FHWA TEXAS DIVISION	PROJECT NO.		SHEET NO.
	C 2379-2-10		1
STATE	DISTRICT	COUNTY	
TEXAS	ABL	NOLAN	
CONTROL	SECTION	JOB	HIGHWAY NO.
2379	02	010	FM 608

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

PROJECT NO. C 2379-2-10

NET LENGTH OF ROADWAY= 27,926.47 ft = 5.289 mi
NET LENGTH OF BRIDGE = 0 ft = 0 mi
NET LENGTH OF PROJECT= 27,926.47 ft = 5.289 mi

FM 608
NOLAN COUNTY

LIMITS: FISHER COUNTY LINE TO BU 84J

FOR THE CONSTRUCTION OF: REHABILITATE EXISTING ROADWAY

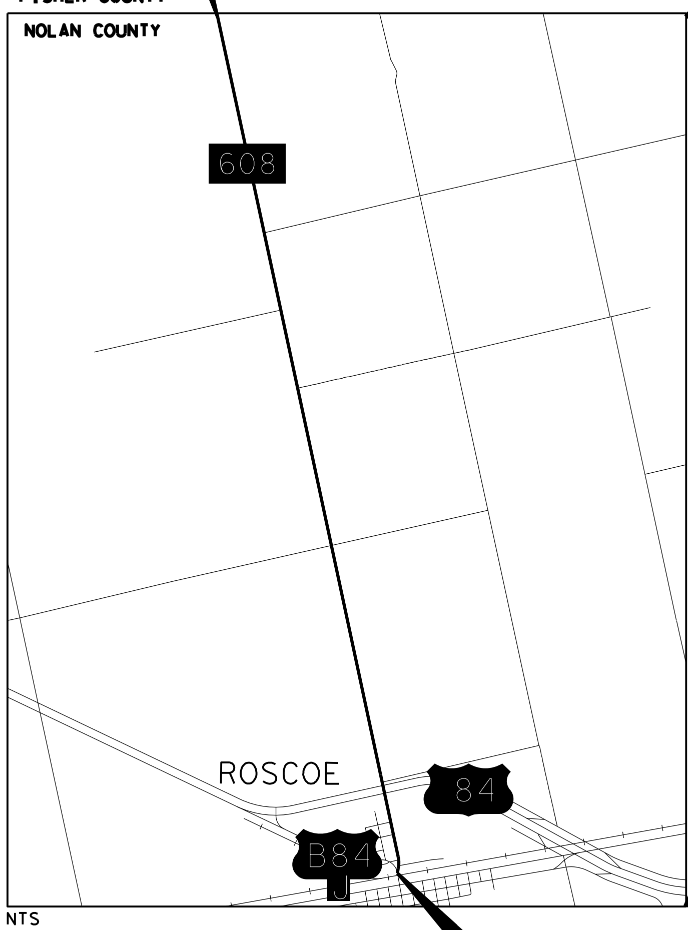
CONSISTING OF: REHABILITATE EXISTING ROADWAY

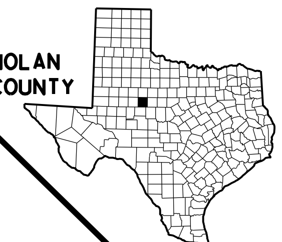
DESIGN SPEED = 40 mph
CURRENT A.D.T. (2026) = 400 vpd
PROJECTED A.D.T. (2046) = 600 vpd
FUNCTIONAL CLASS = MINOR ARTERIAL
EXISTING NBI# = N/A
PROPOSED NBI# = N/A

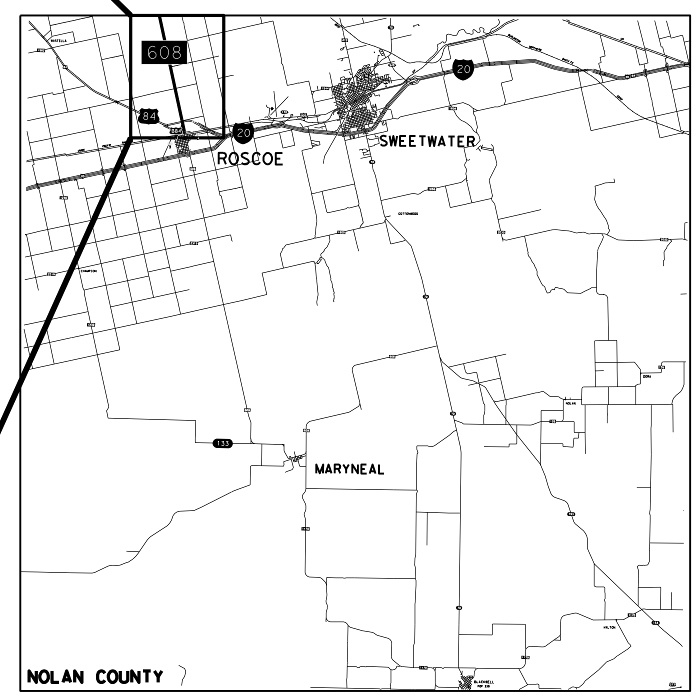
INDEX OF SHEETS

SEE SHEET 2

BEGIN CONTROL
CSJ: 2379-02-010
REF MRK: 286+1.111 mi.
STA: 0+00.00 ft.







END CONTROL
CSJ: 2379-02-010
REF MRK: 292+1.426 mi.
STA: 280+79.47 ft.

EXCEPTIONS: STA. 252+55.00 TO STA. 254+08.00
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

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

FINAL PLANS

LETTING DATE: SEPTEMBER 2023
DATE CONTRACTOR BEGAN WORK: ____
DATE WORK WAS COMPLETED: ____
DATE WORK WAS ACCEPTED: ____
FINAL CONTRACT COST: $ ____
CONTRACTOR : ____

CERTIFICATION FOR FINAL PLANS

THIS PROJECT WAS BUILT ACCORDING TO THE PLANS AND SPECIFICATIONS. THESE FINAL PLANS REFLECT THE WORK DONE AND THE QUANTITIES SHOWN THEREON AND ON THE FINAL ESTIMATE ARE FINAL QUANTITIES.

AREA ENGINEER DATE

THE DISTRICT TRAFFIC SAFETY COMMITTEE HAS REVIEWED THE TRAFFIC CONTROL PLAN FOR THIS PROJECT AND IT IS IN COMPLIANCE WITH CURRENT TRAFFIC CONTROL STANDARDS.

DocuSigned by: Saul N Norman, P.E. 7/11/2023
25E84E0F4AB6444...
COMMITTEE CHAIRMAN DATE

Texas Department of Transportation

RECOMMENDED FOR LETTING: 7/11/2023
DocuSigned by: Ryan Sayles
EBF7BBC5154947E...
RYAN R. SAYLES, P.E.
AREA ENGINEER

SUBMITTED FOR LETTING: 7/10/2023
DocuSigned by:
DDD6B1E4BEE74F8...
NATHAN MOORE
TXDOT PROJECT MANAGER

RECOMMENDED FOR LETTING: 7/11/2023
DocuSigned by: Michael Haithcock
5757E286798B4FD...
MICHAEL A. HAITHCOCK, P.E.
DIRECTOR OF T P & D

RECOMMENDED FOR LETTING: 7/11/2023
DocuSigned by: Stephen T. Jones, P.E.
3A22F03A4BD84FD...
STEPHEN T. JONES, P.E.
TxDOT DESIGN ENGINEER

APPROVED FOR LETTING: 7/11/2023
DocuSigned by: Thomas G. Allbritton, P.E.
0F6F7E74C57D430...
THOMAS G. ALLBRITTON, P.E.
DISTRICT ENGINEER

PENTABLE:
DATE: 6/27/2023
FILE: pw://txdot.projectwiseonline.com:TXDOT12/Documents/08 - ABL/Design Projects/2379020104 - Design/Plan Set/1. General/TITLE SHEET.dgn

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3-4	PROJECT LAYOUT
5-6	TYPICAL SECTIONS
7-10	GENERAL NOTES
11-12	ESTIMATE & QUANTITY
13-14	QUANTITY SUMMARY
	TRAFFIC CONTROL PLAN
15	TCP NARRATIVE
16-24	TCP LAYOUT
25-26	DETOUR LAYOUT
	TRAFFIC CONTROL PLAN STANDARDS
27-38	BC (1)-21 THRU BC (12)-21
# 39	TCP(3-1)-13
# 40	WZ(RCD)-13
	ROADWAY DETAILS
41	SURVEY CONTROL INDEX AND DATA
42	SURVEY CONTROL DATA
43-68	PLAN AND PROFILE
69	FM 608 & BUS 84J INTERSECTION DETAIL
70	DRIVEWAY DETAILS
71	YOUNG FARM ESTATES DRIVEWAY DETAIL
72	MAILBOX TURNOUT DETAILS
	ROADWAY STANDARDS
# 73	MB(1)-21
# 74	MB(2)-21
# 75	MB(3)-21
# 76	MB(4)-21
# 77	MBP(1)-22
# 78	MBP(2)-22
	DRAINAGE DETAILS
79-82	CULVERT CROSS SECTIONS
83	BCS
	DRAINAGE STANDARDS
# 84	SCC-MD
# 85-86	SCC-3&4
# 87-88	SCC-5&6
# 89-90	SCC-8
# 91	PSET-SC
# 92-94	SETB-FW-0
95	PW
	SIGNING
96-120	SIGN & STRIPING LAYOUT
121-125	SUMMARY OF SMALL SIGNS
126-128	SIGN DETAILS
	SIGNING STANDARDS
# 129	SMD(GEN)-08
# 130	SMD(SLIP-1)-08
# 131	SMD(SLIP-2)-08
# 132	SMD(SLIP-3)-08
# 133	TSR(3)-13
# 134	TSR(4)-13
135	TSR(5)-13
	PAVEMENT MARKINGS & DELINEATION STANDARDS
# 136	PM(1)-22
# 137	PM(2)-22
# 138	D&OM(1)-20
# 139	D&OM(2)-20
# 140	D&OM(3)-20
# 141	D&OM(4)-20
142	D&OM(VIA)-20
	ENVIRONMENTAL ISSUES
143-144	STORMWATER POLLUTION PREVENTION PLAN (SW3P)
145-148	ENVIRONMENTAL LAYOUT SHEETS
149	ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
	ENVIRONMENTAL ISSUES STANDARDS
150-152	EC (9)-16

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET WITH A "#" HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

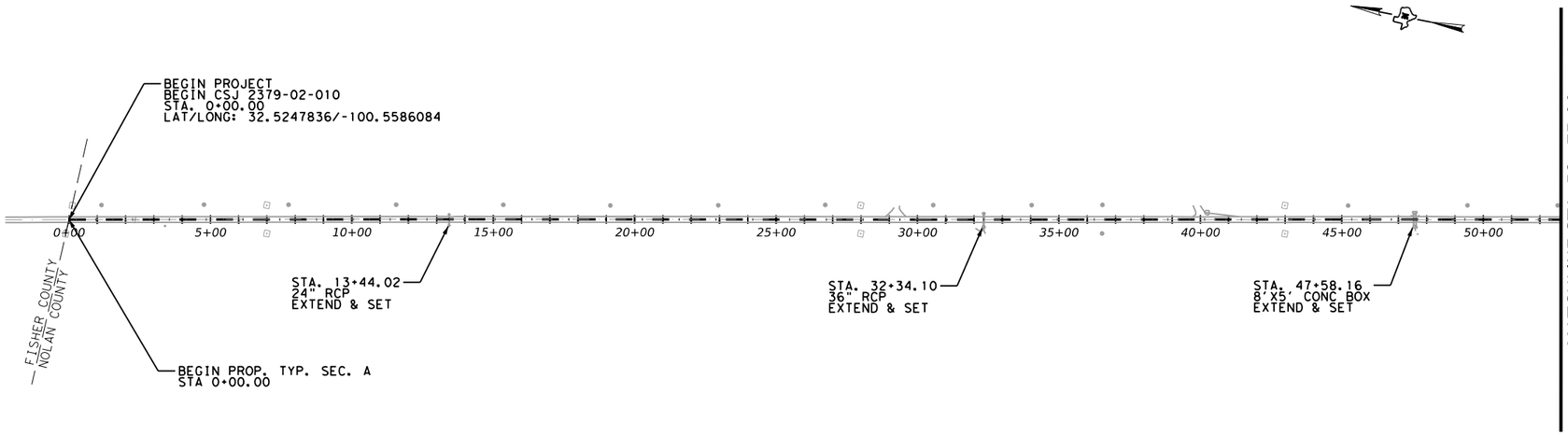
Stephen T. Jones, P.E. 06/06/2023
NAME DATE

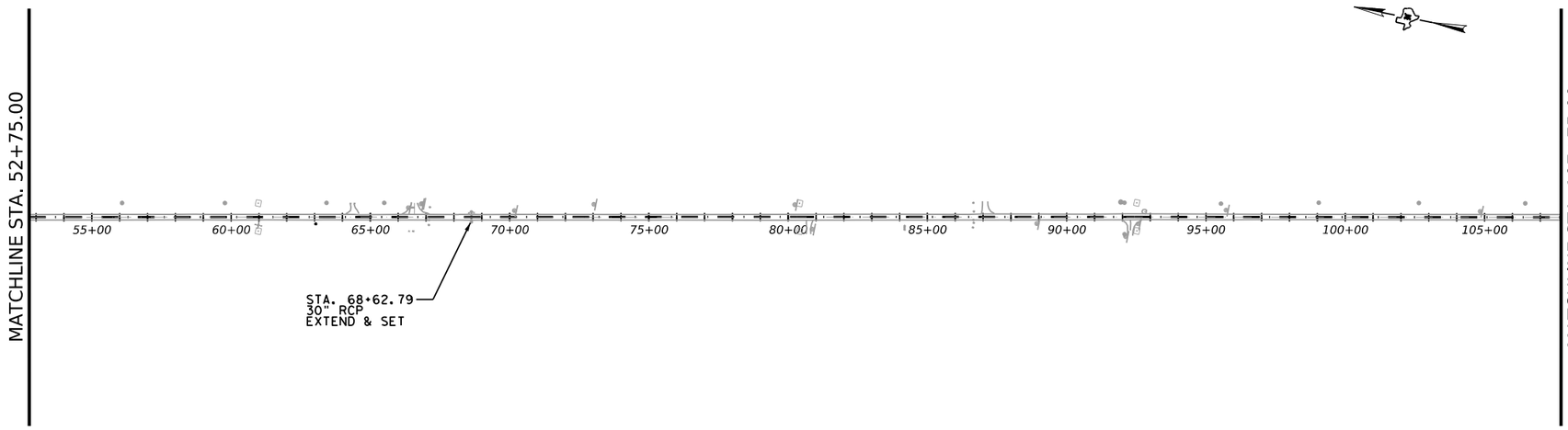
INDEX OF SHEETS

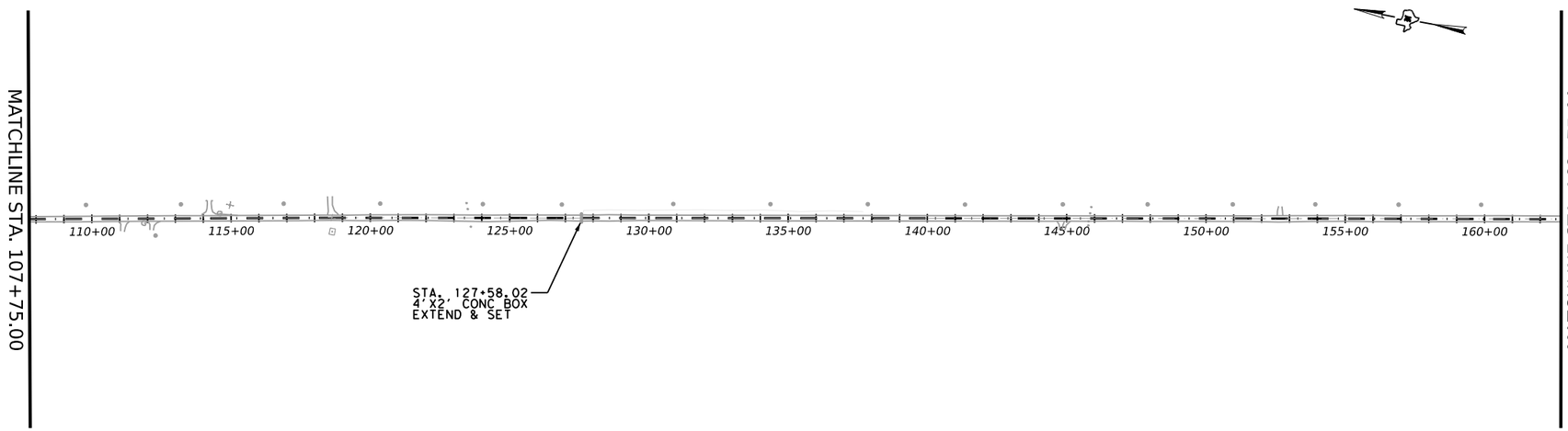
 Texas Department of Transportation

SCALE: N/A SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		2
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010







STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PROJECT LAYOUT

 Texas Department of Transportation

SCALE: 1" = 500' SHEET 1 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		3
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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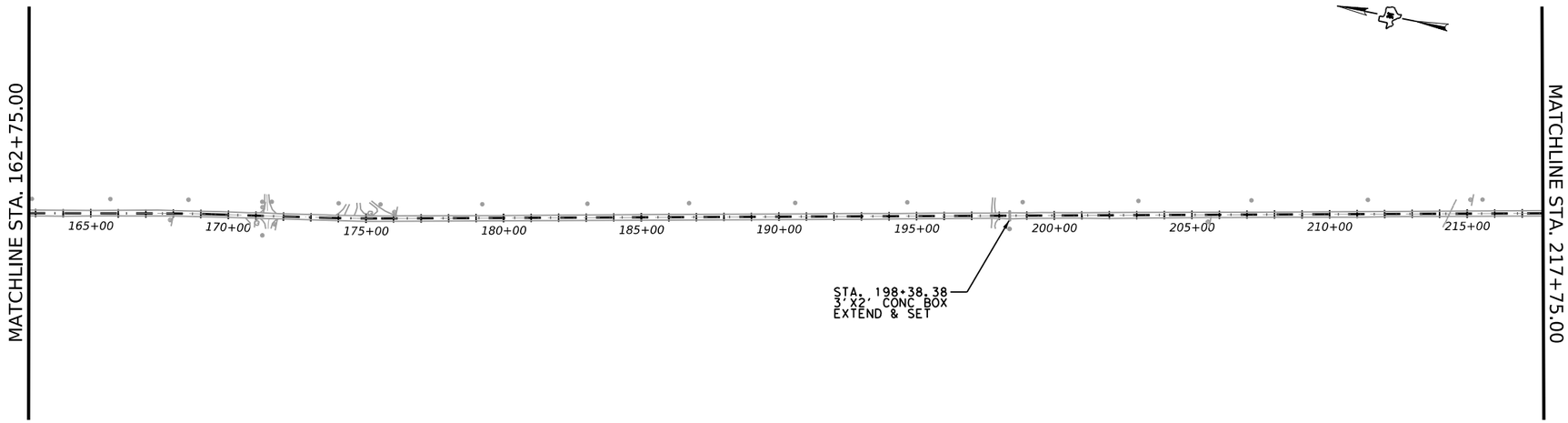

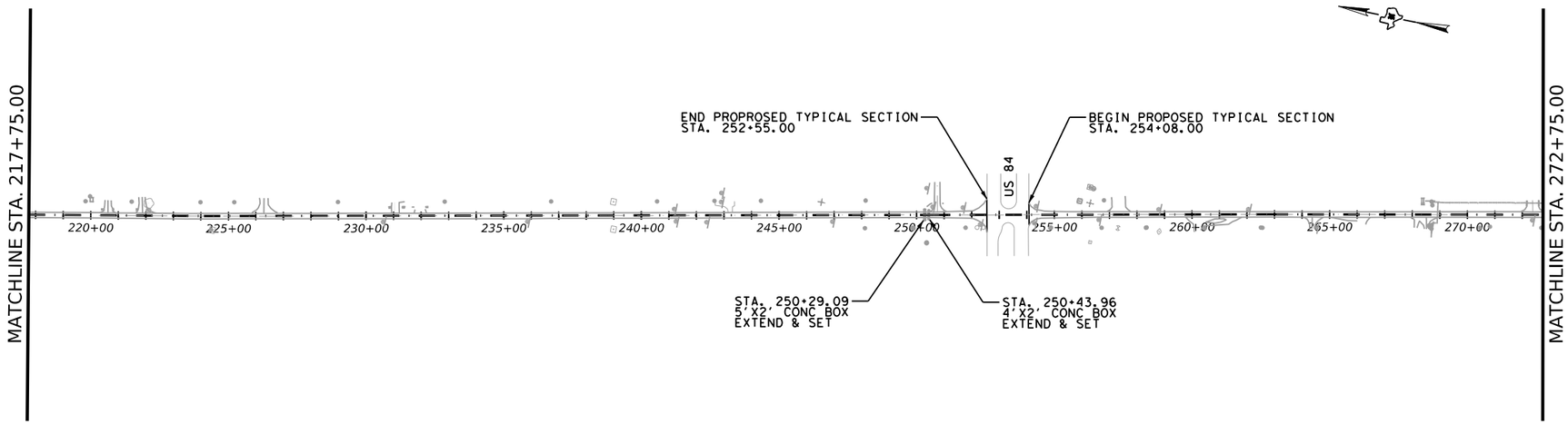

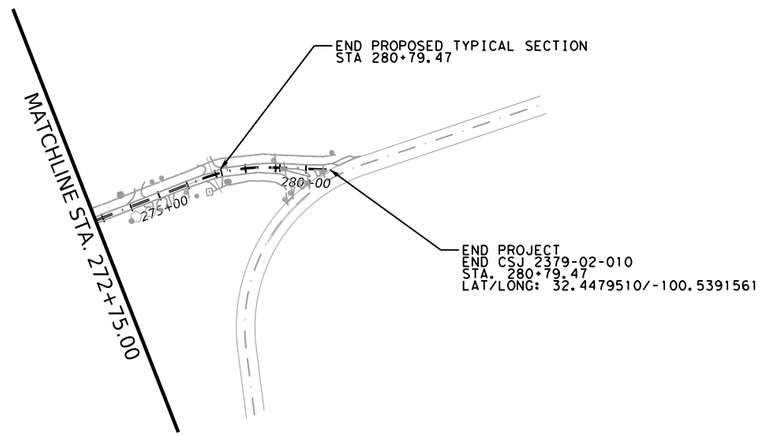

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PROJECT LAYOUT

SCALE: 1" = 500'

SHEET 2 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		4
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/1. General/PROJECT LAYOUT
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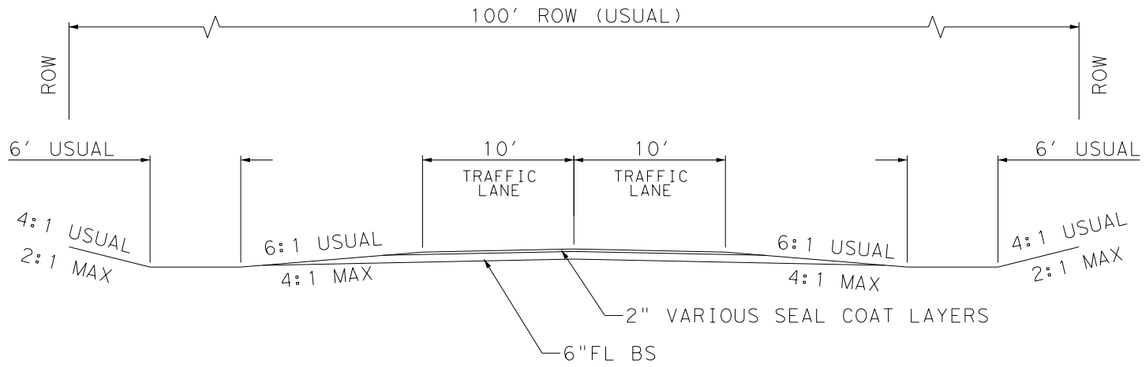

EXISTING TYPICAL SECTION
STA. 0+00.00 TO STA 252+55.00
STA. 254+08.00 TO STA 280+79.47

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TYPICAL SECTIONS

SCALE: 1" = 10' SHEET 1 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		5
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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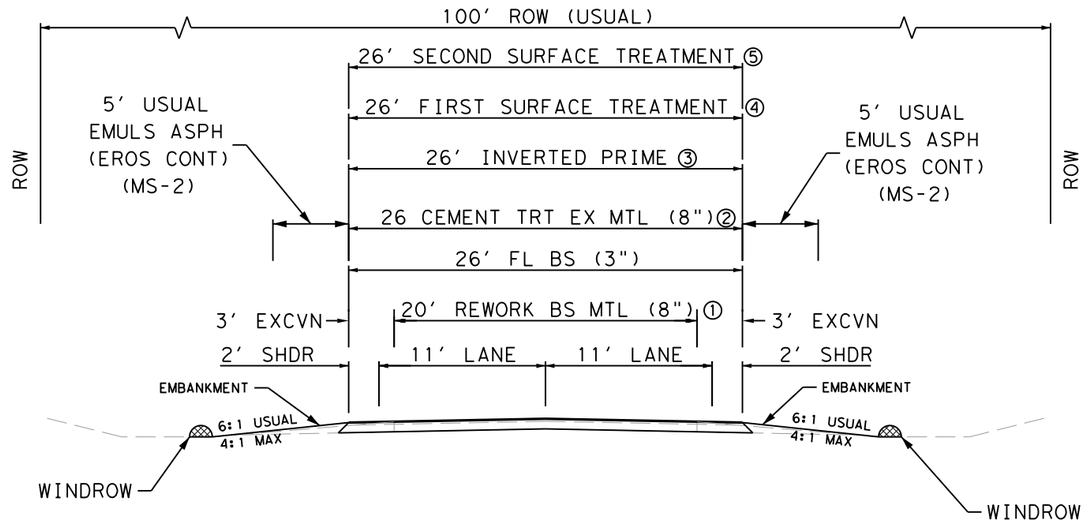
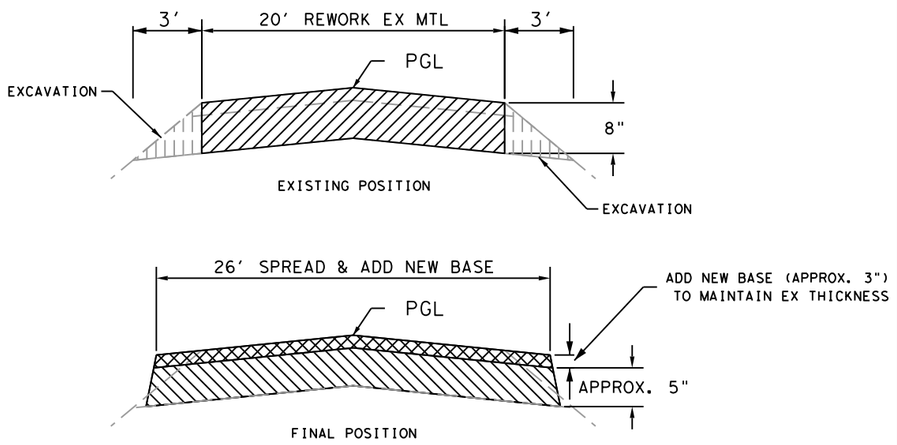


PROPOSED TYPICAL SECTION A
STA. 0+00.00 TO STA 252+55.00
STA 254+08.00 TO STA 272+01.30
STA 272+73.10 TO STA 277+20.00



REWORK DETAIL
NOT TO SCALE

① BLEND EXISTING PAVEMENT AND BASE MATERIAL INTO AN EVEN MIXTURE. SPREAD THE BLENDED MATERIAL TO THE FINAL ROAD BED WIDTH (SUBSIDIARY TO ITEM 251). SEE REWORK DETAIL.

② CEMENT CALCULATED AT 4% BY BASE WT, 125 LB/CF

③ ASPH(RC-250) & AGGR(TY-B GR 5 SAC-B)

④ ASPH(MULTI OPT) & AGGR(TY-PB GR 3 SAC-B)

⑤ ASPH(AC-20-5TR) & AGGR(TY-PB GR 4 SAC-B)

PAVEMENT EDGE SEQUENCE OF WORK

1. BLADE EXISTING VEGETATION TO LIMITS OF EMBANKMENT AS SHOWN ON THE CROSS SECTIONS.
2. ADD EMBANKMENT AS SHOWN UP TO THE EDGE OF PAVEMENT
3. SPREAD WINDROW UP TO THE EDGE OF PAVEMENT.
4. APPLY EMULS ASPH (EROS CONT)(MS-2) AT A RATE OF 0.15 GAL/SY RESIDUAL ASPHALT.

WINDROW NOTES

1. ALL WINDROW AND EMULSION WORK SHALL BE SUBSIDIARY TO ITEM 132.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/20/2023

TYPICAL SECTIONS

SCALE: 1" = 10' SHEET 2 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		6
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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DATE: 6/20/2023 5:02:33 PM

ABILENE DISTRICT GENERAL NOTES
2014 SPECIFICATIONS

General

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

Ryan R. Sayles, P.E. / Phone: 432-263-4768 / Ryan.Sayles@txdot.gov
(Big Spring Area Office)

Contractor questions will be accepted through email, phone, and in person by the above individuals.

For Q&A's on Proposals navigate to
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors
Use the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

All relevant project documentation including contract time, cross sections,etc will be posted on the districts FTP website. https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

Failure to make necessary corrections to SW3P based on SW3P inspections will be cause for withholding the monthly estimate until such corrections have been made.

Failure to make necessary corrections to traffic control items based on barricade inspections will be cause for withholding the monthly estimate until such corrections have been made.

Provide ingress/egress to the adjacent properties in areas under construction. Phased construction of driveways and streets shall be required to provide uninterrupted access to adjacent properties. Coordinate work with the property owners before beginning any construction in the vicinity of the drive.

Mailbox manipulation made necessary because of construction shall be done in accordance with Item 560, except that this work will not be paid for directly but will be considered subsidiary to the permanent installation pay item. For temporary mailbox supports, use type 6 as shown on the MB-15(1) standards.

Environmental

Endangered and Protected Species

1. Migratory Birds
   - **a. Bird nesting season is typically 15Feb through 15Sep annually.**

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Highway: FM 608

   - b. The Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, or anywhere they are encountered.
   - c. Perform all tree trimming and other vegetation clearing activities during the non-breeding season (typically 15Sep-15Feb annually). Perform any inactive nest removal and bird exclusion methods to prevent birds from establishing nests. Phasing of work during construction may be necessary to stay in compliance.
   - d. When active nests are unexpectedly encountered on-site during construction, the Contractor will stop work and immediately notify the Engineer. Take measures to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the Migratory Bird Treaty Act, Texas Parks and Wildlife Code, and TxDOT policy.
   - e. The Engineer will notify the Contractor when work may resume.
   - f. The Contractor should be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repelling sprays and/or gels, between 15Feb and 15Sep. The Contractor can discuss other preventative measures with the Engineer and/or District Environmental Staff.

Best Management Practices

1. Comply with the SW3P and associated sheets.
2. Migratory Birds:
   - a. Bird nesting season is typically 15Feb through 15Sep annually.
   - b. The Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, or anywhere they are encountered.
   - c. Perform all tree trimming and other vegetation clearing activities during the non-breeding season (typically 15Sep-15Feb annually). Perform any inactive nest removal and bird exclusion methods to prevent birds from establishing nests. Phasing of work during construction may be necessary to stay in compliance.
   - d. When active nests are unexpectedly encountered on-site during construction, the Contractor will stop work and immediately notify the Engineer. Take measures to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the Migratory Bird Treaty Act, Texas Parks and Wildlife Code, and TxDOT policy.
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CONT	SECT	JOB	HIGHWAY
2379	02	010	FM 608
DIST	COUNTY		SHEET NO.
ABL	NOLAN		7

GENERAL NOTES

3. Other Best Management Practices for State Protected Species
    a. If Black Tailed Prairie Dog (BTPD) burrows or pocket gopher mounds are found near or within the project area, place barrier fencing to discourage the individual animals of moving into or through the construction area.
    b. While seeding or revegetating, if BTPD or pocket gopher mounds are discovered near or within the planned area, a vegetative barrier should be planted to discourage the dispersal of the species within the TxDOT ROW.
    c. If any animals are within the project area, avoid harming when encountered. Let them leave the area without harassment. Avoid any unnecessary impacts to dens or burrows.
    d. Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible.
    e. 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 the presence of wildlife prior to backfilling.
    f. Rubbish found near bridges on TxDOT ROW should be removed and disposed of properly to minimize the risk of pollution. Rubbish does not include brush piles or snags.
    g. If Texas tortoises (Gopherus berlandieri) or box turtles (Terrepene 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.
    h. Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided.

Item 5, "Control of Work"
Use Method C for construction surveying.

Provide notification to the District Traffic Engineering Section by telephone at 325-676-6991 and by email at ABL_TrafficFix@txdot.gov when planning drilling or excavation work in areas where existing TxDOT underground utilities exist. Visual evidence of TxDOT underground utilities in the area include illumination poles, ground boxes, flashing beacons, traffic signals, etc. This notification must be provided 72 hours in advance of performing the work.

Item 7, "Legal Relations and Responsibilities"
The total area disturbed for this project is **6.45** acres. The disturbed area in this project, all project locations in the Contract, and the Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area

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disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer and to the government that operates a separate storm sewer system.

Provide one SW3P Notification Board for this project. Notification Boards are to be placed at locations within the right-of-way but outside the clear zone as directed by the Engineer. Consider this work to be subsidiary to the various bid items of the contract.

No significant traffic generator events identified.

Hard hats are required at all times during construction when construction personnel are in TxDOT Right-of-Way.

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

LIGHTING STANDARDS FOR HIGHWAY MAINTENANCE OR CONSTRUCTION VEHICLES AND SERVICE VEHICLES

VEHICLE LIGHTING SUMMARY

Vehicle	Color of Flashing Lights	Transportation Code
Police Vehicles	Red/Blue/White/Amber	547.305 & 547.702
Fire/EMS Vehicles	Red/Blue/White/Amber	547.305 & 547.702
Volunteer Fire/EMS	Red/Blue/White/Amber	547.305 & 547.702
School	Bus Red/White (rooftop) /Amber	547.305 & 547.701
Highway Maintenance or Construction Vehicles and Service Vehicles	Amber/Blue	547.105 & TxDOT Lighting Standards

Item 8 "Prosecution and Progress"
Each contract awarded by the Department stands on its own and as such, is separate from other contracts. A Contractor awarded multiple contracts must be capable and sufficiently staffed to concurrently process and/or execute all contracts at the same time.

Coordinate and update the work schedule with the project inspector daily. Give a minimum of 24 hours of notice to project inspector if work requiring inspection or testing is to be performed.

CONT	SECT	JOB	HIGHWAY
2379	02	010	FM 608
DIST	COUNTY		SHEET NO.
ABL	NOLAN		8

GENERAL NOTES

Failure to do so may cause that work to be delayed or postponed if TxDOT personnel are not available. Work performed without suitable inspection, as determined by the Engineer, may be ordered removed and replaced at Contractor's expense.

Item 9, "Measurement and Payment"
The progress payment period shall end on the 25th of each month, unless directed by the Area Office Engineer. Material on Hand (MOH) is due two business days before estimate cut off.

Item 316, "Surface Treatments"
When cutback asphalt is used, delay the second surface treatment course or ACP overlay 14 days or as directed by the Engineer.

Seal driveways, mailbox turnouts, and intersections prior to sealing the roadway, unless otherwise approved.

Provide pre-coat aggregate with **PG 64-22** or as approved by the Engineer.

For items of work that include both summer and winter materials or the Asphalt (Multi Option), the Engineer will determine which asphalt to apply based on timing and prevailing weather conditions. The Asphalt (Multi Option) shall consist of the following choices and rates.

Estimated Summer Rates with Grade 3 Aggr.
ASPH (AC-20-5TR) @ .40 GAL/SY
Estimated Summer Rates with Grade 4 Aggr.
ASPH (AC-20-5TR) @ .36 GAL/SY
Estimated Winter Rates with Grade 3 Aggr.
ASPH (CRS-2P) @ .42 GAL/SY*
Estimated Winter Rates with Grade 4 Aggr.
ASPH (CRS-2P) @ .40 GAL/SY *

AGGREGATES
AGGR (TY-PB GR-3 SAC –B) – 1 CY/115 SY
AGGR (TY-PB GR-4 SAC –B) – 1 CY/125 SY

The rates shown are for estimating purposes and the engineer can dictate higher or lower rates based on roadway conditions.

Item 502, "Barricades, Signs and Traffic Handling"
Provide the Engineer with written notification seven (7) days in advance of major traffic changes. A major traffic change is defined as the temporary (greater than one day) or permanent relocation of traffic lanes typically in an urban setting. The notice will, at a minimum, include the expected date, time, and scope of the traffic change. The Department will utilize the information provided to inform the traveling public of the changes. Failure to provide advance

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County: NOLAN
Highway: FM 608

notice, or to provide accurate information, will result in delaying the work until such time that the public has been notified.

Additional signs, barricades and traffic handling may be necessary to complete the work shown herein and will be provided by the contractor as required and will be considered subsidiary to this item.

Provide separate attenuators for each work area within a common lane closure as approved or directed by the Engineer.
In sections where traffic is restricted to one lane, two-way traffic, flaggers will be stationed at each end of that section with two-way communication devices.

Relocate existing roadside signs to temporary supports as approved by the engineer.

All safety appurtenances such as signs, delineators, object markers and route markers will be in place prior to opening each phase of the construction to traffic, unless otherwise directed.

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.

The Contractor's person responsible for TCP compliance must be available by local telephone and have a response time within 45 minutes.

Equip all work vehicles within 30 feet of the traveled way with a functioning amber strobe light or rotating beacon visible from all directions.

Repair barricades within the timeline shown on the barricade inspection report. Failure to comply will cease all work until barricades are repaired to the satisfaction of the Department. Replace all damaged traffic control devices immediately. Remove any damaged traffic control devices from the project within 24 hours.

Conflicting guide signs shall be covered as approved by the Engineer. This work shall be subsidiary to Item 502.

Item 644, "Small Roadside Sign Supports and Assemblies"
Use the latest edition of the "Standard Highway Sign Designs for Texas" for Sign types for which design details are not shown on the plans.

CONT	SECT	JOB	HIGHWAY
2379	02	010	FM 608
DIST	COUNTY		SHEET NO.
ABL	NOLAN		9

GENERAL NOTES

Sign placement shall be in accordance with the latest edition of the TMUTCD & TxDOT's Sign Crew Field Book located at the following addresses.
TMUTCD - https://www.txdot.gov/business/resources/signage/tmutcd.html
TxDOT's Sign Crew Field Book - http://onlinemanuals.txdot.gov/txdotmanuals/sfb/index.htm

Before final sign installation, stake all sign locations for approval by the engineer.

All triangle slip base small sign mounts installed under this item shall utilize clamp type bases.

Remove entire small sign foundation.

Item 658, "Delineator and Object Marker Assemblies"
Delineators and object marker assemblies will use winged channel posts. The winged channel posts will be 1.12 lb/ft and 6.5 ft in length.

All MBGF delineation shall be equivalent to Shure-tite GF2 (BRF) mounted on posts.

Use a minimum 2-inch-long lag screws with Shure-tite equivalent washers to attach flexible GF2 barrier reflectors to wooden post. For steel posts, use an approved adhesive, or other method approved by Engineer.

Item 666, "Retro reflectorized Pavement Markings"
All longitudinal pavement markings (including profile pavement markings) must meet minimum retro reflectivity requirements.

Establish a true and correct alignment with a method approved by the Engineer. This work will be considered subsidiary.

Contractor is responsible for re-establishing location and alignment for new pavement markings matching pavement marking alignment prior to construction activities. This work will be considered subsidiary.

Item 672, "Raised Pavement Markers"
Provide a complete system of raised pavement markers at locations indicated on the plans and as directed by the engineer. The plans are intended to show typical conditions, which can be extended to similar conditions throughout this project as approved or directed.

Bituminous adhesive shall be used on this project.

Item 6185, "Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)"
Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA) will not be considered a major item of work on this project.

TMA,s will only be paid while workers are present or to protect a blunt object.

CCSJ: 2379-02-010
County: NOLAN
Highway: FM 608

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project. The Contractor must get approval from the Engineer for any changes in the number of TMA as shown in the plans.

If a TMA is used for both mobile and stationary traffic control on the same day, it will be paid for as stationary for that day.

BASIS OF ESTIMATE FOR MOBILE TMAs				
Phase	Standard	Required	Additional	TOTAL
10	TCP(3-1)-13	3		3

CONT	SECT	JOB	HIGHWAY
2379	02	010	FM 608
DIST	COUNTY		SHEET NO.
ABL	NOLAN		10

GENERAL NOTES

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2379-02-010 **DISTRICT** Abilene **COUNTY** Nolan
HIGHWAY FM 608

			CONTROL SECTION JOB		**2379-02-010**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00140688**		
			COUNTY		**Nolan**		
			HIGHWAY		**FM 608**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	110-6001	EXCAVATION (ROADWAY)	CY	4,717.000		4,717.000	
	132-6008	EMBANKMENT (FINAL)(DENS CONT)(TY D)	CY	5,201.000		5,201.000	
	247-6041	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)	CY	6,629.000		6,629.000	
	251-6034	REWORK BS MTL (TY C) (8") (ORD COMP)	SY	62,663.000		62,663.000	
	275-6001	CEMENT	TON	1,218.000		1,218.000	
	275-6014	CEMENT TREAT (MX EXST MTL & NW BS)(8")	SY	81,016.000		81,016.000	
	310-6012	PRIME COAT (RC-250)	GAL	20,255.000		20,255.000	
	316-6001	ASPH (MULTI OPTION)	GAL	34,038.000		34,038.000	
	316-6017	ASPH (AC-20-5TR)	GAL	32,417.000		32,417.000	
	316-6177	AGGR(TY-B GR-5 SAC-B)	CY	651.000		651.000	
	316-6222	AGGR(TY-PB GR-3 SAC-B)	CY	708.000		708.000	
	316-6224	AGGR(TY-PB GR-4 SAC-B)	CY	651.000		651.000	
	462-6047	CONC BOX CULV (4 FT X 2 FT)(EXTEND)	LF	10.000		10.000	
	462-6050	CONC BOX CULV (5 FT X 2 FT)(EXTEND)	LF	8.000		8.000	
	462-6064	CONC BOX CULV (8 FT X 5 FT)(EXTEND)	LF	17.000		17.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	4.000		4.000	
	464-6008	RC PIPE (CL III)(36 IN)	LF	4.000		4.000	
	466-6182	WINGWALL (PW - 1) (HW=7 FT)	EA	2.000		2.000	
	467-6106	SET (TY I)(S=3 FT)(HW=3FT)(4:1)(C)	EA	2.000		2.000	
	467-6139	SET (TY I)(S= 4 FT)(HW= 3 FT)(4:1) (C)	EA	4.000		4.000	
	467-6172	SET (TY I)(S= 5 FT)(HW= 3 FT)(4:1) (C)	EA	2.000		2.000	
	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	467-6419	SET (TY II) (30 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	467-6450	SET (TY II) (36 IN) (RCP) (4: 1) (C)	EA	2.000		2.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	8.000		8.000	
	506-6042	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	270.000		270.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	270.000		270.000	
	530-6006	DRIVEWAYS (SURF TREAT)	SY	1,547.000		1,547.000	
	530-6009	TURNOUTS (SURF TREAT)	SY	179.000		179.000	
	530-6016	DRIVEWAYS (BASE)	SY	1,867.000		1,867.000	
	560-6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	7.000		7.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	34.000		34.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)	EA	2.000		2.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	19.000		19.000	
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	55,711.000		55,711.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2379-02-010 **DISTRICT** Abilene **COUNTY** Nolan
HIGHWAY FM 608

		CONTROL SECTION JOB		**2379-02-010**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00140688**			
		COUNTY		**Nolan**			
		HIGHWAY		**FM 608**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6346	REF PROF PAV MRK TY I(Y)6"(BRK)(100MIL)	LF	4,862.000		4,862.000	
	666-6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	23,708.000		23,708.000	
	668-6018	PREFAB PAV MRK TY B (W)(24")(SLD)	LF	98.000		98.000	
	668-6033	PREFAB PAV MRK TY B (W)(18")(YLD TRI)	EA	9.000		9.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	697.000		697.000	
	6056-6002	PREFORMED CENTERLINE RUMBLE STRIP	LF	1,562.000		1,562.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	15.000		15.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF PAVEMENT ITEMS

				INVERTED PRIME			FIRST CST			SECOND CST		
					310	316		316	316		316	316
LOCATION	STA FROM	STA TO	LENGTH LF	WIDTH LF	PRIME COAT (RC-250) SY	AGGR(TY-B GR-5 SAC-B) SY	WIDTH LF	ASPH (MULTI OPTION) SY	AGGR(TY-PB GR-3 SAC-B) SY	WIDTH LF	ASPH (AC-20-5TR) SY	AGGR(TY-PB GR-4 SAC-B) SY
TYPICAL SECTION	0+00.00	252+55.00	25255	26	72959	72959	26	72959	72959	26	72959	72959
TYPICAL SECTION	254+08.00	272+01.30	1793.3	26	5181	5181	26	5181	5181	26	5181	5181
YOUNG FARM ESTATES DRIVEWAY DETAIL	272+01.30	272+73.10	71.8	23	183	183	26	207	207	26	207	207
TYPICAL SECTION	272+73.10	277+20.00	446.9	26	1291	1291	26	1291	1291	26	1291	1291
FM 608 & BUS-84J INTERSECTION DETAIL	277+20.00	280+79.47	359.47	VARIES	1400	1400	26	1400	1400	26	1400	1400
PROJECT TOTALS					**81014**	**81014**		**81038**	**81038**		**81038**	**81038**

* SEE BASIS OF ESTIMATE FOR PAY QUANTITY

** CEMENT CALCULATED AT 4% OF BASE WEIGHT, 125 LB/CF

BASIS OF ESTIMATE

ITEM	DESCRIPTION	AREA (SY)	RATE	QUANTITY	UOM
310-6012	PRIME COAT (RC-250)	81014	0.25 GAL/SY	20255	GAL
316-6001	ASPH (MULTI OPTION)	81038	0.42 GAL/SY	34038	GAL
316-6017	ASPH (AC-20-5TR)	81038	0.4 GAL/SY	32417	GAL
316-6177	AGGR(TY-B GR-5 SAC-B)	81014	1 CY/125 SY	651	CY
316-6222	AGGR(TY-PB GR-3 SAC-B)	81038	1 CY/115 SY	708	CY
316-6224	AGGR(TY-PB GR-4 SAC-B)	81038	1 CY/125 SY	651	CY

SUMMARY OF MAILBOX ITEMS

LOCATION	530 6009 TURNOUTS (SURF TREAT) SY	560 6004 MAILBOX INSTALL-S (TWG-POST) TY 2 EA
MAILBOX TURNOUT DETAILS	179	7
PROJECT TOTALS	**179**	**7**

SUMMARY OF ROADWAY ITEMS

LOCATION	LENGTH LF	110 6001 EXCAVATION (ROADWAY) CY	132 6008 EMBANKMENT (FINAL)(DENS CONT)(TY D) CY	247 6041 FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS) CY	251 6034 REWORK BS MTL (TY C)(8")(ORD COMP) SY	** 275 6001 CEMENT TON	275 6014 CEMENT TREAT (MX EXST MTL & NW BS)(8") SY	530 6016 DRIVEWAYS (BASE) SY	530 6019 DRIVEWAYS (ACP)(TYPE 1) SY
STA 0+00 TO STA 252+55	25255	4297	4737	6080	56123	1095	72959	1133	1069
STA 254+08 TO STA 272+01.30	1793.3	326	360	432	3986	78	5181	372	366
STA 272+01.30 TO STA 272+73.10	71.8	13	14	9	460	3	184		
STA 272+73.10 TO STA 277+20	446.9	81	90	108	994	20	1292	362	112
STA 277+20 TO STA 280+79.47	359.47				1400	22	1400		
PROJECT TOTALS		4717	5201	6629	62963	** 1218	81016	1867	1547

QUANTITY SUMMARY

Texas Department of Transportation

SCALE: N/A

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		13
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

SUMMARY OF CULVERT ITEMS

DESCRIPTION	STATION	462 6045	462 6047	462 6050	462 6064	464 6005	464 6008
		CONC BOX CULV (3 FT X 2 FT) (EXTEND)	CONC BOX CULV (4 FT X 2 FT) (EXTEND)	CONC BOX CULV (5 FT X 2 FT) (EXTEND)	CONC BOX CULV (8 FT X 5 FT) (EXTEND)	RC PIPE (CL III) (24 IN)	RC PIPE (CL III) (36 IN)
		LF	LF	LF	LF	LF	LF
24" RCP	13+44.02					4	
36" RCP	32+34.10						4
8' X5' CONC BOX	47+58.16				17		
30" RCP	68+62.79						
4' X2' CONC BOX	127+58.02		5				
3' X2' CONC BOX	198+38.38	7					
5' X2' CONC BOX	250+29.09			8			
4' X2' CONC BOX	250+43.96		5				
PROJECT TOTALS		**11**	**20**	**12**	**21**	**4**	**4**

SUMMARY OF SIGNING ITEMS

LOCATION	644 6001	644 6004	644 6007	644 6076
	IN SM RD SN SUP&AM	IN SM RD SN SUP&AM	IN SM RD SN SUP&AM	REMOVE SM RD SN SUP&AM
	EA	EA	EA	EA
SOSS	34	2	2	19
PROJECT TOTALS	34	2	2	19

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	506 6042	506 6043
	BIODEG EROSN CONT LOGS (INSTL)(18")	BIODEG EROSN CONT LOGS (REMOVE)
	LF	LF
ENV LAYOUT SHEETS	270	270
PROJECT TOTALS	**270**	**270**

SUMMARY OF SET ITEMS

DESCRIPTION	STATION	466 6171	467 6106	467 6139	467 6172	467 6390	467 6419	467 6450
		WINGWALL (PW - 1) (HW=10 FT)	SET (TY I) (S=3 FT) (HW=3FT) (4:1)(C)	SET (TY I) (S=4 FT) (HW=3FT) (4:1)(C)	SET (TY I) (S=5 FT) (HW=3FT) (4:1)(C)	SET (TY II) (24 IN) (RCP) (4:1) (C)	SET (TY II) (30 IN) (RCP) (4:1) (C)	SET (TY II) (36 IN) (RCP) (4:1) (C)
		EA	EA	EA	EA	EA	EA	EA
24" RCP	13+44.02					2		
36" RCP	32+34.10							2
8' X5' CONC BOX	47+58.16	2						
30" RCP	68+62.79						2	
4' X2' CONC BOX	127+58.02			2				
3' X2' CONC BOX	198+38.38		2					
5' X2' CONC BOX	250+29.09				2			
4' X2' CONC BOX	250+43.96			2				
PROJECT TOTALS		**2**	**2**	**4**	**2**	**2**	**2**	**2**

WZ TRAFFIC CONTROL ITEMS

LOCATION	6185 6005
	TMA (MOBILE
	DAY
	15
PROJECT TOTALS	**15**

SUMMARY OF PAVEMENT MARKING ITEMS

	666 6343	666 6347	666 6346	672 6009	668 6018	668 6033	6056 6002
	REF PROF PAV MRK TY I(W) 6"(SLD) (100MIL)	REF PROF PAV MRK TY I(Y) 6"(SLD) (100MIL)	REF PROF PAV MRK TY I(Y) 6"(BRK) (100MIL)	REFL PAV MRKR TY II-A-A	PREFAB PAV MRK TY B (W)(24") (SLD)	PREFAB PAV MRK TY B (W)(18") (YLD TRI)	PREFORMED CENTERLINE RUMBLE STRIP
	LF	LF	LF	EA	LF	EA	LF
	56159	23708	4862	702	98	9	1562
PROJECT TOTALS	**56159**	**23708**	**4862**	**702**	**98**	**9**	**1562**

QUANTITY SUMMARY

 Texas Department of Transportation

SCALE: N/A SHEET 2 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		14
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

SEQUENCE OF CONSTRUCTION

PHASE 1: FISHER COUNTY LINE TO US 84, ROAD CLOSURE AND DETOUR

STEP 1: SET UP DETOUR ACCORDING TO DETOUR LAYOUT SHEET 1 OF 2. CLOSE FM 608 FROM FISHER COUNTY LINE TO US 84 ACCORDING TO STANDARD SHEET WZ(RCD)-13.

PHASE 2: FISHER COUNTY LINE TO US 84, CULVERT WORK

STEP 1: COMPLETE CULVERT EXTENSIONS AND PLACE SAFETY END TREATMENTS. SEE CULVERT CROSS SECTIONS FOR CULVERT DETAILS.

PHASES 3-8: FISHER COUNTY LINE TO US 84, ROAD WORK

STEP 1: WINDROW TOPSOIL. WIDEN SUBGRADE BY EXCAVATING FRONT DITCH SLOPE TO THE WIDTH SHOWN ON THE TYPICAL SECTIONS.

STEP 2: BLEND EXISTING BASE AND PAVEMENT MATERIAL AND REWORK OVER THE WIDENED SUBGRADE TO THE WIDTH AND DEPTHS SHOWN ON THE TYPICAL SECTIONS. PLACE NEW FLEX BASE AS REQUIRED, APPROX. 3", TO MATCH EXISTING PGL.

STEP 3: CEMENT TREAT 8" OF EXISTING AND NEW MATERIAL USING THE APPLICATION RATE SHOWN ON QUANTITY SUMMARY.

STEP 4: PLACE INVERTED PRIME.

STEP 5: PLACE FIRST SURFACE TREATMENT.

PHASE 9: US 84 TO BUS 84, ROAD CLOSURE AND DETOUR

STEP 1: SET UP DETOUR ACCORDING TO DETOUR LAYOUT SHEET 2 OF 2. CLOSE FM 608 FROM US 84 TO BUS 84 ACCORDING TO STANDARD SHEET WZ(RCD)-13.

PHASE 10: US 84 TO BUS 84, ROAD WORK

STEP 1-5: SAME AS STEPS 1-5 IN PHASES 3-8 ABOVE.

PHASE 11: FINAL SURFACE TREATMENT AND PAVEMENT MARKING

STEP 1: SET UP TCP ACCORDING TO STANDARD SHEETS FOR SEAL COAT OPERATIONS.

STEP 2: PLACE SECOND SURFACE TREATMENT ACCORDING TO THE TYPICAL SECTIONS.

STEP 3: PLACE FINAL PAVEMENT MARKINGS USING TCP(3-1)-13.

GENERAL NOTES

1. THE STEPS OF THIS SEQUENCE MAY BE MODIFIED AS APPROVED BY THE ENGINEER. ANY CHANGES IMPLEMENTED SHALL HAVE DETAILS THAT ARE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER.

2. PHASES 3-9 SHALL BE COMPLETED AT THE MATCHING LOCATION SHOWN ON THE TCP LAYOUT SHEETS. EACH PHASE 3-9 SHOULD BE COMPLETED BEFORE MOVING TO THE NEXT PHASE. ALL SECTIONS NOT UNDER CONSTRUCTION SHALL REMAIN OPEN TO LOCAL TRAFFIC. WORK SHALL BE COMPLETED SUCH THAT ALL TRAFFIC LANES REMAIN OPEN TO LOCAL TRAFFIC AT NIGHT.

3. REOPEN FM 608 TO ALL TRAFFIC FROM FISHER COUNTY LINE TO US 84 AFTER THE COMPLETION OF PHASE 8. REOPEN FM 608 TO ALL TRAFFIC FROM US 84 TO BUS 84 AFTER THE COMPLETION OF PHASE 10.

4. ROAD CLOSURES DESCRIBED IN PHASES 1 AND 9 MAY NOT BE DONE AT THE SAME TIME.

5. FLAGGERS SHALL BE STATIONED AT THE YOUNG FARM ESTATES DRIVEWAY DURING PHASE 10, STEPS 2 & 3.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

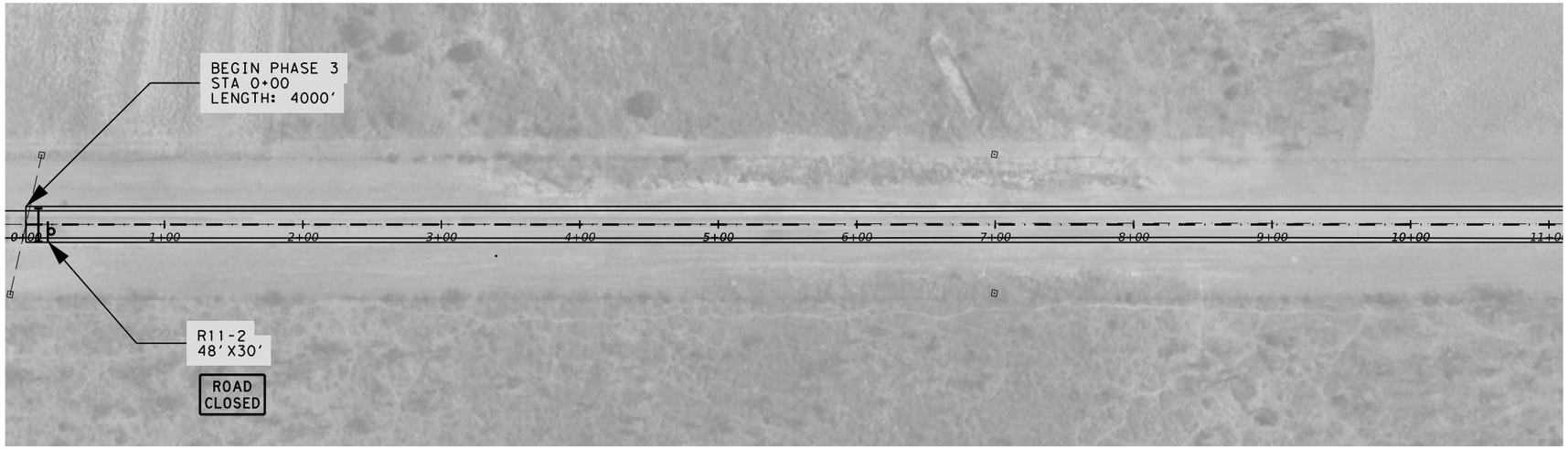
Stephen T. Jones, P.E.
06/06/2023

TCP NARRATIVE

Texas Department of Transportation

SCALE: 1"=10' SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		15
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

3. SIGNS AND BARRICADES AT COUNTY ROADS SHALL ONLY BE PRESENT DURING THE ADJACENT FM 608 PHASE.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TCP LAYOUT

 Texas Department of Transportation

SCALE: 1" = 100' SHEET 1 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		16
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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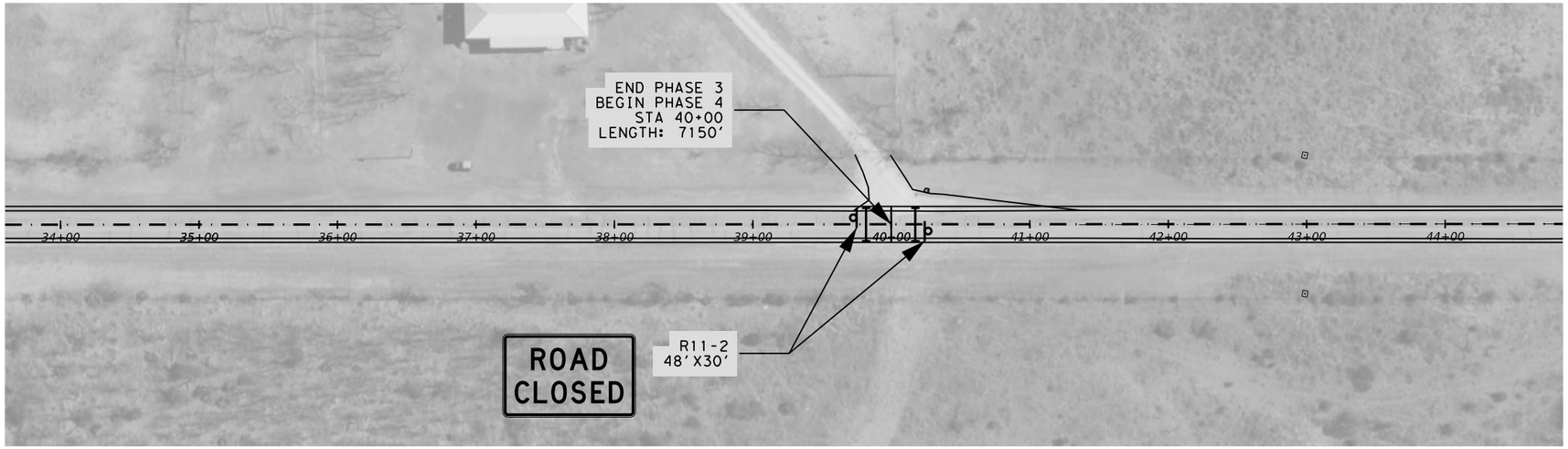

LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

3. SIGNS AND BARRICADES AT COUNTY ROADS SHALL ONLY BE PRESENT DURING THE ADJACENT FM 608 PHASE.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TCP LAYOUT

Texas Department of Transportation

SCALE: 1" = 100' SHEET 2 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		17
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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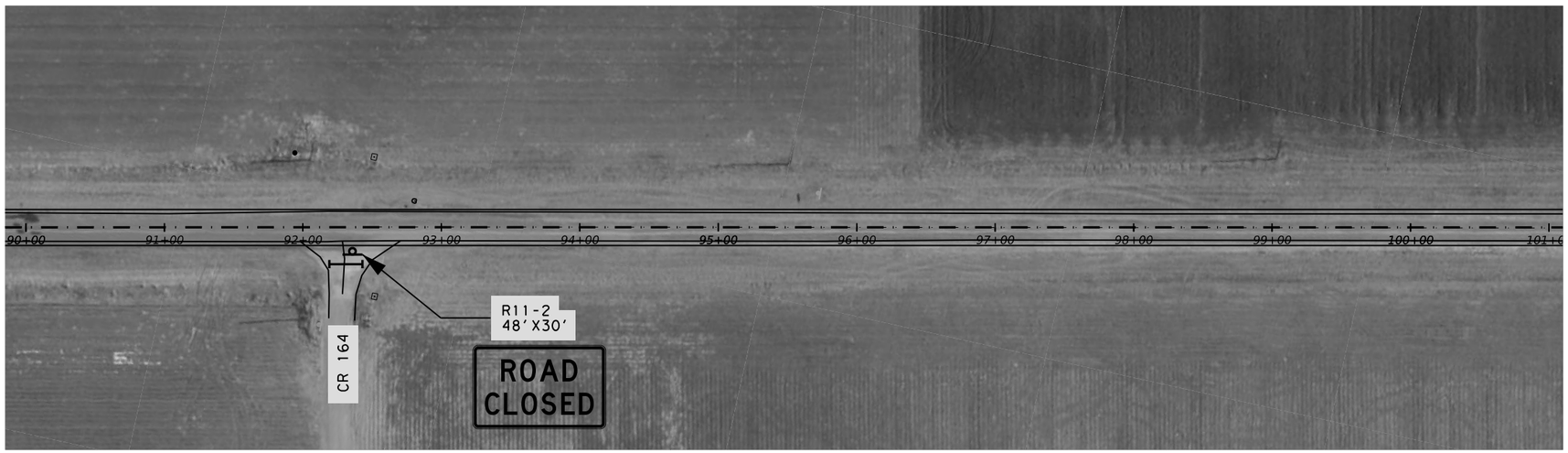

LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

3. SIGNS AND BARRICADES AT COUNTY ROADS SHALL ONLY BE PRESENT DURING THE ADJACENT FM 608 PHASE.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TCP LAYOUT

Texas Department of Transportation

SCALE: 1" = 100' SHEET 3 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		18
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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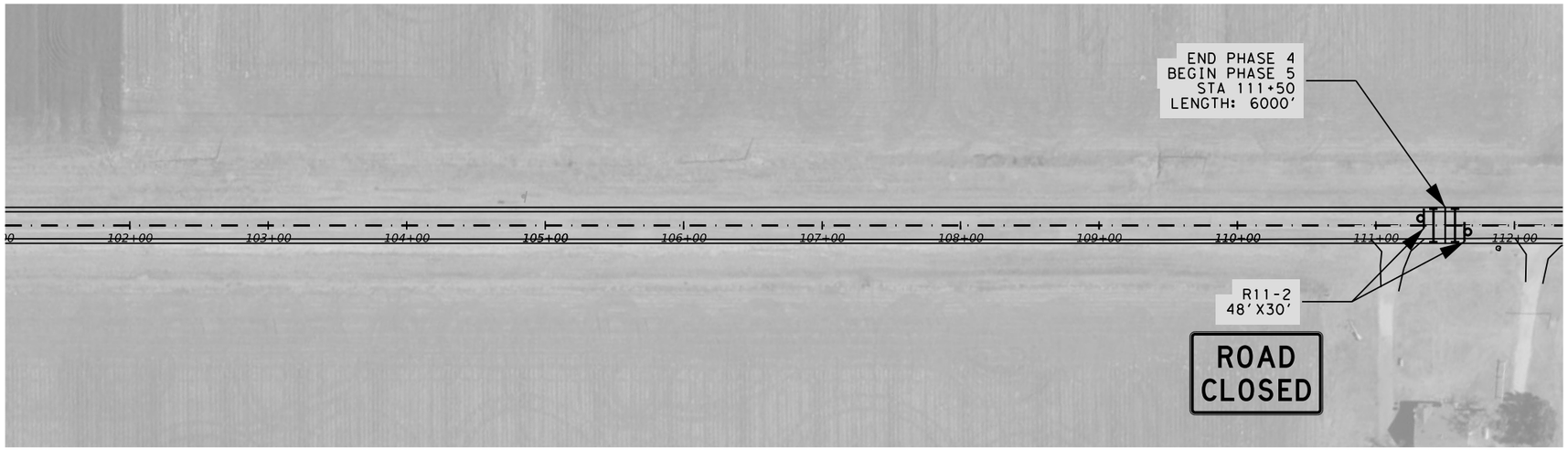

LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

3. SIGNS AND BARRICADES AT COUNTY ROADS SHALL ONLY BE PRESENT DURING THE ADJACENT FM 608 PHASE.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

TCP LAYOUT

 Texas Department of Transportation

SCALE: 1" = 100' SHEET 4 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		19
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

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STATE OF TEXAS
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Stephen T. Jones, P.E.

06/06/2023

TITLE

Texas Department of Transportation

SCALE: 1" = 100' SHEET 5 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		20
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/2. TCP/TCP LAYOUT.dgn
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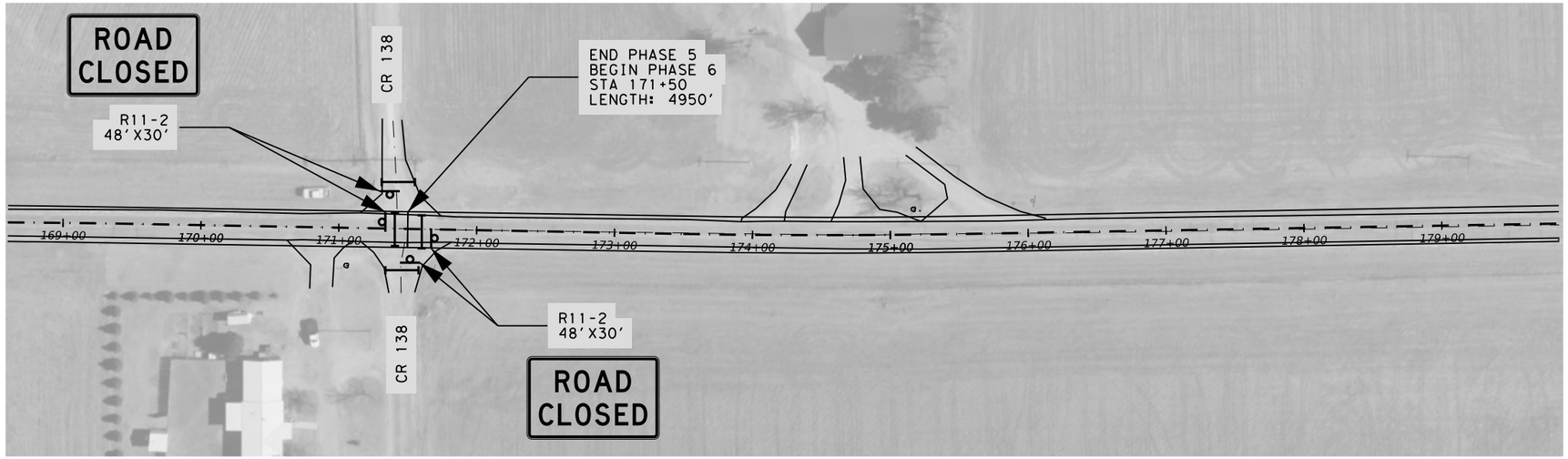

LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

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STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TCP LAYOUT

Texas Department of Transportation

SCALE: 1" = 100'

SHEET 6 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		21
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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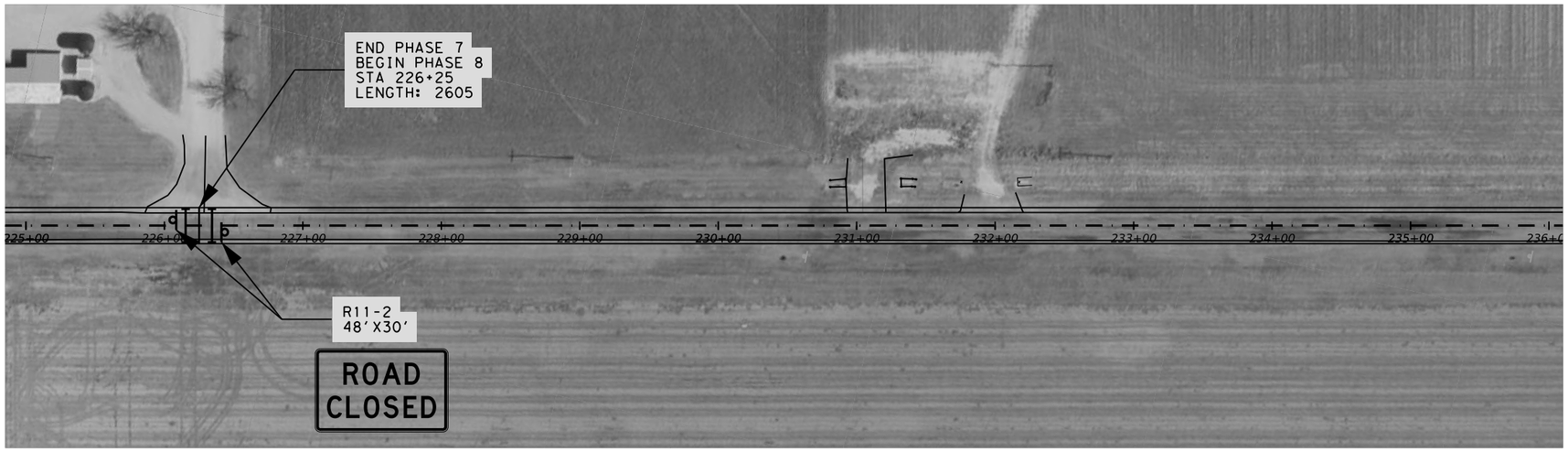

LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

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STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TCP LAYOUT

 Texas Department of Transportation

SCALE: 1" = 100' SHEET 7 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		22
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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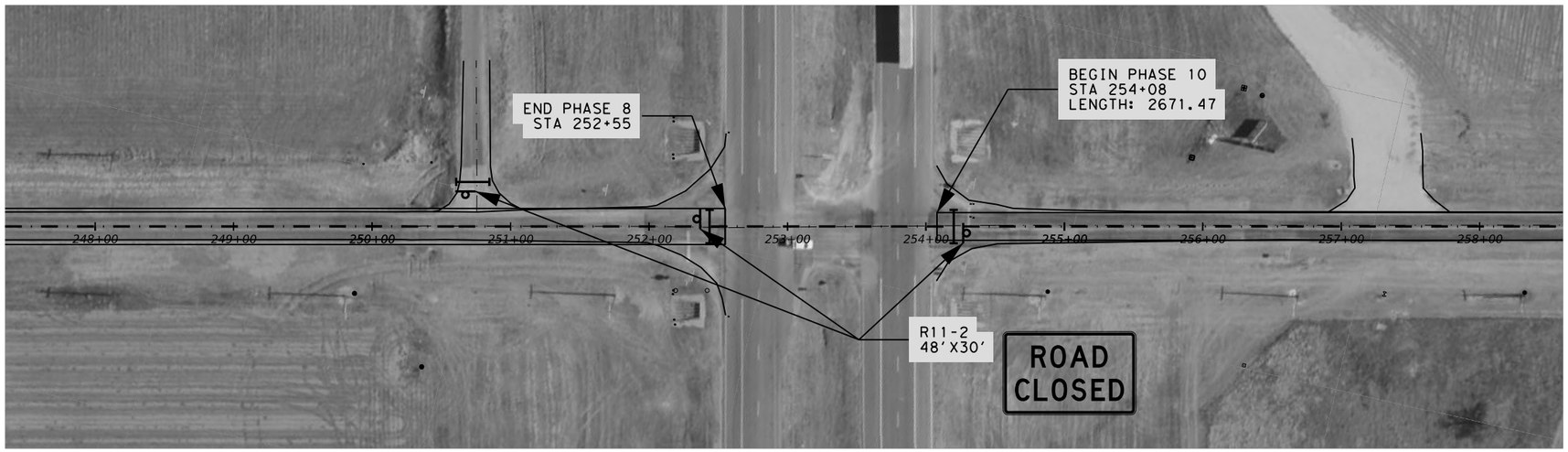

LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

3. SIGNS AND BARRICADES AT COUNTY ROADS SHALL ONLY BE PRESENT DURING THE ADJACENT FM 608 PHASE.

STATE OF TEXAS
STEPHEN T. JONES
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PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

TCP LAYOUT

 Texas Department of Transportation

SCALE: 1" = 100' SHEET 8 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		23
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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LEGEND

WORK ZONE SIGN

TY 3 BARRICADE

NOTES.

1. PHASE LENGTHS MAY BE ADJUSTED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

2. CONTRACTOR WILL ALLOW INGRESS AND EGRESS FROM ALL DRIVEWAYS DURING CONSTRUCTION.

3. SIGNS AND BARRICADES AT COUNTY ROADS SHALL ONLY BE PRESENT DURING THE ADJACENT FM 608 PHASE.

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

TCP LAYOUT

Texas Department of Transportation

SCALE: 1" = 100'

SHEET 9 OF 9

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		24
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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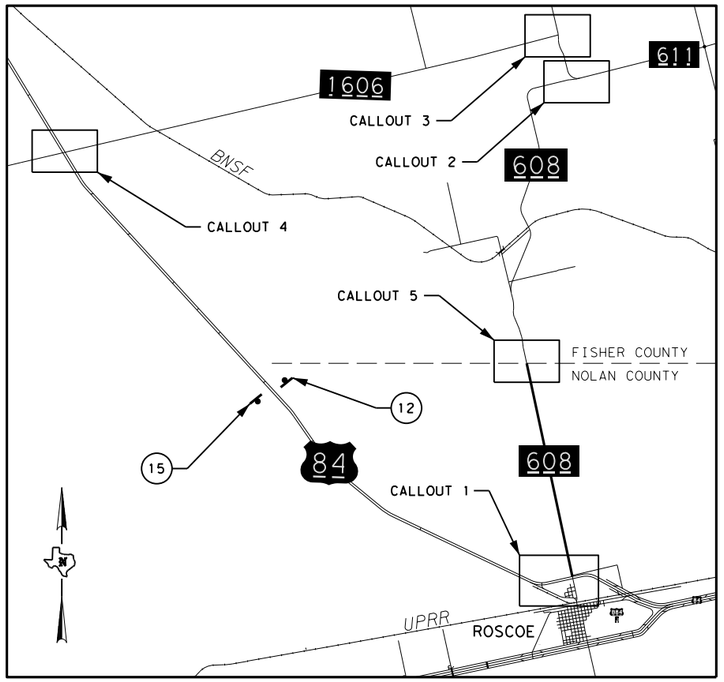
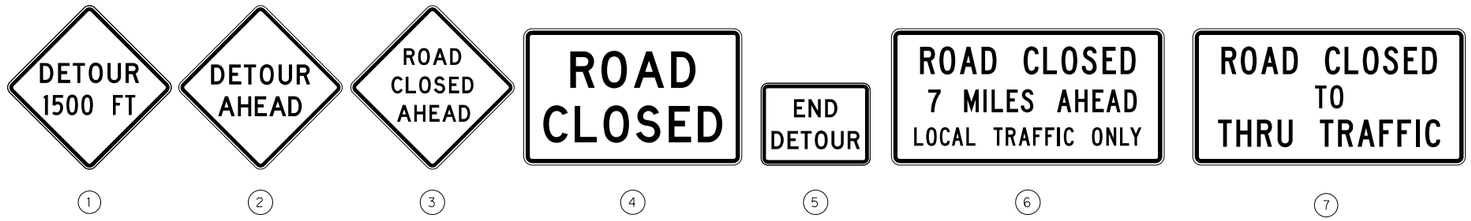
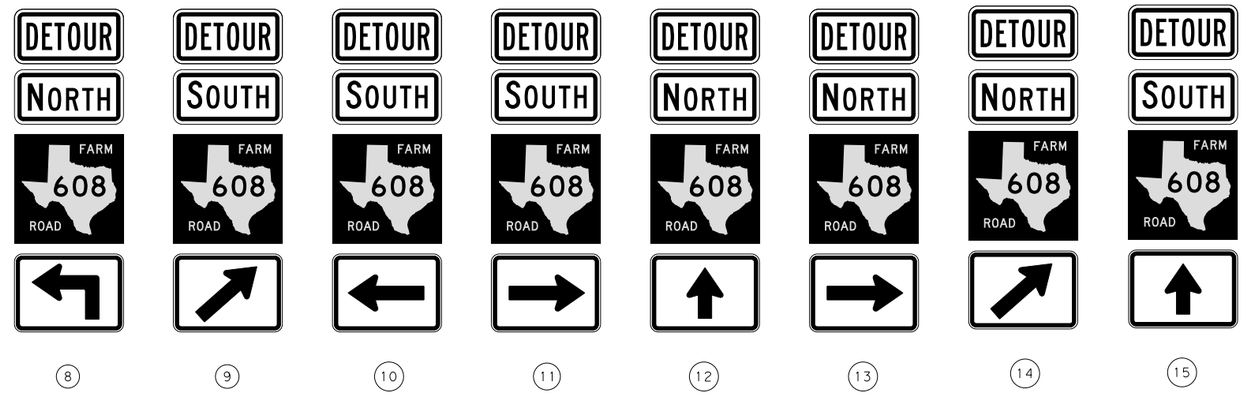
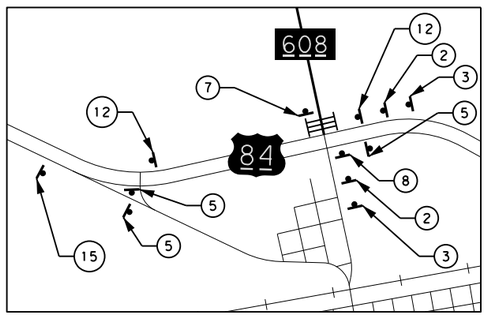


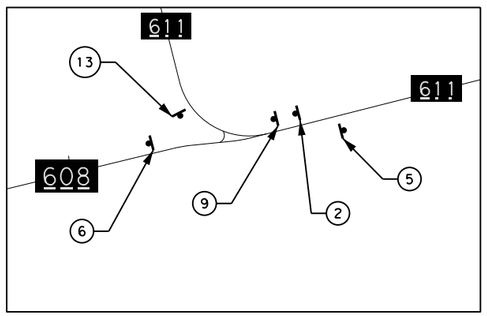
DETOUR MAP







CALLOUT 1



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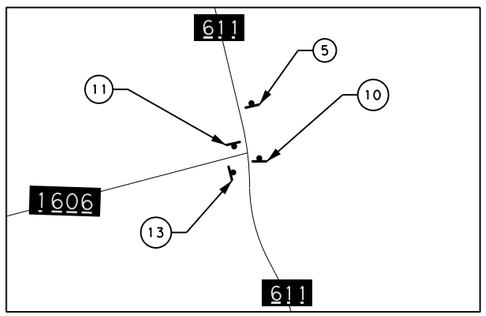

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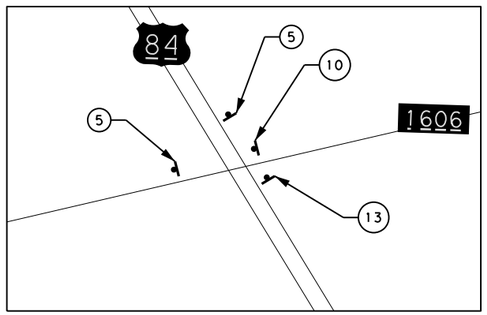
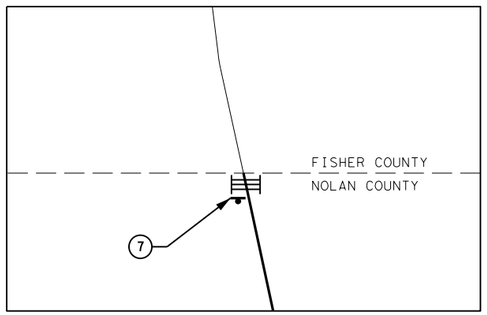


CALLOUT 4



CALLOUT 5

LEGEND

SIGN

TYPE 3 BARRICADE

GENERAL NOTES

1. DETOUR LENTH: 27 MI
2. SEE STANDARD SHEET WZ(RC)FOR FURTHER DETAILS

ADDITIONAL SIGNS AND BARRICADES MAY BE ADDED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

DETOUR LAYOUT

PHASE 1

 Texas Department of Transportation

SCALE: NTS SHEET 1 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		25
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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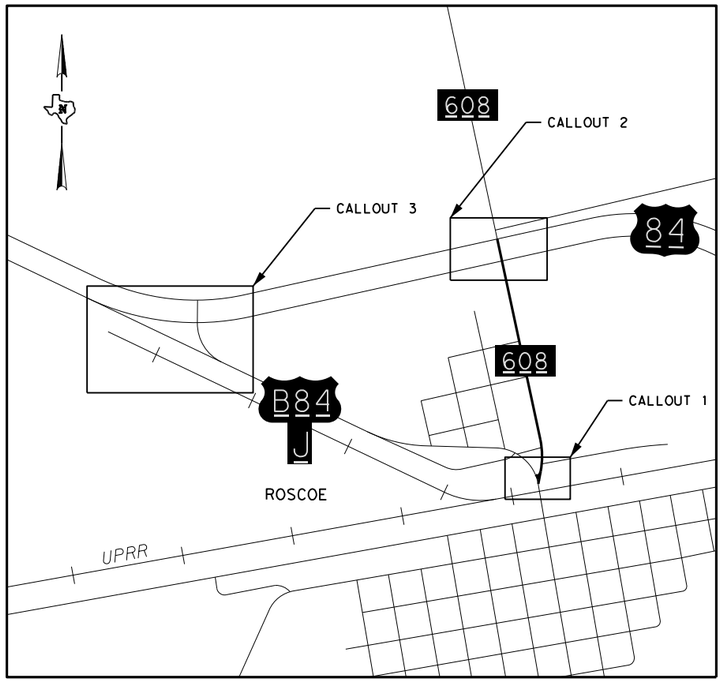
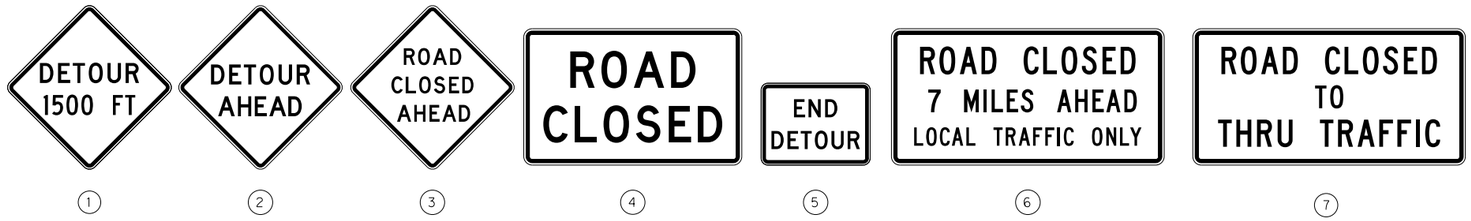
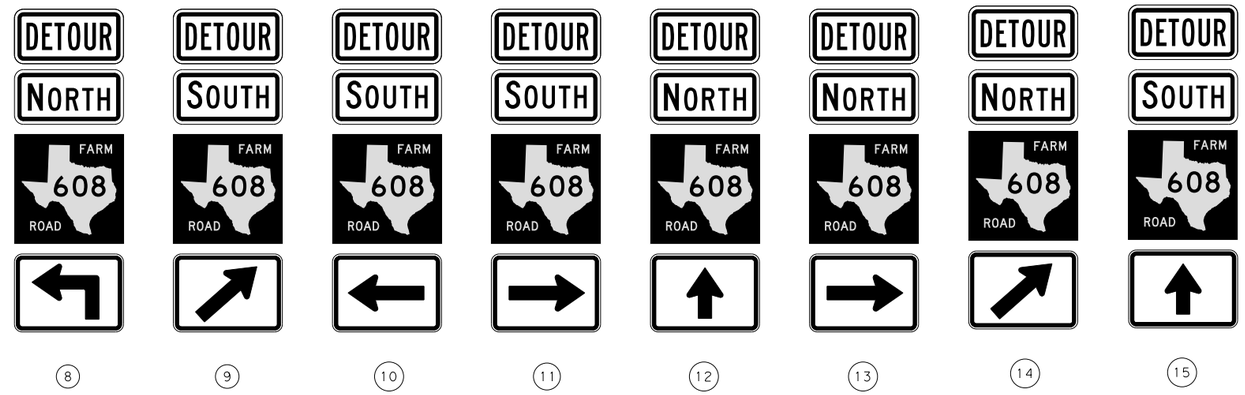
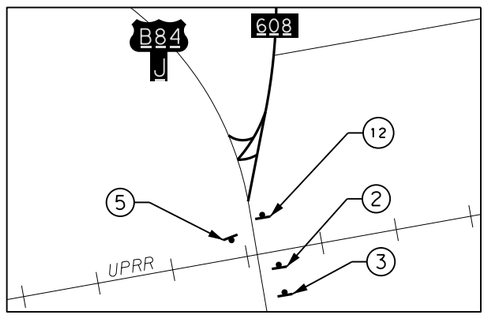


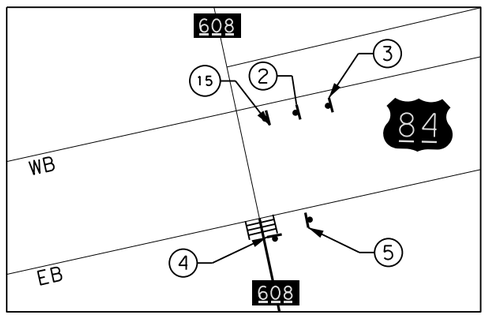
DETOUR MAP



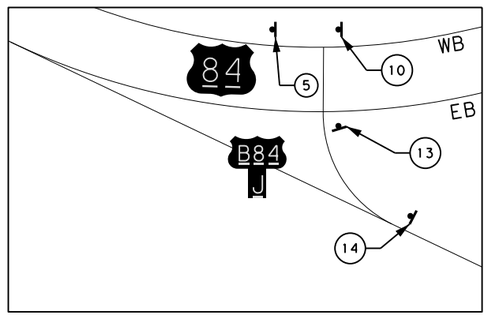




CALLOUT 1



CALLOUT 2



CALLOUT 3

LEGEND

SIGN

TYPE 3 BARRICADE

GENERAL NOTES

1. DETOUR LENTH: 1.6 MI

2. SEE STANDARD SHEET WZ(RC)FOR FURTHER DETAILS

ADDITIONAL SIGNS AND BARRICADES MAY BE ADDED AS NEEDED WITH APPROVAL FROM THE ENGINEER.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

DETOUR LAYOUT

PHASE 9

 Texas Department of Transportation

SCALE: NTS SHEET 2 OF 2

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

26

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

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

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

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

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	2379	02	010	FM 608
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	ABL	NOLAN		27

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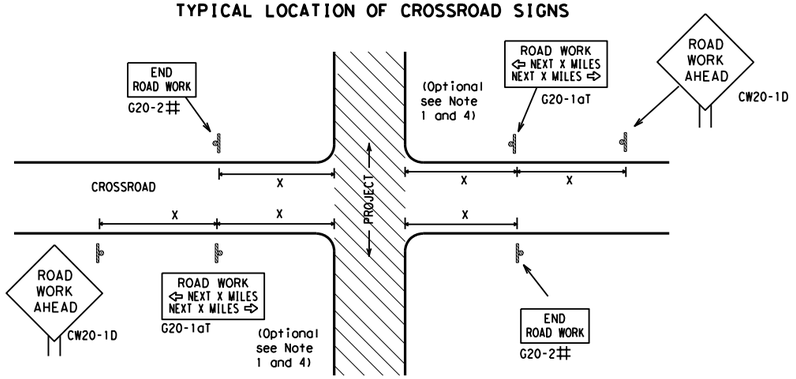
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/2. TCP/BC-21.dgn

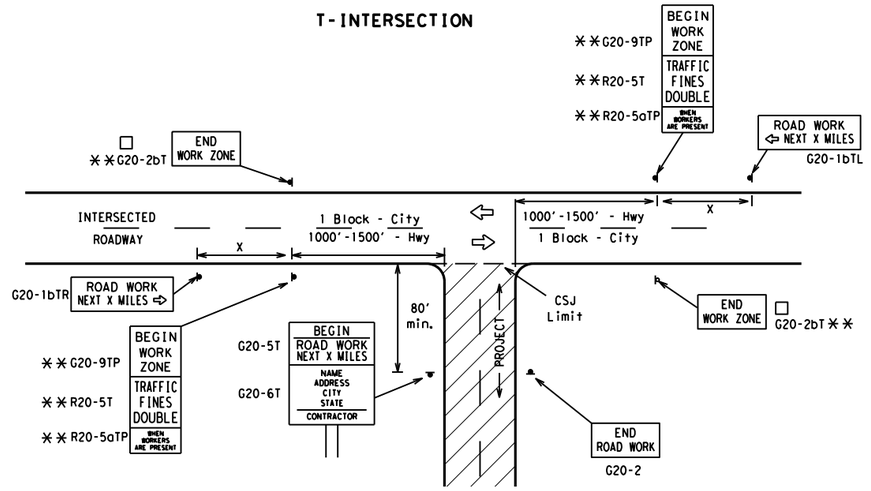
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. 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.
2. 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.
3. 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.
4. 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.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. 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

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

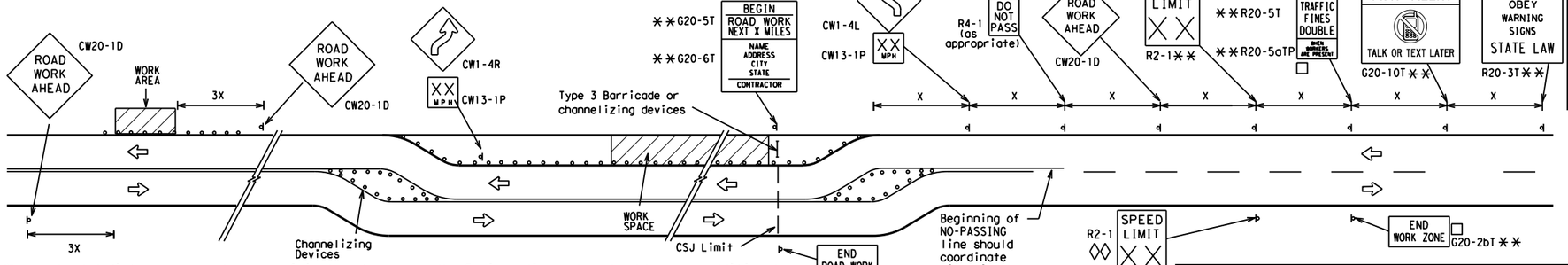
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

