STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO. BR 2025(073)

6	PROJECT NO.		SHEET NO.
	BR 2025(073)		1
STATE	DISTRICT	COUNTY	
TEXAS	ABL	NOLAN	
CONTROL	SECTION	JOB	HIGHWAY NO.
0264	01	046, ETC	SH 70

SH 70 AT SWEETWATER CREEK:
DESIGN SPEED = 60 mph
CURRENT A.D.T. (2022) = 4,172 vpd
PROJECTED A.D.T. (2042) = 5,590 vpd
FUNCTIONAL CLASS = MINOR ARTERIAL
EXISTING NBI# = 08-177-0-0264-01-002
PROPOSED NBI# = 08-177-0-0264-01-104

SH 70 AT COTTONWOOD CREEK:
DESIGN SPEED = 60 mph
CURRENT A.D.T. (2022) = 3,368 vpd
PROJECTED A.D.T. (2042) = 5,321 vpd
FUNCTIONAL CLASS = MINOR ARTERIAL
EXISTING NBI# = 08-177-0-0264-01-004
PROPOSED NBI# = 08-177-0-0264-01-103

CSJ: 0264-01-046 (SH 70 AT SWEETWATER CREEK)
NET LENGTH OF ROADWAY = 813.54 ft = 0.154 mi
NET LENGTH OF BRIDGE = 265.00 ft = 0.050 mi
NET LENGTH OF PROJECT = 1078.54 ft = 0.204 mi

CSJ: 0264-01-047 (SH 70 AT COTTONWOOD CREEK)
NET LENGTH OF ROADWAY = 1361.60 ft = 0.258 mi
NET LENGTH OF BRIDGE = 150.00 ft = 0.028 mi
NET LENGTH OF PROJECT = 1511.60 ft = 0.286 mi

SH 70
NOLAN COUNTY

LIMITS: SH 70 AT SWEETWATER CREEK
SH 70 AT COTTONWOOD CREEK

FOR THE CONSTRUCTION OF: BRIDGE REPLACEMENT

CONSISTING OF: REPLACE BRIDGE

INDEX OF SHEETS

SEE SHEET 2

FINAL PLANS

LETTING DATE: OCTOBER 2024

DATE CONTRACTOR BEGAN WORK: _____

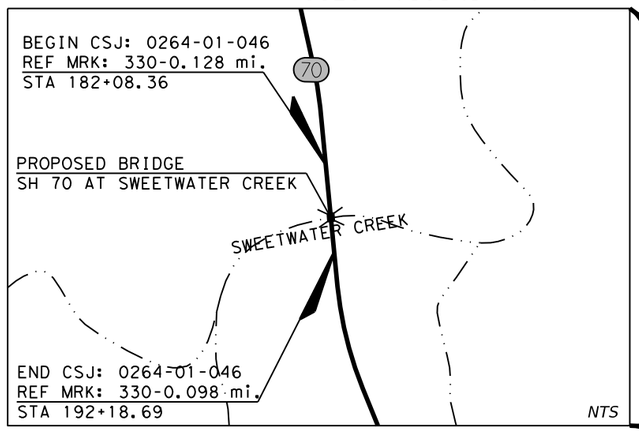
DATE WORK WAS COMPLETED: _____

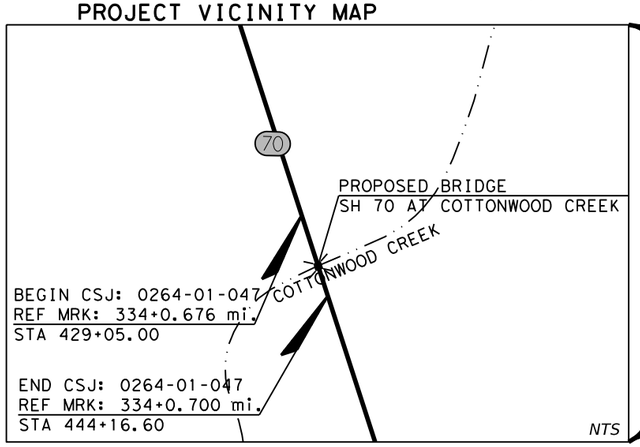
DATE WORK WAS ACCEPTED: _____

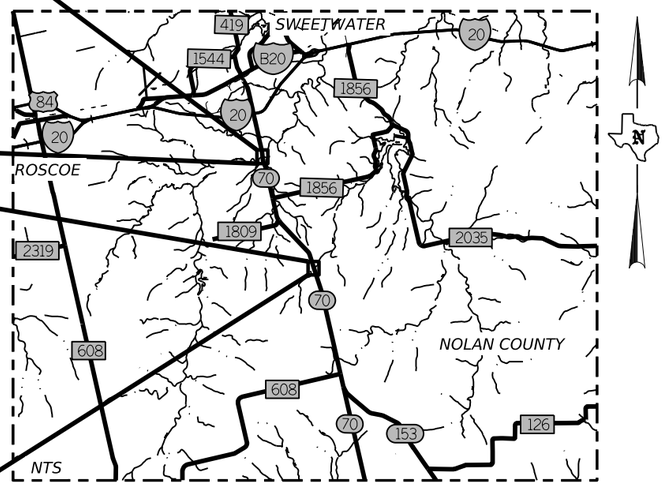
FINAL CONTRACT COST: $ _____

CONTRACTOR : _____

PROJECT VICINITY MAP







SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, OCTOBER 23, 2023).

EXCEPTIONS: N/A
EQUATIONS: N/A
RAILROAD CROSSINGS: NONE

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 COMPLIENCE WITH CURRENT TRAFFIC CONTROL STANDARDS.

Designed by:
DocuSigned by: Michael Wittie, P.E. 7/24/2024
62A1E0BBE5624E5... COMMITTEE CHAIRMAN DATE

Texas Department of Transportation

RECOMMENDED FOR LETTING: 7/25/2024
DocuSigned by: Ryan Sayles
EBF7B8C315A947E... RYAN T. SAYLES, P.E.
AREA ENGINEER

SUBMITTED FOR LETTING: 6/28/2024
JON H. KILGORE, P.E.
JACOBS PROJECT MANAGER

RECOMMENDED FOR LETTING: 7/25/2024
DocuSigned by: Michael Haithcock
5757E2887984FD... MICHAEL A. HAITHCOCK, P.E.
DIRECTOR OF T P & D

RECOMMENDED FOR LETTING: 7/1/2024
DocuSigned by: Michelle Luedke
B2156B9F1E1748B... MICHELLE LUEDKE
TxDOT PROJECT MANAGER

APPROVED FOR LETTING: 7/25/2024
DocuSigned by: Thomas D. Allbritton, P.E.
0F6F7ED6E57D430... THOMAS D. ALLBRITTON, P.E.
DISTRICT ENGINEER

PENTABLE:
DATE: 6/25/2024
FILE: dwr://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/MJXN4706 - ABL Bridges/30 Project Data/SH70/General/Sheets/SH70+TITLE.dgn

INDEX OF SHEETS

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.

JH Kilgore, P.E.

JON H. KILGORE — 6/25/2024 DATE

STATE OF TEXAS
JON H. KILGORE, P.E.
73980
LICENSED PROFESSIONAL ENGINEER

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

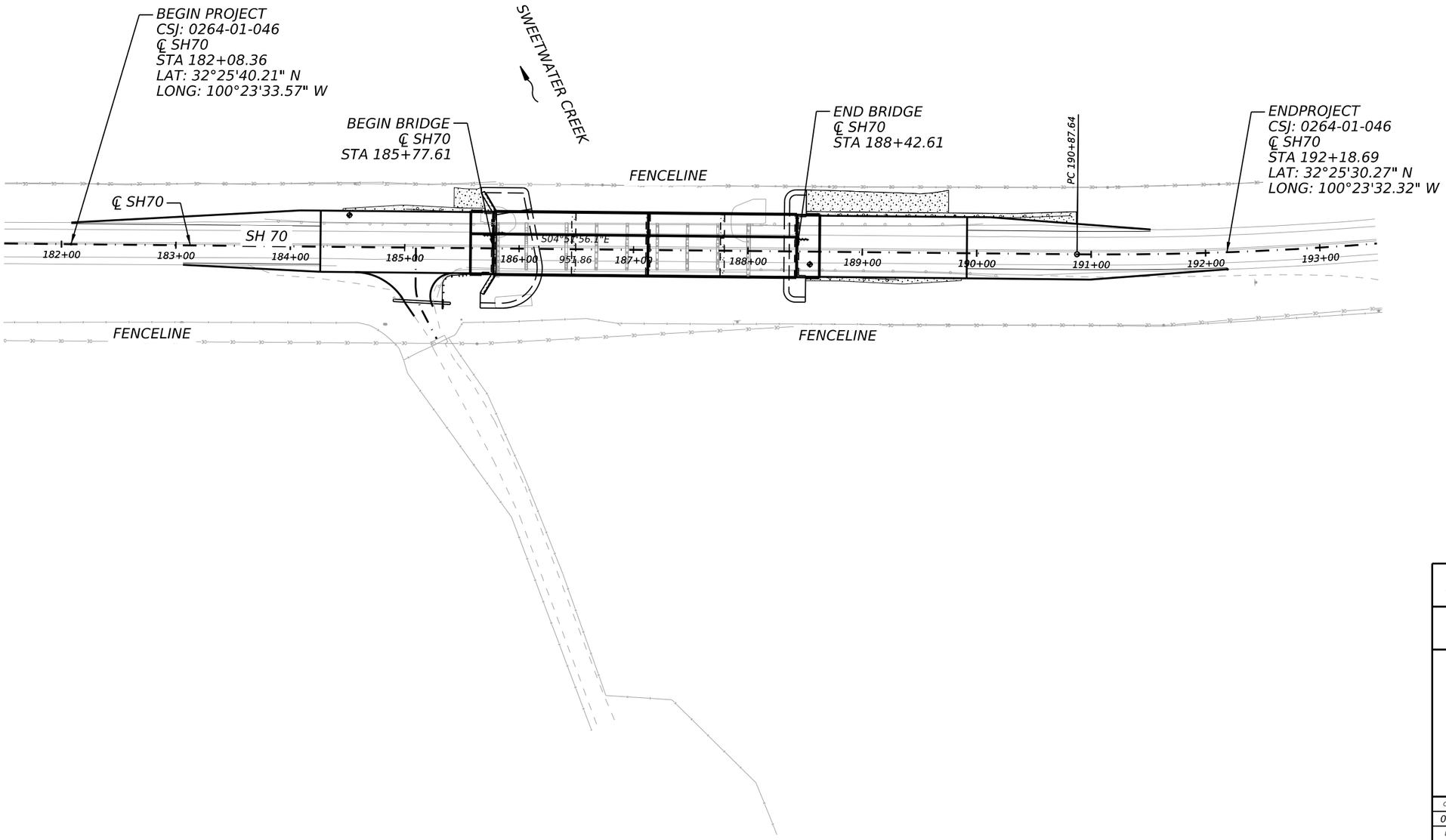
INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		2

DATE: DATE TIME
FILE:

0 50 100
SCALE IN FEET



Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

5/16/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

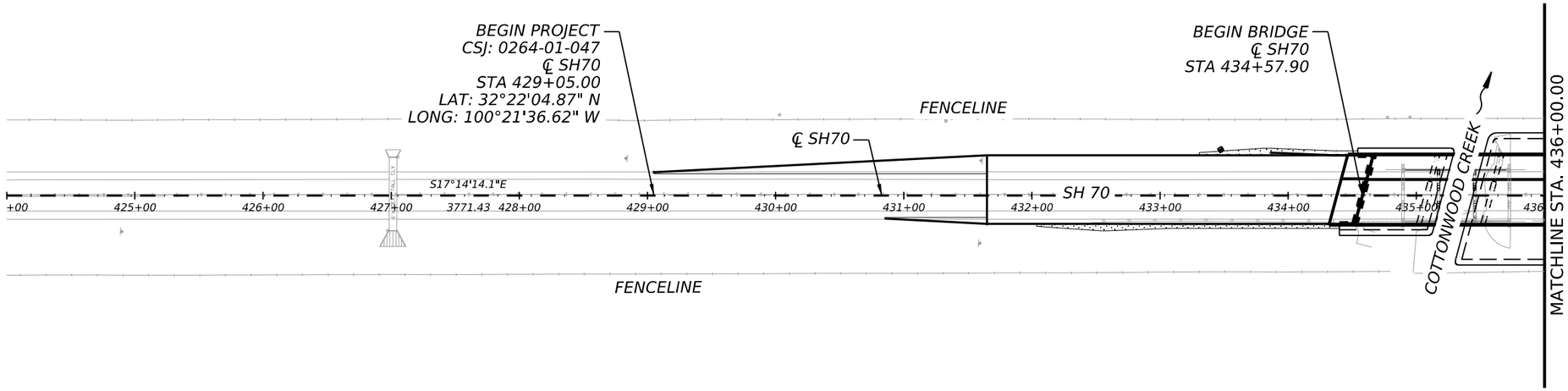
SH 70

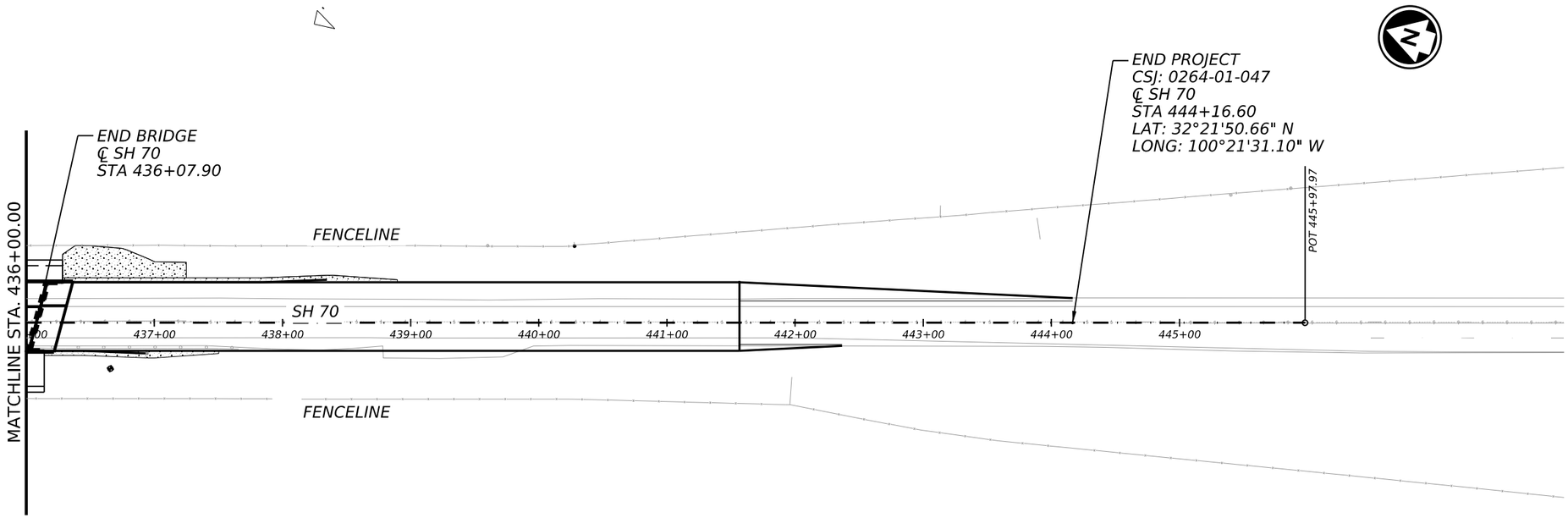
SWEETWATER CREEK
PROJECT LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, etc	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		3

DATE: 5/16/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Project Layout/SH70_PROJLAYOUT-01.dgn





0 50 100
SCALE IN FEET

Jorge Gonzalez

STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

5/16/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

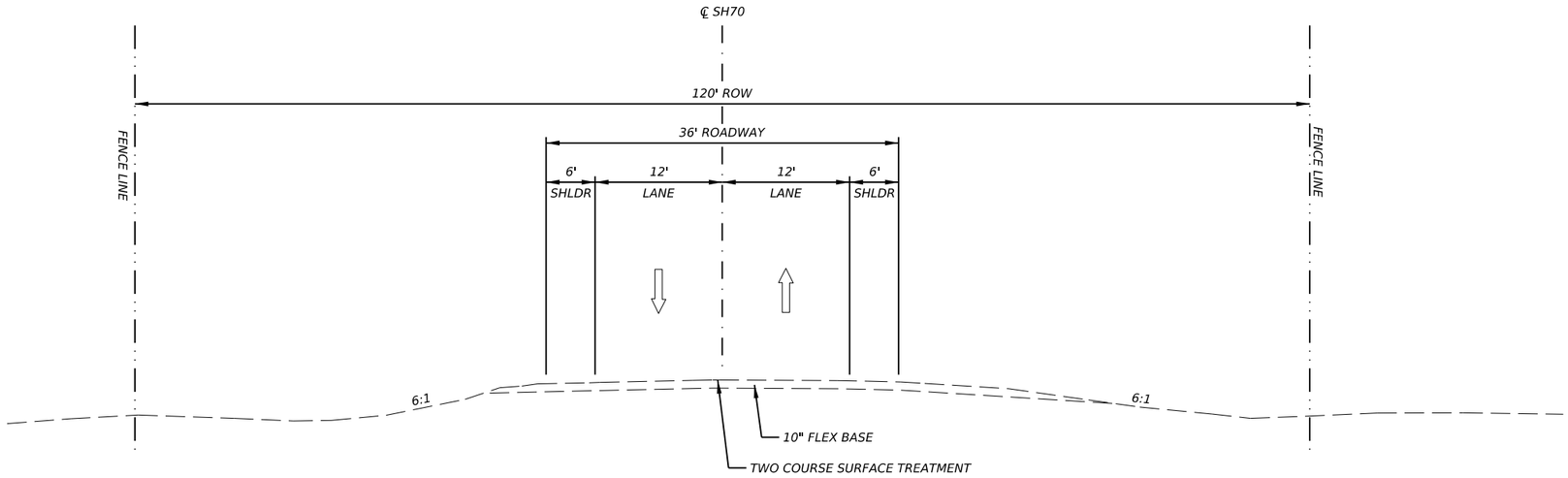
SH 70

COTTONWOOD CREEK PROJECT LAYOUT

SHEET 1 OF 1

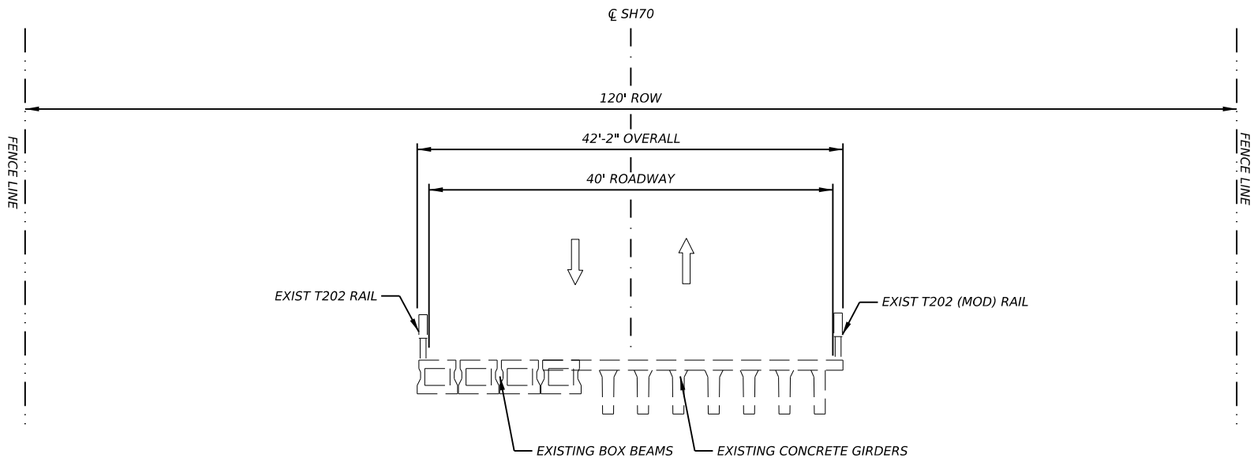
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		4

DATE: 5/16/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Project Layout/SH70_PROJLAYOUT-02.dgn



SH 70 EXISTING (SWEETWATER CREEK)

STA 182+00.00 TO STA 185+80.39
STA 188+02.14 TO STA 193+00.00



SH 70 EXISTING (SWEETWATER CREEK)

STA 185+80.39 TO STA 188+02.14

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

SWEETWATER CREEK TYPICAL SECTIONS

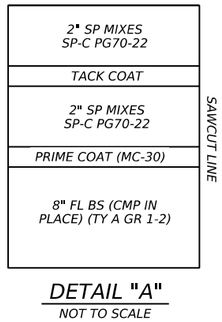
NTS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70

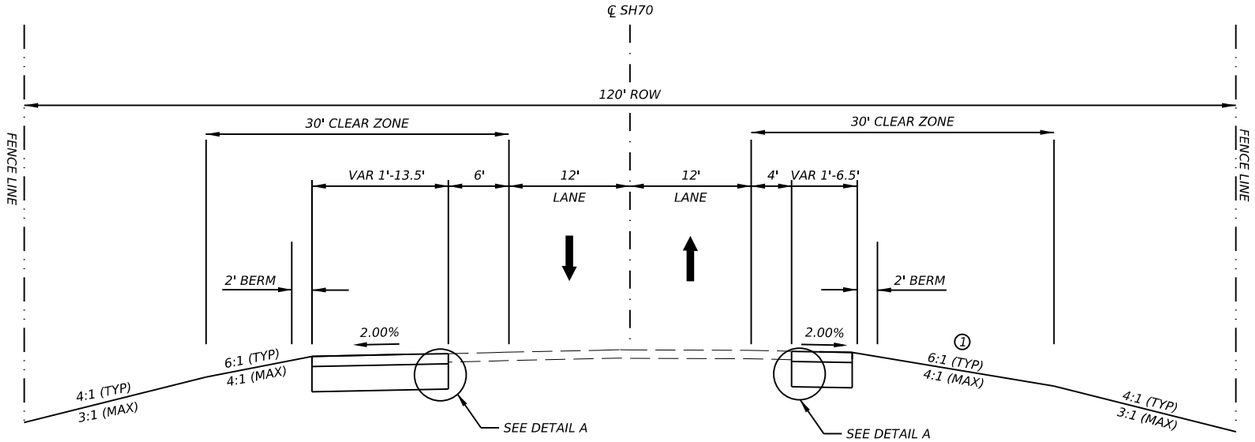
DIST	COUNTY	SHEET NO.
ABL	NOLAN	5

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_EX TYP-01.dgn



DETAIL "A"

NOT TO SCALE

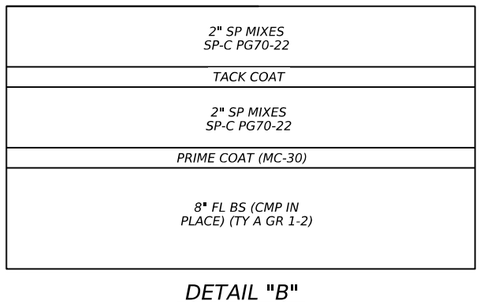


NOTES:

1. 8:1 SLOPE FROM 182+08.36 TO STA 184+54.24/
2. 2:1 SLOPE FROM STA 185+42.75 TO STA 185+77.61NAND FROM STA 188+42.61 TO STA 189+75.00.

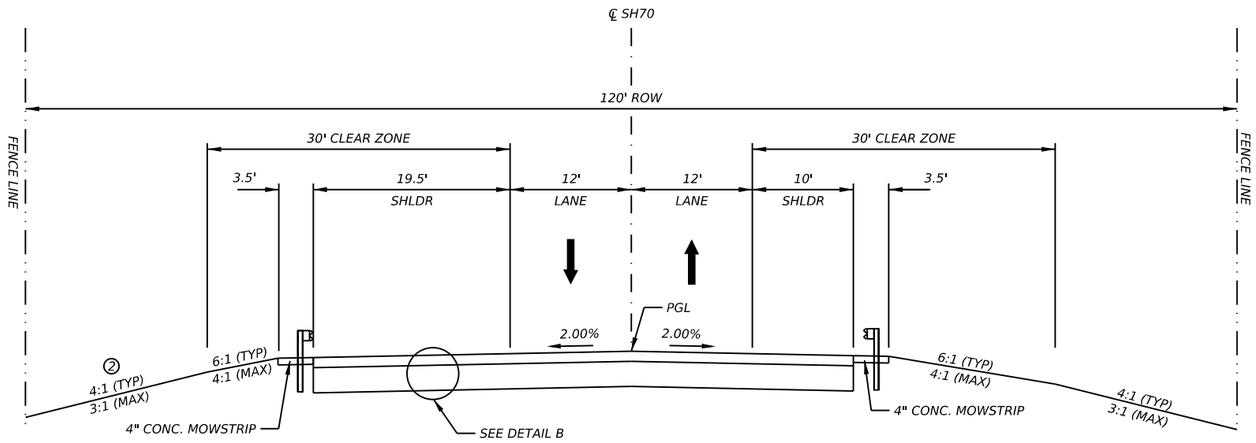
SH 70 PROPOSED (SWEETWATER CREEK)

STA 182+08.36 TO STA 184+26.38
STA 189+91.38 TO STA 192+18.69



DETAIL "B"

NOT TO SCALE



SH 70 PROPOSED (SWEETWATER CREEK)

STA 184+26.38 TO STA 185+77.61
STA 188+42.61 TO STA 189+91.38

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

SWEETWATER CREEK
TYPICAL SECTIONS

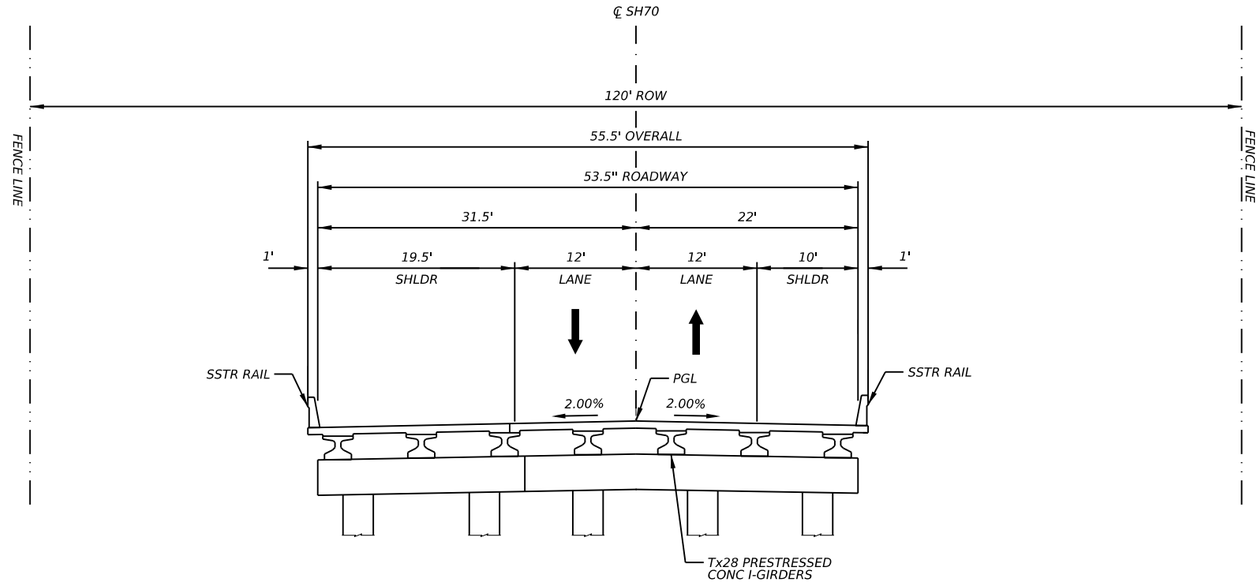
NTS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		6

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_PR TYP-01.dgn

CK
DW
CK
DW



SH 70 PROPOSED BRIDGE (SWEETWATER CREEK)

STA 185+77.61 TO STA 188+42.61

Jorge Gonzalez

STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

SWEETWATER CREEK TYPICAL SECTIONS

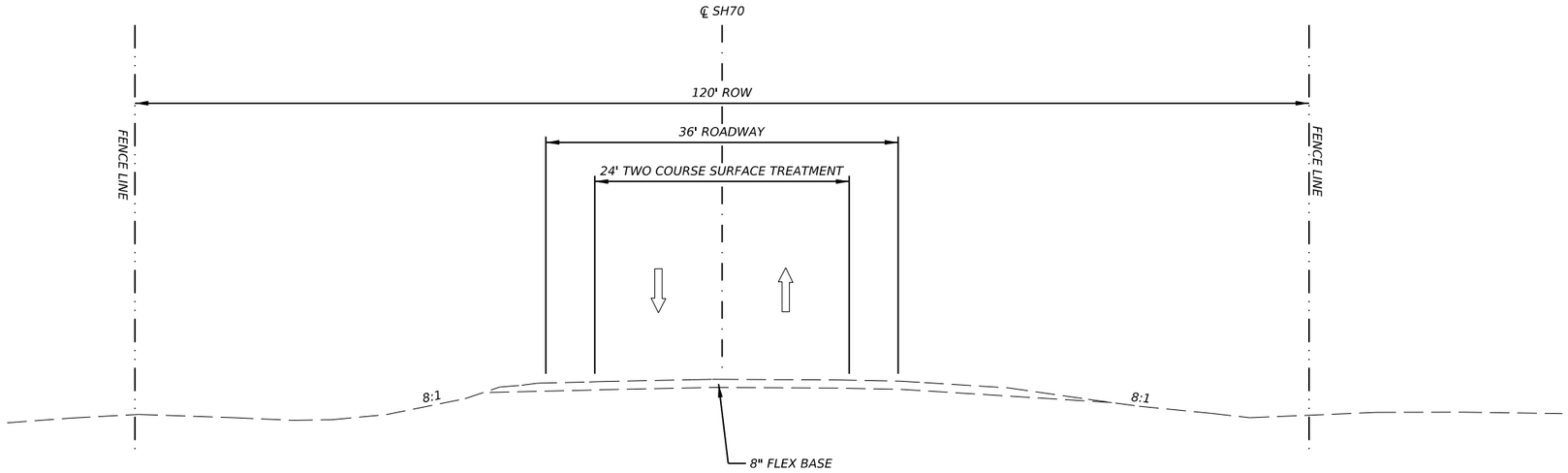
NTS

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		7

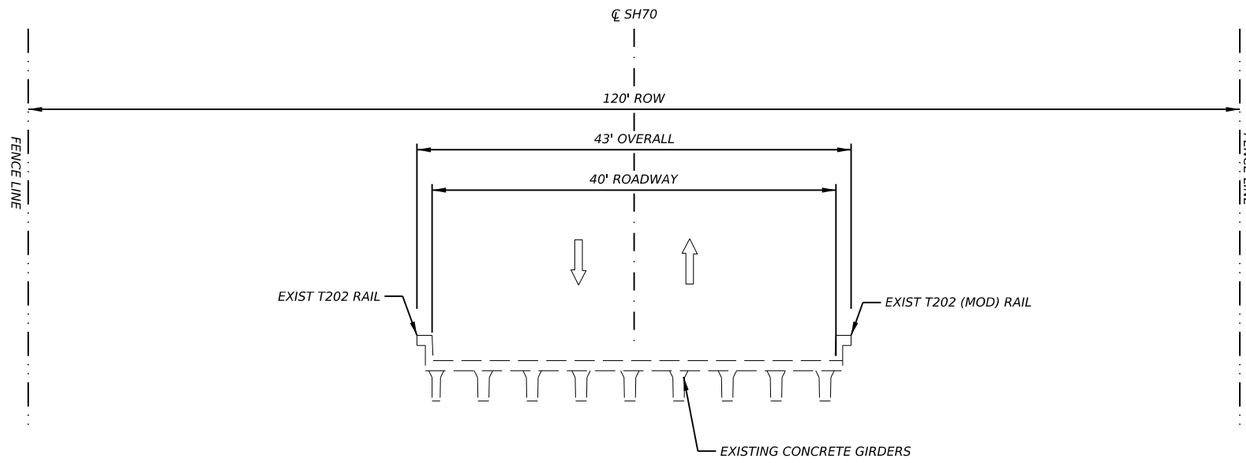
DATE: 6/27/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_PR TYP-02.dgn

CK | DW | CK | DW



SH 70 EXISTING (COTTONWOOD CREEK)

STA 429+00.00 TO STA 434+89.63
STA 435+74.59 TO STA 445+00.00



SH 70 EXISTING (COTTONWOOD CREEK)

STA 434+89.63 TO STA 435+74.59

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

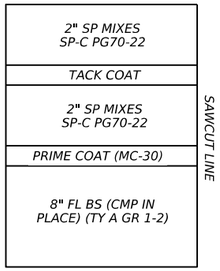
COTTONWOOD CREEK TYPICAL SECTIONS

NTS

SHEET 1 OF 4

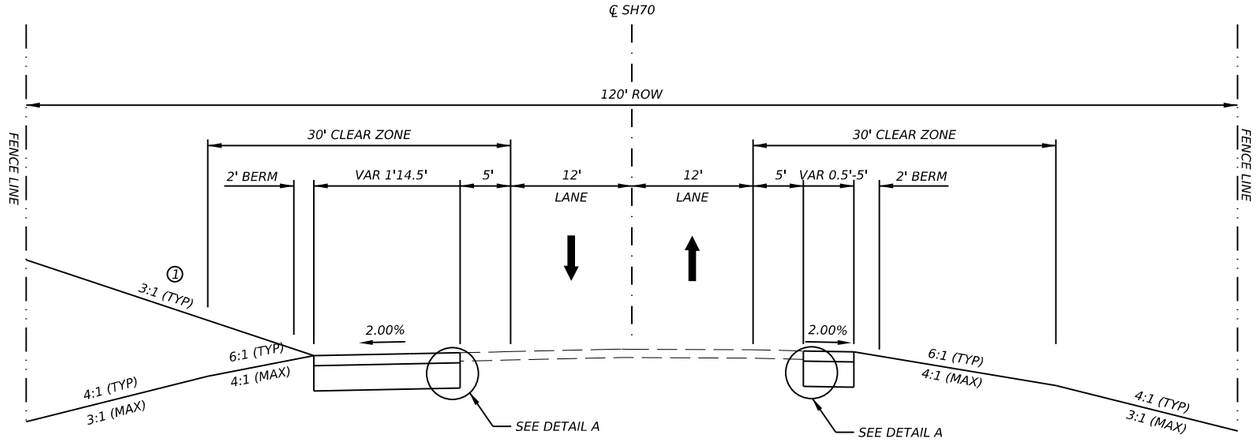
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		8

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_EX TYP-02.dgn



DETAIL "A"

NOT TO SCALE



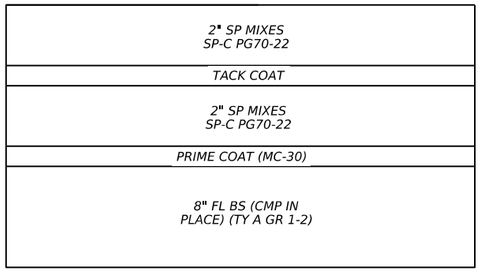
SH 70 PROPOSED (COTTONWOOD CREEK)

STA 429+05.00 TO STA 431+65.00

STA 441+56.60 TO STA 444+16.60

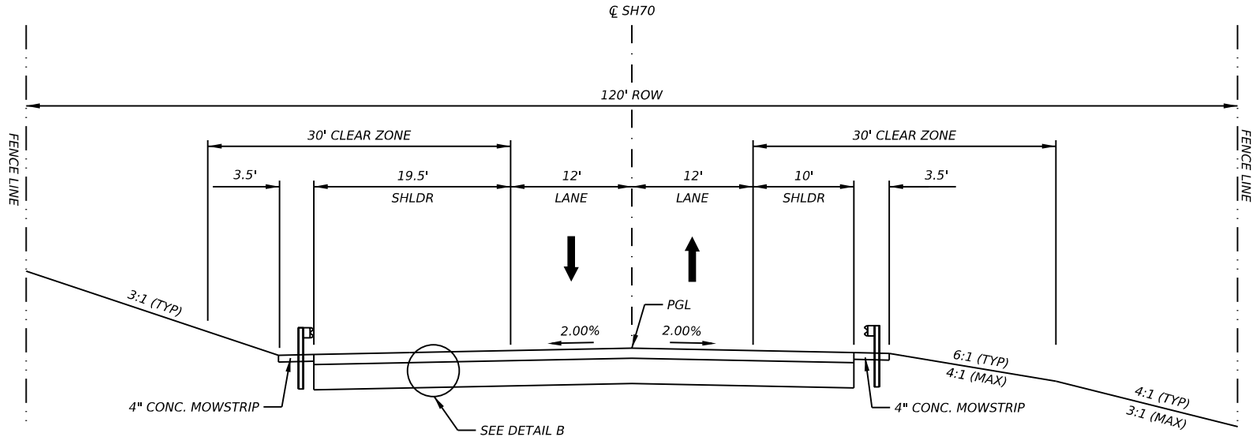
NOTES:

1. 3:1 SLOPE FROM STA 429+05.00 TO STA 431+65.00



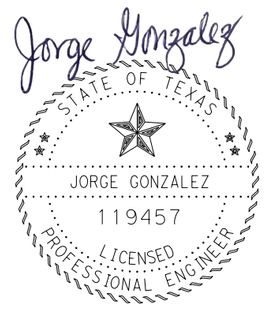
DETAIL "B"

NOT TO SCALE



SH 70 PROPOSED (COTTONWOOD CREEK)

STA 431+65.00 TO STA 434+57.90



6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

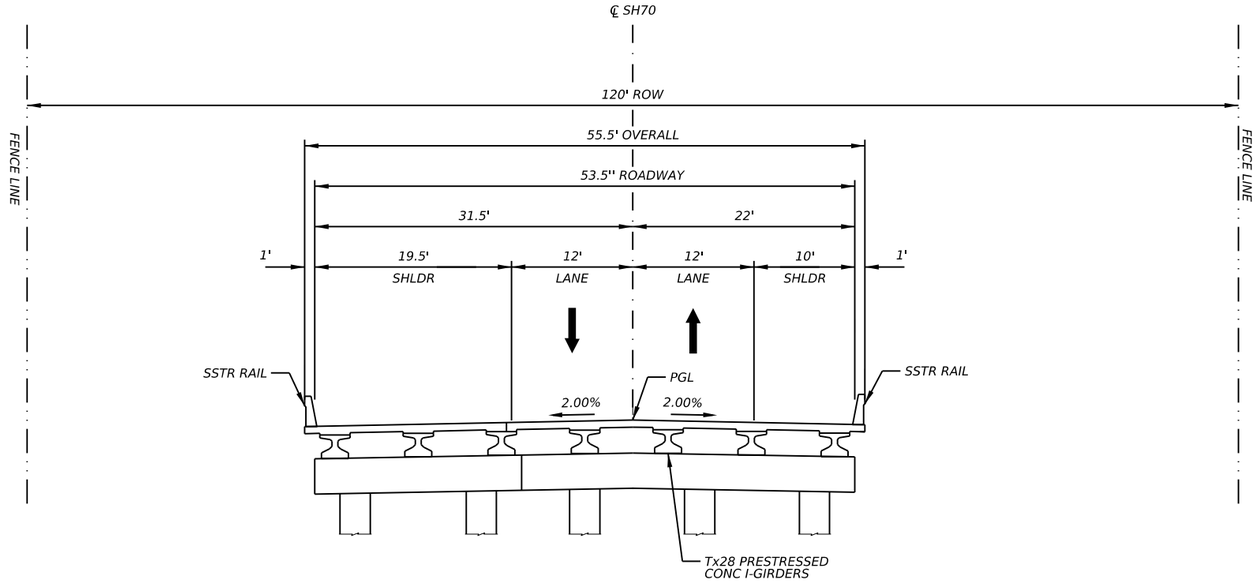
SH 70

COTTONWOOD CREEK
TYPICAL SECTIONS

NTS SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		9

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_PR TYP-03.dgn



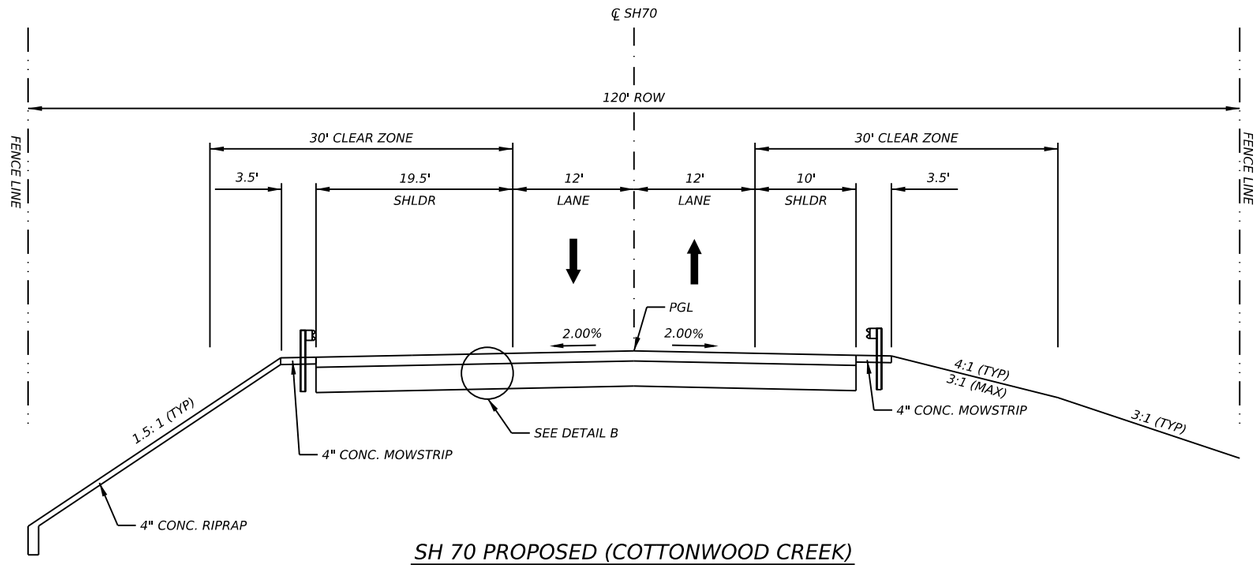
SH 70 PROPOSED BRIDGE (COTTONWOOD CREEK)

STA 434+57.90 TO STA 436+07.90

2" SP MIXES SP-C PG70-22
TACK COAT
2" SP MIXES SP-C PG70-22
PRIME COAT (MC-30)
8" FL BS (CMP IN PLACE) (TY A GR 1-2)

DETAIL "B"

NOT TO SCALE



SH 70 PROPOSED (COTTONWOOD CREEK)

STA 436+07.90 TO STA 437+25.00

Jorge Gonzalez

STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

COTTONWOOD CREEK TYPICAL SECTIONS

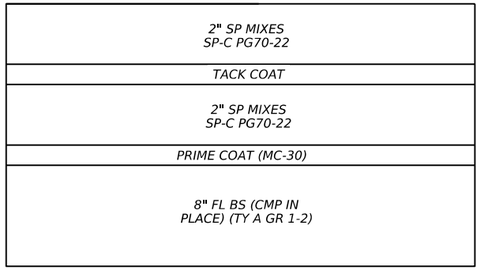
NTS

SHEET 3 OF 4

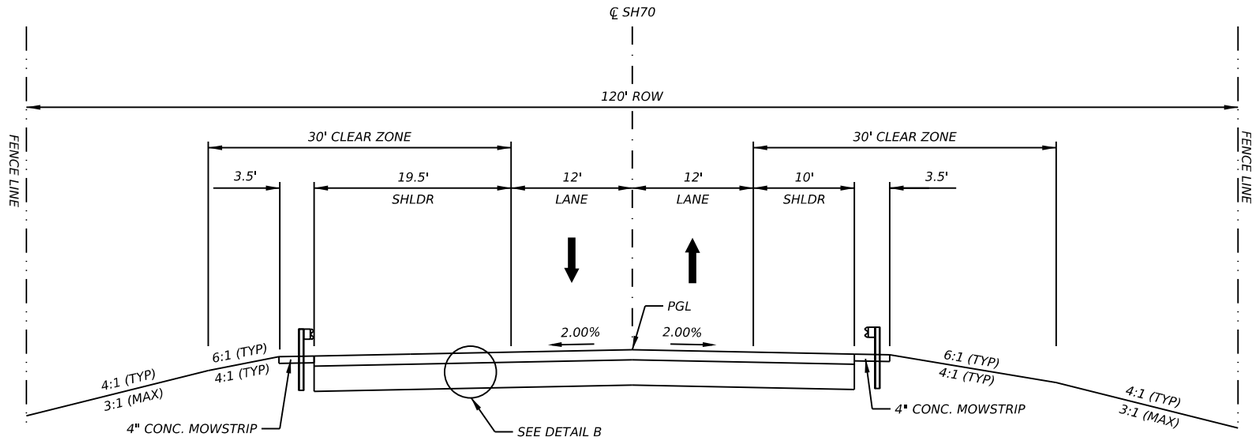
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		10

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_PR TYP-04.dgn

CK
DW
CK
DW



DETAIL "B"
NOT TO SCALE



SH 70 PROPOSED (COTTONWOOD CREEK)
STA 437+25.00 TO STA 441+56.60

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

COTTONWOOD CREEK
TYPICAL SECTIONS

NTS SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		11

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_PR TYP-05.dgn

ABILENE DISTRICT GENERAL NOTES
2024 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
Jeremy Arreguin, P.E. / Phone: 682-287-0804 / jeremy.arreguin@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.

Failure to make necessary corrections to SWP3 based on SWP3 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-21 standards.

Cut neat, straight lines with vertical faces along pavement edges or along joints between existing asphalt or concrete pavement and new pavement perpendicular or parallel to the direction of traffic by methods described in applicable bid items, or as directed. Provide clean edges or joints without jagged appearance or chunks broken out. This work is considered subsidiary to various bid items.

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

Environmental

Endangered and Protected Species

1. 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.
   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. Bird BMPs
   a. Not disturbing, destroying, or removing active nests, including ground nesting birds, during the nesting season.
   b. Avoiding the removal of unoccupied, inactive nests, as practicable.
   c. Preventing the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
   d. Not collecting, capturing, relocating, or transporting birds, eggs, young, or active nests without a permit.

Item 5, "Control of Work"

All known utilities are identified in the plans, including the crossing of power lines. Use this information to identify potential issues with power poles and power lines prior to bidding.

Make necessary arrangements with utility owners regarding temporary protections such as bracing power poles, and de-energizing power lines. The Department will not reimburse the cost of such temporary protections to the Contractor, unless the Engineer determines that inadequate information was available at the time the project was bid. **"Call Before You Dig" "Call 811"**

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		12

DATE: DATE TIME
FILE: DOCUMENT NAME

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.

Drilled shaft locations or excavation areas must be staked prior to the notification so that the underground utilities can be located in relationship to the proposed work. Preserve and document the marked utility locations to prevent unnecessary secondary notifications. Notify the Engineer of conflicts between proposed work and underground utilities.

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

Item 6, "Control of Materials"
To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit an original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

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

The Buy America Material Classification Sheet is located at the below link.

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

Item 7, "Legal Relations and Responsibilities"
The total area disturbed for this project is **1.60** acres at Sweetwater Creek and **2.36** acres at Cottonwood Creek. 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 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.

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

Provide one SWP3 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.

The Contractor is hereby authorized to begin work prior to the expiration of the number of calendar days provided in the Special Provision to Item 8, Article 8.1. Notify the Engineer in writing of the date to begin work. Time charges will commence when work begins or on the expiration of the number of calendar days provided, whichever occurs first.

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		13

DATE: DATE TIME
FILE: DOCUMENT NAME

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. 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.

This project includes a delayed start provision of 60 days for Contractor Mobilization.

Prepare the progress schedule as a Critical Path Method (CPM).

The Additional Project Specific Liquidated Damages are $6,082 per working day for this project.

A **Disincentive for Failure to Substantially Complete Work on Time** will apply to this contract in accordance with section 8.9.2 of special provision 008-006 using a daily road-user cost (RUC) of $6,082.00. Failure to Substantially Complete Phase 2 for both Sweetwater Creek Bridge and Cottonwood Creek Bridge within 5 working days will result in the assessment of disincentives.

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 100, "Preparing Right of Way"
The Contractor's attention is directed to potential regulations against burning within the project limits. Abide by all local ordinances and county imposed burn bans. When burning is prohibited, dispose of material in accordance with regulations set forth by other regulatory agencies including the Texas Commission for Environmental Quality. The cost of burning or disposal of any product is subsidiary to various bid items.

Item 160, "Topsoil"
Salvage existing topsoil in windrows along the limits of the disturbed area, or as directed.

Item 164, "Seeding for Erosion Control"
Quantities shown are approximate; limits of the temporary and permanent seeding will be determined during construction.

Temporary seeding will be required in several small areas as work progresses to comply with the storm water pollution prevention plan and may require multiple mobilizations of seeding crew.

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

Item 168, "Vegetative Watering"
Water rate for this project shall be ¼" of water per acre every two weeks for a 3-month period. This is equal to approx.. 39000 gal/acre or 8 gal/sy total for 6 cycles.

Item 204, "Sprinkling"
Sprinkle for dust control as directed. Payment for this item will be subsidiary to the various bid items.

Item 247, "Flexible Base"
The estimated quantity of flexible base is for the roadway and driveways. The measured area for payment is the crown width only. The tapers, etc., are not included in the measurements for the flexible base and are considered subsidiary to this item.

Item 310, "Prime Coat"
Apply a prime coat to all finished treated base, new flexible and salvage base due to receive asphaltic concrete pavement or surface treatments. Remove all loose and scabbed material from the surface prior to prime coat application.

Allow the prime coat to penetrate and dry for a minimum of 72 hours before placing any asphaltic material on the primed surface, unless otherwise authorized by the Engineer.

(Also, may want to specify blotter material if base sweepings or native sand is not available or wanted)

Item 344, "Superpave Mixtures"
Furnish aggregate for final surfaces with a minimum surface aggregate classification of "**B**".

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

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

Paving operations will not be allowed to begin until TxDOT has tested and obtained passing Hamburg results on the trial batch.

A maximum of 0.50% anti-stripping agent will be allowed for each specified mix type.

Dilution of tack coat is not allowed.

Do not exceed a laydown width of 16' per pass.

There are paving widths of less than 10' wide on this project

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		14

DATE: DATE TIME
FILE: DOCUMENT NAME

No miscellaneous areas or exempt production on driving lanes and shoulders.

Substitute Binders will not be allowed unless RAP is used in the production of the mixture.

A maximum of 10% fractionated RAP will be allowed in surface mixes.

A warm mix additive will be required for hotmix hauls over 50 miles.
Unless otherwise directed by the engineer, a warm mix additive will be required when paving during November 1st through March 15th.

The maximum allowable dust / asphalt ratio that will be allowed is 0.6 to 1.2.
The use of a tapered longitudinal joint will be required for pavement thicker than 2 inches.

Use a self-propelled, wheel-mounted material transfer vehicle (MTV) capable of receiving hot mix from the haul trucks separate from the paver on this project. Minimum requirements for the MTV are a storage capacity of approximately 25 tons, a pivoting discharge conveyor, and a means of completely remixing the ACP prior to placement.

Provide PG 64-22 tack coat at a rate of 0.10 gal/sy.

The Contractor will be required to tack 100% of the surfaces with uniform coverage prior to the subsequent lift. The type and grade of tack will be approved by the Engineer prior to use.

Tack all vertical joints unless otherwise directed.

Cement and kiln dust will not be allowed to be used as mineral fillers.
Final surface of driveway shall not be placed prior to adjoining surface.

Item 416, "Drilled Shaft Foundations"
Riprap will be paid for under item 432.

All soil, water, and slurry removed from drilled shafts shall be captured and disposed of properly. No discharge of these materials into, or in close proximity to, the surrounding water will be allowed.

Item 420, "Concrete Substructures"
In addition to the elements shown in table 1, the following elements are Plans Quantity Elements.

- Bent Concrete

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

Item 420, 427, "Concrete Substructures" & "Surface Finishes for Concrete"
Provide a Surface Area 1 finish using an Adhesive Grout Coating or Rub Finish as directed.

Item 421, "Hydraulic Cement Concrete"
Use a cement meeting the requirements of Ty II when Mix Design Option 7 is selected for cast in place concrete.

Class C fly ash and Type I cement will not be allowed for any mix unless approved by the Engineer.

As a minimum, curing facility includes concrete curing tank, heater and a concrete recording thermometer. Provide a recorder with the capability to chart temperatures for 24 hours, 7 days and 30 day periods of time.

Air Entrainment requirements are waived with exception to bridge deck concrete, and rails, top slabs of direct traffic culverts and approach slabs. Air Entrainment is required for all slip formed concrete (bridge rail, concrete traffic barrier, pavement, etc.).

Item 422, "Concrete Superstructures"
Provide either a carpet drag or broom finish for micro-texture to deck and approach slabs.

Item 432, "Riprap"
Provide tooled contraction joints at a maximum spacing of 25 feet and ½" fiber board every 150 feet when constructing cable median barrier mow strips. The depth for tooled joints shall be sufficient to ensure cracking at the joints. The depth for fiber board joints shall be the full depth of the mow strip.

Provide structural fiber reinforced or conventionally reinforced concrete for formed M.B.G.F. concrete mow strip.

Meet the following requirements when using structural fiber reinforcement:

- If slip forming, use an approved method that ensures adequate concrete consolidation. Sprinkle and consolidate the subgrade before the concrete is placed. Finish the surface with a wood float or broom finish as approved. Immediately after finishing operation, cure the riprap according to Item 420, "Concrete Structures".

Item 496, "Removing Structures"
The contractor will be required to provide a demo plan for bridge structures to be approved by the engineer.

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		15

DATE: DATE TIME
FILE: DOCUMENT NAME

Item 502, "Barricades, Signs and Traffic Handling"
Mobile traffic control in accordance with TPC 3 series will be required for placement of short duration, short term, intermediate term, and long-term traffic control.

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 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.
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 and a pilot car will control operations.

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

Work will not be allowed on both sides of the roadbed at the same time.

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.

Removing, relocating or covering speed limit signs shall be considered subsidiary to item 502.

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

Item 504, "Field Office for Laboratory"
Field Laboratory:
Furnish a "Type D" structure for the asphalt mix control laboratory for the Engineer's exclusive use. In addition to the requirements of Item 504, furniture and equipment to be furnished by the Contractor shall include*:*

- eye wash station
- first-aid kit
- two fire extinguishers
- Provide internet connectivity for use by TxDOT lab testing personnel at all laboratory structures on this project.

Item 505, "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.
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 mobile for that day.

Provide separate attenuators for each work area within a common lane closure as approved or directed by the Engineer.

BASIS OF ESTIMATE FOR MOBILE TMAs

		TMA (Mobile)		
Phase	Standard	Required	Additional	TOTAL
Sweetwater PH1	TCP(3-1)-13	2		2
Sweetwater PH2A	TCP(3-1)-13	2		2
Sweetwater PH2B	TCP(3-3)-14	2		2
Cottonwood PH1	TCP(3-1)-13	2		2
Cottonwood PH2	TCP(3-3)-14	2		2

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		16

DATE: DATE TIME
FILE: DOCUMENT NAME

Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls"
On site concrete washout shall not be allowed on this project.

Item 510, "One-way Traffic Control"
The contractor shall use ADDCO PTS-2000 or equivalent, that shall show wait time, as temporary traffic signals. Three temporary traffic signals will be required for this project.

Item 512, "Portable Traffic Barrier
Type X Joint installation shall be used.

Upon completion of the project, PCTB will become the property of the contractor.

Item 533, "Rumble Strips"
The milled rumble strips should be placed on shoulder according to RS (1-4)-23 standards and the shoulder widths as shown below.

- Shoulder width of Equal to or less than 2 feet the rumble strip will begin on the edge line as shown in the standards.
- Shoulder width of greater than 2 feet and less than 9 feet the rumble strip will be centered on the shoulder.
- Shoulder width of equal to or greater than 9 feet the rumble strip will be 3 feet from the edge line.

Guidance markings are considered subsidiary to this item.

Item 540, "Metal Beam Guard Fence"
Steel posts for metal beam guard fence may be field cut to proper rail height with a power saw when approved by the engineer.

Core drill 1 ¼ diameter holes through existing slab. Percussion or impact drilling is not permitted. Patch spalls, when directed by the engineer, in accordance with item 429, "Concrete Structure Repair", at the contractor's expense.

Item 542, "Removing Metal Beam Guard Fence"
Metal beam guard fence and posts deemed salvageable by the Engineer will remain the property of the contractor.

Item 644, "Small Roadside Sign 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.

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

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

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.

All signs on this project, new or relocated, will require a retroreflective wrap on the sign support. This wrap shall be 12 inches in height, visible in all directions and shall be placed 2 ft. below the bottom of the sign to top of wrap. The color for YIELD, STOP, WRONG WAY, and DO NOT ENTER signs shall be red. The color for all other signs shall be yellow. This retroreflective wrap will not be paid for directly but considered subsidiary to Item 644.

Item 658, "Delineator and Object Marker Assemblies"
All MBGF delineation shall be equivalent to Shure-tite GF2 (BRF) mounted on posts.

Use a minimum 2 inch long lag screws with washers to attach flexible GF2 barrier reflectors to wooden post. For steel posts, use an approved adhesive, or other method approved by Engineer. Concrete Barrier Reflectors shall be equivalent to Shure-tite CTB "Cup Mount" Delineator (8"). Attach delineators to concrete rail with concrete anchors as approved by the Engineer.

Surface Mount posts shall be the three-piece Flexible Delineator Post System, utilizing a 2-3/8" round post with a square to round 5" base. The Base shall have a minimum 2 mounting holes to accommodate for mounting on narrow surfaces. The Posts shall be permanently sealed at the top and have a 3-1/2" wide x 4" flattened surface to accommodate up to a 3" x 4" reflective sheet on both sides.

Guard Fence Delineator posts shall be 33" in length and permanently sealed at the top and have a 3-1/2" wide x 13" flattened surface to accommodate up to a 3" x 12" reflective sheet on both sides. They shall be flattened on both ends and transition to 2-3/8" round in the center for 360-degree visibility.

Item 662, "Work Zone Pavement Markings"
Place work zone pavement markings (flexible tabs) prior to the seal coat operation.

Dispose of tabs and paper in an approved trash receptacle. (Reference Standard **SW3P**, waste material)

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

The 3" spacing option in Detail A and B shall be used when PM (1)-22 is applicable.

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		17

DATE: DATE TIME
FILE: DOCUMENT NAME

CCSJ: 0264-01-046, ETC
Highway: SH 70
County: NOLAN

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 677, "Eliminating Existing Pavement Markings and Markers"
If any pre-existing pavement markings on removed areas re-surface, simulate old pavement markings or are considered to cause driver confusion to any extend, as determined by the Engineer, the Contractor shall apply corrective actions by applying a fog seal, or slutty at least 2 feet wide over where the pavement markings were removed as approved by the Engineer, at no cost to the Department.

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

GENERAL NOTES

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		18

DATE: DATE TIME
FILE: DOCUMENT NAME

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0264-01-046 **DISTRICT** Abilene **COUNTY** Nolan
HIGHWAY SH 70

				CONTROL SECTION JOB	0264-01-046		0264-01-047		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00194067		A00194424			
				COUNTY	Nolan		Nolan			
				HIGHWAY	SH 70		SH 70			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	100-7002	PREPARING ROW	STA				2.000		2.000	
	104-7006	REMOV CONC (RIPRAP)	SY		142.000		158.000		300.000	
	104-7041	REMOV CONC (FLUME)	SY		35.000				35.000	
	110-7001	EXCAV (ROADWAY)	CY		2,685.000		2,000.000		4,685.000	
	132-7004	EMBANK (FNL)(DC)(TY B)	CY		1,133.000		4,066.000		5,199.000	
	164-7018	HYDRO MULCH SEED (PERM_RURAL_CLAY)	SY		2,268.000		4,394.000		6,662.000	
	164-7021	HYDRO MULCH SEED (TEMP_WARM)	SY		1,134.000		2,197.000		3,331.000	
	164-7022	HYDRO MULCH SEED (TEMP_COOL)	SY		1,134.000		2,197.000		3,331.000	
	168-7001	VEGETATIVE WATERING	TGL		20.000		40.000		60.000	
	247-7067	FL BS (CMP IN PLC)(TY A GR 1-2) (8")	SY		1,995.000		5,174.000		7,169.000	
	250-7001	GEOGRID BASE REINFORCEMENT (TYPE 1)	SY				434.000		434.000	
	310-7004	PRIME COAT (MC-30)	GAL		399.000		1,035.000		1,434.000	
	344-7019	SP MIXES SP-C PG70-22	TON		439.000		1,138.000		1,577.000	
	344-7077	TACK COAT	GAL		200.000		517.000		717.000	
	400-7010	CEM STABIL BKFL	CY		113.000		189.000		302.000	
	403-7001	TEMPORARY SPL SHORING	SF		150.000				150.000	
	416-7005	DRILL SHAFT (30 IN)	LF		555.000				555.000	
	416-7006	DRILL SHAFT (36 IN)	LF		1,268.000		725.000		1,993.000	
	420-7013	CL C CONC (ABUT)(HPC)	CY		68.000		62.800		130.800	
	420-7023	CL C CONC (CAP)(HPC)	CY		75.300		53.000		128.300	
	420-7039	CL C CONC (COLUMN)(HPC)	CY		25.200		48.500		73.700	
	422-7002	REINF CONC SLAB (HPC)	SF		14,709.000		8,325.000		23,034.000	
	422-7014	APPROACH SLAB (HPC)	CY		86.000		88.900		174.900	
	423-7019	RETAINING WALL (DRILL SHAFT) (FASCIA)	SF		1,307.000				1,307.000	
	425-7001	PRESTR CONC GIRDER (TX28)	LF		1,841.000		1,039.500		2,880.500	
	428-7001	PENETRATING CONCRETE SURFACE TREATMENT	SY		111.000		211.000		322.000	
	432-7001	RIPRAP (CONC)(4 IN)	CY		33.000		23.000		56.000	
	432-7013	RIPRAP (MOW STRIP)(4 IN)	CY		27.000		37.000		64.000	
	432-7043	RIPRAP (STONE PROTECTION)(18 IN)	CY		374.000		1,065.000		1,439.000	
	450-7025	RAIL (TY SSTR)(HPC)	LF		566.000		348.000		914.000	
	454-7004	SEALED EXPANSION JOINT (4 IN) (SEJ - M)	LF		164.000		112.000		276.000	
	464-7005	RC PIPE (CL III)(24 IN)	LF		50.000				50.000	
	467-7327	SET (TY II) (24 IN) (RCP) (6: 1) (C)	EA		2.000				2.000	
	496-7007	REMOV STR (PIPE)	LF		55.000				55.000	
	496-7009	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	EA				1.000		1.000	
	496-7010	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	EA		1.000				1.000	
	500-7001	MOBILIZATION	LS		1.000				1.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0264-01-046 **DISTRICT** Abilene **COUNTY** Nolan
HIGHWAY SH 70

				CONTROL SECTION JOB	0264-01-046		0264-01-047		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00194067		A00194424			
				COUNTY	Nolan		Nolan			
				HIGHWAY	SH 70		SH 70			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO		19.000				19.000	
	503-7002	PORTABLE CHANGEABLE MESSAGE SIGN	EA		1.000		1.000		2.000	
	505-7003	TMA (MOBILE OPERATION)	DAY		6.000		6.000		12.000	
	506-7039	TEMP SEDMT CONT FENCE (INSTALL)	LF		1,228.000		2,337.000		3,565.000	
	506-7041	TEMP SEDMT CONT FENCE (REMOVE)	LF		1,228.000		2,337.000		3,565.000	
	506-7043	BIODEG EROSN CONT LOGS (INSTL) (8")	LF		313.000		473.000		786.000	
	506-7046	BIODEG EROSN CONT LOGS (REMOVE)	LF		313.000		473.000		786.000	
	508-7001	CONSTRUCTING DETOURS	SY		270.000		270.000		540.000	
	510-7003	ONE-WAY TRAF CONT (PORT TRAF SIG)	MO		4.000		5.000		9.000	
	512-7005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	LF		1,410.000		540.000		1,950.000	
	512-7009	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	LF		200.000		220.000		420.000	
	512-7010	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	LF		40.000				40.000	
	512-7029	PORT CTB (MOVE)(F-SHAPE)(TY 1)	LF		840.000		2,580.000		3,420.000	
	512-7033	PORT CTB (MOVE)(LOW PROF)(TY 1)	LF				200.000		200.000	
	512-7034	PORT CTB (MOVE)(LOW PROF)(TY 2)	LF				40.000		40.000	
	512-7053	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	LF				1,950.000		1,950.000	
	512-7057	PORT CTB (REMOVE)(LOW PROF)(TY 1)	LF				420.000		420.000	
	512-7058	PORT CTB (REMOVE)(LOW PROF)(TY 2)	LF				40.000		40.000	
	533-7001	MILL RUMBLE STRIPS (ASPHALT) (SHLDR)	LF		520.000		1,546.000		2,066.000	
	533-7002	MILL RUMBLE STRIPS (ASPH) (CENTERLINE)	LF		260.000		802.000		1,062.000	
	540-7001	MTL W-BEAM GD FEN (TIM POST)	LF		162.500		262.500		425.000	
	540-7005	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA		3.000		4.000		7.000	
	540-7039	TL-3 31" SHORT RADIUS (COMPLETE)	EA		1.000				1.000	
	542-7001	REMOVE METAL BEAM GUARD FENCE	LF		425.000		537.500		962.500	
	542-7004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA		4.000		4.000		8.000	
	544-7001	GUARDRAIL END TREATMENT (INSTALL)	EA		3.000		4.000		7.000	
	544-7003	GUARDRAIL END TREATMENT (REMOVE)	EA		4.000		4.000		8.000	
	545-7002	CRASH CUSH ATTEN (MOVE & RESET)	EA		3.000		6.000		9.000	
	545-7004	CRASH CUSH ATTEN (REMOVE)	EA		2.000		4.000		6.000	
	545-7014	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA		6.000				6.000	
	560-7002	MAILBOX INSTALL-S (TWG-POST) TY 2	EA		1.000				1.000	
	644-7004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA				2.000		2.000	
	644-7058	IN SM RD SN SUP&AM TYTWT(1)WS(T)	EA		2.000		2.000		4.000	
	644-7073	REMOVE SM RD SN SUP&AM	EA				2.000		2.000	
	658-7013	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB (BI)	EA		8.000		6.000		14.000	
	658-7019	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	EA		4.000		6.000		10.000	
	662-7068	WK ZN PAV MRK REMOV (W)6"(SLD)	LF		5,394.000		5,518.000		10,912.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0264-01-046 **DISTRICT** Abilene **COUNTY** Nolan
HIGHWAY SH 70

				CONTROL SECTION JOB	0264-01-046		0264-01-047		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00194067		A00194424			
				COUNTY	Nolan		Nolan			
				HIGHWAY	SH 70		SH 70			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**		EST.	FINAL	EST.	FINAL		
	662-7077	WK ZN PAV MRK REMOV (W)24"(SLD)	LF		24.000		24.000		48.000	
	662-7100	WK ZN PAV MRK REMOV (Y)6"(SLD)	LF		23,171.000		20,011.000		43,182.000	
	666-7411	REFL PAV MRK TY I (W)6"(SLD)(100MIL)	LF		1,130.000		1,984.000		3,114.000	
	666-7423	REFL PAV MRK TY I (Y)6"(SLD)(100MIL)	LF		1,130.000		1,984.000		3,114.000	
	672-7004	REFL PAV MRKR TY II-A-A	EA		14.000		25.000		39.000	
	677-7001	ELIM EXT PM & MRKS (4")	LF		6,117.000		6,077.000		12,194.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS		1.000				1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS		1.000				1.000	

SUMMARY OF TRAFFIC CONTROL PLAN ITEMS										
ITEM NUMBER	503	505	508	510	512	512	512	512	512	512
DESC. CODE	7002	7003	7001	7003	7005	7009	7010	7029	7033	7034
SHEET NO.	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (MOBILE OPERATION)	CONSTRUCTING DETOURS	ONE-WAY TRAF CONT (PORT TRAF SIG)	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	PORT CTB (FUR & INST)(LOW PROF)(TY 1)	PORT CTB (FUR & INST)(LOW PROF)(TY 2)	PORT CTB (MOVE)(F-SHAPE)(TY 1)	PORT CTB (MOVE)(LOW PROF)(TY 1)	PORT CTB (MOVE)(LOW PROF)(TY 2)
	EA	DAY	SY	MO	LF	LF	LF	LF	LF	LF
CSJ: 0264-01-046										
PHASE 1										
1 OF 2		2			720					
2 OF 2					690					
PHASE 2A										
1 OF 2		2	270	4		110	20	360		
2 OF 2						90	20	330		
PHASE 2B										
1 OF 1	1	2						150		
CSJ 0264-01-046 SUBTOTALS	1	6	270	4	1410	200	40	840	0	0
CSJ: 0264-01-047										
PHASE 1										
1 OF 2		2	48					510		
2 OF 2			222		540			900		
PHASE 2										
1 OF 2		2		5				120		
2 OF 2	1	2				220		1050	200	40
CSJ 0264-01-047 SUBTOTALS	1	6	270	5	540	220	0	2580	200	40
PROJECT TOTALS	2	12	540	9	1950	420	40	3420	200	40

SUMMARY OF TRAFFIC CONTROL PLAN ITEMS CONT.							
ITEM NUMBER	512	512	512	545	545	545	662
DESC. CODE	7053	7057	7058	7002	7004	7014	7068
SHEET NO.	PORT CTB (REMOVE)(F-SHAPE)(TY 1)	PORT CTB (REMOVE)(LOW PROF)(TY 1)	PORT CTB (REMOVE)(LOW PROF)(TY 2)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	WK ZN PAV MRK REMOV (W)6"(SLD)
	LF	LF	LF	EA	EA	EA	LF
CSJ: 0264-01-046							
PHASE 1							
1 OF 2						1	2238
2 OF 2						1	1860
PHASE 2A							
1 OF 2				1			978
2 OF 2				1		1	318
PHASE 2B							
1 OF 1				1	2	3	
CSJ 0264-01-046 SUBTOTALS	0	0	0	3	2	6	5394
CSJ: 0264-01-047							
PHASE 1							
1 OF 2				1			1842
2 OF 2	780			1			1427
PHASE 2							
1 OF 2				2	2		200
2 OF 2	1170	420	40	2	2		2049
CSJ 0264-01-047 SUBTOTALS	1950	420	40	6	4	0	5518
PROJECT TOTALS	1950	420	40	9	6	6	10912

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

QUANTITY SUMMARIES

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		22

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF TRAFFIC CONTROL PLAN ITEMS CONT.			
ITEM NUMBER	662	662	677
DESC. CODE	7077	7100	7001
SHEET NO.	WK ZN PAV MRK REMOV (W)24"(SLD)	WK ZN PAV MRK REMOV (Y)6"(SLD)	ELIM EXT PM & MRKS (4")
	LF	LF	LF
CSJ: 0264-01-046			
PHASE 1			
1 OF 2		6915	2598
2 OF 2		5056	3519
PHASE 2A			
1 OF 2	12	7000	
2 OF 2	12	4200	
PHASE 2B			
1 OF 1			
CSJ 0264-01-046 SUBTOTALS	24	23171	6117
CSJ: 0264-01-047			
PHASE 1			
1 OF 2		7123	3338
2 OF 2		6536	2739
PHASE 2			
1 OF 2	12	2954	
2 OF 2	12	3398	
CSJ 0264-01-047 SUBTOTALS	24	20011	6077
PROJECT TOTALS	48	43182	12194

SUMMARY OF REMOVAL ITEMS										
ITEM NUMBER	100	104	104	496	496	496	542	542	544	644
DESC. CODE	7002	7006	7041	7007	7009	7010	7001	7004	7003	7073
SHEET NO.	PREPARING ROW	REMOV CONC (RIPRAP)	REMOV CONC (FLUME)	REMOV STR (PIPE)	REMOV STR (BRIDGE 0 - 99 FT LENGTH)	REMOV STR (BRIDGE 100 - 499 FT LENGTH)	REMOVE METAL BEAM GUARD FENCE	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (REMOVE)	REMOVE SM RD SN SUP&AM
	STA	SY	SY	LF	EA	EA	LF	EA	EA	EA
CSJ: 0264-01-046										
1 OF 1		142	35	55		1	425	4	4	0
CSJ 0264-01-046 SUBTOTALS	0	142	35	55	0	1	425	4	4	0
CSJ: 0264-01-047										
1 OF 1	2	158			1		537.5	4	4	2
CSJ 0264-01-047 SUBTOTALS	2	158	0	0	1	0	537.5	4	4	2

DATE: DATE TIME
FILE: DOCUMENT NAME

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

QUANTITY SUMMARIES

SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		23

SUMMARY OF ROADWAY ITEMS										
ITEM NUMBER	110	132	250	422	432	432	464	467	540	540
DESC. CODE	7001	7004	7001	7014	7001	7013	7005	7327	7001	7005
SHEET NO.	EXCAV (ROADWAY)	EMBANK (FNL)(DC)(TY B)	GEOGRID BASE REINFORCEMENT (TYPE 1)	APPROACH SLAB (HPC)	RIPRAP (CONC)(4 IN)	RIPRAP (MOW STRIP)(4 IN)	RC PIPE (CL III)(24 IN)	SET (TY II) (24 IN) (RCP) (6: 1) (C)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)
	CY	CY	SY	CY	CY	CY	LF	EA	LF	EA
CSJ: 0264-01-046										
1 OF 1	2685	1133		86	33	27	50	2	162.5	3
CSJ 0264-01-046 SUBTOTALS	2685	1133	0	86	33	27	50	2	162.5	3
CSJ: 0264-01-047										
1 OF 2	1486	434				17			112.5	2
2 OF 2	514	3632	434	88.9	23	20			150	2
CSJ 0264-01-047 SUBTOTALS	2000	4066	434	88.9	23	37	0	0	262.5	4
PROJECT TOTALS	4685	5199	434	174.9	56	64	50	2	425	7

SUMMARY OF ROADWAY ITEMS			
ITEM NUMBER	540	544	560
DESC. CODE	7039	7001	7002
SHEET NO.	TL-3 31" SHORT RADIUS (COMPLETE)	GUARDRAIL END TREATMENT (INSTALL)	MAILBOX INSTALL-S (TWG-POST) TY 2
	EA	EA	EA
CSJ: 0264-01-046			
1 OF 1	1	3	1
CSJ 0264-01-046 SUBTOTALS	1	3	1
CSJ: 0264-01-047			
1 OF 2		2	
2 OF 2		2	
CSJ 0264-01-047 SUBTOTALS		4	
PROJECT TOTALS	1	7	1

ROADWAY BASIS OF ESTIMATE							
CSJ: 0264-01-046							
ITEM NUMBER		DESCRIPTION	RATE		AREA (SY)	QUANTITY	UNIT
310	7004	PRIME COAT (MC-30)	0.2	GAL/SY	1995	399	GAL
344	7019	SP MIXES SP-C PG70-22	110	LBS/SY/IN	1995	439	TON
344	7077	TACK COAT	0.1	GAL/SY	1995	200	GAL
CSJ: 0264-01-047							
310	7004	PRIME COAT (MC-30)	0.2	GAL/SY	5174	1035	GAL
344	7019	SP MIXES SP-C PG70-22	110	LBS/SY/IN	5174	1138	TON
344	7077	TACK COAT	0.1	GAL/SY	5174	517	GAL
PROJECT TOTALS							
310	7004	PRIME COAT (MC-30)	0.2	GAL/SY	7169	1434	GAL
344	7019	SP MIXES SP-C PG70-22	110	LBS/SY/IN	7169	1577	TON
344	7077	TACK COAT	0.1	GAL/SY	7169	717	GAL

SUMMARY OF ASPHALT AREAS										
ITEM NUMBER					LENGTH	WIDTH	247	310	344	344
DESC. CODE							7067			
LOCATION					LENGTH	WIDTH	FL BS (CMP IN PLC)(TY A GR 1-2) (8")	PRIME COAT (MC-30)	SP MIXES SP-C PG70-22	TACK COAT
					LF	LF	SY	SY		SY
CSJ: 0264-01-046										
STA	182+08.36	TO	STA	183+06.38	98.02	2.75	30	30	30	30
STA	183+06.38	TO	STA	184+26.38	120.00	10.61	141	141	141	141
STA	184+26.38	TO	STA	185+57.61	131.23	53.50	780	780	780	780
STA	188+62.61	TO	STA	189+91.38	128.77	53.50	765	765	765	765
STA	189+91.38	TO	STA	190+11.83	20.45	11.21	25	25	25	25
STA	190+11.83	TO	STA	191+52.32	140.49	7.25	113	113	113	113
STA	191+52.32	TO	STA	192+18.69	66.37	1.42	10	10	10	10
DRIVEWAY 01							129	129	129	129
CSJ 0264-01-046 SUBTOTALS							1995	1995	1995	1995
CSJ: 0264-01-047										
STA	429+05.00	TO	STA	430+85.00	180	4.39	88	88	88	88
STA	430+85.00	TO	STA	431+65.00	80	12.85	114	114	114	114
STA	431+65.00	TO	STA	434+37.90	272.9	53.50	1622	1622	1622	1622
STA	436+27.90	TO	STA	441+56.60	528.7	53.50	3143	3143	3143	3143
STA	441+56.60	TO	STA	442+36.60	80	12.86	114	114	114	114
STA	442+36.60	TO	STA	444+16.60	180	4.63	93	93	93	93
CSJ 0264-01-047 SUBTOTALS							5174	5174	5174	5174
PROJECT TOTALS							7169	7169	7169	7169

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

QUANTITY SUMMARIES

SHEET 3 OF 5

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		24

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF SIGN & PAVEMENT MARKING ITEMS										
ITEM NUMBER	533	533	644	644	658	658	666	666	672
DESC. CODE	7001	7002	7004	7058	7013	7019	7411	7423	7004
SHEET NO.	MILL RUMBLE STRIPS (ASPHALT) (SHOULDER)	MILL RUMBLE STRIPS (ASPHALT) (CENTERLINE)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYTWT(1)WS(T)	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB (BI)	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)	REFL PAV MRK TY I (W)6"(SLD)(100MIL)	REFL PAV MRK TY I (Y)6"(SLD)(100MIL)	REFL PAV MRKR TY II-A-A
	LF	LF	EA	EA	EA	EA	LF	LF	EA
CSJ: 0264-01-046									
1 OF 1	520	260		2	8	4	1130	1130	14
CSJ 0264-01-046 SUBTOTALS	520	260	0	2	8	4	1130	1130	14
CSJ: 0264-01-047									
1 OF 1	1546	802	2	2	6	6	1984	1984	25
CSJ 0264-01-047 SUBTOTALS	1546	802	2	2	6	6	1984	1984	25
PROJECT TOTALS	2066	1062	2	4	14	10	3114	3114	39

SUMMARY OF ENVIRONMENTAL ITEMS								
ITEM NUMBER	164	164	164	168	506	506	506	506
DESC. CODE	7018	7021	7022	7001	7039	7041	7043	7046
LOCATION	HYDRO MULCH SEED (PERM_RURAL_CLAY)	HYDRO MULCH SEED (TEMP_WARM)	HYDRO MULCH SEED (TEMP_COOL)	VEGETATIVE WATERING	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (8")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	TGL	LF	LF	LF	LF
CSJ: 0264-01-046								
0264-01-046	2268	1134	1134	20	1228	1228	313	313
CSJ 0264-01-046 SUBTOTALS	2268	1134	1134	20	1228	1228	313	313
CSJ: 0264-01-047								
0264-01-047	4394	2197	2197	40	2337	2337	473	473
CSJ 0264-01-047 SUBTOTALS	4394	2197	2197	40	2337	2337	473	473
PROJECT TOTALS	6662	3331	3331	60	3565	3565	786	786

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

QUANTITY SUMMARIES

CONT	SECT	JOB	HIGHWAY
0264	01	045, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		25

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF BRIDGES

CSJ	PLAN PROFILE SHEET	BRIDGE NBI #		DESIGN		BRIDGE LOCATION	STATION		LENGTH	CLEAR RDWY WIDTH	LOADING	400-7010 CEM STABIL BKFL	403-7001 TEMPORARY SPL SHORING	416-7005 DRILL SHAFT (30 IN)	416-7006 DRILL SHAFT (36 IN)
		EXISTING	PROPOSED	EXISTING	PROPOSED		BEGIN	END	FT	FT		CY	SF	LF	LF
0264-01-046		08-177-0-0264-01-002	08-177-0-0264-01-104	8 SIMPLE SPANS, CONC. GIRDER/BOX ON CONC. CAPS, PILES, SPREAD FOOTINGS, AND DRILLED SHAFTS	4 SIMPLE SPANS, CONC. TX28 GIRDERS ON CONC. CAPS, COLUMNS, AND DRILLED SHAFTS	SH70 OVER SWEETWATER CREEK	185+77.61	188+42.61	265′	53.5′	HL93	113	150	555	1,268
0264-01-047		08-177-0-0264-01-004	08-177-0-0264-01-103	3 SIMPLE SPANS, CONC. GIRDER ON CONC. CAPS, SPREAD FOOTINGS, AND DRILLED SHAFTS	3 SIMPLE SPANS, CONC. TX28 GIRDERS ON CONC. CAPS, COLUMNS, AND DRILLED SHAFTS	SH70 OVER COTTONWOOD CREEK	434+57.90	436+07.90	150′	53.5′	HL93	189			725
TOTALS												**302**	**150**	**555**	**1,993**

SUMMARY OF BRIDGES CONT'D

CSJ (CONT'D FROM ABOVE)	420-7013 CL "C" CONC (ABUT) (HPC)	420-7023 CL "C" CONC (CAP) (HPC)	420-7039 CL "C" CONC (COLUMN) (HPC)	422-7002 REINF CONC SLAB (HPC)	423-7019 RETAINING WALL (DRILL SHAFT) (FACIA)	425-7001 PRESTR CONC GIRDER (TX28)	428-7001 PENETRATING CONCRETE SURFACE TREATMENT	432-7043 RIPRAP (STONE PROTECTION) (18 IN)	450-7025 RAIL (TY SSTR) (HPC)	454-7004 SEALED EXP. JOINT (4 IN) (SEJ-M)	@ INSTALL BRIDGE IDETIFICATION NUMBERS
	CY	CY	CY	SF	SF	LF	SY	CY	LF	LF	EA
0264-01-046	68.0	75.3	25.2	14,709	1,307	1,841.00	111	374	566.0	164	2
0264-01-047	62.8	53.0	48.5	8,325		1,039.50	211	1,065	348.0	112	2
TOTALS	**130.8**	**128.3**	**73.7**	**23,034**	**1,307**	**2,880.50**	**322**	**1,439**	**914.0**	**276**	**4**

@ FOR CONTRACTOR'S INFORMATION ONLY, WORK SUBSIDIARY TO ABUTMENT BID ITEMS

HL93 LOADING

Jacobs
1999 BRYAN ST, SUITE 1200
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

QUANTITY SUMMARIES

SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		26

DATE: DATE TIME
FILE: DOCUMENT NAME

CC
DW
CC
DW

CONSTRUCTION SEQUENCE

GENERAL

THE SWEETWATER CREEK BRIDGE WILL BE CONSTRUCTED FIRST. ALL ITEMS PERTAINING TO THE SWEETWATER CREEK BRIDGE IS TO BE FULLY CONSTUCTED AND COMPLETED PRIOR BEGINNING CONSTRUCTION OF THE COTTONWOOD CREEK BRIDGE. NO WORK FOR BOTH BRIDGES SHALL BE CONDUCTED AT THE SAME TIME.

1. MAINTAIN TEMPORARY DRAINAGE AT ALL TIMES. TEMPORARY DRAINAGE SHALL BE CONSIDERED SUBSIDIARY TO OTHER BID ITEMS.
2. SHORT TERM TRAFFIC CONTROL OPERATIONS FOR PLACEMENT OF CHANNELIZING DEVICES WILL BE AS DETAILED IN THE TCP STANDARD DRAWINGS OR AS DIRECTED BY THE ENGINEER IN THE FIELD.

PHASE 1

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21. INSTALL AND MAINTAIN SWP3 DEVICES FOR THE PROJECT LIMITS.
2. PLACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD TCP(2-3b)-23. SHIFT TRAFFIC.
3. BREAK BACK THE EXISTING BRIDGE AND CONSTRUCT THE NORTHBOUND PORTION OF THE BRIDGE INCLUDING BRIDGE RAIL AS SHOWN IN THE PLANS.
4. CONSTRUCT APPROACH ROADWAY FOLLOWING THE TRAFFIC CONTROL TYPICAL SECTIONS IN THE PLANS.
5. CONSTRUCT PAVEMENT TRANSITION AS SHOWN IN THE PLANS.

PHASE 2

SWEETWATER CREEK BRIDGE

PHASE 2A

1. MAINTAIN ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. PLACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD TCP(2-8b)-23. INSTALL TEMPORARY SIGNALS AND WARNING DEVICES FOR ONE LANE TWO-WAY CONFIGURATION. SHIFT TRAFFIC.
3. DEMOLISH THE EXISTING BRIDGE AND CONSTRUCT THE REMAINING PORTION OF THE BRIDGE INCLUDING BRIDGE RAIL AS SHOWN IN THE PLANS.
4. CONSTRUCT ROADWAY FROM STATION 185+09.38 TO STATION 192+18.69 INCLUDING THE SOUTH PORTION OF THE DRIVEWAY AS SHOWN IN THE PLANS.

PHASE 2B

1. MAINTAIN ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. MAINTAIN TRAFFIC CONTROL CONFIGURATION FROM PHASE 2A.
3. CONSTRUCT BRIDGE APPROACHES AND ROADWAY FROM STATION 183+06.38 TO STATION 185+09.76 INCLUDING THE REMAINING PORTION OF THE DRIVEWAY AS SHOWN IN THE PLANS.

PHASE 2C

1. MAINTAIN ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. PLACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD TCP(2-3b)-23. SHIFT TRAFFIC
3. PLACE FINAL SURFACE OF ASPHALT ON ROADWAY CONSTRUCTED IN PHASE 1 AND INSTALL GUARDRAIL.

COTTONWOOD CREEK BRIDGE

PHASE 2A

1. MAINTAIN ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. PLACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD TCP(2-8b)-23. INSTALL TEMPORARY SIGNALS AND WARNING DEVICES FOR ONE LANE TWO-WAY CONFIGURATION. SHIFT TRAFFIC.
3. DEMOLISH THE EXISTING BRIDGE AND CONSTRUCT THE REMAINING PORTION OF THE BRIDGE INCLUDING BRIDGE RAIL AS SHOWN IN THE PLANS.
4. CONSTRUCT BRIDGE APPROACHES AND ROADWAY.

PHASE 2B

1. PLACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD TCP(2-3b)-23. SHIFT TRAFFIC
2. PLACE FINAL SURFACE OF ASPHALT ON ROADWAY CONSTRUCTED IN PHASE 1 AND INSTALL GUARDRAIL.

FINAL PHASE

1. INSTALL ALL APPLICABLE TRAFFIC CONTROL DEVICES PER MUTCD AND TCP STANDARDS FOR PAVEMENT MARKINGS, SIGNS AND SEEDING.
2. INSTALL FINAL PAVEMENT MARKINGS AND RUMBLE STRIPS USING TCP(3-1)-13.
3. INSTALL PROPOSED SIGNS.
4. COMPLETE SEEDING AND PERMANENT SW3P USING TCP(2-1)-18.
5. COMPLETE FINAL SITE CLEAN UP AND REMOVE ADVANCED WARNING SIGNS AND BARRICADES.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

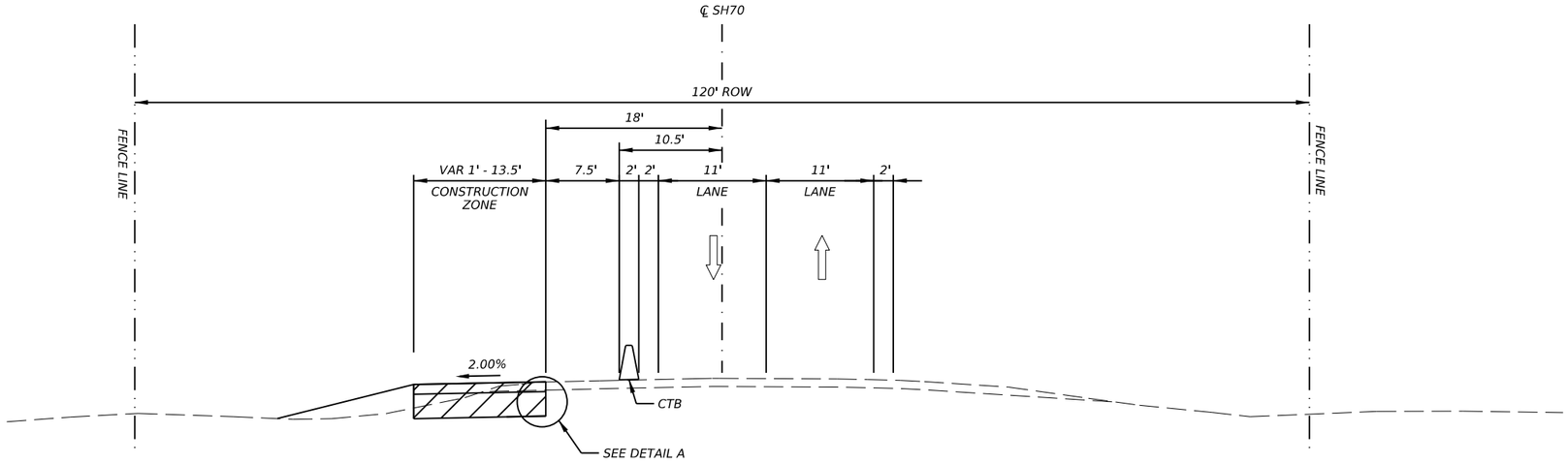
SH 70

TCP
CONSTRUCTION SEQUENCE

SHEET 1 OF 1

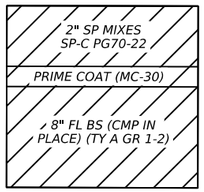
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		27

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/SH70_TCP SEQ-01.dgn



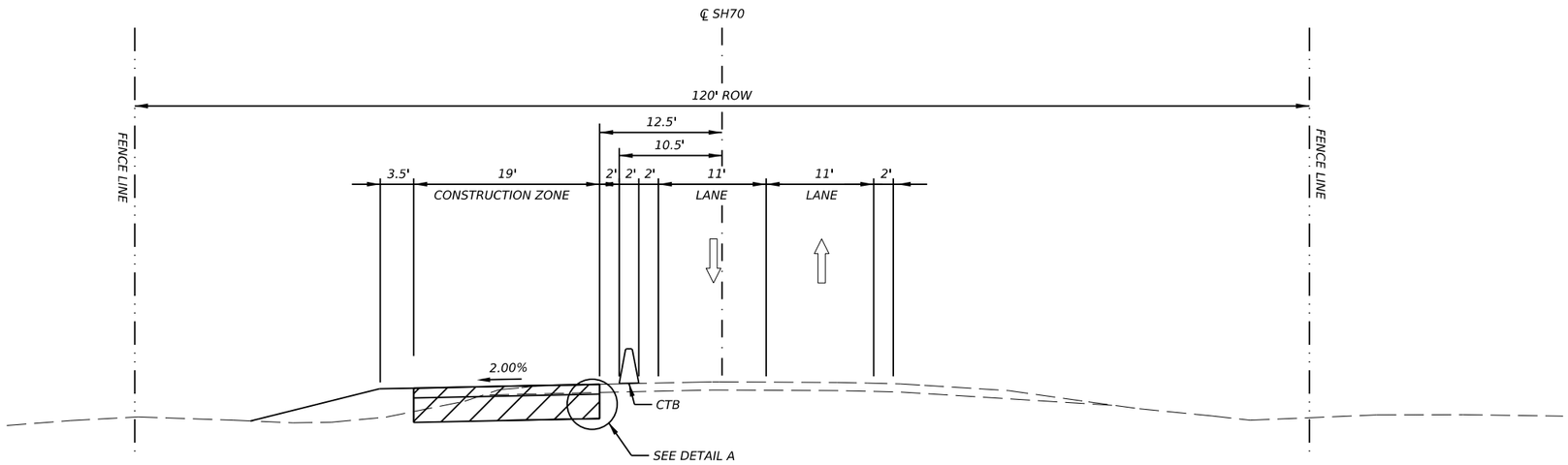
SH 70 PHASE 1 (SWEETWATER CREEK)

STA 182+08.36 TO STA 184+26.38



DETAIL "A"

NOT TO SCALE



SH 70 PHASE 1 (SWEETWATER CREEK)

STA 184+26.38 TO STA 185+77.61

STA 188+42.61 TO STA 189+91.38

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

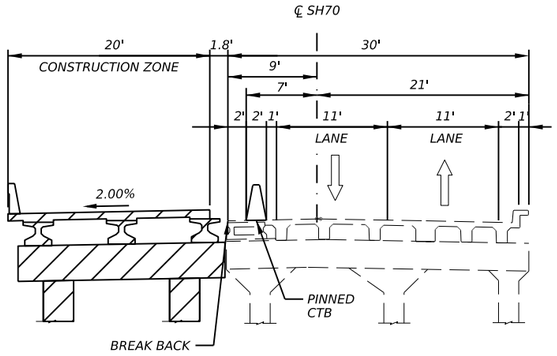
SWEETWATER CREEK
TCP TYPICAL SECTIONS
PHASE 1

NTS

SHEET 1 OF 2

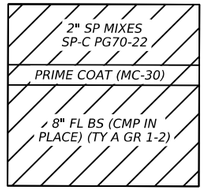
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		28

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP TYP-01.dgn

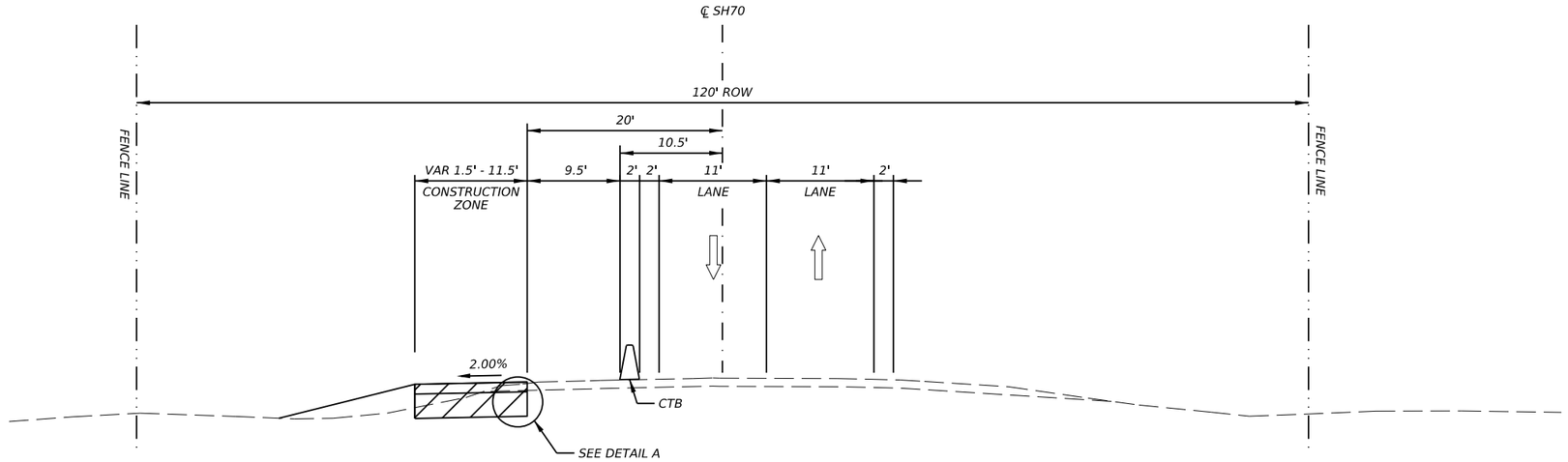


SH 70 PHASE 1 BRIDGE (SWEETWATER CREEK)

STA 185+77.61 TO STA 188+42.61



DETAIL "A"
NOT TO SCALE



SH 70 PHASE 1 (SWEETWATER CREEK)

STA 189+91.38 TO STA 191+52.32

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

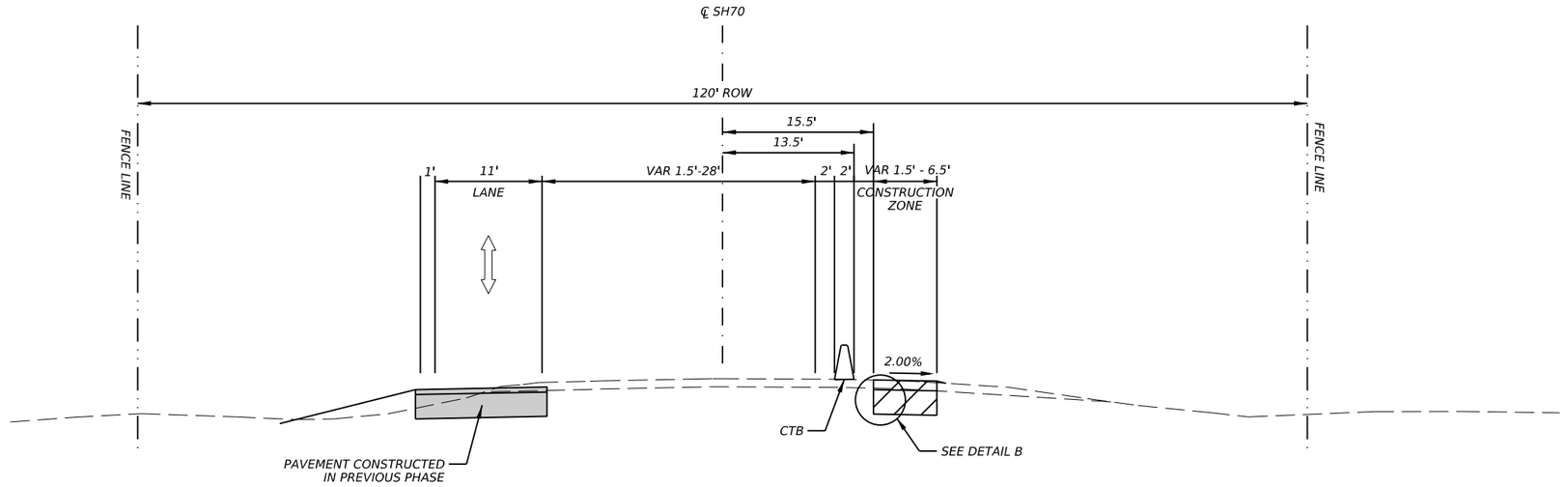
SH 70

SWEETWATER CREEK
TCP TYPICAL SECTIONS
PHASE 1

NTS SHEET 2 OF 2

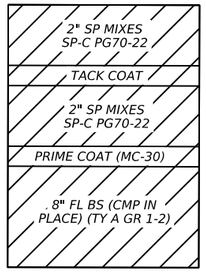
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		29

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP TYP-02.dgn



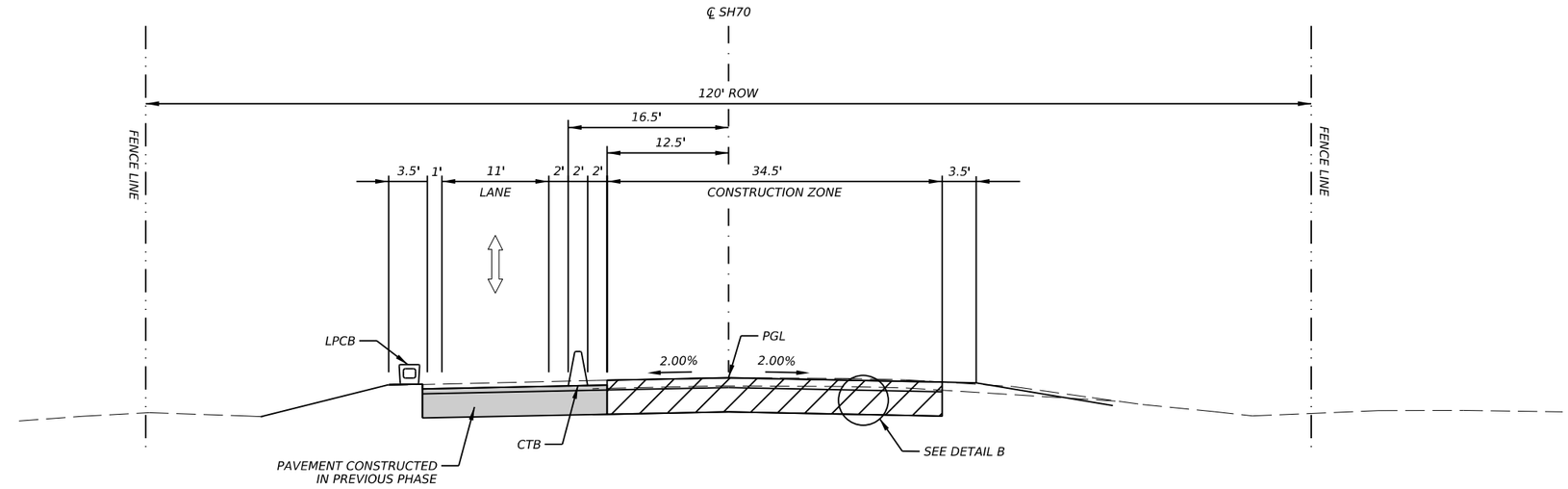
SH 70 PHASE 2A (SWEETWATER CREEK)

STA 183+06.38 TO STA 184+26.38



DETAIL "B"

NOT TO SCALE



① SH 70 PHASE 2A (SWEETWATER CREEK)

STA 184+26.38 TO STA 185+77.61
STA 188+42.61 TO STA 189+91.38

NOTES:

① PHASE 2B FROM STA 183+22.88 TO STA 185+09.76

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

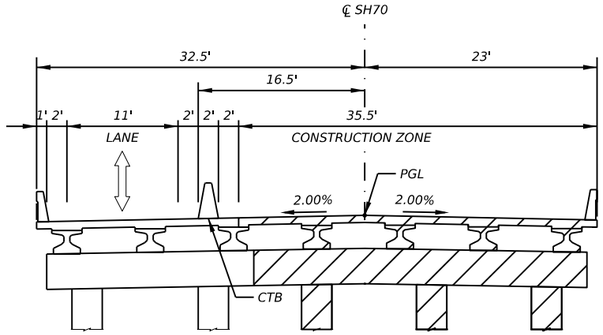
SH 70

SWEETWATER CREEK
TCP TYPICAL SECTIONS
PHASE 2

NTS SHEET 1 OF 2

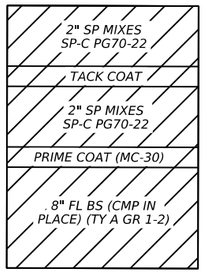
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		30

DATE: 6/27/2024
FILE: pw://acobs-US-VA.PW.Bentley.com:acobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP TYP-01.dgn



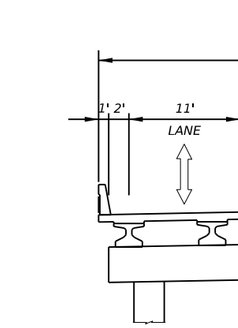
SH 70 PHASE 2A BRIDGE (SWEETWATER CREEK)

STA 185+77.61 TO STA 188+42.61



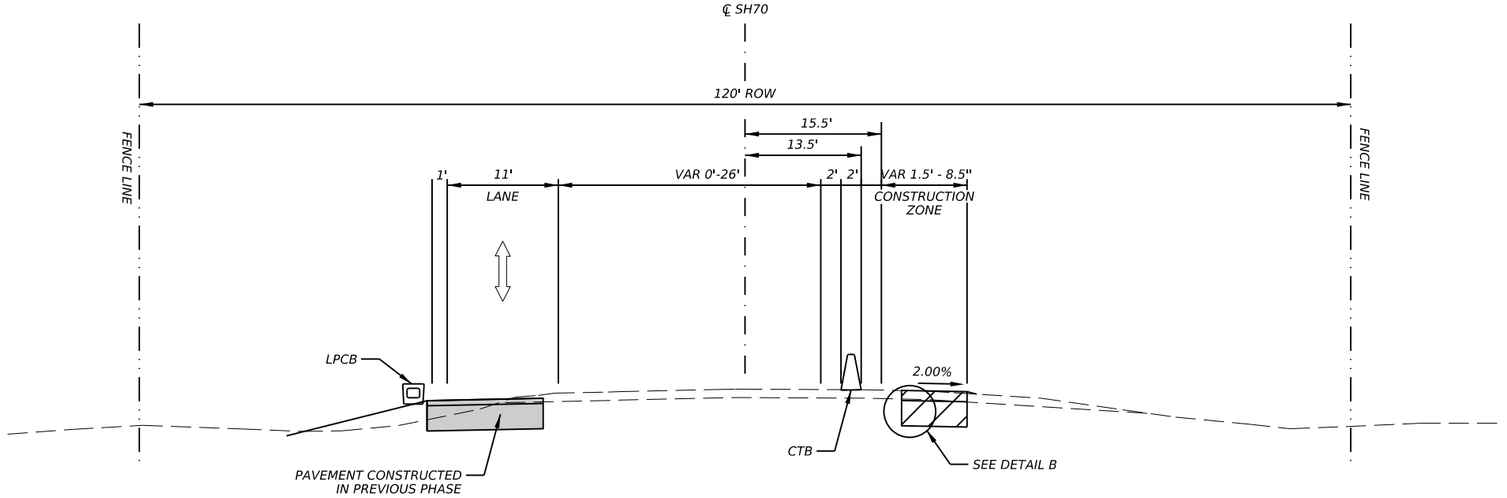
DETAIL "B"

NOT TO SCALE



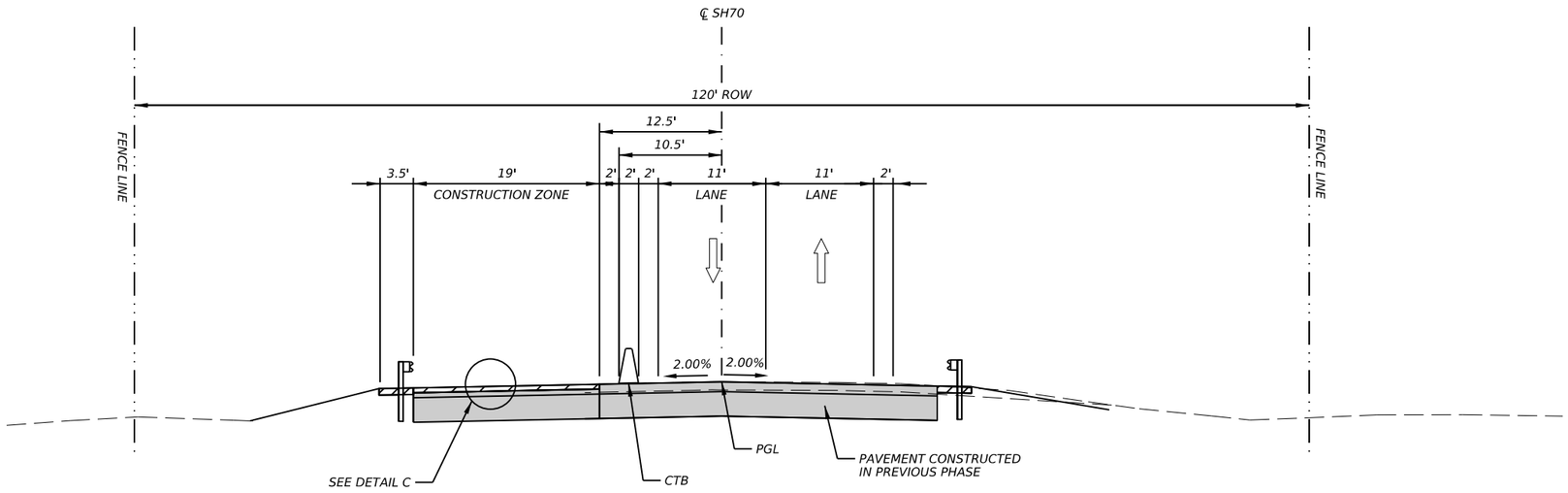
DETAIL "C"

NOT TO SCALE



SH 70 PHASE 2A (SWEETWATER CREEK)

STA 189+91.38 TO STA 192+18.69



SH 70 PHASE 2C (SWEETWATER CREEK)

STA 182+08.36 TO STA 185+77.61
STA 188+42.61 TO STA 192+18.69

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

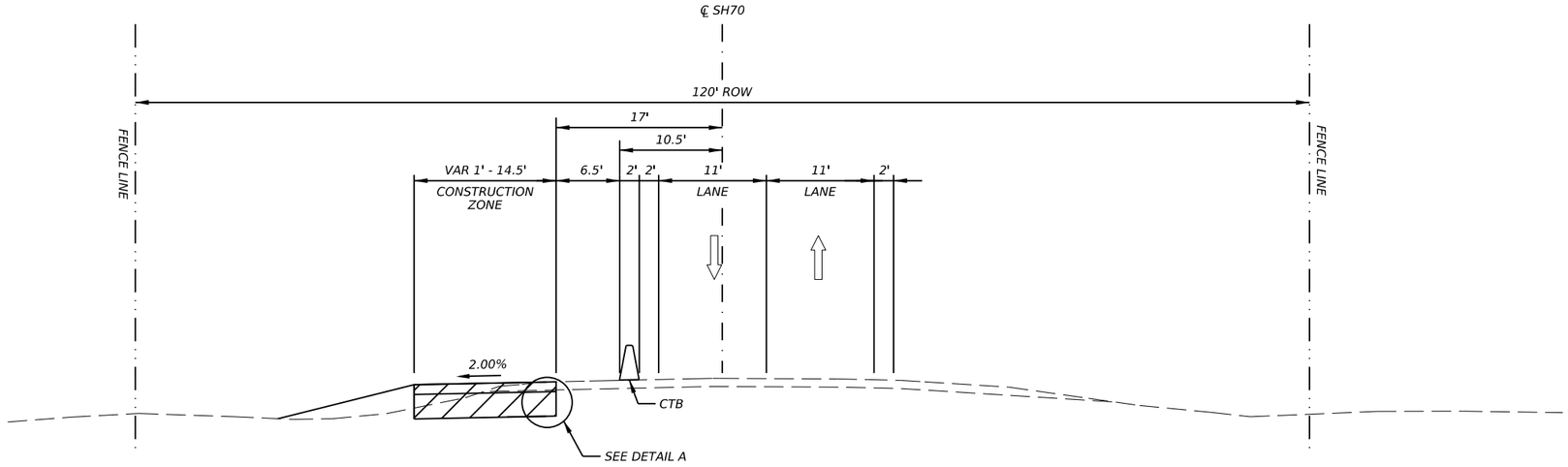
SWEETWATER CREEK
TCP TYPICAL SECTIONS
PHASE 2

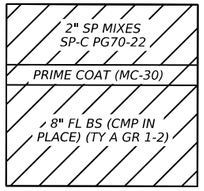
NTS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		31

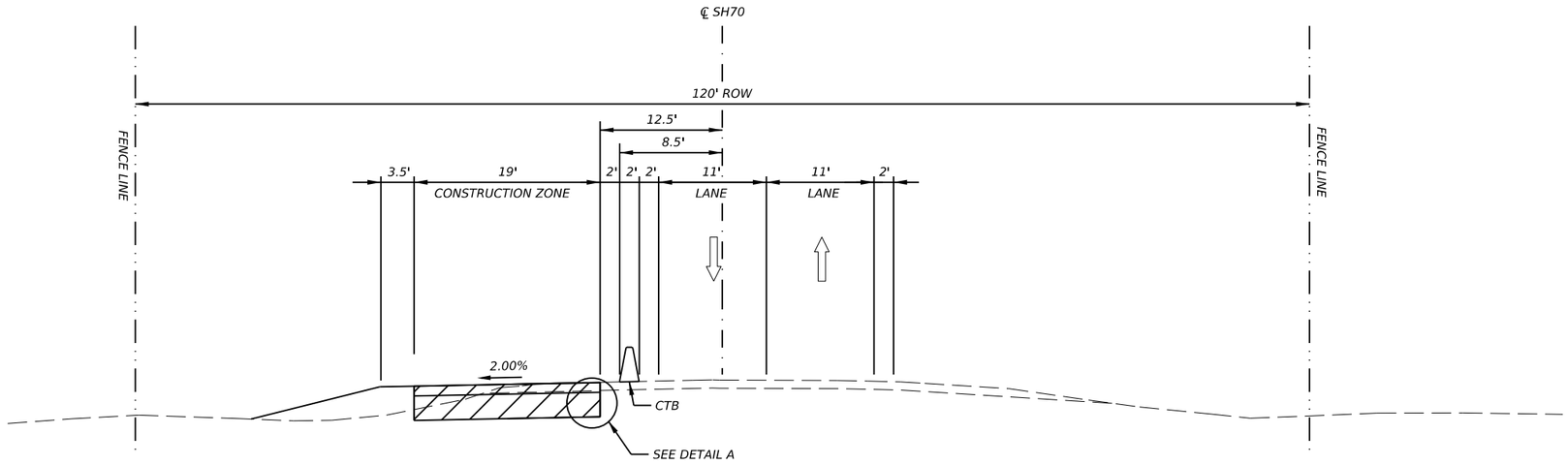
DATE: 6/27/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP TYP-02.dgn





DETAIL "A"
NOT TO SCALE

SH 70 PHASE 1 (COTTONWOOD CREEK)
STA 429+05.00 TO STA 431+65.00
STA 441+56.60 TO STA 444+16.60



SH 70 PHASE 1 (COTTONWOOD CREEK)
STA 431+65.00 TO STA 434+57.90
STA 436+07.90 TO STA 441+56.60

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

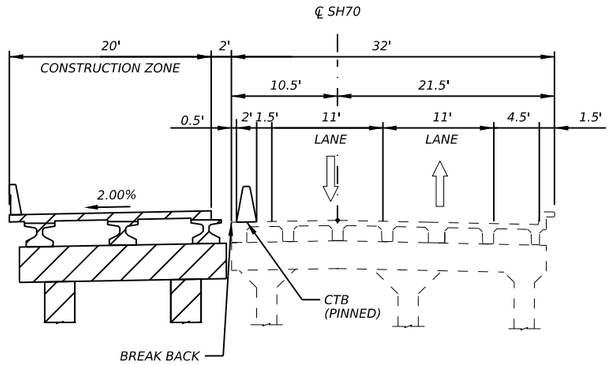
COTTONWOOD CREEK
TCP TYPICAL SECTIONS
PHASE 1

NTS

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		32

DATE: 6/27/2024
FILE: pw://acobs-US-VA.PW.Bentley.com:acobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP TYP-03.dgn

CK
DW
CK
DW



SH 70 PHASE 1 BRIDGE (COTTONWOOD CREEK)

STA 434+57.90 TO STA 436+07.90

Jorge Gonzalez

STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

COTTONWOOD CREEK
TCP TYPICAL SECTIONS
PHASE 1

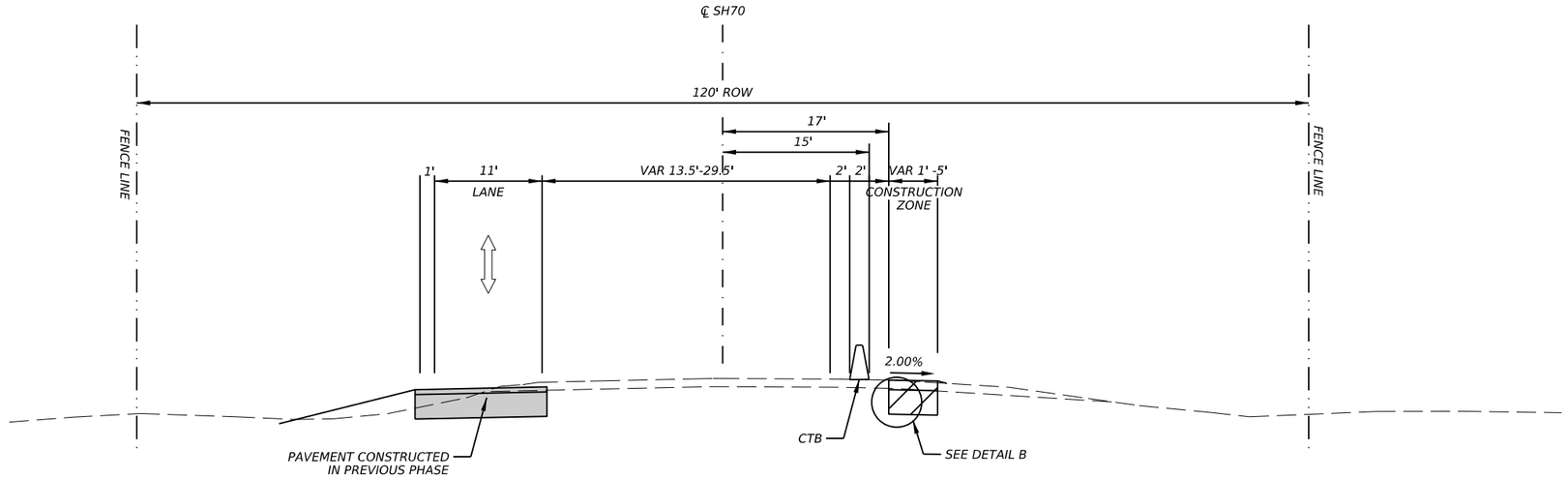
NTS

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70

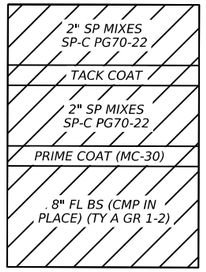
DIST	COUNTY	SHEET NO.
ABL	NOLAN	33

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP TYP-04.dgn



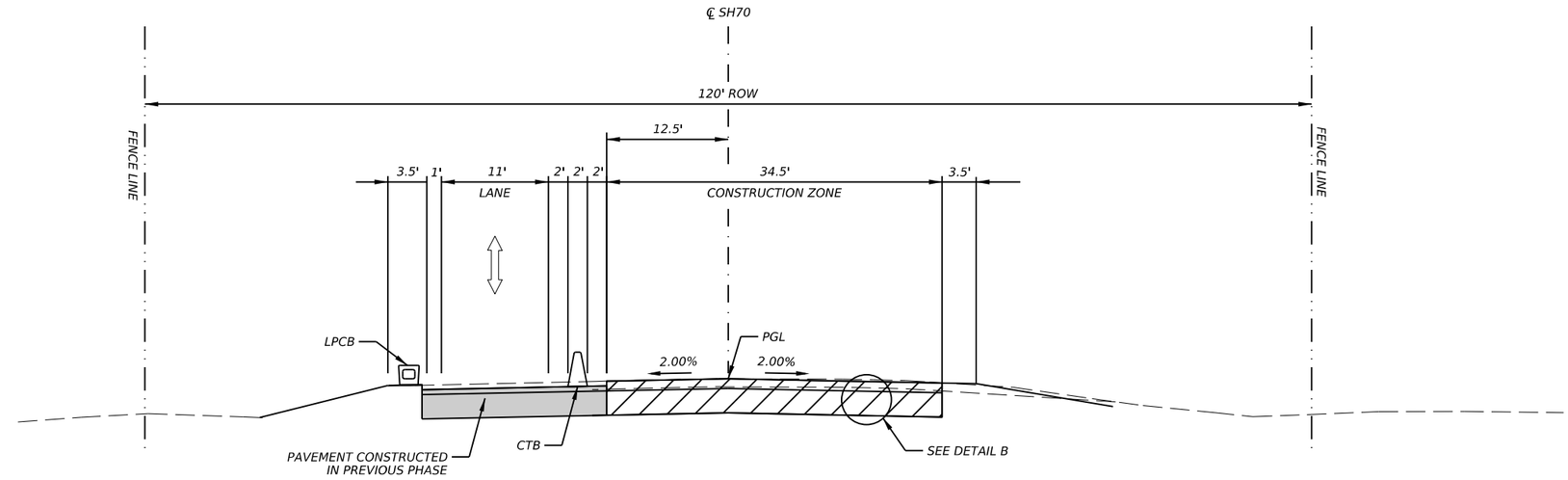
SH 70 PHASE 2A (COTTONWOOD CREEK)

