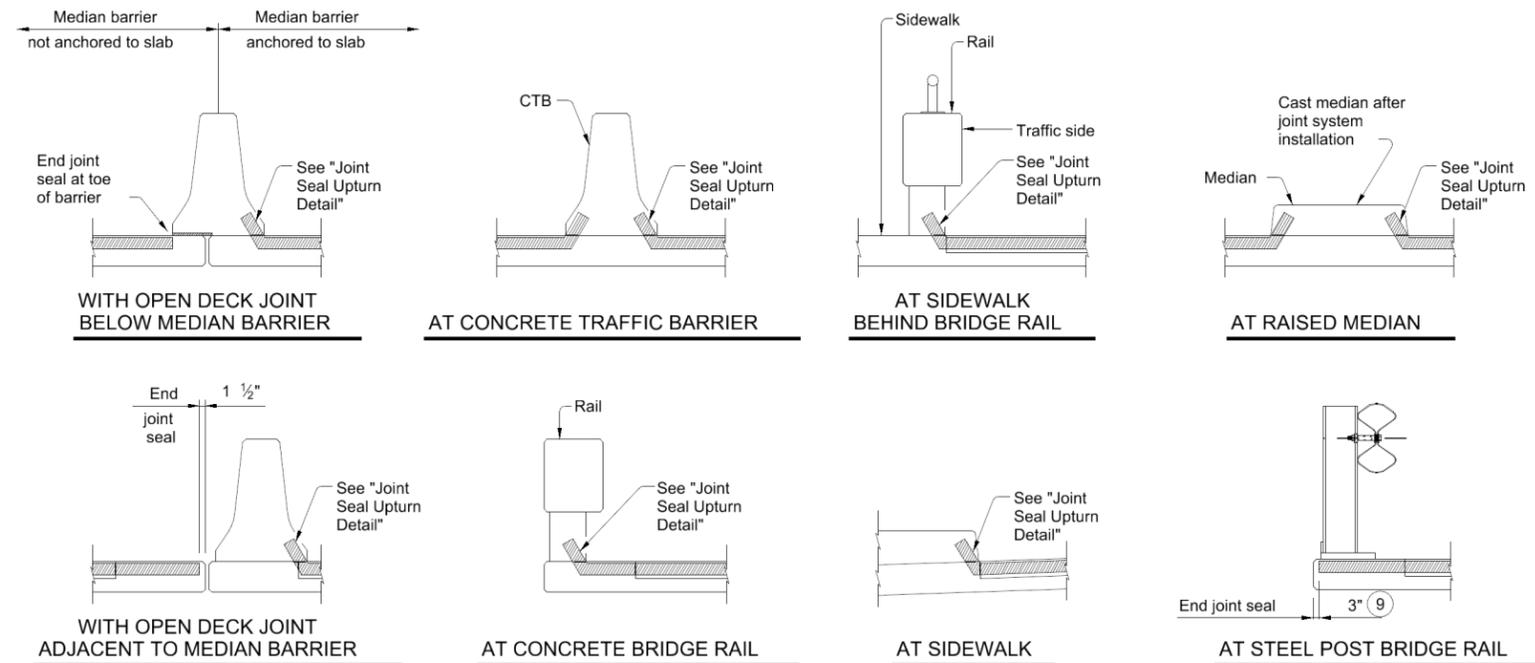
APPROVED PRECOMPRESSED FOAM SEAL MANUFACTURERS

MANUFACTURER	SEAL TYPE
Watson Bowman Acme	Wabo FS
SSI	Silspec SES
Sealtite	Sealtite 50N
EMSEAL	BEJS

TABLE OF ESTIMATED QUANTITIES

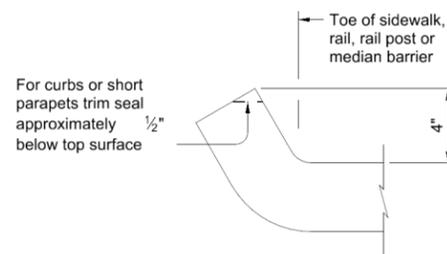
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16-205-0-0101-04-050 (TERRE BONNIE)	JOINT W/HOT-POURED RUBBER SEAL	438-6002	CLEAN AND SEAL EXIST JOINTS (XXX)	3	120
16-205-0-0101-04-029 (TERRE BONNIE)	JOINT W/HOT-POURED RUBBER SEAL	438-6002	CLEAN AND SEAL EXIST JOINTS (XXX)	4	160
16-205-0-0101-04-052 (MUSTANG MOTT)	JOINT W/HOT-POURED RUBBER SEAL	438-6002	CLEAN AND SEAL EXIST JOINTS (XXX)	4	160
16-205-0-0101-04-031 (MUSTANG MOTT)	JOINT W/HOT-POURED RUBBER SEAL	438-6002	CLEAN AND SEAL EXIST JOINTS (XXX)	5	200

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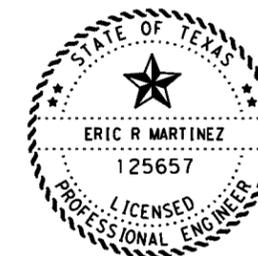


JOINT SEALANT TERMINATION DETAILS

⑨ 1 1/2" for precompressed foam and silicone seal



JOINT SEAL UPTURN DETAIL



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11/03/2023

SHEET 3 OF 3



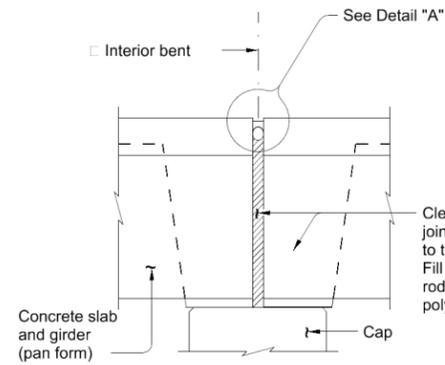
CLEANING AND SEALING EXISTING BRIDGE JOINTS

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 16-205-0-0101-04-052
 16-205-0-0101-04-031

FILE:	DN:	CK:	DW:	CK:
©TxDOT August 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181	
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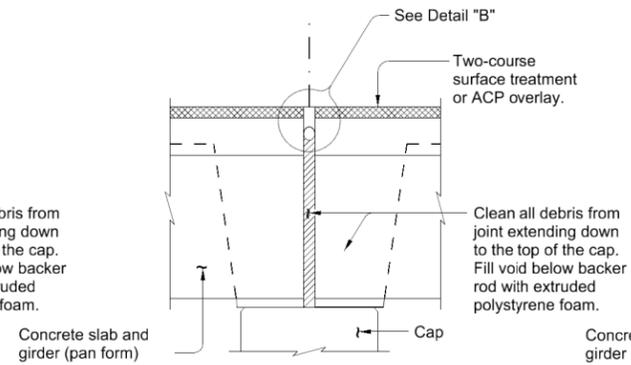
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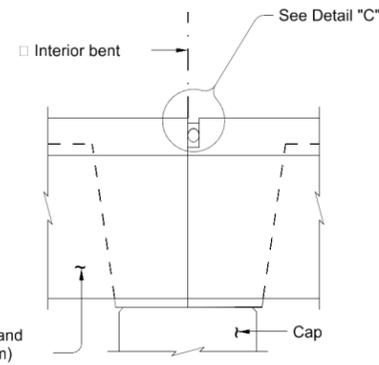
JOINT WITH SILICONE SEAL

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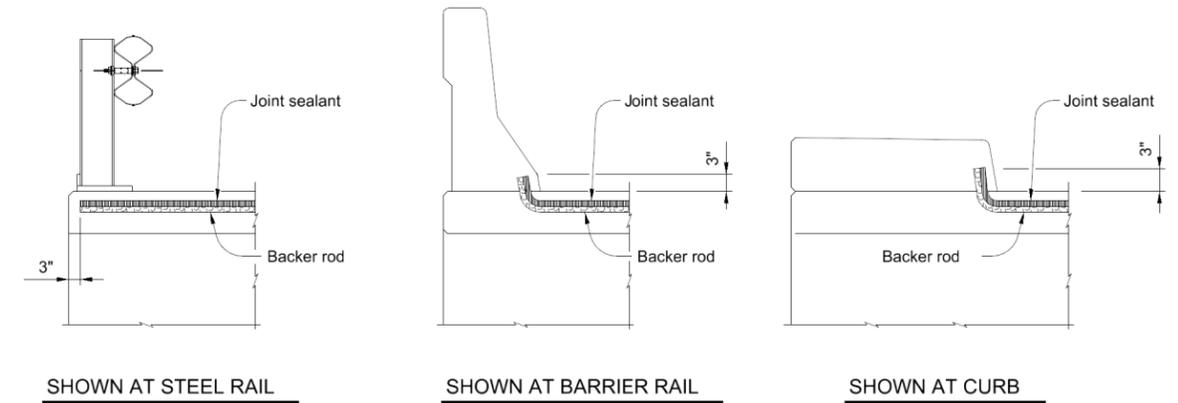


JOINT W/ HOT-POURED RUBBER SEAL

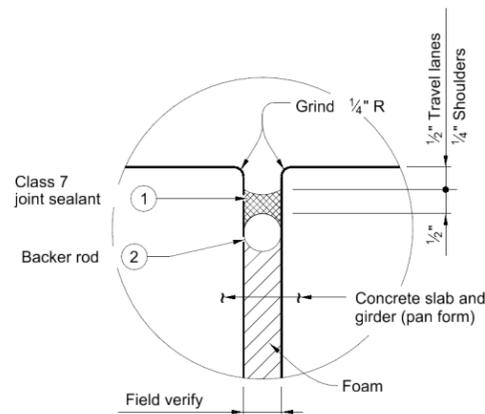
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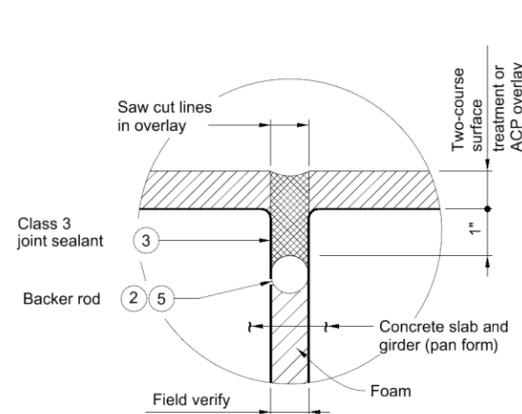
FIXED JOINT



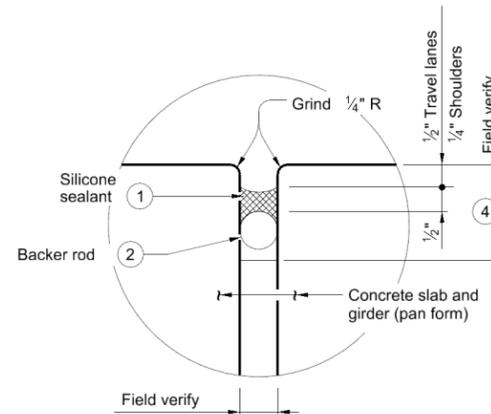
JOINT SEALANT TERMINATION DETAILS



DETAIL "A"



DETAIL "B"



DETAIL "C"

NOTE TO DESIGNER:
 This drawing shows three options for resealing existing joints on pan girder bridges. For other bridge types and joint sealing options, please see the companion drawing, WD-CSBJ-22.dgn.
 Use Item 438-6002 when specifying Class 3 joint sealant.
 Use Item 438-6004 when specifying Class 7 joint sealant.
 This sheet may not be used without modification. In all cases, details and notes not required must be crossed out or eliminated, and the phrase "Not to be used as a standard" must be removed. Sheet must be signed and sealed.

- 1 Use Class 7 joint sealant. Prepare joint and seal in accordance with Item 438, "Cleaning and Sealing Joints."
- 2 Provide backer rod 25% larger than joint opening and compatible with the sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.
- 3 Use Class 3 joint sealant. Prepare joint and seal in accordance with Item 438, "Cleaning and Sealing Joints."
- 4 Backer rod may be omitted if existing joint depth is less than 1 1/2".
- 5 Backer rod must be compatible with the hot poured rubber sealant and rated for a minimum of 400°F.

PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH SILICONE SEAL:

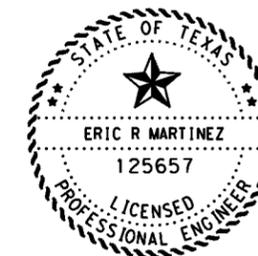
- 1) Clean joint opening of all existing expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Fill void with extruded polystyrene foam.
- 4) Place backer rod into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.

PROCEDURE FOR CLEANING AND SEALING EXISTING CONCRETE GIRDER JOINT WITH HOT POURED RUBBER SEAL:

- 1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a 1/2" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Fill void with extruded polystyrene foam.
- 4) Place backer rod into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 3 joint sealant. Seal flush to the top of the asphaltic concrete pavement.

PROCEDURE FOR CLEANING AND SEALING EXISTING FIXED JOINTS:

- 1) Remove existing seal and debris from recess.
- 2) Abrasive blast clean existing surfaces where silicone seal is to be placed.
- 3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 4) Place backer rod into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 7 joint sealant. Recess seal 1/2" below top of concrete in travel lanes and 1/4" below top of concrete in shoulders.



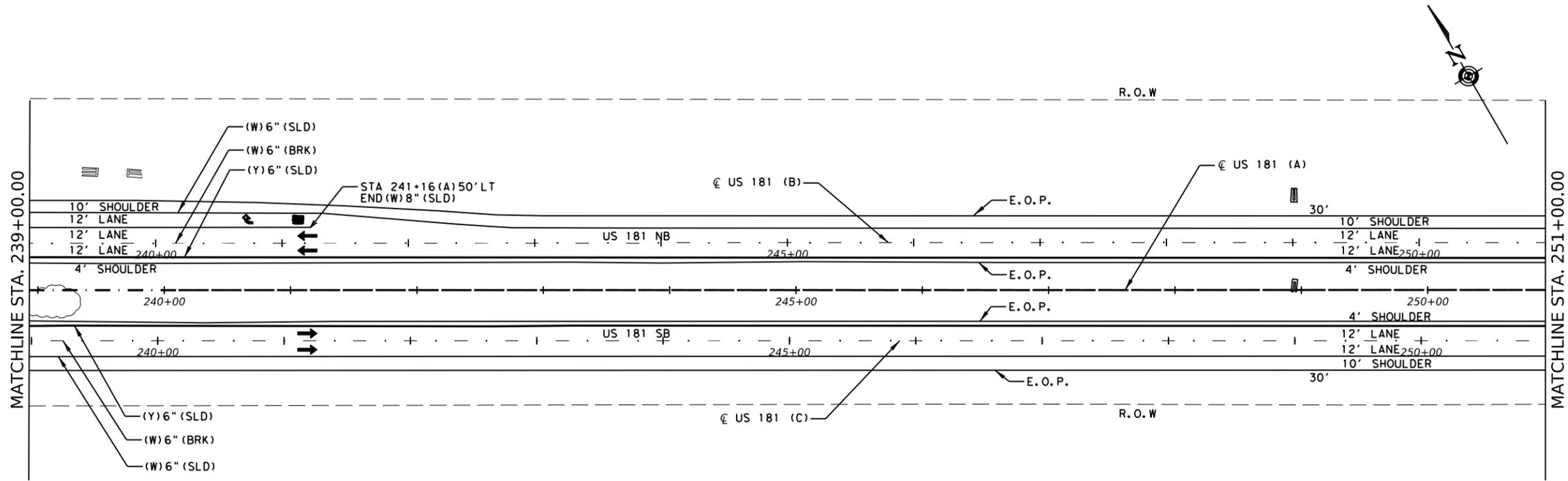
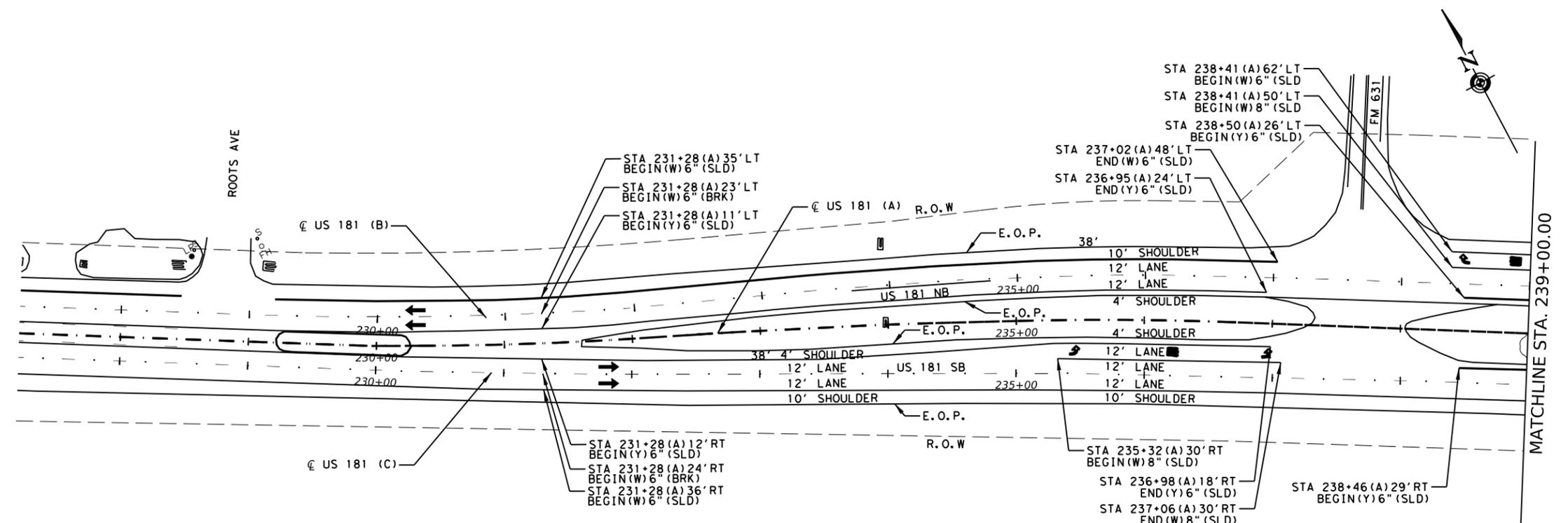
E. Martinez

11/03/2023

				Bridge Division	
CLEANING AND SEALING EXISTING BRIDGE JOINTS (PAN GIRDER BRIDGES)					
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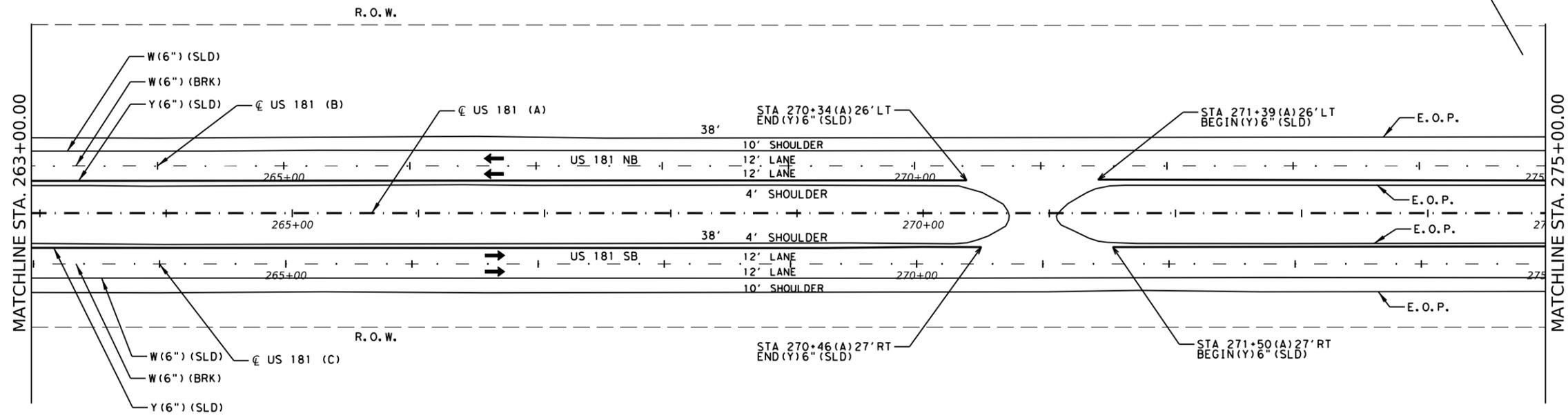
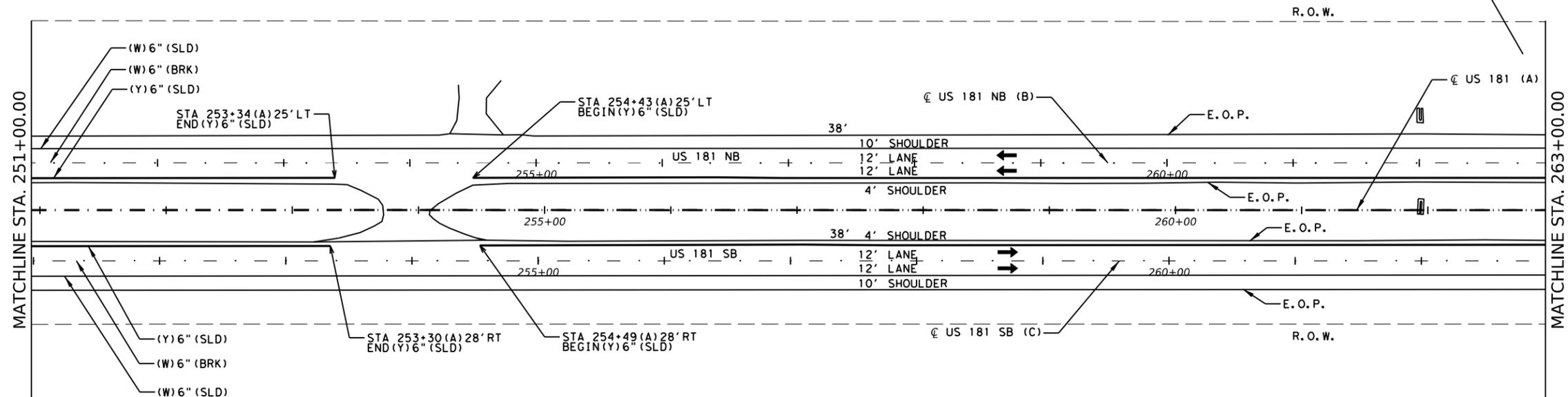
US 181
SURFACE DETAIL LAYOUTS