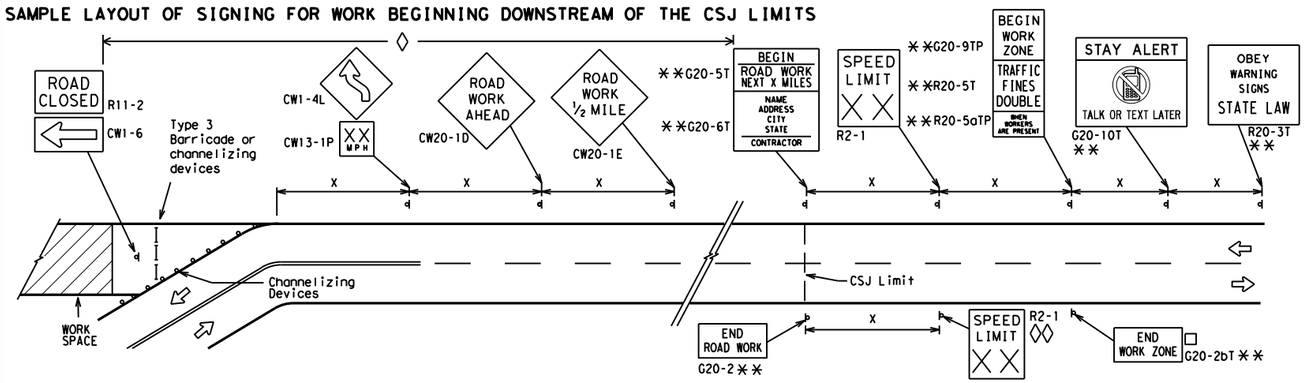
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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 AT THE CSJ LIMITS

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.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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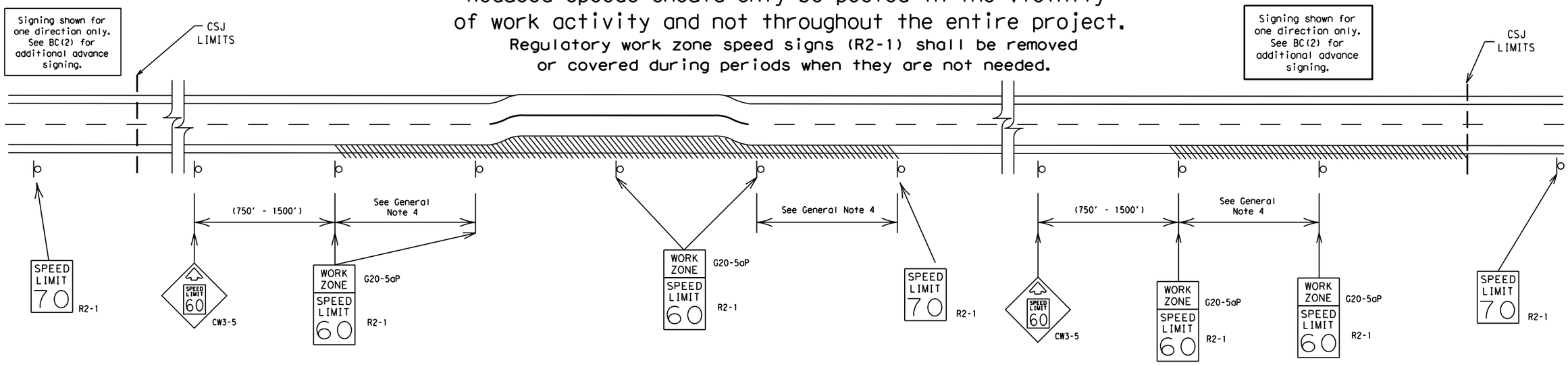
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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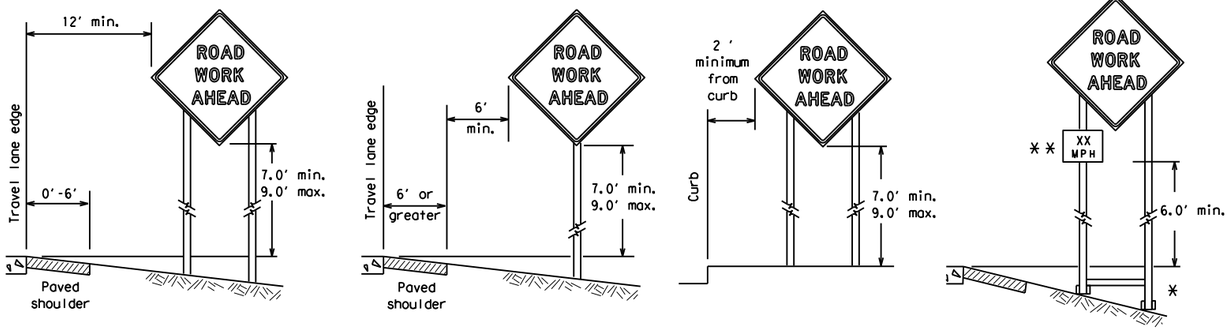
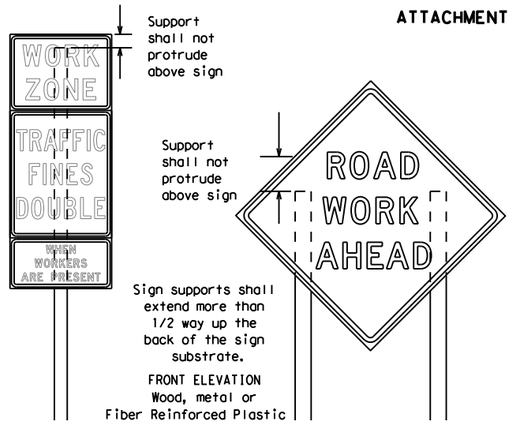
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

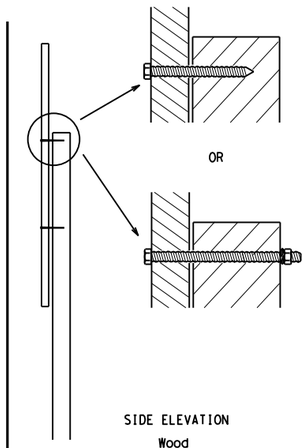


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





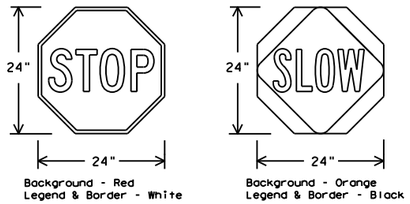
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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 spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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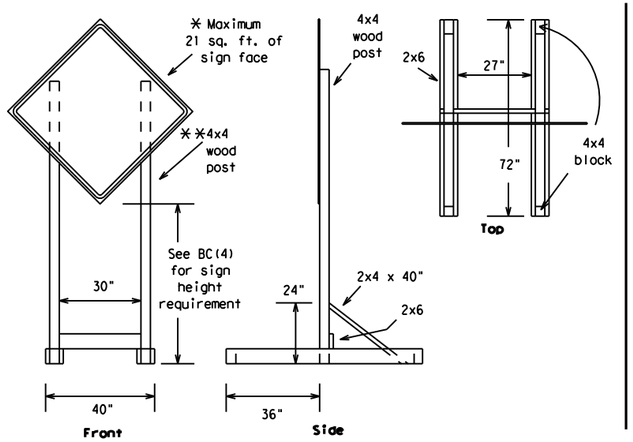
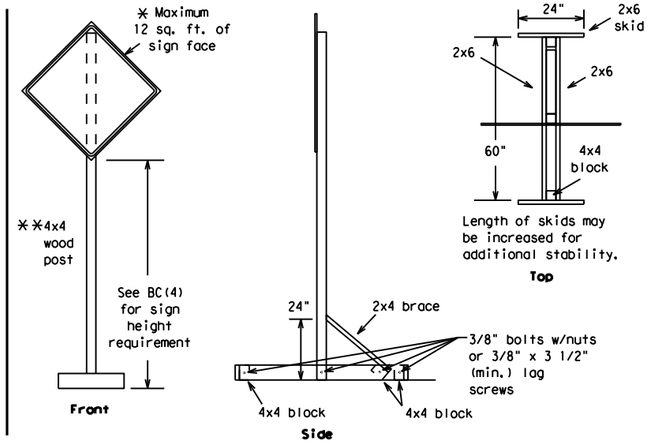
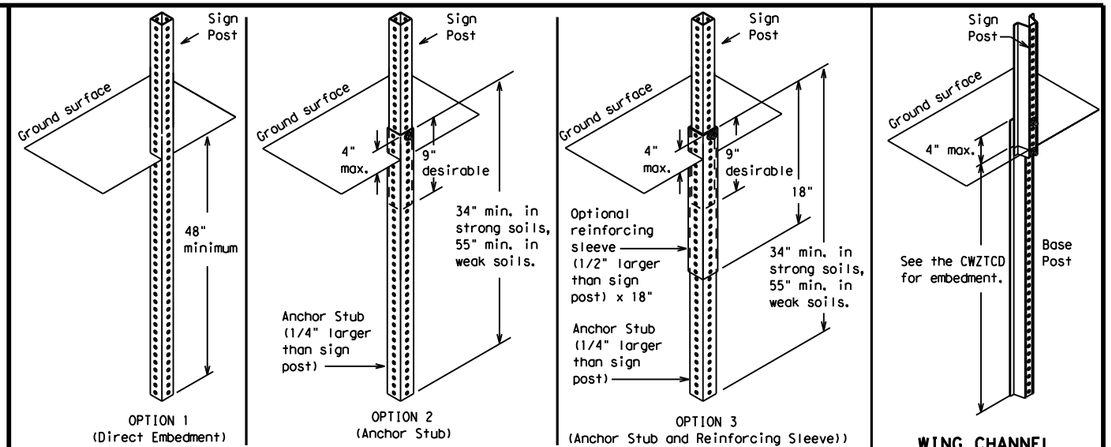




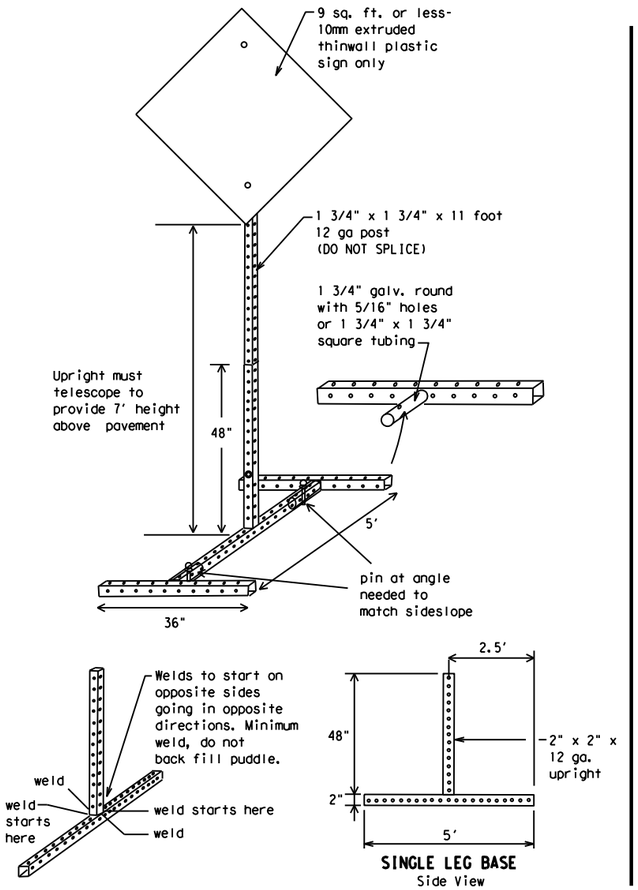
SKID MOUNTED WOOD SIGN SUPPORTS

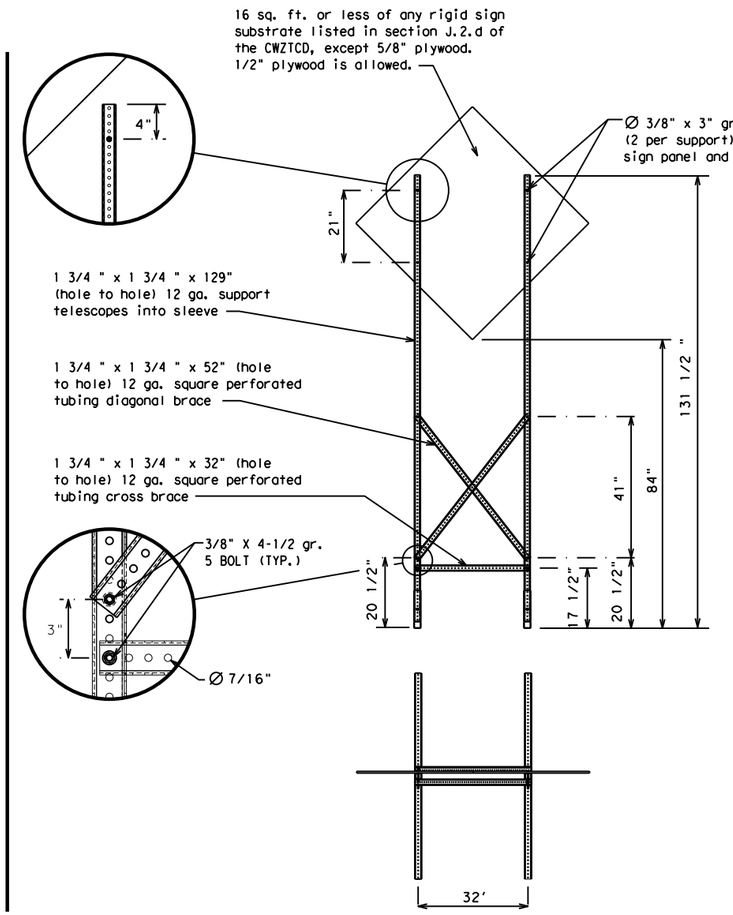
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

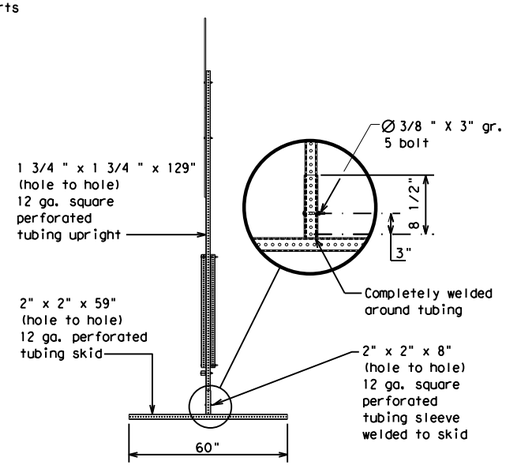


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. 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.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. 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.

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. 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.
3. 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.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. 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.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

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
XXXXXXXX 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		Location List	Warning List	**Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. 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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		32

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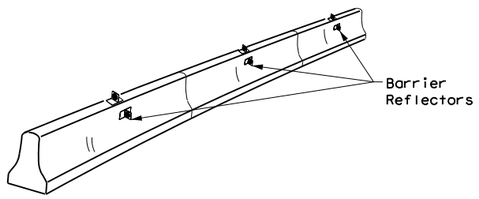
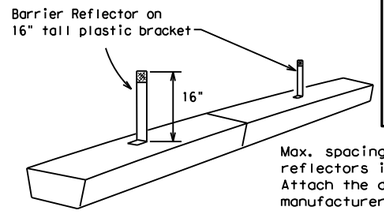
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/2. TCP/BC-21.dgn

1. 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).
2. 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)

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

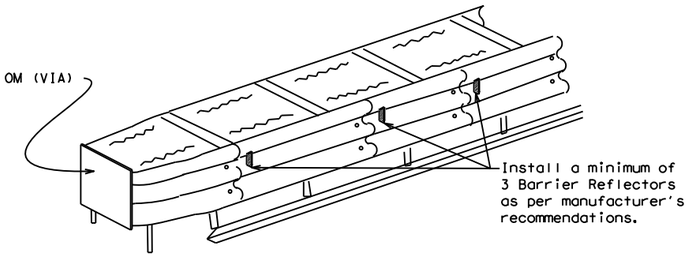


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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)

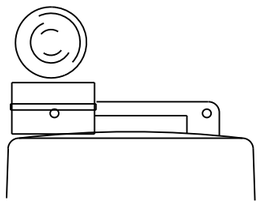


DELINEATION OF END TREATMENTS

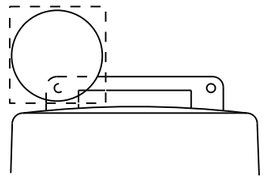
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate 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



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

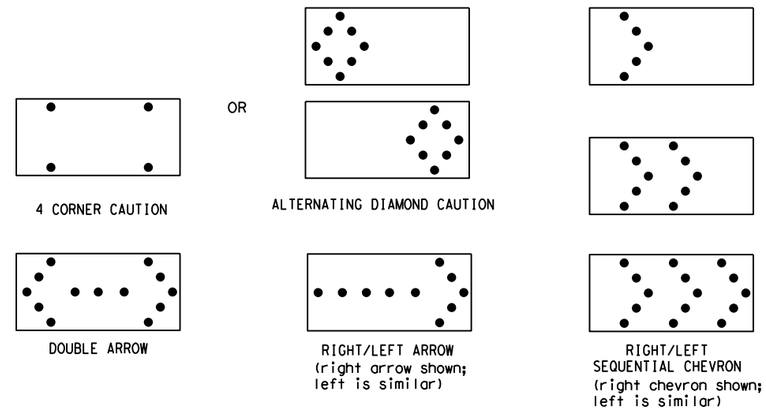
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. 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.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

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

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



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. 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.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. 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.

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

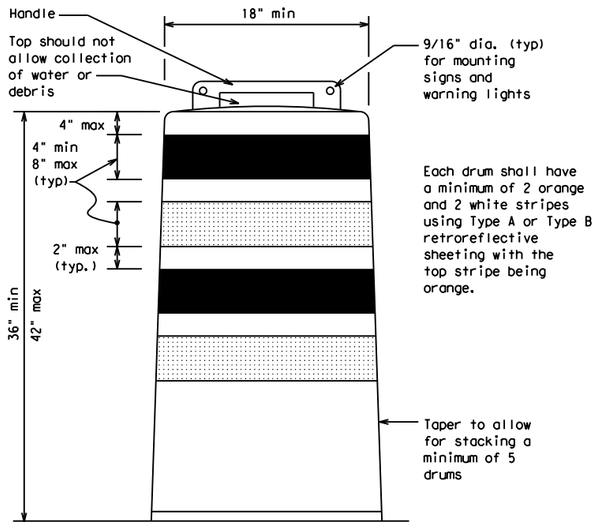
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

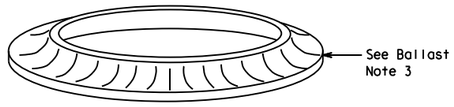
RETROREFLECTIVE SHEETING

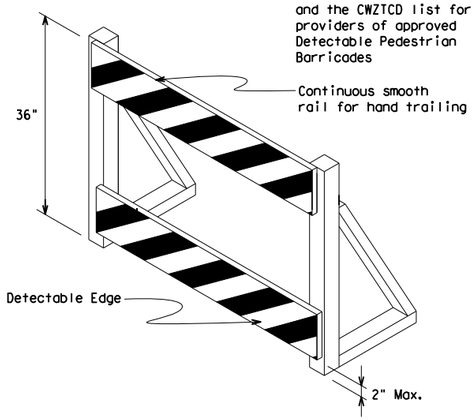
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

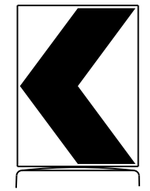




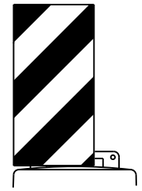


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. 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

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	2379	02	010	FM 608
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	ABL	NOLAN		34
7-13				

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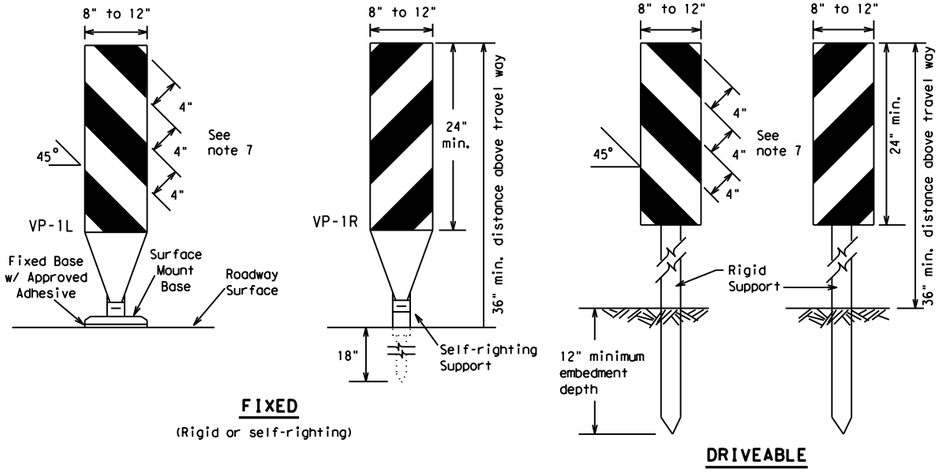
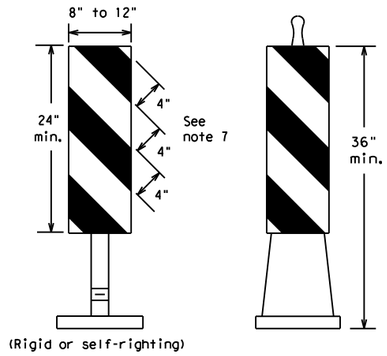


FIXED
(Rigid or self-righting)

DRIVEABLE

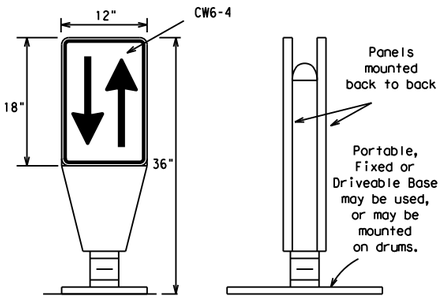


(Rigid or self-righting)

PORTABLE

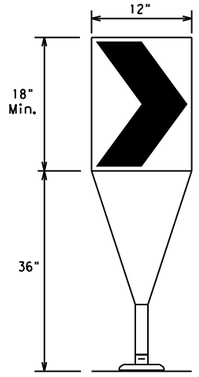
VERTICAL PANELS (VPs)

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



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

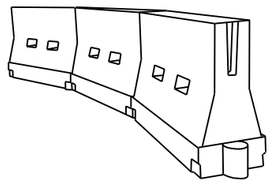
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. 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.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. 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.
5. 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

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. 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.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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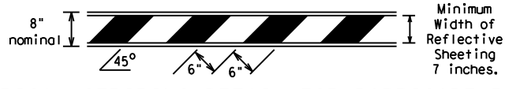
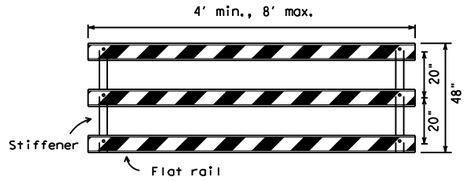
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



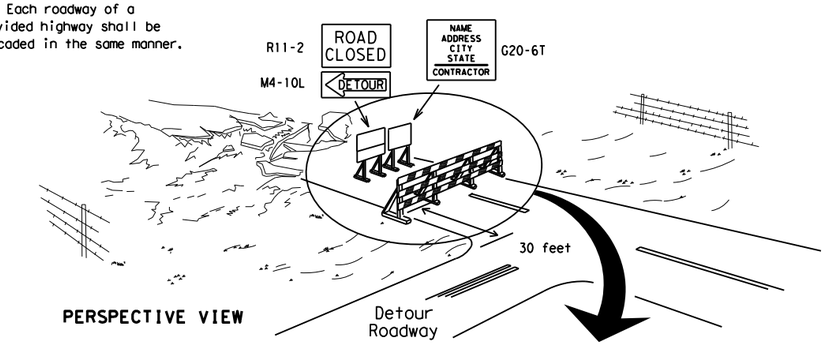
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

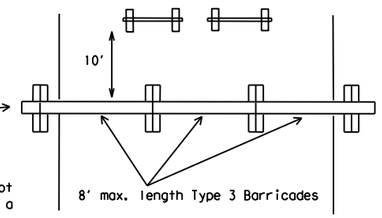
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

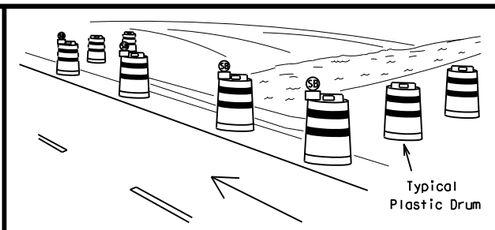
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

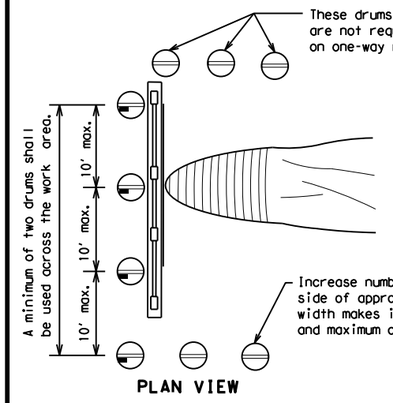
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

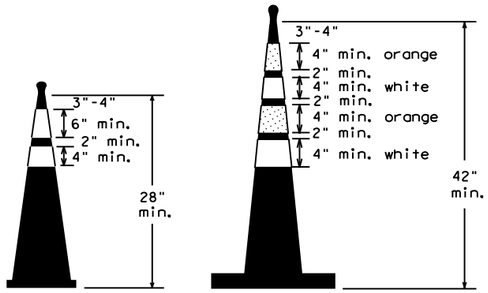
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

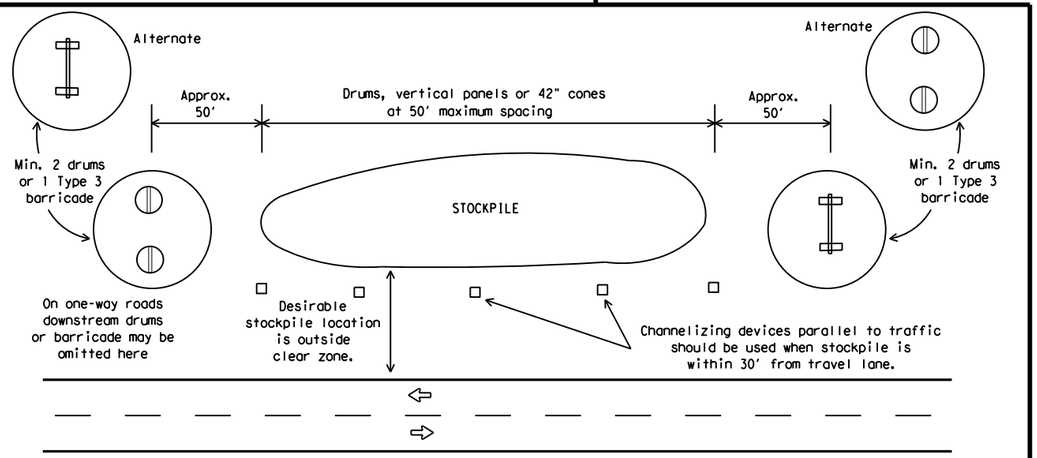
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

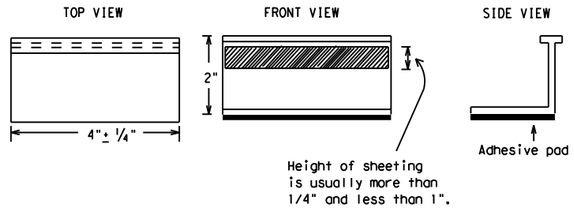
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic 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.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. 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).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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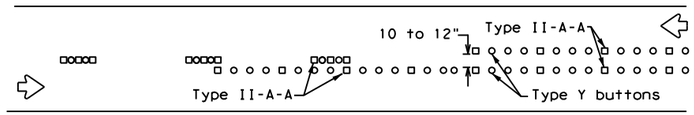
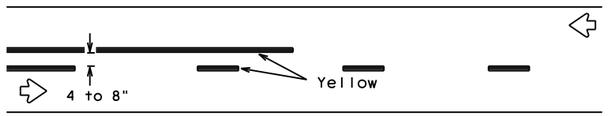
PAVEMENT MARKING PATTERNS

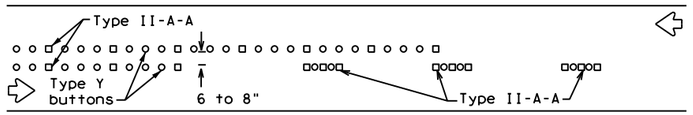
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



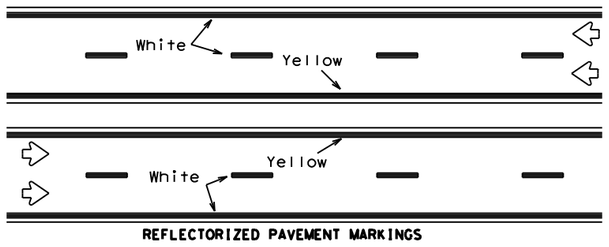
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



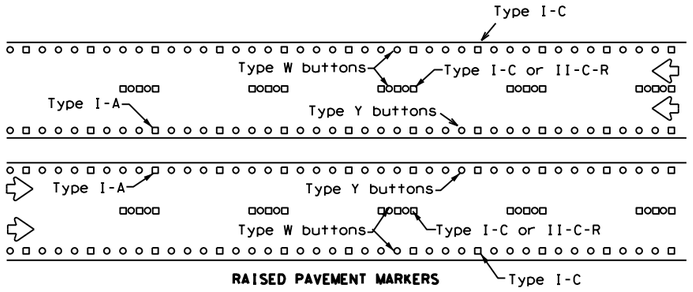
RAISED PAVEMENT MARKERS - PATTERN B

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

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



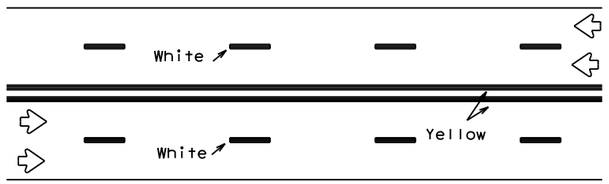
REFLECTORIZED PAVEMENT MARKINGS



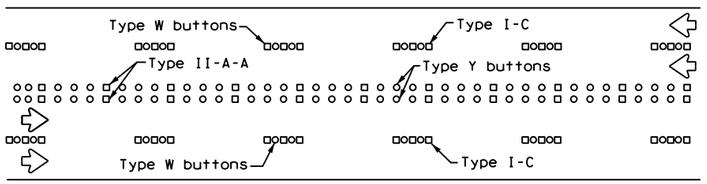
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



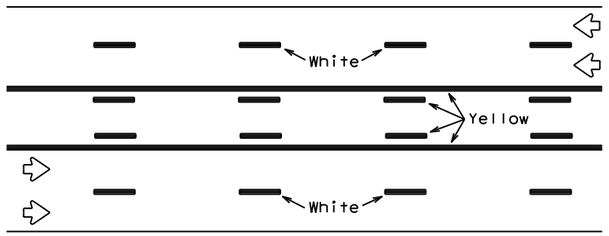
REFLECTORIZED PAVEMENT MARKINGS



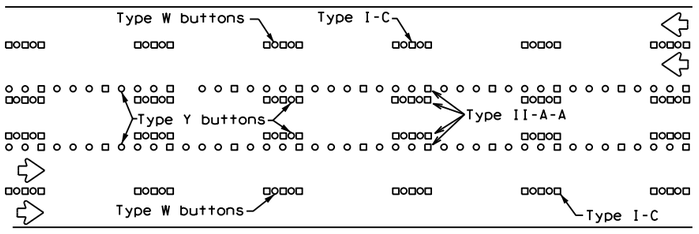
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

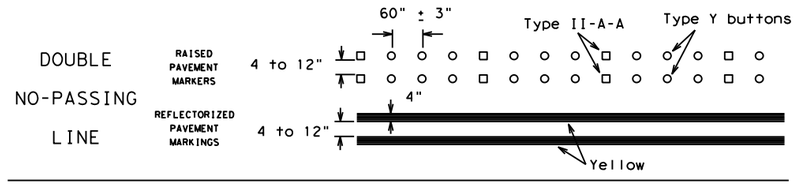
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

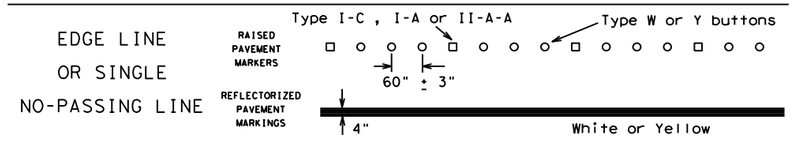
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

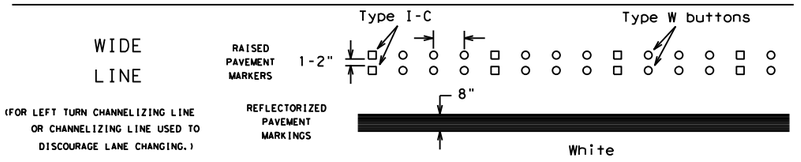


EDGE LINE OR SINGLE NO-PASSING LINE



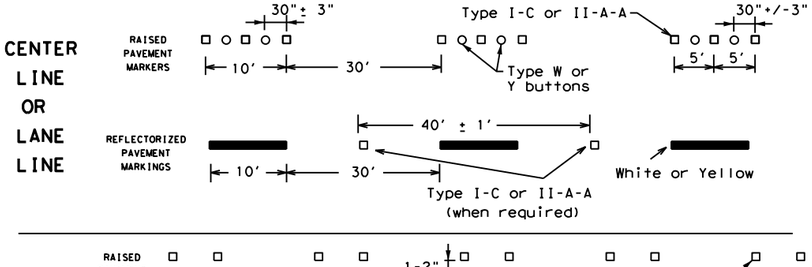
WIDE LINE

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

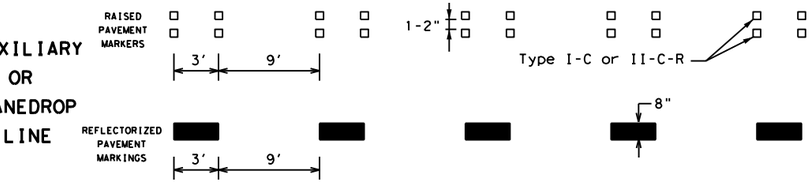


BROKEN LINES

CENTER LINE OR LANE LINE

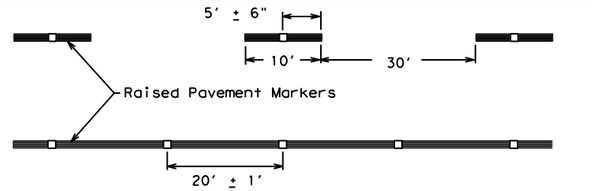


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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."

Texas Department of Transportation

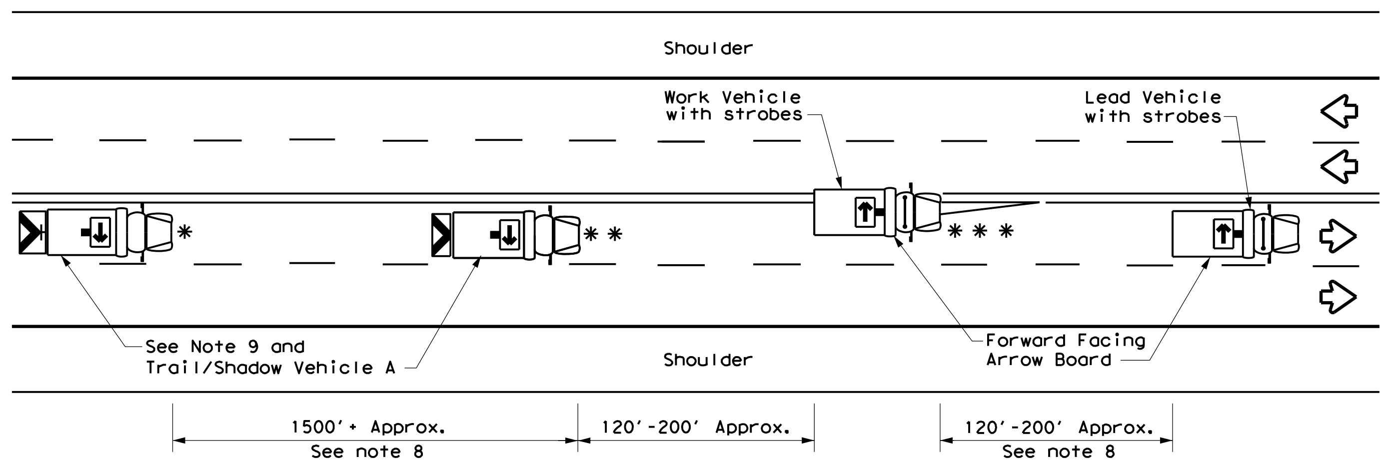
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

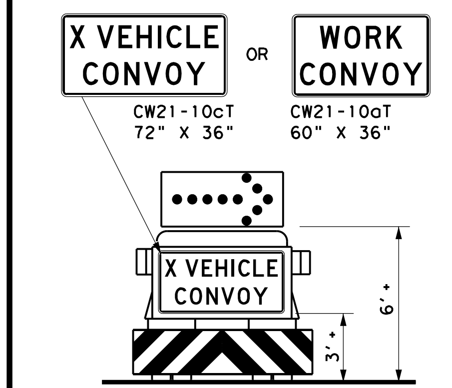
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	ABL	NOLAN		38
11-02 8-14				

106



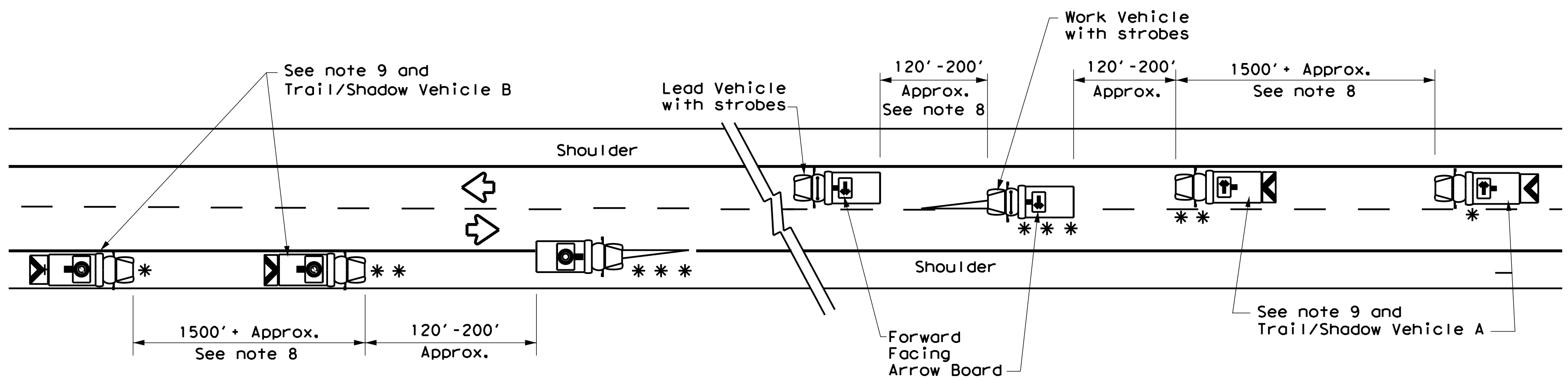
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

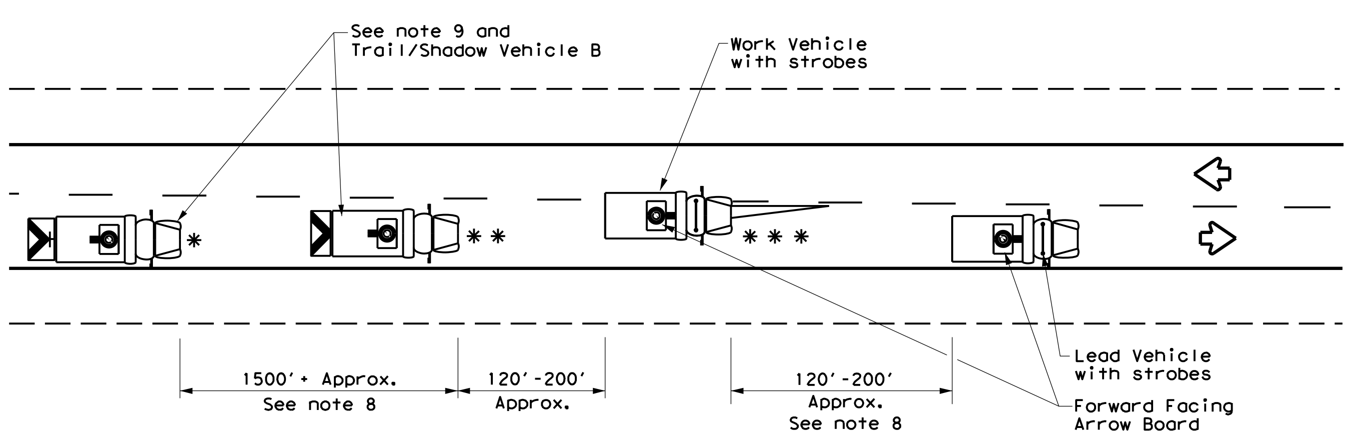


WORK ON SHOULDER

WORK ON TRAVEL LANE

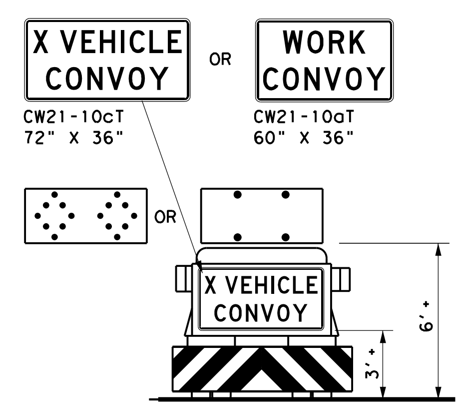
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display

LEGEND

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

TYPICAL USAGE

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used 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.

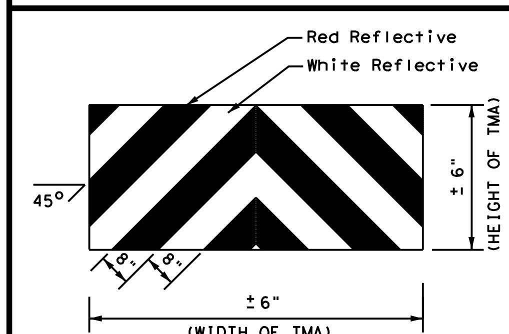
6. Each vehicle shall have two-way radio communication capability.

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 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 2-94 4-98 8-95 7-13 1-97	DIST ABL		COUNTY NOLAN	SHEET NO. 39

175

DATE: 6/5/2023 6:54:36 PM
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DATE: 6/5/2023 6:54:53 PM
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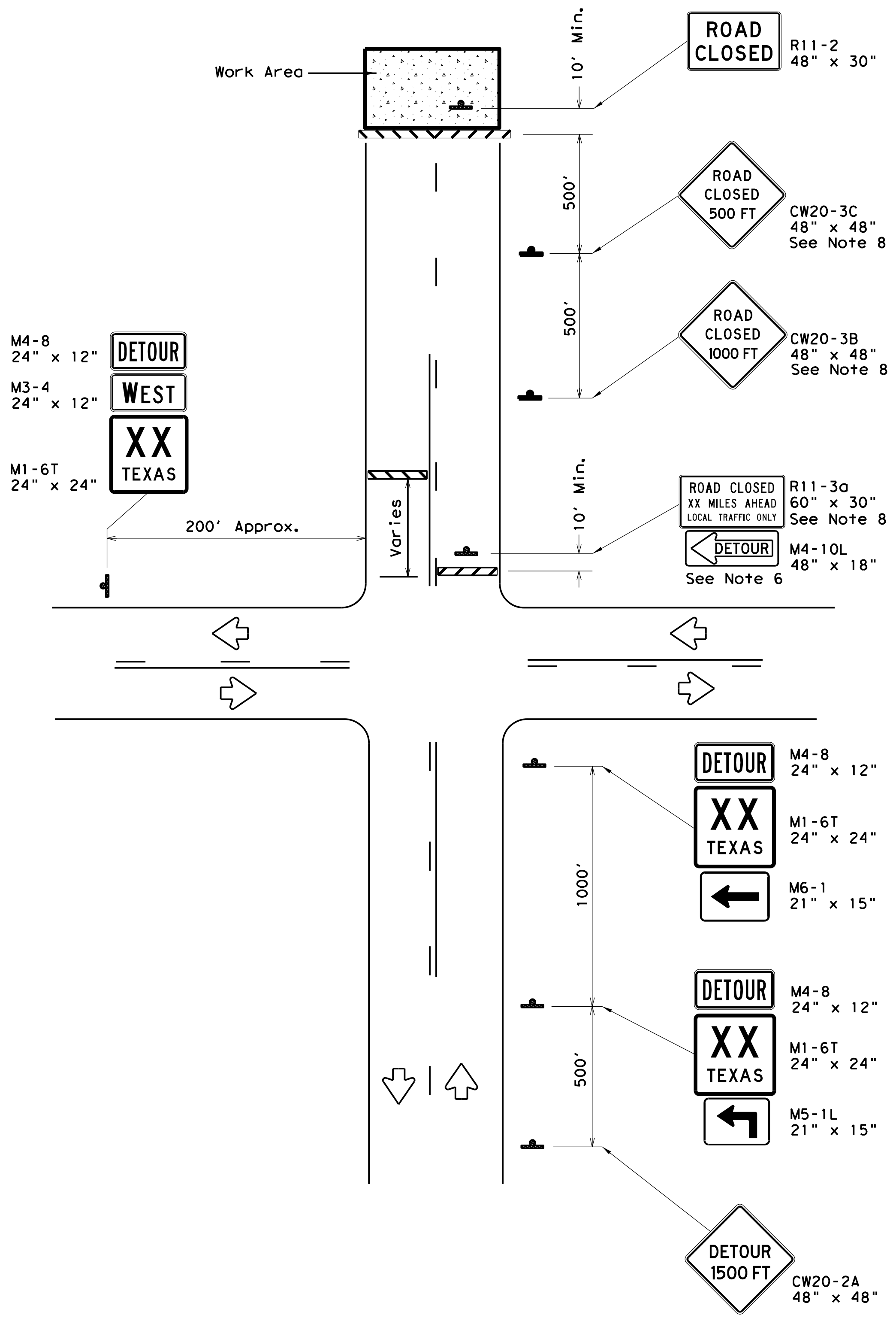
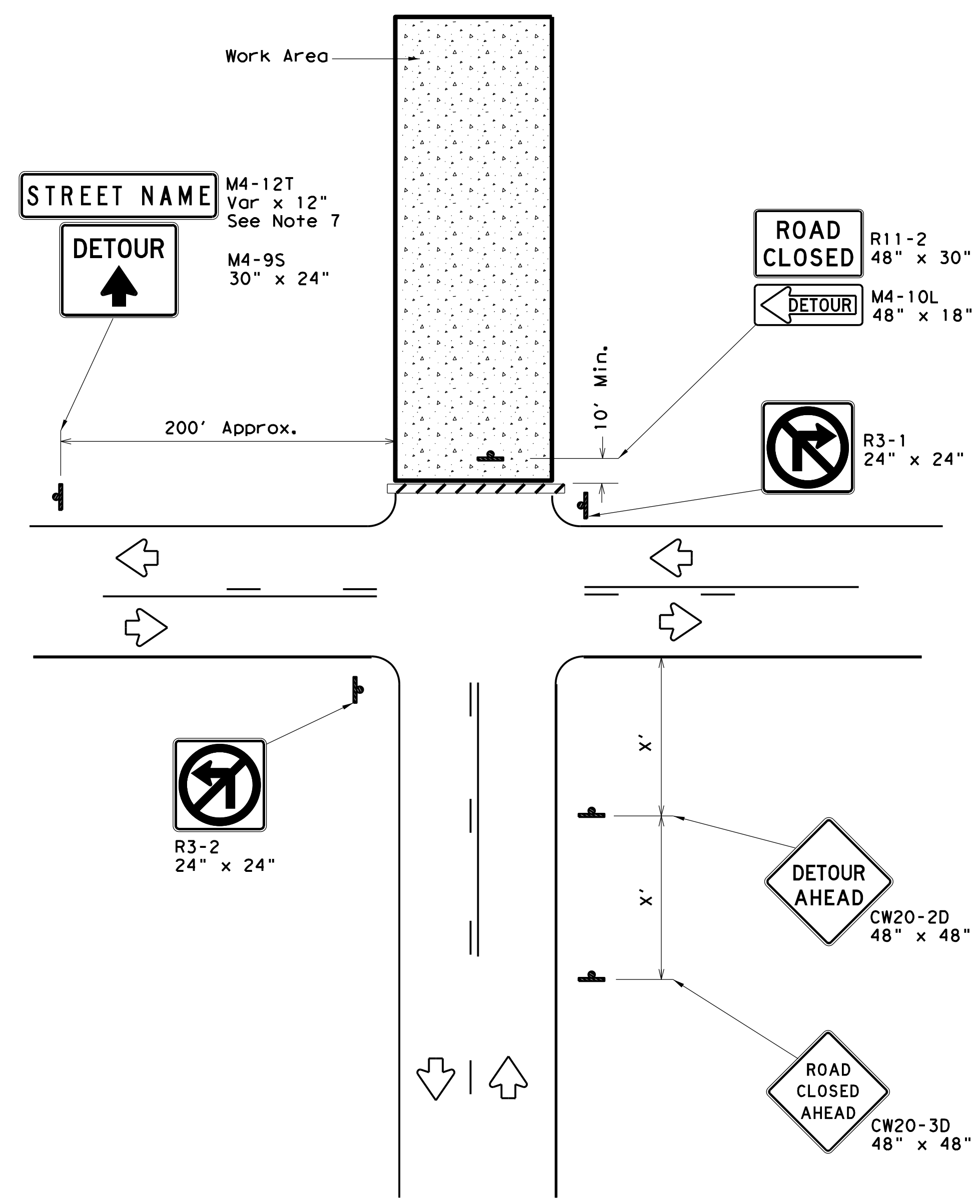


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
(hatched bar)	Type 3 Barricade
(sign symbol)	Sign

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

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

FILE: wzrcd-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 1995	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 1-97 4-98 7-13 2-98 3-03	DIST ABL		COUNTY NOLAN	SHEET NO. 40

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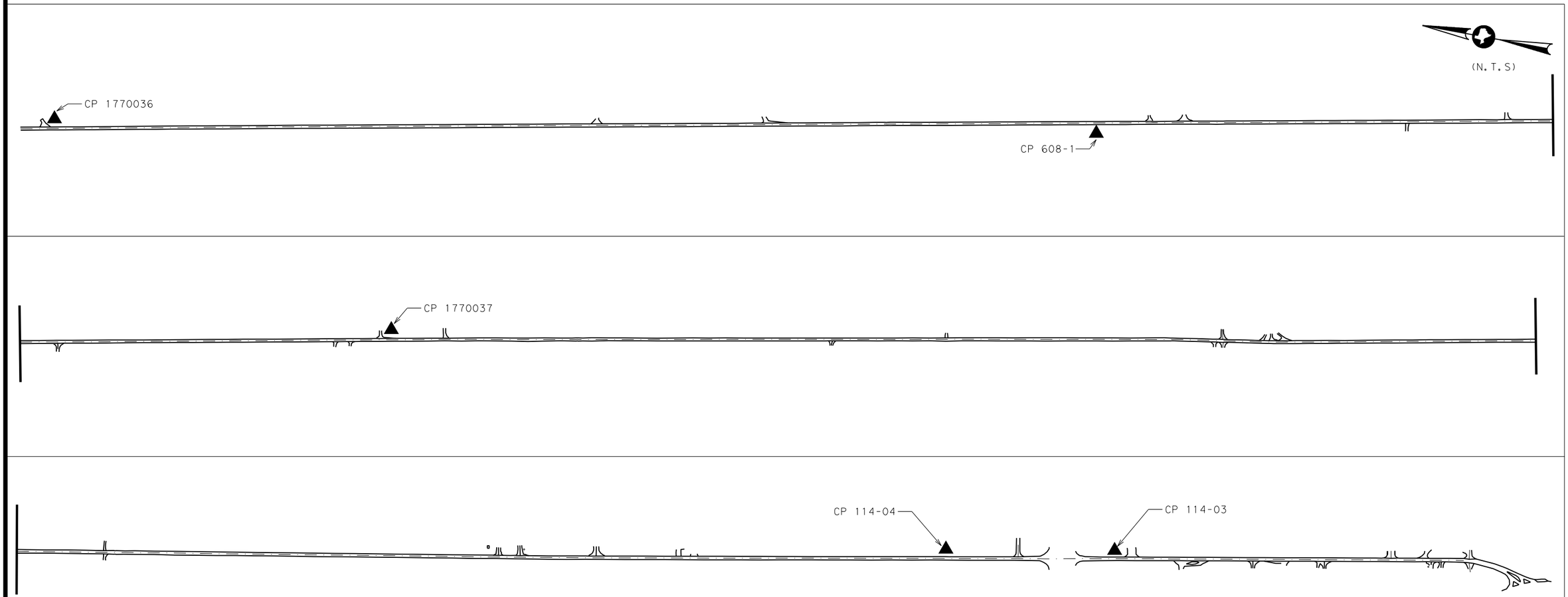


LEGEND

CENTER LINE ——— – ———

CONTROL POINT ▲

CONTROL POINT	SURFACE COORDINATES NORTHING	SURFACE COORDINATES EASTING	GRID COORDINATES NORTHING	GRID COORDINATES EASTING	LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
1770036	6,880,906.23	1,334,260.61	6,880,080.62	1,334,100.52	32°31'29.2564"	100°33'30.4532"	2,240.65	5/8" REBAR WITH 3 1/4" ALUMINUM CAP IN CONCRETE
1770037	6,869,097.75	1,336,637.28	6,868,273.56	1,336,476.93	32°29'32.9014"	100°33'00.0103"	2,381.82	5/8" REBAR WITH 3 1/4" ALUMINUM CAP IN CONCRETE
114-03	6,855,233.25	1,339,379.34	6,854,410.72	1,339,218.63	32°27'16.2753"	100°32'24.8608"	2,379.02	5/8" REBAR WITH 3 1/4" ALUMINUM CAP IN CONCRETE
114-04	6,856,189.38	1,339,188.77	6,855,366.74	1,339,023.09	32°27'25.3593"	100°32'27.3593"	2,377.07	5/8" REBAR WITH 3 1/4" ALUMINUM CAP IN CONCRETE
608-1	6,874,375.72	1,335,500.89	6,873,550.89	1,335,340.64	32°30'24.8938"	100°33'14.4799"	2,370.07	5/8" REBAR WITH 3 1/4" ALUMINUM CAP

NOTES:

ALL BEARINGS AND COORDINATES SHOWN ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202)NORTH AMERICAN DATUM OF 1983 (NAD 83) 2011 ADJUSTMENT, ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00012.

UNIT OF MEASURE IS U.S. SURVEY FEET

HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (SWEETWATER BASE) BASED ON AVERAGED THREE 180 EPOCH OBSERVATIONS

VERTICAL CONTROL IS NORTH AMERICAN VERTICAL DATUM OF 1988(NAVD 88); GEOID 12B; TxDOT VRS NETWORK BASED ON THREE 180 EPOCH OBSERVATIONS

FIELD SURVEYS WERE PERFORMED NOVEMBER 2022

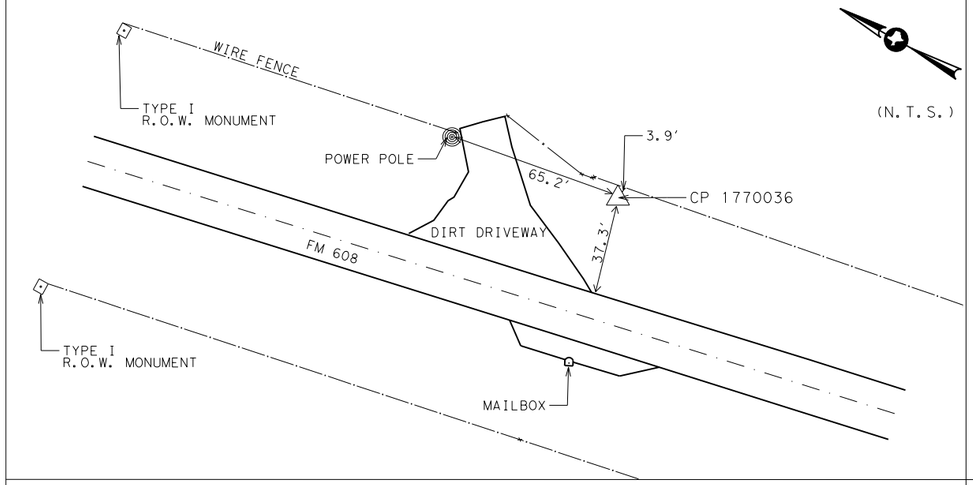
6/6/2023

STATE OF TEXAS
REGISTERED
KEITH L. RAYBURN
5666
PROFESSIONAL
LAND SURVEYOR

TEXAS DEPARTMENT OF TRANSPORTATION
ABILENE DISTRICT
4250 North Clack Street
Abilene, Texas 79601
PHONE: (325) 676 - 6800

FM 608
SURVEY CONTROL INDEX AND DATA

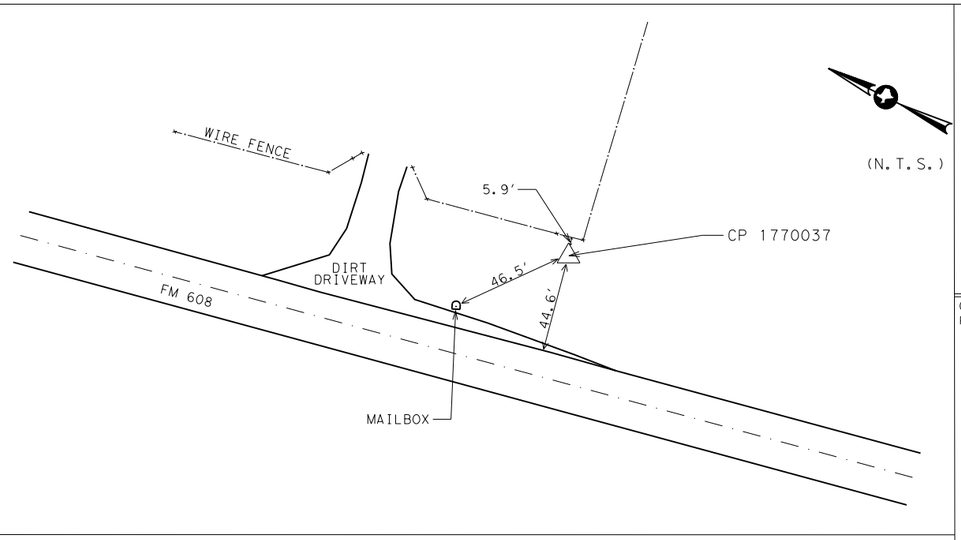
FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TEXAS	FPN			FM 608
STATE DISTRICT NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
8	NOLAN	2379	02	010	41



CONTROL POINT: 1770036

CP # 1770036 IS A 5/8" REBAR WITH A TXDOT ALUMINUM CAP. LOCATED ON THE EAST SIDE OF FM 608 AND BEING ± 47' FEET EAST OF THE FM 608 CENTERLINE.

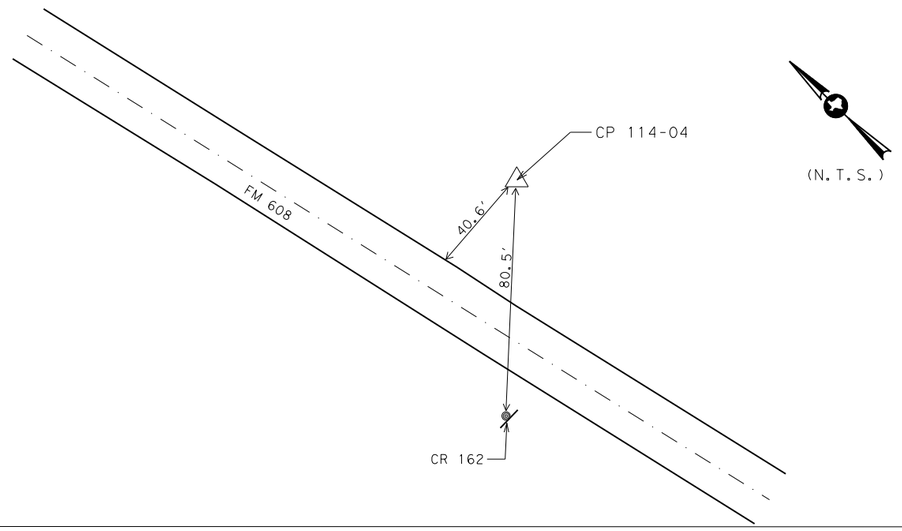
GRID COORDINATES		SURFACE COORDINATES		LATITUDE	LONGITUDE
NORTHING	6,880,080.62	NORTHING	6,880,906.23	32°31'29.2564"	100°33'30.4532"
EASTING	1,334,100.52	EASTING	1,334,260.61		
ELEVATION	2,240.65				



CONTROL POINT: 1770037

CP # 1770037 IS A 5/8" REBAR WITH A TXDOT ALUMINUM CAP. LOCATED ON THE EAST SIDE OF FM 608 AND BEING ± 53' FEET EAST OF THE FM 608 CENTERLINE.

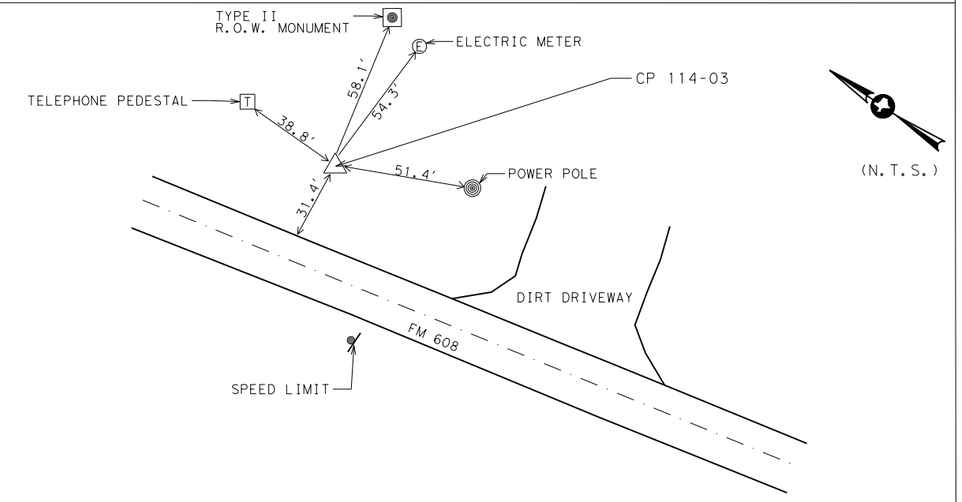
GRID COORDINATES		SURFACE COORDINATES		LATITUDE	LONGITUDE
NORTHING	6,868,273.56	NORTHING	6,869,097.75	32°29'32.9014"	100°33'00.0103"
EASTING	1,336,476.93	EASTING	1,336,637.28		
ELEVATION	2,381.82				



CONTROL POINT: 114-04

CP # 114-04 IS A 5/8" REBAR WITH A TXDOT ALUMINUM CAP. LOCATED ON THE EAST SIDE OF FM 608 AND BEING ± 603' FEET NORTH FROM THE EDGE OF PAVEMENT OF US HWY 84.

GRID COORDINATES		SURFACE COORDINATES		LATITUDE	LONGITUDE
NORTHING	6,855,366.74	NORTHING	6,856,189.38	32°27'25.6962"	100°32'27.3593"
EASTING	1,339,023.09	EASTING	1,339,183.77		
ELEVATION	2,377.07				



CONTROL POINT: 114-03

CP # 114-03 IS A 5/8" REBAR WITH A TXDOT ALUMINUM CAP. LOCATED ON THE EAST SIDE OF FM 608 AND BEING ± 222' FEET SOUTH FROM THE EDGE OF PAVEMENT OF US HWY 84.

GRID COORDINATES		SURFACE COORDINATES		LATITUDE	LONGITUDE
NORTHING	6,854,410.72	NORTHING	6,855,233.25	32°27'16.2752"	100°32'24.8608"
EASTING	1,339,218.63	EASTING	1,339,379.34		
ELEVATION	2,379.02				

NOTES:

ALL BEARINGS AND COORDINATES SHOWN ARE BASED ON THE TEXAS COORDINATE SYSTEM, NORTH CENTRAL ZONE (4202) NORTH AMERICAN DATUM OF 1983 (NAD 1983) 2011, ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00012.

UNIT OF MEASURE IS U.S. SURVEY FEET

HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (SWEETWATER BASE) BASED ON AVERAGED THREE 180 EPOCH OBSERVATIONS

VERTICAL CONTROL IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88); GEOID 12B; TxDOT VRS NETWORK BASED ON THREE 180 EPOCH OBSERVATIONS

FIELD SURVEYS WERE PERFORMED IN NOVEMBER 2022

LEGEND

CENTER LINE
FENCE
CONTROL POINT

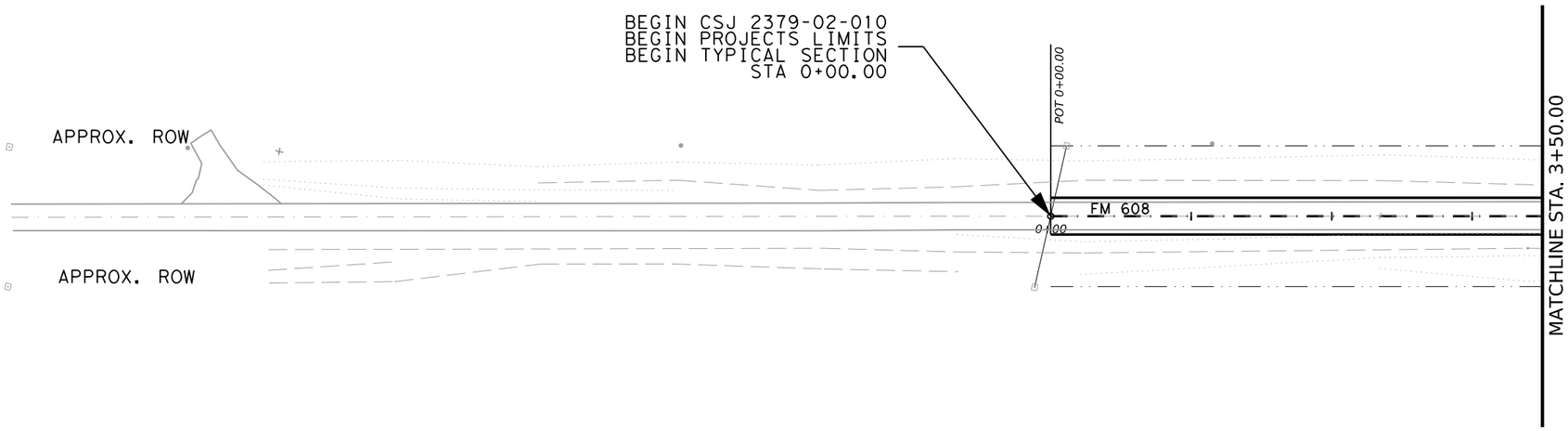
STATE OF TEXAS
REGISTERED
KEITH V. RAYBURN
5666
PROFESSIONAL
LAND SURVEYOR

6/6/2023

TEXAS DEPARTMENT OF TRANSPORTATION
ABILENE DISTRICT
4250 North Clack Street
Abilene, Texas 79601
PHONE: (325) 676 - 6800

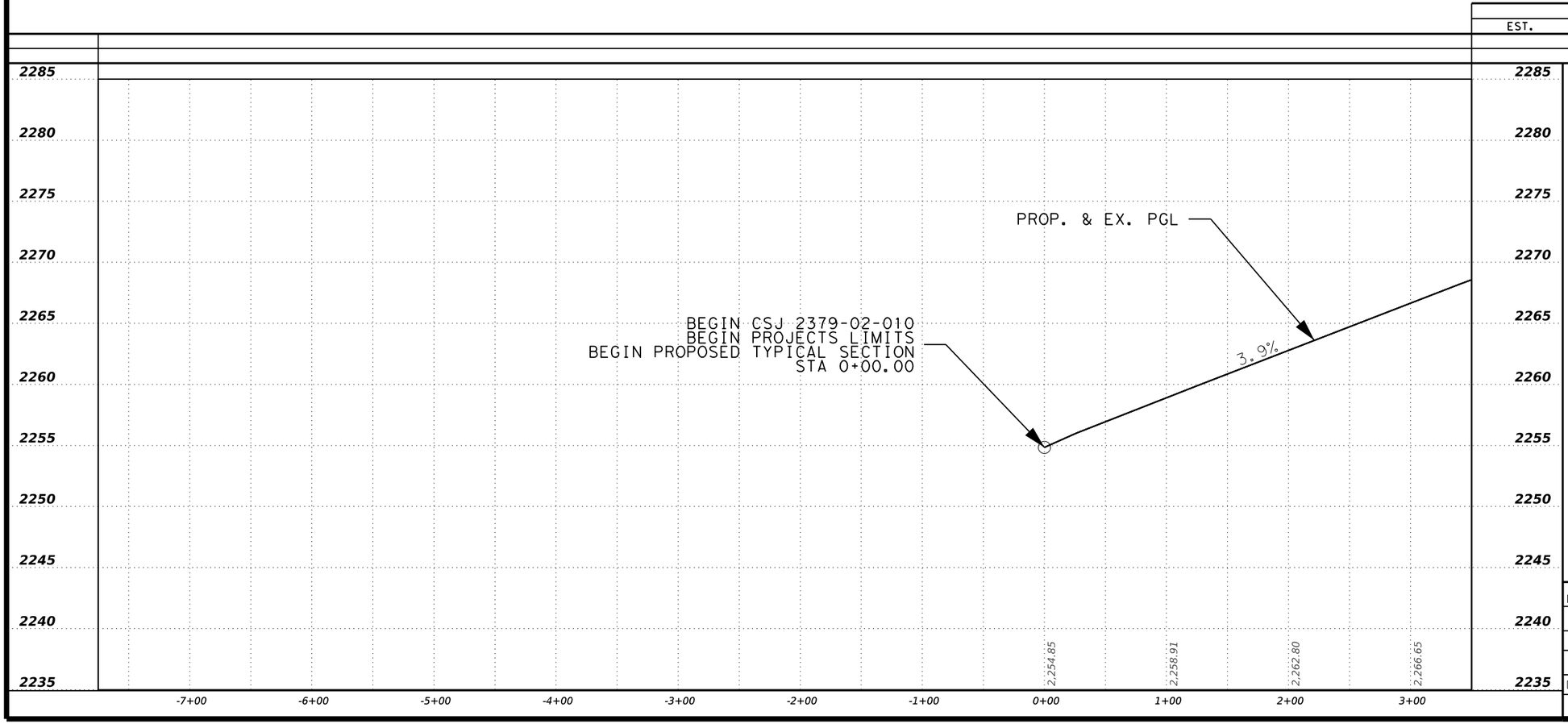
FM 608
SURVEY CONTROL DATA

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TEXAS	FPN			FM 608
STATE DISTRICT NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
8	NOLAN	2379	02	010	42



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2285		

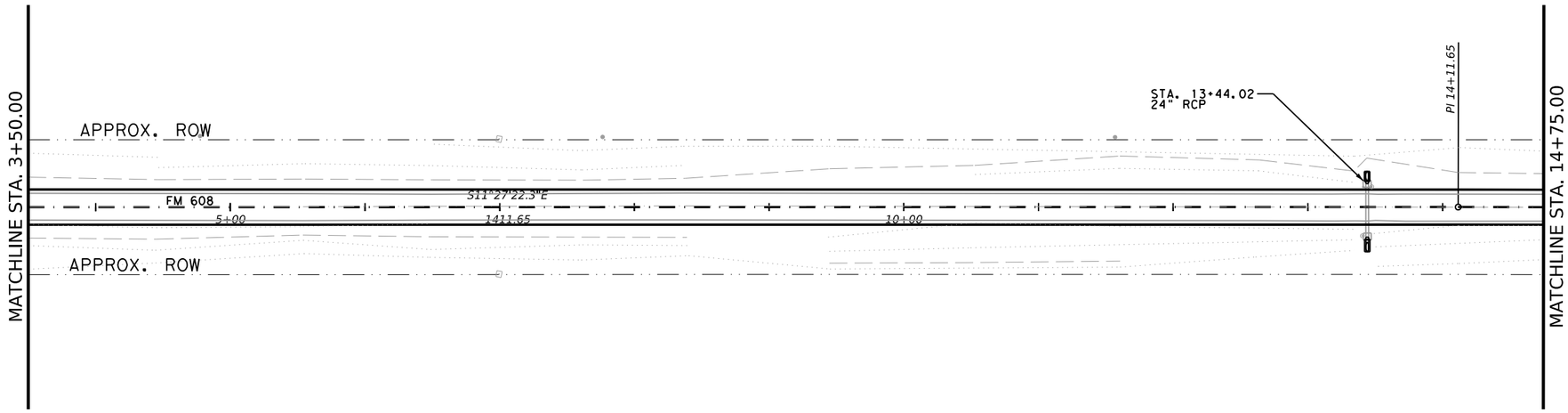
STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

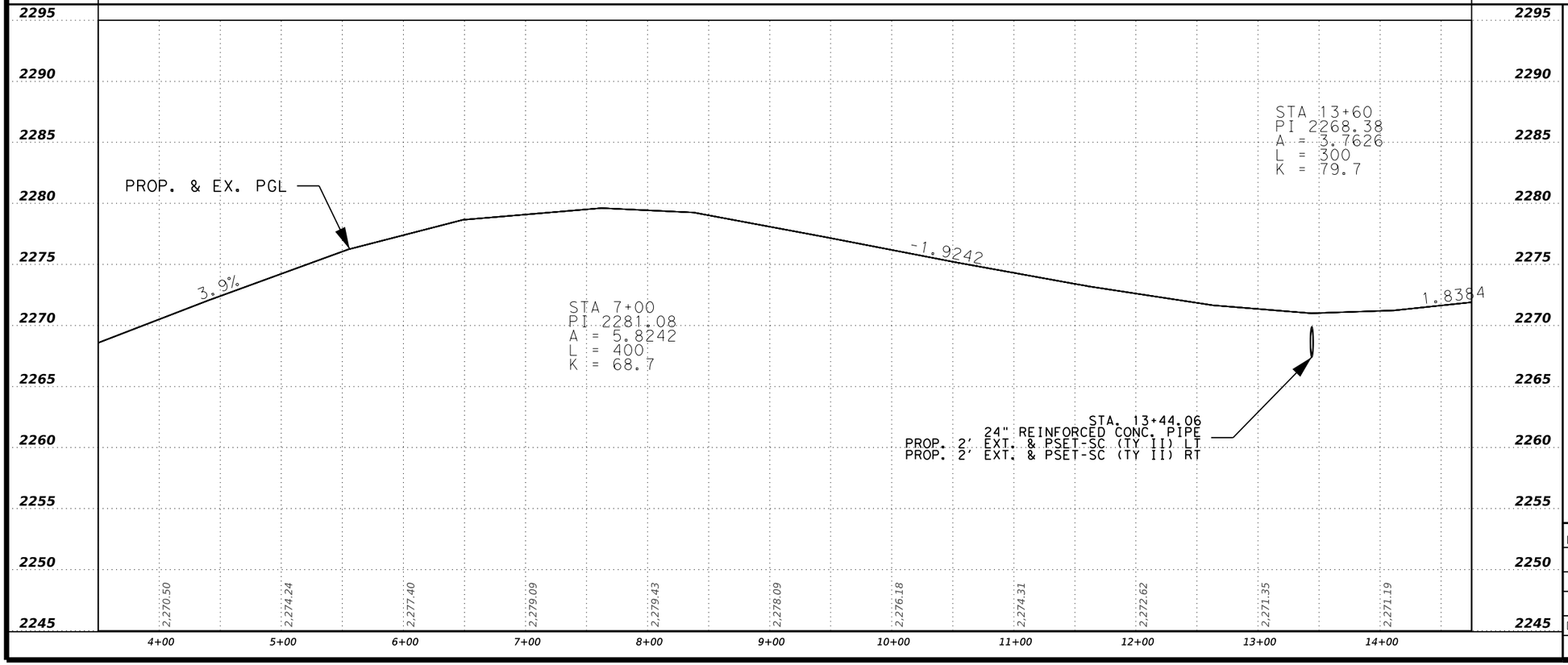
SCALE: 1" = 100' SHEET 1 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		43
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2295		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

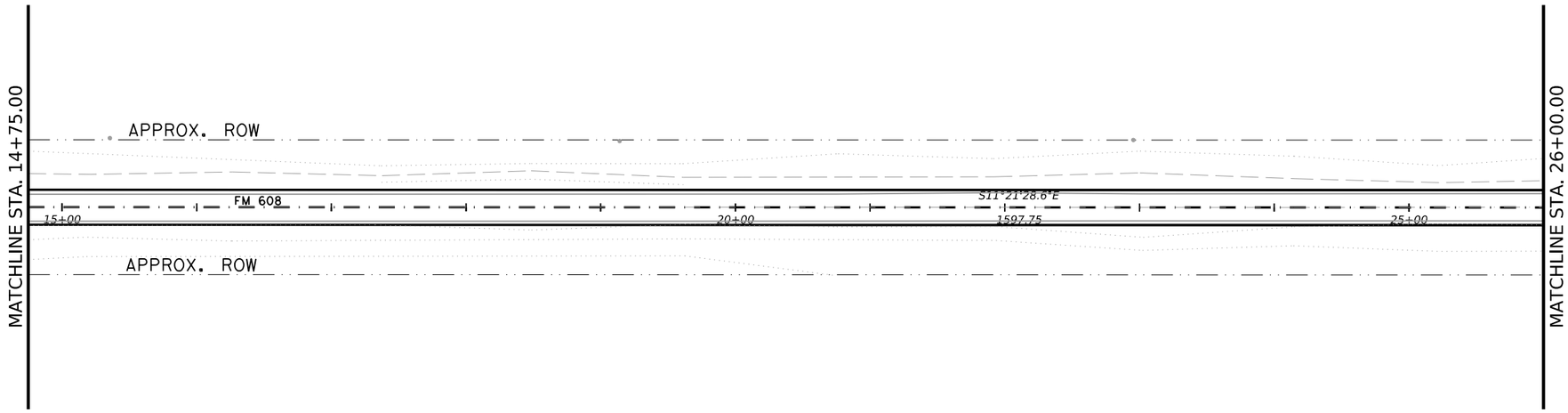
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

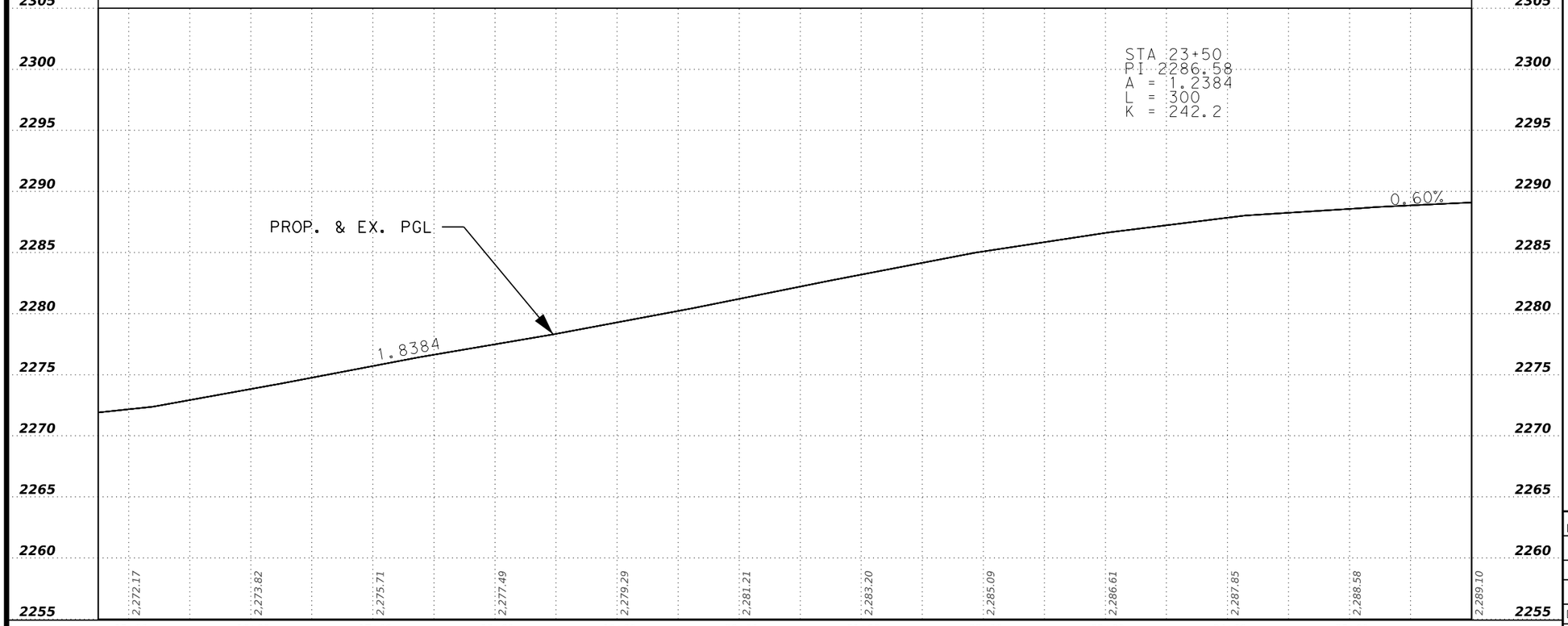
SCALE: 1" = 100' SHEET 2 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		44
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2305		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

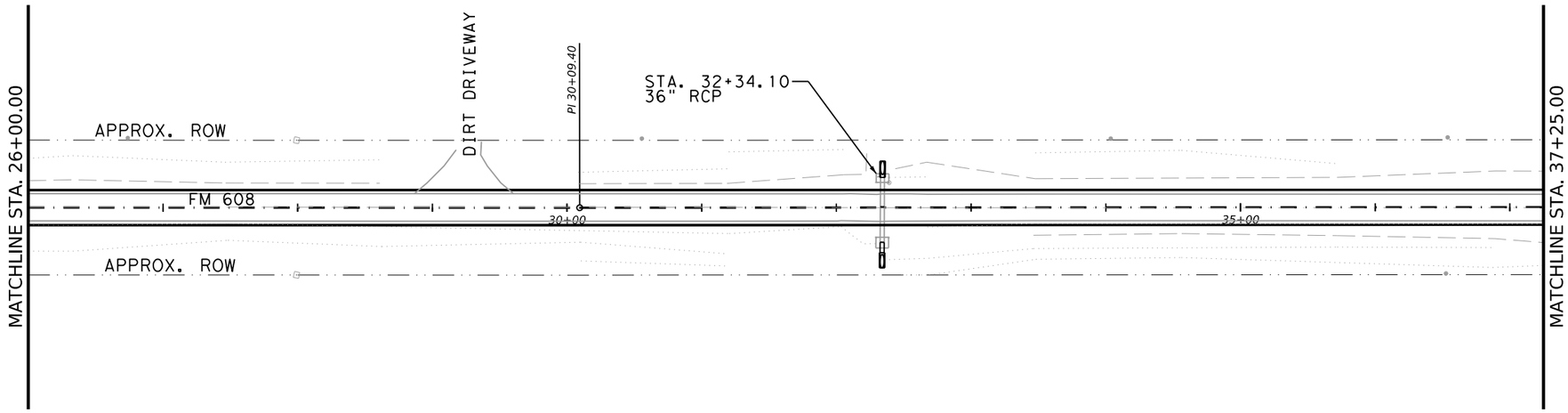
Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

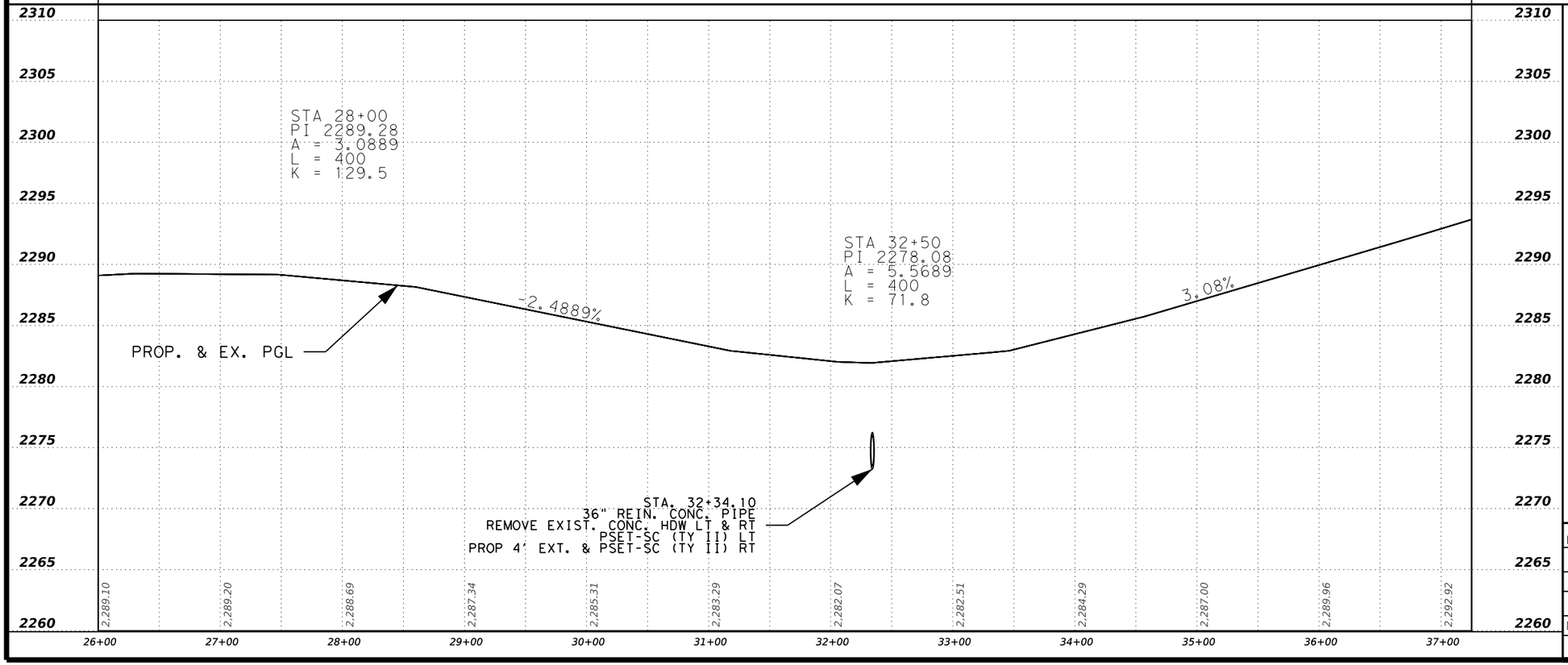
SCALE: 1" = 100' SHEET 3 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		45
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2310		

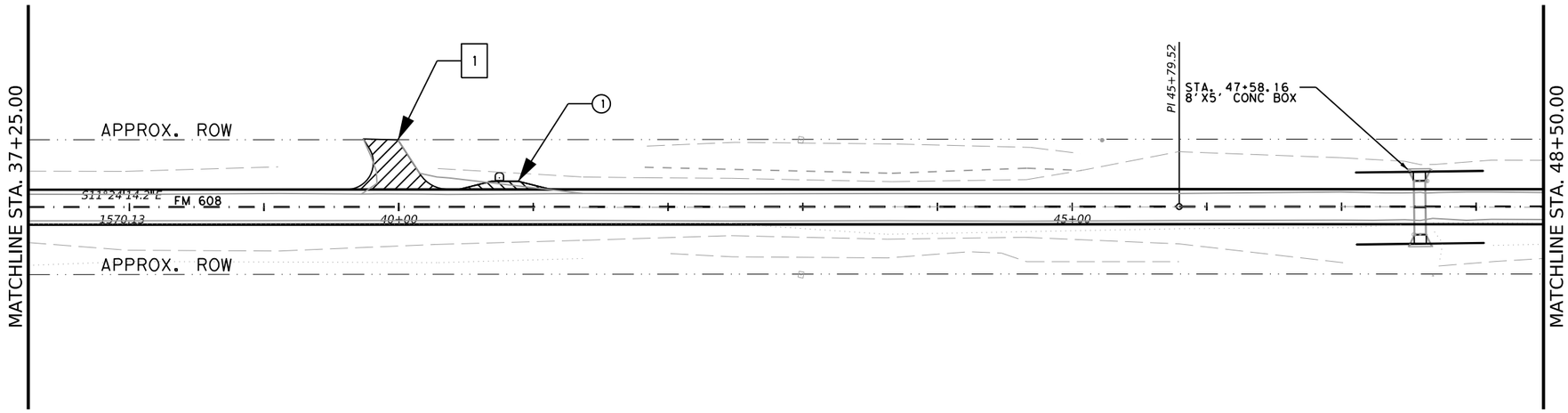
STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

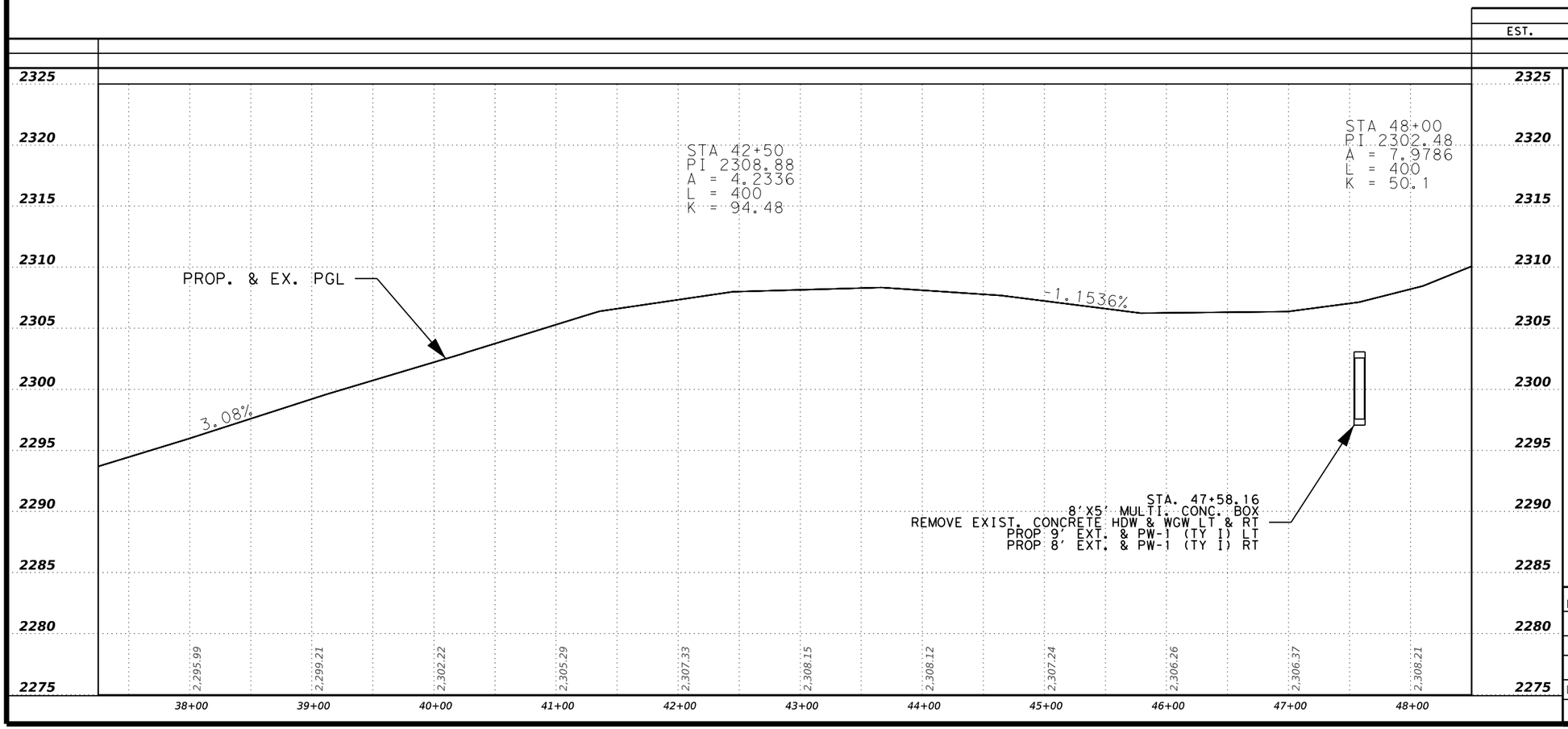
SCALE: 1" = 100' SHEET 4 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		46
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2325		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

