

# STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

## PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NUMBER  
STP 2022(818)HES  
CSJ: 1186-02-025

NET LENGTH OF PROJECT - 5,315.00 FEET = 1.007 MILES  
 ROADWAY = 5,225.00 FEET = 0.990 MILES  
 BRIDGE = 90.00 FEET = 0.017 MILES

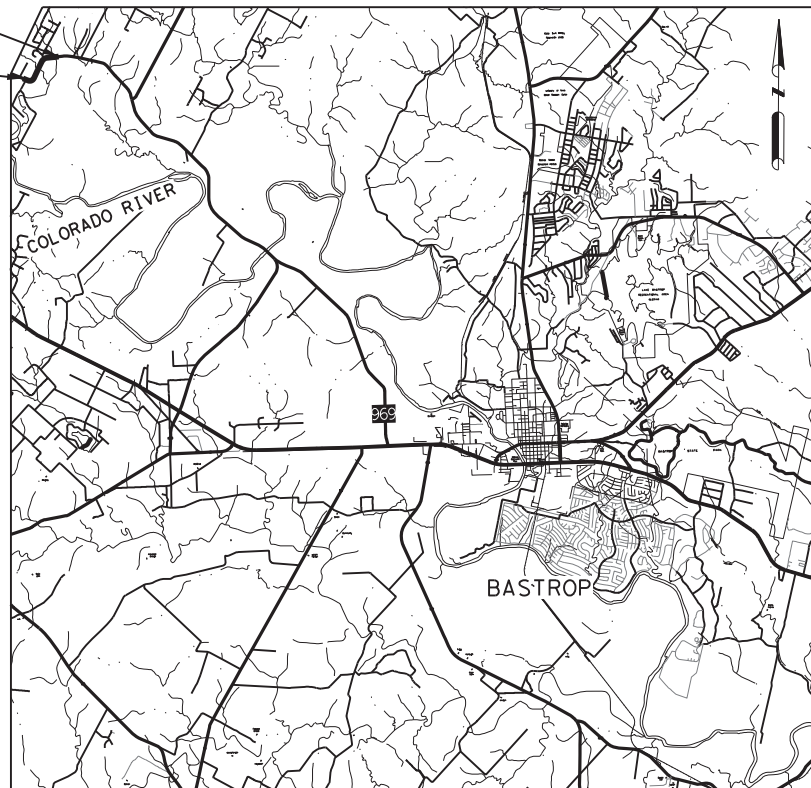
### BASTROP COUNTY FM 969

FROM: 0.129 MILES WEST OF LAZY RIVER  
TO: 0.264 MILES EAST OF TERRI TRAIL

FOR THE CONSTRUCTION OF SFT IMPROVEMENT PROJECTS  
CONSISTING OF WIDEN PAVED SHOULDERS TO GREATER THAN 5'

END PROJECT  
CSJ: 1186-02-025  
@ FM 969  
STA: 945+82.00  
REF MRKR: 466+1.223  
MILE PT: 1.213  
DFO: 17.925

BEGIN PROJECT  
CSJ: 1186-02-025  
@ FM 969  
STA: 892+67.00  
REF MRKR: 466+0.223  
MILE PT: 0.213  
DFO: 16.925



LOCATION MAP NOT TO SCALE

EXCEPTIONS: NONE  
EQUATIONS: NONE  
RAILROAD CROSSINGS: NONE



CONT	SECT	JOB	HIGHWAY
1186	02	025	FM 969
DIST		COUNTY	SHEET NO.
AUS		BASTROP	1

DESIGN SPEED

RURAL: MAJOR COLLECTOR 40 MPH \*\*  
\*\* FOR HSIP ELEMENTS

A. D. T.

2019: 5,048 VPD  
2039: 7,673 VPD

FINAL PLANS

NAME OF CONTRACTOR: \_\_\_\_\_  
DATE OF LETTING: \_\_\_\_\_  
DATE WORK BEGAN: \_\_\_\_\_  
DATE WORK COMPLETED: \_\_\_\_\_  
DATE WORK ACCEPTED: \_\_\_\_\_  
FINAL CONTRACT COST: \_\_\_\_\_

LIST OF APPROVED CHANGE ORDERS:

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

AREA ENGINEER \_\_\_\_\_ P. E. \_\_\_\_\_ DATE \_\_\_\_\_

RECOMMENDED FOR LETTING: 5/26/2022  
DocuSigned by: *Dwayne M. Hillbark, P.E.*  
198012407A50146 REGIONAL DESIGN ENGINEER

SUBMITTED FOR LETTING: 5/26/2022  
DocuSigned by: *Diana K. Schulze, P.E.*  
6775445255A3422 AREA ENGINEER

APPROVED FOR LETTING: 5/28/2022  
DocuSigned by: *Heather Ashby-Nguyen*  
8912407A50146 REGIONAL DESIGN ENGINEER



TDLR INSPECTION NOT REQUIRED

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, MAY 1, 2012)

SHEET NO. DESCRIPTION

GENERAL

- 1 TITLE SHEET
- 2 INDEX OF SHEETS
- 3 EXISTING TYPICAL SECTIONS
- 4 PROPOSED TYPICAL SECTIONS
- 5-6 PROJECT LAYOUT
- 7,7A-7I GENERAL NOTES
- 8,8A-8B ESTIMATE AND QUANTITY SHEETS
- 9-11 QUANTITY SUMMARY

TRAFFIC CONTROL PLAN

- 12 SEQUENCE OF WORK
- 13 TRAFFIC CONTROL PLAN - TYPICAL SECTIONS PHASE I
- 14 TRAFFIC CONTROL PLAN - TYPICAL SECTIONS PHASE II
- 15 TRAFFIC CONTROL PLAN - TYPICAL SECTIONS PHASE III
- 16 TRAFFIC CONTROL PLAN - MISCELLANEOUS DETAILS

TRAFFIC CONTROL PLAN STANDARDS

- 17-28 \*BC(1)-21 THRU BC(12)-21
- 29 \*TCP(2-1)-18
- 30 \*TCP(2-2)-18
- 31 \*TCP(2-3)-18
- 32 \*TCP(3-1)-13
- 33 \*TCP(3-3)-14
- 34 \*TCP(7-1)-13
- 35 \*WZ(RS)-22
- 36 \*WZ(STPM)-13
- 37 \*WZ(BRK)-13
- 38 \*WZ(UL)-13

ROADWAY DETAILS

- 39 CONTROL INDEX SHEET
- 40-41 HORIZONTAL AND VERTICAL CONTROL
- 42-43 HORIZONTAL ALIGNMENT DATA
- 44-48 PLAN & PROFILE
- 49-52 INTERSECTION PLAN & PROFILE
- 53-60 DRIVEWAY PLAN & PROFILE

ROADWAY DETAILS STANDARDS

- 61 \*GF(31)-19
- 62 \*GF(31)MS-19
- 63-66 \*MB(1)-21 THRU MB(4)-21
- 67 \*RAIL-ADJ(B)-19
- 68 \*SGT(10S)31-16
- 69 \*SGT(12S)31-18
- 70 \*DWMB-22(AUS)
- 71 \*TE(HMAC)-11
- 71A-71B \*FLEXPAVE(2)-22(AUS) THRU FLEXPAVE(3)-22(AUS)

DRAINAGE DETAILS

- 72 DRAINAGE AREA MAP
- 73 HYDROLOGICAL DATA SHEET
- 74-76 CULVERT LAYOUTS
- 77-79 HYDRAULIC CALCULATIONS
- 80 CONCRETE COLLAR DETAILS

DRAINAGE STANDARDS

- 81 \*SETP-PD
- 82 \*CH-PW-0

SHEET NO. DESCRIPTION

UTILITY DETAILS

- 83-86 S. U. E. PLAN SHEET

SIGNING, PAVEMENT MARKINGS & DELINEATION

- 87-89 SIGNING AND PAVEMENT MARKING LAYOUTS
- 90-92 SUMMARY OF SMALL SIGNS
- 93 SMALL SIGN DETAILS

SIGNING, PAVEMENT MARKINGS & DELINEATION STANDARDS

- 94 \*TSR(3)-13
- 95 \*TSR(4)-13
- 96 \*TSR(5)-13
- 97-101 \*D&OM(1)-20 THRU D&OM(5)-20
- 102 \*D&OM(VIA)-20
- 103-104 \*PM(1)-20(MOD) THRU PM(2)-20(MOD)
- 105 \*PM(3)-20
- 105 \*SMD(GEN)-08
- 106-108 \*SMD(SLIP-1)-08 THRU SMD(SLIP-3)-08
- 109 \*SPRFBA(1)-13
- 110A \*ED(1)-14
- 110B-110C \*ED(3)-14 THRU ED(4)-14
- 110D-110E \*ED(11)-14 THRU ED(12)-14

ENVIRONMENTAL ISSUES

- 110 TXDOT STORM WATER POLLUTION PREVENTION PLAN
- 111 ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS-EPIC
- 112-114 EROSION CONTROL LAYOUT

ENVIRONMENTAL ISSUES STANDARDS

- 115 \*PRWPD-20(AUS)
- 116 \*EC(1)-16
- 117 \*EC(2)-16
- 118 \*EC(3)-16
- 119-121 \*EC(9)-16

\* THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.



DESIGN ENGINEER

6/23/2022

DATE

Kimley»Horn F-928



FM 969

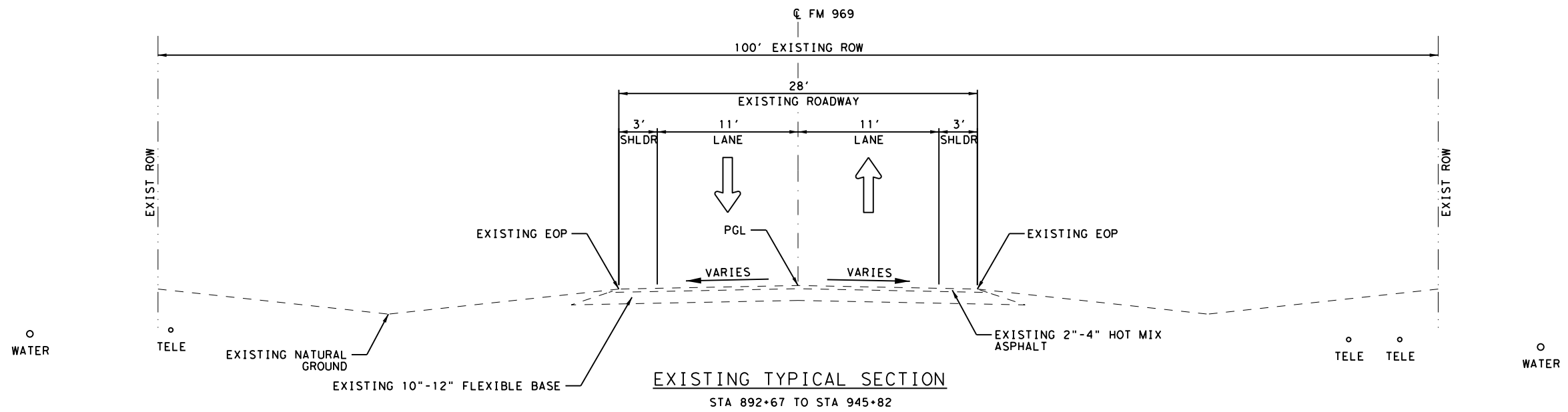
INDEX OF SHEETS

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 2

FILENAME: c:\pwworking\1\00152774\FM969\_GEN\_TYP\_01.dgn  
 PLOTTED: 5/11/2022 4:20:36 PM



5/11/2022

*TJN*

**Kimley»Horn** F-928

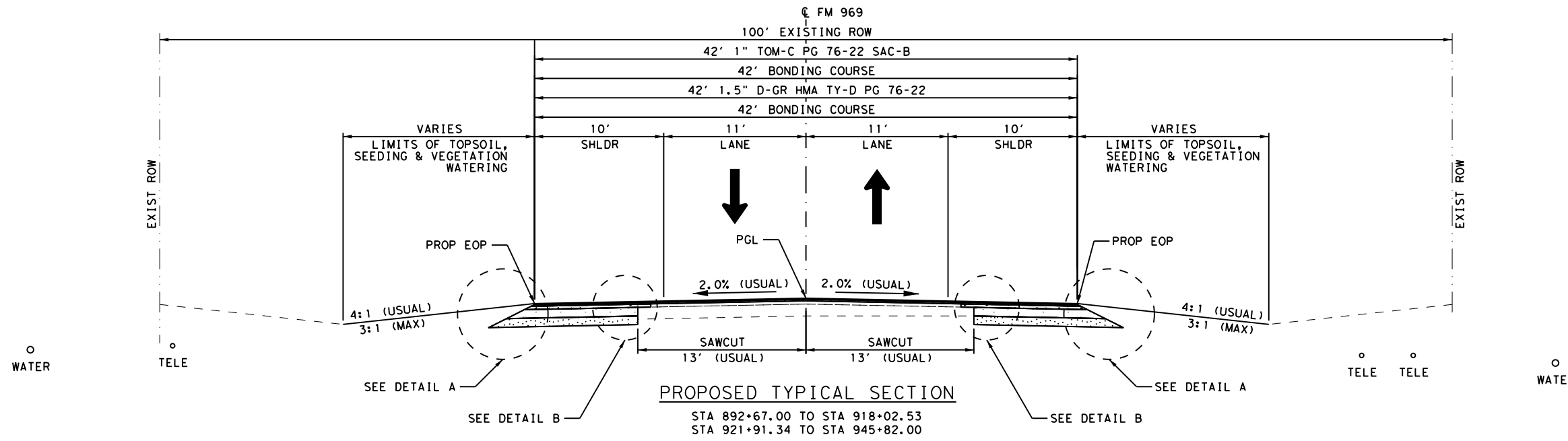
© 2022  
 Texas Department of Transportation

FM 969

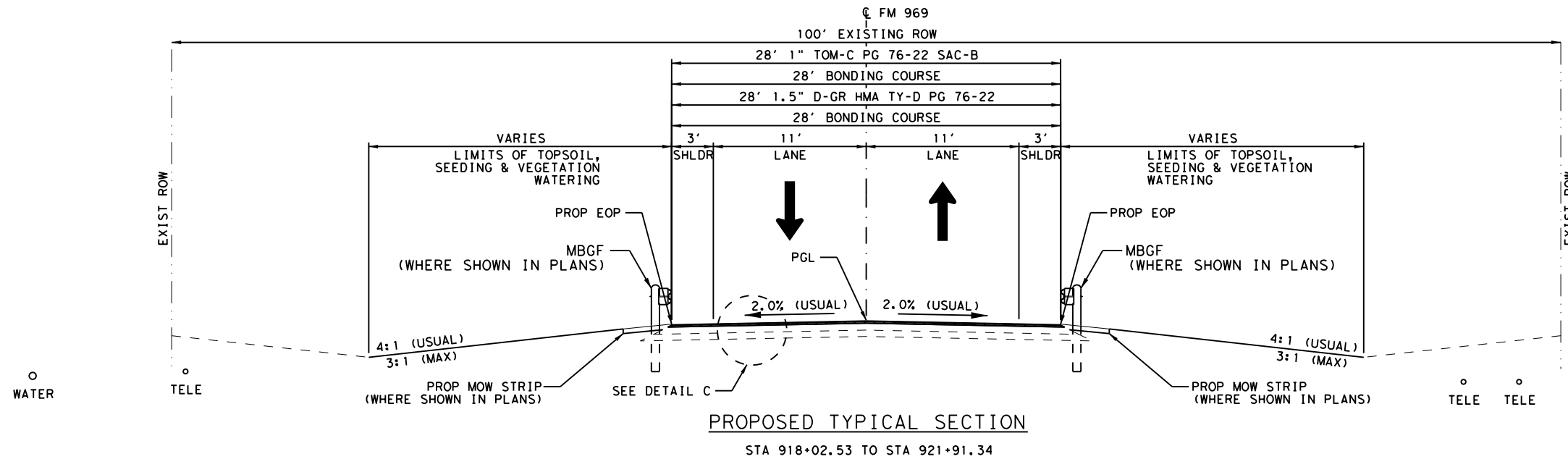
EXISTING  
 TYPICAL SECTIONS

SCALE: 10' SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
3		



**PROPOSED TYPICAL SECTION**  
 STA 892+67.00 TO STA 918+02.53  
 STA 921+91.34 TO STA 945+82.00

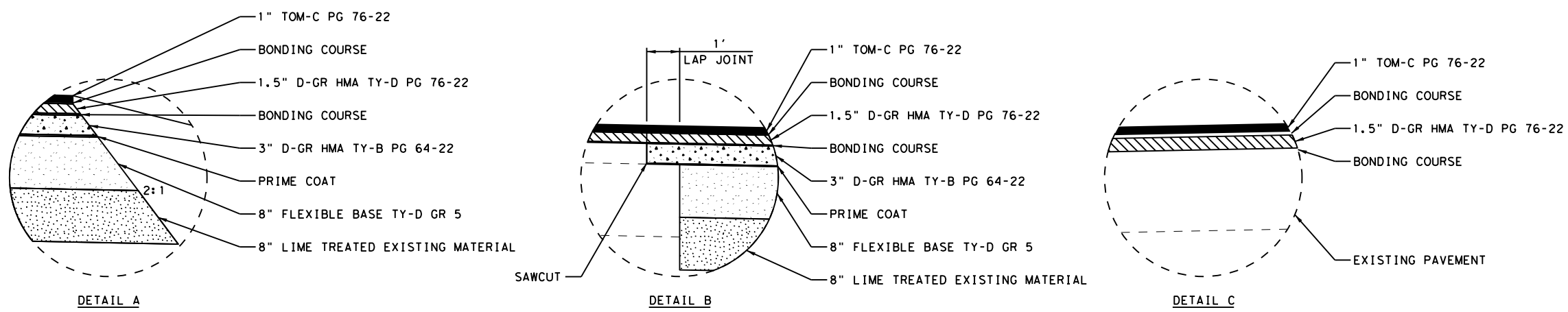


**PROPOSED TYPICAL SECTION**  
 STA 918+02.53 TO STA 921+91.34

**NOTES:**

1. SEE PLAN & PROFILE SHEETS FOR EXACT SAWCUT LIMITS.
2. SEE PLAN & PROFILE SHEETS FOR EXACT MILL AND OVERLAY LIMITS.
3. LAP JOINT PAVEMENT REMOVAL IS SUBSIDIARY TO PERTINENT ITEMS.

5/11/2022



**Kimley»Horn** F-928

© 2022  
 Texas Department of Transportation

**FM 969**

**PROPOSED TYPICAL SECTIONS**

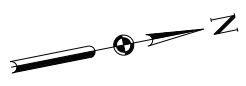
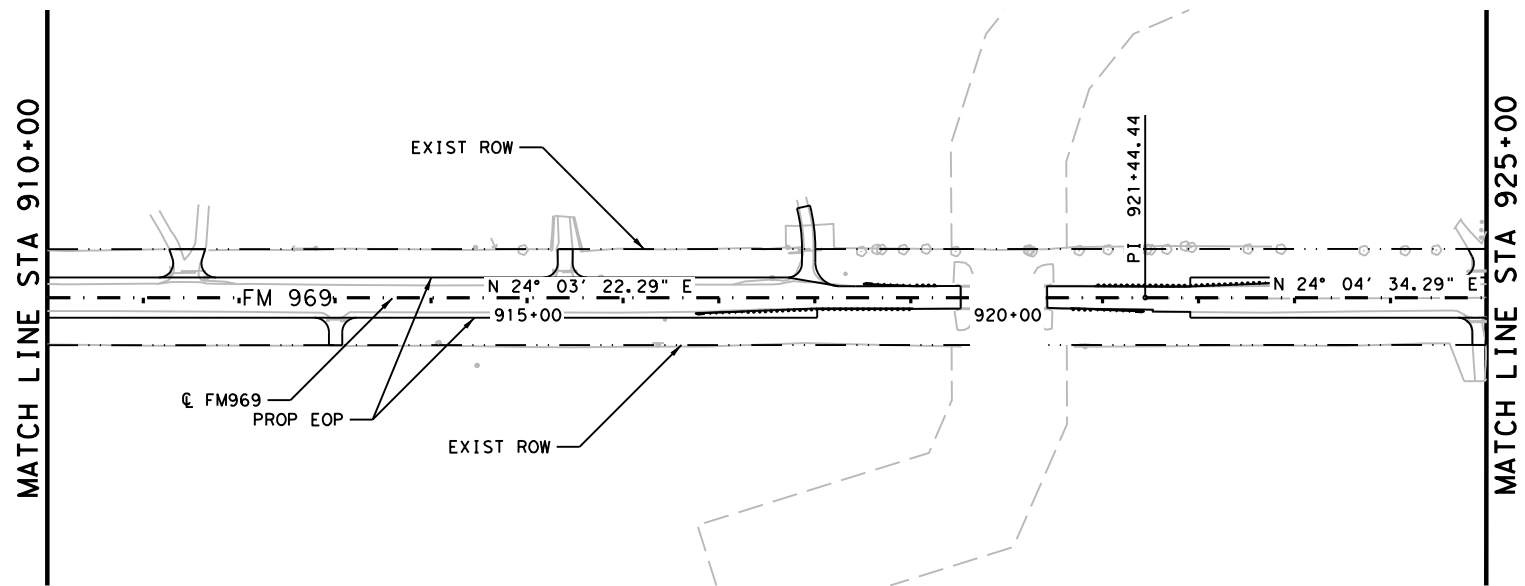
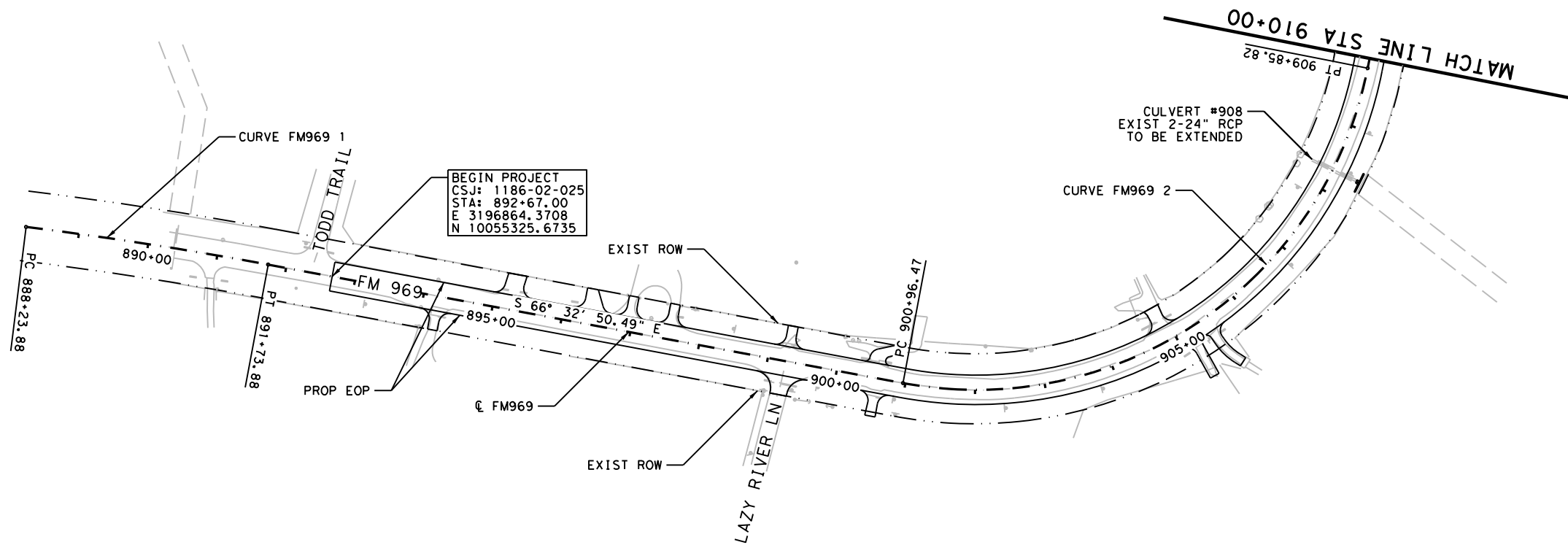
SCALE: 10' SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 4

FILENAME: c:\pwworking\1\00152774\FM969\_GEN\_TYP\_02.dgn  
 PLOTTED: 5/11/2022 4:20:52 PM





TJN  
 5/11/2022  
 STATE OF TEXAS  
 TROY NEAL  
 106194  
 LICENSED PROFESSIONAL ENGINEER

**Kimley»Horn** F-928  
 © 2022  
 Texas Department of Transportation

**FM 969**  
**PROJECT LAYOUT**

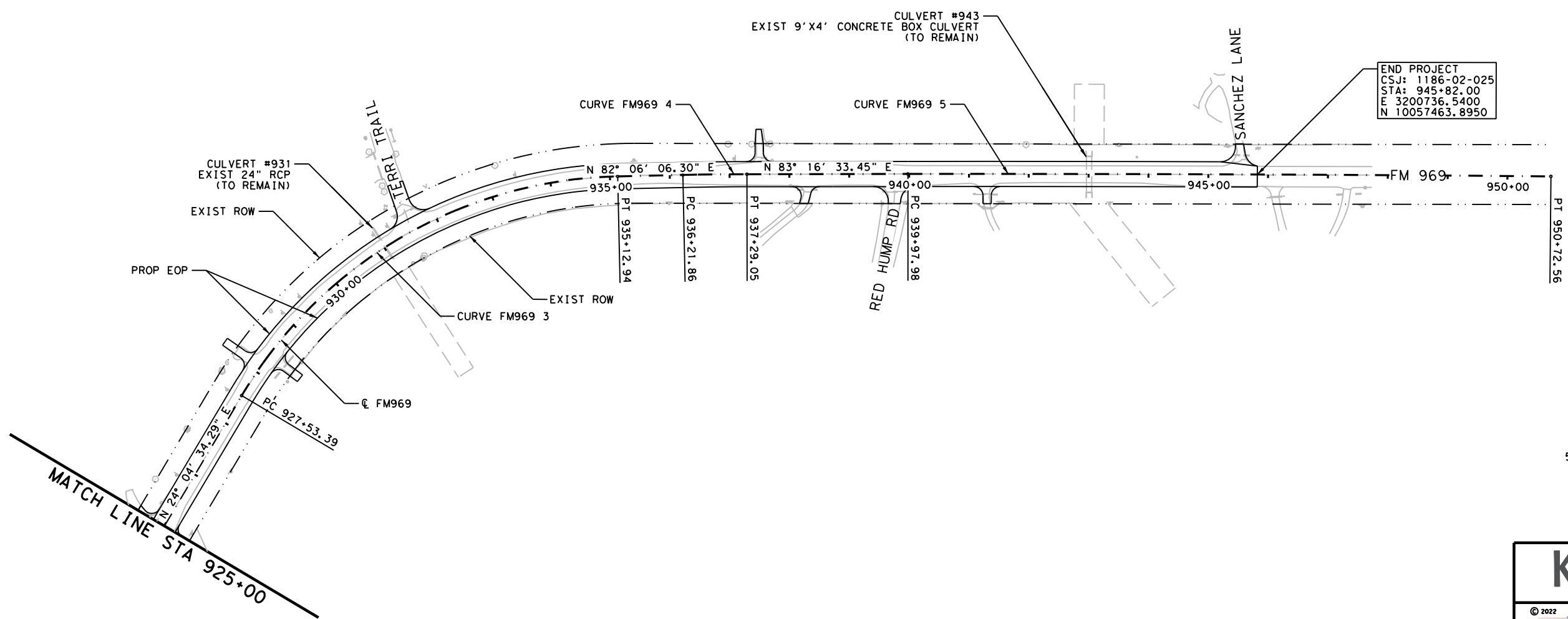
SCALE: 200' SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	
TEXAS	AUSTIN	BASTROP	
CONT.	SECT.	JOB	
1186	02	025	
			SHEET NO. 5

FILENAME: c:\pwworking\100152774\FM969\_GEN\_PLAY\_01.dgn  
 PLOTTED: 5/11/2022 4:21:11 PM



END PROJECT  
 CSJ: 1186-02-025  
 STA: 945+82.00  
 E 3200736.5400  
 N 10057463.8950



*TJN*  
 5/11/2022  


**Kimley»Horn** F-928

© 2022  
  
 Texas Department of Transportation

FM 969  
 PROJECT LAYOUT

SCALE: 200' SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	
TEXAS	AUSTIN	BASTROP	
CONT.	SECT.	JOB	
1186	02	025	
			SHEET NO.
			6

FILENAME: c:\pwworking\0152774\FM969\_GEN\_PLAY\_02.dgn  
 PLOTTED: 5/11/2022 4:21:29 PM

GENERAL NOTES: Version: April 28, 2022

Item	Description	**Rate
**204	<b>Sprinkling</b> (Dust) (Item 132) (Item 247)	30 GAL/CY 30 GAL/CY 30 GAL/CY
**210	<b>Rolling (Flat Wheel)</b> (Item 247) (Item 316)	1 HR/200 TON 1 HR/6000 SY
**210	<b>Rolling (Tamping and Heavy Tamping)</b>	1 HR/200 CY
**210	<b>Rolling (Lt Pneumatic Tire)</b> (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	<b>Flexible Base (CMP IN PLC)</b>	132 LB/CF
310	<b>Prime Coat</b>	0.20 GAL/SY
3076	<b>Dense-Graded Hot-Mix Asphalt and Superpave</b>	110 LB/SY/IN
3081	<b>Thin Overlay Mixtures (TOM)</b> SAC B	113.0 LB/SY/IN
	SAC A	116.0 LB/SY/IN
3084	<b>Bonding Course</b>	0.09 GAL/SY
	<b>Tack Coat</b>	0.08 GAL/SY

\*\* For Informational Purposes Only

The following standard detail sheet or sheets have been modified:

**Modified Standards**

**PM(1)-20 (MOD)**

**PM(2)-20 (MOD)**

**GENERAL**

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

Bastrop Area [Diana.Schulze@txdot.gov](mailto:Diana.Schulze@txdot.gov)

Bastrop Area [Tanli.Sun@txdot.gov](mailto:Tanli.Sun@txdot.gov)

Contractor questions and request for documents will be accepted through email, phone, and in person by the above individuals. Response and documents will be posted to TxDOT's Public FTP at the following Address:

<https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>

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.

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 48 hours before commencing any work that might affect present ITS Infrastructure. Use caution if working in these areas to avoid damaging or interfering with existing facilities. Repair any damage to this system within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify TxDOT/CTECC at (512) 974-0883 within one hour of occurrence. Failure of the Contractor to repair damage to any infrastructure that conveys any corridor information to TxDOT/CTECC will result in the Contractor being billed for the full cost of emergency repairs.

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.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The contractor will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the Engineer.

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.

#### ITEM 5 – CONTROL OF THE WORK

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](mailto:AUS_Locate@TxDOT.gov) to request illumination, traffic signal, ITS, or toll equipment utility locates. Provide [AUS\\_Locate@TxDOT.gov](mailto: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 <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design>. 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.

#### Electronic Shop Drawing Submittals.

Submit electronic shop drawing submittals according to the current [Guide to Electronic Shop Drawing Submittal](https://www.txdot.gov/business/resources/specifications/shop-drawings.html) <https://www.txdot.gov/business/resources/specifications/shop-drawings.html> (TxDOT.gov Business > Resources - General > Shop Drawings). Pre-approved producers can be found online at TxDOT.gov > Business > Resources - Material Producer List. 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](mailto: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.

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.

#### ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES

No significant traffic generator events identified.

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

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

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

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

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

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

#### PSL in Edwards Aquifer Recharge and Contributing Zone.

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



#### Work within a USACE Jurisdictional Area.

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

#### 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](mailto: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.

#### Vegetation BMPs

- Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. Impacted vegetation should be replaced with in-kind on-site replacement/restoration of native vegetation.
- To minimize adverse effects, activities should be planned to preserve mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation have high value to wildlife as food and cover.
- It is strongly recommended that trees greater than 12 inches in diameter at breast height (DBH) that are removed be replaced. TPWD's experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to either on-site or off-site. Trees less than 12 inches DBH should be replaced at a 1:1 ratio.
- Replacement trees should be of equal or better wildlife quality than those removed and be regionally adapted native species.
- When trees are planted, a maintenance plan that ensures at least an 85 percent survival rate after three years should be developed for the replacement trees.
- The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.

- The use of seed mix that contains seeds from only regional ecotype native species is recommended.

#### 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.

In addition to complying with the Migratory Bird Treaty Act (MBTA) and Chapter 64 of the Parks and Wildlife Code (PWC) regarding nongame bird protections, perform the following BMP:

- Avoid vegetation clearing activities during the general bird nesting season, March through August, to minimize adverse impacts to birds.
- Prior to construction, perform daytime surveys for nests including under bridges and in culverts to determine if they are active before removal. Nests that are active should not be disturbed. If active nests are observed during surveys, TPWD recommends a 150-foot buffer of vegetation remain around the nests until the young have fledged or the nest is abandoned.
- Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season.
- If unoccupied, inactive nests will be removed, ensure that nests are not protected under the Endangered Species Act (ESA), MBTA, or BGEPA.
- Prevent the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
- Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.
- Minimize extended human presence near nesting birds during construction and maintenance activities. Protect sensitive habitat areas with temporary barriers or fencing to limit human foot-traffic and off-road vehicle use to alert and discourage contractors from causing any unintentional impacts.
- Minimize construction noise above ambient levels during general bird nesting season to minimize adverse impacts on birds.
- Minimize construction lighting during the general bird nesting season by scheduling work activities between dawn and dusk.

#### Terrestrial Amphibian and Reptile BMPs

- For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling

- Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.
- Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge.
- Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season. Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged.
- When designing roads with curbs, consider using Type I or Type III curbs to provide a gentle slope to enable turtles and small animals to get out of roadways.
- If Texas tortoises (*Gopherus berlandieri*) or box turtles (*Terrepenes* spp.) are present in a project area, they should be removed from the area and relocated between 100 and 200 meters from the project area. After removal of the individuals, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude reentry by turtles, tortoises, and other reptiles. The exclusion fence should be constructed and maintained as follows:
  - o The exclusion fence should be constructed with metal flashing or drift fence material.
  - Rolled erosion control mesh material should not be used.
  - The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
  - The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.
- After project is complete, revegetate disturbed areas with an appropriate locally sourced native seed mix. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

#### Aquatic Amphibian and Reptile BMPs

For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

- Minimize impacts to wetlands, temporary and permanent open water features, including depressions, and riverine habitats.
- Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features.
- Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
- Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

- Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
- When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs). If gutters and curbs are part of the roadway design, install gutters that do not include the side box inlet and include sloped (i.e., mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

#### 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.

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

#### ITEM 8 – PROSECUTION AND PROGRESS

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

#### 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 110 – EXCAVATION

The Engineer will define unsuitable material.



**ITEM 132 – ALL EMBANKMENT**

The Engineer will define unsuitable material. Material which the Contractor might deem to be unsuitable due to moisture content will not be considered unsuitable material.

Prior to begin embankment of existing area, correct or replace unstable material to a depth of 6 in. below existing grade. Embankment areas will be inspected prior to beginning work.

Rock or broken concrete produced by the project is allowed in earth embankments. The size of the rock or broken concrete will not exceed the layer thickness requirements in Section 132.3.4., "Compaction Methods." The material will not be placed vertically within 5 ft. of the finished subgrade elevation.

Embankment placed vertically within 5 ft. of the finished subgrade elevation or within the edges of the subgrade and treated with lime, cement, or other calcium based additives must have a sulfate content less than 3000 ppm. Allow 5 business days for testing. Treatment of sulfate material 3000 ppm to 7000 ppm requires 7 days of mellowing and continuous water curing, in accordance TxDOT guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures (9/2005). Material over 7000 ppm is not allowed.

**ITEM 160 - TOPSOIL**

Off-site topsoil will have a minimum PI of 25.

No Sandy Loam allowed.

Obtain approval of the actual depth of the topsoil sources for both on-site and off-site sources. Construct topsoil stockpiles of no more than five (5) feet in height.

Salvage topsoil from sites of excavation and embankment. Maximum salvage depth is 6 inches.

Windrowing of topsoil obtained from the Right of Way (ROW) is not allowed.

**ITEM 168 – VEGETATIVE WATERING**

Water all areas of project to be seeded or sodded.

Maintain the seedbed in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of ½ inch or greater, but will be resumed before the soil dries out. Continue watering until final acceptance.

Vegetative watering rates and quantities are based on ¼ inch of watering per week over a 3-month watering cycle. The actual rates used and paid for will be as directed and will be based on prevailing weather conditions to maintain the seedbed.

Obtain water at a source that is metered (furnish a current certification of the meter being used) or furnish the manufacturer's specifications showing the tank capacity for each truck used. Notify the Engineer, each day that watering takes place, before watering, so that meter readings or truck counts can be verified.

**ITEM 169 – SOIL RETENTION BLANKETS**

Type A blankets containing straw fibers are not allowed. Type B and D blankets shall be a spray type blanket.

**ITEM 247 - FLEXIBLE BASE**

The layer thickness will be 4 in. to 6 in. unless shown on the plans. Placing in a single layer is allowed when total thickness of base is 8 in. or less. When placed in multiple layers, compact the bottom and middle layers to at least 95% and 98% of the maximum dry density, respectively. When placed in a single layer or the final layer, compact to at least 100%.

Correction of subgrade soft spots is subsidiary.

Complete per plans the subgrade, ditches, slopes, and drainage structures prior to the placement of base.

Do not use a vibratory roller to compact base placed directly on top of a drainage structure.

Grade 4 will have the same material requirements as Grade 5 except minimum compressive strength at lateral pressure 3 psi will be 70 psi and at lateral pressure 15 psi will be 150 psi. Grade 4 does not have a minimum compressive strength at lateral pressure 0 psi.

**ITEMS 260 – SUBGRADE TREATMENTS AND BASE**

Use ordinary compaction for subgrade treatment.

Three weeks prior to treatment, provide a sample of soil or flexible base to be treated.

**ITEM 260 - LIME TREATMENT (ROAD-MIXED)**

Apply 36 pounds per square yard.

For sulfate content greater than 3000 ppm, mix in an additional 4.0% points above optimum moisture after initial mixing and prior to mellow.

If the sulfate content is greater than 7000 ppm, do not treat. Undercut the unsuitable material to the depth per bid item for lime treatment and replace unsuitable material in accordance with Item 110. Payment will be made in accordance with Item 110.

**ITEM 300s – SURFACE COURSES AND PAVEMENTS**

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

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

**ITEM 310 – PRIME COAT**

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

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

Rolling to ensure penetration is required.

**ITEMS 3076 - HOT-MIX ASPHALT PAVEMENT**

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

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

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

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

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

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

Tack every layer. Do not dilute tack coat. Apply it evenly through a distributor spray bar.

Provide a minimum transition of 10' for intersections, 10' for commercial driveways, and 6' for residential driveways unless otherwise shown on the plans.

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

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

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

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

No RAS is allowed in surface courses.

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

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

**ITEMS 3076 - DENSE-GRADED HOT-MIX ASPHALT**

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

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

**ITEMS 3081 - THIN OVERLAY MIXTURES (TOM)**

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

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

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

**ITEM 351 – FLEXIBLE PAVEMENT STRUCTURE REPAIR**

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

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

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

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

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

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

For greater than 6 in. deep repairs use 2 in. Type C or D surface and Type B for the bottom lifts.

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

**ITEM 354 - PLANING AND TEXTURING PAVEMENT**

Contractor retains ownership of salvaged materials.

Mill and fill the work area during each shift unless otherwise shown on the plans.

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

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

**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.

Saw-cut the pavement at the edge of the excavation. This work is subsidiary.

**ITEM 420 – CONCRETE SUBSTRUCTURES**

Perform work during good weather unless otherwise directed. If work is performed at Contractor’s option, when inclement weather is impending, and the work is damaged by the weather, the Contractor is responsible for all costs associated with repairs/replacement.

**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 466 - HEADWALLS AND WINGWALLS**

Remove all loose formwork and materials from the waterway at the end of each work week or prior to a rain event. Debris that falls into the waterway must be removed at the end of each work day. Upon completion of the structure, stencil the National Bridge Inventory (NBI) number (structure number) using black paint and 4 in. tall numbers at 4 locations designated by TxDOT. This work is subsidiary.

**ITEM 467 - SAFETY END TREATMENT**

Field adjust pipe end to maintain the necessary slope. Field cutting of pipe end is allowed. Coat all metal field cuts or exposed reinforcement with asphalt paint.

**ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING**

<u>Table 1</u>		
<u>Roadway</u>	<u>Limits</u>	<u>Allowable Closure Time</u>
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>
Outside Austin City Limits	9 A to 3 P and 7 P to 7 A	6 P to 11 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 8 P to 6 A. Unless stated, daytime or Friday night lane closures will not be allowed and one lane in each direction will remain open at all times for all roadways.

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. Closures the Sunday of the Super Bowl will not be allowed from 1 P to 11 P. No closures will be allowed on Friday and the weekends for projects within 20 miles of Formula 1 at COTA, ACL Fest, SXSW, ROT Rally, UT home football games (includes games not on a Friday or weekend), sales tax holiday, Dell Match Play (includes Thursday), Rodeo Austin, or other special events that could be impacted by the construction. All lanes will be open by noon of the day before these special events. Additional key dates or special events include the following:

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.

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

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

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

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday. For all roadways: Submit request for traffic detours and full roadway closures 168 hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.



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

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

Cover, relocate or remove existing signs that conflict with traffic control. 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. 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 traffic control, if at any time the queue becomes greater than 20 minutes. Have a contingency plan of how modification will occur. Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

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

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

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

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

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

#### **ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS**

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

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

Erosion control measures must be initiated immediately in areas where construction activities have ceased and will not resume for a period exceeding 14 calendar days. Vertical track all exposed soil,

stockpiles, and slopes. Re-track after each rain event or every 14 days, whichever occurs first. Sheep foot roller is allowed for vertical tracking. This work is subsidiary.

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.

#### **ITEM 530 – INTERSECTIONS, DRIVEWAYS, AND TURNOUTS**

Notify property owners at least 48 hr. before beginning work on their driveway. Provide a list of each notification and contact before each closure. Only close driveways for reconstruction if duration and alternate access are approved. Install and maintain material across a work zone as temporary access. This work is subsidiary.

Grade breaks must not exceed 8% for permanent or temporary. Sidewalk crossing slope will be 1.5% and 5 ft. wide with width reduction in approved locations.

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

For CONC, the pavement structure will be 6 in. thick and have 3 in. flexible base bedding unless detailed on the plans. Coarse Aggregate Grades 1-8 may be used for the required Class A concrete. Expansion joints will be placed every 20 ft. Construct expansion joints as detailed in the latest Austin District Standard for Sidewalk (MCPSWMD).

#### **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.

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.

**ITEMS 600s & 6000s – ITS, 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.

**ITEM 644 – SMALL ROADSIDE SIGN ASSEMBLIES**

Triangular slip base that use set screws to secure the post will require 1 of the set screws to penetrate the post by drilling a hole in the post at the location of the screw. All set screws shall be treated with anti-seize compound.

**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.

**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.

**ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS**

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

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.

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 685 – ROADSIDE FLASHING BEACON ASSEMBLIES**

Installation includes all components in the assembly, signs, signal heads, and conductors in the foundation and within 6 in. of the foundation to provide a fully operational assembly.

Test period for the assembly shall be in accordance with item 680.3.1.8.

**ITEM 752 – TREE AND BRUSH REMOVAL**

Follow Item 752.4 Work Methods and Item 752 general notes when removing or working on or near trees and brush even if Item 752 is not included as a pay item.

Flailing equipment is not allowed. Burning brush is not allowed in urban areas or on ROW. Use hand methods or other means of removal if doing work by mechanical methods is impractical.

Prior to begin tree pruning, send email confirmation to the Engineer that training and demonstration of work methods has been provided to the employees. This work is subsidiary.

Shredded vegetation may be blended, at a rate not to exceed 15 percent by volume, with Item 160 if the maximum dimension is not greater than 2 in.

**ITEM 3084 – BONDING COURSE**

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

The target shear bond strengths are listed in Table BCS. The informational test cores shall be taken once a shift for first 5 lots of placement or a change to placement method of bonding course,

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

Table BC

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

Table BCS (For Informational Tests)

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

**ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN**

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

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 1186-02-025

DISTRICT Austin  
HIGHWAY FM 969

COUNTY Bastrop

CONTROL SECTION JOB				1186-02-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00177166			
COUNTY				Bastrop			
HIGHWAY				FM 969			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	53.100		53.100	
	104-6009	REMOVING CONC (RIPRAP)	SY	233.000		233.000	
	104-6017	REMOVING CONC (DRIVEWAYS)	SY	180.000		180.000	
	110-6001	EXCAVATION (ROADWAY)	CY	4,339.000		4,339.000	
	132-6003	EMBANKMENT (FINAL)(ORD COMP)(TY B)	CY	3,197.000		3,197.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	18,687.000		18,687.000	
	164-6035	DRILL SEEDING (PERM) (RURAL) (CLAY)	SY	18,687.000		18,687.000	
	164-6071	BROADCAST SEED (TEMP)(WARM OR COOL)	SY	18,687.000		18,687.000	
	168-6001	VEGETATIVE WATERING	MG	31.600		31.600	
	169-6002	SOIL RETENTION BLANKETS (CL 1) (TY B)	SY	18,687.000		18,687.000	
	247-6392	FL BS(CMP IN PLC)(TY D GR 5)(FNAL POS)	CY	2,495.000		2,495.000	
	260-6043	LIME (HYD, COM OR QK)(SLURRY)	TON	231.000		231.000	
	260-6073	LIME TRT (SUBGRADE)(8")	SY	12,736.000		12,736.000	
	310-6001	PRIME COAT (MULTI OPTION)	GAL	2,159.000		2,159.000	
	351-6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR(6")	SY	2,380.000		2,380.000	
	351-6019	FLEXIBLE PAVEMENT STRUCTURE REPAIR(3")	SY	2,400.000		2,400.000	
	354-6064	PLANE ASPH CONC PAV (2 1/2")	SY	809.000		809.000	
	400-6005	CEM STABIL BKFL	CY	30.500		30.500	
	420-6071	CL C CONC (COLLAR)	EA	2.000		2.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	16.400		16.400	
	464-6005	RC PIPE (CL III)(24 IN)	LF	11.000		11.000	
	466-6097	HEADWALL (CH - PW - 0) (DIA= 24 IN)	EA	1.000		1.000	
	467-6351	SET (TY II) (18 IN) (HDPE) (6: 1) (P)	EA	34.000		34.000	
	467-6384	SET (TY II) (24 IN) (HDPE) (6: 1) (P)	EA	10.000		10.000	
	496-6004	REMOV STR (SET)	EA	1.000		1.000	
	496-6005	REMOV STR (WINGWALL)	EA	2.000		2.000	
	496-6006	REMOV STR (HEADWALL)	EA	3.000		3.000	
	496-6007	REMOV STR (PIPE)	LF	883.000		883.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	7.000		7.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	90.000		90.000	
	506-6004	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	796.000		796.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	886.000		886.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	1,565.000		1,565.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	1,565.000		1,565.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	100.000		100.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	100.000		100.000	



CONTROLLING PROJECT ID 1186-02-025

DISTRICT Austin  
HIGHWAY FM 969

COUNTY Bastrop

# Estimate & Quantity Sheet

CONTROL SECTION JOB				1186-02-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00177166			
COUNTY				Bastrop			
HIGHWAY				FM 969			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	506-6053	ROCK FILTER DAMS (INSTALL) (TY 2) (6:1)	LF	36.000		36.000	
	530-6002	INTERSECTIONS (ACP)	SY	506.000		506.000	
	530-6004	DRIVEWAYS (CONC)	SY	184.000		184.000	
	530-6005	DRIVEWAYS (ACP)	SY	1,495.000		1,495.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	300.000		300.000	
	540-6039	MTL BM GD FEN TRANS (31"-28")(25')	EA	4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	350.000		350.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	544-6002	GUARDRAIL END TREATMENT (MOVE & RESET)	EA	2.000		2.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000	
	560-6011	MAILBOX INSTALL-S (TWW-POST) TY 4	EA	8.000		8.000	
	560-6012	MAILBOX INSTALL-D (TWW-POST) TY 4	EA	3.000		3.000	
	560-6013	MAILBOX INSTALL-M (TWW-POST) TY 4	EA	4.000		4.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	32.000		32.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	3.000		3.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	26.000		26.000	
	658-6046	INSTL OM ASSM (OM-2X)(WC)GND	EA	6.000		6.000	
	658-6062	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA	19.000		19.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	22,060.000		22,060.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)	LF	44.000		44.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	22,060.000		22,060.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	100.000		100.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	280.000		280.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	26.000		26.000	
	666-6342	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL)	LF	12,564.000		12,564.000	
	666-6344	REF PROF PAV MRK TY I(Y)4"(BRK)(100MIL)	LF	630.000		630.000	
	666-6345	REF PROF PAV MRK TY I(Y)4"(SLD)(100MIL)	LF	9,551.000		9,551.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	153.000		153.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	2,000.000		2,000.000	
	685-6005	RELOCT RDS D FLSH BCN AM (SOLAR PWRD)	EA	2.000		2.000	
	3076-6003	D-GR HMA TY-B PG64-22 (EXEMPT)	TON	1,781.000		1,781.000	
	3076-6072	D-GR HMA TY-D PG 76-22 (EXEMPT)	TON	2,305.000		2,305.000	
	3081-6008	TOM-C PG76-22 SAC-B	TON	1,347.000		1,347.000	
	3084-6001	BONDING COURSE	GAL	4,657.000		4,657.000	
	4122-6010	THERMOPLASTIC PIPE(24 IN)(PP)(TYPE III)	LF	230.000		230.000	
	4122-6014	THERMOPLASTIC PIPE(18 IN)(PP)(TYPE III)	LF	1,000.000		1,000.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	

DISTRICT	COUNTY	CCSJ	SHEET
Austin	Bastrop	1186-02-025	8A



# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 1186-02-025

DISTRICT Austin  
HIGHWAY FM 969

COUNTY Bastrop


CONTROL SECTION JOB				1186-02-025		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00177166			
COUNTY				Bastrop			
HIGHWAY				FM 969			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	6185-6002	TMA (STATIONARY)	DAY	180.000		180.000	
	6185-6003	TMA (MOBILE OPERATION)	HR	160.000		160.000	
	7251-6001	Subsurface Util Locate (Outside Rdbed)	EA	10.000		10.000	
	7251-6002	Subsurface Util Locate (Within Rdbed)	EA	5.000		5.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	


SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS									
DESCRIPTION	0502 6001	0662 6063	0662 6075	0662 6095	0662 6111	0677 6001	6001 6002	6185 6002	6185 6003
	BARRICADES, SIGNS AND TRAFFIC HANDLING	WK ZN PAV MRK REMOV (W) 4" (SLD)	WK ZN PAV MRK REMOV (W) 24" (SLD)	WK ZN PAV MRK REMOV (Y) 4" (SLD)	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	MO	LF	LF	LF	EA	LF	EA	DAY	HR
PHASE I STEP I	0.5							15	
PHASE I STEP II	0.5				100			15	
PHASE II	2.5	11030	22	11030		1000		75	
PHASE III	2.5	11030	22	11030		1000		75	
PHASE IV	1								160
TOTAL	7	22060	44	22060	100	2000	2	180	160

SUMMARY OF ROADWAY ITEMS											
SHEET NO.	STATION	0100 6002	0104 6017	0110 6001	0132 6003	0247 6392	0260 6043	0260 6073	0310 6001	0351 6002	
		PREPARING ROW	REMOVING CONC (DRIVEWAYS)	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	FL BS (CMP IN PLC) (TY D GR 5) (FNAL POS)	LIME (HYD, COM OR QK) (SLURRY)	LIME TRT (SUBGRADE) (8")	PRIME COAT (MULTI OPTION)	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	
FM 969		STA	SY	CY	CY	CY	TON	SY	GAL	SY	
1 OF 5	BEGIN TO 900+00	7.3	180	586	166	369	34	1883	319		
2 OF 5	900+00 TO 912+00	12.0		997	757	608	56	3103	526		
3 OF 5	912+00 TO 924+00	12.0		988	1285	418	39	2131	362	1931	
4 OF 5	924+00 TO 936+00	12.0		976	689	603	56	3083	522	449	
5 OF 5	936+00 TO END	9.8		792	300	497	46	2536	430		
TOTAL		53.1	180	4339	3197	2495	231	12736	2159	* 2380	

SUMMARY OF ROADWAY ITEMS											
SHEET NO.	STATION	0351 6019	0354 6064	0400 6005	0530 6002	0530 6004	0530 6005	0560 6011	0560 6012	0560 6013	3084 6001
		FLEXIBLE PAVEMENT STRUCTURE REPAIR (3")	PLANE ASPH CONC PAVE (2.5")	CEM STABIL BKFL	INTERSECTIONS (ACP)	DRIVEWAYS (CONC)	DRIVEWAYS (ACP)	MAILBOX INSTALL-S (TWW-POST) TY 4	MAILBOX INSTALL-D (TWW-POST) TY 4	MAILBOX INSTALL-M (TWW-POST) TY 4	BONDING COURSE
FM 969		SY	SY	CY	SY	SY	SY	EA	EA	EA	GAL
1 OF 5	BEGIN TO 900+00			6	104	184	228	2		1	694
2 OF 5	900+00 TO 912+00			16			535	1			1093
3 OF 5	912+00 TO 924+00		412	3			255	2			869
4 OF 5	924+00 TO 936+00		397		217		305		2		1083
5 OF 5	936+00 TO END			2	185		172	3	1	3	918
TOTAL		* 2400	809	27	506	184	1495	8	3	4	4657

\* ITEM TO BE USED AS DIRECTED BY THE ENGINEER





**FM 969**

## QUANTITY SUMMARY

SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025


FILENAME: c:\pwworking\00152774\FM969\_GEN\_SUM\_01.dgn  
 PLOTTED: 5/18/2022 7:42:48 PM


SHEET NO.		STATION	3076 6003 D-GR HMA TY-B PG64-22 (EXEMPT)	3076 6072 D-GR HMA TY-D PG76-22 (EXEMPT)	3081 6008 TOM-C PG 76-22 SAC-B	7251 6001 SUBSURFACE UTIL LOCATE (OUTSIDE RDBED)	7251 6002 SUBSURFACE UTIL LOCATE (WITHIN RDBED)
		FM 969	TON	TON	TON	EA	EA
1	OF 5	BEGIN TO 900+00	263	354	194		
2	OF 5	900+00 TO 912+00	434	539	317		
3	OF 5	912+00 TO 924+00	298	418	260		
4	OF 5	924+00 TO 936+00	431	531	317		
5	OF 5	936+00 TO END	355	463	259		
		TOTAL	1781	2305	1347	* 10	* 5

\* ITEM TO BE USED AS DIRECTED BY THE ENGINEER.

DESCRIPTION	0104 6009 REMOVING CONC (RIPRAP)	0432 6045 RIPRAP (MOW STRIP) (4 IN)	0540 6001 MTL W-BEAM GD FEN (TIM POST)	0540 6039 MTL BM GD FEN TRANS (31"-28") (25')	0542 6001 REMOVE METAL BEAM GUARD FENCE	0544 6001 GUARDRAIL END TREATMENT (INSTALL)	0544 6002 GUARDRAIL END TREATMENT (MOVE & RESET)	0544 6003 GUARDRAIL END TREATMENT (REMOVE)
	SY	CY	LF	EA	LF	EA	EA	EA
FM 969								
PHASE I STEP I	83	1.1		1	150	1		1
PHASE I STEP II	83	1.1		1	150	1		1
PHASE II								
PHASE III								
PHASE IV	67	14.2	300	2	50	2	2	2
TOTAL	233	16.4	300	4	350	4	2	4

SHEET NO.	STATION	0467 6351 SET (TY II) (18 IN) (HDPE) (6:1) (P)	0467 6384 SET (TY II) (24 IN) (HDPE) (6:1) (P)	0496 6005 REMOV STR (WINGWALL)	0496 6006 REMOV STR (HEADWALL)	0496 6007 REMOV STR (PIPE)	4122 6010 THERMO- PLASTIC PIPE (24 IN) (PP) (TYPE III)	4122 6014 THERMO- PLASTIC PIPE (18 IN) (PP) (TYPE III)	
		EA	EA	EA	EA	LF	LF	LF	
FM 969									
1	OF 5	BEGIN TO 900+00.00	10			290		350	
2	OF 5	900+00.00 TO 912+00.00	4	6		1	221	130	
3	OF 5	912+00.00 TO 924+00.00	2	4	2	2	71	100	
4	OF 5	924+00.00 TO 936+00.00	8				138	210	
5	OF 5	936+00.00 TO END	10				163	240	
TOTAL			34	10	2	3	883	230	1000





**FM 969**

**QUANTITY SUMMARY**

SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

FILENAME: c:\pwworking\0152774\FM969\_GEN\_SUM\_02.dgn  
 PLOTTED: 5/18/2022 7:42:53 PM

SUMMARY OF CROSS DRAINAGE ITEMS						
SHEET NO.	STATION	0400 6005	0420 6071	0464 6005	0466 6097	0496 6004
		CEM STABIL BKFL	CL C CONC (COLLAR)	RC PIPE (CL III) (24 IN)	HEADWALL (CH-PW-O) (DIA= 24 IN)	REMOV STR (SET)
FM 969		CY	EA	LF	EA	EA
1 OF 3	908+32.06	3.5	2	11	1	1
TOTAL		3.5	2	11	1	1


SUMMARY OF SIGNING ITEMS							
SHEET NO.	STATION	0644 6001	0644 6004	0644 6076	0658 6046	0658 6062	0685 6005
		IN SM RD SN SUP&AM TY10BWG (1)SA(P)	IN SM RD SN SUP&AM TY10BWG (1)SA(T)	REMOVE SM RD SN SUP&AM	INSTL OM ASSM (OM-2X) (WC)GND	INSTL DEL ASSM (D-SW)SZ1 (BRF)GF2(BI)	RELOCT RDS FLSH BCN AM (SOLAR PWRD)
FM 969		EA	EA	EA	EA	EA	EA
1 OF 3	BEGIN TO 912+00	16	3	14	2		
2 OF 3	912+00 TO 936+00	12		10	2	19	1
3 OF 3	936+00 TO END	4		2	2		1
TOTAL		32	3	26	6	19	2


SUMMARY OF PAVEMENT MARKING ITEMS							
SHEET NO.	STATION	0666 6042	0666 6048	0666 6342	0666 6344	0666 6345	0672 6009
		REFL PAV MRK TY I (W)12" (SLD)(100MIL)	REFL PAV MRK TY I (W)24" (SLD)(100MIL)	REFL PROF PAV MRK TY I (W)4"(SLD) (100 MIL)	REFL PROF PAV MRK TY I (Y)4"(BRK) (100 MIL)	REFL PROF PAV MRK TY I (Y)4"(SLD) (100 MIL)	REFL PAV MRKR TY II-A-A
FM 969		LF	LF	LF	LF	LF	EA
1 OF 3	BEGIN TO 912+00	70	12	4650	270	3250	56
2 OF 3	912+00 TO 936+00	140	14	4716		4634	58
3 OF 3	936+00 TO END	70		3198	360	1667	39
TOTAL		280	26	12564	630	9551	153

SUMMARY OF EROSION CONTROL ITEMS											
SHEET NO.	STATION	0160 6003	0164 6035	0164 6071	0168 6001	0169 6002	0506 6002	0506 6004	0506 6011	0506 6038	0506 6039
		FURNISHING AND PLACING TOPSOIL (4")	DRILL SEEDING (PERM) (RURAL) (CLAY)	BROADCAST SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1 ) (TY B)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (INSTALL) (TY 4)	ROCK FILTER DAMS (REMOVE)	TEMP SDMT CONT FENCE (INSTALL)	TEMP SDMT CONT FENCE (REMOVE)
FM 969		SY	SY	SY	MG	SY	LF	LF	LF	LF	LF
1 OF 3	BEGIN TO 912+00	7342	7342	7342	12.4	7342	43	285	328	59	59
2 OF 3	912+00 TO 936+00	8186	8186	8186	13.8	8186	47	299	346	1255	1255
3 OF 3	936+00 TO END	3159	3159	3159	5.4	3159		212	212	251	251
TOTAL		18687	18687	18687	31.6	18687	90	796	886	1565	1565

SUMMARY OF EROSION CONTROL ITEMS				
SHEET NO.	STATION	0506 6041	0506 6043	0506 6053
		BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)	ROCK FILTER DAMS (INSTL) (TY 2) (6:1)
FM 969		LF	LF	LF
1 OF 3	BEGIN TO 912+00			18
2 OF 3	912+00 TO 936+00			18
3 OF 3	936+00 TO END			
TOTAL		*100	*100	36

\* ITEM TO BE USED AS DIRECTED BY THE ENGINEER.





**FM 969**

**QUANTITY SUMMARY**

SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025



# GENERAL NOTES AND SEQUENCE OF CONSTRUCTION

## GENERAL NOTES:

1. DO NOT BLOCK DRAINAGE WHEN HANDLING & STOCKPILING EXCAVATED MATERIAL, MAINTAIN POSITIVE DRAINAGE THROUGHOUT ALL PHASES OF CONSTRUCTION.
2. MAINTAIN ACCESS TO DRIVEWAYS AND INTERSECTIONS THROUGH ALL PHASES OF CONSTRUCTION USING ALL-WEATHER MATERIAL.
3. NO PLAN VIEW TCP PROVIDED, CONSTRUCT THE ROADWAY USING THE PHASED TCP TYPICAL SECTIONS PROVIDED AND THE APPLICABLE TCP STANDARD DETAILS.
4. CONSTRUCT 50':1" VERTICAL TRANSITIONS BETWEEN WORK SECTIONS BEFORE OPENING TO TRAFFIC. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
5. SPRINKLE FOR DUST CONTROL AS DIRECTED, THIS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
6. UTILIZE TCP(2-1)-18 FOR WORK IN THE RIGHT-OF-WAY THAT DOES NOT REQUIRE LANE CLOSURES. THIS WORK INCLUDES: PREPARING ROW, GRADING, DRIVEWAY CONSTRUCTION, SEEDING, ETC.
7. USE 3:1 SAFETY WEDGES FOR ALL DROP-OFFS GREATER THAN TWO INCHES (2") LEFT OVERNIGHT, CONSIDER THIS SUBSIDIARY TO ITEM 502.
8. CONTRACTOR MAY CHANGE SEQUENCE OF CONSTRUCTION WITH PRIOR APPROVAL FROM THE ENGINEER.

## TRAFFIC CONTROL DEVICES:

1. REMOVE OR COMPLETELY COVER ALL EXISTING SIGNS WHICH ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN.
2. RELOCATE STOP SIGNS AS NEEDED ON INTERSECTING STREETS DURING THE VARIOUS CONSTRUCTION PHASES. DO NOT REMOVE ANY EXISTING STOP SIGNS UNTIL TEMPORARY STOP SIGNS ARE IN PLACE.
3. COORDINATE WITH THE TRAFFIC CONTROL PLAN TYPICAL SECTIONS AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT CONSTRUCTION PROJECTS IF APPLICABLE, TO ENSURE THE UNINTERRUPTED AND SAFE FLOW OF TRAFFIC.
4. NOTIFY THE ENGINEER IN WRITING WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. NOTIFICATIONS MUST BE GIVEN A MINIMUM OF THREE WORKING DAYS PRIOR TO THE CHANGE.
5. ALL WORK ZONE PAVEMENT MARKINGS FOR THIS PROJECT SHALL BE 0.100 INCHES (100 MIL) THICK THERMOPLASTIC.

## PROJECT SPECIFIC NOTES:

1. THE TRAFFIC CONTROL PLAN TYPICAL SECTIONS AND VARIOUS PHASES AND SEQUENCES OF CONSTRUCTION SERVE AS A GUIDE FOR THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION OF THE PROJECT ROADWAYS, ASSOCIATED UTILITIES, AND OTHER RELATED ITEMS. THE TCP DOES NOT ATTEMPT TO ADDRESS EVERY ASPECT OF CONSTRUCTION THAT IS REQUIRED DURING EACH PHASE OF CONSTRUCTION. THE TCP DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF CONSTRUCTING THE COMPLETE ROADWAYS, UTILITIES, AND OTHER RELATED ITEMS, AS NOTED ON THE PLANS AND SPECIFICATIONS.
2. NOTIFY THE PROPER CITY, COUNTY, E.M.S., FIRE DEPARTMENT, POLICE DEPARTMENT, TEXAS DEPARTMENT OF PUBLIC SAFETY, AND TXDOT OFFICIALS WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. THE NOTIFICATION MUST BE MADE THREE DAYS PRIOR TO CHANGES.
3. PROTECT THE PAVEMENT FROM ALL DAMAGE AS DIRECTED BY THE ENGINEER WHEN MOVING ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS ANY PAVEMENT. THE CONTRACTOR SHALL KEEP TRAVELED SURFACES USED IN HAULING OPERATIONS CLEAR AND FREE OF DIRT AND OTHER DEBRIS.

## PHASE I:

PHASE I CONSISTS OF CONSTRUCTING SPOT PAVEMENT REPAIRS AS DETERMINED BY THE ENGINEER, TYPE D HMA MILL AND OVERLAY AND INSTALLING TEMPORARY BRIDGE END TREATMENT AS DETERMINED BY THE ENGINEER. A CONTINUOUS 24-HR OPERATION SHALL BE UTILIZED WHERE TWO-WAY TRAFFIC CANNOT BE MAINTAINED DURING NON-WORK HOURS. SEE TCP TYPICAL SECTIONS PHASE I FOR MORE DETAILS.

1. INSTALL TEMPORARY SIGNAGE AND EROSION CONTROL ITEMS IN ACCORDANCE TO APPLICABLE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER. THESE SIGNS AND EROSION CONTROL ITEMS SHALL BE ERECTED AND IN PLACE PRIOR TO COMMENCING ANY CONSTRUCTION AND SHALL REMAIN IN PLACE DURING THE CONSTRUCTION PHASE.
2. CLOSE ONE LANE FOR THE LIMITS OF THE WORKZONE USING TCP(2-2b)-18. EXISTING TRAFFIC SHALL BE SHIFTED TO ONE SIDE OF FM 969 CENTERLINE.
3. PERFORM SPOT PAVEMENT REPAIR TO ROAD CENTERLINE AS DETERMINED BY THE ENGINEER. 3" FULL-DEPTH REPAIR SHALL BE USED FOR SURFACE FAILURES AND 6" FULL-DEPTH REPAIR SHALL BE USED FOR BASE FAILURES.
4. MILL 1.5" IN MILL LOCATIONS, PLACE BONDING COURSE AND 1.5" OF TYPE D HMA AS SHOWN IN THE PLANS. TYPE D HMA OVERLAY WILL BE USED TO CORRECT ROAD CROSS SLOPE TO 2% EXCEPT AT SUPERELEVATION LOCATIONS. CONTRACTOR MUST MILL AND OVERLAY WITHIN ONE TCP SHIFT. MILLED AREAS ARE NOT TO BE DRIVEN UPON.
5. CONTRACTOR TO PROVIDE A 50':1" VERTICAL TRANSITION AT BRIDGE ENDS BEFORE OPENING TO TRAFFIC. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS.
6. ADJUST MBGF AS SHOWN IN THE TRAFFIC CONTROL PLAN MISCELLANEOUS DETAILS.
7. OPEN CLOSED TRAVEL LANE TO TRAFFIC AS SHOWN IN TCP TYPICAL SECTIONS.
8. REPEAT STEPS 2 - 5 ON THE OPPOSITE SIDE OF FM 969 CENTERLINE.

## PHASE II:

PHASE II CONSISTS OF CONSTRUCTING PROPOSED CULVERT WIDENING AND WIDENED PAVEMENT. SEE TCP TYPICAL SECTIONS PHASE II FOR MORE DETAILS.

1. INSTALL AND ADJUST TEMPORARY SIGNAGE AND EROSION CONTROL ITEMS IN ACCORDANCE TO APPLICABLE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER. THESE SIGNS AND EROSION CONTROL ITEMS SHALL BE ERECTED AND IN PLACE PRIOR TO COMMENCING ANY CONSTRUCTION AND SHALL REMAIN IN PLACE DURING THE CONSTRUCTION PHASE.
2. UTILIZE TCP(3-1)-13 AND TCP(3-3)-14 TO INSTALL WORK ZONE PAVEMENT MARKINGS.
3. SHIFT TRAFFIC FOR THE LIMITS OF THE WORKZONE USING TCP(2-3)-18 AS SHOWN ON FM 969 TCP TYPICAL SECTIONS PHASE II PAVEMENT WIDENING.
4. CONSTRUCT CULVERT WIDENING AS SHOWN IN THE PLANS
5. SAWCUT, EXCAVATE, AND PREPARE SUBGRADE AS SHOWN ON FM 969 TCP TYPICAL SECTIONS.
6. INSTALL WIDENED PAVEMENT STRUCTURE ALONG ONE SIDE AS CONSTRUCTION PROGRESSES. TYPE D HMA SHALL BE CONTINUOUSLY PLACED WITHIN STATION LIMITS SHOWN ON TCP TYPICAL SECTIONS.
7. UTILIZING FM 969 EROSION CONTROL LAYOUTS, INSTALL TOPSOIL AND SEEDING.

## PHASE III:

PHASE III CONSISTS OF CONSTRUCTING PROPOSED WIDENED PAVEMENT. SEE TCP TYPICAL SECTIONS PHASE III FOR MORE DETAILS.

1. INSTALL AND ADJUST TEMPORARY SIGNAGE AND EROSION CONTROL ITEMS IN ACCORDANCE TO APPLICABLE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER. THESE SIGNS AND EROSION CONTROL ITEMS SHALL BE ERECTED AND IN PLACE PRIOR TO COMMENCING ANY CONSTRUCTION AND SHALL REMAIN IN PLACE DURING THE CONSTRUCTION PHASE.
2. UTILIZE TCP(3-1)-13 AND TCP(3-3)-14 TO INSTALL WORK ZONE PAVEMENT MARKINGS.
3. SHIFT TRAFFIC FOR THE LIMITS OF THE WORKZONE USING TCP(2-3)-18 AS SHOWN ON FM 969 TCP TYPICAL SECTIONS PHASE III PAVEMENT WIDENING.
4. SAWCUT, EXCAVATE, AND PREPARE SUBGRADE AS SHOWN ON FM 969 TCP TYPICAL SECTIONS.
5. INSTALL WIDENED PAVEMENT STRUCTURE ALONG ONE SIDE AS CONSTRUCTION PROGRESSES. TYPE D HMA SHALL BE CONTINUOUSLY PLACED WITHIN STATION LIMITS SHOWN ON TCP TYPICAL SECTIONS.
6. UTILIZING FM 969 EROSION CONTROL LAYOUTS, INSTALL TOPSOIL AND SEEDING.

## PHASE IV:

PHASE IV INCLUDES COMPLETING THE FINAL SURFACE, PLACING FINAL PAVEMENT MARKINGS AND SIGNAGE, PLACING MBGF AND END TREATMENTS TO FINAL CONDITION, AND PLACING PERMANENT EROSION CONTROL ITEMS AS SHOWN IN THE PLANS OR AS DETERMINED BY THE ENGINEER. A CONTINUOUS 24-HR OPERATION SHALL BE UTILIZED WHERE TWO-WAY TRAFFIC CANNOT BE MAINTAINED DURING NON-WORK HOURS.

1. INSTALL AND ADJUST TEMPORARY SIGNAGE AND EROSION CONTROL ITEMS IN ACCORDANCE TO APPLICABLE STANDARDS AND/OR AS DIRECTED BY THE ENGINEER. THESE SIGNS AND EROSION CONTROL ITEMS SHALL BE ERECTED AND IN PLACE PRIOR TO COMMENCING ANY CONSTRUCTION AND SHALL REMAIN IN PLACE DURING THE CONSTRUCTION PHASE.
2. PLACE BONDING COURSE AND 1" TOM OVER THE ENTIRE PROJECT AS SHOWN ON THE TYPICAL SECTIONS. UTILIZING TCP(2-2b)-18, USE ONE-WAY TRAFFIC CONTROL WHILE THE LANES CLOSURES ARE IN PLACE.
3. INSTALL MBGF AND END TREATMENTS TO FINAL CONDITION AS SHOWN IN THE TCP MISCELLANEOUS DETAILS.
4. UTILIZING TCP(3-1)-13 & TCP(3-3)-14, INSTALL FINAL PAVEMENT MARKINGS AND MARKERS AS SHOWN ON THE PAVEMENT MARKING LAYOUTS.
5. INSTALL ANY REMAINING SIGNS AND DELINEATION AND COMPLETE ALL MISCELLANEOUS WORK TO FINISH THE PROJECT AS DIRECTED BY THE ENGINEER.
6. REMOVE EROSION CONTROL DEVICES ONCE SUFFICIENT VEGETATION IS ESTABLISHED AND APPROVED BY THE ENGINEER.
7. PRIOR TO FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL TEMPORARY STRIPING, BARRICADES AND SIGNS, AND OPEN ALL TRAVEL LANES TO TRAFFIC BUT MUST LEAVE ADVANCED WARNING SIGNS IN PLACE UNTIL FINAL ACCEPTANCE BY THE ENGINEER.



FILENAME: c:\pwworking\100152779\FM969\_TCP\_SOW.dgn  
 PLOTTED: 5/11/2022 4:22:35 PM

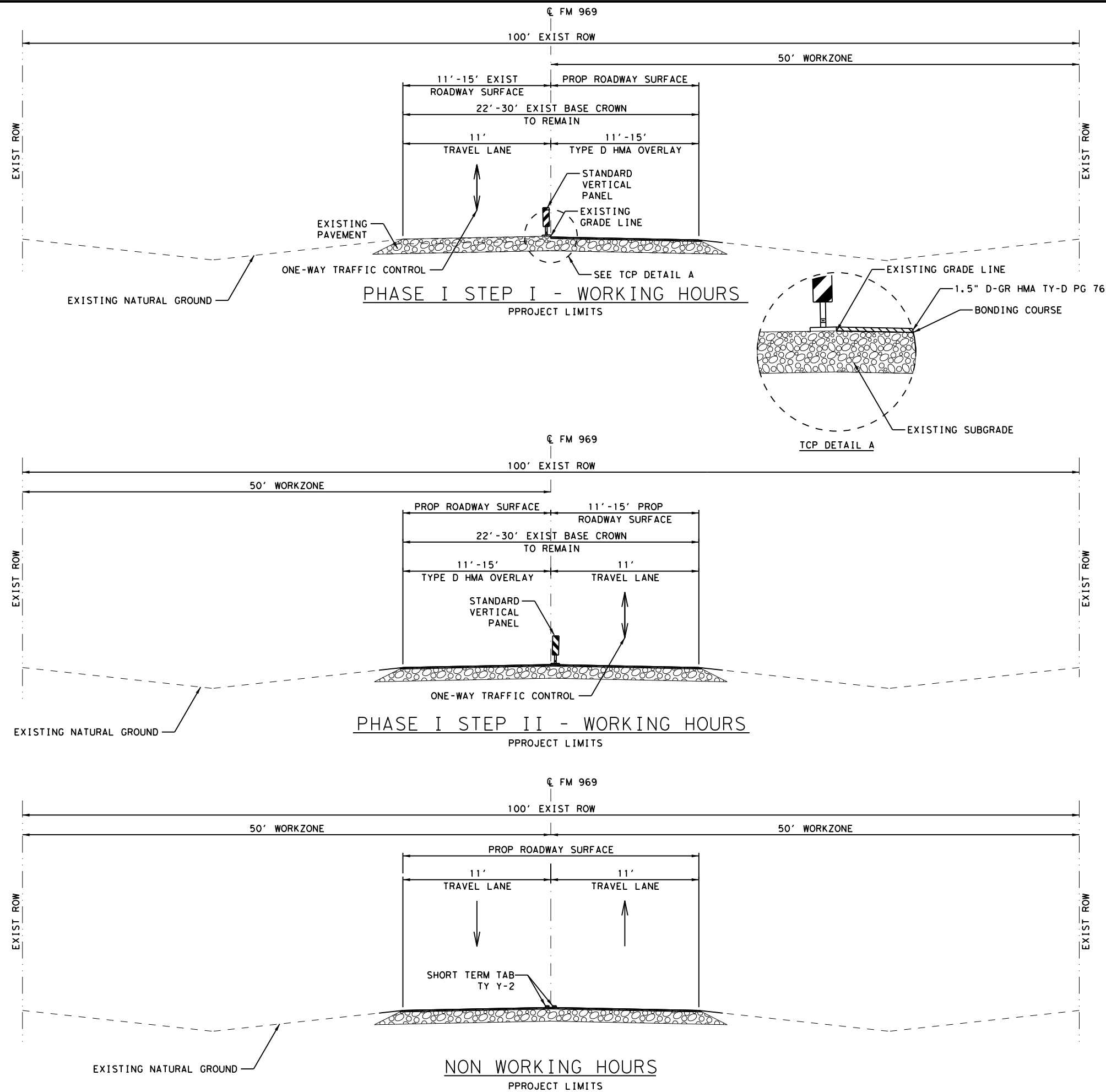
Kimley»Horn
F-928

FM 969

SEQUENCE OF WORK

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025



**NOTE TO CONTRACTOR:**

- NO PLAN VIEW TCP PROVIDED. USE TCP(2-2b)-18 FOR ONE-WAY TRAFFIC CONTROL SETUP/LANE CLOSURE DETAILS.
- USE 3:1 SAFETY SLOPES FOR ALL DROPOFFS GREATER THAN 2-INCHES AT THE END OF WORKSHIFT, CONSIDER THIS SUBSIDIARY TO ITEM 502.
- SEQUENCE OF CONSTRUCTION CAN BE CHANGED WITH PRIOR APPROVAL FROM ENGINEER.
- PHASE I, STEP I CONSTRUCTION MAY BE INTERCHANGED WITH PHASE I, STEP II CONSTRUCTION. HOWEVER, STEP I AND STEP II SHALL NOT BE OPERATED CONCURRENTLY.
- MAINTAIN A 1 FT CLEARZONE BETWEEN EDGE OF TRAVEL LANE AND VERTICAL PANEL.
- REFER TO BC STANDARDS FOR VERTICAL PANEL SPACING REQUIREMENTS.
- REFER TO TCP MISCELLANEOUS DETAILS FOR MBGF REMOVAL AND INSTALLATION FOR PHASE I.
- REFER TO ROADWAY PLAN & PROFILE FOR EXACT MILL & OVERLAY LIMITS.

TSN  
 5/11/2022

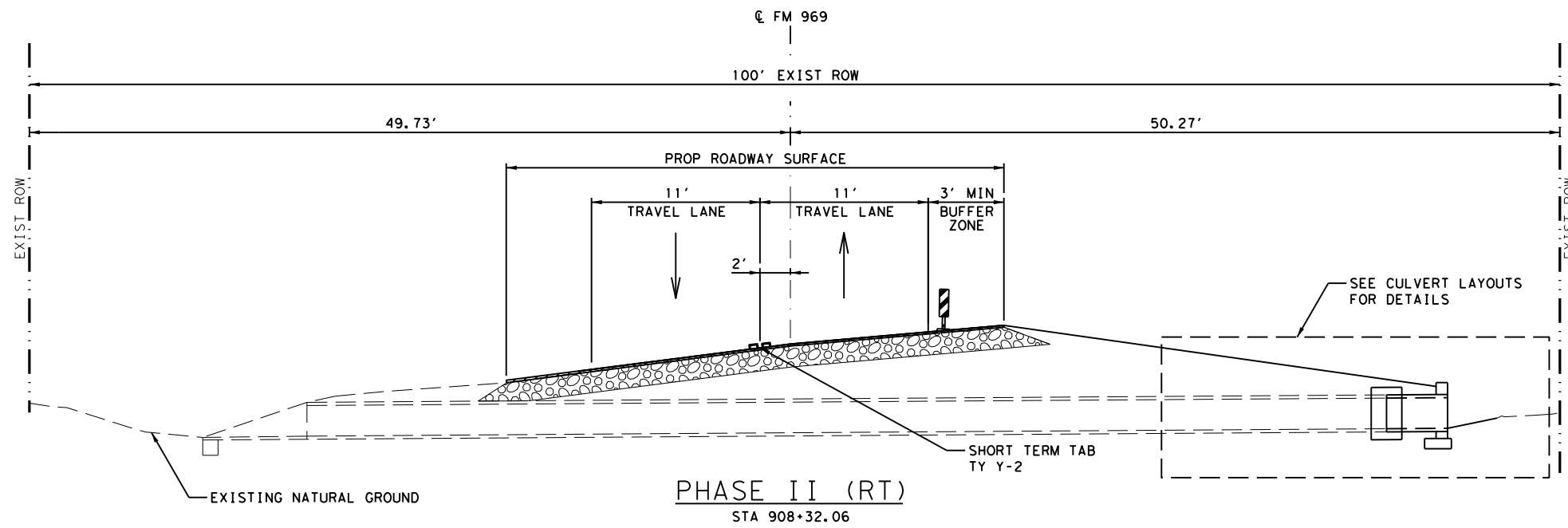
**FM 969**  
**TCP TYPICAL SECTIONS**  
**PHASE I**  
**FULL DEPTH REPAIR**

SCALE: 10'      SHEET 1 OF 1

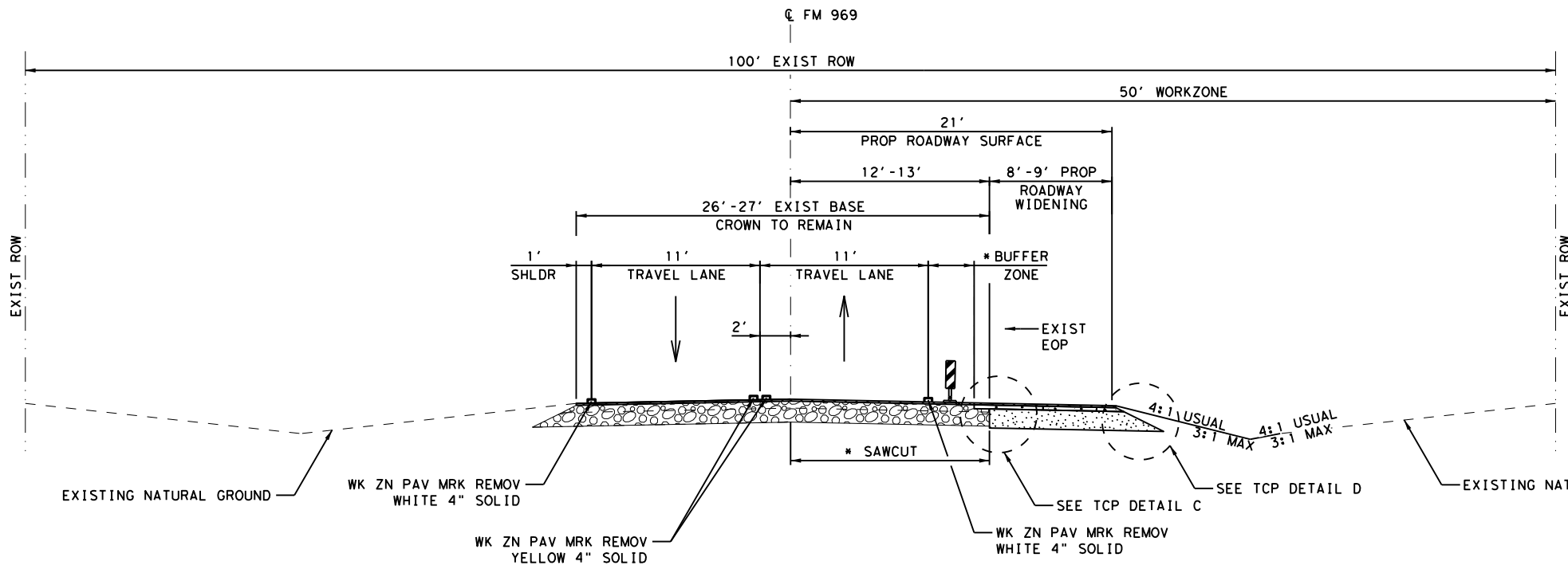
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 13

FILENAME: c:\pwworkh1\00152779\FM969\_TCP\_TYP\_01.dgn  
 PLOTTED: 5/11/2022 4:22:53 PM

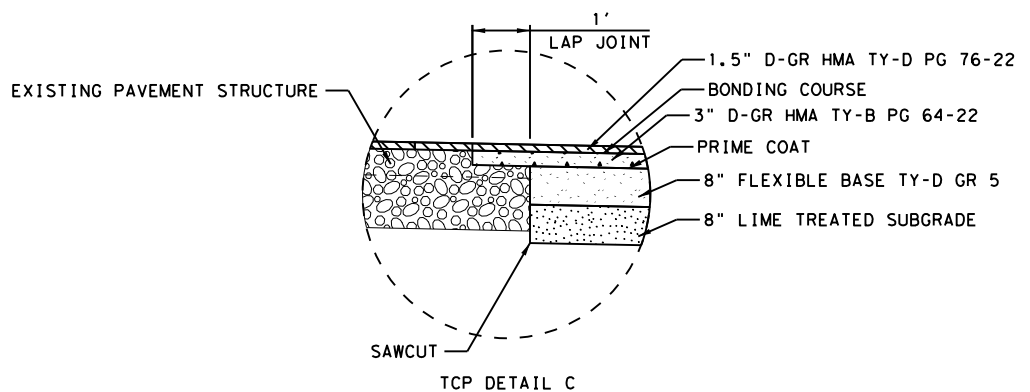


**PHASE II (RT)**  
STA 908+32.06

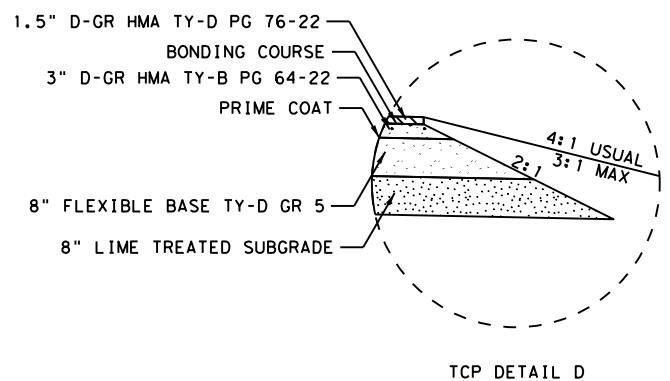


**PHASE II**  
STA 892+67.00 TO STA 918+02.53  
STA 921+91.34 TO STA 945+82.00

\* REFER TO PLAN & PROFILE FOR SAWCUT LOCATIONS



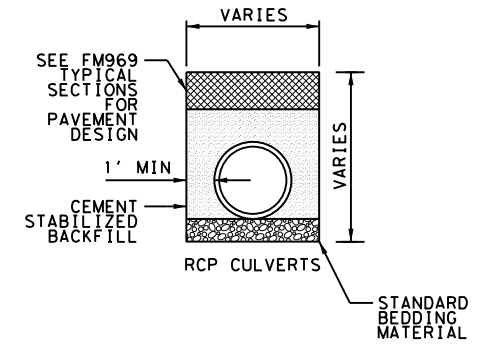
TCP DETAIL C



TCP DETAIL D

**NOTE TO CONTRACTOR:**

1. NO PLAN VIEW TCP PROVIDED. USE TCP(2-3)-18 FOR TWO-WAY SETUP/LANE CLOSURE DETAILS.
2. USE 3:1 SAFETY SLOPES FOR ALL DROPOFFS GREATER THAN 2-INCHES AT THE END OF WORKSHIFT, CONSIDER THIS SUBSIDIARY TO ITEM 502.
3. SEQUENCE OF CONSTRUCTION CAN BE CHANGED WITH PRIOR APPROVAL FROM ENGINEER.
4. MAINTAIN A 1 FT CLEARZONE BETWEEN EDGE OF TRAVEL LANE AND TRAFFIC BARREL.
5. REFER TO BC STANDARDS FOR VERTICAL PANEL SPACING REQUIREMENTS.



5/11/2022

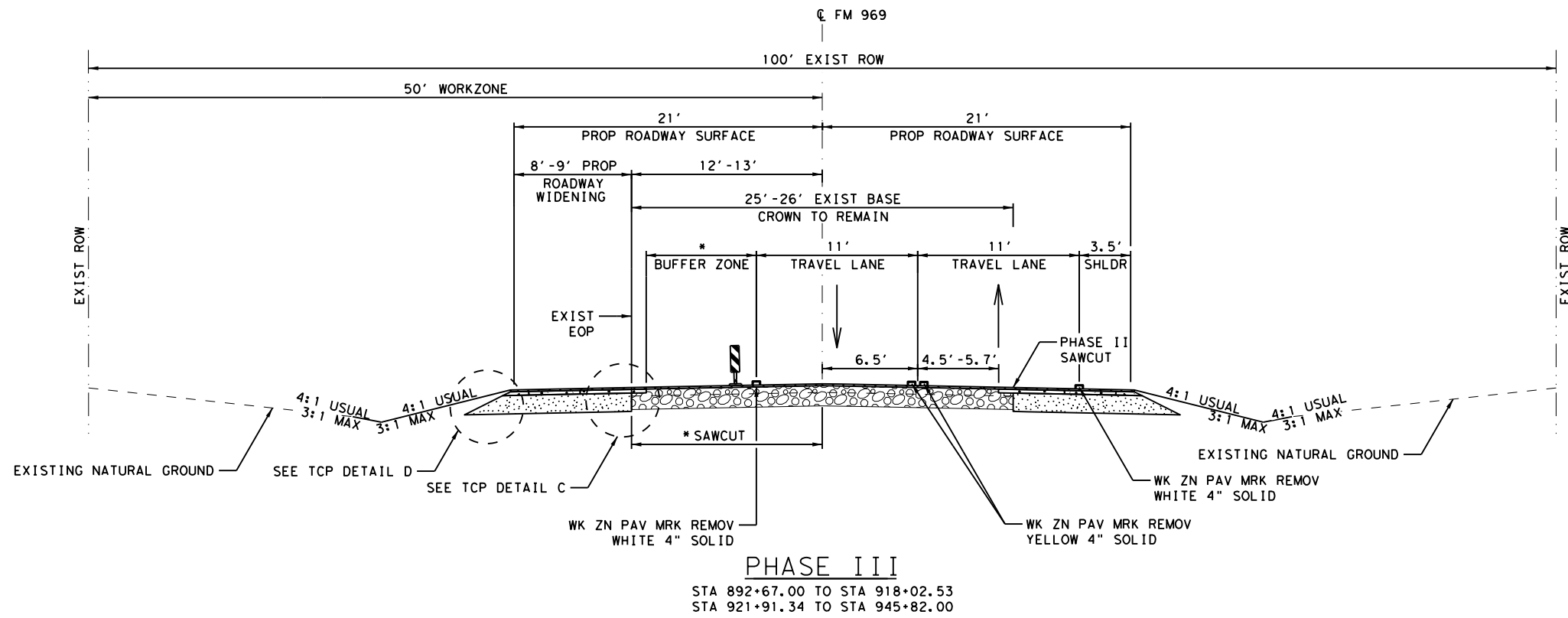
**Kimley»Horn** F-928

© 2022

Texas Department of Transportation

FM 969			
TCP TYPICAL SECTIONS PHASE II PAVEMENT WIDENING			
SCALE: 10'		SHEET 1 OF 1	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	14
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: c:\pwworking\kimleyhorn\152779\FM969\_TCP\_TYP\_02.dgn  
 PLOTTED: 5/11/2022 4:23:05 PM

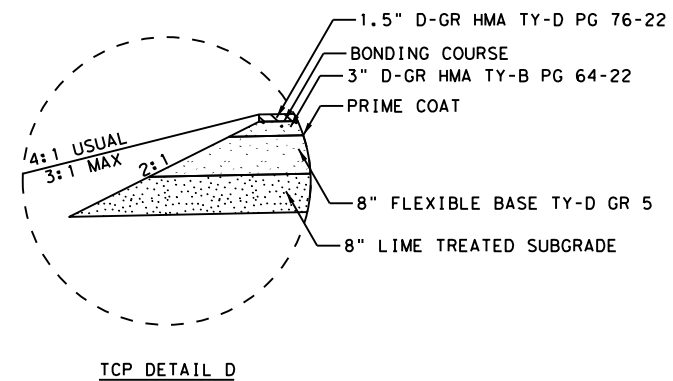
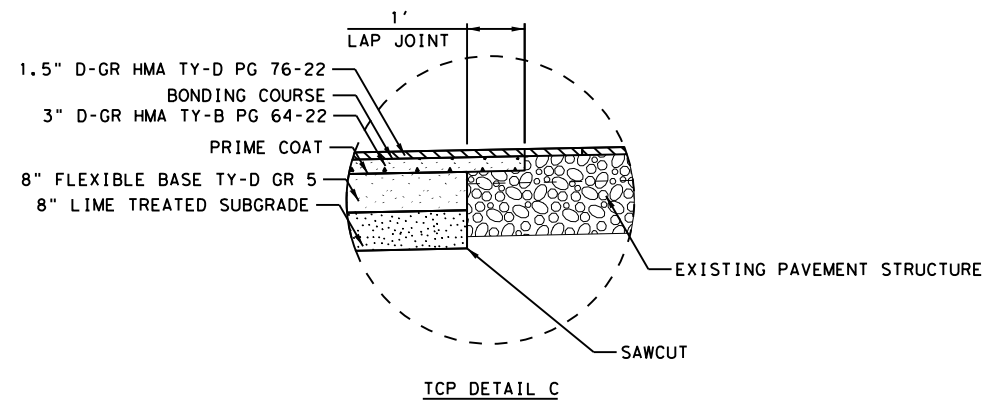


\* REFER TO PLAN & PROFILE FOR SAWCUT LOCATIONS

**NOTE TO CONTRACTOR:**

1. NO PLAN VIEW TCP PROVIDED. USE TCP(2-3)-18 FOR TWO-WAY SETUP/LANE CLOSURE DETAILS.
2. USE 3:1 SAFETY SLOPES FOR ALL DROPOFFS GREATER THAN 2-INCHES AT THE END OF WORKSHIFT, CONSIDER THIS SUBSIDIARY TO ITEM 502.
3. SEQUENCE OF CONSTRUCTION CAN BE CHANGED WITH PRIOR APPROVAL FROM ENGINEER.
4. MAINTAIN A 1 FT CLEARZONE BETWEEN EDGE OF TRAVEL LANE AND TRAFFIC BARREL.
5. REFER TO BC STANDARDS FOR VERTICAL PANEL SPACING REQUIREMENTS.

  
 5/11/2022  








**FM 969**

**TCP TYPICAL SECTIONS**  
**PHASE III**  
**PAVEMENT WIDENING**

SCALE: 10'		SHEET 1 OF 1	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	15
CONT.	SECT.	JOB	
1186	02	025	

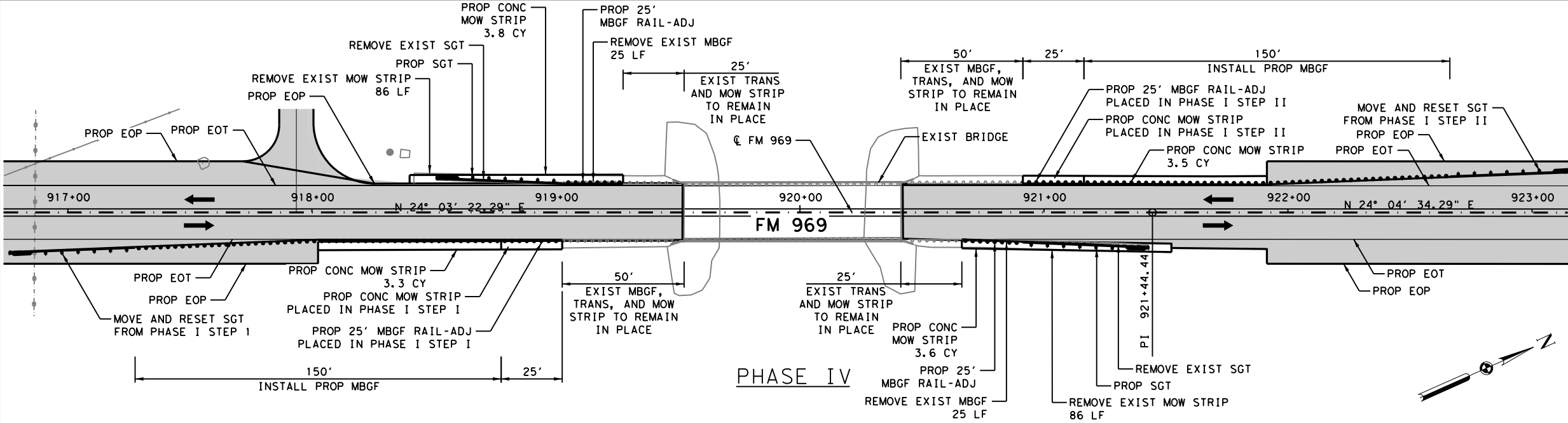
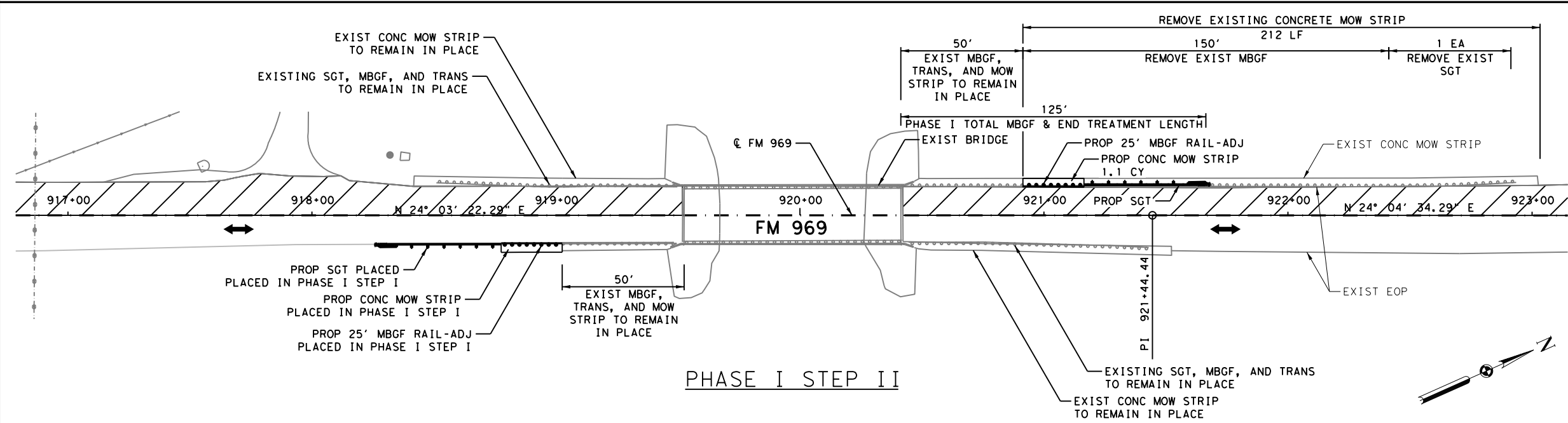
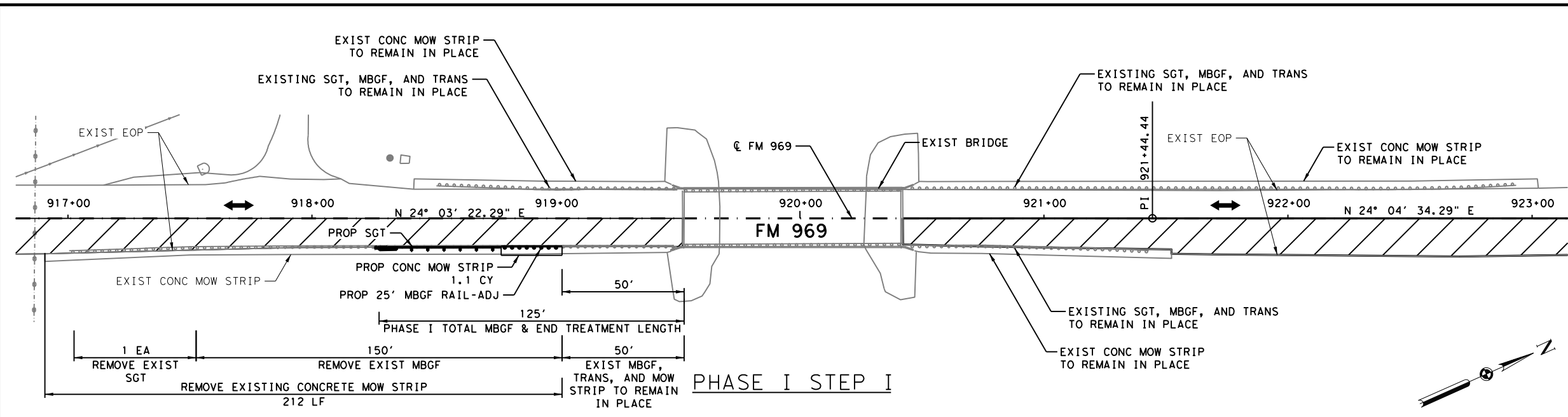
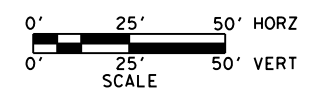


**LEGEND**

-  TRAFFIC DIRECTION
-  FINAL PAVEMENT SURFACE
-  BASE REPAIR CURRENT PHASE

**NOTE TO CONTRACTOR:**

1. CONTRACTOR WILL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS.
2. END TREATMENT INSTALLED IN PHASE I TO REMAIN IN PLACE UNTIL END OF PHASE IV. SEE SEQUENCE OF WORK FOR MORE INFORMATION.
3. SEE SEQUENCE OF WORK AND TCP TYPICAL SECTIONS FOR MORE INFORMATION.
4. USE 3:1 SAFETY SLOPES FOR ALL DROPOFFS GREATER THAN 2-INCHES AT THE END OF WORKSHIFT, CONSIDER THIS SUBSIDIARY TO ITEM 502.
5. MAINTAIN A 1 FT CLEARZONE BETWEEN EDGE OF TRAVEL LANE AND VERTICAL PANEL.