SHEET 1 OF 14

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US 181

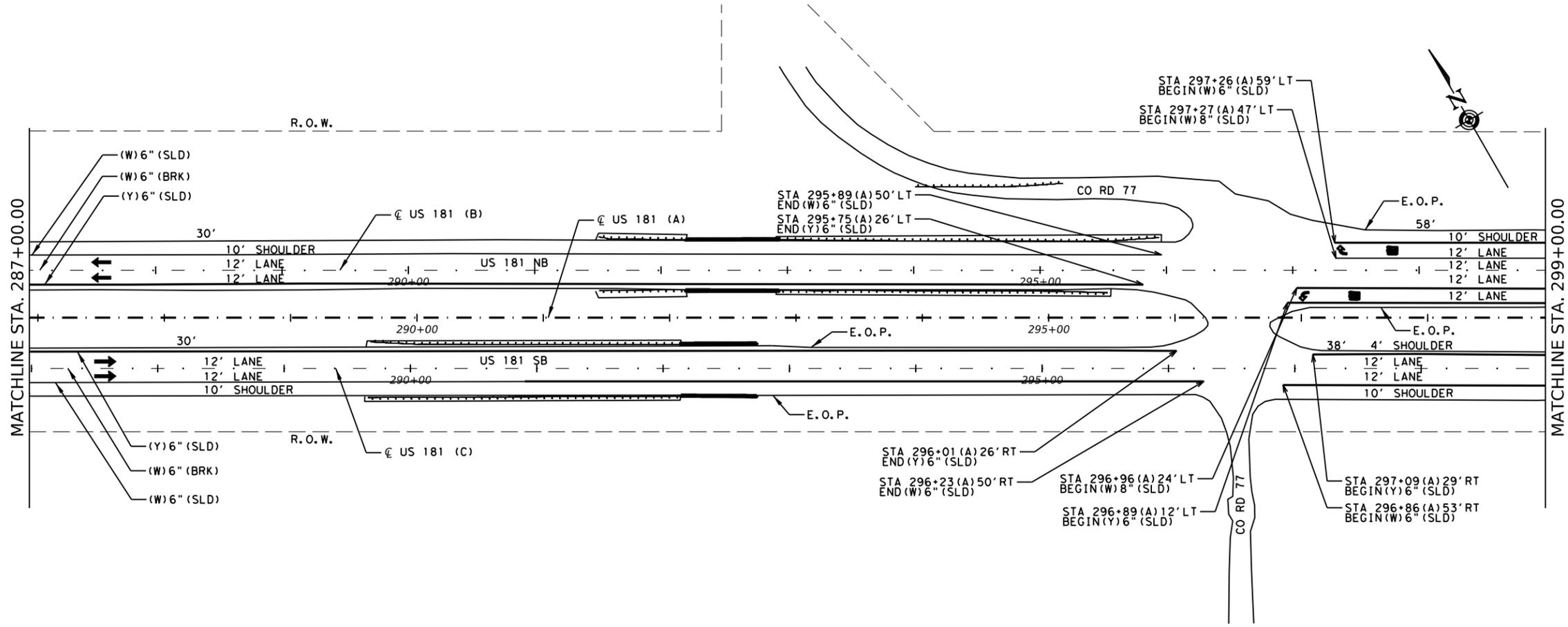
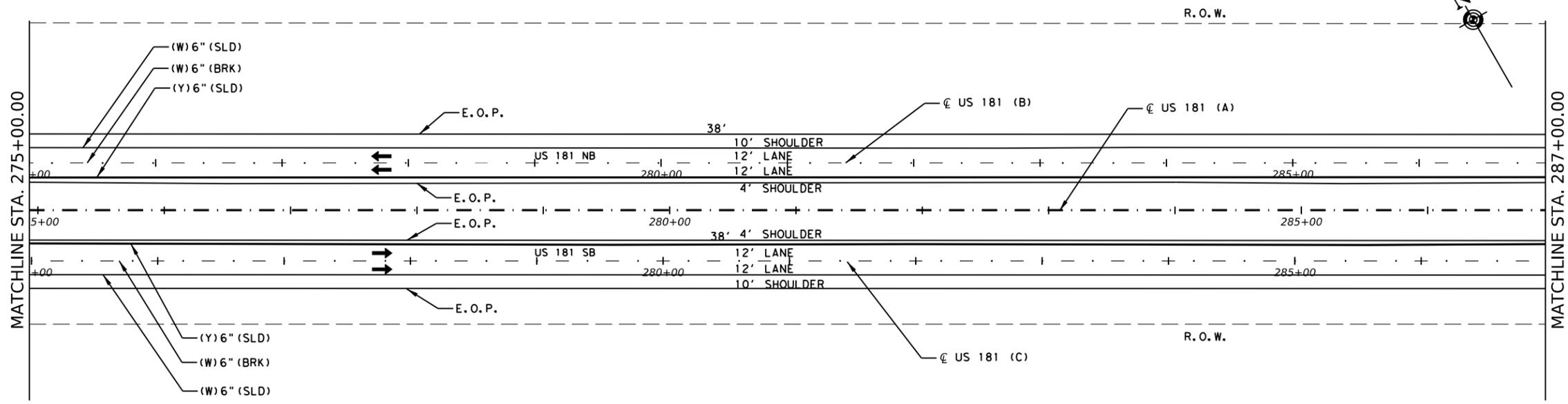
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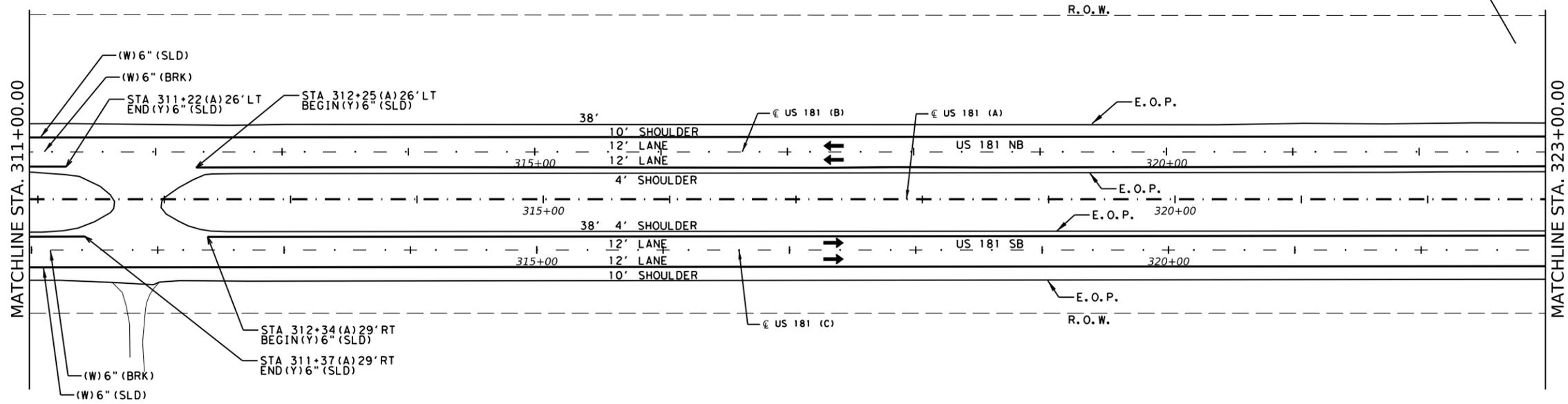
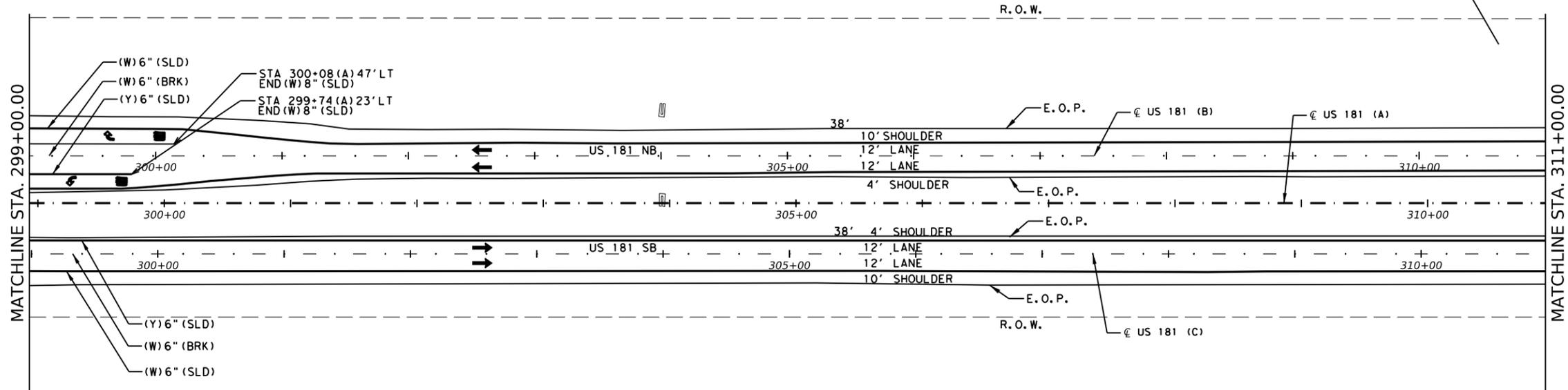
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11/03/2023



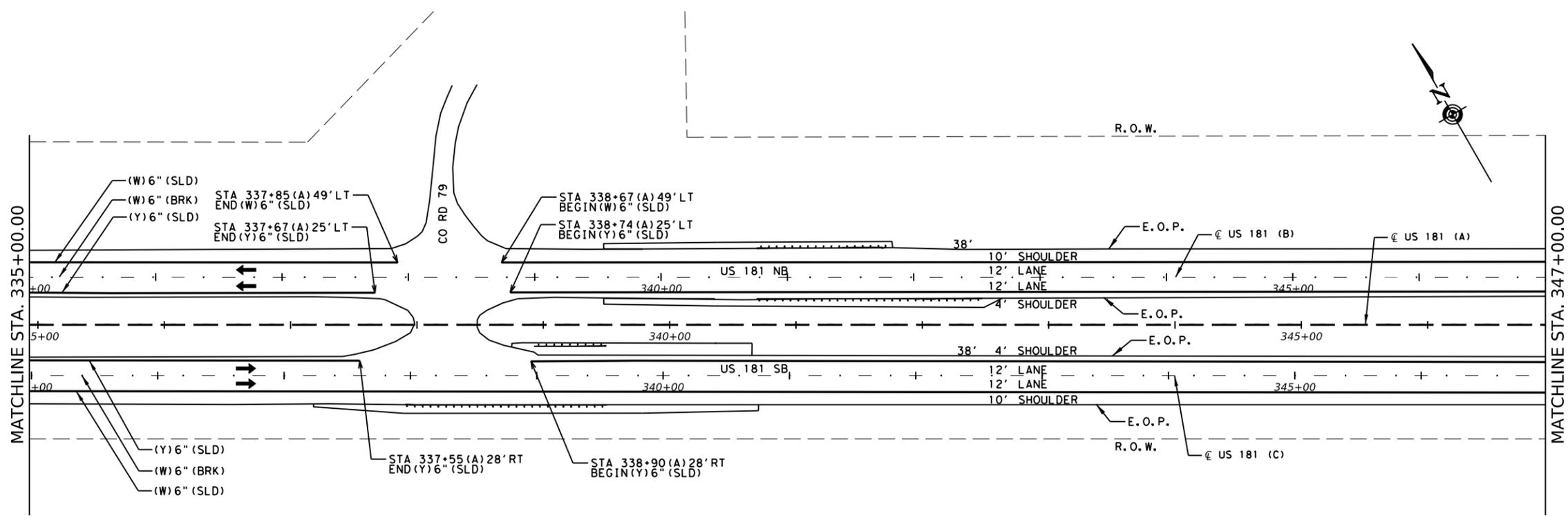
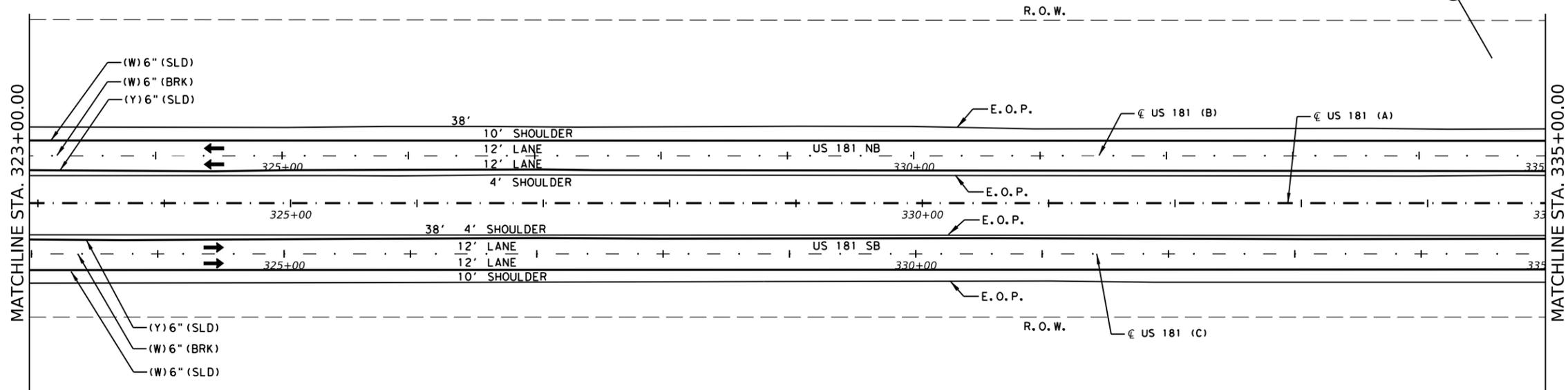
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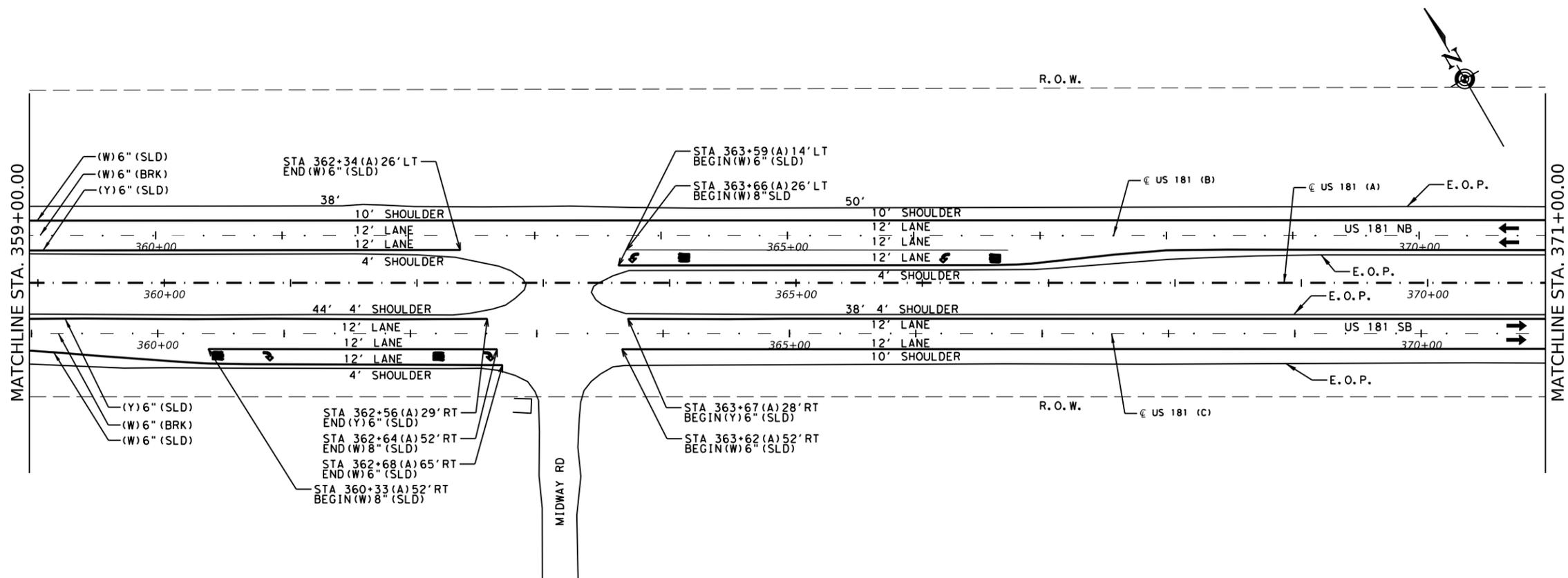
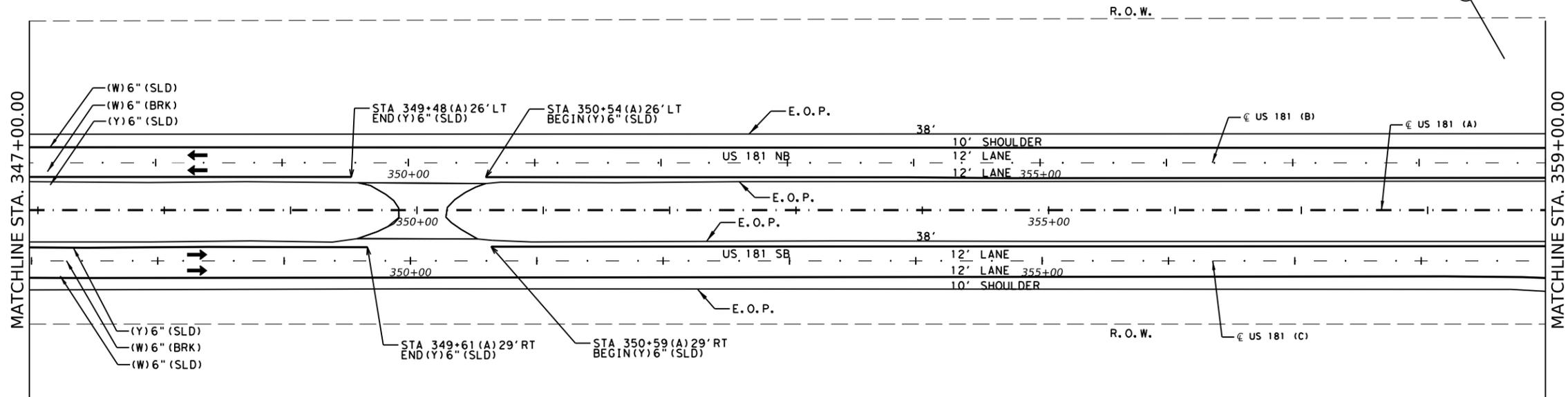
US 181
SURFACE DETAIL LAYOUTS

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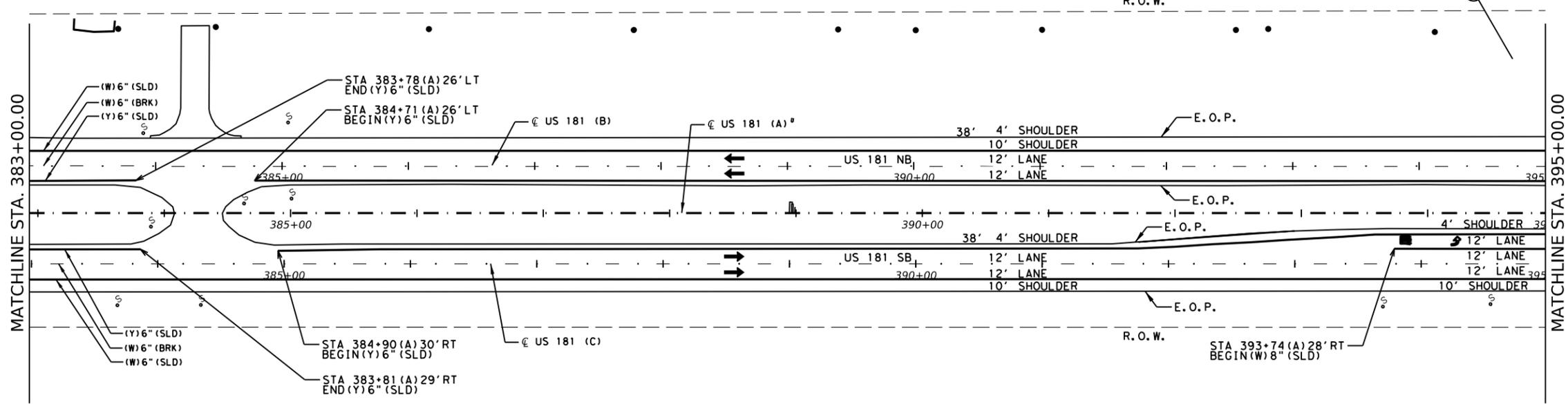
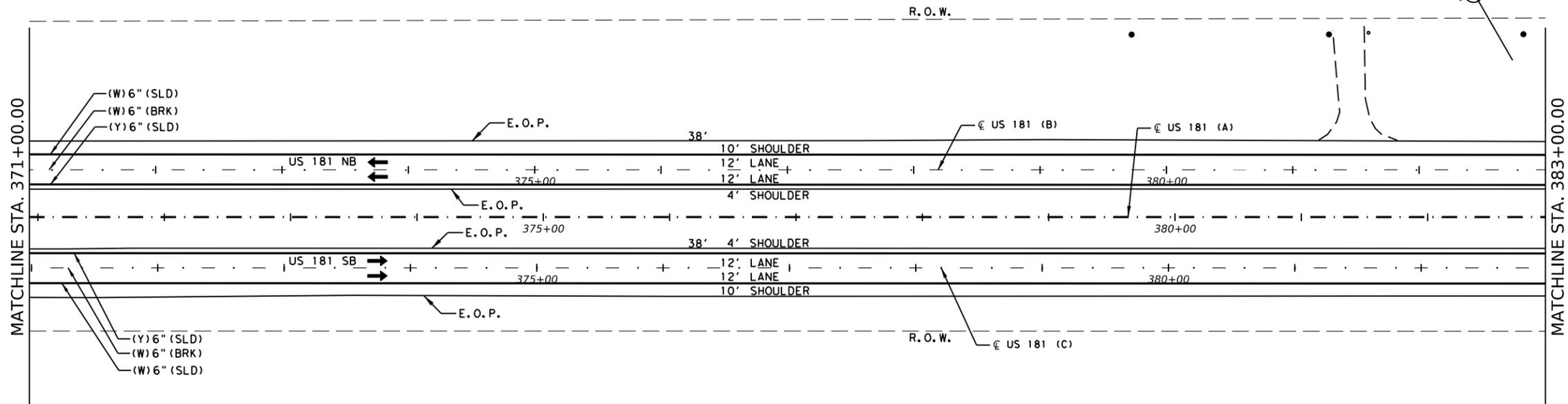
US 181
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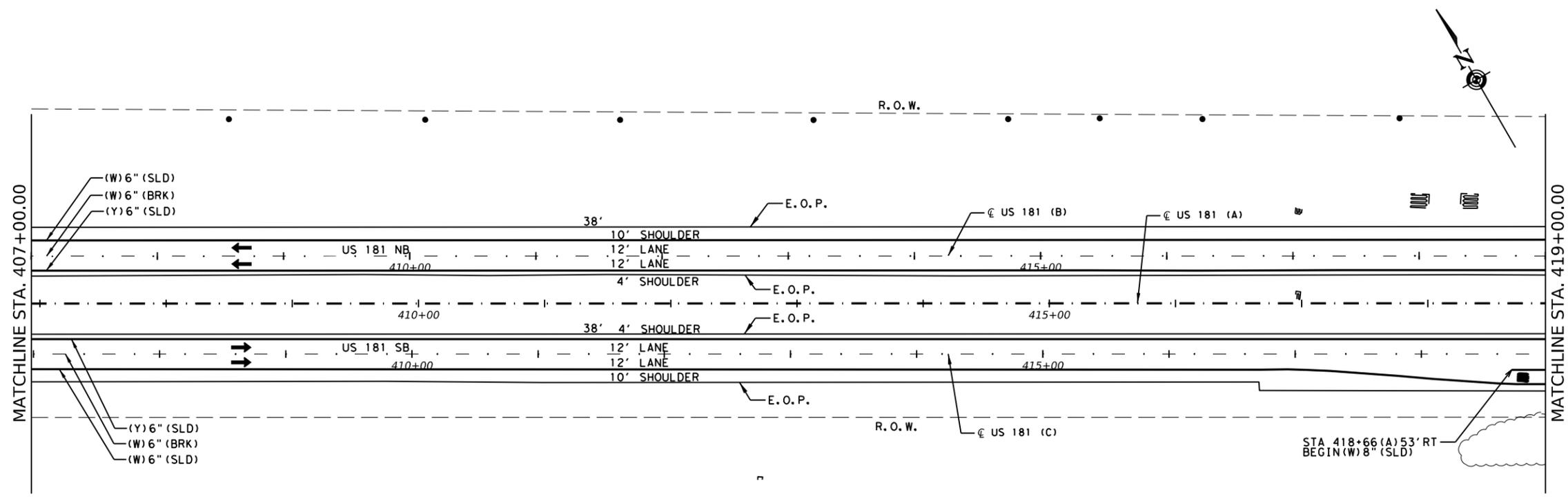
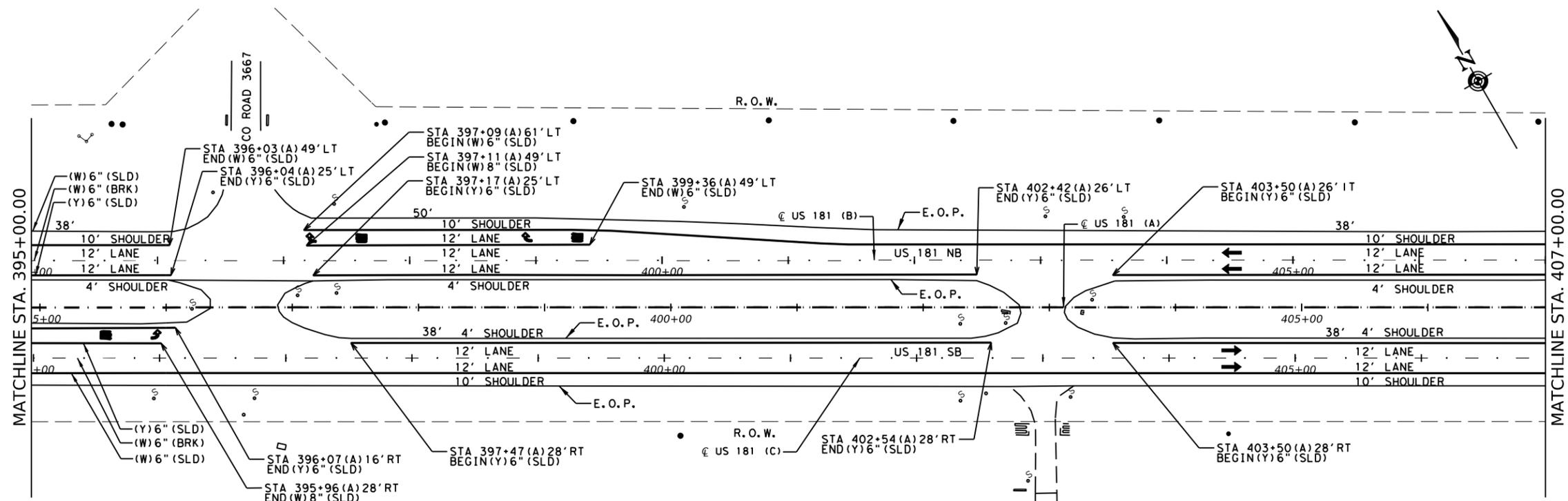
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Eric R. Martinez