STA 430+85.00 TO STA 431+65.00
STA 441+56.60 TO STA 442+36.60



DETAIL "B"

NOT TO SCALE



SH 70 PHASE 2A (COTTONWOOD CREEK)

STA 431+65.00 TO STA 434+57.90
STA 436+07.90 TO STA 441+56.60

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

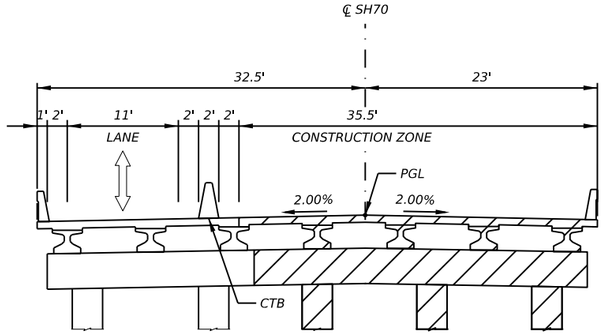
COTTONWOOD CREEK TCP TYPICAL SECTIONS PHASE 2

NTS

SHEET 1 OF 2

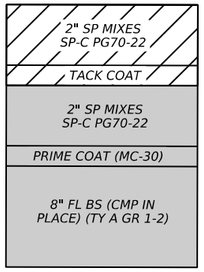
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		34

DATE: 6/27/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP TYP-03.dgn

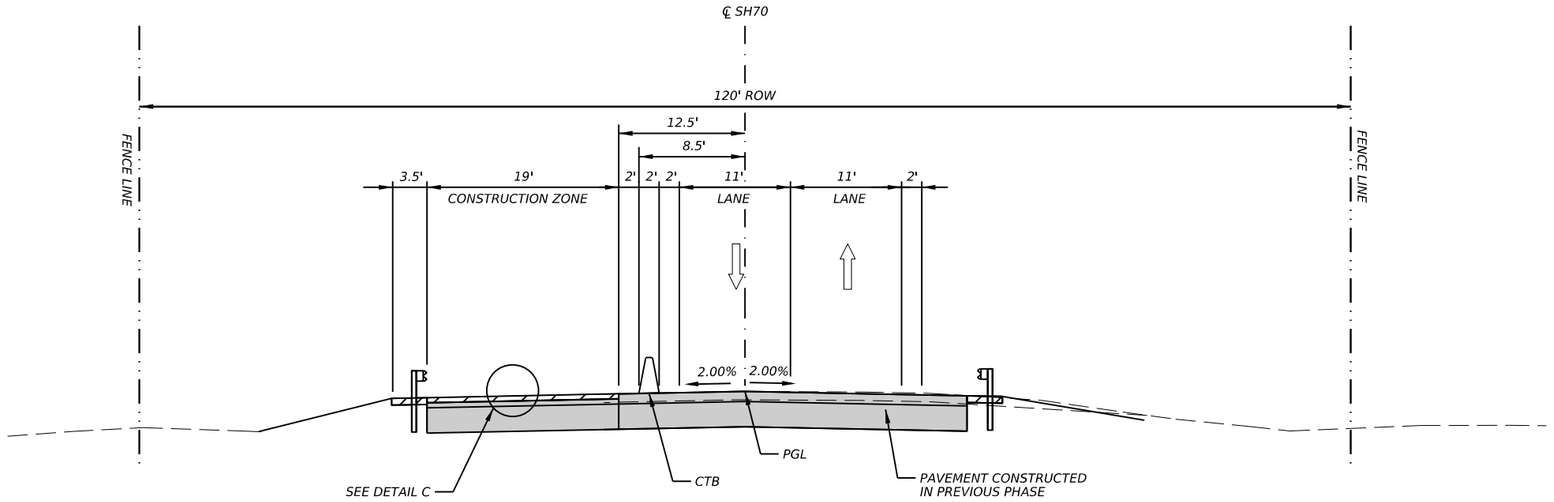


SH 70 PHASE 2A BRIDGE (COTTONWOOD CREEK)

STA 434+57.90 TO STA 436+07.90



DETAIL "C"
NOT TO SCALE



SH 70 PHASE 2B (COTTONWOOD CREEK)

STA 429+05.00 TO STA 434+57.90
STA 436+07.90 TO STA 444+16.60

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

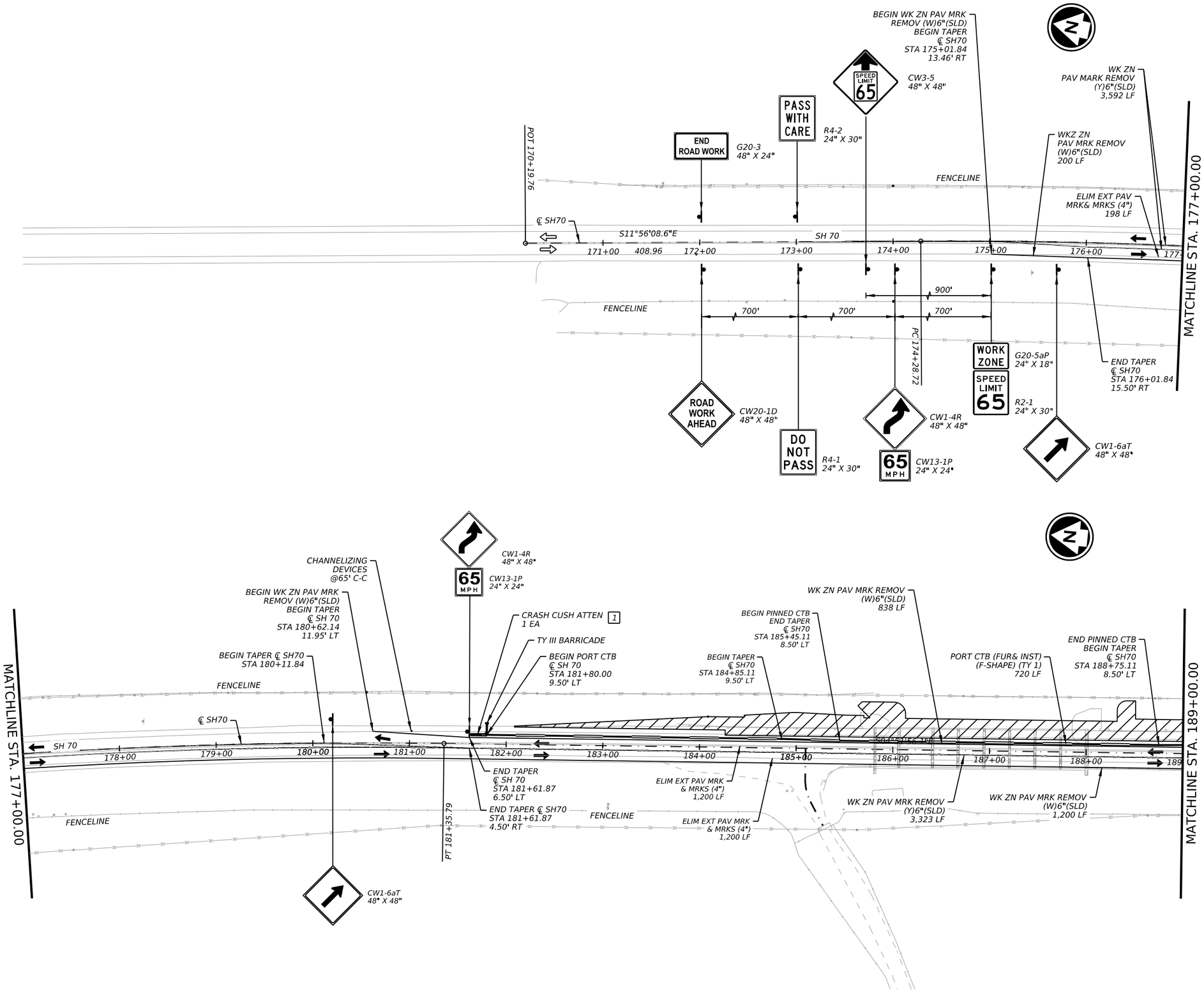
COTTONWOOD CREEK
TCP TYPICAL SECTIONS
PHASE 2

NTS SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		35

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP TYP-04.dgn

CK DW CK DW



LEGEND

- EXISTING TRAFFIC
- TCP PHASE TRAFFIC
- TRAFFIC SIGN
- CHANNELIZING DEVICES
- TY III BARRICADE
- CRASH CUSHION NO.
- CTB
- TCP PHASE CONSTRUCTION
- PAVEMENT PREVIOUSLY CONSTRUCTED
- PORTABLE CHANGEABLE MESSAGE SIGN
- TEMPORARY SIGNAL

NOTES

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. SPACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD BC (9)-21.
3. TRAFFIC CONTROL PLAN IS BASED ON TXDOT STANDARD TCP(2-3b)-23.
4. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.
5. REFER TO TCP DETAIL SHEET FOR ADDITIONAL INFORMATION ON TEMPORARY TRANSITION ON BRIDGE ENDS.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

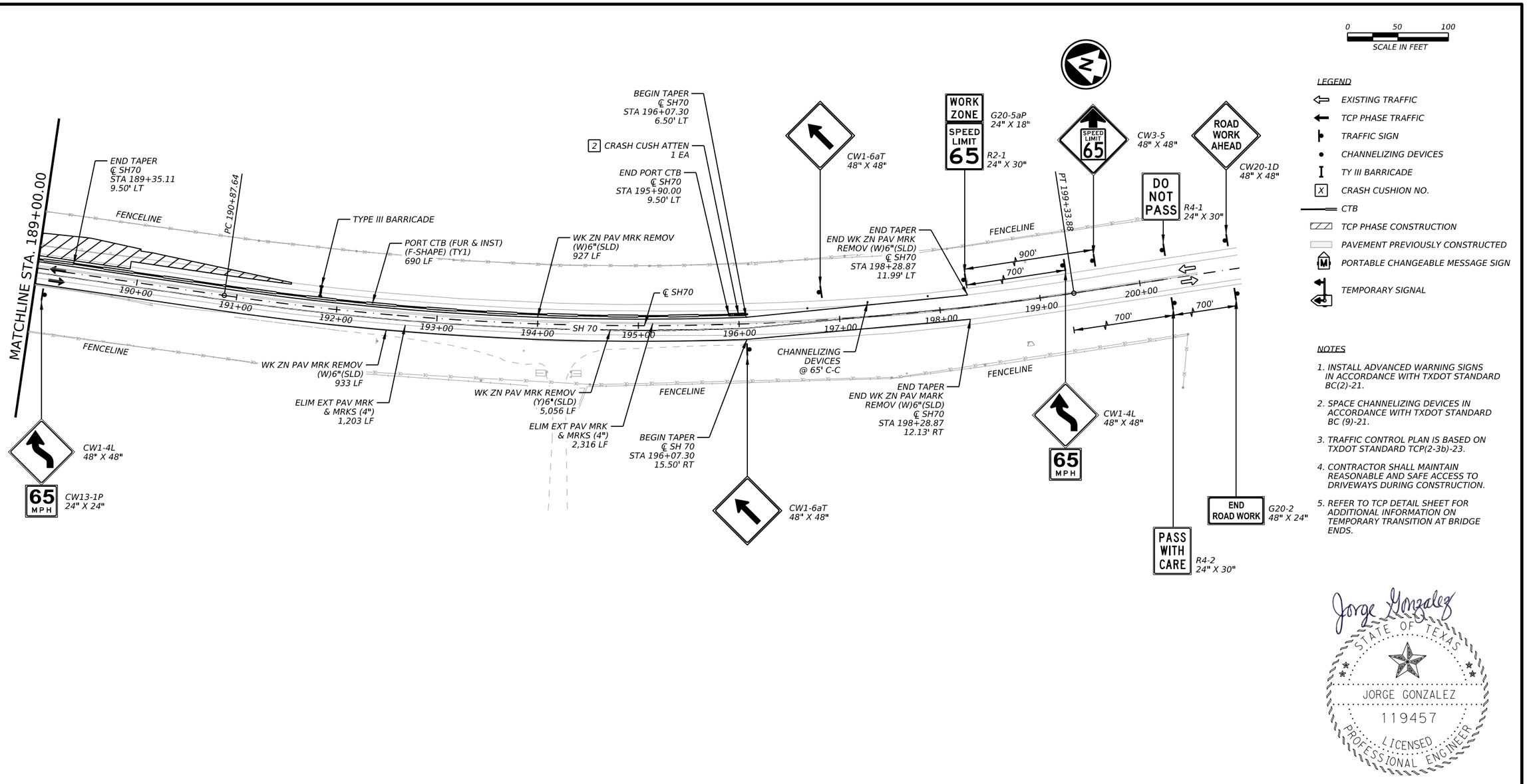
SWEETWATER CREEK TRAFFIC CONTROL PLAN PHASE 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		36

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP-01.dgn

CK DW CK DW



LEGEND

- EXISTING TRAFFIC
- TCP PHASE TRAFFIC
- TRAFFIC SIGN
- CHANNELIZING DEVICES
- TY III BARRICADE
- [X] CRASH CUSHION NO.
- CTB
- TCP PHASE CONSTRUCTION
- PAVEMENT PREVIOUSLY CONSTRUCTED
- [M] PORTABLE CHANGEABLE MESSAGE SIGN
- TEMPORARY SIGNAL

NOTES

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. SPACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD BC (9)-21.
3. TRAFFIC CONTROL PLAN IS BASED ON TXDOT STANDARD TCP(2-3b)-23.
4. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.
5. REFER TO TCP DETAIL SHEET FOR ADDITIONAL INFORMATION ON TEMPORARY TRANSITION AT BRIDGE ENDS.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

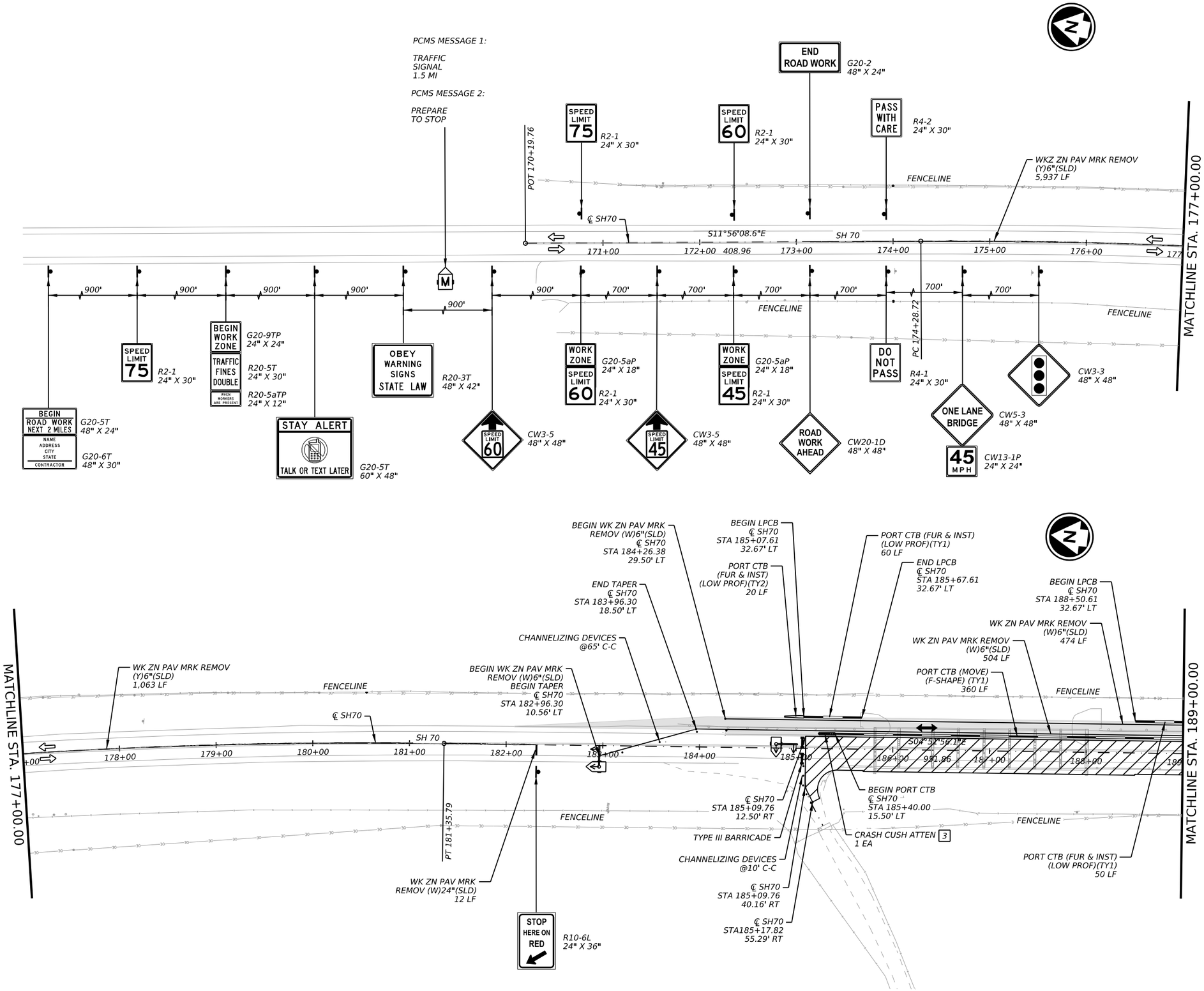
SH 70

SWEETWATER CREEK
TRAFFIC CONTROL PLAN
PHASE 1

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		37

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP-02.dgn



0 50 100
SCALE IN FEET

LEGEND

- EXISTING TRAFFIC
- TCP PHASE TRAFFIC
- TRAFFIC SIGN
- CHANNELIZING DEVICES
- TY III BARRICADE
- CRASH CUSHION NO.
- CTB
- TCP PHASE CONSTRUCTION
- PAVEMENT PREVIOUSLY CONSTRUCTED
- PORTABLE CHANGEABLE MESSAGE SIGN
- TEMPORARY SIGNAL

NOTES

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. SPACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD BC (9)-21.
3. TRAFFIC CONTROL PLAN IS BASED ON TXDOT STANDARD TCP(2-8b)-23.
4. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

6/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

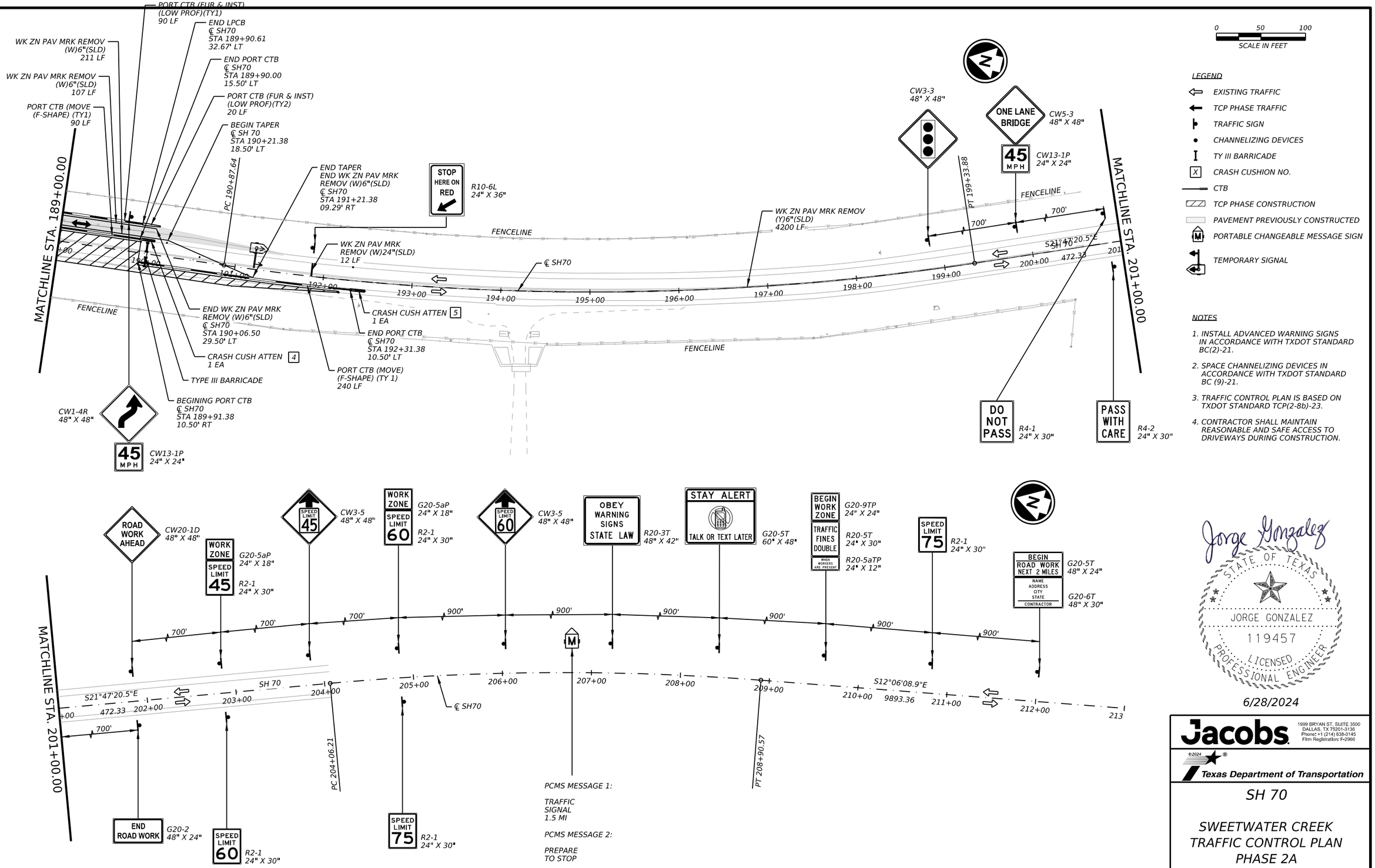
SH 70

SWEETWATER CREEK TRAFFIC CONTROL PLAN PHASE 2A

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		38

DATE: 6/28/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP-01.dgn



Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

6/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

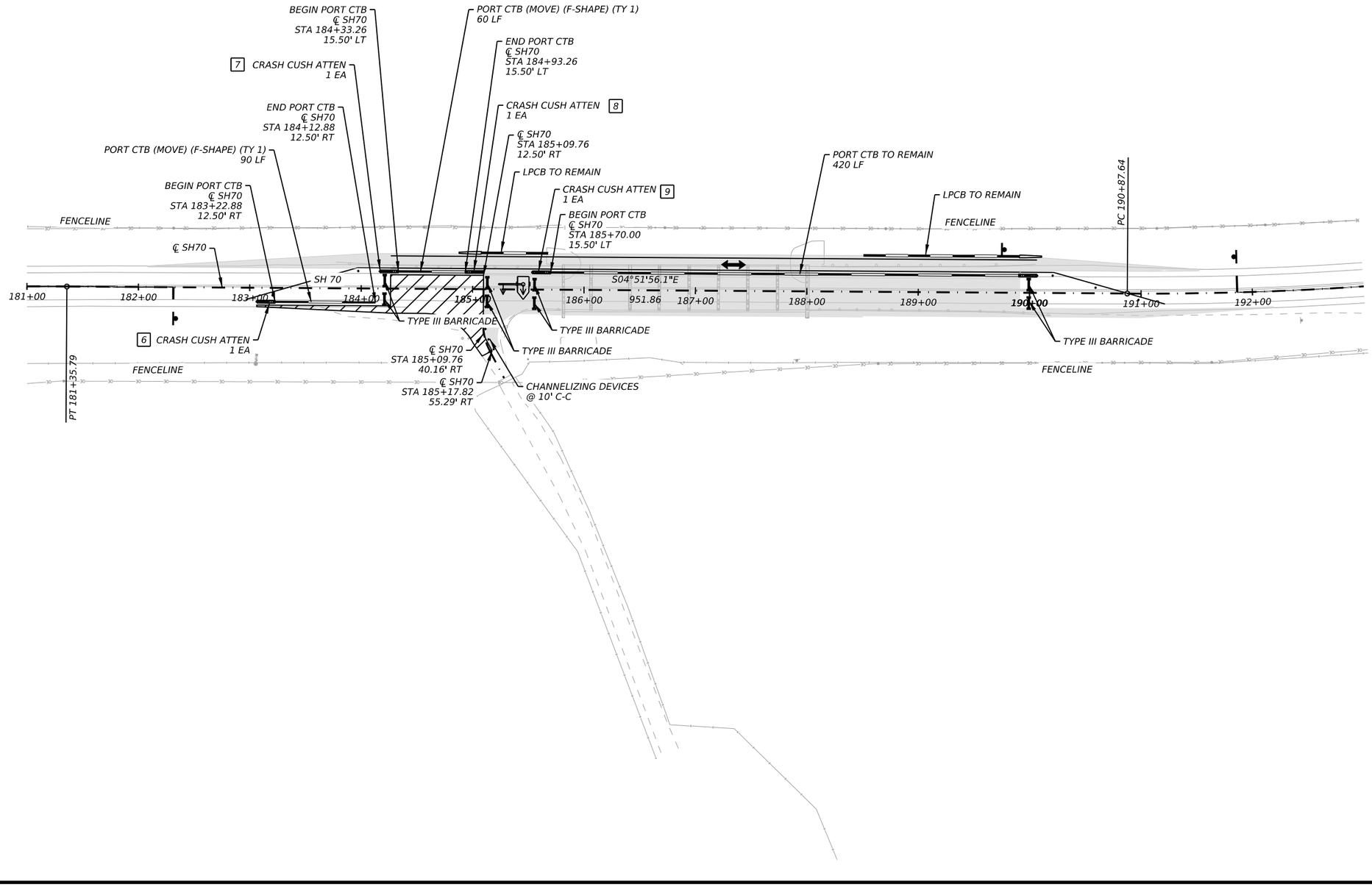
SH 70

SWEETWATER CREEK TRAFFIC CONTROL PLAN PHASE 2A

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		39

DATE: 6/28/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP-02.dgn



0 50 100

SCALE IN FEET

LEGEND

- EXISTING TRAFFIC
- TCP PHASE TRAFFIC
- TRAFFIC SIGN
- CHANNELIZING DEVICES
- TY III BARRICADE
- X CRASH CUSHION NO.
- CTB
- TCP PHASE CONSTRUCTION
- PAVEMENT PREVIOUSLY CONSTRUCTED
- M PORTABLE CHANGEABLE MESSAGE SIGN
- TEMPORARY SIGNAL

NOTES

1. ADVANCED WARNING SIGNS FROM TCP PHASE 2A SHALL REMAIN IN PLACE.
2. TRAFFIC CONTROL PLAN USED IN TCP PHASE 2A SHALL REMAIN IN PLACE EXCEPT FOR THE MODIFICATIONS SHOWN ON THIS SHEET.
3. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/27/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH70

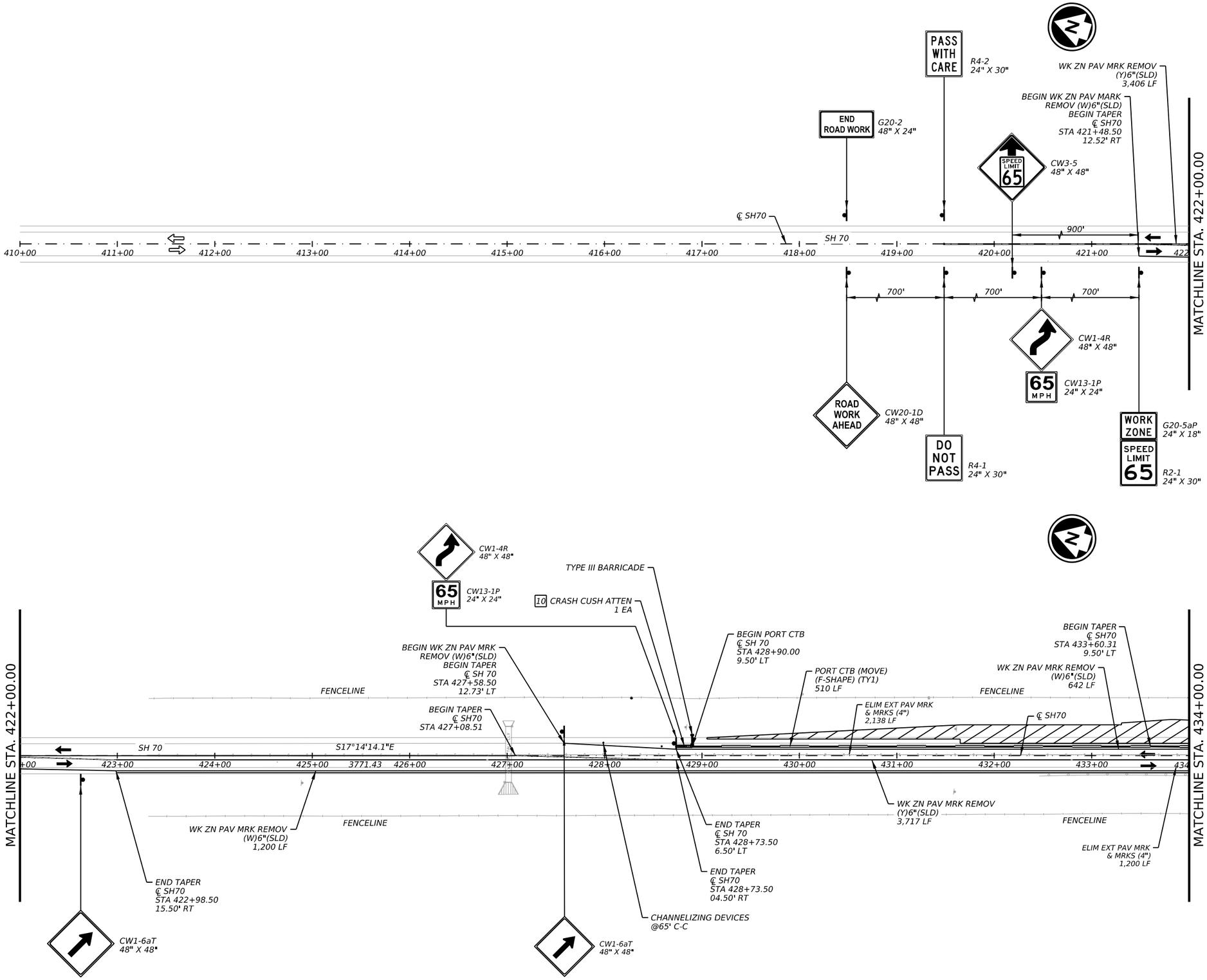
SWEETWATER CREEK TRAFFIC CONTROL PLAN PHASE 2B

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264-	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		40

DATE: 6/27/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2B_TCP-01.dgn

CK DW CK DW



0 500 1000
SCALE IN FEET

LEGEND

- EXISTING TRAFFIC
- TCP PHASE TRAFFIC
- TRAFFIC SIGN
- CHANNELIZING DEVICES
- TY III BARRICADE
- CRASH CUSHION NO.
- CTB
- TCP PHASE CONSTRUCTION
- PAVEMENT PREVIOUSLY CONSTRUCTED
- PORTABLE CHANGEABLE MESSAGE SIGN
- TEMPORARY SIGNAL

NOTES

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. SPACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD BC (9)-21.
3. TRAFFIC CONTROL PLAN IS BASED ON TXDOT STANDARD TCP(2-3b)-23.
4. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.
5. REFER TO TCP DETAIL SHEET FOR ADDITIONAL INFORMATION ON TEMPORARY TRANSITION AT BRIDGE ENDS.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

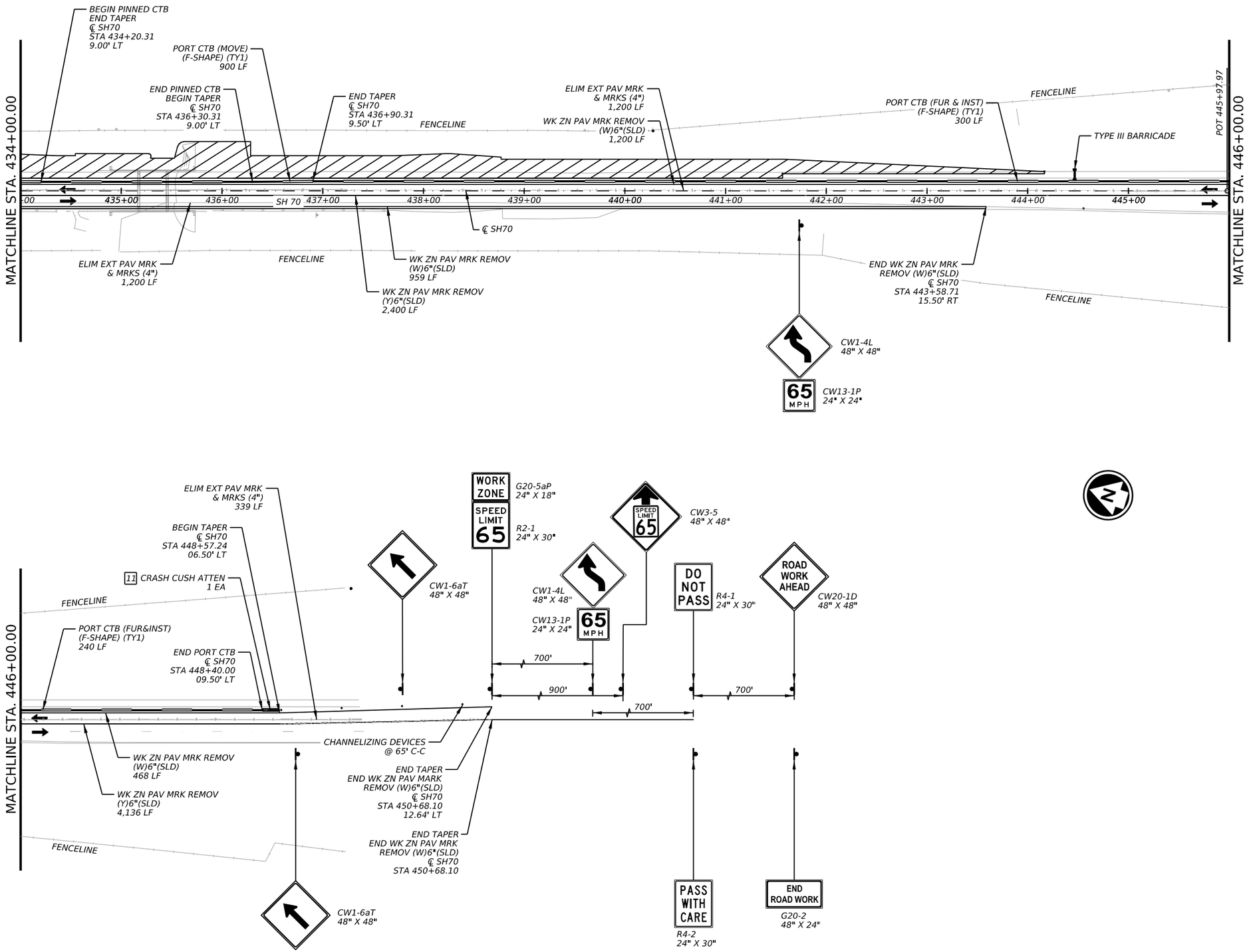
COTTONWOOD CREEK TRAFFIC CONTROL PLAN PHASE 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		41

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP-03.dgn

CK DW CK DW



0 50 100
SCALE IN FEET

LEGEND

- EXISTING TRAFFIC
- TCP PHASE TRAFFIC
- TRAFFIC SIGN
- CHANNELIZING DEVICES
- TY III BARRICADE
- CRASH CUSHION NO.
- CTB
- TCP PHASE CONSTRUCTION
- PAVEMENT PREVIOUSLY CONSTRUCTED
- PORTABLE CHANGEABLE MESSAGE SIGN
- TEMPORARY SIGNAL

NOTES

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. SPACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD BC (9)-21.
3. TRAFFIC CONTROL PLAN IS BASED ON TXDOT STANDARD TCP(2-3b)-23.
4. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.
5. REFER TO TCP DETAIL SHEET FOR ADDITONAL INFORMATION ON TEMPORARY TRANSITION AT BRIDGE ENDS.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

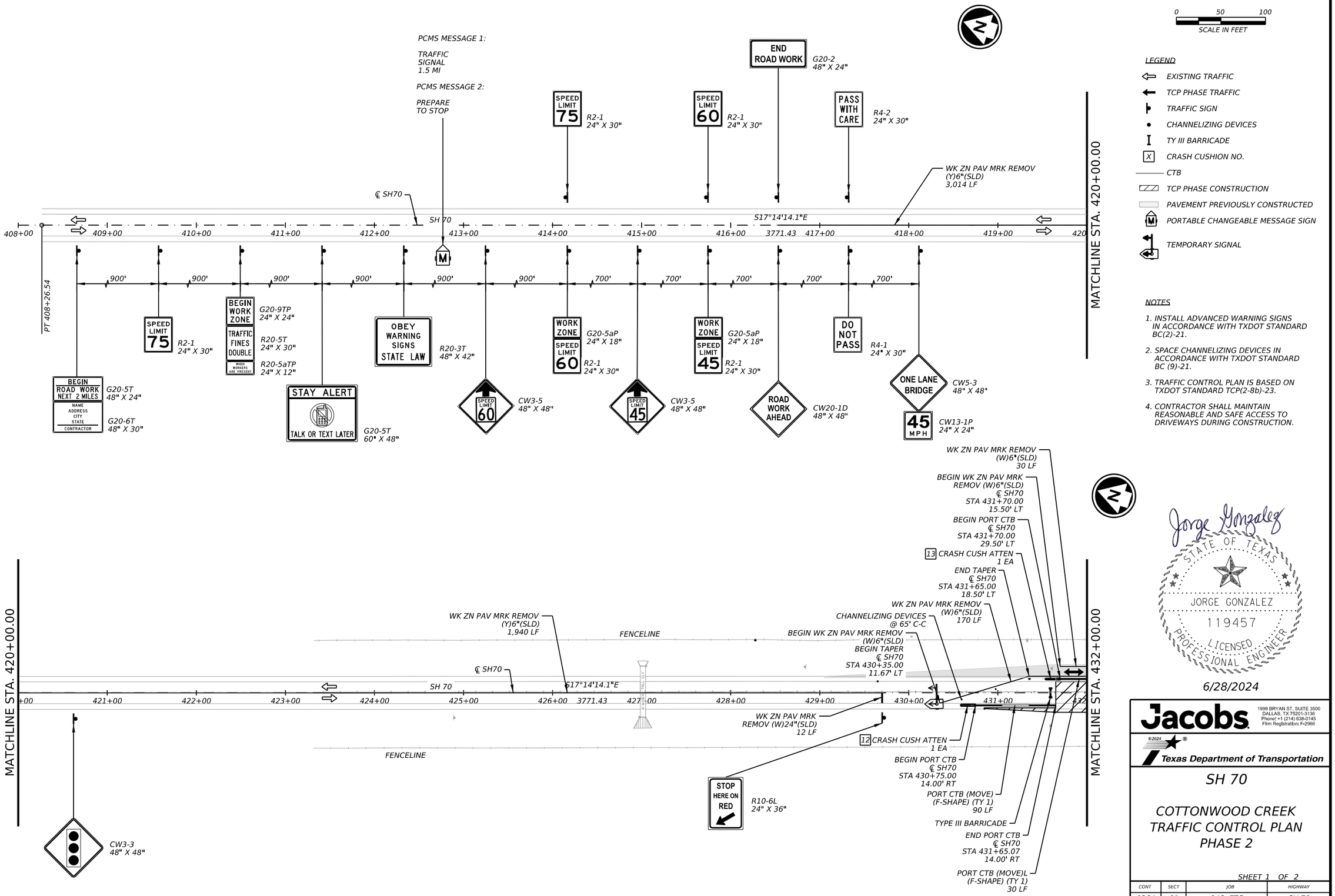
COTTONWOOD CREEK TRAFFIC CONTROL PLAN PHASE 1

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		42

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP-04.dgn

CK DW CK DW



NOTES

1. INSTALL ADVANCED WARNING SIGNS IN ACCORDANCE WITH TXDOT STANDARD BC(2)-21.
2. SPACE CHANNELIZING DEVICES IN ACCORDANCE WITH TXDOT STANDARD BC (9)-21.
3. TRAFFIC CONTROL PLAN IS BASED ON TXDOT STANDARD TCP(2-8b)-23.
4. CONTRACTOR SHALL MAINTAIN REASONABLE AND SAFE ACCESS TO DRIVEWAYS DURING CONSTRUCTION.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

6/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

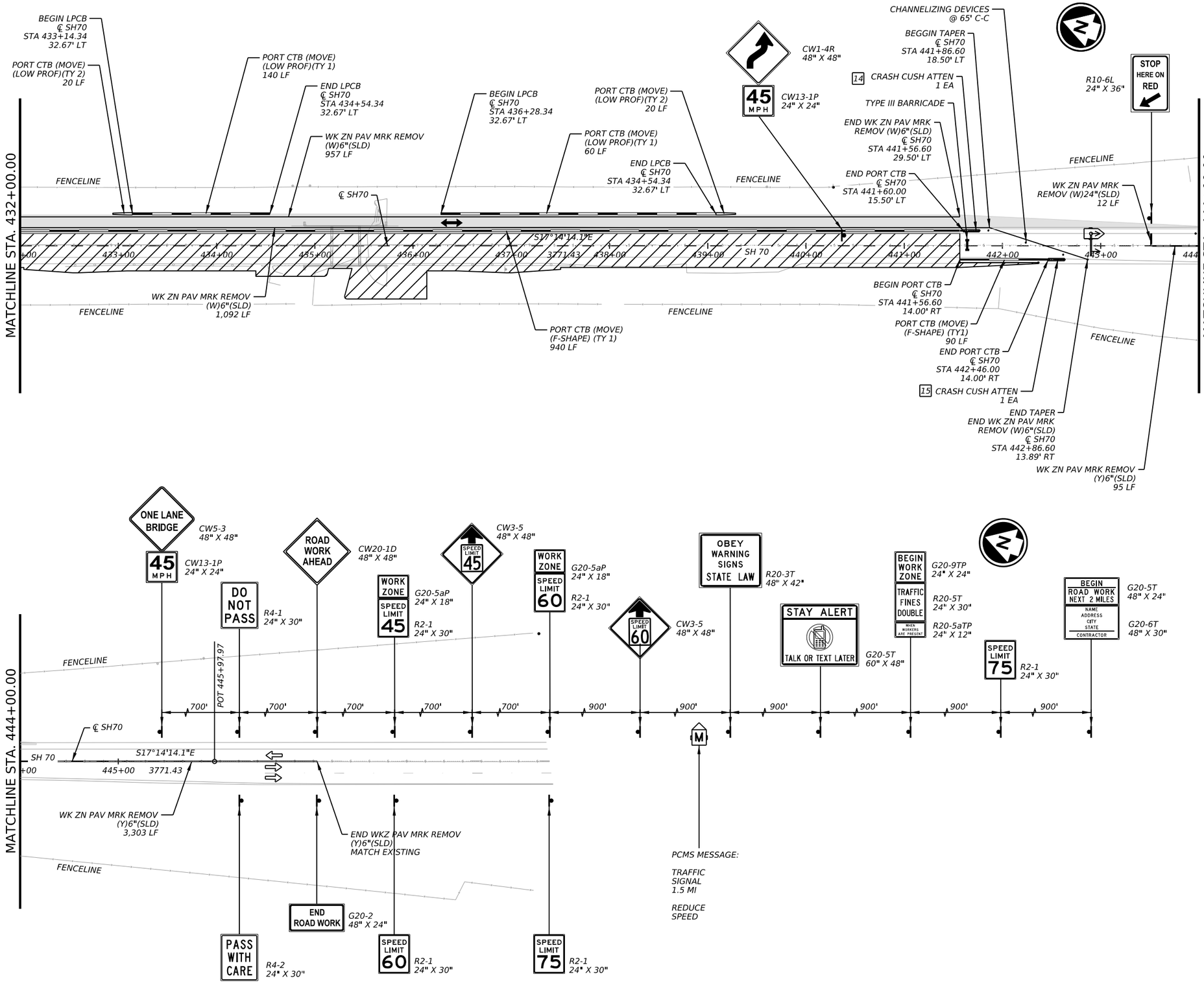
SH 70

COTTONWOOD CREEK TRAFFIC CONTROL PLAN PHASE 2

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		43

DATE: 6/28/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP-03.dgn



Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

COTTONWOOD CREEK TRAFFIC CONTROL PLAN PHASE 2

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		44

DATE: 6/28/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 2/SH70_PH2_TCP-04.dgn

CK DW CK DW

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
															MOVE / RESET		L	L	R	R	S	S
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
CSJ 0264-01-046																						
1	PHASE 1		SH70 NORTHBOUND	181+80.00	TL-3	BI			CONCRETE BARRIER	24"	42"		1								1	
2	PHASE 1		SH70 NORTHBOUND	195+90.00	TL-3	BI			CONCRETE BARRIER	24"	42"		1								1	
3	PHASE 2A		SH70 NORTHBOUND	185+40.00	TL-3	BI			CONCRETE BARRIER	24"	42"				1	1					1	
4	PHASE 2A		SH70 NORTHBOUND	189+90.00	TL-3	BI			CONCRETE BARRIER	24"	42"				1	2					1	
5	PHASE 2A		SH70 NORTHBOUND	192+31.38	TL-3	BI			CONCRETE BARRIER	24"	42"		1								1	
6	PHASE 2B		SH70 NORTHBOUND	183+22.88	TL-3	BI			CONCRETE BARRIER	24"	42"		1								1	
7	PHASE 2B		SH70 NORTHBOUND	184+33.26	TL-3	BI			CONCRETE BARRIER	24"	42"		1									
8	PHASE 2B		SH70 NORTHBOUND	184+93.26	TL-3	BI			CONCRETE BARRIER	24"	42"		1	1								
9	PHASE 2B		SH70 NORTHBOUND	185+70.00	TL-3	BI			CONCRETE BARRIER	24"	42"			1	1	3						
CSJ 0264-01-047																						
10	PHASE 1		SH70 NORTHBOUND	428+90.00	TL-3	BI			CONCRETE BARRIER	24"	42"				1	4					1	
11	PHASE 1		SH70 NORTHBOUND	448+40.00	TL-3	BI			CONCRETE BARRIER	24"	42"				1	5					1	
12	PHASE 2		SH70 NORTHBOUND	430+75.00	TL-3	BI			CONCRETE BARRIER	24"	42"			1	1	6					1	
13	PHASE 2		SH70 NORTHBOUND	431+70.00	TL-3	BI			CONCRETE BARRIER	24"	42"			1	1	7					1	
14	PHASE 2		SH70 NORTHBOUND	441+60.00	TL-3	BI			CONCRETE BARRIER	24"	42"			1	1	10					1	
15	PHASE 2		SH70 NORTHBOUND	442+46.60	TL-3	BI			CONCRETE BARRIER	24"	42"			1	1	11					1	
												TOTALS	6	6	9							

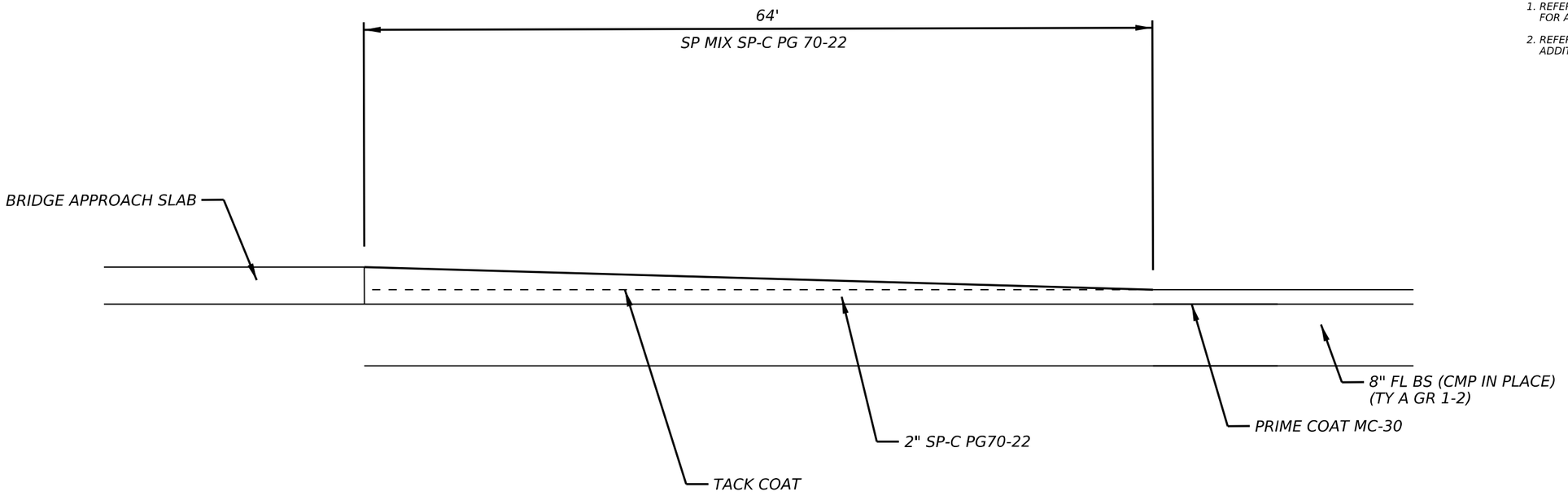
LEGEND:
L=LOW MAINTENANCE
R=REUSABLE
S=SACRIFICIAL
N=NARROW
W=WIDE

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyise.htm

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER
5/20/2024

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		
	ABL	NOLAN		
	FEDERAL AID PROJECT			SHEET NO.
				45



NOTES

1. REFER TO TCP TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
2. REFER TO BRIDGE SHEETS FOR ADDITIONAL INFORMATION.

TEMPORARY PAVEMENT TRANSITION DETAIL

SCALE: NTS

SUMMARY OF TEMPORARY PAVEMENT TRANSITION ITEMS		
ITEM NUMBER	344	344
LOCATION	SP MIXES SP-C PG70-22	TACK COAT
	TON	GAL
SWEETWATER CREEK BRIDGE	16	28
COTTONWOOD CREEK BRIDGE	64	140

THESE ITEMS ARE SUBSIDIARY TO ITEM 508

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/18/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

TCP DETAIL SHEET
PHASE 1

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		46

DATE: 6/18/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/Phase 1/SH70_PH1_TCP-01_PVMT RAMP DETAIL.dgn

DW | CK | DW | CK

DATE: 5/16/2024 4:24:40 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn

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

SHEET 1 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

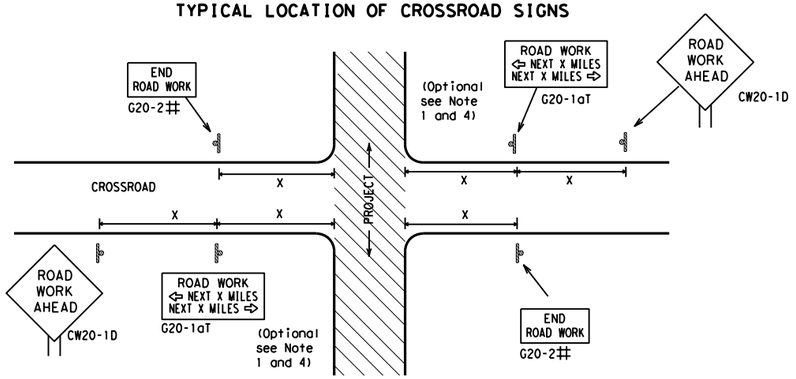
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

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	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	ABL	NOLAN		47

DATE: 5/16/2024 4:24:41 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHO/MOT-TCP/Sheets/2S standards/bc-21.dgn

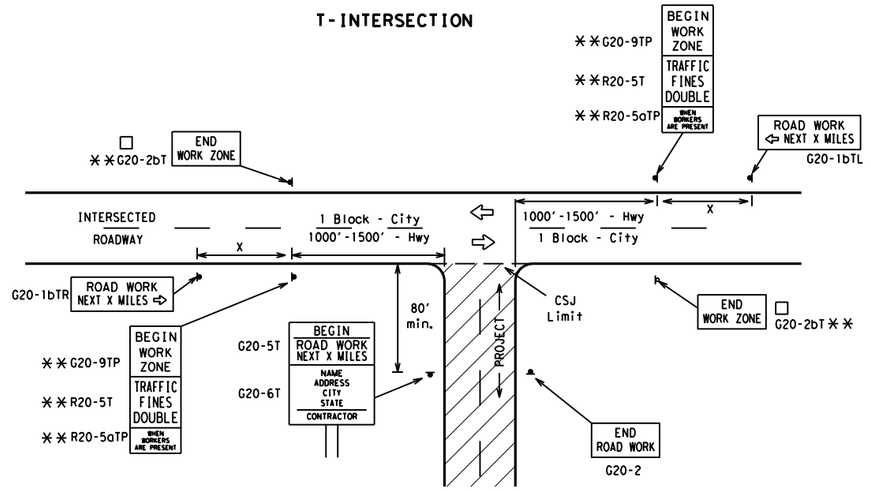
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

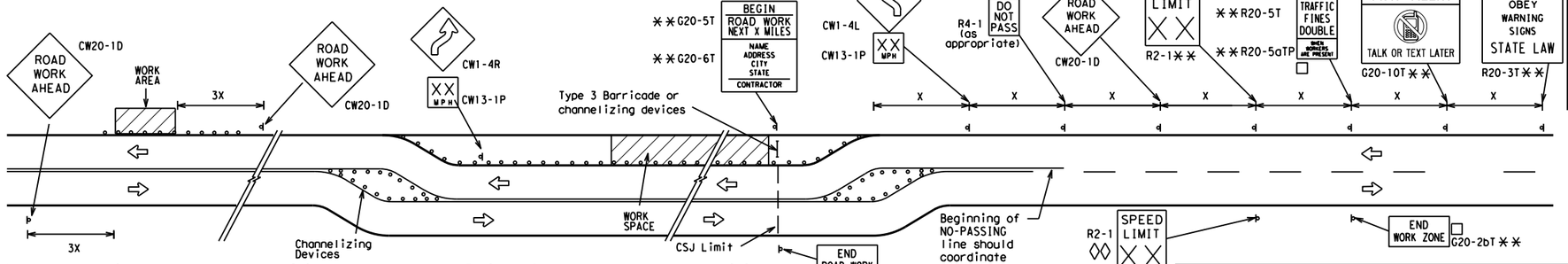
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

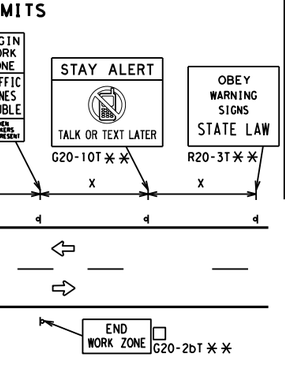
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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

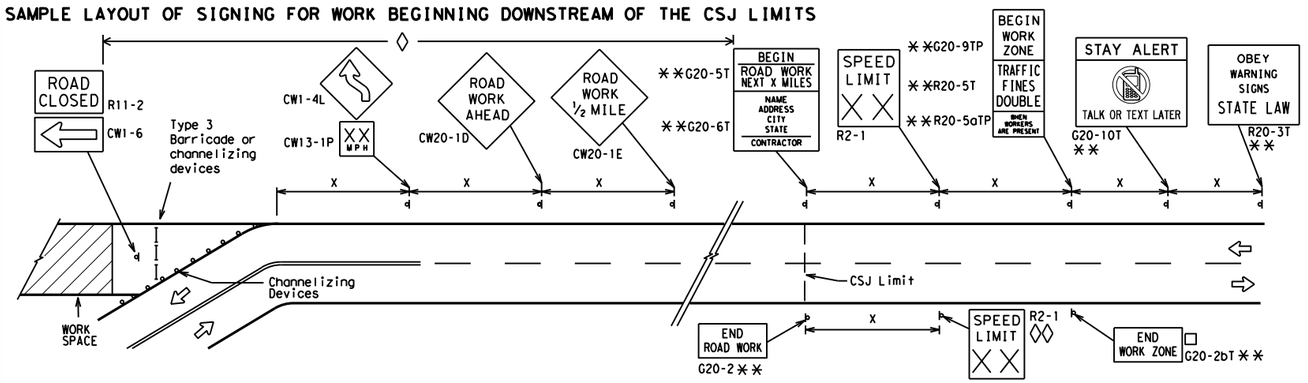


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing 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
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		48

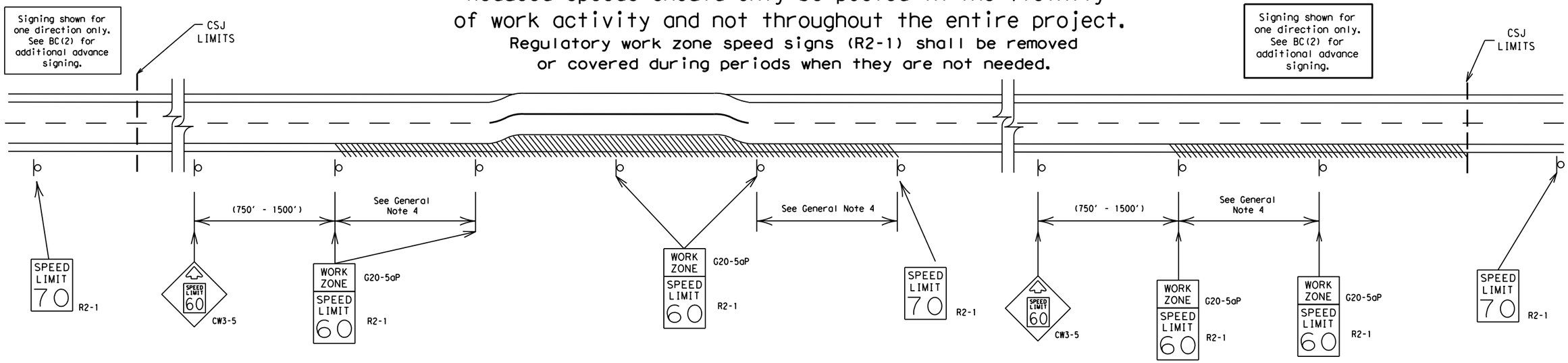
DATE: 5/16/2024 4:24:41 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL BRidges/30 Project Data/SHRO/MOT-TCP/Sheets/25 standards/bc-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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.

Texas Department of Transportation | Traffic Safety Division Standard

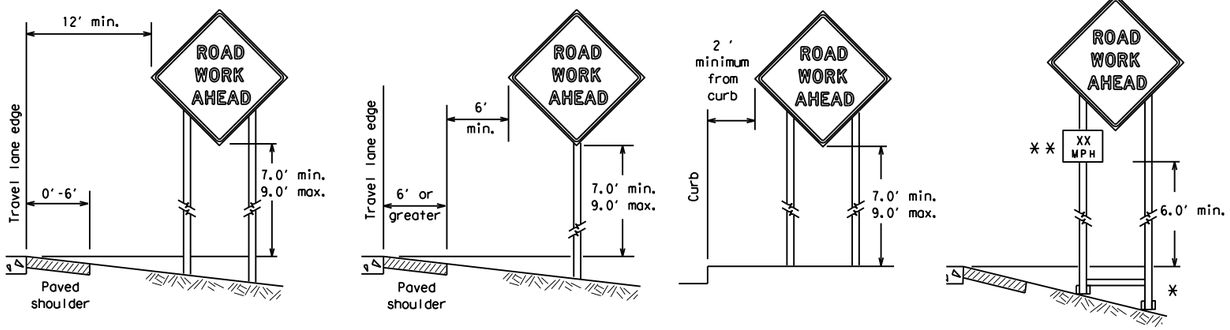
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		49

DATE: 5/16/2024 4:24:41 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn

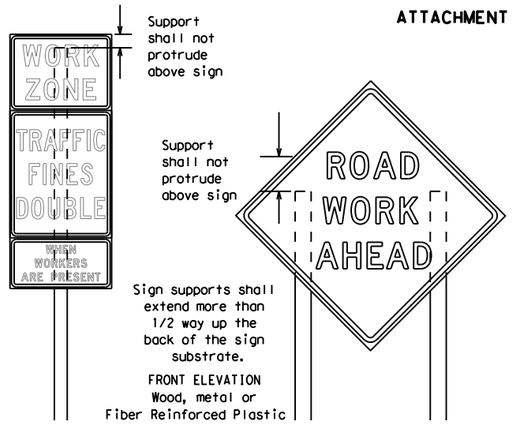
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

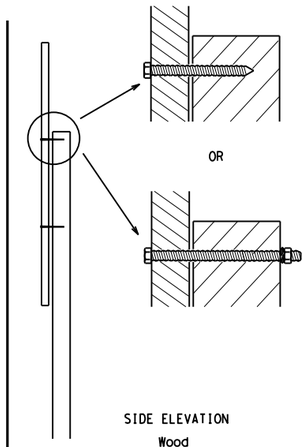


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





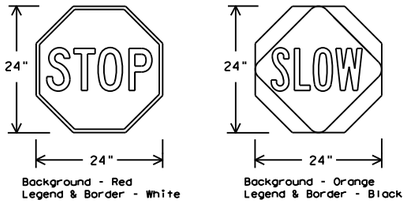
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

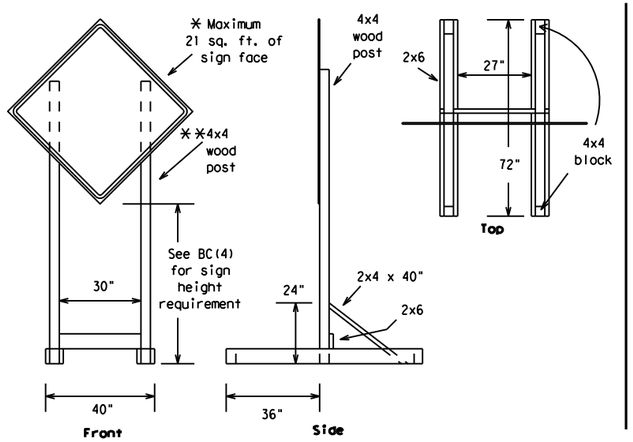
Texas Department of Transportation | Traffic Safety Division Standard

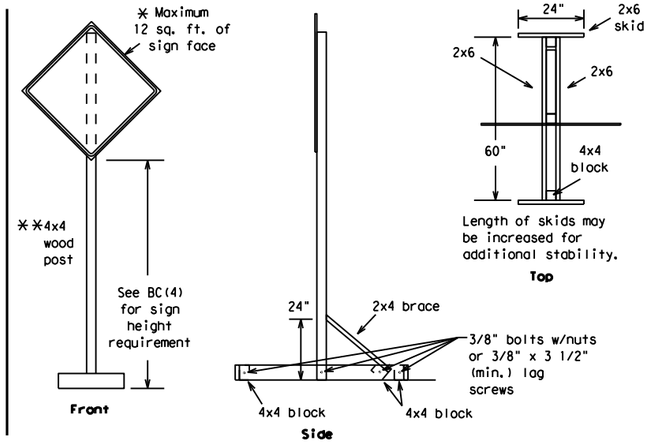
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		50

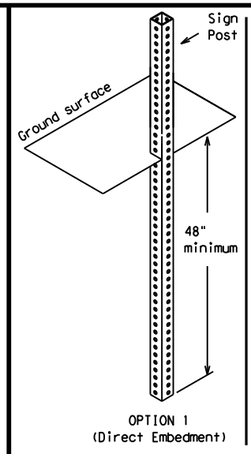
DATE: 5/16/2024 4:24:41 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn

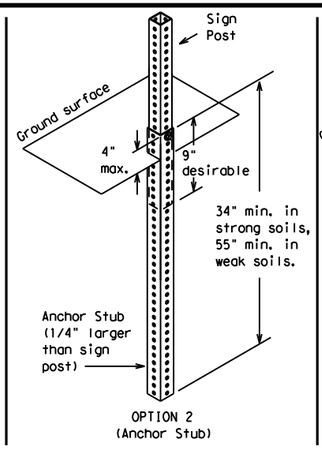


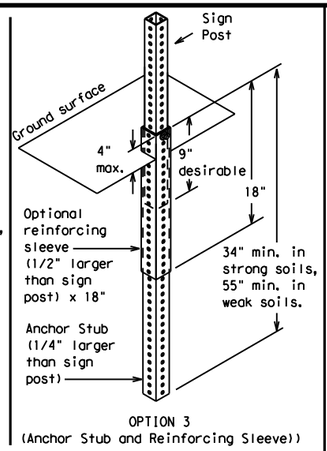


SKID MOUNTED WOOD SIGN SUPPORTS

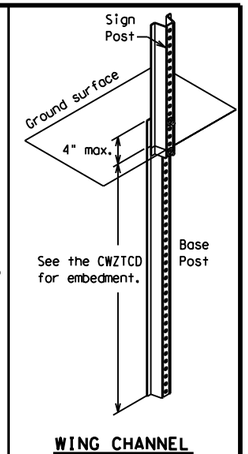
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







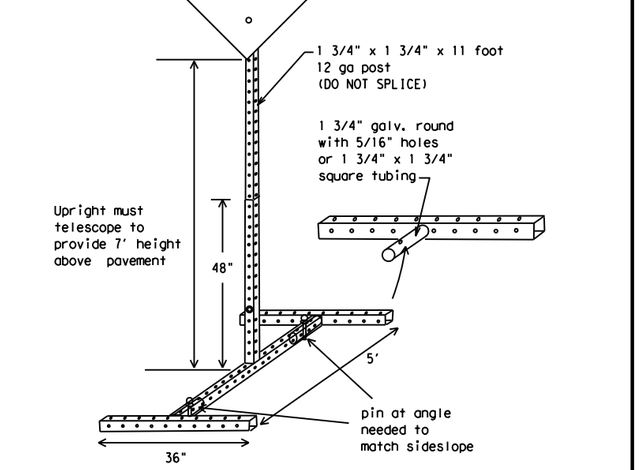
PERFORATED SQUARE METAL TUBING

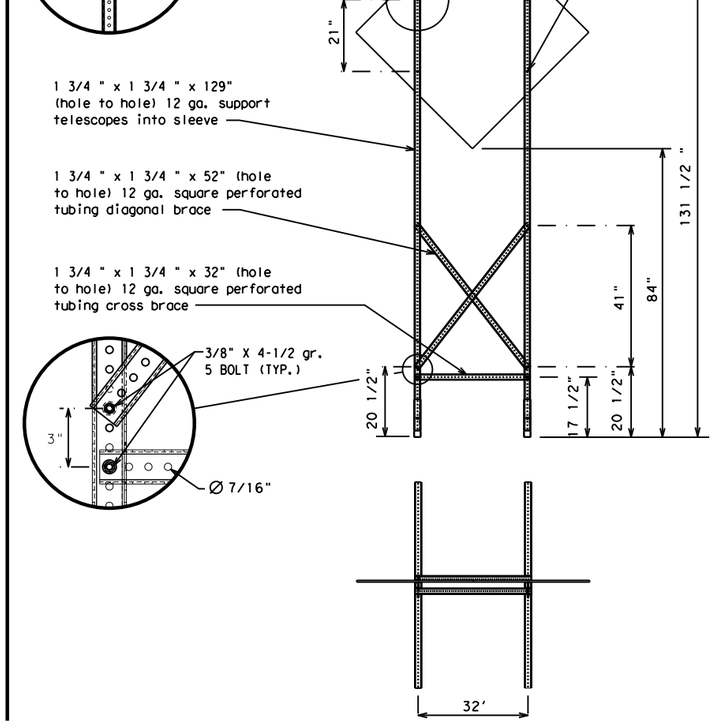


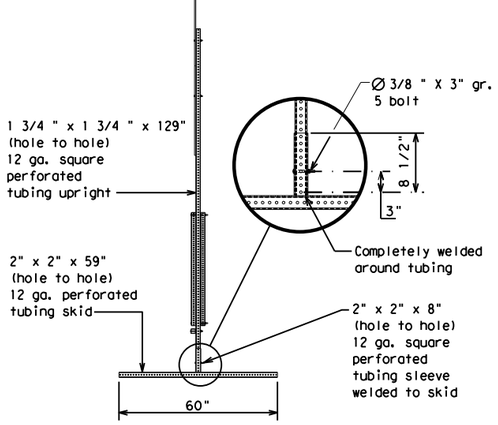
WING CHANNEL
Lap-splice/base bolted anchor

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.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		51

DATE: 5/16/2024 4:24:42 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn

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

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
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

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

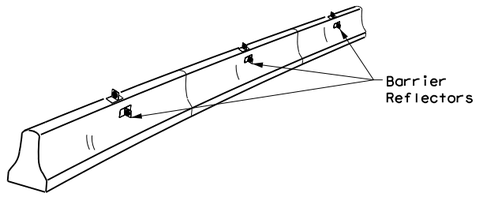
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		52

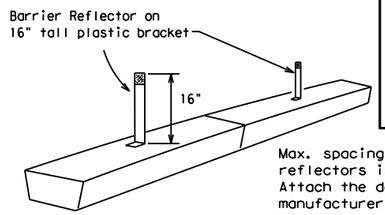
DATE: 5/16/2024 4:24:42 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/ZStandards/bc-21.dgn

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.

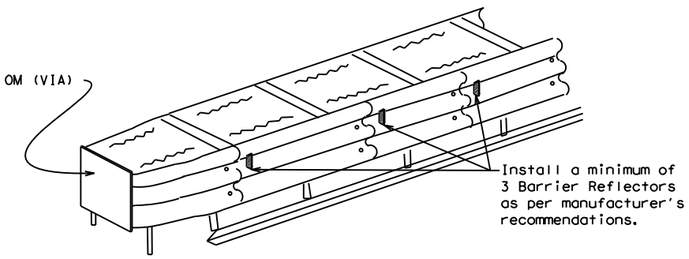


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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)

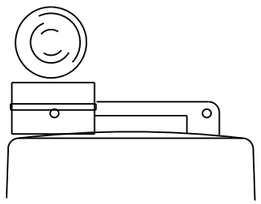


DELINEATION OF END TREATMENTS

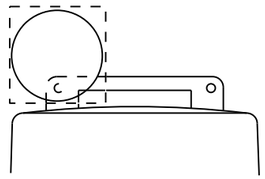
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

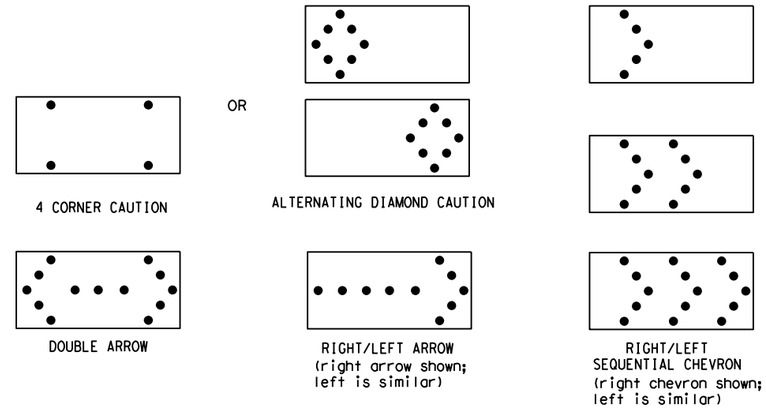
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		53

DATE: 5/16/2024 4:24:42 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/ZStandards/bc-21.dgn

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:

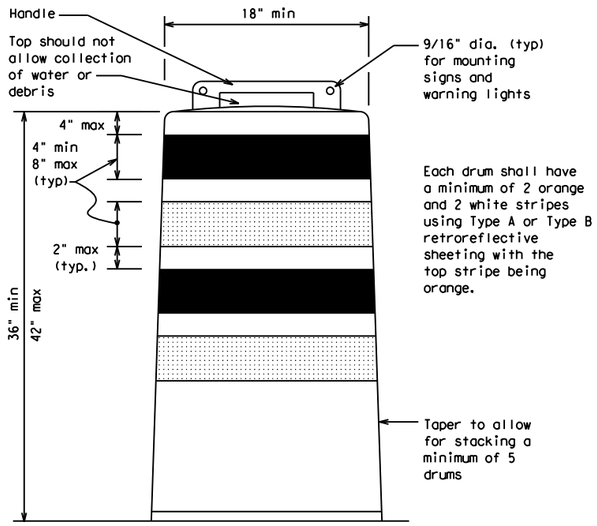
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

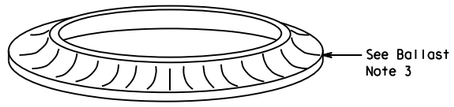
RETROREFLECTIVE SHEETING

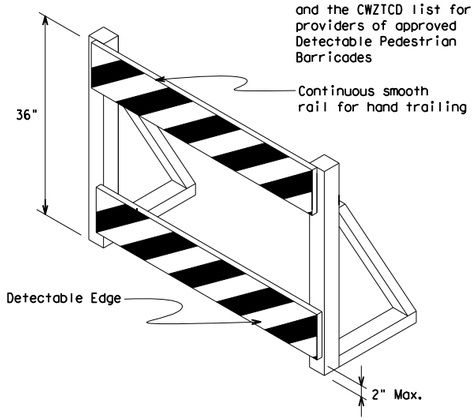
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.

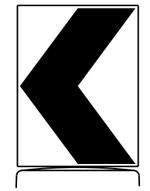




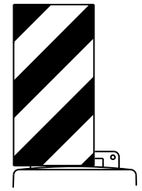


DETECTABLE PEDESTRIAN BARRICADES

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.

Texas Department of Transportation | Traffic Safety Division Standard

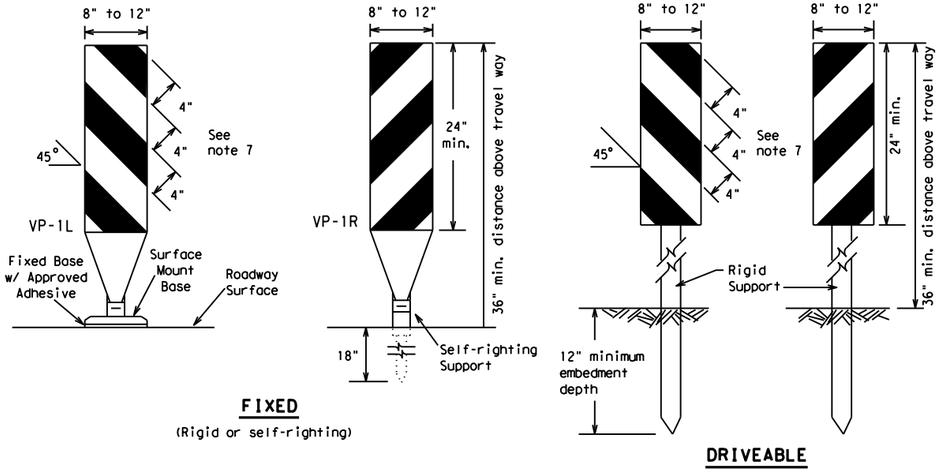
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	ABL	NOLAN		54
7-13				

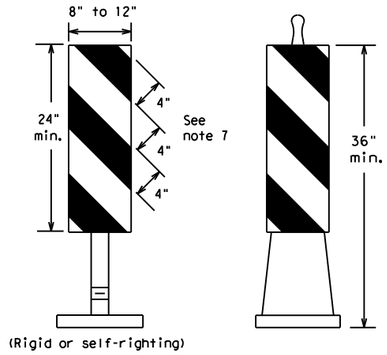
102

DATE: 5/16/2024 4:24:42 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn



FIXED
(Rigid or self-righting)

DRIVEABLE

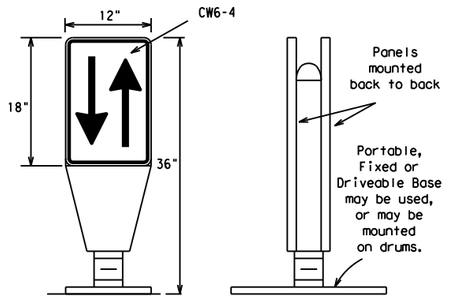


(Rigid or self-righting)

PORTABLE

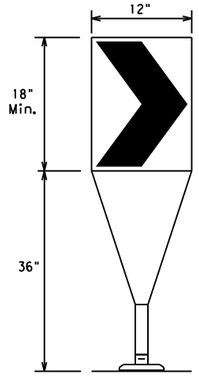
VERTICAL PANELS (VPs)

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)



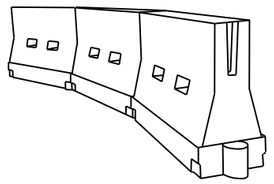
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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.



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

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

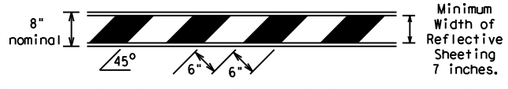
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		55

DATE: 5/16/2024 4:24:43 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn

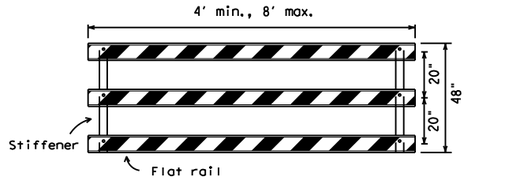
TYPE 3 BARRICADES

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.



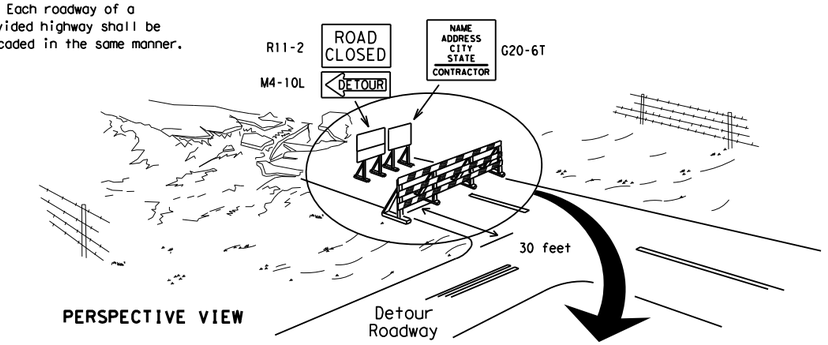
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

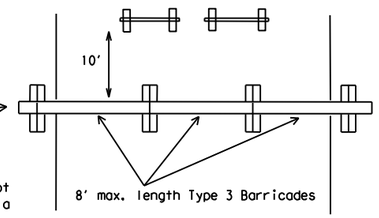
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

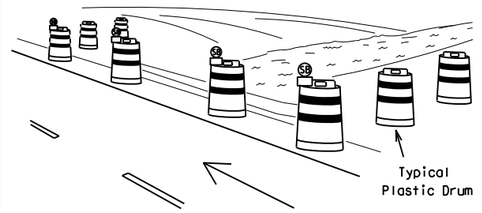
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

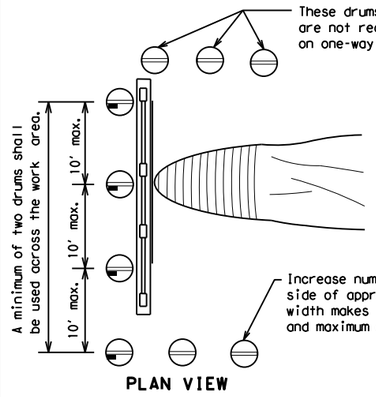
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

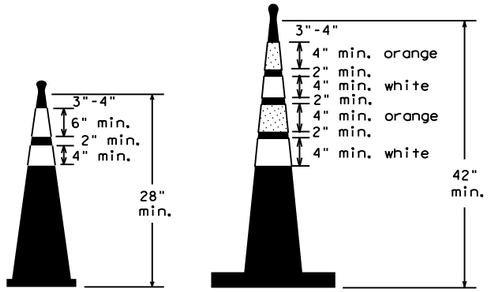
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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

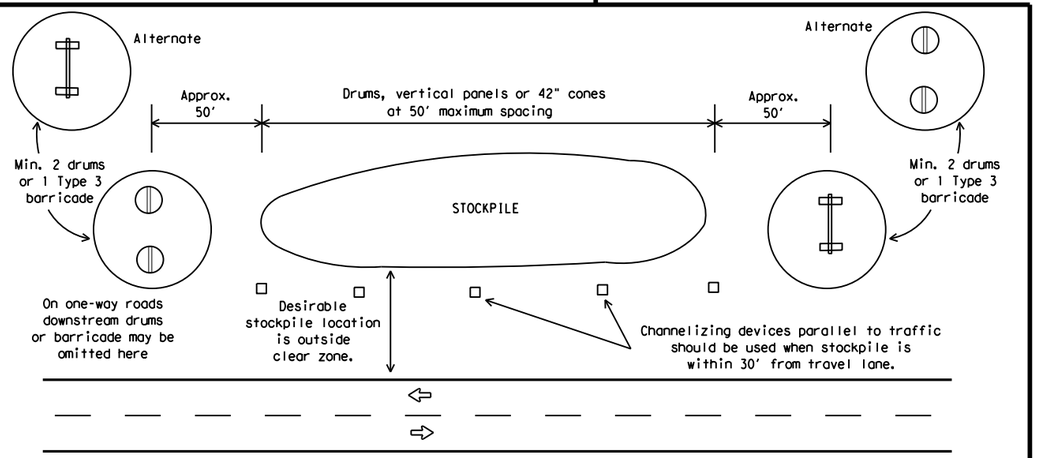
PLAN VIEW

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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ABL	NOLAN		56

104

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.

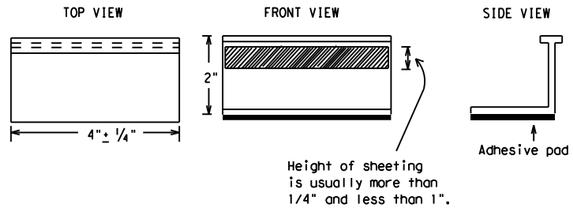
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

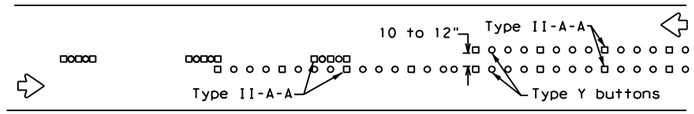
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	ABL	NOLAN		57
11-02 8-14				

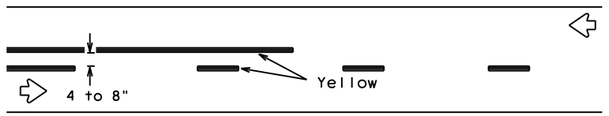
DATE: 5/16/2024 4:24:43 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/MOT-TCP/Sheets/2Standards/bc-21.dgn

PAVEMENT MARKING PATTERNS

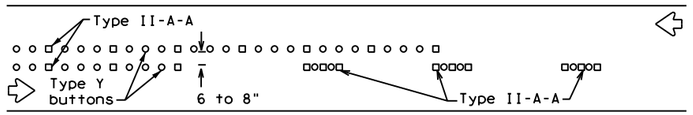
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



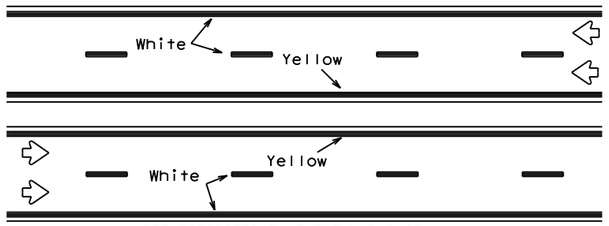
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



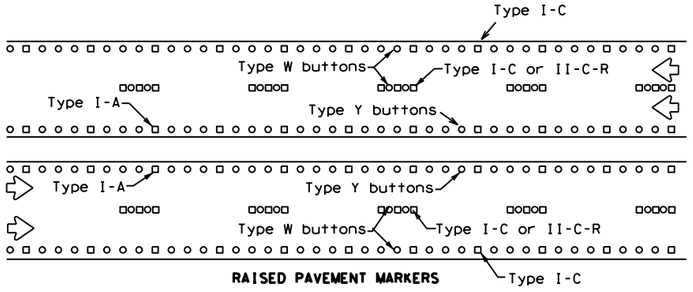
RAISED PAVEMENT MARKERS - PATTERN B

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



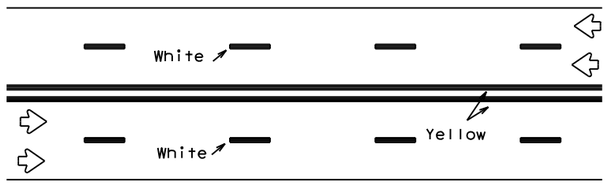
REFLECTORIZED PAVEMENT MARKINGS



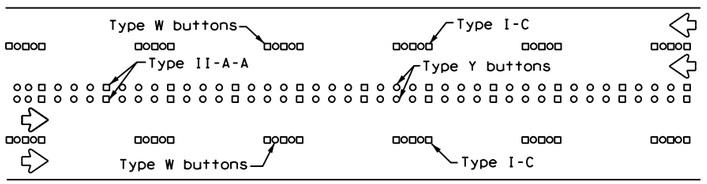
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



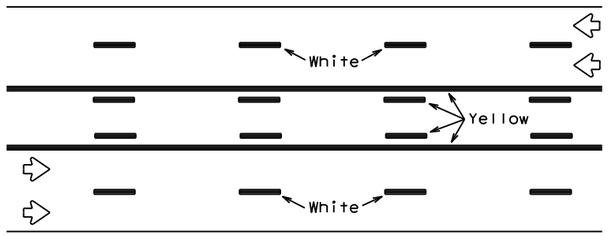
REFLECTORIZED PAVEMENT MARKINGS



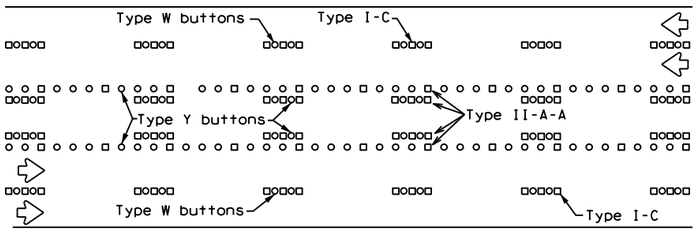
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

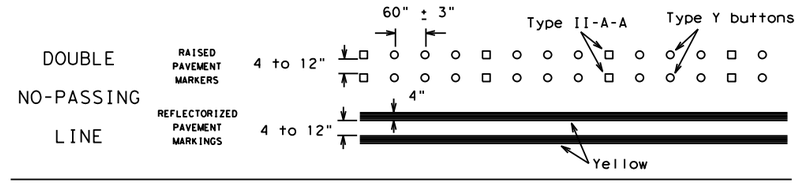
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

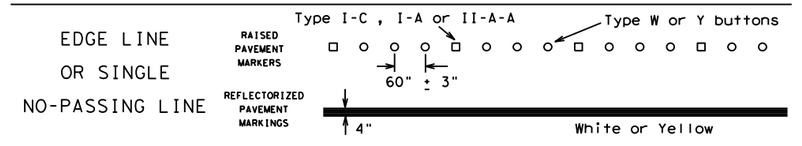
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

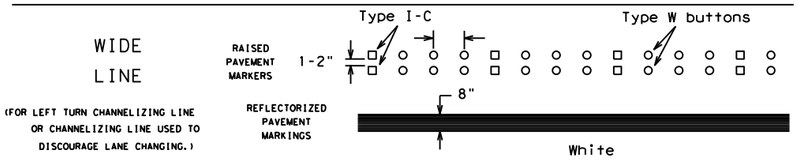


EDGE LINE OR SINGLE NO-PASSING LINE



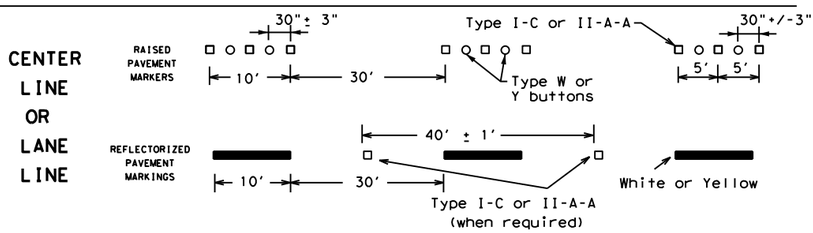
WIDE LINE

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

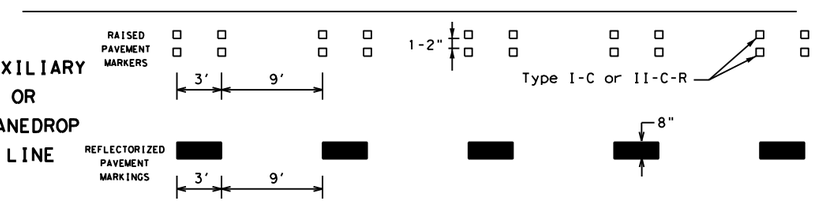


BROKEN LINES

CENTER LINE OR LANE LINE

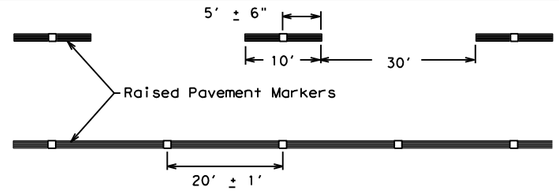


AUXILIARY OR LANEDROP LINE



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

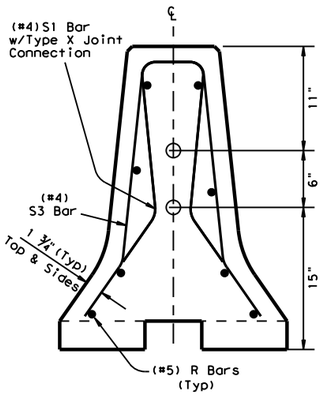
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

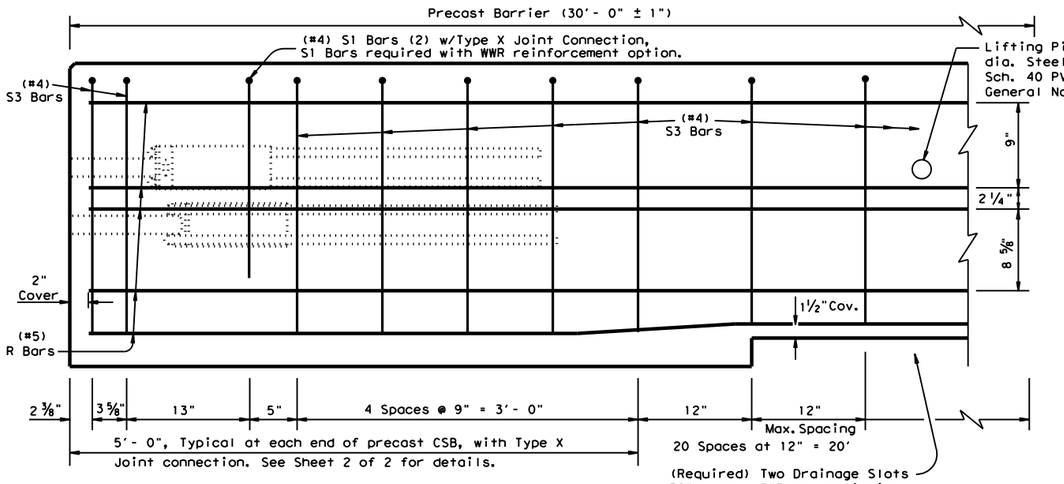
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
1-97 9-07 5-21	DIST	COUNTY		SHEET NO.
2-98 7-13	ABL	NOLAN		58
11-02 8-14				

DATE: 6/18/2024 12:40:44 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/csb110.dgn



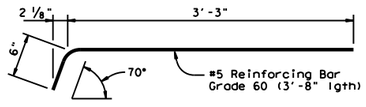
End View Precast Barrier

See sheet 2 of 3 for Joint connection Type X



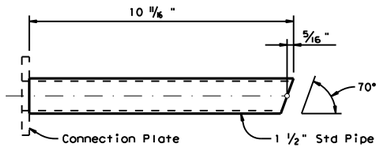
Reinforcement for Precast (CSB) Concrete Safety Barrier (Type 1)

Showing reinforcement for Joint Type X



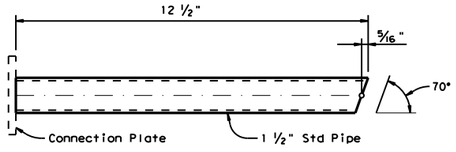
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



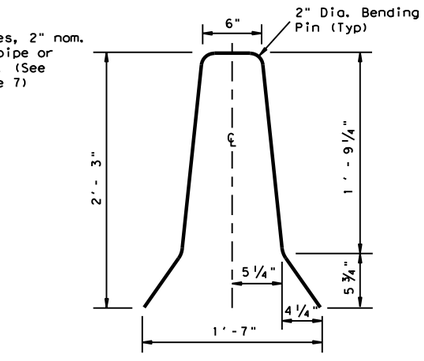
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



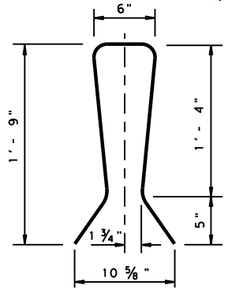
LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.



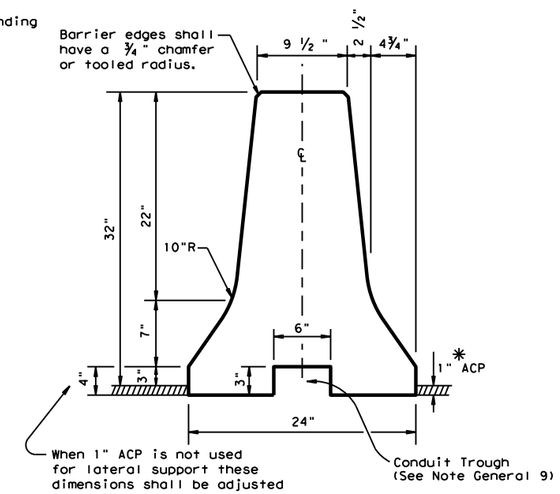
S3 Bar

#4 Bar



S1 Bar

#4 Bar (2)
(Joint Type X)

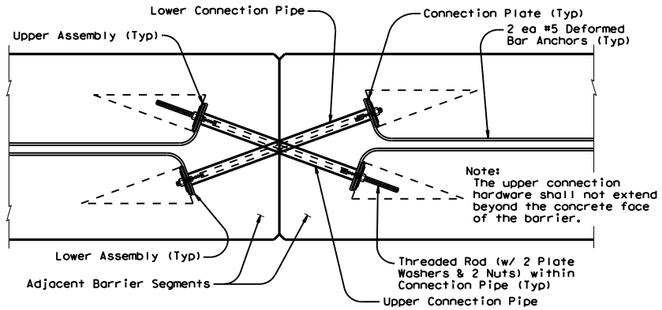


Concrete Safety Barrier

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

GENERAL NOTES

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.



TYPE X JOINT INSTALLATION DETAIL

Barrier reinforcing and Type X Joint Leave-Out dimensions not shown for clarity.

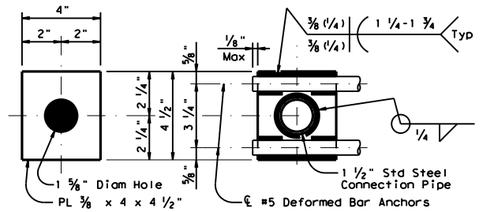
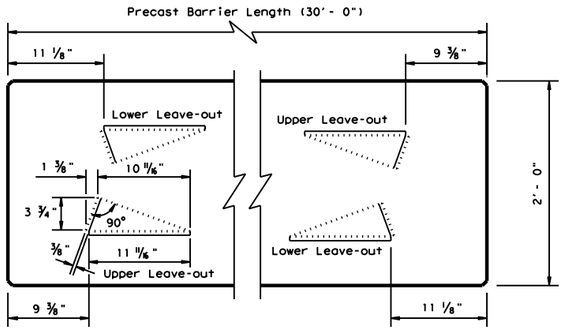


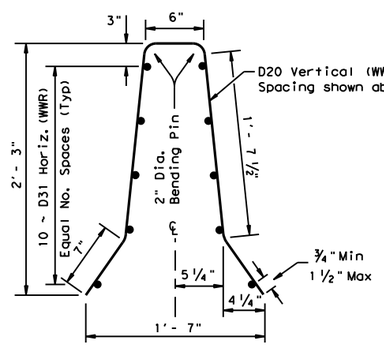
PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

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



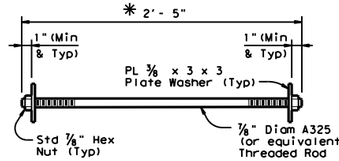
BARRIER PLAN AT END JOINTS



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

(WWR) General Notes

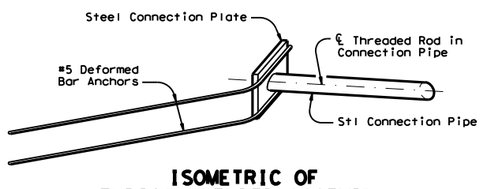
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut or bent to accommodate the Type X joint connection and drainage slots, as directed by the Engineer.
3. All reinforcement shall comply with Item 440, "Reinforcing Steel."
4. Combinations of reinforcing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



CONNECTION BOLT OR THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts) (w/ Two (2) PL ⅜ x 3 x 3 Plate Washers & Two (2) Std Hex Nuts) required per Joint.

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



ISOMETRIC OF TYPICAL WELDED ASSEMBLY

Four (4) [2 Upper & 2 Lower] Assemblies required per Joint.

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

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

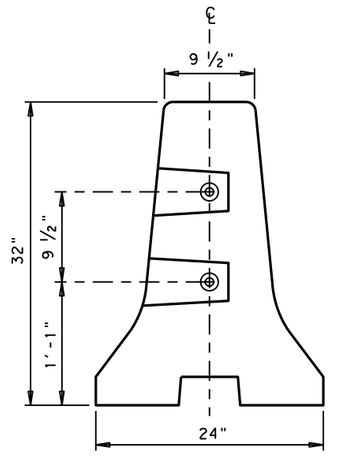
CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER (TYPE 1)

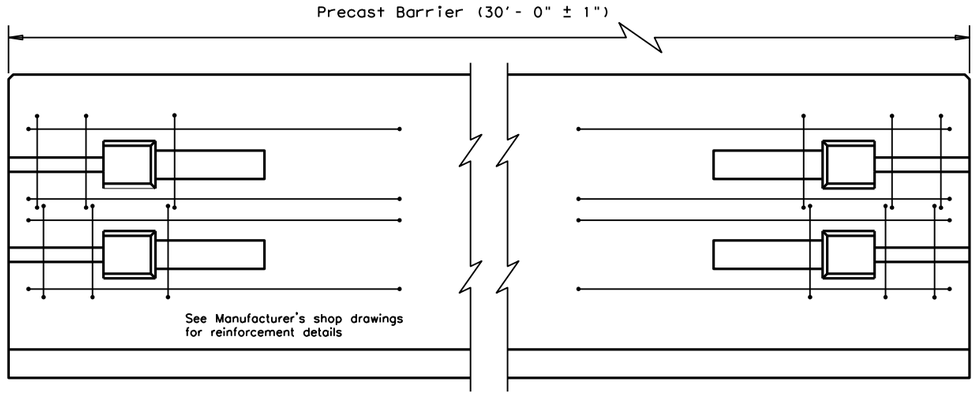
CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		59

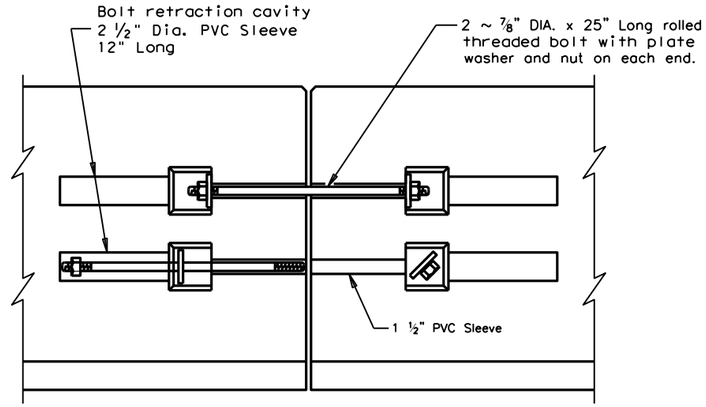
DATE: 6/18/2024 12:41:13 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/csb110.dgn



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

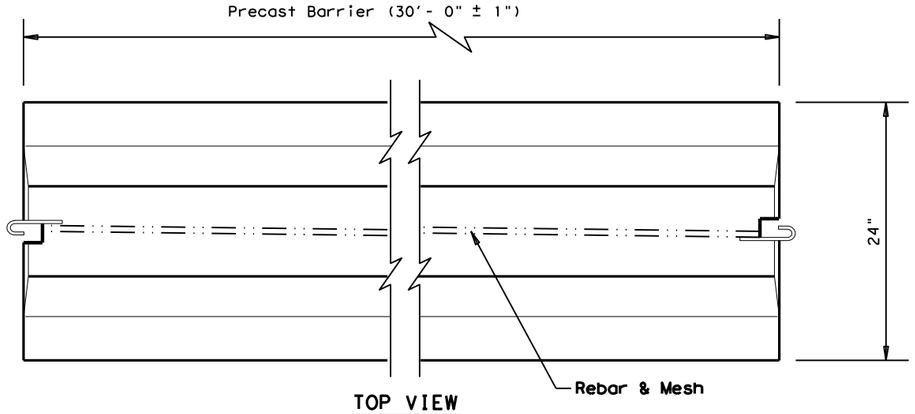


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

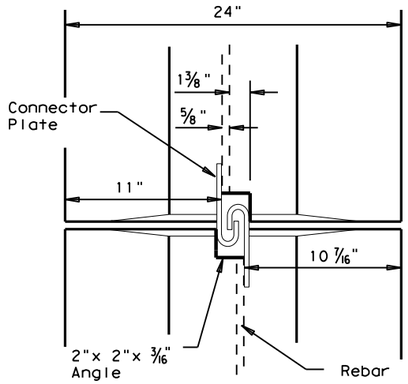


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

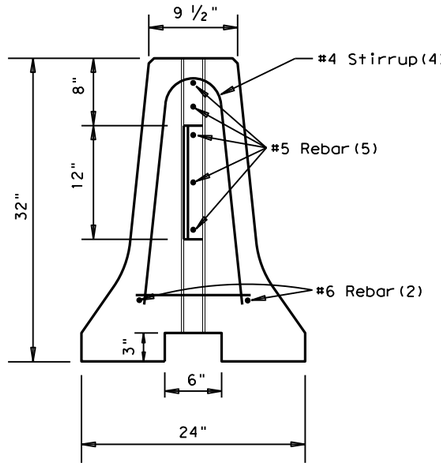
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)

Proprietary Joint Connections (CSB)

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

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

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

Texas Department of Transportation
Design Division Standard

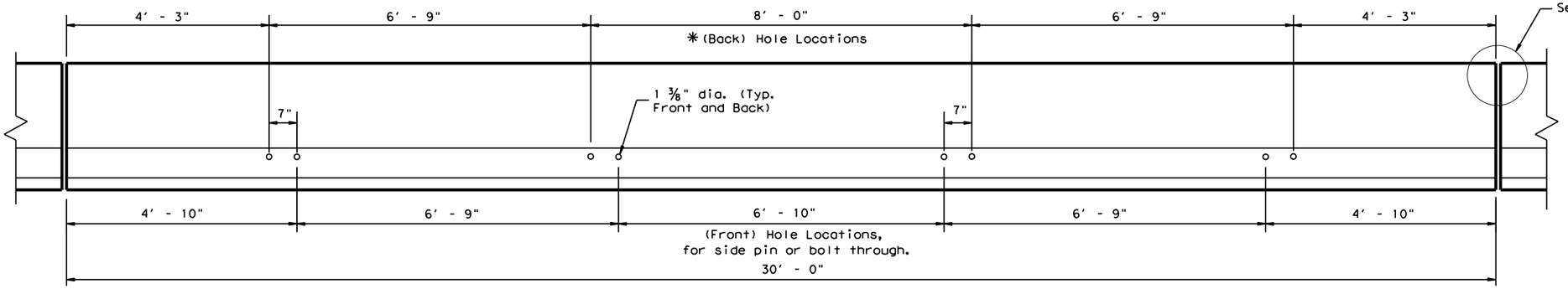
CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)

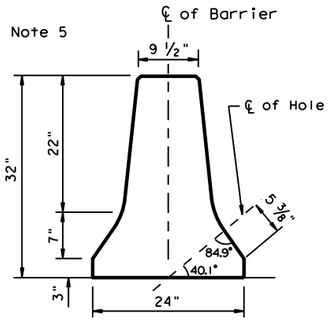
CSB(1)-10

FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		60

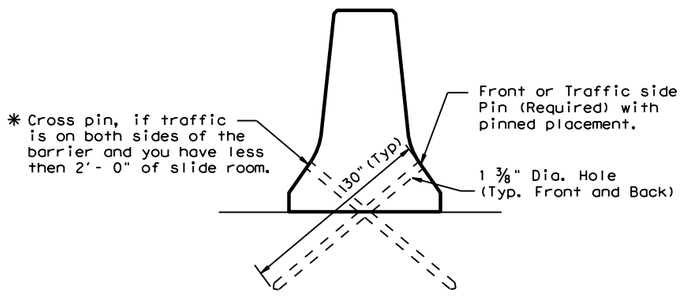
DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/csb710.dgn



DETAIL 1

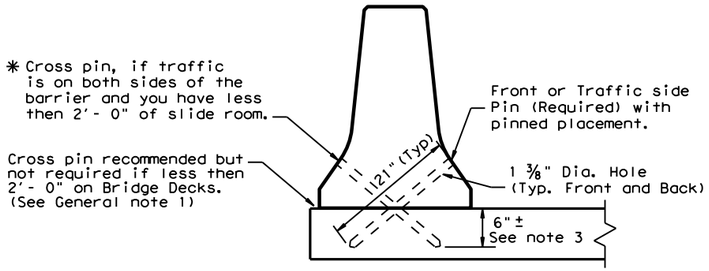


HOLE LOCATION DETAIL



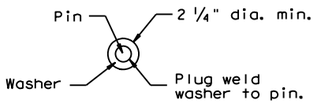
DETAIL 2

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

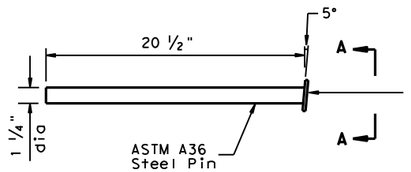


DETAIL 3

Bridge Deck or CRCP
(21" pin required)



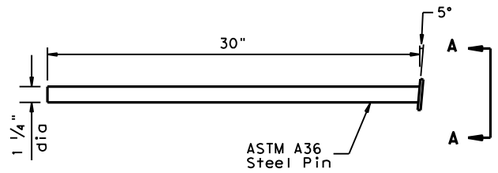
VIEW A-A



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

(21") PIN DETAIL

See Detail 3

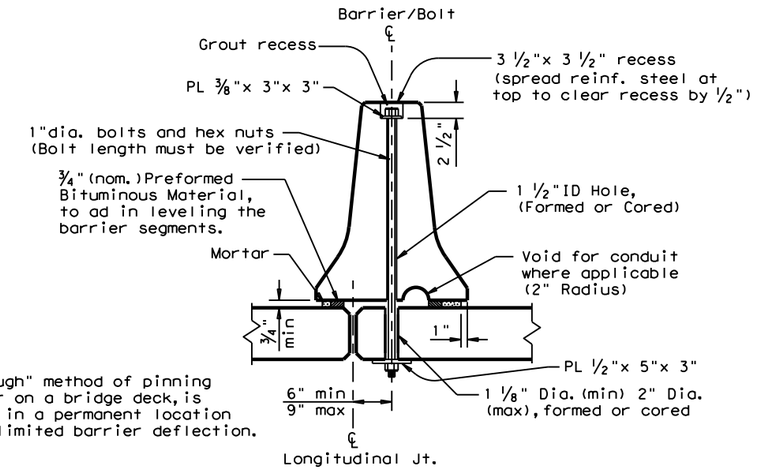


(30") PIN DETAIL

See Detail 2

CORE DRILLING EXISTING BARRIER

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



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

PRECAST CSB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

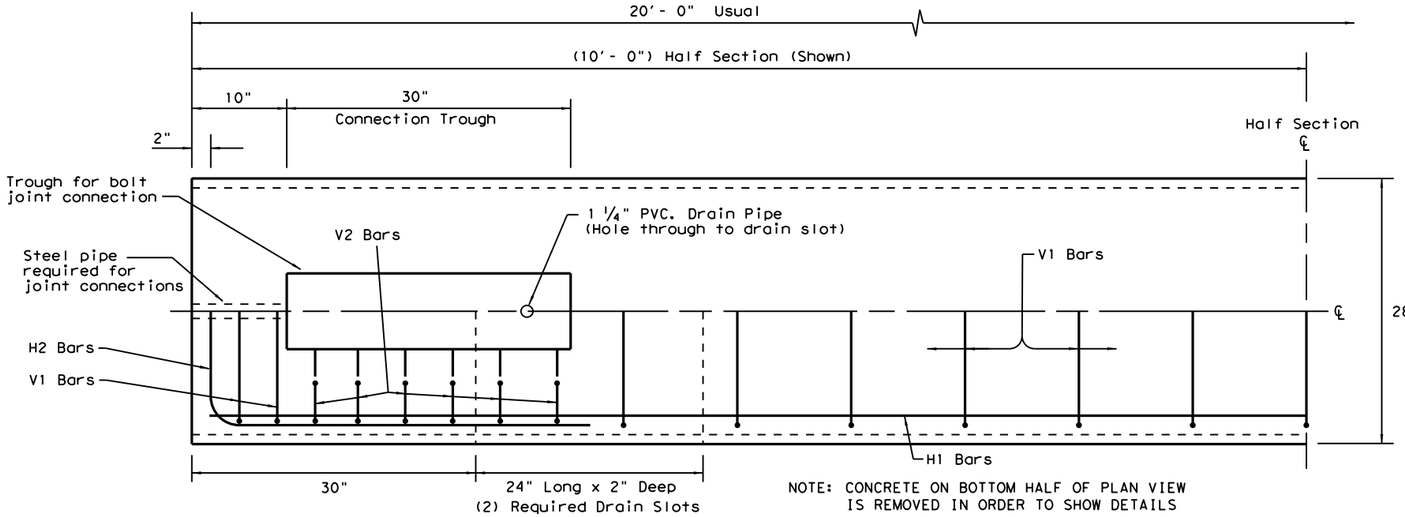
CONCRETE SAFETY BARRIER (F-SHAPE)

PRECAST BARRIER
(TYPE 1)
PINNED PLACEMENT

CSB(7)-10

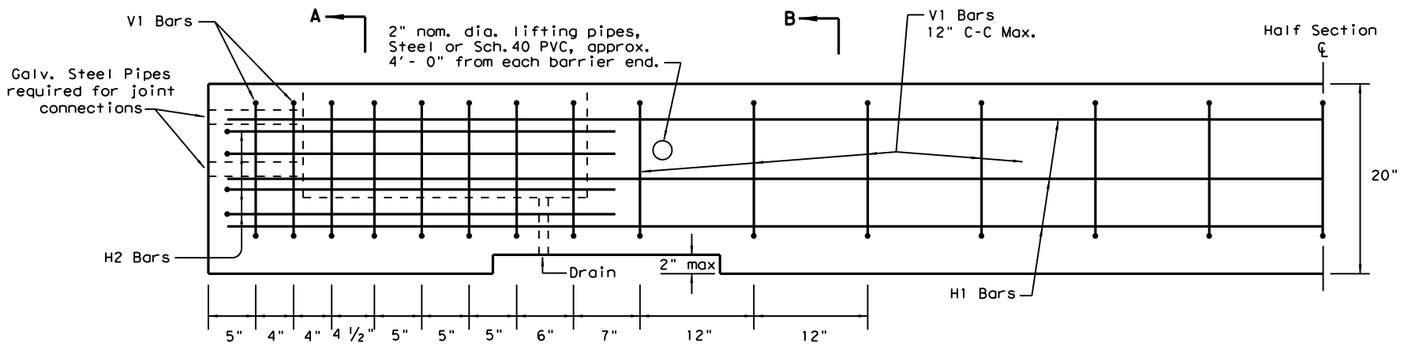
FILE: csb710.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		61

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/zStandards/lpcb13.dgn

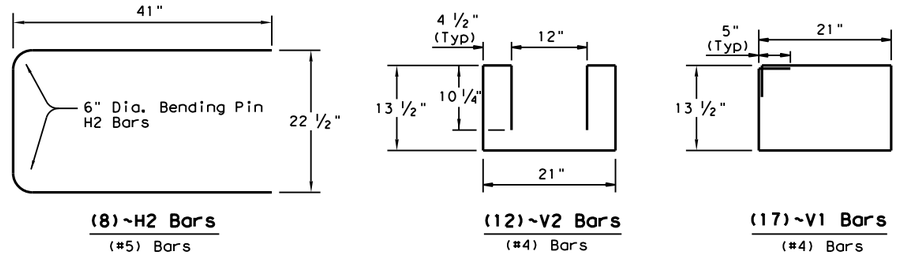


NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



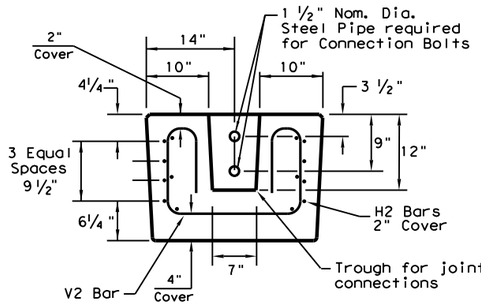
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

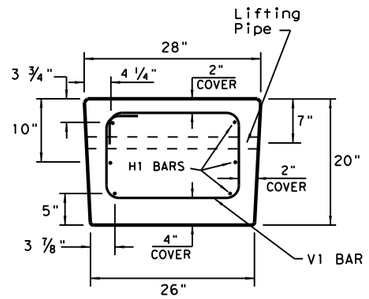
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



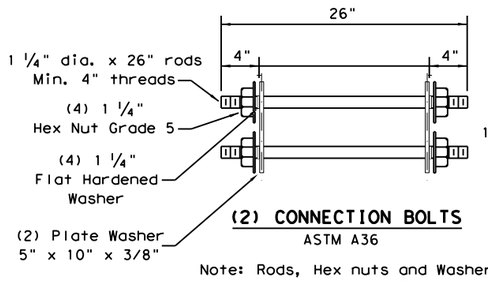
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



(2) CONNECTION BOLTS
ASTM A36

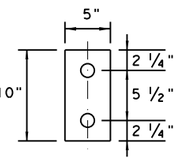
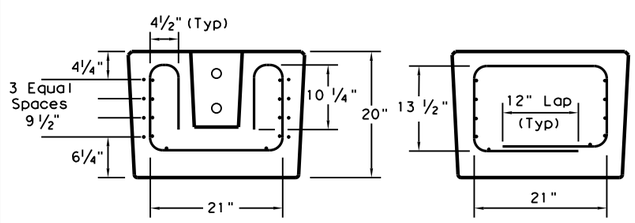


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.



SECTION A-A

SECTION B-B

(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING

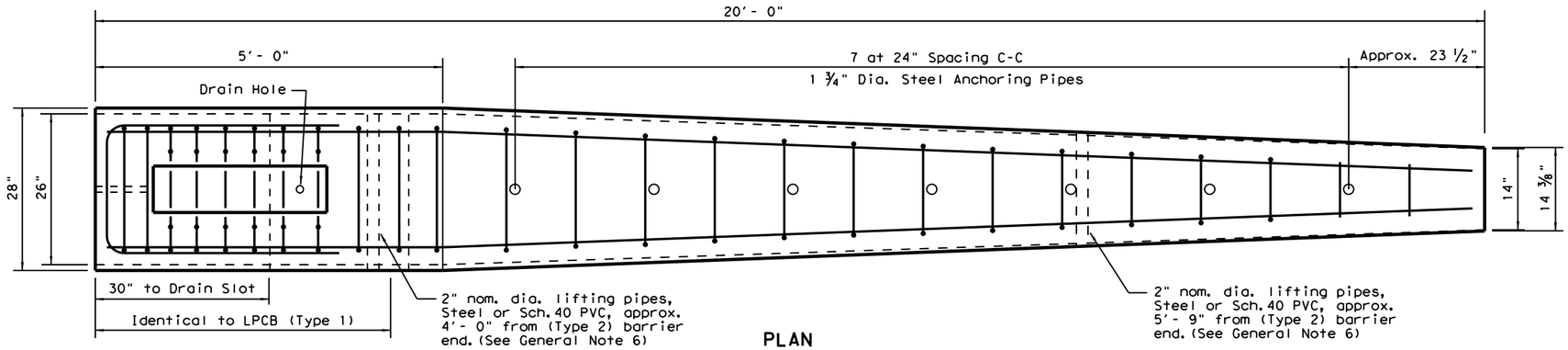
SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

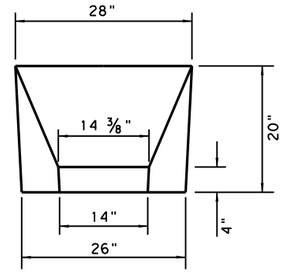
LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		62

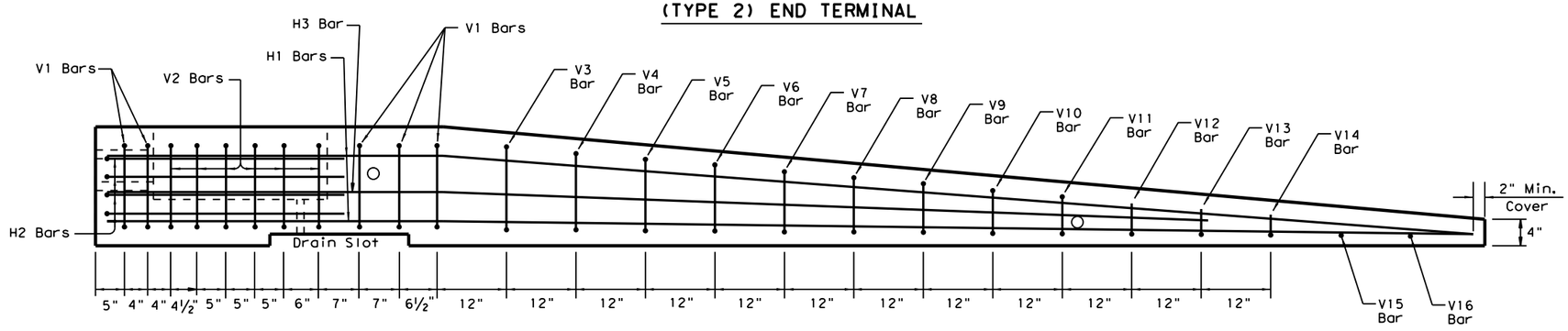
DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/zStandards/lpcb13.dgn



PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

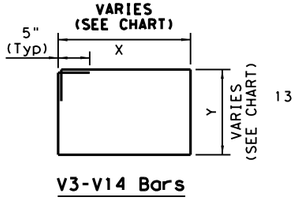


ELEVATION
(TYPE 2) END TERMINAL

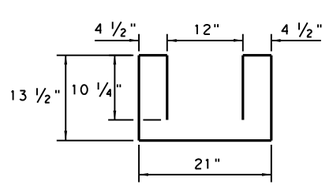
Note:
Anchoring pipes not shown in Elevation View

TYPE 2 - NOTES

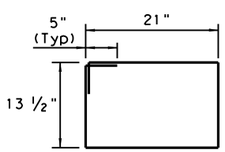
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.



