

CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		1

DESIGN SPEED:
Mainlane: N/A

A.D.T.:
2022:6,290 VPD (US77) 9,191 VPD (SH21)
2042:8,806 VPD (US77) 12,316 VPD(SH21)

FINAL PLANS

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

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

P.E. DATE

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NUMBER
BR 2024(835)

CSJ 0211-04-027, ETC

US 77, ETC.

LEE COUNTY

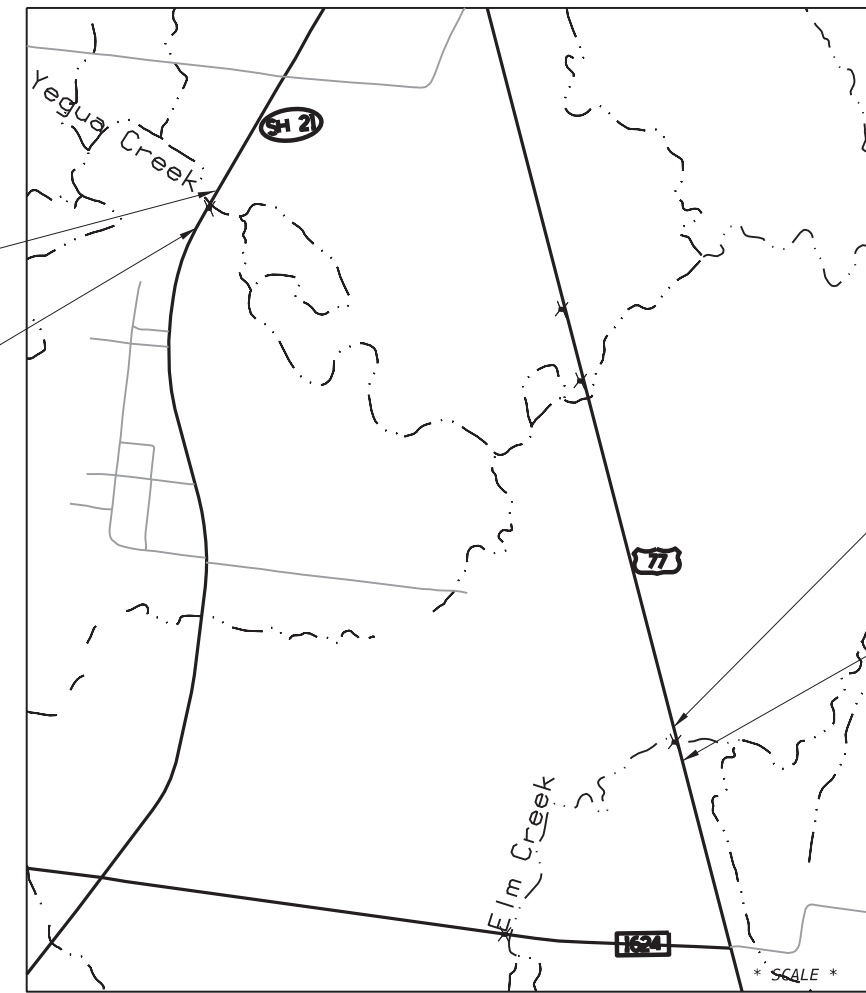
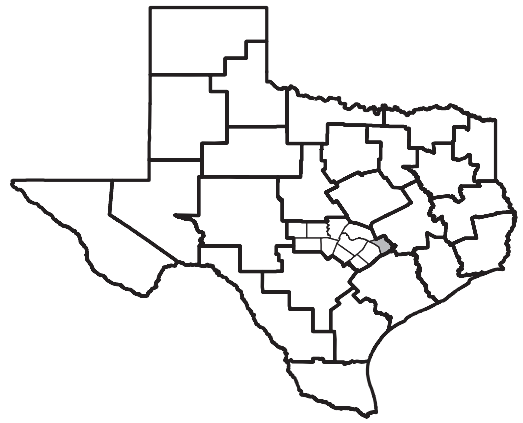
NET LENGTH OF PROJECT = 5,825.00 FEET = 1.103 MILES
ROADWAY = 5,403.00 FEET = 1.023 MILES
BRIDGE = 422.00 FEET = 0.080 MILES

CSJ	ROADWAY LENGTH		BRIDGE LENGTH		TOTAL LENGTH	
	(FT)	(MI)	(FT)	(MI)	(FT)	(MI)
0211-04-027	2,836.00	0.537	142.00	0.027	2,978.00	0.564
0473-02-042	2,567.00	0.486	280.00	0.053	2,847.00	0.539
TOTAL	5,403.00	1.023	422.00	0.080	5,825.00	1.103

LIMITS: AT ELM CREEK TO- (CCSJ 0211-04-027), AT WEST YEGUA CREEK TO-(CSJ 0473-02-042)

FOR THE CONSTRUCTION OF BRIDGE MAINTENANCE

CONSISTING OF BRIDGE MAINTENANCE LOCATION 6.5 MI N OF US 290 (CCSJ 0211-04-027), 0.9 MI W OF US 77 (CSJ 0473-02-042)



BEGIN PROJECT
CSJ 0473-02-042
MILE PT 9.099

END PROJECT
CSJ 0473-02-042
MILE PT 9.102

BEGIN PROJECT
CCSJ 0211-04-027
MILE PT 19.36

END WORK
CCSJ 0211-04-027
MILE PT 19.386

NOT TO SCALE

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE



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SUBMITTED FOR LETTING: 1/24/2024

DocuSigned by:
Diana K. Schulzes P.E.
6775445255A3482...

RECOMMENDED FOR LETTING: 1/24/2024

DocuSigned by:
Suzana Ceballos P.E.
E1816167B5C7414...
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 1/25/2024

DocuSigned by:
Heather Kelly-Ng
8912A19E18A416...
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

DATE: 1/9/2024 9:33:52 AM FILE: p:\dot\projectwiseonline.com\TXDOT4\Documents\14 - AUS\Design Projects\021104027\4 - Design\Plan Set\1 - General\US77 - TITLE SHEET.dgn

PLAN FILES WERE SENT TO LOCAL FLOODPLAIN ADMINISTRATOR DALE BOLT ON DECEMBER 8, 2023

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

CK: DW: CK: DW: CK: DW:

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ENVIRONMENTAL ISSUES STANDARDS

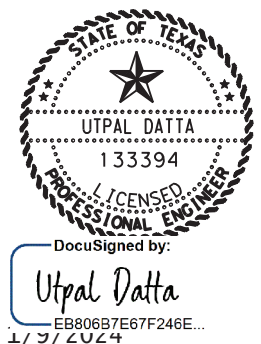
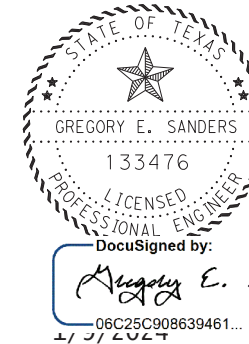
- >> 93 EC(1)-16
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>> THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY DocuSigned by: SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

Utpal Datta PE 1/9/2024
EB806B7E67F246E...
UTPAL DATTA, PE DATE

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY DocuSigned by: ON AND ARE APPLICABLE TO THIS PROJECT.

Gregory E. Sanders 1/9/2024
06C25C908639461...
GREGORY E. SANDERS, PE DATE



Austin District
Portfolio Production Group

Texas Department of Transportation

US77, ETC.
INDEX OF SHEETS

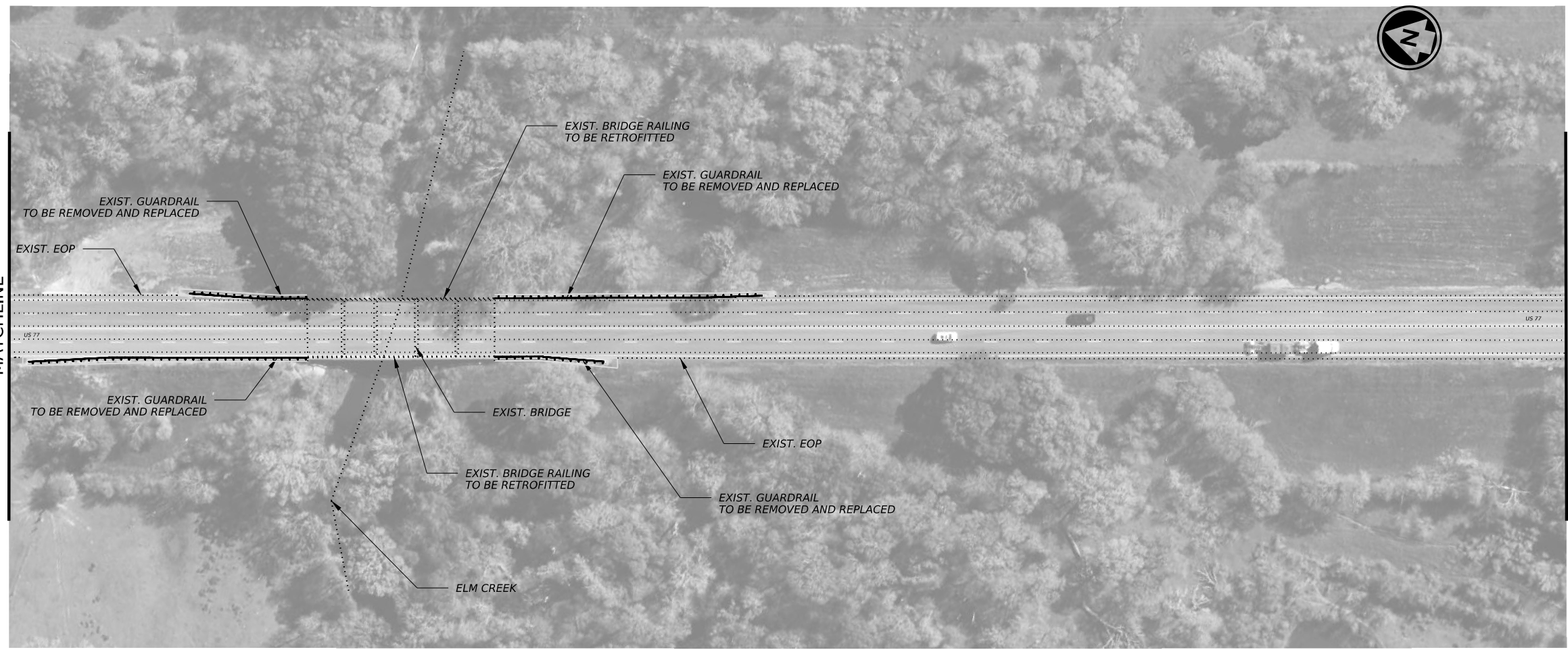
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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST		COUNTY	SHEET NO.
AUS		LEE	2

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NOTE:
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NO SURVEY AND ALIGNMENT INFORMATION
AVAILABLE. LINEWORKS BASED ON BING MAP
IMAGE.



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Utpal Datta
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12/8/2023

STATE OF TEXAS
UTPAL DATTA
133394
LICENSED
PROFESSIONAL ENGINEER

0 50 100
SCALE IN FEET

Austin District
Portfolio Production Group

Texas Department of Transportation

US77, ETC.
US 77
CSJ 0211-04-027
PROJECT LAYOUT

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST		COUNTY	SHEET NO.
AUS		LEE	3

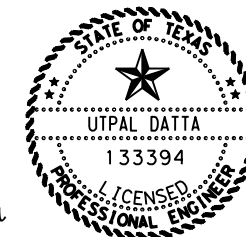
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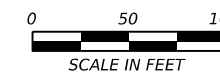
MATCHLINE



NOTE:
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NO SURVEY AND ALIGNMENT INFORMATION
AVAILABLE. LINEWORKS BASED ON BING MAP
IMAGE.



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Austin District
Portfolio Production Group



US77, ETC.

US 77
CSJ 0211-04-027
PROJECT LAYOUT

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	4	

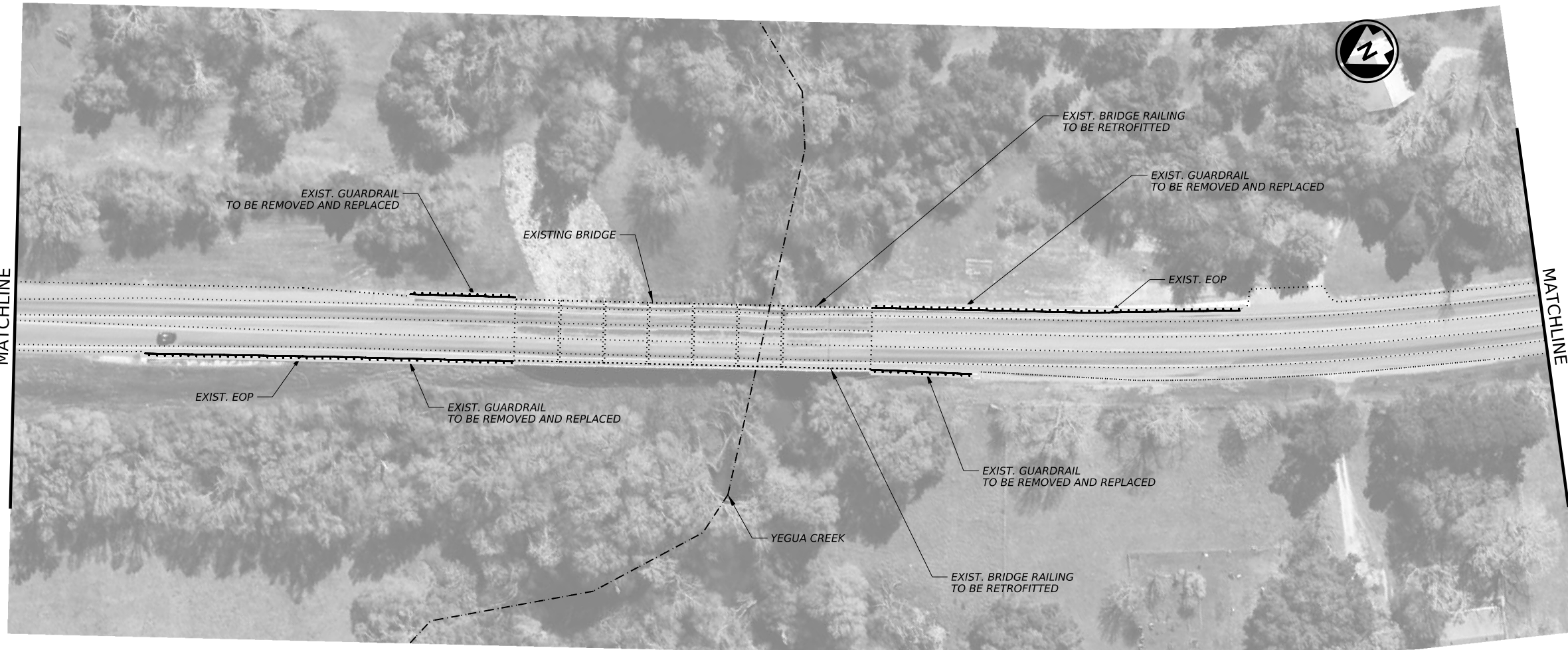
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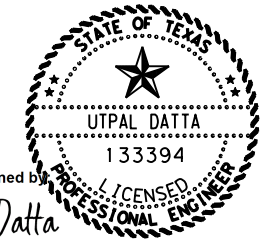
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MATCHLINE

MATCHLINE



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US77, ETC.
SH21
CSJ 0473-02-042
PROJECT LAYOUT

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST		COUNTY	SHEET NO.
AUS		LEE	5

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DocuSigned by
 Utpal Datta
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Austin District
 Portfolio Production Group

Texas Department of Transportation

US77, ETC.

SH21
 CSJ 0473-02-042
 PROJECT LAYOUT

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST		COUNTY	SHEET NO.
AUS		LEE	6

GENERAL NOTES: Version: January 4, 2024

Item	Description	**Rate
**204	Sprinkling (Dust) (Item 132) (Item 247)	30 GAL/CY 30 GAL/CY 30 GAL/CY
**210	Rolling (Flat Wheel) (Item 247) (Item 316)	1 HR/200 TON 1 HR/6000 SY
**210	Rolling (Tamping and Heavy Tamping)	1 HR/200 CY
**210	Rolling (Lt Pneumatic Tire) (Item 132) (Item 247) (Item 316 - Seal Coat) (Item 316 - Two Course)	1 HR/500 CY 1 HR/200 TON 1 HR/6000 SY 1 HR/3000 SY
247	Flexible Base (CMP IN PLC)	132 LB/CF
310	Prime Coat	0.20 GAL/SY
314	Emulsified Asphalt Treatment (SS-1 or MS-2)	0.30 GAL/SY
316	Underseals Asphalts (Multi Option)	0.20 GAL/SY
	Surface Treatments	
	Seal Coat	
	Grade 4	
	Asphalt	0.38 GAL/SY
	Aggregate	1 CY/120 SY
	Grade 5	
	Asphalt	0.32 GAL/SY
	Aggregate	1 CY/150 SY
	Two Course Surface Treatment	
	Asphalt 1st Application	0.28 GAL/SY
	Asphalt 2nd Application	0.24 GAL/SY
	Aggregate 1st Application Grade 4	1 CY/110 SY
	Aggregate 2nd Application Grade 4	1 CY/130 SY
341/3076, 344/3077	Dense-Graded Hot-Mix Asphalt and Superpave	110 LB/SY/IN
342/3079	Permeable Friction Course (PFC)	90.0 LB/SY/IN
346/3080	Stone-Matrix Asphalt	113 LB/SY/IN
347/3081	Thin Overlay Mixtures (TOM) SAC B SAC A	113.0 LB/SY/IN 116.0LB/SY/IN
350	Microsurfacing	25 LB/SY
3084	Bonding Course	0.09 GAL/SY
3085	UnderSeal Course	0.20 GAL/SY
	Tack Coat	0.08 GAL/SY

** For Informational Purposes Only

The following standard detail sheet or sheets have been modified:

Modified Standards
TYPE T131RC (MOD)

GENERAL

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

Bastrop Area Diana.Schulze@txdot.gov
Bastrop Area Tanli.Sun@txdot.gov

Questions and requests for documents will be accepted via the Letting Pre-Bid Q&A web page. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
<https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors>

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

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

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

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

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

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

Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and that the system must remain operational throughout construction. The exact location of ITS Infrastructure is not known. Contact the TxDOT Area Engineer's or Inspection Team's Office for the location(s) at least 72 hours before commencing any work that might affect present ITS

Infrastructure. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Refer to Item 6000 for additional details.

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

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

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

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

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

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

Coordinate and obtain approval for all bridgework over existing roadways.

Bridge Vertical Clearance and Traffic Handling.

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

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

ITEM 2 – INSTRUCTIONS TO BIDDERS

This Contract includes non-site specific work. Multiple work orders will be used to procure work of the type identified in the Contract at locations that have not yet been determined.

ITEM 5 – CONTROL OF THE WORK

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

Obtain and maintain compliance with additional training requested by UPRR "Property Access Training".

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

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

Precast Alternate Proposals.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at [Alternate Precast Proposal Submission \(txdot.gov\)](http://txdot.gov). Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Thermoplastic Pipe Alternate Proposals

When a reinforced concrete or corrugated metal pipe is included in the plans, a thermoplastic polypropylene pipe alternate may be submitted in a 2-phase process. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Phase 1 submit an official request to TxDOT PM with a summary of proposed locations, max depth of placement for each location, cover depth, and pipe diameters. TxDOT goal is to review and respond within 10 days. Phase 1 approval does not guarantee Phase 2 approval.

Phase 2 submit the following documents with all documents signed and sealed by a licensed Engineer in the state of Texas. 1-Provide a redline or revised set of drainage plans reflecting the revised locations. 2-Provide certification that the use of the alternate pipe and proposed bedding are adequate for the proposed application, depth, etc. 3-Provide a completed thermoplastic pipe installation drawing using the following,

<https://ftp.txdot.gov/pub/txdot/brg/thermoplastic-pipe-installation-drawing.pdf>

<https://ftp.txdot.gov/pub/txdot/brg/thermoplastic-pipe-installation-drawing.dgn>

For all uses of thermoplastic pipe as an alternate, furnish, install, and inspect the thermoplastic pipe in accordance with SS4216 or latest thermoplastic pipe special specification at time of letting. Minimum values, such as cover depth, required by the specification, installation drawing, etc. will not be waived. Use granular backfill unless flowable fill or CSB is required by the

alternate design. Backfill locations shown in the bid plans using flowable fill or CSB must use the backfill per the bid plans.

Electronic Shop Drawing Submittals.

Submit electronic shop drawing submittals according to the current Guide to Electronic Shop Drawing Submittal which can be found online at, <https://www.txdot.gov/business/resources/highway/bridge/shop-drawing-submittal-cycle.html>.

Pre-approved producers can be found online at, <https://www.txdot.gov/business/resources/materials/material-producer-list.html>.

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

Submittal Contact List

Bastrop Area Diana.Schulze@txdot.gov AUS_BA-ShopReview@txdot.gov

Alignment and Profile.

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

ITEM 6 - CONTROL OF MATERIALS

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

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

The area designated as the potential habitat for the Houston Toad will not be allowed as a source for embankment unless approved by the Engineer. The general area is Bastrop County north of the Colorado River and east of SH 95 unless provided in the plans.

For removal, tie, or tap of asbestos concrete (AC) pipe, contact TxDOT and the local utility company 60 days prior to performing the work. Expose the AC pipe to provide a minimum of 1 ft. of clearance around the top and sides. A minimal amount of soil may remain around the AC pipe to avoid disturbance. The local utility company will be responsible for the demo notice to DSHS and removal of the AC pipe. Tie or tap into existing AC pipe may require removing an entire section of pipe from collar to collar and replacement of pipe with new pipe using existing bid items.

For Federally Funded Contracts, comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, by submitting 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, located at the following link, for clarification on material categorization. [Buy America material classification sheet \(txdot.gov\)](#)

Storage of Material Near Structures

Do not store equipment or flammable material within 100 ft. of bridges, culverts, or near their openings (portals). Flammable materials include all material that is not metal or aluminum.

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES

Roadway closures during key dates and/or special events are prohibited. See notes for Item 502 for the key dates and/or special events. Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.

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

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

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

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

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

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

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

DSHS Asbestos and Demolition Notification.

Complete and provide the Texas Department of State Health Services (DSHS) notification form to the Engineer and email to AUS_BRG_Notify@txdot.gov at least 30 calendar days prior to

bridge removal or renovation for each phase or step of work. Notify the Engineer via email of any changes to the work start and end dates.

Migratory Birds and Bats.

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

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

Tree and Brush Trimming and Removal.

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

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

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

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

Law Enforcement Personnel.

Submit charge summary and invoices using the Department forms.

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

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

A maximum combined rate of \$85 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 officer’s governing authority.

Back Up Alarm.

For hours 9 P to 5 A, utilize a non-intrusive, self-adjusting noise level reverse signal alarm. This is not applicable to hotmix or seal coat operations. This is subsidiary.

ITEM 8 – PROSECUTION AND PROGRESS

The sequence of work shown on the plans demonstrates a volume of work available in each phase of construction that will ensure the Contractor is not impacted by the unclear ROW, railroad, and utilities. A deviation from the sequence of work shown on the plans must be approved by the Engineer.

Electronic versions of schedules will be saved in Primavera P6 format.

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

Lane Closure Assessment Fee.

The monthly estimate will be deducted a fee per 15-minute interval according to the following schedule for each closure or obstruction that extends beyond the allowable closure time. Fee will be based on Annual Average Daily Traffic (AADT) of the roadway. Use AADT information as shown on the plans. If AADT is not found on the plans please use TxDOT – Statewide Planning Map https://www.txdot.gov/apps/statewide_mapping/StatewidePlanningMap.html. If the roadway has a peak direction of traffic, the Engineer may reduce the fee by 25 percent for off-peak direction of traffic for up to 30 minutes.

AADT		Lane Closure Assessment Fee (per lane per 15 minutes)
More than	To and Including	
0	10000	\$150.00
10000	20000	\$300.00
20000	40000	\$600.00
40000	60000	\$900.00
60000	80000	\$1,200.00
80000	100000	\$1,500.00
100000		\$1,800.00
All of IH 35 Mainlanes		\$2,000.00

ITEM 100 - PREPARING RIGHT OF WAY

Prep ROW must not begin until accessible trees designated for preservation have been protected, items listed in the EPIC have been addressed, and SW3P controls installed in accessible areas. Backfill material will be Type B Embankment using ordinary compaction.

Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush.

Unless shown otherwise in the plans or a designated non-mow area, perform trimming or removal for areas within 30 ft. of edge of pavement under construction. Trim or remove to provide minimum of 5 ft. of horizontal clearance and 7 ft. of vertical clearance for the following: sidewalks, paths, guard fence, rails, signs, object markers, and structures. Trim to provide a minimum of 14 ft. vertical clearance under all trees. This work is subsidiary.

ITEM 400 - EXCAVATION AND BACKFILL FOR STRUCTURES

Unless shown on the plans, the following backfill will apply to cutting and restoring flexible pavement. Backfill with cement-stabilized backfill. The cement-stabilized backfill is subsidiary.

Cap the backfill with Type B hot-mix to a depth equal to the adjacent hot-mix. At locations where the backfill surface is final, place 1-1/2 in. Type D for the surface. The minimum hot-mix depth will be 4 in.

Unless shown on the plans, flowable fill option 1 item will be used for pavement widening. Saw-cut the pavement at the edge of the excavation. This work is subsidiary.

Backfill the bridge ends in accordance with the limits shown on TxDOT "CSAB" Standard. Use material in accordance with "CSAB" or Item 423, Type BS. The "CSAB" optional bond breaker materials are allowed. This work is subsidiary.

ITEM 432 - RIPRAP

Mow strip riprap will be 4 in. and all other riprap will be 5 in. unless otherwise shown on the plans. Mow strip for cable barrier may be placed monolithically with the barrier foundations if using concrete in accordance with Item 543. Fiber reinforcement is not allowed except in mow strip for cable barrier if foundation and mow strip are placed monolithically. GFRP is allowed reinforcement for all applications.

Saw-cut existing riprap then epoxy 12 in. long No. 3 or No. 4 bars 6 in. deep at a maximum spacing of 18 in. in each direction to tie new riprap to existing riprap. This work is subsidiary.

Provide Type A Grade 3 or 5 flexible base for cement stabilized riprap. Compressive strengths for flexible base are waived.

SGT approach taper, paid for using mow strip item, will be installed using concrete, flexible base coated with SS-1 at a rate of 0.12 GAL/SY, or HMA Type B/C/D. Placement will be ordinary compaction and does not require placement using an asphalt paver.

ITEM 450 - RAILING

Use the elliptical tube option for rails T401, T402, and C402.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

<u>Table 1</u>		
<u>Roadway</u>	<u>Limits</u>	<u>Allowable Closure Time</u>
IH 35	All (1 lane closed)	9 P to 5 A
IH 35	All (2 lanes closed, see allowable work below)	9 P to 5 A
IH 35	All (2 lanes closed, all work)	11 P to 5 A
SH 45	US 183 to SH130	8 P to 5 A
LP 1	William Cannon to Parmer Lane	8 P to 5 A
US 183	SH 29 to FM 1327	8 P to 5 A
SH 71	SH 130 to IH 35	8 P to 5 A
SH 71	SH 304 to Tahitian Drive	8 P to 5 A
SH 71	US 290 W to RM 3238	8 P to 5 A
US 290 W	IH 35 to Nutty Brown Rd	8 P to 5 A
US 290 E	IH 35 to SH 95	8 P to 5 A
FM 734	FM 1431 to US 290 E	8 P to 5 A
US 79	IH 35 to Bus 79 in Taylor	8 P to 5 A
RM 1431	Lohmans Ford Rd to IH 35	8 P to 5 A
SH 29	LP 332 western terminus to SH 130	8 P to 5 A
SH 80	Charles Austin to River Road	8 P to 5 A
RM 2222	All	8 P to 5 A
RM 620	All	8 P to 5 A
RM 2244	All	8 P to 5 A
SPUR 69	All	8 P to 5 A
LP 360	All	8 P to 5 A
LP 343	All	8 P to 5 A
LP 275	All	8 P to 5 A
FM 1325	All	8 P to 5 A
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

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

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

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

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

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

No closures will be allowed on the weekends, working day prior, and working day after the National Holidays defined in the Standard Specifications, Good Friday, and Easter weekend.

No closures will be allowed 1 P.M. to 11 P.M. the Sunday of the Super Bowl.

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

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

Table 4 (Large Events)

Event	City	Dates
Formula 1 @ COTA	Austin	Annually (See Event Website)
Moto GP @ COTA	Austin	Annually (See Event Website)
ACL Fest	Austin	Annually (See Event Website)
SXSW	Austin	Annually (See Event Website)
ROT Rally	Bastrop	Annually (See Event Website)
UT Football Games	Austin	Annually (See Event Website)
Sales Tax Holiday	All	Annually (See Event Website)
Rodeo Austin	Austin	Annually (See Event Website)

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

Table 5 (Special Events)

Event	City	Dates
Eaker BBQ Competition	Fredericksburg	March 10, 2024
Sherwood Forest Faire	McDade / Paige	Weekends in March and April
Smithville Jamboree	Smithville	April 4-6, 2024
Wiener Dog Races	Buda	April 29-30, 2023
Founders Day Festival	Dripping Springs	April 28-30, 2023
Red Poppy Festival	Georgetown	April 26-28, 2024
Crawfish Open	Llano	3 rd Friday and Saturday in April
Fair and Rodeo	Liberty Hill	May 18, 2023
Founders Day Ceremony	Fredericksburg	2 nd Weekend in May
Crawfish Festival	Fredericksburg	Saturday before Memorial Day
Lakefest Boat Races	Marble Falls	June 10-11, 2023
Watermelon Thump	Luling	Last Full Weekend in June
Pie in the Sky	Kyle	Sept 1-2, 2023
Wine and Music Festival	Georgetown	Last Saturday of September
Deer Season Opening Weekend	All Counties in Burnet Area Office	1 st Friday and Saturday of Season
Christmas Nights of FBG Lights	Fredericksburg	Nov 21, 2023
Christmas on Mercer	Dripping Springs	Dec 2, 2023
Lady of Guadalupe Procession	Fredericksburg	Dec 12, 2023
Texas State Graduation Fall	San Marcos	TBD
Texas State Graduation Spring	San Marcos	TBD

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

No closures will be allowed during the upcoming eclipses on April 8, 2024. All lanes will be open from noon April 5th to noon April 9th. Time charges will not be suspended during this event.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS

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

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

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

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

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

Cover small waste containers (100 gallons or less) at all times. This work is subsidiary. Large waste containers (more than 100 gallons) must have a secondary discharge containment system around the container using erosion control logs. Installation of the log for each container location will be paid using existing bid items. Repair, remove, or replace of the log will not be paid. Revisions, repairs, remove or replace of the log during exchange of empty/full containers at the same location will not be paid.

Portable restrooms must be located more than 50 ft. from a waterway. Tie or stake down portable restrooms to prevent tipping due to vandalism or weather. This work is subsidiary.

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Provide a designated location for disposal when excess and waste, including waste generated from cleaning of all equipment used for mixing, hauling, and transfer concrete is disposed in the ROW or PSL. Manufactured disposal containers must be metal or a plastic material with minimum 10 mil thickness. Paper, earthen berms, or pits must be lined with minimum 10 mill thickness polyethylene sheeting. Disposal locations must be located a minimum of 50 ft. from a waterway, tree, or sensitive feature. The disposal location must have a minimum height of 6 in. Maintain a minimum 4 in. of freeboard at all times. Disposal locations are not required for cleaning of small hand tools. Hardened concrete waste may be used as embankment if placed in accordance with Item 132.

ITEM 512 – PORTABLE TRAFFIC BARRIER

Designated source barrier stockpile locations: SH 45 just west of US 183 South, SH 130 @ Harold Green, or SH 130 @ Greg Manor Rd. Upon completion of the project, designated source PTB deemed unsalvageable by the Engineer will become the property of the contractor and paid for removal using Item 104. Connection hardware is NOT available for designated source, furnish and retain all hardware to install the PTB.

In lieu of a crash cushion, place 25:1 Class C concrete transition where concrete PTB terminates adjacent to existing concrete barrier. Installation and removal will be paid using existing Item 512 bid items.

If bid item allows concrete or steel, the steel barrier must provide a maximum deflection of 2 ft. 3 in. Pinning and other work to obtain the required deflection is subsidiary.

Any increase in temporary barrier quantities that occur due to Contractor changes in the sequence of work or the traffic control plan will not be paid.

ITEMS 540, 542, & 544 - METAL BEAM GUARD FENCE AND GUARDRAIL END TREATMENTS

Furnish round timber posts for guard fence. Steel posts for low fill culvert applications is subsidiary including use of low fill culvert application due to other concrete structures such as inlets. Long span application at inlets may be used as an alternate to low fill culvert. Unless otherwise specified on the plans, use of low fill culvert or long span at inlets will be subsidiary to pertinent items. Stake the locations for approval before installation. Adjust the limits of the fence to meet field conditions. Install delineators before opening the road to traffic.

Retain all materials. Existing materials that are structurally sound and dent free may be reused. All reused material will be from this project and in compliance with current standards. Structurally sound rust spots with the largest dimension of 4 in. may be cleaned and repaired in accordance with Section 540.3.5. Punch or field drill holes in the metal rail element to accommodate post spacing. Additional holes for splice or connections are not allowed. Space the field holes in accordance with the latest standard but no closer than the minimum spacing shown on the current standard.

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Remove, replace, and install mow strip block out material. Construct new block outs and backfill unused block outs with class B concrete. This work is subsidiary.

Repair of mow strip damage, not caused by contractor negligence, and installation of new mow strip will be paid with appropriate bid items. Backfill and shoulder up of area around fence and mow strip will be paid using embankment item.

ITEM 545 - CRASH CUSHION ATTENUATORS

Use a coring machine or saw cut to remove the mounting hardware/bolts from the existing pavement. Cutting the hardware flush with the surface is not allowed. Refill voids in accordance with the pavement specification. This work is subsidiary.

Install and maintain three 42 in. cones, vertical panels, or plastic drums in advance of the attenuator. Place at spacing per channelizing devices on BC (9). This work is subsidiary.

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

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

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

For signal shop contact Robert Bolin (Robert.Bolin@txdot.gov) and Kevin Plumlee (Kevin.Plumlee@txdot.gov).

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

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

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

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

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

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

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

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

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

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

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

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

Minimum distance between HDPE joints will be 200 ft.

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

ITEM 658 – DELINEATOR AND OBJECT MARKER ASSEMBLIES

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

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

CTB delineators must be placed on top of the CTB.

ITEM 662 - WORK ZONE PAVEMENT MARKINGS

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

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

Item 668 is not allowed for use as Item 662.

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

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS

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

All projects, including resurfacing, must increase center-to-center width for center line markings to 18 in. unless the plans or existing is greater than 18 in.

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

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

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

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

ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS

Dispose of removed materials and debris at locations off the right of way.

Elimination using a pavement marking will not be allowed in lieu of methods listed in specification.

Remove pavement markings on concrete surfaces by a blasting method. Flail milling will be allowed when total quantity of removal on concrete surfaces is less than 1000 ft.

Strip seal is only method allowed on seal coat surface unless project includes placement of a new surface. If total quantity of removal on a seal coat surface is less than 2000 ft., elimination using a pavement marking is allowed if a test section is approved by the Engineer. Test section shall demonstrate the thermo marking color matches the existing pavement color.

Remove pavement markings outside the limits of the new surface by a blasting method.

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Use a TRAIL or a non-retroreflective paint to cover stripe remnants that remain after elimination.

The test requirements for these materials are waived. The paint color shall be adjusted to resemble the existing pavement color. Installation and maintenance is subsidiary.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN

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

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

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

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR

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

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

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



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0211-04-027

DISTRICT Austin
HIGHWAY SH 21, US 77

COUNTY Lee

CONTROL SECTION JOB				0211-04-027		0473-02-042		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00193469		A00193414			
COUNTY				Lee		Lee			
HIGHWAY				US 77		SH 21			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
	100-6002	PREPARING ROW	STA	5.700		8.600		14.300	
	104-6009	REMOVING CONC (RIPRAP)	SY	550.000				550.000	
	400-6005	CEM STABIL BKFL	CY			80.000		80.000	
	401-6001	FLOWABLE BACKFILL	CY	10.000		20.000		30.000	
	428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	606.000		800.000		1,406.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	40.000		65.000		105.000	
	432-6031	RIPRAP (STONE PROTECTION)(12 IN)	CY			15.000		15.000	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	404.000		125.000		529.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	178.000		352.000		530.000	
	451-6004	RETROFIT RAIL (TY T131RC)	LF	344.000				344.000	
	451-6019	RETROFIT RAIL (TY T631)	LF			560.000		560.000	
	495-6001	RAISING EXIST STRUCT	LS	1.000				1.000	
	500-6001	MOBILIZATION	LS	1.000				1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	4.500		4.500		9.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	60.000		60.000		120.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	60.000		60.000		120.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	632.000		747.000		1,379.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	632.000		747.000		1,379.000	
	512-6089	PTB(FRN&INSTL)(SSCB OR CSB)(TY1)OR(STL)	LF	1,124.000		1,482.000		2,606.000	
	512-6091	PTB(REMOVE)(SSCB OR CSB)(TY1)OR(STL)	LF	1,124.000		1,482.000		2,606.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	612.500		750.000		1,362.500	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000				4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	612.500		750.000		1,362.500	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000		8.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000		8.000	
	545-6005	CRASH CUSH ATTEN (REMOVE)	EA	4.000		4.000		8.000	
	545-6019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	4.000		4.000		8.000	
	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	EA	15.000		15.000		30.000	
	662-6060	WK ZN PAV MRK REMOV (W)4"(BRK)	LF	1,382.000		502.000		1,884.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	5,992.000		5,616.000		11,608.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF			6,674.000		6,674.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	6,022.000		1,070.000		7,092.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	5,963.000		5,616.000		11,579.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF			2,990.000		2,990.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	5,963.000		6,770.000		12,733.000	
	672-6007	REFL PAV MRKR TY I-C	EA	300.000		280.000		580.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	11,985.000		16,446.000		28,431.000	



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0211-04-027

DISTRICT Austin
HIGHWAY SH 21, US 77

COUNTY Lee

CONTROL SECTION JOB				0211-04-027		0473-02-042		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00193469		A00193414			
COUNTY				Lee		Lee			
HIGHWAY				US 77		SH 21			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL	EST.	FINAL		
	740-6002	GRAFFITI REMOVAL (PAINTING)	SF	65.000				65.000	
	5129-6001	INSTALL FTB	LF	150.000		150.000		300.000	
	5129-6002	REMOVE FTB	LF	150.000		150.000		300.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	30.000		30.000		60.000	
	6185-6002	TMA (STATIONARY)	DAY	30.000		30.000		60.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	5.000		5.000		10.000	
	7000-6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	24.000				24.000	
	7000-6011	REML & DESPL DRIFTWOOD & DEBRIS-SITE 1	LS			1.000		1.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000				1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000				1.000	

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SUMMARY OF MOBILIZATION ITEMS		
LOCATION	500 6001	502 6001
	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING
	LS	MO
US 77	1.00	4.50
PROJECT TOTALS	1	4.5

SUMMARY OF BRIDGE # 1 ITEMS							
NBI: 141440021104013							
LOCATION	401 6001	428 6001	429 6007	432 6033	438 6002	451 6004	495 6001
	FLOWABLE BACKFILL	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (STONE PROTECTION)(18 IN)	CLEANING AND SEALING EXIST JOINTS(CL3)	RETROFIT RAIL (TY T131RC)	RAISING EXIST STRUCT
	CY	SY	SF	CY	LF	LF	LS
US 77	10	606	40	404	178	344	1
PROJECT TOTALS	10	606	40	404	178	344	1

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS										
LOCATION	512 6089	512 6091	545 6005	545 6019	662 6060	662 6063	677 6001	6001 6001	6185 6002	6185 6005
	PTB(FRN&IN STL)(SSCB OR CSB)(TY1)OR(STL)	PTB(REMOVE)(SSCB OR CSB)(TY1)OR(STL)	CRASH CUSH ATTN (REMOVE)	CRASH CUSH ATTN (INSTL)(S)(N)(TL3)	WK ZN PAV MRK REMOV (W)4"(BRK)	WK ZN PAV MRK REMOV (W)4"(SLD)	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LF	LF	EA	EA	LF	LF	LF	DAY	DAY	DAY
US 77	1124	1124	4	4	1382	5992	11985	30	30	5
PROJECT TOTALS	1124	1124	4	4	1382	5992	11985	30	30	5


SUMMARY OF ROADWAY ITEMS							
LOCATION	100 6002	540 6001	540 6006	542 6001	544 6001	544 6003	658 6061
	PREPARING ROW	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2
	STA	LF	EA	LF	EA	EA	EA
US 77	5.7	612.5	4	612.5	4	4	15
PROJECT TOTALS	5.7	612.5	4	612.5	4	4	15

SUMMARY OF PAVEMENT MARKING ITEMS				
LOCATION	666 6306	666 6309	666 6321	672 6007
	RE PM W/RET REQ TY I (W)6"(BRK) (100MIL)	RE PM W/RET REQ TY I (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD) (100MIL)	REFL PAV MRKR TY I-C
	LF	LF	LF	EA
US 77	6022	5963	5963	300
PROJECT TOTALS	6022	5963	5963	300

SUMMARY OF EROSION CONTROL ITEMS						
LOCATION	506 6002	506 6011	506 6038	506 6039	5129 6001	5129 6002
	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	INSTALL FTB	REMOVE FTB
	LF	LF	LF	LF	LF	LF
US 77	60	60	632	632	150	150
PROJECT TOTALS	60	60	632	632	150	150

SUMMARY OF REMOVAL ITEMS			
LOCATION	104 6009	740 6002	7000 6001
	REMOVING CONC (RIPRAP)	GRAFFITI REMOVAL (PAINTING)	REML & DISPL DRIFTWOOD & DEBRIS
	SY	SF	CY
US 77	550	65	24
PROJECT TOTALS	550	65	24

**Austin District
Portfolio Production Group**



US77, ETC.

**US 77
CSJ 0211-04-027
QUANTITY SUMMARY**

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		9

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SUMMARY OF MOBILIZATION ITEMS	
LOCATION	
	502 6001
	BARRICADES, SIGNS AND TRAFFIC HANDLING
	MO
SH21	4.50
PROJECT TOTALS	4.5

SUMMARY OF REMOVAL ITEMS	
LOCATION	
	7000 6011
	REML & DESPL DRIFTWOOD & DEBRIS-SITE 1
	LS
SH21	1
PROJECT TOTALS	1

SUMMARY OF EROSION CONTROL ITEMS						
LOCATION	506 6002	506 6011	506 6038	506 6039	5129 6001	5129 6002
	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	INSTALL FTB	REMOVE FTB
	LF	LF	LF	LF	LF	LF
SH21	60	60	747	747	150	150
PROJECT TOTALS	60	60	747	747	150	150

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS											
LOCATION	512 6089	512 6091	545 6005	545 6019	662 6060	662 6063	662 6095	677 6001	6001 6001	6185 6002	6185 6005
	PTB(FRN&IN STL)(SSCB OR CSB)(TY1)OR(STL)	PTB(REMOVE)(SSCB OR CSB)(TY1)OR(STL)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	WK ZN PAV MRK REMOV (W)4"(BRK)	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LF	LF	EA	EA	LF	LF	LF	LF	DAY	DAY	DAY
SH21	1482	1482	4	4	502	5616	6674	16446	30	30	5
PROJECT TOTALS	1482	1482	4	4	502	5616	6674	16446	30	30	5

SUMMARY OF ROADWAY ITEMS						
LOCATION	100 6002	540 6001	542 6001	544 6001	544 6003	658 6061
	PREPARING ROW	MTL W-BEAM GD FEN (TIM POST)	REMOVE METAL BEAM GUARD FENCE	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2
	STA	LF	LF	EA	EA	EA
SH21	8.6	750	750	4	4	15
PROJECT TOTALS	8.6	750	750	4	4	15

SUMMARY OF PAVEMENT MARKING ITEMS					
LOCATION	666 6306	666 6309	666 6318	666 6321	672 6007
	RE PM W/RET REQ TY 1 (W)6"(BRK) (100MIL)	RE PM W/RET REQ TY 1 (W)6"(SLD) (100MIL)	RE PM W/RET REQ TY 1 (Y)6"(BRK) (100MIL)	RE PM W/RET REQ TY 1 (Y)6"(SLD) (100MIL)	REFL PAV MRKR TY I-C
	LF	LF	LF	LF	EA
SH21	1070	5616	2990	6770	280
PROJECT TOTALS	1070	5616	2990	6770	280

SUMMARY OF BRIDGE # 1 ITEMS								
		NBI: 141440047302005						
LOCATION	400 6005	401 6001	428 6001	429 6007	432 6031	432 6033	438 6002	451 6019
	CEM STABIL BKFL	FLOWABLE BACKFILL	PENETRATING CONCRETE SURFACE TREATMENT	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (STONE PROTECTION) (12 IN)	RIPRAP (STONE PROTECTION) (18 IN)	CLEANING AND SEALING EXIST JOINTS(CL3)	RETROFIT RAIL (TY T631)
	CY	CY	SY	SF	CY	CY	LF	LF
SH21	80	20	800	65	15	125	352	560
PROJECT TOTALS	80	20	800	65	15	125	352	560

Austin District
Portfolio Production Group

US77, ETC.

SH 21
CSJ 0473-02-042
QUANTITY SUMMARY

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		10

DN:
CN:
DW:
CC:

TCP CRASH CUSHION SUMMARY

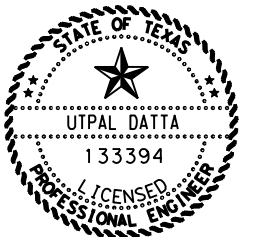
LOC. NO.	TCP PHASE OR PERM. INST.	PLAN SHEET NO.	LOCATION	STA/DIRECTION FROM BRIDGE DECK (CONNECTI ON TO PTB)	DIRECTION OF TRAVEL (BI/UNI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH (FT)	CRASH CUSHION													
						PROP. MATERIAL	PROP. THICKNESS (IN)	DESCRIPTION	WIDTH (IN)	HEIGHT (IN)		INSTALL	MOVE/RESET		REMOVE	L	L	R	R	S	S				
													MOVE/RESET	FROM/T O LOC. NO.		N	W	N	W	N	W				
1	TCP		BEGIN CSB	SB TO BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X					
2	TCP		END CSB	SB FROM BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X					
3	TCP		BEGIN CSB	NB TO BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X					
4	TCP		END CSB	NB FROM BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X					
TOTALS												4				4									

LEGEND:

- L = LOW MAINTENANCE
- R = REUSABLE
- S = SACRIFICIAL
- N = NARROW
- W = WIDE
- C.S. = CONTRACTOR STORAGE

FOR DEFINITIONS, SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS THE ATTENUATORS/CRASH CUSHIONS SECTION.

<http://www.dot.state.tx.us/insdot/orgchart/cmd/cserve/standard/rdwylse.htm>
<ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/roadway/cccc.pdf>



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**Austin District
Portfolio Production Group**

Texas Department of Transportation

US77, ETC.

**US 77
CSJ 0211-04-027
CRUSH CUSHION SUMMARY**

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		10A

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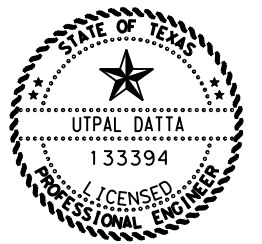
TCP CRASH CUSHION SUMMARY

LOC. NO.	TCP PHASE OR PERM. INST.	PLAN SHEET NO.	LOCATION	STA/DIRECTION FROM BRIDGE DECK (CONNECTI ON TO PTB)	DIRECTION OF TRAVEL (BI/UNI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH (FT)	CRASH CUSHION										
						PROP. MATERIAL	PROP. THICKNESS (IN)	DESCRIPTION	WIDTH (IN)	HEIGHT (IN)		INSTALL	MOVE/RESET		REMOVE	L	L	R	R	S	S	
													MOVE/RESET	FROM/T O LOC. NO.		N	W	N	W	N	W	
1	TCP		BEGIN CSB	SB TO BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X		
2	TCP		END CSB	SB FROM BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X		
3	TCP		BEGIN CSB	NB TO BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X		
4	TCP		END CSB	NB FROM BR.	BI	ASPHALT	N/A	PRECAST CONC. OR STL. SAF. BAR	24	32	> 35	I								X		
TOTALS											4			4								

LEGEND:

- L = LOW MAINTENANCE
 - R = REUSABLE
 - S = SACRIFICIAL
 - N = NARROW
 - W = WIDE
- C.S. = CONTRACTOR STORAGE

FOR DEFINITIONS, SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS THE ATTENUATORS/CRASH CUSHIONS SECTION.
<http://www.dot.state.tx.us/insdot/orgchart/cmd/cserve/standard/rdwylse.htm>
<ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/roadway/cccc.pdf>



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 3/1/2024

**Austin District
Portfolio Production Group**

Texas Department of Transportation

**US77, ETC.
SH 21
CSJ 0473-02-042
CRUSH CUSHION SUMMARY**

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		10B

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GENERAL NOTES

1. LIMIT THE LENGTH OF THE WORK ZONE TO WHAT CAN BE CONSTRUCTED IN A SINGLE DAY (EXCEPT WORK ZONES USING TEMPORARY TRAFFIC SIGNALS). THERE SHALL BE NO EDGE DROP-OFF BETWEEN THE TRAFFIC LANES BEFORE OPENING TO TWO-LANE TRAFFIC. IN THE EVENT THAT CONSTRUCTION IS NOT ABLE TO BE COMPLETED BEFORE NIGHTTIME OPERATIONS, PROVIDE A TRANSITION BETWEEN THE TRAFFIC LANES AS APPROVED BY THE ENGINEER BEFORE OPENING TO TWO-LANE TRAFFIC. THIS WORK SHALL BE SUBSIDIARY TO ITEM 502.
2. MAINTAIN POSITIVE DRAINAGE THROUGHOUT THE PROJECT SITE TO REDUCE PONDING.
3. COMPLETE US 77 LOCATION WORK BEFORE BEGIN WORK AT SH 21 LOCATION.

SEQUENCE OF WORK

PHASE 1

1. INSTALL EROSION CONTROL DEVICES AS DIRECTED BY THE ENGINEER.
2. INSTALL WORK ZONE SIGNS.
3. REMOVE EXISTING PAVEMENT MARKING, INSTALL PTB, INSTALL CRASH CUSHON PER TCP.
4. ADD REMOVABLE WORK ZONE PAVEMENT MARKING PER TCP TO REDUCE TRAFFIC TO ONE LANE IN EACH DIRECTION.

PHASE 2

REMOVE SECTION OF MBGF IF NEEDED TO ACCESS BENEATH THE BRIDGE AS DIRECTED BY THE ENGINEER.
REMOVE VEGETATION TO PROVIDE ACCESS BENEATH THE BRIDGE

CONCRETE WORK

SPAN 3, BENT 3:
PLACE TEMPORARY SUPPORTS TO PERFORM BEARING SEAT REPAIRS UNDER BEAMS AS INDICATED ON THE PLANS.

PHASE 3

DEBRIS REMOVAL
REMOVE DEBRIS FROM BENTS AND UNDER BRIDGE SPANS AS INDICATED ON THE PLANS.

CONCRETE WORK

SPAN 3, BENT 3:
PERFORM BEARING SEAT REPAIRS UNDER BEAMS AS INDICATED ON THE PLANS.
BENTS 2, 3 AND 4:
PERFORM CONCRETE STRUCTURE REPAIRS ON BENTS 2, 3 AND 4.
EAST BRIDGE RAIL REMOVAL AND REPLACEMENT:
REMOVE EXISTING RAILING AND PERFORM RAILING REPLACEMENT WORK AS INDICATED ON THE PLANS.

CLEAN AND SEAL JOINTS

BENTS 2, 3, 4 AND 5:
CLEAN AND SEAL JOINTS ON BRIDGE DECK
EAST GUARDRAIL REMOVAL AND REPLACEMENT
REMOVE AND REPLACE EAST GUARDRAIL AS INDICATED ON THE PLANS

PHASE 4

CONCRETE WORK

WEST BRIDGE RAIL REMOVAL AND REPLACEMENT:
REMOVE EXISTING RAILING AND PERFORM RAILING REPLACEMENT WORK AS INDICATED ON THE PLANS.

CLEAN AND SEAL JOINTS

BENTS 2, 3, 4 AND 5:
CLEAN AND SEAL JOINTS ON BRIDGE DECK

EXISTING RIPRAP REMOVAL AND REPLACEMENT

REMOVE EXISTING RIPRAP AT BOTH ABUTMENTS AND PLACE FLOWABLE FILL AT LOCATIONS INDICATED ON THE PLANS.
PLACE STONE RIPRAP AT BOTH ABUTMENTS

APPLICATION OF PENETRATING CONCRETE SURFACE TREATMENT

APPLY PENETRATING CONCRETE SURFACE TREATMENT ON ALL EXPOSED SURFACES OF ALL ABUTMENTS, BENTS AND WINGWALLS.

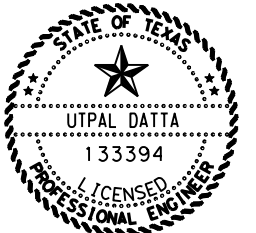
WEST GUARDRAIL REMOVAL AND REPLACEMENT

REMOVE AND REPLACE WEST GUARDRAIL AS INDICATED ON THE PLANS

PHASE 5

REMOVE EROSION CONTROL DEVICES, REMOVE PTB, CRASH CUSION, WORKZONE PAVEMENT MARKING.

RESTRIPE PAVEMENT MARKINGS TO EXISTING LAYOUT.



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**Austin District
Portfolio Production Group**

Texas Department of Transportation

US77, ETC.

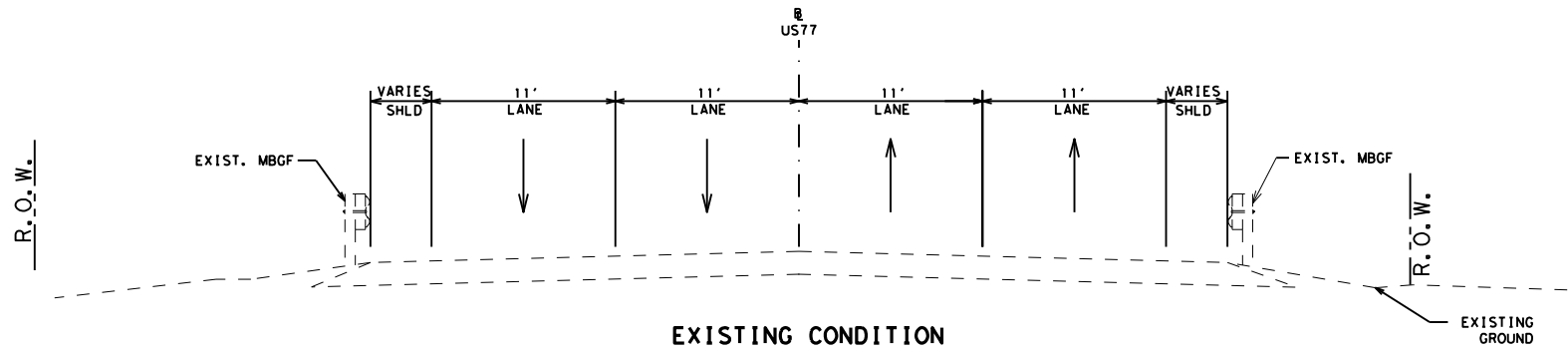
**US 77
CSJ 0211-04-027
SEQUENCE OF WORK**

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	11	

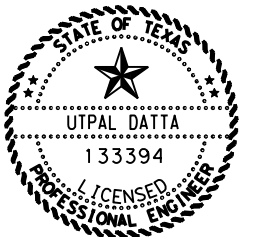
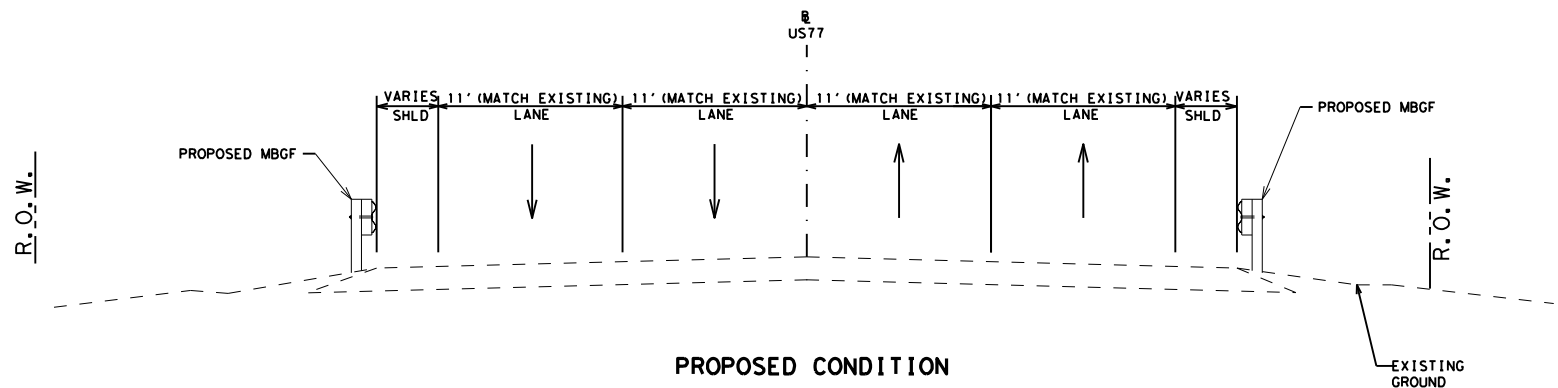
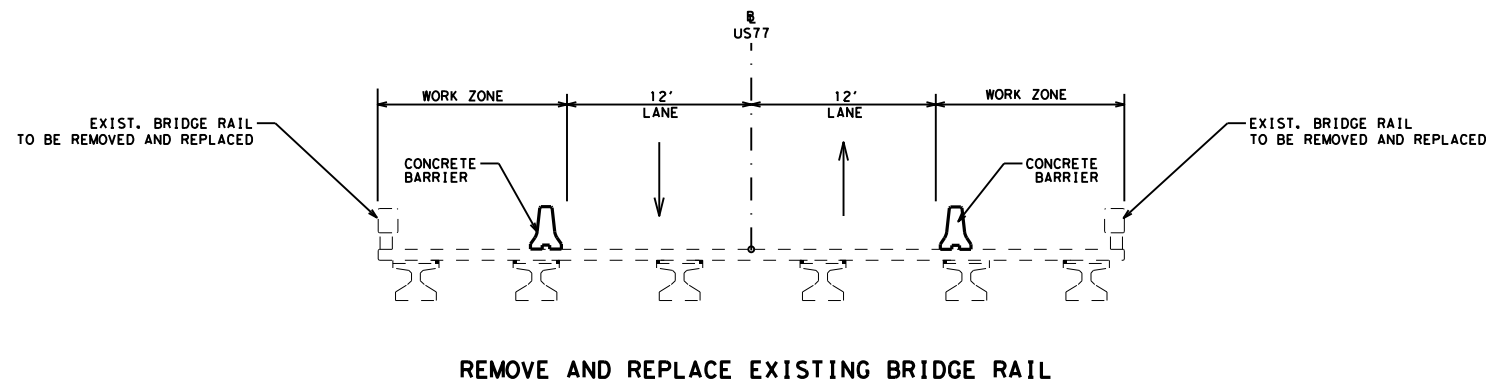
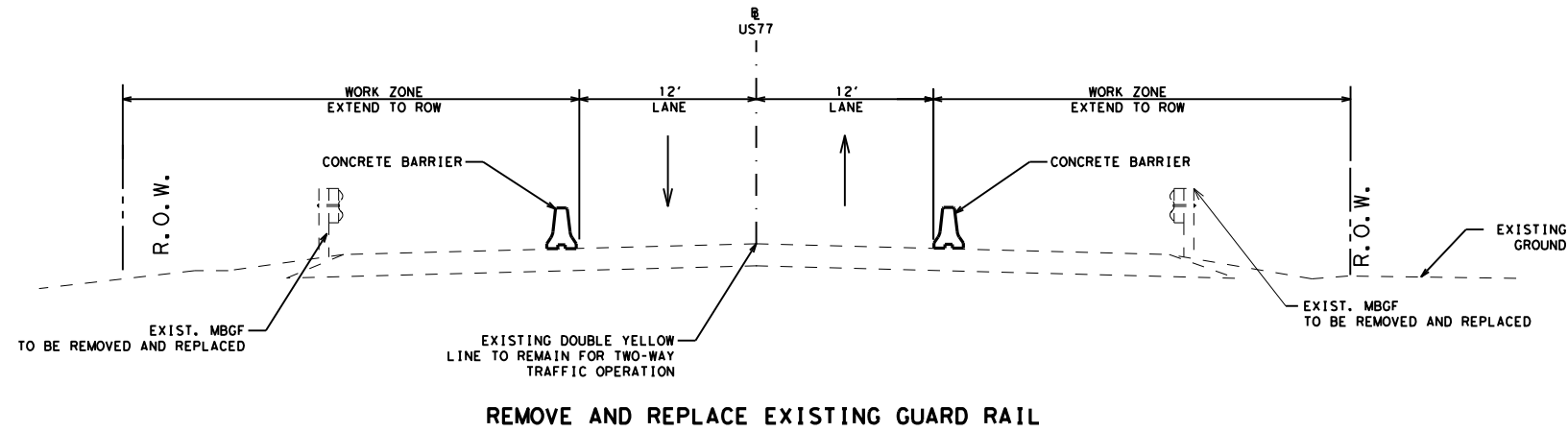
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1/9/2024

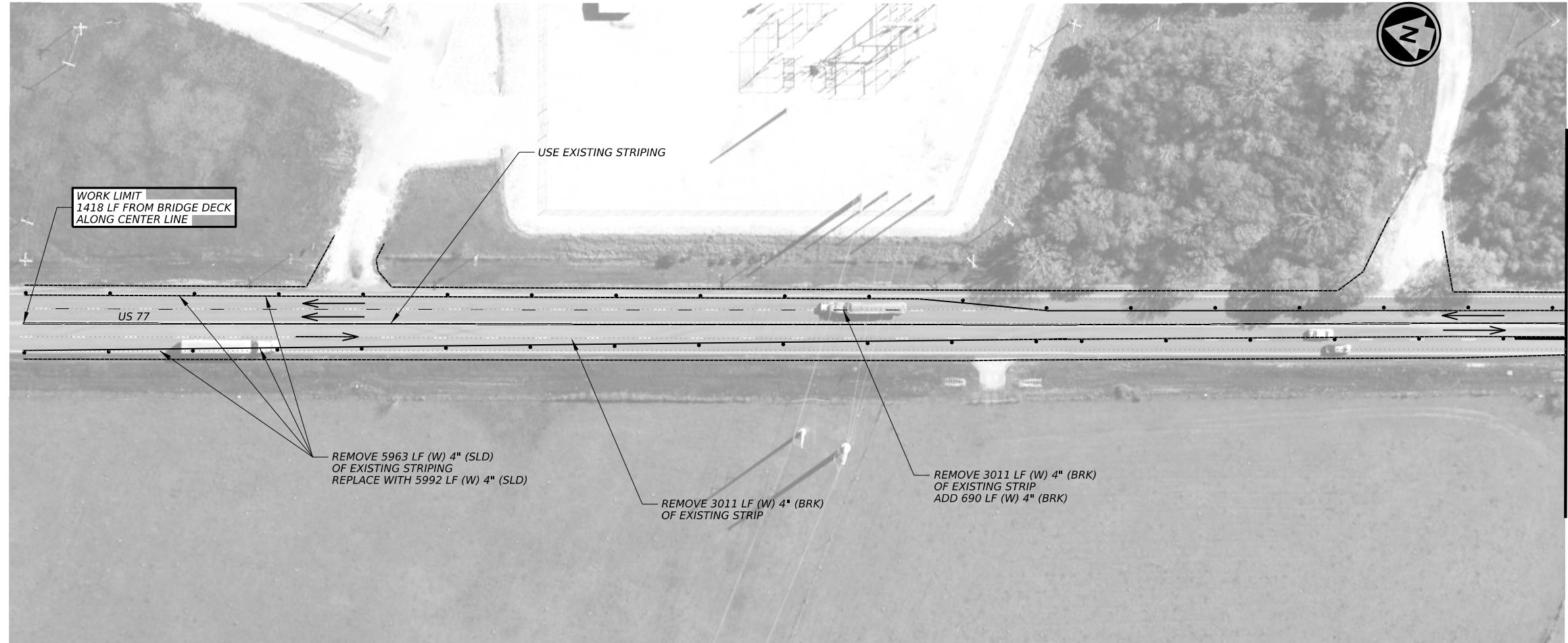
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US77, ETC.
US 77
CSJ 0211-04-027
TCP TYP SECTIONS

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DIST	COUNTY	SHEET NO.	
AUS	LEE	12	

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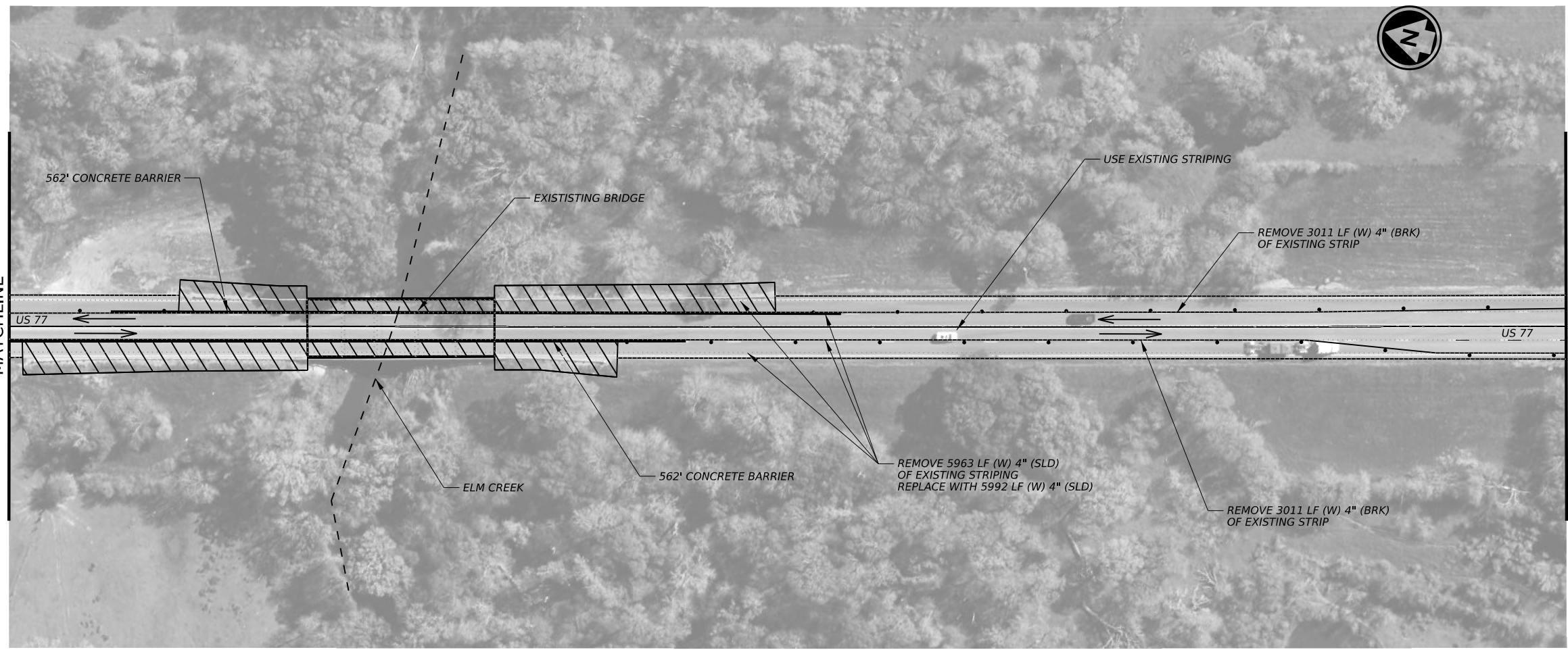


LEGEND	
	WORKZONE AREA
	CHANNELIZING DEVICES
	CONCRETE BARRIER
	DIRECTION OF TRAVEL

NOTE:
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LINEWORKS BASED ON BING MAP IMAGE.
VERIFY AND KEEP TRACK RECORD OF EXISTING PAVEMENT MARKINGS PRIOR TO REMOVAL OF STRIPINGS DURING TCP, RESTRIPE TO EXISTING AT END OF THE WORK. LIMIT WORKZONE AREA WITHIN EXISTING RIGHT OF WAY BOUNDARY.

FOLLOW TCP(2-5)-18 FOR SETTING UP LANE DROP, APPROPRIATE TAPER LENGTH AND SIGNS.

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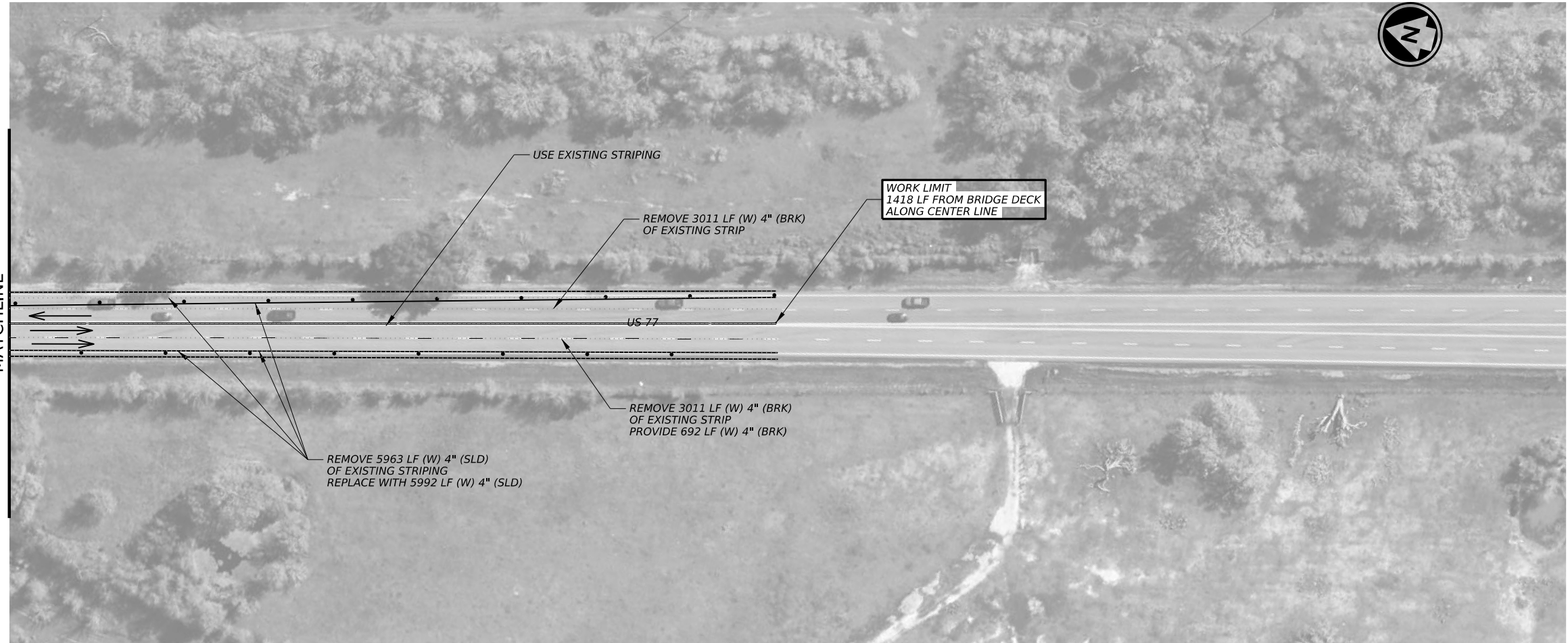
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US77, ETC.
US 77
CSJ 0211-04-027
TRAFFIC CONTROL PLAN
PHASE 1

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		13

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MATCHLINE



LEGEND	
	WORKZONE AREA
	CHANNELIZING DEVICES
	CONCRETE BARRIER
	DIRECTION OF TRAVEL

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 LINEWORKS BASED ON BING MAP IMAGE.
 VERIFY AND KEEP TRACK RECORD OF EXISTING PAVEMENT MARKINGS PRIOR TO REMOVAL OF STRIPINGS DURING TCP. RESTRIPE TO EXISTING AT END OF THE WORK. LIMIT WORKZONE AREA WITHIN EXISTING RIGHT OF WAY BOUNDARY.

FOLLOW TCP(2-5)-18 FOR SETTING UP LANE DROP, APPROPRIATE TAPER LENGTH AND SIGNS.

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 US 77
 CSJ 0211-04-027
 TRAFFIC CONTROL PLAN
 PHASE 1

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	14	

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GENERAL NOTES

1. LIMIT THE LENGTH OF THE WORK ZONE TO WHAT CAN BE CONSTRUCTED IN A SINGLE DAY (EXCEPT WORK ZONES USING TEMPORARY TRAFFIC SIGNALS). THERE SHALL BE NO EDGE DROP-OFF BETWEEN THE TRAFFIC LANES BEFORE OPENING TO TWO-LANE TRAFFIC. IN THE EVENT THAT CONSTRUCTION IS NOT ABLE TO BE COMPLETED BEFORE NIGHTTIME OPERATIONS, PROVIDE A TRANSITION BETWEEN THE TRAFFIC LANES AS APPROVED BY THE ENGINEER BEFORE OPENING TO TWO-LANE TRAFFIC. THIS WORK SHALL BE SUBSIDIARY TO ITEM 502.
2. MAINTAIN POSITIVE DRAINAGE THROUGHOUT THE PROJECT SITE TO REDUCE PONDING.

SEQUENCE OF WORK

PHASE 1

1. INSTALL EROSION CONTROL DEVICES AS DIRECTED BY THE ENGINEER.
2. INSTALL WORK ZONE SIGNS.
3. REMOVE EXISTING PAVEMENT MARKING PER TCP
4. ADD REMOVABLE WORK ZONE PAVEMENT MARKING PER TCP TO REDUCE TRAFFIC TO ONE LANE EACH DIRECTION.

PHASE 2

CONCRETE REPAIR
 REPAIR CONCRETE SPALLS AT BENT CAPS. THIS WORK IS UNDER BRIDGE AND SHOULD NOT REQUIRE ADDITIONAL TRAFFIC CONTROL.

PHASE 3

EROSION CONTROL REPAIR
 FILL EROSION GULLY WITH ROCK RIPRAP. THIS WORK IS UNDER BRIDGE AND SHOULD NOT REQUIRE ADDITIONAL TRAFFIC CONTROL

PHASE 4

RETROFIT BRIDGE RAIL
 REMOVE APPROACH GUARDRAIL AND REPLACE WITH APPROPRIATE BARRIER.
 BEGIN BRIDGE RAIL RETROFIT ON ONE SIDE OF THE BRIDGE USING ONE-LANE TWO WAY TRAFFIC CONTROL WITH FLAGGING OPERATION.
 CONTINUE RAIL RETROFIT ON OTHER SIDE OF BRIDGE.

PHASE 5

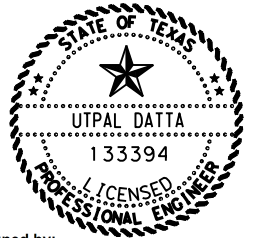
CLEANING AND SEALING JOINTS
 START WITH CLEANING AND SEALING JOINTS ON THE BRIDGE USING ONE-LANE TWO TRAFFIC CONTROL WITH FLAGGING OPERATION.

PHASE 6

APPROACH MBGF
 REPLACE APPROACH MBGF WITH END TREATMENTS USING ONE-LANE TWO TRAFFIC CONTROL WITH FLAGGING OPERATION

PHASE 7

REMOVE EROSION CONTROL AND WORK ZONE SIGNS.
 REMOVE SILT FENCES AND SIGS AFTER ALL WORK IS COMPLETE.
 RESTRIPE PAVEMENT MARKINGS TO EXISTING LAYOUT.



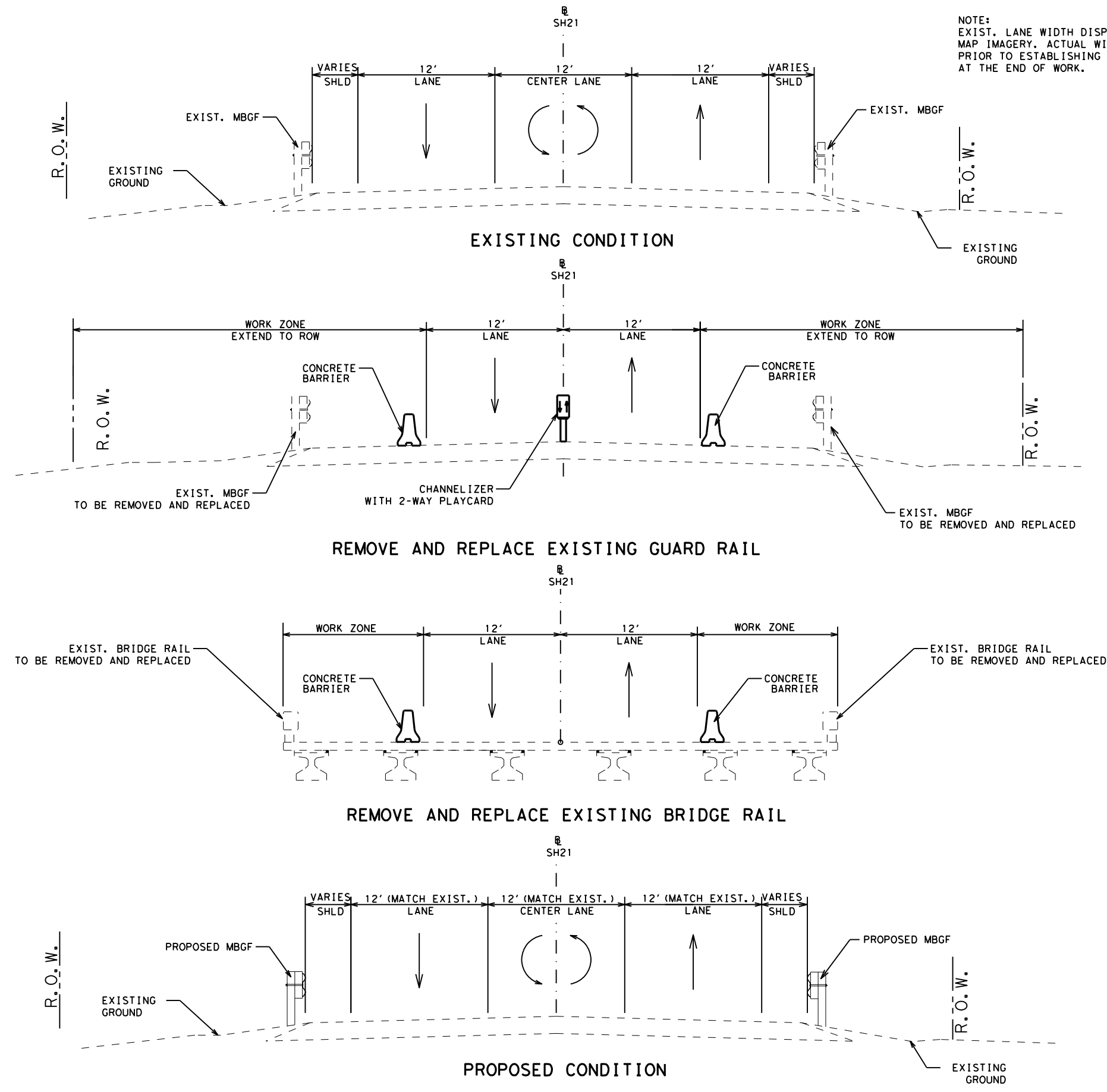
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SH 21 CSJ 0473-02-042 SEQUENCE OF WORK			
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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	15	

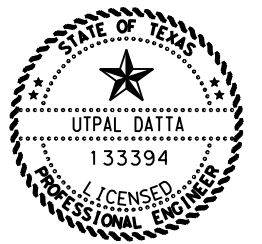
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MAP IMAGERY. ACTUAL WIDTH MAY VARY. VERIFY AND RECORD EXISTING DIMENSIONS
PRIOR TO ESTABLISHING TCP. RESTRIPE AND MAINTAIN EXISTING LANE WIDTH
AT THE END OF WORK.