11/03/2023



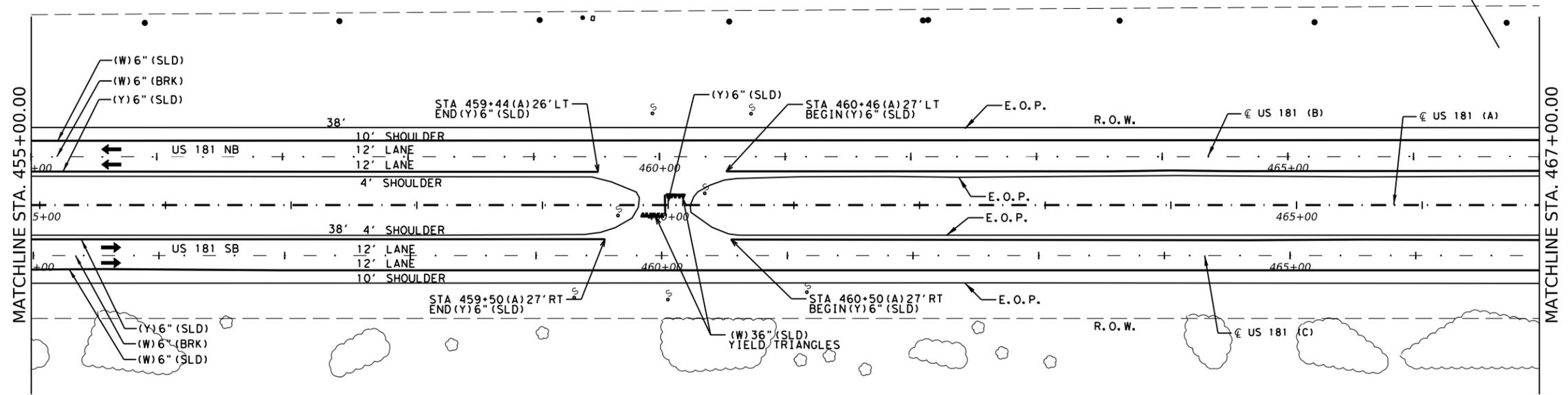
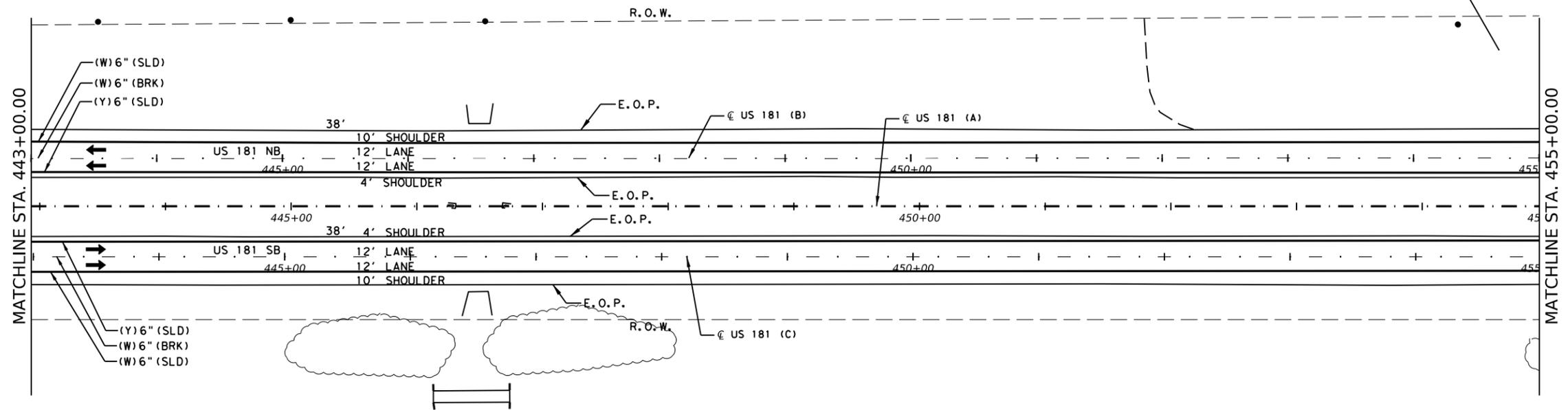
US 181
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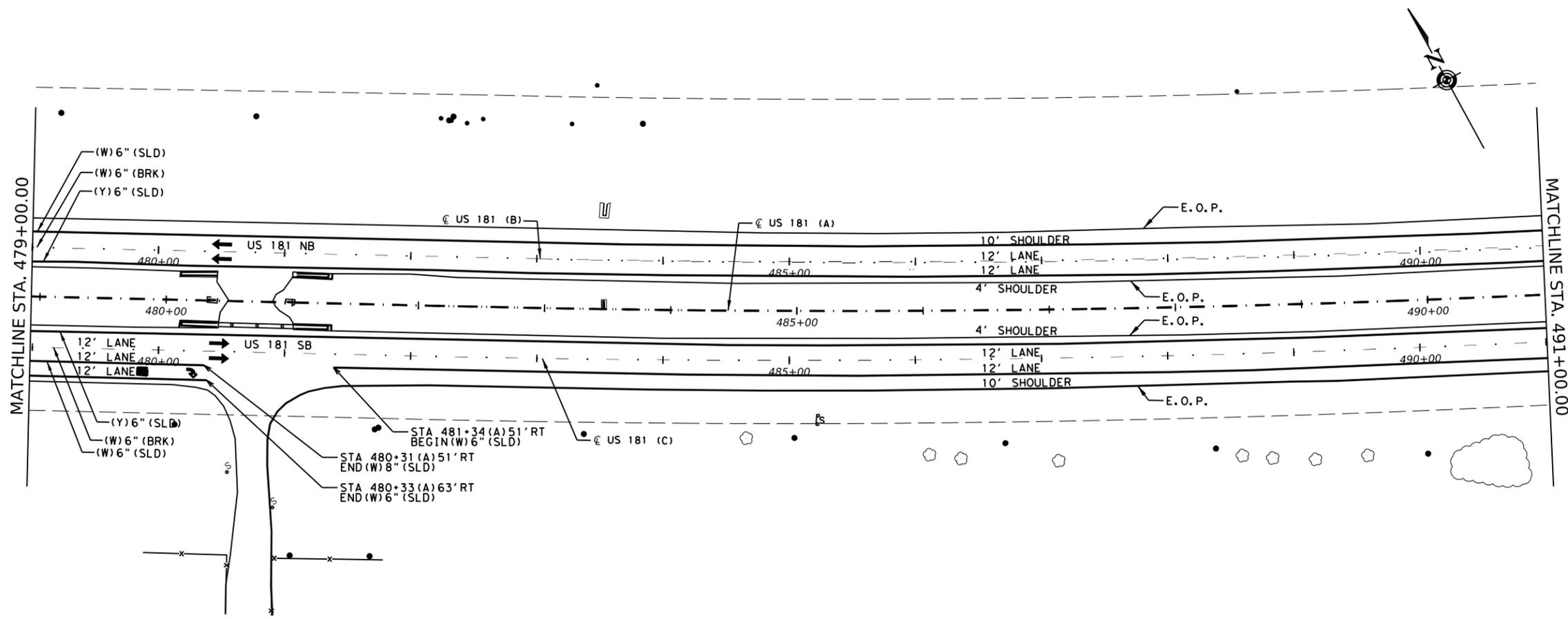
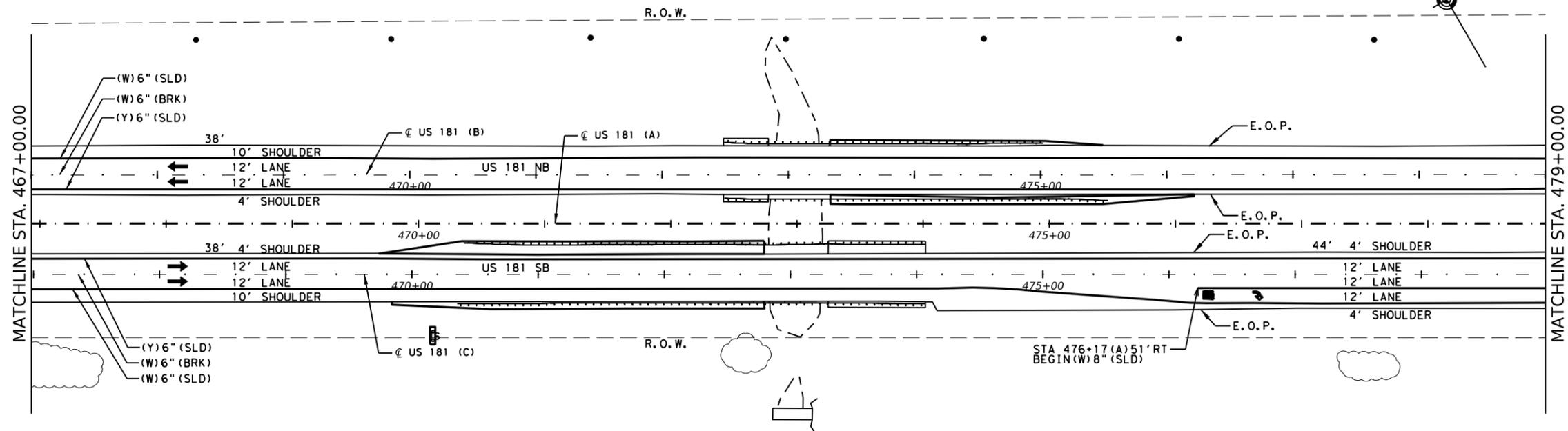
US 181
SURFACE DETAIL
LAYOUTS

SHEET 10 OF 14

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11/03/2023

Texas Department of Transportation

US 181

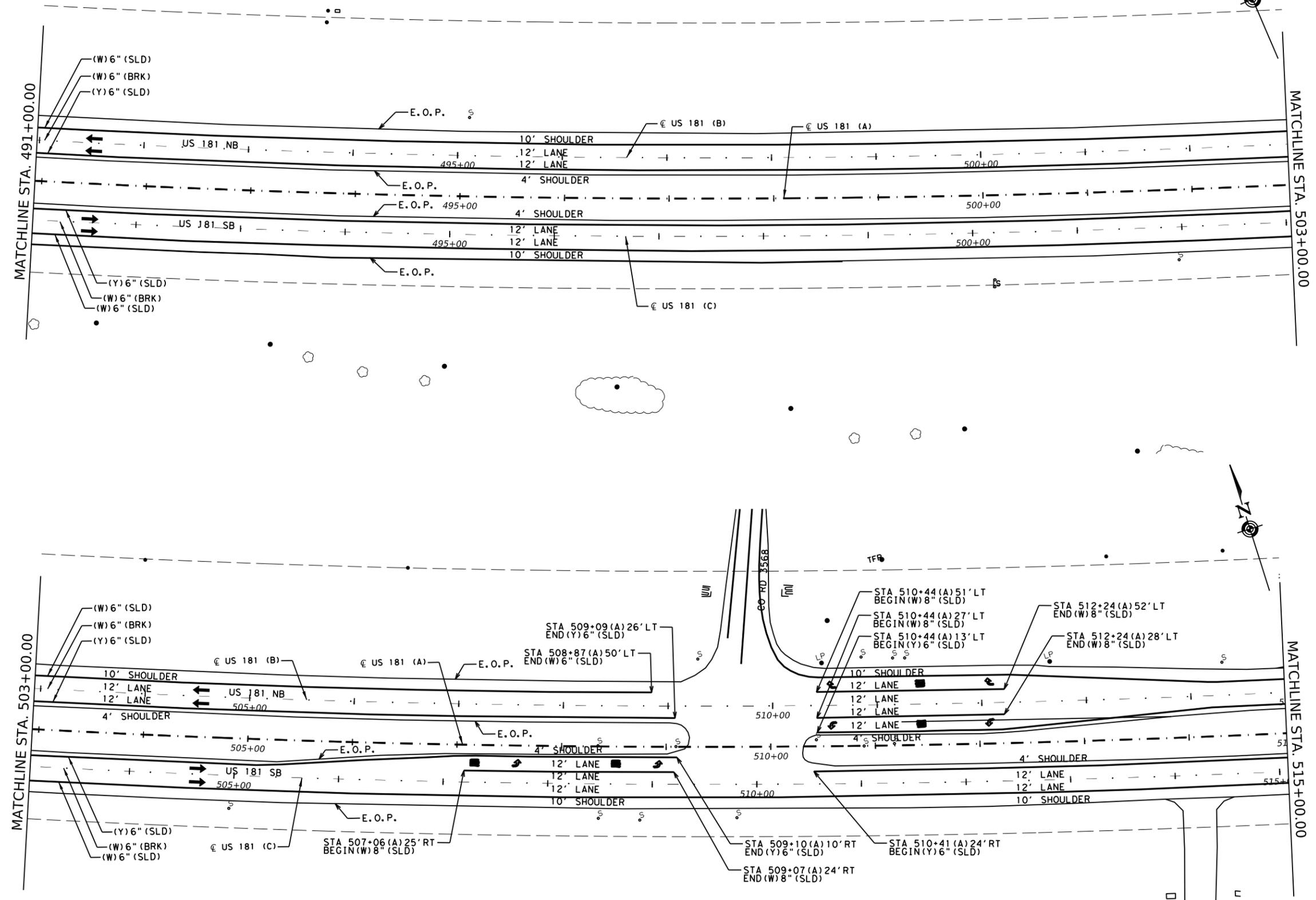
SURFACE DETAIL LAYOUTS

SHEET 11 OF 14

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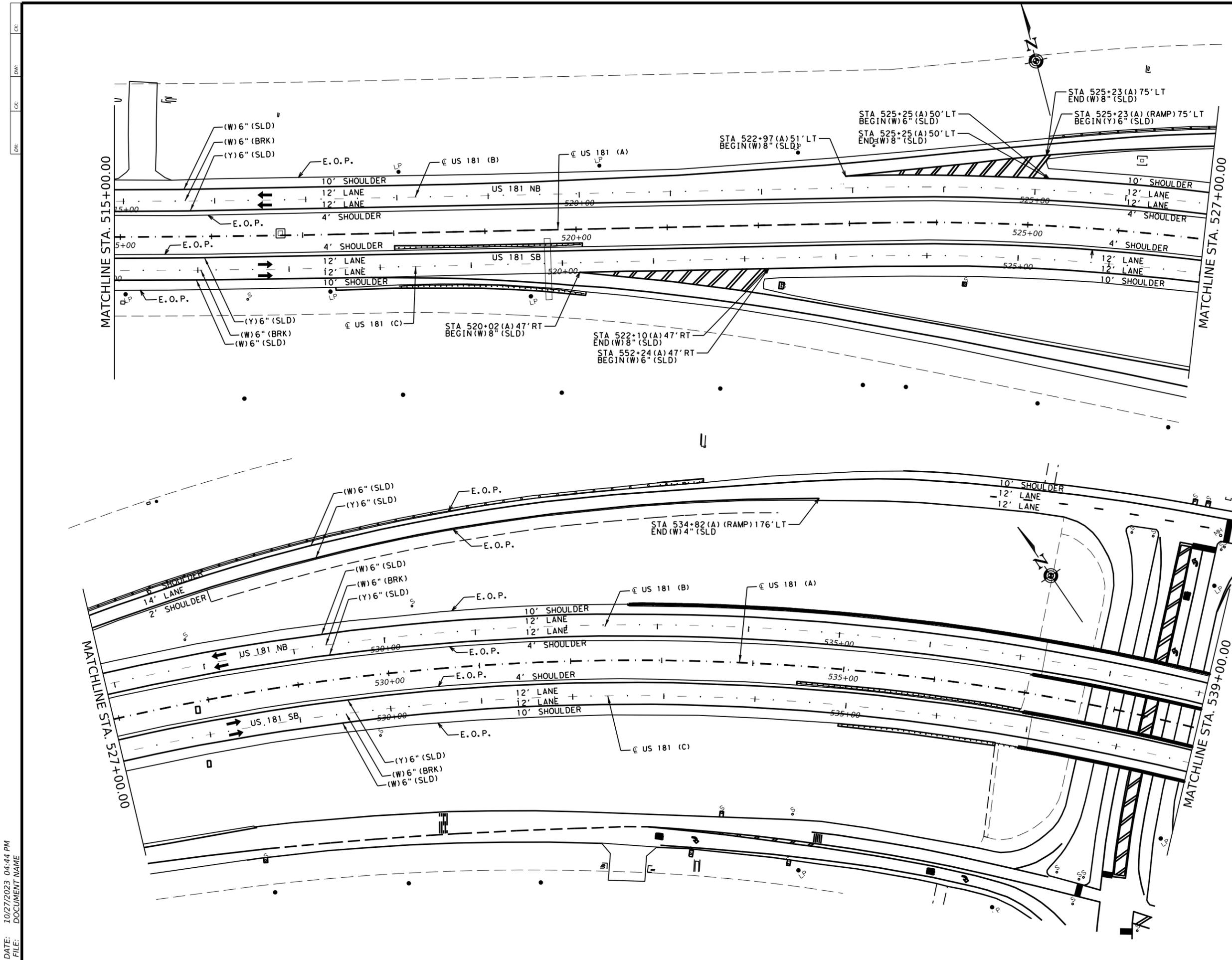


US 181
SURFACE DETAIL LAYOUTS

SHEET 12 OF 14

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US 181
SURFACE DETAIL LAYOUTS

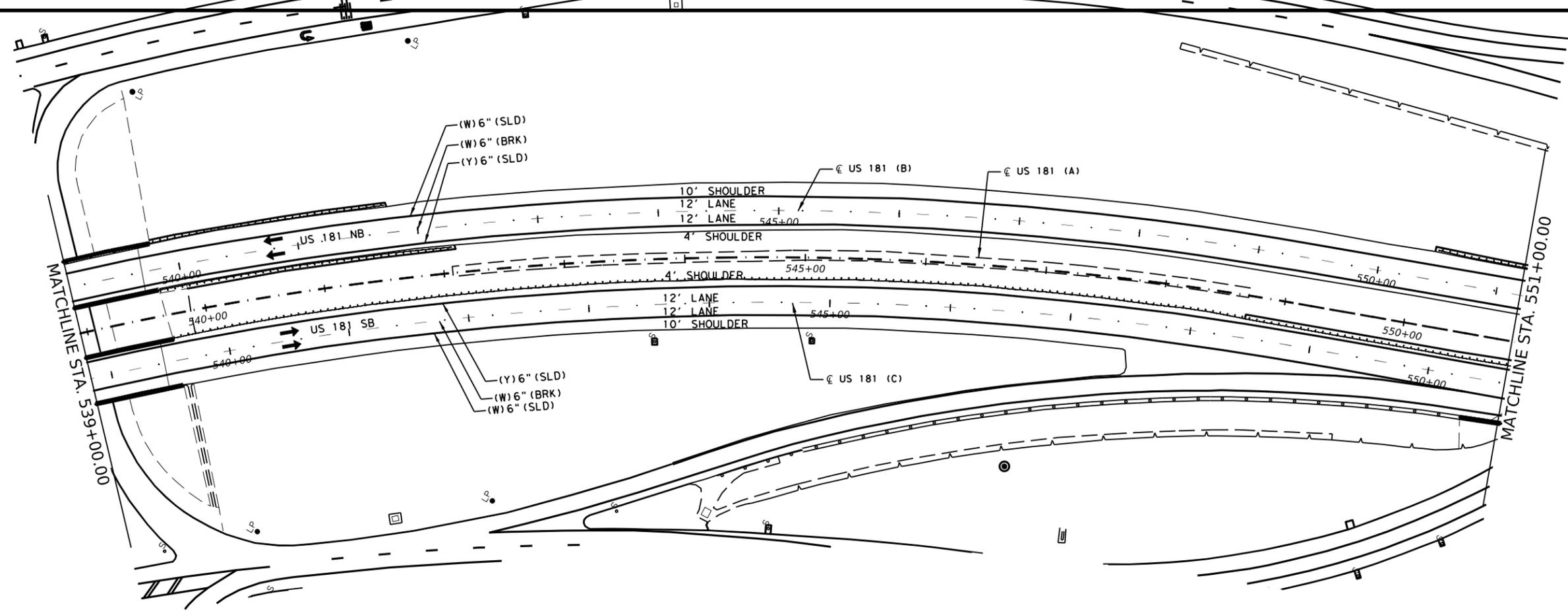
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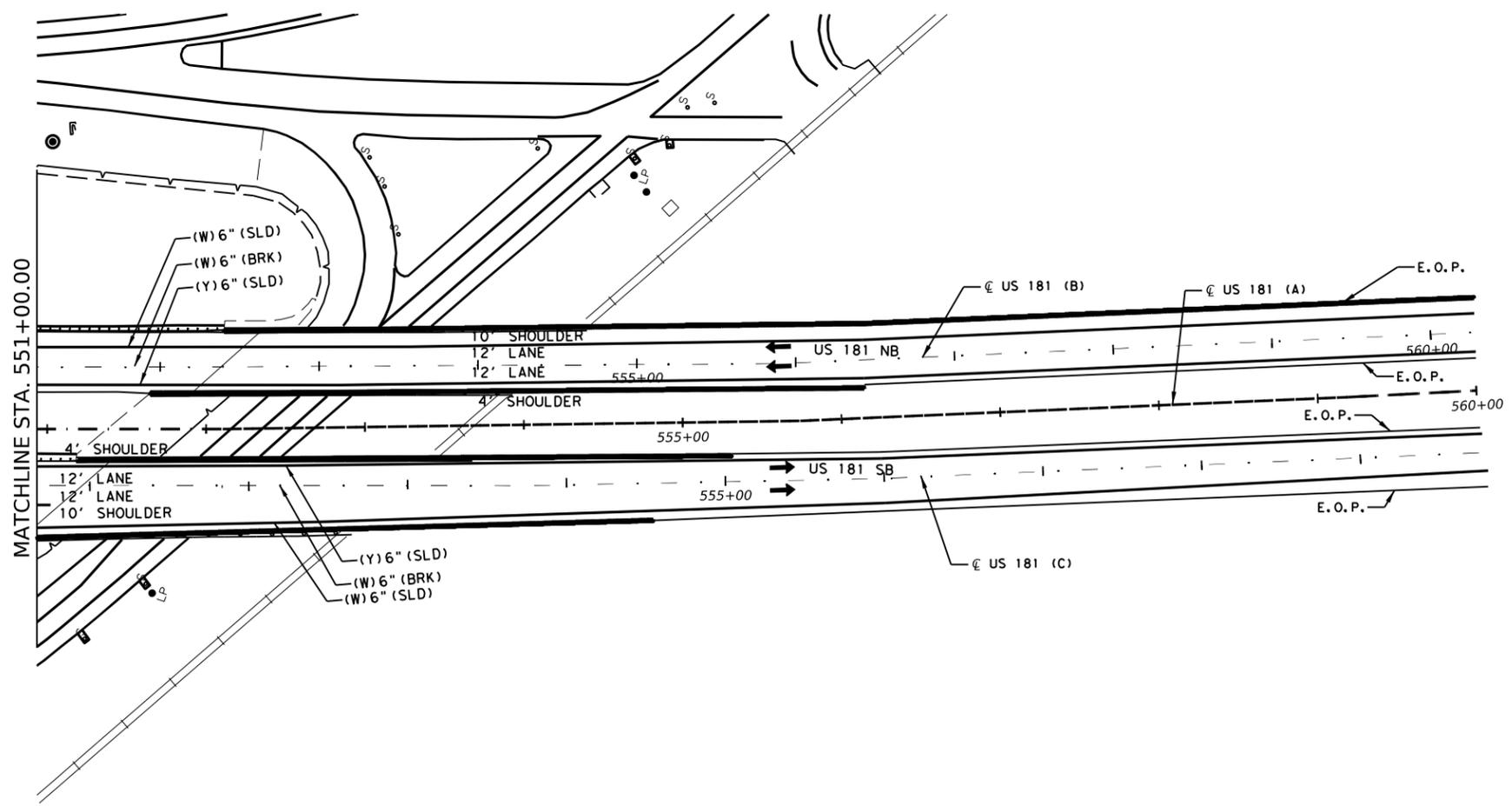
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11/03/2023



US 181
SURFACE DETAIL
LAYOUTS

SHEET 14 OF 14

CONT	SECT	JOB	HIGHWAY
0101	04	131	US 181
DIST	COUNTY	SHEET NO.	
CRP	SAN PATRICIO	111	

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS				DELINEATORS				D & OM DESCRIPTIVE CODES	
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE	DOUBLE	INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)	
								NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRP = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount	
SHEETING	Yellow, White or Red Type B or C reflective sheeting				SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.				POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
					MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

OBJECT MARKERS								D & OM DESCRIPTIVE CODES		
DEVICE	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)	INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)	
		OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4	TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector units (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector units (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional
SHEETING	Yellow-Type B _{FL} or C _{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting			Red -Type B _{FL} or C _{FL} Sheeting	DEPARTMENTAL MATERIAL SPECIFICATIONS FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES) DMS-4400 SIGN FACE MATERIALS DMS-8300 DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS DMS-8600	
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT		
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP		

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE: Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.		
DEVICE	GF1	GF2	CTB	 W1-8				 W1-6			
SHEETING	Yellow, White, Red			SIZE (W x L)	18" x 24" (Conventional)	24" x 30" (Conventional Oversize)	30" x 36" (Expressway)	36" x 48" (Freeway)	SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.			MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	MOUNTING HEIGHT	7'-0"		
				NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).						