FILENAME: c:\pwworking\152779\FM969\_TCP\_MISC.01.dgn  
 PLOTTED: 5/11/2022 4:23:38 PM



**FM 969**  
**TRAFFIC CONTROL PLAN**  
**MISCELLANEOUS DETAILS**

SCALE: 50'		SHEET 1 OF 1	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	16
CONT.	SECT.	JOB	
1186	02	025	

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

DATE: 5/11/2022 4:23:51 PM  
 FILE: c:\pw\khl\d0168457\bc-21.dgn

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

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

**WORKER SAFETY NOTES:**

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

**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

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

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

SHEET 1 OF 12



**BARRICADE AND CONSTRUCTION  
GENERAL NOTES  
AND REQUIREMENTS**

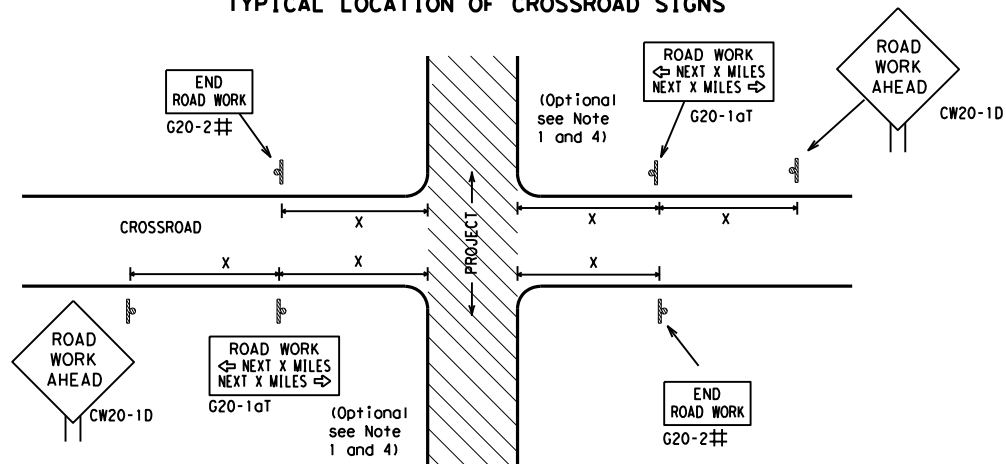
**BC (1) -21**

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CR:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
4-03	7-13	DIST	COUNTY	SHEET NO.					
9-07	8-14	5-10	AUS	BASTROP	17				
5-10	5-21								



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

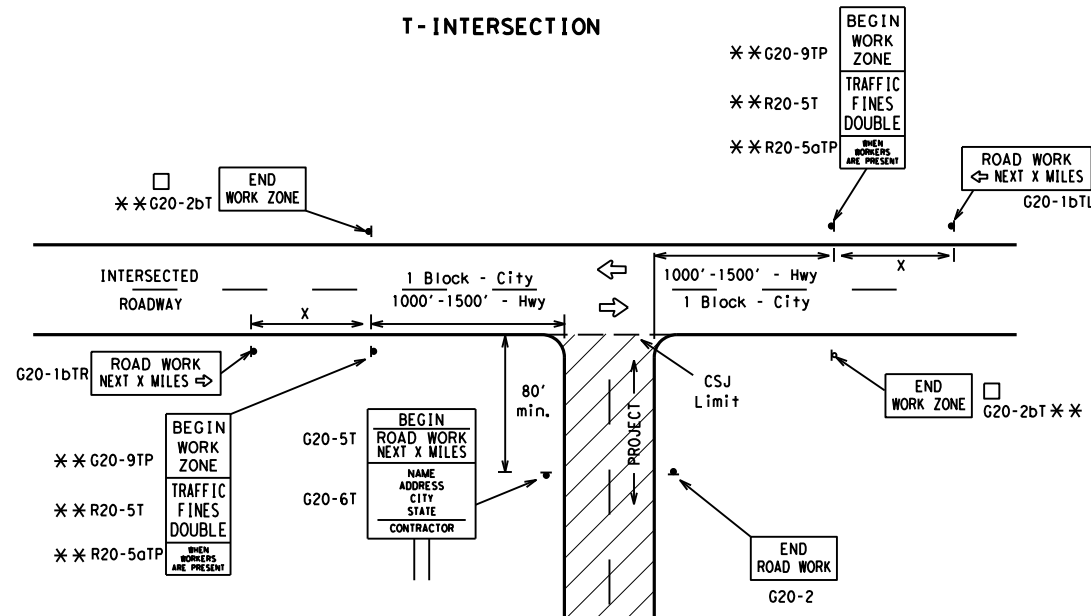
**TYPICAL LOCATION OF CROSSROAD SIGNS**



# 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<sup>1,5,6</sup>**

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 <sup>4</sup>	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 <sup>2</sup>
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 <sup>2</sup>
			65	700 <sup>2</sup>
			70	800 <sup>2</sup>
			75	900 <sup>2</sup>
			80	1000 <sup>2</sup>
			*	* <sup>3</sup>

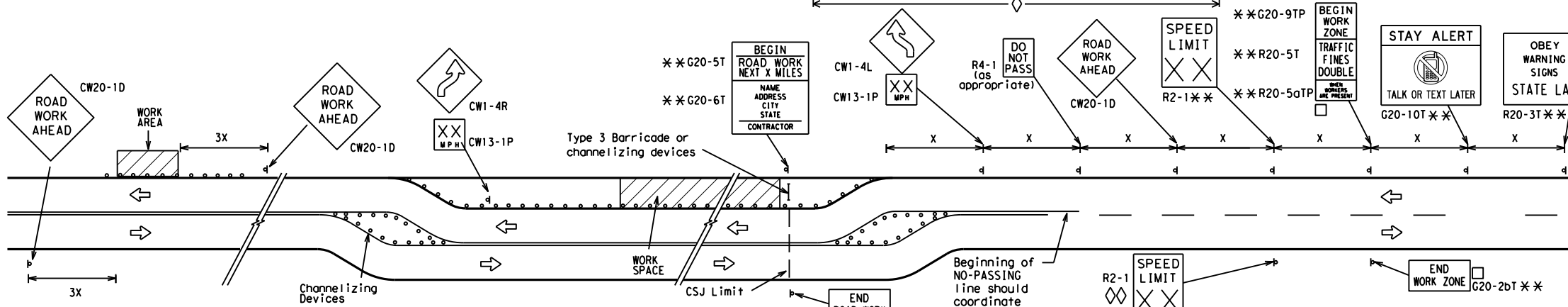
\* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

**GENERAL NOTES**

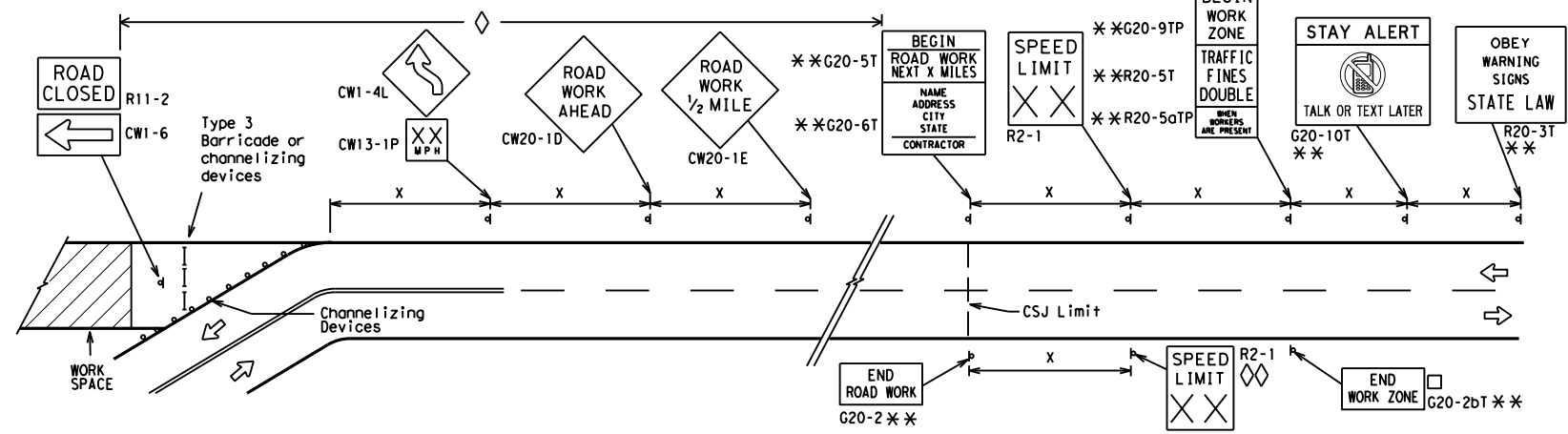
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

**WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS**



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

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



**NOTES**

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

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

SHEET 2 OF 12



**BARRICADE AND CONSTRUCTION PROJECT LIMIT**

**BC(2)-21**

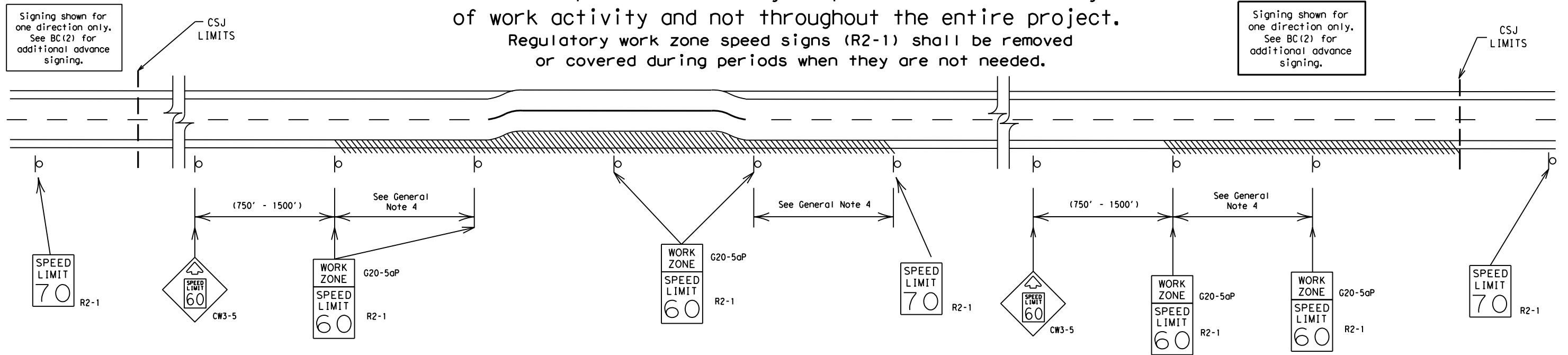
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	AUS	BASTROP	18	

DATE: 5/11/2022 4:23:56 PM  
 FILE: c:\pwworking\dot168457\bc-21.dgn

# 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.

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

DATE: 5/11/2022 4:24:03 PM  
FILE: c:\pwworking\dot\118602\118602\_02\118602\_02\_025\_fm969.dgn

SHEET 3 OF 12



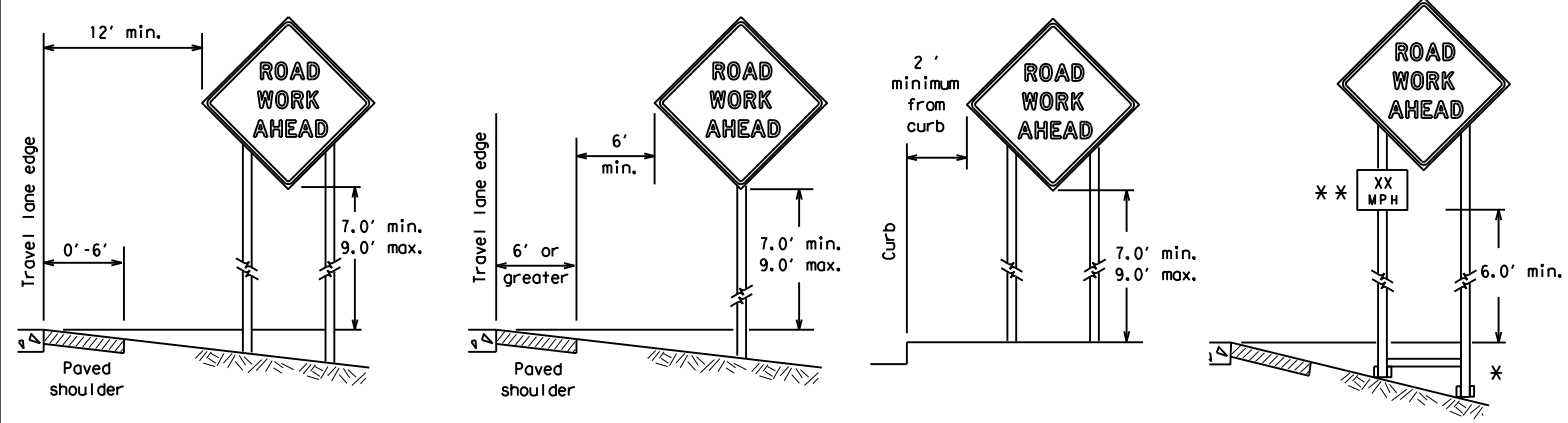
## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3) - 21

FILE:	bc-21.dgn	DW:	TxDOT	CR:	TxDOT	DW:	TxDOT	CR:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
9-07	8-14	DIST	COUNTY		SHEET NO.				
7-13	5-21	AUS	BASTROP		19				

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

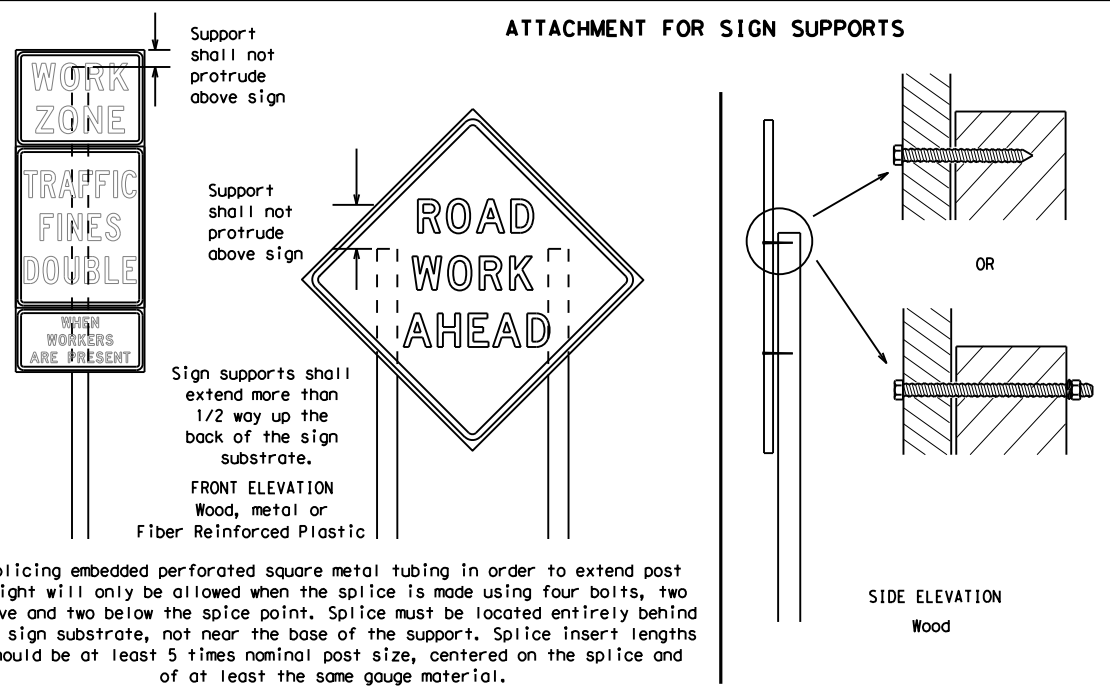
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



\* 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**



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

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

**GENERAL NOTES FOR WORK ZONE SIGNS**

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

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

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

**SIGN MOUNTING HEIGHT**

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

**SIZE OF SIGNS**

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

**SIGN SUBSTRATES**

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

**REFLECTIVE SHEETING**

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

**SIGN LETTERS**

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

**REMOVING OR COVERING**

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

**SIGN SUPPORT WEIGHTS**

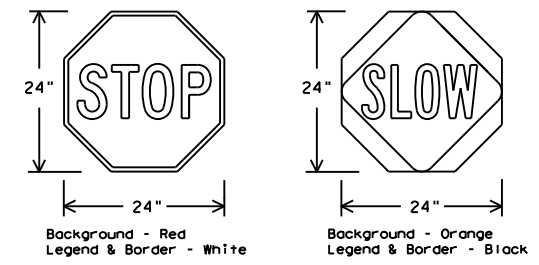
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not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

**FLAGS ON SIGNS**

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

**STOP/SLOW PADDLES**

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



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

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

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



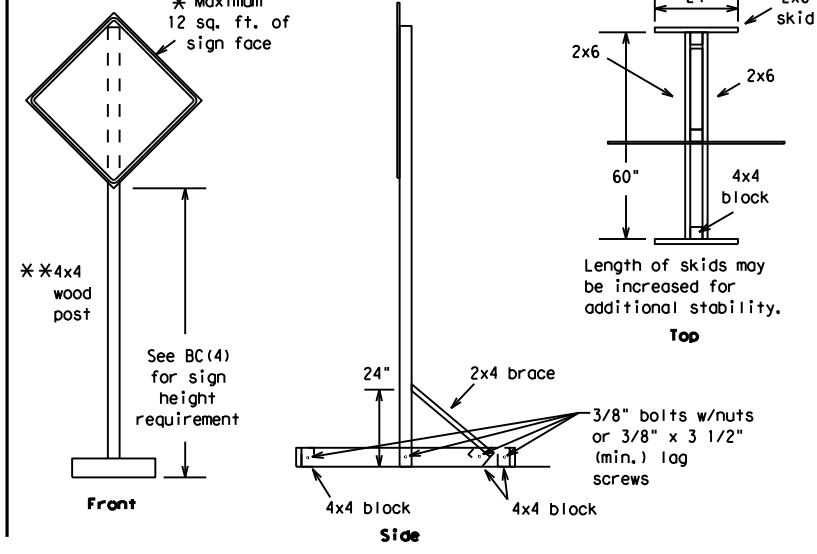
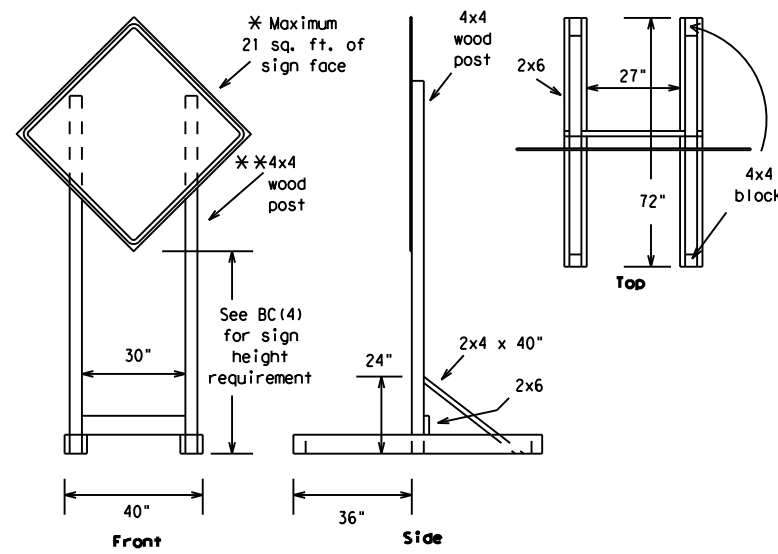
**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

**BC (4) - 21**

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	AUS	BASTROP	20					

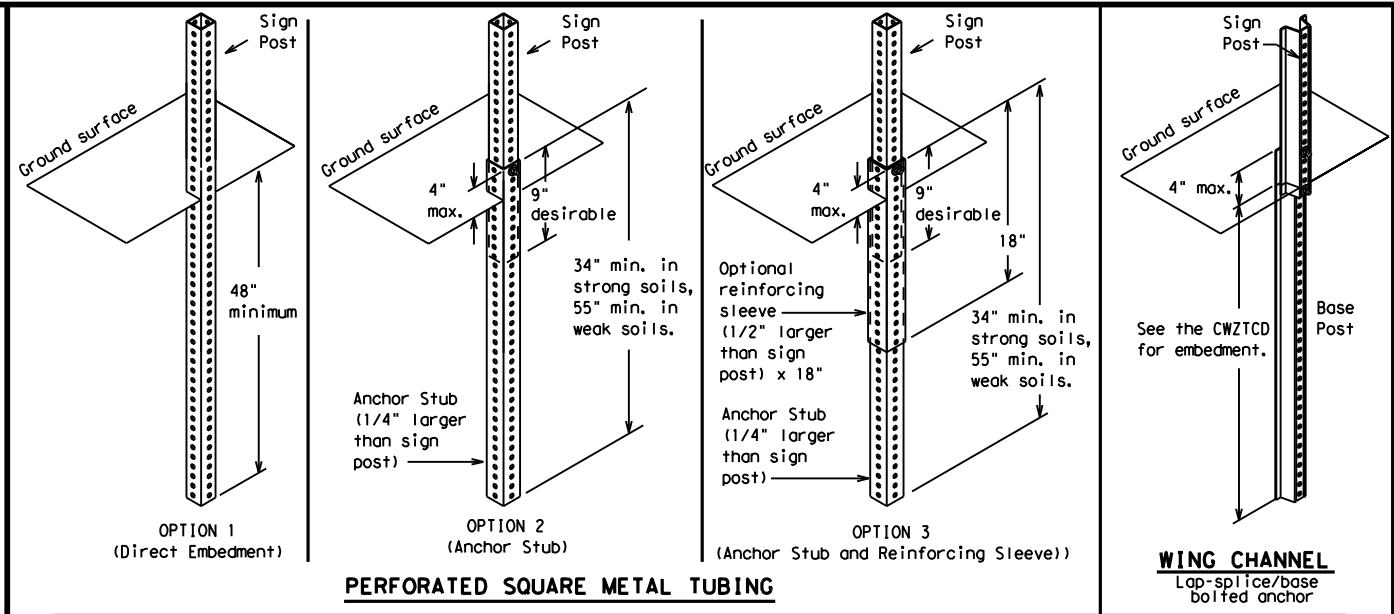
DATE: 5/11/2022 4:24:08 PM  
FILE: c:\pwworking\10168457\bc-21.dgn

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



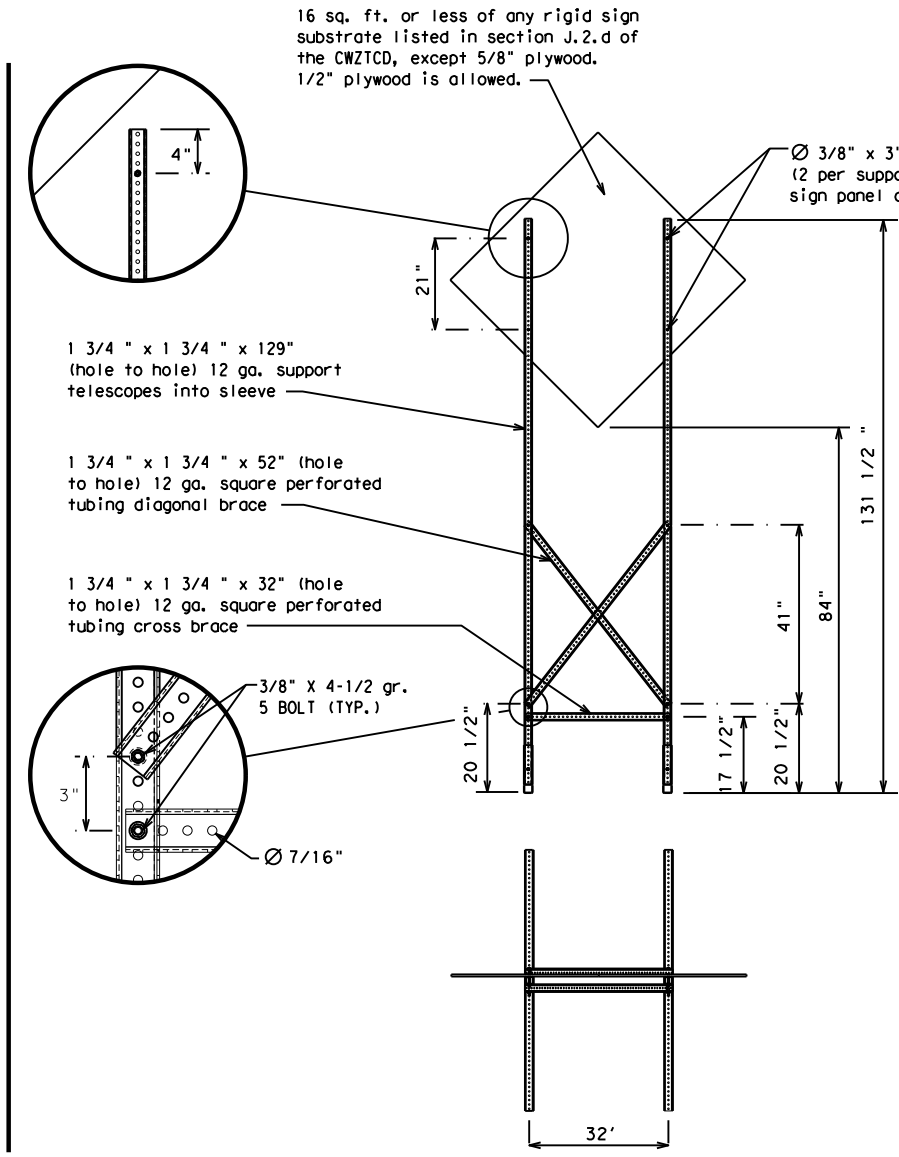
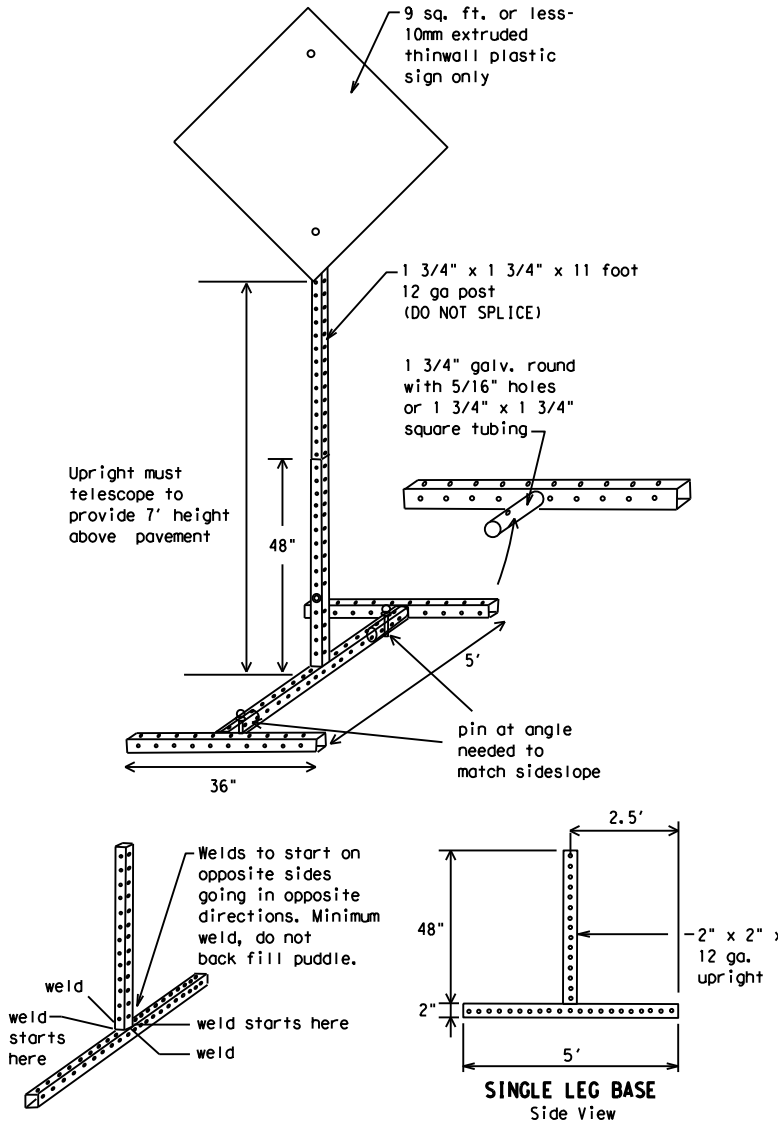
### SKID MOUNTED WOOD SIGN SUPPORTS

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



### GROUND MOUNTED SIGN SUPPORTS

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



### SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

### WEDGE ANCHORS

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

### OTHER DESIGNS

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

### GENERAL NOTES

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

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

SHEET 5 OF 12



## BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	AUS	BASTROP	21	

DATE: 5/11/2022 4:24:14 PM  
FILE: c:\pw\khl\d0168457\bc-21.dgn

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXXX BLVD CLOSED	

### Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

### Location List

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

### Warning List

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

### \*\* Advance Notice List

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

\*\* See Application Guidelines Note 6.

## APPLICATION GUIDELINES

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

## WORDING ALTERNATIVES

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

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

## FULL MATRIX PCMS SIGNS

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

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

DATE: 5/11/2022 4:24:19 PM  
FILE: c:\pwworking\dot168457\bc-21.dgn

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
Hour(s)	HR, HRS	Time Minutes	TIME MIN
Information	INFO	Upper Level	UPR LEVEL
It Is	ITS	Vehicles (s)	VEH, VEHS
Junction	JCT	Warning	WARN
Left	LFT	Wednesday	WED
Left Lane	LFT LN	Weight Limit	WT LIMIT
Lane Closed	LN CLOSED	West	W
Lower Level	LWR LEVEL	Westbound	(route) W
Maintenance	MAINT	Wet Pavement	WET PVMT
		Will Not	WONT

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



## BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

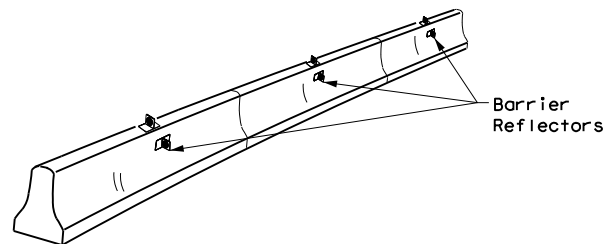
BC (6) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT:	1186	SECT:	02	JOB:	025	HIGHWAY:	FM 969
REVISIONS		DIST:		COUNTY:		SHEET NO.:			
9-07	8-14	AUS:		BASTROP					22
7-13	5-21								



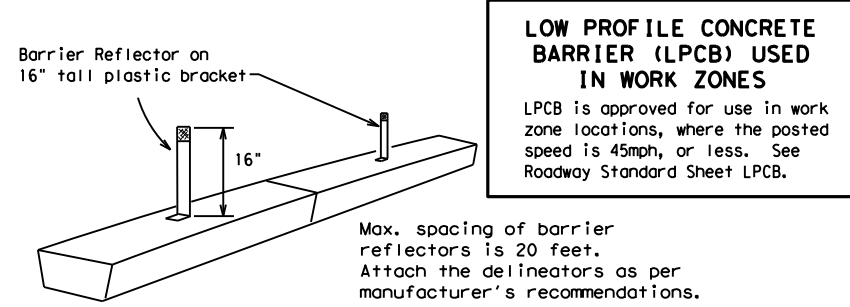
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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



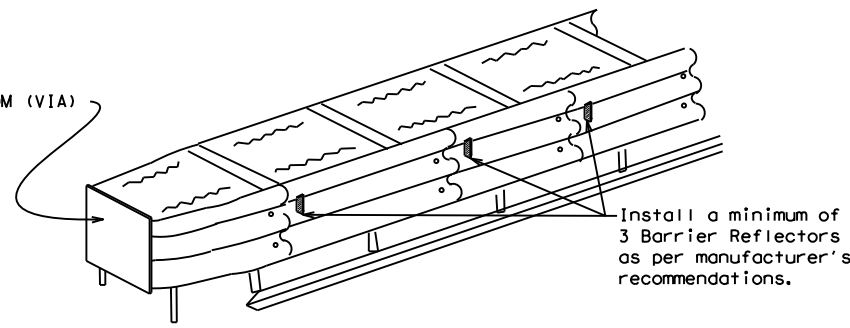
**CONCRETE TRAFFIC BARRIER (CTB)**

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



**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**  
 LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

**LOW PROFILE CONCRETE BARRIER (LPCB)**



**DELINEATION OF END TREATMENTS**

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**  
 End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

**BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS**

**WARNING LIGHTS**

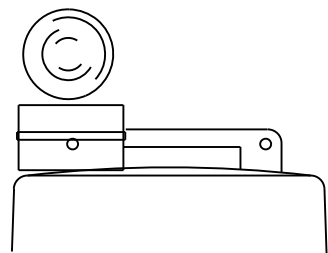
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

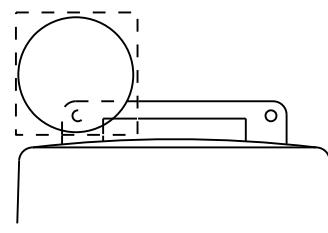
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



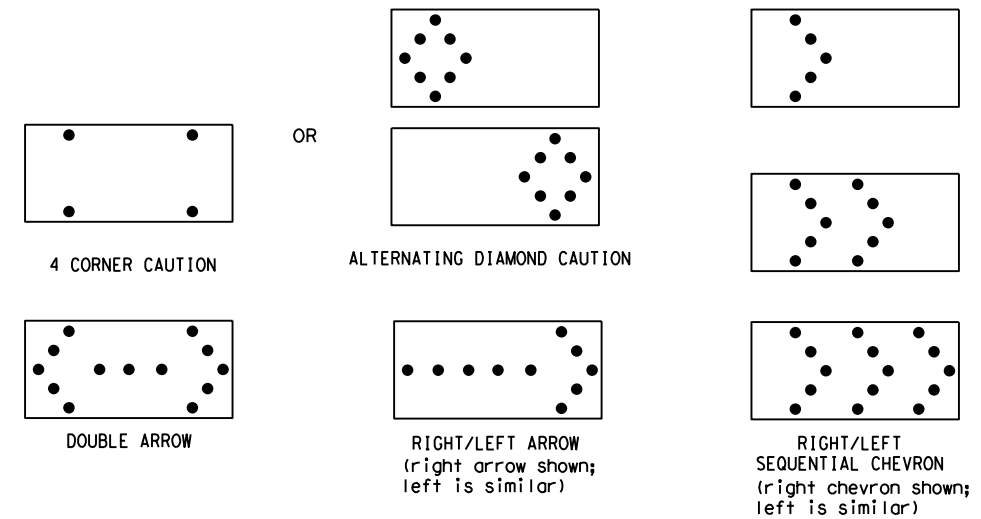
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

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



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

**BC (7) -21**

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
9-07	8-14	DIST	COUNTY		SHEET NO.				
7-13	5-21	AUS	BASTROP		23				

DATE: 5/11/2022 4:24:24 PM  
 FILE: c:\pwworking\dot\168457\bc-21.dgn

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

DATE: 5/11/2022 4:24:30 PM  
 FILE: c:\pwworking\dot\168457\bc-21.dgn

**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:

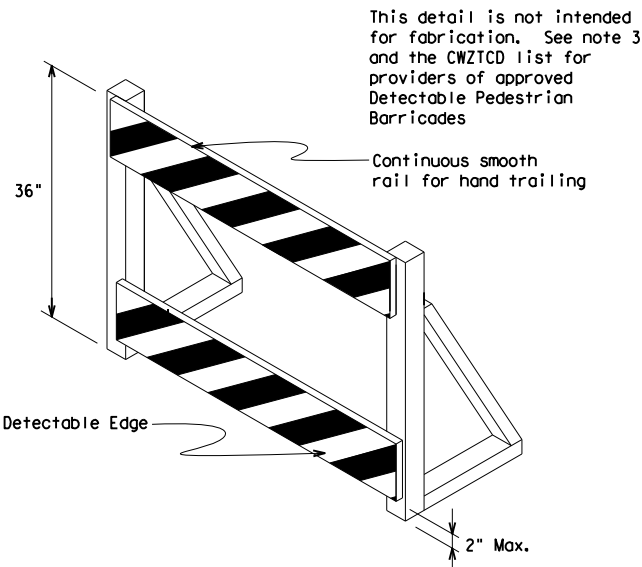
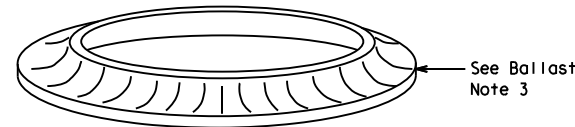
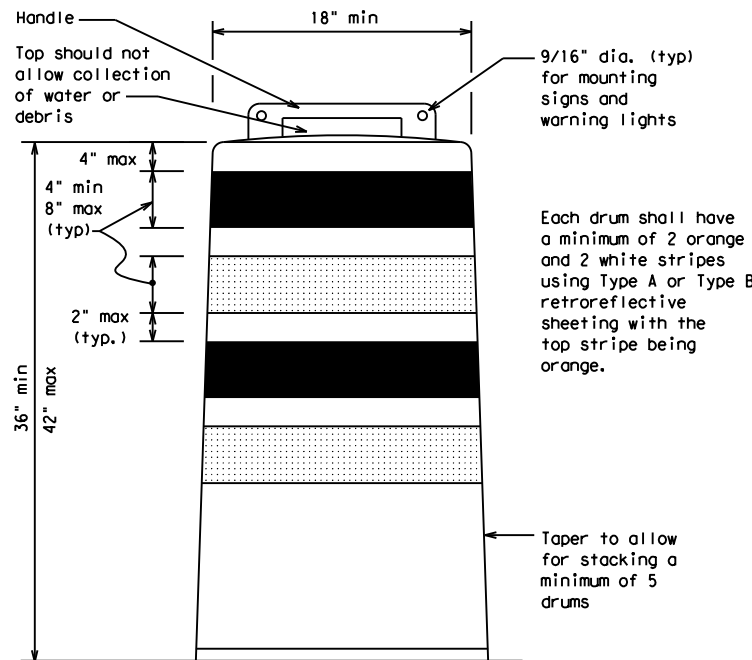
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

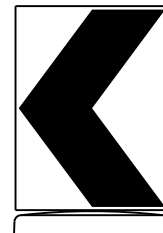
**BALLAST**

- 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.

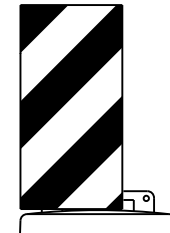


**DETECTABLE PEDESTRIAN BARRICADES**

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

SHEET 8 OF 12

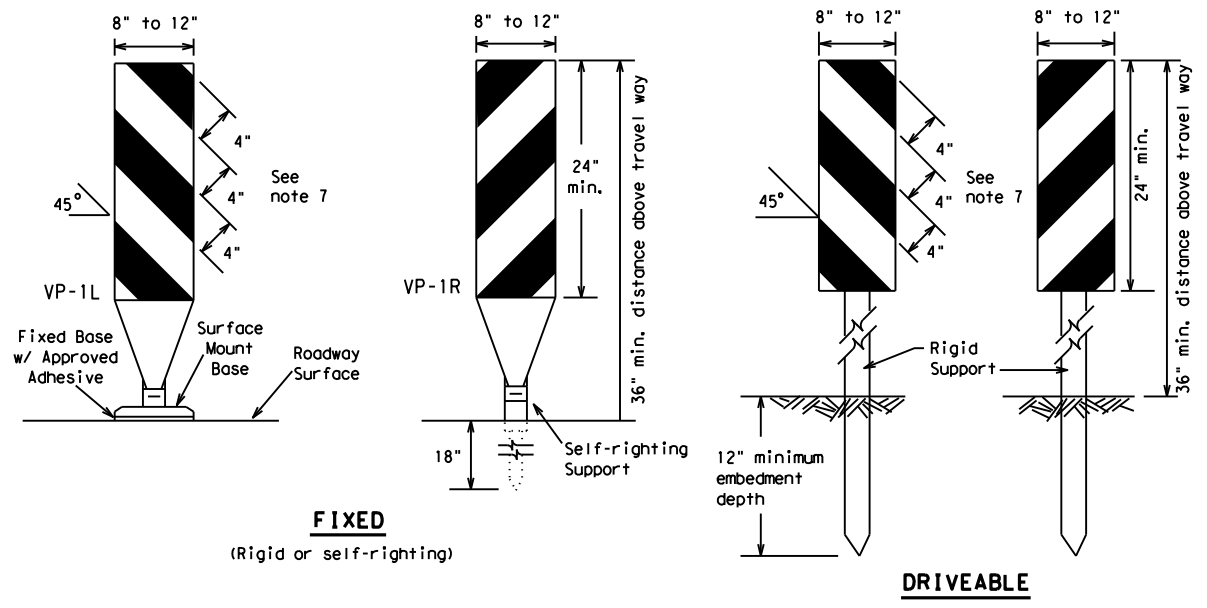


**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (8) - 21**

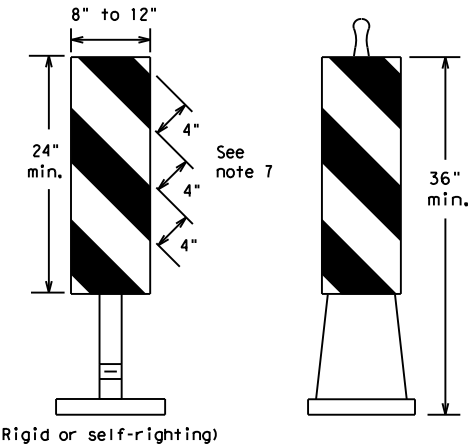
FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
4-03	8-14	DIST	COUNTY	SHEET NO.					
9-07	5-21	AUS	BASTROP	24					
7-13									

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



**FIXED**  
(Rigid or self-righting)

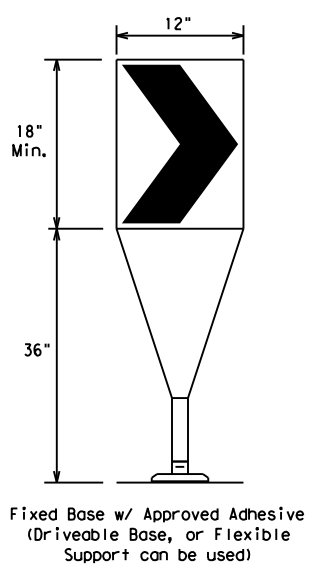
**DRIVEABLE**



**PORTABLE**

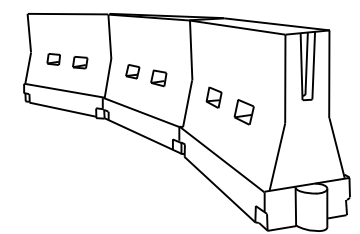
**VERTICAL PANELS (VPs)**

- 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.



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

**CHEVRONS**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

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

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

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

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

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

**GENERAL NOTES**

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

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

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

**SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS**

SHEET 9 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (9) - 21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	AUS	BASTROP	25	

DATE: 5/11/2022 4:24:36 PM  
FILE: c:\pw\khl\d0168457.bc-21.dgn

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

**TYPE 3 BARRICADES**

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

Barricades shall NOT be used as a sign support.



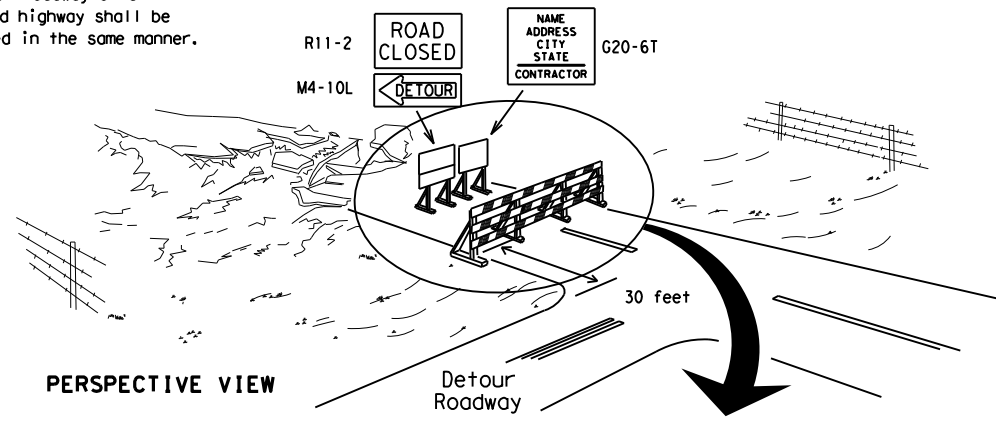
**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



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

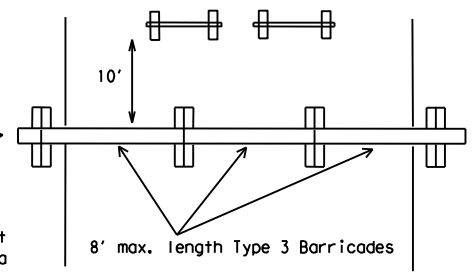
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

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



PERSPECTIVE VIEW

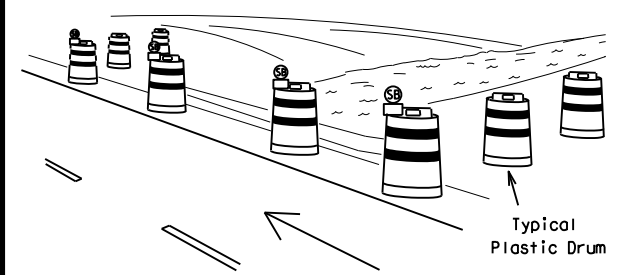
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



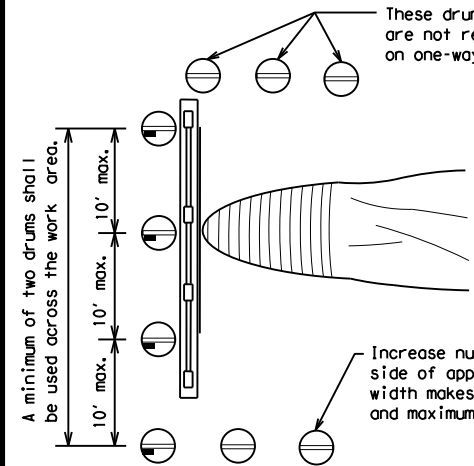
PLAN VIEW

- 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.
- Advance signing shall be as specified elsewhere in the plans.

**TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION**



PERSPECTIVE VIEW

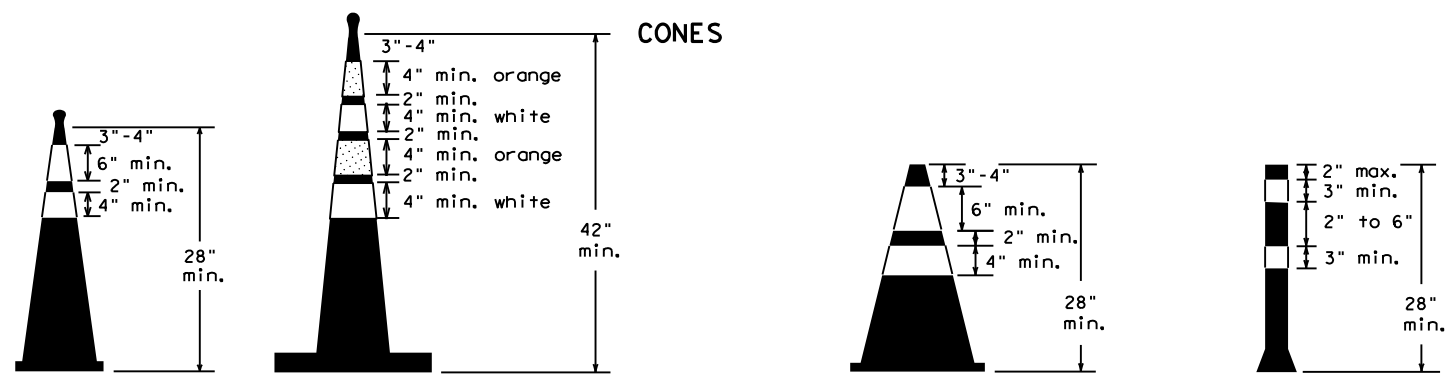


PLAN VIEW

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

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

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



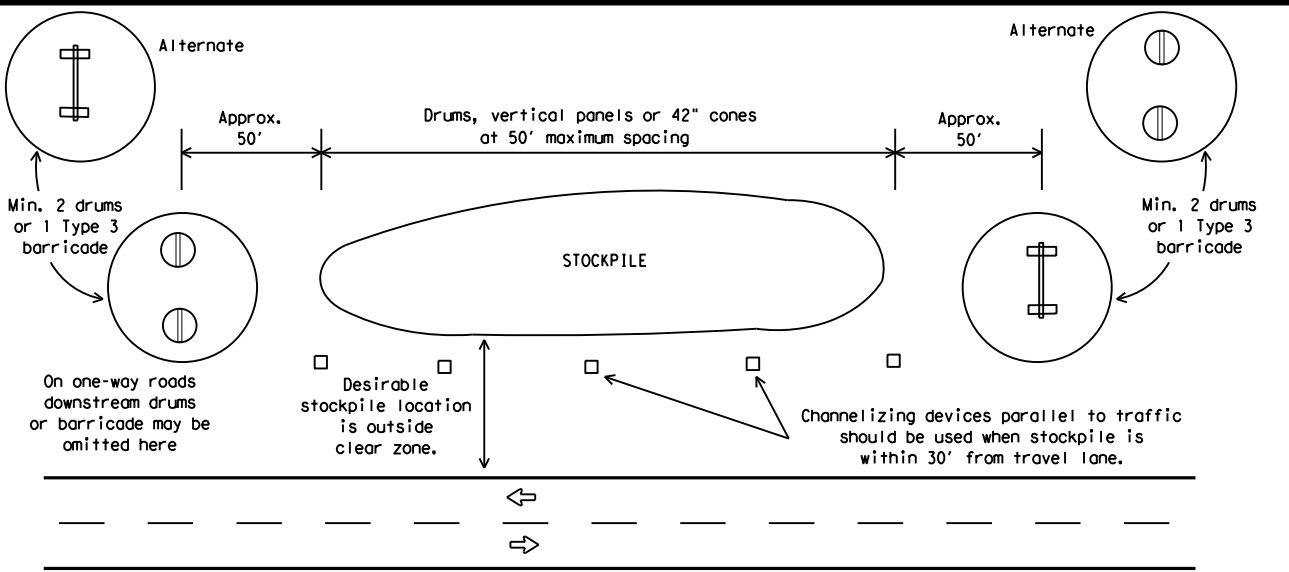
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC (10) - 21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	AUS	BASTROP	26	

DATE: 5/11/2022 4:24:42 PM  
 FILE: c:\pwworking\dot\168457\bc-21.dgn

## WORK ZONE PAVEMENT MARKINGS

### GENERAL

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

### RAISED PAVEMENT MARKERS

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

### PREFABRICATED PAVEMENT MARKINGS

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

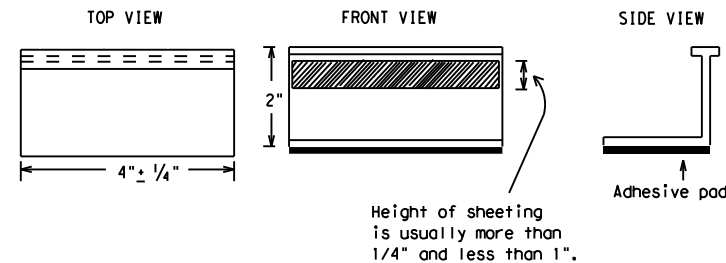
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

### REMOVAL OF PAVEMENT MARKINGS

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

## Temporary Flexible-Reflective Roadway Marker Tabs



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

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

### RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

**BC(11)-21**

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	AUS	BASTROP	27	
11-02 8-14				

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

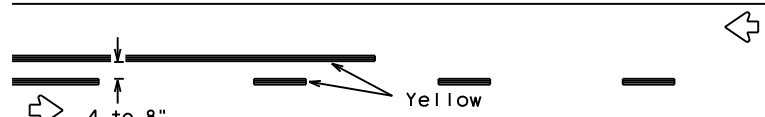
DATE: 5/11/2022 4:24:47 PM  
FILE: c:\pw\khl\d0168457\bc-21.dgn



## PAVEMENT MARKING PATTERNS

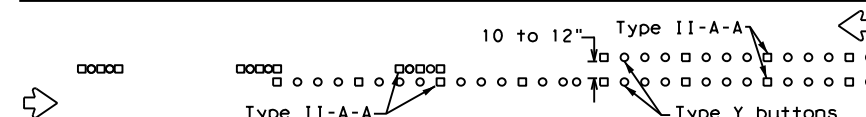


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

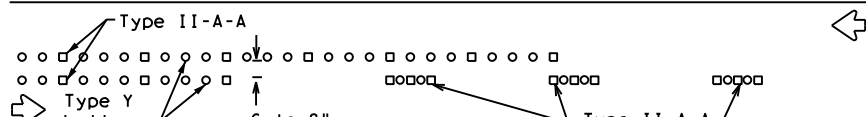


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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



RAISED PAVEMENT MARKERS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN B

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



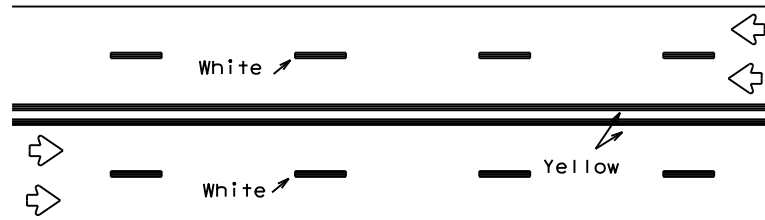
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



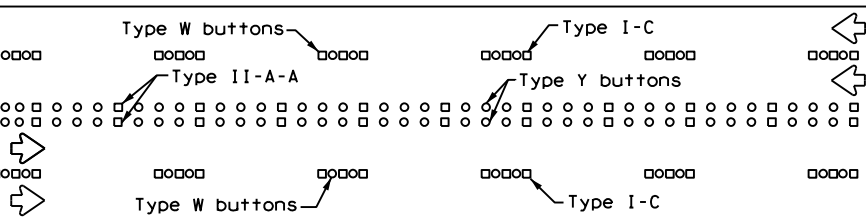
RAISED PAVEMENT MARKERS

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



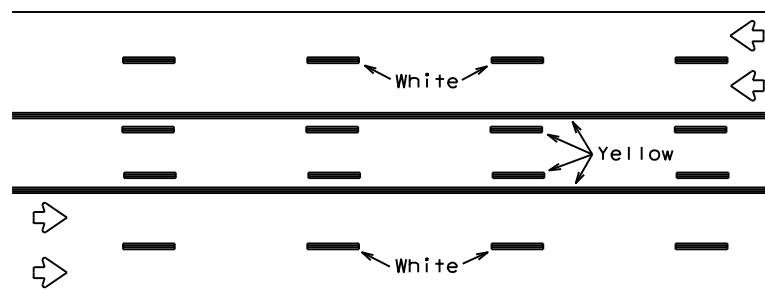
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



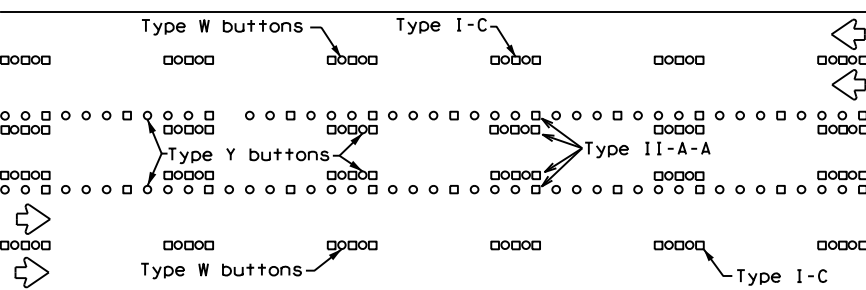
RAISED PAVEMENT MARKERS

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



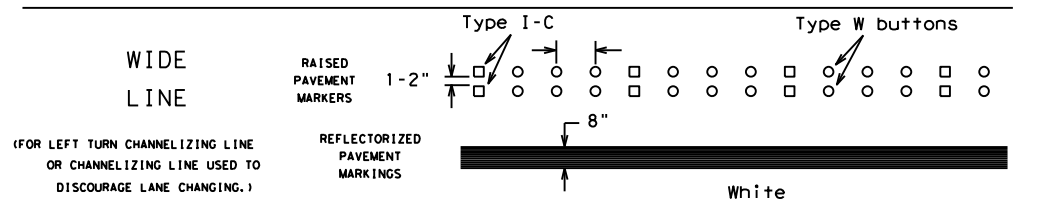
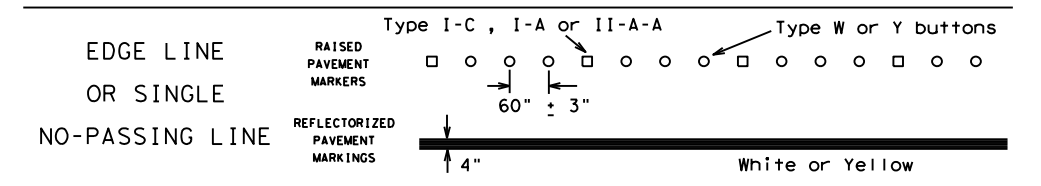
RAISED PAVEMENT MARKERS

## TWO-WAY LEFT TURN LANE

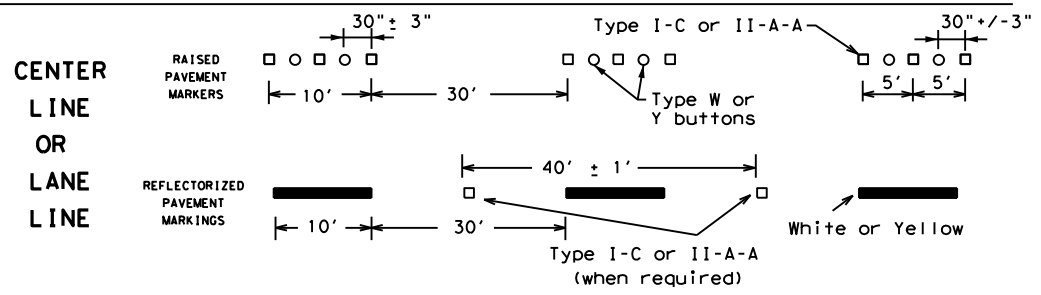
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



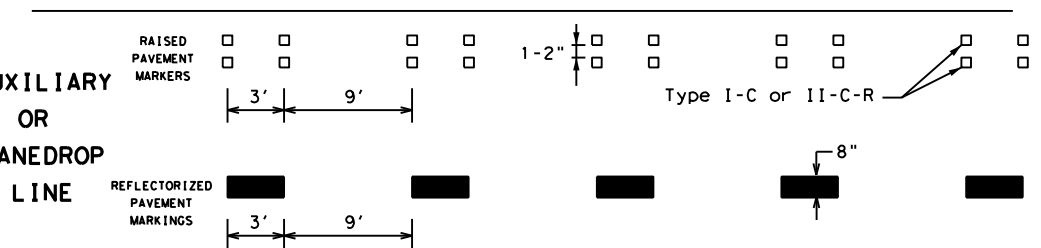
### SOLID LINES



### BROKEN LINES



### AUXILIARY OR LANEDROP LINE



### REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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

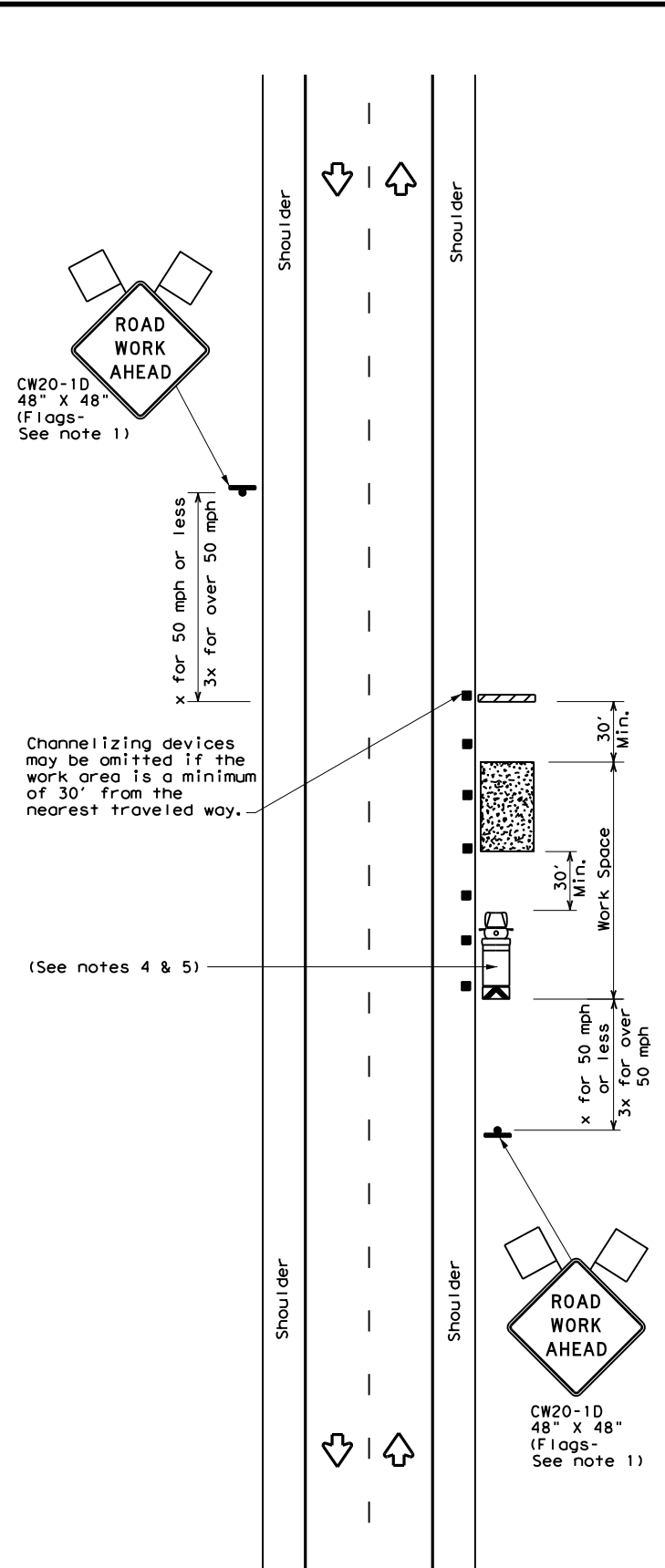
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
1-97 9-07 5-21				
2-98 7-13				
11-02 8-14	AUS	COUNTY	BASTROP	SHEET NO. 28

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

DATE: 5/11/2022 4:24:52 PM  
FILE: c:\pwworking\tdot\168457\bc-21.dgn

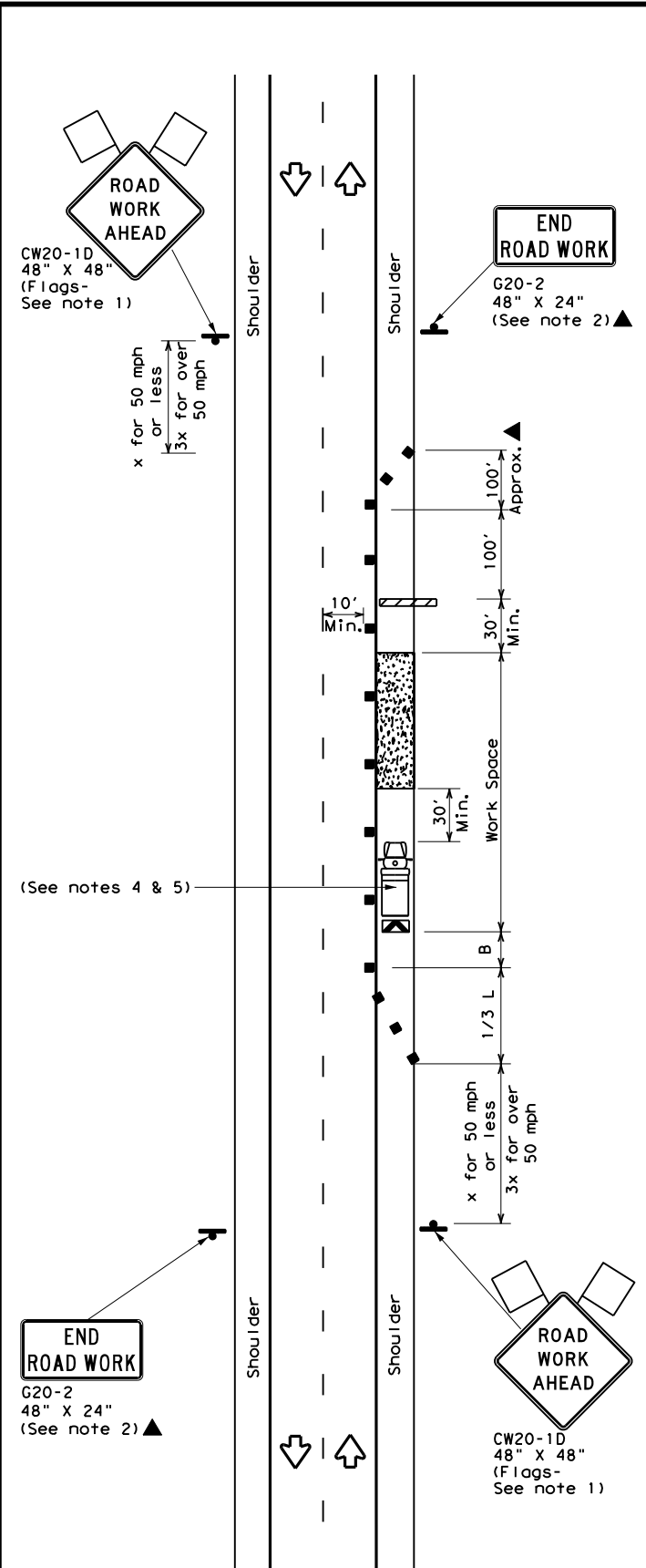
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022 4:25:06 PM  
 FILE: c:\pwworking\kh\0168457\tcp2-1-18.dgn



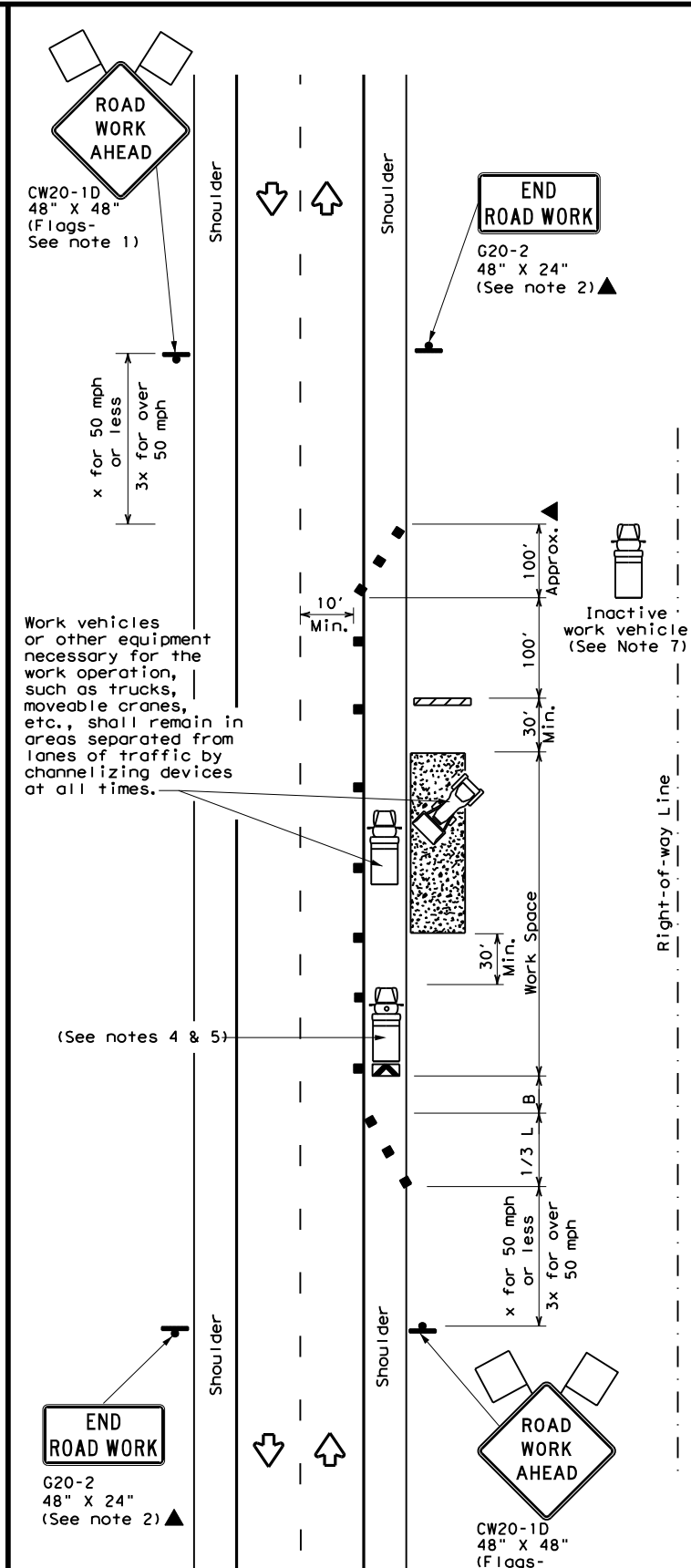
TCP (2-1a)

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

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

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

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



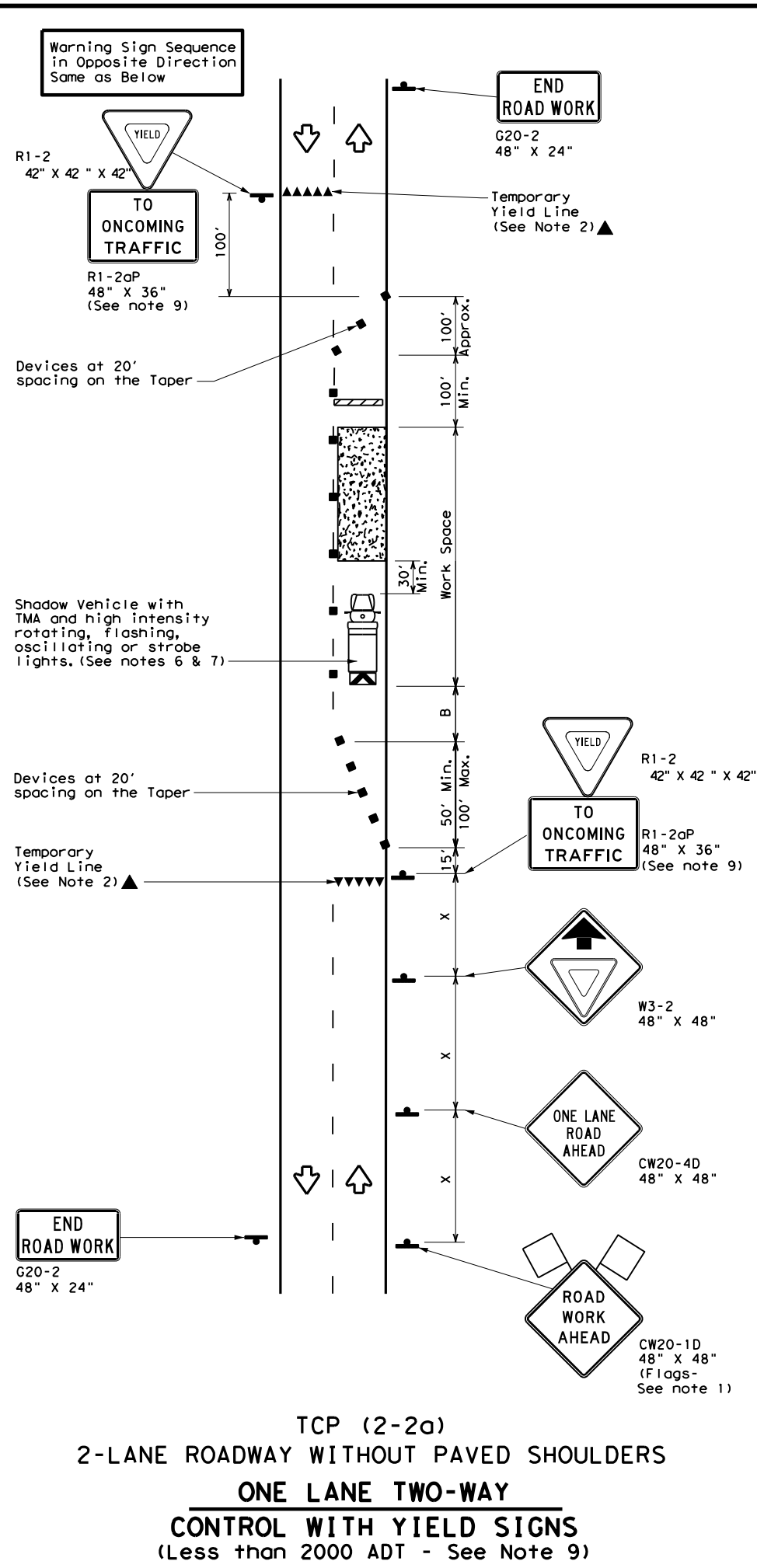
**TRAFFIC CONTROL PLAN**  
**CONVENTIONAL ROAD**  
**SHOULDER WORK**

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

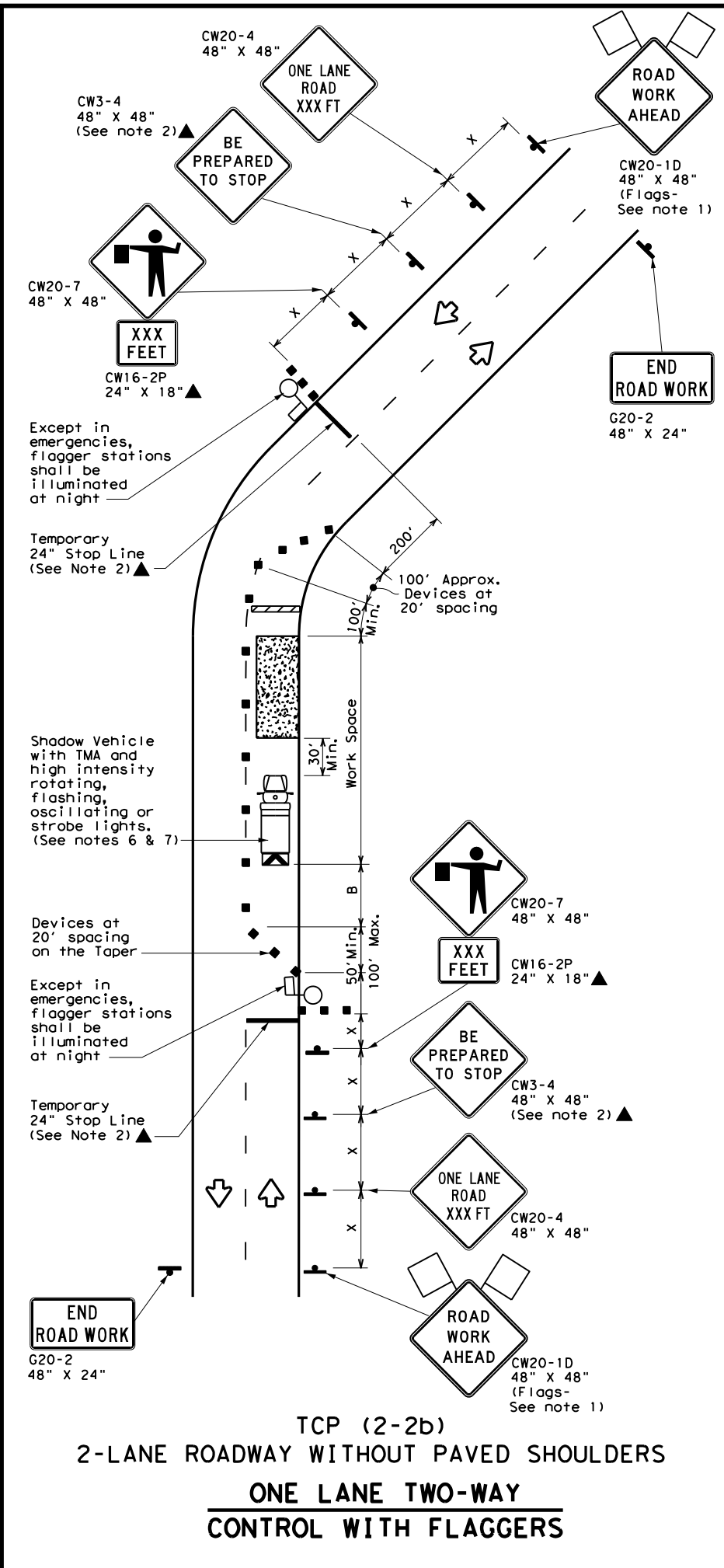
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CON:	SECT:	JOB:	HIGHWAY:
REVISIONS	1186	02	025	FM 969
2-94 4-98	DIST:	COUNTY:	SHEET NO.:	
8-95 2-12	AUS	BASTROP	29	
1-97 2-18				

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

DATE: 5/11/2022 4:25:16 PM  
 FILE: c:\pwworking\10168457\tcp2-2-18.dgn



TCP (2-2a)  
 2-LANE ROADWAY WITHOUT PAVED SHOULDERS  
 ONE LANE TWO-WAY  
 CONTROL WITH YIELD SIGNS  
 (Less than 2000 ADT - See Note 9)



TCP (2-2b)  
 2-LANE ROADWAY WITHOUT PAVED SHOULDERS  
 ONE LANE TWO-WAY  
 CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	L = WS <sup>2</sup> / 60	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

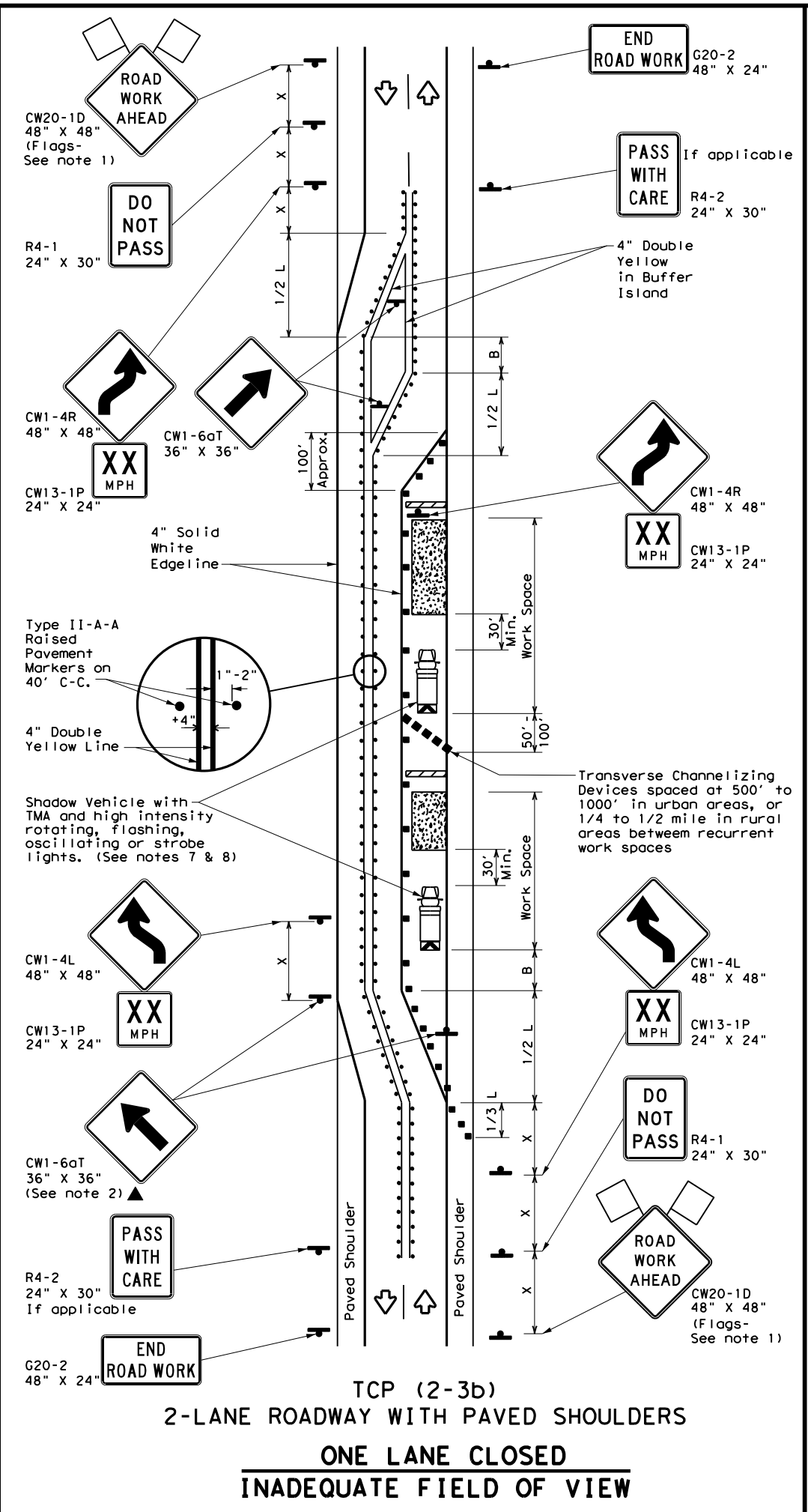
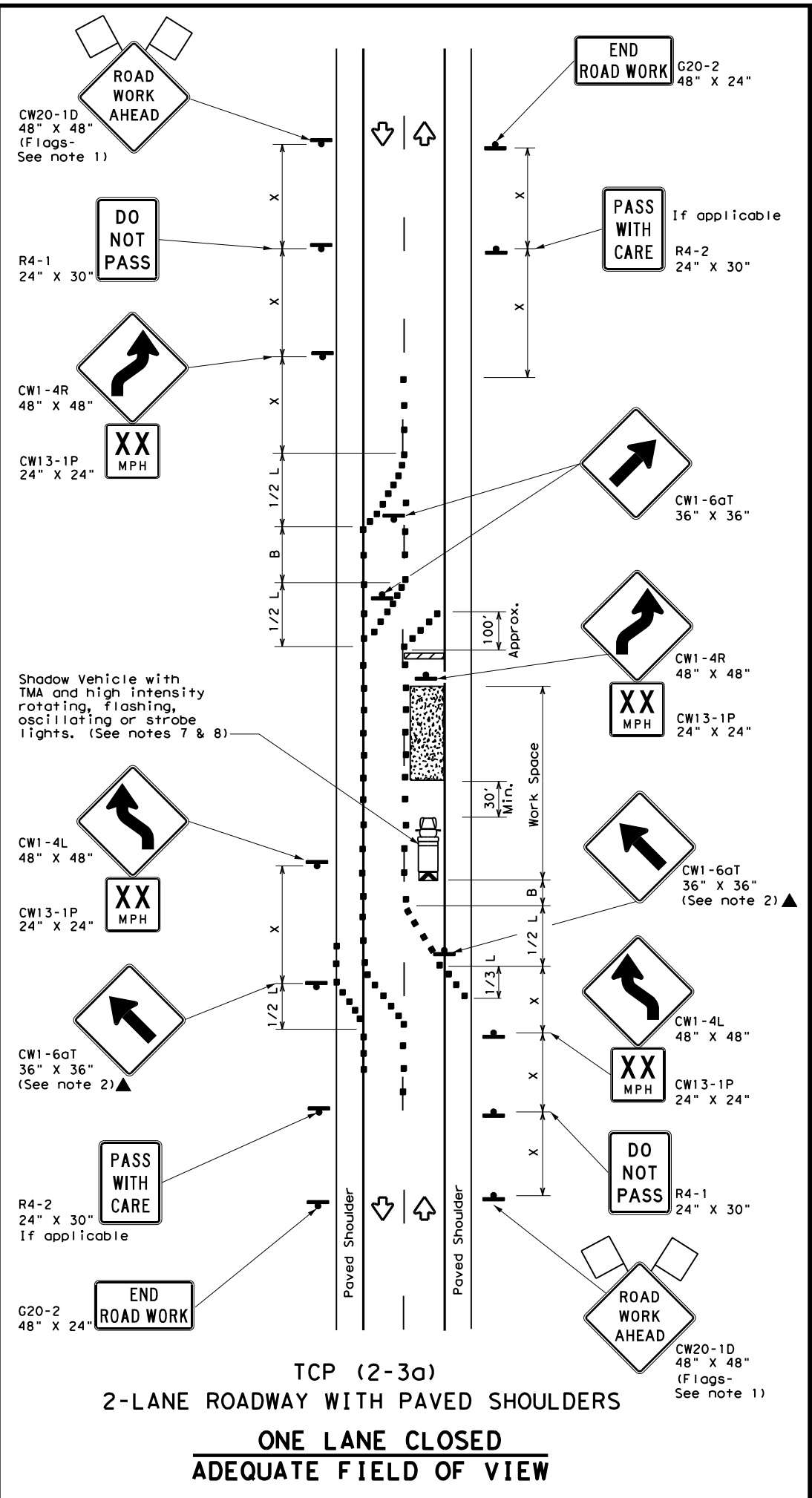
**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
  - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
  - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
  - Flaggers should use two-way radios or other methods of communication to control traffic.
  - Length of work space should be based on the ability of flaggers to communicate.
  - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
  - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-2a)**
- The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
  - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
  - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
  - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

		Traffic Operations Division Standard	
<b>TRAFFIC CONTROL PLAN</b> <b>ONE-LANE TWO-WAY</b> <b>TRAFFIC CONTROL</b>			
<b>TCP (2-2) - 18</b>			
FILE:	tcp2-2-18.dgn	DN:	CK:
© TxDOT	December 1985	CONT	SECT
REVISIONS		1186	02
8-95	3-03	JOB	HIGHWAY
1-97	2-12	025	FM 969
4-98	2-18	DIST	COUNTY
		AUS	BASTROP
			SHEET NO.
			30

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

DATE: 5/11/2022 4:25:30 PM  
 FILE: c:\pwworking\dot\168457\tdp2-3-18.dgn



**LEGEND**

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

Posted Speed * X	Formula L = WS <sup>2</sup> / 60	Minimum Desirable Taper Lengths * X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS <sup>2</sup> / 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	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	L = WS	750'	825'	900'	75'	150'	900'	540'
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
			✓	✓
				TCP (2-3b) ONLY

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

**TCP (2-3a)**

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

**Texas Department of Transportation**  
 Traffic Operations Division Standard

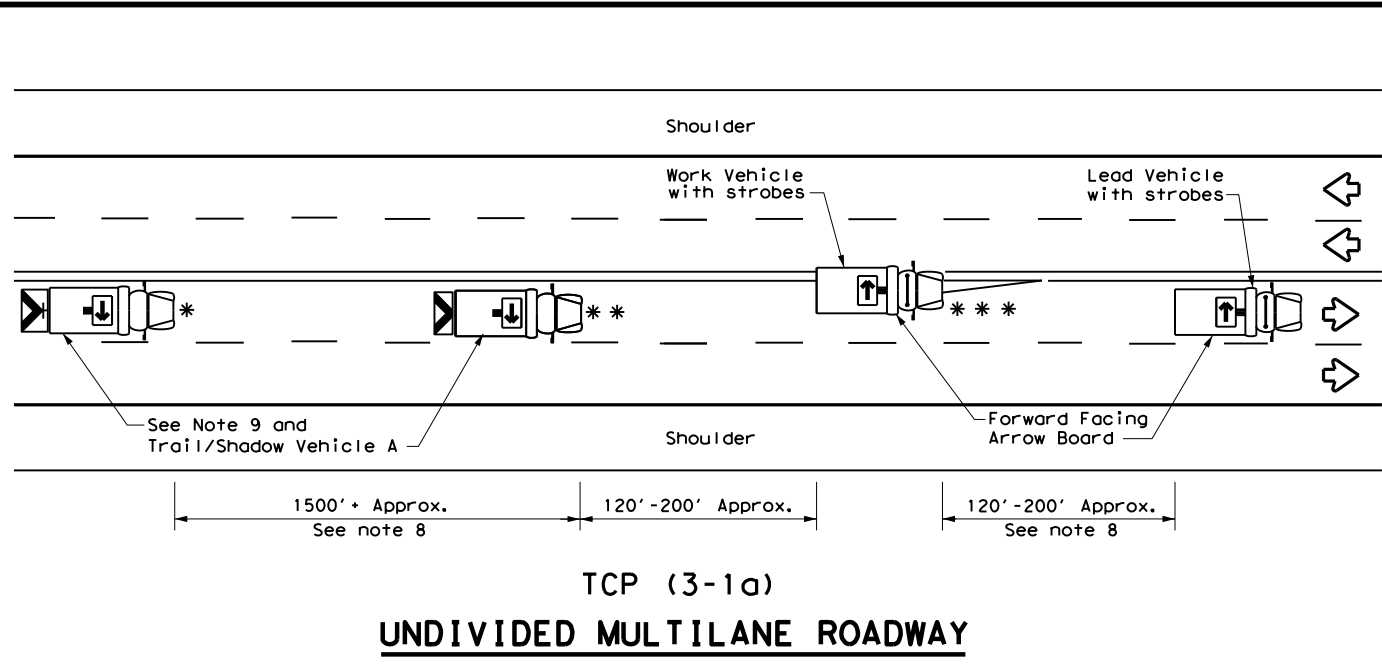
**TRAFFIC CONTROL PLAN**  
**TRAFFIC SHIFTS ON**  
**TWO-LANE ROADS**

**TCP (2-3) - 18**

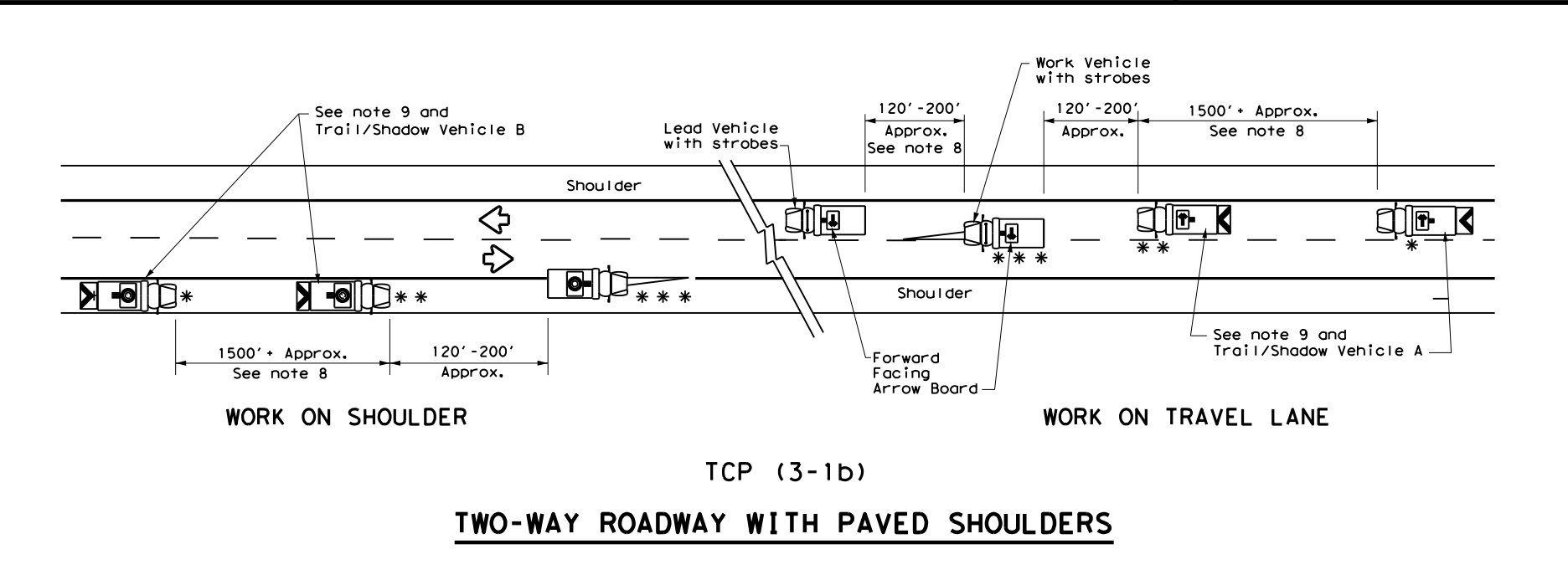
FILE: tcp(2-3)-18.dgn	DW:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
8-95 3-03	DIST	COUNTY	SHEET NO.	
1-97 2-12	AUS	BASTROP	31	
4-98 2-18				

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

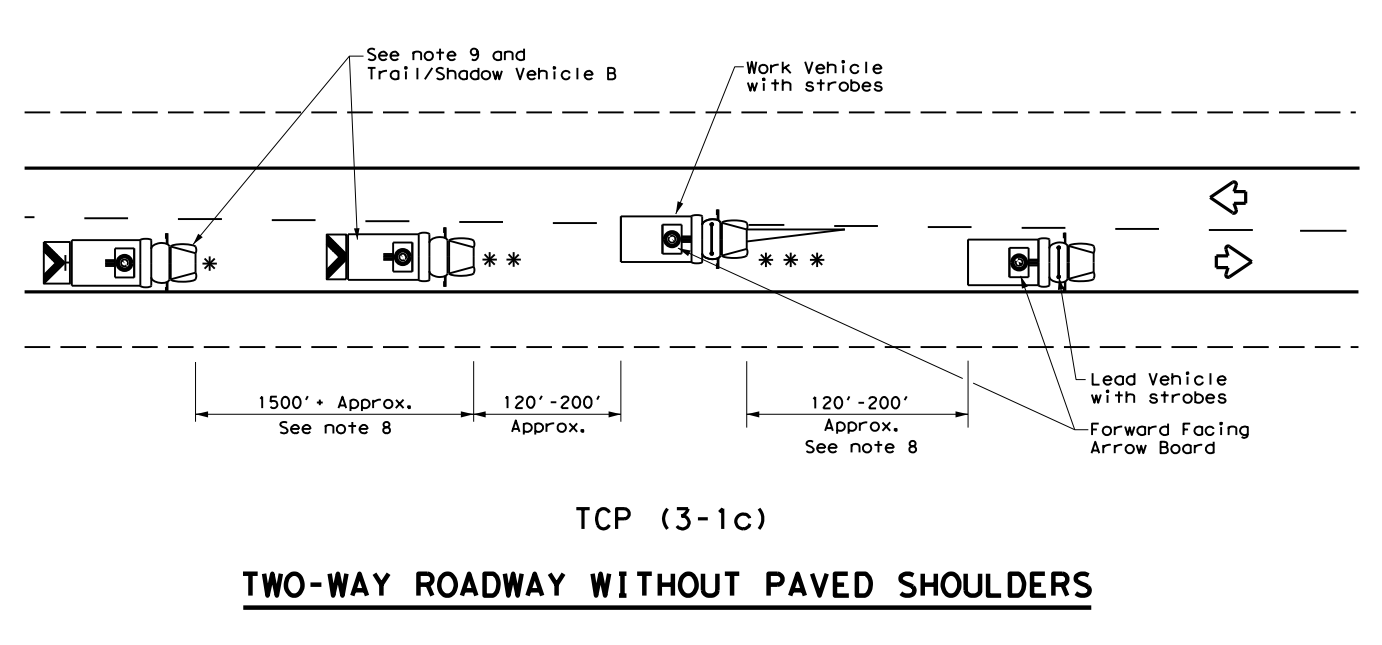
DATE: 5/11/2022 4:25:43 PM  
 FILE: c:\pwworking\dot\168457\tcp3-1.dgn



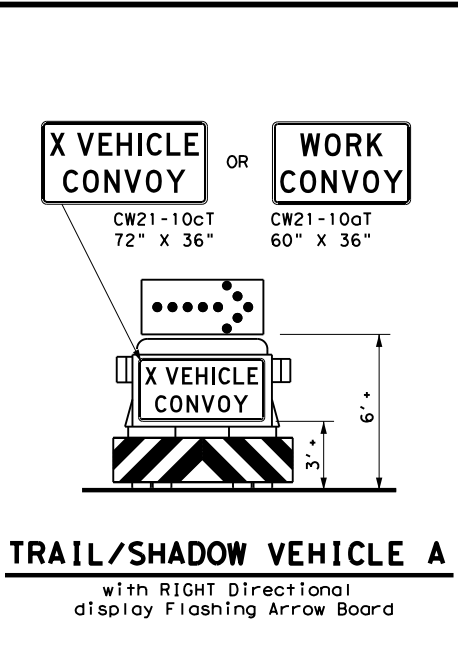
TCP (3-1a)  
**UNDIVIDED MULTILANE ROADWAY**



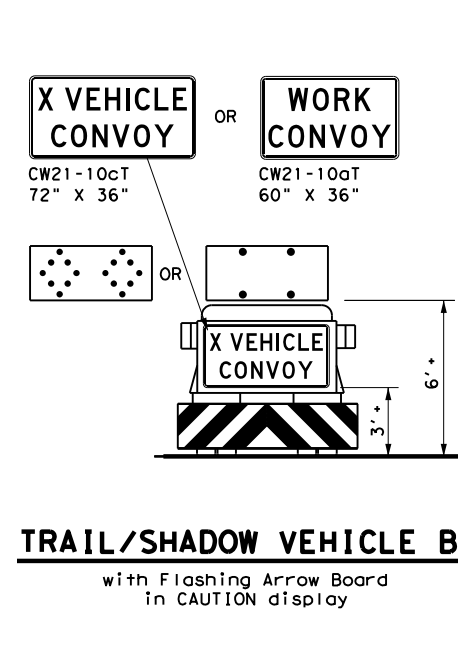
TCP (3-1b)  
**TWO-WAY ROADWAY WITH PAVED SHOULDERS**



TCP (3-1c)  
**TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS**



**TRAIL/SHADOW VEHICLE A**  
 with RIGHT Directional display Flashing Arrow Board



**TRAIL/SHADOW VEHICLE B**  
 with Flashing Arrow Board in CAUTION display

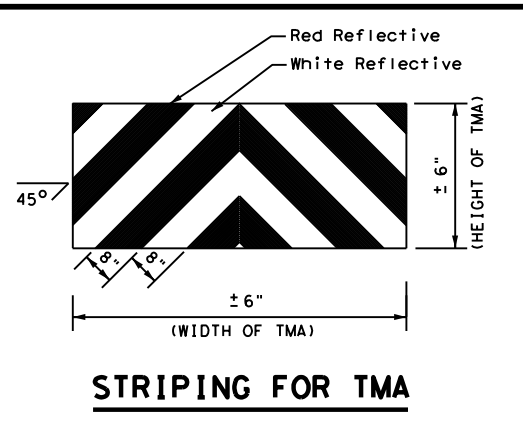
LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

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

**GENERAL NOTES**

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



**STRIPING FOR TMA**

Texas Department of Transportation  
 Traffic Operations Division Standard

**TRAFFIC CONTROL PLAN  
 MOBILE OPERATIONS  
 UNDIVIDED HIGHWAYS**

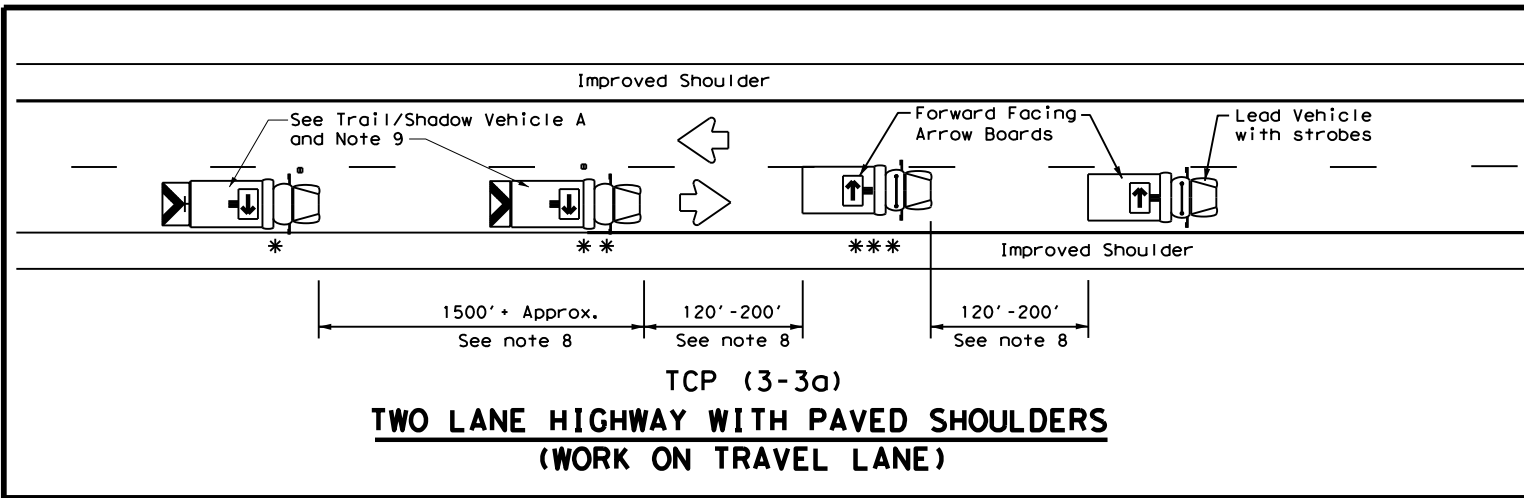
**TCP(3-1)-13**

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	AUS	BASTROP	32	
1-97				

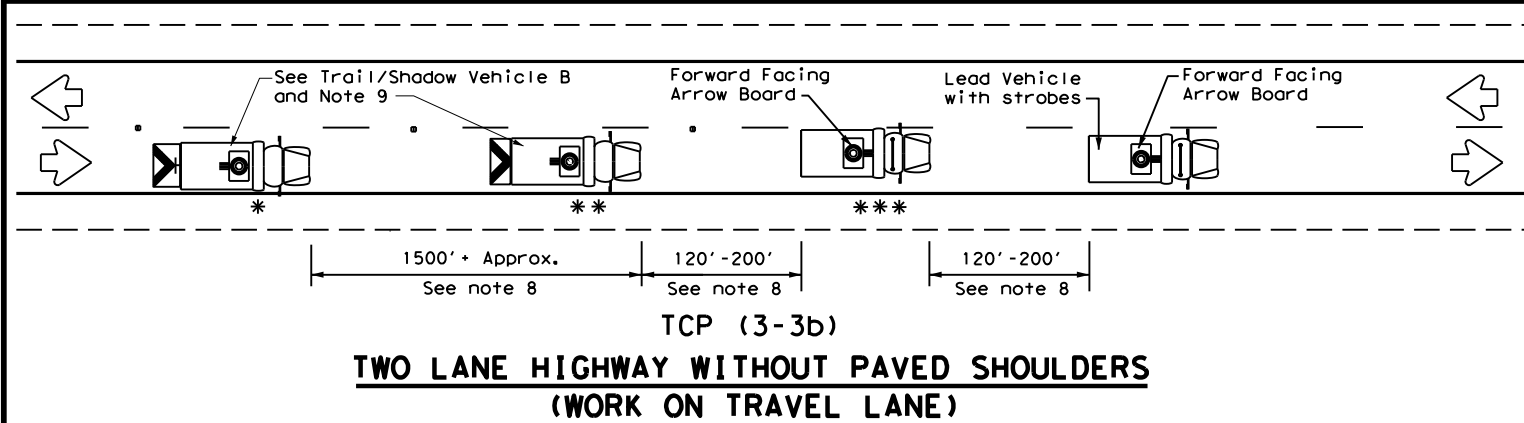


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

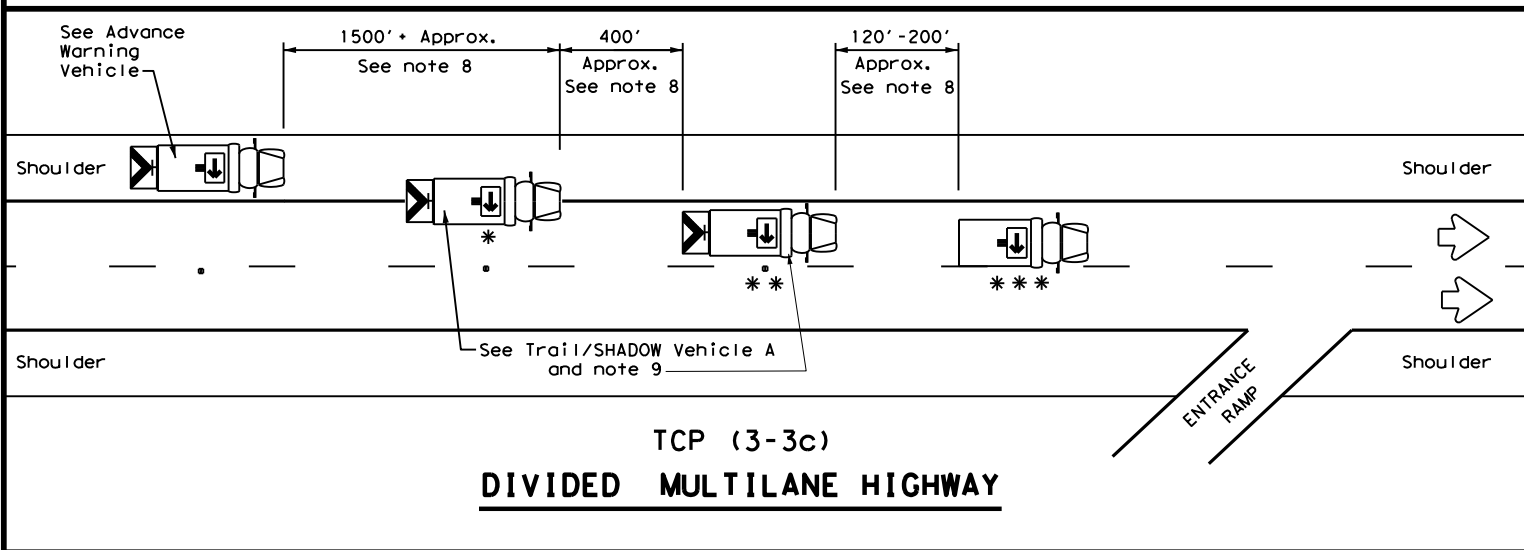
DATE: 5/11/2022 4:25:56 PM  
 FILE: c:\pwworking\dot\168457\tcp3-3.dgn



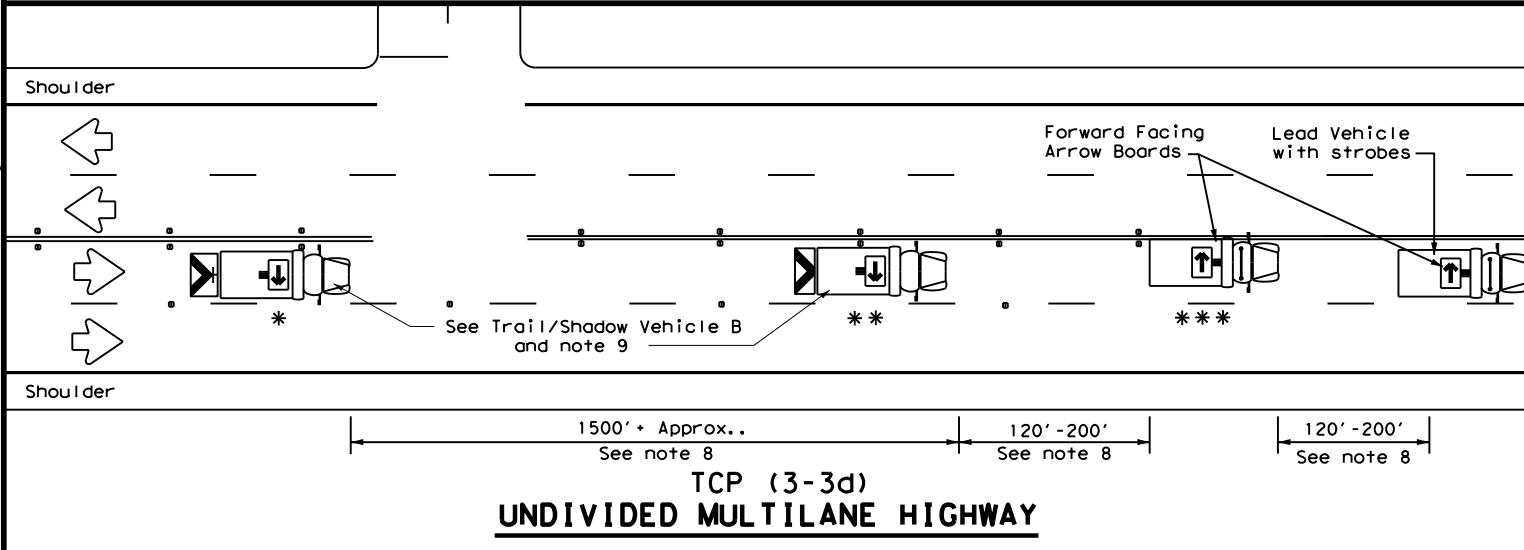
**TCP (3-3a)**  
**TWO LANE HIGHWAY WITH PAVED SHOULDERS**  
**(WORK ON TRAVEL LANE)**



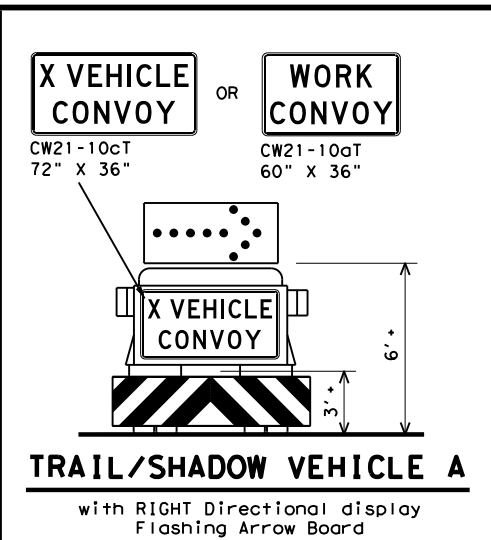
**TCP (3-3b)**  
**TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS**  
**(WORK ON TRAVEL LANE)**



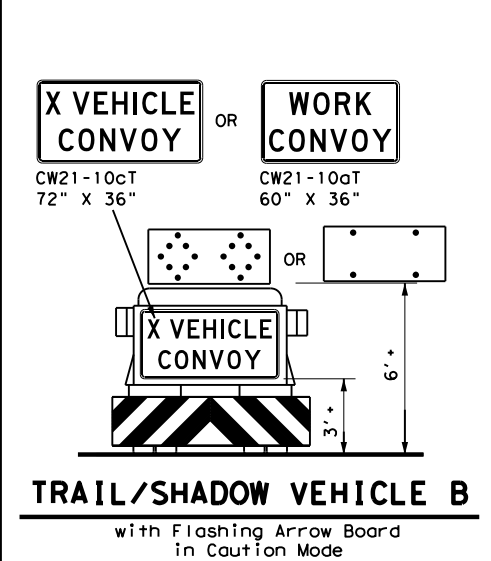
**TCP (3-3c)**  
**DIVIDED MULTILANE HIGHWAY**



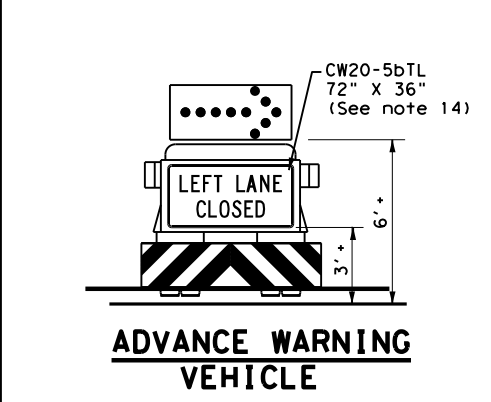
**TCP (3-3d)**  
**UNDIVIDED MULTILANE HIGHWAY**



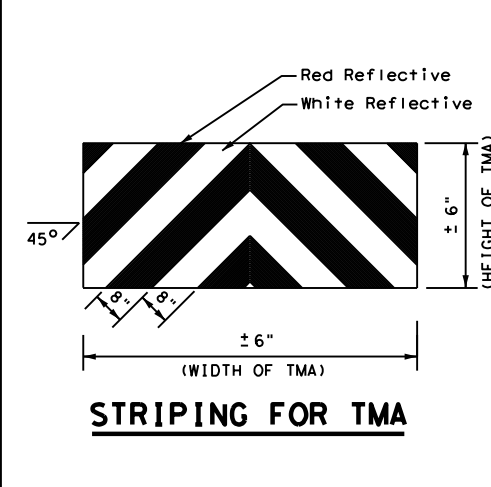
**TRAIL/SHADOW VEHICLE A**  
 with RIGHT Directional display  
 Flashing Arrow Board



**TRAIL/SHADOW VEHICLE B**  
 with Flashing Arrow Board  
 in Caution Mode



**ADVANCE WARNING VEHICLE**



**STRIPING FOR TMA**

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

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

**GENERAL NOTES**

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

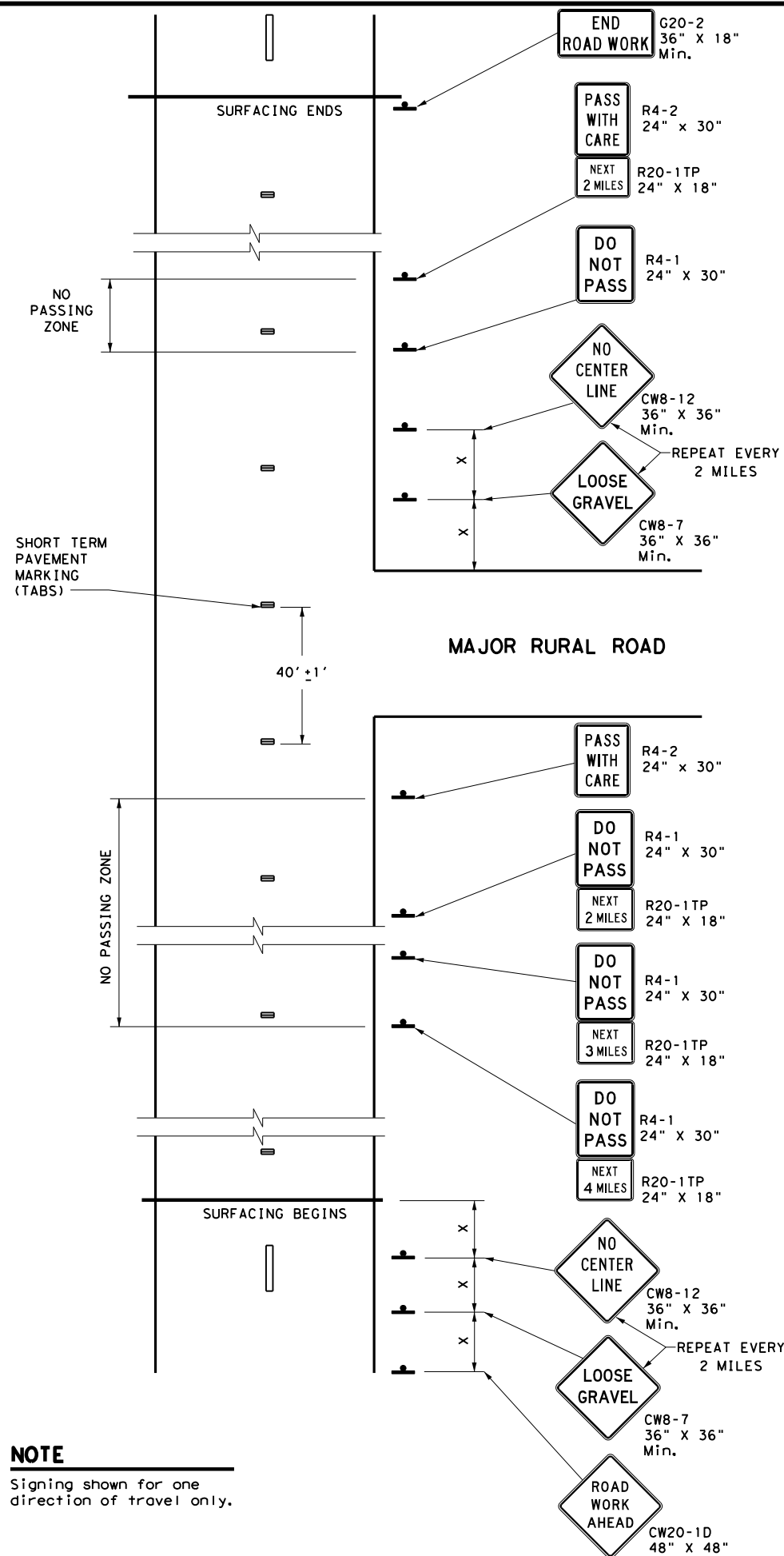
Texas Department of Transportation  
 Traffic Operations Division Standard

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

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 7-13	AUS	BASTROP	33	
1-97 7-14				

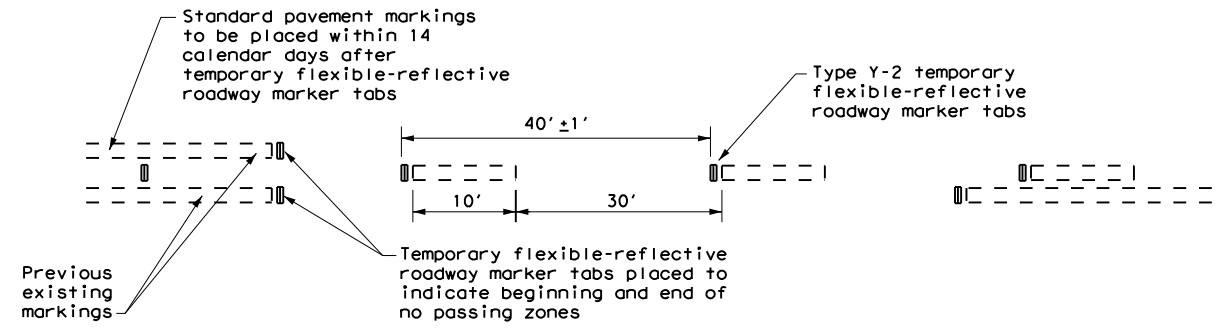
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022 4:26:09 PM  
 FILE: c:\pwworking\0168457\tcp7-1.dgn



**NOTE**  
 Signing shown for one direction of travel only.

**NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS**



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

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

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

**"NO CENTER LINE" SIGN (CW8-12)**

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

**"LOOSE GRAVEL" SIGN (CW8-7)**

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

**PAVEMENT MARKINGS**

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

**COORDINATION OF SIGN LOCATIONS**

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

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

\* Conventional Roads Only

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

**GENERAL NOTES**

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



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

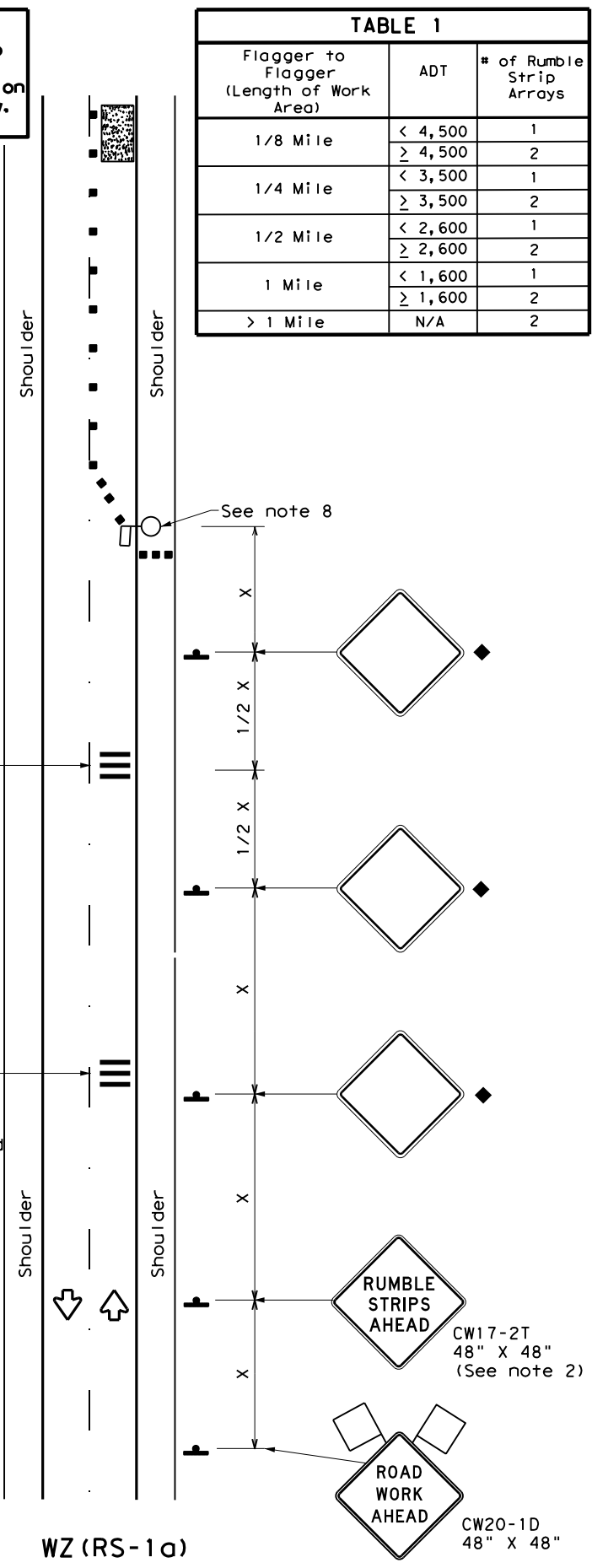
FILE:	tcp7-1.dgn	DW:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	March 1991	CONT:	1186	SECT:	02	JOB:	025	HIGHWAY:	FM 969
REVISIONS:	4-92 4-98	DIST:	AUS	COUNTY:	BASTROP	SHEET NO.:	34		

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

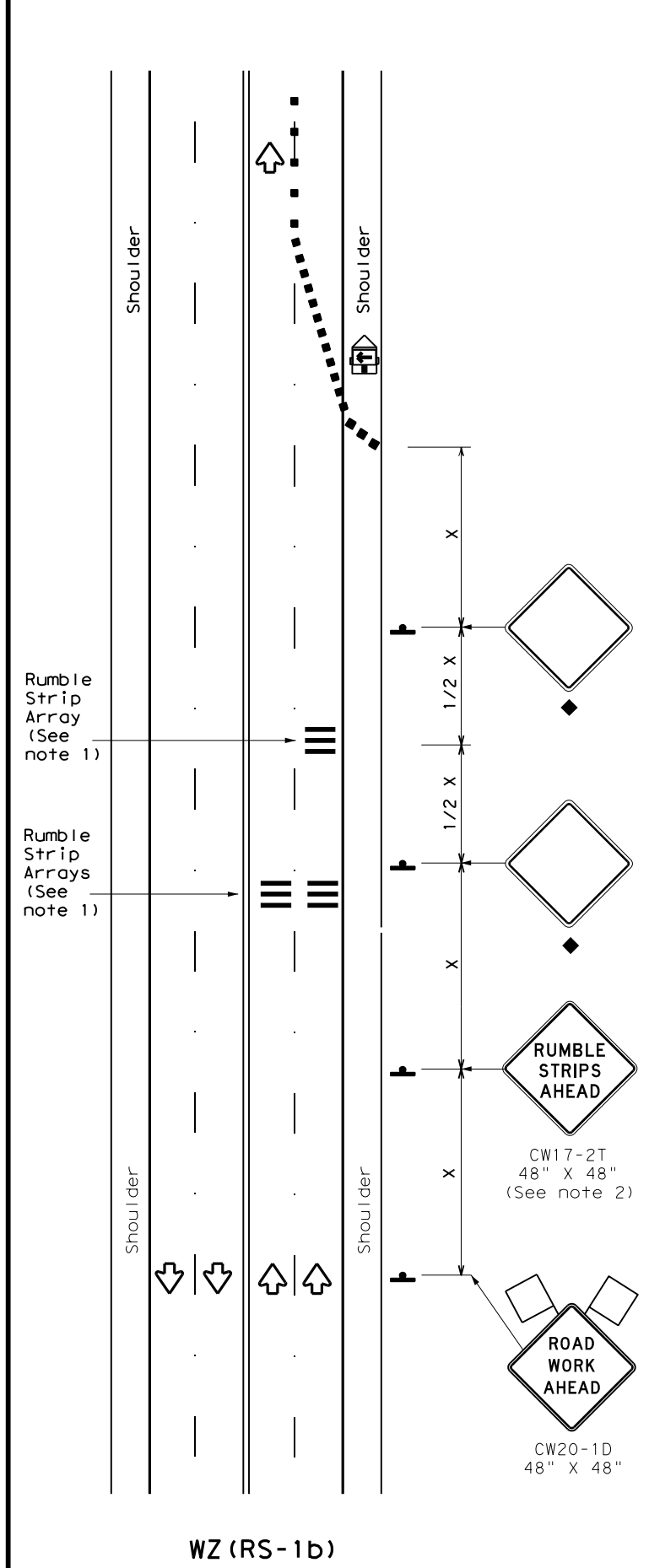
DATE: 5/11/2022 4:26:22 PM  
 FILE: c:\pwworking\kh\0168457\wzrs22.dgn