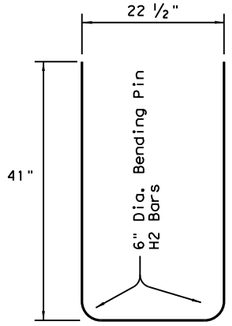
V3-V14 Bars



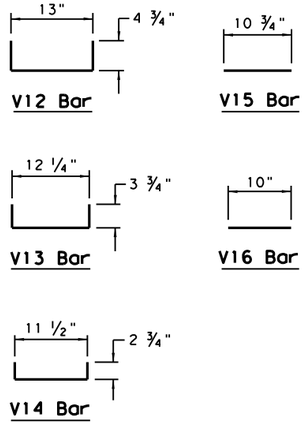
(6)~V2 Bars



(5)~V1 Bars



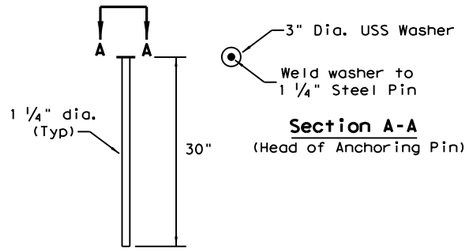
(4)~H2 Bars
(#5) Bars



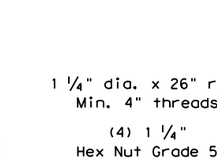
Note: All V Bars are (#4)

BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6

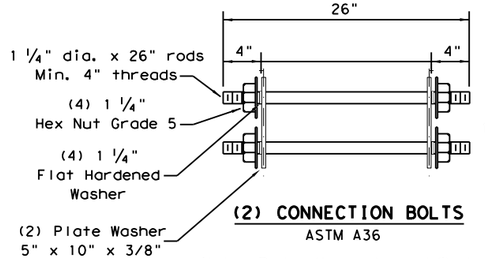
REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



(7) Anchor Pins
ASTM A36 Steel
(See Note 3)



Section A-A
(Head of Anchoring Pin)



(2) CONNECTION BOLTS
ASTM A36

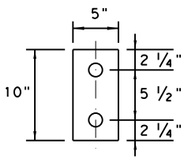
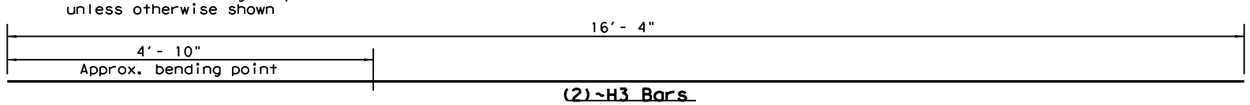


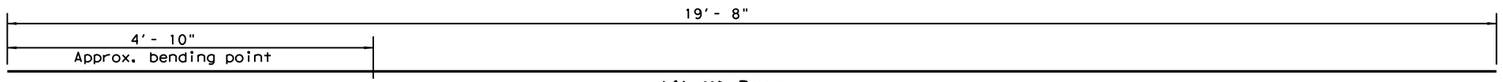
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

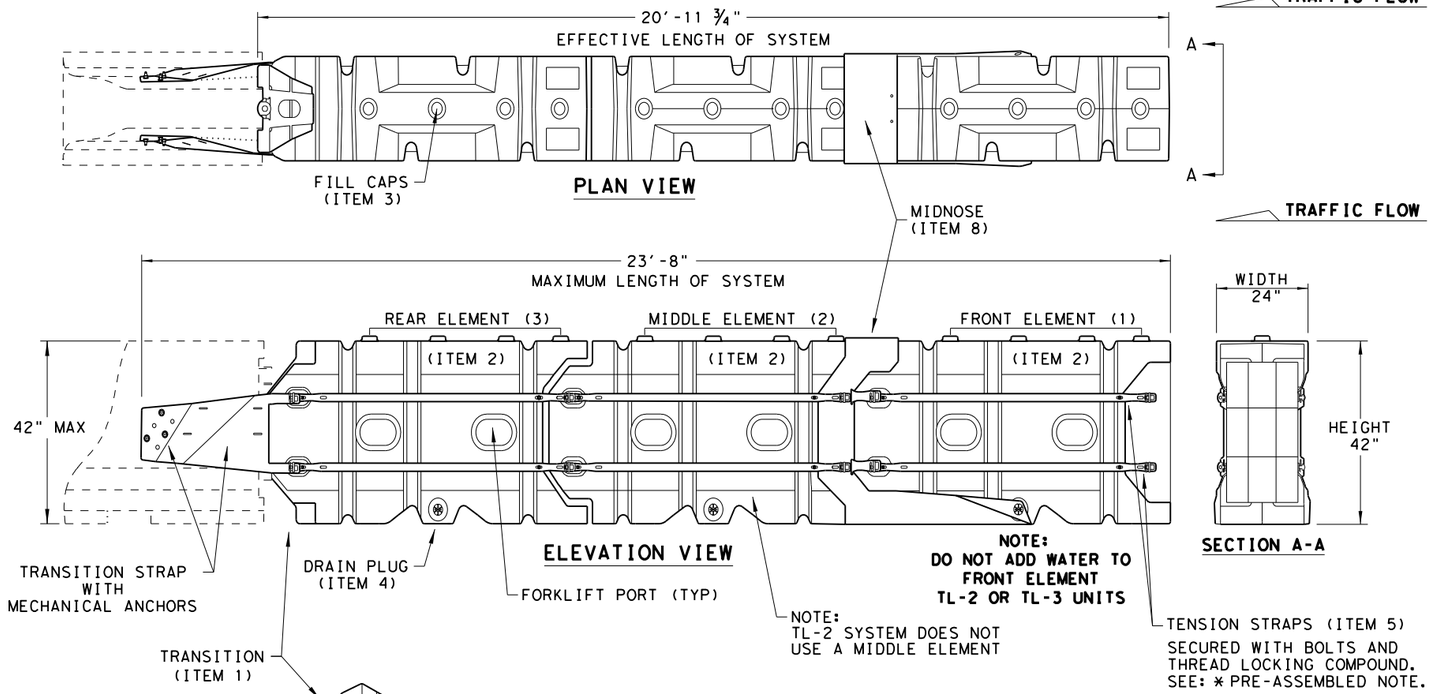
Texas Department of Transportation
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		63

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/zStandards/absorbm19.dgn

SYSTEM SHOWN - ABSORB-M TL-3



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

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

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

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

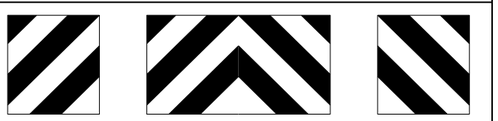
GENERAL NOTES

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

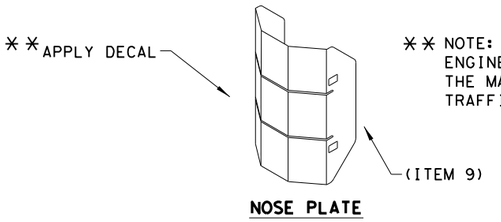
BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00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

*COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE



TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER



NOSE PLATE

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

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

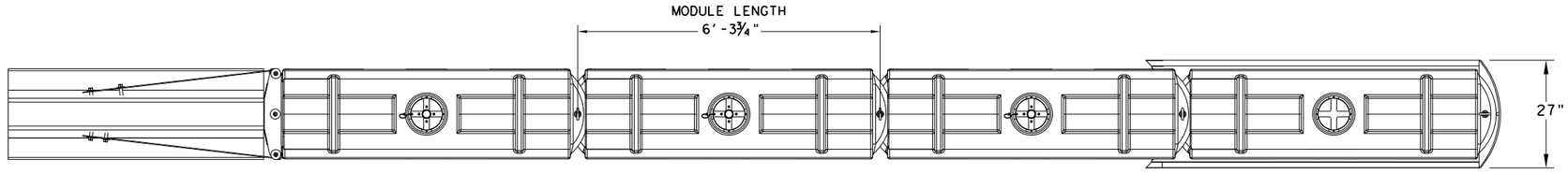
NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

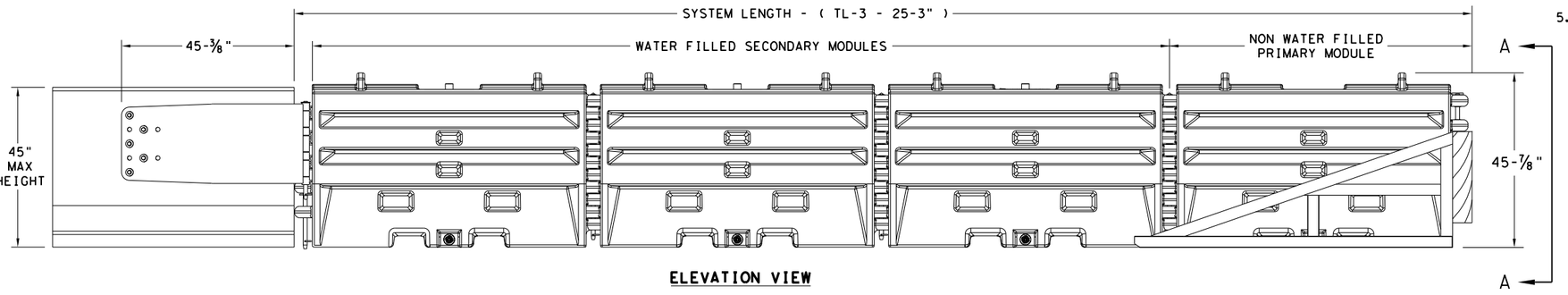
Texas Department of Transportation — Design Division Standard

LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		64



PLAN VIEW



ELEVATION VIEW

SECTION A-A

NOSE SHEETING PANEL DELINEATION

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

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

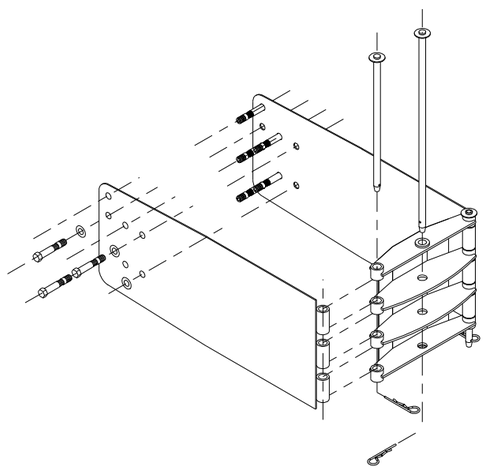
GENERAL NOTES

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

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

BILL OF MATERIAL

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



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

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

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

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

SACRIFICIAL

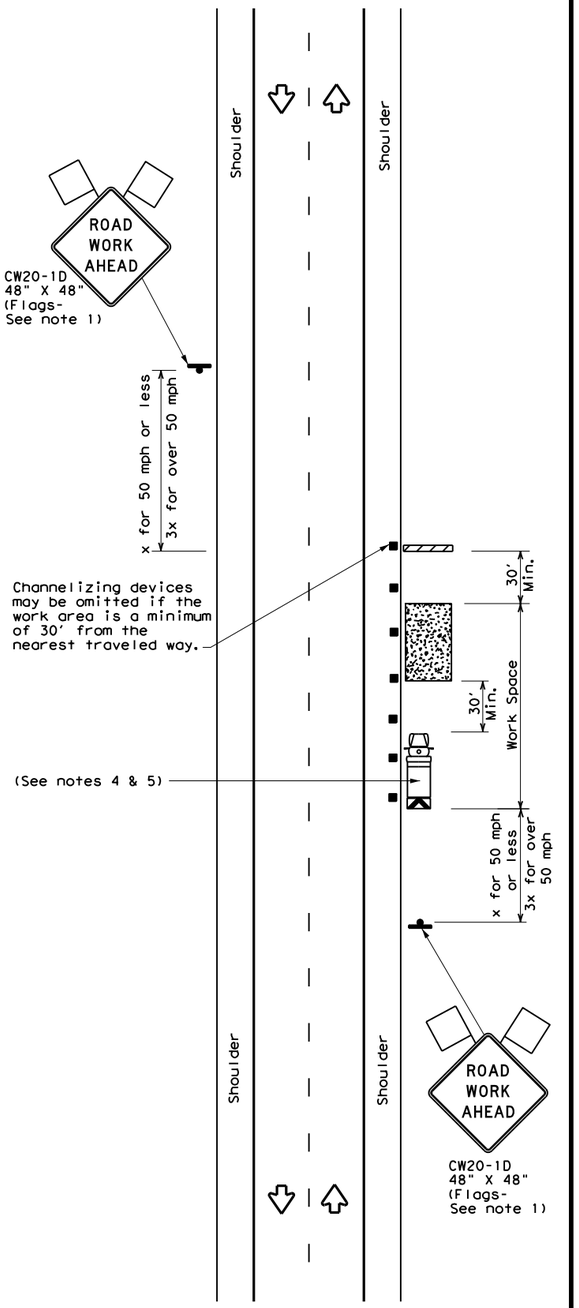
Texas Department of Transportation

Design Division Standard

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

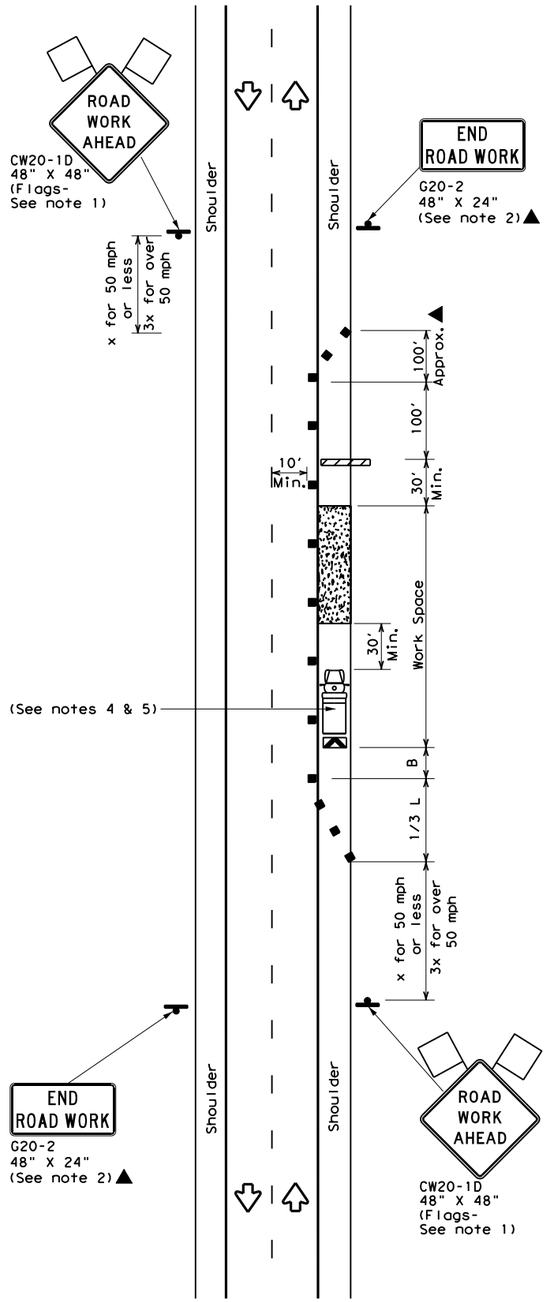
FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		65

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT-TCP/Sheets/2Standards/sled19.dgn



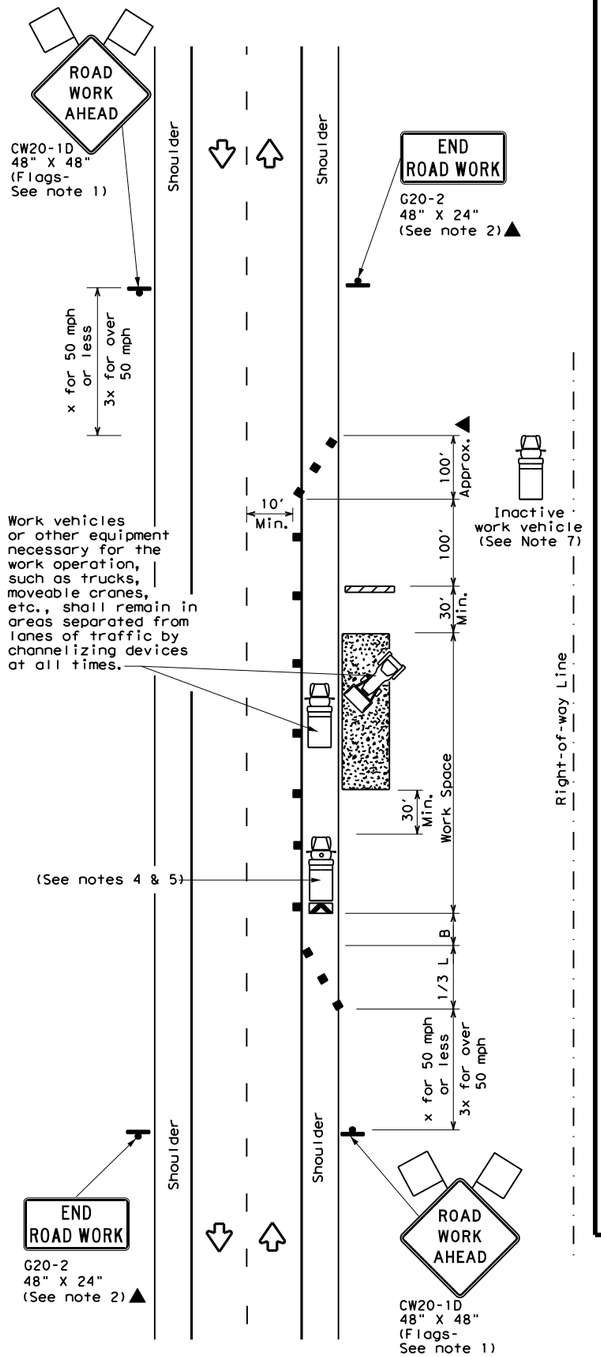
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

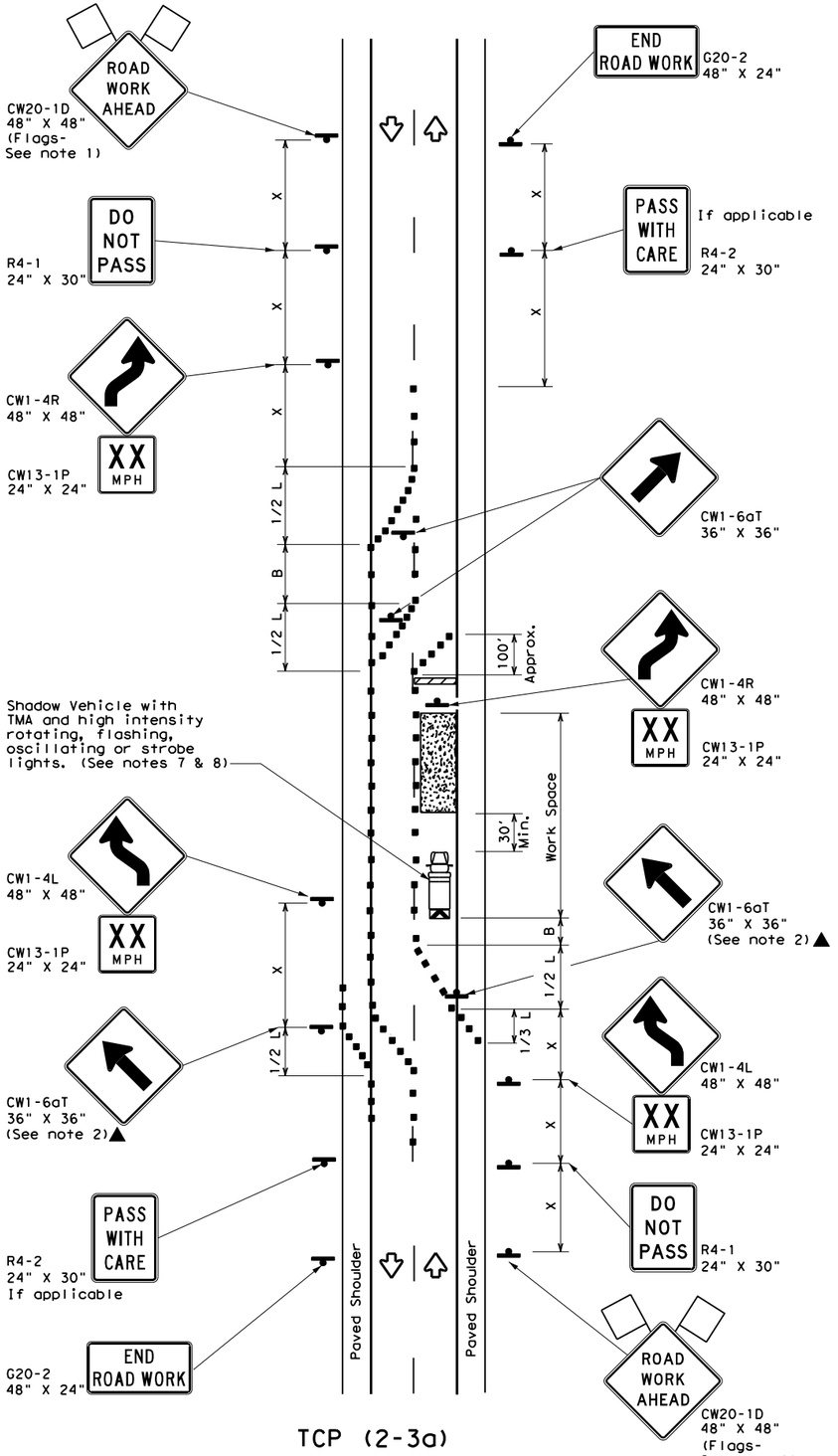
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

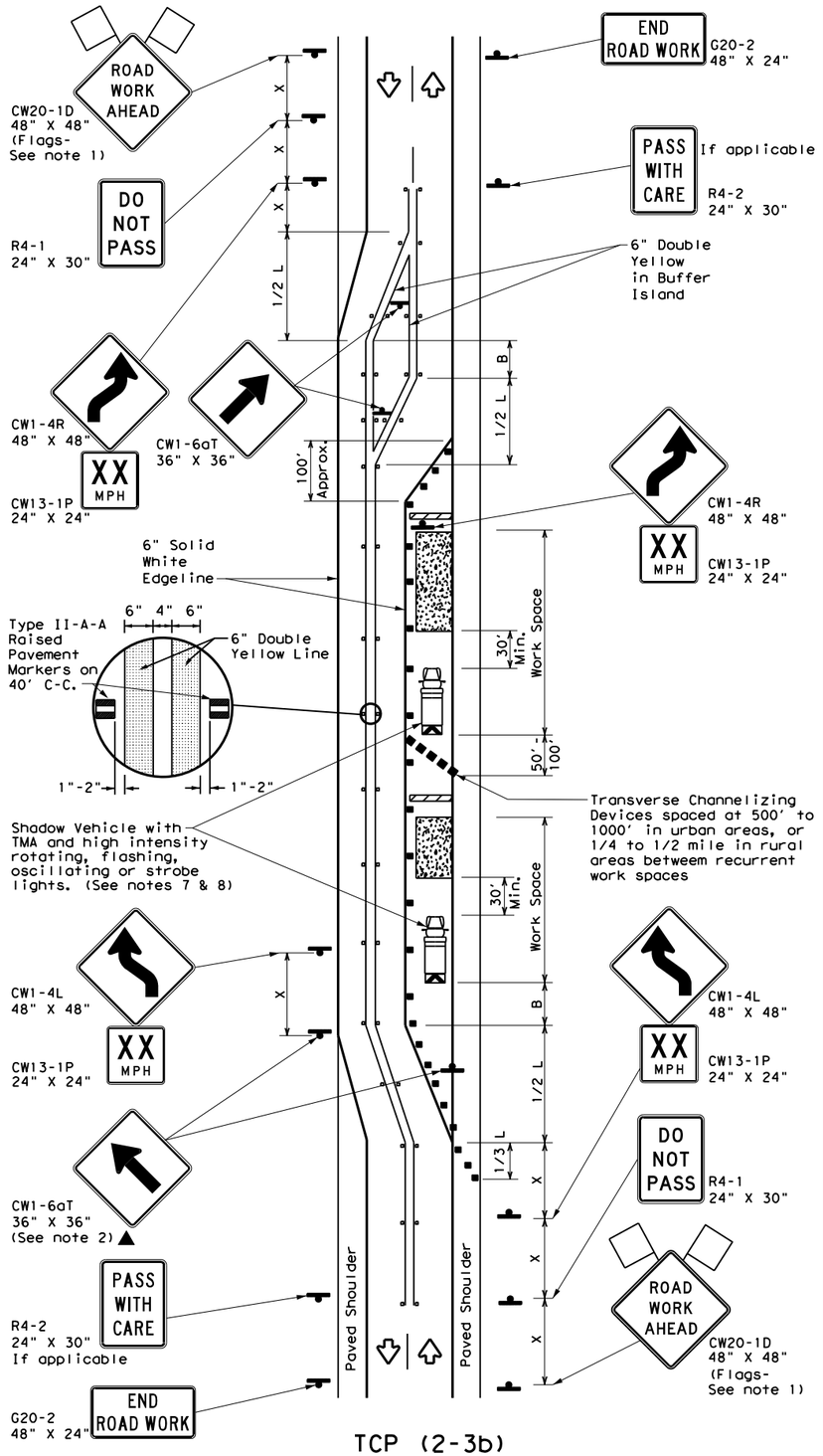
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	ABL	NOLAN		66
1-97 2-18				

DATE: 5/16/2024 4:26:14 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 ABL's project/Traffic Safety/Standards/TCP(2-3)-23.dgn



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

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

TCP (2-3a)

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

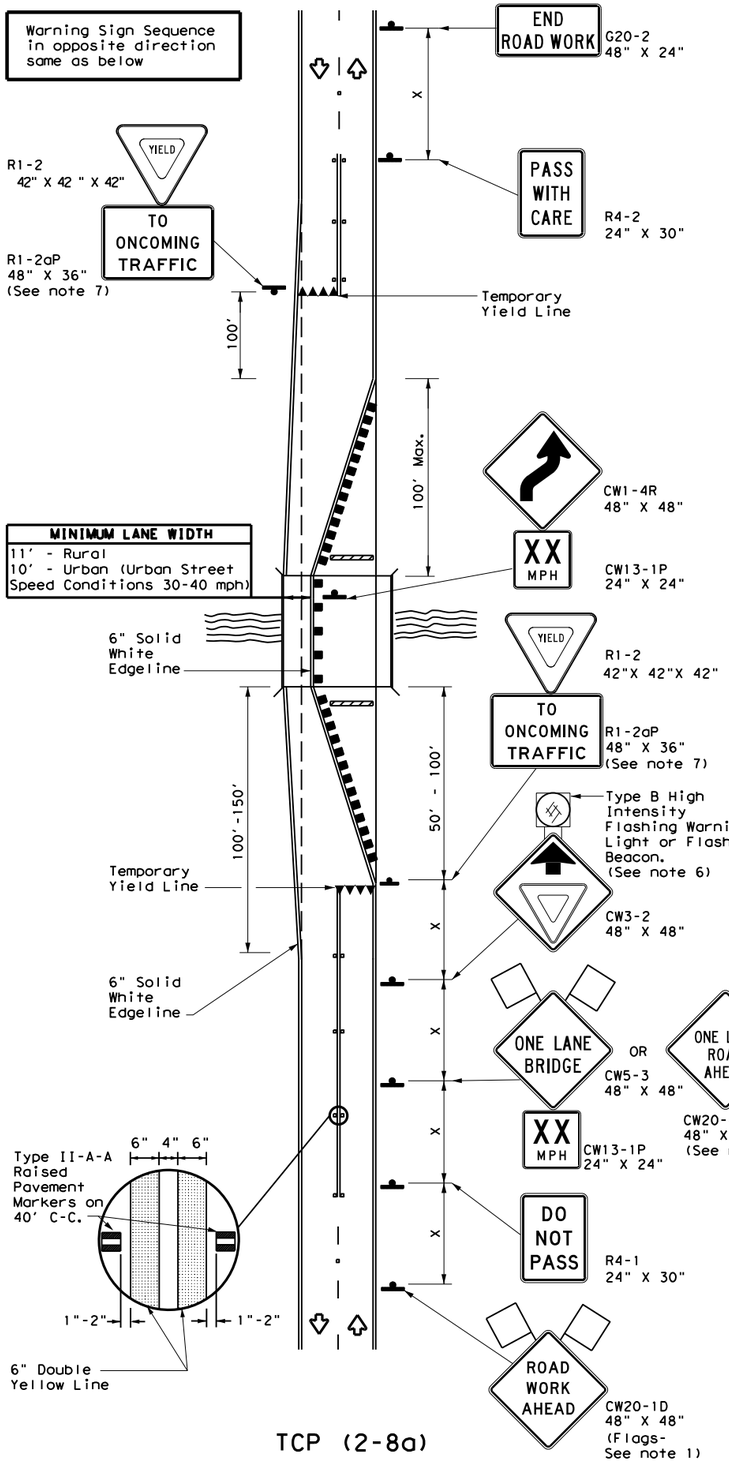
Texas Department of Transportation — Traffic Safety Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-23

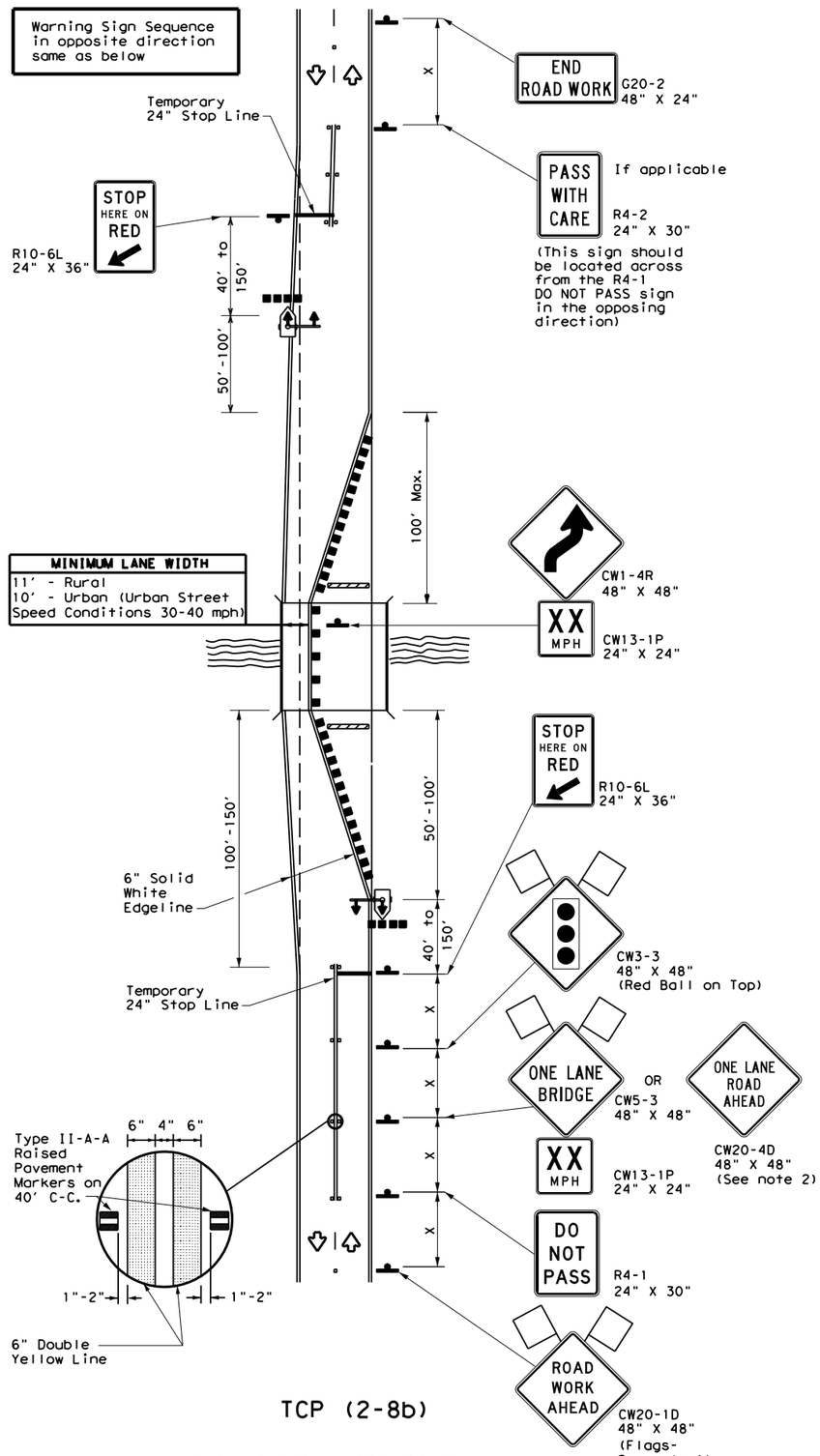
FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18	0264	01	046, ETC	SH 70
8-95 3-03 4-23	DIST	COUNTY		SHEET NO.
1-97 2-12	ABL	NOLAN		67

DATE: 5/16/2024 4:26:27 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - TABLE TOP PROJECTS/TCP/Sheet Set 25 of 26/tcp2-8-23.dgn



TCP (2-8a)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
(Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

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	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

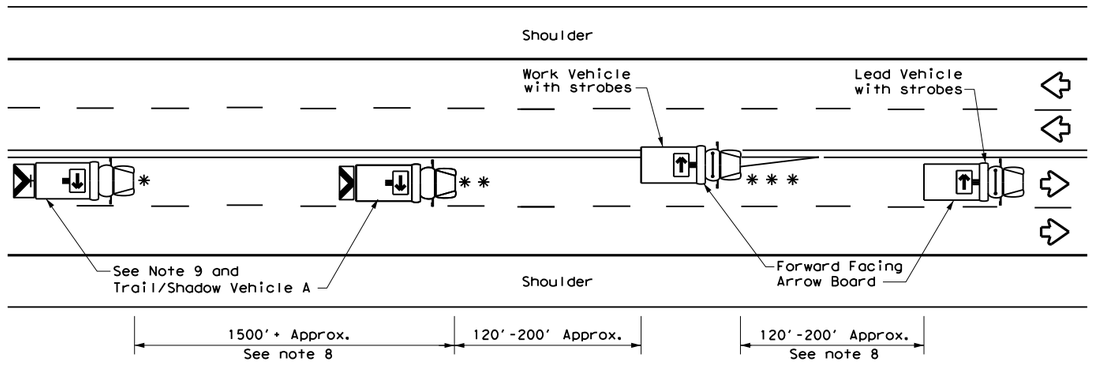
Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL PLAN LONG TERM ONE-LANE TWO-WAY CONTROL

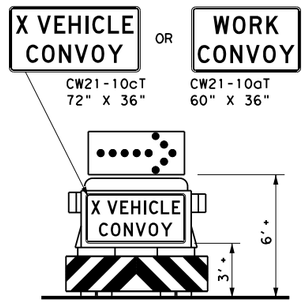
TCP(2-8)-23

FILE: tcp2-8-23.dgn	DN:	CK:	DW:	CK:
©TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		68



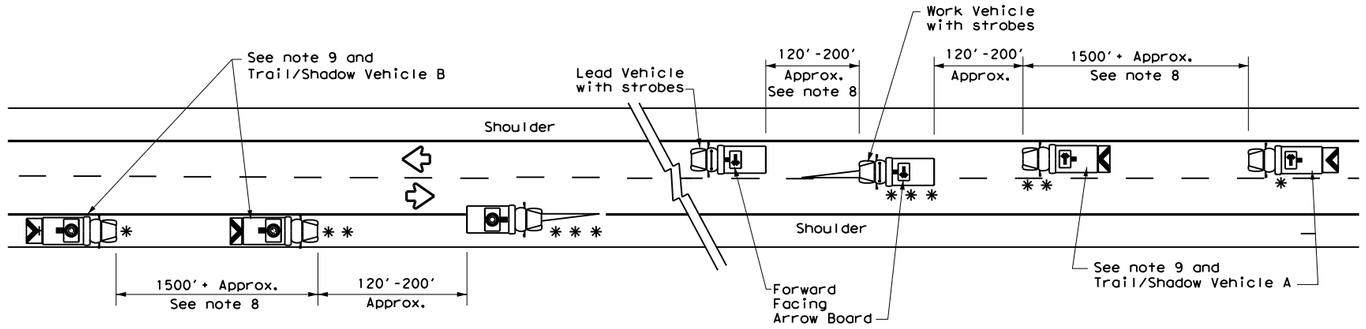
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

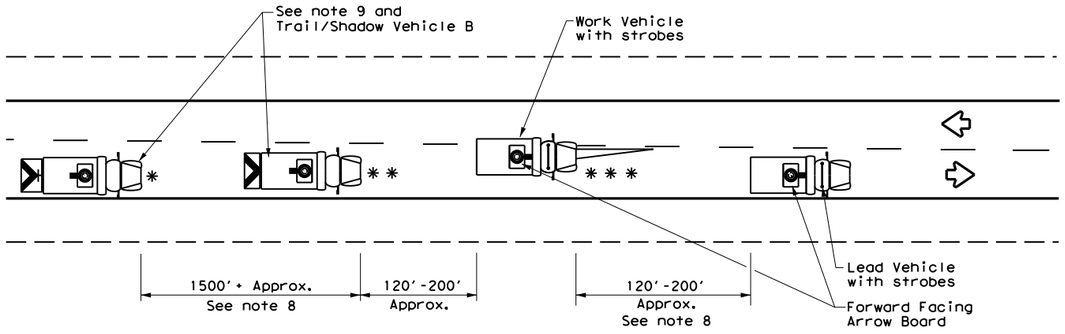
with RIGHT Directional display Flashing Arrow Board



WORK ON SHOULDER — WORK ON TRAVEL LANE

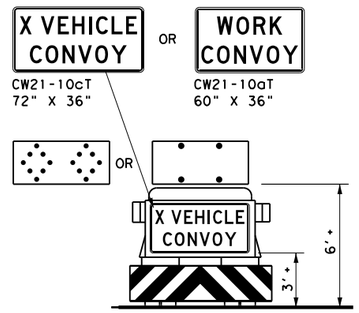
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

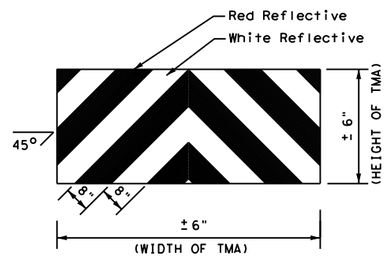
with Flashing Arrow Board in CAUTION display

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

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

GENERAL NOTES

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



STRIPING FOR TMA

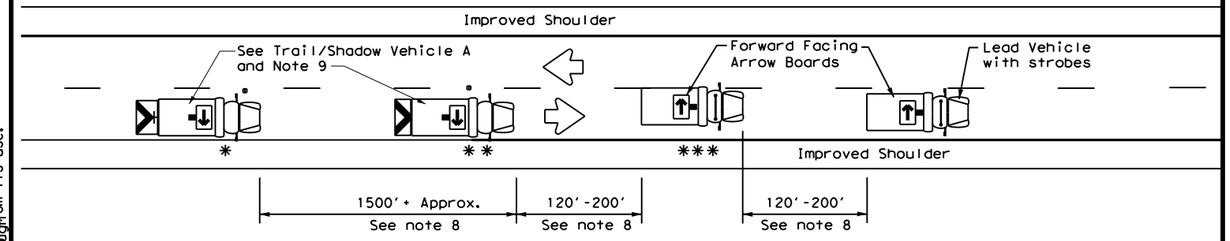
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

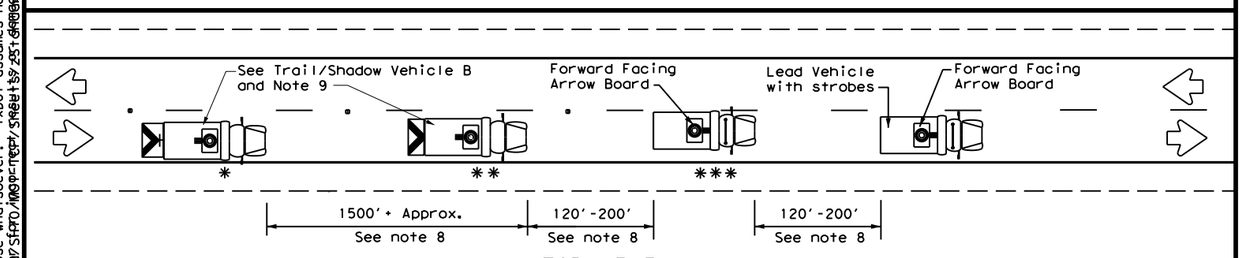
FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		69

DATE: 5/16/2024 4:26:53 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 ABL SPRINGS/Design/Sheet Files/25 GADGETS/TCP(3-3)-14.dgn



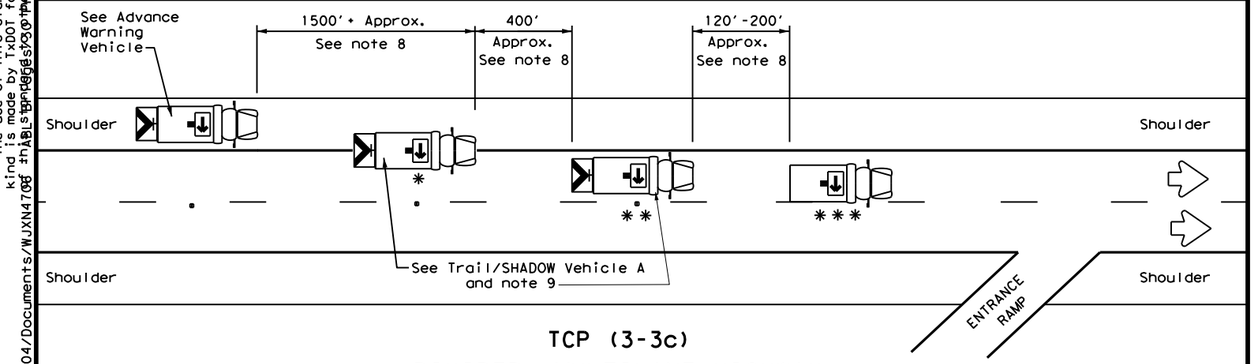
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



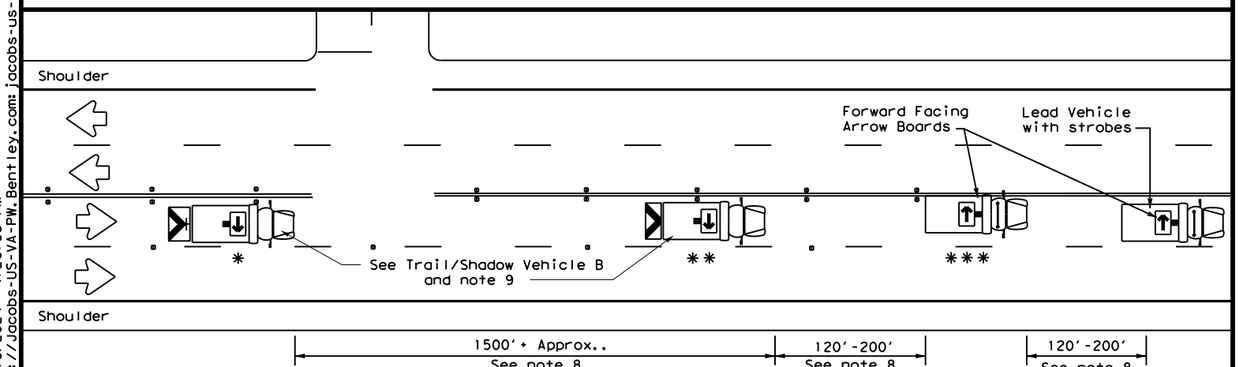
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



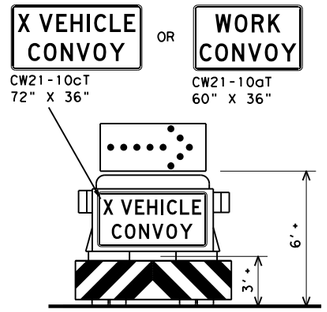
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



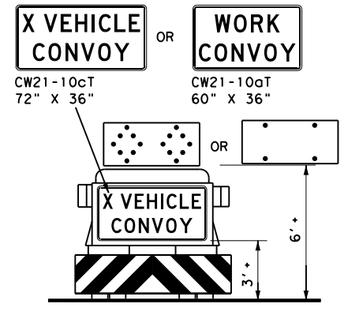
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



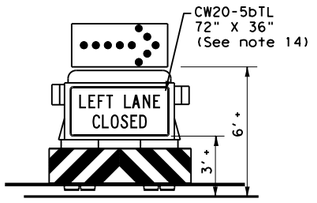
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

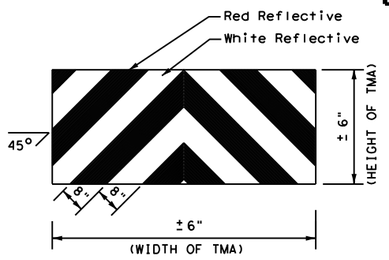


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

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

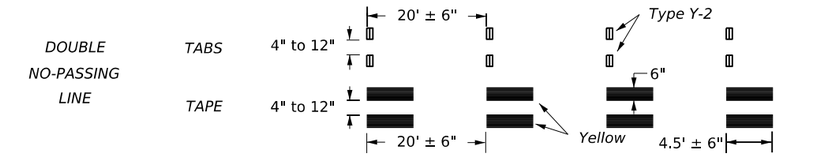
FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	ABL	NOLAN		70
1-97 7-14				

DATE: 5/16/2024 4:27:08 PM
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/MOT/CSJ Sheets/standards/wzstpm-23.dgn

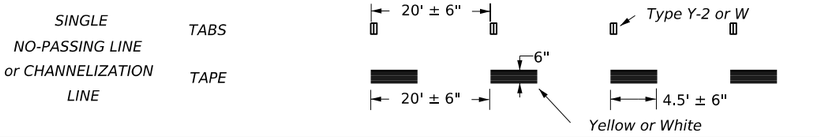
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

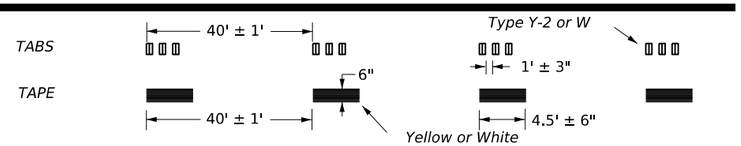


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



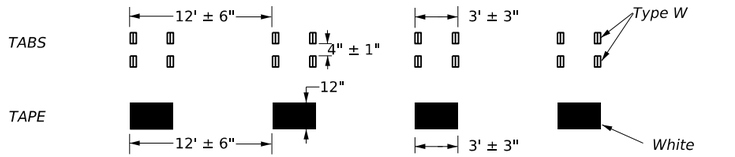
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

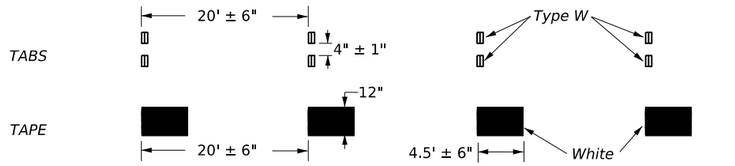


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



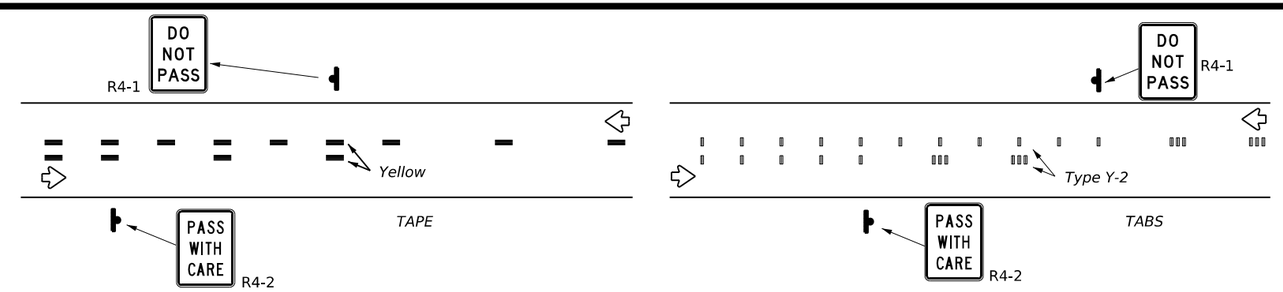
NOTES:

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

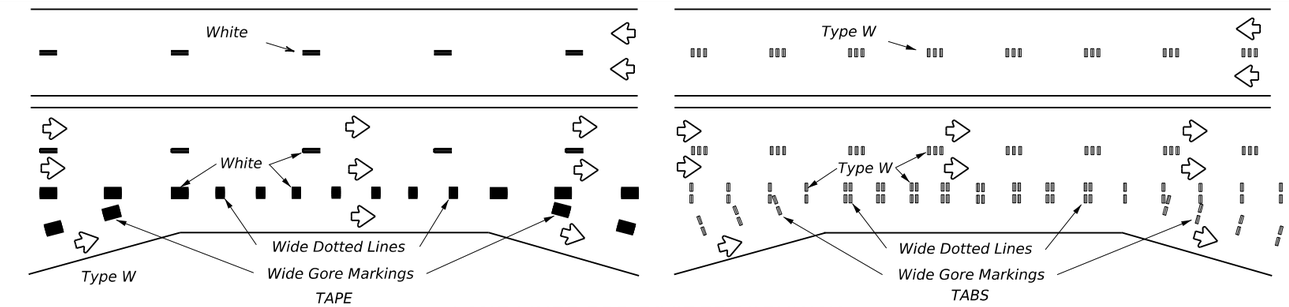
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

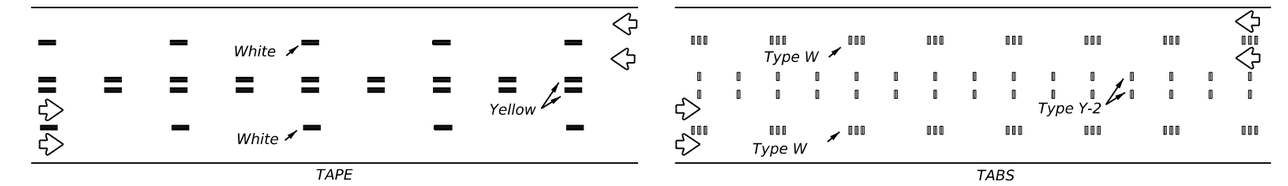
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



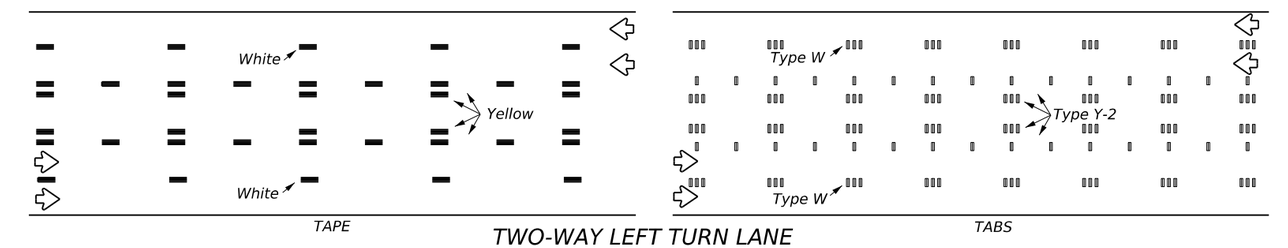
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



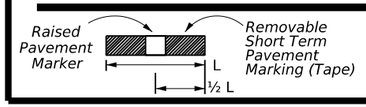
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

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

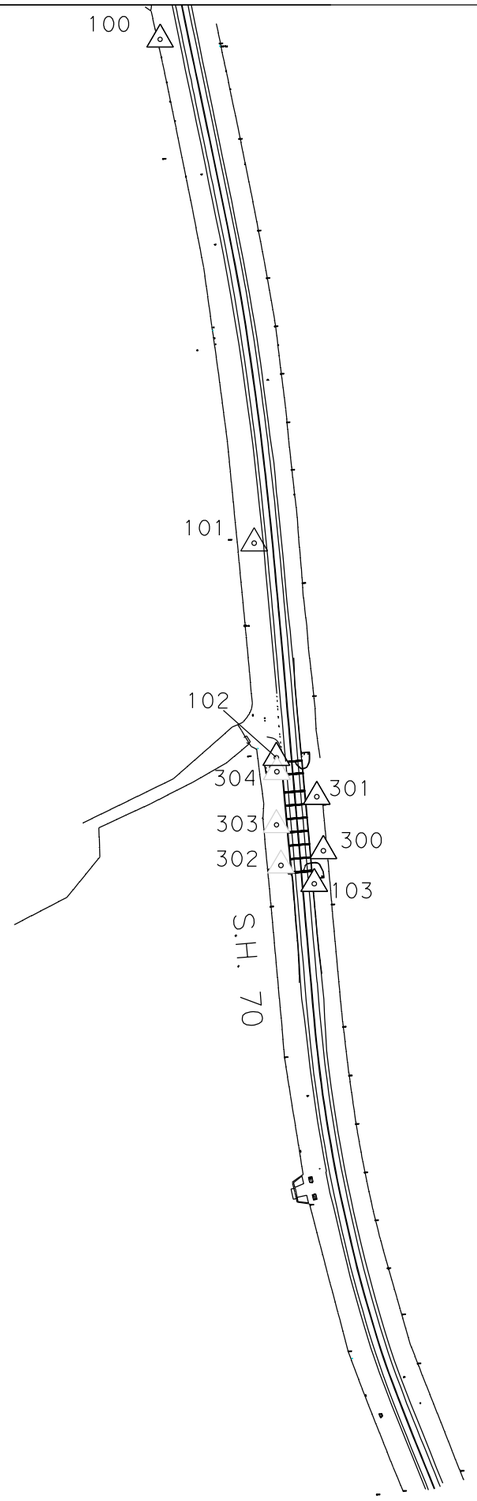
Texas Department of Transportation

Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	ABL	NOLAN		71
3-03				



LEGEND

△ 1/2" IRON ROD W ALUMINUM CAP SET

PNT#	NORTHING	EASTING	ELEV.	DESC.
100	6,845,732.28	1,384,497.02	2121.38	IRSC-1/2"
101	6,844,734.61	1,384,683.44	2107.72	IRSC-1/2"
102	6,844,309.87	1,384,727.23	2106.78	IRSC-1/2"
103	6,844,060.19	1,384,802.45	2106.89	IRSC-1/2"
104	6,842,704.42	1,385,151.10	2107.75	IRSC-1/2"
300	6,844,125.47	1,384,820.37	2097.22	IRSC-1/2"
301	6,844,232.72	1,384,807.34	2092.94	IRSC-1/2"
302	6,844,096.69	1,384,736.23	2097.10	IRFC-1/2"
303	6,844,176.81	1,384,727.50	2096.00	IRFC-1/2"
304	6,844,281.96	1,384,728.44	2097.79	IRFC-1/2"

GRAPHIC SCALE

0 150 300

1" = 300'

HORIZONTAL SCALE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4203 NAD 83/2011. ALL COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, SHOWN IN SURFACE VALUES, AND MAY BE CONVERTED TO GRID USING THE SURFACE ADJUSTMENT FACTOR OF 1.00012.

2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK.

3. ELEVATIONS ARE BASED ON NAVD88 VALUES, OBTAINED USING GEOID 12B ON THE TXDOT RTK NETWORK.

4. CONTROL WAS ESTABLISHED MARCH 2023.

STATE OF TEXAS REGISTERED DAN H. CLARK 6011 PROFESSIONAL LAND SURVEYOR

04/16/2024

DAN H. CLARK, R.P.L.S. #6011

AG3 Group, LLC
ENGINEERING · SURVEY · CONSTRUCTION

4800 FREDERICKSBURG RD. SUITE 200SL
SAN ANTONIO, TX 78229
P:210-208-9400 F:210-208-9401
TBPE No. F-10015 · TBPLS No. 10193922

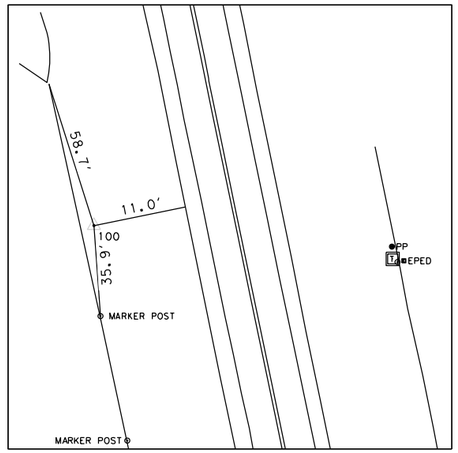
Texas Department of Transportation

SH 70

SWEETWATER CREEK
SURVEY CONTROL INDEX

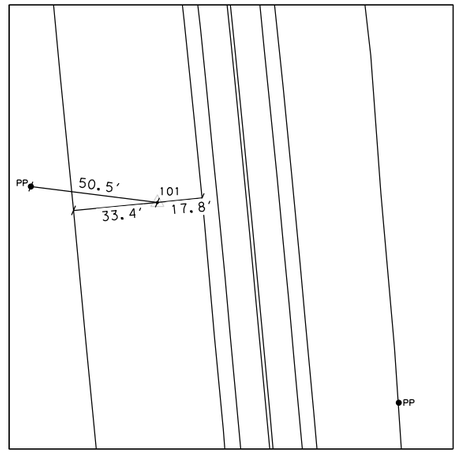
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
06	(SEE TITLE SHEET)		72
STATE	DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
264	01	046, ETC	S.H. 70

CP #100-1/2" IRON ROD SET
N: 6,845,732.28
E: 1,384,497.02
EL: 2121.38'



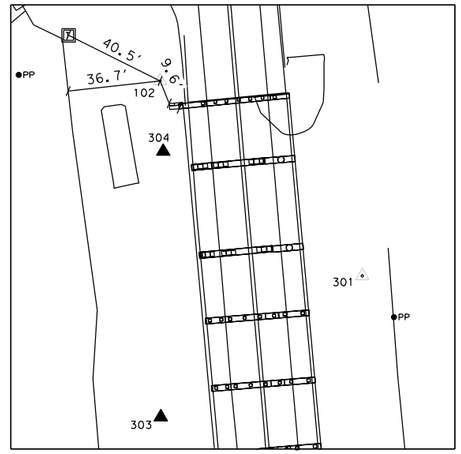
CONTROL POINT #100 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.2 OF A MILE SOUTH OF SKELLY LANE. 11.0 FEET FROM THE EDGE OF PAVEMENT, 58.7 FEET FROM THE END OF FENCE, AND 35.9 FEET FROM A MARKER POST.

CP #101-1/2" IRON ROD SET
N: 6,844,734.61
E: 1,384,683.44
EL: 2107.72'



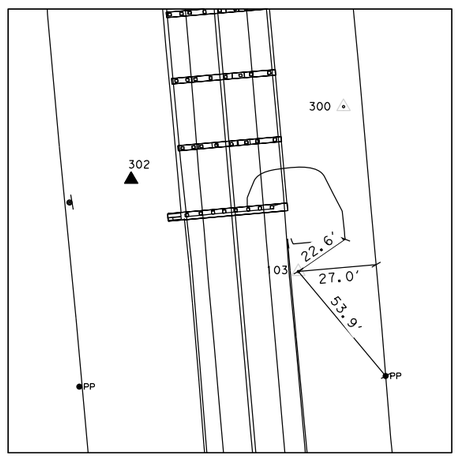
CONTROL POINT #101 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.4 OF A MILE SOUTH OF SKELLY LANE. 50.5 FEET FROM A POWER POLE, 33.4 FROM THE WIRE FENCE, AND 17.8 FEET FROM THE EDGE OF ASPHALT.

CP #102-1/2" IRON ROD SET
N: 6,844,309.87
E: 1,384,727.23
EL: 2106.78'



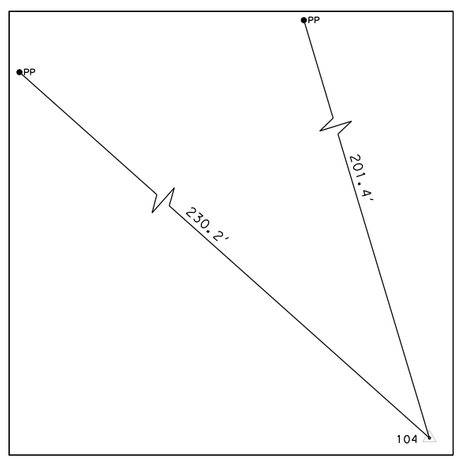
CONTROL POINT #102 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.4 OF A MILE SOUTH OF SKELLY LANE. 9.6 FEET FROM THE WINGWALL CORNER, 36.7 FEET FROM THE WIRE FENCE, AND 40.5 FEET FROM A TELEPHONE PEDESTAL.

CP #103-1/2" IRON ROD SET
N: 6,844,060.19
E: 1,384,802.45
EL: 2106.89'



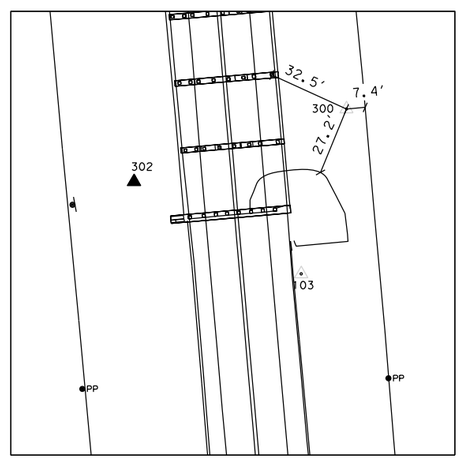
CONTROL POINT #103 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE EAST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.5 OF A MILE SOUTH OF SKELLY LANE. 22.6 FEET FROM THE CORNER OF CONCRETE, 27.0 FEET FROM THE WIRE FENCE, AND 53.9 FEET FROM A POWER POLE.

CP #104-1/2" IRON ROD SET
N: 6,842,704.42
E: 1,385,151.10
EL: 2107.75'



CONTROL POINT #104 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE EAST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.8 OF A MILE SOUTH OF SKELLY LANE. 201.4 FEET FROM A POWER POLE, 230.2 FEET FROM A POWER POLE.

CP #300-1/2" IRON ROD SET
N: 6,844,125.47
E: 1,384,820.37
EL: 2097.22'



CONTROL POINT #300 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE EAST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.5 OF A MILE SOUTH OF SKELLY LANE. 32.5 FEET FROM BRIDGE COLUMN, 27.2 FEET FROM THE EDGE OF CONCRETE, AND 7.4 FEET FROM THE WIRE FENCE.

GRAPHIC SCALE
0 30 60
1" = 60'
HORIZONTAL SCALE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4203 NAD 83/2011. ALL COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, SHOWN IN SURFACE VALUES, AND MAY BE CONVERTED TO GRID USING THE SURFACE ADJUSTMENT FACTOR OF 1.00012.

2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK.

3. ELEVATIONS ARE BASED ON NAVD88 VALUES, OBTAINED USING GEOID 12B ON THE TXDOT RTK NETWORK.

4. CONTROL WAS ESTABLISHED MARCH 2023.

STATE OF TEXAS
REGISTERED
DAN H. CLARK
6011
PROFESSIONAL
LAND SURVEYOR

04/16/2024
DAN H. CLARK, R.P.L.S. #6011

AG3 Group, LLC
ENGINEERING • SURVEY • CONSTRUCTION
4800 FREDERICKSBURG RD. SUITE 200SL
SAN ANTONIO, TX 78229
P:210-208-9400 F:210-208-9401
TBPE No. F-10015 · TBPLS No. 10193922

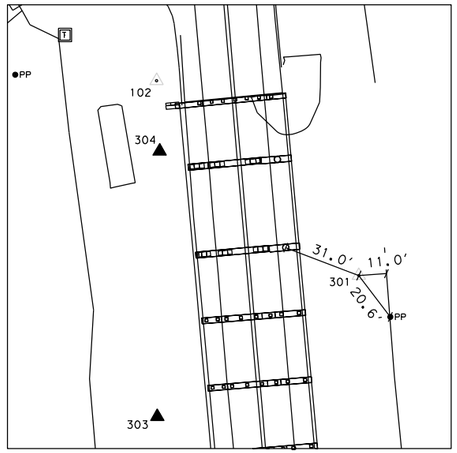
Texas Department of Transportation

SH 70

SWEETWATER CREEK
SURVEY CONTROL DETAILS

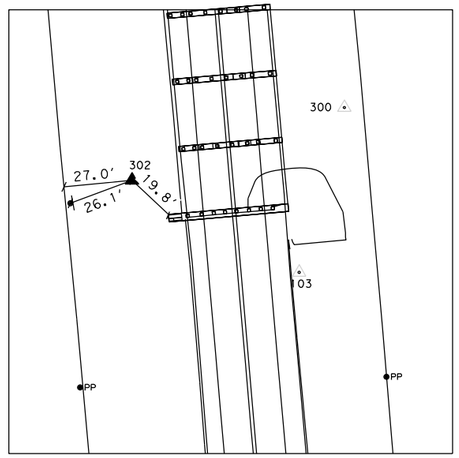
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	(SEE TITLE SHEET)		73
STATE	DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
264	01	046, ETC	S.H. 70

CP #301-1/2" IRON ROD SET
N: 6,844,232.72
E: 1,384,807.34
EL: 2092.94'



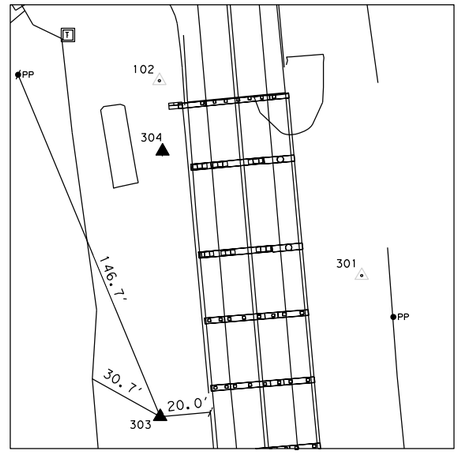
CONTROL POINT #301 IS AN IRON ROD WITH ALUMINIUM CAP SET LOCATED ON THE EAST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.5 OF A MILE SOUTH OF SKELLY LANE. 31.0 FEET FROM THE NEAREST BRIDGE COLUMN, 11.0 FEET FROM THE WIRE FENCE, AND 20.6 FEET FROM A POWER POLE.

CP #302-1/2" IRON ROD FOUND
N: 6,844,096.69
E: 1,384,736.23
EL: 2097.10'



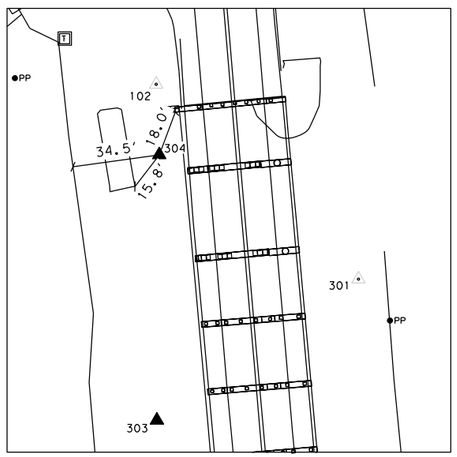
CONTROL POINT #302 IS AN IRON ROD FOUND LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.5 OF A MILE SOUTH OF SKELLY LANE. 27.0 FEET FROM THE WIRE FENCE, 26.1 FEET FROM A SIGN, AND 19.8 FEET FROM BRIDGE WALL CORNER.

CP #303-1/2" IRON ROD FOUND
N: 6,844,176.81
E: 1,384,727.50
EL: 2096.00'



CONTROL POINT #303 IS AN IRON ROD FOUND LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.5 OF A MILE SOUTH OF SKELLY LANE. 30.7 FEET FROM FENCE PI, 20.0 FEET FROM THE EDGE OF ASPHALT, AND 146.7 FEET FROM POWER POLE.

CP #304-1/2" IRON ROD FOUND
N: 6,844,281.96
E: 1,384,728.44
EL: 2097.79'



CONTROL POINT #304 IS AN IRON ROD FOUND LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.4 OF A MILE SOUTH OF SKELLY LANE. 34.5 FEET FROM THE WIRE FENCE, 15.8 FROM CORNER OF CONCRETE, AND 18.0 FEET FROM BRIDGE WALL CORNER.

GRAPHIC SCALE
0 30 60
1" = 60'
HORIZONTAL SCALE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4203 NAD 83/2011. ALL COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, SHOWN IN SURFACE VALUES, AND MAY BE CONVERTED TO GRID USING THE SURFACE ADJUSTMENT FACTOR OF 1.00012.

2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK.

3. ELEVATIONS ARE BASED ON NAVD88 VALUES, OBTAINED USING GEOID 12B ON THE TXDOT RTK NETWORK.

4. CONTROL WAS ESTABLISHED MARCH 2023.

STATE OF TEXAS
REGISTERED
DAN H. CLARK
6011
PROFESSIONAL
LAND SURVEYOR

04/16/2024
DAN H. CLARK, R.P.L.S. #6011

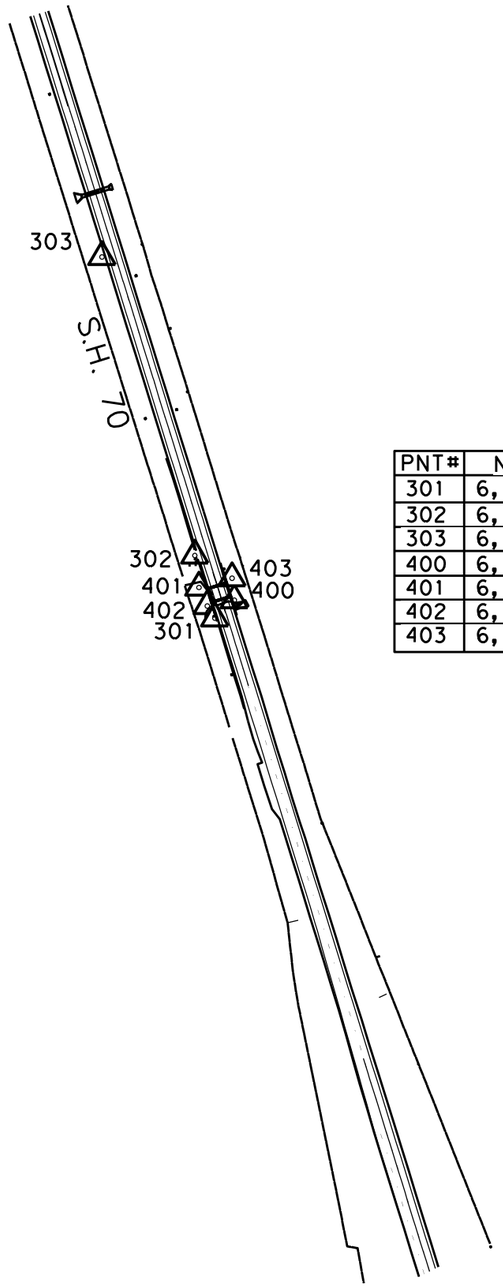
AG3 Group, LLC
ENGINEERING · SURVEY · CONSTRUCTION
4800 FREDERICKSBURG RD. SUITE 200SL
SAN ANTONIO, TX 78229
P:210-208-9400 F:210-208-9401
TBPE No. F-10015 · TBPLS No. 10193922

Texas Department of Transportation

SH 70

SWEETWATER CREEK
SURVEY CONTROL DETAILS

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	(SEE TITLE SHEET)		74
STATE	DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
264	01	046, ETC	S.H. 70



LEGEND

△ 1/2" IRON ROD SET

PNT#	NORTHING	EASTING	ELEV.	DESC.
301	6,822,084.60	1,394,539.09	2335.80'	IRSC-1/2"
302	6,822,208.72	1,394,499.35	2336.40'	IRSC-1/2"
303	6,822,799.92	1,394,315.64	2344.23'	IRSC-1/2"
400	6,822,120.25	1,394,577.61	2313.10'	IRSC-1/2"
401	6,822,145.36	1,394,507.56	2314.15'	IRSC-1/2"
402	6,822,108.69	1,394,523.92	2319.66'	IRSC-1/2"
403	6,822,163.72	1,394,573.20	2313.84'	IRSC-1/2"

GRAPHIC SCALE

0 150 300

1" = 300'

HORIZONTAL SCALE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4203 NAD 83/2011. ALL COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, SHOWN IN SURFACE VALUES, AND MAY BE CONVERTED TO GRID USING THE SURFACE ADJUSTMENT FACTOR OF 1.00012.

2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK.

3. ELEVATIONS ARE BASED ON NAVD88 VALUES, OBTAINED USING GEOID 12B ON THE TXDOT RTK NETWORK.

4. CONTROL WAS ESTABLISHED MARCH 2023.

STATE OF TEXAS
REGISTERED
DAN H. CLARK
6011
PROFESSIONAL
LAND SURVEYOR

04/16/2024

DAN H. CLARK, R.P.L.S. #6011

AG3 Group, LLC
ENGINEERING · SURVEY · CONSTRUCTION

4800 FREDERICKSBURG RD. SUITE 200SL
SAN ANTONIO, TX 78229
P:210-208-9400 F:210-208-9401
TBPE No. F-10015 · TBPLS No. 10193922

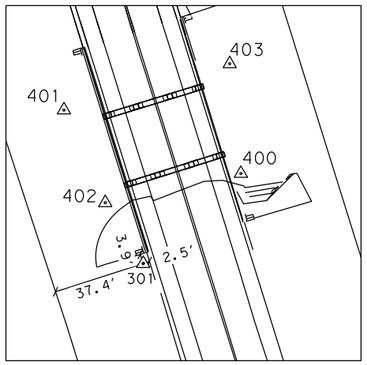
Texas Department of Transportation

SH70

COTTONWOOD CREEK
SURVEY CONTROL INDEX

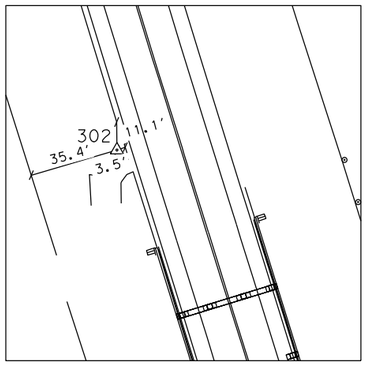
FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	(SEE TITLE SHEET)		75
STATE	DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
264	01	046, ETC	S.H. 70

CP #301-1/2" IRON ROD SET
N: 6,819,968.27
E: 1,395,249.89
EL: 2,451.03′



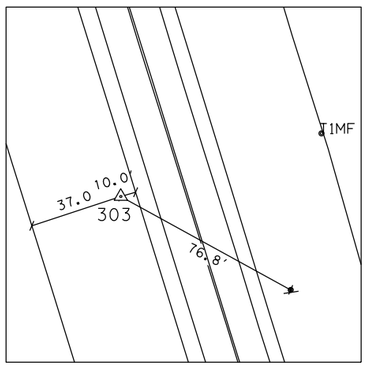
CONTROL POINT #301 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.96 OF A MILE SOUTH OF C.O. RD. 214. 37.4′ FROM THE WIRE FENCE, 2.5′ FROM THE BACK OF CURB, AND 3.9′ FROM THE EDGE OF CONCRETE.

CP #302-1/2"IRON ROD SET
N: 6,822,208.72
E: 1,394,499.35
EL: 2,336.40′



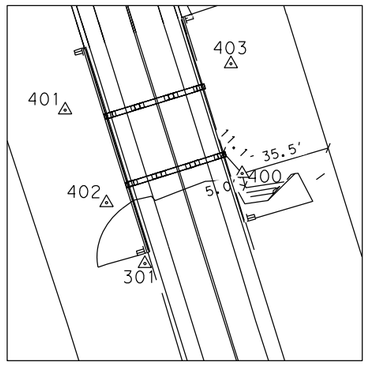
CONTROL POINT #302 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.96 OF A MILE SOUTH OF C.O. RD. 214. 35.4′ FROM THE WIRE FENCE, 3.5′ FROM THE BACK OF CURB, AND 11.1′ FROM THE END OF GUARD RAIL.

CP #303-1/2"IRON ROD SET
N: 6,822,799.92
E: 1,394,315.64
EL: 2,344.23′



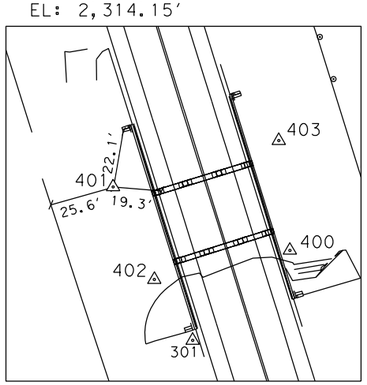
CONTROL POINT #303 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.19 OF A MILE SOUTH OF C.O. RD. 214. 37.0′ FROM THE WIRE FENCE, 10.0′ FROM THE EDGE OF PAVEMENT, AND 76.8′ FROM THE LEFT CURVE AHEAD SIGN.

CP #400-1/2"IRON ROD SET
N: 6,822,120.25
E: 1,394,577.61
EL: 2,313.10′



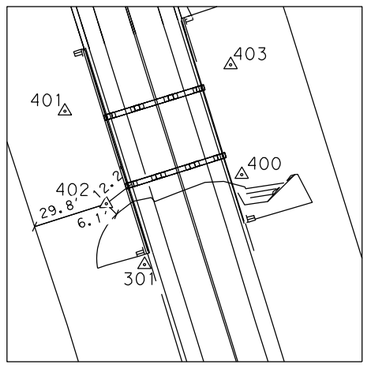
CONTROL POINT #400 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.96 OF A MILE SOUTH OF C.O. RD. 214. 35.5′ FROM THE WIRE FENCE, 5.0′ FROM THE EDGE OF CONCRETE, AND 11.1′ FROM THE NEAREST COLUMN.

CP #401-1/2"IRON ROD SET
N: 6,822,145.36
E: 1,394,507.56
EL: 2,314.15′



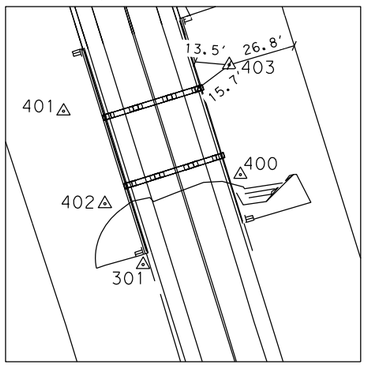
CONTROL POINT #401 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.96 OF A MILE SOUTH OF C.O. RD. 214. 25.6′ FROM THE WIRE FENCE, 22.1′ FROM THE EDGE OF CONCRETE, AND 19.3′ FROM THE NEAREST COLUMN.

CP #402-1/2"IRON ROD SET
N: 6,822,108.69
E: 1,394,523.93
EL: 2,319.66′



CONTROL POINT #402 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.96 OF A MILE SOUTH OF C.O. RD. 214. 29.8′ FROM THE WIRE FENCE, 6.1′ FROM THE EDGE OF CONCRETE, AND 12.2′ FROM THE NEAREST COLUMN.

CP #403-1/2"IRON ROD SET
N: 6,822,163.72
E: 1,394,573.20
EL: 2,313.84′



CONTROL POINT #403 IS AN IRON ROD SET WITH ALUMINIUM CAP LOCATED ON THE WEST SIDE OF S.H. 70. IN THE EXISTING R.O.W. APPROXIMATLEY 0.96 OF A MILE SOUTH OF C.O. RD. 214. 26.8′ FROM THE WIRE FENCE, 13.5′ FROM THE EDGE OF CONCRETE, AND 15.7′ FROM THE NEAREST COLUMN.

GRAPHIC SCALE
0 30 60
1" = 60′
HORIZONTAL SCALE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, NORTH CENTRAL ZONE 4203 NAD 83/2011. ALL COORDINATES AND DISTANCES ARE U.S. SURVEY FEET, SHOWN IN SURFACE VALUES, AND MAY BE CONVERTED TO GRID USING THE SURFACE ADJUSTMENT FACTOR OF 1.00012.

2. HORIZONTAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK.

3. ELEVATIONS ARE BASED ON NAVD88 VALUES, OBTAINED USING GEOID 12B ON THE TXDOT RTK NETWORK.

4. CONTROL WAS ESTABLISHED MARCH 2023.

STATE OF TEXAS
REGISTERED
DAN H. CLARK
6011
PROFESSIONAL
LAND SURVEYOR

04/16/2024
DAN H. CLARK, R.P.L.S. #6011

AG3 Group, LLC
ENGINEERING · SURVEY · CONSTRUCTION
4800 FREDERICKSBURG RD. SUITE 200SL
SAN ANTONIO, TX 78229
P:210-208-9400 F:210-208-9401
TBPE No. F-10015 · TBPLS No. 10193922

Texas Department of Transportation

SH70

COTTONWOOD CREEK
SURVEY CONTROL DETAILS

FED.RD. DIV.NO.	FEDERAL AID PROJECT		SHEET NO.
6	(SEE TITLE SHEET)		76
STATE	DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
264	01	046, ETC	S.H. 70

SH 70 (SWEETWATER CREEK)

```
================================================
BEGINNING ALIGNMENT SH70 DESCRIPTION
================================================
                    Tangent Data
                   *-----------*
Element ID: SH70-1
POB:          Sta. 170+19.757 R1    N = 6845845.268    E = 1384530.302
PC:           Sta. 174+28.720 R1    N = 6845445.146    E = 1384614.881
Bearing:            S11°56'08.56"E
Distance:                408.963

                     Curve Data
                    *----------*
Element ID: SH70-2
PI            Sta. 177+82.702 R1    N = 6845098.818    E = 1384688.090
Delta                  7.070° (RT)
Degree (Arc):            1.000°
Tangent:                353.982
Length:                 707.065
Radius:                5730.000
External:               10.924
Chord:                  706.617
Middle Ordinate:         10.903
PC              174+28.720 R1       6845445.146       1384614.881
PT              181+35.785 R1       6844746.111       1384718.114
CC                                  6844260.102       1379008.762
Back Bearing:       S11°56'08.56"E
Chord Bearing:      S08°24'02.33"E
Ahead Bearing:      S04°51'56.09"E

                    Tangent Data
                   *-----------*
Element ID: SH70-3
PT:           Sta. 181+35.785 R1    N = 6844746.111    E = 1384718.114
PC:           Sta. 190+87.642 R1    N = 6843797.685    E = 1384798.849
Bearing:            S04°51'56.09"E
Distance:                951.856

                     Curve Data
                    *----------*
Element ID: SH70-4
PI            Sta. 195+13.862 R1    N = 6843373.000    E = 1384835.000
Delta                 16.923° (LT)
Degree (Arc):            2.000°
Tangent:                426.221
Length:                 846.235
Radius:                2865.000
External:               31.531
Chord:                  843.162
Middle Ordinate:         31.187
PC              190+87.642 R1       6843797.685       1384798.849
PT              199+33.877 R1       6842977.230       1384993.209
CC                                  6844040.690       1387653.524
Back Bearing:       S04°51'56.09"E
Chord Bearing:      S13°19'38.31"E
Ahead Bearing:      S21°47'20.53"E

                    Tangent Data
                   *-----------*
Element ID: SH70-5
PT:           Sta. 199+33.877 R1    N = 6842977.230    E = 1384993.209
PC:           Sta. 204+06.210 R1    N = 6842538.641    E = 1385168.534
Bearing:            S21°47'20.53"E
Distance:                472.333

================================================
ENDING ALIGNMENT SH70 DESCRIPTION
================================================
```

SH 70 (COTTONWOOD CREEK)

```
================================================
BEGINNING ALIGNMENT SH70 DESCRIPTION
================================================
                    Tangent Data
                   *-----------*
Element ID: SH70-13
PT:           Sta. 408+26.537 R1    N = 6824718.649    E = 1393745.658
POE:          Sta. 445+97.966 R1    N = 6821116.610    E = 1394863.241
Bearing:            S17°14'14.05"E
Distance:                3771.429

================================================
ENDING ALIGNMENT SH70 DESCRIPTION
================================================
```

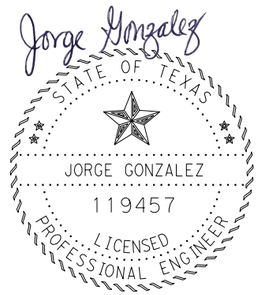
DRIVE 01

```
================================================
BEGINNING ALIGNMENT DRIVE01 DESCRIPTION
================================================
                    Tangent Data
                   *-----------*
Element ID: DRIVE01-1
POB:          Sta. 10+00.000 R1     N = 6844373.480    E = 1384749.834
PC:           Sta. 10+31.394 R1     N = 6844370.818    E = 1384718.553
Bearing:            S85°08'03.91"W
Distance:                31.394

                     Curve Data
                    *----------*
Element ID: DRIVE01-2
PI            Sta. 10+43.886 R1     N = 6844369.758    E = 1384706.106
Delta                 28.054° (LT)
Degree (Arc):           114.592°
Tangent:                12.492
Length:                 24.482
Radius:                 50.000
External:                1.537
Chord:                  24.238
Middle Ordinate:         1.491
PC              10+31.394 R1        6844370.818       1384718.553
PT              10+55.876 R1        6844362.969       1384695.621
CC                                  6844320.998       1384722.794
Back Bearing:       S85°08'03.91"W
Chord Bearing:      S71°06'25.83"W
Ahead Bearing:      S57°04'47.75"W

                    Tangent Data
                   *-----------*
Element ID: DRIVE01-3
PT:           Sta. 10+55.876 R1     N = 6844362.969    E = 1384695.621
POE:          Sta. 10+83.895 R1     N = 6844347.742    E = 1384672.101
Bearing:            S57°04'47.75"W
Distance:                28.019

================================================
ENDING ALIGNMENT DRIVE01 DESCRIPTION
================================================
```



5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

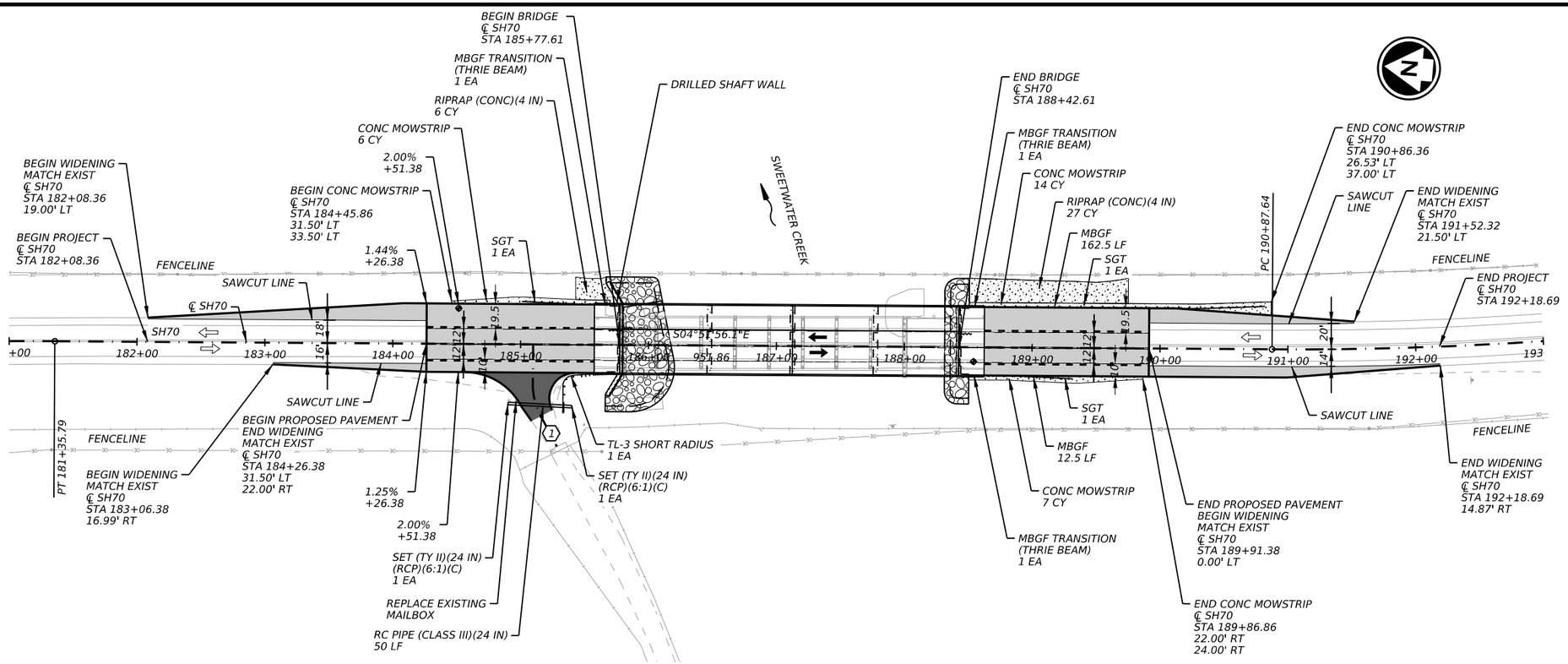
SH 70

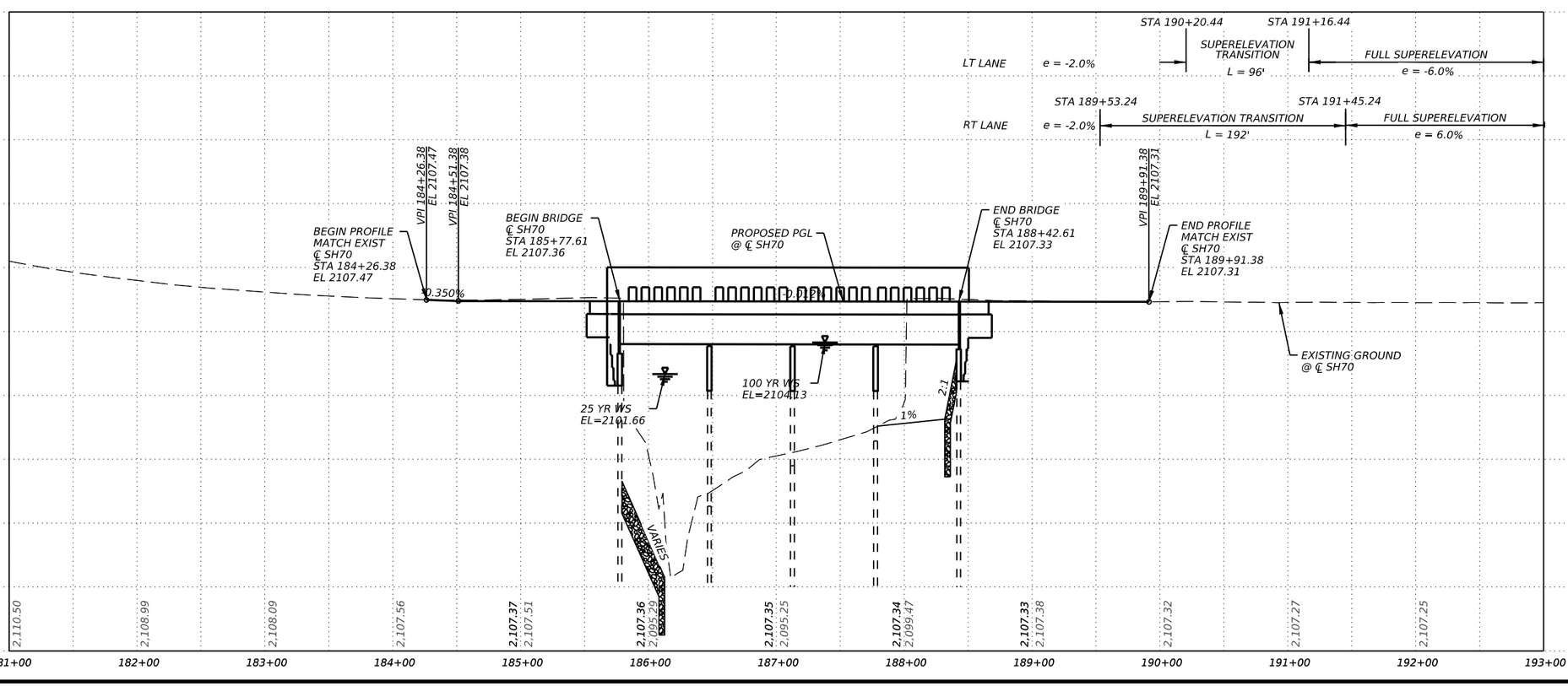
HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		77

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Horizontal Control/SH70_HALN01.dgn





Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

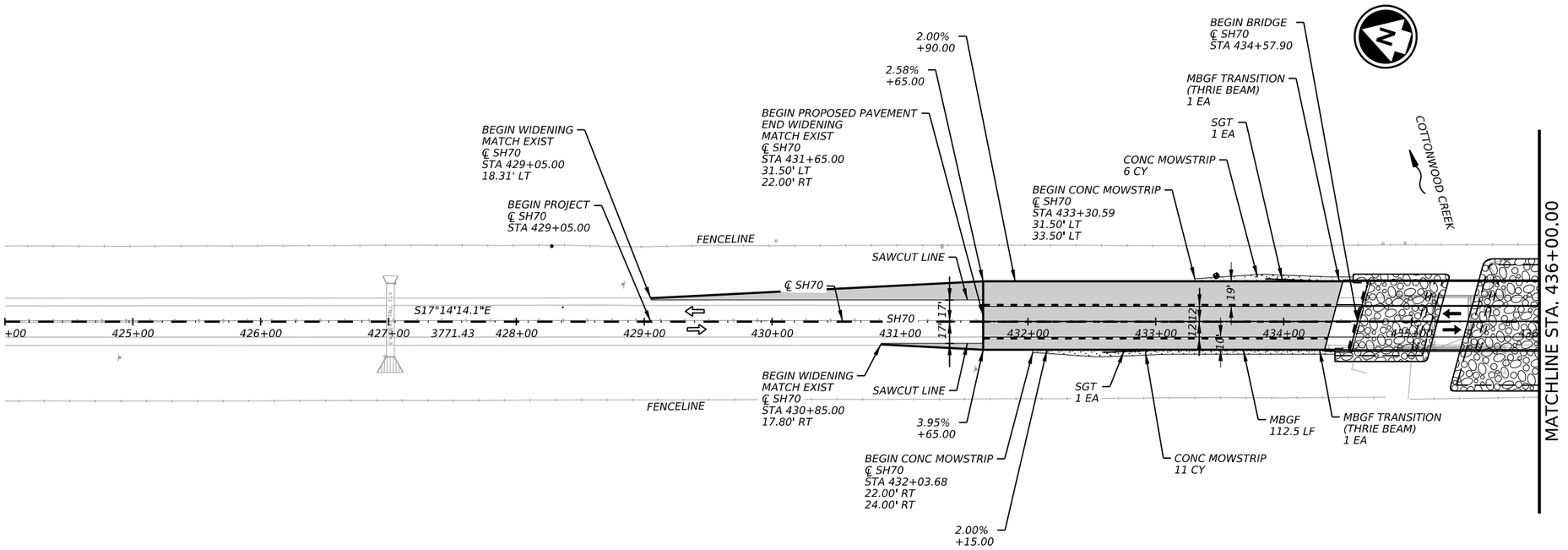
SH 70

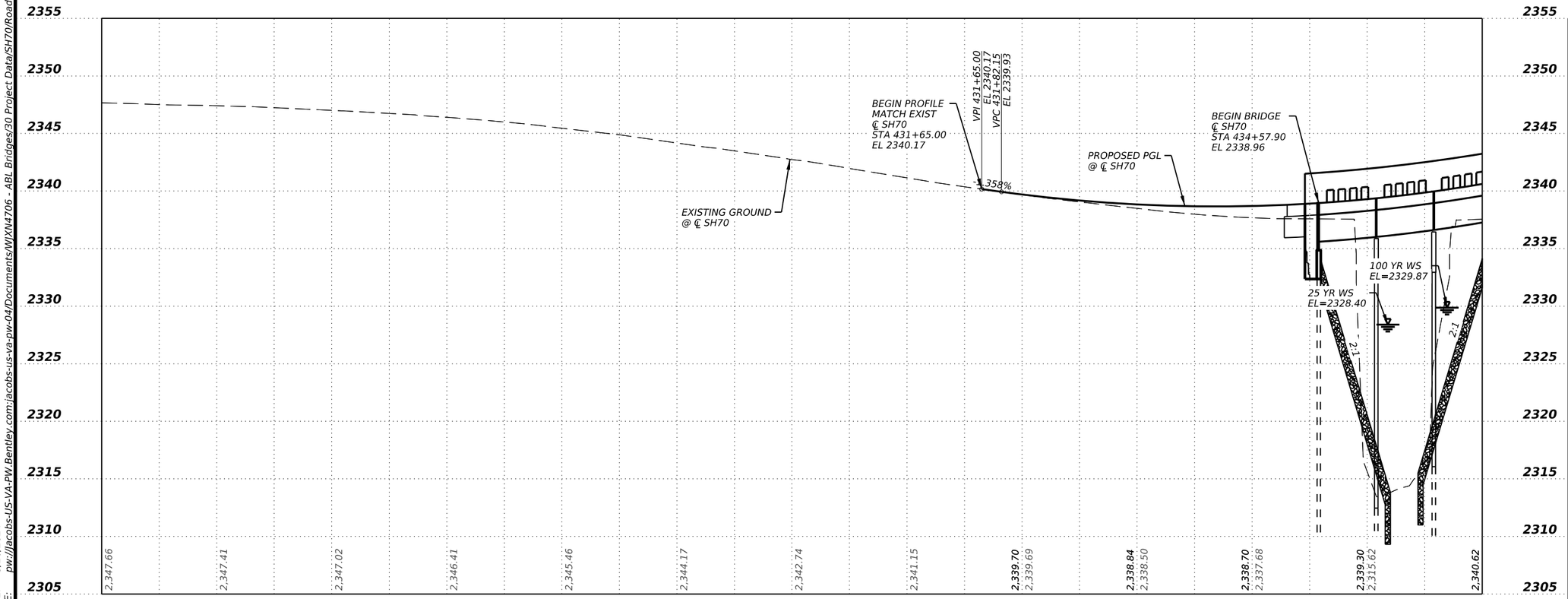
SWEETWATER CREEK
ROADWAY
PLAN AND PROFILE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		78

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Plan & Profile/SH70_PP01.dgn





DATE: 5/20/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Plan & Profile/SH70_PP02.dgn

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER
5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

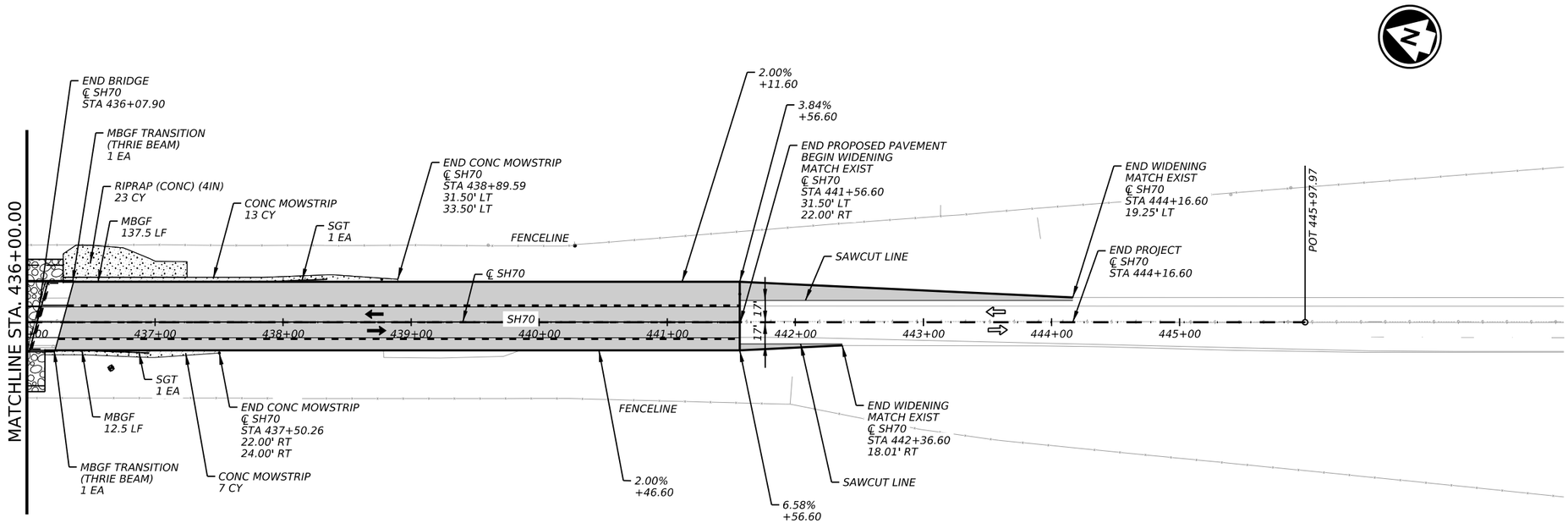
Texas Department of Transportation

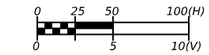
SH 70

COTTONWOOD CREEK ROADWAY PLAN AND PROFILE

SHEET 1 OF 2

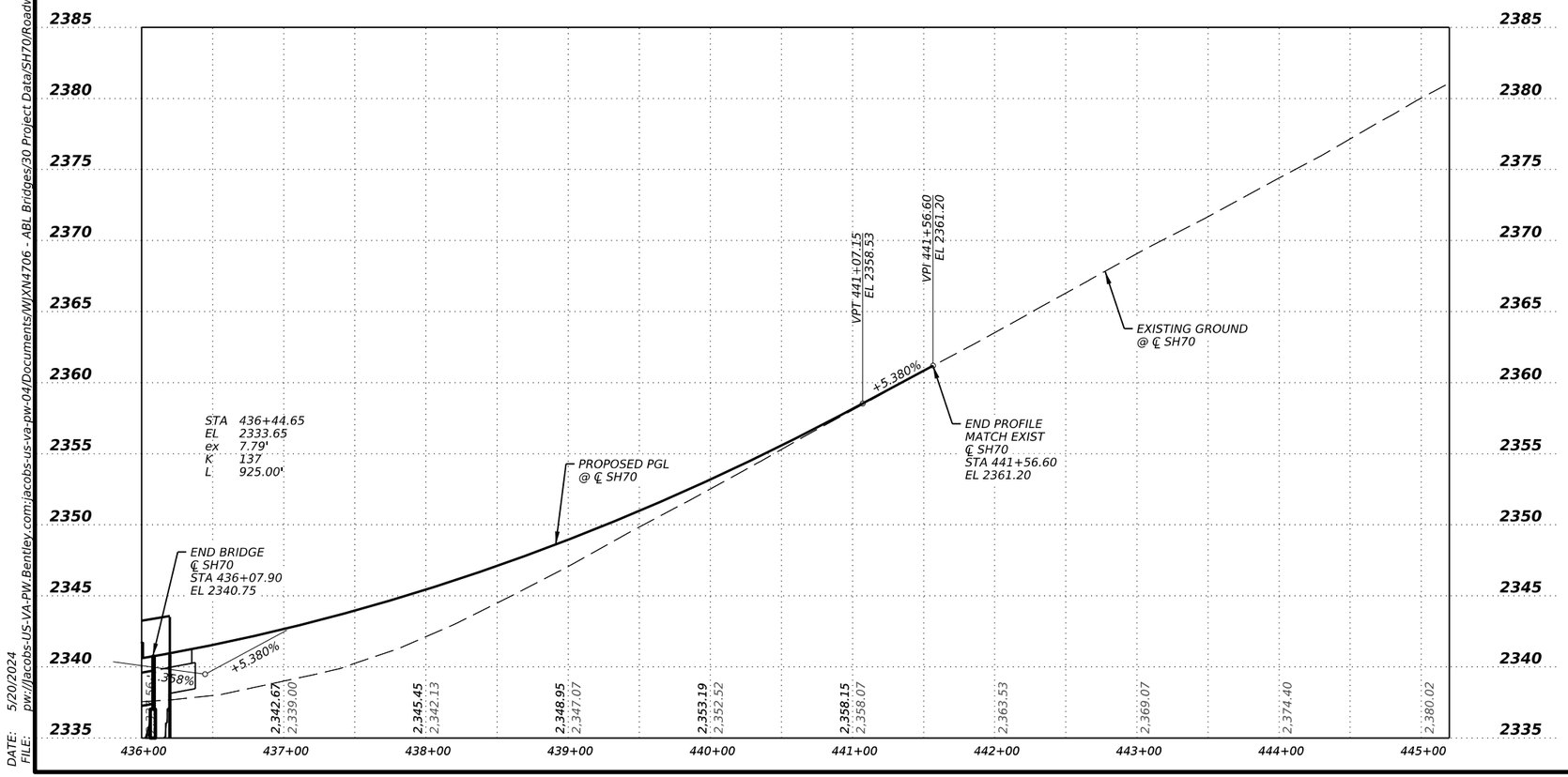
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		79





LEGEND

- PAVING LIMITS
- DRIVEWAY
- BRIDGE STONE RIPRAP
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- DIRECTION OF CREEK FLOW
- DRIVEWAY NO.



Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

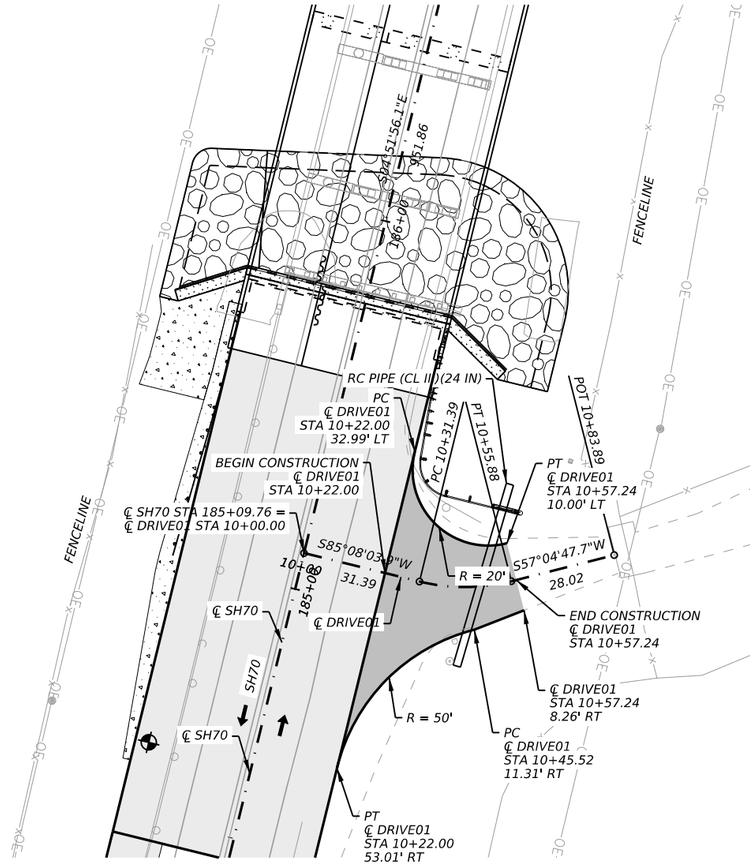
SH 70

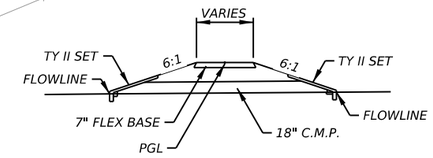
COTTONWOOD CREEK ROADWAY PLAN AND PROFILE

SHEET 2 OF 2

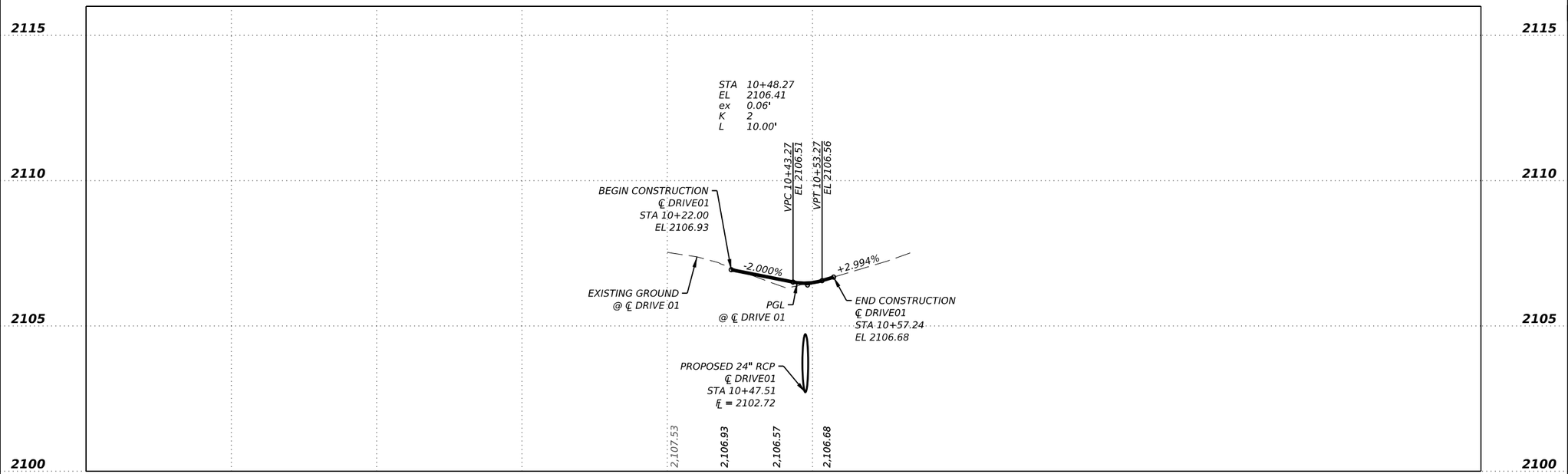
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		80

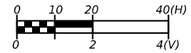
DATE: 5/20/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Plan & Profile/SH70_PP03.dgn





DRIVEWAY TYPICAL SECTION





LEGEND

- PAVING LIMITS
- DRIVEWAY
- BRIDGE STONE RIPRAP
- PROPOSED TRAFFIC
- EXISTING TRAFFIC
- DIRECTION OF CREEK FLOW
- DRIVEWAY NO.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

SWEETWATER CREEK
DRIVEWAY 01
PLAN AND PROFILE

SHEET 1 OF 1

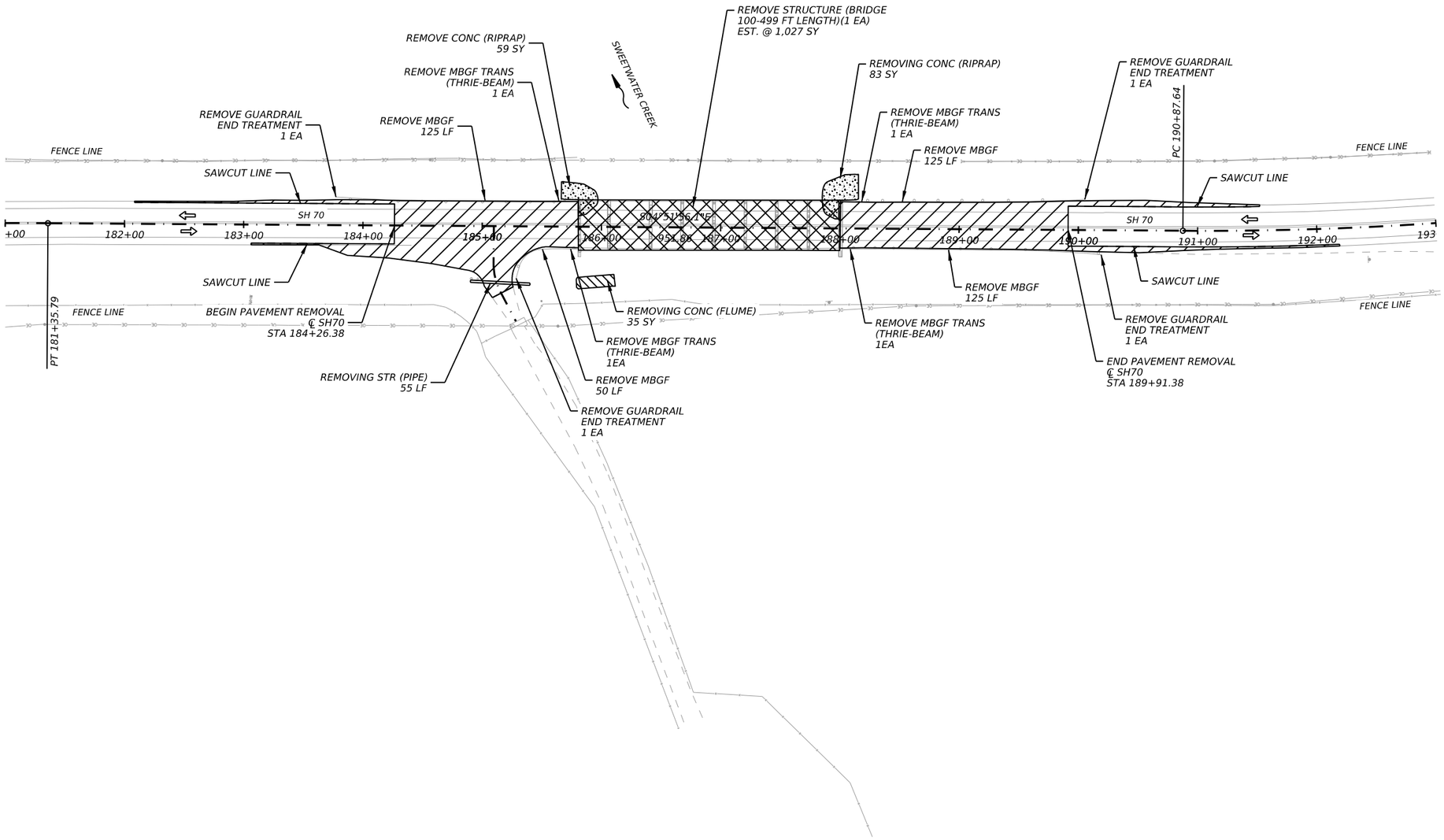
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		81

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Driveways/SH70_DRIVE01_PP.dgn

DW: CK: DW: CK:

0 50 100
SCALE IN FEET

LEGEND
EXISTING ASPHALT TO BE SCARIFIED
EXISTING BRIDGE TO BE REMOVED



Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

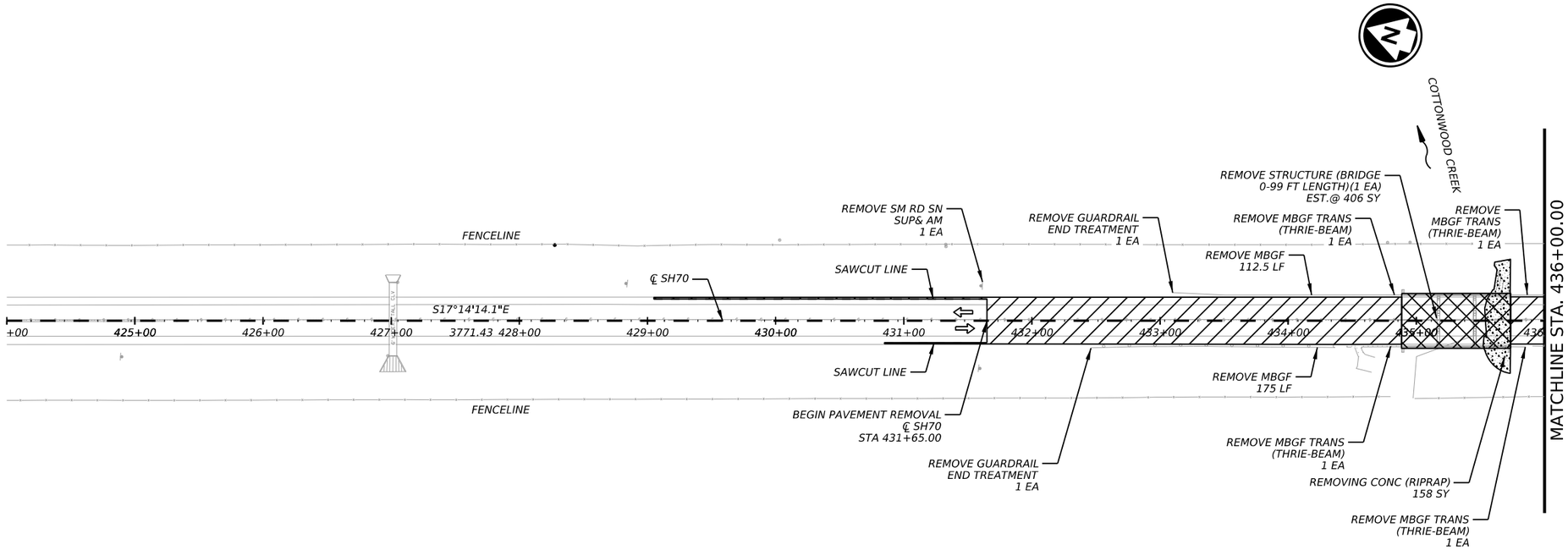
SH 70

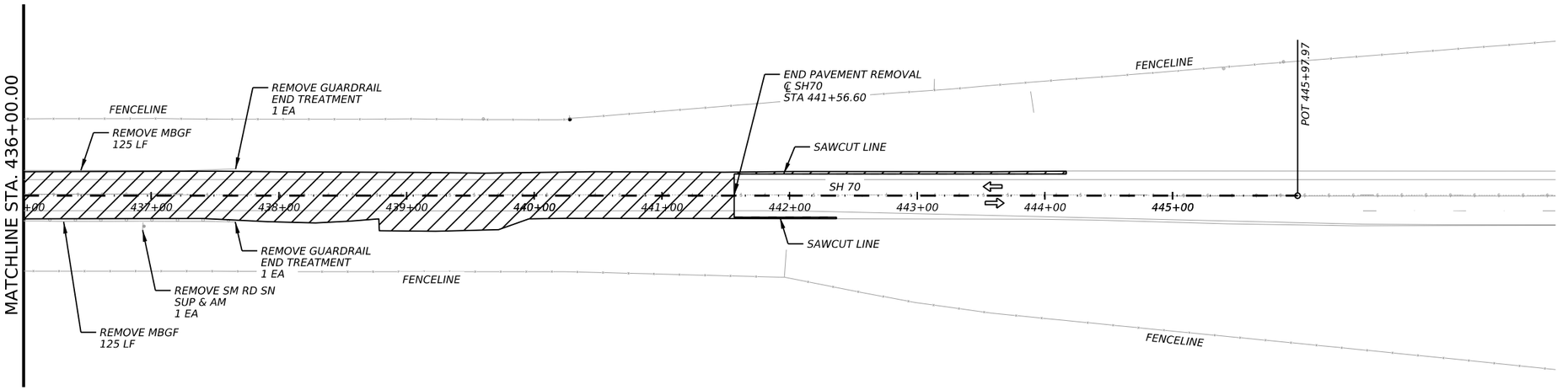
SWEETWATER CREEK REMOVAL PLAN

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		82

DATE: 5/20/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Removals/SH70_REM-01.dgn





0 50 100
SCALE IN FEET

LEGEND

EXISTING ASPHALT TO BE SCARIFIED

EXISTING BRIDGE TO BE REMOVED

NOTES:

1. TREE REMOVALS REQUIRED FOR ROADWAY CONSTRUCTION OR AS INDICATED BY THE ENGINEER SHALL BE INCLUDED AS SUBSIDIARY TO ITEM 100-6002, PREPARING ROW.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

5/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

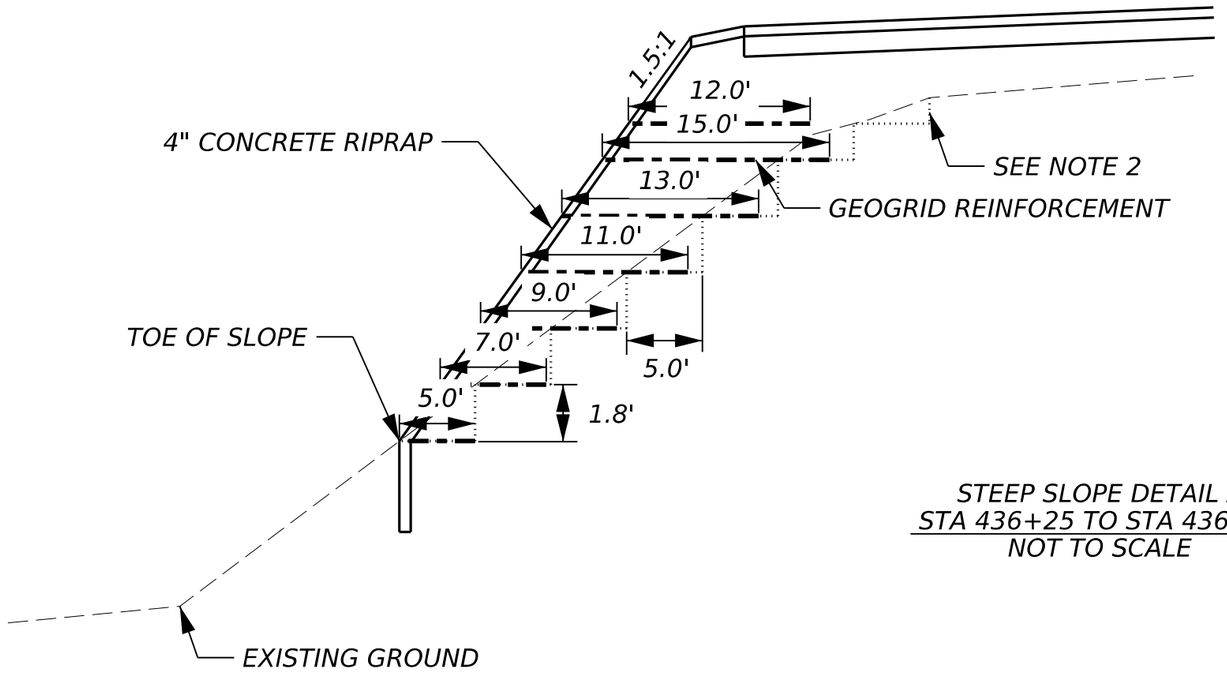
SH 70

COTTONWOOD CREEK
REMOVAL PLAN

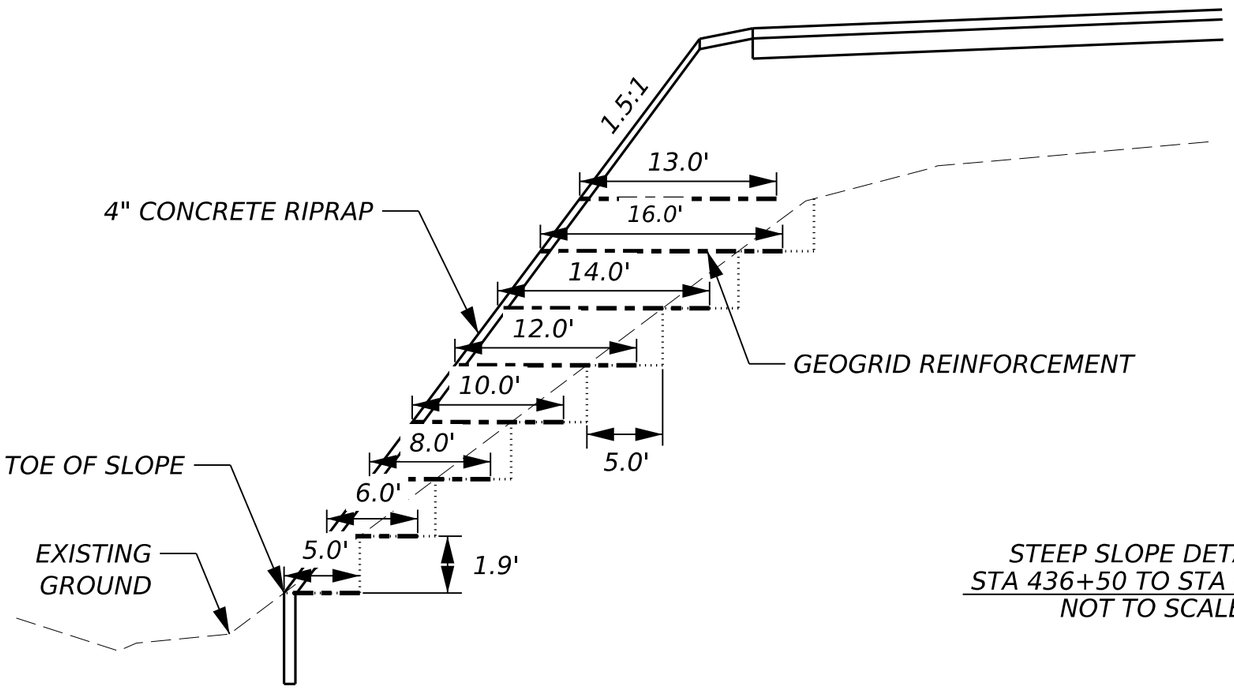
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		83

DATE: 5/20/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WIXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Removals/SH70_REM-02.dgn



STEEP SLOPE DETAIL A
STA 436+25 TO STA 436+50
NOT TO SCALE



STEEP SLOPE DETAIL B
STA 436+50 TO STA 436+75
NOT TO SCALE

NOTES:

1. CONSTRUCT SUCCEEDING BENCH CUTS AND EMBANKMENT PLACEMENT AND COMPACTION STARTING AT THE TOE OF SLOPE UPWARD.

2. ALL CUTS SHALL BE 1.8' TALL AS SHOWN ON THE DETAIL EXCEPT FOR THE FIRST ROW. THIS ROW SHALL BE 1.2' TALL.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED PROFESSIONAL ENGINEER

6/25/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

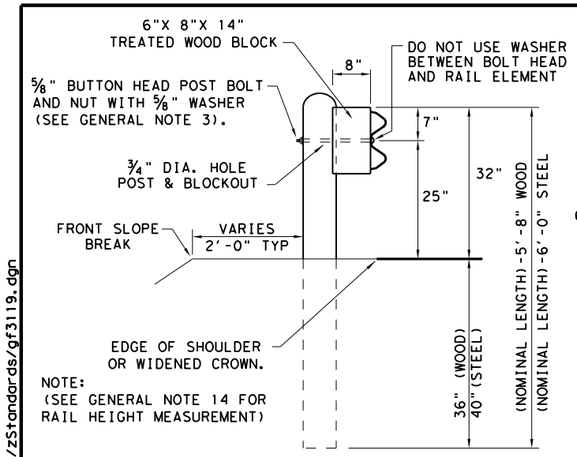
ROADWAY MISCELLANEOUS DETAILS

SHEET 1 OF 1

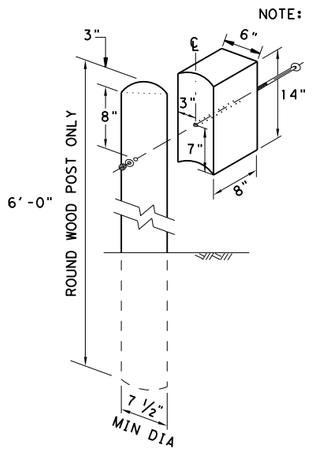
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		84

DATE: 6/25/2024
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/Typical Sections/SH70_MISC DETAILS.dgn

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/gf3119.dgn

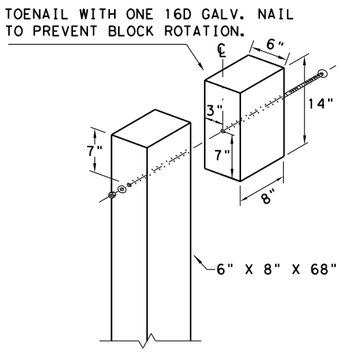


TYPICAL POST PLACEMENT

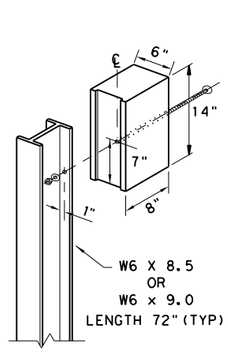


WOOD BLOCK TO ROUND WOOD POST

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

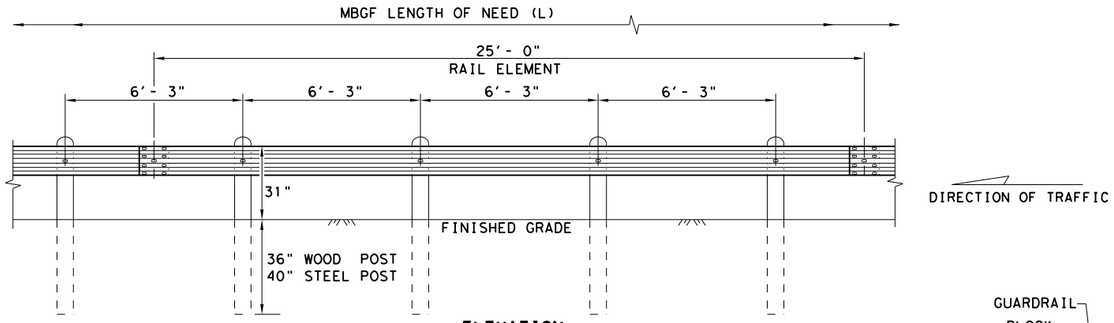


WOOD BLOCK TO RECTANGULAR WOOD POST



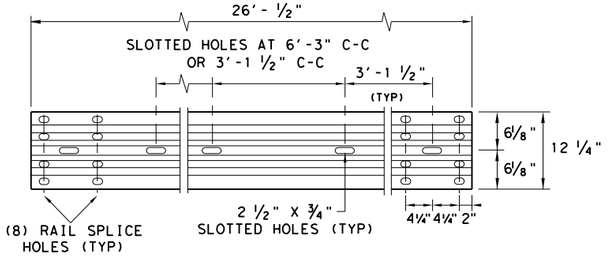
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



ELEVATION MID-SPAN RAIL SPLICE

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



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

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

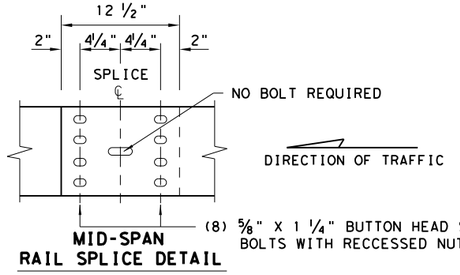
NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH — VARIES
FBB01 = 1 ¼"
FBB02 = 2"
⅝"

POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

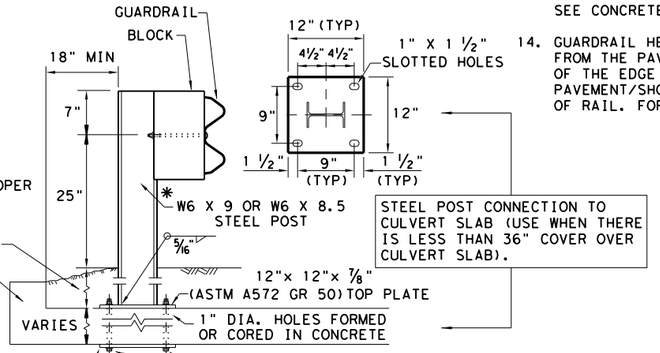
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

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

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

GENERAL NOTES

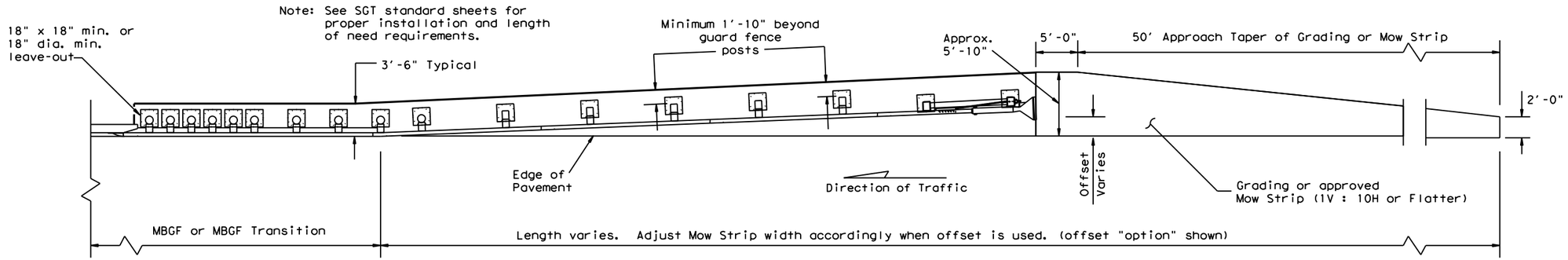
1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

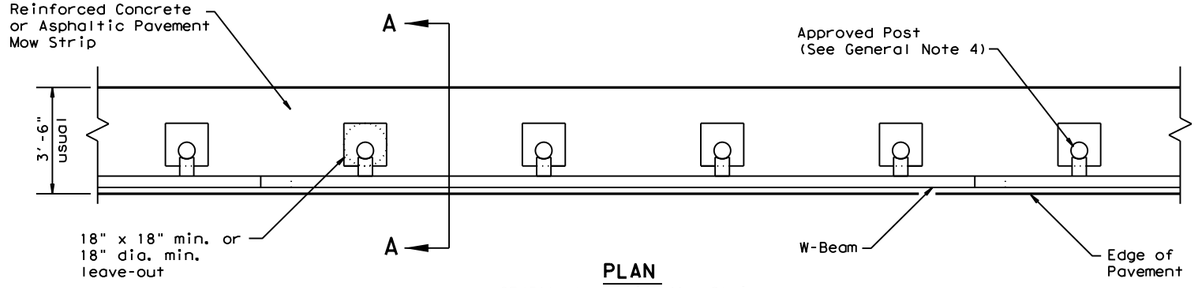
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		85

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/gf31ms19.dgn

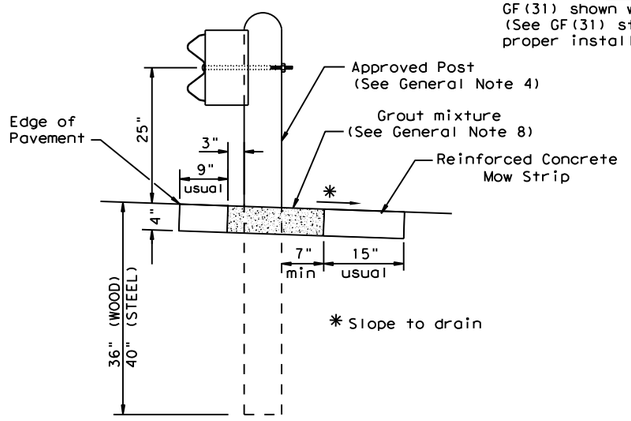


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



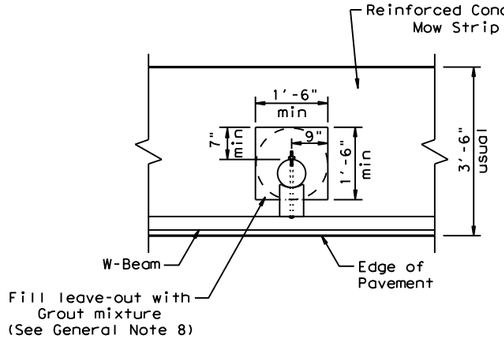
PLAN

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



SECTION A-A

Typical



MOW STRIP DETAIL

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

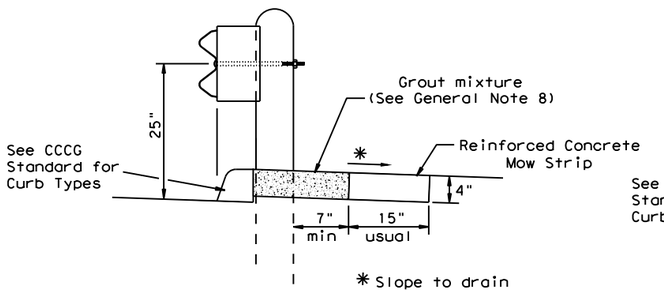
Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

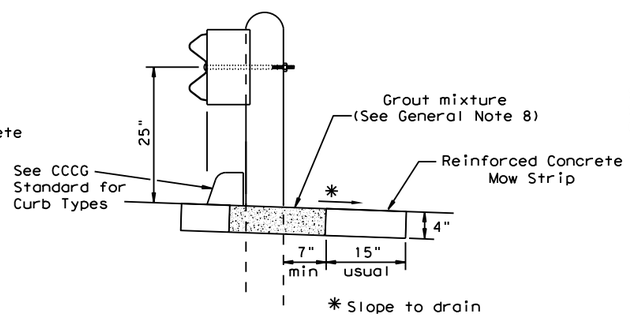
GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type I or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.



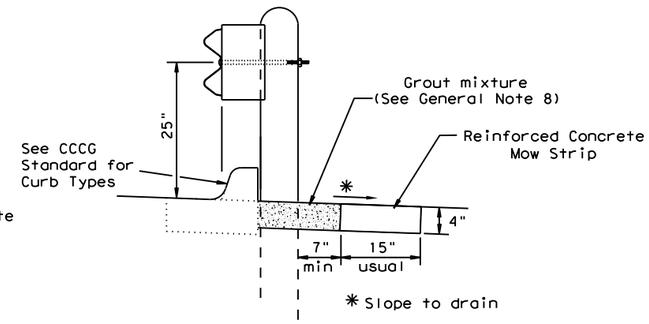
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Texas Department of Transportation

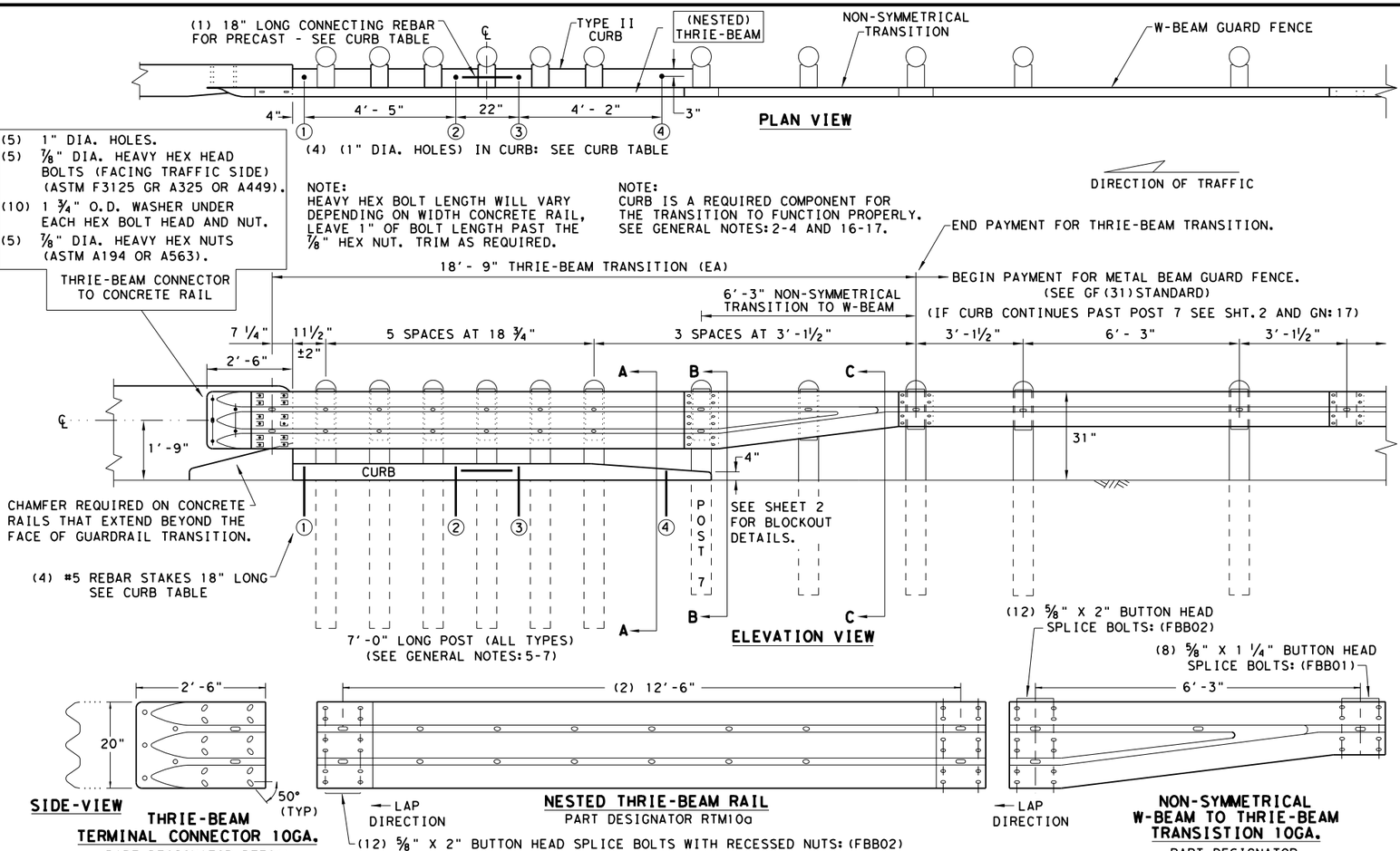
Design Division Standard

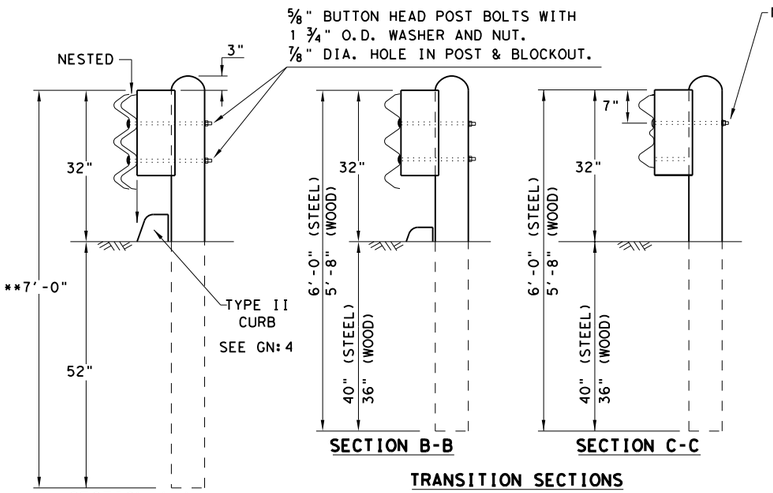
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

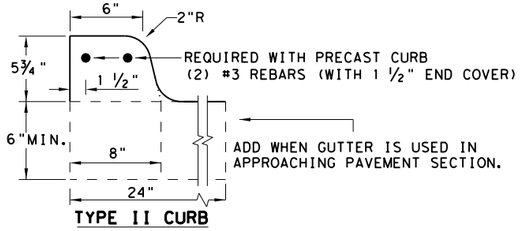
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		86

DATE: 5/20/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:Jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/gf31trt1320.dgn





THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2" THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.



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

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

TYPE II CURB DETAILS

GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED)(TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED)(STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

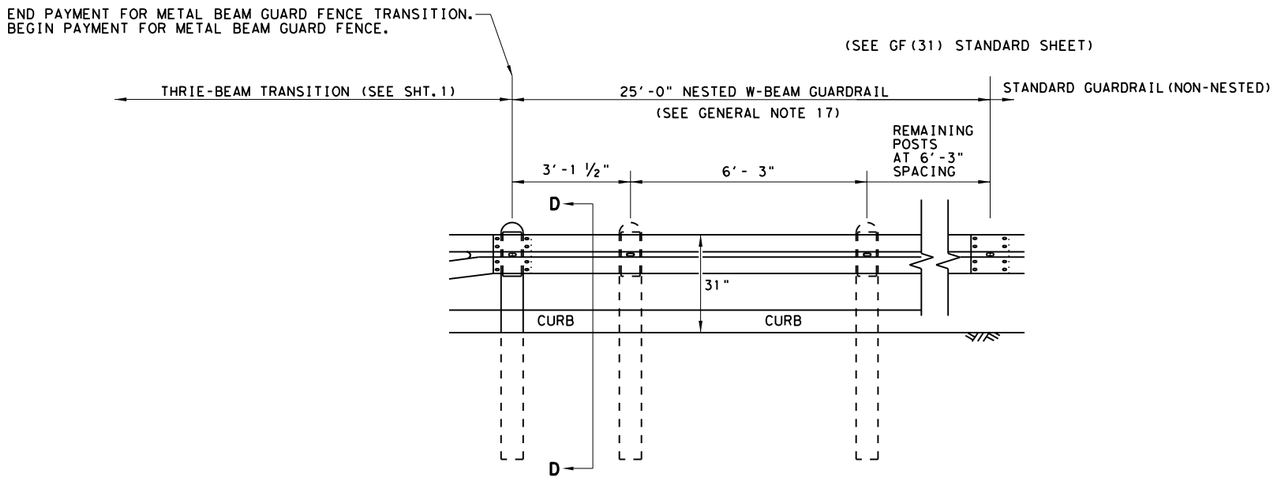
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

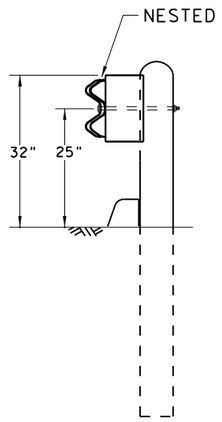
FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	DST	NOLAN		87

DATE: 5/20/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/gf31trt1320.dgn

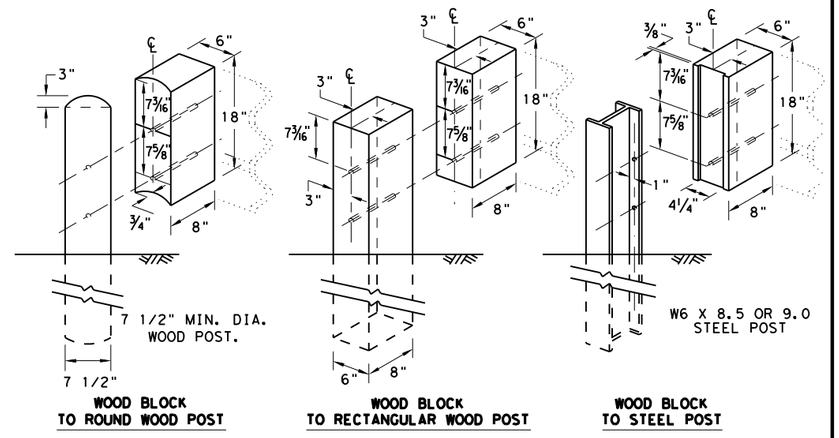
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0264	01	046, ETC	SH 70	
	DIST	COUNTY		SHEET NO.	
	DST	NOLAN		88	

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/sgt10s3116.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANGLE STRUT PN: 15202G

ANCHOR PADDLE PN: 15204A

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(1) POST(0)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

BEGIN LENGTH OF NEED

PLAN VIEW

TRAFFIC FLOW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)1½" X 6'-9 ⅝"

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

SoftStop FACE SEE GN(3) & NOTE:B

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE:C

POST 32" HEIGHT

31"

RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

SEE NOTE:A

(8) ⅝"x 1- ¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"x 1- ¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3) POST(2) 6'-0" (SYTP) PN: 15000G POST(1) 4'-9 ½" SYTP PN: 15203G POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"x 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1- ½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE:A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3 AT POST(0)

6'-5 ⅜" (W6 X 15) I-BEAM POST PN: 15205A

TRAFFIC FLOW

ALTERNATE BLOCKOUT SEE GENERAL NOTE:6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

LINE POST (3, 4, 5, 6, 7 & 8)

FINISHED GRADE

SECTION VIEW B-B

6'-0" (W6 X 8.5) I-BEAM POST PN: 533G

6" X 8" X 14" BLOCKOUT WOOD

W-BEAM RAIL 25'-0"

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

POST(2)

FINISHED GRADE

SECTION VIEW A-A

6'-0" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST 17"- ½" HEIGHT

4'-9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5) (SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

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

NOTE:A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE:B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE:C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅜")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE:B

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

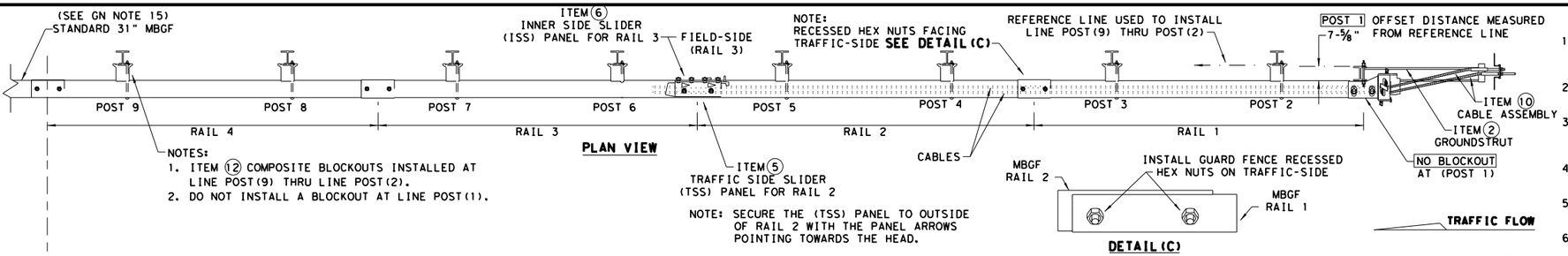
Texas Department of Transportation

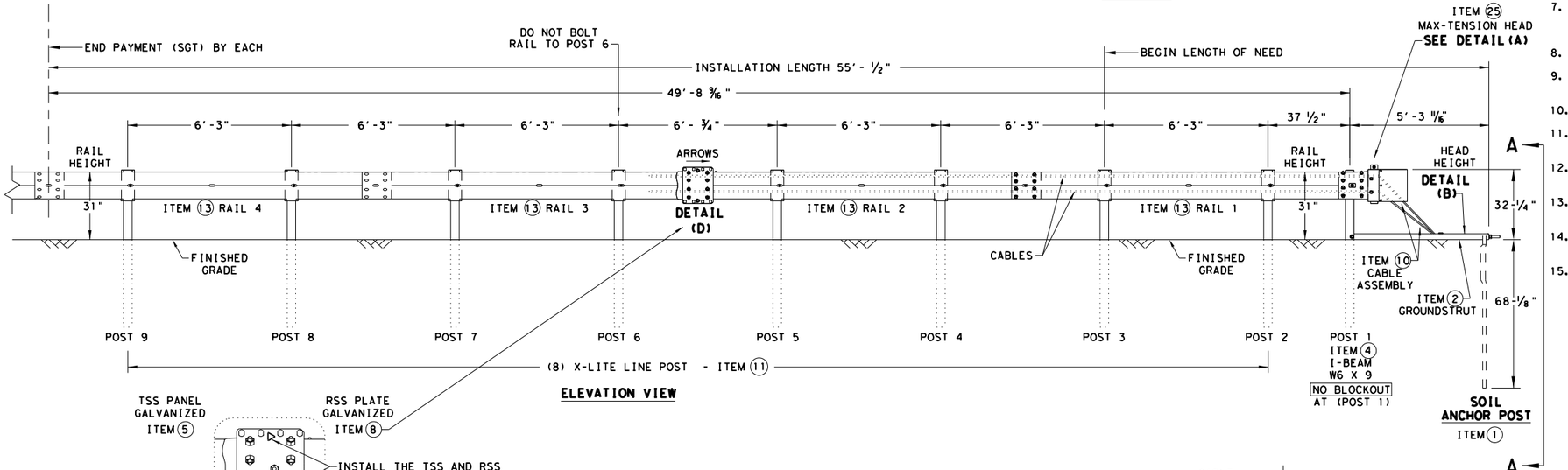
Design Division Standard

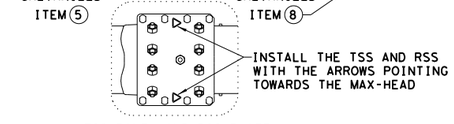
TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

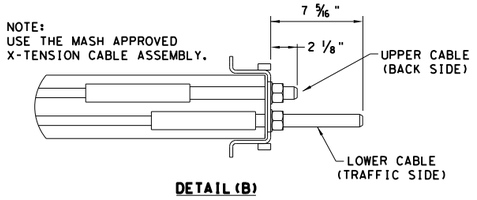
FILE: sgt10s3116	DN: TxDOT	CK: KM	DW: VP	CK: MB/VP
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		89

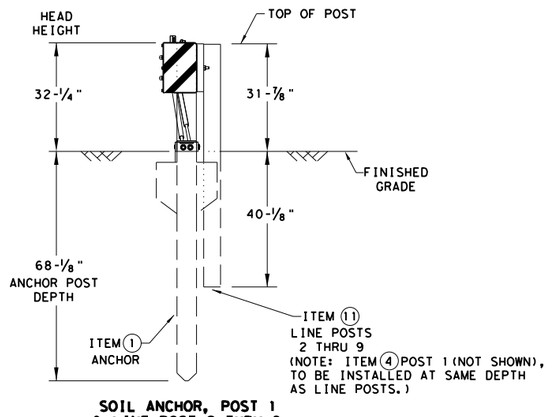
DATE: 5/16/2024
FILE: dw:://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABLS Springfield/Roadway/Sheet Sets/25 Standards/SGT11S31 18.dgn

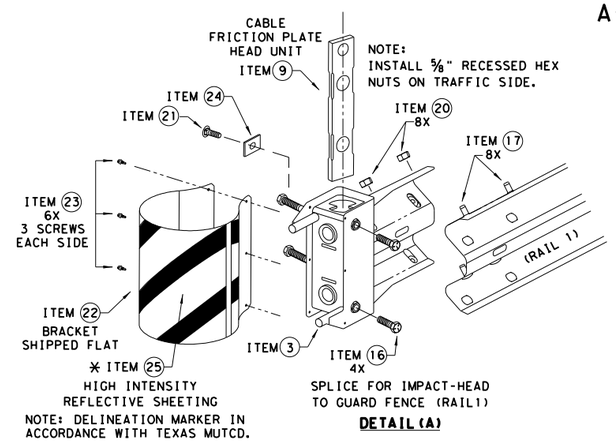


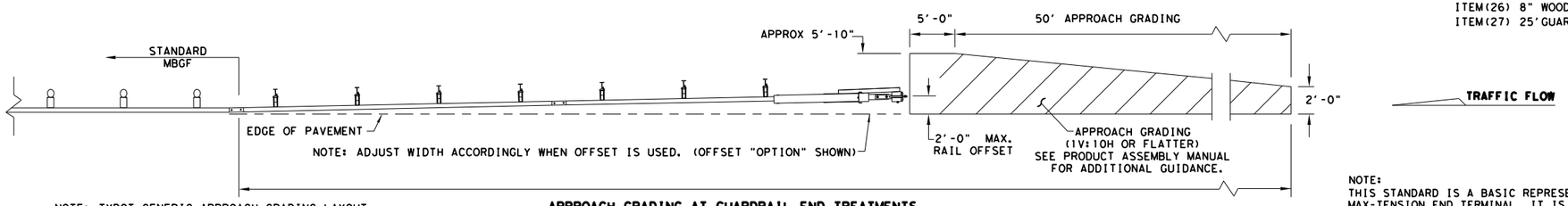












GENERAL NOTES

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

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	⅝" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	¾" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	⅝" X 1 ¼" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	⅝" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	⅝" WASHER F436 STRUCTURAL MGAL	2
20	4001116	⅝" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	⅝" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	¼" X ¾" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

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

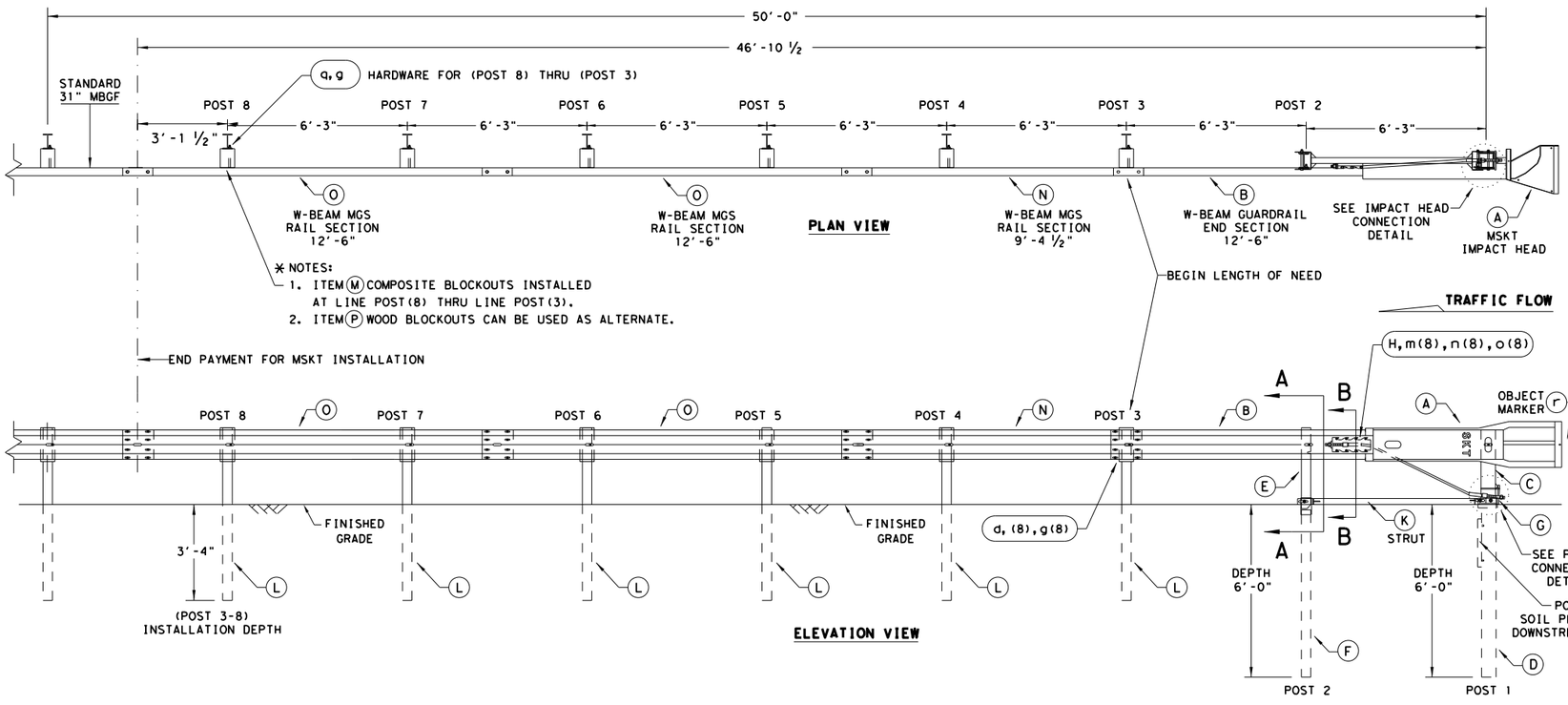
Texas Department of Transportation

Design Division Standard

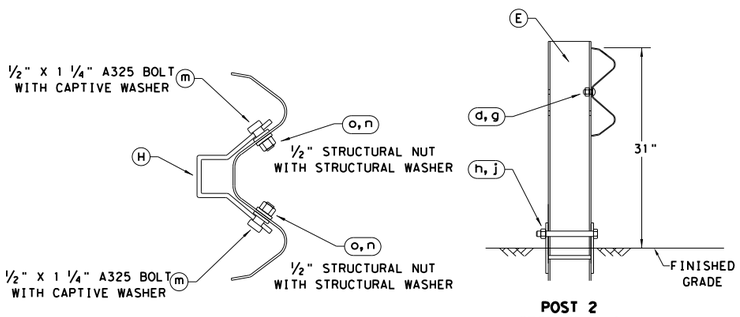
MAX-TENSION END TERMINAL
MASH - TL-3
SGT(11S)31-18

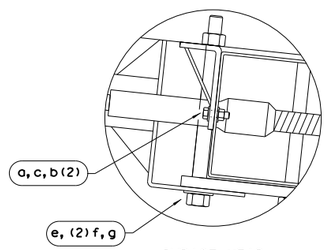
FILE: sgt11s3118.dgn	DN: TxDOT	CK: KM	DW: TxDOT	CK: CL
© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		90

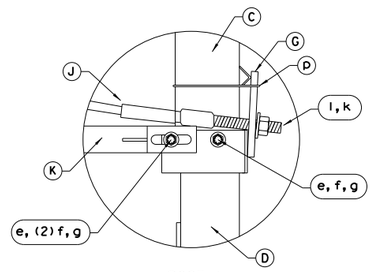
DATE: 5/16/2024
FILE: dw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/sgt12s3118.dgn

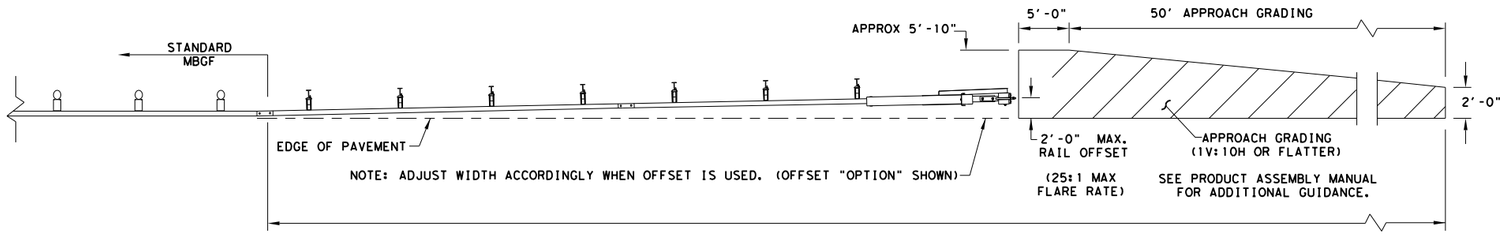


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

SEE NOTES: *

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

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/16" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 5/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

Texas Department of Transportation

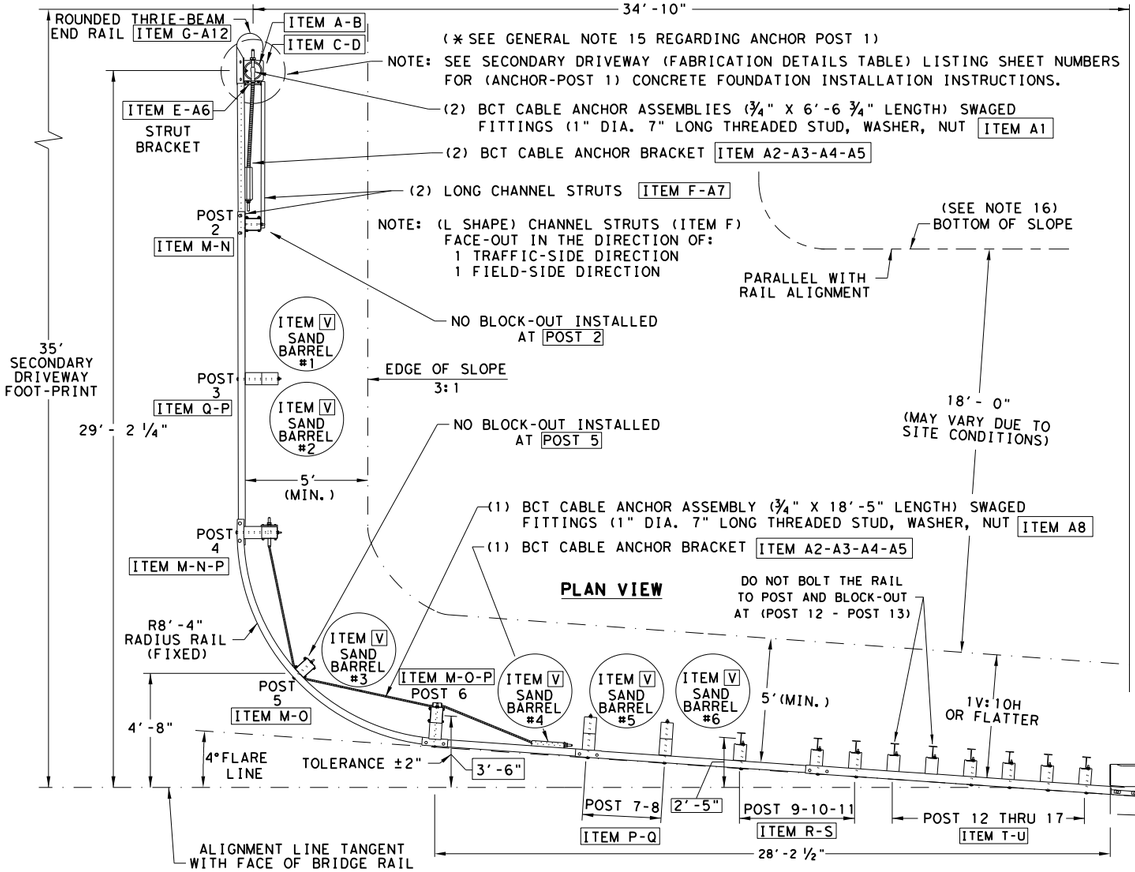
Design Division Standard

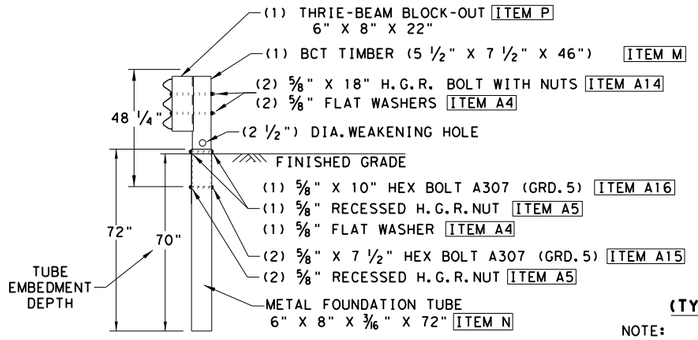
SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

SGT(12S)31-18

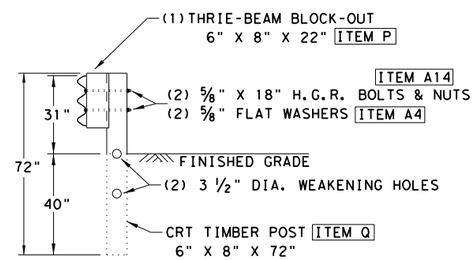
FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		91





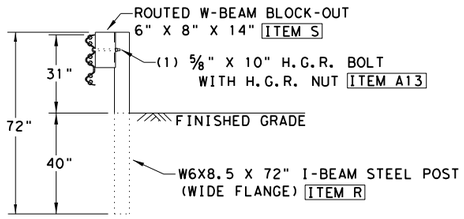
SECTION VIEW (A-A)
TIMBER POST WITH METAL FOUNDATION TUBE
(TYP) BCT POSTS 2-4-5-6

NOTE:
NO BLOCK-OUTS INSTALLED AT BCT POST 2 - POST 5

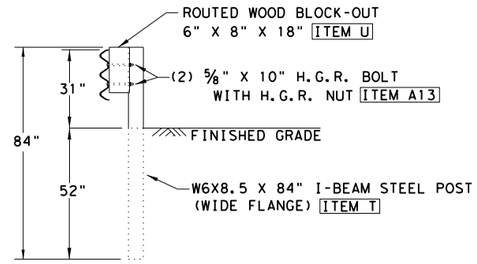


SECTION VIEW (B-B)
(TYP) CRT TIMBER POSTS 3-7-8

NOTE:
SEE SPECIAL APPLICATION NOTES ON SHEET 3 OF 3.
CRT POST WILL REQUIRE AN ADDITIONAL ¾" HOLE TO ACCOMMODATE THE 22" LONG BLOCKOUT.



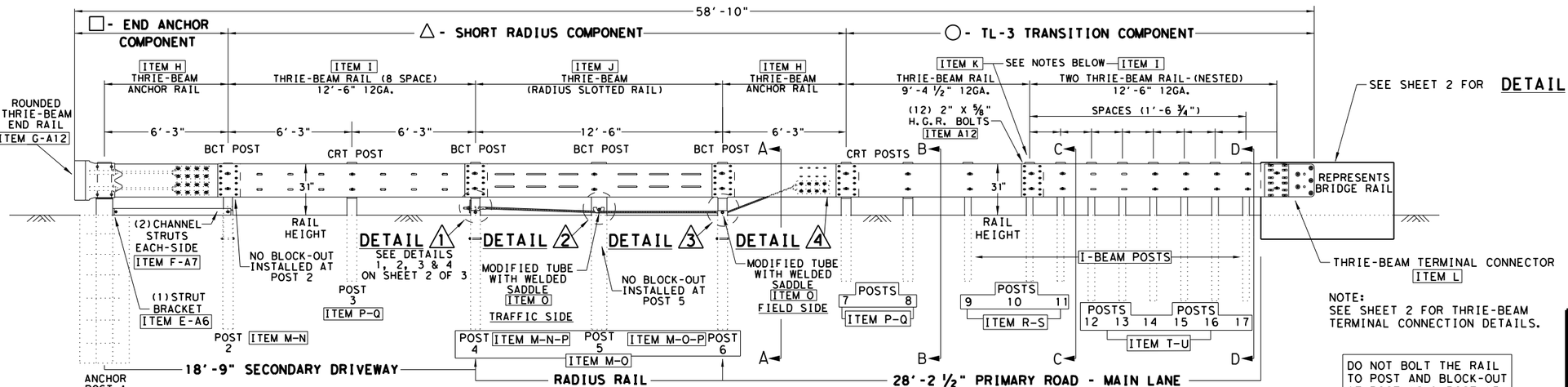
SECTION VIEW C-C
(TYP) AT POSTS 9-10-11



*** SECTION VIEW D-D**
(TYP) AT POSTS 12-13-14-15-16-17

DO NOT BOLT THE RAIL TO POST AND BLOCK-OUT AT (POST 12 & POST 13)

NOTE: FOR POST 12 & 13



SEE SHEET 2 FOR DETAIL 5 (PRIMARY BRIDGE RAIL CONNECTION)

NOTE:
SEE SHEET 2 FOR THRIE-BEAM TERMINAL CONNECTION DETAILS.

DO NOT BOLT THE RAIL TO POST AND BLOCK-OUT AT (POST 12 & POST 13)

NOTE: FOR POST 12 & 13

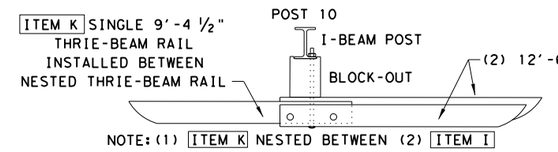
(MASH TL-3 COMPLIANT)
TESTED TO MASH TL-3 WITH A 3:1 SLOPE

ANCHOR POST 1 FABRICATION DETAILS	
SHEET DESCRIPTION	SHEET NUMBER
ANCHOR POST	SHEET 1 OF 8
ANCHOR SLEAVE	SHEET 2 OF 8
RADIUS RAIL	SHEET 3 OF 8
THRIE-BEAM RAILS	SHEET 4 OF 8
BCT TIMBER POST	SHEET 5 OF 8
STRUT RADIUS ANCHOR	SHEET 6 OF 8
FOUNDATION TUBE	SHEET 7 OF 8
ANCHOR CABLE	SHEET 8 OF 8

FULL-LENGTH ELEVATION VIEW

NOTE: ALL CABLE BRACKET ASSEMBLIES ARE LOCATED ON THE FIELD-SIDE. SHOWN HERE FOR CLARITY.

NOTE: FOR BCT POSTS 2-4-5-6 INSTALL (1) OR (2) ITEM A15-A4-A5 BOLT ASSEMBLIES TO PREVENT TIMBER POST SLIDING DOWN FOUNDATION TUBE.



NESTED-GUARDRAIL SPLICE AT POST 10

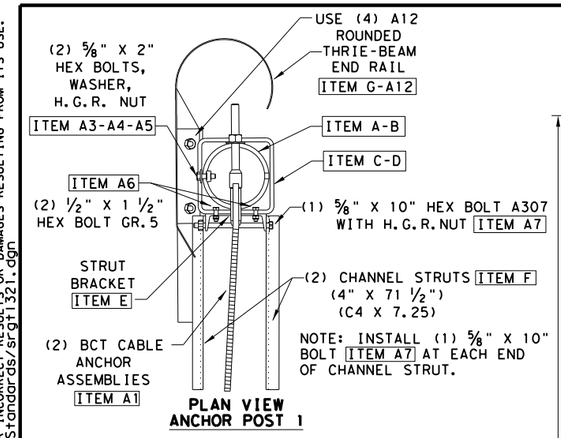
SHEET 1 OF 3

Texas Department of Transportation

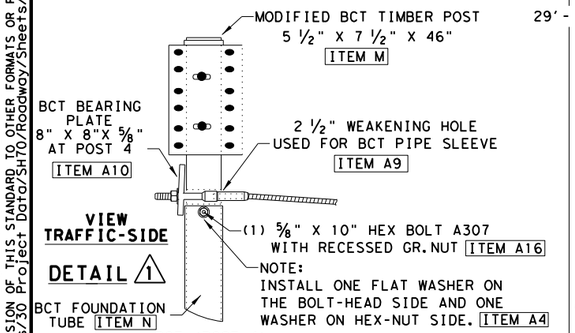
Design Division Standard

TL-3
SHORT RADIUS GUARDRAIL
MASH COMPLIANT
SRG(TL-3)-21

FILE: srgt1321	TxDOT	CK:KM	DN: VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		92



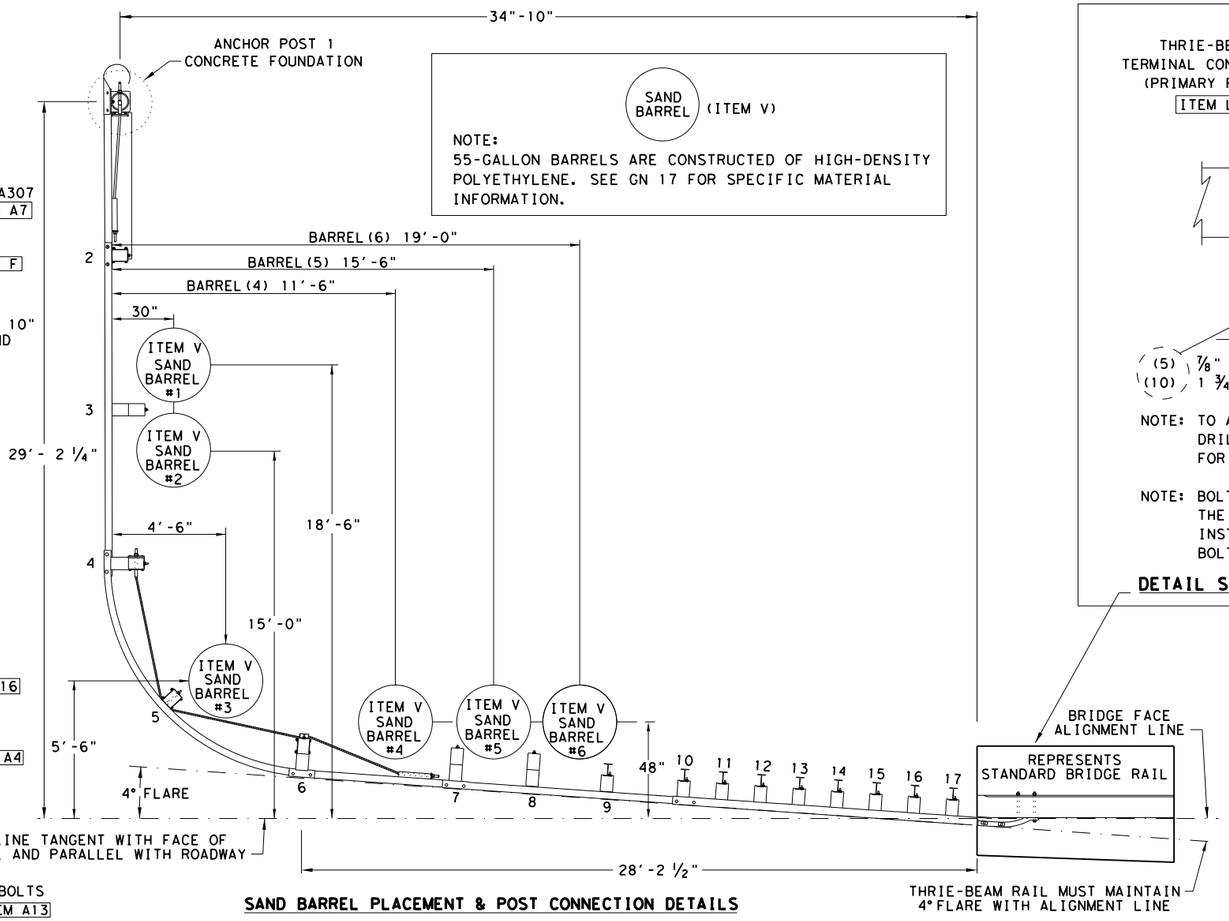
PLAN VIEW ANCHOR POST 1



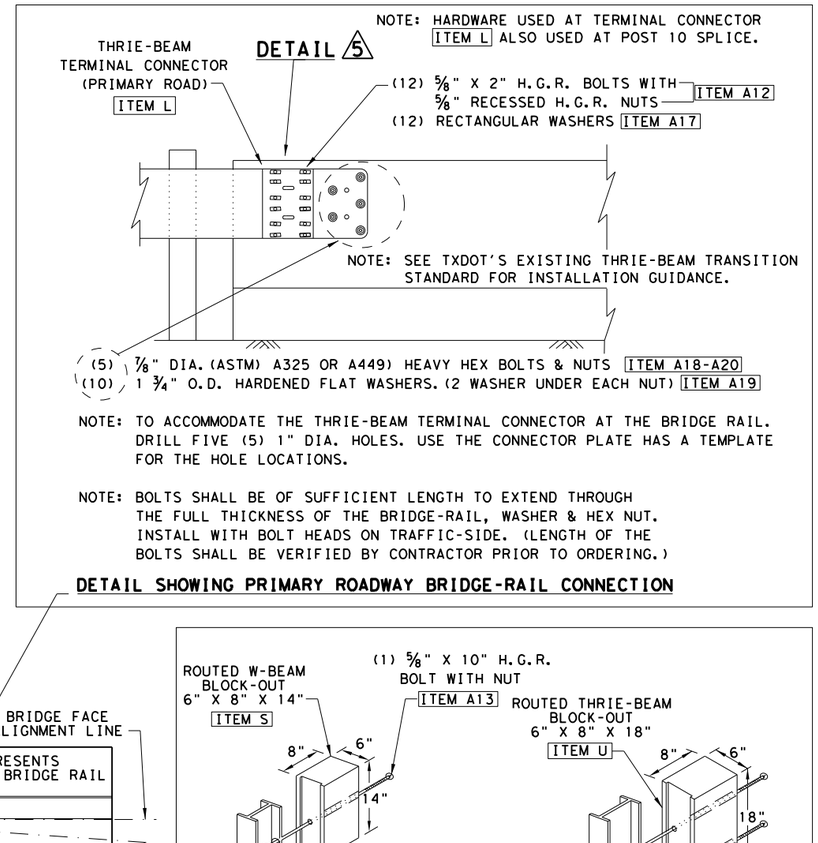
VIEW TRAFFIC-SIDE

DETAIL 1

BCT (POST 4) TIMBER POST WITH METAL FOUNDATION TUBE



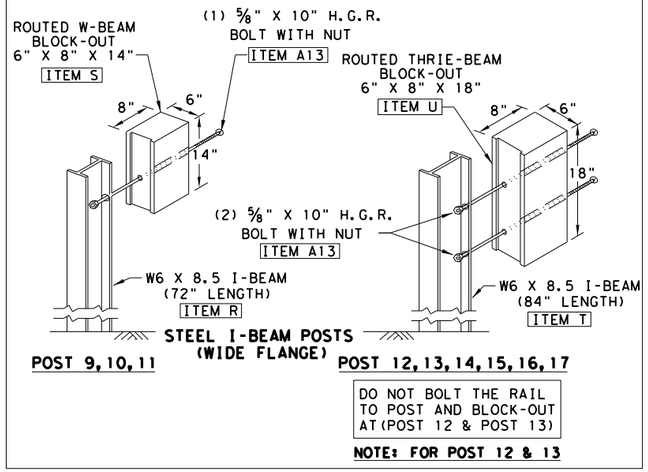
SAND BARREL PLACEMENT & POST CONNECTION DETAILS

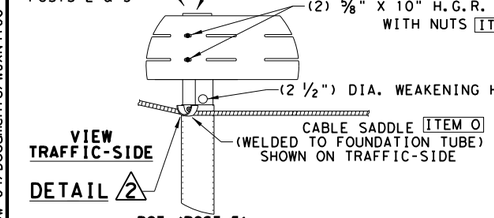


NOTE: TO ACCOMMODATE THE THRIE-BEAM TERMINAL CONNECTOR AT THE BRIDGE RAIL. DRILL FIVE (5) 1" DIA. HOLES. USE THE CONNECTOR PLATE HAS A TEMPLATE FOR THE HOLE LOCATIONS.

NOTE: BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE BRIDGE-RAIL, WASHER & HEX NUT. INSTALL WITH BOLT HEADS ON TRAFFIC-SIDE. (LENGTH OF THE BOLTS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING.)

DETAIL SHOWING PRIMARY ROADWAY BRIDGE-RAIL CONNECTION

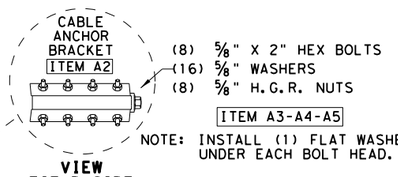




VIEW TRAFFIC-SIDE

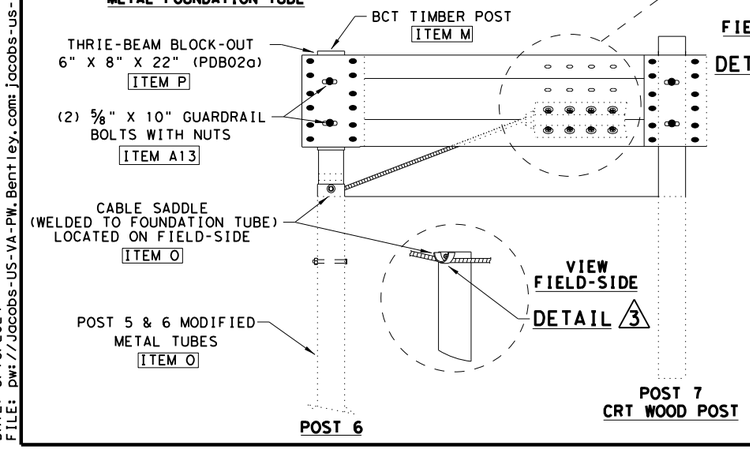
DETAIL 2

BCT (POST 5) TIMBER POST WITH METAL FOUNDATION TUBE



VIEW FIELD-SIDE

DETAIL 4



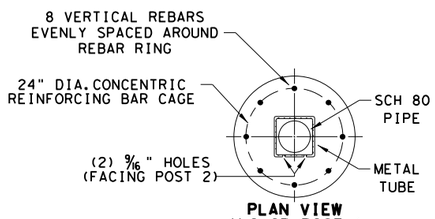
VIEW FIELD-SIDE

DETAIL 3

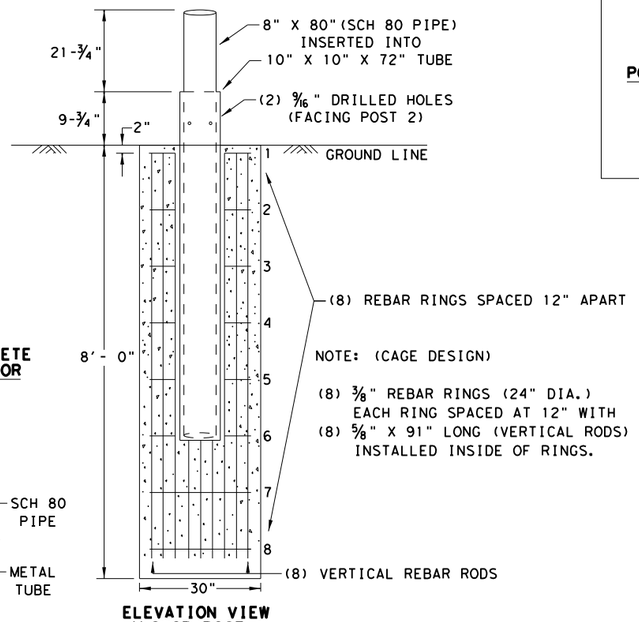
POST 6

POST 7 CRT WOOD POST

POST 1 REINFORCED CONCRETE FOUNDATION ANCHOR



PLAN VIEW ANCHOR POST 1



NOTE: (CAGE DESIGN)

(8) 3/8" REBAR RINGS (24" DIA.) EACH RING SPACED AT 12" WITH (8) 5/8" X 91" LONG (VERTICAL RODS) INSTALLED INSIDE OF RINGS.

ELEVATION VIEW ANCHOR POST 1

(MASH TL-3 COMPLIANT)
TESTED TO MASH TL-3 WITH A 3:1 SLOPE

Texas Department of Transportation — Design Division Standard

TL-3
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-3)-21

FILE: srgt1321	TxDOT	CK:KM	DN: VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		93

ITEM	ALL LARGE & SMALL COMPONENT DESCRIPTIONS	END ANCHOR (POST 1 & POST 2) □		TL-3 SHORT RADIUS (POST 2 TO POST 7) △		TL-3 TRANSITION (POST 7 TO POST 17) ○		TL-3 SHORT RADIUS GUARDRAIL COMPLETE SYSTEM	
		ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	TOTAL QTY
A	POST 1 TOP (SCH.80 PIPE) (8" X 80" LENGTH)	A	1					A	1
B	POST 1 TOP (WELDED SUPPORT COLLAR 10" X 10" X ½" ASTM A36)	B	1					B	1
C	POST 1 TUBE (HSS 10" X 10" X ½" X 72" LENGTH) A500 GR.B	C	1					C	1
D	POST 1 (WELDED PLATE 9 ¼" X 9 ¼" X ⅛") A36	D	1					D	1
E	POST 1 STRUT BRACKET (C8 X 11.50 A36)	E	1					E	1
F	(POST 1 & 2) CHANNEL STRUTS (4" X 71 ½")(C4 X 7.25)A36	F	2					F	2
G	THRIE-BEAM RAIL (END ANCHOR - ROUNDED TYPE) 12GA. (RTE02a)	G	1					G	1
H	THRIE-BEAM RAIL (ANCHOR) (6'-3" LENGTH) 12GA. (RWM14a)	H	1	H	1			H	2
I	THRIE-BEAM RAIL (8 SPACE) (12'-6" LENGTH) 12GA. (RTM08)			I	1	I	2	I	3
J	THRIE-BEAM RAIL (RADIUS 8'-4 ½") (SLOTTED) 12GA.			J	1			J	1
K	THRIE-BEAM RAIL (3 SPACE) (9'-4 ½" LENGTH) 12GA.					K	1	K	1
L	THRIE BEAM RAIL (TERMINAL CONNECTOR) (BRIDGE-RAIL) (RTE01b)					L	1	L	1
M	POST 2,4,5,6 BCT TIMBER (5 ½" X 7 ½" X 46") (PDF04)			M	4			M	4
N	POST 2,4, BCT TUBE (6" X 8" X 3/16" X 72" LENGTH) (PTE05)			N	2			N	2
O	POST 5,6 MODIFIED BCT TUBES (FOR WELDED CABLE SADDLES)			O	2			O	2
P	POST 3,4,6,7,8 THRIE-BEAM BLOCK-OUT (6" X 8" X 22")(PDB02a)			P	4	P	1	P	5
Q	POST 3,7,8 CRT TIMBER POSTS (6" X 8" X 72" LENGTH)(PDE09)			Q	2	Q	1	Q	3
R	POST 9,10,11 I-BEAM POSTS (W6X8.5 X 72" LENGTH) (PWE01)					R	3	R	3
S	POST 9,10,11 ROUTED W-BEAM BLOCK-OUT(6" X 8" X 14")(PDB01b)					S	3	S	3
T	POST 12 THRU 17 I-BEAM POSTS (W6X8.5 X 84" LENGTH) (PWE07)					T	6	T	6
U	POST 12 THRU 17 ROUTED BLOCK-OUT (6" X 8" X 18") (PDB??)					U	6	U	6
V	SAND BARRELS 700-715 LBS							V	6
A1	BCT CABLE ANCHOR ASSEMBLIES (¾" X 6'-6 ¾" LENGTH) (FCA01)	A1	2					A1	2
A2	BCT CABLE ANCHOR BRACKET (FPA01)	A2	2	A2	1			A2	3
A3	⅝" X 2" HEX BOLT A307 GRD.5 (FOR CABLE BRACKETS)	A3	18	A3	8			A3	26
A4	⅝" FLAT WASHER A307 GRD.5 (1 WASHER UNDER BOLT HEAD & 1 NUT)	A4	36	A4	40			A4	76
A5	⅝" RECESSED H.G.R NUT (NUTS FOR HEX BOLTS)	A5	22	A5	20			A5	42
A6	STRUT BRACKET HARDWARE (½" X 1 ½") HEX BOLT A307 GRD.5	A6	2					A6	2
A7	CHANNEL STRUT HARDWARE (⅝" X 10") HEX BOLT A307 GRD.5	A7	2					A7	2
A8	BCT CABLE ANCHOR ASSEMBLY (FCA02) (¾" X 18'-5" LENGTH)			A8	1			A8	1
A9	BCT POST SLEEVE (FMM02a) (POST 4 ONLY)			A9	1			A9	1
A10	BCT CABLE BEARING PLATE (⅝" X 8" X 8" (FPB01) (POST 4 ONLY)			A10	1			A10	1
A11	⅝" X 1 ¼" H.G.R. BOLTS (FBB01) (SPLICES AT POST 2,4,6,7)			A11	48			A11	48
A12	⅝" X 2" H.G.R. BOLTS (FBB02)(ROUND TERM-POST 10-END SPLICE)	A12	4			A12	24	A12	28
A13	⅝" X 10" H.G.R. BOLTS (FBB03) (I-BEAM POSTS RAIL & BLOCKOUT)					A13	18	A13	18
A14	⅝" X 18" H.G.R. BOLTS (FBB04) (POSTS 3,4,6,7,8)			A14	8	A14	2	A14	10
A15	⅝" X 7 ½" HEX BOLTS A307 GRD.5 (BCT POSTS 2,4,5,6)			A15	8			A15	8
A16	⅝" X 10" HEX BOLTS A307 GRD.5 (BCT POSTS 2,4,5,6)			A16	4			A16	4
A17	RECTANGULAR WASHERS (FWR03) (FOR TERMINAL CONNECTOR RTE01b)					A17	12	A17	12
A18	⅞" X (LENGTH VARIES) HEX BOLTS A325 OR A449 GR.5					A18	5	A18	5
A19	1 ¾" O.D. HARDENED FLAT WASHER A325					A19	10	A19	10
A20	⅞" HEX NUT GR.5 A325					A20	5	A20	5

GENERAL NOTES

1. FOR ADDITIONAL INSTALLATION INFORMATION AND GUIDANCE CONTACT: TEXAS DEPARTMENT OF TRANSPORTATION, (TXDOT'S DESIGN DIVISION). (512) 416-2678. THE EXACT POSITION OF MBGF SHALL BE SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE SIGHT DISTANCE OF THE INSTALLATION WILL NEED TO BE VERIFIED WITH RESPECT TO THE SPECIFIC SITE PLACEMENT.
2. STEEL POSTS ARE NOT PERMITTED AT CRT OR BCT POST POSITIONS.
3. RAIL ELEMENT SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 12 ½" OR 25 FOOT NOMINAL LENGTHS.
4. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
5. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
7. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A SLOPE RATE OF NOT MORE THAN 1V:10H.
8. IT IS NOT RECOMMENDED THAT GUARD FENCE BE PLACED IN THE VICINITY OF CURBS.
9. GUARDRAIL POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
10. SPECIAL FABRICATION WILL BE REQUIRED FOR THRIE BEAM RAIL RADIUS (ITEM J).
11. ALL MATERIAL AND WORK INVOLVED IS SUBSIDIARY TO SHORT RADIUS BID ITEM, INCLUDING, BUT NOT LIMITED TO FOUNDATIONS, GRADING, THRIE BEAM RAIL, SAND BARRELS, AND OTHER PARTS.
12. ALL CABLE ASSEMBLIES SHOULD BE TAUT AFTER INSTALLATION. WHEN CABLES ARE MANIPULATED BY HAND THE CABLES SHOULD NOT MOVE MORE THAN 1" IN ANY DIRECTION PERPENDICULAR TO THE CABLE.
13. THE BCT BEARING PLATE INSTALLED AT POST 4 SHOULD BE ORIENTED SUCH THAT THE 3" DIMENSION FROM PLATE EDGE TO CENTER OF BOLT HOLE IS ON THE BOTTOM AND 5" DIMENSION FROM PLATE EDGE TO CENTER OF BOLT HOLE IS ON THE TOP.
14. FOUNDATION AT POST 1 SHALL BE CLASS C CONCRETE.
*15. POST (1) IS NOT A CRASHWORTHY TERMINAL. THE DESIGN AND PLACEMENT OF POST (1) MUST BE OUTSIDE OF THE CLEAR ZONE OF THE SECONDARY ROADWAY USING THE RESPECTIVE CLEAR ZONE CRITERIA. PLEASE CONTACT THE DESIGN DIVISION (512) 416-2678 FOR ASSISTANCE IN DETERMINING THE APPROPRIATE USE AND/OR PLACEMENT OF THE SYSTEM IN CONSTRAINED LOCATIONS. THE PAYMENT OF THE COMPLETE SYSTEM WILL BE WITH BID ITEMS: 540 XXXX TL-3 31" SHORT RADIUS (COMPLETE).
16. TESTED TO MASH WITH A 3:1 SLOPE OR SHALLOWER IS PREFERABLE IN THE LIMITS OF THE TOP AND BOTTOM OF THE SLOPE AS SHOWN IN THE PLAN VIEW. IF FIELD CONDITIONS REQUIRE A STEEPER SLOPE, THIS MAY BE ALLOWABLE UP TO A 2:1 SLOPE. CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE.
17. THE BARRELS ARE ENERGY ABSORPTION ENERGITE III, MODEL 640 FILLED WITH 715 LB (+/-15) SAND; OR AN APPROVED EQUIVALENT. THE APPROXIMATE HEIGHT OF THE BARREL IS 41" (+/-).
18. ALTERNATE METHODS TO TERMINATE THE SRG ALONG THE PRIMARY ROADWAY ARE AVAILABLE WHEN SITE CONDITIONS DICTATE. CONTACT DESIGN DIVISION FOR DETAILS: 512 416-2678

NOTE: SEE SHEET 1 OF 3.

(MASH TL-3 COMPLIANT)
TESTED TO MASH TL-3 WITH A 3:1 SLOPE

SPECIAL APPLICATION NOTES.

1. THIS IS A MASH COMPLIANT TL-3 SHORT RADIUS GUARDRAIL SYSTEM WITH A TOP RAIL HEIGHT OF 31". AVAILABLE FOR USE ON ANY SPEED ROADWAY. THE SYSTEM REQUIRES A MINIMUM PLACEMENT FOOTPRINT OF 34'-10" ALONG THE PRIMARY ROAD AND A 35'-0" ALONG SECONDARY DRIVEWAY.
2. IT IS CRITICAL THAT THE PRIMARY GUARDRAIL MAINTAIN A (4 DEGREE FLARE) WITH THE SECONDARY DRIVEWAY.
3. THE SYSTEM REQUIRES A MINIMUM 5' WIDE (WORK ZONE) DIRECTLY BEHIND THE GUARDRAIL SYSTEM WITH A SLOPE AT 1V:10H OR FLATTER FROM THERE A MAXIMUM 3:1 SLOPE IS RECOMMENDED. SEE SHEET 1 OF 3 FOR FLARE AND SLOPE DETAILS.
4. NOTE FOR INSTALLER: THE THREE (3) CRT POSTS ITEM (Q), AT POST LOCATIONS, 3, 7, & 8.), REQUIRE THE FOLLOWING FIELD ADJUSTMENT. USING A ¾" X 10" LONG SPADE BIT DRILL ONE (1) ADDITIONAL HOLE 7-⅞" DIRECTLY BELOW THE EXISTING TOP HOLE TO ACCOMMODATE THE HARDWARE FOR THE 22" LONG BLOCKOUT.

   OPTION FOR ADDITIONAL ¾" HOLE. THE 22" LONG BLOCKOUT (PDB01a) IS MANUFACTURED WITH TWO ¾" DRILLED HOLES FOR THE POST HARDWARE, THEREFORE THE BLOCKOUT CAN BE USED AS A TEMPLATE GUIDE FOR THE BOTTOM ¾" HOLE. AFTER INSTALLING THE CRT POST USE THE TOP HOLE TO MOUNT THE 22" LONG BLOCKOUT TO POST, USE THE BLOCKOUT'S PRE-DRILLED HOLE AS A GUIDE FOR THE BOTTOM ¾" HOLE.

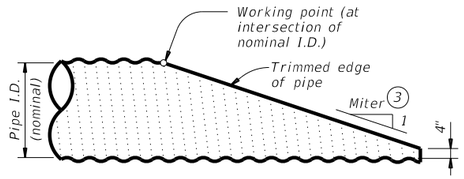
Texas Department of Transportation — Design Division Standard

TL-3 SHORT RADIUS GUARDRAIL MASH COMPLIANT

SRG(TL-3)-21

FILE: srgt1321	TxDOT	CK:KM	DN: VP	CK:CGL
© TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		94

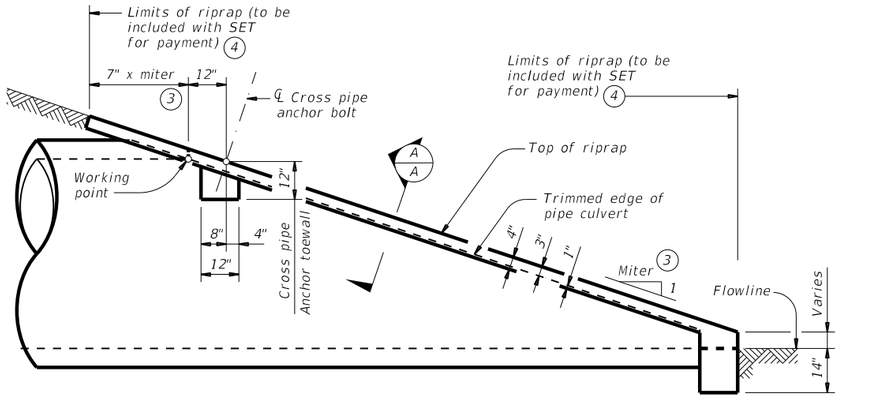
DATE: 5/16/2024 4:31:31 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/2Standards/CD-SETP-CD-20.dgn



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

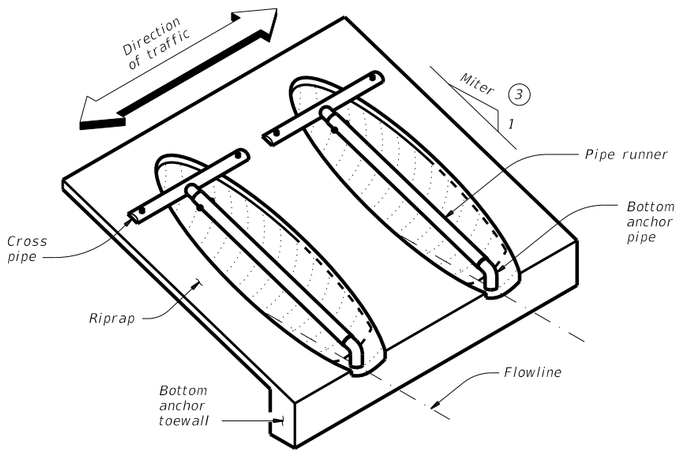
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' - 7"	3' - 5"	N/A	N/A	N/A	5' - 10"	N/A	N/A	N/A	8' - 1"	N/A	N/A	N/A	12' - 9"
27"	1' - 8"	3' - 8"	N/A	N/A	5' - 5"	6' - 11"	N/A	N/A	7' - 7"	9' - 7"	N/A	N/A	11' - 11"	14' - 11"
30"	1' - 10"	3' - 11"	N/A	N/A	6' - 4"	8' - 0"	N/A	N/A	8' - 9"	11' - 0"	N/A	N/A	13' - 8"	17' - 0"
33"	1' - 11"	4' - 2"	6' - 2"	6' - 5"	7' - 3"	9' - 1"	8' - 6"	8' - 10"	10' - 0"	12' - 5"	13' - 3"	13' - 9"	15' - 5"	19' - 2"
36"	2' - 1"	4' - 5"	6' - 11"	7' - 3"	8' - 2"	10' - 2"	9' - 6"	9' - 11"	11' - 2"	13' - 10"	14' - 9"	15' - 3"	17' - 2"	21' - 3"
42"	2' - 4"	4' - 11"	8' - 6"	8' - 10"	9' - 11"	12' - 4"	11' - 7"	12' - 0"	13' - 6"	16' - 8"	17' - 9"	18' - 5"	20' - 8"	25' - 7"
48"	2' - 7"	5' - 5"	10' - 1"	10' - 5"	11' - 9"	N/A	13' - 7"	14' - 2"	15' - 10"	N/A	20' - 9"	21' - 6"	24' - 2"	N/A
54"	3' - 0"	5' - 11"	11' - 8"	12' - 1"	N/A	N/A	15' - 8"	16' - 3"	N/A	N/A	23' - 10"	24' - 8"	N/A	N/A
60"	3' - 3"	6' - 5"	13' - 3"	N/A	N/A	N/A	17' - 9"	N/A	N/A	N/A	26' - 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' - 0"
4" STD	4.500"	4.026"	19' - 8"
5" STD	5.563"	5.047"	34' - 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

Texas Department of Transportation

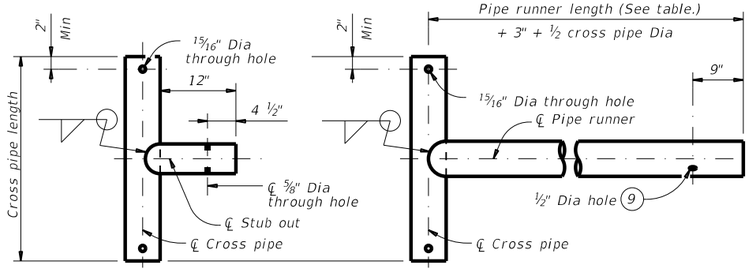
Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

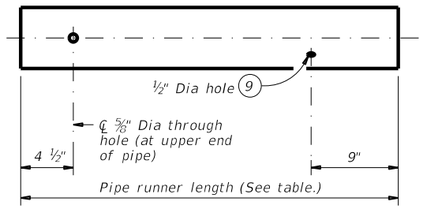
FILE: CD-SETP-CD-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		95

DATE: 5/16/2024 4:31:32 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SHTO/Roadway/Sheets/2Standards/CD-SETP-CD-20.dgn



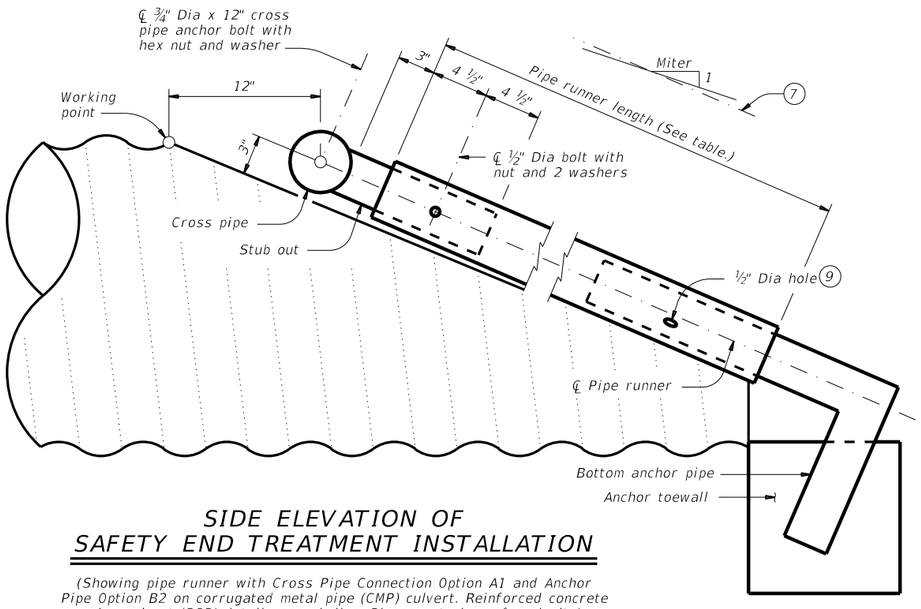
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



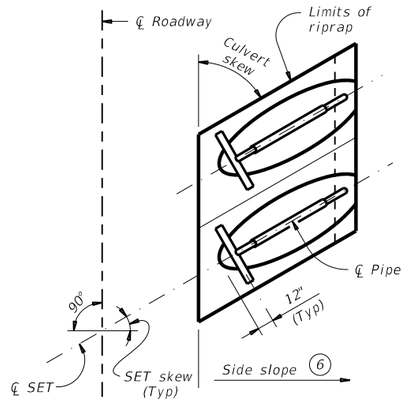
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

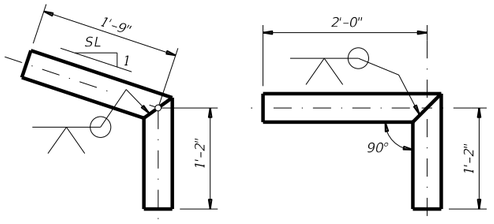


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

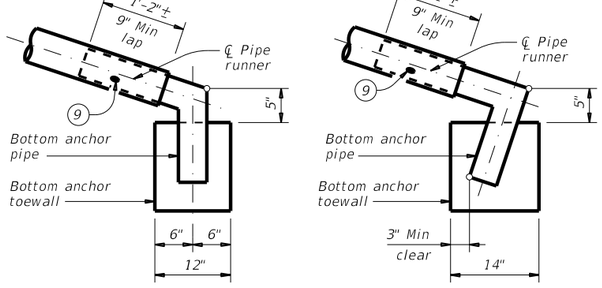


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

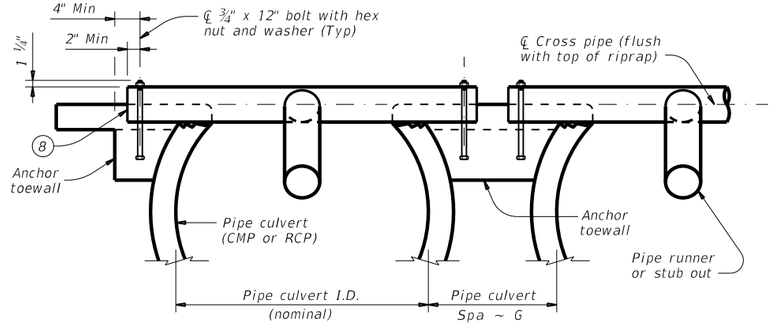
BOTTOM ANCHOR PIPE DETAILS (10)



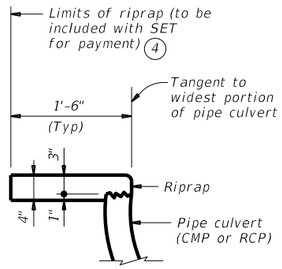
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

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.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap."

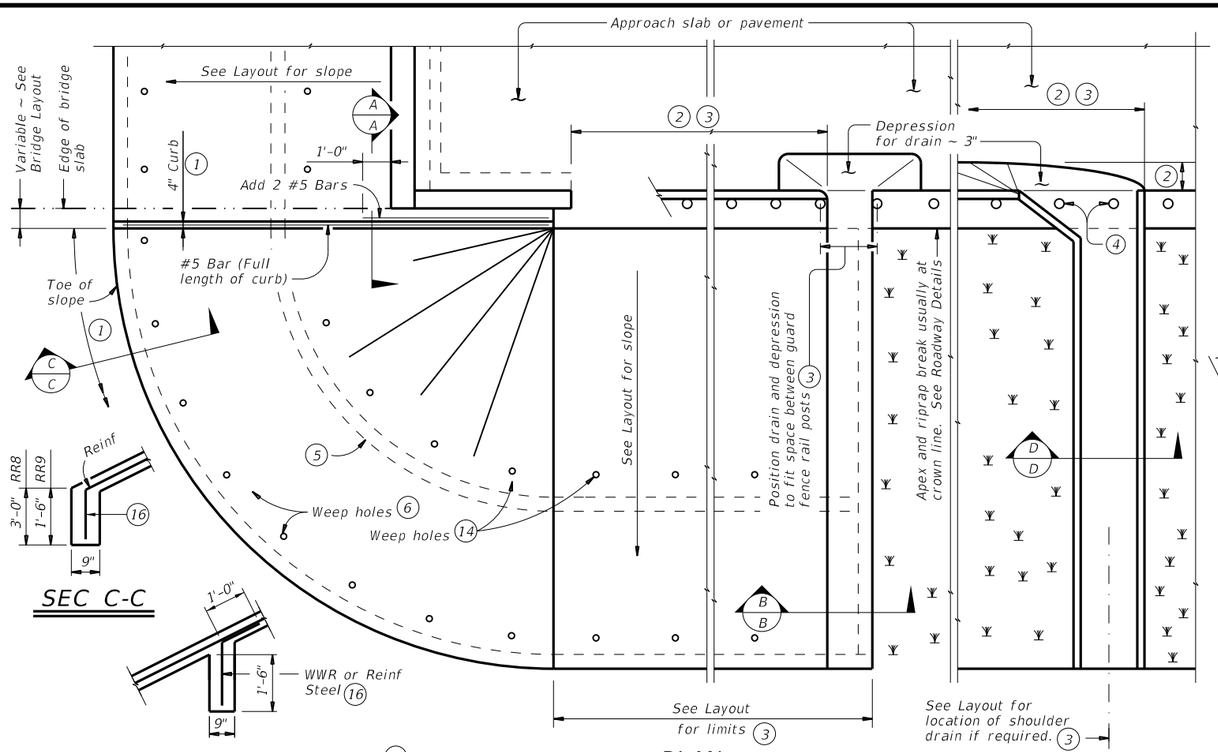
Texas Department of Transportation | Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: CD-SETP-CD-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		96

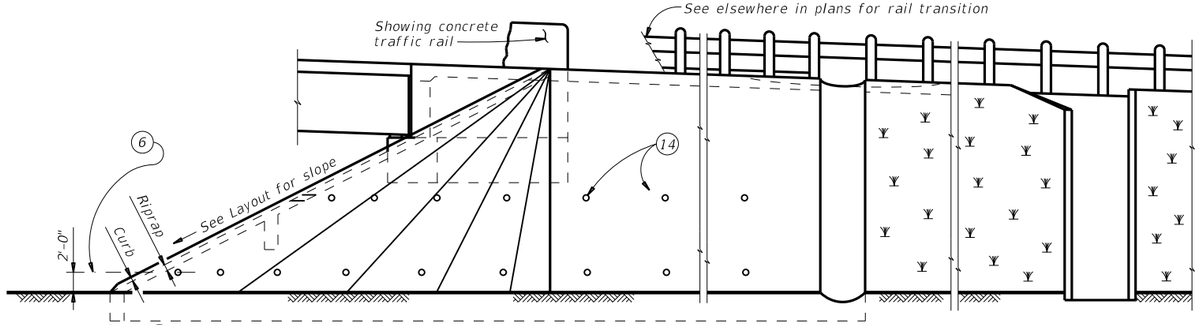
DATE: 5/16/2024 4:31:49 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/2Standards/MS-CRR-19.dgn



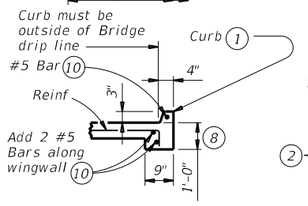
PLAN

SEC C-C

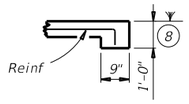
INTERMEDIATE TOEWALL (5)



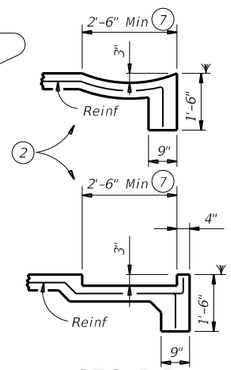
ELEVATION



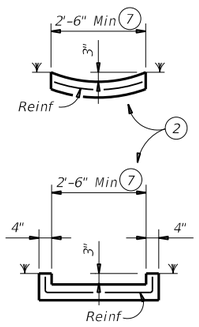
SEC A-A



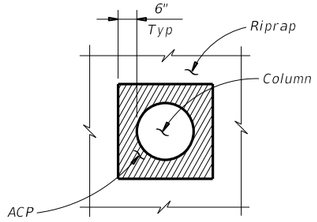
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

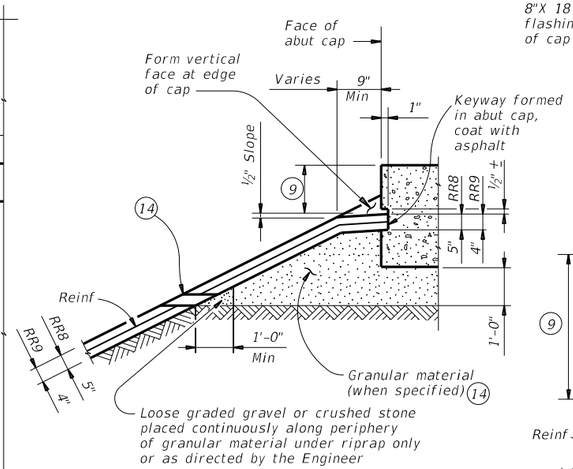


SEC D-D
(Shoulder drain)

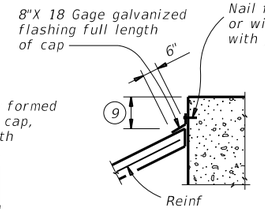


Riprap blockout to be filled with ACP. (Subsidiary to riprap)

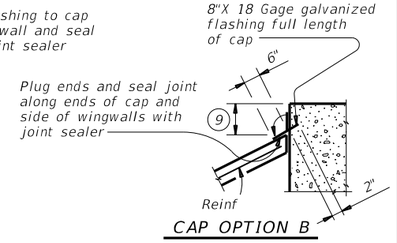
RIPRAP DETAIL AT COLUMNS
(As directed by the Engineer)



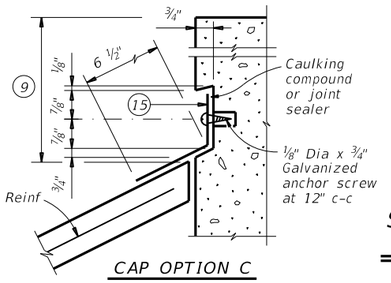
SHOWING KEYWAY OPTION



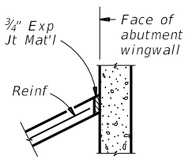
CAP OPTION A



CAP OPTION B

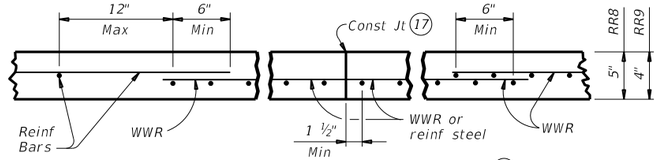


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

(1) When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.

(2) Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.

(3) Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

(4) See details elsewhere in plans for installation of guard fence posts through concrete riprap.

(5) Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

(6) Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.

(7) Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.

(8) Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.

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

(10) #5 bars shown are required even when synthetic fiber reinforcing option is selected.

(11) Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.

(12) Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.

(13) Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

(14) If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.

(15) 8" x 18 Gage Galv Sheet Metal

(16) Provide WWR or #3 bars, with 1'-0" extension into slope.

(17) WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

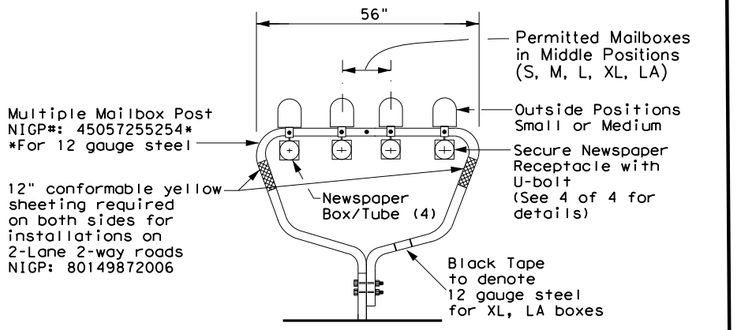
CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

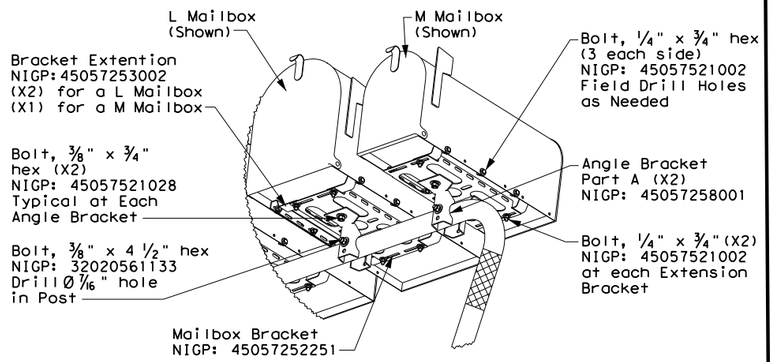
CRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		97

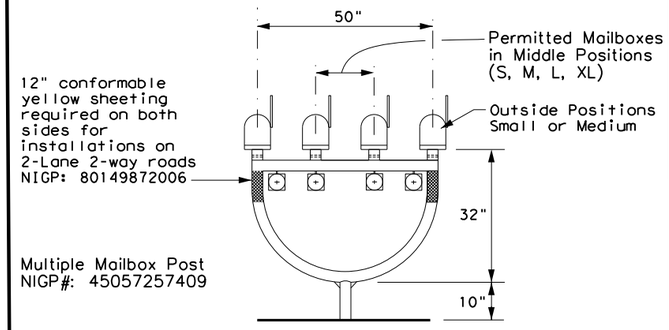
DATE: 5/16/2024 4:32:02 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/W.JXN47066 thABLS SPF Pages/Projects/Texas/Roadway/Sheet Set 251 Drainage/mb21.dgn

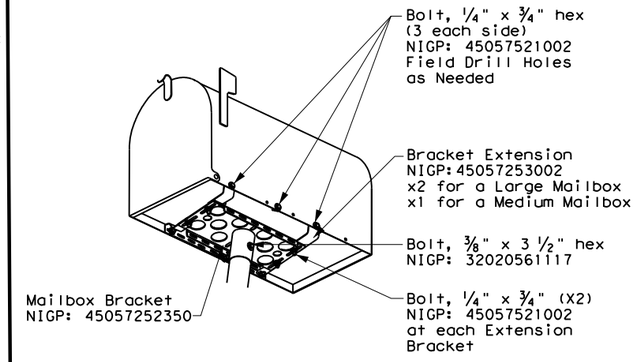
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

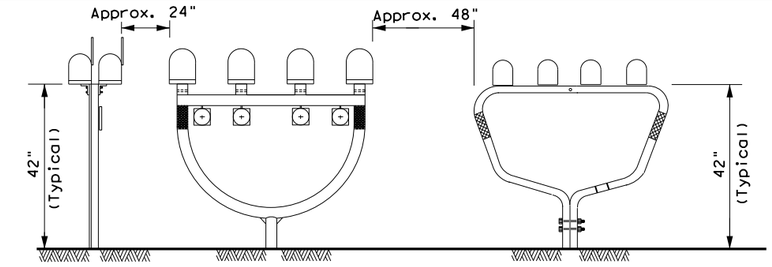
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

* 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.

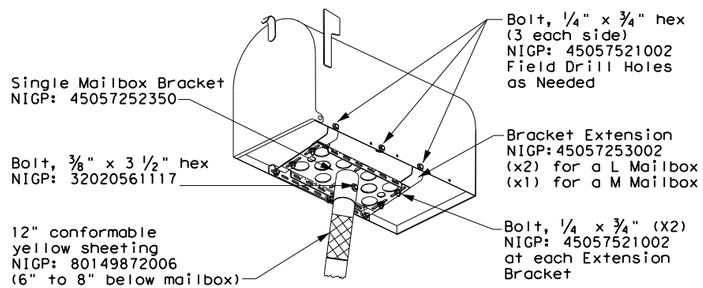
TYPICAL INSTALLATION MEASUREMENTS

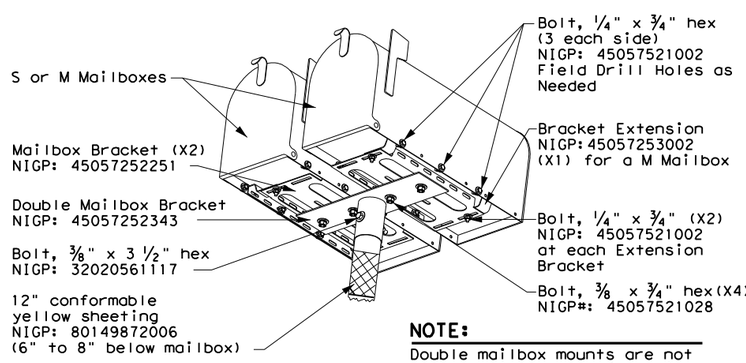


NOTE:

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

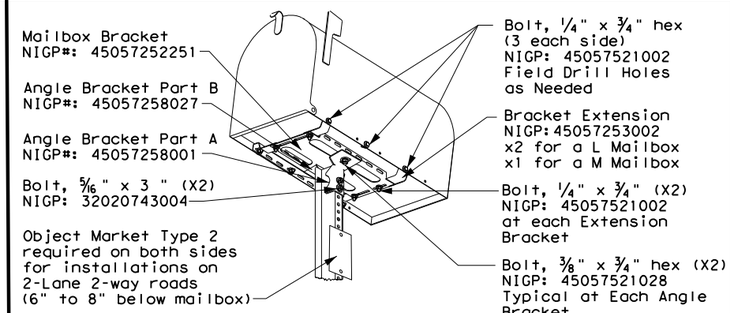


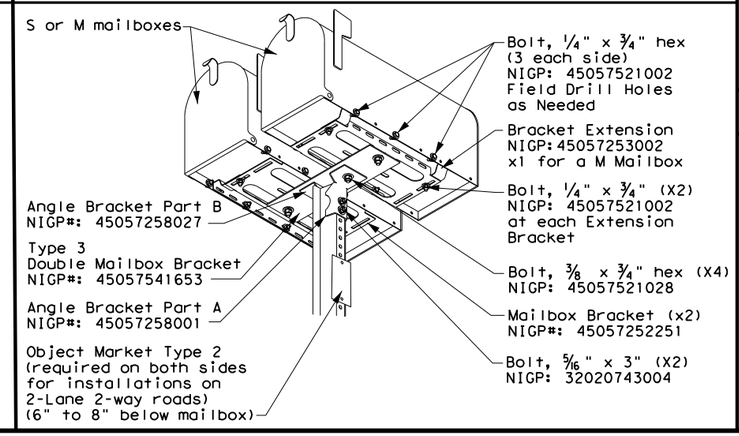


NOTE:

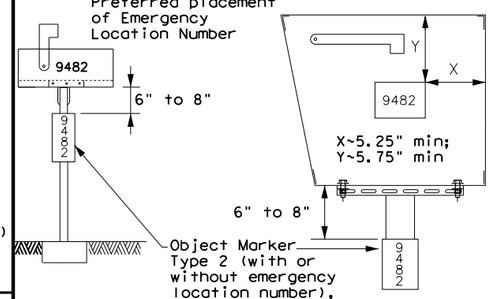
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

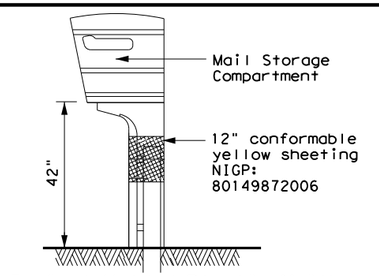


NOTES:

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.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation — Maintenance Division Standard

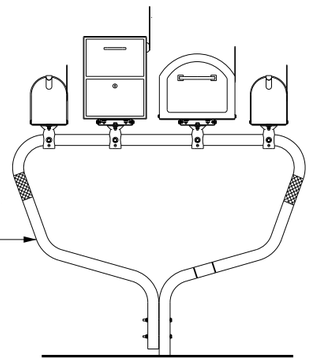
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

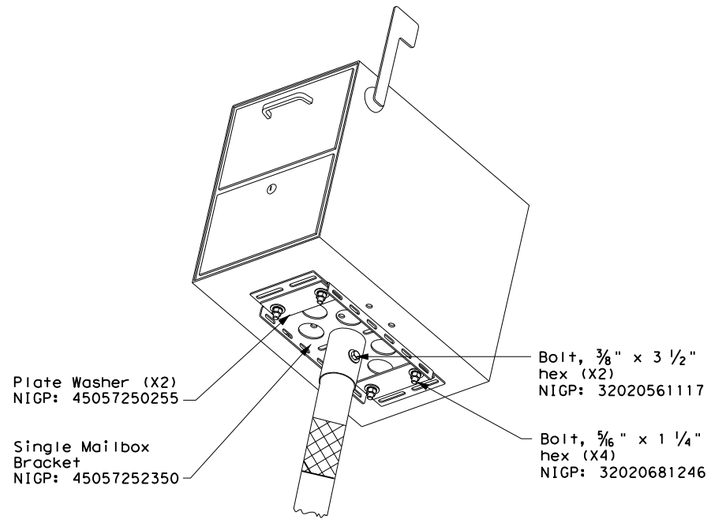
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		98

DATE: 5/16/2024 4:32:03 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4768 - ABL's Bridges/250 - ABL's Bridges/250 MB21.dgn

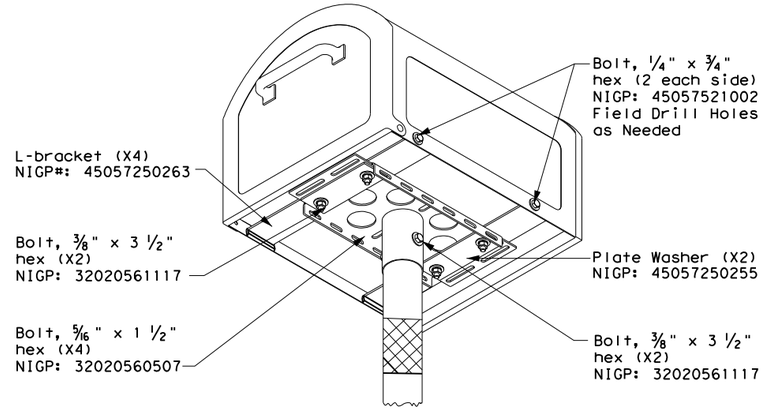
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

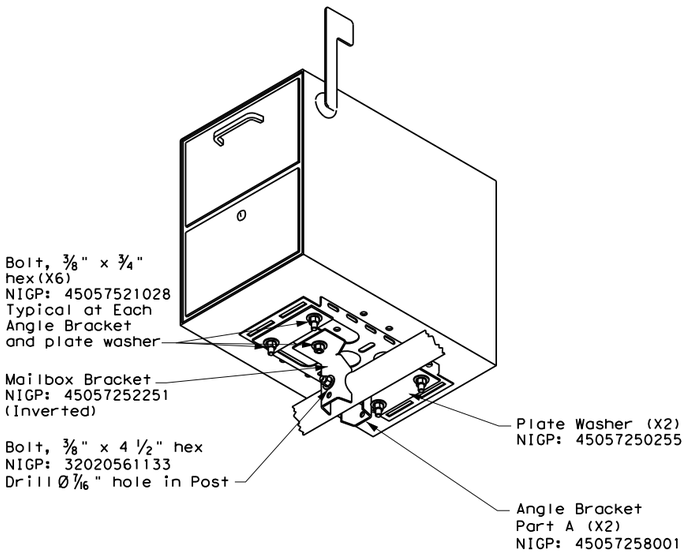


TYPE 2/4 - SINGLE XL MAILBOX

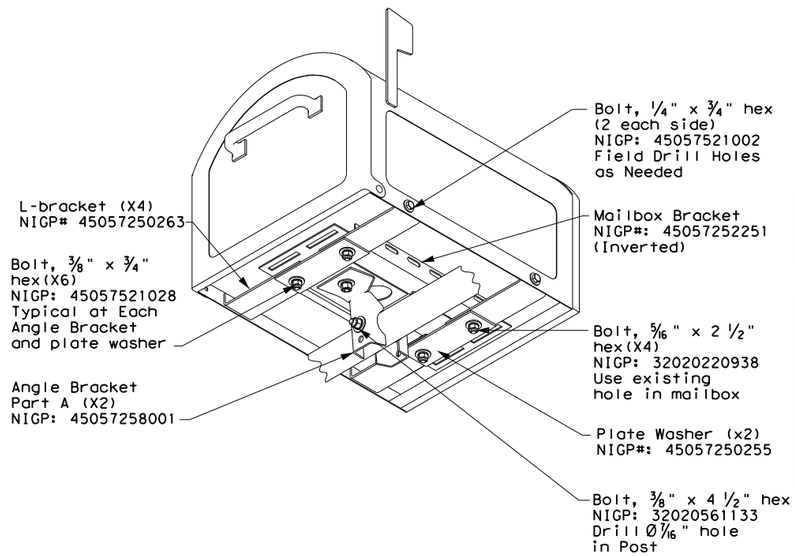


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

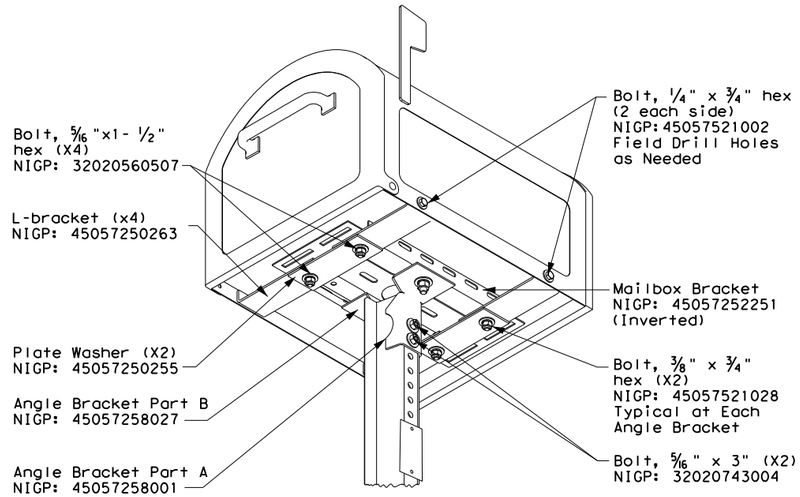
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation — Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

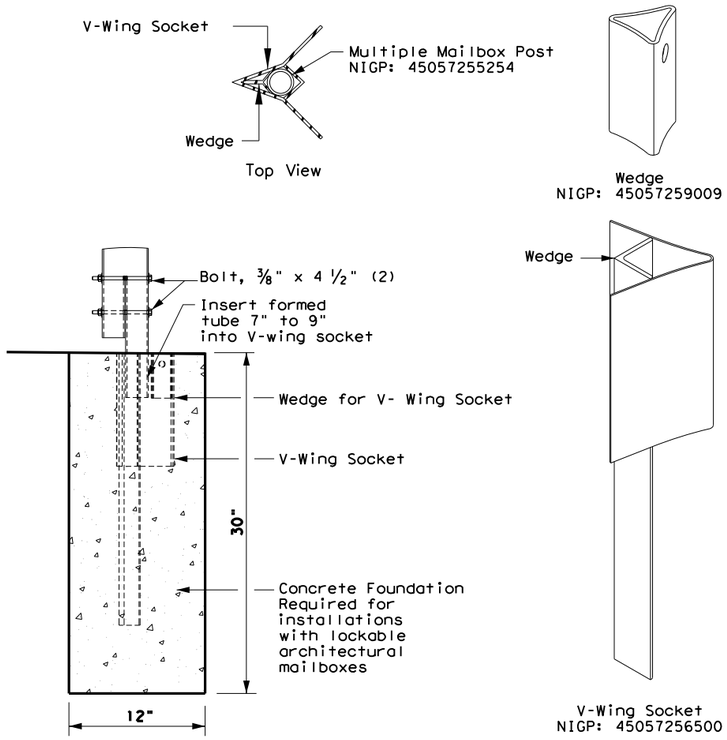
MB(2)-21

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	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		99

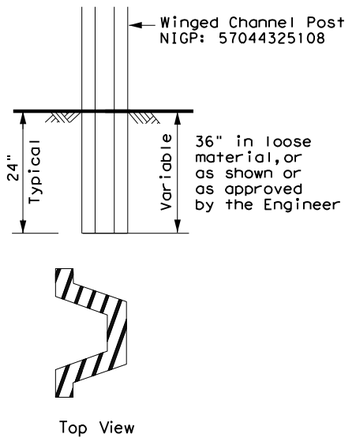
DATE: 5/16/2024 4:32:03 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706\mb-21.dgn

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



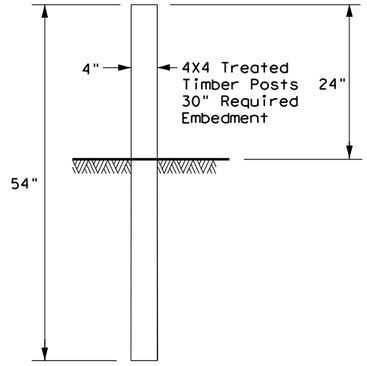
TYPE 3 - SUPPORT/FOUNDATION



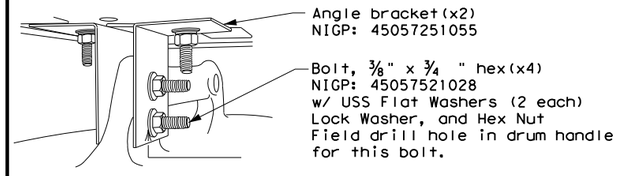
NOTES:

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

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

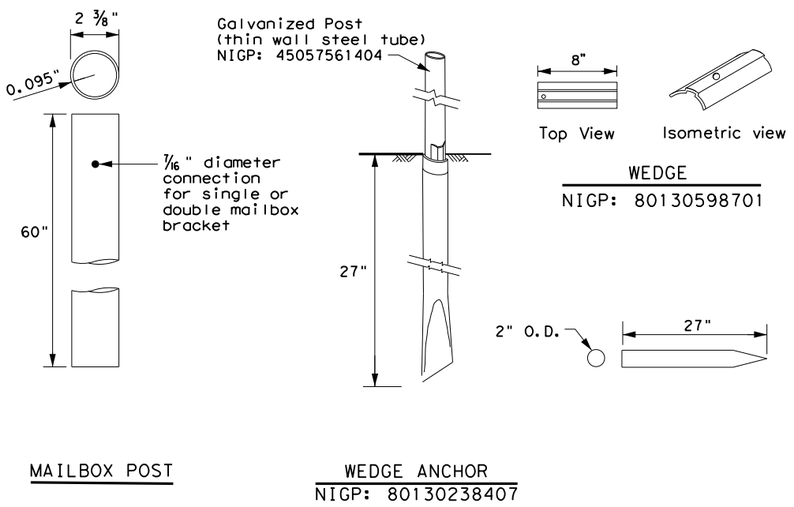
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

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

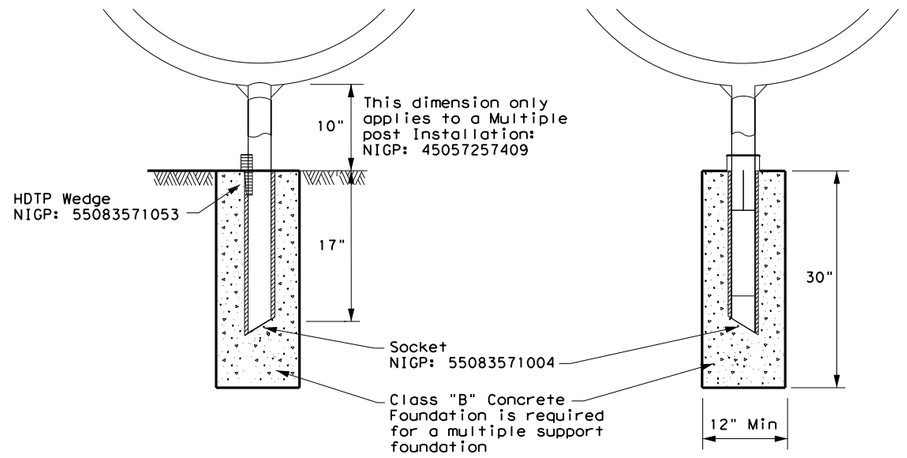


MAILBOX POST

WEDGE 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

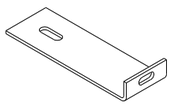
MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

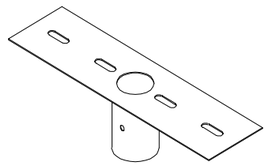
FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		100

DATE: 5/16/2024 4:32:03 PM
FILE: dw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN470\mf-TxDOT_standards_900\mb21\mb21_dgn

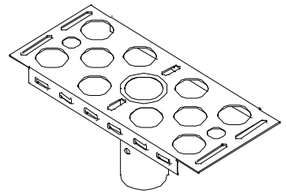
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: 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



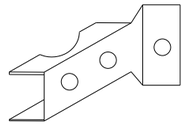
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



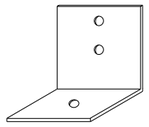
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



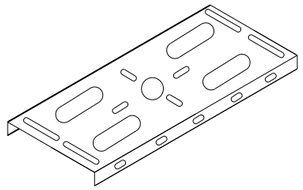
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



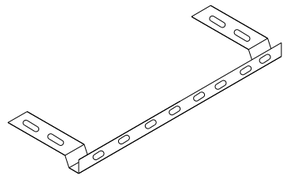
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



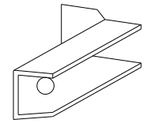
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



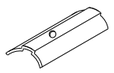
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



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



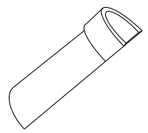
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



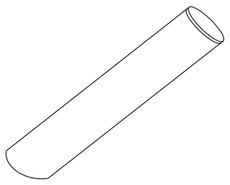
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

NIGP: 45057541653
Type 3 double mailbox bracket

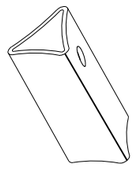


NIGP: 55083571053
Type 4 Mailbox Wedge

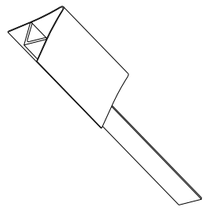


NIGP: 55083571004
Type 4 Mailbox Socket

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

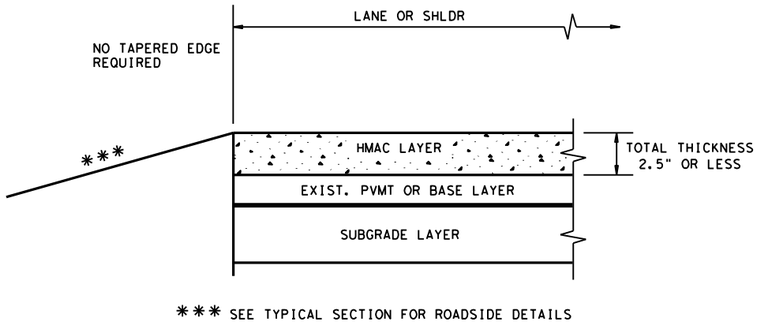
Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

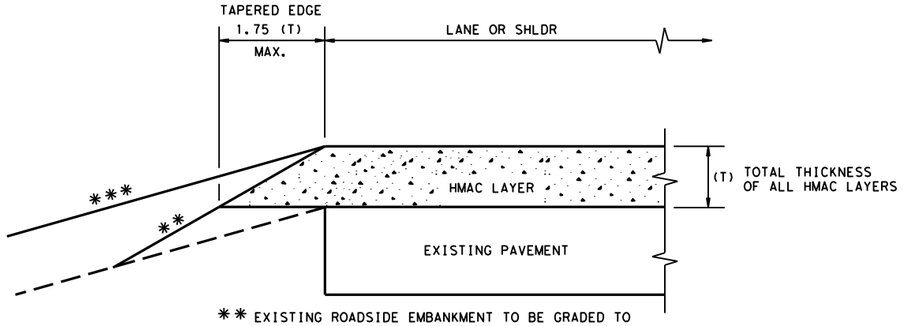
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABI	NOLAN		101

DATE: 5/16/2024
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Roadway/Sheets/zStandards/tehmac11.dgn



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

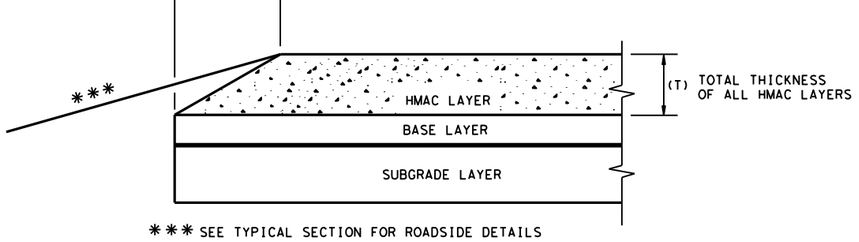
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



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

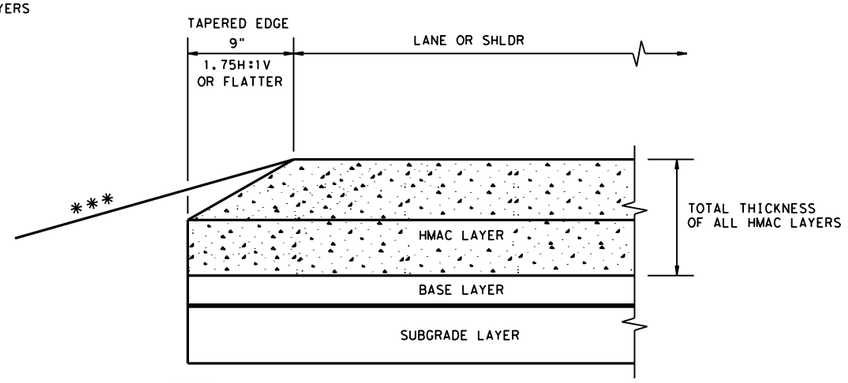
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

(NOT TO SCALE)

GENERAL NOTES

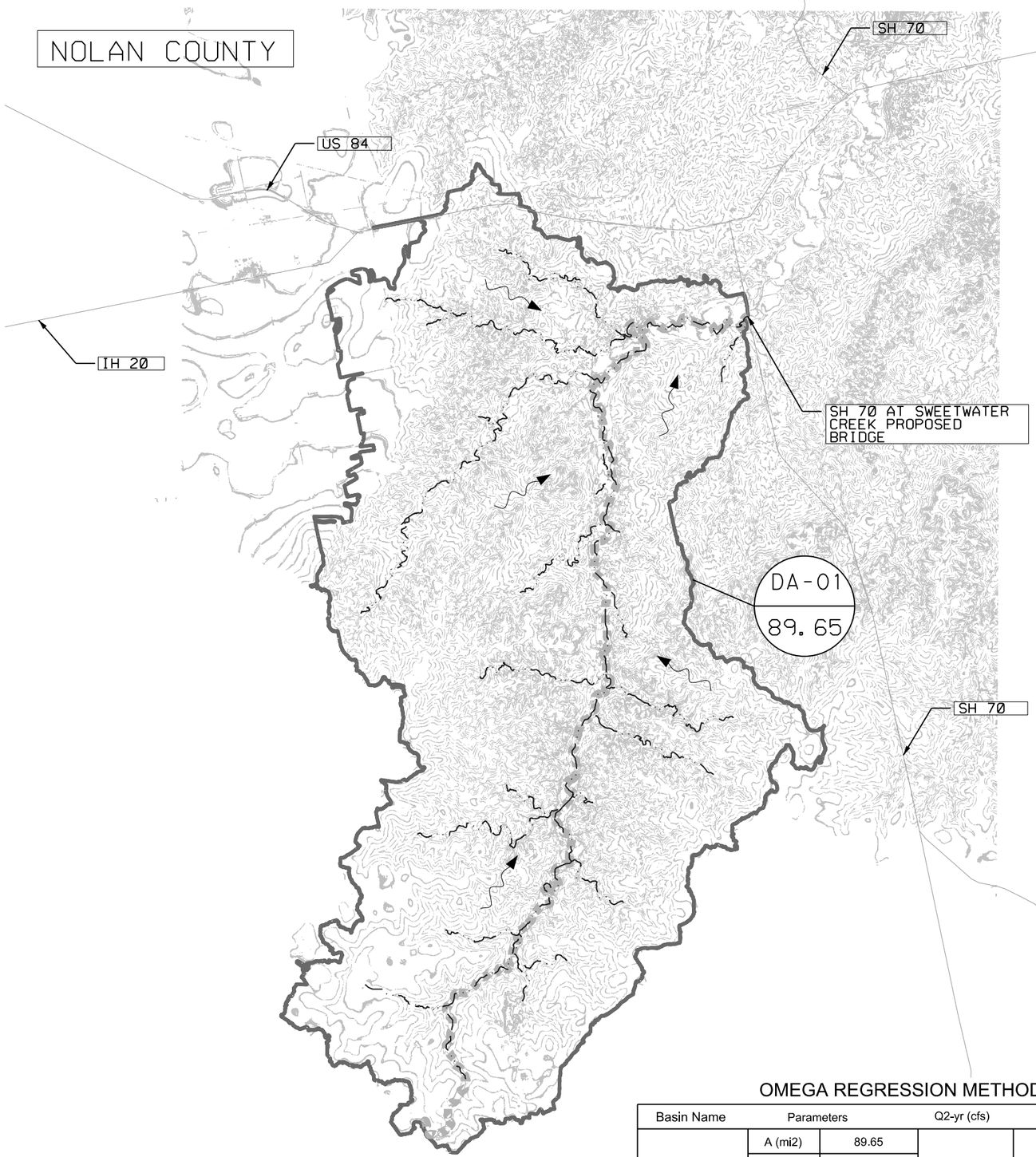
1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE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

Texas Department of Transportation | Design Division Standard

TAPERED EDGE DETAILS HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		102



LEGEND

- NAME / SQ.MI — DRAINAGE AREA I.D.
- DRAINAGE AREA
- CONTOUR
- FLOW ARROW
- STREAM
- LONGEST FLOW PATH

NOTES:

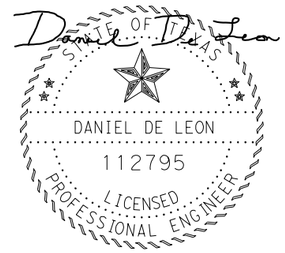
1. DRAINAGE AREA DELINEATED BASED ON USGS TOPOGRAPHIC DATA.