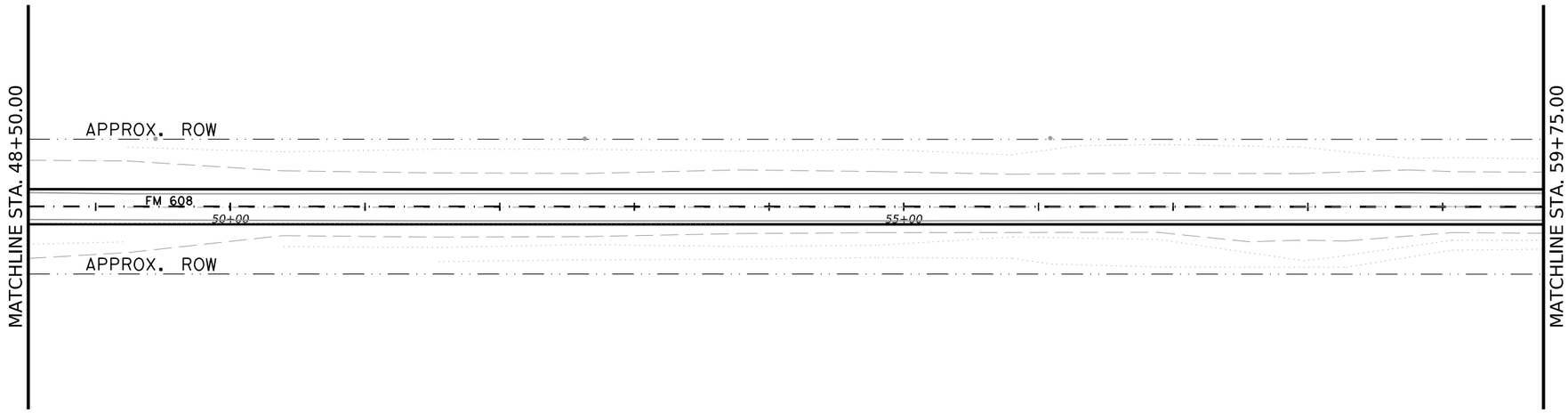
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

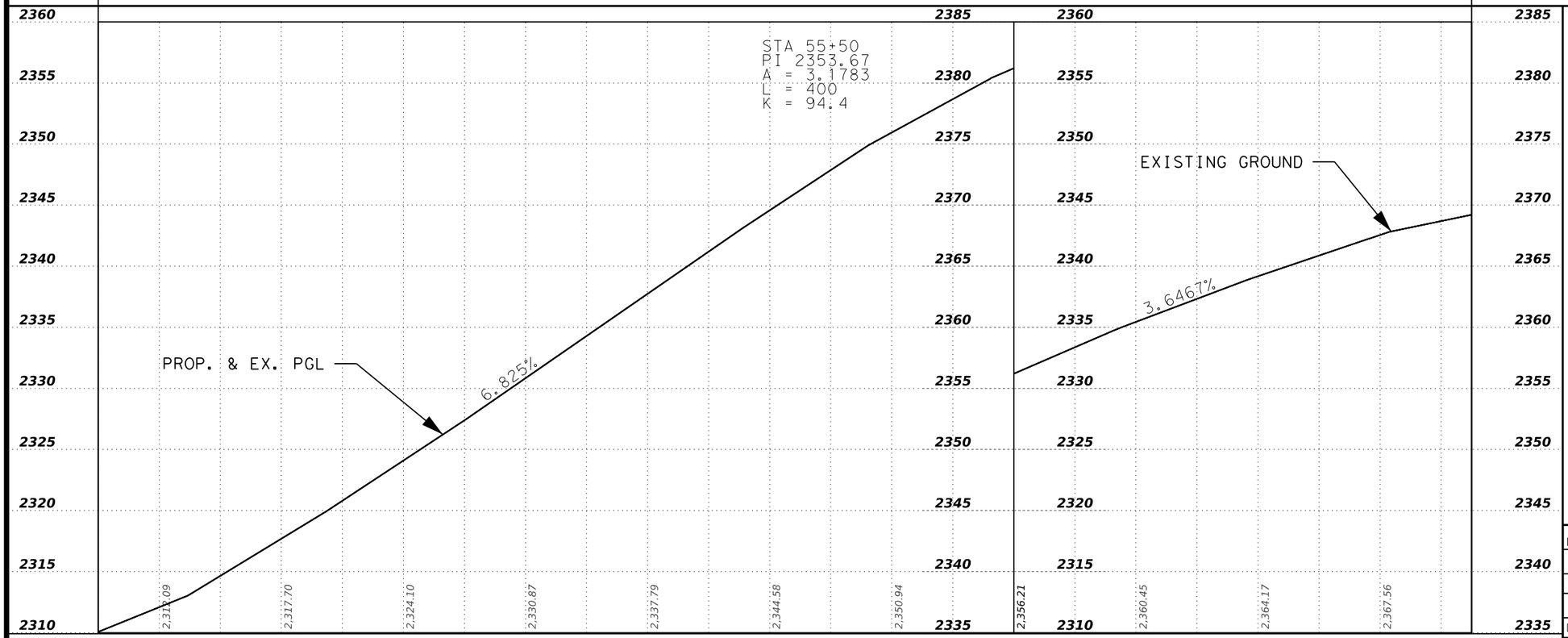
SCALE: 1" = 100' SHEET 5 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		47
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION

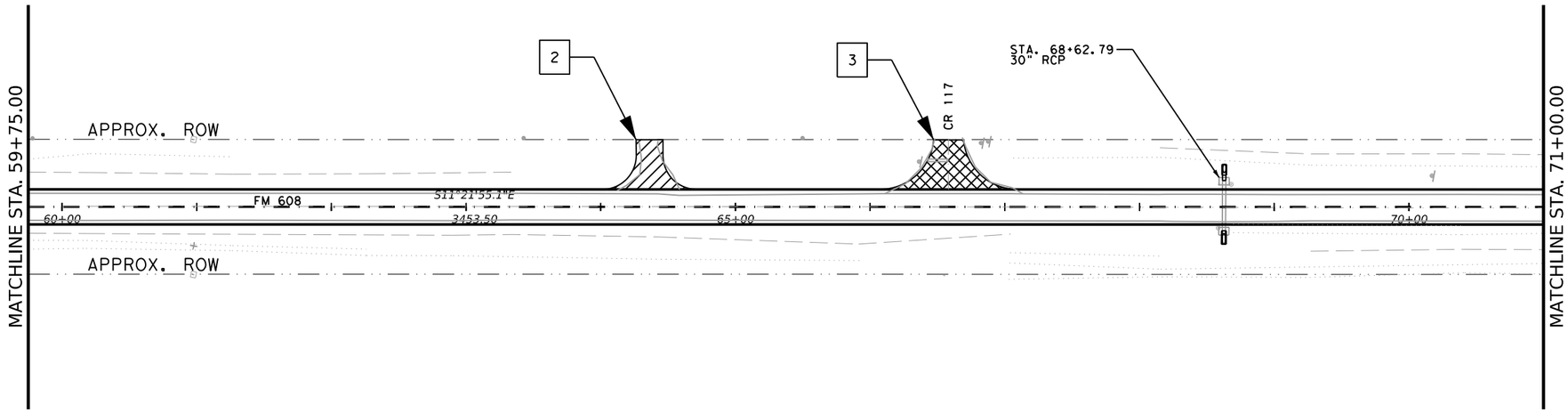
STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

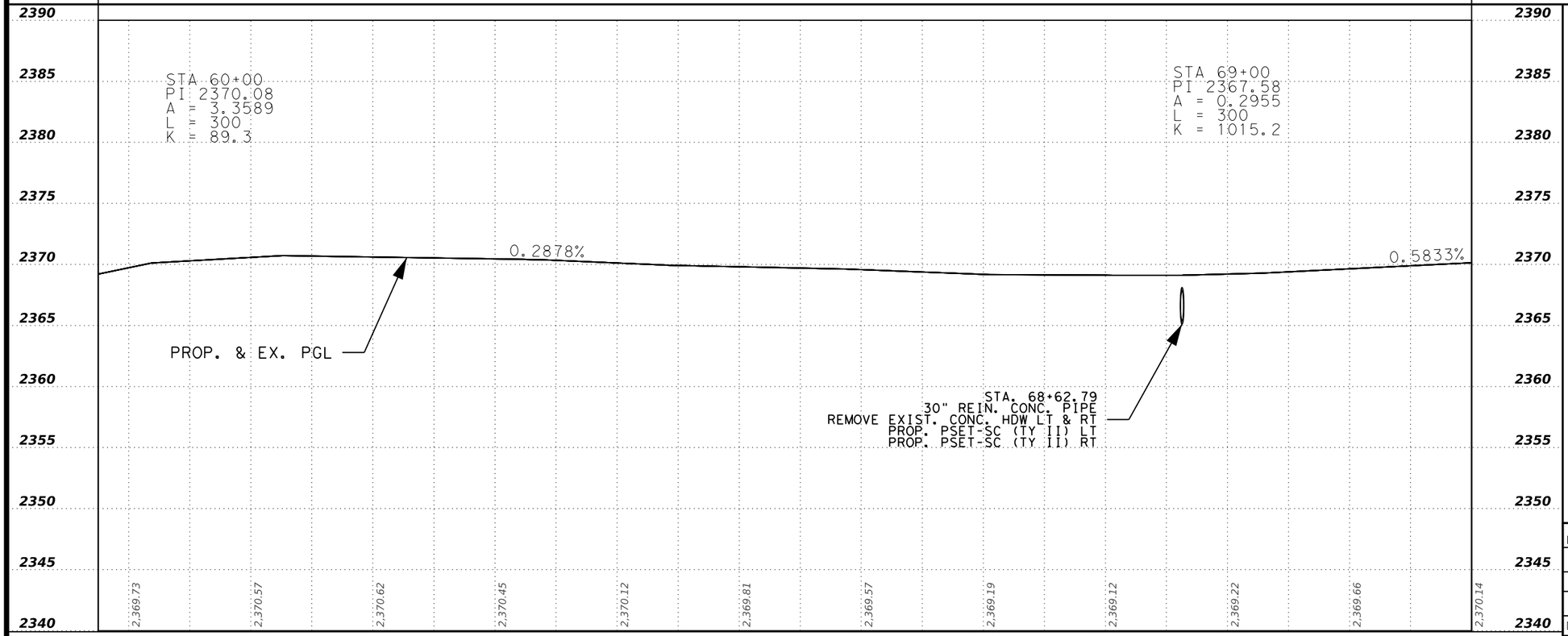
SCALE: 1" = 100' SHEET 6 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		48
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2390		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

SCALE: 1" = 100'

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		49
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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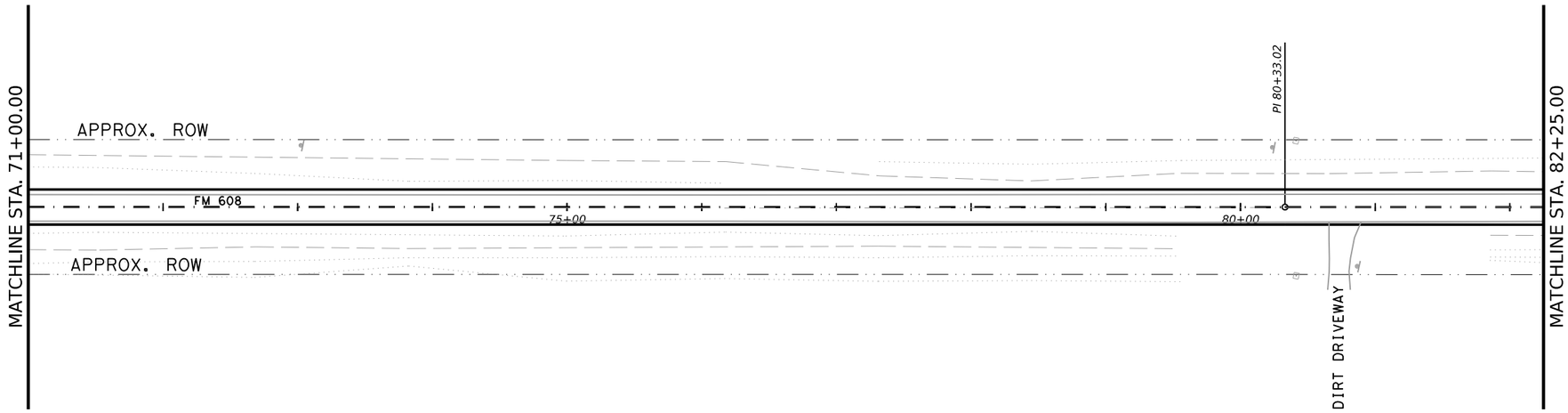
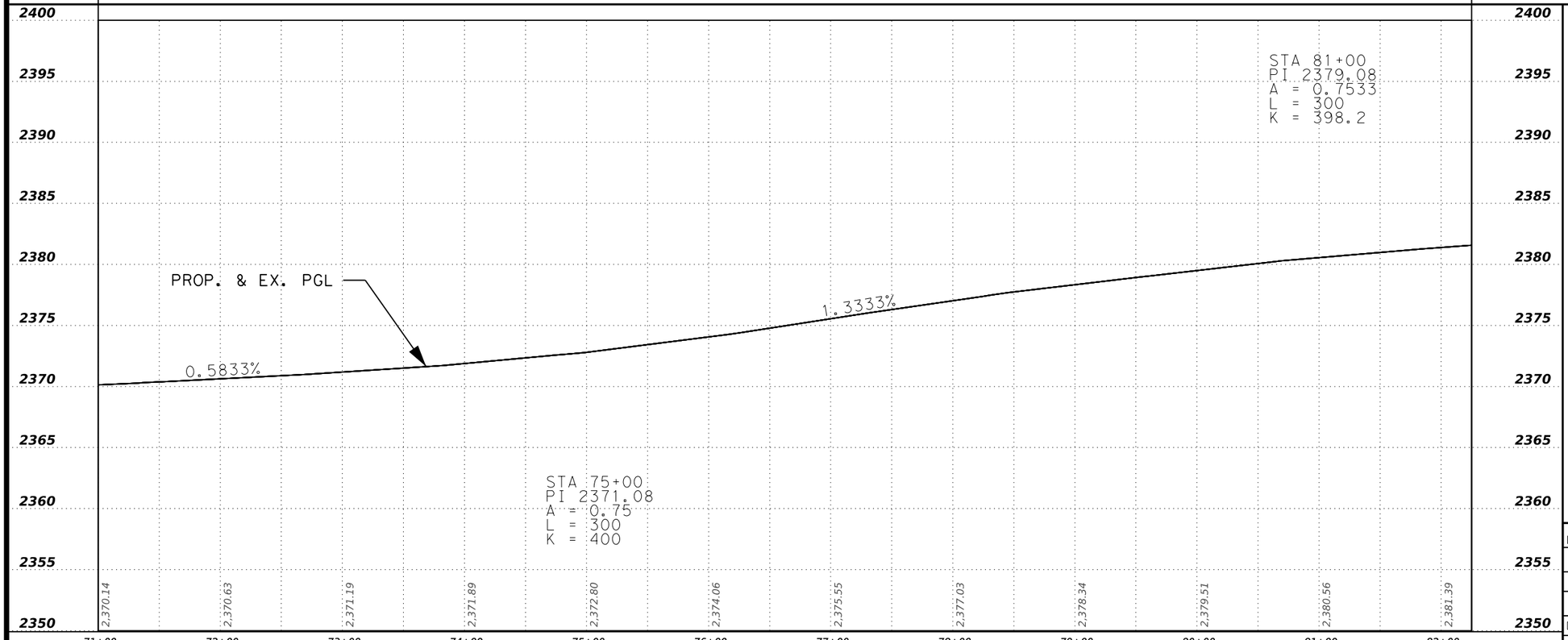


LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION

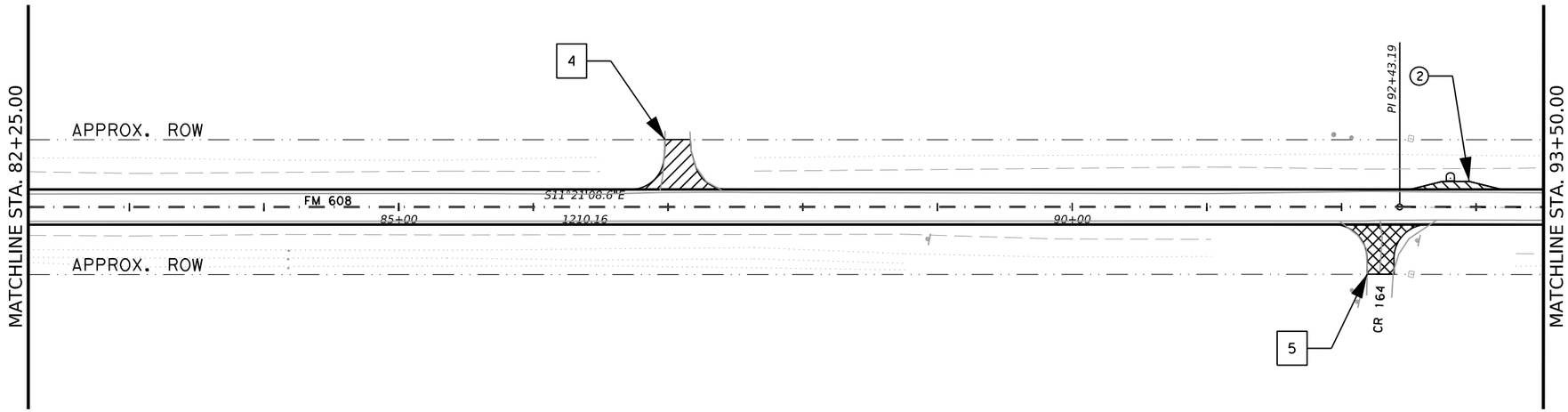
STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

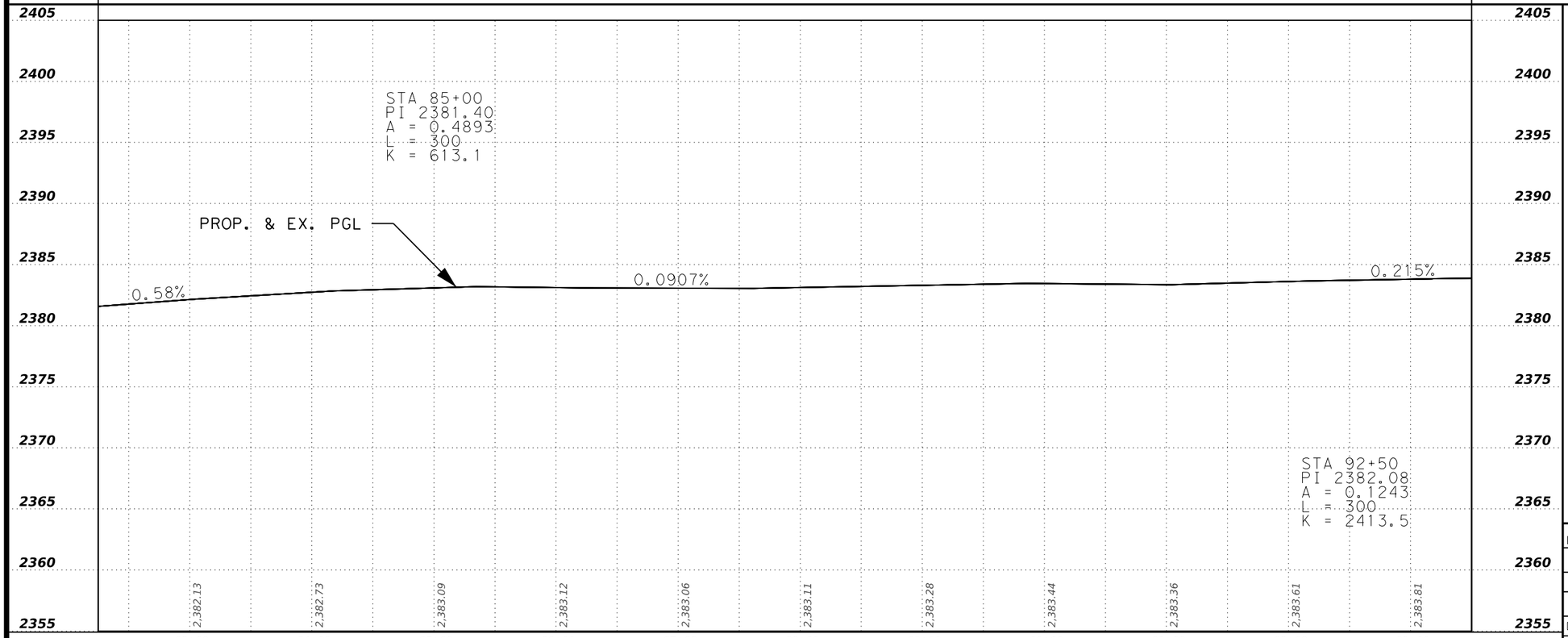
SCALE: 1" = 100' SHEET 8 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		50
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

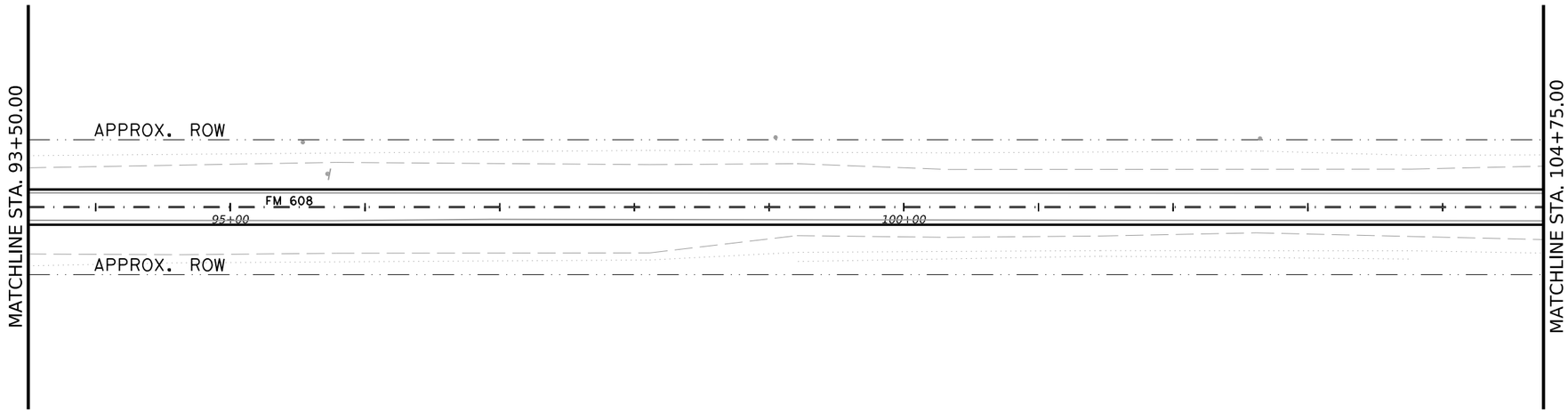
STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

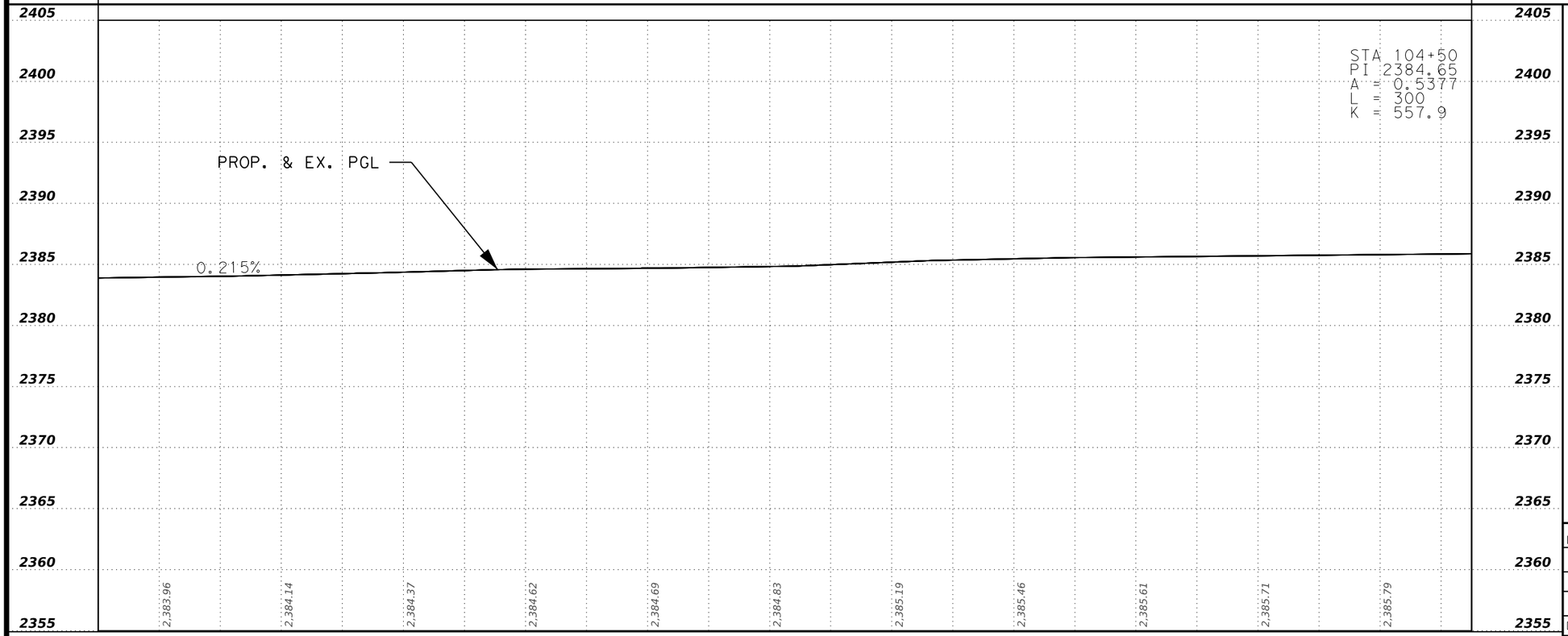
SCALE: 1" = 100' SHEET 9 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		51
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

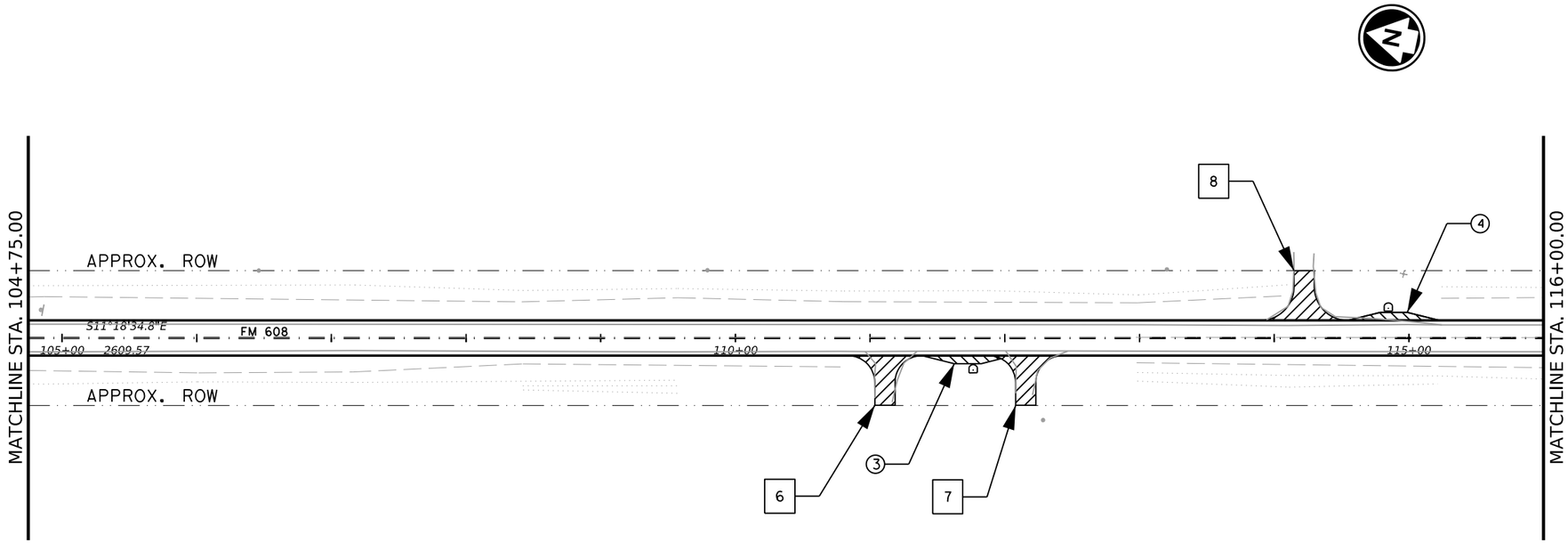
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

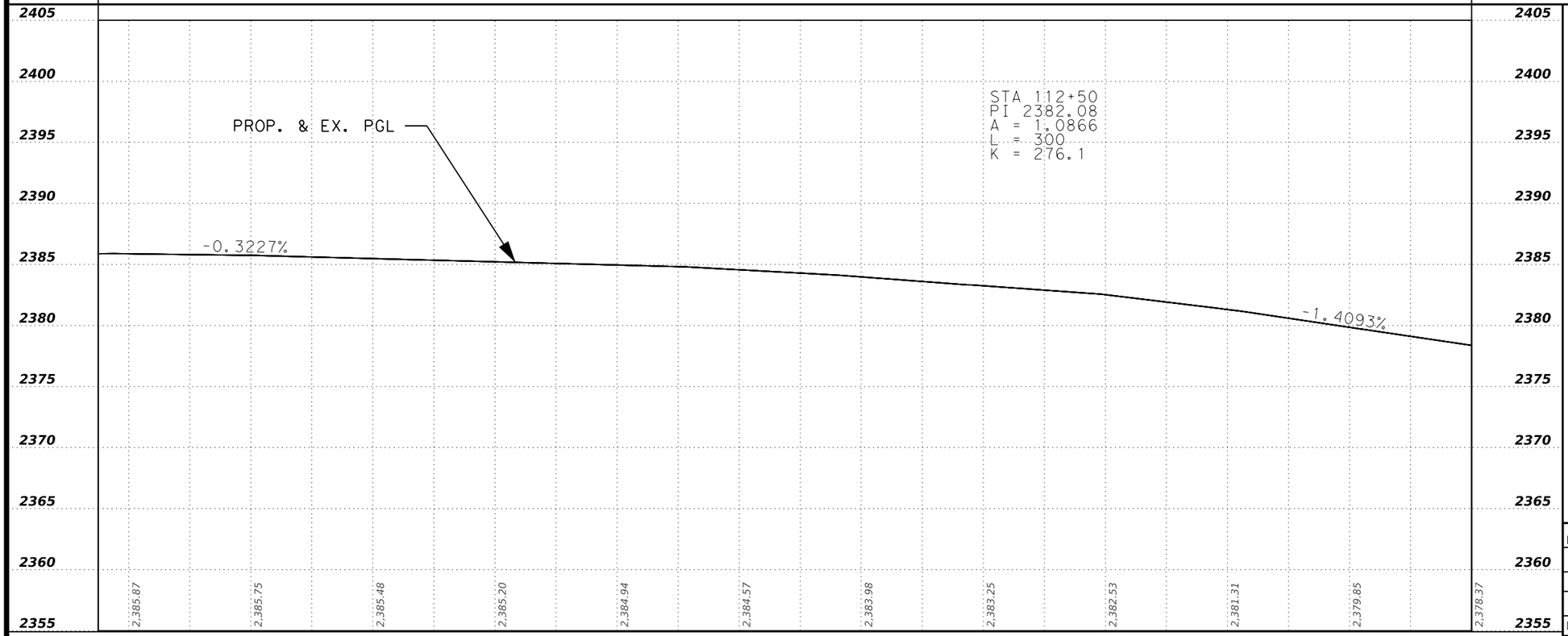
SCALE: 1" = 100' SHEET 10 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		52
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

SCALE: 1" = 100' SHEET 11 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		53
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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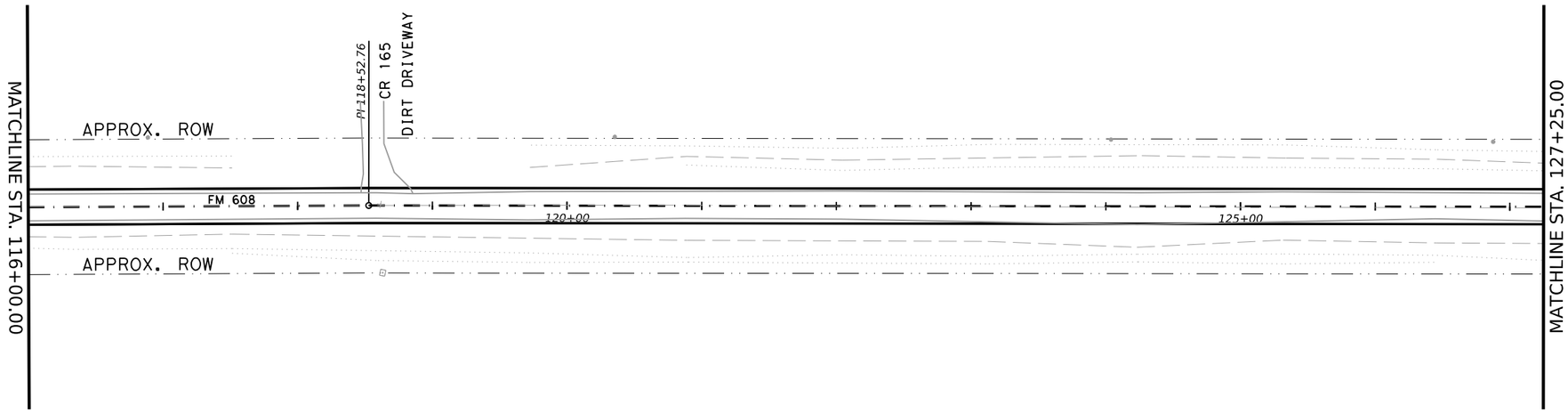


LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.

SHEET TOTALS		
EST.	UNIT	DESCRIPTION

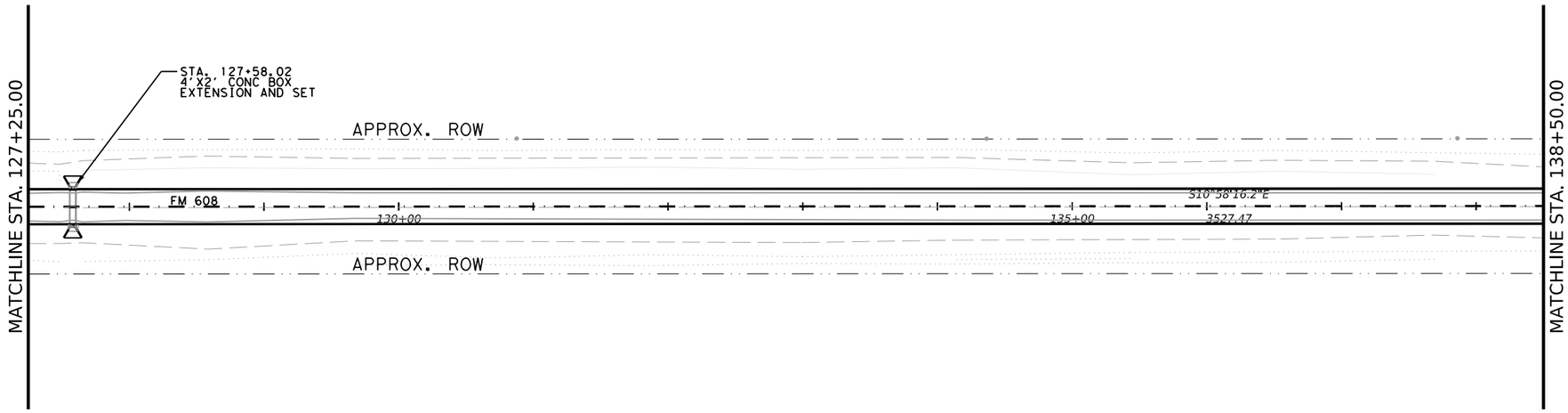
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

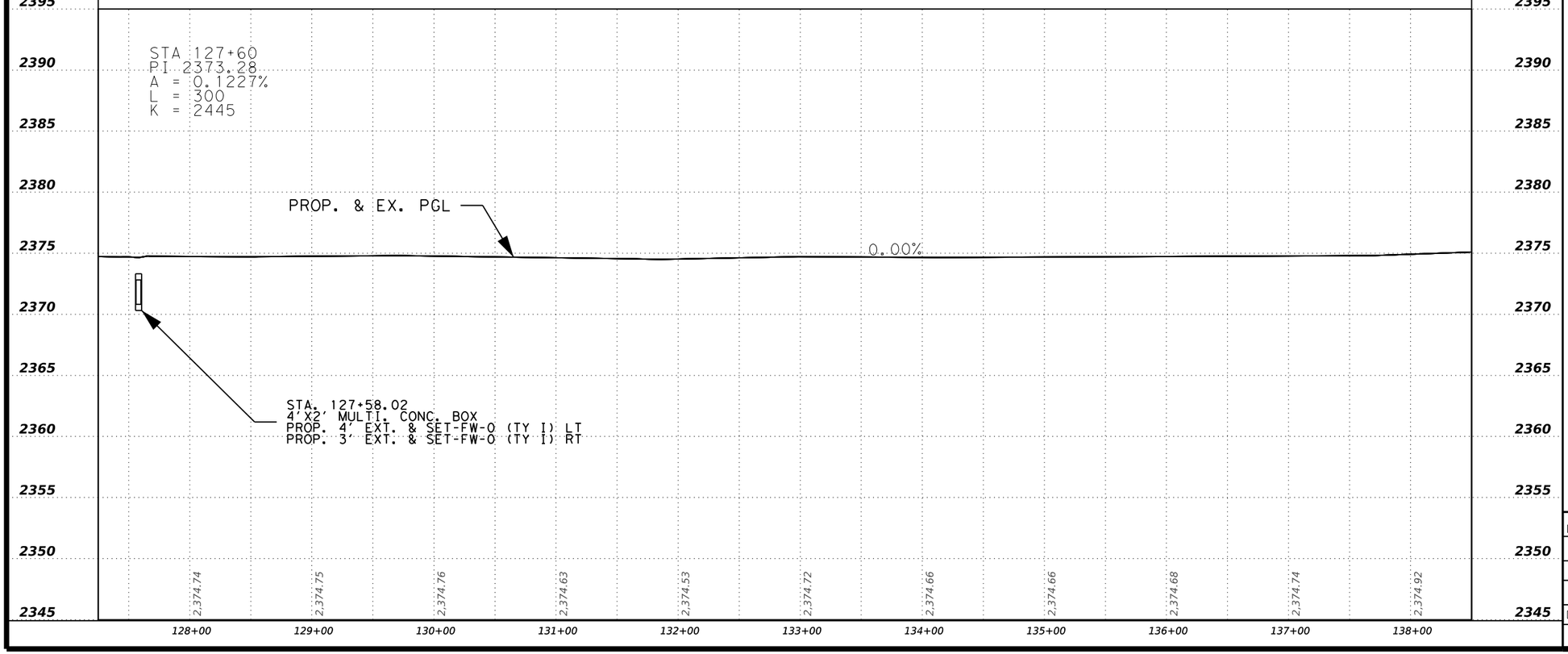
SCALE: 1" = 100' SHEET 12 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		54
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2395		2395

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

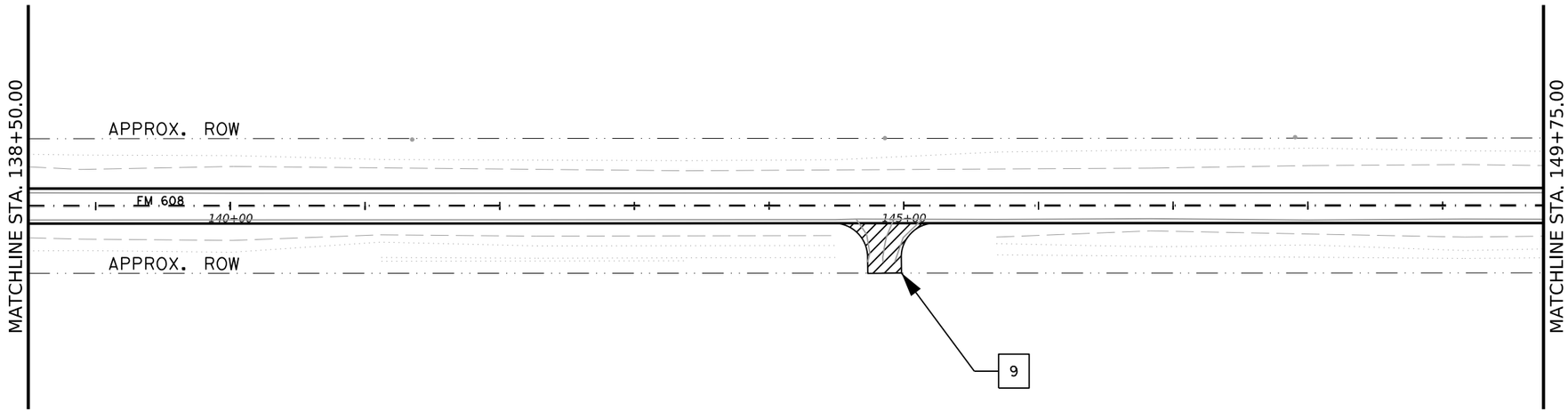
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

SCALE: 1" = 100' SHEET 13 OF 26

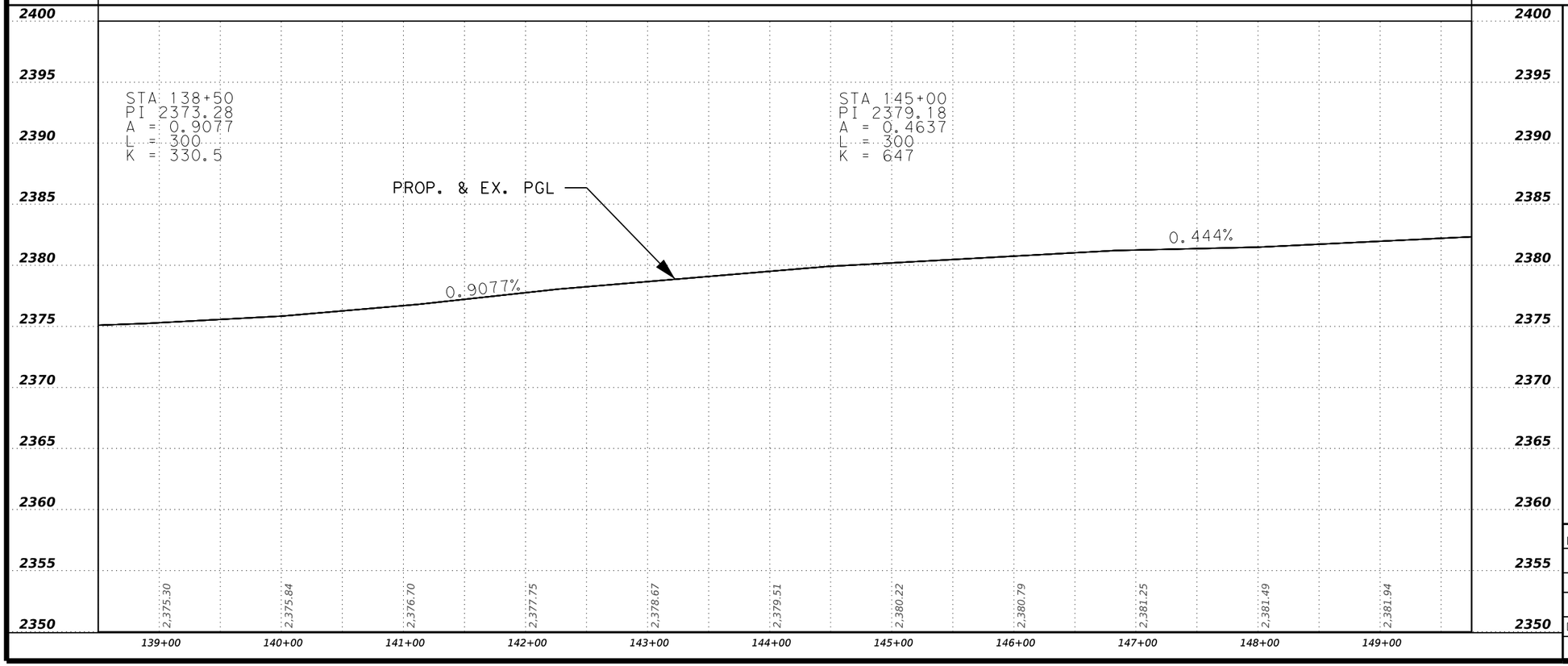
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		55
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.

SHEET TOTALS		
EST.	UNIT	DESCRIPTION



STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

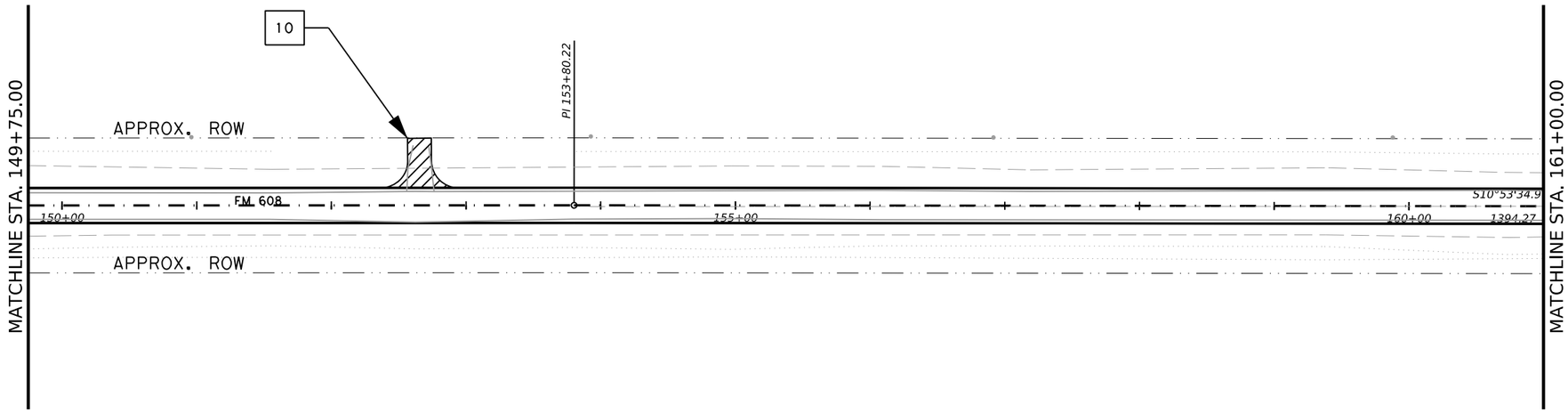
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

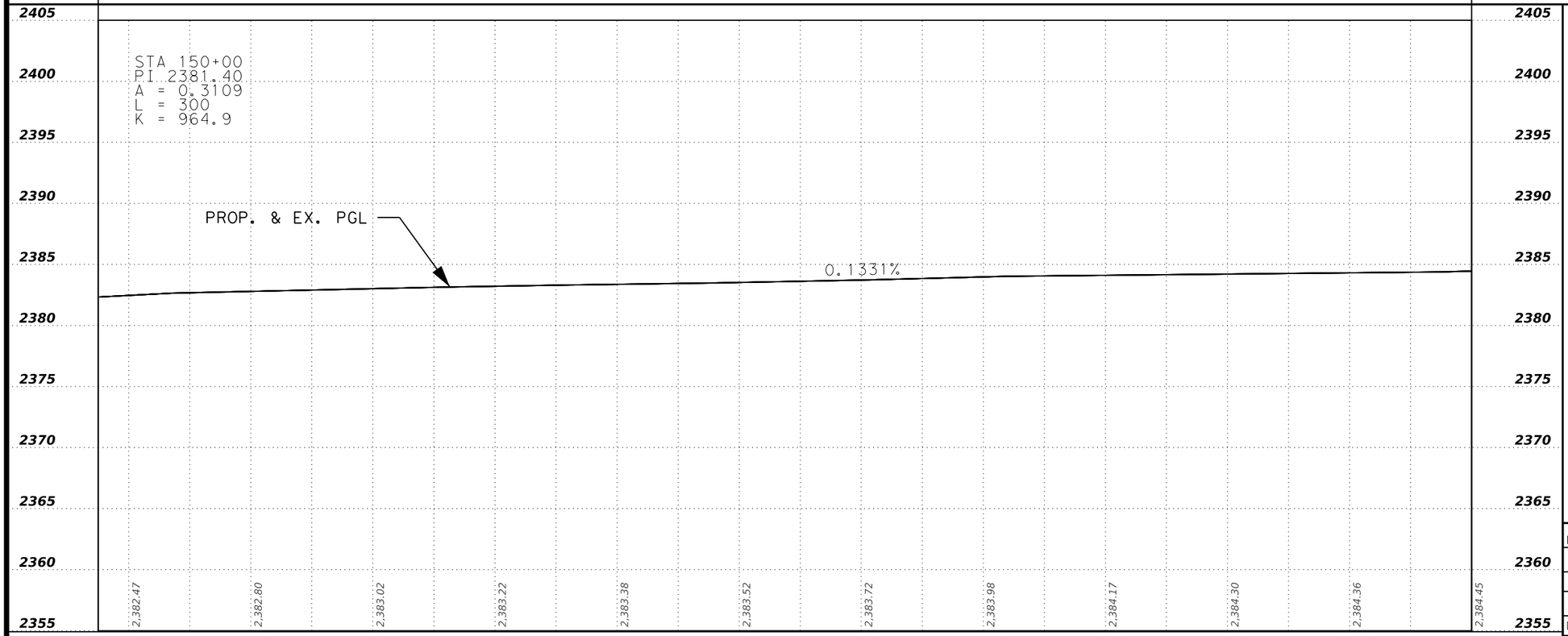
SCALE: 1" = 100' SHEET 14 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		56
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

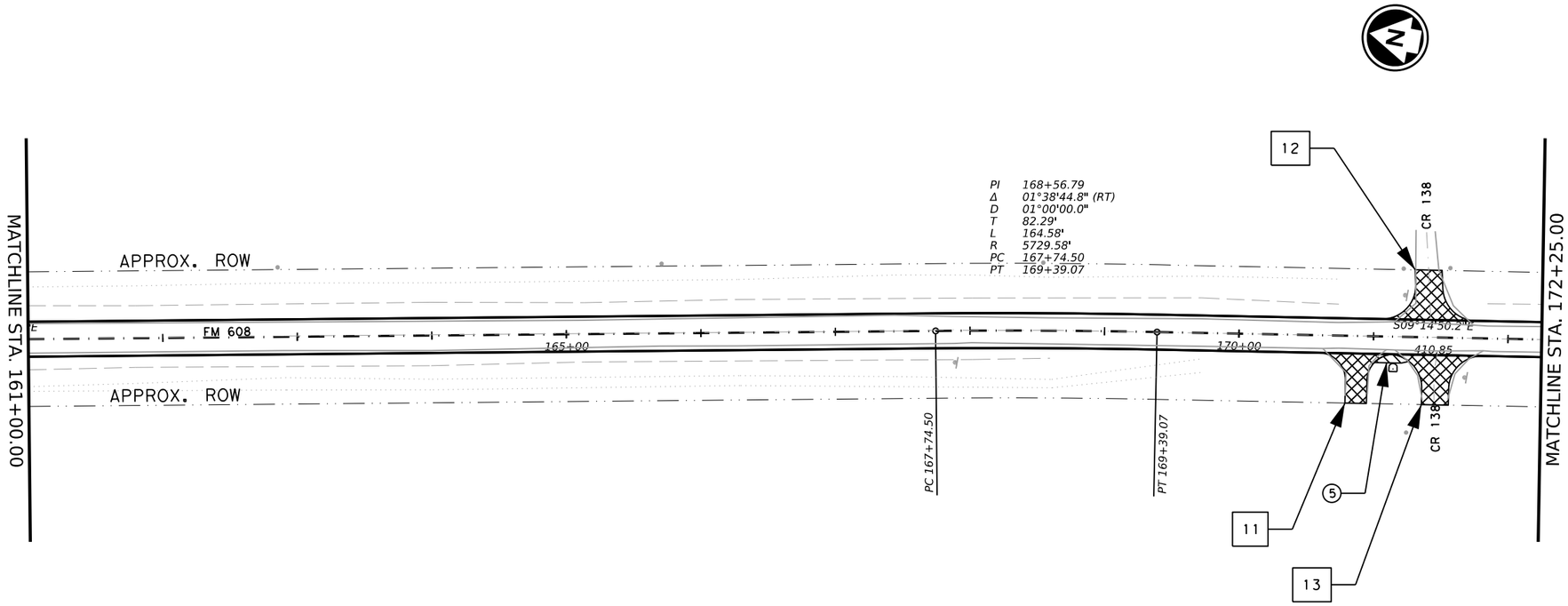
STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

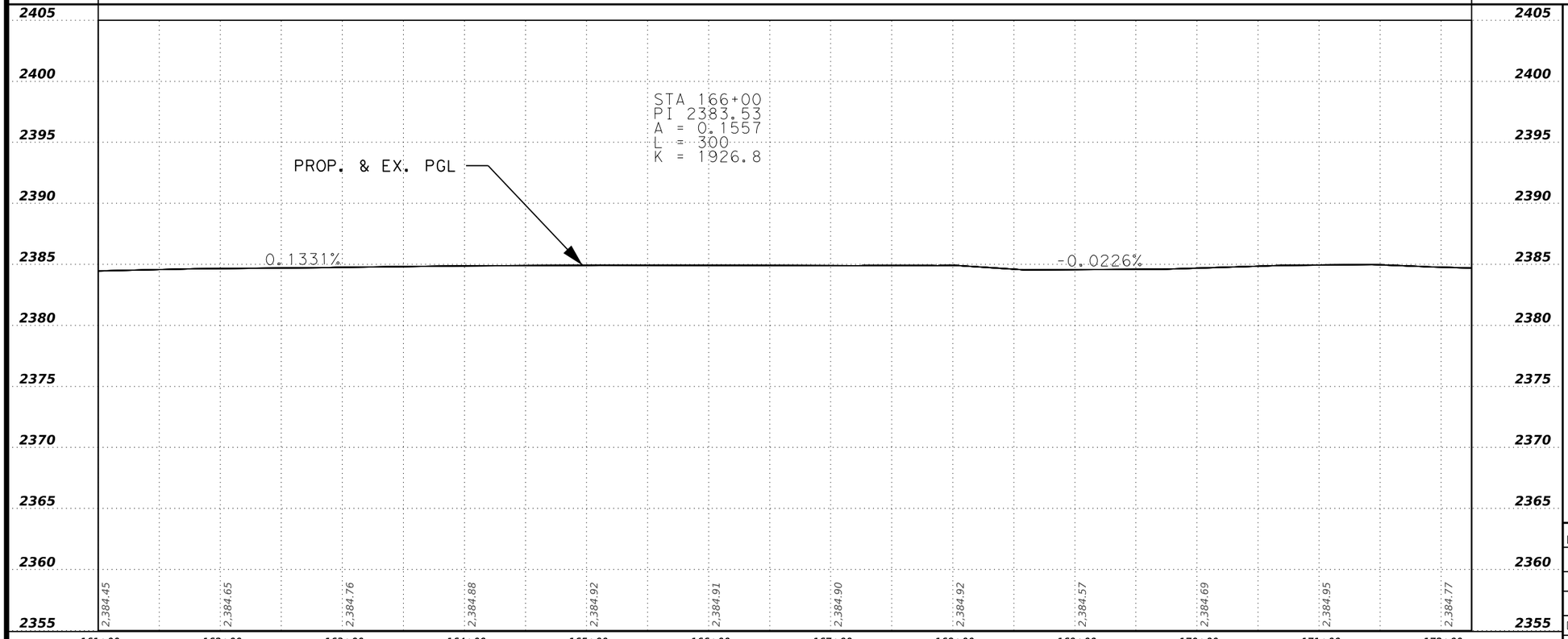
SCALE: 1" = 100' SHEET 15 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		57
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

Texas Department of Transportation

SCALE: 1" = 100' SHEET 16 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		58
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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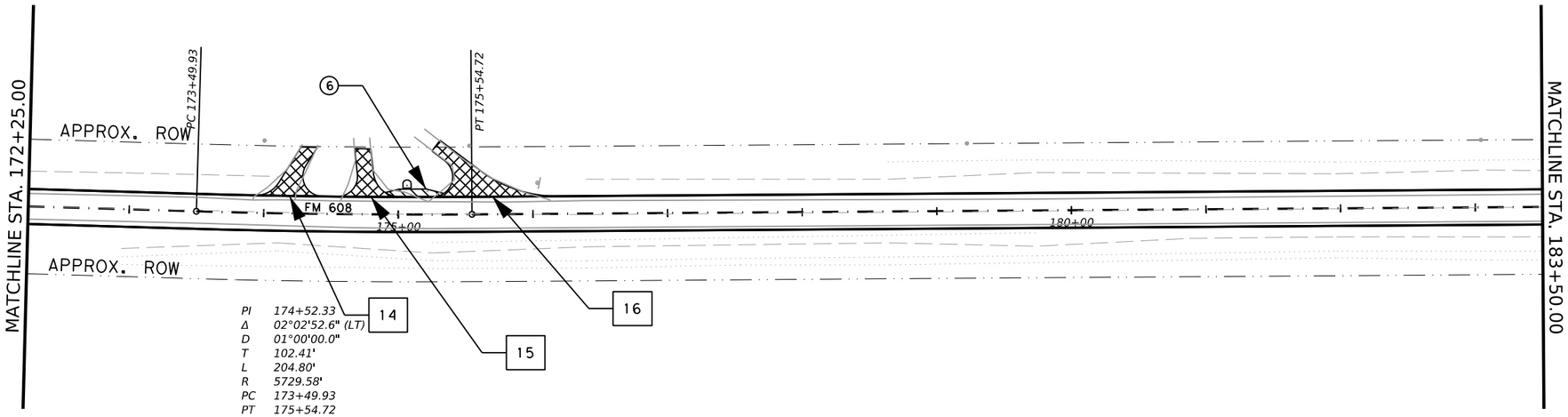
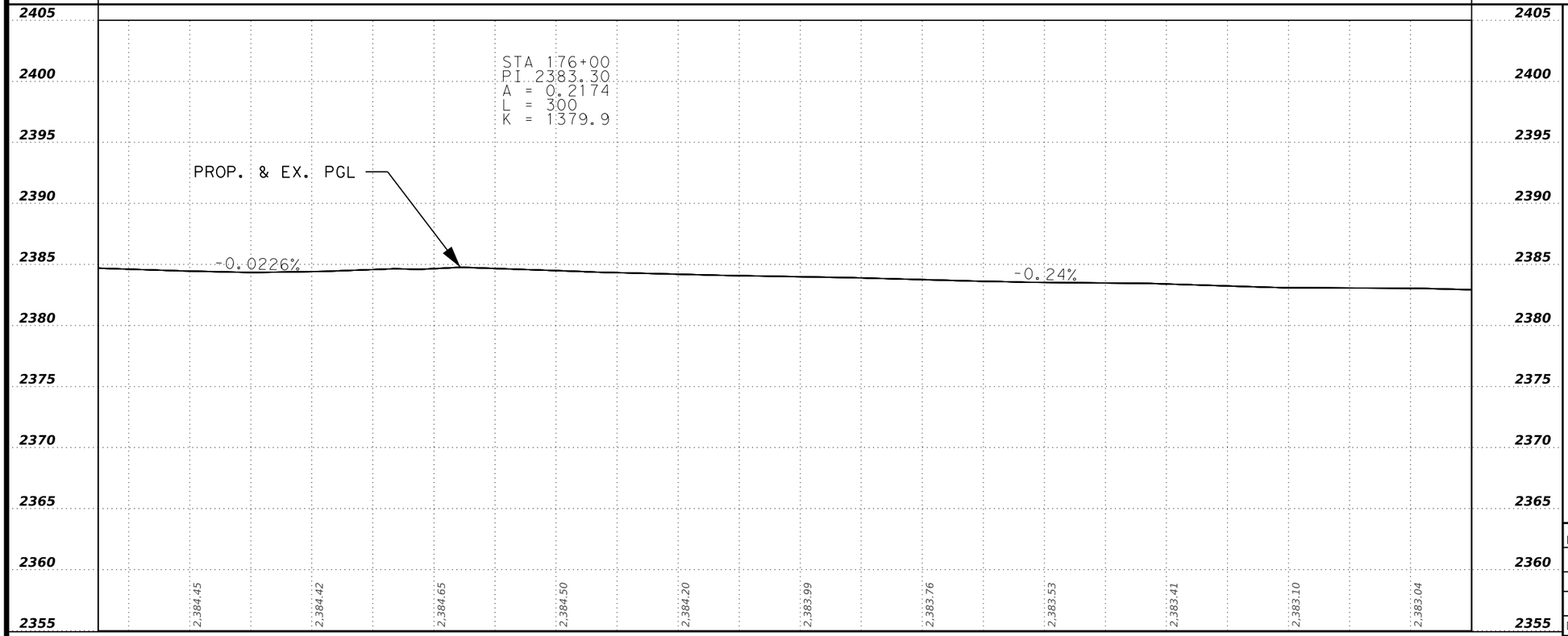


LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

SCALE: 1" = 100' SHEET 17 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		59
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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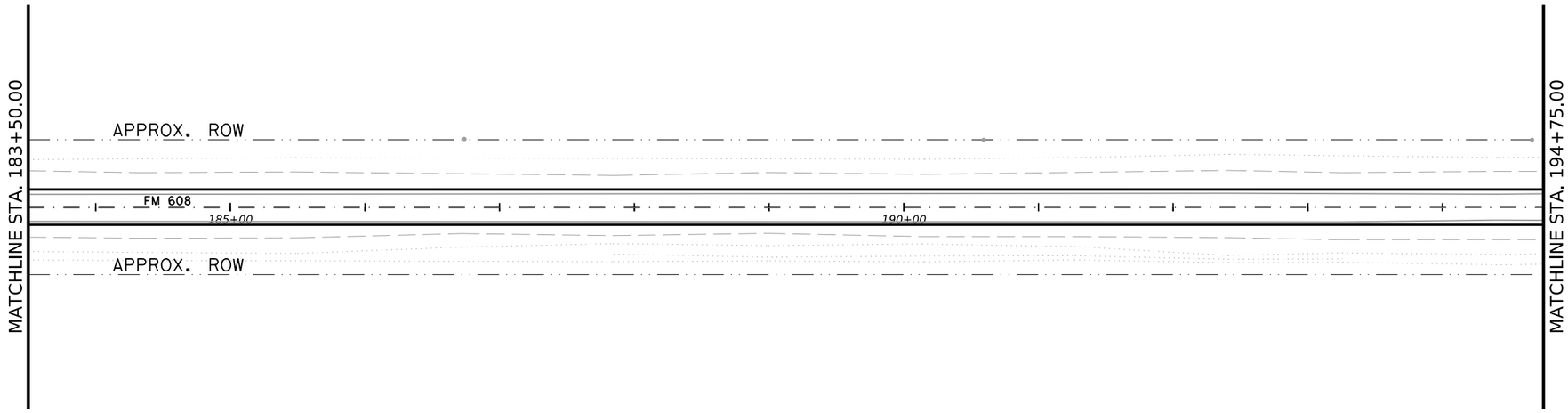
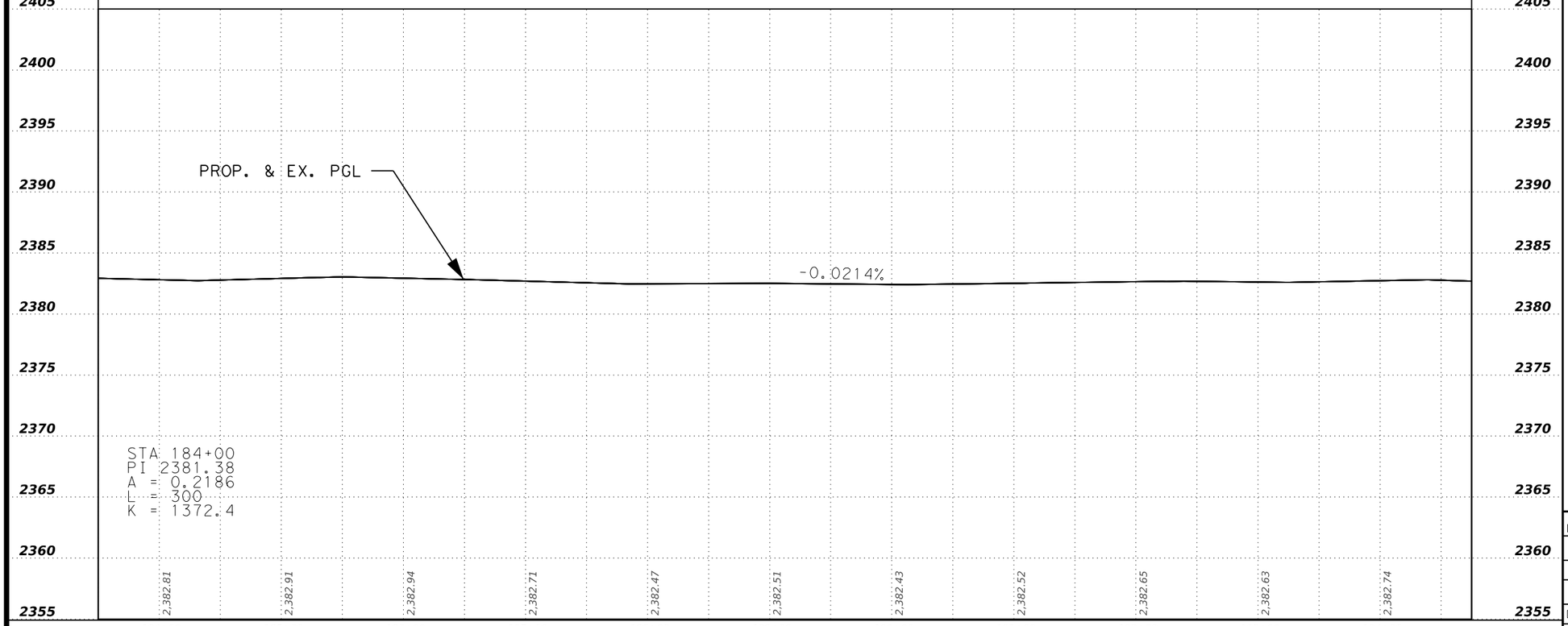


LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

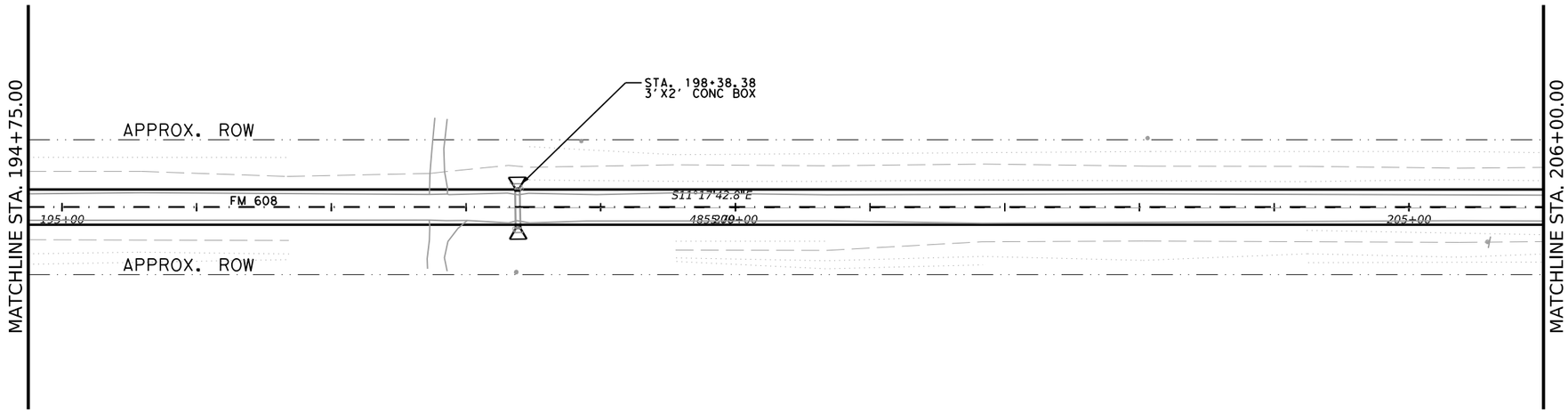
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

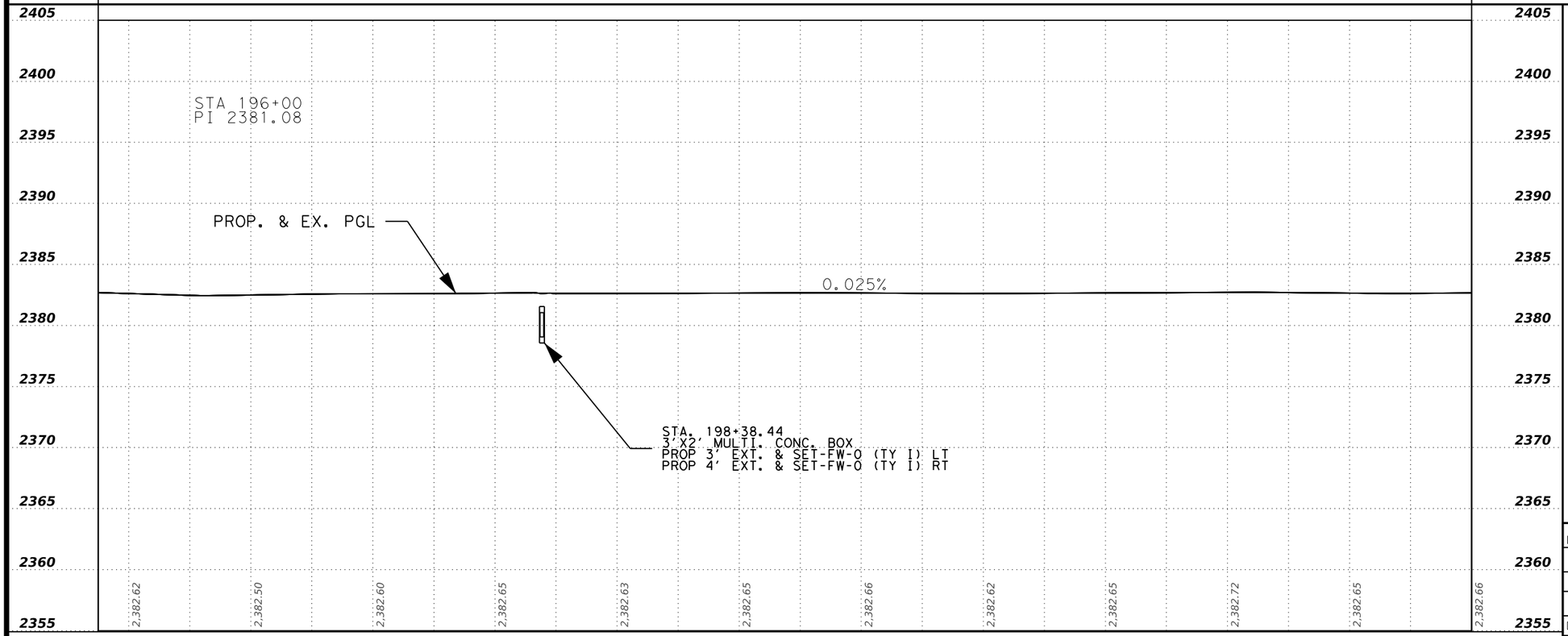
SCALE: 1" = 100' SHEET 18 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		60
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

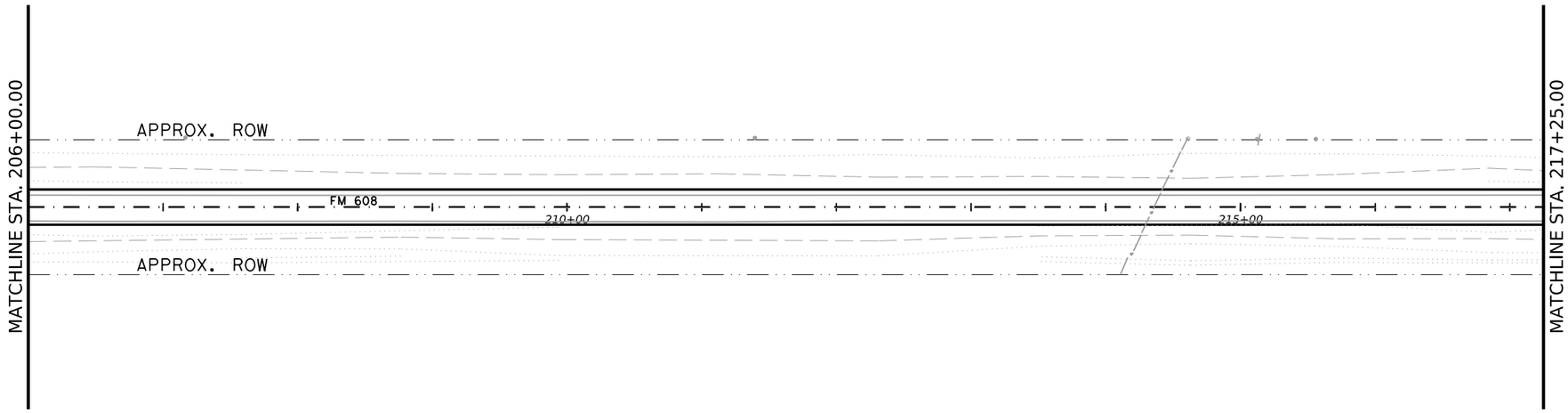
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

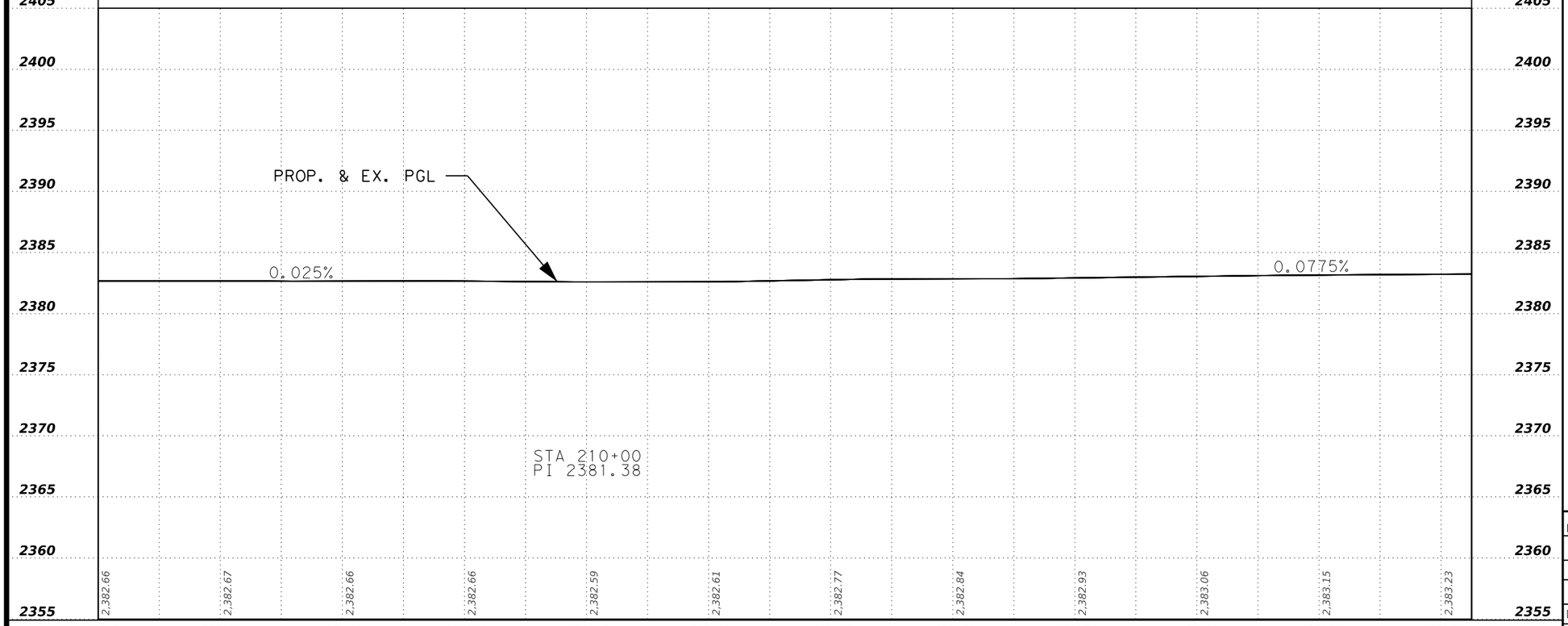
SCALE: 1" = 100' SHEET 19 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		61
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

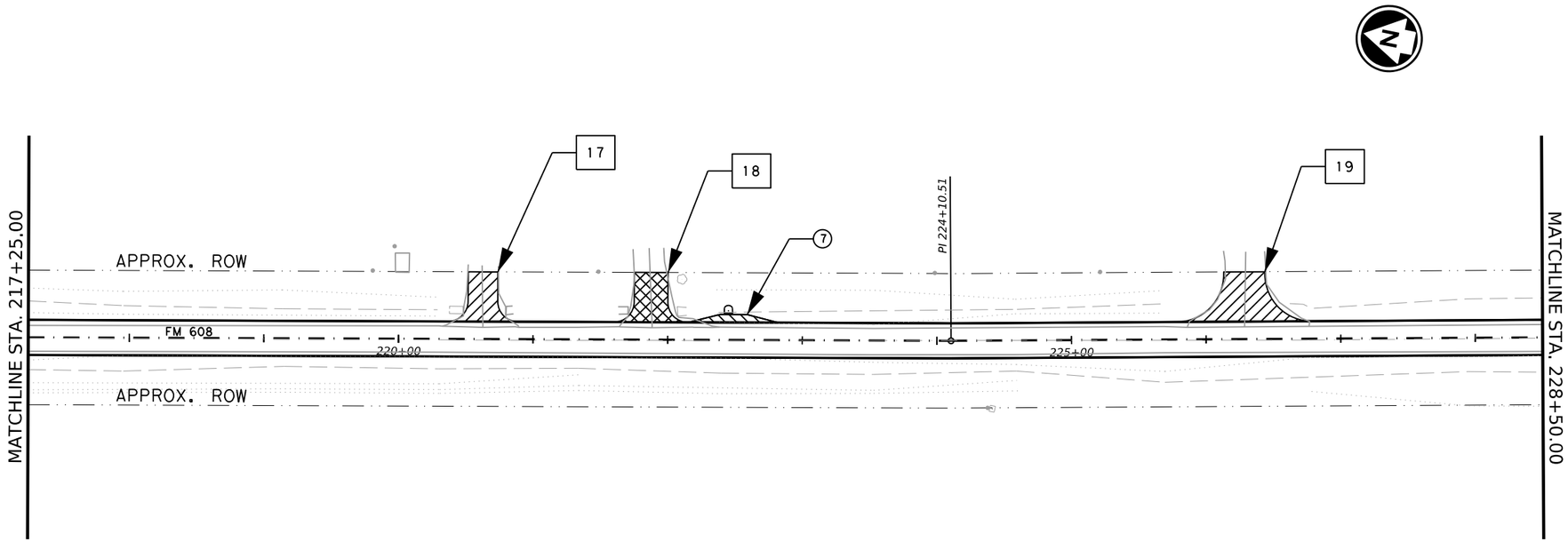
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

Texas Department of Transportation

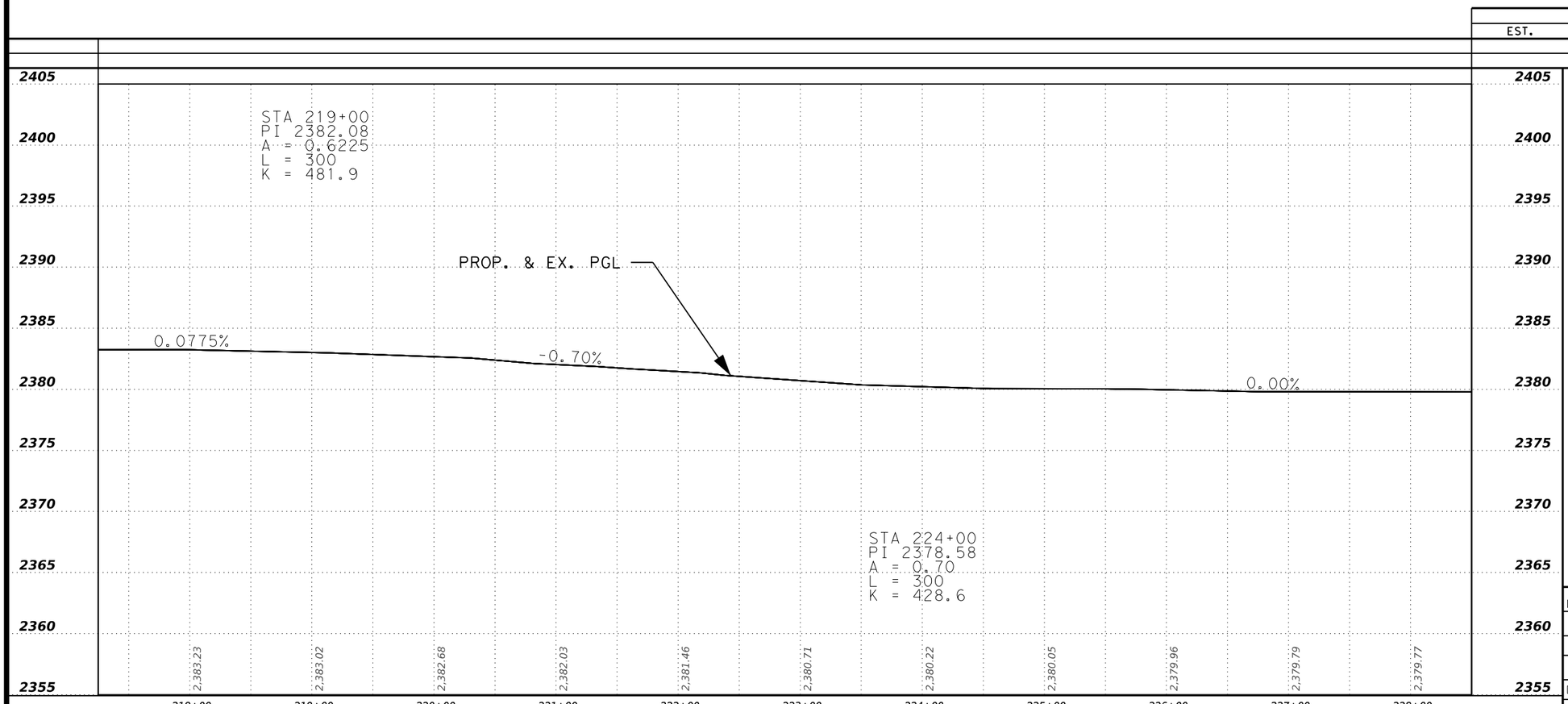
SCALE: 1" = 100' SHEET 20 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		62
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

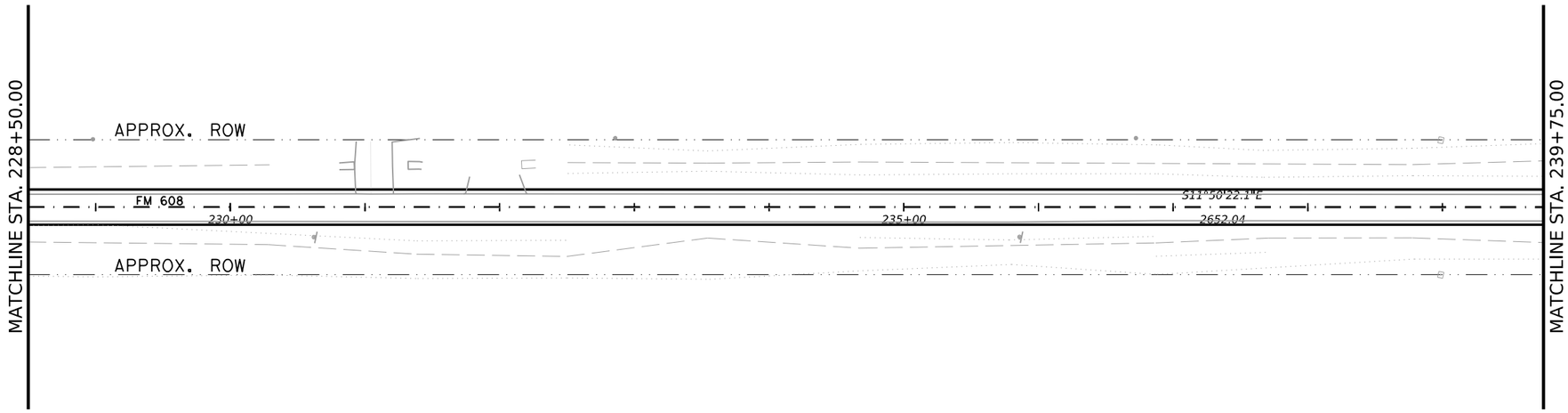
Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

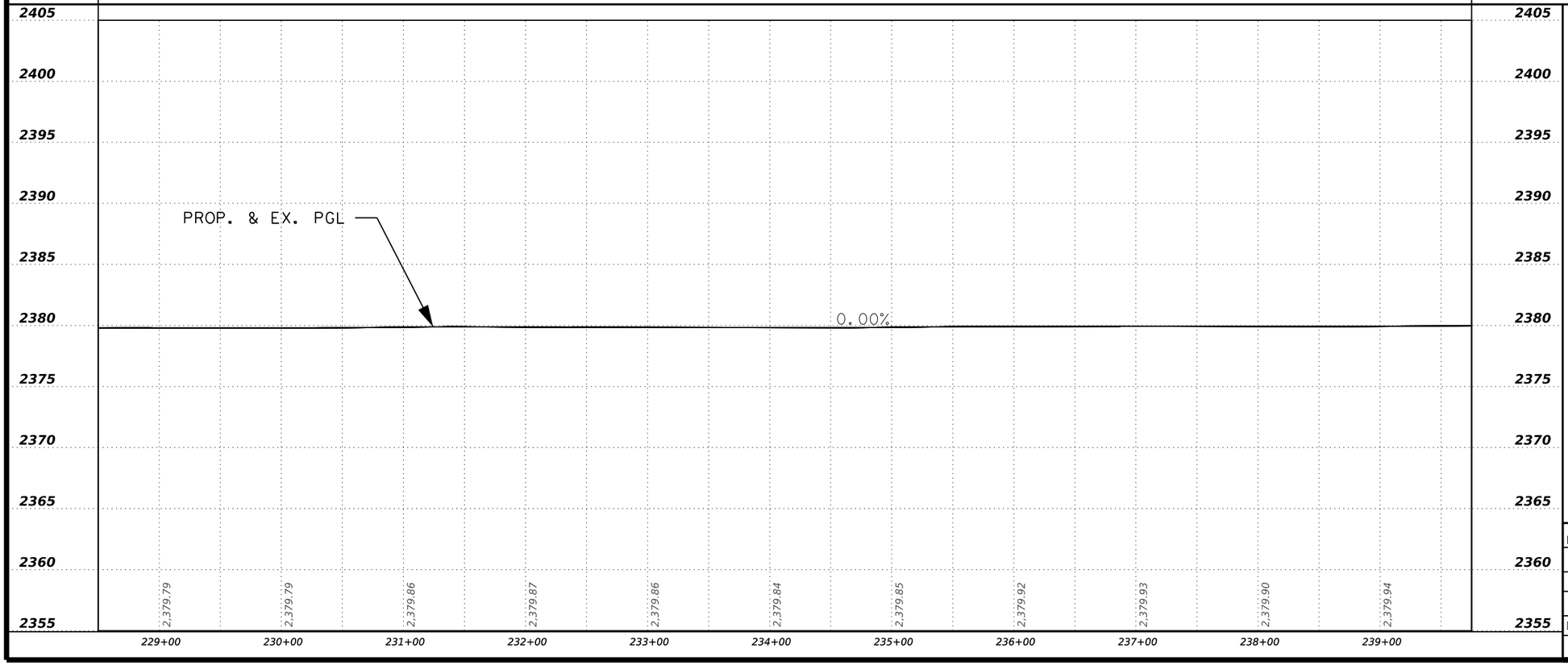
SCALE: 1" = 100' SHEET 21 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		63
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



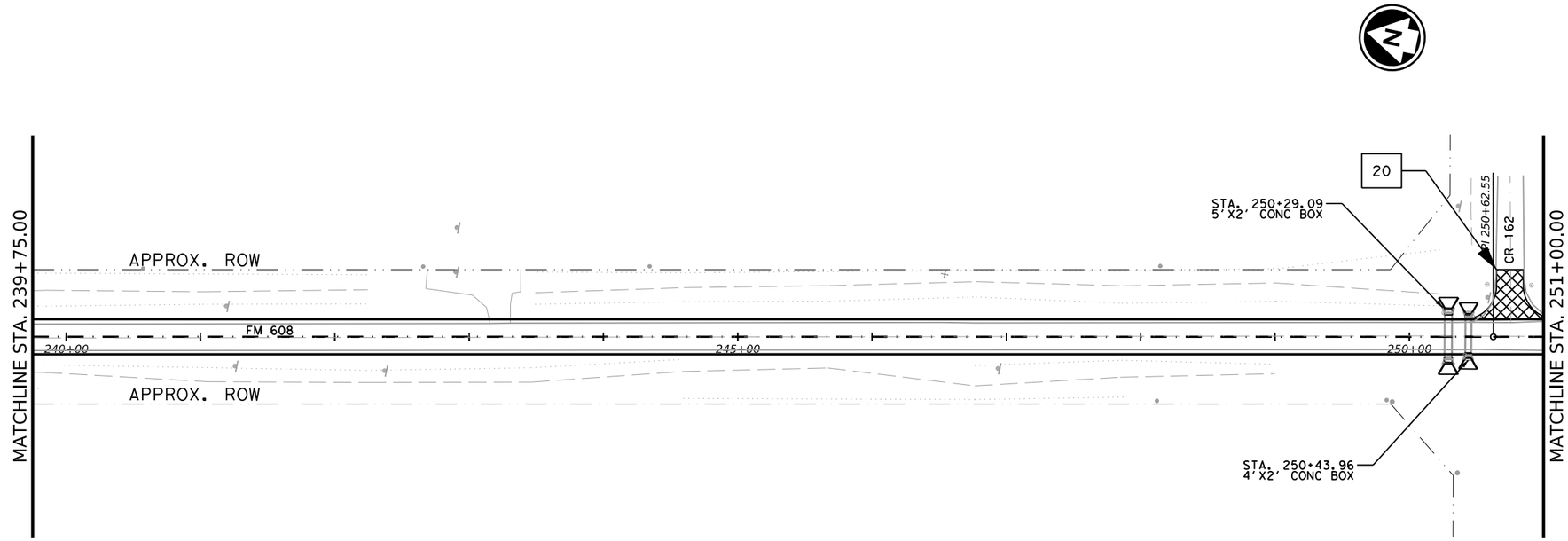
SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

PLAN & PROFILE

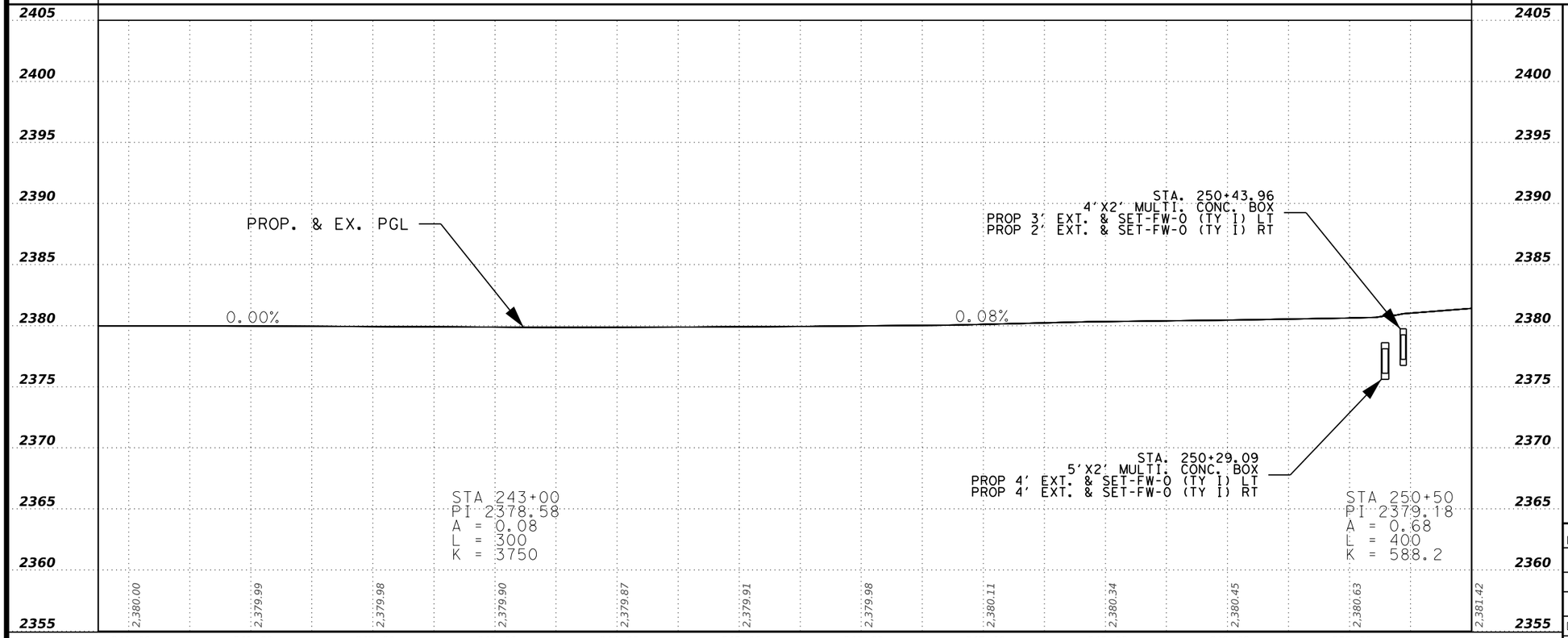
SCALE: 1" = 100' SHEET 22 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		64
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

Texas Department of Transportation

SCALE: 1" = 100' SHEET 23 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		65
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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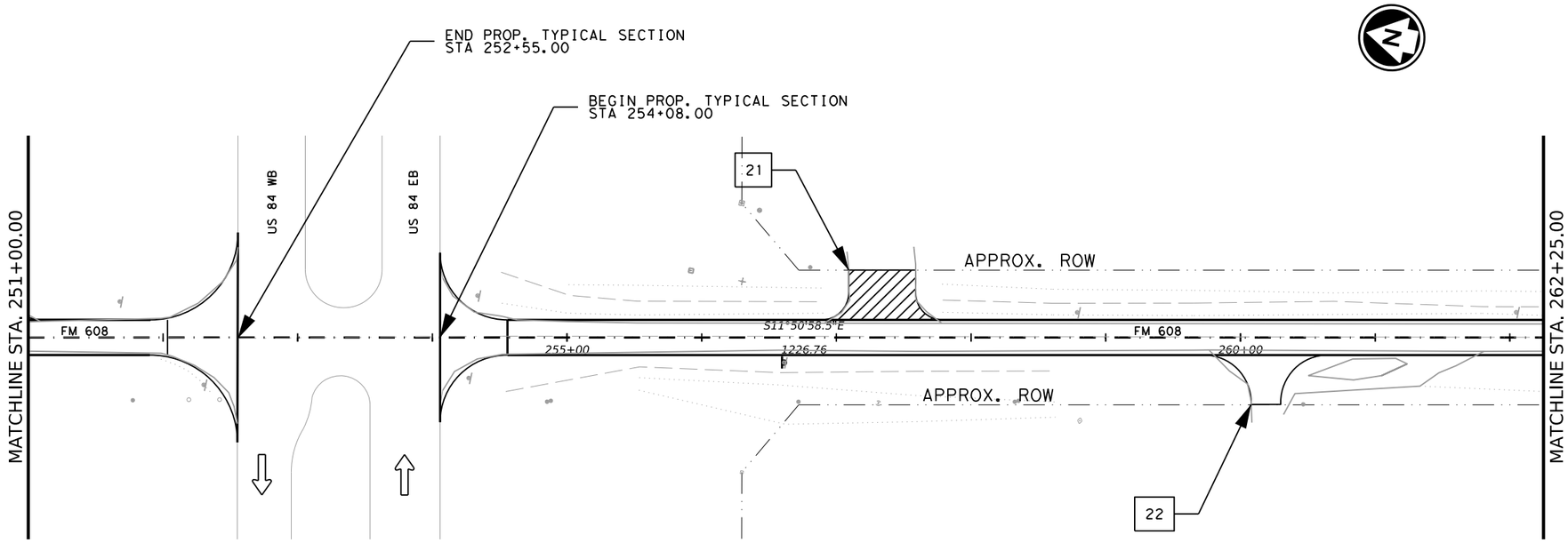
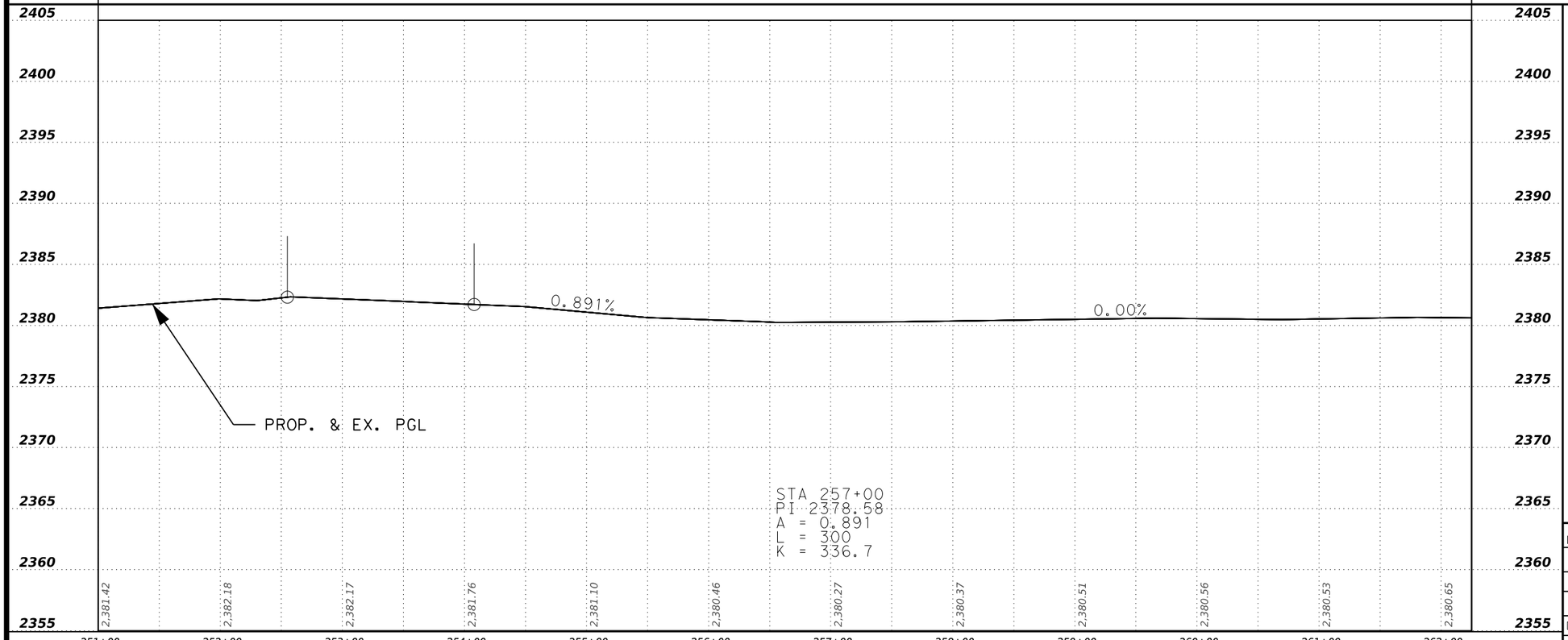


EXCEPTION: STA 252+55.00 TO STA 254+08.00

LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.

SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		2405



STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

SCALE: 1" = 100' SHEET 24 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		66
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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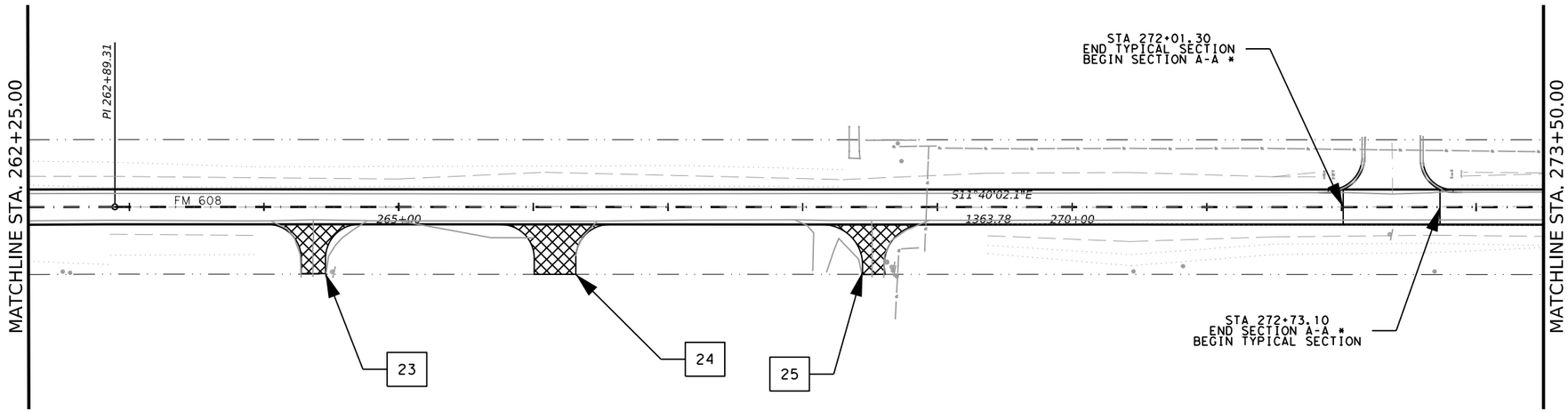
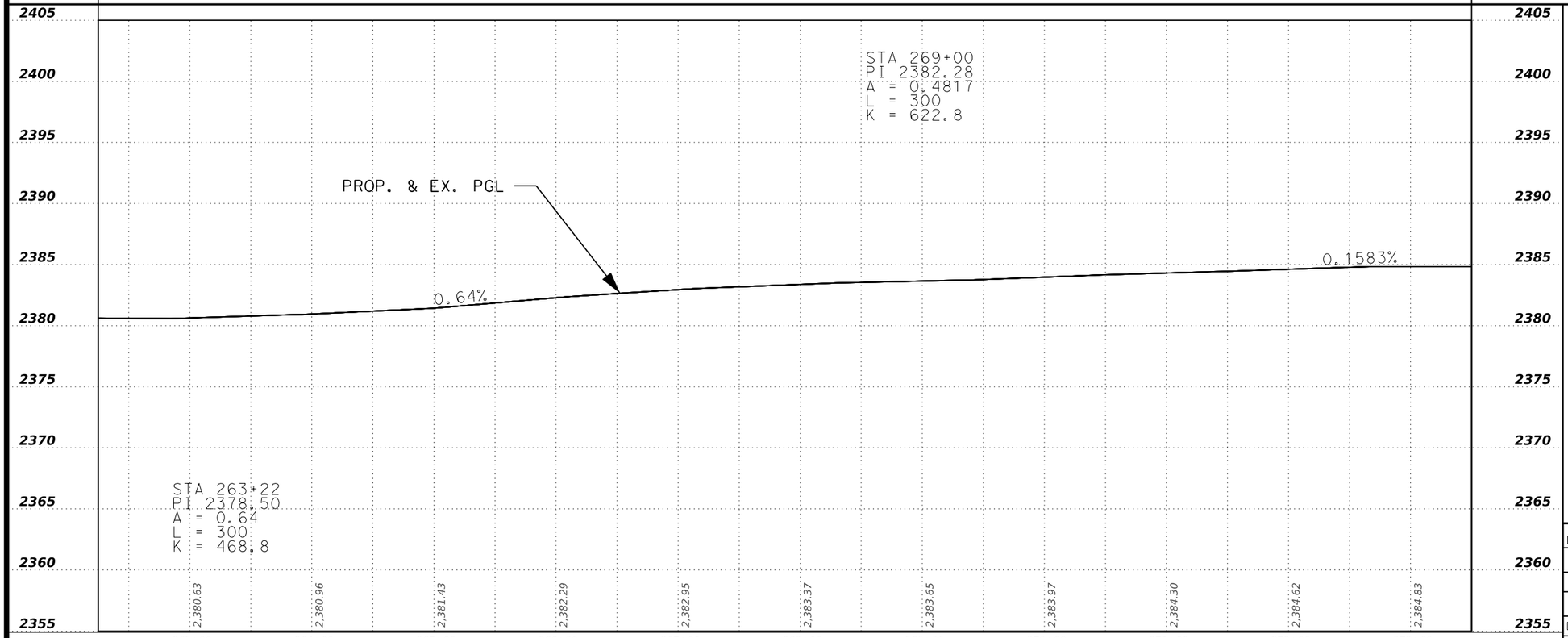


LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.

* SEE YOUNG FARM ESTATES DRIVEWAY DETAIL FOR SECTION A-A



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2405		

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

SCALE: 1" = 100' SHEET 25 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		67
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/3. Roadway/PLAN & PROFILE
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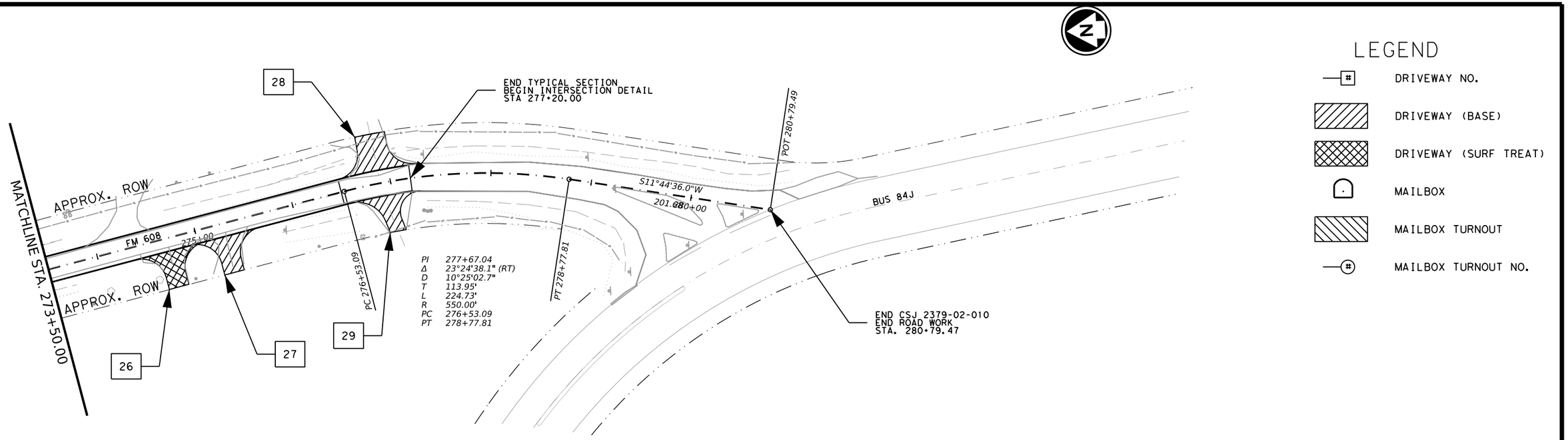
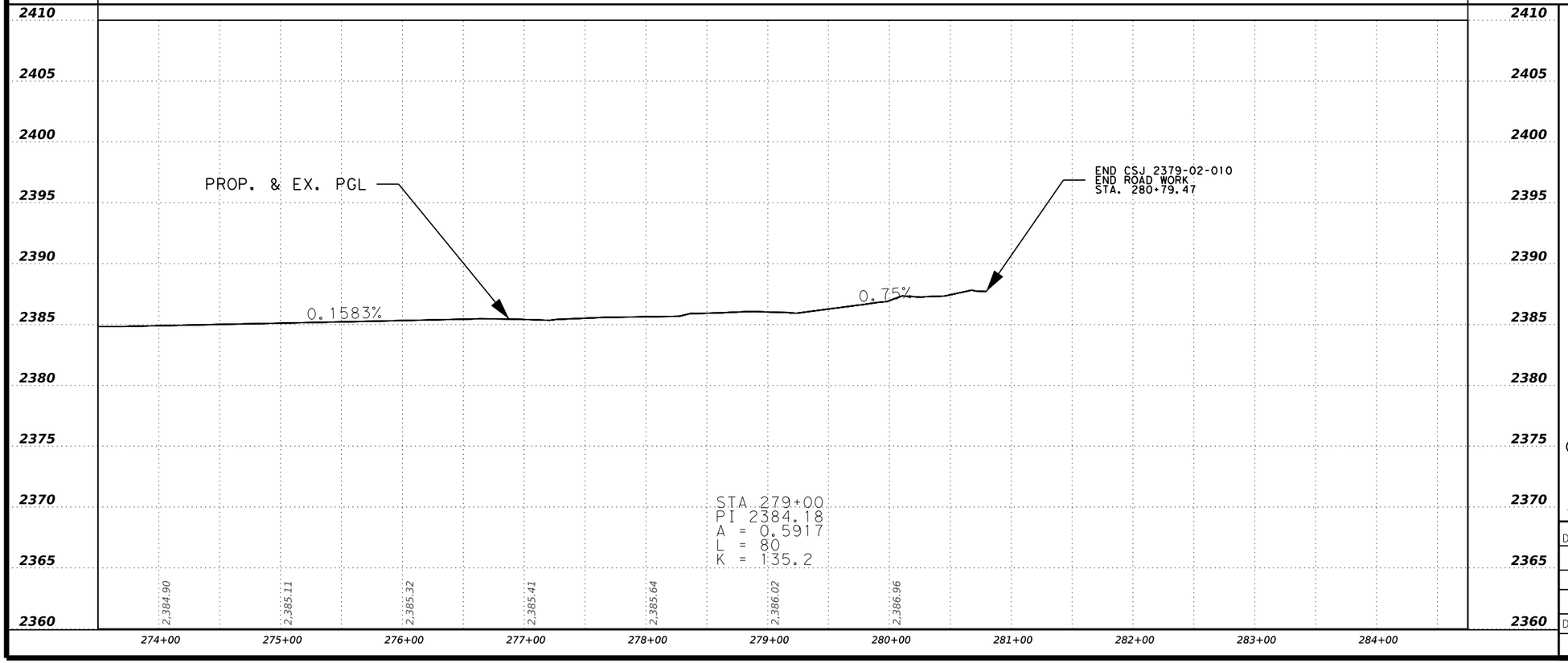


LEGEND

- DRIVEWAY NO.
- DRIVEWAY (BASE)
- DRIVEWAY (SURF TREAT)
- MAILBOX
- MAILBOX TURNOUT
- MAILBOX TURNOUT NO.



SHEET TOTALS		
EST.	UNIT	DESCRIPTION
2410		2410

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

PLAN & PROFILE

Texas Department of Transportation

SCALE: 1" = 100' SHEET 26 OF 26

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		68
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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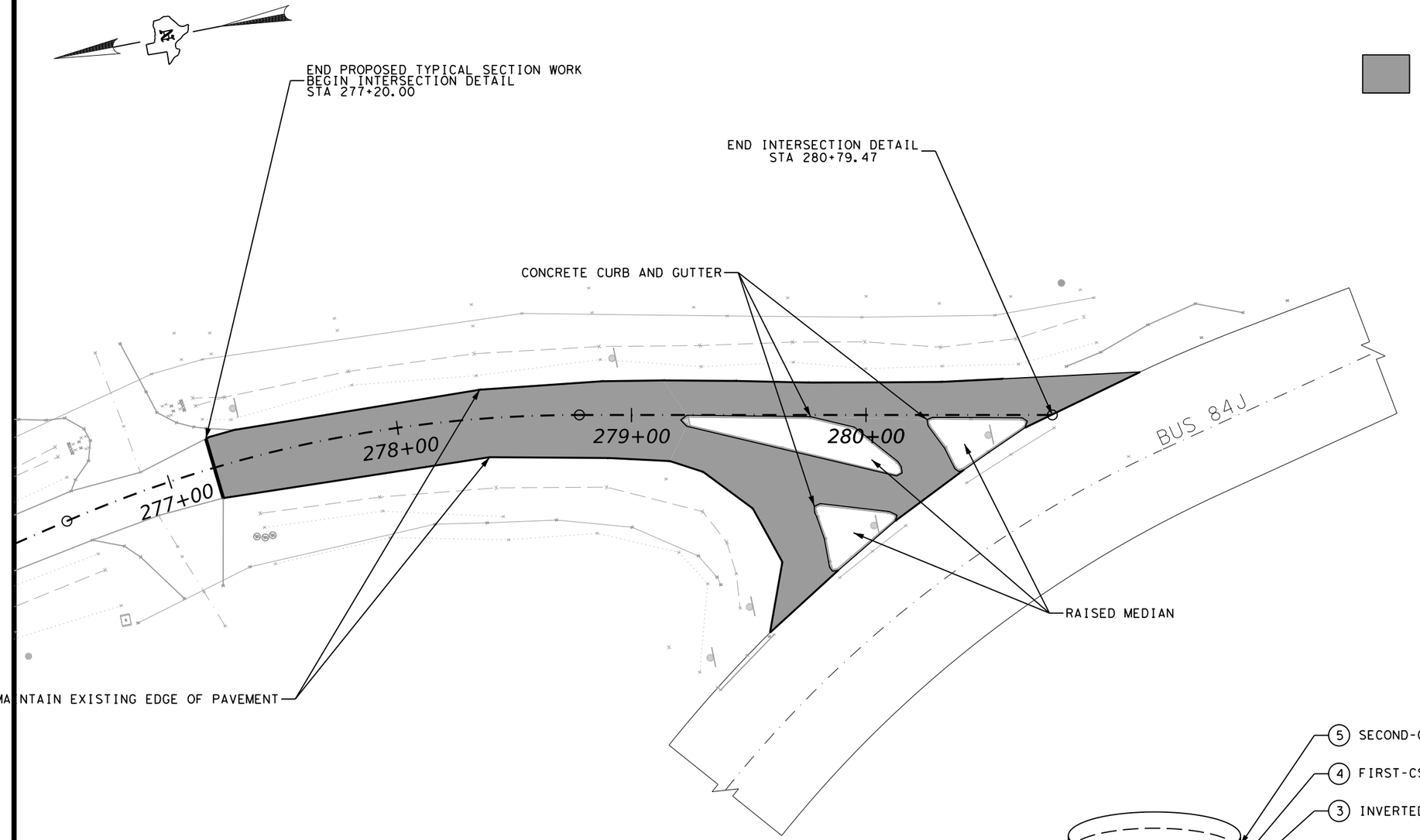
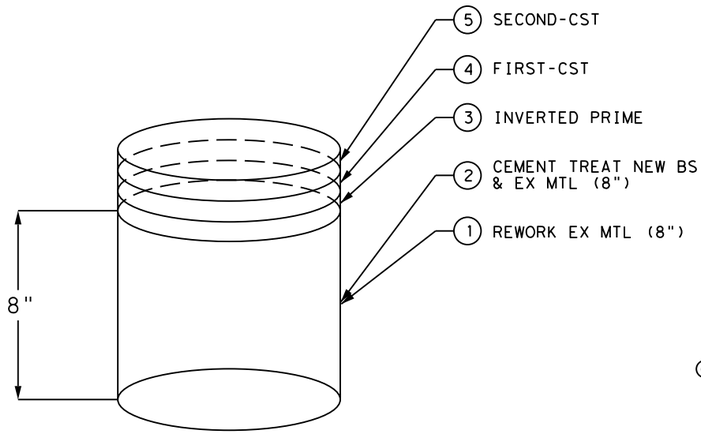


LEGEND

REWORK & BLEND EXISTING SURFACE & BASE MTRL (8")
CEMENT TREAT BLENDED MATERIAL (8")
PLACE INVERTED PRIME
PLACE TWO COURSE SURFACE TREATMENT

TOTAL ROAD WORK AREA: 1400 SY



PAVEMENT SECTION
NOT TO SCALE

GENERAL NOTES

1. MAINTAIN EXISTING LANE WIDTHS BETWEEN THE EDGE OF PAVEMENT AND EDGE OF CONCRETE.
2. REWORK THE EXISTING SURFACE AND BASE MATERIAL TO CREATE UNIFORM BLEND. ADD NEW FLEX BASE AS NEEDED TO MAINTAIN EXISTING PROFILE.
3. CEMENT TREAT THE BLENDED MATERIAL AT THE SAME RATE SHOWN ON QUANTITY SUMMARY.
4. INVERTED PRIME, FIRST COURSE AND SECOND COURSE SURFACE TREATMENT SHALL CONSIST OF THE ASPHALT AND AGGREGATES SHOWN ON THE TYPICAL SECTIONS.
5. CONCRETE CURB AND GUTTER SHALL REMAIN INTACT THROUGHOUT CONSTRUCTION. ANY DAMAGE THE CONCRETE AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

FM 608 & BUS 84J INTERSECTION DETAIL

 Texas Department of Transportation

SCALE: 1" = 50' SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		69
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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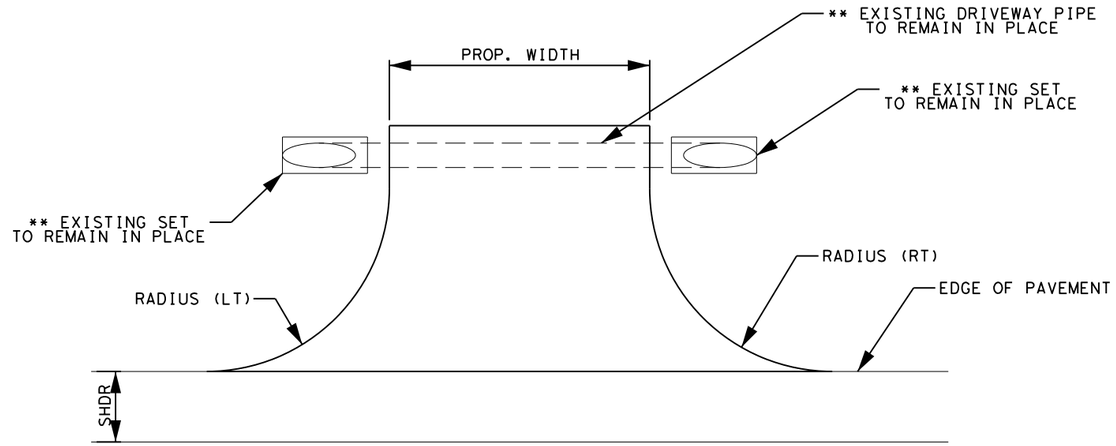
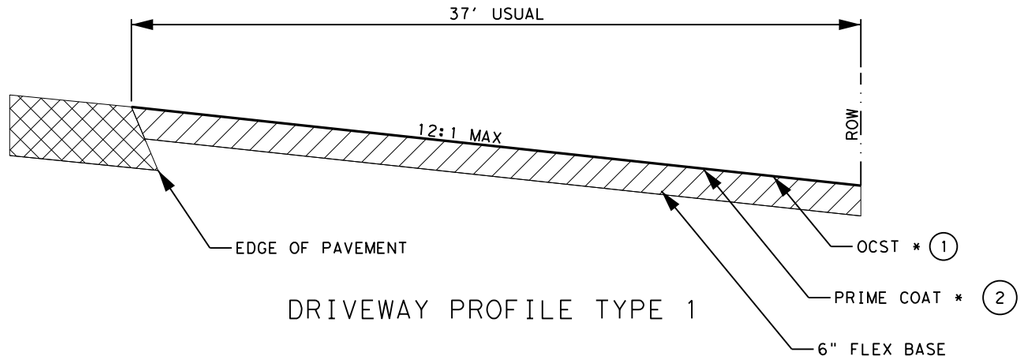
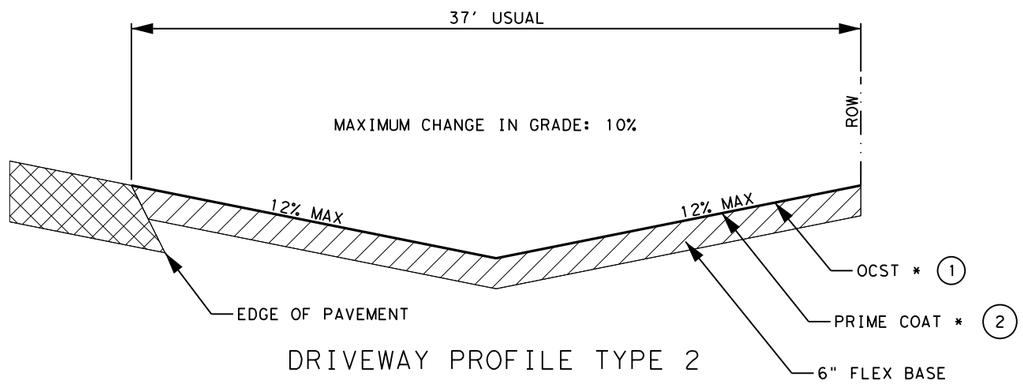


TYPICAL DRIVEWAY PLAN



DRIVEWAY PROFILE TYPE 1



DRIVEWAY PROFILE TYPE 2

DRIVEWAY NUMBER	FM 608 STATI	SIDE OF	CONSTRUCTI ON TYPE	AREA (SY)	WIDTH (LF)	RADIUS (LT)(L	RADIUS (RT)(L
1	40+00	LT	BASE	141	25	20	25
2	64+35	LT	BASE	112	20	25	25
3	66+58	LT	PAVED	166	22	40	40
4	87+07	LT	BASE	117	19	25	25
5	92+28	RT	PAVED	112	20	25	25
6	111+12	RT	BASE	81	15	20	20
7	112+15	RT	BASE	81	15	20	20
8	114+22	LT	BASE	92	15	25	25
9	144+86	RT	BASE	133	25	25	25
10	152+65	LT	BASE	91	18	20	20
11	170+88	RT	PAVED	85	16	20	20
12	171+42	LT	PAVED	112	20	25	25
13	171+48	RT	PAVED	112	20	25	25
14	174+18	LT	PAVED	69	12	20	15
15	174+76	LT	PAVED	62	12	15	20
16	175+60	LT	PAVED	125	12	15	95
** 17	220+62	LT	BASE	101	22	15	15
** 18	221+88	LT	PAVED	114	25	15	15
19	226+28	LT	BASE	184	30	35	35
20	250+75	LT	PAVED	112	20	25	25
21	257+34	LT	BASE	224	50	20	20
22	260+19	RT	BASE	148	22	35	35
23	264+36	RT	PAVED	103	18	25	25
24	266+16	RT	PAVED	157	30	25	25
25	268+51	RT	PAVED	106	16	30	30
26	274+70	RT	PAVED	112	20	25	25
27	275+29	RT	BASE	112	20	25	25
28	276+90	LT	BASE	151	30	25	25
29	276+90	RT	BASE	99	16	20	30

* FOR PAVED DRIVEWAYS ONLY

(1) AGGR(TY-B GR-4 SAC-B) & ASPH(MULTI-OPT)

(2) PRIME COAT (RC-250)

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

DRIVEWAY DETAILS

 Texas Department of Transportation

NOT TO SCALE SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		70
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/3. Roadway/DRIVEWAY DETAILS.dgn
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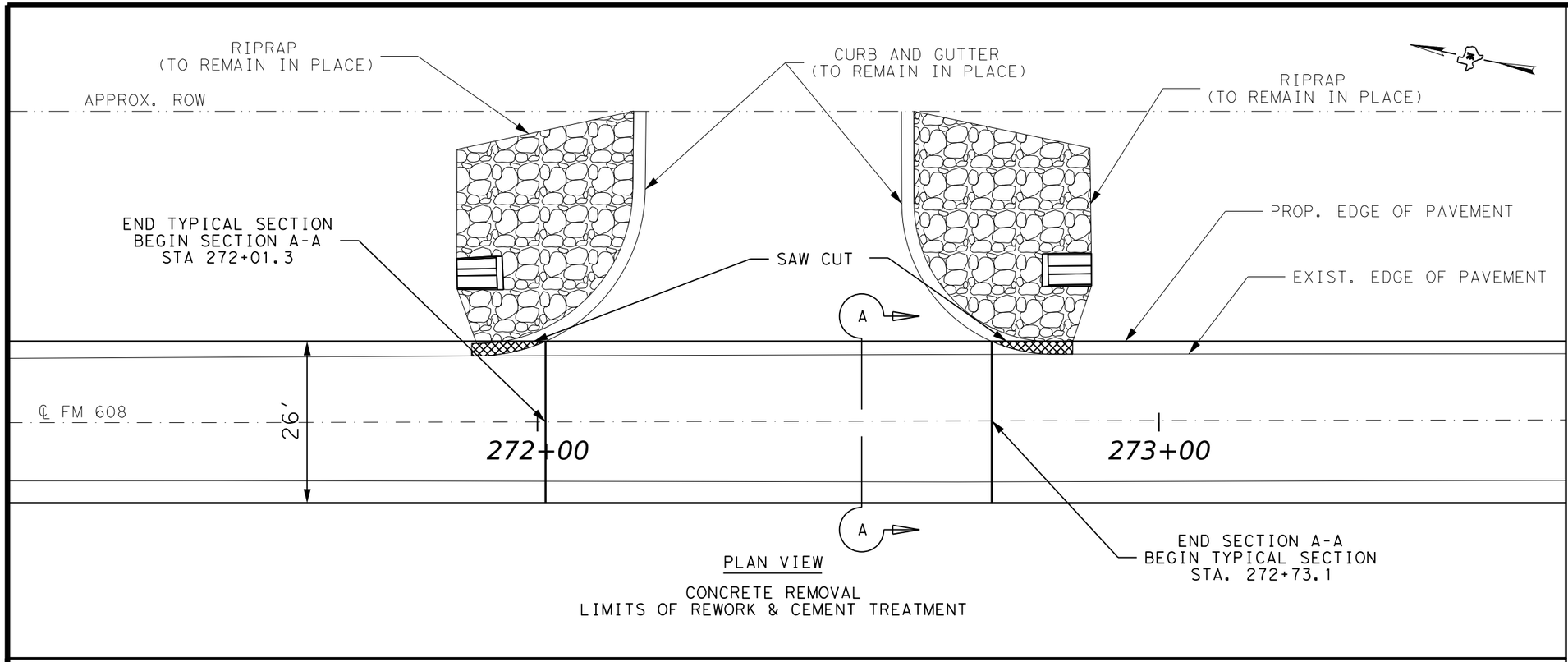
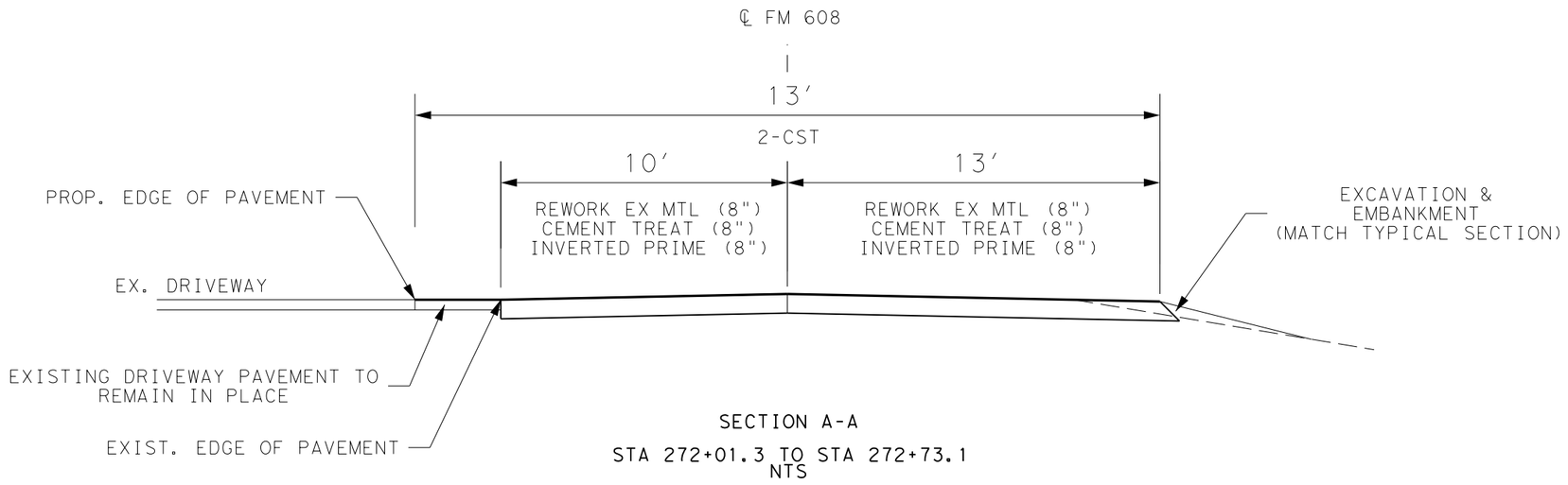


PLAN VIEW

CONCRETE REMOVAL
LIMITS OF REWORK & CEMENT TREATMENT



SECTION A-A

STA 272+01.3 TO STA 272+73.1
NTS

ASPHALT AND AGGREGATES FOR INVERTED PRIME, FIRST COURSE, AND SECOND COURSE SURFACE TREATMENTS SHALL BE AS SHOWN ON THE TYPICAL SECTIONS. QUANTITIES FOR SECTION A-A ARE SHOWN IN THE QUANTITY SUMMARY.

GENERAL NOTES

1. SAW CUT & REMOVE CONCRETE WITHIN 13' OF THE CENTERLINE. CONCRETE CURB AND GUTTER OUTSIDE THE SAW CUT LINE SHALL REMAIN IN PLACE. CONCRETE REMOVAL SHALL BE CONSIDERED SUBSIDIARY TO ITEM 251.
2. EXISTING DRIVEWAY PAVEMENT SHALL REMAIN IN PLACE.

CONCRETE TO BE REMOVED

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

YOUNG FARM ESTATES DRIVEWAY DETAIL

 Texas Department of Transportation

NOT TO SCALE SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

71

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/3. Roadway/YOUNG FARM ESTATES DRIVEWAY DETAIL.dgn
DATE: 6/6/2023 10:53:15 AM

MAILBOX TURNOUT NO.	FM 608 STATION	SIDE OF ROAD	TURNOUT TYPE	NO. OF MAILBOXES	MAILBOX TYPE	MAILBOX SIZE	TURNOUT AREA (SY)
1	40+75	LT	CASE 1	1	2	M	29
2	92+80	LT	CASE 1	1	2	M	29
3	111+76	RT	CASE 1	1	2	M	27
4	114+85	LT	CASE 1	1	2	M	29
5	171+15	RT	CASE 1	1	2	M	13
6	175+06	LT	CASE 1	1	2	M	23
7	222+45	LT	CASE 1	1	2	M	29

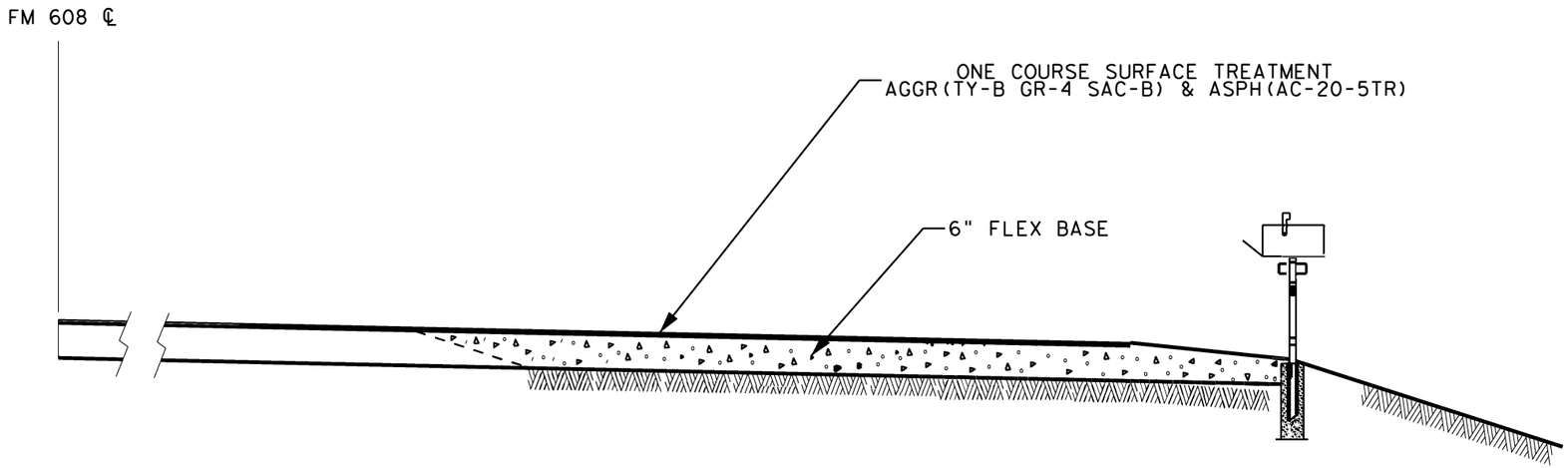
SUMMARY OF MAILBOX ITEMS		
LOCATION	530	560
	TURNOUTS (SURF TREAT)	MAILBOX INSTALL-S (TWG-POST) TY 2
	SY	EA
SHEET TOTALS	179	7

GENERAL NOTES

1. SEE MBP-22 STANDARD SHEETS FOR MAILBOX TYPE AND SIZE INFORMATION.

2. SEE MB(1)-21 FOR MAILBOX TURNOUT DETAILS.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING MAILBOX IDENTIFICATION INFORMATION OF EACH MAILBOX PRIOR TO REMOVAL. MARK THE NEW MAILBOXES WITH THE SAME INFORMATION AFTER INSTALLATION, ACCORDING TO MB-21 STANDARD SHEETS.



MAILBOX TURNOUT SECTION DETAIL

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

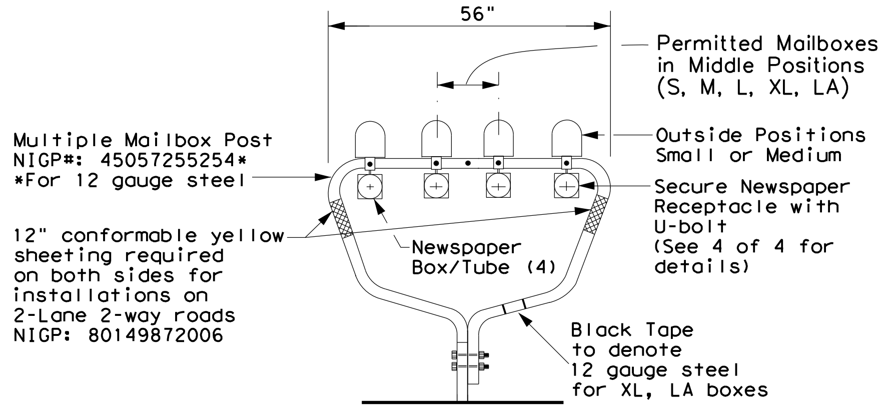
MAILBOX TURNOUT DETAILS

 Texas Department of Transportation

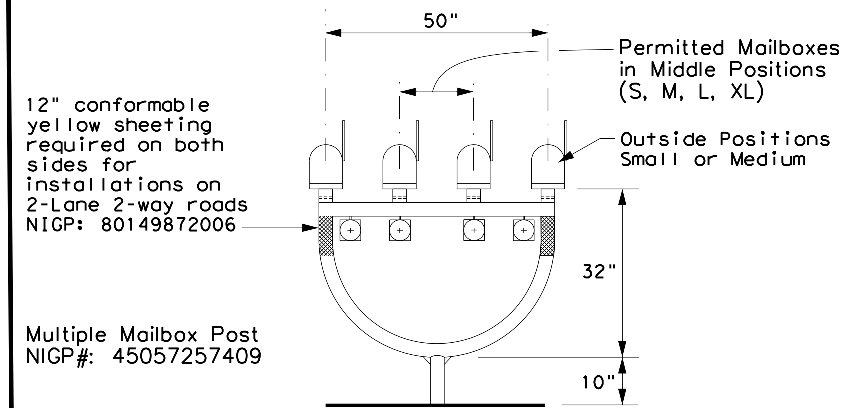
NOT TO SCALE SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		72
DISTRICT	CONTROL / SECTION / JOB		
ABL	2379 / 02 / 010		

TYPE 1 - MULTIPLE



TYPE 4 - MULTIPLE



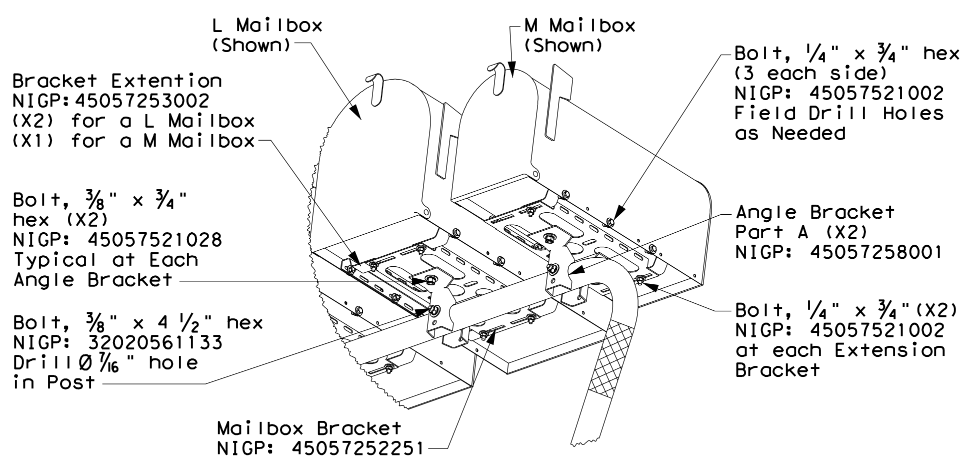
MAILBOX SIZES

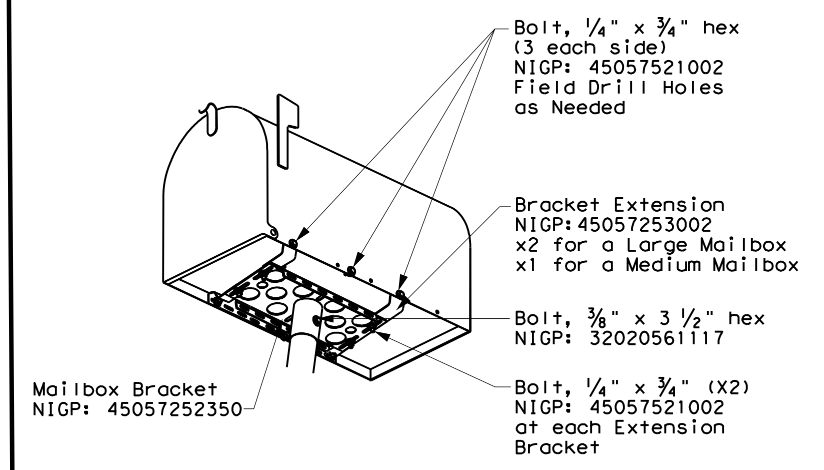
MAILBOX SIZE	TYPICAL DIMENSIONS LENGTH	WIDTH	HEIGHT	MAX ** WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

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

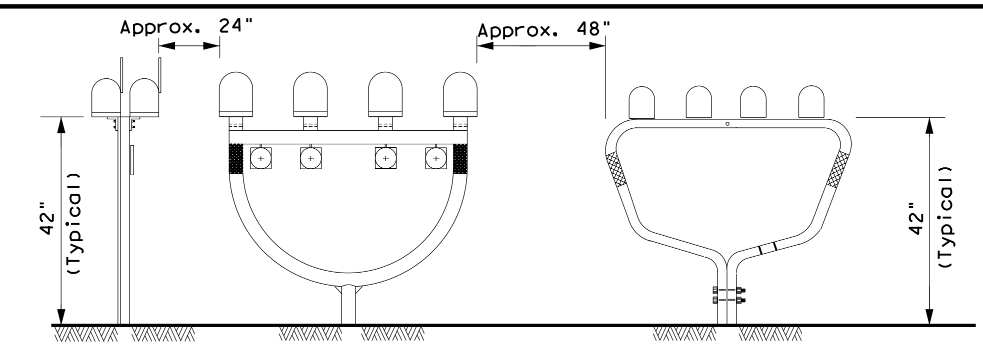
GENERAL NOTES:

1. 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.
2. 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.



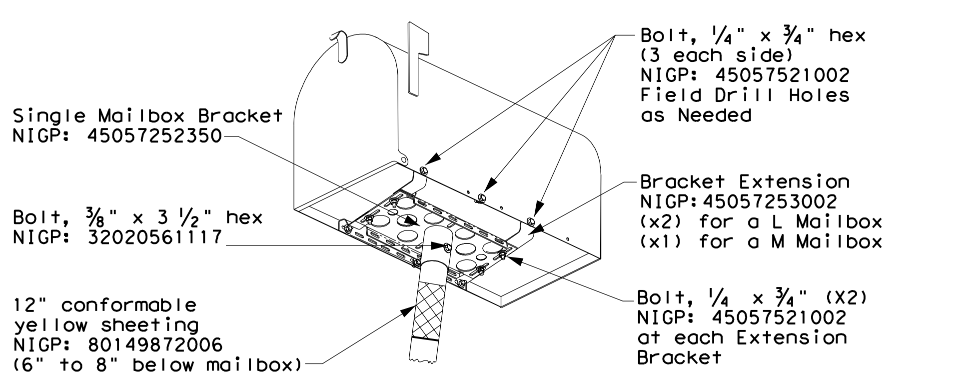


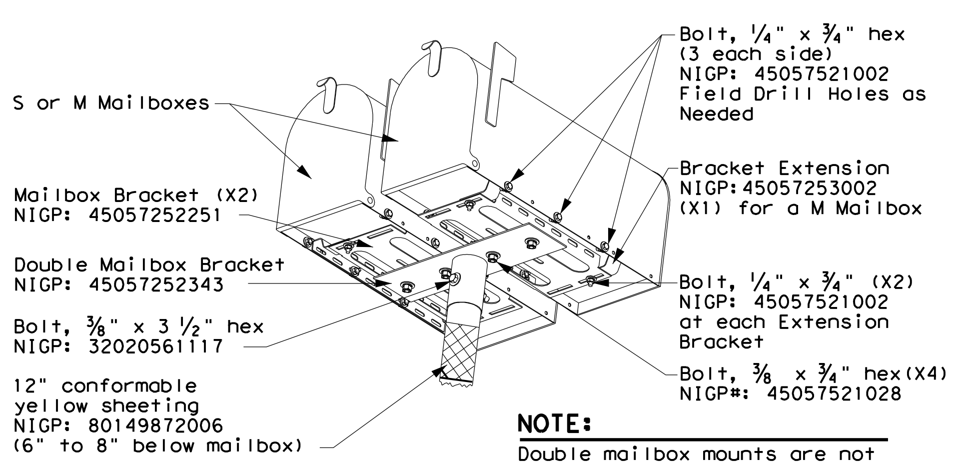
TYPICAL INSTALLATION MEASUREMENTS



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

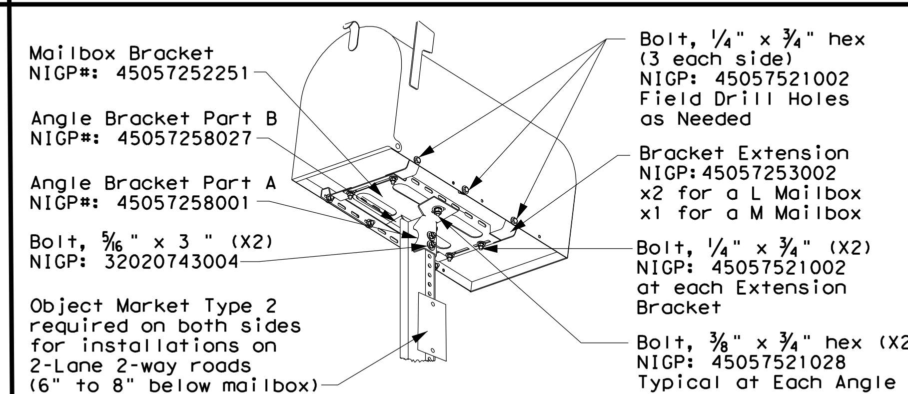
TYPE 2 and 4 - SINGLE/DOUBLE

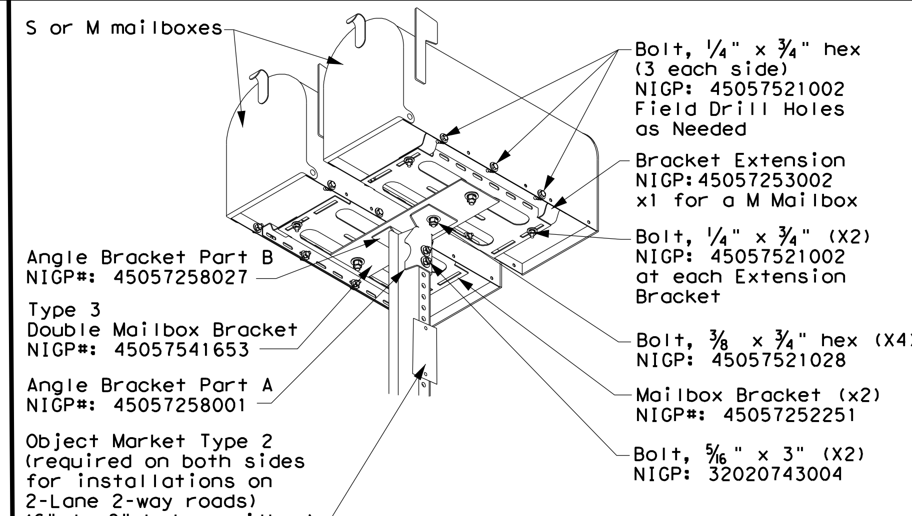




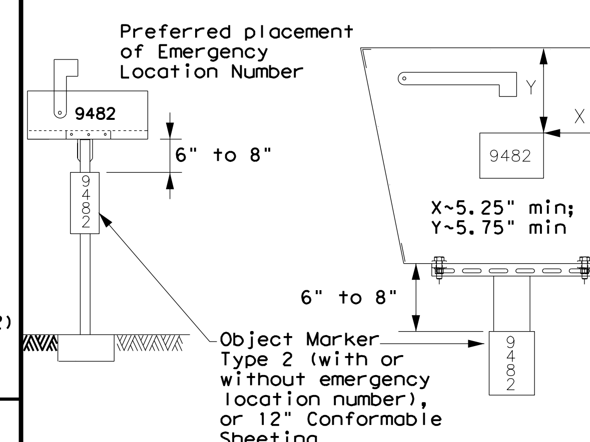
NOTE:
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





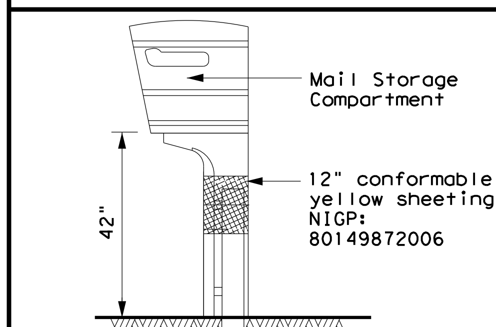
PLACEMENT OF EMERGENCY LOCATION NUMBER



NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. 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.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation — Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST ABL		COUNTY NOLAN	SHEET NO. 73

DATE: 6/5/2023 6:58:28 PM
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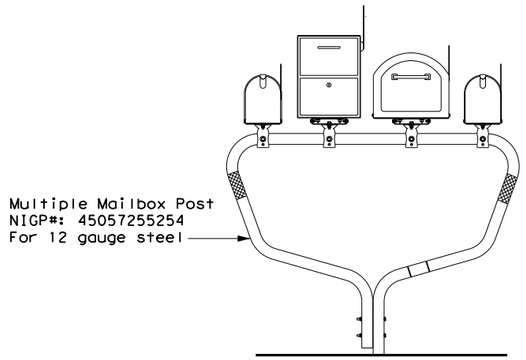
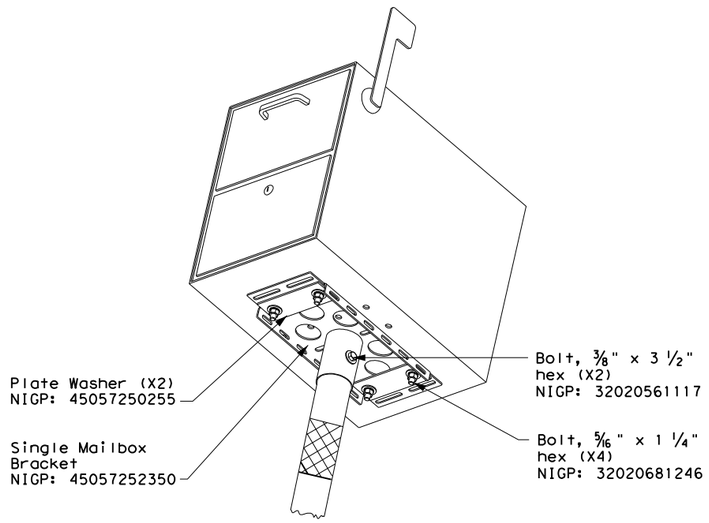
DATE: 6/5/2023 6:58:31 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Profiles/MB-21.dgn

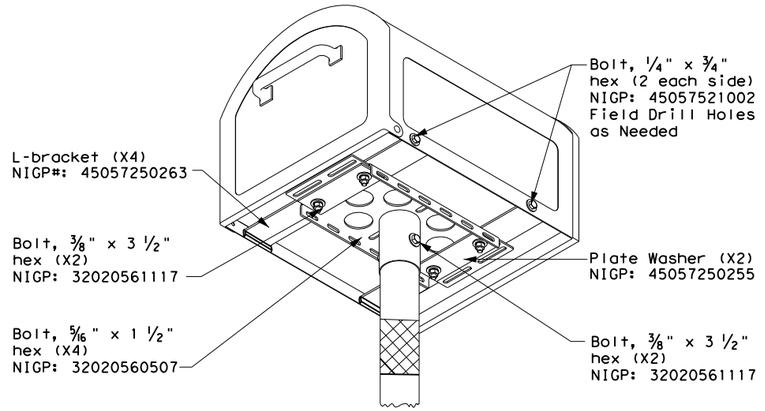
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

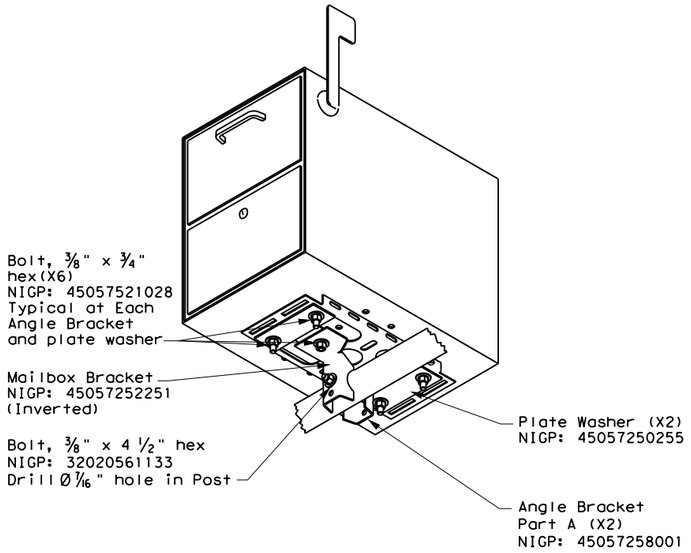


TYPE 2/4 - SINGLE XL MAILBOX

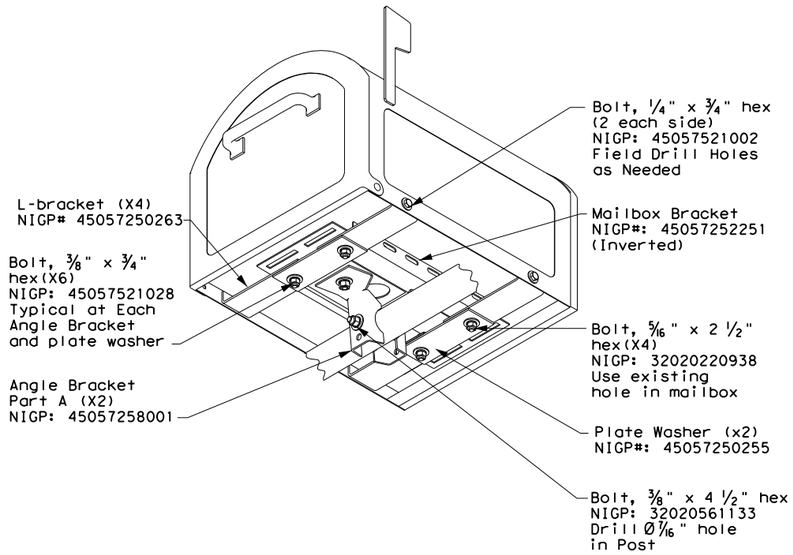


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

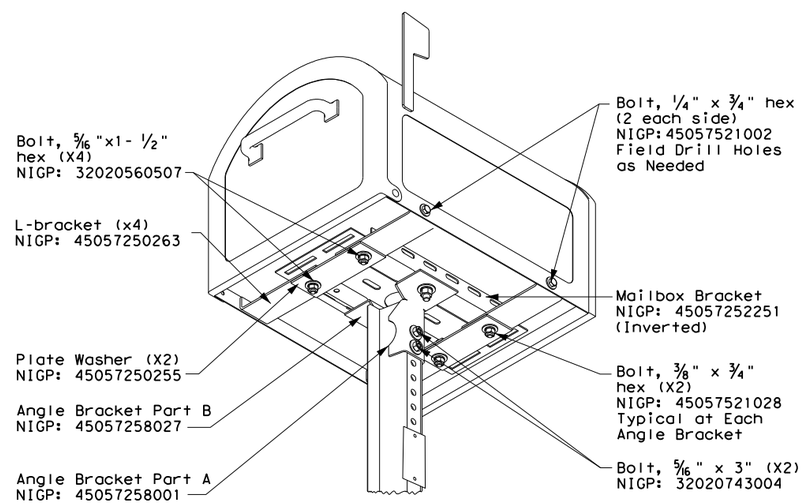
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



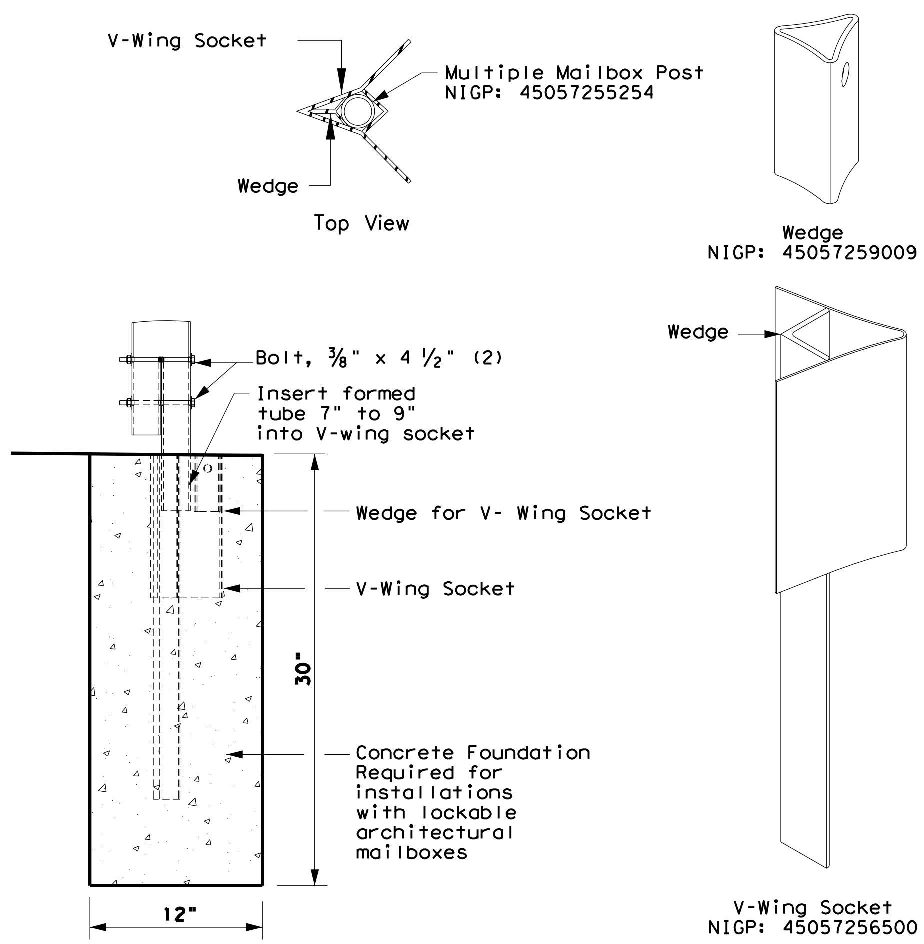
Texas Department of Transportation | Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

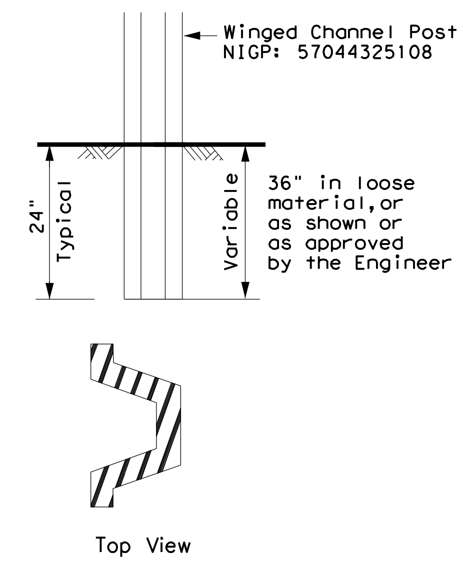
MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		74

TYPE 1 - SUPPORT/FOUNDATION
Thin Wall Tube w/ V-LOC Anchorage



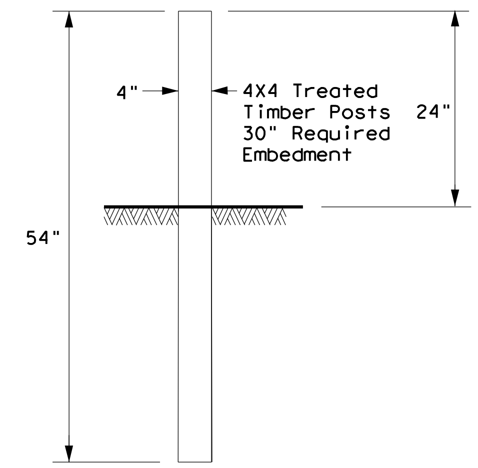
TYPE 3 - SUPPORT/FOUNDATION



NOTES:

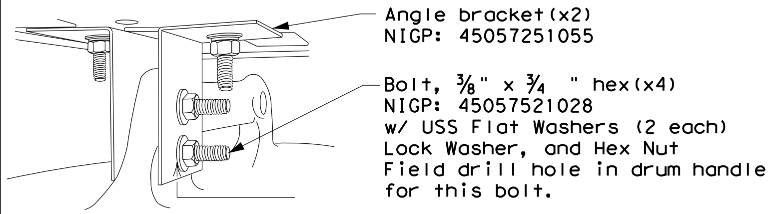
1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.

TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

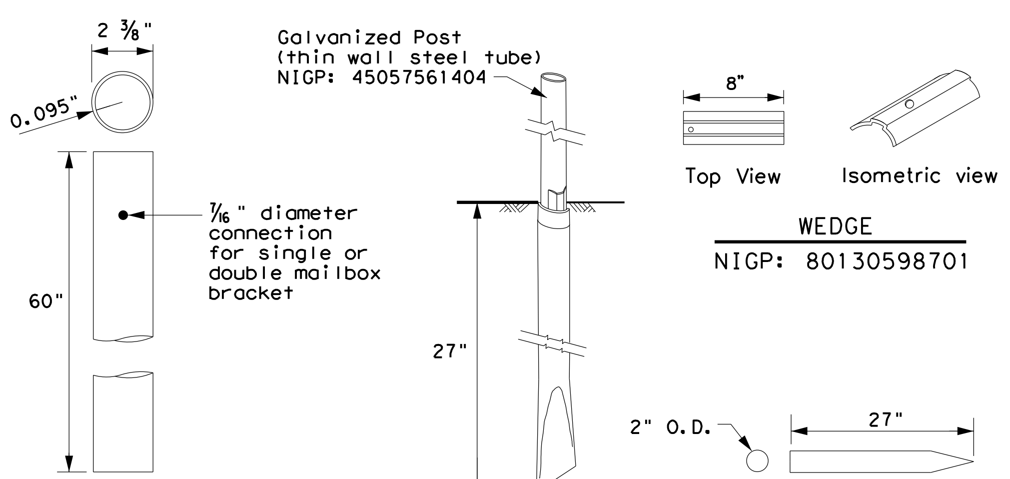
NOTES:

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.

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

TYPE 2 - SUPPORT/FOUNDATION
Thin Wall Steel Tube w/Wedge Anchor System

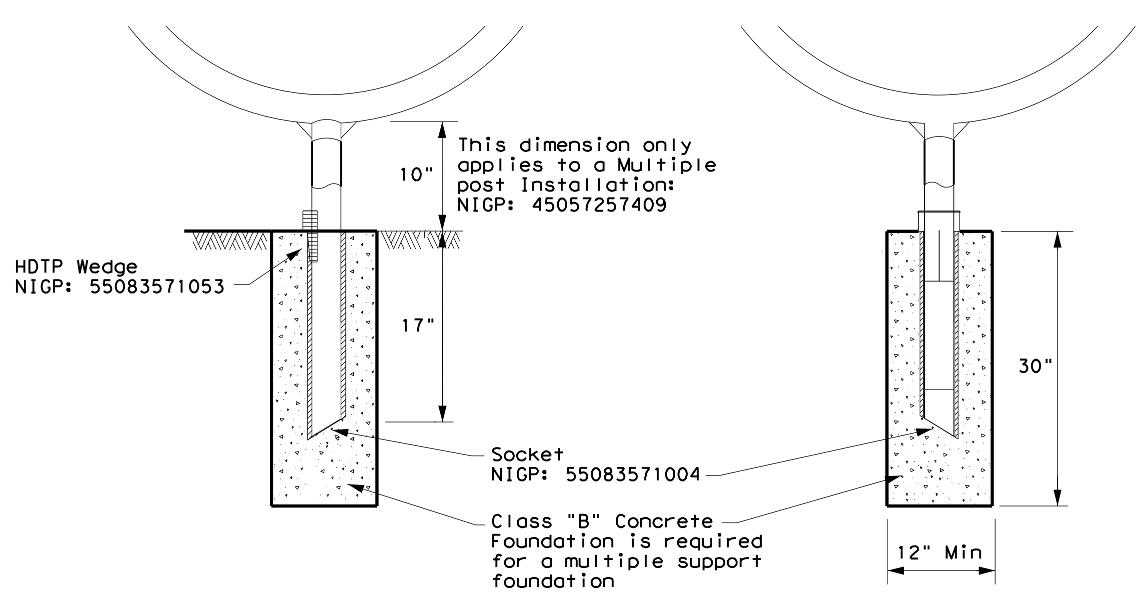


MAILBOX POST

WEDGE
NIGP: 80130598701

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION
Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation — Maintenance Division Standard

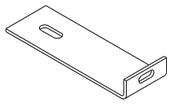
MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

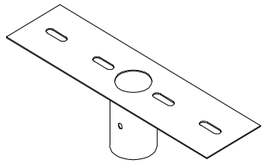
FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015	2379	02	010	FM 608
6/2005 1/2011	DIST		COUNTY	SHEET NO.
11/2006 7/2014	ABL		NOLAN	75

DATE: 6/5/2023 6:58:34 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/...

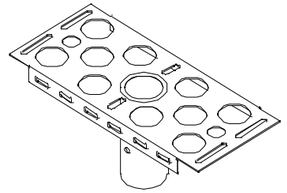
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: 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	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	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)	4x4 Timber	Construction Barrel
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 forXL 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)	None	45057251055 Angle Bracket (x2)
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	None	None



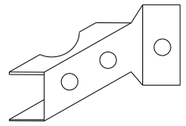
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



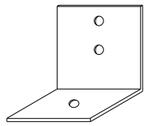
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



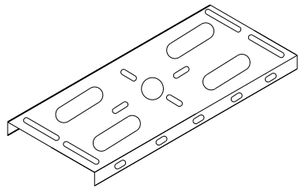
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



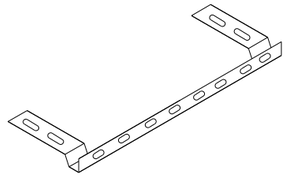
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



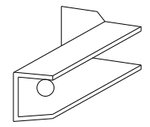
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



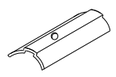
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



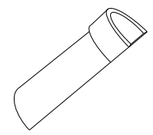
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



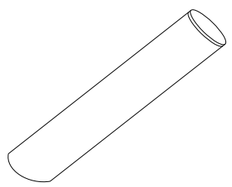
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

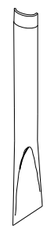
NIGP: 45057541653
Type 3 double mailbox bracket



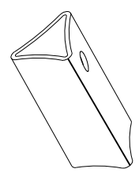
NIGP: 55083571053
Type 4 Mailbox Wedge



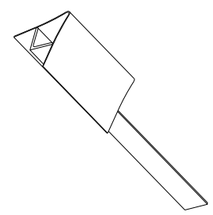
NIGP: 55083571004
Type 4 Mailbox Socket



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:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. 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

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		76

DATE: 6/5/2023 6:58:37 PM
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DATE: 6/5/2023 6:58:55 PM
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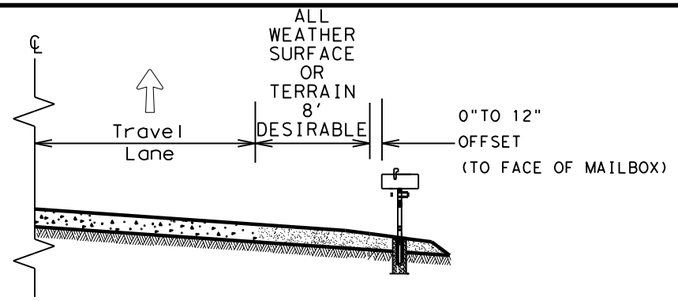
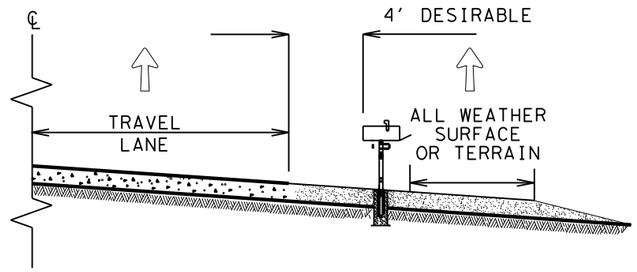
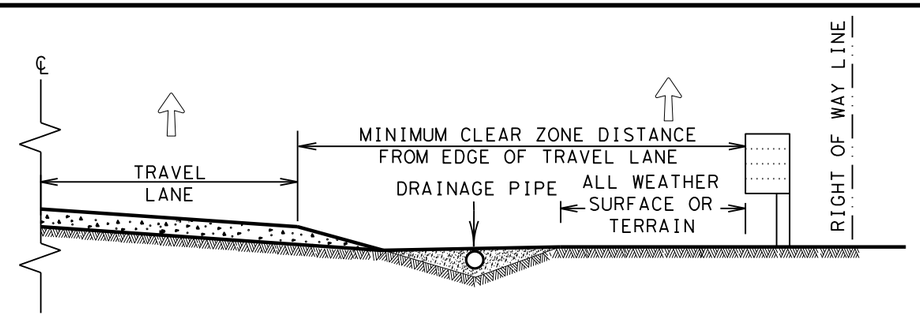


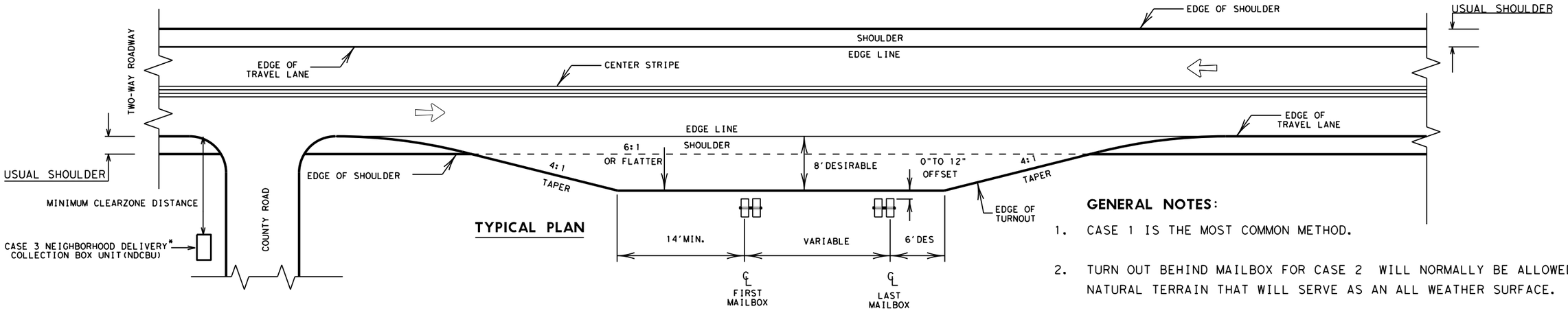
CASE 1. OFF TRAVEL WAY DELIVERY



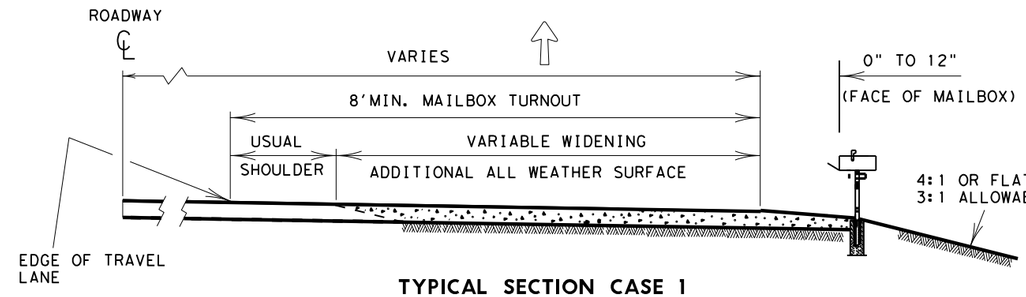
CASE 2. BACK SIDE DELIVERY



CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



TYPICAL PLAN



TYPICAL SECTION CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. WHEN 3 OR MORE MULTI-RACKS ARE ANTICIPATED, THE USE OF AN NDCBU IS RECOMMENDED. ONLY RURAL PATRONS LOCATED ON STATE MAINTAINED HIGHWAYS MAY HAVE A MAILBOX OR NDCBU SLOT ON TXDOT RIGHT OF WAY.

*NDCBU MAY BE INSTALLED ON COUNTY ROAD ROW WITH APPROVAL OF COUNTY.

MAIL DELIVERY VEHICLE TRAVEL DIRECTION

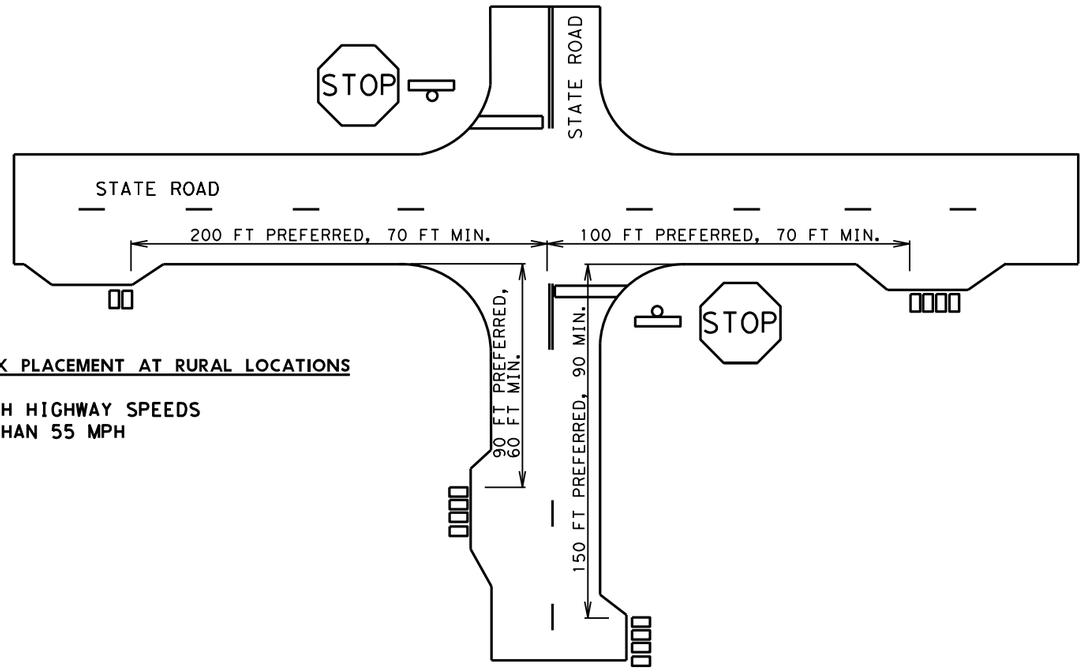
Texas Department of Transportation | Maintenance Division Standard

Guideline

MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS

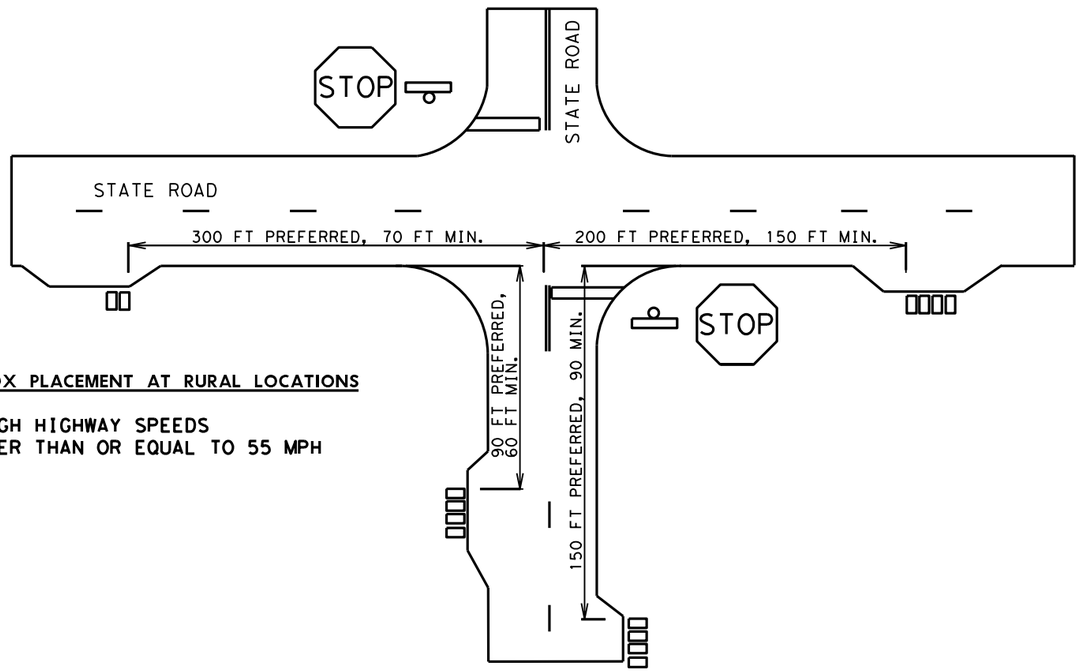
MBP(1)-22

FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/2012 5/2014	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		77



MAILBOX PLACEMENT AT RURAL LOCATIONS

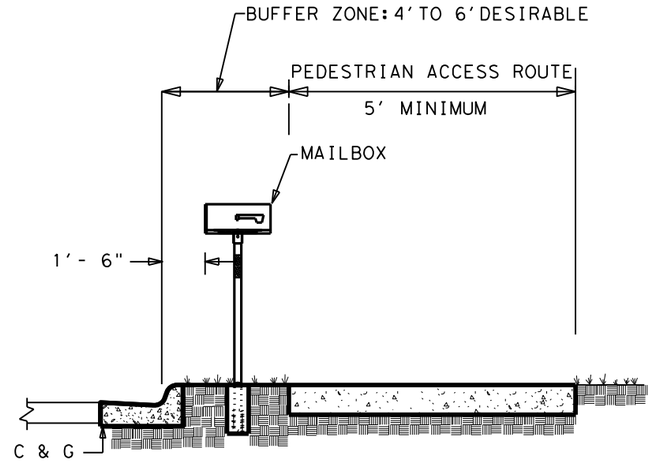
THROUGH HIGHWAY SPEEDS
LESS THAN 55 MPH



MAILBOX PLACEMENT AT RURAL LOCATIONS

THROUGH HIGHWAY SPEEDS
GREATER THAN OR EQUAL TO 55 MPH

CURB AND GUTTER MAILBOX INSTALLATION



NOTES:

1. A NON-TRAVERSABLE SURFACE MUST BE INSTALLED NEAR THE MAILBOX (NATURAL VEGETATION OR OTHER) IN THE BUFFER ZONE. ALTERNATIVELY, A BASE WITH A MINIMUM HEIGHT OF 2.5 INCHES MAY BE INSTALLED SO THAT THE EDGE OF THE MAILBOX DOES NOT EXTEND OUT MORE THAN 4 INCHES HORIZONTALLY BEYOND THE BASE.

2. THE SIDEWALK WIDTH MAY BE REDUCED TO 4 FOOT FOR SHORT DISTANCES AROUND THE MAILBOX IF NEEDED.

3. MAINTAIN A MINIMUM OF 5 FEET BETWEEN OBSTRUCTIONS IN THE PEDESTRIAN ACCESS ROUTE.

Texas Department of Transportation | Maintenance Division Standard

MAILBOX PLACEMENT CURBS & INTERSECTIONS

MBP(2)-22

FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/2012 5/2014	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		78

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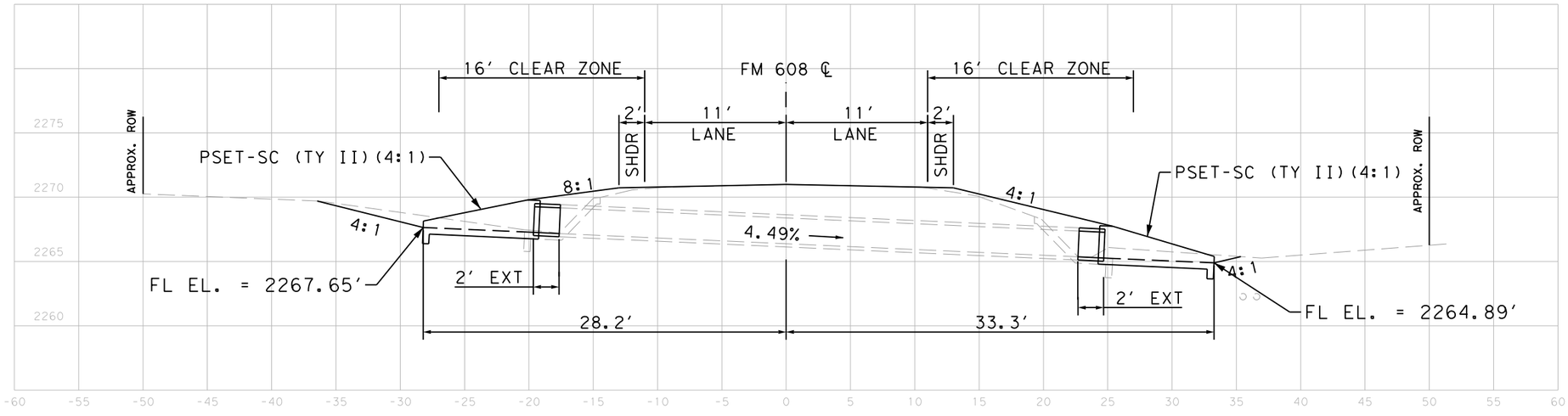
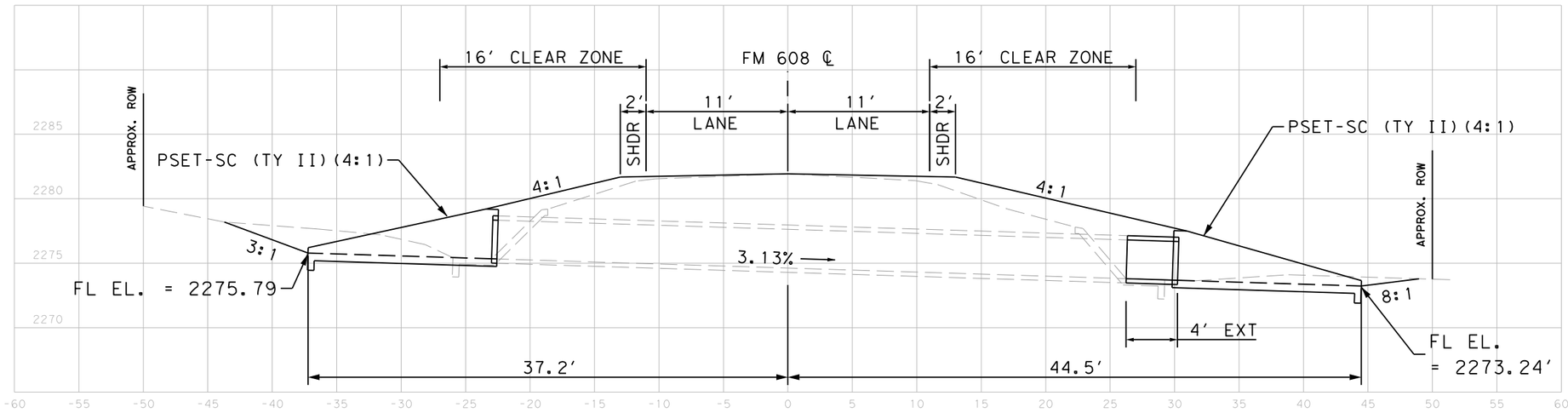


24" REINFORCED CONCRETE PIPE
PROPOSED 2' EXTENSION & PSET-SC (TY II) LT, 2' EXTENSION & PSET-SC (TY II) RT
STA 13+44.06



36" REINFORCED CONCRETE PIPE
PROPOSED PSET-SC (TY II) LT, 4' EXTENSION & PSET-SC (TY II) RT
STA 32+34.10

NOTES

1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING UTILITIES BEFORE BEGINNING ANY TYPE OF WORK.