Texas Department of Transportation
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DNR TxDOT	CR: TxDOT	DNR TxDOT	CR: TxDOT
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REVISIONS	010104	131	US 181	
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	CRP SAN PATRICIO		112	

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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS	
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT
GND	GND	SRF	WAS	WAP	GF1
	EMBEDDED		STEEL	PLASTIC	GF2
	NOTES 1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only. 2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.		NOTES 1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices. 2. Install per manufacturer's recommendations. 3. Post length may vary to meet field conditions. 4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.		
			NOTE 1. Install per manufacturer's recommendations.		CONCRETE TRAFFIC BARRIER (CTB)

GENERAL NOTES	
1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.	2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.	4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.	6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS

NOTE
 Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN

NOTE
 Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS

See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DNR TxDOT	CR: TxDOT	DNR TxDOT	CR: TxDOT
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REVISIONS	010104	131	US	181
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	CRP	SAN PATRICIO	113	

DATE: 05/09/2023 09:09 AM
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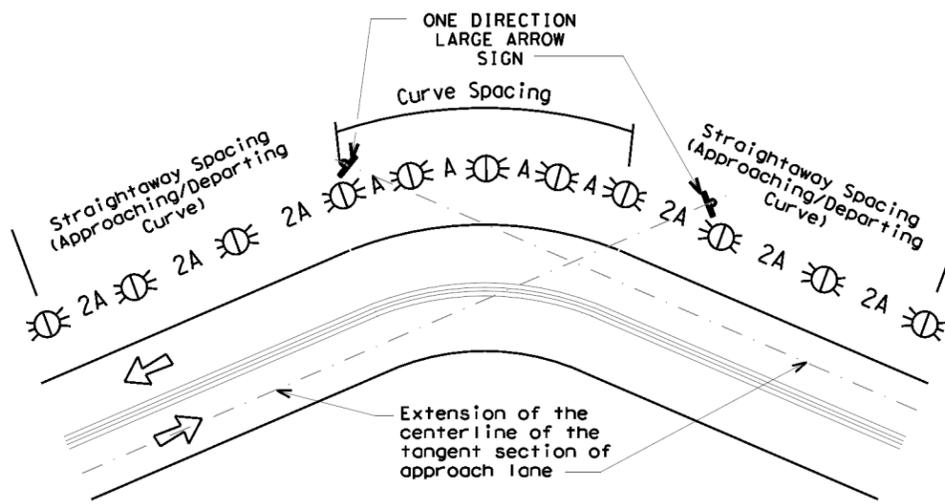
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

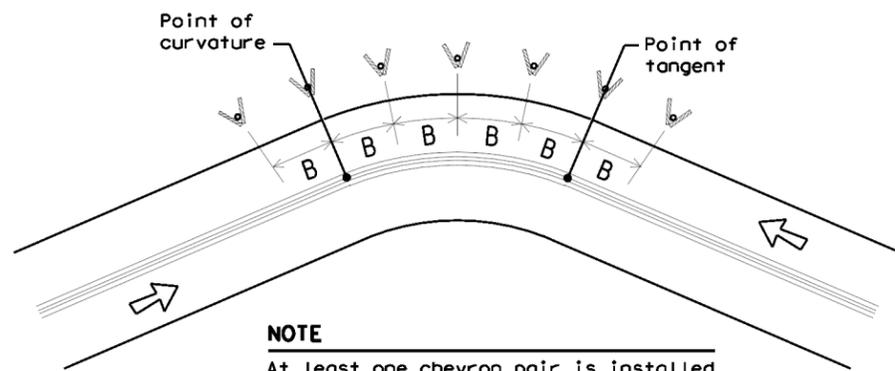
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

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

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

DELINEATOR AND CHEVRON SPACING

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

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

- Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

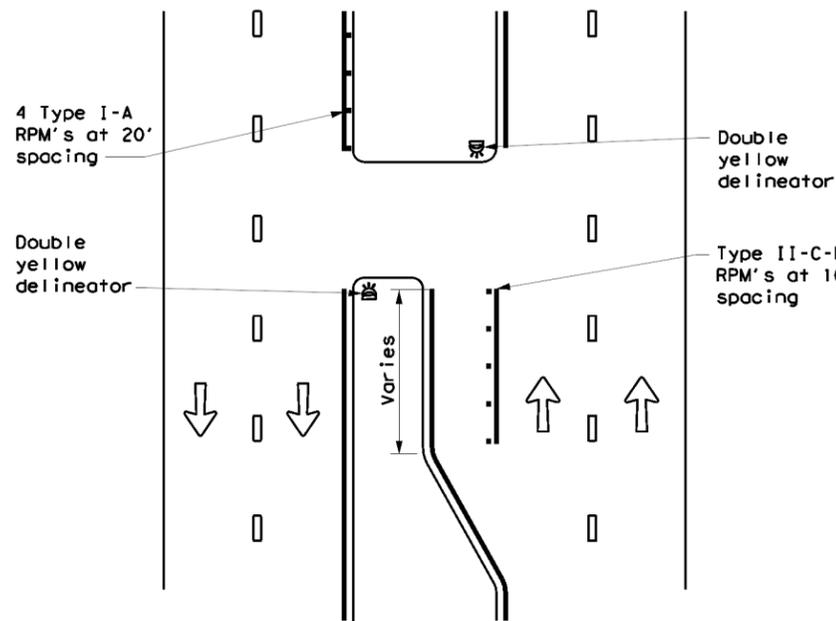
D & OM(3)-20

FILE: dom3-20.dgn	DNR TxDOT	CR: TxDOT	DNR TxDOT	CR: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS		010104	131	US 181
3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	CRP	SAN PATRICIO	114	

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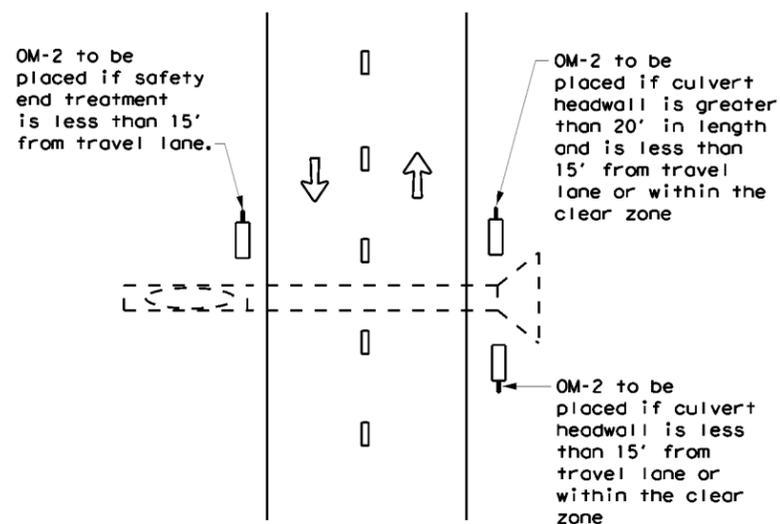
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CROSSOVERS



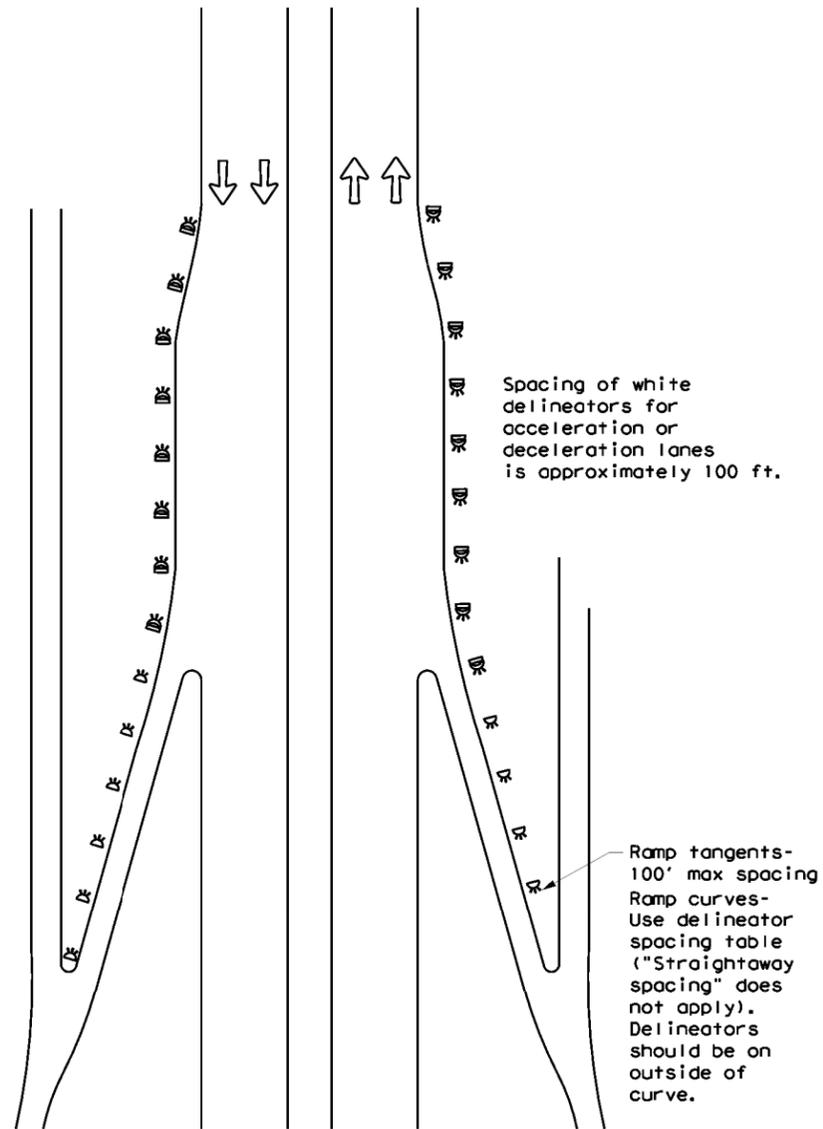
DETAIL 1

FOR CULVERTS WITHOUT MBGF



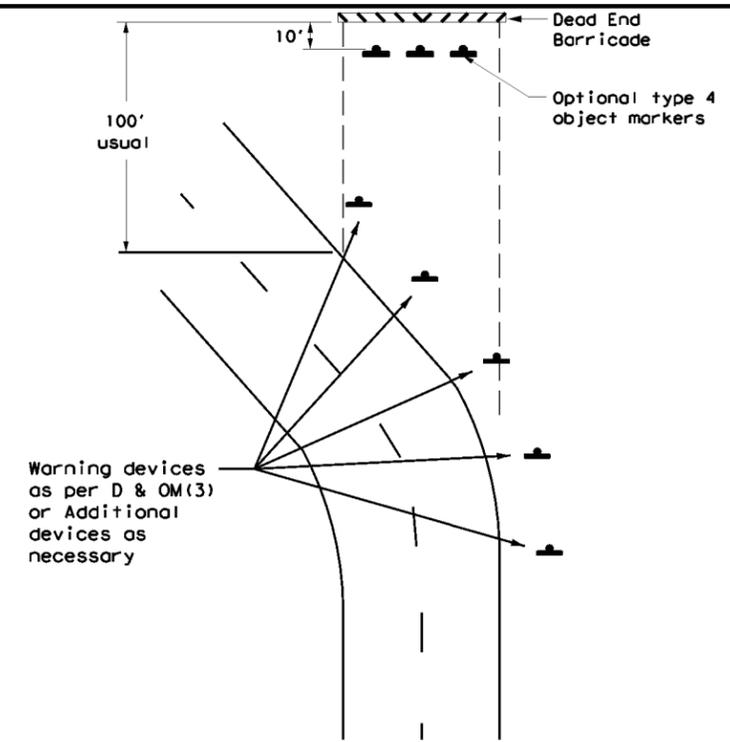
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



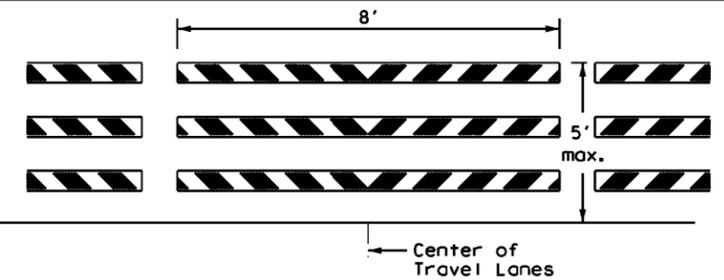
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

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

DETAIL 5

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



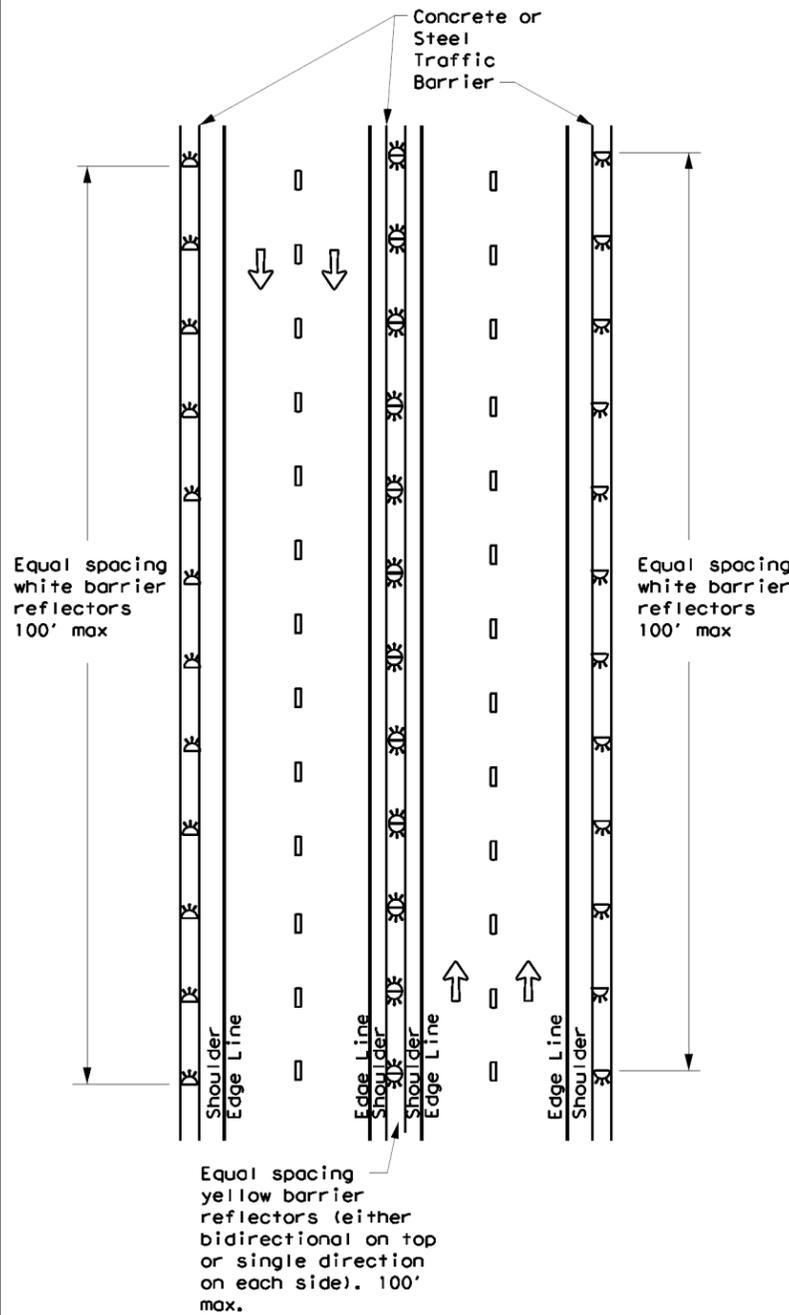
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) -20

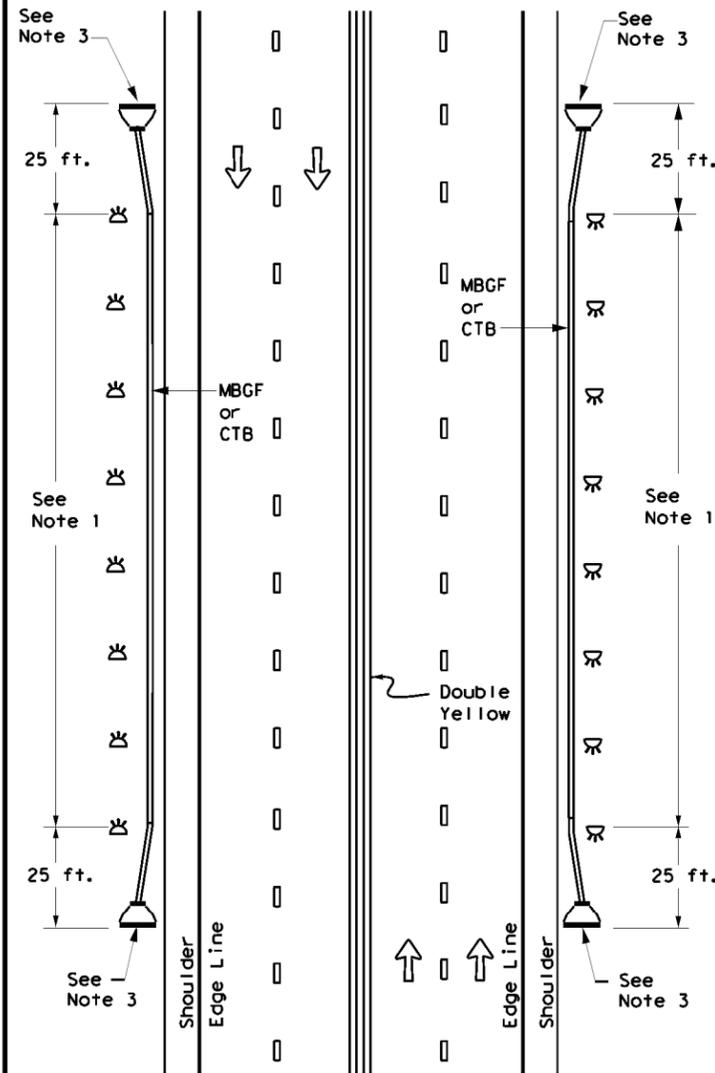
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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181	
3-15	DIST	COUNTY	SHEET NO.	
7-20	CRP SAN PATRICIO		115	

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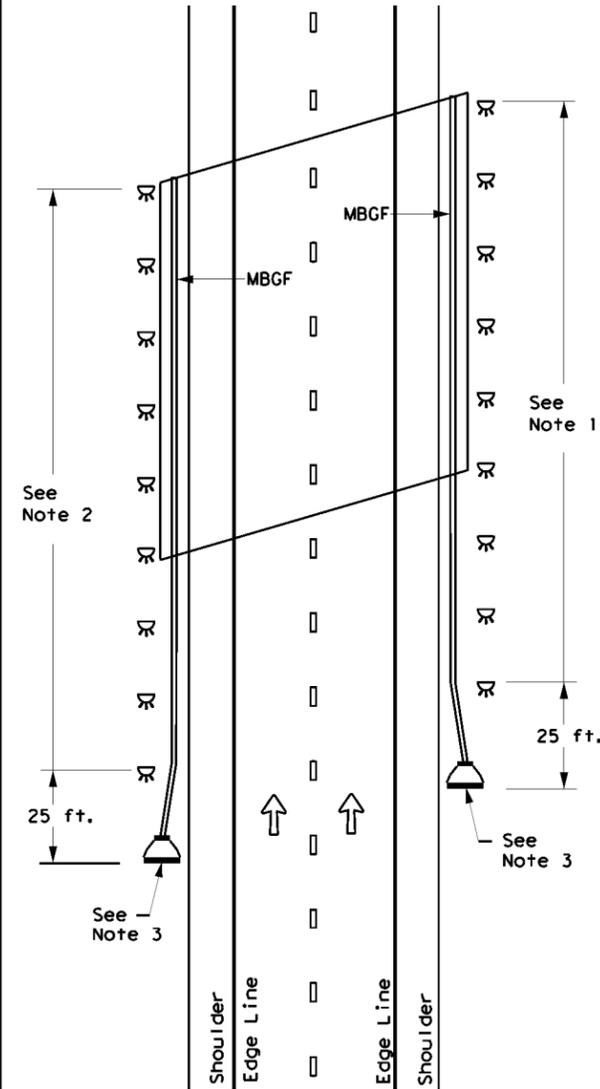
CONTINUOUS CONCRETE OR STEEL BARRIER



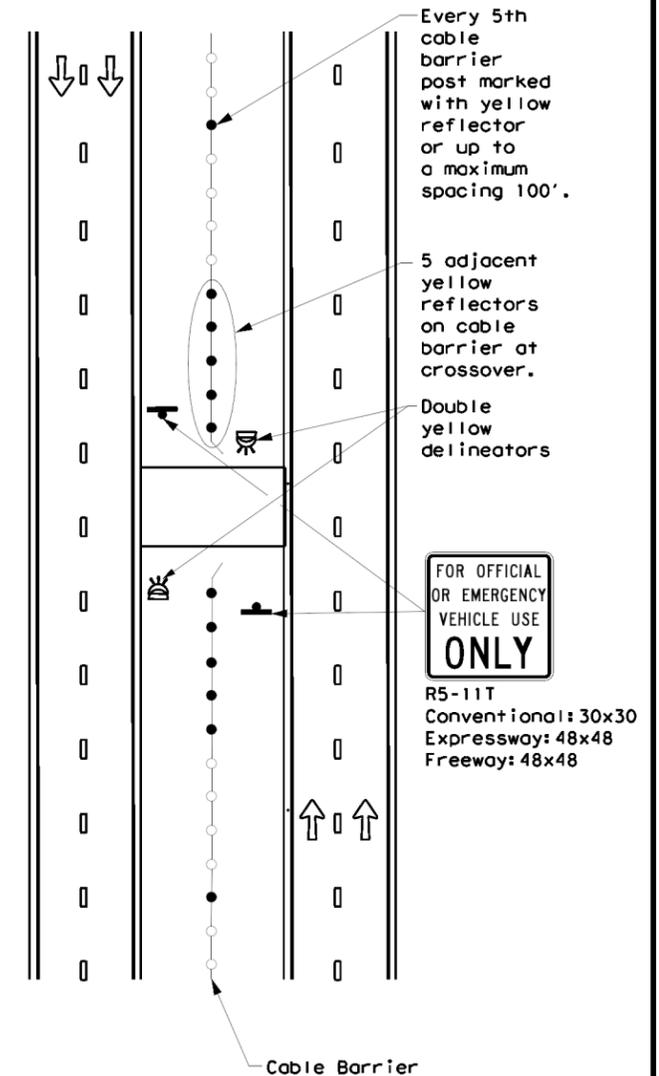
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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