2. OMEGA EM REGRESSION METHOD WAS USED TO CALCULATE PEAK FLOWS PER TXDOT HYDRAULIC DESIGN MANUAL (SEPT 2019)

3. PROJECT IS LOCATED IN FEMA ZONE A, MAP NO. 4812400040A, EFFECTIVE AUGUST 2, 1990.

OMEGA REGRESSION METHOD PARAMETERS AND PEAK FLOWS (CFS)

Basin Name	Parameters		Q2-yr (cfs)	Q5-yr (cfs)	Q10-yr (cfs)	Q25-yr (cfs)	Q50-yr (cfs)	Q100-yr (cfs)
DA-01	A (mi2)	89.65	1384	3182	4802	7468	9919	12966
	S	0.00387						
	P (in)	22						
	Ω	-0.076						



05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

DRAINAGE AREA MAP
SWEETWATER CREEK

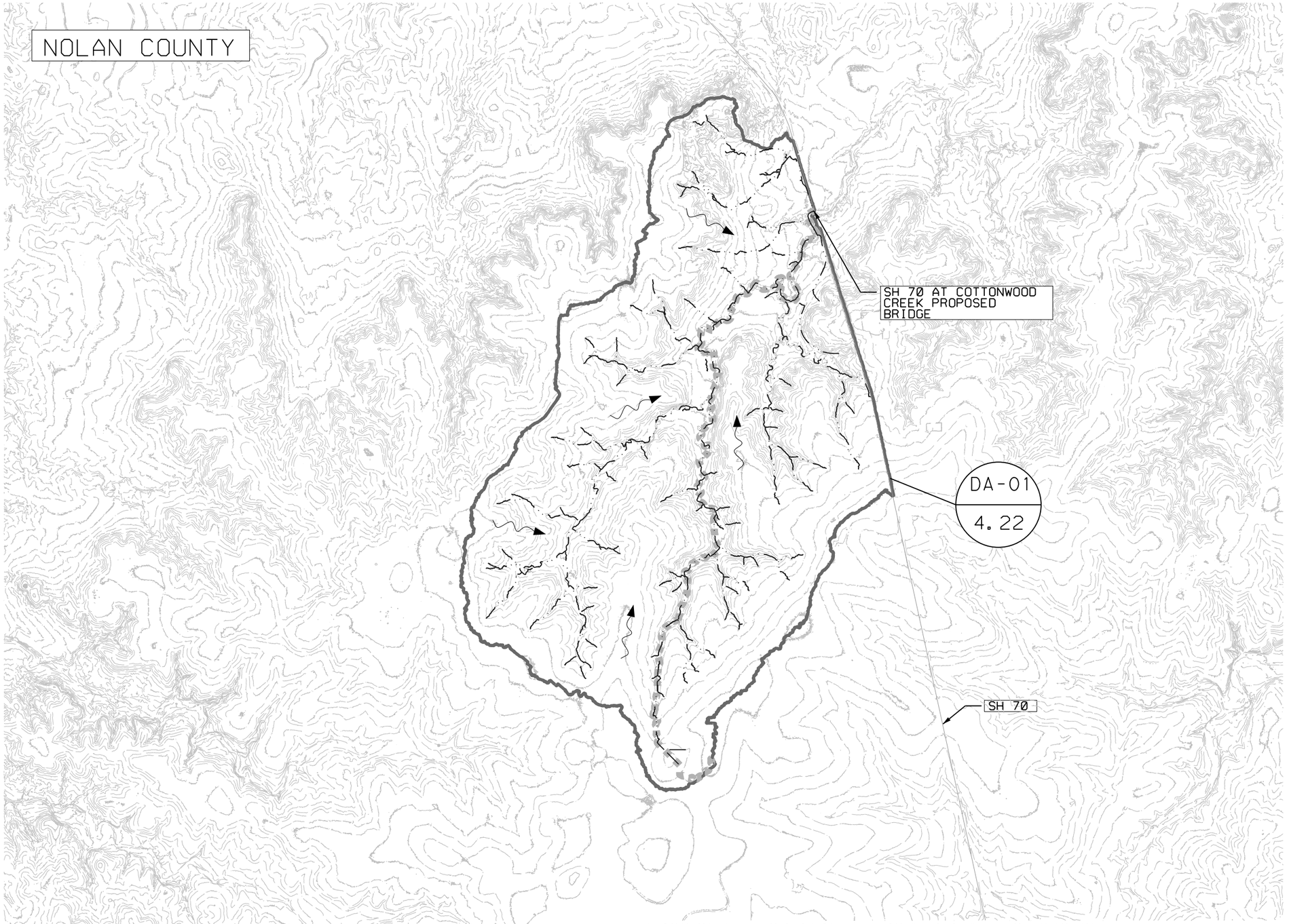
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		103

DATE:
FILE:

CK
DW
CK
DW

NOLAN COUNTY



0 2400 4800 9600 (ft)

LEGEND

- NAME / SQ.MI — DRAINAGE AREA I.D.
- DRAINAGE AREA
- CONTOUR
- FLOW ARROW
- STREAM
- LONGEST FLOW PATH

NOTES:

1. DRAINAGE AREA DELINEATED BASED ON USGS TOPOGRAPHIC DATA.

2. NRCS CN METHOD WAS USED TO CALCULATE PEAK FLOWS PER TXDOT HYDRAULIC DESIGN MANUAL (SEPT 2019)

3. PROJECT IS LOCATED IN FEMA OTHER AREA ZONE X, MAP NO. 4812400065A, EFFECTIVE AUGUST 2, 1990.

NRCS-CN METHOD PARAMETERS AND PEAK FLOWS (CFS)

Basin Name	Parameters		Q2-yr (cfs)	Q5-yr (cfs)	Q10-yr (cfs)	Q25-yr (cfs)	Q50-yr (cfs)	Q100-yr (cfs)
DA-01	A (mi2)	4.22	770	1270	1751	2474	3079	3726
	CN	74						
	Ia	0.69						
	T lag (min)	94.1						

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

DRAINAGE AREA MAP
COTTONWOOD CREEK

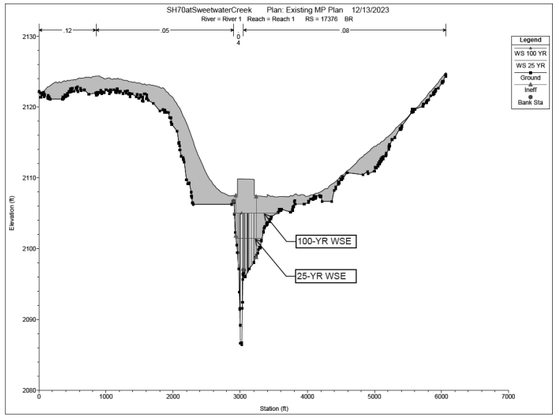
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		104

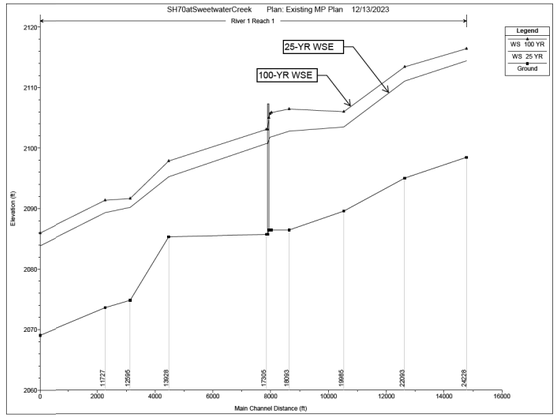
DATE:
FILE:

CK
DW
CK
DW

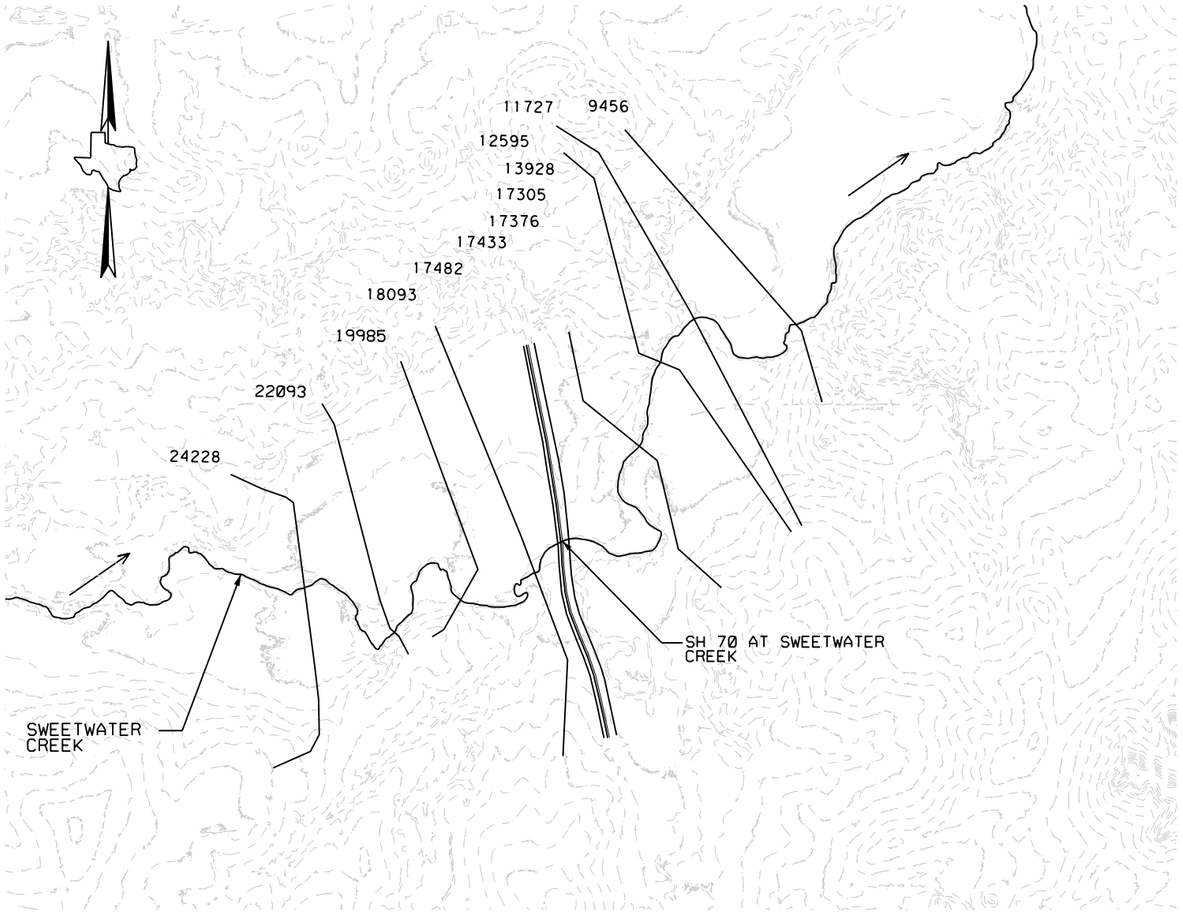
SH 70 HEC-RAS EXISTING CONDITION CROSS SECTION COMPUTATION



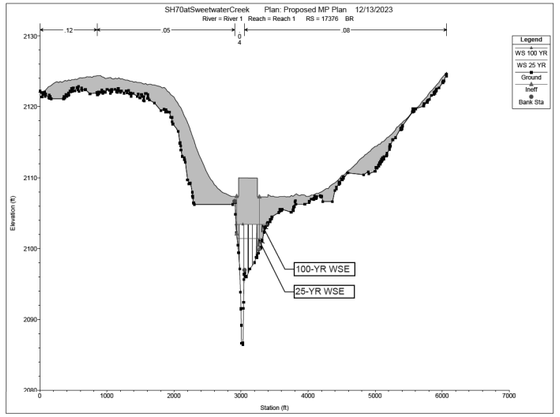
SH 70 HEC-RAS EXISTING CONDITION PROFILE COMPUTATION



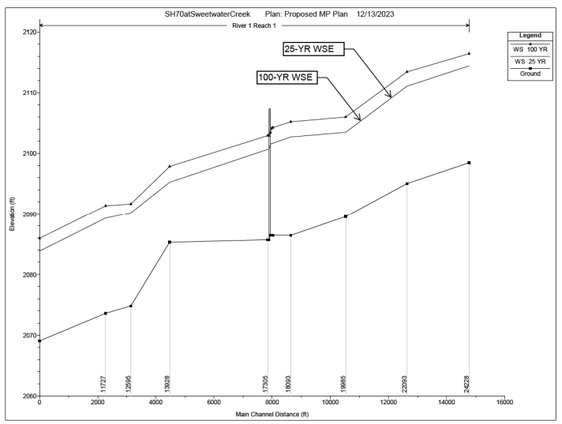
CROSS SECTION LAYOUT MAP



SH 70 HEC-RAS PROPOSED CONDITION CROSS SECTION COMPUTATION



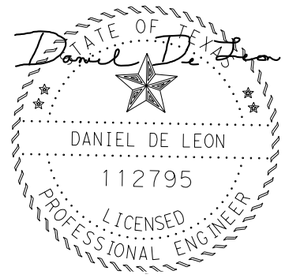
SH 70 HEC-RAS PROPOSED CONDITION PROFILE COMPUTATION



NOTES:

1. HEC-RAS VER 6.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE BRIDGE. NORMAL DEPTH COMPUTATION USED FOR THE DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.00463 FT/FT FOR EXISTING AND PROPOSED CONDITIONS.

2. NOLAN COUNTY FLOODPLAIN ADMINISTRATOR, WHITLEY MAY, WAS INFORMED OF THE PROPOSED PROJECT AND PROVIDED WITH A SUMMARY OF HYDRAULIC IMPACTS ON 05-20-24.



05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

HYDRAULIC DATA SHEET
SWEETWATER CREEK

SHEET 1 *OF* 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		105

DATE:
FILE:

HEC-RAS 25-YEAR COMPARISON

RIVER STATION (FT)	LOCATION	PROPOSED STRUCTURE 25 YR			RIVER STATION (FT)	EXISTING STRUCTURE 25 YR			DELTA (PR-EX) 25 YR	
		Q	V (CHAN)	WSEL		Q	V (CHAN)	WSEL	V (CHAN)	WSEL
		CFS	FPS	FT		CFS	FPS	FT	FPS	FT
24228		7468	10.22	2114.41	24228	7468	10.22	2114.41	0.00	0.00
22093		7468	5.93	2111.06	22093	7468	5.93	2111.06	0.00	0.00
19985		7468	12.86	2103.48	19985	7468	12.86	2103.48	0.00	0.00
18093		7468	2.91	2102.71	18093	7468	2.88	2102.78	0.03	-0.07
17482		7468	7.94	2101.68	17482	7468	7.64	2101.84	0.30	-0.16
17433	BR U/S XS	7468	6.45	2101.66	17433	7468	6.37	2101.80	0.08	-0.14
17376	SH 70	Bridge			17376	Bridge			Bridge	Bridge
17305	BR D/S XS	7468	6.73	2100.67	17305	7468	7.18	2100.73	-0.45	-0.06
13928		7468	4.18	2095.24	13928	7468	4.18	2095.24	0.00	0.00
12595		7468	10.66	2090.19	12595	7468	10.66	2090.19	0.00	0.00
11727		7468	5.74	2089.30	11727	7468	5.74	2089.30	0.00	0.00
9456		7468	8.65	2083.85	9456	7468	8.65	2083.85	0.00	0.00

HEC-RAS 100-YEAR COMPARISON

RIVER STATION (FT)	LOCATION	PROPOSED STRUCTURE 100 YR			RIVER STATION (FT)	EXISTING STRUCTURE 100 YR			DELTA (PR-EX) 100 YR	
		Q	V (CHAN)	WSEL		Q	V (CHAN)	WSEL	V (CHAN)	WSEL
		CFS	FPS	FT		CFS	FPS	FT	FPS	FT
24228		12966	10.14	2116.42	24228	12966	10.14	2116.42	0.00	0.00
22093		12966	6.61	2113.42	22093	12966	6.61	2113.42	0.00	0.00
19985		12966	14.50	2106.00	19985	12966	14.50	2106.00	0.00	0.00
18093		12966	3.62	2105.20	18093	12966	3.14	2106.45	0.48	-1.25
17482		12966	8.18	2104.25	17482	12966	6.47	2105.86	1.71	-1.61
17433	BR U/S XS	12966	7.55	2104.13	17433	12966	6.61	2105.69	0.94	-1.56
17376	SH 70	Bridge			17376	Bridge			Bridge	Bridge
17305	BR D/S XS	12966	8.42	2102.93	17305	12966	9.18	2103.07	-0.76	-0.14
13928		12966	4.30	2097.85	13928	12966	4.30	2097.85	0.00	0.00
12595		12966	14.16	2091.64	12595	12966	14.16	2091.64	0.00	0.00
11727		12966	6.18	2091.36	11727	12966	6.18	2091.36	0.00	0.00
9456		12966	10.42	2085.96	9456	12966	10.42	2085.96	0.00	0.00

NOTES:

1. HEC-RAS VER 6.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE BRIDGE. NORMAL DEPTH COMPUTATION USED FOR THE DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.00463 FT/FT FOR EXISTING AND PROPOSED CONDITIONS.

2. NOLAN COUNTY FLOODPLAIN ADMINISTRATOR, WHITLEY MAY, WAS INFORMED OF THE PROPOSED PROJECT AND PROVIDED WITH A SUMMARY OF HYDRAULIC IMPACTS ON 05-20-24.

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

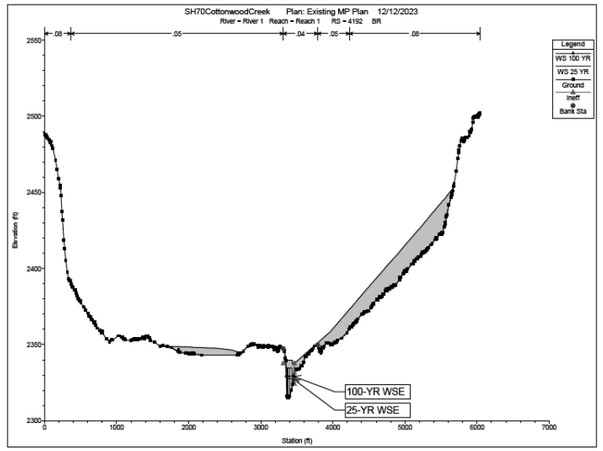
HYDRAULIC DATA SHEET
SWEETWATER CREEK

SHEET 2 OF 2

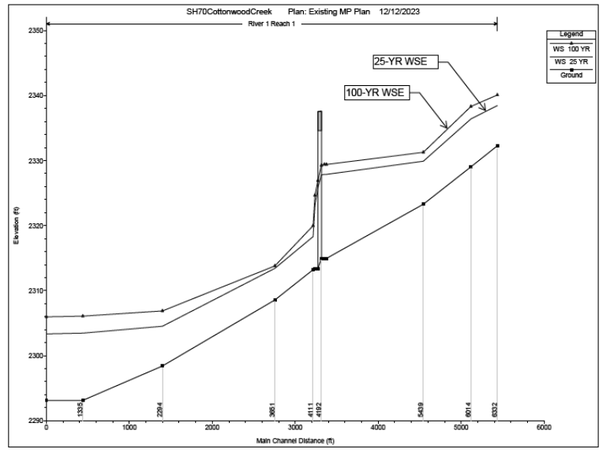
CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		106

DATE:
FILE:

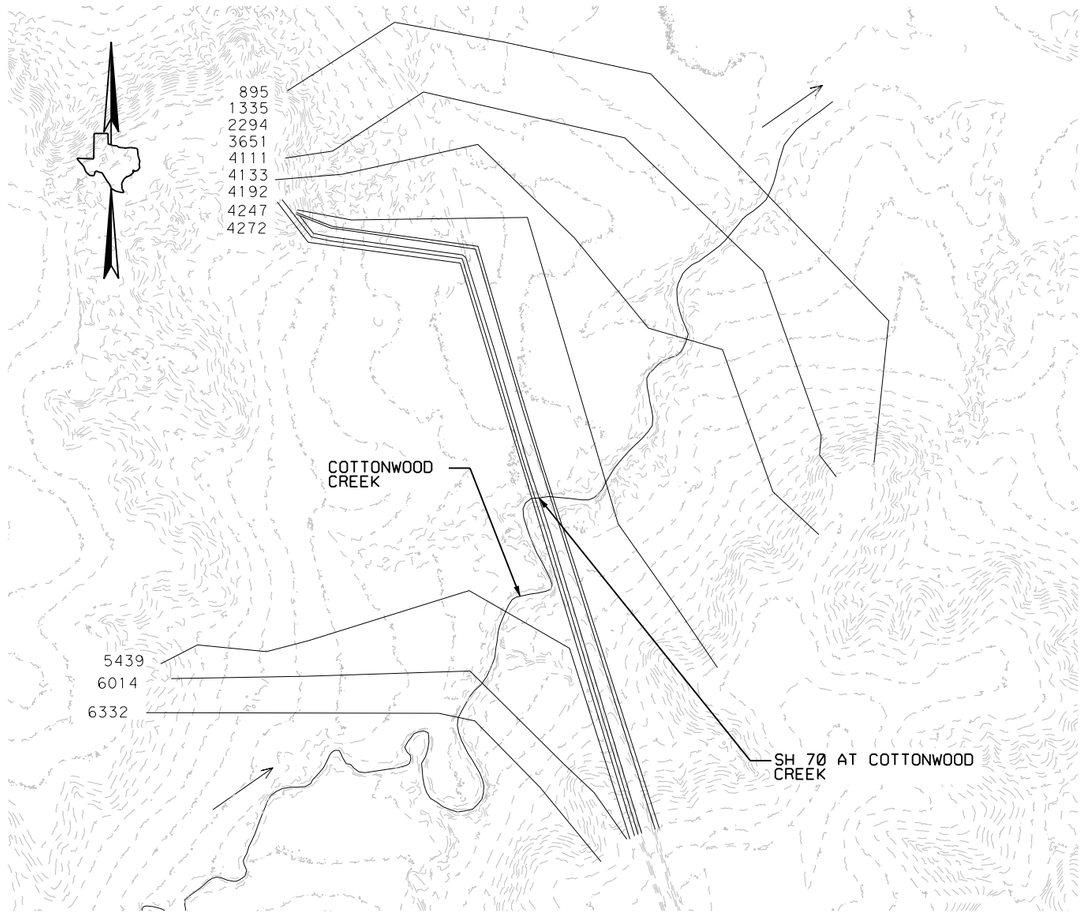
SH 70 HEC-RAS EXISTING CONDITION CROSS SECTION COMPUTATION



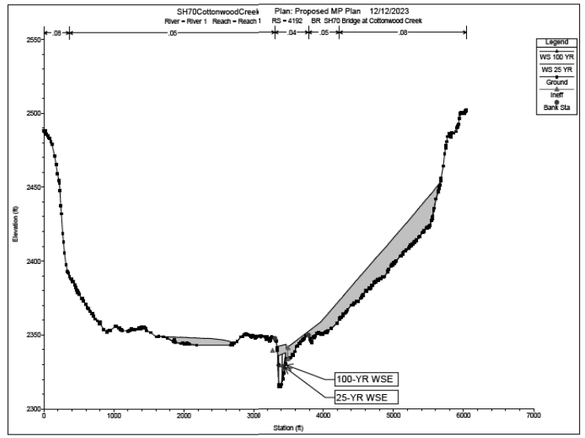
SH 70 HEC-RAS EXISTING CONDITION PROFILE COMPUTATION



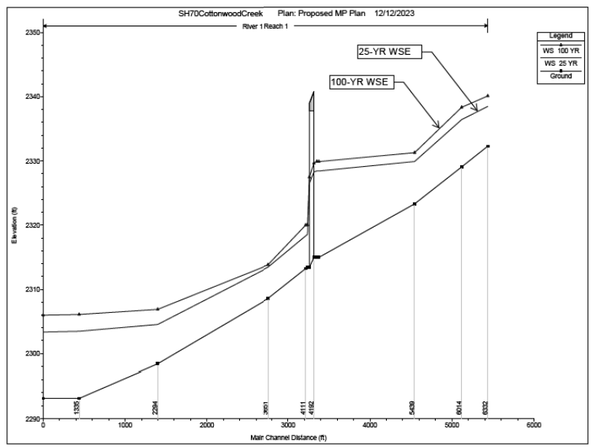
CROSS SECTION LAYOUT MAP



SH 70 HEC-RAS PROPOSED CONDITION CROSS SECTION COMPUTATION



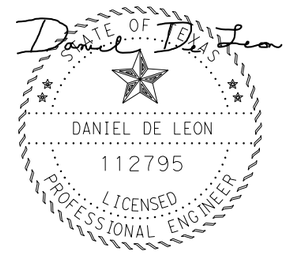
SH 70 HEC-RAS PROPOSED CONDITION PROFILE COMPUTATION



NOTES:

1. HEC-RAS VER 6.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE BRIDGE. NORMAL DEPTH COMPUTATION USED FOR THE DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.000283 FT/FT FOR EXISTING AND PROPOSED CONDITIONS.

2. NOLAN COUNTY FLOODPLAIN ADMINISTRATOR, WHITLEY MAY, WAS INFORMED OF THE PROPOSED PROJECT AND PROVIDED WITH A SUMMARY OF HYDRAULIC IMPACTS ON 05-20-24.



05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

HYDRAULIC DATA SHEET
COTTONWOOD CREEK

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		107

DATE:
FILE:

HEC-RAS 25-YEAR COMPARISON

RIVER STATION (FT)	LOCATION	PROPOSED STRUCTURE 25 YR			RIVER STATION (FT)	EXISTING STRUCTURE 25 YR			DELTA (PR-EX) 25 YR	
		Q	V (CHAN)	WSEL		Q	V (CHAN)	WSEL	V (CHAN)	WSEL
		CFS	FPS	FT		CFS	FPS	FT	FPS	FT
6332		2474	10.32	2338.44	6332	2474	10.31	2338.44	0.01	0.00
6014		2474	7.65	2336.39	6014	2474	7.66	2336.38	-0.01	0.01
5439		2474	11.50	2329.87	5439	2474	11.46	2329.89	0.04	-0.02
4272		2474	3.02	2328.39	4272	2474	3.21	2327.86	-0.19	0.53
4247	BR U/S XS	2474	2.65	2328.40	4247	2474	2.81	2327.86	-0.16	0.54
4192	SH 70	Bridge			4192	Bridge			Bridge	Bridge
4133	BR D/S XS	2474	11.63	2318.56	4133	2474	11.11	2323.06	0.52	-4.50
4111		2474	9.73	2318.29	4111	2474	9.73	2318.29	0.00	0.00
3651		2474	7.80	2313.42	3651	2474	7.81	2313.42	0.00	0.00
2294		2474	6.55	2304.51	2294	2474	6.55	2304.51	0.00	0.00
1335		2474	3.48	2303.46	1335	2474	3.48	2303.46	0.00	0.00
895		2474	2.48	2303.34	895	2474	2.48	2303.34	0.00	0.00

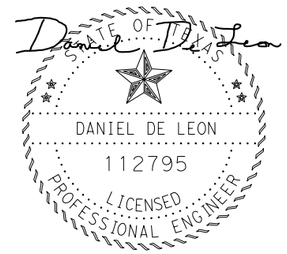
HEC-RAS 100-YEAR COMPARISON

RIVER STATION (FT)	LOCATION	PROPOSED STRUCTURE 100 YR			RIVER STATION (FT)	EXISTING STRUCTURE 100 YR			DELTA (PR-EX) 100 YR	
		Q	V (CHAN)	WSEL		Q	V (CHAN)	WSEL	V (CHAN)	WSEL
		CFS	FPS	FT		CFS	FPS	FT	FPS	FT
6332		3726	11.14	2340.07	6332	3726	11.14	2340.07	0.00	0.00
6014		3726	7.64	2338.31	6014	3726	7.64	2338.30	0.00	0.01
5439		3726	12.81	2331.23	5439	3726	12.79	2331.25	0.02	-0.01
4272		3726	3.91	2329.86	4272	3726	4.10	2329.39	-0.19	0.47
4247	BR U/S XS	3726	3.43	2329.87	4247	3726	3.59	2329.41	-0.16	0.36
4192	SH 70	Bridge			4192	Bridge			Bridge	Bridge
4133	BR D/S XS	3726	12.90	2320.00	4133	3726	11.18	2324.65	1.72	-4.65
4111		3726	6.60	2319.97	4111	3726	9.60	2319.97	0.00	0.00
3651		3726	10.46	2313.80	3651	3726	10.46	2313.80	0.00	0.00
2294		3726	6.13	2306.87	2294	3726	6.13	2306.87	0.00	0.00
1335		3726	3.78	2306.07	1335	3726	3.78	2306.07	0.00	0.00
895		3726	2.78	2305.97	895	3726	2.78	2305.97	0.00	0.00

NOTES:

1. HEC-RAS VER 6.2 WAS USED FOR THE HYDRAULIC ANALYSIS AND DESIGN OF THE BRIDGE. NORMAL DEPTH COMPUTATION USED FOR THE DOWNSTREAM BOUNDARY CONDITION SLOPE = 0.000283 FT/FT FOR EXISTING AND PROPOSED CONDITIONS.

2. NOLAN COUNTY FLOODPLAIN ADMINISTRATOR, WHITLEY MAY, WAS INFORMED OF THE PROPOSED PROJECT AND PROVIDED WITH A SUMMARY OF HYDRAULIC IMPACTS ON 05-20-24.



05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

HYDRAULIC DATA SHEET
COTTONWOOD CREEK

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		108

DATE:
FILE:

PIER SCOUR RESULTS 50-YEAR

Parameter	Value	Unit
L	15.00	ft
a	3.00	ft
L/a	5.00	ft/ft
Angle of Attack	15.00	Degrees
K1	1.00	
K2	1.50	
K3	1.10	
Y1	16.99	ft
V1	4.98	fps
Fr	0.21	
Ys (With 50% Reduction Factor)	4.67	ft

PIER SCOUR RESULTS 100-YEAR

Parameter	Value	Unit
L	15.00	ft
a	3.00	ft
L/a	5.00	ft/ft
Angle of Attack	15.00	Degrees
K1	1.00	
K2	1.50	
K3	1.10	
Y1	16.99	ft
V1	6.50	fps
Fr	0.28	
Ys (With 50% Reduction Factor)	5.24	ft

CONTRACTION SCOUR RESULTS 50-YEAR

PARAMETER	LOB	CHANNEL	ROB	UNIT
AVERAGE DEPTH OF FLOW IN U/S CHANNEL (Y1)		17.48		FT
APPROACH VELOCITY (V1)		6.61		FPS
DEPTH IN CONTRACTED SECTION BEFORE SCOUR (Y0)		11.16		FT
FLOW IN CONTRACTED SECTION (Q2)		9919.00		CFS
BOTTOM WIDTH OF CONTRACTED SECTION (W2)		256.00		FT
GRAIN SIZE (D50)		0.20		MM
FLOW IN UPSTREAM CHANNEL (Q1)		5818.96		CFS
BOTTOM WIDTH OF MAIN CHANNEL (W1)		136.70		FT
CHANNEL SLOPE		0.002		FT/FT
SHEAR VELOCITY (V*) = (g.y.S)0.5		0.93		FPS
WATER TEMPERATURE		60.00		°F
MEDIAN BED MATERIALS FALL VELOCITY(1)		0.06		FPS
V*/T		15.60		-
K1(2)		0.69		-
AVERAGE FLOW DEPTH IN CONTRACTED SECTION (Y2)	N/A	17.91	N/A	FT
CONTRACTION SCOUR (Ys = Y2 - Y0)	N/A	6.75	N/A	FT
CRITICAL VELOCITY FOR INCEPTION MOTION (Vc)	0.00	1.56	0.00	FPS
EQUATION	N/A	LIVE	N/A	-

CONTRACTION SCOUR RESULTS 100-YEAR

PARAMETER	LOB	CHANNEL	ROB	UNIT
AVERAGE DEPTH OF FLOW IN U/S CHANNEL (Y1)		17.81		FT
APPROACH VELOCITY (V1)		8.18		FPS
DEPTH IN CONTRACTED SECTION BEFORE SCOUR (Y0)		11.16		FT
FLOW IN CONTRACTED SECTION (Q2)		12966.00		CFS
BOTTOM WIDTH OF CONTRACTED SECTION (W2)		256.00		FT
GRAIN SIZE (D50)		0.20		MM
FLOW IN UPSTREAM CHANNEL (Q1)		7491.78		CFS
BOTTOM WIDTH OF MAIN CHANNEL (W1)		136.70		FT
CHANNEL SLOPE		0.002		FT/FT
SHEAR VELOCITY (V*) = (g.y.S)0.5		0.93		FPS
WATER TEMPERATURE		60.00		°F
MEDIAN BED MATERIALS FALL VELOCITY(1)		0.06		FPS
V*/T		15.74		-
K1(2)		0.69		-
AVERAGE FLOW DEPTH IN CONTRACTED SECTION (Y2)	N/A	18.49	N/A	FT
CONTRACTION SCOUR (Ys = Y2 - Y0)	N/A	7.33	N/A	FT
CRITICAL VELOCITY FOR INCEPTION MOTION (Vc)	0.00	1.57	0.00	FPS
EQUATION	N/A	LIVE	N/A	-

NOTES:

1. UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) WEB SOIL SURVEY INDICATES CLAY LOAM AS THE DOMINATE SOIL TYPE.

2. D50 VALUES: MINIMUM D50 OF 0.20 MM USED AS RECOMMENDED IN THE TXDOT GEOTECHNICAL MANUAL, CHAPTER 5, SECTION 6.

3. ABUTMENT SCOUR RESULTS NOT REPORTED AS RECOMMENDED IN THE TXDOT GEOTECHNICAL MANUAL, CHAPTER 5, SECTION 6.

TOTAL SCOUR (FT)

50-YR	100-YR
11.42	12.56

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

SCOUR DATA SHEET
SWEETWATER CREEK

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		109

DATE:
FILE:

PIER SCOUR RESULTS 50-YEAR

Parameter	Value	Unit
L	15.00	ft
a	3.00	ft
L/a	5.00	ft/ft
Angle of Attack	15.00	Degrees
K1	1.00	
K2	1.50	
K3	1.10	
Y1	14.00	ft
V1	4.30	fps
Fr	0.20	
Ys	8.54	ft

PIER SCOUR RESULTS 100-YEAR

Parameter	Value	Unit
L	15.00	ft
a	3.00	ft
L/a	5.00	ft/ft
Angle of Attack	15.00	Degrees
K1	1.00	
K2	1.50	
K3	1.10	
Y1	14.67	ft
V1	4.85	fps
Fr	0.22	
Ys	9.05	ft

CONTRACTION SCOUR RESULTS 50-YEAR

PARAMETER	LOB	CHANNEL	ROB	UNIT
AVERAGE DEPTH OF FLOW IN U/S CHANNEL (Y1)		14.20		FT
APPROACH VELOCITY (V1)		3.48		FPS
DEPTH IN CONTRACTED SECTION BEFORE SCOUR (Y0)		35.35		FT
FLOW IN CONTRACTED SECTION (Q2)		3079.00		CFS
BOTTOM WIDTH OF CONTRACTED SECTION (W2)		144.00		FT
GRAIN SIZE (D50)		0.20		MM
FLOW IN UPSTREAM CHANNEL (Q1)		3079.00		CFS
BOTTOM WIDTH OF MAIN CHANNEL (W1)		483.90		FT
CHANNEL SLOPE		0.007		FT/FT
SHEAR VELOCITY (V*) = (g.y.S)0.5		1.82		FPS
WATER TEMPERATURE		60.00		°F
MEDIAN BED MATERIALS FALL VELOCITY(1)		0.06		FPS
V*/T		30.59		-
K1(2)		0.69		-
AVERAGE FLOW DEPTH IN CONTRACTED SECTION (Y2)	N/A	32.77	N/A	FT
CONTRACTION SCOUR (Ys = Y2 - Y0)	N/A	-2.58	N/A	FT
CRITICAL VELOCITY FOR INCEPTION MOTION (Vc)	0.00	1.51	0.00	FPS
EQUATION	N/A	LIVE	N/A	-

CONTRACTION SCOUR RESULTS 100-YEAR

PARAMETER	LOB	CHANNEL	ROB	UNIT
AVERAGE DEPTH OF FLOW IN U/S CHANNEL (Y1)		14.92		FT
APPROACH VELOCITY (V1)		3.91		FPS
DEPTH IN CONTRACTED SECTION BEFORE SCOUR (Y0)		35.35		FT
FLOW IN CONTRACTED SECTION (Q2)		3726.00		CFS
BOTTOM WIDTH OF CONTRACTED SECTION (W2)		144.00		FT
GRAIN SIZE (D50)		0.20		MM
FLOW IN UPSTREAM CHANNEL (Q1)		3726.00		CFS
BOTTOM WIDTH OF MAIN CHANNEL (W1)		483.90		FT
CHANNEL SLOPE		0.007		FT/FT
SHEAR VELOCITY (V*) = (g.y.S)0.5		1.86		FPS
WATER TEMPERATURE		60.00		°F
MEDIAN BED MATERIALS FALL VELOCITY(1)		0.06		FPS
V*/T		31.35		-
K1(2)		0.69		-
AVERAGE FLOW DEPTH IN CONTRACTED SECTION (Y2)	N/A	34.43	N/A	FT
CONTRACTION SCOUR (Ys = Y2 - Y0)	N/A	-0.92	N/A	FT
CRITICAL VELOCITY FOR INCEPTION MOTION (Vc)	0.00	1.52	0.00	FPS
EQUATION	N/A	LIVE	N/A	-

TOTAL SCOUR (FT)

50-YR	100-YR
8.54	9.05

NOTES:

1. UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) WEB SOIL SURVEY INDICATES SHEP LOAM AS THE DOMINATE SOIL TYPE.

2. D50 VALUES: MINIMUM D50 OF 0.20 MM USED AS RECOMMENDED IN THE TXDOT GEOTECHNICAL MANUAL, CHAPTER 5, SECTION 6.

3. ABUTMENT SCOUR RESULTS NOT REPORTED AS RECOMMENDED IN THE TXDOT GEOTECHNICAL MANUAL, CHAPTER 5, SECTION 6.

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

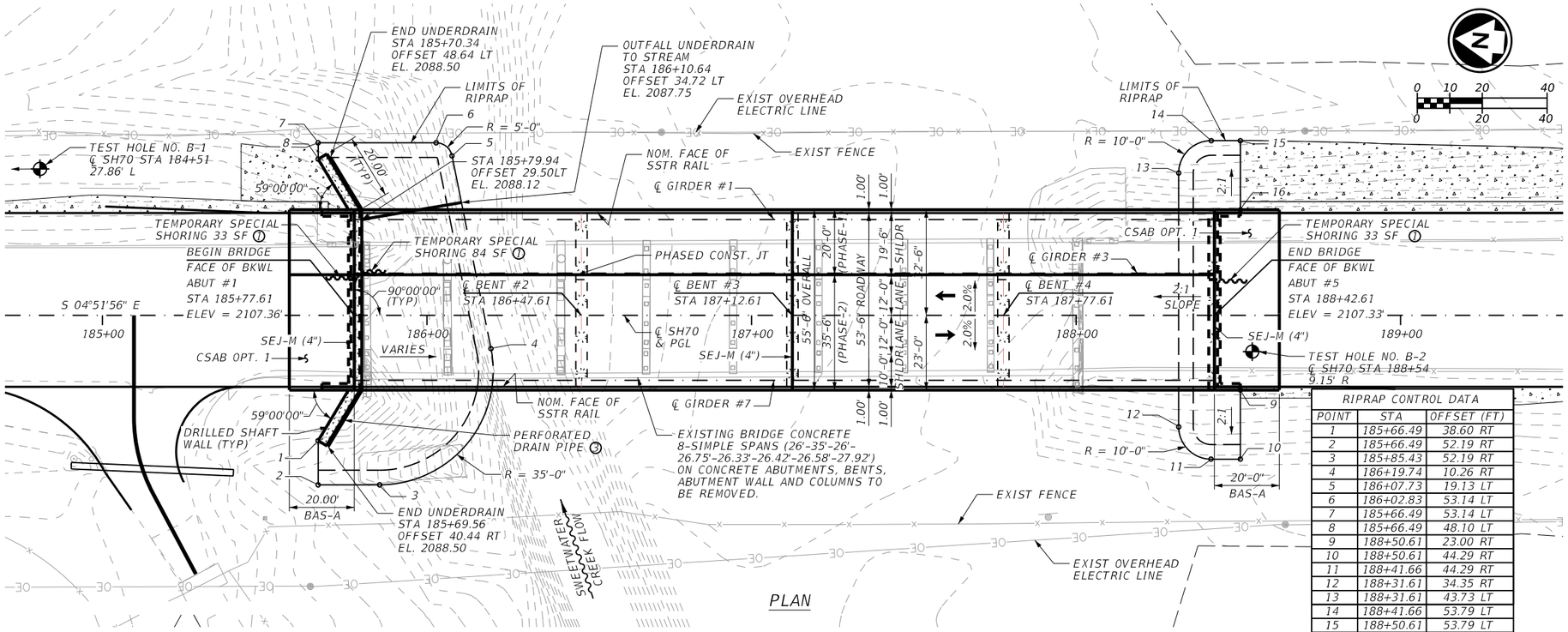
SCOUR DATA SHEET
COTTONWOOD CREEK

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		110

DATE:
FILE:

DW AP | DW SP | CK SP | DW SS | CK SP



PLAN

RIPRAP CONTROL DATA		
POINT	STA	OFFSET (FT)
1	185+66.49	38.60 RT
2	185+66.49	52.19 RT
3	185+85.43	52.19 RT
4	186+19.74	10.26 RT
5	186+07.73	19.13 LT
6	186+02.83	53.14 LT
7	185+66.49	53.14 LT
8	185+66.49	48.10 LT
9	188+50.61	23.00 RT
10	188+50.61	44.29 RT
11	188+41.66	44.29 RT
12	188+31.61	34.35 RT
13	188+31.61	43.73 LT
14	188+41.66	53.79 LT
15	188+50.61	53.79 LT
16	188+50.61	32.50 LT

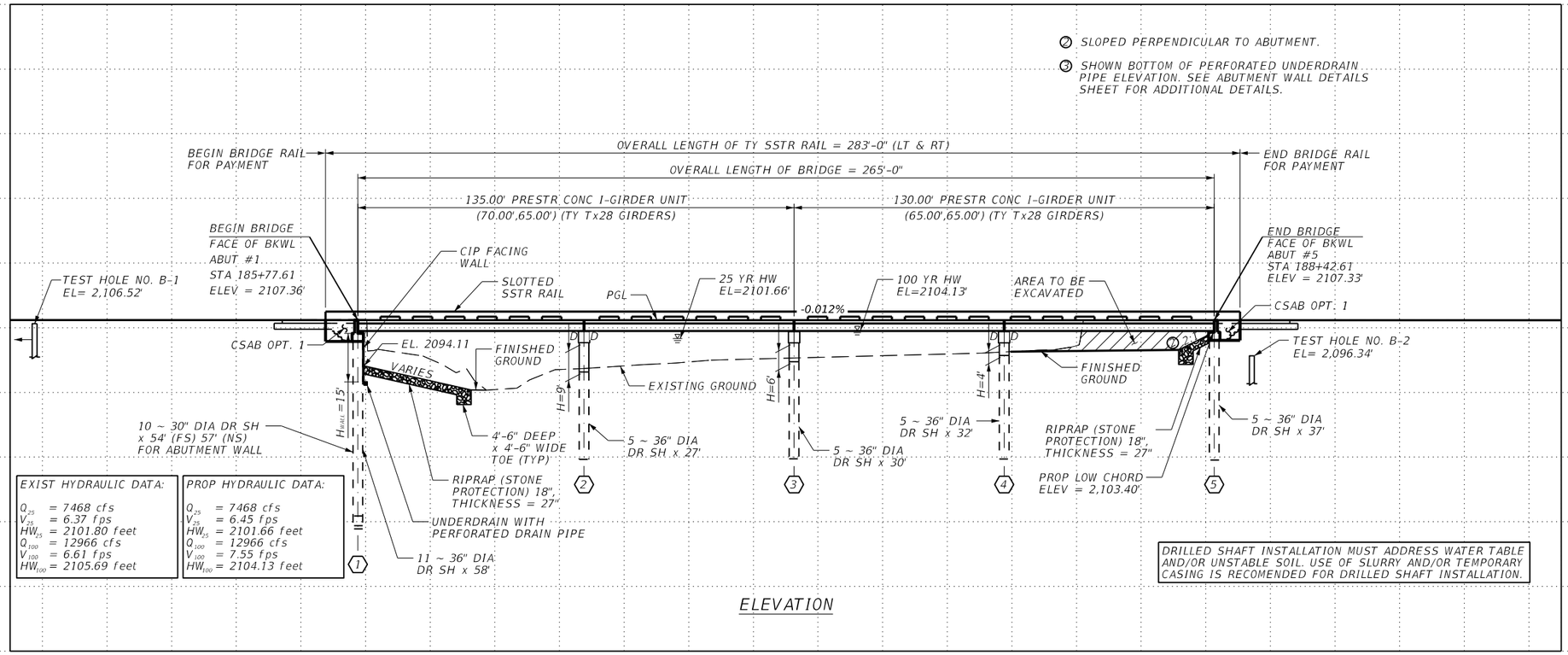
GENERAL NOTES:

1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. BRIDGE NOT DESIGNED FOR OVERLAY.
3. "D" DENOTES DOWELS IN THE OUTSIDE GIRDERS UNLESS SPECIFIED OTHERWISE ON THE ABUTMENT OR BENT DETAIL SHEETS.
4. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE AND CROSS SLOPE.
5. COLUMN HEIGHTS ("H") SHOWN ARE CALCULATED AT THE PROFILE GRADE LINE (PGL), ACTUAL COLUMN HEIGHTS SHALL BE MEASURED IN THE FIELD PRIOR TO ORDERING MATERIALS.
6. SEE "PHASED BRIDGE TYPICAL SECTION" SHEET FOR ADDITIONAL INFORMATION.
7. CONTRACTOR TO VERIFY LOCATION AND STATUS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
8. CONTRACTOR MUST FIELD VERIFY ALL EXISTING ABUTMENT AND BENT LOCATIONS, DIMENSIONS, AND ELEVATONS PRIOR TO FABRICATION OF I-GIRDERS.
9. SEE "BORING LOGS" SHEET FOR TEST HOLE DATA.

FUNCTIONAL CLASS: MINOR ARTERIAL
DESIGN SPEED: 60 MPH
ADT: 4,172 (2022); 5,590 (2042)
EXIST. NBI: 08-177-0-0264-01-002
PROP. NBI: 08-177-0-0264-01-104

ALL ABUTMENTS AND BENTS AT BEARING N 85°08'04" E

ⓘ CONTRACTOR SHALL PROVIDE TEMPORARY SPECIAL SHORING AT ABUTMENTS IN ACCORDANCE WITH ITEM 403.



ELEVATION

EXIST HYDRAULIC DATA:	PROP HYDRAULIC DATA:
Q_{25} = 7468 cfs	Q_{25} = 7468 cfs
V_{25} = 6.37 fps	V_{25} = 6.45 fps
HW_{25} = 2101.80 feet	HW_{25} = 2101.66 feet
Q_{100} = 12966 cfs	Q_{100} = 12966 cfs
V_{100} = 6.61 fps	V_{100} = 7.55 fps
HW_{100} = 2105.69 feet	HW_{100} = 2104.13 feet

DRILLED SHAFT INSTALLATION MUST ADDRESS WATER TABLE AND/OR UNSTABLE SOIL. USE OF SLURRY AND/OR TEMPORARY CASING IS RECOMENDED FOR DRILLED SHAFT INSTALLATION.

HL93 LOADING: SUPERSTRUCTURE INV/OPR RATING = 1.11/2.05

SUBSTRUCTURE INV/OPR RATING = SUBSTRUCTURE NOT RATED

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
P.E

5/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

BRIDGE LAYOUT

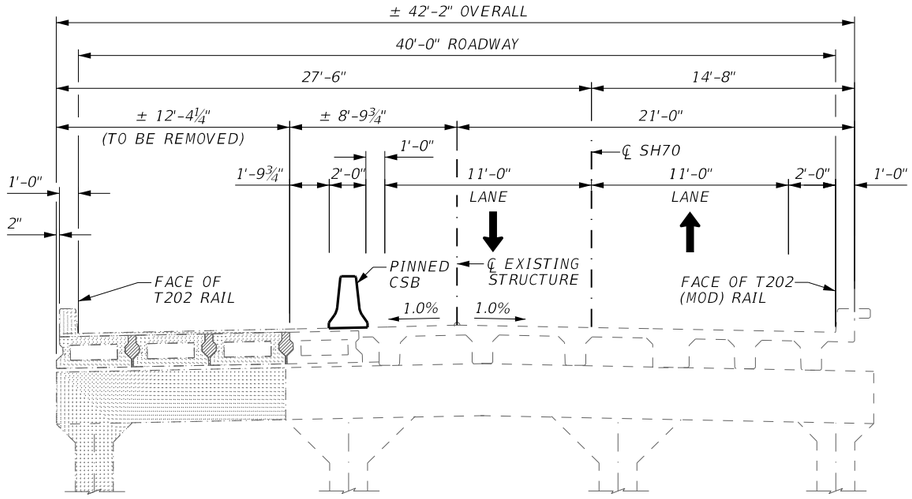
SWEETWATER CREEK BRIDGE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		111

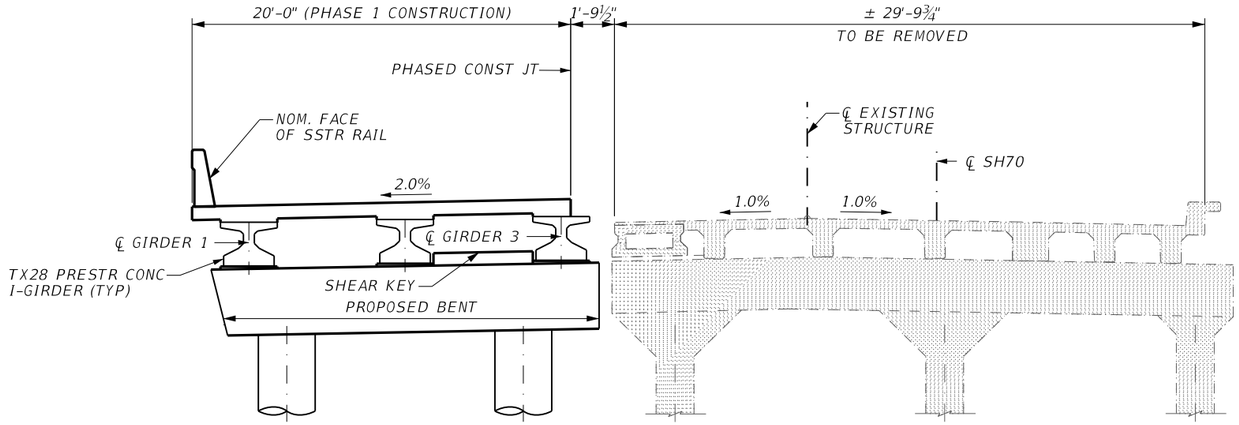
DATE:
FILE:

SP
CK SP
DW SS
DW SP
CK AP
DW



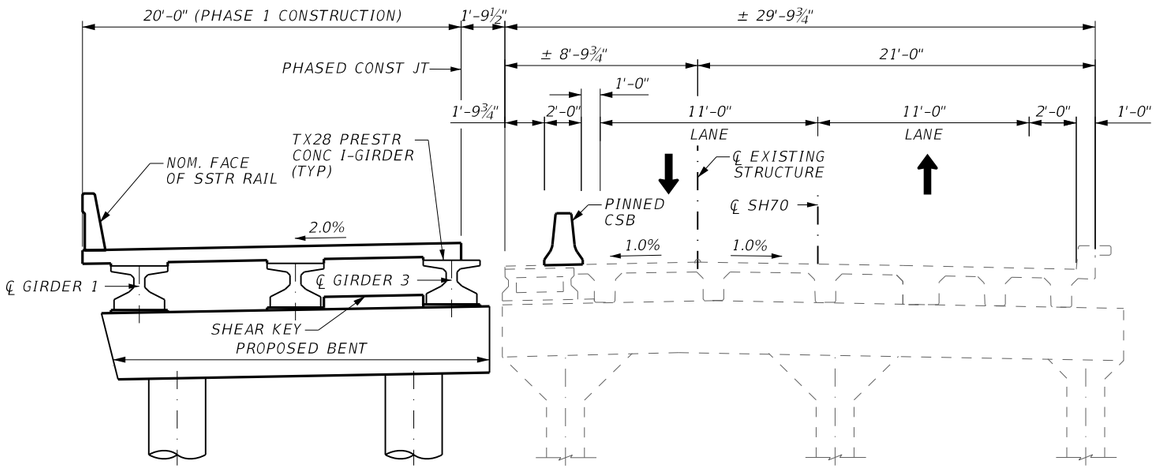
TYPICAL TRANSVERSE SECTION PHASE 1 REMOVAL

(SWEETWATER CREEK BRIDGE)



TYPICAL TRANSVERSE SECTION PHASE 2 REMOVAL

(SWEETWATER CREEK BRIDGE)



TYPICAL TRANSVERSE SECTION PHASE 1 CONSTRUCTION

(SWEETWATER CREEK BRIDGE)

▨ SHADED AREA TO BE REMOVED

FIELD VERIFY ALL EXISTING DIMENSIONS.

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

PHASED BRIDGE TYPICAL SECTION

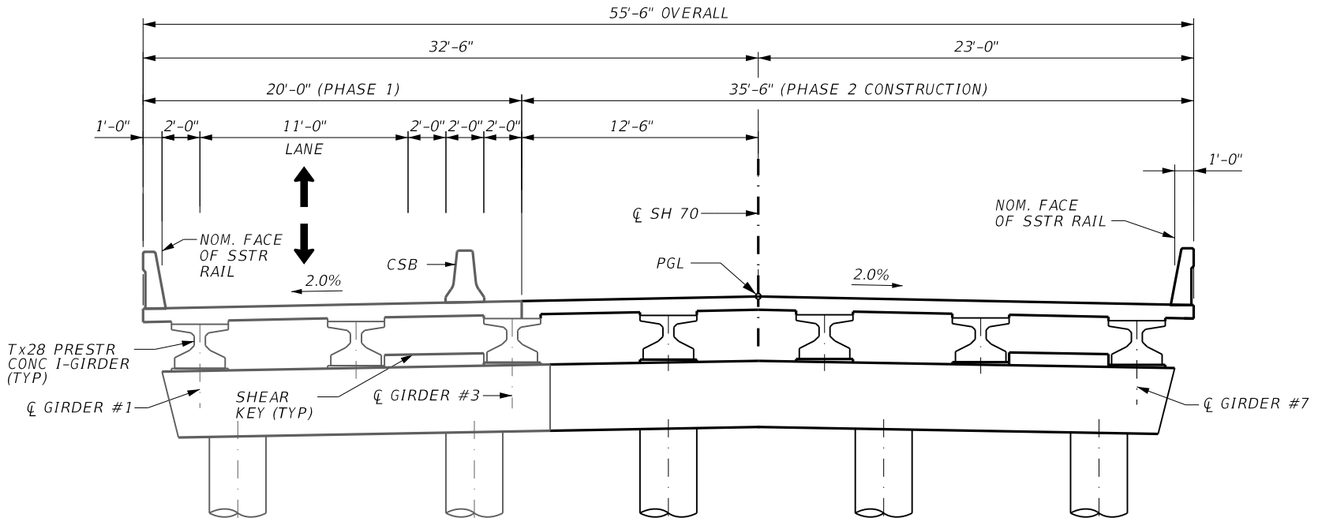
SWEETWATER CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		112

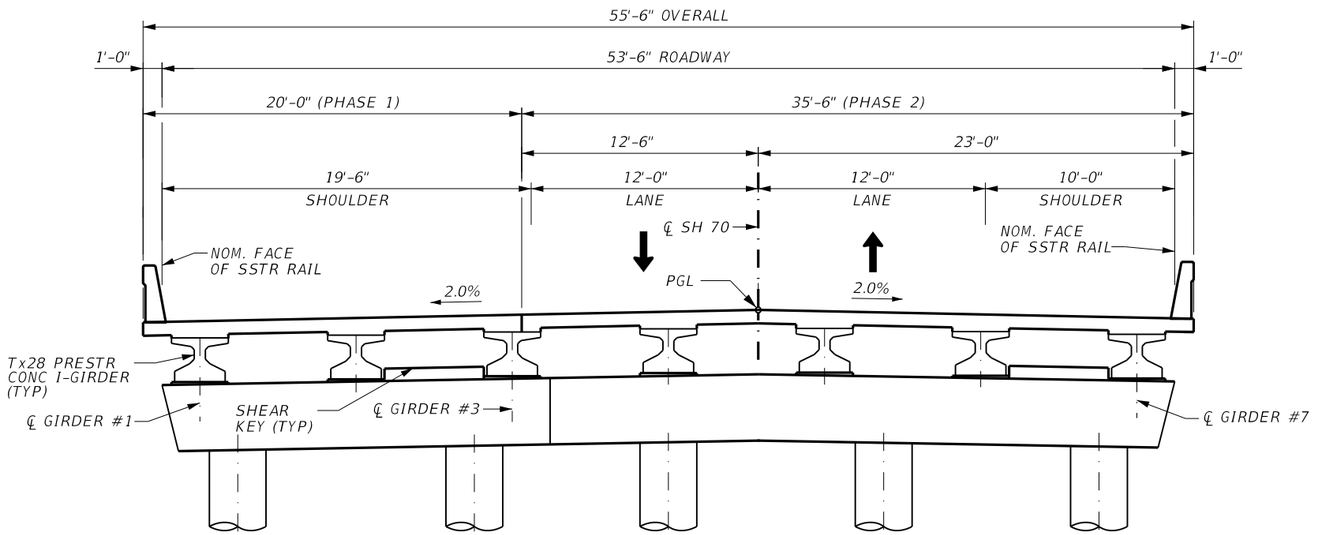
DATE:
FILE:

DW AP | DW SP | CK SS | DW SP | CK SP



TYPICAL TRANSVERSE SECTION PHASE 2 CONSTRUCTION

(SWEETWATER CREEK BRIDGE)



PROPOSED TYPICAL TRANSVERSE SECTION

(SWEETWATER CREEK BRIDGE)

DATE:
FILE:

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

PHASED BRIDGE TYPICAL SECTION

SWEETWATER CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		113

DRILLING LOG

WinCore
Version 3.3

County	Nolan	Hole	B-1	District	Abilene
Highway	SH 70	Structure	Bridge	Date	5/20/2023
CSJ	0264-01-049	Station		Grnd. Elev.	0.00 ft
		Offset		GW Elev.	-21.50 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, Clayey, moist, brown, few Gravel, fine to coarse grained (SC)			10	26	12		SSS@1', N=14, -200=34.5% SC=1,760ppm
						4	23	8		SSS@3', N=13, -200=38.2%
-4.5						6				
5		19 (6) 22 (6)	CLAY, Lean, very stiff, moist, dark brown, trace calcareous deposits (CL)							
						11	44	26		SSS@6.4', N=18, -200=96.7%
-8.						9	27	15		SSS@8', N=17, -200=66.2% SC>20,000ppm
10		28 (6) 36 (6)	CLAY, Sandy Lean, very stiff, moist, light brown, trace gypsum (CL)							
						9				SSS@11.3', N=18
-13.			SAND, Silty, slightly compact, moist, reddish brown, fine grained (SM)							
15		16 (6) 14 (6)								
						6				SSS@16.5', N=13, -200=27.7%
-19.										
20		36 (6) 44 (6)	SAND, Silty, compact, moist, light brown, few Gravel, fine to coarse grained (SM)							
						15				SSS@21.3', N=35, -200=21.1%
-24.			SAND, Silty, dense, moist, reddish brown and gray, fine grained (SM)							
25		50 (4.5) 50 (1.75)								
						8				SSS@25.9', N=50/5
-29.										
30		50 (1.75) 50 (0.5)	SAND, Silty, very dense, moist, light gray, fine grained (SM)							
						19				SSS@30.5', N=50/4.25, -200=18.1%
35		50 (1) 50 (1)								
						15				SSS@35.3', N=50/2
-39.										
40		50 (0.75) 50 (0.25)	SILT, Sandy, very dense, moist, brown (ML)							

Remarks: LAT: 32.427222, LONG: -100.392500. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; SC: Sulfate Content; Drilling Method: Air Rotary to 25', then Mud Rotary.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Beyond Engineering and Testing, LLC Logger: AD **Organization: Foresight PES**

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-006 Jacobs CR 309 - SH 70\Logs\60%\B-1.CLG

DRILLING LOG

WinCore
Version 3.3

County	Nolan	Hole	B-1	District	Abilene
Highway	SH 70	Structure	Bridge	Date	5/20/2023
CSJ	0264-01-049	Station		Grnd. Elev.	0.00 ft
		Offset		GW Elev.	-21.50 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SILT, Sandy, very dense, moist, brown (ML)			14				SSS@40.2', N=50/2.5, -200=58.7%
45		50 (1) 50 (0.25)				9				SSS@45.2', N=50/1.75
50		50 (0.75) 50 (0)								SSS@50.1', N=50/0.5
55		50 (0.5) 50 (0.25)				13				SSS@55.2', N=50/2
60		50 (1) 50 (0.5)				10				SSS@60.2', N=50/2.5
-64.			SAND, Silty, very dense, moist, light gray, fine grained (SM)							
65		50 (0.75) 50 (0)				17				SSS@65.2', N=50/2.5
-70.3										
70		50 (0.75) 50 (0.25)								SSS@70.2', N=50/1.25 Boring terminated at 70.3'
75										
80										

Remarks: LAT: 32.427222, LONG: -100.392500. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; SC: Sulfate Content; Drilling Method: Air Rotary to 25', then Mud Rotary.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Beyond Engineering and Testing, LLC Logger: AD **Organization: Foresight PES**

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-006 Jacobs CR 309 - SH 70\Logs\60%\B-1.CLG

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER
, P.E

6/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

BORING LOGS

SWEETWATER CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		114

SP CK SS DW SP CK AP DW

DATE: DATE TIME
FILE: DOCUMENT NAME

SP | CK | SS | DW | SP | CK | AP | DW

DRILLING LOG

WinCore	County	Nolan	Hole	B-2	District	Abilene
Version 3.3	Highway	SH 70	Structure	Bridge	Date	5/20/2023 to 5/21/2023
	CSJ	0264-01-049	Station		Grnd. Elev.	0.00 ft
			Offset		GW Elev.	-11.80 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Lean with Sand, moist, dark brown, traces Gravel and roots; Sandy Lean Clay to 2' (CL)			6	25	9		SSS@0', N=9, -200=66.5% SC<100ppm
						7	28	12		SSS@2', N=11, -200=71.1%
-5.		16 (6) 16 (6)								
5			SAND, Silty, slightly compact, moist, light brown, fine grained (SM)			2				SSS@6.4', N=8, -200=18.6%
						3				SSS@8', N=4, SC<100ppm
-10.		7 (6) 9 (6)								
10			SILT, with Sand, loose, moist, brown and gray, trace Gravel; Sandy Silt to 13' (ML)			16	19	2		SSS@11.5', N=9, -200=55.9%
15		7 (6) 10 (6)								
						9				SSS@16.5', N=29, -200=75.1%
-19.										
20		50 (1.5) 50 (0.5)	SAND, Silty, very dense, moist, gray and brown, fine grained (SM)			21				SSS@20.4', N=50/4.5
25		50 (1) 50 (0.5)								SSS@25.2', N=50/2.25
30		50 (0.75) 50 (0.25)				13				SSS@30.2', N=50/2.5
35		50 (0.5) 50 (0.5)				9				SSS@35.2', N=50/2.75
40		50 (0.5) 50 (0.25)								

Remarks: LAT: 32.426111, LONG: -100.392500. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; SC: Sulfate Content; Drilling Method: Air Rotary to 15', then Mud Rotary.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Beyond Engineering and Testing, LLC Logger: AD **Organization: Foresight PES**

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-006 Jacobs CR 309 - SH 70\Logs\60%\B-2.CLG

DRILLING LOG

WinCore	County	Nolan	Hole	B-2	District	Abilene
Version 3.3	Highway	SH 70	Structure	Bridge	Date	5/20/2023 to 5/21/2023
	CSJ	0264-01-049	Station		Grnd. Elev.	0.00 ft
			Offset		GW Elev.	-11.80 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, Silty, very dense, moist, gray and brown, fine grained (SM)							SSS@40.1', N=50/0.5
45		50 (1.25) 50 (0.5)				13				SSS@45.3', N=50/2
50		50 (0.75) 50 (0.5)				17				SSS@50.3', N=50/3, SC=16,200ppm
55		50 (1) 50 (0.75)				17				SSS@55.2', N=50/2, -200=32.4%
-60.5		50 (1.5) 50 (0.5)				6				SSS@60.3', N=50/2.5 Boring terminated at 60.5'
65										
70										
75										
80										

Remarks: LAT: 32.426111, LONG: -100.392500. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; SC: Sulfate Content; Drilling Method: Air Rotary to 15', then Mud Rotary.

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Beyond Engineering and Testing, LLC Logger: AD **Organization: Foresight PES**

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-006 Jacobs CR 309 - SH 70\Logs\60%\B-2.CLG

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER
, P.E

6/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

BORING LOGS

SWEETWATER CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		115

DATE: DATE TIME
FILE: DOCUMENT NAME

SUMMARY OF ESTIMATED QUANTITIES

BID ITEM NUMBER	400	403	416	416	420	420	420	422	423	425	428	432	450	454	④
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	TEMPORARY SPECIAL SHORING	DRILL SHAFT (30 IN)	DRILL SHAFT (36 IN)	CL "C" CONC (ABUT) (HPC)	CL "C" CONC (CAP) (HPC)	CL "C" CONC (COLUMN) (HPC)	REINF CONC SLAB (HPC)	RETAINING WALL (DRILL SHAFT) (FASCIA)	PRESTR CONC GIRDER (TX28)	PENETRATING CONCRETE SURFACE TREATMENT	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY SSTR) (HPC)	SEALED EXP. JOINT (4 IN) (SEJ-M)	INSTALL BRIDGE IDENTIFICATION NUMBERS
	CY	SF	LF	LF	CY	CY	CY	SF	SF	LF	SY	CY	LF	LF	EA
PHASE 1															
2 ~ ABUTMENTS	43	150	270	306	28.8				544		48	149	18.0	42	2
3 ~ INTERIOR BENTS				178		29.1	10.1							21	
1 ~ 135.00' PRESTR CONC GIRDER UNIT								2,700		402.00			135.0		
1 ~ 130.00' PRESTR CONC GIRDER UNIT								2,600		387.00			130.0		
PHASE 1 SUBTOTAL	43	150	270	484	28.8	29.1	10.1	5,300	544	789.00	48	149	283.0	63	2
PHASE 2															
2 ~ ABUTMENTS	70		285	517	39.2				763		63	225	18.0	67	
3 ~ INTERIOR BENTS				267		46.2	15.1							34	
1 ~ 135.00' PRESTR CONC GIRDER UNIT								4,793		536.00			135.0		
1 ~ 130.00' PRESTR CONC GIRDER UNIT								4,616		516.00			130.0		
PHASE 2 SUBTOTAL	70		285	784	39.2	46.2	15.1	9,409	763	1,052.00	63	225	283.0	101	0
OVERALL TOTAL	113	150	555	1,268	68.0 ①	75.3 ②	25.2	14,709	1,307	1,841.00 ③	111	374	566.0	164	2

① INCLUDES SHEAR KEYS QUANTITY. SEE PHASED BRIDGE TYPICAL SECTION AND SHEAR KEY DETAILS FOR I-GIRDERS STANDARD (IGSK) FOR SHEAR KEY LOCATION, DETAILS AND NOTES.

② INCLUDES SHEAR KEYS QUANTITY. SEE PHASED BRIDGE TYPICAL SECTION AND SHEAR KEY DETAILS FOR I-GIRDERS STANDARD (IGSK) FOR SHEAR KEY LOCATION, DETAILS AND NOTES.

③ LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

④ FOR CONTRACTOR'S INFORMATION ONLY, WORK SUBSIDIARY TO ABUTMENT BID ITEMS.

BEARING SEAT ELEVATIONS

	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
ABUT 1 (FWD)	2103.190	2103.355	2103.521	2103.685	2103.710	2103.545	2103.380
	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
BENT 2 (BK)	2103.182	2103.347	2103.512	2103.677	2103.702	2103.537	2103.372
(FWD)	2103.201	2103.366	2103.531	2103.696	2103.721	2103.556	2103.391
	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
BENT 3 (BK)	2103.193	2103.358	2103.523	2103.688	2103.713	2103.548	2103.383
(FWD)	2103.193	2103.358	2103.523	2103.688	2103.713	2103.548	2103.383
	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
BENT 4 (BK)	2103.185	2103.350	2103.515	2103.680	2103.705	2103.540	2103.375
(FWD)	2103.185	2103.350	2103.515	2103.680	2103.705	2103.540	2103.375
	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7
ABUT 5 (BK)	2103.177	2103.342	2103.506	2103.671	2103.697	2103.531	2103.366

SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS

SWEETWATER CREEK BRIDGE

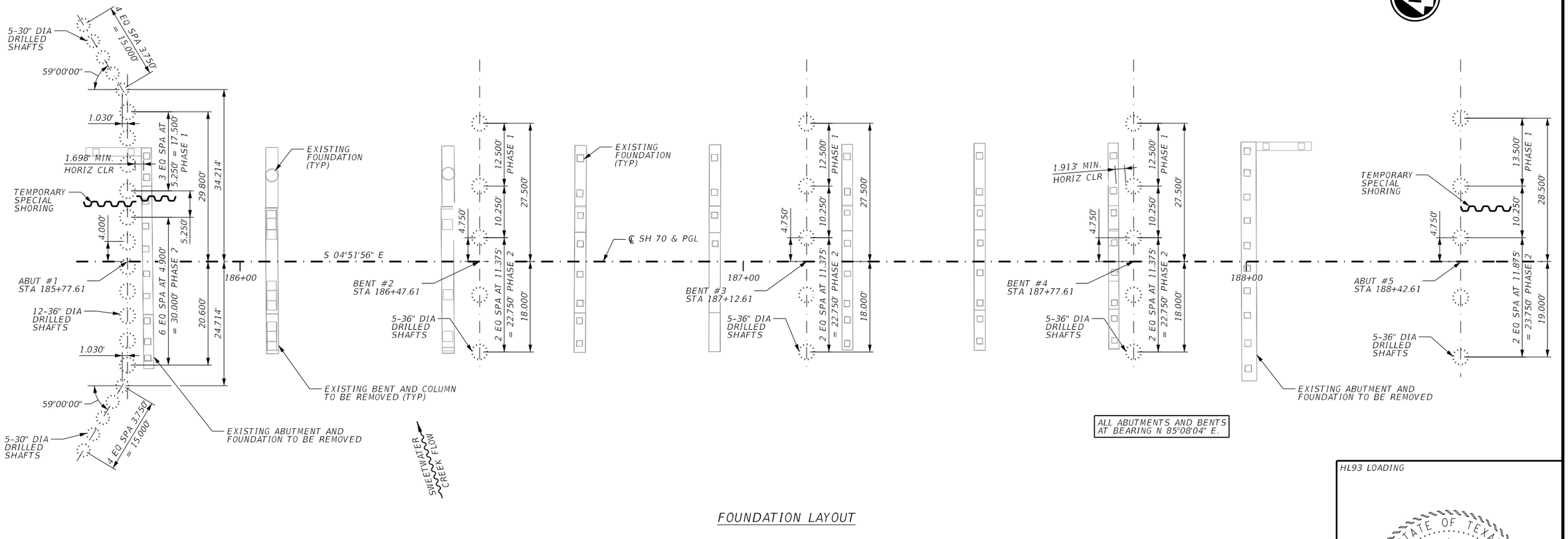
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		116

DATE: DATE TIME
FILE: DOCUMENT NAME

DW AP CK SP DW SS DW SP CK SP

DW AP | DW SP | CK SP | DW SS | CK SP

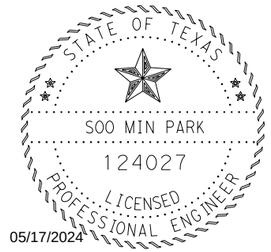


FOUNDATION LAYOUT

NOTES:

1. SEE BRIDGE LAYOUT FOR DRILLED SHAFT LENGTH.
2. SEE TEST HOLE DATA SHEETS FOR SOIL BORING DATA.
3. CONTRACTOR TO FIELD VERIFY LOCATIONS AND STATUS OF EXISTING STRUCTURES AND UTILITIES PRIOR TO CONSTRUCTION.
4. DRILLED SHAFTS TO BE FOUNDED AT ELEVATIONS SHOWN ON BRIDGE LAYOUT OR DEEPER AS NECESSARY TO OBTAIN A MINIMUM OF THREE SHAFT DIAMETERS PENETRATION INTO VERY DENSE BROWN SAND.

HL93 LOADING



Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

FOUNDATION LAYOUT

SWEETWATER CREEK BRIDGE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		117

DATE:
FILE:

DW AP | DW SP | CK SP | DW SS | DW CK SP

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.

FIELD VERIFY EXISTING ABUTMENT AND WINGWALL LOCATIONS, DIMENSIONS, AND ELEVATIONS PRIOR TO CONSTRUCTION.

SEE STONE RIPRAP (SRR) STANDARD FOR RIPRAP ATTACHMENT DETAILS.

SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN.

SEE SHEAR KEY DETAILS (IGSK) FOR SHEAR KEY DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN WINGWALL.

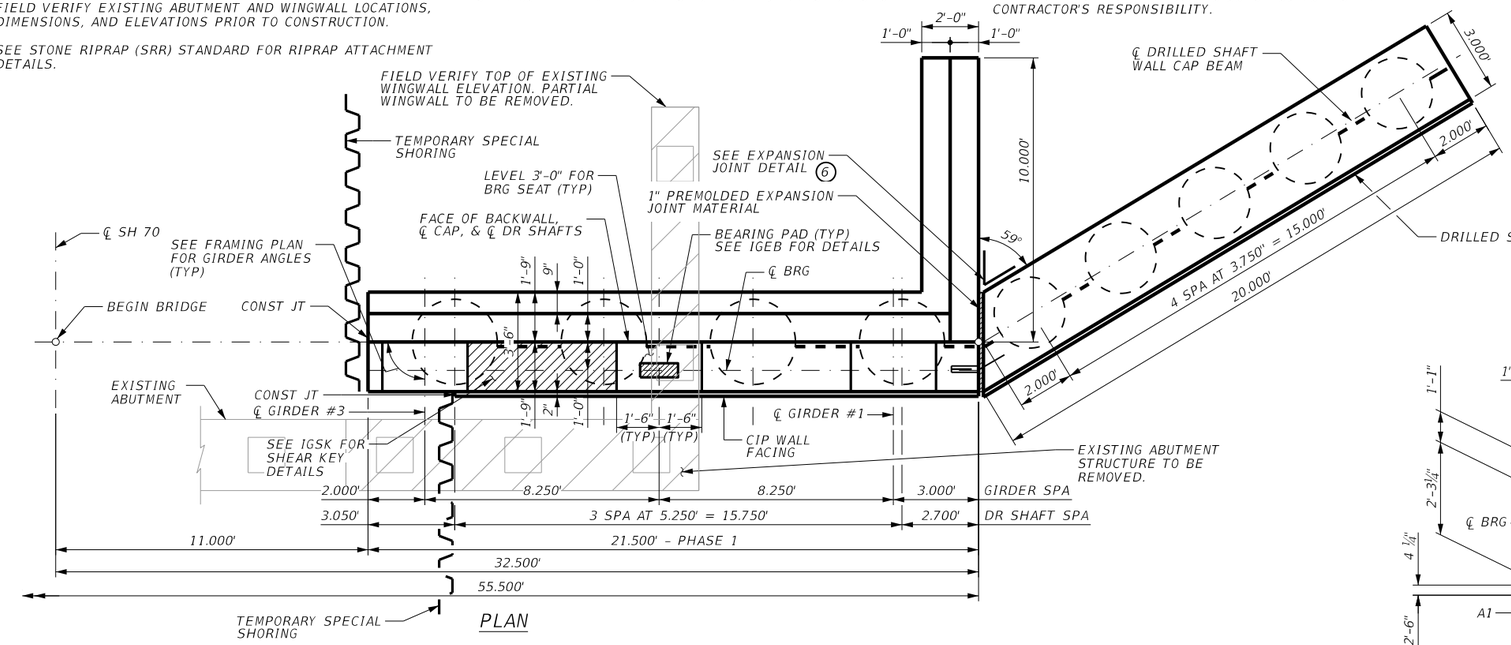
SEE ABUTMENT WALL DETAILS FOR WALL DETAILS NOT SHOWN.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

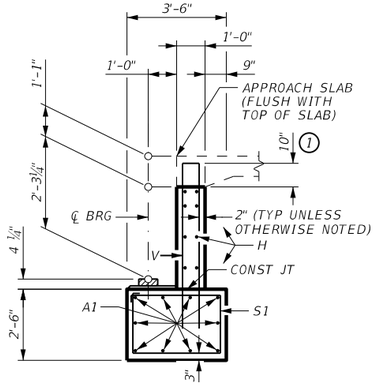
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 43 TONS/DR SH.

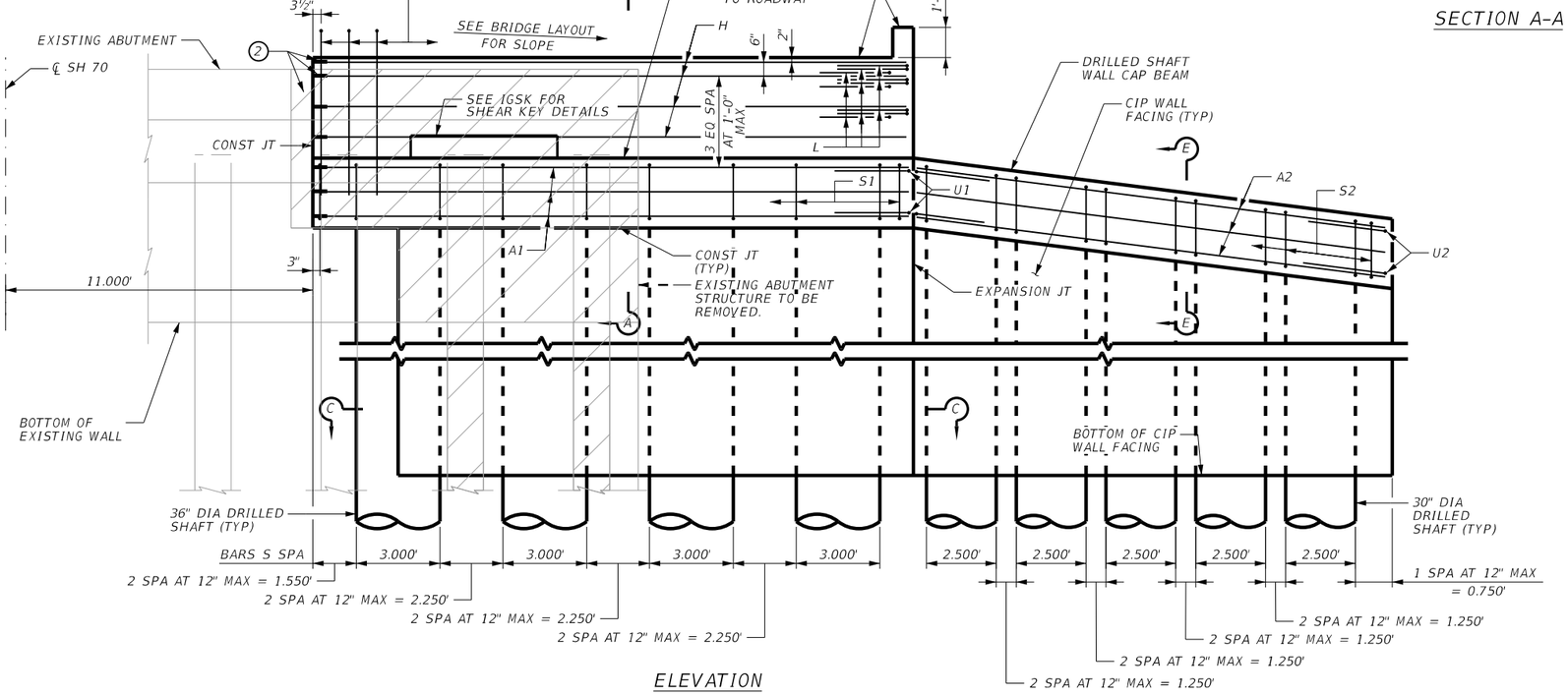
STABILIZING SLOPES ADJACENT TO TEMPORARY SHORING AND NEXT TO EXISTING WALL DURING CONSTRUCTION IS THE CONTRACTOR'S RESPONSIBILITY.



PLAN

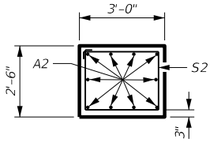


SECTION A-A



ELEVATION

(DIMENSIONS MEASURED ALONG FRONT FACE OF WALL)



SECTION E-E

TABLE OF ESTIMATED QUANTITIES (PHASE 1) (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A1 (2)	10	#11	21'-0"	1,116
A2	10	#11	18'-10" AVG	1,001
H (2)	8	#6	21'-4"	257
L	9	#6	4'-0"	55
S1	14	#5	11'-6"	168
S2	15	#5	10'-6"	165
U1	2	#6	8'-1"	25
U2	4	#6	7'-1"	43
V	21	#5	11'-5"	251
wH1	7	#6	11'-5"	121
wH2	10	#6	9'-8"	146
wS	11	#4	7'-10"	58
wV	11	#5	11'-5"	131
REINFORCING STEEL (4)			LB	3,537
CLASS "C" CONCRETE (ABUT) (HPC) (5)			CY	17.4
PENETRATING CONCRETE SURFACE TREATMENT (5)			SY	30

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

(2) PLACE FEMALE MECHANICAL COUPLERS WITH PLUGS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL".

(3) QUANTITIES SHOWN ARE FOR ONE ABUTMENT (WITH APPROACH SLAB) AND ONE WALL CAP ONLY.

(4) FOR CONTRACTOR'S INFORMATION ONLY.

(5) DRILLED SHAFT WALL CAP QUANTITY IS INCLUDED.

(6) TYPE 10 WATERPROOFING. TYPE 10 WATERPROOFING (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).

MATERIAL NOTES:

PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 1 PHASE 1

SWEETWATER CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		118

DATE:
FILE:

DW AP SP CK SS DW SP CK

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.

FIELD VERIFY EXISTING ABUTMENT AND WINGWALL LOCATIONS. DIMENSIONS, AND ELEVATIONS PRIOR TO CONSTRUCTION.

SEE STONE RIPRAP (SRR) STANDARD FOR RIPRAP ATTACHMENT DETAILS.

SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN.

SEE SHEAR KEY DETAILS (IGSK) FOR SHEAR KEY DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN WINGWALL.

SEE ABUTMENT WALL DETAILS FOR WALL DETAILS NOT SHOWN.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 43 TONS/DR SH.

TABLE OF ESTIMATED QUANTITIES (PHASE 2) (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A1 (2)	10	#11	34'-6"	1,833
A2	10	#11	18'-10" AVG	1,001
H (2)	8	#6	34'-10"	419
L	9	#6	4'-0"	55
S1	20	#5	11'-6"	240
S2	15	#5	10'-6"	165
U1	2	#6	8'-1"	25
U2	4	#6	7'-1"	43
V	34	#5	11'-5"	405
wH1	7	#6	11'-5"	121
wH2	10	#6	9'-8"	146
wS	11	#4	7'-10"	58
wV	11	#5	11'-5"	131
REINFORCING STEEL (4)			LB	4,642
CLASS "C" CONCRETE (ABUT) (HPC) (5)			CY	22.6
PENETRATING CONCRETE SURFACE TREATMENT (5)			SY	37

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

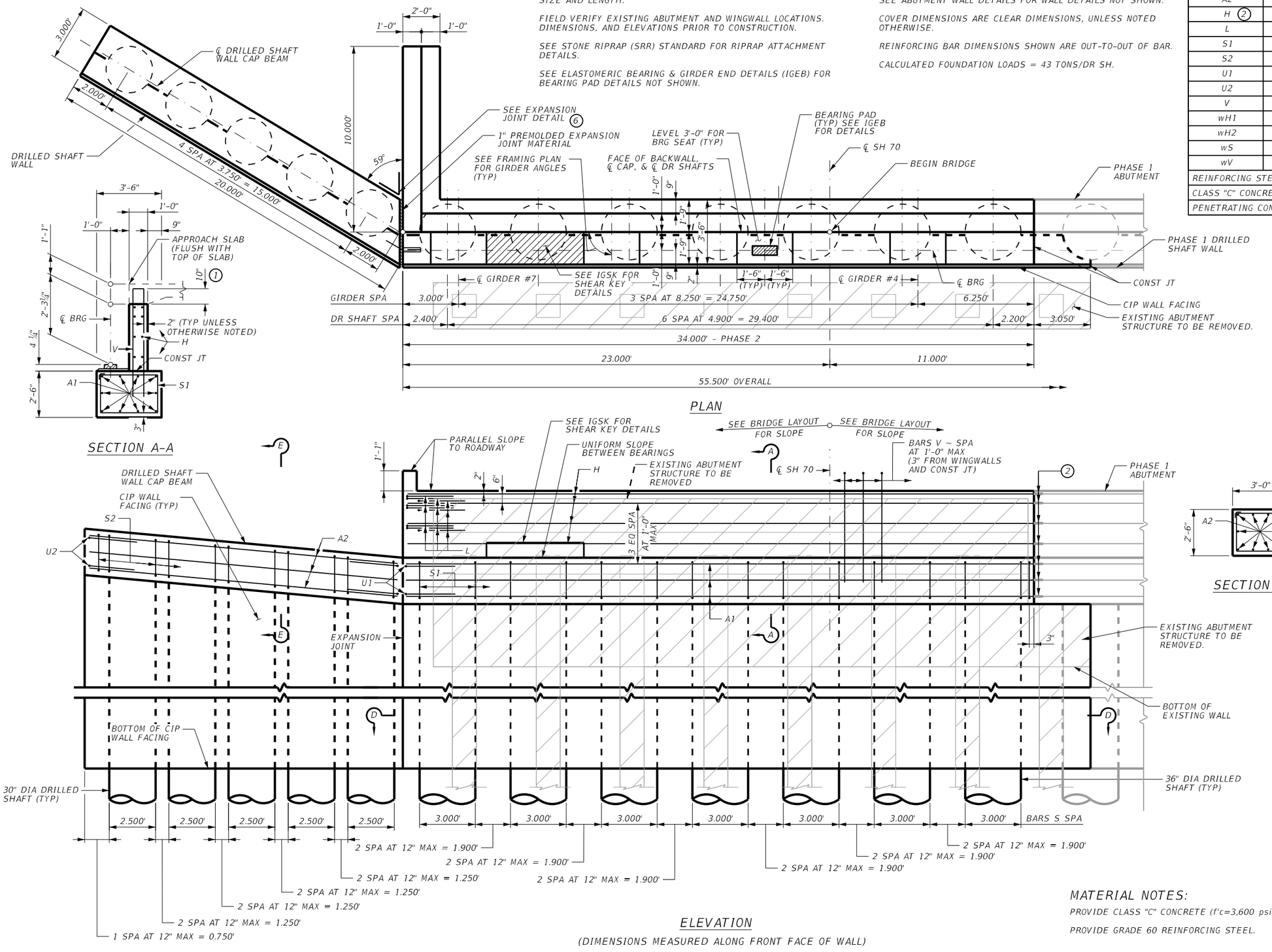
(2) EXTEND BARS INTO PHASE 1 CONSTRUCTION. USING MECHANICAL COUPLERS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL". ADJUST LENGTH OF BARS AS NEEDED.

(3) QUANTITIES SHOWN ARE FOR ONE ABUTMENT (WITH APPROACH SLAB) AND ONE WALL CAP ONLY.

(4) FOR CONTRACTOR'S INFORMATION ONLY.

(5) QUANTITY FOR DRILLED SHAFT CAP IS INCLUDED.

(6) TYPE 10 WATERPROOFING. TYPE 10 WATERPROOFING (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).



ELEVATION

(DIMENSIONS MEASURED ALONG FRONT FACE OF WALL)

MATERIAL NOTES:

PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 1 PHASE 2

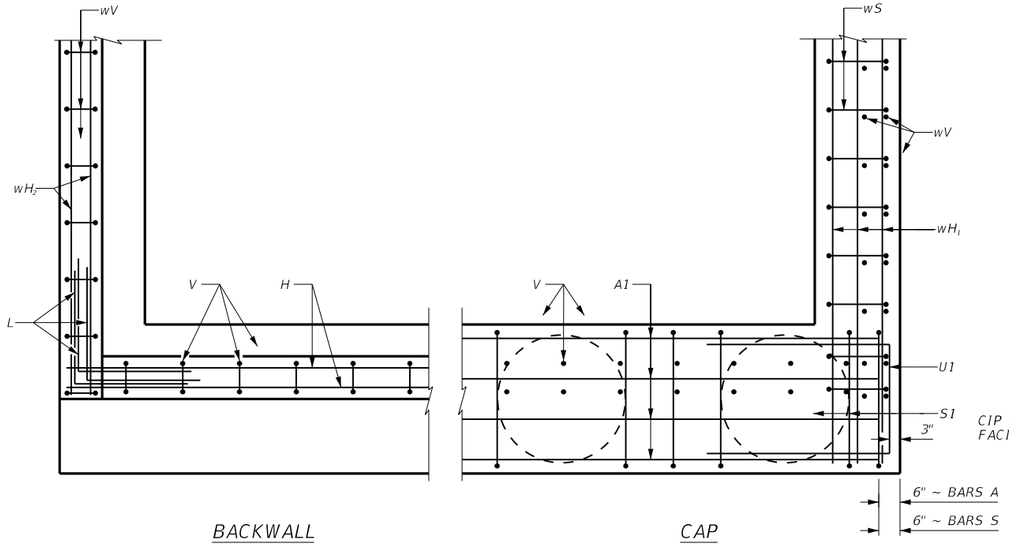
SWEETWATER CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		119

DATE:
FILE:

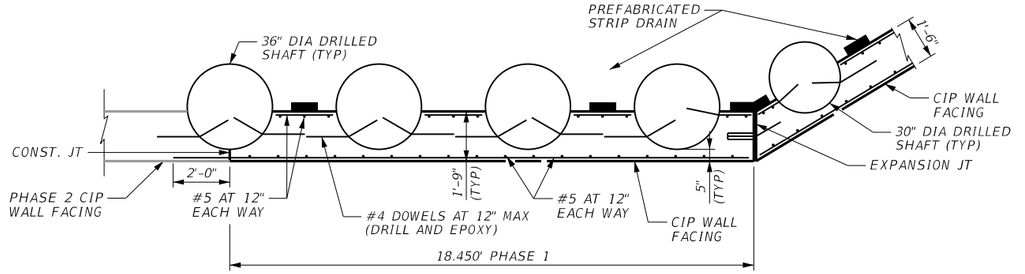
SP
CK
SS
DW
SP
CK
AP
DW



BACKWALL

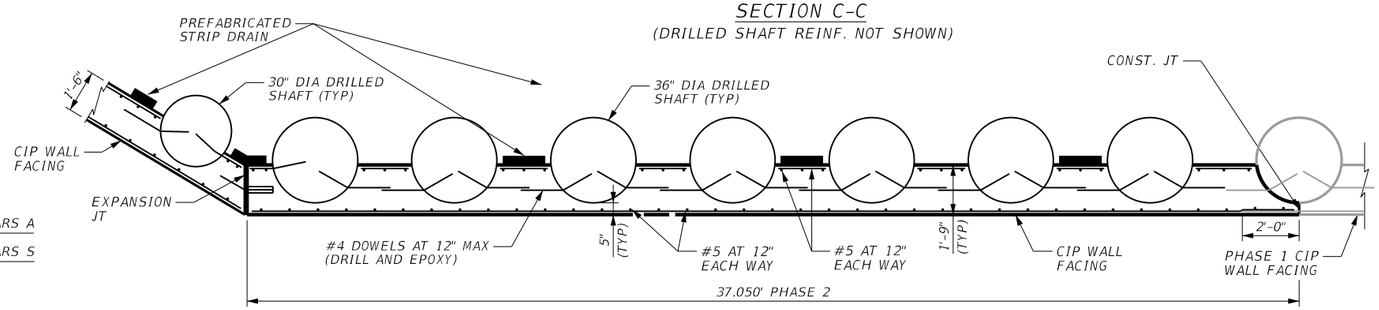
CAP

CORNER DETAILS



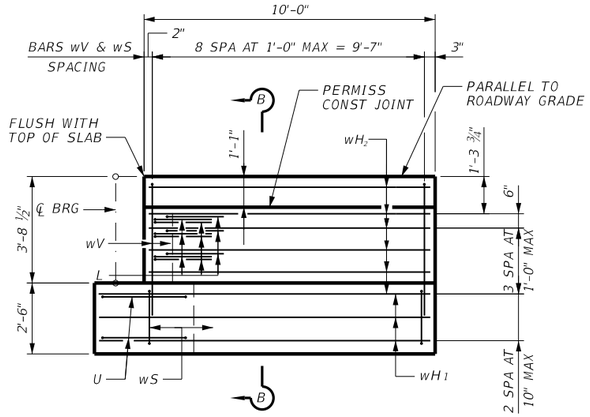
SECTION C-C

(DRILLED SHAFT REINF. NOT SHOWN)

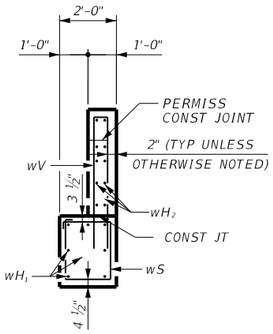


SECTION D-D

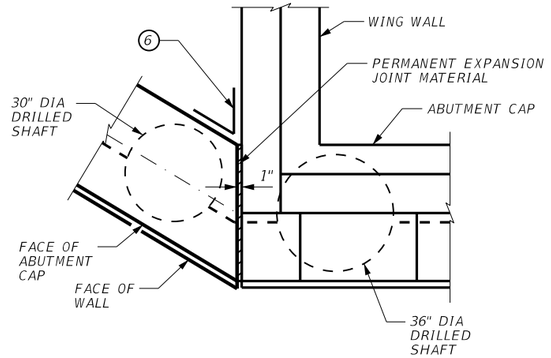
(DRILLED SHAFT REINF. NOT SHOWN)



WINGWALL ELEVATION

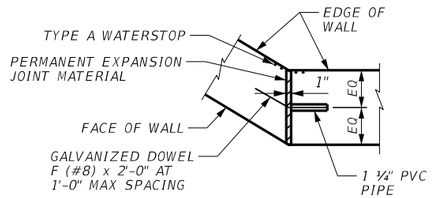


SECTION B-B



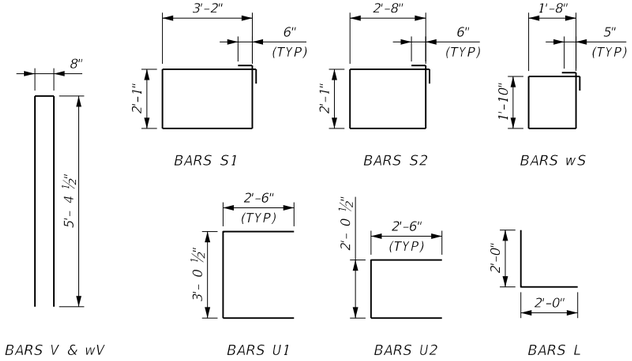
EXPANSION JOINT

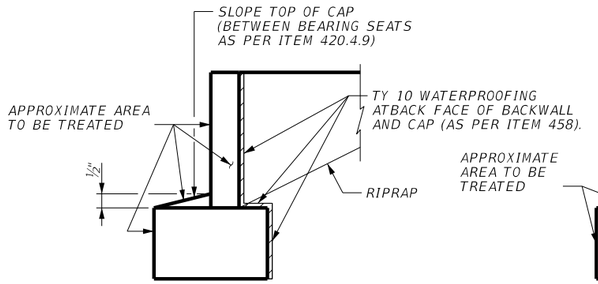
(SHOWING ABUTMENT CAP)



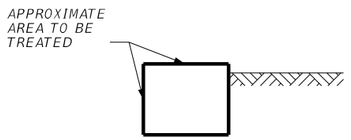
EXPANSION JOINT

(SHOWING ABUTMENT WALL)





ABUTMENT CAP

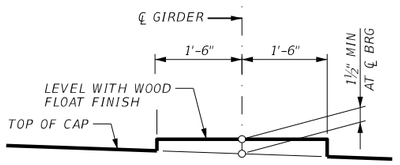


DRILLED SHAFT CAP

WATERPROOFING DETAIL

(TREAT THE FACE OF BACKWALL AND TOP, FRONT AND END OF CAP AS SHOWN, EXCEPT BEARING SHEETS, WITH PENETRATING CONCRETE SURFACE TREATMENT FINISH AS PER ITEM 428. TYPE 10 WATERPROOFING MEMBRANE) (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).

6 TYPE 10 WATERPROOFING MEMBRANE (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER

05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 1 DETAILS

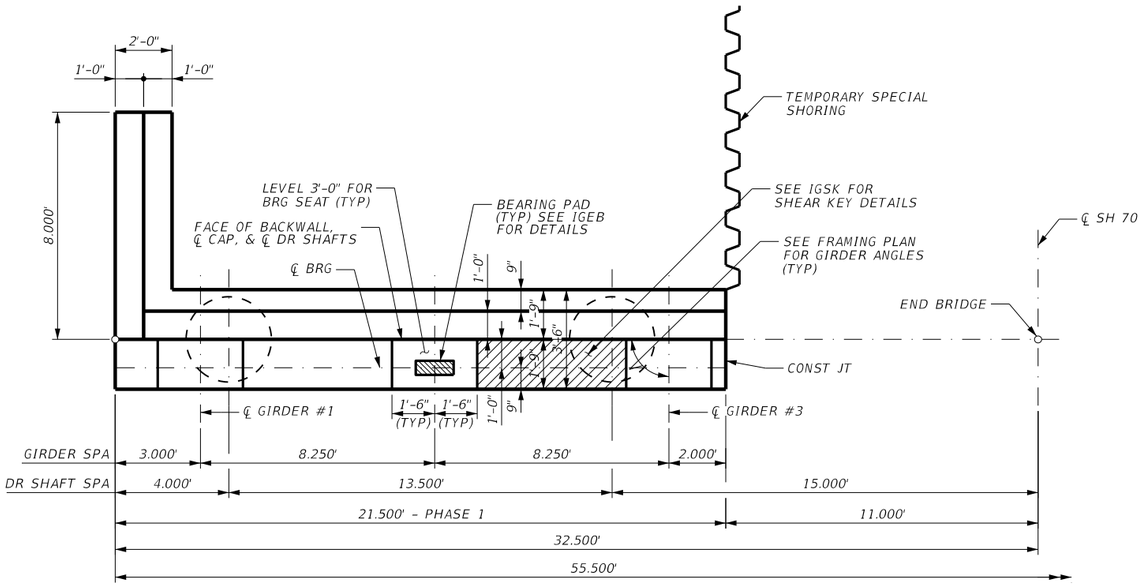
SWEETWATER CREEK BRIDGE

SHEET 1 OF 1

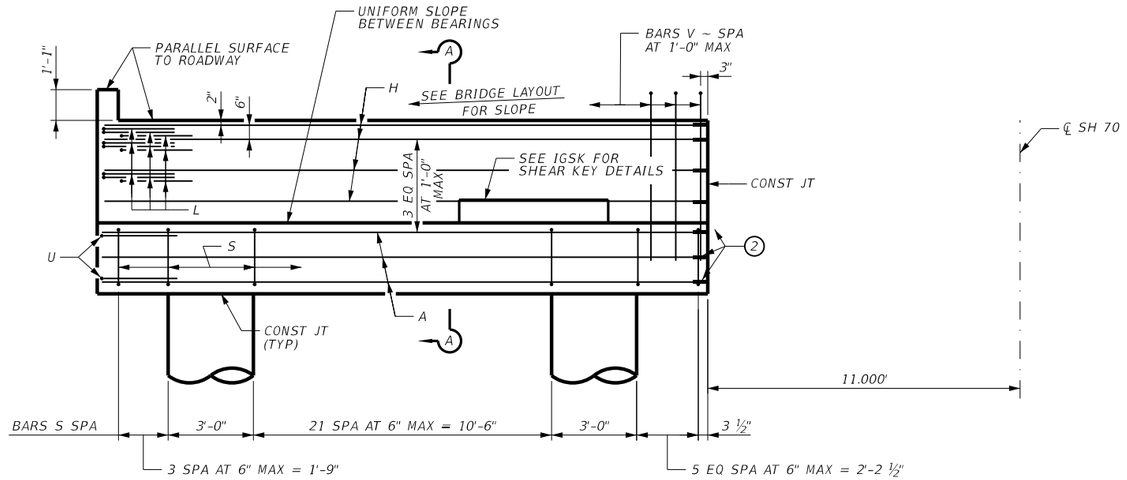
CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		120

DATE:
FILE:

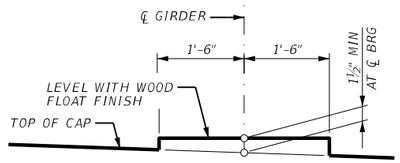
DW AP | DW SP | CK SP | DW SS | CK SP



PLAN



ELEVATION



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE STONE RIPRAP (SRR) STANDARD FOR RIPRAP ATTACHMENT DETAILS.

SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN.

SEE SHEAR KEY DETAILS (IGSK) FOR SHEAR KEY DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN WINGWALL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 83 TONS/DR SH.

TABLE OF ESTIMATED QUANTITIES (PHASE 1) (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A (2)	10	#11	21'-0"	1,116
H (2)	8	#6	21'-4"	257
L	9	#6	4'-0"	55
S	33	#5	11'-6"	396
U	2	#6	8'-1"	25
V	21	#5	11'-5"	251
wH1	7	#6	9'-5"	100
wH2	10	#6	7'-8"	116
wS	9	#4	7'-10"	48
wV	9	#5	11'-5"	108
REINFORCING STEEL (4)			LB	2,472
CLASS "C" CONCRETE (ABUT) (HPC)			CY	11.4
PENETRATING CONCRETE SURFACE TREATMENT			SY	18

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

(2) PLACE FEMALE MECHANICAL COUPLERS WITH PLUGS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL".

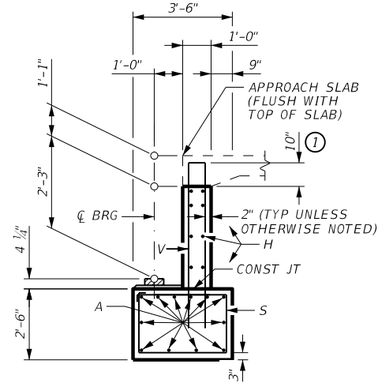
(3) QUANTITIES SHOWN ARE FOR ONE ABUTMENT ONLY (WITH APPROACH SLAB).

(4) FOR CONTRACTOR'S INFORMATION ONLY.

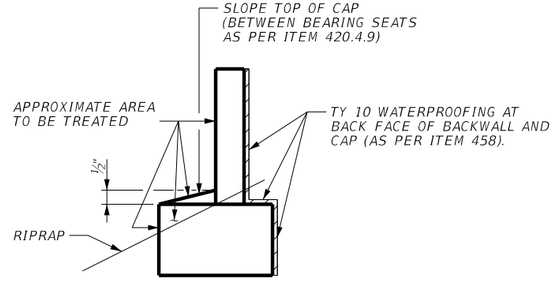
MATERIAL NOTES:

PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.



SECTION A-A



WATERPROOFING DETAIL

(TREAT THE FACE OF BACKWALL AND TOP, FRONT AND END OF CAP AS SHOWN, EXCEPT BEARING SHEETS, WITH PENETRATING CONCRETE SURFACE TREATMENT FINISH AS PER ITEM 428. TYPE 10 WATERPROOFING MEMBRANE) (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 5 PHASE 1

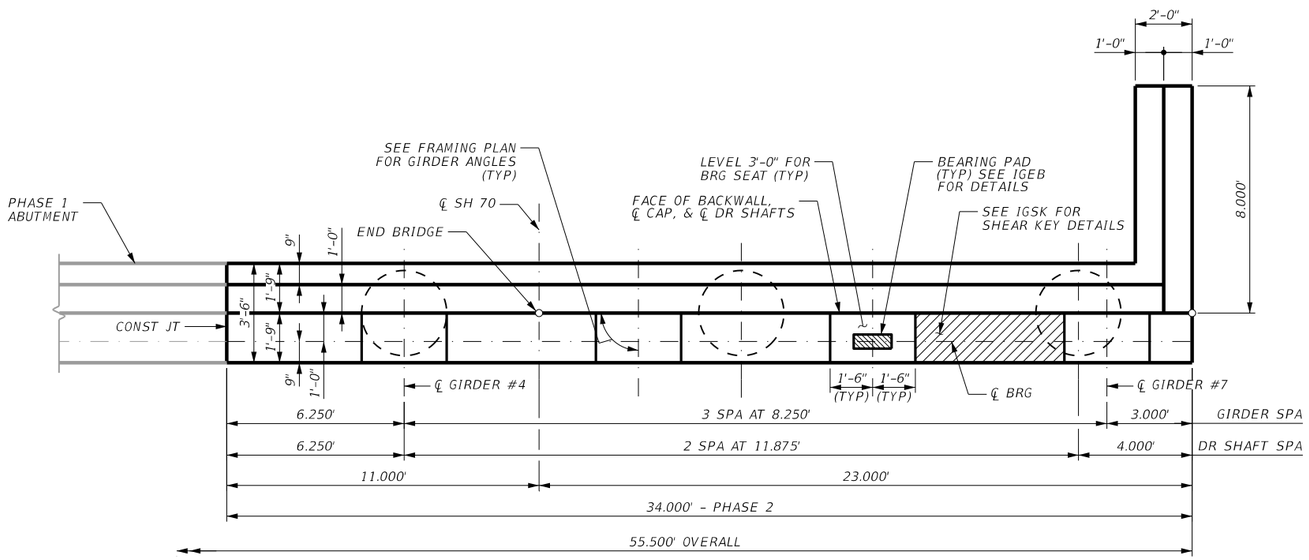
SWEETWATER CREEK BRIDGE

SHEET 1 OF 2

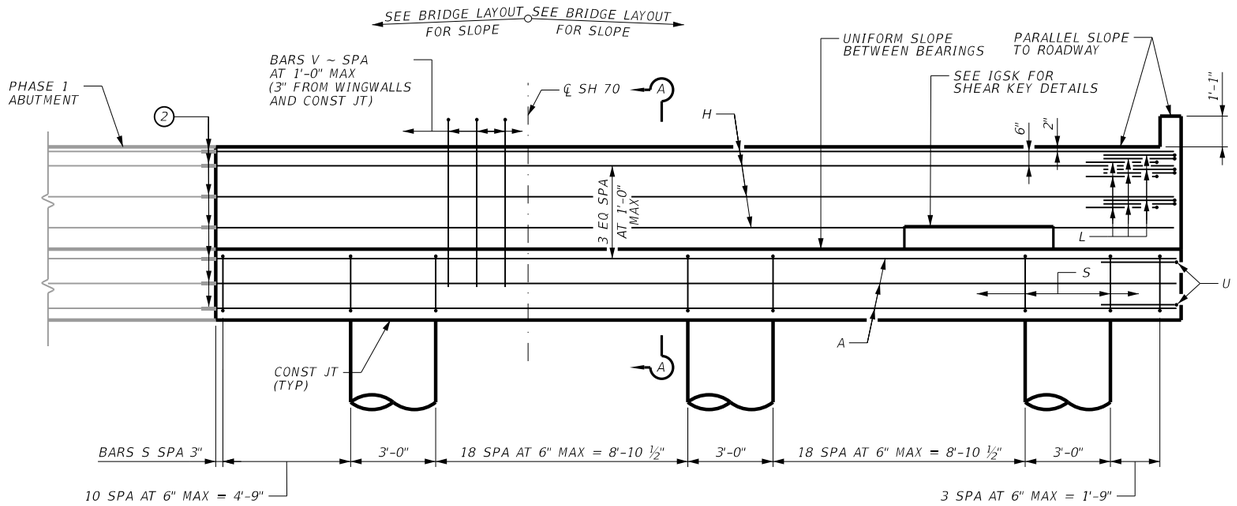
CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		121

DATE:
FILE:

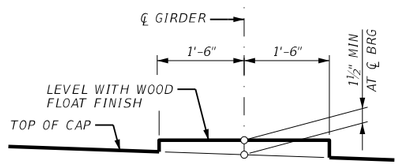
DW AP | DW SP | CK SP | DW SS | CK SP



PLAN



ELEVATION



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE STONE RIPRAP (SRR) STANDARD FOR RIPRAP ATTACHMENT DETAILS.

SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN.

SEE SHEAR KEY DETAILS (IGSK) FOR SHEAR KEY DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN WINGWALL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 83 TONS/DR SH.

TABLE OF ESTIMATED QUANTITIES (PHASE 2) (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A (2)	10	#11	34'-6"	1,833
H (2)	8	#6	34'-10"	419
L	9	#6	4'-0"	55
S	53	#5	11'-6"	636
U	2	#6	8'-1"	25
V	34	#5	11'-5"	408
wH1	7	#6	9'-5"	100
wH2	10	#6	7'-8"	116
wS	9	#4	7'-10"	48
wV	9	#5	11'-5"	108
REINFORCING STEEL (4)			LB	3,748
CLASS "C" CONCRETE (ABUT) (HPC)			CY	16.6
PENETRATING CONCRETE SURFACE TREATMENT			SY	26

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

(2) EXTEND BARS INTO PHASE 1 CONSTRUCTION. USING MECHANICAL COUPLERS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL". ADJUST LENGTH OF BARS AS NEEDED.

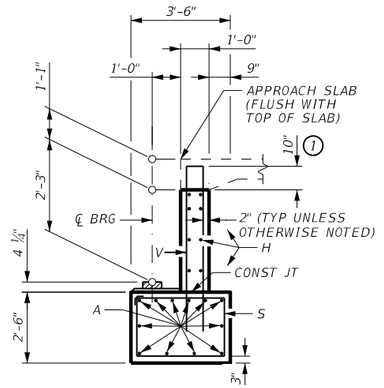
(3) QUANTITIES SHOWN ARE FOR ONE ABUTMENT ONLY (WITH APPROACH SLAB).

(4) FOR CONTRACTOR'S INFORMATION ONLY.

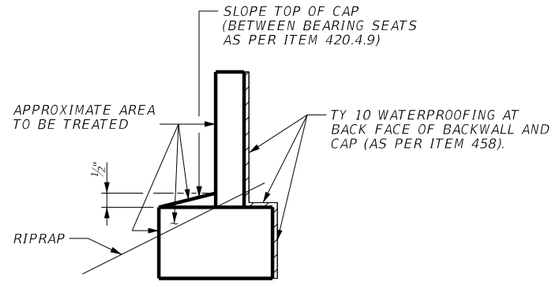
MATERIAL NOTES:

PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.