2. EXISTING STRUCTURE FLOWLINES MAY VARY FROM PLANS. PROPOSED SAFETY END TREATMENT MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

3. ALL PIPE DIMENSIONS, INCLUDING EXTENSIONS AND BREAKBACKS, ARE MEASURED ALONG THE LENGTH OF THE PIPE.

4. BREAKING BACK AND REMOVING EXISTING CONCRETE HEADWALL ARE CONSIDERED SUBSIDIARY TO ITEM 467.

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

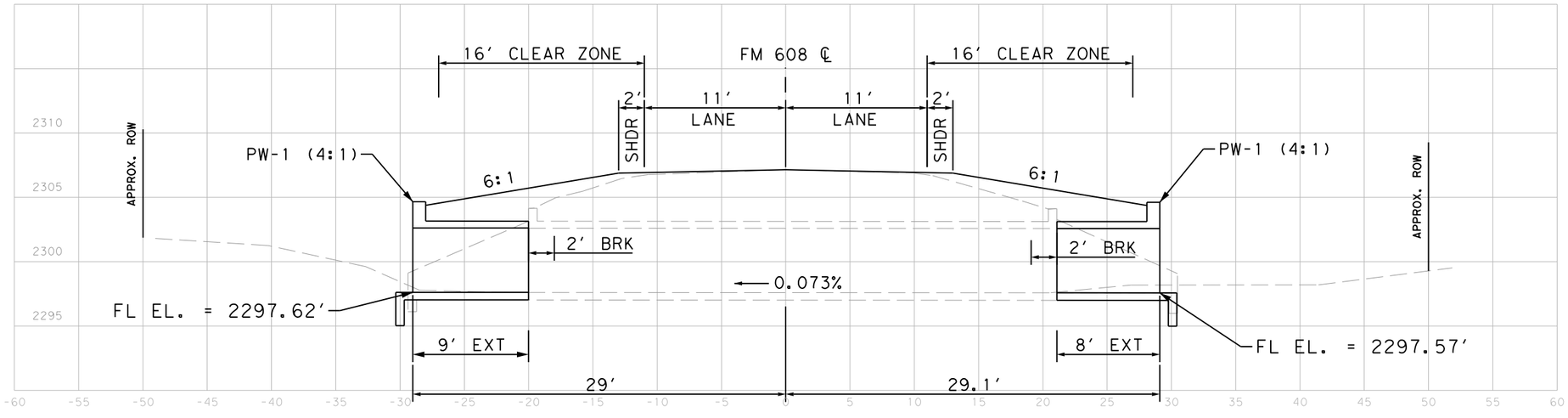
FM 608
CULVERT CROSS SECTIONS

 Texas Department of Transportation

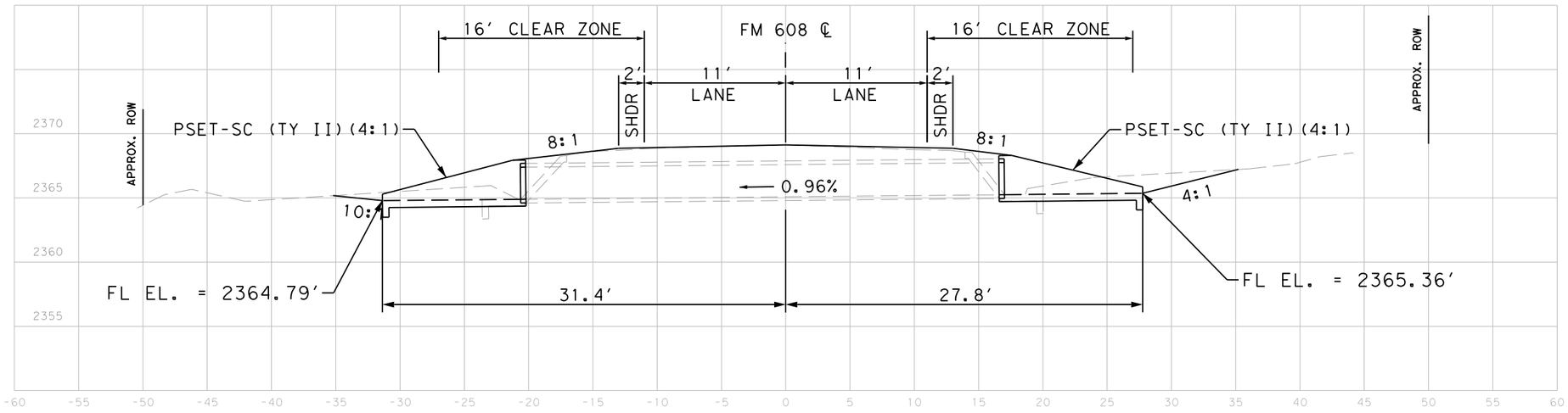
SCALE: 1"=10' SHEET 1 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		79
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/5. Drainage/CULVERT LAYOUTS
DATE: 6/6/2023 10:03:29 AM



8'X5' CONCRETE BOX
REMOVE EXISTING CONCRETE HEADWALL LT & RT
PROPOSED 9' EXTENSION & INSTALL PW-1 LT, 8' EXTENSION & INSTALL PW-1 RT
STA 47+58.16



30" REINFORCED CONCRETE PIPE
REMOVE EXISTING CONCRETE HEADWALL LT & RT
PROPOSED 6' EXTENSION & PSET-SC (TY II) LT, 6' EXTENSION & PSET-SC (TY II) RT
STA 68+62.79

NOTES

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2. EXISTING STRUCTURE FLOWLINES MAY VARY FROM PLANS. PROPOSED SAFETY END TREATMENT MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

3. ALL PIPE DIMENSIONS, INCLUDING EXTENSIONS AND BREAKBACKS, ARE MEASURED ALONG THE LENGTH OF THE PIPE.

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STATE OF TEXAS
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100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

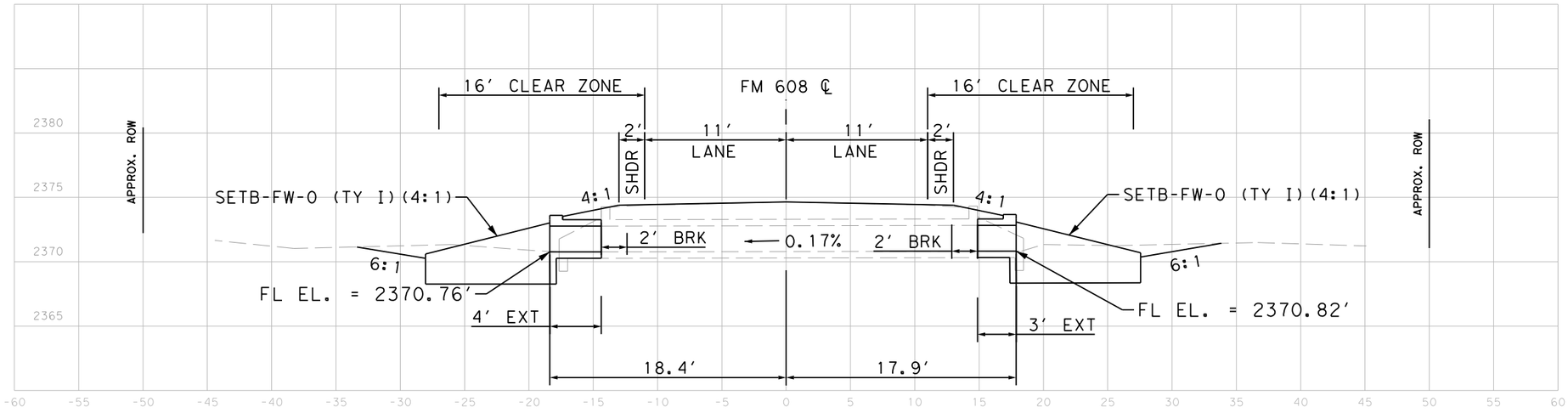
FM 608
CULVERT CROSS SECTIONS

 Texas Department of Transportation

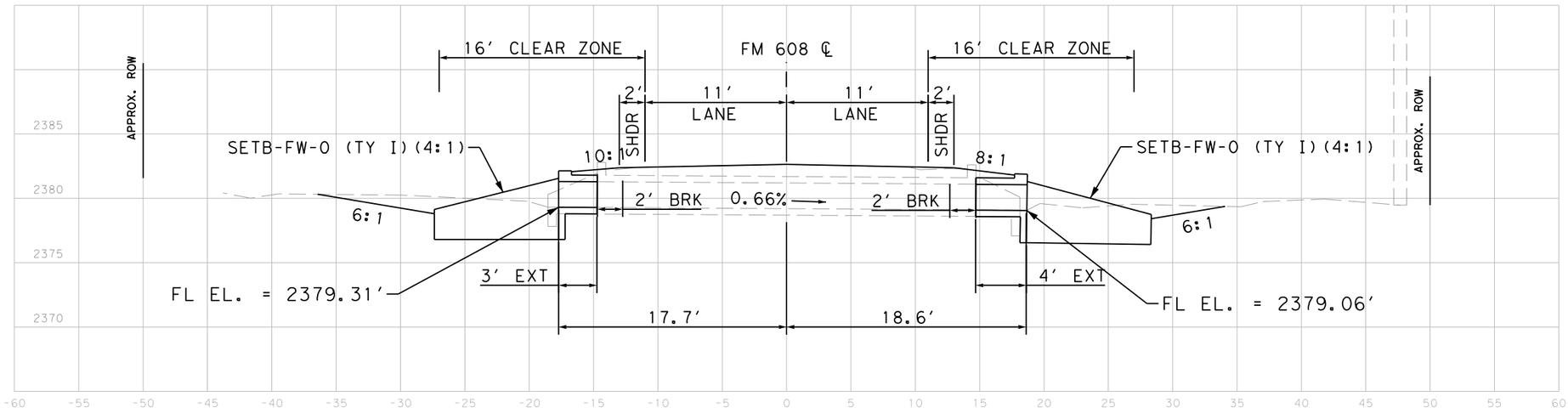
SCALE: 1"=10' SHEET 2 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		80
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/5. Drainage/CULVERT LAYOUTS
DATE: 6/5/2023 6:59:20 PM



4'X2' CONCRETE BOX
REMOVE EXISTING CONCRETE HEADWALL & WINGWALLS LT & RT
PROPOSED 2' EXTENSION & SETB-FW-0 (TY I)(4:1) LT, EXTEND 3' & SETB-FW-0 (TY I)(4:1) RT
STA 127+58.02



3'X2' CONCRETE BOX
REMOVE EXISTING CONCRETE HEADWALL & WINGWALLS LT & RT
PROPOSED 3' EXTENSION & SETB-FW-0 (TY I)(4:1) LT, EXTEND 4' & SETB-FW-0 (TY I)(4:1) RT
STA 198+38.44

NOTES

1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING UTILITIES BEFORE BEGINNING ANY TYPE OF WORK.

2. EXISTING STRUCTURE FLOWLINES MAY VARY FROM PLANS. PROPOSED SAFETY END TREATMENT MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

3. ALL PIPE DIMENSIONS, INCLUDING EXTENSIONS AND BREAKBACKS, ARE MEASURED ALONG THE LENGTH OF THE PIPE.

4. BREAKING BACK AND REMOVING EXISTING CONCRETE HEADWALL ARE CONSIDERED SUBSIDIARY TO ITEM 467.

STATE OF TEXAS
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06/06/2023

FM 608
CULVERT CROSS SECTIONS

 Texas Department of Transportation

SCALE: 1"=10' SHEET 3 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		81
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/5. Drainage/CULVERT LAYOUTS
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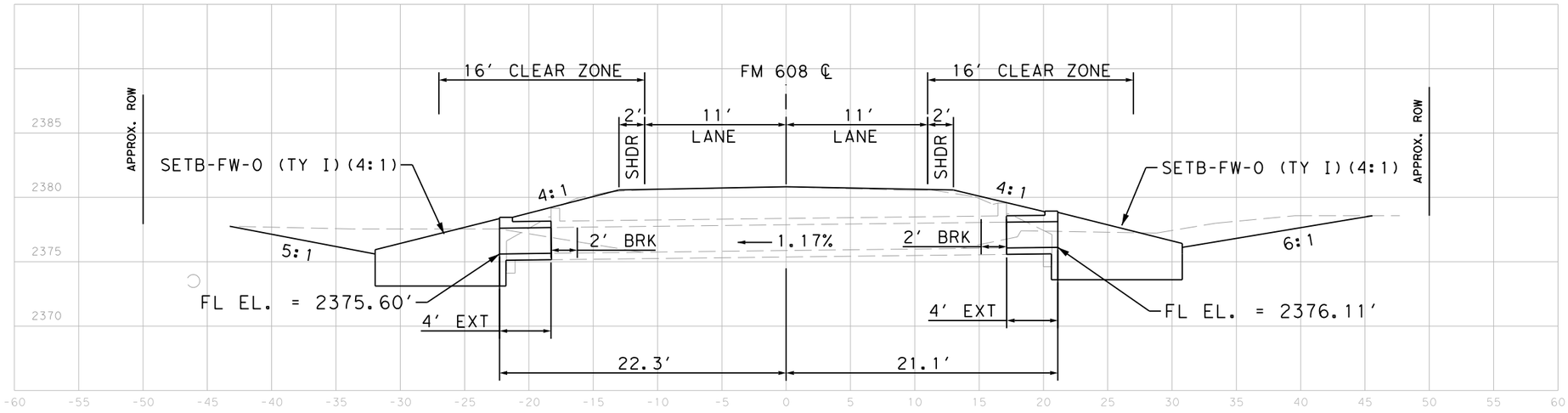
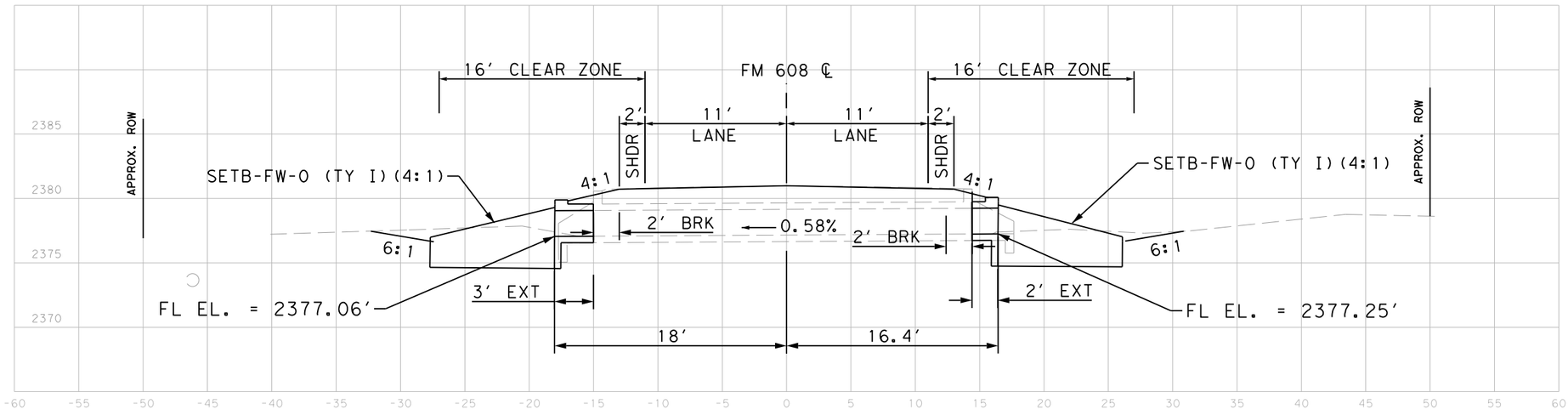


5'X2' CONCRETE BOX
REMOVE EXISTING CONCRETE HEADWALL & WINGWALLS LT & RT
PROPOSED 4' EXTENSION & SETB-FW-0 (TY I)(4:1) LT, EXTEND 4' & SETB-FW-0 (TY I)(4:1) RT
STA 250+29.09



4'X2' CONCRETE BOX
REMOVE EXISTING CONCRETE HEADWALL & WINGWALLS LT & RT
PROPOSED 3' EXTENSION & SETB-FW-0 (TY I)(4:1) LT, EXTEND 2' & SETB-FW-0 (TY I)(4:1) RT
STA 250+43.96

NOTES

1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING UTILITIES BEFORE BEGINNING ANY TYPE OF WORK.

2. EXISTING STRUCTURE FLOWLINES MAY VARY FROM PLANS. PROPOSED SAFETY END TREATMENT MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

3. ALL PIPE DIMENSIONS, INCLUDING EXTENSIONS AND BREAKBACKS, ARE MEASURED ALONG THE LENGTH OF THE PIPE.

4. BREAKING BACK AND REMOVING EXISTING CONCRETE HEADWALL ARE CONSIDERED SUBSIDIARY TO ITEM 467.

STATE OF TEXAS
STEPHEN T. JONES
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PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

FM 608
CULVERT CROSS SECTIONS

 Texas Department of Transportation

SCALE: 1"=10' SHEET 4 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		82
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/5. Drainage/CULVERT LAYOUTS
DATE: 6/5/2023 6:59:25 PM

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (1) (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
47+58.16 (Both)	1 ~ 8' x 5'	4'	SCC-8	PW-1	0°	4:1	8"	7"	1.500 '	7.167 '	N/A	N/A	28.667 '	9.167 '	N/A	0.0	1.0	53.4	822
127+58.02 (Both)	1 ~ 4' x 2'	1.36'	SCC-3&4	SETB-FW-0	0°	4:1	8"	7"	0.333 '	2.750 '	9.667 '	5.581'	11.162 '	5.167 '	15.162 '	0.0	0.2	8.2	N/A
198+38.44 (Both)	1 ~ 3' x 2'	0.95'	SCC-3&4	SETB-FW-0	0°	4:1	8"	7"	0.333 '	2.750 '	9.667 '	5.581'	11.162 '	4.167 '	14.162 '	0.0	0.2	8.0	N/A
250+29.09 (Both)	1 ~ 5' x 2'	2.46'	SCC-5&6	SETB-FW-0	0°	4:1	8"	7"	0.333 '	2.750 '	9.667 '	5.581'	11.162 '	6.167 '	16.162 '	0.0	0.2	8.4	N/A
250+43.96 (Both)	1 ~ 4' x 2'	1.33'	SCC-3&4	SETB-FW-0	0°	4:1	8"	7"	0.333 '	2.750 '	9.667 '	5.581'	11.162 '	5.167 '	15.162 '	0.0	0.2	8.2	N/A

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
· Side slope at culvert for flared or straight wingwalls.
· Channel slope for parallel wingwalls.
· Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE:	bcsstde1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS		2379	02	010	FM 608
		DIST	COUNTY		SHEET NO.
		ABL	NOLAN		83

DATE: 6/5/2023 6:59:44 PM
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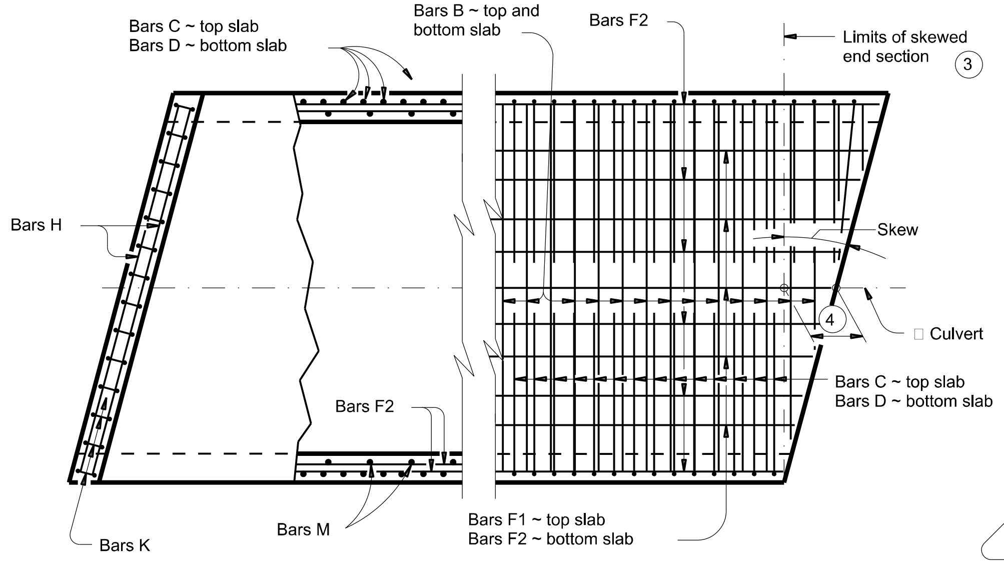
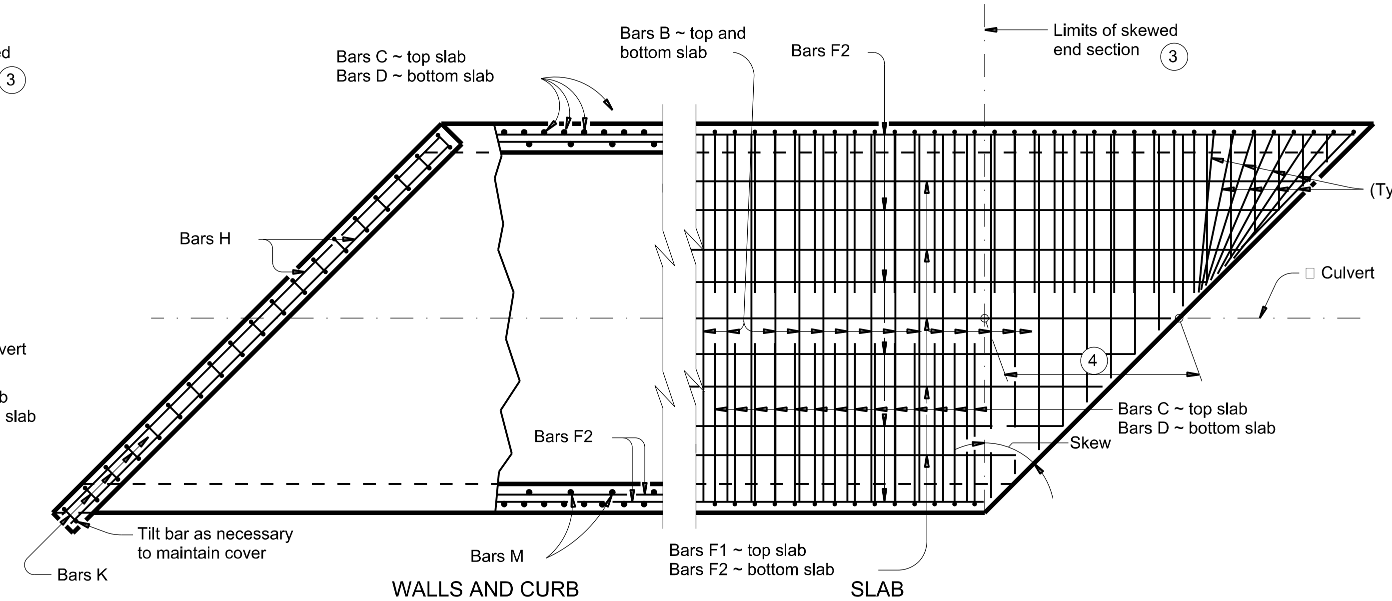
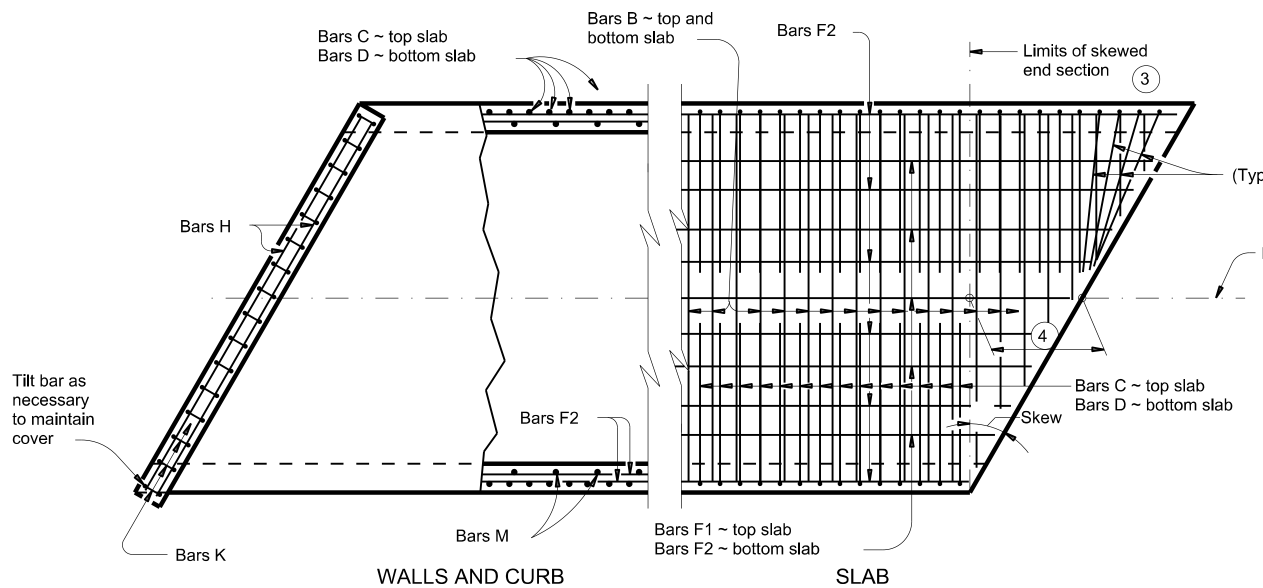


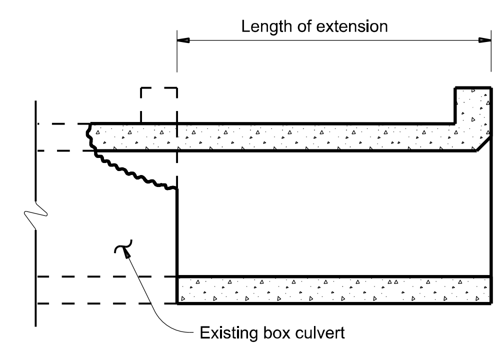
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



LENGTHENING DETAIL (1)

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D , E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.
Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B vary in the skewed end sections.

(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

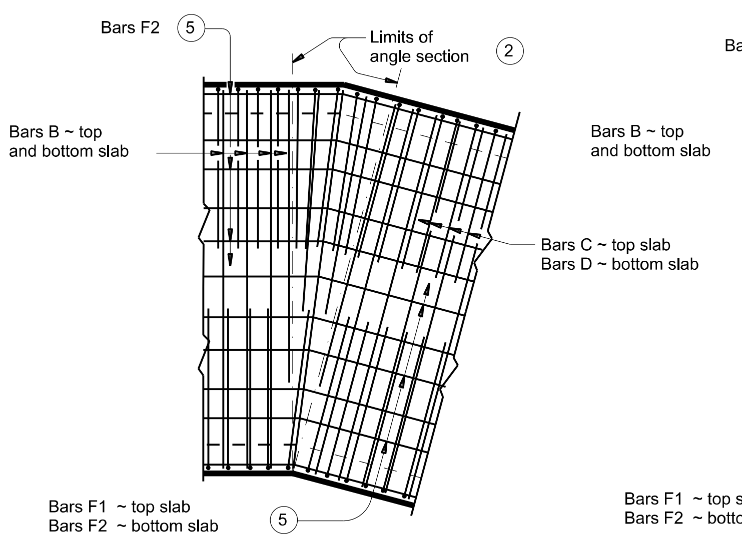
(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:
Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

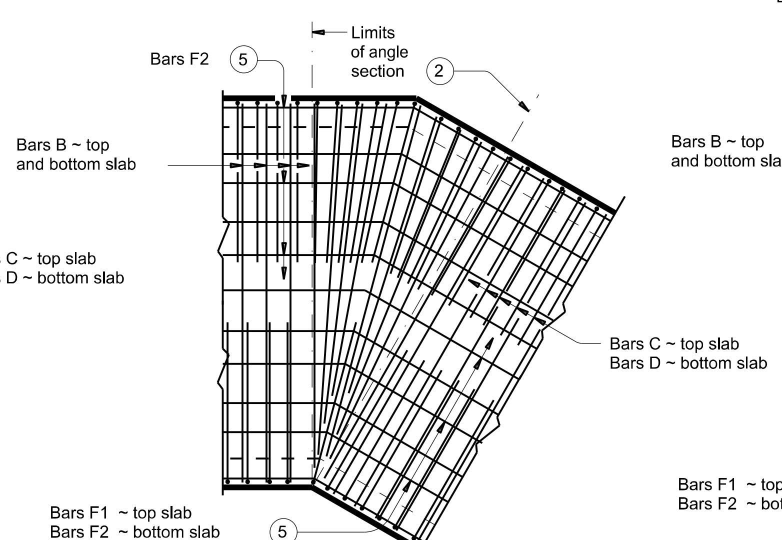
MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-In-Place (SCC) standard sheets by the cosine of the skew angle.

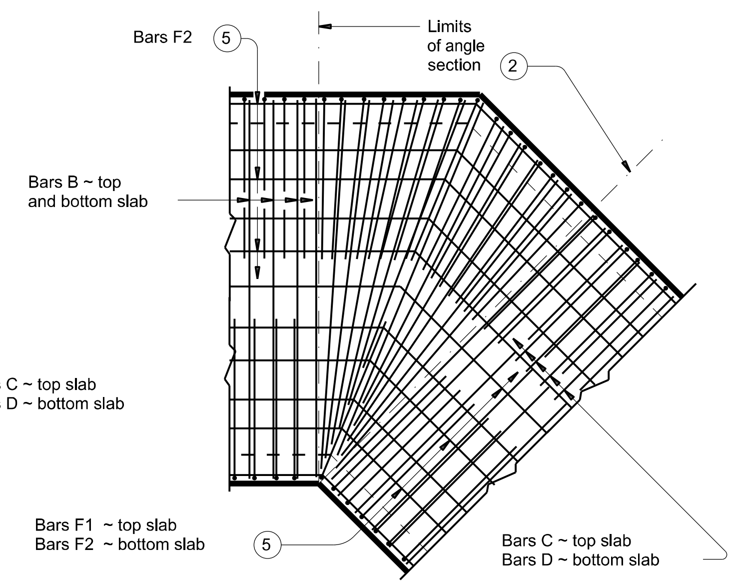
Cover dimensions are clear dimensions, unless noted otherwise.



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

FILE: sccmdste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
	DIST		COUNTY	SHEET NO.
	ABL		NOLAN	84

DATE: 6/5/2023 7:58:47 PM
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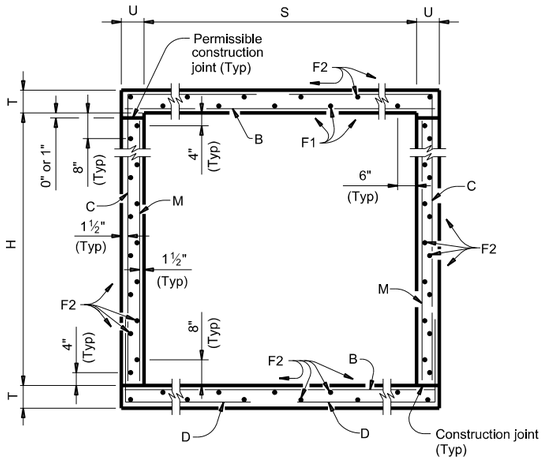
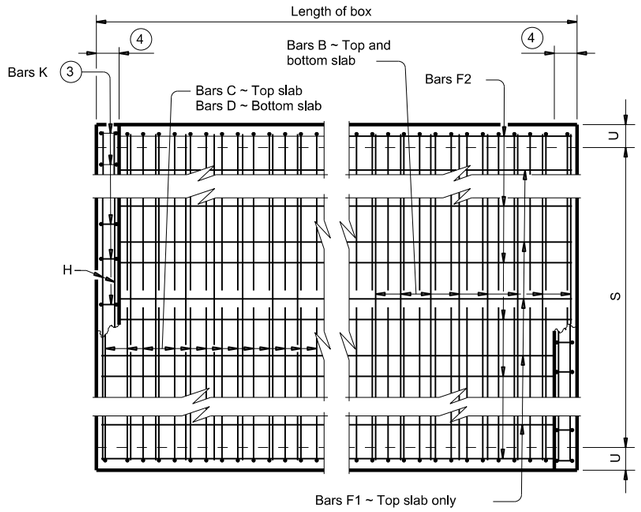
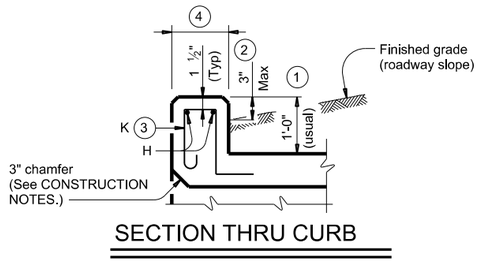
DATE: 6/5/2023 7:59:07 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/SCC-3&4.dgn



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   · For structures without bridge rail, construct curbs no more than 3" above finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

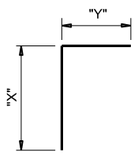
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
· culverts with overlay,
· culverts with 1-to-2 course surface treatment, or
· culverts with the top slab as the final riding surface.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min
· Uncoated or galvanized ~ #5 = 2'-1" Min

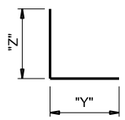
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

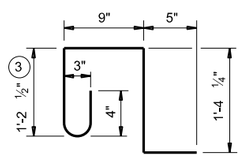
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-3 & 4

FILE: scc34sle-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
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	ABL	NOLAN		85

SECTION DIMENSIONS				FILL HEIGHT (5)	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																												QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
3' - 0"	2' - 0"	8"	7"	30'	108	#5	9"	3' - 11"	441	108	#4	9"	5' - 4"	385	2' - 6"	2' - 10"	108	#4	9"	5' - 1"	367	2' - 10"	2' - 3"	108	9"	2' - 0"	144	3	39' - 9"	80	19	39' - 9"	505	3' - 11"	10	10	28	0.292	48.1	0.3	38	12.0	1,960
3' - 0"	3' - 0"	8"	7"	30'	108	#5	9"	3' - 11"	441	108	#4	9"	6' - 4"	457	3' - 6"	2' - 10"	108	#4	9"	5' - 1"	367	2' - 10"	2' - 3"	108	9"	3' - 0"	216	3	39' - 9"	80	23	39' - 9"	611	3' - 11"	10	10	28	0.335	54.3	0.3	38	13.7	2,210
4' - 0"	2' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	5' - 8"	613	2' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	2' - 0"	144	3	39' - 9"	80	21	39' - 9"	558	4' - 11"	13	12	33	0.342	63.4	0.4	46	14.1	2,581
4' - 0"	3' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	6' - 8"	721	3' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	3' - 0"	216	3	39' - 9"	80	25	39' - 9"	664	4' - 11"	13	12	33	0.385	70.5	0.4	46	15.8	2,867
4' - 0"	4' - 0"	8"	7"	30'	108	#5	9"	4' - 11"	554	162	#4	6"	7' - 8"	830	4' - 6"	3' - 2"	162	#4	6"	5' - 5"	586	3' - 2"	2' - 3"	108	9"	4' - 0"	289	3	39' - 9"	80	25	39' - 9"	664	4' - 11"	13	12	33	0.428	75.1	0.4	46	17.5	3,049

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

SCC-3 & 4

FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		86

DATE: 6/5/2023 7:59:10 PM
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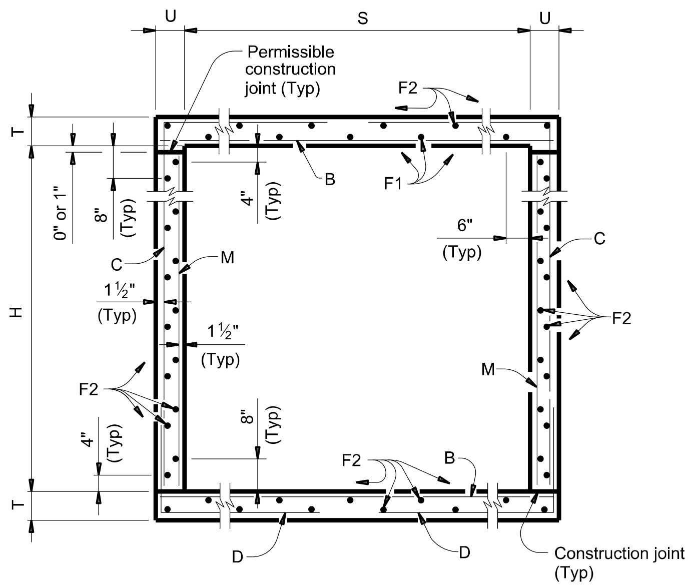
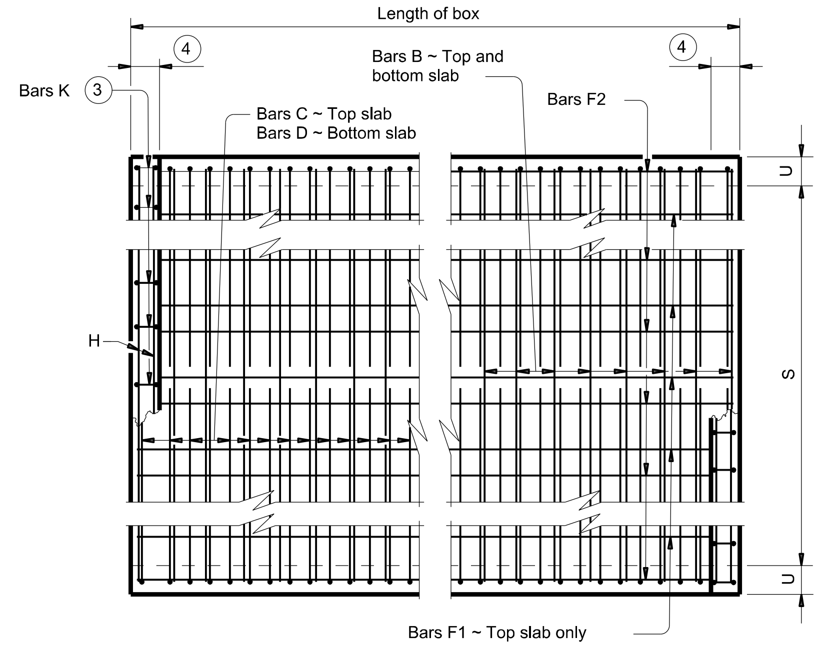
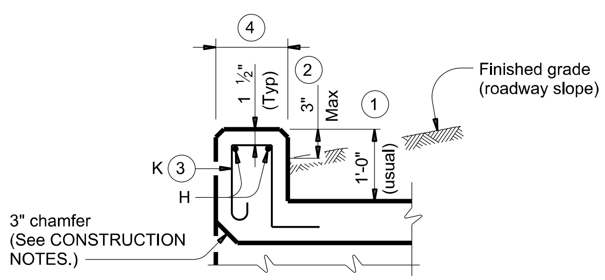


TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

(1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

(4) 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

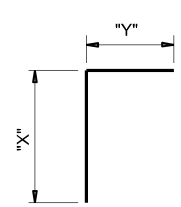
CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

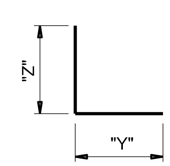
Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

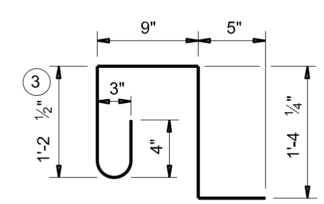
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
04/2021 Updated X values.	DIST		COUNTY	SHEET NO.
	ABL		NOLAN	87

DATE: 6/5/2023 7:59:29 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/2379020104 ... SCC-5&6.dgn

BILLS OF REINFORCING STEEL (For Box Length = 40 feet)

SECTION DIMENSIONS				FILL HEIGHT (5)	Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		QUANTITIES: Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
5' - 0"	2' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	6' - 3"	704	2' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	2' - 0"	144	4	39' - 9"	106	22	39' - 9"	584	5' - 11"	16	14	39	0.391	80.5	0.5	55	16.1	3,276
5' - 0"	2' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	6' - 4"	713	2' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	2' - 0"	144	4	39' - 9"	106	22	39' - 9"	584	5' - 11"	16	14	39	0.429	81.0	0.5	55	17.6	3,294
5' - 0"	3' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	7' - 3"	817	3' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	3' - 0"	216	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.434	87.8	0.5	55	17.8	3,567
5' - 0"	3' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	7' - 4"	826	3' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	3' - 0"	216	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.472	88.3	0.5	55	19.3	3,585
5' - 0"	4' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	8' - 3"	929	4' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	4' - 0"	289	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.477	92.4	0.5	55	19.5	3,752
5' - 0"	4' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	8' - 4"	939	4' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	4' - 0"	289	4	39' - 9"	106	26	39' - 9"	690	5' - 11"	16	14	39	0.515	92.9	0.5	55	21.1	3,771
5' - 0"	5' - 0"	8"	7"	26'	108	#6	9"	5' - 11"	960	108	#5	9"	9' - 3"	1,042	5' - 6"	3' - 9"	108	#5	9"	6' - 5"	723	3' - 9"	2' - 8"	108	9"	5' - 0"	361	4	39' - 9"	106	30	39' - 9"	797	5' - 11"	16	14	39	0.521	99.7	0.5	55	21.3	4,044
5' - 0"	5' - 0"	9"	7"	30'	108	#6	9"	5' - 11"	960	108	#5	9"	9' - 4"	1,051	5' - 7"	3' - 9"	108	#5	9"	6' - 6"	732	3' - 9"	2' - 9"	108	9"	5' - 0"	361	4	39' - 9"	106	30	39' - 9"	797	5' - 11"	16	14	39	0.559	100.2	0.5	55	22.8	4,062
6' - 0"	2' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	6' - 7"	742	2' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	2' - 0"	144	5	39' - 9"	133	25	39' - 9"	664	6' - 11"	18	16	45	0.440	89.1	0.5	63	18.1	3,628
6' - 0"	2' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	6' - 8"	1,126	2' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	2' - 0"	144	5	39' - 9"	133	25	39' - 9"	664	6' - 11"	18	16	45	0.485	108.6	0.5	63	19.9	4,407
6' - 0"	2' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	6' - 10"	1,155	2' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	2' - 0"	110	5	39' - 9"	133	25	39' - 9"	664	7' - 1"	19	18	50	0.551	109.9	0.5	69	22.6	4,463
6' - 0"	3' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	7' - 7"	854	3' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	3' - 0"	216	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.484	96.4	0.5	63	19.9	3,918
6' - 0"	3' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	7' - 8"	1,295	3' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	3' - 0"	216	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.528	117.3	0.5	63	21.6	4,754
6' - 0"	3' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	7' - 10"	1,324	3' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	3' - 0"	164	5	39' - 9"	133	29	39' - 9"	770	7' - 1"	19	18	50	0.601	118.1	0.5	69	24.6	4,792
6' - 0"	4' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	8' - 7"	967	4' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	4' - 0"	289	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.527	101.0	0.5	63	21.6	4,104
6' - 0"	4' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	8' - 8"	1,464	4' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	4' - 0"	289	5	39' - 9"	133	29	39' - 9"	770	6' - 11"	18	16	45	0.571	123.3	0.5	63	23.4	4,996
6' - 0"	4' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	8' - 10"	1,493	4' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	4' - 0"	219	5	39' - 9"	133	29	39' - 9"	770	7' - 1"	19	18	50	0.650	123.7	0.5	69	26.5	5,016
6' - 0"	5' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	9' - 7"	1,080	5' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	5' - 0"	361	5	39' - 9"	133	33	39' - 9"	876	6' - 11"	18	16	45	0.570	108.3	0.5	63	23.3	4,395
6' - 0"	5' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	9' - 8"	1,633	5' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	5' - 0"	361	5	39' - 9"	133	33	39' - 9"	876	6' - 11"	18	16	45	0.614	132.0	0.5	63	25.1	5,343
6' - 0"	5' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	9' - 10"	1,661	5' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	5' - 0"	274	5	39' - 9"	133	33	39' - 9"	876	7' - 1"	19	18	50	0.700	131.9	0.5	69	28.5	5,345
6' - 0"	6' - 0"	8"	7"	20'	108	#6	9"	6' - 11"	1,122	108	#5	9"	10' - 7"	1,192	6' - 6"	4' - 1"	108	#5	9"	6' - 9"	760	4' - 1"	2' - 8"	108	9"	6' - 0"	433	5	39' - 9"	133	37	39' - 9"	982	6' - 11"	18	16	45	0.613	115.6	0.5	63	25.0	4,685
6' - 0"	6' - 0"	9"	7"	26'	108	#6	9"	6' - 11"	1,122	162	#5	6"	10' - 8"	1,802	6' - 7"	4' - 1"	162	#5	6"	6' - 10"	1,155	4' - 1"	2' - 9"	108	9"	6' - 0"	433	5	39' - 9"	133	37	39' - 9"	982	6' - 11"	18	16	45	0.657	140.7	0.5	63	26.8	5,690
6' - 0"	6' - 0"	10"	8"	30'	108	#6	9"	7' - 1"	1,149	162	#5	6"	10' - 10"	1,830	6' - 8"	4' - 2"	162	#5	6"	7' - 0"	1,183	4' - 2"	2' - 10"	82	12"	6' - 0"	329	5	39' - 9"	133	37	39' - 9"	982	7' - 1"	19	18	50	0.749	140.2	0.5	69	30.5	5,675

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

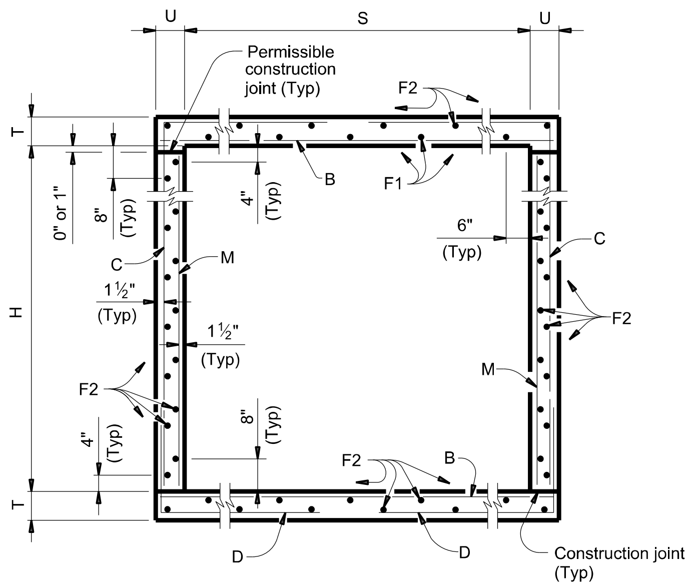
SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

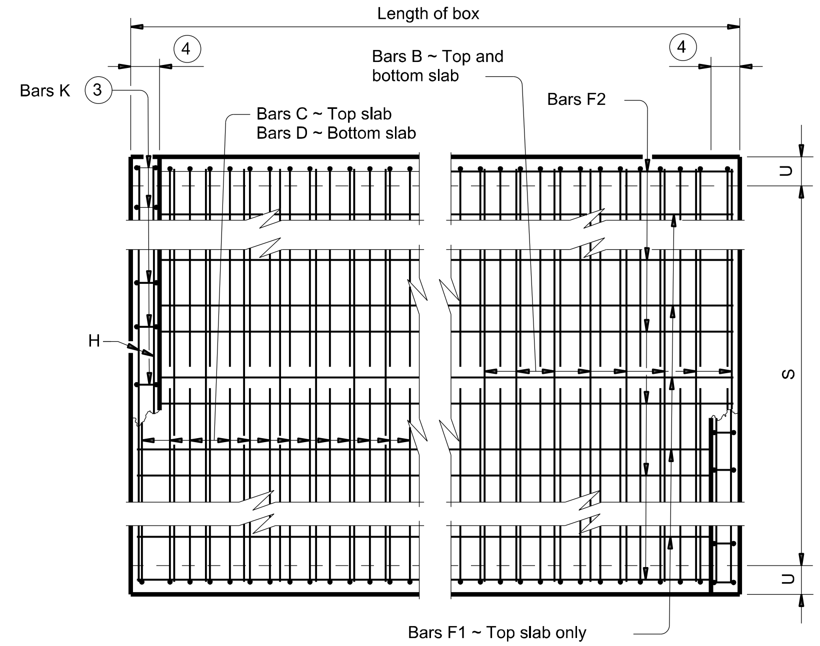
SCC-5 & 6

FILE: scc56ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		88

DATE: 6/5/2023 7:59:51 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/2379020104 - Design Plans/SCC-8.dgn



TYPICAL SECTION



PLAN OF REINF STEEL

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

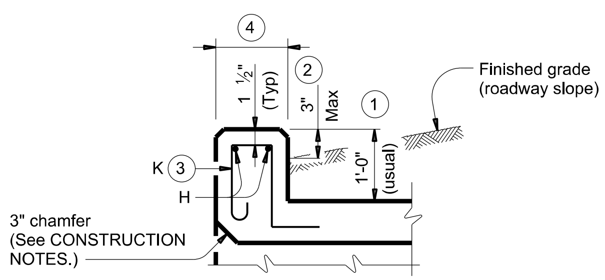
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).



SECTION THRU CURB

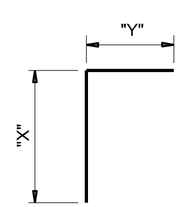
CONSTRUCTION NOTES:
Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

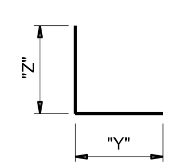
Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

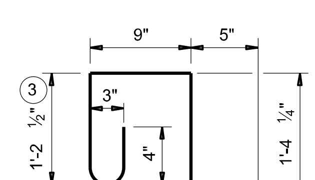
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE
0' TO 30' FILL

SCC-8

FILE: scc08ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
04/2021 Updated X values.	DIST		COUNTY	SHEET NO.
	ABL		NOLAN	89

SECTION DIMENSIONS				⑤ FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
8' - 0"	3' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	8' - 8"	1,406	3' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.582	153.5	0.7	80	24.0	6,219
8' - 0"	3' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	8' - 8"	1,406	3' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.582	153.5	0.7	80	24.0	6,219
8' - 0"	3' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	8' - 10"	1,433	3' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	3' - 0"	164	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.724	154.5	0.7	85	29.6	6,266
8' - 0"	3' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	8' - 11"	1,446	3' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	3' - 0"	164	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.782	155.2	0.7	85	32.0	6,293
8' - 0"	3' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	9' - 2"	1,487	3' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	9' - 3"	25	22	61	0.929	159.6	0.7	86	37.9	6,468
8' - 0"	4' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	9' - 8"	1,568	4' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.626	159.4	0.7	80	25.7	6,454
8' - 0"	4' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	9' - 8"	1,568	4' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.626	159.4	0.7	80	25.7	6,454
8' - 0"	4' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	9' - 10"	1,595	4' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	4' - 0"	219	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.774	160.0	0.7	85	31.6	6,483
8' - 0"	4' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	9' - 11"	1,609	4' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	4' - 0"	219	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.831	160.7	0.7	85	33.9	6,511
8' - 0"	4' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	10' - 2"	1,649	4' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	9' - 3"	25	22	61	0.985	165.4	0.7	86	40.1	6,703
8' - 0"	5' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	10' - 8"	1,730	5' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	8' - 11"	24	20	56	0.669	167.9	0.7	80	27.4	6,794
8' - 0"	5' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	10' - 8"	1,730	5' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	8' - 11"	24	20	56	0.669	167.9	0.7	80	27.4	6,794
8' - 0"	5' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	10' - 10"	1,757	5' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	5' - 0"	274	6	39' - 9"	159	36	39' - 9"	956	9' - 1"	24	22	61	0.823	168.0	0.7	85	33.6	6,806
8' - 0"	5' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	10' - 11"	1,771	5' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	5' - 0"	274	6	39' - 9"	159	36	39' - 9"	956	9' - 1"	24	22	61	0.881	168.7	0.7	85	35.9	6,834
8' - 0"	5' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	11' - 2"	1,811	5' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	9' - 3"	25	22	61	1.040	173.9	0.7	86	42.3	7,043
8' - 0"	6' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	11' - 8"	1,893	6' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.712	176.4	0.7	80	29.2	7,135
8' - 0"	6' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	11' - 8"	1,893	6' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.712	176.4	0.7	80	29.2	7,135
8' - 0"	6' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	11' - 10"	1,920	6' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	6' - 0"	329	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.872	176.1	0.7	85	35.6	7,130
8' - 0"	6' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	11' - 11"	1,933	6' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	6' - 0"	329	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.930	176.8	0.7	85	37.9	7,157
8' - 0"	6' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	12' - 2"	1,974	6' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	9' - 3"	25	22	61	1.096	182.5	0.7	86	44.5	7,384
8' - 0"	7' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	12' - 8"	2,055	7' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.755	182.2	0.7	80	30.9	7,369
8' - 0"	7' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	162	#6	6"	12' - 8"	3,082	7' - 6"	5' - 2"	162	#6	6"	8' - 3"	2,007	5' - 2"	3' - 1"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.755	224.6	0.7	80	30.9	9,065
8' - 0"	7' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	162	#6	6"	12' - 10"	3,123	7' - 8"	5' - 2"	162	#6	6"	8' - 5"	2,048	5' - 2"	3' - 3"	82	12"	7' - 0"	383	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.922	224.6	0.7	85	37.6	9,070
8' - 0"	7' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	162	#6	6"	12' - 11"	3,143	7' - 9"	5' - 2"	162	#6	6"	8' - 6"	2,068	5' - 2"	3' - 4"	82	12"	7' - 0"	383	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.979	225.6	0.7	85	39.8	9,110
8' - 0"	7' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	162	#6	6"	13' - 2"	3,204	7' - 11"	5' - 3"	162	#6	6"	8' - 9"	2,129	5' - 3"	3' - 6"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	9' - 3"	25	22	61	1.151	232.8	0.7	86	46.7	9,396
8' - 0"	8' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	13' - 8"	2,217	8' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	8' - 11"	24	20	56	0.798	190.7	0.7	80	32.6	7,709
8' - 0"	8' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	162	#6	6"	13' - 8"	3,325	8' - 6"	5' - 2"	162	#6	6"	8' - 3"	2,007	5' - 2"	3' - 1"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	8' - 11"	24	20	56	0.798	235.2	0.7	80	32.6	9,486
8' - 0"	8' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	162	#6	6"	13' - 10"	3,366	8' - 8"	5' - 2"	162	#6	6"	8' - 5"	2,048	5' - 2"	3' - 3"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	9' - 1"	24	22	61	0.971	238.2	0.7	85	39.5	9,613
8' - 0"	8' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	162	#6	6"	13' - 11"	3,386	8' - 9"	5' - 2"	162	#6	6"	8' - 6"	2,068	5' - 2"	3' - 4"	162	6"	8' - 0"	866	6	39' - 9"	159	44	39' - 9"	1,168	9' - 1"	24	22	61	1.029	246.4	0.7	85	41.8	9,942
8' - 0"	8' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	162	#6	6"	14' - 2"	3,447	8' - 11"	5' - 3"	162	#6	6"	8' - 9"	2,129	5' - 3"	3' - 6"	162	6"	8' - 0"	866	6	39' - 9"	159	44	39' - 9"	1,168	9' - 3"	25	22	61	1.207	250.5	0.7	86	49.0	10,106

⑤ For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

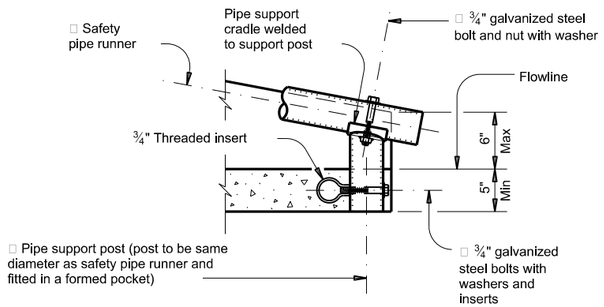
SCC-8

FILE: scc08ste-21.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		90

DATE: 6/5/2023 8:00:37 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/PSET - SC.dgn

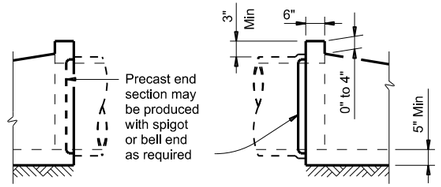
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe		Multiple Pipes	
						Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' - 11"	≤ 45°	No	≤ 45°	No
				4:1	3' - 6"				
				6:1	4' - 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' - 8"	≤ 45°	No	≤ 45°	No
				4:1	4' - 7"				
				6:1	6' - 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' - 6"	≤ 45°	No	≤ 45°	No
				4:1	5' - 8"				
				6:1	8' - 0"				
24"	3"	1.95"	31.00"	3:1	6' - 2"	≤ 45°	No	= 30°	No
				4:1	7' - 10"			> 30°	Yes
				6:1	11' - 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' - 10"	= 15°	No	= 15°	No
				4:1	10' - 1"	> 15°	Yes	> 15°	Yes
				6:1	14' - 8"				
36"	4"	2.75"	45.50"	3:1	9' - 5"	= 0°	No	≥ 0°	Yes
				4:1	12' - 3"	> 0°	Yes		
				6:1	17' - 11"				
42"	4 ½"	2.7"	52.50"	3:1	11' - 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' - 5"				
				6:1	21' - 2"				



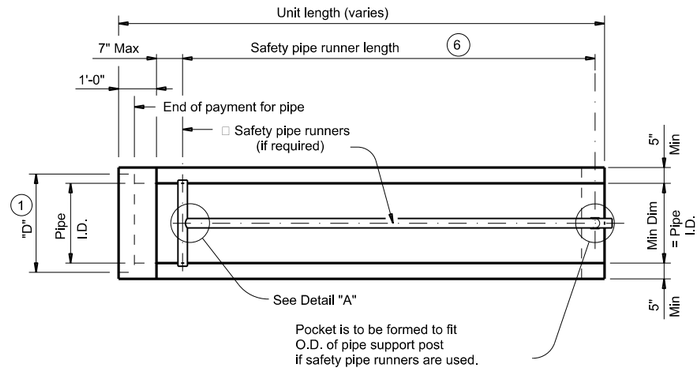
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



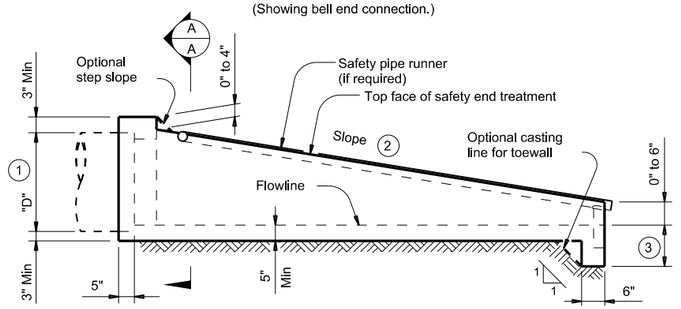
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



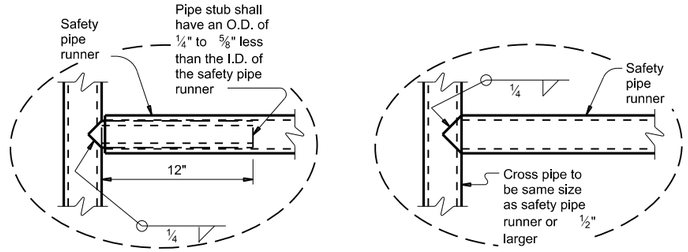
PLAN

(Showing bell end connection.)



LONGITUDINAL ELEVATION

(Showing bell end connection.)

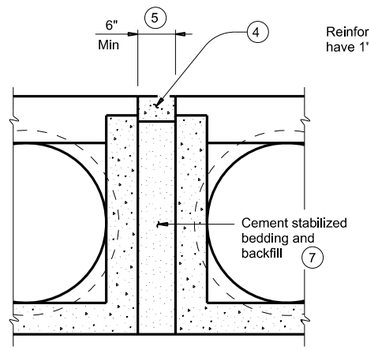


OPTION A

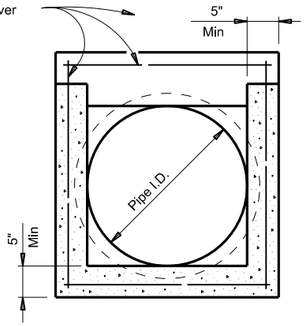
DETAIL A

(If required)

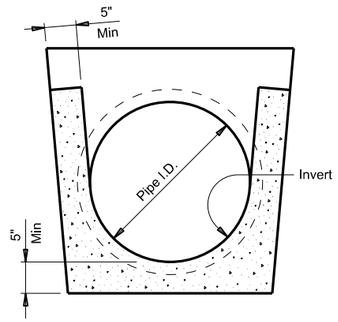
OPTION B



MULTIPLE PIPE INSTALLATION

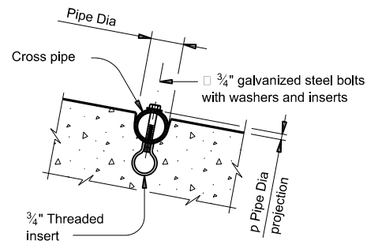


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' - 2"	3" STD	3.500"	3.068"
15' - 6"	3 ½" STD	4.000"	3.548"
20' - 10"	4" STD	4.500"	4.026"
35' - 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" - D12 x D12 or 5"x5" - D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

FILE: psetscss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		91

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for One Structure End)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (Two~Wings) (3)	
Maximum Wingwall Height Hw (9)	W	X	Y	Z	Bars J1		Bars J2			
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.41	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721

TABLE OF WING WALL REINFORCING (Two~Wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4	~	1'-0"
N	#5	6	~
OL	#4	6	~
Reinf (Lb/Ft)			9.82
Conc (CY/Ft)			0.074

(1) Extend Bars P 3'-0" Min into bottom slab of box culvert.

(2) Adjust to fit as necessary to maintain 1 1#2" clear cover and 4" Min between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.

(4) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.

(6) At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.

(7) 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.

(8) For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

(9) See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.

TABLE OF MAXIMUM WING HEIGHTS (9)

Side Slope	Hw Max
3:1	11'- 5"
4:1	8'-10"
6:1	6'- 1"

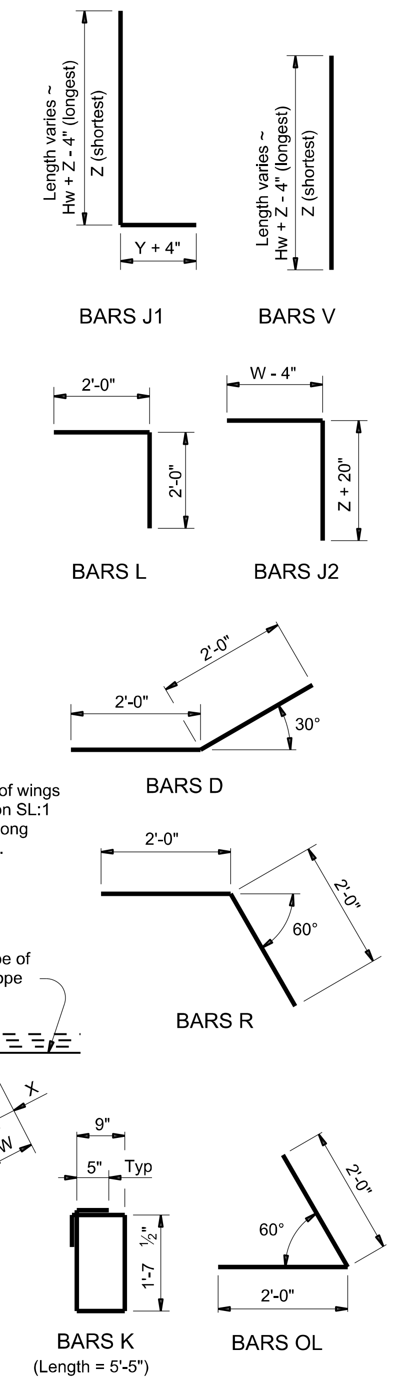
WING DIMENSION CALCULATIONS:

Hw = H + T + C - 0.250' (9)
A = (Hw - 0.333') (SL)
B = (A) (tan (30°))
Lw = (A) ÷ cos (30°))

For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)
For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.500')

Lc = (Ltw) - (2U)
Atw = (Lc) + (2B)
Total Wingwall Area (two wings ~ SF) = (Hw + 0.333') (Lw)

Hw = Height of wingwall (feet)
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)
Ltw = Culvert toewall length (feet)
Lc = Culvert curb between wings (feet)
See applicable box culvert standard for H, S, T, and U values.
See Table of Maximum Wall Heights for limits on Hw.



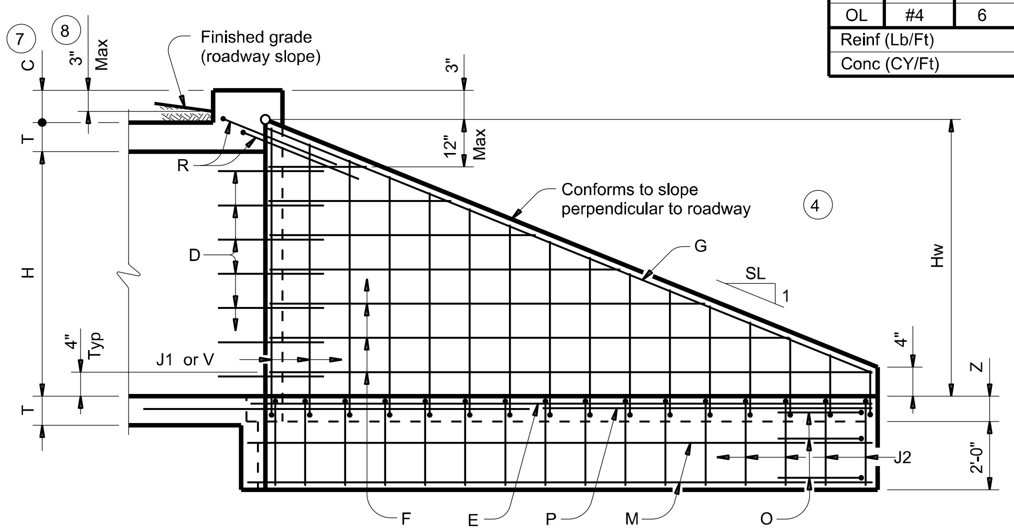
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
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 Class "C" concrete (f`c = 3,600 psi).
Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".
Provide pipe runners and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts and nuts.
Provide ASTM A36 steel plates.
Galvanize all steel components, except reinforcing unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".
For optional adhesive anchors, install adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing adhesive, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Provide anchorage rods that are clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

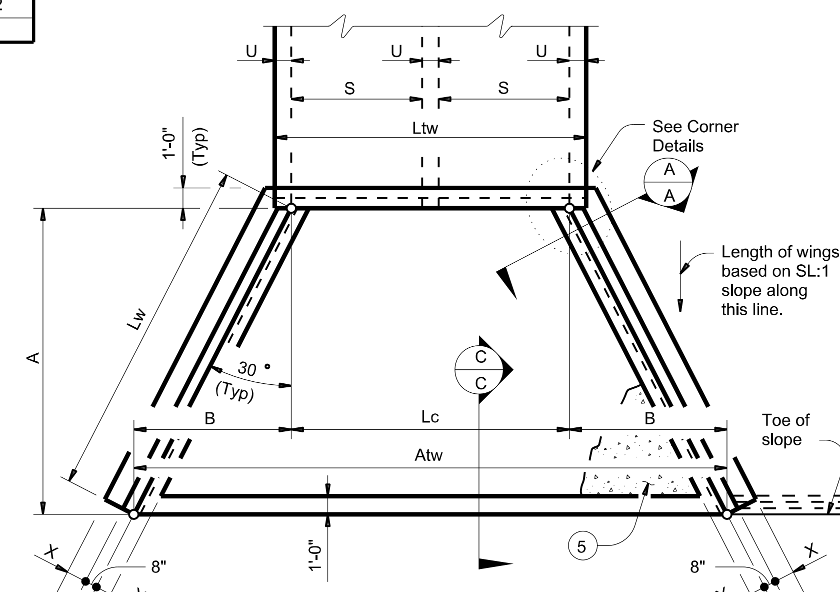
Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
All bolts, nuts, washers, brackets, angles, and pipe runners are considered parts of the safety end treatment for payment.
The quantities for pipe runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

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



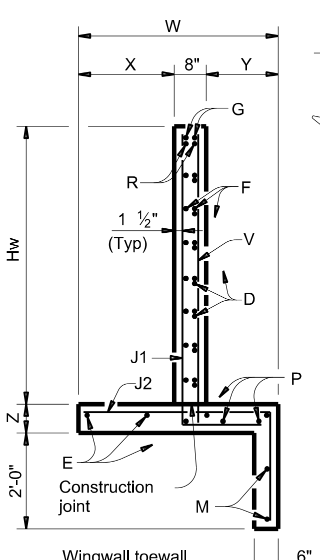
INSIDE ELEVATION OF WINGWALL

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

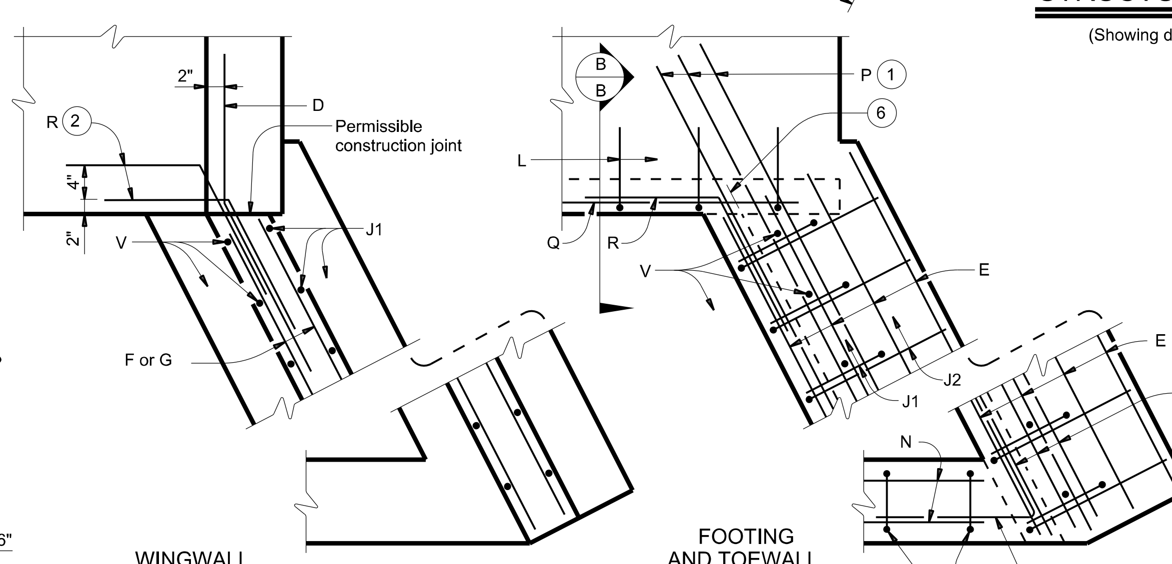


STRUCTURAL PLAN

(Showing dimensions.)

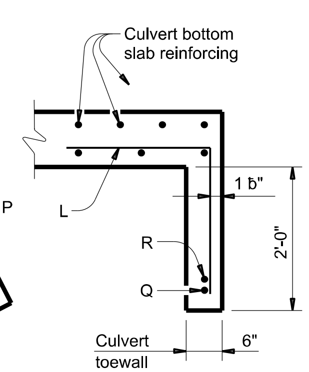


SECTION A-A

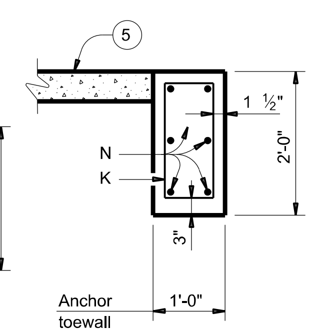


CORNER DETAILS

(Culvert and culvert toewall reinforcing not shown for clarity.)



SECTION B-B (5)



SECTION C-C

SHEET 1 OF 3

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

FILE: setbf0se-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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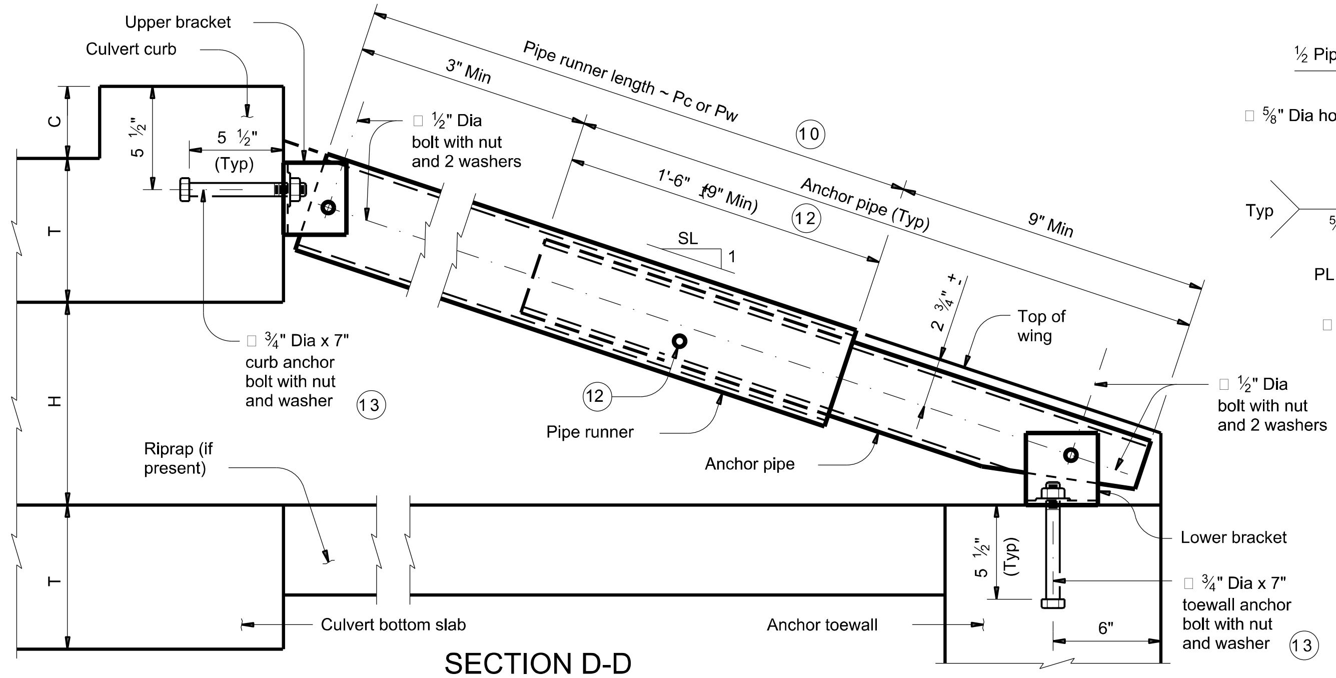
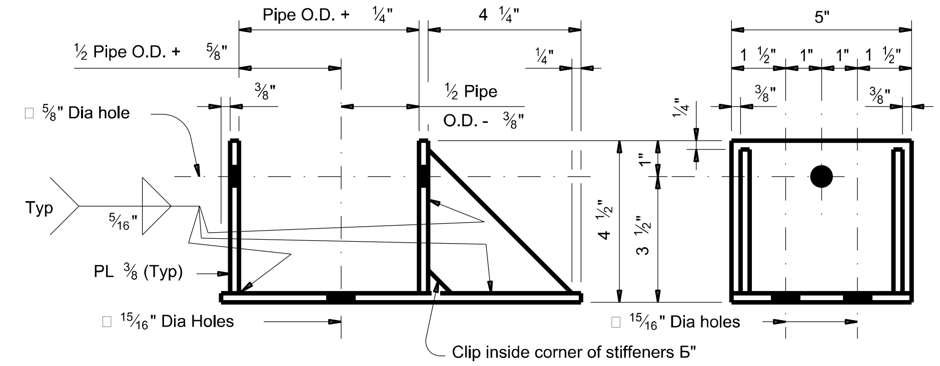
	DIST		COUNTY	SHEET NO.
	ABL		NOLAN	92



SECTION D-D

(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)



ELEVATION

SIDE VIEW

MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER SIZES

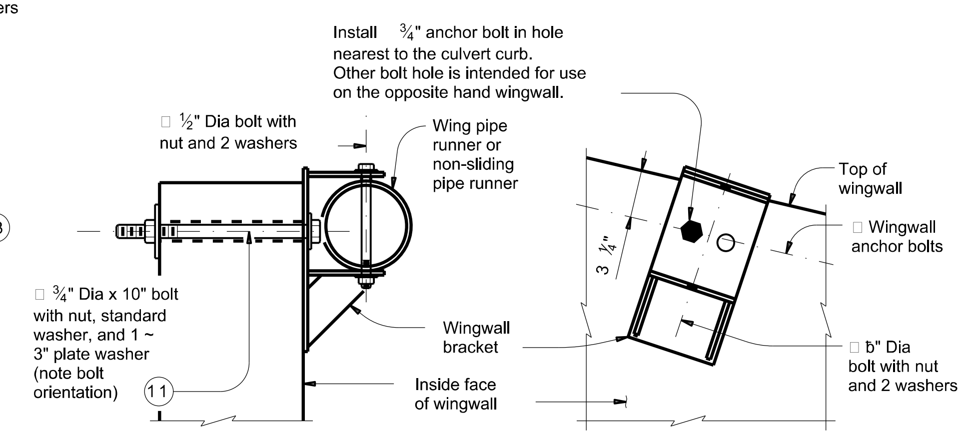
Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

(10) If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.

(11) At Contractor's option, ⅞" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.

(12) After installation of pipe runner, use the inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.

(13) At Contractor's option, an adhesive anchor may be used. Provide ¾" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.



SECTION E-E
(Showing installed bracket.)

ELEVATION
(Showing installed bracket normal to wall. Pipe not shown for clarity.)

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS

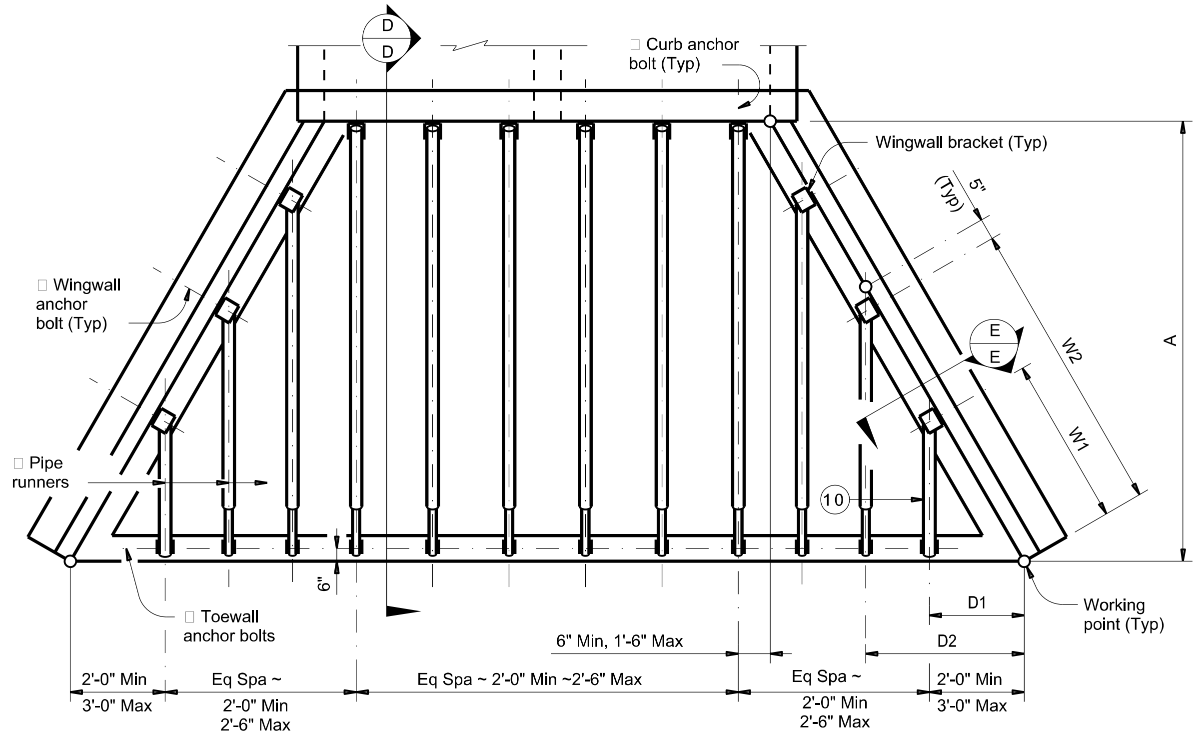
PIPE RUNNER DIMENSION CALCULATIONS:

Wn = (2.000) (Dn) - (0.416')
Pwn = (Dn) (K2) - (2.063')
Pw1 Non-Sliding Pipe Runner (If required) = (D1) (K2) - (0.563')
Pc = (A) (K1) - (1.688')

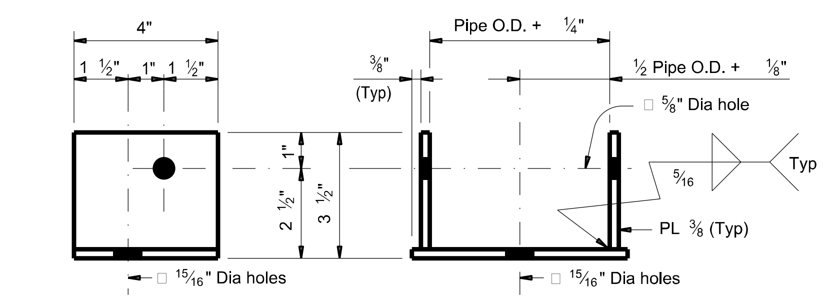
Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
Pw = Wingwall pipe runner length (feet)
Pc = Curb pipe runner length (feet)
K = Constant values for use in formulas

Slope SL:1	K1	K2
3:1	1.054	1.826
4:1	1.031	1.785
6:1	1.014	1.756

n = Wing pipe runner number



PIPE RUNNER PLAN

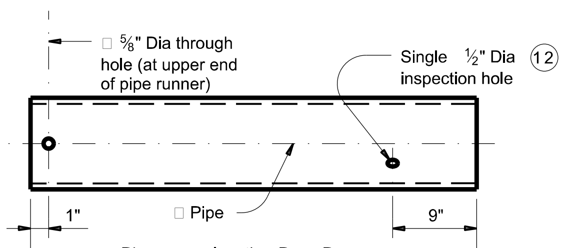


SIDE VIEW

ELEVATION

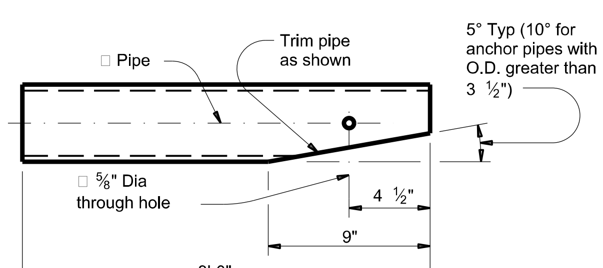
Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

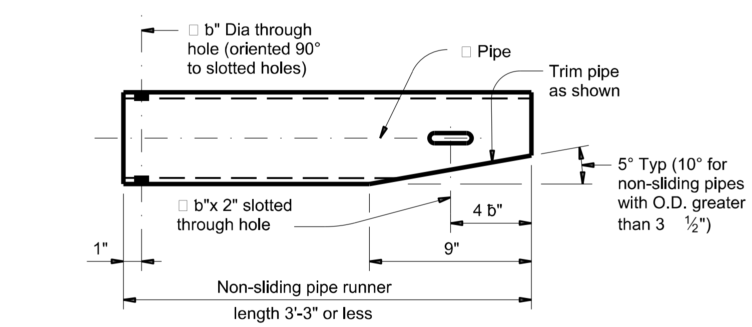


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS



ANCHOR PIPE DETAILS



Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

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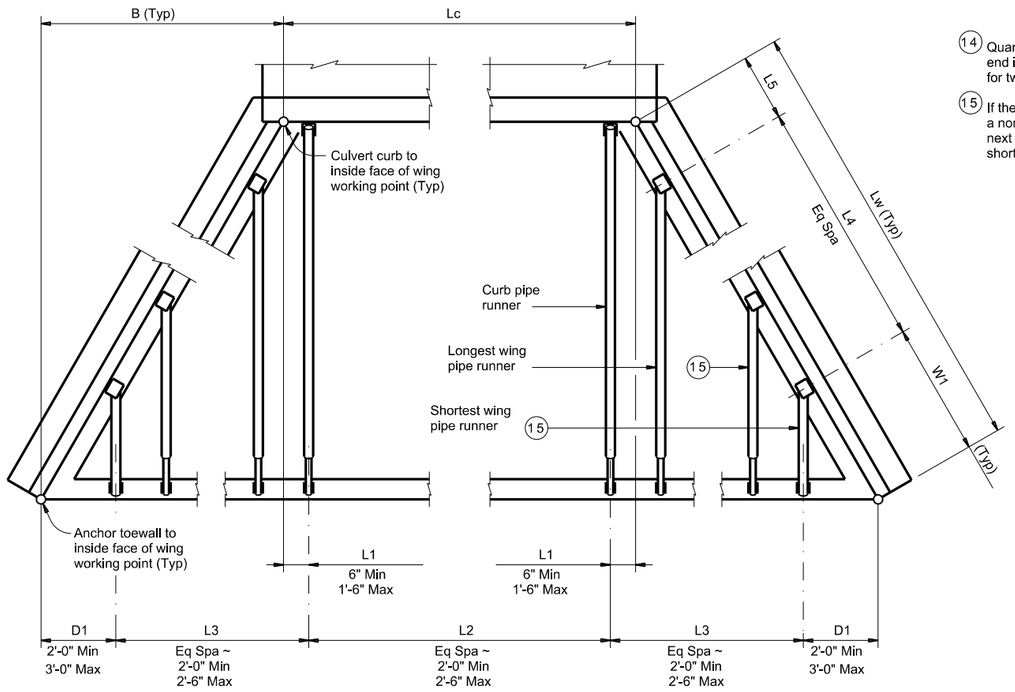
Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc	L1	L2			D1	L3			W1	L4			L5	Curb Pipe Runner (Pc)		Longest Wing Pipe Runner (Pw)	Shortest Wing Pipe Runner (Pw)	Non-Sliding Wing Pipe Runner (if applicable)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No. Spa	Spa at	Overall Length		No.	Length				Size (3",4" or 5")	Total Length (14)	Size (2",3" or 4")	Total Length (14)
	(Ft)	(Ft)		(Ft)	(Ft)	(Ft)			(Ft)	(Ft)			(Ft)	(Ft)		(Ft)	(Ft)	(Ft)	(Ft)				
127+58.02 (Both)	4.000 '	0.750 '	1	2.500 '	2.500 '	2.250 '	2	2.041'	4.081'	4.083 '	1	4.081'	4.081'	2.998 '	2	8.271'	5.604 '	1.958 '	N/A	3"	63.333 '	2"	36.000 '
198+38.44 (Both)	3.000 '	0.500 '	1	2.000 '	2.000 '	2.000 '	2	2.041'	4.081'	3.583 '	1	4.081'	4.081'	3.498 '	2	8.271'	5.146 '	N/A	3.000 '	3"	65.667 '	2"	24.000 '
250+29.09 (Both)	5.000 '	0.500 '	2	2.000 '	4.000 '	2.000 '	2	2.041'	4.081'	3.583 '	1	4.081'	4.081'	3.498 '	3	8.271'	5.146 '	N/A	3.000 '	3"	82.208 '	2"	30.000 '
250+43.96 (Both)	4.000 '	0.750 '	1	2.500 '	2.500 '	2.250 '	2	2.041'	4.081'	4.083 '	1	4.081'	4.081'	2.998 '	2	8.271'	5.604 '	1.958 '	N/A	3"	63.333 '	2"	36.000 '



PIPE RUNNER LAYOUT

(14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.

(15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

SPECIAL NOTE:

This tabular sheet is to be filled out by the culvert specifier and provides information for the construction details and quantities of pipe runners.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Note that the tabular quantities are given for estimating purposes only. It is likely that these quantities will change due to field conditions. Therefore, all dimensions must be verified by the Contractor in the field prior to fabrication of the safety end treatment components.

DATE: 6/5/2023 8:00:19 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/SETB-FW-0.dgn

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT WITH FLARED WINGS

FOR 0° SKEW BOX CULVERTS
TYPE I ~ CROSS DRAINAGE

SETB-FW-0

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	ABL	NOLAN		94

DATE: 6/5/2023 8:00:56 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/pwstde01-20.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

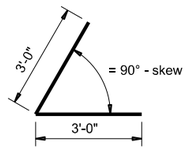
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

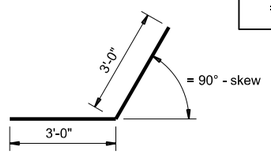
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

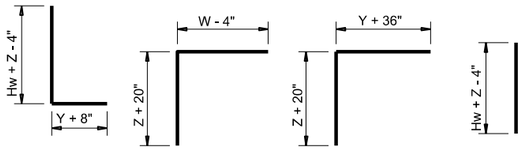
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION FORMULAS:

(All values are in feet.)

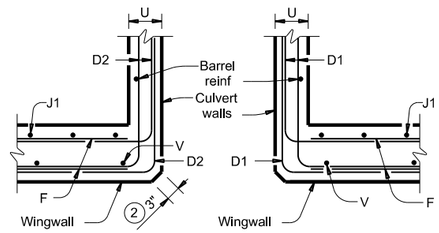
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw 4' ≥
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw 4' <

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

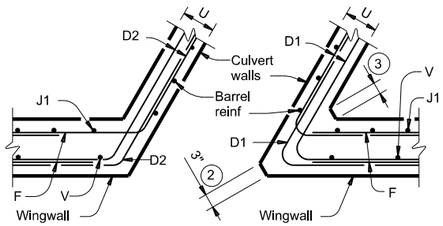
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw 4' ≥
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw 4' <

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

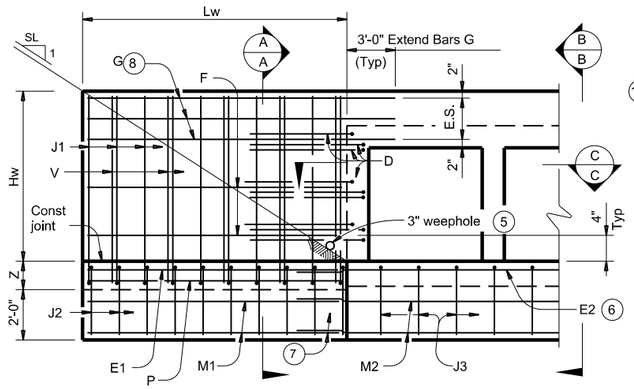
See applicable box culvert standard sheet for S, H, T, and U values.