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

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



**RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION**



**RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY**

**GENERAL NOTES**

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

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

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

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

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

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

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

Texas Department of Transportation Traffic Safety Division Standard

## TEMPORARY RUMBLE STRIPS

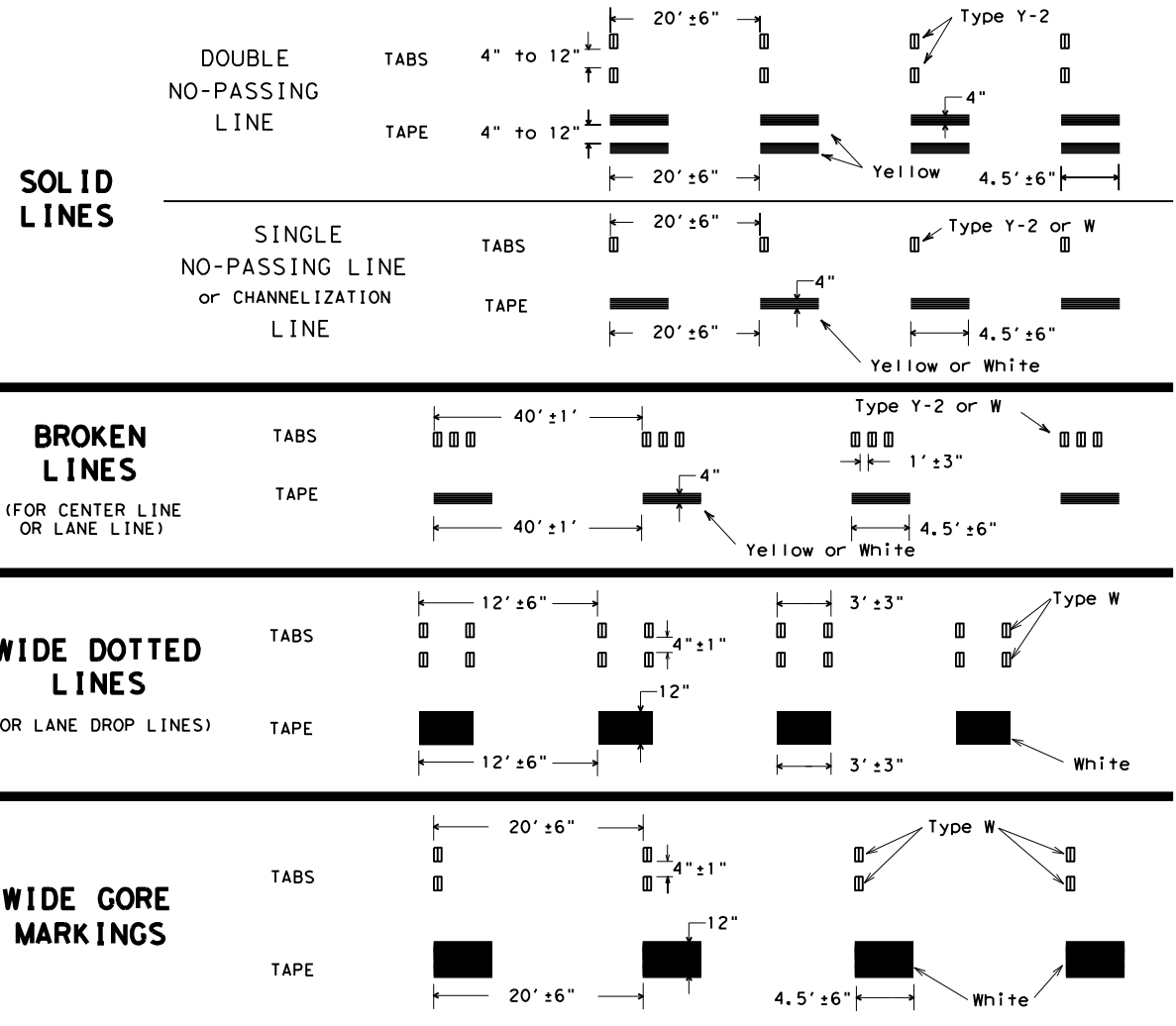
### WZ (RS) - 22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
2-14 1-22	DIST	COUNTY	SHEET NO.	
4-16	AUS	BASTROP	35	

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

DATE: 5/11/2022 4:26:35 PM  
 FILE: c:\pwworking\dot\168457\wzstpm-13.dgn

## WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



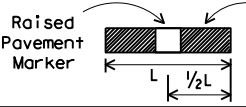
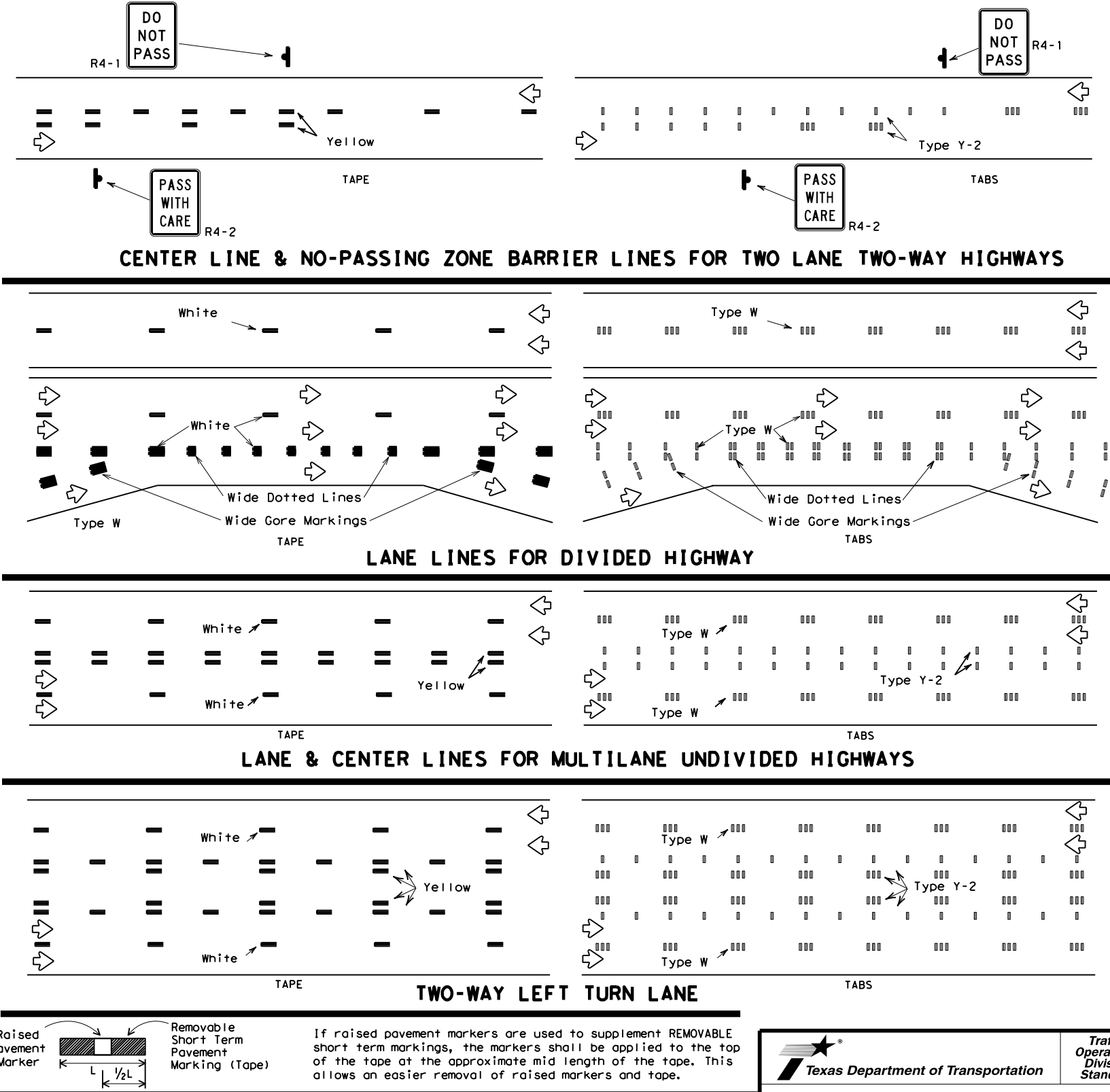
### NOTES:

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



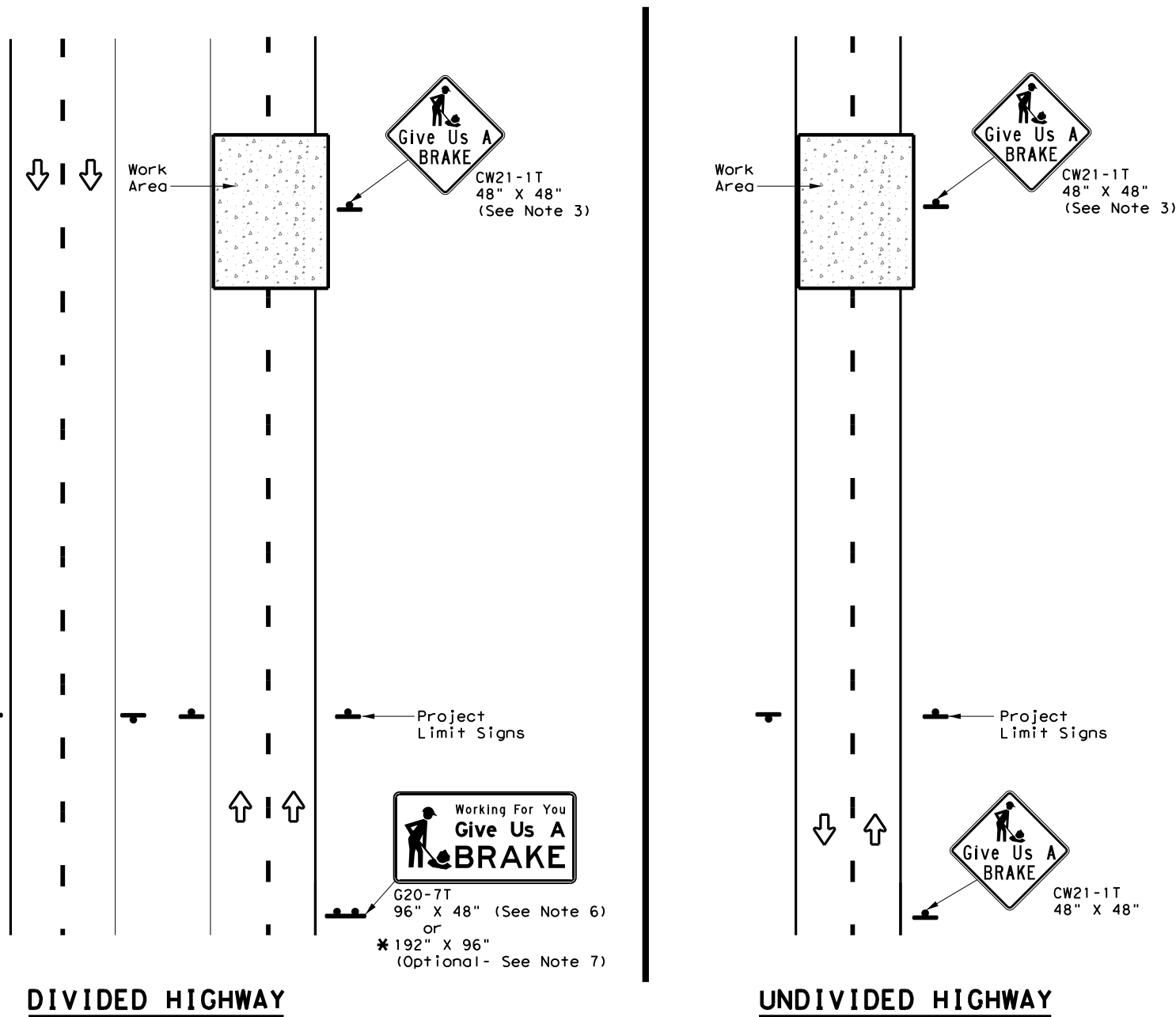
## WORK ZONE SHORT TERM PAVEMENT MARKINGS

### WZ (STPM) - 13

FILE:	wzstpm-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	April 1992	CONT:	1186	SECT:	02	JOB:	025	HIGHWAY:	FM 969
REVISIONS:		DIST:	AUS	COUNTY:	BASTROP	SHEET NO.:			36

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

DATE: 5/11/2022 4:26:50 PM  
 FILE: c:\pwworking\kh1\0168457\wzbrk-13.dgn



SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B <sub>FL</sub> or C <sub>FL</sub>	32	▲	▲ ▲	▲
Orange	G20-7T		192" X 96"	Type B <sub>FL</sub> or C <sub>FL</sub>	128	W8x18	16 17	12

▲ See Note 6 Below

**LEGEND**

	Sign
	Large Sign
	Traffic Flow

**DEPARTMENTAL MATERIAL SPECIFICATIONS**

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub>
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

**GENERAL NOTES**

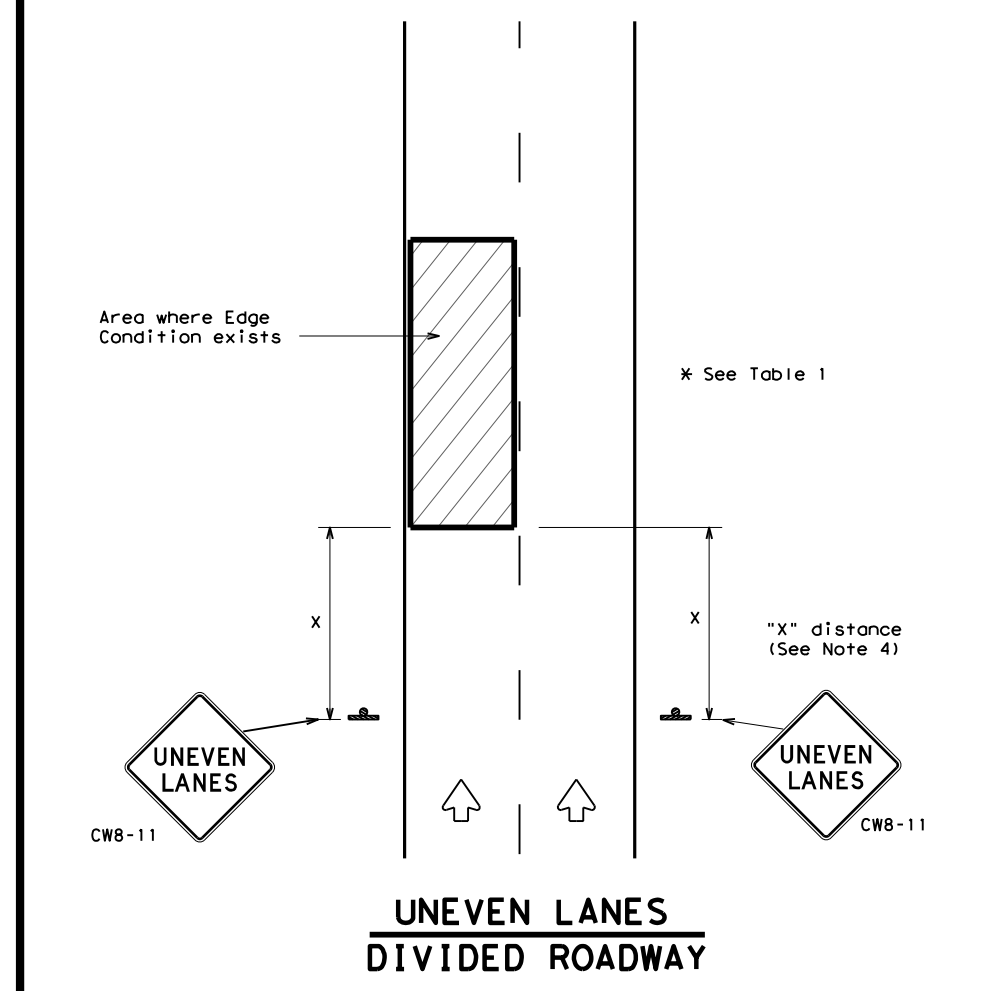
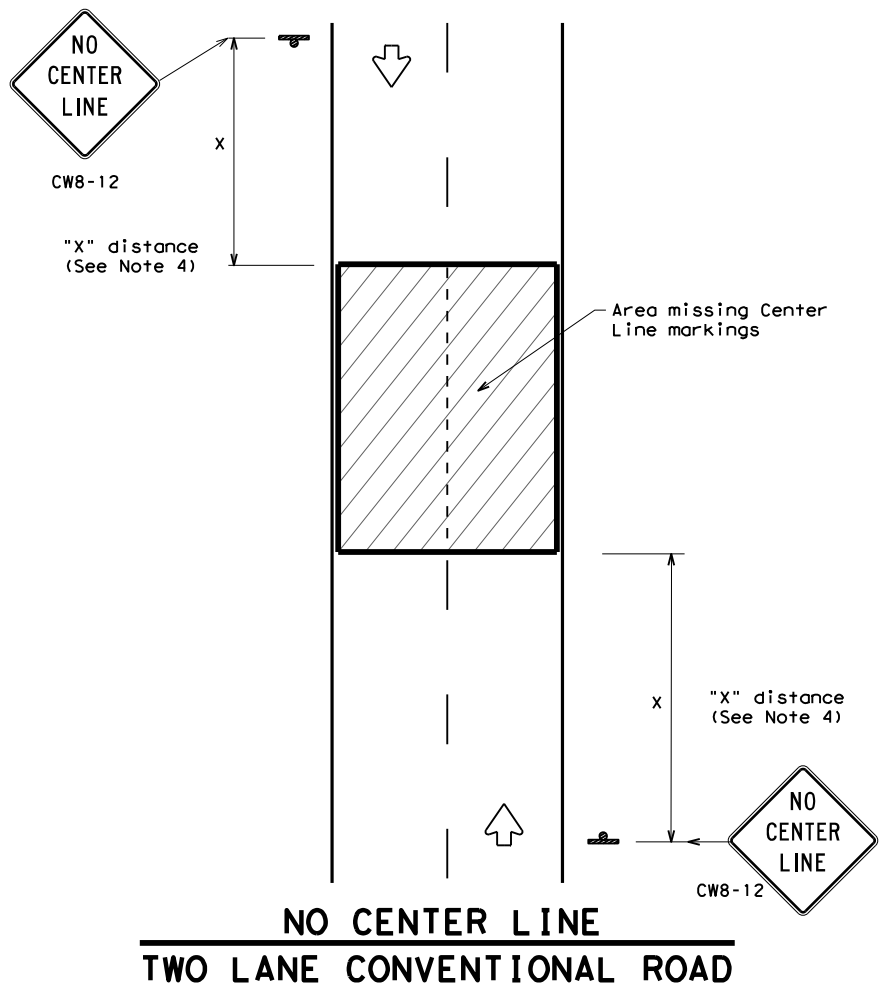
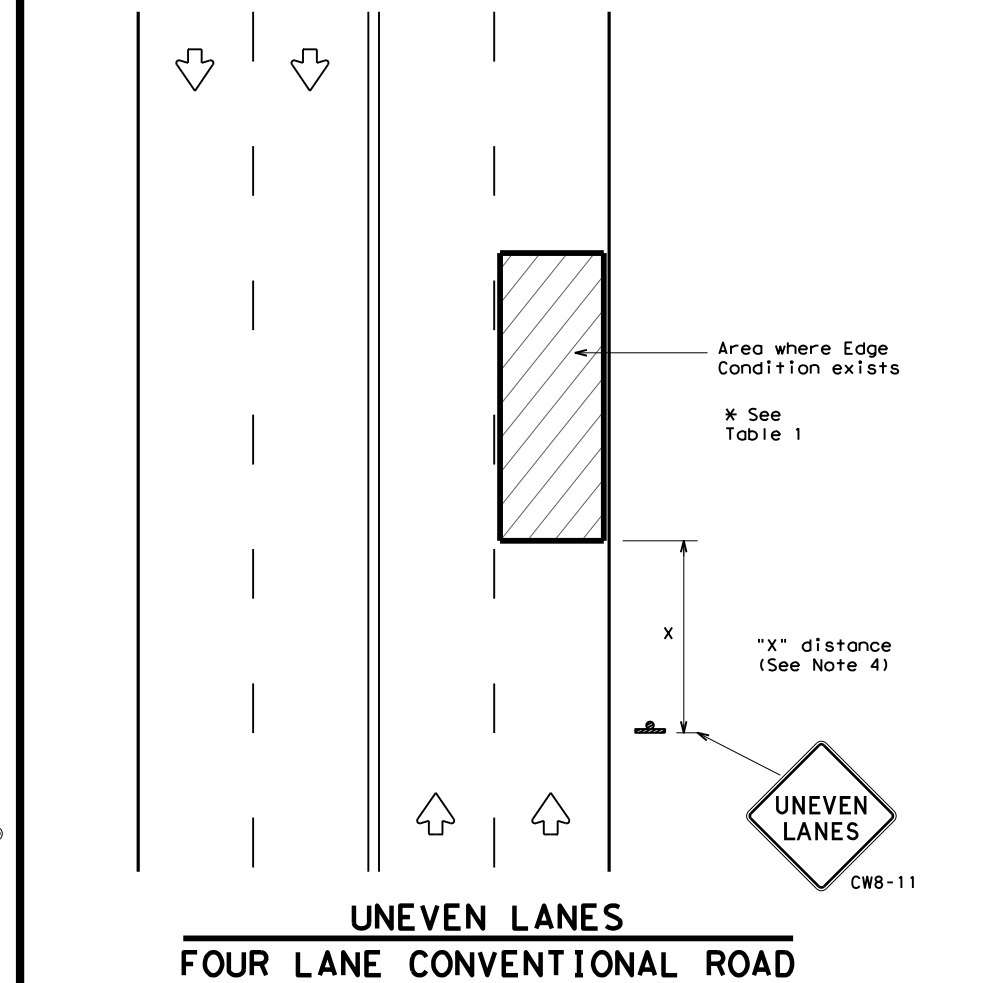
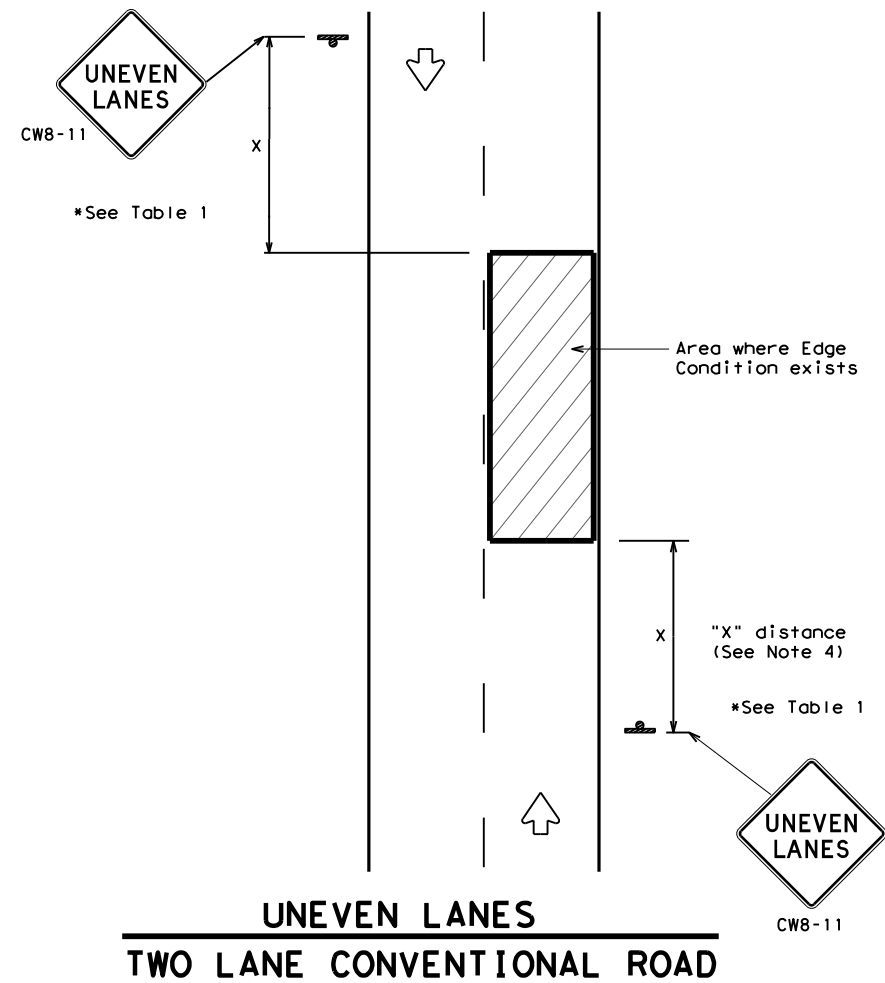
- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
- Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
- The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:  
 Item 636 - Aluminum Signs  
 Item 647 - Large Roadside Sign Supports and Assemblies.  
 Item 416 - Drilled Shaft Foundations
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

				Traffic Operations Division Standard	
<b>WORK ZONE "GIVE US A BRAKE" SIGNS</b>					
<b>WZ (BRK) - 13</b>					
FILE:	wzbrk-13.dgn	DN:	TxDOT	CK:	TxDOT
©TxDOT	August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS		1186	02	025	FM 969
6-96	5-98	7-13	DIST	COUNTY	SHEET NO.
8-96	3-03		AUS	BASTROP	37



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

DATE: 5/11/2022 4:27:00 PM  
 FILE: c:\pwworking\dot168457\wzuj-13.dgn



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

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B <sub>FL</sub> OR TYPE C <sub>FL</sub> SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

**GENERAL NOTES**

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

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

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

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

Texas Department of Transportation  
 Traffic Operations Division Standard

**SIGNING FOR UNEVEN LANES**

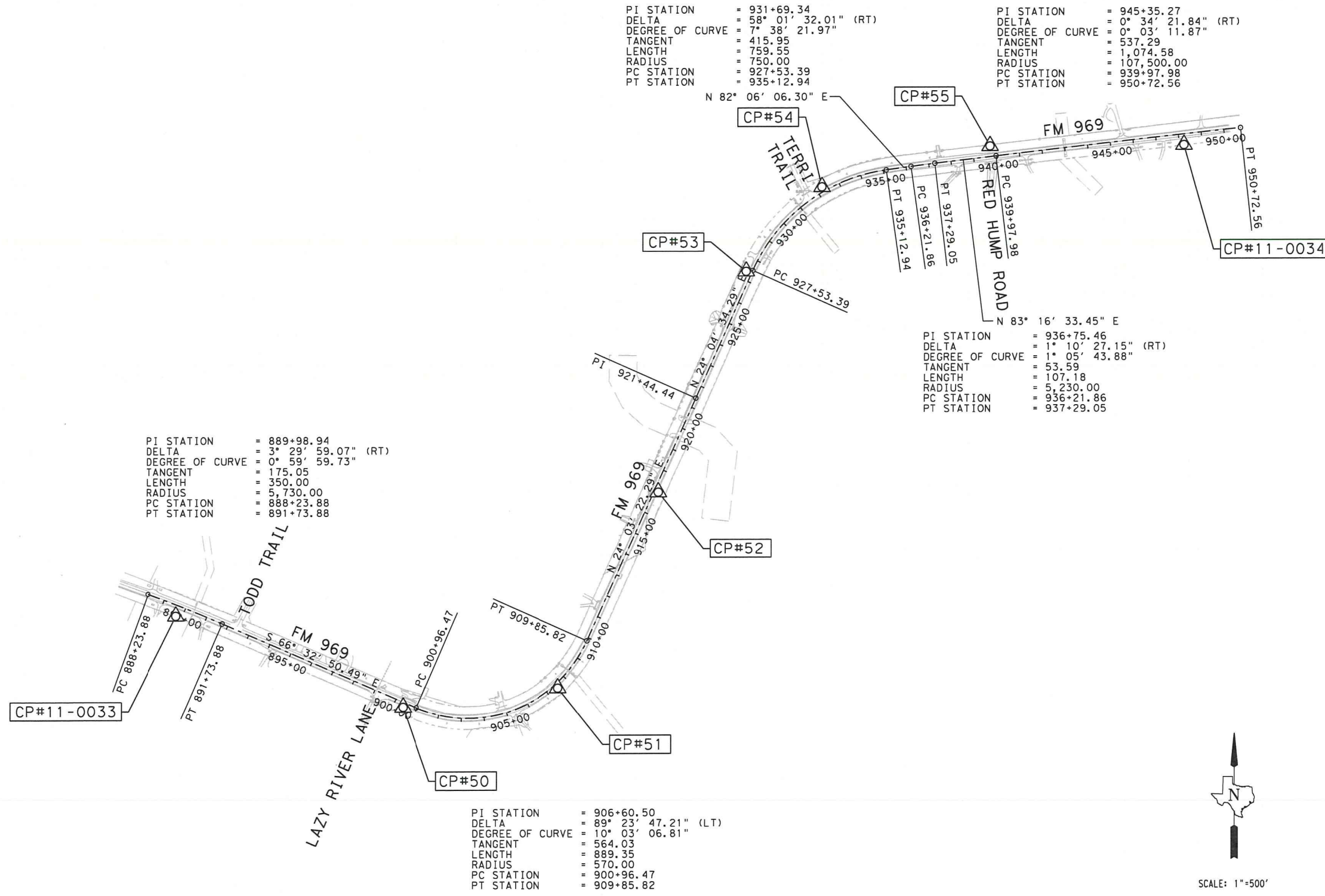
**WZ (UL) - 13**

FILE: wzuj-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
8-95 2-98 7-13	DIST	COUNTY	SHEET NO.	
1-97 3-03	AUS	BASTROP	38	

CONTROL POINT	SURFACE COORDINATES		GRID COORDINATES		LATITUDE	LONGITUDE	ELEVATION	STATION	OFFSET	DESCRIPTION
	NORTHING	EASTING	NORTHING	EASTING						
11-1033	10,055,396.489	3,196,576.178	10,055,094.836	3,196,480.284	N 30° 13' 10.20401"	W 97° 29' 01.96263"	432.420'	889+72.76	46.23'RT	SET 3-1/2" ALUMINUM DISK IN CONCRETE STAMPED 11-1033"
50	10,054,997.974	3,197,568.125	10,054,997.974	3,197,568.125	N 30° 13' 06.00910"	W 97° 28' 50.77706"	431.696'	900+43.03	20.54'RT	SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT"
51	10,055,080.272	3,198,245.462	10,055,080.272	3,198,245.462	N 30° 13' 06.65147"	W 97° 28' 43.03565"	429.331'	907+46.71	18.80'RT	SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT"
52	10,055,934.683	3,198,682.105	10,055,934.683	3,198,682.105	N 30° 13' 14.99490"	W 97° 28' 37.81069"	419.089'	917+04.20	18.18'RT	SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT"
53	10,056,895.949	3,199,064.798	10,056,895.949	3,199,064.798	N 30° 13' 24.40931"	W 97° 28' 33.16891"	429.762'	927+37.96	24.41'LT	SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT"
54	10,057,263.283	3,199,395.340	10,057,263.283	3,199,395.340	N 30° 13' 27.96001"	W 97° 28' 29.29506"	436.145'	932+26.62	20.92'LT	SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT"
55	10,057,439.825	3,200,129.723	10,057,439.825	3,200,129.723	N 30° 13' 29.52003"	W 97° 28' 20.87549"	435.220'	939+76.53	45.56'LT	SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT"
11-1034	10,057,443.935	3,200,977.190	10,057,443.935	3,200,977.190	N 30° 13' 29.34490"	W 97° 28' 11.21791"	436.230'	948+19.01	46.45'RT	SET 3-1/2" ALUMINUM DISK IN CONCRETE STAMPED 11-1034"

NOTES:

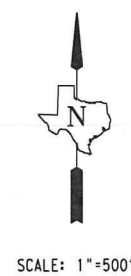
- COORDINATES AND DISTANCES ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES USING A SURFACE FACTOR OF 1.00003.
- HORIZONTAL CONTROL IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM NAD83(2011) (EPOCH2010.00) CENTRAL ZONE (4203).
- ALL ELEVATIONS ARE BASED ON A DIGITAL LEVEL LOOP ORIGINATING FROM CP NUMBER 11-1033 OF WHICH VERTICAL VALUES WERE BASED ON GPS DERIVED ELLIPSOID HEIGHTS UTILIZING NAVD 88, GEOID 12B.



GORRONDONA & ASSOCIATES, INC.  
 2800 N.E. LOOP 820, SUITE 660  
 FORT WORTH, TEXAS 76137  
 TEXAS REGISTERED SURVEYING FIRM 10106900



FM 969  
 CONTROL INDEX SHEET

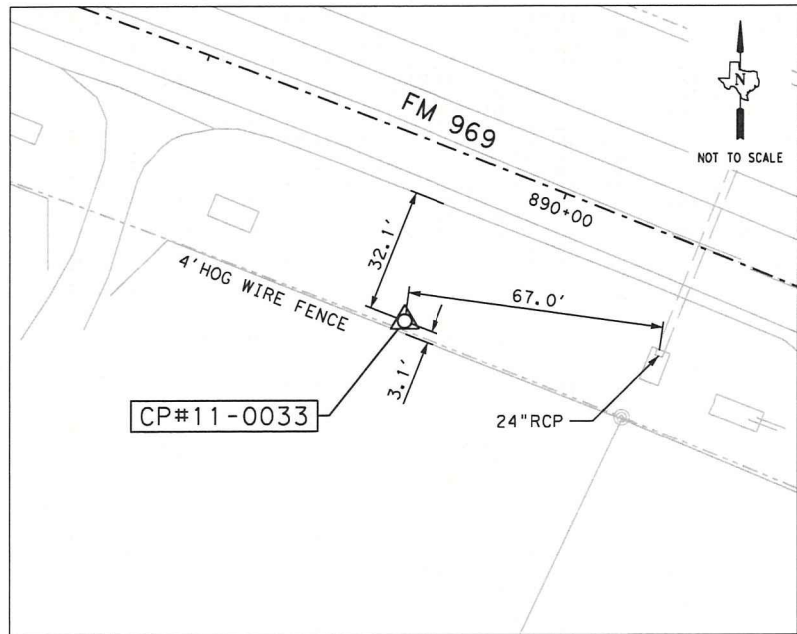


SHEET 1 OF 1

© 2021	CONT	SECT	JOB	HIGHWAY
	1186	02	025	FM 969
	DIST	COUNTY		SHEET NO.
	14	BASTROP		39

118602025\_S01.dgn  
2/28/2022



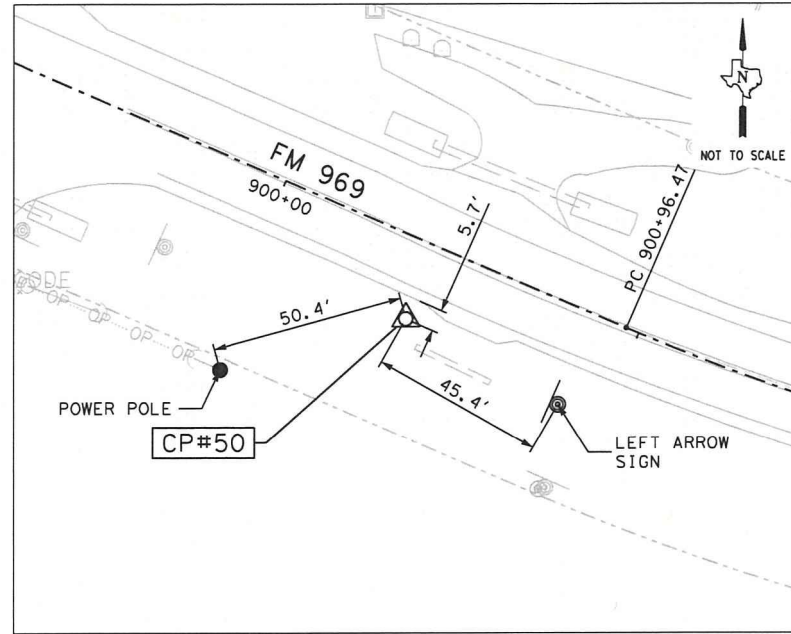


**CONTROL POINT: CP#11-0033**

CP#11-0033 IS A SET 3-1/2" ALUMINUM DISK IN CONCRETE STAMPED "11-1033" LOCATED 250 FEET NORTHWEST OF THE INTERSECTION OF FM 969 WITH TODD TRAIL AND LOCATED 32.1 FEET SOUTHWEST OF THE SOUTHWEST EDGE OF FM 969, 3.1 FEET NORTHEAST OF A 4 FOOT HOG WIRE FENCE, AND 67.0 FEET WEST OF A 24" RCP.

LATITUDE: N 30°13'10.20401" STATION: 889+72.76  
LONGITUDE: W 97°29'01.96263" OFFSET: 46.23' RT

SURFACE COORDINATES: GRID COORDINATES:  
NORTHING: 10,055,396.489 NORTHING: 10,055,094.836  
EASTING: 3,196,576.178 EASTING: 3,196,480.284  
ELEVATION: 432.420' ELEVATION: 432.420'

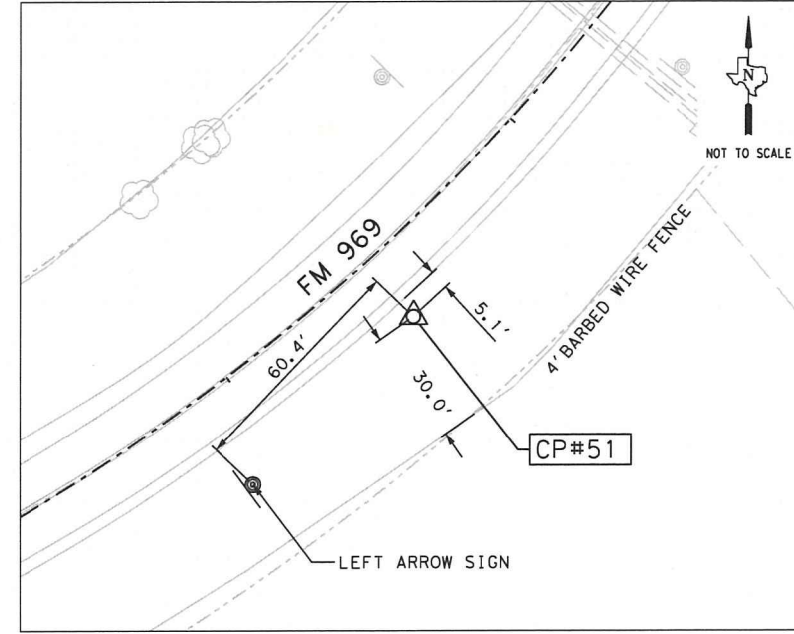


**CONTROL POINT: CP#50**

CP#50 IS A SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT" LOCATED 120 FEET SOUTHWEST OF THE INTERSECTION OF FM 969 WITH LAZY RIVER LANE AND LOCATED 5.7 FEET SOUTHWEST OF THE SOUTHWEST EDGE OF FM 969, 50.4 FEET NORTHEAST OF A POWER POLE, AND 45.4 FEET NORTHWEST OF A LEFT ARROW SIGN.

LATITUDE: N 30°13'06.00910" STATION: 900+43.03  
LONGITUDE: W 97°28'50.77706" OFFSET: 20.54' RT

SURFACE COORDINATES: GRID COORDINATES:  
NORTHING: 10,054,997.974 NORTHING: 10,054,997.974  
EASTING: 3,197,568.125 EASTING: 3,197,568.125  
ELEVATION: 431.696' ELEVATION: 431.696'



**CONTROL POINT: CP#51**

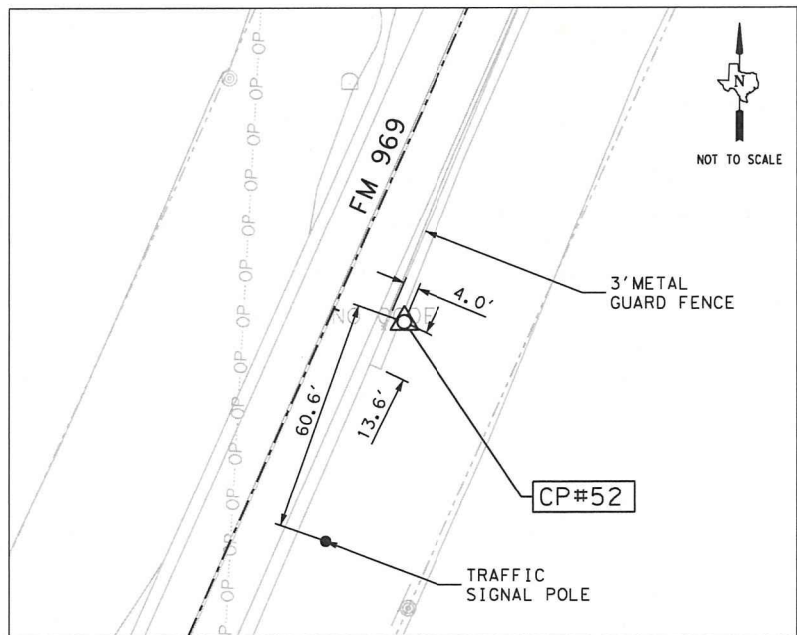
CP#51 IS A SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT" LOCATED 0.2 MILES EAST OF THE INTERSECTION OF FM 969 WITH LAZY RIVER LANE AND LOCATED 5.1 FEET SOUTHWEST OF THE SOUTHWEST EDGE OF FM 969, 50.4 FEET NORTHWEST OF A 4 FOOT BARBED WIRE FENCE, AND 60.4 FEET NORTHEAST OF A LEFT ARROW SIGN.

LATITUDE: N 30°13'06.65147" STATION: 907+46.71  
LONGITUDE: W 97°28'43.03565" OFFSET: 18.80' RT

SURFACE COORDINATES: GRID COORDINATES:  
NORTHING: 10,055,080.272 NORTHING: 10,055,080.272  
EASTING: 3,198,245.462 EASTING: 3,198,245.462  
ELEVATION: 429.331' ELEVATION: 429.331'

**NOTES:**

- COORDINATES AND DISTANCES ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES USING A SURFACE FACTOR OF 1.00003.
- HORIZONTAL CONTROL IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM NAD83(2011) (EPOCH2010.00) CENTRAL ZONE (4203).
- ALL ELEVATIONS ARE BASED ON A DIGITAL LEVEL LOOP ORIGINATING FROM CP NUMBER 11-1033 OF WHICH VERTICAL VALUES WERE BASED ON GPS DERIVED ELLIPSOID HEIGHTS UTILIZING NAVD 88, GEOID 12B.

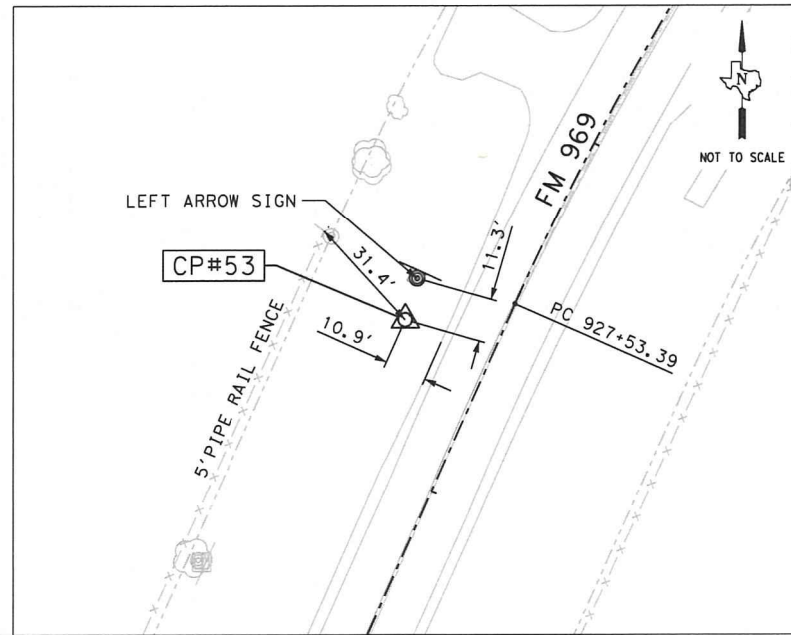


**CONTROL POINT: CP#52**

CP#52 IS A SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT" LOCATED 0.3 MILES NORTHEAST OF THE INTERSECTION OF FM 969 WITH LAZY RIVER LANE AND LOCATED 4.0 FEET SOUTHWEST OF THE SOUTHWEST EDGE OF FM 969, 13.6 FEET NORTHEAST OF THE END OF A 3 FOOT METAL GUARD FENCE, AND 60.6 FEET NORTHEAST OF A TRAFFIC SIGNAL POLE.

LATITUDE: N 30°13'14.99490" STATION: 917+04.20  
LONGITUDE: W 97°28'37.81069" OFFSET: 18.18' RT

SURFACE COORDINATES: GRID COORDINATES:  
NORTHING: 10,055,934.683 NORTHING: 10,055,934.683  
EASTING: 3,198,682.105 EASTING: 3,198,682.105  
ELEVATION: 419.089' ELEVATION: 419.089'

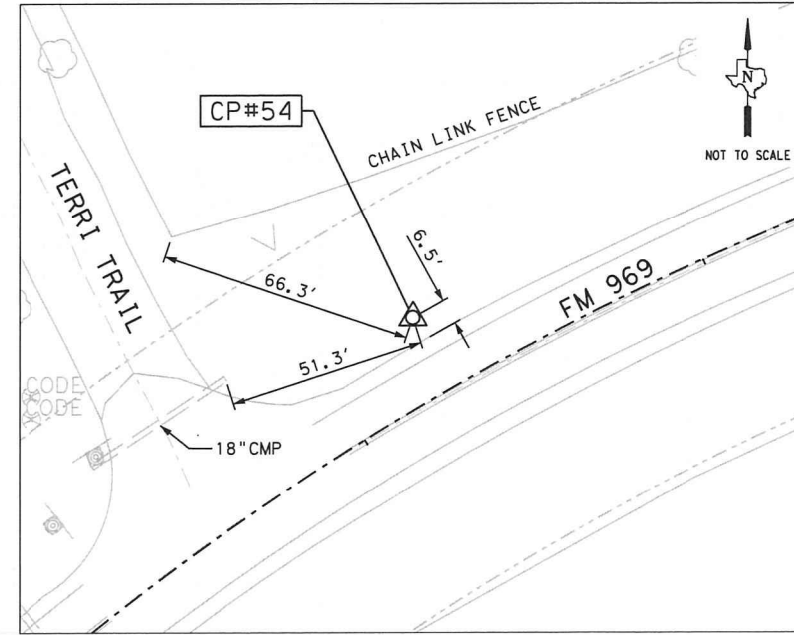


**CONTROL POINT: CP#53**

CP#53 IS A SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT" LOCATED 420 FEET SOUTHWEST OF THE INTERSECTION OF FM 969 WITH TERRI TRAIL AND LOCATED 10.9 FEET NORTHWEST OF THE NORTHWEST EDGE OF FM 969, 31.4 FEET SOUTHWEST OF A 5 FOOT PIPE RAIL FENCE CORNER, AND 11.3 FEET SOUTHWEST OF A LEFT ARROW SIGN.

LATITUDE: N 30°13'24.40931" STATION: 927+37.96  
LONGITUDE: W 97°28'33.16891" OFFSET: 24.41' LT

SURFACE COORDINATES: GRID COORDINATES:  
NORTHING: 10,056,895.949 NORTHING: 10,056,895.949  
EASTING: 3,199,064.798 EASTING: 3,199,064.798  
ELEVATION: 429.762' ELEVATION: 429.762'

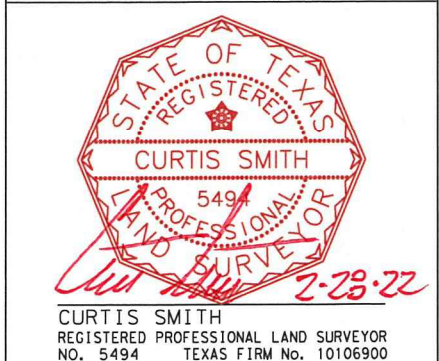


**CONTROL POINT: CP#54**

CP#54 IS A SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT" LOCATED 70 FEET NORTHEAST OF THE INTERSECTION OF FM 969 WITH TERRI TRAIL AND LOCATED 6.5 FEET NORTHWEST OF THE NORTHWEST EDGE OF FM 969, 66.3 FEET SOUTHWEST OF A CHAIN LINK FENCE CORNER POST, AND 51.3 FEET NORTHEAST OF AN 18" CMP.

LATITUDE: N 30°13'27.96001" STATION: 932+26.62  
LONGITUDE: W 97°28'29.29506" OFFSET: 20.92' LT

SURFACE COORDINATES: GRID COORDINATES:  
NORTHING: 10,057,263.283 NORTHING: 10,057,263.283  
EASTING: 3,199,395.34 EASTING: 3,199,395.340  
ELEVATION: 436.145' ELEVATION: 436.145'



GORRONDONA & ASSOCIATES, INC.  
2800 N.E. LOOP 820, SUITE 660  
FORT WORTH, TEXAS 76137  
TEXAS REGISTERED SURVEYING FIRM 10106900



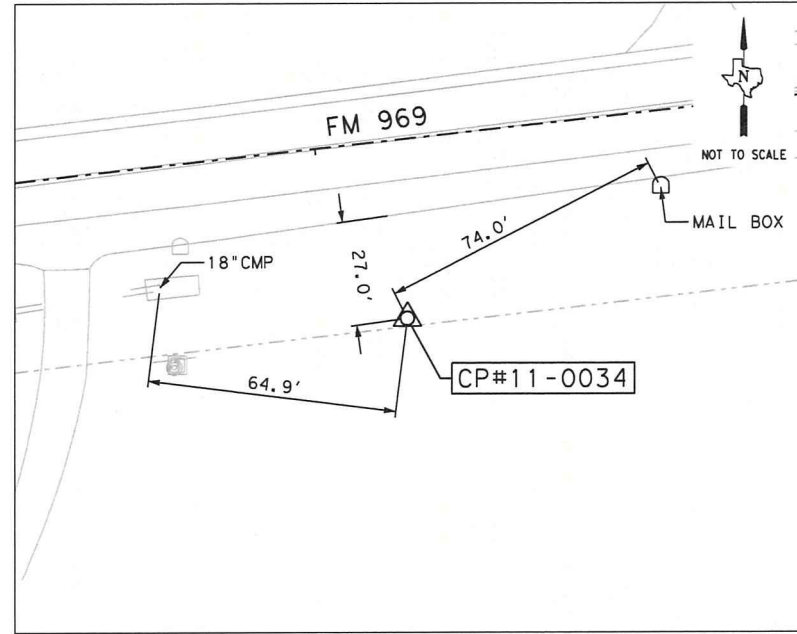
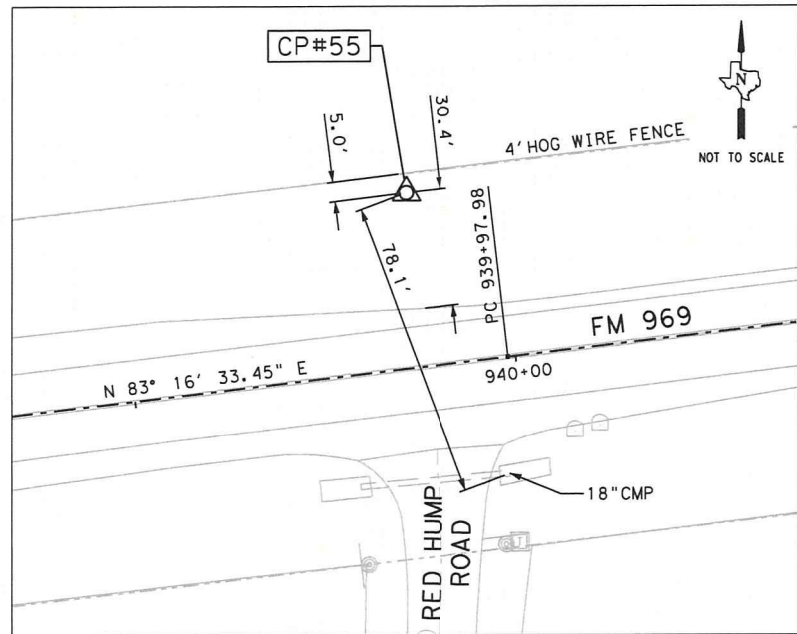
**FM 969 CONTROL DETAIL SHEET**

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
1186	02	025	FM 969
DIST COUNTY			SHEET NO.
14 BASTROP			40

118602025\_S02.dgn 2/28/2022





**CONTROL POINT: CP#55**

CP#55 IS A SET 5/8" IRON ROD WITH CAP STAMPED "REFERENCE POINT" LOCATED AT THE NORTH CORNER OF THE INTERSECTION OF FM 969 WITH RED HUMP ROAD AND LOCATED 30.4 FEET NORTH OF THE NORTH EDGE OF FM 969, 5.0 FEET SOUTH OF A 4 FOOT HOG WIRE FENCE, AND 78.1 FEET NORTHWEST OF AN 18" CMP.

LATITUDE: N 30°13'29.52003" STATION: 939+76.53  
 LONGITUDE: W 97°28'20.87549" OFFSET: 45.56'LT

SURFACE COORDINATES: GRID COORDINATES:  
 NORTHING: 10,057,439.825 NORTHING: 10,057,439.825  
 EASTING: 3,200,129.723 EASTING: 3,200,129.723  
 ELEVATION: 435.220' ELEVATION: 435.220'

**CONTROL POINT: CP#11-0034**

CP#11-0034 IS A SET 3-1/2" ALUMINUM DISK IN CONCRETE STAMPED "11-1034" LOCATED 0.2 MILES EAST OF THE INTERSECTION OF FM 969 WITH RED HUMP ROAD AND LOCATED 27.0 FEET SOUTH OF THE SOUTH EDGE OF FM 969, 64.9 FEET SOUTHEAST OF AN 18" CMP, AND 74.0 FEET SOUTHWEST OF A MAIL BOX.

LATITUDE: N 30°13'29.34490" STATION: 948+19.01  
 LONGITUDE: W 97°28'11.21791" OFFSET: 46.45'RT

SURFACE COORDINATES: GRID COORDINATES:  
 NORTHING: 10,057,443.935 NORTHING: 10,057,443.935  
 EASTING: 3,200,977.190 EASTING: 3,200,977.19  
 ELEVATION: 436.230' ELEVATION: 436.230'

**NOTES:**

- COORDINATES AND DISTANCES ARE US SURVEY FEET DISPLAYED IN SURFACE VALUES USING A SURFACE FACTOR OF 1.00003.
- HORIZONTAL CONTROL IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM NAD83(2011) (EPOCH2010.00) CENTRAL ZONE (4203).
- ALL ELEVATIONS ARE BASED ON A DIGITAL LEVEL LOOP ORIGINATING FROM CP NUMBER 11-1033 OF WHICH VERTICAL VALUES WERE BASED ON GPS DERIVED ELLIPSOID HEIGHTS UTILIZING NAVD 88, GEOID 12B.

118602025\_S03.dgn

2/28/2022



CURTIS SMITH  
 REGISTERED PROFESSIONAL LAND SURVEYOR  
 NO. 5494 TEXAS FIRM No. 10106900

GORRONDONA & ASSOCIATES, INC.  
 2800 N.E. LOOP 820, SUITE 660  
 FORT WORTH, TEXAS 76137  
 TEXAS REGISTERED SURVEYING FIRM 10106900



**FM 969 CONTROL DETAIL SHEET**

SHEET 2 OF 2

© 2021	CONT	SECT	JOB	HIGHWAY
	1186	02	025	FM 969
	DIST	COUNTY		SHEET NO.
	14	BASTROP		41

FM 969

Beginning chain FM969 description  
Feature: Geom Centerline

Curve Data  
\*\*\*\*\*

Curve FM969 1				
P.I. Station	889+98.94	N	10,055,432.4032	E 3,196,618.3534
Delta	3° 29' 59.07"	(RT)		
Degree	0° 59' 59.73"			
Tangent	175.0544			
Length	350.0000			
Radius	5,730.0000			
External	2.6734			
Long Chord	349.9456			
Mid. Ord.	2.6721			
P.C. Station	888+23.88	N	10,055,492.1401	E 3,196,453.8069
P.T. Station	891+73.88	N	10,055,362.7331	E 3,196,778.9465
C.C.		N	10,050,106.0921	E 3,194,498.4586
Back	S 70° 02' 49.57"	E		
Ahead	S 66° 32' 50.49"	E		
Chord Bear	S 68° 17' 50.03"	E		

Course from PT FM969 1 to PC FM969 4 S 66° 32' 50.49" E Dist 922.5895

Curve Data  
\*\*\*\*\*

Curve FM969 2				
P.I. Station	906+60.50	N	10,054,771.0732	E 3,198,142.7527
Delta	89° 23' 47.21"	(LT)		
Degree	10° 03' 06.81"			
Tangent	564.0270			
Length	889.3495			
Radius	570.0000			
External	231.8893			
Long Chord	801.8448			
Mid. Ord.	164.8319			
P.C. Station	900+96.47	N	10,054,995.5509	E 3,197,625.3203
P.T. Station	909+85.82	N	10,055,286.1123	E 3,198,372.6684
C.C.		N	10,055,518.4628	E 3,197,852.1751
Back	S 66° 32' 50.49"	E		
Ahead	N 24° 03' 22.29"	E		
Chord Bear	N 68° 45' 15.90"	E		

Course from PT FM969 4 to 24 N 24° 03' 22.29" E Dist 1,158.6206

Point 24 N 10,056,344.1022 E 3,198,844.9597 Sta 921+44.44

Course from 24 to PC FM969 9 N 24° 04' 34.29" E Dist 608.9454

Curve Data  
\*\*\*\*\*

Curve FM969 3				
P.I. Station	931+69.34	N	10,057,279.8361	E 3,199,263.0671
Delta	58° 01' 32.01"	(RT)		
Degree	7° 38' 21.97"			
Tangent	415.9505			
Length	759.5528			
Radius	750.0000			
External	107.6216			
Long Chord	727.5070			
Mid. Ord.	94.1163			
P.C. Station	927+53.39	N	10,056,900.0717	E 3,199,093.3796
P.T. Station	935+12.94	N	10,057,336.9936	E 3,199,675.0718
C.C.		N	10,056,594.1084	E 3,199,778.1325
Back	N 24° 04' 34.29"	E		
Ahead	N 82° 06' 06.31"	E		
Chord Bear	N 53° 05' 20.30"	E		

Course from PT FM969 9 to PC FM969 12 N 82° 06' 06.31" E Dist 108.9218

Curve Data  
\*\*\*\*\*

Curve FM969_4				
P.I. Station	936+75.46	N	10,057,359.3255	E 3,199,836.0450
Delta	1° 10' 27.15"	(RT)		
Degree	1° 05' 43.88"			
Tangent	53.5931			
Length	107.1825			
Radius	5,230.0000			
External	0.2746			
Long Chord	107.1806			
Mid. Ord.	0.2746			
P.C. Station	936+21.86	N	10,057,351.9610	E 3,199,782.9603
P.T. Station	937+29.05	N	10,057,365.6006	E 3,199,889.2695
C.C.		N	10,052,171.5746	E 3,200,501.6369
Back	N 82° 06' 06.31"	E		
Ahead	N 83° 16' 33.45"	E		
Chord Bear	N 82° 41' 19.88"	E		

Course from PT FM969\_12 to PC FM969\_15 N 83° 16' 33.45" E Dist 268.9338

FM 969 CONTINUED

Curve Data  
\*\*\*\*\*

Curve FM969 5				
P.I. Station	945+35.27	N	10,057,459.9999	E 3,200,689.9527
Delta	0° 34' 21.84"	(RT)		
Degree	0° 03' 11.87"			
Tangent	537.2950			
Length	1,074.5810			
Radius	107,500.0000			
External	1.3427			
Long Chord	1,074.5766			
Mid. Ord.	1.3427			
P.C. Station	939+97.98	N	10,057,397.0894	E 3,200,156.3535
P.T. Station	950+72.56	N	10,057,517.5734	E 3,201,224.1542
C.C.		N	9,950,636.5165	E 3,212,743.2552
Back	N 83° 16' 33.45"	E		
Ahead	N 83° 50' 55.30"	E		
Chord Bear	N 83° 33' 44.37"	E		

Ending chain FM969 description

DRIVEWAY 07

Beginning chain DW07 description

Point DW07\_01 N 10,055,012.1363 E 3,197,587.0899 Sta 0+00.00

Course from DW07\_01 to PC DW07\_1 N 23° 27' 09.50" E Dist 27.9174

Curve Data  
\*\*\*\*\*

Curve DW07_1				
P.I. Station	0+34.56	N	10,055,043.8452	E 3,197,600.8462
Delta	67° 13' 21.60"	(RT)		
Degree	572° 57' 28.06"			
Tangent	6.6468			
Length	11.7326			
Radius	10.0000			
External	2.0075			
Long Chord	11.0711			
Mid. Ord.	1.6719			
P.C. Station	0+27.92	N	10,055,037.7475	E 3,197,598.2008
P.T. Station	0+39.65	N	10,055,043.7669	E 3,197,607.4925
C.C.		N	10,055,033.7676	E 3,197,607.3747
Back	N 23° 27' 09.51"	E		
Ahead	S 89° 19' 28.90"	E		
Chord Bear	N 57° 03' 50.30"	E		

Course from PT DW07\_1 to PC DW07\_2 S 89° 19' 28.90" E Dist 41.2228

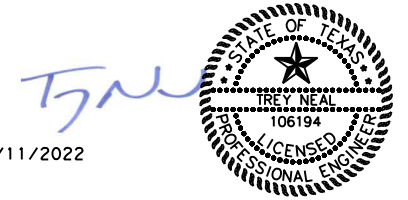
Curve Data  
\*\*\*\*\*

Curve DW07_2				
P.I. Station	0+88.16	N	10,055,043.1952	E 3,197,655.9947
Delta	72° 07' 46.68"	(LT)		
Degree	572° 57' 28.06"			
Tangent	7.2827			
Length	12.5890			
Radius	10.0000			
External	2.3709			
Long Chord	11.7740			
Mid. Ord.	1.9165			
P.C. Station	0+80.87	N	10,055,043.2810	E 3,197,648.7125
P.T. Station	0+93.46	N	10,055,050.0997	E 3,197,658.3111
C.C.		N	10,055,053.2803	E 3,197,648.8304
Back	S 89° 19' 28.90"	E		
Ahead	N 18° 32' 44.42"	E		
Chord Bear	N 54° 36' 37.76"	E		

Course from PT DW07\_2 to DW07\_02 N 18° 32' 44.41" E Dist 21.5674

Point DW0702 N 10,055,070.5471 E 3,197,665.1708 Sta 1+15.03

Ending chain DW07 description



Kimley»Horn F-928



FM 969			
HORIZONTAL ALIGNMENT DATA			
SHEET 1 OF 2			
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	42
CONT.	SECT.	JOB	
1186	02	025	



☪ DRIVEWAY 11

DW1101 CUR D\_DW111 DW1102

Beginning chain D\_DW111 description

Point DW1101 N 10,054,989.6700 E 3,198,064.9617 Sta 0+00.00

Course from DW1101 to PC D\_DW111 S 21° 55' 11.60" E Dist 40.1948

Curve Data  
\*-----\*

Curve D\_DW111  
 P.I. Station 0+57.66 N 10,054,936.1750 E 3,198,086.4881  
 Delta = 23° 01' 38.51" (LT)  
 Degree = 66° 48' 41.43"  
 Tangent = 17.4689  
 Length = 34.4662  
 Radius = 85.7574  
 External = 1.7611  
 Long Chord = 34.2347  
 Mid. Ord. = 1.7257  
 P.C. Station 0+40.19 N 10,054,952.3810 E 3,198,079.9668  
 P.T. Station 0+74.66 N 10,054,923.8113 E 3,198,098.8291  
 C.C. N 10,054,984.3951 E 3,198,159.5245  
 Back = S 21° 55' 11.60" E  
 Ahead = S 44° 56' 50.11" E  
 Chord Bear = S 33° 26' 00.85" E

Course from PT D\_DW111 to DW1102 S 44° 56' 50.11" E Dist 30.1421

Point DW1102 N 10,054,902.4781 E 3,198,120.1231 Sta 1+04.80

Ending chain D\_DW111 description

☪ DRIVEWAY 15

DW1501 CUR D\_DW151 DW1502

Beginning chain D\_DW151 description

Point DW1501 N 10,056,023.7391 E 3,198,701.9482 Sta 0+00.00

Course from DW1501 to PC D\_DW151 N 65° 56' 37.71" W Dist 51.5540

Curve Data  
\*-----\*

Curve D\_DW151  
 P.I. Station 0+71.51 N 10,056,052.8869 E 3,198,636.6534  
 Delta = 13° 16' 03.05" (LT)  
 Degree = 33° 23' 57.09"  
 Tangent = 19.9513  
 Length = 39.7241  
 Radius = 171.5484  
 External = 1.1563  
 Long Chord = 39.6354  
 Mid. Ord. = 1.1485  
 P.C. Station 0+51.55 N 10,056,044.7541 E 3,198,654.8718  
 P.T. Station 0+91.28 N 10,056,056.6215 E 3,198,617.0548  
 C.C. N 10,055,888.1054 E 3,198,584.9431  
 Back = N 65° 56' 37.71" W  
 Ahead = N 79° 12' 40.76" W  
 Chord Bear = N 72° 34' 39.23" W

Course from PT D\_DW151 to DW1502 N 79° 12' 40.75" W Dist 12.0966

Point DW1502 N 10,056,058.8859 E 3,198,605.1720 Sta 1+03.37

Ending chain D\_DW151 description



5/11/2022



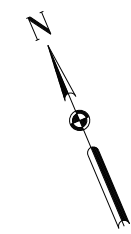
FM 969  
 HORIZONTAL ALIGNMENT  
 DATA

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

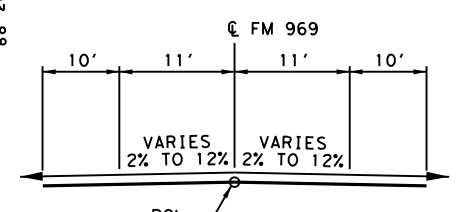
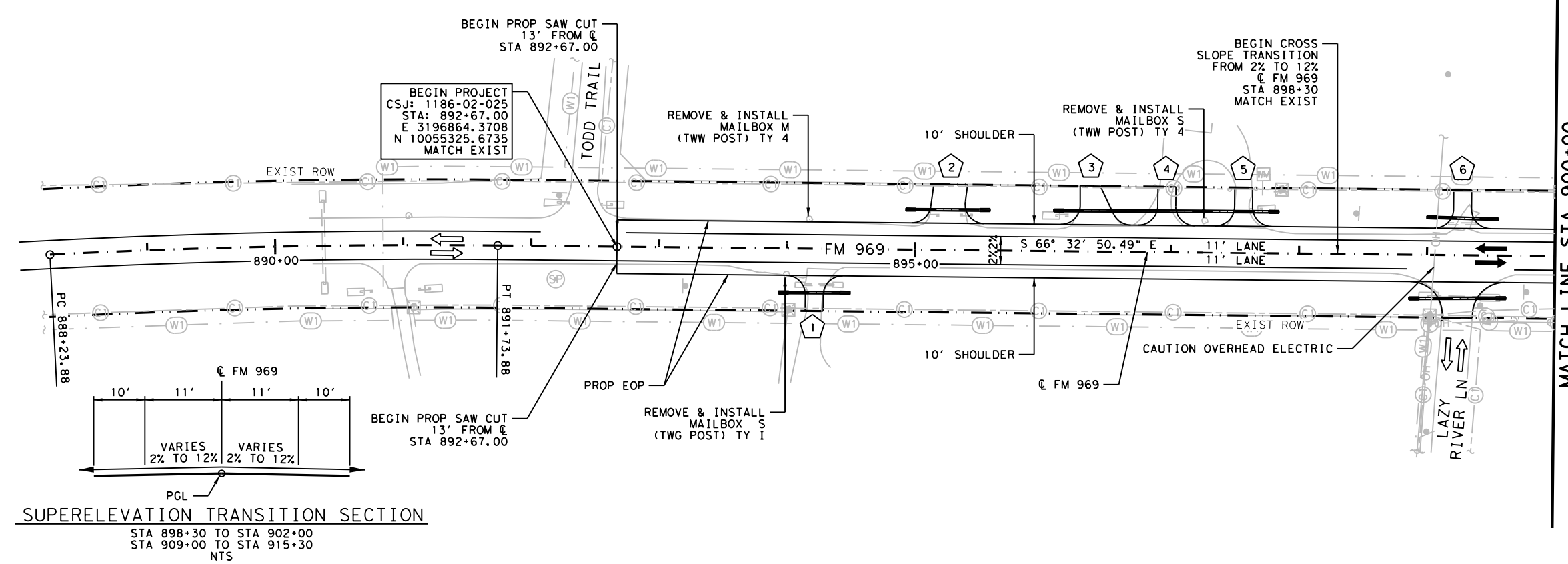
SHEET NO. 43

FILENAME: c:\pwworking\1\0152780\FM969\_RDW\_HAD\_02.dgn  
 PLOTTED: 5/11/2022 4:28:26 PM



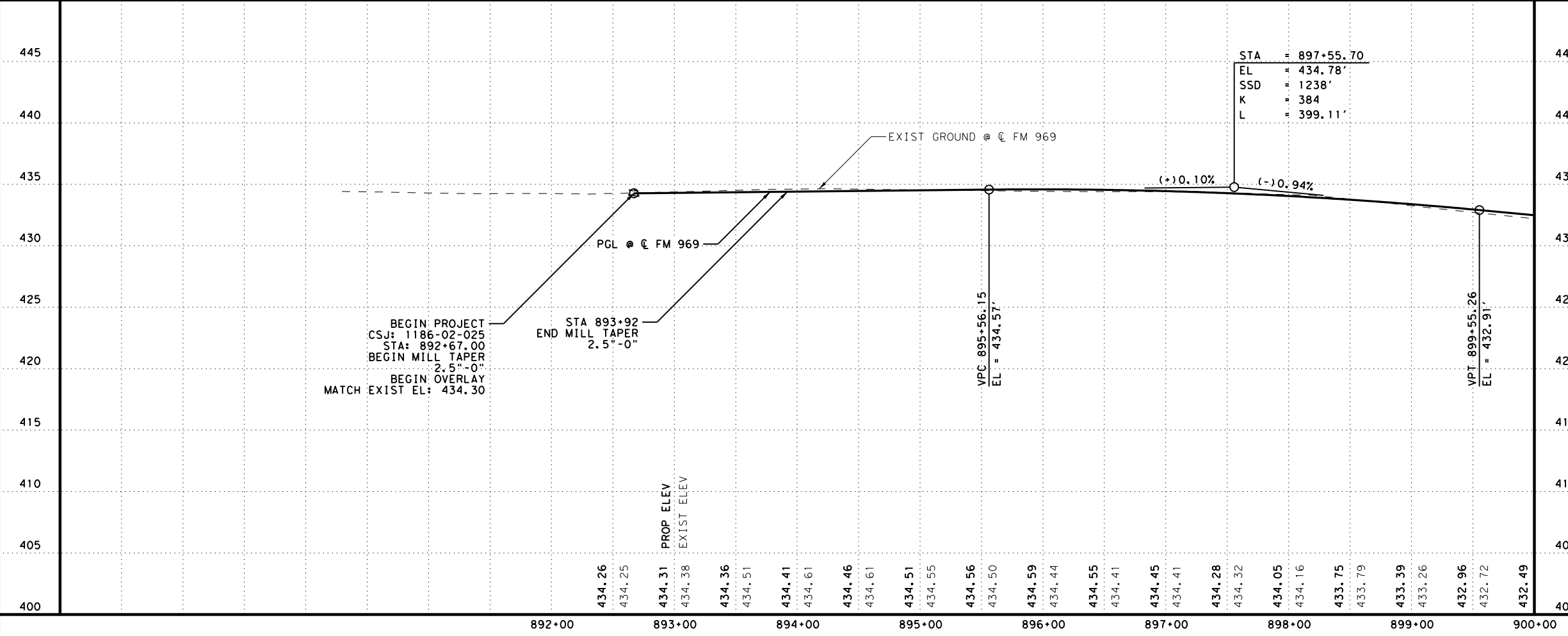
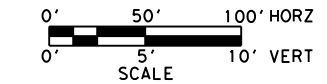
**LEGEND**

- ➔ PROPOSED LANE
- ➡ EXISTING LANE
- ⬡ DRIVENWAYS



**NOTES:**

1. HORIZONTAL DATA & PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
2. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
3. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.

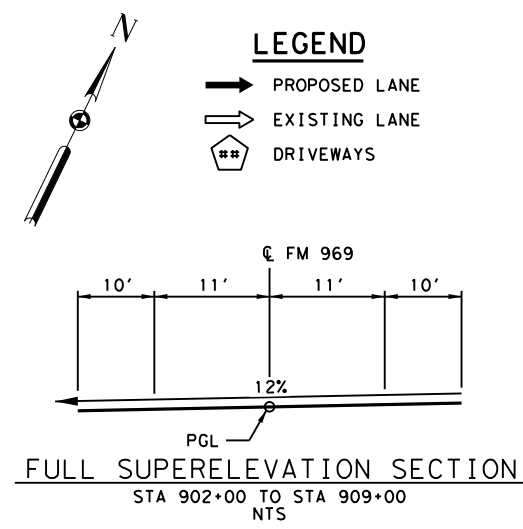


5/11/2022  
  
 TREY NEAL  
 106194  
 LICENSED PROFESSIONAL ENGINEER

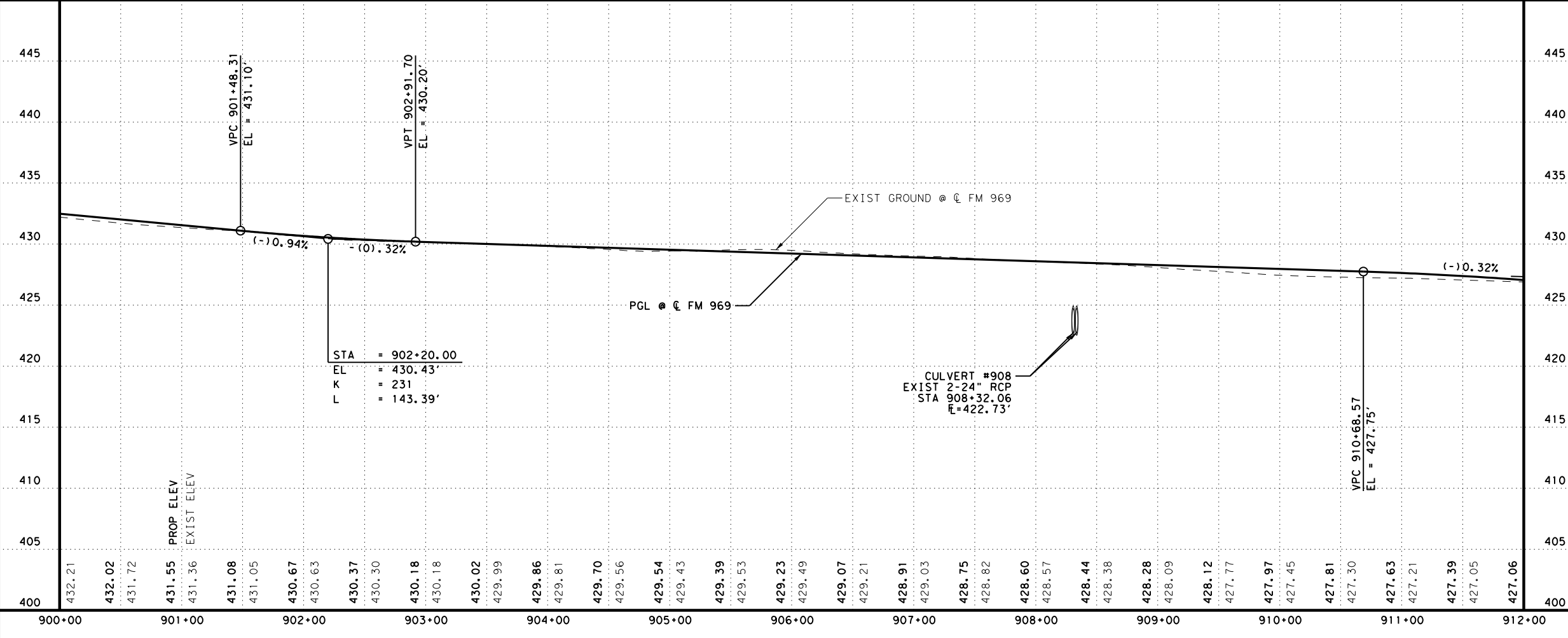
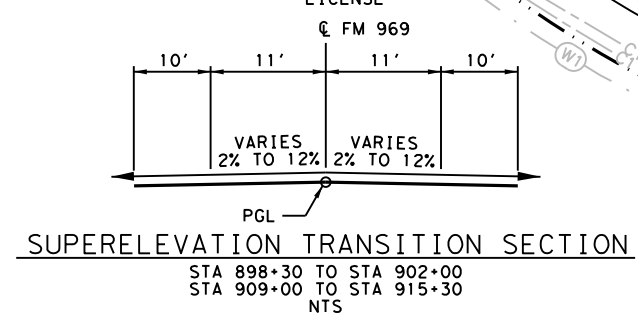
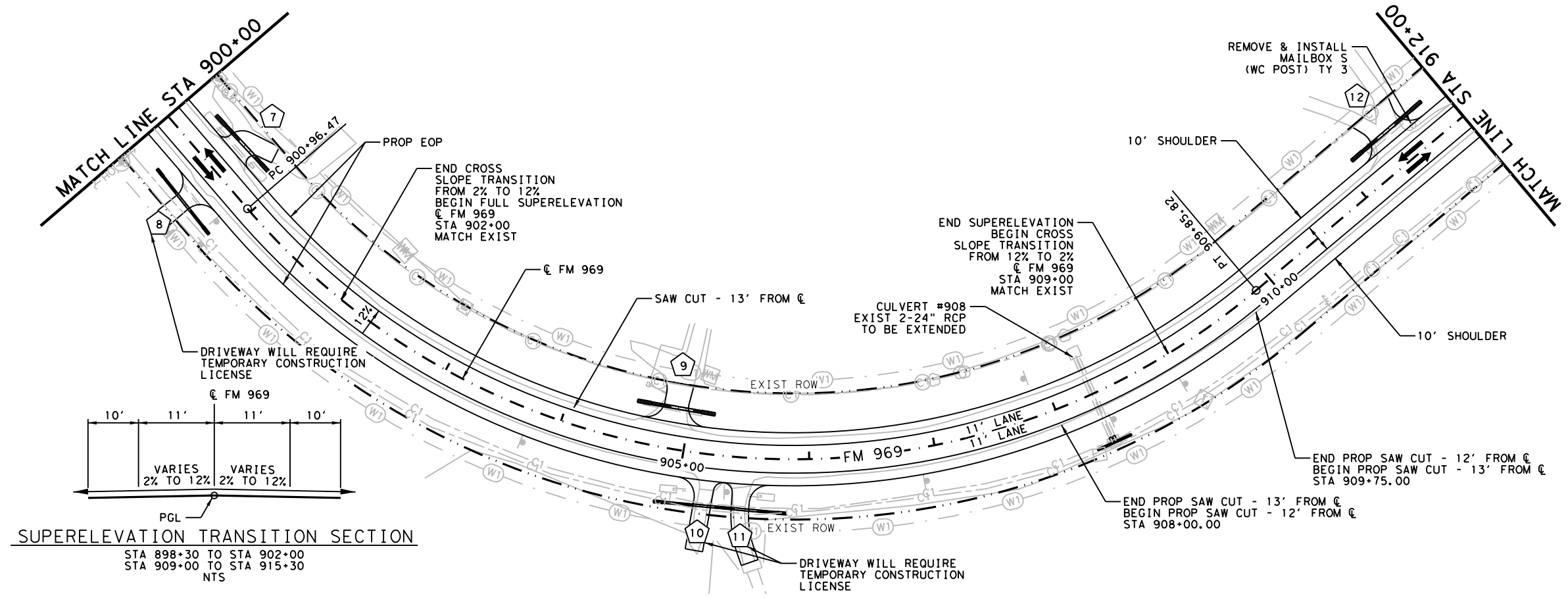
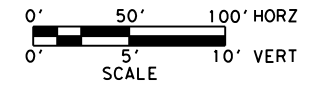


<b>FM 969</b>			
<b>PLAN &amp; PROFILE</b>			
BEGIN TO STA 900+00			
SCALE: 100'		SHEET 1 OF 5	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	44
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: c:\pwworking\1\00152780\FM969\_RDW\_PP\_01.dgn  
 PLOTTED: 5/11/2022 4:28:37 PM



- NOTES:**
- HORIZONTAL DATA & PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
  - LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
  - CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



5/11/2022

**Kimley»Horn** F-928

Texas Department of Transportation

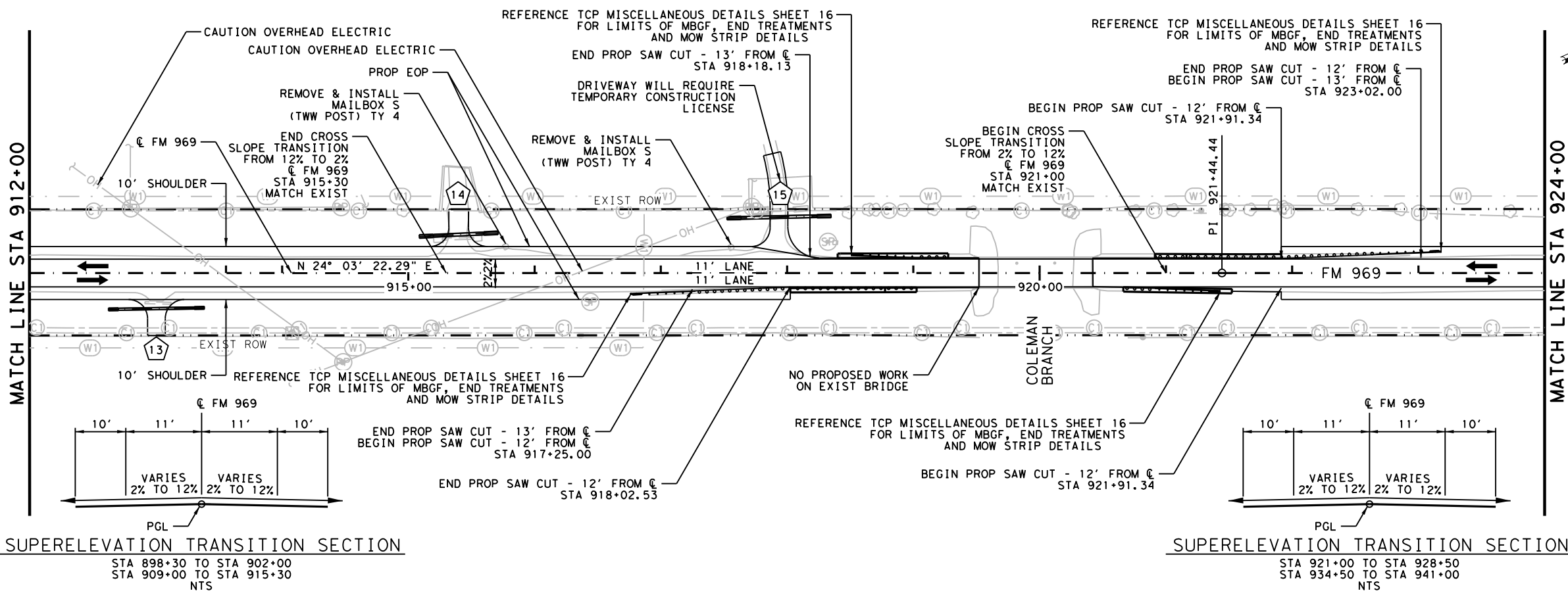
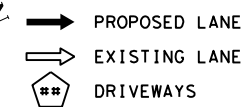
**FM 969**  
**PLAN & PROFILE**  
 STA 900+00 TO 912+00

SCALE: 100' SHEET 2 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
45		

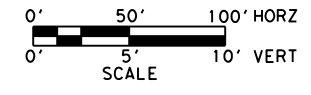
FILENAME: c:\pwworking\100152780\FM969\_RDW\_PP\_02.dgn  
 PLOTTED: 5/11/2022 4:28:51 PM

**LEGEND**

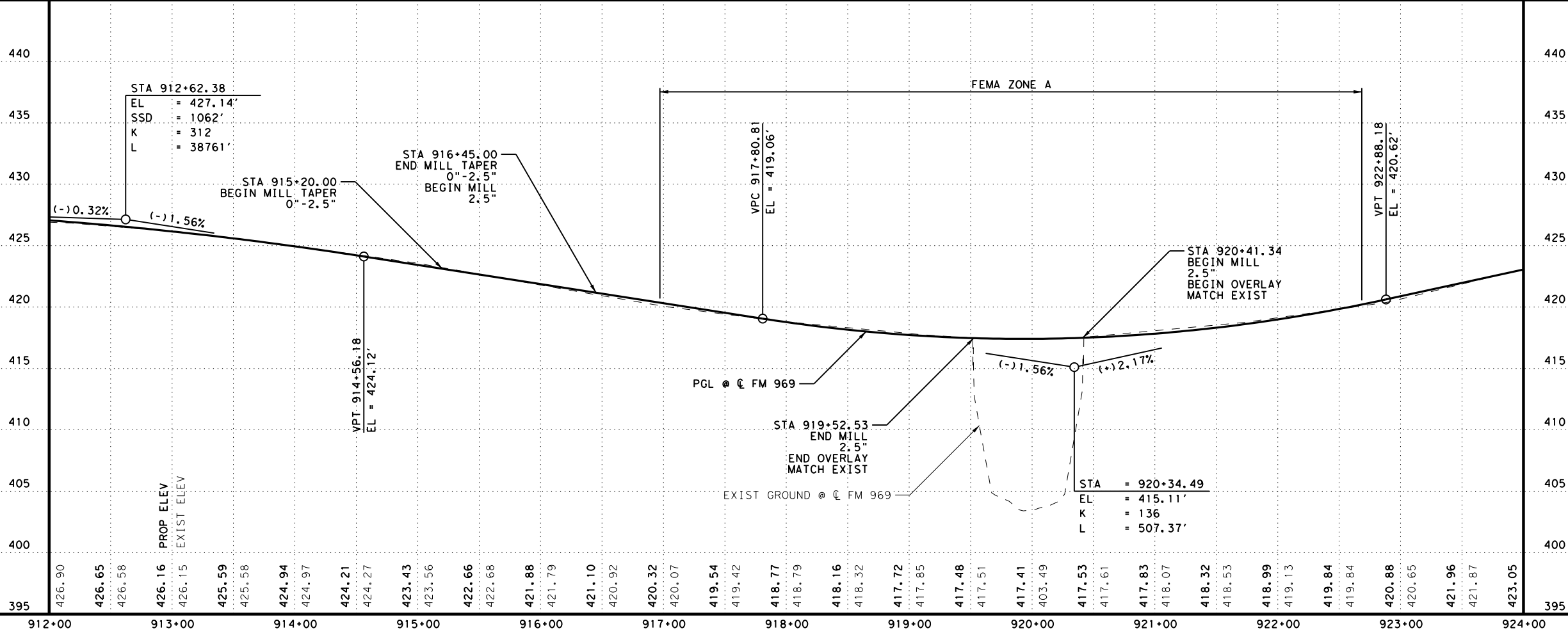


**NOTES:**

1. HORIZONTAL DATA & PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
2. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
3. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



FILENAME: c:\pwworking\152780\FM969\_RDW\_PP\_03.dgn  
 PLOTTED: 5/11/2022 4:29:04 PM



5/11/2022  
  
 TREY NEAL  
 LICENSED PROFESSIONAL ENGINEER

**Kimley»Horn** F-928

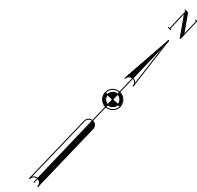


**FM 969**  
**PLAN & PROFILE**  
 STA 912+00 TO STA 924+00

SCALE: 100' SHEET 3 OF 5

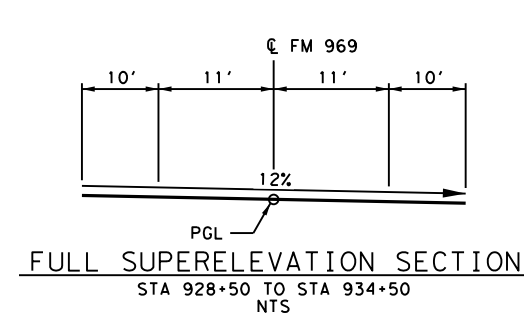
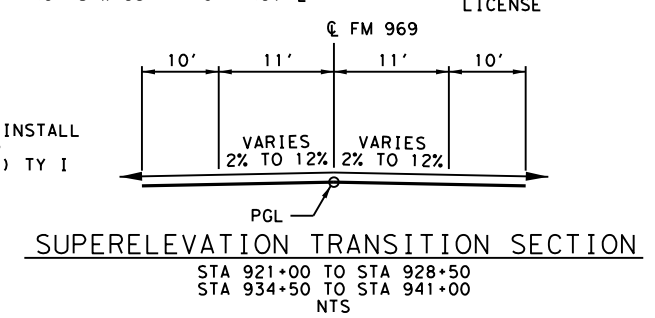
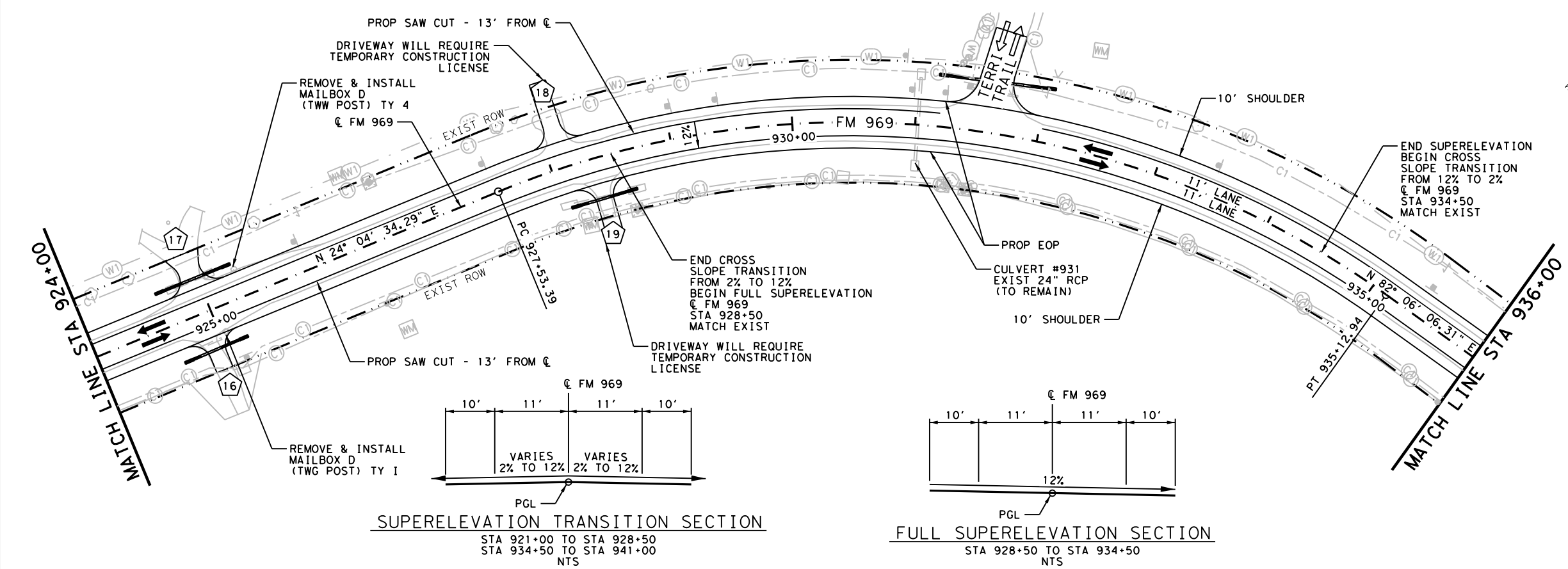
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
46		





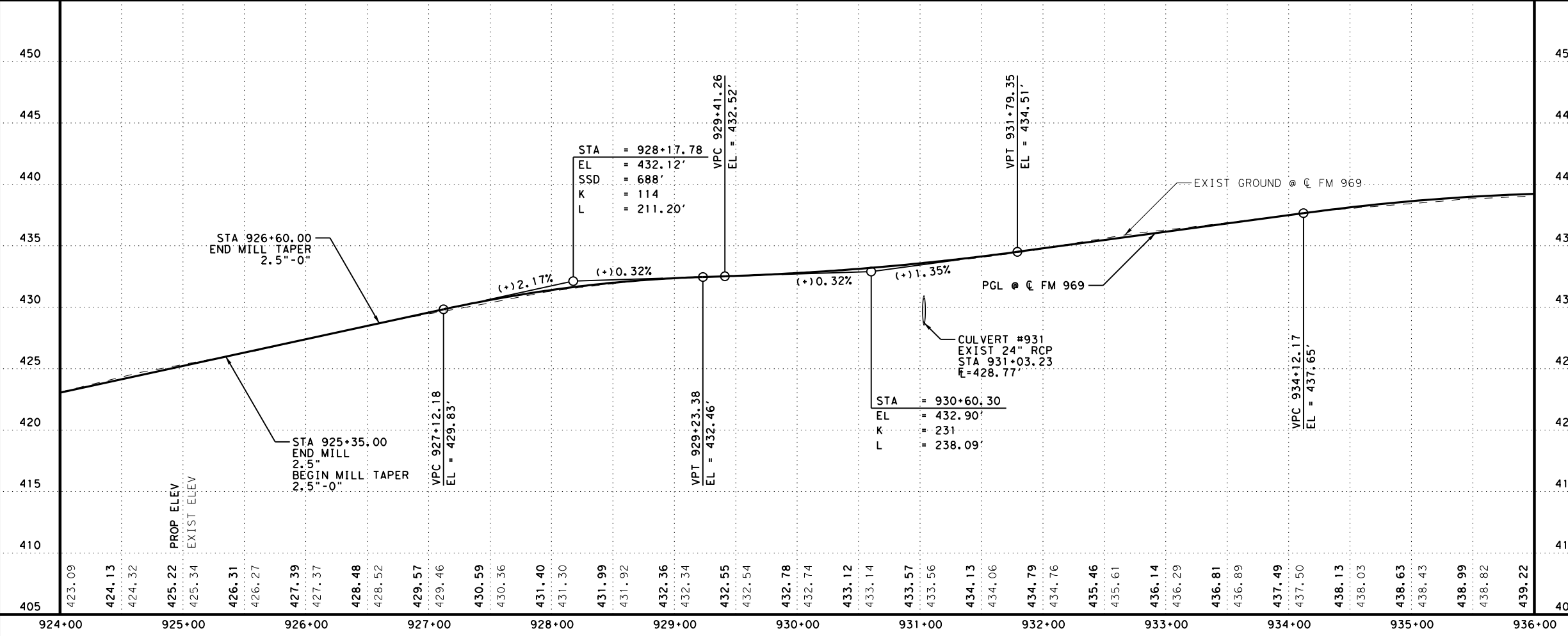
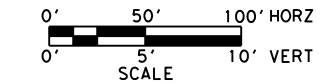
**LEGEND**

- ➔ PROPOSED LANE
- ➡ EXISTING LANE
- ⬡ DRIVEWAYS



**NOTES:**

1. HORIZONTAL DATA & PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
2. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
3. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



5/11/2022

**Kimley»Horn** F-928

© 2022  
 Texas Department of Transportation

**FM 969**

**PLAN & PROFILE**

STA 924+00 TO STA 936+00

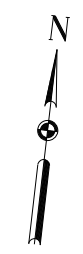
SCALE: 100' SHEET 4 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 47

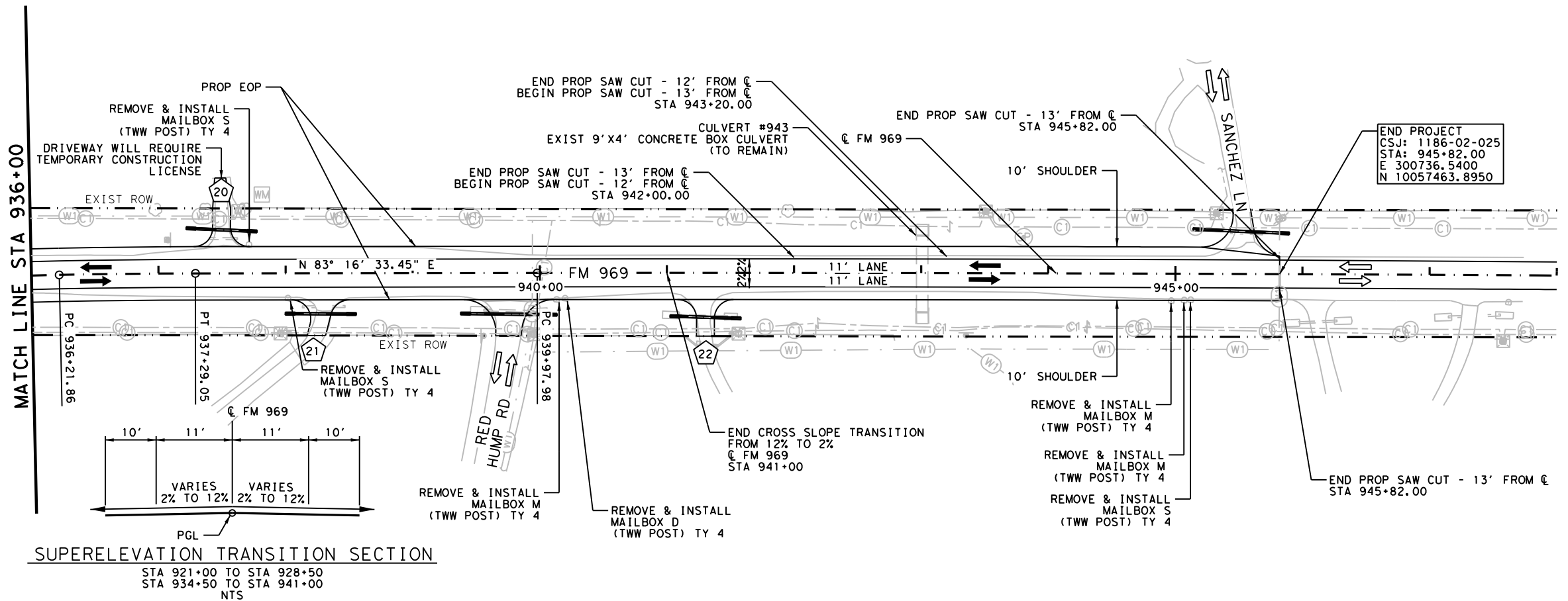
FILENAME: c:\pwworking\100152780\FM969\_RDW\_PP\_04.dgn  
 PLOTTED: 5/11/2022 4:29:17 PM





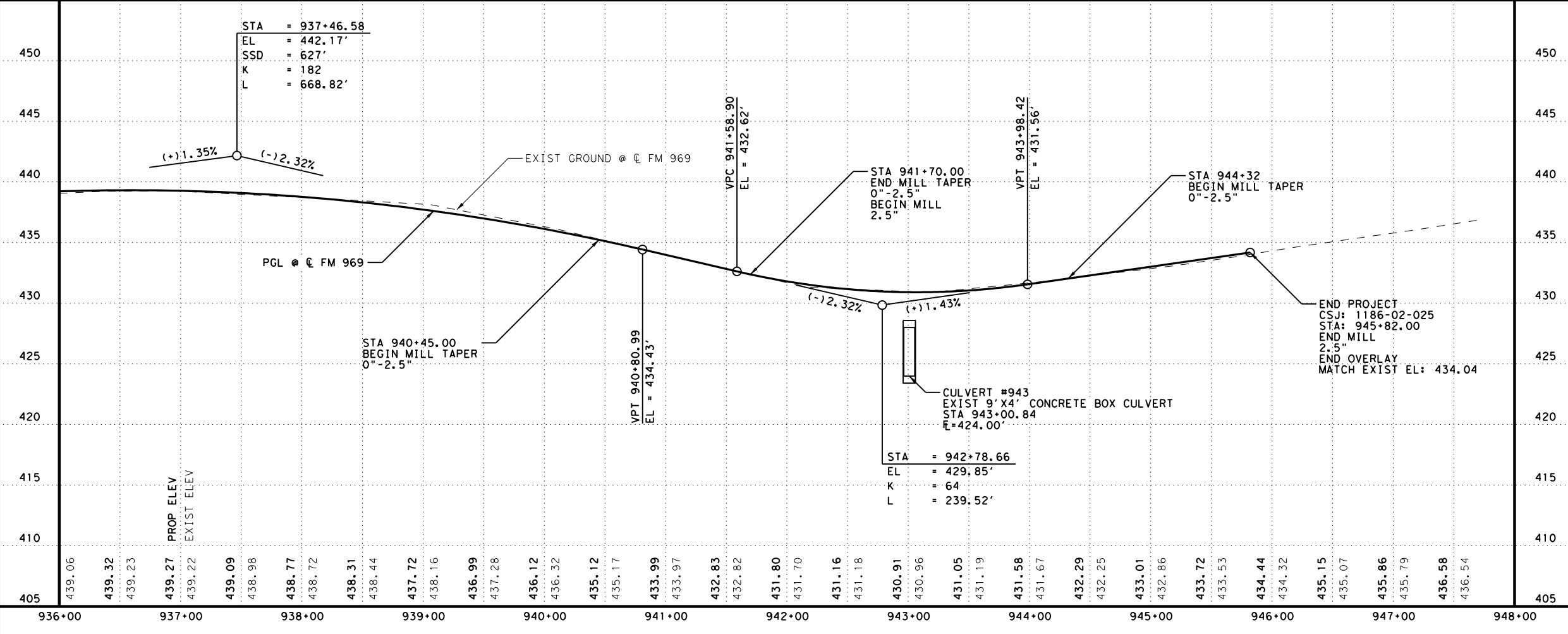
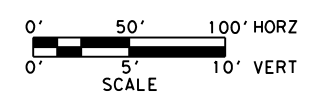
**LEGEND**

- ➔ PROPOSED LANE
- ➡ EXISTING LANE
- ⬮ DRIVEWAYS



**NOTES:**

1. HORIZONTAL DATA & PROFILE GRADE IS A GUIDE FOR DESIGN VERIFICATION PURPOSES ONLY. CONSTRUCT THE PAVEMENT IN ACCORDANCE WITH THE TYPICAL SECTION.
2. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
3. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



5/11/2022

**Kimley»Horn** F-928



**FM 969**

**PLAN & PROFILE**

STA 936+00 TO END

SCALE: 100' SHEET 5 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

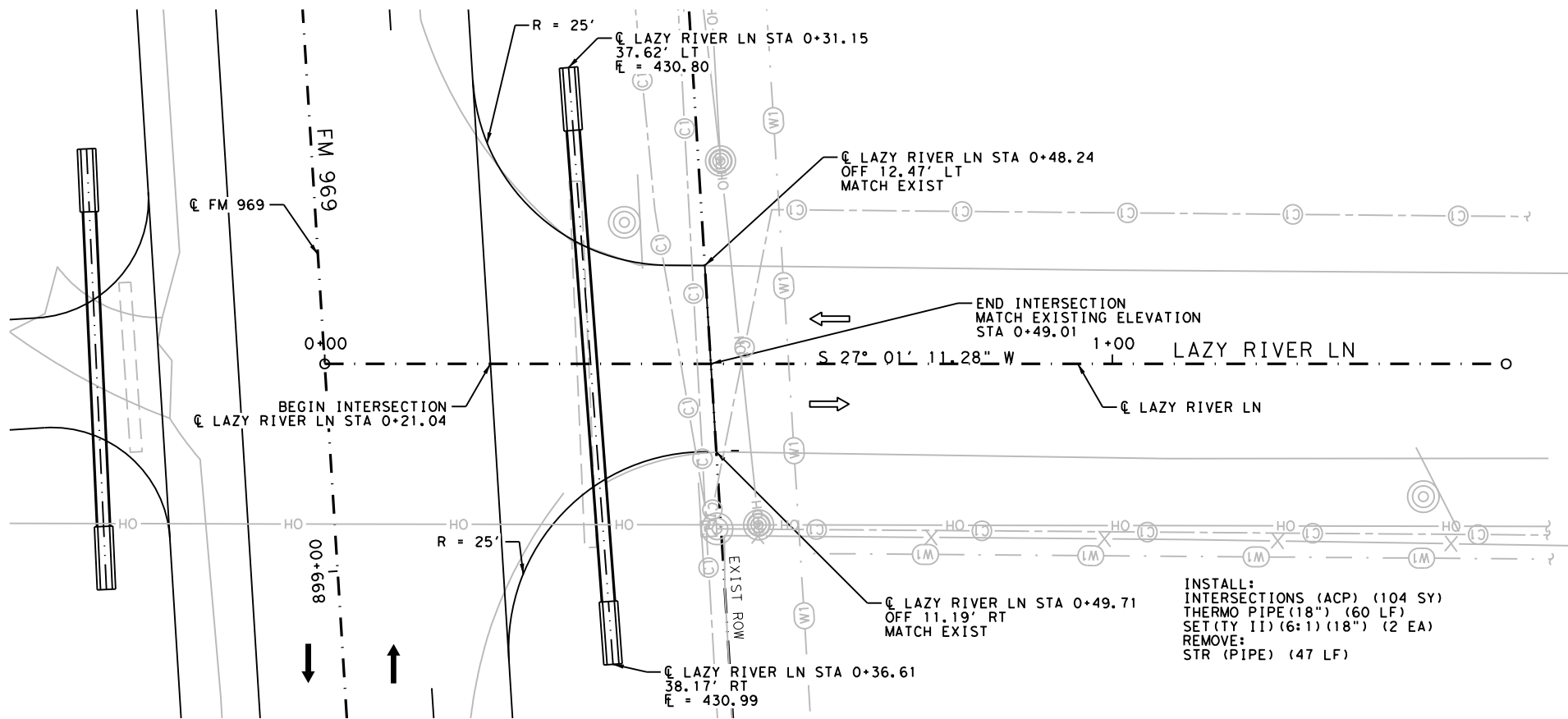
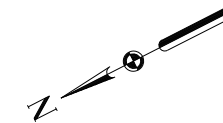
FILENAME: c:\pwworking\100152780\FM969\_RDW\_PP\_05.dgn  
 PLOTTED: 5/11/2022 4:29:29 PM

**LEGEND**

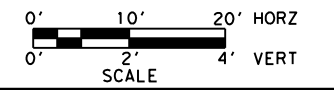
- ➔ PROPOSED LANE
- ⇨ EXISTING LANE

**NOTES:**

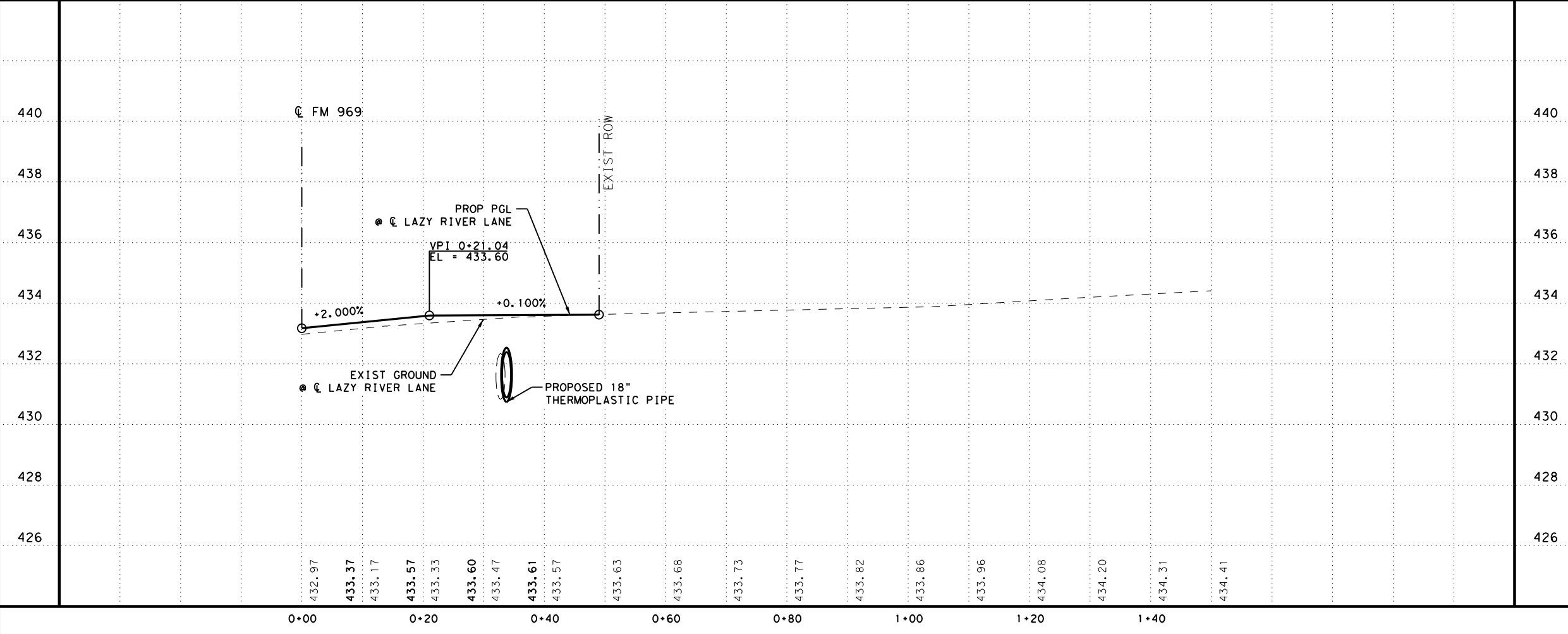
1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



INSTALL:  
 INTERSECTIONS (ACP) (104 SY)  
 THERMO PIPE (18") (60 LF)  
 SET (TY 11) (6:1) (18") (2 EA)  
 REMOVE:  
 STR (PIPE) (47 LF)



FILENAME: c:\pwworking\152780\FM969\_INT\_PP\_01.dgn  
 PLOTTED: 5/11/2022 4:29:42 PM