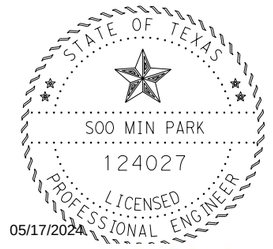
SECTION A-A



WATERPROOFING DETAIL

(TREAT THE FACE OF BACKWALL AND TOP, FRONT AND END OF CAP AS SHOWN, EXCEPT BEARING SHEETS, WITH PENETRATING CONCRETE SURFACE TREATMENT FINISH AS PER ITEM 428. TYPE 10 WATERPROOFING MEMBRANE) (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED



Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 5 PHASE 2

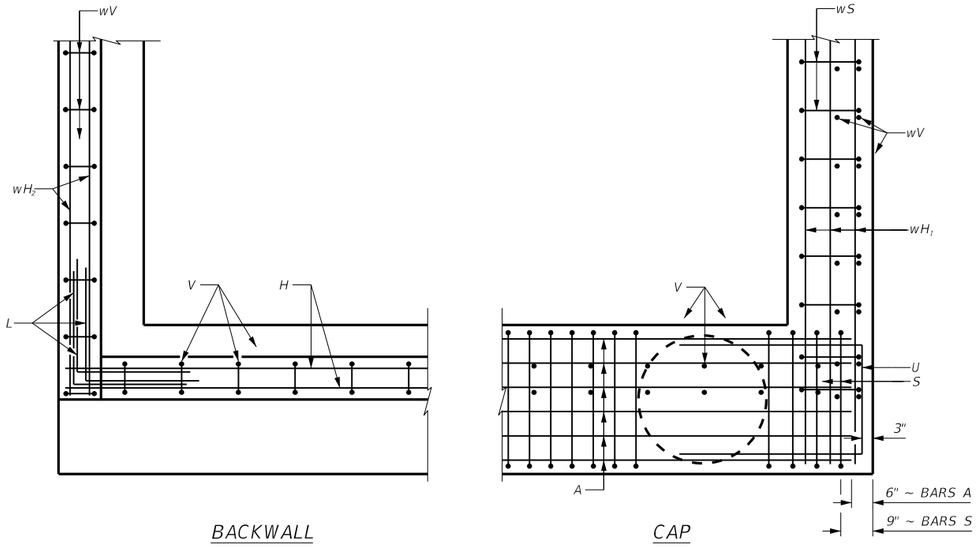
SWEETWATER CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		122

DATE:
FILE:

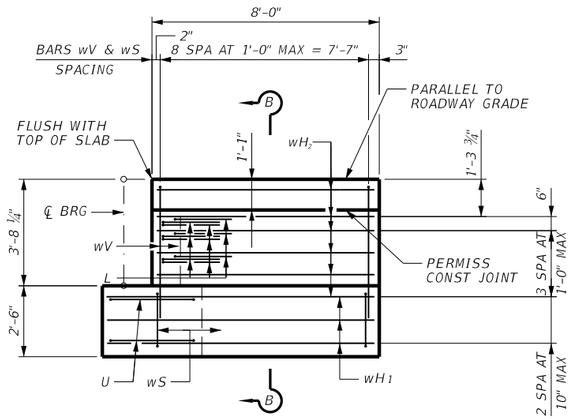
SP | CK | SS | DW | SP | CK | AP | DW



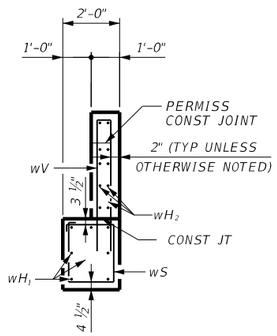
BACKWALL

CAP

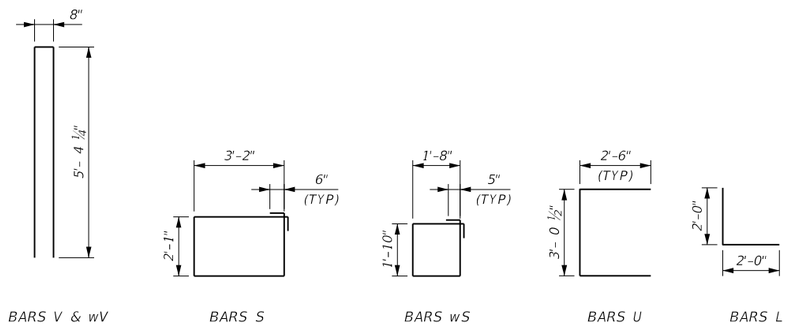
CORNER DETAILS



WINGWALL ELEVATION



SECTION B-B



BARS V & wV | BARS S | BARS wS | BARS U | BARS L

HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

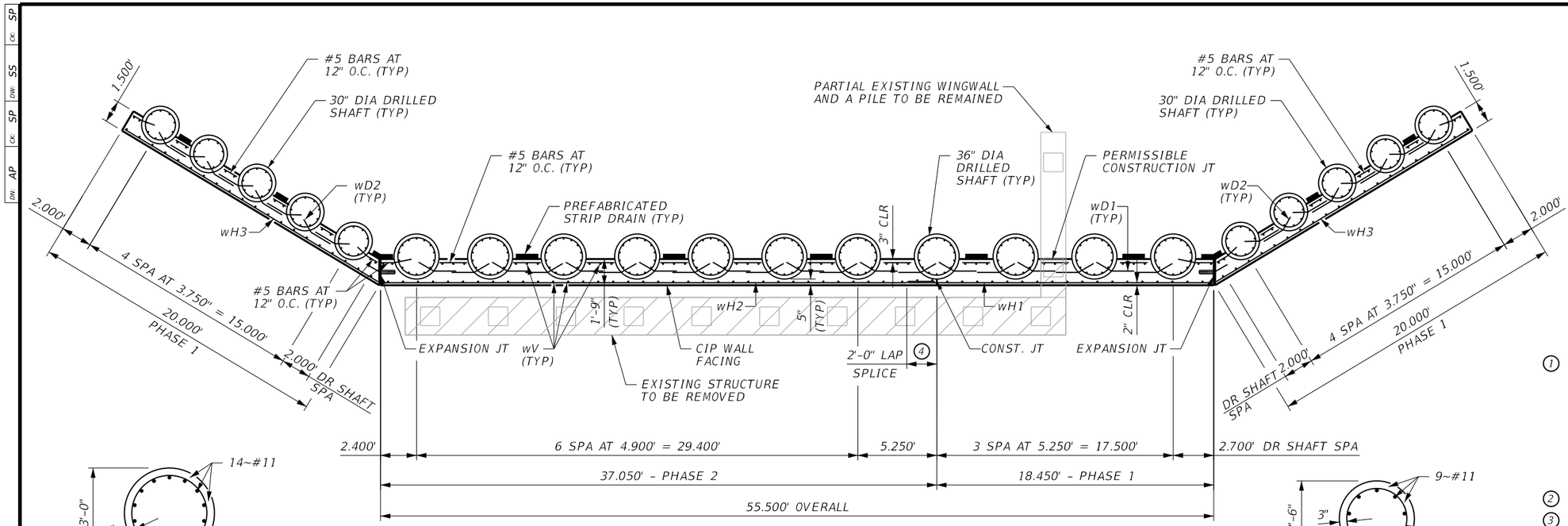
ABUTMENT NO. 5 DETAILS

SWEETWATER CREEK BRIDGE

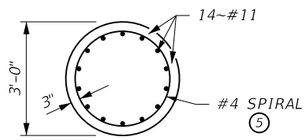
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		123

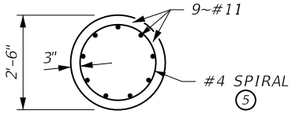
DATE:
FILE:



PLAN



REINFORCEMENT DETAILS FOR 36" DIA DS



REINFORCEMENT DETAILS FOR 30" DIA DS

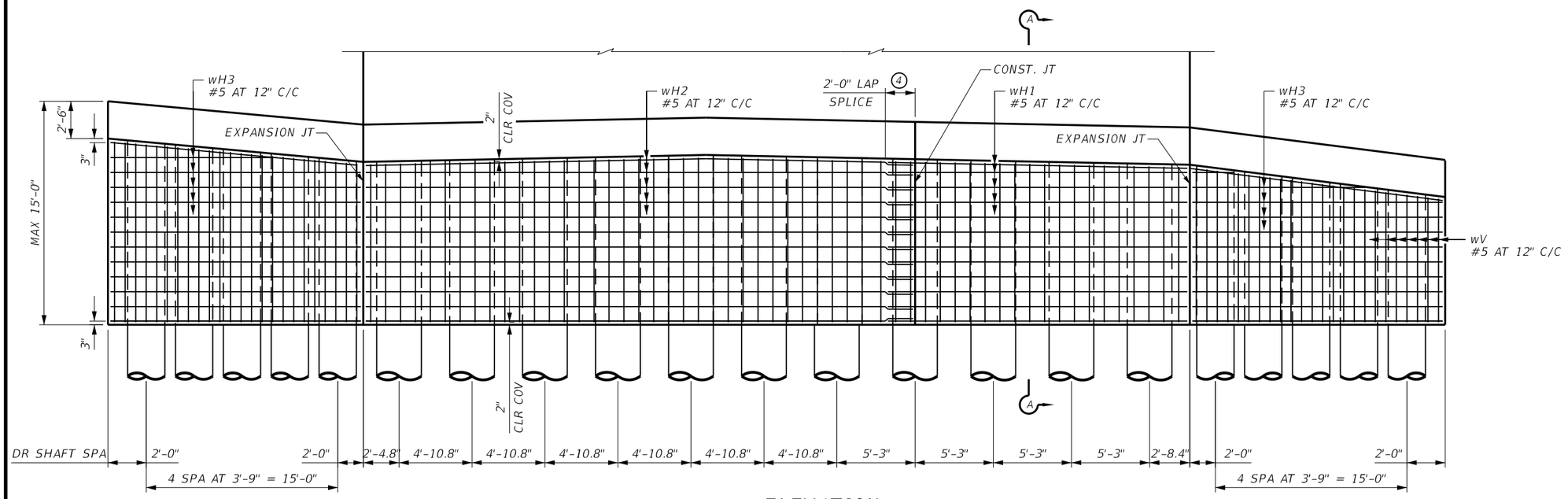
MATERIAL NOTES:

PROVIDE CLASS C CONCRETE (F'c=3,600 PSI). CHAMFER ALL EXPOSED CORNERS.

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE BAR LAPS FOR DRILLED SHAFT REINFORCING, WHERE REQUIRED, AS FOLLOWS:

UNCOATED (#11) ~ 5'-3"



ELEVATION

(BAR wD NOT SHOWING FOR CLARITY)
(DIMENSIONS MEASURED ALONG FRONT FACE OF WALL)

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

CONTRACTOR WILL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO ORDERING MATERIALS.

SEE ABUTMENT NO.1 PHASE 1, ABUTMENT NO.1 PHASE 2 AND ABUTMENT NO.1 DETAILS SHEETS FOR ABUTMENT WALL DETAILS NOT SHOWN.

SEE FD STANDARD SHEET FOR FOUNDATION DETAILS NOT SHOWN.

SEE ABUTMENT NO. 1 DETAILS SHEET FOR EXPANSION JOINT DETAIL.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

STABILIZING SLOPES ADJACENT TO TEMPORARY SHORING AND NEXT TO EXISTING WALL DURING CONSTRUCTION IS THE CONTRACTOR'S RESPONSIBILITY.

1. EMBED BARS wD 1'-0" INTO COLUMNS WITH A TYPE III, CLASS C, D, E, OR F ANCHOR ADHESIVE. ANCHOR ADHESIVE CHOSEN MUST BE ABLE TO ACHIEVE A BASIC BOND STRENGTH IN TENSION, Nba, OF 10 KIPS. SUBMIT SIGNED AND SEALED CALCULATIONS OR THE MANUFACTURER'S PUBLISHED LITERATURE SHOWING THE PROPOSED ANCHOR ADHESIVE'S ABILITY TO DEVELOP THIS LOAD TO THE ENGINEER FOR APPROVAL PRIOR TO USE. ANCHOR INSTALLATION, INCLUDING HOLE SIZE, DRILLING, AND CLEAN OUT, MUST BE IN ACCORDANCE WITH ITEM 420, "CONCRETE SUBSTRUCTURES". DO NOT DAMAGE DRILLED SHAFT REINFORCING STEEL.
2. FIELD BEND BARS wD AS NEEDED.
3. 3" I.D. DRAIN PIPE SPACED AT 15 FT C-C MAX. LOCATE DRAIN 3" CLEAR ABOVE THE GROUND LINE. PLACE 12" X 12" HARDWARE CLOTH (¼" MESH) CENTERED BEHIND THE OPENING.
4. EXTEND wH1 BARS 2'-0" INTO PHASE 2 CONSTRUCTION.
5. SPIRAL AT 6 IN. PITCH (ONE AND A HALF FLAT TURNS TOP AND BOTTOM).

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

ABUTMENT WALL DETAILS

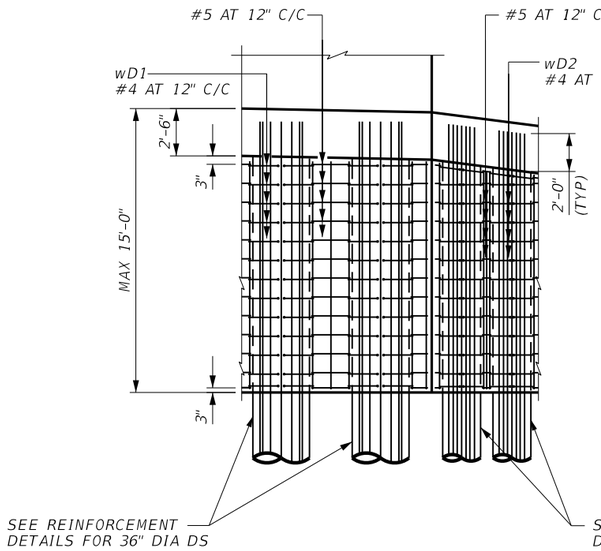
SWEETWATER CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		124

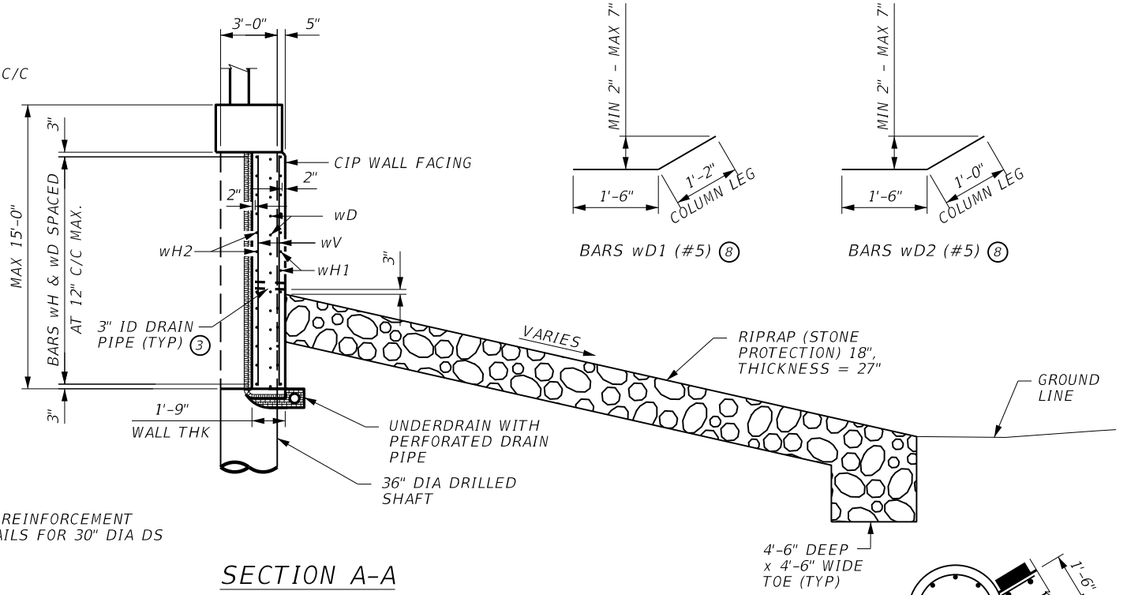
DATE:
FILE:

SP | CK | SS | DW | SP | CK | AP | DW



ELEVATION

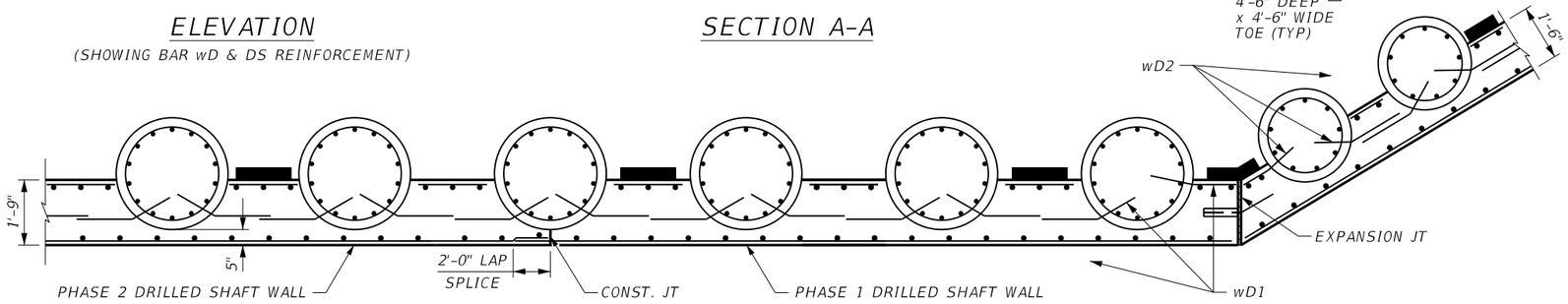
(SHOWING BAR wD & DS REINFORCEMENT)



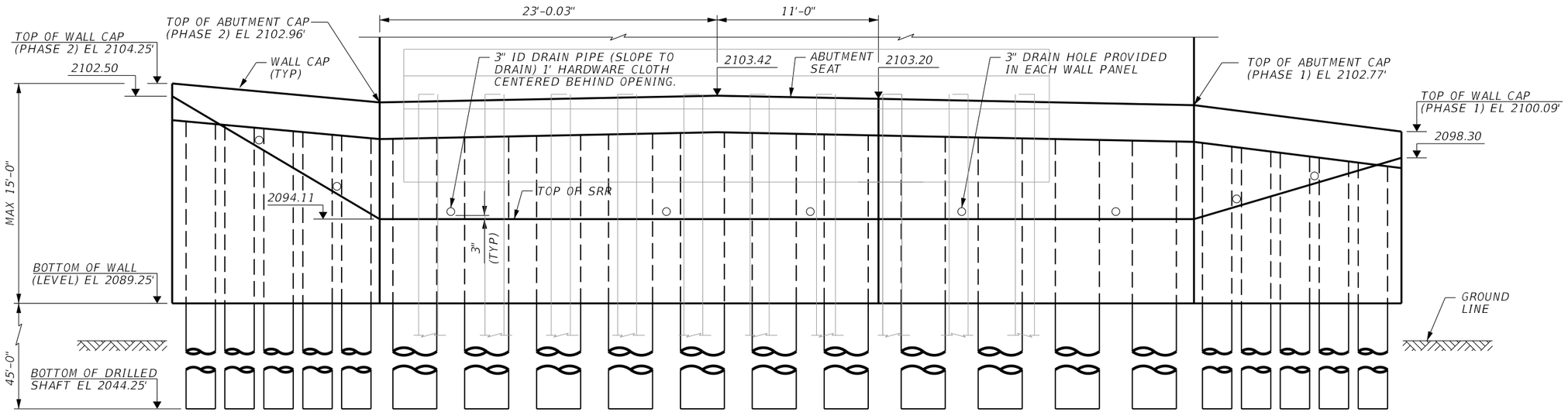
SECTION A-A

BARS wD1 (#5) (8)

BARS wD2 (#5) (8)



ENLARGE VIEW CONST. JT AND EXPANSION JT



ELEVATION

(SHOWING DRAIN LOCATION)

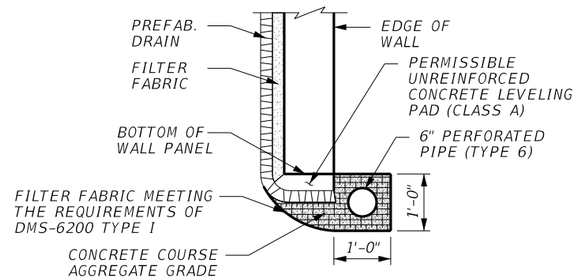
TABLE OF ESTIMATED QUANTITIES RETAINING WALL (DRILLED SHAFT FASCIA) (PHASE 1)		
	LENGTH	WEIGHT
REINFORCING STEEL (6)	LB	4,080
RETAINING WALL (DRILLED SHAFT FASCIA) (7)	SF	544

TABLE OF ESTIMATED QUANTITIES RETAINING WALL (DRILLED SHAFT FASCIA) (PHASE 2)		
	LENGTH	WEIGHT
REINFORCING STEEL (6)	LB	5,723
RETAINING WALL (DRILLED SHAFT FASCIA) (7)	SF	763

(6) FOR CONTRACTOR'S INFORMATION ONLY. WALL REINFORCING STEEL ESTIMATE ASSUMES 7.5 LB PER SQ.FT.

(7) ALL REINFORCING STEEL, CONCRETE, UNDERDRAIN, WEEP HOLE, EXPANSION JOINT MATERIAL, ETC. SHOWN IN THESE DETAILS IS SUBSIDIARY TO THE RETAINING WALL (DRILLED SHAFT FASCIA) EXCEPT RIPRAP.

(8) TRIM BARS AT EXPANSION JT TO PROVIDE MIN 2" SPACING.



UNDERDRAIN DETAIL

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER

05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

ABUTMENT WALL DETAILS

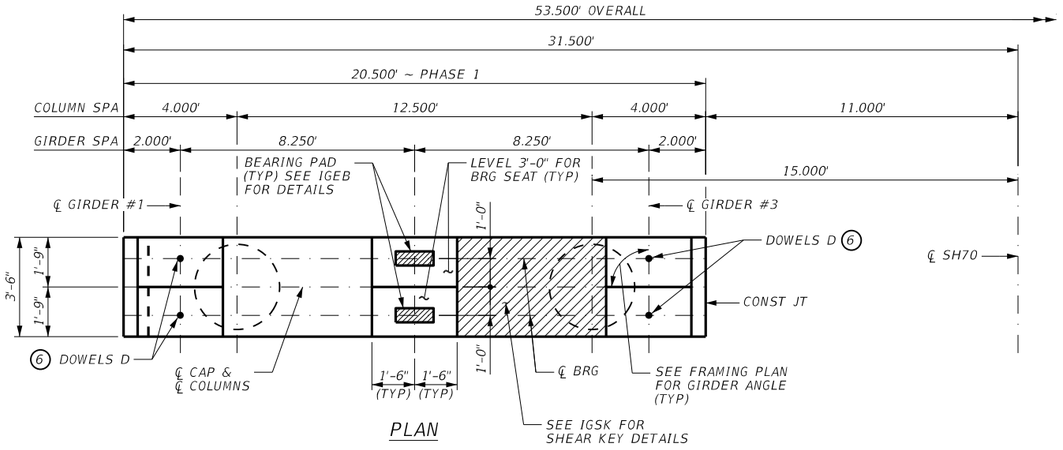
SWEETWATER CREEK BRIDGE

SHEET 2 OF 2

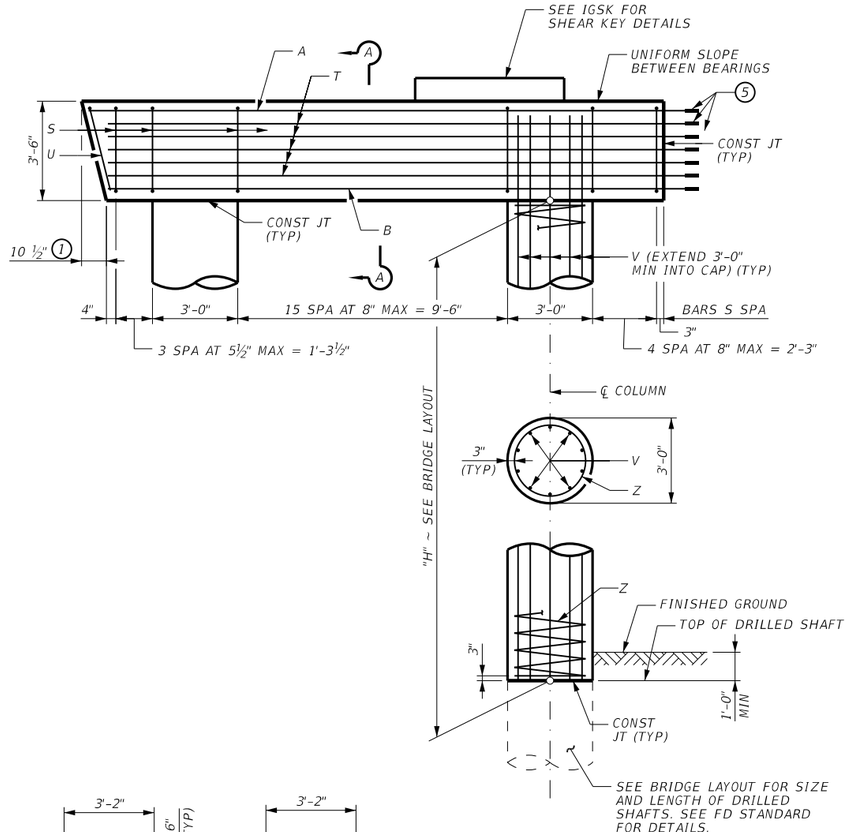
CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		125

DATE:
FILE:

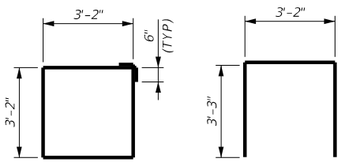
DW AP SP CK DW SS SP CK



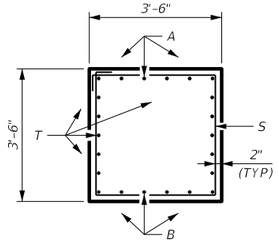
PLAN



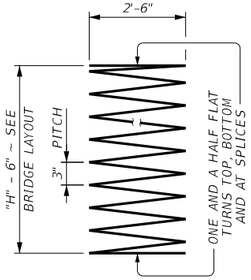
ELEVATION



BARS S BARS U



SECTION A-A



BARS Z

TABLE OF COLUMN QUANTITIES (PHASE 1) (2)

BENT	NUMBER OF COLUMN	"H"	BARS V 20 ~ #9		BARS Z 2 ~ #4 SPIRAL		REINF STEEL (4)	CLASS "C" CONC (COL) (HPC)
NO.		HEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
2	2	9'	12'-0"	816	282'-9"	378	1,194	4.8
3	2	6'	9'-0"	612	188'-6"	252	864	3.2
4	2	4'	7'-0"	476	125'-8"	168	644	2.1

TABLE OF BENT CAP QUANTITIES (PHASE 1) (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	21'-4"	794
B	6	#11	20'-8"	660
D (6)	4	#9	1'-8"	23
S	25	#5	13'-8"	357
T	10	#5	20'-8"	216
U	1	#5	9'-8"	11
REINFORCING STEEL (4)			LB	2,060
CLASS "C" CONCRETE (CAP) (HPC)			CY	9.7
PENETRATING CONCRETE SURFACE TREATMENT			SY	25

(1) MEASURED PARALLEL TO THE TOP OF CAP SLOPE.

(2) FOR EACH LINEAR FOOT VARIATIONS IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
BARS V LENGTH, 1'-0"
BARS Z LENGTH, 31'-5"
REINFORCING STEEL, 165 LB
CLASS "C" CONC (COL) (HPC), 0.78 CY
PER BENT

(3) QUANTITIES ARE FOR ONE BENT ONLY.

(4) FOR CONTRACTOR'S INFORMATION ONLY.

(5) EXTEND BARS 1'-0" INTO PHASE 2 CONSTRUCTION. SPLICE BARS A,B & T BY WELDING IN ACCORDANCE WITH ITEM 448. "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 400, "REINFORCING STEEL".

(6) OMIT GALVANIZED DOWELS D AT BENT 3. ADJUST REINFORCING STEEL TOTAL ACCORDINGLY.

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE SHEAR KEY DETAILS (IGSK) FOR SHEAR KEY DETAILS NOT SHOWN.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

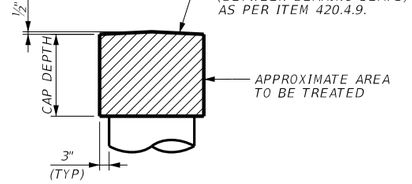
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 150 TONS/DR SH.

MATERIAL NOTES:

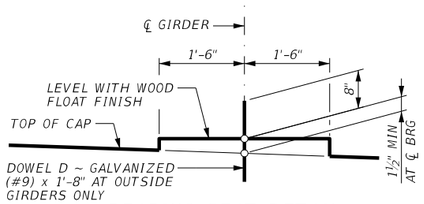
PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.



WATERPROOFING DETAIL

(TREAT THE FRONT, BACK, ENDS, TOP OF THE CAP AND 3" UNDERNEATH THE CAP AS SHOWN, EXCEPT FOR BEARING SEAT BUILDUPS, WITH PENETRATING CONCRETE SURFACE TREATMENT AS PER ITEM 428.)



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER

05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

INTERIOR BENTS NO. 2 - 4
PHASE 1

SWEETWATER CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		126

DATE:
FILE:

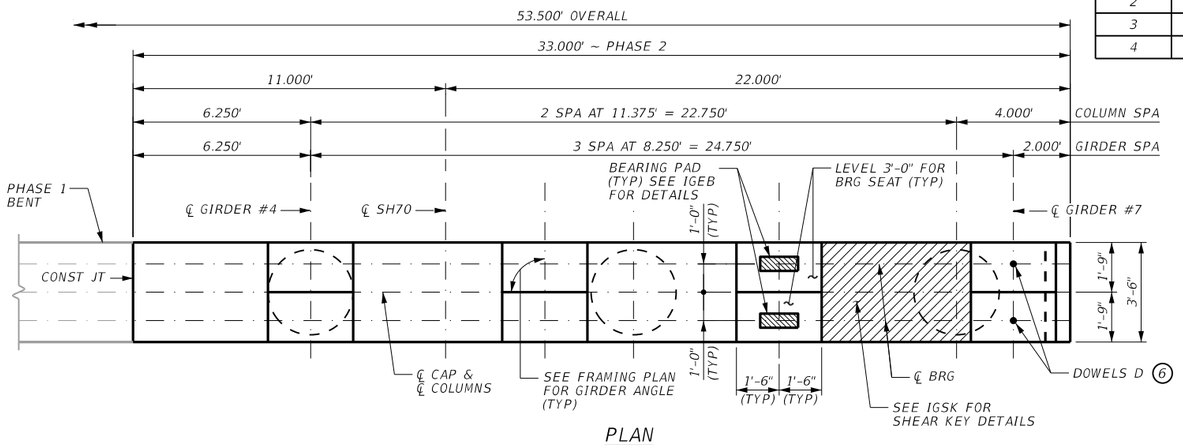
DW AP | DW SP | CK SP | DW SS | CK SP

TABLE OF COLUMN QUANTITIES (PHASE 2) (2)

BENT	NUMBER OF COLUMN	"H"	BARS V 30 ~ #9		BARS Z 3 ~ #4 SPIRAL		REINF STEEL (4)	CLASS "C" CONC (COL) (HPC)
NO.		HEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
2	3	9'	12'-0"	1224	282'-9"	567	1,791	7.1
3	3	6'	9'-0"	918	188'-6"	378	1,296	4.8
4	3	4'	7'-0"	714	125'-8"	252	966	3.2

TABLE OF BENT CAP QUANTITIES (PHASE 2) (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	6	#11	31'-10"	1,184
B	6	#11	31'-2"	994
D (6)	2	#9	1'-8"	12
S	44	#5	13'-8"	628
T	10	#5	31'-2"	326
U	1	#5	9'-8"	11
REINFORCING STEEL (4)			LB	3,155
CLASS "C" CONCRETE (CAP) (HPC)			CY	15.4
PENETRATING CONCRETE SURFACE TREATMENT			SY	40



PLAN

1 MEASURED PARALLEL TO THE TOP OF CAP SLOPE.

2 FOR EACH LINEAR FOOT VARIATIONS IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
- BARS V LENGTH, 1'-0"
- BARS Z LENGTH, 31'-5"
- REINFORCING STEEL, 165 LB
- CLASS "C" CONC (COL) (HPC), 0.78 CY

PER BENT

3 QUANTITIES ARE FOR ONE BENT ONLY.

4 FOR CONTRACTOR'S INFORMATION ONLY.

5 EXTEND BARS 1'-0" INTO PHASE 2 CONSTRUCTION. SPLICE BARS A,B & T BY WELDING IN ACCORDANCE WITH ITEM 448. "STRUCTURAL FIELD WELDING" OR BY USING MECHANICAL COUPLERS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 400, "REINFORCING STEEL".

6 OMIT GALVANIZED DOWELS D AT BENT 3. ADJUST REINFORCING STEEL TOTAL ACCORDINGLY.

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (NOV 2021).

SEE "BRIDGE LAYOUT" FOR FOUNDATION TYPE, SIZE AND LENGTH.

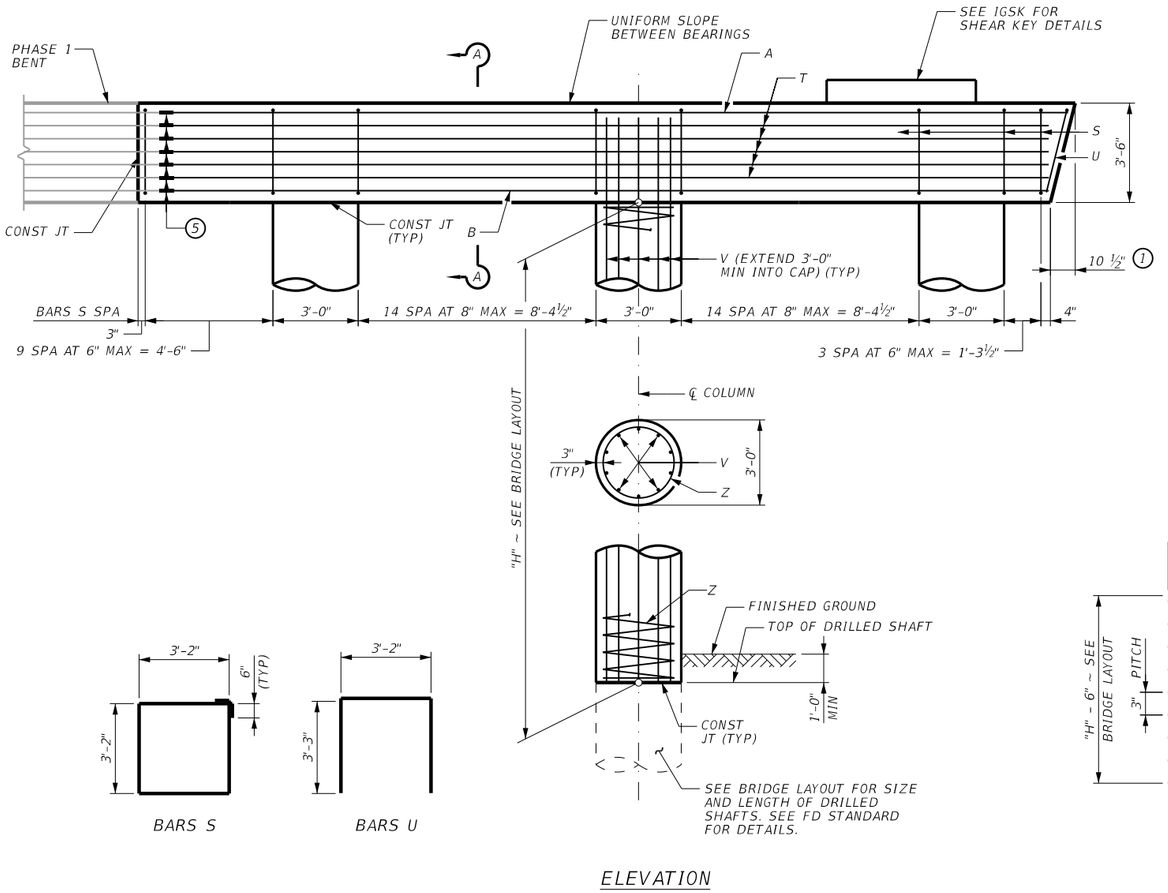
SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE SHEAR KEY DETAILS (IGSK) FOR SHEAR KEY DETAILS NOT SHOWN.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

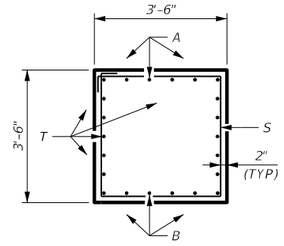
REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 150 TONS/DR SH.

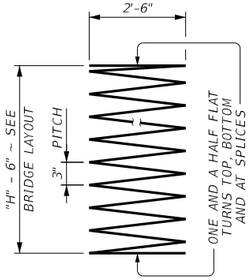


ELEVATION

BARS S BARS U



SECTION A-A

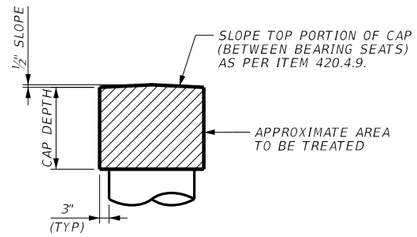


BARS Z

MATERIAL NOTES:

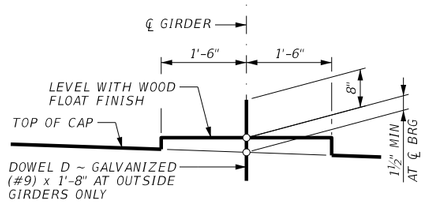
PROVIDE CLASS "C" CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.



WATERPROOFING DETAIL

(TREAT THE FRONT, BACK, ENDS, TOP OF THE CAP AND 3" UNDERNEATH THE CAP AS SHOWN, EXCEPT FOR BEARING SEAT BUILDUPS, WITH PENETRATING CONCRETE SURFACE TREATMENT AS PER ITEM 428.)



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER

05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

INTERIOR BENTS NO. 2 - 4
PHASE 2

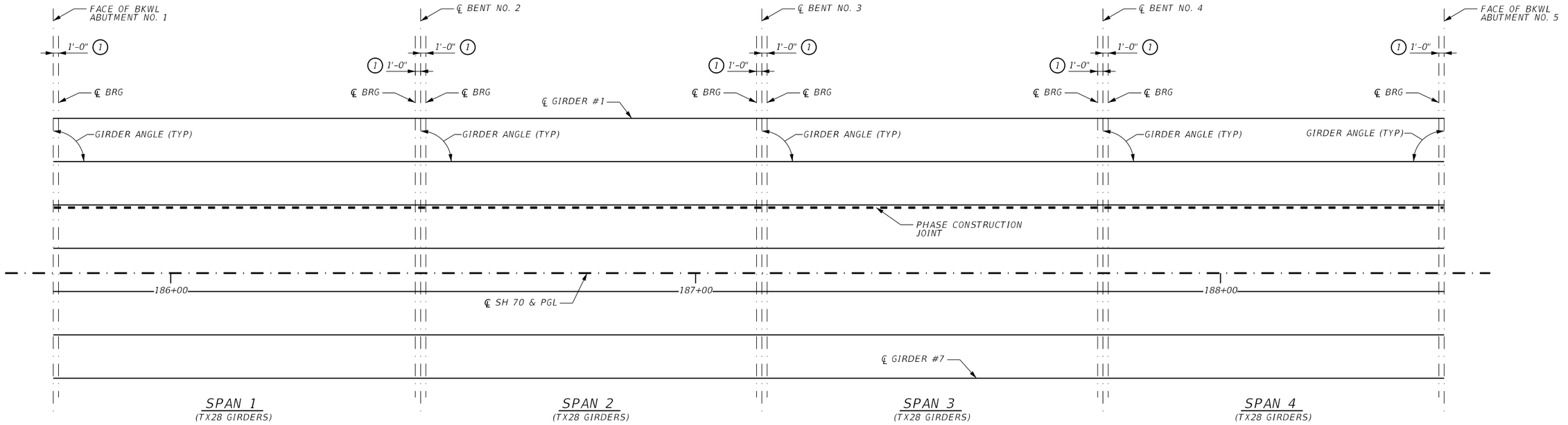
SWEETWATER CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		127

DATE:
FILE:

SP CK | SS DW | SP CK | AP DW



BENT REPORT

ABUT NO. 1 (N 85° 8' 4" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 1	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

BENT NO. 2 (N 85° 8' 4" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 1	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 2	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

BENT NO. 3 (N 85° 8' 4" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 2	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

FRAMING PLAN

DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 3	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

BENT NO. 4 (N 85° 8' 4" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 3	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 4	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

ABUT NO. 5 (N 85° 8' 4" E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 29.500 L

		GIRDER SPAC. (CL BENT)	GIRDER ANGLE D M S
SPAN 4	GIRDER 1	0.000	90 00 00
	GIRDER 2	8.250	90 00 00
	GIRDER 3	8.250	90 00 00
	GIRDER 4	8.250	90 00 00
	GIRDER 5	8.250	90 00 00
	GIRDER 6	8.250	90 00 00
	GIRDER 7	8.250	90 00 00
	TOTAL	49.500	

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	70.000	68.000	69.50	-0.0001
GIRDER 2	70.000	68.000	69.50	-0.0001
GIRDER 3	70.000	68.000	69.50	-0.0001
GIRDER 4	70.000	68.000	69.50	-0.0001
GIRDER 5	70.000	68.000	69.50	-0.0001
GIRDER 6	70.000	68.000	69.50	-0.0001
GIRDER 7	70.000	68.000	69.50	-0.0001

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	65.000	63.000	64.50	-0.0001
GIRDER 2	65.000	63.000	64.50	-0.0001
GIRDER 3	65.000	63.000	64.50	-0.0001
GIRDER 4	65.000	63.000	64.50	-0.0001
GIRDER 5	65.000	63.000	64.50	-0.0001
GIRDER 6	65.000	63.000	64.50	-0.0001
GIRDER 7	65.000	63.000	64.50	-0.0001

GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	65.000	63.000	64.50	-0.0001
GIRDER 2	65.000	63.000	64.50	-0.0001
GIRDER 3	65.000	63.000	64.50	-0.0001
GIRDER 4	65.000	63.000	64.50	-0.0001
GIRDER 5	65.000	63.000	64.50	-0.0001
GIRDER 6	65.000	63.000	64.50	-0.0001
GIRDER 7	65.000	63.000	64.50	-0.0001

GIRDER REPORT, SPAN 4

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	65.000	63.000	64.50	-0.0001
GIRDER 2	65.000	63.000	64.50	-0.0001
GIRDER 3	65.000	63.000	64.50	-0.0001
GIRDER 4	65.000	63.000	64.50	-0.0001
GIRDER 5	65.000	63.000	64.50	-0.0001
GIRDER 6	65.000	63.000	64.50	-0.0001
GIRDER 7	65.000	63.000	64.50	-0.0001

(1) SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) STANDARD FOR ORIENTATION OF DIMENSION.

(2) GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

FRAMING PLAN
(SPANS 1-4)

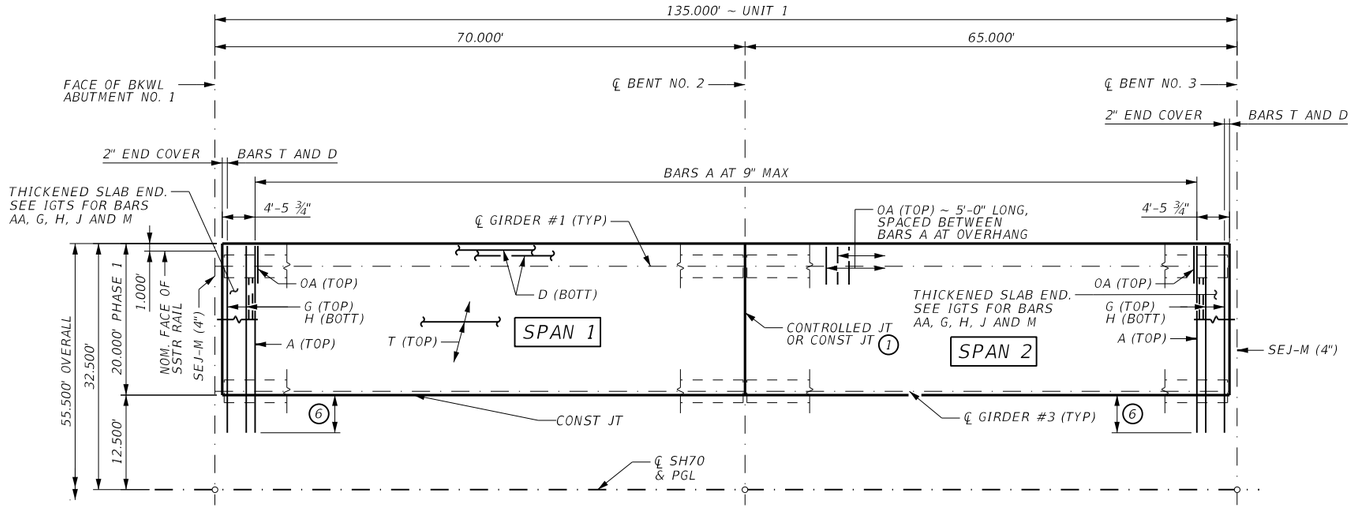
SWEETWATER CREEK
BRIDGE

SHEET 1 OF 1

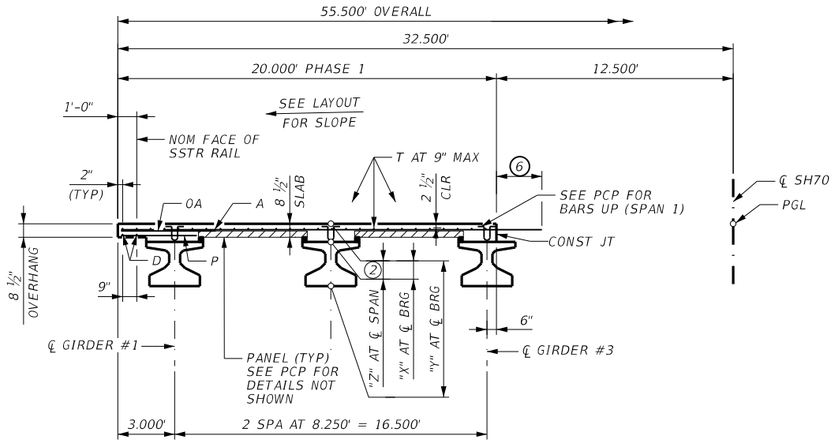
CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		128

DATE:
FILE:

DW AP | DW SP | CK SP | DW SS | CK SP



PLAN



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.

SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN.

SEE IGMS STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB.

SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE 2'-5" BAR LAPS (EPOXY COATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

(1) BARS T MUST BE CONTINUOUS THROUGH JOINT.

(2) THEORETICAL DIMENSION.

(3) LENGTHS SHOWN ARE BOTTOM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

(4) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.

(5) FOR CONTRACTOR'S INFORMATION ONLY.

(6) EXTEND PHASE 1 BARS A, G & H 2'-7" INTO PHASE 2 CONSTRUCTION.

HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

135.000' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 1-2) (PHASE 1)

SWEETWATER CREEK BRIDGE

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		129

DATE:
FILE:

BAR TABLE

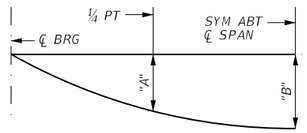
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4
UP	#4

TABLE OF ESTIMATED QUANTITIES (PHASE 1)

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS (Tx28) (3)	REINF STEEL (4)
NO.	SF	LF	LB
1	1,400	208.50	3,220
2	1,300	193.50	2,990
TOTAL	2,700	402.00	6,210

TABLE OF DEAD LOAD DEFLECTIONS

SPAN NO.	GIRDER NO.	"A" FT	"B" FT
1	1	0.081	0.115
	2	0.094	0.133
	3	0.053	0.075
2	1	0.060	0.085
	2	0.069	0.098
	3	0.039	0.055



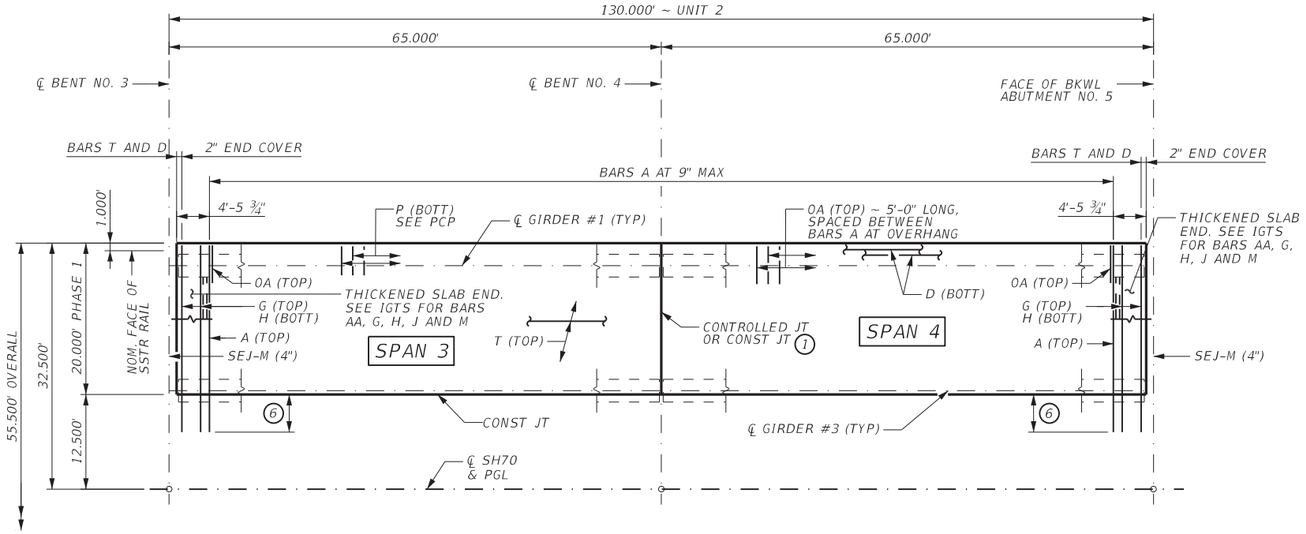
DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec = 5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

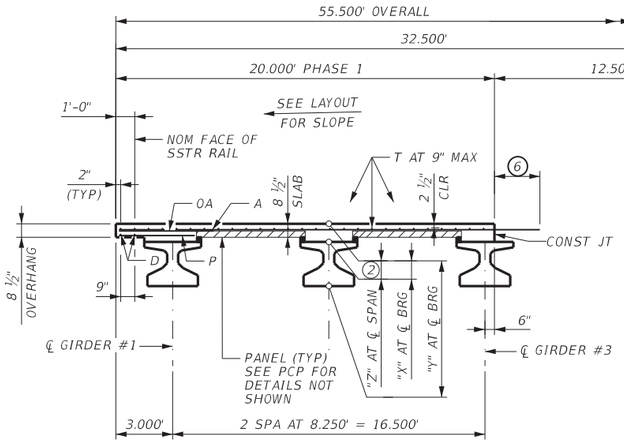
TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT (2) ℄ SPAN
1	1	1'-0 ¼"	3'-4 ¼"	10 ⅛"
	2	1'-0 ¼"	3'-4 ¼"	10 ⅜"
	3	1'-0 ¼"	3'-4 ¼"	9 ¾"
2	1	1'-0"	3'-4"	9 ⅞"
	2	1'-0"	3'-4"	10"
	3	1'-0"	3'-4"	9 ½"

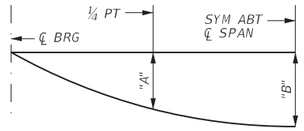
DW AP | DW SP | CK SP | DW SS | CK SP



PLAN



TYPICAL TRANSVERSE SECTION



GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.

SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN.

SEE IGMS STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB.

SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE 2'-5" BAR LAPS (EPOXY COATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

(1) BARS T MUST BE CONTINUOUS THROUGH JOINT.

(2) THEORETICAL DIMENSION.

(3) LENGTHS SHOWN ARE BOTTOM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

(4) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.

(5) FOR CONTRACTOR'S INFORMATION ONLY.

(6) EXTEND PHASE 1 BARS A, G & H 2'-7" INTO PHASE 2 CONSTRUCTION.

HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED
PROFESSIONAL ENGINEER
05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

130.000' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 3-4) (PHASE 1)

SWEETWATER CREEK BRIDGE

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		130

DATE:
FILE:

BAR TABLE

BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES (PHASE 1)

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS (Tx28) (3)	REINF STEEL (4)
NO.	SF	LF	LB
3	1,300	193.50	2,990
4	1,300	193.50	2,990
TOTAL	2,600	387.00	5,980

TABLE OF DEAD LOAD DEFLECTIONS

SPAN NO.	GIRDER NO.	"A" FT	"B" FT
3 - 4	1	0.060	0.085
	2	0.069	0.098
	3	0.039	0.055

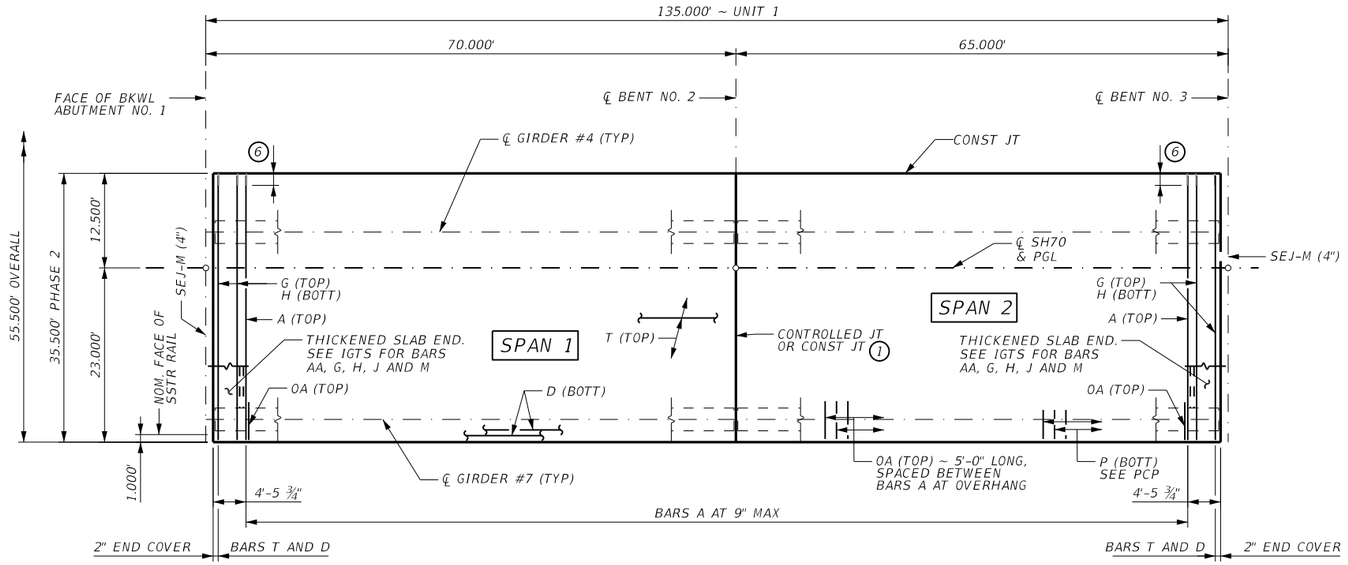
DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec = 5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF SECTION DEPTHS

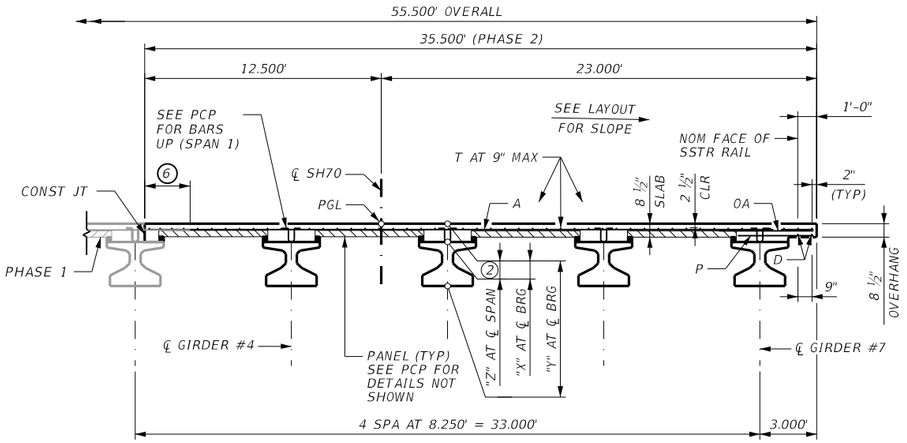
SPAN NO.	GIRDER NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT (2) ℄ SPAN
3 - 4	1	1'-0"	3'-4"	9 7/8"
	2	1'-0"	3'-4"	10"
	3	1'-0"	3'-4"	9 1/2"

DW AP | DW SP | CK SP | DW SS | CK SP



PLAN

(PHASE 1 NOT SHOWN)



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.

SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN.

SEE IGMS STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB.

SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE 2'-5" BAR LAPS (EPOXY COATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

1. BARS T MUST BE CONTINUOUS THROUGH JOINT.
2. THEORETICAL DIMENSION.
3. LENGTHS SHOWN ARE BOTTOM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.
4. REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.
5. FOR CONTRACTOR'S INFORMATION ONLY.
6. EXTEND PHASE 1 BARS A, G & H 2'-7" INTO PHASE 2 CONSTRUCTION.

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

135.000' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 1-2) (PHASE 2)

SWEETWATER CREEK BRIDGE

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		131

DATE:
FILE:

BAR TABLE

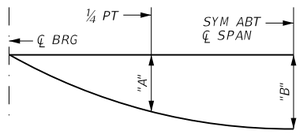
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES (PHASE 2)

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS (Tx28) (3)	REINF STEEL (4)
NO.	SF	LF	LB
1	2,485	278.00	5,716
2	2,308	258.00	5,308
TOTAL	4,793	536.00	11,024

TABLE OF DEAD LOAD DEFLECTIONS

SPAN NO.	GIRDER NO.	"A" FT	"B" FT
1	4 ~ 6	0.094	0.133
	7	0.081	0.115
2 - 4	4 ~ 6	0.069	0.098
	7	0.060	0.085



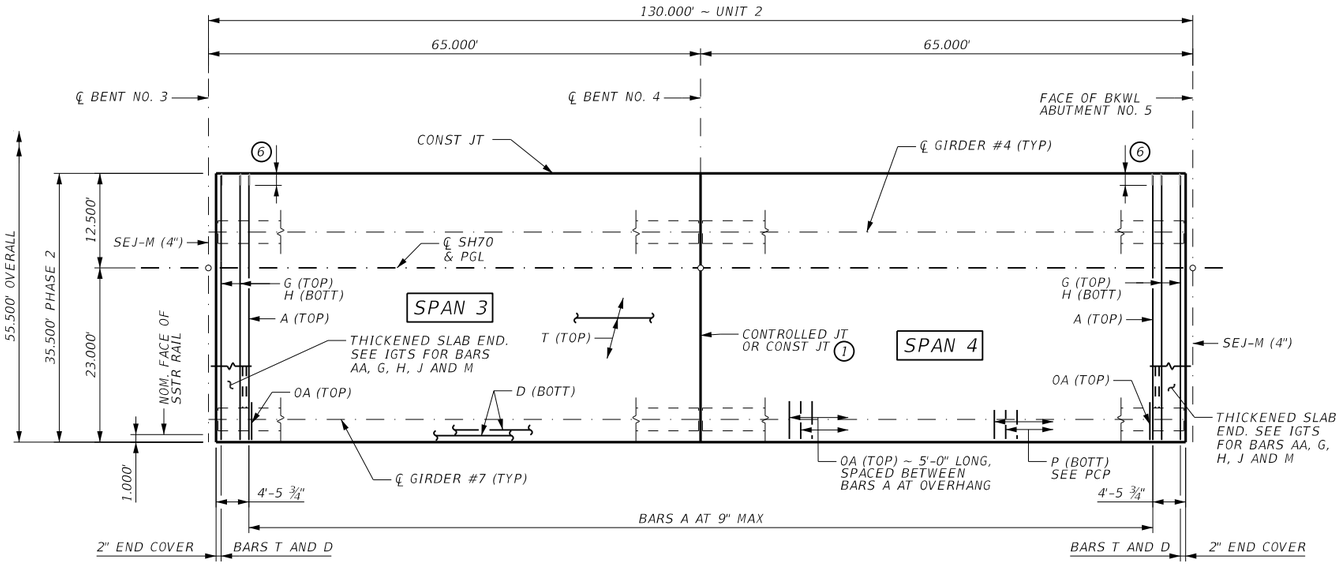
DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec = 5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF SECTION DEPTHS

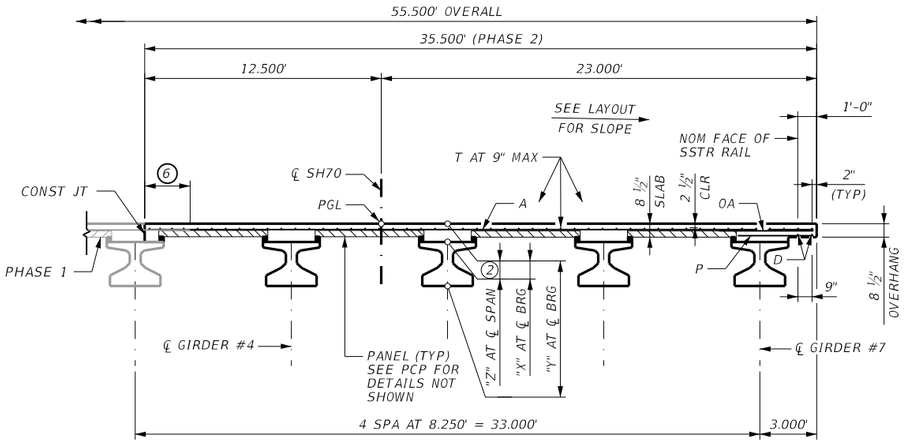
SPAN NO.	GIRDER NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT (2) ℄ SPAN
1	4 ~ 6	1'-0 1/4"	3'-4 1/4"	10 3/8"
	7	1'-0 1/4"	3'-4 1/4"	10 1/8"
2	4 ~ 6	1'-0"	3'-4"	10"
	7	1'-0"	3'-4"	9 7/8"

DW AP | DW SP | CK SS | DW SP | CK SP



PLAN

(PHASE 1 NOT SHOWN)



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.

SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN.

SEE IGMS STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB.

SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

MATERIAL NOTES:

PROVIDE CLASS "S" CONCRETE (f'c = 4,000 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE 2'-5" BAR LAPS (EPOXY COATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P, OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

(1) BARS T MUST BE CONTINUOUS THROUGH JOINT.

(2) THEORETICAL DIMENSION.

(3) LENGTHS SHOWN ARE BOTTOM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

(4) REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.

(5) FOR CONTRACTOR'S INFORMATION ONLY.

(6) EXTEND PHASE 1 BARS A, G & H 2'-7" INTO PHASE 2 CONSTRUCTION.

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.11/2.05
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
05/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

130.000' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 3-4) (PHASE 2)

SWEETWATER CREEK BRIDGE

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		132

DATE:
FILE:

BAR TABLE

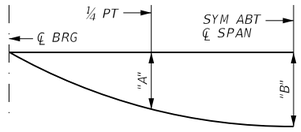
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES (PHASE 2)

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS (Tx28) (3)	REINF STEEL (4)
NO.	SF	LF	LB
3	2,308	258.00	5,308
4	2,308	258.00	5,308
TOTAL	4,616	516.00	10,616

TABLE OF DEAD LOAD DEFLECTIONS

SPAN NO.	GIRDER NO.	"A" FT	"B" FT
3 - 4	4 ~ 6	0.069	0.098
	7	0.060	0.085



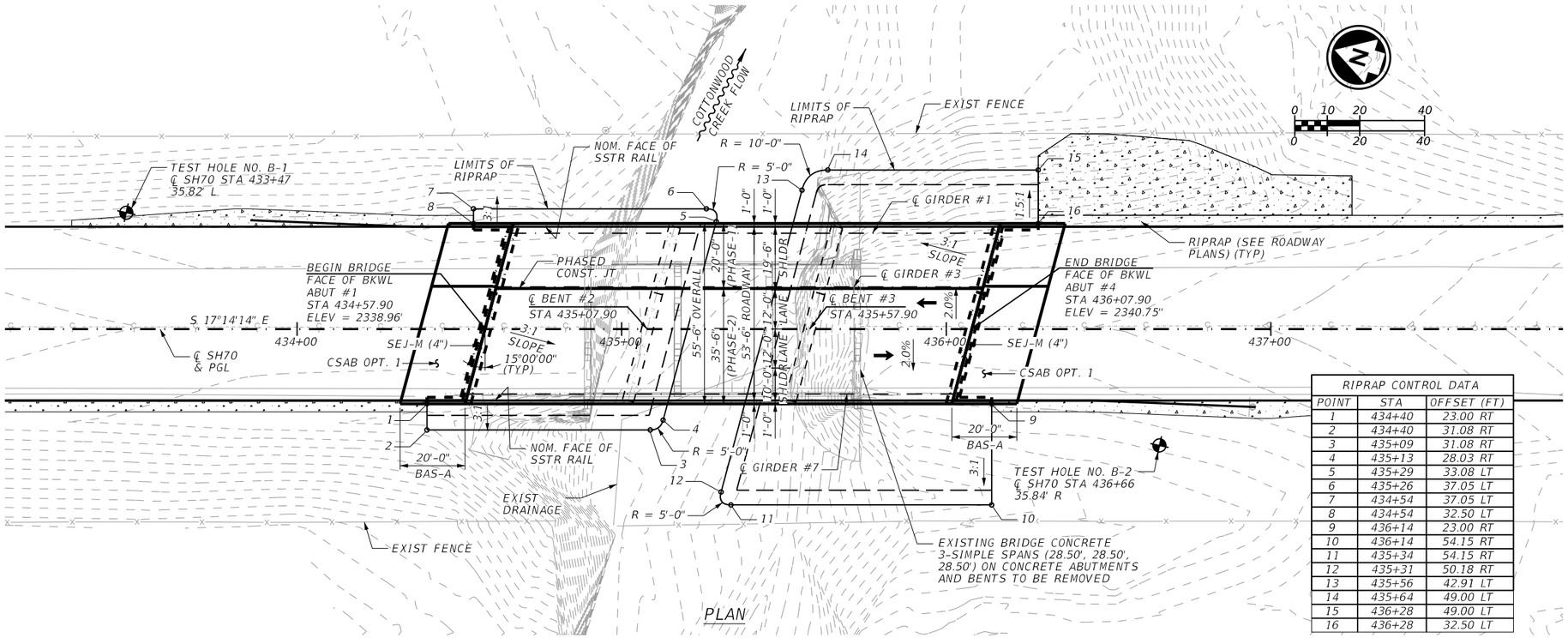
DEAD LOAD DEFLECTION DIAGRAM

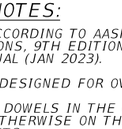
NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec = 5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT ℄ SPAN (2)
3 - 4	4 ~ 6	1'-0"	3'-4"	10"
	7	1'-0"	3'-4"	9 7/8"

DW EB | CK EA | DW EA | DW MM | CK EA





GENERAL NOTES:

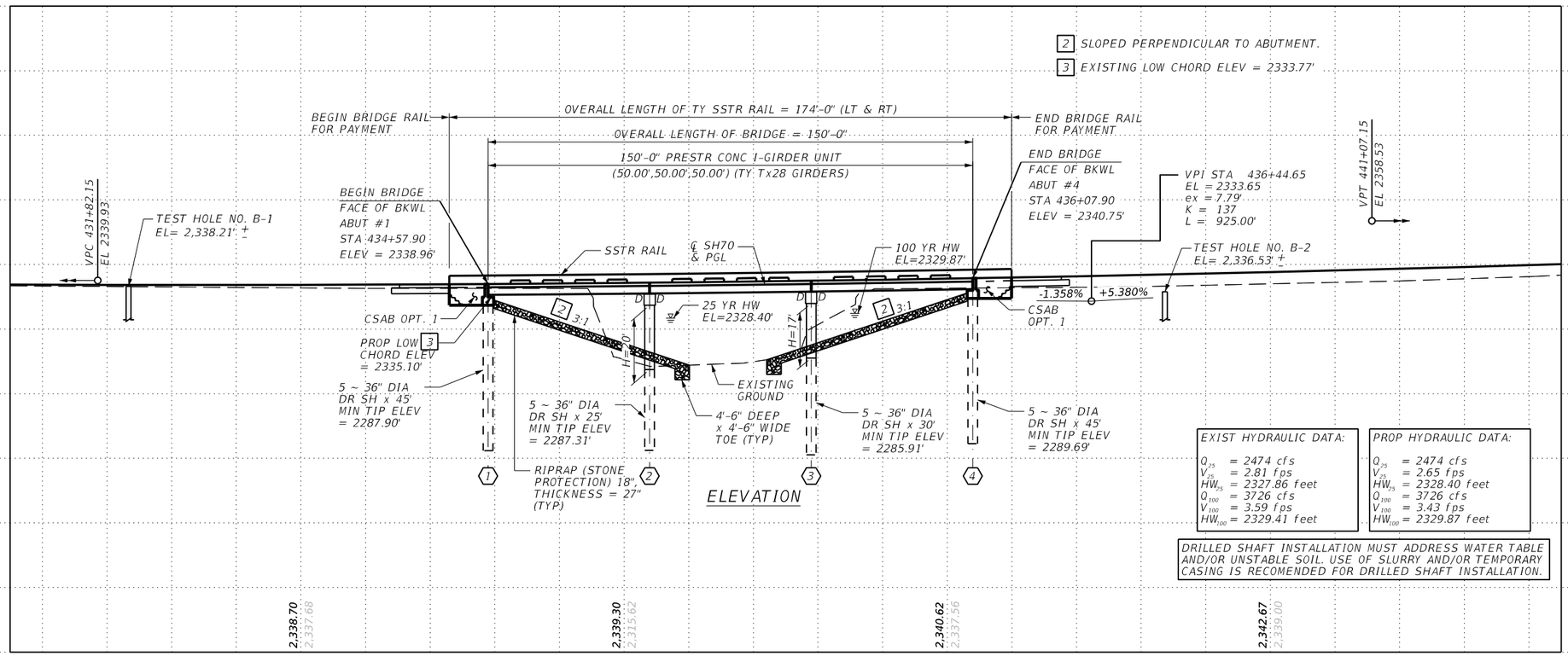
1. DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).
2. BRIDGE NOT DESIGNED FOR OVERLAY.
3. "D" DENOTES DOWELS IN THE OUTSIDE GIRDERS UNLESS SPECIFIED OTHERWISE ON THE ABUTMENT OR BENT DETAIL SHEETS.
4. ALL DIMENSIONS ARE EITHER HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE AND CROSS SLOPE.
5. COLUMN HEIGHTS ("H") SHOWN ARE CALCULATED AT THE PROFILE GRADE LINE (PGL), ACTUAL COLUMN HEIGHTS WILL BE MEASURED IN THE FIELD PRIOR TO ORDERING MATERIALS.
6. SEE "PHASED BRIDGE TYPICAL SECTION" SHEETS FOR ADDITIONAL INFORMATION.
7. CONTRACTOR TO VERIFY LOCATION AND STATUS OF ALL UTILITIES PRIOR TO CONSTRUCTION.
8. CONTRACTOR MUST FIELD VERIFY ALL EXISTING ABUTMENT AND BENT LOCATIONS, DIMENSIONS, AND ELEVATONS PRIOR TO FABRICATION OF I-GIRDERS.
9. SEE "BORING LOGS" SHEETS FOR TEST HOLE DATA.

FUNCTIONAL CLASS: MINOR ARTERIAL
DESIGN SPEED: 60 MPH
ADT: 3,368 (2022); 5,321 (2042)
EXIST. NBI: 08-177-0-0264-01-004
PROP. NBI: 08-177-0-0264-01-103

ALL ABUTMENTS AND BENTS AT BEARING N 87°45'46" E

RIPRAP CONTROL DATA

POINT	STA	OFFSET (FT)
1	434+40	23.00 RT
2	434+40	31.08 RT
3	435+09	31.08 RT
4	435+13	28.03 RT
5	435+29	33.08 LT
6	435+26	37.05 LT
7	434+54	37.05 LT
8	434+54	32.50 LT
9	436+14	23.00 RT
10	436+14	54.15 RT
11	435+34	54.15 RT
12	435+31	50.18 RT
13	435+56	42.91 LT
14	435+64	49.00 LT
15	436+28	49.00 LT
16	436+28	32.50 LT



EXIST HYDRAULIC DATA:

Q_{25} = 2474 cfs
V_{25} = 2.81 fps
HW_{25} = 2327.86 feet
Q_{100} = 3726 cfs
V_{100} = 3.59 fps
HW_{100} = 2329.41 feet

PROP HYDRAULIC DATA:

Q_{25} = 2474 cfs
V_{25} = 2.65 fps
HW_{25} = 2328.40 feet
Q_{100} = 3726 cfs
V_{100} = 3.43 fps
HW_{100} = 2329.87 feet

DRILLED SHAFT INSTALLATION MUST ADDRESS WATER TABLE AND/OR UNSTABLE SOIL. USE OF SLURRY AND/OR TEMPORARY CASING IS RECOMENDED FOR DRILLED SHAFT INSTALLATION.

HL93 LOADING: SUPERSTRUCTURE INV/OPR RATING = 1.38/1.79

SUBSTRUCTURE INV/OPR RATING = SUBSTRUCTURE NOT RATED

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER
P.E

5/23/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

BRIDGE LAYOUT

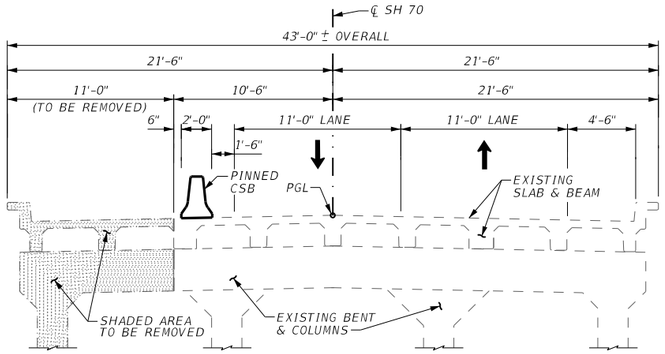
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		133

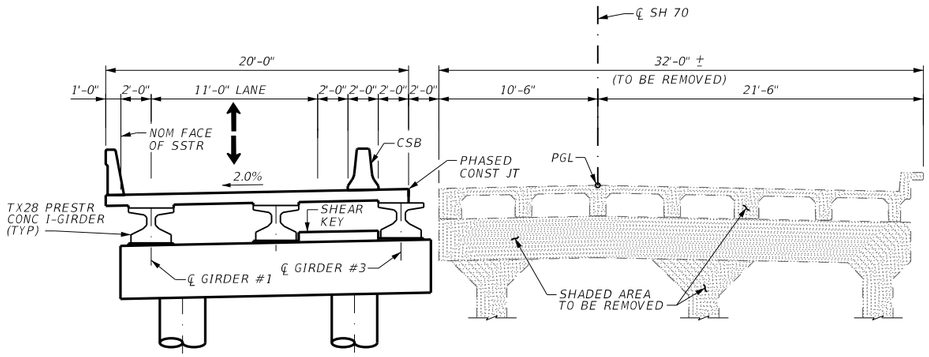
DATE: 5/23/2024 2:05 PM
FILE: c:\pw_work\dir\jacobs-amer-transpldms97108\SH70_BRLY01.dgn

DW EB | CK EA | DW EA | CK MM | DW EA



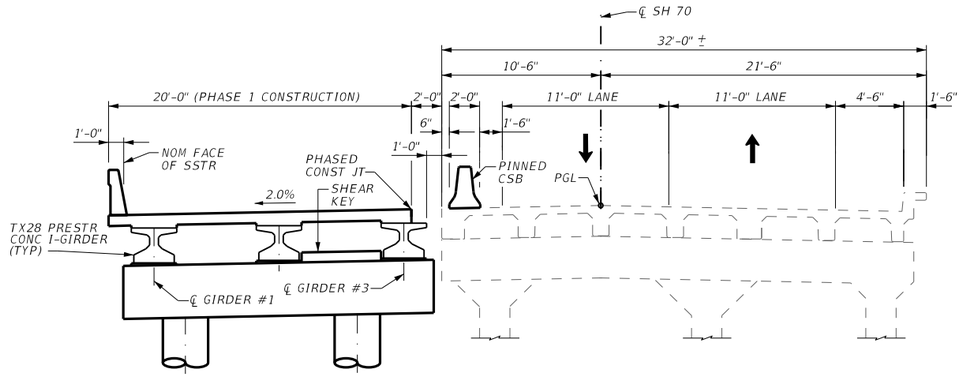
TYPICAL TRANSVERSE SECTION PHASE 1 REMOVAL

(COTTONWOOD CREEK BRIDGE)



TYPICAL TRANSVERSE SECTION PHASE 2 REMOVAL

(COTTONWOOD CREEK BRIDGE)



TYPICAL TRANSVERSE SECTION PHASE 1 CONSTRUCTION

(COTTONWOOD CREEK BRIDGE)

SHADED AREA TO BE REMOVED

DATE:
FILE:

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

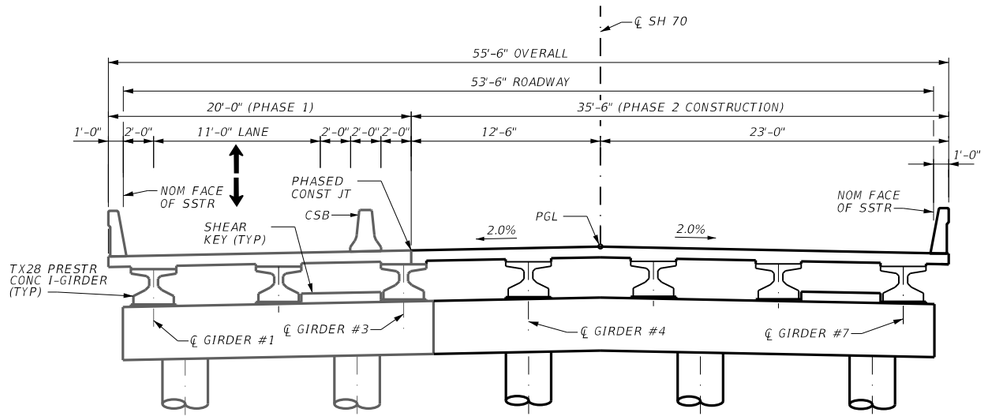
PHASED BRIDGE TYPICAL SECTIONS

COTTONWOOD CREEK BRIDGE

SHEET 1 OF 2

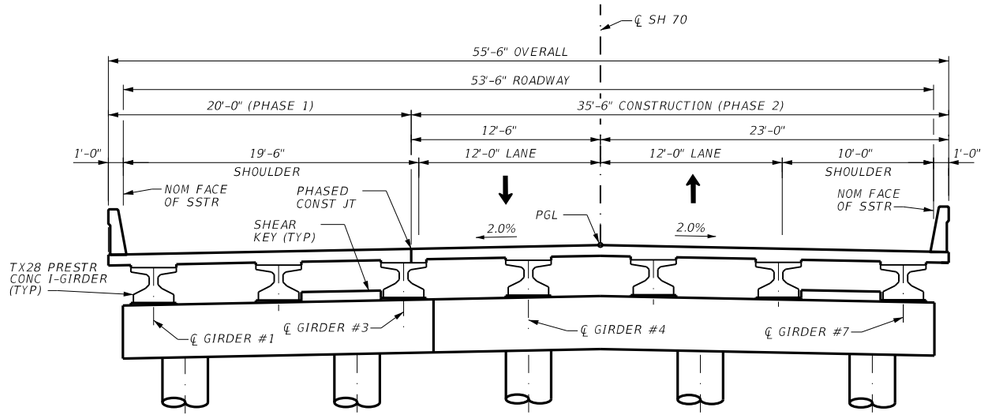
CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		134

DW	EB	CK	EA	DW	MM	CK	EA



TYPICAL TRANSVERSE SECTION PHASE 2 CONSTRUCTION

(COTTONWOOD CREEK BRIDGE)



PROPOSED TYPICAL TRANSVERSE SECTION

(COTTONWOOD CREEK BRIDGE)

DATE:
FILE:

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

PHASED BRIDGE TYPICAL SECTIONS

COTTONWOOD CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		135

DRILLING LOG

WinCore
Version 3.3

County	Nolan	Hole	B-1	District	Abilene
Highway	SH70	Structure	Bridge	Date	11/6/2023
CSJ	0264-01-046	Station		Grnd. Elev.	0.00 ft
		Offset		GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Fat, soft, moist, brown, trace Gravel (CH)							SSS@3', N=6
5		10 (6) 8 (6)								SSS@6.5', N=25
-7.			SAND, Poorly Graded, compact, moist, light brown, fine to coarse grained (SP)							SSS@8', N=26
10		32 (6) 34 (6)								SSS@11.5', N=37
-14.			SAND, Poorly Graded, very dense, moist, light brown, fine to coarse grained (SP)							SSS@15.5', N=50/5.5"
15		50 (0.75) 50 (0.25)								
-19.			CLAY, Sandy Lean, very hard, moist, tan, trace ferrous staining (CL)							SSS@20.3', N=89
20		50 (1) 50 (0.5)								
-24.			CLAY, Fat, very hard, moist, reddish brown (CH)							SSS@25.4', N=65
25		50 (2.25) 50 (0.5)								
-29.			SAND, Clayey, very dense, moist, reddish brown, fine grained (SC)							SSS@30.3', N=50/4"
30		50 (1) 50 (0.25)								
-34.			CLAY, Sandy Fat, very hard, moist, reddish brown (CH)							SSS@35.7', N=50/4.25"
35		50 (2.25) 50 (0.75)								
-39.			SAND, Clayey, very dense, moist, reddish brown, fine grained (SC)							
40		50 (1.25) 50 (0.75)								

Remarks: LAT: 32.366030, LONG: -100.359450. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; Drilling Method: Continuous Flight Auger to 50 feet, Air Rotary thereafter. Coordinates were obtained with a handheld GPS and should be considered approximate

The ground water elevation was not determined during the course of this boring.

Driller: Blue Hole Drilling, LLC **Logger:** FP **Organization:** Foresight PES, LLC

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-108 Jacobs SH 70 Cottonwood Crk\Logs\30 No Lab\B-1.CLG

DRILLING LOG

WinCore
Version 3.3

County	Nolan	Hole	B-1	District	Abilene
Highway	SH70	Structure	Bridge	Date	11/6/2023
CSJ	0264-01-046	Station		Grnd. Elev.	0.00 ft
		Offset		GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, Clayey, very dense, moist, reddish brown, fine grained (SC)							SSS@40.5', N=50/3.5"
45		50 (1.5) 50 (0)								SSS@45.5', N=50/3.75
50		50 (1.25) 50 (0.25)								SSS@50.2', N=50/3.75"
-54.			CLAY, Lean, very hard, moist, reddish brown and gray, trace ferrous staining (CL)							SSS@55.3', N=50/3.5"
55		50 (1.25) 50 (0)								
-58.			SAND, Clayey, very dense, moist, reddish brown, fine grained (SC)							SSS@60.4', N=43,50/4.5"
60		50 (1.5) 50 (0.75)								
-61.1			CLAY, Sandy Lean, very hard, moist, gray, trace ferrous stains (CL)							Boring terminated at 65.3'
-65.3		50 (1.25) 50 (0.5)								
65										
70										
75										
80										

Remarks: LAT: 32.366030, LONG: -100.359450. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; Drilling Method: Continuous Flight Auger to 50 feet, Air Rotary thereafter. Coordinates were obtained with a handheld GPS and should be considered approximate

The ground water elevation was not determined during the course of this boring.

Driller: Blue Hole Drilling, LLC **Logger:** FP **Organization:** Foresight PES, LLC

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-108 Jacobs SH 70 Cottonwood Crk\Logs\30 No Lab\B-1.CLG

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER
, P.E

6/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

BORING LOGS

COTTONWOOD CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70

DIST	COUNTY	SHEET NO.
ABL	NOLAN	136

DATE: DATE TIME
FILE: DOCUMENT NAME

EA CK: EA
MM DW:
EA CK:
EB DW:

DW: EB | CK: EA | DW: EA | CK: MM | DW: EA | CK: EA

DRILLING LOG

WinCore
Version 3.3

County	Nolan	Hole	B-2	District	Abilene
Highway	SH70	Structure	Bridge	Date	11/5/2023
CSJ	0264-01-046	Station		Grnd. Elev.	0.00 ft
		Offset		GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			CLAY, Sandy Lean, moist, light brown, trace ferrous staining (CL)							SSS@3', N=10,16,50/6"
-5.		50 (3.5) 50 (2)								
5			SAND, Poorly Graded, dense, moist, light brown, trace ferrous staining, fine to coarse grained; SC below 8' (SP)							SSS@5.7', N=58
										SSS@8', N=25
-10.		50 (5) 50 (1.25)								
10			SAND, Silty, dense to very dense, moist, light tan, fine grained (SM)							SSS@11', N=34,50/3.5"
		50 (0.5) 50 (0.5)								SSS@15.2', N=42,50/4.5"
-19.										
20		50 (3.25) 50 (1.25)	CLAY, Sandy Lean, hard, moist, tan and light gray, trace ferrous staining (CL)							SSS@20.6', N=17,40,50/4"
-24.										
25		50 (1.5) 50 (0.25)	CLAY, Lean, very hard, moist, reddish brown (CL)							SSS@25.4', N=18,30,50/5.25"
-29.										
30		50 (1) 50 (0.25)	CLAY, Sandy Lean, very hard, moist, reddish brown (CL)							SSS@30.4', N=50/3.5"
35		50 (0.5) 50 (0.75)								SSS@35.5', N=50/3.75"
-39.										
40		50 (0.75) 50 (1)	SAND, Clayey, very dense, moist, reddish brown, fine grained (SC)							

Remarks: LAT: 32.366740, LONG: -100.359690. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; Drilling Method: Continuous Flight Auger to 50 feet, Air Rotary thereafter. Coordinates were obtained with a handheld GPS and should be considered approximate

The ground water elevation was not determined during the course of this boring.

Driller: Blue Hole Drilling, LLC **Logger:** FP **Organization:** Foresight PES, LLC

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-108 Jacobs SH 70 Cottonwood Crk\Logs\30 No Lab\B-2.CLG

DRILLING LOG

WinCore
Version 3.3

County	Nolan	Hole	B-2	District	Abilene
Highway	SH70	Structure	Bridge	Date	11/5/2023
CSJ	0264-01-046	Station		Grnd. Elev.	0.00 ft
		Offset		GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test: Lateral Press. (psi)	Triaxial Test: Deviator Stress (psi)	Properties: MC	LL	PI	Wet Den. (pcf)	Additional Remarks
			SAND, Clayey, very dense, moist, reddish brown, fine grained (SC)							SSS@40.4', N=50/5.25"
45		50 (1.25) 50 (0.5)								SSS@45.3', N=50/3.5"
50		50 (0.5) 50 (0)								SSS@50.4', N=50/2"
-54.										
55		50 (1.5) 50 (1)	CLAY, Fat, very hard, moist, reddish brown (CH)							SSS@55.3', N=50/5.25"
-59.										
60		50 (0.5) 50 (0.25)	CLAY, Sandy Fat, very hard, moist, reddish brown and gray (CH)							SSS@60.4', N=50/4"
-64.										
65		50 (1.5) 50 (0.5)								Boring terminated at 65.5'
70										
75										
80										

Remarks: LAT: 32.366740, LONG: -100.359690. Drill Rig: CME 75 with TxDOT 170-pound Automatic Hammer; SSS: Split Spoon Sample; Drilling Method: Continuous Flight Auger to 50 feet, Air Rotary thereafter. Coordinates were obtained with a handheld GPS and should be considered approximate

The ground water elevation was not determined during the course of this boring.

Driller: Blue Hole Drilling, LLC **Logger:** FP **Organization:** Foresight PES, LLC

C:\Users\JoeKrusee\Foresight Planning & Engineering Services, LLC\FPES - Geotechnical\Projects\23-108 Jacobs SH 70 Cottonwood Crk\Logs\30 No Lab\B-2.CLG

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER
, P.E

6/17/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

SH 70

BORING LOGS

COTTONWOOD CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		137

DATE: DATE TIME
FILE: DOCUMENT NAME

DW EB | CK EA | DW EA | CK MM | DW CK EA

SUMMARY OF ESTIMATED QUANTITIES

BID ITEM NUMBER	400	416	420	420	420	422	425	428	432	450	454	③
BID ITEM DESCRIPTION / BRIDGE ELEMENT	CEM STABIL BKFL	DRILL SHAFT (36 IN)	CL "C" CONC (ABUT) ① (HPC)	CL "C" CONC (CAP) ② (HPC)	CL "C" CONC (COLUMN) (HPC)	REINF CONC SLAB (HPC)	PRESTR CONC GIRDER (TX28)	PENETRATING CONCRETE SURFACE TREATMENT	RIPRAP (STONE PROTECTION) (18 IN)	RAIL (TY SSTR) (HPC)	SEALED EXP. JOINT (4 IN) (SEJ-M)	INSTALL BRIDGE IDENTIFICATION NUMBERS
	CY	LF	CY	CY	CY	SF	LF	SY	CY	LF	LF	EA
PHASE 1												
2 ~ ABUTMENTS	67	180	26.0					33	376	24.0		1
2 ~ INTERIOR BENTS		110		20.6	19.4			47				
1 ~ 150.00' PRESTR CONC GIRDER UNIT						3,000	445.50			150.0	40	
PHASE 1 SUBTOTAL	67	290	26.0	20.6	19.4	3,000	445.50	80	376	174.0	40	1
PHASE 2												
2 ~ ABUTMENTS	122	270	36.8					51	689	24.0		1
2 ~ INTERIOR BENTS		165		32.4	29.1			80				
1 ~ 150.00' PRESTR CONC GIRDER UNIT						5,325	594.00			150.0	72	
PHASE 2 SUBTOTAL	122	435	36.8	32.4	29.1	5,325	594.00	131	689	174.0	72	1
OVERALL TOTAL	189	725	62.8	53.0	48.5	8,325	1,039.50	211	1,065	348.0	112	2

① QUANTITY INCLUDES 1.2 CY FOR SHEAR KEYS. SEE ABUTMENT DETAILS SHEET AND SHEAR KEY DETAILS FOR I-GIRDER (IGSK) STANDARD SHEET FOR SHEAR KEY LOCATION, DETAILS, AND NOTES.

② QUANTITY INCLUDES 2.3 CY FOR SHEAR KEYS. SEE INTERIOR BENT DETAILS SHEET AND SHEAR KEY DETAILS FOR I-GIRDER (IGSK) STANDARD SHEET FOR SHEAR KEY LOCATION, DETAILS, AND NOTES.

③ FOR CONTRACTOR'S INFORMATION ONLY, WORK SUBSIDIARY TO ABUTMENT BID ITEMS.

BEARING SEAT ELEVATIONS

	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7
ABUT 1 (FWD)	2334.989	2335.138	2335.288	2335.438	2335.448	2335.269	2335.090
	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7
BENT 2 (BK)	2335.416	2335.558	2335.699	2335.842	2335.844	2335.658	2335.471
(FWD)	2335.438	2335.579	2335.721	2335.863	2335.865	2335.678	2335.491
	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7
BENT 3 (BK)	2336.040	2336.173	2336.307	2336.442	2336.436	2336.241	2336.047
(FWD)	2336.070	2336.203	2336.336	2336.470	2336.465	2336.269	2336.074
	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7
ABUT 4 (BK)	2336.846	2336.971	2337.097	2337.223	2337.210	2337.007	2336.804

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS

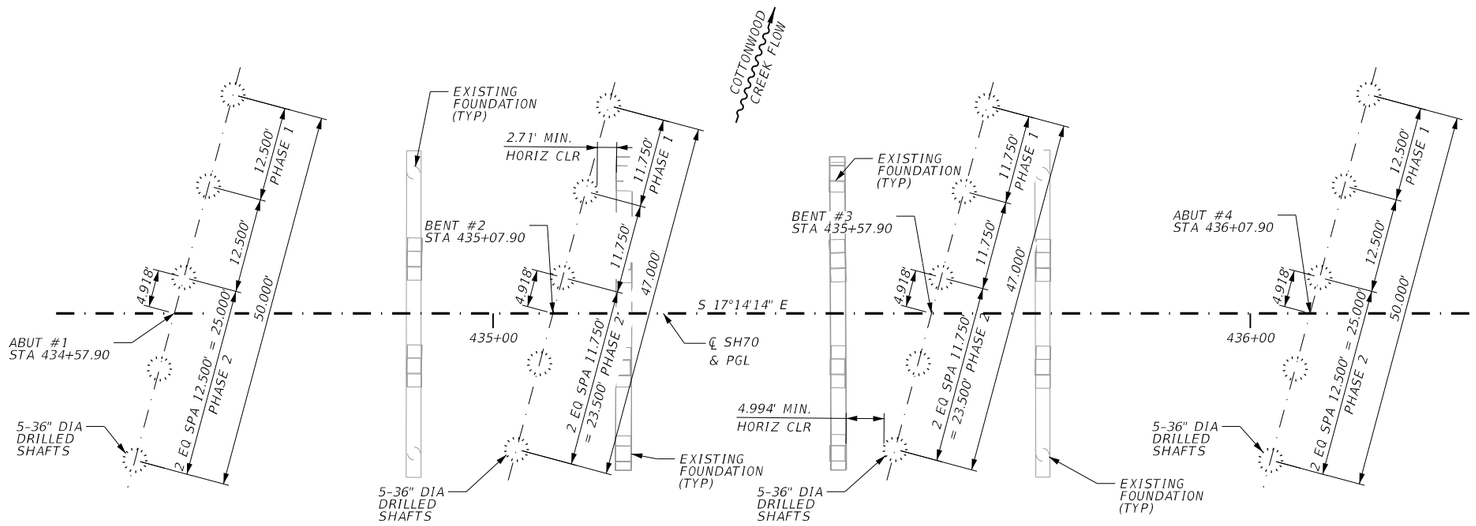
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		138

DATE:
FILE:

DW	EB
CK	EA
DW	EA
CK	MM
DW	EA
CK	EA



FOUNDATION LAYOUT

ALL ABUTMENTS AND BENTS AT BEARING N 87°45'46" E.

NOTES:

1. SEE BRIDGE LAYOUT FOR DRILLED SHAFT LENGTH.
2. SEE BORING LOGS DATA SHEETS FOR SOIL BORING DATA.
3. CONTRACTOR TO FIELD VERIFY LOCATIONS AND STATUS OF EXISTING STRUCTURES AND UTILITIES PRIOR TO CONSTRUCTION.
4. ALL DRILLED SHAFTS TO BE FOUNDED AT ELEVATIONS SHOWN OR DEEPER AS NECESSARY TO OBTAIN A MINIMUM OF THREE SHAFT DIAMETERS PENETRATION INTO VERY DENSE BROWN SAND.

HL93 LOADING

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024 P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

FOUNDATION LAYOUT

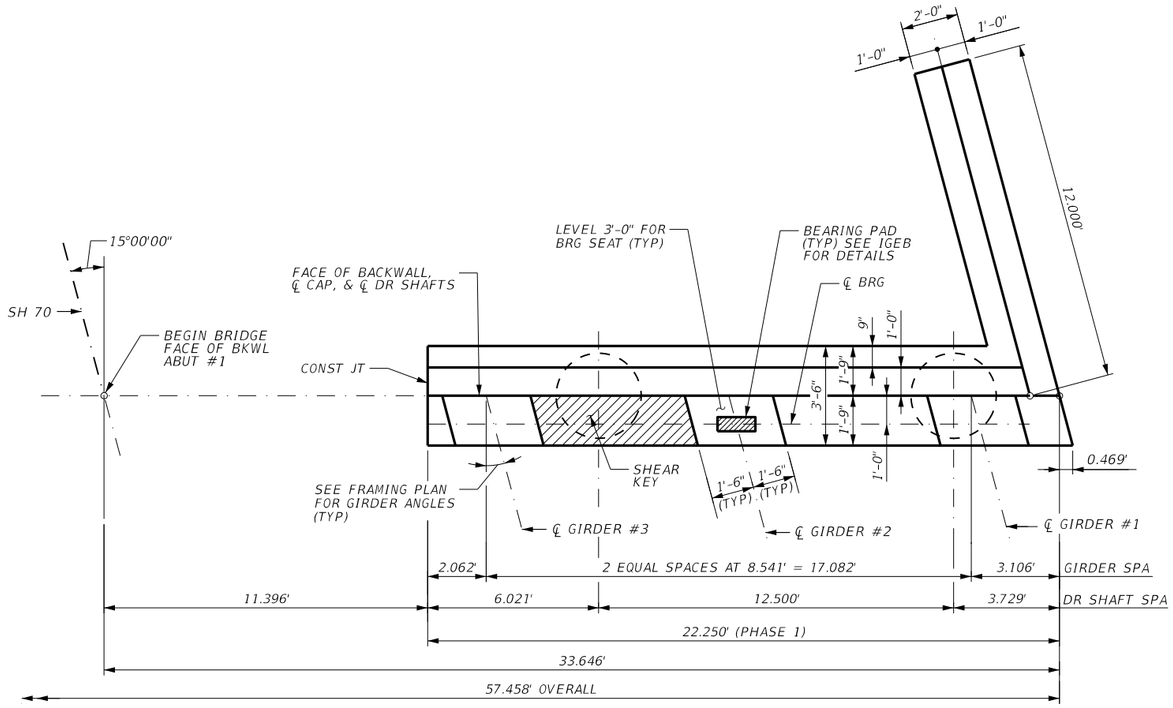
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		139

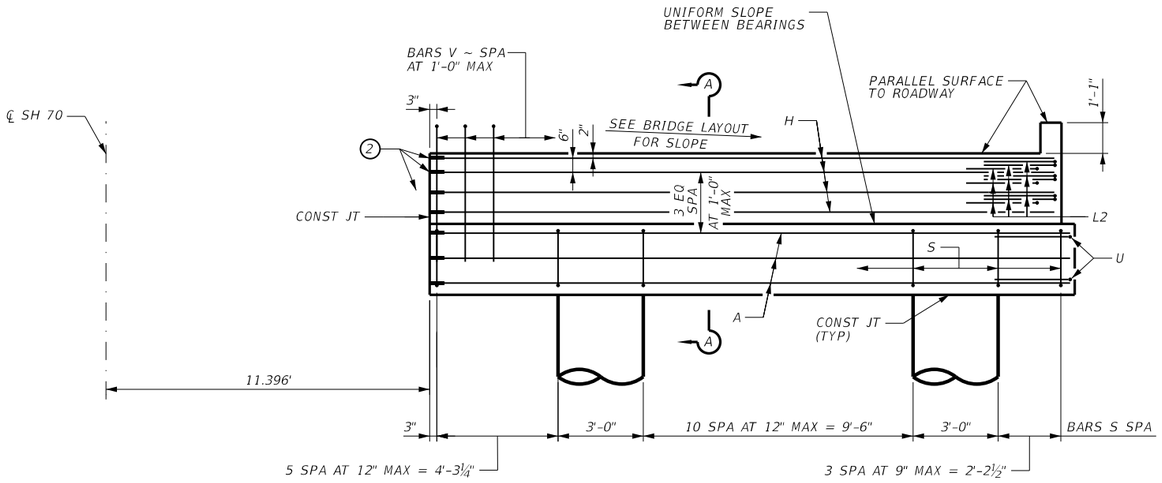
DATE:
FILE:

DW	EB	CK	EA	DW	MM	CK	EA



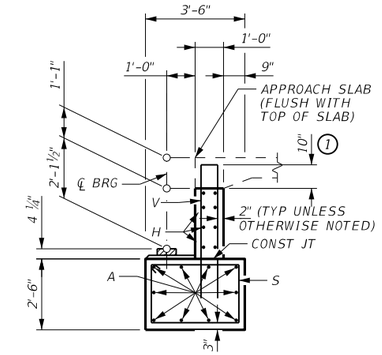
PLAN

(SHOWING ABUTMENT 1
ABUTMENT 4 IS SYMMETRIC BY OPPOSITE HAND.)

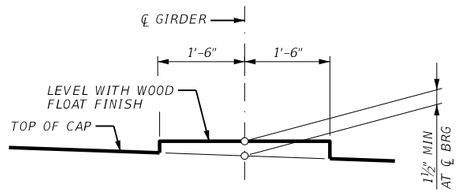


ELEVATION

(ABUTMENT 1 LOOKING BACKSTATION)
(SHEAR KEY NOT SHOWN FOR CLARITY)



SECTION A-A



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF
ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE STONE RIPRAP (SRR) STANDARD FOR RIPRAP ATTACHMENT DETAILS.

SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN WINGWALL.

SEE SHEAR KEY DETAILS (IGSK) STANDARD SHEET FOR ALL SHEAR KEY DETAILS AND NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 68 TONS/DR SH.

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

(2) PLACE FEMALE MECHANICAL COUPLERS WITH PLUGS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL".

MATERIAL NOTES:

PROVIDE CLASS C (HPC) CONCRETE (F'C = 3,600 PSI).

PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.38/1.79
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED
PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 1 & 4 PHASE 1

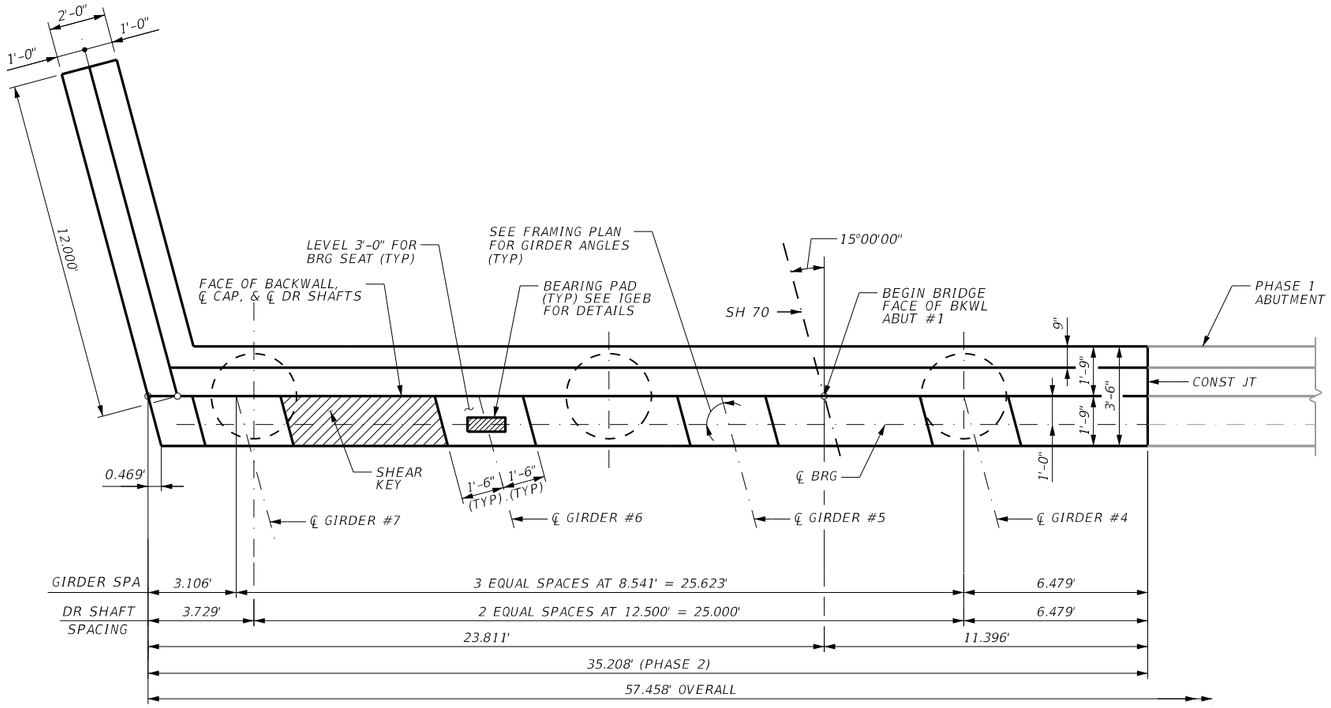
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		140

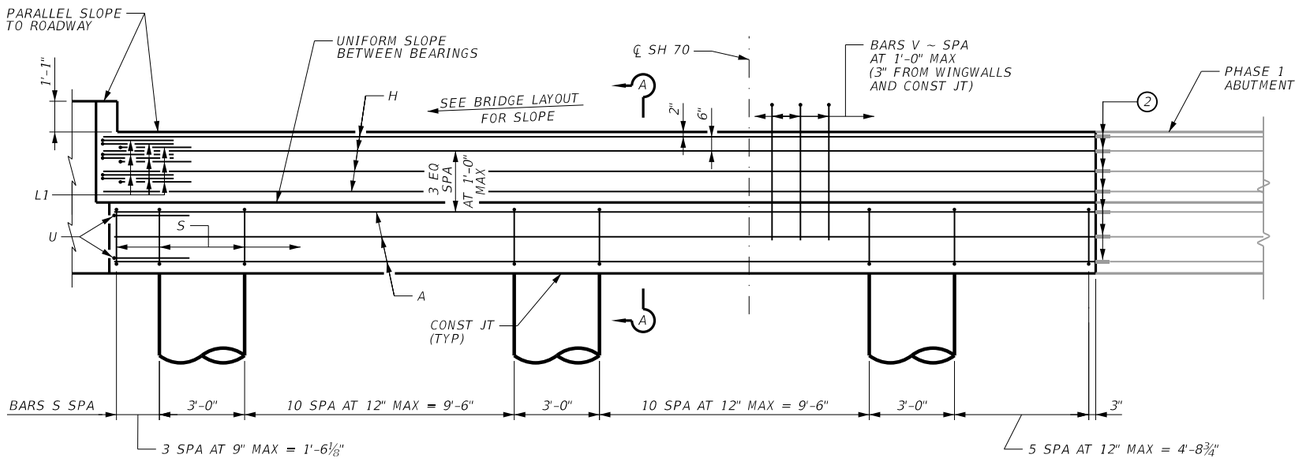
DATE:
FILE:

DW EB | CK EA | DW EA | CK MM | DW EA



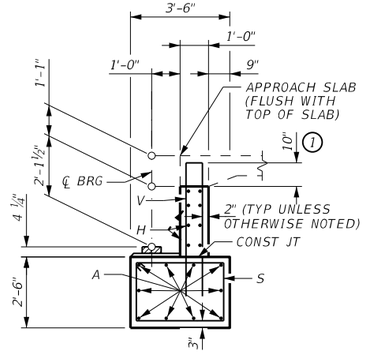
PLAN

(SHOWING ABUTMENT 1
ABUTMENT 4 IS SYMMETRIC BY OPPOSITE HAND.)



ELEVATION

(ABUTMENT 1 LOOKING BACKSTATION)
(SHEAR KEY NOT SHOWN FOR CLARITY)



SECTION A-A

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR HEADER SLOPE, FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE STONE RIPRAP (SRR) STANDARD FOR RIPRAP ATTACHMENT DETAILS.

SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) FOR BEARING PAD DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN WINGWALL.

SEE SHEAR KEY DETAILS (IGSK) STANDARD SHEET FOR ALL SHEAR KEY DETAILS AND NOTES.

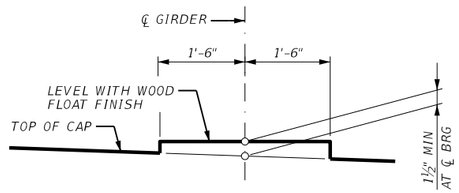
COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 61 TONS/DR SH.

(1) INCREASE AS REQUIRED TO MAINTAIN 3" FROM FINISHED GRADE.

(2) EXTEND BARS INTO PHASE 1 CONSTRUCTION. USING MECHANICAL COUPLERS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL". ADJUST LENGTH OF BARS AS NEEDED.



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD)

MATERIAL NOTES:

PROVIDE CLASS C (HPC) CONCRETE (F'C = 3,600 PSI).

PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.38/1.79
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 1 & 4 PHASE 2

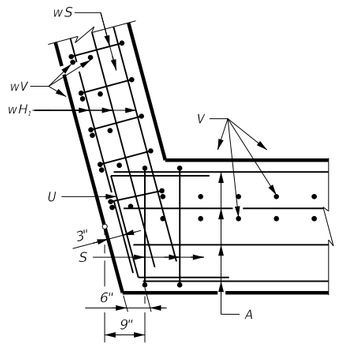
COTTONWOOD CREEK BRIDGE

SHEET 2 OF 3

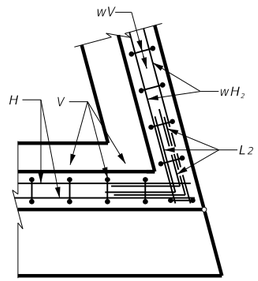
CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		141

DATE:
FILE:

DW	EB	CK	EA	DW	MM	CK	EA

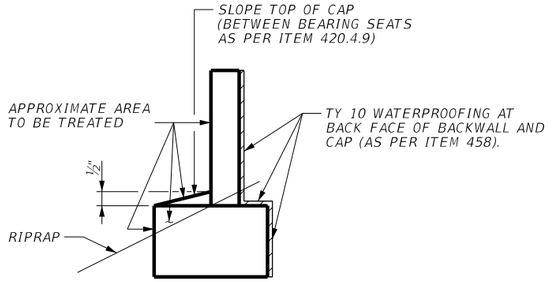


CAP



BACKWALL

CORNER DETAILS



WATERPROOFING DETAIL

(TREAT THE FACE OF BACKWALL AND TOP, FRONT AND END OF CAP AS SHOWN, EXCEPT BEARING SEATS, WITH PENETRATING CONCRETE SURFACE TREATMENT FINISH AS PER ITEM 428. TYPE 10 WATERPROOFING MEMBRANE) (ITEM 458) IS CONSIDERED SUBSIDIARY TO CLASS "C" CONC (ABUT).

TABLE OF ESTIMATED QUANTITIES
PHASE 1 (1)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	22'-1" AVG	1,173
H	8	#6	21'-1"	253
L1	9	#6	4'-0"	54
S	21	#5	11'-6"	252
U	2	#6	8'-2"	25
V	22	#5	11'-2"	256
wH1	7	#6	13'-5"	141
wH2	10	#6	11'-8"	175
wS	13	#4	7'-10"	68
wV	13	#5	11'-2"	151

REINFORCING STEEL (2)	LB	2,549
CLASS "C" CONCRETE	CY	13.0
PENETRATING CONCRETE SURFACE TREATMENT	SY	16.5

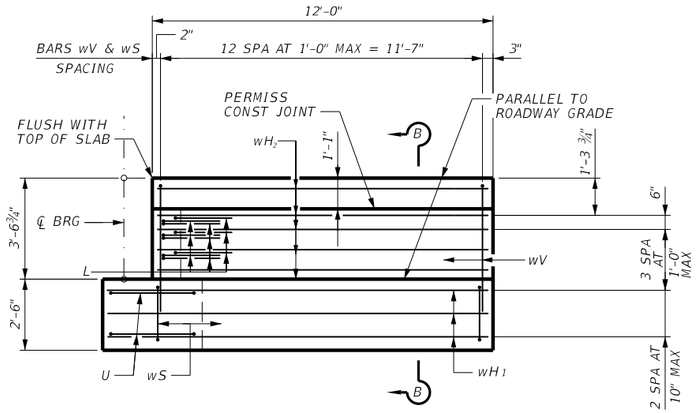
TABLE OF ESTIMATED QUANTITIES
PHASE 2 (1)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	10	#11	35'-0" AVG	1,860
H	8	#6	34'-0"	409
L2	9	#6	4'-0"	54
S	32	#5	11'-5"	384
U	2	#6	8'-2"	25
V	35	#5	11'-2"	408
wH1	7	#6	13'-5"	141
wH2	10	#6	11'-8"	175
wS	13	#4	7'-10"	68
wV	13	#5	11'-2"	151

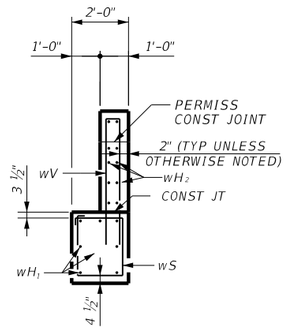
REINFORCING STEEL (2)	LB	3,678
CLASS "C" CONCRETE	CY	18.4
PENETRATING CONCRETE SURFACE TREATMENT	SY	25.5

(1) QUANTITIES SHOWN ARE FOR ONE ABUTMENT ONLY (WITH APPROACH SLAB).

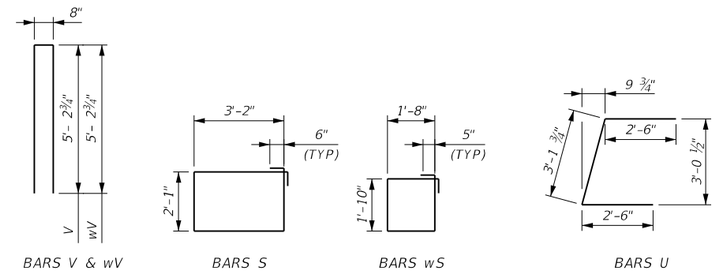
(2) FOR CONTRACTOR'S INFORMATION ONLY.

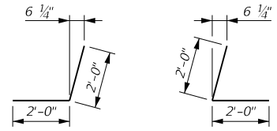


WINGWALL ELEVATION

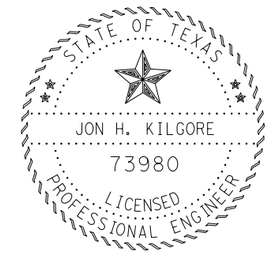


SECTION B-B





HL93 LOADING
SUPERSTRUCTURE INV/OPR
=1.38/1.79
SUBSTRUCTURE NOT RATED



5/16/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ABUTMENT NO. 1 & 4 DETAILS

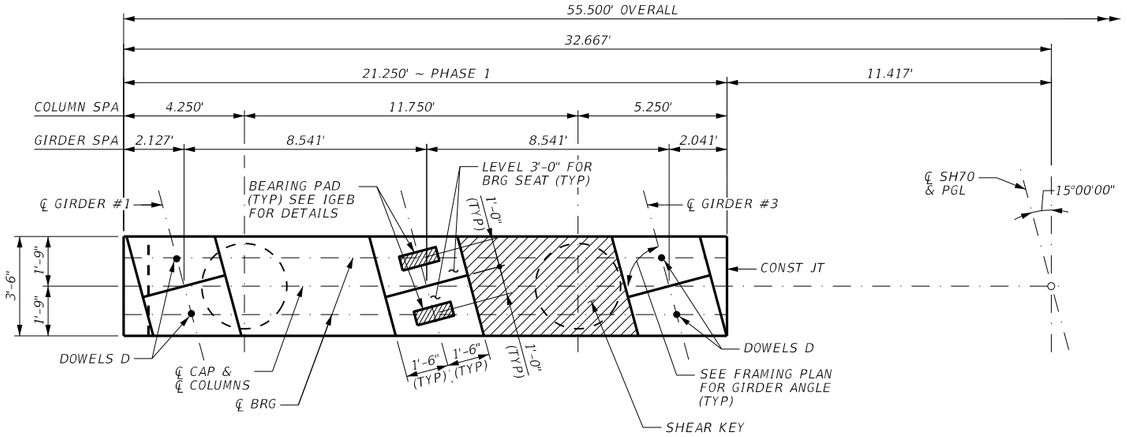
COTTONWOOD CREEK BRIDGE

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		142

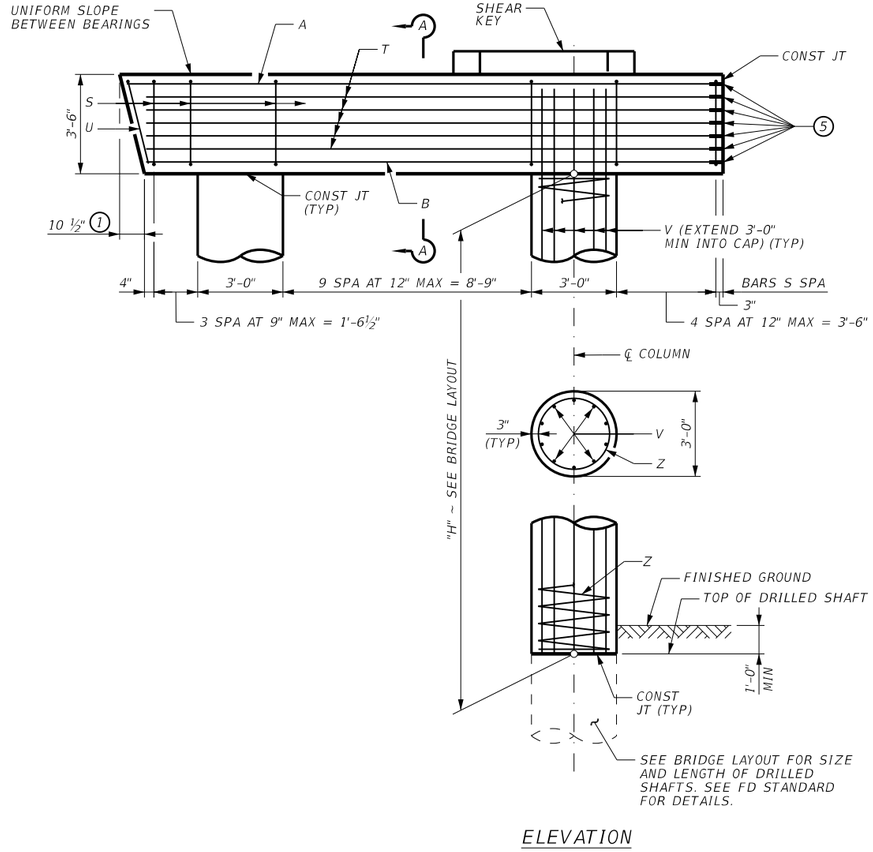
DATE:
FILE:

DW	EB	CK	EA	DW	MM	CK	EA

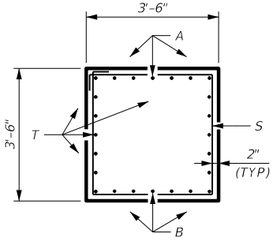


PLAN

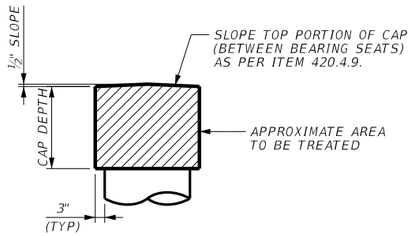
(BENT NO. 2 & 3 SHOWN, LOOKING UPSTATION)



ELEVATION

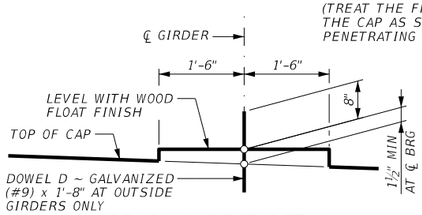


SECTION A-A



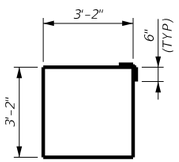
WATERPROOFING DETAIL

(TREAT THE FRONT, BACK, ENDS, TOP OF THE CAP AND 3" UNDERNEATH THE CAP AS SHOWN, EXCEPT FOR BEARING SEAT BUILDUPS, WITH PENETRATING CONCRETE SURFACE TREATMENT AS PER ITEM 428.)

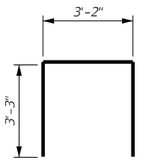


BEARING SEAT DETAIL

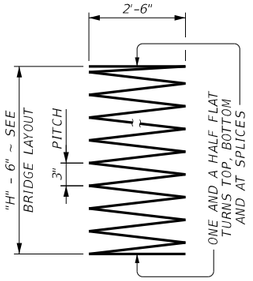
(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)



BARS S



BARS U



BARS Z

TABLE OF COLUMN QUANTITIES (2)

BENT	"H"	BARS V 20 ~ #9		BARS Z 2 ~ #4 SPIRAL		REINF STEEL (4)	CLASS "C" CONC (COL) (HPC)
NO.	HEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
2	20'	23'-0"	1564	681'-3"	506	2,070	10.5
3	17'	20'-0"	1360	580'-3"	910	2,270	8.9

(1) MEASURED PARALLEL TO THE TOP OF CAP SLOPE.

(2) FOR EACH LINEAR FOOT VARIATIONS IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
BARS V LENGTH, 1'-0"
BARS Z LENGTH, 34'-0"
REINFORCING STEEL, 113 LB
CLASS "C" CONC (COL) (HPC), 0.52 CY
PER BENT

(3) QUANTITIES ARE FOR ONE BENT ONLY.

(4) FOR CONTRACTOR'S INFORMATION ONLY.

(5) PLACE FEMALE MECHNANICAL COUPLERS WITH PLUGS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL".