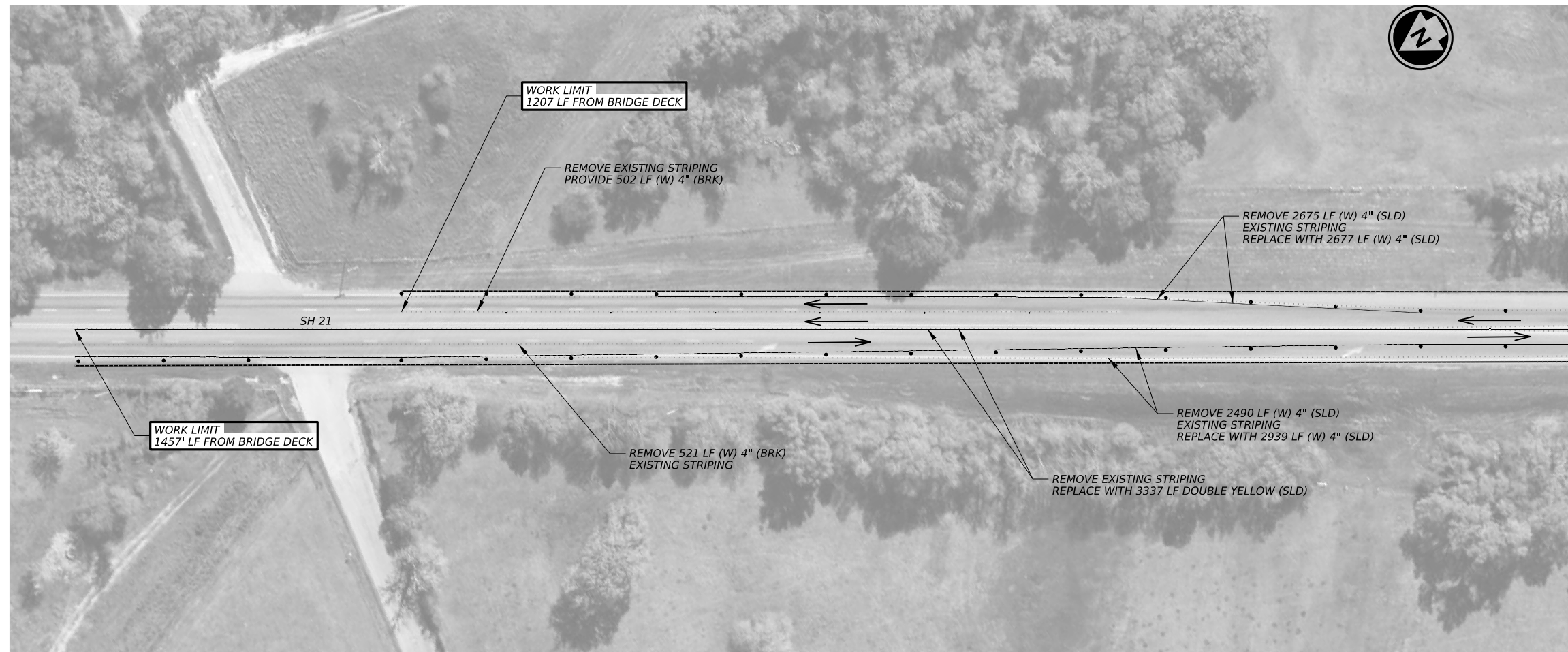
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SH 21
CSJ 0473-02-042
TCP TYP SECTIONS

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CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.	
AUS	LEE	16	

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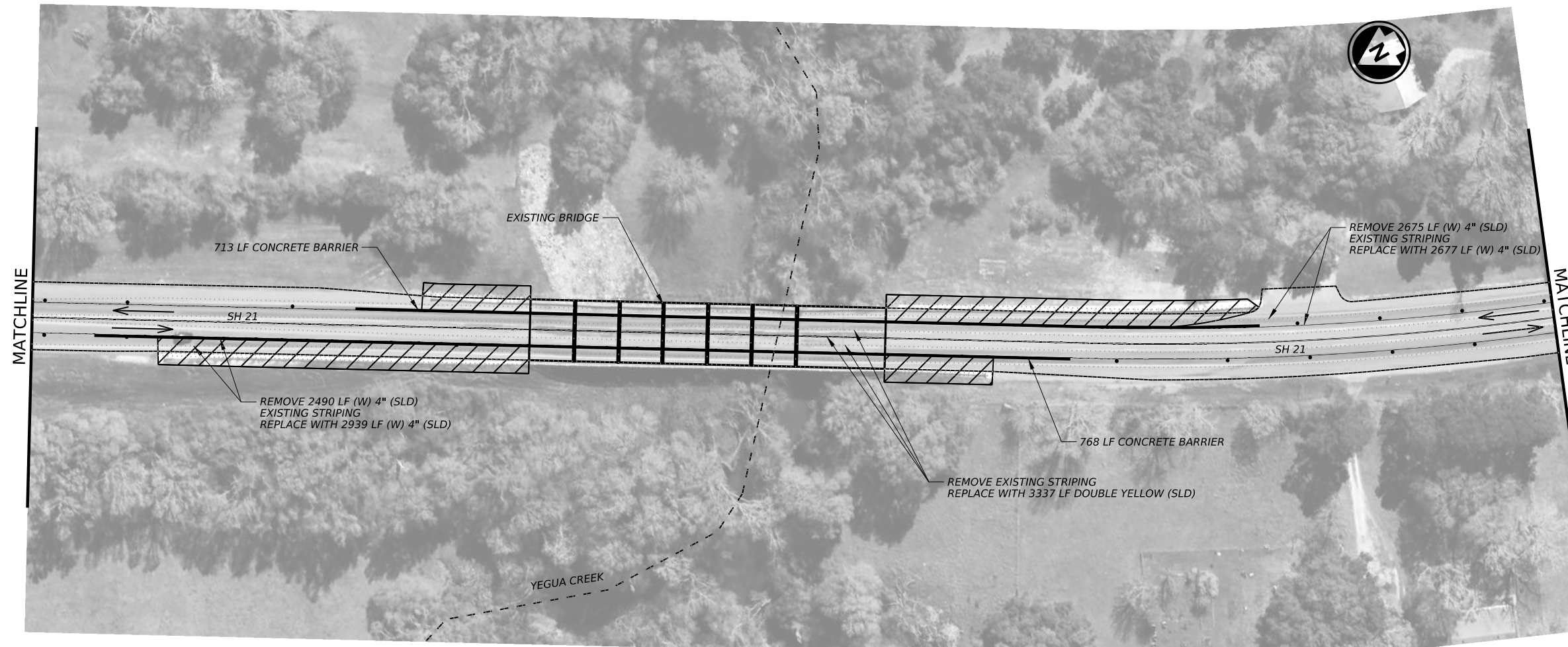


LEGEND	
	WORKZONE AREA
	CHANNELIZING DEVICES
	CONCRETE BARRIER
	DIRECTION OF TRAVEL

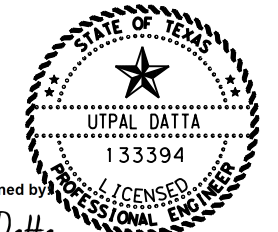
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LINEWORKS BASED ON BING MAP IMAGE.
VERIFY AND KEEP TRACK RECORD OF EXISTING PAVEMENT MARKINGS PRIOR TO REMOVAL OF STRIPINGS, RESTRIPE TO EXISTING AT END OF THE WORK. LIMIT WORKZONE AREA WITHIN EXISTING RIGHT OF WAY BOUNDARY.

FOLLOW TCP(2-5)-18 FOR SETTING UP LANE DROP, APPROPRIATE TAPER LENGTH AND SIGNS.

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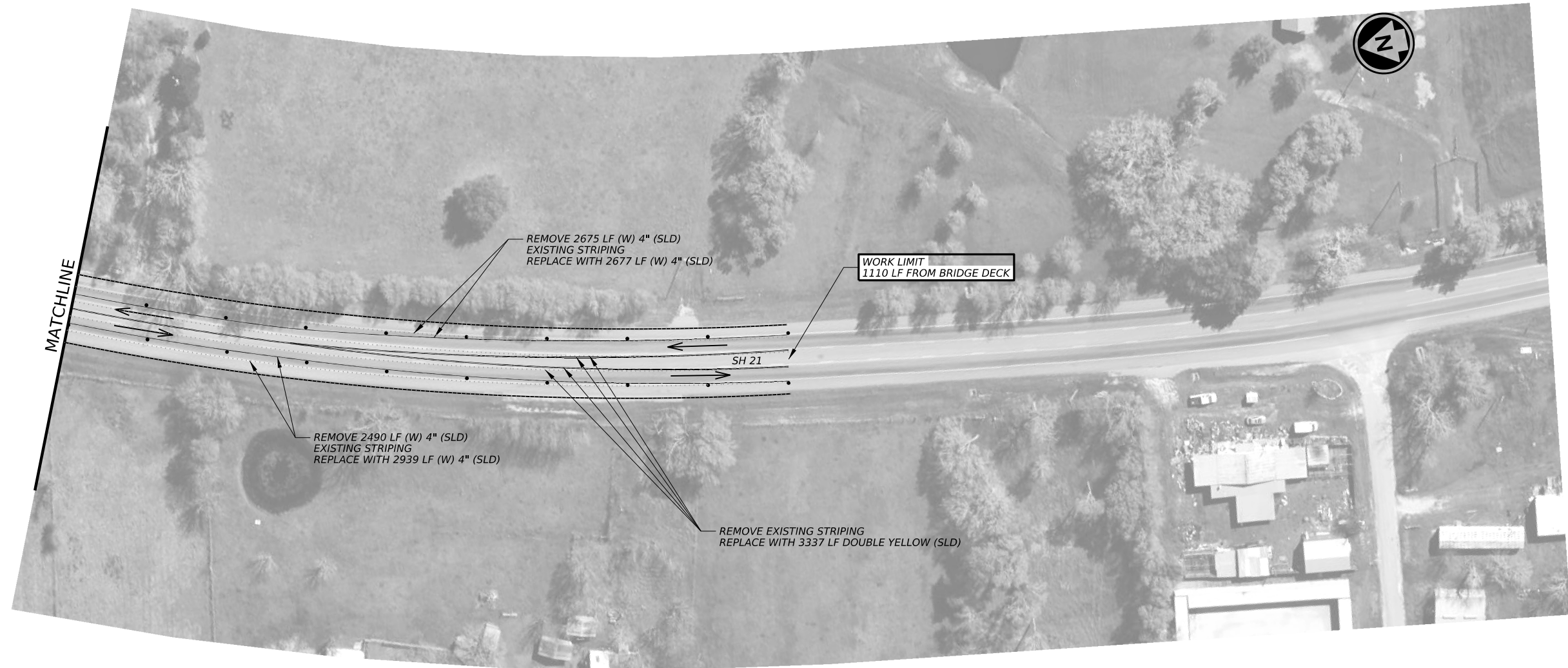


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SH 21 CSJ 0473-02-042 TRAFFIC CONTROL PLAN PHASE 1			
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DIST	COUNTY	SHEET NO.	
AUS	LEE	17	

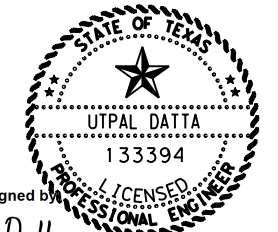
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LEGEND	
	WORKZONE AREA
	CHANNELIZING DEVICES
	CONCRETE BARRIER
	DIRECTION OF TRAVEL

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 VERIFY AND KEEP TRACK RECORD OF EXISTING
 PAVEMENT MARKINGS PRIOR TO REMOVAL OF
 STRIPINGS, RESTRIPE TO EXISTING AT END OF
 THE WORK. LIMIT WORKZONE AREA WITHIN
 EXISTING RIGHT OF WAY BOUNDARY.

FOLLOW TCP(2-5)-18 FOR SETTING UP LANE
 DROP, APPROPRIATE TAPER LENGTH AND SIGNS.



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 1/9/2024



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 CSJ 0473-02-042
 TRAFFIC CONTROL PLAN
 PHASE 1

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES


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

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

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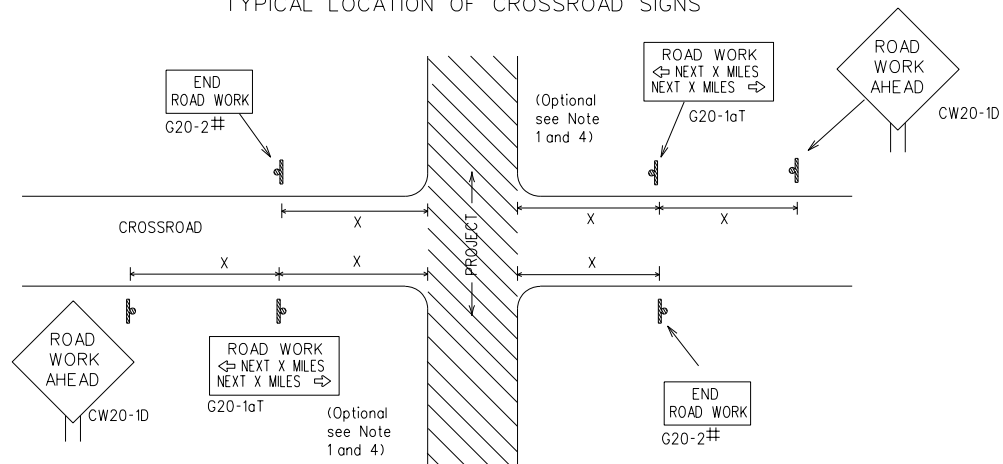
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SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
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© TxDOT	November 2002	CONT:	0211
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		JOB:	027, ETC
		HIGHWAY:	US 77, ETC.
4-03	7-13	DIST:	AUS
9-07	8-14	COUNTY:	LEE
5-10	5-21	SHEET NO.:	19

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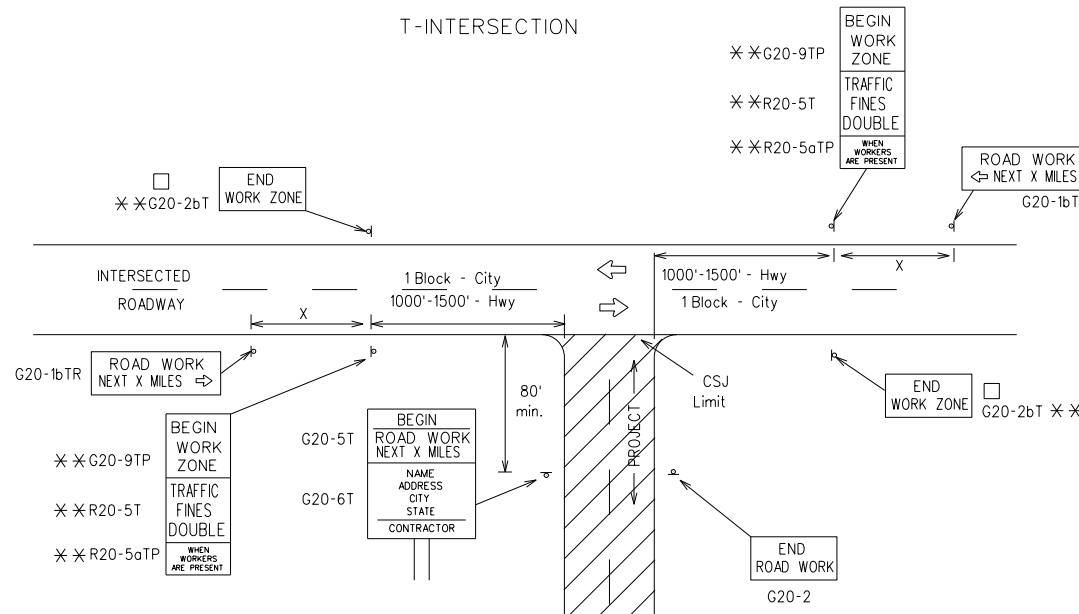
TYPICAL LOCATION OF CROSSROAD SIGNS



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

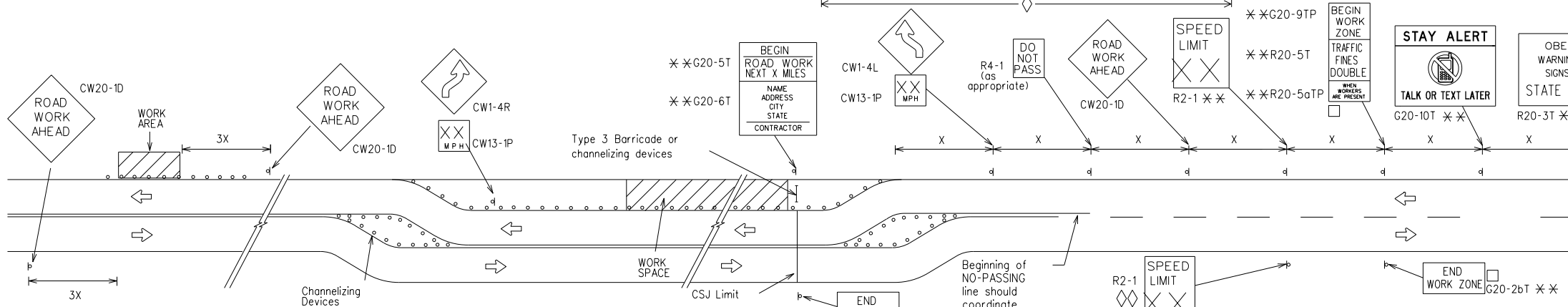
Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/ Freeway	Posted Speed MPH	Sign * Spacing "X" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW23			40	240
CW25			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	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.
- * Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

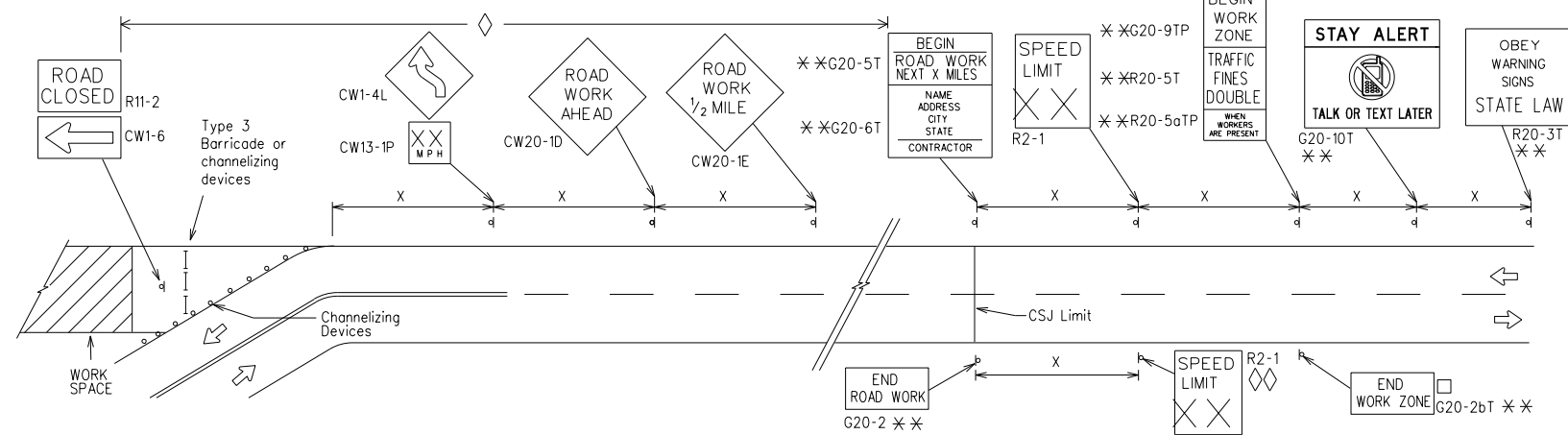
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

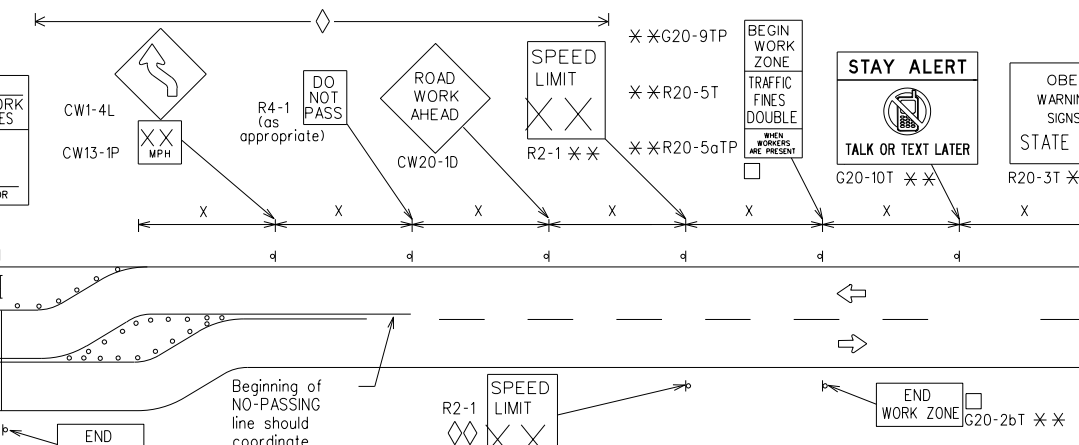


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

- The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- ✖✖ CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- ◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- ◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

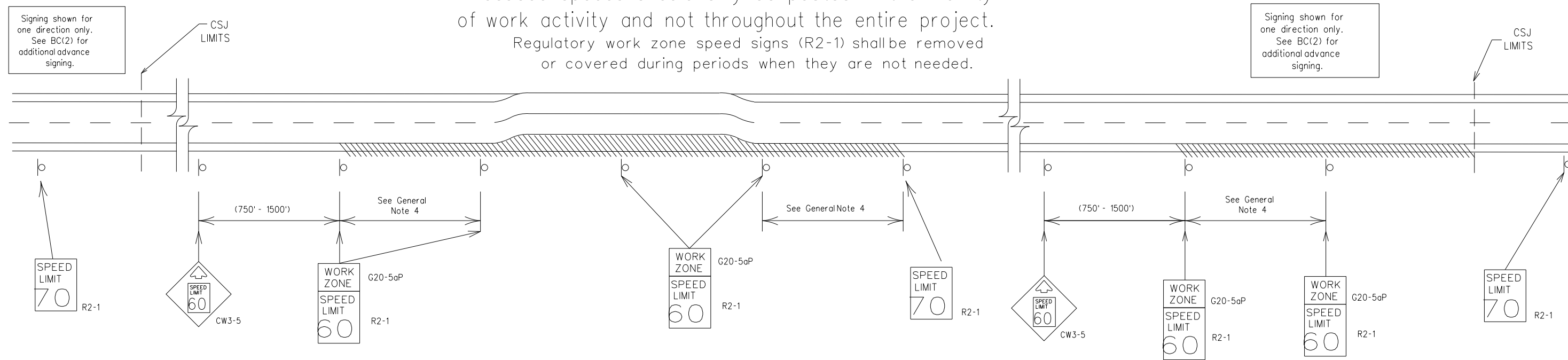
BC(2)-21

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REVISIONS		DIST	AUS	COUNTY	LEE	SHEET NO.		20	
9-07	8-14								
7-13	5-21								

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

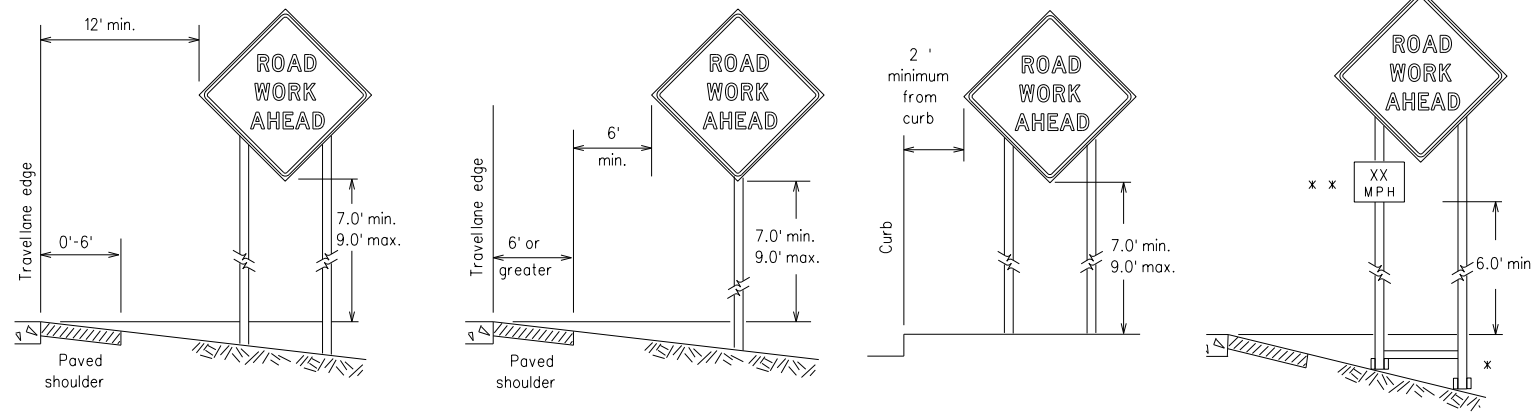
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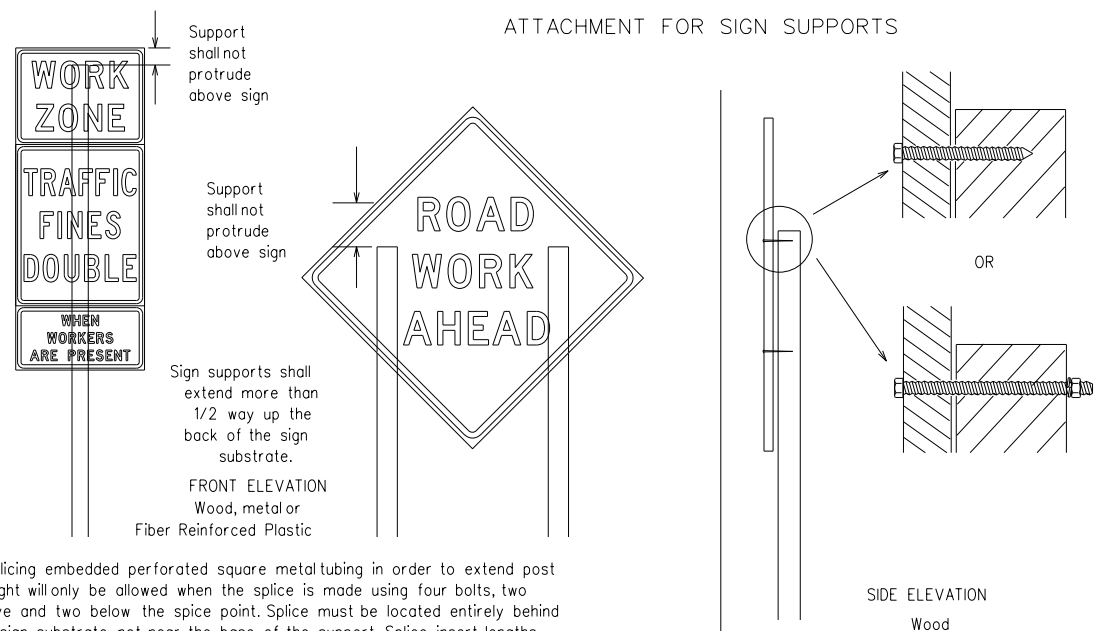
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

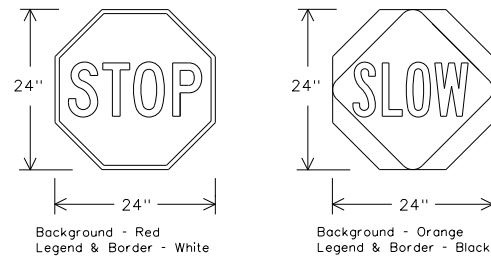
ATTACHMENT FOR SIGN SUPPORTS



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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (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.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

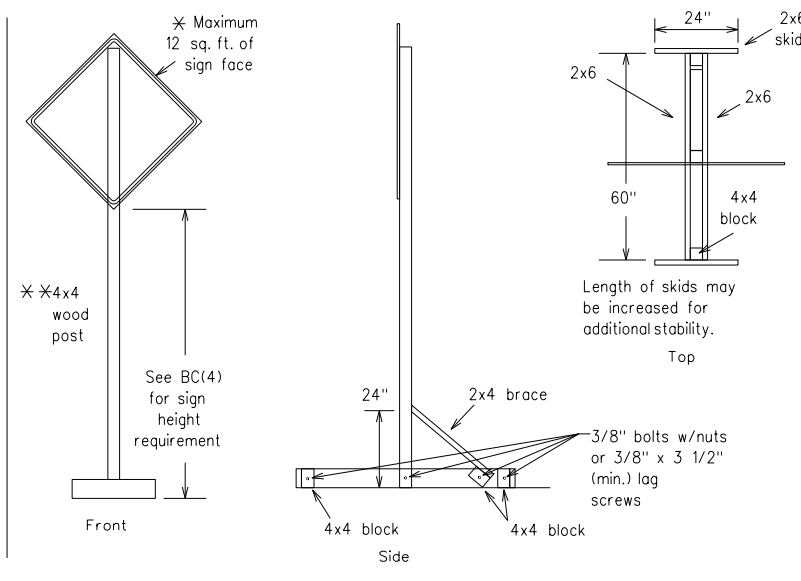
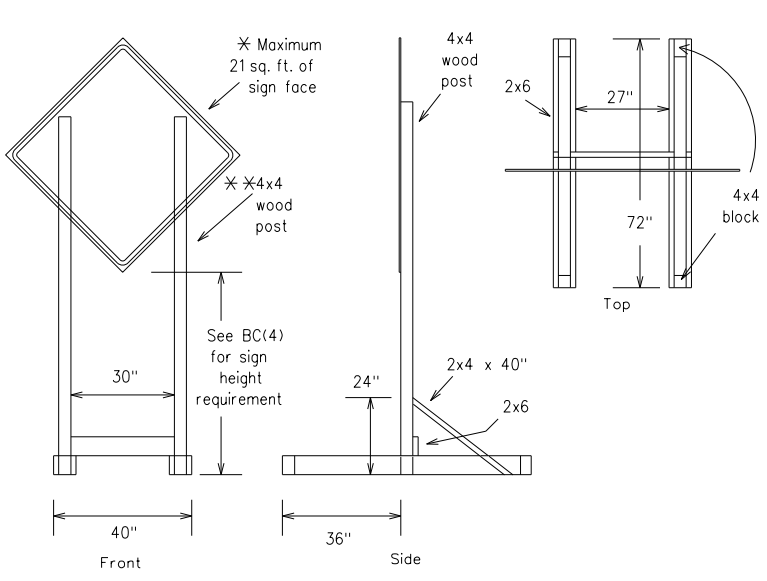
1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

SHEET 4 OF 12

<h2>BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES</h2>			
<h3>BC(4)-21</h3>			
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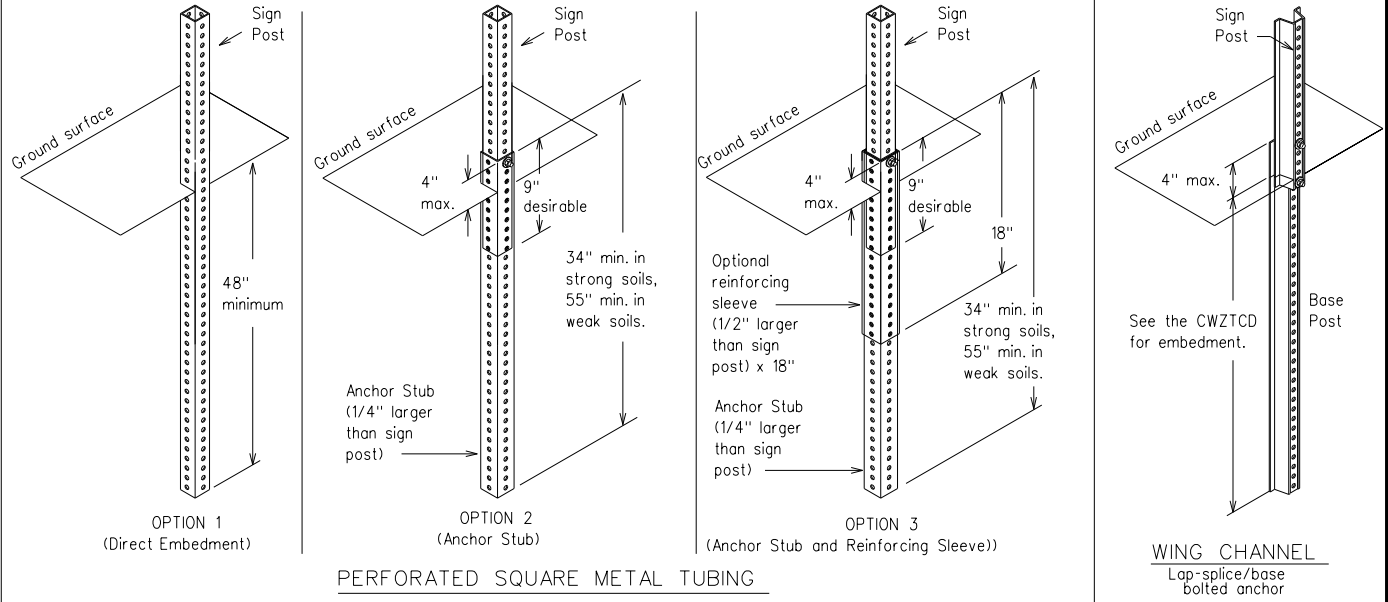
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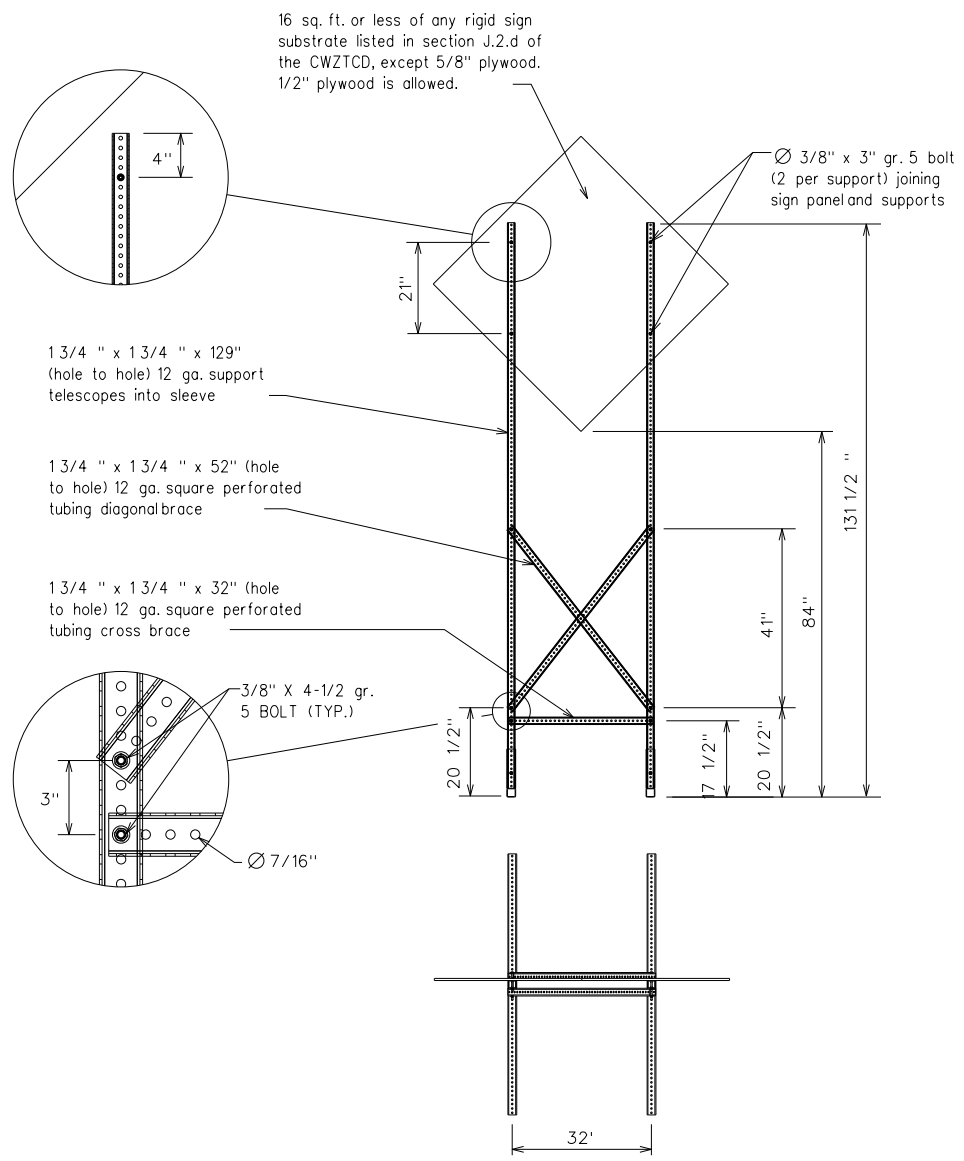
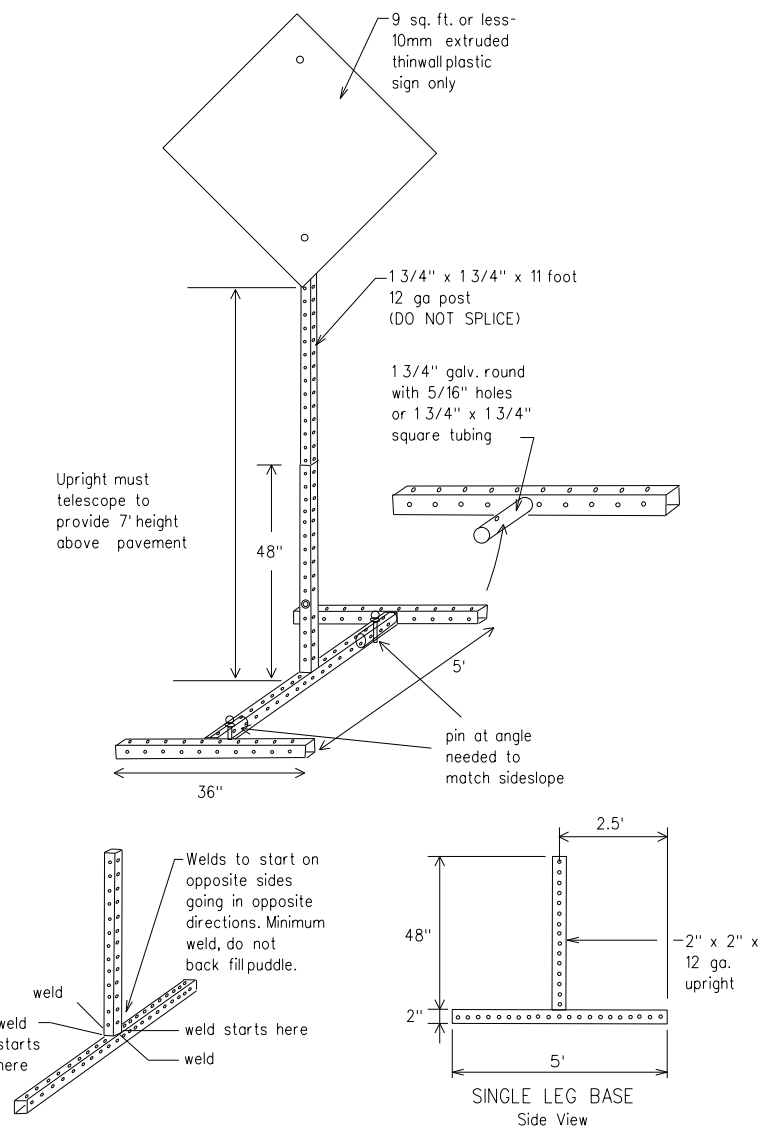
SKID MOUNTED WOOD SIGN SUPPORTS

* 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

Traffic Safety Division Standard

**BARRICADE AND CONSTRUCTION
TYPICAL SIGN SUPPORT**

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

* 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

Location List

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

Warning List

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

x x 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

x x 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 should 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

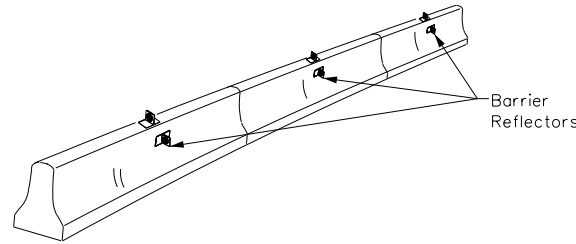
- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbols/signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS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

<p>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</p> <p>BC(6)-21</p>			
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REVISIONS	0211	DW:	TxDOT
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		DIST	COUNTY
		AUS	LEE
		SHEET NO.	24

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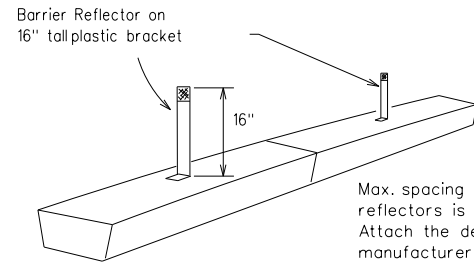
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



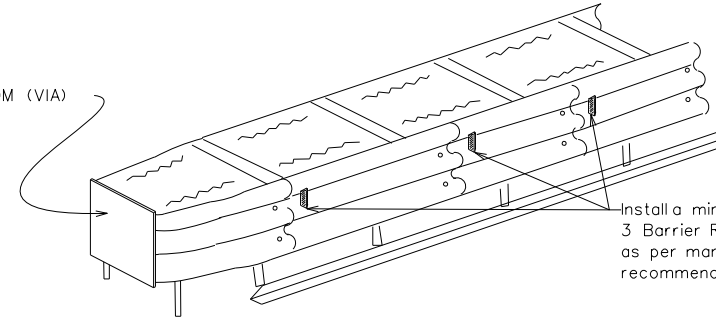
LOW PROFILE CONCRETE BARRIER (LPCB)

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.

See D & OM (VIA)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

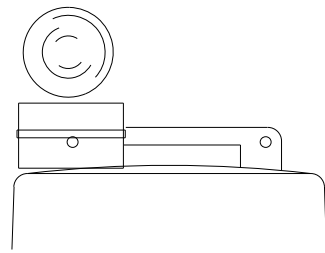
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

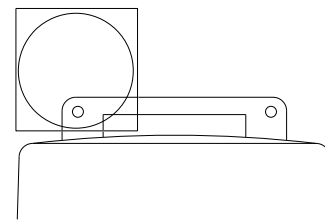
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



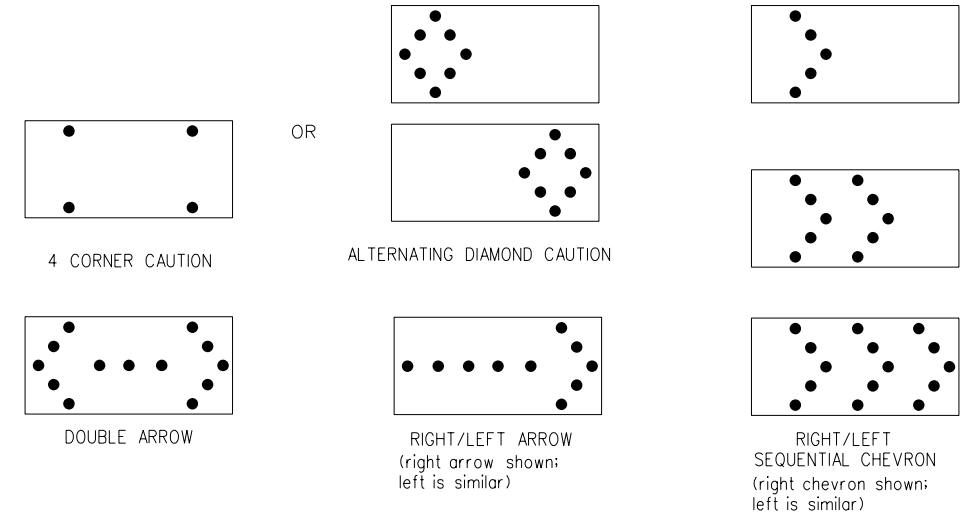
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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



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

BC(7)-21

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

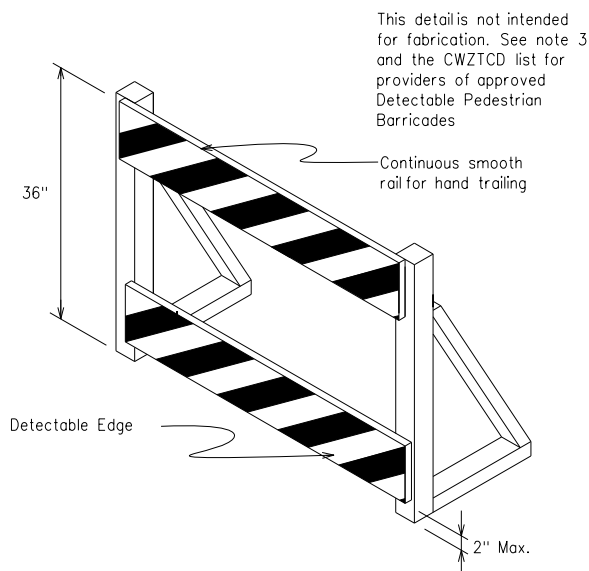
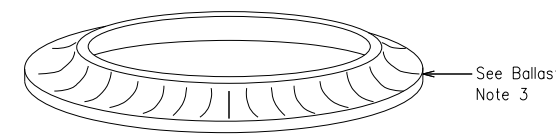
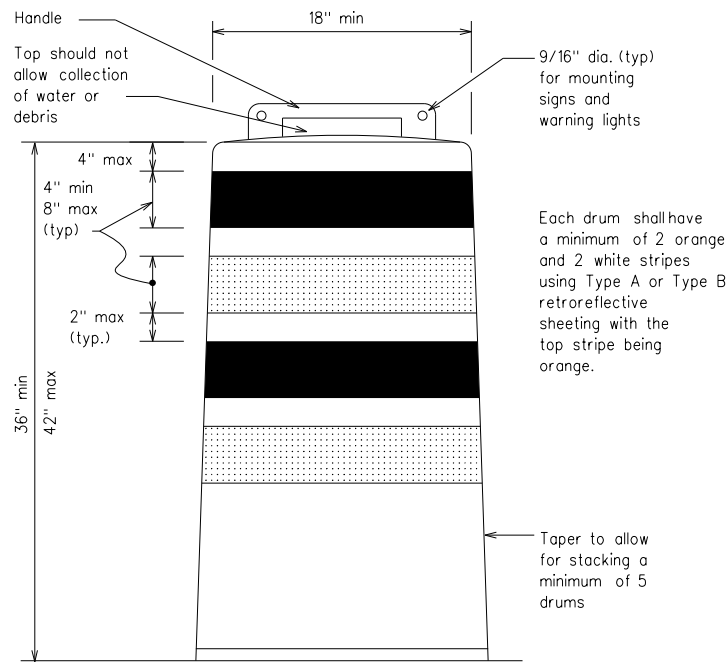
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

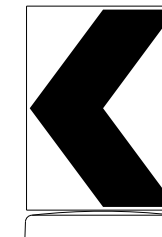
BALLAST

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

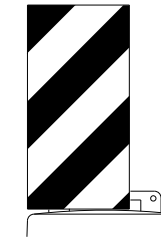


DETECTABLE PEDESTRIAN BARRICADES

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



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B or Type C 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



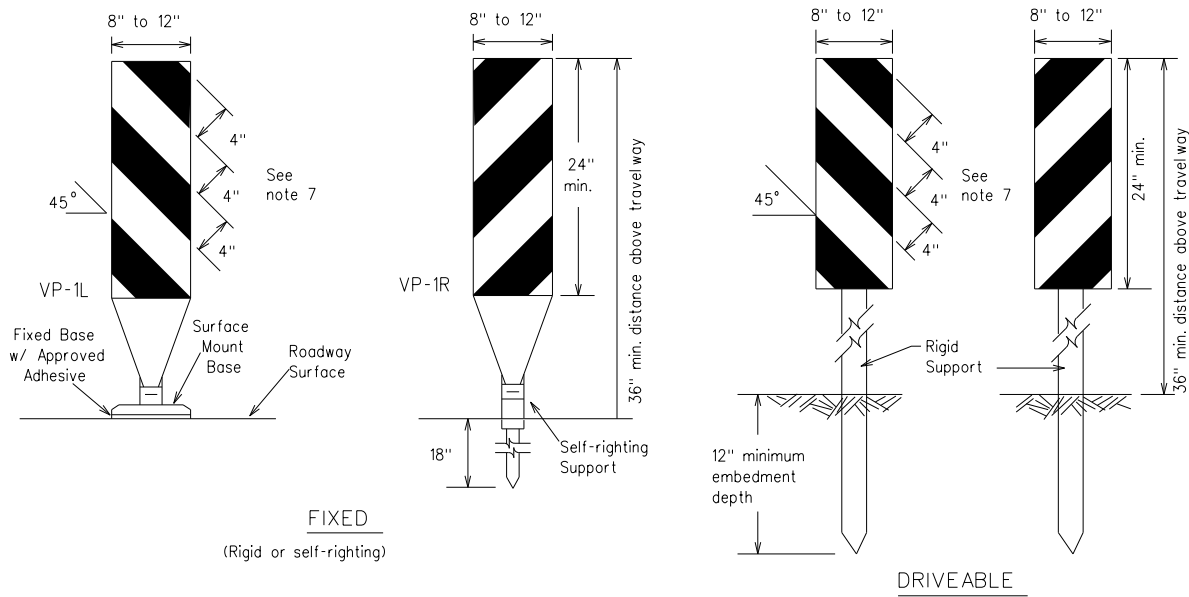
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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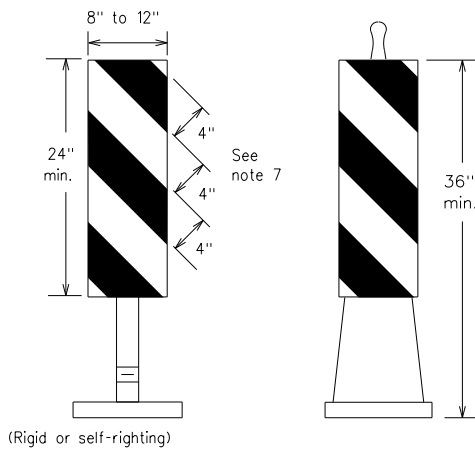
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FIXED
(Rigid or self-righting)

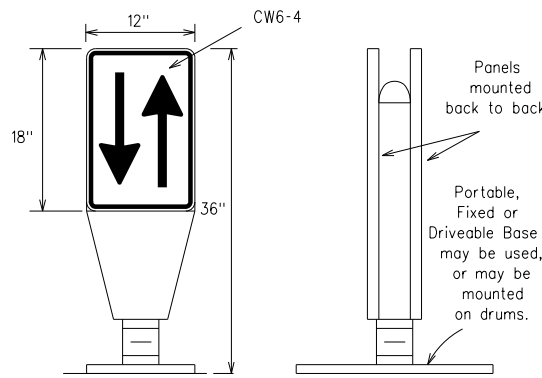
DRIVEABLE



PORTABLE

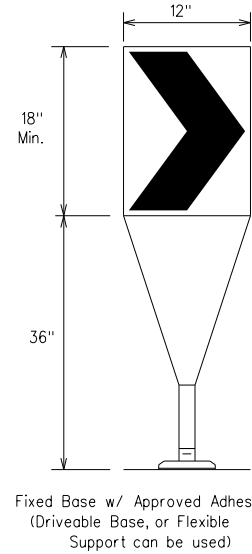
VERTICAL PANELS (VPs)

- 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)

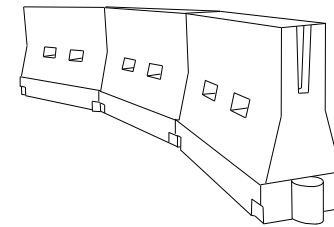
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base 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 VP's.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VP's 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 or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



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

- 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 or Type C 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 x x			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'

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

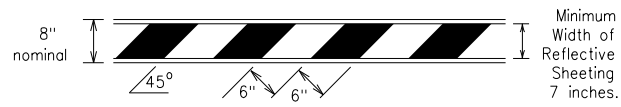
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© TxDOT November 2002	CONT: 0211	SECT: 04	JOB: 027, ETC	HIGHWAY: US 77, ETC.
REVISIONS	0211	04	027, ETC	US 77, ETC.
9-07 8-14	DIST: AUS	COUNTY: LEE	SHEET NO. 27	
7-13 5-21				

DATE: 11/30/2023 8:36:39 PM
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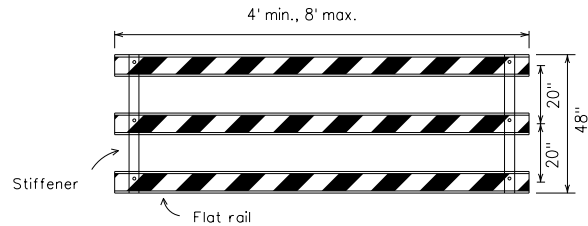
TYPE 3 BARRICADES

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.

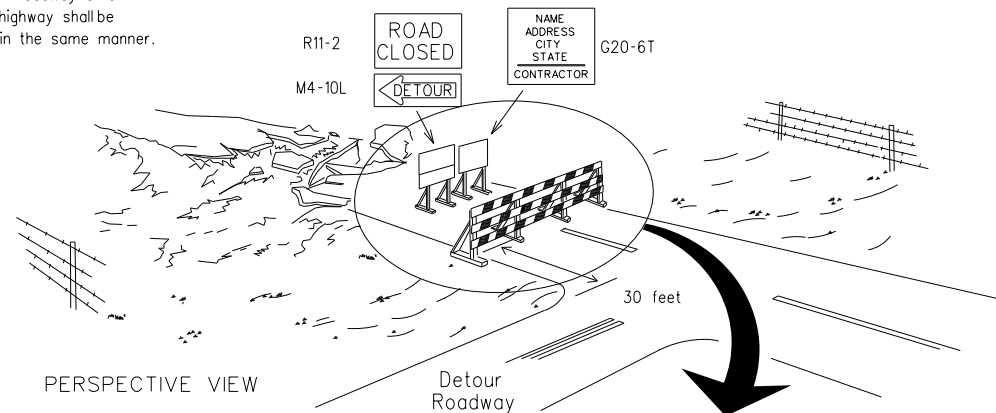


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

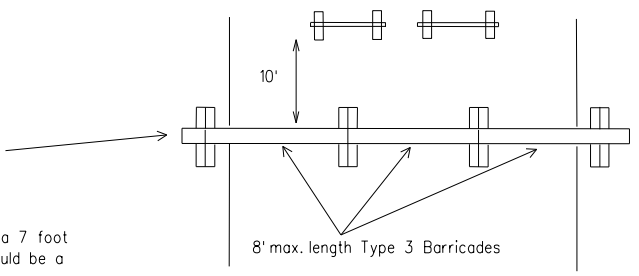
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

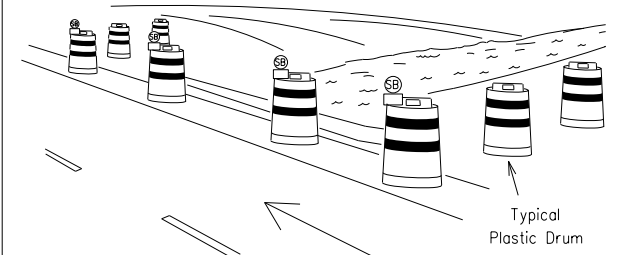
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.

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.

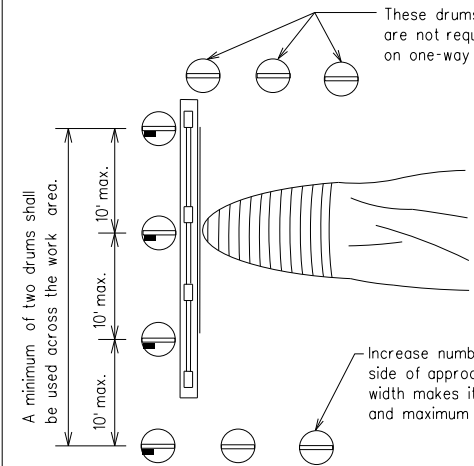


PLAN VIEW

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

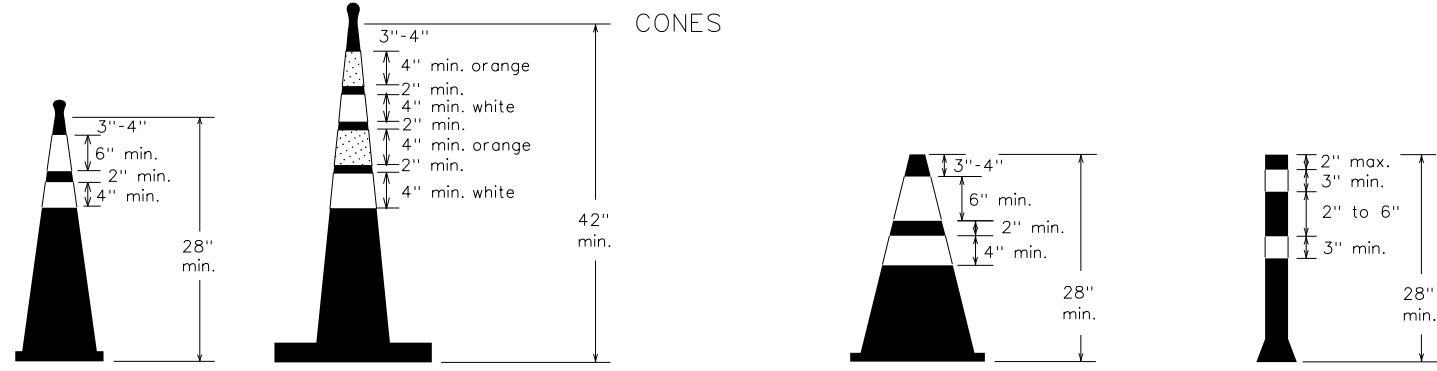


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

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

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



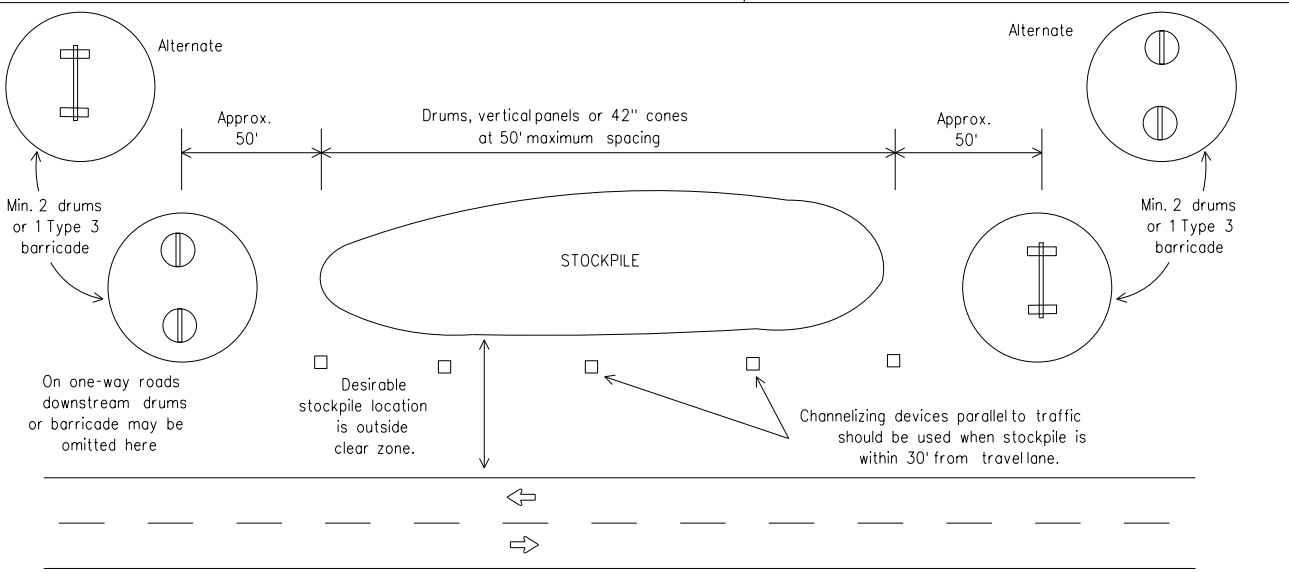
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC	US 77, ETC.
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	AUS	LEE	28	

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 (foilback) shall meet the requirements of DMS-8240.

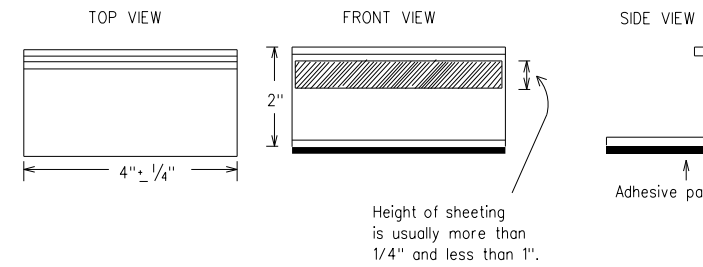
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

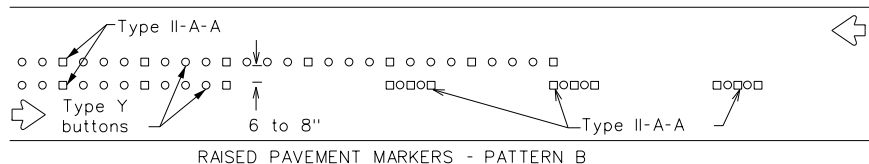
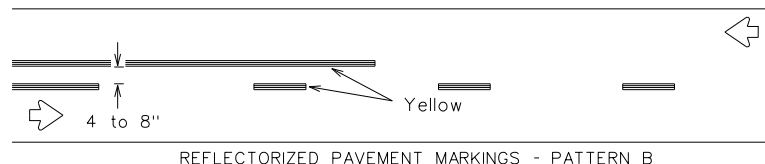
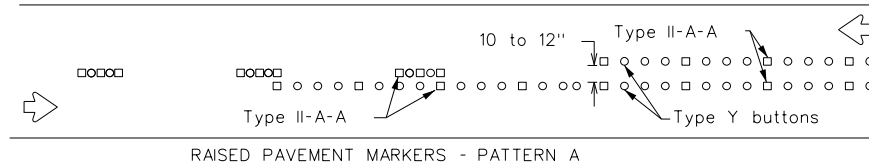
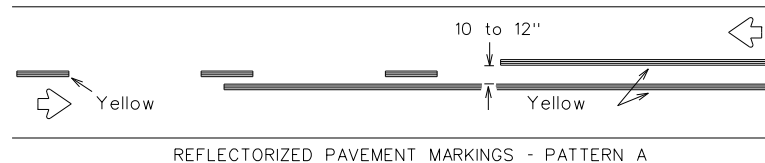
A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12

Texas Department of Transportation		Traffic Safety Division Standard
<h2 style="margin: 0;">BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS</h2> <h3 style="margin: 0;">BC(11)-21</h3>		
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT: 0211	SECT: 04
REVISIONS	JOB: 027, ETC	HIGHWAY: US 77, ETC.
2-98 9-07 5-21	DIST: AUS	COUNTY: LEE
1-02 7-13	SHEET NO. 29	
11-02 8-14		

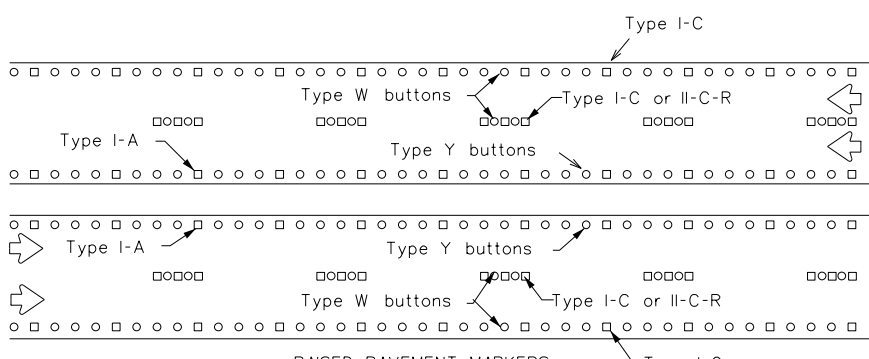
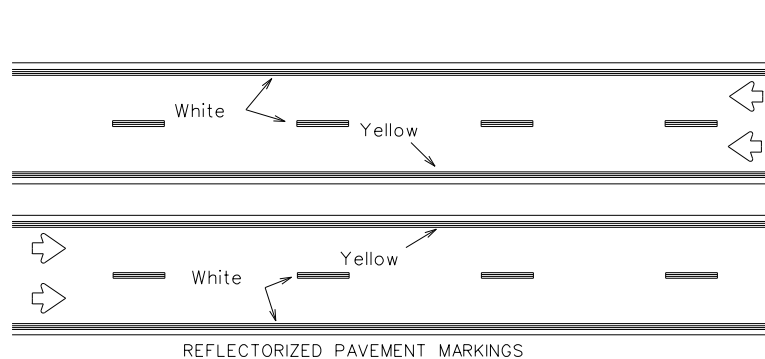
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PAVEMENT MARKING PATTERNS



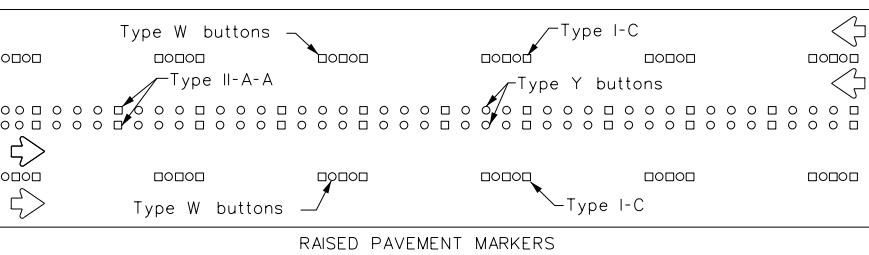
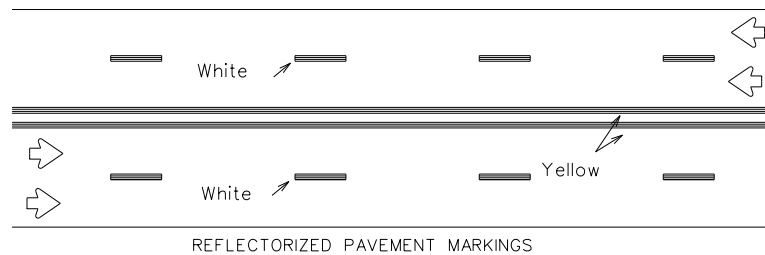
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

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



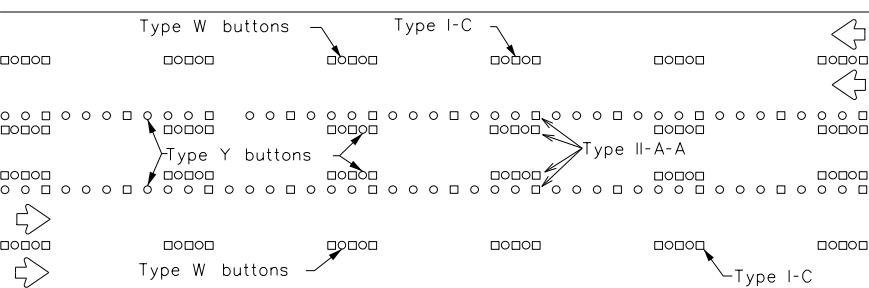
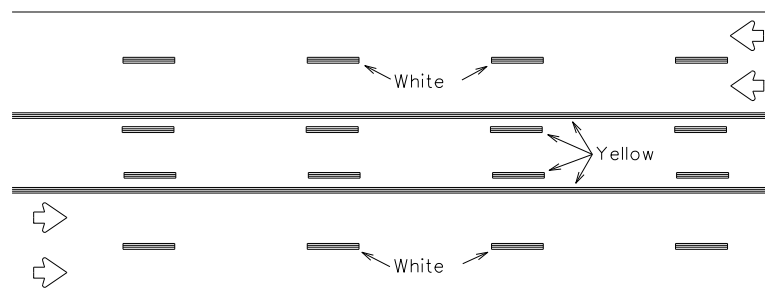
Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

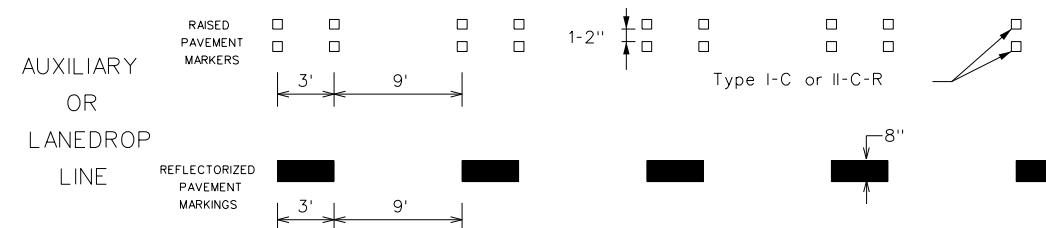
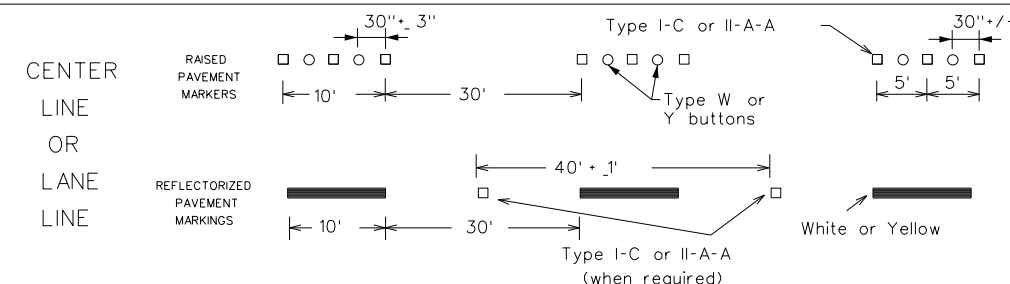
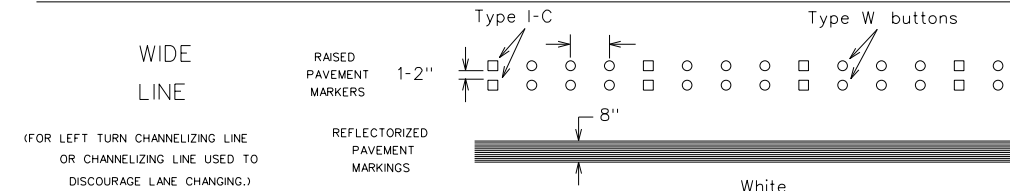
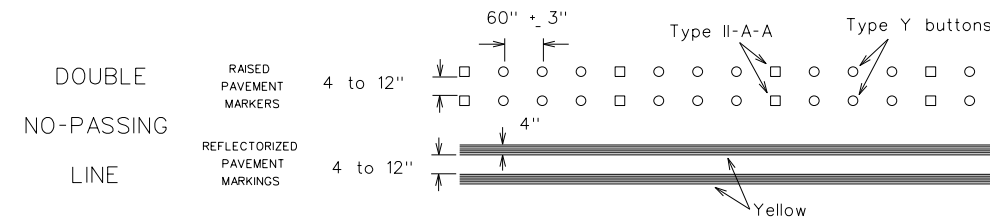
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Prefabricated markings may be substituted for reflectorized pavement markings.

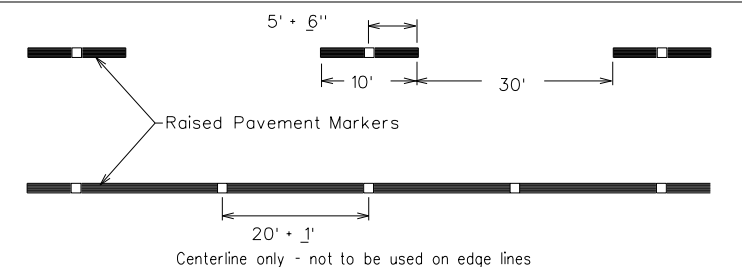
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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				

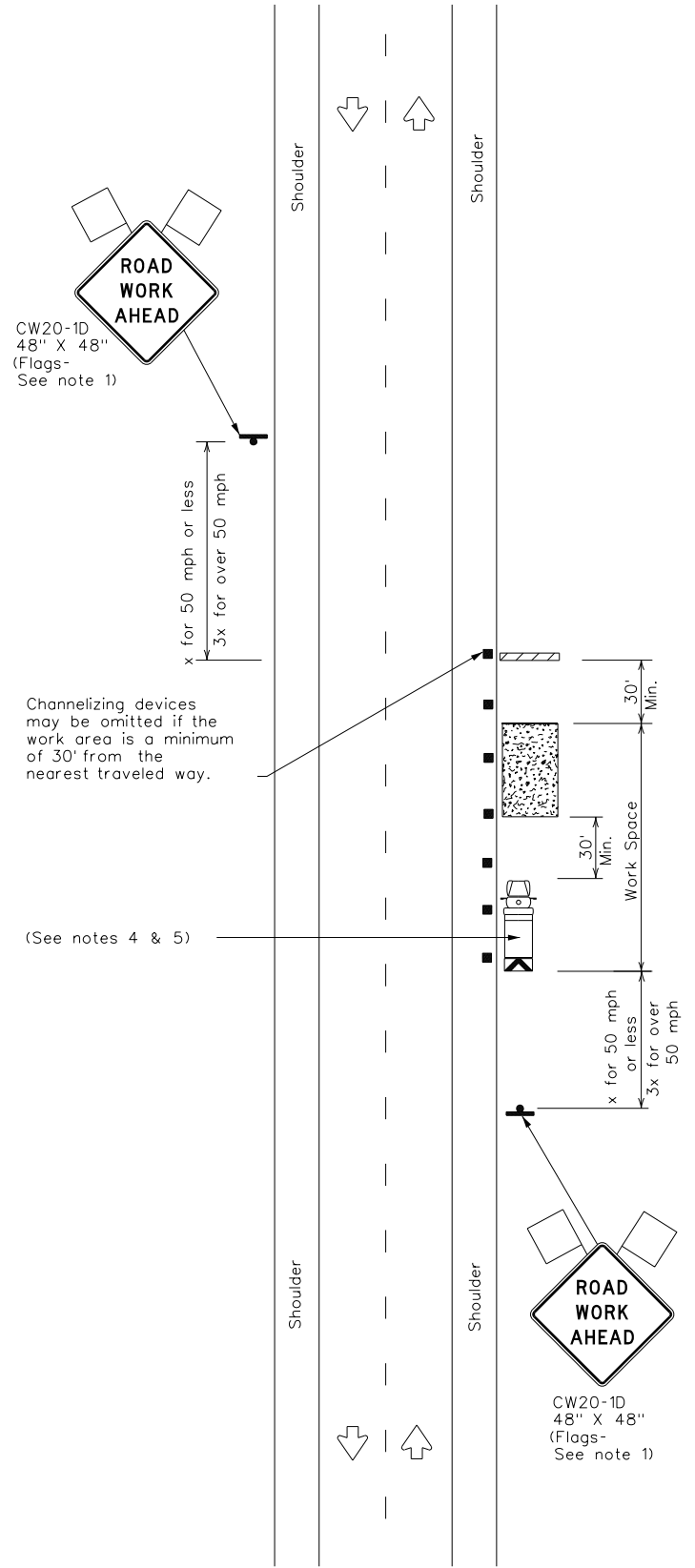
Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

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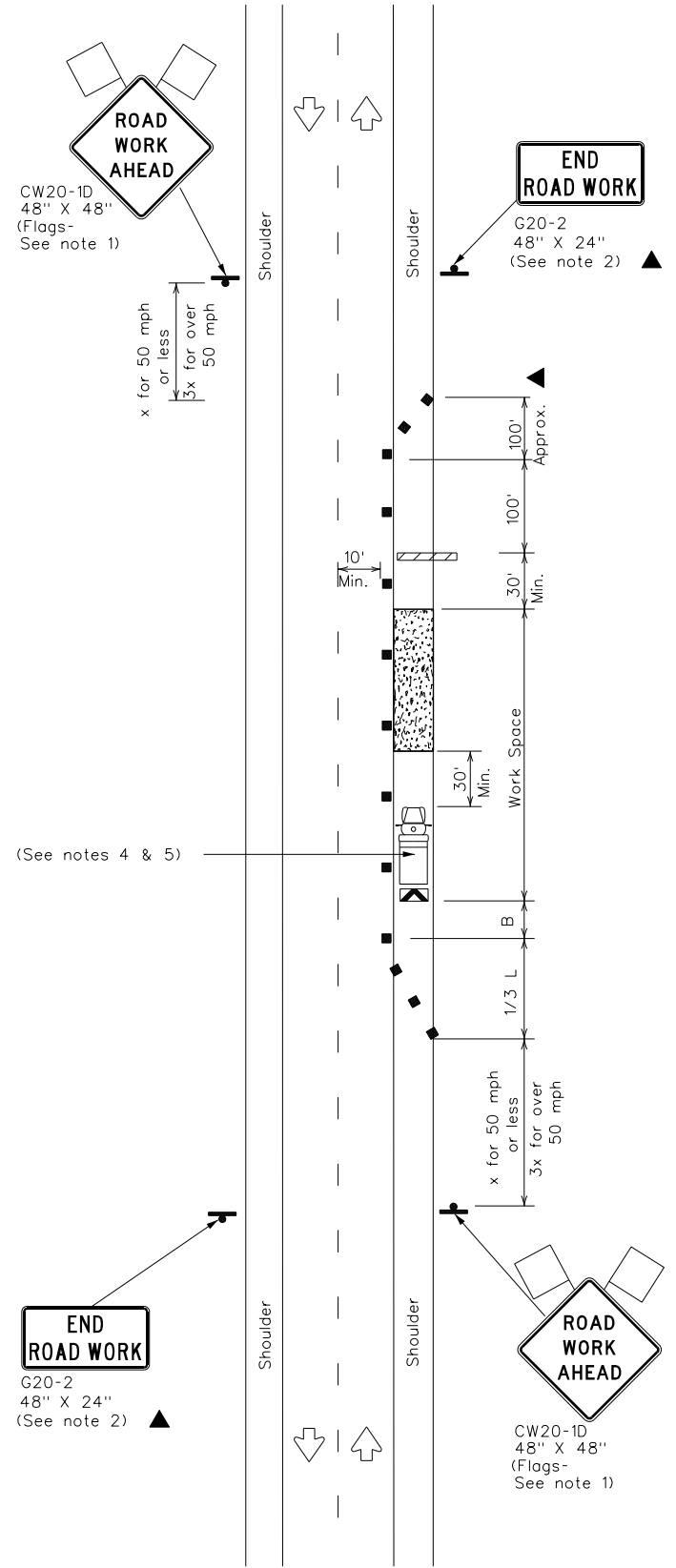
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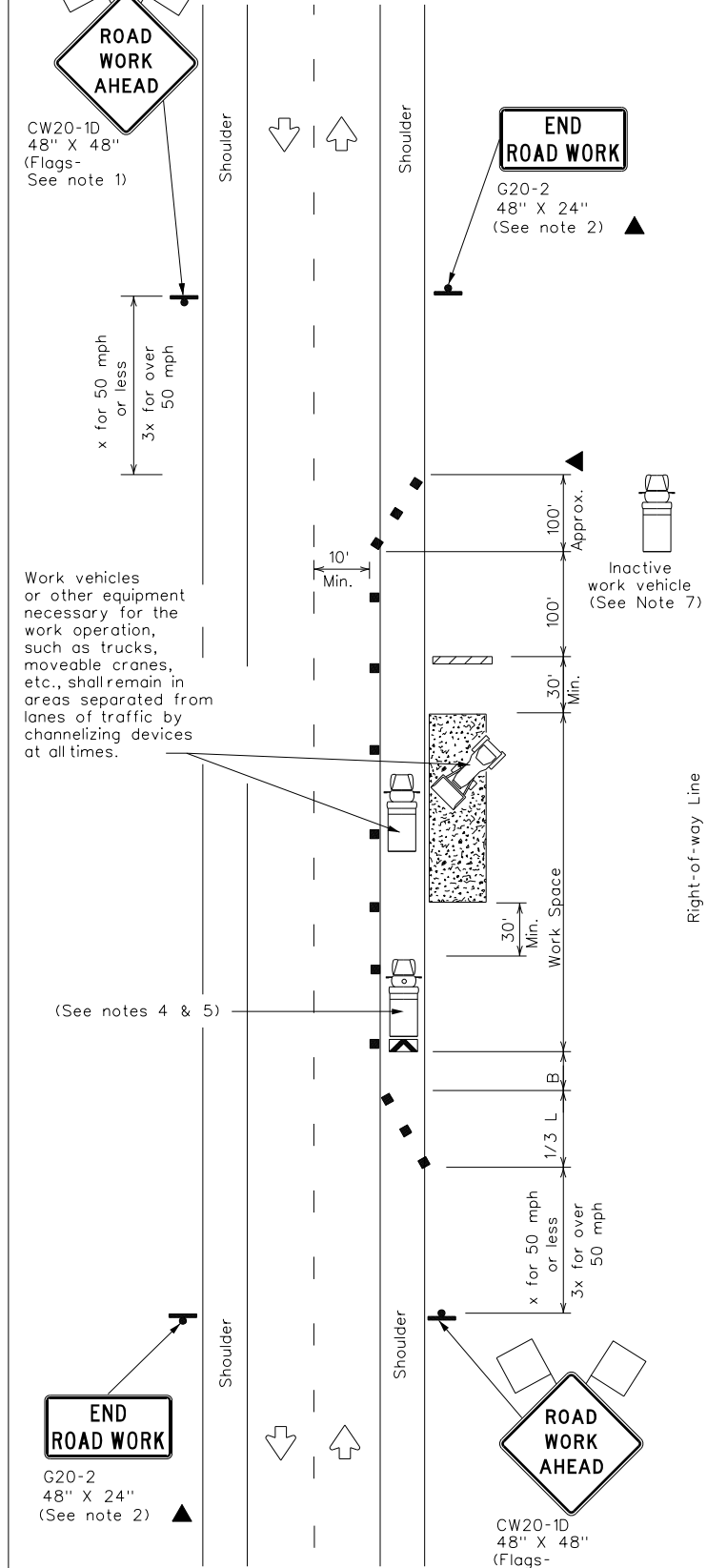
TCP (2-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	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 x x			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{W \cdot V^2}{60}$	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 in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

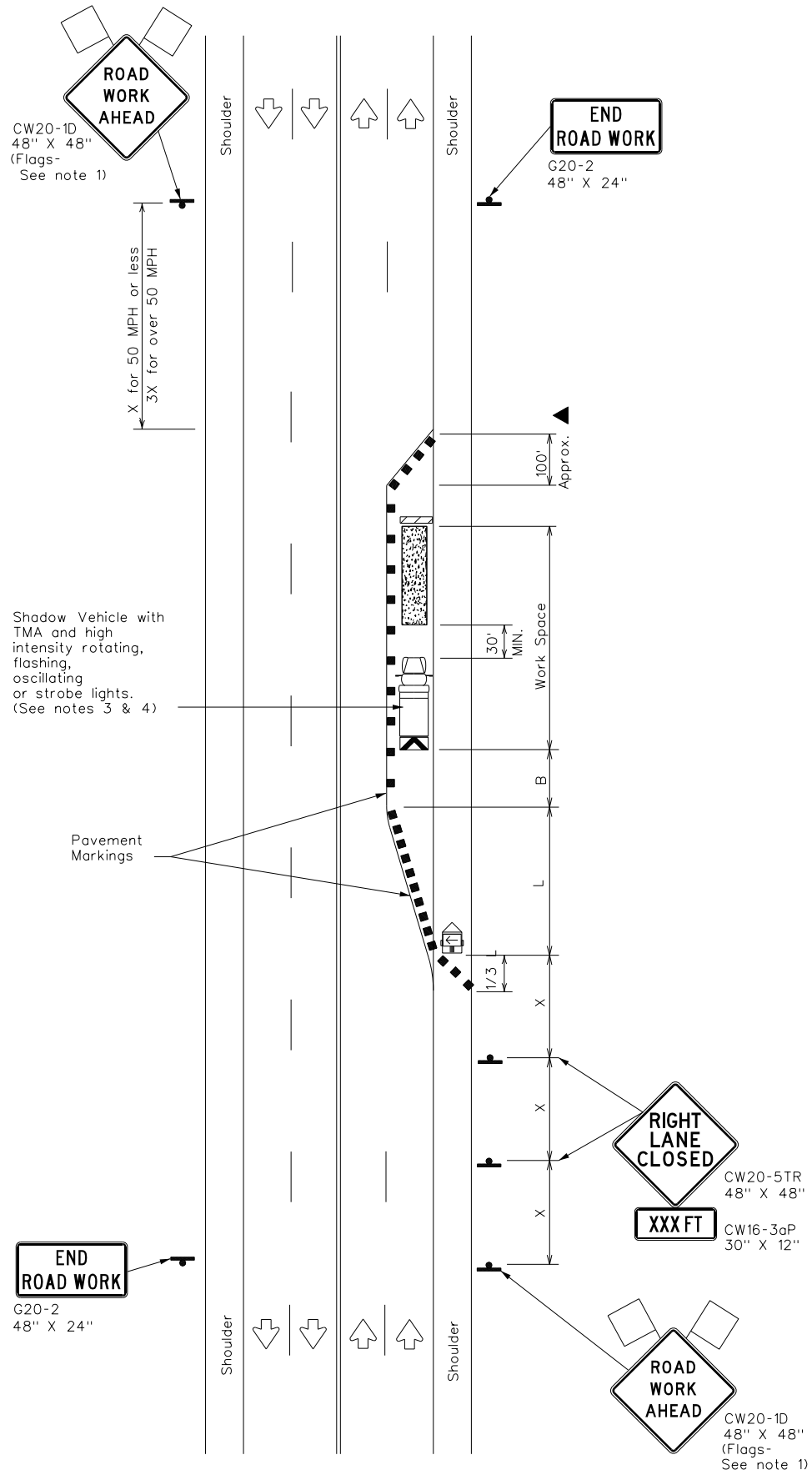
TRAFFIC CONTROL PLAN
 CONVENTIONAL ROAD
 SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	AUS	LEE	31	
1-97 2-18				

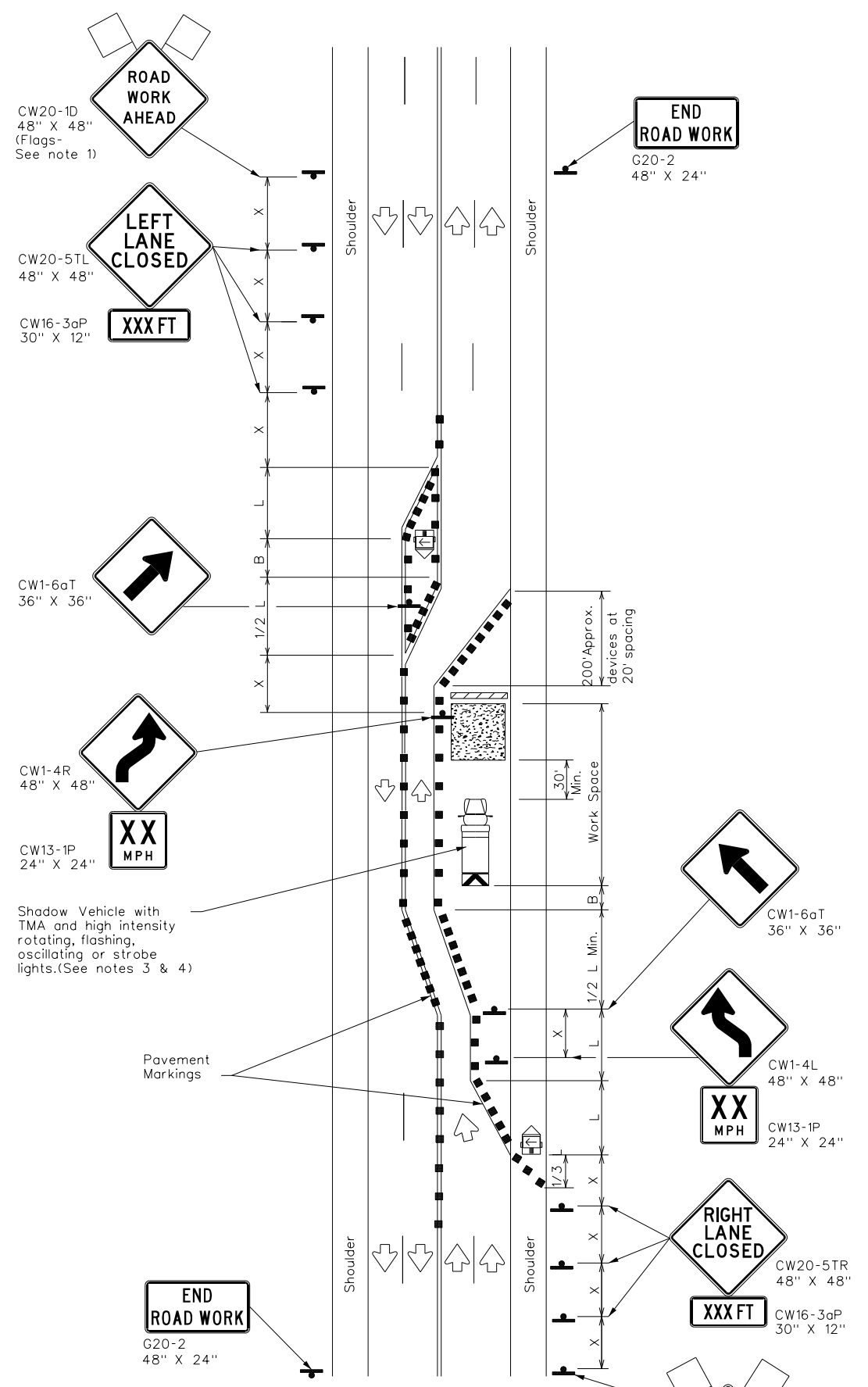
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TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

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

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

- GENERAL NOTES
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
 - The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

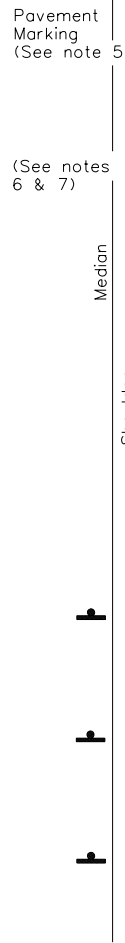
TCP (2-5b)

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

		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.			
TCP(2-5)-18			
FILE:	tcp2-5-18.dgn	DN:	CK:
© TxDOT	December 1985	CONT:	SECT:
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1-97	3-03	JOB: 027, ETC	
4-98	2-18	US 77, ETC.	
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		AUS	LEE
			SHEET NO. 32

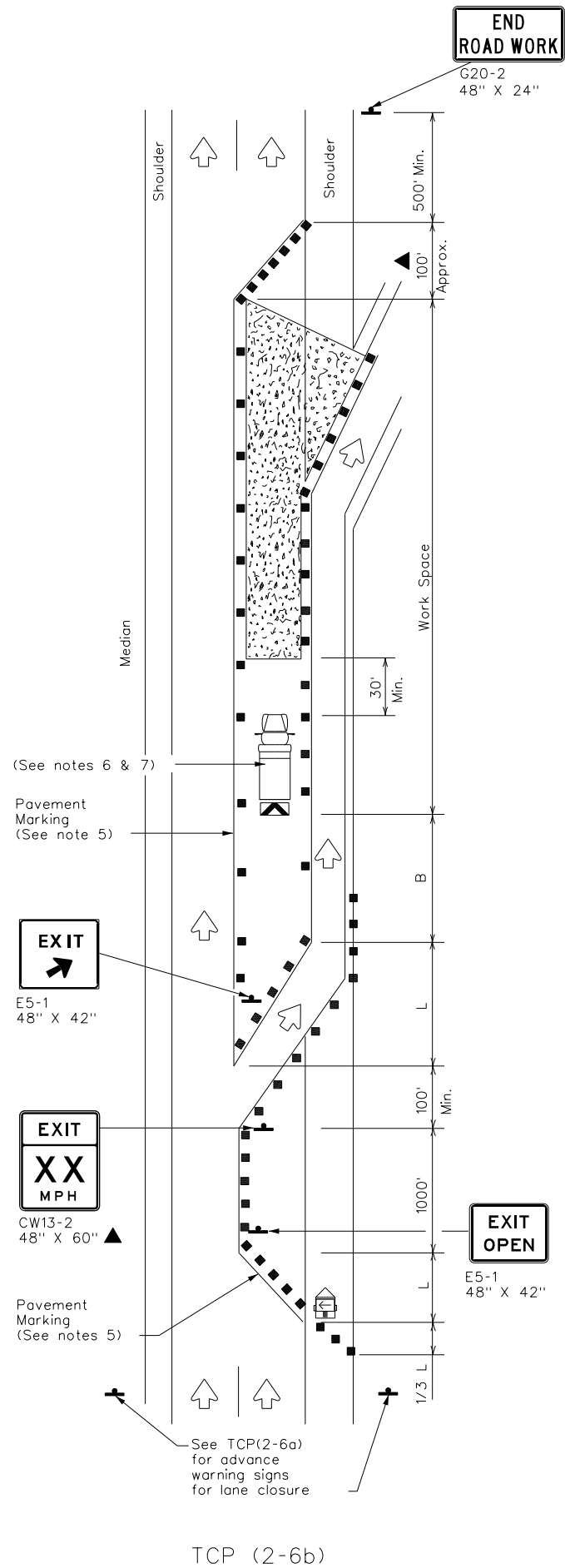
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DATE: 11/30/2023 8:36:44 PM
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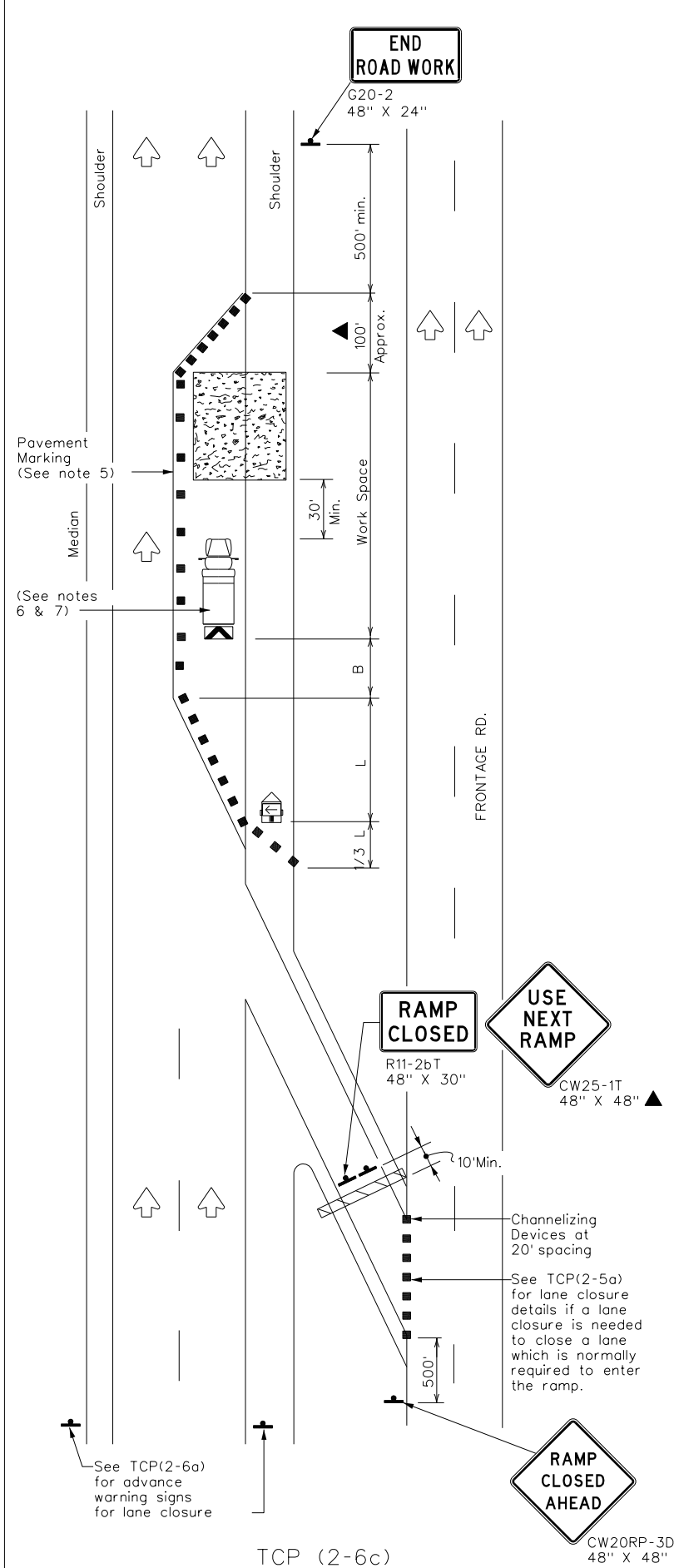
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMP



TCP (2-6c)

LANE CLOSURE NEAR ENTRANCE RAMP

LEGEND

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

Posted Speed x	Formula $L = \frac{WS^2}{60}$	Minimum Desirable Taper Lengths x x			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60	$L = WS$	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. 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.