  
 5/11/2022  


**Kimley»Horn** F-928


 Texas Department of Transportation

**FM 969**  
**INTERSECTION**  
**PLAN & PROFILE**

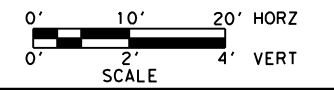
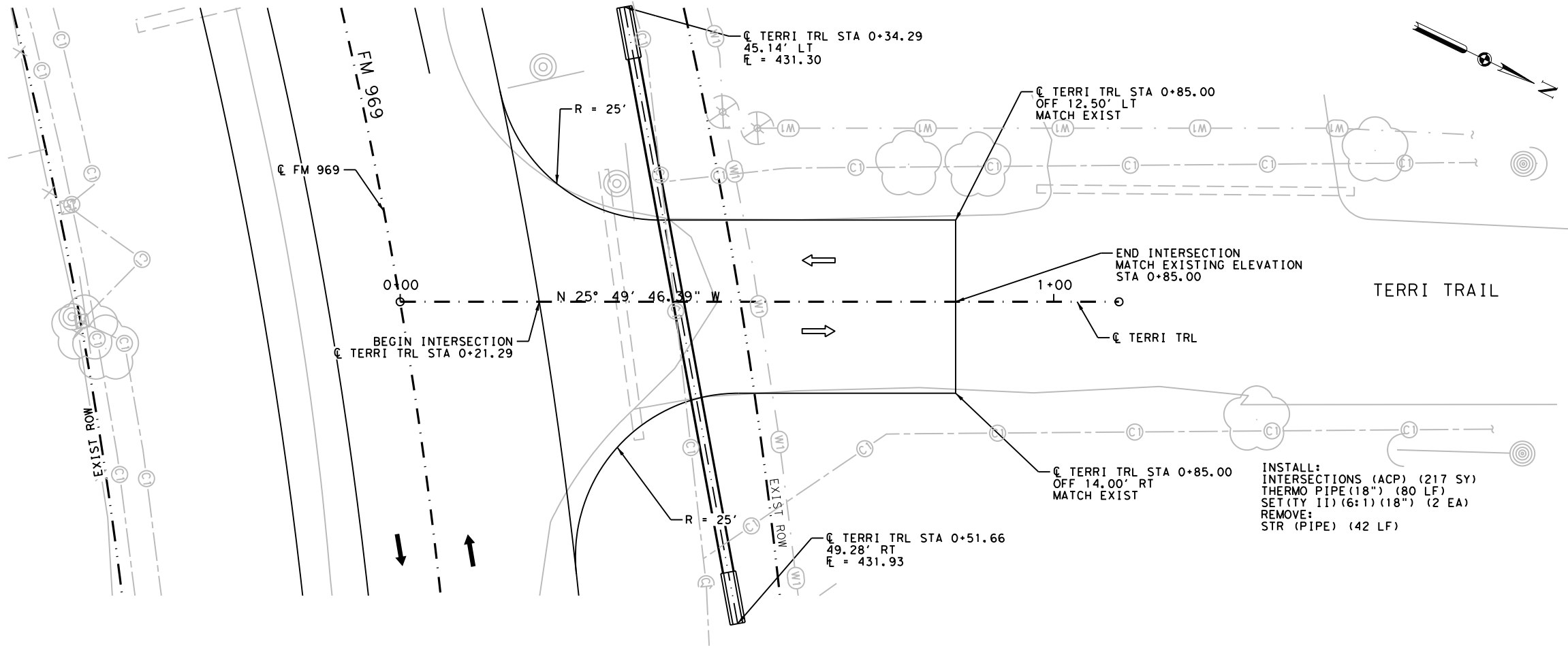
SCALE: 20'		SHEET 1 OF 4	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	49
CONT.	SECT.	JOB	
1186	02	025	

**LEGEND**

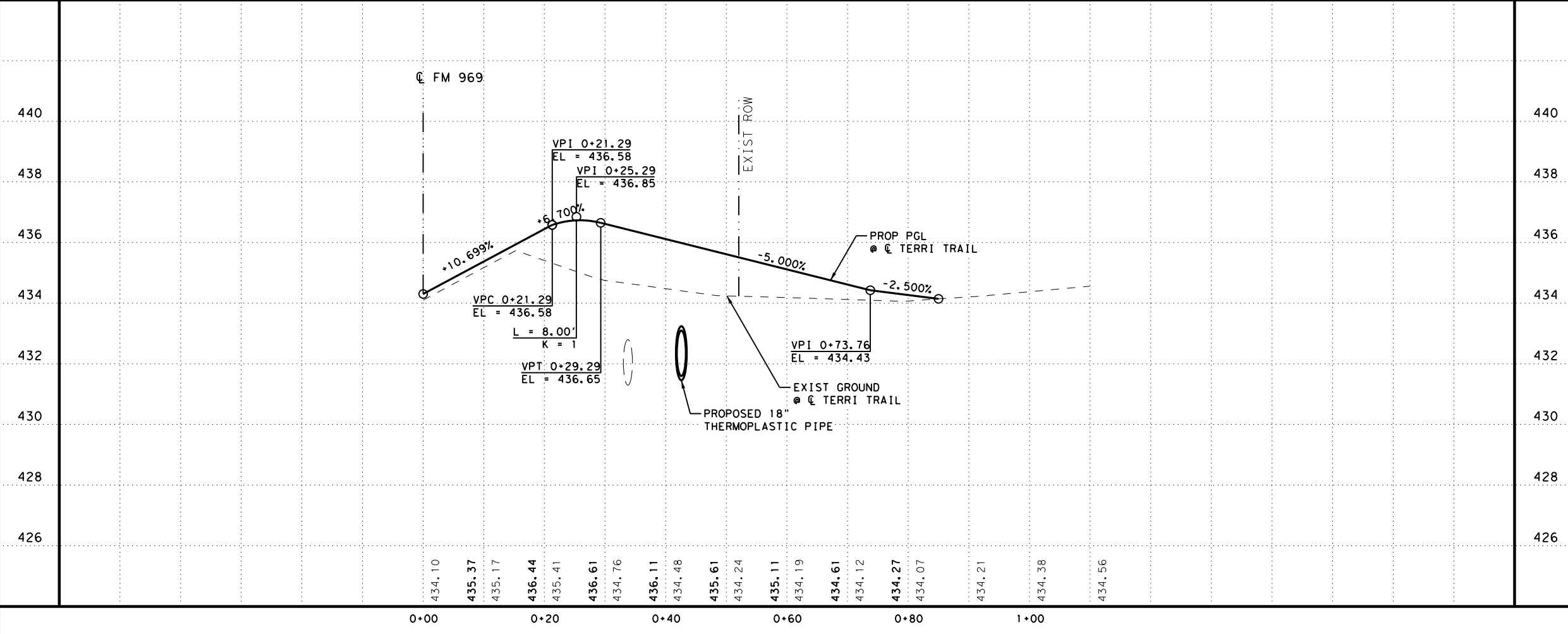
- ➔ PROPOSED LANE
- ➡ EXISTING LANE

**NOTES:**

1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



FILENAME: c:\pwworking\1\00152780\FM969\_INT\_PP\_02.dgn  
 PLOTTED: 5/11/2022 4:29:55 PM



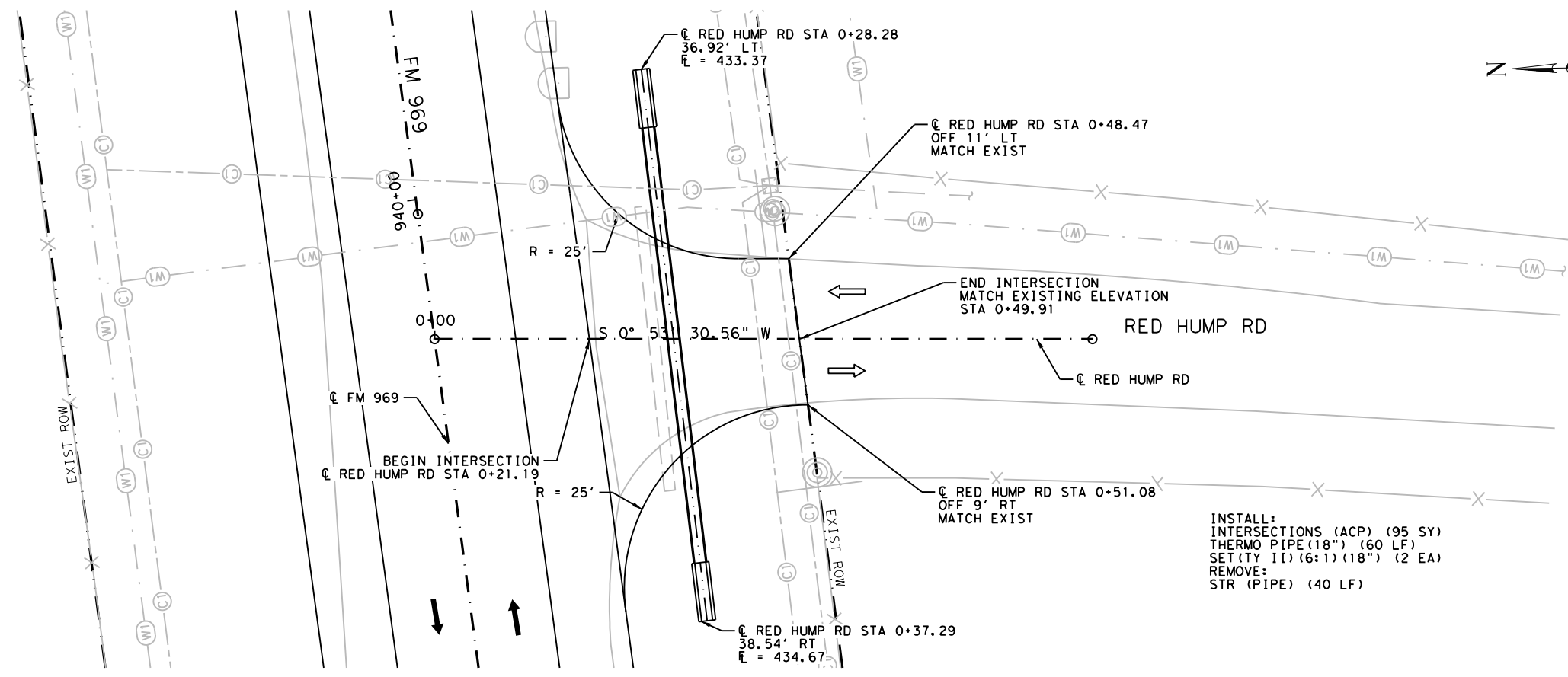
  
 5/11/2022  


**Kimley»Horn** F-928



**FM 969**  
**INTERSECTION**  
**PLAN & PROFILE**

SCALE: 20'		SHEET 2 OF 4	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	50
CONT.	SECT.	JOB	
1186	02	025	

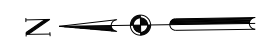


**LEGEND**

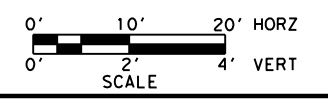
- ➔ PROPOSED LANE
- ➡ EXISTING LANE

**NOTES:**

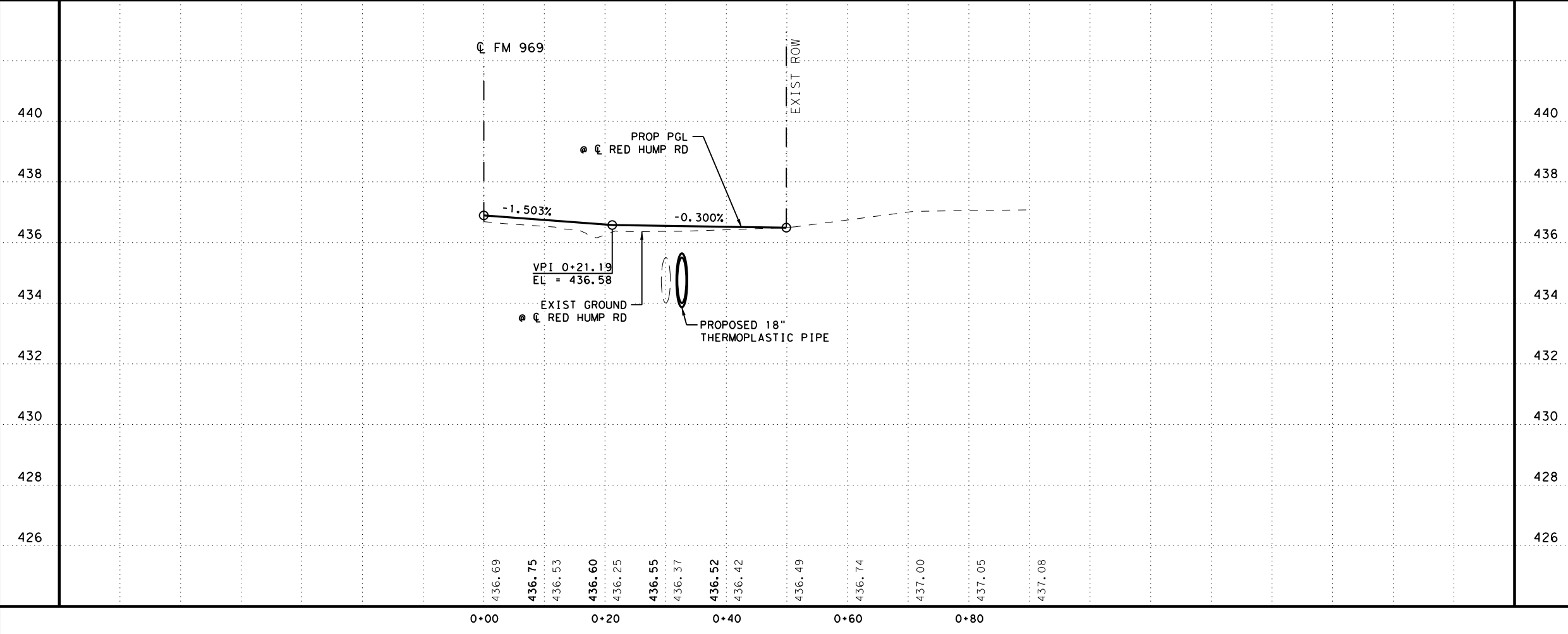
1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



INSTALL:  
 INTERSECTIONS (ACP) (95 SY)  
 THERMO PIPE (18") (60 LF)  
 SET (TY II) (6:1) (18") (2 EA)  
 REMOVE:  
 STR (PIPE) (40 LF)



FILENAME: c:\pwworking\1\00152780\FM969\_INT\_PP\_03.dgn  
 PLOTTED: 5/11/2022 4:30:06 PM

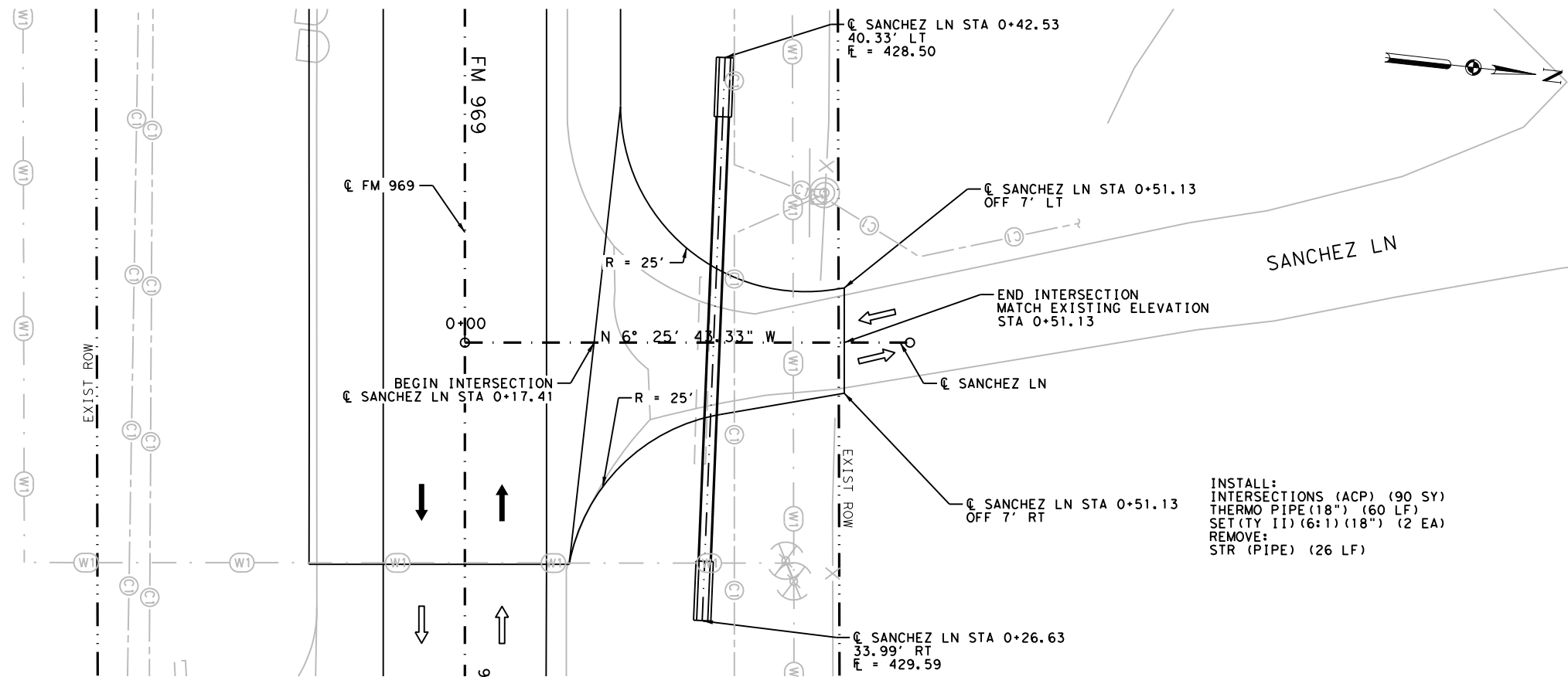


5/11/2022

**Kimley»Horn** F-928



FM 969			
INTERSECTION PLAN & PROFILE			
SCALE: 20'		SHEET 3 OF 4	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	51
CONT.	SECT.	JOB	
1186	02	025	



**LEGEND**

- ➔ PROPOSED LANE
- ⇨ EXISTING LANE

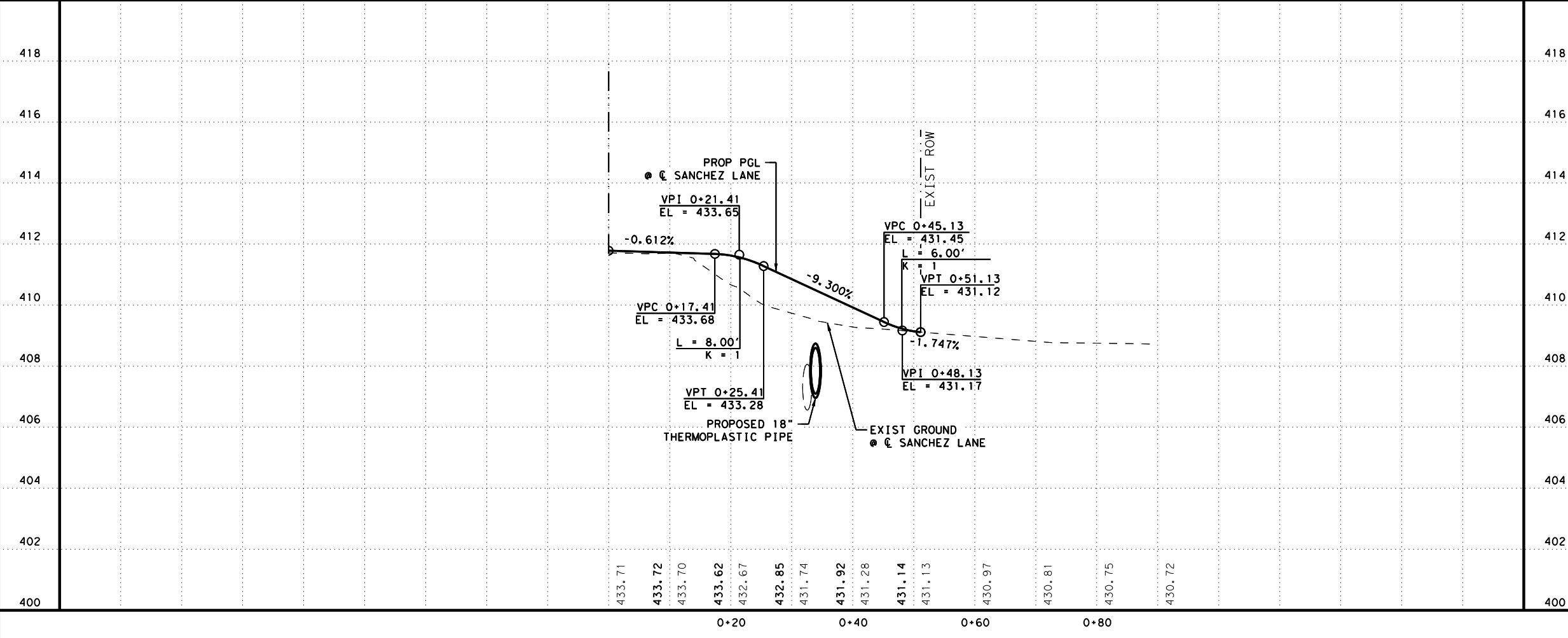
**NOTES:**

1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.

INSTALL:  
 INTERSECTIONS (ACP) (90 SY)  
 THERMO PIPE (18") (60 LF)  
 SET (TY II) (6:1) (18") (2 EA)  
 REMOVE:  
 STR (PIPE) (26 LF)



FILENAME: c:\pwworking\1\00152780\FM969\_INT\_PP\_04.dgn  
 PLOTTED: 5/11/2022 4:30:19 PM



5/11/2022

**Kimley»Horn** F-928

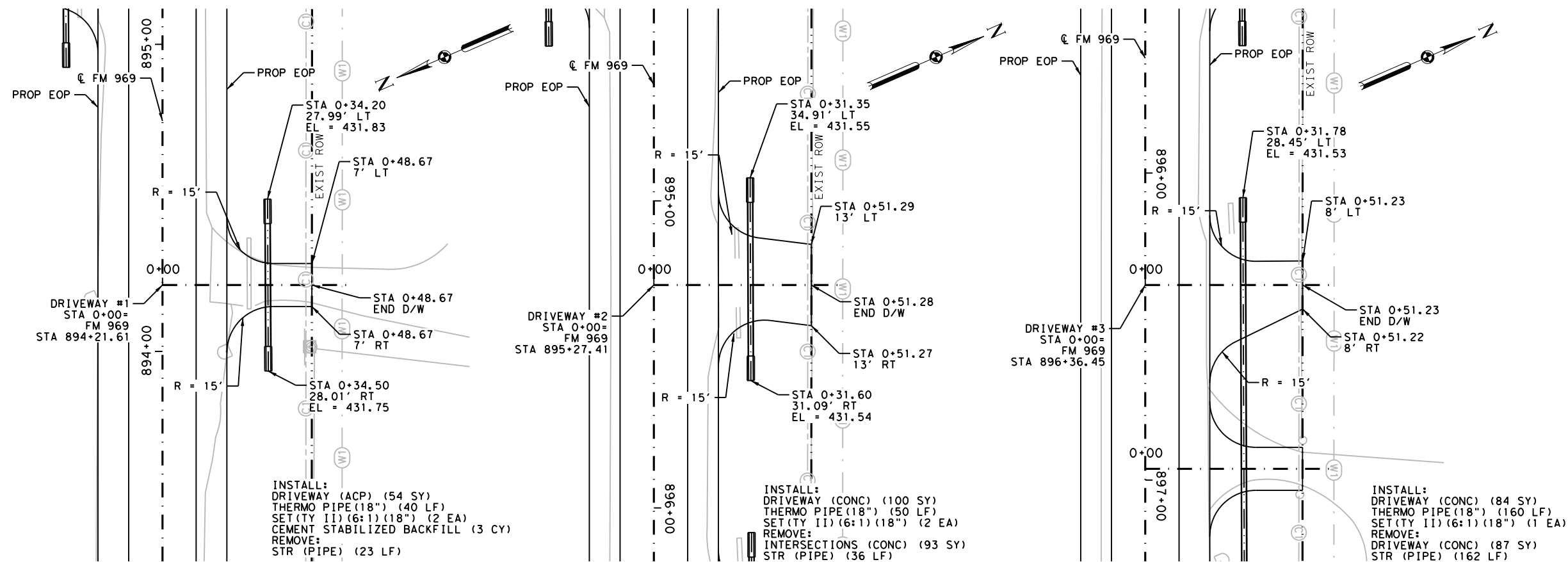


FM 969

**INTERSECTION  
 PLAN & PROFILE**

SCALE: 20'		SHEET 4 OF 4	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	52
CONT.	SECT.	JOB	
1186	02	025	





**DRIVEWAY #1  
STA 894+21**

**DRIVEWAY #2  
STA 895+27**

**DRIVEWAY #3  
STA 896+36**

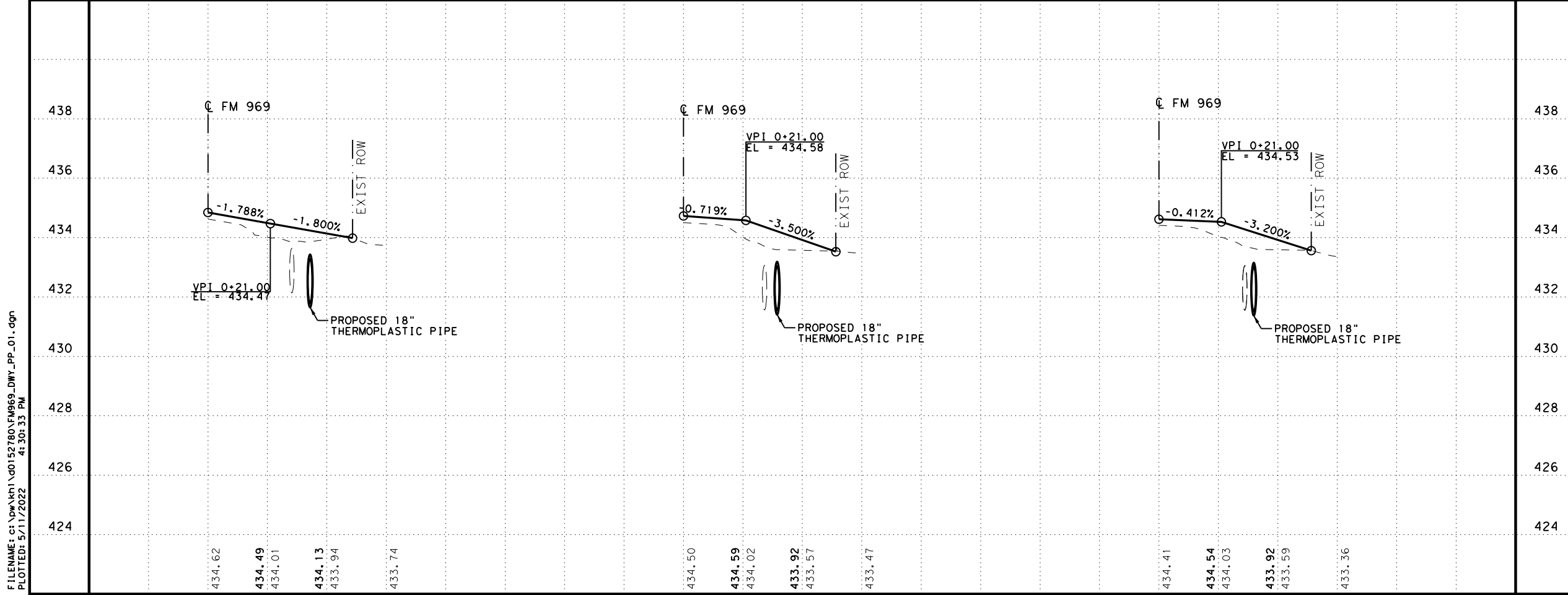
**NOTES:**  
1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



INSTALL:  
DRIVEWAY (ACP) (54 SY)  
THERMO PIPE (18") (40 LF)  
SET (TY I) (6:1) (18") (2 EA)  
CEMENT STABILIZED BACKFILL (3 CY)  
REMOVE:  
STR (PIPE) (23 LF)

INSTALL:  
DRIVEWAY (CONC) (100 SY)  
THERMO PIPE (18") (50 LF)  
SET (TY II) (6:1) (18") (2 EA)  
REMOVE:  
INTERSECTIONS (CONC) (93 SY)  
STR (PIPE) (36 LF)

INSTALL:  
DRIVEWAY (CONC) (84 SY)  
THERMO PIPE (18") (160 LF)  
SET (TY II) (6:1) (18") (1 EA)  
REMOVE:  
DRIVEWAY (CONC) (87 SY)  
STR (PIPE) (162 LF)



5/11/2022  
  
 TREY NEAL  
 106194  
 LICENSED PROFESSIONAL ENGINEER

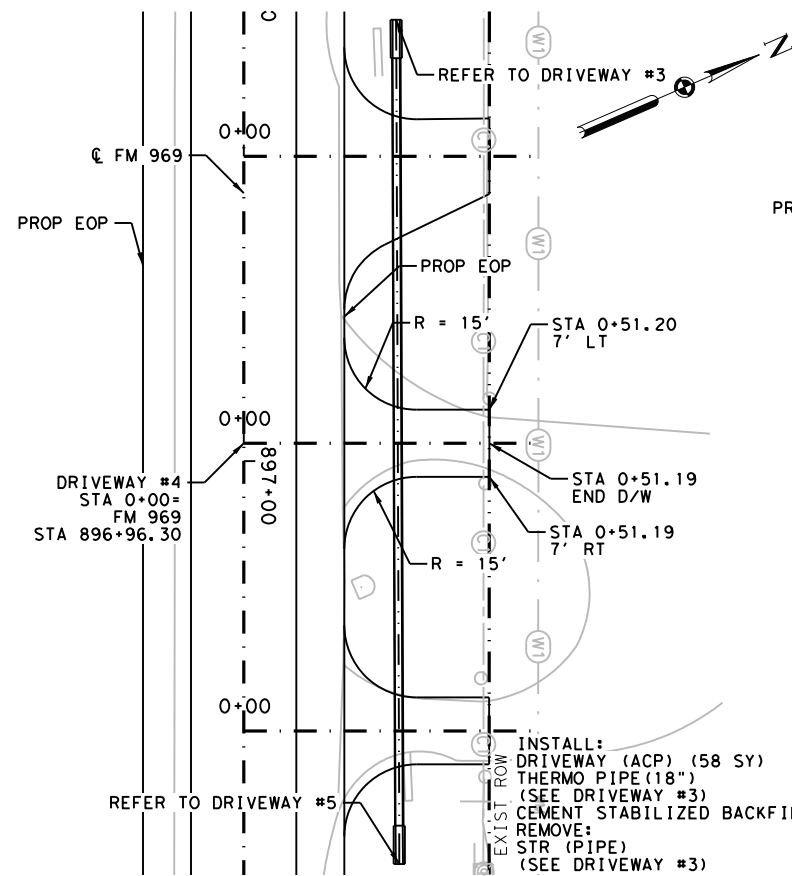
**Kimley»Horn** F-928

© 2022  
  
 Texas Department of Transportation

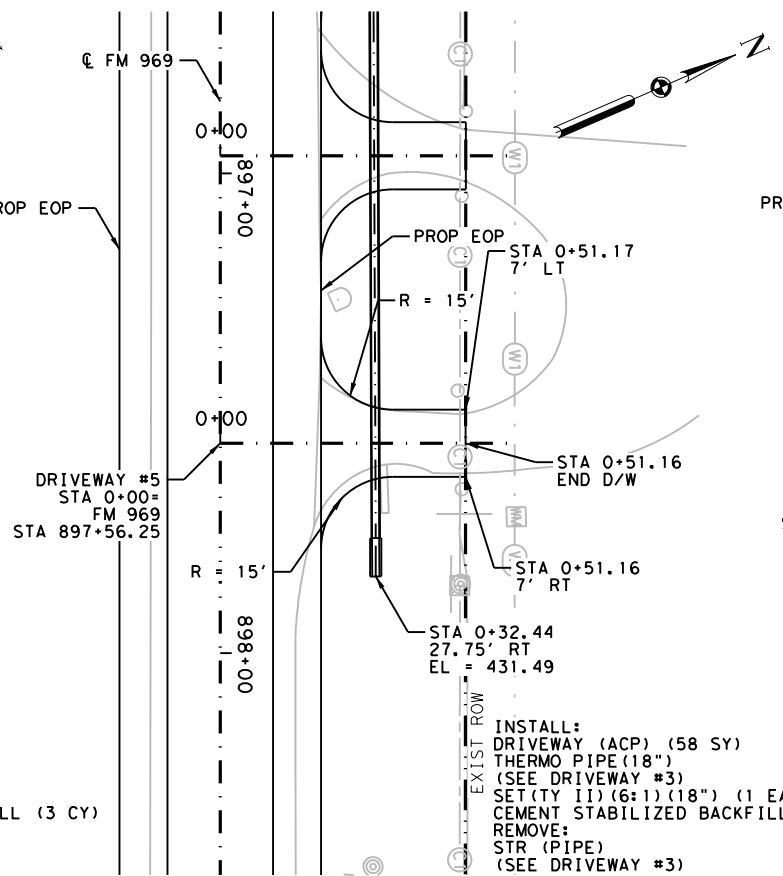
**FM 969  
DRIVEWAY  
PLAN & PROFILE**

SCALE: 40'		SHEET 1 OF 8	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	53
CONT.	SECT.	JOB	
1186	02	025	

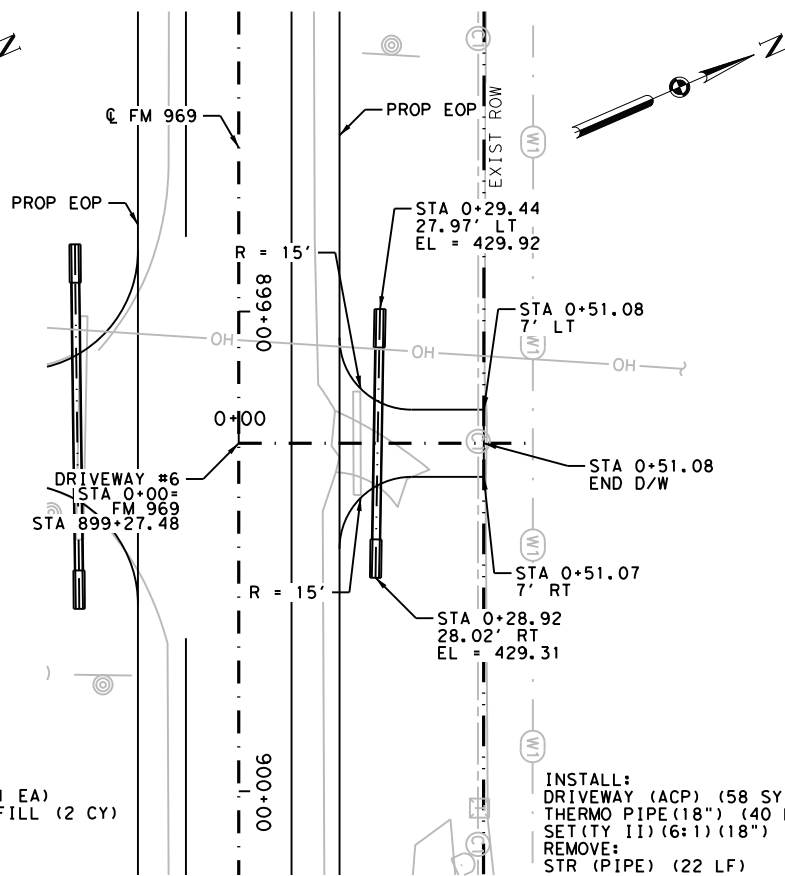
FILENAME: c:\pwworking\1\00152780\FM969\_DWY\_PP\_01.dgn  
 PLOTTED: 5/11/2022 4:30:33 PM



**DRIVEWAY #4**  
STA 896+96



**DRIVEWAY #5**  
STA 897+56



**DRIVEWAY #6**  
STA 899+27

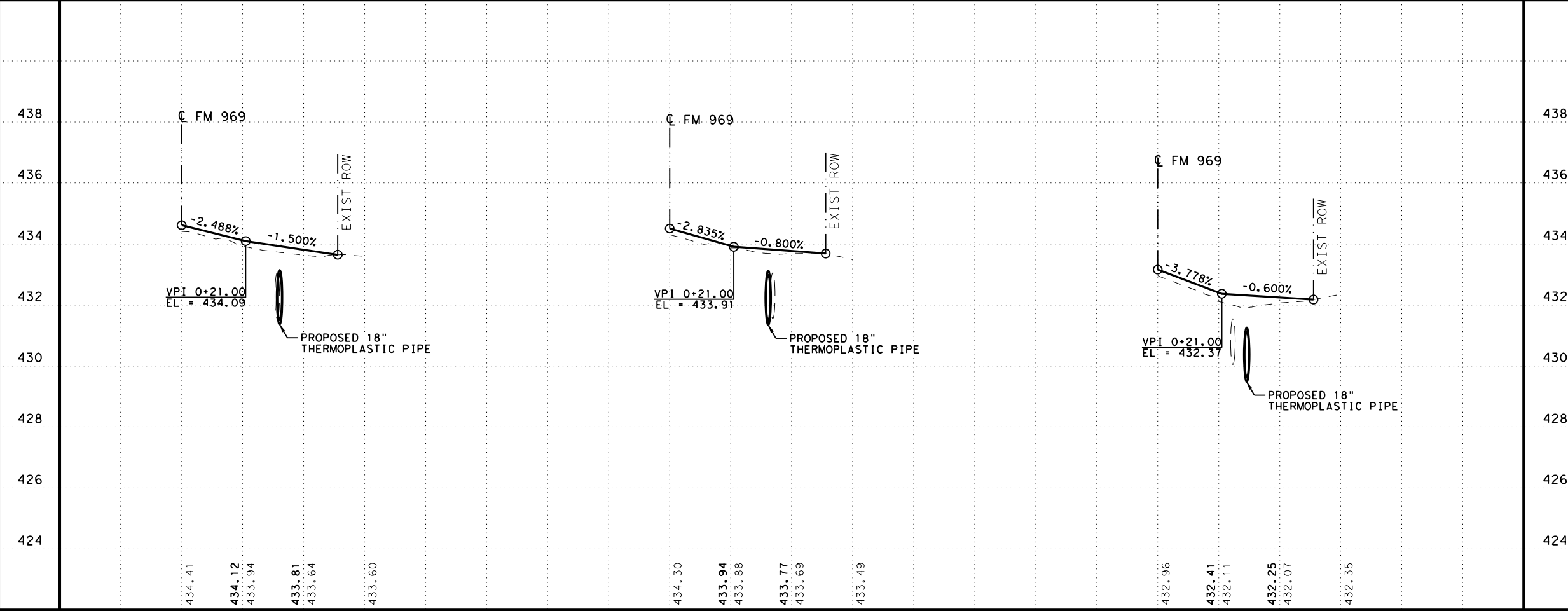
**NOTES:**  
1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



INSTALL:  
DRIVEWAY (ACP) (58 SY)  
THERMO PIPE (18")  
(SEE DRIVEWAY #3)  
CEMENT STABILIZED BACKFILL (3 CY)  
REMOVE:  
STR (PIPE)  
(SEE DRIVEWAY #3)

INSTALL:  
DRIVEWAY (ACP) (58 SY)  
THERMO PIPE (18")  
(SEE DRIVEWAY #3)  
SET (TY II) (6:1) (18") (1 EA)  
CEMENT STABILIZED BACKFILL (2 CY)  
REMOVE:  
STR (PIPE)  
(SEE DRIVEWAY #3)

INSTALL:  
DRIVEWAY (ACP) (58 SY)  
THERMO PIPE (18") (40 LF)  
SET (TY II) (6:1) (18") (2 EA)  
REMOVE:  
STR (PIPE) (22 LF)



5/11/2022

**Kimley»Horn** F-928

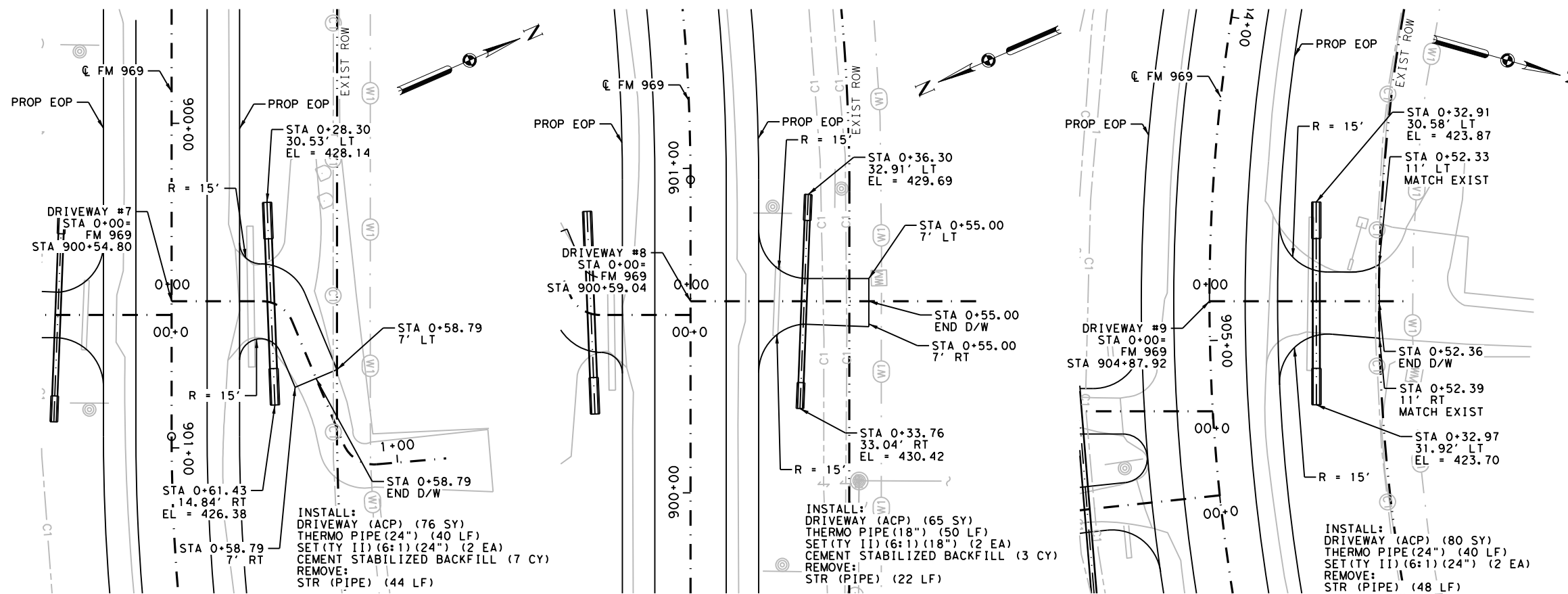
Texas Department of Transportation

**FM 969**  
**DRIVEWAY**  
**PLAN & PROFILE**

SCALE: 40' SHEET 2 OF 8

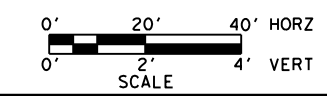
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
54		

FILENAME: c:\pwworking\1\00152780\FM969\_DWY\_PP\_02.dgn  
PLOTTED: 5/11/2022 4:30:44 PM

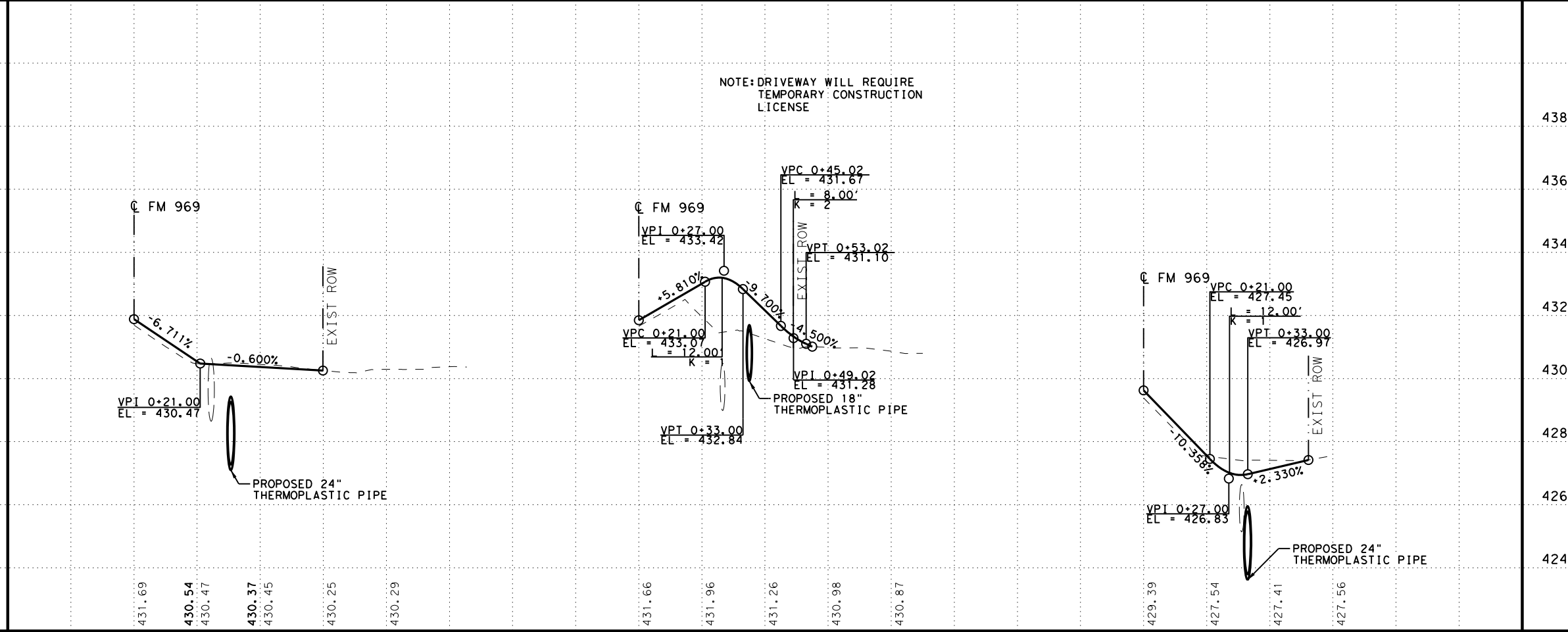


**NOTES:**

- CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



NOTE: DRIVEWAY WILL REQUIRE TEMPORARY CONSTRUCTION LICENSE



5/11/2022

**Kimley»Horn** F-928

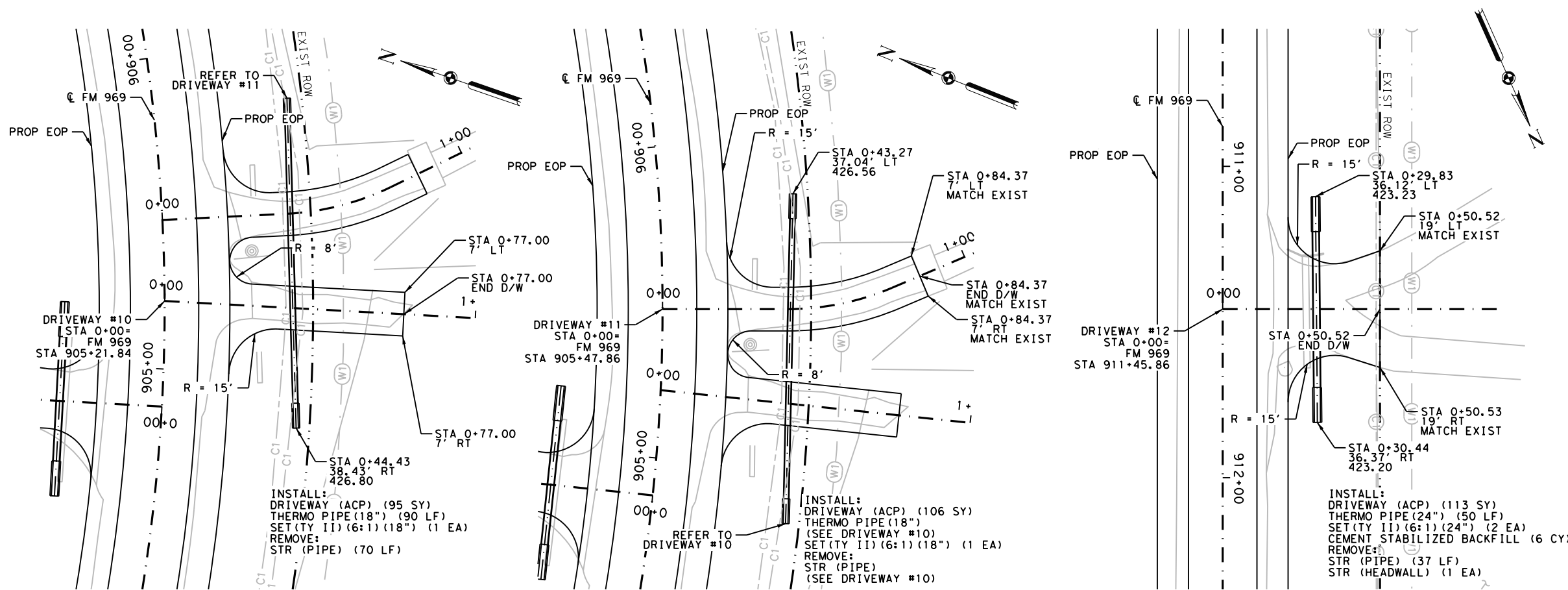
Texas Department of Transportation

FM 969  
DRIVEWAY  
PLAN & PROFILE

SCALE: 40' SHEET 3 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
55		

FILENAME: c:\pwworking\106152780\FM969\_DWY\_PP\_03.dgn  
PLOTTED: 5/11/2022 4:30:57 PM



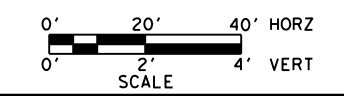
**NOTES:**

- CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.

**DRIVEWAY #10**  
STA 905+21

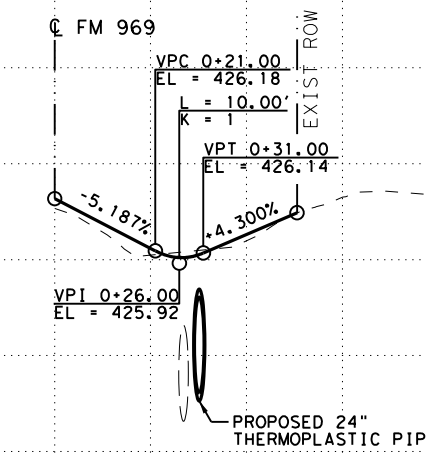
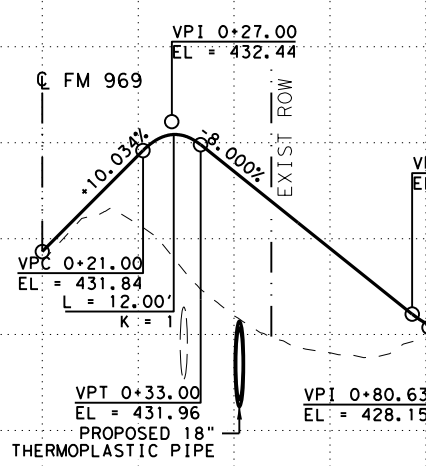
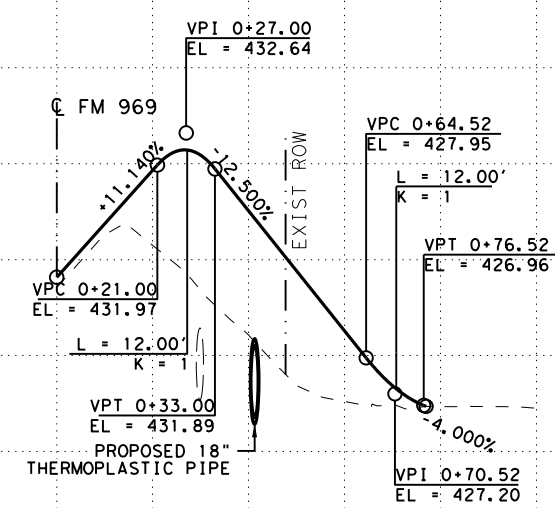
**DRIVEWAY #11**  
STA 905+47

**DRIVEWAY #12**  
STA 911+45



NOTE: DRIVEWAY WILL REQUIRE TEMPORARY CONSTRUCTION LICENSE

NOTE: DRIVEWAY WILL REQUIRE TEMPORARY CONSTRUCTION LICENSE



5/11/2022

**Kimley»Horn** F-928

Texas Department of Transportation

**FM 969**  
**DRIVEWAY**  
**PLAN & PROFILE**

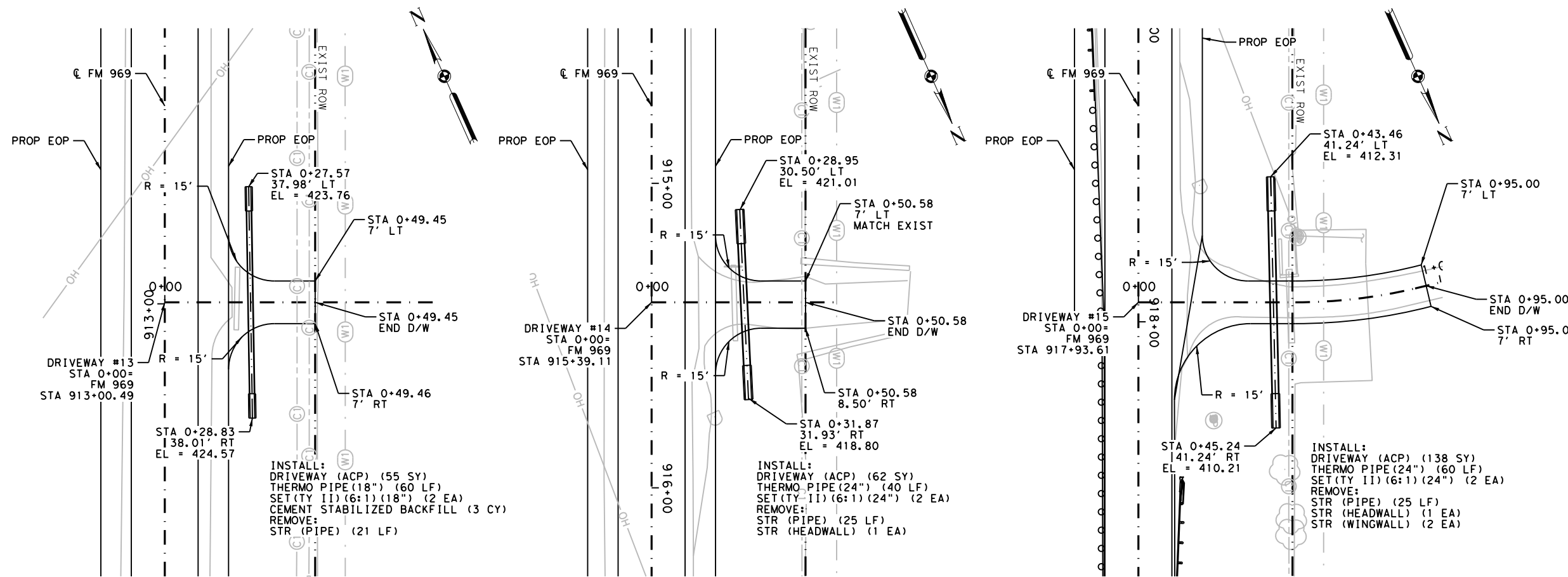
SCALE: 40' SHEET 4 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 56

FILENAME: c:\pwworking\152780\FM969\_DWY\_PP\_04.dgn  
 PLOTTED: 5/11/2022 4:31:11 PM





**DRIVEWAY #13**  
STA 913+00

**DRIVEWAY #14**  
STA 915+39

**DRIVEWAY #15**  
STA 917+93

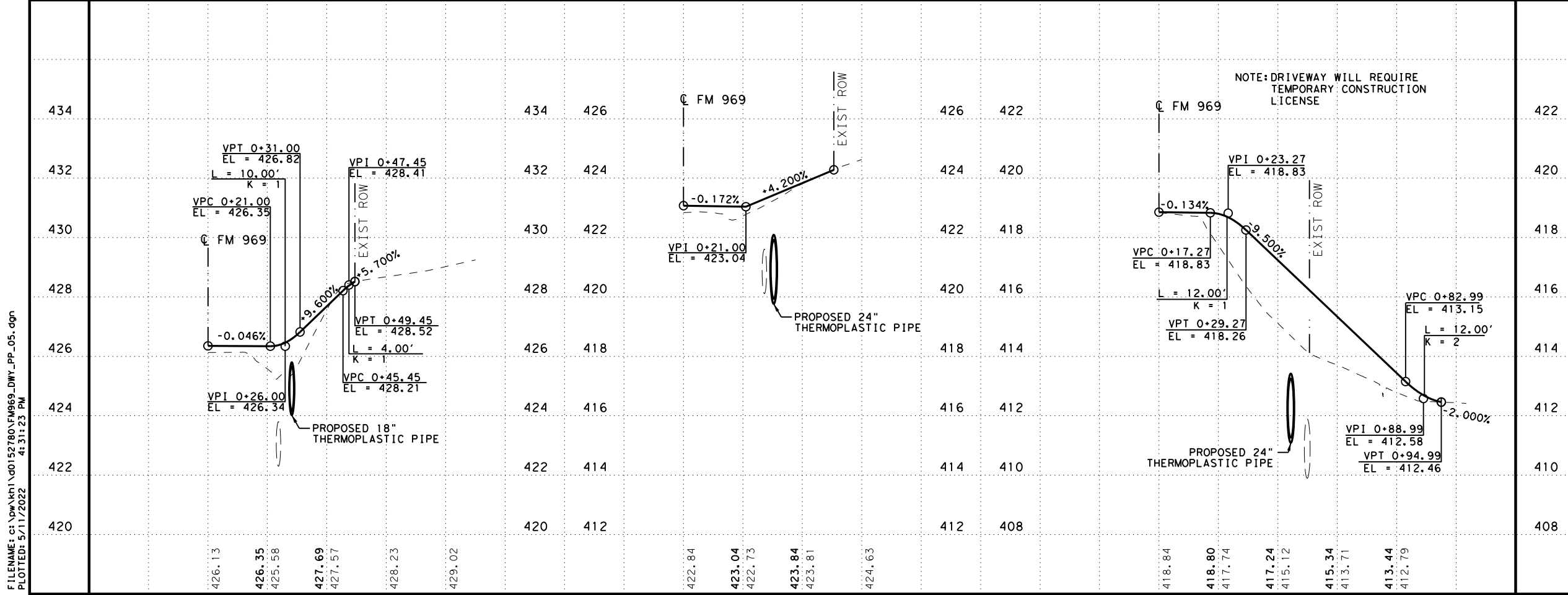
**NOTES:**  
1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



INSTALL:  
DRIVEWAY (ACP) (55 SY)  
THERMO PIPE (18") (60 LF)  
SET (TY II) (6:1) (18") (2 EA)  
CEMENT STABILIZED BACKFILL (3 CY)  
REMOVE:  
STR (PIPE) (21 LF)

INSTALL:  
DRIVEWAY (ACP) (62 SY)  
THERMO PIPE (24") (40 LF)  
SET (TY II) (6:1) (24") (2 EA)  
REMOVE:  
STR (PIPE) (25 LF)  
STR (HEADWALL) (1 EA)

INSTALL:  
DRIVEWAY (ACP) (138 SY)  
THERMO PIPE (24") (60 LF)  
SET (TY II) (6:1) (24") (2 EA)  
REMOVE:  
STR (PIPE) (25 LF)  
STR (HEADWALL) (1 EA)  
STR (WINGWALL) (2 EA)



5/11/2022  
TJN  
STATE OF TEXAS  
TJ NEAL  
106194  
LICENSED PROFESSIONAL ENGINEER

**Kimley»Horn** F-928

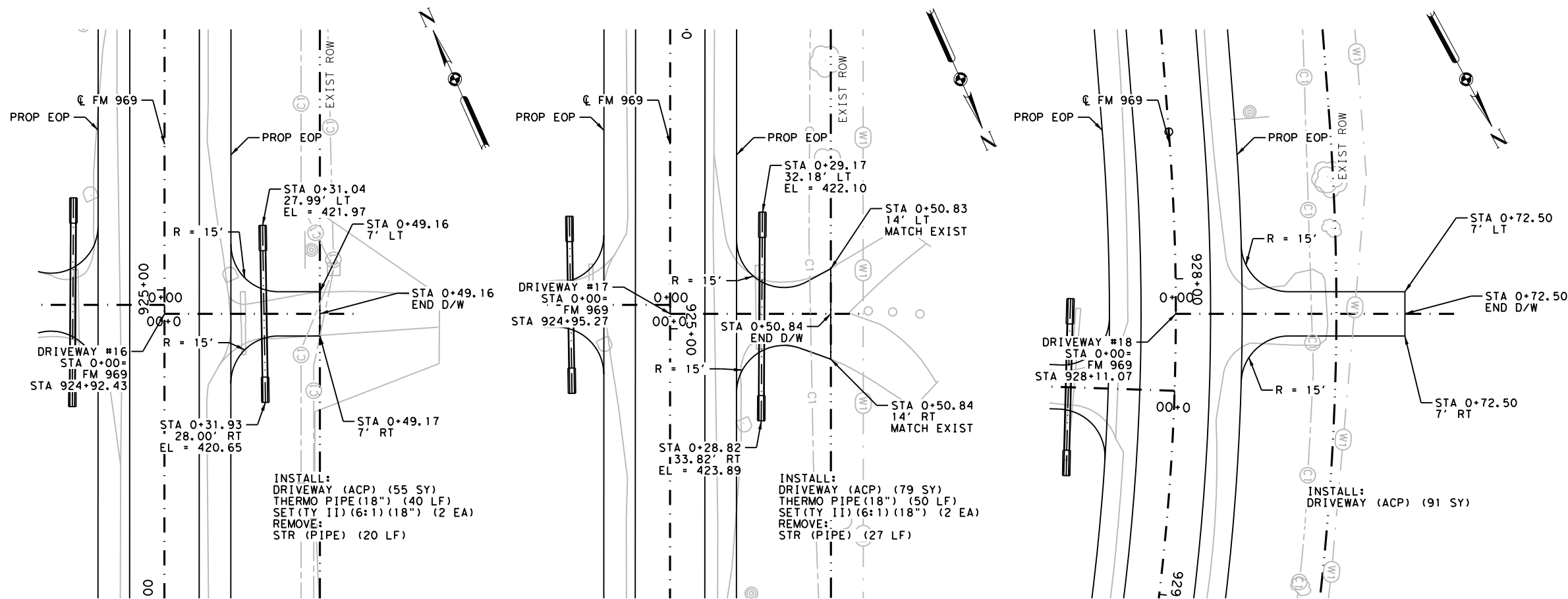
Texas Department of Transportation

**FM 969**  
**DRIVEWAY**  
**PLAN & PROFILE**

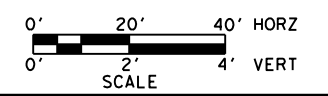
SCALE: 40'		SHEET 5 OF 8	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	57
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: c:\pwworking\kimleyhorn\106194\106194-FM969-DWY-PP-05.dgn  
PLOTTED: 5/11/2022 4:31:23 PM





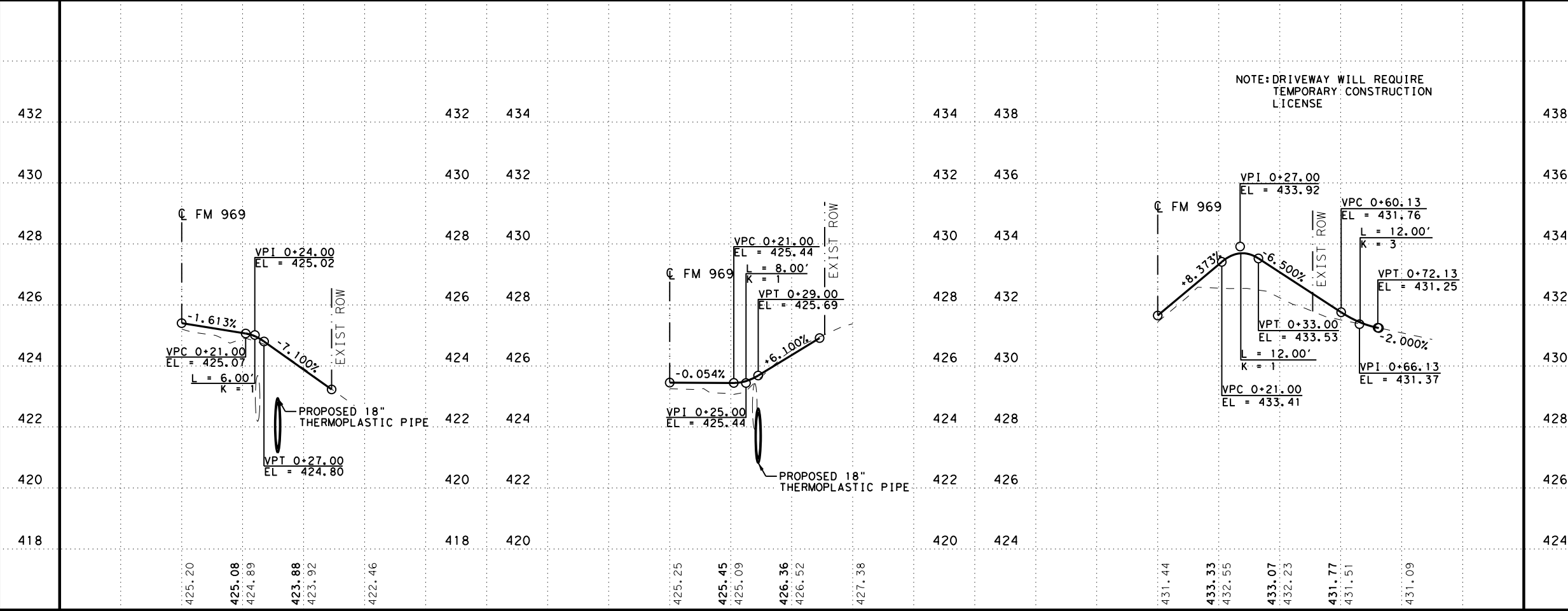
**NOTES:**  
 1. CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



**DRIVEWAY #16  
STA 924+92**

**DRIVEWAY #17  
STA 924+95**

**DRIVEWAY #18  
STA 928+11**



NOTE: DRIVEWAY WILL REQUIRE TEMPORARY CONSTRUCTION LICENSE

5/11/2022

**Kimley»Horn** F-928

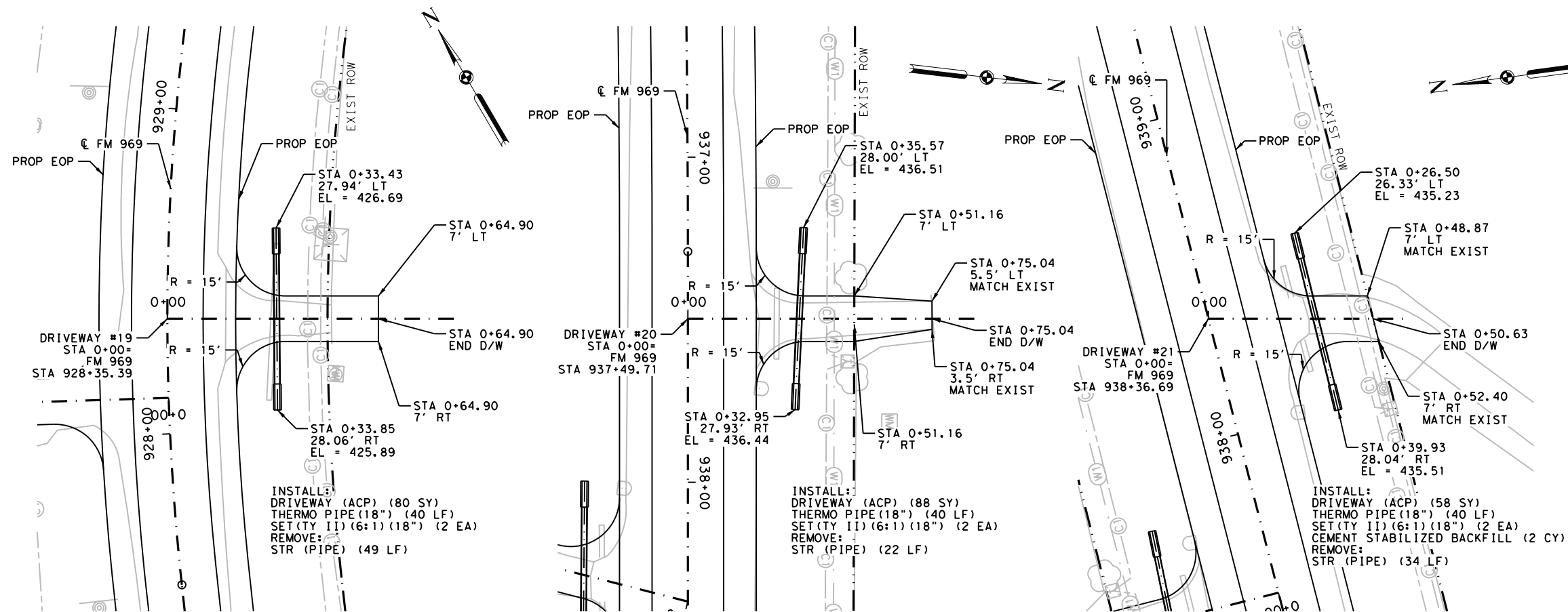
Texas Department of Transportation

**FM 969  
DRIVEWAY  
PLAN & PROFILE**

SCALE: 40' SHEET 6 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
58		

FILENAME: c:\pwworking\kimley-horn\project\152780\FM969\_DWY\_PP\_06.dgn  
 PLOTTED: 5/11/2022 4:31:35 PM



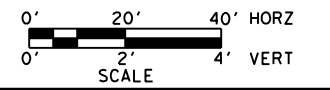
**DRIVEWAY #19**  
STA 928+35

**DRIVEWAY #20**  
STA 937+49

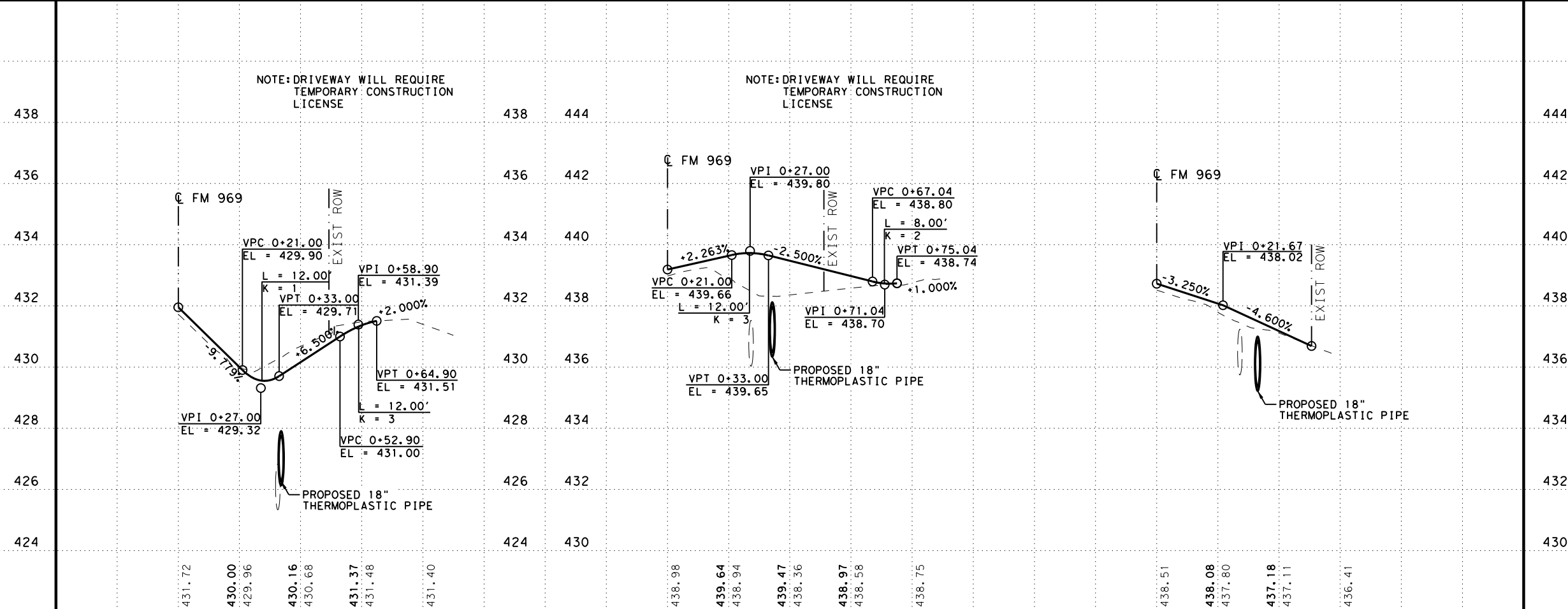
**DRIVEWAY #21**  
STA 938+36

**NOTES:**

- CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



FILENAME: c:\pwworking\1\00152780\FM969\_DWY\_PP\_07.dgn  
 PLOTTED: 5/11/2022 4:31:51 PM

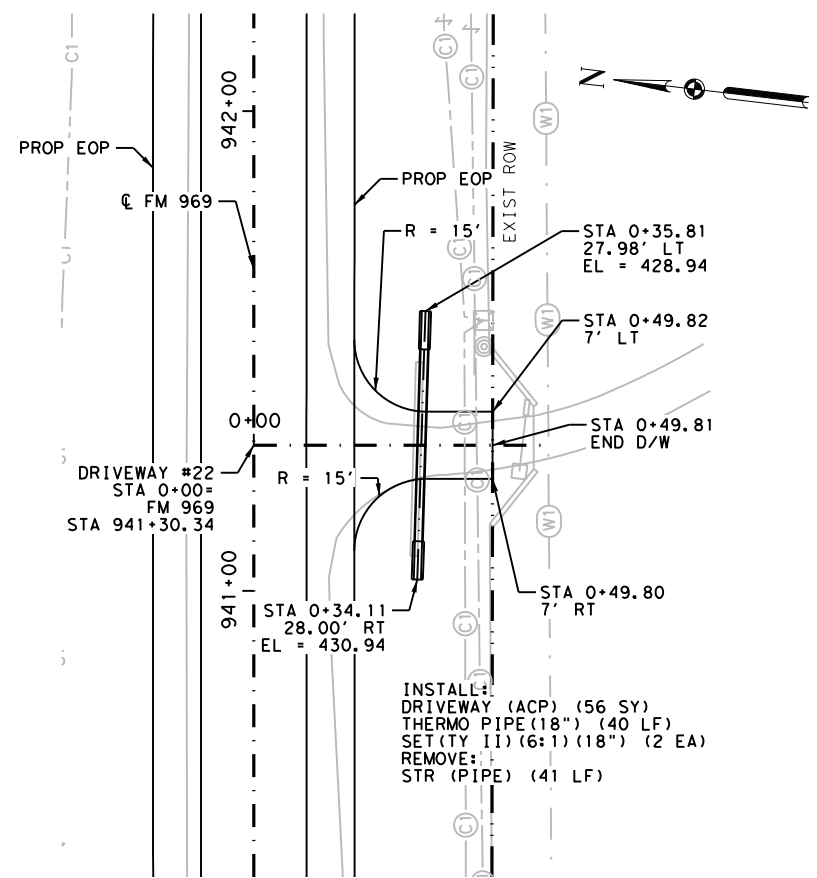


5/11/2022



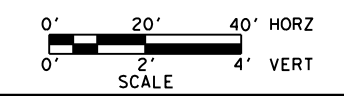
**FM 969**  
**DRIVEWAY**  
**PLAN & PROFILE**

SCALE: 40'		SHEET 7 OF 8	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	59
CONT.	SECT.	JOB	
1186	02	025	

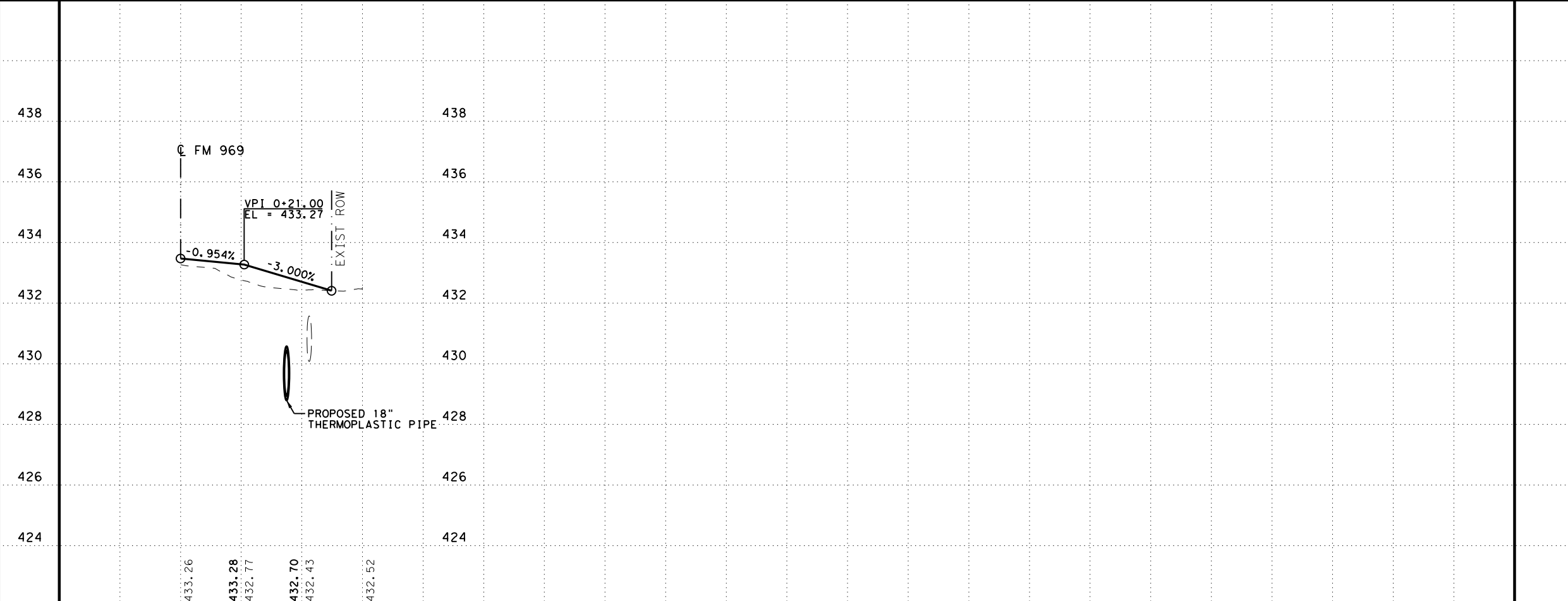


**DRIVEWAY #22  
STA 941+30**

- NOTES:**
- CAUTION UNDERGROUND COMMUNICATION LINE. CONTRACTOR TO USE CAUTION WHEN INSTALLING CULVERT AND PROTECT IN PLACE IF NECESSARY.



INSTALL:  
 DRIVEWAY (ACP) (56 SY)  
 THERMO PIPE (18") (40 LF)  
 SET (TY 1) (6:1) (18") (2 EA)  
 REMOVE:  
 STR (PIPE) (41 LF)



*TJN*  
 5/11/2022

**Kimley»Horn** F-928



**FM 969  
 DRIVEWAY  
 PLAN & PROFILE**

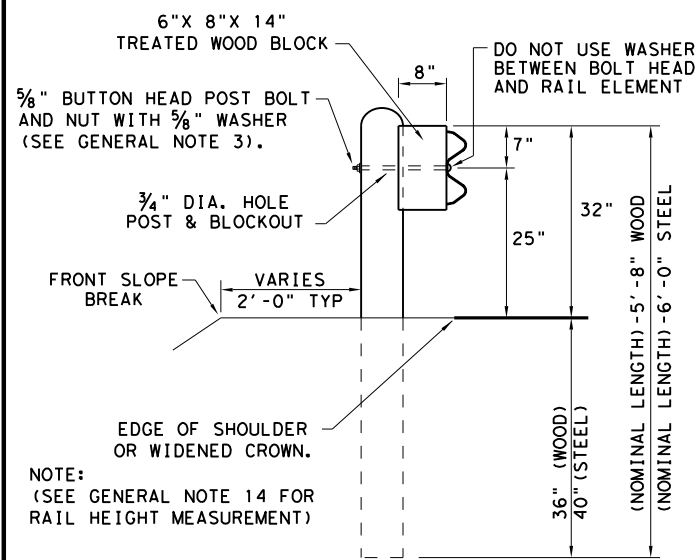
SCALE: 40' SHEET 8 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
60		

FILENAME: c:\pwworking\0152780\FM969\_DWY\_PP\_08.dgn  
 PLOTTED: 5/11/2022 4:32:02 PM

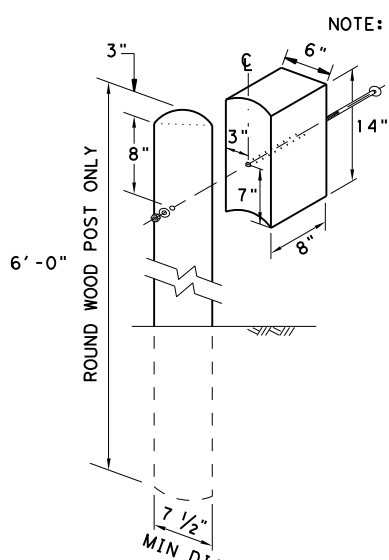
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE: 5/11/2022  
 FILE: c:\pwworking\0168457\gf3119.dgn



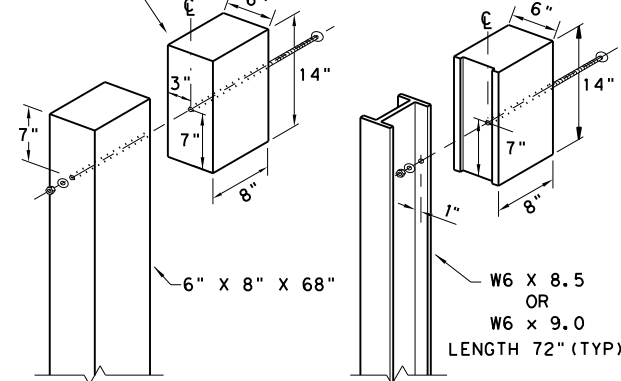
**TYPICAL POST PLACEMENT**

NOTE: (SEE GENERAL NOTE 14 FOR RAIL HEIGHT MEASUREMENT)



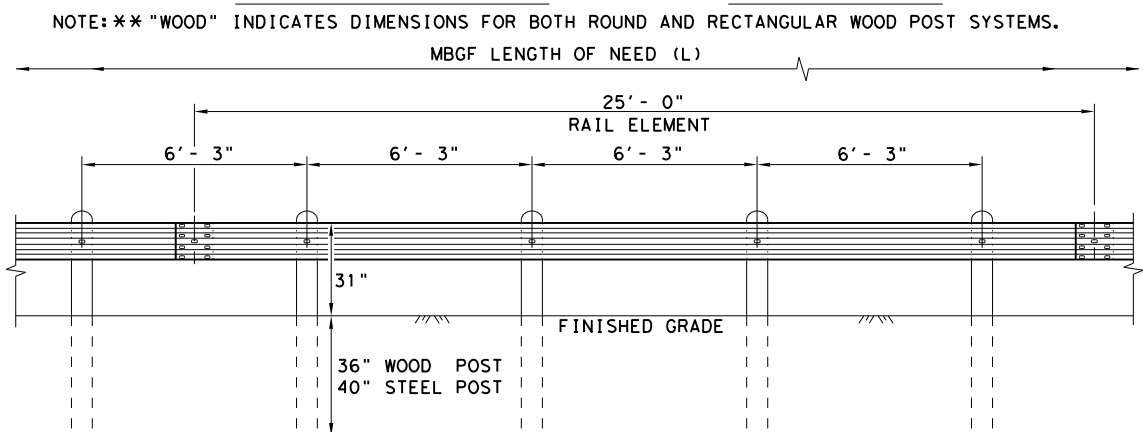
**WOOD BLOCK TO ROUND WOOD POST**

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.



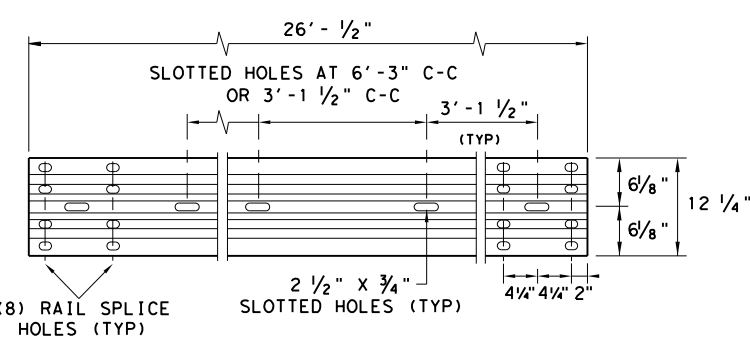
**WOOD BLOCK TO RECTANGULAR WOOD POST**

**ROUTED WOOD BLOCK TO I-BEAM STEEL POST**



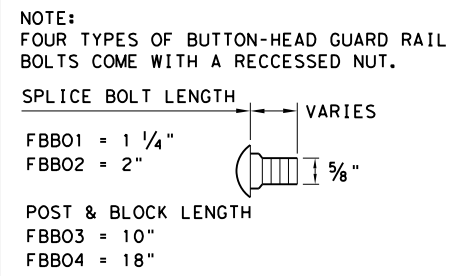
**ELEVATION MID-SPAN RAIL SPLICE**

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



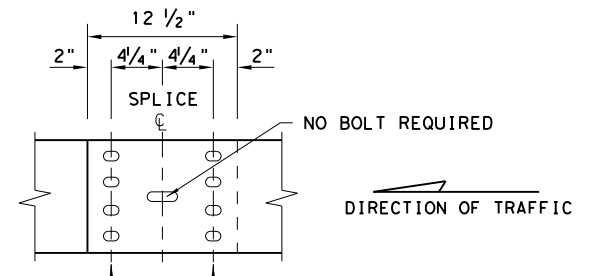
**ELEVATION 25'-0" (NOM.) W-BEAM SECTION**

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



**BUTTON HEAD BOLT**

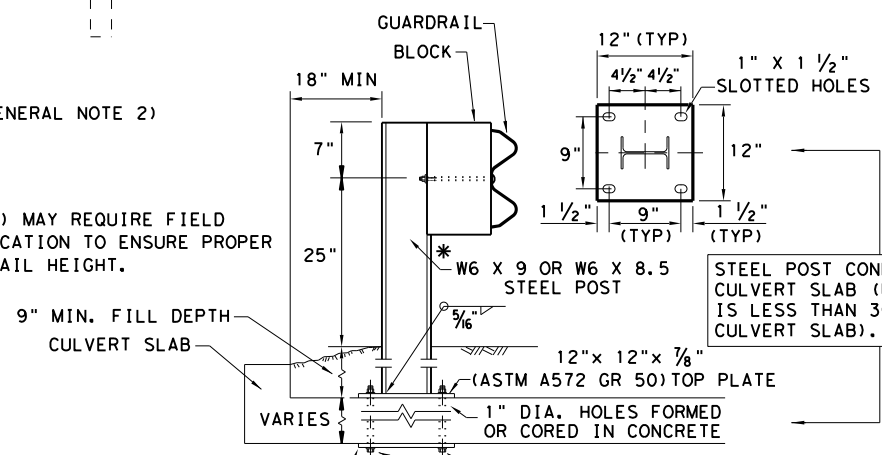
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



**MID-SPAN RAIL SPLICE DETAIL**

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

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



**LOW FILL CULVERT POST**

- NOTE: TWO INSTALLATION OPTIONS.
- 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.
  - 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**

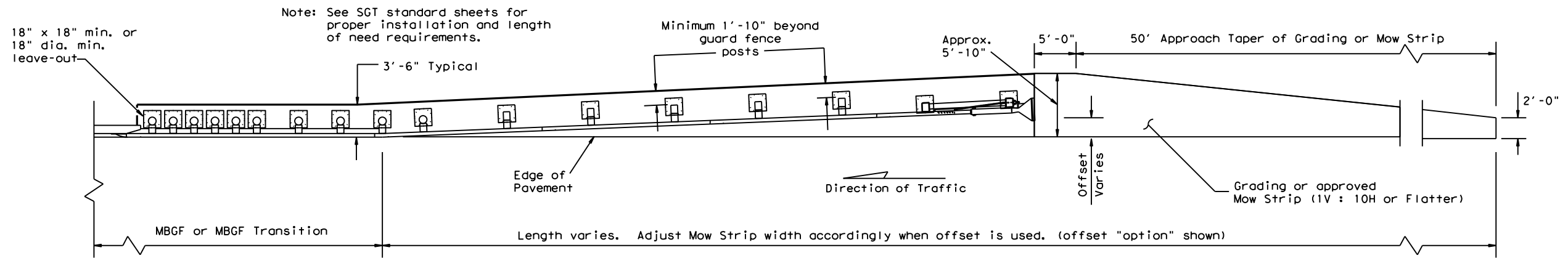
- THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
- RAIL ELEMENTS SHALL MEET THE REQUIREMENTS 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.
- 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.
- FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
- CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
- THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
- 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.
- 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.
- 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.
- POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
- SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
- 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.
- 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.
- GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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
<b>METAL BEAM GUARD FENCE</b> <b>TL-3 MASH COMPLIANT</b> <b>GF(31)-19</b>				
FILE: gf3119.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CGL/AG
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
	DIST	COUNTY	SHEET NO.	
	AUS	BASTROP	61	

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

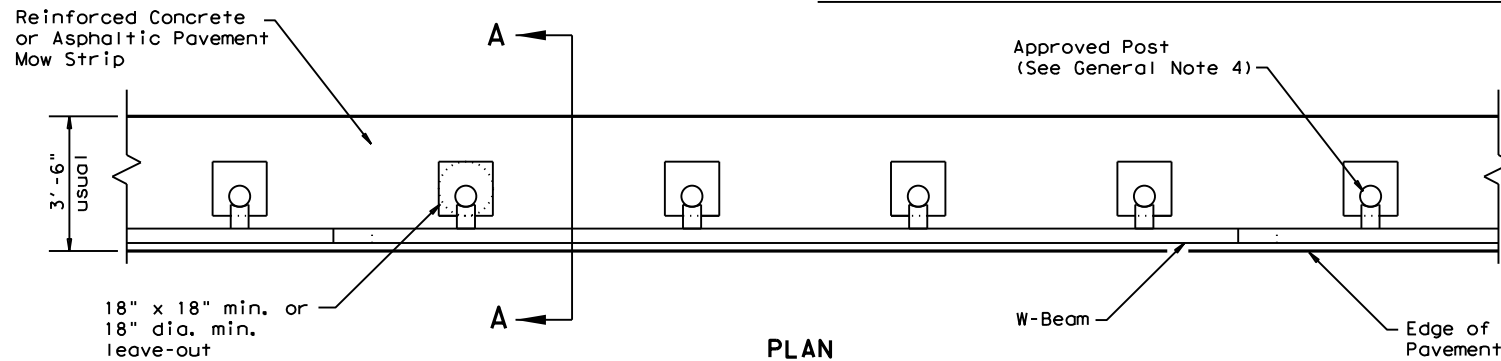
DATE: 5/11/2022  
 FILE: c:\pwworking\kh1\00168457\gf31ms19.dgn



**GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS**

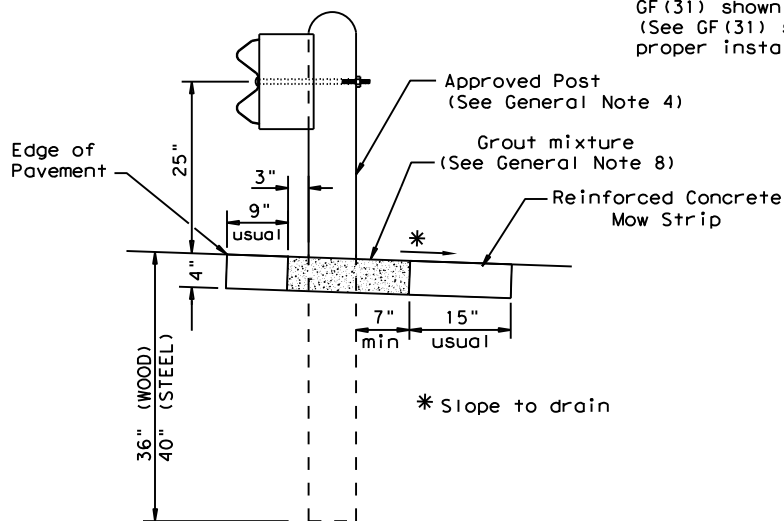
Note: Site Condition(s)

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.



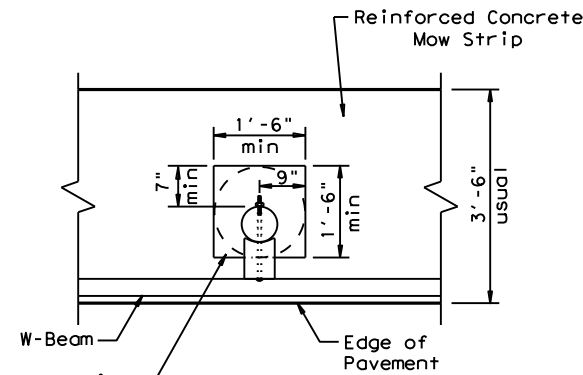
**PLAN**

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



**SECTION A-A**

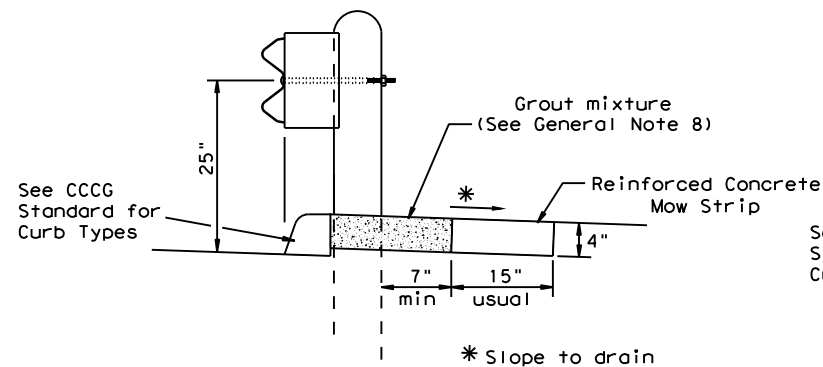
Typical



**MOW STRIP DETAIL**

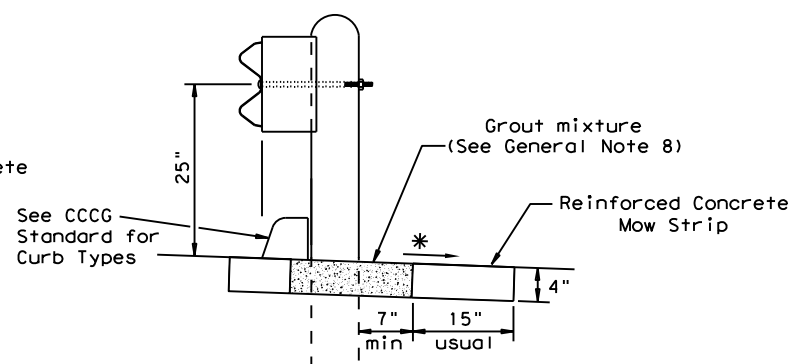
Reinforced Concrete Mow Strip with 18" x 18" Square or 18" Dia. minimum leave-out.

- 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 I or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



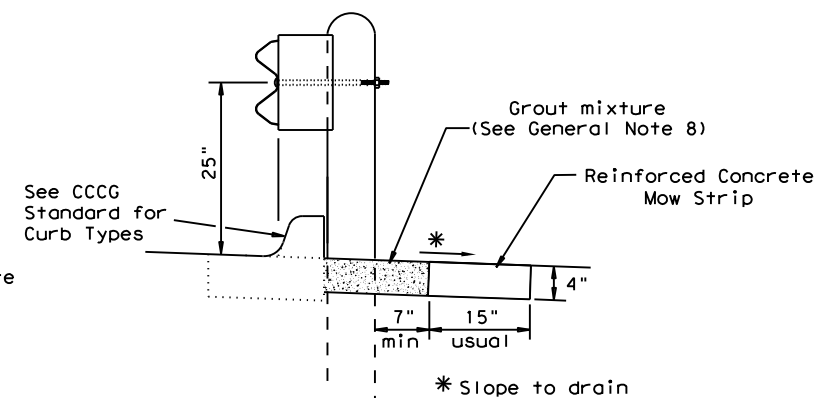
**CURB OPTION (1)**

This option will increase the post embedment throughout the system.



**CURB OPTION (2)**

Curb shown on top of mow strip



**CURB OPTION (3)**

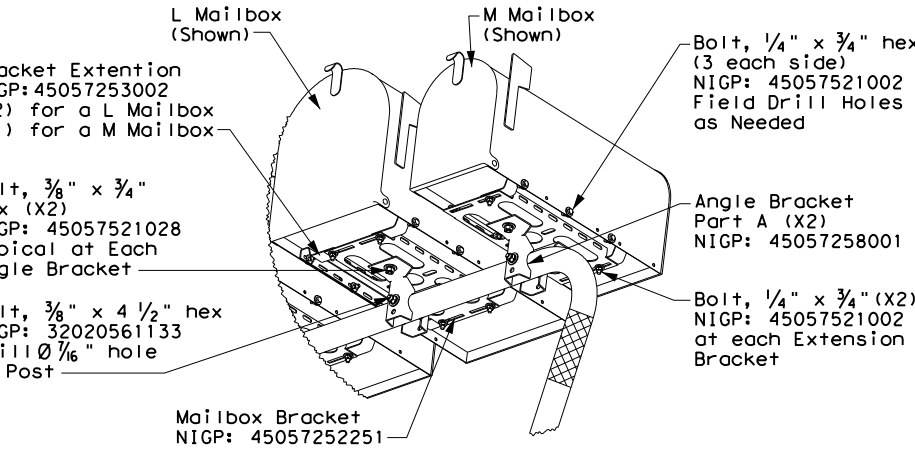
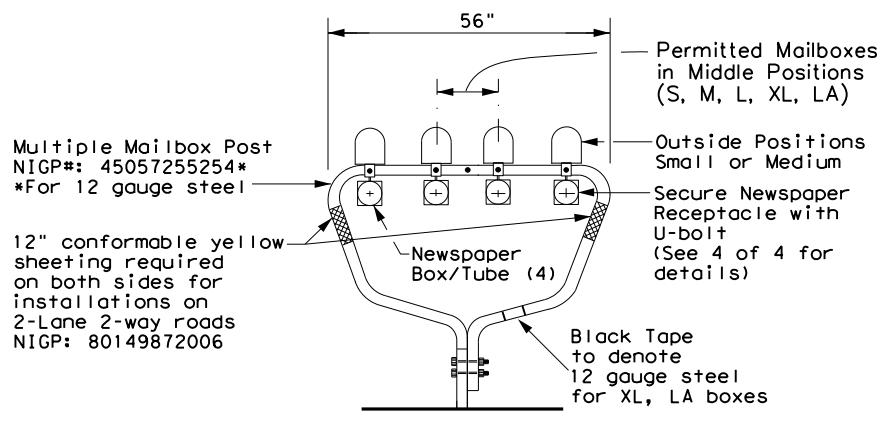
		Design Division Standard	
<b>METAL BEAM GUARD FENCE (MOW STRIP)</b> <b>TL-3 MASH COMPLIANT</b> <b>GF(31)MS-19</b>			
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP
© TXDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	1186	02	025
			FM 969
	DIST	COUNTY	SHEET NO.
	AUS	BASTROP	62



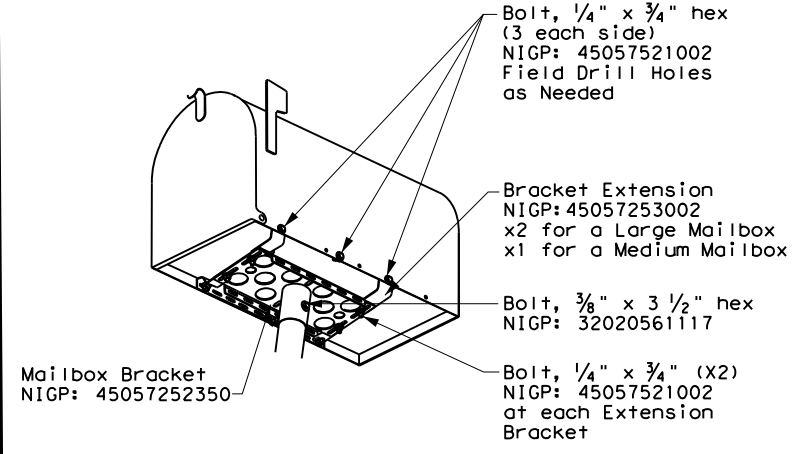
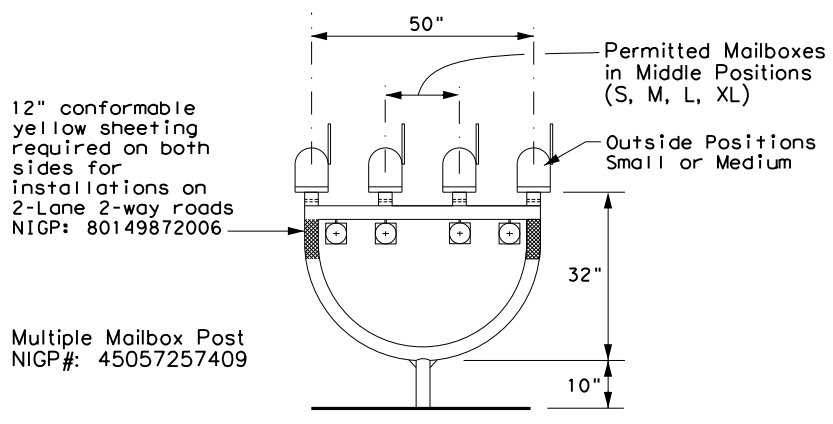
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022 4:32:41 PM  
 FILE: c:\pwworking\10168457\mb-21.dgn

### TYPE 1 - MULTIPLE



### TYPE 4 - MULTIPLE



### MAILBOX SIZES

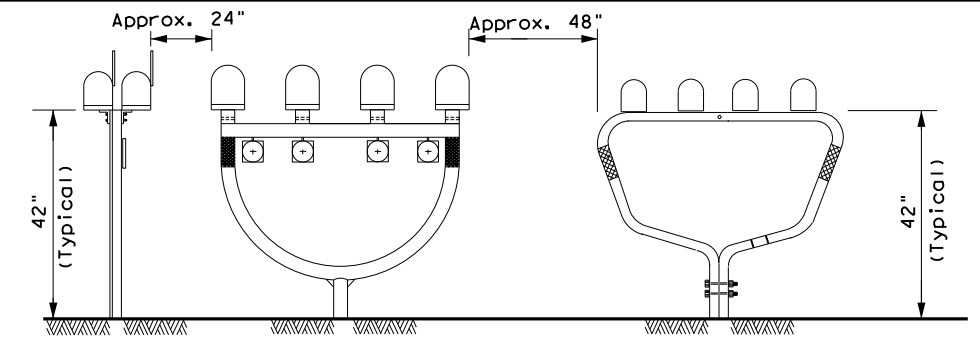
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

#### GENERAL NOTES:

- Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
- Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

\* See Note 1.  
 \*\* Excluding Molded Plastic on 4 X 4 Post

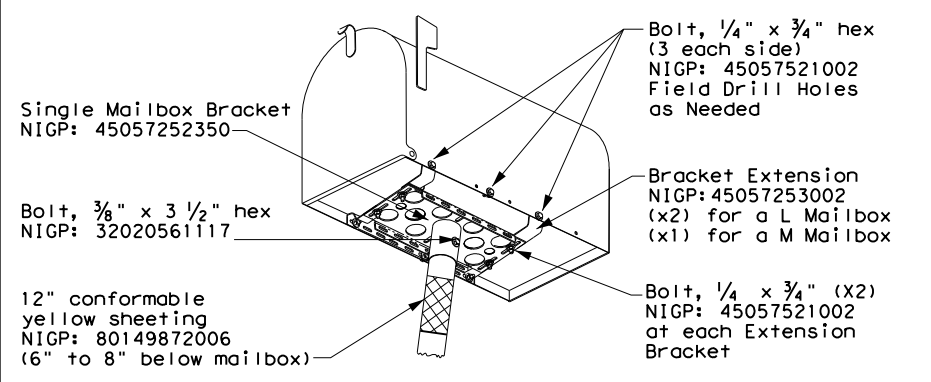
### TYPICAL INSTALLATION MEASUREMENTS



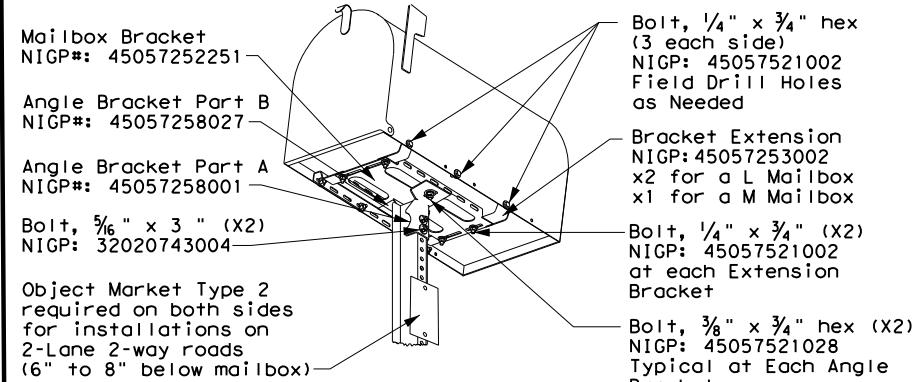
#### NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

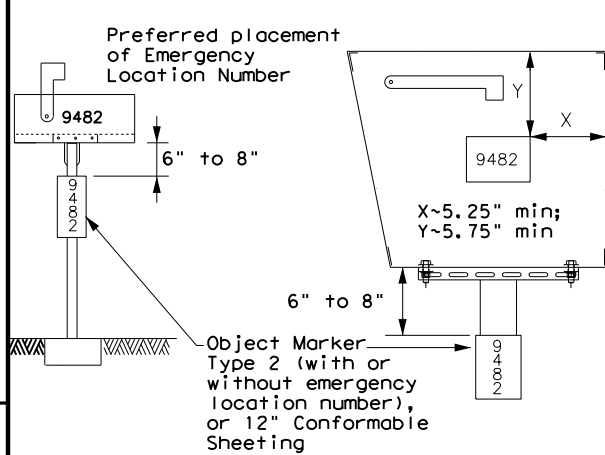
### TYPE 2 and 4 - SINGLE/DOUBLE



### TYPE 3 - SINGLE/DOUBLE

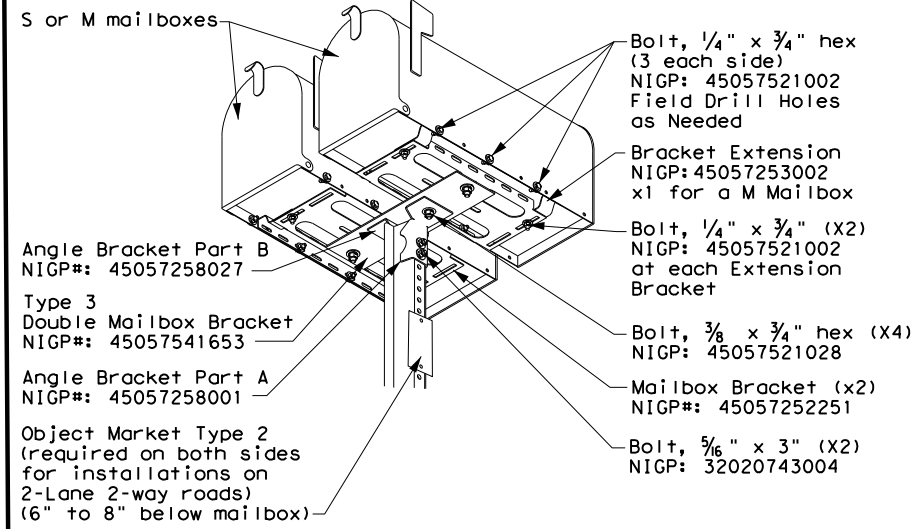
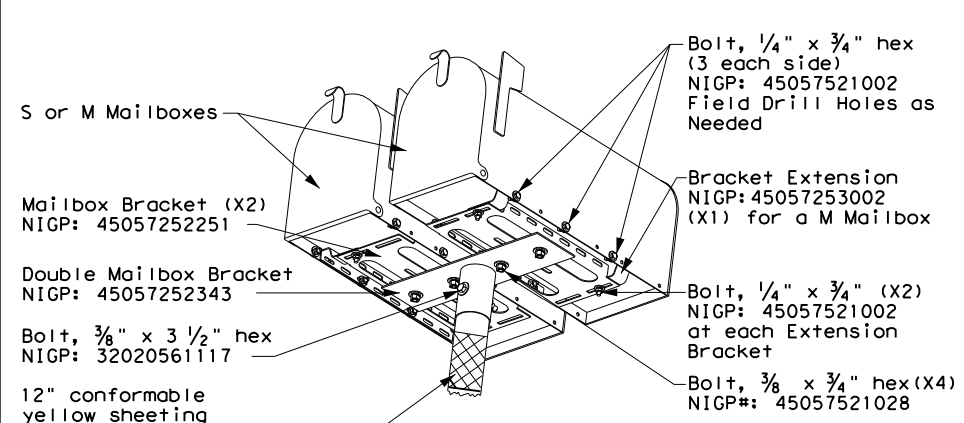


### PLACEMENT OF EMERGENCY LOCATION NUMBER

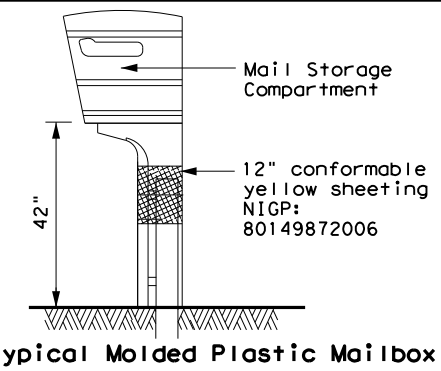


#### NOTES:

- Location numbers are provided by homeowner. Minimum size 1" height.
- Location number is typically placed on the mailbox in a contrasting color.
- Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
- Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
- See 3 of 4 for Foundation details.
- See 4 of 4 for Hardware details.