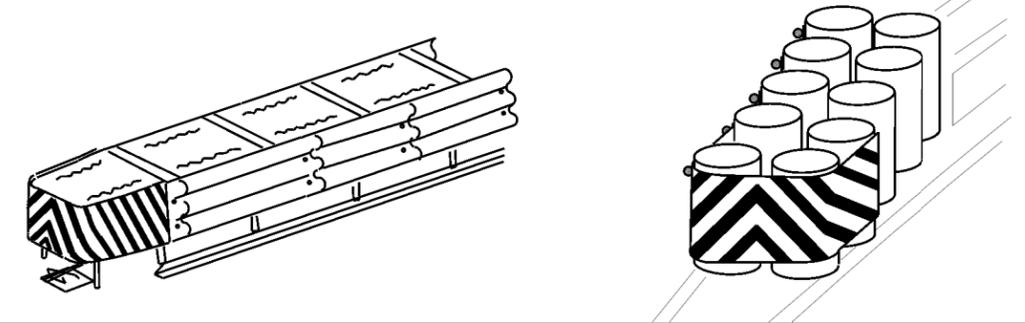
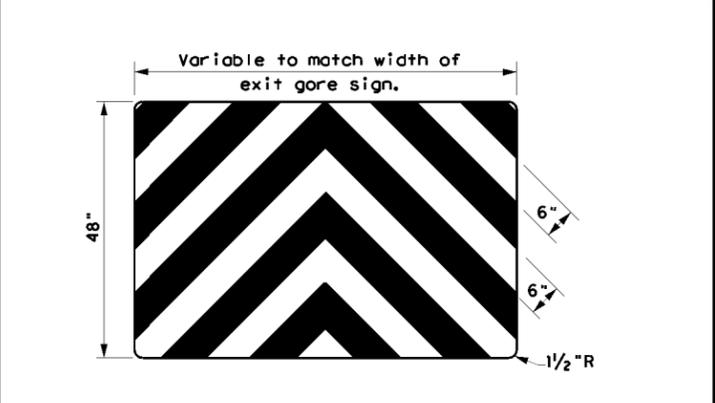
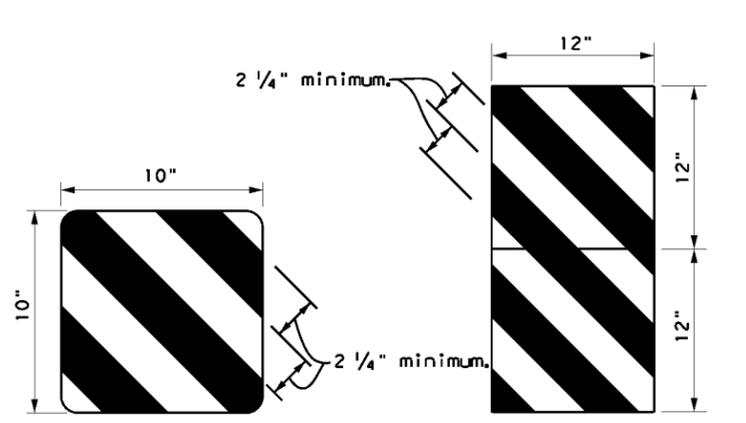
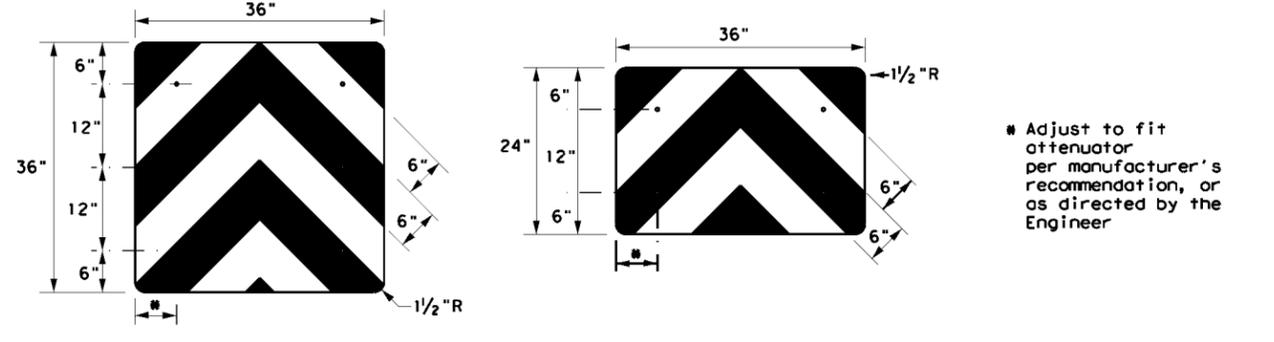
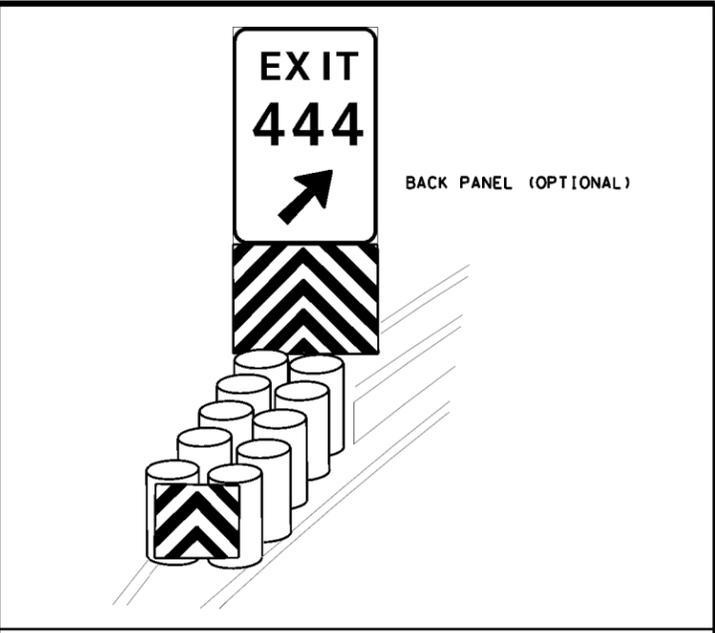
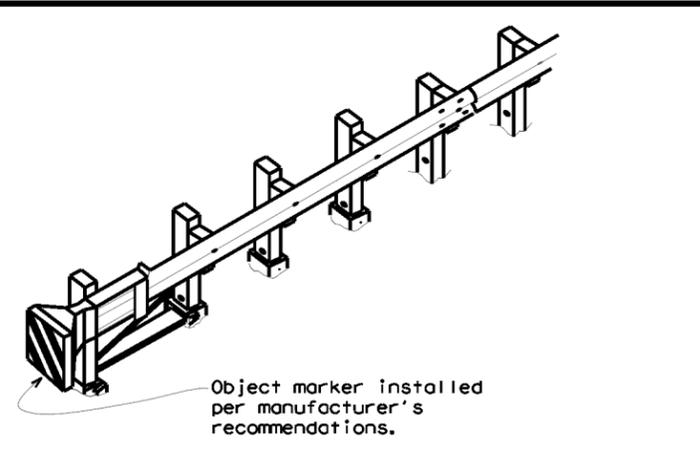
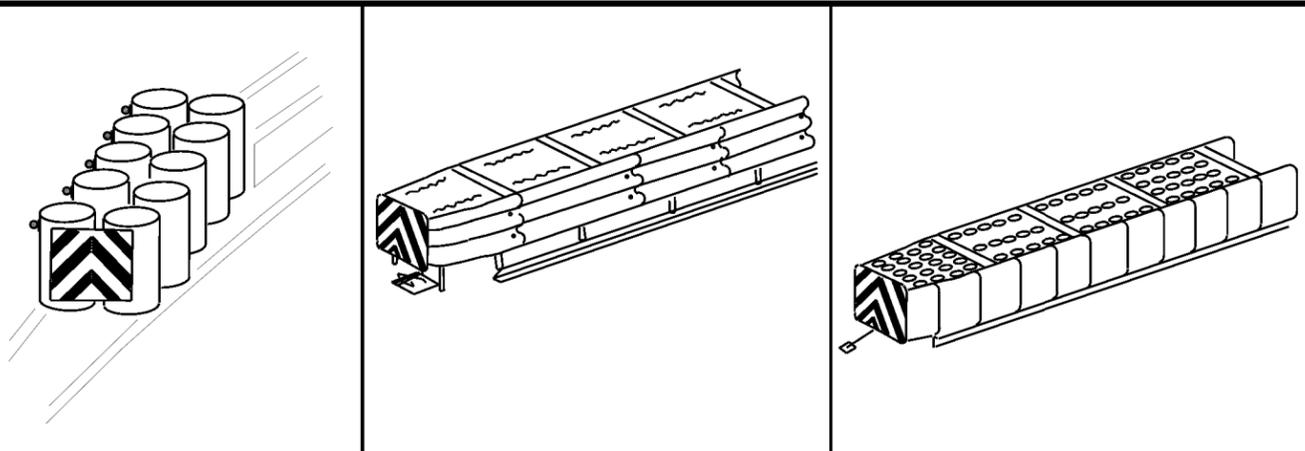
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

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REVISIONS	010104	131	US 181	
7-20	DIST	COUNTY	SHEET NO.	
	CRP SAN PATRICIO		116	

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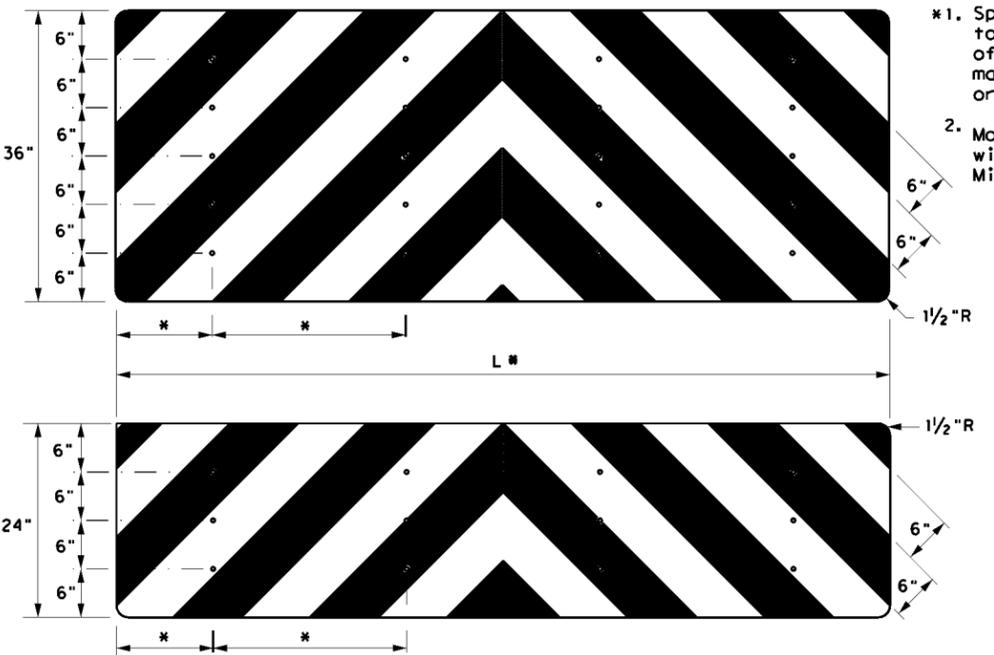
OBJECT MARKERS SMALLER THAN 3 FT²

NOTES

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

NOTES

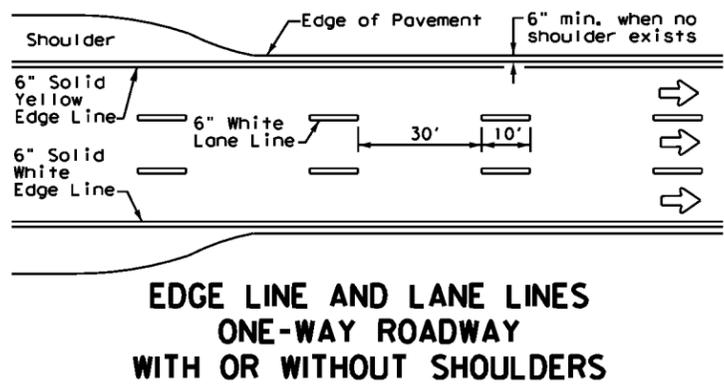
- Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturer's recommendation, or as directed by the Engineer.
- Mounting should be flush with top of attenuator. Minimum size 96" x 24".



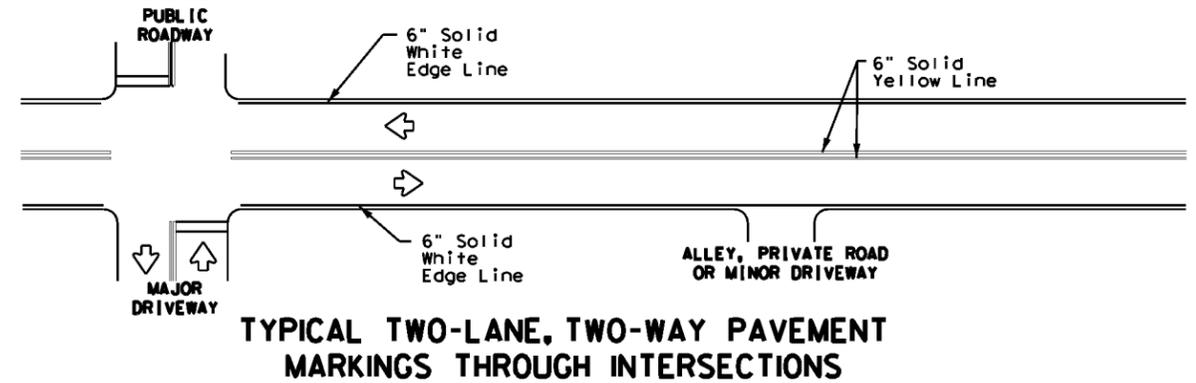
		Traffic Safety Division Standard	
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS D & OM(VIA) -20			
FILE: domv ia20.dgn	DNR TxDOT	CR: TxDOT	DNR TxDOT
© TxDOT December 1989	CONT	SECT	JOB
REVISIONS	010104	131	US 181
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	CRP	SAN PATRICIO	117
4-98 7-20			
206			

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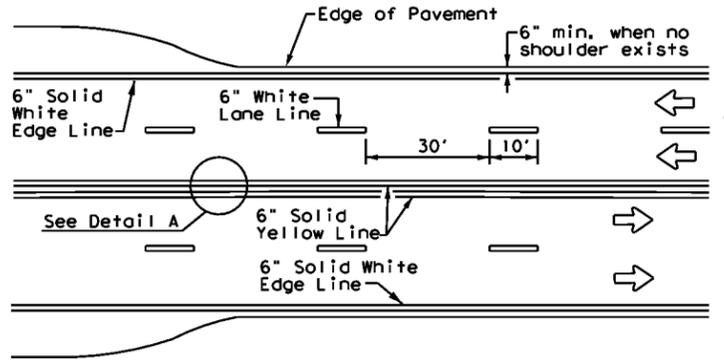
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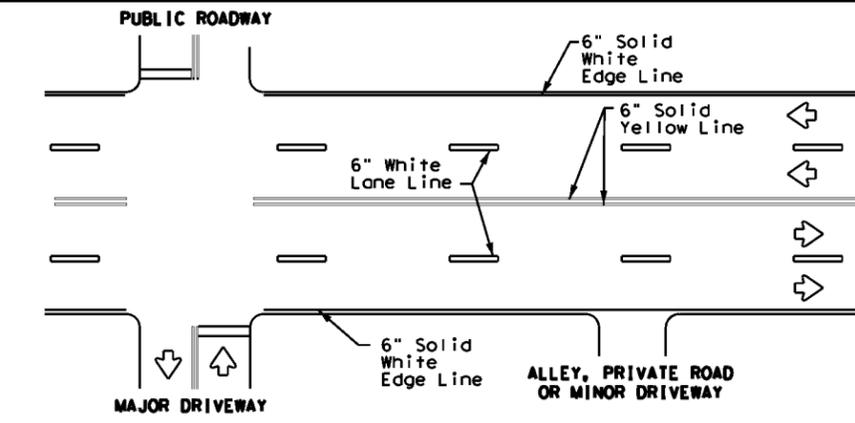
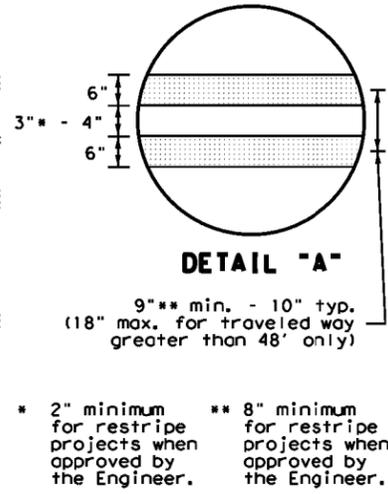
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



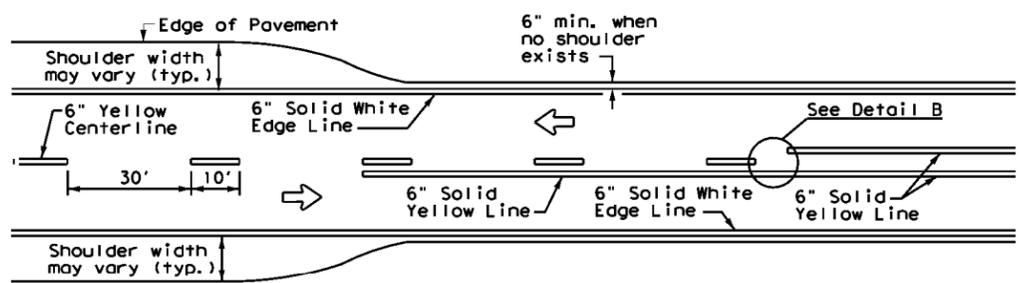
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



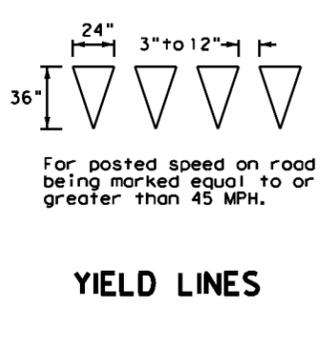
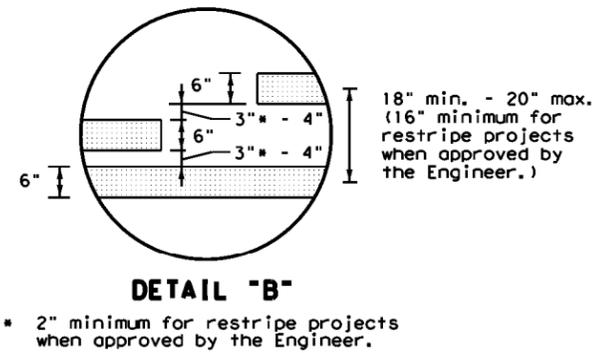
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



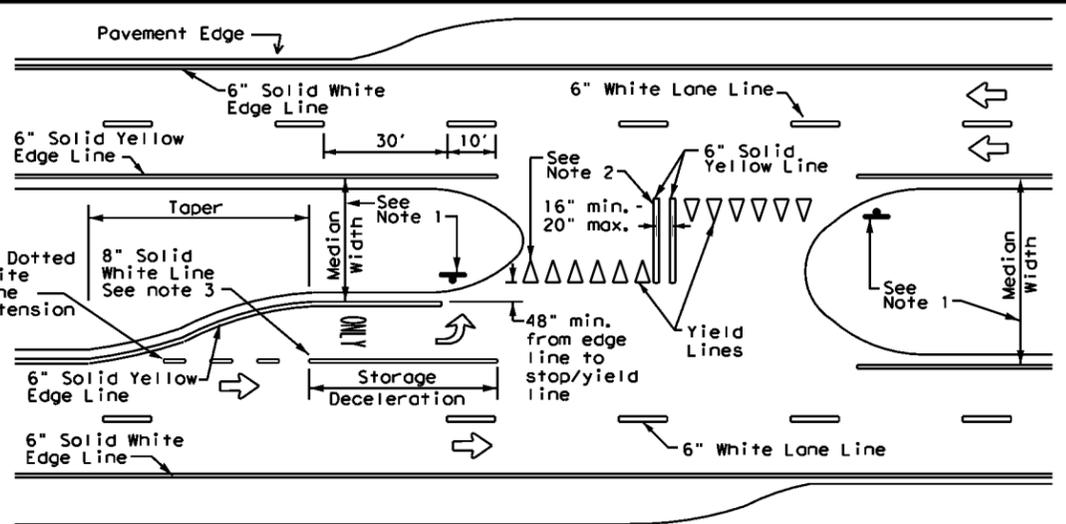
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



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



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

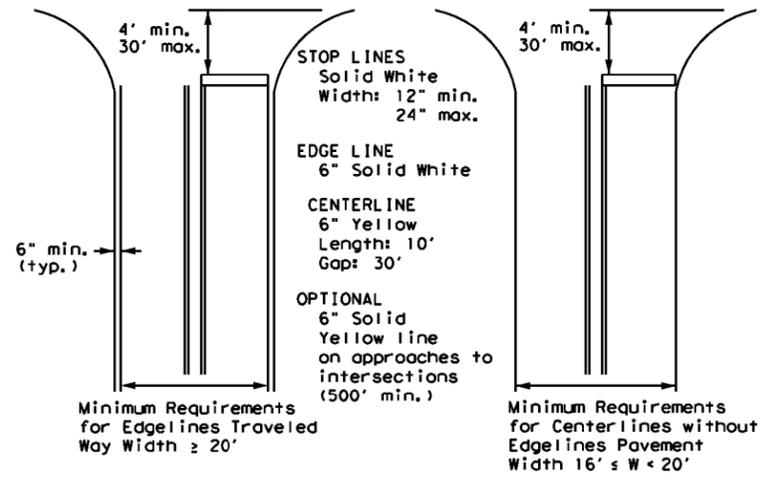
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

GENERAL NOTES

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

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

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



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

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

Texas Department of Transportation
 Traffic Safety Division Standard

**TYPICAL STANDARD
PAVEMENT MARKINGS**

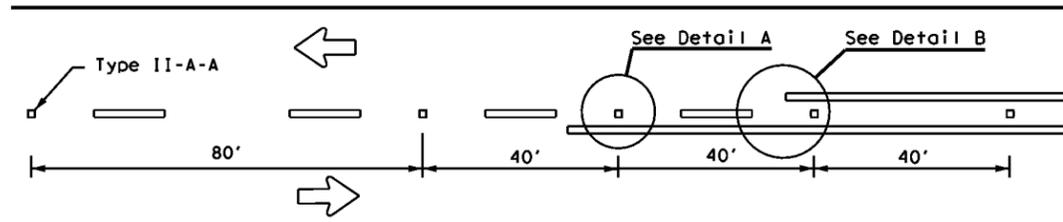
PM(1) - 22

FILE: pm1-22.dgn	DWG: CKS	CHK: DW	CKS
© TxDOT December 2022		CONT: 010104	SECT: 131
REVISIONS		JOB: HIGHWAY	
11-78	8-00	6-20	US 181
8-95	3-03	12-22	
5-00	2-12		
DIST: CRP SAN PATRICIO		COUNTY:	SHEET NO. 118

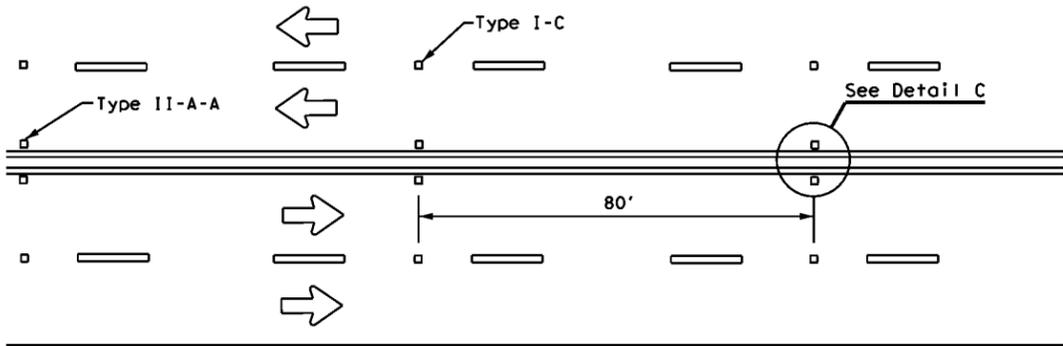
22A

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

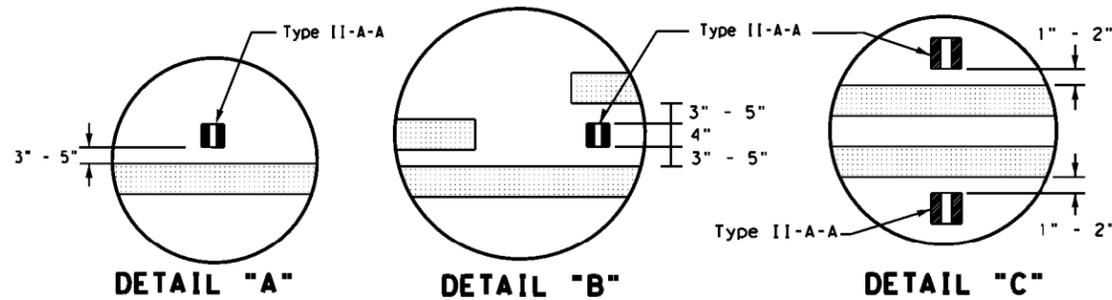
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