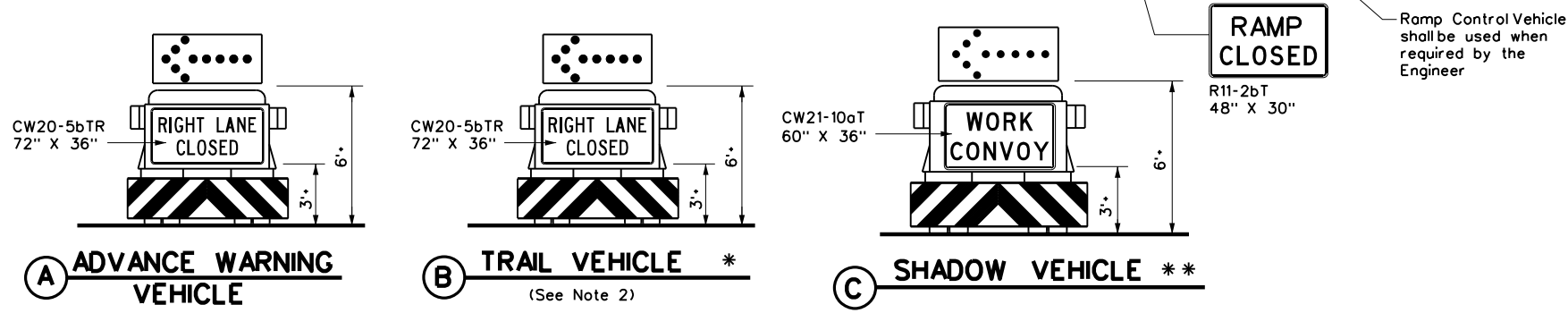
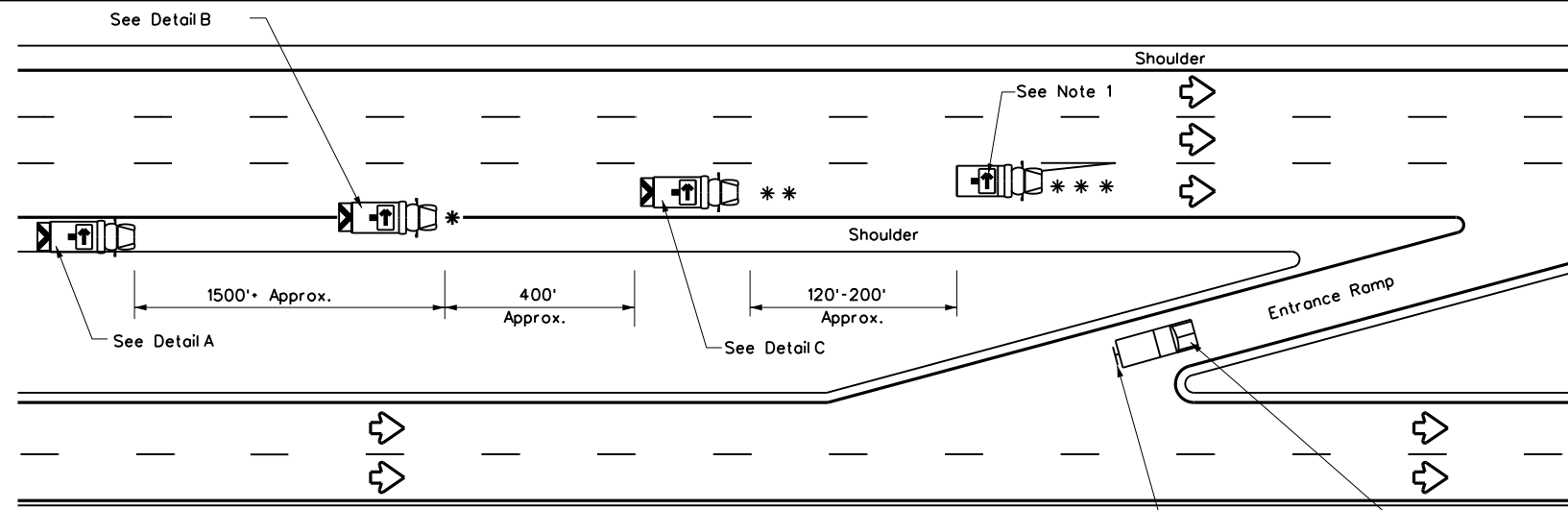
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LANE CLOSURES ON
DIVIDED HIGHWAYS

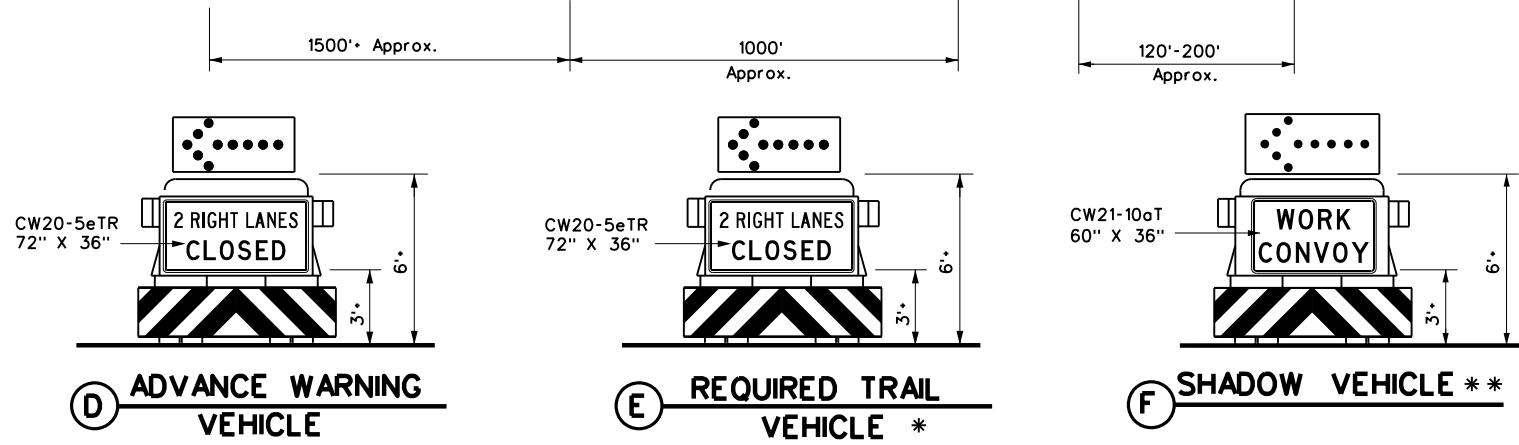
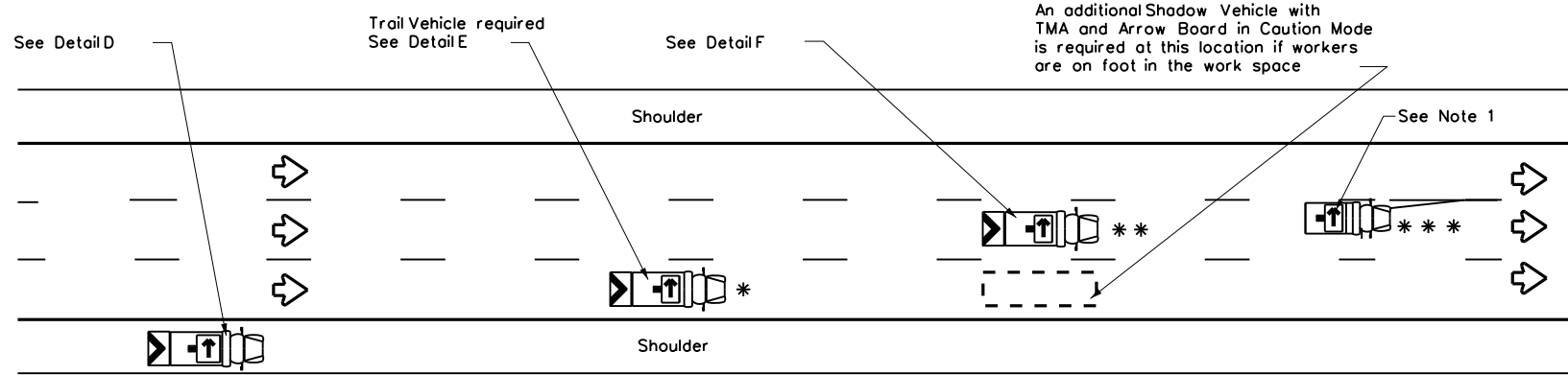
TCP(2-6)-18

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© TxDOT December 1985	CONT:	SECT:	JOB:	HIGHWAY:
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2-94 4-98			US 77, ETC.	
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1-97 2-18	AUS		LEE	33

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

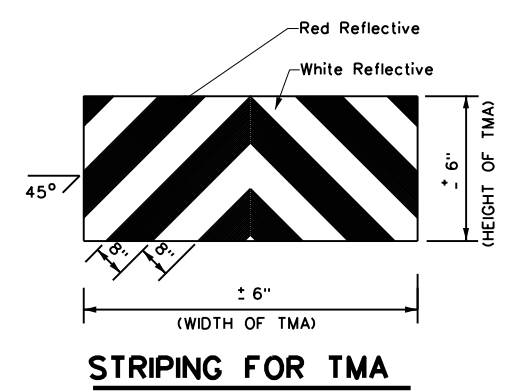


INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

- 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

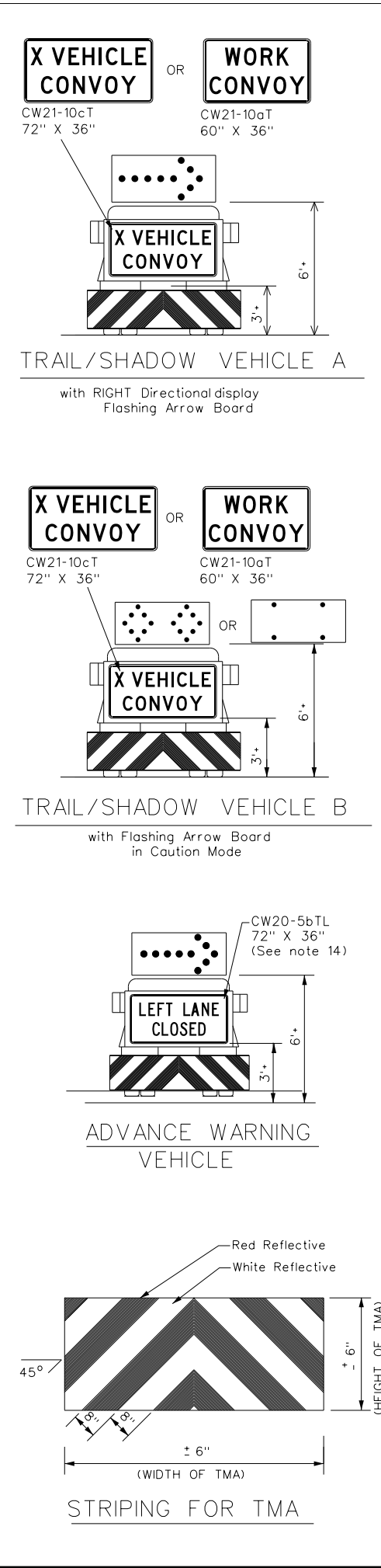
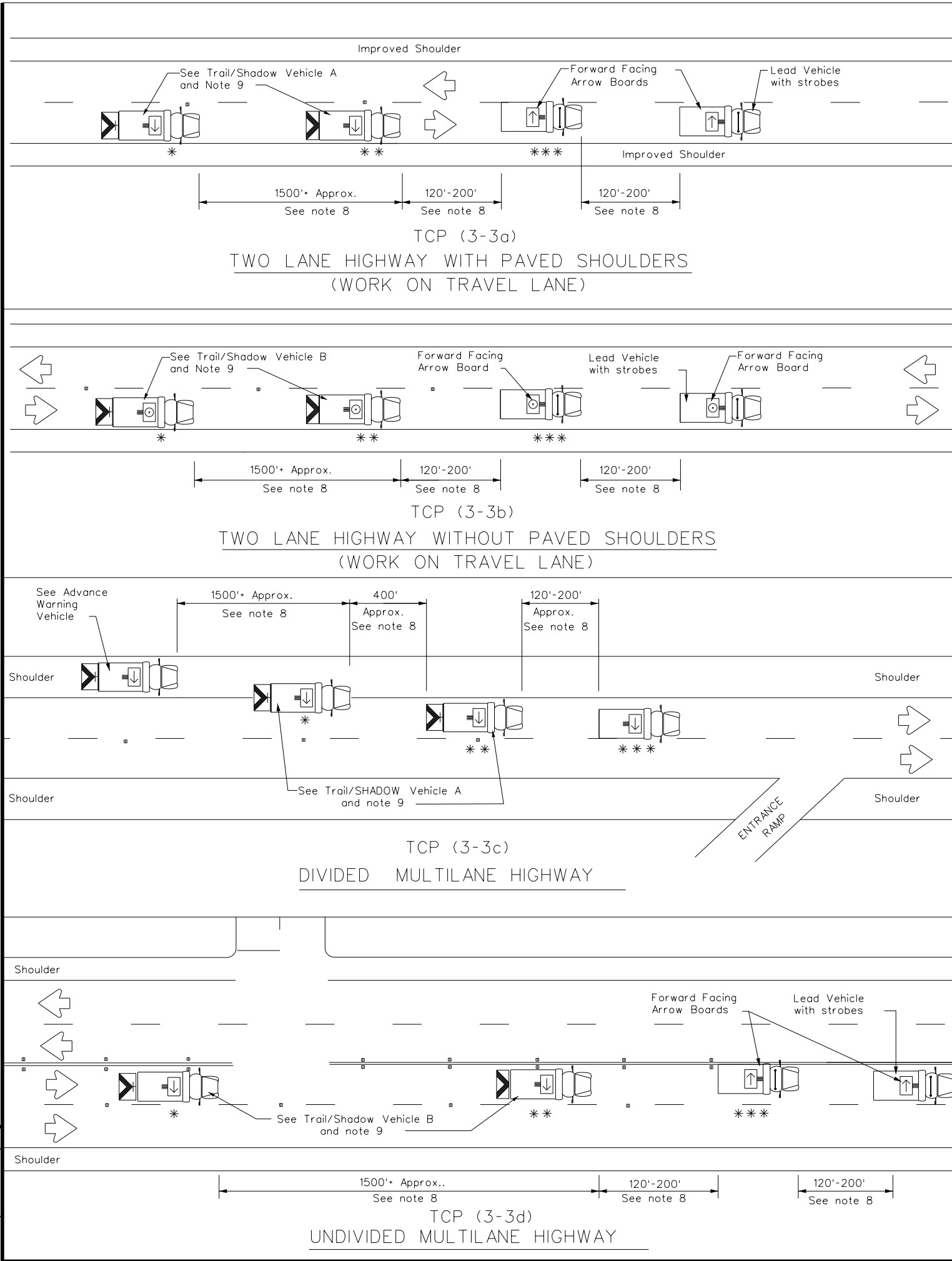
TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
DIVIDED HIGHWAYS

TCP(3-2)-13

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© TxDOT December 1985	CONT: 0211	SECT: 04	JOB: 027, ETC	HIGHWAY: US 77, ETC.
REVISIONS:	0211	04	027, ETC	US 77, ETC.
2-94 4-98				
8-95 7-13				
1-97				
AUS			COUNTY: LEE	SHEET NO.: 34

1/76

DATE: 11/30/2023 8:36:46 PM
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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

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

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN

MOBILE OPERATIONS

RAISED PAVEMENT

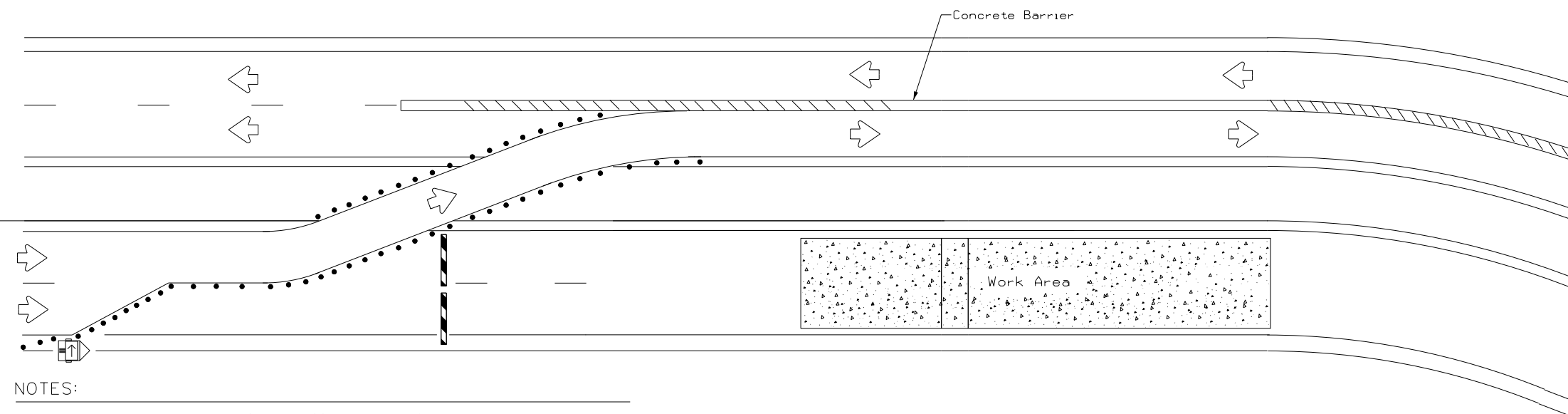
MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	AUS	LEE	35	
1-97 7-14				

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NOTES:

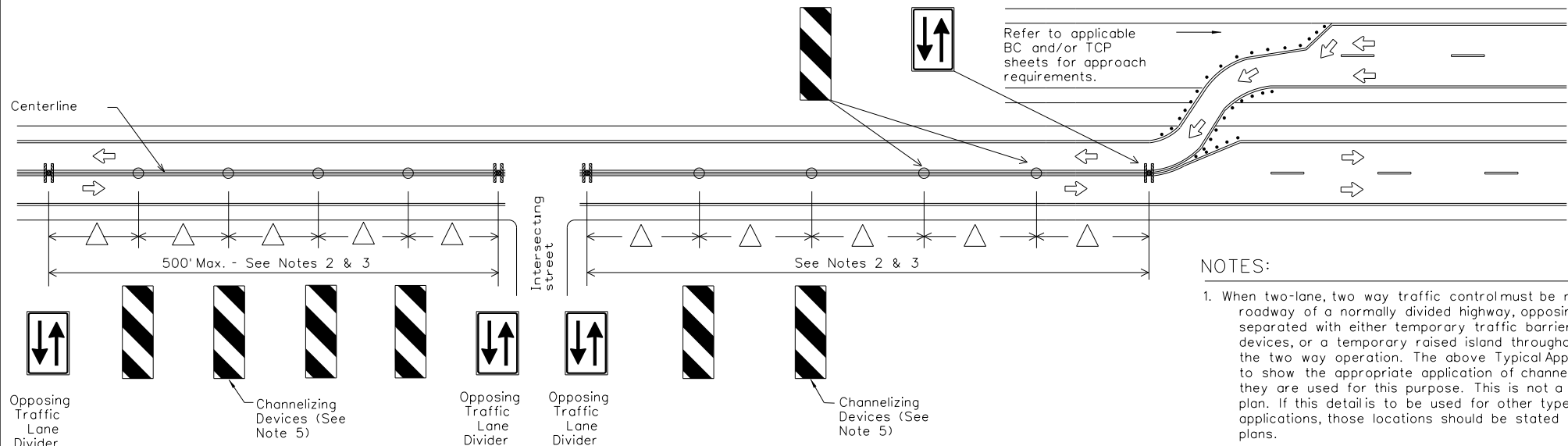
1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
<http://www.txdot.gov/business/resources/producer-list.html>



NOTES:

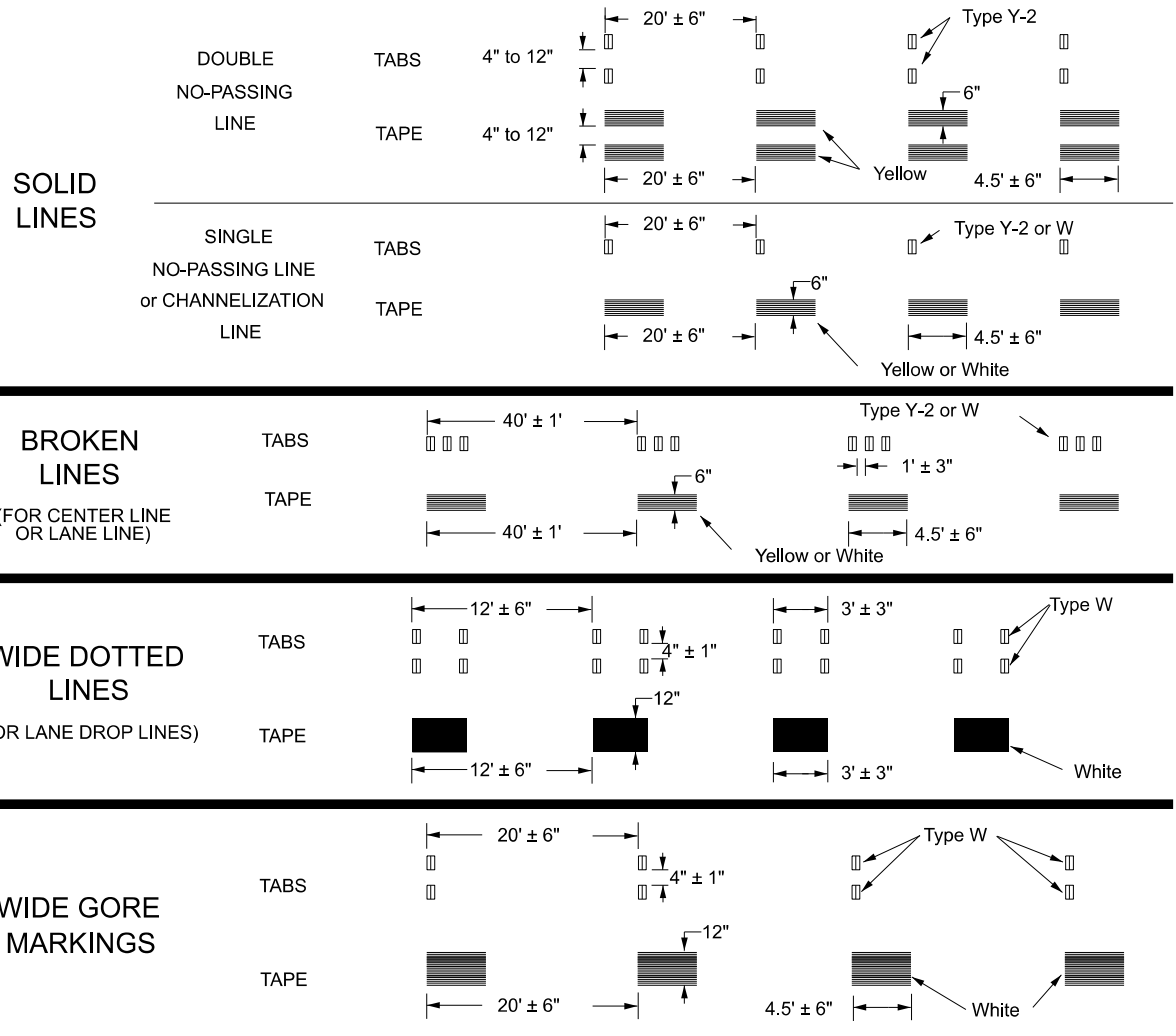
1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN TYPICAL DETAILS			
WZ(TD)-17			
FILE: wzt17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT February 1998	CONT: 0211	SECT: 04	JOB: US 77, ETC.
REVISIONS	4-98 2-17	0211	027, ETC
3-03		DIST: AUS	COUNTY: LEE
7-13			SHEET NO. 36

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



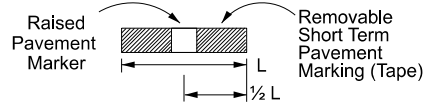
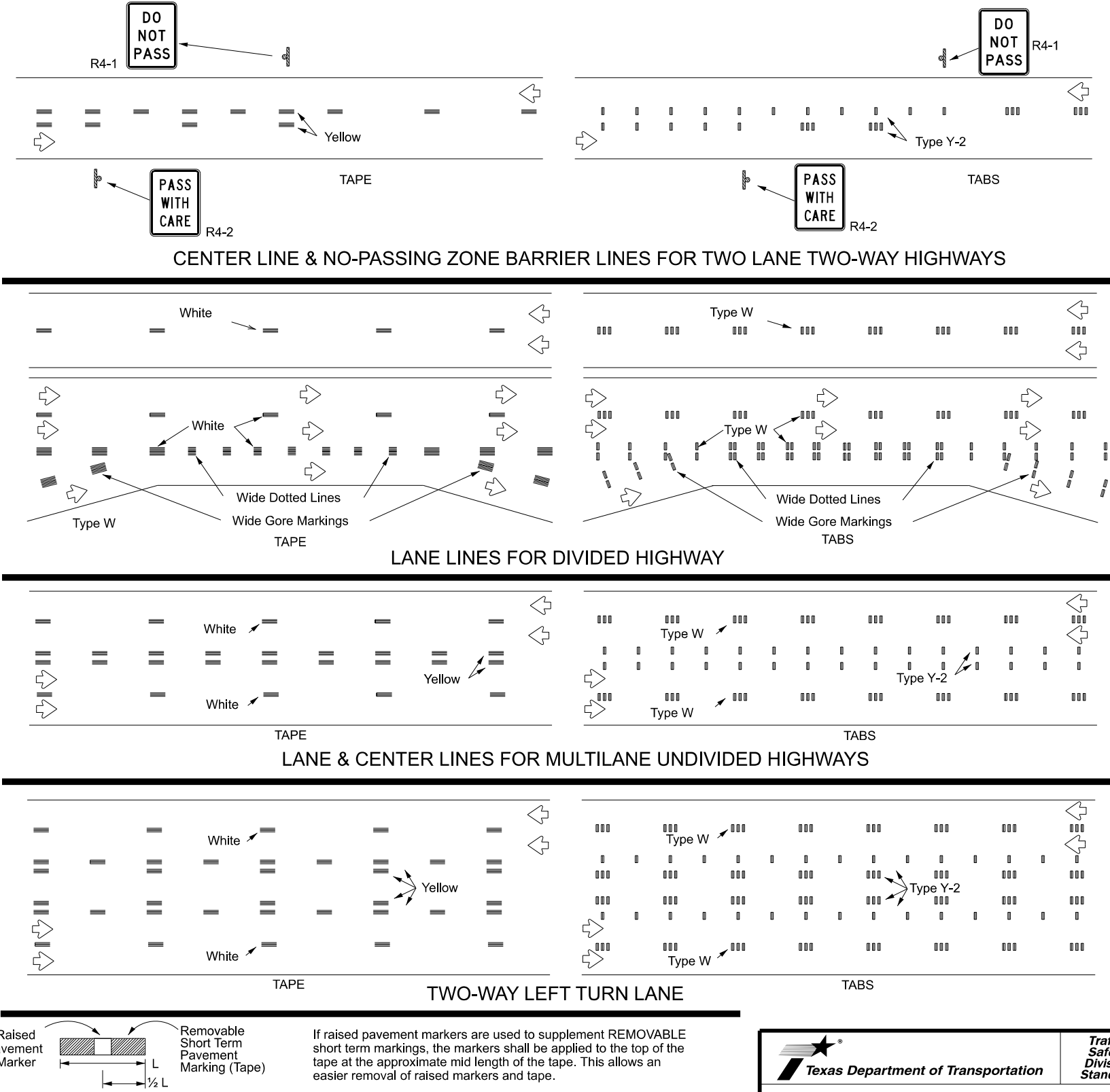
NOTES:

- 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



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

PREFABRICATED PAVEMENT MARKINGS

- Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.

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

RAISED PAVEMENT MARKERS

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

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

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

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

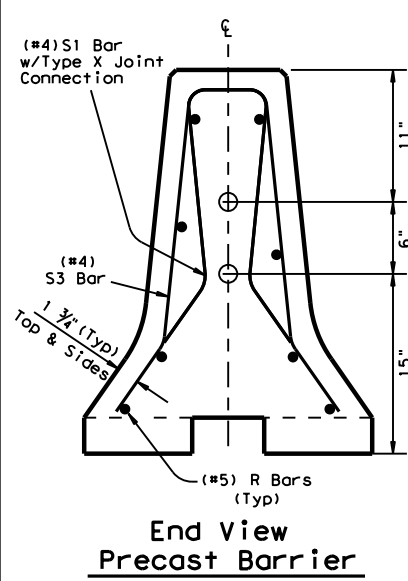


WORK ZONE SHORT TERM PAVEMENT MARKINGS

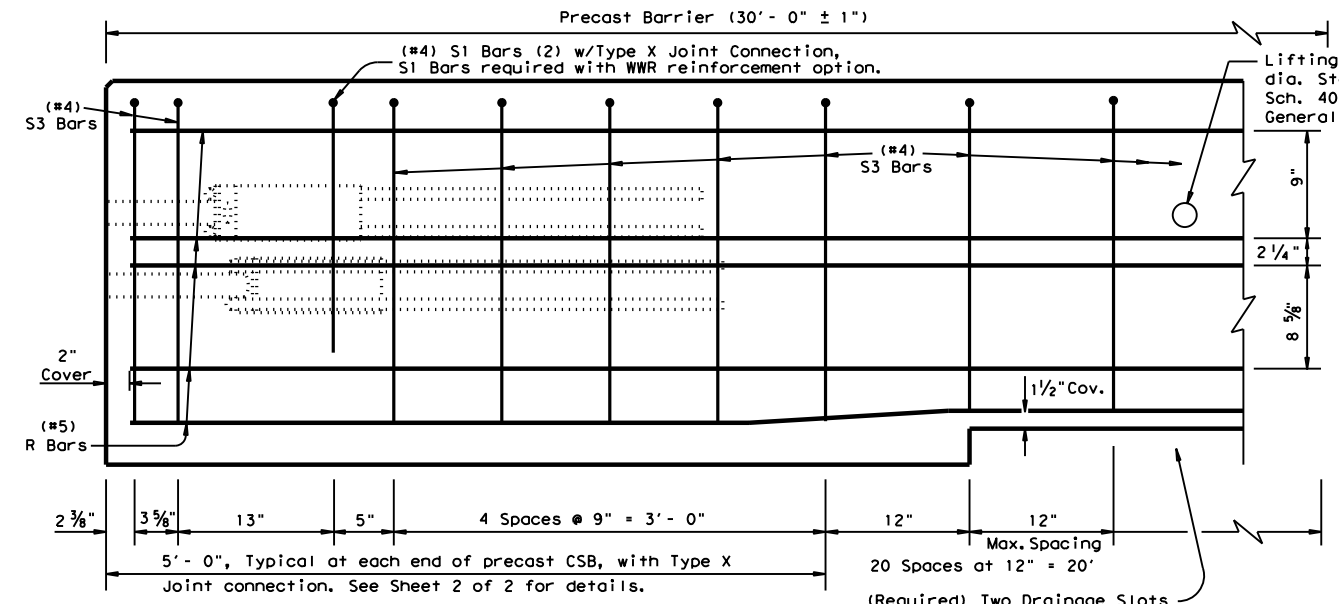
WZ(STPM)-23

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1-97	2-23	AUS	LEE	37
3-03				

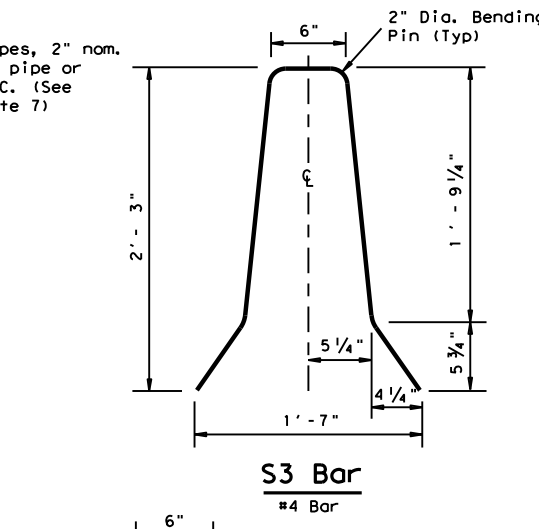
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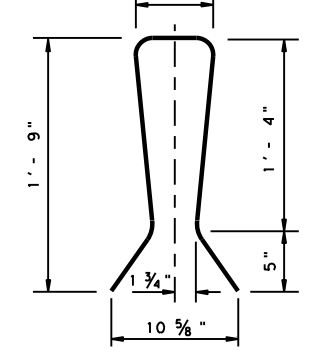
End View Precast Barrier
See sheet 2 of 3 for Joint connection Type X



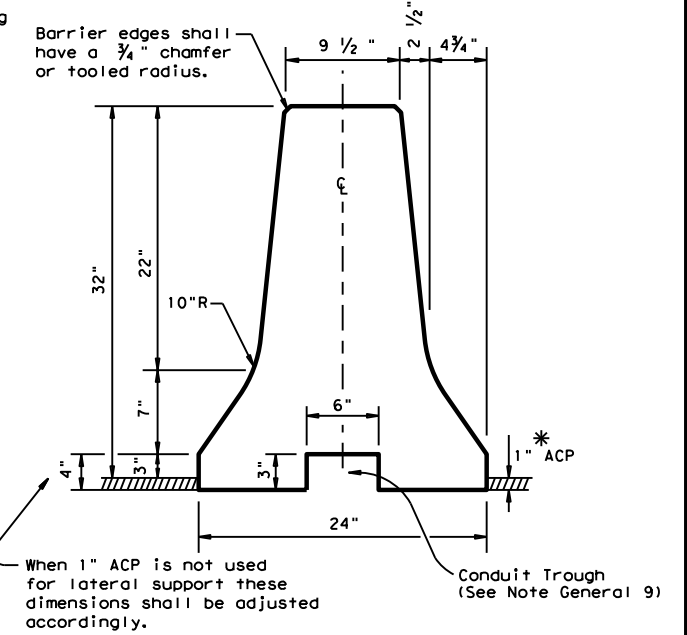
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)
Showing reinforcement for Joint Type X
(Required) Two Drainage Slots 36" Long x 3" Deep, beginning 6'-0" from each end of the 30'-0" barrier segment.



S3 Bar
#4 Bar



S1 Bar
#4 Bar (2)
(Joint Type X)

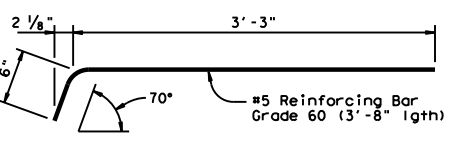


Concrete Safety Barrier

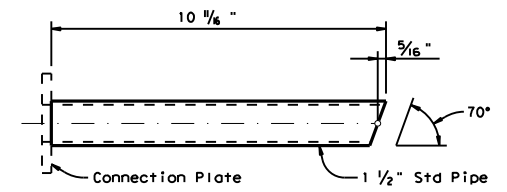
* When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

GENERAL NOTES

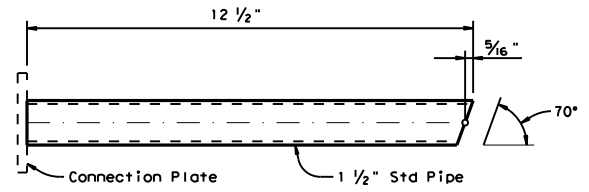
- Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
- Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
- Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
- All precast barrier edges shall have a 3/4" chamfer or tooled radius.
- All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
- All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
- 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 involved.
- Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



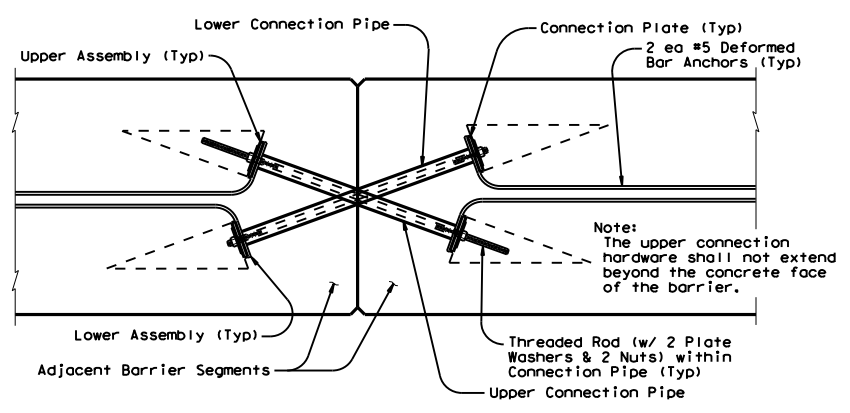
DEFORMED BAR ANCHOR DETAILS
Two (2) Bars required per assembly. Eight (8) required per joint.



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.



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

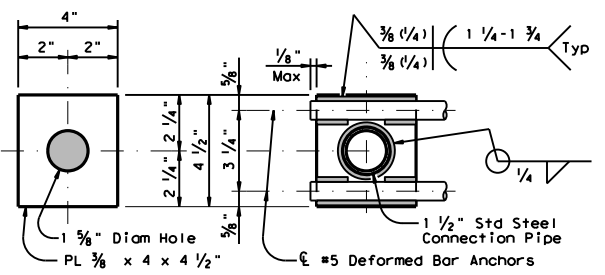
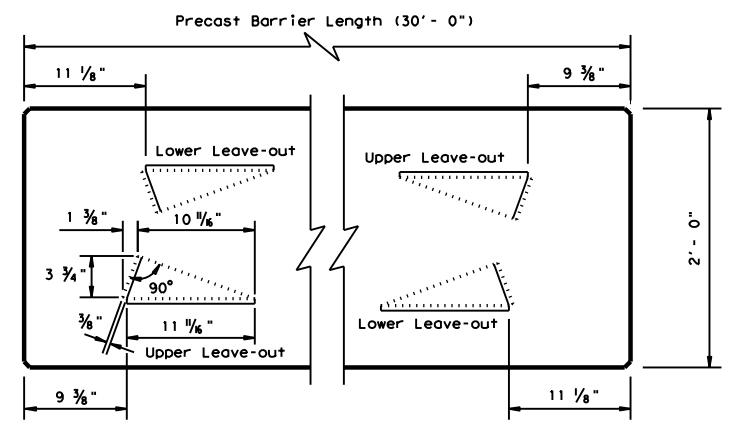
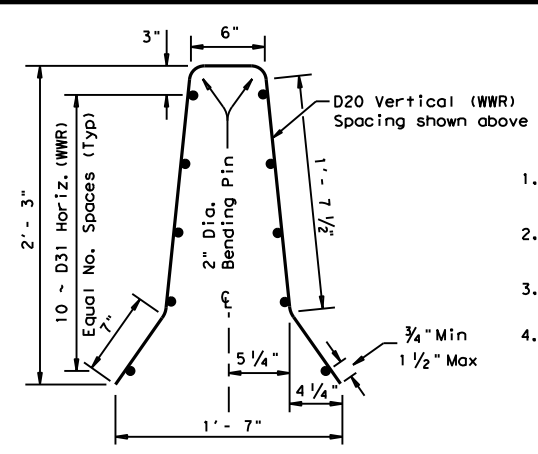


PLATE DIMENSIONS
WELDING DETAILS
CONNECTION PLATE DETAILS
One (1) Plate required per assembly. Four (4) required per joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.

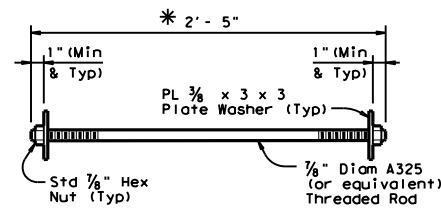


BARRIER PLAN AT END JOINTS

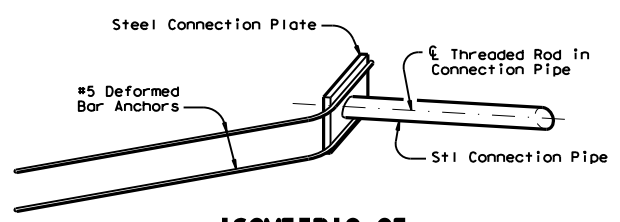


Welded Wire Reinforcement (WWR) Option for Bars R and S3
(WWR) General Notes

- 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".



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.



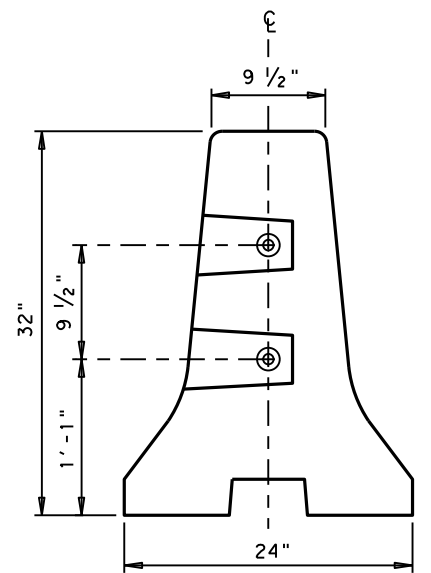
ISOMETRIC OF TYPICAL WELDED ASSEMBLY
Four (4) [2 Upper & 2 Lower] Assemblies required per joint.

Weight of one Precast 30 ft. (CSB) segment = Approx. 6.5 Tons or 440 lbs per ft.

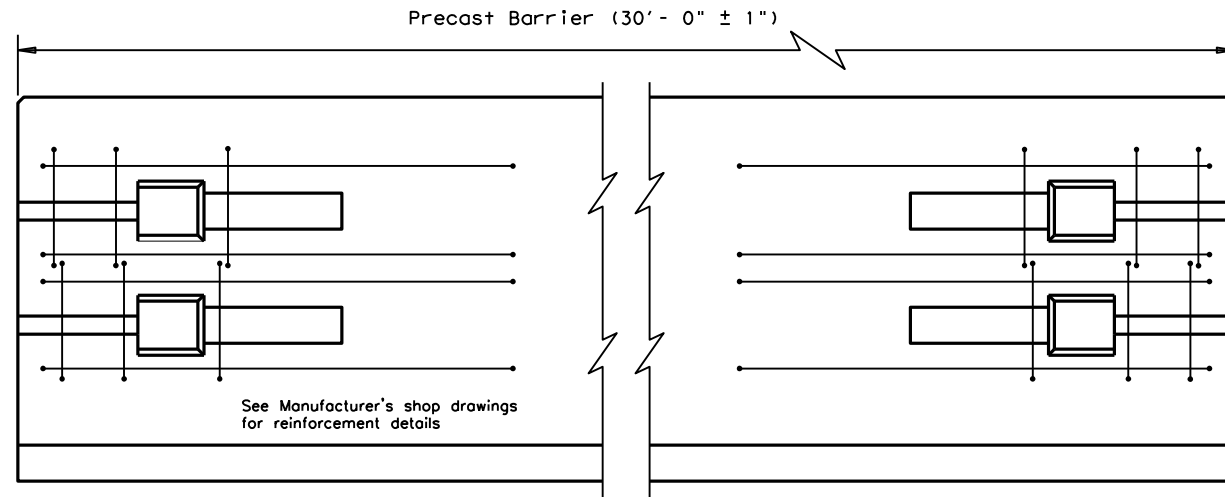
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CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) CSB(1)-10			
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© TxDOT December 2010	CONT: 0211	SECT: 04	JOB: 027, ETC US 77, ETC.
REVISIONS	DIST: AUS	COUNTY: LEE	SHEET NO. 38

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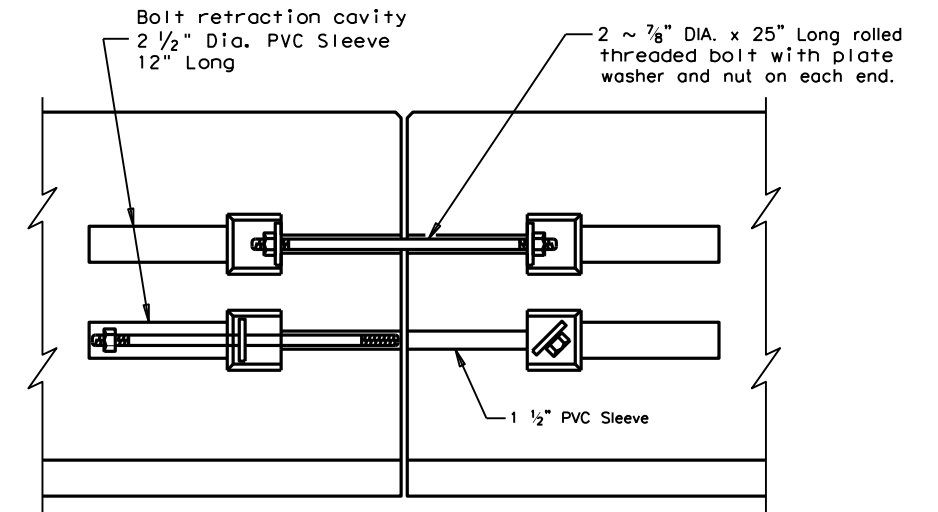
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END VIEW (CSB) QUICK-BOLT
 QUICK-BOLT POCKET LOCATIONS

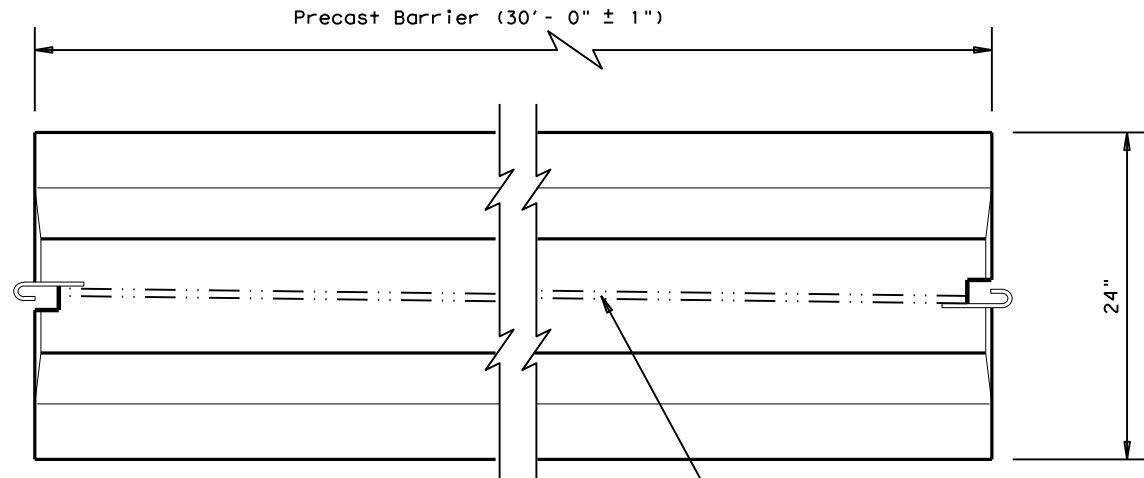


ELEVATION (CSB) QUICK-BOLT
 See Manufacturer's shop drawing for additional details

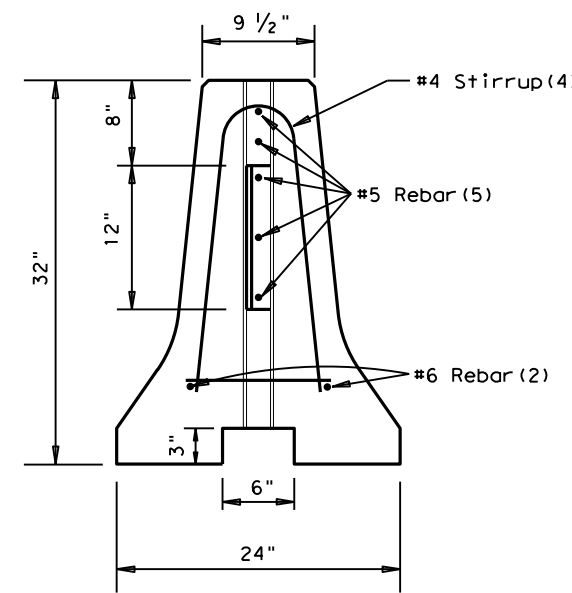


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)

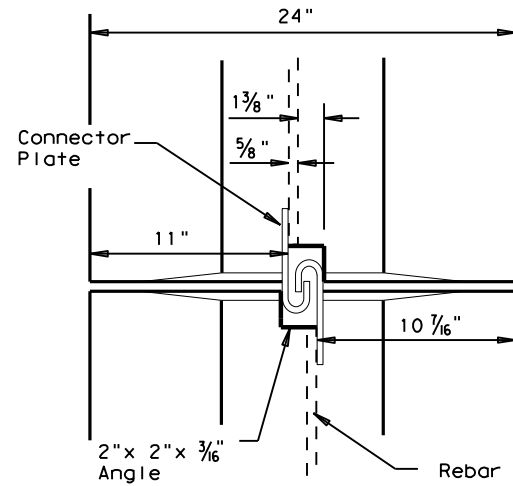


TOP VIEW
PRECAST (CSB) WITH J-J HOOKS
 See Manufacturer's shop drawing for additional details



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)



VIEW FROM ABOVE
J-J HOOK CONNECTION

Proprietary Joint Connections (CSB)

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 Bexar Concrete, (210)497-3773

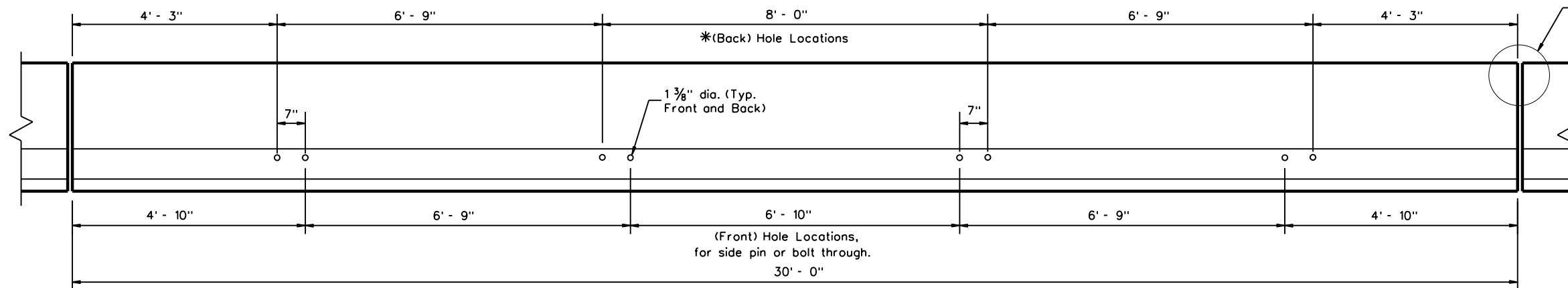
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

SHEET 2 OF 2

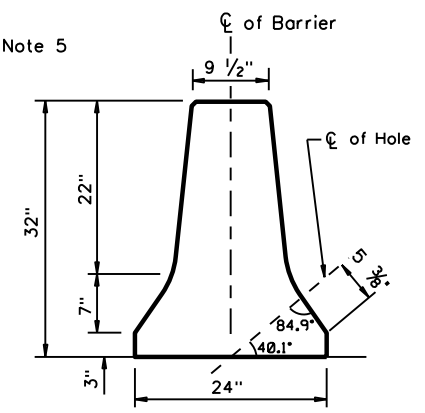
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© TxDOT December 2010	CONT	SECT	JOB
REVISIONS	0211	04	027, ETC
DIST	COUNTY		SHEET NO.
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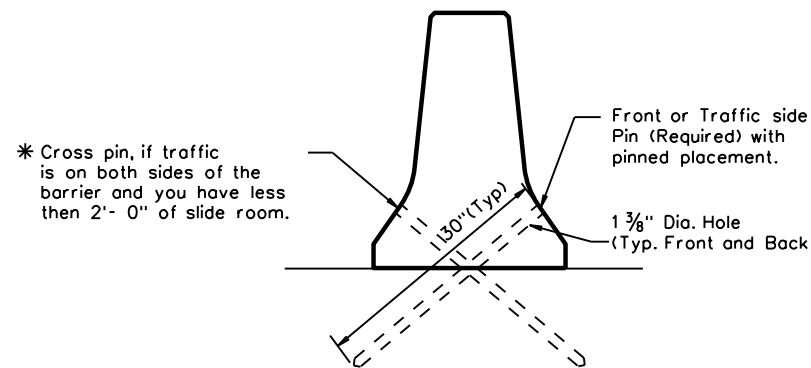
DETAIL 1



HOLE LOCATION DETAIL

GENERAL NOTES

- These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less than 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
- Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8" ID, holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
- The drilling of the travel surface is accomplished by placing the pre-drilled barrier section on the travel surface in the desired position. Then the hole is drilled with the bit passing through the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travel surface is drilled to a point which is slightly more than the pin length.
- Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
- See CSB(1) standard sheets for reinforcement requirements and joint connection types.
- The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 1/4" pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
- The barrier and travel surface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
- Provide galvanized bolts, nuts, and plate washers. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
- Weight of barrier is approx. 440 lbs per foot.

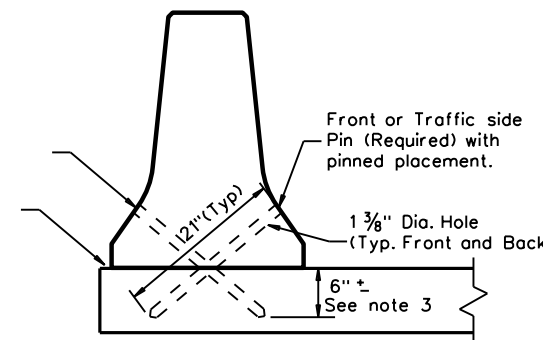


DETAIL 2

Placement on (ACP) Asphalt Concrete Pavement or Treated Base Material (30" Pin required)

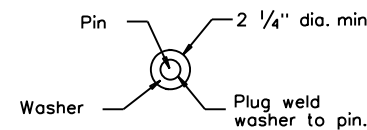
* Cross pin, if traffic is on both sides of the barrier and you have less than 2'-0" of slide room.

Cross pin recommended but not required if less than 2'-0" on Bridge Decks. (See General note 1)



DETAIL 3

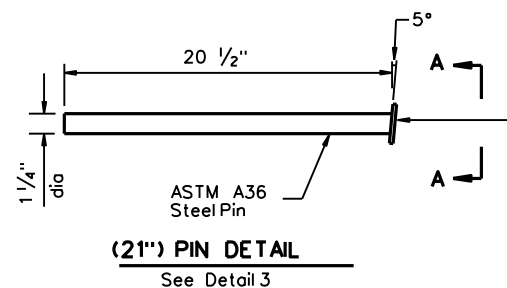
Bridge Deck or CRCP (21" pin required)



VIEW A-A

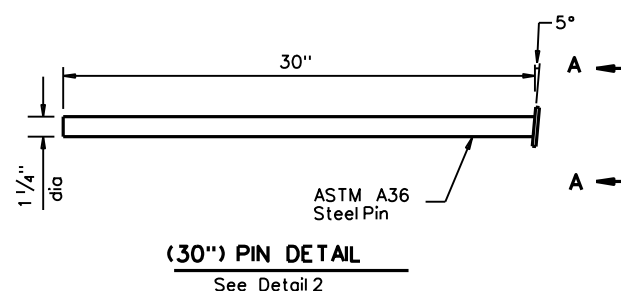
CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding 1/2" shall be patched.



(21'') PIN DETAIL

See Detail 3

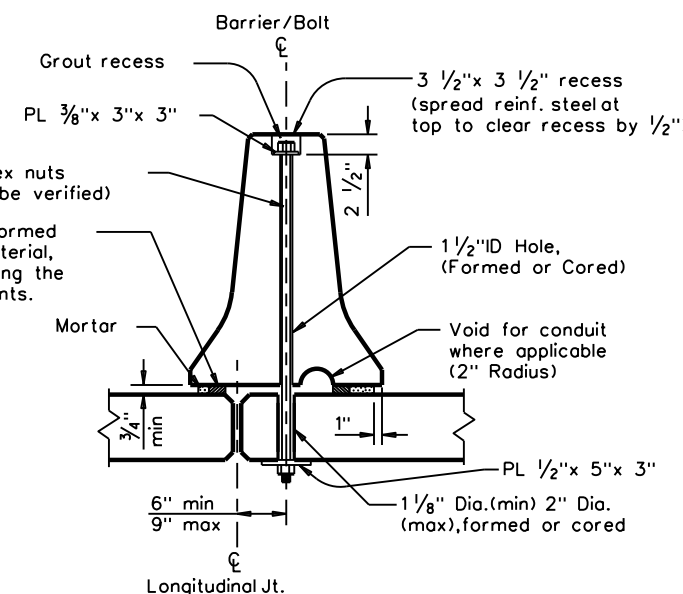


(30'') PIN DETAIL

See Detail 2

Steel washer welded to pin at 5° angle so that the washer is flush to the barrier surface. (See View A-A)

Note: The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.



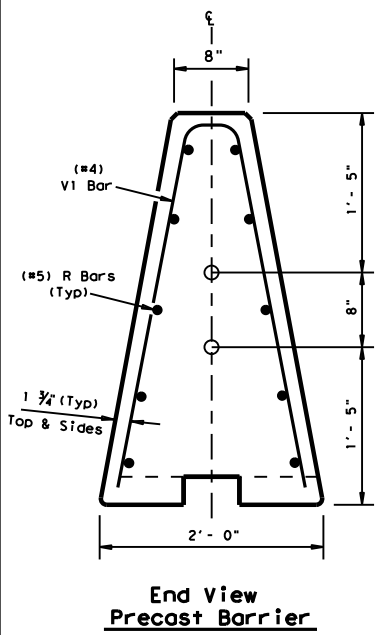
PRECAST CSB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

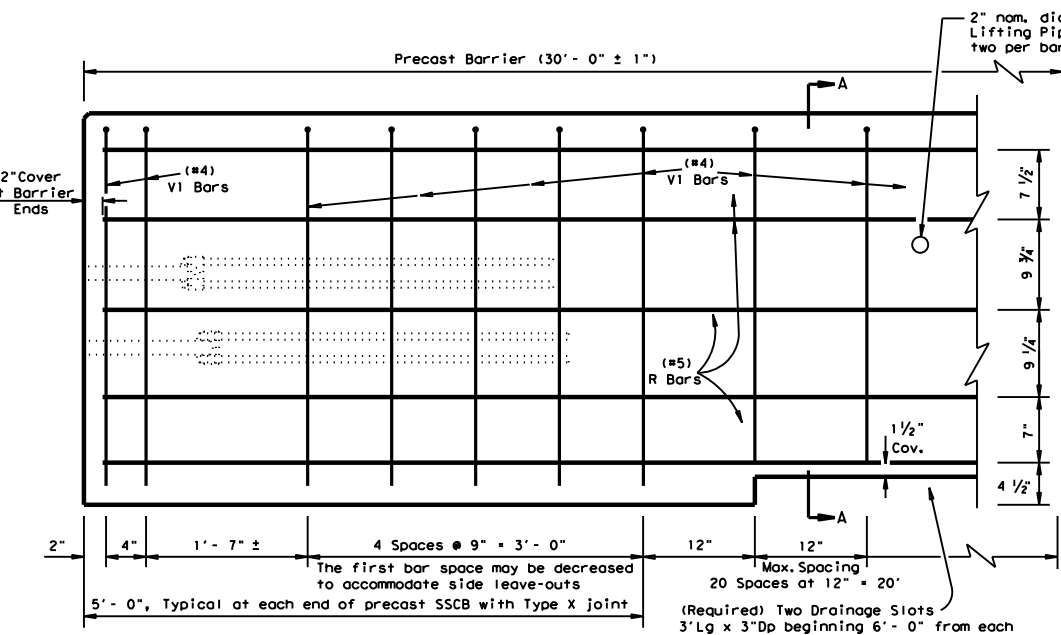
		Design Division Standard	
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1) PINNED PLACEMENT CSB(7)-10			
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© TxDOT December 2010	CONT: 0211	SECT: 04	JOB: 027, ETC
REVISIONS:	DIST: AUS	COUNTY: LEE	HIGHWAY: US 77, ETC.
			SHEET NO. 40

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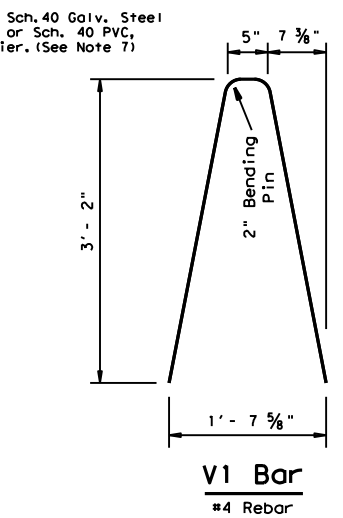
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End View Precast Barrier
 Pipe locations for Joint Type X connection

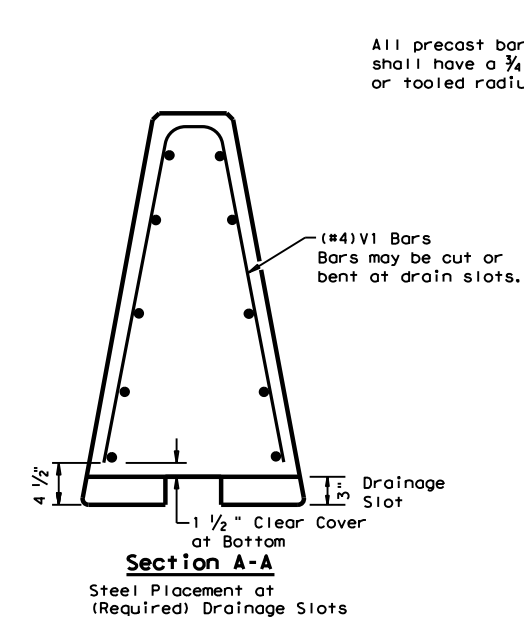


Reinforcement for Precast (SSCB) Single Slope Concrete Barrier (Type 1)
 Showing reinforcement for Joint Connection (Type X)

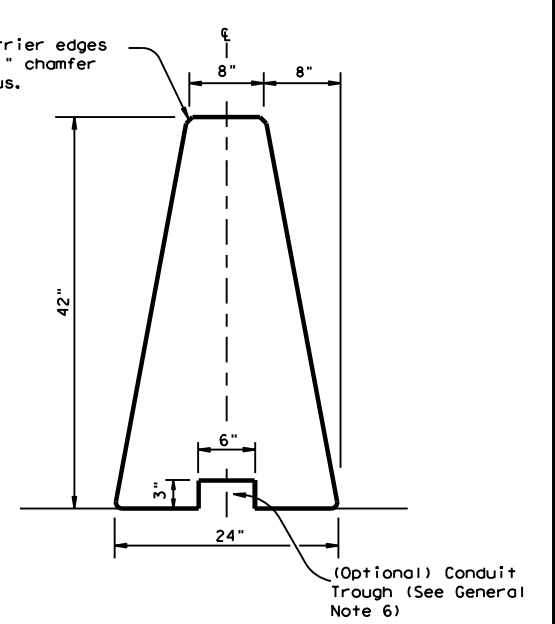


V1 Bar
 #4 Rebar

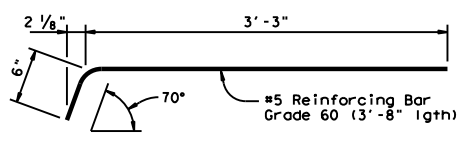
Note:
 V1 Bars above the drainage slots may be bent to accommodate 1 1/2 inch clear cover as directed by the Engineer.



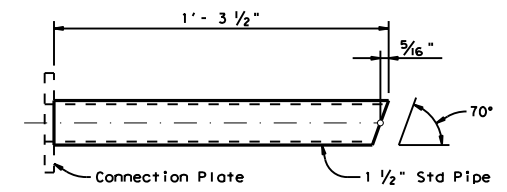
Section A-A
 Steel Placement at (Required) Drainage Slots



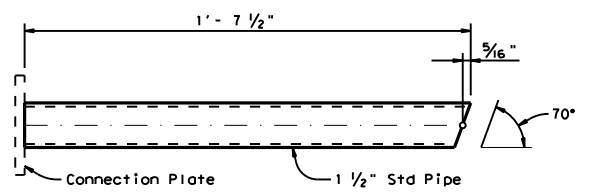
Single Slope Concrete Traffic Barrier
 Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



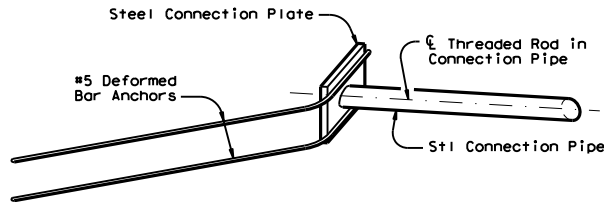
DEFORMED BAR ANCHOR DETAILS
 Two (2) Bars required per assembly. Eight (8) required per Joint.



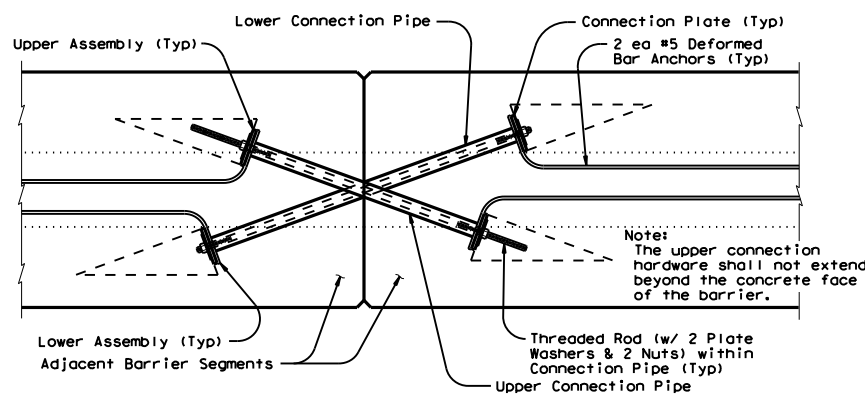
UPPER CONNECTION PIPE DETAILS
 One (1) Steel Pipe required per Upper Assembly. Two (2) required per Joint.



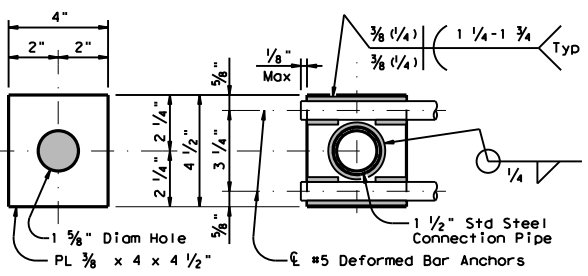
LOWER CONNECTION PIPE DETAILS
 One (1) Steel Pipe required per Lower Assembly. Two (2) required per Joint.



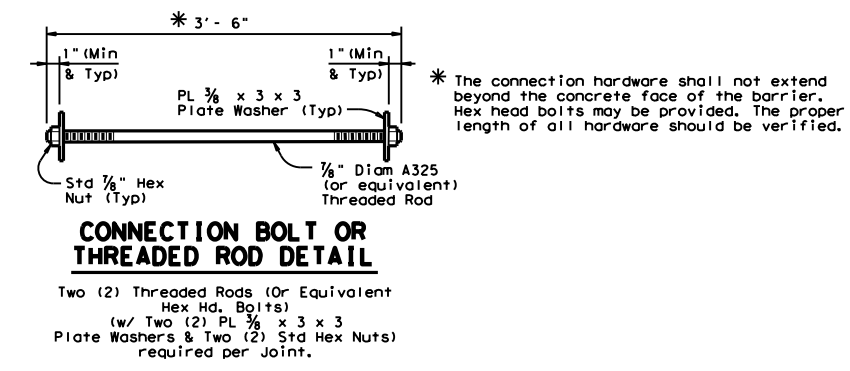
ISOMETRIC OF TYPICAL WELDED ASSEMBLY
 Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.



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



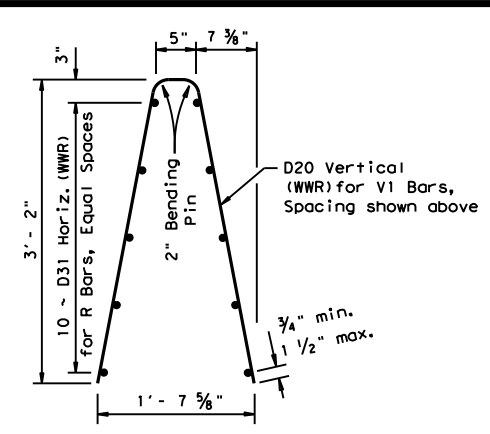
CONNECTION PLATE DETAILS
 One (1) Plate required per assembly. Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



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.

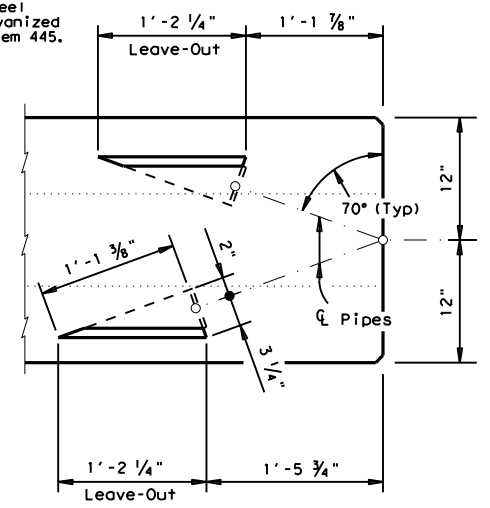
* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

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 3/4 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 and 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."