### TYPE 5



SHEET 1 OF 4



## MAILBOX MOUNTING AND ASSEMBLY

### MB(1)-21

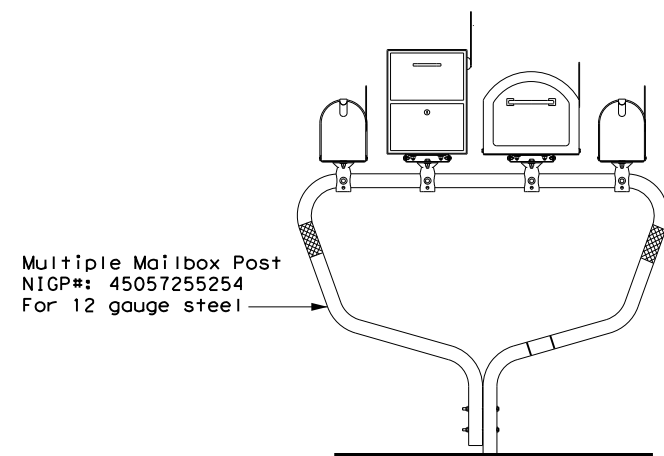
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
2/2005	11/2009	4/2015		
6/2005	1/2011			
11/2006	7/2014			
	DIST	COUNTY		SHEET NO.
	AUS	BASTROP		63

Maintenance Division Standard

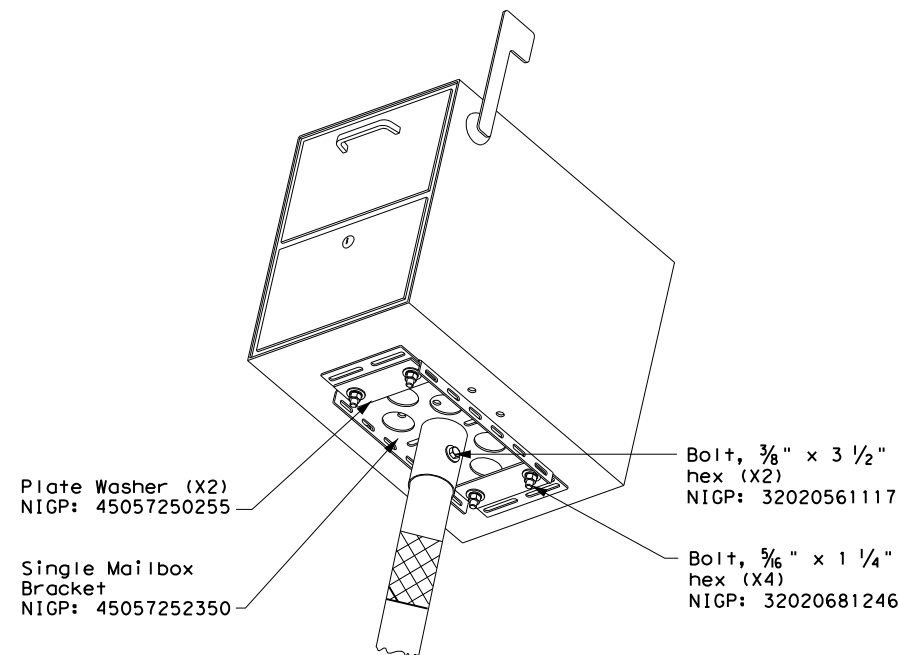
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022 4:32:47 PM  
 FILE: C:\pwworking\kh1\00168457.mbd-21.dgn

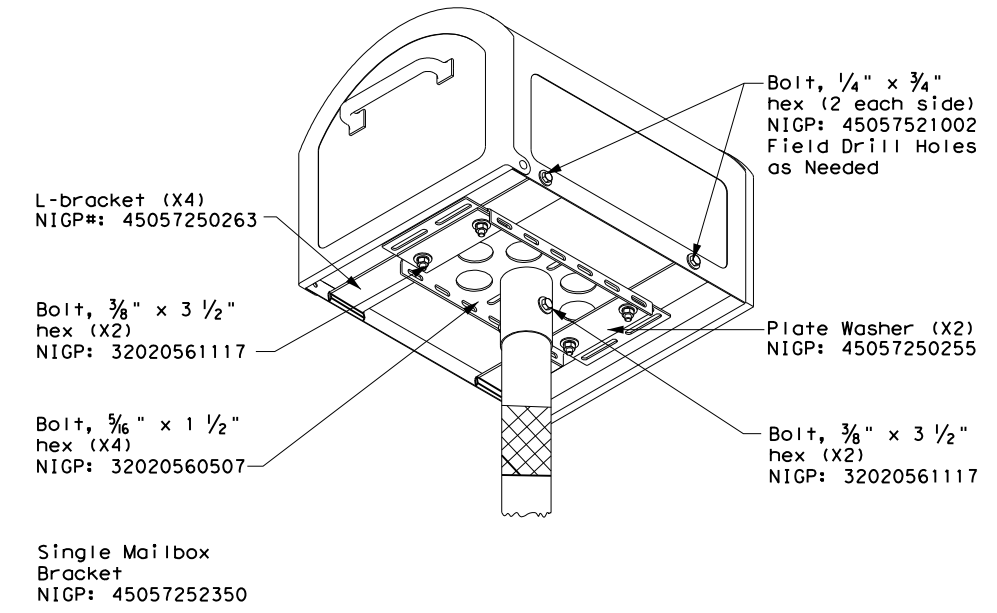
**TYPE 1 - MULTI LOCKABLE AND XL MAILBOX**



**TYPE 2/4 - SINGLE LOCKABLE MAILBOX**

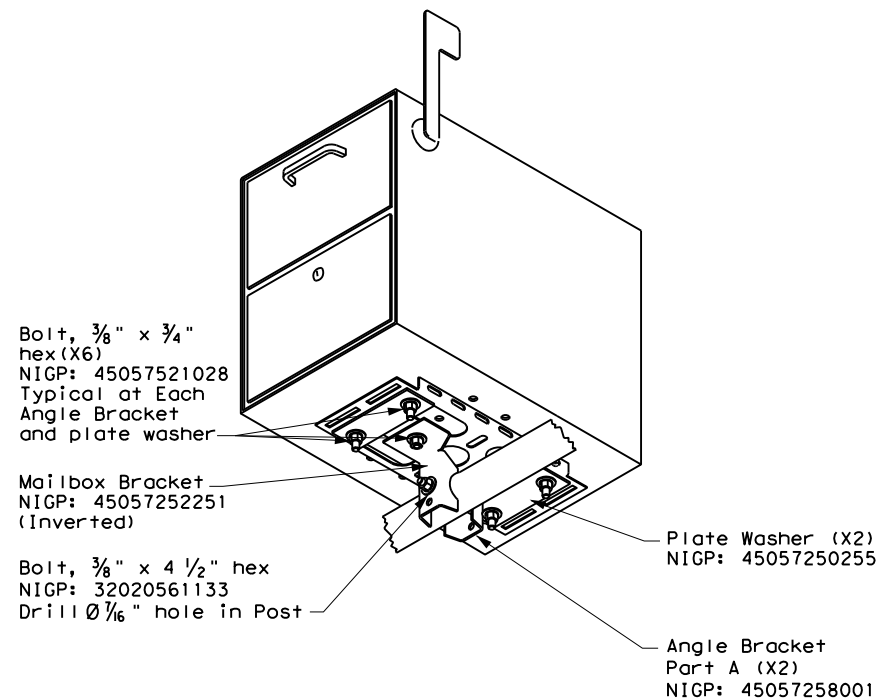


**TYPE 2/4 - SINGLE XL MAILBOX**

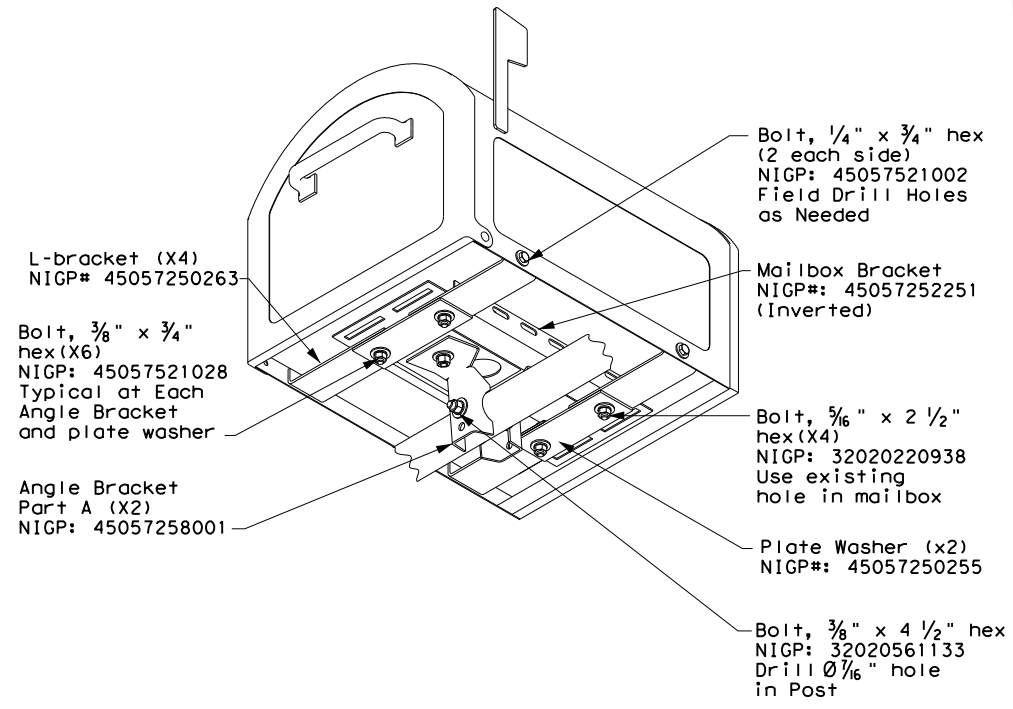


**NOTE:**  
 Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

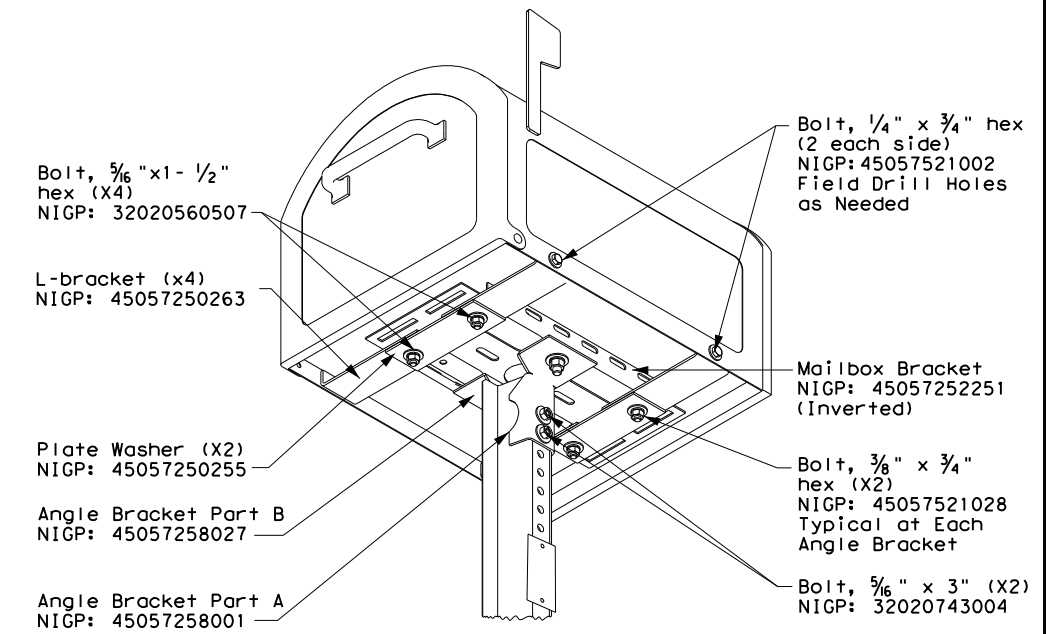
**TYPE 1 MULTI - LOCKABLE ARCHITECTURAL (LA)**



**TYPE 1 MULTI - XL MAILBOX**



**TYPE 3 - XL MAILBOX MOUNTING**



SHEET 2 OF 4

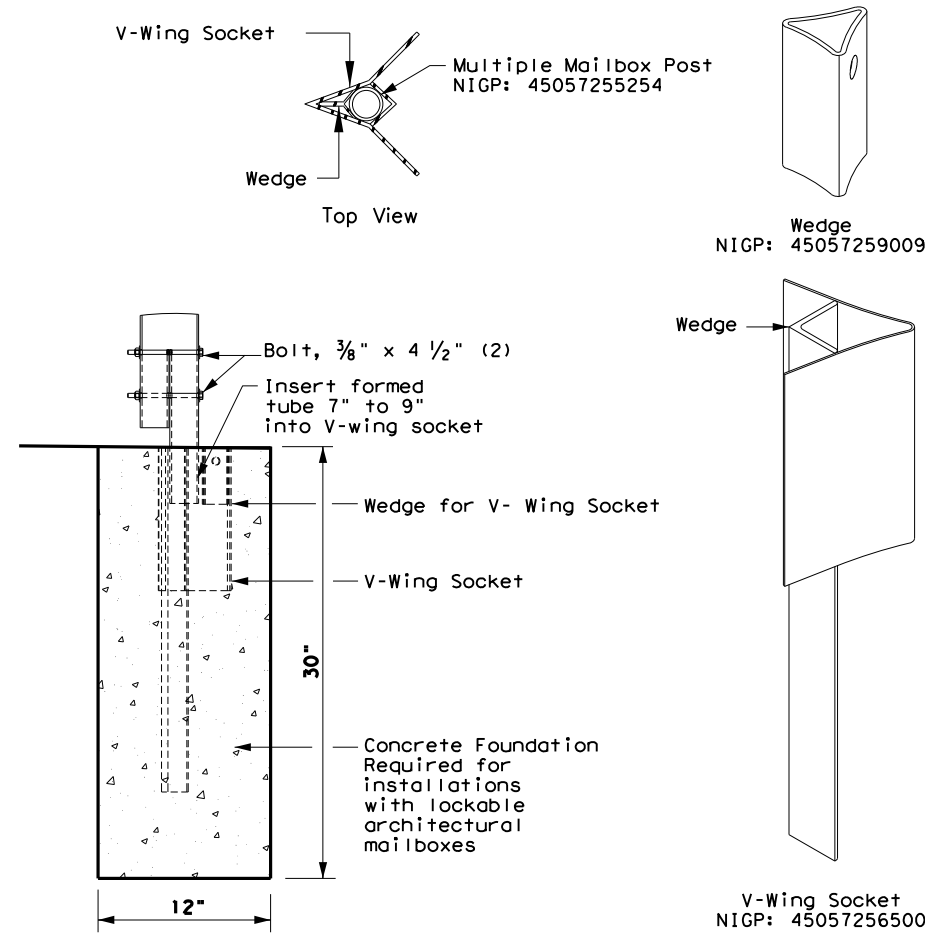
		Maintenance Division Standard	
<h2>XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY</h2> <h3>MB (2) - 21</h3>			
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT March 2004	CONT	SECT	JOB
2/2005	11/2009	4/2015	1186 02 025 FM 969
6/2005	1/2011		DIST COUNTY SHEET NO.
11/2006	7/2014	AUS	BASTROP 64

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

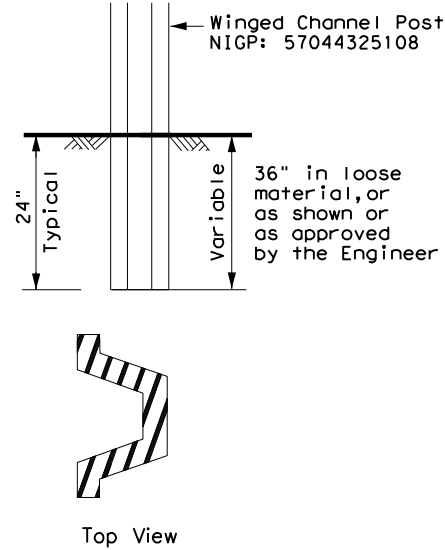
DATE: 5/11/2002 4:32:52 PM  
 FILE: C:\pwwork1\00866657\11186\11186.dgn

### TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



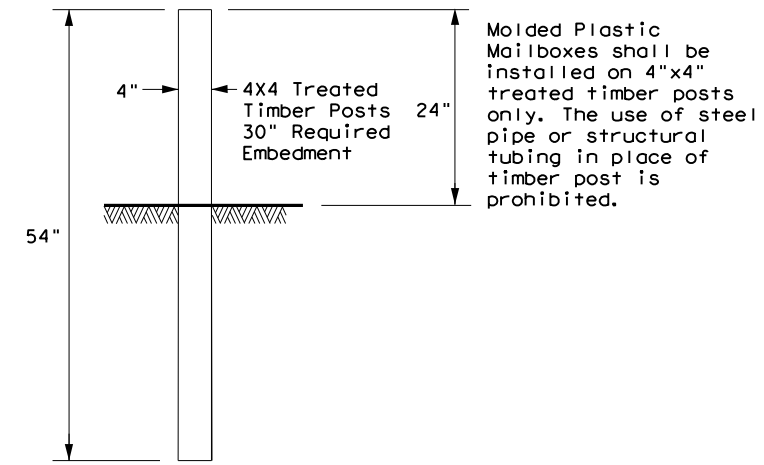
### TYPE 3 - SUPPORT/FOUNDATION



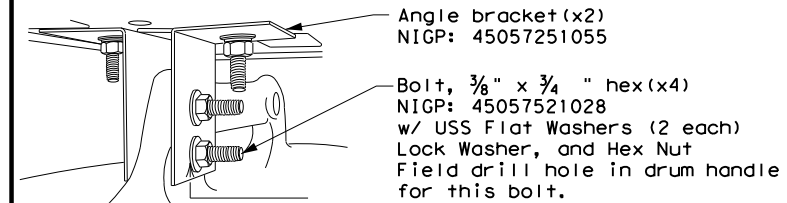
#### NOTES:

1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

### TYPE 5 - SUPPORT/FOUNDATION



### TYPE 6 - TEMPORARY MAILBOX SUPPORT



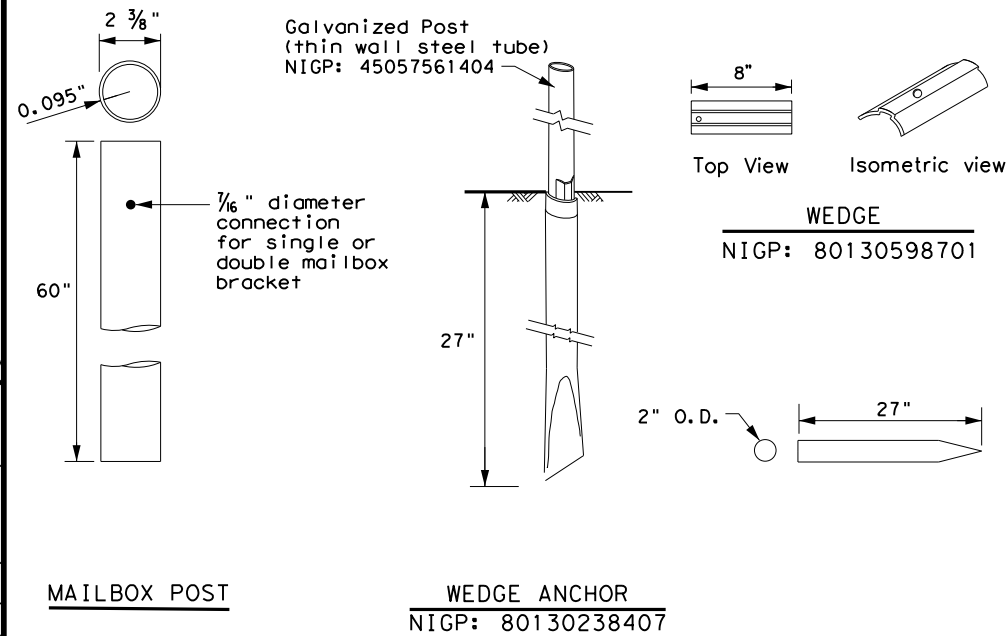
Plastic Drum NIGP: 55093383655  
 Rubber Collar NIGP: 55093387102

#### NOTES:

1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

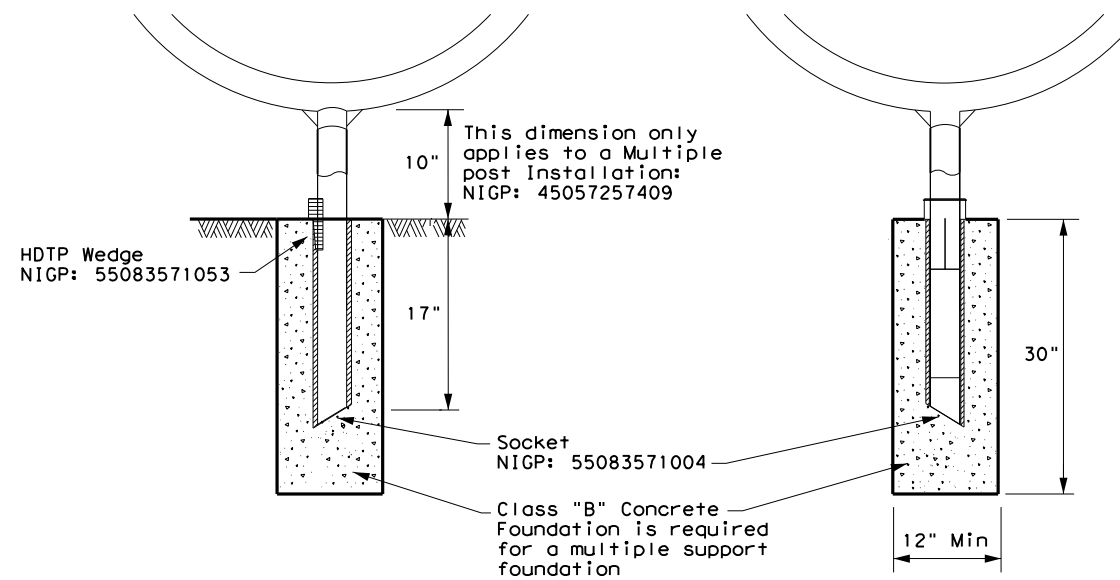
### TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System



### TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107  
 Multiple post NIGP: 45057257409  
 Recycled Rubber post (RR) NIGP: 45057561057



#### GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

SHEET 3 OF 4



## MAILBOX SUPPORT AND FOUNDATION

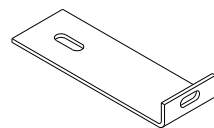
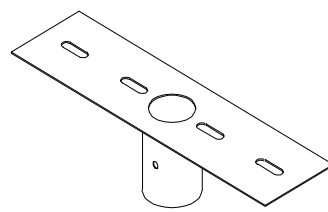
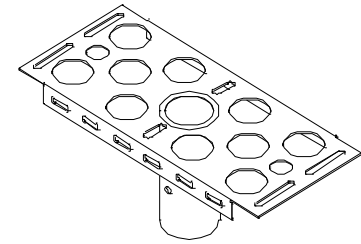
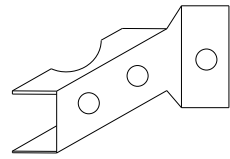
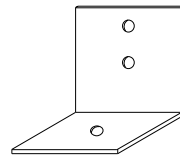
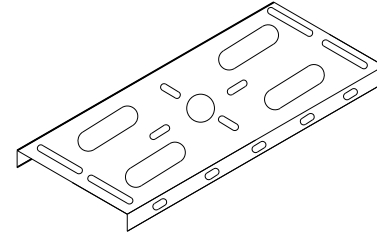
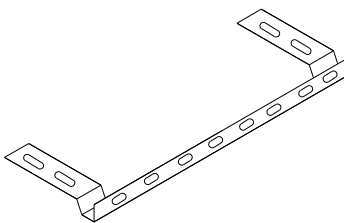
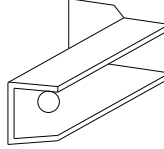
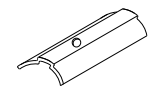

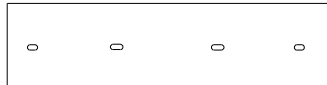
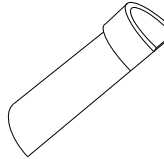
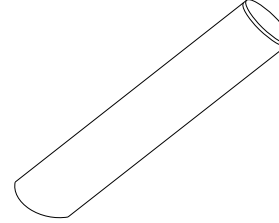

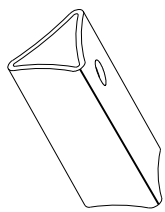
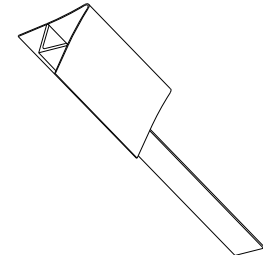
MB (3) - 21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
2/2005	11/2009	4/2015	1186 02	025 FM 969
6/2005	1/2011		DIST	COUNTY SHEET NO.
11/2006	7/2014		AUS	BASTROP 65

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

DATE: 5/11/2022 4:32:56 PM  
 FILE: c:\pwworking\dot\168457\mb-21.dgn

TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Govanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete

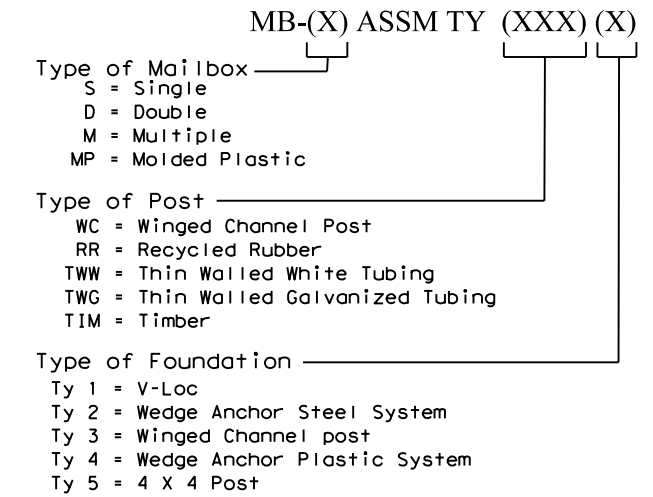
 NIGP: 45057250263 L-Bracket x4 for XL sized mailboxes	 NIGP: 45057252343 Double Mailbox Bracket For Type 2 and Type 4 double mount	 NIGP: 45057252350 Single Mailbox Bracket For Type 2 single and for Type 4 single and multi mount	 NIGP: 45057258001 Part "A" Angle Bracket For Type 1 multi (2 per mailbox) and Type 3 single and double
 NIGP: 45057251055 Type 6 Angle Bracket (2 per mailbox)	 NIGP: 45057252251 Mailbox Bracket For Type 1 multi and any double mount (use 2)	 NIGP: 45057253002 Bracket Extension Use 1 for a medium Mailbox Use 2 for a Large Mailbox	 NIGP: 45057258027 Part "B" Angle Bracket For Type 3 single and double
 NIGP: 80130598701 Wedge for Type 2	 NIGP: 45057250255 Plate Washer for Architecural and XL Mailboxes	 NIGP: 45057541653 Type 3 double mailbox bracket	 NIGP: 55083571053 Type 4 Mailbox Wedge
 NIGP: 55083571004 Type 4 Mailbox Socket	 NIGP: 80130238407 Type 2 Wedge Anchor	 NIGP: 45057259009 Wedge for Type 1 V-wing Socket	 NIGP: 45057256500 V-wing Socket for Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts


**NOTES:**

- Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
- A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

**BID CODES FOR CONTRACTS**

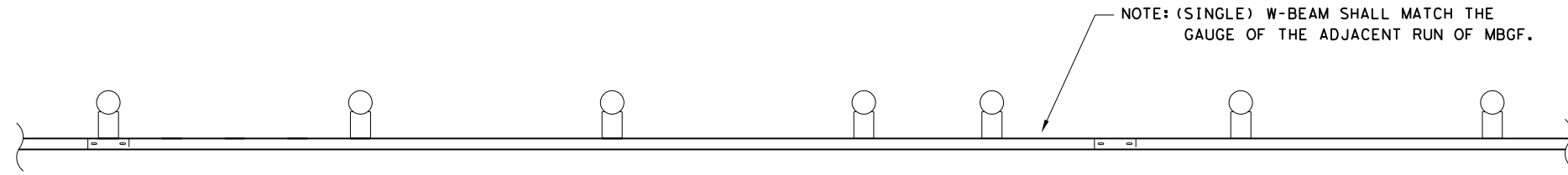


SHEET 4 OF 4

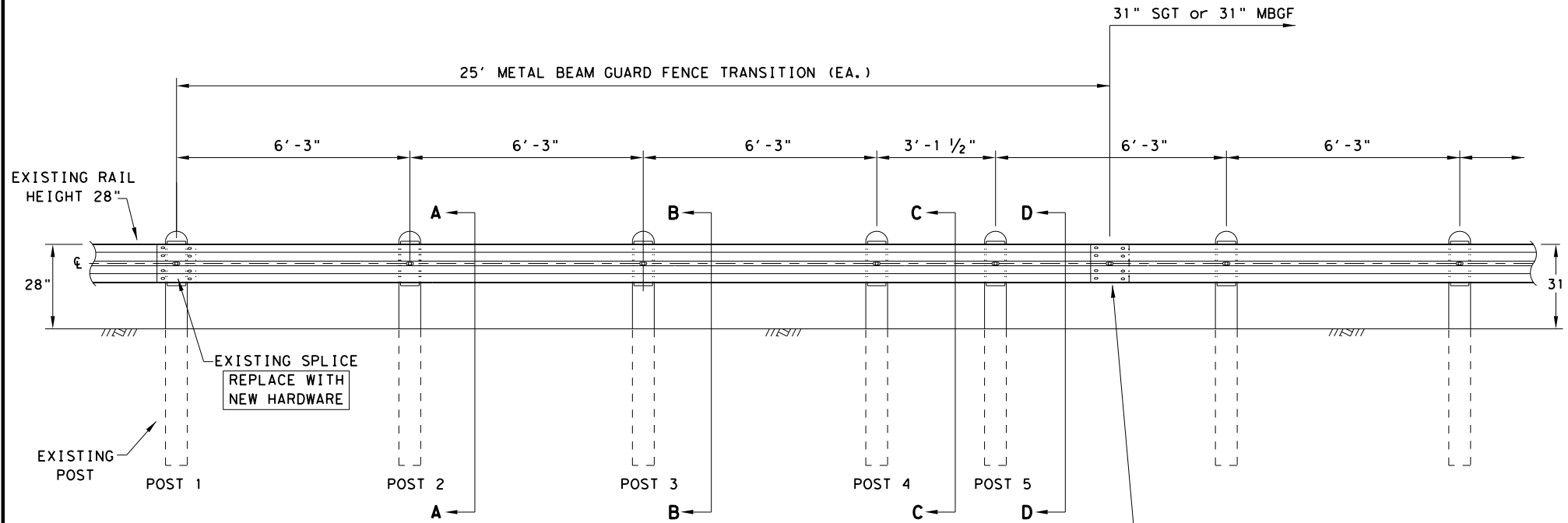
 Texas Department of Transportation		Maintenance Division Standard
<b>NIGP PARTS LIST AND COMPATIBILITY</b>		
<b>MB(4)-21</b>		
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT
2/2005 11/2009 4/2015	1186	02
6/2005 1/2011	DIST	COUNTY
11/2006 7/2014	AUS	BASTROP
		SHEET NO.
		66

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

DATE: 5/11/2022  
 FILE: c:\pwworking\dot168457\ra1\ad\jb19.dgn



**PLAN VIEW**



**ELEVATION VIEW**

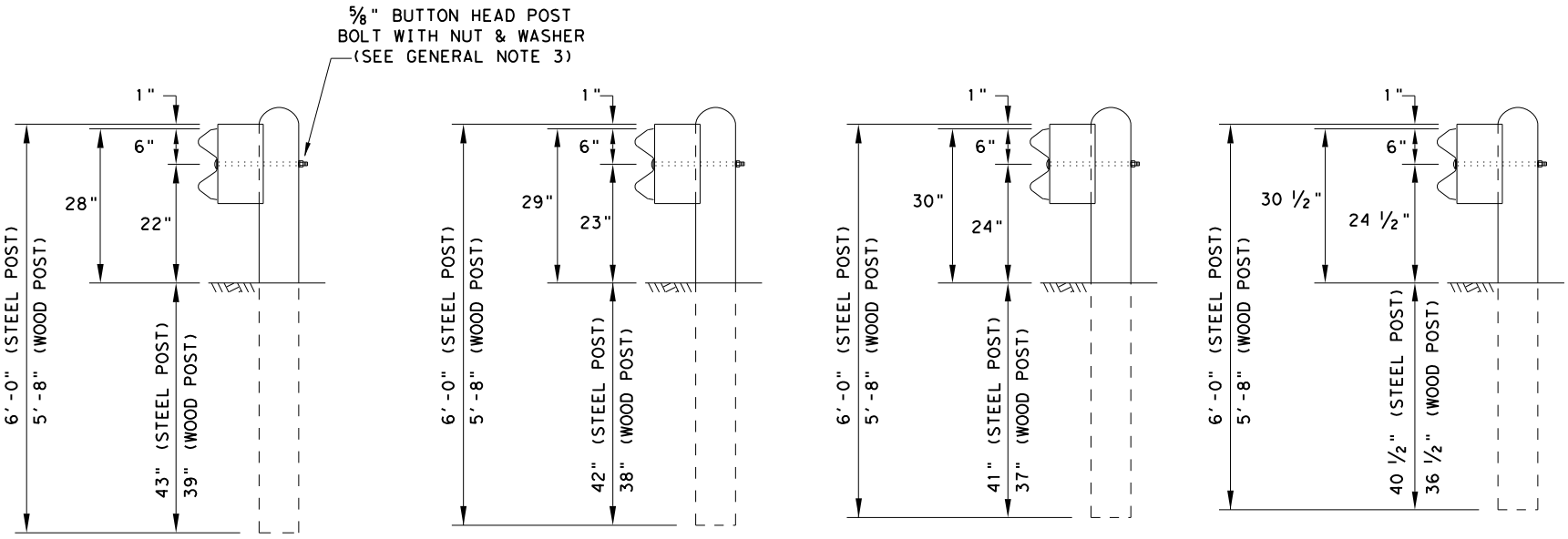
\* "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.

(8) 5/8" DIA. x 1 1/4" GUARDRAIL SPLICE BOLTS WITH 5/8" NUTS (ASTM A563). (SEE GENERAL NOTE 3).

POST AND BLOCK-OUT TYPES AVAILABLE

FOR WOOD POST

FOR STEEL POST



**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**SECTION D-D**

NOTE: HARDWARE SHALL MEET THE FOLLOWING REQUIREMENTS.  
 GUARDRAIL POST BOLTS (ASTM A307 GR. A)  
 GUARDRAIL ROUND WASHERS (ASTM F436)  
 GUARDRAIL DOUBLE RECESSED NUTS (ASTM A563)  
 GUARDRAIL SPLICE BOLTS (ASTM A307 GR. A)  
 GUARDRAIL SPLICE NUTS (ASTM A563)

**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 AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENT 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 TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND 5/8" ROUND WASHER (ASTM F436) AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE 5/8" X 1-1/4" WITH 5/8" NUTS (ASTM A563).
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM REQUIRING CONSTRUCTION OF THE TRANSITION.
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. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. SEE GF(31) STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. 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.
11. REFER TO STANDARD GF(31) FOR ADDITIONAL DETAILS.
12. RAIL HEIGHT ADJUSTMENT IS ASSESSED AT TL-3 MASH COMPLIANT FOR STEEL POST HEIGHT TRANSITION TO 28" STEEL POST GUARDRAIL.

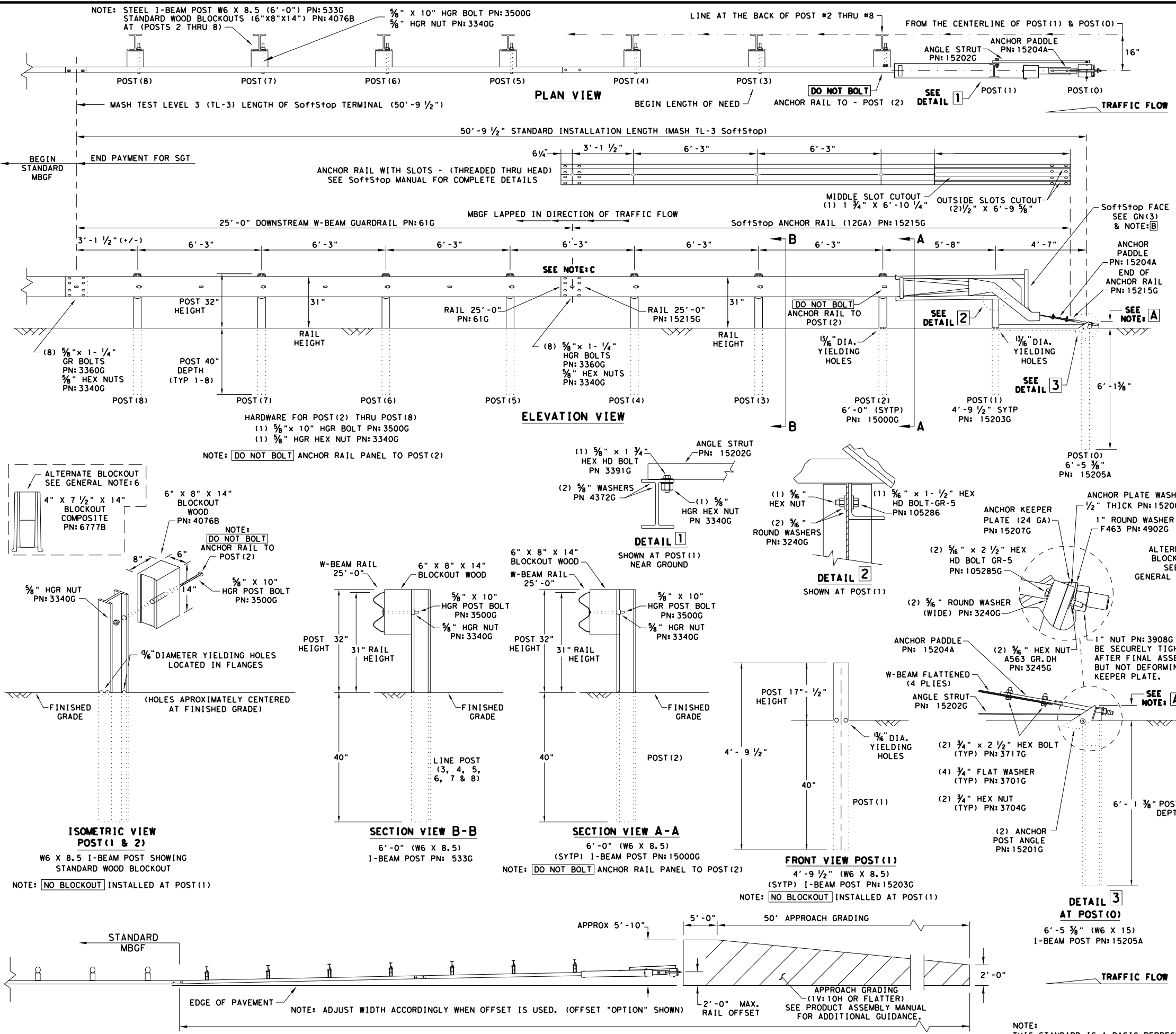
**HARDWARE LIST**

QTY	DESCRIPTION
1	25'-0" W-BEAM RAIL ELEMENT 12GA. (TYP)
5	7 1/2" DIA X 6'-0" DOMED ROUND WOOD POSTS (TYP)
5	6" X 8" X 68" RECTANGULAR WOOD POSTS (TYP)
5	W6 X 8.5 OR W6 X 9 X 72" STEEL POSTS (TYP)
5	6" X 8" X 14" WOOD BLOCKS OR COMPOSITE (TYP)
5	5/8" X 18" GUARDRAIL BOLTS AND NUTS (FBB04)
5	5/8" ROUND WASHERS (ASTM F436) (FWC160)
5	5/8" X 10" GUARDRAIL BOLTS AND NUTS (FBB03)
16	5/8" X 1-1/4" GUARDRAIL SPLICE BOLTS WITH DOUBLE RECESSED NUTS (ASTM A563) (FBB01)

		<i>Design Division Standard</i>	
<b>METAL BEAM GUARD FENCE          RAIL HEIGHT ADJUSTMENT          (28" TO 31")          TL-3 MASH COMPLIANT          RAIL-ADJ(B)-19</b>			
FILE: ra1\ad\jb19	DN: TxDOT	CK: KM	DW: VP
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB
REVISIONS	1186	02	025
DIST	COUNTY		SHEET NO.
AUS	BASTROP		67



DATE: 5/11/2022  
 FILE: c:\pwworking\tdot\1068457\sgt10s3116.dgn  
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



- 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 MBGF STANDARD FOR INSTALLATION GUIDANCE.
  - POSTS SHALL NOT BE SET IN CONCRETE.
  - IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
  - DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
  - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
  - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRoACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

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

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

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

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25' - 0")
15205A	1	POST #0 - ANCHOR POST (6' - 5 3/8")
15203G	1	POST #1 - (SYTP) (4' - 9 1/2")
15000G	1	POST #2 - (SYTP) (6' - 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 X 8.5) (6' - 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" X 8" X 14")
6777B	7	BLOCKOUT - COMPOSITE (4" X 7 1/2" X 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (1/2" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT

HARDWARE		
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR. DH
3717G	2	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

**Texas Department of Transportation**  
 Design Division Standard

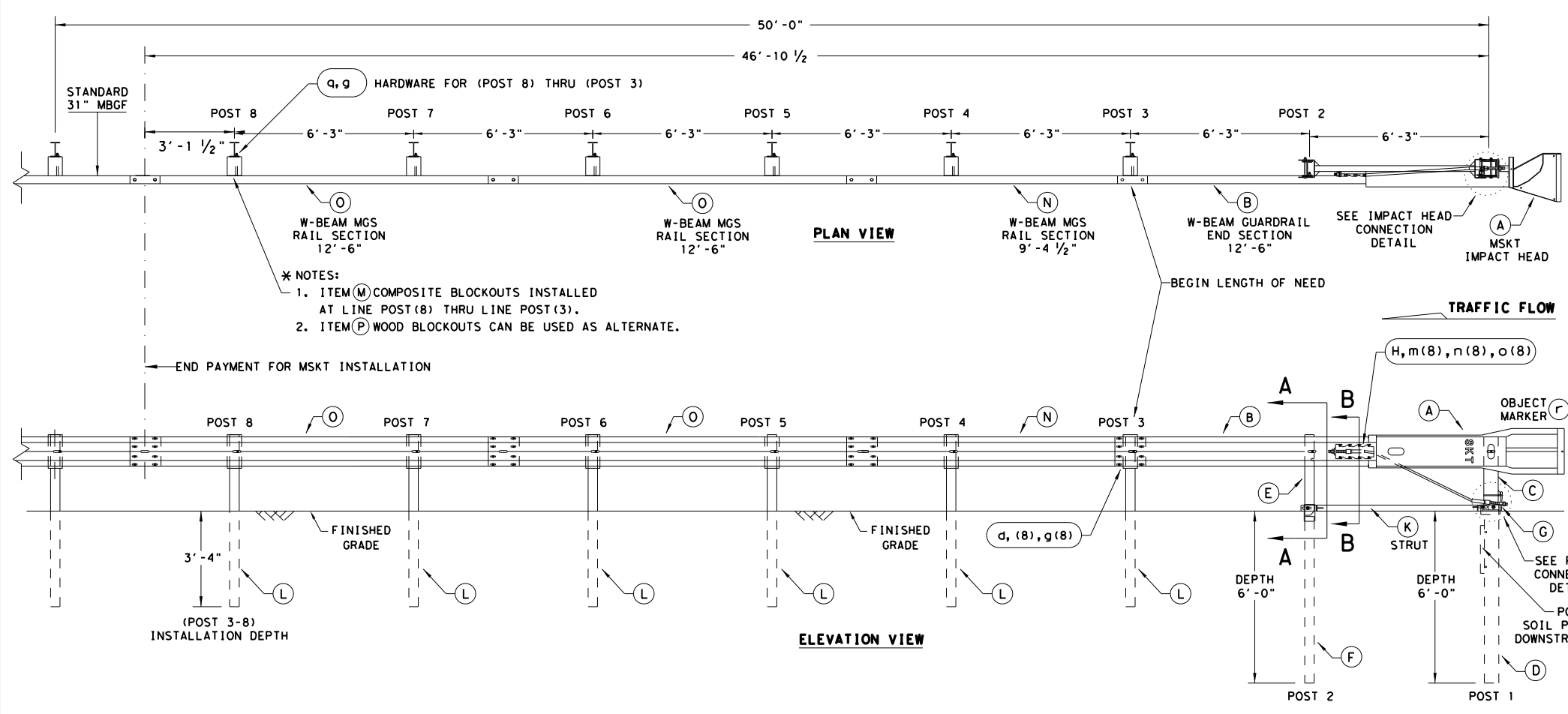
**TRINITY HIGHWAY  
 SOFTSTOP END TERMINAL  
 MASH - TL-3  
 SGT (10S) 31-16**

FILE: sgt10s3116	DW: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
	DIST	COUNTY	SHEET NO.	
	AUS	BASTROP	68	

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

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

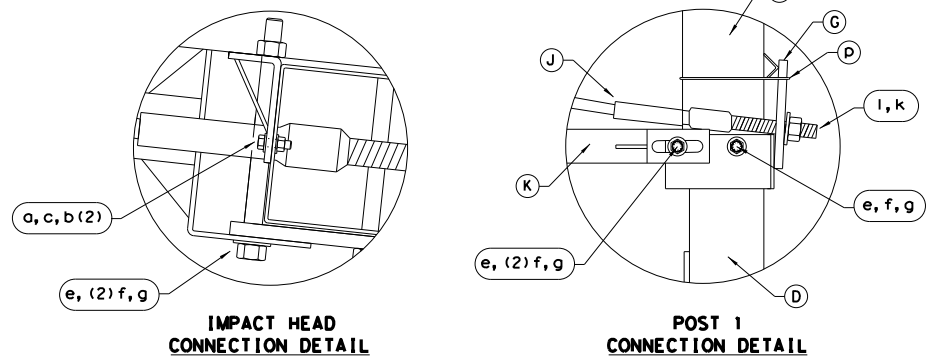
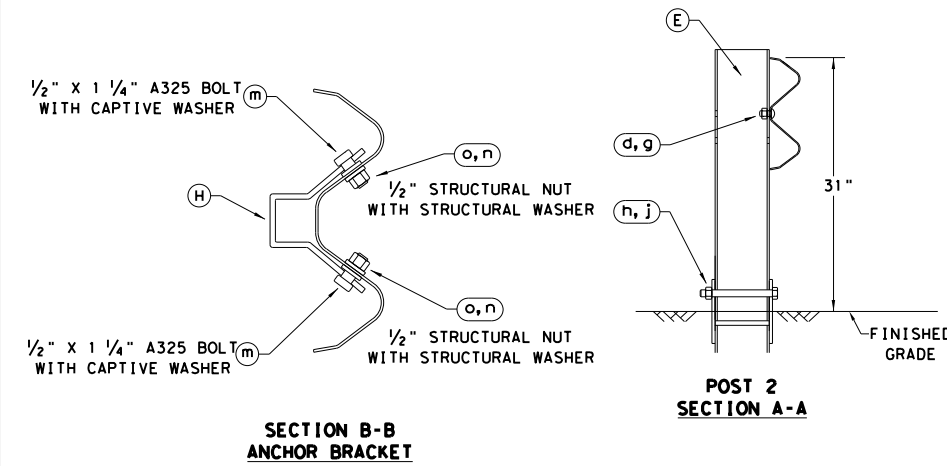
DATE: 5/11/2022  
 FILE: c:\pwworking\0168457\sgt12s3118.dgn



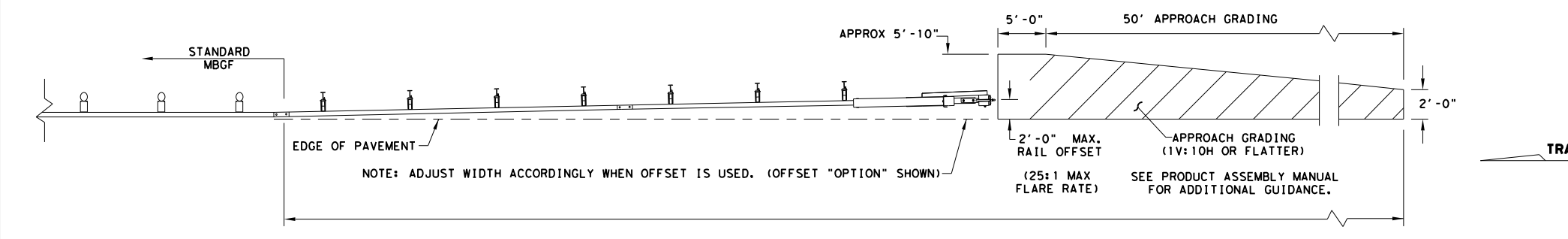
- \* NOTES:
- ITEM (M) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST (8) THRU LINE POST (3).
  - ITEM (P) WOOD BLOCKOUTS CAN BE USED AS ALTERNATE.

- 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 MOW STRIP STANDARD FOR INSTALLATION GUIDANCE.
  - POSTS SHALL NOT BE SET IN CONCRETE.
  - SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
  - UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
  - A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCRoACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
  - THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
  - A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

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



ALTERNATIVE ITEMS NOT SHOWN. \*  
 \* ITEM (P) 8" WOOD-BLOCKOUT  
 \*\* ITEM (Q) 25' GUARD FENCE PANEL



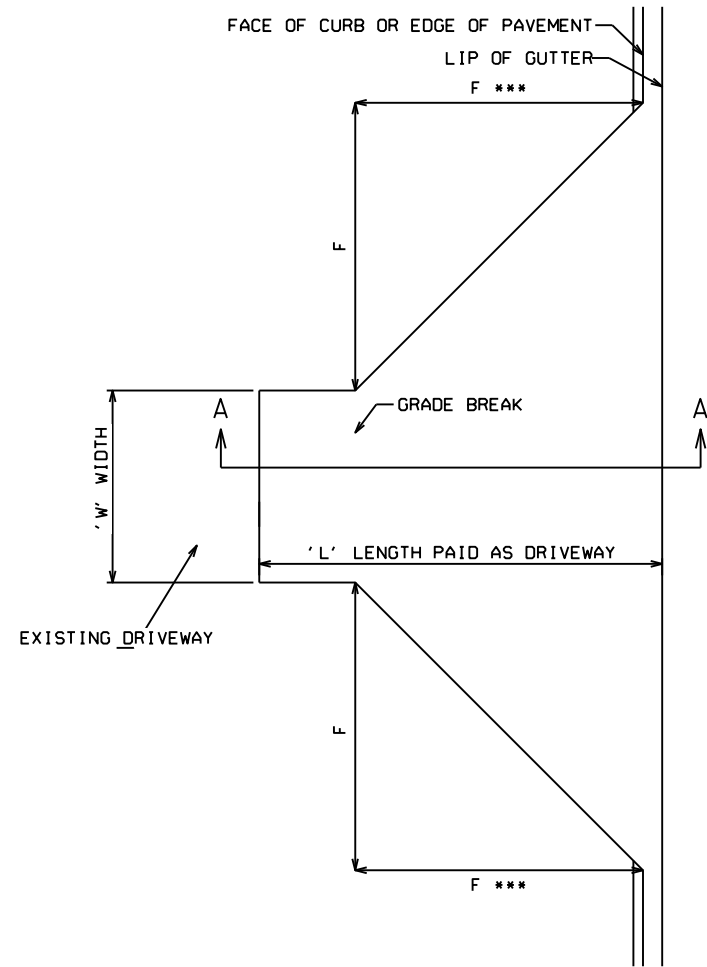
NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

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

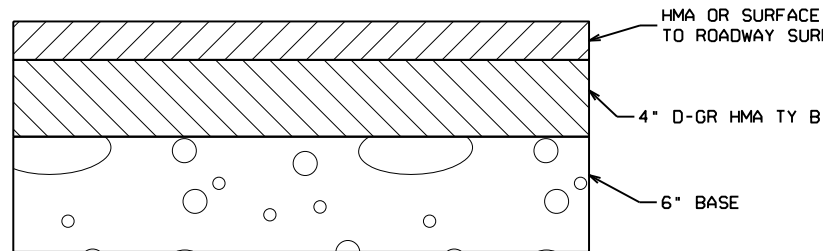
FILE: sgt12s3118.dgn	DN: TXDOT	CK: KM	DW: VP	CK: CL
© TXDOT: APRIL 2018	CONT SECT	JOB	HIGHWAY	
REVISIONS	1186	02	025	FM 969
	DIST	COUNTY	SHEET NO.	
	AUS	BASTROP		69



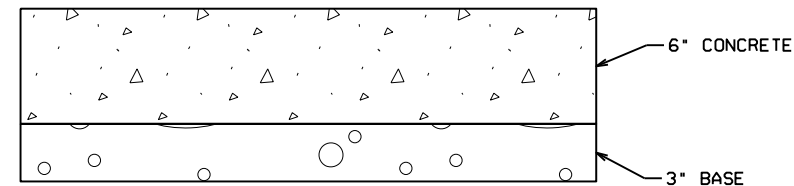
**DRIVEWAY PLAN**

FLARE	FARM/RANCH	RESIDENTIAL	COMMERCIAL
"F" (FT)	25	20	25

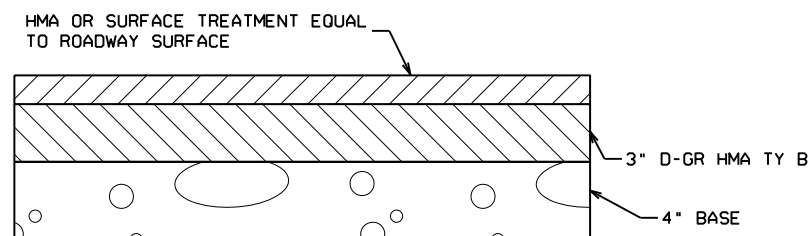
\*\*\* THIS 'F' DIMENSION MAY BE REDUCED TO KEEP WORK WITHIN THE ROW.



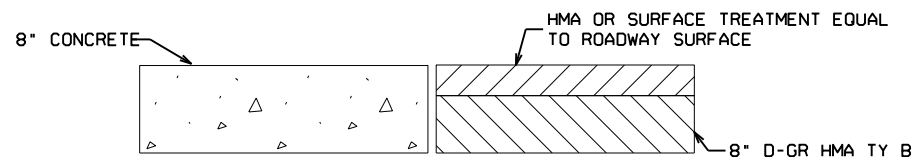
**HMA OR SURFACE TREATMENT - COMMERCIAL**



**CONCRETE - ALL DRIVEWAY TYPES**

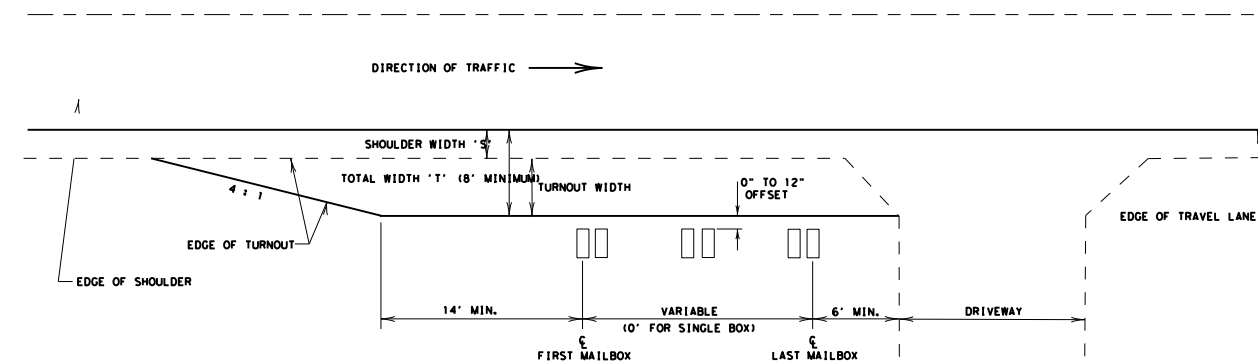


**HMA OR SURFACE TREATMENT - FARM/RANCH/RESIDENTIAL**

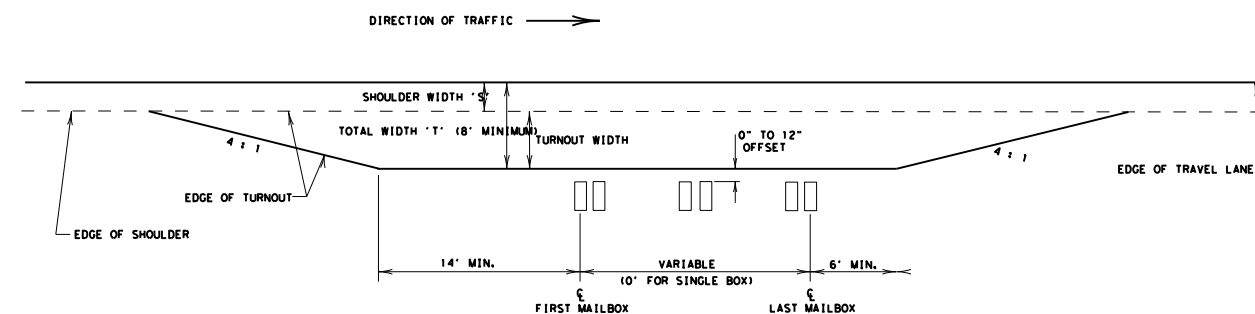


**FAST TRACK ACP (TYPE 3) OR CONCRETE**

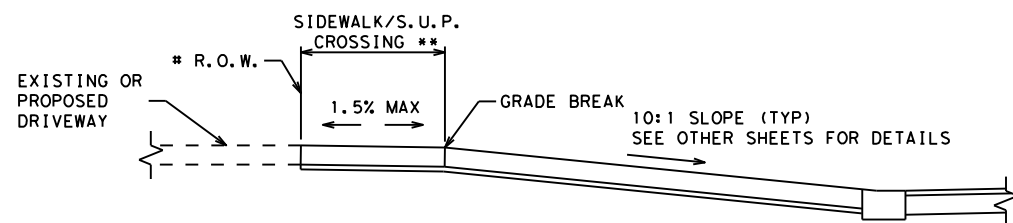
**DRIVEWAY AND TURNOUT TYPICAL SECTIONS**



**MAILBOX TURNOUT PLAN WITH DRIVEWAY**



**MAILBOX TURNOUT PLAN WITHOUT DRIVEWAY**



**DRIVEWAY WITH GUTTER SECTION A-A**

\* ACTUAL TIE-IN SHOWN ELSEWHERE IN PLANS OR AS DIRECTED

ENSURE GRADE BREAK DOES NOT EXCEED 8% UNLESS OTHERWISE DIRECTED. PROVIDE ABSOLUTE MINIMUM SIDEWALK CROSSING WIDTH OF 4' FOR DRIVEWAYS WIDTH OF 20' OR LESS

\*\* LOCATE SIDEWALK CROSSING TO ALIGN WITH ADJACENT SIDEWALK; SIDEWALK/S.U.P. WIDTH AND LOCATION SHOWN ELSEWHERE IN PLANS.

**GENERAL NOTES**

PROVIDE EXPANSION 20 FT C-C FOR WIDTH OR LENGTH OVER 25 FT. EXPANSION JOINT PER AUS STANDARD FOR SIDEWALK (MCPSWMD).

REINFORCEMENT WILL BE IN ACCORDANCE WITH ITEM 432.3.1 USING NO. 3 OR NO. 4 BARS.

FIBER REINFORCEMENT IS NOT ALLOWED. CLASS A CONCRETE IS ALLOWED TO USE COARSE AGGREGATE GRADES 1-8.

IN LIEU OF PFC OR TOM, SURFACE SHALL BE 1.5\"/>

BLADE LAY HMA IS ALLOWED FOR NON SURFACE HMA.

FURNISH BASE MEETING THE REQUIREMENTS FOR ANY TYPE OR GRADE IN ACCORDANCE WITH ITEM 247. BASE COMPRESSIVE STRENGTHS ARE WAIVED.

THE BASE UNDER THE CONCRETE MAY BE REPLACED WITH CONCRETE AT A RATIO OF 3 INCHES OF BASE EQUALS 2 INCHES OF CONCRETE.

FAST TRACK DRIVEWAYS SHALL BE CLOSED, CONSTRUCTED, AND REOPENED WITHIN 24 HOURS.

IF ROOTS ARE ENCOUNTERED VERIFY WITH THE ENGINEER PRIOR TO ACCOMMODATING OR REMOVING 2 IN. DIAMETER OR LARGER ROOTS. ROOT REMOVAL MUST BE IN ACCORDANCE WITH ITEM 752.4.2. ROOTS MAY REMAIN IN THE BASE. FOR IMPROVEMENTS WITHIN 6 IN. OF A ROOT, THE CONCRETE THICKNESS MAY BE REDUCED BY 1 IN. AND THE BASE INCREASED BY 1 IN. TO MINIMIZE IMPACTS TO THE ROOTS. ADJUST BASE AND SURFACE PROFILE TO PROVIDE A 1 IN. BASE CUSHION AROUND THE ROOTS. THE SURFACE PROFILE MAY BE ADJUSTED TO THE EXTENT ALLOWED BY ADA. THIS WORK IS SUBSIDIARY.



5/11/2022



**DRIVEWAYS**

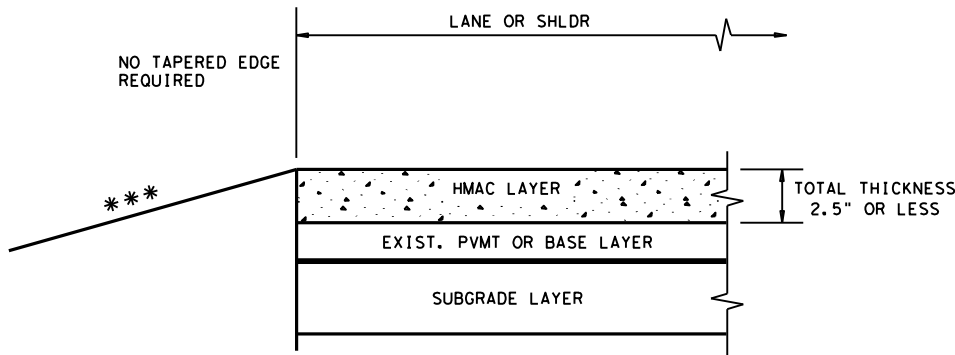
**DWMB-22 (AUS)**

CONT	SECT	JOB	HIGHWAY
1186	02	025	FM 969
AUS	BASTROP		70

DATE: 5/11/2022 4:33:52 PM  
FILE: c:\pwwork1\0168457\DWMB-22 (AUS).dgn

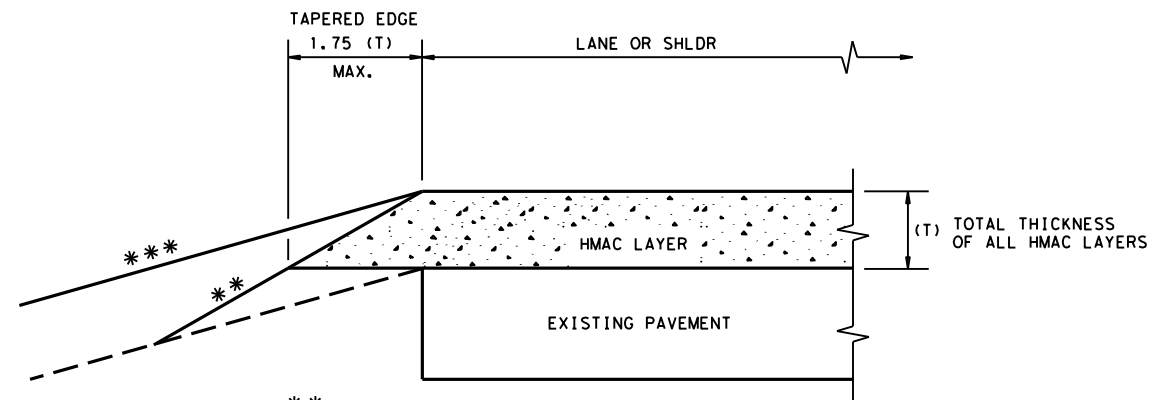
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022  
 FILE: c:\pw\khl\d0168457\tehmoc11.dgn



\*\*\* SEE TYPICAL SECTION FOR ROADSIDE DETAILS

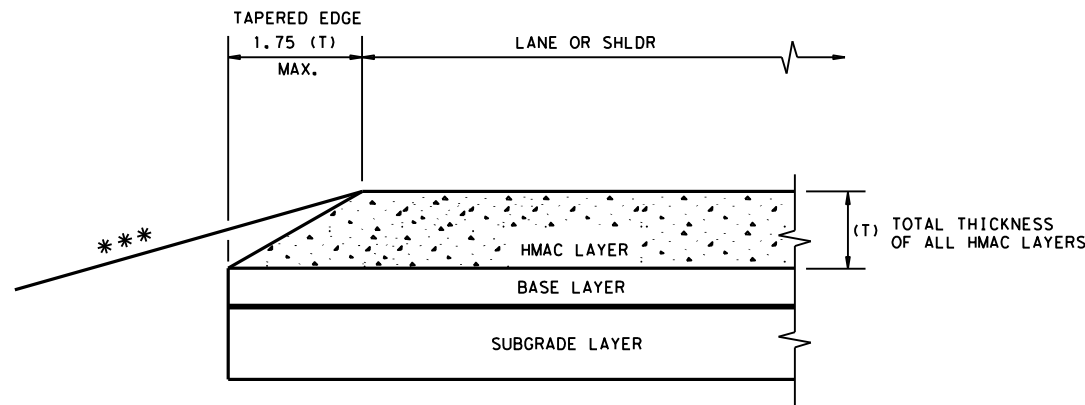
**CONDITION - 1**  
 THIN HMAC SURFACES OR HMAC OVERLAY  
 WITH THICKNESS OF 2.5" OR LESS



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

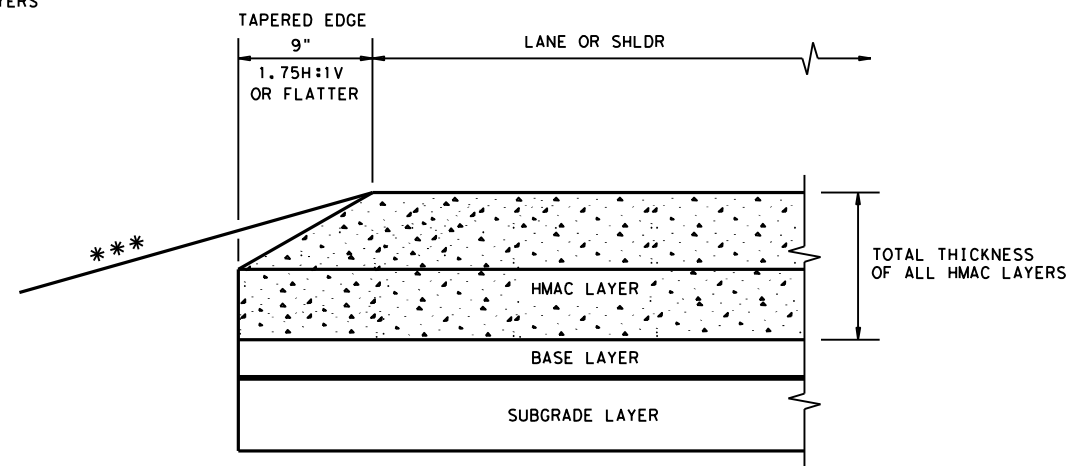
\*\*\* SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



\*\*\* SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



\*\*\* SEE TYPICAL SECTION FOR ROADSIDE DETAILS

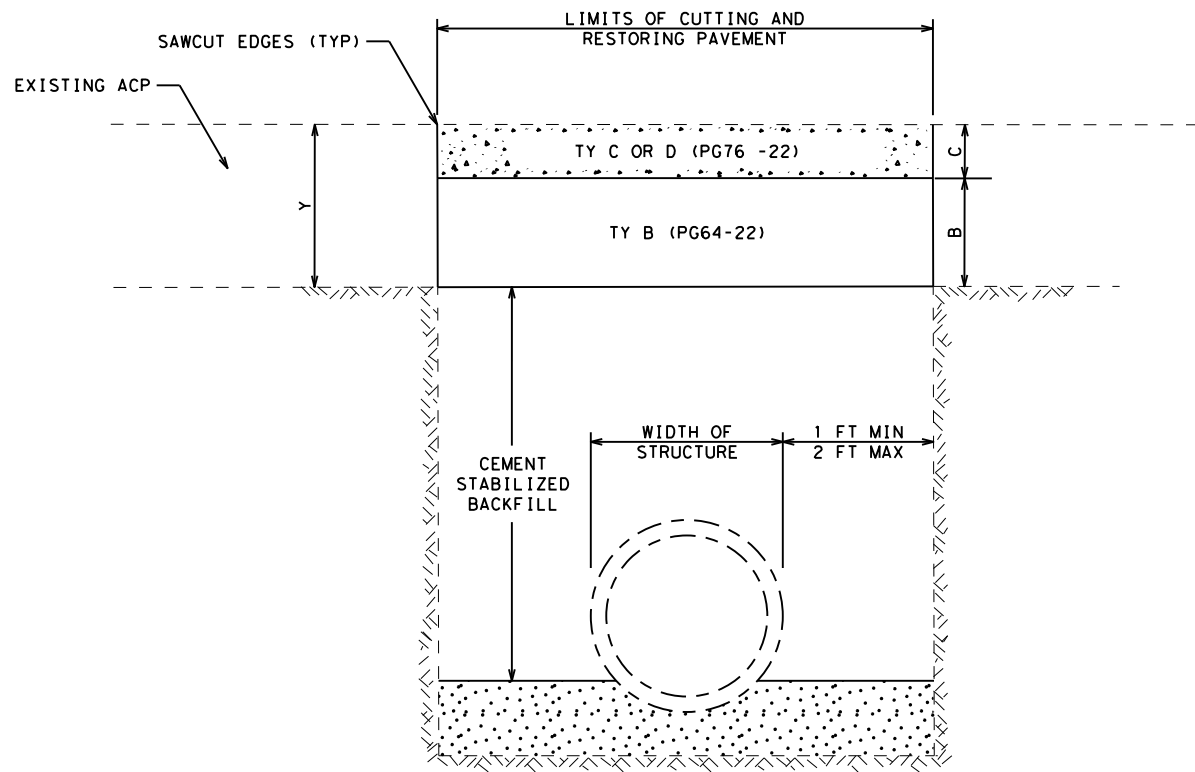
**CONDITION - 4**  
 NEW OR RECONSTRUCTED PAVEMENT  
 HMAC THICKNESS 5" OR GREATER

**GENERAL NOTES**

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

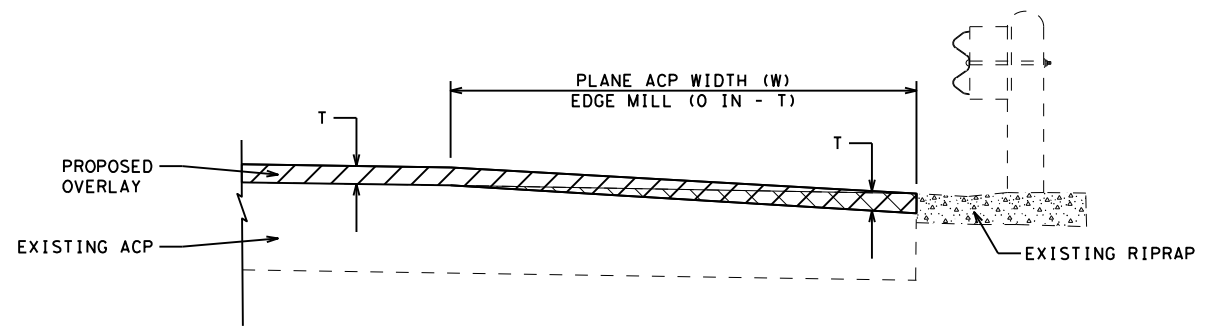
					Design Division Standard
<b>TAPERED EDGE DETAILS          HMAC PAVEMENT</b>					
<b>TE (HMAC) - 11</b>					
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:	
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY	
REVISIONS		1186	02	025	FM 969
DIST	COUNTY			SHEET NO.	
AUS	BASTROP			71	



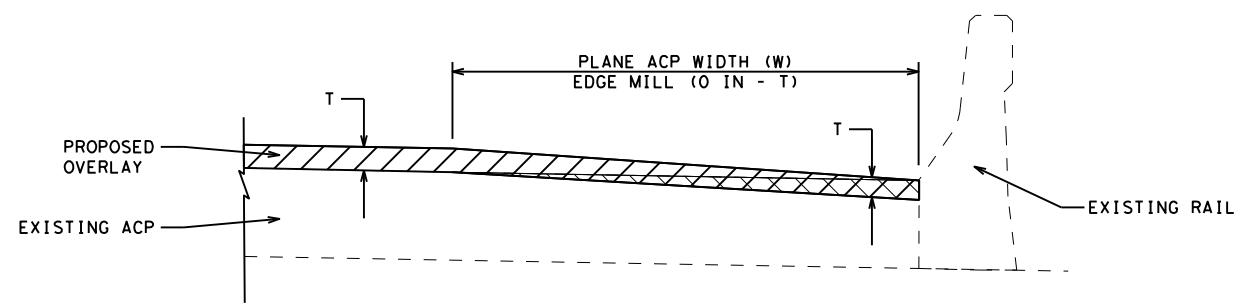
**CUTTING AND RESTORING PAVEMENT DETAIL**

**CUT AND RESTORE NOTES**

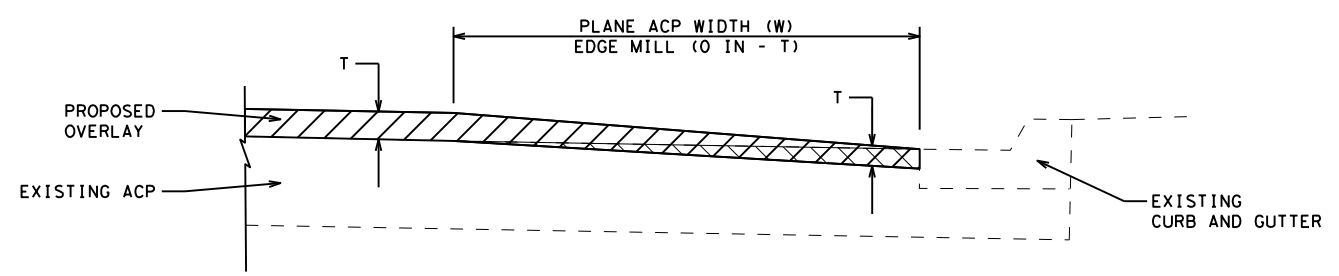
- Y = DEPTH OF EXISTING ACP (IN)
- Y = C + B
- C = MIN 2 IN AND MAX 4 IN THICKNESS
- CUTTING AND RESTORING PAVEMENT PER ITEM 400
- HMA MAY BE BLADE LAID
- ALL ACP PER ITEM 3076
- THE FOLLOWING WORK IS SUBSIDIARY:
- CEMENT STABILIZED BASE
- SAWCUT EDGES
- TACK ALL ACP SURFACES IN CUT AND RESTORE



**MOWSTRIP OR RIPRAP EDGE MILL DETAIL**



**RAIL EDGE MILL DETAIL**

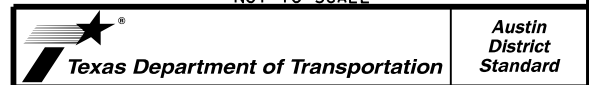


**CURB EDGE MILL DETAIL**

**EDGE REPAIR NOTES**

- T = OVERLAY/INLAY THICKNESS (IN)
- W = FULL LANE WIDTH OR MINIMUM 10 FT

NOT TO SCALE



**FLEXIBLE PAVEMENT DETAILS**

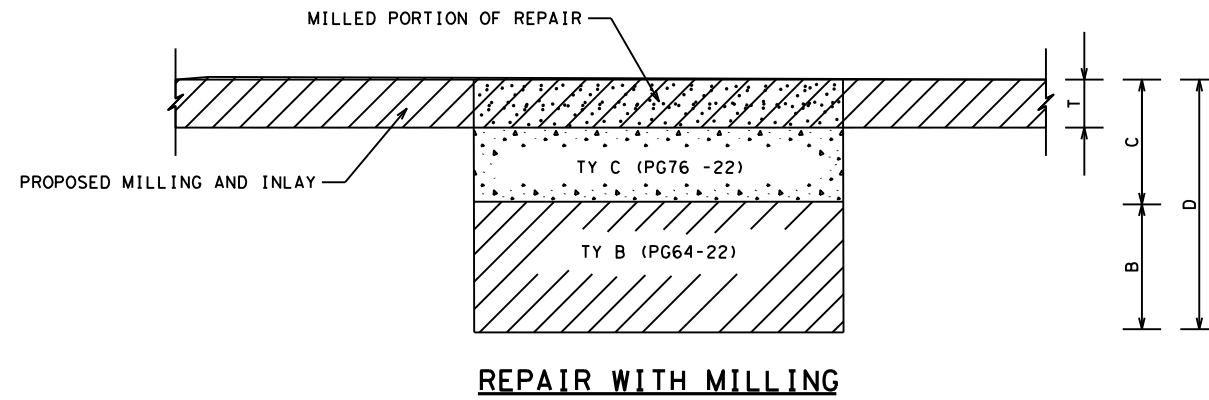
**FLEXPAVE (2) -22 (AUS)**

©TxDOT 2022	CONT	SECT	JOB	HIGHWAY
	1186	02	025	FM 969
	DIST	COUNTY		SHEET NO.
	AUS	BASTROP		71A

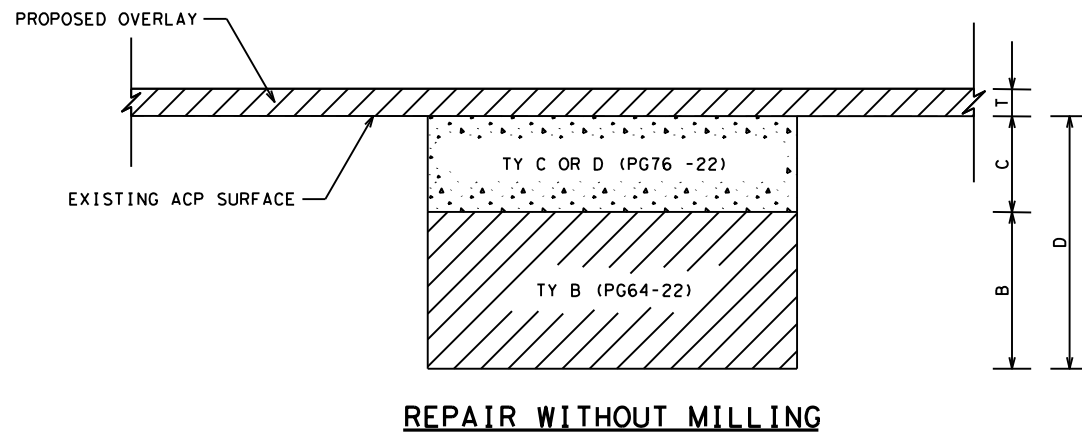
DATE: 6/3/2022 12:20:49 PM FILE: c:\pw\knl\d0168457\220201\_FLEXPAVE-22 (AUS).dgn



REPAIR DEPTH W/ MILLING	T = 1 IN		T = 1.5 IN		T = 2 IN	
	TY C	TY B	TY C	TY B	TY C	TY B
<= 4	4	0	4	0	4	0
5	5	0	5	0	5	0
6	6	0	6	0	6	0
7	3	4	4	3	4	3
8	4	4	4	4	4	4
>= 9	4	D-4	4	D-4	4	D-4

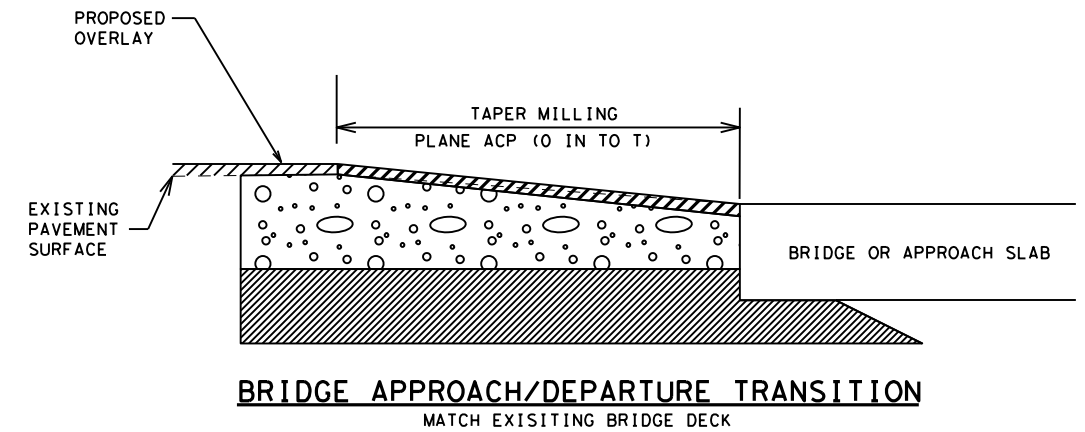
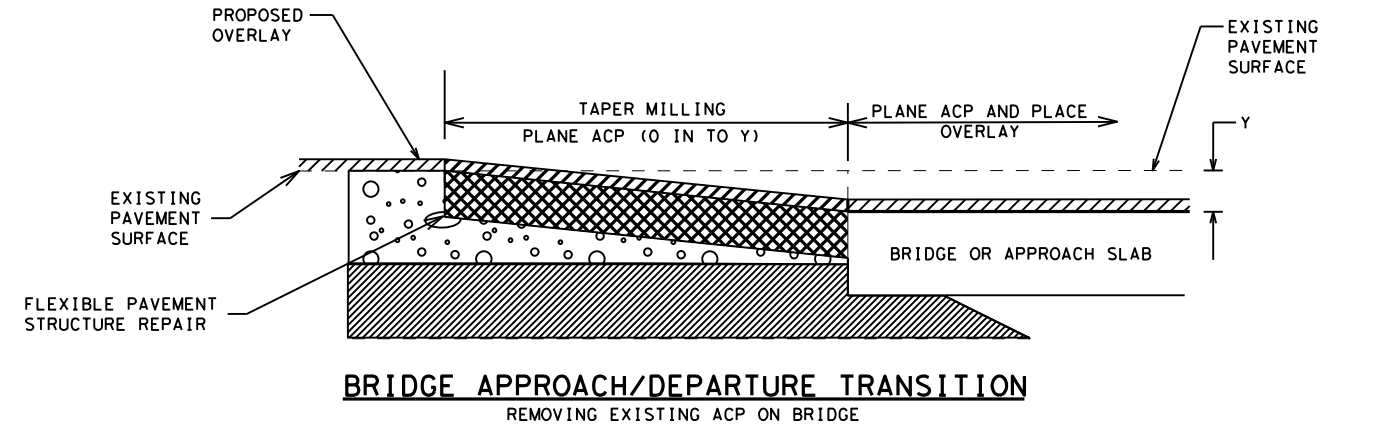
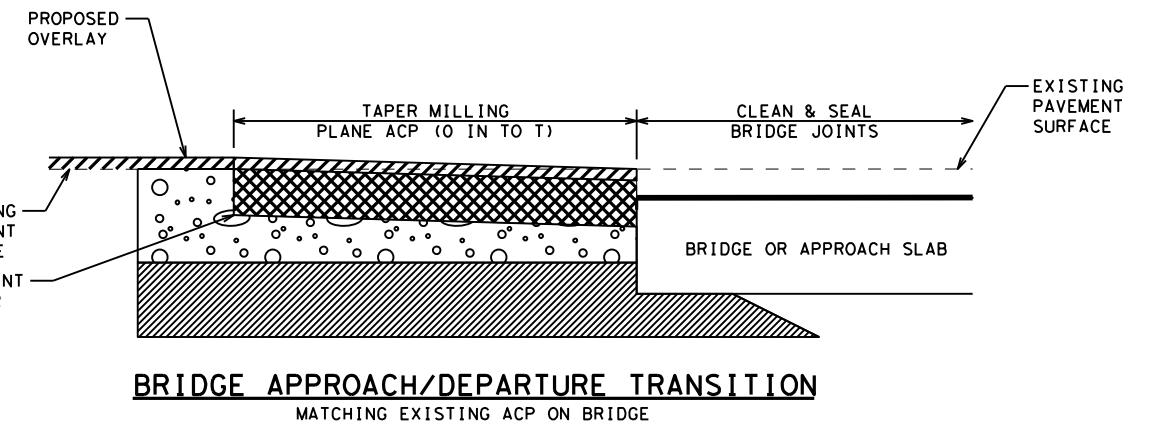


REPAIR DEPTH W/O MILLING	TY D	TY C	TY B
2	2	0	0
3	0	3	0
4	0	4	0
5	0	5	0
6	0	6	0
7	2	0	5
8	2	0	6
>= 9	2	0	D-4



**FLEX PAV REPAIR NOTES**

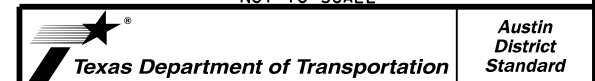
- T = OVERLAY/INLAY THICKNESS (IN)
- D = REPAIR DEPTH
- C = TY C/D ACP DEPTH
- B = TY B ACP DEPTH
- TY B MAY BE BLADE LAID.
- TY C/D MUST BE PAVER LAID.
- TY C/D MAX LIFT THICKNESS 3 IN
- TY B MAX LIFT THICKNESS 5 IN
- ALL ACP PER ITEM 3076.
- FOLLOWING WORK IS SUBSIDIARY:
  - SAW CUT ALL EDGES
  - TACK ALL ACP SURFACES AND LAYERS



**BRIDGE APPROACH MILLING NOTES**

- T = OVERLAY/INLAY THICKNESS (IN)
- Y = DEPTH OF MILLING ON BRIDGE
- TAPER LENGTH = 50 FT PER 1 IN OF T OR Y

NOT TO SCALE

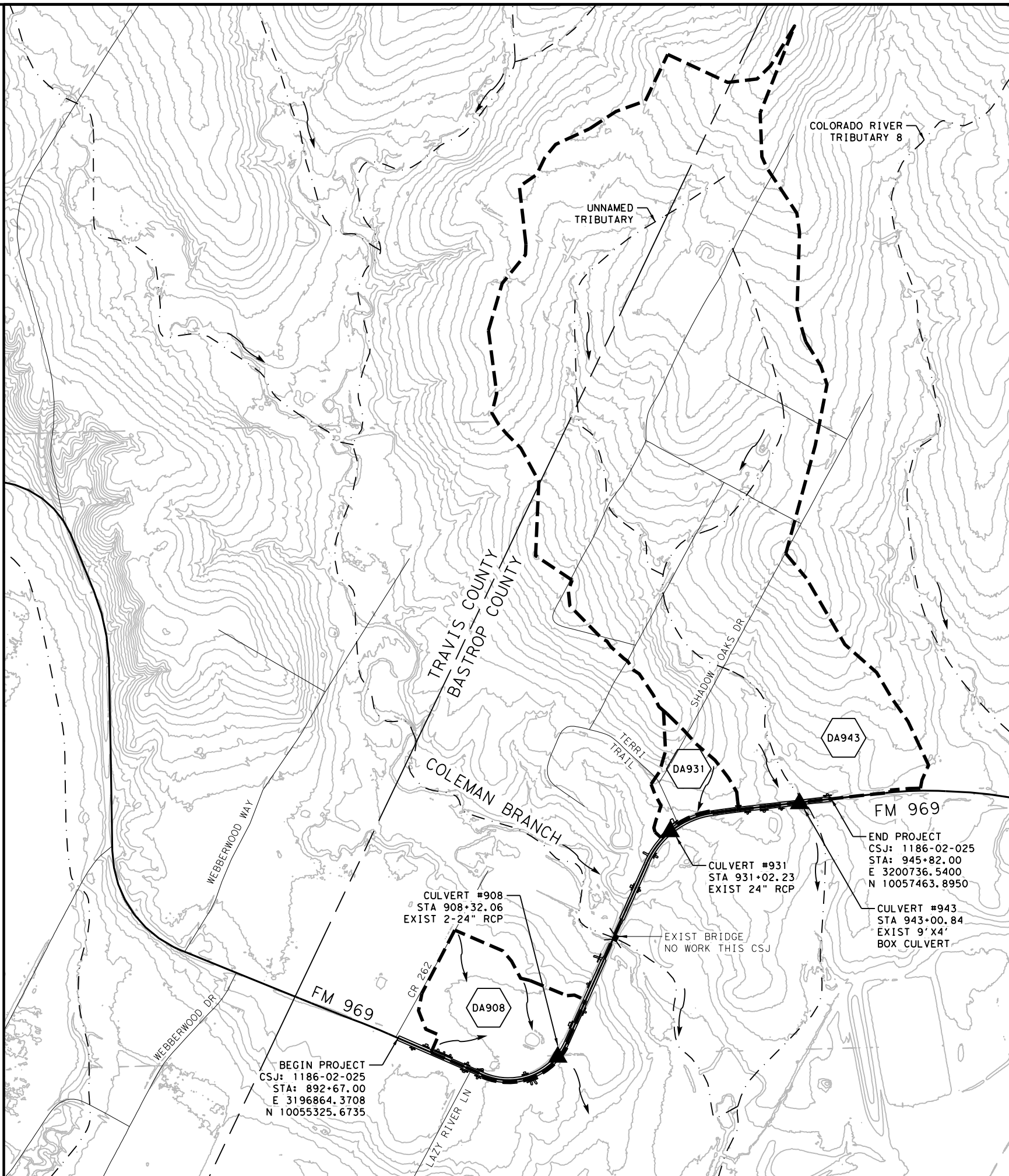


**FLEXIBLE PAVEMENT  
DETAILS**

**FLEXPAVE (3) -22 (AUS)**

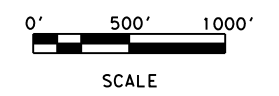
©TxDOT 2022	CONT	SECT	JOB	HIGHWAY
	1186	02	025	FM 969
	DIST	COUNTY	SHEET NO.	
	AUS	BASTROP	71B	

FILENAME: c:\pwwork1\00152782\FM969\_DRG\_DAM\_01.dgn  
 PLOTTED: 5/16/2022 10:02:01 AM



- LEGEND**
- FLOW ARROW
  - STREAM CENTERLINE
  - DRAINAGE AREA ID
  - DRAINAGE AREA BOUNDARY
  - EXISTING CONTOURS
  - CROSS CULVERT CROSSING

- NOTES:**
1. ELEVATION DATA USED WAS TWDB/TNRIS SOUTH CENTRAL TEXAS LIDAR 2017 50 CM ACQUIRED FROM TEXAS NATURAL RESOURCES INFORMATION SYSTEM CHECKED AGAINST USGS 10 M DEM.
  2. PLANS WERE SENT TO THE LOCAL FLOODPLAIN ADMINISTRATOR, JENNIFER BILLS, ON 03/22/2022.



5/16/2022



**Kimley»Horn** F-928

© 2022

Texas Department of Transportation

FM 969

**DRAINAGE AREA MAP**

SCALE: 1000' SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	
TEXAS	AUSTIN	BASTROP	
CONT.	SECT.	JOB	
1186	02	025	
			SHEET NO.
			72

**RUNOFF CALCULATIONS**

DRAINAGE AREA ID	STATION	CULVERT DESCRIPTION	DRAINAGE AREA (ACRES)	T <sub>c</sub> (MINUTES)	LAND USE DESCRIPTION	SOIL GROUP %	CLIMATIC CN ADJUSTMENT	RUNOFF COEFFICIENT (C) / ADJUSTED CURVE NUMBER (CN)	MINIMUM DESIGN STORM EVENT	2 YR (CFS)	5 YR (CFS)	10 YR (CFS)	25 YR (CFS)	50 YR (CFS)	100 YR (CFS)	500 YR (CFS)	METHOD
DA908	908+32.06	2-24" RCP	28.8	50.9	38% Pasture/Cultivated 31% Wood Cover 29% Grass Areas 2% Impervious			0.34	10 YR	22.48	28.09	32.86	39.63	44.92	50.47	65.15	RATIONAL
DA931	931+02.23	24" RCP	10.2	19.8	38% Pasture/Cultivated 35% Wood Cover 18% Grass Areas 9% Impervious			0.38	10 YR	15.03	18.69	21.88	26.37	29.85	33.59	42.62	RATIONAL
DA943	943+00.84	9'x4' BC	337.1	45.5	55% Pasture - Good 36% Wood Cover - Good 9% Impervious	94% D 5% C 1% A	15	65	5 YR	163.5	297	430.5	634	808.3	996.6	1511.7	UNIT HYDROGRAPH

**NOTES:**

- ATLAS 14 USED FOR ALL RAINFALL INTENSITIES.
- C- AND CN-VALUES ACQUIRED FROM TABLES 4-10 AND 4-18 TXDOT HYDRAULIC DESIGN MANUAL FOR URBAN WATERSHEDS.
- HEC-HMS VERSION 4.9 WAS USED FOR THE HYDROLOGIC ANALYSIS ON DA943.

**TIME OF CONCENTRATION - NRCS METHODOLOGY**

TIME OF CONCENTRATION & LAG TIME NRCS Methodology																								
SHEET FLOW						SHALLOW CONCENTRATED FLOW								OPEN CHANNEL FLOW								TOTAL	LAG TIME	
T <sub>c</sub> = (0.007(nL) <sup>0.8</sup> ) / (P <sup>0.5</sup> ) (s <sup>0.4</sup> ) 2-year/24-hr Rainfall Depth = 4.14 Bastrop County, Texas TxDOT HDM, Chapter 4 Section 11, Equation 4-17						T <sub>c</sub> = L / (3600 * K * S <sup>0.5</sup> ) K = 16.13 if unpaved K = 20.32 if paved TxDOT HDM, Chapter 4 Section 11, Equation 4-18								T <sub>c</sub> = L / (3600 * (1.49/n) * R <sup>2/3</sup> * S <sup>1/2</sup> ) TxDOT HDM, Chapter 4 Section 11, Equation 4-19										
Basin	Length (ft)	Elev <sub>1</sub> (ft)	Elev <sub>2</sub> (ft)	Slope (ft/ft)	Manning's "n"	T <sub>c1</sub> (hr)	T <sub>c1</sub> (minutes)	Length (ft)	Elev <sub>1</sub> (ft)	Elev <sub>2</sub> (ft)	Slope (ft/ft)	Condition Paved or Unpaved	V <sub>avg</sub> (ft/s)	T <sub>c2</sub> (minutes)	Length (ft)	Elev <sub>1</sub> (ft)	Elev <sub>2</sub> (ft)	Slope (ft/ft)	Manning's "n"	Hydraulic Radius, R From FlowMasters	T <sub>c3</sub> (hr)	T <sub>c3</sub> (minutes)	T <sub>cTOTAL</sub> (minutes)	T <sub>lag</sub> (minutes)
DA-908	100	434.00	433.00	0.0100	0.40	0.42	24.9	1457	433.00	423.00	0.0069	Unpaved	1.34	18.2	93	423.00	423.0	0.0001	0.035	0.30	0.13	7.8	50.9	
DA-931	100	466.00	460.50	0.0550	0.40	0.21	12.6	735	460.50	436.00	0.0333	Unpaved	2.95	4.2	638	436.00	430.3	0.0089	0.035	0.80	0.05	3.1	19.8	
DA-943	100	559.00	557.00	0.0200	0.40	0.31	18.9	1711	557.00	501.00	0.0327	Unpaved	2.92	9.8	6804	501.00	424.0	0.0113	0.070	1.09	0.79	47.2	75.9	45.5

**PRECIPITATION FREQUENCY**

FREQUENCY	* ATLAS 14 RAINFALL (inches)
2	4.14
5	5.47
10	6.75
25	8.70
50	10.40
100	12.30
500	18.10

\* 24-HOUR DURATION

5/11/2022



**Kimley»Horn** F-928





FM 969

**HYDROLOGICAL  
DATA SHEET**

SHEET 1 OF 1

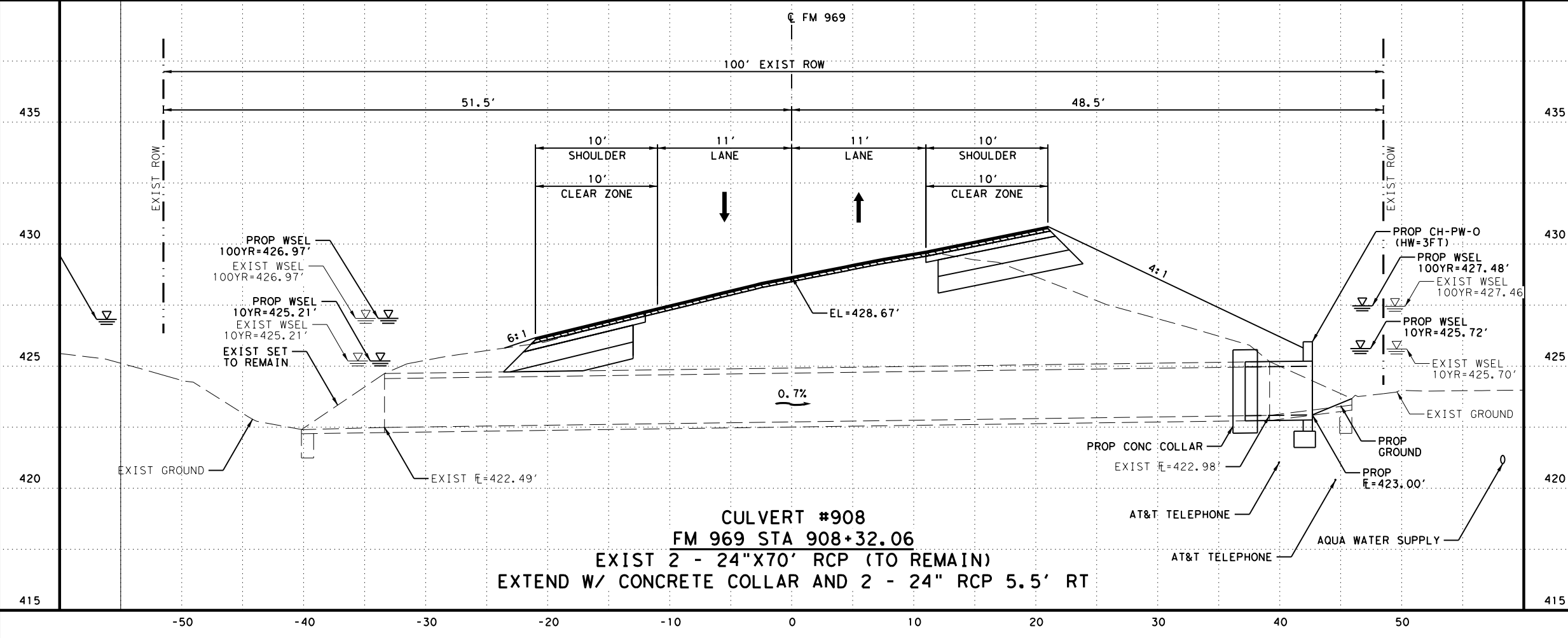
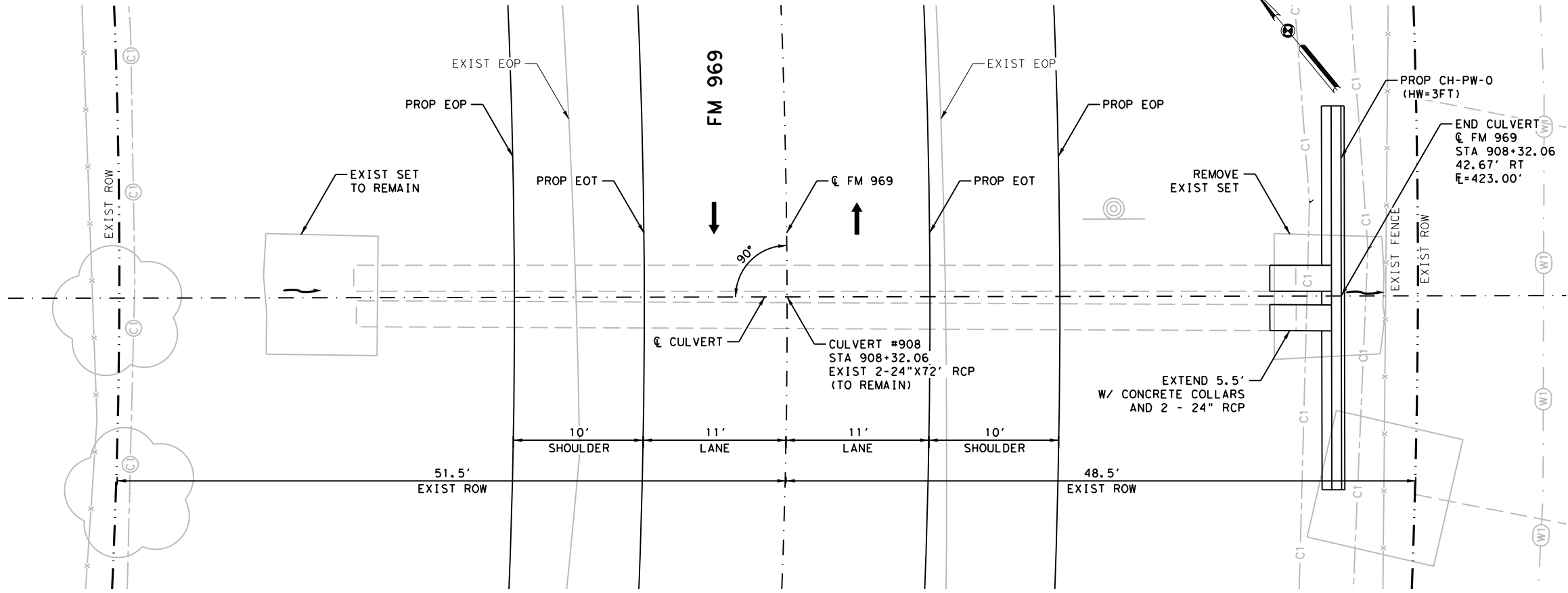
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
		SHEET NO. 73

**LEGEND**

-  FLOW DIRECTION
-  TRAFFIC DIRECTION

**NOTES:**

1. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
2. CONTRACTOR WILL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS.
3. ALL STATION AND OFFSETS ARE BASED ON FM 969 C UNLESS OTHERWISE NOTED.
4. THE EXISTING CULVERT STRUCTURE WILL COME NEAR OR PROTRUDE INTO THE ROADWAY PAVEMENT STRUCTURE. CONTRACTOR TO ADJUST THE ROADWAY PAVEMENT STRUCTURE TO ACCOMODATE THE EXISTING CULVERT.



**CULVERT #908**  
**FM 969 STA 908+32.06**  
**EXIST 2 - 24"X70' RCP (TO REMAIN)**  
**EXTEND W/ CONCRETE COLLAR AND 2 - 24" RCP 5.5' RT**

  
 5/11/2022  


**Kimley»Horn** F-928


 Texas Department of Transportation

**FM 969**  
**CULVERT LAYOUT**  
**CULVERT #908**  
 STA 908+32.06



SCALE: 10' SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
74		

FILENAME: c:\pwworking\152782\FM969\_DRG\_CULV\_01.dgn  
 PLOTTED: 5/11/2022 4:34:55 PM

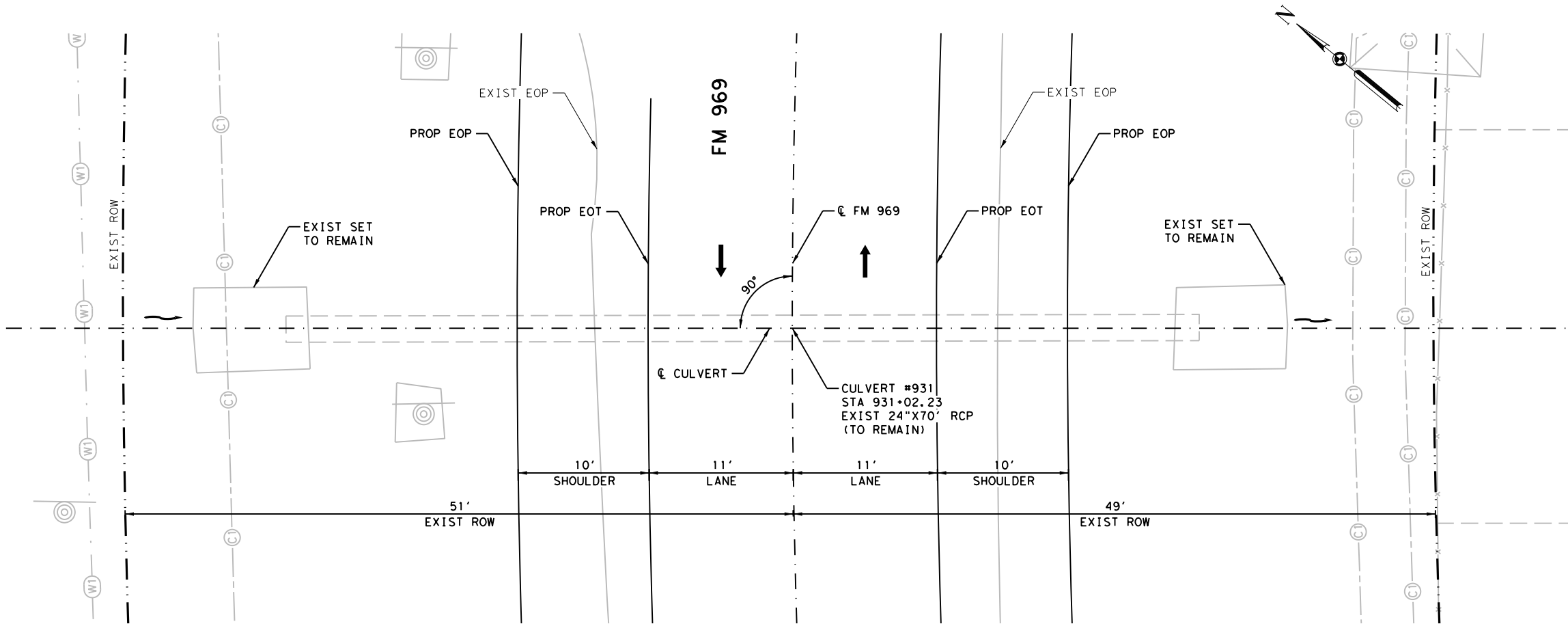


**LEGEND**

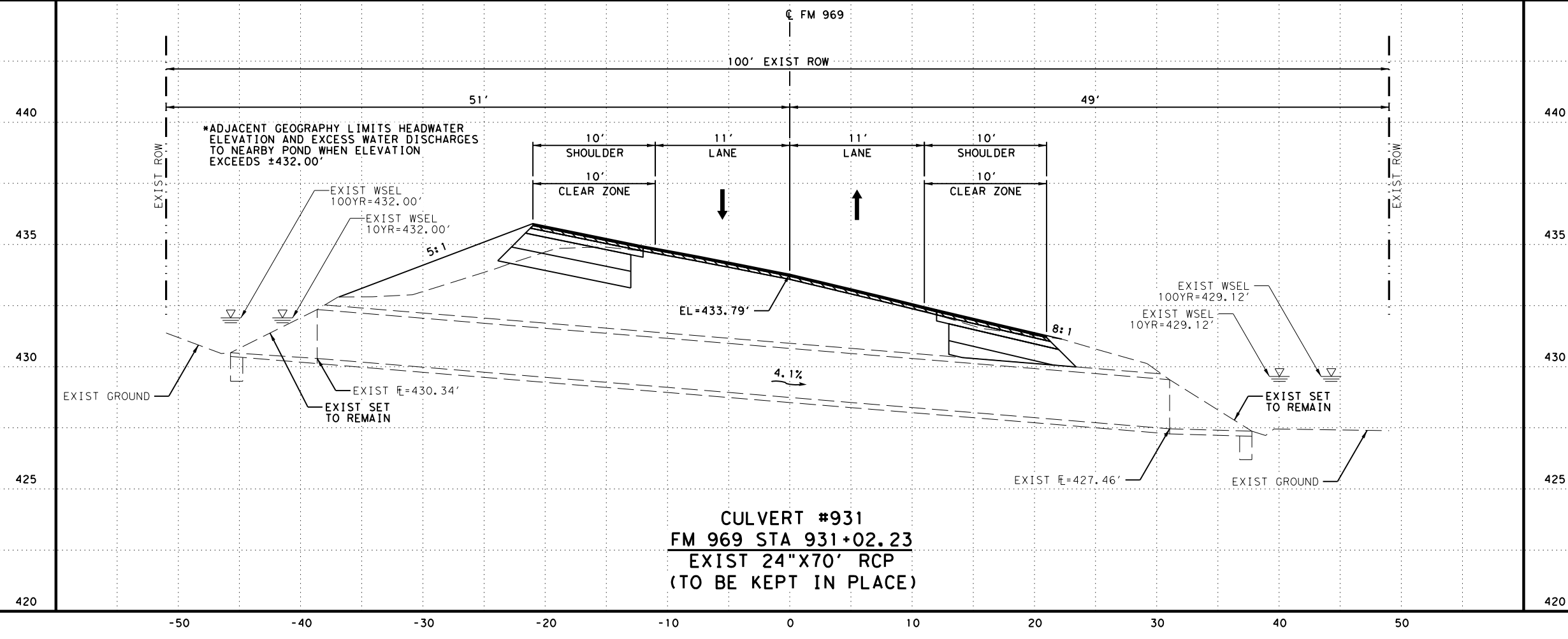
-  FLOW DIRECTION
-  TRAFFIC DIRECTION

**NOTES:**

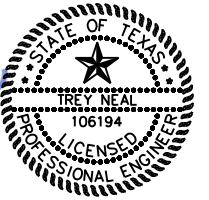
1. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
2. CONTRACTOR WILL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS.
3. ALL STATION AND OFFSETS ARE BASED ON FM 969 C UNLESS OTHERWISE NOTED.
4. THE EXISTING CULVERT STRUCTURE WILL COME NEAR OR PROTRUDE INTO THE ROADWAY PAVEMENT STRUCTURE. CONTRACTOR TO ADJUST THE ROADWAY PAVEMENT STRUCTURE TO ACCOMMODATE THE EXISTING CULVERT.



FILENAME: c:\pwworking\1\00152782\FM969\_DRG\_CULV\_02.dgn  
 PLOTTED: 5/11/2022 4:35:07 PM



**CULVERT #931**  
**FM 969 STA 931+02.23**  
**EXIST 24"X70' RCP**  
**(TO BE KEPT IN PLACE)**

  
 5/11/2022





**FM 969**



**CULVERT LAYOUT**  
**CULVERT #931**

STA 931+02.23

SCALE: 10'		SHEET 2 OF 3	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	75
CONT.	SECT.	JOB	
1186	02	025	

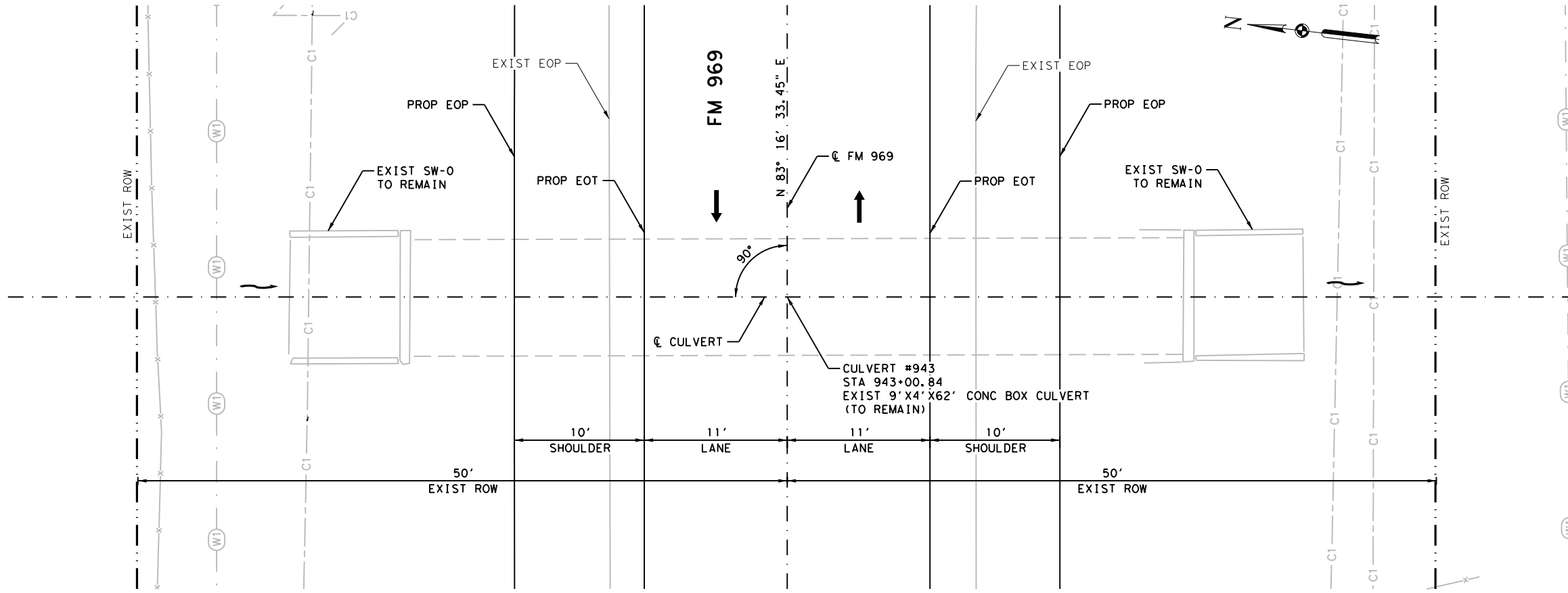
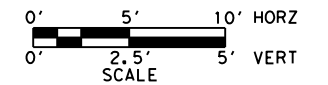


**LEGEND**

-  FLOW DIRECTION
-  TRAFFIC DIRECTION

**NOTES:**

1. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
2. CONTRACTOR WILL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS.
3. ALL STATION AND OFFSETS ARE BASED ON FM 969 C UNLESS OTHERWISE NOTED.
4. THE EXISTING CULVERT STRUCTURE WILL COME NEAR OR PROTRUDE INTO THE ROADWAY PAVEMENT STRUCTURE. CONTRACTOR TO ADJUST THE ROADWAY PAVEMENT STRUCTURE TO ACCOMODATE THE EXISTING CULVERT.