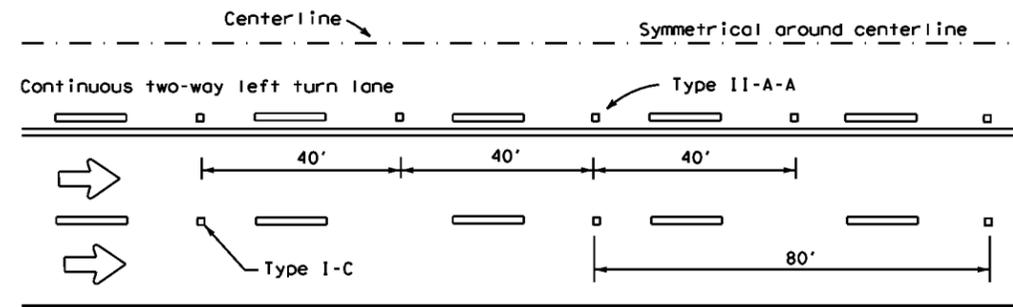
**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS**



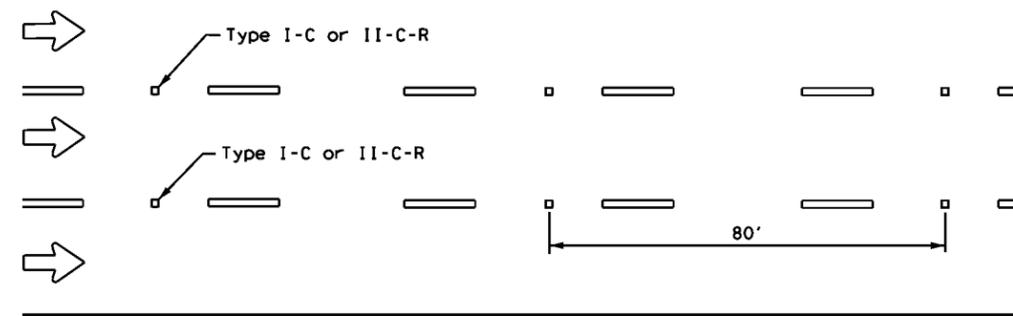
DETAIL "A"

DETAIL "B"

DETAIL "C"

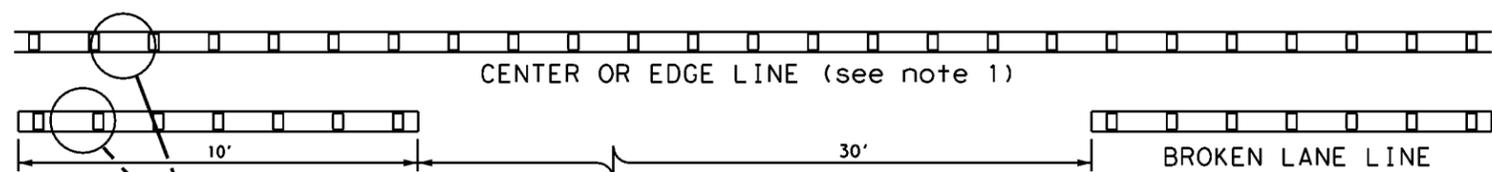


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



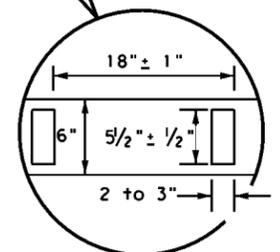
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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



CENTER OR EDGE LINE (see note 1)

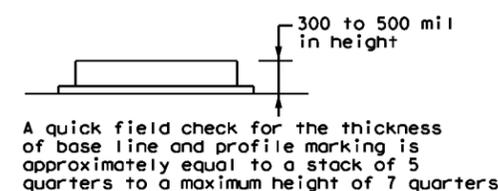
BROKEN LANE LINE



**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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



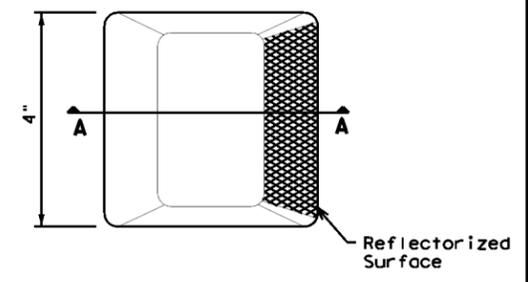
A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

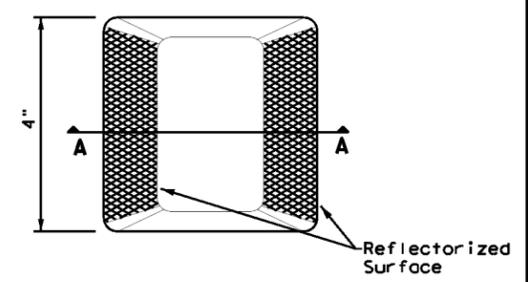
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

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

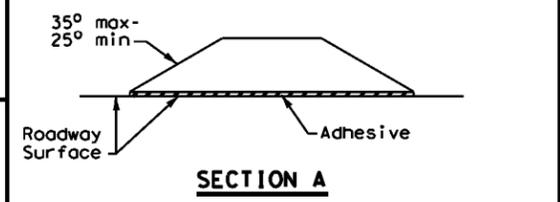
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



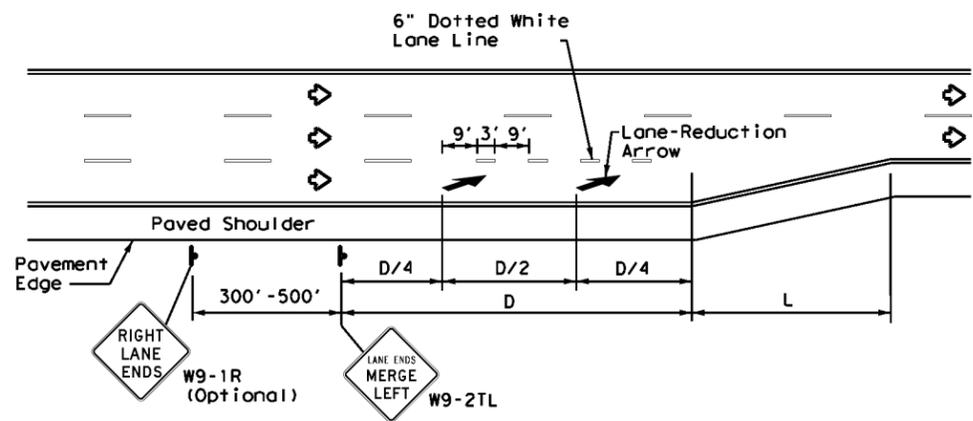
**POSITION GUIDANCE USING
RAISED MARKERS
REFLECTORIZED PROFILE
MARKINGS
PM(2) - 22**

FILE: pm2-22.dgn	DN: []	CK: []	DW: []	CK: []	
© TxDOT December 2022		CONT	SECT	JOB	HIGHWAY
REVISIONS		010104	131	US 181	
4-77	8-00	6-20			
4-92	2-10	12-22			
5-00	2-12				
CRP SAN PATRICIO			119		

DATE: 05/09/2023 09:33 AM
FILE: DOCUMENT NAME

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DATE: 05/09/2023 09:36 AM
FILE: DOCUMENT NAME



LANE REDUCTION

NOTES

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

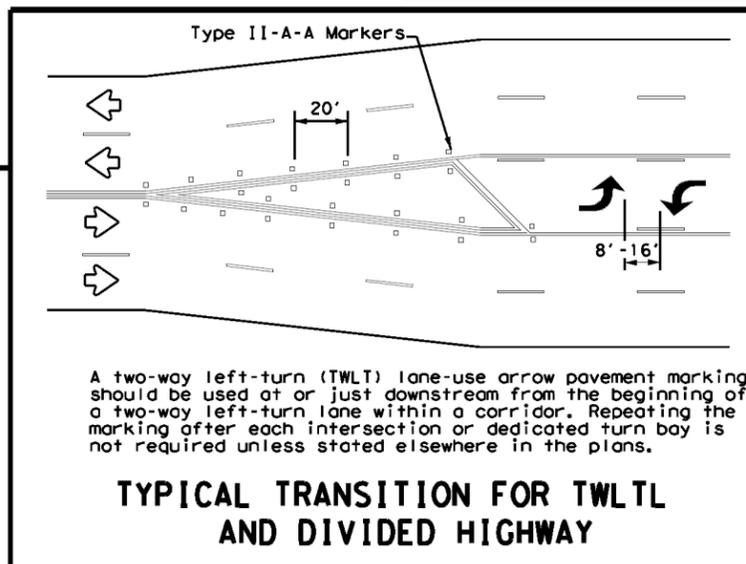
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	L=WS
45 MPH	775	
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

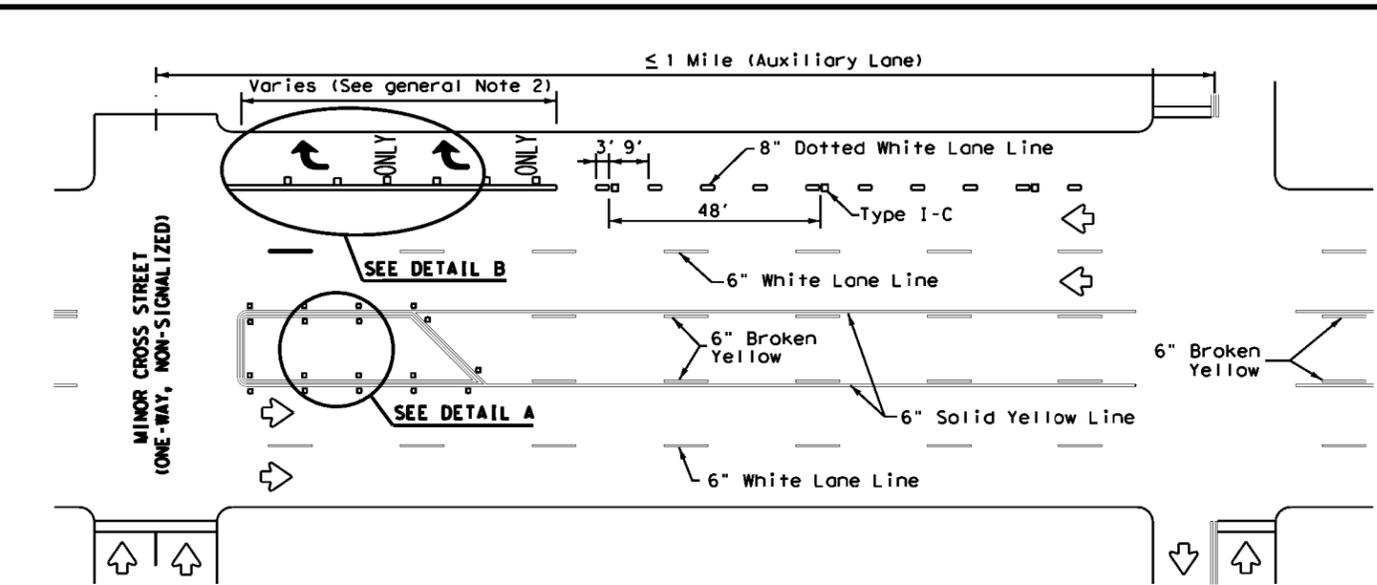
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

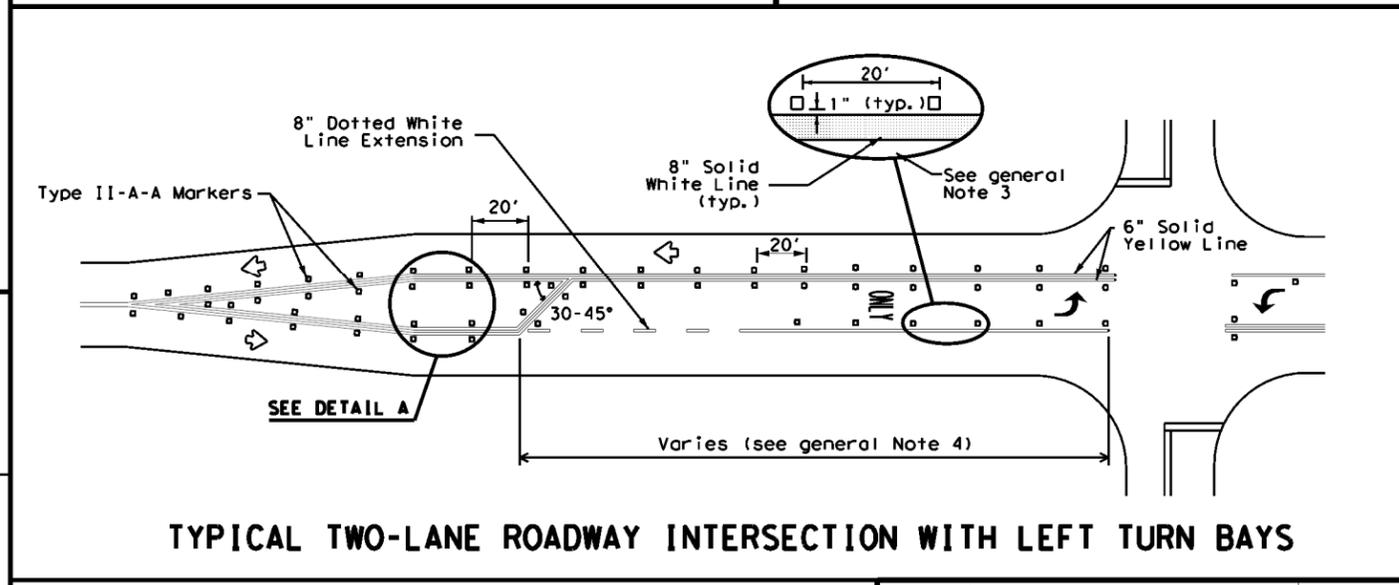
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



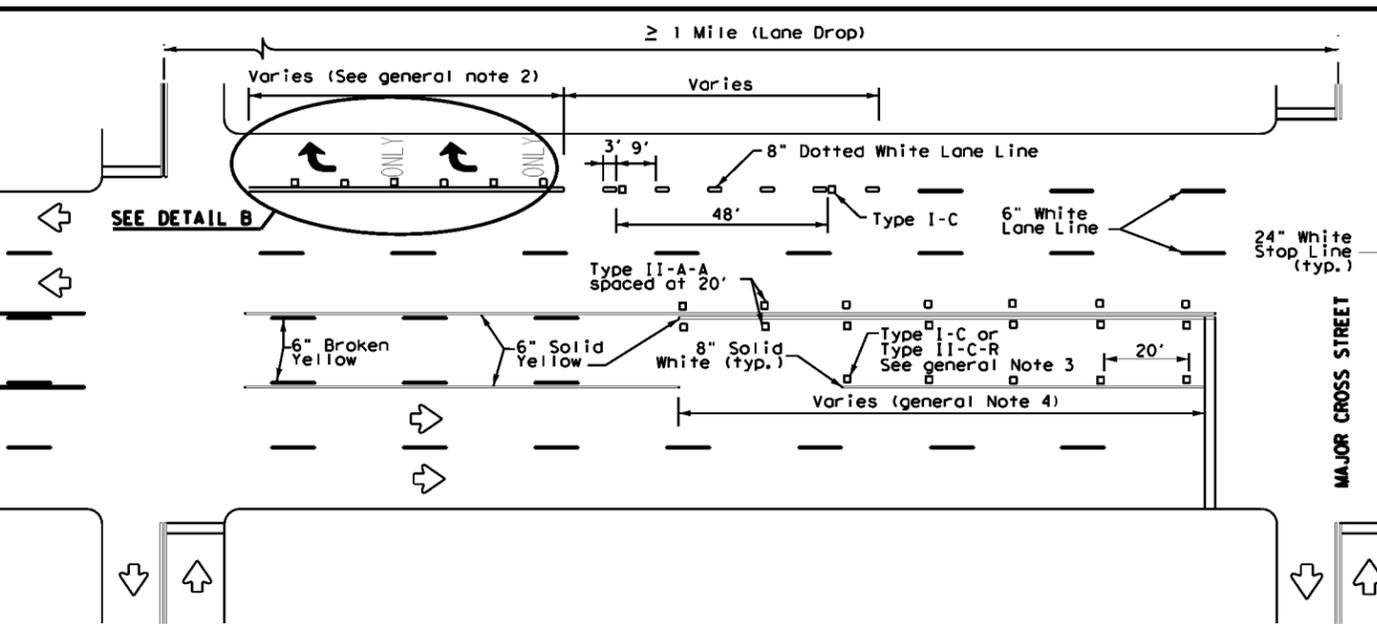
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



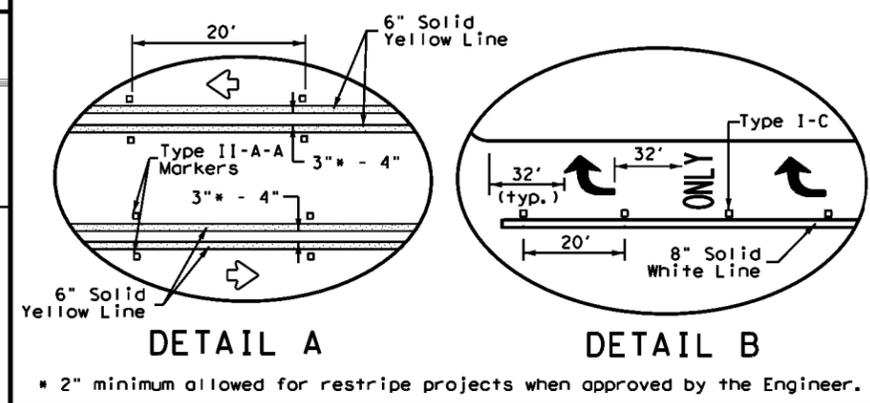
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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



DETAIL A

DETAIL B

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

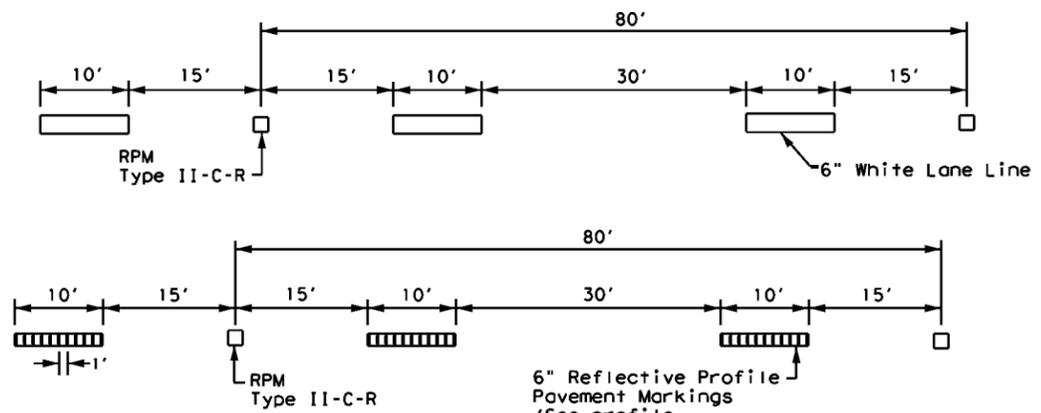
Texas Department of Transportation
Traffic Safety Division Standard

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

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	010104	131	US 181	
4-98 3-03 6-20	DIST	COUNTY	SHEET NO.	
5-00 2-10 12-22	CRP	SAN PATRICIO	120	
8-00 2-12				

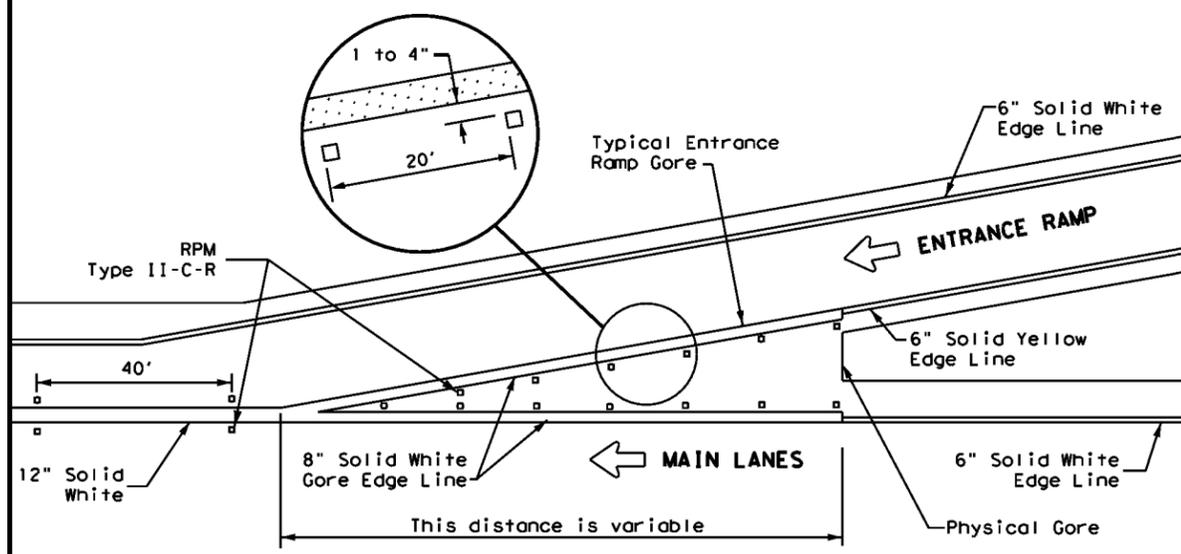
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DATE: 05/09/2023 09:38 AM
 FILE: DOCUMENT NAME



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

TRAFFIC LANE LINES PAVEMENT MARKING



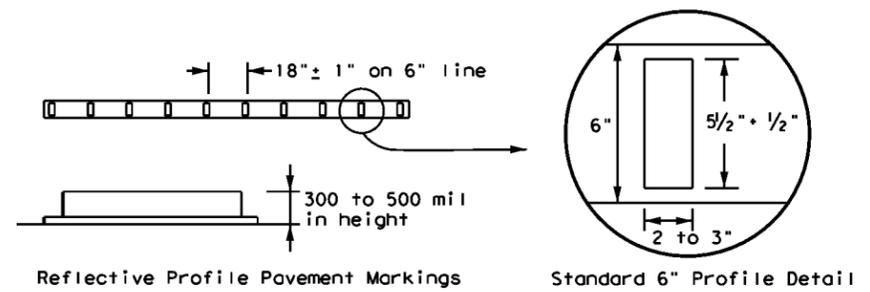
TYPICAL ENTRANCE RAMP GORE MARKING

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

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

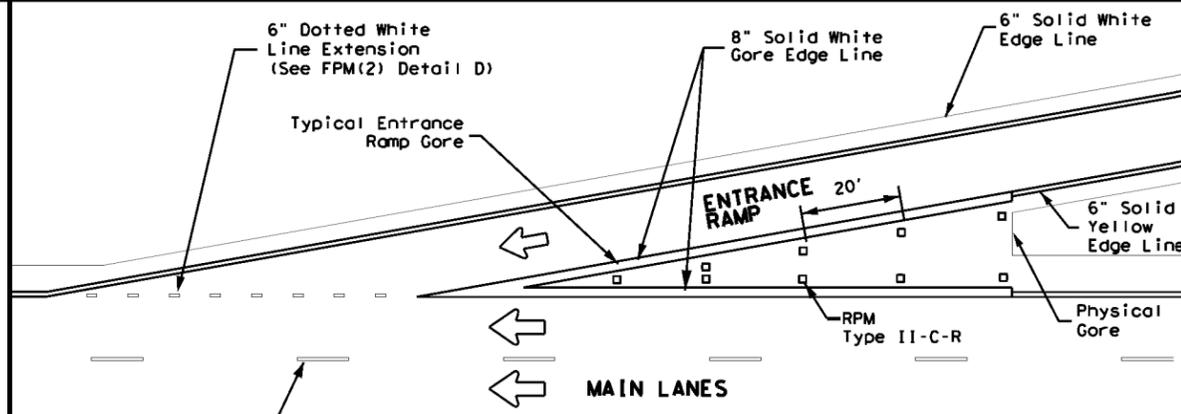
LEGEND	
	Traffic flow
	Pavement marking arrows (white)
	ReflectORIZED Raised Markers (RPM) Type II-C-R

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



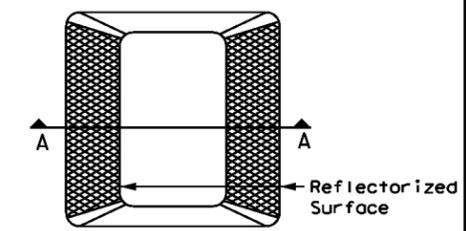
NOTE
 Edge lines should typically be 6" wide and the materials shall be as specified in the plans. See details above if reflective profile pavement markings are to be used.