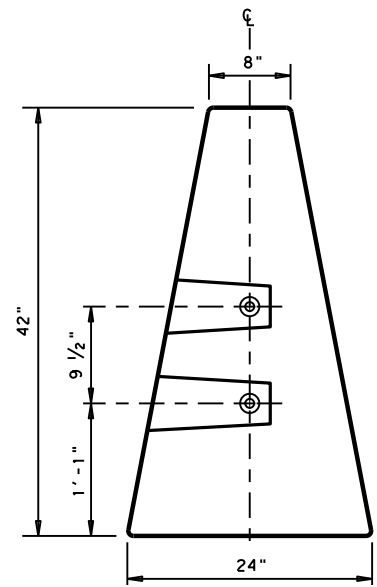
Texas Department of Transportation
 Design Division Standard

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

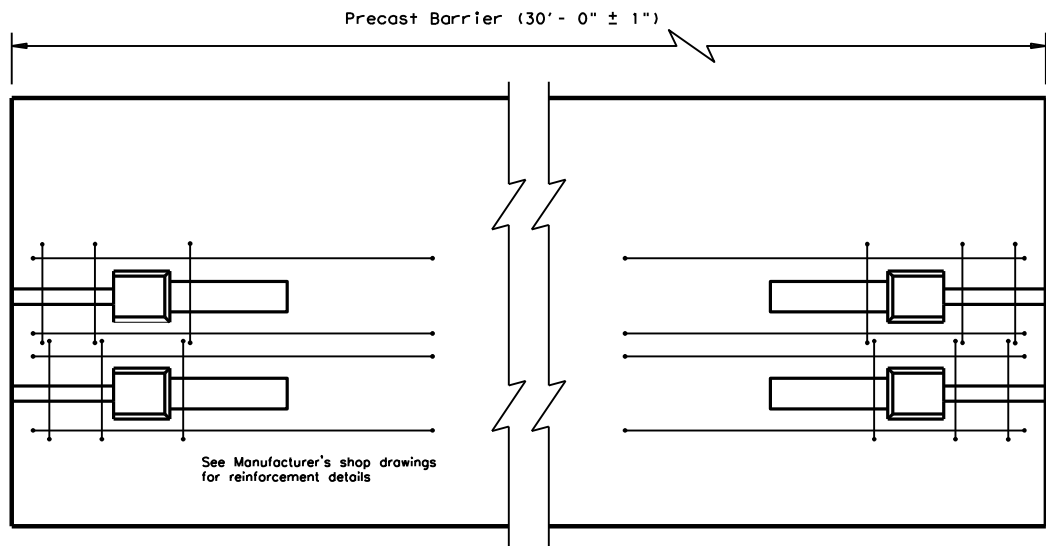
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© TxDOT December 2010	CONT: 0211	SECT: 04	JOB: 027, ETC	HIGHWAY: US 77, ETC.
REVISIONS	DIST: AUS	COUNTY: LEE	SHEET NO. 41	

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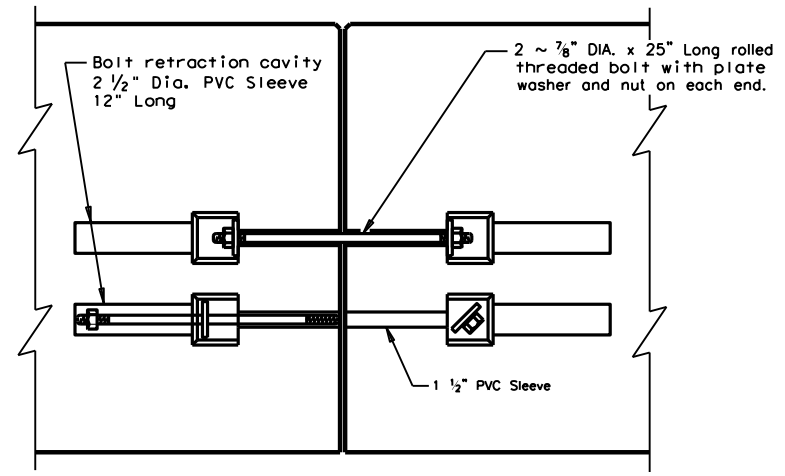
DATE: 11/30/2023 8:39:17 PM
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END VIEW
 "QUICK-BOLT" POCKET LOCATIONS

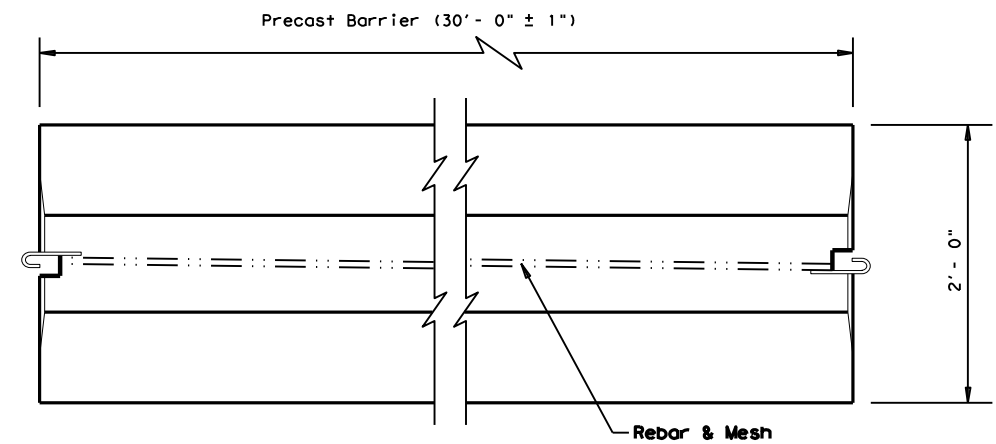


ELEVATION VIEW
 "QUICK-BOLT" (SSCB)
 See Manufacturer's shop drawing for additional details

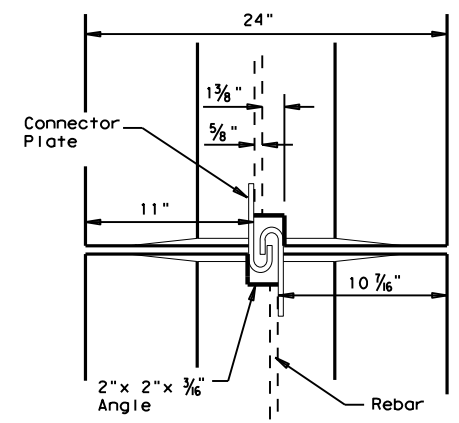


ELEVATION VIEW SHOWING JOINT CONNECTION
 "QUICK-BOLT"

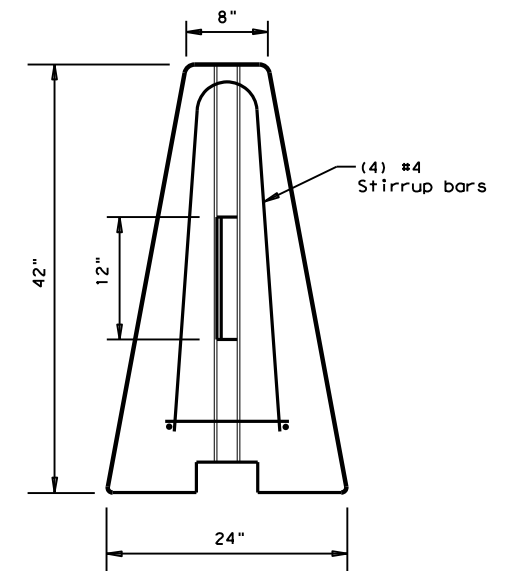
Joint Connection (Type Q)



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



VIEW FROM ABOVE
 J-J HOOK CONNECTION



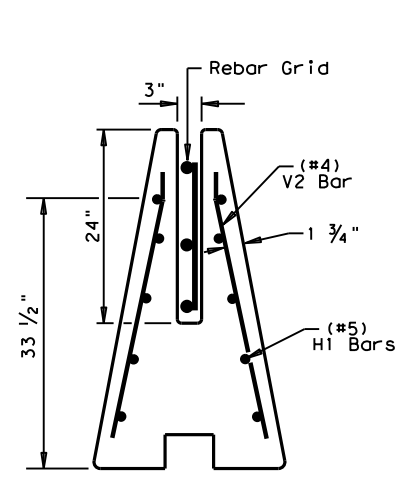
END VIEW

Proprietary Joint Connections (SSCB)

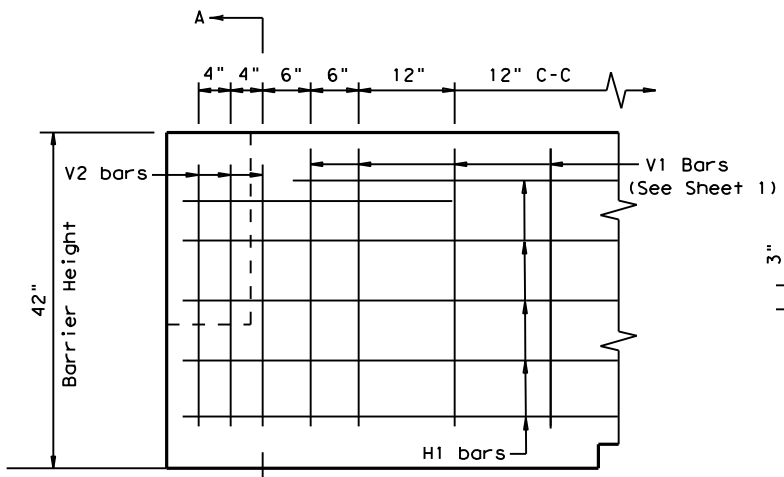
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

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

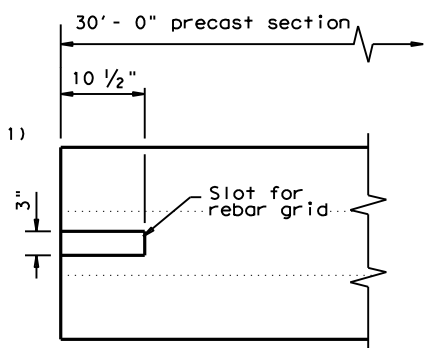
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



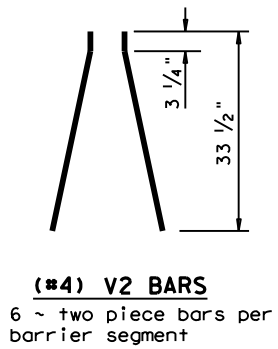
SECTION A-A
 Showing (Type R)
 Rebar Grid



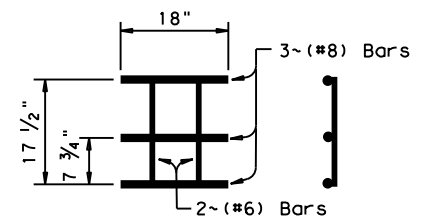
ELEVATION
 V1 Bars (See Sheet 1)



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)

SHEET 2 OF 2

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

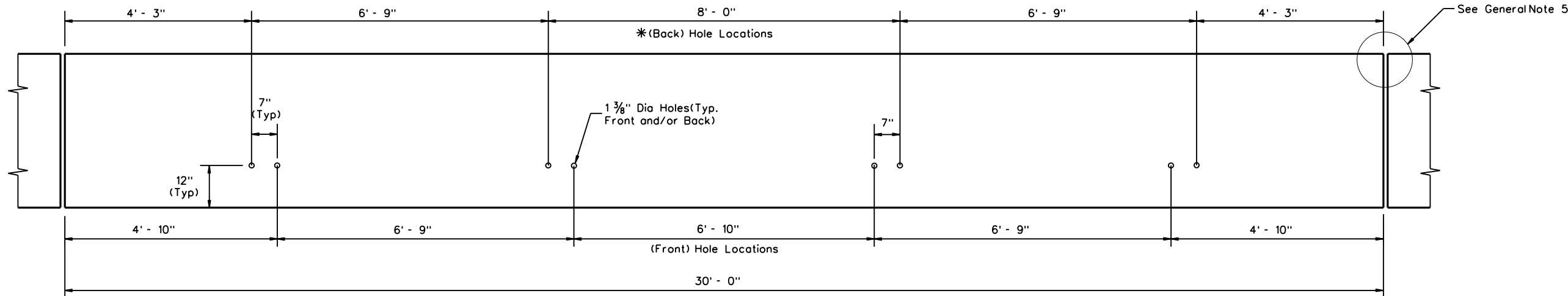
PRECAST BARRIER (TYPE 1)

SSCB(2) - 10

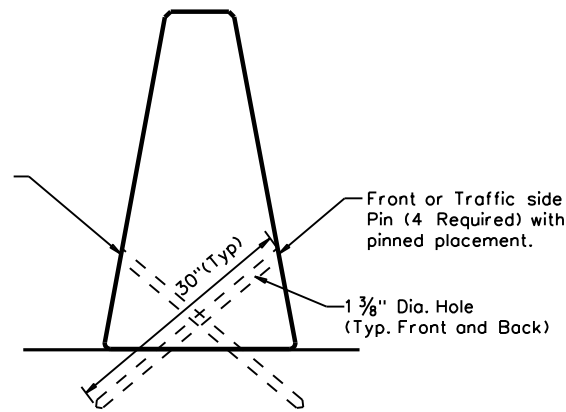
FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC	US 77, ETC.
DIST	COUNTY		SHEET NO.	
AUS	LEE		42	

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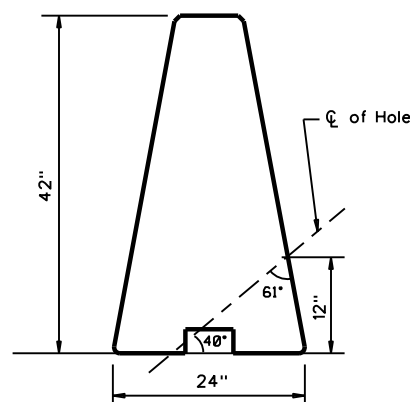


* Cross pin, if traffic is on both sides of the barrier and you have less than 2'-0" of slide room.



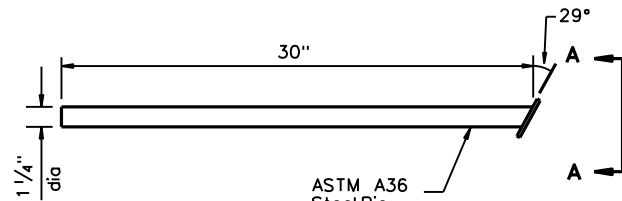
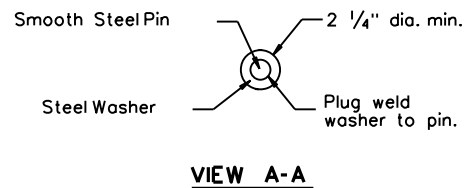
DETAIL 2

Placement on (ACP) Asphalt Conc. Pavement or Treated Base Material (30" Pin required)

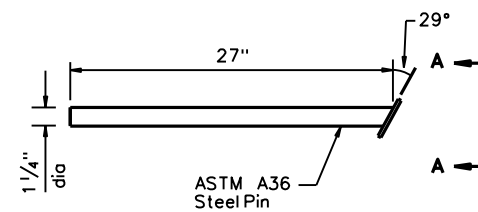


HOLE LOCATION DETAIL

Note: Steel washer welded to pin at 29° angle so that the washer is flush with barrier surface. (See View A-A)



(30'') PIN DETAIL
See Detail 2

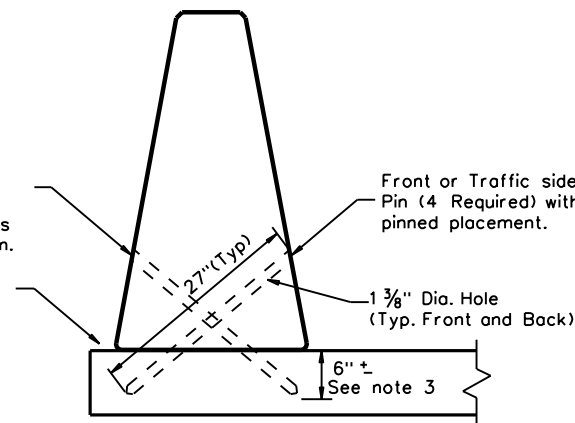


(27'') PIN DETAIL
See Detail 3

DETAIL 1
Precast SSCB(42")
Showing hole locations

* Cross pin, if traffic is on both sides of the barrier and you have less than 2'-0" of slide room.

Cross pin recommended but not required if less than 2'-0" on Bridge Decks. (See Generalnote 1)

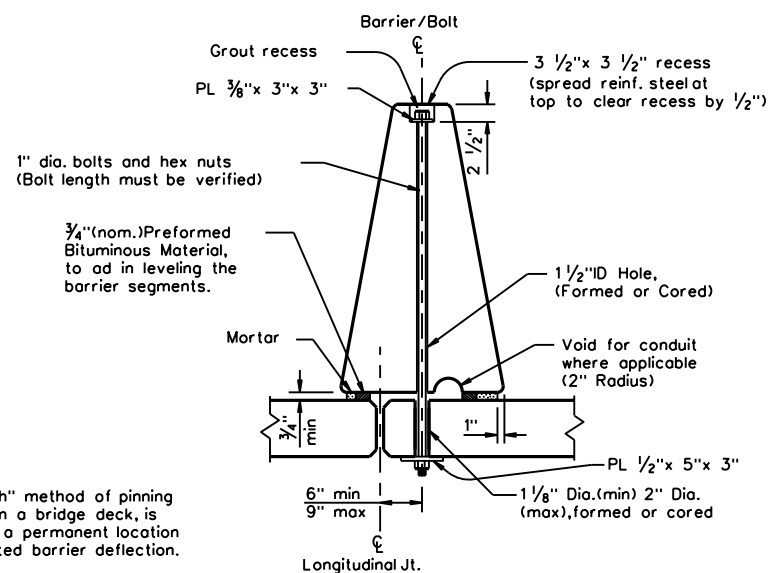


DETAIL 3

Bridge Deck or CRCP (27" Pin required).

CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding 1/2" shall be patched.



Note: The "Bolt Through" method of pinning precast barrier on a bridge deck, is primarily used in a permanent location that requires limited barrier deflection.

PRECAST SSCB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

For bolt through locations, use the (Front) hole locations shown on Detail 1.

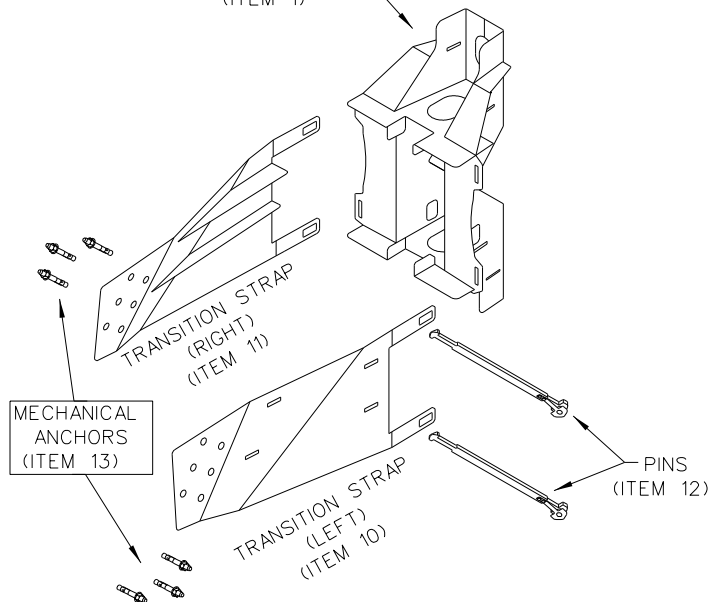
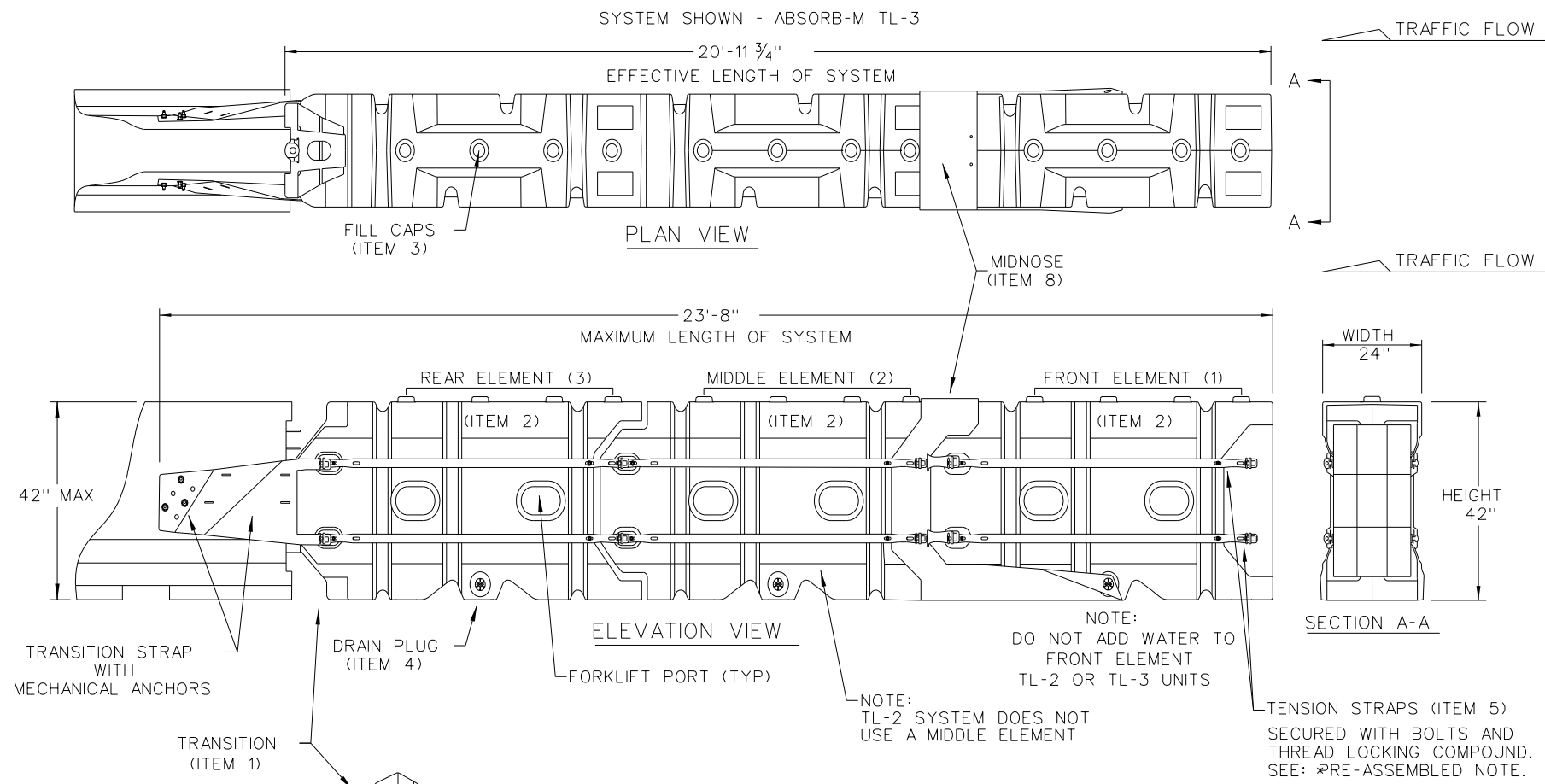
GENERAL NOTES

- These details provide a method of laterally restraining precast concrete barrier to limit deflections under normally expected passenger vehicle impacts. These details are intended for use in work zones, primarily on bridge decks, or pavement where temporary barrier must be placed less than 2 ft. from the longitudinal edge of the deck or dropoff and parallel to the direction of travel. Other applications of these details are acceptable as directed by the Engineer.
- Each precast concrete barrier section shall have a minimum of four or total of eight 1 3/8 in. ID holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
- The drilling of the travelsurface is accomplished by placing the pre-drilled barrier section on the travelsurface in the desired position. Then the hole is drilled with the bit passing through the hole in the barrier. The bit is to be inserted into the hole in the barrier so that the travelsurface is drilled to a point which is slightly more than the pin length.
- Note that steel washers have been welded to the top of the steel pins to aid in the removal of the pins, when the barrier is removed.
- See SSCB(2) standard sheet for reinforcement requirements and joint connection types.
- The forming or coring of holes in the barrier, drilling of holes in bridge deck or pavement, fabrication and materials for the 1 1/4 in. pins, installation of pins, and any repair to the barrier shall be considered as subsidiary to the barrier bid items.
- The barrier and travelsurface will be repaired as directed by the Engineer in accordance with Item 429, "Concrete Structure Repair."
- All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
- Weight of barrier is approx. 700 lbs per foot.

		Design Division Standard	
<h1>SINGLE SLOPE CONCRETE BARRIER</h1> <h2>PRECAST BARRIER (TYPE 1) PINNED PLACEMENT</h2> <h3>SSCB(5)-10</h3>			
FILE: sscb510.dgn	DN: TxDOT	CK: AM	DW: BD
© TxDOT December 2010	CONT: 0211	SECT: 04	JOB: 027, ETC
REVISIONS			US 77, ETC.
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 FILE: p:\projects\projectwiseonline.com\TXDOT14\Documents\14 - AUS\Standards\Statewide Standards\Roadway\5-Attenuators & Crash Cushions\ABSORB(M)-19.dgn

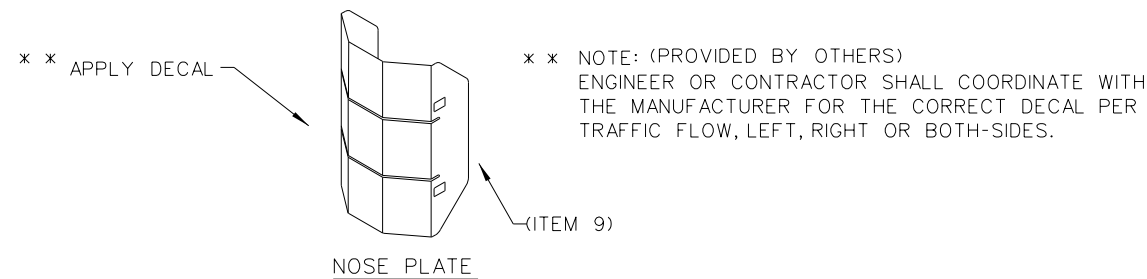


THE ABSORB-M IS A NON-REDIRECTIVE, GATING, CRASH CUSHION DESIGNED TO MEET THE LATEST TL-3 & TL-2 MASH REQUIREMENTS.

THE SYSTEM IS DESIGNED TO ACCOMMODATE A VARIETY OF F-SHAPE AND SINGLE SLOPE CONCRETE BARRIERS. CONTACT THE MANUFACTURER FOR GUIDANCE REGARDING OTHER ALLOWABLE SHAPES.

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"

NOTE: CROSS SLOPES OF UP TO 8% (OR 1:12 SLOPE) CAN BE ACCOMMODATED WITH STANDARD HARDWARE SHOWN WITHIN THE INSTRUCTIONS MANUAL. FOR SLOPES WITH EXCESS OF 8% (OR 1:12) CONTACT, LINDSAY TRANSPORTATION SOLUTIONS.



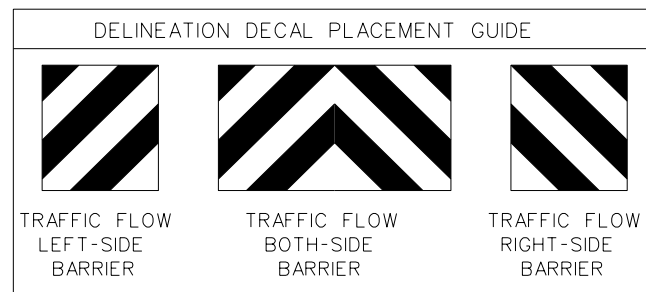
NOTE: APPLY A HIGH REFLECTIVE DECAL TO THE NOSE PLATE. DELINEATION DECAL ORIENTATION IS SHOWN ON THE CONSTRUCTION PLAN SET AND SHALL BE IN ACCORDANCE WITH THE TEXAS MUTCD FOR (TRAFFIC CONTROL DEVICES). DECALS ARE AVAILABLE FOR TRAFFIC FLOW ON THE LEFT-SIDE, BOTH -SIDES AND RIGHT-SIDE.

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).

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

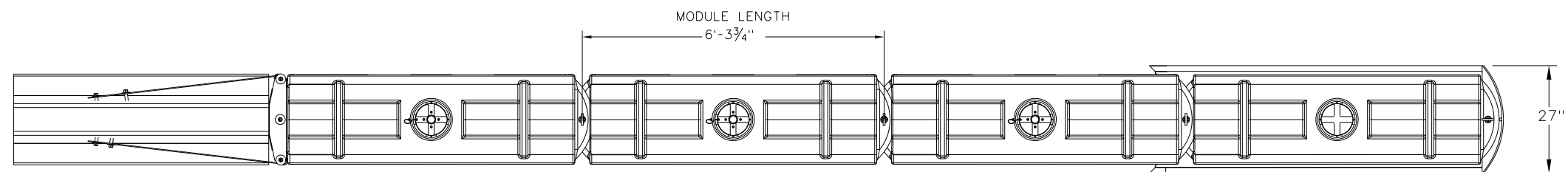


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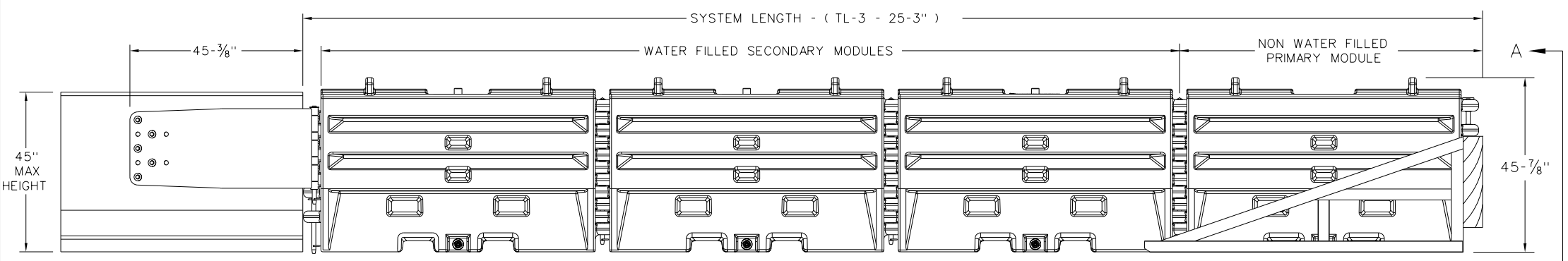
NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

		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	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC	US 77, ETC.
	DIST	COUNTY	SHEET NO.	
	AUS	LEE	44	

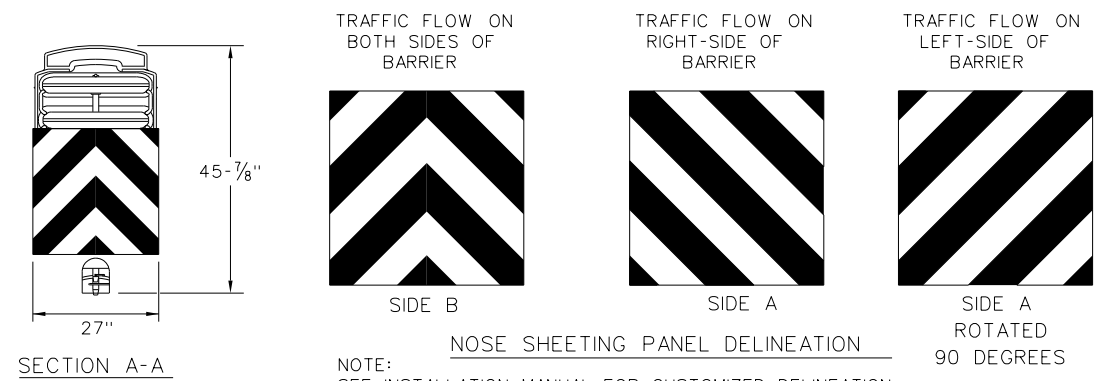
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PLAN VIEW



ELEVATION VIEW

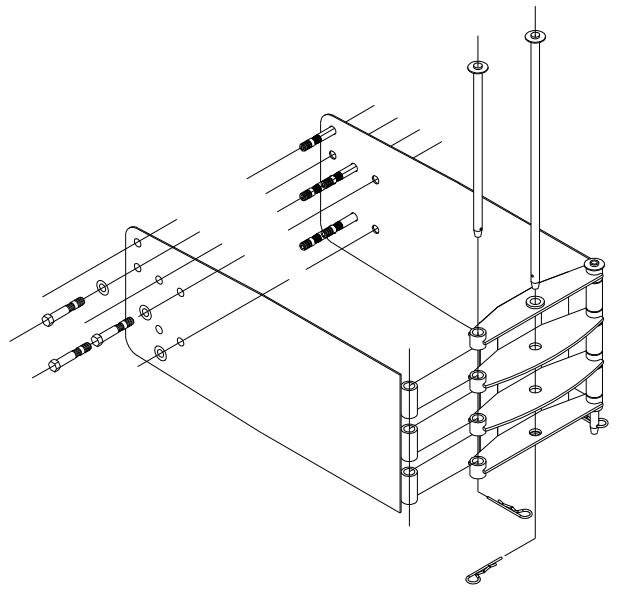


SECTION A-A

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"

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



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

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

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

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



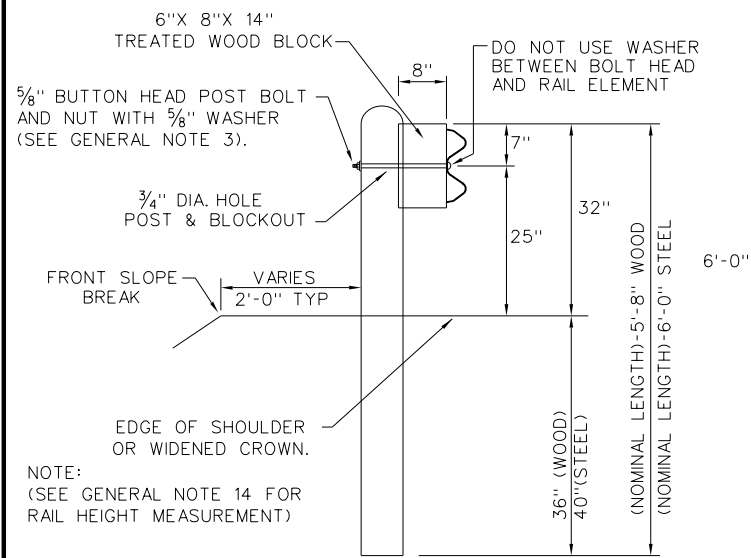
SLED
 CRASH CUSHION
 TL-3 MASH COMPLIANT
 (TEMPORARY, WORK ZONE)
 SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
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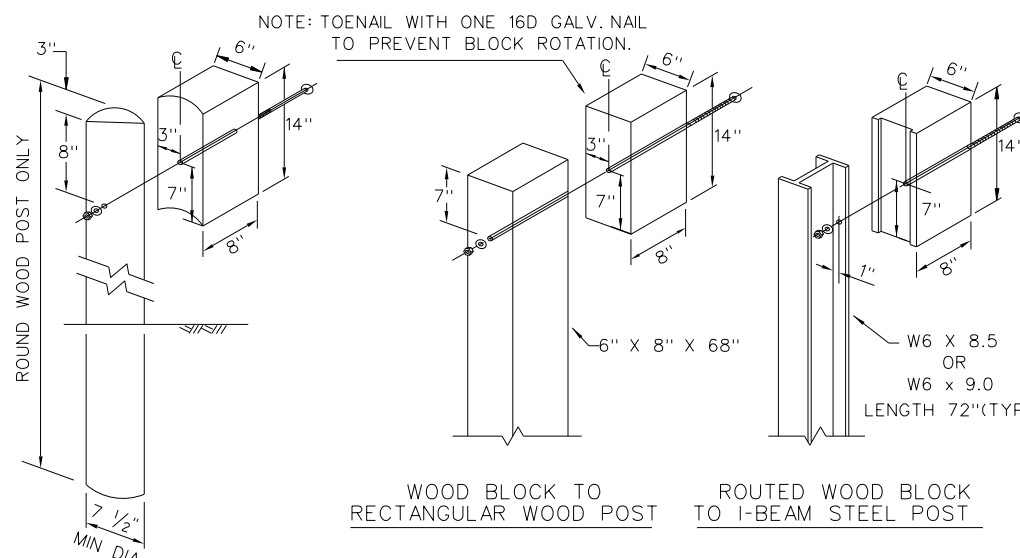
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TYPICAL POST PLACEMENT

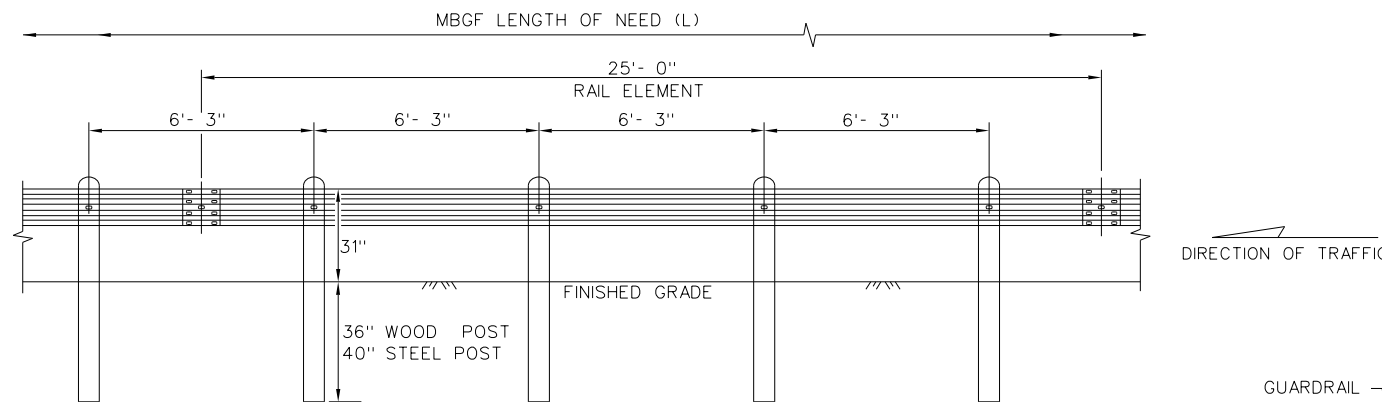


WOOD BLOCK TO ROUND WOOD POST

WOOD BLOCK TO RECTANGULAR WOOD POST

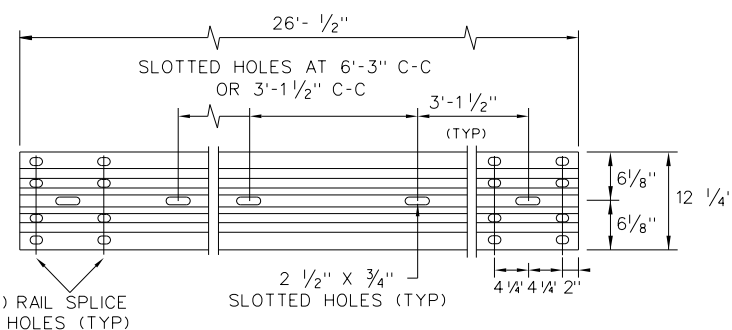
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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"

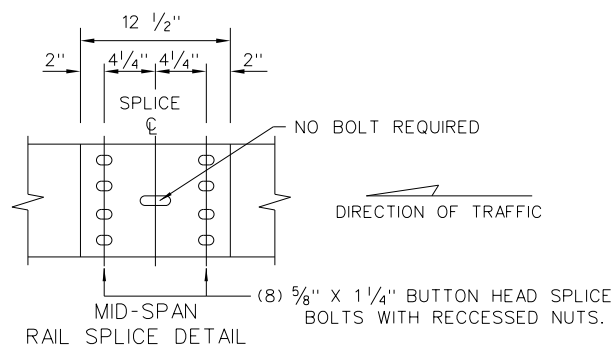
POST & BLOCK LENGTH

FBB03 = 10"

FBB04 = 18"

BUTTON HEAD BOLT

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



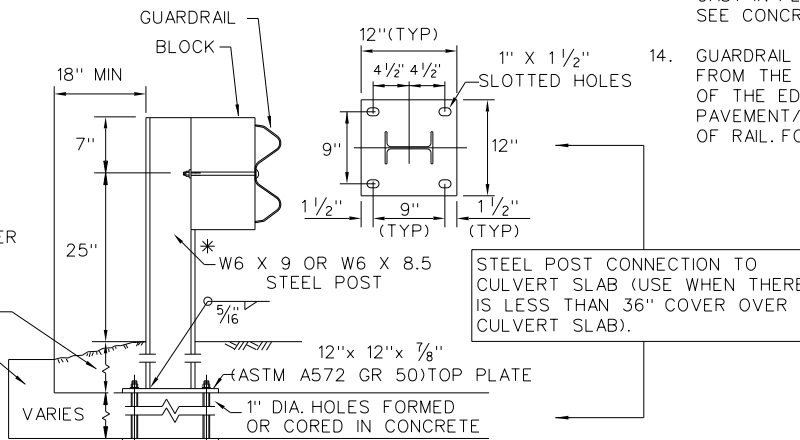
NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.

*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. 7/8" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS. NOTE: BOLT LENGTH = SLAB PLUS 2 1/4" MIN.

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

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

GENERAL NOTES

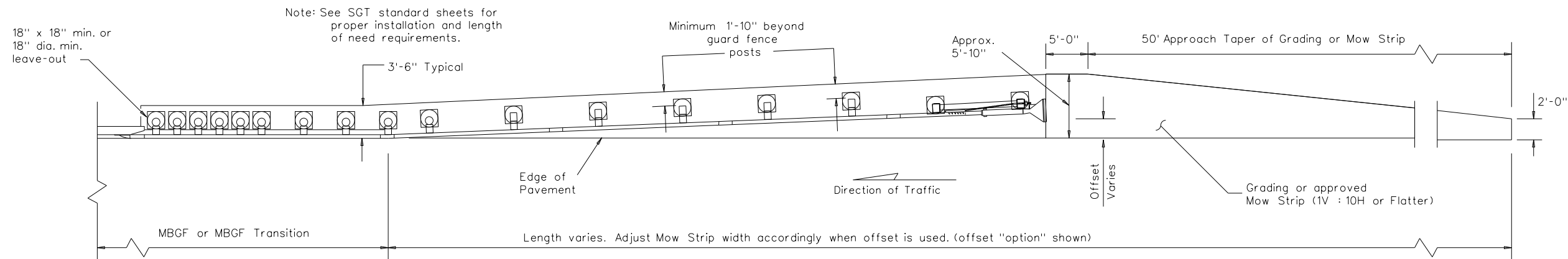
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS 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 5/8" WASHER (FWC16a) 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/SOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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

		Design Division Standard	
<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
©2024 NOVEMBER 2019	CONT SECT	JOB	HIGHWAY
REVISIONS		0211 04	027, ETC
		US 77, ETC.	
DIST	COUNTY	SHEET NO.	
AUS	LEE	46	

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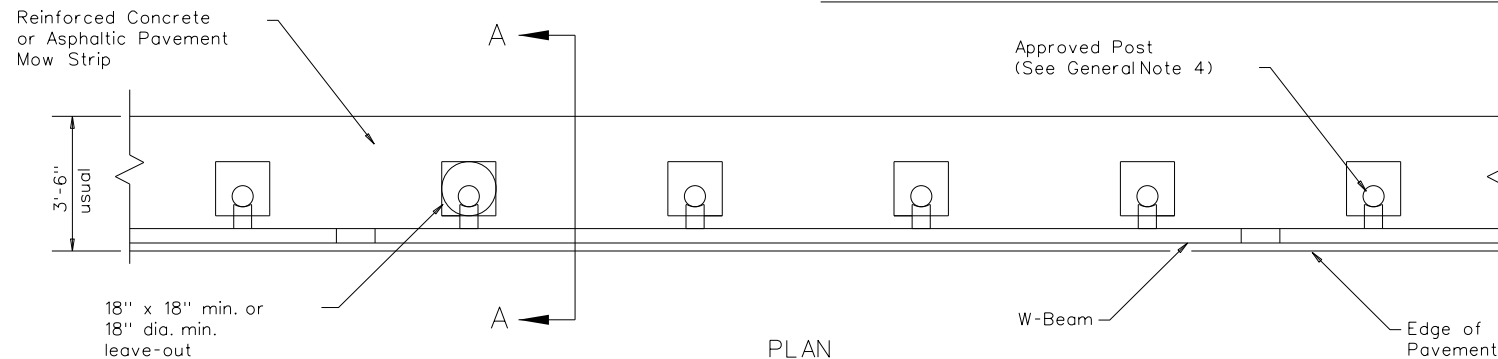
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 FILE: p:\t\project\wiseonline.com\TXDOT14\Documents\14 - AUS\Standards\Statewide Standards\Roadway\1-BARRIER (Flexible)\GF(31)MS-19.dgn



GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS

Note: Site Condition(s)

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

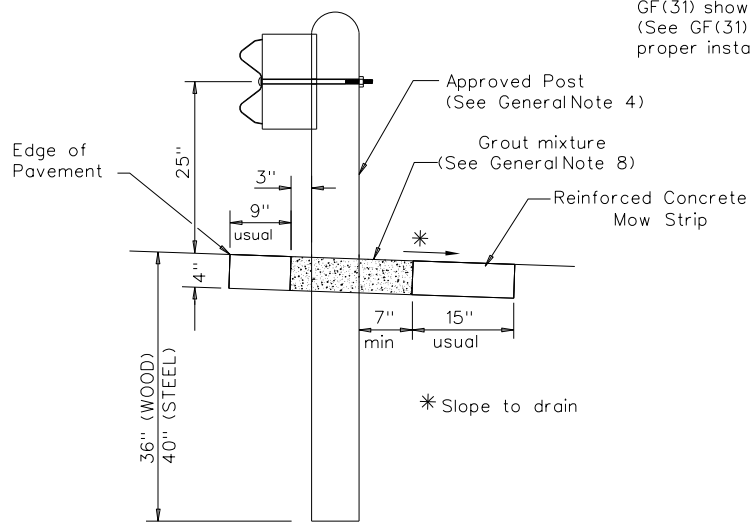


PLAN

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

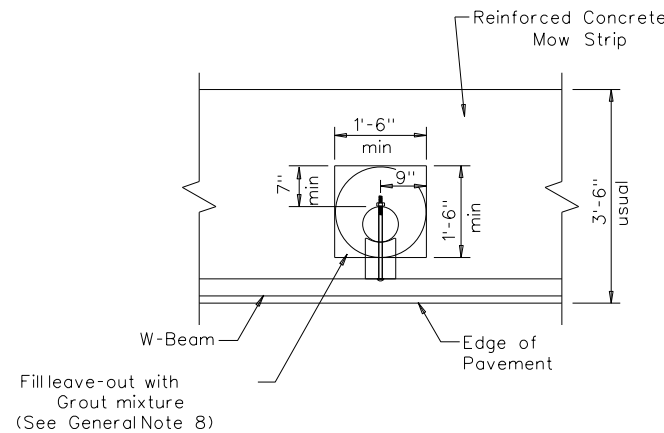
GENERAL NOTES

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



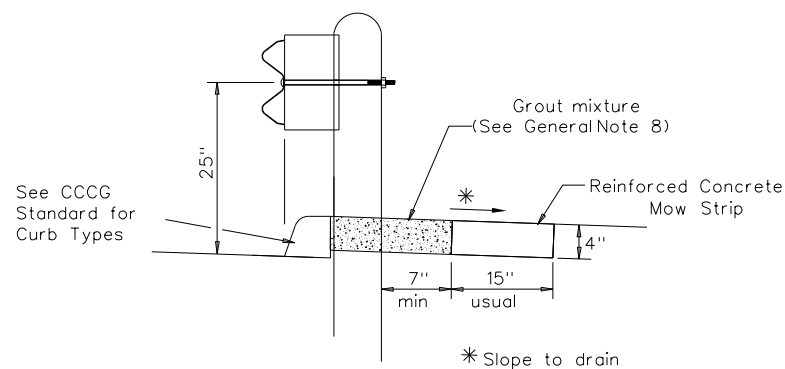
SECTION A-A

Typical



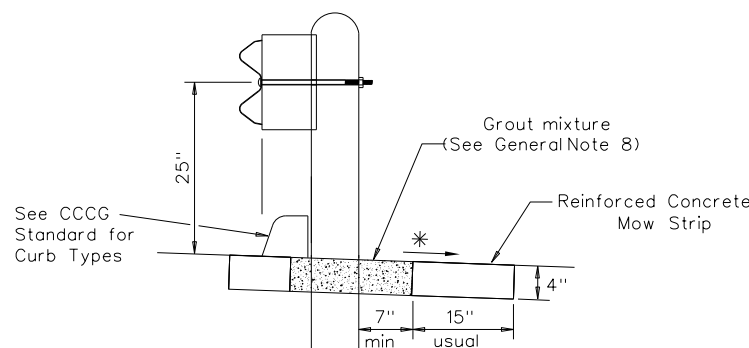
MOW STRIP DETAIL

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



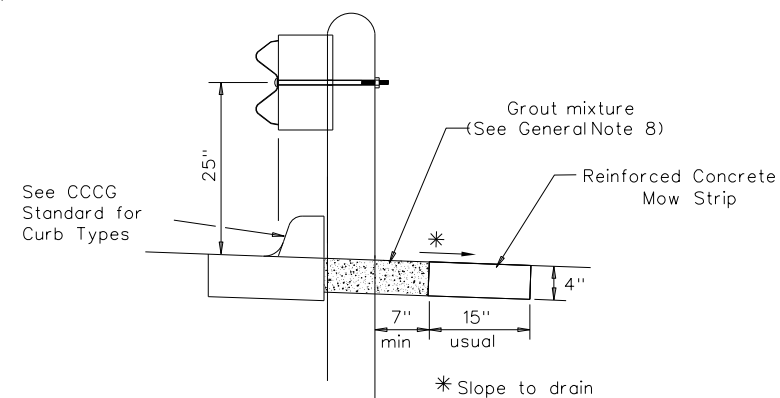
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

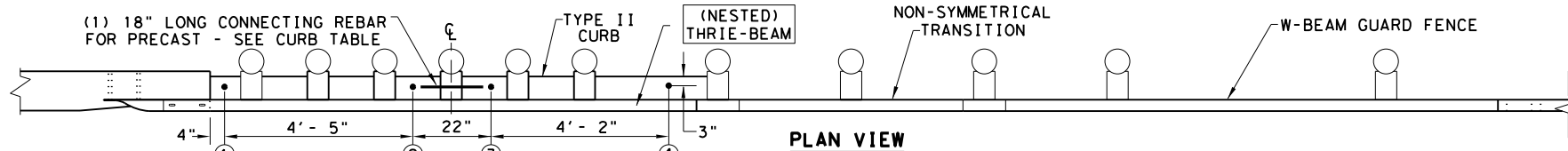
Curb shown on top of mow strip



CURB OPTION (3)

		Design Division Standard	
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT GF(31)MS-19			
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP
©2024 NOVEMBER 2019	CONT SECT	JOB	HIGHWAY
REVISIONS		0211 04	027, ETC US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	47	

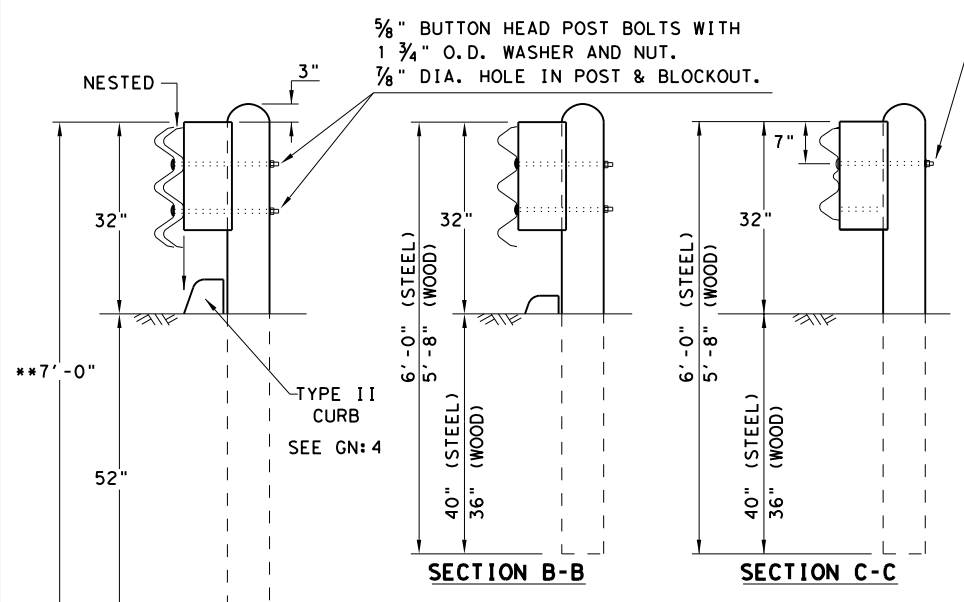
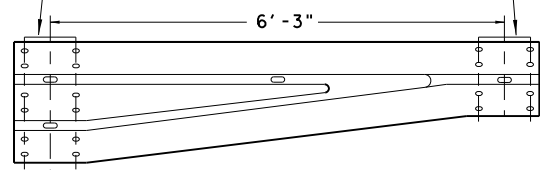
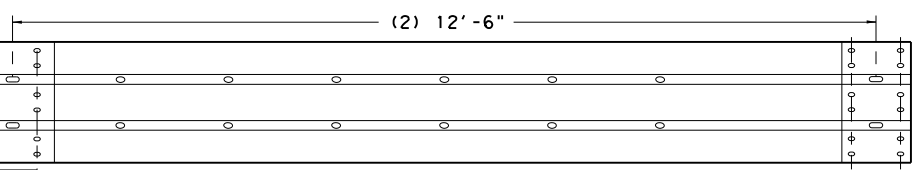
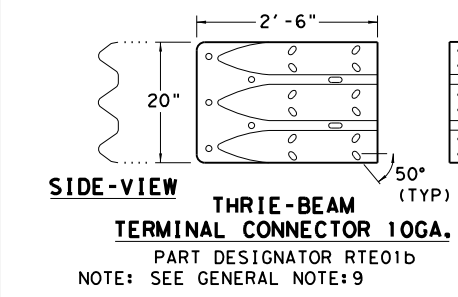
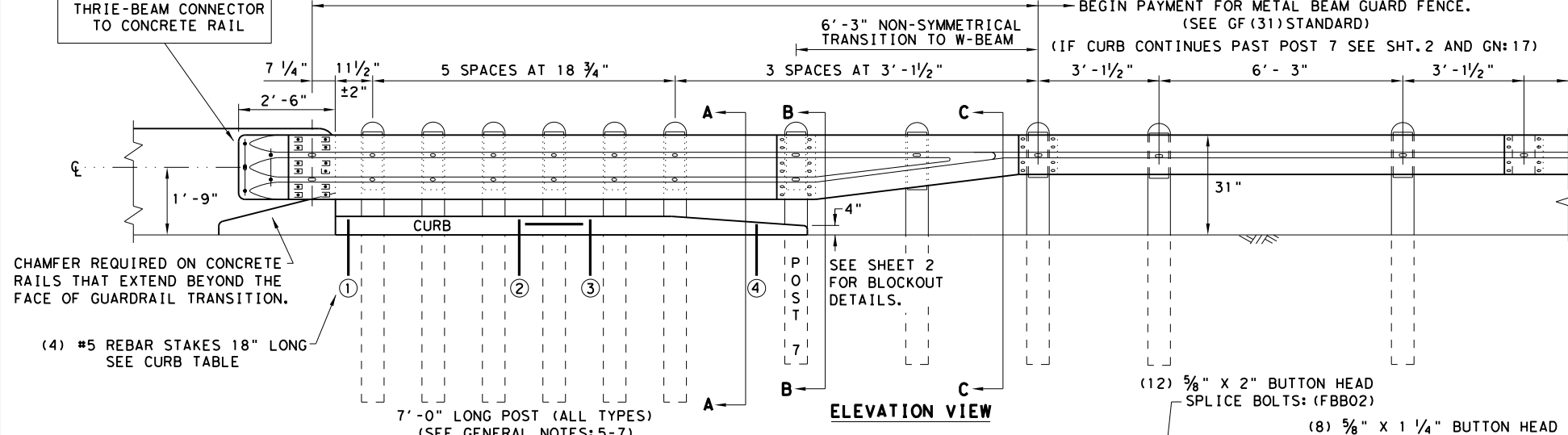
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- (5) 1" DIA. HOLES.
- (5) 7/8" DIA. HEAVY HEX HEAD BOLTS (FACING TRAFFIC SIDE) (ASTM F3125 GR A325 OR A449).
- (10) 1 3/4" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
- (5) 7/8" DIA. HEAVY HEX NUTS (ASTM A194 OR A563).

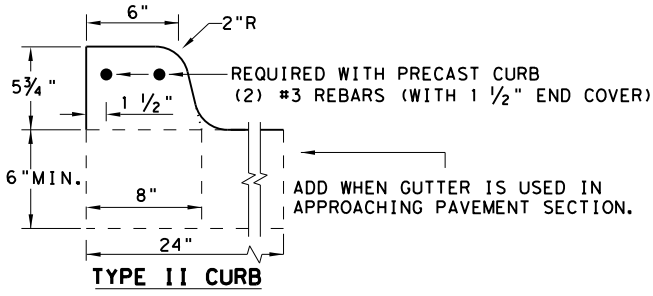
NOTE:
HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE 7/8" HEX NUT. TRIM AS REQUIRED.

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



THRIE-BEAM TERMINAL - 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

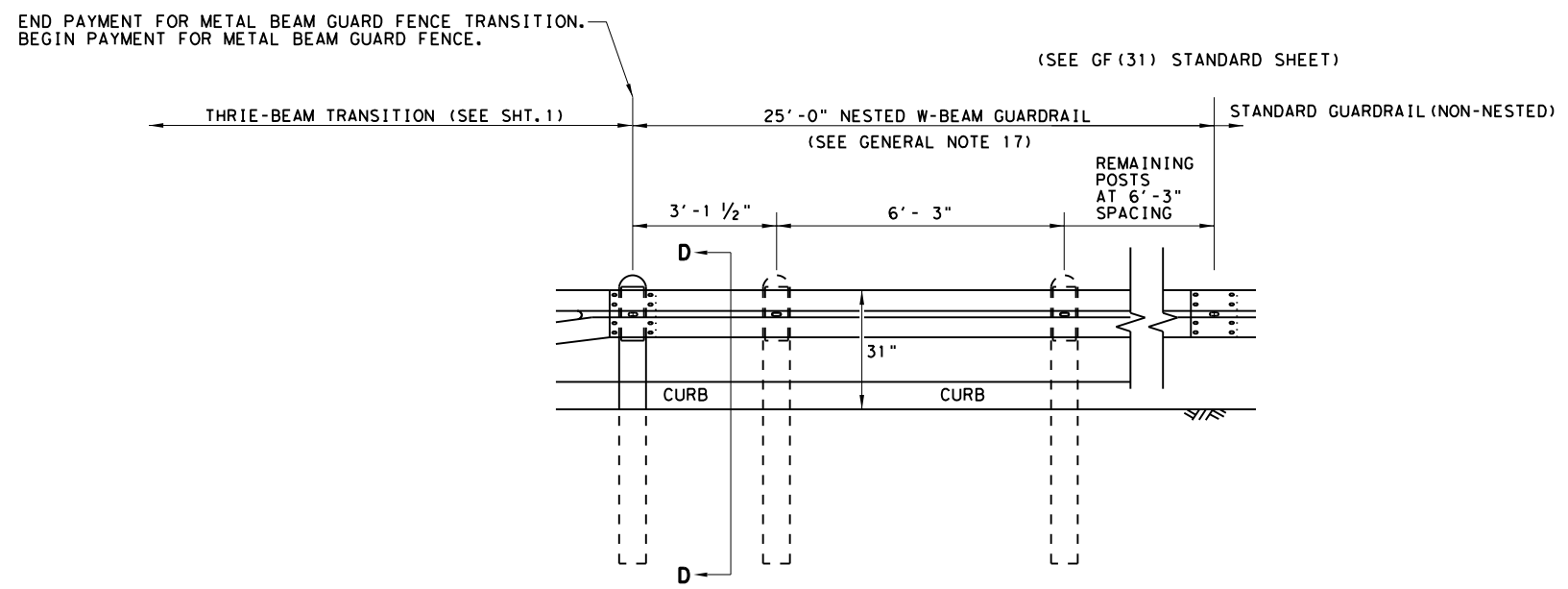
1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- 3/4" HEIGHT); 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 5/8" 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 5/8" 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**

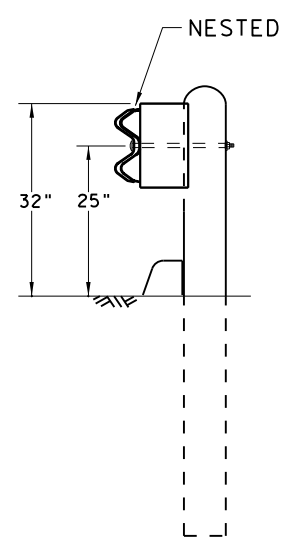
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METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT		
GF (31) TR TL3-20		
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© TXDOT: NOVEMBER 2020	CONT: 0211	SECT: 04
REVISIONS	027, ETC	US 77, ETC.
DIST: AUS	COUNTY: LEE	SHEET NO.: 48

DATE: 11/30/2023
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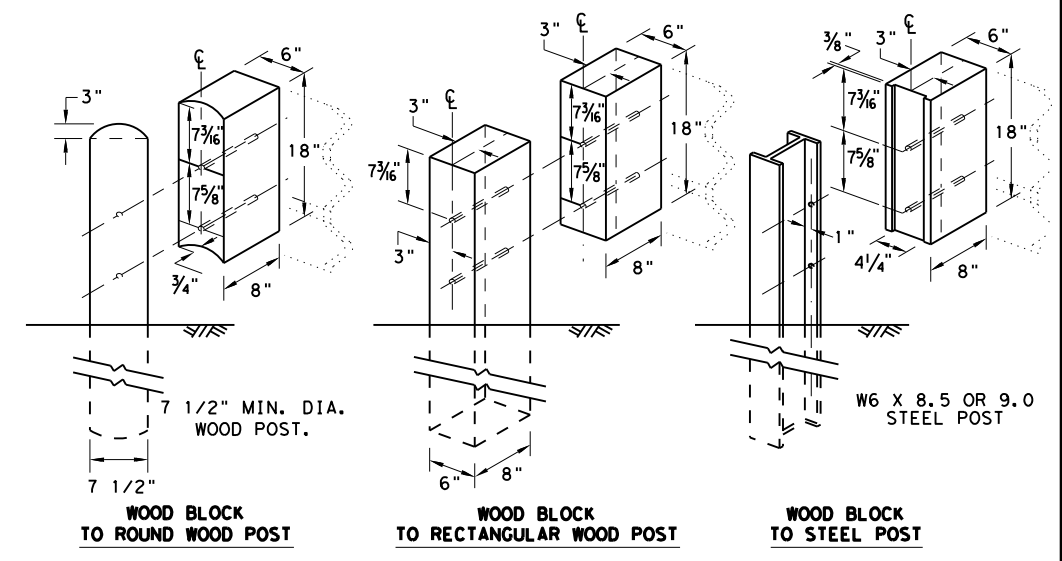
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



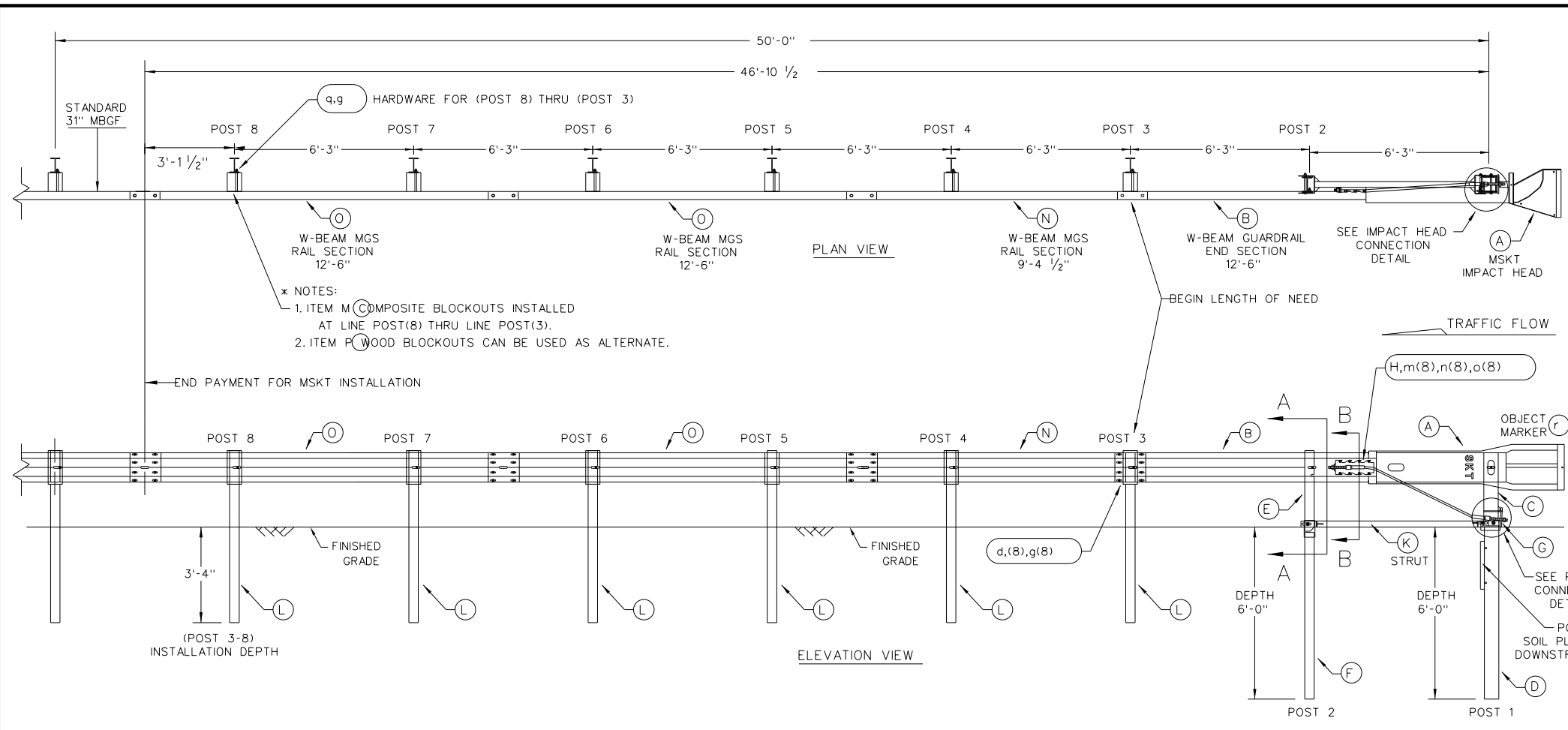
THREE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

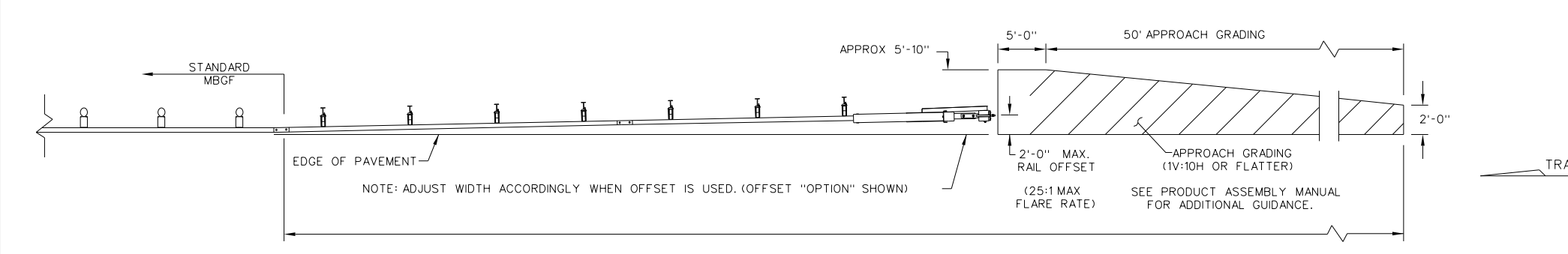
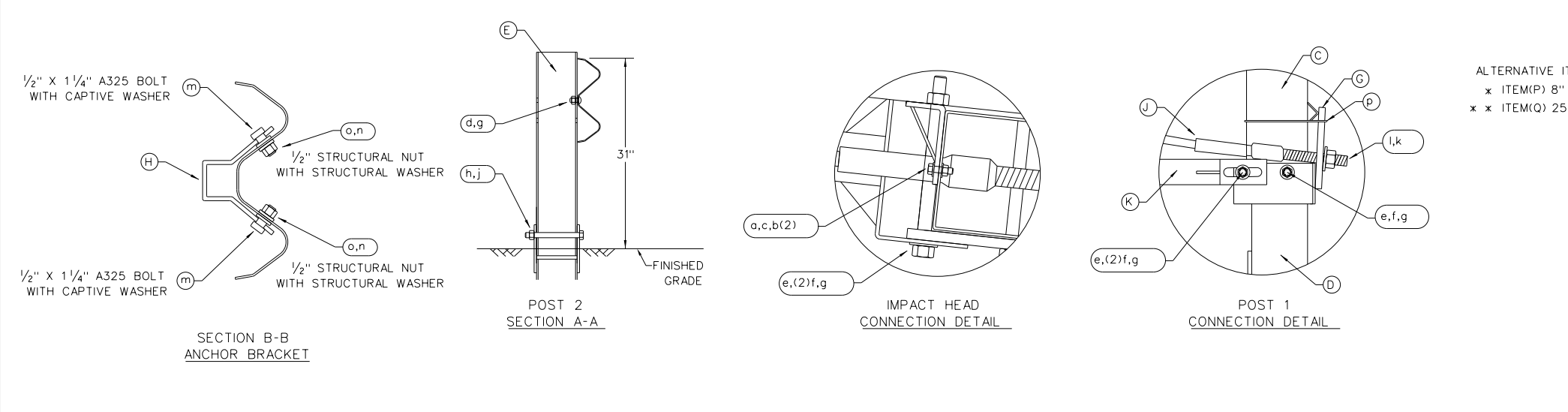
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METAL BEAM GUARD FENCE THREE-BEAM TRANSITION TL-3 MASH COMPLIANT GF (31) TR TL3-20				
FILE: gf31tr+1320.dgn	DN: TXDOT	CK: KM	DW: KM	CK: CGL/AG
©TXDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC	US 77, ETC.
	DIST	COUNTY		SHEET NO.
	AUS	LEE		49

DATE: 11/30/2023
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- GENERAL NOTES**
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE: MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION-062717).
 - APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
 - FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
 - HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
 - SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
 - A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
 - IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
 - POSTS SHALL NOT BE SET IN CONCRETE.
 - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
 - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
 - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
 - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN 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 Ga.	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			
a	2	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" 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 1/16" O.D. x 3/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" 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.

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

Texas Department of Transportation

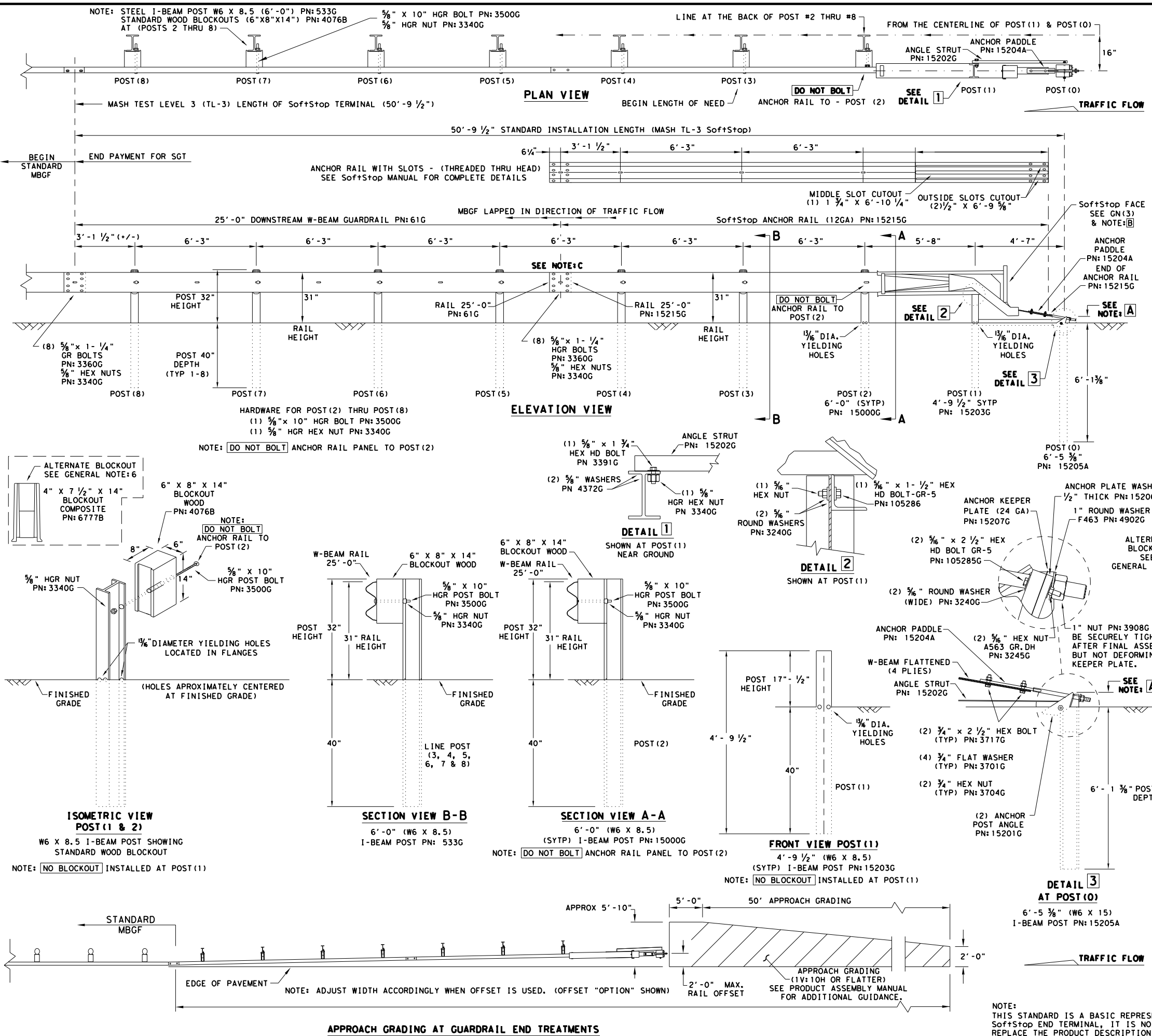
Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3

SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
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REVISIONS		0211	04	027, ETC
		DIST	COUNTY	SHEET NO.
		AUS	LEE	50

DATE: 3/11/2024
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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 PADDL
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
HARDWARE		
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	3/4" X 2 1/2" HEX BOLT A325
3701G	4	3/4" ROUND WASHER F436
3704G	2	3/4" HEAVY HEX NUT A563 GR.DH
3360G	16	5/8" X 1 1/4" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	5/8" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	5/8" X 10" HGR POST BOLT A307
3391G	1	5/8" X 1 3/4" HEX HD BOLT A325
4489G	1	5/8" X 9" HEX HD BOLT A325
4372G	4	5/8" WASHER F436
105285G	2	5/8" X 2 1/2" HEX HD BOLT GR-5
105286G	1	5/8" X 1 1/2" HEX HD BOLT GR-5
3240G	6	5/8" ROUND WASHER (WIDE)
3245G	3	5/8" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT (10S) 31-16

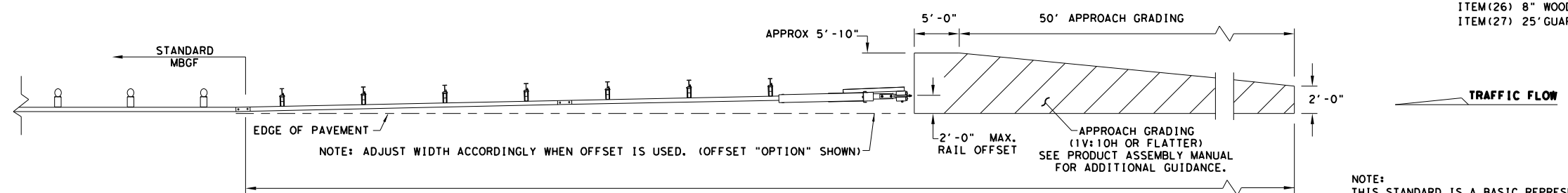
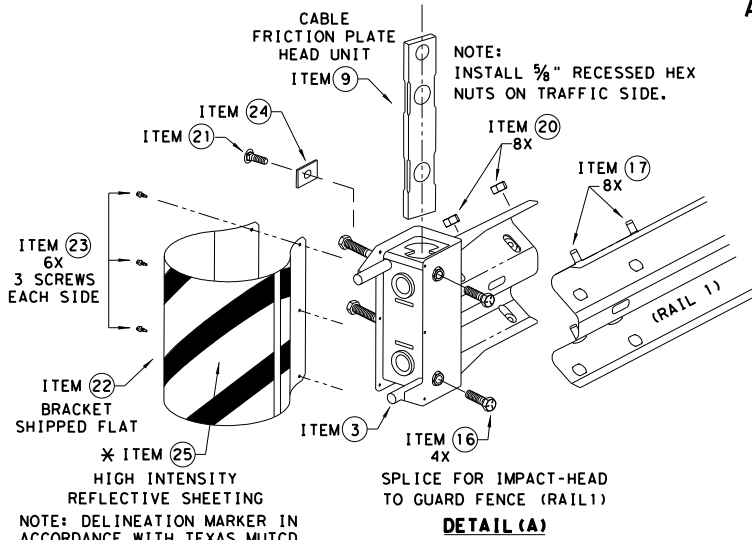
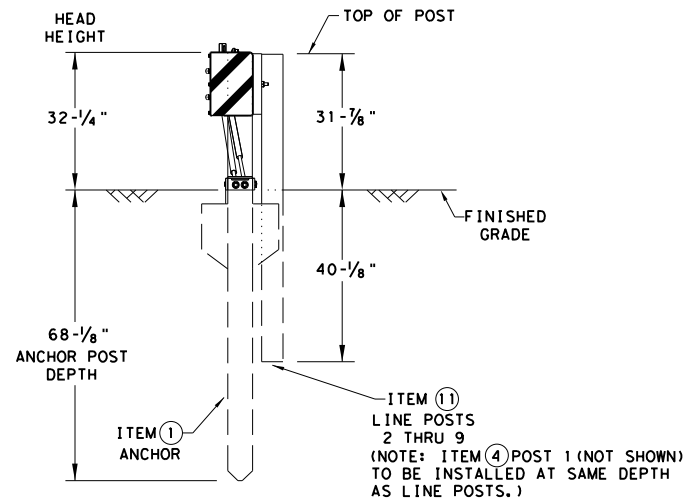
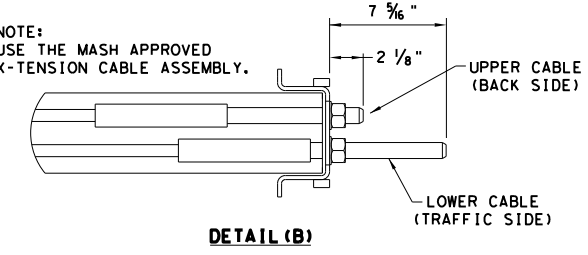
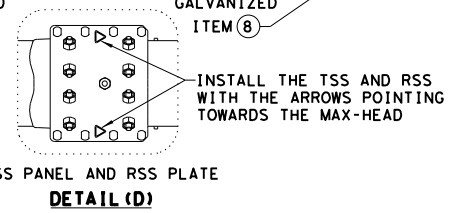
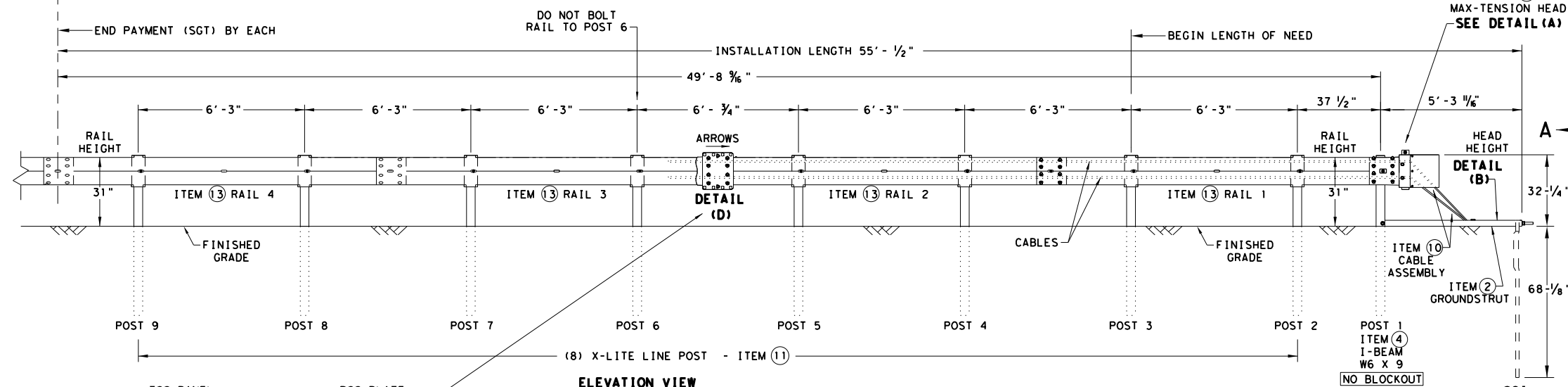
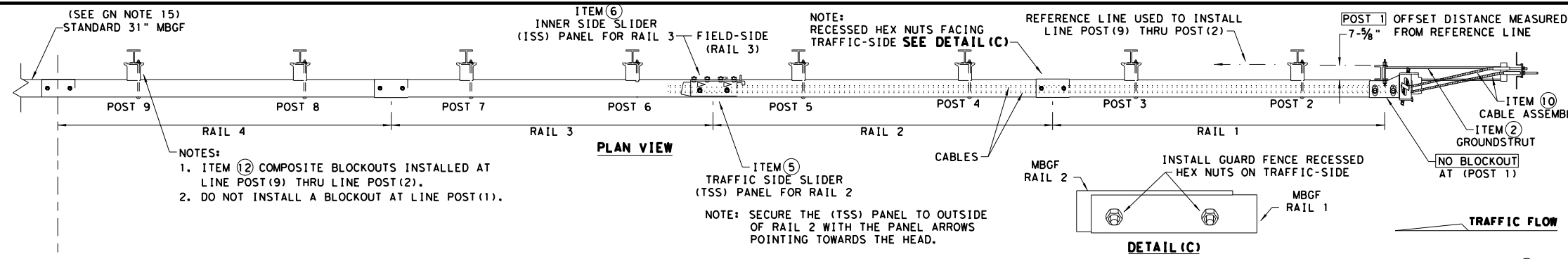
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NOTE:
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GENERAL NOTES

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

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

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

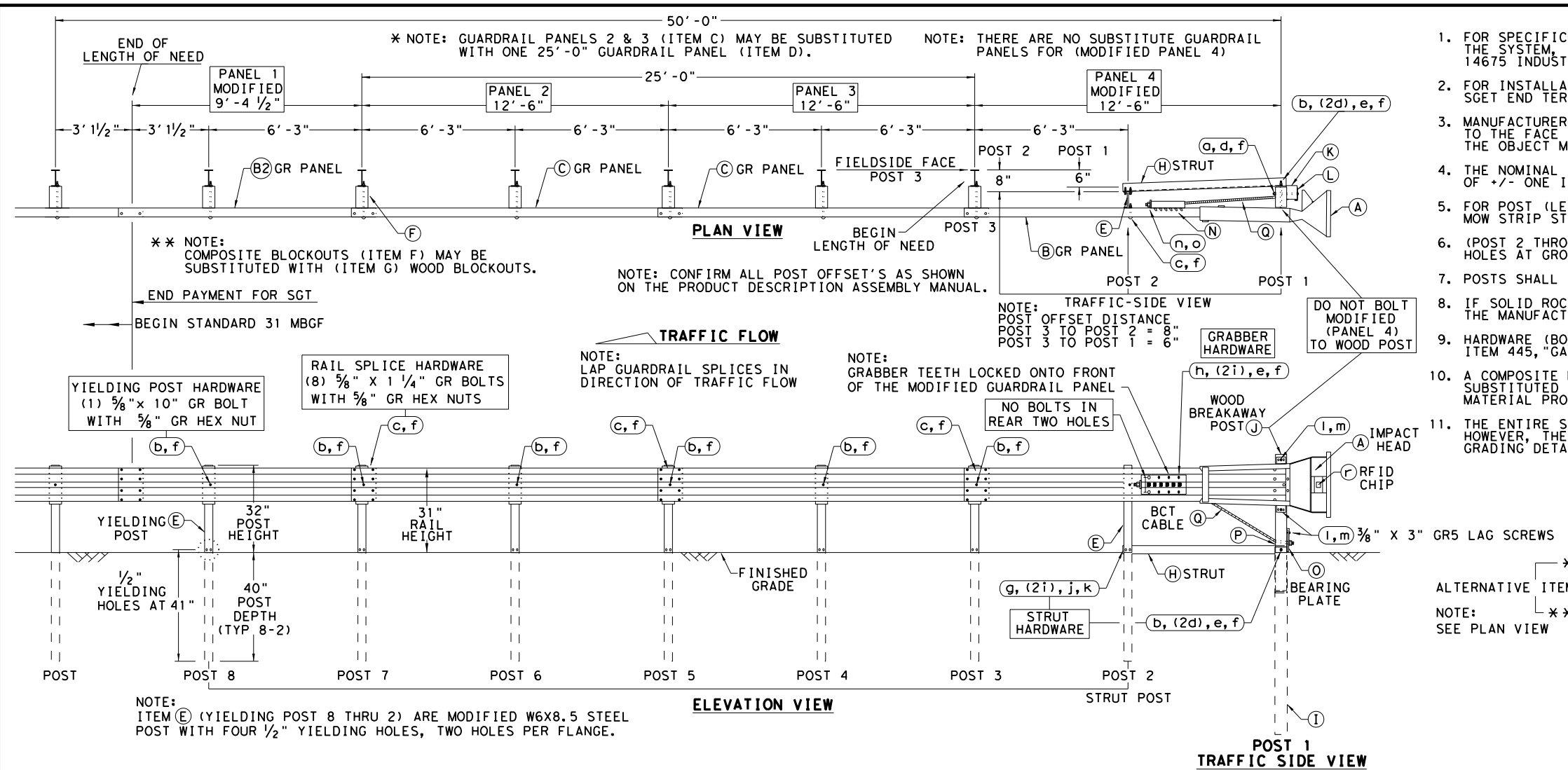
Texas Department of Transportation
 Design Division Standard