FM 969

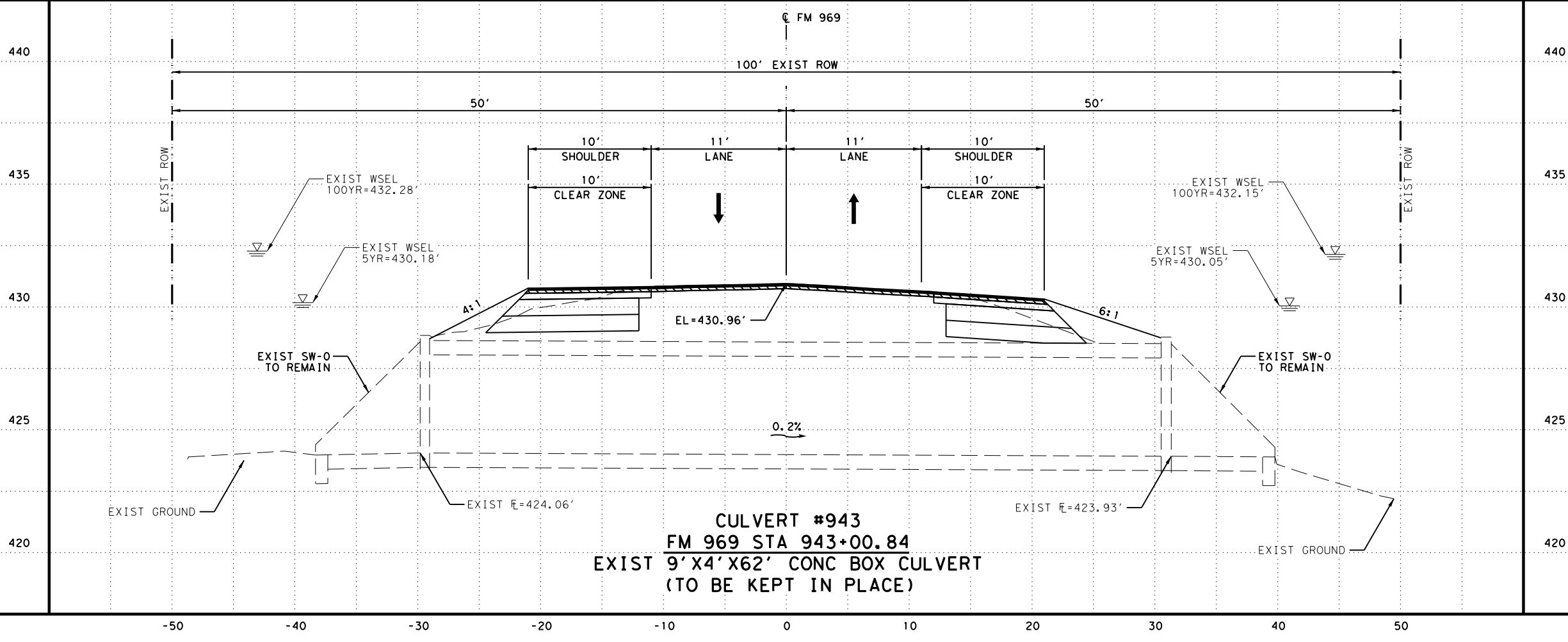
N 83° 16' 33.45" E

CULVERT #943  
STA 943+00.84  
EXIST 9' X 4' X 62' CONC BOX CULVERT  
(TO REMAIN)

10' SHOULDER 11' LANE 11' LANE 10' SHOULDER

50' EXIST ROW

50' EXIST ROW



**CULVERT #943**  
**FM 969 STA 943+00.84**  
**EXIST 9' X 4' X 62' CONC BOX CULVERT**  
**(TO BE KEPT IN PLACE)**

5/11/2022



**Kimley»Horn** F-928

© 2022  
**Texas Department of Transportation**

FM 969

**CULVERT LAYOUT**  
**CULVERT #943**

STA 943+00.84

SCALE: 10' SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
		SHEET NO.
		76

FILENAME: c:\pwworking\1\2022\152782\FM969\_DRG\_CULV\_03.dgn  
PLOTTED: 5/11/2022 4:35:20 PM

**CULVERT #908 - EXISTING**

Roadway Data	
Roadway Profile Shape	Irregular
Roadway Surface	Paved
Top Width (Ft)	28.5

Tailwater Data	
Channel Type	Trapezoidal
Channel Slope (Ft/Ft)	0.0095
Manning's "n" (Channel)	0.035
Channel Invert Elevation (Ft)	422.98

Site Data	
Site Data Input Option	Culvert Invert
Inlet Station (Ft)	0
Inlet Elevation (Ft)	422.49
Outlet Station (Ft)	72
Outlet Elevation (Ft)	422.98
Number of Barrels	2

Culvert Data	
Name	EXIST STA 908+32.06
Shape	Circular
Material	Concrete
Diameter	24"
Embedment Depth (in)	0
Manning's "n"	0.015
Culvert Type	Straight
Inlet Configuration	Mitered
Inlet Depression	No

CULVERT SUMMARY TABLE: EXISTING					
Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
424.83	2 year	22.48	22.48	0.00	1
425.02	5 year	28.09	28.09	0.00	1
425.21	*10 year	32.86	32.86	0.00	1
425.71	25 year	39.63	39.63	0.00	1
426.29	50 year	44.92	44.92	0.00	1
426.97	100 year	50.47	50.47	0.00	1

SUMMARY OF FLOWS AT CROSSING: EXISTING									
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	22.48	22.48	424.83	1.84	2.34	1.20	0.15	5.70	1.13
5 year	28.09	28.09	425.02	2.21	2.53	1.35	0.17	6.23	1.23
10 year	32.86	32.86	425.21	2.59	2.72	1.46	0.19	6.68	1.30
25 year	39.63	39.63	425.71	3.22	3.05	1.60	0.21	7.36	1.39
50 year	44.92	44.92	426.29	3.80	3.35	1.69	0.23	7.93	1.46
100 year	50.47	50.47	426.97	4.48	3.70	1.77	0.24	8.59	1.52

\* MINIMUM DESIGN STORM EVENT

**NOTES:**

1. HY-8 VERSION 7.7 USED FOR CULVERT HYDRAULIC CALCULATIONS.

**CULVERT #908 - PROPOSED**

Roadway Data	
Roadway Profile Shape	Irregular
Roadway Surface	Paved
Top Width (Ft)	42

Tailwater Data	
Channel Type	Trapezoidal
Channel Slope (Ft/Ft)	0.0095
Manning's "n" (Channel)	0.035
Channel Invert Elevation (Ft)	423.00

Site Data	
Site Data Input Option	Culvert Invert
Inlet Station (Ft)	0
Inlet Elevation (Ft)	422.49
Outlet Station (Ft)	74
Outlet Elevation (Ft)	423.00
Number of Barrels	2

Culvert Data	
Name	PROP STA 908+32.06
Shape	Circular
Material	Concrete
Diameter	24"
Embedment Depth (in)	0
Manning's "n"	0.015
Culvert Type	Straight
Inlet Configuration	Mitered
Inlet Depression	No

5/11/2022



CULVERT SUMMARY TABLE: PROPOSED					
Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
424.83	2 year	22.48	22.48	0.00	1
425.02	5 year	28.09	28.09	0.00	1
425.21	*10 year	32.86	32.86	0.00	1
425.71	25 year	39.63	39.63	0.00	1
426.29	50 year	44.92	44.92	0.00	1
426.97	100 year	50.47	50.47	0.00	1

SUMMARY OF FLOWS AT CROSSING: PROPOSED									
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	22.48	22.48	424.83	1.84	2.34	1.20	0.15	5.70	1.13
5 year	28.09	28.09	425.02	2.21	2.53	1.35	0.17	6.23	1.23
10 year	32.86	32.86	425.21	2.59	2.72	1.46	0.19	6.68	1.30
25 year	39.63	39.63	425.71	3.22	3.05	1.60	0.21	7.36	1.39
50 year	44.92	44.92	426.29	3.80	3.35	1.69	0.23	7.93	1.46
100 year	50.47	50.47	426.97	4.48	3.70	1.77	0.24	8.59	1.52

\* MINIMUM DESIGN STORM EVENT

F-928

© 2022

**FM 969**

**HYDRAULIC CALCULATIONS  
 CULVERT #908**

STA 908+32.06

SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 77

FILENAME: c:\pwworking\1\00152782\FM969\_DRG\_HH\_DATA\_01.dgn  
 PLOTTED: 5/11/2022 4:35:33 PM

**CULVERT #931 - EXISTING**

Roadway Data	
Roadway Profile Shape	Irregular
Roadway Surface	Paved
Top Width (Ft)	30.75

Tailwater Data	
Channel Type	Trapezoidal
Channel Slope (Ft/Ft)	0.007
Manning's "n" (Channel)	0.035
Channel Invert Elevation (Ft)	427.46

Site Data	
Site Data Input Option	Culvert Invert
Inlet Station (Ft)	0
Inlet Elevation (Ft)	430.34
Outlet Station (Ft)	70
Outlet Elevation (Ft)	427.46
Number of Barrels	1

Culvert Data	
Name	EXIST STA 931+02.23
Shape	Circular
Material	Concrete
Diameter	24"
Embedment Depth (in)	0
Manning's "n"	0.015
Culvert Type	Straight
Inlet Configuration	Mitered
Inlet Depression	No

CULVERT SUMMARY TABLE: EXISTING					
Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
432.00	2 year	9.00	9.00	0.00	1
432.00	5 year	9.00	9.00	0.00	1
432.00	*10 year	9.00	9.00	0.00	1
432.00	25 year	9.00	9.00	0.00	1
432.00	50 year	9.00	9.00	0.00	1
432.00	100 year	9.00	9.00	0.00	1

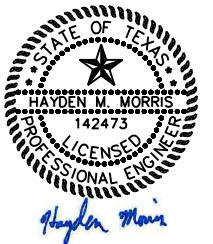
\* MINIMUM DESIGN STORM EVENT

SUMMARY OF FLOWS AT CROSSING: EXISTING									
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	9.00	9.00	432.00	1.66	-1.45	0.65	0.28	10.25	1.41
5 year	9.00	9.00	432.00	1.66	-1.45	0.65	0.28	10.25	1.41
10 year	9.00	9.00	432.00	1.66	-1.45	0.65	0.28	10.25	1.41
25 year	9.00	9.00	432.00	1.66	-1.45	0.65	0.28	10.25	1.41
50 year	9.00	9.00	432.00	1.66	-1.45	0.65	0.28	10.25	1.41
100 year	9.00	9.00	432.00	1.66	-1.45	0.65	0.28	10.25	1.41

**NOTES:**

1. HY-8 VERSION 7.7 USED FOR CULVERT HYDRAULIC CALCULATIONS.

5/11/2022



**Kimley»Horn** F-928



FM 969

HYDRAULIC CALCULATIONS  
CULVERT #931

STA 931+02.23

SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
		SHEET NO.
		78

**CULVERT #943 - EXISTING**

Roadway Data	
Roadway Profile Shape	Irregular
Roadway Surface	Paved
Top Width (Ft)	28.2

Tailwater Data	
Channel Type	Trapezoidal
Channel Slope (Ft/Ft)	0.0722
Manning's "n" (Channel)	0.07
Channel Invert Elevation (Ft)	423.93

Site Data	
Site Data Input Option	Culvert Invert
Inlet Station (Ft)	0
Inlet Elevation (Ft)	424.06
Outlet Station (Ft)	62
Outlet Elevation (Ft)	423.93
Number of Barrels	1

Culvert Data	
Name	EXIST STA 943+00.84
Shape	Concrete Box
Material	Concrete
Span X Rise (Ft)	9 X 4
Embedment Depth (in)	0
Manning's "n"	0.015
Culvert Type	Straight
Inlet Configuration	Square Edge(0° flare) Wingwall
Inlet Depression	No

CULVERT SUMMARY TABLE: EXISTING					
Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
427.95	2 year	163.50	163.50	0.00	1
430.18	*5 year	297.00	297.00	0.00	1
431.54	10 year	430.50	354.48	75.44	10
431.89	25 year	634.00	367.90	265.63	6
432.10	50 year	808.30	375.51	432.52	5
432.28	100 year	996.60	382.28	614.00	4

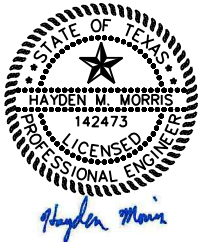
SUMMARY OF FLOWS AT CROSSING: EXISTING									
Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2 year	163.50	163.50	427.95	3.66	3.89	2.17	0.87	8.36	4.03
5 year	297.00	297.00	430.18	6.12	5.80	3.23	1.16	10.20	4.73
10 year	430.50	354.48	431.54	7.48	6.72	3.64	1.38	10.82	5.22
25 year	634.00	367.90	431.89	7.83	6.99	3.73	1.65	10.96	5.77
50 year	808.30	375.51	432.10	8.04	7.15	3.78	1.85	11.03	6.15
100 year	996.60	382.28	432.28	8.22	7.28	3.83	2.03	11.10	6.49

\* MINIMUM DESIGN STORM EVENT

**NOTES:**

1. HY-8 VERSION 7.7 USED FOR CULVERT HYDRAULIC CALCULATIONS.

5/11/2022



**Kimley»Horn** F-928



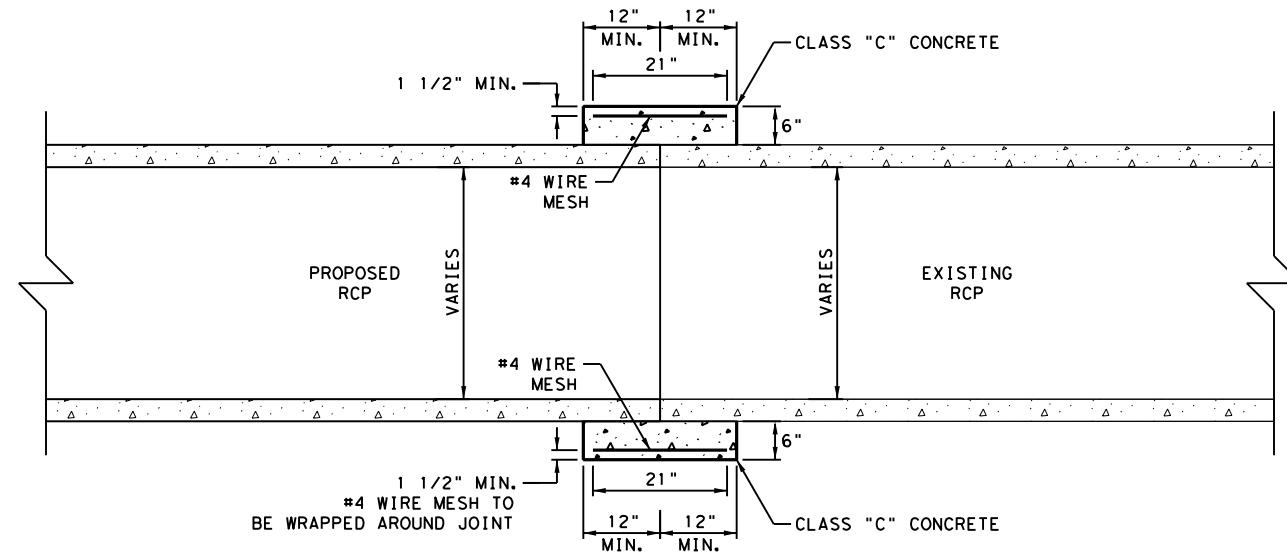
FM 969

HYDRAULIC CALCULATIONS  
CULVERT #943

STA 943+00.84

SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
		SHEET NO.
		79



**CONCRETE COLLAR DETAIL**

**NOTES:**

1. CONCRETE COLLAR MUST BE ATTACHED TO AN UNDAMAGED SECTION OF THE EXISTING RCP.
2. THE CONTRACTOR SHALL TAKE STEPS TO ENSURE A SMOOTH JOINT ALONG THE INSIDE WALL OF PIPE.
3. ANY SPILLAGE OF CONCRETE THROUGH THE JOINT SHALL BE REMOVED AND THE INSIDE PIPE SURFACES SMOOTHED AS DIRECTED BY THE ENGINEER.

TJN  
 5/18/2022  


**Kimley»Horn** F-928

© 2022  
  
 Texas Department of Transportation

FM 969

CONCRETE COLLAR  
 DETAILS

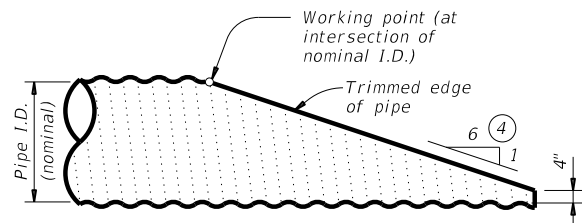
SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO.		
80		



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

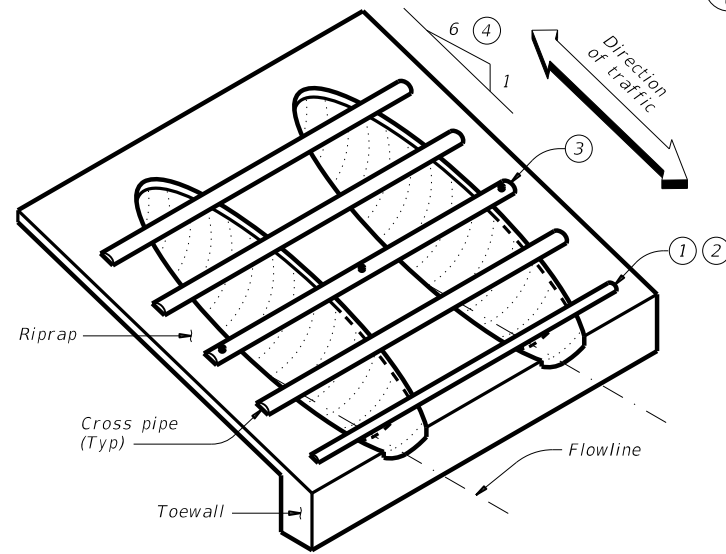
DATE: 5/11/2022 4:36:21 PM  
 FILE: c:\pwworking\dot168457\setppdse-20.dgn



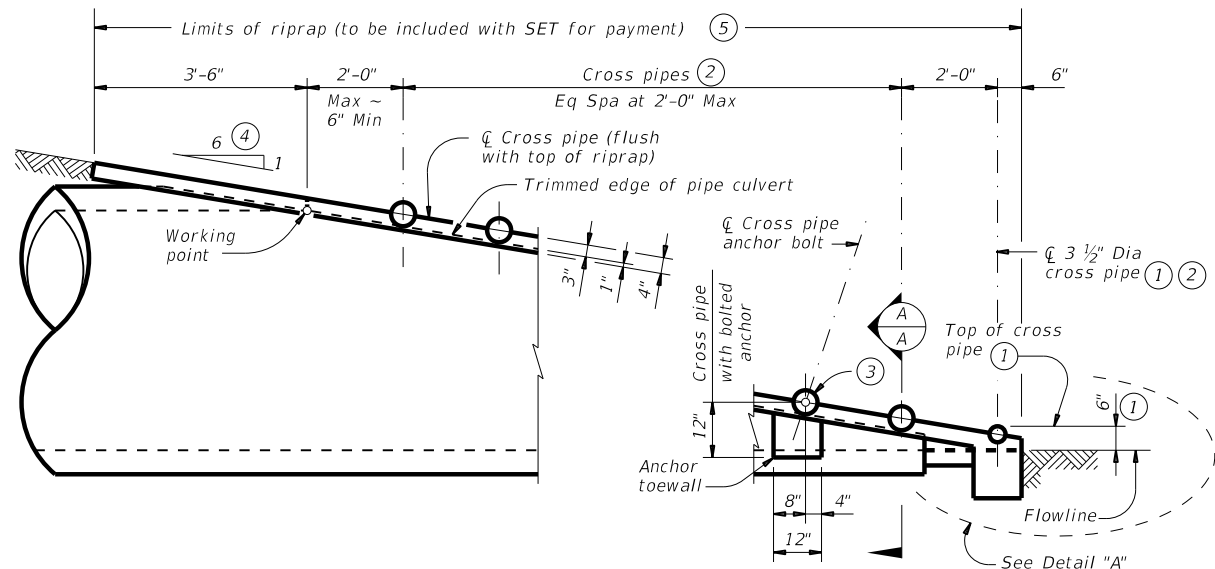
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

**SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER**

(Showing corrugated metal pipe (CMP) culvert. Details at reinforced concrete pipe (RCP) culvert are similar.)

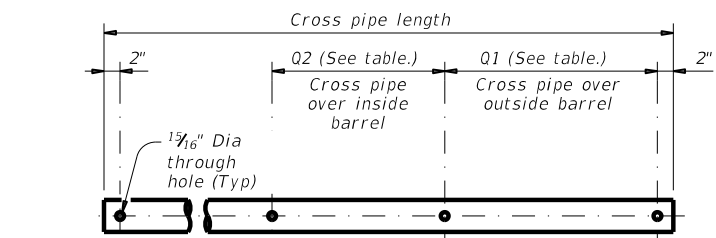


**ISOMETRIC VIEW OF TYPICAL INSTALLATION**

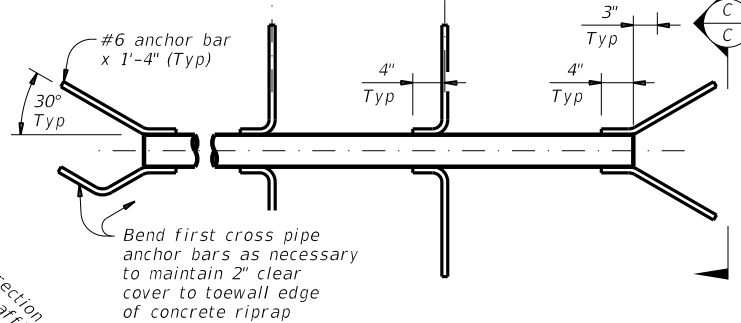


**SIDE ELEVATION OF CAST-IN-PLACE CONCRETE**

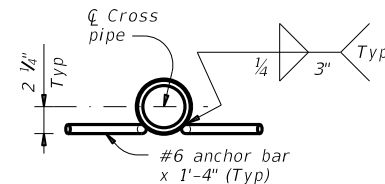
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



**PIPE WITH BOLTED ANCHOR**

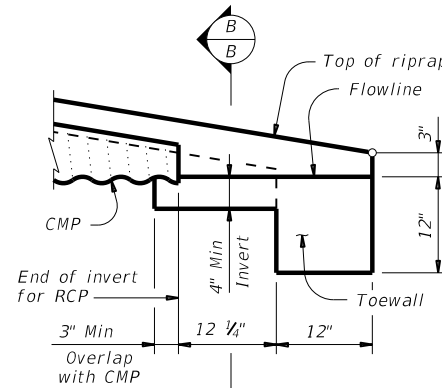


**PIPE WITH ANCHOR BARS**



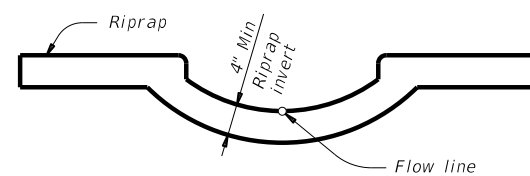
**SECTION C-C**

**CROSS PIPE DETAILS**



**DETAIL "A"**

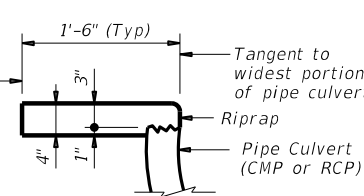
(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



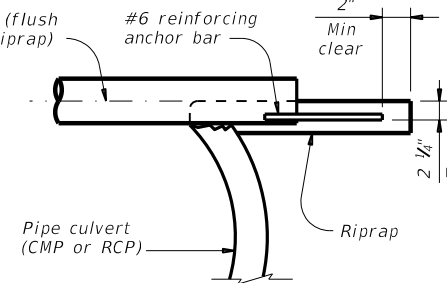
**SECTION B-B**

(Cross pipes not shown for clarity.)

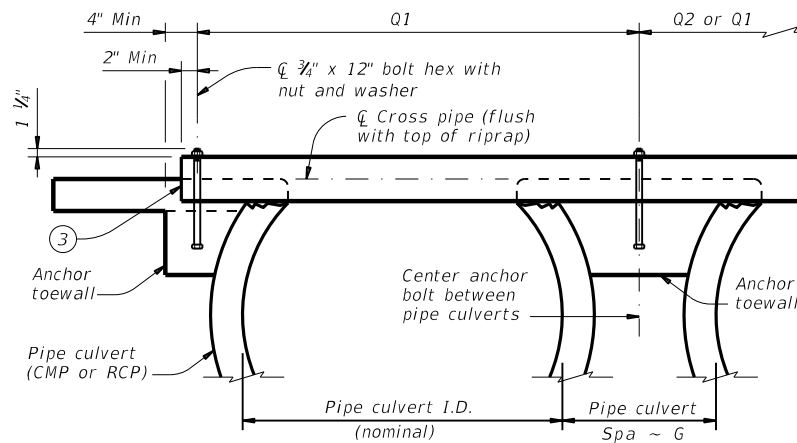
Limits of riprap (to be included with SET for payment) ⑤



**SHOWING TYPICAL PIPE CULVERT AND RIPRAP**



**SHOWING CROSS PIPE WITH ANCHOR BAR**



**SHOWING CROSS PIPE WITH BOLTED ANCHOR**

**SECTION A-A**

**CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES**

Nominal Culvert I.D.	Conc Riprap (CY) ⑥	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	2 or more pipe culverts	
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	All pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	4" Std (4.500" O.D.)
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"	All pipe culverts	5" Std (5.563" O.D.)
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"	All pipe culverts	
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"	All pipe culverts	
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"	All pipe culverts	
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"	All pipe culverts	

- The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.
- Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1/2" standard pipe (4" O.D.) for the first bottom pipe.
- Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.
- Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.
- Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".
- Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

**MATERIAL NOTES:**

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52. Provide ASTM A307 bolts and nuts. Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

**GENERAL NOTES:**

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981. Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes. Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap". Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

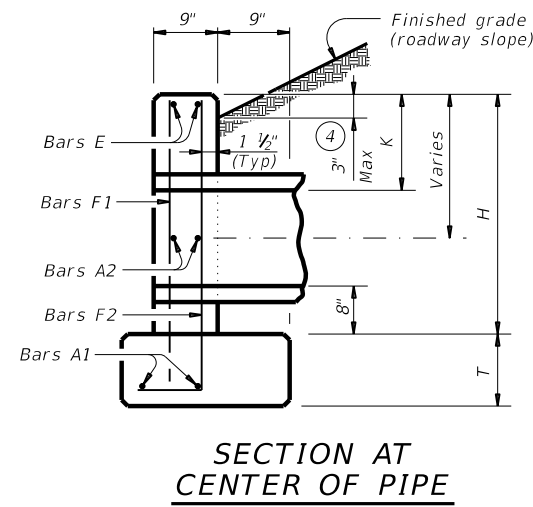
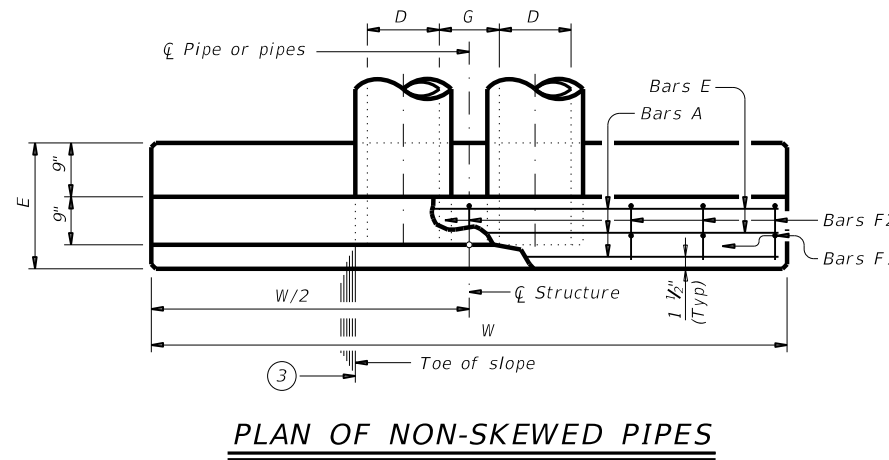
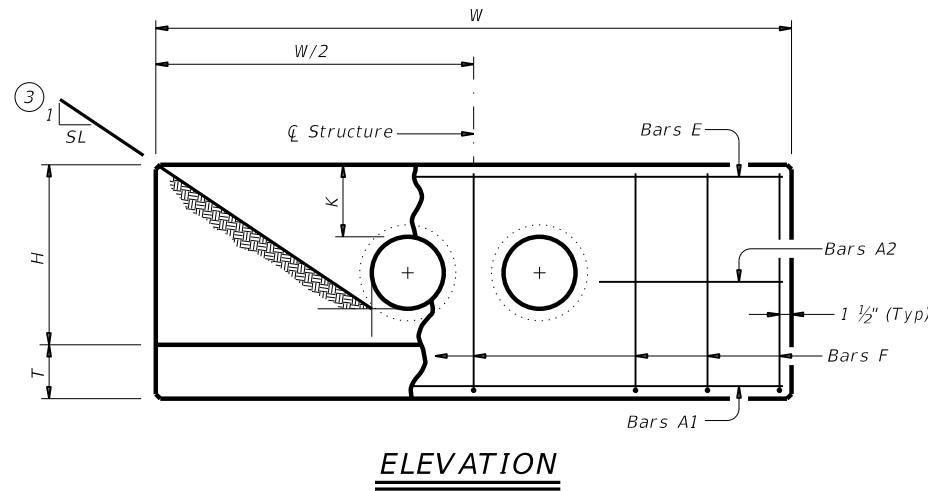
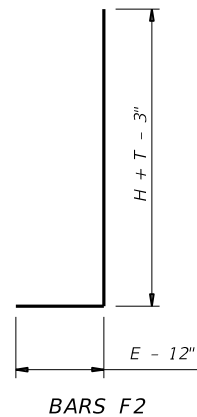
		<b>Bridge Division Standard</b>	
<b>SAFETY END TREATMENT</b> FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE			
<b>SETP-PD</b>			
FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP
©TxDOT February 2020	CONTRACT: 1186 02	SECTION: 025	HIGHWAY: FM 969
REVISIONS:	DIST: AUS	COUNTY: BASTROP	SHEET NO.: 81

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

DATE: 5/11/2022 4:36:39 PM  
 FILE: c:\pwworking\dot168457\chpw0ste-20.dgn

### TABLE OF VARIABLE DIMENSIONS (5) AND QUANTITIES FOR ONE HEADWALL

Slope	Dia of Pipe (D)	Values for One Pipe		Values To Be Added for Each Add'l Pipe			
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9'-0"	122	1.1	1'-9"	15	0.2
	15"	10'-3"	136	1.3	2'-2"	16	0.2
	18"	11'-6"	163	1.5	2'-8"	19	0.3
	21"	12'-9"	200	1.8	3'-1"	31	0.4
	24"	14'-0"	217	2.1	3'-7"	34	0.4
	27"	15'-3"	254	2.4	3'-11"	37	0.5
	30"	16'-6"	272	2.7	4'-4"	40	0.6
	33"	17'-9"	314	3.1	4'-8"	43	0.6
	36"	19'-0"	371	3.9	5'-1"	46	0.8
	42"	21'-6"	442	4.9	5'-10"	52	1.0
	48"	25'-0"	569	6.4	6'-7"	59	1.3
	54"	27'-6"	701	7.5	7'-6"	82	1.6
	60"	30'-0"	794	8.8	8'-3"	90	1.8
	66"	32'-6"	894	10.2	8'-9"	96	2.0
72"	35'-0"	1,055	11.7	9'-4"	103	2.3	
3:1	12"	13'-0"	175	1.6	1'-9"	14	0.2
	15"	14'-9"	193	1.9	2'-2"	17	0.2
	18"	16'-6"	228	2.2	2'-8"	19	0.3
	21"	18'-3"	299	2.6	3'-1"	31	0.4
	24"	20'-0"	323	3.0	3'-7"	33	0.4
	27"	21'-9"	371	3.5	3'-11"	37	0.5
	30"	23'-6"	415	4.0	4'-4"	40	0.5
	33"	25'-3"	469	4.6	4'-8"	43	0.6
	36"	27'-0"	556	5.7	5'-1"	46	0.8
	42"	30'-6"	675	7.1	5'-10"	52	1.0
	48"	35'-6"	837	9.2	6'-7"	59	1.3
	54"	39'-0"	1,015	11.0	7'-6"	84	1.6
	60"	42'-6"	1,171	12.9	8'-3"	91	1.8
	66"	46'-0"	1,298	14.9	8'-9"	98	2.0
72"	49'-6"	1,561	17.1	9'-4"	103	2.3	
4:1	12"	17'-0"	229	2.0	1'-9"	15	0.2
	15"	19'-3"	266	2.4	2'-2"	17	0.2
	18"	21'-6"	308	2.9	2'-8"	19	0.3
	21"	23'-9"	382	3.5	3'-1"	31	0.3
	24"	26'-0"	430	3.9	3'-7"	34	0.4
	27"	28'-3"	486	4.7	3'-11"	37	0.5
	30"	30'-6"	539	5.2	4'-4"	40	0.6
	33"	32'-9"	603	6.0	4'-8"	42	0.6
	36"	35'-0"	738	7.5	5'-1"	47	0.8
	42"	39'-6"	881	9.3	5'-10"	52	1.0
	48"	46'-0"	1,102	12.1	6'-7"	61	1.3
	54"	50'-6"	1,364	14.4	7'-6"	84	1.6
	60"	55'-0"	1,547	16.9	8'-3"	91	1.8
	66"	59'-6"	1,741	19.5	8'-9"	98	2.0
72"	64'-0"	2,077	22.4	9'-4"	102	2.3	
6:1	12"	25'-0"	336	3.0	1'-9"	14	0.2
	15"	28'-3"	384	3.6	2'-2"	17	0.2
	18"	31'-6"	452	4.2	2'-8"	19	0.3
	21"	34'-9"	581	5.1	3'-1"	31	0.4
	24"	38'-0"	644	5.8	3'-7"	34	0.4
	27"	41'-3"	737	6.9	3'-11"	37	0.5
	30"	44'-6"	807	7.7	4'-4"	39	0.6
	33"	47'-9"	912	8.9	4'-8"	44	0.6
	36"	51'-0"	1,108	11.0	5'-1"	48	0.8
	42"	57'-6"	1,318	13.7	5'-10"	54	1.0
	48"	67'-0"	1,682	17.9	6'-7"	59	1.3
	54"	73'-6"	2,072	21.3	7'-6"	83	1.6
	60"	80'-0"	2,351	24.9	8'-3"	89	1.8
	66"	86'-6"	2,643	28.9	8'-9"	96	2.0
72"	93'-0"	3,121	33.1	9'-4"	101	2.3	



- ① Total quantities include one 3'-1" lap for bars over 60' in length.
- ② Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
- ③ Indicated slope is perpendicular to centerline pipe or pipes.
- ④ For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ⑤ Dimensions shown are usual and maximum.
- ⑥ Quantities shown are for one structure end only (one headwall).

### TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0'-9"	1'-0"	2'-8"	0'-9"	1'-9"
15"	0'-11"	1'-0"	2'-11"	0'-9"	1'-9"
18"	1'-2"	1'-0"	3'-2"	0'-9"	1'-9"
21"	1'-4"	1'-0"	3'-5"	0'-9"	2'-0"
24"	1'-7"	1'-0"	3'-8"	0'-9"	2'-0"
27"	1'-8"	1'-0"	3'-11"	0'-9"	2'-3"
30"	1'-10"	1'-0"	4'-2"	0'-9"	2'-3"
33"	1'-11"	1'-0"	4'-5"	0'-9"	2'-6"
36"	2'-1"	1'-0"	4'-8"	1'-0"	2'-6"
42"	2'-4"	1'-0"	5'-2"	1'-0"	2'-9"
48"	2'-7"	1'-3"	5'-11"	1'-0"	3'-0"
54"	3'-0"	1'-3"	6'-5"	1'-0"	3'-3"
60"	3'-3"	1'-3"	6'-11"	1'-0"	3'-6"
66"	3'-3"	1'-3"	7'-5"	1'-0"	3'-9"
72"	3'-4"	1'-3"	7'-11"	1'-0"	4'-0"

### TABLE OF (6) REINFORCING STEEL

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1'-6"	~
E	#5	~	2
F	#5	1'-0"	~

**MATERIAL NOTES:**  
 Provide Grade 60 reinforcing steel.  
 Provide Class C concrete (f'c = 3,600 psi).

**GENERAL NOTES:**  
 Designed according to AASHTO LRFD Bridge Design Specifications.  
 Do not mount bridge rails of any type directly to these culvert headwalls.  
 This standard may not be used for wall heights, H, exceeding the values shown.

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

**Bridge Division Standard**

## CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

### CH-PW-0

FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
DIST	COUNTY		SHEET NO.	
AUS	BASTROP		82	

**SPECIAL NOTES**

1. ALL PIPE SIZES WERE TAKEN FROM UTILITY RECORDS WHERE POSSIBLE. THE UTILITIES DEPICTED WERE INVESTIGATED BY THE RIOS GROUP, INC.. ALL OTHER PLAN INFORMATION, NOTABLY THE BACKGROUND INFORMATION, WAS PROVIDED BY OTHERS AND THE RIOS GROUP, INC. DISCLAIMS RESPONSIBILITY FOR ITS ACCURACY.

2. EXISTING SUBSURFACE UTILITY INVESTIGATIONS WERE COMPLETED ON 12/06/2021. THE RIOS GROUP, INC. EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS, MODIFICATIONS, AND/OR ADJUSTMENTS TO EXISTING UTILITIES AFTER THE COMPLETION DATE.

3. UTILITY LOCATIONS ON THESE DRAWINGS ARE INTENDED FOR DESIGN PURPOSES AND NOT CONSTRUCTION. THEY REFLECT SUBSURFACE UTILITIES AT THE TIME OF FIELD INVESTIGATION. CALL TEXAS ONE CALL SYSTEM (800)245-4545 FOR UTILITY LOCATIONS 48 HOURS PRIOR TO ANY WORK.

4. WHERE POSSIBLE, WATER, GAS, AND COMMUNICATION SERVICE LINES WERE DESIGNATED. HOWEVER, SOME SERVICE LINES ARE CONSTRUCTED OF NON-CONDUCTIVE MATERIAL AND UTILITY COMPANY DRAWINGS MAY NOT SHOW SERVICE LINE LOCATIONS. THEREFORE ALL SERVICE LINES MAY NOT BE SHOWN.

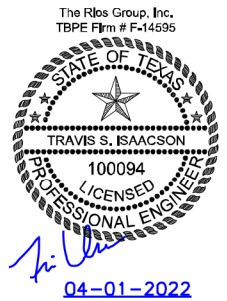
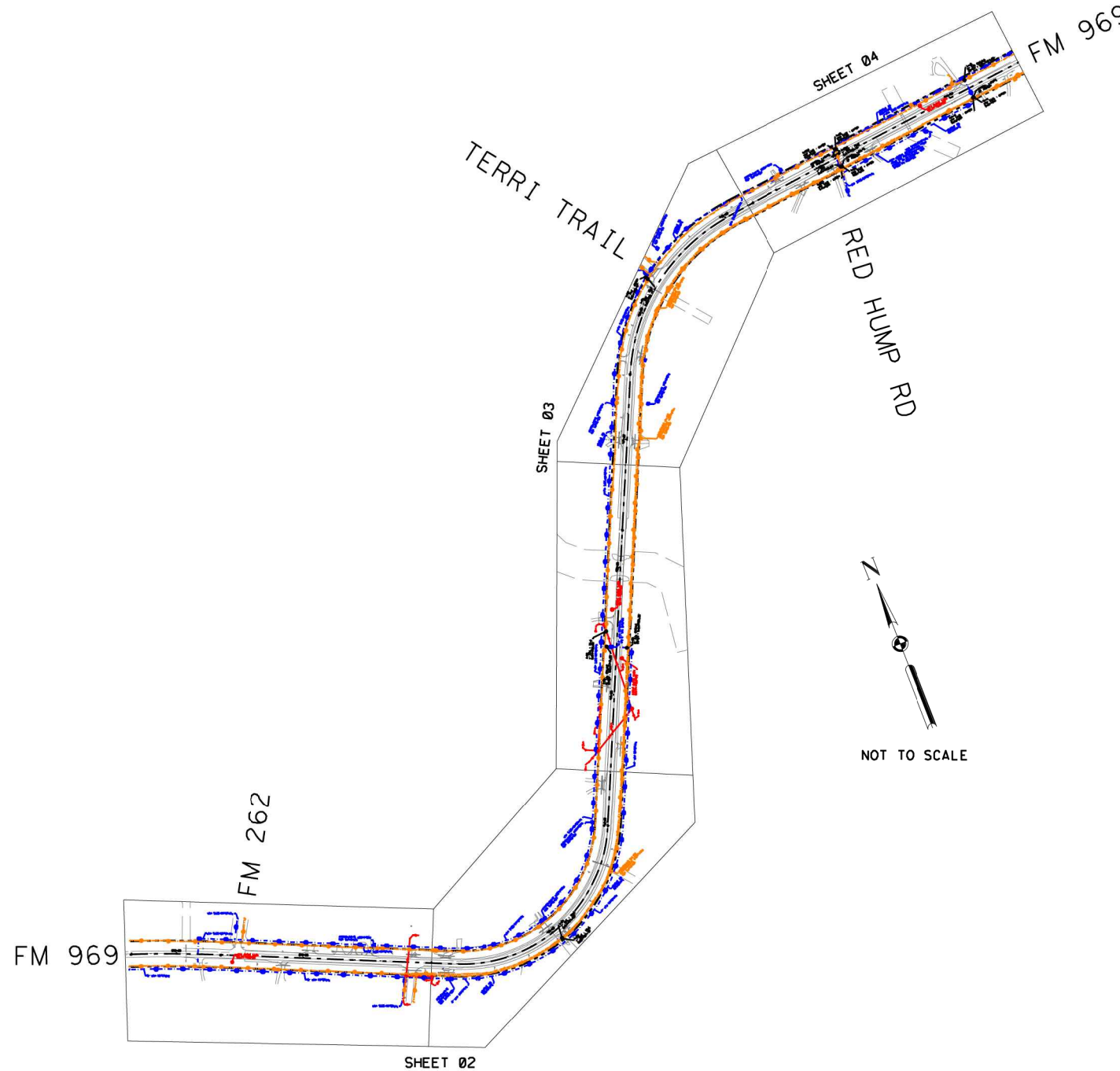
**QUALITY LEVELS**

Quality Level "D" - Information derived from existing records and/or oral collection.

Quality Level "C" - Information obtained by surveying and plotting visible above ground utility features and by using professional judgment in correlating information to Quality Level "D" information.

Quality Level "B" - Designate: Two-dimensional horizontal mapping. This information is obtained through the application and interpretation of appropriate non-destructive surface geophysical methods. Utility indications are referenced to established survey control. Incorporates Quality Levels "C" and "D" information to produce Quality Level "B" information.

Quality Level "A" - Locate: Precise horizontal and vertical location of utilities obtained by the actual exposure and subsequent measurement of subsurface utilities at a specific point. Diameters shown are verified visually and may not be exact.



04-01-2022

**THE RIOS GROUP**  
SUBSURFACE UTILITY ENGINEERING  
 UTILITY COORDINATION

**Texas Department of Transportation**

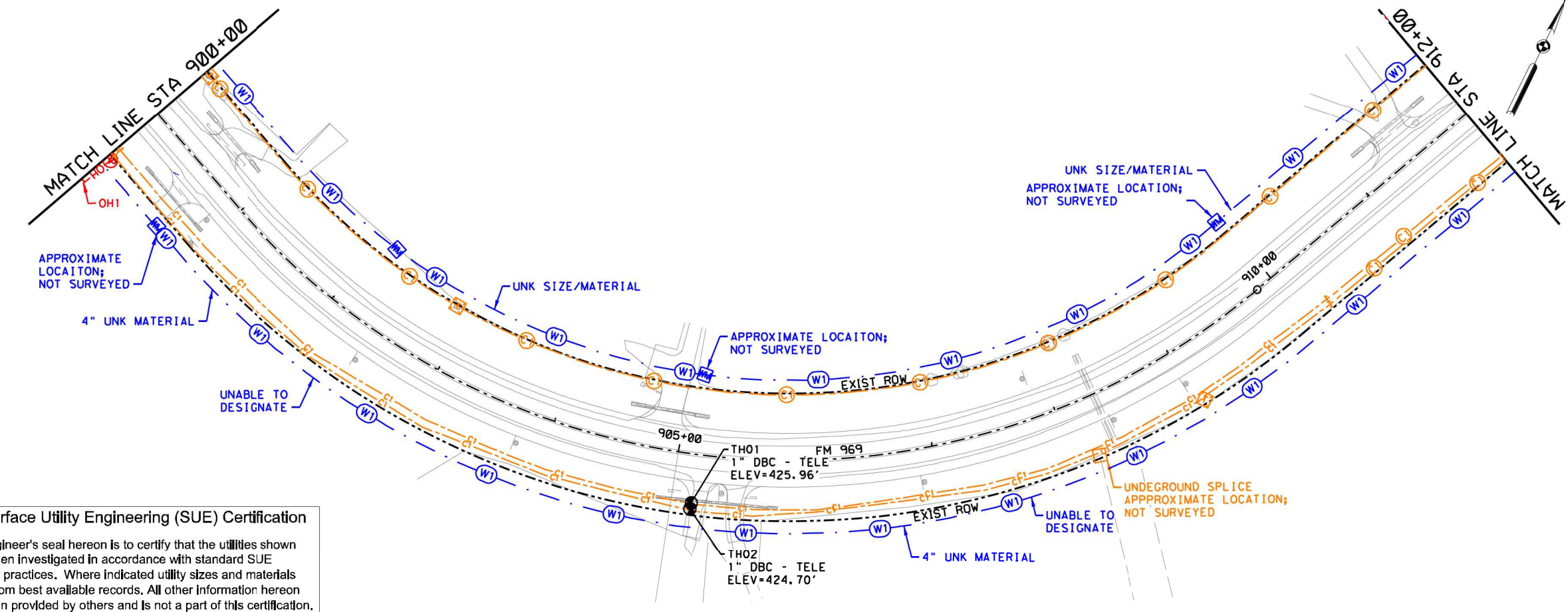
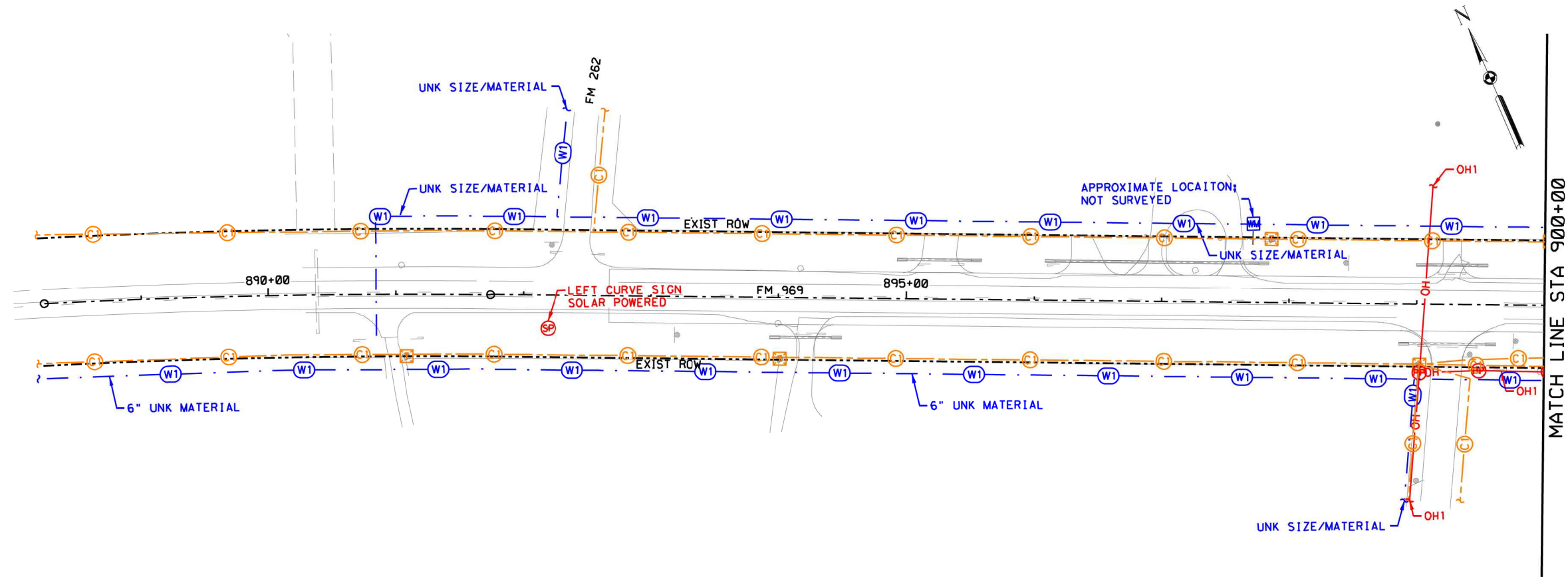
FM 969			
S.U.E. PLAN SHEET			
INDEX			
SHEET 01 OF 04			
FED. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6		FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUS	BASTROP	83
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: \*\*\*\*\*DGN\*\*\*\*\*  
 PLOTTED: \*\*\*\*\*DATE\*\*\*\*\*

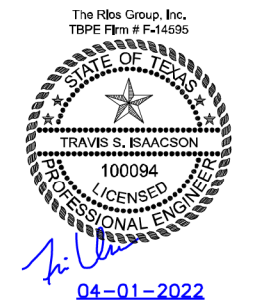
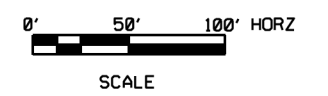
**Subsurface Utility Engineering (SUE) Certification**

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.





LEGEND OF UTILITY TYPES	
QL "B" LIFESTYLE	---
QL "C" LIFESTYLE	---
QL "D" LIFESTYLE	---
ABANDONED UTILITY	---
PROPOSED UTILITY	---
UNKNOWN UTILITY	---
COMMUNICATIONS	
AT&T (TELE)	QL "B" C1
AT&T (TELE)	QL "D" C1
POTABLE WATER	
AQUA WATER SUPPLY CORPORATION	QL "B" W1
AQUA WATER SUPPLY CORPORATION	QL "D" W1
OVERHEAD UTILITY	
OH1 (BLUEBONNET ELECTRIC COOPERATIVE - ELEC)	OH C
LEGEND OF UTILITY SYMBOLS	
END CAP	⌈
QUALITY LEVEL CHANGE	⊙
TEST HOLE	⊙
UTILITY CONTINUATION	⊙
TELEPHONE PEDESTAL	⊙
ELECTRIC POLE (POWER)	⊙
SIGNAL POLE	⊙
WATER METER	⊙
WATER VALVE	⊙



FM 969			
S.U.E. PLAN SHEET			
BEGIN TO STA 912+00			
SHEET 02 OF 04			
FED. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6		FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUS	BASTROP	84
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: \*\*\*\*\*DGN\*\*\*\*\*  
 PLOTTED: \*\*\*\*\*DATE\*\*\*\*\*

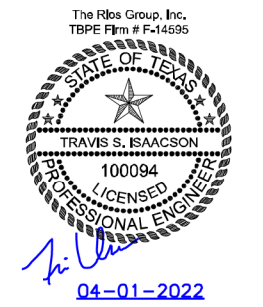
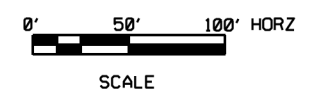
**Subsurface Utility Engineering (SUE) Certification**  
 The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

**LEGEND OF UTILITY TYPES**

QL "B" LIFESTYLE	---
QL "C" LIFESTYLE	---
QL "D" LIFESTYLE	---
ABANDONED UTILITY	---
PROPOSED UTILITY	---
UNKNOWN UTILITY	---
<b>COMMUNICATIONS</b>	
AT&T (TELE)	QL "B" C1
AT&T (TELE)	QL "D" C1
<b>POTABLE WATER</b>	
AQUA WATER SUPPLY CORPORATION	QL "B" W1
AQUA WATER SUPPLY CORPORATION	QL "D" W1
<b>OVERHEAD UTILITY</b>	
OH1 (BLUEBONNET ELECTRIC COOPERATIVE - ELEC)	QL "C" OH

**LEGEND OF UTILITY SYMBOLS**

END CAP	⌈
QUALITY LEVEL CHANGE	⊕
TEST HOLE	⊙
UTILITY CONTINUATION	⊚
TELEPHONE PEDESTAL	⊞
ELECTRIC POLE (POWER)	⊞
SIGNAL POLE	⊞
WATER METER	⊞
WATER VALVE	⊞

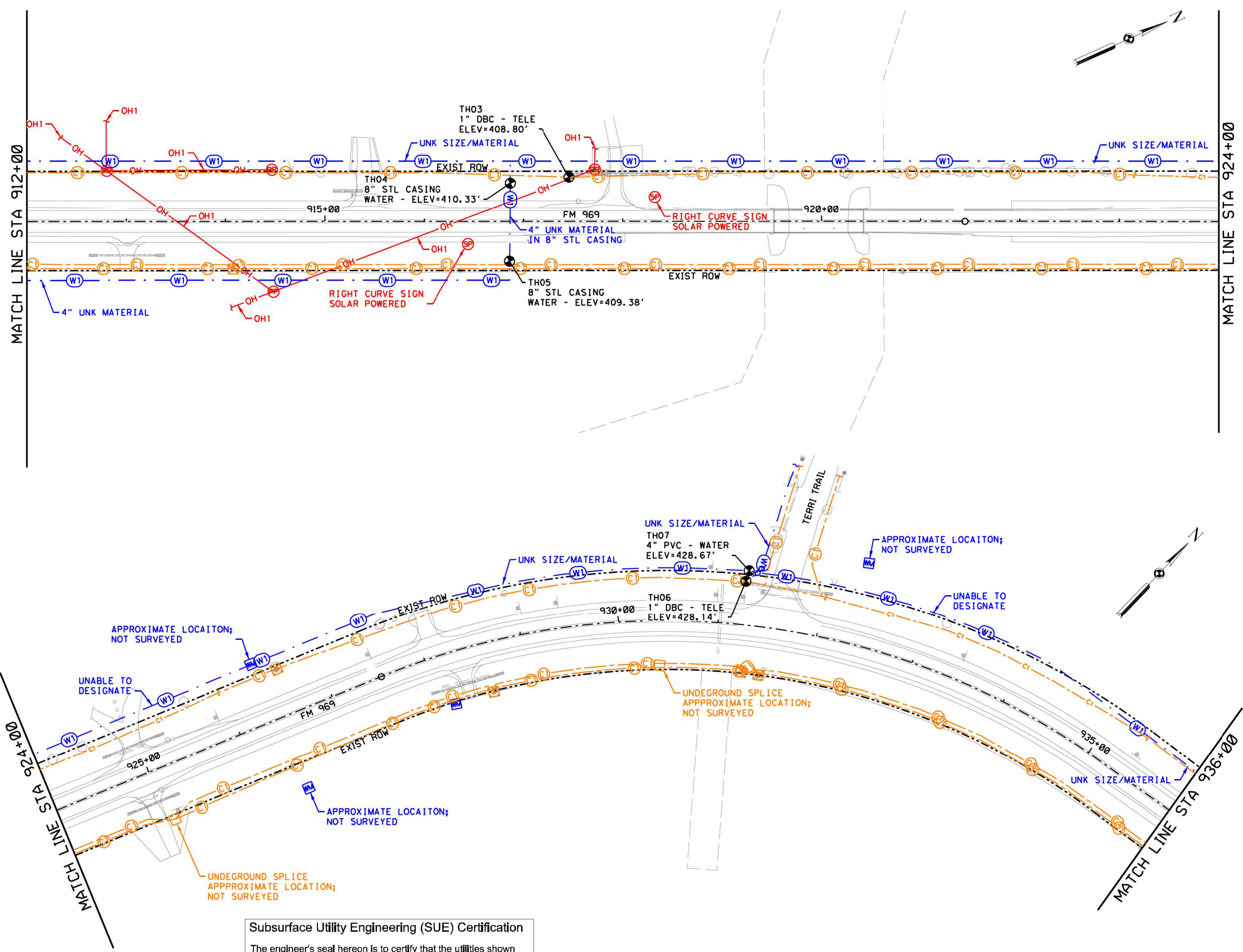


FM 969			
S.U.E. PLAN SHEET			
STA 912+00 TO STA 936+00			
SHEET 03 OF 04			
FED. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6		FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUS	BASTROP	85
CONT.	SECT.	JOB	
1186	02	025	

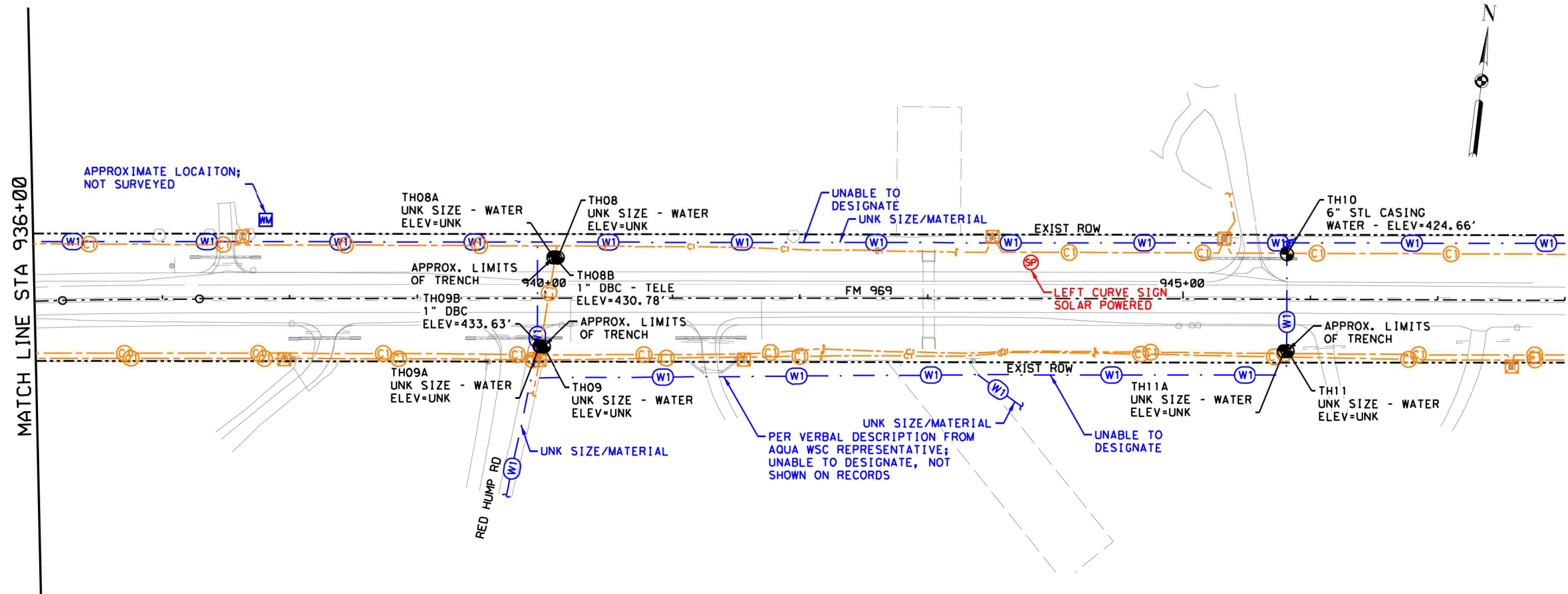
**Subsurface Utility Engineering (SUE) Certification**

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

FILENAME: \*\*\*\*\*DGN\*\*\*\*\*  
PLOTTED: \*\*\*\*\*DATE\*\*\*\*\*







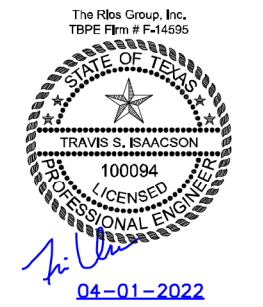
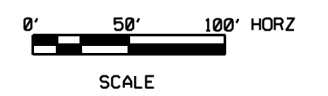
MATCH LINE STA 936+00

**LEGEND OF UTILITY TYPES**

QL "B" LIFESTYLE	---
QL "C" LIFESTYLE	---
QL "D" LIFESTYLE	---
ABANDONED UTILITY	---
PROPOSED UTILITY	---
UNKNOWN UTILITY	---
<b>COMMUNICATIONS</b>	
AT&T (TELE)	QL "B" C1
AT&T (TELE)	QL "D" C1
<b>POTABLE WATER</b>	
AQUA WATER SUPPLY CORPORATION	QL "B" W1
AQUA WATER SUPPLY CORPORATION	QL "D" W1
<b>OVERHEAD UTILITY</b>	
OH1 (BLUEBONNET ELECTRIC COOPERATIVE - ELEC)	OH

**LEGEND OF UTILITY SYMBOLS**

END CAP	[Symbol]
QUALITY LEVEL CHANGE	[Symbol]
TEST HOLE	[Symbol]
UTILITY CONTINUATION	[Symbol]
TELEPHONE PEDESTAL	[Symbol]
ELECTRIC POLE (POWER)	[Symbol]
SIGNAL POLE	[Symbol]
WATER METER	[Symbol]
WATER VALVE	[Symbol]



**THE RIOS GROUP**  
 SUBSURFACE UTILITY ENGINEERING  
 UTILITY COOPERATION

**Texas Department of Transportation**

FM 969			
S.U.E. PLAN SHEET			
STA 936+00 TO END			
SHEET 04 OF 04			
FED. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6		FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUS	BASTROP	86
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: \*\*\*\*\*DGN\*\*\*\*\*  
 PLOTTED: \*\*\*\*\*DATE\*\*\*\*\*

**Subsurface Utility Engineering (SUE) Certification**

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

**LEGEND:**

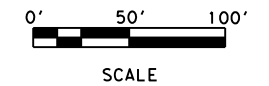
- Ⓢ PROPOSED SMALL SIGN
- Ⓡ PROPOSED SIGN TO BE REMOVED
- TY 2 (OM-2) OBJECT MARKER
- EXISTING SIGN POST
- PROPOSED SIGN POST
- DIRECTION OF TRAFFIC
- ⓧ DELINEATORS
- ∧ CHEVRON

**LEGEND:**

- NO PASSING ZONE STRIPING
- WB PASSING ZONE STRIPING
- EB PASSING ZONE STRIPING

**NOTES:**

1. SEE APPLICABLE TXDOT SIGNING AND PAVEMENT MARKING STANDARD SHEETS FOR ADDITIONAL DETAILS.
2. ALL PROPOSED SMALL SIGNS TO BE INSTALLED TO OUTSIDE PROPOSED EDGE OF PAVEMENT AS PER TXDOT STANDARD SHEET SMD(GEN)-08.



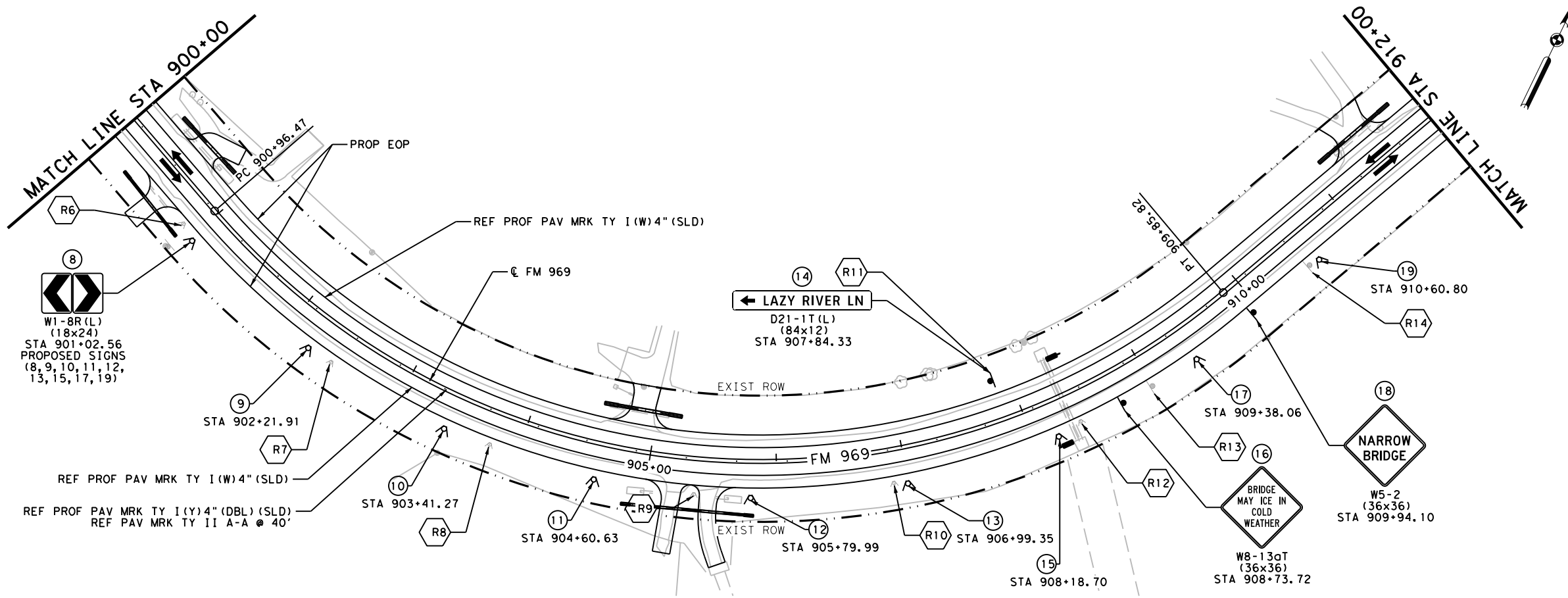
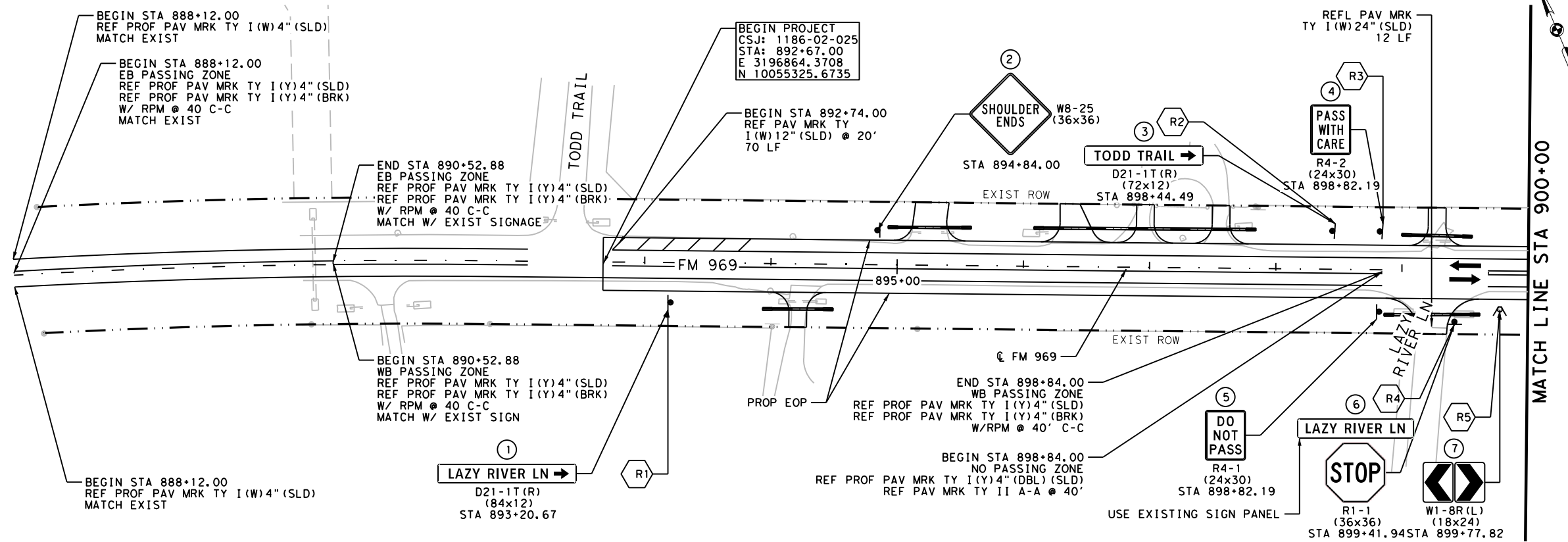
5/18/2022

**Kimley»Horn** F-928

Texas Department of Transportation

**FM 969**  
**SIGNING & PAVEMENT MARKING LAYOUT**  
BEGIN TO STA 912+00

SCALE: 100'		SHEET 1 OF 3	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	87
CONT.	SECT.	JOB	
1186	02	025	



FILENAME: c:\pwworking\kimleyhorn\1\2022\1186\FM969\_TRF\_SPM0\_01.dgn  
 PLOTTED: 5/18/2022 7:44:35 PM

**LEGEND:**

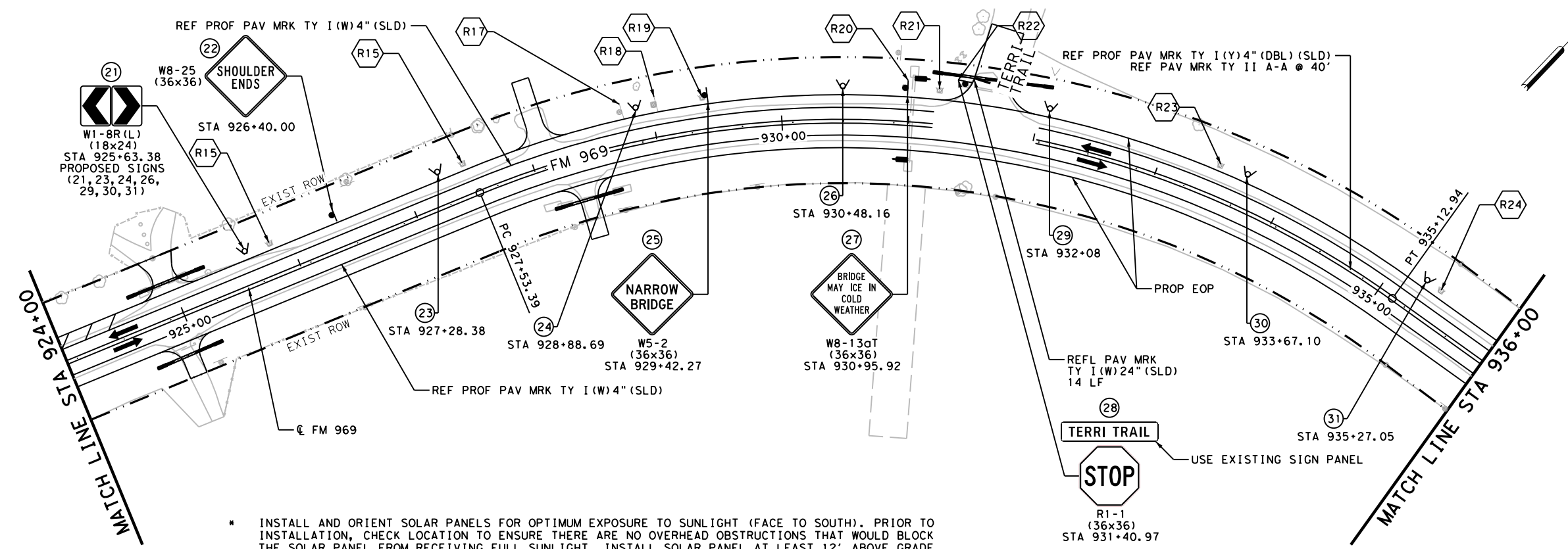
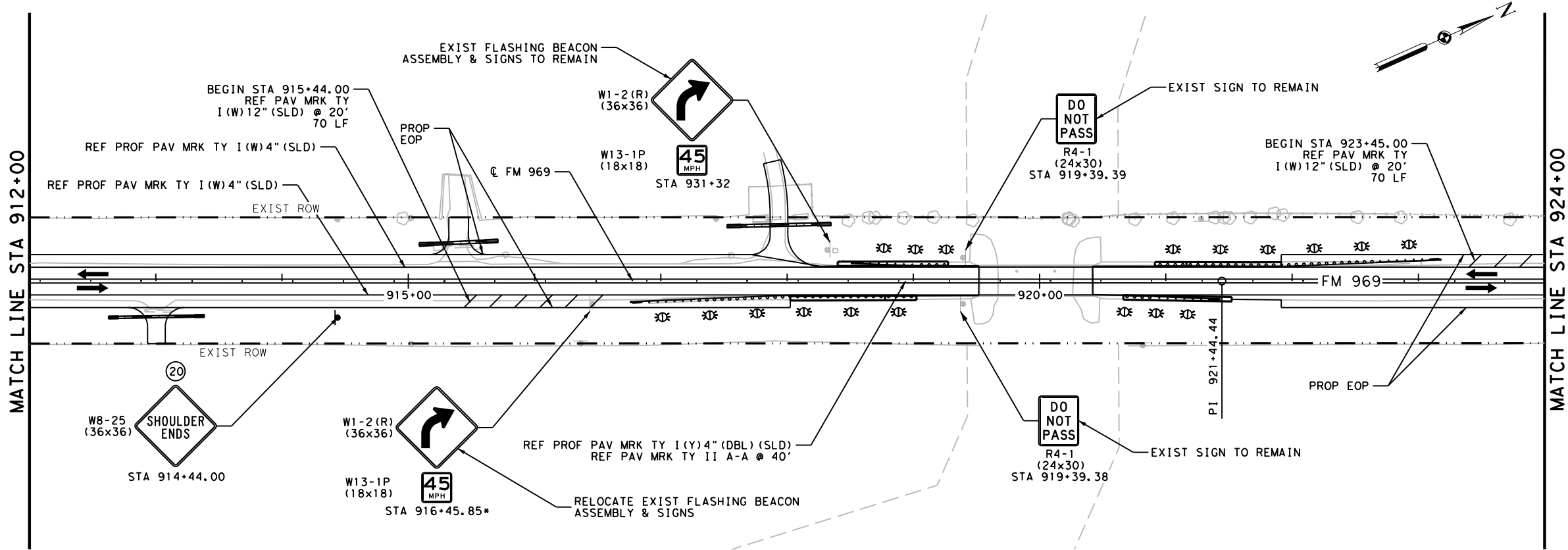
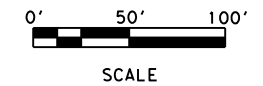
- Ⓜ PROPOSED SMALL SIGN
- Ⓜ R\*\* EXISTING SIGN TO BE REMOVED
- TY 2 (OM-2) OBJECT MARKER
- EXISTING SIGN POST
- PROPOSED SIGN POST
- DIRECTION OF TRAFFIC
- Ⓜ DELINEATORS
- Ⓜ CHEVRON

**LEGEND:**

- NO PASSING ZONE STRIPING
- WB PASSING ZONE STRIPING
- EB PASSING ZONE STRIPING

**NOTES:**

1. SEE APPLICABLE TXDOT SIGNING AND PAVEMENT MARKING STANDARD SHEETS FOR ADDITIONAL DETAILS.
2. ALL PROPOSED SMALL SIGNS TO BE INSTALLED TO OUTSIDE PROPOSED EDGE OF PAVEMENT AS PER TXDOT STANDARD SHEET SMD(GEN)-08.



TJN  
5/18/2022  
  
 TREY NEAL  
 106194  
 LICENSED PROFESSIONAL ENGINEER

**Kimley»Horn** F-928

© 2022  
  
 Texas Department of Transportation

**FM 969**

**SIGNING & PAVEMENT MARKING LAYOUT**

STA 912+00 TO 936+00

SCALE: 100' SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

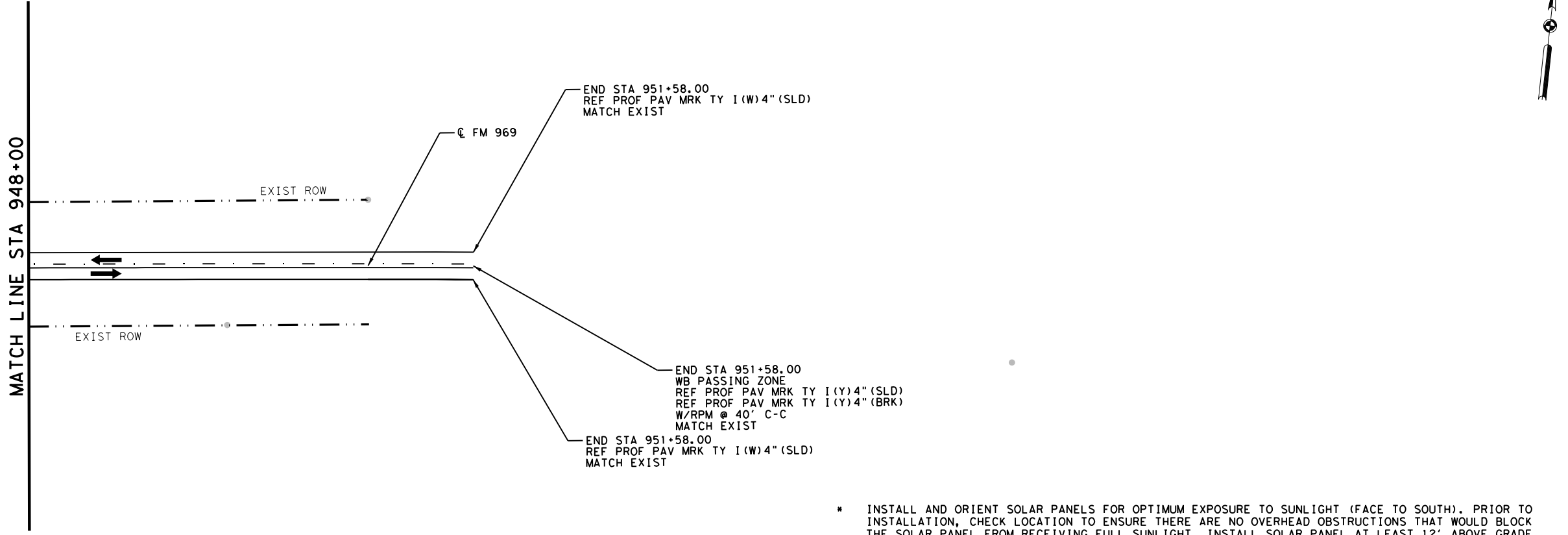
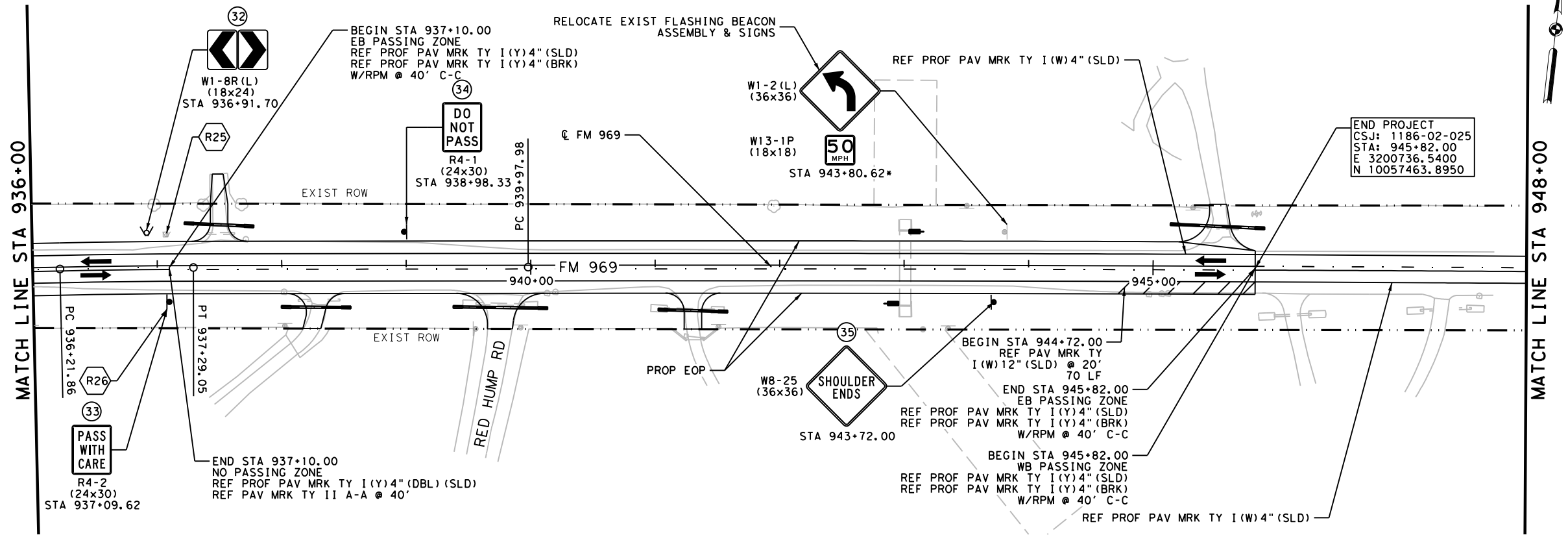
SHEET NO. 88

\* INSTALL AND ORIENT SOLAR PANELS FOR OPTIMUM EXPOSURE TO SUNLIGHT (FACE TO SOUTH). PRIOR TO INSTALLATION, CHECK LOCATION TO ENSURE THERE ARE NO OVERHEAD OBSTRUCTIONS THAT WOULD BLOCK THE SOLAR PANEL FROM RECEIVING FULL SUNLIGHT. INSTALL SOLAR PANEL AT LEAST 12' ABOVE GRADE.  
 CONTRACTOR TO INSTALL FLASHING BEACONS AT LOCATION WITH DIRECT LINE OF SIGHT VISIBILITY TO ON-COMING TRAFFIC.

FILENAME: c:\pwworking\152785\FM969\_TRF\_SPMD\_02.dgn  
 PLOTTED: 5/18/2022 7:59:25 PM



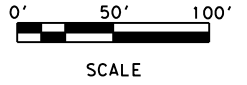
FILENAME: c:\pwwork1\00152785\FM969\_TRF\_SPM0\_03.dgn  
 PLOTTED: 5/18/2022 7:44:52 PM



- LEGEND:**
- Ⓜ PROPOSED SMALL SIGN
  - Ⓜ R\*\* EXISTING SIGN TO BE REMOVED
  - TY 2 (OM-2) OBJECT MARKER
  - EXISTING SIGN POST
  - PROPOSED SIGN POST
  - DIRECTION OF TRAFFIC
  - ⓧ DELINEATORS
  - ∧ CHEVRON

- LEGEND:**
- NO PASSING ZONE STRIPING
  - WB PASSING ZONE STRIPING
  - EB PASSING ZONE STRIPING

- NOTES:**
1. SEE APPLICABLE TXDOT SIGNING AND PAVEMENT MARKING STANDARD SHEETS FOR ADDITIONAL DETAILS.
  2. ALL PROPOSED SMALL SIGNS TO BE INSTALLED TO OUTSIDE PROPOSED EDGE OF PAVEMENT AS PER TXDOT STANDARD SHEET SMD(GEN)-08.



5/18/2022

**Kimley»Horn** F-928

© 2022  
 Texas Department of Transportation

**FM 969**

**SIGNING & PAVEMENT MARKING LAYOUT**

STA 936+00 TO END

SCALE: 100' SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025

SHEET NO. 89











\* INSTALL AND ORIENT SOLAR PANELS FOR OPTIMUM EXPOSURE TO SUNLIGHT (FACE TO SOUTH). PRIOR TO INSTALLATION, CHECK LOCATION TO ENSURE THERE ARE NO OVERHEAD OBSTRUCTIONS THAT WOULD BLOCK THE SOLAR PANEL FROM RECEIVING FULL SUNLIGHT. INSTALL SOLAR PANEL AT LEAST 12' ABOVE GRADE.

CONTRACTOR TO INSTALL FLASHING BEACONS AT LOCATION WITH DIRECT LINE OF SIGHT VISIBILITY TO ON-COMING TRAFFIC.

# SUMMARY OF SMALL SIGNS

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

DATE: FILE:

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
1	1	D21-1TR	LAZY RIVER LN →	84 x 12	X		10BWG	1	SA	T		
1	2	W8-25		36 x 36	X		10BWG	1	SA	P		
1	3	D21-1TR	TODD TRAIL →	72 x 12	X		10BWG	1	SA	T		
1	4	R4-2		24 x 30	X		10BWG	1	SA	P		
1	5	R4-1		24 x 30	X		10BWG	1	SA	P		
1	6	R1-1		36 x 36	X		10BWG	1	SA	P		
1	7	W1-8R W1-8L		18 x 24	X		10BWG	1	SA	P		
1	8	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
1	9	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
1	10	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
1	11	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
1	12	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.  
<http://www.txdot.gov/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
  - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
  - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).



## SUMMARY OF SMALL SIGNS

### SOSS

FILE: slums16.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
4-16	DIST	COUNTY		SHEET NO.
8-16	AUSTIN	BASTROP		90



# SUMMARY OF SMALL SIGNS

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

DATE: FILE:

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	TY = TYPE TY N TY S	
1	13	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	
1	14	D21-1TL		84 x 12	X			10BWG	1	SA	T	
1	15	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	
1	16	W8-13aT		36 x 36	X			10BWG	1	SA	P	
1	17	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	
1	18	W5-2		36 x 36	X			10BWG	1	SA	P	
1	19	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	
2	20	W8-25		36 x 36	X			10BWG	1	SA	P	
2	21	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	
2	22	W8-25		36 x 36	X			10BWG	1	SA	P	
2	23	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	
2	24	W1-8R W1-8L		18 x 24 18 x 24	X			10BWG	1	SA	P	

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.  
<http://www.txdot.gov/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
  - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
  - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).



## SUMMARY OF SMALL SIGNS












### SOSS

FILE: slms16.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
4-16	DIST	COUNTY		SHEET NO.
8-16	AUSTIN	BASTROP		91

# SUMMARY OF SMALL SIGNS

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

DATE: FILE:

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
2	25	W5-2		36 x 36	X		10BWG	1	SA	P		
2	26	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
2	27	W8-13oT		36 x 36	X		10BWG	1	SA	P		
2	28	R1-1		36 x 36	X		10BWG	1	SA	P		
2	29	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
2	30	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
2	31	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
3	32	W1-8R W1-8L		18 x 24 18 x 24	X		10BWG	1	SA	P		
3	33	R4-2		24 x 30	X		10BWG	1	SA	P		
3	34	R4-1		24 x 30	X		10BWG	1	SA	P		
3	35	W8-25		36 x 36	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.  
<http://www.txdot.gov/>

- NOTE:**
- Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
  - For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
  - For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

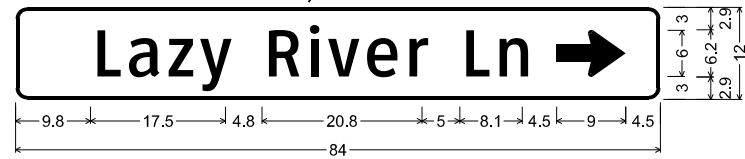


## SUMMARY OF SMALL SIGNS

### SOSS

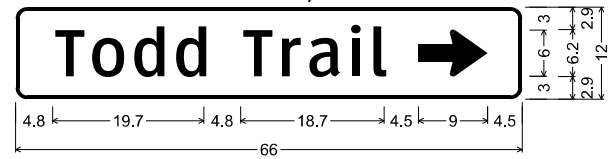
FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
4-16	DIST	COUNTY		SHEET NO.
8-16	AUSTIN	BASTROP		92

SIGN NO. 1. SHEET 1, OF 3



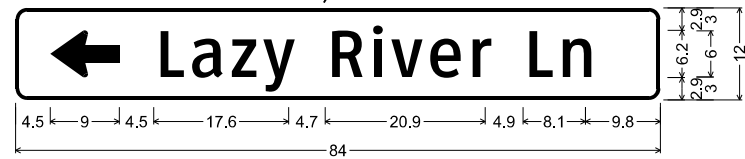
D21-1TR\_84x12;  
 1.5" Radius, 0.5" Border, White on, Green;  
 "Lazy River Ln", ClearviewHwy-3-W; Standard Arrow Custom 9.0" X 6.1" 0";

SIGN NO. 2. SHEET 1, OF 3



D21-1TR\_66x12;  
 1.5" Radius, 0.5" Border, White on, Green;  
 "Todd Trail", ClearviewHwy-3-W;  
 Standard Arrow Custom 9.0" X 6.1" 0";


SIGN NO. 13. SHEET 1, OF 3




D21-1TL\_84x12;  
 1.5" Radius, 0.5" Border, White on, Green;  
 Standard Arrow Custom 9.0" X 6.1" 180"; "Lazy River Ln", ClearviewHwy-3-W;

TJN  
 5/11/2022  


FILENAME: c:\pwworking\1\00152785\FM969\_TRF\_SS\_DETAIL\_01.dgn  
 PLOTTED: 5/11/2022 9:01:33 PM





**FM 969**

**SMALL SIGN  
DETAILS**

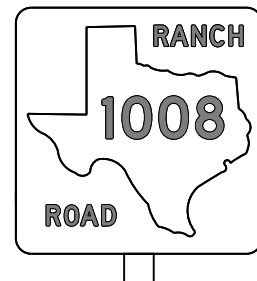
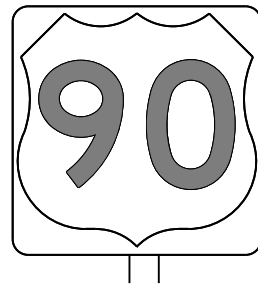
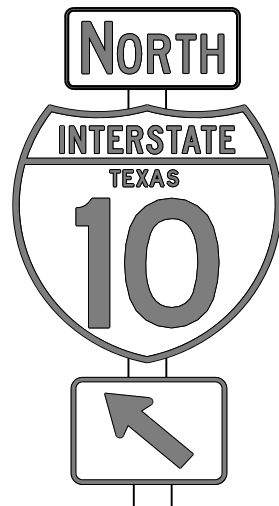
NOT TO SCALE SHEET 1 OF 1			
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	93
CONT.	SECT.	JOB	
1186	02	025	

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

DATE: 5/11/2022 9:01:52 PM  
 FILE: c:\pwworkh\0168457\tsr3-13.dgn

## REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

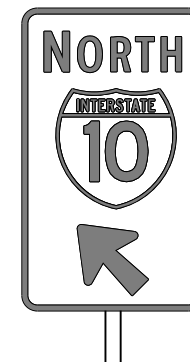
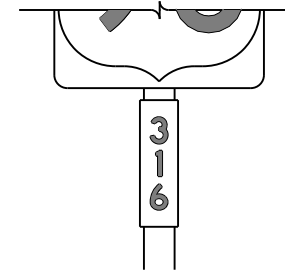
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

## REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

## GENERAL NOTES

- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

- Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.
- Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

<http://www.txdot.gov/>



## TYPICAL SIGN REQUIREMENTS

### TSR(3) - 13

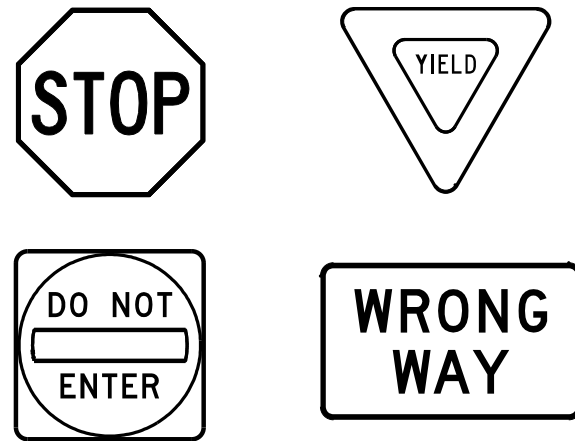
FILE:	tsr3-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
©TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
12-03	7-13	DIST	COUNTY	SHEET NO.					
9-08		AUS	BASTROP	94					

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

DATE: 5/11/2022 9:02:05 PM  
 FILE: c:\pwworking\dot\168457\tsr-4-13.dgn

### REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



#### REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

### REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

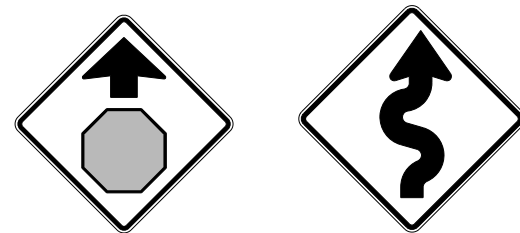
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



#### TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

### REQUIREMENTS FOR WARNING SIGNS



#### TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

### REQUIREMENTS FOR SCHOOL SIGNS



#### TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B <sub>FL</sub> OR C <sub>FL</sub> SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

### GENERAL NOTES

- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
- White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
- Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

#### ALUMINUM SIGN BLANKS THICKNESS

Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

#### DEPARTMENTAL MATERIAL SPECIFICATIONS

ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

<http://www.txdot.gov/>



## TYPICAL SIGN REQUIREMENTS

### TSR (4) - 13

FILE:	tsr4-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY				
REVISIONS		1186	02	025	FM 969				
12-03	7-13	DIST	COUNTY	SHEET NO.					
9-08		AUS	BASTROP	95					

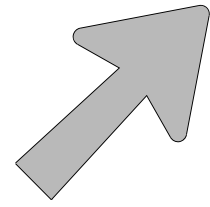


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

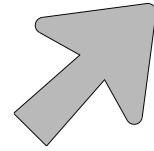
DATE: 5/11/2022 9:02:17 PM  
 FILE: c:\pwworking\dot\168457\tsr5-13.dgn

### ARROW DETAILS

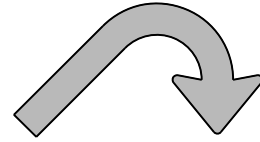
for Large Ground-Mounted and Overhead Guide Signs



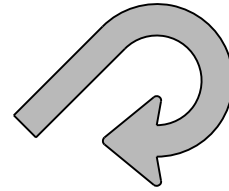
Type A



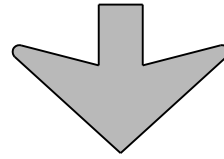
Type B



E-3



E-4



Down Arrow

TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

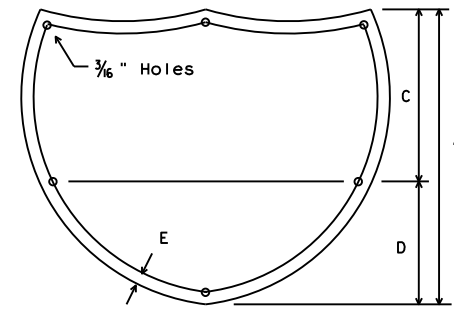
**NOTE**

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

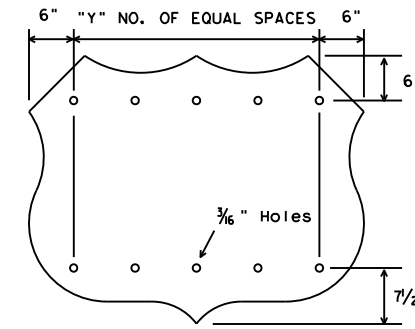
<http://www.txdot.gov/>

### SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)



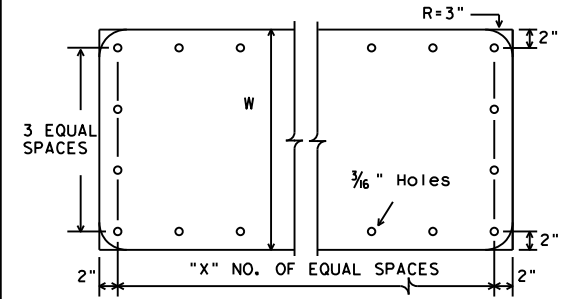
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4



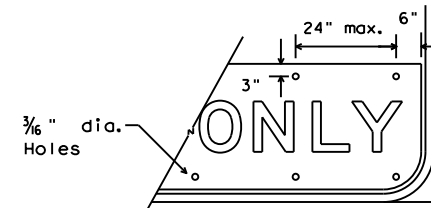
U.S. ROUTE MARKERS

Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



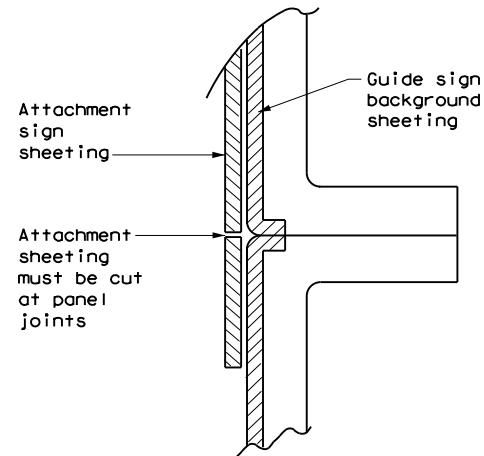
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5



EXIT ONLY PANEL

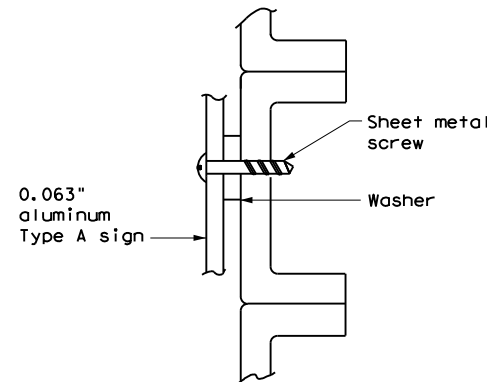
### MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



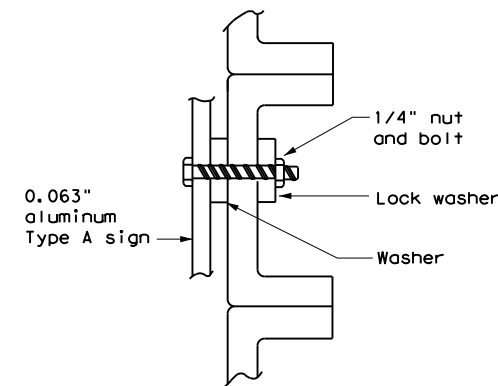
DIRECT APPLIED ATTACHMENT

**NOTE:**

- Sheeting for legend, symbols, and borders must be cut at panel joints.
- Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT

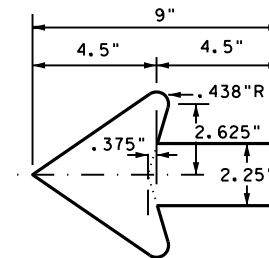


NUT/BOLT ATTACHMENT

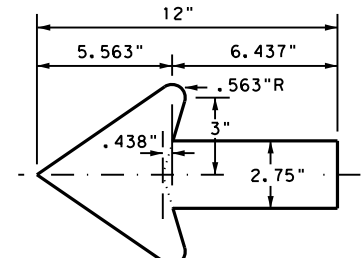
**NOTE:**

Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

### ARROW DETAILS for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.



### TYPICAL SIGN REQUIREMENTS

#### TSR (5) - 13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
12-03 7-13	DIST	COUNTY	SHEET NO.	
9-08	AUS	BASTROP	96	

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

DATE: 5/11/2022 9:02:31 PM  
 FILE: c:\pwworking\dot168457\dom1-20.dgn

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

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

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

Traffic Safety Division Standard

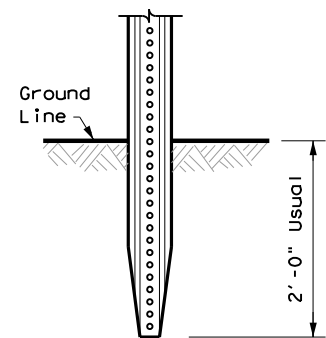
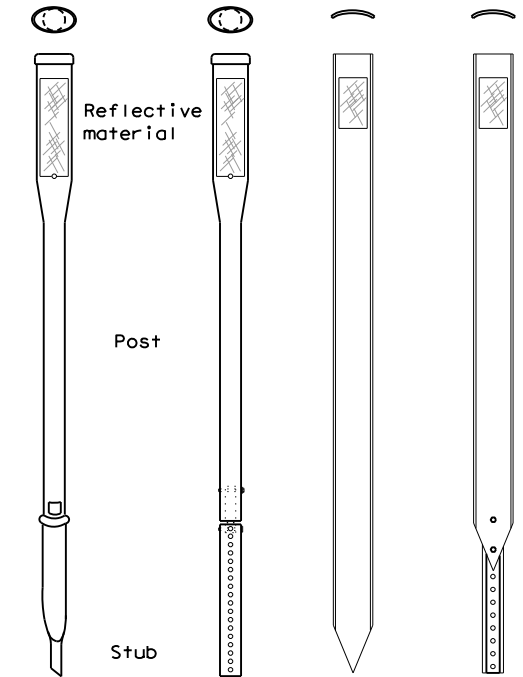
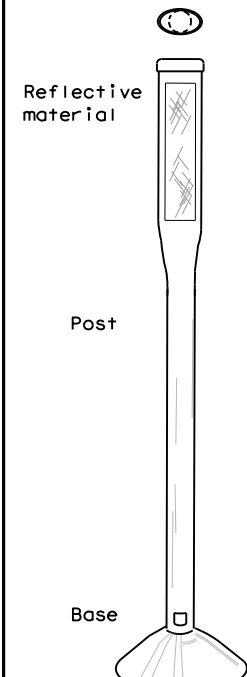
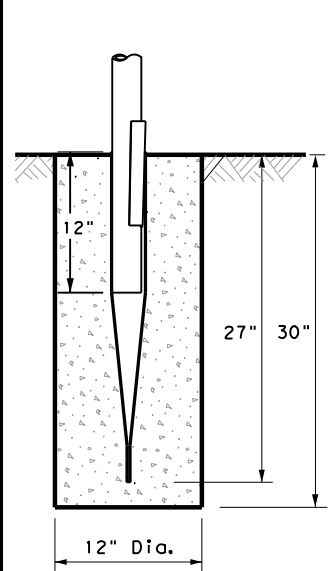
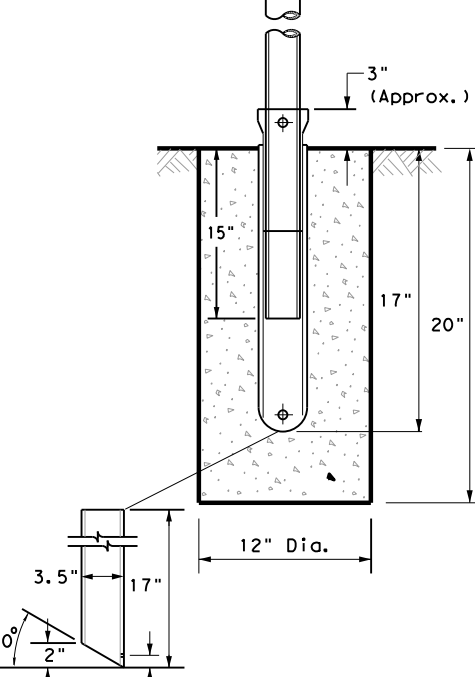
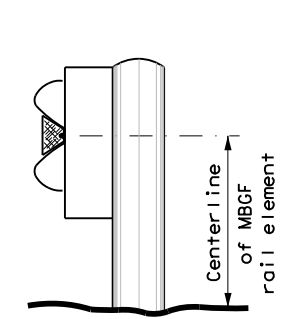
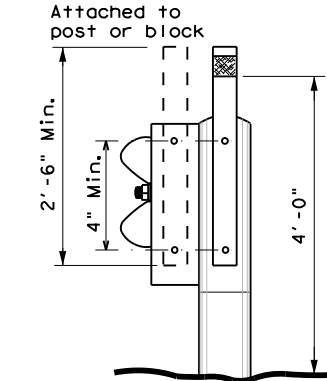
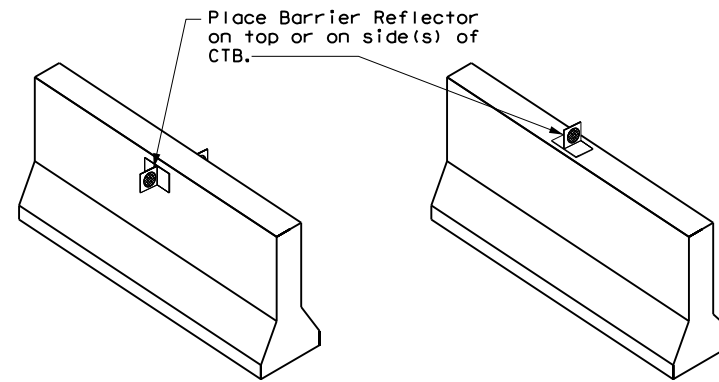
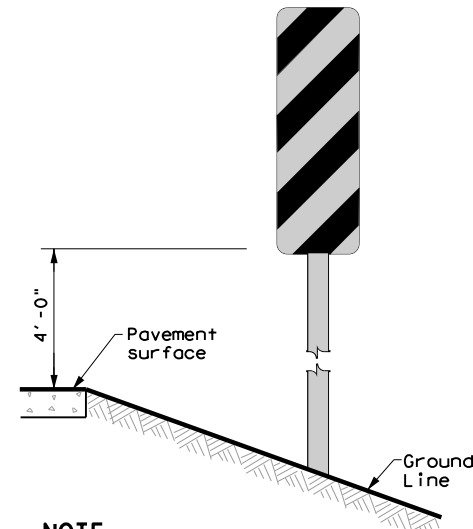
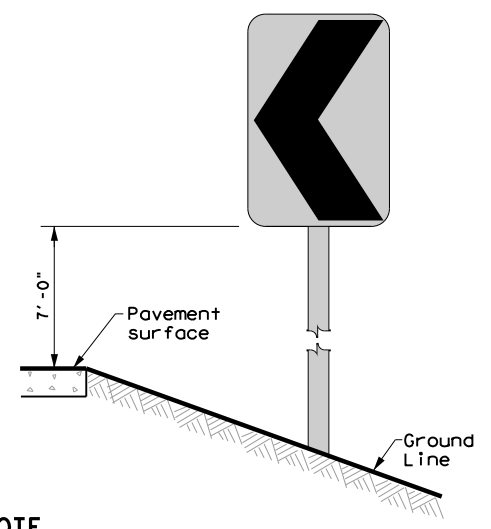
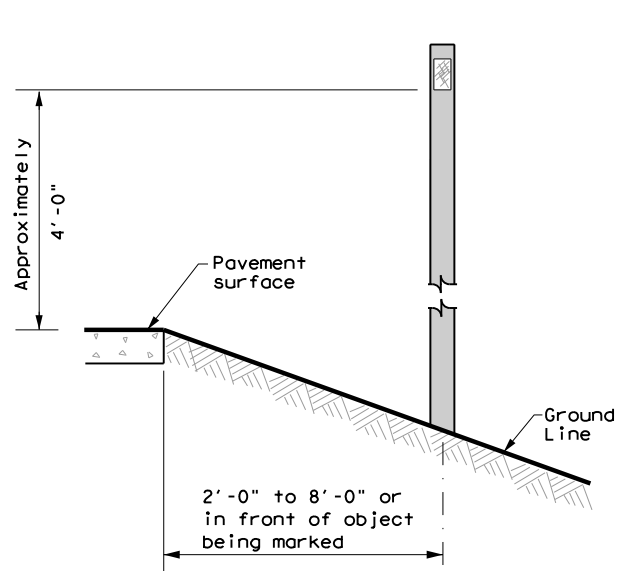

## DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

### D & OM(1)-20

FILE: dom1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	AUS	BASTROP	97	

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

DATE: 5/11/2022 9:02:44 PM  
 FILE: c:\pwworking\kh1\d0168457\dom2-20.dgn

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	GF 1	
 <p style="text-align: center;">2'-0" Usual</p>						
	EMBEDDED	SURFACE MOUNT	STEEL	PLASTIC	CONCRETE TRAFFIC BARRIER (CTB)	
<b>NOTES</b> 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.	<b>NOTES</b> 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.		<b>NOTE</b> 1. Install per manufacturer's recommendations.			
TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS		CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN		DELINEATORS AND TYPE 2 OBJECT MARKERS		
						
<b>NOTE</b> Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)		<b>NOTE</b> Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.		See general notes 1, 2 and 3.		
<b>GENERAL NOTES</b> 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.						
 <span style="float: right;">Traffic Safety Division Standard</span>						
<h2 style="margin: 0;">DELINEATOR &amp; OBJECT MARKER INSTALLATION</h2> <h3 style="margin: 0;">D &amp; OM(2)-20</h3>						
<small>FILE: dom2-20.dgn</small>		<small>DN: TxDOT</small>		<small>CK: TxDOT</small>		
<small>© TxDOT August 2004</small>		<small>CON: 1186</small>		<small>SECT: 02</small>		
<small>10-09 3-15</small>		<small>DIST: AUS</small>		<small>JOB: 025</small>		
<small>4-10 7-20</small>		<small>COUNTY: BASTROP</small>		<small>HIGHWAY: FM 969</small>		
				<small>SHEET NO. 98</small>		

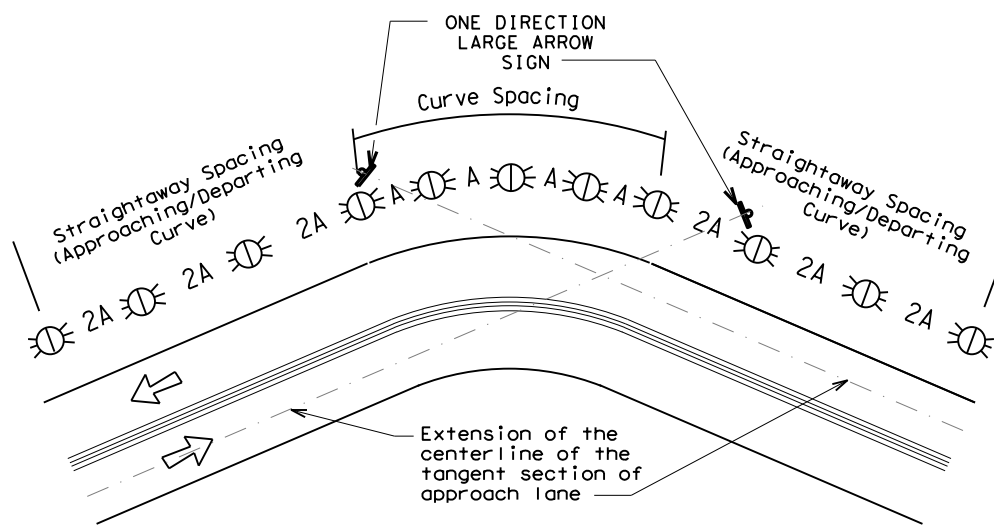
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022 9:03:05 PM  
 FILE: c:\pw\khl\0168457\dom3-20.dgn

### MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

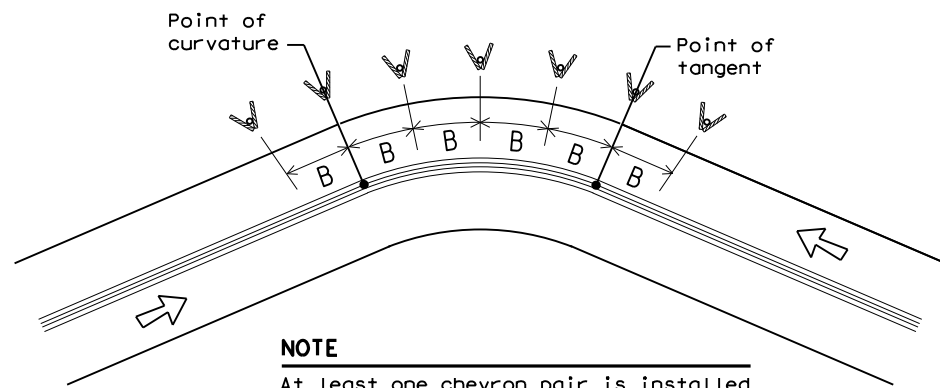
### SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



**NOTE**

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

### SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



**NOTE**

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

### DELINEATOR AND CHEVRON SPACING

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

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

### DELINEATOR AND CHEVRON SPACING

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

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

### DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

**NOTES**

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

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Traffic Safety Division Standard

## DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

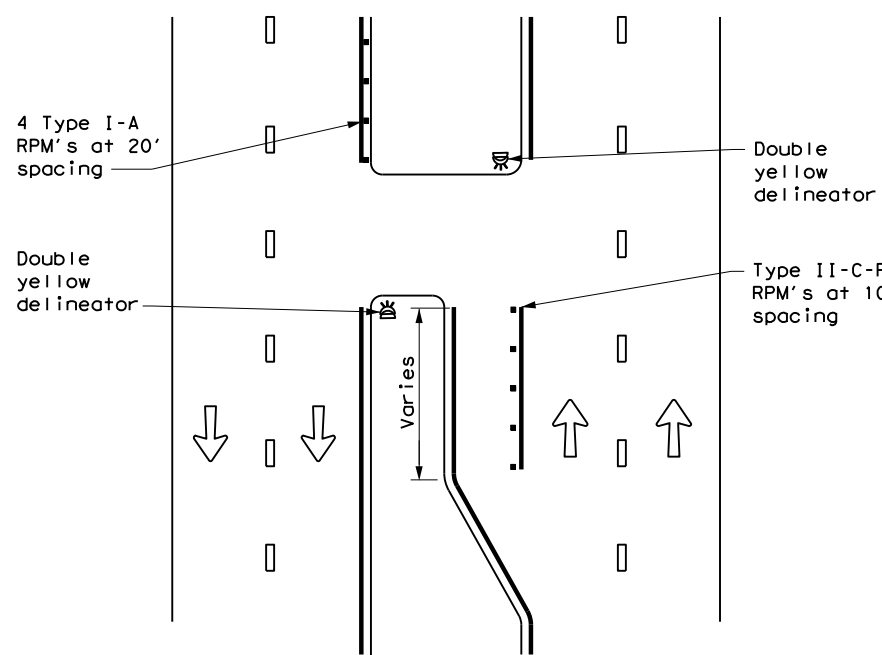
### D & OM(3)-20

FILE: dom3-20.dgn	DW: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT	
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	
REVISIONS		1186	02	025	FM 969
3-15 8-15	DIST	COUNTY		SHEET NO.	
8-15 7-20	AUS	BASTROP		99	