EDGE LINE PAVEMENT MARKINGS

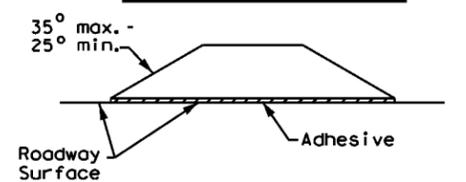


NOTE
 See the Roadway Design Manual Chapter 3 to determine if a tapered acceleration lane may be used.

TAPERED ACCELERATION LANE

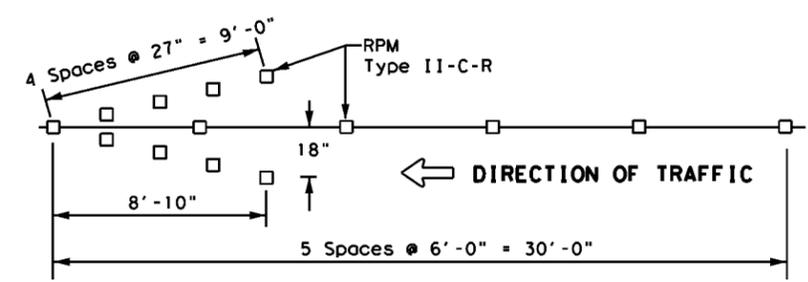


Type II (Top View)



SECTION A

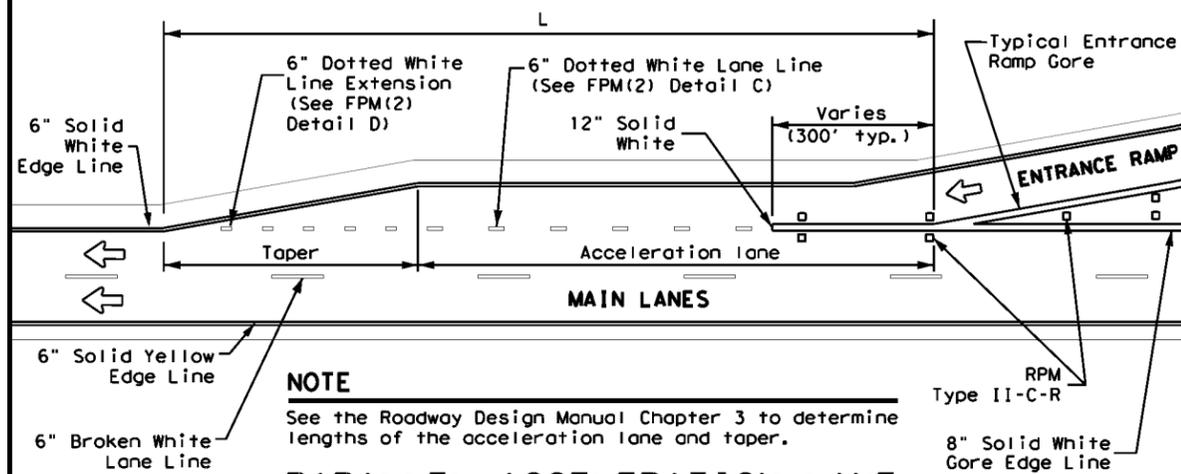
REFLECTORIZED RAISED PAVEMENT MARKER (RPM)



NOTES

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

WRONG WAY ARROW



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

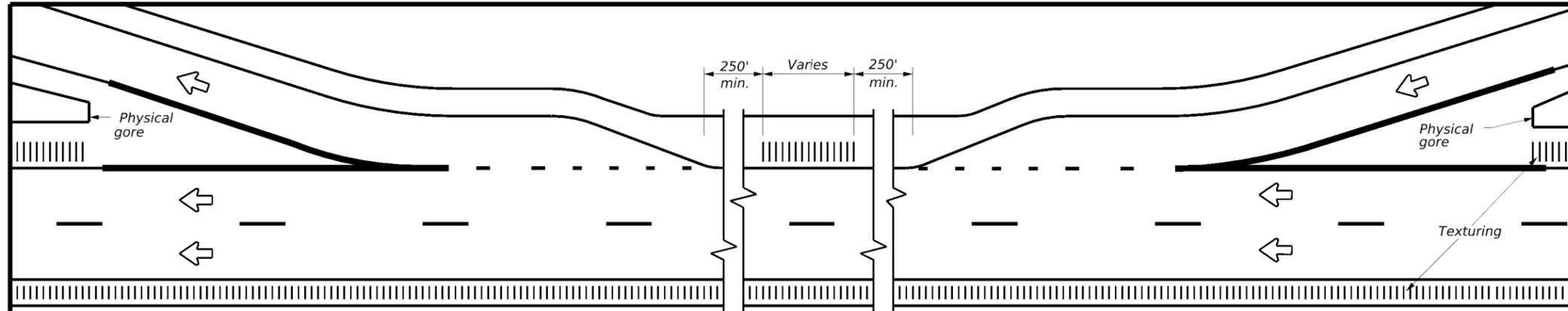
PARALLEL ACCELERATION LANE

Texas Department of Transportation
 Traffic Safety Division Standard

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

FILE: fpm(1)-22.dgn	DWG: CKS	DWG: CKS	CKS
© TxDOT October 2022	CONT: 010104	SECT: 131	JOB: US 181
REVISIONS	DIST: CRP	COUNTY: SAN PATRICIO	SHEET NO.: 121
5-74 8-00 2-12			
4-92 2-08 10-22			
5-00 2-10			

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TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS

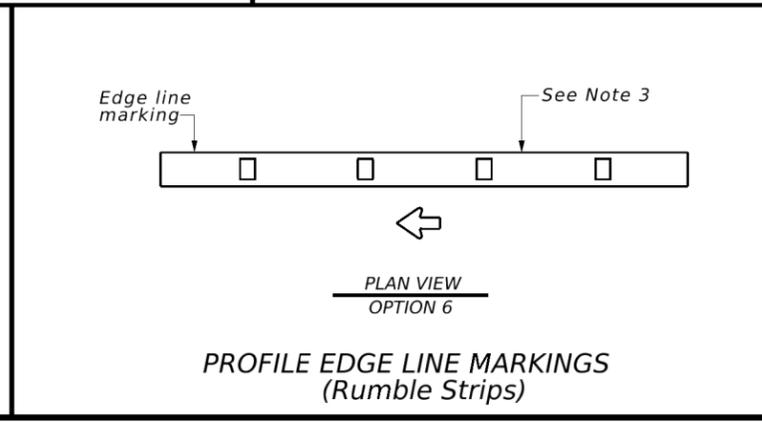
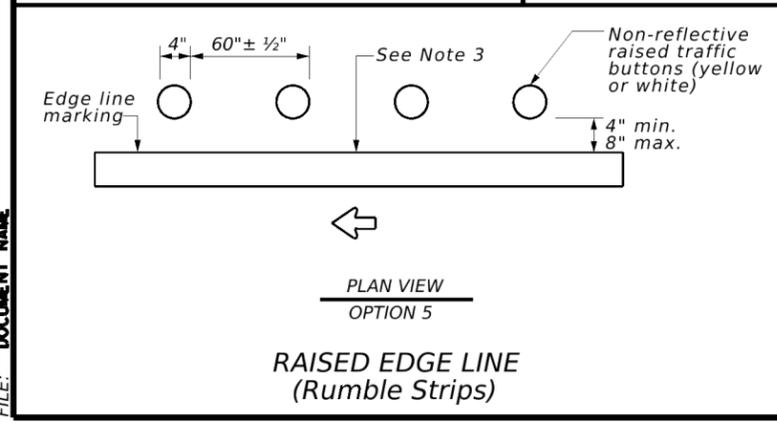
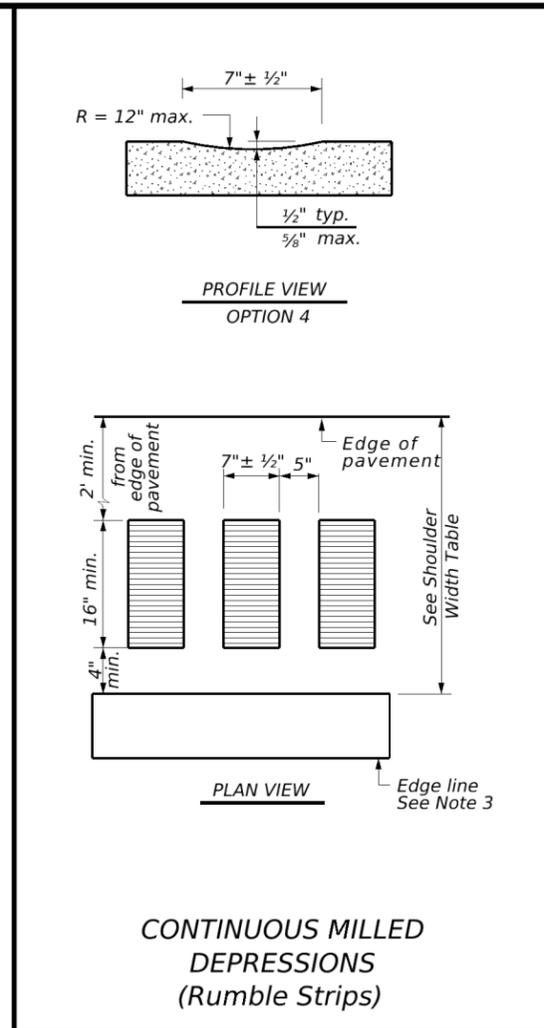
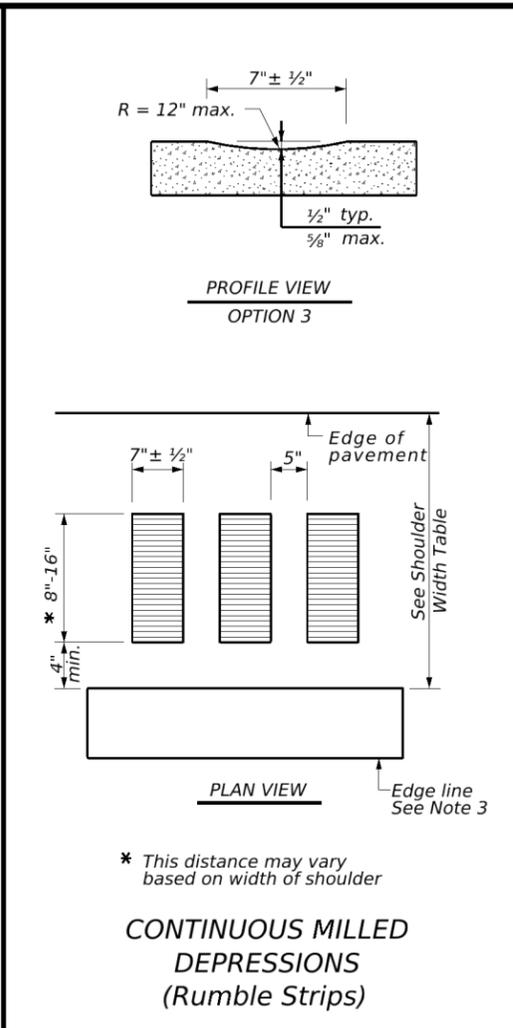
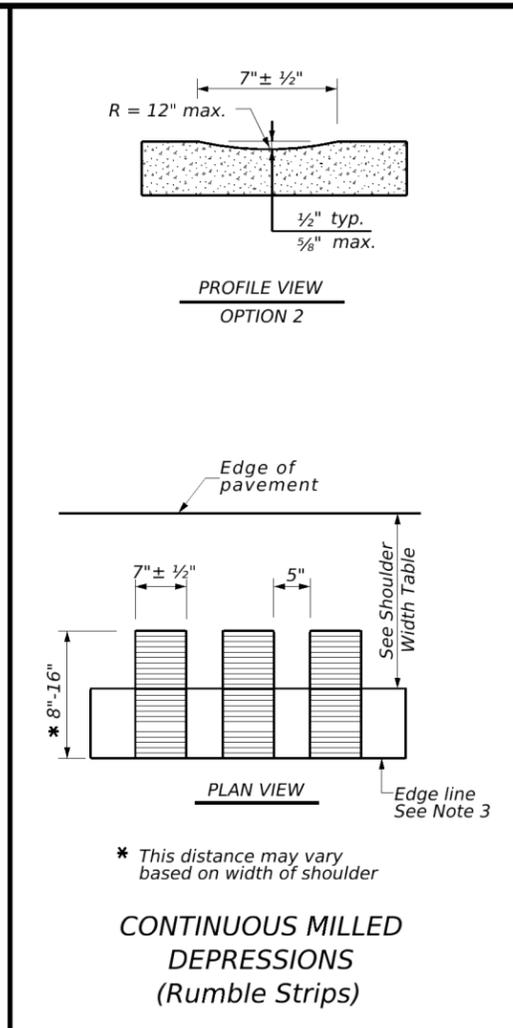
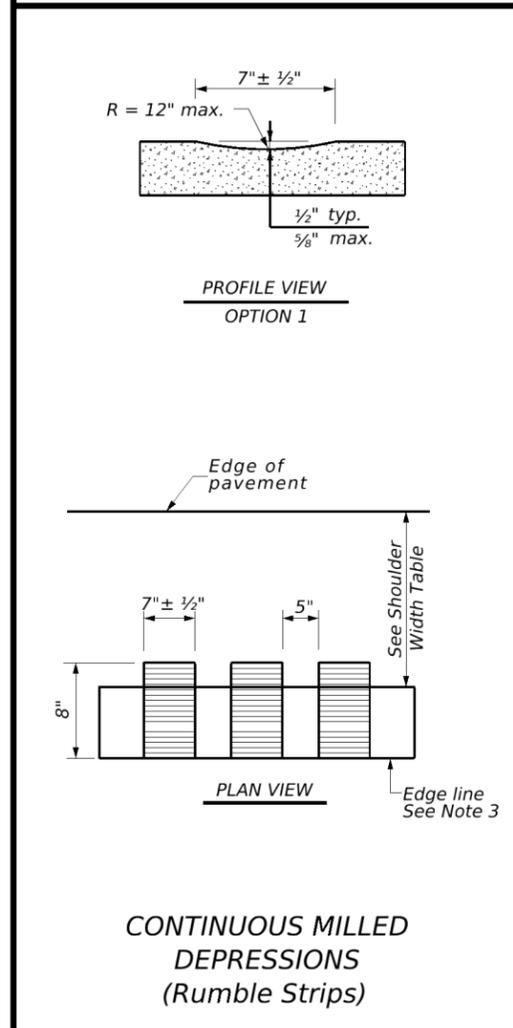
- GENERAL NOTES**
- Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
 - Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble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

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

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

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

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



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

Texas Department of Transportation

Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS RS(1)-23

FILE: rs(1)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	January 2023	CONT	SECT	JOB
REVISIONS	010104	131	US	181
4-06 1-23	DIST	COUNTY	SHEET NO.	
2-10	CRP	SAN PATRICIO	122	
10-13				

DATE: 05/09/2023 09:40 AM
 FILE: DOCUMENT NAME

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I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

This project is adjacent or parallel work, not within RR ROW:
 DOT No.: 746406W
 Crossing Type: at grade at CR 1207 (CR 77)
 RR Company Operating Track at Crossing: Union Pacific Railroad Company
 RR Company Owning Track at Crossing: Union Pacific Railroad Company
 RR MP: 9.850
 RR Subdivision: Kosmos Ind Ld
 City: Taft
 County: San Patricio
 CSJ at this Crossing: 0101-04-131
 Latitude: 27.9630487
 Longitude: -97.3687013

Scope of Work, including any TCP, to be performed by State Contractor:

The state's Contractor will be performing overlay operations on the main lanes of the highway parallel to the railroad tracks outside of railroad ROW. Traffic control may be implemented through railroad ROW at the county road cross street. No TCP channelizers will be within railroad ROW. RR flagging to be provided for the entire duration of TCP through railroad ROW.

Scope of Work to be performed by Railroad Company:

None. Advanced signs will be placed on county ROW in advance of railroad tracks outside of railroad ROW. No lane closures.

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1
 On this project, night or weekend flagging is:
 Expected
 Not Expected

Flagging services will be provided by:

Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
 Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

UPRR UP.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 UP.request@nrssinc.net
 Call Center 877-984-6777

BNSF BNSFinfo@railprosfs.com
 Call Center 877-315-0513, Select #1 for flagging

CPKCR KCS.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 Bottom Line On-Track Safety Services
 bottomline076@aol.com, 903-767-7630

OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

Required.
 Not Required
 Railroad Point of Contact: _____

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

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits	
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

Railroad Protective Liability Limits	
<input checked="" type="checkbox"/> Not Required	
<input type="checkbox"/> Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Structure Projects. Includes new construction or replacement of overpass/underpass structures	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

Not Required
 Required: UPRR Maintenance Consent Letter. TxDOT to assist
 Required: TxDOT to assist in obtaining the UPRR CROE
 Required: Contractor to obtain

- BNSF: _____
https://bnsf.railpermitting.com
- CPKCR
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- Other Railroads: _____

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-entry-agreements.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

In Case of Railroad Emergency
 Call: Union Pacific Railroad
 Railroad Emergency Line at: 800-848-8715
 Location: DOT #746406W
 RR Milepost: 9.850
 Subdivision: Kosmos Ind Ld

RRD Review Only
 Initials: [Signature]
 Date: 11/28/2023

Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
6/2023	0101	04	131	US 181
DIST		COUNTY		SHEET NO.
CRP		SAN PATRICIO		123

DISCLAIMER:
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I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

This project is adjacent or parallel work, not within RR ROW:
 DOT No.: 746408K
 Crossing Type: at grade at CR 1197 (Midway Rd)
 RR Company Operating Track at Crossing: Union Pacific Railroad Company
 RR Company Owning Track at Crossing: Union Pacific Railroad Company
 RR MP: 11.110
 RR Subdivision: Kosmos Ind Ld
 City: Gregory
 County: San Patricio
 CSJ at this Crossing: 0101-04-131
 Latitude: 27.9537617
 Longitude: -97.3509235

Scope of Work, including any TCP, to be performed by State Contractor:

The state's Contractor will be performing overlay operations on the main lanes of the highway parallel to the railroad tracks outside of railroad ROW. Traffic control may be implemented through railroad ROW at the county road cross street. No TCP channelizers will be within railroad ROW. RR flagging to be provided for the entire duration of TCP through railroad ROW.

Scope of Work to be performed by Railroad Company:

None. Advanced signs will be placed on County ROW in advance of railroad tracks outside of railroad ROW. No lane closures.

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

Expected
 Not Expected

Flagging services will be provided by:

Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
 Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

UPRR UP.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 UP.request@nrssinc.net
 Call Center 877-984-6777
 BNSF BNSFinfo@railprofs.com
 Call Center 877-315-0513, Select #1 for flagging
 CPKCR KCS.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 Bottom Line On-Track Safety Services
 bottomline076@aol.com, 903-767-7630

OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

Required.
 Not Required
 Railroad Point of Contact: _____

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

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits	
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

Railroad Protective Liability Limits	
<input checked="" type="checkbox"/> Not Required	
<input type="checkbox"/> Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Structure Projects. Includes new construction or replacement of overpass/underpass structures	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other:	_____

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

Not Required
 Required: UPRR Maintenance Consent Letter. TxDOT to assist
 Required: TxDOT to assist in obtaining the UPRR CROE
 Required: Contractor to obtain

- BNSF: _____
https://bnsf.railpermitting.com
- CPKCR
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- Other Railroads: _____

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-entry-agreements.html>

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VI. RAILROAD COORDINATION MEETING

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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

In Case of Railroad Emergency
 Call: Union Pacific Railroad
 Railroad Emergency Line at: 800-848-8715
 Location: DOT #746408K
 RR Milepost: 11.110
 Subdivision: Kosmos Ind Ld

RRD Review Only
 Initials: [Signature]
 Date: 11/28/2023

		Rail Division
RAILROAD SCOPE OF WORK PROJECT SPECIFIC DETAILS		
FILE: rr-scope-of-work.pdf	DN: TxDOT	CK: _____
© TxDOT June 2014	CONT	SECT
	0101	04
	JOB	
	131	
	HIGHWAY	
	US 181	
6/2023	DIST	COUNTY
	CRP	SAN PATRICIO
		SHEET NO.
		124

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I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

This project is adjacent or parallel work, not within RR ROW:
 DOT No.: 746410L
 Crossing Type: at grade at CR 1206 (CR 3667)
 RR Company Operating Track at Crossing: Union Pacific Railroad Company
 RR Company Owning Track at Crossing: Union Pacific Railroad Company
 RR MP: 12.240
 RR Subdivision: Kosmos Ind Ld
 City: Gregory
 County: San Patricio
 CSJ at this Crossing: 0101-04-131
 Latitude: 27.9452354
 Longitude: -97.3346059

Scope of Work, including any TCP, to be performed by State Contractor:

The state's Contractor will be performing overlay operations on the main lanes of the highway parallel to the railroad tracks outside of railroad ROW. Traffic control may be implemented through railroad ROW at the county road cross street. No TCP channelizers will be within railroad ROW. RR flagging to be provided for the entire duration of TCP through railroad ROW.

Scope of Work to be performed by Railroad Company:

None. Advanced signs will be placed on County ROW in advance of railroad tracks outside of railroad ROW. No lane closures.

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1

On this project, night or weekend flagging is:

Expected
 Not Expected

Flagging services will be provided by:

Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
 Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

UPRR UP.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 UP.request@nrssinc.net
 Call Center 877-984-6777

BNSF BNSFinfo@railprofs.com
 Call Center 877-315-0513, Select #1 for flagging

CPKCR KCS.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 Bottom Line On-Track Safety Services
 bottomline076@aol.com, 903-767-7630

OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

Required.
 Not Required
 Railroad Point of Contact: _____

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

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies and corresponding certificates of insurance must be issued by the contractor on behalf of the Railroad. Separate insurance policies and certificates are required when more than one Railroad Company is operating on the same right of way, or when several Railroad Companies are involved and operate on their own separate right of ways.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Escalated Limits	
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

Railroad Protective Liability Limits	
<input checked="" type="checkbox"/> Not Required	
<input type="checkbox"/> Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Structure Projects. Includes new construction or replacement of overpass/underpass structures	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other:	_____

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

Not Required
 Required: UPRR Maintenance Consent Letter. TxDOT to assist
 Required: TxDOT to assist in obtaining the UPRR CROE
 Required: Contractor to obtain

- BNSF: _____
https://bnsf.railpermitting.com
- CPKCR
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- Other Railroads: _____

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-entry-agreements.html>

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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

In Case of Railroad Emergency
 Call: Union Pacific Railroad
 Railroad Emergency Line at: 800-848-8715
 Location: DOT #746410L
 RR Milepost: 12.240
 Subdivision: Kosmos Ind Ld

RRD Review Only
 Initials: [Signature]
 Date: 11/28/2023



**RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS**

FILE: rr-scope-of-work.pdf	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
6/2023	0101	04	131	US 181
	DIST	COUNTY		SHEET NO.
	CRP	SAN PATRICIO		125

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I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

This project is adjacent or parallel work, not within RR ROW:
 DOT No.: 922511G
 Crossing Type: RR under US 181
 RR Company Operating Track at Crossing: Union Pacific Railroad Company
 RR Company Owning Track at Crossing: Union Pacific Railroad Company
 RR MP: 14.650
 RR Subdivision: Kosmos Ind Ld
 City: Gregory
 County: San Patricio
 CSJ at this Crossing: 0101-04-131
 Latitude: 27.9276298
 Longitude: -97.3009727

Scope of Work, including any TCP, to be performed by State Contractor:

The state's Contractor will be performing overlay operations on the approaches up to the structure that carries traffic above and over the railroad tracks within 140-170 feet of the railroad tracks. The Contractor will also be replacing railroad fencing attached to the overhead structure over the railroad tracks and within 20 - 60 feet overhead of the railroad tracks. Traffic control will be implemented through railroad ROW on the structure above the railroad tracks. RR flagging to be provided for the entire duration of TCP through railroad ROW.

Scope of Work to be performed by Railroad Company:

None.