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

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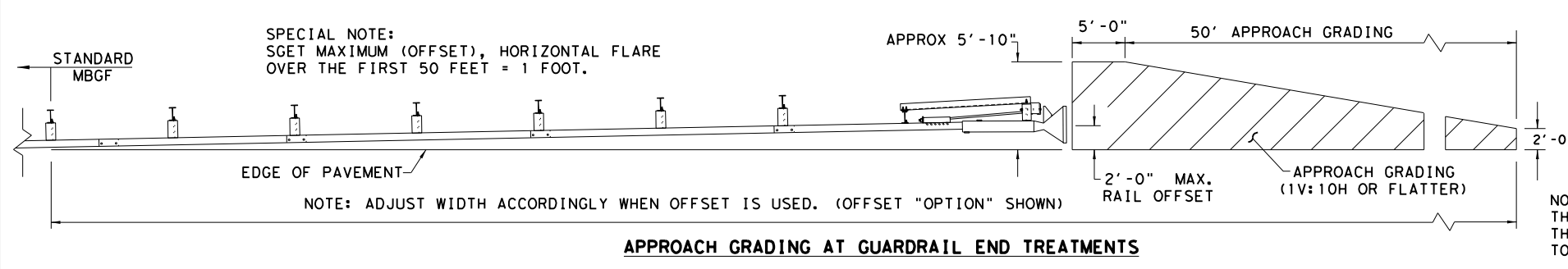
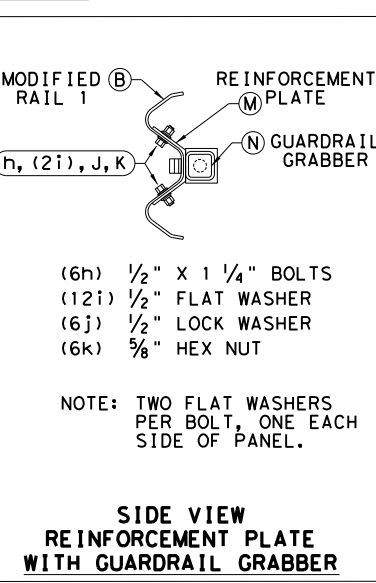
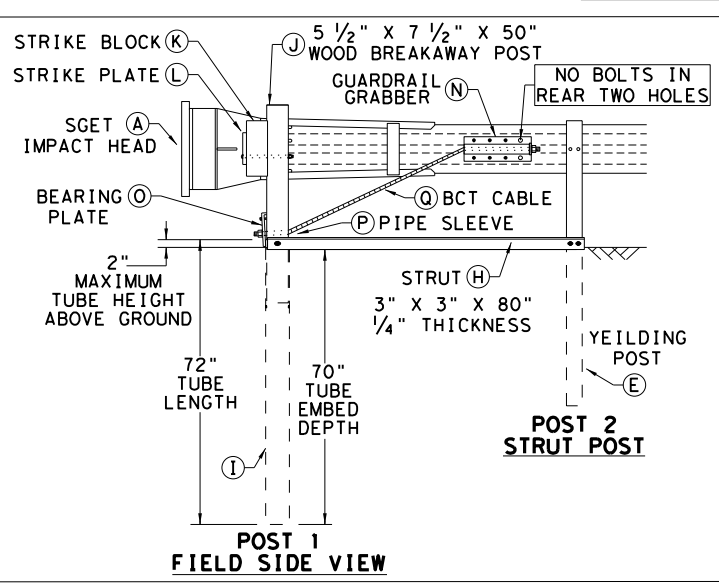
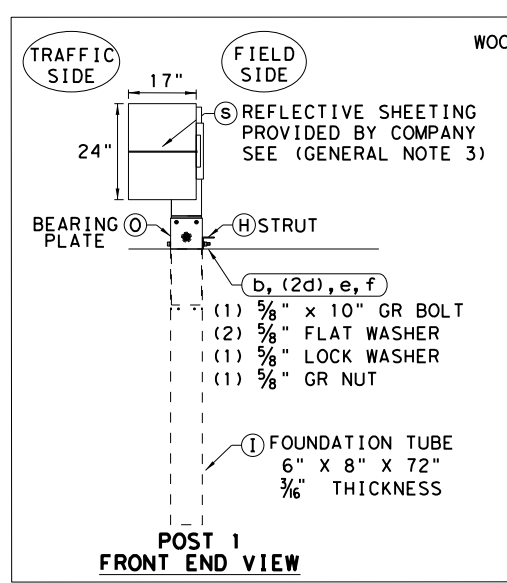
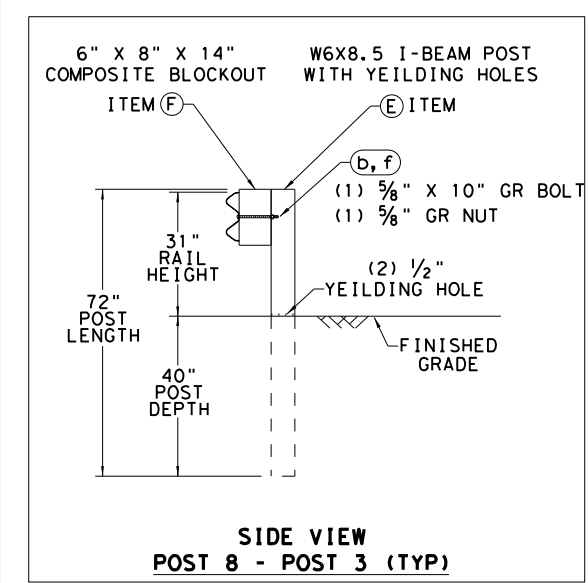
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- ### GENERAL NOTES
- FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
 - FOR INSTALLATION, REPAIR AND MAINTENANCE REFER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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM #
A	1	SGET IMPACT HEAD	SIH1A
B	1	MODIFIED GUARDRAIL PANEL 12'-6" 12GA	126SPZGP
B2	1	MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA	GP94
C	2	STANDARD GUARDRAIL PANEL 12'-6" 12GA	GP126
D	1	STANDARD GUARDRAIL PANEL 25'-0" 12GA	GP25
E	7	MODIFIED YIELDING I-BEAM POST W6x8.5	YP6MOD
F	6	COMPOSITE BLOCKOUT 6" X 8" X 14"	CBO8
G	6	WOOD BLOCKOUT 6" X 8" X 14"	WBO8
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			
g	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 A563HD HDG	1HN563
p	1	18" TO 24" LONG ZIP TIE RATED 175-200LB	ZPT18
q	1	1 1/2" X 4" SCH-40 PVC PIPE	PSPCR4
r	1	RFID CHIP RATED MIL-STD-810F	RFID810F
s	1	IMPACT HEAD REFLECTIVE SHEETING	RS30M



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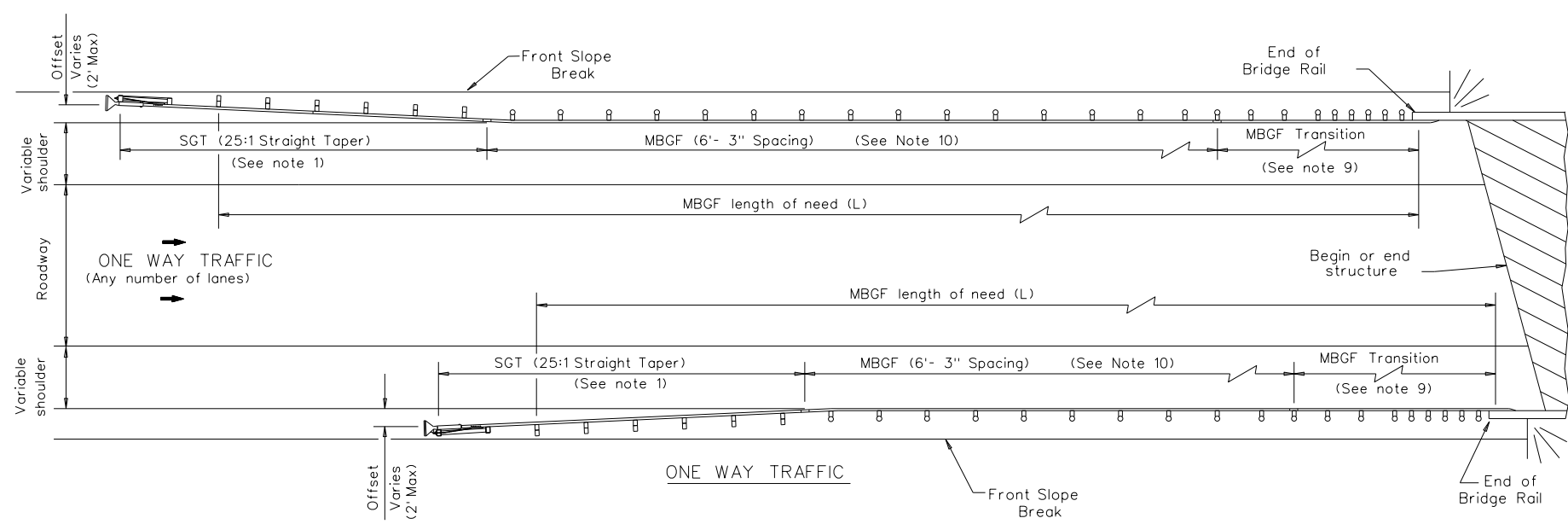
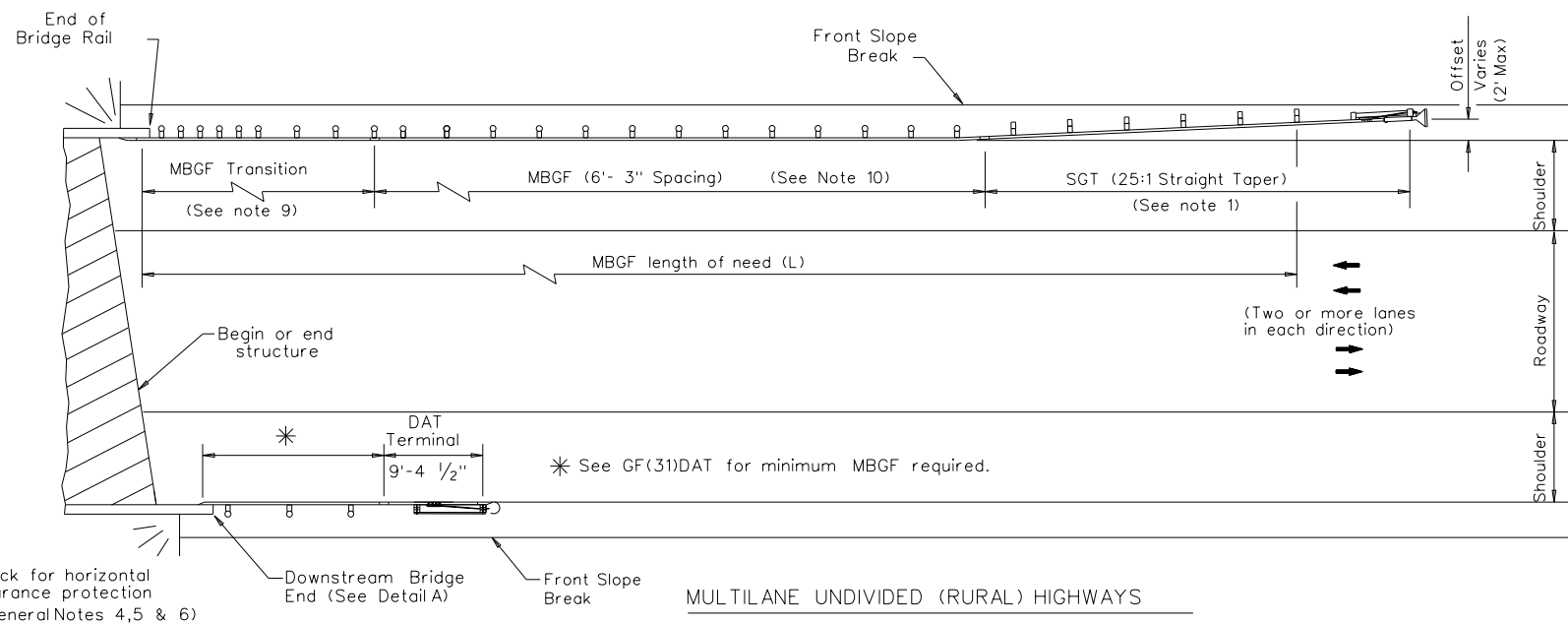
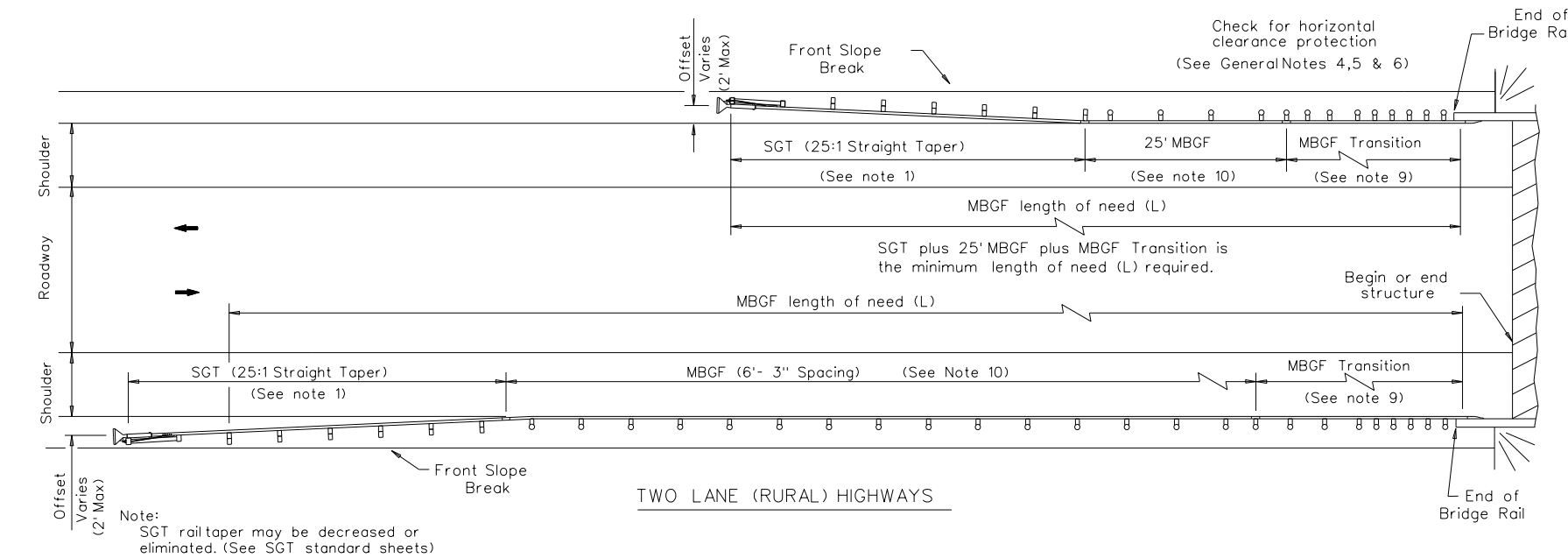
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SINGLE GUARDRAIL TERMINAL
SGET - TL-3 - MASH
SGT (15) 31-20

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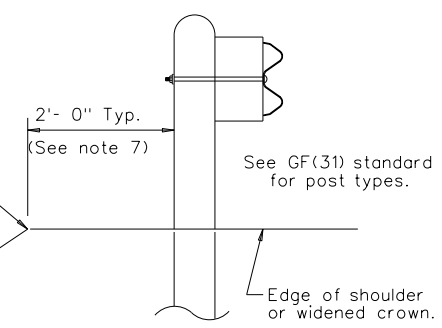
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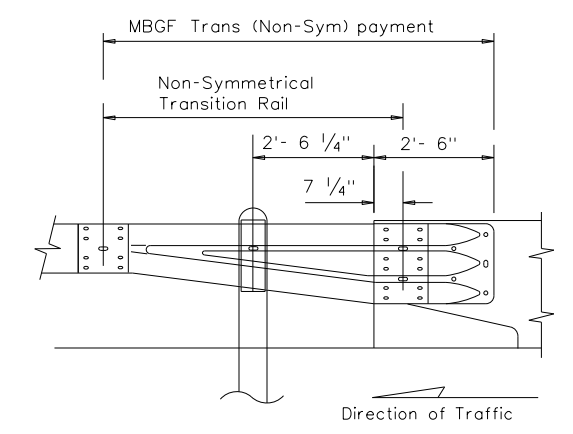


GENERAL NOTES

1. For more detail: See GF(31), SGT ()31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'-0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



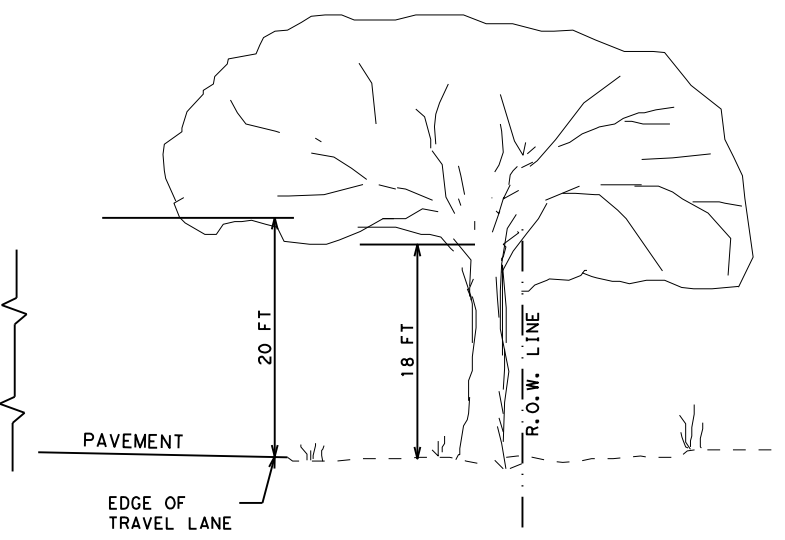
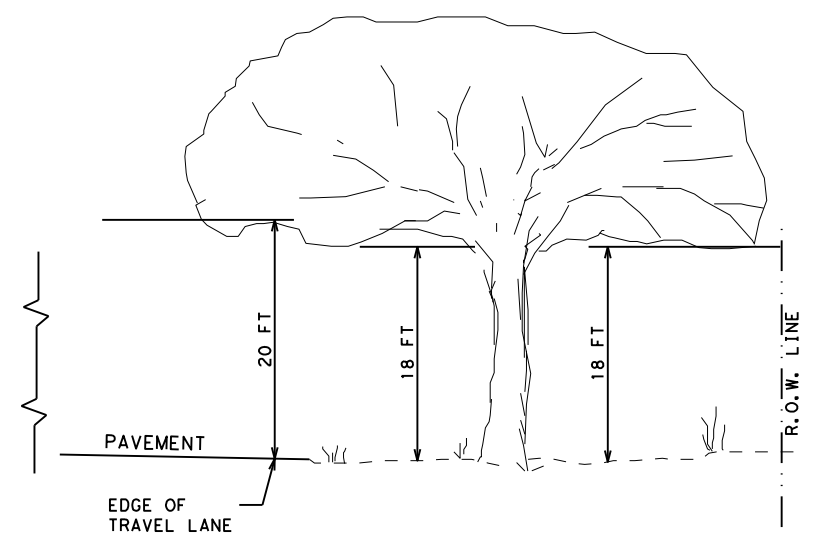
Note: All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

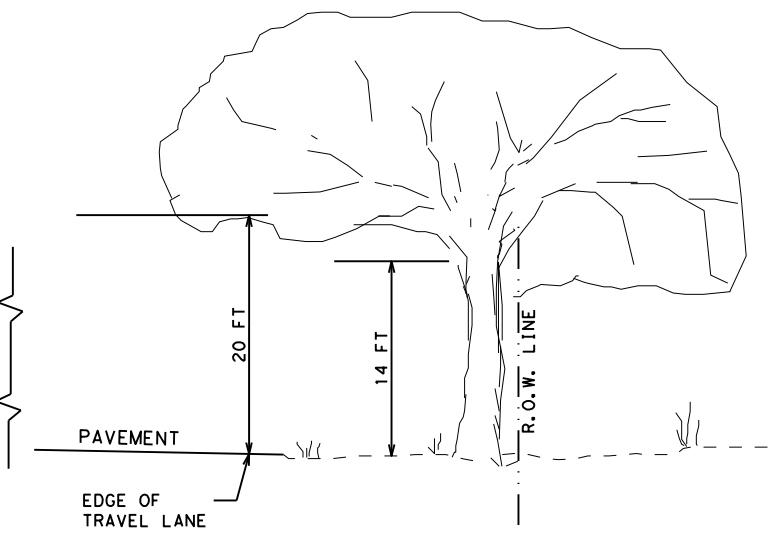
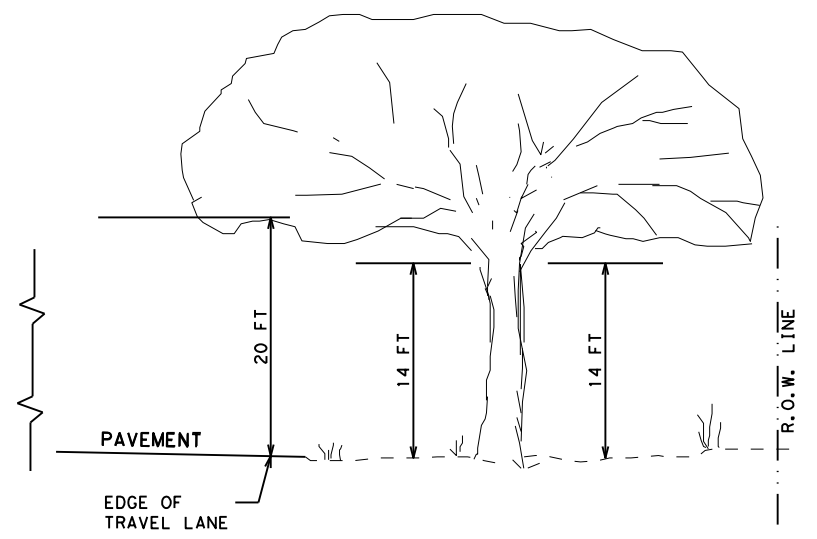
Showing Downstream Rail Attachment

		Design Division Standard		
<h2>BRIDGE END DETAILS</h2> <h3>(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)</h3> <h1>BED-14</h1>				
FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
©2024 December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC	US 77, ETC.
24-2014 Added 25' MBGF to Two Lane Rural Highway section. Eng. CCL, Cust. VP	DIST	COUNTY	SHEET NO.	
AUS	LEE		51	

DATE: 11/30/2023 8:42:23 PM
 FILE: pw://txdot.projectwiseonline.com/TXD04/Documents/14 - AUS/Design Projects/021104027/4 - Design/Plan Set/10. Miscellaneous/PRWD-20(AUS).dgn



**NON-OAK SPECIES
TREE PRUNING LIMITS**

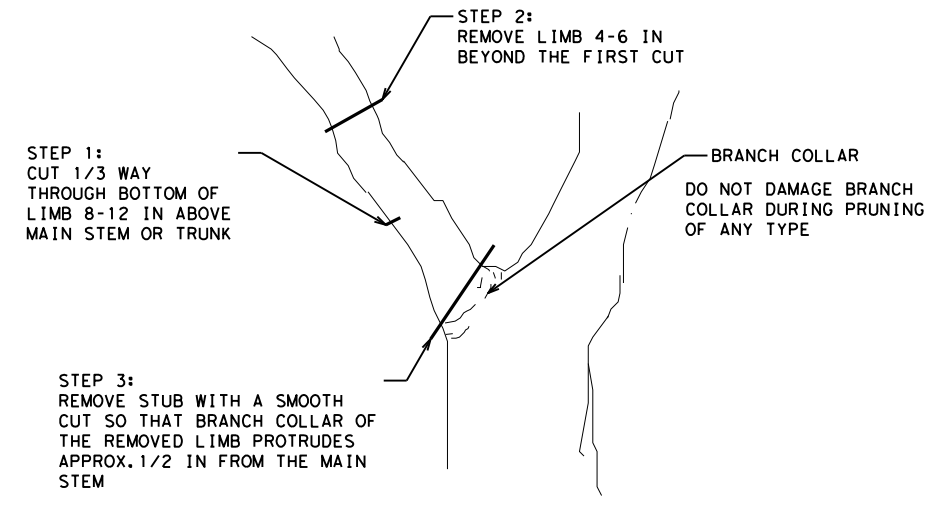


**OAK SPECIES
TREE PRUNING LIMITS**

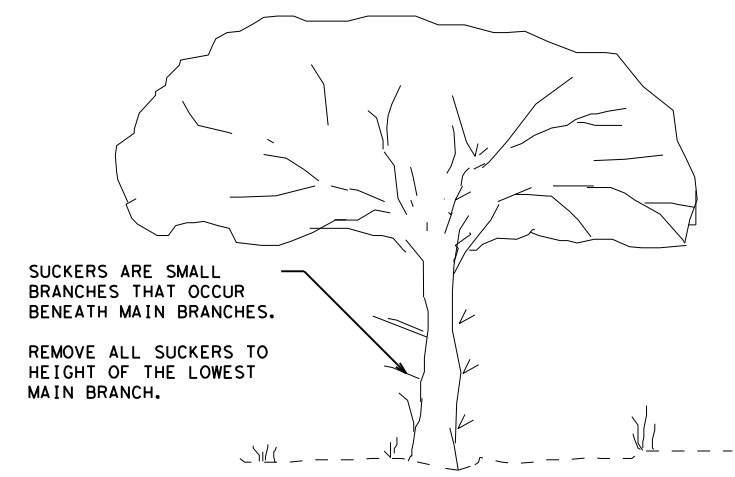
GENERAL NOTES

PAYMENT FOR THIS WORK IS SUBSIDIARY TO PREP R.O.W.

1. REMOVE ALL DEAD TREES, DEAD BRUSH, AND DEAD MULTI-TRUNKED TREES WITHIN THE R.O.W.. TREES, SHRUBS, OR MULTI-TRUNKED TREES THAT DIE DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO COMPLETION OF THE PROJECT.
2. USE WORK METHODS IN ACCORDANCE WITH ANSI A300 STANDARDS AND ITEM 752.
3. FLAILING EQUIPMENT IS NOT ALLOWED ON OAK TREES.
4. REPAIR DAMAGE TO PRIVATE FENCES AND/OR PRIVATE PROPERTY.
5. PERFORM TREE PRUNING ONLY WITHIN THE R.O.W.. NO CUTS SHALL BE MADE OUTSIDE THE R.O.W..
6. PERFORM TREE PRUNING PER DETAIL FOR ENTIRE R.O.W. AREA WITHIN PROJECT LIMITS. THE ENGINEER MAY DEFINE AREAS TO RESTRICT TREE PRUNING.
7. REVIEW EPIC SHEETS FOR AREAS TO BE AVOIDED DUE TO ENVIRONMENTAL REASONS OR ADDITIONAL NOTES THAT PERTAIN TO TREE PRUNING.
8. MIGRATORY BIRDS AND BATS MAY BE NESTING WITHIN THE PROJECT LIMITS. PERFORM TREE TRIMMING OUTSIDE THE NESTING SEASON DATES LISTED IN THE GENERAL NOTES.
9. NO TRIMMING OF THE VEGETATION THAT CONTAINS AN ACTIVE NEST FOR MIGRATORY BIRDS IS ALLOWED.
10. THE TRIMMING OR CUTTING OF RED OAK AND LIVE OAK SPECIES FOR PURPOSES OTHER THAN PROTECTING PUBLIC SAFETY IS ONLY PERMITTED BETWEEN JULY 1ST AND JANUARY 31ST AND PROHIBITED BETWEEN FEBRUARY 1ST AND JUNE 30TH
11. ALL PRUNING CUTS MUST BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE EXPOSED SURFACE FROM CONTAMINATION. USE OF AEROSOL CAN IS THE PREFERRED METHOD OF APPLICATION FOR SEALING CUTS. ANY WOUNDS, WHETHER MADE BY TRIMMING, CONSTRUCTION OR ACCIDENT, SHALL BE TREATED IMMEDIATELY WITH COMMERCIAL PRUNING PAINT TO SEAL THE SURFACE FROM CONTAMINATION. THE TXDOT INSPECTOR MAY CONDUCT UNANNOUNCED INSPECTIONS TO ENSURE COMPLIANCE.
12. IF MORE THAN 25% OF THE TREE CANOPY WILL BE REMOVED CONTACT THE TXDOT ARBORIST OR INSPECTOR FOR APPROVAL PRIOR TO PROCEEDING.



**PROPER TREE PRUNING
FOR LIMBS 2" IN DIA. AND GREATER**



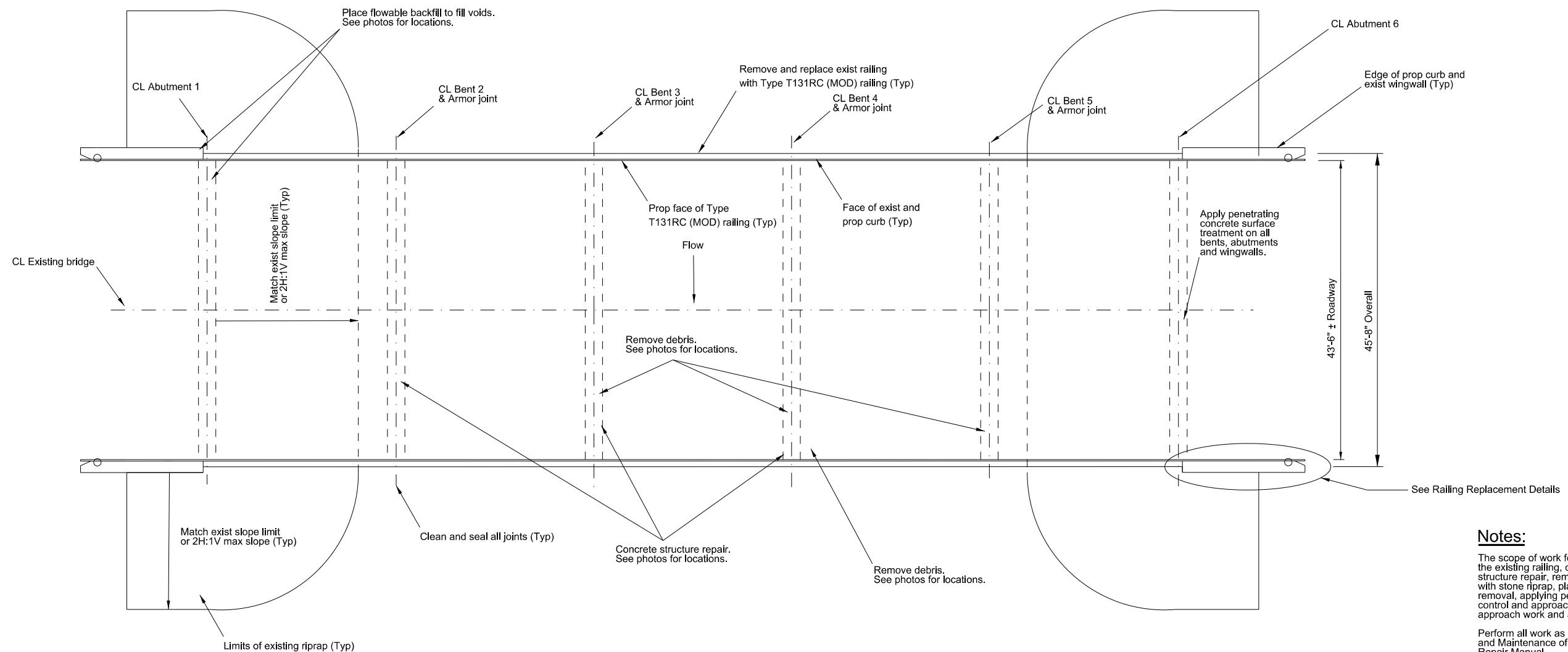
SUCKER REMOVAL DETAIL



**PREP R.O.W.
PRUNING
DETAIL**

PRWD-20 (AUS)

©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
	0211	04	027, ETC	US 77, ETC.
	DIST	COUNTY	SHEET NO.	
	AUS	LEE	52	



Plan

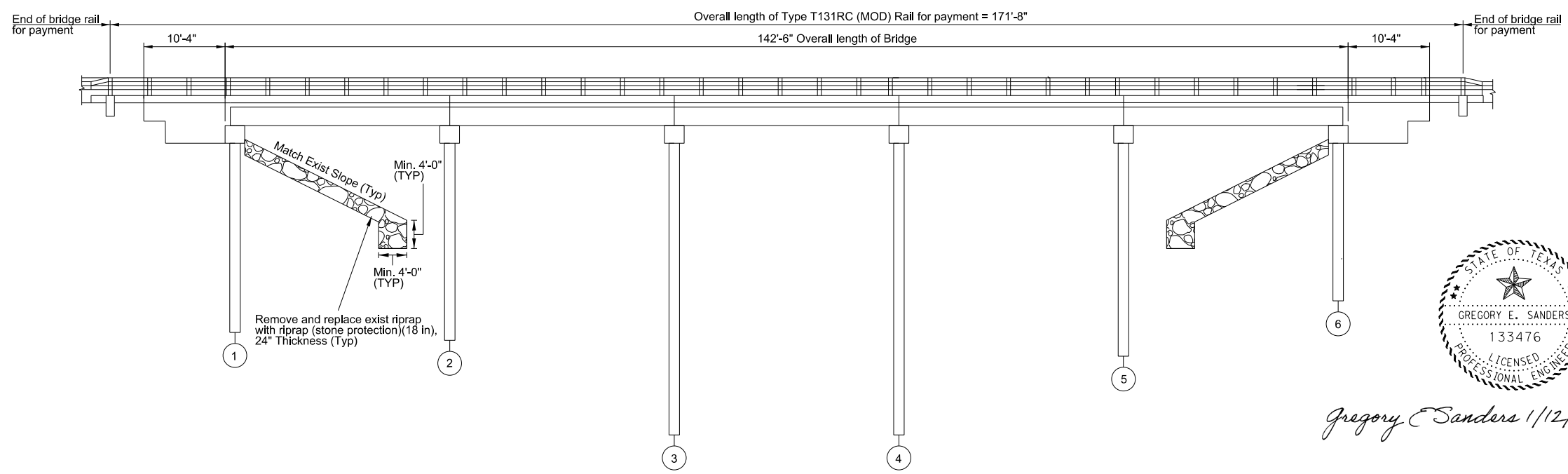
Notes:

The scope of work for the project involves removing and replacing the existing railing, cleaning and sealing existing joints, concrete structure repair, removing and replacing existing concrete riprap with stone riprap, placing flowable backfill, debris removal, graffiti removal, applying penetrating concrete surface treatment, traffic control and approach work. See roadway plans for traffic control, approach work and all other work.

Perform all work as per TxDOT Standard Specifications For Construction and Maintenance of Highways, Streets and Bridges and TxDOT Concrete Repair Manual.

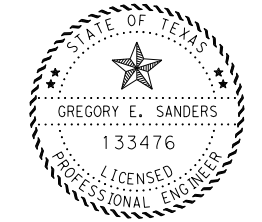
See Type T131RC (MOD) standard sheets for railing replacement details.

The total overlay depth on the bridge must not exceed 4". The existing overlay depth is 2".



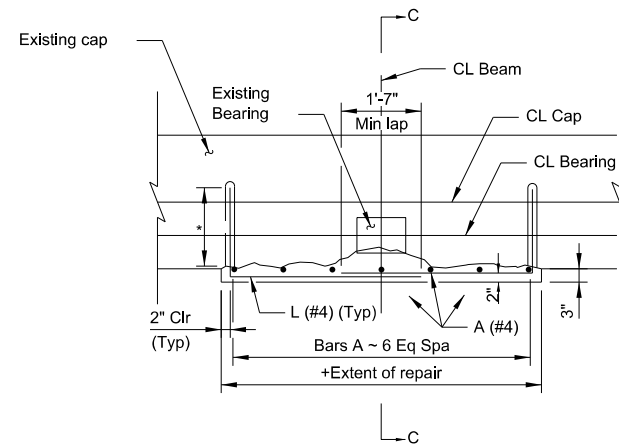
Elevation

NOT TO SCALE

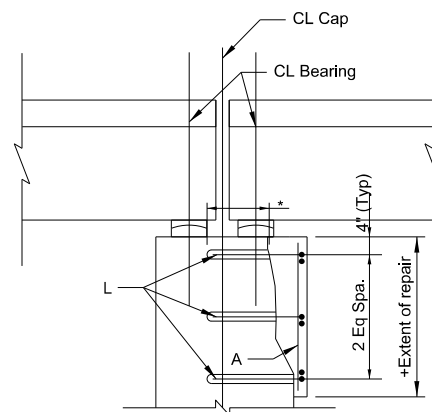


Gregory E Sanders 1/12/24

		Austin District Bridge	
<h2>Bridge Repair Layout</h2> <p>Elm Creek Bridge NBI: 14-144-0-0211-04-013</p>			
FILE:	DWG: MS	CHK: GS	DWG: MS
©TxDOT	CONT: 0211	SECT: 04	JOB: 027, ETC.
REVISIONS	DIST: 14		COUNTY: LEE
			SHHWAY: US 77, ETC.
			SHEET NO.: 53



Plan



Section C-C

Bent Cap Bearing Repair Detail

+To be determined in the field
 *Follow anchor system manufacturer's recommended installation depth, 6" min.

Bearing Repair Notes:

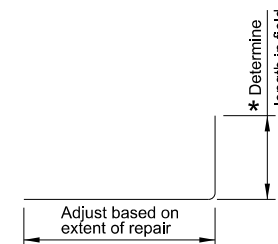
Repair as major spall per TxDOT Concrete Repair Manual Chapter 3, Section 3. Form repair area to lines shown. Use of prepackaged repair material is permissible.

Paid for as Item 429, "Concrete Structure Repair".

Quantity is based on total formed area.

Notes to Engineer:

- When bearing is compromised or bearing loss is greater than 20%, jacking beams may be required to repair bearing area.
- Pertinent Bid Codes may include:
 0429 6007 CONG STR REPAIR (VERTICAL & OVERHEAD) SF
 0495 6001 RAISING EXIST STRUCT LS



Bars L (#4)

* Follow anchor system manufacturer's recommended installation depth, 6" min.

General Notes:

Perform bent cap bearing repair on the North face of bent 3, under beams 3 and 4 from the West.

All work shall be performed in accordance with TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges and TxDOT Concrete Repair Manual.

Place temporary support as per item 495 before performing bent cap bearing repairs. Payment is included in bid items for concrete structure repair and raising existing structures.

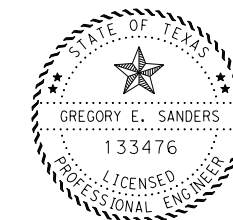
Lifting Notes:

1. Submit lifting plans and calculations to the Engineer for approval. Design lifting device and supports for live load and dead load with appropriate load factors in accordance with item 495 "Raising Existing Structures". Unfactored loads are as follows:

DL = 20 kips per beam end
 LL = 55 kips per beam end (including impact)

- Do not damage deck, beams, or cap during any stage of performing repairs.
- Supporting falsework on existing bent caps is permitted following requirements of lifting note 1 above.
- Jacking against the slab is not allowed. Jacking from existing bent cap is permitted following requirements of lifting note 1 above.

Live load is permitted on the bridge only after the structure has been raised and is supported by cribbing or temporary supports



Gregory Sanders 1/12/24

Texas Department of Transportation		Austin District Bridge		
<h2 style="margin: 0;">Bent Cap Bearing Repair Details</h2> <p style="margin: 0;">Elm Creek Bridge NBI: 14-144-0-0211-04-013</p>				
FILE:	DNR: MS	CK: GS	DW: MS	CR: GS
CONT	SECT	JOB	HIGHWAY	
REVISIONS	0211 04	027, ETC.	US 77, ETC.	
DIST	COUNTY		SHEET NO.	
14	LEE		54	



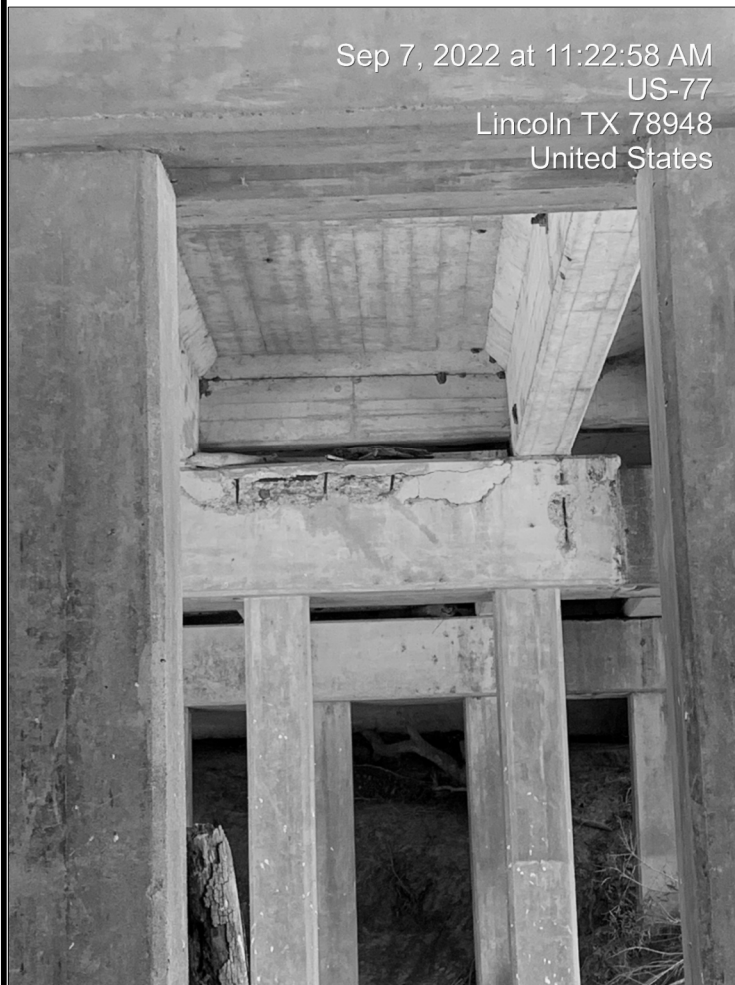
Voids under Northwest Wingwall and Abutment



Bents 3, 4 and 5 - Debris on top of bents



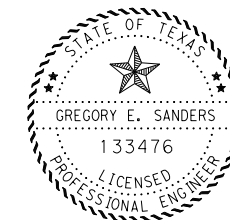
Bent 4 - Debris near bent 4



Bent 3 - Delaminated and spalled concrete



Abutments 1 and 6 - Failed concrete riprap

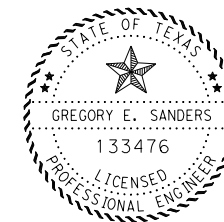


Gregory E Sanders 1/12/24

				Austin District Bridge	
<h2>Repair Locations</h2> <p>Elm Creek Bridge NBI: 14-144-0-0211-04-013</p>					
FILE:	DWG	MS	CK: GS	DW: MS	CK: GS
©TxDOT	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0211	04	027, ETC.	US 77, ETC.	
	DIST	COUNTY			SHEET NO.
	14	LEE			55

BID CODE	BID ITEM	UNIT	QUANTITY
0104-6009	REMOVING CONC (RIPRAP)	SY	550
0401-6001	FLOWABLE BACKFILL	CY	10
0428-6001	PENETRATING CONCRETE SURFACE TREATMENT	SY	606
0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	40
0432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	404
0438-6002	CLEANING AND SEALING EXIST JOINTS (CL3)	FT	178
0451-6004	*RETROFIT RAIL (TY T131RC)	FT	344
0495-6001	RAISING EXIST STRUCT	LS	1
0740-6002	GRAFFITI REMOVAL (PAINTING)	SF	65
7000-6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	24

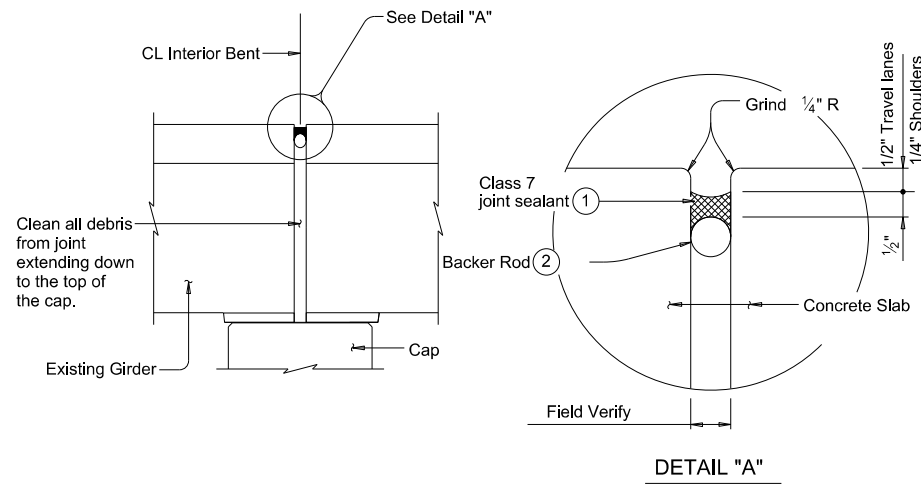
*Payment for Type T131RC (MOD) Railing will be paid using the bid item 0451-6004 RETROFIT RAIL (TY T131RC)



Gregory E Sanders 1/12/24

		Austin District Bridge		
<h2>Quantity Estimate</h2> <p>Elm Creek Bridge NBI: 14-144-0-0211-04-013</p>				
FILE:	DWG: MS	CHK: GS	DWG: MS	CHK: GS
©TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC.	US 77, ETC.
	DIST	COUNTY		SHEET NO.
	14	LEE		56

Structure (Featured Crossed)	Number of Joints	Joint Location	Item 438-6002 CLEANING AND SEALING EXIST JOINTS (CL3) LF
141440021104013(Elm Creek)	4	Bents 2, 3, 4&5	178

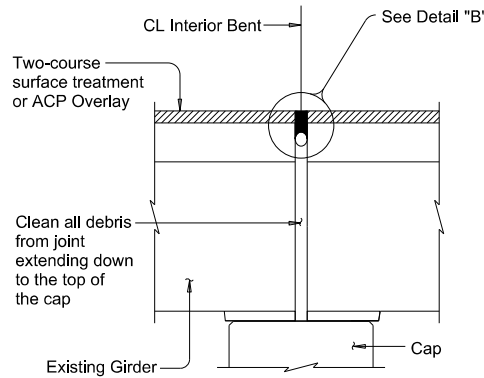


JOINT WITH SILICONE SEAL

(used without ACP Overlay)

PROCEDURE:

- 1) Clean joint opening of all 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.

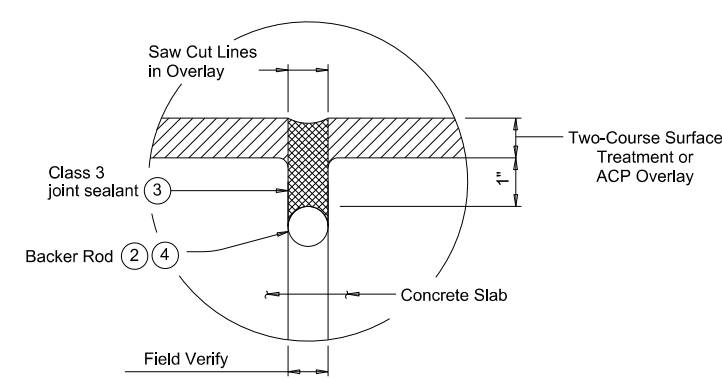


JOINT WITH HOT POURED RUBBER SEAL

(Used with ACP Overlay)

PROCEDURE:

- 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.



- 1) Use Class 7 joint sealant and primer in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Joints".
- 2) Backer rod must be 25% larger than joint opening and must be 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 hot poured rubber sealant and rated for a minimum of 400 degree Fahrenheit.
- 5) Match existing joint opening or set at a minimum:
 - a. 1" at 70°F when the distance between joints is 150' or less
 - b. 2" at 70°F when the distance between joints is greater than 150'
 - c. or 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".

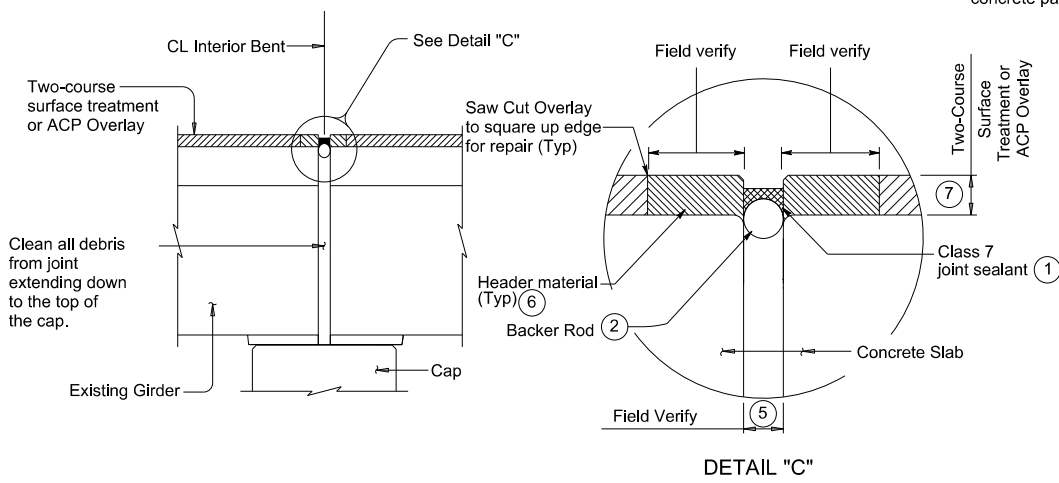
GENERAL NOTES:

Field verify all quantities, joint locations and joint types prior to ordering materials and beginning work.

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" of the sealant type specified and measured by the linear foot of joint.

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.

Repair of damaged concrete caused by the Contractor must be repaired at the Contractor's expense in accordance with Item 429, "Concrete Structure Repair", and TxDOT's Concrete Repair Manual.

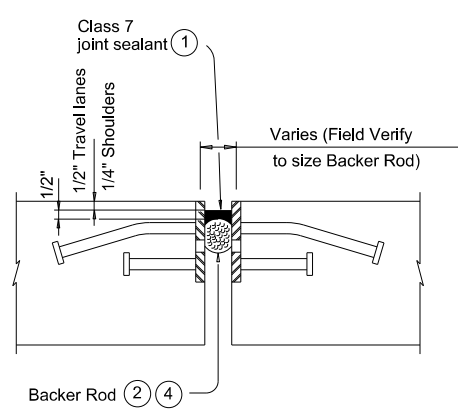


HEADER JOINT WITH SILICONE SEAL

(ACP Overlay with Joints > 100' apart)

PROCEDURE:

- 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.

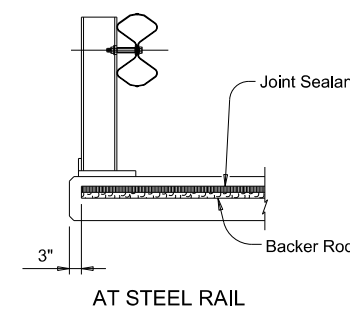


ARMOR JOINTS

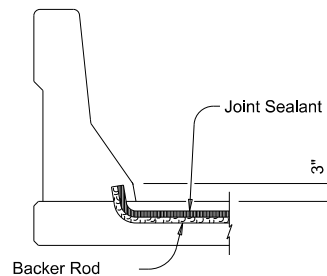
(Used without ACP Overlay. Armor joints with ACP Overlay is similar)

PROCEDURE:

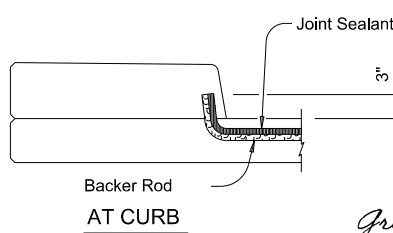
- 1) Remove existing seal, if present. Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints". Clean joint out full depth of the joint.
- 2) Abrasive blast clean existing steel surface where silicone 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.



AT STEEL RAIL



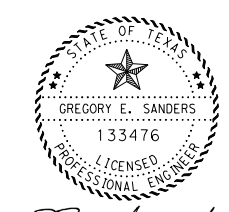
AT CONCRETE RAIL



AT CURB

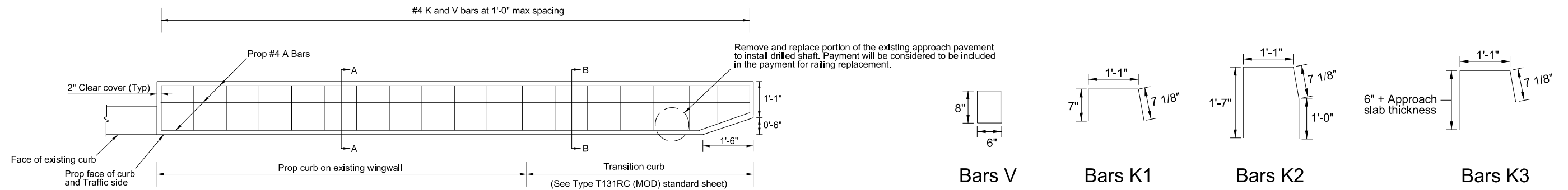
JOINT SEALANT TERMINATION DETAILS

Gregory Sanders 1/12/24



		Austin District		
<h2>CLEANING & SEALING EXISTING BRIDGE JOINTS CSBJ-22(AUS)</h2> <p>Elm Creek Bridge NBI: 14-144-0-0211-04-013</p>				
FILE:	DN: MS	CK: GS	DW: MS	CK: GS
©TxDOT 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC.	US 77, ETC.
	DIST	COUNTY	SHEET NO.	
	14	LEE	57	

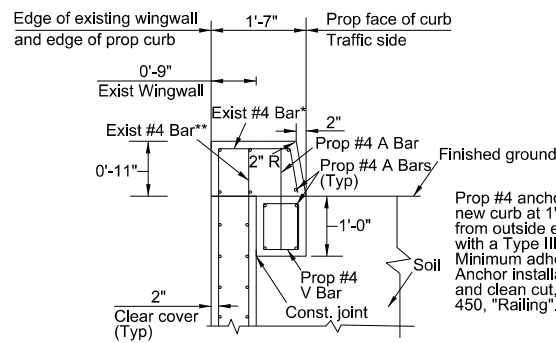
DATE:
FILE:



Railing Replacement Details

Note: Other reinforcements are not shown for clarity.

Remove and replace portion of the existing approach pavement to install drilled shaft. Payment will be considered to be included in the payment for railing replacement.

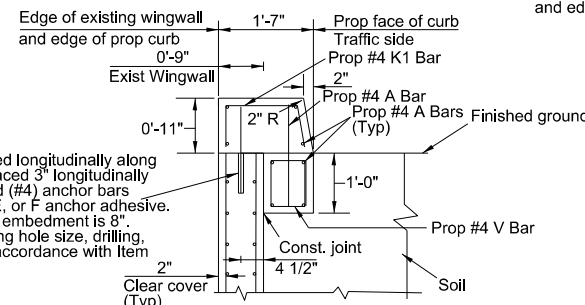


Section A-A

* Clean existing K bar, bend bar in field and reuse as shown.
** Clean existing K bar and reuse as shown.

Option 1

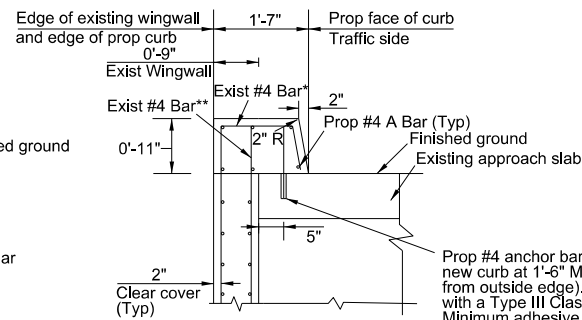
Without Approach Slab



Section A-A

Trim the existing K bar projecting from the wingwall and make it flush with the top of the existing wingwall.

Option 2

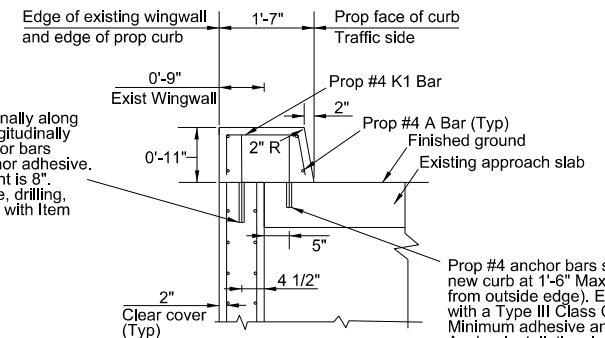


Section A-A

* Clean existing K bar, bend bar in field and reuse as shown.
** Clean existing K bar and reuse as shown.

Option 1

With Approach Slab



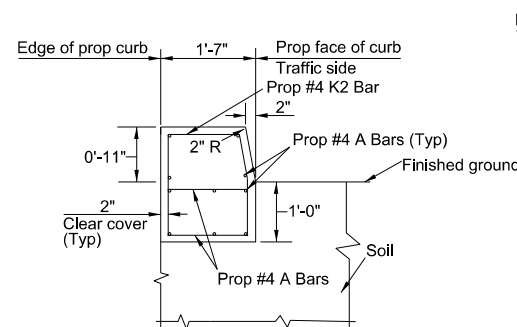
Section A-A

Trim the existing K bar projecting from the wingwall and make it flush with the top of the existing wingwall.

Option 2

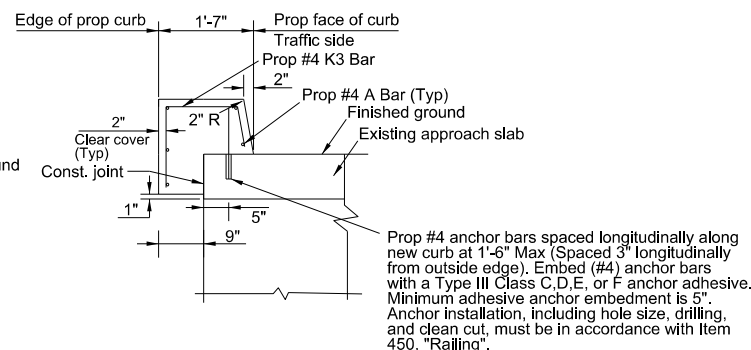
Notes:

Field verify all existing conditions before fabrication and construction.



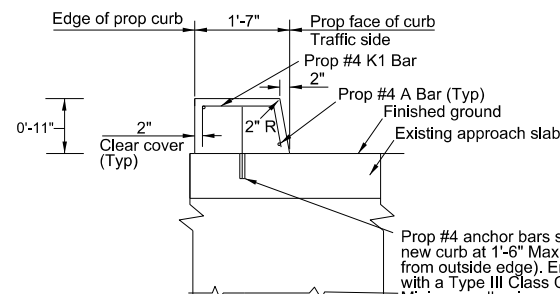
Section B-B

Without Approach Slab



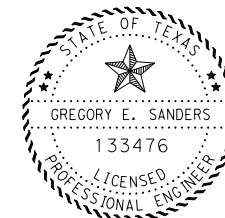
Section B-B

With Partial Width Approach Slab



Section B-B

With Full or Almost Full Width Approach Slab



Gregory E Sanders 1/12/24

Texas Department of Transportation
Austin District Bridge

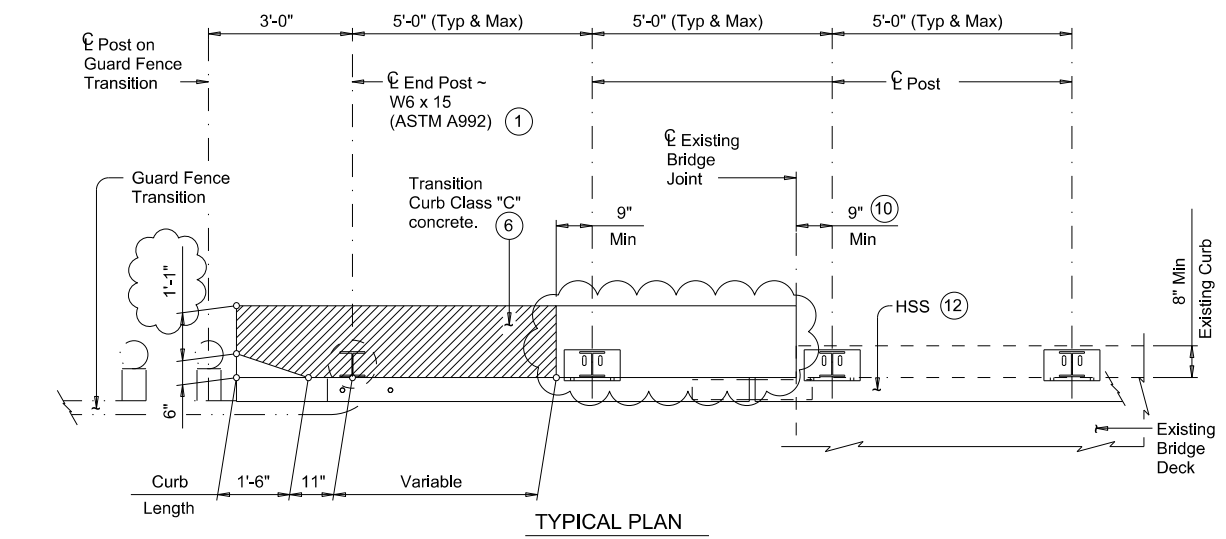
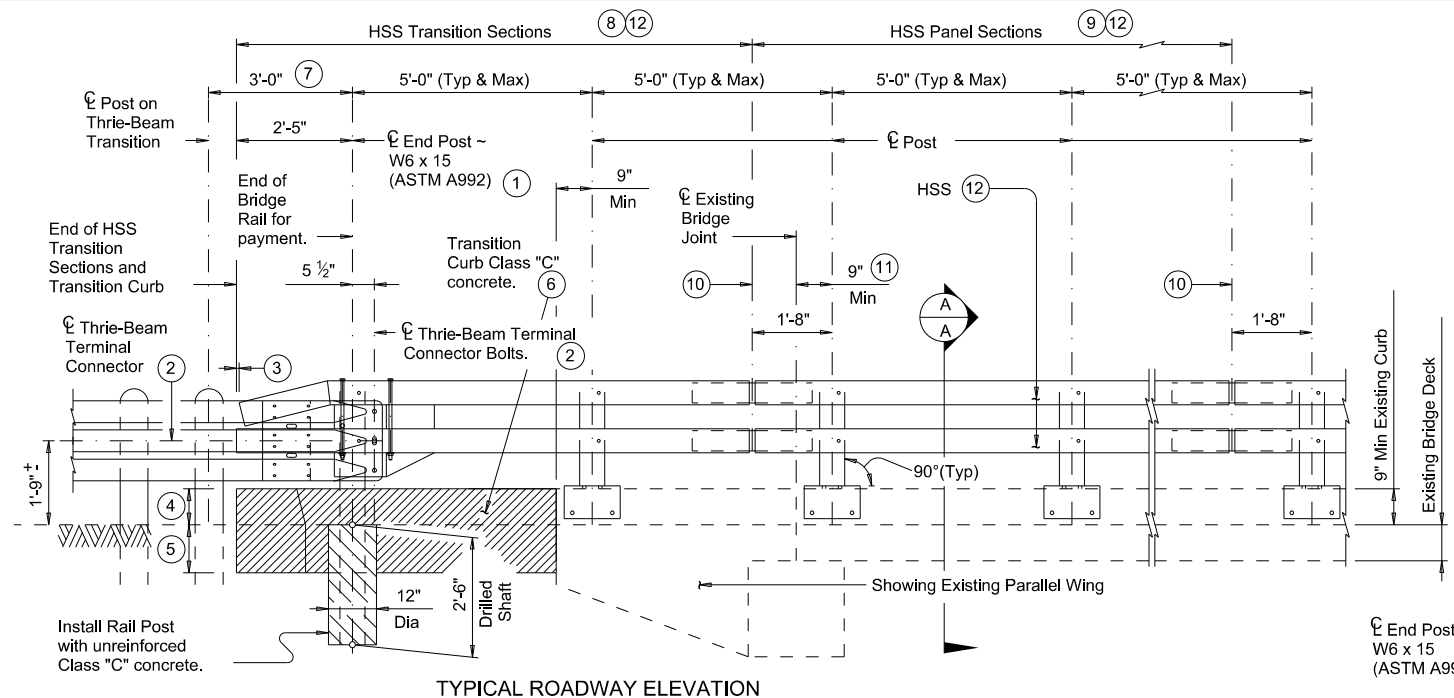
Railing Replacement Details

Elm Creek Bridge
NBI: 14-144-0-0211-04-013

FILE:	DWG: MS	CHK: GS	DWG: MS	CHK: GS
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REVISIONS:	DIST: 14	COUNTY: LEE	SHEET NO. 58	

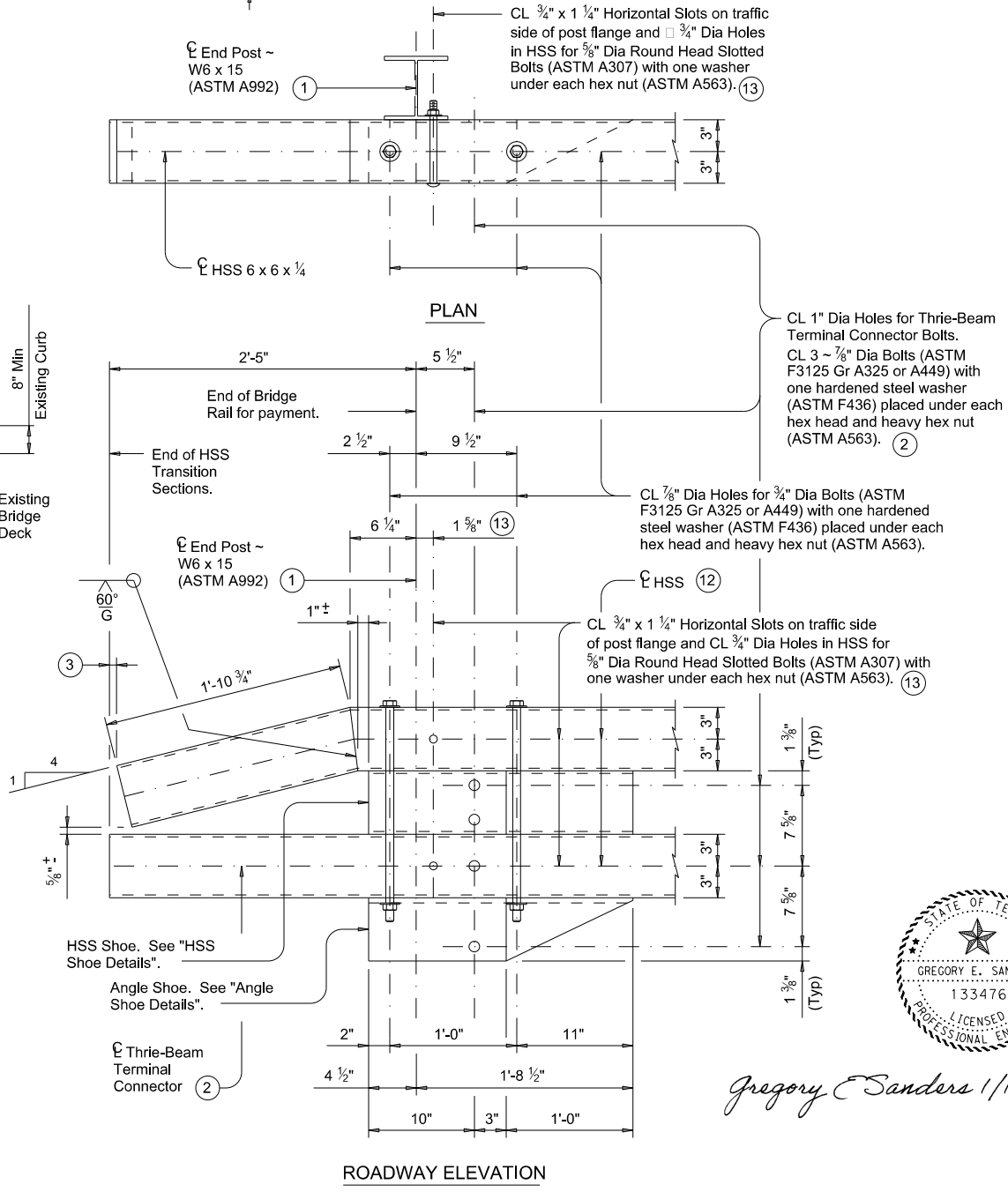
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DATE: FILE:



EXAMPLE "A" RETROFIT WITH PARALLEL WING
(Showing 9" high and 8" wide curbs, higher and wider curbs similar)

- 1 Post length = Top of rail elevation minus bottom of drilled shaft elevation.
- 2 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach the appropriate Metal Beam Guard Fence Transitions or Downstream Anchor Terminal to the bridge rail using 3 bolts as shown, and extend along the embankment.
- 3 Top HSS can be shorter than bottom HSS 5/8" plus or minus.
- 4 Match existing bridge curb height.
- 5 Cast transition curb 1'-0" into soil or top of concrete approach slab. Remove any asphaltic concrete or mow strip if present.
- 6 Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.
- 7 Showing first post for a TL-3 rated guard fence transition. First post for a TL-2 rated guard fence transition or a guard fence downstream anchor terminal is 4'-4 3/4".
- 8 HSS Transition Sections must have one soil mounted end post embedded in an unreinforced, Class "C" concrete drilled shaft as shown, and a minimum of one curb mounted post per transition section.
- 9 HSS Panel Sections must have a minimum of three posts and a maximum of eight posts per panel section.
- 10 CL HSS Expansion Joint or CL HSS Splice Joint as required.
- 11 Use 9" minimum for both expansion joints and construction/controlled joints.
- 12 HSS 6 x 6 x 1/4 (ASTM A1085 or A500 Gr C).
- 13 May be placed on either side of W6 x 15 web.



HSS TRANSITION SECTION END DETAILS

Thrie-Beam Terminal Connector not shown for clarity.

CONSTRUCTION NOTES:

Field verify dimensions before commencing work and ordering materials.

Provide Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

One shop splice per rail member section is permitted with minimum 85 percent penetration.

The weld may be square groove or single vee groove.

Round or chamfer exposed edges of HSS rail, rail post and plate to approximately 1/16" by grinding.

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.

Submit erection drawings showing panel lengths, splice locations, post placement, anchor bolt locations and adhesive anchor test data to demonstrate pullout strength to the Engineer for approval. Shop drawings are not required.

MATERIAL NOTES:

Galvanize all metal components of steel rail system.

Provide Grade 60 reinforcing steel.

Provide Class "C" concrete. As an alternate, provide Class "K" concrete, or a Type A-2 or Type C concrete repair material per DMS-4655 "Concrete Repair Materials". Do not use Type "B" (Ultra-Rapid) concrete repair materials.

Anchor bolts must be 3/4" Dia ASTM A193 Gr B7 or ASTM A449 fully threaded rods with one heavy hex nut and one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into concrete curb using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 6 3/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 30 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".

GENERAL NOTES:

This retrofit railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This retrofit railing 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.

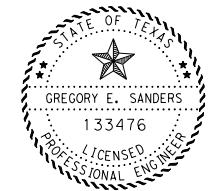
Rail anchorage details shown on this guide may require modification for select structure types.

See "Section A-A" for limits on existing overlay/seal coats thickness based on existing curb height.

This rail is to be paid for as "Retrofit Rail (Ty T131RC)" under Item 451 "Retrofit Railing".

Average weight with no overlay: 55 plf (9", 11" & 12" Curbs)
53 plf (18" Curbs)

Cover dimensions are clear dimensions, unless noted otherwise.



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SHEET 1 OF 4

Texas Department of Transportation
Bridge Division Standard

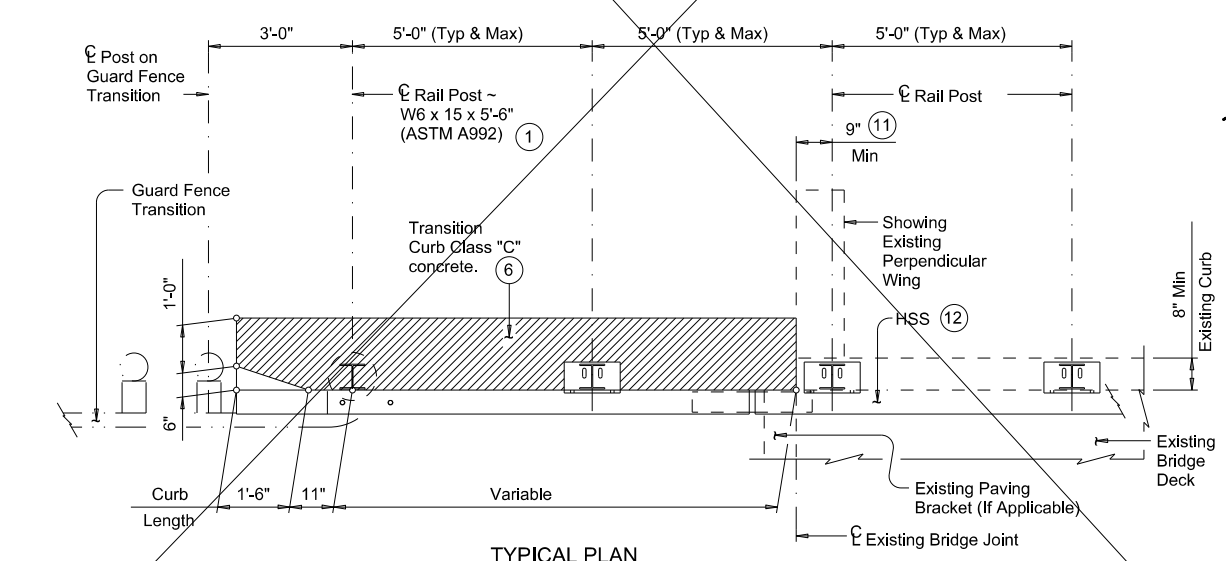
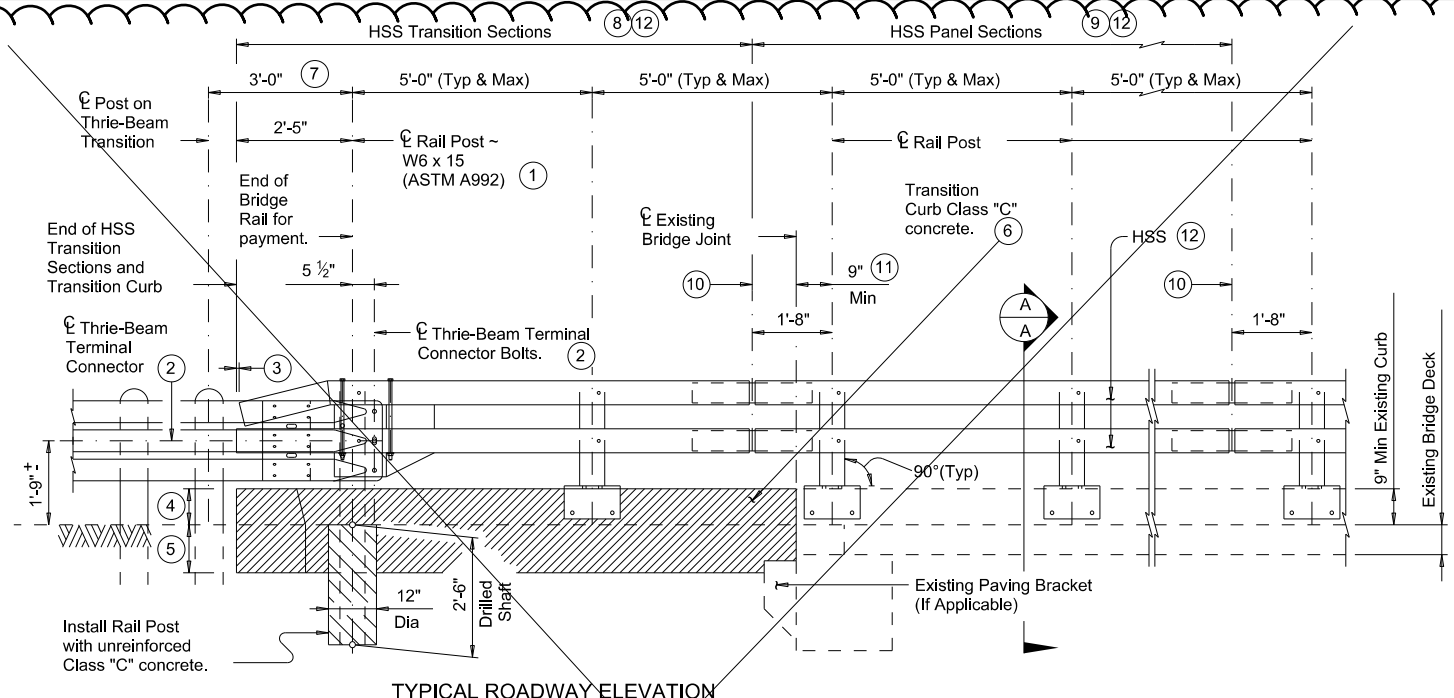
RETROFIT GUIDE FOR T131RC RAIL ON CURBS
TYPE T131RC (MOD)

FILE: r1std034-19.dgn	DN: MS	CK: GS	DW: MS	CK: GS
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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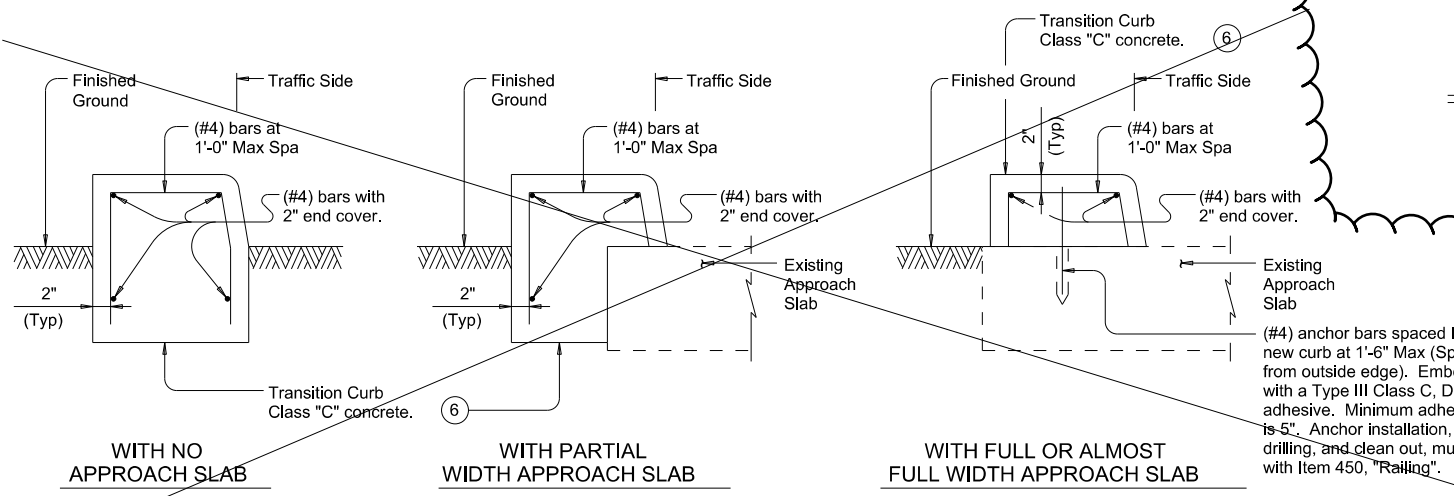
Indicates modified details

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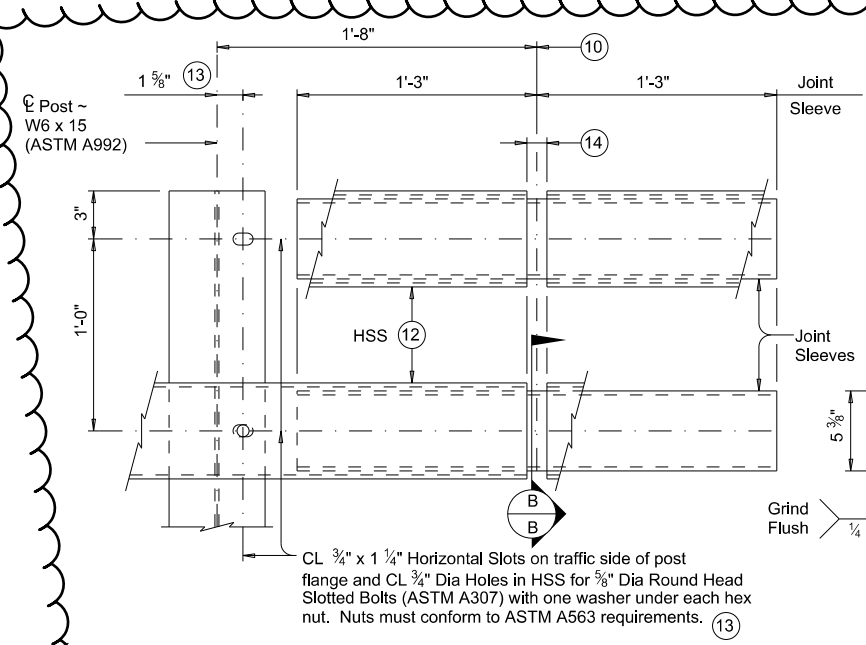
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EXAMPLE "B" RETROFIT WITH PERPENDICULAR WING
(Showing 9" high and 8" wide curbs, higher and wider curbs similar)

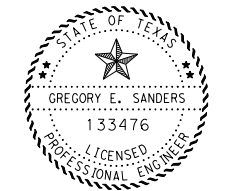


EXAMPLES OF TRANSITION CURB SECTIONS



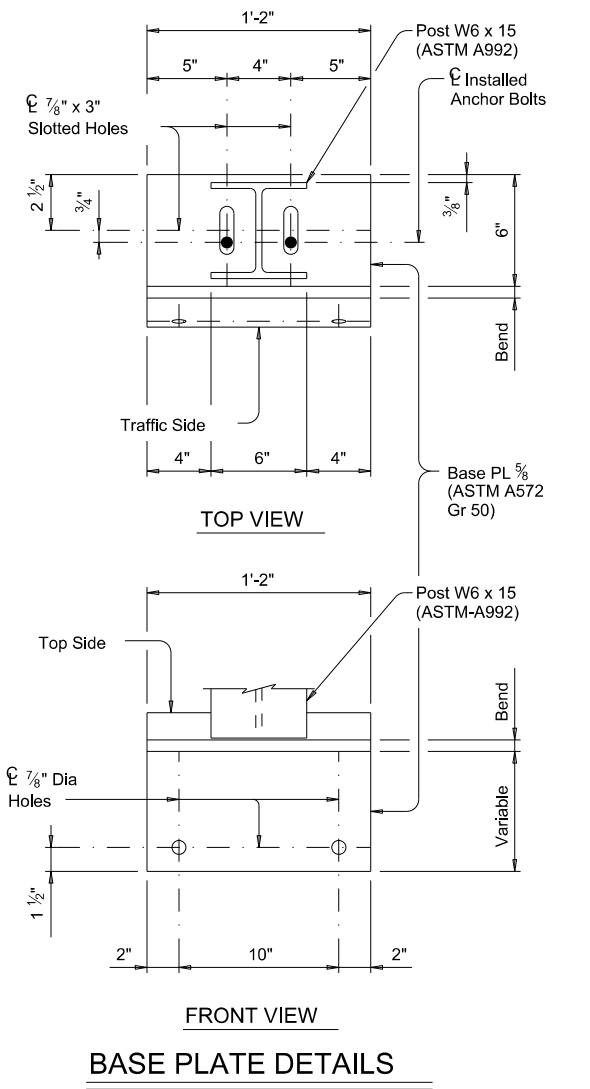
TYPICAL POST CONNECTION AND SPLICE DETAIL FOR HSS

SECTION B-B
Showing typical joint sleeve.



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- Post length = Top of rail elevation minus bottom of drilled shaft elevation.
- Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach the appropriate Metal Beam Guard Fence Transitions or Downstream Anchor Terminal to the bridge rail using 3 bolts as shown, and extend along the embankment.
- Top HSS can be shorter than bottom HSS 5/8" plus or minus.
- Match existing bridge curb height.
- Cast transition curb 1'-0" into soil or top of concrete approach slab. Remove any asphaltic concrete or mow strip if present.
- Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.
- Showing first post for a TL-3 rated guard fence transition. First post for a TL-2 rated guard fence transition or a guard fence downstream anchor terminal is 4'-4 3/4".
- HSS Transition Sections must have one soil mounted end post embedded in an unreinforced, Class "C" concrete drilled shaft as shown, and a minimum of one curb mounted post per transition section.
- HSS Panel Sections must have a minimum of three posts and a maximum of eight posts per panel section.
- CL HSS Expansion Joint or CL HSS Splice Joint as required.
- Use 9" minimum for both expansion joints and construction/controlled joints.
- HSS 6 x 6 x 1/4 (ASTM A1085 or A500 Gr C).
- May be placed on either side of W6 x 15 web.
- Place HSS Expansion Joints in rail at every slab Expansion Joint. For Expansion and Splice Joints openings, use the greater of 1" or (slab opening plus 1/2").