TABLE OF BENT CAP QUANTITIES (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	21'-1"	448
B	4	#11	20'-3"	452
D	4	#9	1'-8"	23
S	19	#5	13'-7"	269
T	10	#5	21'-3"	222
U	1	#5	9'-8"	10
REINFORCING STEEL (4)			LB	1,402
CLASS "C" CONCRETE (CAP) (HPC)			CY	10.3
PENETRATING CONCRETE SURFACE TREATMENT			SY	23.5

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE SHEAR KEY DETAILS (IGSK) STANDARD SHEET FOR ALL SHEAR KEY DETAILS AND NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

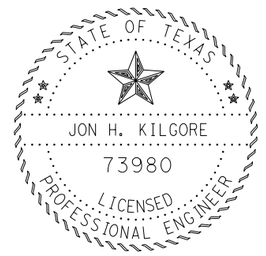
CALCULATED FOUNDATION LOADS = 115 TONS/DR SH.

MATERIAL NOTES:

PROVIDE CLASS "C" (HPC) CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.38/1.79
SUBSTRUCTURE NOT RATED



5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

INTERIOR BENTS NO. 2 & 3
PHASE 1

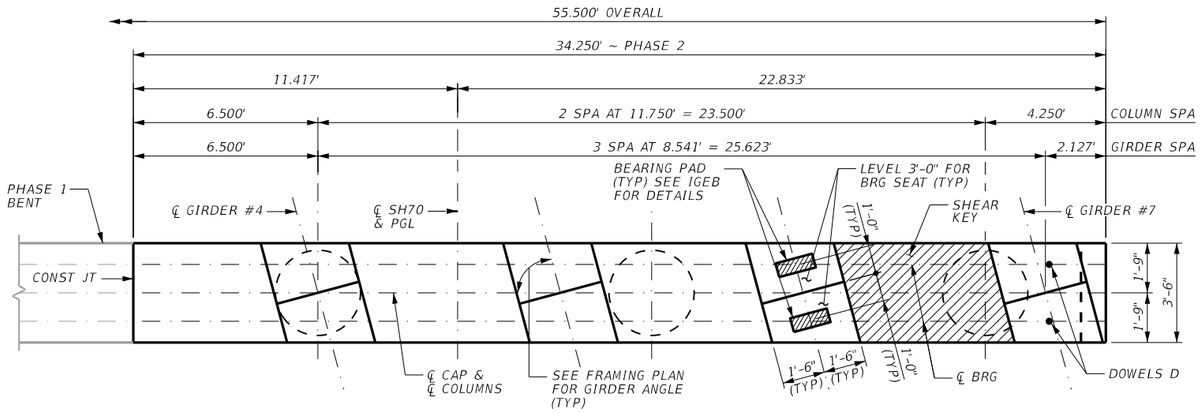
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		143

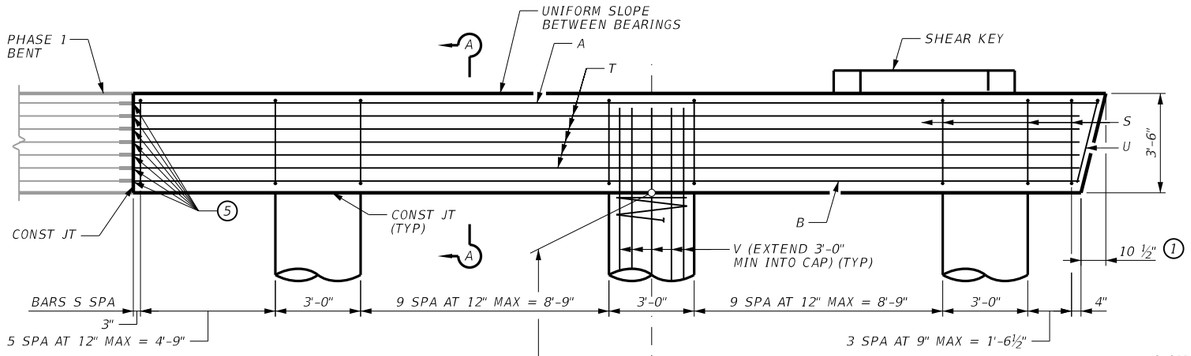
DATE:
FILE:

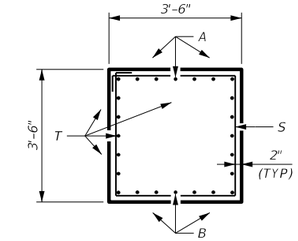
DW EB | DW EA | CK EA | DW MM | CK EA



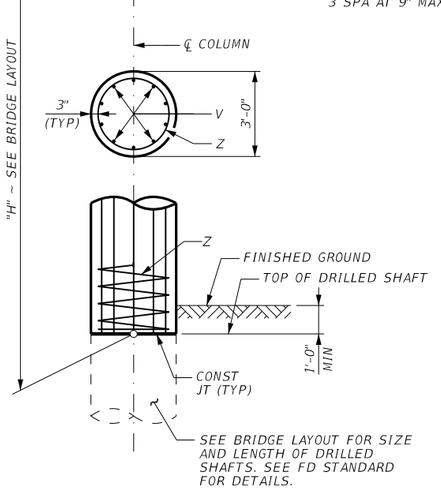
PLAN

(BENT NO. 2 & 3 SHOWN, LOOKING UPSTATION)

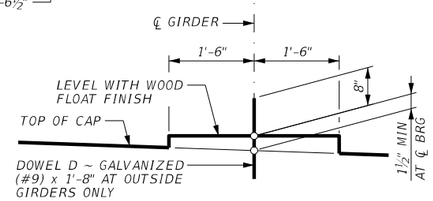




SECTION A-A

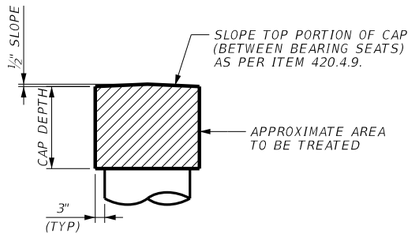


ELEVATION



BEARING SEAT DETAIL

(BEARING SURFACE MUST BE CLEAN AND FREE OF ALL LOOSE MATERIAL BEFORE PLACING BEARING PAD.)



WATERPROOFING DETAIL

(TREAT THE FRONT, BACK, ENDS, TOP OF THE CAP AND 3" UNDERNEATH THE CAP AS SHOWN, EXCEPT FOR BEARING SEAT BUILDUPS, WITH PENETRATING CONCRETE SURFACE TREATMENT AS PER ITEM 428.)

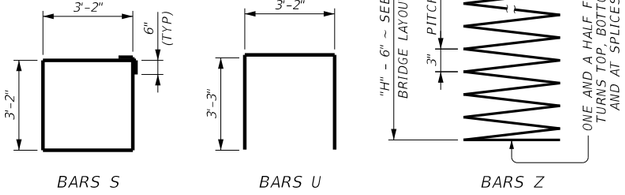


TABLE OF COLUMN QUANTITIES (2)

BENT	"H"	BARS V 30 ~ #9		BARS Z 3 ~ #4 SPIRAL		REINF STEEL (4)	CLASS "C" CONC (COL) (HPC)
NO.	HEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LB	CY
2	20'	23'-0"	2,346	681'-3"	1,365	3,711	15.7
3	17'	20'-0"	2,040	580'-3"	1,163	3,203	13.4

(1) MEASURED PARALLEL TO THE TOP OF CAP SLOPE.

(2) FOR EACH LINEAR FOOT VARIATIONS IN "H" VALUE, MAKE THE FOLLOWING ADJUSTMENTS:
BARS V LENGTH, 1'-0"
BARS Z LENGTH, 34'-0"
REINFORCING STEEL, 170 LB
CLASS "C" CONC (COL), 0.79 CY
PER BENT

(3) QUANTITIES ARE FOR ONE BENT ONLY.

(4) FOR CONTRACTOR'S INFORMATION ONLY.

(5) EXTEND BARS INTO PHASE 1 CONSTRUCTION. USING MECHANICAL SOUPLERS IN ACCORDANCE WITH CURRENT SPECIAL PROVISIONS TO ITEM 440, "REINFORCING STEEL". ADJUST LENGTH OF BARS AS NEEDED.

TABLE OF BENT CAP QUANTITIES (3)

BAR	NO.	SIZE	LENGTH	WEIGHT
A	4	#11	34'-1"	724
B	4	#11	33'-3"	707
D	2	#9	1'-8"	11
S	30	#5	13'-8"	428
T	10	#5	33'-3"	347
U	1	#5	9'-8"	10

REINFORCING STEEL (4)	LB	2,227
CLASS "C" CONCRETE (CAP) (HPC)	CY	10.3
PENETRATING CONCRETE SURFACE TREATMENT	SY	40

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE "BRIDGE LAYOUT" FOR FOUNDATION TYPE, SIZE AND LENGTH.

SEE COMMON FOUNDATION DETAILS (FD) STANDARD SHEET FOR ALL FOUNDATION DETAILS AND NOTES.

SEE SHEAR KEY DETAILS (IGSK) STANDARD SHEET FOR ALL SHEAR KEY DETAILS AND NOTES.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

REINFORCING BAR DIMENSIONS SHOWN ARE OUT-TO-OUT OF BAR.

CALCULATED FOUNDATION LOADS = 103 TONS/DR SH.

MATERIAL NOTES:

PROVIDE CLASS "C" (HPC) CONCRETE (f'c=3,600 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

HL93 LOADING
SUPERSTRUCTURE INV/OPR =1.38/1.79
SUBSTRUCTURE NOT RATED

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024 , P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

INTERIOR BENTS NO. 2 & 3
PHASE 2

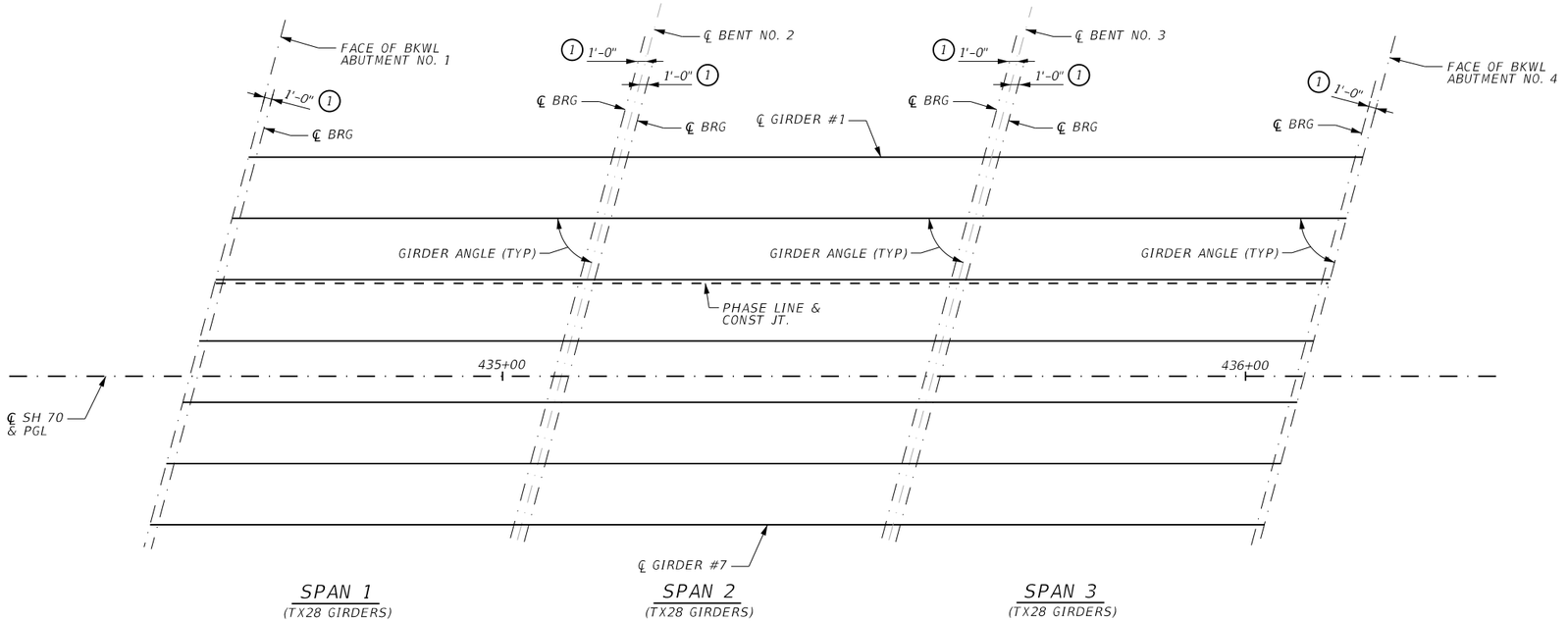
COTTONWOOD CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		144

DATE:
FILE:

DW	EB	CK	EA	DW	EA	CK	MM	DW	EA



FRAMING PLAN

1. SEE ELASTOMERIC BEARING & GIRDER END DETAILS (IGEB) STANDARD FOR ORIENTATION OF DIMENSION.
2. GIRDER LENGTHS SHOWN ARE BOTTOM GIRDER FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.

BENT REPORT

ABUT NO. 1 ((N 87° 45' 46" E))
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 30.5406 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1	GIRDER 1	0.0000	75 0 0.00
	GIRDER 2	8.5410	75 0 0.00
	GIRDER 3	8.5410	75 0 0.00
	GIRDER 4	8.5410	75 0 0.00
	GIRDER 5	8.5410	75 0 0.00
	GIRDER 6	8.5410	75 0 0.00
	GIRDER 7	8.5410	75 0 0.00
	TOTAL	51.2460	

BENT NO. 2 ((N 87° 45' 46" E))
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 30.5406 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 1	GIRDER 1	0.0000	75 0 0.00
	GIRDER 2	8.5410	75 0 0.00
	GIRDER 3	8.5410	75 0 0.00
	GIRDER 4	8.5410	75 0 0.00
	GIRDER 5	8.5410	75 0 0.00
	GIRDER 6	8.5410	75 0 0.00
	GIRDER 7	8.5410	75 0 0.00
	TOTAL	51.2460	
SPAN 2	GIRDER 1	0.0000	75 0 0.00
	GIRDER 2	8.5410	75 0 0.00
	GIRDER 3	8.5410	75 0 0.00
	GIRDER 4	8.5410	75 0 0.00
	GIRDER 5	8.5410	75 0 0.00
	GIRDER 6	8.5410	75 0 0.00
	GIRDER 7	8.5410	75 0 0.00
	TOTAL	51.2460	

BENT NO. 3 ((N 87° 45' 46" E))
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 30.5406 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 2	GIRDER 1	0.0000	75 0 0.00
	GIRDER 2	8.5410	75 0 0.00
	GIRDER 3	8.5410	75 0 0.00
	GIRDER 4	8.5410	75 0 0.00
	GIRDER 5	8.5410	75 0 0.00
	GIRDER 6	8.5410	75 0 0.00
	GIRDER 7	8.5410	75 0 0.00
	TOTAL	51.2460	
SPAN 3	GIRDER 1	0.0000	75 0 0.00
	GIRDER 2	8.5410	75 0 0.00
	GIRDER 3	8.5410	75 0 0.00
	GIRDER 4	8.5410	75 0 0.00
	GIRDER 5	8.5410	75 0 0.00
	GIRDER 6	8.5410	75 0 0.00
	GIRDER 7	8.5410	75 0 0.00
	TOTAL	51.2460	

ABUT NO. 4 ((N 87° 45' 46" E))
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 30.5406 L

		BEAM SPAC. (CL BENT)	BEAM ANGLE D M S
SPAN 3	GIRDER 1	0.0000	75 0 0.00
	GIRDER 2	8.5410	75 0 0.00
	GIRDER 3	8.5410	75 0 0.00
	GIRDER 4	8.5410	75 0 0.00
	GIRDER 5	8.5410	75 0 0.00
	GIRDER 6	8.5410	75 0 0.00
	GIRDER 7	8.5410	75 0 0.00
	TOTAL	51.2460	

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	GIRDER SLOPE
GIRDER 1	50.000	47.929	49.50	0.00891
GIRDER 2	50.000	47.929	49.50	0.00875
GIRDER 3	50.000	47.929	49.50	0.00859
GIRDER 4	50.000	47.929	49.50	0.00843
GIRDER 5	50.000	47.929	49.50	0.00826
GIRDER 6	50.000	47.929	49.50	0.00811
GIRDER 7	50.000	47.929	49.50	0.00794

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	GIRDER SLOPE
GIRDER 1	50.000	47.929	49.50	0.01255
GIRDER 2	50.000	47.929	49.50	0.01239
GIRDER 3	50.000	47.929	49.50	0.01223
GIRDER 4	50.000	47.929	49.50	0.01207
GIRDER 5	50.000	47.929	49.50	0.01191
GIRDER 6	50.000	47.929	49.50	0.01175
GIRDER 7	50.000	47.929	49.50	0.01159

GIRDER REPORT, SPAN 3

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. BM. FLG. (2)	GIRDER SLOPE
GIRDER 1	50.000	47.929	49.50	0.01619
GIRDER 2	50.000	47.929	49.50	0.01604
GIRDER 3	50.000	47.929	49.50	0.01587
GIRDER 4	50.000	47.929	49.50	0.01571
GIRDER 5	50.000	47.929	49.50	0.01555
GIRDER 6	50.000	47.929	49.50	0.01539
GIRDER 7	50.000	47.929	49.50	0.01523

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

FRAMING PLAN (SPANS 1-3)

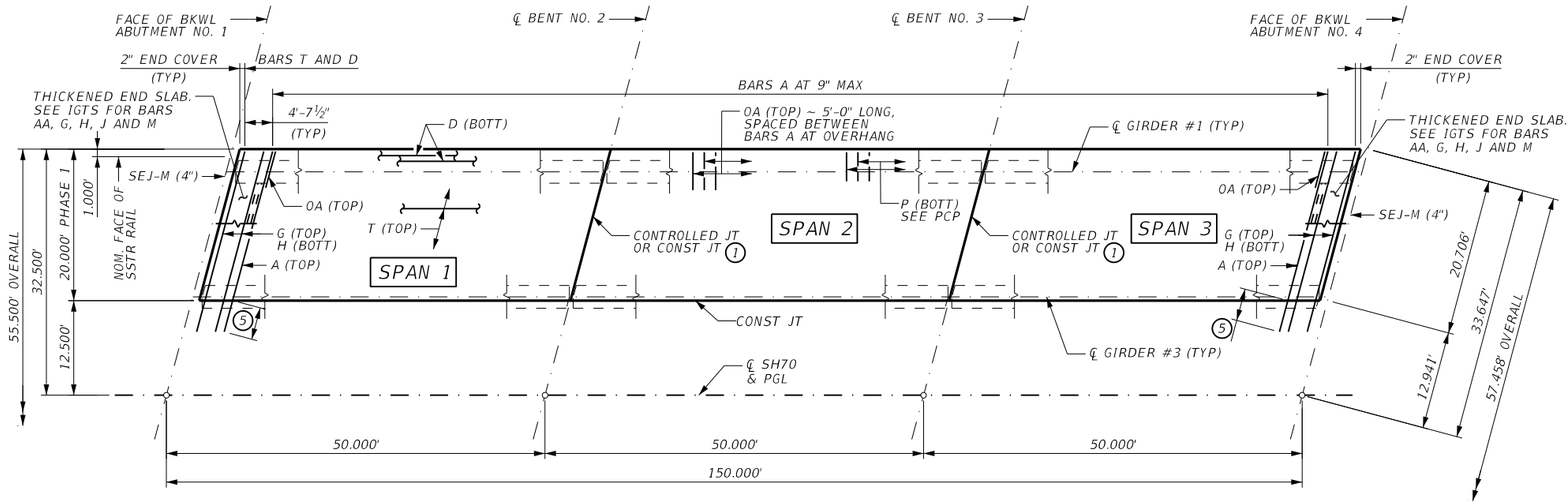
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 1

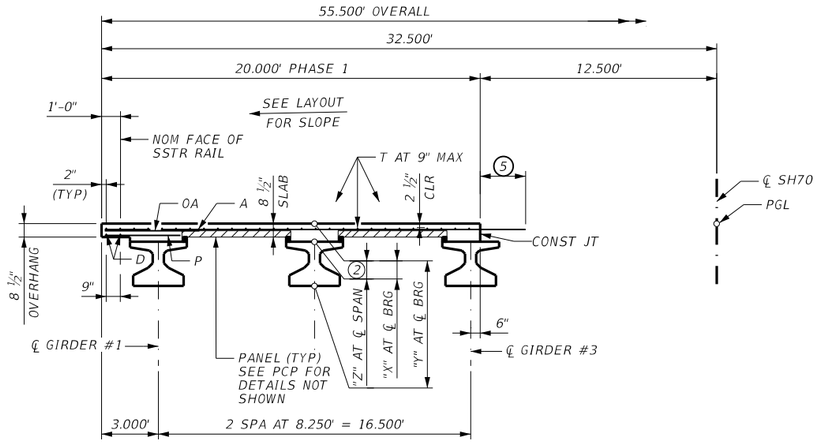
CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		145

DATE:
FILE:

DW	EB	CK	EA	DW	EA	CK	MM	CK	EA



PLAN



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.

SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN.

AT THE CONTRACTORS OPTION, THE PREFABRICATED OVERHANGS MAY BE USED ON A SKEWED BRIDGE. HOWEVER, THE STANDARDS DO NOT SUPPORT THE DETAILS REQUIRED. THE CONTRACTOR MAY SUBMIT SIGNED AND SEALED DESIGN AND DETAILS FOR SKEWED SLABS FOR REVIEW AND APPROVAL BY THE ENGINEER.

SEE IGMS STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB.

SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB.

SEE IGFRP STANDARD FOR DETAILS OF THE GLASS FIBER REINFORCED POLYMER FOR THE TOP MAT OF SLAB REINFORCEMENT.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

1. BARS T MUST BE CONTINUOUS THROUGH JOINT.
2. THEORETICAL DIMENSION.
3. LENGTHS SHOWN ARE BOTTOM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.
4. REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.
5. EXTEND PHASE 1 BARS A, G & H 2'-7" INTO PHASE 2 CONSTRUCTION.

MATERIAL NOTES:

PROVIDE CLASS "S" (HPC) CONCRETE (f'c = 4,000 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE 1'-7" BAR LAPS (UNCOATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

BAR TABLE

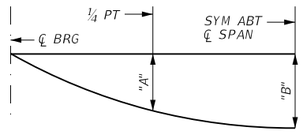
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS (Tx28) (3)	REINF STEEL (4)
NO.	SF	LF	LB
1	1,000	148.5	2,300
2	1,000	148.5	2,300
3	1,000	148.5	2,300
TOTAL	3,000	445.5	6,900

TABLE OF DEAD LOAD DEFLECTIONS

SPAN NO.	GIRDER NO.	"A" FT	"B" FT
1 - 3	1	0.020	0.029
	2	0.023	0.033
	3	0.013	0.019



DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec = 5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT (2) ℄ SPAN
1 - 3	1	10 ½"	3'-2 ½"	9 5/8"
	2	10 ½"	3'-2 ½"	9 5/8"
	3	10 ½""	3'-2 ½"	9 5/8"

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

, P.E

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

150.00' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 1-3) (PHASE 1)

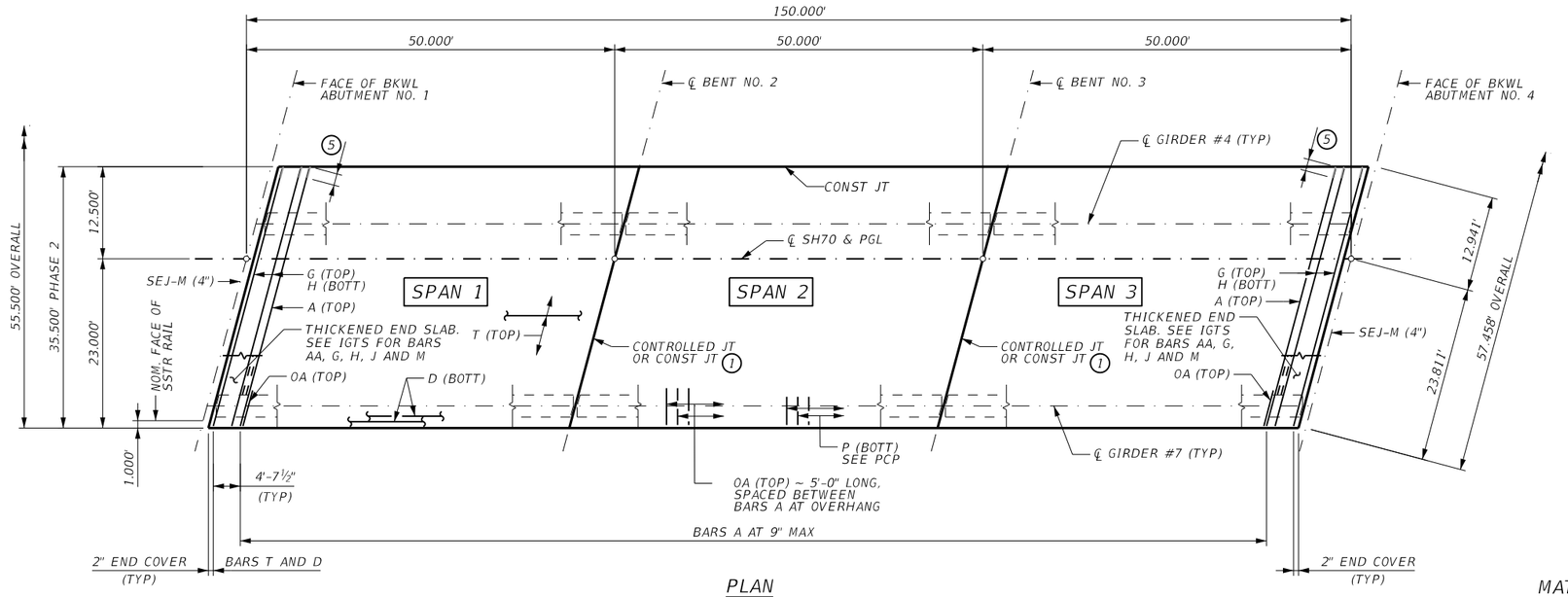
COTTONWOOD CREEK BRIDGE

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		146

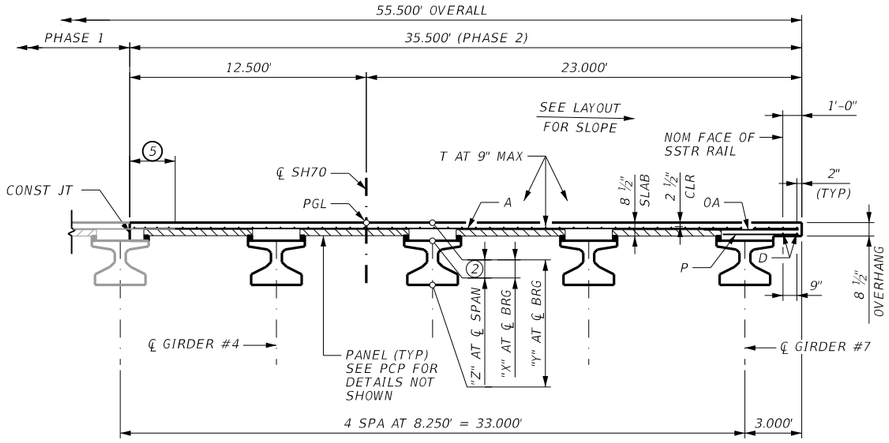
DATE:
FILE:

DW	EB	CK	EA	DW	MM	CK	EA



PLAN

(PHASE 1 NOT SHOWN)



TYPICAL TRANSVERSE SECTION

GENERAL NOTES:

DESIGNED ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION (2020) AND TxDOT BRIDGE DESIGN MANUAL (JAN 2023).

SEE CONTINUOUS SLAB DETAILS (IGCS) STANDARD SHEET FOR ADDITIONAL DETAILS.

SEE IGTS STANDARD FOR THICKENED SLAB END DETAILS AND QUANTITY ADJUSTMENTS.

SEE PCP AND PCP-FAB STANDARDS FOR PANEL DETAILS NOT SHOWN.

AT THE CONTRACTORS OPTION, THE PREFABRICATED OVERHANGS MAY BE USED ON A SKEWED BRIDGE. HOWEVER, THE STANDARDS DO NOT SUPPORT THE DETAILS REQUIRED. THE CONTRACTOR MAY SUBMIT SIGNED AND SEALED DESIGN AND DETAILS FOR SKEWED SLABS FOR REVIEW AND APPROVAL BY THE ENGINEER.

SEE IGMS STANDARD FOR MISCELLANEOUS SLAB DETAILS NOT SHOWN.

SEE SSTR STANDARD FOR RAIL ANCHORAGE IN SLAB.

SEE SEJ-M STANDARD FOR DETAILS OF JOINT TO BE PLACED WITH SLAB.

SEE IGFRP STANDARD FOR DETAILS OF THE GLASS FIBER REINFORCED POLYMER FOR THE TOP MAT OF SLAB REINFORCEMENT.

COVER DIMENSIONS ARE CLEAR DIMENSIONS, UNLESS NOTED OTHERWISE.

1. BARS T MUST BE CONTINUOUS THROUGH JOINT.
2. THEORETICAL DIMENSION.
3. LENGTHS SHOWN ARE BOTTOM FLANGE LENGTHS WITH ADJUSTMENTS MADE FOR GIRDER SLOPE.
4. REINFORCING STEEL WEIGHT IS CALCULATED USING AN APPROXIMATE FACTOR OF 2.3 LBS/SF.
5. EXTEND PHASE 1 BARS A, G & H 2'-7" INTO PHASE 2 CONSTRUCTION.

MATERIAL NOTES:

PROVIDE CLASS "S" (HPC) CONCRETE (f'_c = 4,000 psi).

PROVIDE GRADE 60 REINFORCING STEEL.

PROVIDE 1'-7" BAR LAPS (UNCOATED #4 BARS), WHERE REQUIRED.

DEFORMED WELDED WIRE REINFORCEMENT (WWR) (ASTM A1064) OF EQUAL SIZE AND SPACING MAY BE SUBSTITUTED FOR BARS A, D, OA, P OR T UNLESS NOTED OTHERWISE. PROVIDE THE SAME LAPS AS REQUIRED FOR REINFORCING BARS.

BAR TABLE

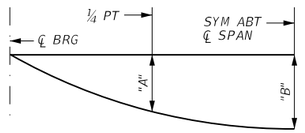
BAR	SIZE
A	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONCRETE SLAB	PRESTR CONCRETE GIRDERS (Tx28) (3)	REINF STEEL (4)
NO.	SF	LF	LB
1	1,775	198.00	4,083
2	1,775	198.00	4,083
3	1,775	198.00	4,083
TOTAL	5,325	594.00	12,249

TABLE OF DEAD LOAD DEFLECTIONS

SPAN NO.	GIRDER NO.	"A" FT	"B" FT
1 - 3	4	0.023	0.033
	5	0.023	0.033
	6	0.023	0.033
	7	0.020	0.029



DEAD LOAD DEFLECTION DIAGRAM

NOTE: DEFLECTIONS SHOWN ARE DUE TO PRESTRESSED CONCRETE PANELS AND CAST-IN-PLACE CONCRETE SLAB ONLY (Ec = 5000 ksi). ADJUST DEFLECTIONS BASED ON FIELD OBSERVATIONS AS NEEDED.

TABLE OF SECTION DEPTHS

SPAN NO.	GIRDER NO.	"X" AT ℄ BRG	"Y" AT ℄ BRG	"Z" AT (2) ℄ SPAN
1 - 3	4	10 ½"	3'-2 ½"	9 5/8"
	5	10 ½"	3'-2 ½"	9 5/8"
	6	10 ½"	3'-2 ½"	9 5/8"
	7	10 ½"	3'-2 ½"	9 5/8"

DATE:
FILE:

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

5/16/2024

P.E.

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone:+1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

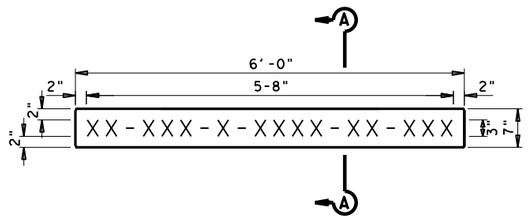
150.00' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 1-3) (PHASE 2)

COTTONWOOD CREEK BRIDGE

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		147

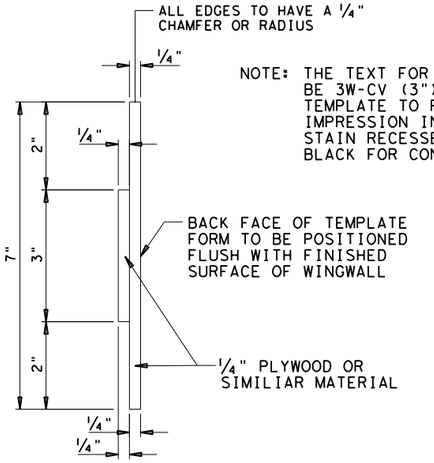
NBI NUMBER TEMPLATE



NOTE: THE SYMBOLS XX-XXX-X-XXXX-XX-XXX REPRESENT THE NBI NUMBER WHICH IS SHOWN IN THE TABLE TO THE RIGHT.

NBI NUMBER FORMAT:
DISTRICT-COUNTY-O-CONTROL-SECTION-STR NO.

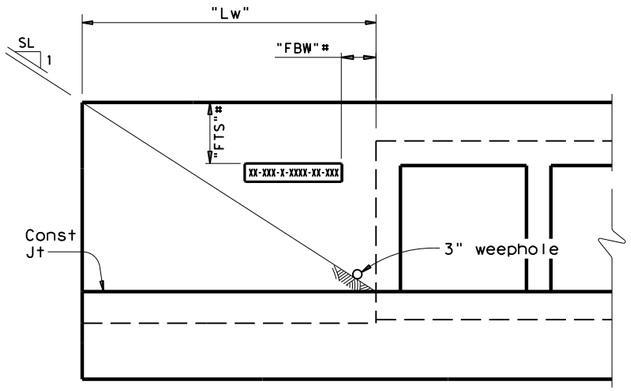
ALL CHARACTERS ARE REQUIRED, AND ARE TO BE FORMATTED EXACTLY AS SHOWN IN THE NBI NUMBER COLUMN TO THE RIGHT.



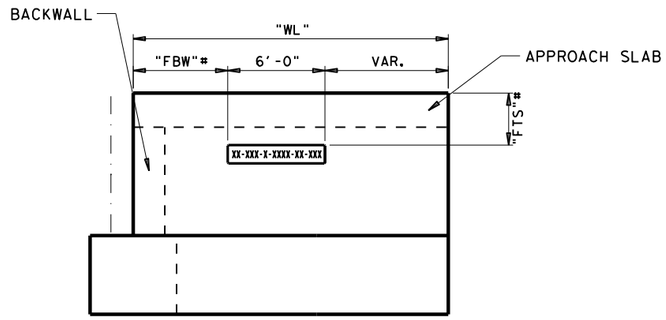
NOTE: THE TEXT FOR ALL TEMPLATES SHOULD BE 3W-CV (3") CLEAR VIEW FONT. TEMPLATE TO PROVIDE A RECESSED IMPRESSION INTO CAST CONCRETE. STAIN RECESSED NUMERAL SURFACES BLACK FOR CONTRAST.

SECTION A-A

NBI NUMBER TEMPLATE NUMBERS					
NBI NUMBER	LOCATION	"WL"	"Lw"	"FBW"#	"FTS"#
08-177-0-0264-01-104	SH 70 OVER SWEETWATER CREEK	8'	NA	6"	6"
08-177-0-0264-01-103	SH 70 OVER COTTONWOOD CREEK	12'	NA	6"	6"

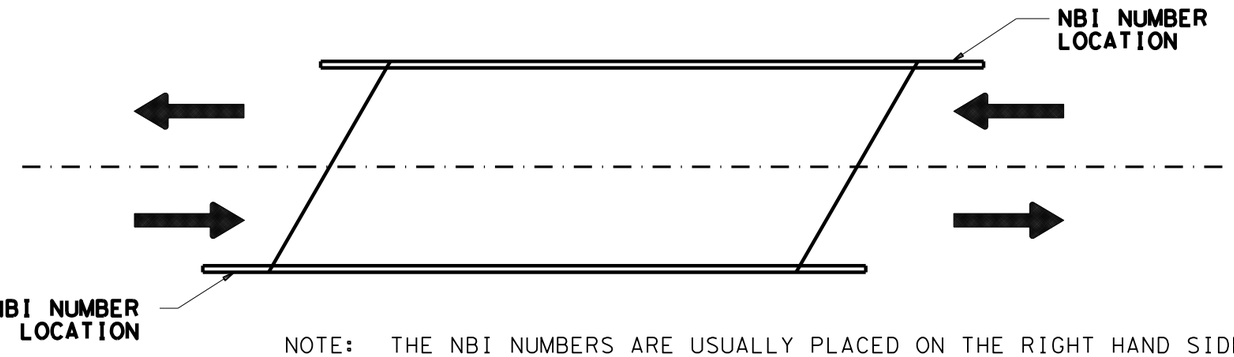


PARALLEL WING ELEVATION

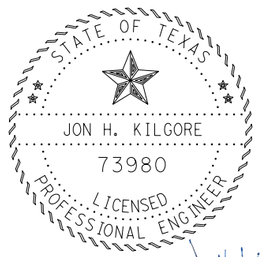


ABUTMENT WINGWALL ELEVATION

FIELD LOCATE TO AVOID CONFLICT WITH REINFORCEMENT AND RIPRAP. THE ENGINEER SHALL APPROVE INSTALLATION LOCATION PRIOR TO PLACEMENT.



NOTE: THE NBI NUMBERS ARE USUALLY PLACED ON THE RIGHT HAND SIDE OF APPROACHES. THIS PLACES THE ID'S ON DIAGONAL CORNERS. THE NBI NUMBERS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BRIDGE ITEMS.



5/15/2024 , P.E

STRUCTURE ID DETAILS
SIDD-14

Texas Department of Transportation

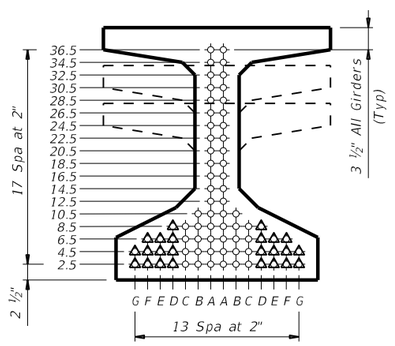
NO SCALE SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH 70
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		
DISTRICT	CONTROL	SECTION	JOB
ABL	0264	01	046

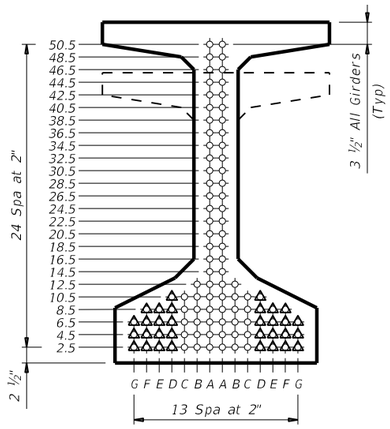
$FILE$
$DATE$

DATE:
FILE:

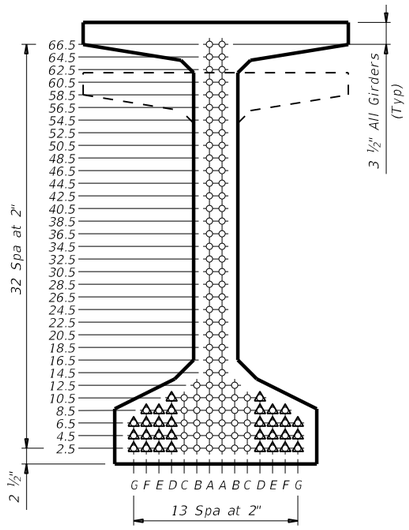
STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS		
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						NO.	TO END (in)	RELEASE STRGTH (1) f'ci (ksi)	MINIMUM 28 DAY COMP STRGTH f'c (ksi)	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)								Moment	Shear	Inv	Opr	Inv
SH70 AT SWEETWATER CREEK	1-4	1 - 7	Tx28		28	0.6	270	9.48	6.62	4	24.5	6.000	7.300	3.392	-4.128	3,061	0.642	0.832	1.58	2.05	1.11
SH70 AT COTTONWOOD CREEK	1-3	1 - 7	Tx28		14	0.6	270	10.48	8.05	2	19.5	4.200	5.500	1.701	-2.232	1,790	0.704	0.880	1.38	1.79	1.39



TYPE Tx28, Tx34 & Tx40



TYPE Tx46 & Tx54



TYPE Tx62 & Tx70

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications. Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.

Optional designs for girders 120 feet or longer must have a calculated residual camber equal to or greater than that of the designed girder.

Prestress losses for the designed girders have been calculated for a relative humidity of 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.

STATE OF TEXAS
JON H. KILGORE
73980
LICENSED PROFESSIONAL ENGINEER

STATE OF TEXAS
SOO MIN PARK
124027
LICENSED PROFESSIONAL ENGINEER
05/17/2024

5/16/2024 HL93 LOADING

Texas Department of Transportation

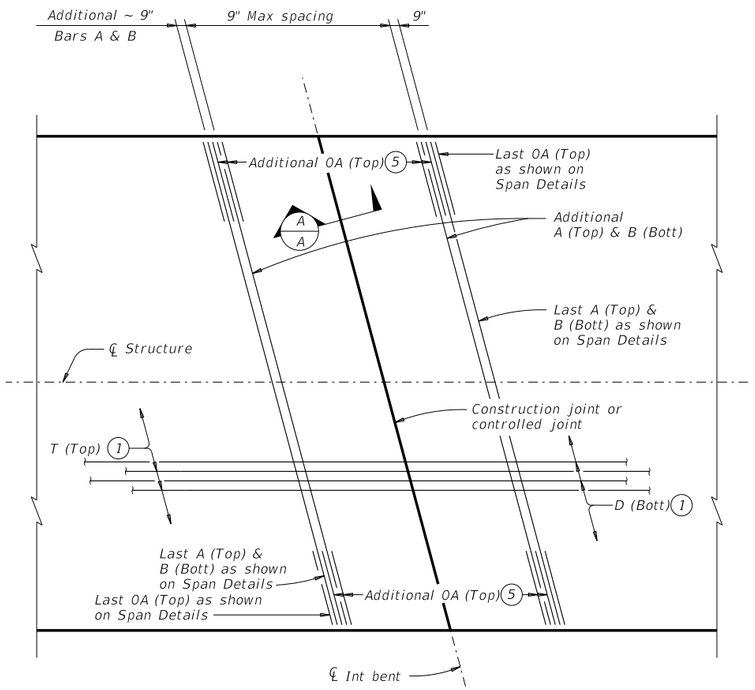
Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

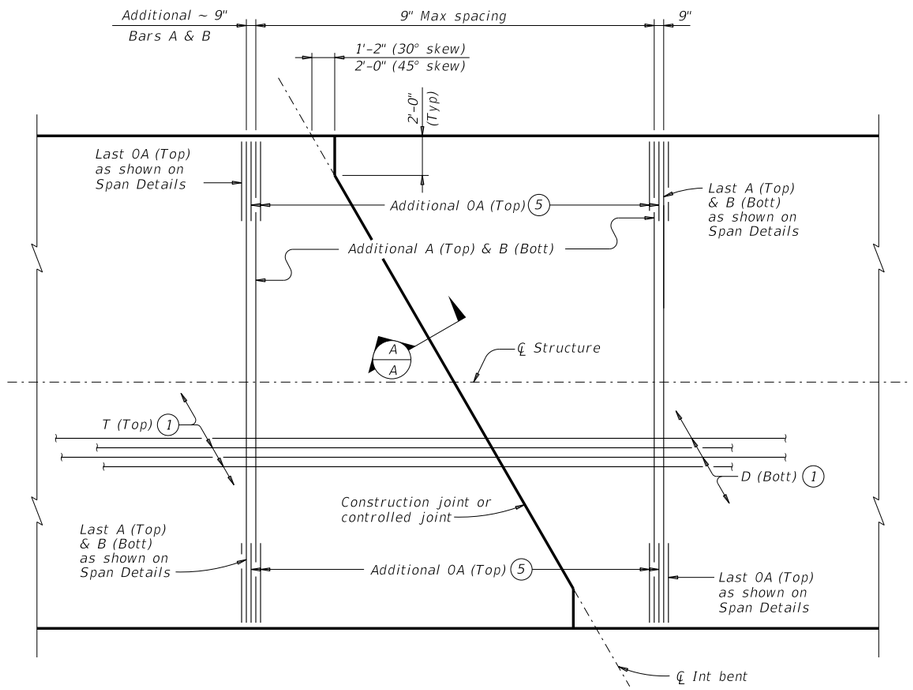
FILE:	DN: TxDOT	CK: TxDOT	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Modified for depressed strands only. 3-22: Added Load Rating.	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		149

DATE:
FILE:



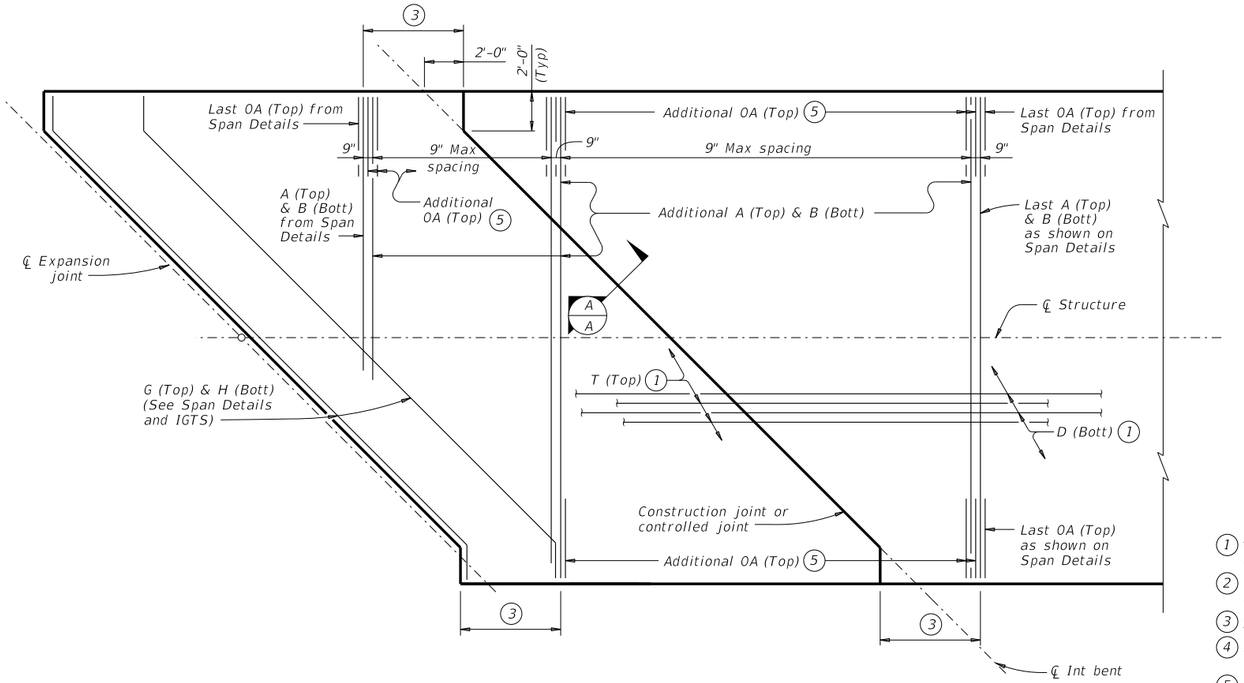
PLAN FOR 0° OR 15° SKEW

(Showing 15° skew)



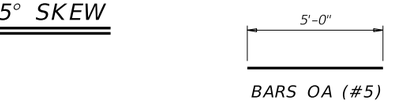
PLAN FOR 30° OR 45° SKEW

(Showing 30° skew)

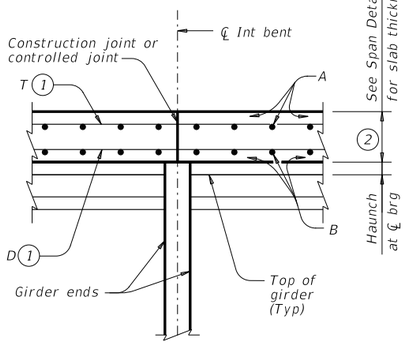


PLAN FOR 45° SKEW 4

(Showing short span condition.)



BARS OA (#5)



SECTION A-A

Bars 0A (Top) not shown for clarity.

1. Top and bottom mats must be continuous through joint.
2. Maintain a constant slab thickness over the bent.
3. 5'-4" as shown on Span Details.
4. Use these details when no full slab width bars A and B are shown on Span Details.
5. Bars 0A (Top) at 9" Max spacing between Bars A (Top).
6. Values in table assume a temperature change of 70° F after erection when calculating thermal movement in one direction (not total).

TABLE OF ALLOWABLE UNIT LENGTH 6

Max Rdwy Grade, Percent	Unit Length Factor
0.00	4.1
1.00	3.9
2.00	3.7
3.00	3.5
4.00	3.3
5.00	3.1

Unit length must not exceed the length of the shortest end span times the Unit Length Factor shown in table or 400', whichever is less.

BAR TABLE

BAR	SIZE
A	#4
B	#4
D	#4
T	#4
0A	#5

The details shown on this sheet are applicable for two and three span units comprised of the same girder type.
Units may be comprised of different span lengths. See "Table of Allowable Unit Length".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

This standard is drawn showing right forward skew. See Bridge Layout for actual skew direction.

CONSTRUCTION NOTES:

Where multi-span units are indicated on the Bridge Layout, the thickened slab end details and reinforcement shown on IGTS standard (Bars AA, G, H, J, K, and M) and on the Span Details will be omitted where slabs are continuous over interior bents. At these locations, the slab details and reinforcement will be as shown on this sheet or on PCP standard (if using this option).

Thickened slab end reinforcement and details still apply at expansion joint locations (ends of units).

See Span Details for remainder of slab reinforcement and details.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide Class "S" concrete (f'c = 4,000 psi). Provide Class "S" (HPC) if shown elsewhere on the plans.

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

The details shown on this sheet are applicable for use only with the Prestressed Concrete I-Girder Standard Designs shown on standards IGSD-24, IGSD-28, IGSD-30, IGSD-32, IGSD-34, IGSD-38, IGSD-40 and IGSD-44.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

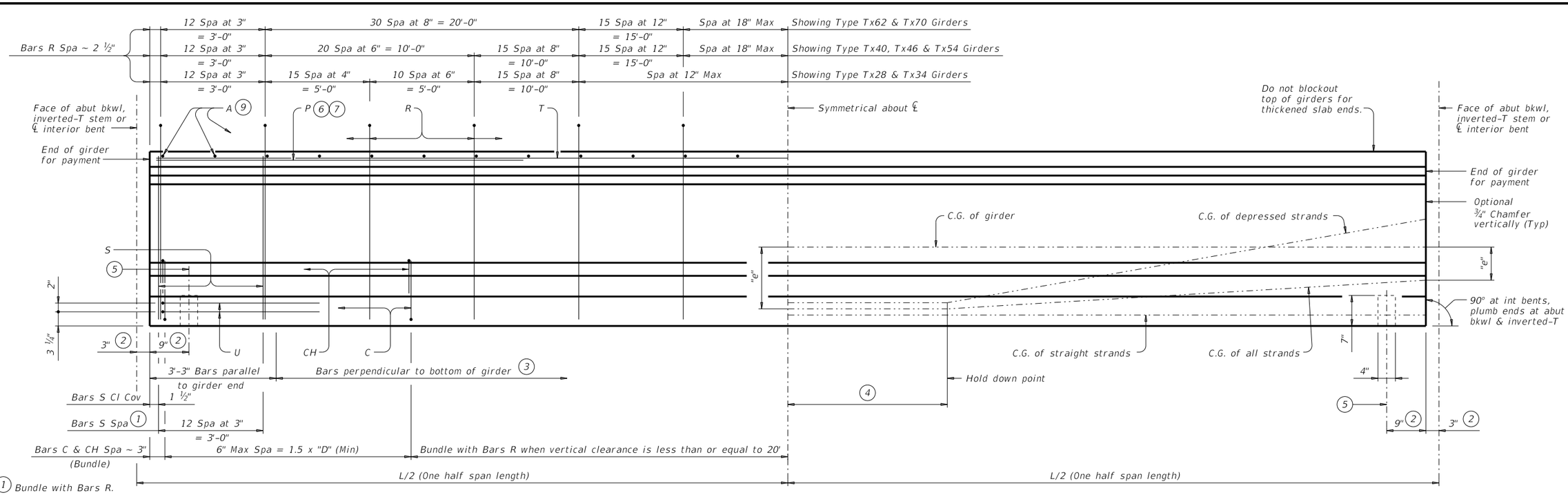
CONTINUOUS SLAB DETAILS

PRESTR CONC I-GIRDER SPANS

IGCS

FILE: IG-IGCS-23.dgn	DN: JMH	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
10-19: Added bubble note 6.	DIST	COUNTY		SHEET NO.
01-23: Added 34' Rdwy.	ABL	NOLAN		150

DATE: 7/24/2023 3:28:41 PM
FILE: DOCUMENT NAME



(1) Bundle with Bars R.

(2) Measured along ℄ Girder at interior bents; perpendicular to abutment bkwl or inverted-T stem.

(3) The average of the top and bottom spacing of Bars R cannot exceed the required spacing.

(4) L/20, but not less than 5'-0" (-0,+2').

(5) ℄ 4" x 1 ½" Vertical Slotted Hole at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details. Anchorage holes may be tapered (4 ¾" x 1 ⅝") at base. If holes are formed with sheet metal, forms may be left in place.

GIRDER ELEVATION

(6) Bars P (#6 x 15'-0") required in Tx62 and Tx70 girders. At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

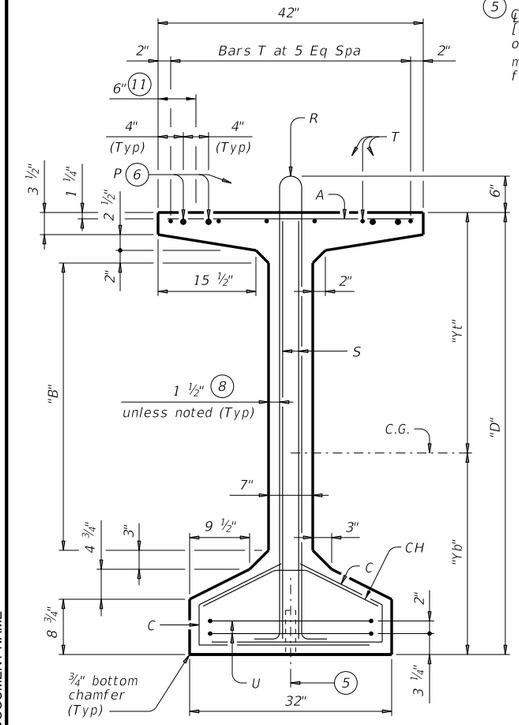
(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

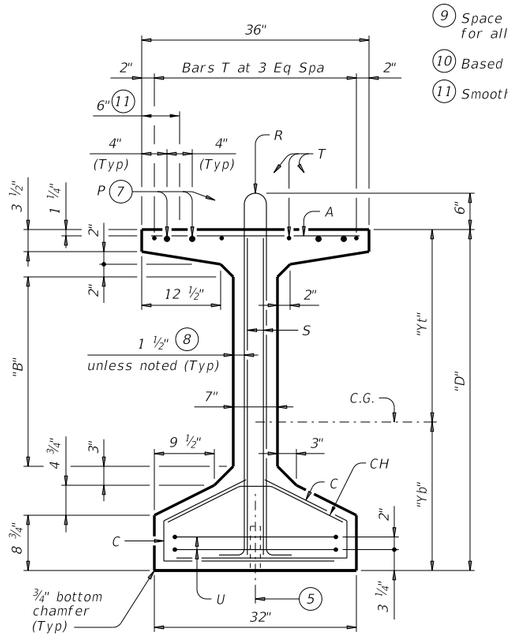
(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

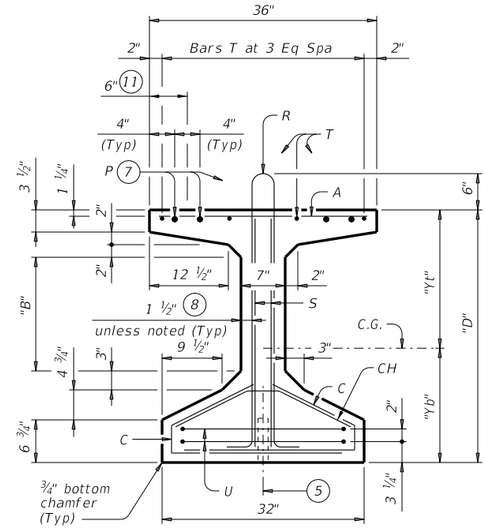
(11) Smooth trowel finish on the slab overhang side of exterior girder.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

GIRDER DIMENSIONS AND SECTION PROPERTIES

Girder Type	"D" (in.)	"B" (in.)	"Yt" (in.)	"Yb" (in.)	Area (in.²)	"Ix" (in.⁴)	"Iy" (in.⁴)	Weight (10) (plf)
Tx28	28	6	15.02	12.98	585	52,772	40,559	630
Tx34	34	12	18.49	15.51	627	88,355	40,731	675
Tx40	40	18	21.90	18.10	669	134,990	40,902	720
Tx46	46	22	25.90	20.10	761	198,089	46,478	819
Tx54	54	30	30.49	23.51	817	299,740	46,707	880
Tx62	62	37 ½"	33.72	28.28	910	463,072	57,351	980
Tx70	70	45 ½"	38.09	31.91	966	628,747	57,579	1,040

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Provide Class H concrete.
Provide Grade 60 reinforcing steel.
An equal area of deformed Welded Wire Reinforcement (WWR) (ASTM A1064) may be substituted for Bars A, C, R or T unless otherwise noted.
It is permissible for bars or strands to come in contact with materials used in forming anchor holes.
When vertical clearance of the span is less than or equal to 20', provide additional Bars C and CH in every girder of that span.

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

HL93 LOADING

SHEET 1 OF 2

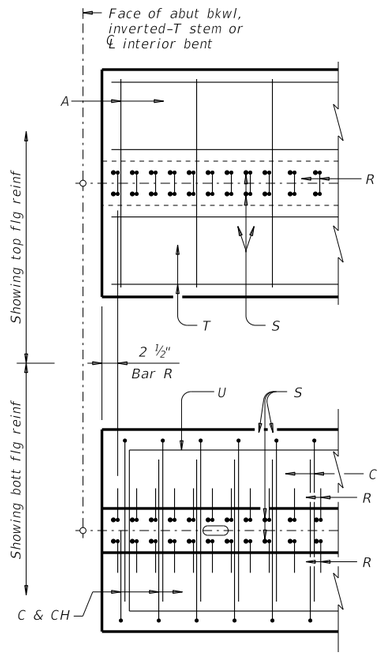
Texas Department of Transportation

Bridge Division Standard

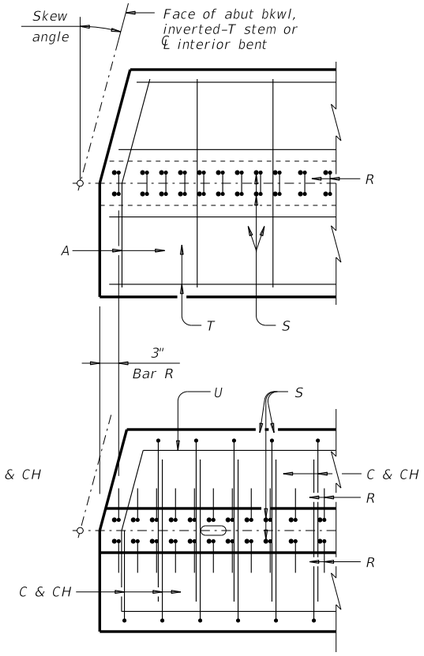
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

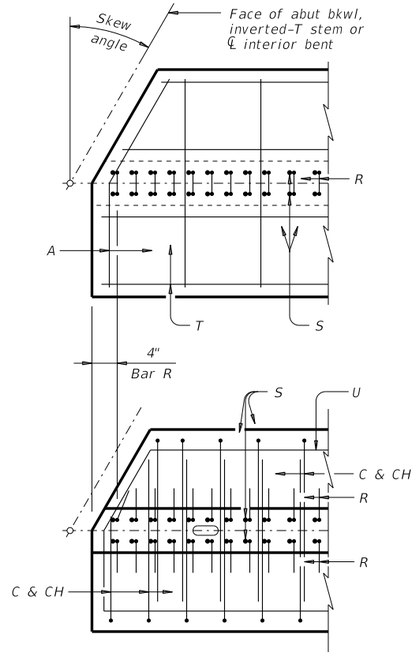
FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		151



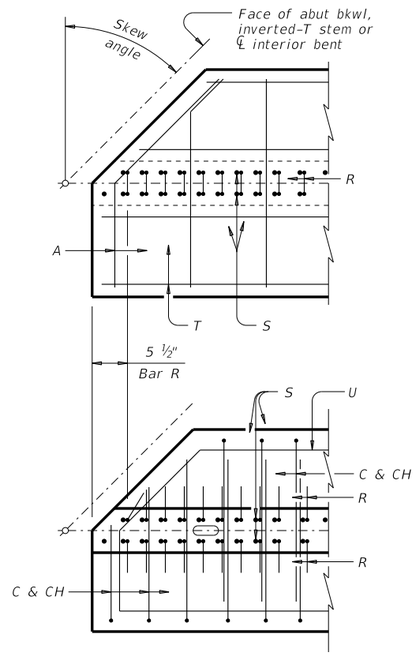
0° SKEW



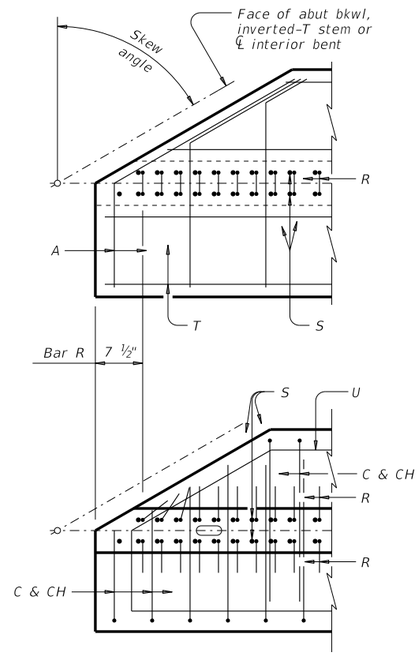
15° SKEW



30° SKEW



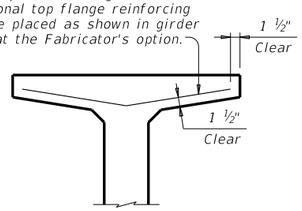
45° SKEW



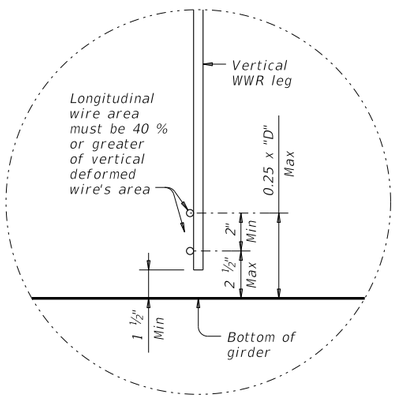
60° SKEW

PLAN OF GIRDER ENDS (12)

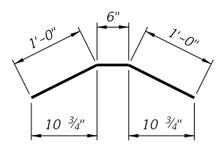
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



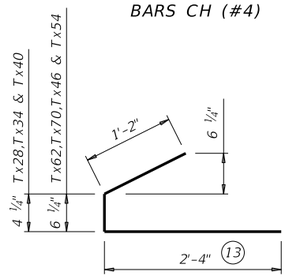
OPTIONAL TOP FLANGE REINFORCING DETAIL



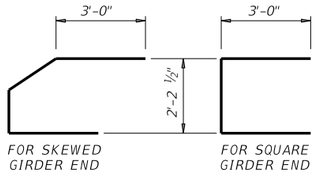
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



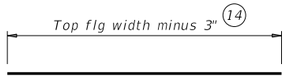
BARS CH (#4)



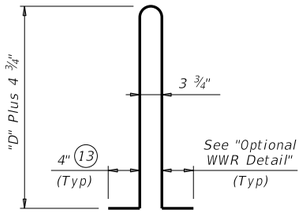
BARS C (#4)



BARS U (#5)

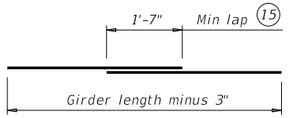


BARS A (#3)



BARS R (#4) (16)

BARS S (#6)



BARS T (#4)

(12) Reinforcing patterns shown are provided as guides to determine reinforcement placement in skewed ends. Place Bars S as close to girder end as cover requirements permit, which may prevent them to be bundled with Bars R.

(13) Bars may be cut or bent at skewed end as required.

(14) Increase as necessary for bars at skewed end.

(15) No portion of bar less than 10 ft.

(16) For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.

HL93 LOADING — SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

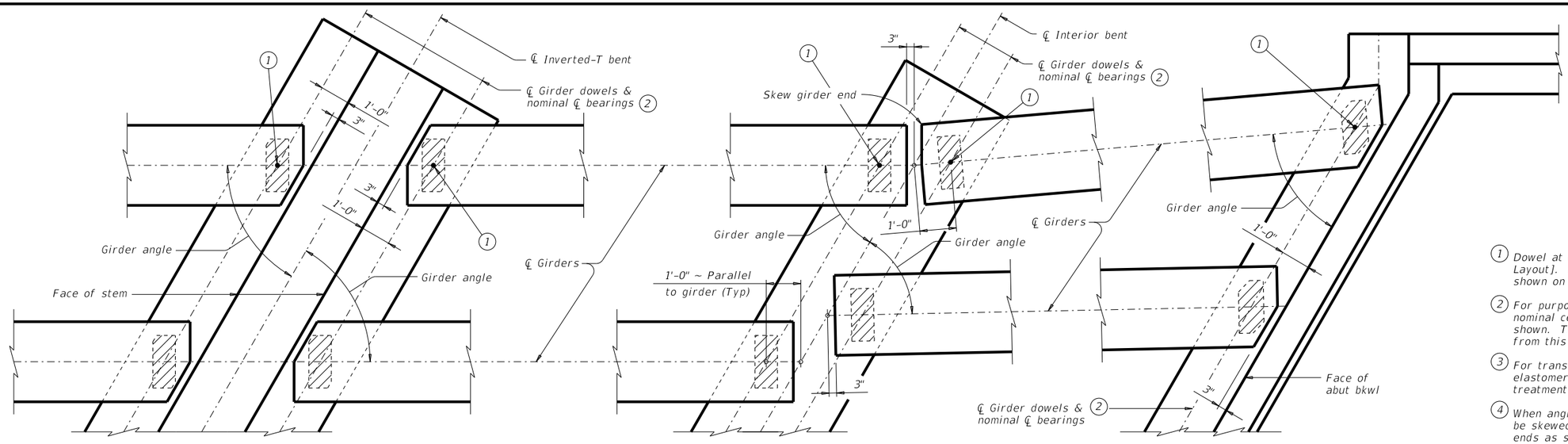
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

FILE: IG-IGD-23.dgn	DN: TxDOT	CK: JMH	DW: JTR	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Added Bars C and CH full length for VC<= 20' 3-23: Clarified C and CH requirement	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		152

DATE: 7/24/2023 3:28:41 PM
FILE: DOCUMENT NAME

DATE:
FILE:



AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

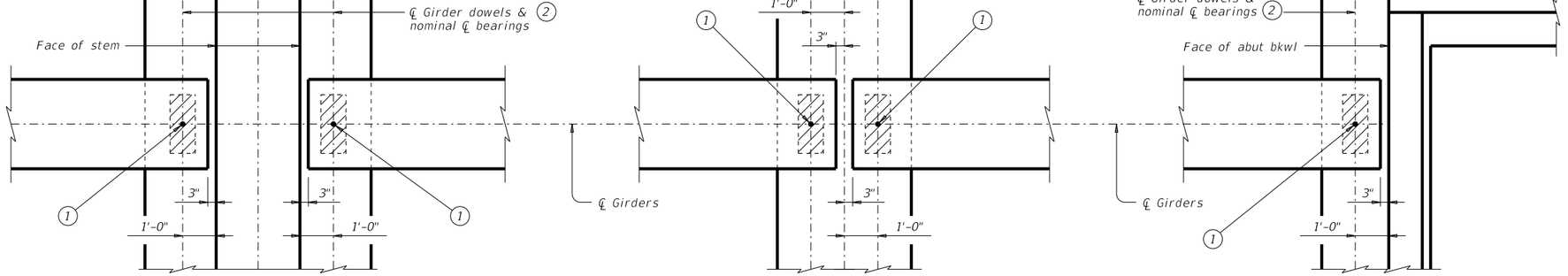
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(3) For transition bents with backwall, girder and elastomeric bearings must receive the same treatment as shown for abutments.

(4) When angle exceeds 0°, one or both girders ends must be skewed to maintain the clearance between girder ends as shown in view.

(5) See Table of Bearing Pad Dimensions for bearing size. Girder end skew angles in Table not applicable for this situation. Table reflects girder conflicts of this type on radial bents only.

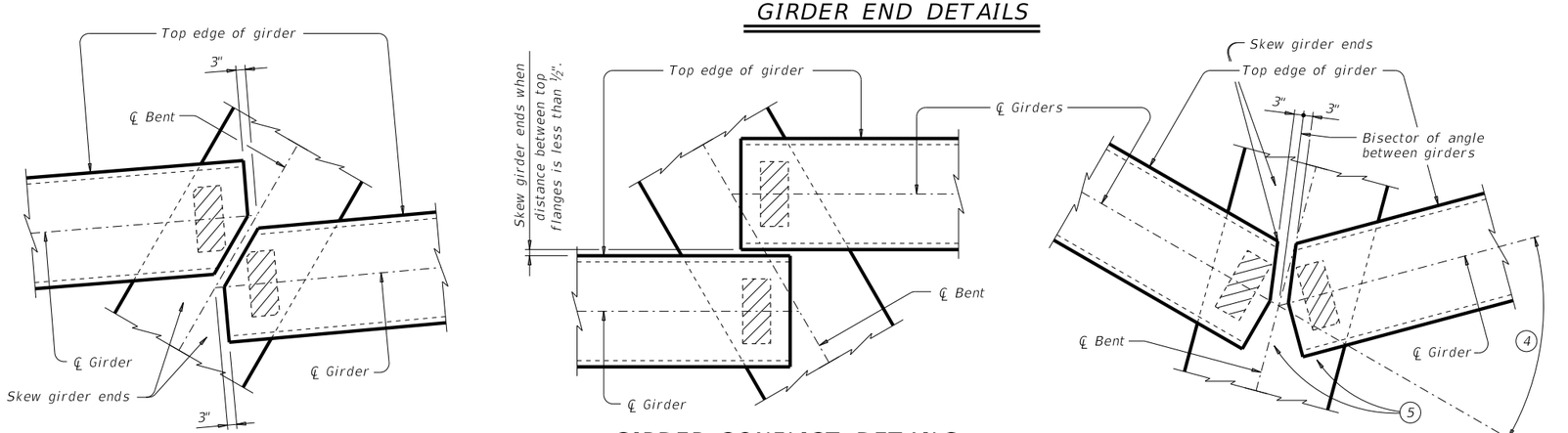


AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT (3)

GIRDER END DETAILS



GIRDER CONFLICT DETAILS

GENERAL NOTES:

These details accommodate skew angles up to 60°.

Shop drawings for approval are required.

A bearing layout which identifies location and orientation of all bearings must be developed by the bearing fabricator. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Cost of furnishing and installing elastomeric bearings, including beveled and embedded steel plates, must be included in unit price bid for "Prestressed Concrete Girders".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

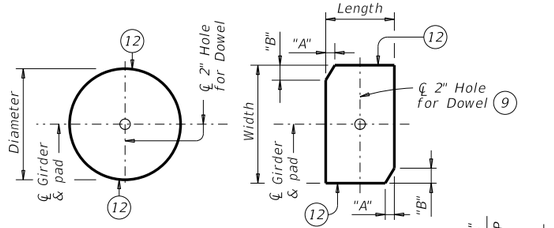
ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

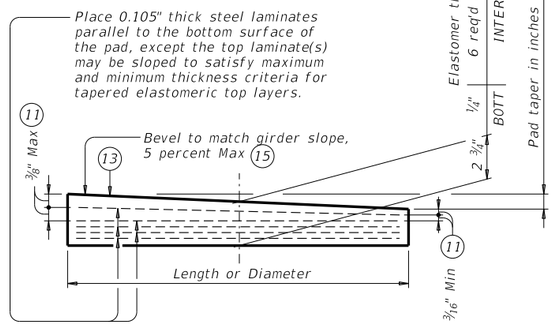
IGEB

FILE: IG-IGEB-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		153

DATE:
FILE:



PLANS (10)



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

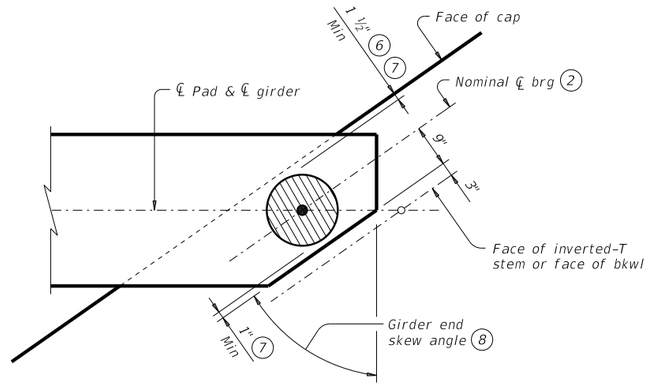
(50 DUROMETER)

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

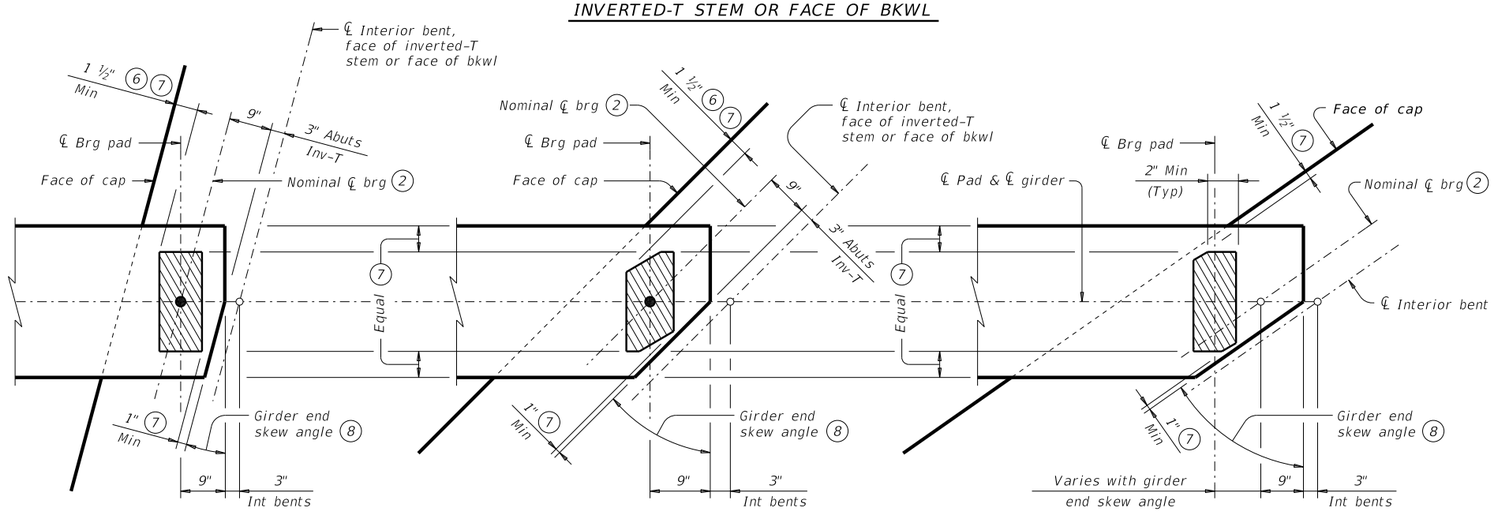
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

TABLE OF BEARING PAD DIMENSIONS

Bent Type	Girder Type	Bearing Type (13)	Girder End Skew Angle Range	Pad Size Lgth x Wdth	Pad Clip Dimensions "A"	Pad Clip Dimensions "B"
ABUTMENTS, INVERTED-T AND TRANSITION BENTS WITH BACKWALLS	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 21°	8" x 21"	---	---
		G-2-"N"	21°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-3-"N"	30°+ thru 45°	9" x 21"	4 ½"	4 ½"
		G-4-"N"	45°+ thru 60°	15" Dia	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 21°	9" x 21"	---	---
		G-6-"N"	21°+ thru 30°	9" x 21"	1 ½"	2 ½"
		G-7-"N"	30°+ thru 45°	10" x 21"	4 ½"	4 ½"
		G-8-"N"	45°+ thru 60°	10" x 21"	7 ¼"	4 ¼"
CONVENTIONAL INTERIOR BENTS	Tx28,Tx34, Tx40,Tx46 & Tx54	---	---	---	---	---
		---	---	---	---	---
		G-1-"N"	0° thru 60°	8" x 21"	---	---
	Tx62 & Tx70	G-5-"N"	0° thru 60°	9" x 21"	---	---
CONVENTIONAL INTERIOR BENTS WITH SKEWED GIRDER ENDS (GIRDER CONFLICTS) (16)	Tx28,Tx34, Tx40,Tx46 & Tx54	G-1-"N"	0° thru 18°	8" x 21"	---	---
		G-2-"N"	18°+ thru 30°	8" x 21"	1 ½"	2 ½"
		G-9-"N"	30°+ thru 45°	8" x 21"	3"	3"
		G-10-"N"	45°+ thru 60°	9" x 21"	6"	3 ½"
	Tx62 & Tx70	G-5-"N"	0° thru 18°	9" x 21"	---	---
		G-5-"N"	18°+ thru 30°	9" x 21"	---	---
		G-11-"N"	30°+ thru 45°	9" x 21"	1 ½"	1 ½"
		G-12-"N"	45°+ thru 60°	9" x 21"	3"	1 ¾"



ROUND BEARINGS FOR SKEWED GIRDER ENDS AT FACE OF INVERTED-T STEM OR FACE OF BKWL



SKEWED GIRDER ENDS AT INT BENTS, FACE OF INVERTED-T STEM OR FACE OF BKWL

SKEWED GIRDER ENDS AT CONVENTIONAL INTERIOR BENTS (16)

(NO GIRDER DOWELS)

BEARING PAD PLACEMENT DIAGRAMS

(2) For purposes of computing bearing seat elevations, nominal centerline of bearing must be defined as shown. The actual center of bearing pad may vary from this line.

(6) 3" for inverted-T.

(7) Place centerline pad as near nominal centerline bearing as possible between limits shown.

(8) Girder end skew angle is equal to 90° minus the girder angle except at some conflicting girders.

(9) Provide 2" dia hole only at locations required. See Substructure details for location.

(10) See Table of Bearing Pad Dimensions for dimensions.

(11) Maximum and minimum layer thicknesses shown are for elastomer only, on tapered layers.

(12) Locate Permanent Mark here.

(13) Indicate BEARING TYPE on all pads. For tapered pads, locate BEARING TYPE on the high side. The Fabricator must include the value of "N" (amount of taper in ⅛" increments) in this mark.
Examples: N=0, (for 0" taper)
N=1, (for ⅛" taper)
N=2, (for ¼" taper)
(etc.)
Fabricated pad top surface slope must not vary from plan girder slope by more than $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(14) Substructure dimensions must satisfy the minimums provided to accommodate the elastomeric bearings shown on this standard.

(15) See sheet 3 of 3 for beveled plate use when slopes exceed 5 percent.

(16) If girder end is skewed for a girder conflict at an interior bent and a beveled sole plate is required, use bearing type for abutments at this location. Location of bearing centerline is to be set as for abutments in this case.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation | Bridge Division Standard

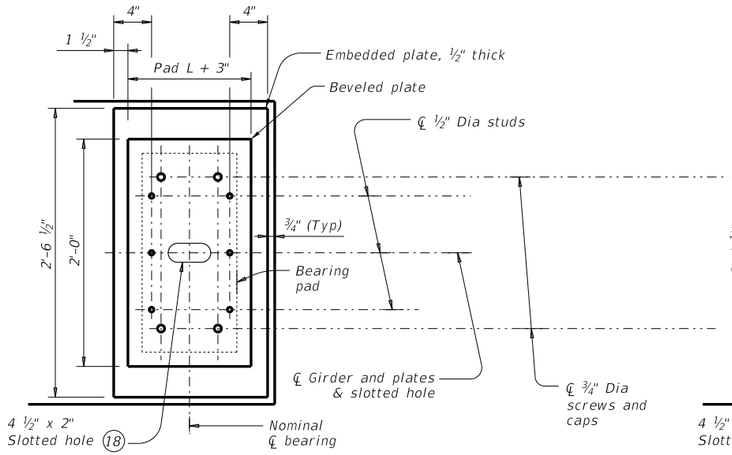
ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

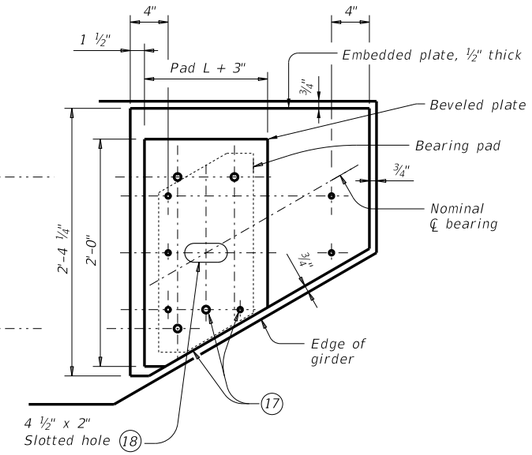
IGEB

FILE: IG-IGEB-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		154

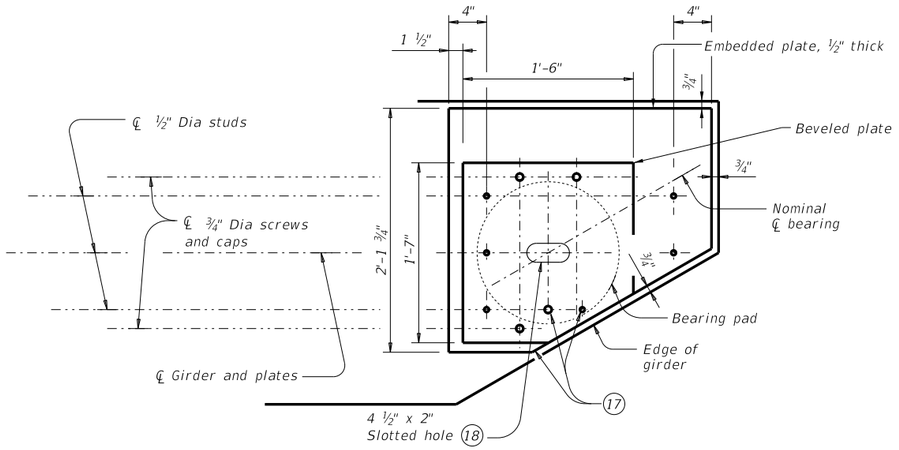
DATE:
FILE:



NORMAL GIRDER END
RECTANGULAR BEARING PAD

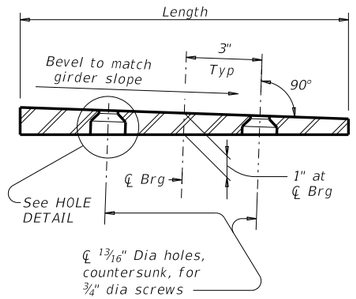


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

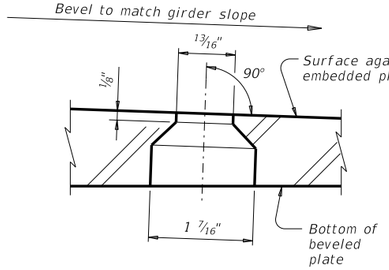


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS



SECTION



HOLE DETAIL

(17) Cut beveled and embedded plates to match girder end skew. Adjust location of screw and stud as shown when necessary.

(18) Slotted hole is required at doweled girder end locations.

SOLE PLATE NOTES:

Provide constant thickness elastomeric bearings with beveled and embedded steel sole plates in accordance with these details when the girder slope exceeds 5 percent or if otherwise required in the plans. Provide for all girders in the span.

On the shop drawings, dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of girder. Thickness tolerance variation from the approved shop drawings is 1/16"+/-, except variation from a plane parallel to the theoretical top surface can not exceed 1/16" total. Bearing surface tolerances listed in Item 424 apply to embedded and beveled plates.

Steel plate must conform to ASTM A36, A572 Gr 50, or A709 Gr 36 or Gr 50. Hot dip galvanize both the embedded plate and beveled sole plate after fabrication. Seal weld caps to embedded plate before galvanizing.

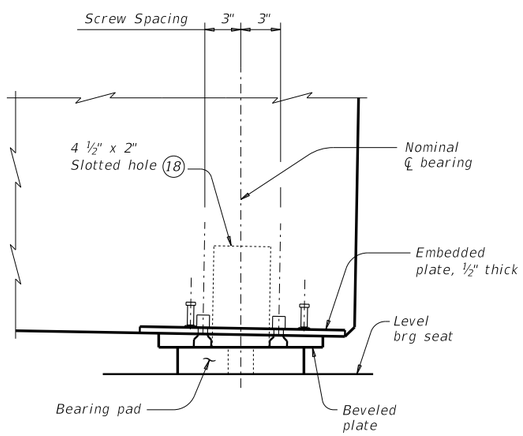
When determining if relocation of screw holes and studs are necessary for skewed girder ends, minimum clearance from screw or stud centerline to plate edge is 1.25".

Tap threads in the embedded plate only. Drill and tap prior to galvanizing.

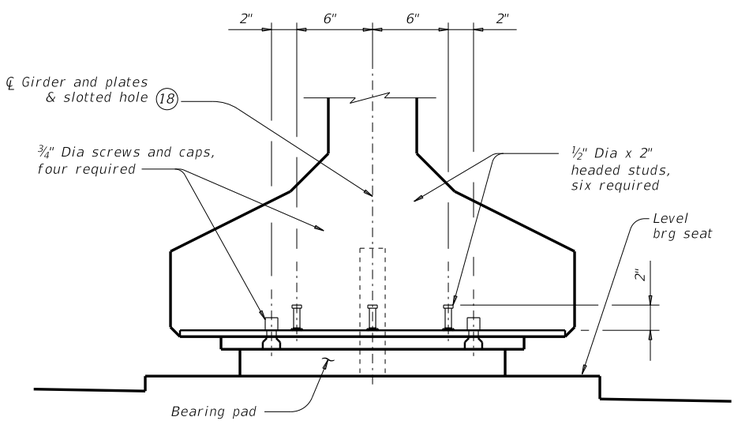
¾" Dia screws must be electroplated, socket flat head countersunk cap screws conforming to ASTM F835. Electroplating must conform to ASTM B633, SC 2, Type I. Provide screws long enough to maintain a ¾" minimum embedment into the embedded plate and galvanized cap. Provide galvanized steel caps (16 ga Min) with a nominal 1" inside diameter and deep enough to accommodate the screws, but not less than ½" deep or deeper than 1".

Install beveled sole plates prior to shipping girders. Installed screw heads must not protrude below the bottom of the beveled plate.

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

HL93 LOADING SHEET 3 OF 3

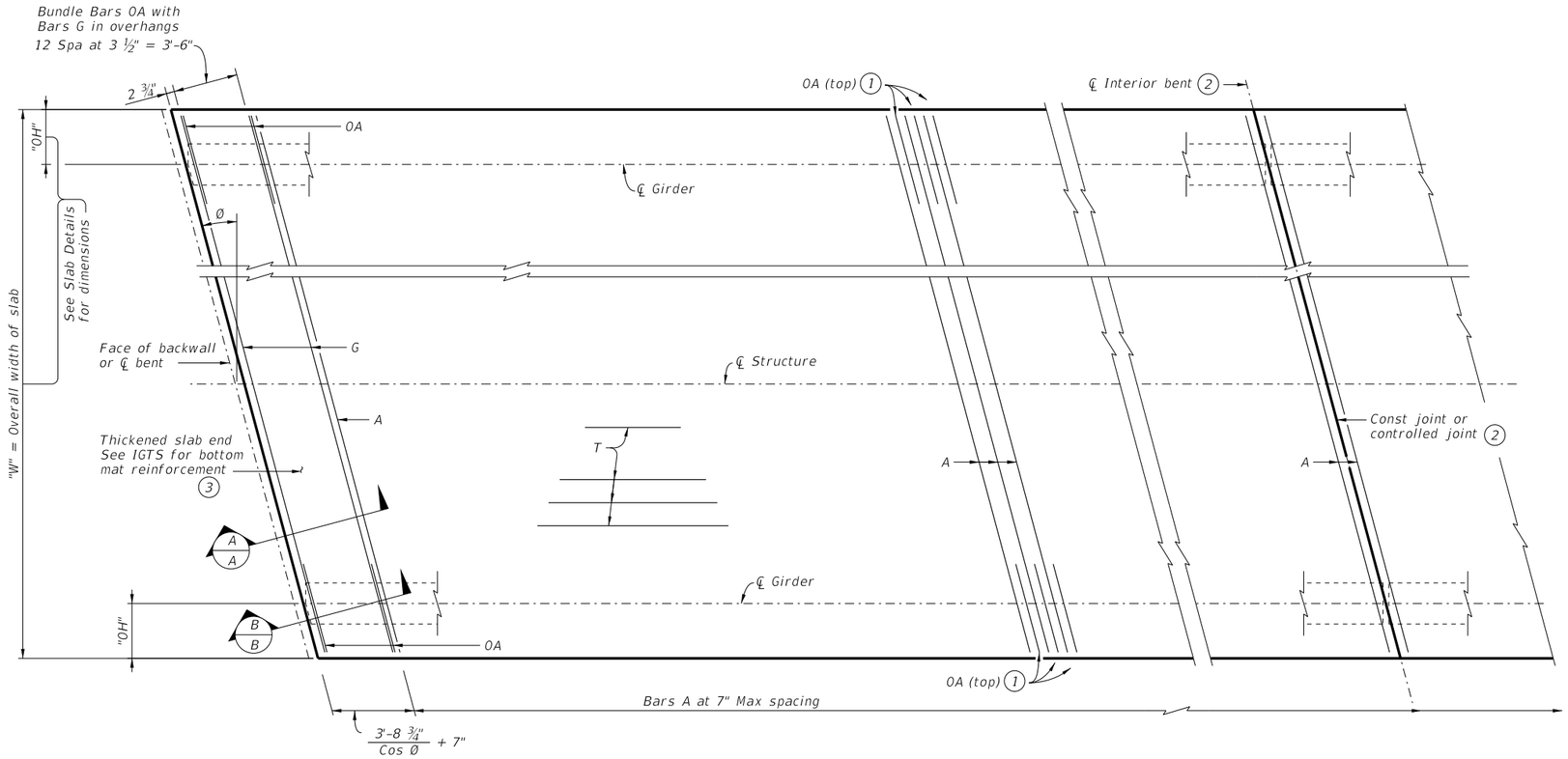
Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

IGEB

FILE: IG-IGEB-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT	
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY	
	0264	01	046	SH 70	
	DIST	COUNTY		SHEET NO.	
	ABL	NOLAN		155	

DATE:
FILE:

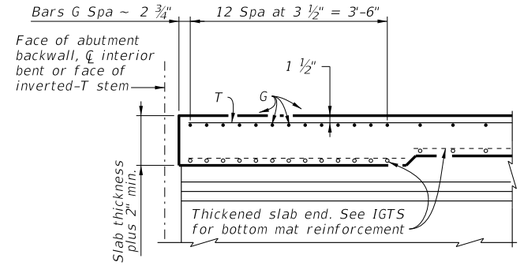


AT THICKENED SLAB END

AT SLAB CONTINUOUS OVER INTERIOR BENTS

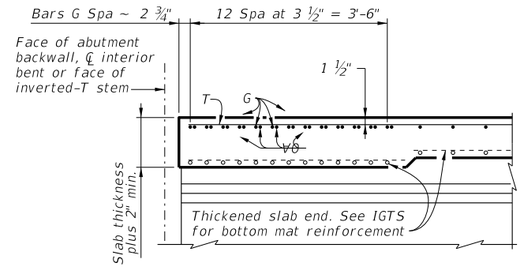
PLAN FOR SLABS WITHOUT BREAKBACKS

Showing top mat reinforcement only.



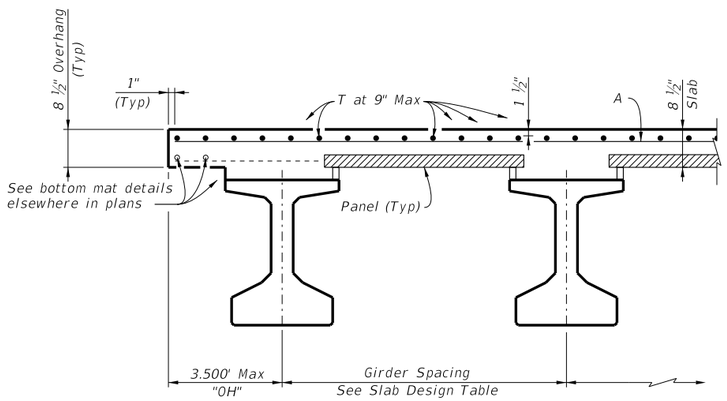
SECTION A-A

Showing Thickened Slab End with PCP Option 1. Option 2 similar.

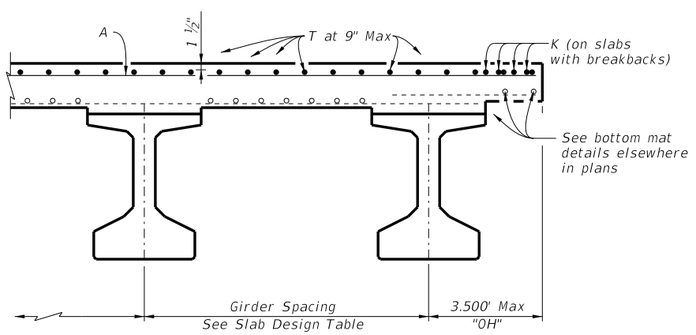


SECTION B-B

Showing Thickened Slab End with PCP Option 1. Option 2 similar.



PARTIAL TYPICAL TRANSVERSE SECTION



SECTION OF THICKENED SLAB END

Showing PCP Option 1. Option 2 similar.

1. Place Bars OA midway between Bars A at overhang.
2. Bars are continuous through joint.
3. Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

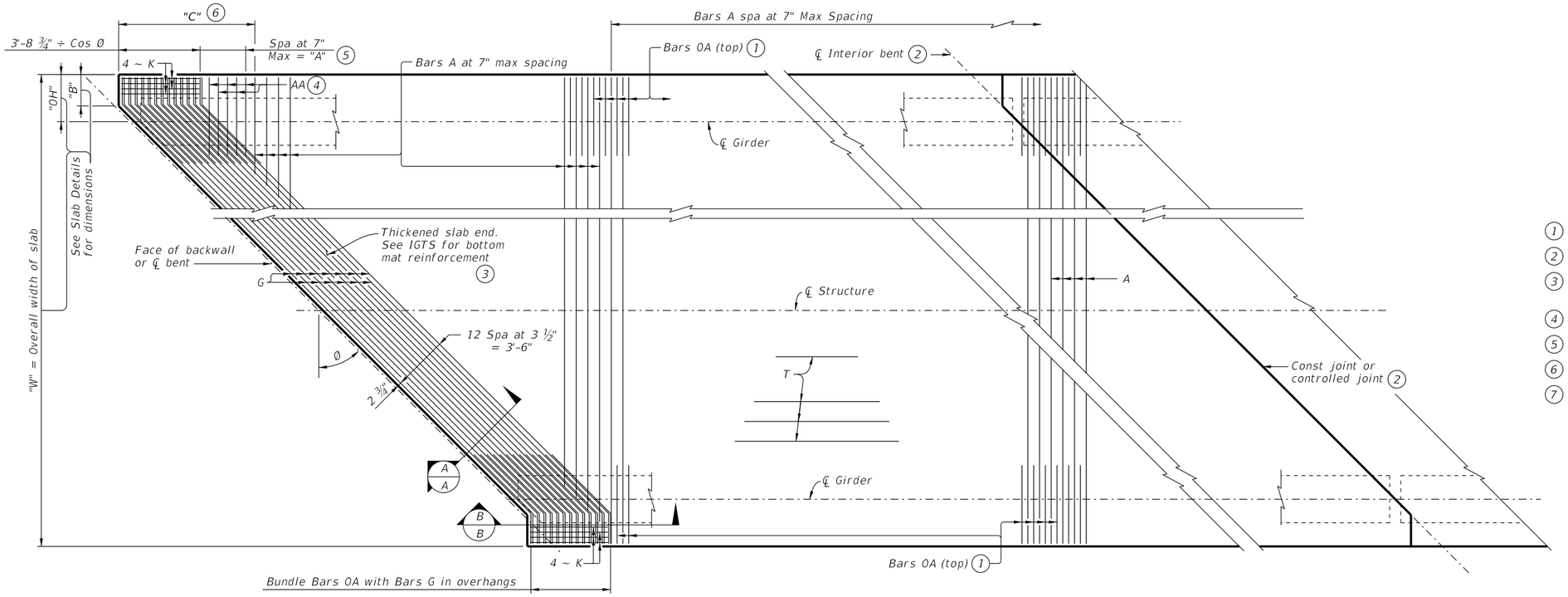
GFRP SLAB TOP MAT REINFORCEMENT

PRESTRESSED CONC I-GIRDER SPANS

IGFRP

FILE: IG-IGFRP-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Updated to latest design specification.	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		156

DATE:
FILE:

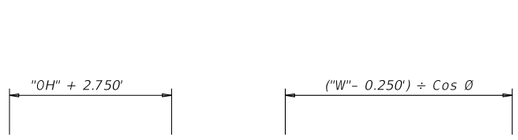


AT THICKENED SLAB END

AT SLAB CONTINUOUS OVER INTERIOR BENTS

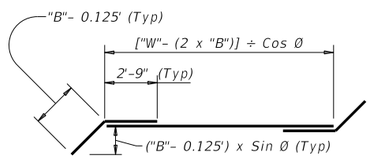
PLAN FOR SLABS WITH BREAKBACKS

Showing top mat reinforcement only.

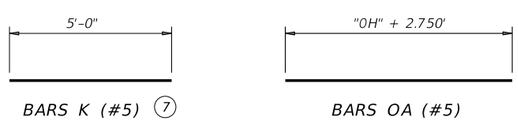


BARS AA (#5) (7)

BARS G (#5)
(For slabs without breakbacks)

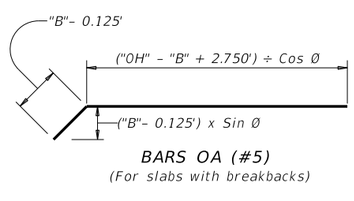


BARS G (#5)
(For slabs with breakbacks)



BARS K (#5) (7)

BARS OA (#5)



BARS OA (#5)
(For slabs with breakbacks)

BAR TABLE

BAR	SIZE
A	#5
AA	#5
G	#5
K	#5
0A	#5
T	#5

(1) Place Bars 0A midway between Bars A at overhang.

(2) Bars are continuous through joint.

(3) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

(4) Tie Bars AA to bottom of Bars G in this location.

(5) A = ("OH" + 2.333' - "B") x Tan Ø

(6) $C = \frac{3.729'}{\cos Ø} + \text{"A"} + \text{Bar A spacing}$

(7) Only required on slabs with breakbacks.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Bridge Design Guide Specifications for GFRP-Reinforced Concrete, 2nd Edition.

These details are restricted to Prestressed Concrete I-Girder spans with an 8 ½" slab and up to a 10'-0" girder spacing.

These details are to be used in conjunction with the Span Details and PCP Standard (if prestressed concrete panels are used).

This standard provides Glass Fiber Reinforced Polymer (GFRP) reinforcement details for the top mat of slab reinforcement. The bottom mat reinforcement and other slab details are as shown elsewhere in the plans.

The Contractor has the option to provide GFRP reinforcement, in accordance with the details shown, when epoxy-coated steel bars are specified for the deck slab. The Contractor may provide an alternate GFRP slab design with calculations signed and sealed by a Professional Engineer.

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

MATERIAL NOTES:

Provide GFRP bars, conforming to ASTM D7957/7957M, except provide a minimum modulus of elasticity of 7,500 ksi.

Provide Grade 60 steel bars for all bottom mat reinforcement as shown elsewhere in plans.

Provide bar laps, where required, as follows:
#5 GFRP bar = 2'-9"

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

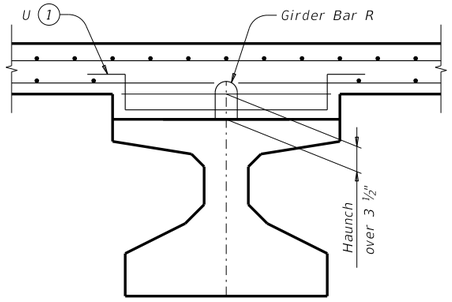
GFRP SLAB TOP MAT REINFORCEMENT

PRESTRESSED CONC I-GIRDER SPANS

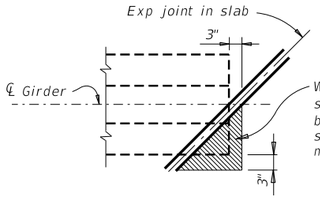
IGFRP

FILE: IG-IGFRP-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
10-19: Updated to latest design specification.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		157

DATE:
FILE:

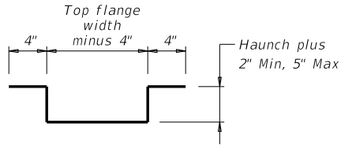


HAUNCH REINFORCING DETAIL

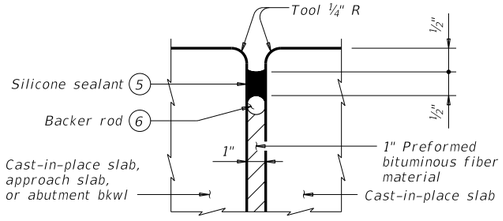


Where flanges project under slab of adjacent span, provide a minimum of ½" clearance between top of girder and bottom of adjacent slab. Polystyrene or other suitable compressible material may be used as a filler.

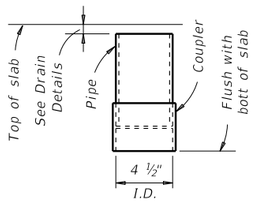
TREATMENT AT GIRDER END FOR SKEWED SPANS



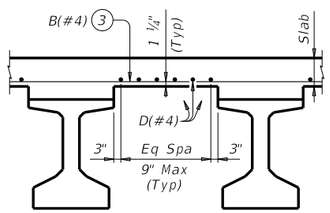
BARS U (#4)



TYPE A JOINT DETAIL (7)

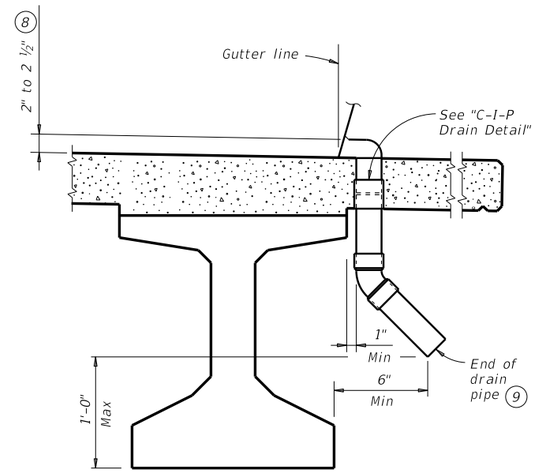


C-I-P DRAIN DETAIL (2)



TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



DRAIN DETAIL (10)

(1) Space Bars U with girder Bars R in all areas where measured haunch exceeds 3 ½".

(2) Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.

(3) Bars B(#4) spaced at 9" Max with 2" end cover. Overhang option, Contractor's may end alternating bars B(#4) at centerline outside girder.

(4) Provide Grade 60 reinforcing steel. Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy coated ~ #4 = 2'-5"

(5) Class 7 silicone sealant that conforms to DMS-6310. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(6) 1 ¼" backer rod must be compatible with joint sealant. Use of multiple pieces to create a backer rod cross section is not permitted. Top of backer rod must be convex as shown.

(7) The maximum distance between Type A expansion joints is 100'. See Bridge Layout for location of joints.

(8) Drain entrance formed in rail or sidewalk.

(9) Water may not be discharged onto girders.

(10) All drain pipe and fittings to be 4" diameter (Sch 40) PVC. See Item 481 "Pipe for Drains" for pipe, connections and solvent welding. Bend reinforcing steel to clear PVC 1". Drain length and location is as directed by the Engineer. Drains are not permitted over roadways or railways, or within 10'-0" of bent caps. Degrease outside of exposed PVC, apply acrylic water base primer, then coat with same surface finishing material as used for outside girder face. Variations of the above designs, as required for the type of rail used and its location on the structure, may be installed with the approval and direction of the Engineer.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Payment for Type A joint will be as per Item 454, "Bridge Expansion Joints."

All other items (reinforcing steel, drains, etc.) shown on this sheet are subsidiary to other bid items.

Cover dimensions are clear dimensions, unless noted otherwise.

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

DECK FORMWORK NOTES:

Overhang bracket hangers are limited to a safe working load of 3,600 lbs, applied to and along the axis of a coil rod at 45 degrees from vertical, regardless of higher loads permitted by hanger manufacturers. Do not place a hanger less than 12" from girder end. Space hangers accordingly.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

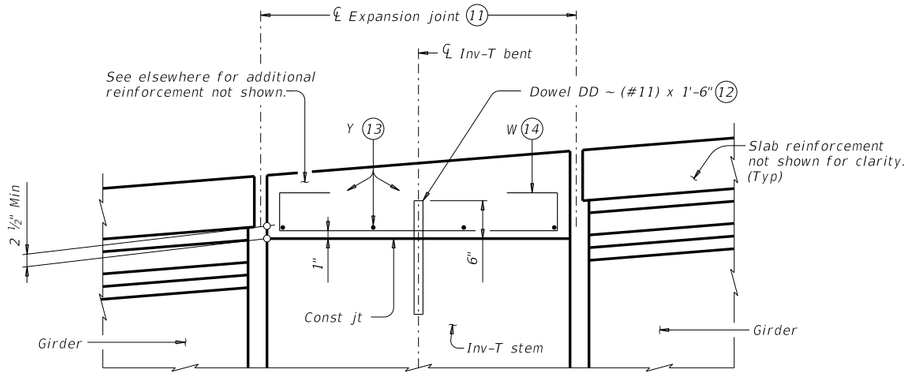
MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

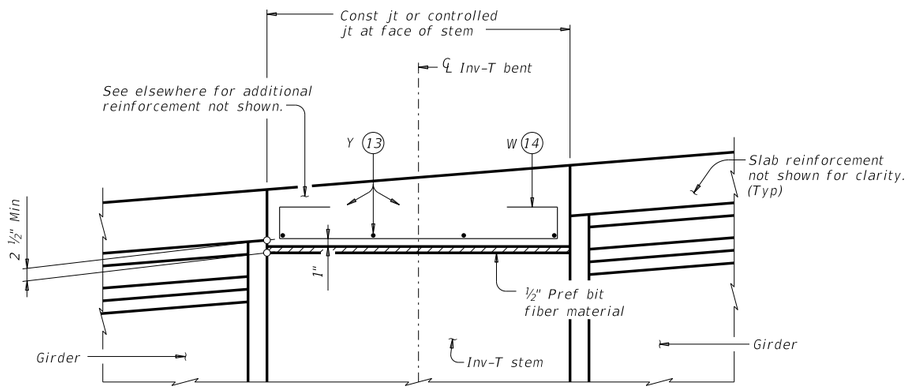
IGMS

FILE: IG-IGMS-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT		
©TxDOT August 2017	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0264	01	046		SH 70	
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY			SHEET NO.	
	ABL	NOLAN			158	

DATE:
FILE:

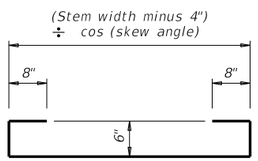


SHOWING EXPANSION JOINTS

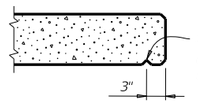


SHOWING CONST JTS OR CONTROLLED JTS

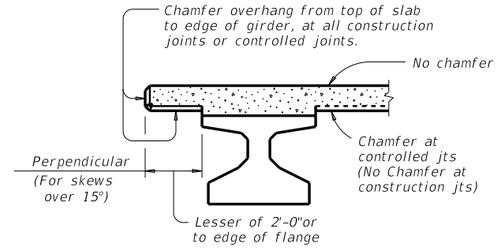
REINFORCEMENT OVER INV-T BENTS



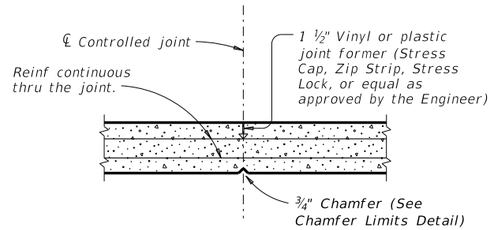
BARS W (#4)



DRIP BEAD DETAIL



CHAMFER LIMITS DETAIL (15)



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)

(11) See Layout for joint type.

(12) Dowels DD (#11) spaced at 5 Ft Max. See Inv-T bents for quantity and location.

(13) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(14) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(15) See Span details for type of joint and joint locations.

Texas Department of Transportation

Bridge Division Standard

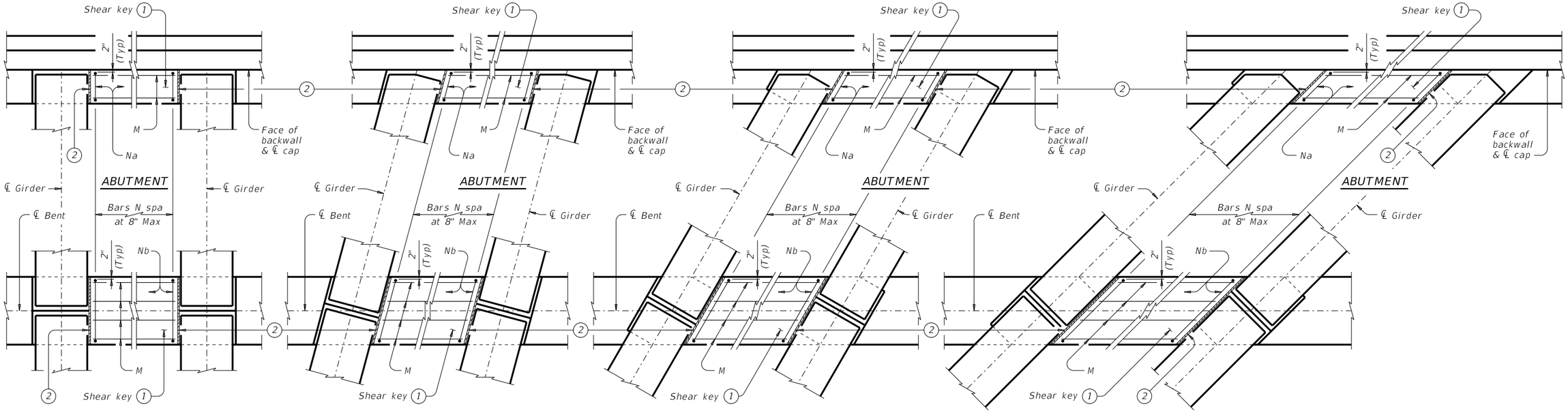
MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

FILE: IG-IGMS-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		159

DATE:
FILE:



PARTIAL PLANS WITH NO SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 15° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

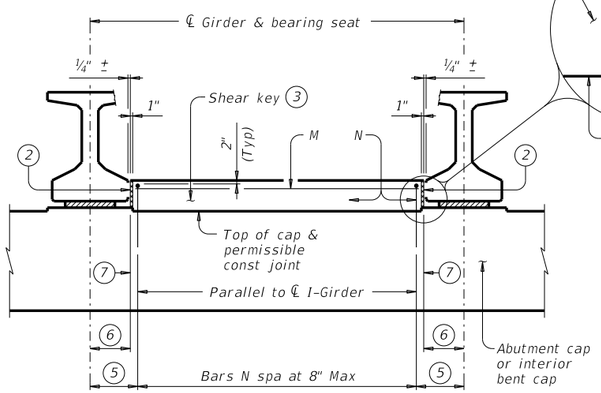
PARTIAL PLANS WITH 30° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

PARTIAL PLANS WITH 45° SKEW

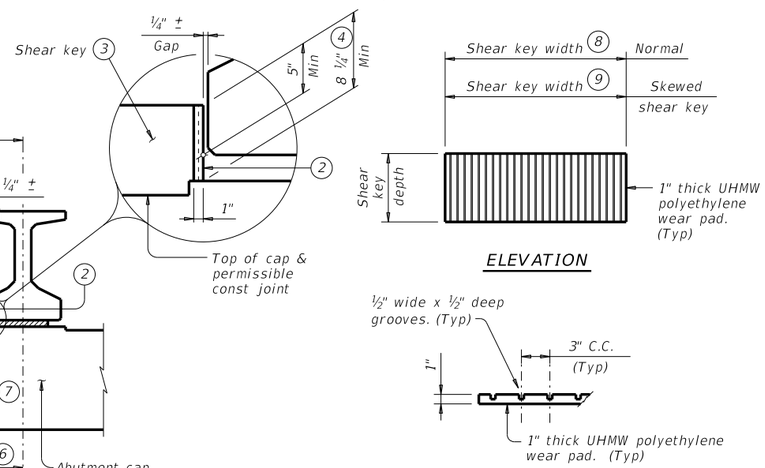
Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

1. Place shear keys on the upstream side of structure between outside girder and next adjacent girder, unless shown otherwise on plans.
2. UHMW polyethylene wear pad. (Typ)
3. Leave a ¼" gap plus or minus between girder and face of wear pad. Cast wear pad with shear key, smooth side facing girder. Care must be taken to keep concrete from flowing under girder. Slope top of shear keys in accordance with Item 420.4.9, "Treatment and Finishing of Horizontal Surfaces."
4. Measure at higher bearing seat elevation forward or back. Dimension based on typical bearing pad and bearing seat. Increase as necessary to maintain 5" overlap.
5. With No Skew = 1'-8 ¼", measured along ℄ cap.
   With Skew = 1'-8 ¼" ÷ Cos Skew, measured along ℄ cap.
6. With No Skew = 1'-4 ¼", measured along ℄ cap.
   With Skew = 1'-4 ¼" ÷ Cos Skew, measured along ℄ cap.
7. Face of UHMW polyethylene wear pad. Smooth side of pad facing girder.
8. Abutments = ½ Cap width.
   Interior bents = Cap width.
9. Abutments = ½ Cap width ÷ Cos Skew.
   Interior bents = Cap width ÷ Cos Skew.

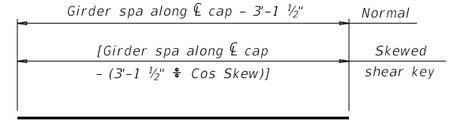


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP (1)

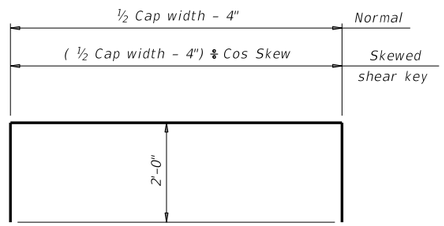
Showing shear key with girder Type Tx46.
Other I-Girder types similar.



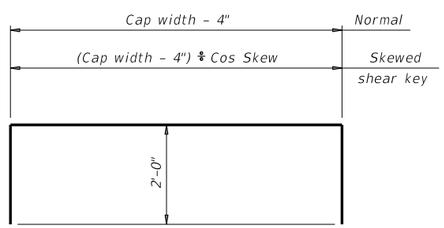
ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



BARS M (#5)



BARS Na (#5)
(For abutments)



BARS Nb (#5)
(For interior bents)

CONSTRUCTION NOTES:

Provide Class "C" concrete (f'c = 3,600 psi). Provide Class "C" (HPC) if shown elsewhere on the plans.
Provide Grade 60 reinforcing steel.
Provide epoxy coated reinforcing steel for shear key if abutment or interior bent reinforcing steel is epoxy coated.
Provide Ultra High Molecular Weight (UHMW) polyethylene wear pads in accordance with ASTM D6712.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Details showing skew are drawn showing right forward skew. See Bridge Layout for actual skew direction.
These details are limited to bridges skewed 45 degrees and less.
This standard is only applicable for I-Girders.
Modify details for bearing conditions, and girder spacing not shown on this standard. Details do not account for sole plate or pedestal bearing seat.
Include shear key concrete in abutment or bent concrete for payment.
UHMW polyethylene wear pads are subsidiary to Class "C" concrete.