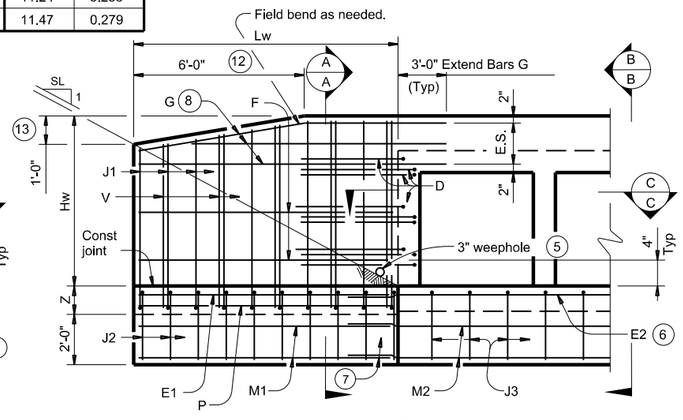
SECTION C-C - PW-1



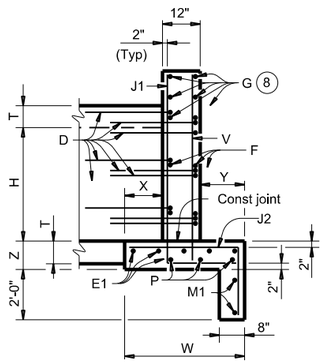
SECTION C-C - PW-2



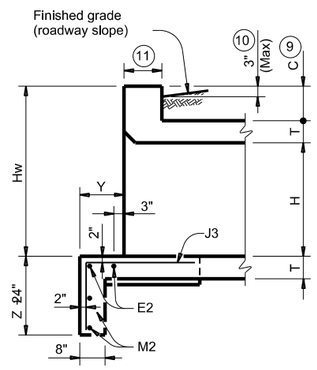
PARTIAL ELEVATION - PW-1



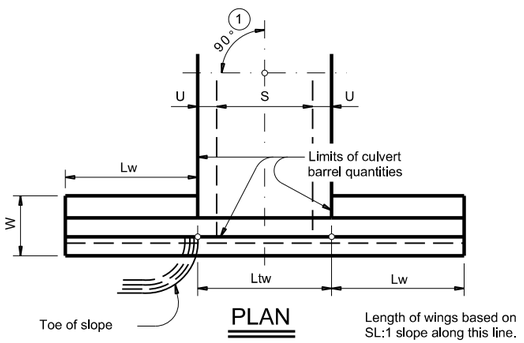
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)



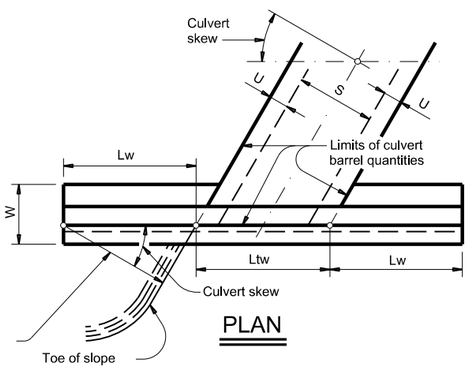
SECTION B-B
(Showing wing reinforcement.)



PLAN

Length of wings based on SL:1 slope along this line.

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

FILE: pwstde01-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
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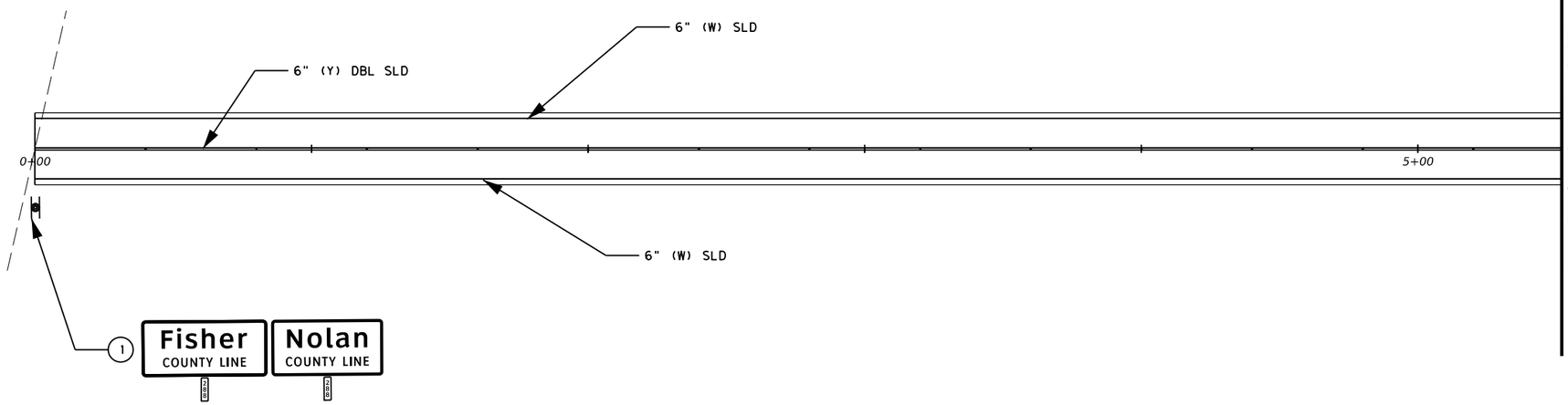
REVISIONS	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		95



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SIGN NO.

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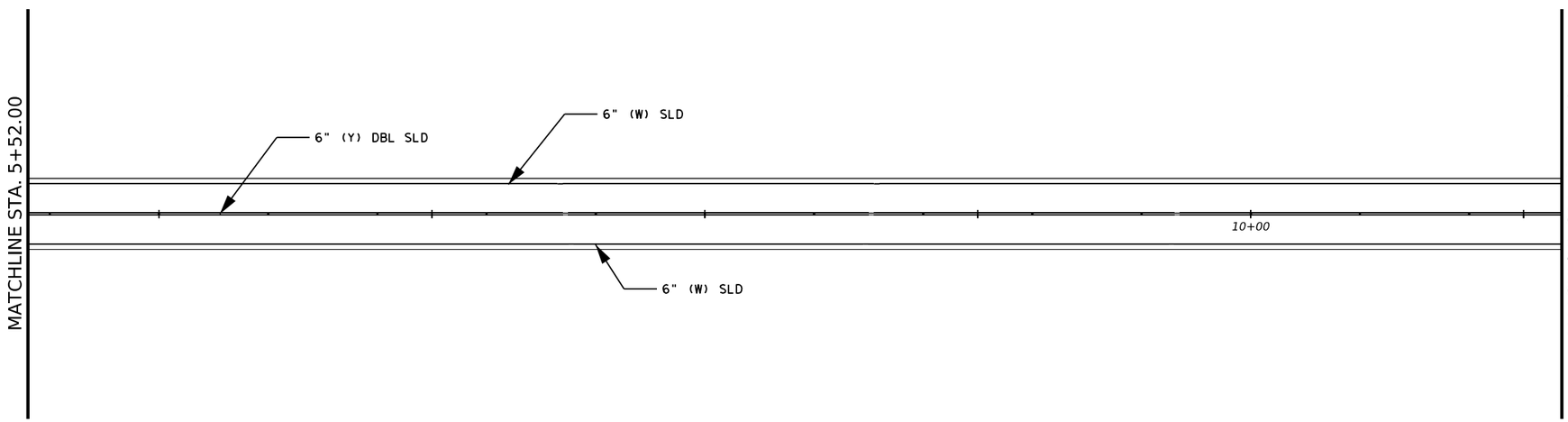

STATE OF TEXAS
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100126
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PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

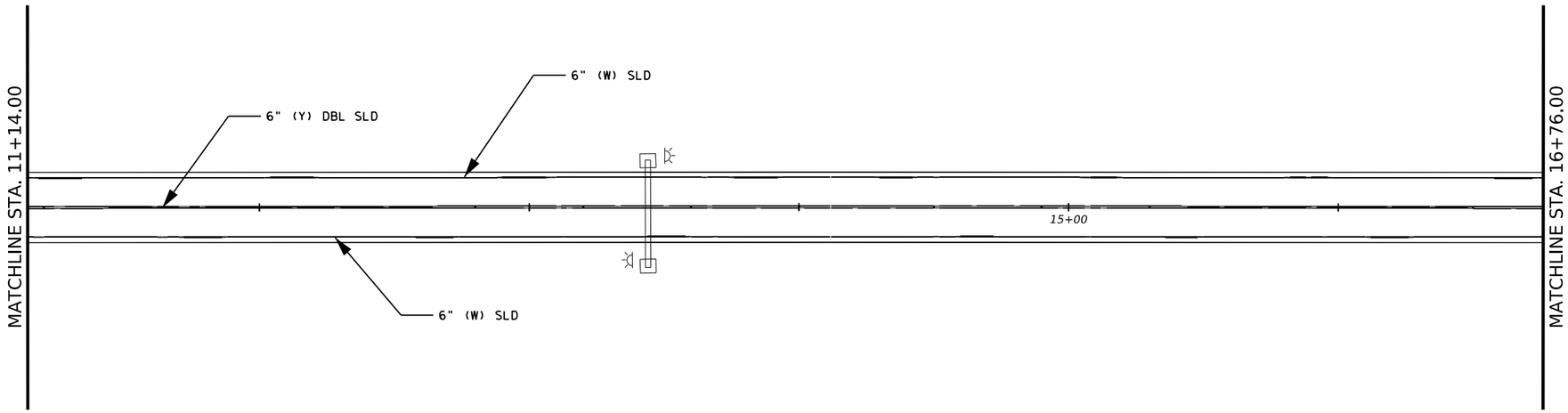
06/06/2023

SIGN & STRIPING LAYOUT

SCALE: 1" = 50'

SHEET 1 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		96
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



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SIGN NO.

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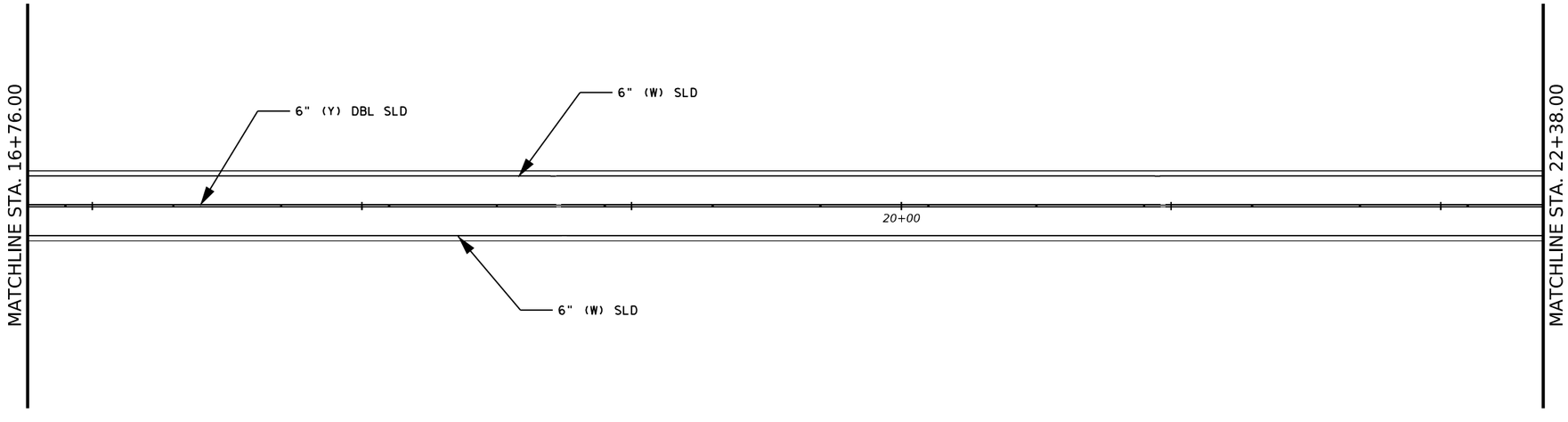

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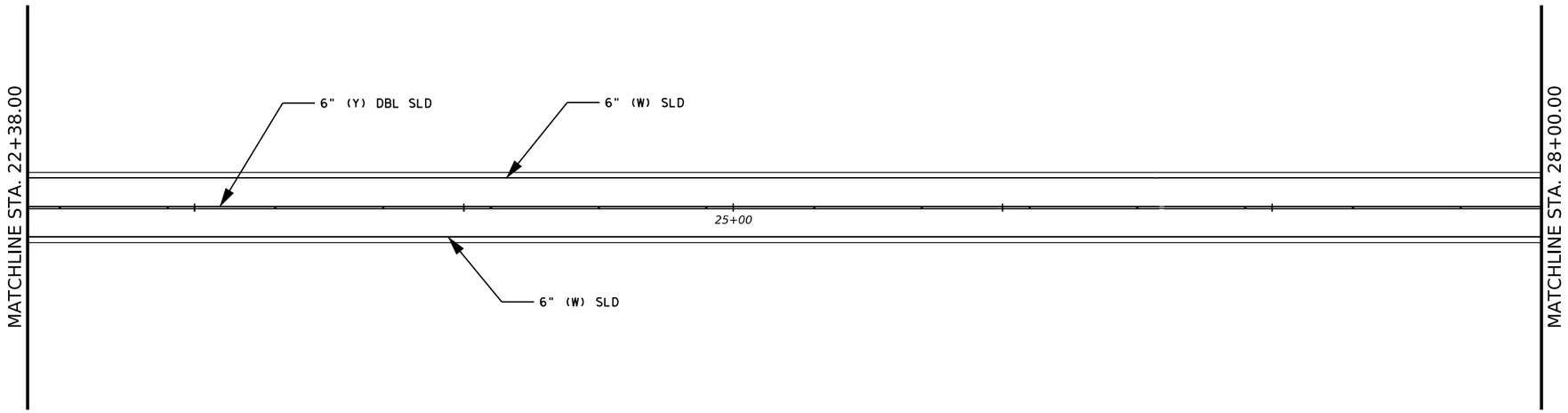
SCALE: 1" = 50'

SHEET 2 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		97
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



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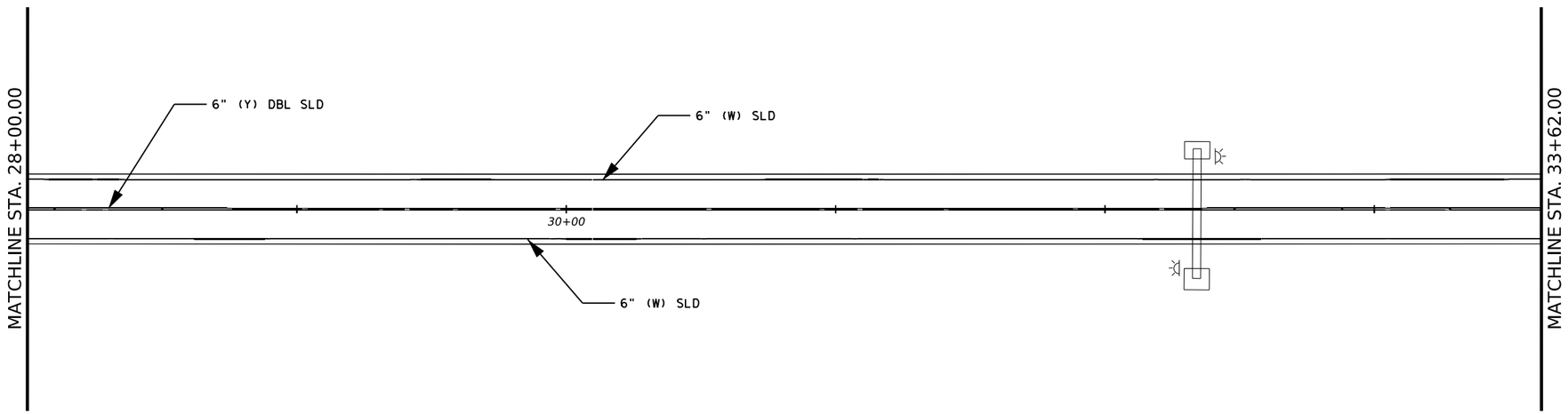
SIGN NO.

OBJECT MARKER



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SCALE: 1" = 50'

SHEET 3 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		98
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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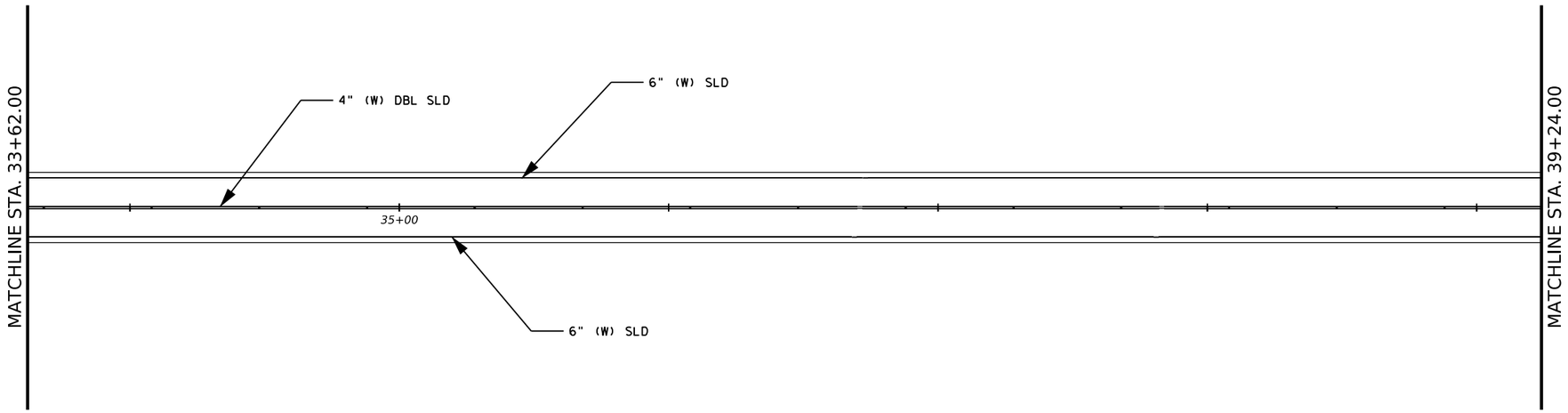
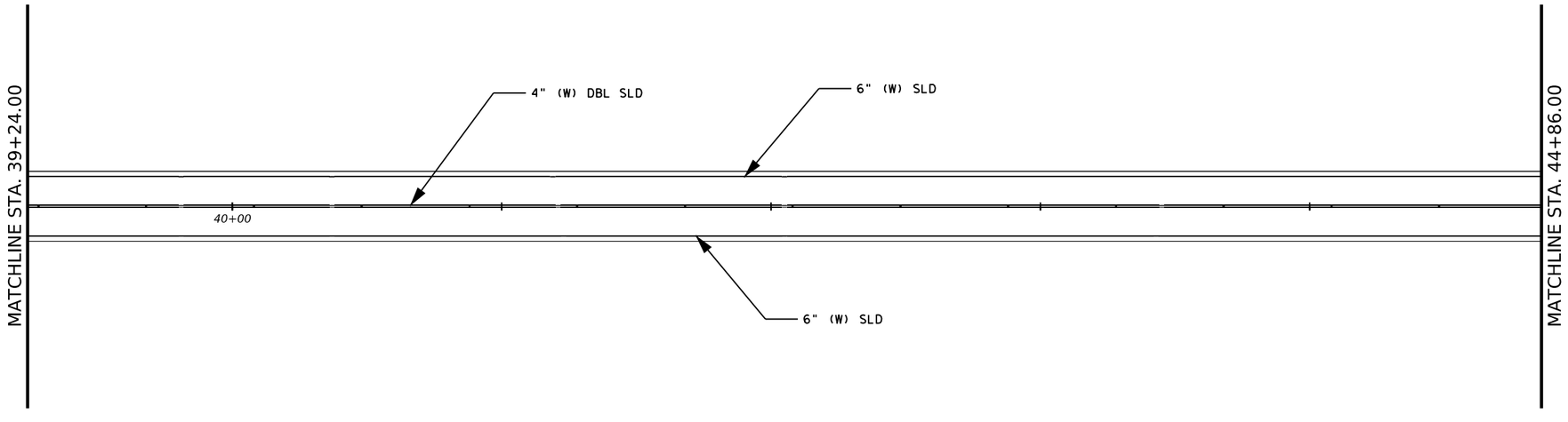


LEGEND

SIGN NO.

OBJECT MARKER



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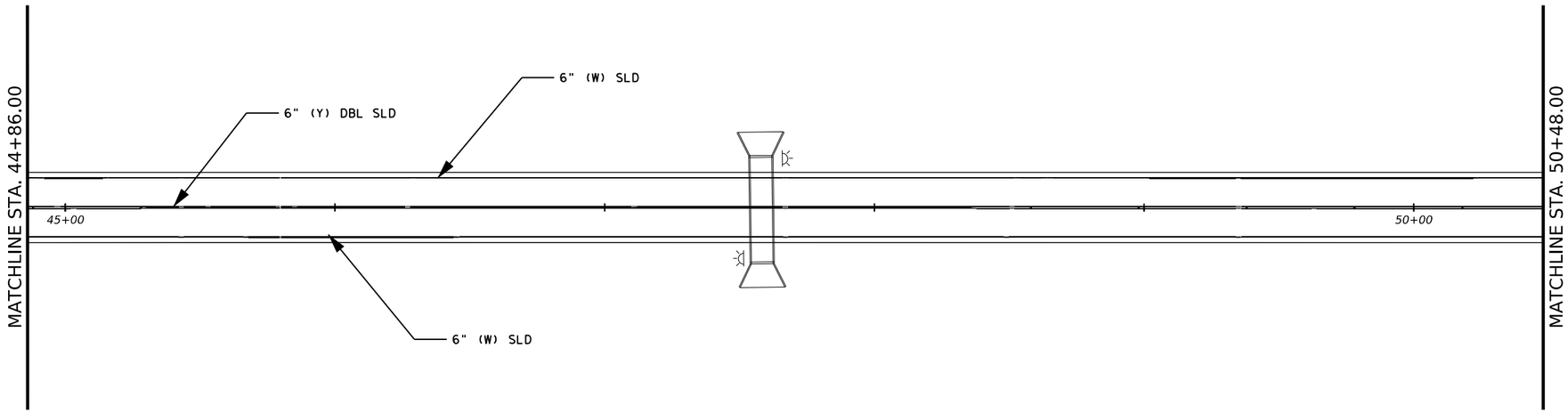
Texas Department of Transportation

SCALE: 1" = 50'

SHEET 4 OF 25

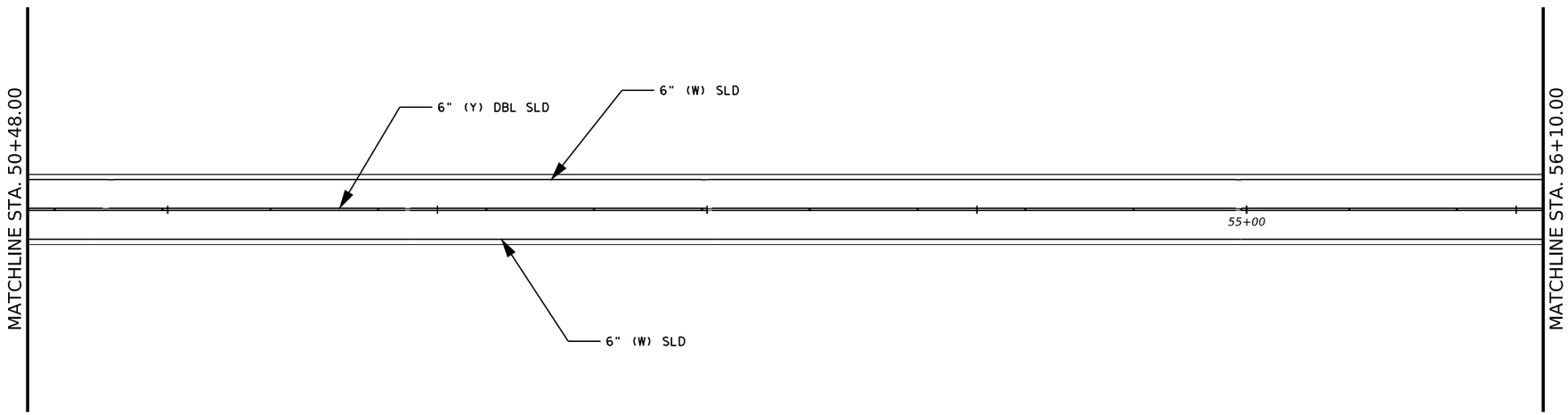
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		99
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



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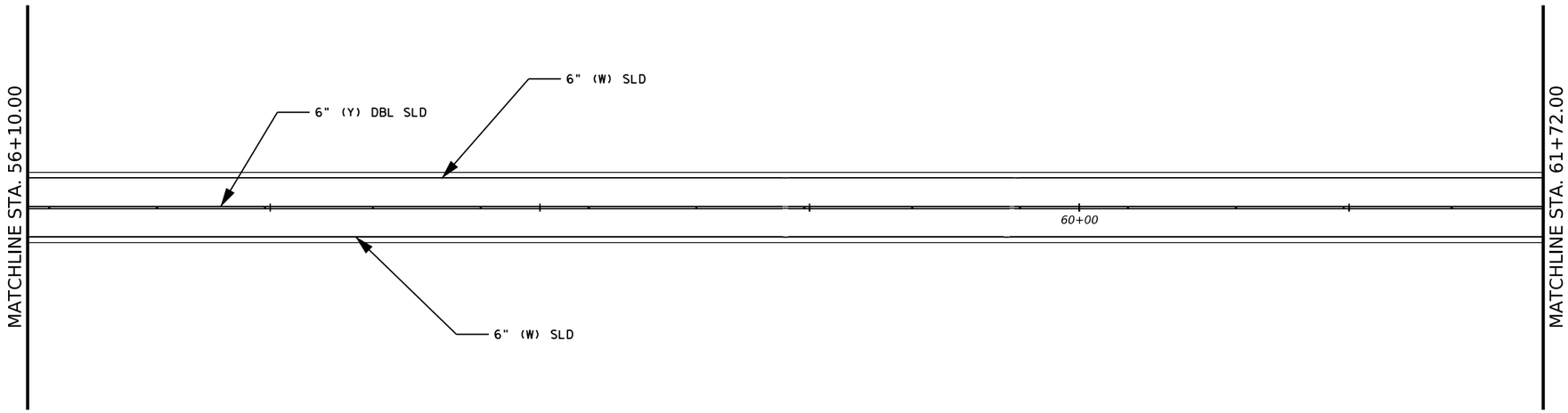
SCALE: 1" = 50' SHEET 5 OF 25

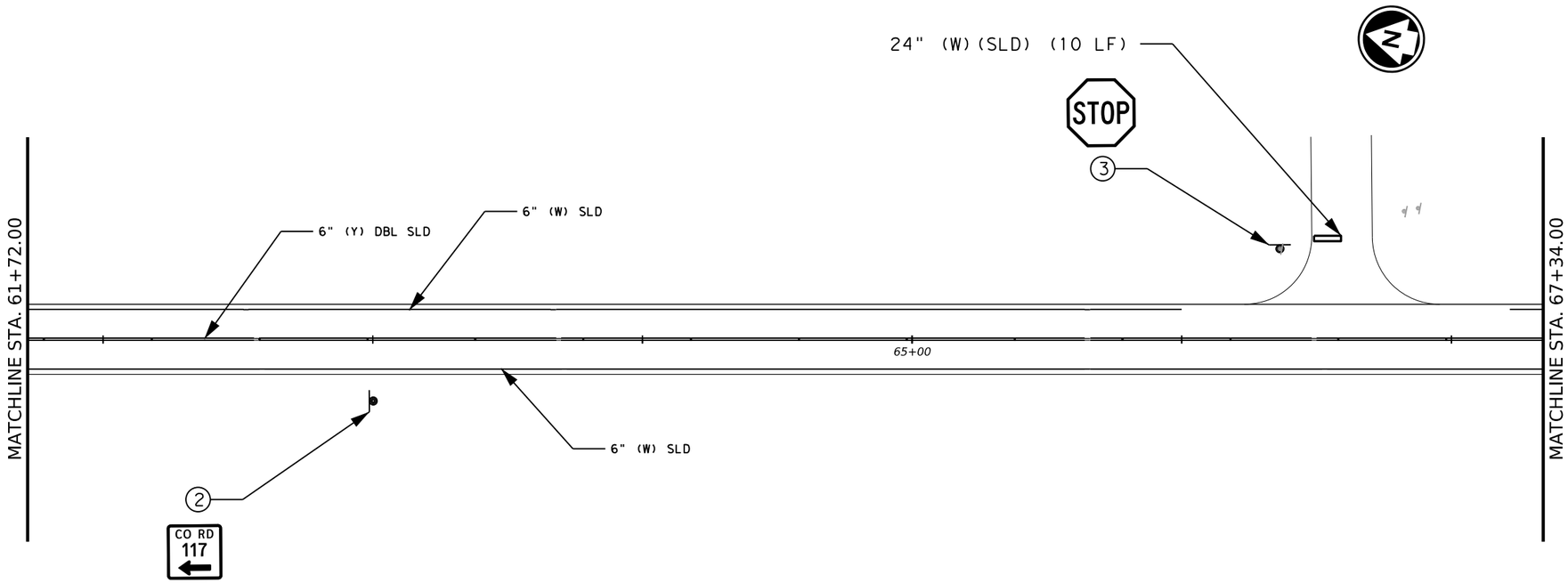
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		100
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



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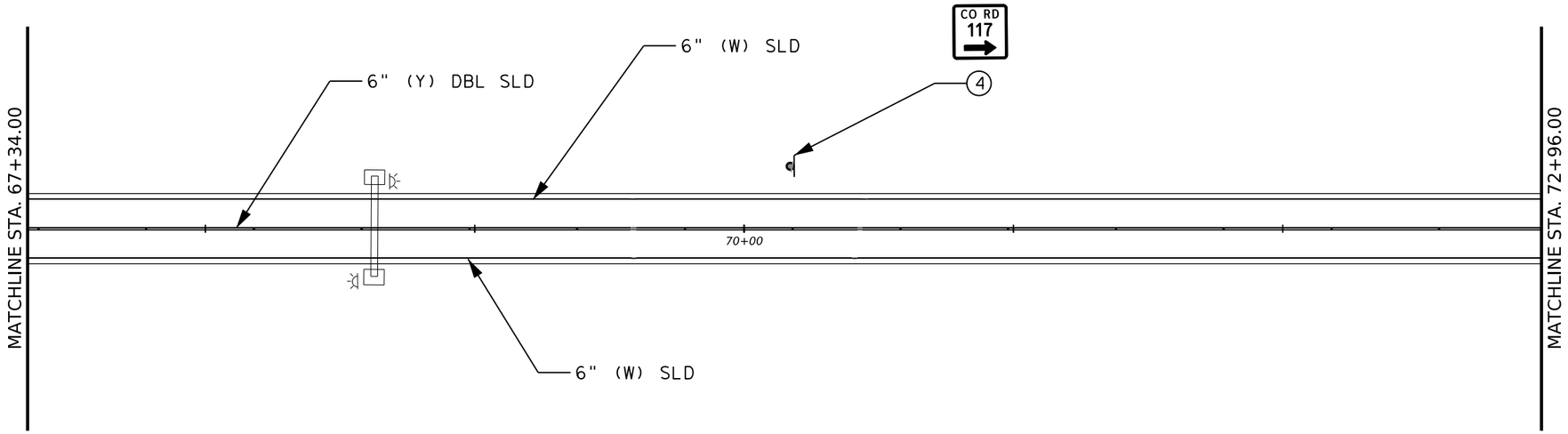
SCALE: 1" = 50'

SHEET 6 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		101
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



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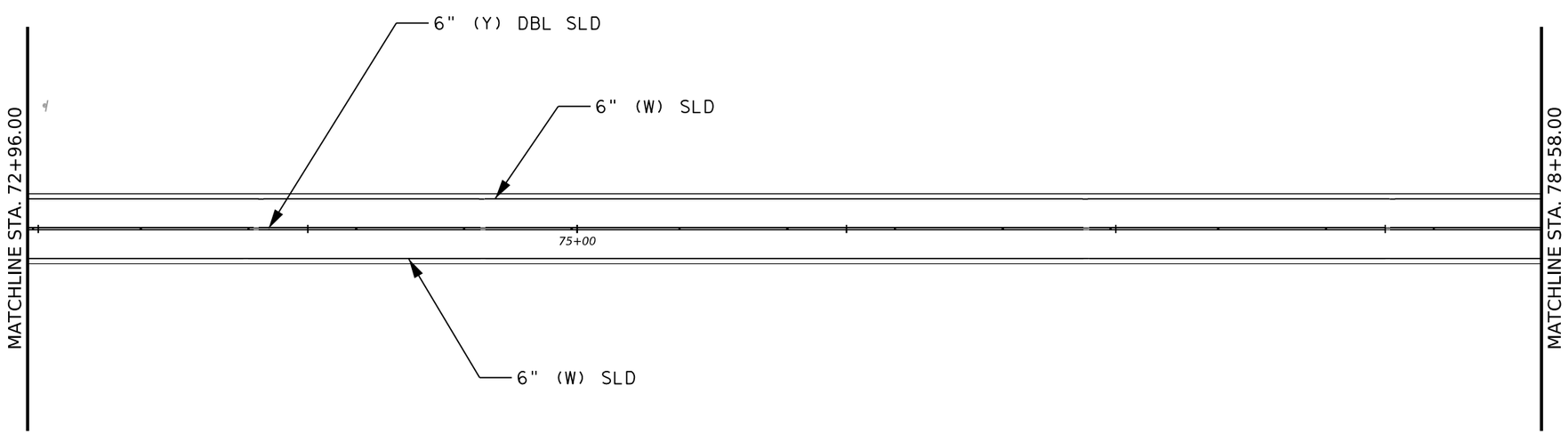
SIGN NO.

OBJECT MARKER



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 Texas Department of Transportation

SCALE: 1" = 50'

SHEET 7 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		102
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
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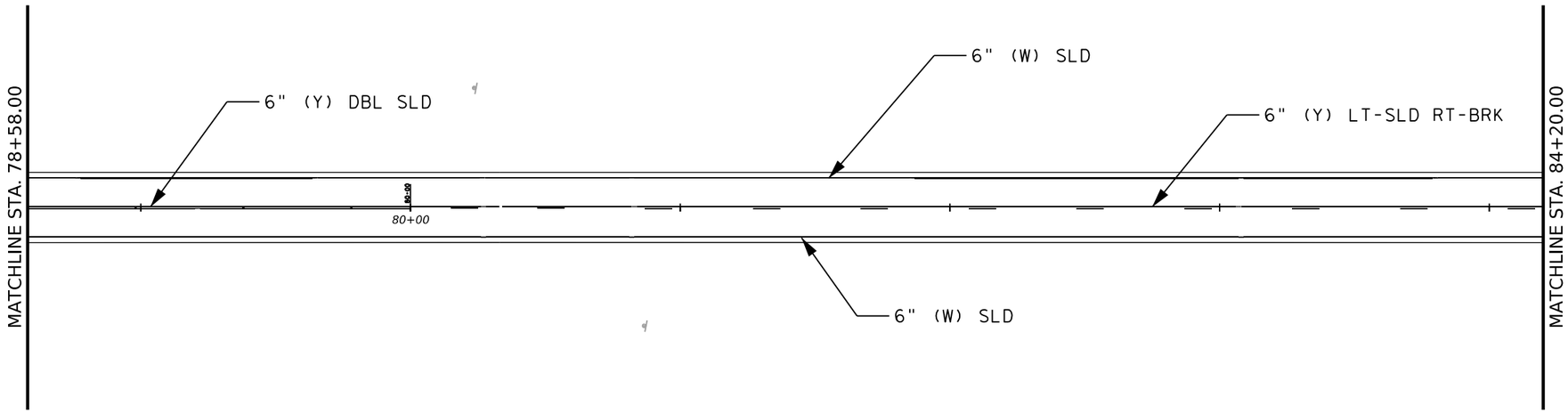

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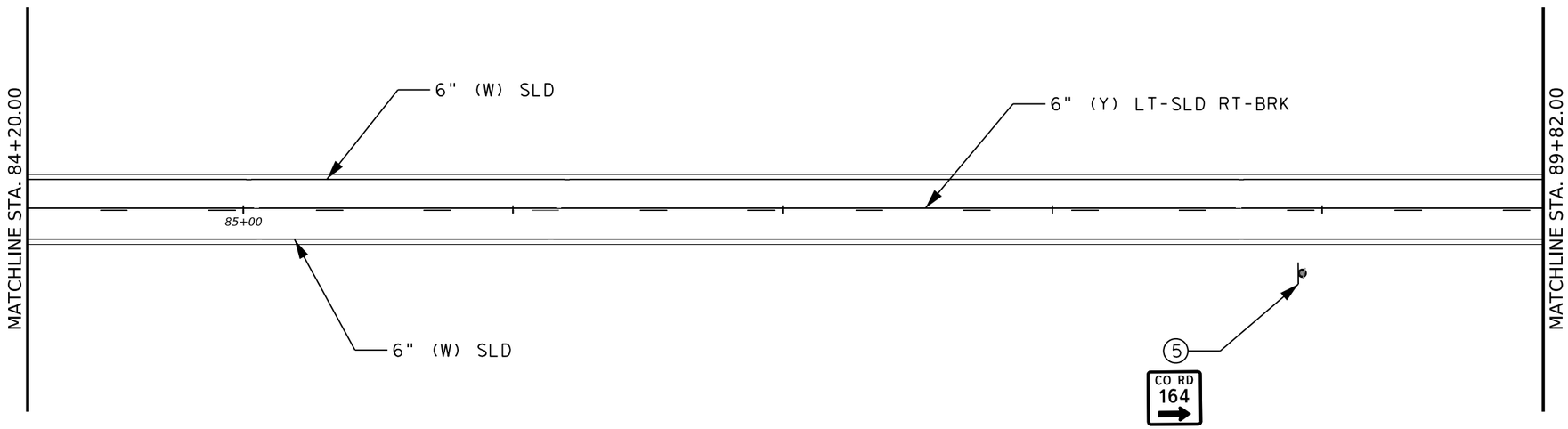
SIGN NO.

OBJECT MARKER



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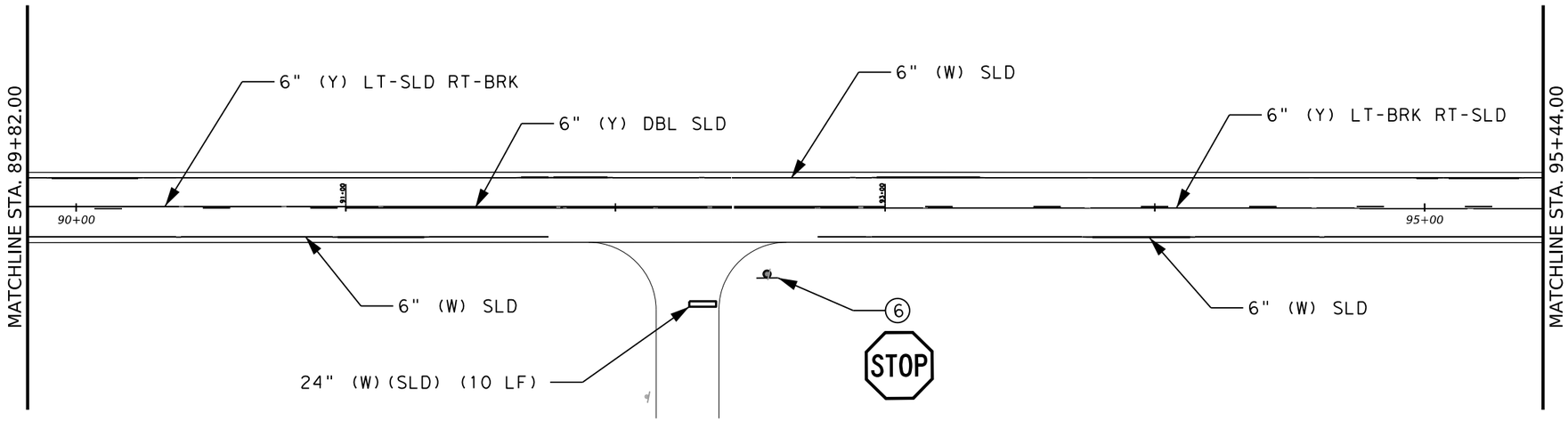
SCALE: 1" = 50'

SHEET 8 OF 25

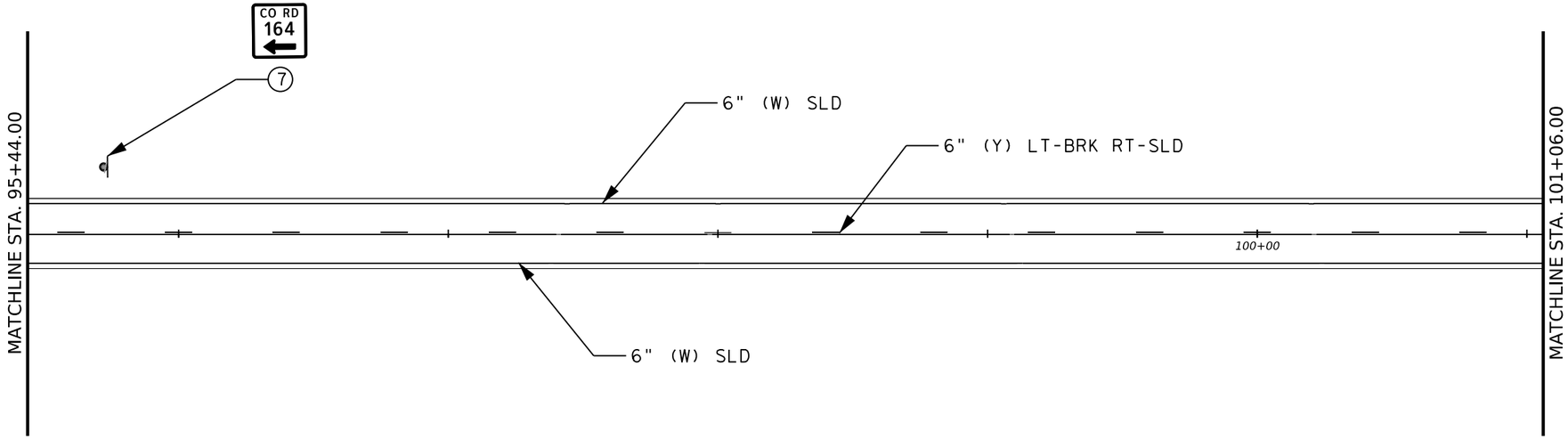
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		103
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



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SCALE: 1" = 50'

SHEET 9 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		104
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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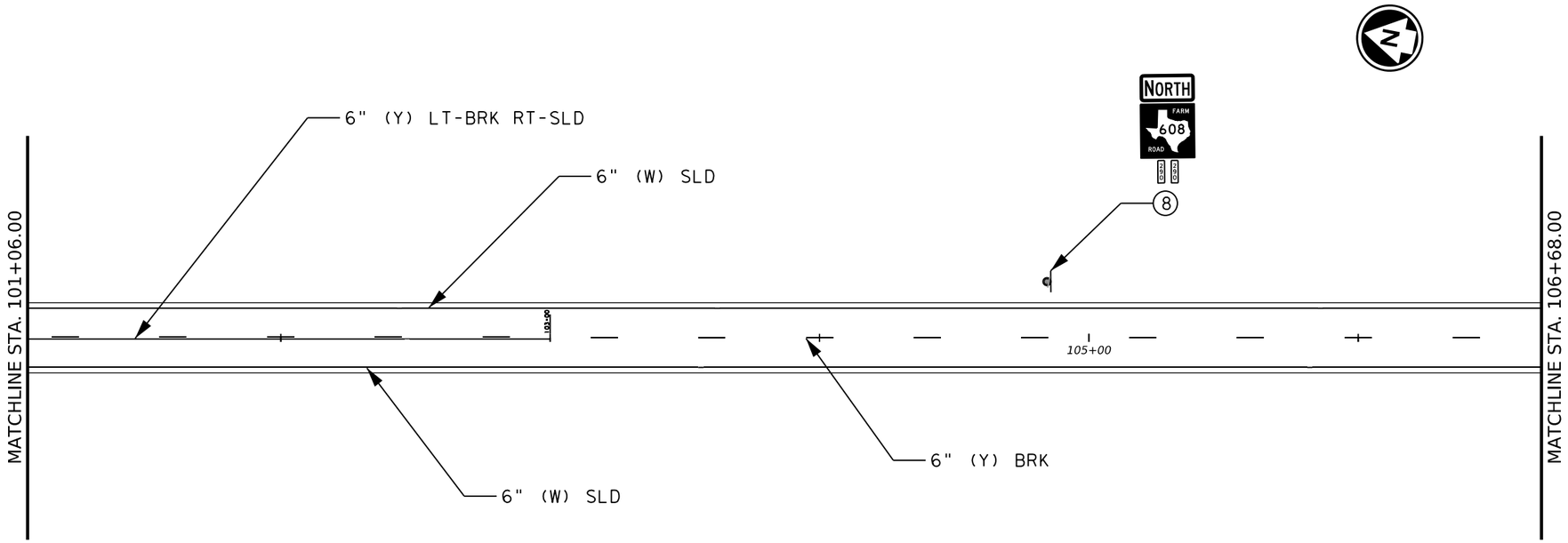

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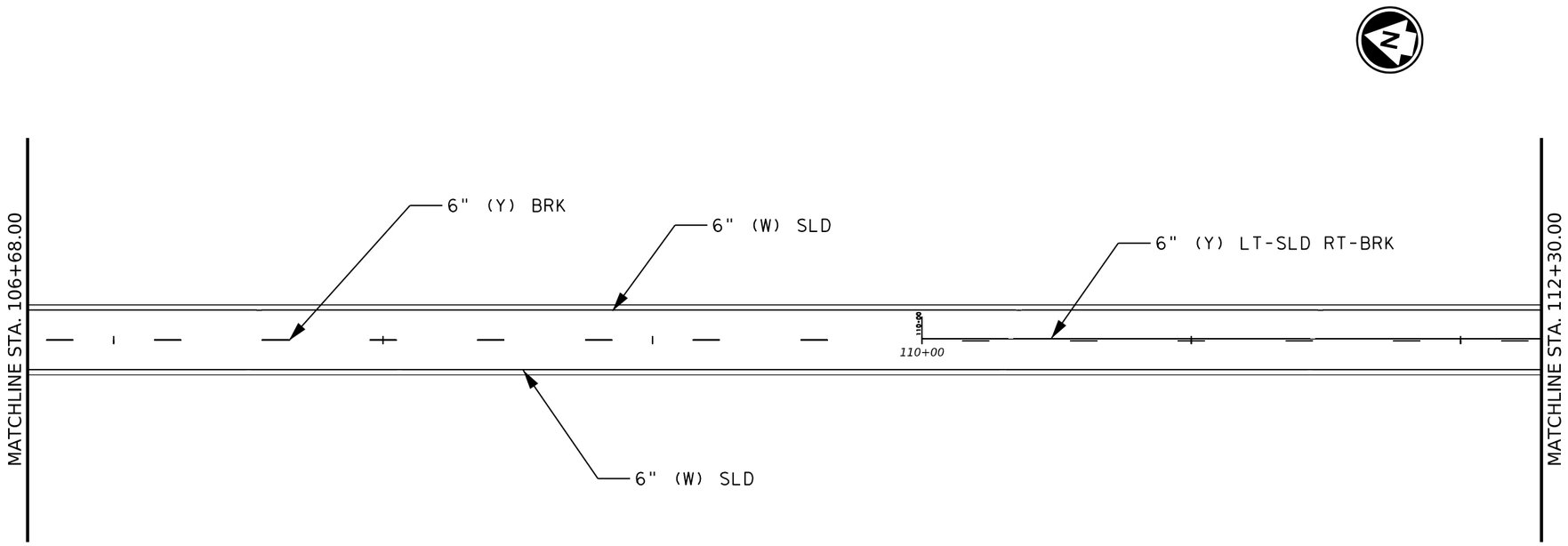

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SCALE: 1" = 50'

SHEET 10 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		105
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
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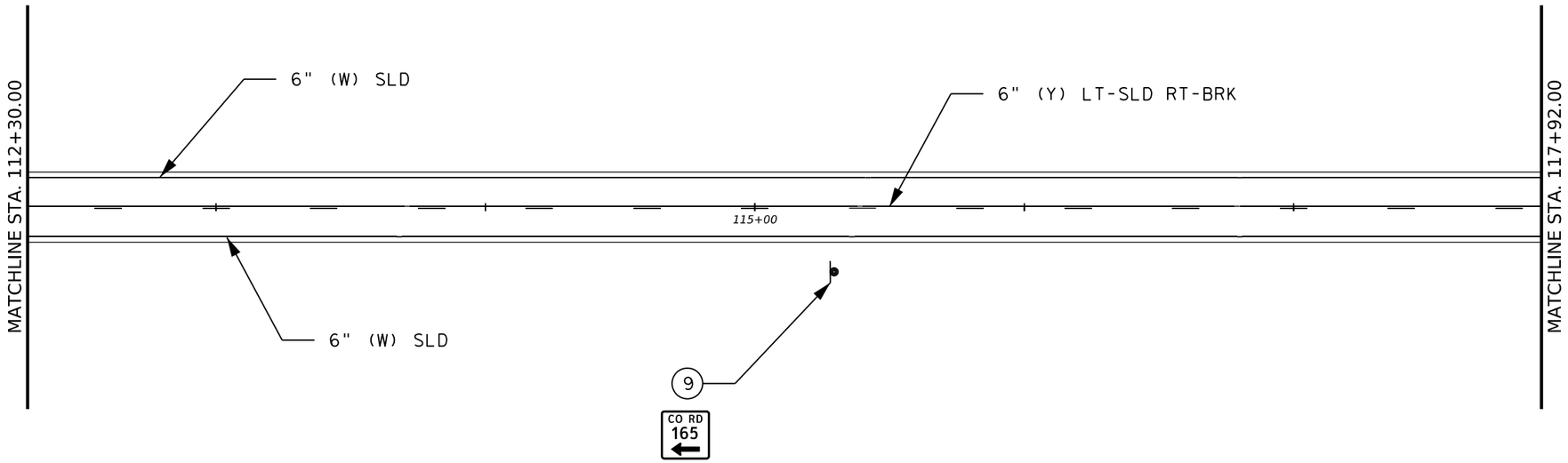
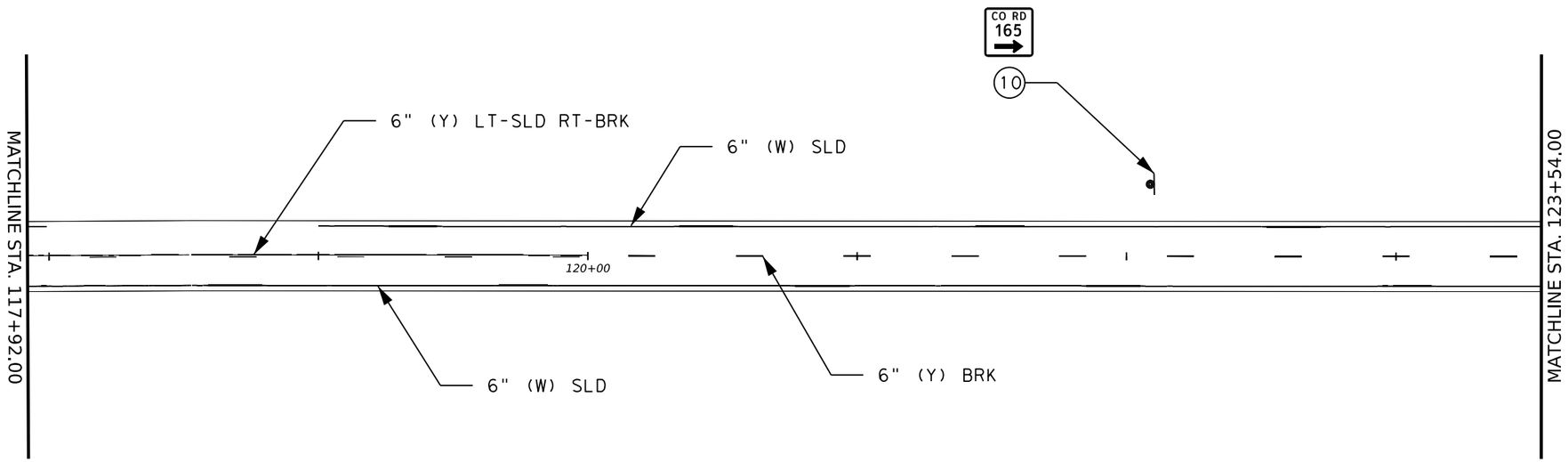


LEGEND

SIGN NO.

OBJECT MARKER



STATE OF TEXAS
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Texas Department of Transportation

SCALE: 1" = 50 SHEET 11 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		106
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
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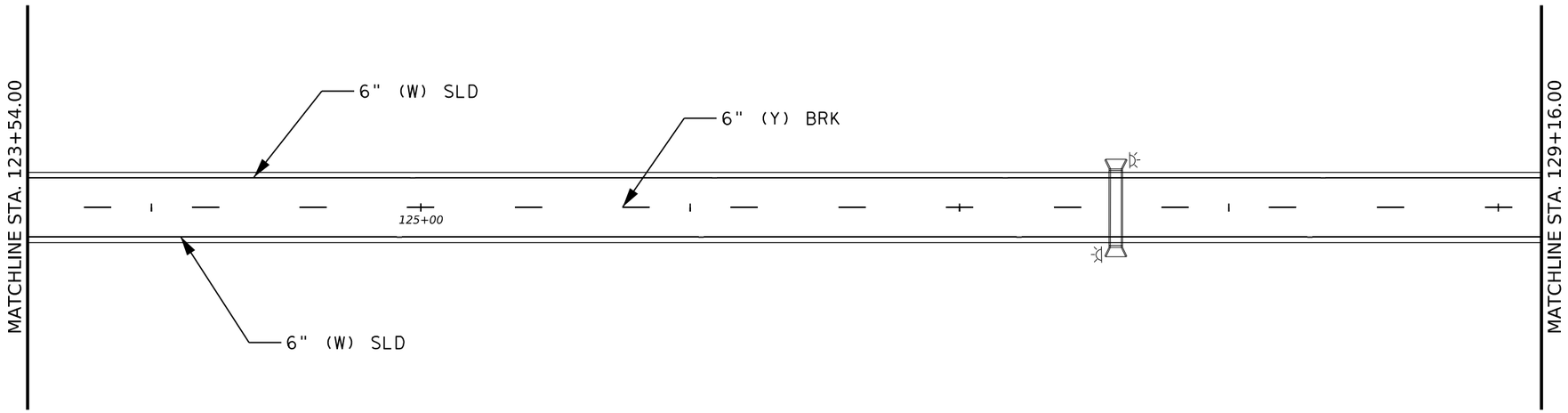
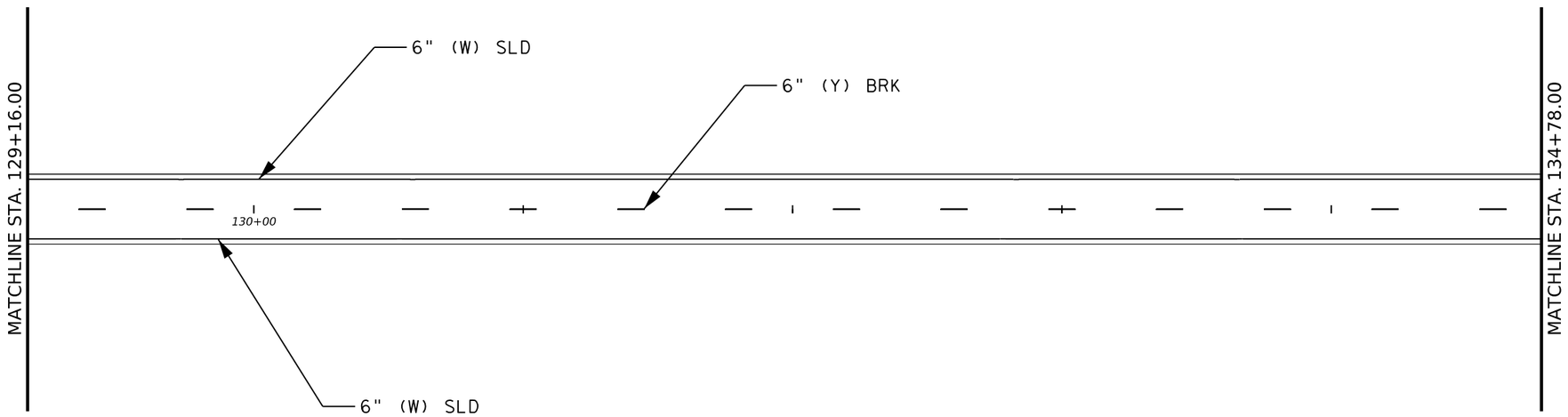


LEGEND

SIGN NO.

OBJECT MARKER



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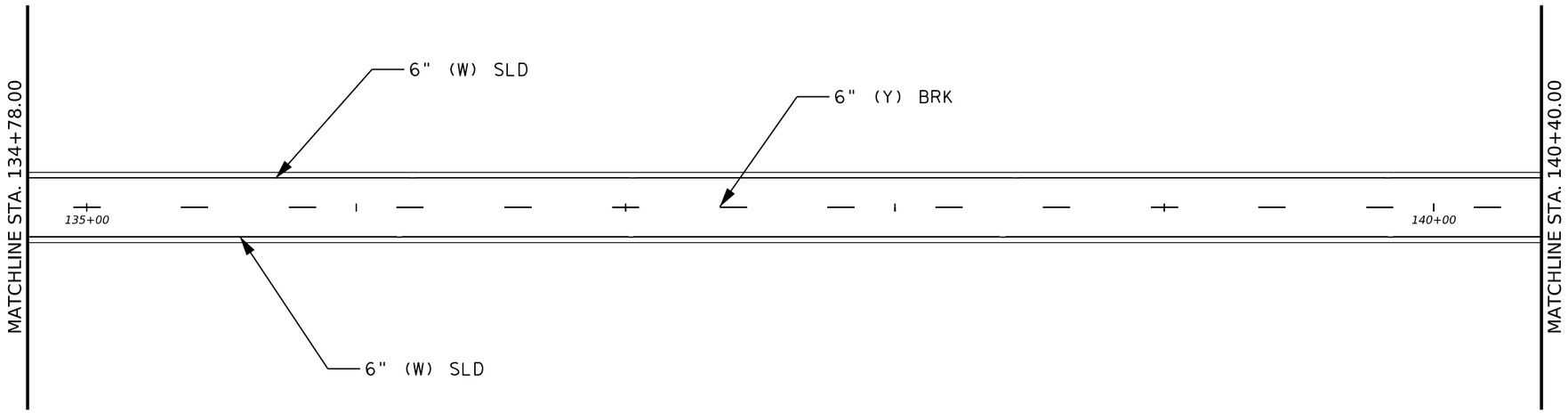
Texas Department of Transportation

SCALE: 1" = 50' SHEET 12 OF 25

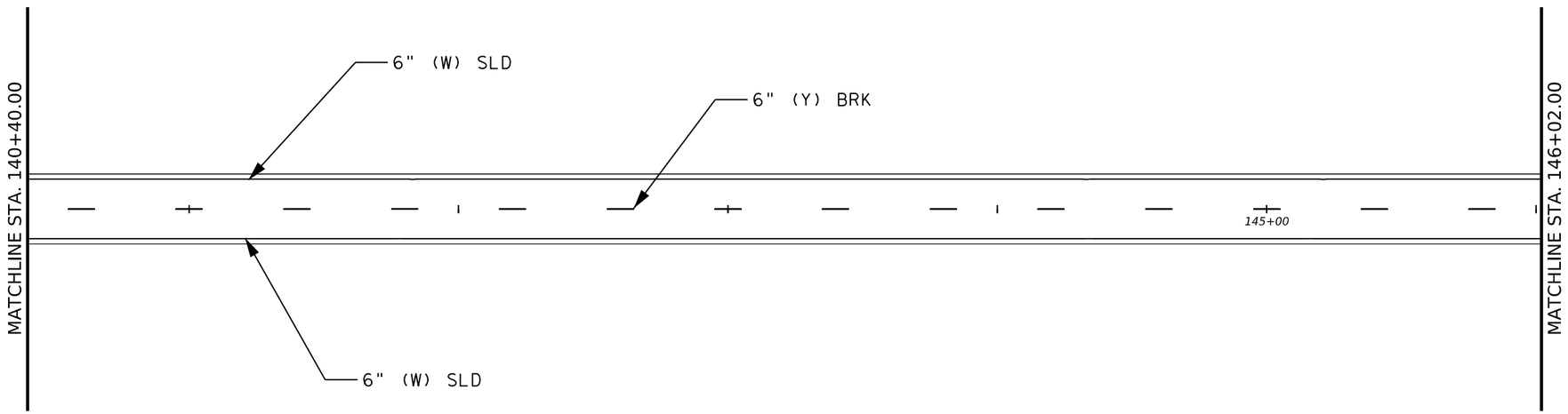
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		107
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



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06/06/2023

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Texas Department of Transportation

SCALE: 1" = 50'

SHEET 13 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		108
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
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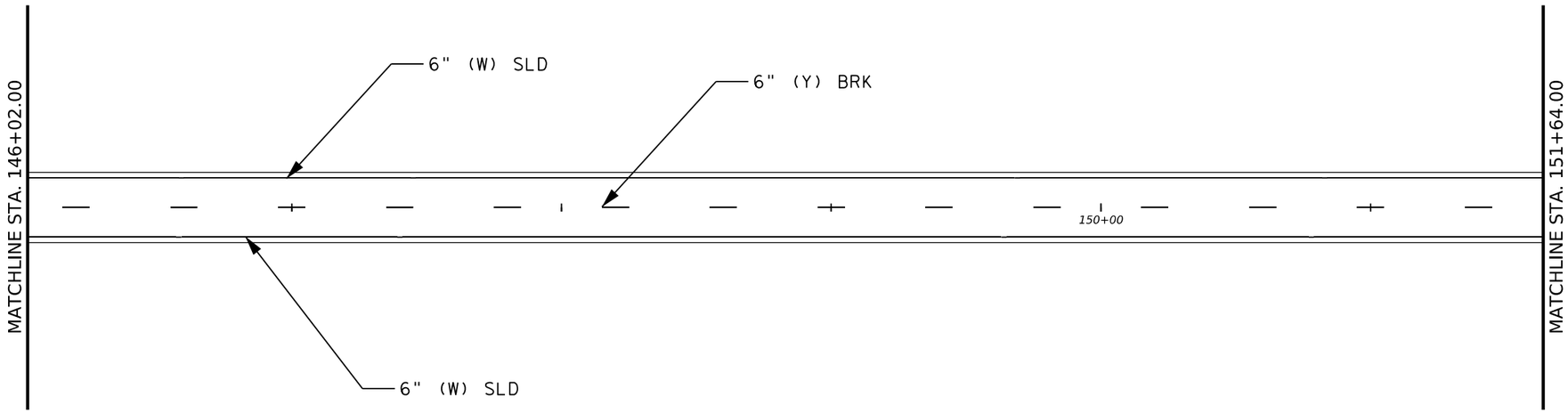

LEGEND

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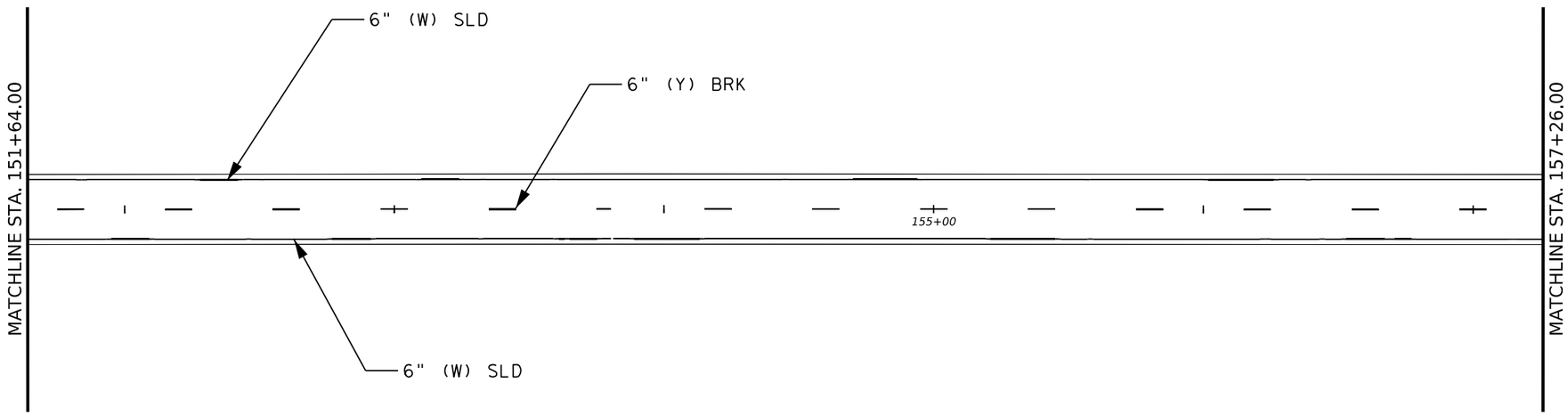

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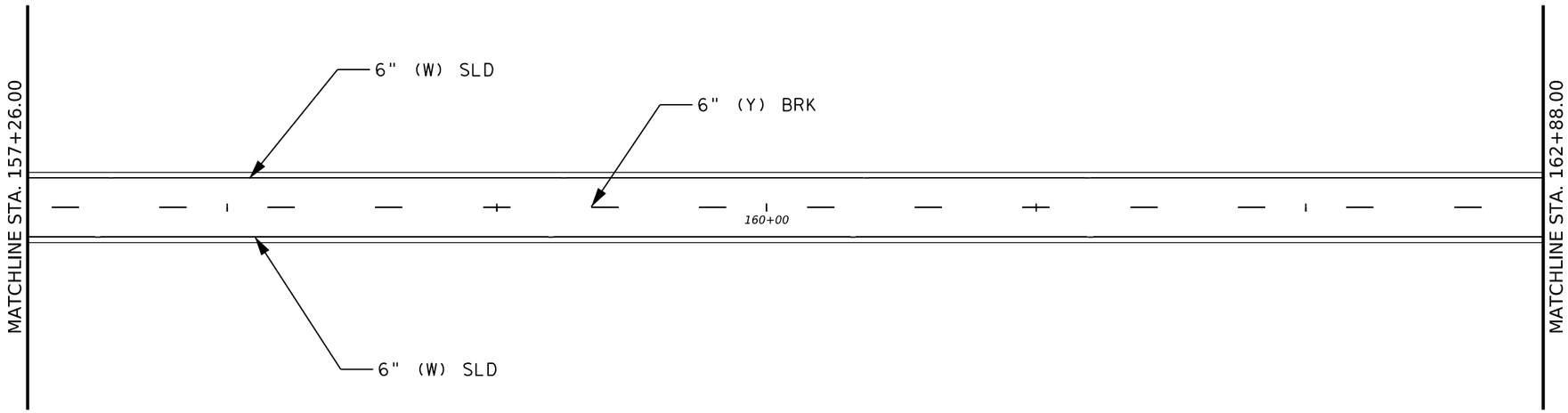
SCALE: 1" = 50'

SHEET 14 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		109
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



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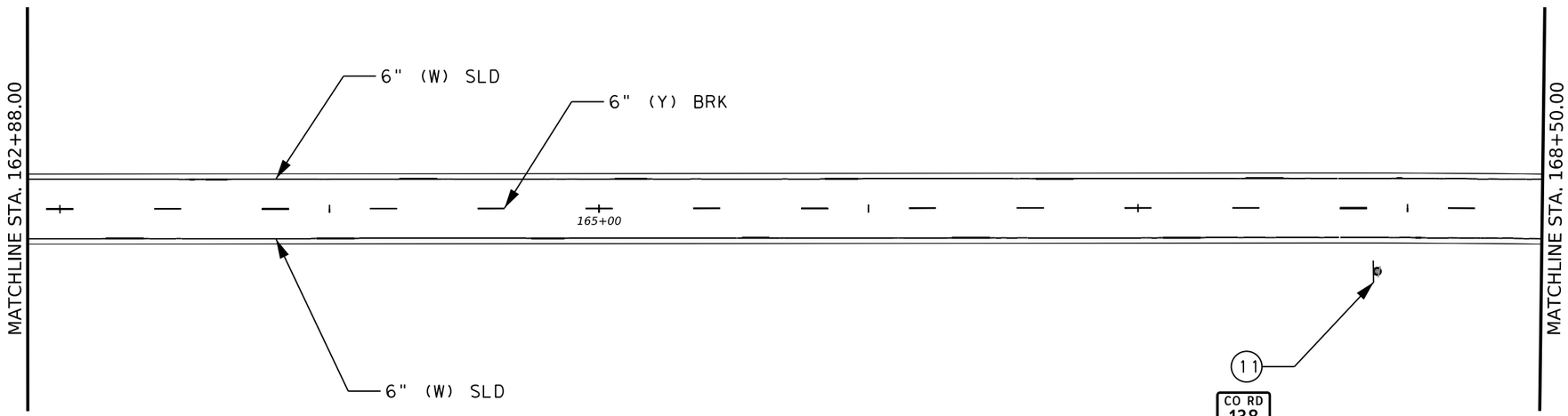
OBJECT MARKER



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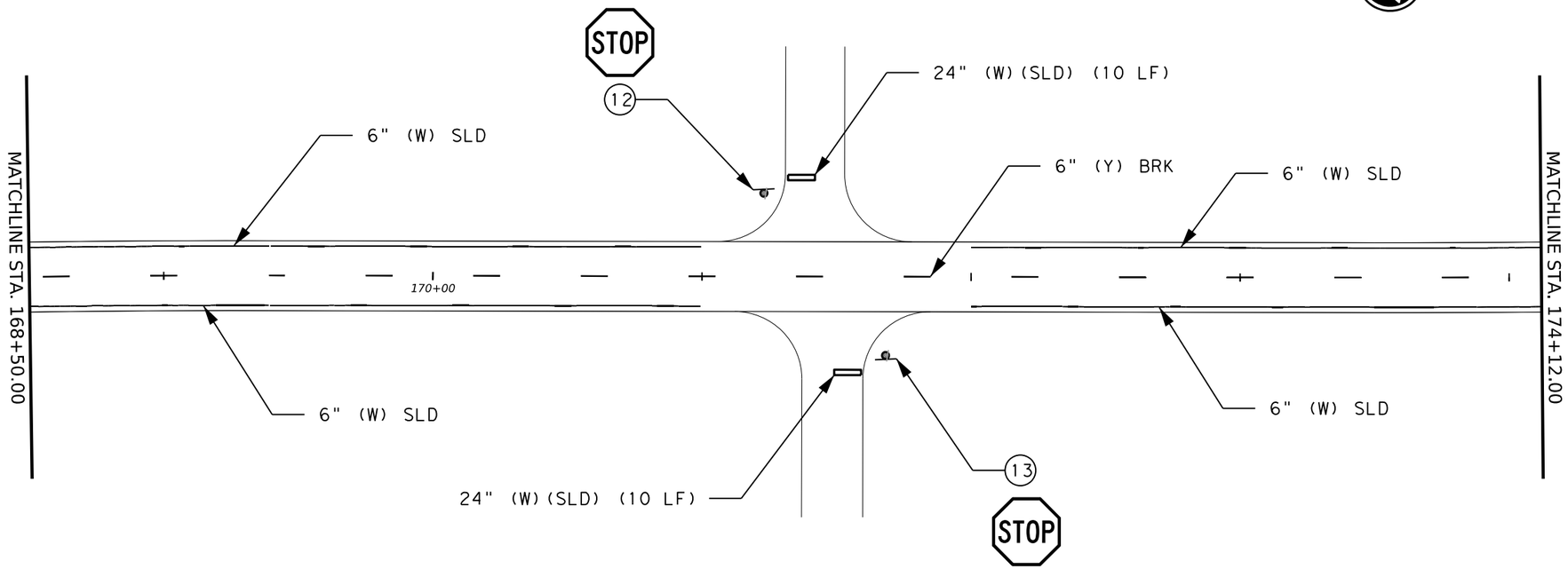
SCALE: 1" = 50' SHEET 15 OF 25

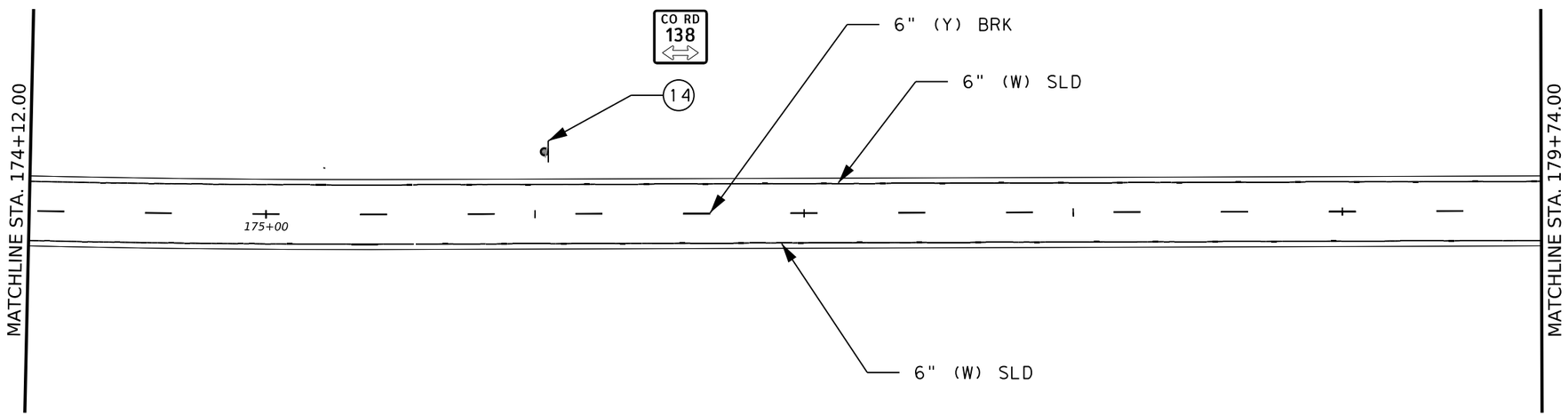
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		110
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



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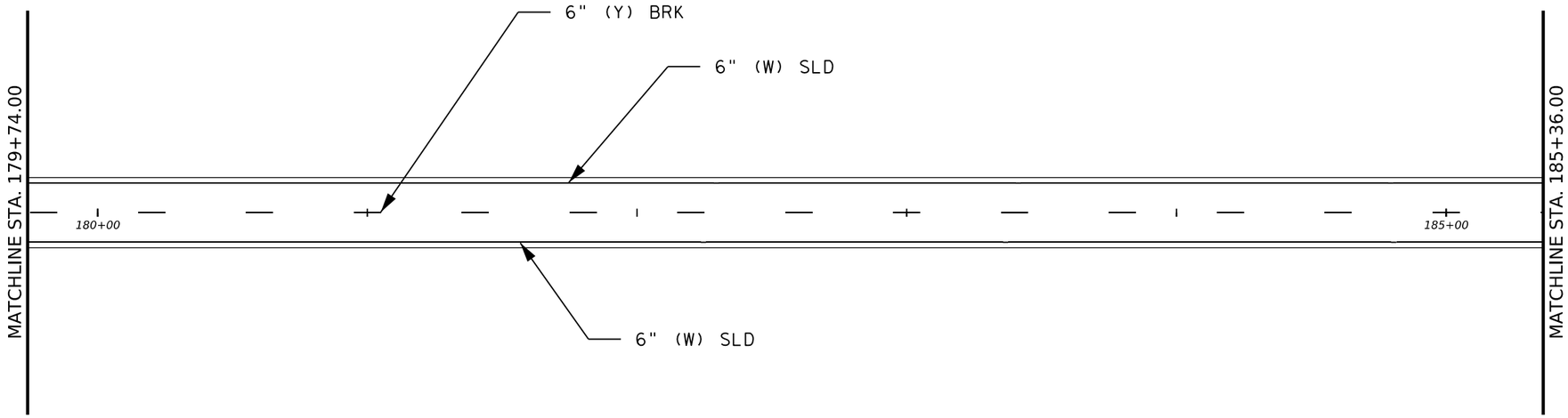
SCALE: 1" = 50' SHEET 16 OF 25

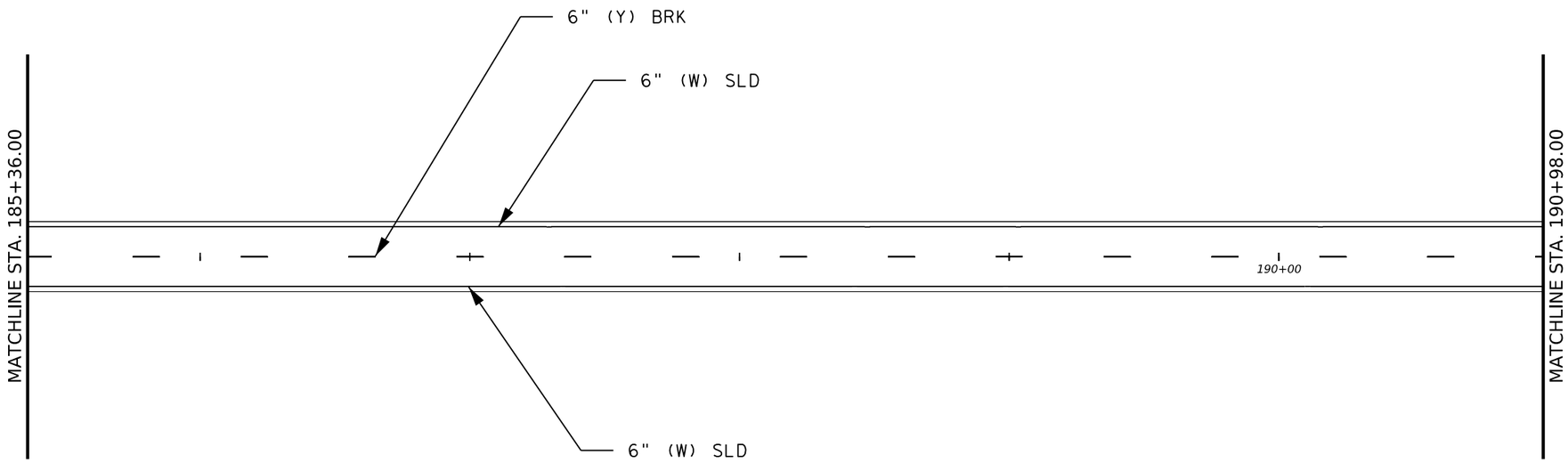
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		111
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



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SCALE: 1" = 50' SHEET 17 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		112
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
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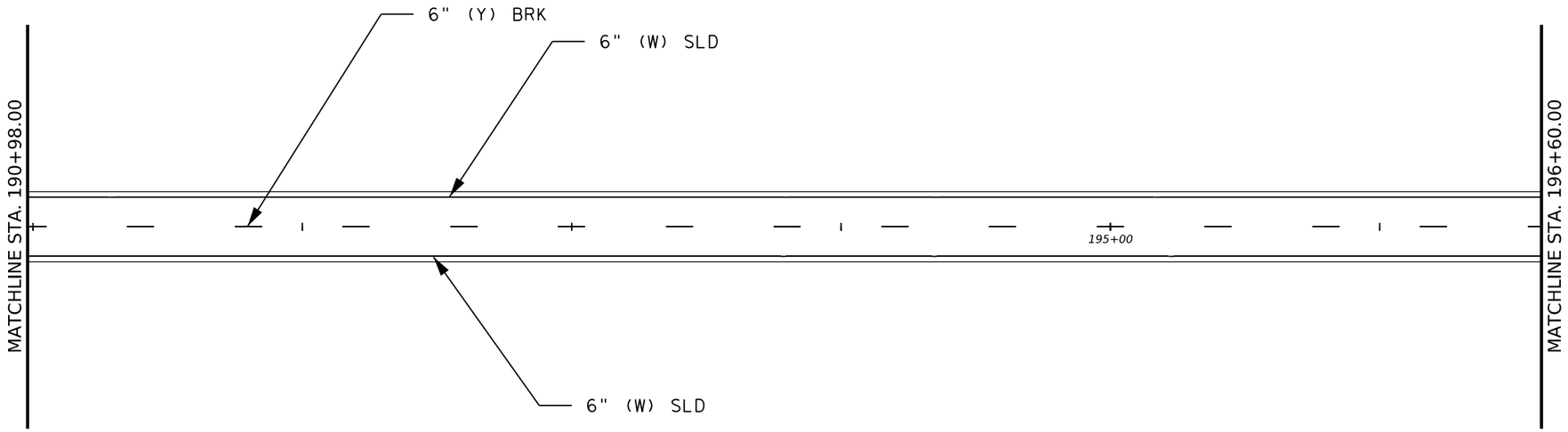
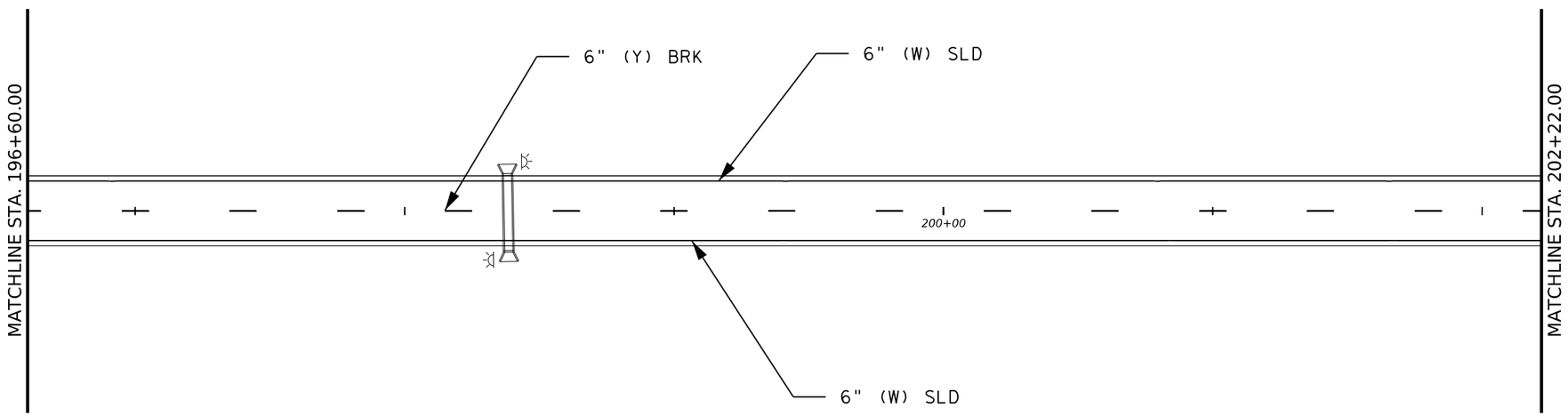


LEGEND

SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

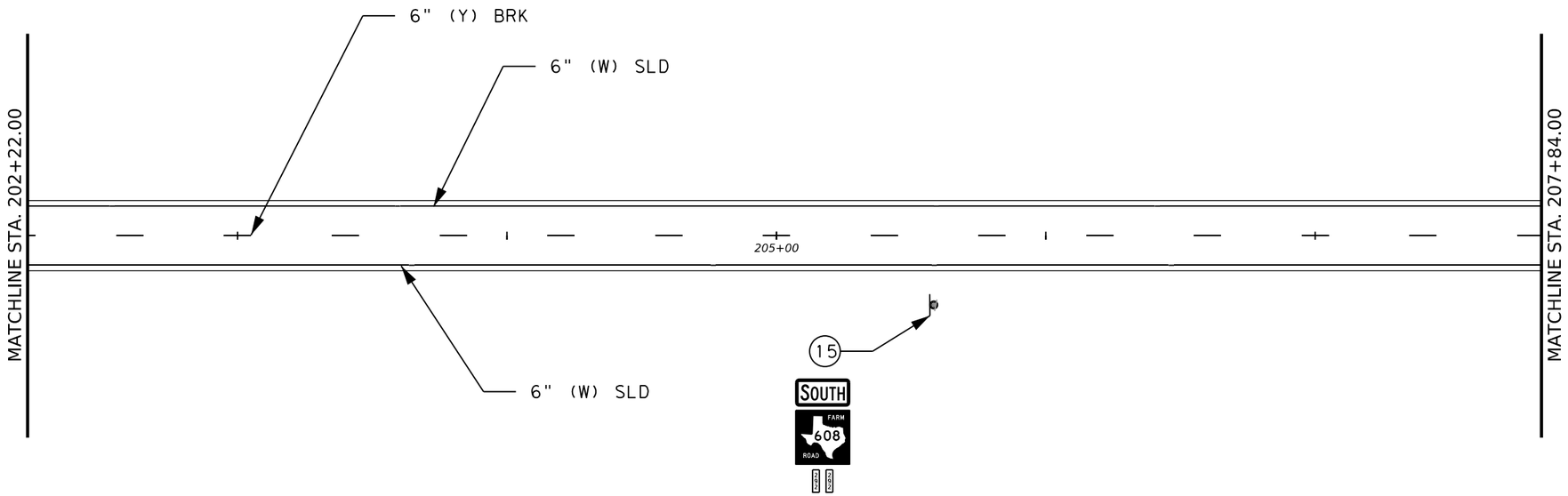
06/06/2023

SIGN & STRIPING LAYOUT

Texas Department of Transportation

SCALE: 1" = 50' SHEET 18 OF 25

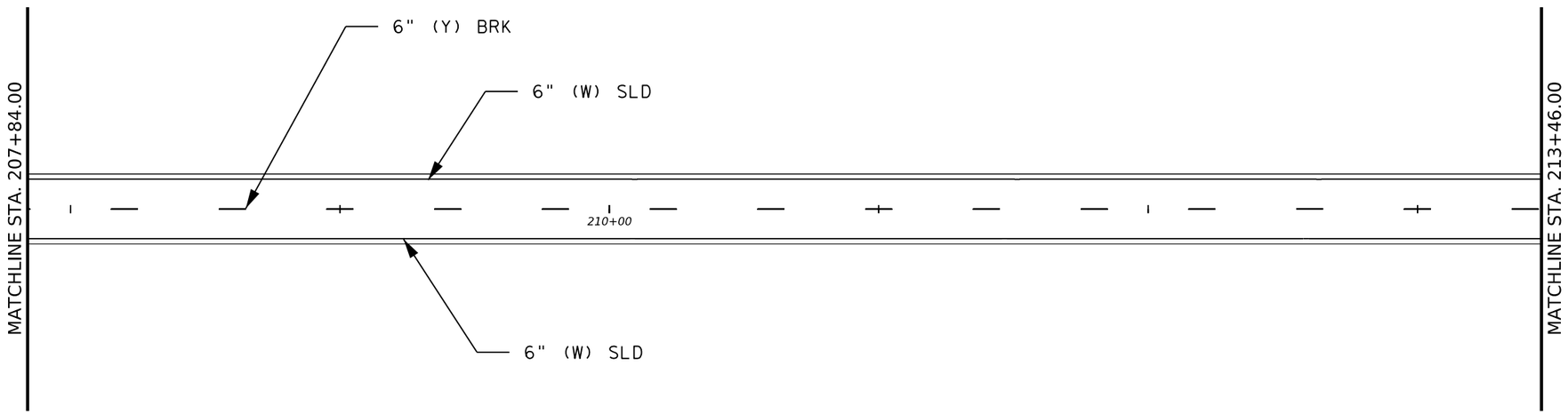
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		113
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

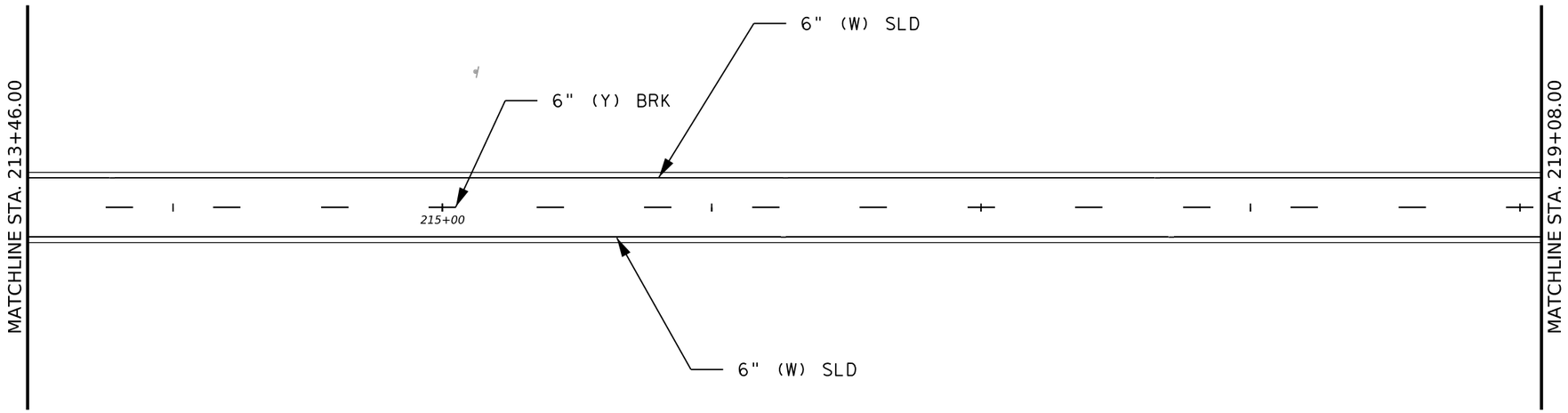
SIGN & STRIPING LAYOUT

 Texas Department of Transportation

SCALE: 1" = 50' SHEET 19 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		114
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

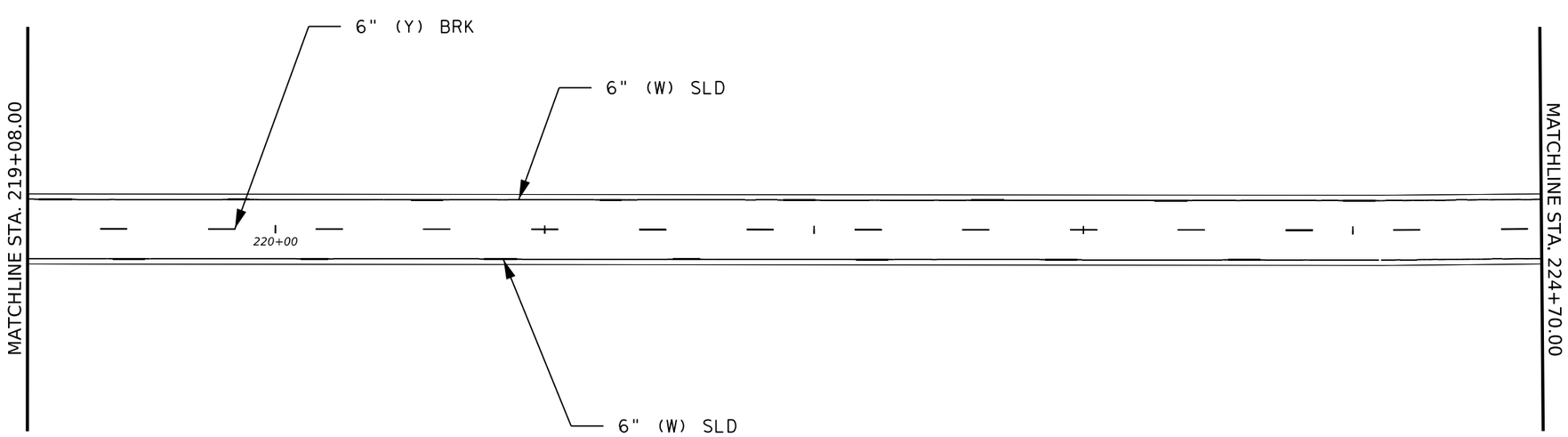
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
DATE: 6/5/2023 8:02:22 PM



LEGEND

SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

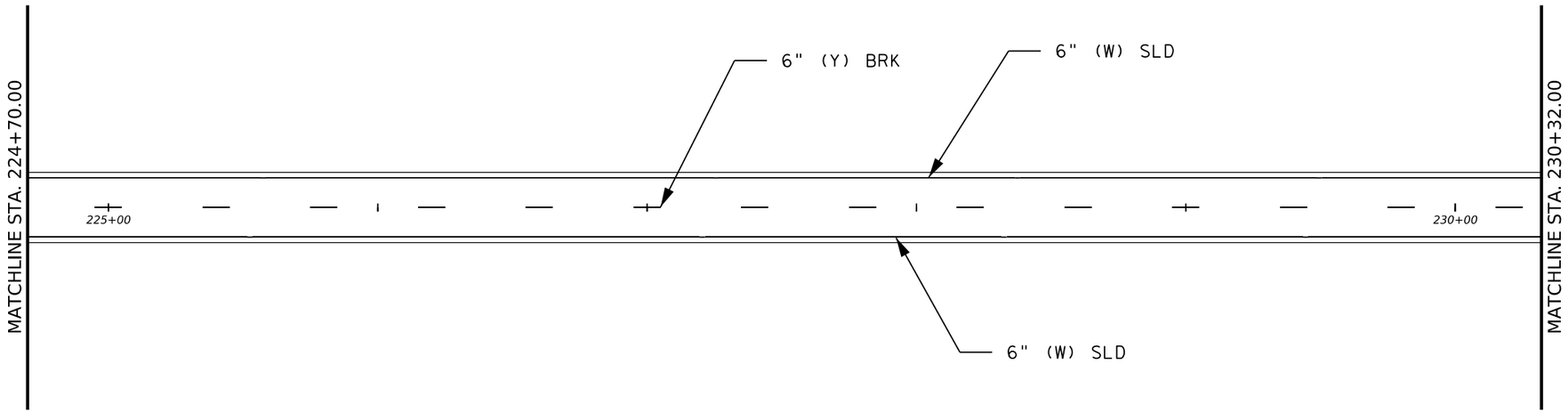
Stephen T. Jones, P.E.