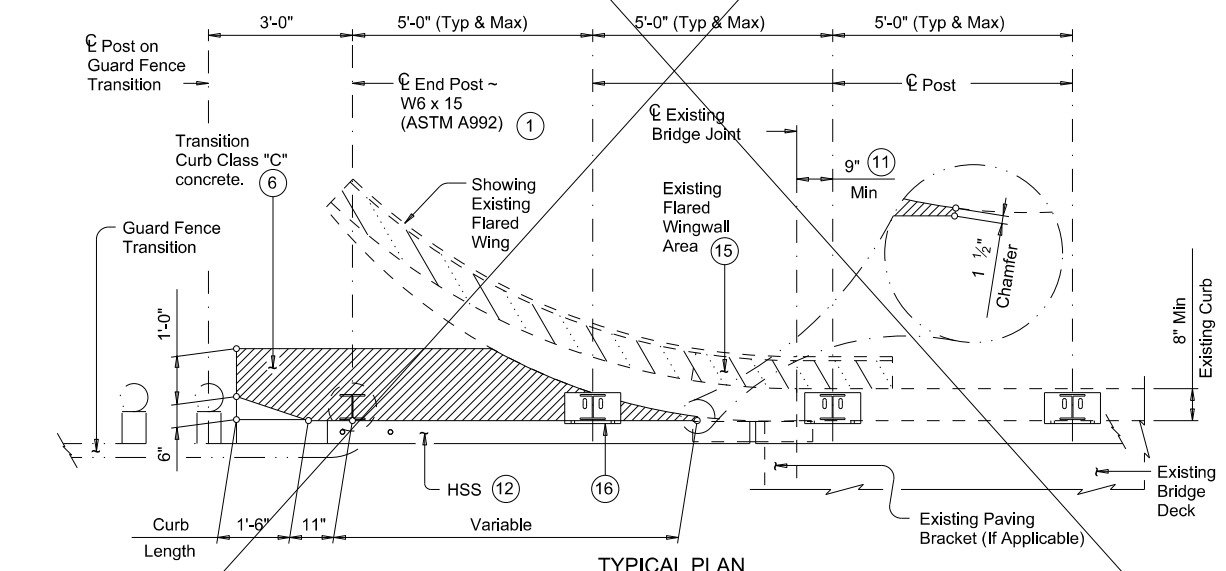
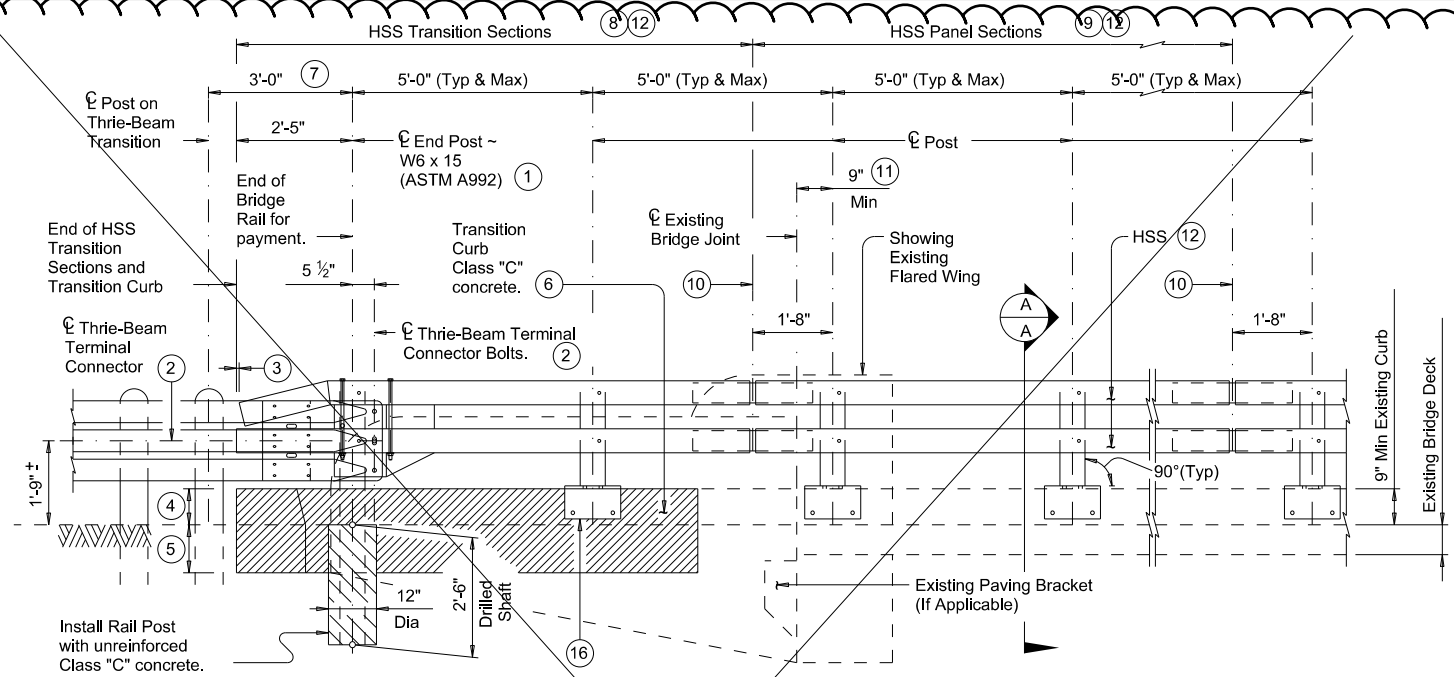


SHEET 2 OF 4

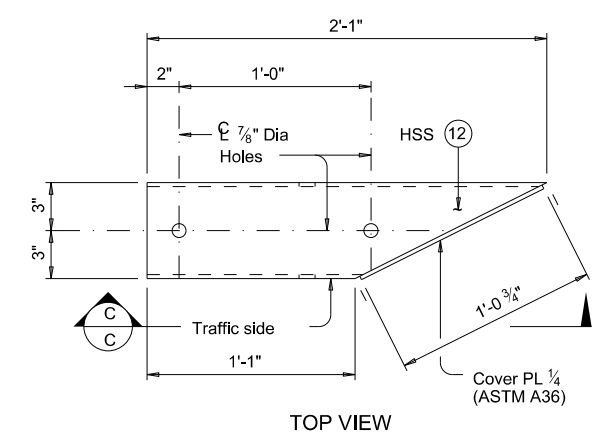
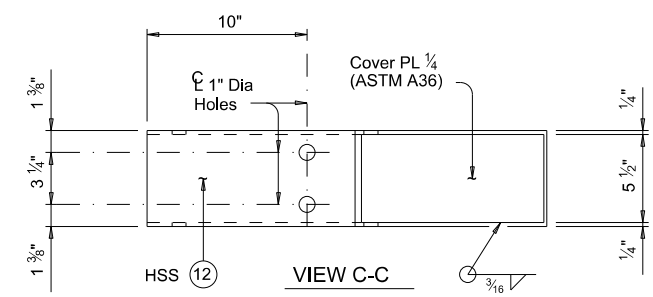
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RETROFIT GUIDE FOR T131RC RAIL ON CURBS TYPE T131RC (MOD)			
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REVISIONS	0211	04	027, ETC.
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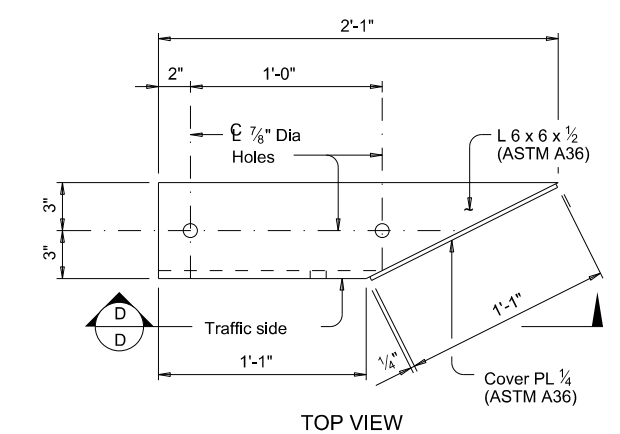
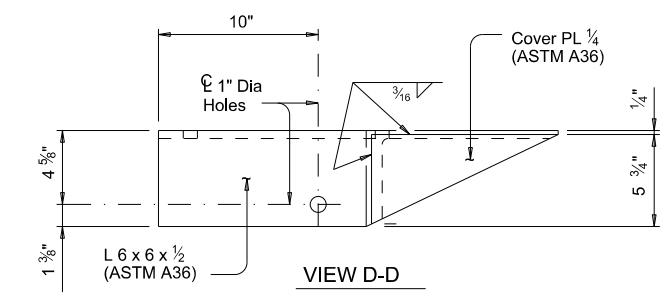
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EXAMPLE "C" RETROFIT WITH FLARED WING
(Showing 9" high and 8" wide curbs, higher and wider curbs similar)



HSS SHOE DETAILS

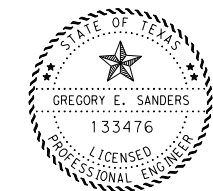


ANGLE SHOE DETAILS

Angle Shoe shown is detailed for one side only, other side similar. For other side shoe must be built for opposite hand.

- 1 Post length = Top of rail elevation minus bottom of drilled shaft elevation.
- 2 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". The appropriate Metal Beam Guard Fence Transitions or Downstream Anchor Terminal must be attached to the bridge rail and extended along the embankment.
- 3 Top HSS can be shorter than bottom HSS 5/8" plus or minus.
- 4 Match existing bridge curb height.
- 5 Cast transition curb 1'-0" into soil or top of concrete approach slab. Remove any asphaltic concrete or mow strip if present.
- 6 Match existing bridge curb face on traffic side of transition curb. Transition curb 6" x 1'-6" taper will remain vertical.
- 7 Showing first post for a TL-3 rated guard fence transition. First post for a TL-2 rated guard fence transition or a guard fence downstream anchor terminal is 4'-4 3/4".
- 8 HSS Transition Sections must have one soil mounted end post embedded in an unreinforced, Class "C" concrete drilled shaft as shown, and a minimum of one curb mounted post per transition section.
- 9 HSS Panel Sections must have a minimum of three posts and a maximum of eight posts per panel section.
- 10 CL HSS Expansion Joint or CL HSS Splice Joint as required.
- 11 Use 9" minimum for both expansion joints and construction/controlled joints.
- 12 HSS 6 x 6 x 1/4 (ASTM A1085 or A500 Gr C).
- 15 Remove all existing structure area from top of existing curb. Cut and grind flush all existing reinforcing extending from top of existing curb and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing".
- 16 When post is mounted to the transition curb on flared wings as shown, transition curb must be supported laterally by the existing wingwall/curb.

SHEET 3 OF 4

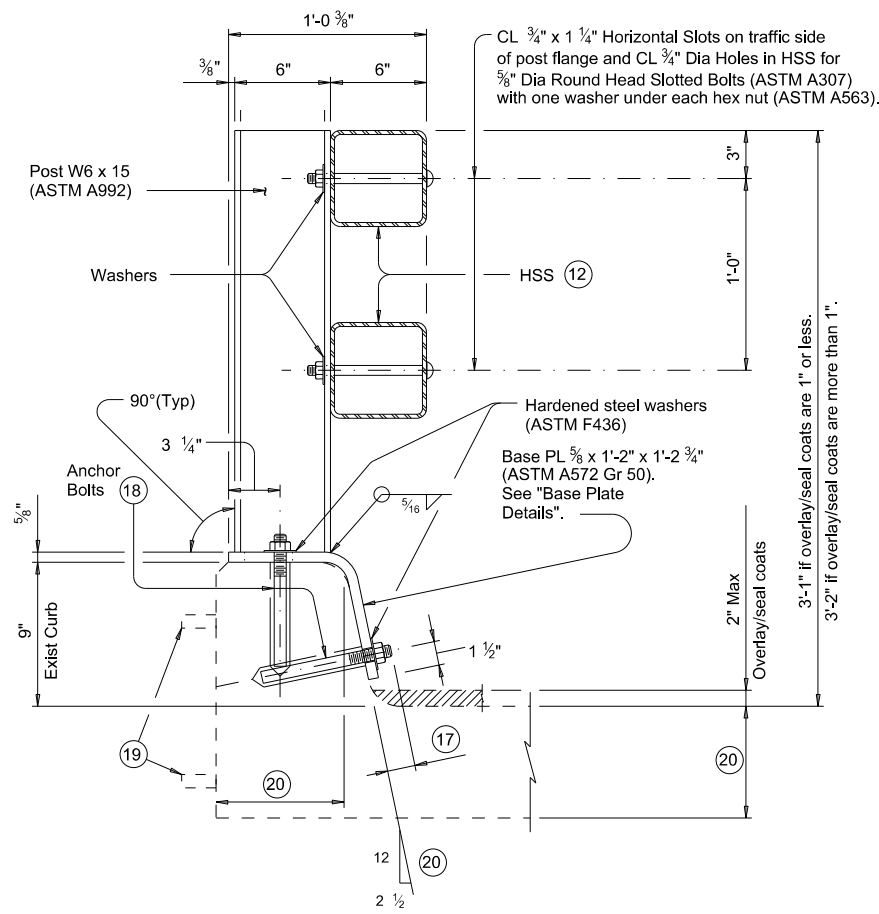


Gregory E Sanders 1/12/24

		Bridge Division Standard		
RETROFIT GUIDE FOR T131RC RAIL ON CURBS TYPE T131RC (MOD)				
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©TxDOT September 2019	CONTRACT: 0211	SECTION: 04	JOB: 027, ETC.	HIGHWAY: US 77, ETC.
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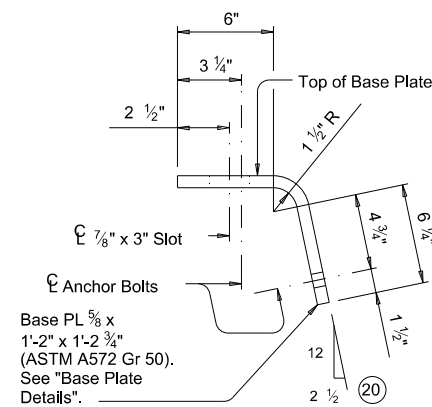
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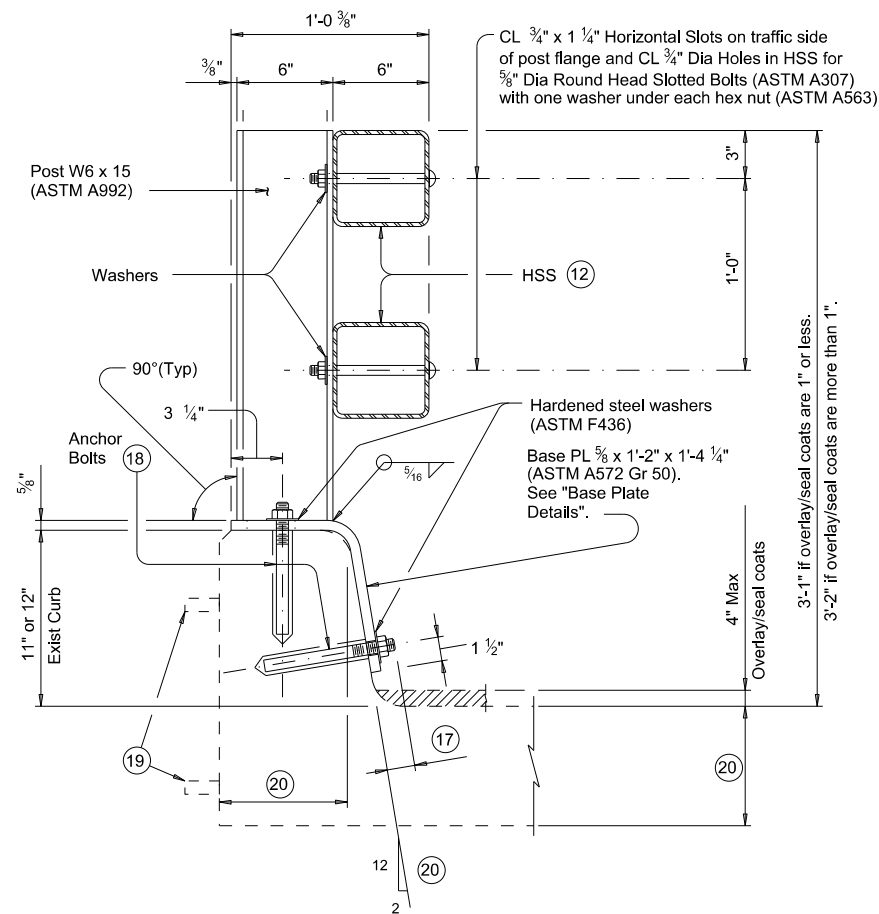


SECTION A-A OF 9" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)

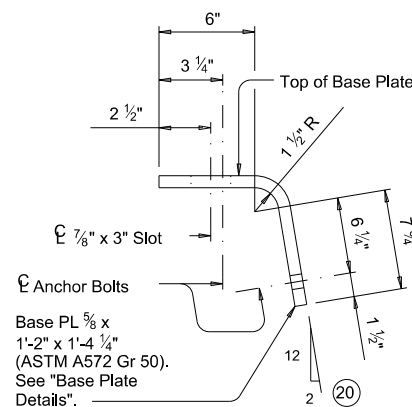


9" HIGH CURB BASE PLATE DETAIL

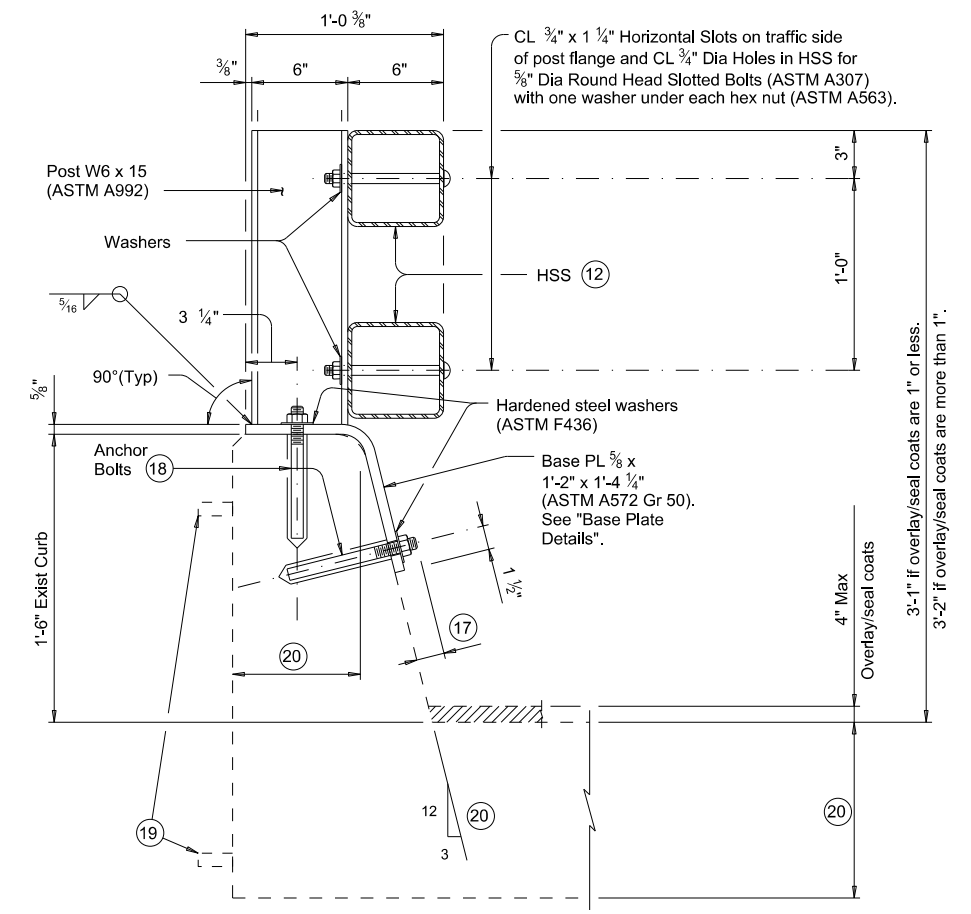


SECTION A-A OF 11" & 12" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)

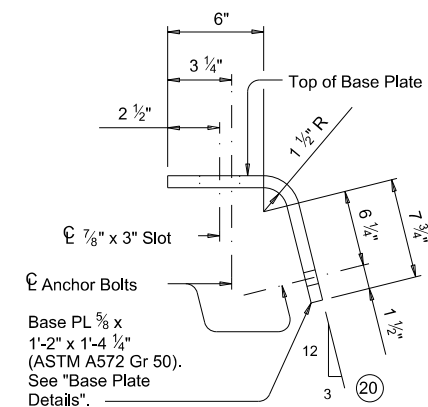


11" & 12" HIGH CURB BASE PLATE DETAIL



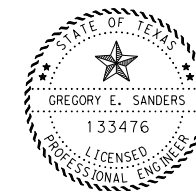
SECTION A-A OF 18" HIGH CURBS

(Showing example of 8" Min width curb, wider curbs similar)



18" HIGH CURB BASE PLATE DETAIL

- ⑫ HSS 6 x 6 x 1/4 (ASTM A1085 or A500 Gr C).
- ⑬ 1 3/4" Bolt Projection (Typ).
- ⑭ See "Material Notes" for anchor Bolt information.
- ⑮ Remove existing railing (including posts), cut and grind anchor bolts flush and paint ends with two coats of zinc-rich paint conforming to the Item "Galvanizing".
- ⑯ See elsewhere in plans for dimensions (curb width and height, slab and overlay thickness). Slope of curb may differ from what is shown. Adjust base plate as necessary to conform to curb face geometry.



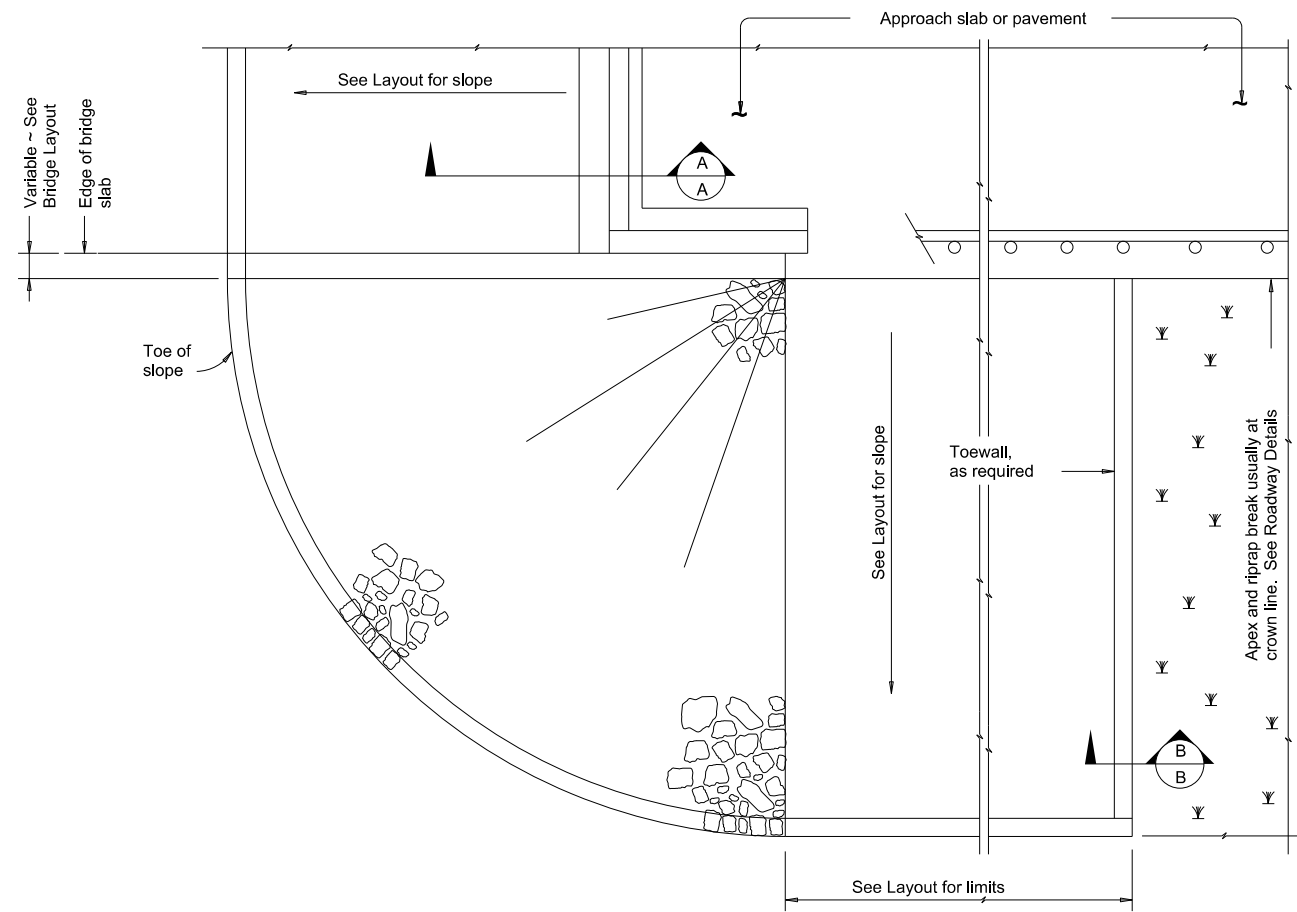
Gregory E Sanders 1/12/24

SHEET 4 OF 4

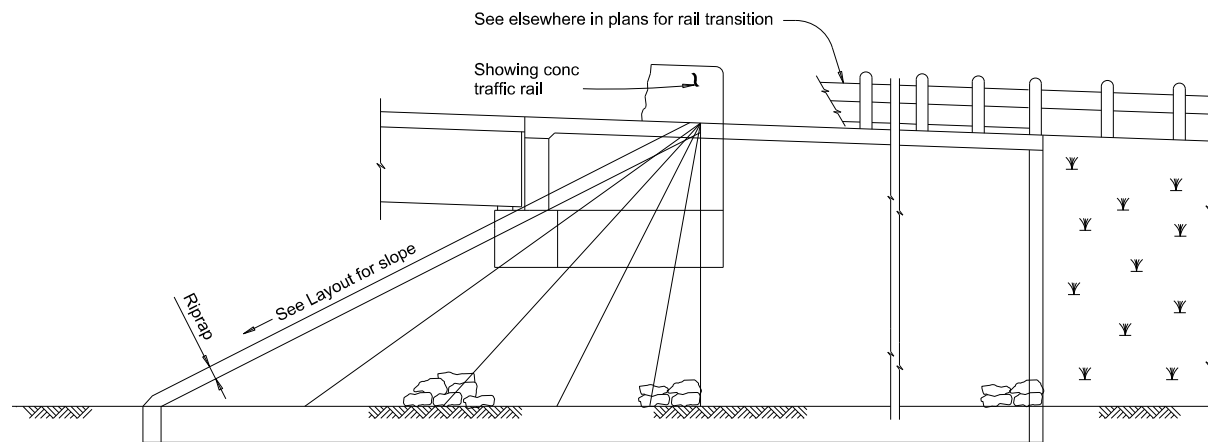
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RETROFIT GUIDE FOR T131RC RAIL ON CURBS			
TYPE T131RC (MOD)			
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REVISIONS	0211	04	027, ETC.
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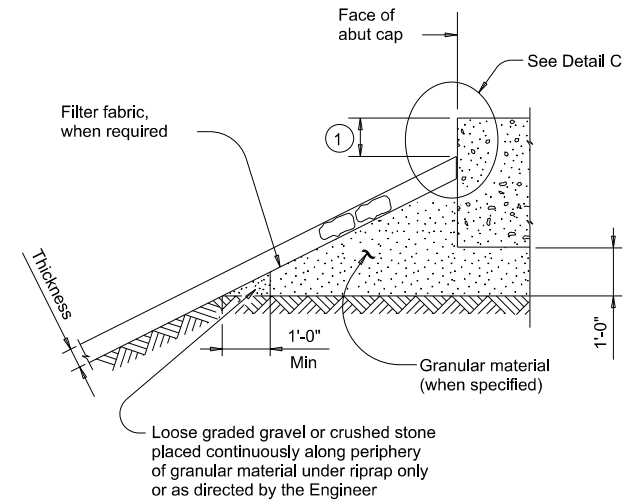
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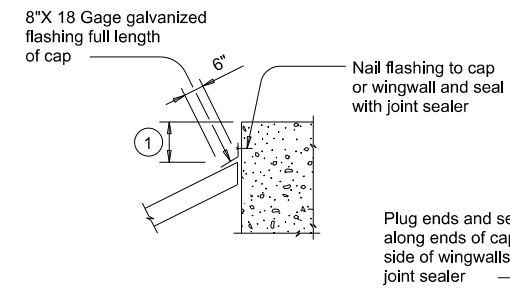
PLAN



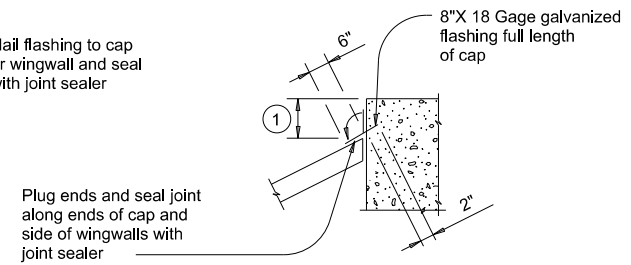
ELEVATION



SECTION A-A AT CAP

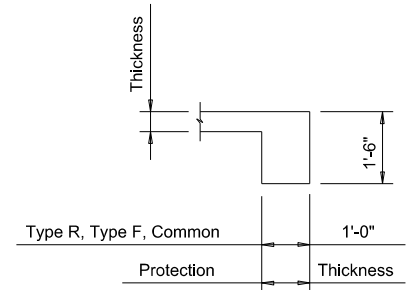


CAP OPTION A



CAP OPTION B

DETAIL C



SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

① Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:

Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

		Bridge Division Standard	
<h2>STONE RIPRAP</h2>			
<h3>SRR</h3>			
FILE: srrstd1-19.dgn	DN: MS	CK: GS	DW: MS
©TxDOT April 2019	CONT: 0211	SECT: 04	JOB: US 77, ETC.
REVISIONS	DIST: 14	COUNTY: LEE	SHEET NO.: 63

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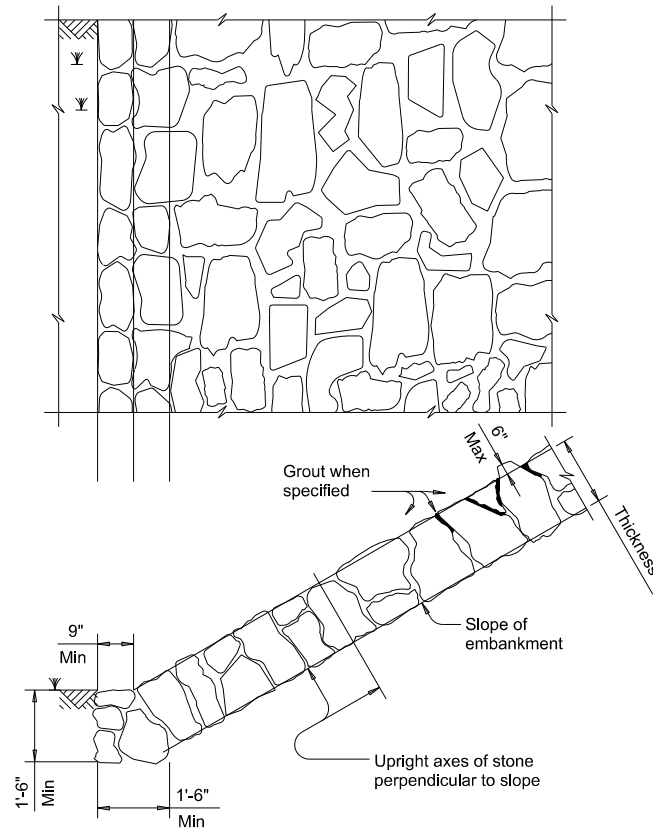


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

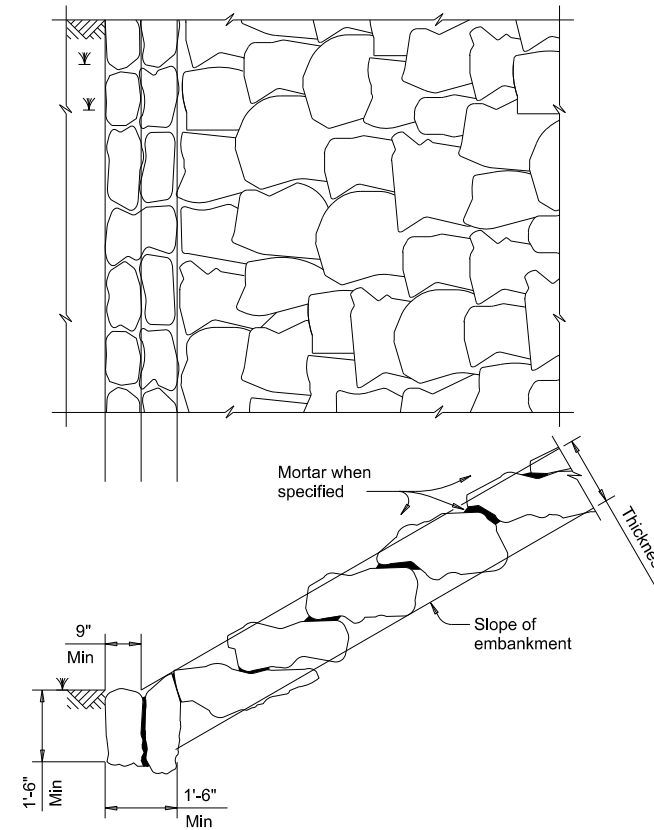


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

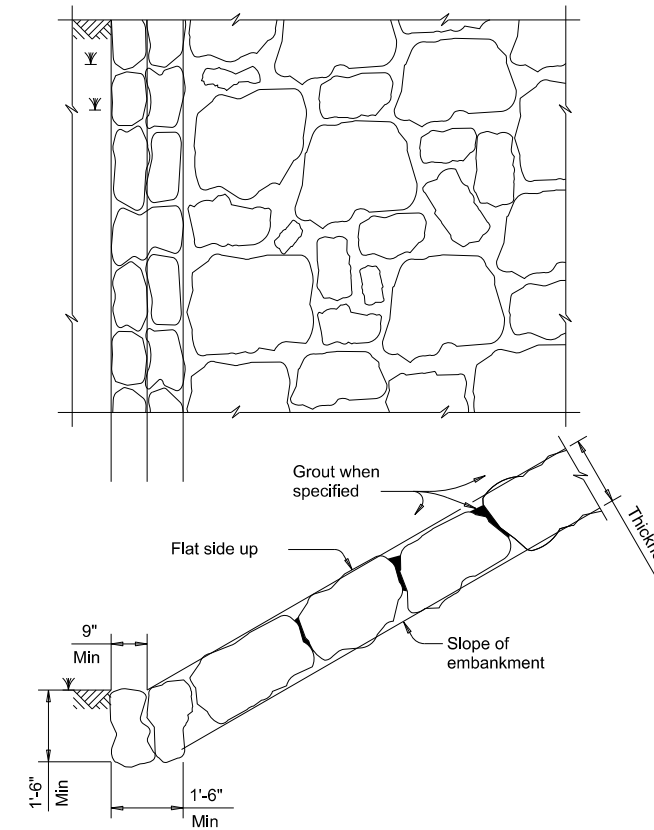


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

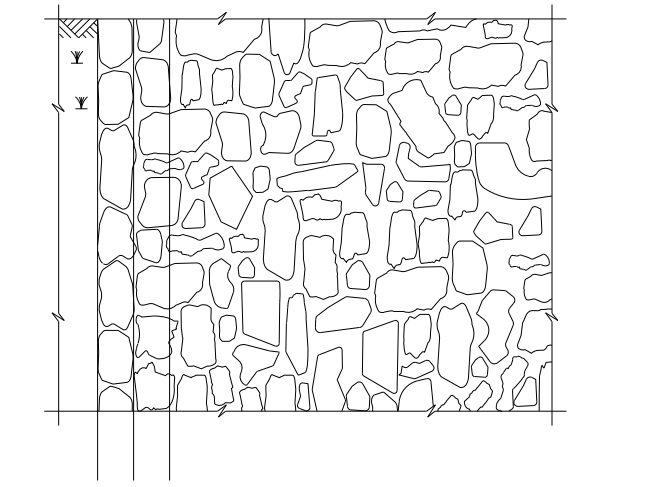


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

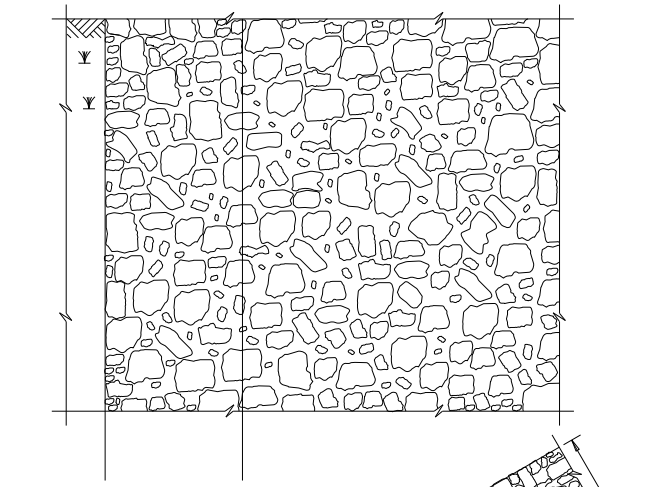
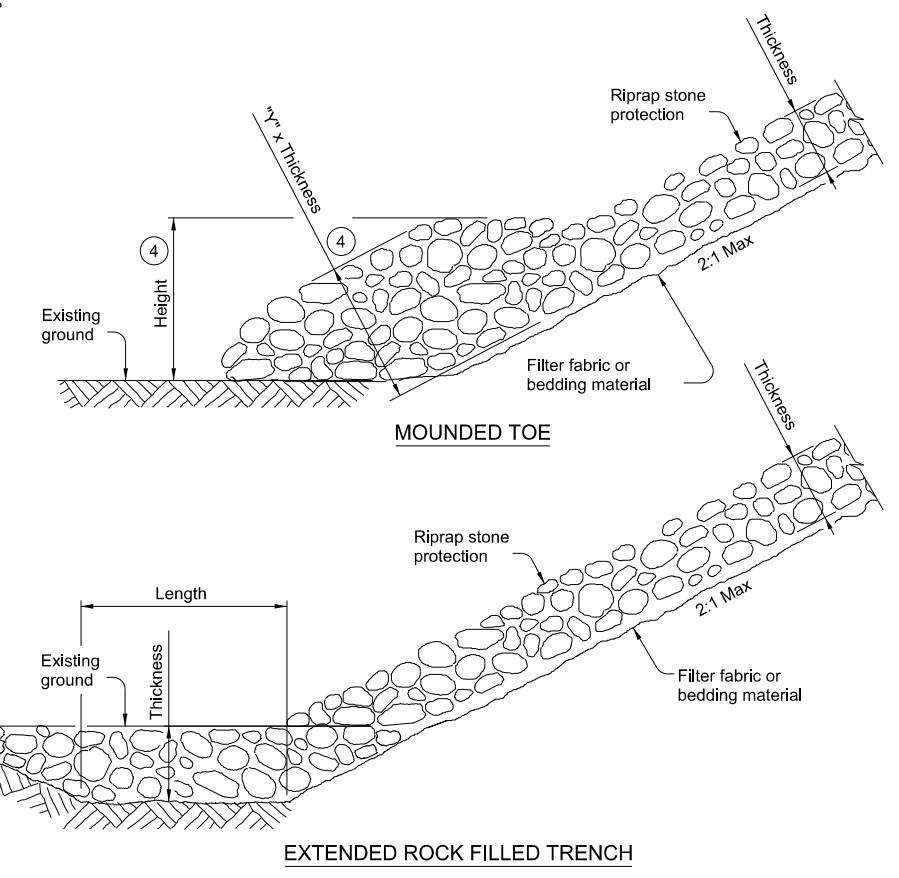


FIGURE 5 ~ PROTECTION STONE RIPRAP ⑤

- ② Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.
- ③ Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.
- ④ "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.
- ⑤ List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



PROTECTION STONE RIPRAP TOE OPTIONS ⑤

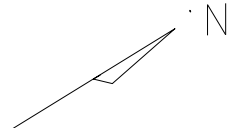
SHEET 2 OF 2

Texas Department of Transportation Bridge Division Standard

STONE RIPRAP

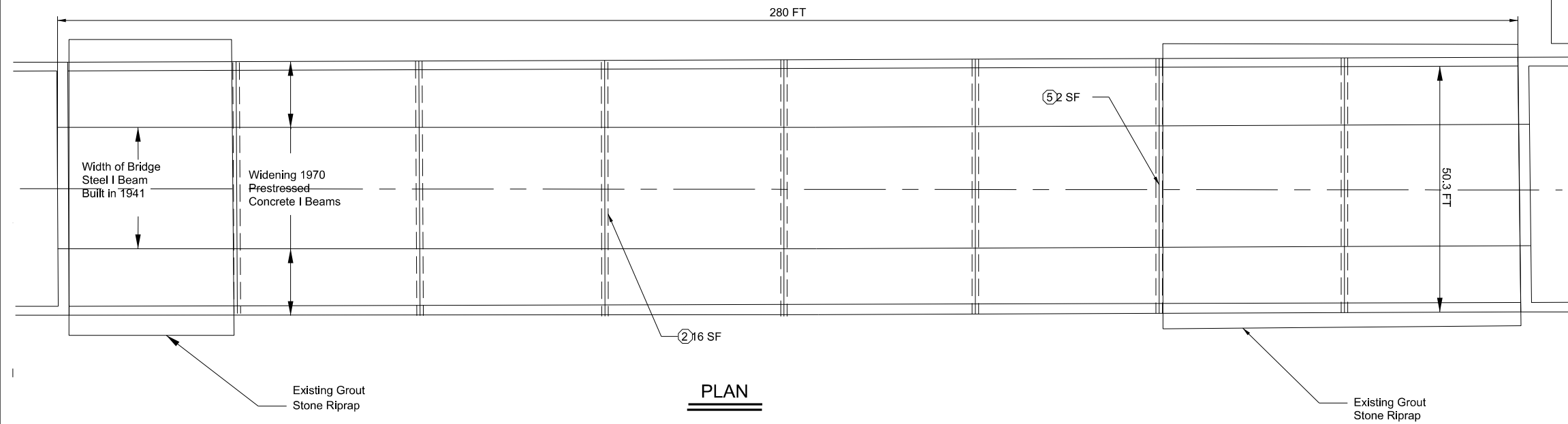
SRR

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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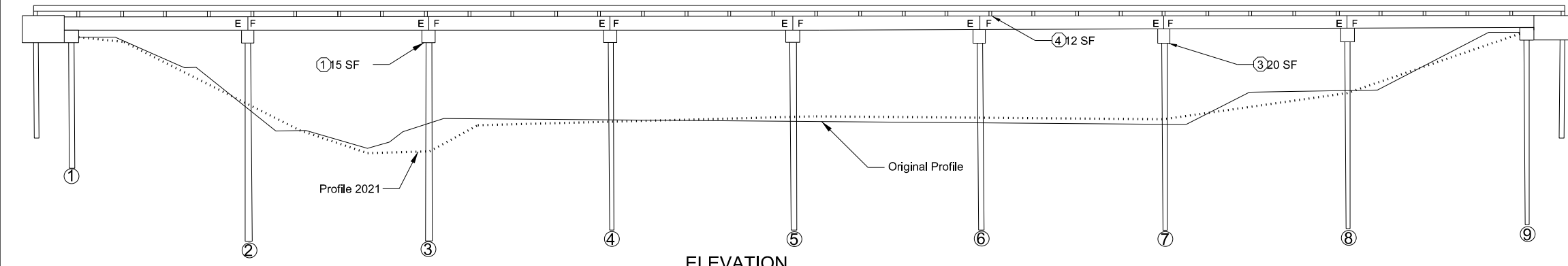


REPAIR CALL-OUT LEGEND

- XX XX XX — Repair Quantity Unit
- Estimated Repair Quantity at Each Location
- Repair No. - See Table of Repairs



PLAN



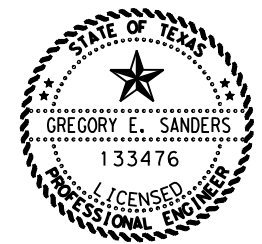
ELEVATION

MATERIAL NOTES:

Submit detailed concrete repair procedure for approval prior to commencing work.

Repair material to be used must meet minimum compressive strength in accordance to DMS 4655.

Perform all concrete repairs in accordance with Item 429 and the TXDOT Concrete Repair Manual. Contractor must maintain a copy of this manual onsite during all concrete repair operations.



Gregory E Sanders 1/12/24

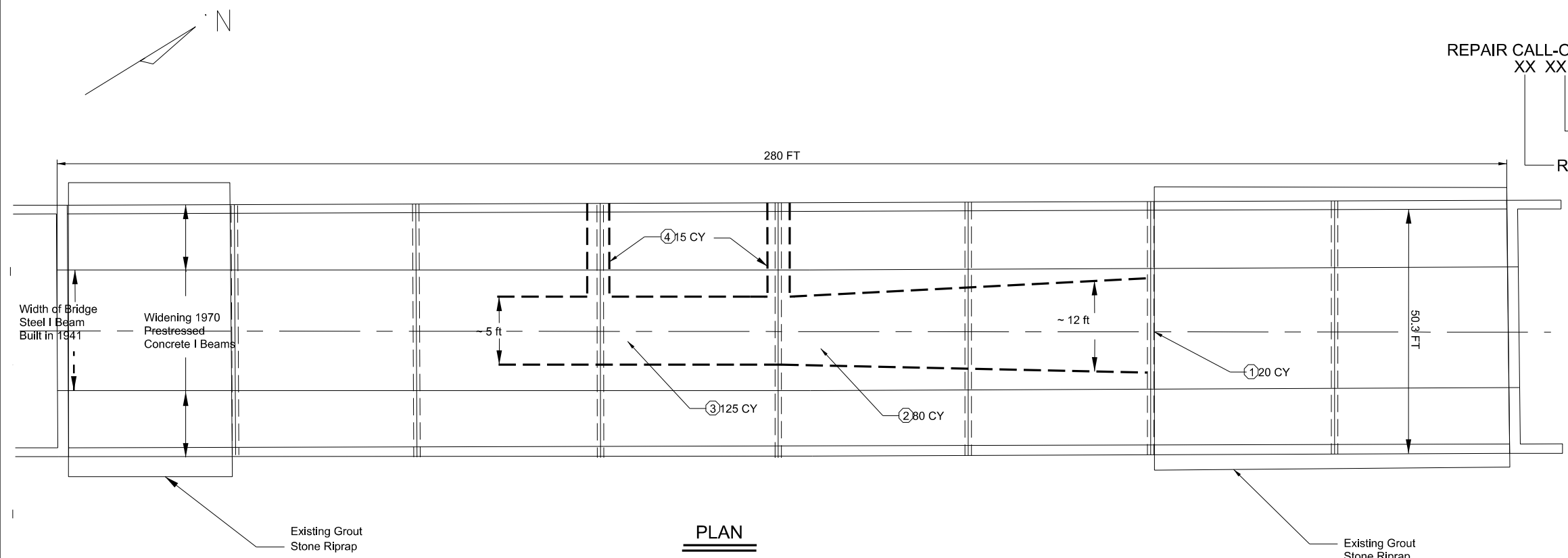
TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	BID CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT
①	BENT 3 CAP SPALL REPAIR	0429-6007	CONC STR REPAIR(VERTICAL & OVERHEAD)	15	SF
②	BENT 4, BETWEEN BEAMS 5 & 6 CONCRETE REPAIR WITH EXPOSED REBAR	0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	16	SF
③	BENT 7, CAP CONCRETE SPALL REPAIR WITH EXPOSED REBAR	0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	20	SF
④	SPAN 6 CRACKED CONCRETE ON DECK AT RAIL POST	0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	12	SF
⑤	BEAM 4 AT BENT 7 BEARING LOSS UNDER PAD	0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	2	SF

Not to Scale

<p>CONCRETE REPAIR</p> <p>NBI: 14-144-0-0473-02-005</p> <p>SH 21 at West Yegua Creek</p> <p>CSJ: 0473-02-042</p>				
FILE:	DN:	CK:	DW:	CK:
©TXDOT	JULY 2021	0211	04	027, ETC.
REVISIONS		DIST		COUNTY
		AUS		Lee
			SHEET NO.	
			65	

DATE:
FILE:



REPAIR CALL-OUT LEGEND
 XX XX XX
 Repair Quantity Unit
 Estimated Repair Quantity at Each Location
 Repair No. - See Table of Repairs

NOTES:
 Gully repair detail will be provided.
 Gully depth varies from 4 ft to 5 ft.
 Gully length is approximately 125 ft.
 Place cement stabilized backfill to half of depth of gully or a minimum 1'-6".
 Provide engineer repair plan quantities prior to beginning repair of gully.

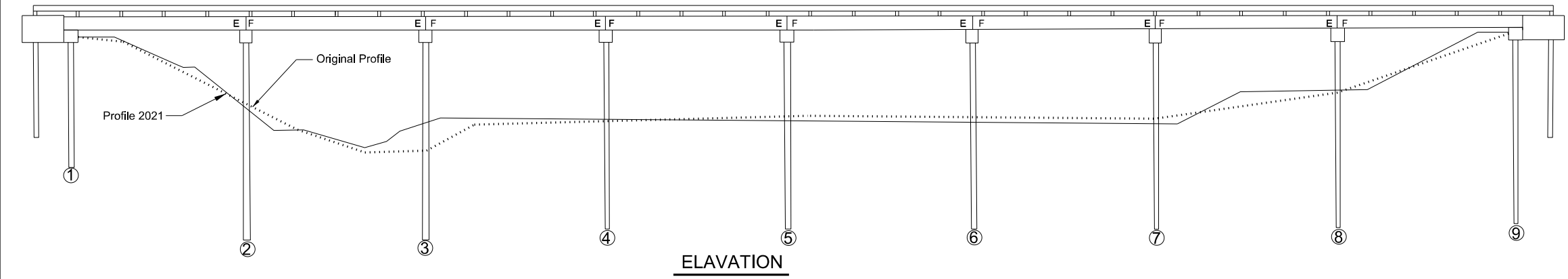
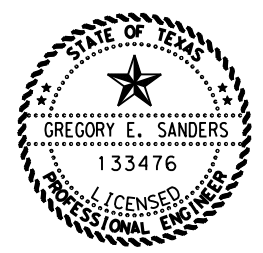


TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	BID CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT
①	ADD FLOWFILL UNDER GROUT RIPRAP TO FILL VOIDS	0401-6001	FLOWABLE FILL BACKFILL	20	CY
②	PLACE CEMENT STABILIZE BACKFILL AT BOTTOM OF GULLY	0400-6005	CEM STABIL BKFL	80	CY
③	PLACE STONE RIPRAP ON TOP OF CSB IN GULLY	0432-6033	RIPRAP (STONE PROTECTION) (18IN)	125	CY
④	PLACE 12 INCH STONE AT EROSION AROUND BENTS 5 & 6	0432-6031	RIPRAP (STONE PROTECTION) (12 IN)	15	CY



Not to Scale *Gregory E Sanders 1/12/24*

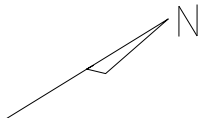
Texas Department of Transportation *Bridge Division*

GULLY REPAIR

NBI: 14-144-0-0473-02-005
 SH 21 at West Yegua Creek
 CSJ: 0473-02-042

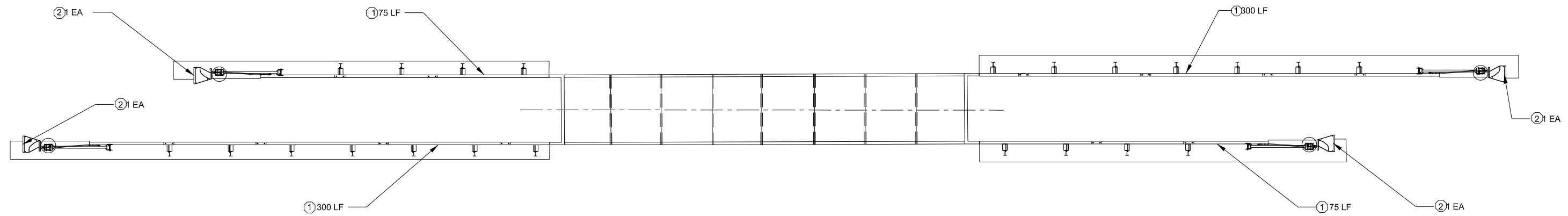
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©TxDOT JULY 2021	CONT SECT	JOB	HIGHWAY
REVISIONS	0211 04	027, ETC.	US 77, ETC.
	DIST	COUNTY	SHEET NO.
	AUS	Lee	66

DATE:
FILE:



REPAIR CALL-OUT LEGEND

- XX XX XX — Repair Quantity Unit
- Estimated Repair Quantity at Each Location
- Repair No. - See Table of Repairs

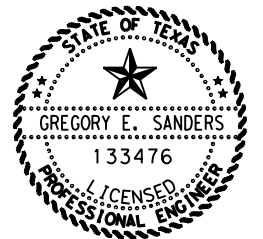


BRIDGE REPAIR LAYOUT

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	BID CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT
①	REMOVE OBSOLETE MBGF FROM APPROACHES	0542-6001	REMOVE METAL BEAM GUARD FENCE	750	LF
②	REMOVE DAT FROM OBSOLETE MBGF AT APPROACHES	0544-6003	GUARDRAIL END TREATMENT (REMOVE)	4	EA

Gregory E Sanders 1/12/24



Not to Scale

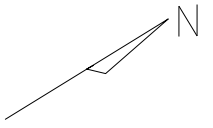


BRIDGE MBGF REMOVAL

NBI: 14-144-0-0473-02-005
 SH 21 at West Yegua Creek
 CSJ: 0473-02-042

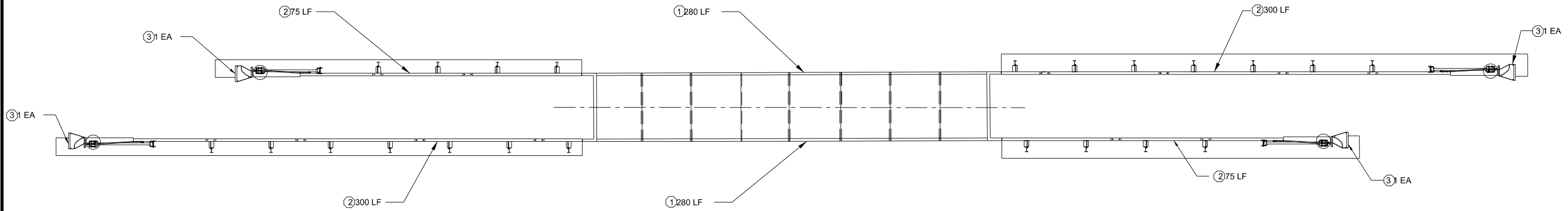
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© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC.	US 77, ETC.
	DIST	COUNTY	SHEET NO.	
	AUS	Lee	67	

DATE:
FILE:



REPAIR CALL-OUT LEGEND

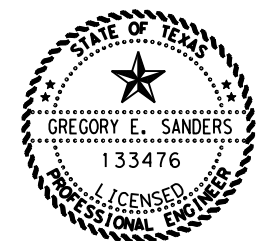
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 — Repair Quantity Unit
 — Estimated Repair Quantity at Each Location
 — Repair No. - See Table of Repairs



BRIDGE REPAIR LAYOUT

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	BID CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT
①	RETROFIT RAIL ON BRIDGE	0451-6019	RETROFIT RAIL (TY T631)	560	LF
②	INSTALL STANDARD MBGF AT APPROACHES	0540-6001	MTL W-BEAM GD FEN (TIM POST)	750	LF
③	INSTALL STANDARD GUARDRAIL END TREATMENTS	0544-6001	GUARDRAIL END TREATMENTS (INSTALL)	4	EA



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Not to Scale

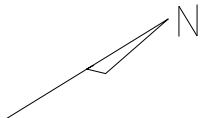


BRIDGE RAIL RETROFIT

NBI: 14-144-0-0473-02-005
 SH 21 at West Yegua Creek
 CSJ: 0473-02-042

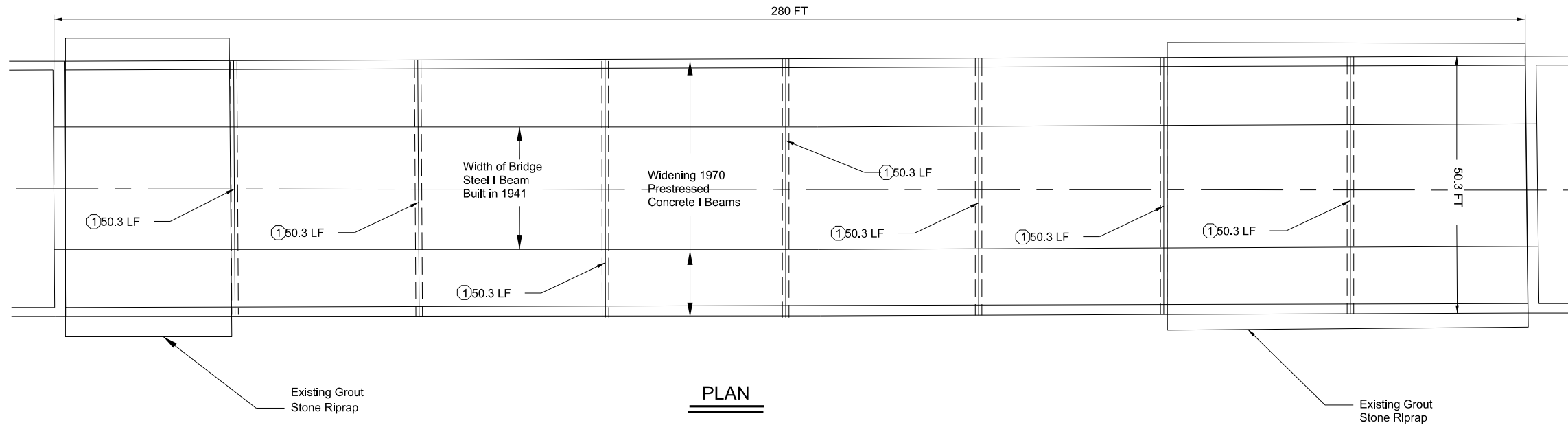
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© TxDOT	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	Lee		68

DATE:
FILE:



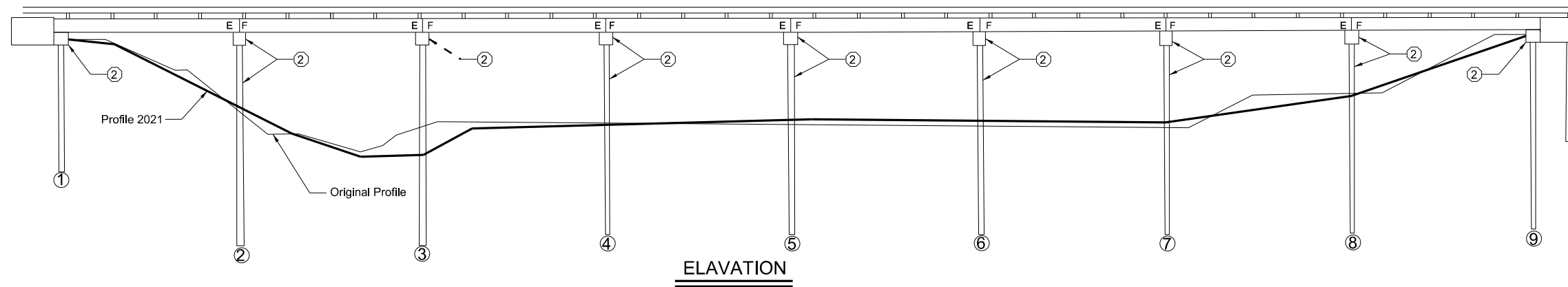
REPAIR CALL-OUT LEGEND

XX XX XX
 Repair Quantity Unit
 Estimated Repair Quantity at Each Location
 Repair No. - See Table of Repairs

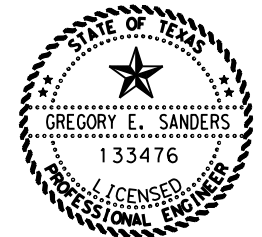


NOTES:

Columns heights vary for placement of concrete penetrating surface treatment.



Gregory E Sanders 1/12/24



Not to Scale



BRIDGE JOINTS, ETC.

NBI: 14-144-0-0473-02-005
 SH 21 at West Yegua Creek
 CSJ:0473-02-042

TABLE OF REPAIRS

REPAIR NO.	REPAIR DESCRIPTION/LOCATION	BID CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT
①	REPAIR JOINTS FROM BENTS 2-8	0438-6002	CLEANING AND SEALING EXISTING JOINTS (CL3)	352	LF
②	ALL INTERIOR BENTS, ABUTMENT CAPS AND COLUMNS	0428-6001	PENETRATING CONCRETE SURFACE TREATMENTS	800	SY

FILE:	DN:	CK:	DW:	CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC.	US 77, ETC.
	DIST	COUNTY		SHEET NO.
	AUS	Lee		69

DATE:
FILE:



Sep 7, 2022 at 12:09:12 PM
1482 SH-21
Lincoln TX 78948
United States

Exposed reinforcement at bent cap.



Sep 7, 2022 at 12:10:42 PM
SH-21
Lincoln TX 78948
United States

Exposed reinforcement on diaphragm.



Sep 7, 2022 at 12:13:42 PM
SH-21
Lincoln TX 78948
United States

More exposed reinforcement is common through out the bridge.



Sep 7, 2022 at 12:16:06 PM
SH-21
Lincoln TX 78948
United States

Concrete loss under bearing pad.



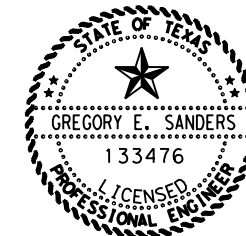
Sep 7, 2022 at 12:33:04 PM
SH-21
Lincoln TX 78948
United States

Cracks under post of existing bridge rail.



Erosion gully under bridge.

Gregory E. Sanders 1/12/24



				Bridge Division	
BRIDGE REPAIR LAYOUT					
NBI: 14-144-0-0473-02-005 SH 21 at West Yegua Creek CSJ: 0473-02-042					
FILE:	DN:	CK:	DW:	CK:	
© TxDOT	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0211	04	027, ETC.	US 77, ETC.	
	DIST	COUNTY		SHEET NO.	
	AUS	Lee		70	

TABLE OF QUANTITIES

BID CODE	BID ITEM DESCRIPTION	QUANTITY	UNIT
0401-6001	FLOWABLE FILL BACKFILL	20	CY
0432-6031	RIPRAP (STONE PROTECTION) (12 IN)	15	CY
0432-6033	RIPRAP (STONE PROTECTION) (18IN)	125	CY
0429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	65	SF
0428-6001	PENETRATING CONCRETE SURFACE TREATMENTS	800	SY
0438-6002	CLEANING AND SEALING EXISTING JOINTS	352	LF
7000-6011	REML & DESPL DRIFTWOOD & DEBRIS	1	LS
0451-6019	RETROFIT RAIL (TY T631)	560	LF
0542-6001	REMOVE METAL BEAM GUARD FENCE	750	LF
0544-6003	GUARDRAIL END TREATMENT (REMOVE)	4	EA
0540-6001	MTL W-BEAM GD FEN (TIM POST)	750	LF
0544-6001	GUARDRAIL END TREATMENT (INSTALL)	4	EA


SUMMARY OF WORK

1. Fix concrete spalls at bent caps.
2. Remove driftwood and debris at abutments and bents.
3. Place flowable fill under voids of existing grout riprap.
4. Fill erosion gully with rock riprap.
5. Remove bridge rail and replace with new retrofit rail.
6. Remove and replace metal beam guard fence at approaches.
7. Remove and replace metal beam guard fence end treatments.
8. Clean and seal joints all joints on deck.
9. Apply silane treatment to interior bents and caps.

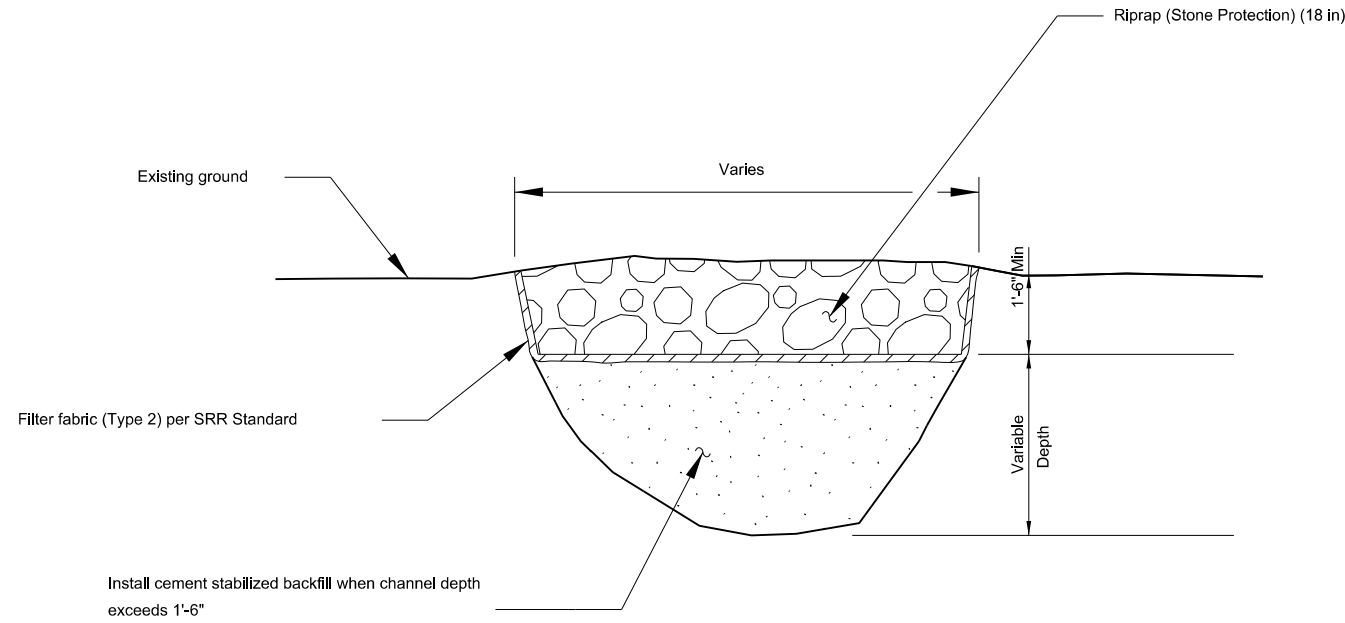
DATE:
FILE:

Gregory E Sanders 1/12/24



 Texas Department of Transportation		Bridge Division	
BRIDGE REPAIR LAYOUT			
NBI: 14-144-0-0473-02-005 SH 21 at West Yegua Creek CSJ: 0473-02-042			
FILE:	DN: HF	CK:	DW: HF
©TxDOT	CONT	SECT	JOB
REVISIONS	0211	04	027, ETC.
	DIST	COUNTY	SHEET NO.
	AUS	Lee	71

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EROSION GULLY DETAIL

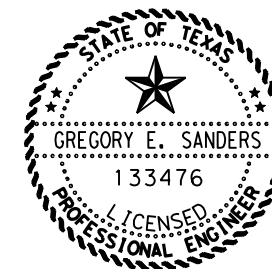
Scale: N.T.S.

NOTES TO ENGINEER:

- Pertinent Bid Codes may include:
 0400 6005 CEM STABIL BKFL CY
 0432 6033 RIPRAP (STONE PROTECTION)(18 IN) CY



EROSION GULLY



Gregory E Sanders 1/12/24

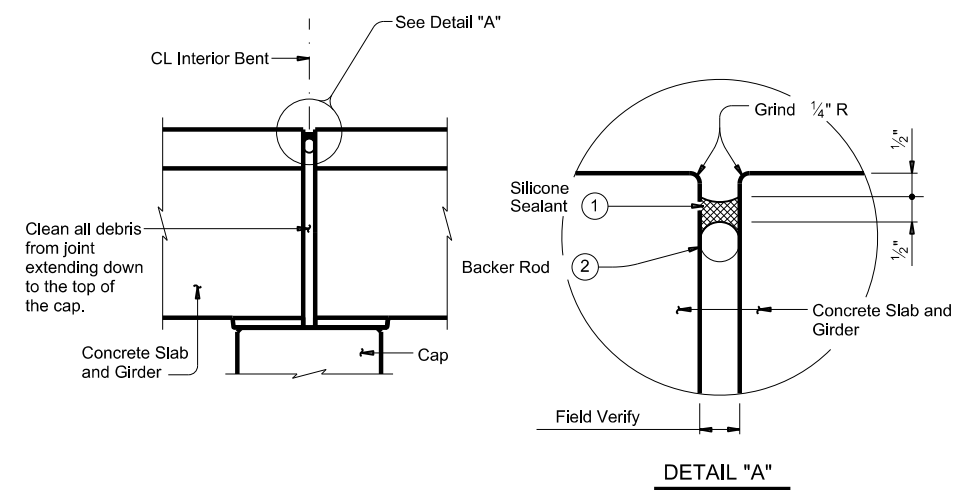
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					Bridge Division
Erosion Gully Detail NBI: 14-144-0-0473-02-005 SH 21 at West Yegua Creek CSJ:0473-02-042					
FILE: XX.dgn	DN: XX	CK: XX	DW: XX	CK: XX	
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0211	04	027, ETC.	US 77, ETC.	
	DIST	COUNTY		SHEET NO.	
	14	LEE		72	

DATE: 01/11/2024 01:45 PM
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Structure (Featured Crossed)	Number of Joints	Joint Location	Item 438-6002 Cleaning and Sealing Existing Joints (CL 3) (LF)
14144047302005 (West Yegua Creek)	7	*Abutment 1 & 9, Bents 2-8	352

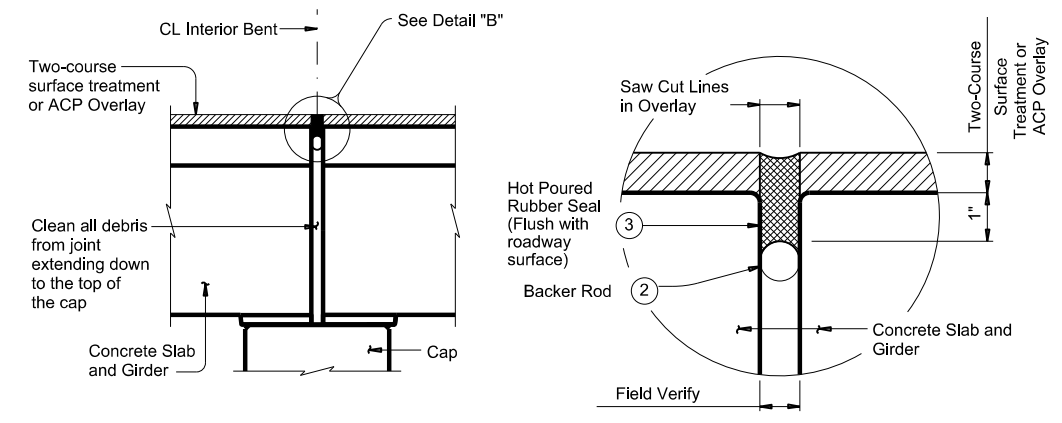
*Clean the debris in the joint. Strip seals are intact and must not be damaged.



JOINT WITH SILICONE SEAL
(used without ACP Overlay)

PROCEDURE:

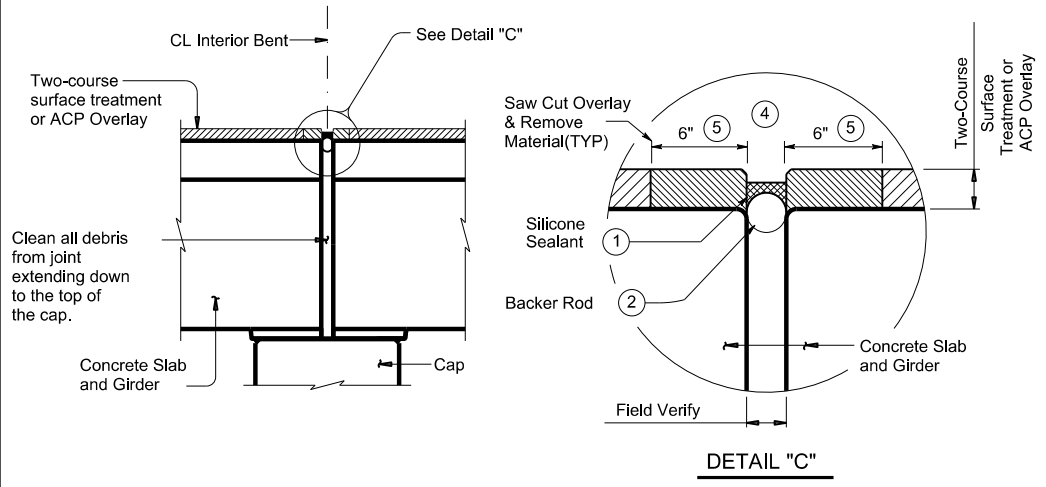
- 1) Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint.
- 2) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 3) Place backer rod (2) into joint opening 1" below the top of concrete.
- 4) Seal the joint opening with a Class 7 Silicone. Recess seal 1/2" below top of concrete in travel lanes and 3/8" below top of concrete in shoulders.



JOINT WITH HOT POURED RUBBER SEAL
(Used with ACP Overlay)

PROCEDURE:

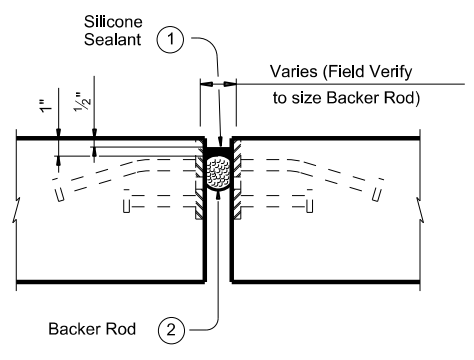
- 1) Saw cut through the asphalt at the centerline of joint. Make multiple saw cuts to create a 1/2" minimum joint opening or match the existing joint opening. Clean joint opening of all old expansion materials/devices, bituminous materials, dirt, grease and all other deleterious materials in accordance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



EXPANSION JOINT HEADER
(ACP Overlay with Joints > 100' apart)

PROCEDURE:

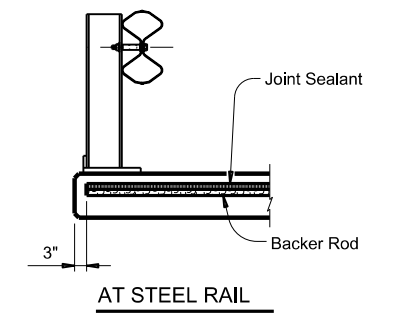
- 1) After existing overlay is removed, clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints". Clean joint out full depth of the joint.
- 2) Repair deck spalls that leave less than 6" of original deck in accordance with Item 785, "Bridge Joint Repair or Replacement". Spalls that are not as deep may be filled with header material.
- 3) Place overlay/surface treatment in accordance with plans.
- 4) Saw cut overlay to top of deck and remove all asphaltic material to expose joint.
- 5) Place header material in accordance with notes (4) & (5)
- 6) Place backer rod (2) into joint opening 1" below top of header material.
- 7) Seal the joint with a Class 7 Silicone. Recess seal 1/2" below top of header material in travel lanes and 1/8" below top of header material in shoulders.



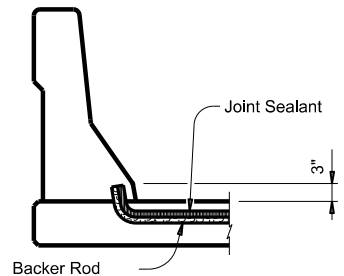
ARMOR JOINTS
(Used without ACP Overlay)

PROCEDURE:

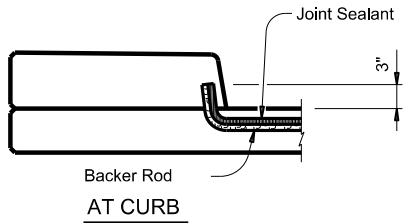
- 1) Remove existing seal and clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints". Clean joint out full depth of the joint.
- 2) Abrasive blast clean existing steel surface where silicone seal is to be placed.
- 3) Obtain approval of cleaned joint prior to proceeding with joint sealing operation.
- 4) Place backer rod (2) into joint opening 1" below the top of concrete.
- 5) Seal the joint opening with a Class 7 Silicone. Recess seal 1/2" below top of concrete in travel lanes and 1/8" below top of concrete in shoulders.



AT STEEL RAIL



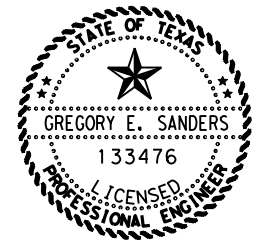
AT CONCRETE RAIL



AT CURB

JOINT SEALANT TERMINATION DETAILS

Gregory E Sanders 1/12/24



- 1) Use Class 7 silicone sealant and primer in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Exist Joints (CL 7)".
- 2) Backer rod must be 25% larger than joint opening and must be compatible with the sealant. Backer rod used with Class 3 sealant must be rated for a minimum of 400°F.
- 3) Use Class 3 hot poured rubber seal in accordance with DMS-6310, "Joint Sealants and Fillers". Prepare joint and seal in accordance with Item 438 "Cleaning and Sealing Exist Joints (CL 3)".
- 4) Match existing joint opening or set at a minimum:
 - a. 1" at 70°F when the distance between joints is 150' or less
 - b. 2" at 70°F when the distance between joints is greater than 150'
 - c. or as directed by the Engineer
- 5) 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. Place header material flush with roadway surface. Do not cantilever header material over the joint opening.

GENERAL NOTES:

Field verify all quantities, joint locations and joint types prior to ordering materials and beginning work.

Cleaning existing joint opening (full depth) of all debris, providing and placing backer rod, saw-cutting joint opening, and sealing joint is paid for by Item 438, "Cleaning and Sealing Joints" of the sealant type specified and measured by the linear foot of joint placed or, in the case of Expansion Joint Headers, by Item 454, "Header Type Expansion Joint", measured by the cubic foot of header material and Item 454, "Joint Sealant", measured by the linear foot of sealant placed.

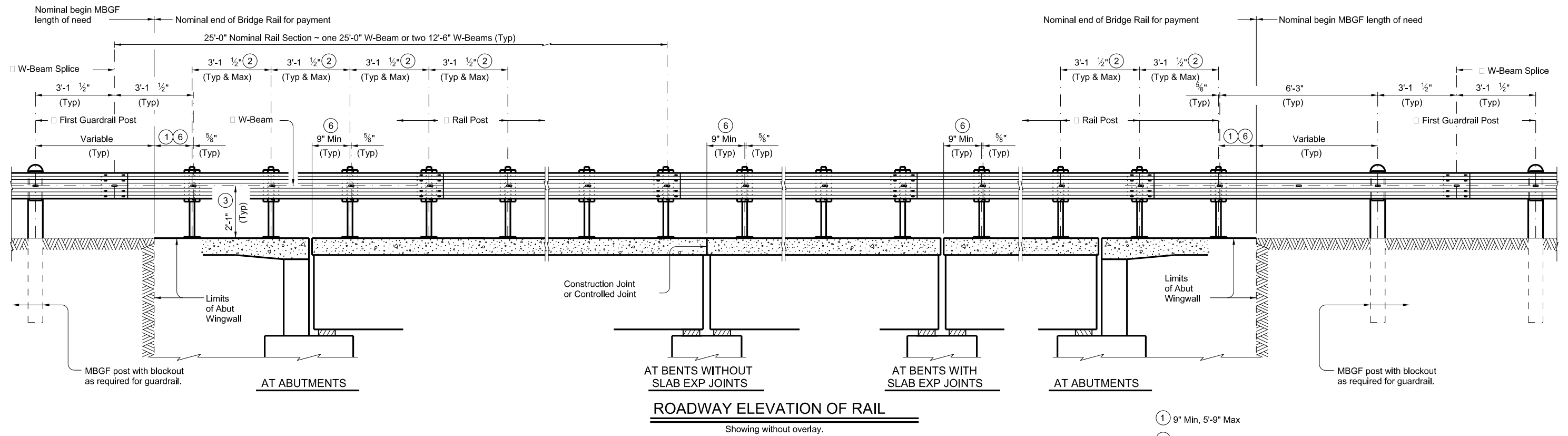
Extend sealant up into rail or curb 3 inches on low side or sides of deck. If the Class 7 Sealant cannot be effectively placed in the vertical position, a Class 4 Sealant compatible with the Class 7 sealant is allowed for the extension of the seal into the curb or rail.

Repair of damaged concrete caused by the Contractor must be repaired at the Contractor's expense in accordance with Item 429, "Concrete Structure Repair", and TxDOT's Concrete Repair Manual.

		Austin District		
Cleaning & Sealing Existing Bridge Joints NBI: 14-144-0-0473-02-005 SH 21 at West Yegua Creek CSJ:0473-02-042				
FILE:	DNE:MS	CR:GS	DW:HF	CR:GS
©TXDOT	CONT:0211	SECT:04	JOB:027, ETC.	HIGHWAY:US 77, ETC.
REVISIONS	DIST:AUS	COUNTY:LEE	SHEET NO.: 73	

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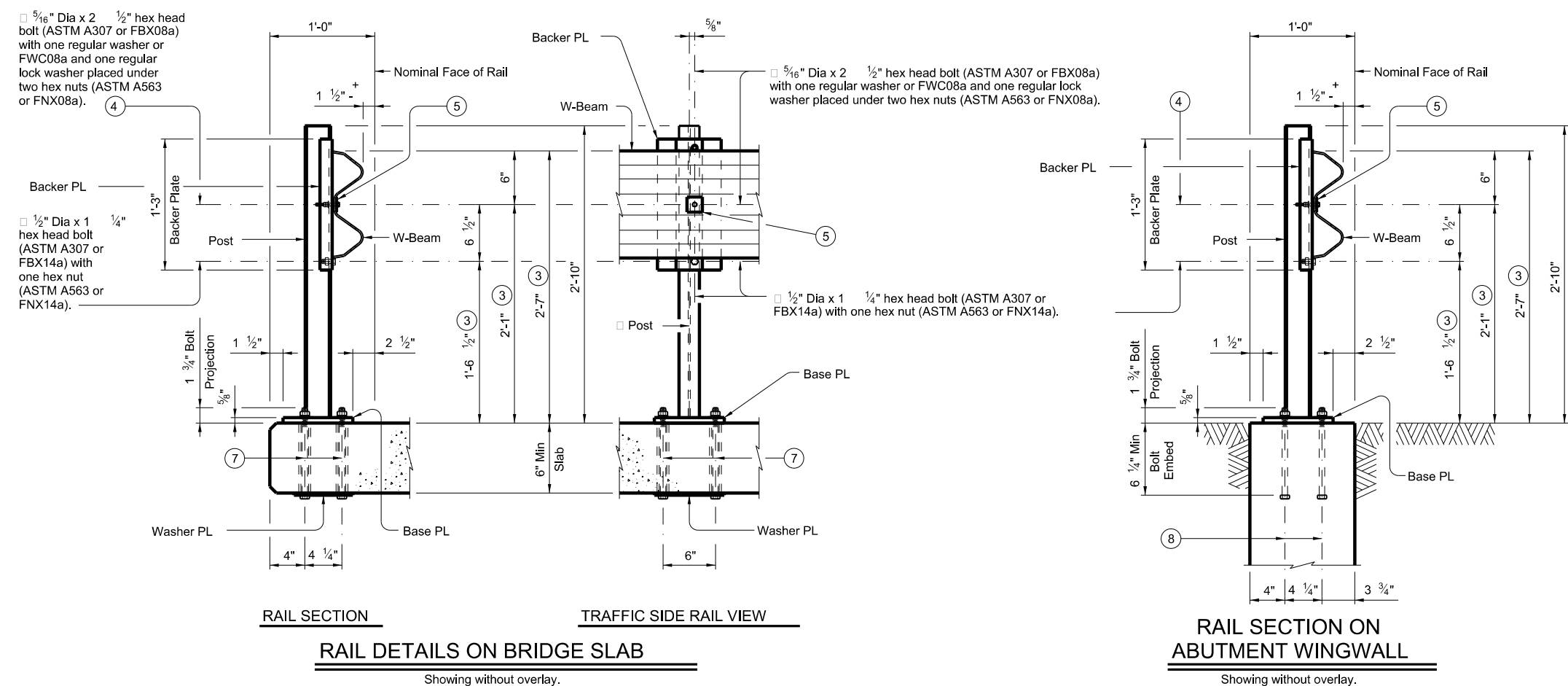
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ROADWAY ELEVATION OF RAIL

Showing without overlay.