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

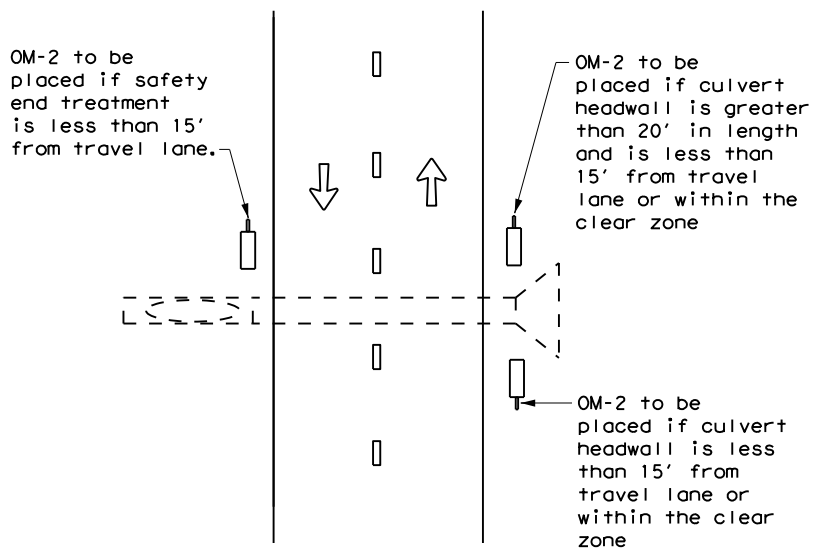
DATE: 5/11/2022 9:03:20 PM  
 FILE: c:\pwworking\dot\168457\dom4-20.dgn

**CROSSOVERS**



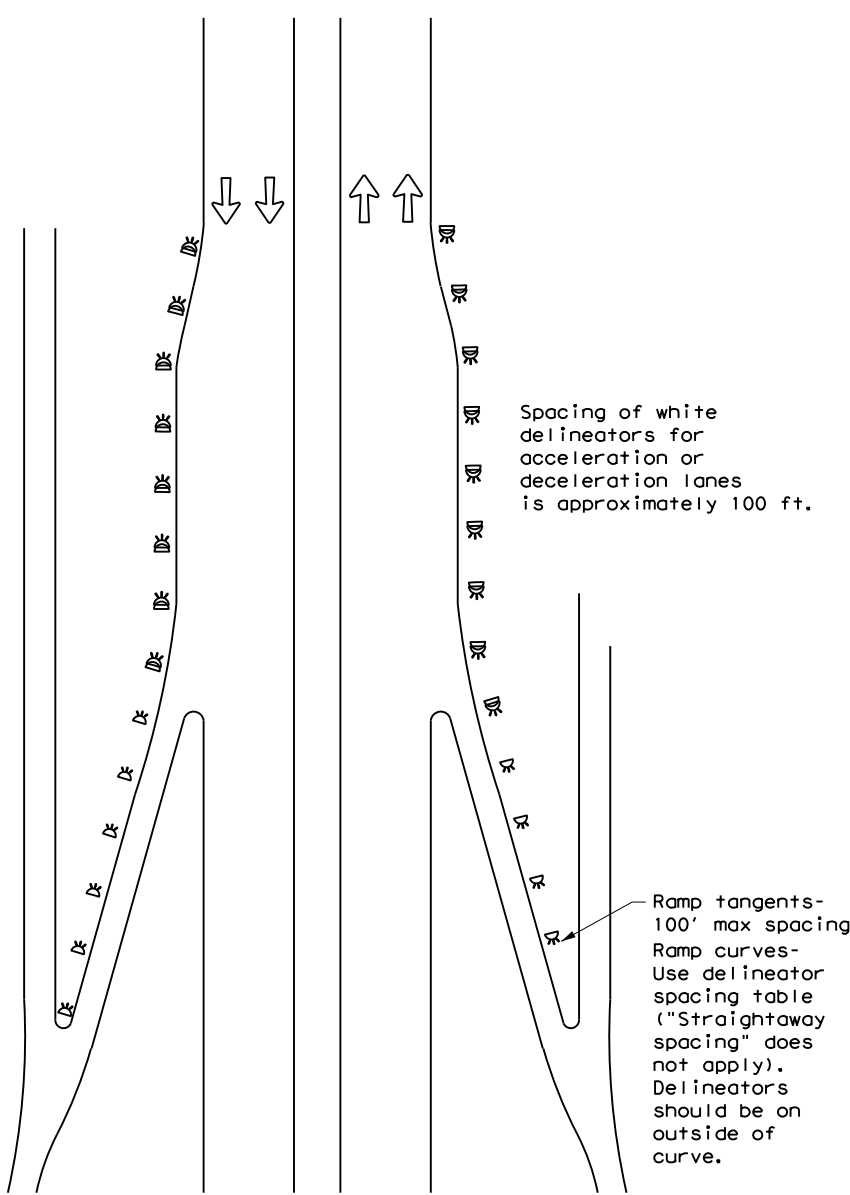
**DETAIL 1**

**FOR CULVERTS WITHOUT MBGF**



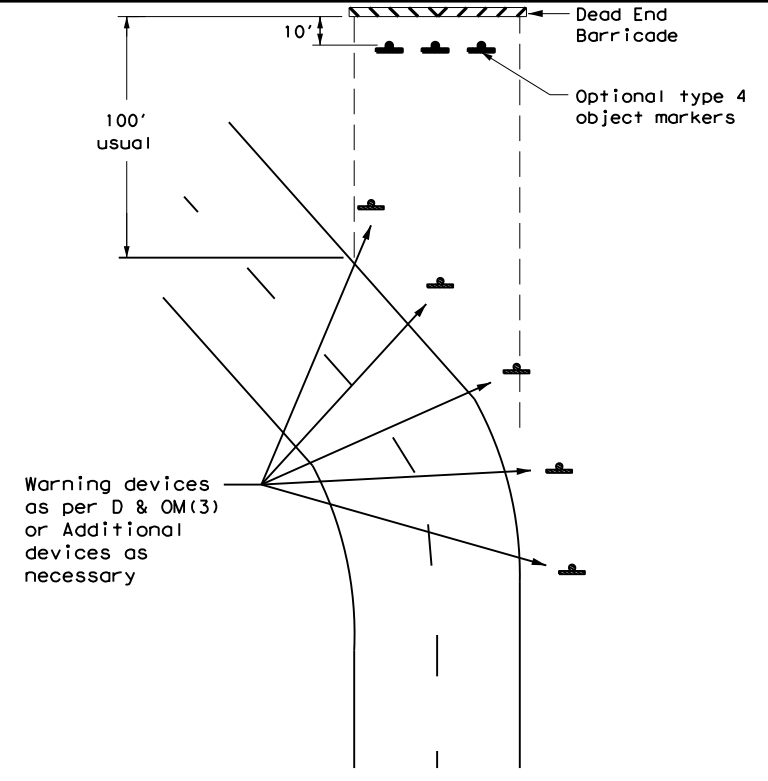
**DETAIL 2**

**FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES**



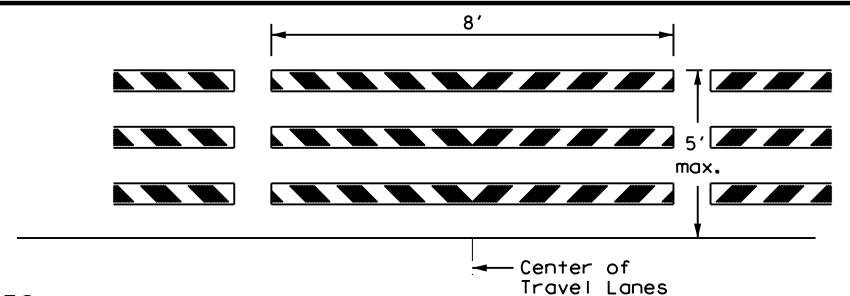
**DETAIL 3**

**TYPICAL APPLICATION OF DEAD END BARRICADE**



**DETAIL 4**

**TYPICAL DEAD END BARRICADE INSTALLATION**



**NOTES**

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

**DETAIL 5**

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



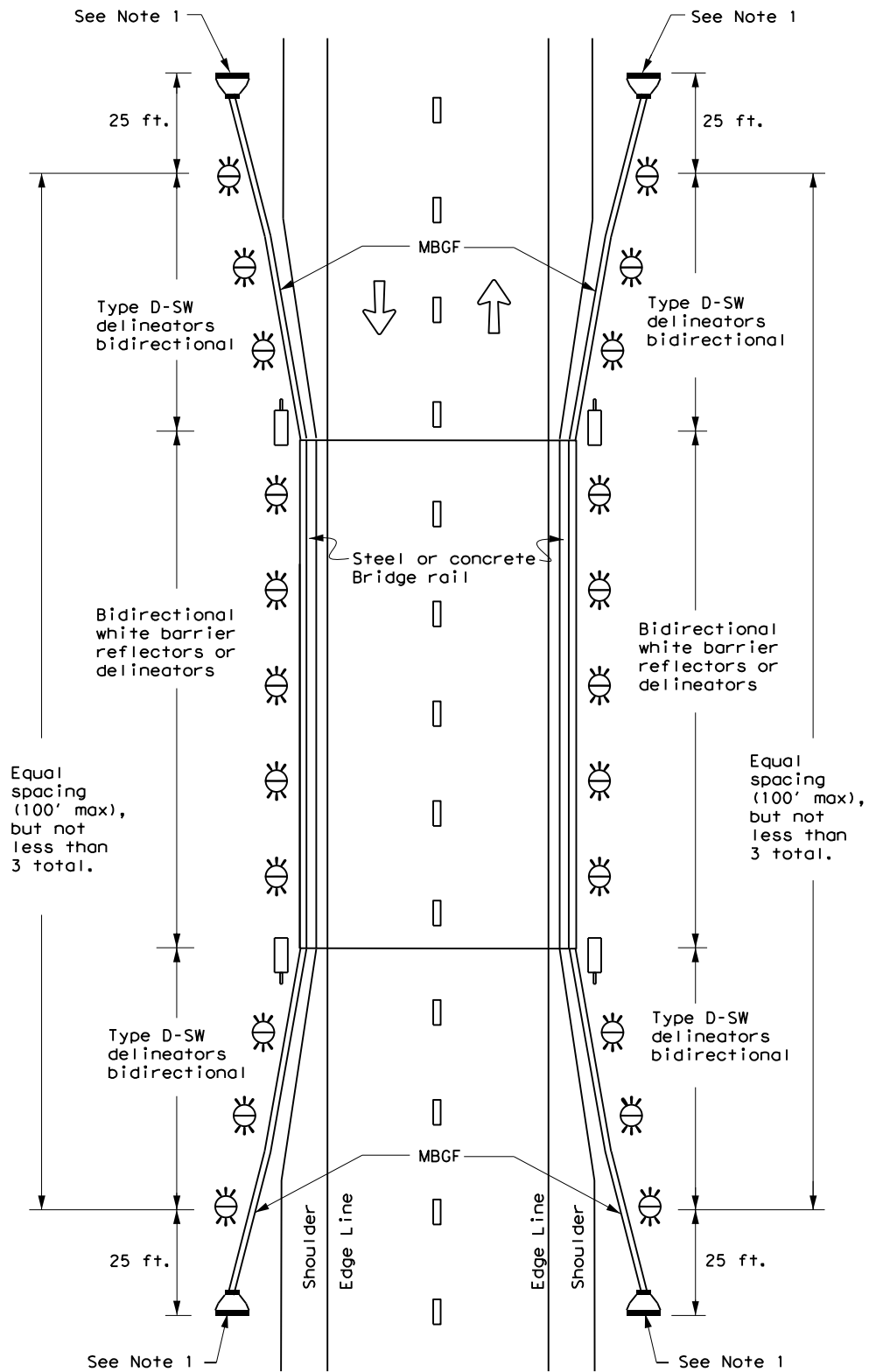
**DELINEATOR & OBJECT MARKER PLACEMENT DETAILS**

**D & OM(4) -20**

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	OW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
3-15	DIST	COUNTY	SHEET NO.	
7-20	AUS	BASTROP	100	



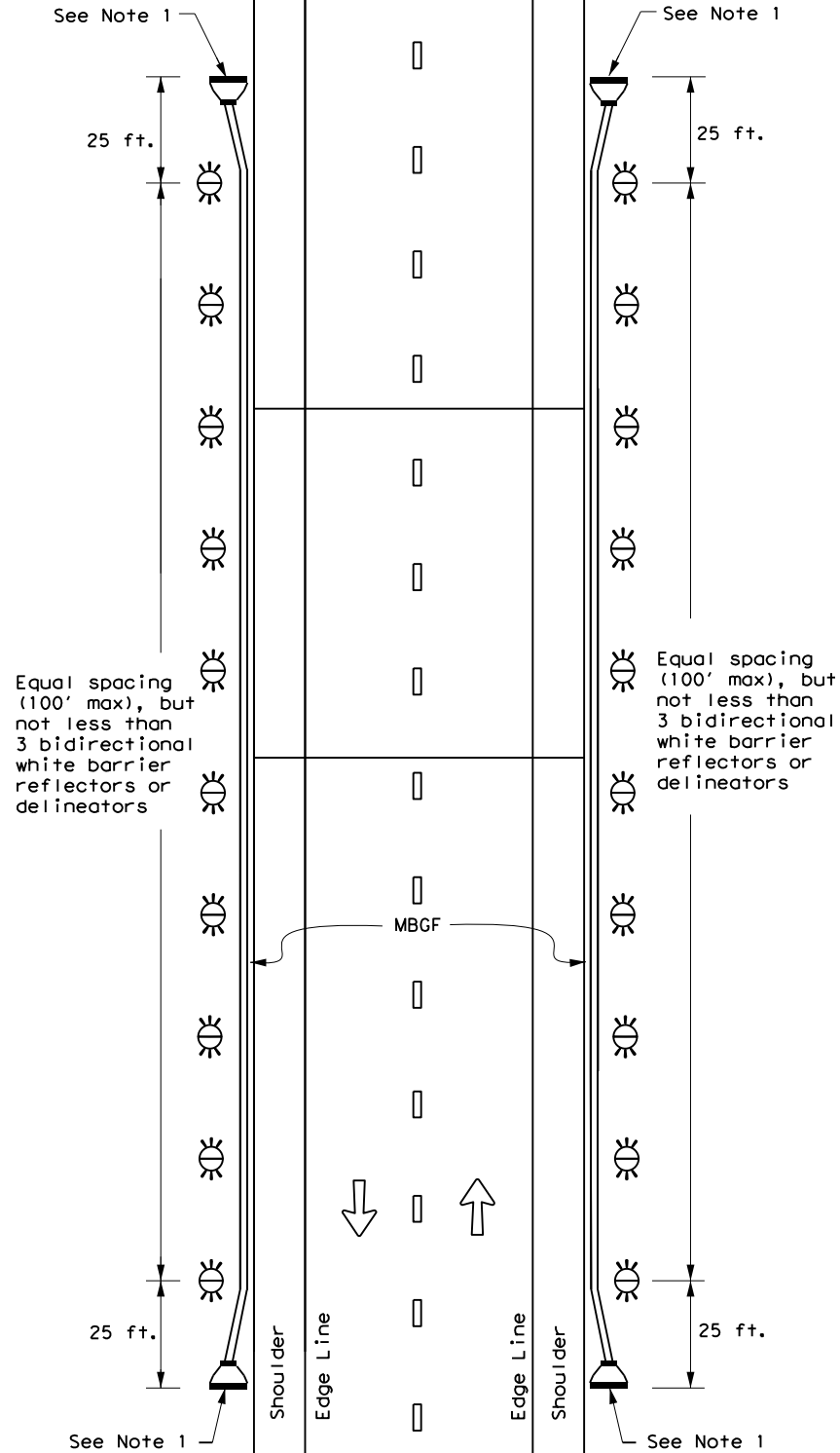
**TWO-WAY, TWO LANE ROADWAY  
WITH REDUCED WIDTH APPROACH RAIL**



**NOTE:**

- 1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

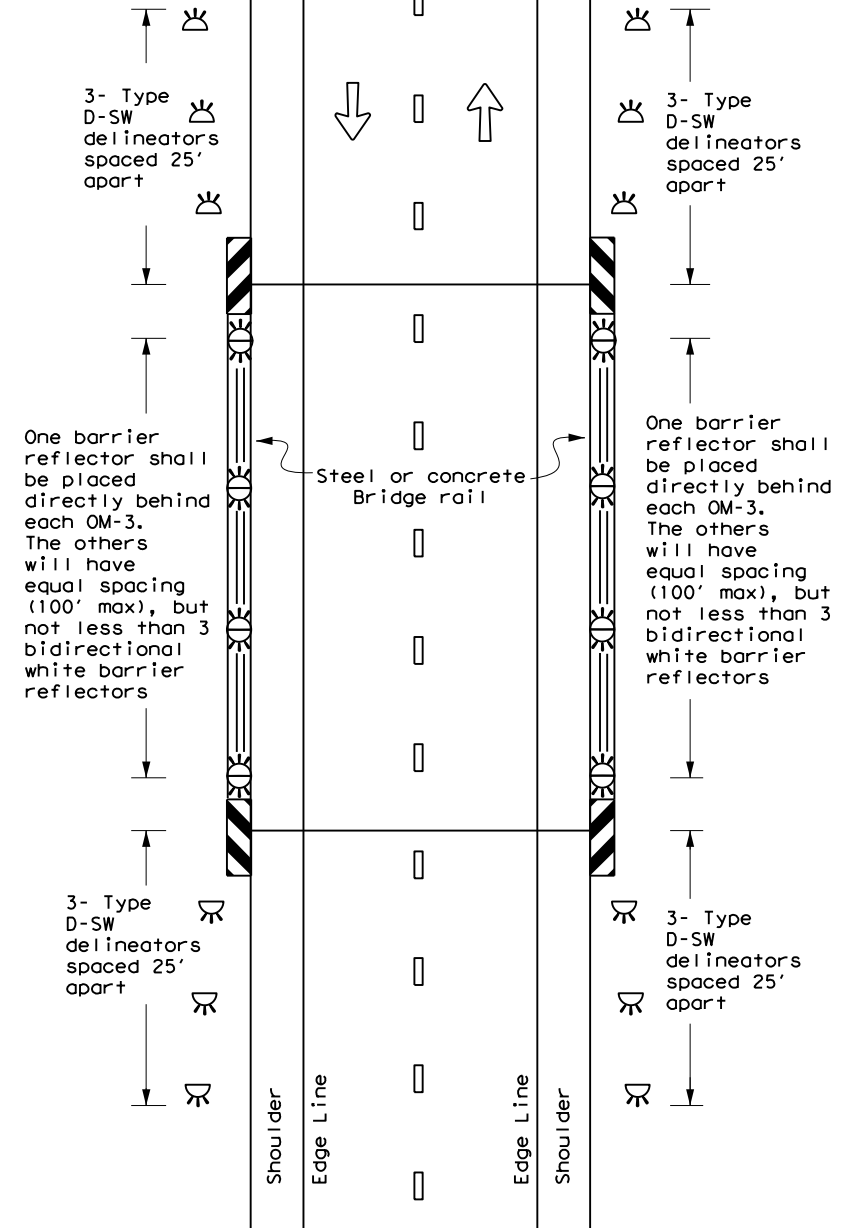
**TWO-WAY, TWO LANE ROADWAY  
WITH METAL BEAM GUARD FENCE (MBGF)**



**NOTE:**

- 1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

**TWO-WAY, TWO LANE ROADWAY  
BRIDGE WITH NO APPROACH RAIL**



**LEGEND**

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



**DELINEATOR &  
OBJECT MARKER  
PLACEMENT DETAILS**

**D & OM(5)-20**

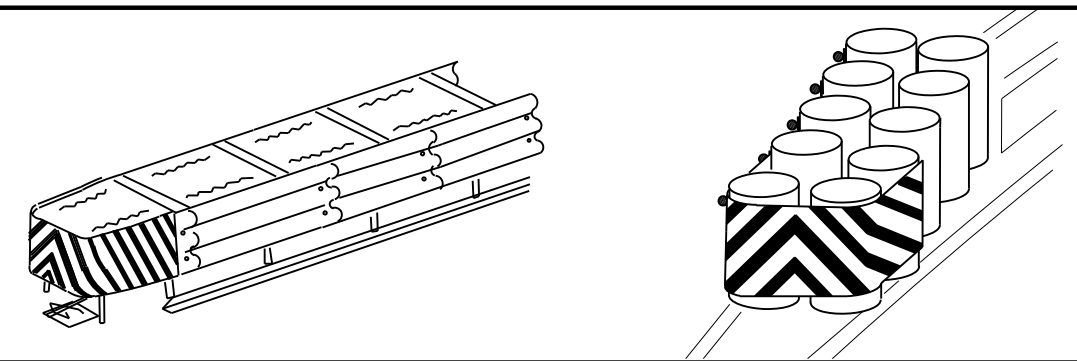
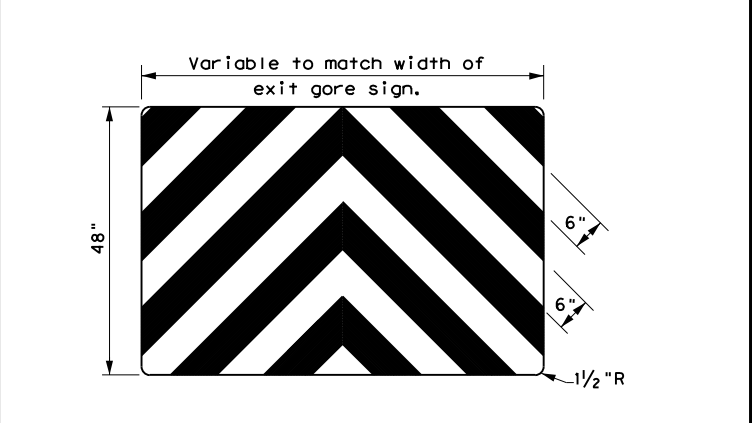
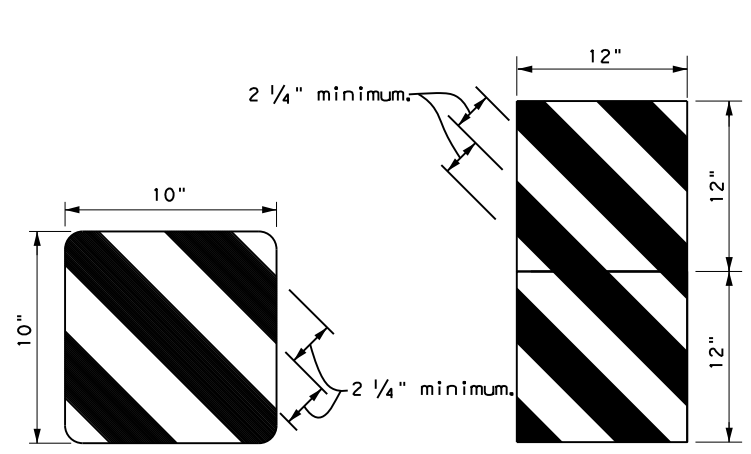
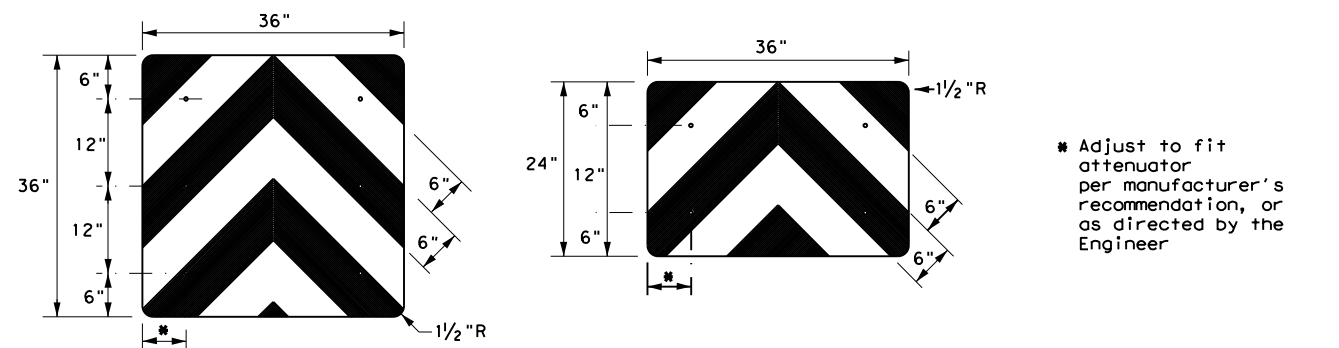
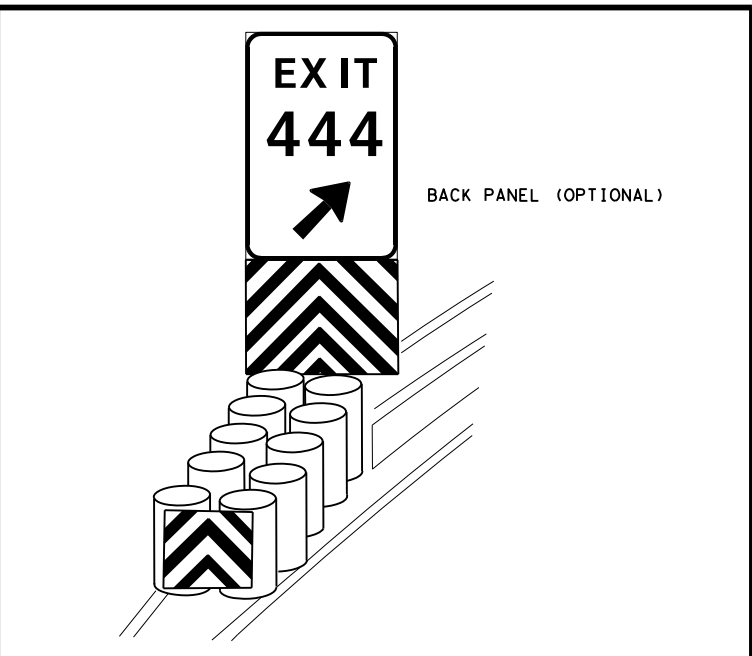
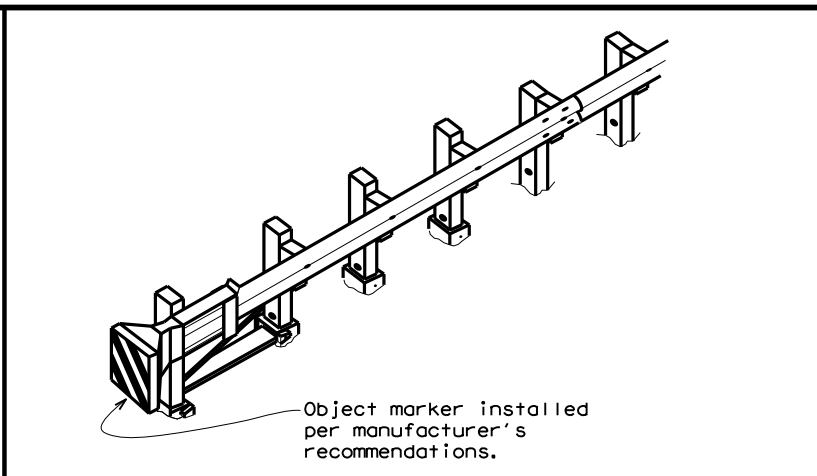
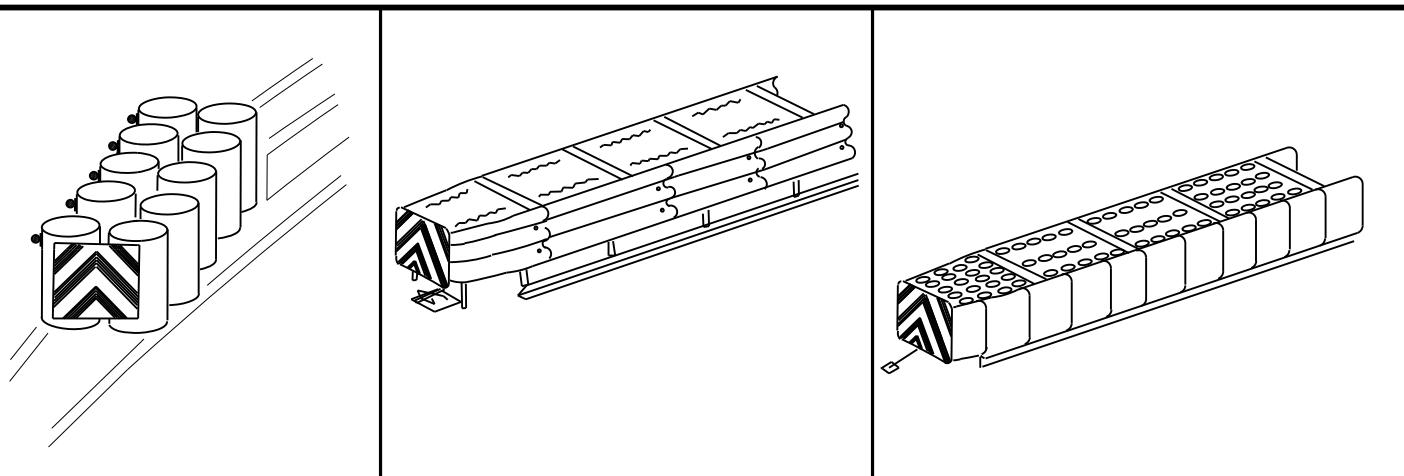
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
7-20	DIST	COUNTY	SHEET NO.	
	AUS	BASTROP	101	

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

DATE: 5/11/2022 9:03:32 PM  
FILE: c:\pwworking\dot168457\dom5-20.dgn

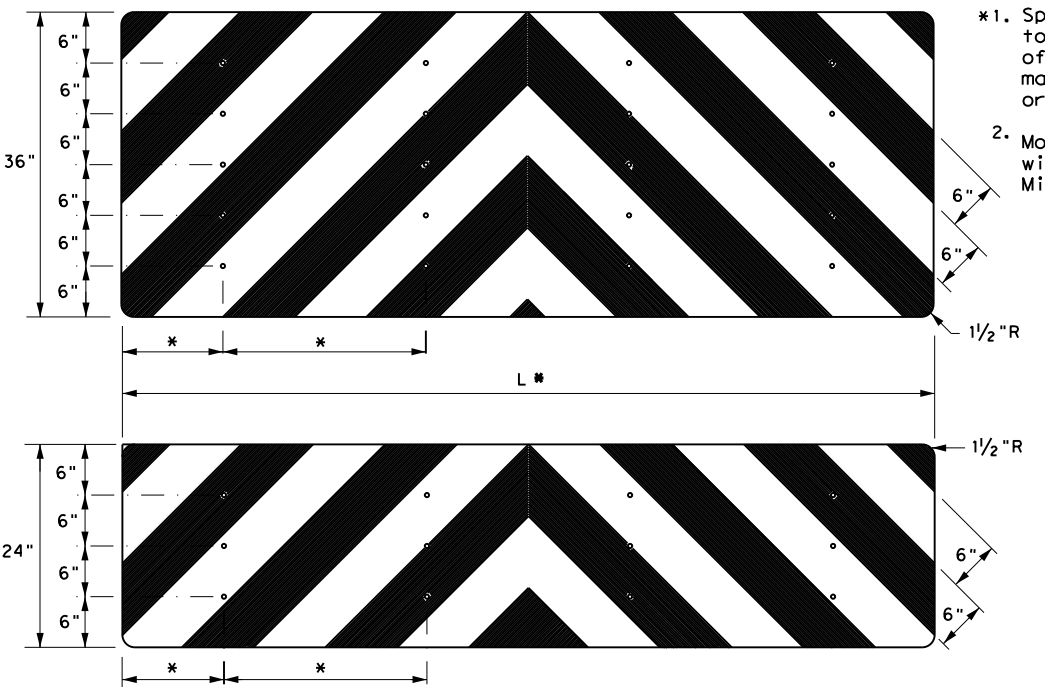
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022 9:03:44 PM  
 FILE: c:\pw\khl\d0168457\domvia-20.dgn



OBJECT MARKERS SMALLER THAN 3 FT<sup>2</sup>

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

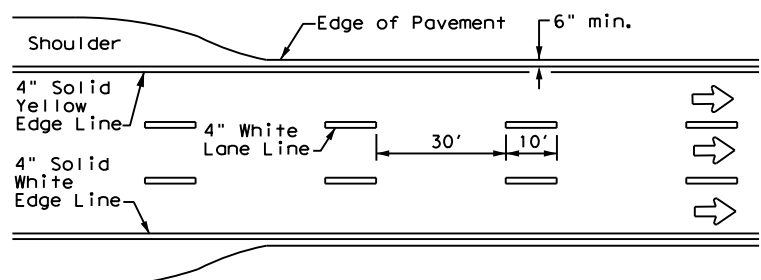


**NOTES**

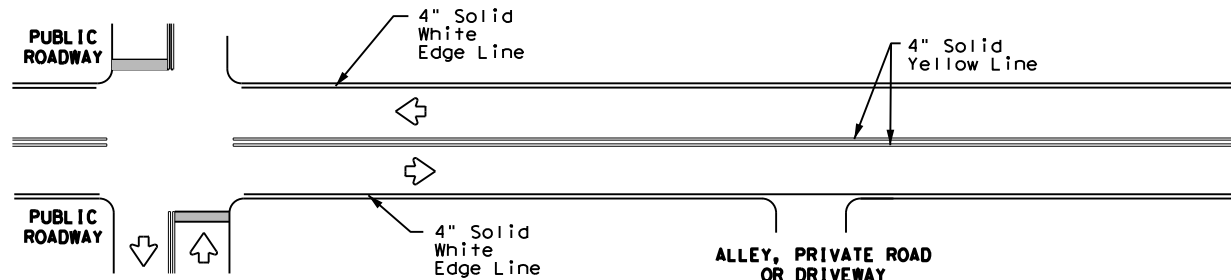
- Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.
- Object Markers may be fabricated from adhesive backed reflective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

<b>DELINEATOR &amp;          OBJECT MARKER          FOR VEHICLE IMPACT          ATTENUATORS          D &amp; OM(VIA) -20</b>			
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT
© TXDOT December 1989	CONT	SECT	JOB
REVISIONS		1186 02	025 FM 969
4-92 8-04	DIST	COUNTY	SHEET NO.
8-95 3-15	AUS	BASTROP	102
4-98 7-20			
20G			

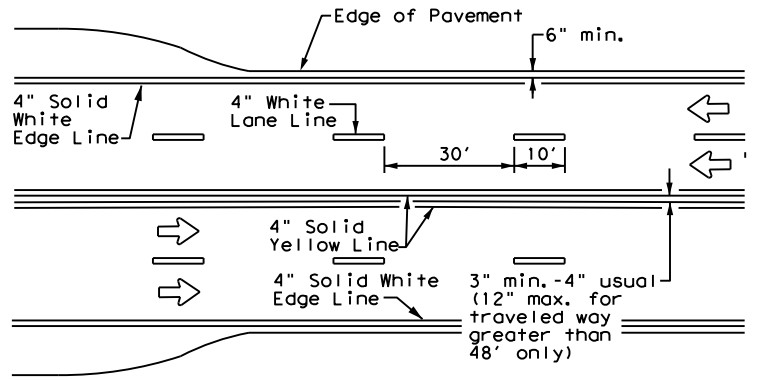
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



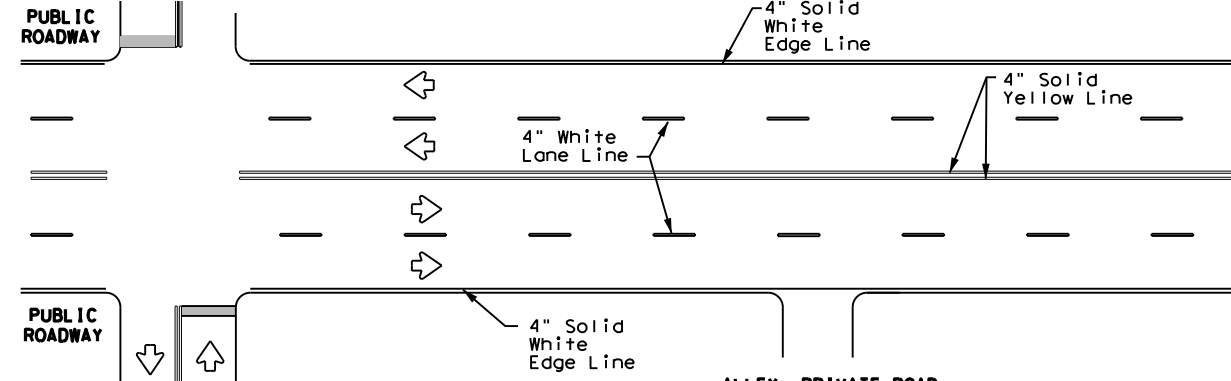
**EDGE LINE AND LANE LINES  
ONE-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



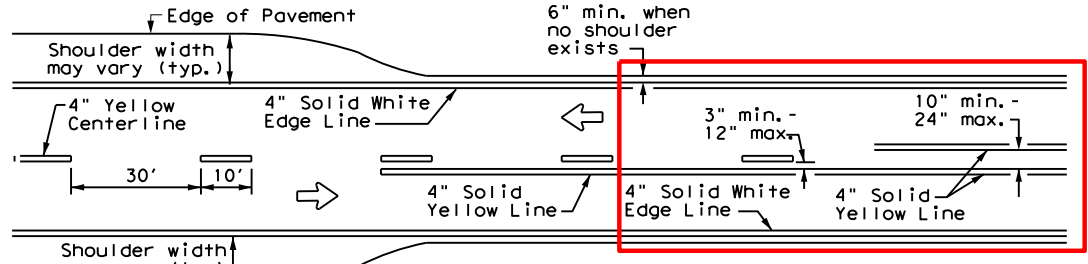
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**



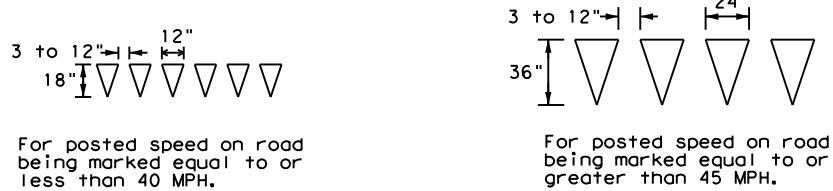
**CENTERLINE AND LANE LINES  
FOUR LANE TWO-WAY ROADWAY  
WITH OR WITHOUT SHOULDERS**



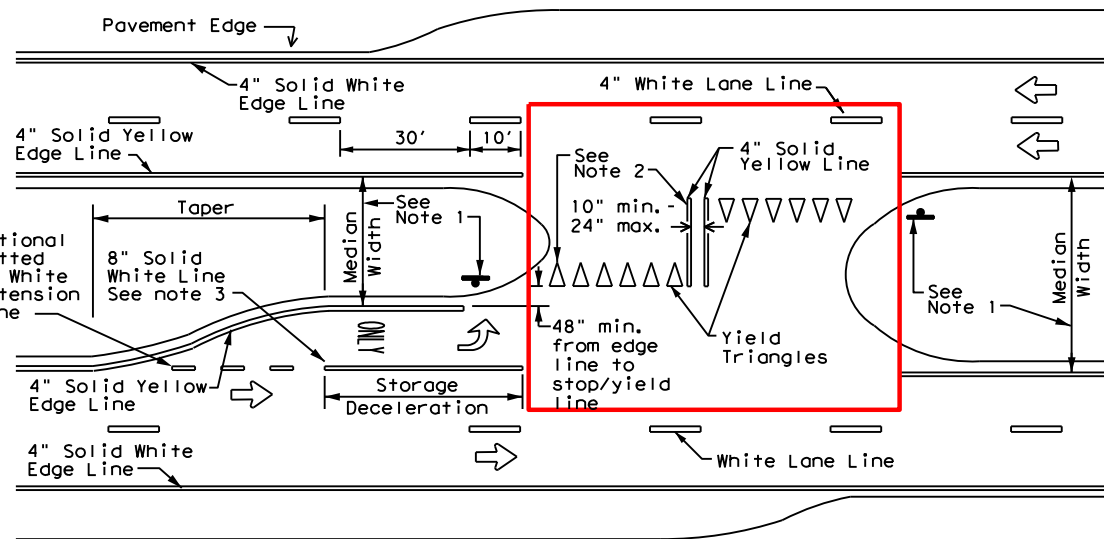
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT  
MARKINGS THROUGH INTERSECTIONS**



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



**YIELD LINES**



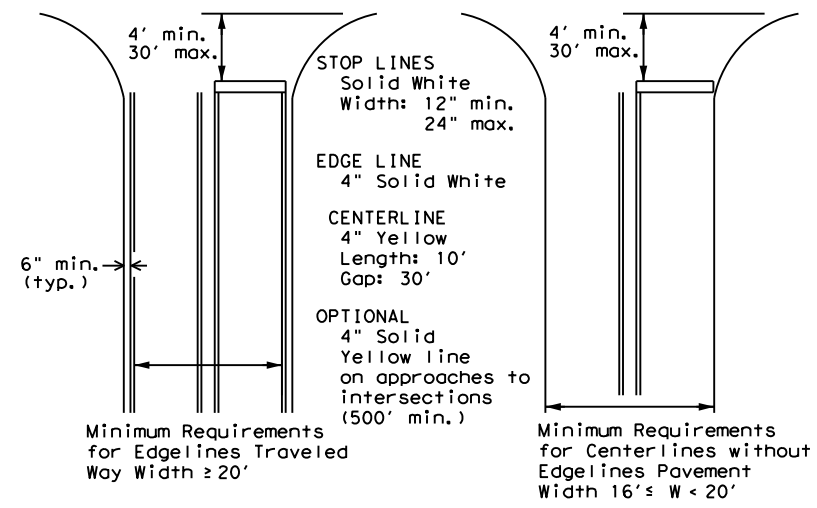
**FOUR LANE DIVIDED ROADWAY CROSSOVERS**

- NOTES**
- Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
  - Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles 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**
- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines 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 inside of edgeline to the inside of edgeline of a two lane roadway.

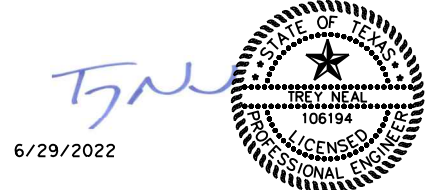
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

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



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

DATE: 6/29/2022 9:45:35 AM  
 FILE: c:\pwworking\dot\dot\dot\d0168457.pml-20 (MOD).dgn



**Texas Department of Transportation** Traffic Safety Division Standard

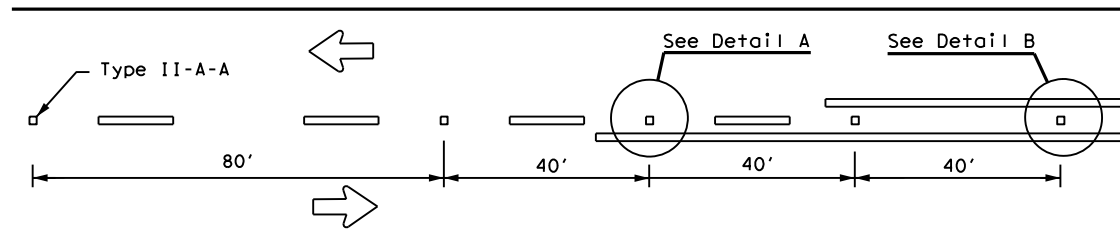
**TYPICAL STANDARD PAVEMENT MARKINGS**

**PM (1) - 20 (MOD)**

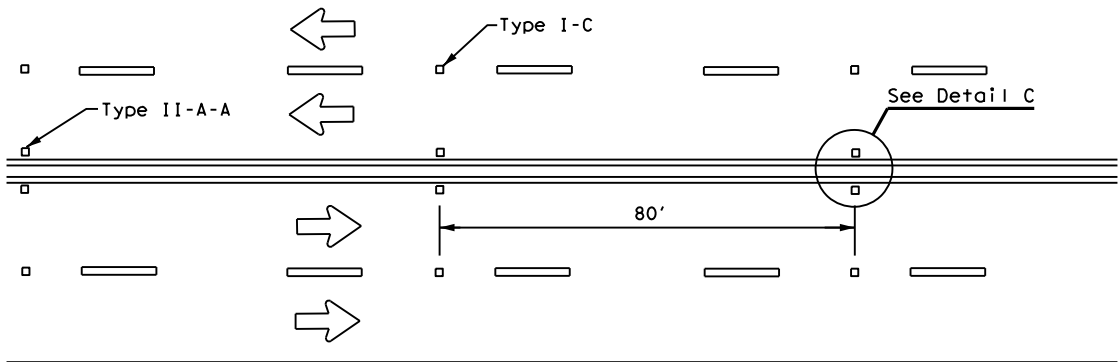
FILE: pml-20.dgn	DN: 1186	CK: 02	DW: 025	CK: FM 969
© TxDOT November 1978	REVISIONS	CONT	SECT	JOB
8-95 3-03		1186	02	025
5-00 2-12		DIST	COUNTY	SHEET NO.
8-00 6-20		AUS	BASTROP	103

# REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

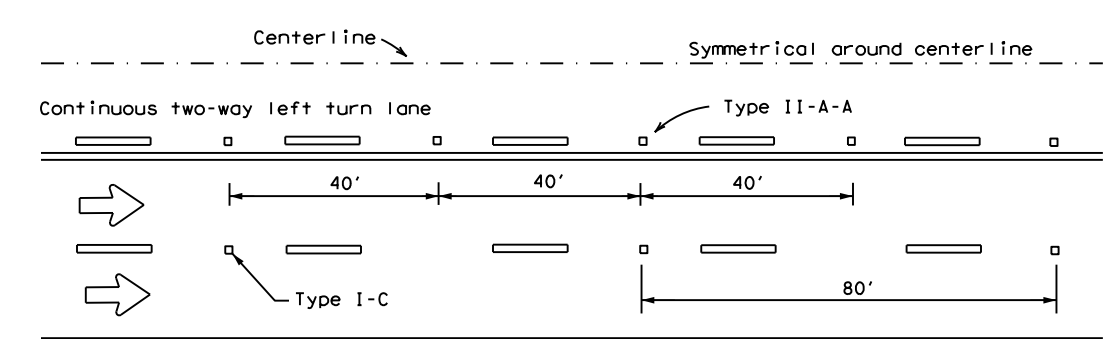
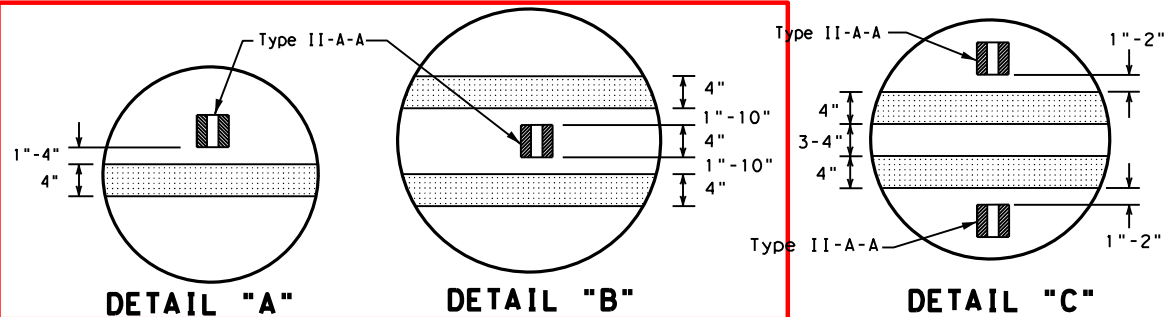
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



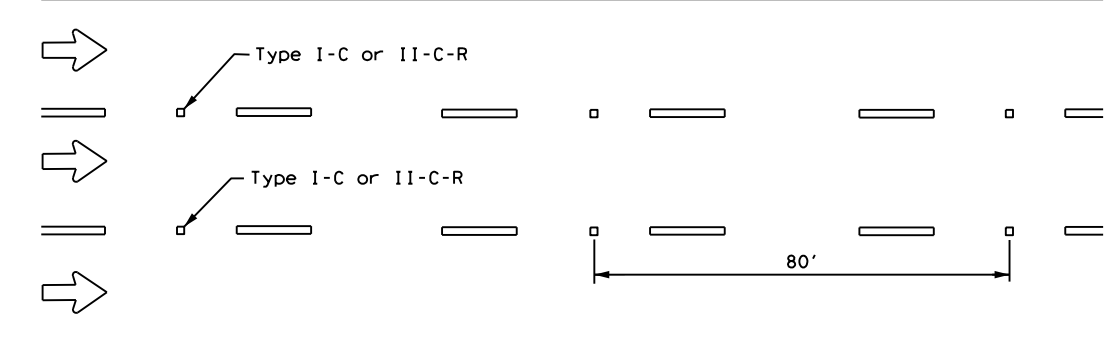
**CENTERLINE FOR ALL TWO LANE ROADWAYS**



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



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

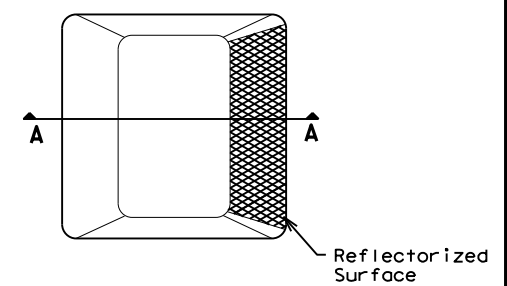


**LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)**

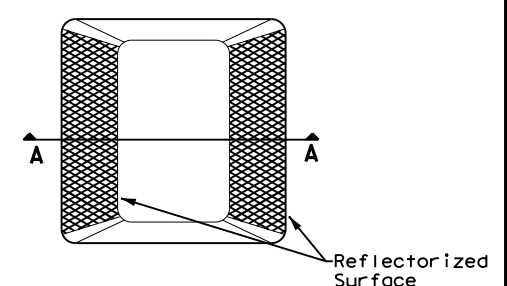
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

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

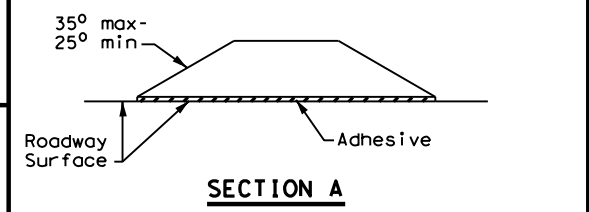
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



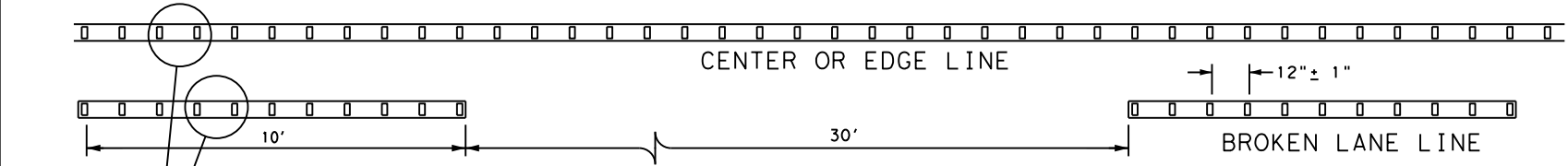
**Type I (Top View)**



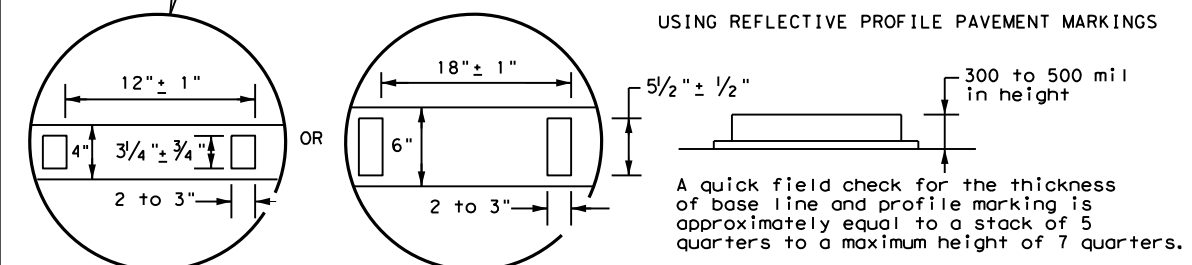
**Type II (Top View)**



**RAISED PAVEMENT MARKERS**



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



**NOTE**  
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 in 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.



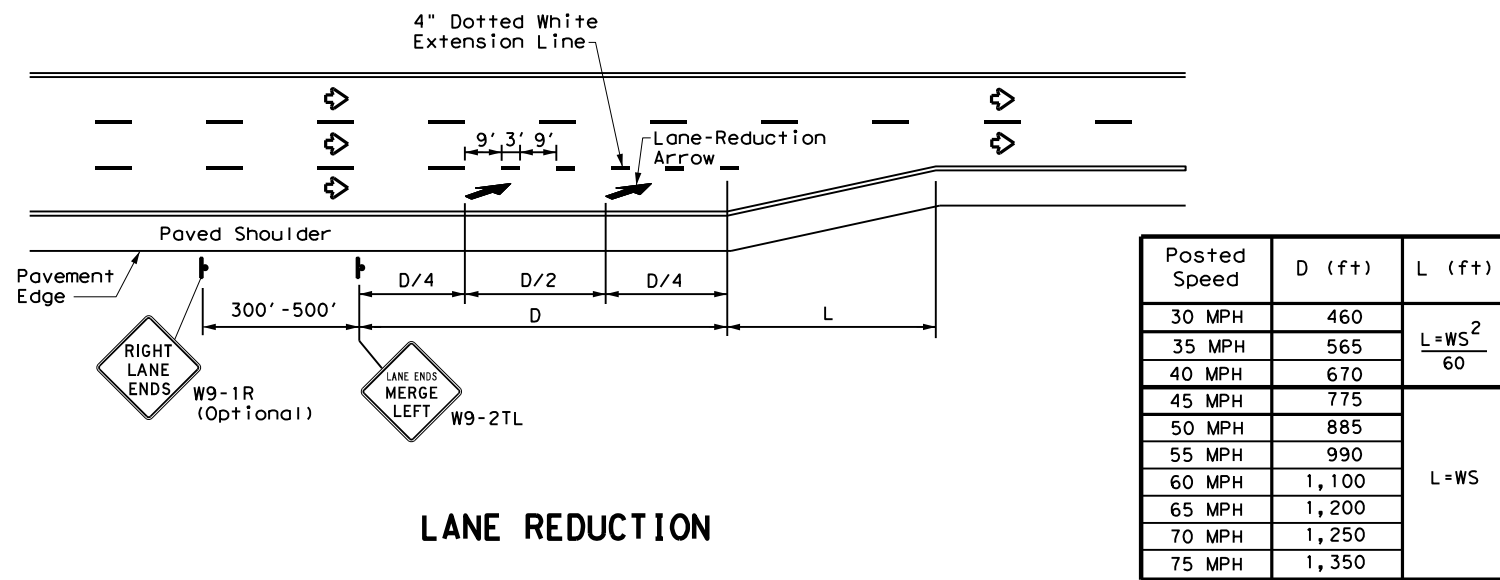
**POSITION GUIDANCE USING  
RAISED MARKERS  
REFLECTORIZED PROFILE  
MARKINGS  
PM(2) - 20 (MOD)**

FILE: pm2-20.dgn	DW: DW	CK: CK	DATE: 6/29/2022
© TxDOT April 1977	CONT: 1186	SECT: 02	JOB: 025
4-92 2-10 REVISIONS	DIST: AUS	COUNTY: BASTROP	HIGHWAY: FM 969
5-00 2-12			SHEET NO. 104
8-00 6-20			

DATE: 6/29/2022 9:45:41 AM  
 FILE: c:\pwworking\dot168457\pm2-20(MOD).dgn

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

DATE: 5/11/2022 9:04:21 PM  
 FILE: c:\pw\khl\d0168457\pm3-20.dgn



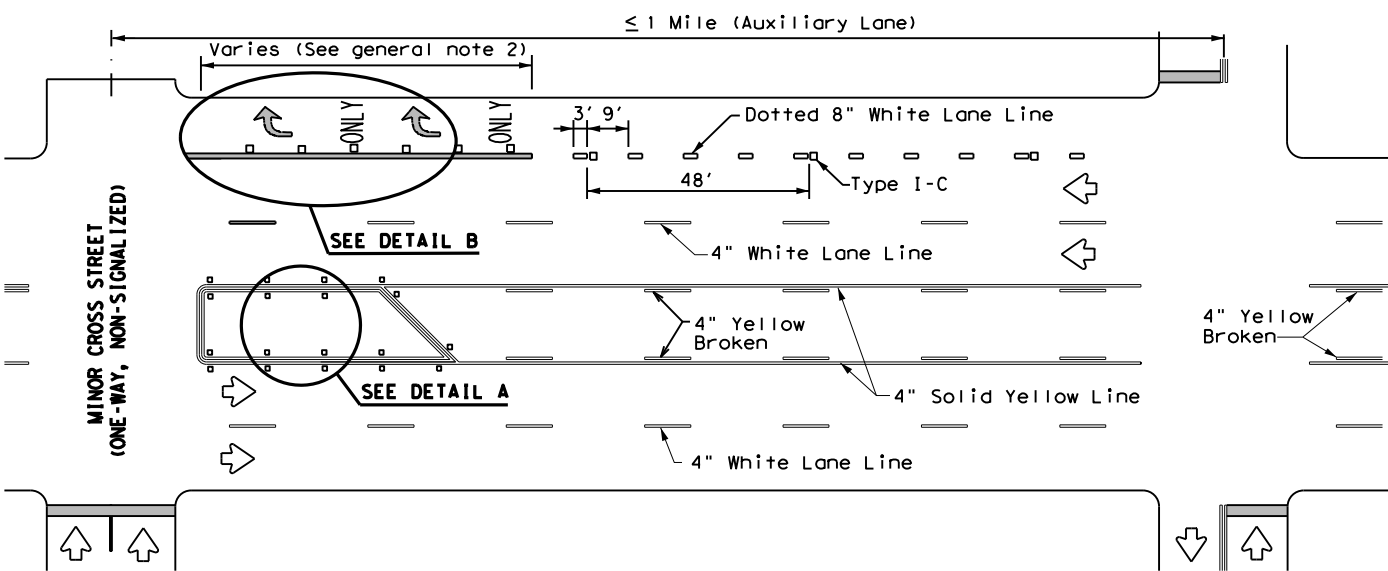
**LANE REDUCTION**

**NOTES**

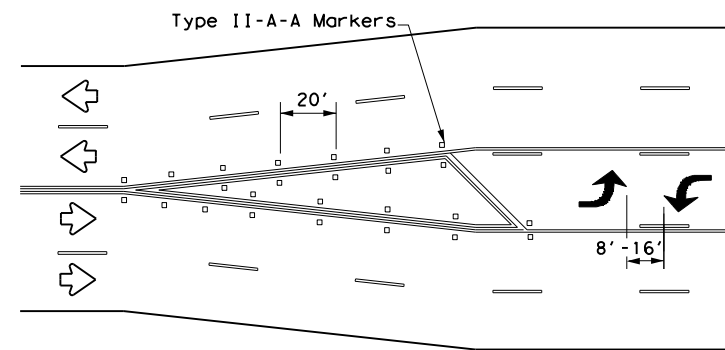
- Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
- On divided highways, an additional W9-1R "RIGHT LANE ENDS" 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.

**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.



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

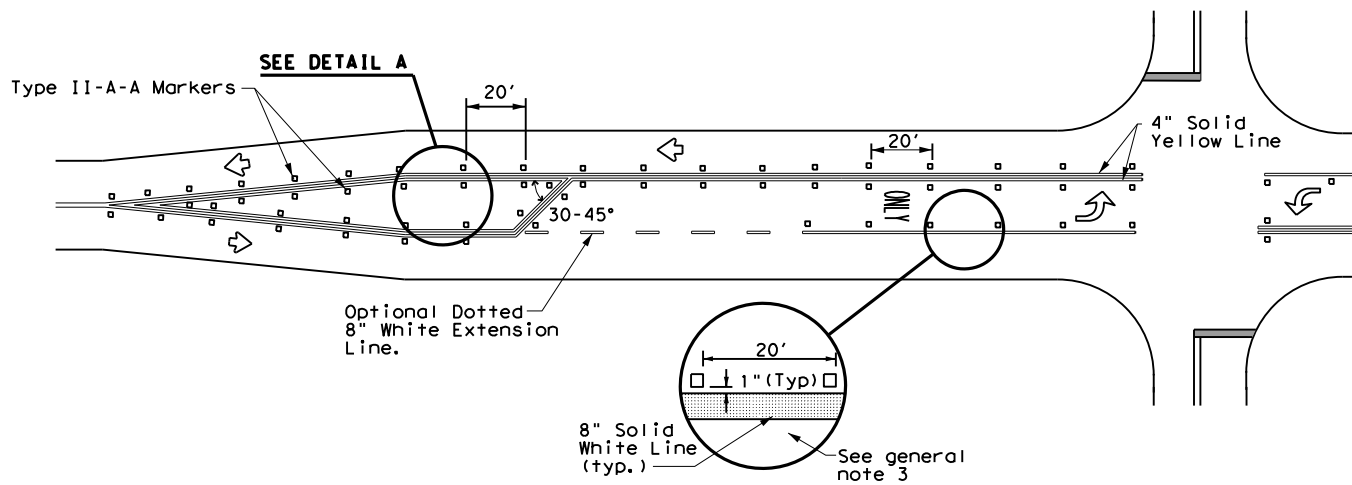


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

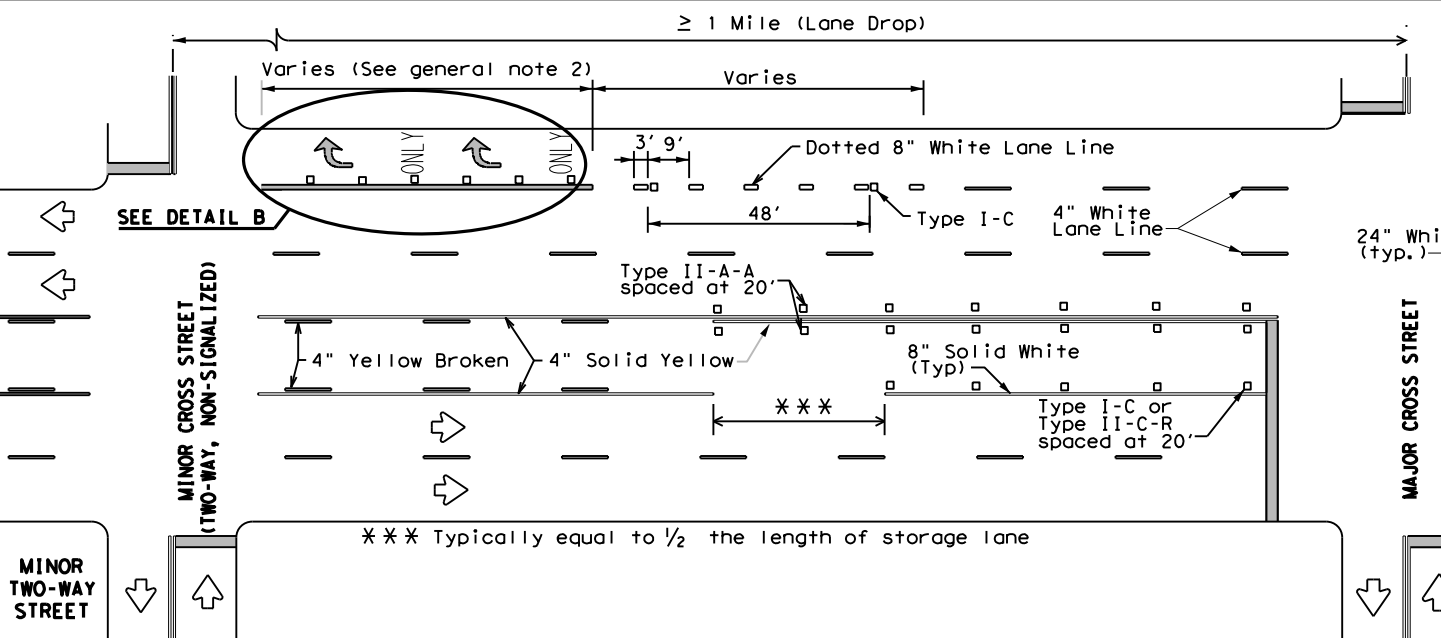
**TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY**

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

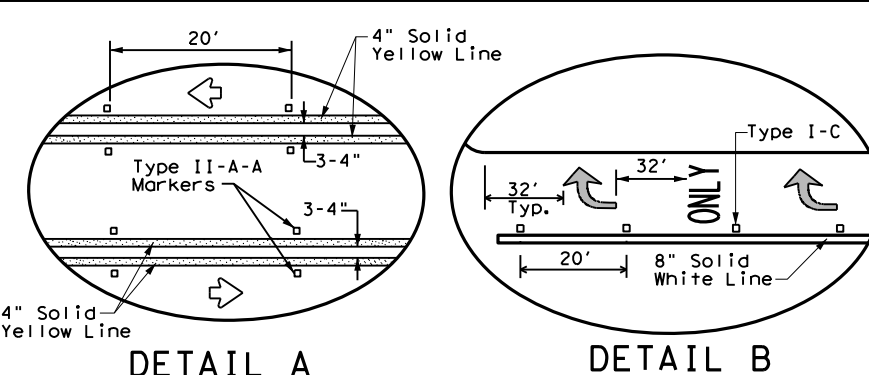
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



**TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS**



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



**DETAIL A**

**DETAIL B**

Texas Department of Transportation Traffic Safety Division Standard

**TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20**

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
5-00 2-10	DIST	COUNTY	SHEET NO.	
8-00 2-12	AUS	BASTROP	105	
3-03 6-20				



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

## SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

### Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))  
 TWT = Thin-Walled Tubing (see SMD(TWT))  
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))  
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

### Number of Posts (1 or 2)

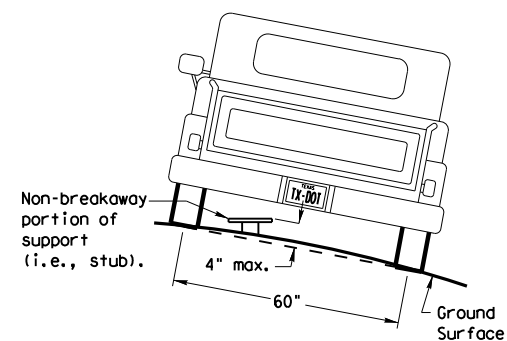
### Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))  
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))  
 WS = Wedge Anchor Steel - (see SMD(TWT))  
 WP = Wedge Anchor Plastic (see SMD(TWT))  
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))  
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

### Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))  
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))  
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))  
 IF REQUIRED  
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))  
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))  
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))  
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

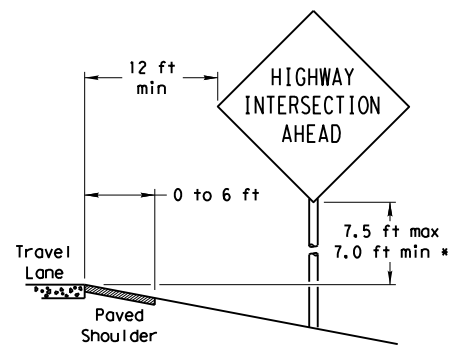
## REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

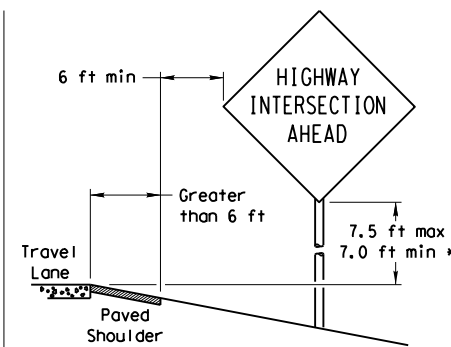
## SIGN LOCATION

### PAVED SHOULDERS



#### LESS THAN 6 FT. WIDE

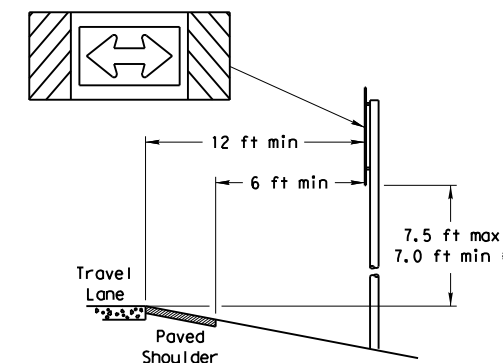
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



#### GREATER THAN 6 FT. WIDE

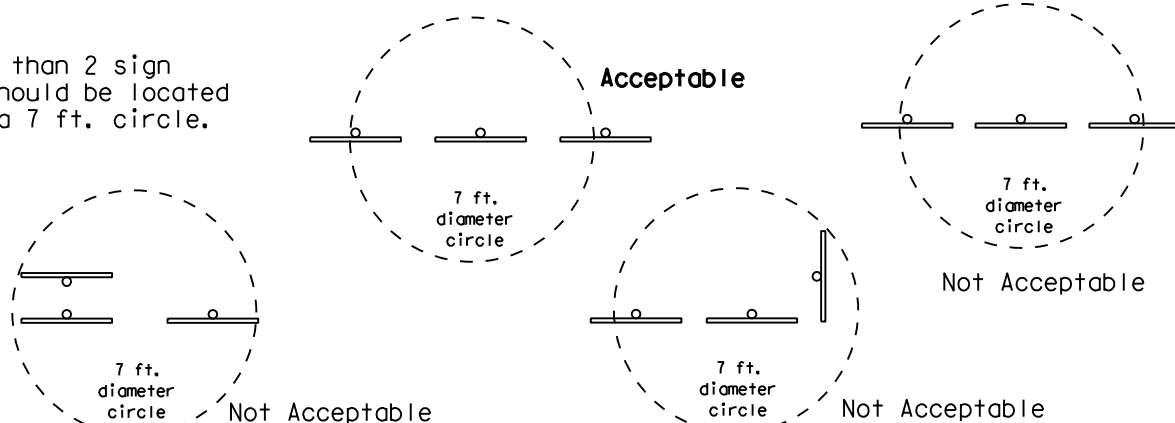
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

### T-INTERSECTION

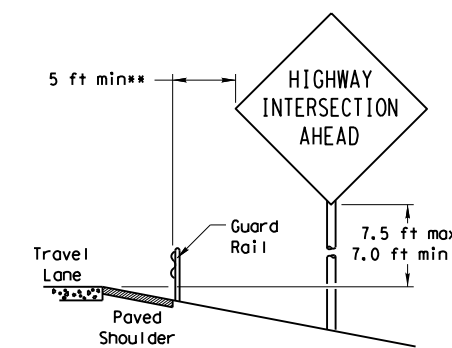


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

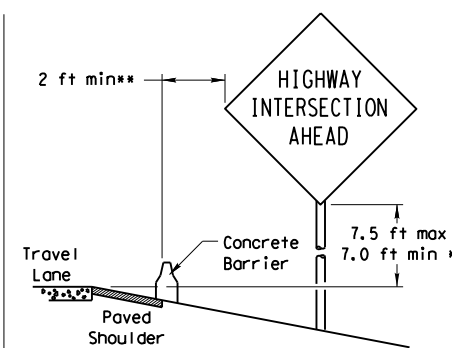
No more than 2 sign posts should be located within a 7 ft. circle.



### BEHIND BARRIER

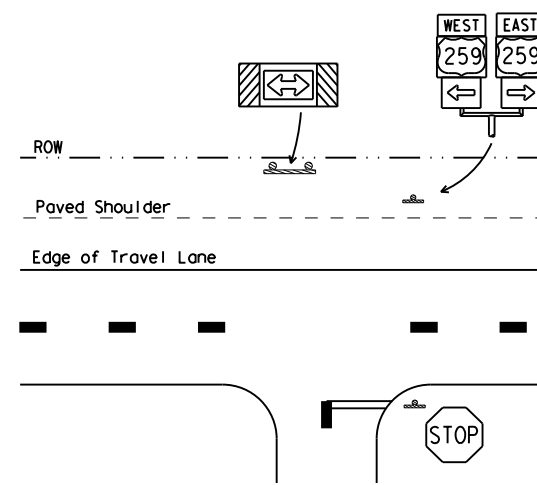


#### BEHIND GUARDRAIL



#### BEHIND CONCRETE BARRIER

\*\*Sign clearance based on distance required for proper guard rail or concrete barrier performance.



\* Signs shall be mounted using the following condition that results in the greatest sign elevation:

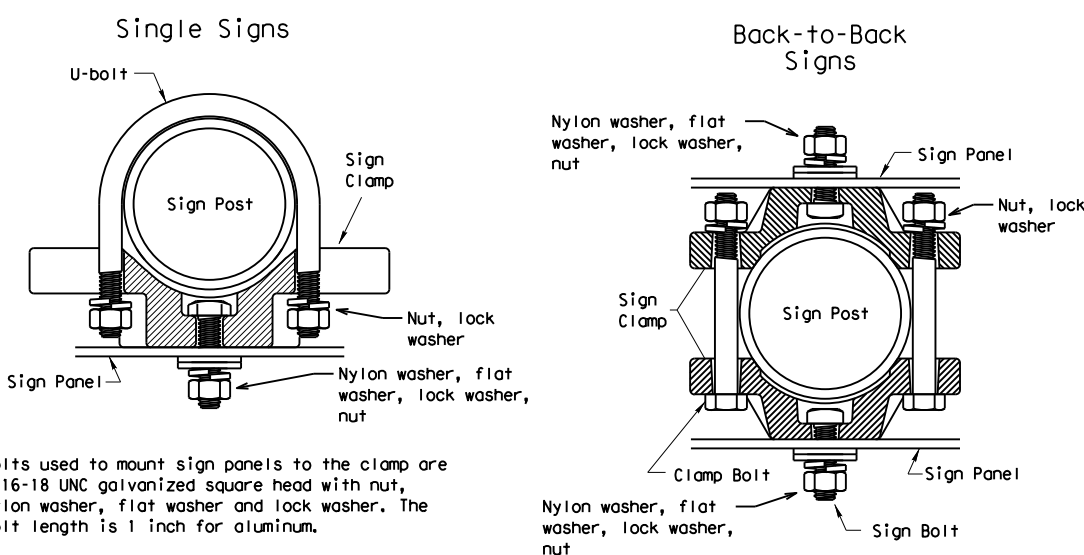
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:  
<http://www.txdot.gov/publications/traffic.htm>

## TYPICAL SIGN ATTACHMENT DETAIL



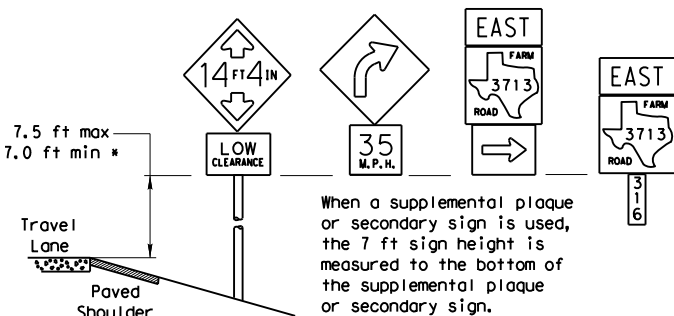
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

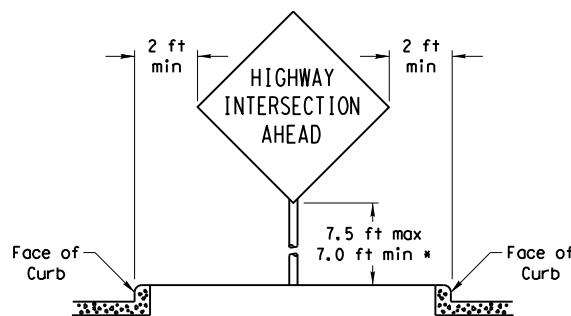
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

### SIGNS WITH PLAQUES

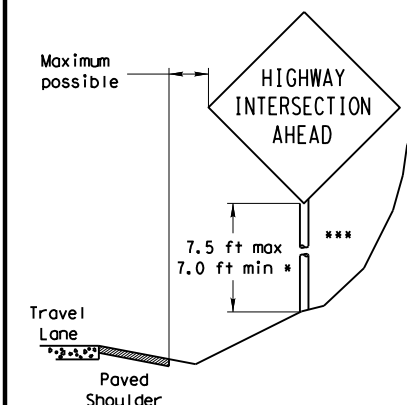


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

### CURB & GUTTER OR RAISED ISLAND



### RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

\*\*\* Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation  
 Traffic Operations Division

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

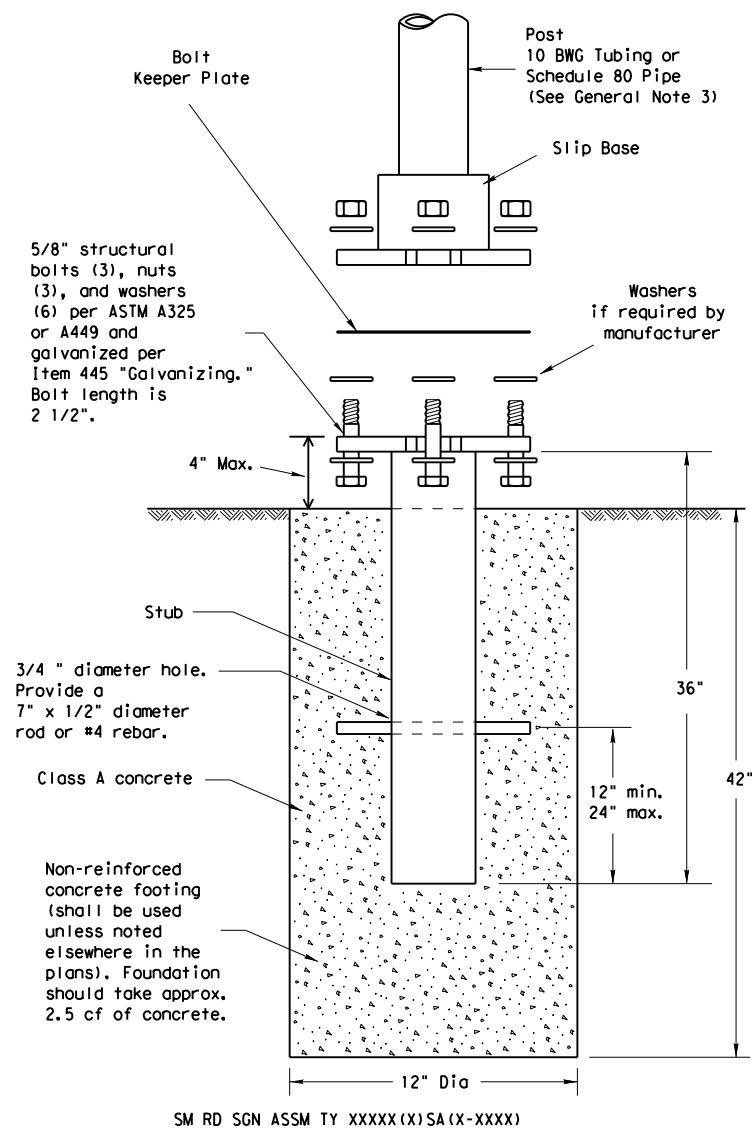
© TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONTRACT NO. 1186 02	SECTION 025	HIGHWAY FM 969
		DIST. AUS	COUNTY BASTROP	SHEET NO. 106

DATE: 5/11/2022 9:04:35 PM  
 FILE: c:\pwworking\dot\168457\smagen.dgn

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

DATE: 5/11/2022 9:04:51 PM  
 FILE: c:\pwworking\dot168457\smas1.dgn

## TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



### NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. [http://www.txdot.gov/business/producer\\_list.htm](http://www.txdot.gov/business/producer_list.htm) The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

### GENERAL NOTES:

- Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
- Material used as post with this system shall conform to the following specifications:
  - 10 BWG Tubing (2.875" outside diameter)
    - 0.134" nominal wall thickness
    - Seamless or electric-resistance welded steel tubing or pipe
    - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
    - Other steels may be used if they meet the following:
      - 55,000 PSI minimum yield strength
      - 70,000 PSI minimum tensile strength
      - 20% minimum elongation in 2"
    - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
    - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
    - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
  - Schedule 80 Pipe (2.875" outside diameter)
    - 0.276" nominal wall thickness
    - Steel tubing per ASTM A500 Gr C
    - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
      - 46,000 PSI minimum yield strength
      - 62,000 PSI minimum tensile strength
      - 21% minimum elongation in 2"
    - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
    - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
    - Galvanization per ASTM A123
- See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: <http://www.txdot.gov/publications/traffic.htm>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

### ASSEMBLY PROCEDURE

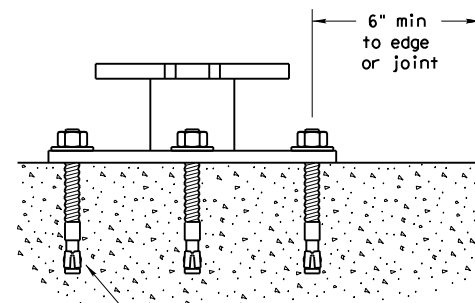
#### Foundation

- Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
- The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
- Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

#### Support

- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
- Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

### CONCRETE ANCHOR



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxyes and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

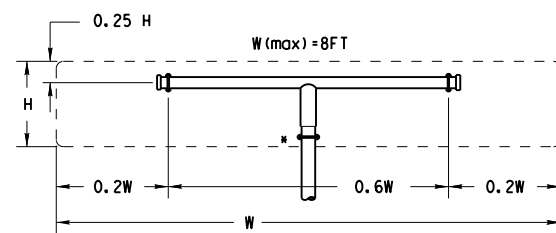
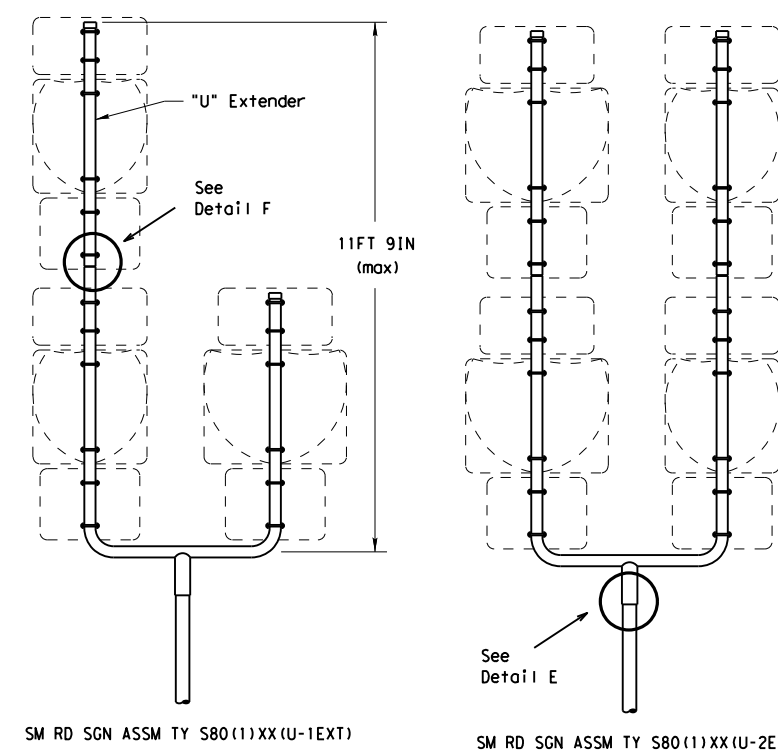
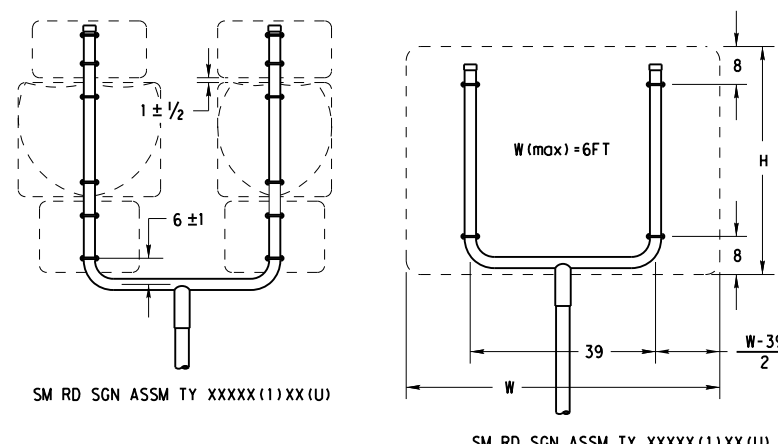
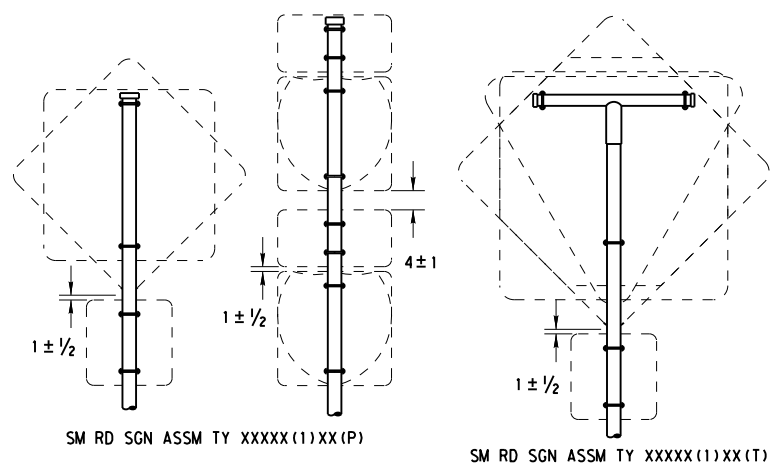
 Texas Department of Transportation  
Traffic Operations Division

## SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM SMD(SLIP-1)-08

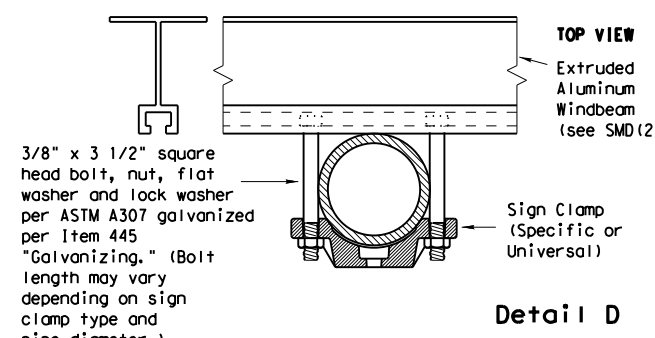
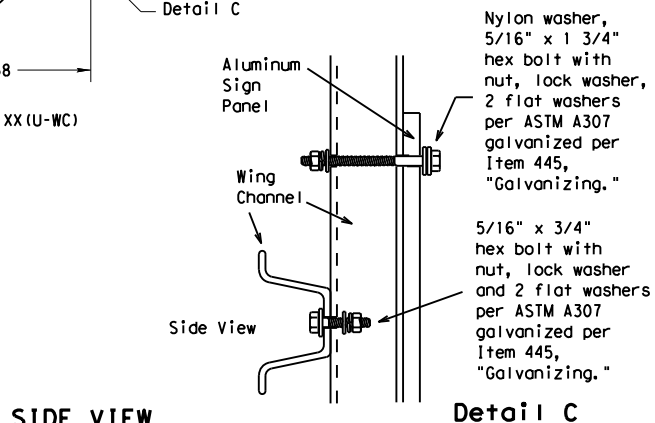
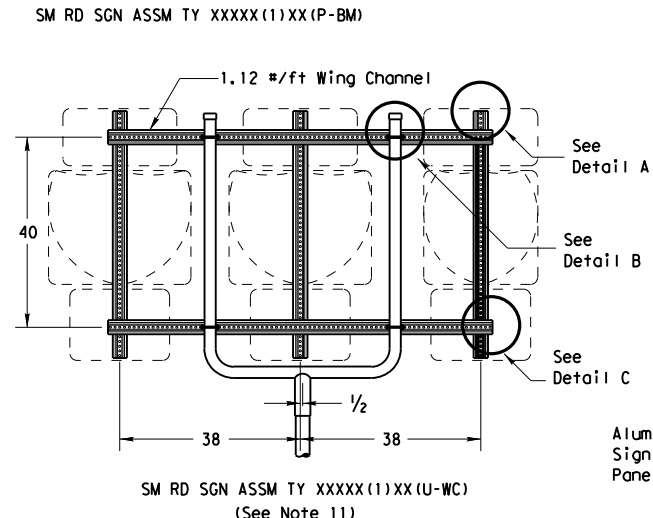
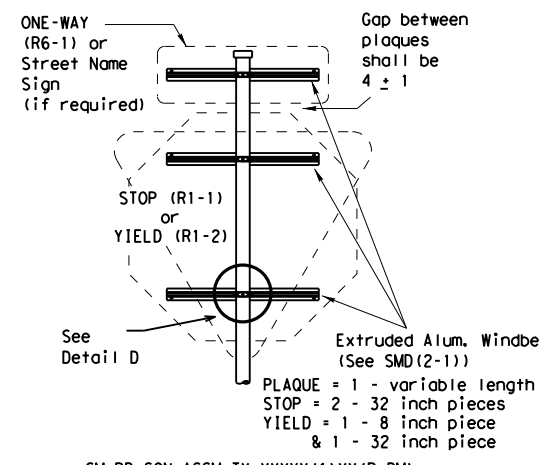
© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
9-08	REVISIONS		CONT	SECT	JOB
			1186	02	025
			DIST	COUNTY	SHEET NO.
		AUS	BASTROP	107	

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

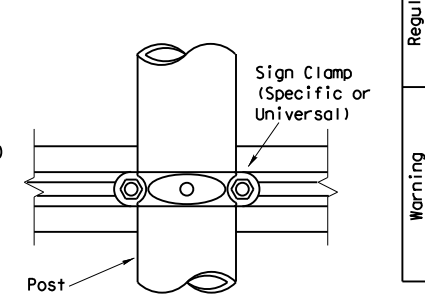
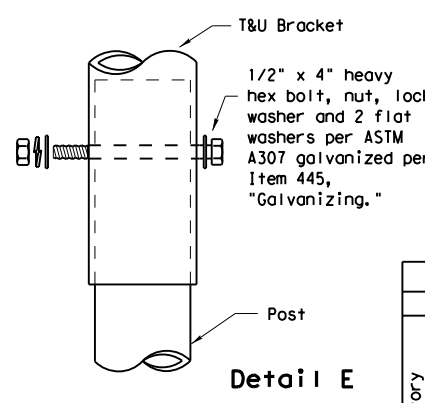
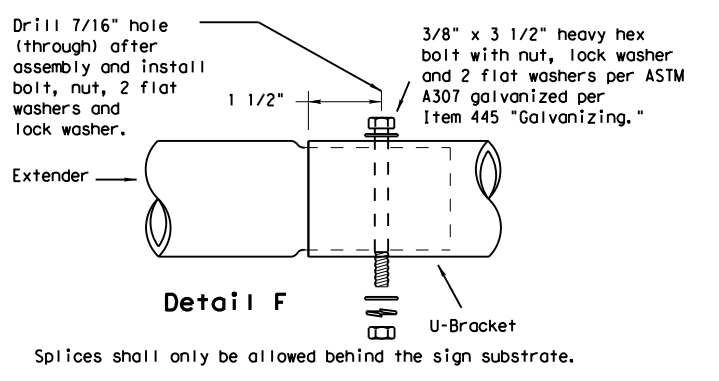
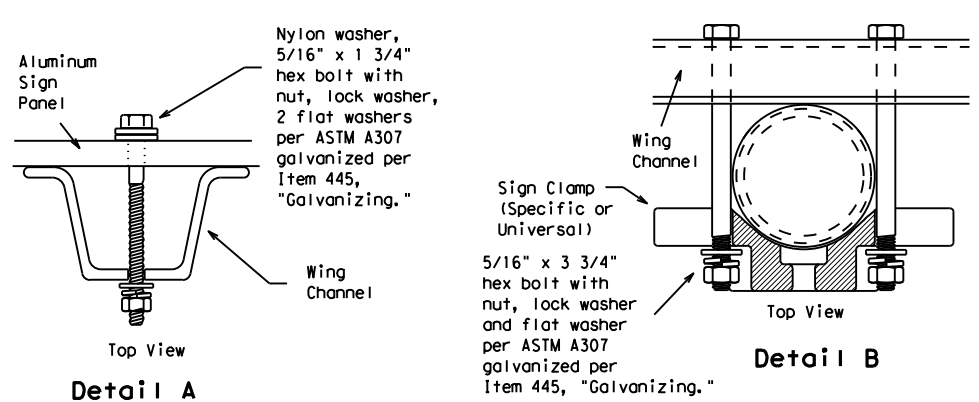
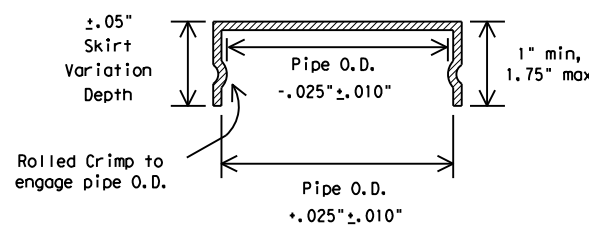
DATE: 5/11/2022 9:05:06 PM  
 FILE: c:\pwworking\1\0168457\smas2.dgn



All dimensions are in english unless detailed otherwise.



FRICION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

- SIGN SUPPORT # OF POSTS MAX. SIGN AREA
 

10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
- Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.
- Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT		
SIGN DESCRIPTION	SUPPORT	
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)	

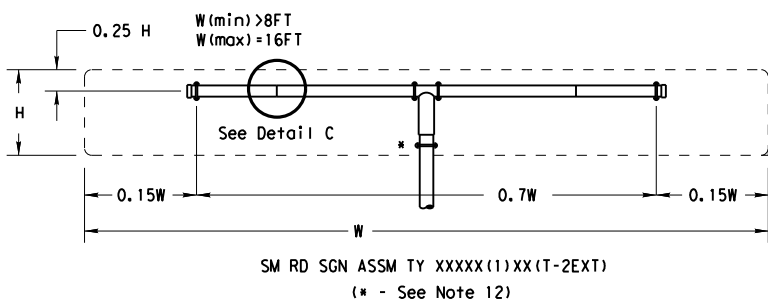


SIGN MOUNTING DETAILS  
 SMALL ROADSIDE SIGNS  
 TRIANGULAR SLIPBASE SYSTEM  
 SMD(SLIP-2)-08

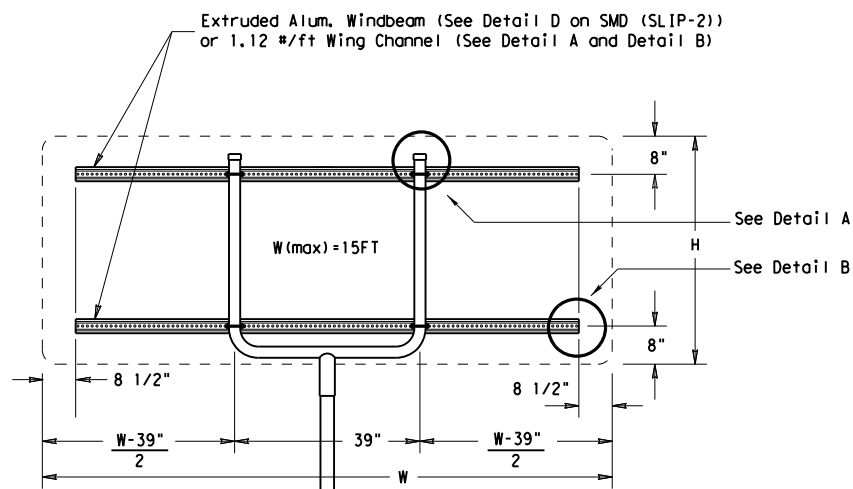
© TxDOT July 2002		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		1186	02	025	FM 969
		DIST	COUNTY		SHEET NO.
		AUS	BASTROP		108

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

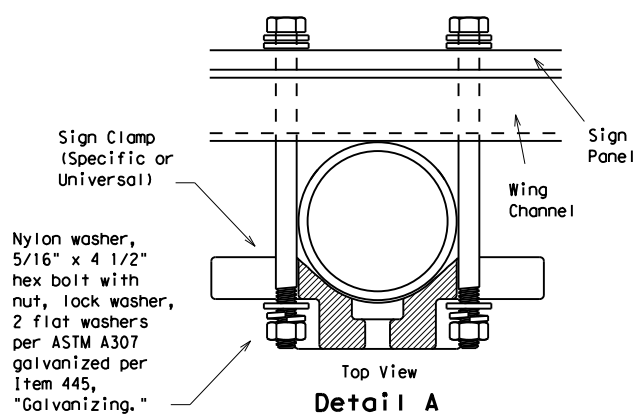
DATE: 5/11/2022 9:05:21 PM  
FILE: c:\pwworking\ad0168457\smas3.dgn



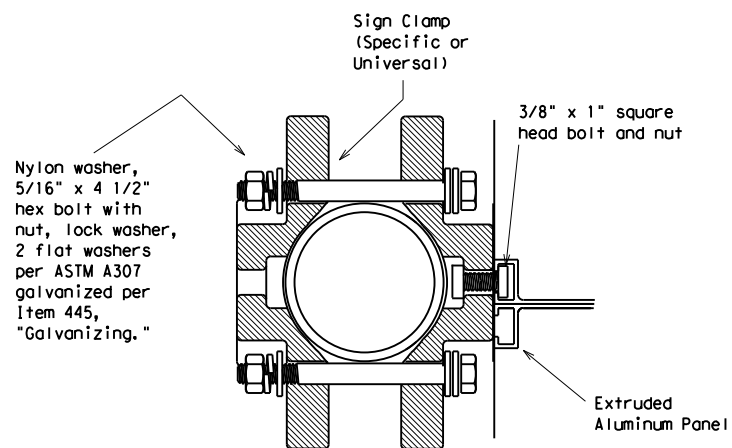
SM RD SGN ASSM TY XXXX(1)XX(T-2EXT)  
(\* - See Note 12)



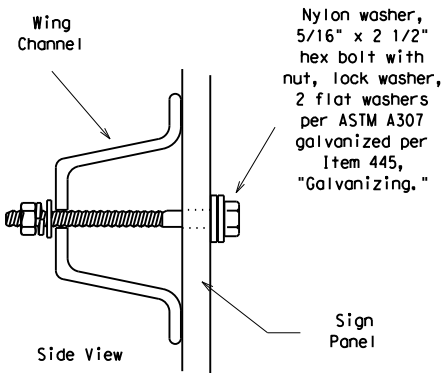
SM RD SGN ASSM TY XXXX(1)XX(U-XX)



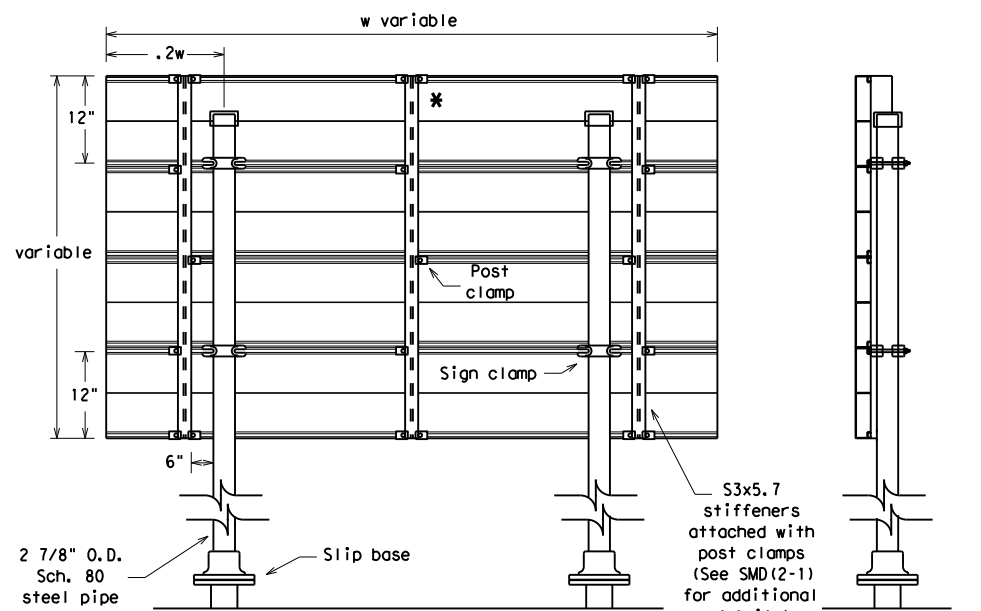
Detail A



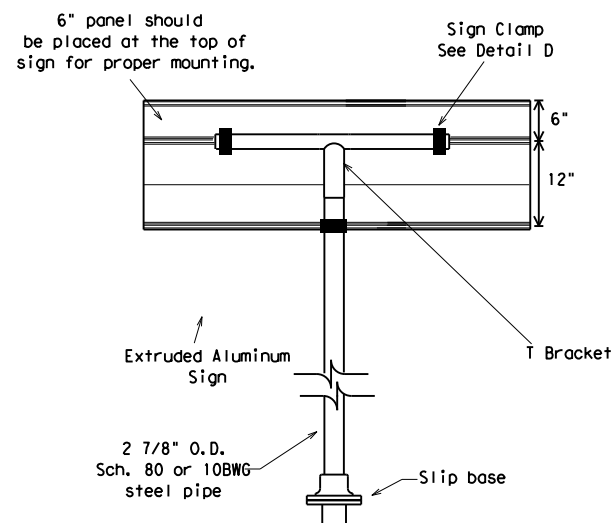
Detail D  
EXTRUDED ALUMINUM SIGN WITH T BRACKET



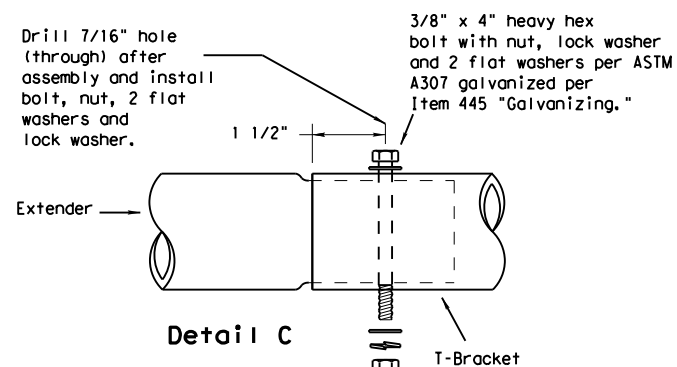
Detail B



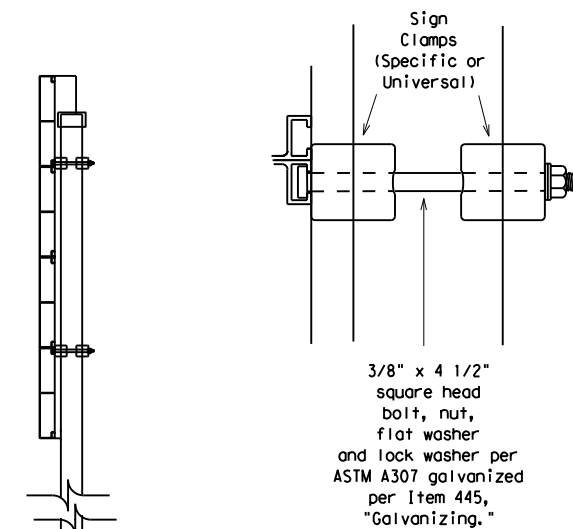
Typical Sign Mount  
SM RD SGN ASSM TY S80(2)XX(IP-EXAL)  
\* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



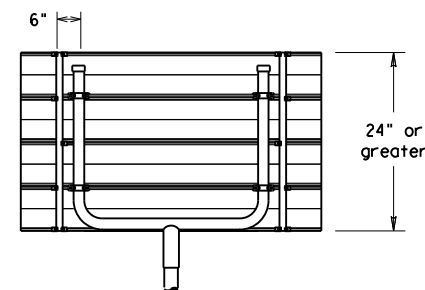
Extruded Aluminum Sign With T Bracket



Splices shall only be allowed behind the sign substrate.



Detail E



Use Extruded Alum. Windbeam as stiffeners See SMD (2-1) for additional details  
See Detail E for clamp installation

GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG       | 1          | 16 SF          |
| 10 BWG       | 2          | 32 SF          |
| Sch 80       | 1          | 32 SF          |
| Sch 80       | 2          | 64 SF          |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
  - Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
  - Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
  - Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
  - For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
  - When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
  - Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
  - Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
  - Sign blanks shall be the sizes and shapes shown on the plans.
  - Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
  - Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation  
Traffic Operations Division

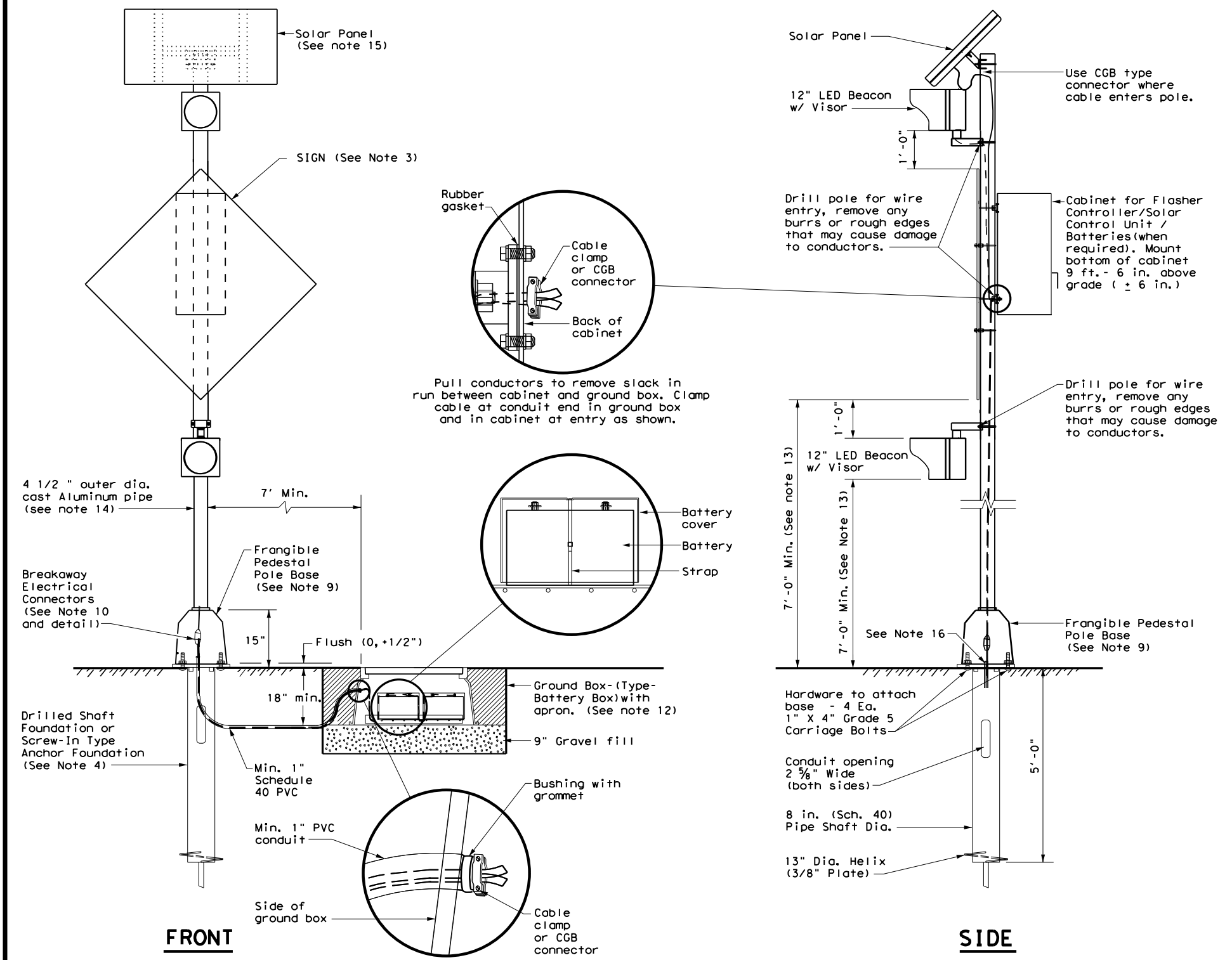
SIGN MOUNTING DETAILS  
SMALL ROADSIDE SIGNS  
TRIANGULAR SLIPBASE SYSTEM  
SMD(SLIP-3)-08

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		1186	02	025	FM 969
		DIST	COUNTY	SHEET NO.	
		AUS	BASTROP	109	

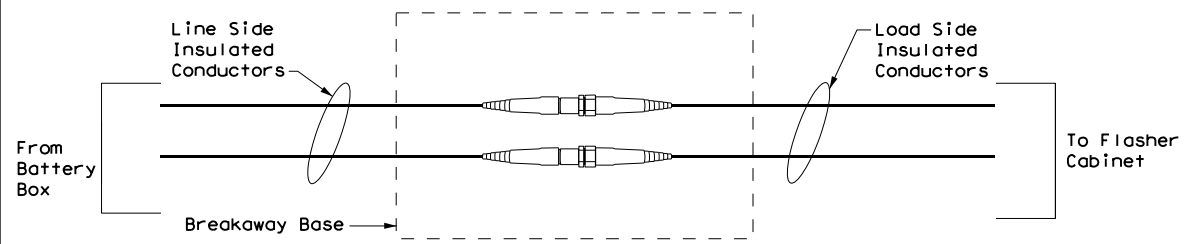
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

**GENERAL NOTES:**

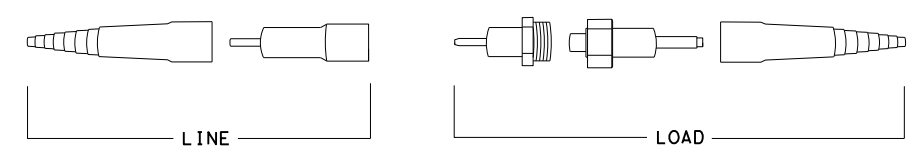
- Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
- See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
- See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
- Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
- When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
- Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
- Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
- Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
- Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
- Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug. For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
- Install the batteries in a battery box. Place the batteries on a  $\frac{3}{16}$ " thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and  $\frac{3}{16}$ " plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
- See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
- Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
- Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
- Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
- Ensure height of conduit is below top of anchor bolts.