06/06/2023

SIGN & STRIPING LAYOUT

SCALE: 1" = 50' SHEET 20 OF 25

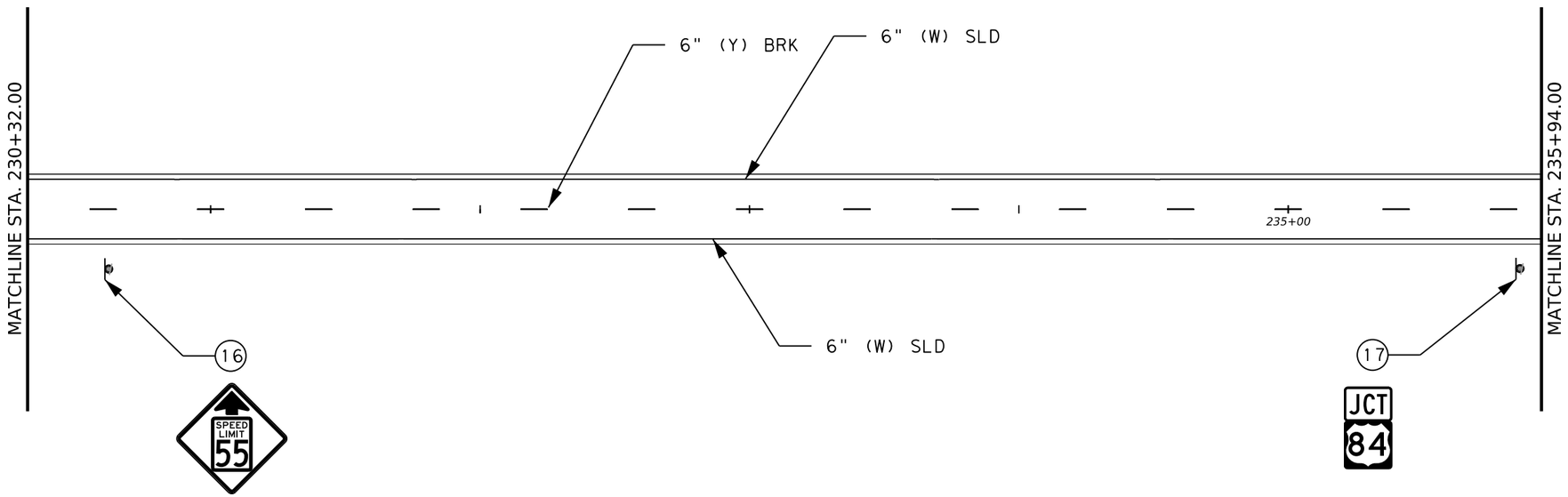
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		115
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER

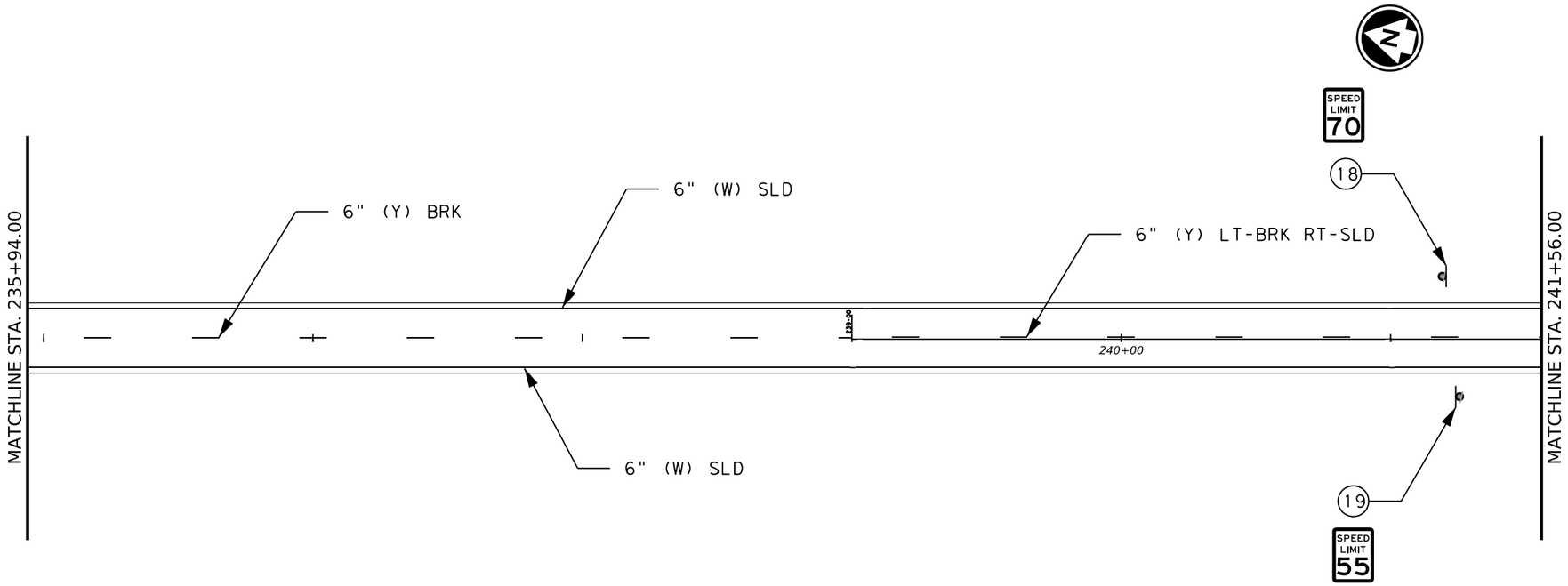


STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

SIGN & STRIPING LAYOUT

SCALE: 1" = 50' SHEET 21 OF 25

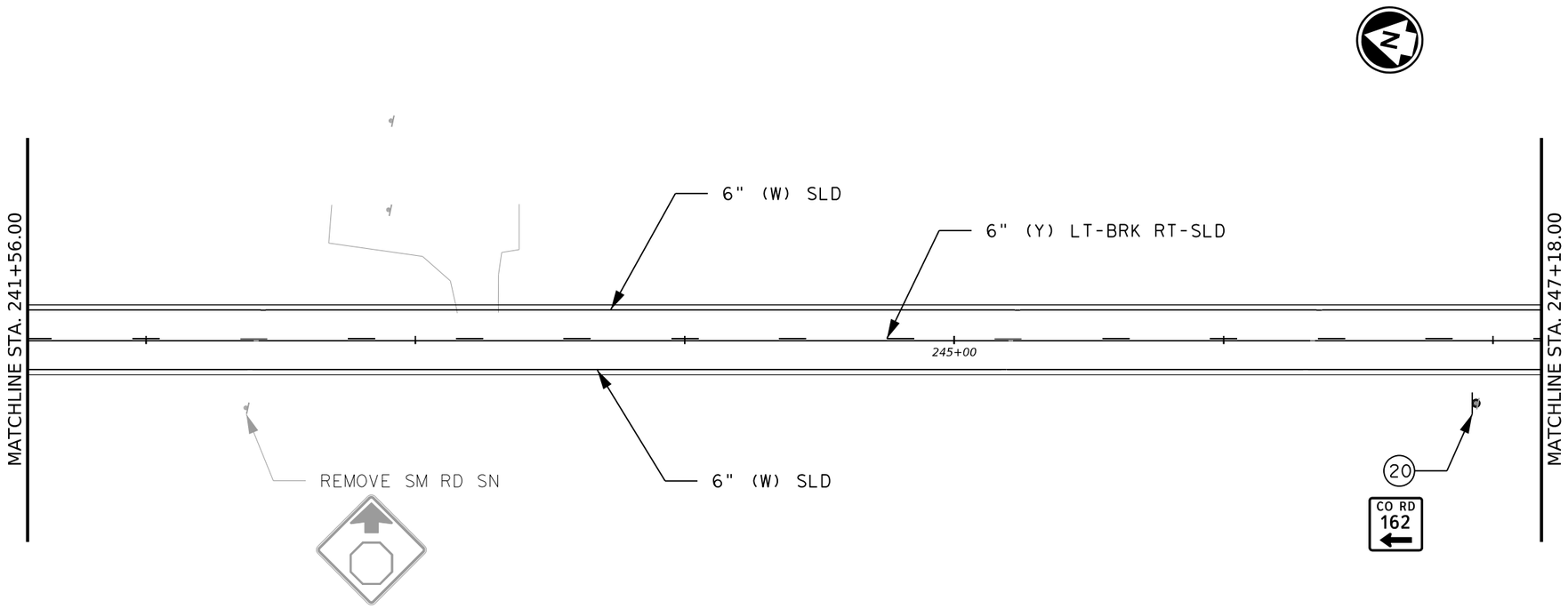
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		116
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
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LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

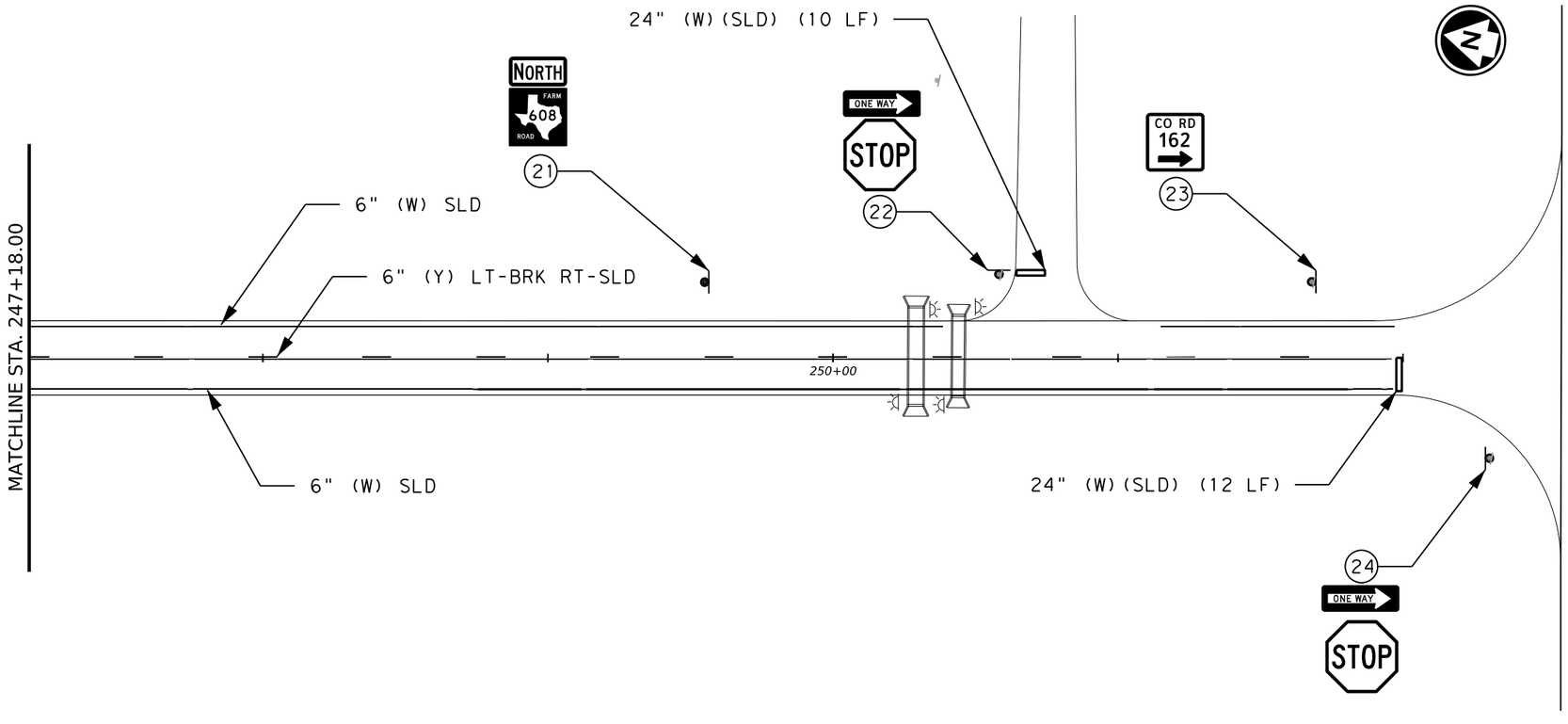
SIGN & STRIPING LAYOUT

 Texas Department of Transportation

SCALE: 1" = 50' SHEET 22 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		117
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

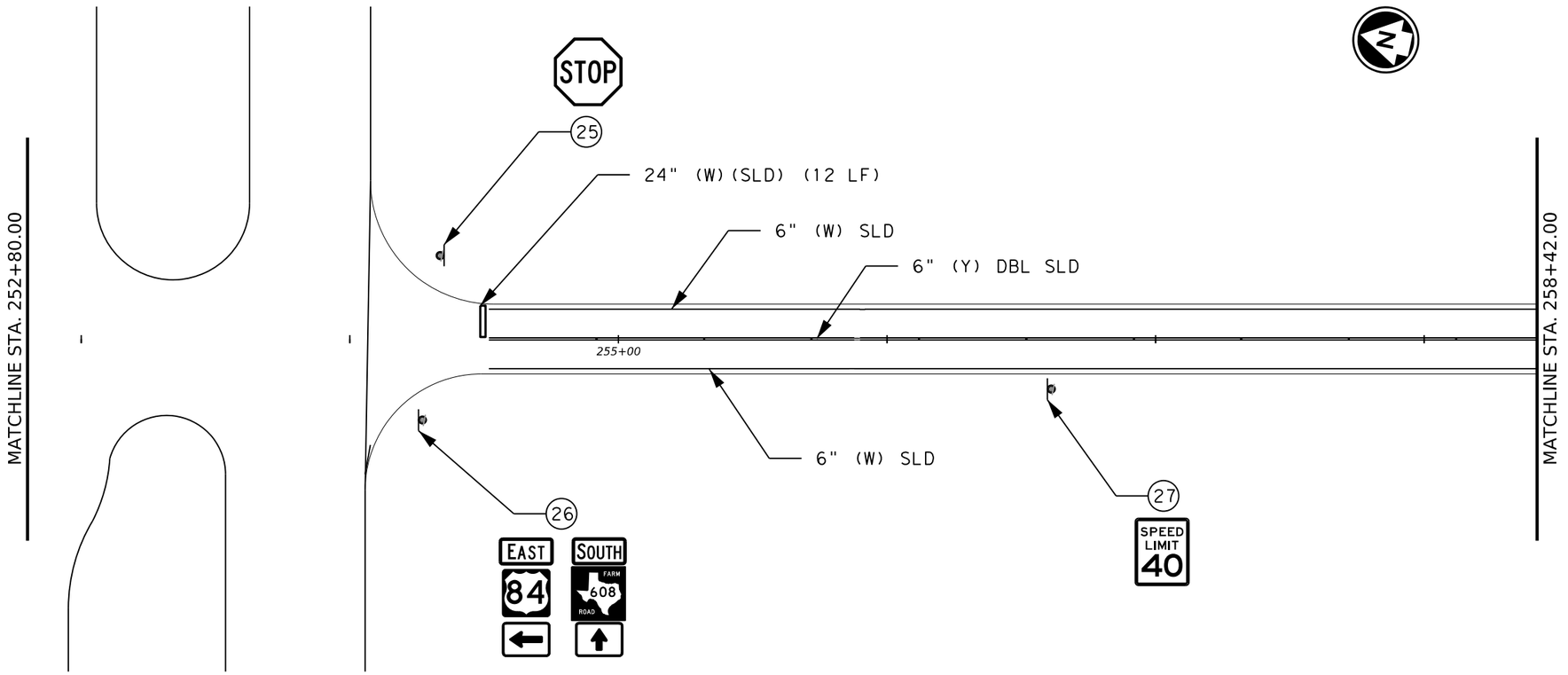
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
DATE: 6/5/2023 8:02:32 PM



LEGEND

(#) SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
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PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

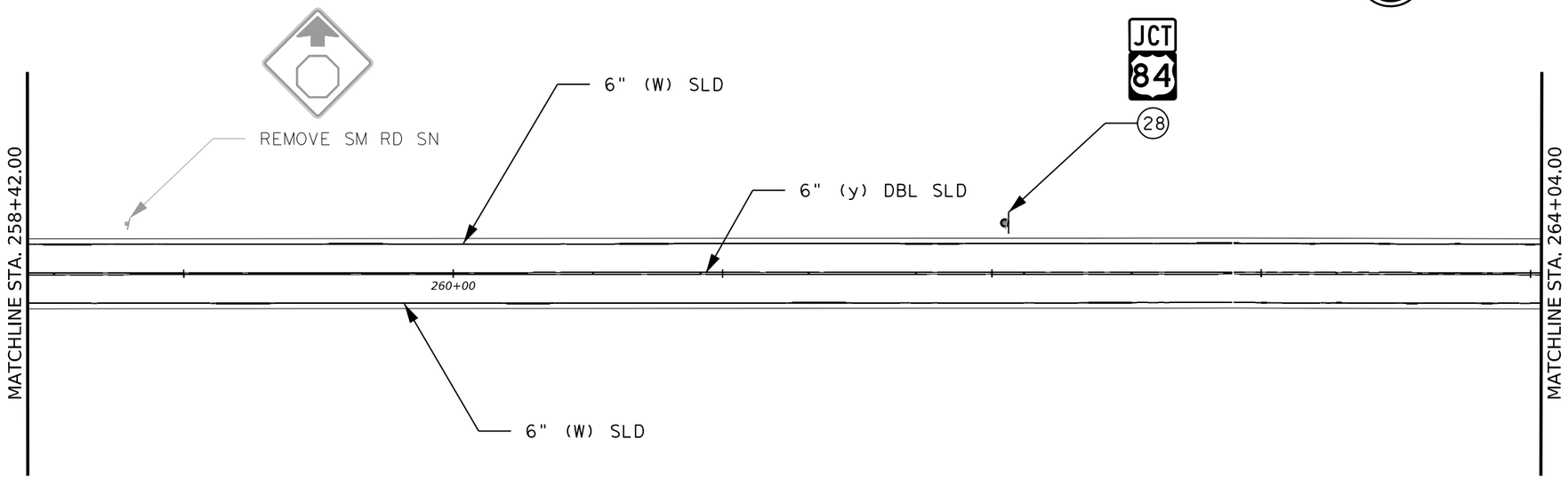
SIGN & STRIPING LAYOUT

 Texas Department of Transportation

SCALE: 1" = 50' SHEET 23 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		118
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

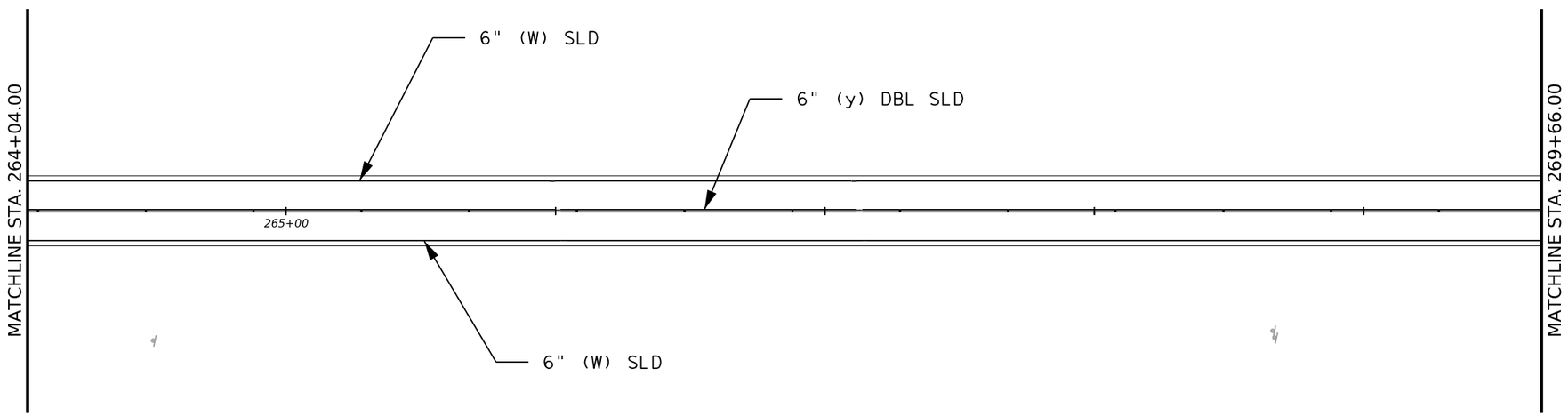
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
DATE: 6/5/2023 8:02:35 PM



LEGEND

(#) SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
100126
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PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

06/06/2023

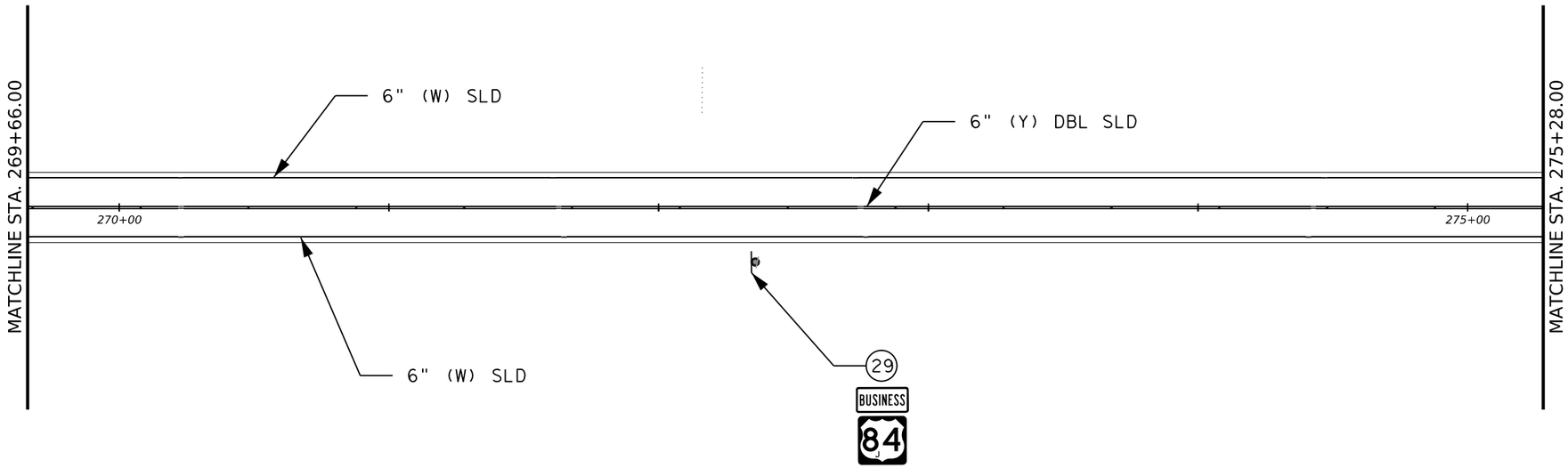
SIGN & STRIPING LAYOUT

 Texas Department of Transportation

SCALE: 1" = 50' SHEET 24 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		119
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

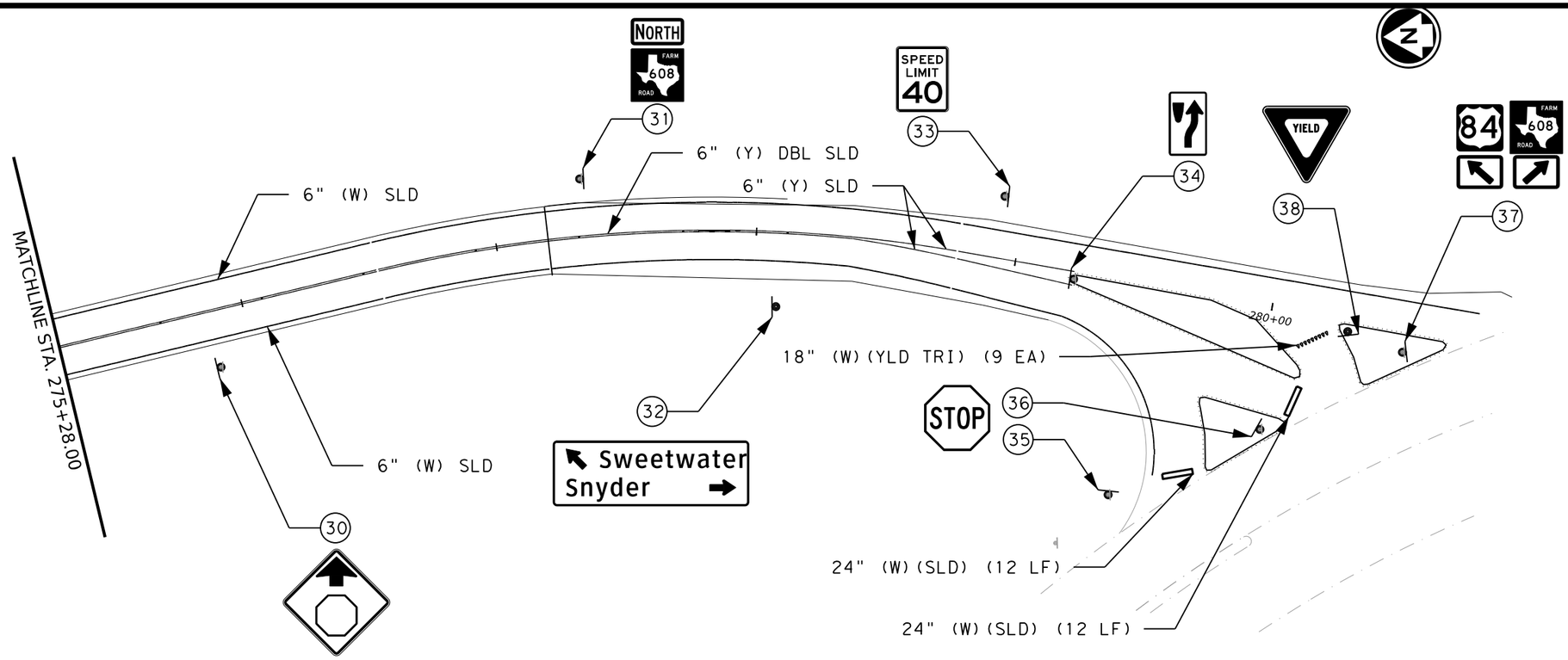
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN & STRIPING LAYOUT
DATE: 6/5/2023 8:02:38 PM



LEGEND

(#) SIGN NO.

OBJECT MARKER



STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

SIGN & STRIPING LAYOUT

SCALE: 1" = 50' SHEET 25 OF 25

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		120
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	1	D3-2	Nolan COUNTY LINE	48 × 24	X		10BWG	1	SA	T		
		D3-2	Fisher COUNTY LINE	54 × 24	X							
		D10-7aT	288 x 2	3 × 10	X							
6	2	D20-1TL	CO RD 117 ←	24 × 24	X		10BWG	1	SA	P		
6	3	R1-1	STOP	30 × 30	X		10BWG	1	SA	P		
7	4	D20-1TR	CO RD 117 →	24 × 24	X		10BWG	1	SA	P		
8	5	D20-1TR	CO RD 164 →	24 × 24	X		10BWG	1	SA	P		
9	6	R1-1	STOP	30 × 30	X		10BWG	1	SA	P		
9	7	D20-1TL	CO RD 164 ←	24 × 24	X		10BWG	1	SA	P		
10	8	M3-1	NORTH	24 × 12	X		10BWG	1	SA	P		
		M1-6F	FARM 608 ROAD	24 × 24	X							
		D10-7aT	290 x 2	3 × 10	X							

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:

1. 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.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation | Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
4-16 8-16	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		121

DATE: 6/5/2023 8:03:01 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Pro...

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
11	9	D20-1TL	CO RD 165 ←	24 x 24	X		10BWG	1	SA	P		
11	10	D20-1TR	CO RD 165 →	24 x 24	X		10BWG	1	SA	P		
15	11	D20-2T	CO RD 138 ↔	24 x 24	X		10BWG	1	SA	P		
16	12	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
16	13	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
16	14	D20-2T	CO RD 138 ↔	24 x 24	X		10BWG	1	SA	P		
19	15	M3-1	SOUTH	24 x 12	X		10BWG	1	SA	P		
		M1-6F	FARM 608 ROAD	24 x 24	X							
		D10-7aT	292 x 2	3 x 10	X							
21	16	W3-5	SPEED LIMIT 55	36 x 36	X		10BWG	1	SA	P		
21	17	M2-1	JCT	21 x 15	X		10BWG	1	SA	P		
		M1-4	84	24 x 24	X							

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:

1. 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.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
4-16 8-16	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		122

18

DATE: 6/5/2023 8:03:04 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/295950 dgn

SUMMARY OF SMALL SIGNS

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) POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
22	18	R2-1	SPEED LIMIT 70	24 x 30	X		10BWG	1	SA	P		
22	19	R2-1	SPEED LIMIT 55	24 x 30	X		10BWG	1	SA	P		
22	20	D20-1TL	CO RD 162 ←	24 x 24	X		10BWG	1	SA	P		
23	21	M3-1	NORTH	24 x 12	X		10BWG	1	SA	P		
		M1-6F	FARM 608 ROAD	24 x 24	X							
23	22	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
23	23	D20-1TR	CO RD 162 →	24 x 24	X		10BWG	1	SA	P		
23	24	R6-1R	ONE WAY →	36 x 12	X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30	X							
23	25	R6-1R	ONE WAY →	36 x 12	X		10BWG	1	SA	P		
		R1-1	STOP	30 x 30	X							

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:

1. 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.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

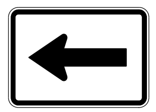
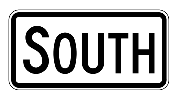
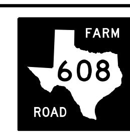
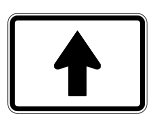
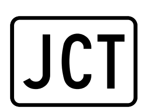
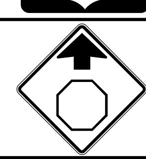
FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		2379	02	010	FM 608
4-16		DIST	COUNTY		SHEET NO.
8-16		ABL	NOLAN		123

18

DATE: 6/5/2023 8:03:07 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Project #259558 dgn

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
23	26	M3-2		24 x 24	X		10BWG	1	SA	U		
		M1-4		24 x 24	X							
		M6-1L		24 x 24	X							
		M3-3		24 x 24	X							
		M1-6F		24 x 24	X							
		M6-3		24 x 24	X							
23	27	R2-1		24 x 30	X		10BWG	1	SA	P		
24	28	M2-1		21 x 15	X		10BWG	1	SA	P		
		M1-4		24 x 24	X							
25	29	M4-3		24 x 12	X		10BWG	1	SA	P		
		M1-4B		24 x 24	X							
25	30	W3-1		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"

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NOTE:

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3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation — Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 4-16 8-16	DIST ABL		COUNTY NOLAN	SHEET NO. 124

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
25	31	M3-1	NORTH	24 x 12	X		10BWG	1	SA	P		
		M1-6F	FARM 608 ROAD	24 x 24	X							
25	32	D1-2	↖ Sweetwater Snyder →	90 x 30	X		S80	1	SA	T		
25	33	R2-1	SPEED LIMIT 40	24 x 30	X		10BWG	1	SA	P		
25	34	R4-7		24 x 30	X		10BWG	1	SA	P		
25	35	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
25	36	R1-1	STOP	30 x 30	X		10BWG	1	SA	P		
25	37	M1-4	84	24 x 24	X		10BWG	1	SA	U		
		M6-2L	↖	30 x 30	X							
		M1-6F	FARM 608 ROAD	24 x 24	X							
		M6-2R	↗	30 x 30	X							

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:

1. 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.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

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FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Pro[illegible]

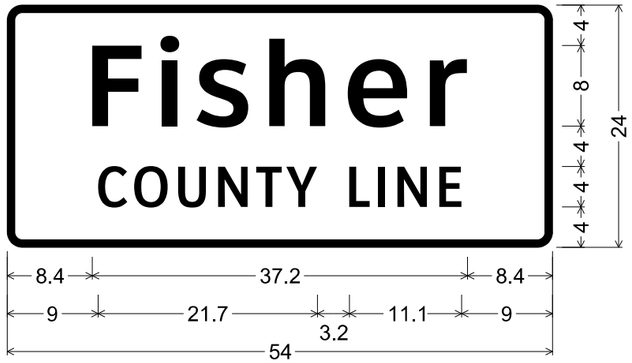
Texas Department of Transportation
Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

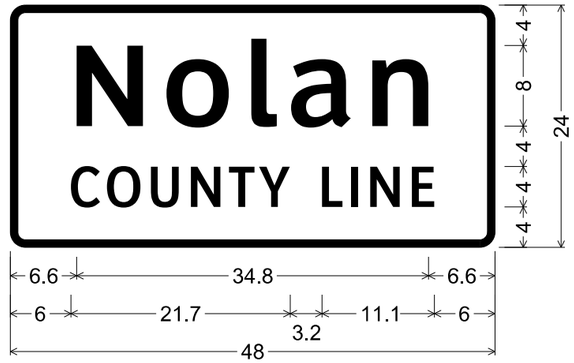
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
4-16 8-16	DIST		COUNTY	SHEET NO.
	ABL		NOLAN	125

18



I-2dT 8in;
1.5" Radius, 0.8" Border, White on Green;
"Fisher", ClearviewHwy-5-W-R;
"COUNTY LINE", ClearviewHwy-3-W;

SIGN NO. 1



I-2dT 8in;
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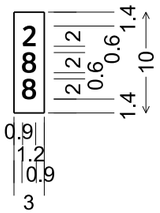
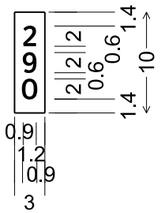
"Nolan", ClearviewHwy-5-W-R;
"COUNTY LINE", ClearviewHwy-3-W;

SIGN NO. 1



D10-7aT 3in;
No border, White on Green;
"2", ClearviewHwy-4-W;
"8", ClearviewHwy-4-W;
"8", ClearviewHwy-4-W;

SIGN NO. 1



D10-7aT 3in;
No border, White on Green;
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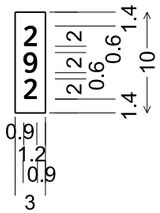
"9", ClearviewHwy-4-W;
"0", ClearviewHwy-4-W;

SIGN NO. 8



D10-7aT 3in;
No border, White on Green;
"2", ClearviewHwy-4-W;
"9", ClearviewHwy-4-W;
"2", ClearviewHwy-4-W;

SIGN NO. 13

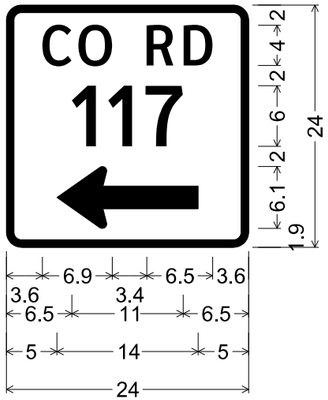
SIGN DETAILS

 Texas Department of Transportation

PLACE SCALE HERE

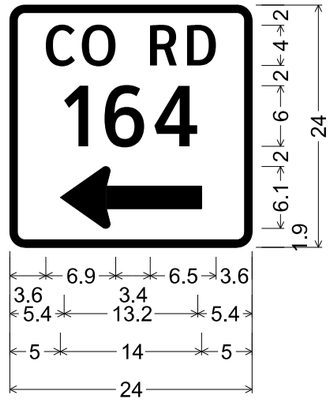
FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		126
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN DETAILS.dgn
DATE: 6/5/2023 8:03:31 PM



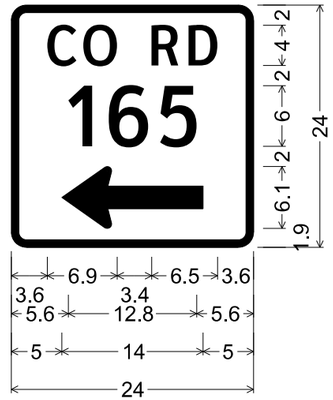
D20-1TL_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"117", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180°;

SIGN NO. 2



D20-1TL_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"164", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180°;

SIGN NO. 7



D20-1TL_24x24;
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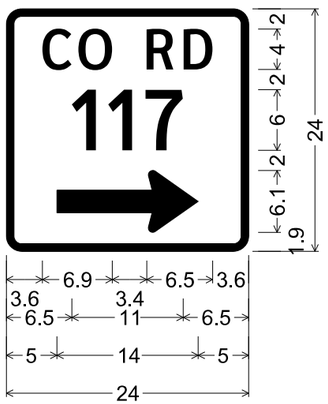
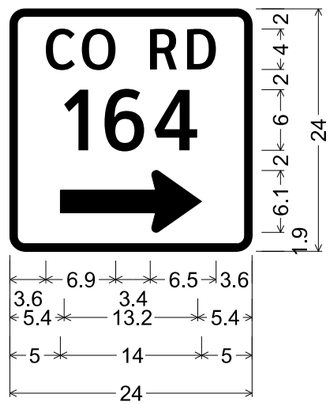
"CO RD", ClearviewHwy-3-W;
"165", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180°;

SIGN NO. 1



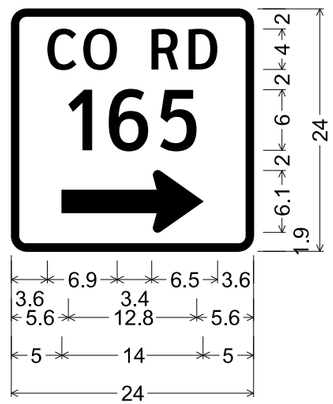
D20-1TR_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"117", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0°;

SIGN NO. 4



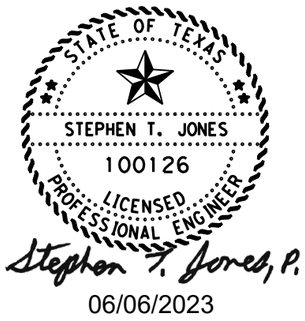
D20-1TR_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"164", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0°;

SIGN NO. 5



D20-1TR_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"165", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0°;

SIGN NO. 1



06/06/2023

SIGN DETAILS

 Texas Department of Transportation

PLACE SCALE HERE

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		127
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN DETAILS.dgn
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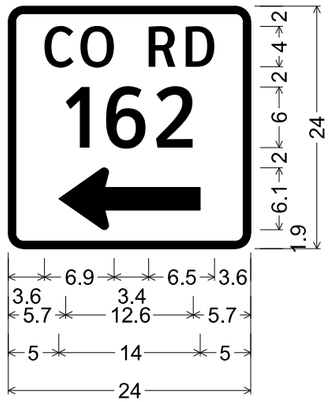
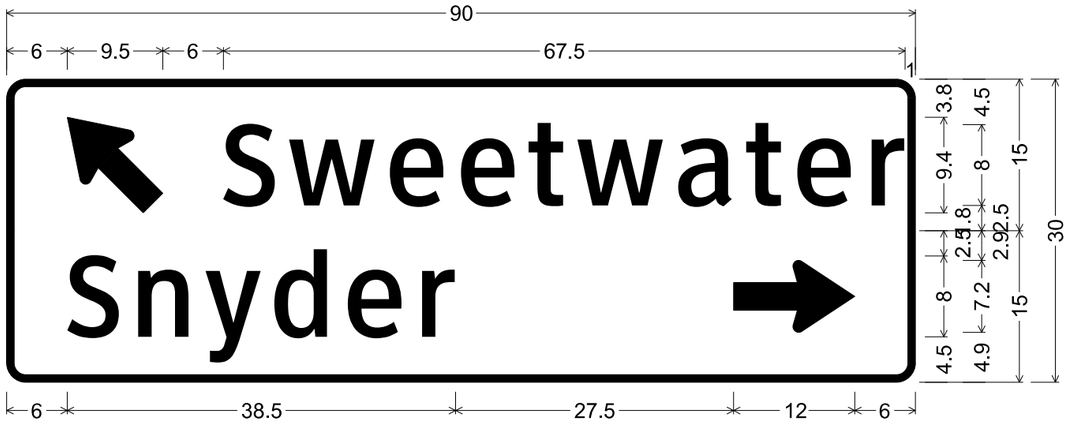


D20-1TL_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"162", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 180°;

SIGN NO. 18

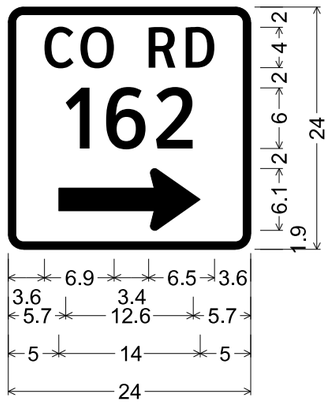


D1-2 8in 45LT-RT;

1.9" Radius, 0.8" Border, White on Green;
Standard Arrow Custom 12.0" X 7.1" 135°; "Sweetwater", ClearviewHwy-3-W;

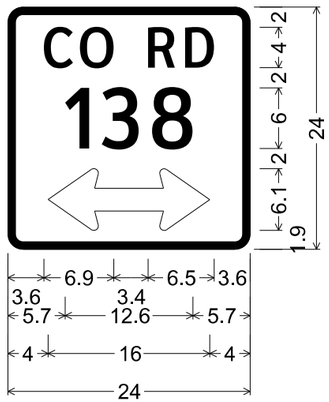
1.9" Radius, 0.8" Border, White on Green;
"Snyder", ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0°;

SIGN NO. 1



D20-1TR_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"162", ClearviewHwy-3-W;
Standard Arrow Custom 14.0" X 6.1" 0°;

SIGN NO. 21



D20-2T_24x24;
1.5" Radius, 0.8" Border, White on Green;
"CO RD", ClearviewHwy-3-W;
"138", ClearviewHwy-3-W;

SIGN NO. 9
SIGN NO. 12

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.
06/06/2023

SIGN DETAILS

 Texas Department of Transportation

PLACE SCALE HERE

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		128
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SIGN DETAILS.dgn
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FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/2379020104 - Design/Plan Set/8. Traffic/SMD(GEN)-08

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))

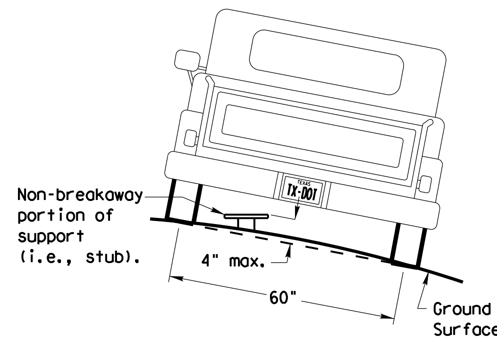
Sign Mounting Designation

- 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

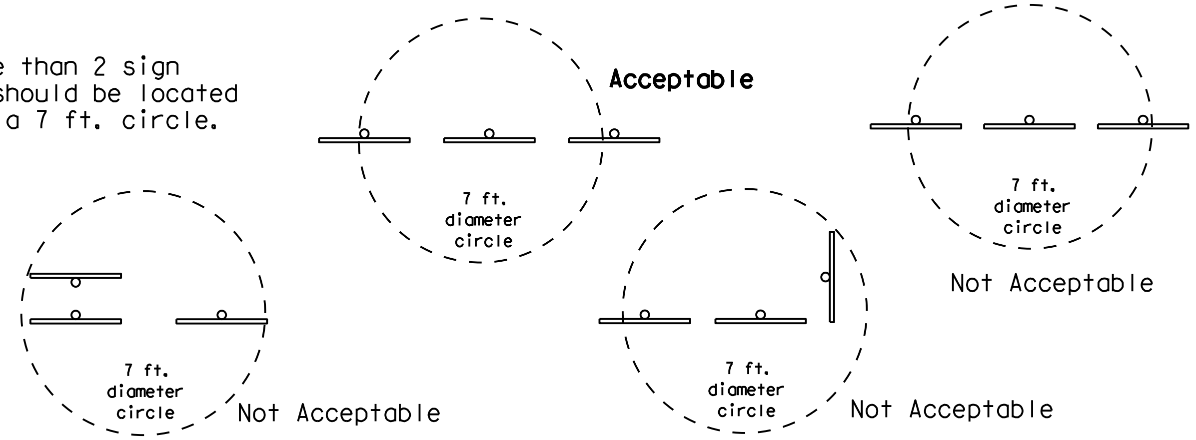
- 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



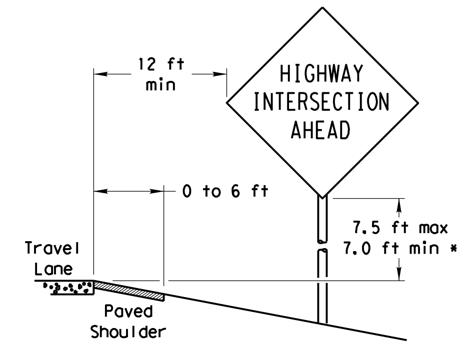
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



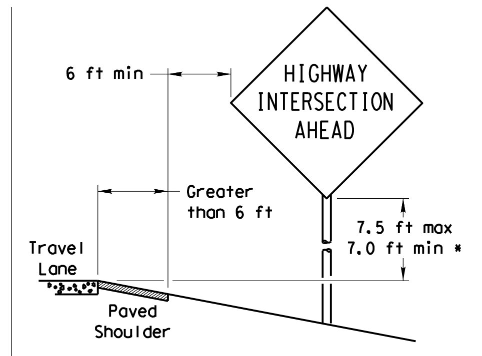
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

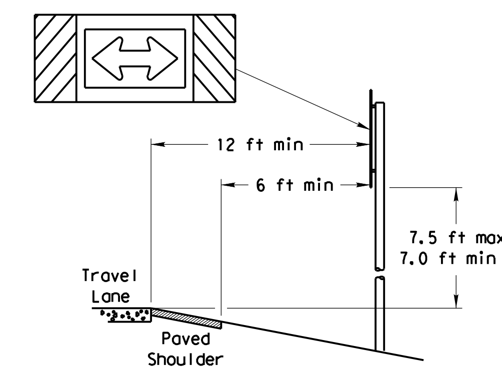
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



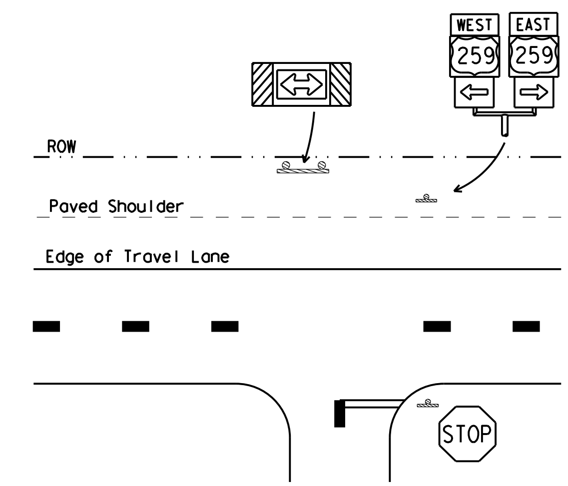
GREATER THAN 6 FT. WIDE

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.

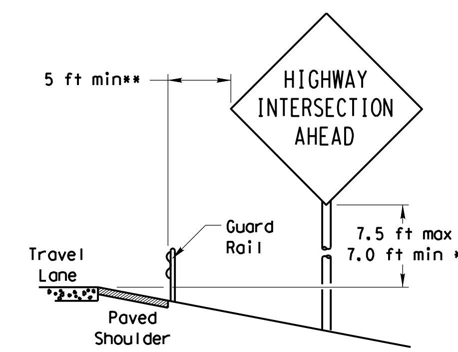
T-INTERSECTION



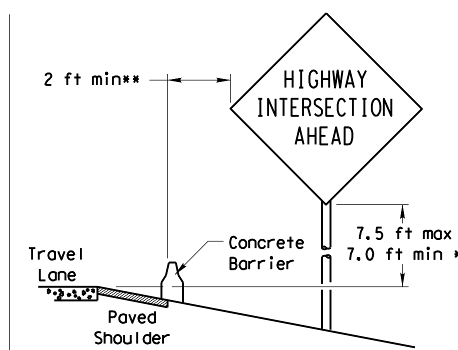
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



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.

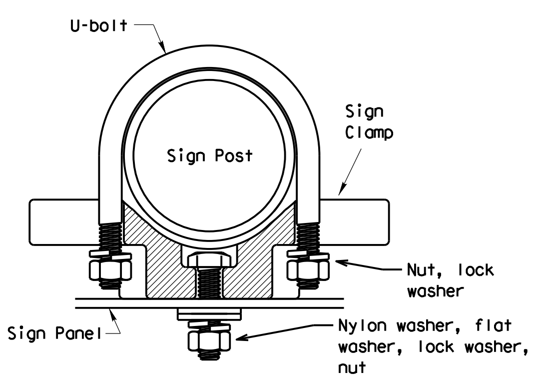
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

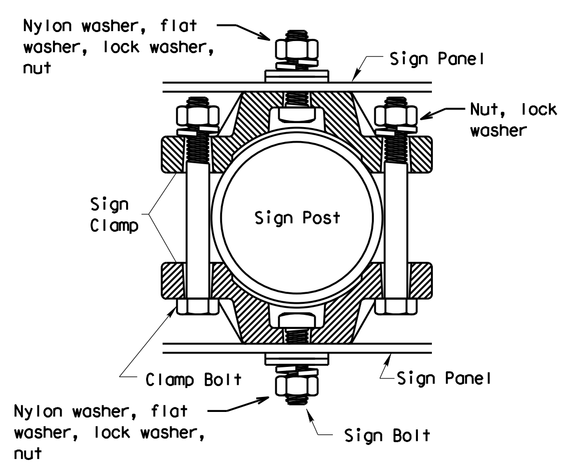
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



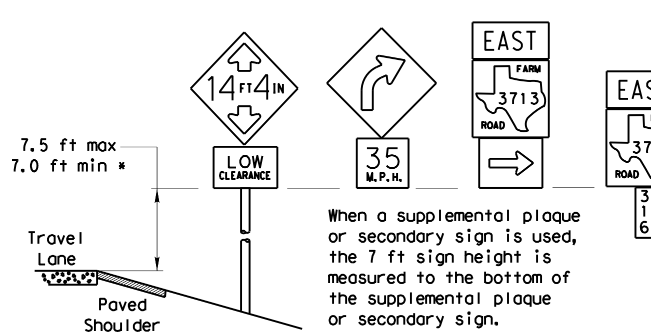
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

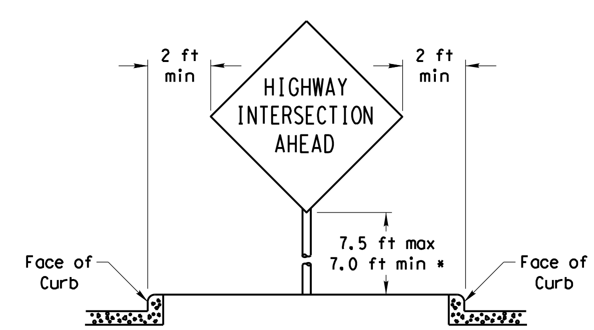
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



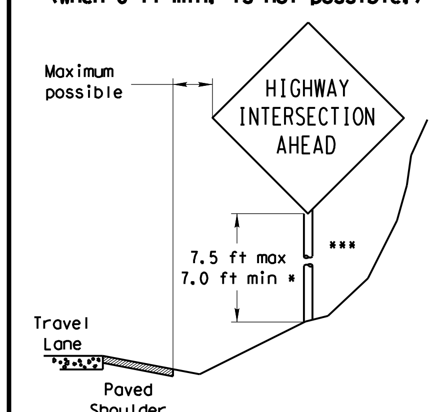
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS: 9-08

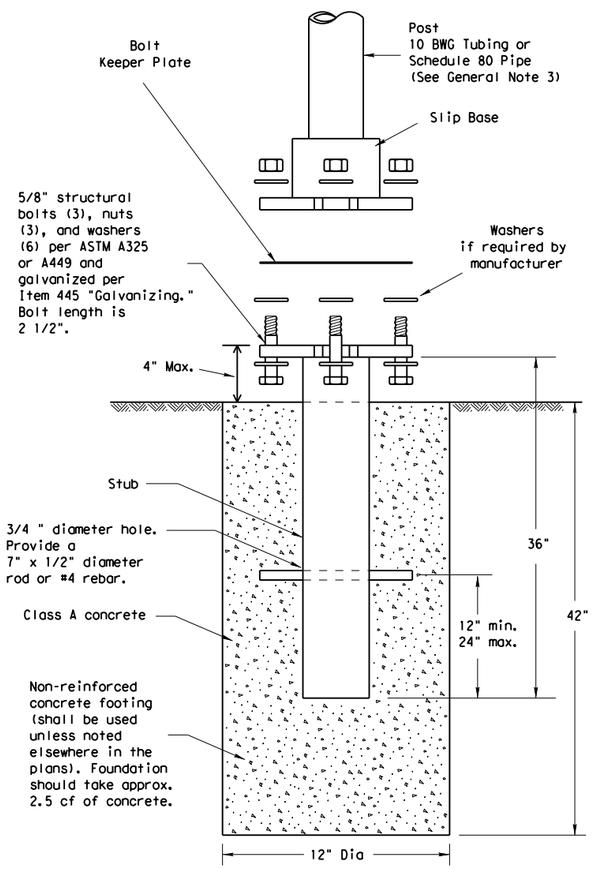
CONT	SECT	JOB	HIGHWAY
2379	02	010	FM 608

DIST	COUNTY	SHEET NO.
ABL	NOLAN	129

26A

DATE: 6/5/2023 8:04:17 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SMD(SLIP-1)-08

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

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 The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. 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.
2. 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.

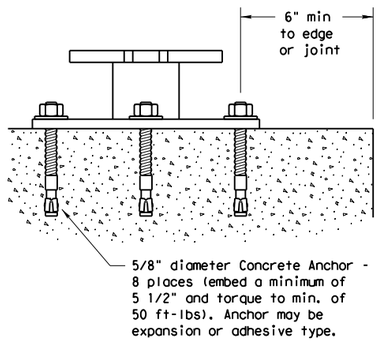
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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
3. 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
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. 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.
2. 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.
3. 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.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. 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.
2. 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



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

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, "Epoxies 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.

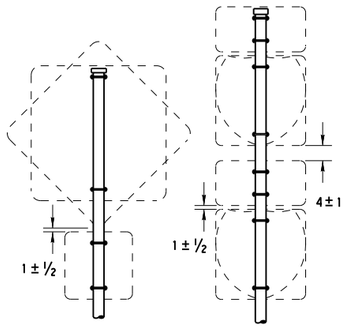
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

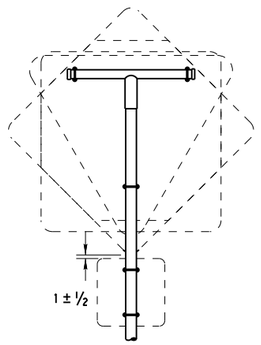
SMD(SLIP-1)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		130

DATE: 6/5/2023 8:04:37 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/8. Traffic/SMD(SLIP-2)-08



SM RD SGN ASSM TY XXXXX(1)XX(P)



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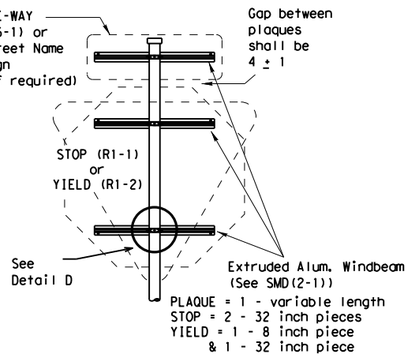
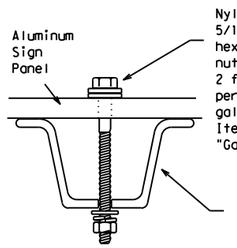
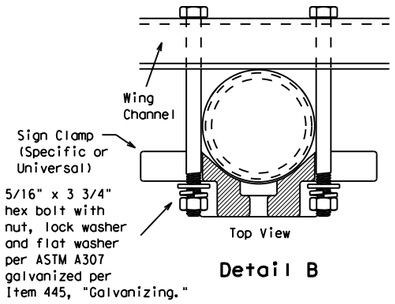


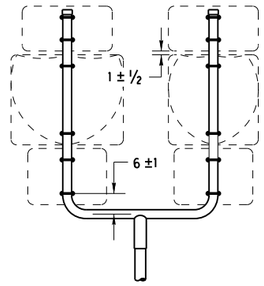
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



Detail B



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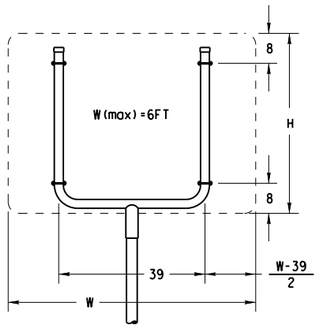

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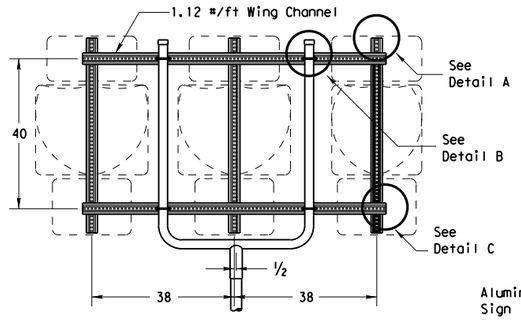
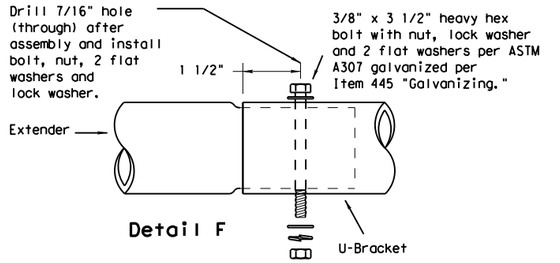
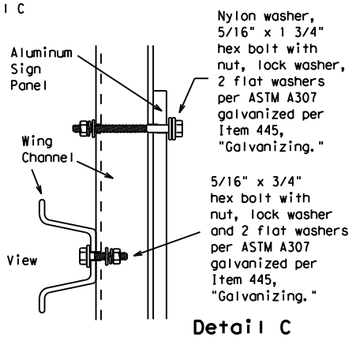


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

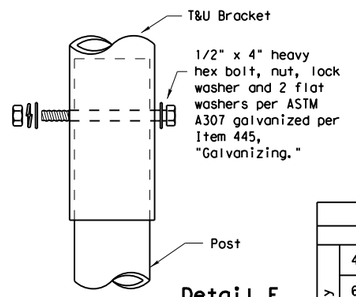


Detail F

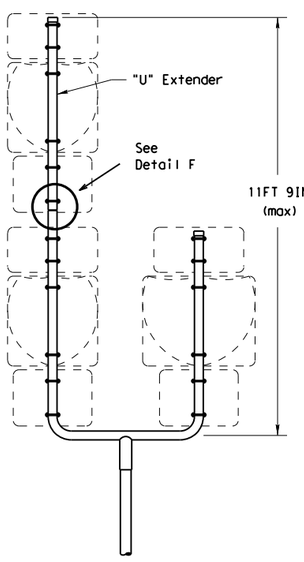
Splices shall only be allowed behind the sign substrate.



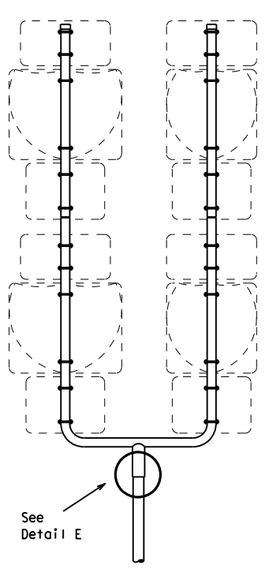
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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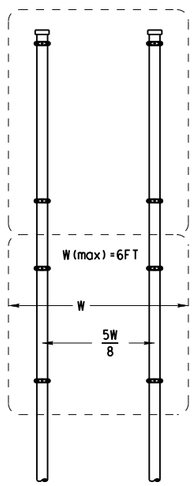
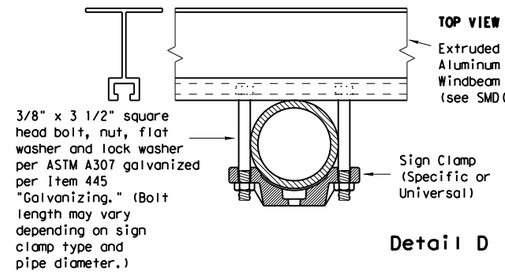
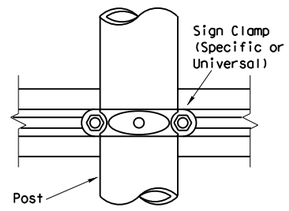


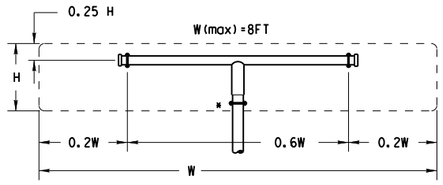
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

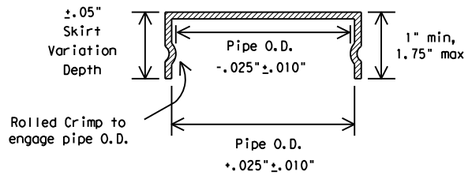




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION 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:

1.

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

2. 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.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. 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.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. 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.
7. 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.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. 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."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. 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.
12. Post open ends shall be fitted with Friction Caps.
13. 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)
	48x60-inch signs	TY S80(1)XX(T)
Warning	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-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	2379	02	010	FM 608

DIST	COUNTY	SHEET NO.
ABL	NOLAN	131

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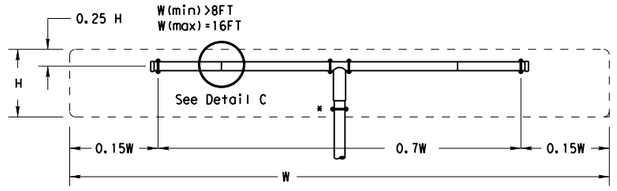
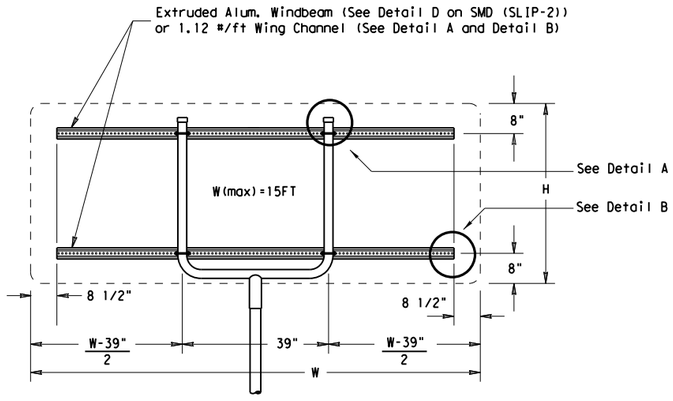
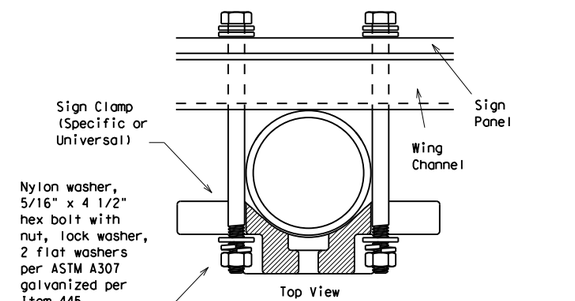


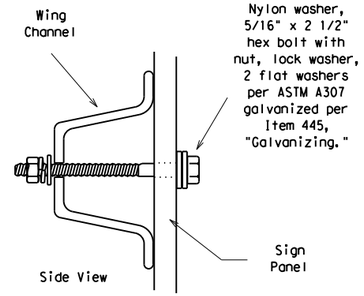
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



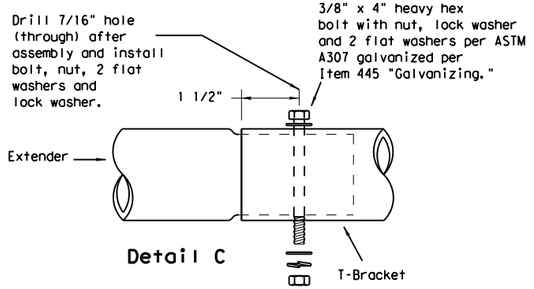
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Detail A



Detail B



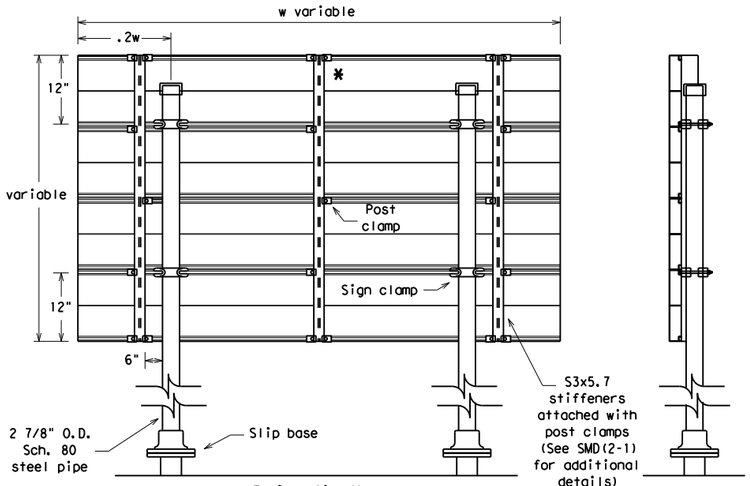
Detail C

Splices shall only be allowed behind the sign substrate.

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

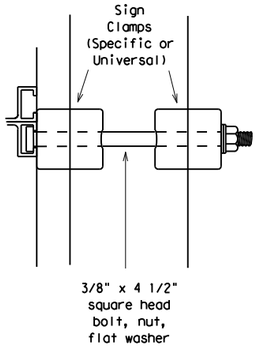
1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material 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.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. 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.
6. 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.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. 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."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. 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.
11. Post open ends shall be fitted with Friction Caps.



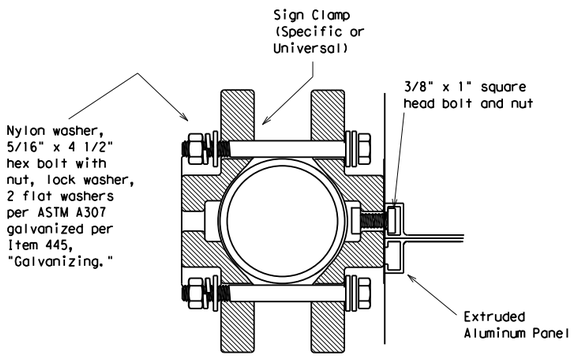
Typical Sign Mount

SM RD SGN ASSM TY S80(2)XX(P-EXAL)

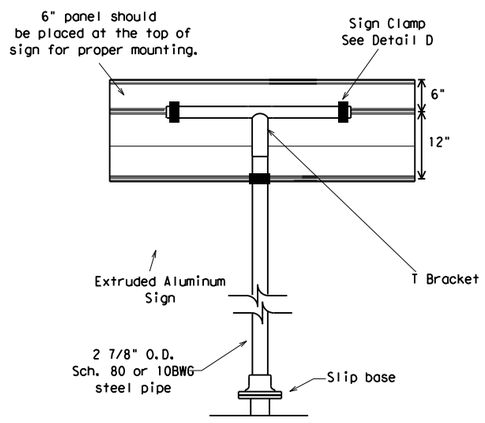
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



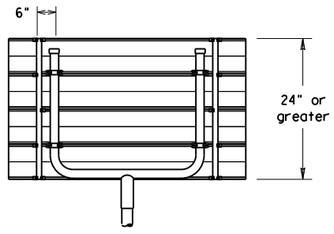
Detail E



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

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)
	48x60-inch signs	TY S80(1)XX(T)
Warning	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

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-08

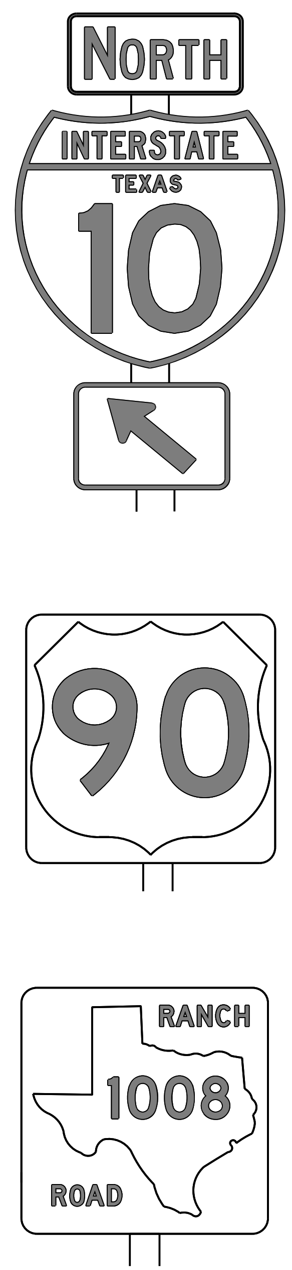
CONT	SECT	JOB	HIGHWAY
2379	02	010	FM 608

DIST	COUNTY	SHEET NO.
ABL	NOLAN	132

DATE: 6/5/2023 8:05:14 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/...

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

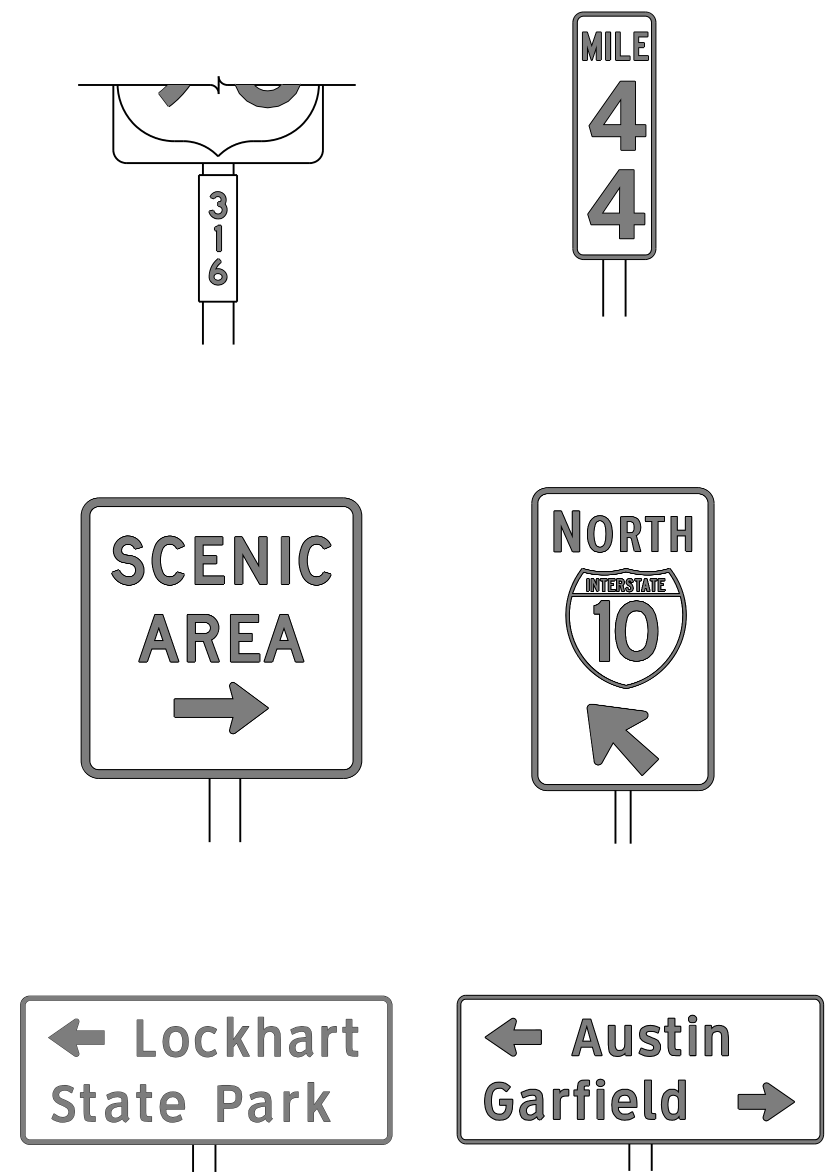
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

1. 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).
2. 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

3. 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).
4. 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.
5. 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.
6. 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.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. 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/

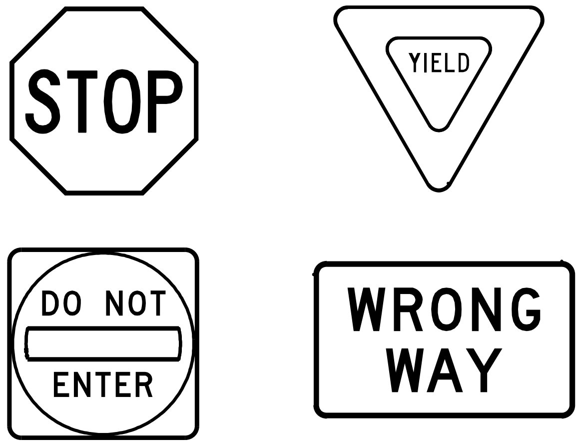
Texas Department of Transportation — Traffic Operations Division Standard

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	2379	02	010	FM 608	
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.	
	ABL	NOLAN		133	

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

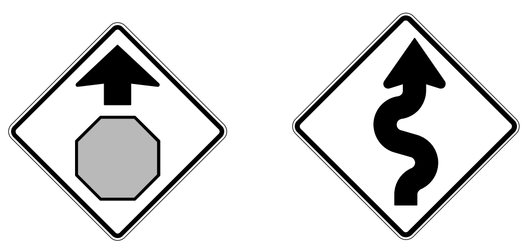
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

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_{FL} OR C_{FL} 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_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. 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).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. 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.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. 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.
6. 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.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. 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/

DATE: 6/5/2023 8:05:33 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/...

Texas Department of Transportation
Traffic Operations Division Standard

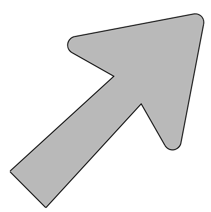
TYPICAL SIGN REQUIREMENTS

TSR(4)-13

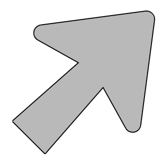
FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 12-03 7-13 9-08	DIST ABL		COUNTY NOLAN	SHEET NO. 134

ARROW DETAILS

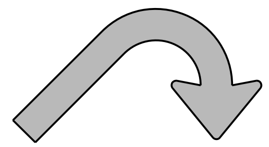
for Large Ground-Mounted and Overhead Guide Signs



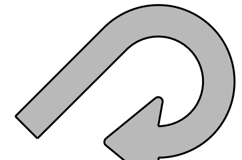
Type A



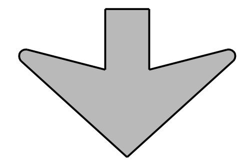
Type B



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

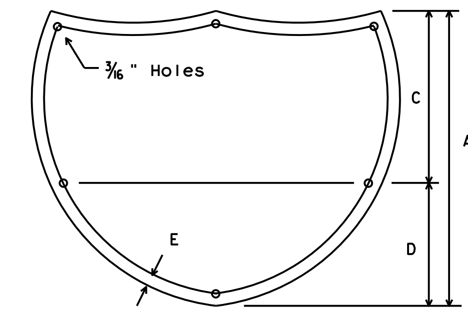
NOTE

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.

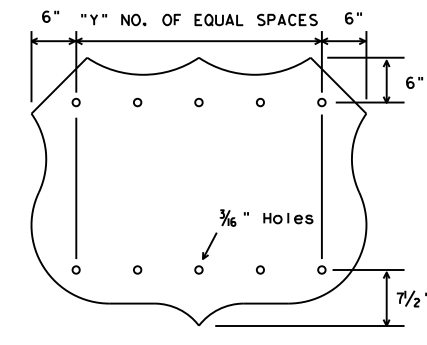
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)



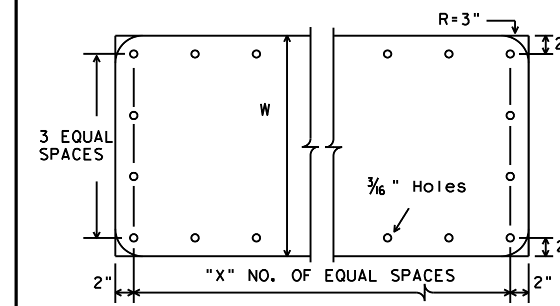
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4



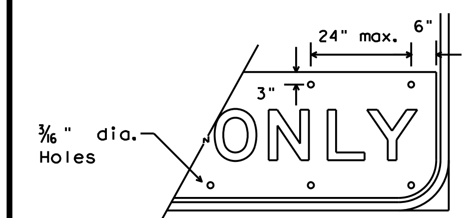
U.S. ROUTE MARKERS

Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



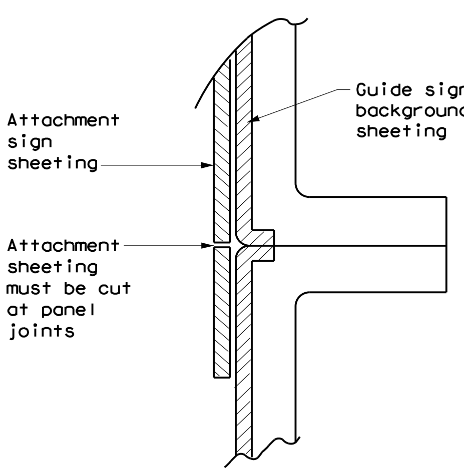
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

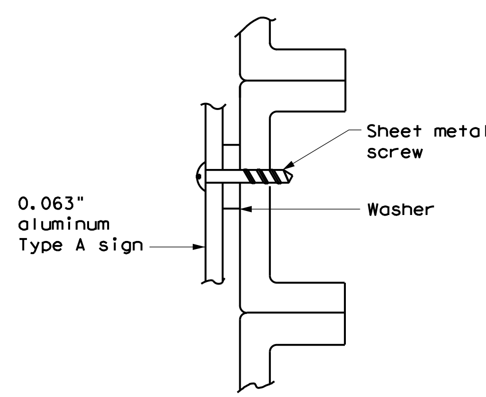


EXIT ONLY PANEL

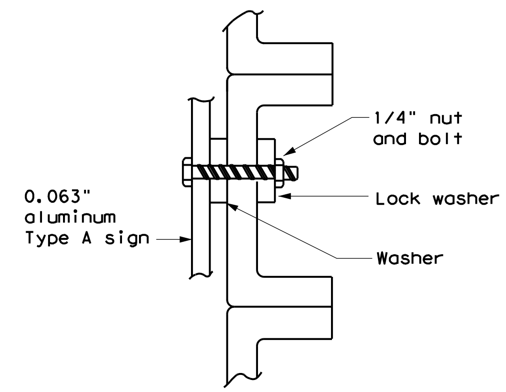
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



DIRECT APPLIED ATTACHMENT



SCREW ATTACHMENT



NUT/BOLT ATTACHMENT

NOTE:

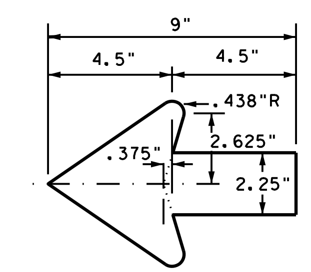
1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".

NOTE:

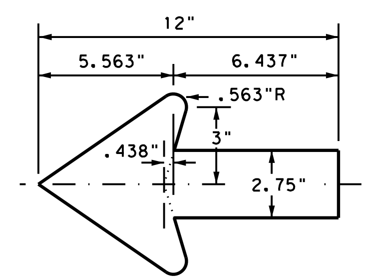
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

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.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
12-03 7-13 9-08	DIST		COUNTY	SHEET NO.
	ABL		NOLAN	135

DATE: 6/5/2023 8:05:53 PM

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DATE: 6/5/2023 8:06:10 PM
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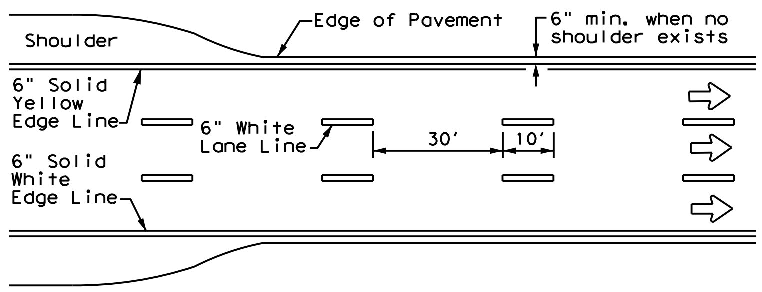
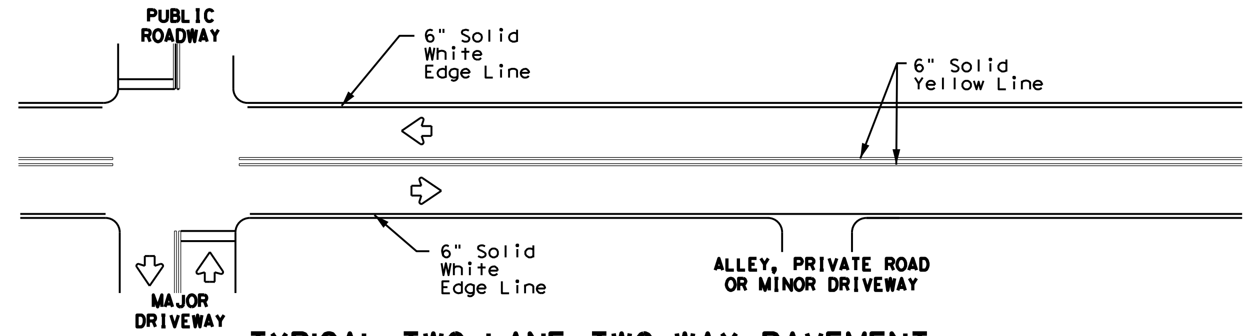
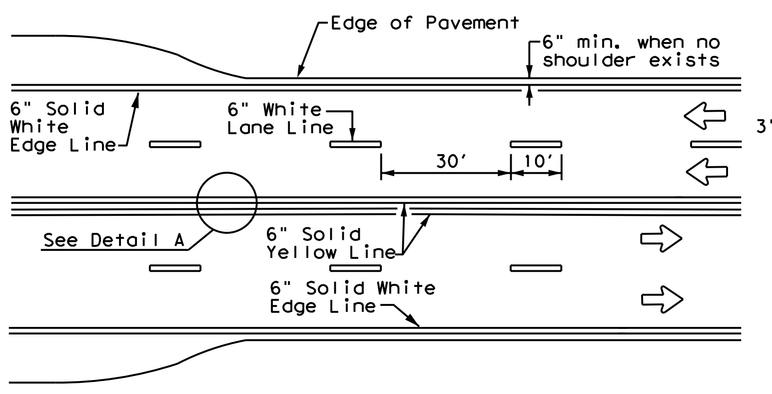


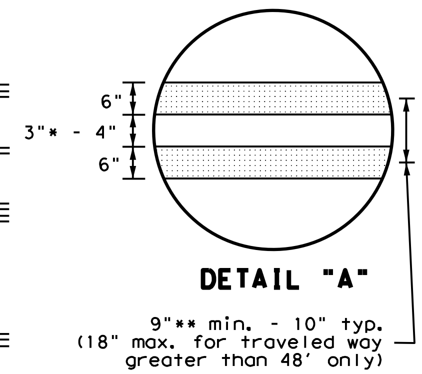
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



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

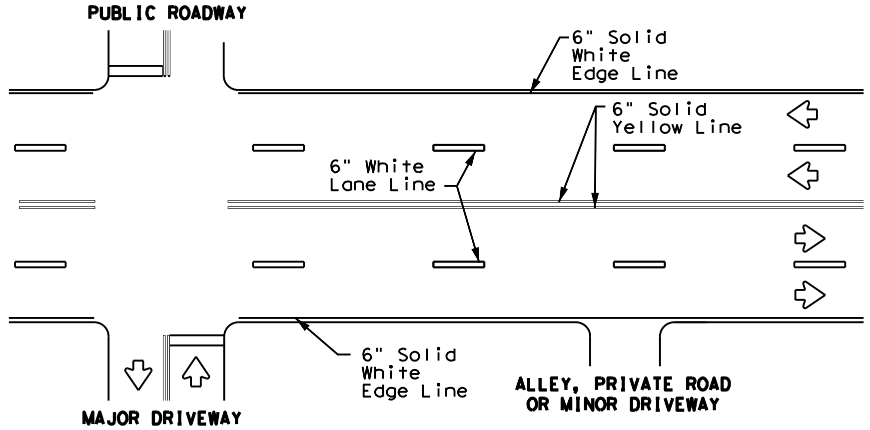


CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS

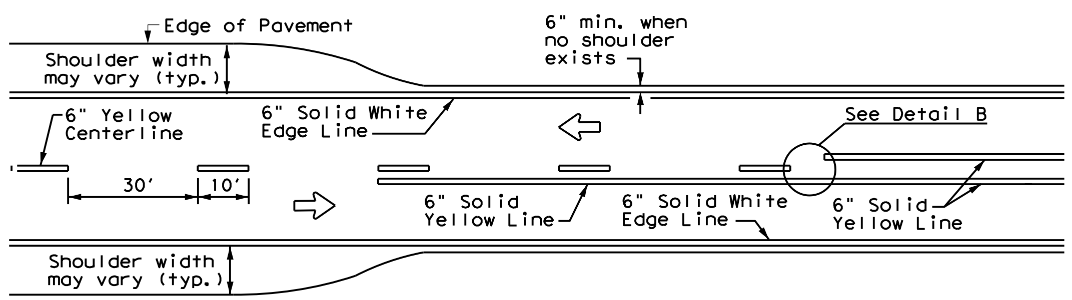


DETAIL "A"

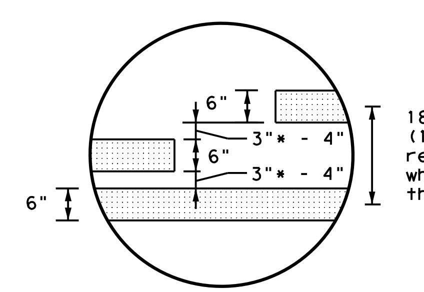
* 2" minimum for restripe projects when approved by the Engineer.
** 8" minimum for restripe projects when approved by the Engineer.



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

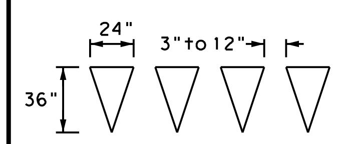


TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



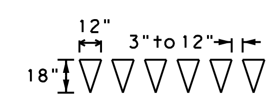
DETAIL "B"

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

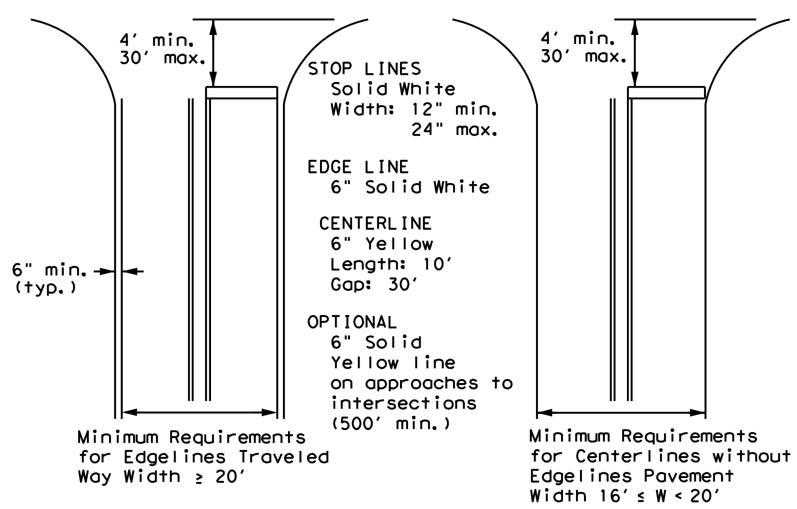


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES

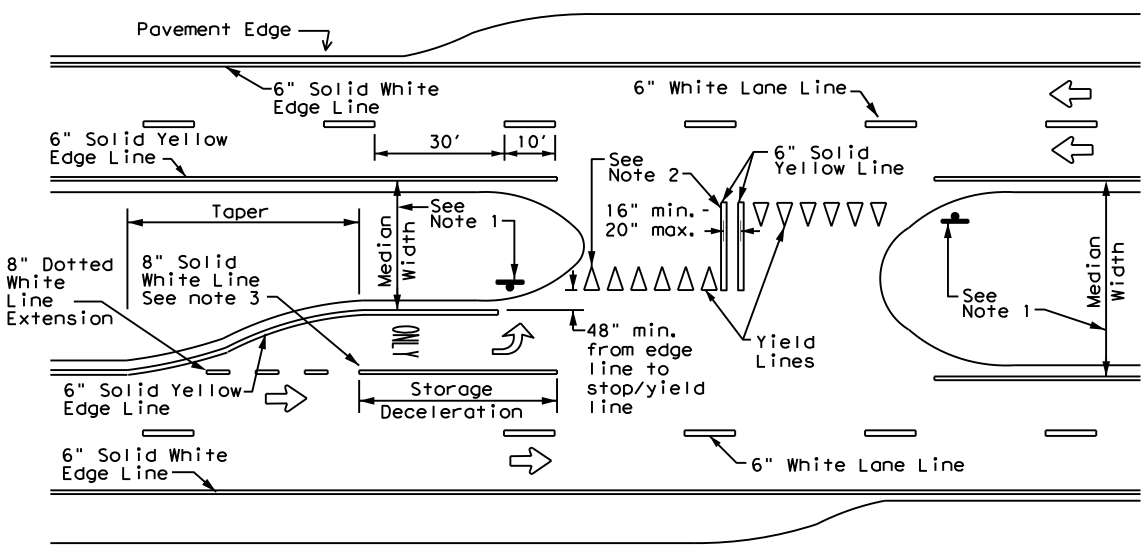


For posted speed on road being marked equal to or less than 40 MPH.