- ① 9" Min, 5'-9" Max
- ② Maintain 3'-1 1/2" Rail Post spacing wherever possible for use with nominal 25'-0" or 12'-6" W-Beam sections. Symmetry of post spacing on both sides and along the structure is not necessary.
- ③ Increase 2" for structures with overlay.
- ④ Tighten the first hex nut by hand until the top and bottom edges of the W-Beam engage the Backer Plate (Backer Plate should be snug against the post). Then tighten hex nut one revolution with wrench and secure with the second hex nut.
- ⑤ PL 1/8" x 1 3/4" x 1 3/4" with 3/8" Dia Hole centered in PL (ASTM A36). Square Guardrail Washer (FWR01).
- ⑥ The post nearest to a slab joint or end of structure may be shifted up to 9" in order to satisfy the minimum offset dimension. Drill a new 3/4" Dia hole on the centerline of W-beam for shifted post. Paint hole with two coats of zinc-rich paint conforming to the Item "Galvanizing". All other posts must remain on the typical spacing.
- ⑦ 7/8" Dia formed holes for 5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".
- ⑧ 5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod. See "Cast-In-Place & Formed Hole Anchor Bolt Options".



RAIL DETAILS ON BRIDGE SLAB

Showing without overlay.

RAIL SECTION ON ABUTMENT WINGWALL

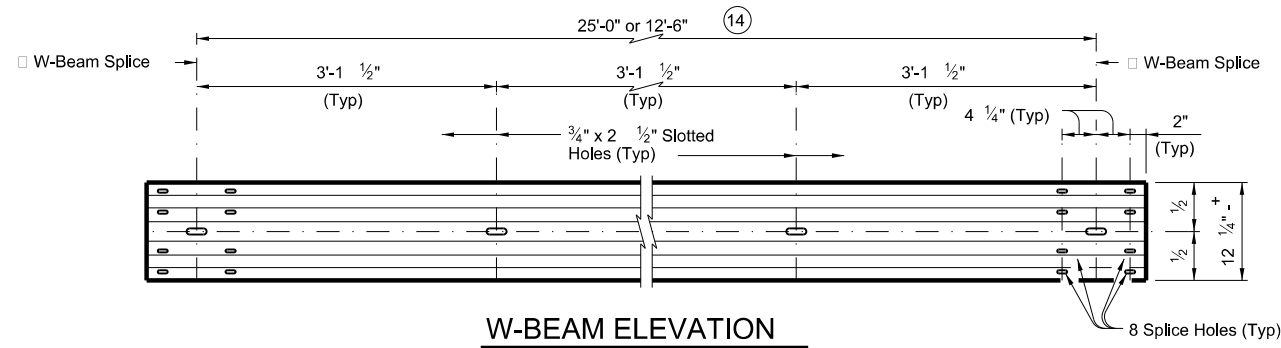
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SHEET 1 OF 2

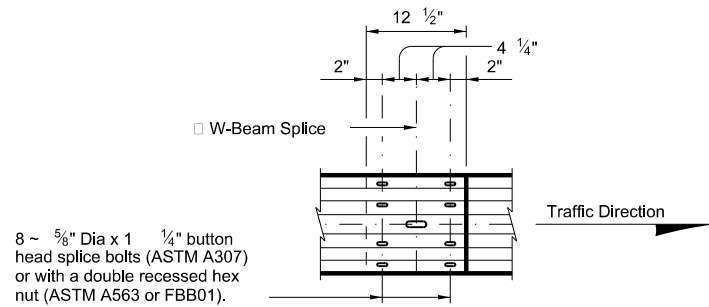
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©TxDOT	September 2019	CONT	SECT	JOB
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07/2020: Allow 9'-4" sections				
03/2020: MBGF Notes				
	DIST	COUNTY	SHEET NO.	
	AUS	LEE	74	

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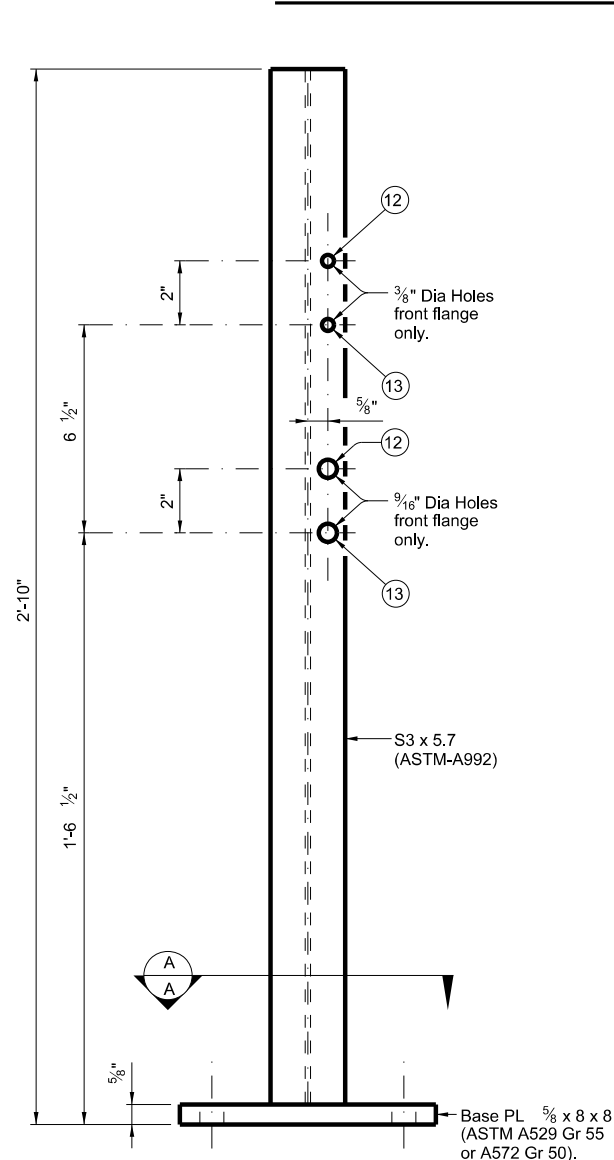
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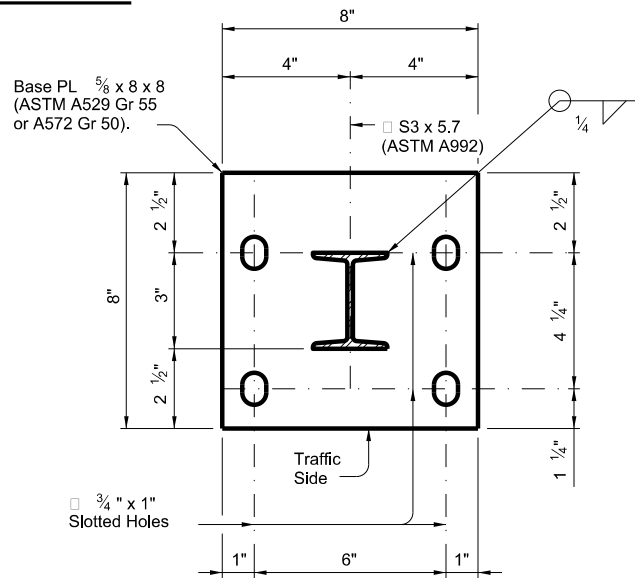
W-BEAM ELEVATION



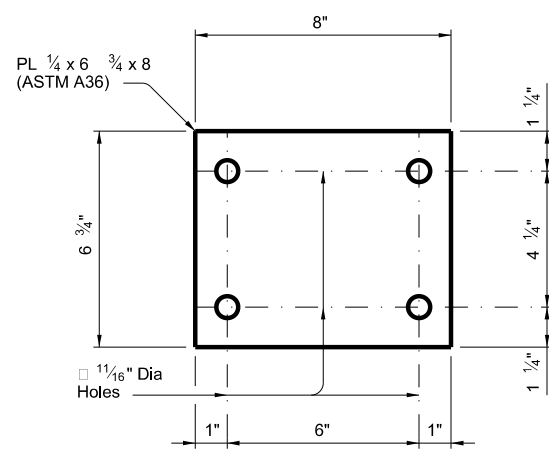
W-BEAM SPLICE ELEVATION



POST ELEVATION

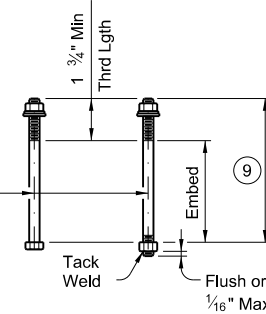


SECTION A-A



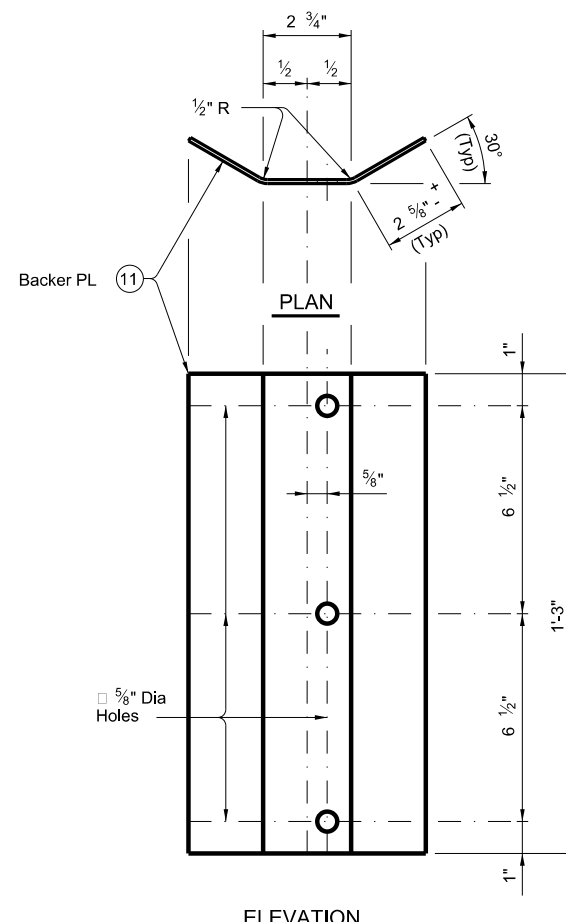
WASHER PLATE DETAIL

5/8" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod.



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

- 9 See "Rail Details On Bridge Slab" and/or "Rail Section On Abutment Wingwall".
- 10 See "Material Notes" for anchor bolt information.
- 11 Backer PL 1/4 x 8 x 1'-3" (ASTM A1011 CS or SS Gr 33, or A1008 CS or SS Gr 33 (11 Gage acceptable)).
- 12 Used for structures with overlay.
- 13 Used for structures without overlay.
- 14 At the nominal end of the bridge rail for payment, one 9'-4" or 6'-3" W-beam section is permitted in order to achieve the required W-Beam splice location on the MBGF.



ELEVATION

BACKER PLATE

MBGF AND END TREATMENT NOTES:
 This traffic railing must be anchored by metal beam guard fence (MBGF) and guard fence end treatments. Determine MBGF length of need in accordance with the Roadway Design Manual, unless otherwise specified. The minimum MBGF length of need required for anchoring the railing is 25' of MBGF plus the appropriate end treatment installed tangent to the primary roadway.

CONSTRUCTION NOTES:
 Face of rail post must be plumb unless otherwise approved by the Engineer. Post must be perpendicular to adjacent roadway grade. Use epoxy mortar under post base plates if gaps larger than 1/16" exist.
 Fully anchored guardrail must be attached to each end of rail. A metal beam guard fence transition is not used with this rail. At the Contractor's option anchor bolts may be an adhesive anchor system. See "Material Notes".

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.

It is recommended to show a Rail Layout with rail posts and W-beam splices. Fabricator must submit erection drawings to the Engineer for approval.
 Round or chamfer exposed edges of rail post and backer plate to approximately 1/16" by grinding.
 Shop drawings are not required for this rail.

MATERIAL NOTES:
 Galvanize all steel components.
 Anchor bolts for base plate must be 5/8" 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) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be 5/8" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under each heavy hex nut. Nuts must conform to ASTM A563 requirements. Embed fully threaded rod into slab and/or abutment wingwall using a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 4 3/4". Anchor adhesive chosen must be able to achieve a nominal bond strength in tension of a single anchor, Na, of 8 kips (edge distance 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."

W-beam must 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" (Nominal) lengths and a single rail element of 9'-4" 1/2" or 6'-3" (Nominal) length. W-Beam must have slotted holes at 3'-1 1/2". Some part numbers from the "Task Force 13" Guide to Standardized Highway Barrier Hardware have been furnished for quick reference.

GENERAL NOTES:
 This railing has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This railing can be used for speeds of 50 mph and greater.
 This rail is designed to deflect approximately 4' to 4'-6" as it contains and redirects the errant vehicle. This rail may not be installed on top of or behind curbs that project above finished grade, on bridges with expansion joints providing more than 5" movement, on retaining walls, or on grade separations and interchanges.

Repairs to impact-damaged post and base plate unit are not permitted. Replace all impact-damaged posts with a new post and base plate unit.
 Average weight of railing with no overlay: 20 plf total.

SHEET 2 OF 2

		Bridge Division Standard		
TRAFFIC RAIL NBI: 14-144-0-0473-02-005 SH 21 at West Yegua Creek CSJ:0473-02-042 TYPE T631				
FILE:	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT	September 2019	CONT	SECT	JOB
REVISIONS		0211	04	027, ETC.
07/2020: Allow 9'-4" or 6'-3" W-Beam sections.		DIST	COUNTY	SHEET NO.
03/2020: MBGF Notes.		AUS	LEE	75

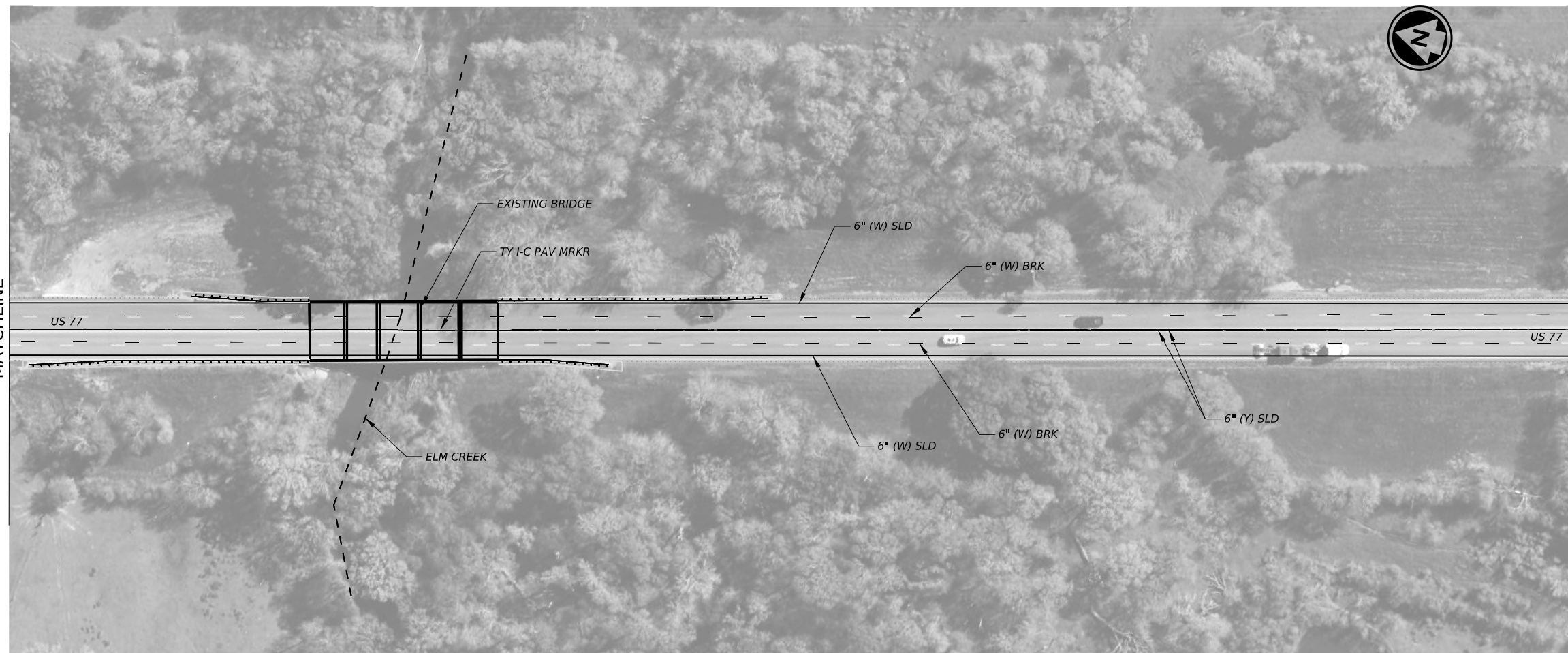
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MATCHLINE

NOTE:
THIS EXHIBIT IS FOR REFERENCE ONLY.
NO SURVEY AND ALIGNMENT INFORMATION
AVAILABLE. LINEWORKS BASED ON BING MAP IMAGE.
VERIFY AND KEEP TRACK RECORD OF EXISTING
PAVEMENT MARKINGS PRIOR TO REMOVAL OF
STRIPINGS DURING TCP. RESTRIPE TO EXISTING
AT END OF THE WORK. LIMIT WORKZONE AREA
WITHIN EXISTING RIGHT OF WAY BOUNDARY.

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MATCHLINE

MATCHLINE

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Utpal Datta
12/8/2023
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STATE OF TEXAS
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US77, ETC.
CSJ 0211-04-027
PVT. MARKING AND
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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	76	

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MATCHLINE



WORK LIMIT
1418 LF FROM BRIDGE DECK
ALONG CENTER LINE

6" (W) SLD

6" (W) BRK

US 77

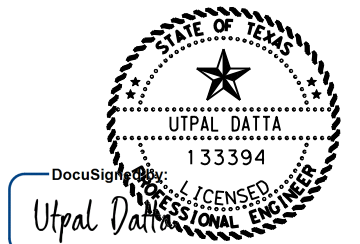
6" (W) SLD

6" (W) BRK

6" (Y) SLD



NOTE:
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NO SURVEY AND ALIGNMENT INFORMATION
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VERIFY AND KEEP TRACK RECORD OF EXISTING
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STRIPINGS DURING TCP, RESTRIPE TO EXISTING
AT END OF THE WORK. LIMIT WORKZONE AREA
WITHIN EXISTING RIGHT OF WAY BOUNDARY.



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PVT. MARKING AND
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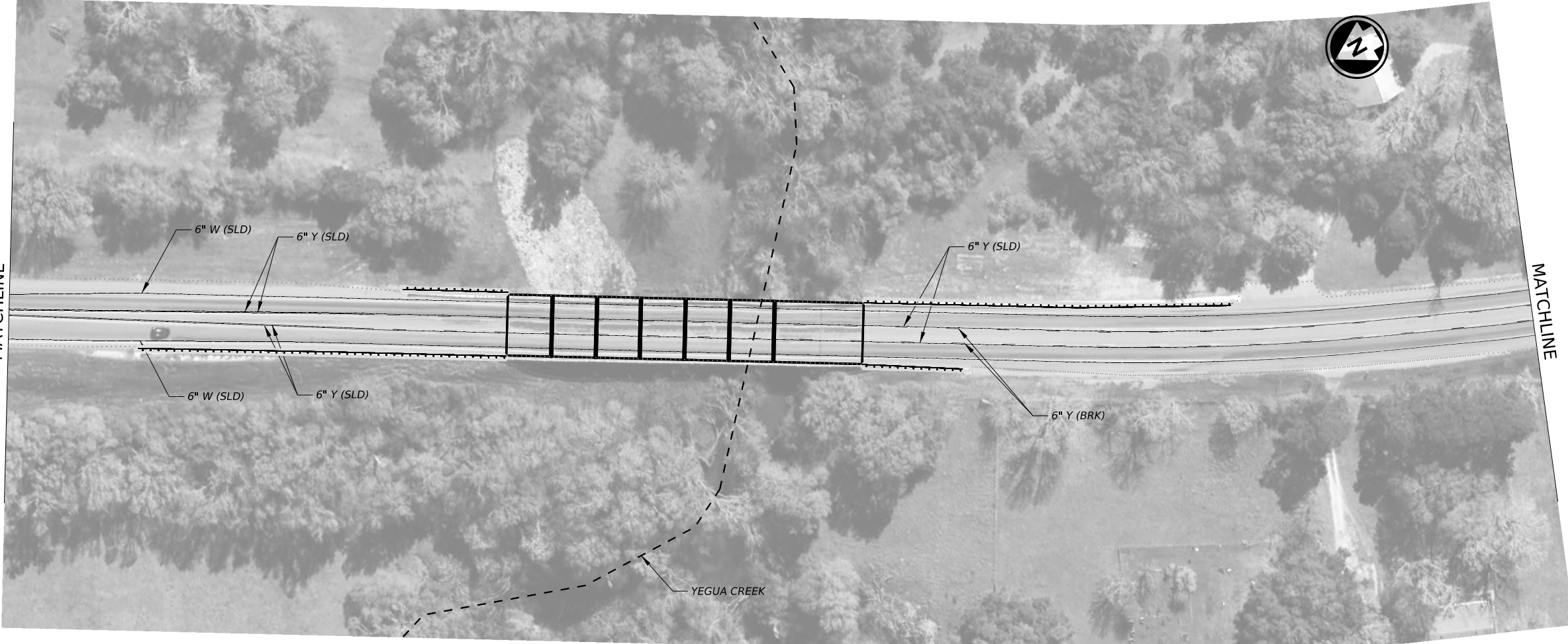
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MATCHLINE

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IMAGE. VERIFY AND KEEP TRACK RECORD OF
EXISTING PAVEMENT MARKINGS PRIOR TO REMOVAL
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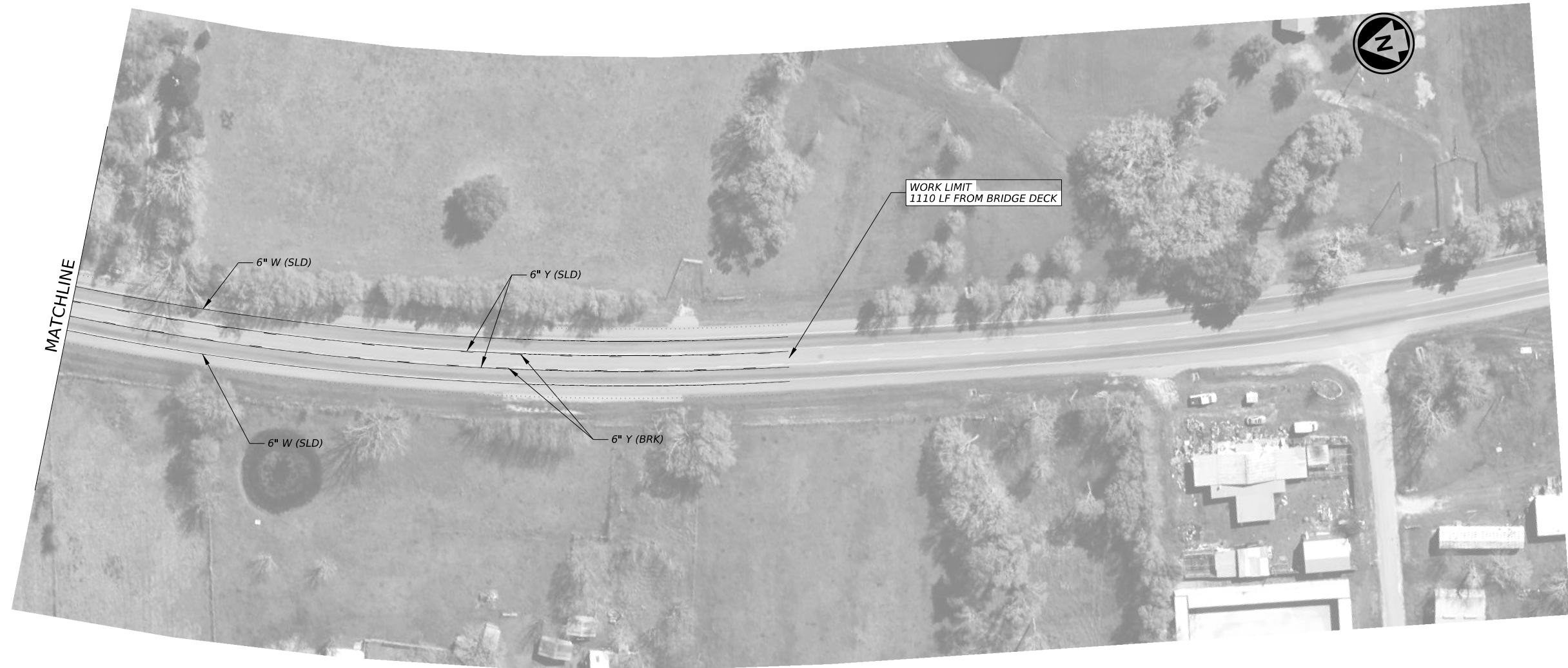
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PAVT. MARKING AND
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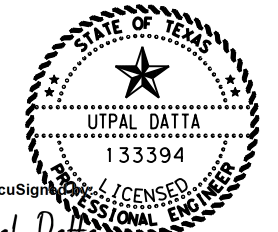
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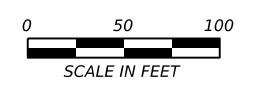
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 AT END OF THE WORK. LIMIT WORKZONE AREA
 WITHIN EXISTING RIGHT OF WAY BOUNDARY.



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 12/8/2023



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 PAVT. MARKING AND
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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

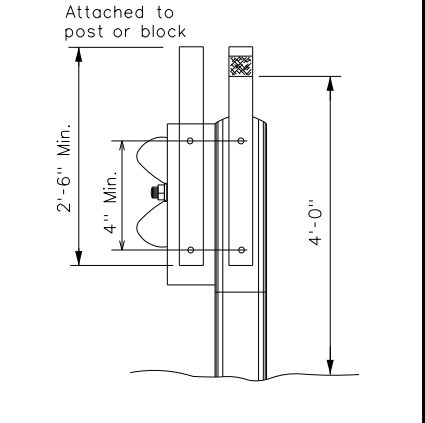
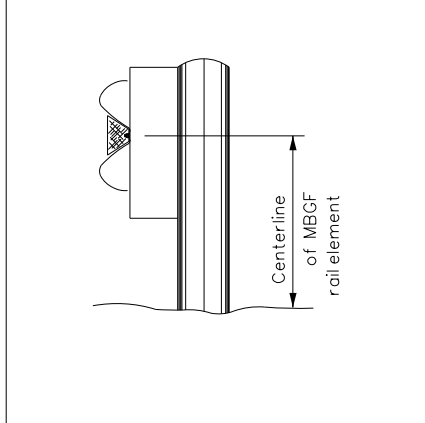
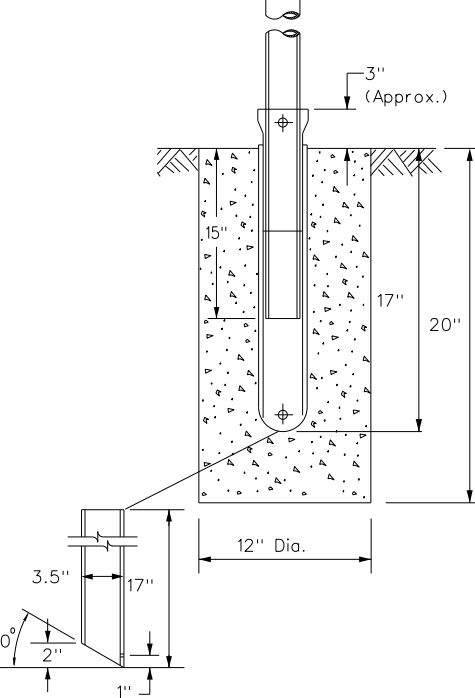
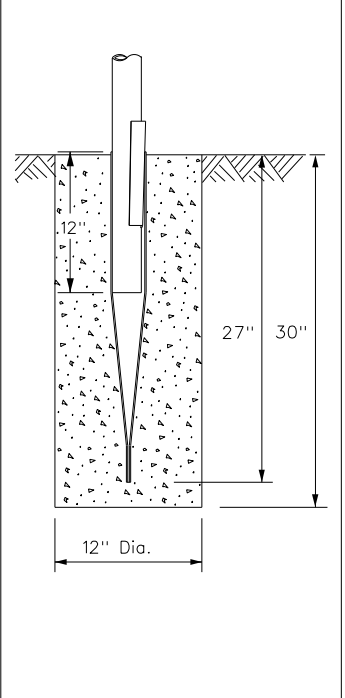
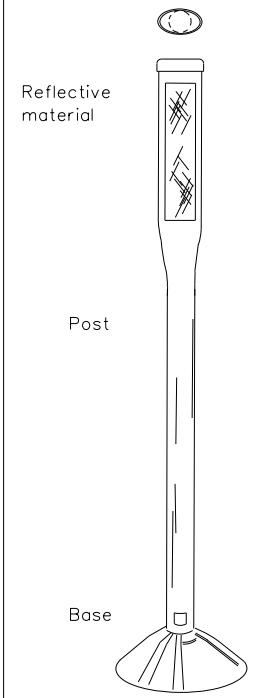
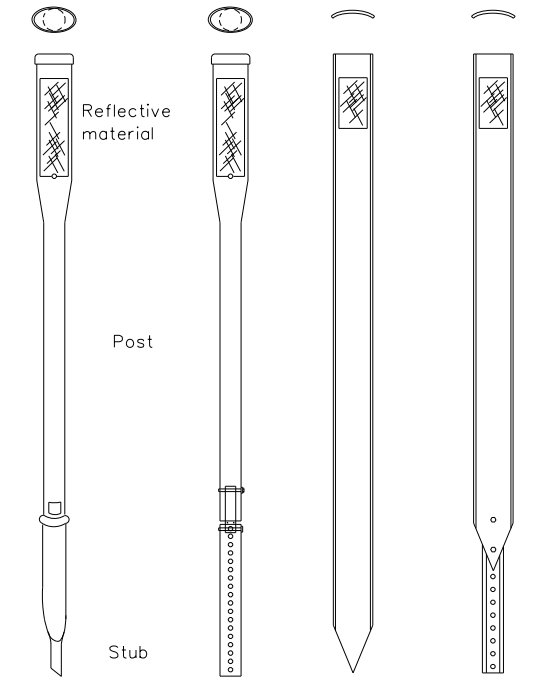
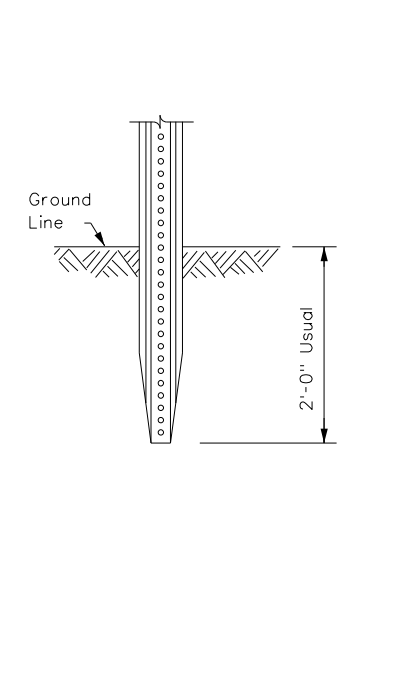
SRF

WAS

WAP

GF1

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)

Place Barrier Reflector on top or on side(s) of CTB.

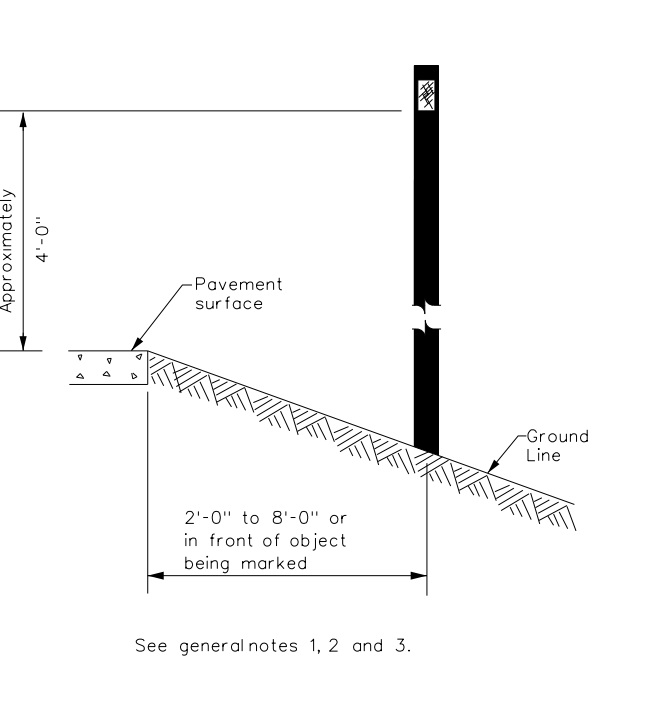
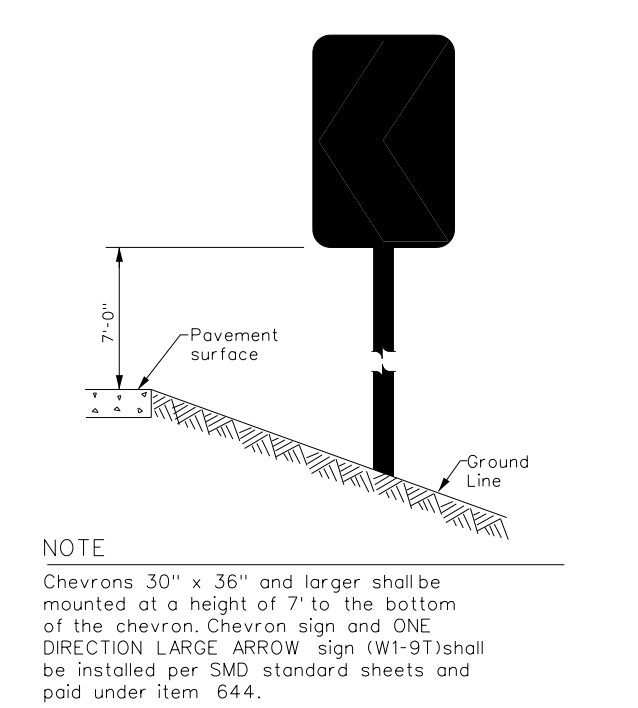
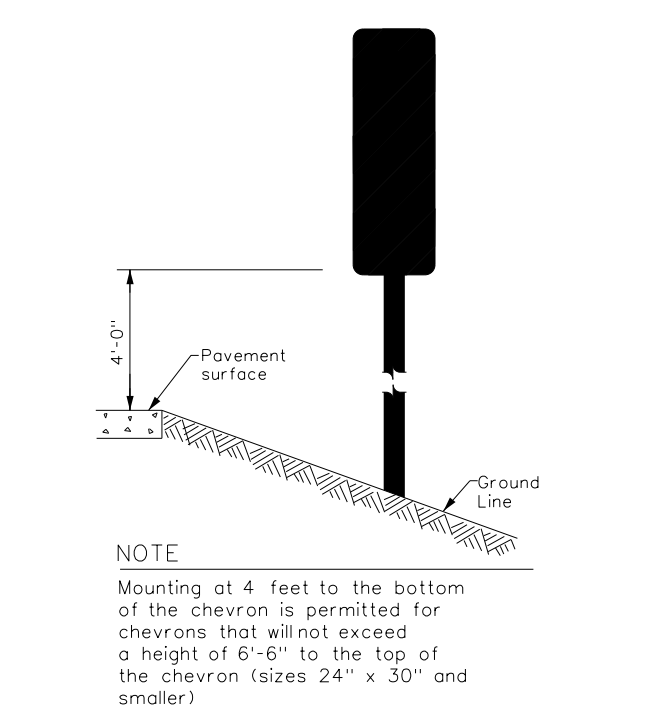
GENERAL NOTES

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

CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN

DELINEATORS AND TYPE 2 OBJECT MARKERS



Texas Department of Transportation

Traffic Safety Division Standard

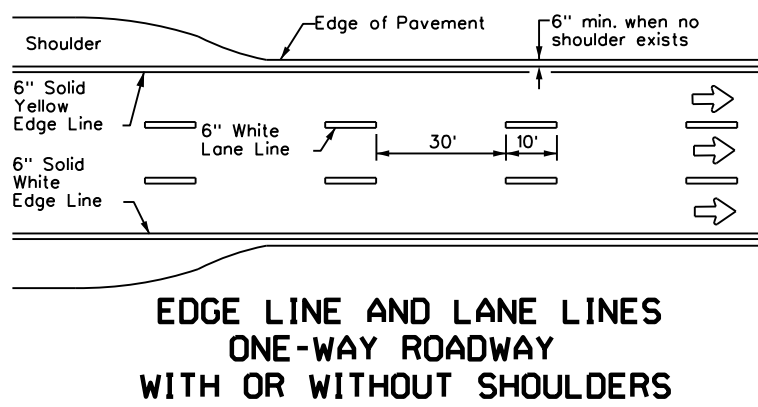
DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

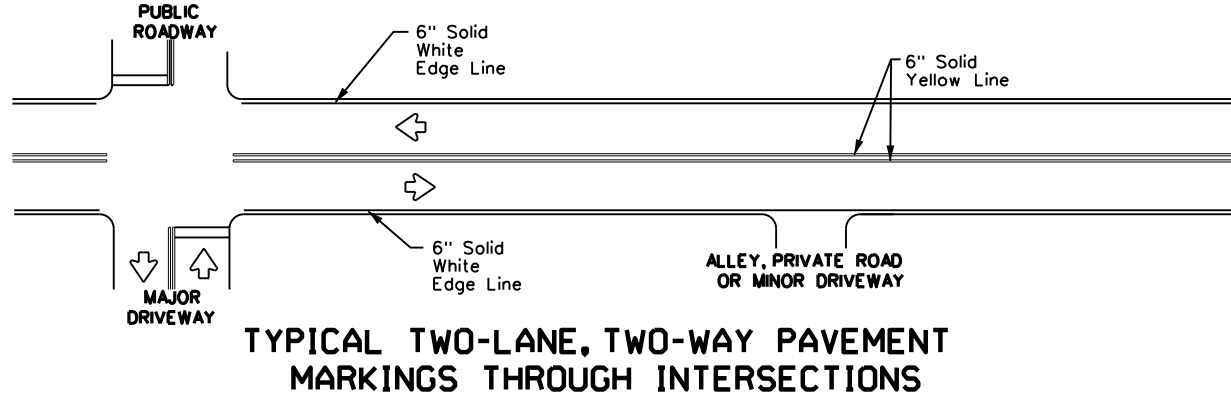
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4-10 7-20	AUS	LEE	81	

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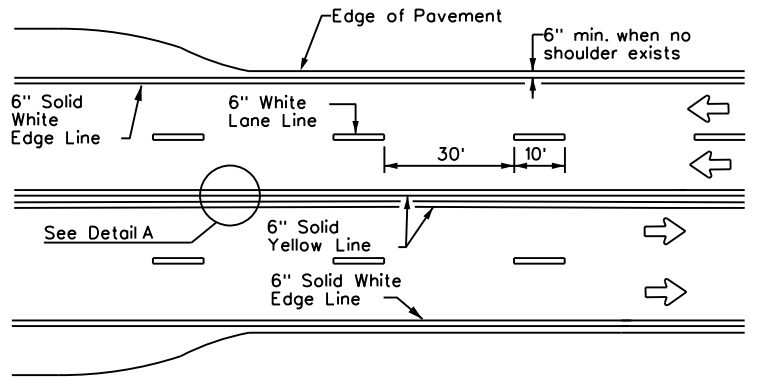
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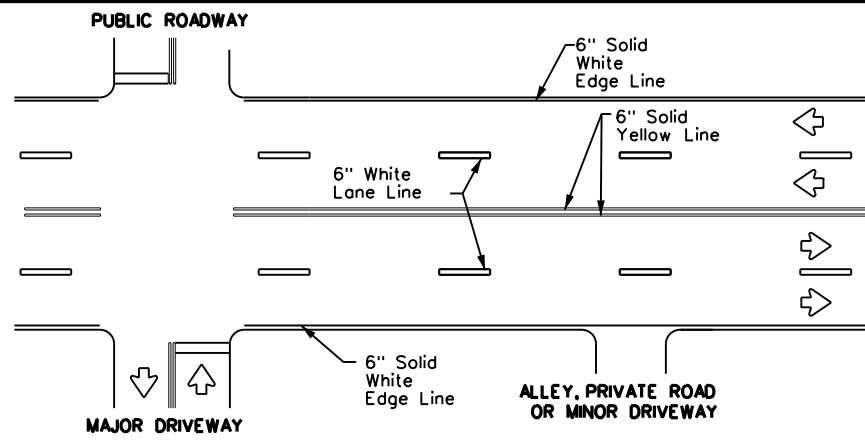
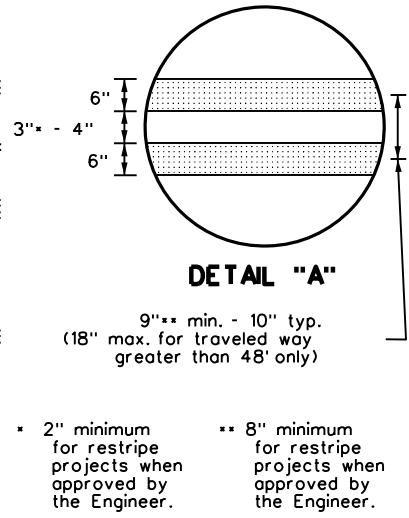
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



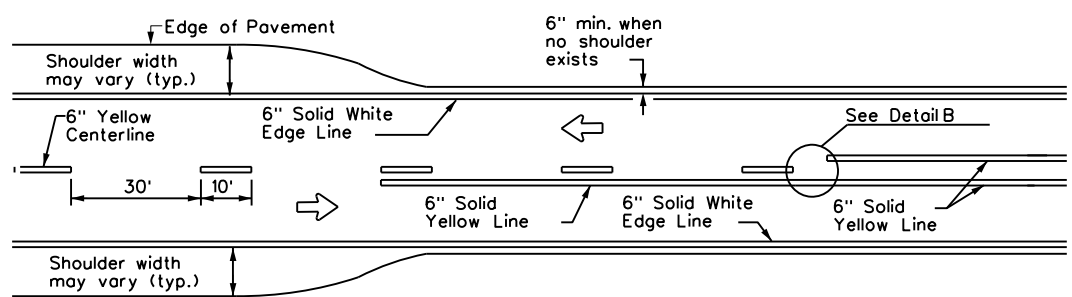
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



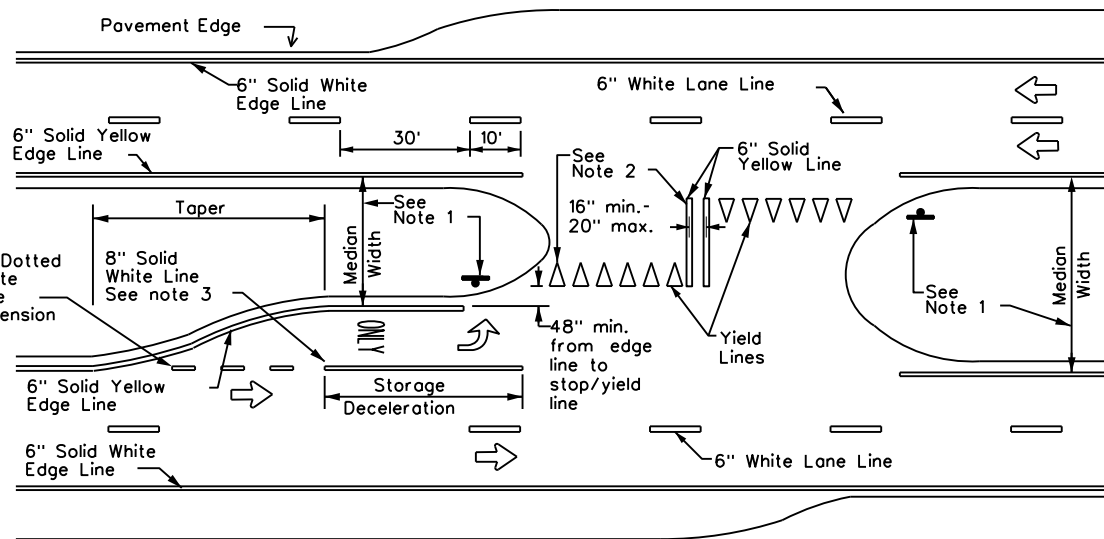
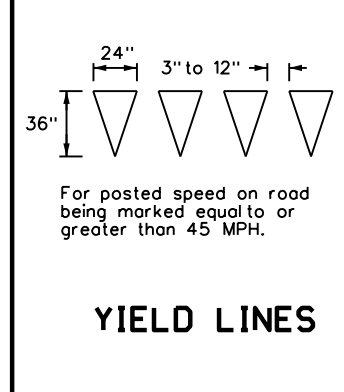
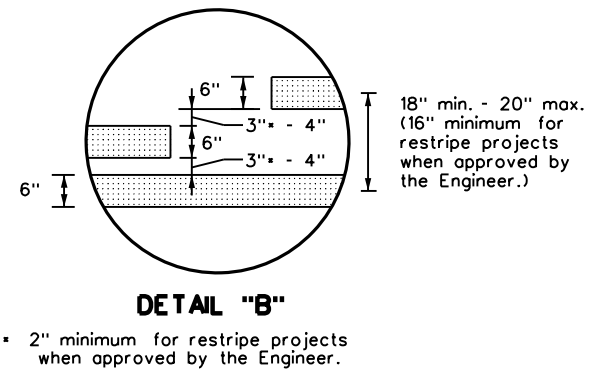
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



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



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

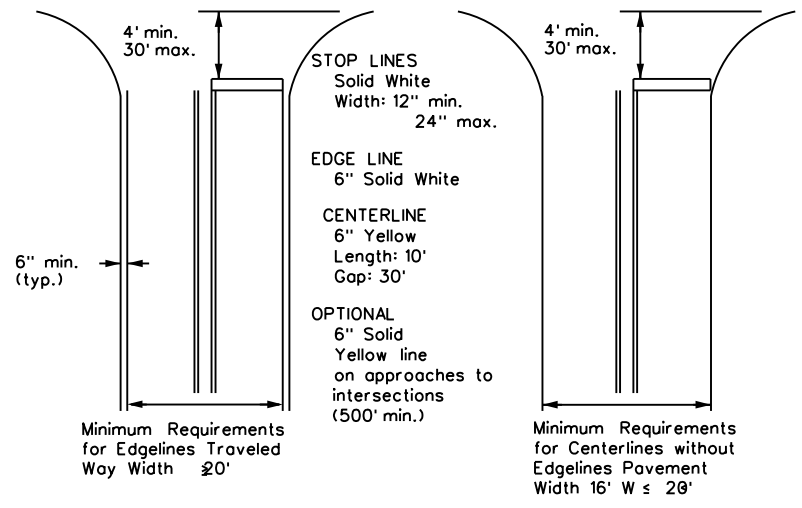
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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

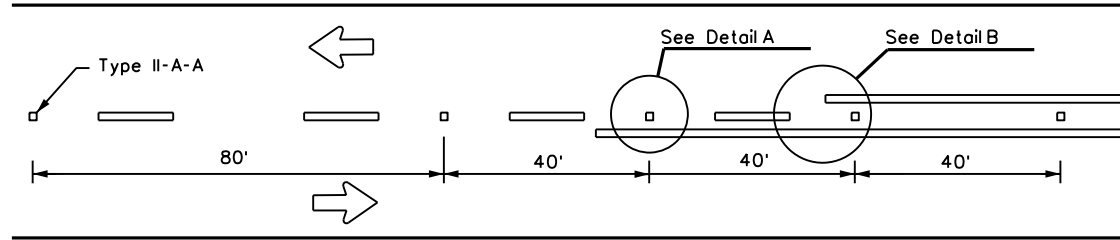
PM(1)-22

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© TxDOT December 2022	CONT:	SECT:	JOB:	HIGHWAY:
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11-78 8-00 6-20	DIST:	COUNTY:	SHEET NO.	
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5-00 2-12				

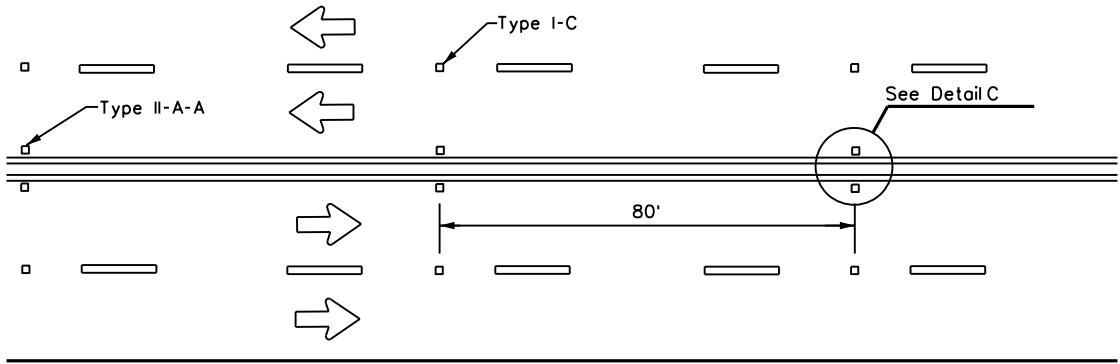
22A

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

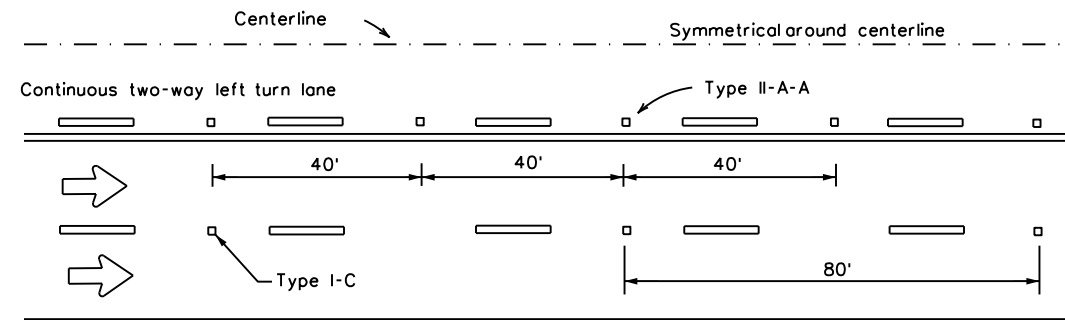
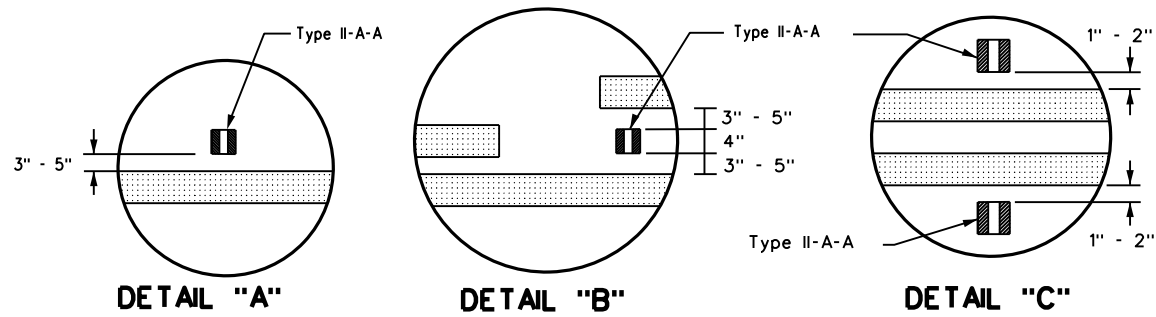
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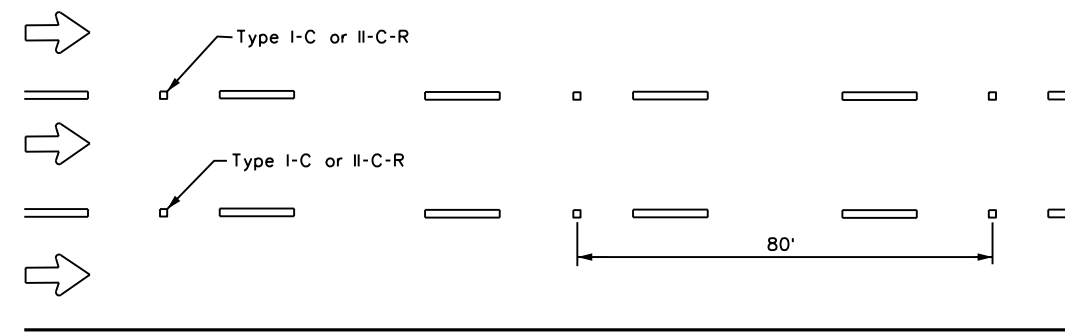
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



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

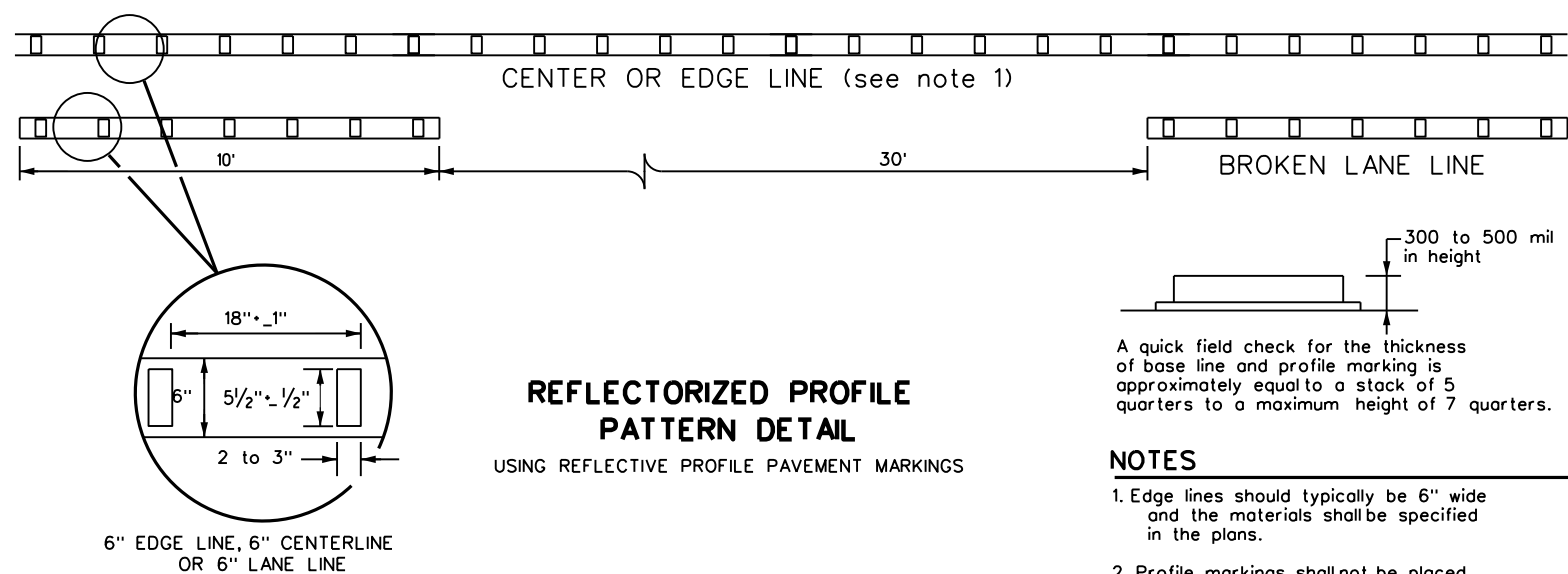


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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



**REFLECTORIZED PROFILE
PATTERN DETAIL**
USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

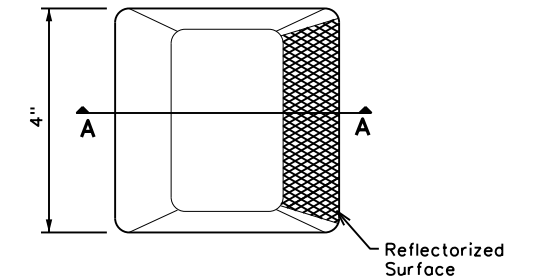
- Edge lines should typically be 6" wide and the materials shall be specified in the plans.
- Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

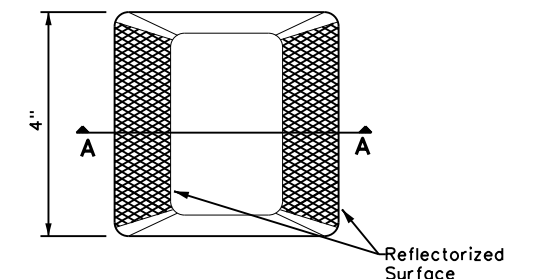
- All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
- Use raised pavement marker Type I-C with undivided roadways, flush medians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

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

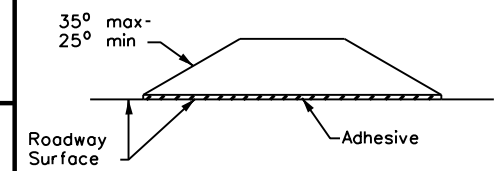
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022				
REVISIONS	CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.	
4-77 8-00 6-20	DIST	COUNTY	SHEET NO.	
4-92 2-10 12-22	AUS	LEE	83	
5-00 2-12				

NOTES

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

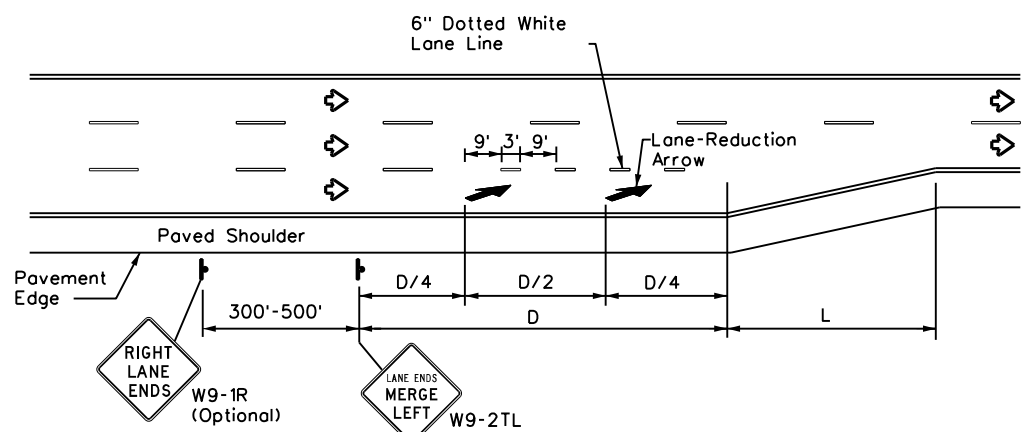
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	L = $\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L = WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

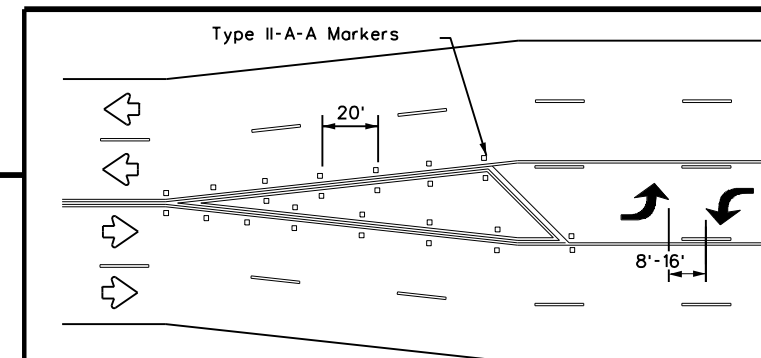
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

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

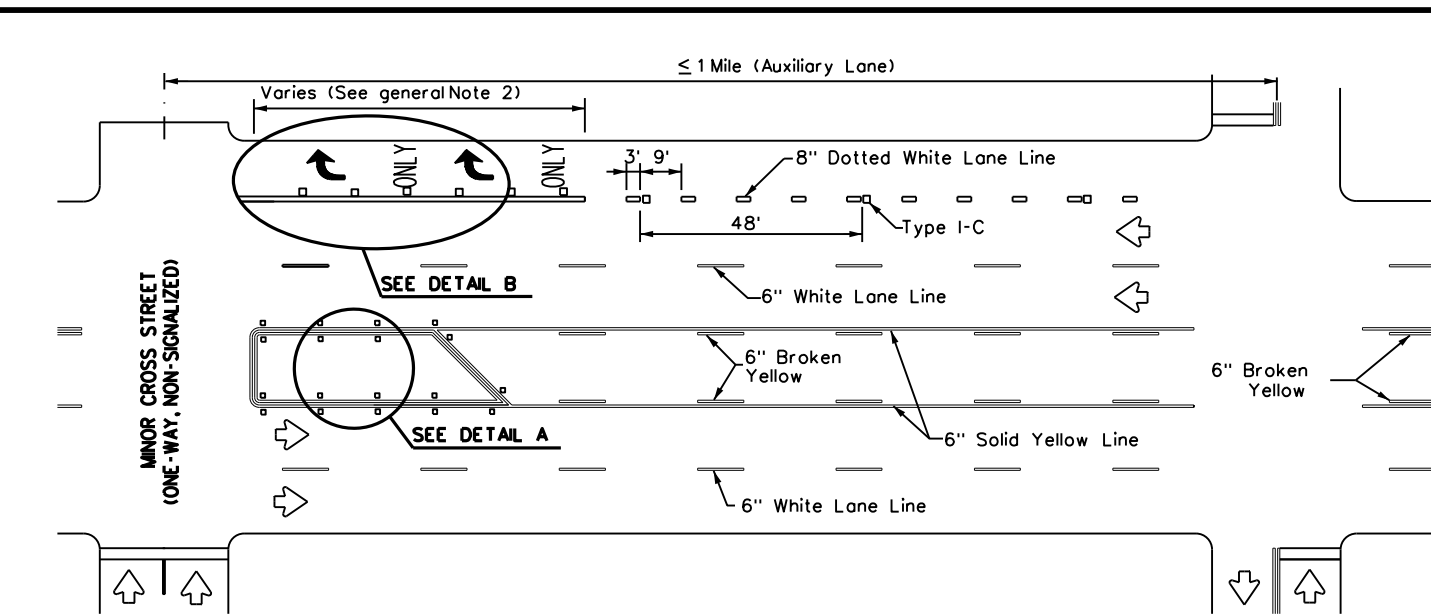


LANE REDUCTION

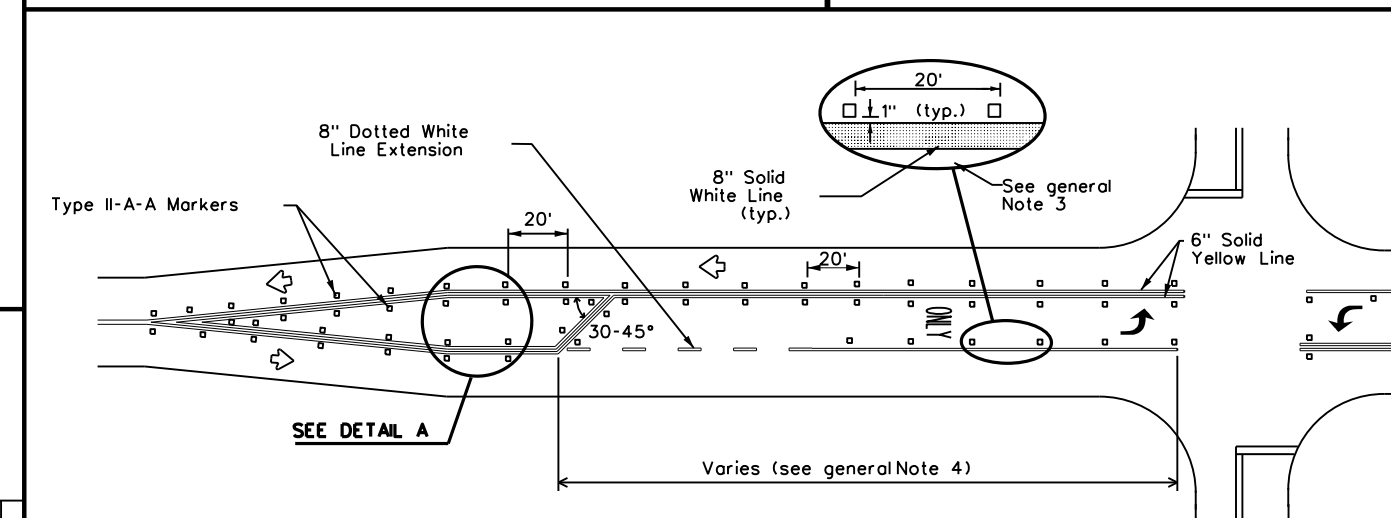


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

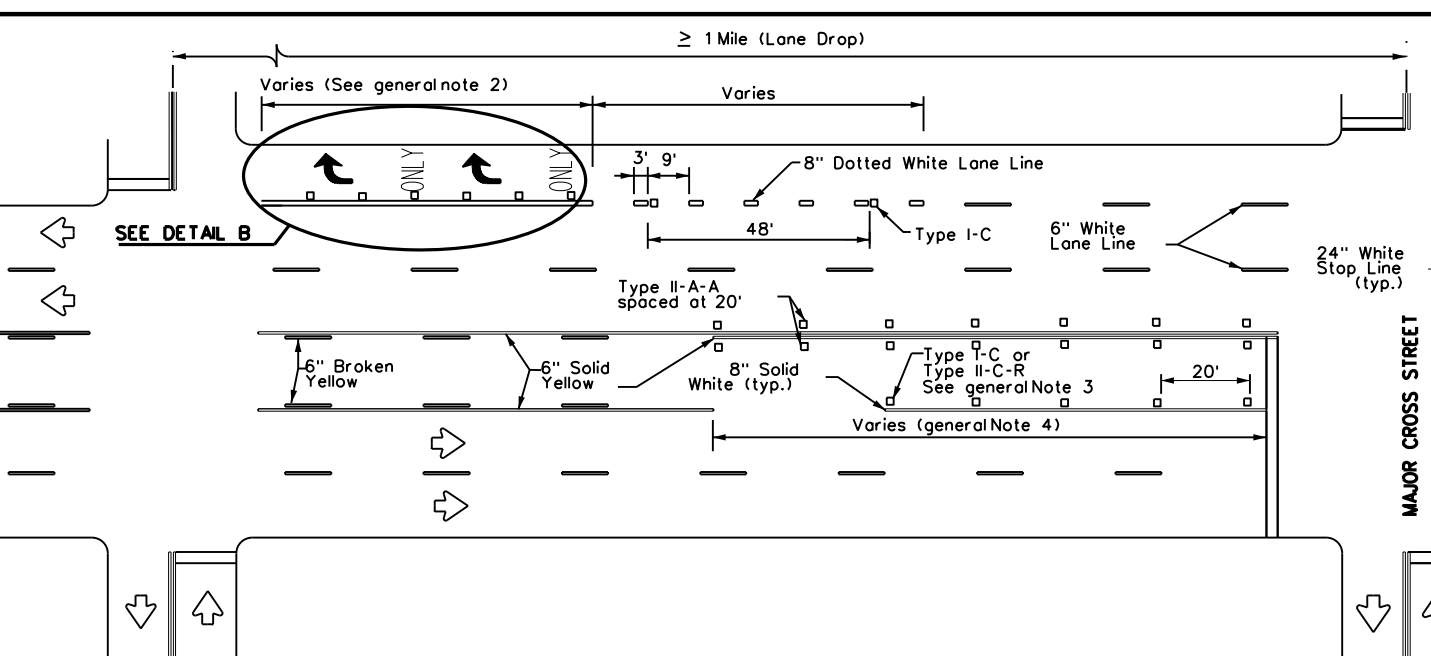
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



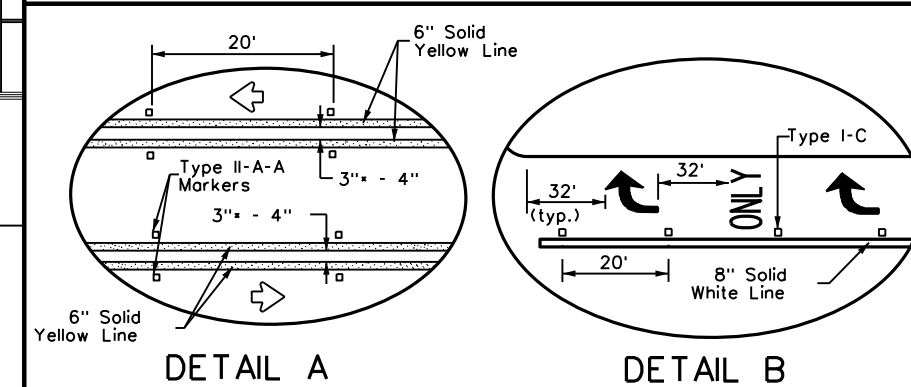
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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.



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

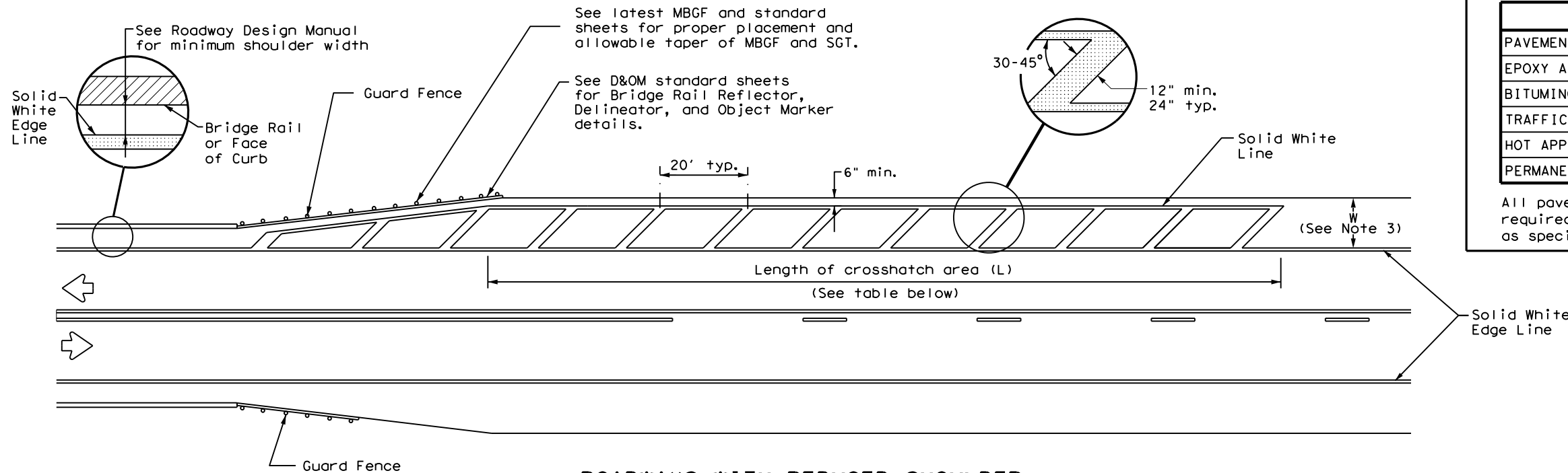
FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0211	04	027, ETC	US 77, ETC.
4-98 3-03 6-20	DIST	COUNTY	SHEET NO.	
5-00 2-10 12-22	AUS	LEE		84
8-00 2-12				

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DATE: 11/30/2023 8:51:59 PM
FILE: p:\t\dot\project\wiseon\line.com\TXDOT14\Documents\14 - AUS\Standards\StateofTexas\14-11-15-2023\14-11-15-2023.dwg

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DATE: 3/1/2024 10:42:59 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT4\Documents\14 - AUS\Design Projects\PM(5)-22.dgn



ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

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

NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 4 inches from the bridge rail or face of curb or 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions.
2. No-passing zone on bridge approach is optional. If used, the no-passing zone shall be a minimum 500 feet long from the beginning of the bridge.
3. The crosshatching should be required if the shoulder width in advance of the bridge is 4 feet or wider and a reduction of at least 3 feet in shoulder width across the bridge occurs.
4. On divided highways, review both the right and left shoulder widths for the need for narrow bridge pavement markings.

MATERIAL SPECIFICATIONS

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

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

				Traffic Safety Division Standard	
PAVEMENT MARKINGS FOR ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT PM(5) - 22					
FILE: pm5-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0211	04	027, ETC	US 77, ETC.	
	DIST	COUNTY		SHEET NO.	
	AUS	LEE		84A	

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 projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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):

0211-04-027, ETC.

1.2 PROJECT LIMITS:

From: At Elm Creek

To: .

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 30.2752865, (Long) -96.9452334

END: (Lat) 30.2749121, (Long) -96.9451354

1.4 TOTAL PROJECT AREA (Acres): 0.842

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.215

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Remove and replace existing concrete riprap, remove drift, repair spalls, upgrade rails

1.7 MAJOR SOIL TYPES:

Soil Type	Description

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
- Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
- 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

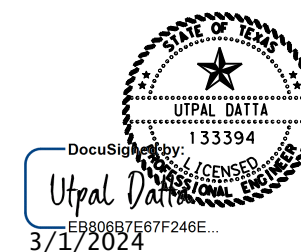
* Add (*) for impaired waterbodies with pollutant in ().

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: _____



STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
			US 77, ETC.
STATE	STATE DIST.	COUNTY	
TEXAS	14	LEE	
CONT.	SECT.	JOB	SHEET NO.
0211	04	027, ETC	85

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
- Daily street sweeping
- 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 DEWATERING:

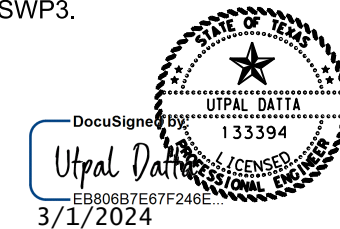
Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 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 .

2.10 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.



STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
			US 77, ETC.
STATE	STATE DIST.	COUNTY	
TEXAS	14	LEE	
CONT.	SECT.	JOB	SHEET NO.
0211	04	027, ETC	86

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 FILE: pw://txdot.projectwiseonline.com:TXDOT4/Documents/14 - AUS/Design Projects/021104027/4 - Design/Plan Set/9. Environmental/UST77-ENV-EPIC.dgn

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.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. 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# 3(a)

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. Elm Creek
- 2.
- 3.
- 4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
<input type="checkbox"/> Temporary Vegetation	<input checked="" type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input checked="" type="checkbox"/> Blankets/Matting	<input checked="" type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

- No Action Required Required Action

Action No.

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

IV. VEGETATION RESOURCES

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

- No Action Required Required Action

Action No.

1. DURING CONSTRUCTION, THE CONTRACTOR SHOULD AVOID IMPACTS TO WOODY VEGETATION. TREE AND BRUSH TRIMMING, CUTTING, AND REMOVAL WILL BE KEPT TO A MINIMUM AND IMPLEMENTED ONLY WHEN NECESSARY TO COMPLETE PROJECT WORK. MINIMIZE THE AMOUNT OF VEGETATION CLEARED. REMOVAL OF NATIVE VEGETATION, PARTICULARLY MATURE NATIVE TREES AND SHRUBS SHOULD BE AVOIDED TO THE GREATEST EXTENT PRACTICABLE. THE USE OF ANY NON-NATIVE VEGETATION IN LANDSCAPING AND REVEGETATION IS DISCOURAGED. LOCALLY ADAPTED NATIVE SPECIES SHOULD BE USED. AVOID AND MINIMIZE CONSTRUCTION RELATED VEGETATION AND SOIL DISTURBANCE, INCLUDING THE REMOVAL OF NATIVE VEGETATION, PARTICULARLY MATURE NATIVE TREES AND SHRUBS, TO THE MAXIMUM EXTENT PRACTICABLE. THIS INCLUDES AREAS WITHIN THE EXISTING ROW AND PROPOSED ROW, BUT OUTSIDE CONSTRUCTION LIMITS.

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

- No Action Required Required Action

Action No.

1. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THERE IS THE POSSIBILITY THAT MIGRATORY BIRDS MAY BE NESTING IN ANY WOODY VEGETATION OR EXISTING STRUCTURES WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHALL REMOVE ALL OLD MIGRATORY BIRD NESTS FROM ANY WOODY VEGETATION OR STRUCTURES BETWEEN SEPTEMBER 16 AND FEBRUARY 28 WHILE THE NESTS ARE NOT OCCUPIED BY A BIRD. IN ADDITION, THE CONTRACTOR MUST BE PREPARED TO PREVENT MIGRATORY BIRDS FROM RE-NESTING BETWEEN MARCH 1 AND SEPTEMBER 15. ALL METHODS MUST BE APPROVED BY THE AUSTIN DISTRICT BIOLOGIST WELL IN ADVANCE OF PLANNED USE.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP: Best Management Practice	SPCC: Spill Prevention Control and Countermeasure
CGP: Construction General Permit	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.

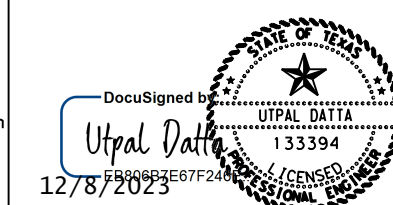
VII. OTHER ENVIRONMENTAL ISSUES

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

- No Action Required Required Action

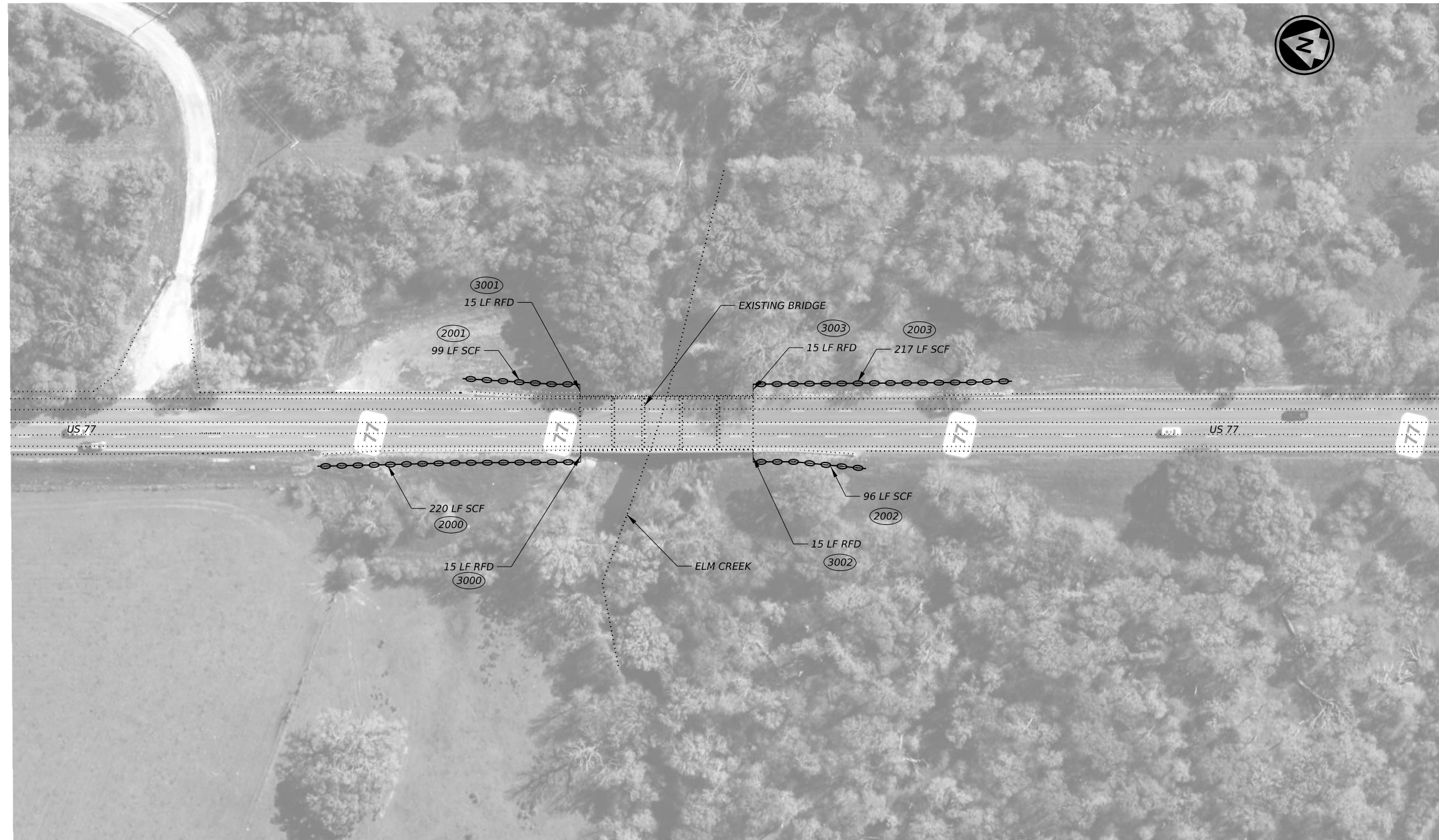
Action No.

- 1.
- 2.
- 3.



		Design Division Standard	
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC			
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©TxDOT: February 2015	CONT	SECT	JOB
12-12-2011 (DS) REVISIONS	0211	04	027, ETC US 77, ETC.
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.	AUS	LEE	87

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 NO SURVEY INFORMATION AVAILABLE.
 LINEWORKS BASED ON BING MAP IMAGE.
 LIMIT EROSION CONTROL AREA WITHIN
 EXISTING RIGHT OF WAY BOUNDARY.

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12/8/2023

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 LICENSED PROFESSIONAL ENGINEER



Austin District
 Portfolio Production Group

Texas Department of Transportation

US77, ETC.
 US 77
 CSJ 0211-04-027
 EROSION CONTROL
 LAYOUT

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CONT	SECT	JOB	HIGHWAY
0211	04	027, ETC	US 77, ETC.
DIST	COUNTY	SHEET NO.	
AUS	LEE	88	

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 projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

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):

0473-02-042

1.2 PROJECT LIMITS:

From: At Yegua Creek

To:

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 30.2915222, (Long) -96.9608547

END: (Lat) 30.2915625, (Long) -96.9608257

1.4 TOTAL PROJECT AREA (Acres): 1.404

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.45

1.6 NATURE OF CONSTRUCTION ACTIVITY:

Remove and replace existing concrete riprap, remove drift, repair spalls, upgrade rails

1.7 MAJOR SOIL TYPES:

Soil Type	Description

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
- Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
- 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

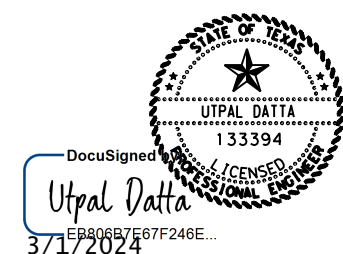
* Add (*) for impaired waterbodies with pollutant in ().

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: _____



STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
			US 77, ETC
STATE	STATE DIST.	COUNTY	
TEXAS	14	LEE	
CONT.	SECT.	JOB	SHEET NO.
0211	04	027, ETC	89

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
- Daily street sweeping
- Other: _____
- _____
- Other: _____
- _____
- Other: _____
- _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.5 POLLUTION PREVENTION MEASURES:

- Chemical Management
- Concrete and Materials Waste Management
- Debris and Trash Management
- Dust Control
- Sanitary Facilities
- 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 DEWATERING:

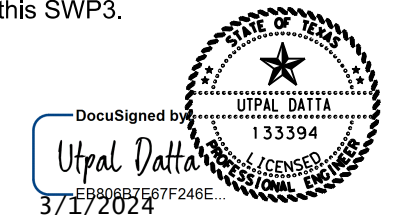
Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 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 .

2.10 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.



STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
			US 77, ETC
STATE	STATE DIST.	COUNTY	
TEXAS	14	LEE	
CONT.	SECT.	JOB	SHEET NO.
0211	04	027, ETC	90

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

- 1.
2.
 No Action Required Required Action

Action No.

- 1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. 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# 3(a)

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. Yegua Creek
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:

Table with 3 columns: Erosion, Sedimentation, Post-Construction TSS. Lists various practices like Temporary Vegetation, Silt Fence, Vegetative Filter Strips, etc.

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

- No Action Required Required Action

Action No.

- 1.
2.
3.
4.

IV. VEGETATION RESOURCES

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

- No Action Required Required Action

Action No.

1. DURING CONSTRUCTION, THE CONTRACTOR SHOULD AVOID IMPACTS TO WOODY VEGETATION. TREE AND BRUSH TRIMMING, CUTTING, AND REMOVAL WILL BE KEPT TO A MINIMUM AND IMPLEMENTED ONLY WHEN NECESSARY TO COMPLETE PROJECT WORK. MINIMIZE THE AMOUNT OF VEGETATION CLEARED. REMOVAL OF NATIVE VEGETATION, PARTICULARLY MATURE NATIVE TREES AND SHRUBS SHOULD BE AVOIDED TO THE GREATEST EXTENT PRACTICABLE.

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

- No Action Required Required Action

Action No.

1. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THERE IS THE POSSIBILITY THAT MIGRATORY BIRDS MAY BE NESTING IN ANY WOODY VEGETATION OR EXISTING STRUCTURES WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHALL REMOVE ALL OLD MIGRATORY BIRD NESTS FROM ANY WOODY VEGETATION OR STRUCTURES BETWEEN SEPTEMBER 16 AND FEBRUARY 28 WHILE THE NESTS ARE NOT OCCUPIED BY A BIRD.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests.

LIST OF ABBREVIATIONS

Table listing abbreviations: BMP, CGP, DSHS, FHWA, MOA, MOU, MS4, MBTA, NOT, NMP, NOI, SPCC, SW3P, PCN, PSL, TCEQ, TPDES, TPWD, TxDOT, T&E, USACE, USFWS, etc.

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...

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

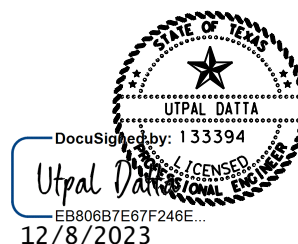
(includes regional issues such as Edwards Aquifer District, etc.)

- No Action Required Required Action

Action No.

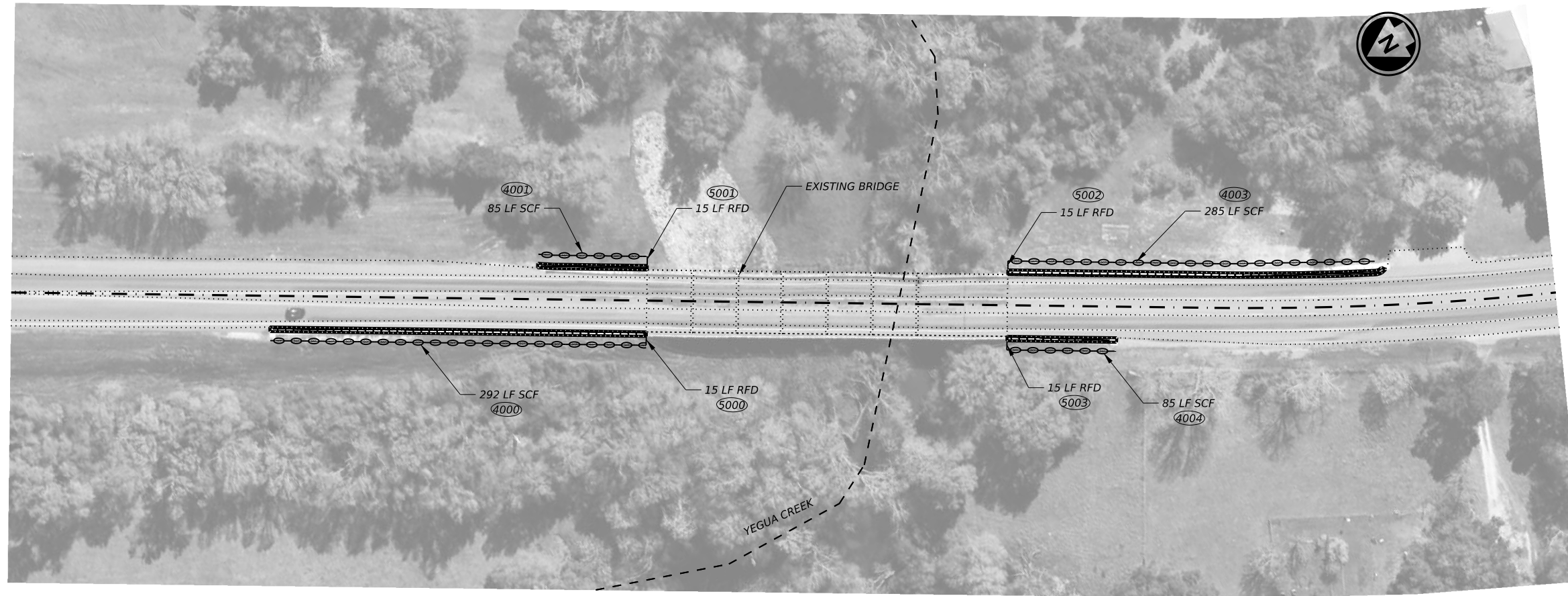
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ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
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LIMIT EROSION CONTROL AREA WITHIN
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STATE OF TEXAS
UTPAL DATTA
133394
LICENSED PROFESSIONAL ENGINEER

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SCALE IN FEET

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Portfolio Production Group

Texas Department of Transportation

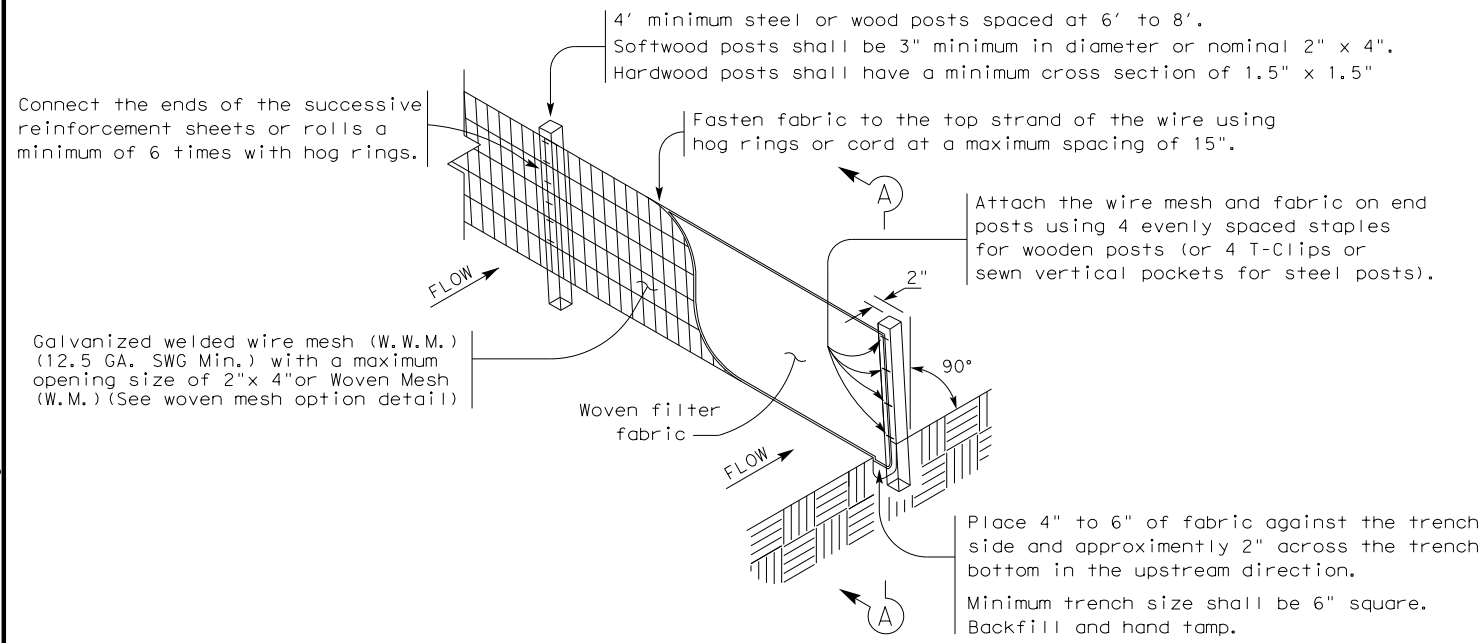
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SH 21
CSJ: 0473-02-042
EROSION CONTROL
LAYOUT

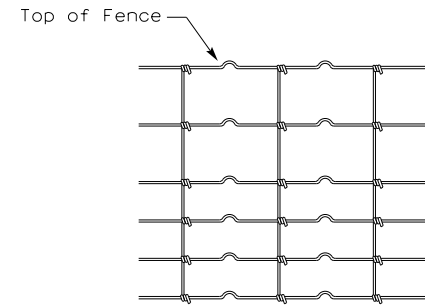
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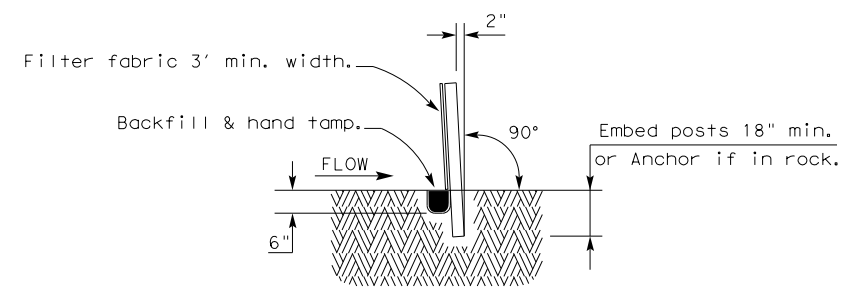


TEMPORARY SEDIMENT CONTROL FENCE



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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



SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

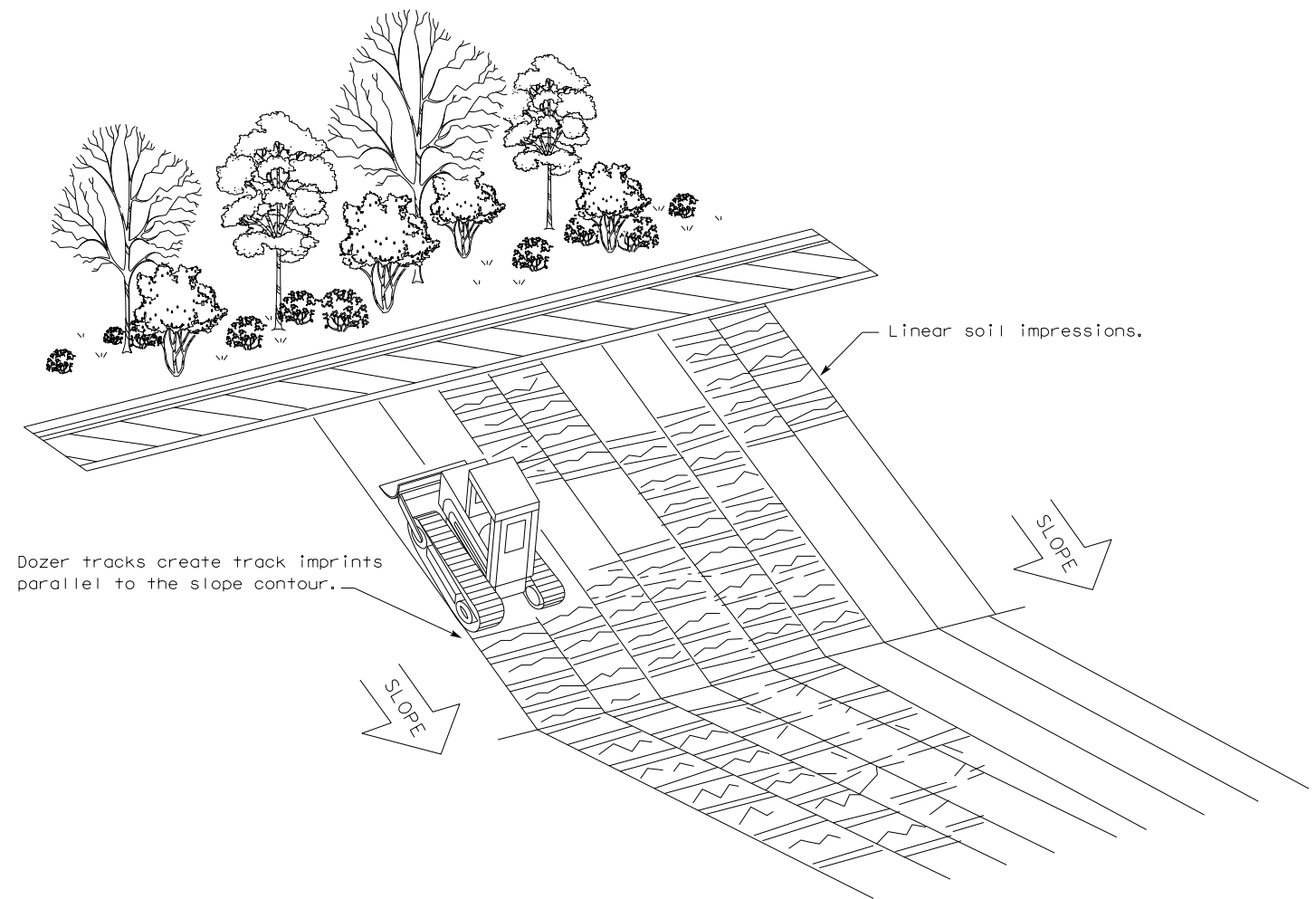
Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

LEGEND

Sediment Control Fence

GENERAL NOTES

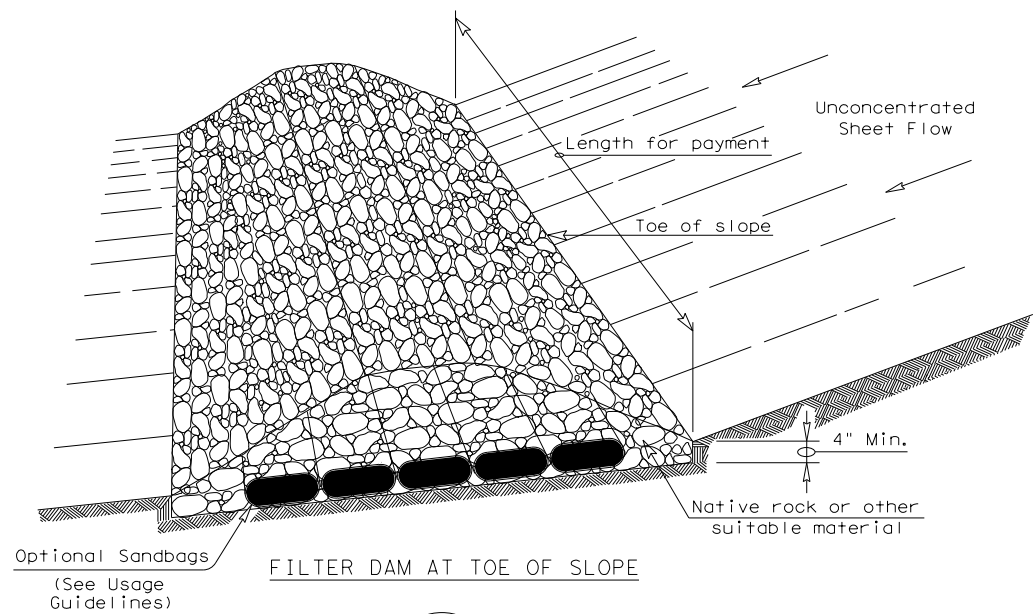
1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum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



VERTICAL TRACKING

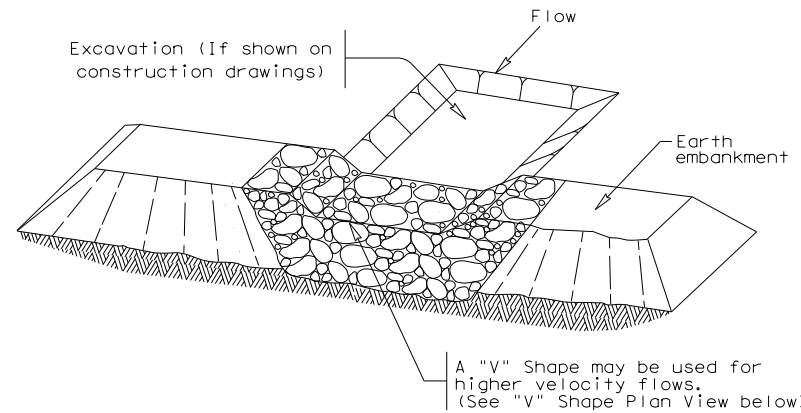
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TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING					
EC(1)-16					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© 2024	JULY 2016	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.	
	AUS	LEE		93	

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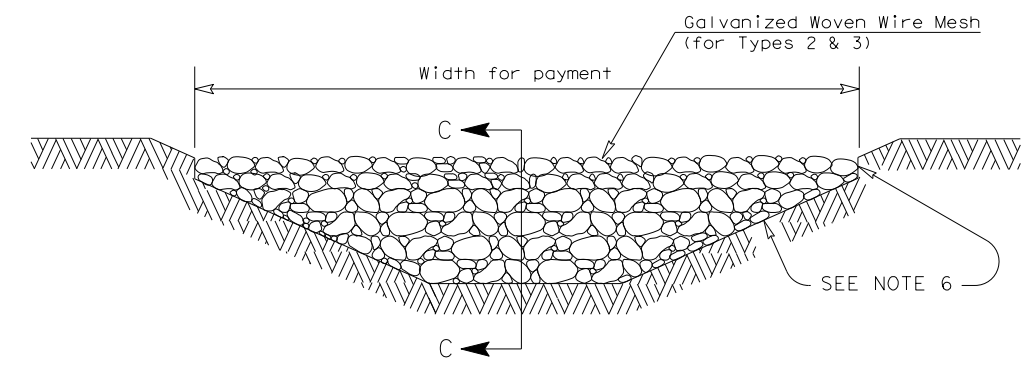
FILTER DAM AT TOE OF SLOPE

RFD1



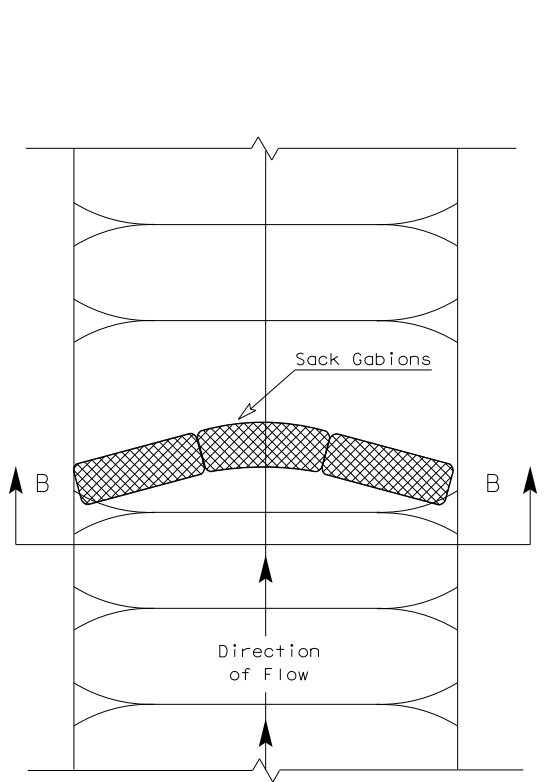
FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2

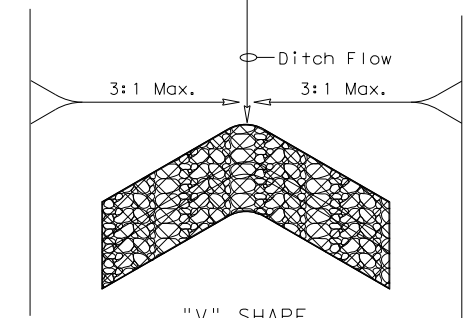


FILTER DAM AT CHANNEL SECTIONS

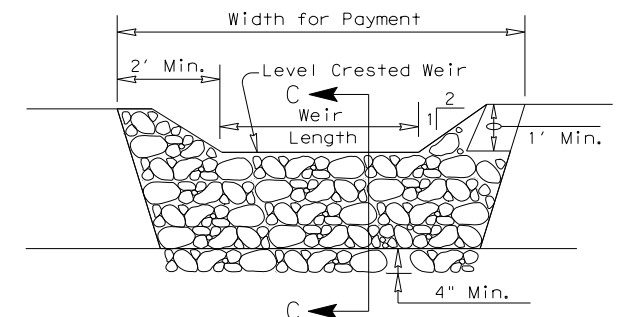
RFD1 OR RFD2 OR RFD3



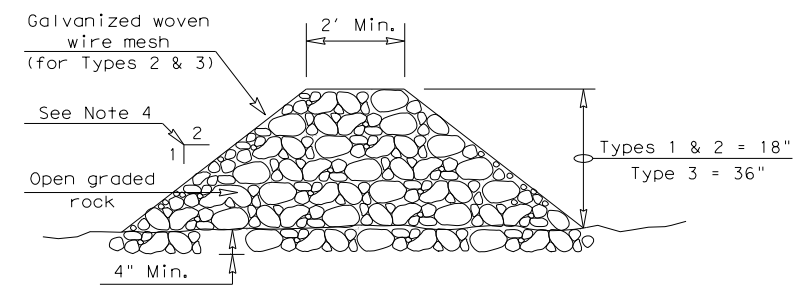
PLAN VIEW



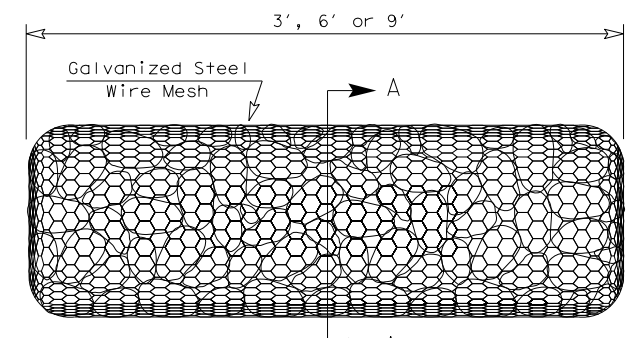
"V" SHAPE PLAN VIEW



PROFILE

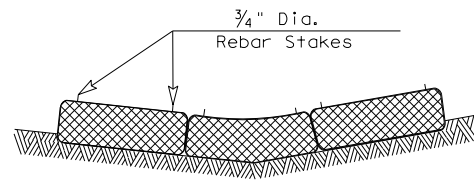


SECTION C-C

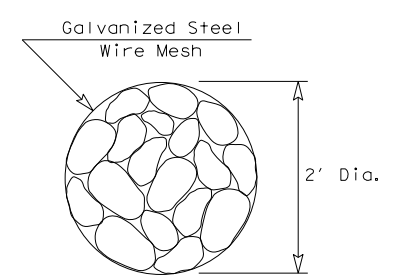


TYPE 4 (SACK GABIONS)

RFD4



SECTION B-B



SECTION A-A

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

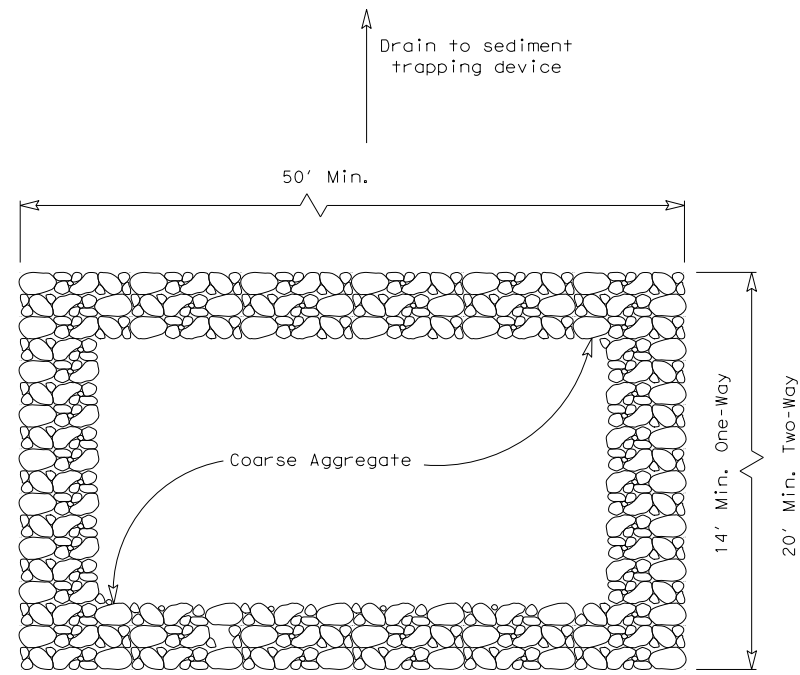
PLAN SHEET LEGEND

- Type 1 Rock Filter Dam — RFD1 —
- Type 2 Rock Filter Dam — RFD2 —
- Type 3 Rock Filter Dam — RFD3 —
- Type 4 Rock Filter Dam — RFD4 —

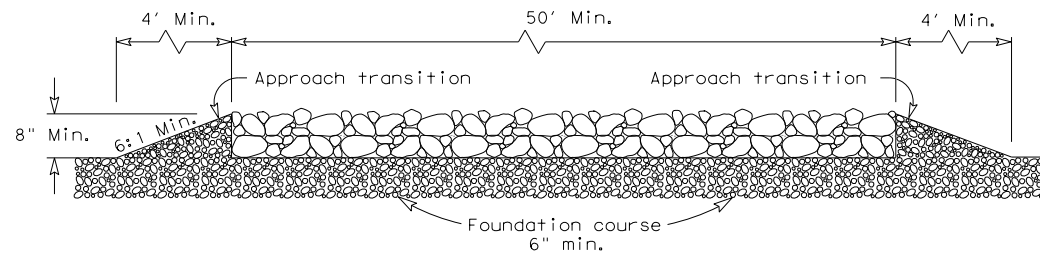
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC(2) - 16			
FILE: ec216	DN: TXDOT	CK: KM	DW: VP
© 2024 JULY 2016	CONT	SECT	JOB
REVISIONS	0211	04	027, ETC US 77, ETC.
DIST	COUNTY		SHEET NO.
AUS	LEE		94

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PLAN VIEW

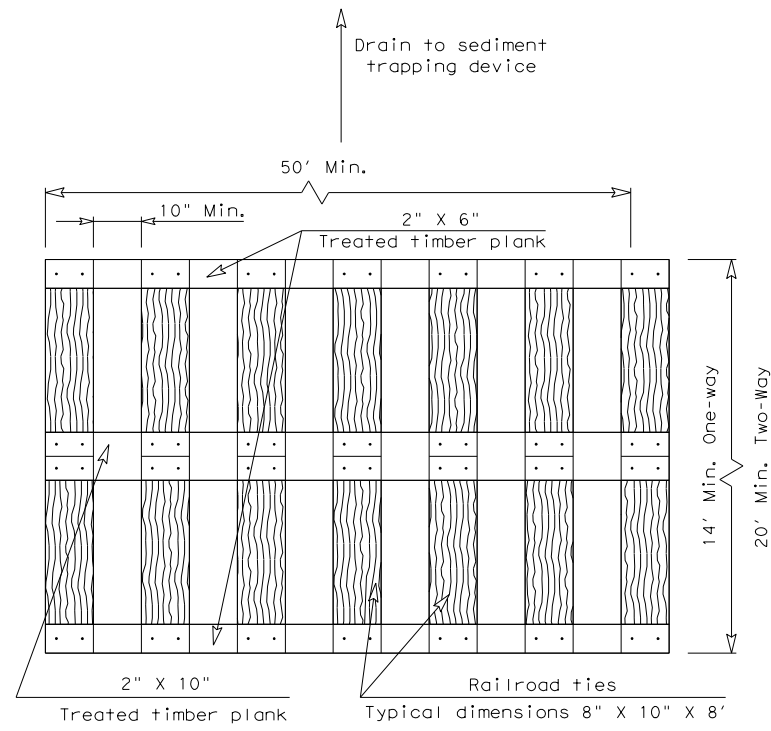


ELEVATION VIEW

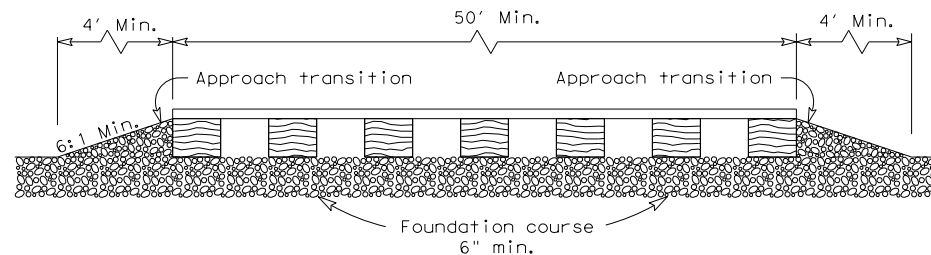
CONSTRUCTION EXIT (TYPE 1)
 ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

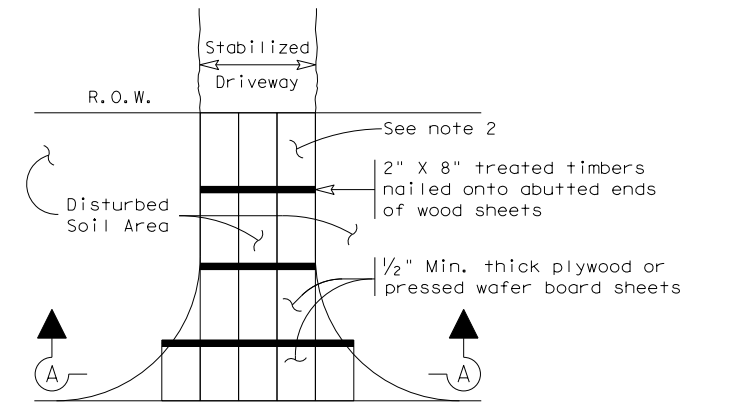


ELEVATION VIEW

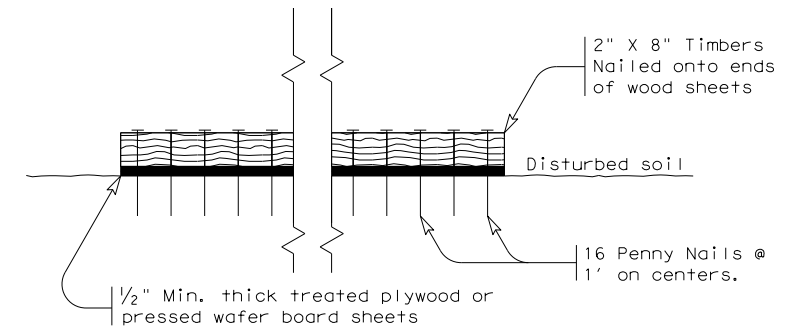
CONSTRUCTION EXIT (TYPE 2)
 TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



SECTION A-A
 CONSTRUCTION EXIT (TYPE 3)
 SHORT TERM

GENERAL NOTES (TYPE 3)

- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16					
FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0211	04	027, ETC	US 77, ETC.	
	DIST	COUNTY		SHEET NO.	
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VOIDS DEFINITION

- VOID GREATER THAN SIX INCHES ACROSS IN ANY DIRECTION AND/OR
- VOID IS GREATER THAN ONE SQUARE FOOT ALONG ANY PLANE AND/OR
- VOID BLOWS AIR AND/OR
- VOID CONTINUALLY RECEIVES WATER DURING A RAIN EVENT AND/OR
- VOID HAS WATER FLOWING THROUGH OR OUT OF IT AND/OR

GENERAL NOTES

1. USING EXPLOSIVES IS NOT ALLOWED.
2. THE PROJECT AREA IS A KNOWN KARST AREA. FRACTURED MATERIAL, BOULDERS, UNDERGROUND VOIDS, GROUNDWATER, UNSTABLE MATERIAL, AND DRASTICALLY VARYING STRATA CAN BE EXPECTED. THE CONTRACTOR SHALL WORK WITH TXDOT AND TXDOT'S PARTNERS TO ALLOW ACCESS AND ON-SITE MONITORING OF EXCAVATION.
3. THE VOID MITIGATION DETAILS ARE EXAMPLES. IMPLEMENTATION OF THE APPROVED MITIGATION PLAN SHOULD USE THE REFERENCED BID ITEMS.
4. CONCRETE USED FOR VOID MITIGATION SHALL BE 3,000 PSI IN ACCORDANCE WITH ITEM 420 CLASS A CONC (MISC). QUANTITIES UNDER 4 CY MAY BE HAND MIXED ON SITE USING 5,000 PSI RATED BAG MIX CONCRETE.
5. 3 IN. x 5 IN. ROCK SHALL BE IN ACCORDANCE WITH ITEM 506. LARGE ROCK > 1 FT. SHALL BE IN ACCORDANCE WITH 12 IN. ROCK PER ITEM 432.
6. FILTER FABRIC AND EROSION LOGS WILL BE IN ACCORDANCE WITH ITEM 506.
7. IMPERMEABLE LINER WILL BE IN ACCORDANCE WITH ITEM 5056. THE EDGE OF THE LINER SHALL BE ANCHORED IN A 6 IN. WIDE BY 18 IN. DEEP TRENCH.
8. STEEL CASING, USED FOR DRILL SHAFT CONSTRUCTION, SHALL BE IN ACCORDANCE WITH ITEM 416.
9. AGGREGATE OR OTHER BACKFILL WILL BE PAID FOR BY OVERRUN OF EXISTING EMBANKMENT ITEM. FILTER FABRIC OVER THE AGGREGATE IS SUBSIDIARY. SANDBAGS SHALL BE PAID USING SANDBAGS FOR EROSION CONTROL. THE SANDBAGS SHALL BE POLYPROPYLENE AND FILLED WITH PEA GRAVEL. CONNECTOR PIPE SHALL BE PAID USING PIPE (PVC) (SCH 80) (6 IN).
10. IF A SINGLE VOID IMPACT CAUSES DELAYS BY MORE THAN 20 WORKING DAYS, DELAY WILL BE CONSIDERED FOR THE IMPACT BEYOND THE INITIAL 20 DAYS. IF THE ACCUMULATION OF VOID IMPACTS CAUSE DELAYS BY MORE THAN 40 WORKING DAYS, DELAY WILL BE CONSIDERED FOR THE IMPACT BEYOND THE 40 DAYS. OVERHEAD, BARRICADES AND DELAYS WILL BE EVALUATED AND PAID IN ACCORDANCE WITH THE CONTRACT. IMPACTS WILL NOT BE CONSIDERED IMPACT AFTER A RESPONSE PROCEDURE IS PROVIDED. ALL DELAYS CAUSED BY A VOID AND THE DURATION FOR IMPLEMENTATION OF A RESPONSE ARE NON-COMPENSABLE FOR LABOR, EQUIPMENT, STANDBY, MOBILIZATIONS, AND COST ESCALATIONS.

VOID MITIGATION AND PROTECTION MEASURES

REFER TO VOID MITIGATION DETAILS FOR ADDITIONAL INFORMATION. VOID MITIGATION DETAILS ARE TO BE APPROVED BY GEOSCIENTIST AND THE TCEQ (IF APPLICABLE) PRIOR TO IMPLEMENTATION.

1. IN THE EVENT THAT UNKNOWN KARST VOIDS ARE ENCOUNTERED, WORK AT THAT LOCATION WILL BE HALTED IMMEDIATELY AND THE FEATURE WILL BE INSPECTED PROMPTLY BY TXDOT.
2. WHEN REQUIRED, TXDOT WILL INSPECT ALL VOIDS TO DETERMINE THE POTENTIAL OF THE FEATURES TO PROVIDE SUITABLE HABITAT FOR ENDANGERED KARST INVERTEBRATES. WORK AT THAT LOCATION WILL NOT RESUME UNTIL AUTHORIZATION TO DISTURB THE FEATURE HAS BEEN OBTAINED. REFER TO THE EPIC SHEET FOR ADDITIONAL INFORMATION FOR THREATENED OR ENDANGERED SPECIES.

TXDOT WILL INSPECT ALL VOIDS TO DETERMINE THE APPROPRIATE VOID MITIGATION PLAN.
3. ADDITIONAL EXCAVATION OF THE VOID MAY BE REQUIRED BY TXDOT OR THE GEOSCIENTIST TO FULLY EVALUATE THE VOID AND/OR MITIGATION PLAN PREPERATION. TXDOT APPROVAL IS REQUIRED PRIOR THE EXCAVATION. THIS WORK IS SUBSIDIARY.

VOID DISCOVERY PROTOCOL

IF A VOID IS DISCOVERED, THE FOLLOWING PROTOCOL WILL BE FOLLOWED:


1. ALL VOIDS REQUIRE AN EMAIL NOTIFICATION TO TXDOT DESIGNATED REPRESENTATIVE WITHIN 2 HOURS OF DISCOVERY. THE EMAIL WILL REQUIRE LOCATION INFORMATION (STATION, LATITUDE & LONGITUDE), DATES OF DISCOVERY, VIDEO/PICTURE DOCUMENTATION, SIZE, ETC. CONTRACTOR SHALL SUPPLY A CAMERA AND DIGITAL PICTURE/VIDEO DOCUMENTATION OF ALL VOIDS AND PROVIDE A MEASUREMENT OF THE SIZE OF THE VOID. FOR VOIDS THAT CANNOT BE SAFELY EXPLORED, ANOTHER DEVICE SHALL BE PROVIDED TO DOCUMENT THE VOID. CONTACT THE DISTRICT CONSTRUCTION OFFICE FOR AN EXAMPLE EMAIL THAT SHALL BE FOLLOWED. THIS WORK IS SUBSIDIARY.
2. ALL ACTIVITY WITHIN A 50-FOOT RADIUS OF THE VOID SHALL STOP. BLOCK TRAFFIC FROM DRIVING NEAR THE VOID AND PREVENT CONSTRUCTION EQUIPMENT FROM OPERATING IN THE VICINITY OF THE VOID USING BARRELS, ORANGE CONSTRUCTION FENCE OR OTHER APPROVED HIGHLY VISIBLE BARRIER.
3. A DRY VOID THAT IS LESS THAN 1 CF IN VOLUME OR LESS THAN 6 IN. IN ALL DIRECTIONS WILL NOT REQUIRE ACTION BEYOND NOTIFICATION. TXDOT SHALL BE NOTIFIED IMMEDIATELY VIA EMAIL AND PHONE WHEN A VOID IS FOUND THAT REQUIRES ACTION. TXDOT WILL RESPOND WITHIN 6 BUSINESS DAYS FROM TIME OF EMAIL NOTIFICATION TO PROVIDE GUIDANCE TO THE CONTRACTOR.
4. COVER THE VOID TO PREVENT CONTAMINATION AND CHANGES IN AMBIENT CONDITIONS (TARPS AND PLYWOOD, OR SIMILAR MATERIALS ARE APPROPRIATE AS AVAILABLE). WHERE COVERING THE VOID IS NOT FEASIBLE, CONTRACTOR SHALL OBTAIN APPROVAL FROM TXDOT OF ALTERNATE TEMPORARY PROTECTION MEASURES. BIODEGRADABLE EROSION CONTROL LOG (BECL) SHOULD WRAP THE SURFACE PERIMETER OF THE VOID. TEMPORARY PROTECTIONS SHOULD REMAIN IN PLACE UNTIL FINAL MITIGATION AND PROTECTION MEASURES ARE APPROVED AND IN PLACE. AN EARTHEN BERM WILL BE MAINTAINED ON THE UP-GRADIENT SIDE OF VOID TO PREVENT ANY CONSTRUCTION RUNOFF FROM ENTERING ANY PART OF THE FEATURE WHICH MAY REMAIN. THIS WORK IS SUBSIDIARY.
5. WHEN REQUIRED TXDOT SHALL IMMEDIATELY NOTIFY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) AUSTIN REGIONAL OFFICE.
6. TXDOT WILL PROVIDE FOR THE EVALUATION OF THE VOID A QUALIFIED GEOSCIENTIST LICENSED BY THE TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS OR BY A PROFESSIONAL ENGINEER WHO QUALIFIES TO PRACTICE GEOSCIENCE ACCORDING TO THE TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS.
7. WHEN REQUIRED TXDOT WILL SUBMIT AND OBTAIN APPROVAL OF AN ENCOUNTERED FEATURE MITIGATION PLAN TO THE TCEQ AUSTIN REGION OFFICE.
8. WORK SHOULD CEASE IN THE AREA UNTIL ASSESSMENT OF THE VOID CAN BE COMPLETED, TCEQ APPROVES THE ENCOUNTERED FEATURE MITIGATION PLAN AND MITIGATION IS COMPLETED. WHEN THE VOID IS OUTSIDE TCEQ JURISDICTION, TXDOT WILL APPROVE THE ENCOUNTERED FEATURE MITIGATION PLAN.

VOIDS RELATED TO DRILLED SHAFTS, SOIL NAILS, ROCK NAILS AND OTHER SIMILAR FUNCTIONS

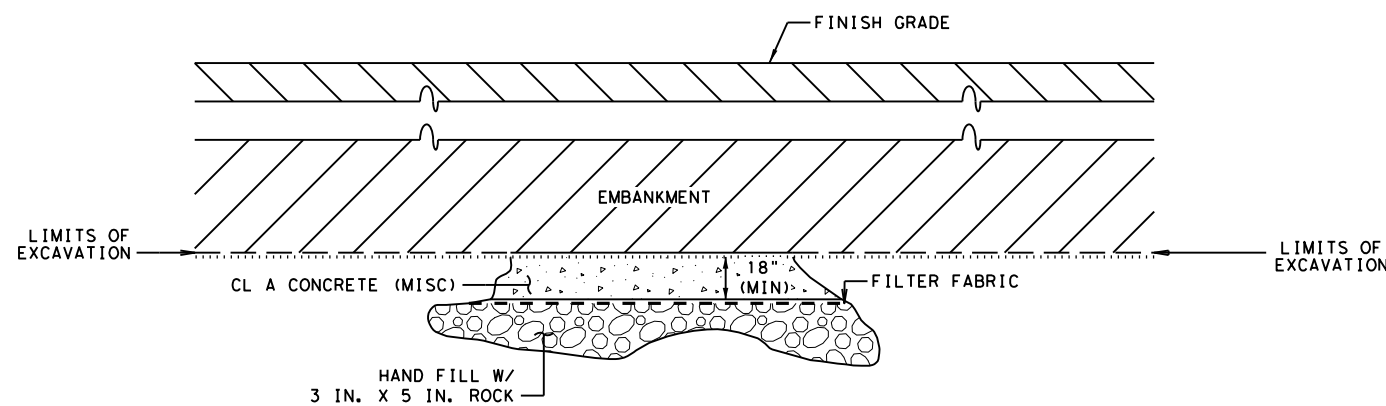
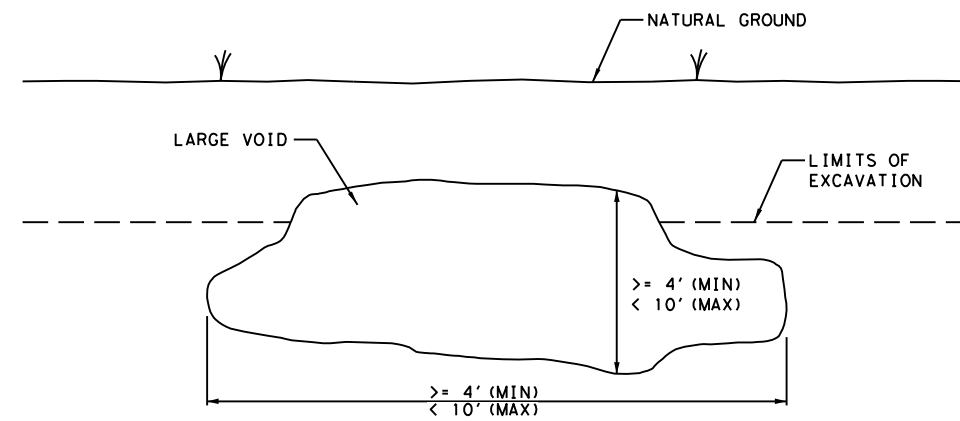
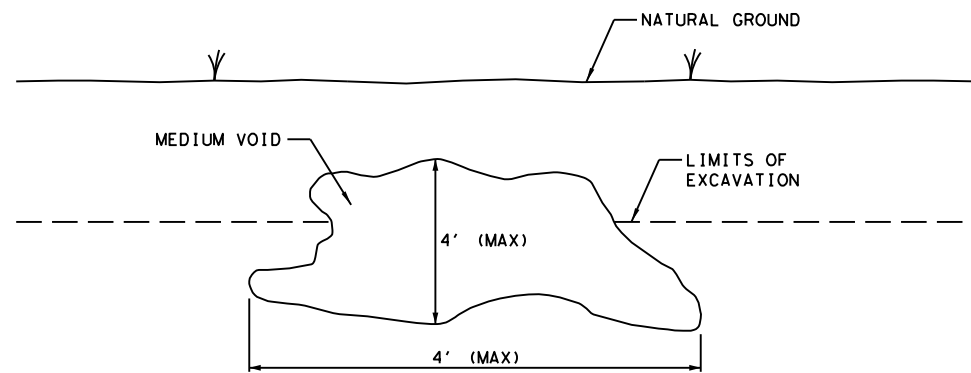
1. SUBMIT INSTALLATION PLAN FOR REVIEW NO LATER THAN 2 MONTHS BEFORE CONSTRUCTION.
2. THE USE OF DRILLING FLUIDS, UNDERWATER PLACEMENT, OR SLURRY METHOD WILL NOT BE ALLOWED IF A VOID IS EXPOSED DURING DRILLING OF SHAFTS OR NAILS. THE CONTRACTOR SHALL USE APPROPRIATE INDUSTRY APPROVED METHODS TO PROVIDE A PRODUCT IN COMPLIANCE WITH THE SPECIFICATIONS. ADDITIONAL TIME OR COMPENSATION WILL NOT BE ALLOWED FOR USE OF ALTERNATE METHODS OR CASING INSTALLATION.
3. DURING NON-WORK HOURS OPEN HOLES SHALL BE PROTECTED FOR SAFETY AND COVERED. SHAFTS SHALL BE SURROUNDED BY EROSION CONTROL LOGS AT AN OFFSET OF 10' FROM THE EDGE OF THE OPENING. THIS WORK IS SUBSIDIARY
4. VIDEO DOCUMENTATION SHALL BE CONDUCTED OF A DRILL SHAFT ONCE EXCAVATION IS COMPLETE AND PRIOR TO PLACING REINFORCEMENT. SUFFICIENT LIGHTING SHALL ACCOMPANY THE VIDEO CAMERA TO ENSURE THE SHAFT AND VOIDS ARE VISIBLE. THIS WORK IS SUBSIDIARY.
5. CONCRETE USED TO FILL THE VOIDS WILL BE PAID USING CLASS A CONC (MISC) ITEM BUT WILL USE THE CLASS OF CONCRETE AS REQUIRED BY THE SPECIFICATION. QUANTITY OF CONCRETE WILL BE BASED ON VISUAL INSPECTION PROVIDED BY THE CONTRACTOR. IF VISUAL INSPECTION IS UNABLE TO DETERMINE THE SIZE OF THE VOID THE CONCRETE FOR PAYMENT WILL BE MEASURED AS THE ADDITIONAL CONCRETE BEYOND THE AMOUNT REQUIRED TO PLACE A CLEAN SHAFT PLUS 10 PERCENT WASTE.
6. THE USE OF PERMANENT CASING SHALL BE IN ACCORDANCE WITH ITEM 416. MATERIAL COST FOR CASING THAT REMAINS WILL BE PAID BY INVOICE FROM SUPPLIER WITH MARK UP IN ACCORDANCE WITH MATERIAL FOR ITEM 9.7. ADDITIONAL LABOR, EQUIPMENT, TIME, ETC. FOR INSTALLATION OF THE CASING WILL NOT BE COMPENSABLE.
7. ADDITIONAL NAIL LENGTH WILL BE PAID BY OVERRUN OF EXISTING BID ITEM. ALTERNATE NAIL TYPE COST WILL BE PAID BY INVOICE FROM SUPPLIER WITH MARK UP IN ACCORDANCE WITH MATERIAL FOR ITEM 9.7. LABOR, EQUIPMENT, ADDITIONAL TIME, ETC. WILL NOT BE COMPENSABLE.
8. CORE HOLES ARE REQUIRED FOR ALL DRILLED SHAFTS.

PLEASE REFER TO VOID MITIGATION INFO FOUND IN THE APPENDIX OF THE AUSTIN DESIGNERS GUIDE. PLEASE DELETE THIS NOTE.

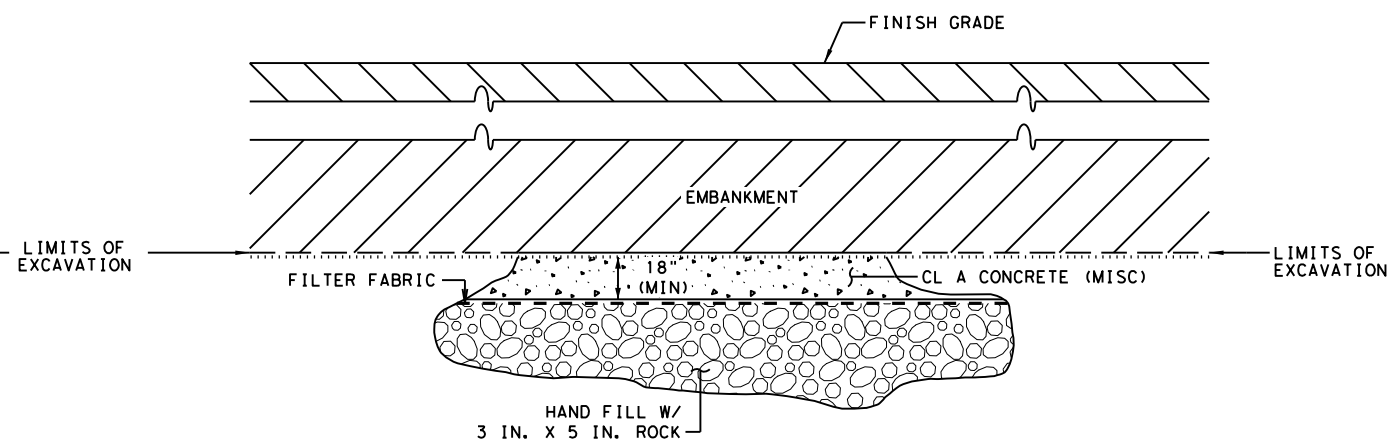
PLEASE CONTACT ZACH LANFEAR AND ANDY BLAIR AT TXDOT AUS ENV OFFICE PRIOR TO USING THESE DETAILS. PLEASE DELETE THIS NOTE PRIOR TO PLACING THESE DETAILS IN THE PLANS.

		Austin District Standard	
VOID MITIGATION NOTES			
VMD-18 (AUS)			
SHEET 1 OF 7			
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	0211	04	027, ETC US 77, ETC.
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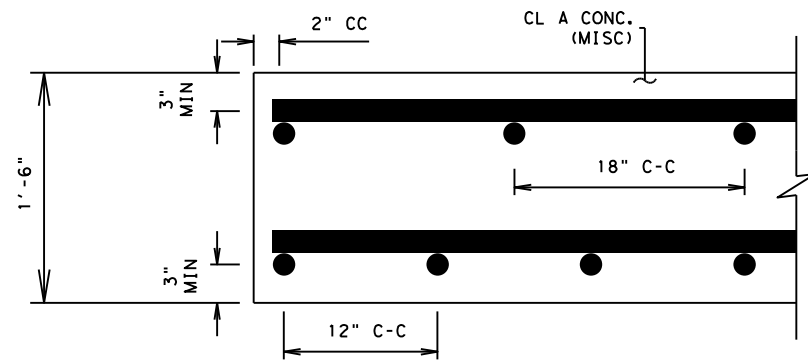
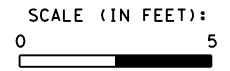
ROADWAY/S.U.P. GRADING OPERATIONS
 MEDIUM (DRY VOID)
 (<4' IN ANY DIRECTION)
 (1 CF < 64 CF)



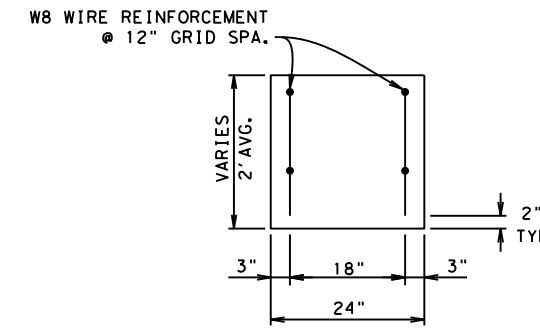
ROADWAY/S.U.P. GRADING OPERATIONS
 LARGE (DRY VOID)
 (>=4' <10' ANY DIRECTION)
 (64 CF < 1000 CF)

				Austin District Standard	
VOID MITIGATION DETAILS					
VMD-18 (AUS)					
SHEET 2 OF 7					
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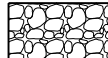




REINFORCING DETAIL



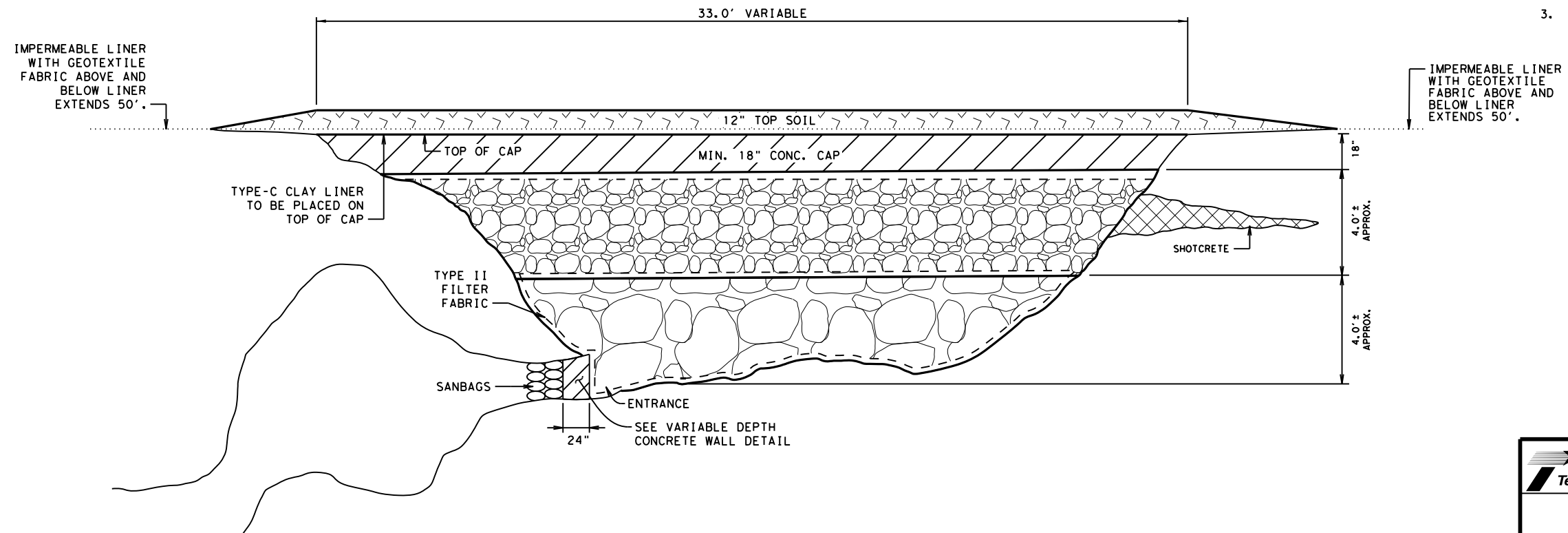
VARIABLE DEPTH CONCRETE WALL

LEGEND


-  CLASS A CONC. (MISC)
-  3 IN. x 5 IN. ROCK
-  LARGE ROCK (≥ 1 FT)
-  SHOTCRETE

NOTE:

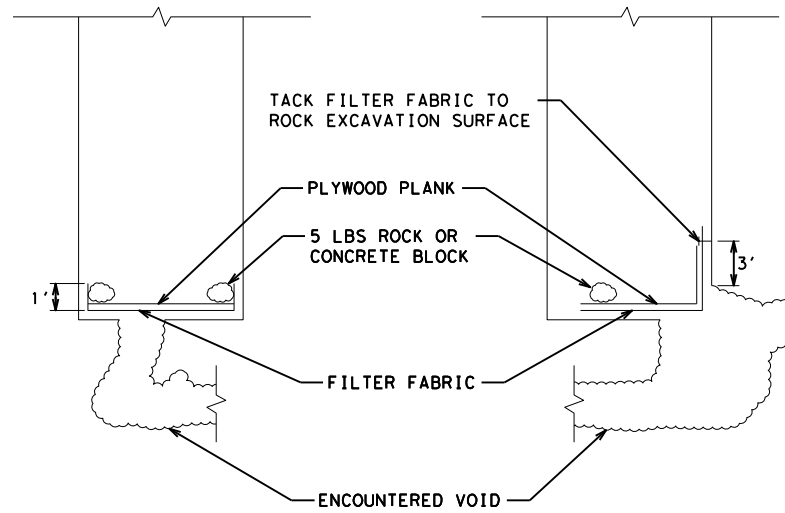
1. CONCRETE WALL AND CONCRETE CAP SHALL BE PAID USING CLASS A CONC. (MISC).
2. SHOTCRETE WILL BE PAID USING CLASS A CONC. (MISC).
3. THE 12 IN. TOPSOIL AND LINER MAY NOT BE APPLICABLE IF THE VOID IS NOT IN A POND.



ELEVATION OF VOID IN A POND

 Texas Department of Transportation		Austin District Standard	
VOID MITIGATION DETAILS			
VMD-18 (AUS)			
SHEET 3 OF 7			
©TxDOT 2024	CONT 0211	SECT 04	JOB 027, ETC US 77, ETC.
DIST AUS	COUNTY LEE		SHEET NO. 98

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TEMPORARY PROTECTION VOID AT BOTTOM OF TRENCH

NOTES:

1. PLACE TEMPORARY PROTECTION WITHIN TRENCH TO COVER VOID AS INDICATED. FABRIC SHALL EXTEND A MINIMUM OF 3 IN. BEYOND EDGE OF VOID. PLACE A PLYWOOD PLANK (MINIMUM 0.75 IN. THICK) OVER FABRIC. PLANK AND FABRIC SHALL BE WEIGHTED AS REQUIRED BY 5 LBS ROCK OR CONCRETE BLOCK TO SECURE FILTER FABRIC.
2. TEMPORARY PROTECTION SHALL BE IN PLACE AT ALL TIMES THAT CONSTRUCTION OPERATIONS ARE NOT IN ACTUAL PROGRESS.
3. CONSTRUCTION OPERATIONS WITHIN 50' SHALL NOT PROGRESS DURING OCCURRENCE OF RAIN TO ALLOW FOR PROTECTION OF VOID DURING A RAIN EVENT.
4. LOCALIZED EROSION MEASURES (SILT FENCE, EROSION CONTROL LOG OR TRIANGULAR FILTER DIKES) SHALL BE INSTALLED ALONG THE TRENCH TO ENSURE THAT LOOSE SPOILS OR RUNOFF DO NOT ENTER THE TRENCH OR AFFECT PERFORMANCE OF TEMPORARY PROTECTION. USE EARTHEN BERN TO DIVERT WATER AWAY FROM THE TRENCH.
5. SPECIAL CARE SHALL BE TAKEN TO ENSURE THAT EROSION CONTROL MEASURES REQUIRED ALONG THE TRENCH ARE MAINTAINED, CLEANED AND FULLY FUNCTIONAL.
6. FILTER FABRIC AND ROCK OR CONCRETE BLOCKS AND PLYWOOD PLANK SHALL BE REMOVED FROM THE TRENCH WHEN PERMANENT VOID MITIGATION MEASURES ARE INSTALLED.



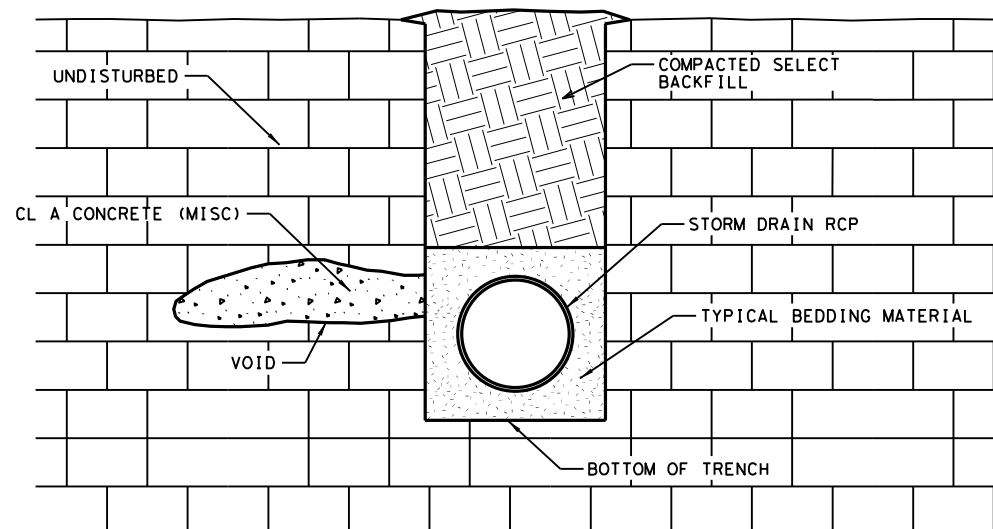
VOID MITIGATION DETAILS

VMD-18 (AUS)

SHEET 4 OF 7

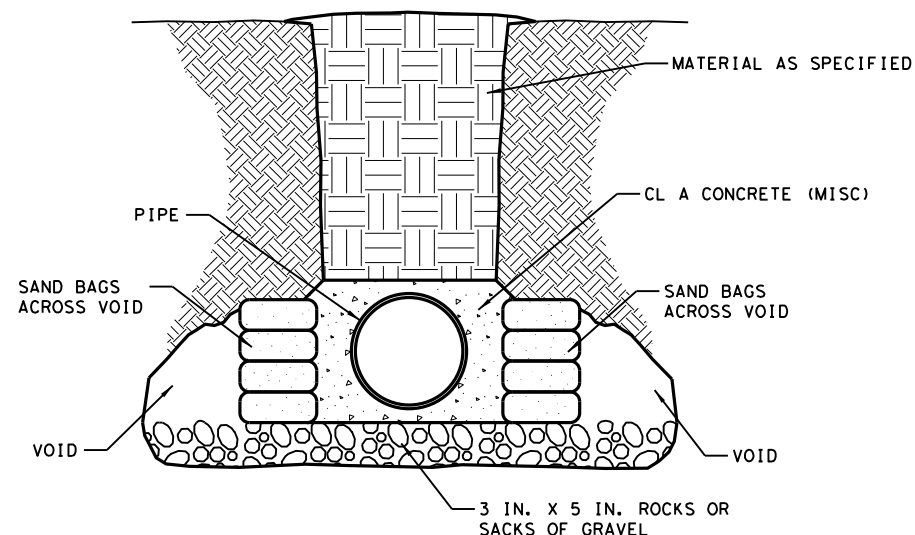
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
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DATE: 11/30/2023 8:59:48 PM
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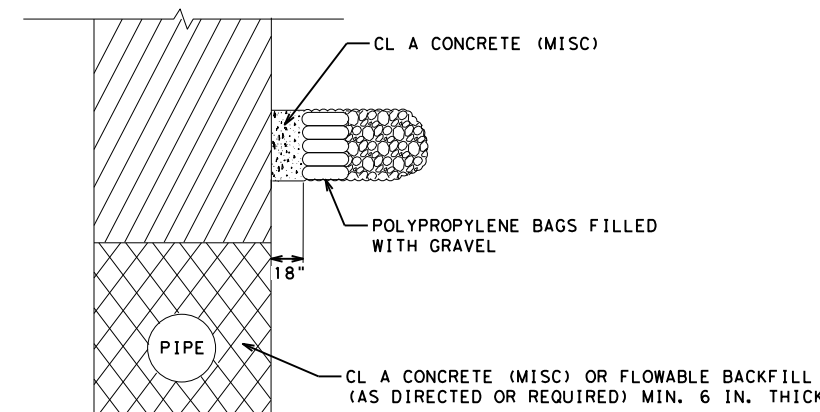
**TRENCHING OPERATIONS
SMALL/MEDIUM (DRY VOID)
(< 64 CF)**

VOID IS EITHER LARGER THAN SIX (6) INCHES IN AT LEAST ONE DIRECTION OR IS LOCATED WITHIN THE LEVEL OF THE PIPE EMBEDMENT. ALL ROCK WITHIN AND SURROUNDING THE VOID IS SOUND.



**TRENCHING OPERATIONS
LARGE (DRY VOID)
(64 CF < 1,000 CF)**

VOID INTERSECTS THE PLANE OF THE TRENCH FLOOR AND ANY OPENING IN TRENCH FLOOR IS GREATER THAN FOUR (4) FEET IN ANY DIRECTION, OR THE TRENCH FLOOR IS UNSTABLE.

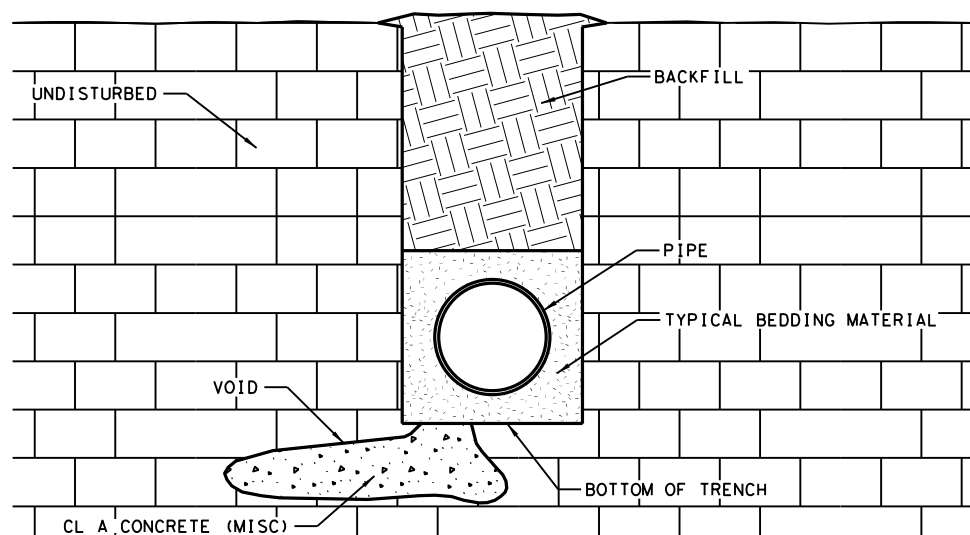


**TRENCHING OPERATIONS
LARGE (DRY VOID)
(64 CF < 1,000 CF)**

VOID IS ABOVE THE PLANE OF THE TRENCH FLOOR

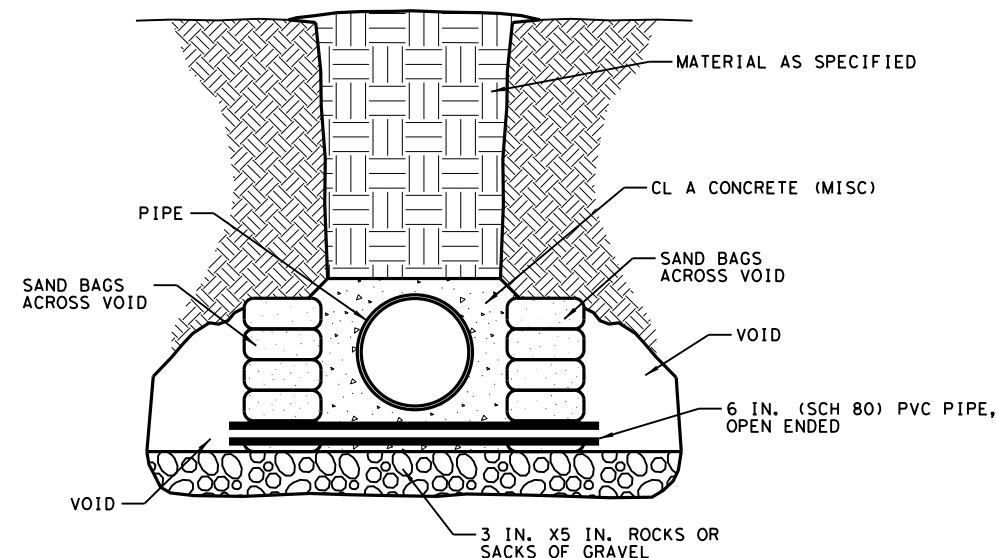
GENERAL NOTE:

- ALL PIPES SHALL BE ENCASED WITH CLASS A CONCRETE THAT EXTENDS 5' BEYOND THE EDGE OF THE VOID IN ALL DIRECTIONS. THE CONCRETE SHALL PROVIDE 6 IN. COVER AROUND THE PIPE.



**TRENCHING OPERATIONS
SMALL/MEDIUM (DRY VOID)
(< 64 CF)**

VOID INTERSECTS THE PLANE OF THE TRENCH FLOOR AND IS LESS THAN FOUR (4) FEET IN ANY DIRECTION. ALL ROCK WITHIN AND SURROUNDING THE VOID IS SOUND.

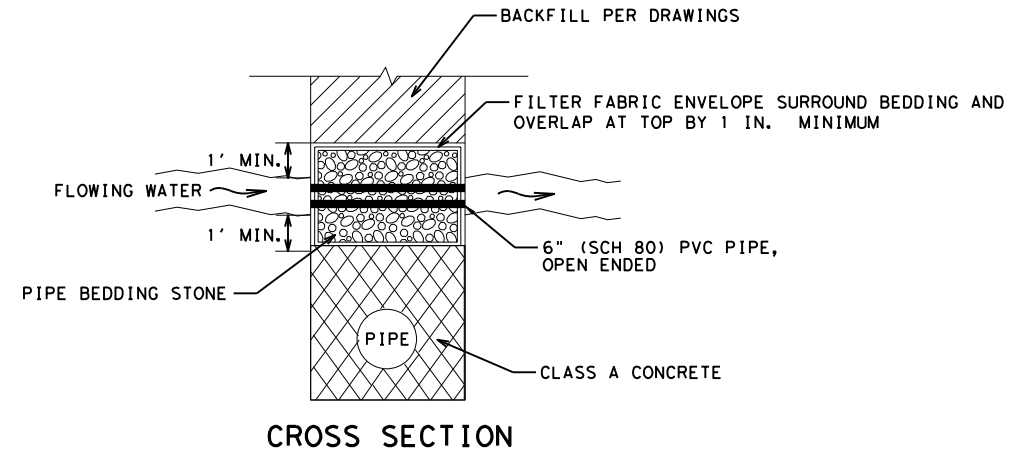


**TRENCHING OPERATIONS
LARGE (WET VOID)
(64 CF < 1,000 CF)**

VOID INTERSECTS THE PLANE OF THE TRENCH FLOOR AND ANY OPENING IN TRENCH FLOOR IS GREATER THAN FOUR (4) FEET IN ANY DIRECTION, OR THE TRENCH FLOOR IS UNSTABLE.

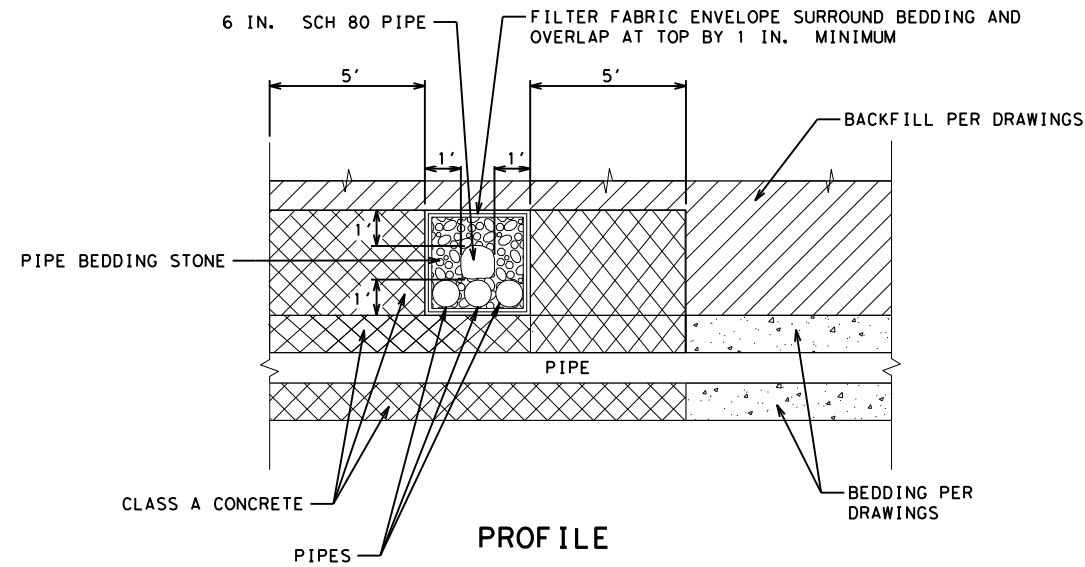
				Austin District Standard	
VOID MITIGATION DETAILS					
VMD-18 (AUS)					
SHEET 5 OF 7					
©TxDOT 2024	CONT	SECT	JOB	HIGHWAY	
	0211	04	027, ETC	US 77, ETC.	
	DIST	COUNTY		SHEET NO.	
	AUS	LEE		100	

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GENERAL NOTE:

1. ALL PIPES SHALL BE ENCASED WITH CLASS A CONCRETE THAT EXTENDS 5' BEYOND THE EDGE OF THE VOID IN ALL DIRECTIONS. THE CONCRETE SHALL PROVIDE 6 IN. COVER AROUND THE PIPE.



TRENCHING OPERATIONS
 GROUNDWATER ABOVE
 BEDDING MATERIAL



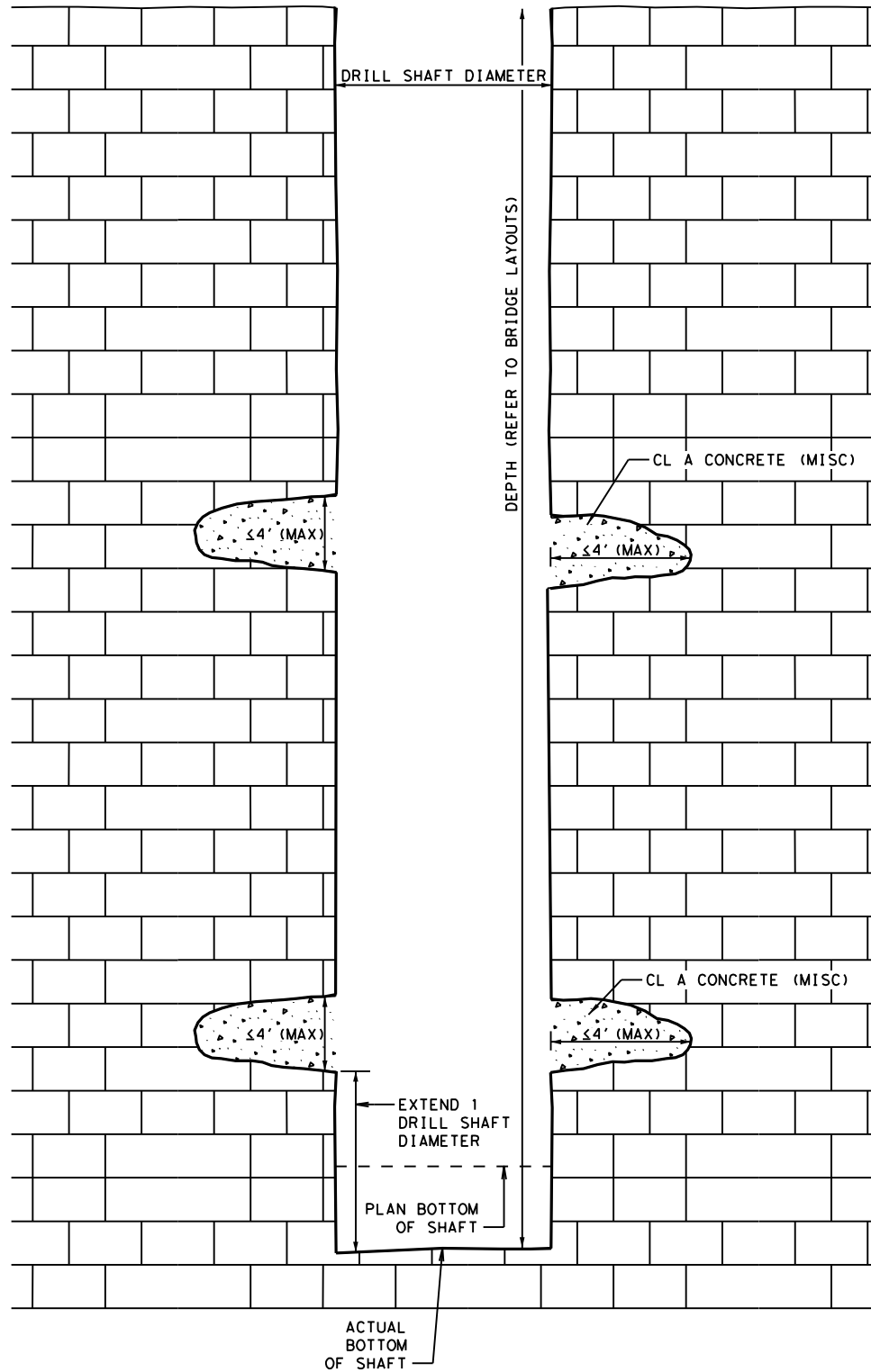
VOID MITIGATION
 DETAILS

VMD-18 (AUS)

SHEET 6 OF 7

©TxDOT 2024	CONT	SECT	JOB	HIGHWAY
	0211	04	027, ETC	US 77, ETC.
	DIST	COUNTY	SHEET NO.	
	AUS	LEE	101	

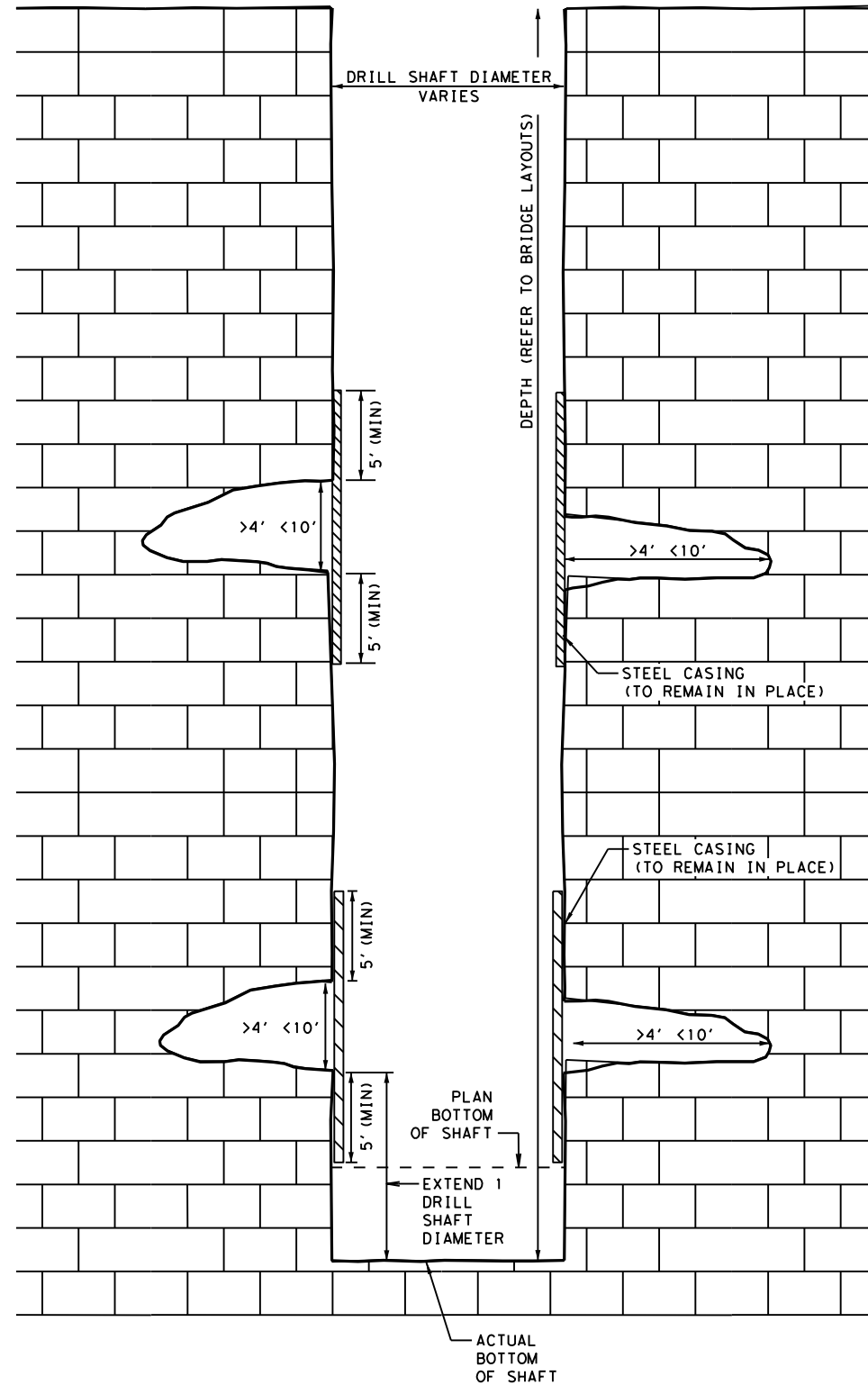
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**DRILL SHAFT OPERATIONS
 SMALL/MEDIUM (DRY VOID)
 ($\le 4'$ IN ANY DIRECTION)**

CONCRETE FOR THE VOID SHALL BE PLACED CONTINUOUSLY WITH THE SHAFT

WHERE VOIDS ARE ENCOUNTERED, DRILL SHAFT LENGTHS MAY NEED TO BE INCREASED. APPROVAL FROM THE ENGINEER OF RECORD IS REQUIRED TO COMPLETE CONSTRUCTION OF THE DRILLED SHAFT.



**DRILL SHAFT OPERATIONS
 LARGE (DRY VOID)
 ($>4' <10'$ IN ANY DIRECTION)**

WHERE VOIDS ARE ENCOUNTERED, DRILL SHAFT LENGTHS MAY NEED TO BE INCREASED. APPROVAL FROM THE ENGINEER OF RECORD IS REQUIRED TO COMPLETE CONSTRUCTION OF THE DRILL SHAFT.

NOTES:

1. STEEL CASING WILL BE USED FOR DRILL SHAFT CONSTRUCTION THAT ENCOUNTERS LARGE VOIDS, SO AS TO ALLOW A MINIMUM AMOUNT OF CONCRETE TO ENTER THE VOID.
2. STEEL CASING SHOULD EXTEND A MINIMUM OF FIVE FEET FROM THE EDGE OF THE VOID.
3. AS PART OF THE DRILL SHAFT INSTALLATION PLAN, CONTRACTOR SHALL PROVIDE MEANS AND METHODS FOR ANCHORING THE CASING.
4. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
5. STEEL CASING MAYBE EXTENDED TO THE TOP OF THE SHAFT. THE ENTIRE LENGTH OF CASING INSTALLED IN A SHAFT WILL BE COMPENSATED IN ACCORDANCE WITH THE VOID MITIGATION NOTES.

**VOID MITIGATION
 DETAILS**

VMD-18 (AUS)

SHEET 7 OF 7

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	0211	04	027, ETC	US 77, ETC.
	DIST	COUNTY	SHEET NO.	
	AUS	LEE	102	