DATE: 5/11/2022 9:05:34 PM  
 FILE: c:\pwworking\0168457\spb1-13.dgn



**NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS**



**NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS  
EXPLODED VIEW**

**SOLAR POWERED ROADSIDE  
FLASHING BEACON ASSEMBLY  
DETAILS**  
**SPRFBA (1) - 13**

FILE: spb1-13.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
12-04	DIST	COUNTY	SHEET NO.	
3-13	AUS	BASTROP	110	



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

DATE: 6/3/2022 12:16:08 PM  
 FILE: c:\pwworking\10168457\ed1-14.dgn

**GENERAL NOTES FOR ALL ELECTRICAL WORK**

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

**CONDUIT**

**A. MATERIALS**

- Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

- Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

**B. CONSTRUCTION METHODS**

- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).
- Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

				Traffic Operations Division Standard	
<h1>ELECTRICAL DETAILS CONDUITS &amp; NOTES</h1>					
<h2>ED(1) - 14</h2>					
FILE:	ed1-14.dgn	DWG:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		1186	02	025	FM 969
		DIST	COUNTY		SHEET NO.
		AUS	BASTROP		110A

# ELECTRICAL CONDUCTORS

## A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

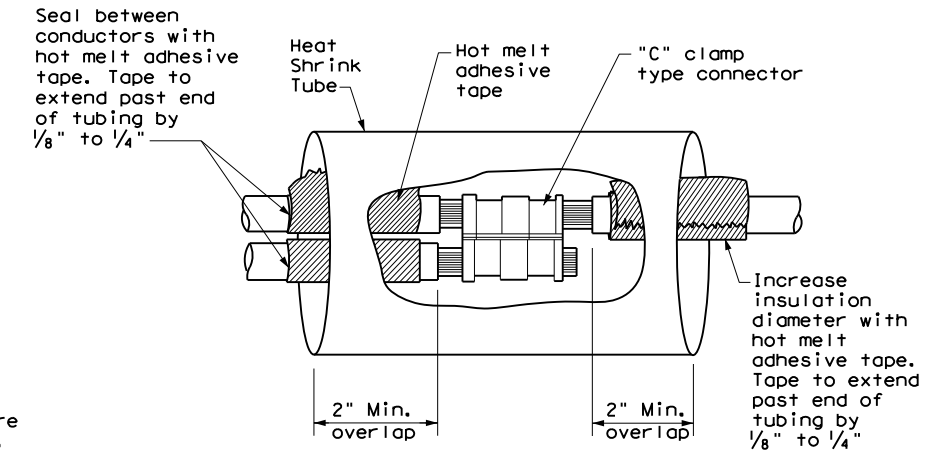
## B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight seal. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

## C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.



**SPLICE OPTION 1  
Compression Type**

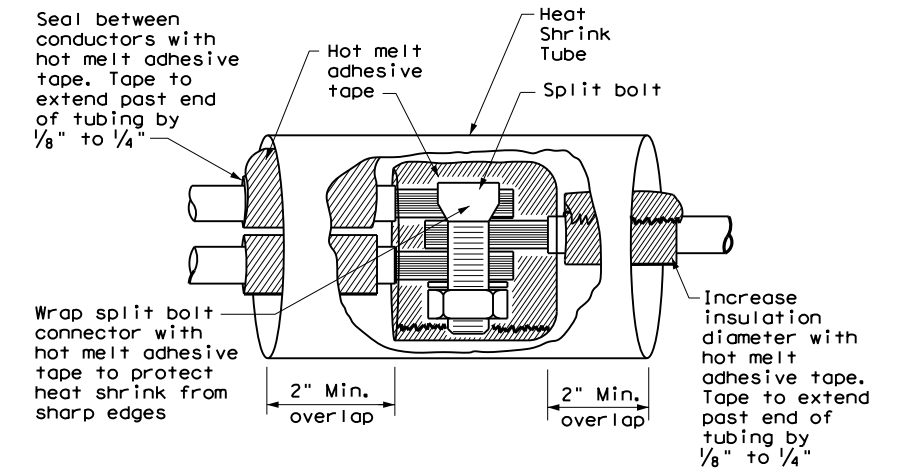
## GROUND RODS & GROUNDING ELECTRODES

### A. MATERIAL INFORMATION

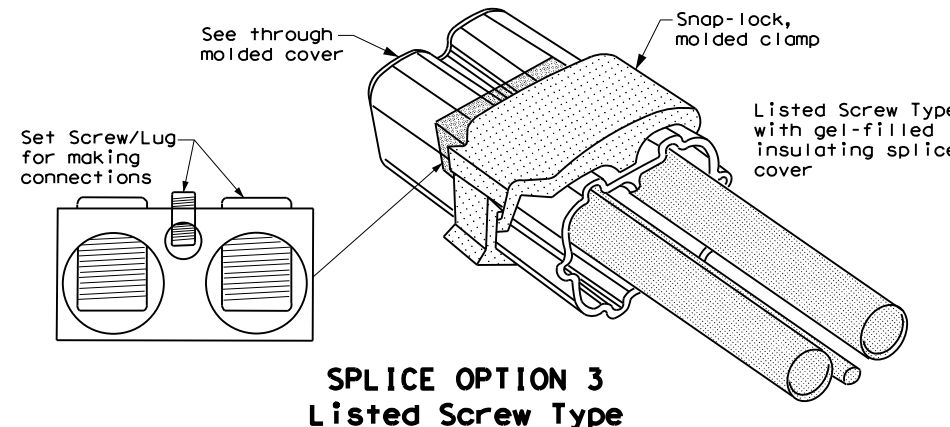
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

### B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



**SPLICE OPTION 2  
Split Bolt Type**



**SPLICE OPTION 3  
Listed Screw Type**

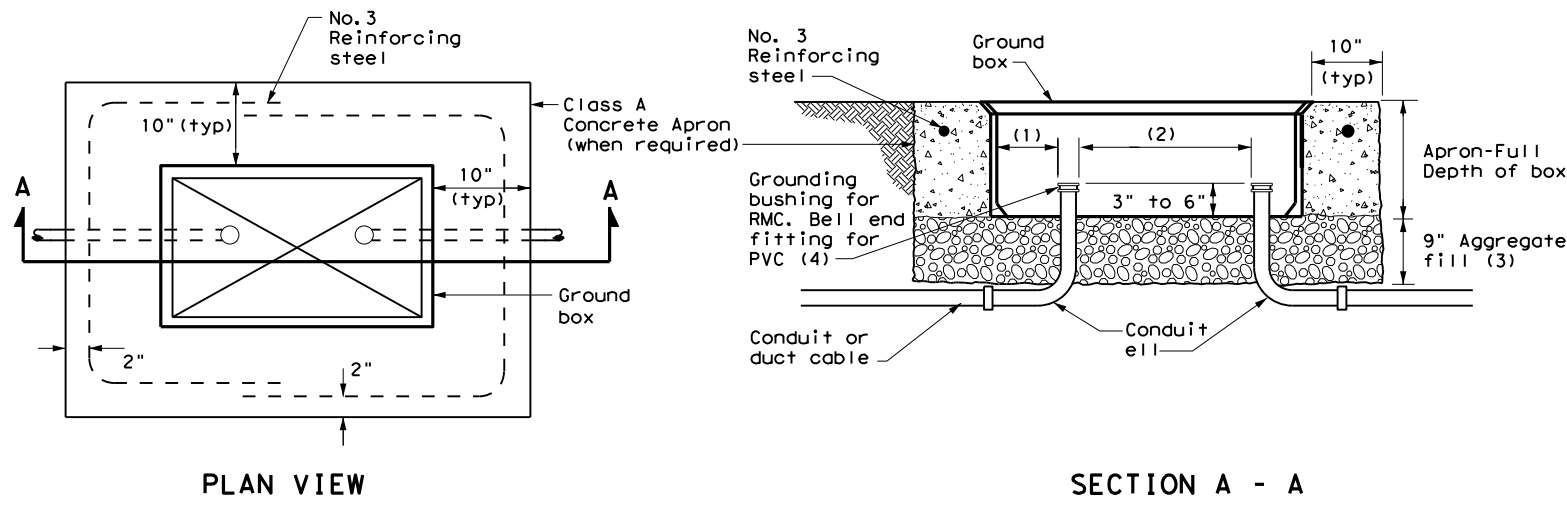
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 6/3/2022 12:16:13 PM  
FILE: c:\pwworkh\10168457\ed3-14.dgn

		<b>Traffic Operations Division Standard</b>	
<h1>ELECTRICAL DETAILS CONDUCTORS</h1>			
<h2>ED(3) - 14</h2>			
FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT	SECT	JOB
REVISIONS	1186	02	025
	DIST	COUNTY	SHEET NO.
	AUS	BASTROP	110B

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

DATE: 6/3/2022 12:16:19 PM  
 FILE: c:\pwworking\0168457\ed4-14.dgn

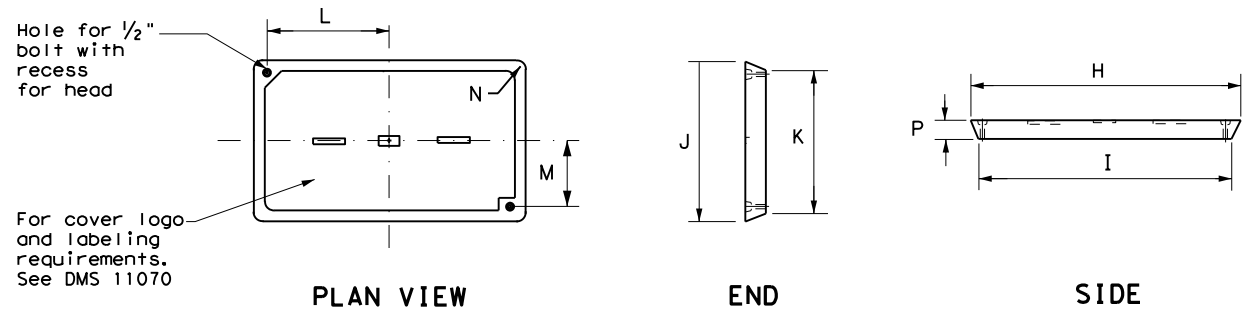


**APRON FOR GROUND BOX**

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of groundings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



**GROUND BOX COVER**

**GROUND BOXES**

**A. MATERIALS**

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.
3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.
4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

**B. CONSTRUCTION METHODS**

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so groundings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

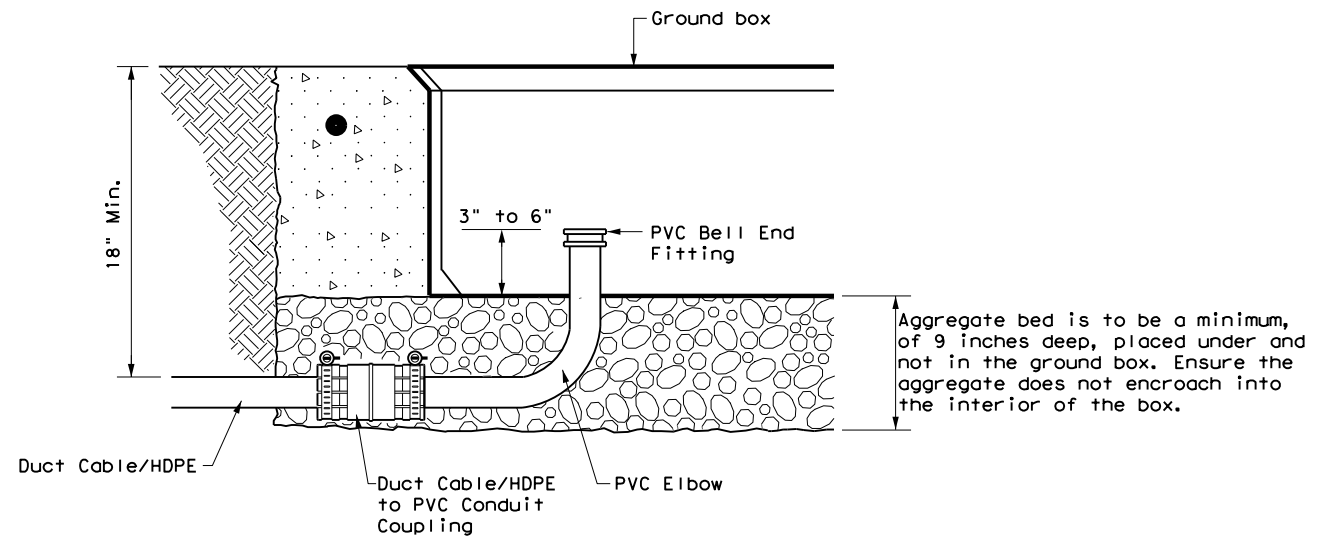
				Traffic Operations Division Standard	
<h2>ELECTRICAL DETAILS</h2> <h3>GROUND BOXES</h3> <h4>ED(4) - 14</h4>					
FILE:	ed4-14.dgn	DN:	TxDOT	CK:	TxDOT
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		1186	02	025	FM 969
DIST	COUNTY	SHEET NO.			
AUS	BASTROP	110C			

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

DATE: 6/3/2022 12:16:24 PM  
 FILE: c:\pwworking\10168457\ed11-14.dgn

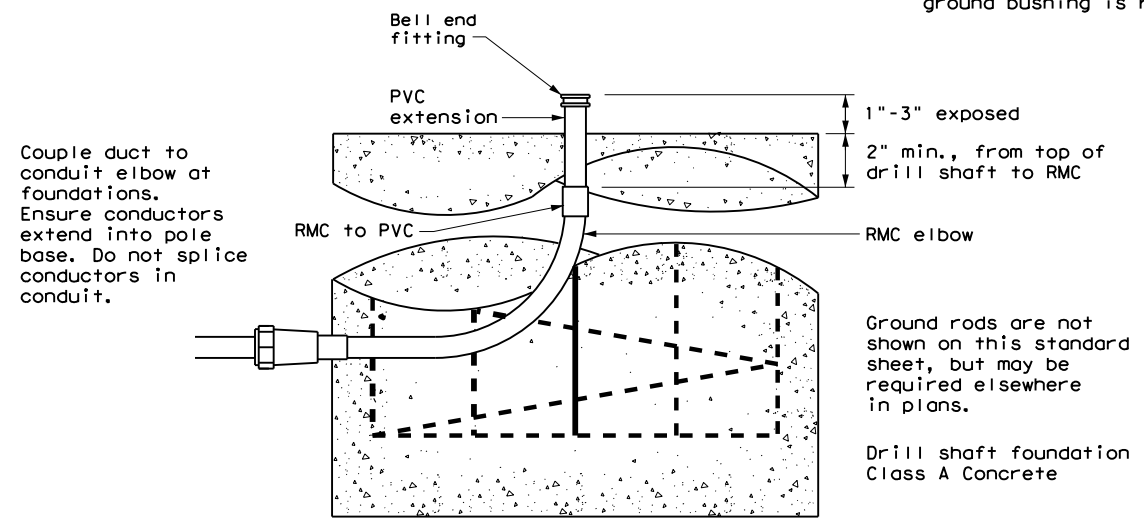
### DUCT CABLE & HDPE CONDUIT NOTES

- Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.
- Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.
- Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.
- Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.
- Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."
- When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.
- Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.
- Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.
- Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed coupling made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

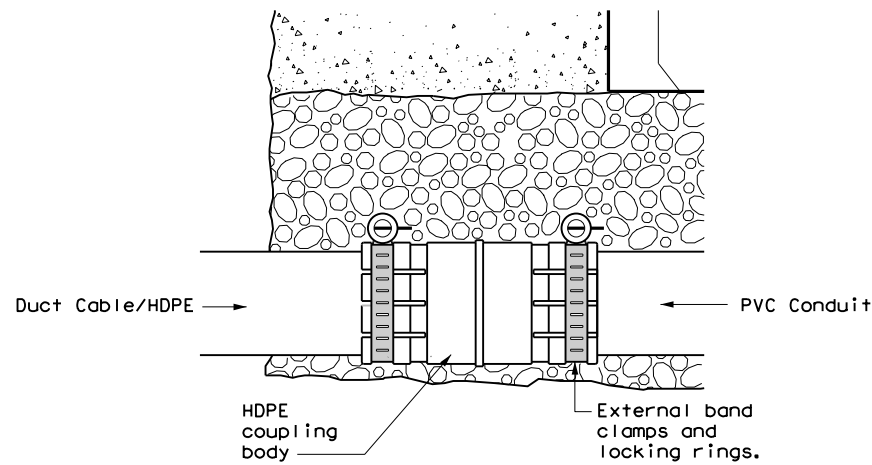


**DUCT CABLE/HDPE AT GROUND BOX**

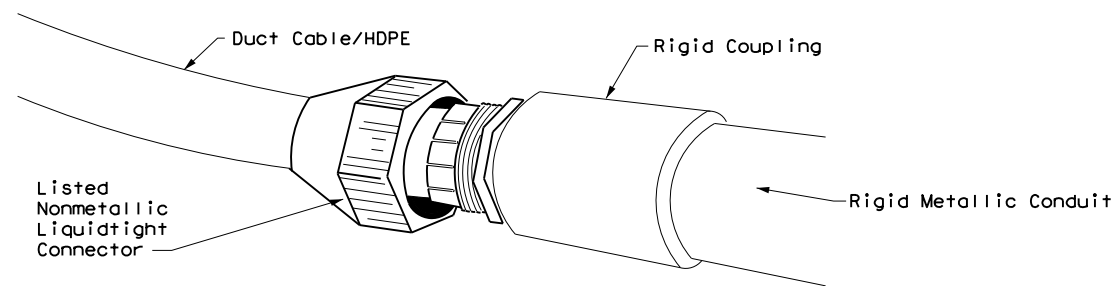
When the upper end of an RMC EII does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



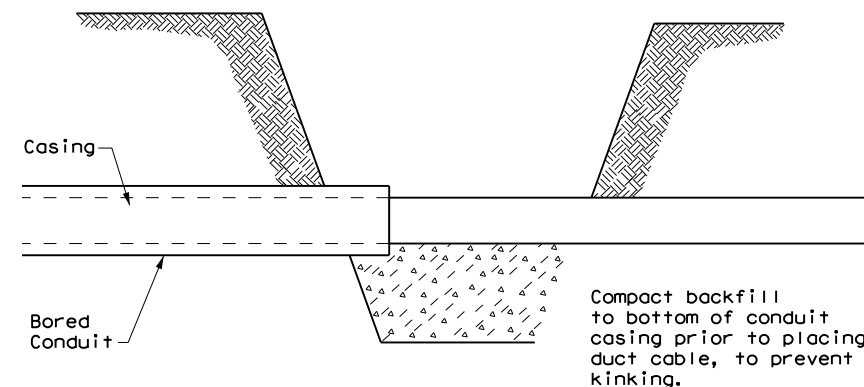
**DUCT CABLE / HDPE AT FOUNDATION**



**DUCT CABLE/HDPE TO PVC**



**DUCT CABLE/HDPE TO RMC**



**BORE PIT DETAIL**

				Traffic Operations Division Standard	
<b>ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT</b>					
<b>ED(11)-14</b>					
FILE: ed11-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1186	02	025	FM 969	
	DIST	COUNTY	SHEET NO.		
	AUS	BASTROP	110D		

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

DATE: 6/3/2022 12:16:32 PM  
 FILE: c:\pwworking\dot168457\ed12-14.dgn

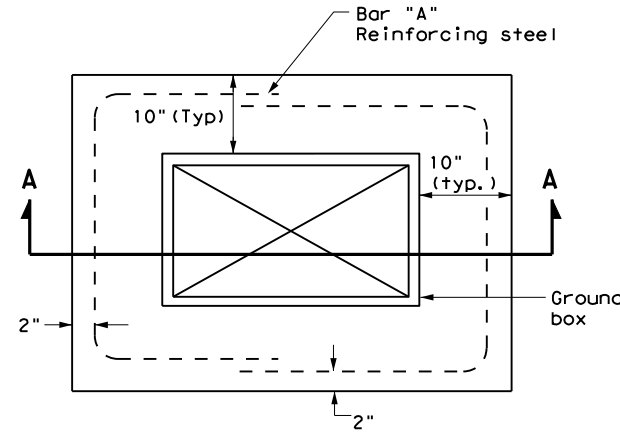
**BATTERY BOX GROUND BOXES NOTES**

**A. MATERIALS**

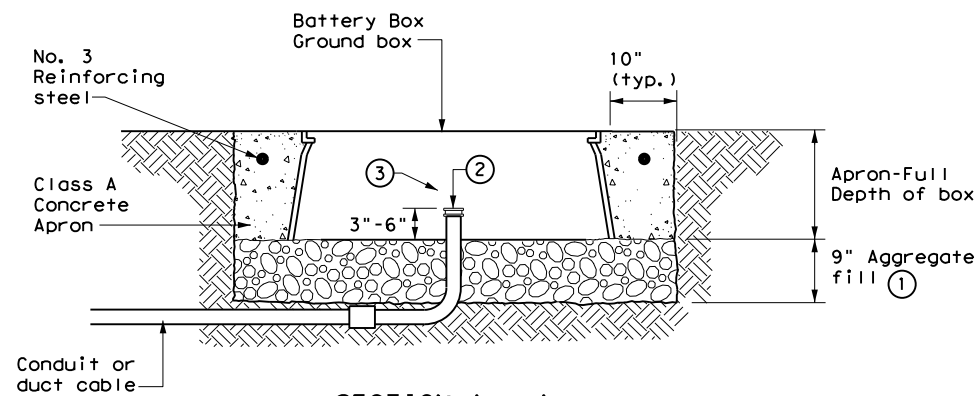
1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.
2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

**B. CONSTRUCTION METHODS**

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.
3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.
4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



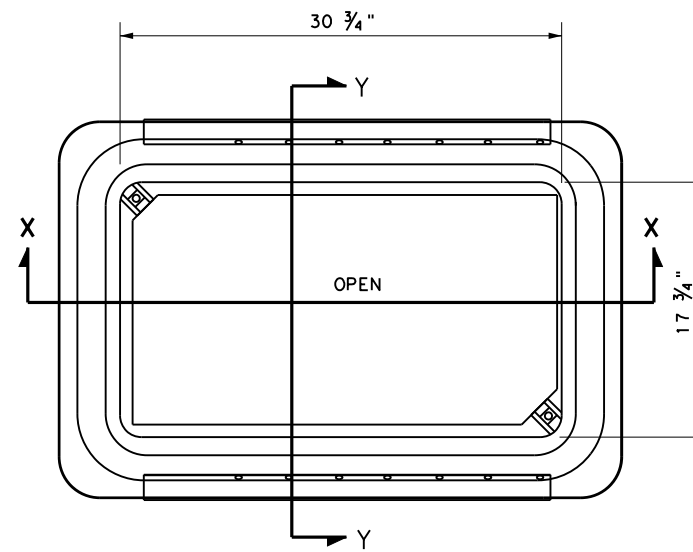
**PLAN VIEW**



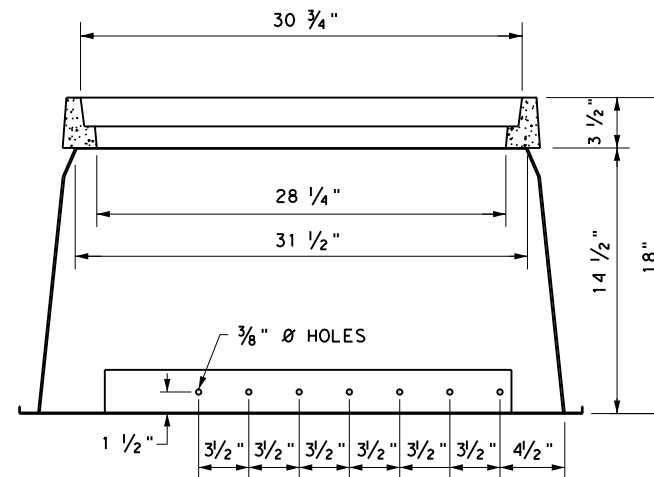
**SECTION A - A**

**APRON FOR BATTERY BOX GROUND BOXES**

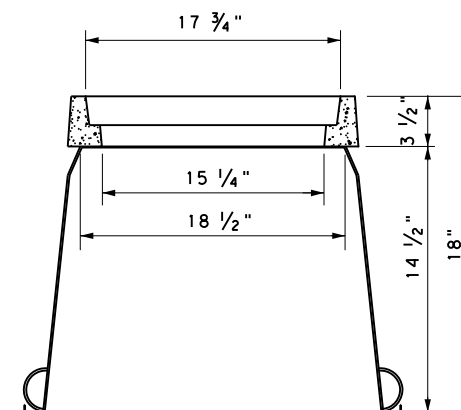
- ① Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.
- ② Install bushing or bell end fitting on the upper end of all elbows.
- ③ Install all conduits in a neat and workmanlike manner.



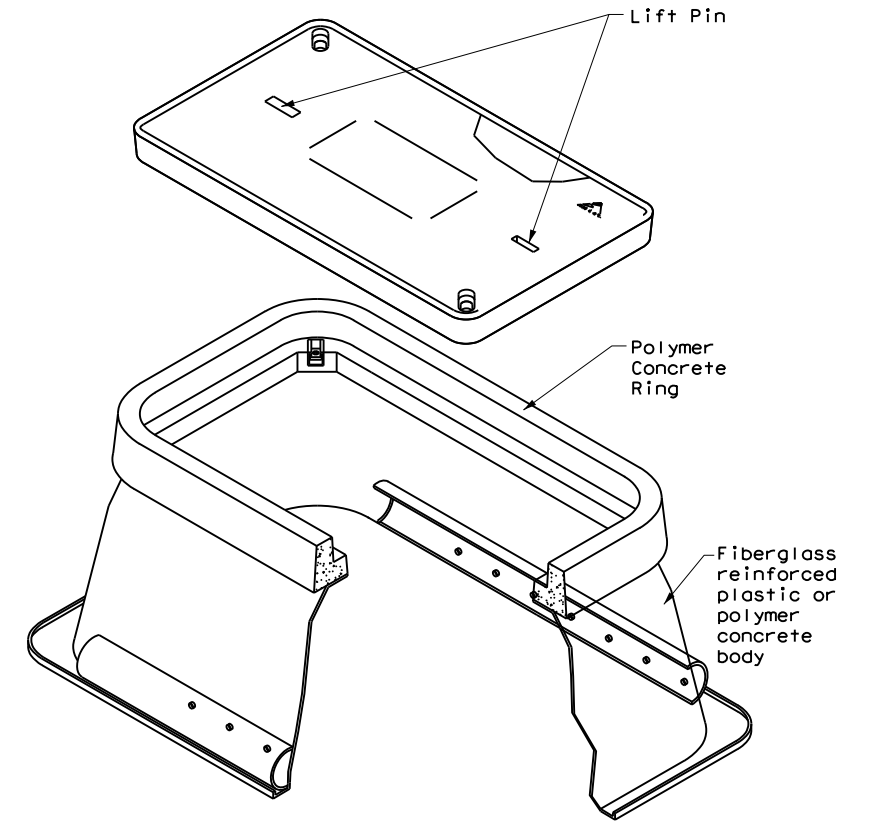
**BATTERY BOX TOP VIEW**



**SECTION X-X**



**SECTION Y-Y**



		Traffic Operations Division Standard	
<b>ELECTRICAL DETAILS BATTERY BOX GROUND BOXES</b>			
<b>ED(12)-14</b>			
FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT
© TxDOT October 2014	CONT: 1186	SECT: 02	JOB: 025
REVISIONS			HIGHWAY: FM 969
	DIST: AUS	COUNTY: BASTROP	SHEET NO.: 110E



**A. GENERAL SITE DATA**

- PROJECT LIMITS: FM 969 FROM 0.129 MILES WEST OF LAZY RIVER TO 0.264 MILES EAST OF TERRI TRAIL  
PROJECT LENGTH = 5315 FT. = 1.007 MILES  
PROJECT COORDINATES: BEGIN PROJECT : STA 892+67  
END PROJECT : STA 945+82  
  
PROJECT LOCATION: BEG LATITUDE: N 10055325.6735 BEG LONGITUDE: E 3196864.3708  
END LATITUDE: N 10057463.8950 END LONGITUDE: E 3200736.5400
- PROJECT SITE MAPS:
  - \* PROJECT LOCATION MAP: TITLE SHEET
  - \* DRAINAGE PATTERNS: DRAINAGE AREA MAP
  - \* SLOPES ANTICIPATED AFTER MAJOR GRADINGS OR AREAS OF SOIL DISTURBANCE: EXISTING AND PROPOSED TYPICAL SECTIONS
  - \* LOCATION OF EROSION AND SEDIMENT CONTROLS: EROSION CONTROL PLAN
  - \* SURFACE WATERS AND DISCHARGE LOCATIONS: DRAINAGE AND CULVERT LAYOUTS
  - \* PROJECT SPECIFIC LOCATIONS: TO BE SPECIFIED BY THE PROJECT FIELD OFFICE DURING CONSTRUCTION AND LOCATED IN THE PROJECT SW3P FILE. REFERENCE ITEM #10 BELOW
- PROJECT DESCRIPTION: SFT-SAFETY IMPROVEMENT PROJECTS  
CONSISTING OF WIDEN PAVED SHOULDERS TO GREATER THAN 5'.
- MAJOR SOIL DISTURBING ACTIVITIES:  
PREPARING RIGHT OF WAY, PAVEMENT REMOVAL, GRADING, EXCAVATION AND EMBANKMENT OF ROADWAY, AND TOPSOIL FOR FINAL PLANTING AND SEEDING.
- EXISTING CONDITION OF SOIL & VEGETATIVE  
COVER AND % OF EXISTING VEGETATIVE COVER:  
THE EXISTING SOIL IS IN GOOD CONDITION AND IS COVERED WITH GREATER THAN 75% VEGETATIVE COVER BY VISUAL INSPECTION.
- TOTAL PROJECT AREA: 12.20 ACRES
- TOTAL AREA TO BE DISTURBED: 9.18 ACRES
- WEIGHTED RUNOFF COEFFICIENT  
BEFORE CONSTRUCTION: 0.67  
AFTER CONSTRUCTION: 0.58
- NAME OF RECEIVING WATERS: (SEGMENT NUMBER OF RECEIVING WATERS)  
SEGMENT ID : 1428  
SEGMENT NAME : COLORADO RIVER BELOW LADY BIRD LAKE (FORMERLY TOWN LAKE)  
SEGMENT DESC : FROM A POINT 100 METERS (100 YARDS) UPSTREAM OF FM 969 NEAR UTLEY IN BASTROP COUNTY TO LONGHORN DAM IN TRAVIS COUNTY  
BASIN NAME : COLORADO RIVER BASIN
- PROJECT SW3P FILE: FOR PROJECTS DISTURBING ONE ACRE OR MORE, TXDOT WILL MAINTAIN AN SW3P FILE WITH ALL PERTINENT ENVIRONMENTAL DOCUMENTS, CORRESPONDENCE, ETC. AT THE PROJECT FIELD OFFICE. IF NO FIELD OFFICE IS AVAILABLE THEN THE SW3P FILE SHALL BE KEPT IN THE INSPECTOR'S TRUCK.

**B. EROSION AND SEDIMENT CONTROLS**

**1. SOIL STABILIZATION PRACTICES:**

- TEMPORARY SEEDING
- PERMANENT PLANTING, SODDING, OR SEEDING
- MULCHING
- SOIL RETENTION BLANKET
- BUFFER ZONES
- PRESERVATION OF NATURAL RESOURCES

OTHER:

**2. STRUCTURAL PRACTICES:**

- SILT FENCES
- ROCK FILTER DAMS
- DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- DIVERSION DIKE AND SWALE COMBINATIONS
- PIPE SLOPE DRAINS
- PAVED FLUMES
- ROCK BEDDING AT CONSTRUCTION EXIT
- TIMBER MATTING AT CONSTRUCTION EXIT
- CHANNEL LINERS
- SEDIMENT TRAPS
- SEDIMENT BASINS
- STORM INLET SEDIMENT TRAP
- STONE OUTLET STRUCTURES
- CURBS AND GUTTERS
- STORM SEWERS
- VELOCITY CONTROL DEVICES

OTHER:

**3. STORM WATER MANAGEMENT:**

STORM WATER DRAINAGE WILL BE PROVIDED BY DITCHES AND DRIVEWAY CULVERTS. THIS SYSTEM WILL CARRY THE DRAINAGE WITHIN THE RIGHT-OF-WAY TO LOW POINTS IN DITCH VERTICAL PROFILE WHERE RUNOFF WILL PERMEATE THROUGH EXISTING SOILS AND VEGETATION.

**4. NON-STORM WATER DISCHARGES:**

- OFF-SITE DISCHARGES ARE PROHIBITED EXCEPT AS FOLLOWS
- DISCHARGES FROM FIRE-FIGHTING ACTIVITIES AND/OR FIRE HYDRANT FLUSHINGS.
  - VEHICLE, EXTERNAL BUILDING, AND PAVEMENT WASH WATER WHERE DETERGENTS AND SOAPS ARE NOT USED AND WHERE SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE NOT OCCURRED. (UNLESS ALL SPILL MATERIAL HAS BEEN REMOVED)
  - PLAIN WATER USED IN DUST CONTROL ACTIVITIES.
  - PLAIN WATER ORIGINATING FROM POTABLE WATER SOURCES.
  - UNCONTAMINATED GROUNDWATER, SPRING WATER, OR ACCUMULATED STORMWATER.
  - FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH PROCESS MATERIALS SUCH AS SOLVENTS.

FILTER NON-STORM WATER DISCHARGES, OR HOLD RETENTION BASINS, BEFORE BEING ALLOWED TO MIX WITH STORM WATER. THESE DISCHARGES CONSIST OF NON-POLLUTED GROUND WATER, SPRING WATER, FOUNDATION AND/OR FOOTING DRAIN WATER, AND WATER USED FOR DUST CONTROL, PAVEMENT WASHING AND VEHICLE WASHWATER CONTAINING NO DETERGENTS.

ANY DISCHARGE OF EXCESS CONCRETE OR WASHOUT FROM CONCRETE TRUCKS SHOULD BE PROHIBITED OR MINIMIZED ON SITE. IF ALLOWED BY THE ENGINEER, THEY MUST BE MANAGED IN A MANNER SO AS TO NOT CONTAMINATE SURFACE WATER. THEY MUST NOT BE LOCATED IN AREAS OF CONCENTRATED FLOW. CONCRETE TRUCK WASH-OUT LOCATIONS SHALL BE FIELD LOCATED AS NEEDED OR AS DIRECTED BY THE ENGINEER, ADDED IN THE SW3P LAYOUT AND INCLUDED IN THE INSPECTIONS.

HAZARDOUS MATERIALS SPILLS/LEAKS SHALL BE PREVENTED OR MINIMIZED. AT A MINIMUM, THIS INCLUDES PAINTS, ACIDS, SOLVENTS, FUELS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, AND CONCRETE CURING COMPOUNDS AND ADDITIVES. WHEN STORING HAZARDOUS MATERIAL ON THE PROJECT SITE, OR AT A PROJECT SPECIFIC LOCATION, BMPs SHALL BE IMPLEMENTED TO THE STORAGE AREAS IF THESE PRODUCTS. ALL SPILLS MUST BE THOROUGHLY CLEANED AND DISPOSED OF PROPERLY, AND REPORTED TO THE ENGINEER. REPORT ANY RELEASE AT OR ABOVE THE REPORTABLE QUANTITY DURING A 24 HOUR PERIOD TO THE NATIONAL RESPONSE CENTER AT 1-800-424-8802.

**C. OTHER REQUIREMENTS & PRACTICES**

**1. MAINTENANCE:**

MAINTENANCE WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

**2. INSPECTION:**

INSPECTION WILL BE PERFORMED AS INDICATED ON FIELD INSPECTION AND MAINTENANCE REPORT FORM 2118.

**3. WASTE MATERIALS:**

ALL WASTE MATERIALS WILL BE COLLECTED, STORED AND DISPOSED OF IN A LEGAL AND PROPER MANNER. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE.

**4. HAZARDOUS WASTE (INCLUDING SPILL REPORTING):**

AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES ARE CONSIDERED TO BE HAZARDOUS. PAINTS, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT A SPILL WHICH MAY BE HAZARDOUS, THE SPILL COORDINATOR MUST BE CONTACTED IMMEDIATELY.

**5. SANITARY WASTE:**

ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

**OFFSITE VEHICLE TRACKING:**

- HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED WITH TARPULIN
- EXCESS DIRT ON ROAD REMOVED DAILY
- STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: DISPOSAL AREAS, STOCKPILES AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL SEDIMENT FROM ENTERING RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED TO MINIMIZE THE RUNOFF OF POLLUTANTS.

**FM 969  
STORM WATER  
POLLUTION  
PREVENTION  
PLAN (SW3P)**

© 2022



5/11/2022



CONT	SECT	JOB	HIGHWAY
1186	02	025	FM 969
DIST		COUNTY	SHEET NO.
AUS		BASTROP	111

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

DATE: 5/11/2022 8:53:56 PM  
 FILE: c:\pwworkh\1\00152775\FM969\_ENV\_EPIC\_01.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.

- 
- No Action Required     Required Action

Action No.

- Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
- Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
- Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
- When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

**II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404**

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

- No Permit Required
- Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- Individual 404 Permit Required
- Other Nationwide Permit Required: NWP# \_\_\_\_\_

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

- 
- 
- 
- 

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 checked="" 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.

- 
- 
- 
- 

**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.

- Comply with Executive Order 13112 on Invasive Species if and when applicable.
- See the special provisions for vegetation in Item 7 of the general notes.
- 
- 

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

- No Action Required     Required Action

Action No.

- See the special provisions for migratory birds in Item 7 of the general notes.
- See the special provisions for terrestrial amphibians and reptiles in Item 7 of the general notes.
- See the special provisions for aquatic amphibians and reptiles in Item 7 of the general notes.
- 

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.

- 
- 
- 


**VII. OTHER ENVIRONMENTAL ISSUES**

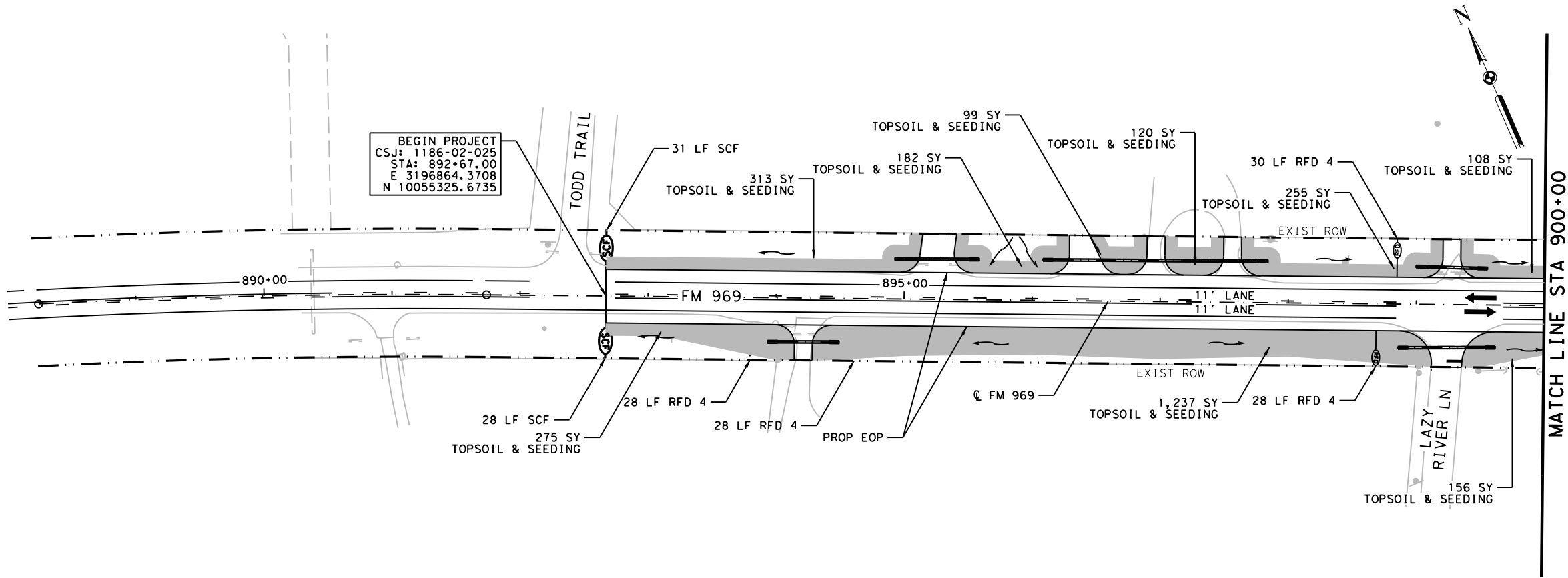
(includes regional issues such as Edwards Aquifer District, etc.)

- No Action Required     Required Action

Action No.

- 
- 
- 

		<i>Design Division Standard</i>		
<b>ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS</b> <b>EPIC</b>				
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
12-12-2011 (DS) REVISIONS	1186	02	025	FM 969
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	BASTROP	112	

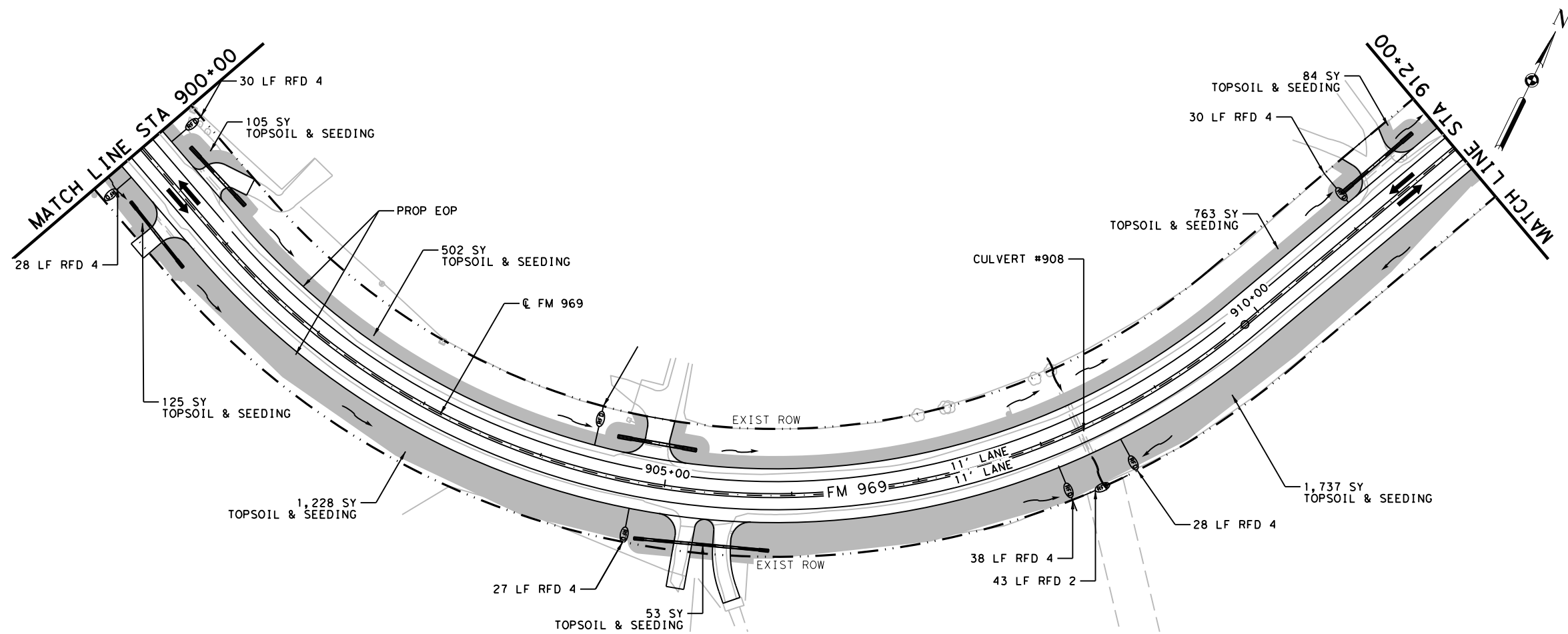
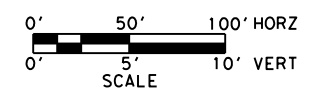


**LEGEND**

- TEMPORARY ROCK FILTER DAM (TY 2 & 4)
- TEMPORARY SEDIMENT CONTROL FENCE
- FLOW DIRECTION
- PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
- TRAFFIC DIRECTION

**NOTES:**

1. ALL SW3P MEASURES ARE TO BE PLACED WITHIN TXDOT RIGHT OF WAY AND AS SHOWN IN STANDARDS EC (1) - EC (3).
2. SILT FENCE AND ROCK FILTER DAMS, ONCE INSTALLED, SHALL REMAIN IN PLACE THROUGHOUT ALL PHASES OF CONSTRUCTION, OR AS DIRECTED.



TJN  
 5/11/2022

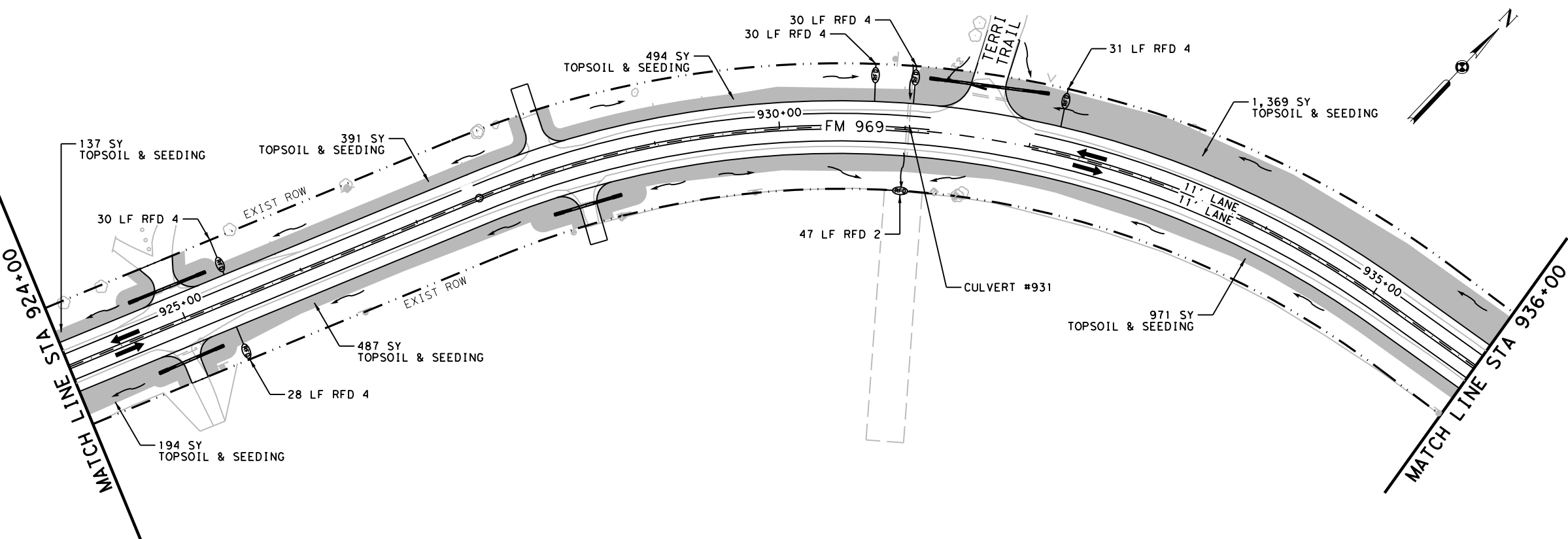
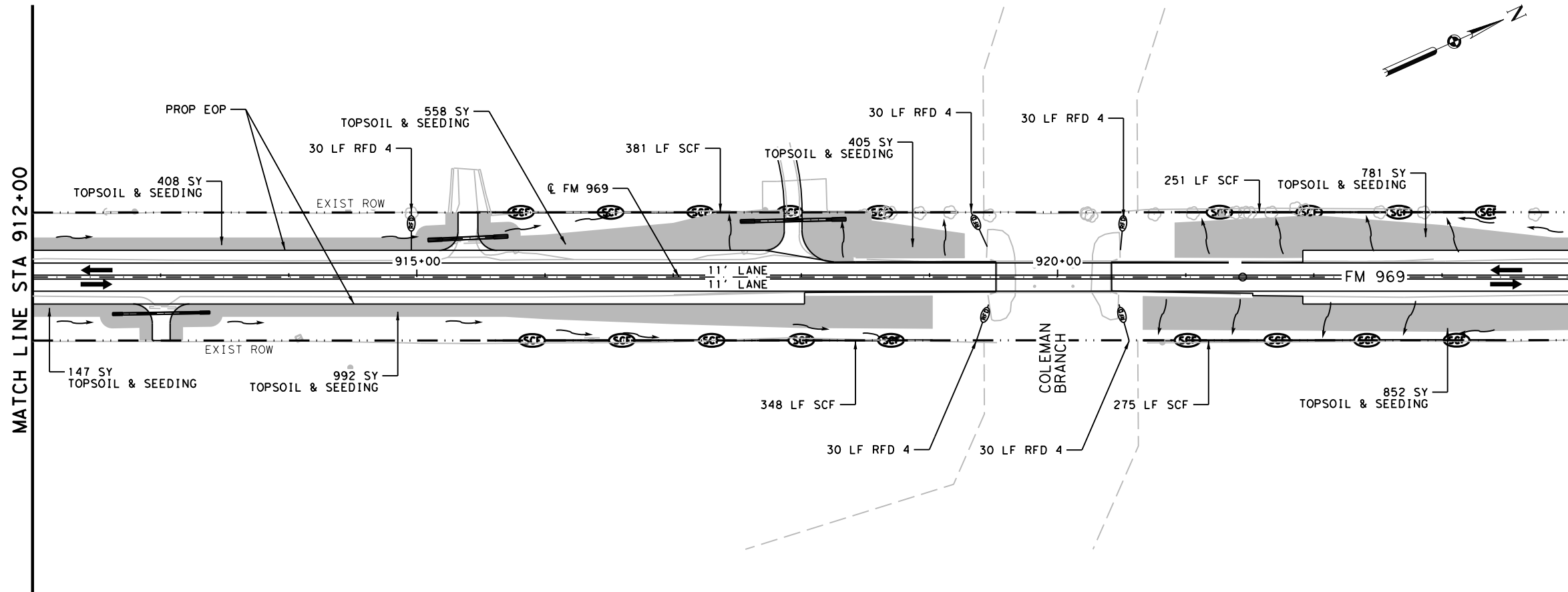
**Kimley»Horn** F-928

© 2022  
  
 Texas Department of Transportation

**FM 969**  
**EROSION CONTROL LAYOUT**  
 BEGIN TO STA 912+00

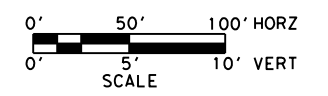
SCALE: 100'		SHEET 1 OF 3	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
6	STP 2022(818)HES	FM 969	
STATE	DIST.	COUNTY	SHEET NO.
TEXAS	AUSTIN	BASTROP	113
CONT.	SECT.	JOB	
1186	02	025	

FILENAME: c:\pwworking\kimley-horn\project\1186-02-025\1186-02-025-ENV-SW3P-PL-01.dgn  
 PLOTTED: 5/11/2022 8:54:12 PM



- LEGEND**
- TEMPORARY ROCK FILTER DAM (TY 2 & 4)
  - TEMPORARY SEDIMENT CONTROL FENCE
  - FLOW DIRECTION
  - PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
  - TRAFFIC DIRECTION

- NOTES:**
1. ALL SW3P MEASURES ARE TO BE PLACED WITHIN TXDOT RIGHT OF WAY AND AS SHOWN IN STANDARDS EC (1) - EC (3).
  2. SILT FENCE AND ROCK FILTER DAMS, ONCE INSTALLED, SHALL REMAIN IN PLACE THROUGHOUT ALL PHASES OF CONSTRUCTION, OR AS DIRECTED.



TJN  
 5/11/2022  
  
 LICENSED PROFESSIONAL ENGINEER

**Kimley»Horn** F-928

© 2022  
 Texas Department of Transportation

**FM 969**

**EROSION CONTROL LAYOUT**

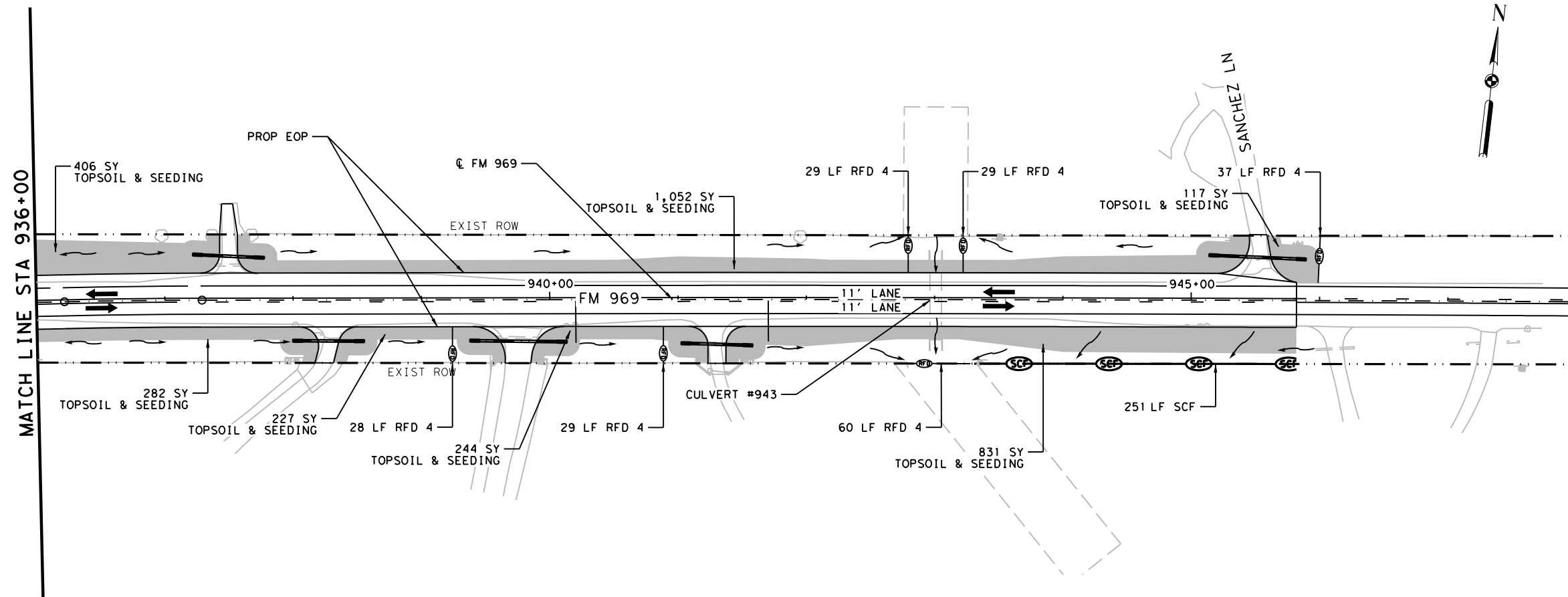
STA 912+00 TO STA 936+00

SCALE: 100' SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025


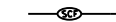



SHEET NO. 114

FILENAME: c:\pwworking\0152775\FM969\_ENV\_SW3P\_PL\_02.dgn  
 PLOTTED: 5/11/2022 8:54:26 PM



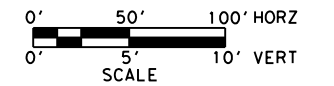
MATCH LINE STA 936+00

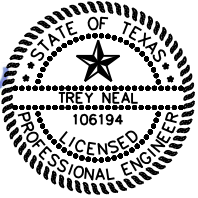
**LEGEND**

-  TEMPORARY ROCK FILTER DAM (TY 2 & 4)
-  TEMPORARY SEDIMENT CONTROL FENCE
-  FLOW DIRECTION
-  PROPOSED SOIL RETENTION BLANKETS, TOPSOIL & SEEDING
-  TRAFFIC DIRECTION

**NOTES:**

1. ALL SW3P MEASURES ARE TO BE PLACED WITHIN TXDOT RIGHT OF WAY AND AS SHOWN IN STANDARDS EC (1) - EC (3).
2. SILT FENCE AND ROCK FILTER DAMS, ONCE INSTALLED, SHALL REMAIN IN PLACE THROUGHOUT ALL PHASES OF CONSTRUCTION, OR AS DIRECTED.



*TJN*  
 5/11/2022  


**Kimley»Horn** F-928

© 2022  
 Texas Department of Transportation

FM 969

**EROSION CONTROL LAYOUT**

STA 936+00 TO END

SCALE: 100' SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
6	STP 2022(818)HES	FM 969
STATE	DIST.	COUNTY
TEXAS	AUSTIN	BASTROP
CONT.	SECT.	JOB
1186	02	025
SHEET NO. 115		

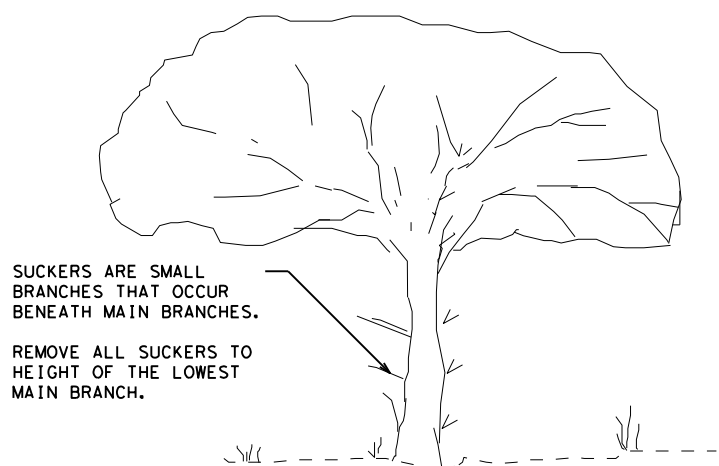
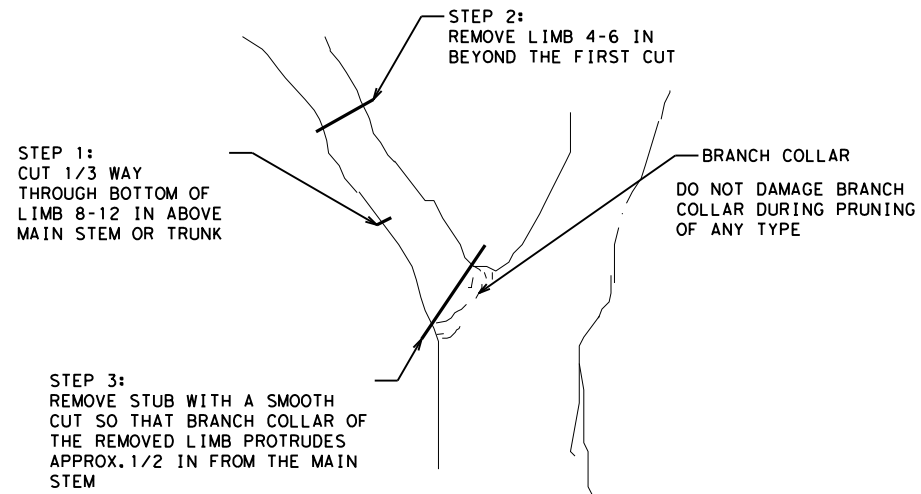
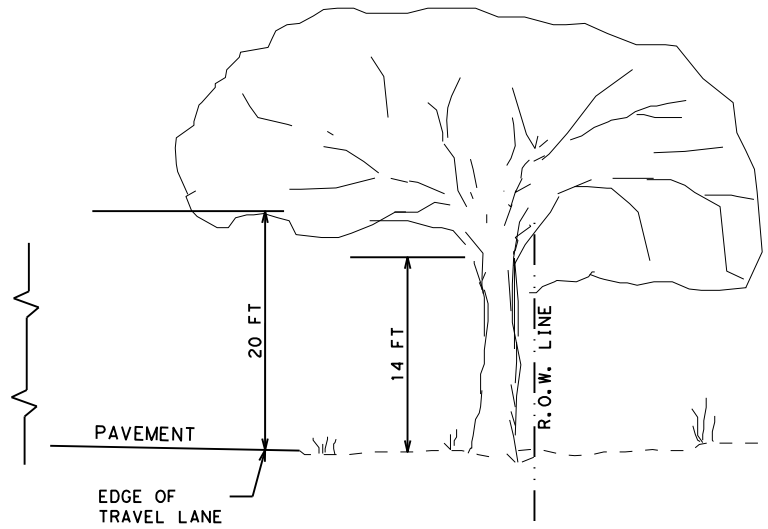
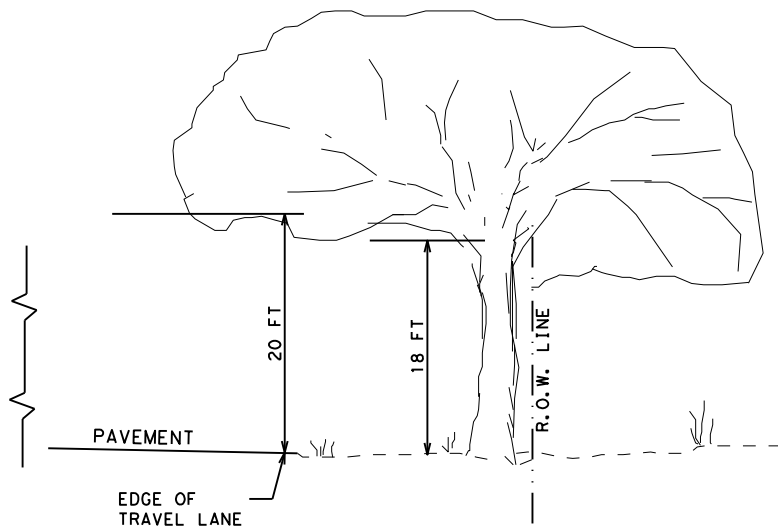
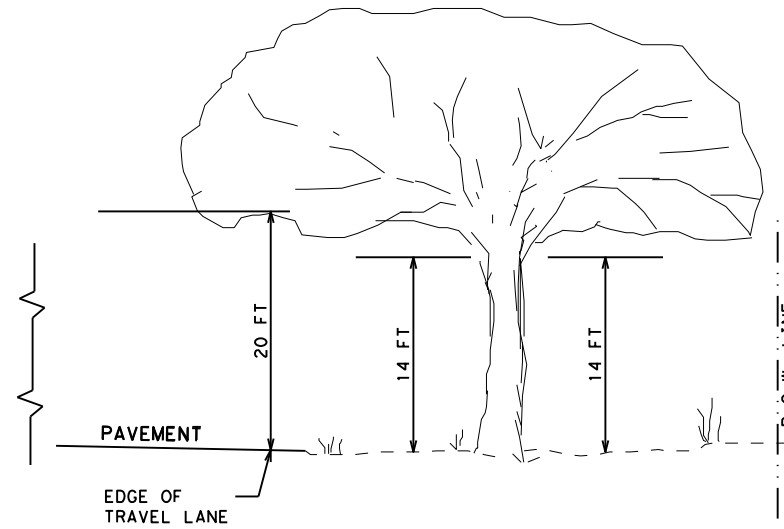
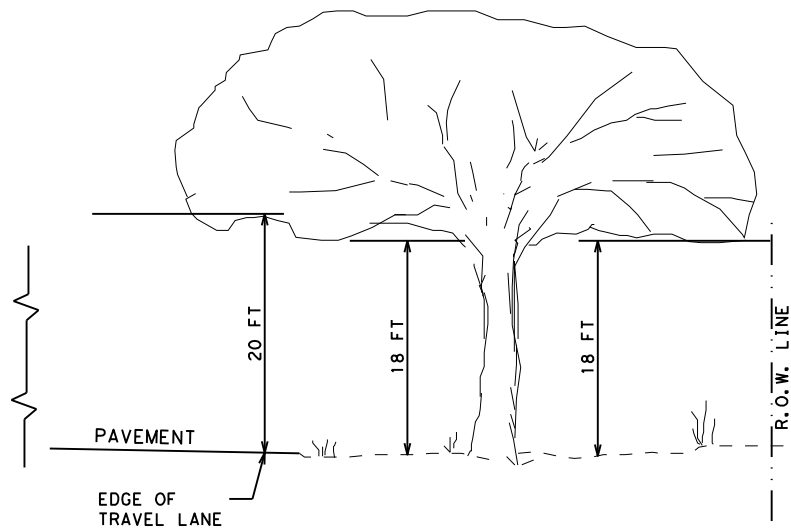
FILENAME: c:\pwworking\kimley-horn\1\2022\51122\FM969\_ENV\_SW3P\_PL\_03.dgn  
 PLOTTED: 5/11/2022 8:54:39 PM



**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.



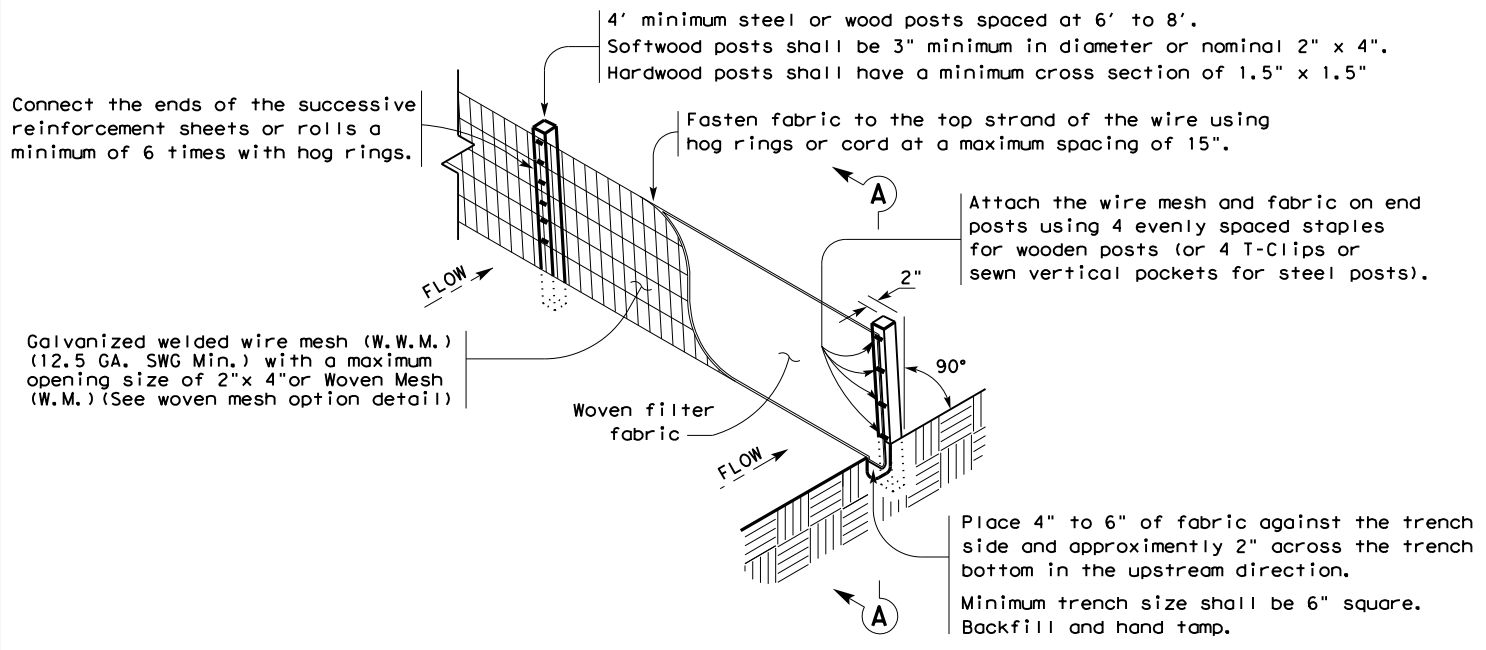
FOR LIMBS 2" IN DIA. AND GREATER

DATE: 5/11/2022 8:54:53 PM  
FILE: c:\pwworking\0168457\200320\_prune\_detail.PRWD-20(AUS).dgn

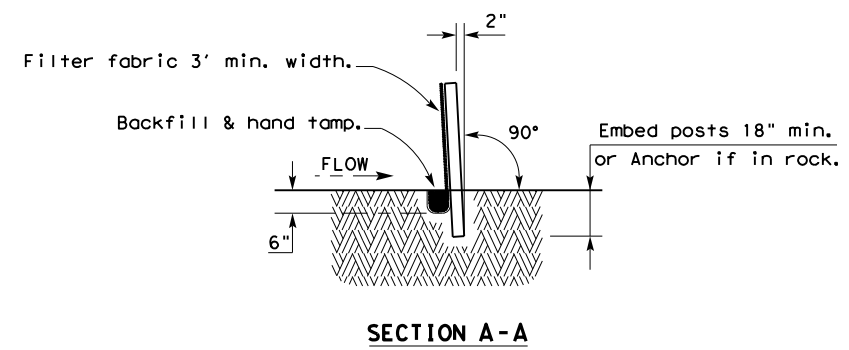
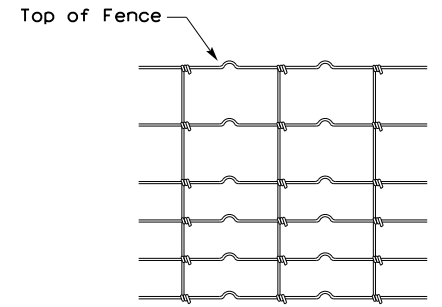
<span style="font-size: small; vertical-align: middle;">Austin District Standard</span>				
<h2 style="margin: 0;">PREP R.O.W. PRUNING DETAIL</h2> <p style="margin: 5px 0 0 0;">PRWD-20 (AUS)</p>				
© TXDOT 2022	CONT	SECT	JOB	HIGHWAY
1186	02	025	FM 969	SHEET NO.
AUS	BASTROP		116	

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

5/04/2022  
cf1db\kh1\d0168457\ec116 (1).dgn



**TEMPORARY SEDIMENT CONTROL FENCE**



**HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL**

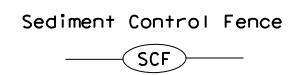
Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

**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.

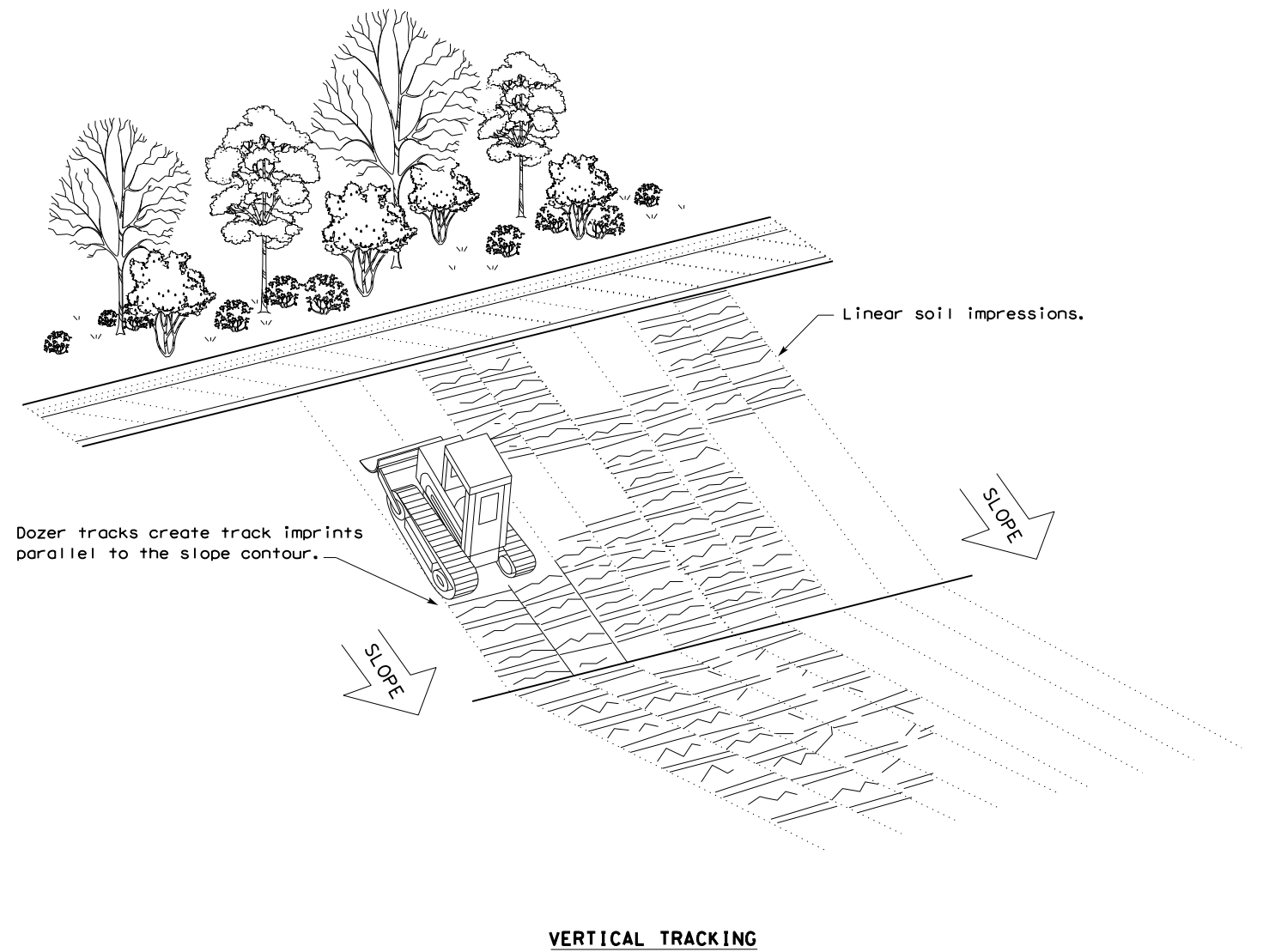
Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT<sup>2</sup>. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

**LEGEND**



**GENERAL NOTES**

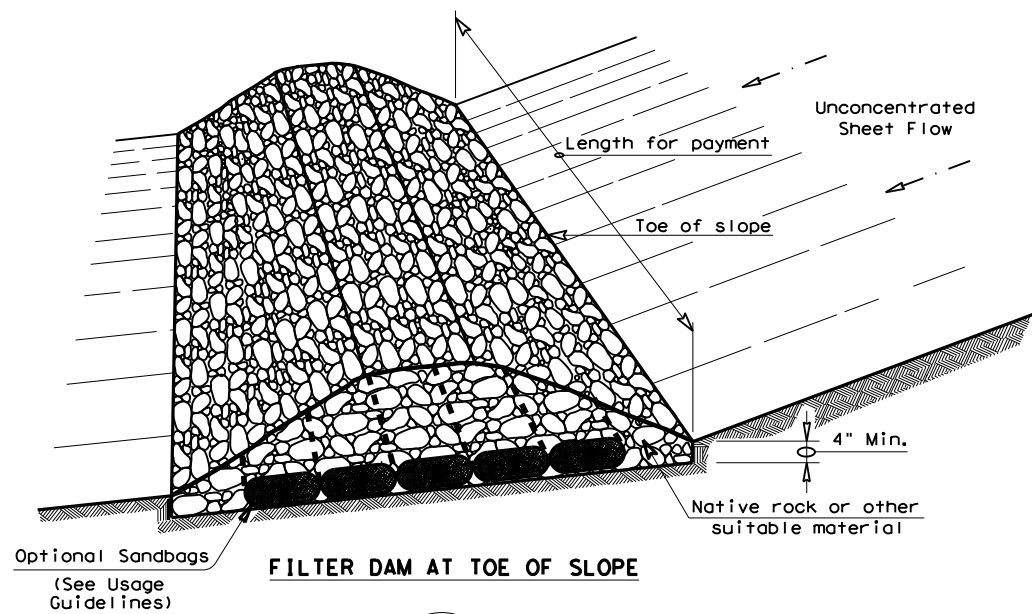
1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum 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.



				Design Division Standard	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE &amp; VERTICAL TRACKING</b> <b>EC(1) - 16</b>					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	1186	02	025	FM 969	
	DIST	COUNTY		SHEET NO.	
	AUS	BASTROP		117	

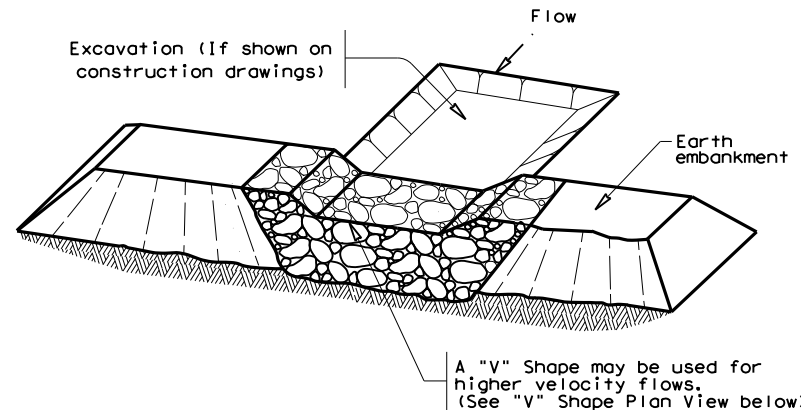
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022  
 FILE: c:\pwworkh1\d0168457\ec216 (1).dgn



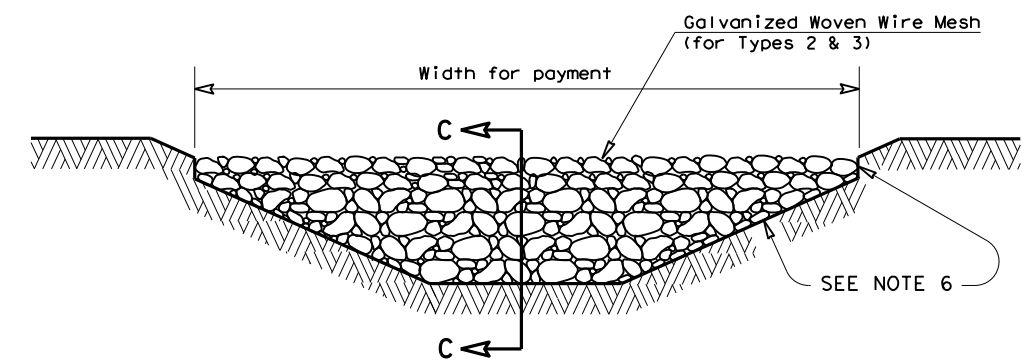
**FILTER DAM AT TOE OF SLOPE**

(RFD1)



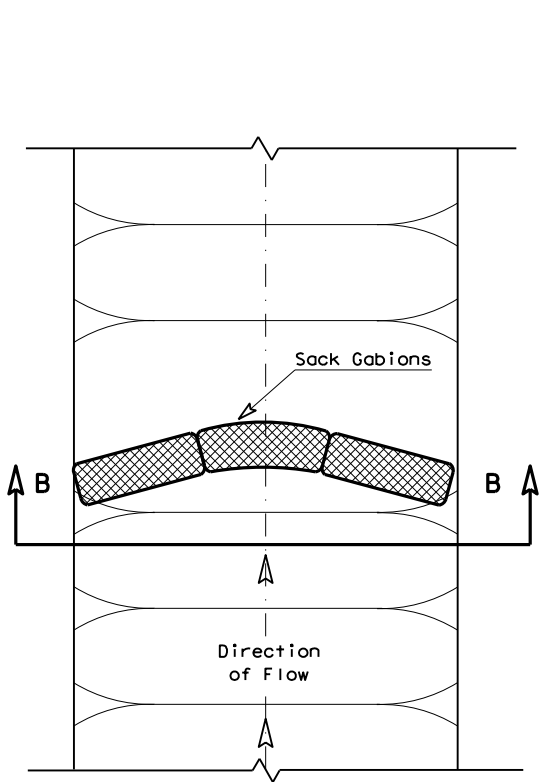
**FILTER DAM AT SEDIMENT TRAP**

(RFD1) OR (RFD2)

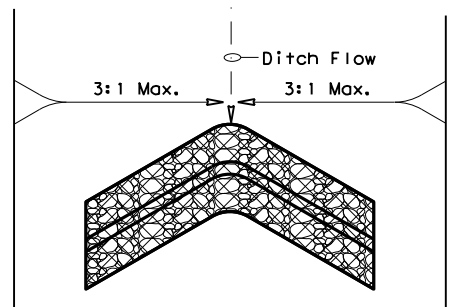


**FILTER DAM AT CHANNEL SECTIONS**

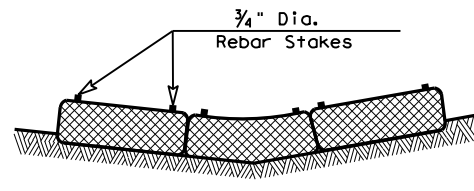
(RFD1) OR (RFD2) OR (RFD3)



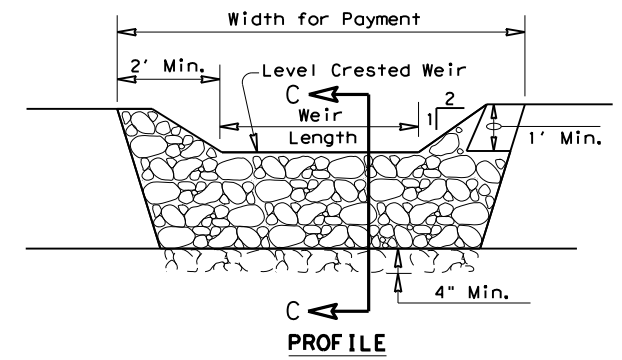
**PLAN VIEW**



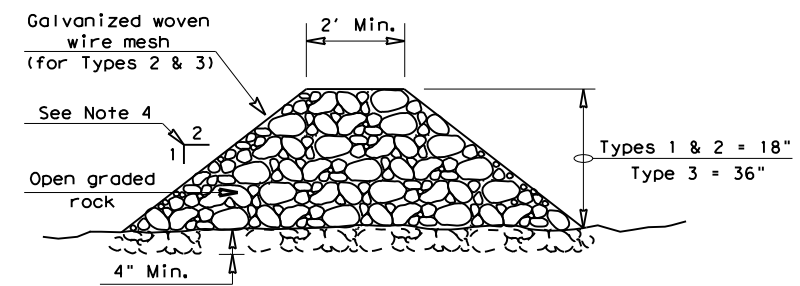
**"V" SHAPE PLAN VIEW**



**SECTION B-B**



**PROFILE**



**SECTION C-C**

**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/FT<sup>2</sup> 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.

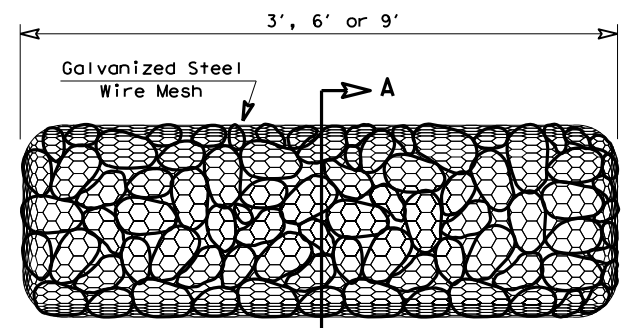
**Type 5:** Provide rock filter dams as shown on plans.

**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.

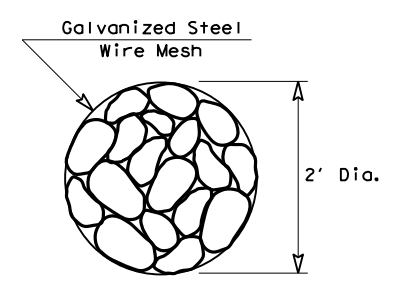
**PLAN SHEET LEGEND**

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



**TYPE 4 (SACK GABIONS)**

(RFD4)

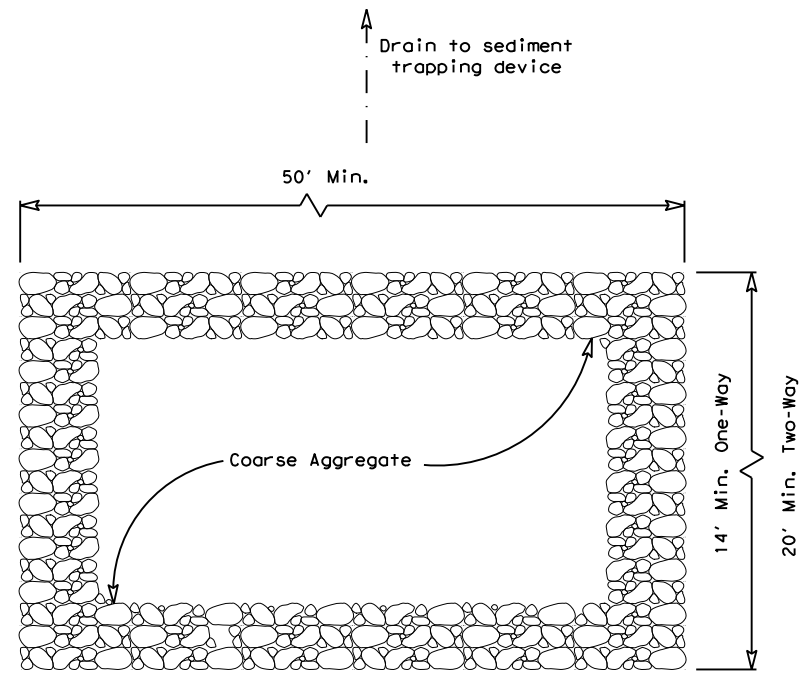


**SECTION A-A**

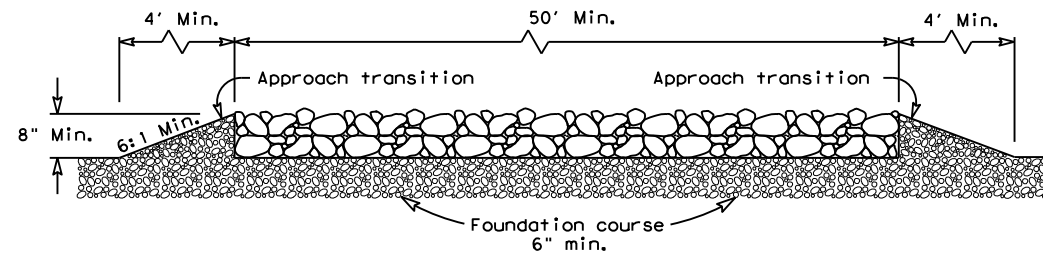
		<b>Design Division Standard</b>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>ROCK FILTER DAMS</b> <b>EC(2) - 16</b>			
FILE: ec216	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT: 1186	SECT: 02	JOB: 025
REVISIONS		HIGHWAY: FM 969	
DIST: AUS	COUNTY: BASTROP	SHEET NO.: 118	

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

DATE: 5/11/2022  
 FILE: c:\pw\khl\00168457\ec316 (1).dgn



PLAN VIEW

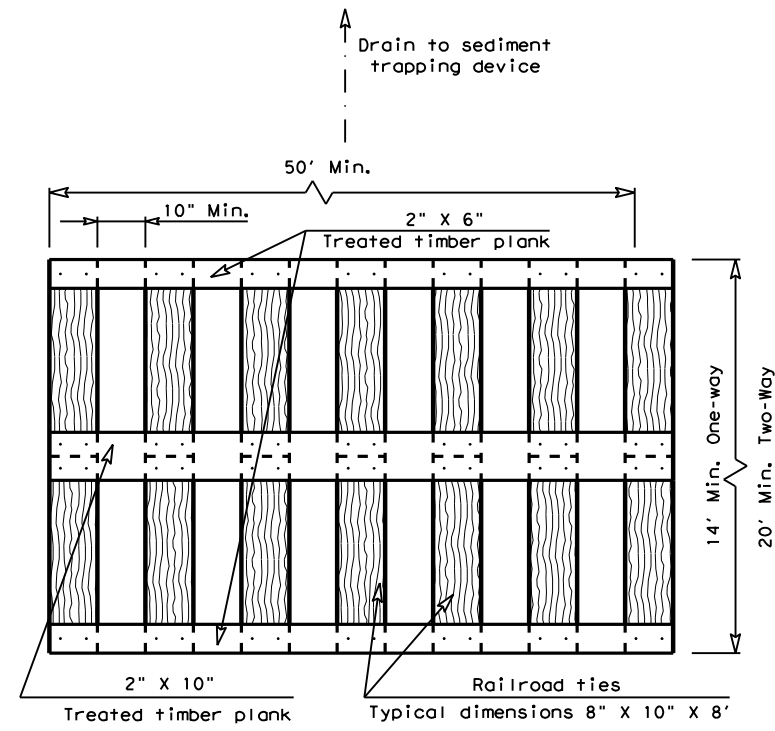


ELEVATION VIEW

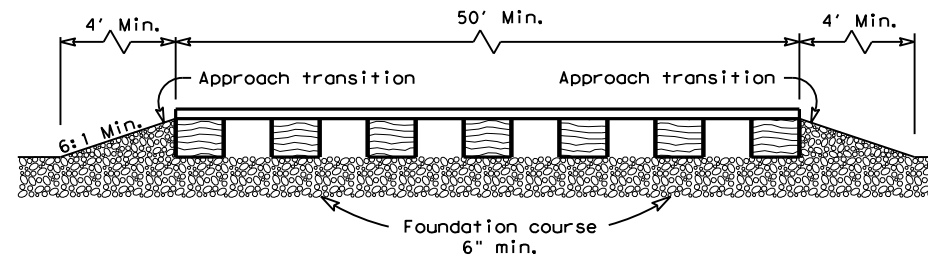
CONSTRUCTION EXIT (TYPE 1)  
 ROCK CONSTRUCTION (LONG TERM)

**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

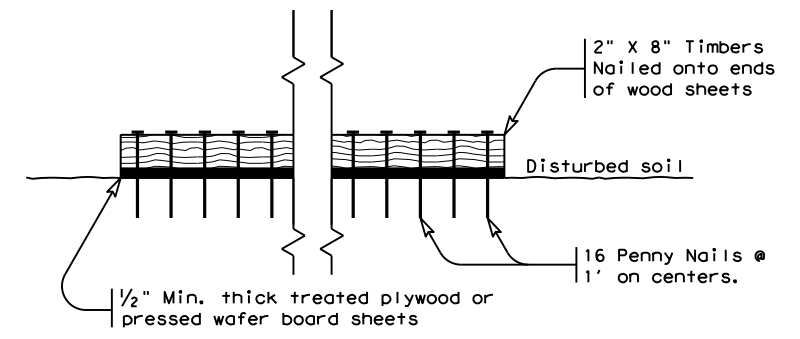
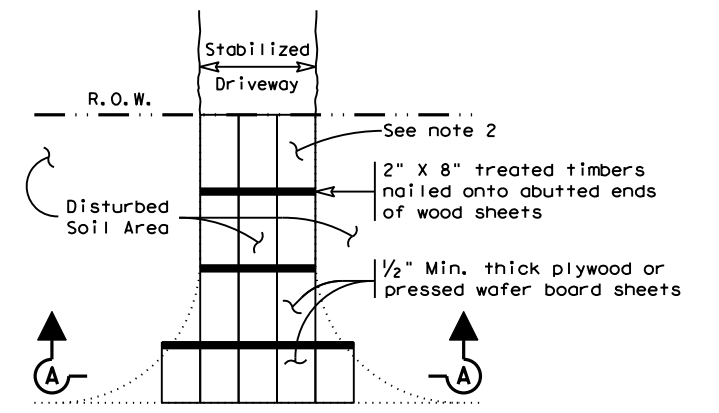


ELEVATION VIEW

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.



CONSTRUCTION EXIT (TYPE 3)  
 SHORT TERM

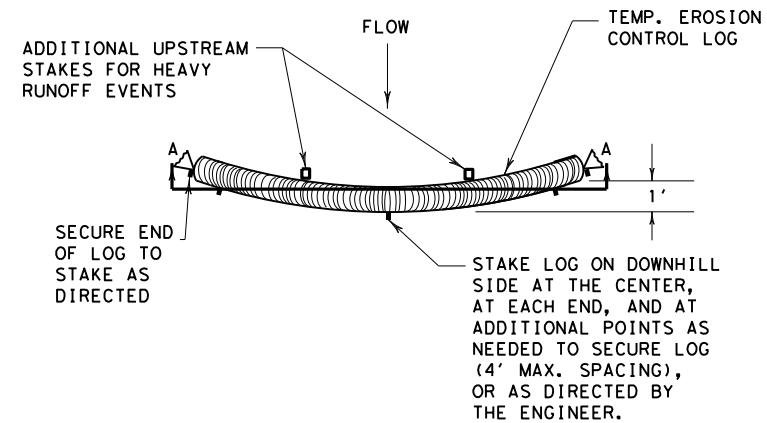
**GENERAL NOTES (TYPE 3)**

- 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.

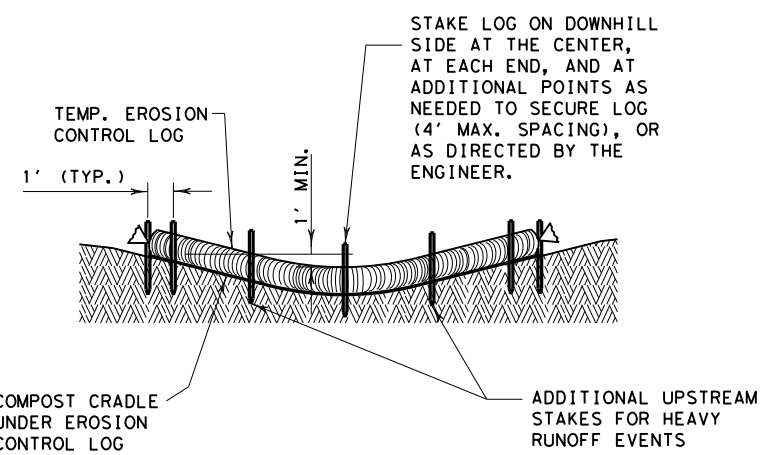
		Design Division Standard	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16</b>			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	1186	02	025
DIST	COUNTY		SHEET NO.
AUS	BASTROP		119

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

DATE: 5/11/2022  
FILE: c:\pwworking\kh1\d0168457\ec916 (1).dgn



PLAN VIEW

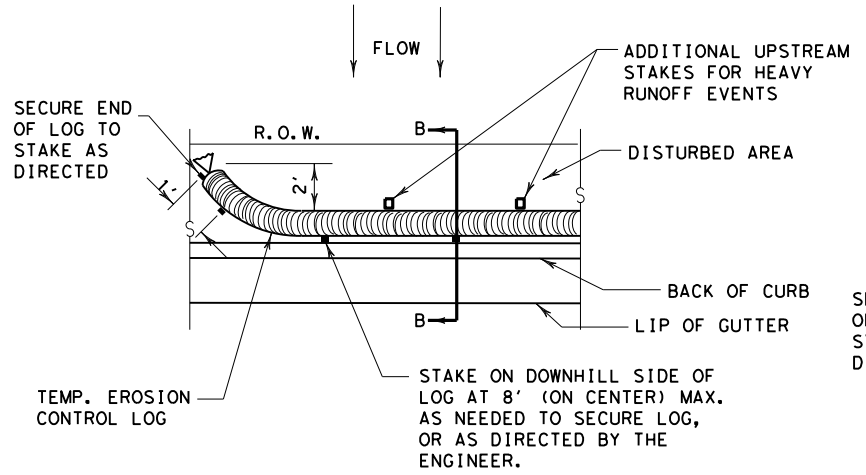


SECTION A-A  
EROSION CONTROL LOG DAM

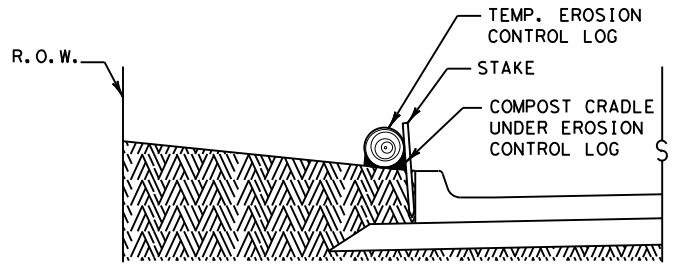
CL-D

LEGEND

- CL-D EROSION CONTROL LOG DAM
- CL-BOC EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI EROSION CONTROL LOG AT DROP INLET
- CL-CI EROSION CONTROL LOG AT CURB INLET
- CL-GI EROSION CONTROL LOG AT CURB & GRATE INLET

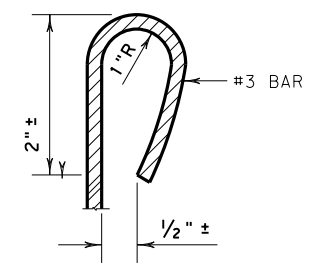


PLAN VIEW

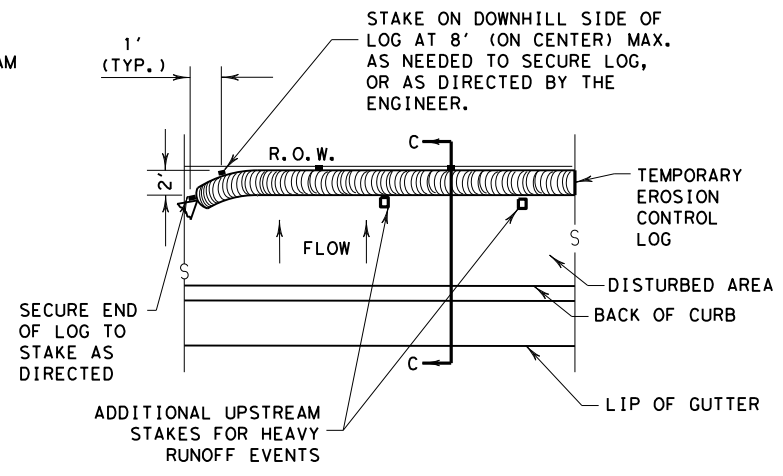


SECTION B-B  
EROSION CONTROL LOG AT BACK OF CURB

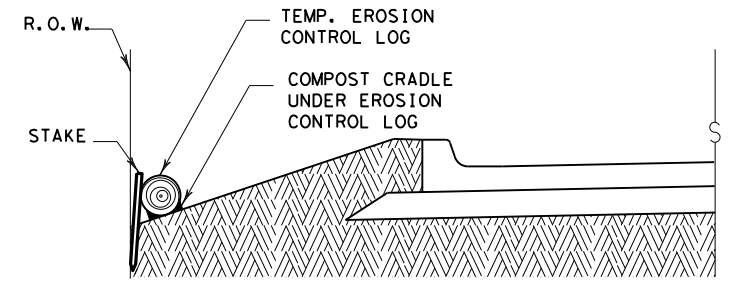
CL-BOC



REBAR STAKE DETAIL



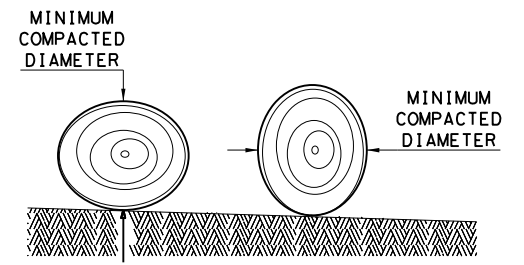
PLAN VIEW



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

**SEDIMENT BASIN & TRAP USAGE GUIDELINES**

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

**Log Traps:** The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

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

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

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SHEET 1 OF 3

Texas Department of Transportation  
Design Division Standard

**TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES**

**EROSION CONTROL LOG**

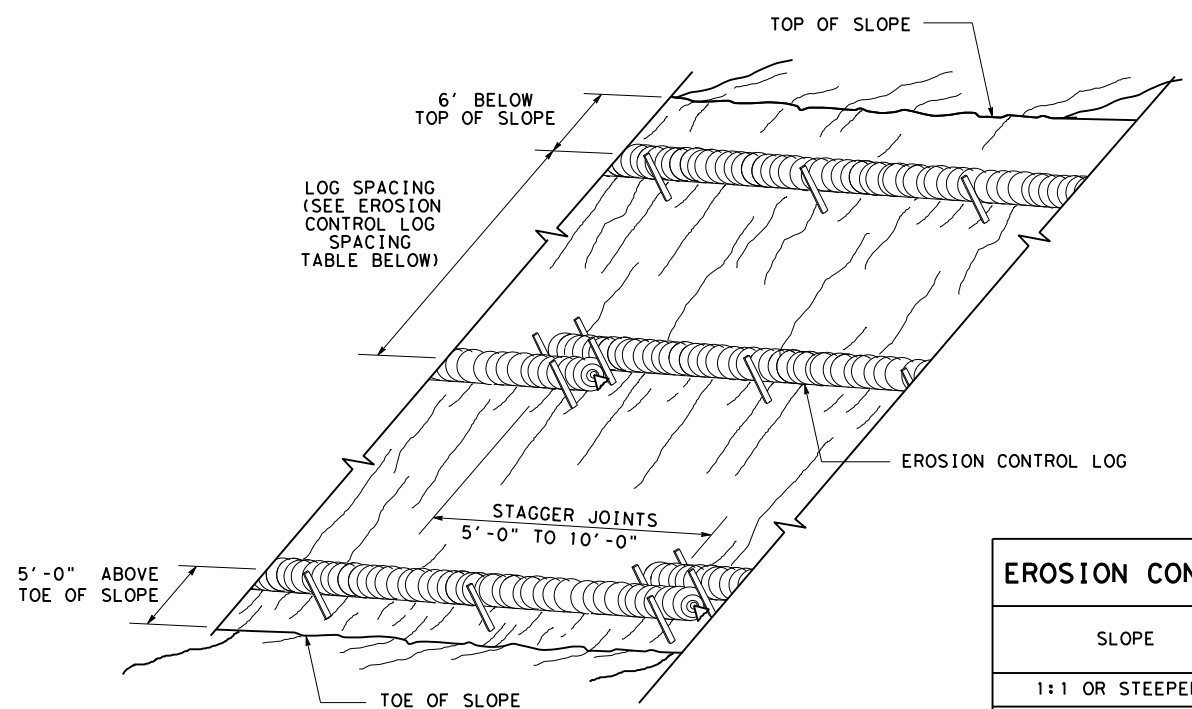
**EC (9) - 16**

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	1186	02	025	FM 969
	DIST	COUNTY	SHEET NO.	
	AUS	BASTROP	120	



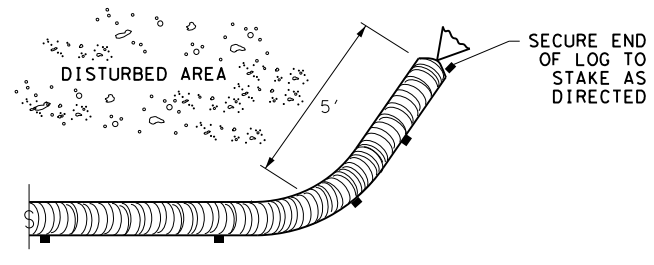
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022  
 FILE: c:\pwworkh1\d0168457\ec916 (1).dgn



**EROSION CONTROL LOGS ON SLOPES  
 STAKE AND TRENCHING ANCHORING**

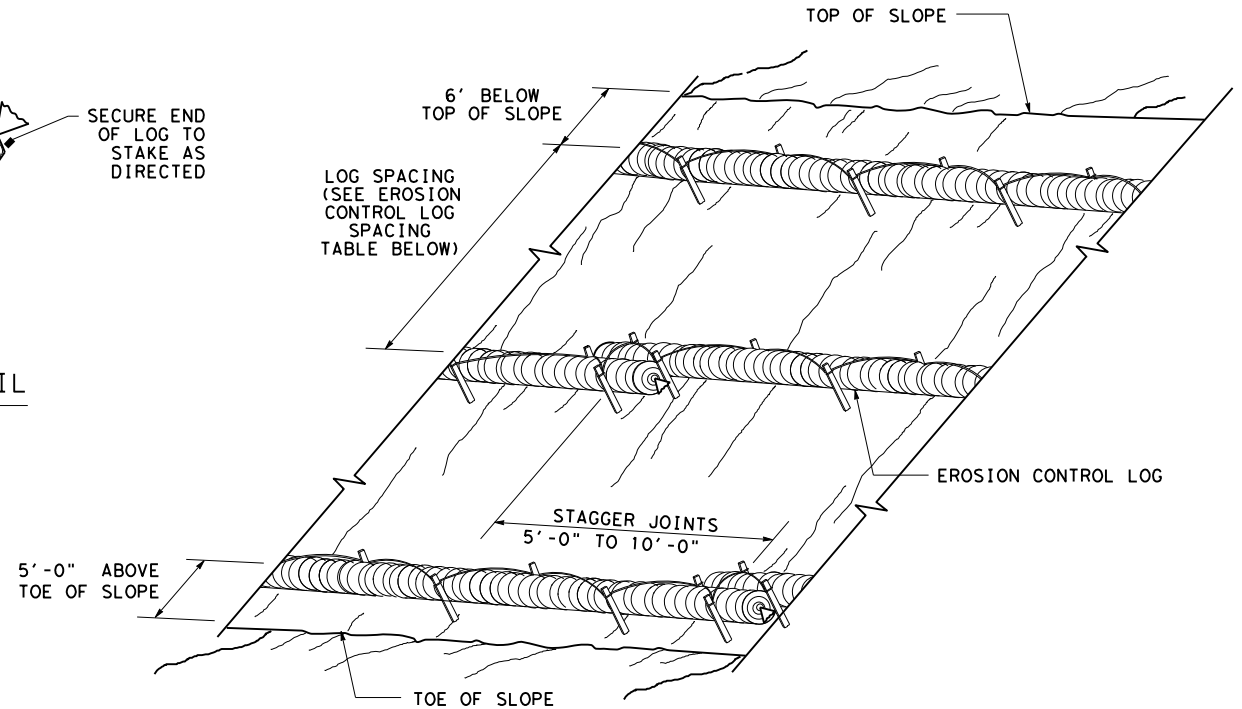
CL-SST



**END SECTION RAP DETAIL**

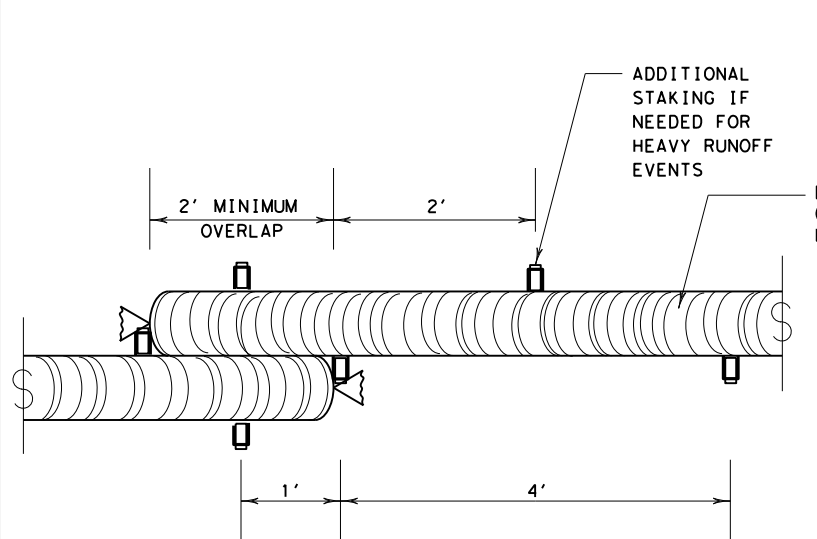
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

\* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:  
 SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;  
 HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



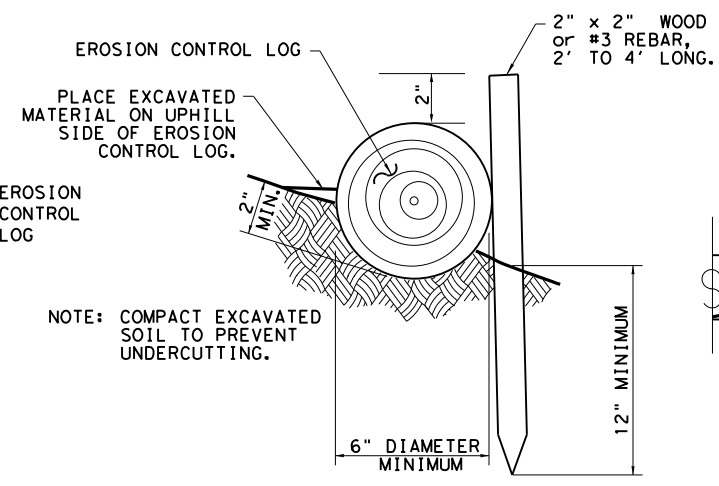
**EROSION CONTROL LOGS ON SLOPES  
 STAKE AND LASHING ANCHORING**

CL-SSL



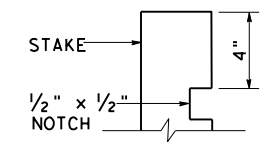
**STAKE AND TRENCHING ANCHORING DETAIL**

CL-SST



**STAKE AND LASHING ANCHORING DETAIL**

CL-SSL



**STAKE NOTCH DETAIL**

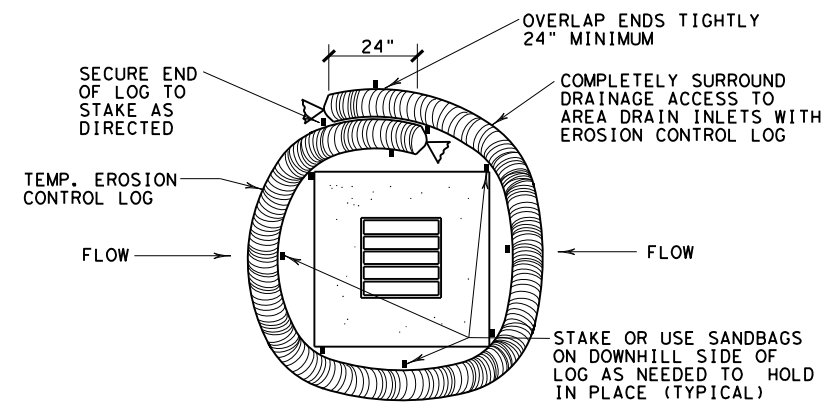
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"

SHEET 2 OF 3

		Design Division Standard	
<b>TEMPORARY EROSION,          SEDIMENT AND WATER          POLLUTION CONTROL MEASURES          EROSION CONTROL LOG          EC (9) - 16</b>			
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT SECT	JOB	HIGHWAY
REVISIONS	1186 02	025	FM 969
DIST	COUNTY	SHEET NO.	
AUS	BASTROP	121	

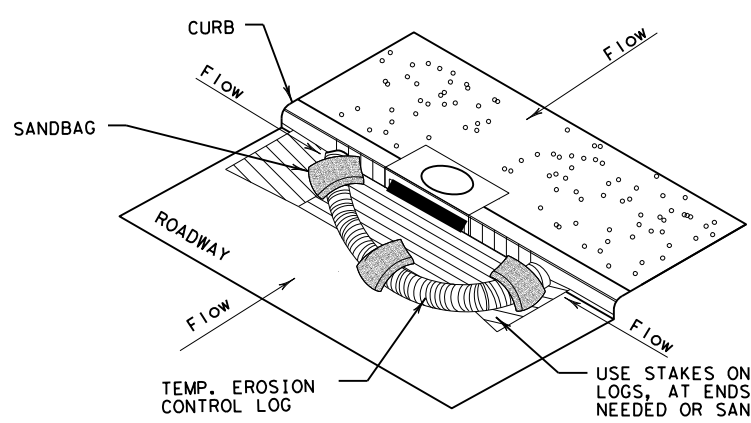
DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 5/11/2022  
 FILE: c:\pwwork\kh1\d0168457\ec916 (1).dgn



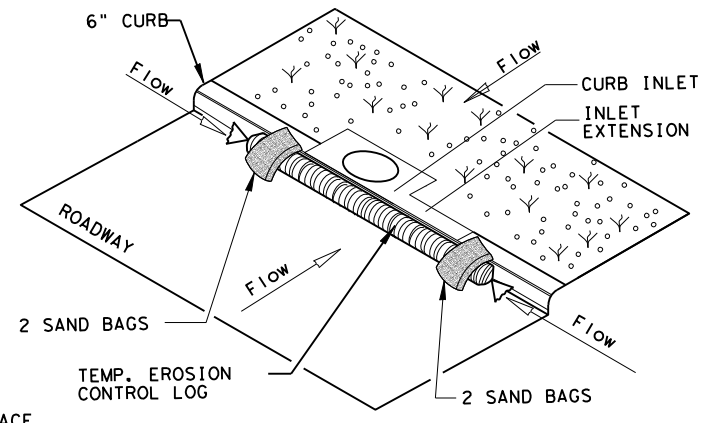
**EROSION CONTROL LOG AT DROP INLET**

CL-DI



**EROSION CONTROL LOG AT CURB INLET**

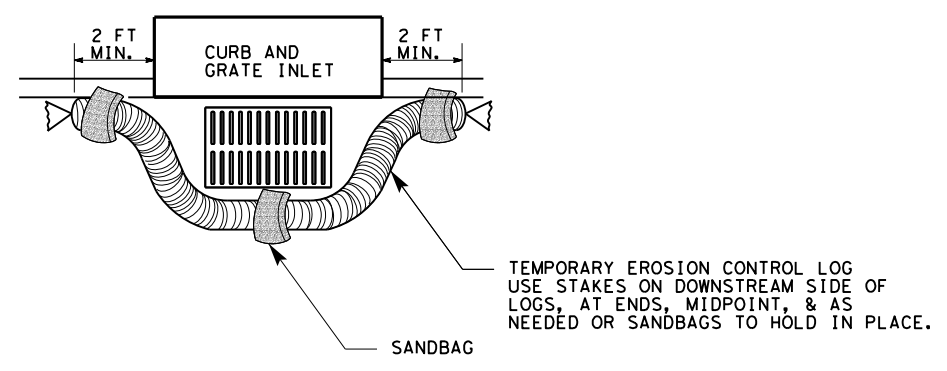
CL-CI



**EROSION CONTROL LOG AT CURB INLET**

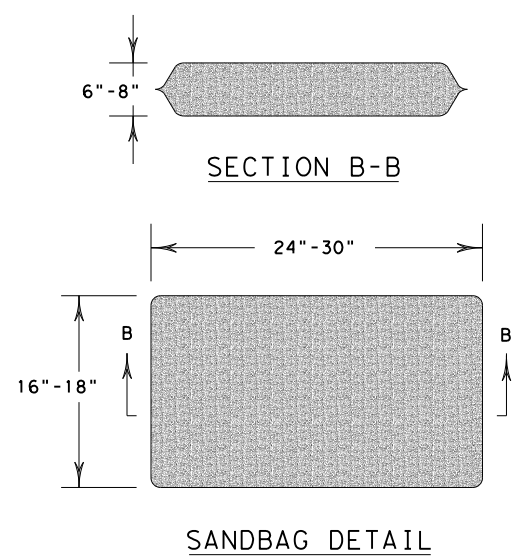
CL-CI

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



**EROSION CONTROL LOG AT CURB & GRADE INLET**

CL-GI



SHEET 3 OF 3

		<i>Design Division Standard</i>	
<b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b> <b>EROSION CONTROL LOG</b> <b>EC (9) - 16</b>			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT: 1186	SECT: 02	JOB: 025
REVISIONS		HIGHWAY: FM 969	
DIST: AUS	COUNTY: BASTROP	SHEET NO.: 122	