II. FLAGGING & INSPECTION

No. of Days of Railroad Flagging Expected: 1
 On this project, night or weekend flagging is:
 Expected
 Not Expected

Flagging services will be provided by:

Railroad Company: 1) Txdot will pay flagging invoices. Flagging Agreement with railroad will be needed or, 2) Permitted crossing. Railroad company to provide flagging.
 Outside Party: Contractor will pay flagging invoices to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30-day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

UPRR UP.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 UP.request@nrssinc.net
 Call Center 877-984-6777

BNSF BNSFinfo@railprofs.com
 Call Center 877-315-0513, Select #1 for flagging

CPKCR KCS.info@railpros.com
 Call Center 877-315-0513, Select #1 for flagging
 Bottom Line On-Track Safety Services
 bottomline076@aol.com, 903-767-7630

OTHERS:

Contractor must incorporate railroad construction inspection into anticipated construction schedule.

Not Required
 Required. Contact Information for Construction Inspection:

III. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

Required.
 Not Required
 Railroad Point of Contact: _____

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.

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Escalated Limits	
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

Railroad Protective Liability Limits	
<input type="checkbox"/> Not Required	
<input checked="" type="checkbox"/> Non - Bridge/Typical Maintenance Projects. Includes repairs to overpass/underpass and culvert structures	\$2,000,000 / \$6,000,000
<input type="checkbox"/> Bridge Structure Projects. Includes new construction or replacement of overpass/underpass structures	\$5,000,000 / \$10,000,000
<input type="checkbox"/> Other: _____	

V. CONTRACTOR'S RIGHT OF ENTRY (CROE)

Not Required
 Required: UPRR Maintenance Consent Letter. TxDOT to assist
 Required: TxDOT to assist in obtaining the UPRR CROE
 Required: Contractor to obtain

- BNSF: _____
https://bnsf.railpermitting.com
- CPKCR
https://jllrpg.360works.com/fmi/webd/rpo_web_kcs.fmp12
- Other Railroads: _____

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-entry-agreements.html>

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In Case of Railroad Emergency
 Call: Union Pacific Railroad
 Railroad Emergency Line at: 800-848-8715
 Location: DOT #922511G
 RR Milepost: 14.650
 Subdivision: Kosmos Ind Ld

RRD Review Only
 Initials: [Signature]
 Date: 11/28/2023

Rail Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

FILE: rr-scope-of-work.pdf	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
6/2023	0101	04	131	US 181
DIST		COUNTY		SHEET NO.
CRP		SAN PATRICIO		125A

PART 1 - GENERAL

1.01 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, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

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

3.01 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 activities.
- 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 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:
 - 1. Exactly what the work entails.
 - 2. The days and hours that work will be performed.
 - 3. The exact location of work, and proximity to the tracks.
 - 4. The type of window requested and the amount of time requested.
 - 5. 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.

3.04 INSURANCE

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.

3.05 RAILROAD SAFETY ORIENTATION

- 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."
- B. 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.

3.07 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.

3.08 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.

		Rail Division	
RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS			
FILE:	DW: TxDOT	CK: TxDOT	DW: TxDOT
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REVISIONS March 2020	010104	131	US 181
	DIST	COUNTY	SHEET NO.
	CRP	SAN PATRICIO	126

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 Contractor'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:
 1. Pre-construction meetings.
 2. Pile driving/drilling of caissons or drilled shafts.
 3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
 4. Erection of precast concrete or steel bridge superstructure.
 5. 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. Include 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 of 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 TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the 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 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.



RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

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REVISIONS March 2020	010104	131	US	181
	DIST	COUNTY	SHEET NO.	
	CRP	SAN PATRICIO	127	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

0101-04-131

1.2 PROJECT LIMITS:

From: FM 631

To: FM 2986

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 27.9724075, (Long) -97.3858698

END: (Lat) 27.9279828, (Long) -97.3011093

1.4 TOTAL PROJECT AREA (Acres): 48

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0

1.6 NATURE OF CONSTRUCTION ACTIVITY:

For the Overlay of Existing Divided Highway consisting of Planning, Underseal, Overlay and Pavement Markings

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Victoria clay 0 to 1 percent slopes	Well drained, Medium runoff
Victoria clay 0 to 1 percent slopes, low	Somewhat poorly drained, Medium runoff
Raymondville clay loam, 0 to 1 percent slopes	Moderately well drained, Medium runoff
Calallen sandy clay loam, 0 to 1 percent slopes	Well drained, Negligible runoff
Papalote fine sandy loam, 0 to 1 percent slopes	Moderately well drained, Medium runoff
Banquete clay, 0 to 1 percent slopes	Moderately well drained, Negligible runoff

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

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

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

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

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

Other: _____
 Other: _____
 Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

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

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
No Tributaries	Nueces Bay (2482), Impaired Copper

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- Development of plans and specifications
- Perform SWP3 inspections
- Maintain SWP3 records and update to reflect daily operations
- Other: _____
- Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- Day To Day Operational Control
- Maintain schedule of major construction activities
- Install, maintain and modify BMPs
- Other: _____
- Other: _____



E. Martinez, P.E.

11/27/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)



Sheet 1 of 2

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
	0101-04-131			128
STATE	STATE DIST.	COUNTY		
TEXAS	CRP	SAN PATRICIO		
CONT.	SECT.	JOB	HIGHWAY NO.	
0101	04	131	US 181	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

Other: _____

Other: _____

Other: _____

2.5 POLLUTION PREVENTION MEASURES:

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

Other: _____

Other: _____

Other: _____

2.6 VEGETATED BUFFER ZONES:

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

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.



E. Martinez

11/27/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)



Sheet 2 of 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	0101-04-131		129
STATE	STATE DIST.	COUNTY	
TEXAS	CRP	SAN PATRICIO	
CONT.	SECT.	JOB	HIGHWAY NO.
0101	04	131	US 181

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DATE: FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.
2.
 No Action Required Required Action

Action No.

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

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

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

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

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

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

1.
2.
3.
4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

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

- No Action Required Required Action
Action No.

IV. VEGETATION RESOURCES

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

- No Action Required Required Action
Action No.

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

- No Action Required Required Action

The Federal Migratory Bird Treaty Act (MBTA) states that it is unlawful to pursue, hunt, take, kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit. This project does not have a federal permit; therefore, in accordance with this regulation, the Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, etc. Typical breeding season occurs from March through August; therefore, tree trimming and other vegetation clearing activities that may disturb breeding birds should be done in the non-breeding season (September-February), when possible. If work must be performed during the breeding season, the Contractor shall have a qualified biologist conduct a survey of the right of way to determine if bird nests are present. In the event that active nests are encountered on-site during construction, the Contractor shall notify the Engineer and measures shall be taken to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the MBTA. Phasing of work during construction may be necessary to stay in compliance with the MBTA. The Contractor can discuss other preventative measures with the Project Engineer and/or District Environmental Staff.

Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season. Avoid the removal of unoccupied, inactive nests, as practicable. Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair. Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

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

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

- Yes No

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

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

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

- Yes No

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

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

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

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

- No Action Required Required Action

Action No.

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

- No Action Required Required Action

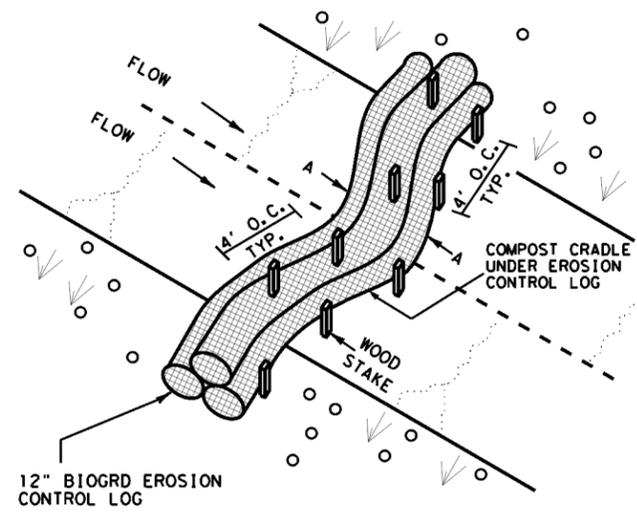
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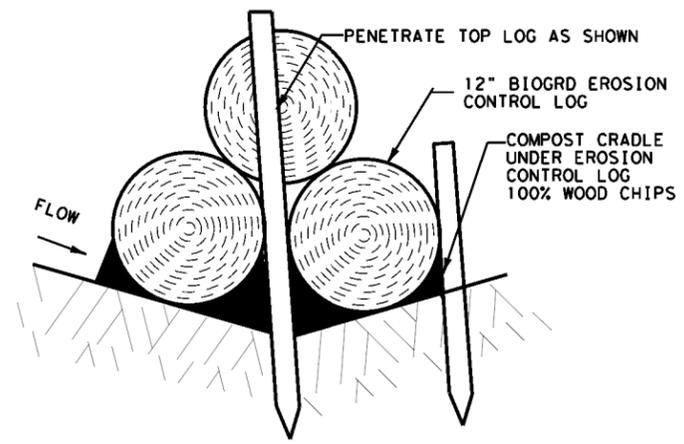
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ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS			
EPIC			
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12-12-2011 (DS) REVISIONS	010104	JOB	US 181
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY	SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	CRP	SAN PATRICIO	130

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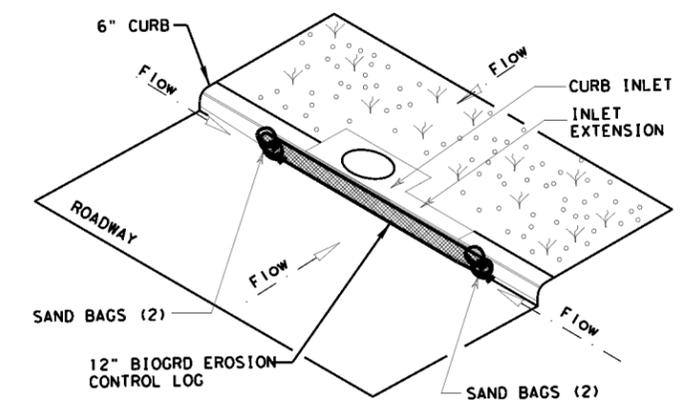
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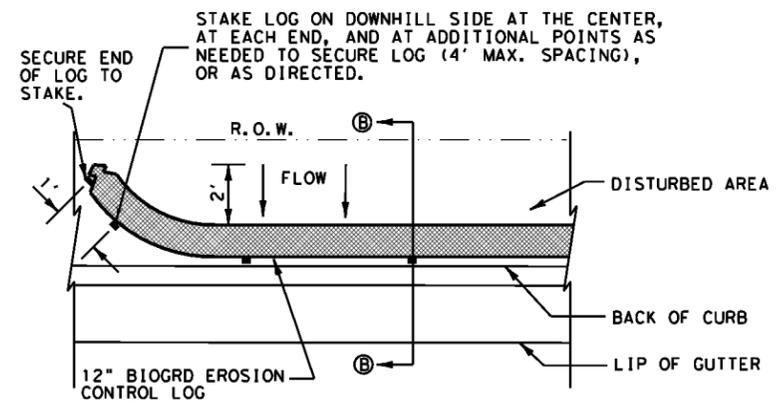
DITCH LINE SEDIMENT TRAP
NTS



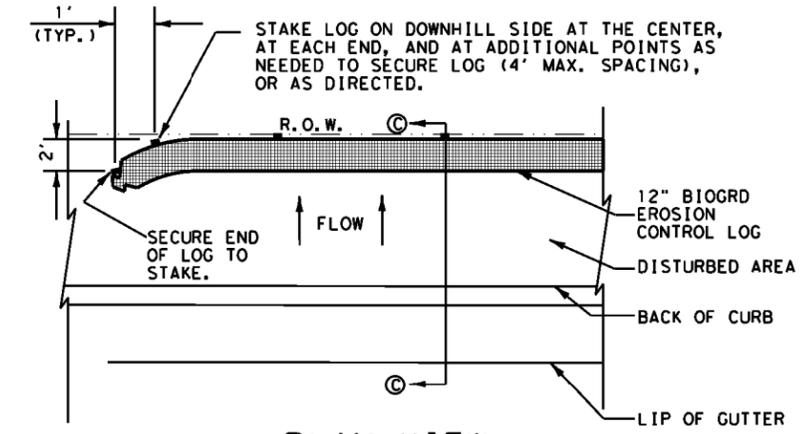
DITCH LINE SEDIMENT TRAP A-A
NTS



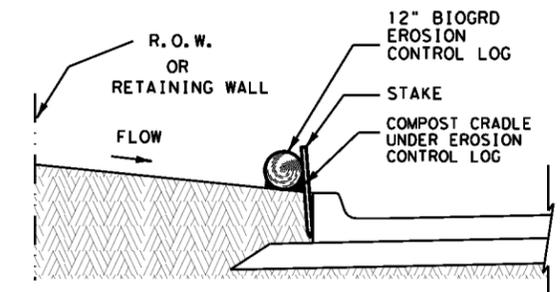
CURB INLET SEDIMENT TRAP
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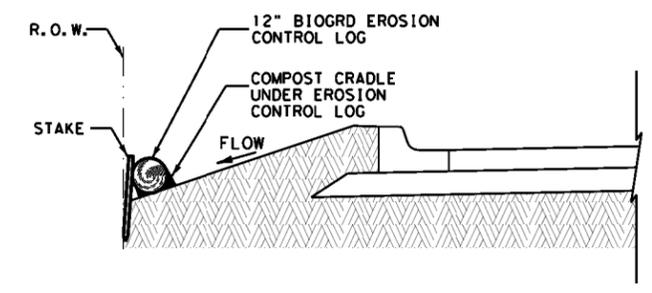
PLAN VIEW
NTS



PLAN VIEW
NTS



SECTION B-B
BACK OF CURB SEDIMENT TRAP
NTS



SECTION C-C
RIGHT-OF-WAY SEDIMENT TRAP
NTS

SEDIMENT TRAP USAGE GUIDELINES

A sediment trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1,800 CF/Acre (0.5" over the drainage area).

Sediment traps should be placed in the following locations:

1. Immediately preceding drain inlets
2. Just before the drainage enters a water course
3. Just before the drainage leaves the Right Of Way
4. Just before the drainage leaves the construction limits where drainage flows away from the project

The trap should be cleaned when the capacity has been reduced by half or the sediment has accumulated to a depth of 1', whichever is less. Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

GENERAL NOTES

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" x 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. COMPOST CRADLE MATERIAL IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.
6. SANDBAGS SHALL BE SUBSIDIARY TO ITEM 506 BIODEGRADABLE EROSION CONTROL LOGS.

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Texas Department of Transportation
BIODEGRADABLE EROSION CONTROL LOGS

CRP-BECL

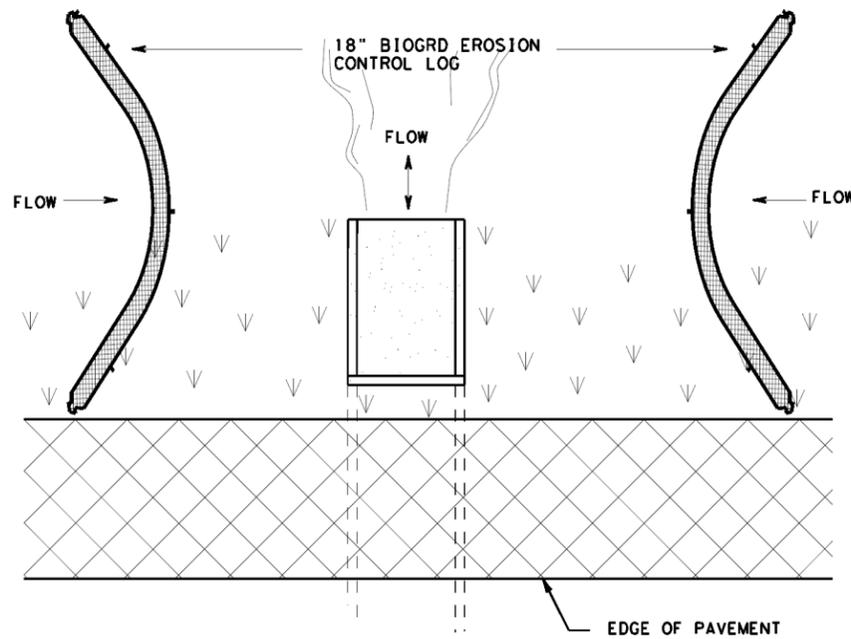
CORPUS CHRISTI DISTRICT STANDARD				SHEET 1 OF 2	
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ORIG DATE:	MAY 2008	DIST:	FED REG	CK:	PWS
REVISIONS:		FEDERAL AID PROJECT:	*	SHEET:	131
	CRP	6			
	COUNTY:	CONTROL:	SECT:	JOB:	HIGHWAY:
	SAN PATRICIO	0101	04	131	US 181

LEVELS DISPLAYED
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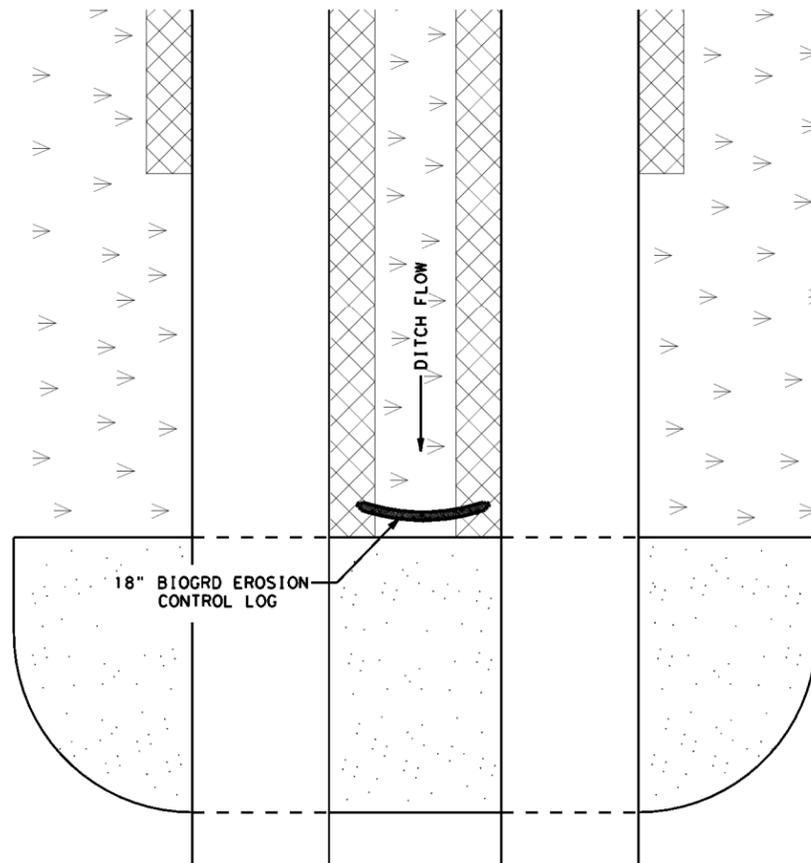
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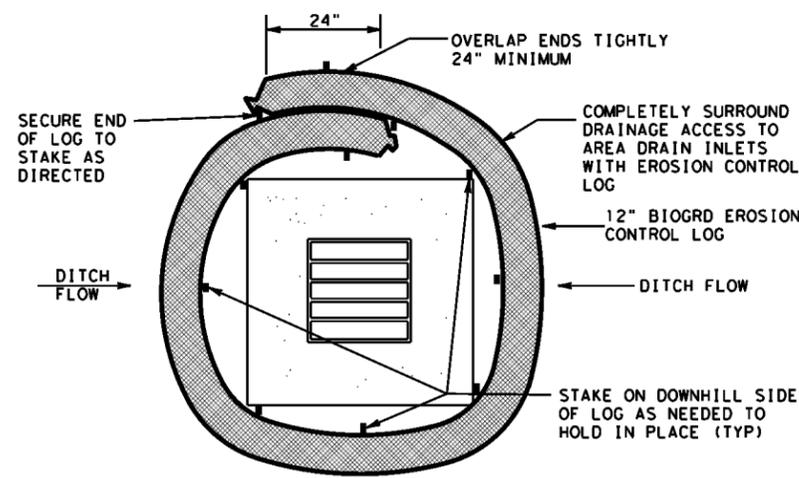
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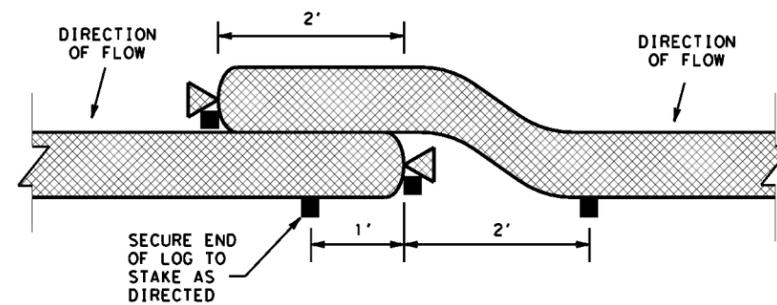
AT CULVERT ENDS
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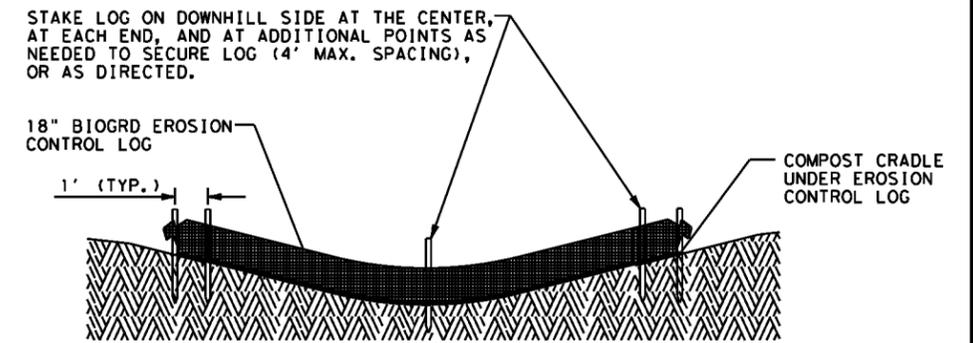
AT BRIDGE MEDIAN
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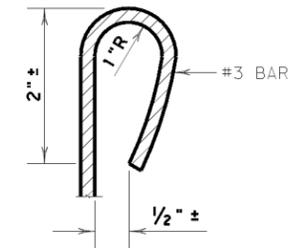
AT DROP INLETS
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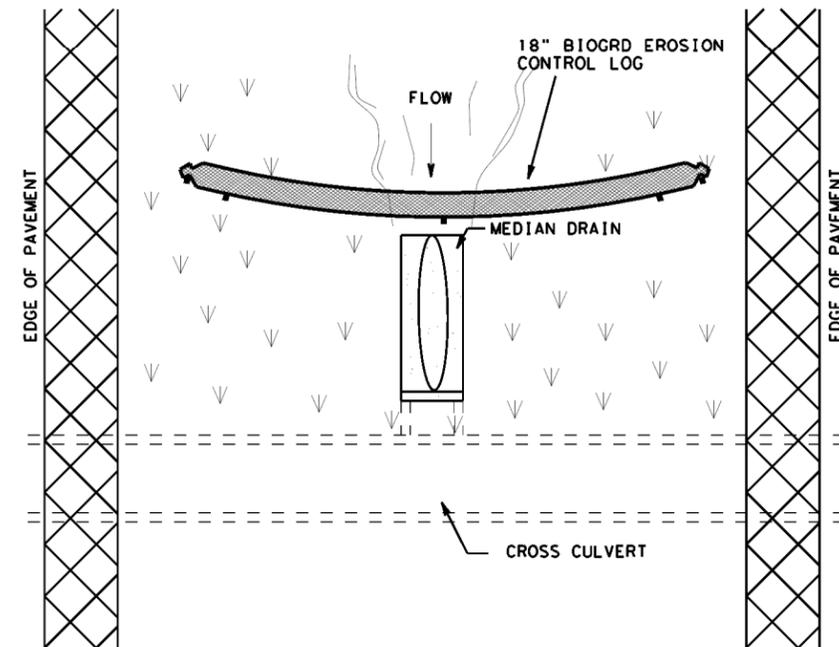
LAP DETAIL
NTS



EROSION CONTROL LOG ELEVATION
NTS



REBAR STAKE DETAIL
NTS



AT MEDIAN DRAINS
NTS

LEGEND



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BIODEGRADABLE EROSION CONTROL LOGS

CRP-BECL

CORPUS CHRISTI DISTRICT STANDARD SHEET 2 OF 2

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ORIG DATE:	MAY 2008	DIST:	FED REG	FEDERAL AID PROJECT:	+	SHEET			
REVISIONS:		CRP:	6			132			
COUNTY:	SAN PATRICIO	CONTROL SECT:	0101	JOB:	04	131	US:	181	