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

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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

GENERAL NOTES

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

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

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

NOTES

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

Texas Department of Transportation — Traffic Safety Division Standard

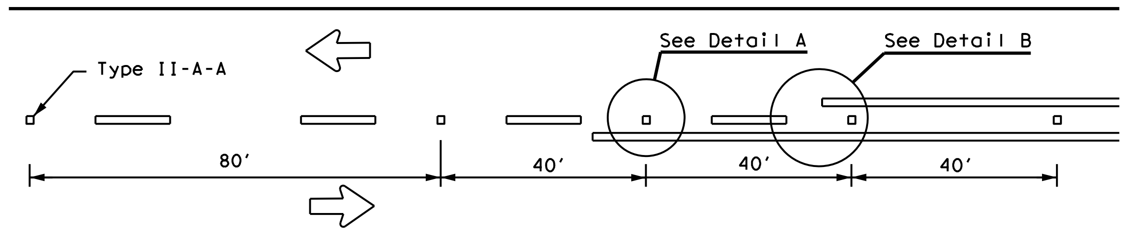
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

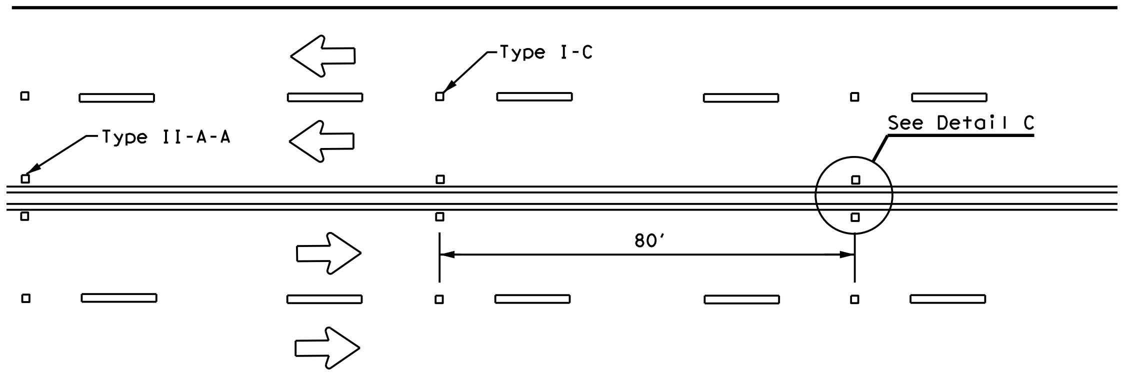
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 11-78 8-00 6-20; 8-95 3-03 12-22; 5-00 2-12	DIST ABL		COUNTY NOLAN	SHEET NO. 136

22A

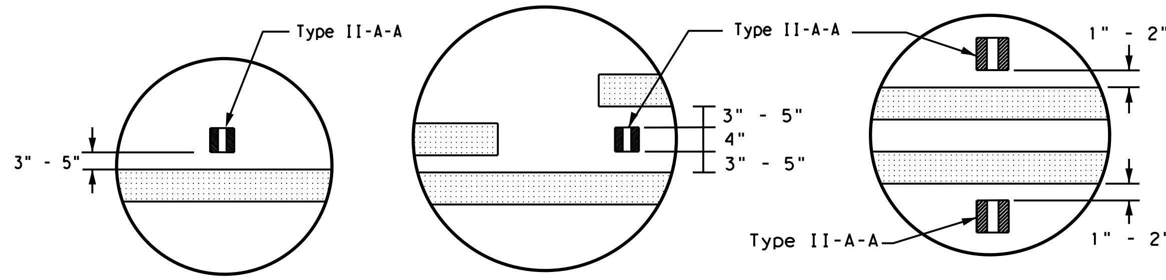
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



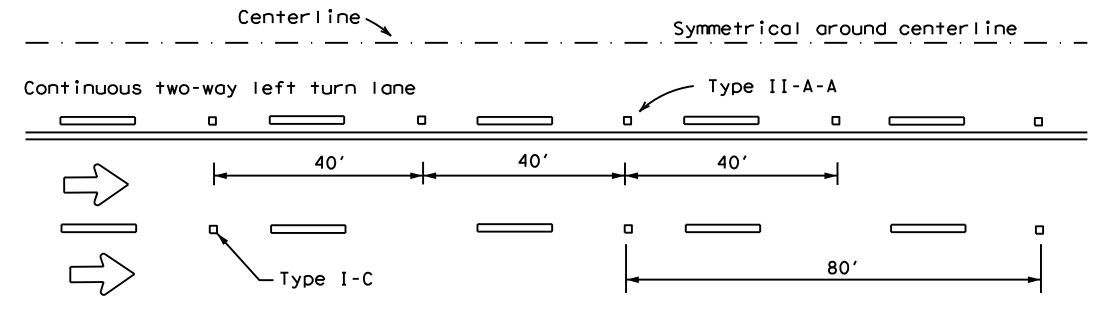
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



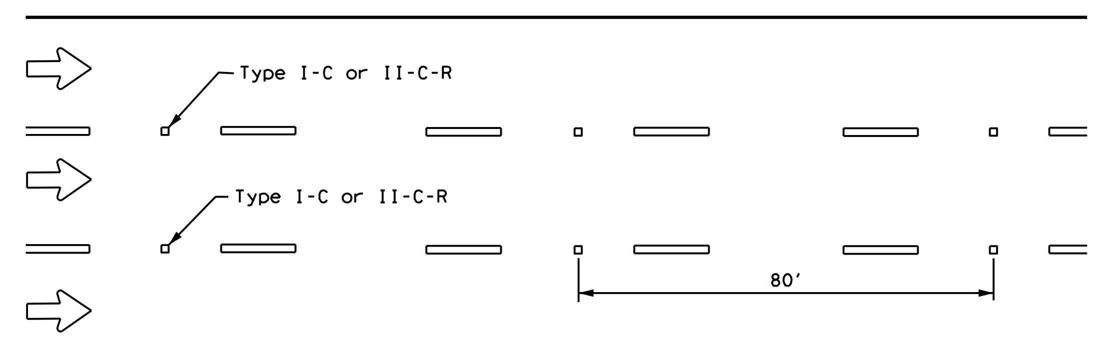
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



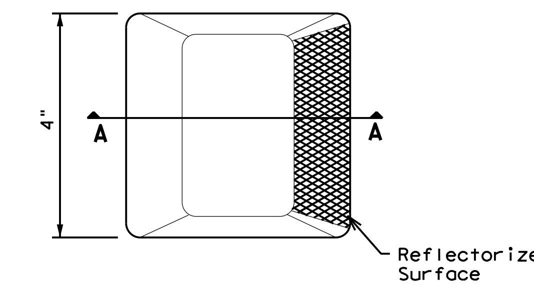
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

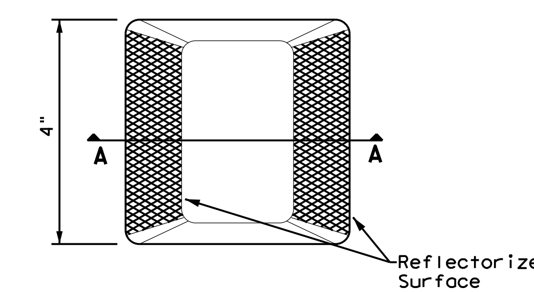
See Note 3.

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

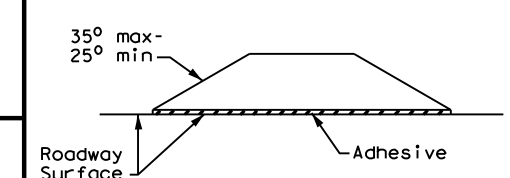
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

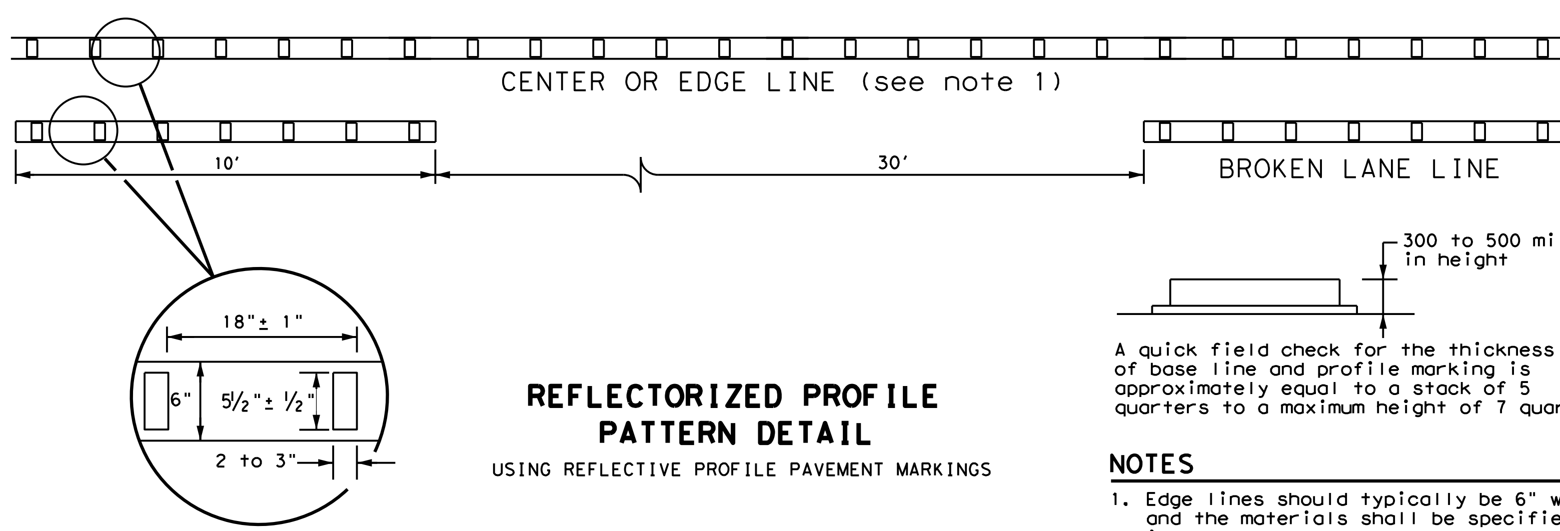


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

300 to 500 mil in height

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

NOTES

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Safety Division Standard

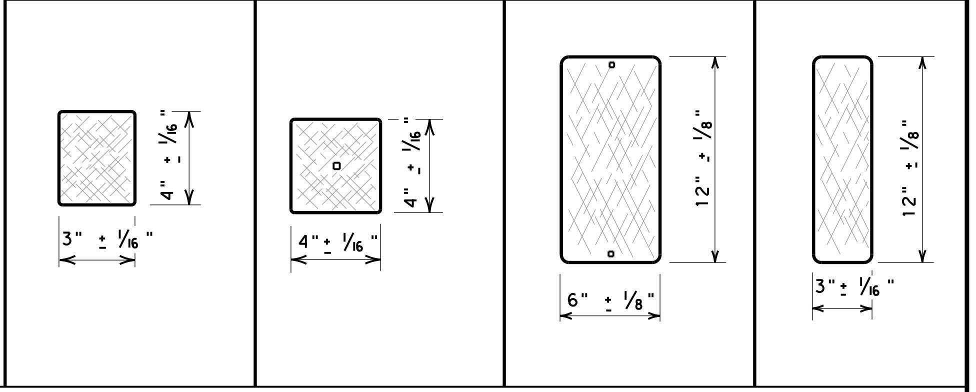
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 4-77 8-00 6-20; 4-92 2-10 12-22; 5-00 2-12	DIST ABL		COUNTY NOLAN	SHEET NO. 137

22B

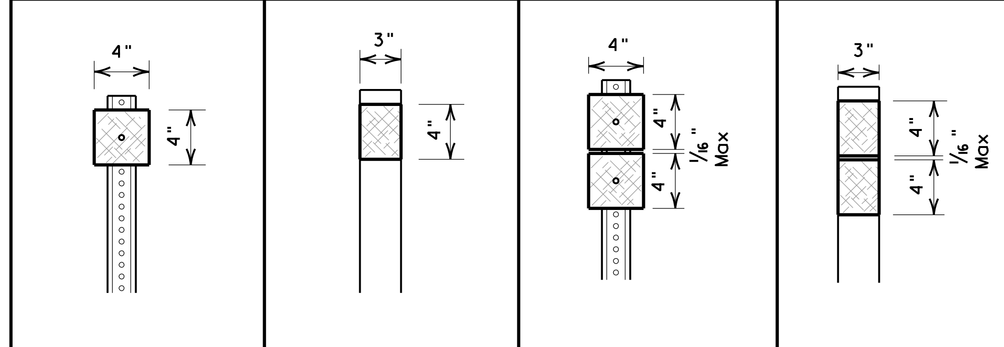
DATE: 6/5/2023 8:06:29 PM
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/...

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS



	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE	3" ± 1/16" x 4" ± 1/16"	4" ± 1/16" x 4" ± 1/16"	6" ± 1/8" x 12" ± 1/8"	3" ± 1/16" x 12" ± 1/8"
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 (flx). 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.			

DELINEATORS



	SINGLE		DOUBLE	
DEVICE	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

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

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

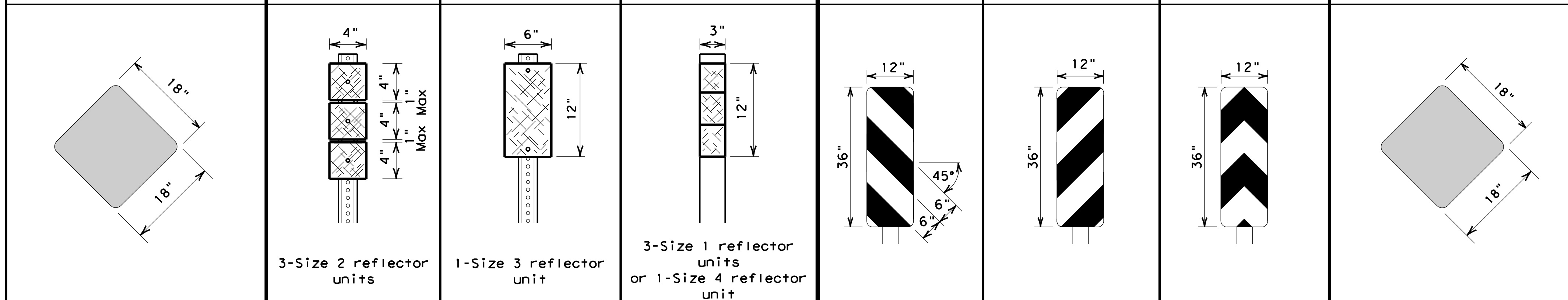
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

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

OBJECT MARKERS

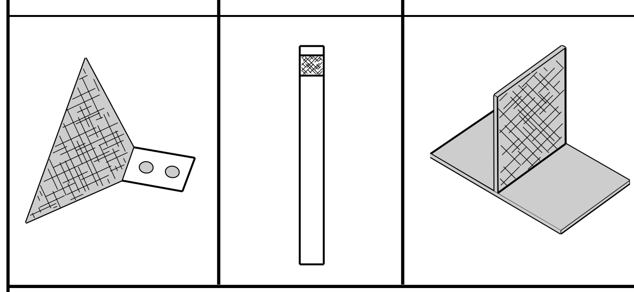


	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

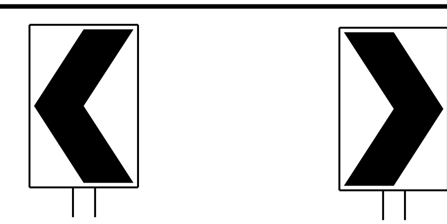
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)



	GF1	GF2	CTB
DEVICE	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.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

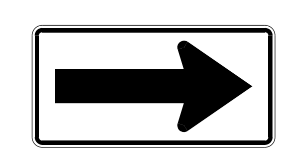
CHEVRONS



W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

ONE DIRECTION LARGE ARROW



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
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).

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

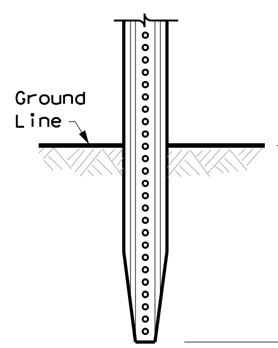
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 10-09 3-15 4-10 7-20	DIST ABL	COUNTY NOLAN		SHEET NO. 138

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

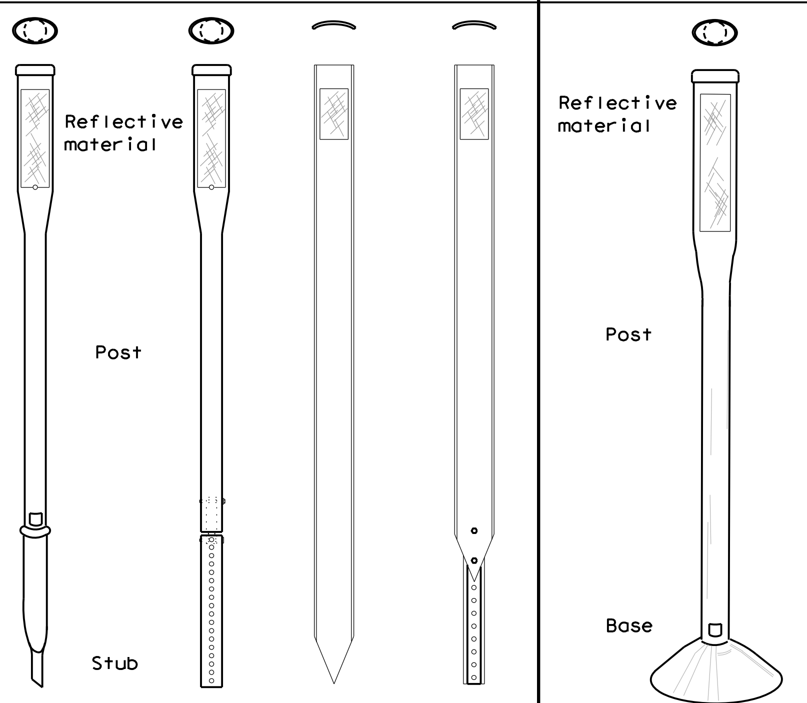


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

FLEXIBLE POSTS (YFLX, WFLX)

GND / SRF



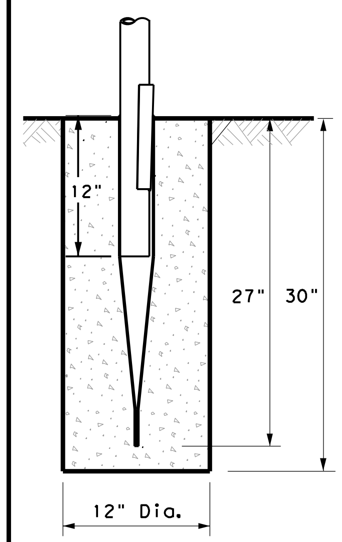
EMBEDDED | SURFACE MOUNT

NOTES

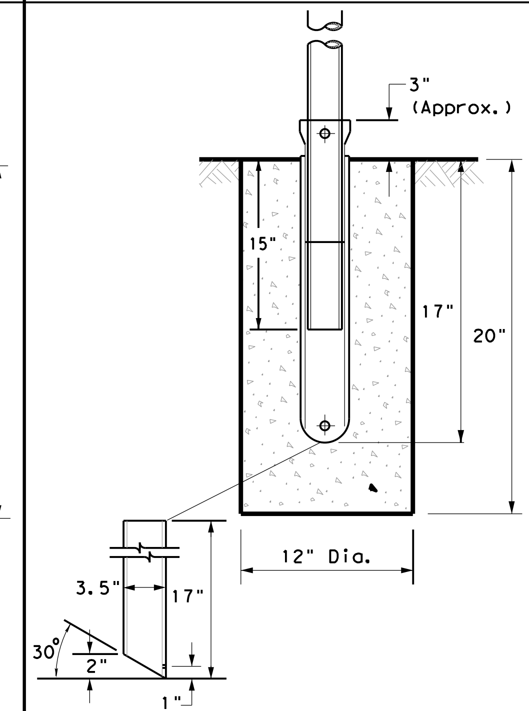
1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

WEDGE ANCHOR SYSTEMS

WAS



WAP



STEEL | PLASTIC

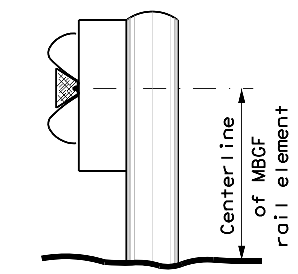
NOTE

1. Install per manufacturer's recommendations.

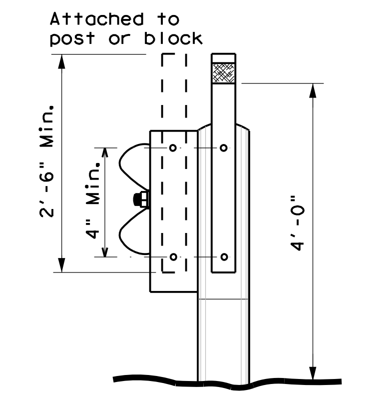
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

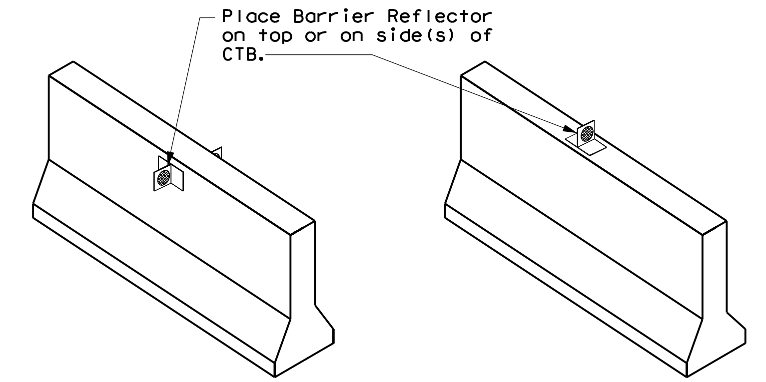
GF1



GF2



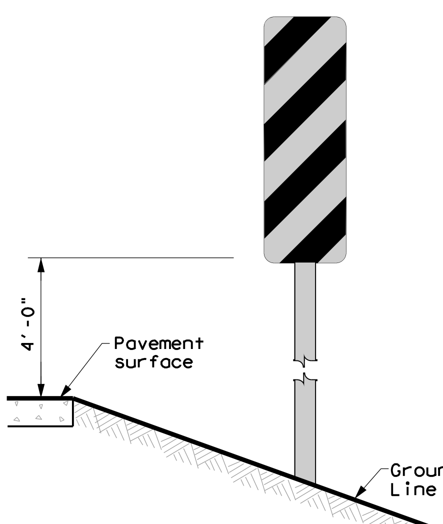
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

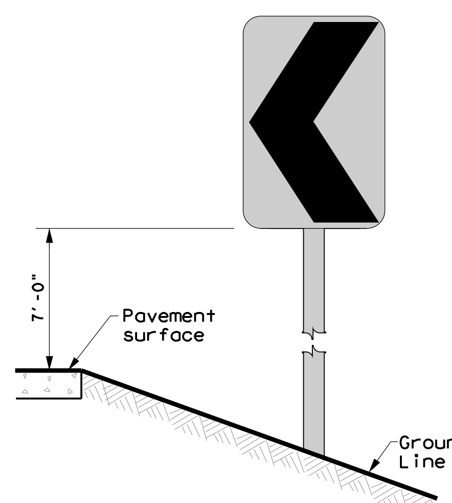
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

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

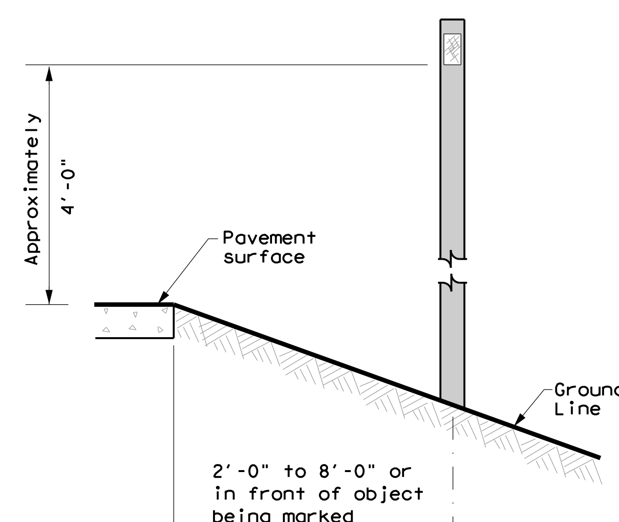
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

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

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation | Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

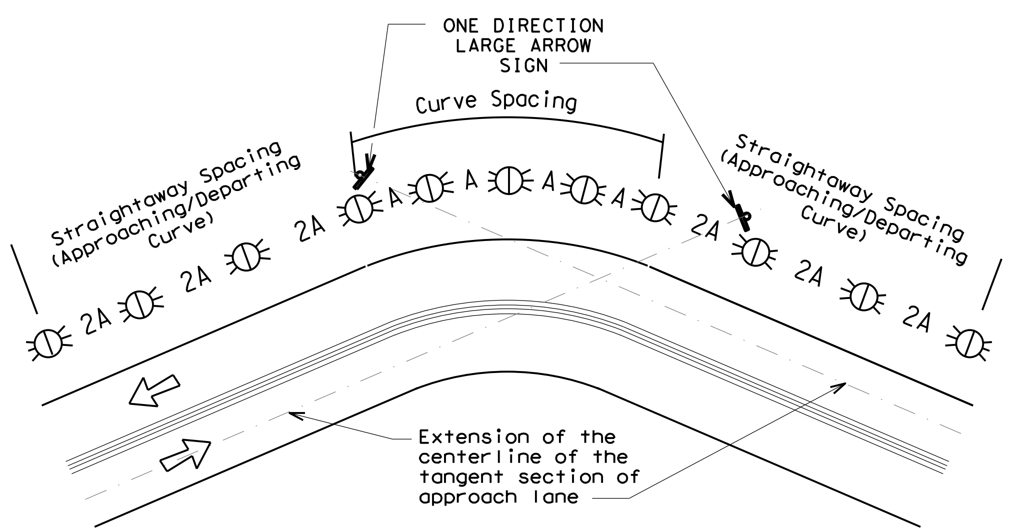
FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
10-09 3-15	DIST		COUNTY	SHEET NO.
4-10 7-20	ABL		NOLAN	139

20B

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 Advisory Speed: 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

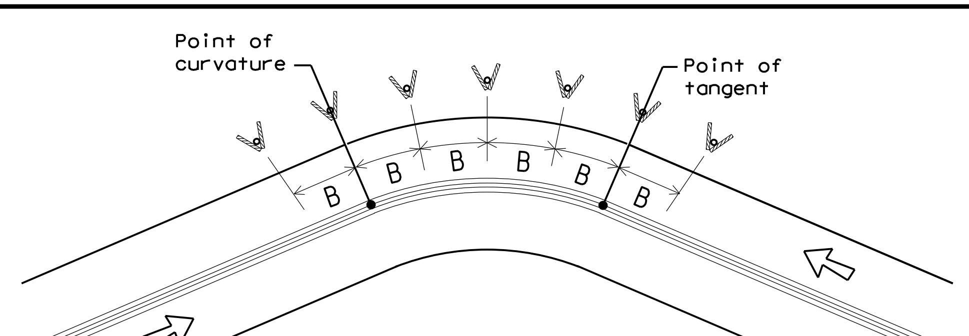
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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	Radius of Curve (FEET)	Spacing in Curve (FEET)	Spacing in Straightaway (FEET)	Chevron Spacing in Curve (FEET)
		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

1. 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.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

Symbol	Meaning
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

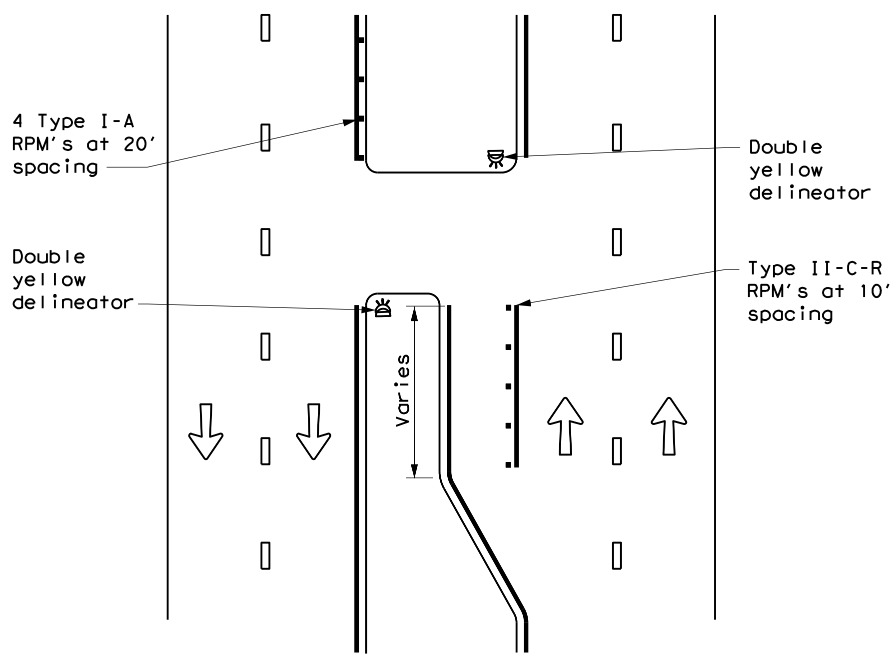
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 3-15 8-15 8-15 7-20	DIST ABL		COUNTY NOLAN	SHEET NO. 140

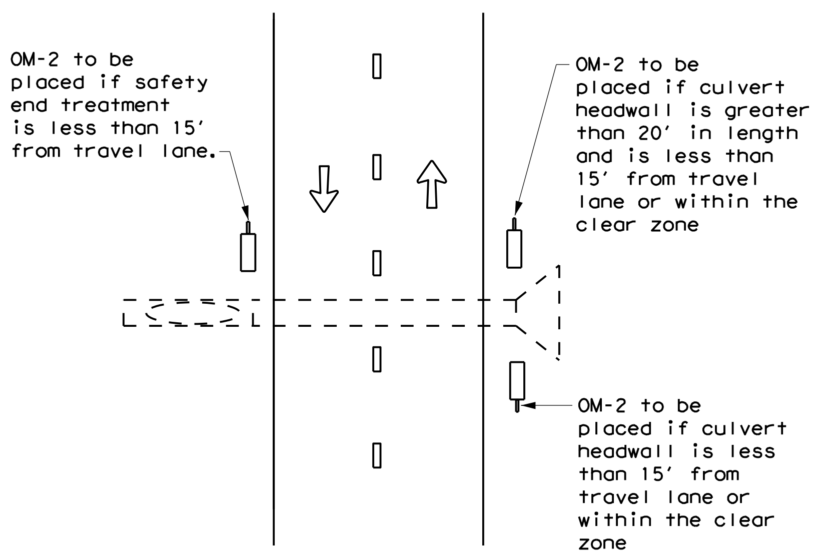
20C

CROSSOVERS



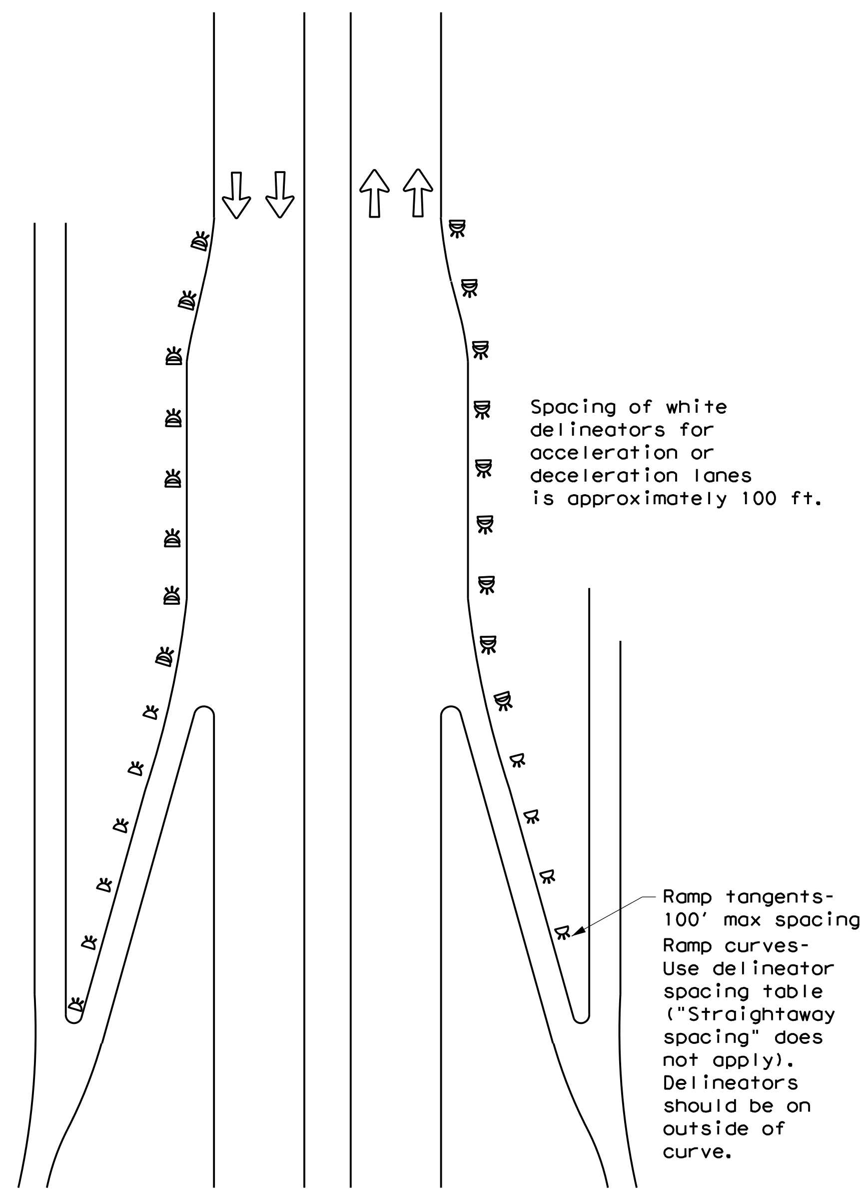
DETAIL 1

FOR CULVERTS WITHOUT MBGF



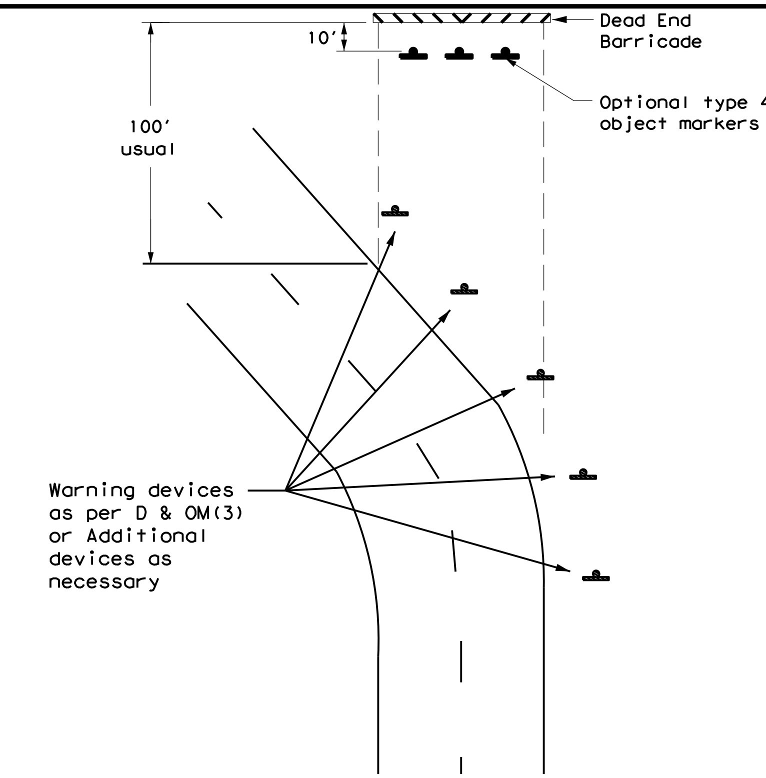
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



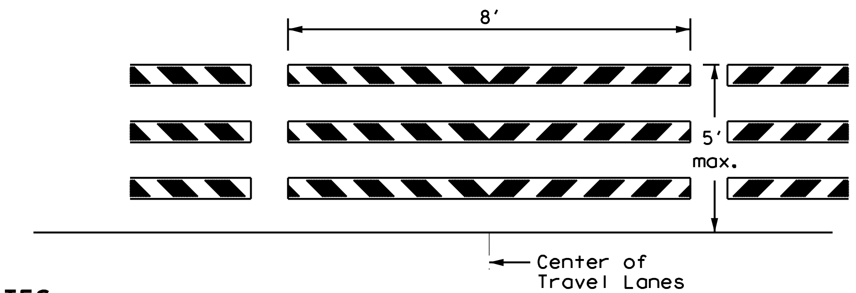
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. 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

Symbol	Description
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

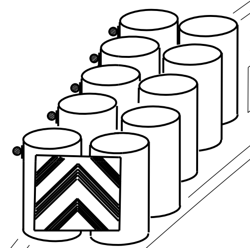
Traffic Safety Division Standard

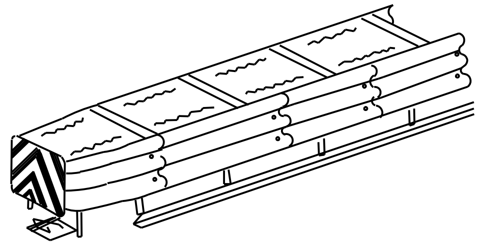
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

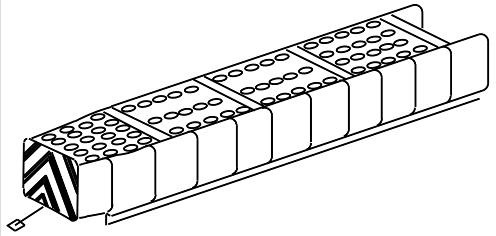
D & OM(4)-20

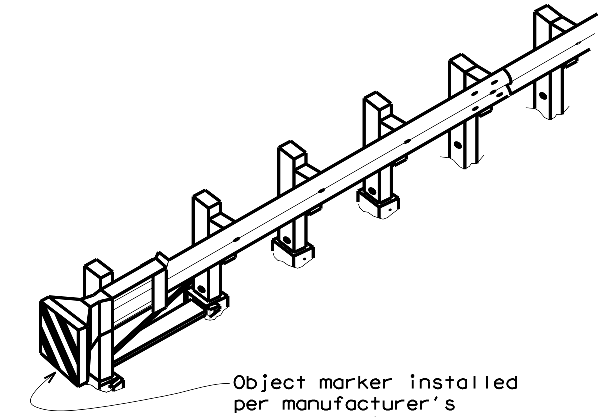
FILE: dom4-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY	
REVISIONS 3-15 7-20	2379	02	010	FM 608	
	DIST	COUNTY		SHEET NO.	
	ABL	NOLAN		141	

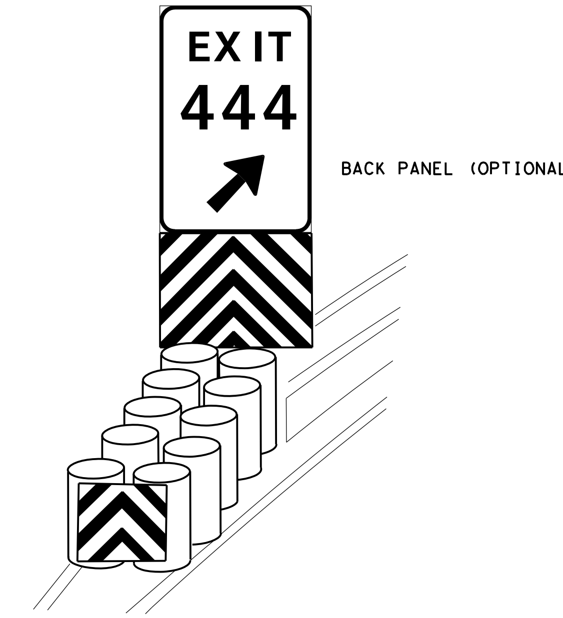
20D

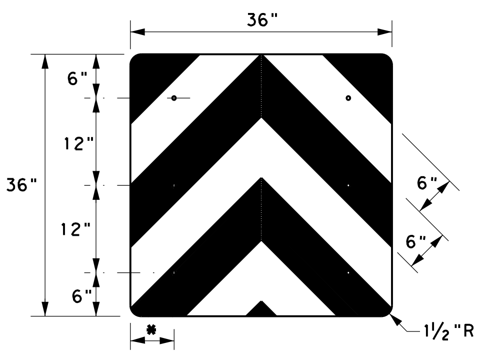


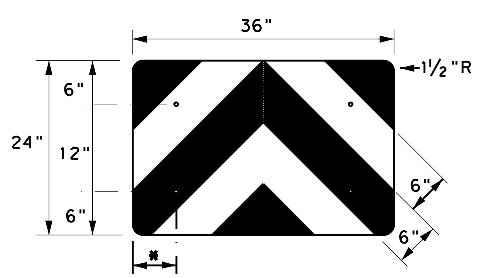




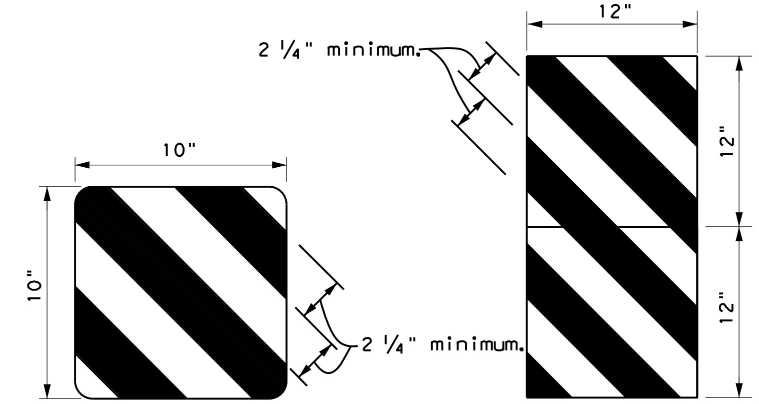




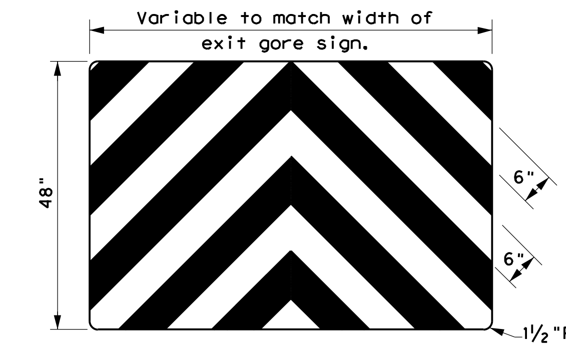


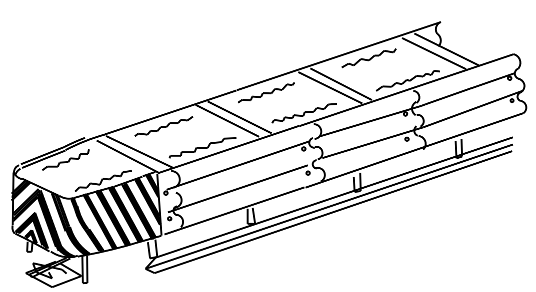


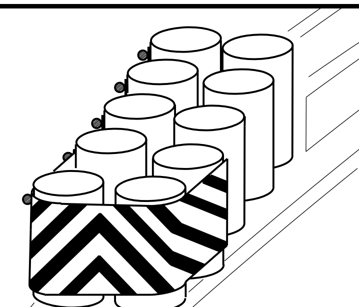
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

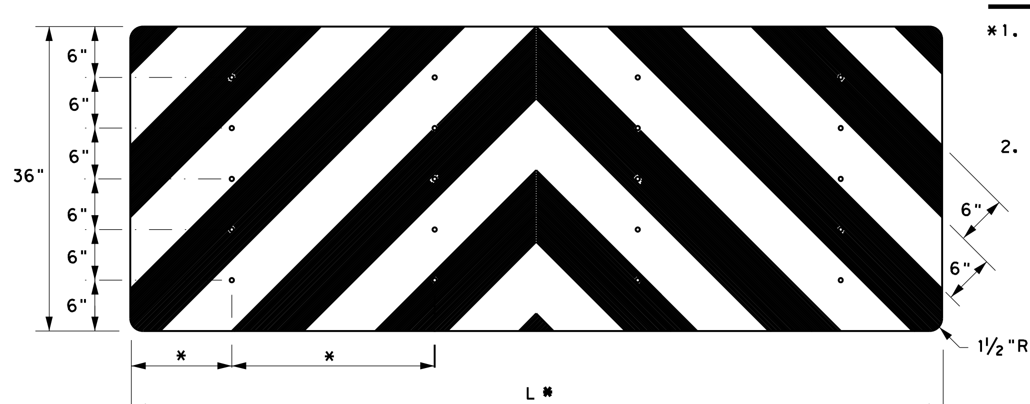


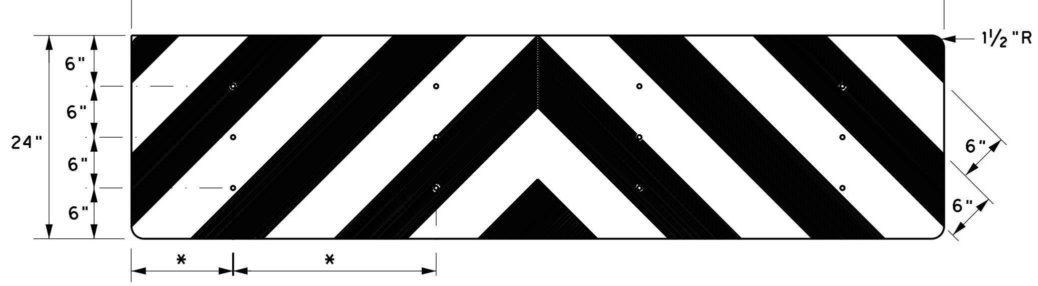
OBJECT MARKERS SMALLER THAN 3 FT^2











NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. 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.

2. 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.

3. 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 ¼".

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.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT 2379	SECT 02	JOB 010	HIGHWAY FM 608
REVISIONS 4-92 8-04 8-95 3-15 4-98 7-20	DIST ABL	COUNTY NOLAN		SHEET NO. 142

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STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
2379-02-010

1.2 PROJECT LIMITS:
From: FISHER COUNTY LINE

To: BU-84

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 32.5247836 ,(Long) -100.5586084

END: (Lat) 32.4479510 ,(Long) -100.5391561

1.4 TOTAL PROJECT AREA (Acres): 23.21

1.5 TOTAL AREA TO BE DISTURBED (Acres): 6.45

1.6 NATURE OF CONSTRUCTION ACTIVITY:
EXTEND AND SAFETY END TREAT CULVERTS
CEMENT TREAT AND SEAL COAT ROADWAY

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Pyron clay loam 0-3% slopes	38.5% clay, 25% sand, 36.5% silt
Roscoe clay 0-1% slopes	50% clay, 22% sand, 28% silt
Veal loam 1-5% slopes	27% clay, 35.8% sand, 37.2% silt

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☒ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s
LINED CONCRETE WASHOUT	147

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☒ Grading operations, excavation, and embankment
☒ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☒ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☒ Place flex base
☒ Rework slopes, grade ditches
☒ Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
☐ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☐ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
NONE	

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
X Post Construction Site Notice
X Submit NOI/CSN to local MS4
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
X Complete and submit Notice of Termination to TCEQ
X Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED PROFESSIONAL ENGINEER
Stephen T. Jones, P.E.
06/06/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		143
STATE	STATE DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
2379	02	010	FM 608

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☒ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☐ Permanent Planting, Sodding or Seeding
- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

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

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

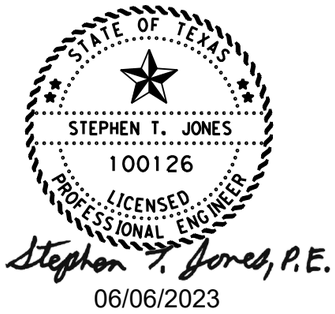
- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.



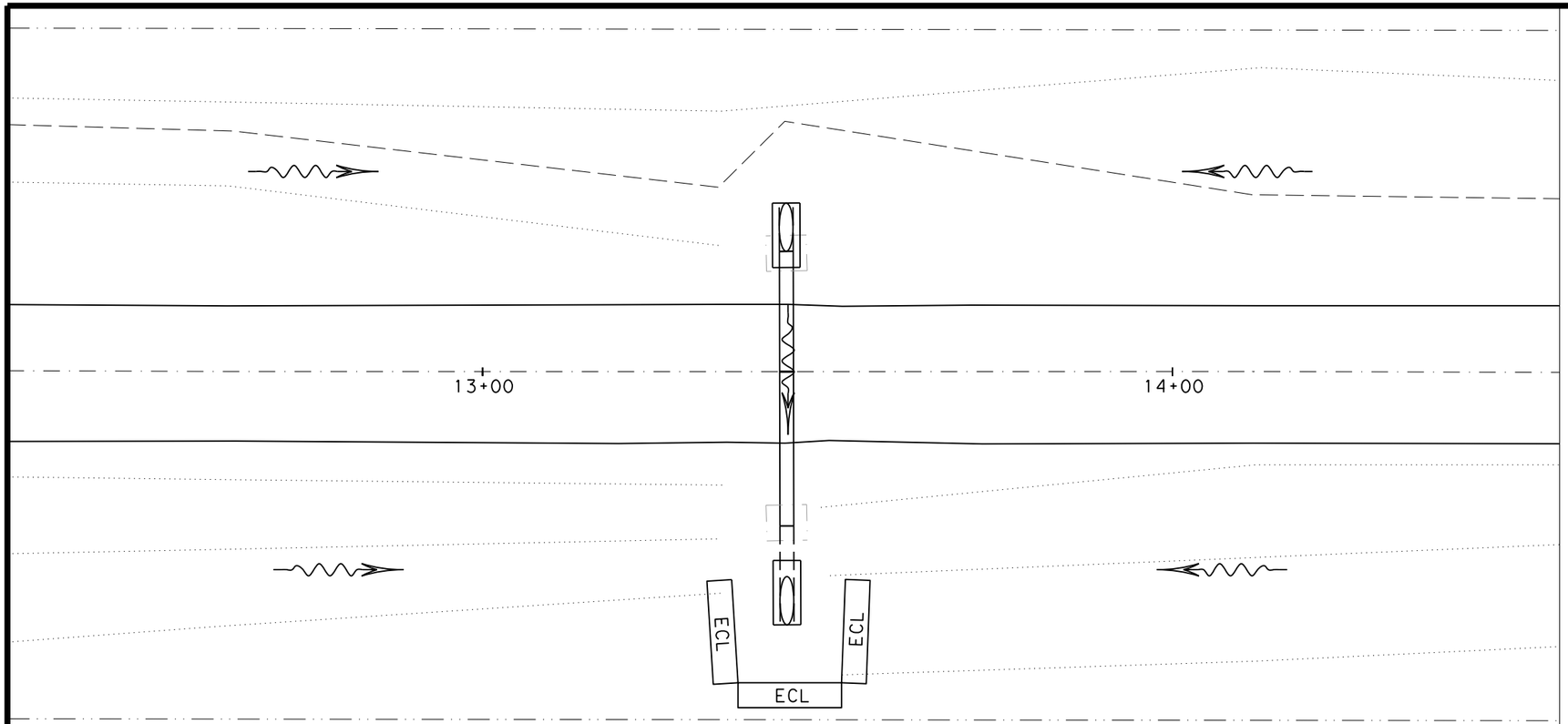
06/06/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		144
STATE	STATE DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
2379	02	010	FM 608



LEGEND

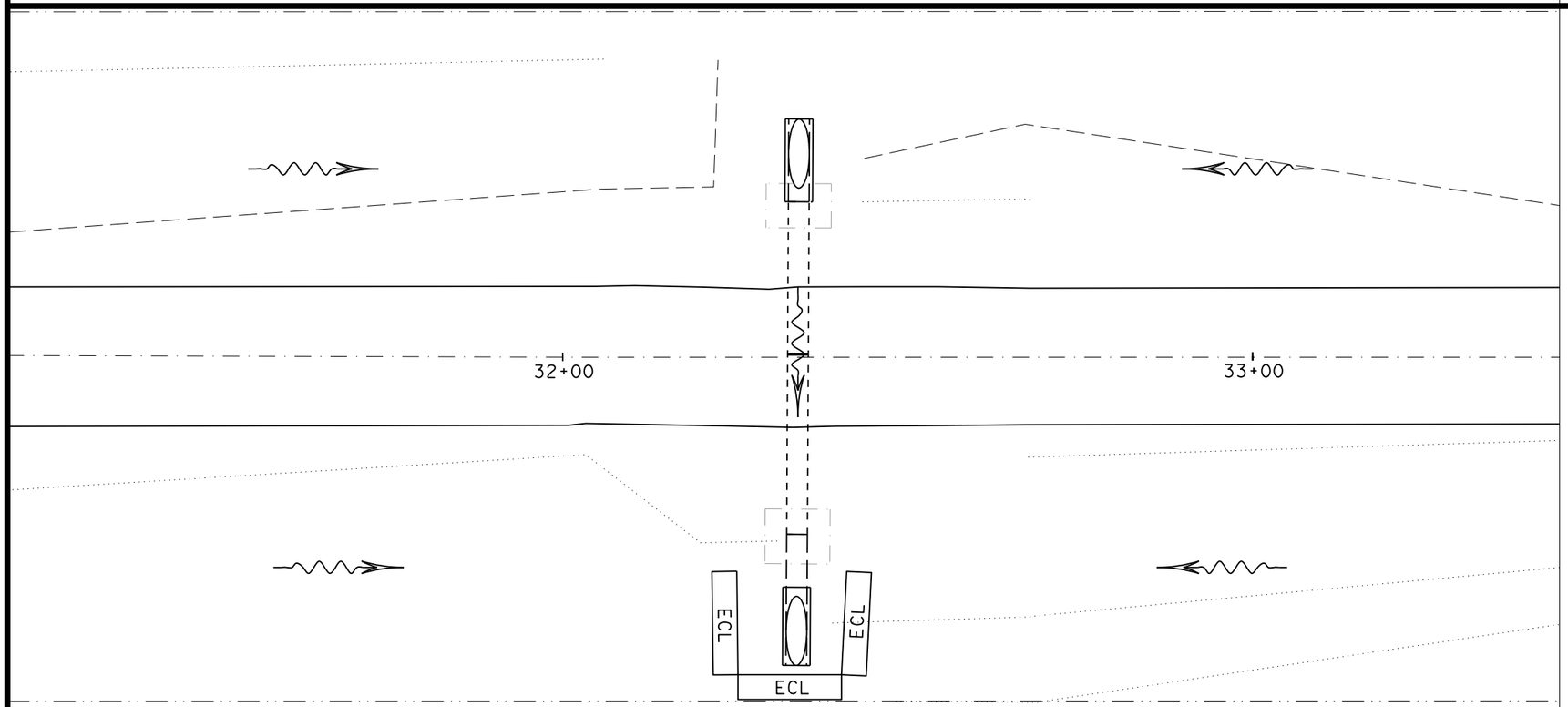
DIRECTION OF TRAVEL

ECL — EROSION CONTROL LOG

DIRECTION OF FLOW

CONCRETE WASHOUT

BMP # 1 STA 13+44.06	45' EROS CONT LOGS
DATE INSTALLED	
DATE REMOVED	



BMP # 2 STA 32+34.10	45' EROS CONT LOGS
DATE INSTALLED	
DATE REMOVED	

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

ENVIRONMENTAL LAYOUT SHEETS

Texas Department of Transportation

NTS

SHEET 1 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		145
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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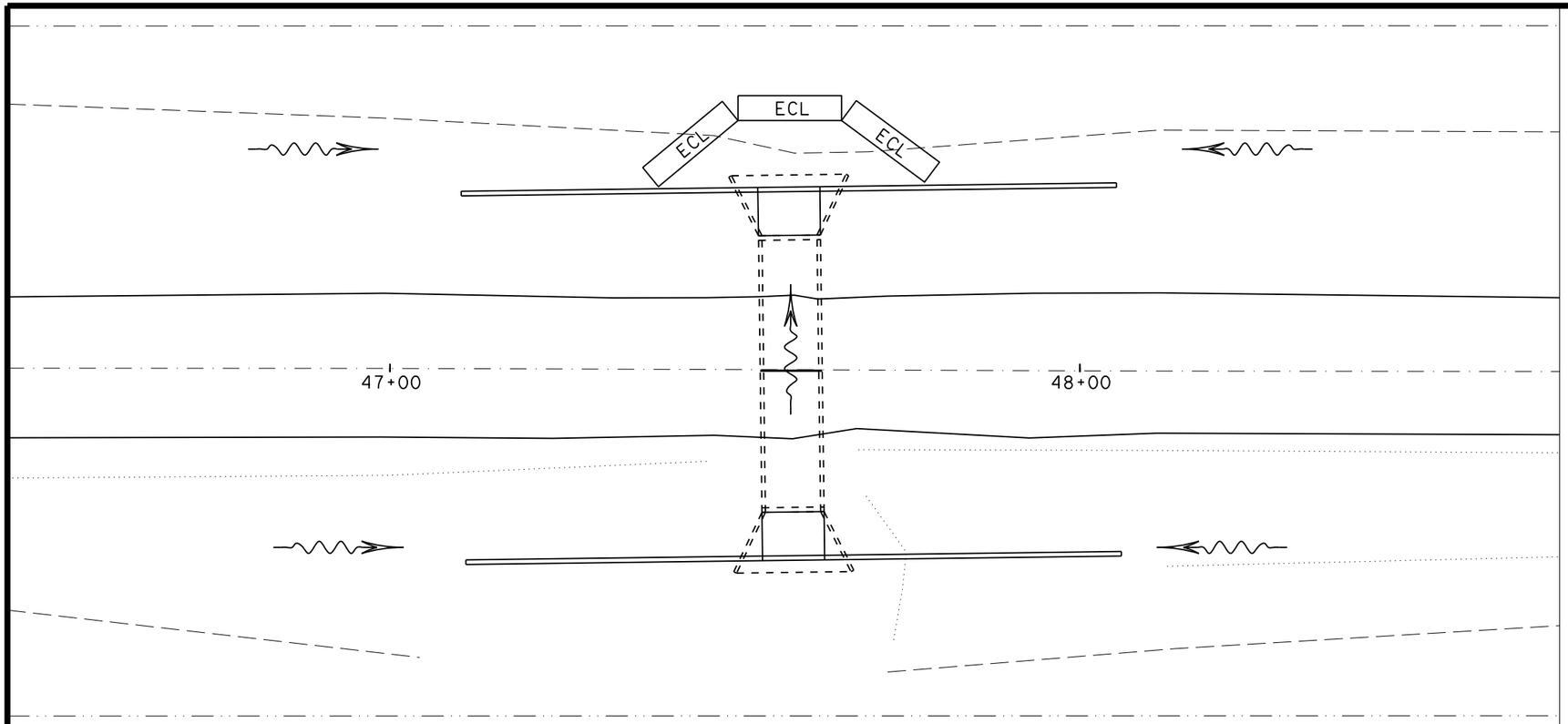

LEGEND

DIRECTION OF TRAVEL

ECL — EROSION CONTROL LOG

DIRECTION OF FLOW

CONCRETE WASHOUT

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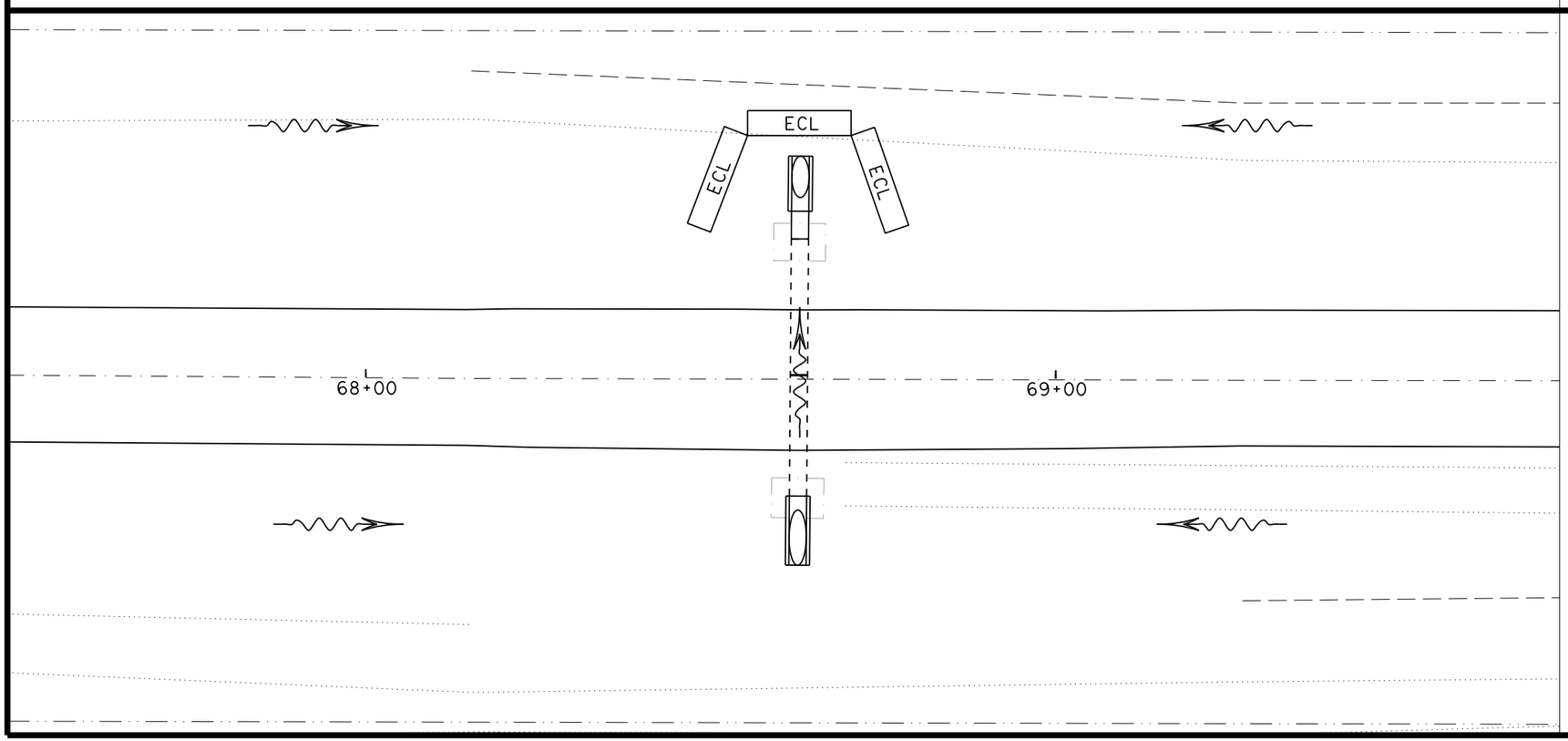
DATE INSTALLED	
DATE REMOVED	



BMP # 4 STA 68+62.79	45' EROS CONT LOGS
DATE INSTALLED	
DATE REMOVED	

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ENVIRONMENTAL LAYOUT SHEETS

Texas Department of Transportation

NTS

SHEET 2 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		146
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

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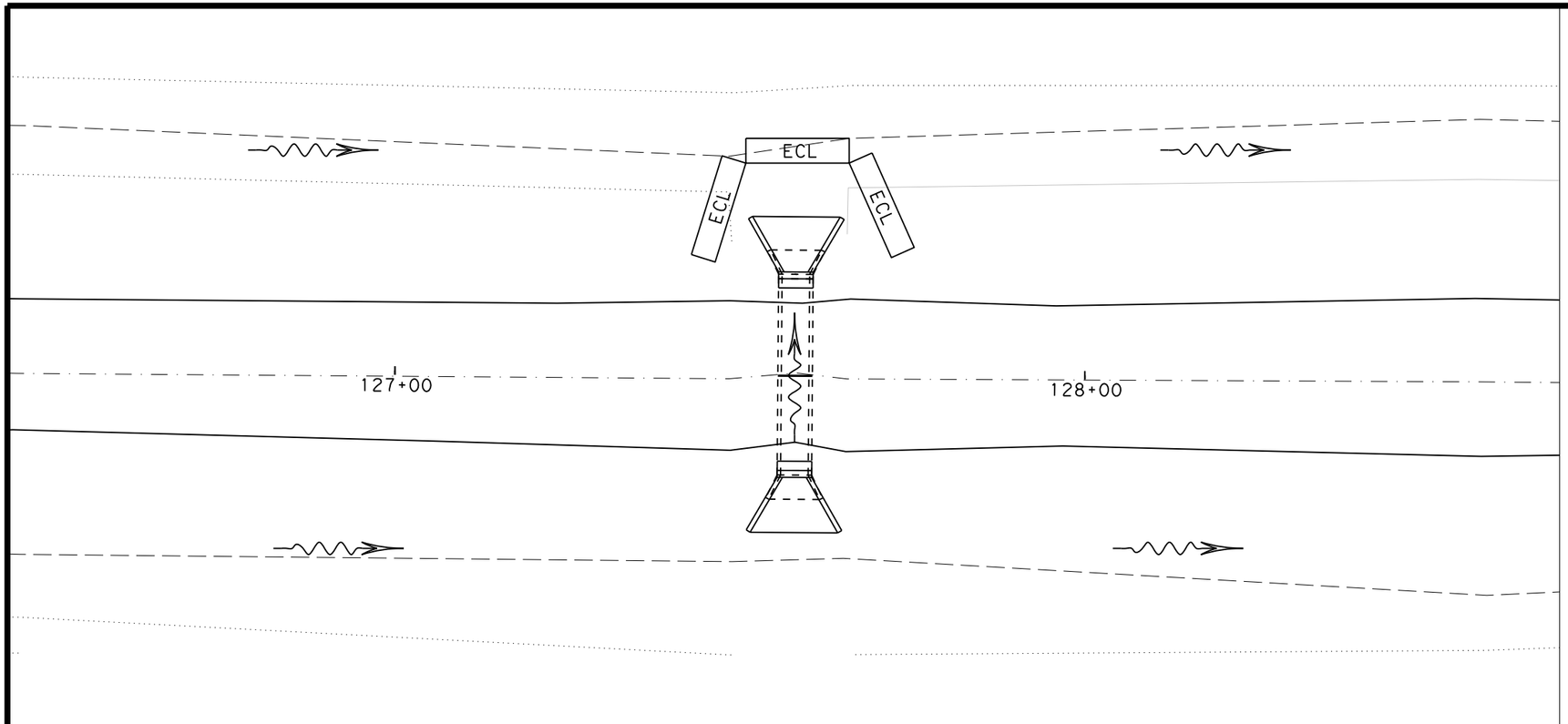


LEGEND

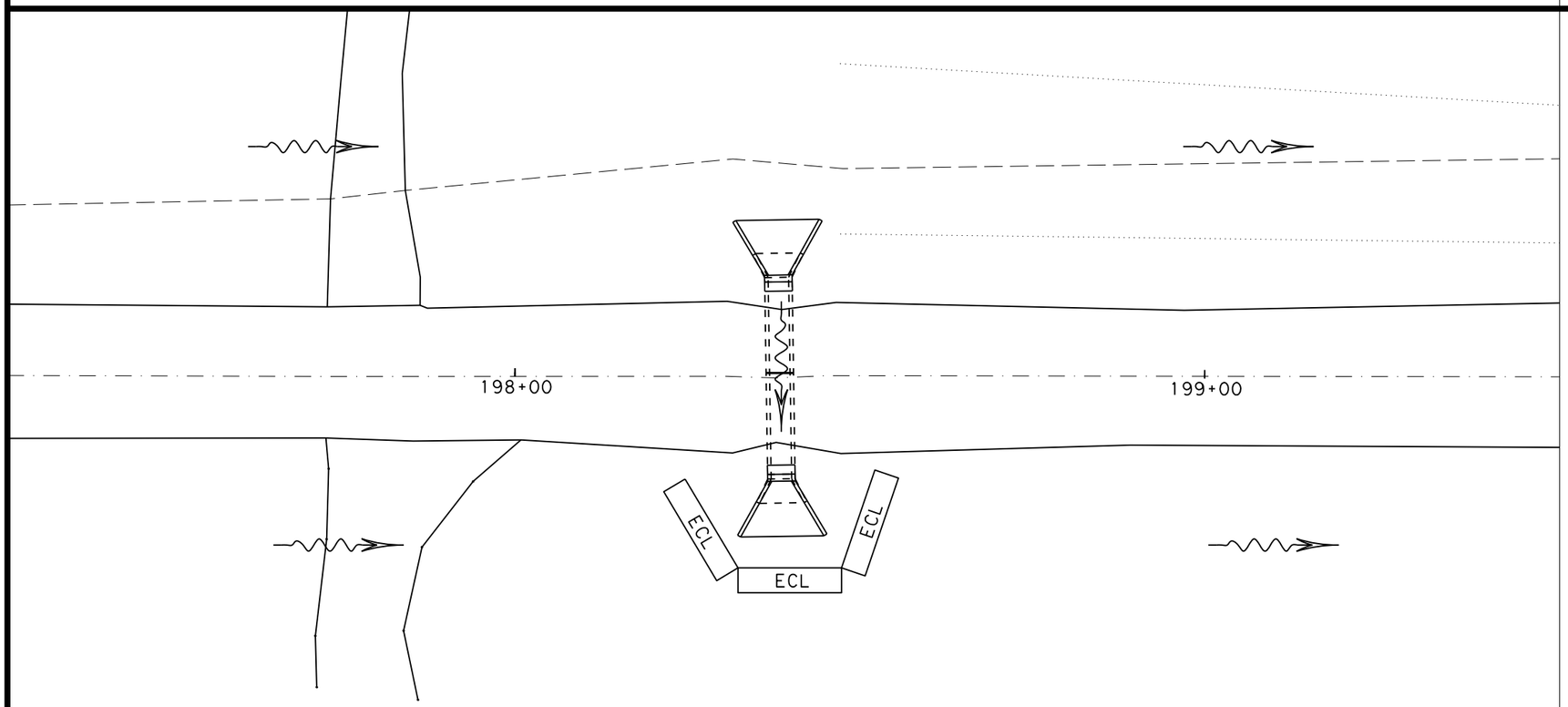
DIRECTION OF TRAVEL

ECL — EROSION CONTROL LOG

DIRECTION OF FLOW

CONCRETE WASHOUT

BMP # 5 STA 127+58.02 45' EROS CONT LOGS	
DATE INSTALLED	
DATE REMOVED	



BMP # 6 STA 198+38.44 45' EROS CONT LOGS	
DATE INSTALLED	
DATE REMOVED	

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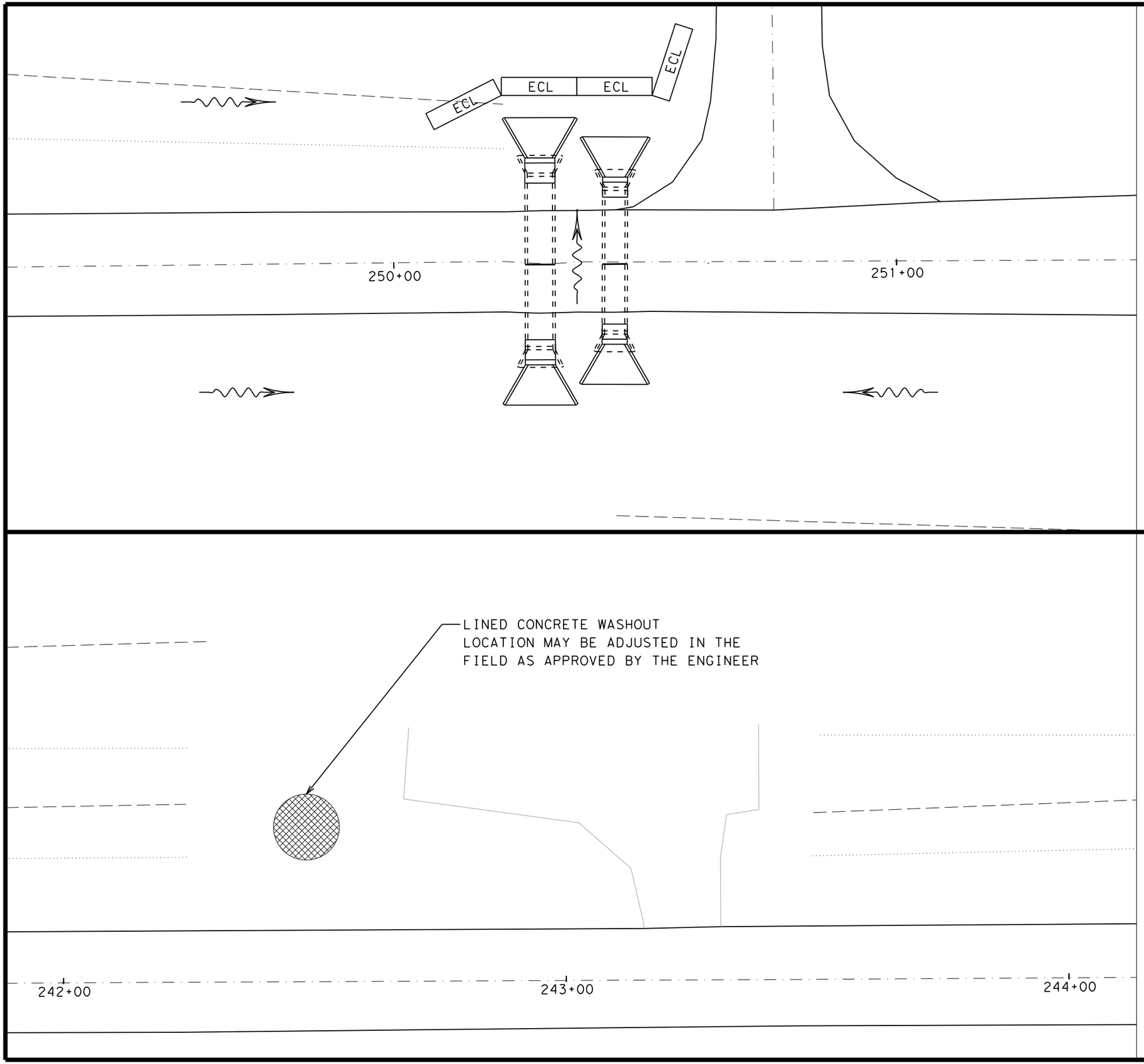
ENVIRONMENTAL LAYOUT SHEETS

Texas Department of Transportation

NTS

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		147
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010



LEGEND

DIRECTION OF TRAVEL

ECL — EROSION CONTROL LOG

DIRECTION OF FLOW

CONCRETE WASHOUT

BMP # 7 STA 250+29.09 60'' EROS CONT LOGS	
DATE INSTALLED	
DATE REMOVED	

STATE OF TEXAS
STEPHEN T. JONES
100126
LICENSED
PROFESSIONAL ENGINEER

Stephen T. Jones, P.E.

ENVIRONMENTAL LAYOUT SHEETS

Texas Department of Transportation

NTS

SHEET 4 OF 4

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		148
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/9. Environmental/ENVIRONMENTAL LAYOUT SHEET
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I. STORM WATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

[ ] No Action Required [X] Required Action

Action No.

1. The project disturbs five or more acres of surface area: TxDOT must file a NOI and coordinate with TCEQ for CGP. The contractor is responsible for the PSL as defined in the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (2014 Edition, Section 7.6., Page 44). The total disturbed acreage is the combined acreage to be disturbed on the project and the contractors PSL. This includes, as required, posting a site notice and NOI for the PSL.
2. TxDOT must file a NOT for the project when final stabilization has been achieved.
3. Prevent storm water pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
4. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
5. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

II. WORK IN OR NEAR STREAMS, WATER BODIES 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
- [X] Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- [ ] Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- [ ] Individual 404 Permit Required
- [ ] Other Nationwide Permit Required: NWP# ______

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

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
[ ] Temporary Vegetation	[ ] Silt Fence	[ ] Vegetative Filter Strips
[ ] Blankets/Matting	[ ] Rock Berm	[ ] Retention/Irrigation Systems
[ ] Mulch	[ ] Triangular Filter Dike	[ ] Sedimentation Basin
[ ] Sodding	[ ] Sand Bag Berm	[ ] Constructed Wetlands
[ ] Interceptor Swale	[ ] Straw & Hay Bale Dike	[ ] Wet Basin
[ ] Diversion Dike	[ ] Brush Berms	[ ] Erosion Control Compost & Mulch
[ ] Erosion Control Compost	[ ] Erosion Control Compost	[ ] Compost Filter Berm and Socks
[ ] Compost Filter Berm and Socks	[ ] Compost Filter Berm and Socks	[ ] Sand Filter Systems
[X] Temporary Erosion Control Logs (BIOLOGS)	[ ] Temporary Erosion Control Logs (BIOLOGS)	[ ] Temporary Erosion Control Logs (BIOLOGS)
[X] Preservation of Natural Resources	[ ] Sediment Traps	[ ] Permanent Vegetation (Planting, Sodding, or Seeding)
[ ] Construction Exits	[ ] Sediment Basins	[ ] 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.

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

[ ] No Action Required [X] Required Action

Action No.

1.

2.

3.

4.

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

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.

[ ] No Action Required [X] Required Action

Action No.

1.

2.

3.

4.

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 Storm water 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 [X] 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 [X] Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

[X] No Action Required [ ] Required Action

Action No.

1.

2.

3.

FM 608
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS
EPIC

Texas Department of Transportation

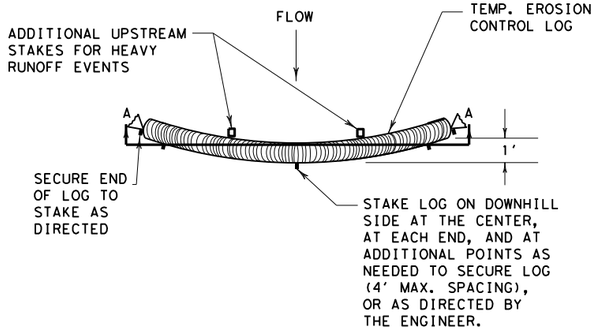
NO SCALE SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		FM 608
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		149
DISTRICT	CONTROL	SECTION	JOB
ABL	2379	02	010

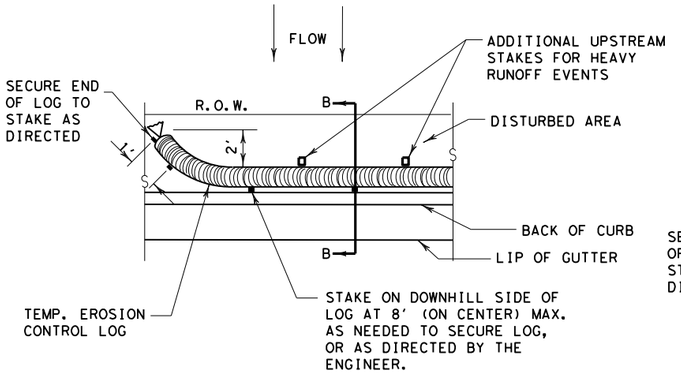
PREPARED BY (NAME OF DESIGNER)
DATE: 6/5/2023
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL

REV. DATE: 02/2015

DATE: 6/5/2023
FILE: pw://txdot.projectwiseonline.com:TXDOT2/Documents/08 - ABL/Design Projects/237902010/4 - Design/Plan Set/9. Environmental/EC(9)-16.dgn



PLAN VIEW



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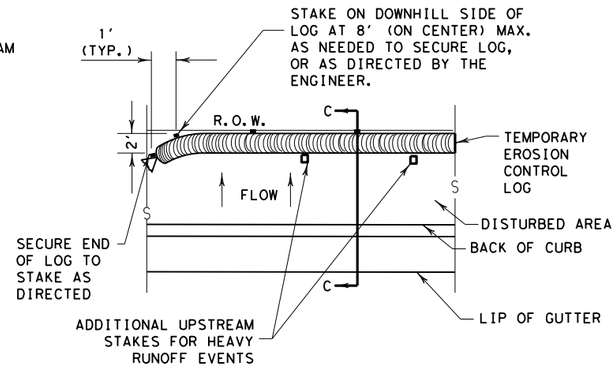

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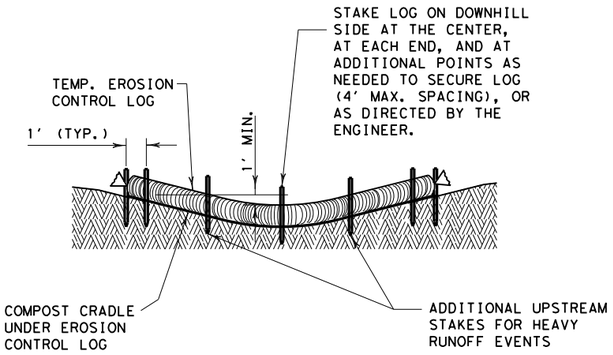
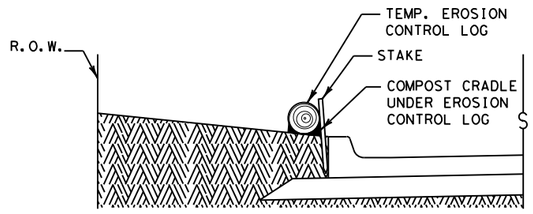


SECTION A-A

EROSION CONTROL LOG DAM

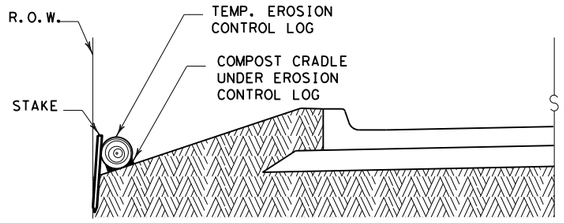
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

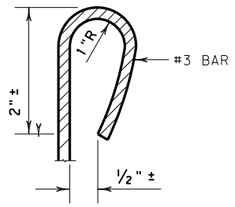
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

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

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'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.

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.

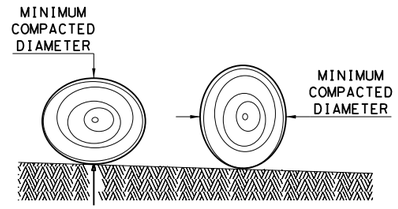
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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	2379	02	010		FM 608		
	DIST	COUNTY				SHEET NO.	
	ABL	NOLAN				150	

DATE: 6/5/2023
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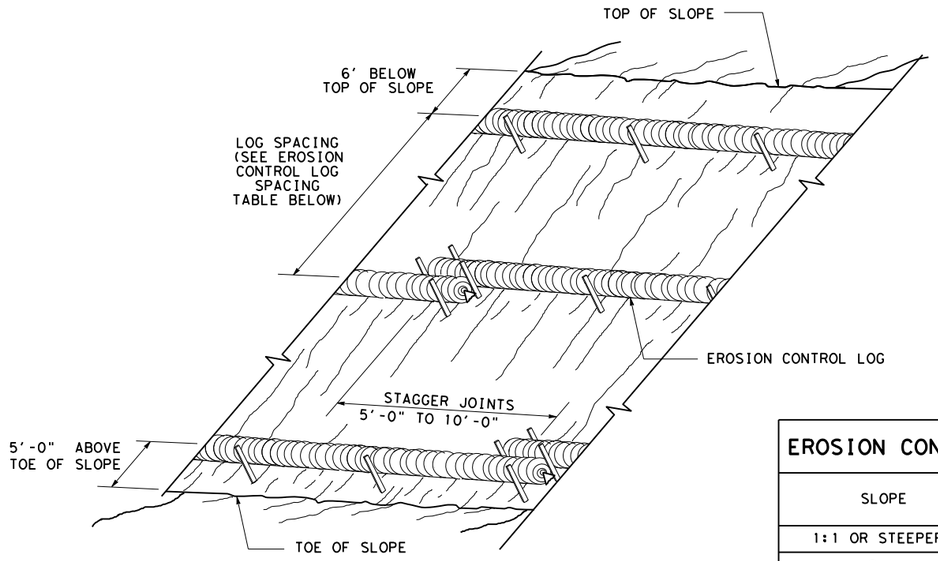
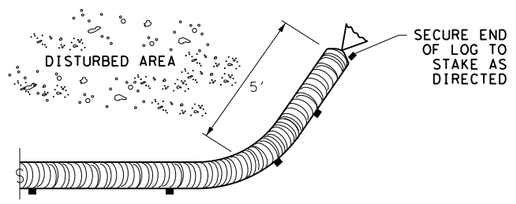


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

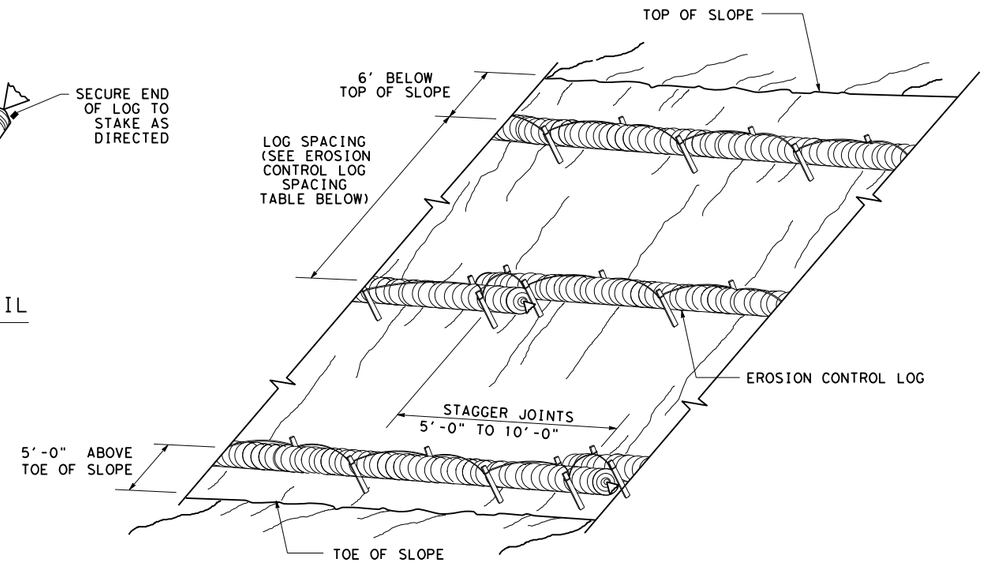
CL-SST



END SECTION RAP DETAIL

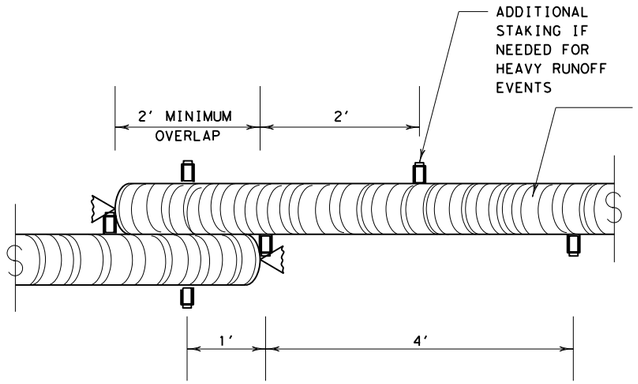
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

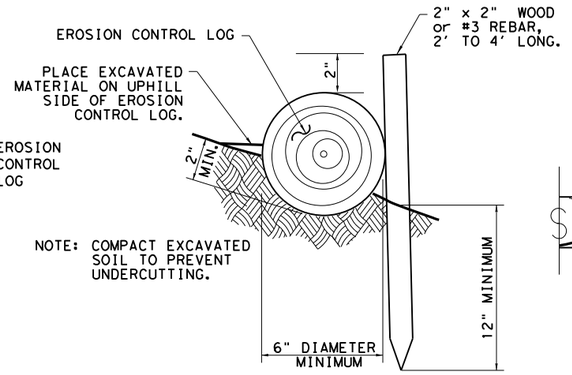
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

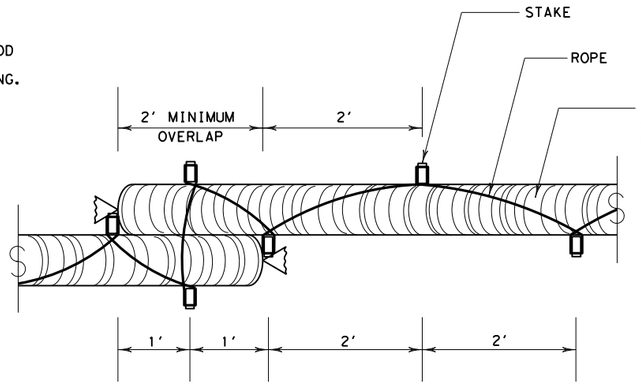


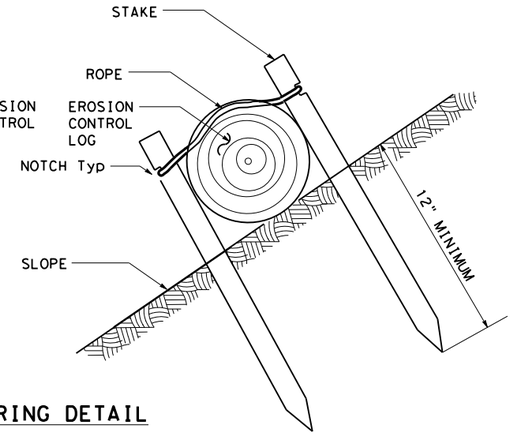


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

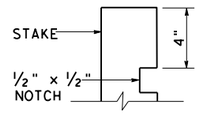
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	2379	02	010	FM 608
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		151

DATE: 6/5/2023
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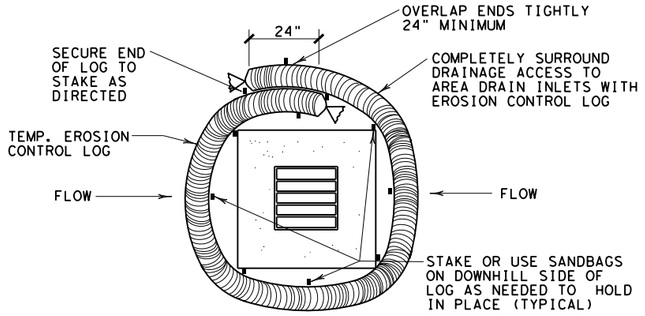
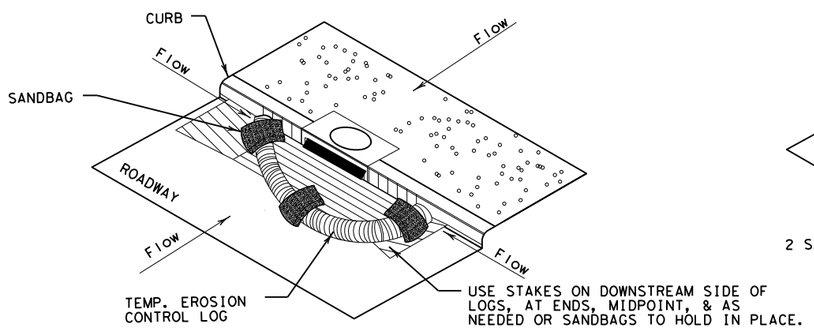


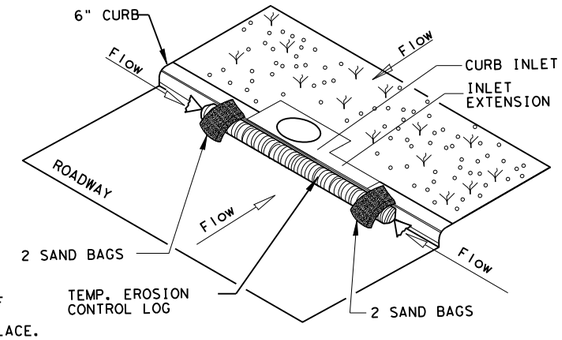
EROSION CONTROL LOG AT DROP INLET

CL-DI



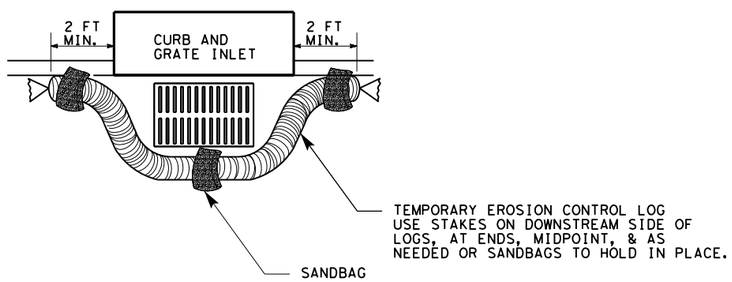
EROSION CONTROL LOG AT CURB INLET

CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

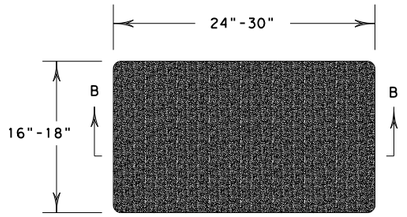


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

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.

SECTION B-B



SANDBAG DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

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REVISIONS	2379	02	010		FM 608	
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