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

Texas Department of Transportation

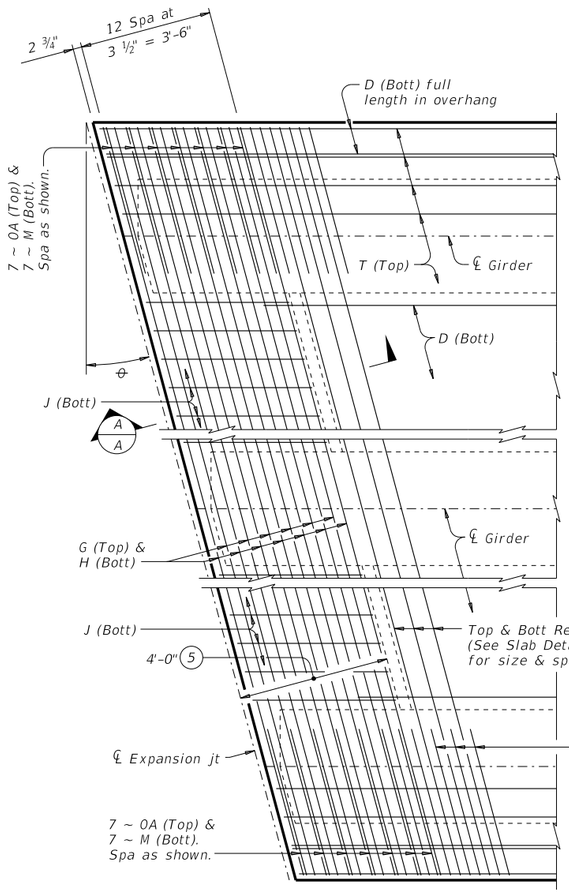
Bridge Division Standard

SHEAR KEY DETAILS
PRESTR CONCRETE I-GIRDERS

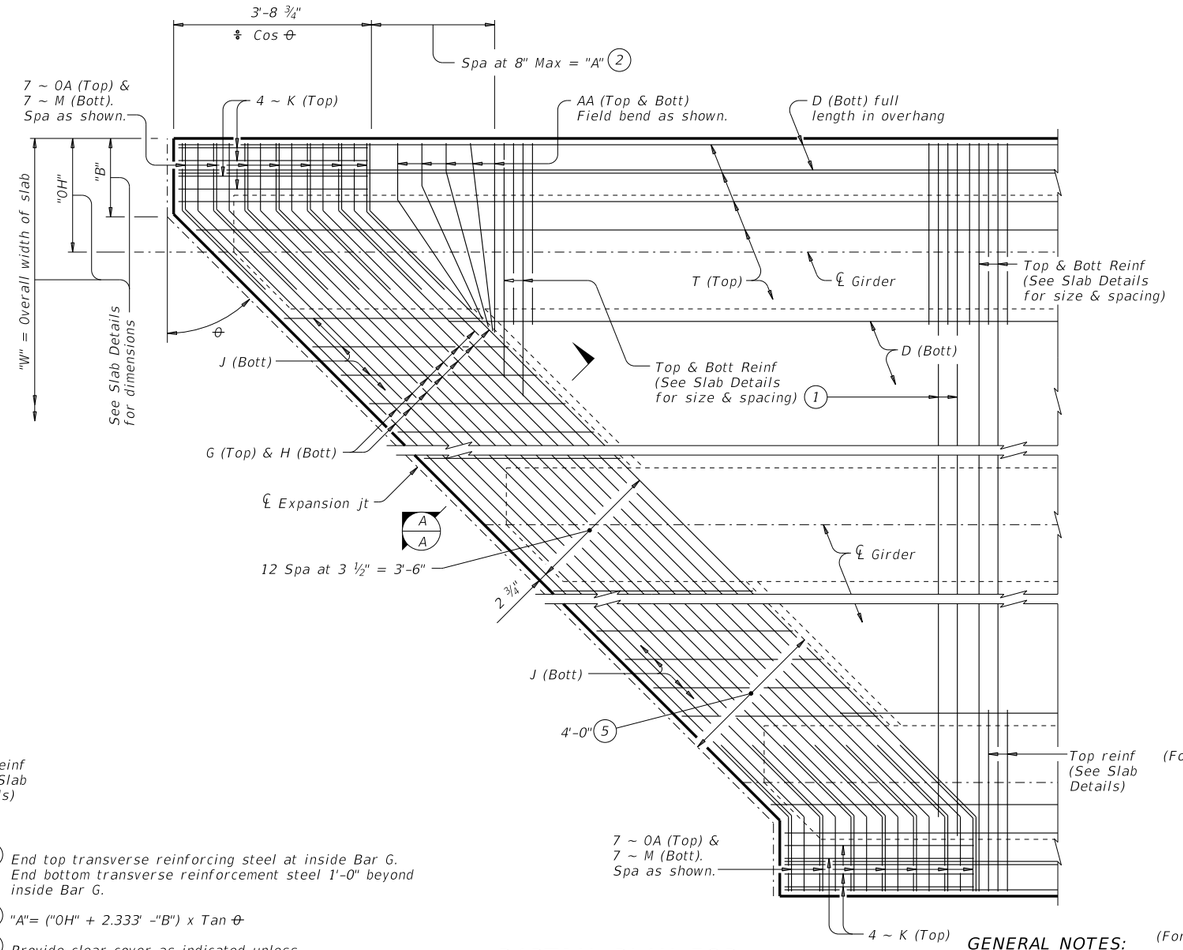
IGSK

FILE: IG-IGSK-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		160

DATE:
FILE:



PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

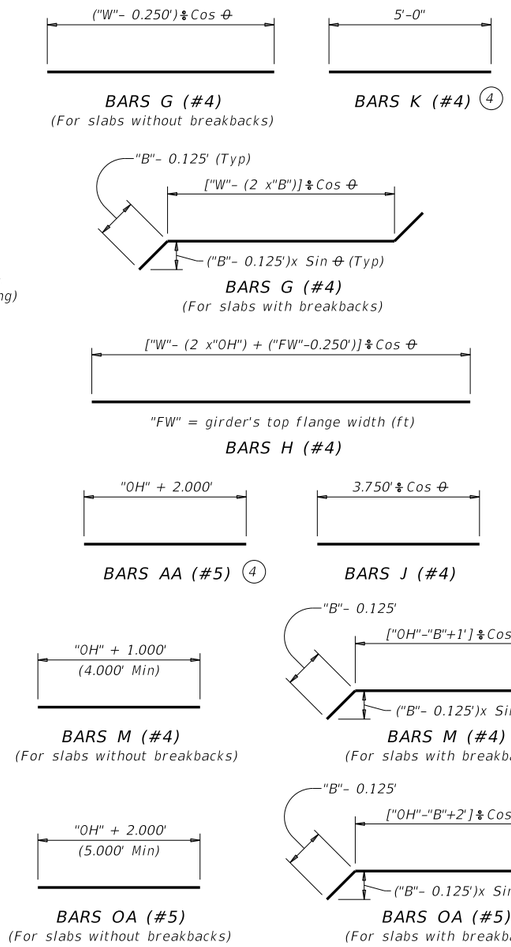
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("0H" + 2.333' -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) Only required on slabs with breakbacks.

(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.



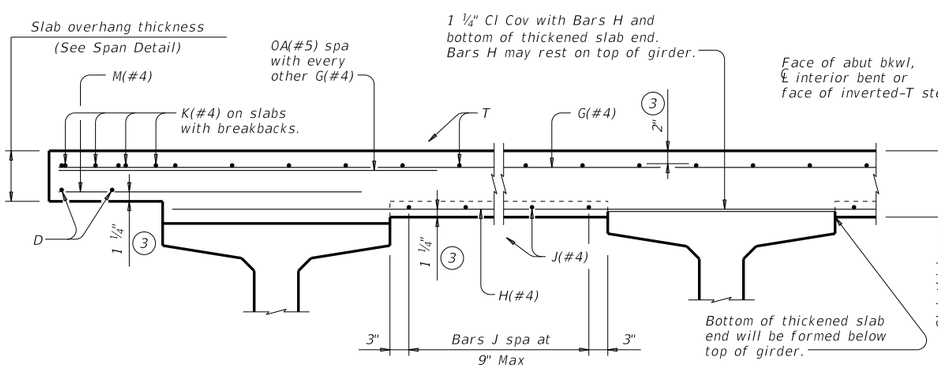
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the Slab Details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

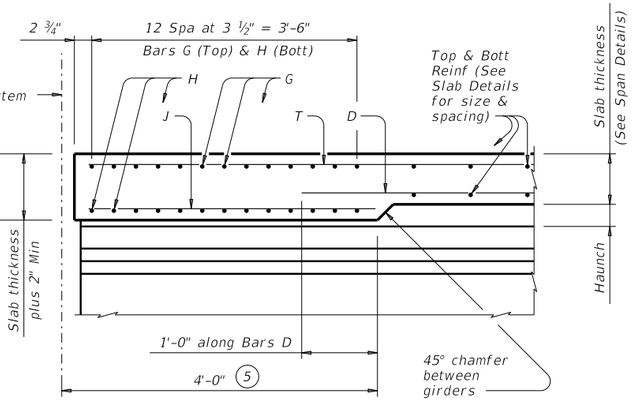
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



2" AND MORE OF HAUNCH — LESS THAN 2" OF HAUNCH

TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ℄ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

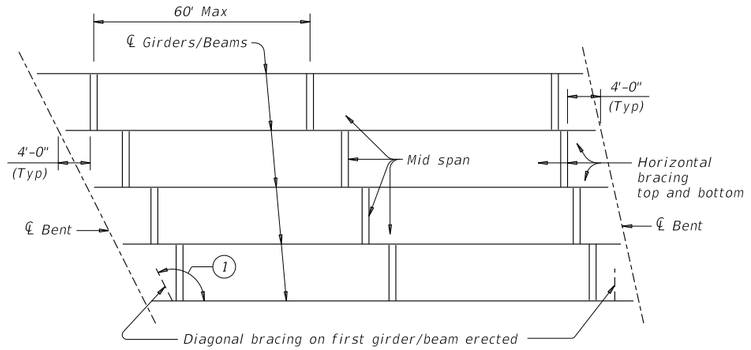
THICKENED SLAB END DETAILS

PRESTRESSED CONCRETE I-GIRDER SPANS

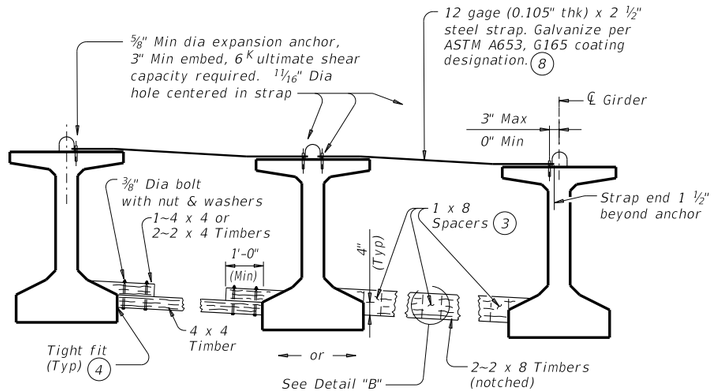
IGTS

FILE: IG-IGTS-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		161

DATE:
FILE:

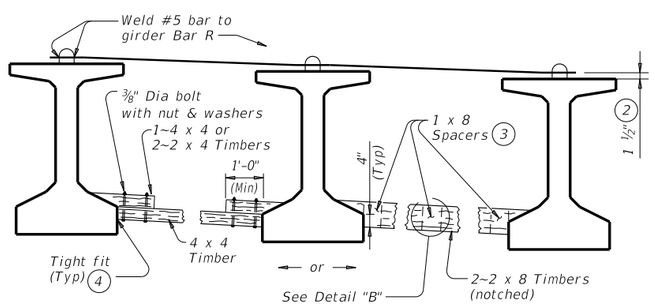


ERECTION BRACING



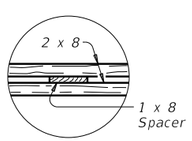
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



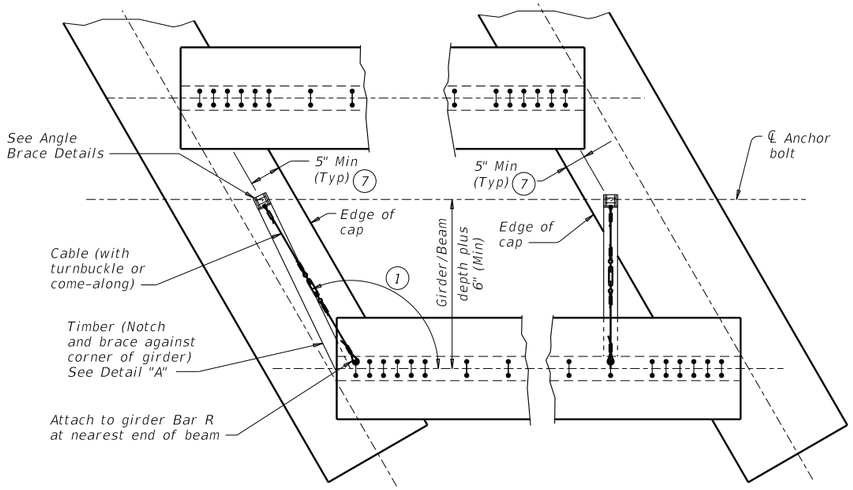
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS 5

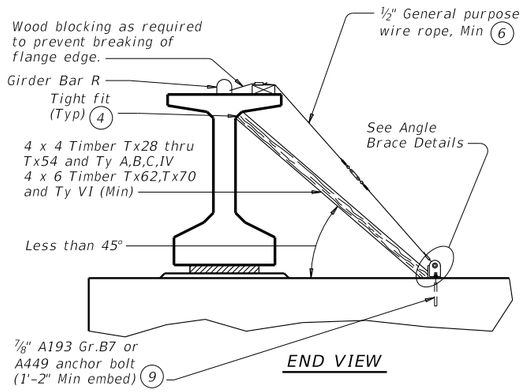


PLAN

DETAIL "B"



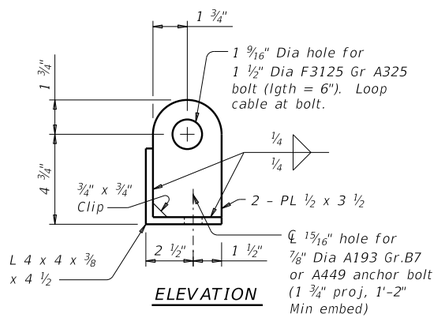
PLAN



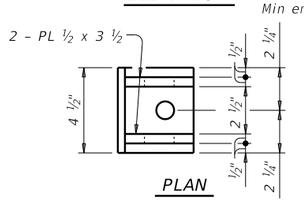
END VIEW

DIAGONAL BRACING DETAILS 5

(To be used on both ends of the first girder/beam erected in the span in each phase.)



ELEVATION



PLAN

ANGLE BRACE DETAILS

HAULING & ERECTION:

The Contractor's attention is directed to the possible lateral instability of prestressed concrete girders and beams over 130' long, especially during hauling and erection. The use of the following methods to improve stability is encouraged: Locate lifting devices at the maximum practical distance from girder ends; use external lateral stiffening devices during hauling and erection; lift with vertical lines using two machines; and take care in handling to minimize inertial and impact forces.

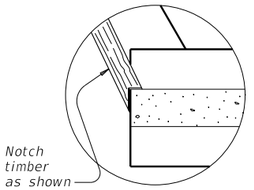
ERECTION BRACING:

Erection bracing details shown are considered the minimum for fulfilling the bracing requirements of Item 425.

Required erection bracing must be placed immediately after erection of each girder and remain in place until additional bracing as required for slab placement is in place. This standard is needed in all cases to meet requirements for Slab Placement Bracing.

PHASED CONSTRUCTION:

Place erection and slab placement bracing for all girders in a phase as shown in these details. For phases after first, also place erection and slab placement bracing between outer girder of completed phase and adjacent girder of current phase. When the phase construction joint is between girders, top bracing can be omitted.



DETAIL "A"

(1) If angle shown exceeds 120 degrees, move diagonal brace to other side of girder/beam and place square to girder/beam. This may prevent exterior girder from being erected first.

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R (See Sheet 2 of 2).

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(6) All hardware used with cable must be able to develop a minimum 25 kips breaking strength. Use thimbles at all loops in cable. Install cable clamps with saddles bearing against the live end and U-bolts bearing aginst the dead end.

(7) It is acceptable to tie anchor bolts to cap reinforcement.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(9) Anchor bolt may be drilled and epoxied in place. Provide 25k minimum pullout. Core drill hole.

Texas Department of Transportation

Bridge Division Standard

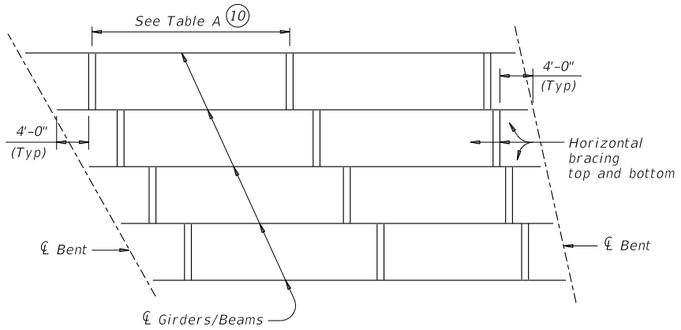
MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

FILE: IG-MEBR(C)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		162

DATE:
FILE:



SLAB PLACEMENT BRACING

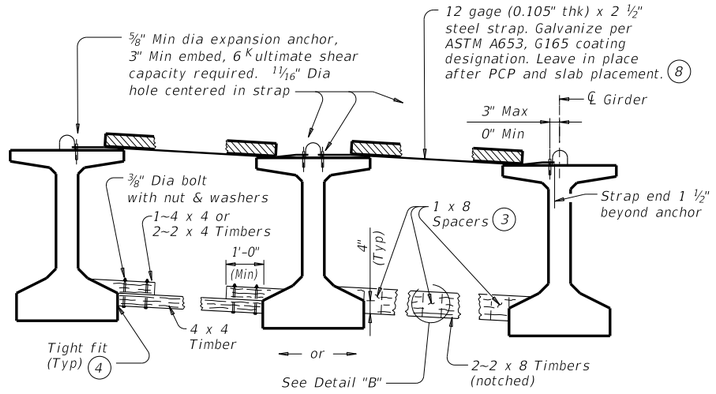
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	¼ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

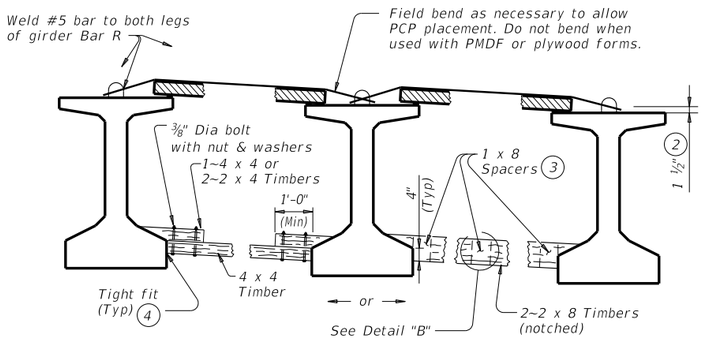
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

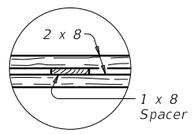
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



PLAN

DETAIL "B"

(2) Place and weld #5 bars as shown during erection. If forming deck with prestressed panels, bars can be temporarily removed, one at a time, during panel erection. Re-install bar prior to additional panel erection. Bars can rest on panels and be bent down and welded to girder Bars R.

(3) Clear distance between spacers must not exceed 3'. Nail together with 16d nails.

(4) Use wedges as necessary to obtain tight fit. Nail wedges to timbers.

(5) Pressure treated landscape timbers can not be used.

(8) Prior to installing, field bend strap to lay flush on both girders' top flange and slope between flange tips.

(10) Bracing spacing (¼ and ⅛ points) measured between first and last typical brace location.

(11) Measure slab overhang from centerline of girder or beam. When overhang varies in span, determine bracing spacing based on largest overhang.

SLAB PLACEMENT BRACING:

The details for slab placement bracing are considered minimum for fulfilling the requirements of Specification Items 422 and 425.

Required slab placement bracing must remain in place until slab concrete has attained a compressive strength of 3000 psi.

GENERAL NOTES:

Bracing details for spans longer than 150' are not provided. The Contractor must submit proposed bracing details for such conditions to the Engineer for approval prior to erection.

Systems equal to or better than those shown may be used provided details of such systems are submitted to and approved by the Engineer prior to erection.

Use of these systems or details does not relieve the Contractor of the responsibility for the adequacy of the bracing and the safety of the structure.

Removal of bracing for short periods of time to align girders and beams is permissible.

All turn-buckles, come-alongs, anchors and other connections must be capable of developing the full strength of the cable shown.

Furnish anchor bolts and nuts in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation

Bridge Division Standard

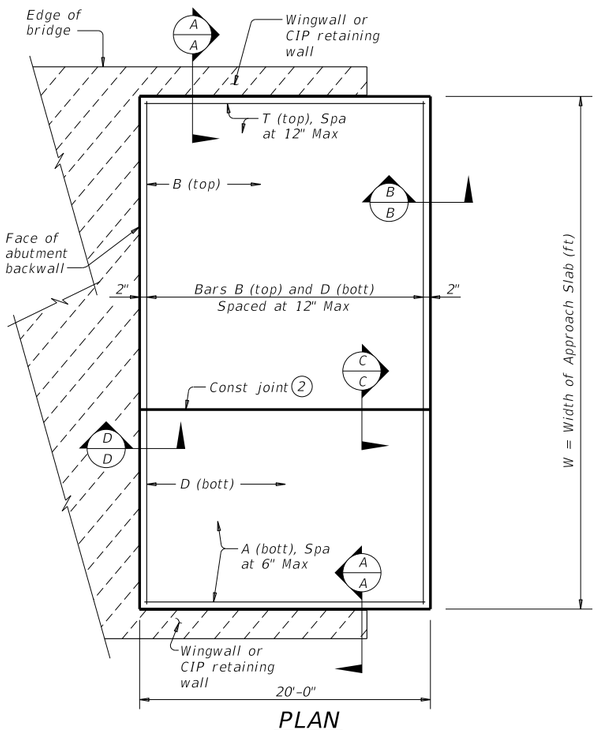
MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

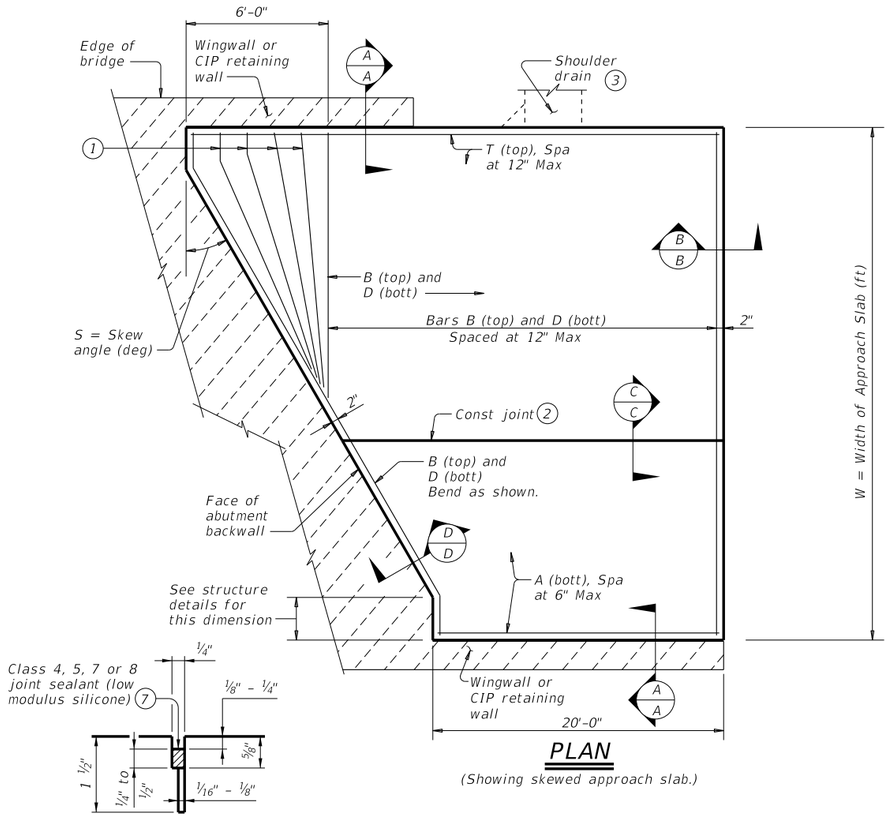
FILE: IG-MEBR(C)-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		163

DATE:
FILE:



PLAN

(Showing non-skewed approach slab.)



PLAN

(Showing skewed approach slab.)

LONGITUDINAL SAW CUT JOINT DETAIL

BAR TABLE	
BAR	SIZE
A	#8
B	#5
D	#5
T	#5

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

Volume of Appr Slab Conc (CY) = 0.802W + 0.02W² Tan S

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

(1) Flare Bars B and D in this region (1'-6" Max Spa, 3" Min Spa). Minimum flared bar length = 2'-6". Bend bars as necessary.

(2) Provide longitudinal construction joints that align with longitudinal construction joints in the bridge slab with bridges built in stages. Other longitudinal construction joints must receive approval of the Engineer.

(3) See details elsewhere in plans for shoulder drain location and details.

(4) For Contractor's information only. Quantities shown are for one approach slab.

(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

(6) See details elsewhere in plans for required cross-slope.

(7) Place in accordance with Item 438.

(8) Provide backer rod that is 25% larger than joint opening and compatible with the sealant.

(9) If bridge rail is present at the wingwall or CIP retaining wall, place ½" rebonded recycled tire rubber between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Provide longitudinal joints as shown on the Longitudinal Saw Cut Joint Detail at lane lines and shoulders when width between longitudinal construction joints or edges of approach slab exceeds 16 feet. Saw cut joints within 24 hours of concrete placement to a depth of 1 ½" and seal in accordance with Item 438. Alternately, provide a controlled joint consisting of 1 ½" vinyl or plastic joint former (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

Provide rebonded recycled tire rubber joint filler that meets the requirements of DMS-6310. "Joint Sealants and Fillers."

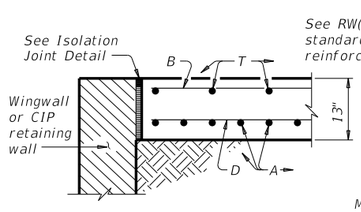
Construct the subgrade or subbase away from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

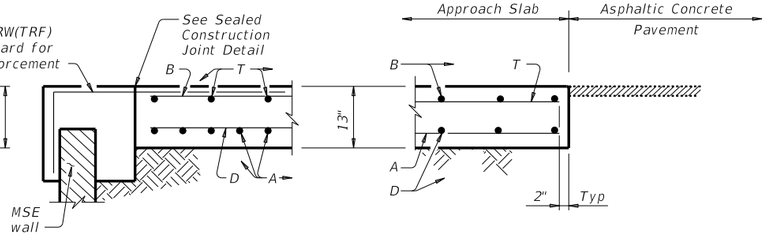
Cure for 4 days using water or membrane curing per Item 422.

All details shown herein are subsidiary to bridge approach slab.

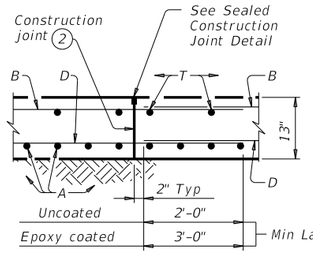
Cover dimensions are clear dimensions, unless noted otherwise.



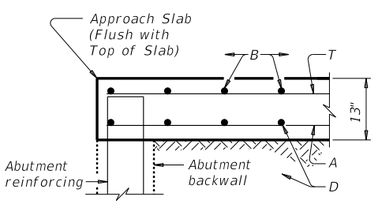
SHOWING WINGWALL OR CIP RETAINING WALL



SHOWING MSE WALL



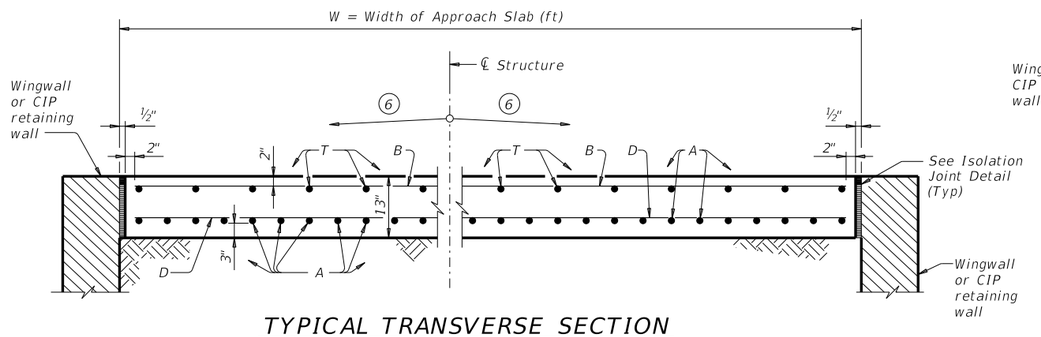
SECTION C-C (5)



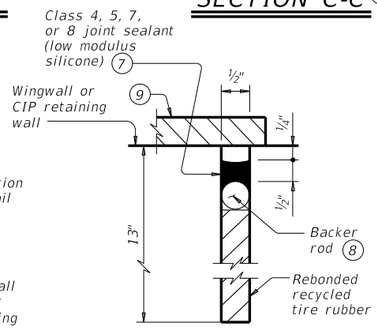
SECTION D-D

SECTION A-A

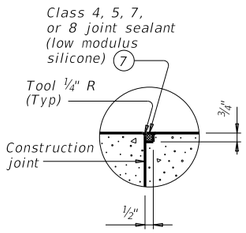
SECTION B-B



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

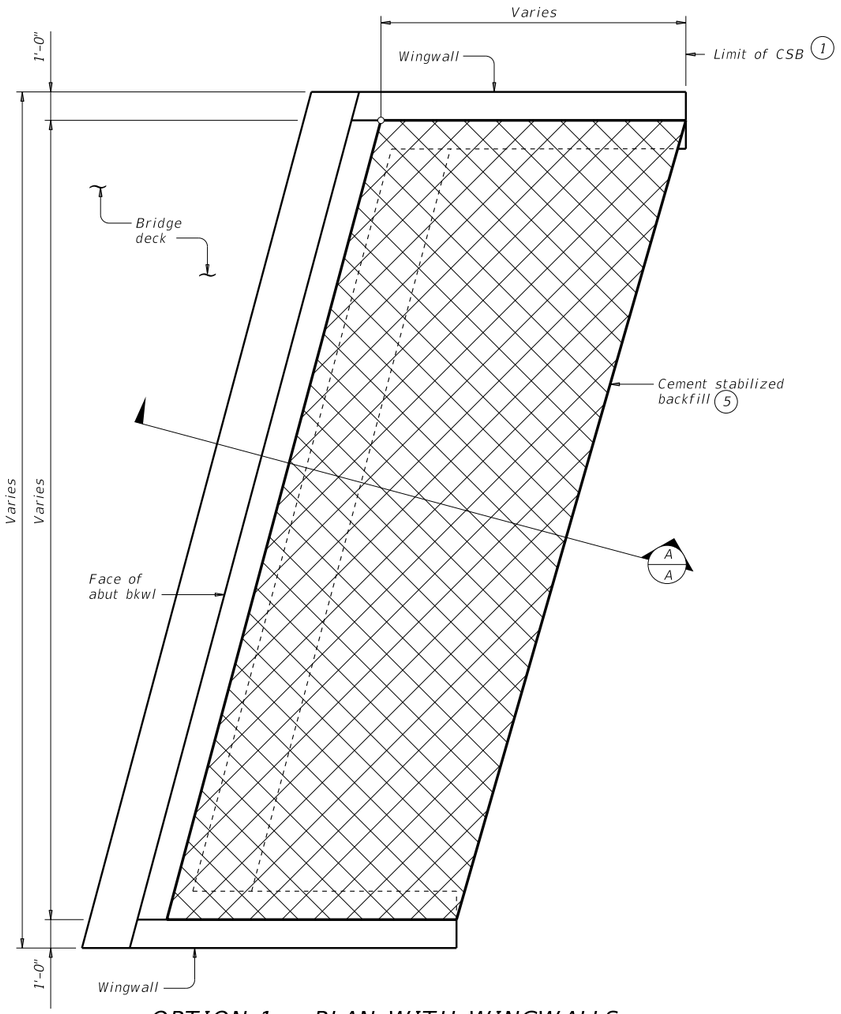
Bridge Division Standard

BRIDGE APPROACH SLAB
ASPHALTIC CONCRETE PAVEMENT

BAS-A

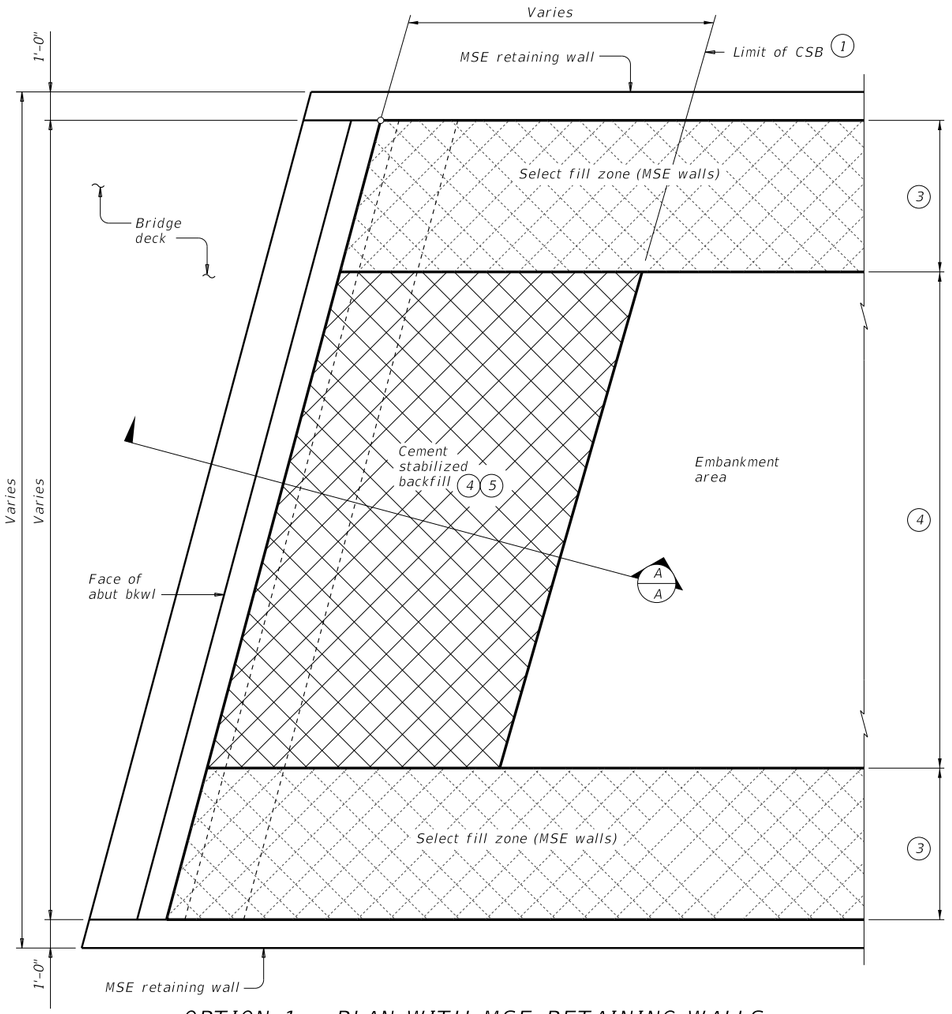
FILE: MS-BAS-A-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
02-20: Removed stress relieving pad.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		164

DATE:
FILE:

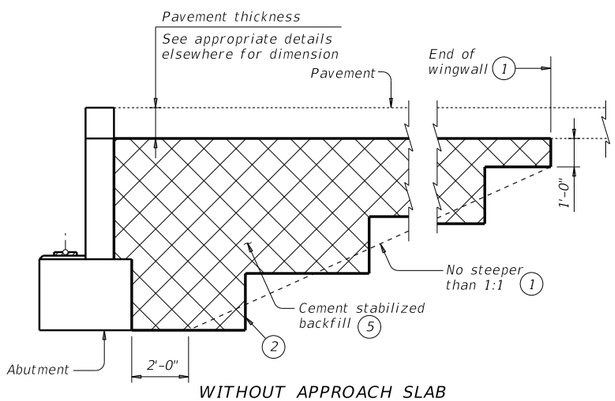


OPTION 1 ~ PLAN WITH WINGWALLS

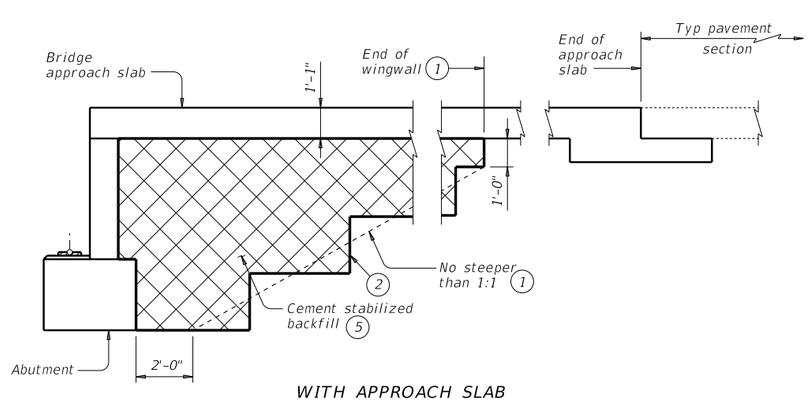
Cast-in-place retaining walls similar.



OPTION 1 ~ PLAN WITH MSE RETAINING WALLS



WITHOUT APPROACH SLAB



WITH APPROACH SLAB

(Showing BAS-C, BAS-A similar.)

SECTION A-A

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

GENERAL NOTES:

See the Bridge Layout for selected Option. Option 1 is intended for construction only requiring plasticity index (PI) controlled embankment fill or excavation in competent soils/rocks in order to construct the abutment. Option 2 is intended for new construction requiring high plasticity embankment fill with a PI greater than 30 or pavement built in poor native soil. Poor soils are defined as high plasticity clays or expansive clays.

Construct abutment backfill in accordance with Item 400, "Excavation and Backfill for Structures".

Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

If required elsewhere in the plans, provide Flowable Backfill meeting the requirements of Item 401, "Flowable Backfill", to the limits shown at bridge abutments.

Details are drawn showing left forward skew. See Bridge Layout for actual skew direction.

These details do not apply when Concrete Block retaining walls are used in lieu of wingwalls.

Texas Department of Transportation

Bridge Division Standard

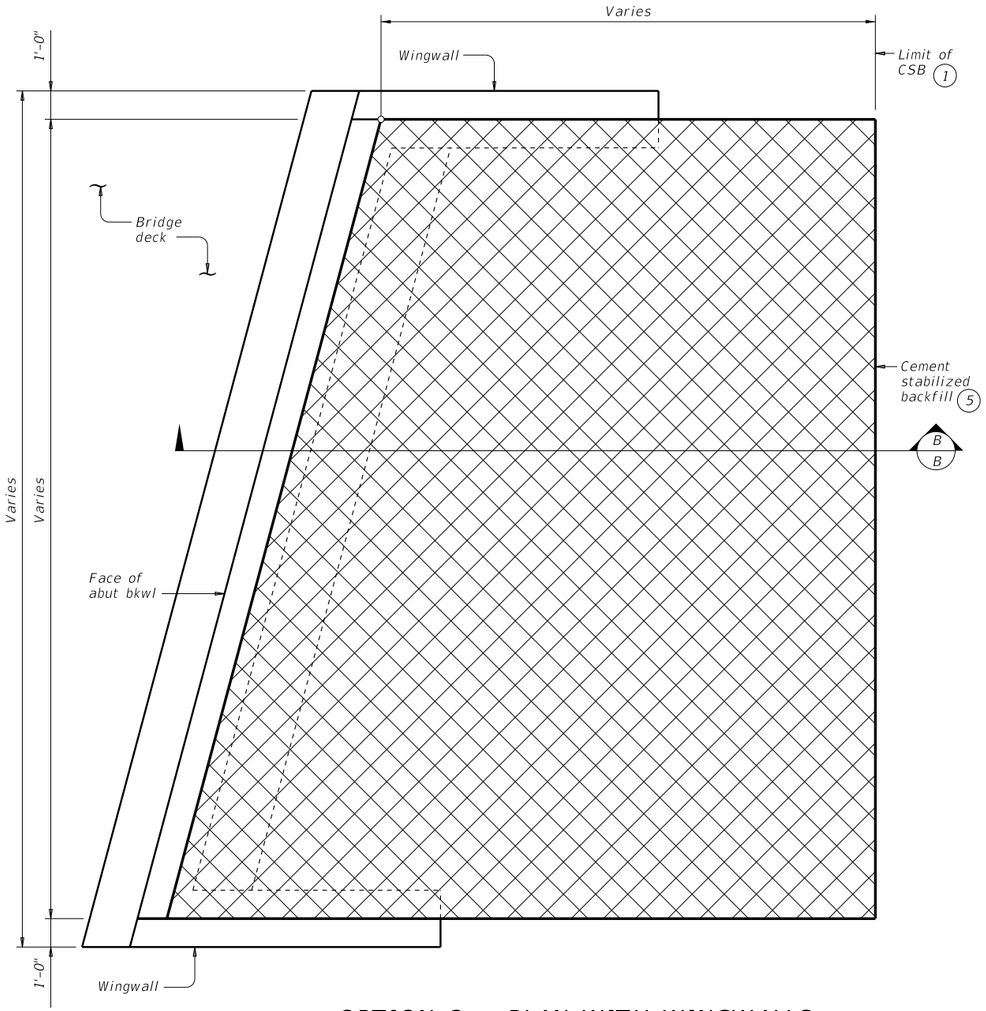
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

CSAB

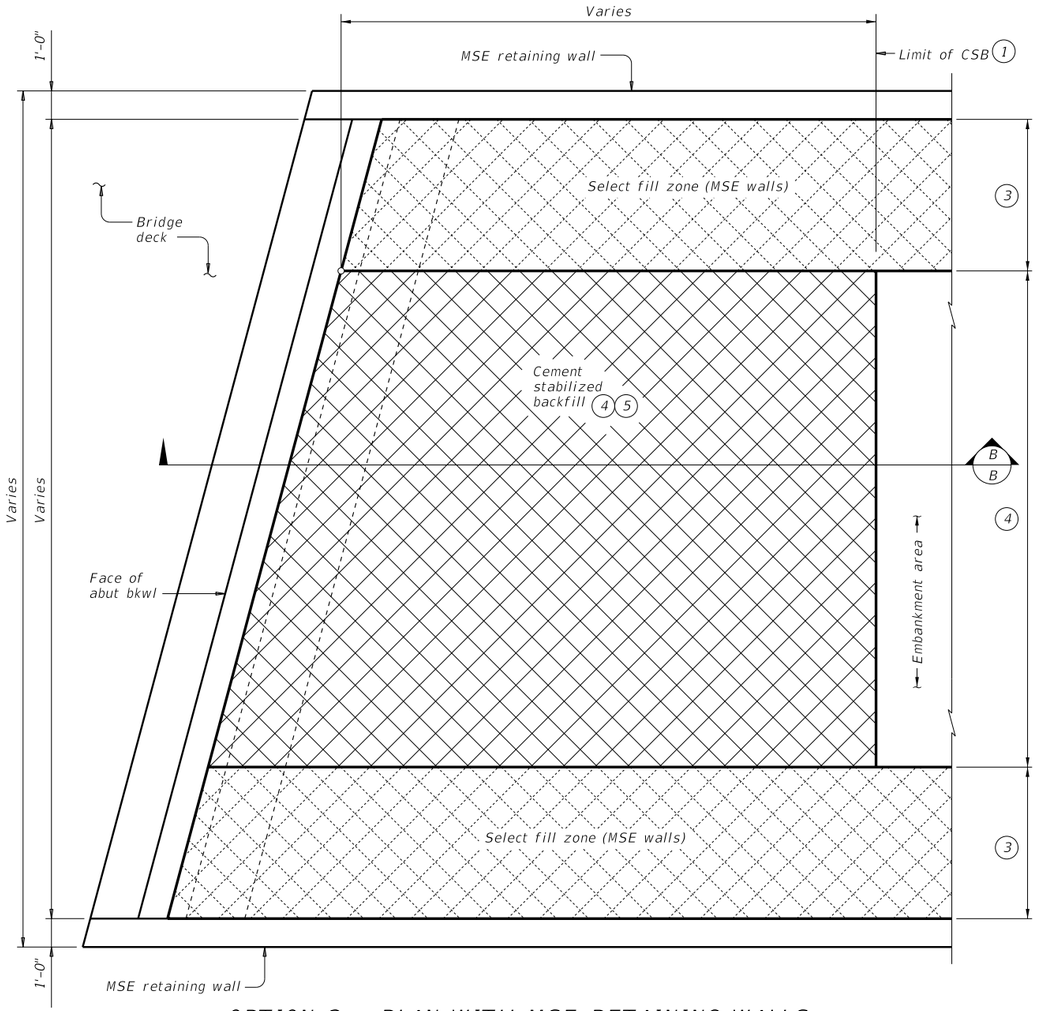
FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
02-20: Added Option 2.	DIST	COUNTY		SHEET NO.
03-23: Updated General Notes.	ABL	NOLAN		165

DATE:
FILE:



OPTION 2 ~ PLAN WITH WINGWALLS

Cast-in-place retaining walls similar.



OPTION 2 ~ PLAN WITH MSE RETAINING WALLS

(1) Usual limit of Cement Stabilized Backfill is at end of wingwall. Extend CSB limits as required to maintain a slope no steeper than 1:1 at bottom of backfill.

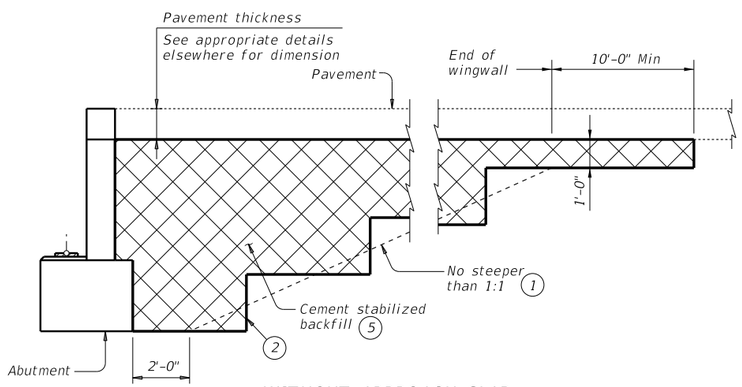
(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

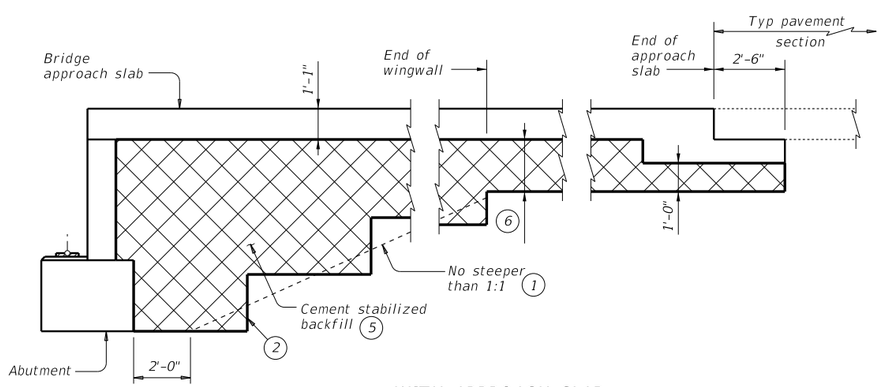
(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(5) If shown in the plans, flowable backfill can be used as a substitute for cement stabilized backfill with the following constraints:
a). If flowable backfill is to be placed over MSE backfill, then a filter fabric will be placed over the MSE backfill prior to placement of the flowable fill; and
b). Place flowable fill in lifts not exceeding 2 feet in height. Place each successive lift when the previous lift has stiffened/hardened (i.e. has lost its flowability).

(6) 1'-0" for BAS-A
1'-10" for BAS-C



WITHOUT APPROACH SLAB



WITH APPROACH SLAB
(Showing BAS-C, BAS-A similar.)

SECTION B-B

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

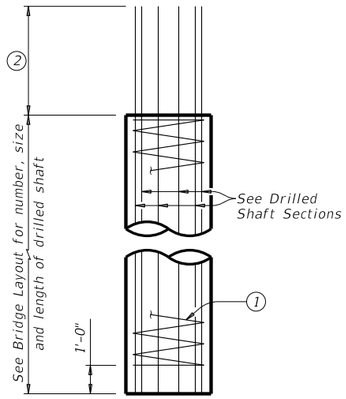
CEMENT STABILIZED ABUTMENT BACKFILL

BRIDGE ABUTMENT

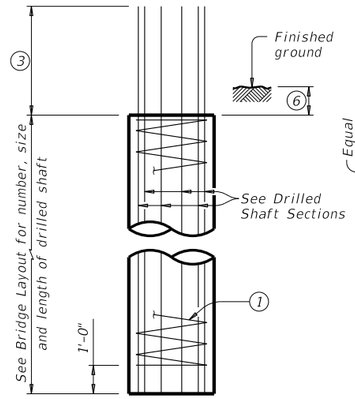
CSAB

FILE: MS-CSAB-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		166

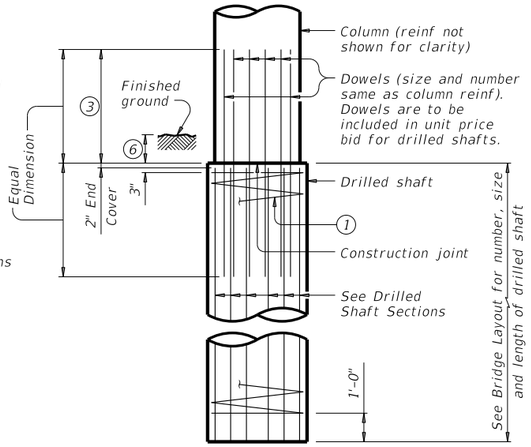
DATE:
FILE:



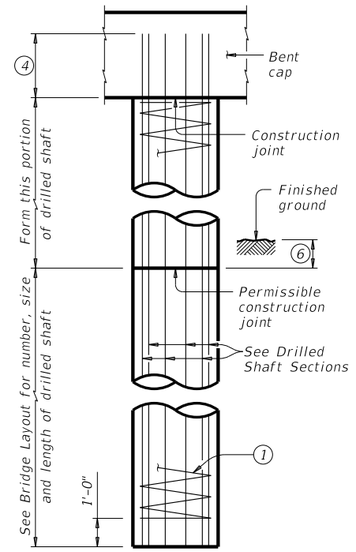
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



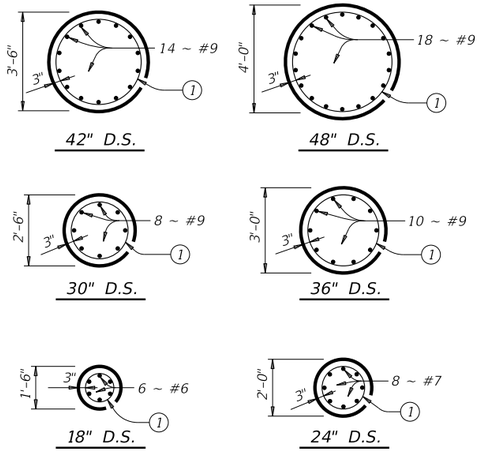
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

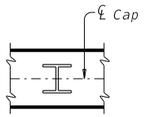


DRILLED SHAFT SECTIONS

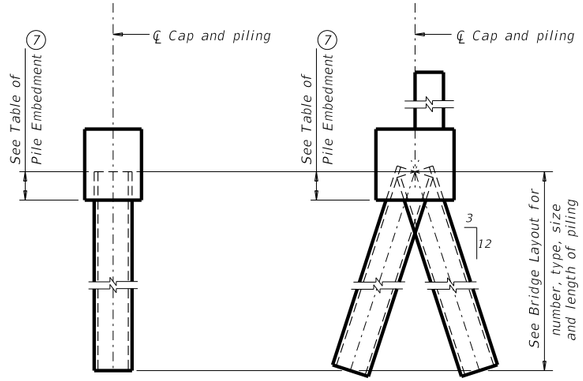
DRILLED SHAFT DETAILS

TABLE OF PILE EMBEDMENT	
Pile Type	Embedment Depth (Ft)
16" Sq Concrete 18" Sq Concrete HP14 Steel HP16 Steel	1'-0"
20" Sq Concrete 24" Sq Concrete HP18 Steel	1'-6"

See Prestressed Concrete Piling (CP) standard for additional details on concrete pile embedment.



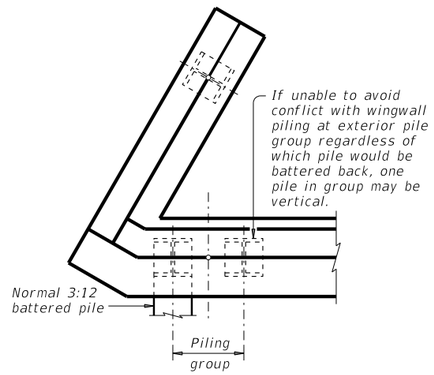
ORIENTATION OF STEEL H-PILING



VERTICAL PILE BATTERED PILE

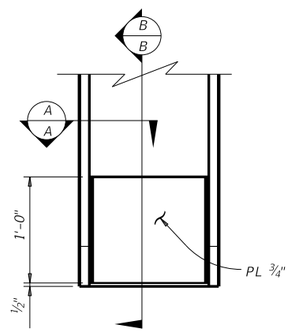
PILING DETAILS

(Concrete or steel H)

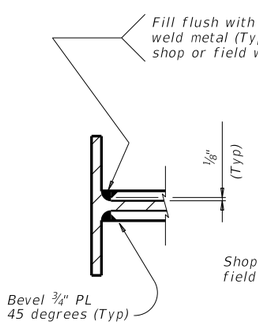


DETAIL "A"

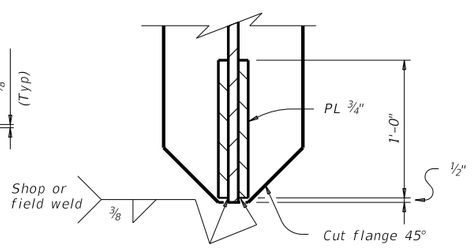
(Showing plan view of a 30° skewed abutment)



ELEVATION



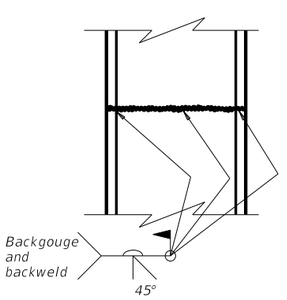
SECTION A-A

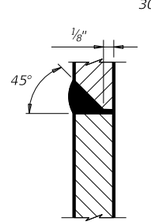


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

See Item 407 "Steel Piling" to determine when tip reinforcement is required and for options to the details shown.





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 spiral at 6" pitch (one and a half flat turns top and bottom).

(2) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-0"
#9 Bars = 2'-3"

(3) Min lap with column reinf:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(4) Min extension into supported element:
#6 Bars = 1'-11"
#7 Bars = 2'-3"
#9 Bars = 2'-9"

(5) Drilled shafts may extend to the bottom of bent caps for "H" heights of 6 ft and less (as shown on the Bridge Layout), if approved. This option can only be used when the drilled shaft diameter equals the column diameter. Obtain approval of the forming method above the ground line prior to construction. No adjustments in payment will be made if this option is used.

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

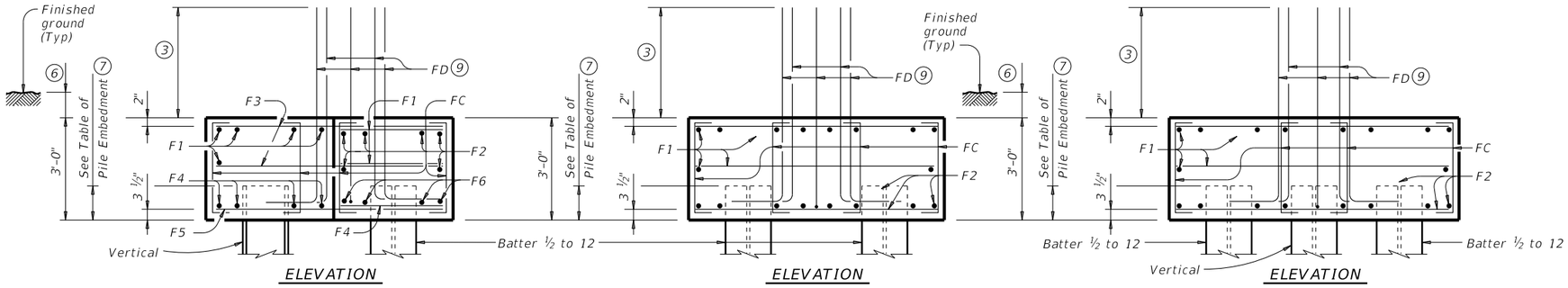
Texas Department of Transportation

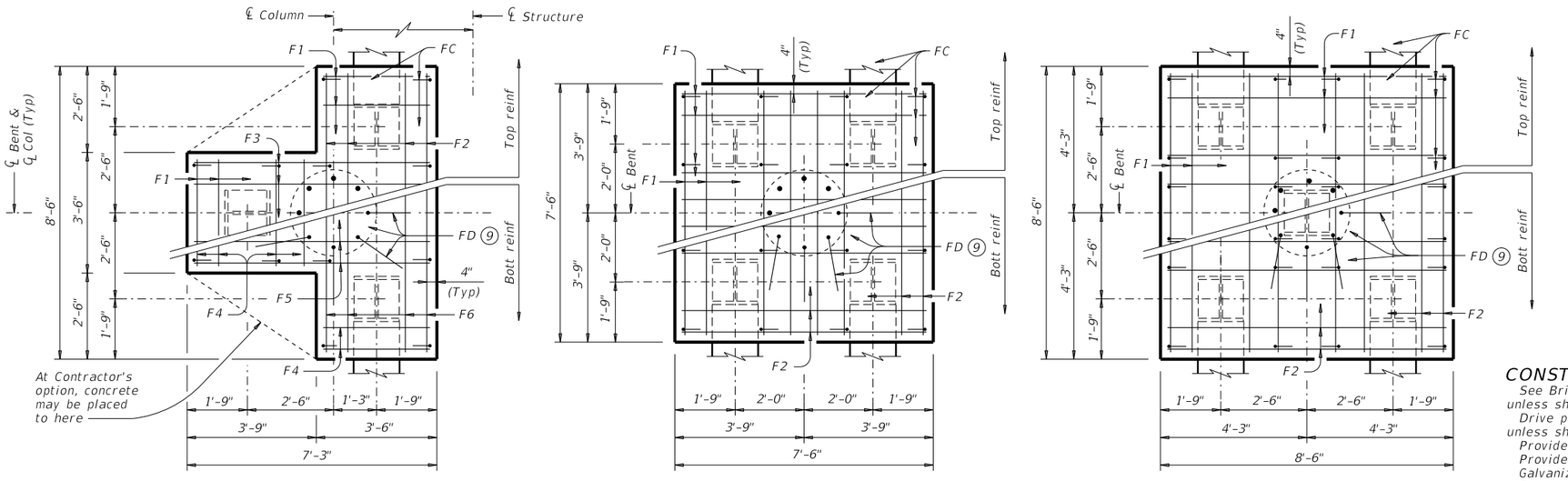
Bridge Division Standard

COMMON FOUNDATION DETAILS

FD

FILE: MS-FD-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
01-20: Added #11 bars to the F.D bars.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		167





THREE PILE FOOTING (8)

For 36" Dia and smaller columns.

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.

TABLE OF FOOTING QUANTITIES FOR 30" COLUMNS

ONE 3 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	11	#4	3'- 2"	23
F2	6	#4	8'- 2"	33
F3	6	#4	6'- 11"	28
F4	8	#9	3'- 2"	86
F5	4	#9	6'- 11"	94
F6	4	#9	8'- 2"	111
FC	12	#4	3'- 6"	28
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	623
Class "C" Concrete			CY	4.8

ONE 4 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	7'- 2"	96
F2	16	#8	7'- 2"	306
FC	16	#4	3'- 6"	37
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	659
Class "C" Concrete			CY	6.3

ONE 5 PILE FOOTING				
Bar	No.	Size	Length	Weight
F1	20	#4	8'- 2"	109
F2	16	#9	8'- 2"	444
FC	24	#4	3'- 6"	56
FD (10)	8	#9	8'- 1"	220
Reinforcing Steel			Lb	829
Class "C" Concrete			CY	8.0

CONSTRUCTION NOTES:

See Bridge Layout for foundation type required. Use these foundation details unless shown otherwise.

Drive piling under abutment wingwalls to a minimum resistance of 10 Tons/Pile unless shown otherwise.

Provide Class C Concrete (f'c = 3,600 psi), unless shown otherwise.

Provide Grade 60 reinforcing steel.

Galvanize reinforcing if shown elsewhere in the plans.

Provide bar laps for drilled shaft reinforcing, where required, as follows:

Uncoated or galvanized (#6) ~ 2'-6"
Uncoated or galvanized (#7) ~ 2'-11"
Uncoated or galvanized (#9) ~ 3'-9"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

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

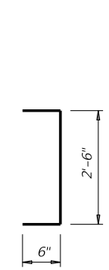
DESIGNER NOTES:

Do not use the drilled shaft details shown on this standard for retaining wall, noise wall, barrier, or sign foundations without structural evaluation.

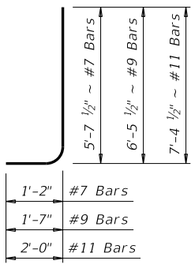
Do not use the footings shown on this standard in direct contact with salt water or exposed to salt water spray.

Maximum allowable pile loads for the footings shown are:

72 Tons/Pile with 24" Dia Columns
80 Tons/Pile with 30" Dia Columns
100 Tons/Pile with 36" Dia Columns
120 Tons/Pile with 42" Dia Columns



BARS FC



BARS FD (9)

(3) Min lap with column reinforcing:
#7 Bars = 2'-11"
#9 Bars = 3'-9"
#11 Bars = 4'-8"

(6) 1'-0" Min, unless shown otherwise on plans.

(7) Or as shown on plans.

(8) See Bridge Layout for type, size and length of piling.

(9) Number and size of FD bars must match column reinforcing. Tie FD bars to the top of the bottom reinforcing mat.

(10) Adjust FD quantity, size and weight as needed to match column reinforcing.

Texas Department of Transportation

Bridge Division Standard

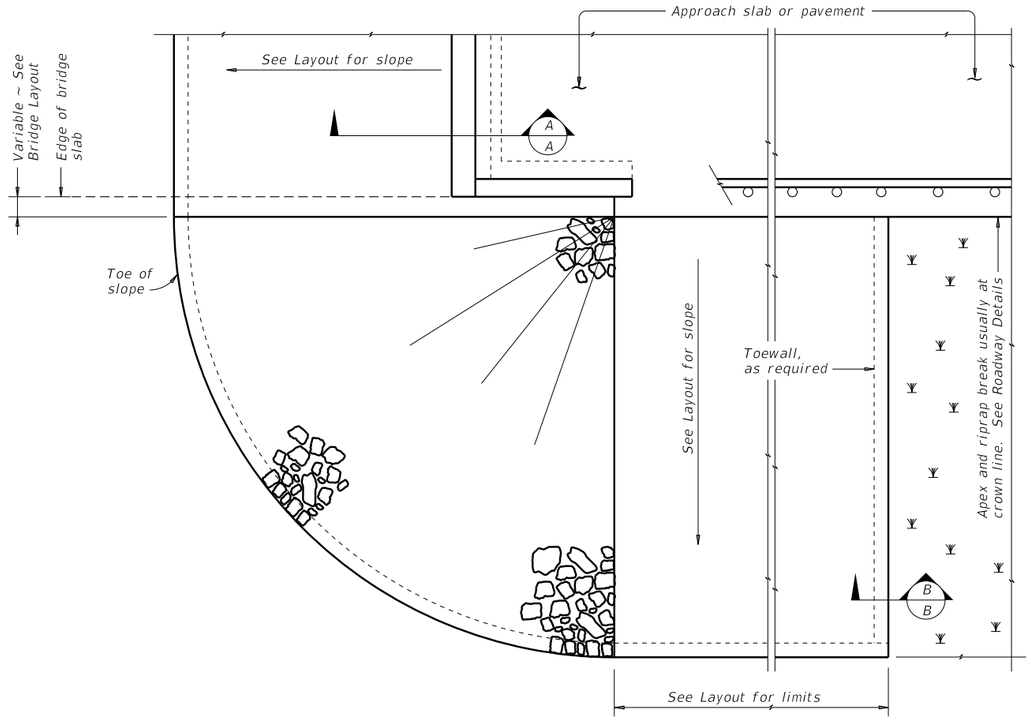
COMMON FOUNDATION DETAILS

FD

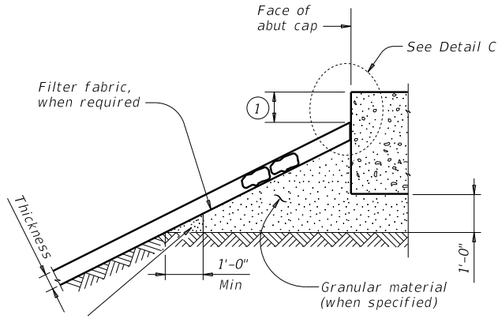
FILE: MS-FD-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		168

DATE:
FILE:

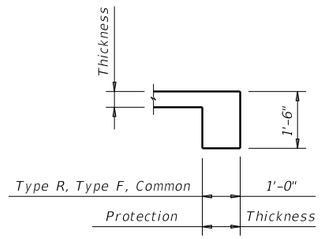
DATE:
FILE:



PLAN

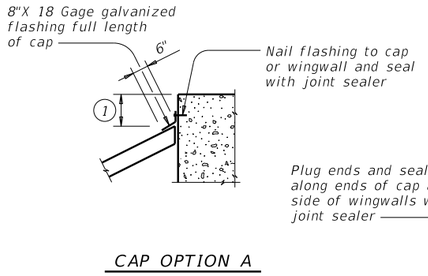


SECTION A-A AT CAP



SECTION B-B

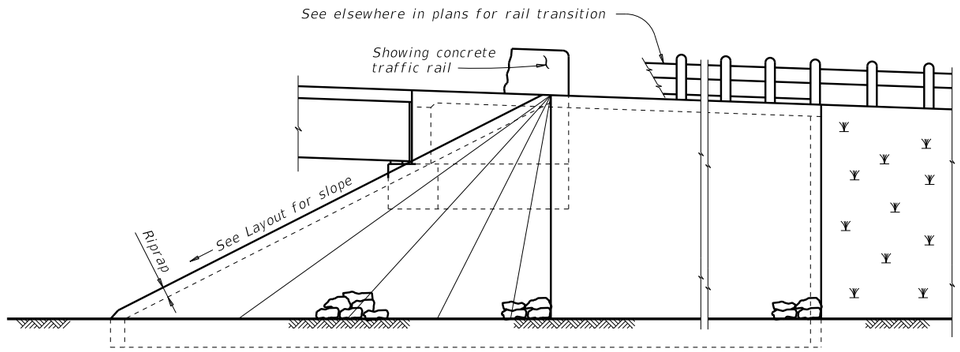
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

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

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: MS-SRR-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		169

DATE:
FILE:

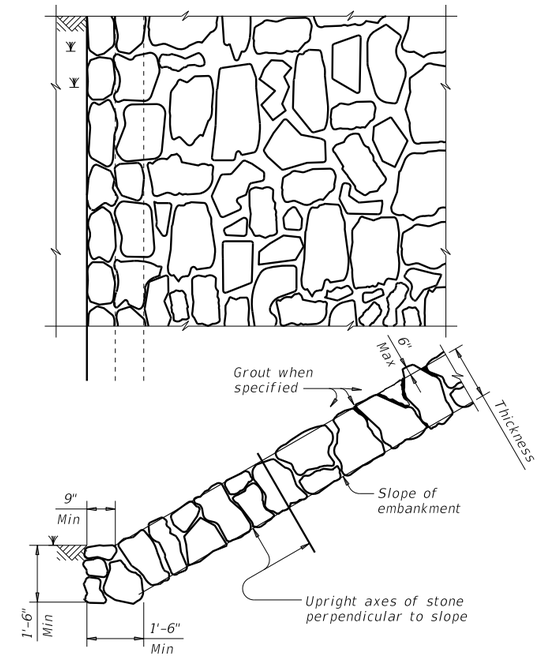


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

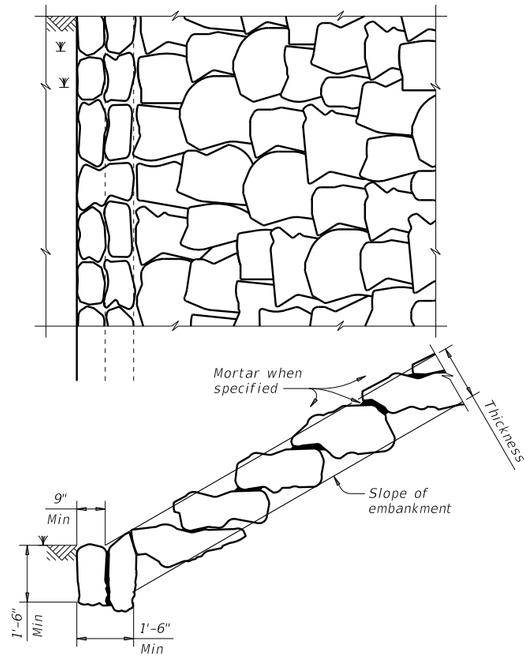


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

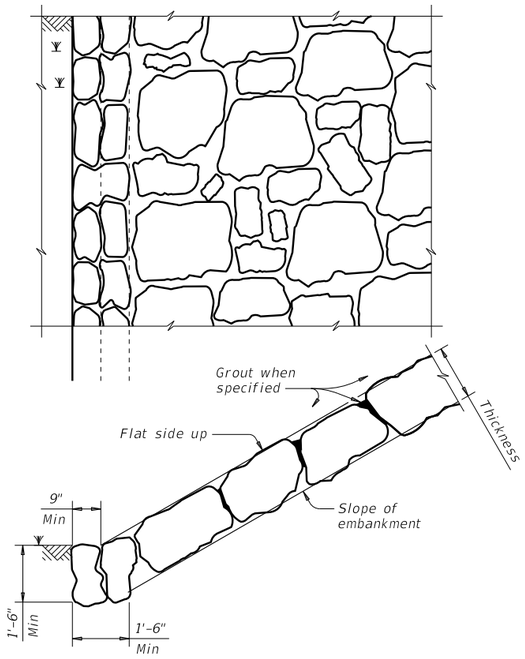


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

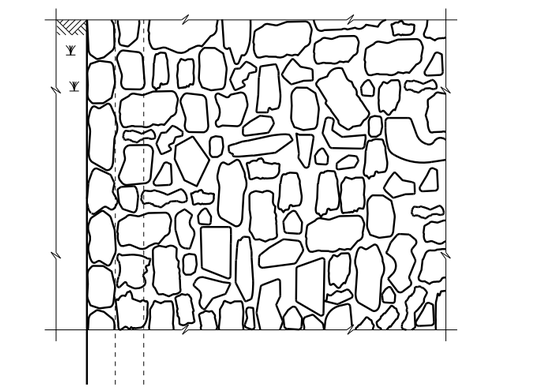


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

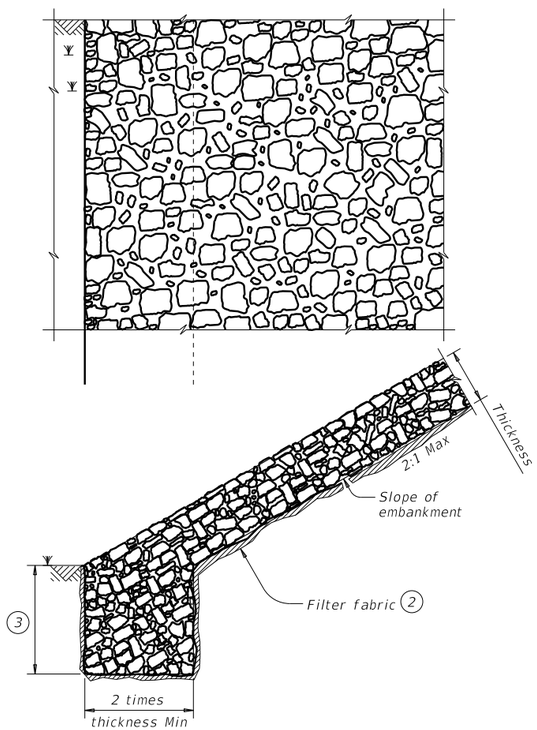


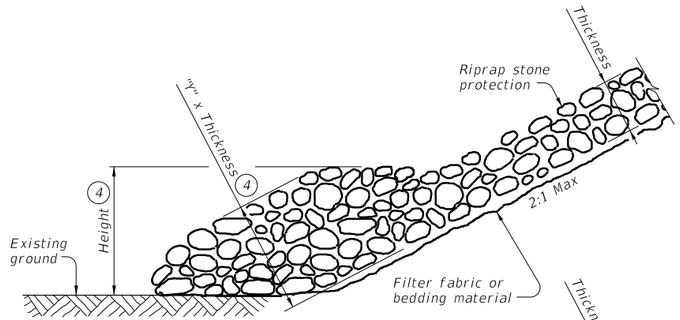
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

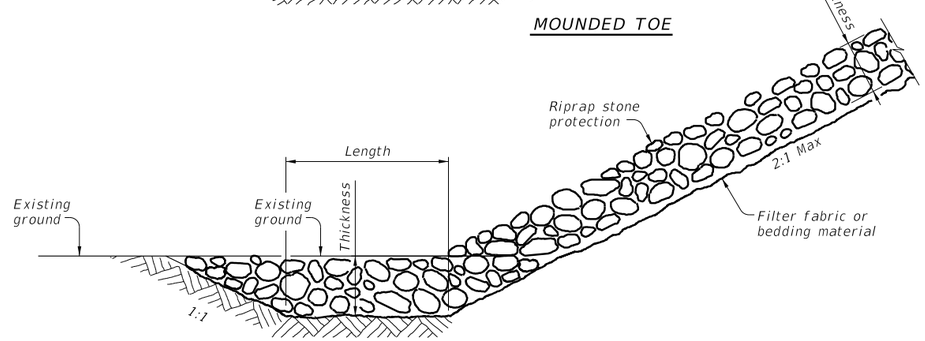
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

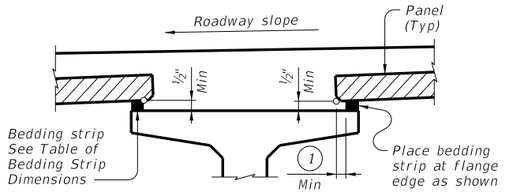
Bridge Division Standard

STONE RIPRAP

SRR

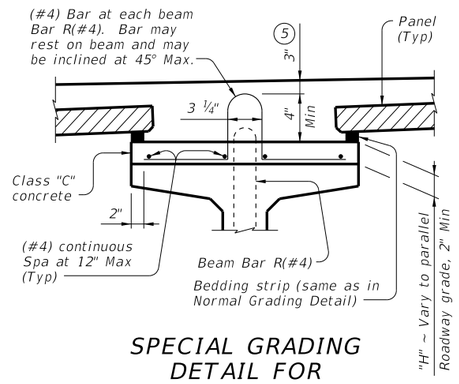
FILE: MS-SRR-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES		
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0264	01	046	SH 70		
	DIST	COUNTY		SHEET NO.		
	ABL	NOLAN		170		

DATE:
FILE:



NORMAL GRADING DETAIL (3)

Showing prestressed concrete I-girders.
(Other beam types similar)



SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing prestressed concrete I-girders.
(Other beam types similar)

TABLE OF BEDDING STRIP DIMENSIONS		
WIDTH	HEIGHT (4)	
	Min	Max
1" (Min)	½"	2"
1 ¼"	½"	2 ½"
1 ½"	½"	3"
1 ¾"	½"	3 ½"
2"	½"	4"
2 ¼"	½"	4 ½" (2)
2 ½"	½"	5" (2)
2 ¾"	½"	5 ½" (2)
3" (Max)	½"	6" (2)

(1) 2" Min for I-girders, 1 ½" Min for all other beam types.

(2) Allowed for prestressed concrete I-girders, not allowed on other beam types.

(3) To reduce the quantity of cast-in-place concrete, bedding strip thickness may be increased in ¼" increments. Bedding strips must be comprised of one layer. Bond bedding strips to the beams with an adhesive compatible with bedding strips. Bedding strips over 2.5" high may need to be bonded to panels. The same thickness strip must be used under any one panel edge and the maximum change in thickness between adjacent panels is ¼". Alternatively, bedding strips may be cut to grade. Panels may be supported by an alternate method, using a commercial product, if approved by the Engineer of Bridge Design, Bridge Division. If bedding strips exceed 6" high for I-Girders, 4" high for all other beam types, use Special Grading Detail for Concrete Beams or submit an alternate method to the Bridge Division for approval.

(4) Height must not exceed twice the width.

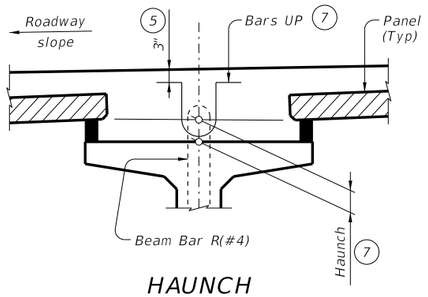
(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(7) Space Bars UP(#4) with Beam Bars R(#4) in all areas where measured haunch exceeds 3 ½" with I-girders, and 3" for all other beam types. Epoxy coating for Bars UP is not required.

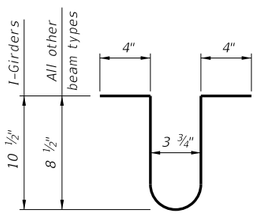
(8) Do not locate construction joints on top of a panel.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

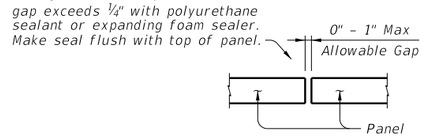


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)

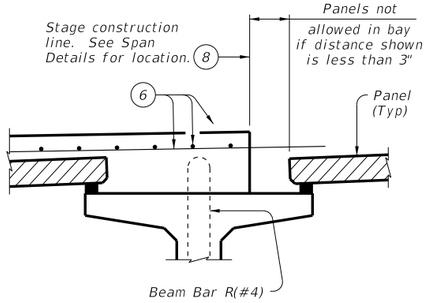


BARS UP (#4) (7)

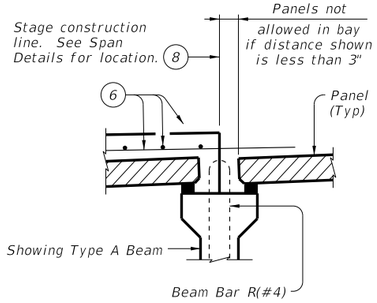


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



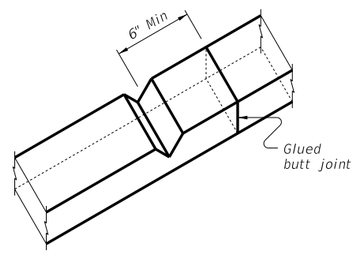
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)



BEDDING STRIP DETAIL (9)

CONSTRUCTION NOTES:

Erected panels must bear uniformly on bedding strips of extruded polystyrene placed along top flange edges.

Placing panels to minimize joint openings is recommended.

If additional blocking is needed, special grading details for supporting the panels and extra reinforcing between beam and slab will be considered subsidiary to deck construction.

Bars U, shown on PCP-FAB, may be bent over or cut off if necessary.

Care must be taken to ensure proper cleaning of construction debris and consolidation of concrete material under the edges of the panels. Bedding strips must be placed at beam flange edges so that adequate space is provided for the mortar to flow a minimum of 1 ½" under the panels as the slab concrete is placed.

To allow the proper amount of mortar to flow between beam and panel, the minimum vertical opening must be at least ½". Roadway cross-slope reduces the opening available for entry of the mortar. Bedding strips varying in thickness across the beam are therefore required.

For clear span between U-beams less than or equal to 18", see Permissible Slab Forming Detail on Miscellaneous Slab Detail sheets, UBMS.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel in the cast-in-place slab. See Table of Reinforcing Steel for size and spacing of reinforcement.

If the top and bottom layer of reinforcing steel is shown on the Span Details to be epoxy coated, then the D, E, P, & Z bars must be epoxy coated.

Provide bar Laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Panel placement may follow either Option 1 or Option 2 except Option 1 must be used if the skew exceeds 45 degrees.

Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

These details are to be used in conjunction with the Span Details, PCP-FAB and other applicable standard drawings.

When panel support (bedding strips) deviates from what is shown herein, provide details signed and sealed by a professional Engineer.

Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

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

HL93 LOADING

Texas Department of Transportation

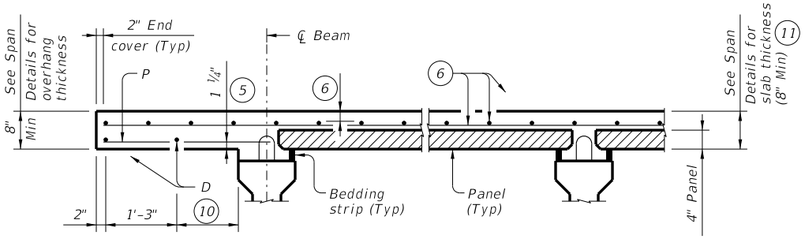
Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

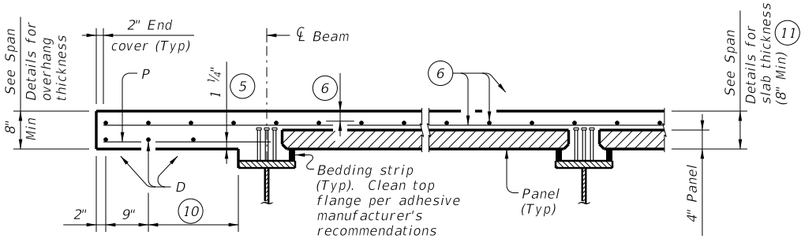
PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		171

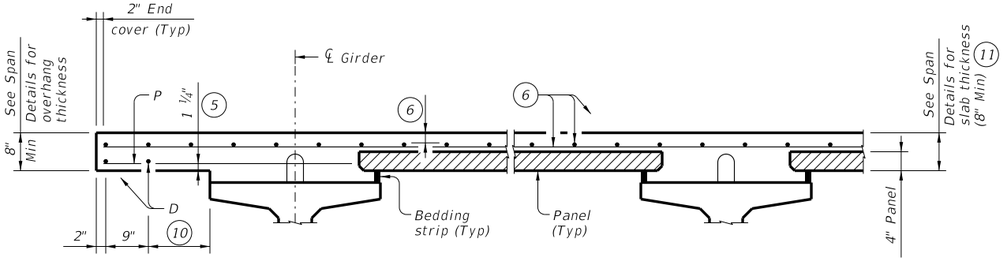
DATE:
FILE:



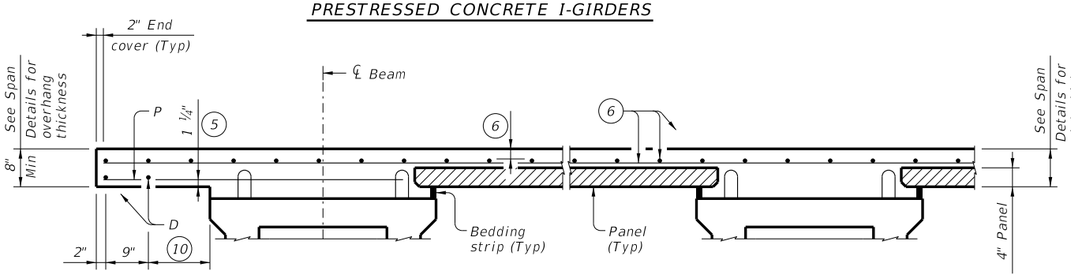
PRESTRESSED CONCRETE I-BEAMS



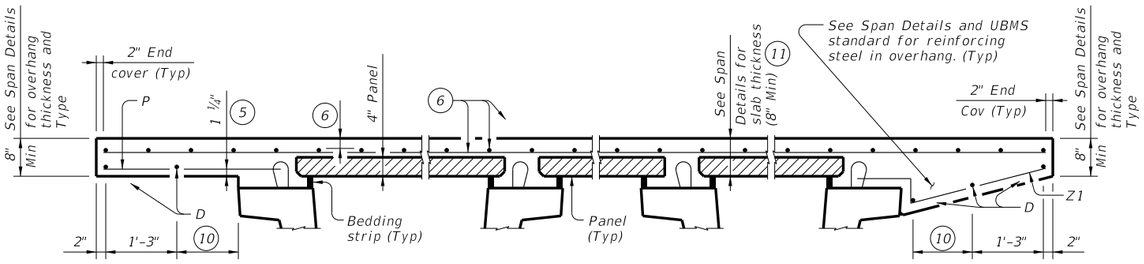
STEEL BEAMS (13)



PRESTRESSED CONCRETE I-GIRDERS



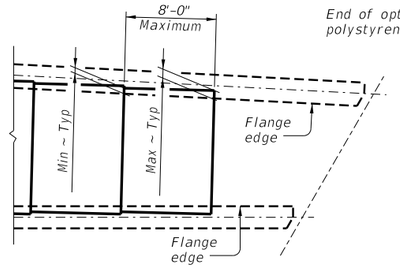
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

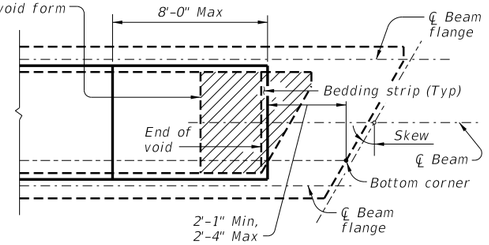
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS



AT FLARED BEAMS OR GIRDERS

See PCP-FAB standard for Min and Max dimensions based on beam/girder type.



OVER CONC U-BEAMS

PART PLANS OF PANEL PLACEMENT

(5) Provide clear cover as indicated unless otherwise shown on Span Details.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

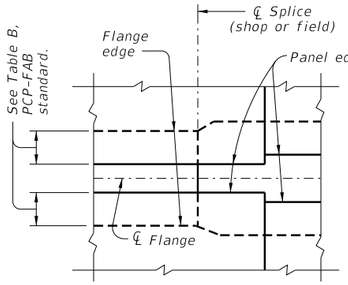
(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(10) Equally space additional bar if more than 1'–3" Max.

(11) The actual thickness constructed may exceed the slab thickness shown on the Span Details but the extra thickness may be no more than 2" (1" for prestressed concrete U-beams and steel beams). Bearing seat elevations or finished grade may be adjusted.

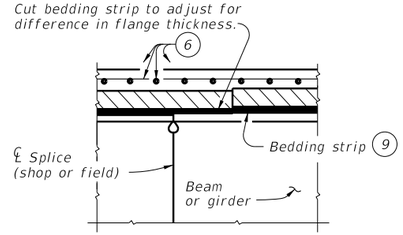
(12) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.

(13) Panels are allowed over top tension flanges, as approved by the Engineer. See Span Details for additional top mat reinforcement required in tension zones. Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



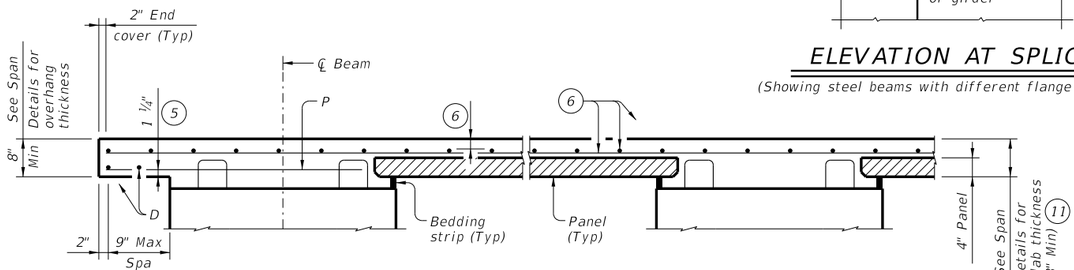
PLAN AT SPLICE

(Showing steel beams with flange width transition)



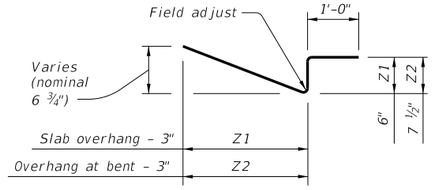
ELEVATION AT SPLICE

(Showing steel beams with different flange thickness)



PRESTRESSED CONCRETE SPREAD SLAB BEAMS

Bars P over exterior beams are still required when no overhang is used. In this case, only one Bar D, 2" from slab edge, is required.



BARS Z (#4) (12)

HL93 LOADING

SHEET 2 OF 4

Texas Department of Transportation

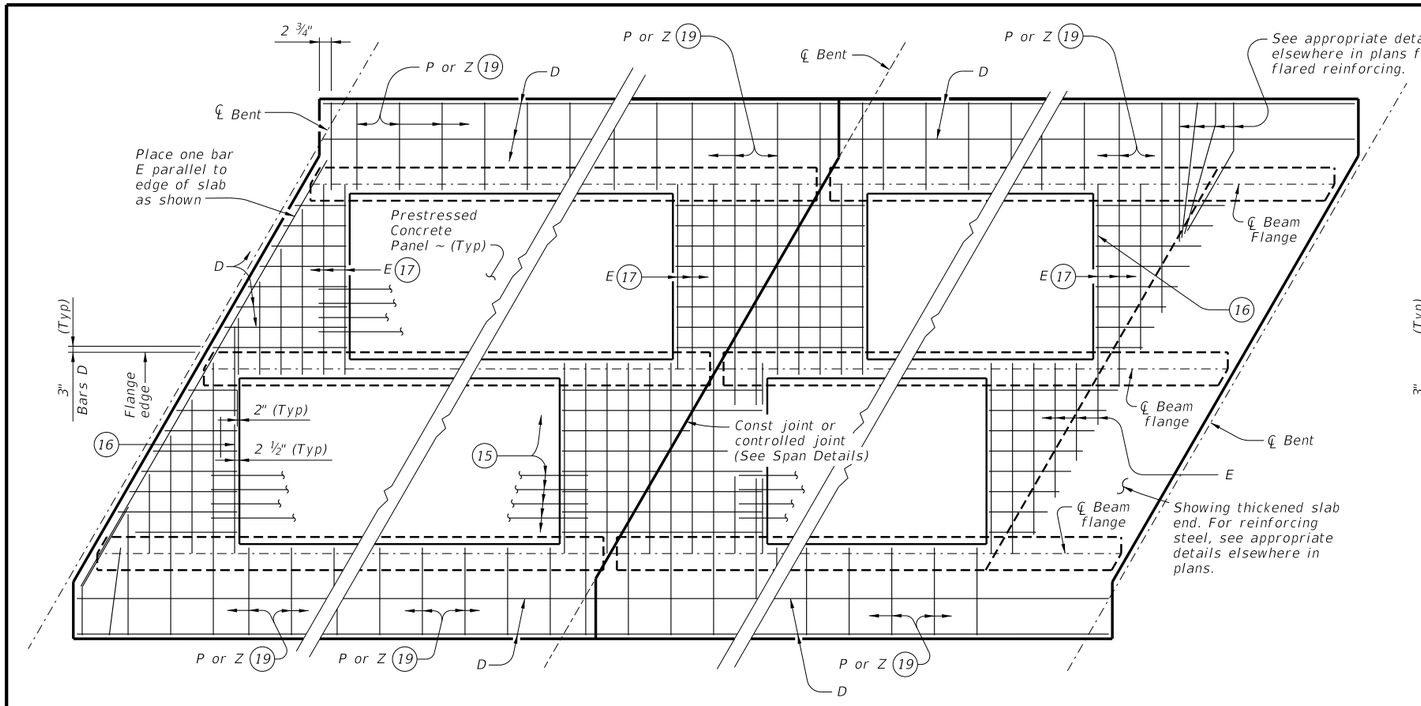
Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

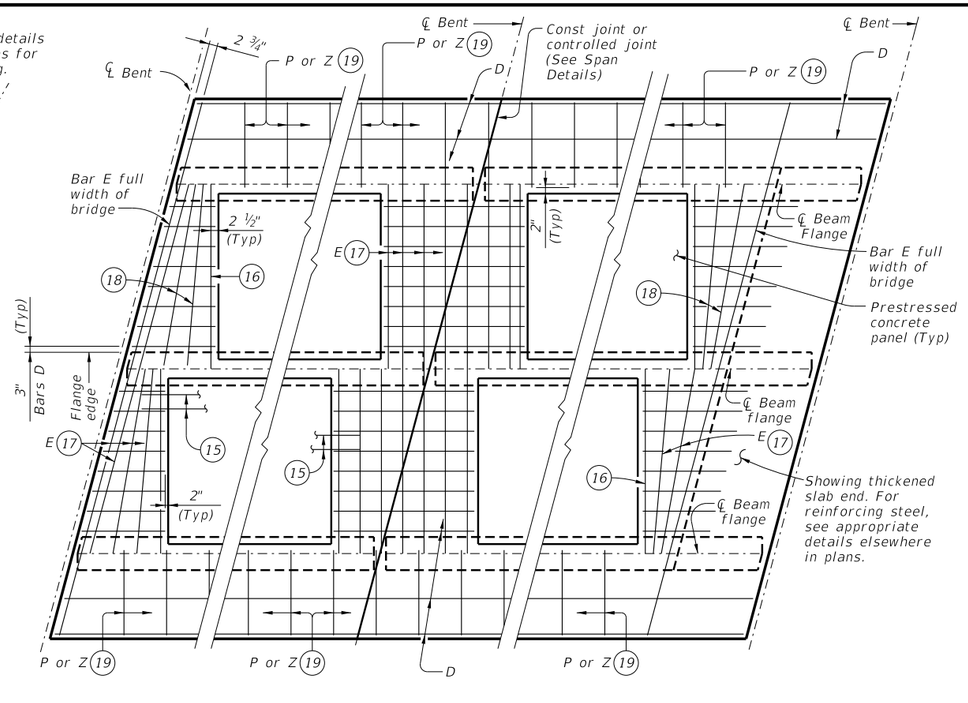
FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		172

DATE:
FILE:



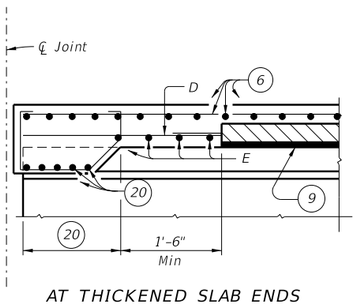
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

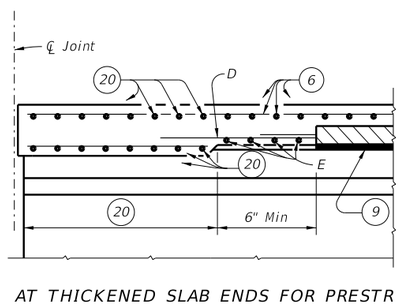


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

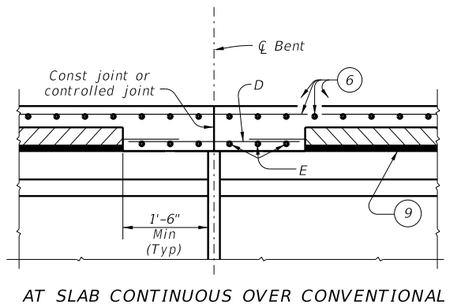
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



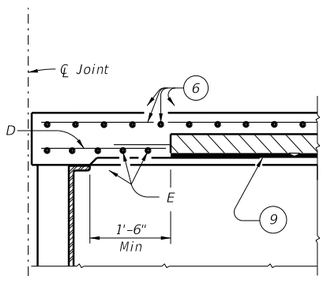
AT THICKENED SLAB ENDS FOR PRESTR CONCRETE U-BEAMS



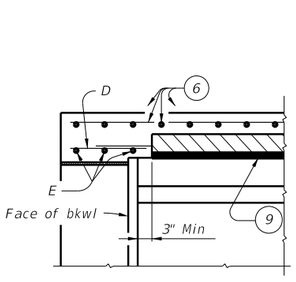
AT THICKENED SLAB ENDS FOR PRESTR CONCRETE I-BEAMS AND STEEL BEAMS



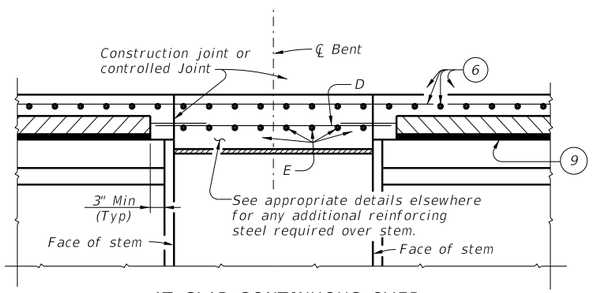
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BEAMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BEAMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BEAMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BEAMS

OPTION 1 ~ ELEVATIONS AT BEAM ENDS

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c.

(14) Max Spacing as listed unless otherwise shown.

(15) At connection with cast-in-place slab, extend longitudinal panel reinforcement. See PCP-FAB for details.

(16) Maintain one Bar E(#4) parallel to panel ends (Typ).

(17) Bars E(#4) not continuous over beam flanges must overlap beam flange 6" Min.

(18) Add flared Bars E(#4) (Min Spa = 6", Max Spa = 12") as required at panel ends.

(19) Where possible, Bars E(#4) may be extended into overhangs to replace Bars P(#4). Bars Z(#4) are required for sloped overhangs with U-Beams.

(20) See appropriate thickened slab end details for reinforcing and limits of thickened slab end.

TABLE OF REINFORCING STEEL (14)

BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18

HL93 LOADING

SHEET 3 OF 4

Texas Department of Transportation

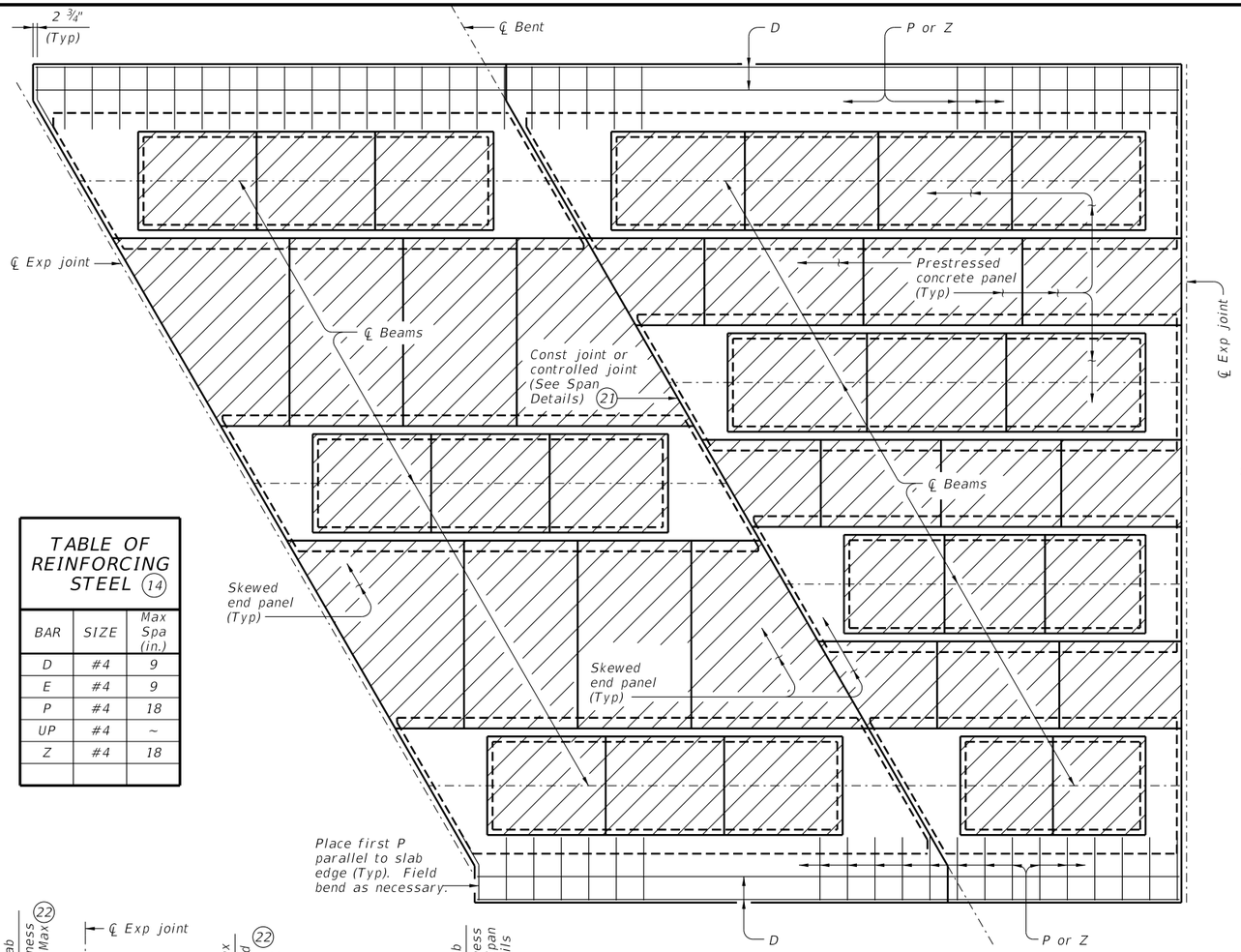
Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		173

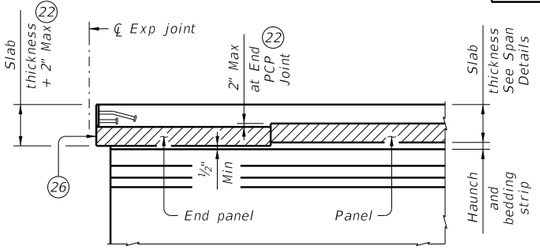
DATE:
FILE:



OPTION 2 ~ PLAN OF SLAB

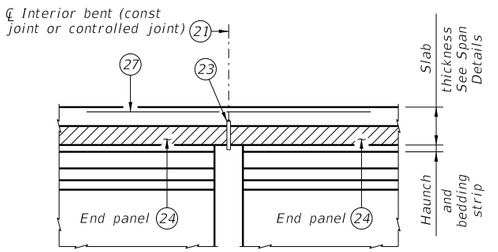
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



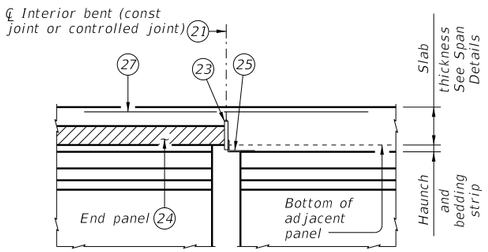
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-B, SEJ-M, SEJ-S(0), AJ, and Type A expansion joints only.



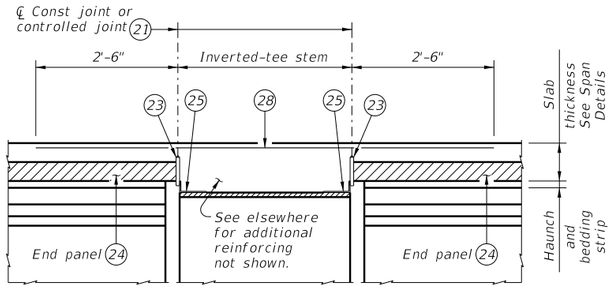
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

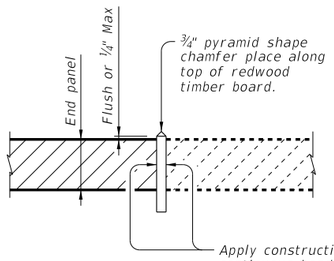
Panel against beam/girder end in adjacent span.



INVERTED-T BENT

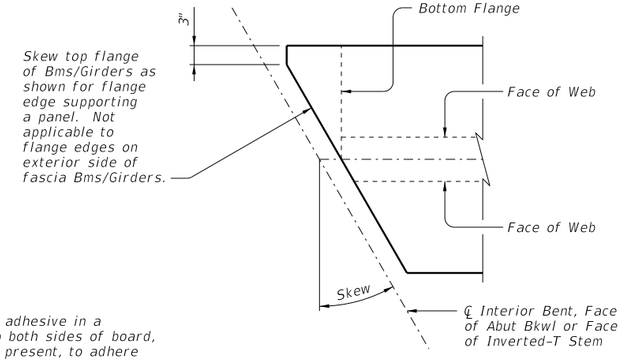
Panels against inverted-tee stem

OPTION 2 ~ ELEVATIONS AT BEAM ENDS (6)



ELEVATION EXAMPLE OF END PANEL AND TIMBER BOARD (23)

See "Option 2 ~ Elevation At Beam Ends".



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

Showing I-Beam/I-Girder, U-Beams and Steel Beams similar.

(6) See Span Details and Thickened Slab End Details for top slab reinforcement and clear cover. Transverse top slab reinforcement may rest on top of prestressed concrete panels if necessary to maintain clear cover.

(14) Max Spacing as listed unless otherwise shown.

(21) 1 ½" Vinyl or plastic joint former at controlled joints (Stress Cap, Zip Strip, Stress Lock, or equal as approved by the Engineer.)

(22) End panel may be set up to 2" lower to accommodate expansion joint hardware, provided bedding strip is not less than ½" thick.

(23) ¾" thick redwood timber board, leave in place. Redwood timber board placed flush with top of panel or within ¼" Max above panel. Place ¾" pyramid shape chamfer along top of timber board. See "Elevation Example of End Panel and Timber Board". Place straight, within ¼" of centerline of bent or face of inverted-tee, across bridge width and end board at exterior flange edge of fascia beams/girders. Do not extend into overhang.

(24) Place panel within ½" of ¾" thick board.

(25) Permanent galvanized steel sheet form. Removable formwork is acceptable.

(26) Place end panel within ½" of expansion joint opening. End panel cannot encroach on required expansion joint opening.

(27) Place additional (#4) bar 5'-0" in length between every slab Bars T. Center (#4) bar on Joint.

(28) Place additional (#4) bar continuous 2'-6" beyond each side of Inverted-T Stem between every slab bars T.

SPECIAL OPTION 2 CONSTRUCTION NOTES:

When Option 2 is chosen bottom mat of thickened end slab reinforcing is not required. Use the same top mat as shown on the Thickened Slab End Details sheet.

Placing panels adjacent to expansion joints and bent centerlines prior to completing interior panel placement is recommended. Saw cutting panels to fit is acceptable when approved by the Engineer. Minimum distance from a saw cut edge to a panel strand is 1 ½".

Do not extend the longitudinal panel reinforcement into the cast-in-place slab.

Top flanges of beams and girders on skewed bridges must be modified as shown on this drawing. The Contractor is responsible for coordinating this modification with the beam fabricator prior to submitting shop drawings for approval.

Fabricator may optionally skew the whole end. When electing to skew whole end, girder end details and bearing type at conventional interior bent must be changed to use condition at abutment. Fabricator must coordinate change in bearing type, bearing centerline location, and dowel location with Engineer and Contractor. Show appropriate changes on girder and bearing shop drawings.

Bending of anchor studs of expansion joints shown on standards AJ, SEJ-B, SEJ-M, and SEJ-S(0) is permissible if necessary to clear top of end panels. The Contractor is responsible for coordinating modifications with the joint fabricator. Submit shop drawings for approval when modifications to expansion joint hardware are made.

Bedding strips under skewed end panels must conform to the requirements of Item 422 except their minimum compressive strength must be 60 psi.

Provide Bars AA, G, K and OA from standard IGTS in the slab.

HL93 LOADING

Texas Department of Transportation

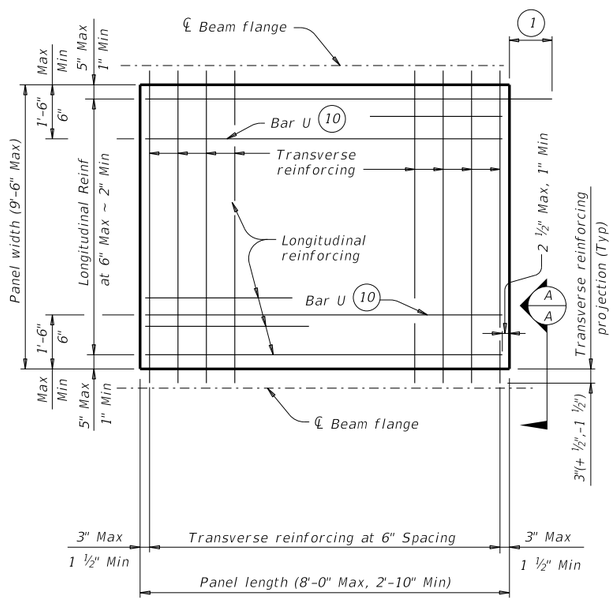
Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

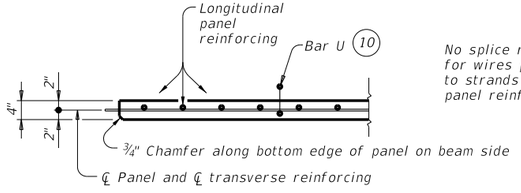
PCP

FILE: MS-PCP-23.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		174

DATE:
FILE:

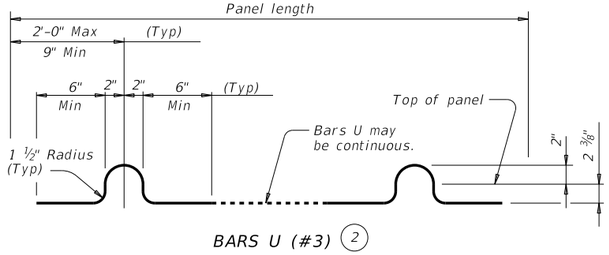


TYPICAL NON-SKEWED PANEL PLAN

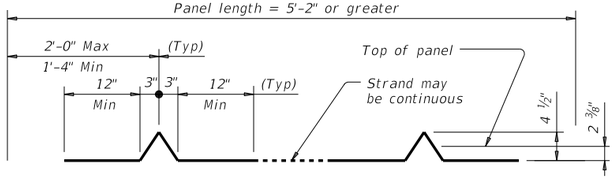


SECTION A-A

(Not showing supplemental #4 bars for skewed end panels.)

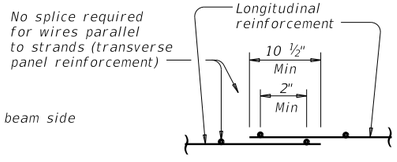


BARS U (#3) 2



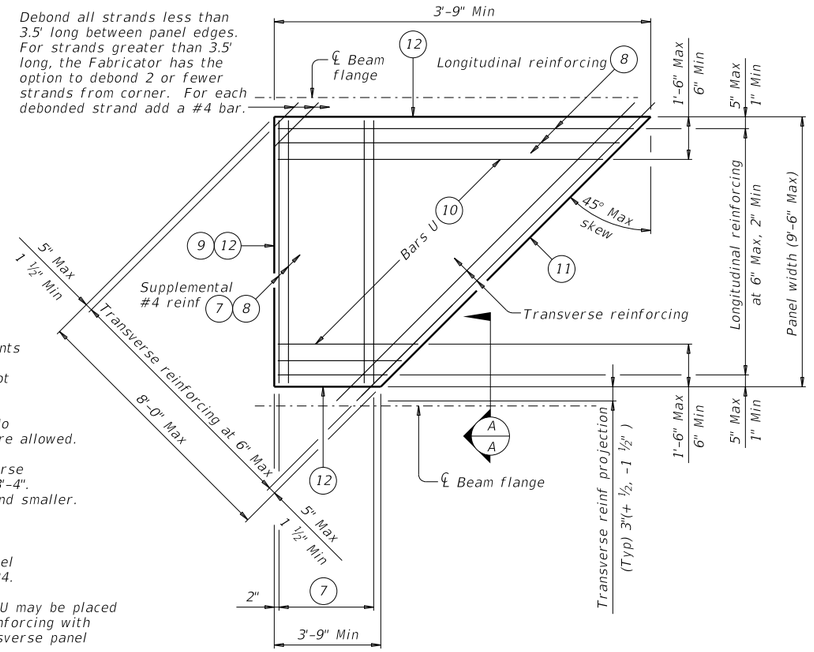
OPTIONAL STRAND FOR BARS U 3

1. At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
2. Four loops required per panel.
3. Four loops required per panel. ⅜" or ½" strands may be used.
4. Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
5. See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
6. One Splice allowed per panel. No more than two sheets of WWR are allowed.
7. Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
8. End Cover 2 ½" Max, 1" Min.
9. Recess strands on indicated panel edge in accordance with Item 424.
10. At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
11. Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
12. Timber form work permissible this edge.



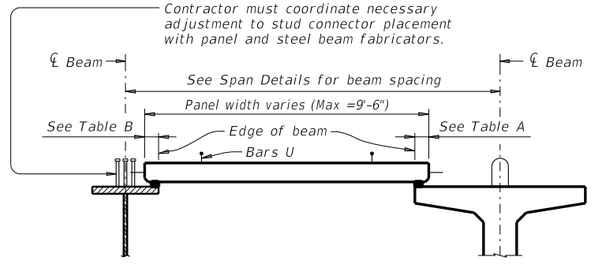
WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL 6

Debond all strands less than 3.5' long between panel edges. For strands greater than 3.5' long, the Fabricator has the option to debond 2 or fewer strands from corner. For each debonded strand add a #4 bar.



TYPICAL SKEWED END PANEL PLAN

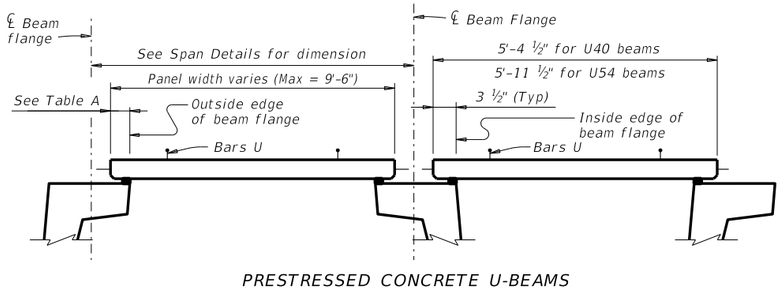
(Only to be used with details shown elsewhere in the plans.)



STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

Typ unless noted otherwise



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½"	8 ½
U40 – 54	5 ½	5 ½	7
Tx28-70	6	5	7 ½
XB20 – 40	4	3	4 ½
XSB12 – 15	4	3	4 ½

TABLE B (4) (5)			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3,500 psi. Minimum 28 day strength f'c=5,000 psi.

Provide ¾" chamfer along bottom edge of panel on beam side.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No. 6 and No. 9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, (#4) Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use (#4) Grade 60 reinforcing bars (prestressed strands alone are not allowed).

Place transverse panel reinforcement at panel centroid and space at 6" Max.

LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

No combination of longitudinal reinforcement options in a panel is allowed.

Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental (#4) reinforcement.

HL93 LOADING

Texas Department of Transportation

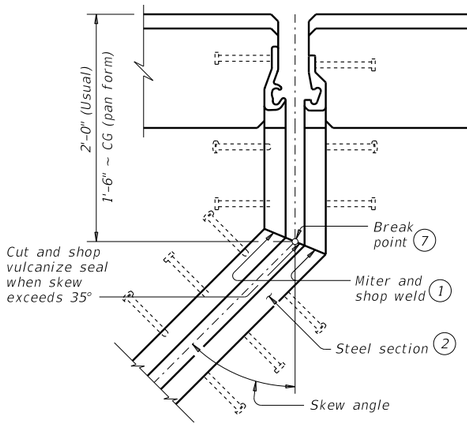
Bridge Division Standard

PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

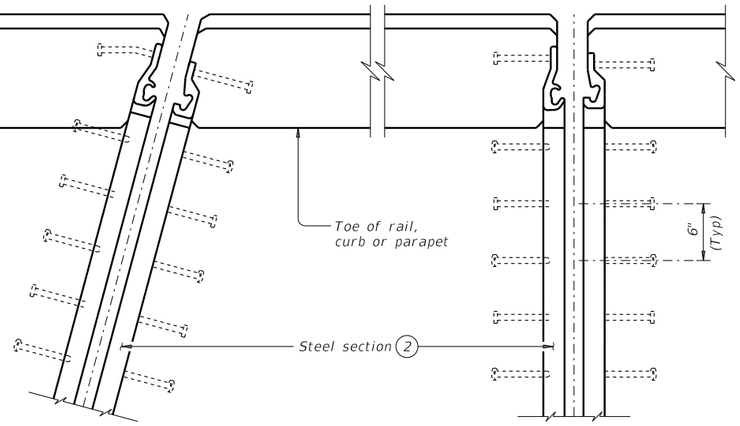
PCP-FAB

FILE: MS-PCP-FAB-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: AES
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		175

DATE:
FILE:



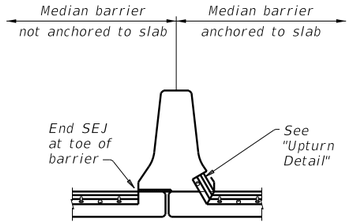
SHOWING SKEWS WITH SLAB BREAKBACKS



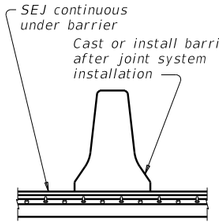
SHOWING SKEWS WITHOUT SLAB BREAKBACKS

SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

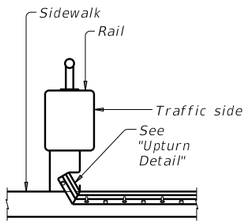
PLANS OF END CONDITIONS



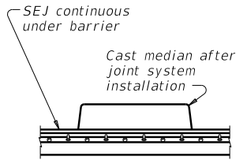
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



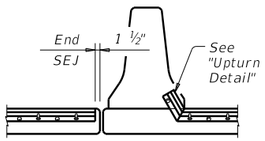
AT MEDIAN BARRIER



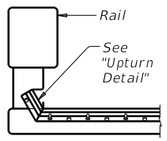
AT SIDEWALK BEHIND BRIDGE RAIL



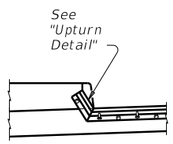
AT RAISED MEDIAN



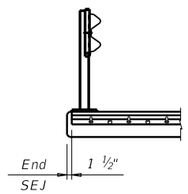
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

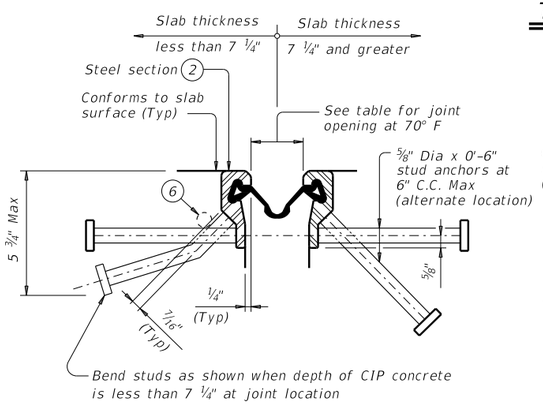


AT SIDEWALK

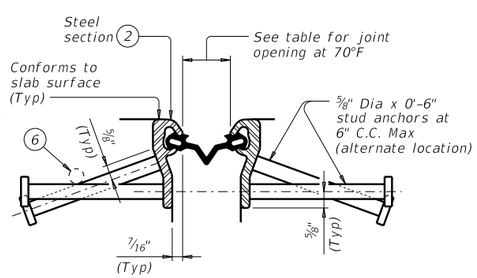


AT STEEL POST BRIDGE RAIL

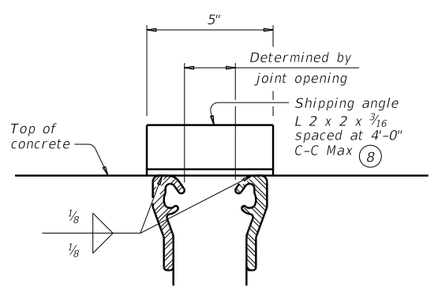
TYPICAL SECTIONS (5)



SECTION THRU WATSON BOWMAN ACME (SE-400 OR SE-500) JOINTS



SECTION THRU D.S. BROWN (A2R-400 OR A2R-XTRA) JOINTS



SHOWING D.S. BROWN (Ty SSCM2)
(All joints are similar.) (Studs are not shown for clarity.)

SHIPPING ANGLE

An alternate method of securing joint sections may be used if approved by the Bridge Division. Erection bolts are not allowed.

TABLE OF SEALED EXPANSION JOINT INFORMATION

MANUFACTURER	STEEL SECTION (2)	STRIP SEAL			
		4" JOINT		5" JOINT	
		Seal Type	Joint Opening (3)	Seal Type	Joint Opening (3)
D.S. Brown	Type SSCM2	A2R-400	1 ¾"	A2R-XTRA	2"
Watson Bowman Acme	Type R	SE-400	1 ¾"	SE-500	2"

REDUCED LONGITUDINAL MOVEMENT RANGE

SKEW (deg)	JOINT SIZE	
	4"	5"
0	4.0"	5.0"
15	4.0"	5.0"
30	3.5"	4.3"
45	2.8"	3.5"

DESIGN NOTES:

Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).

(1) Remove all burrs which will be in contact with seal prior to making splice.

(2) Shape of steel section shown is typical. Variations in sections must be approved by the Engineer.

(3) These openings are also the recommended minimum installation openings.

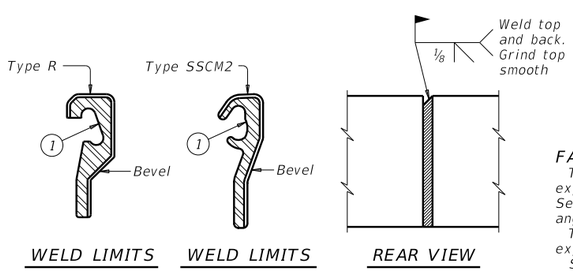
(4) Reduce for sidewalk or parapet heights less than 6".

(5) Other conditions affecting the joint profile should be noted elsewhere.

(6) Move transverse bars that are in conflict with SEJ studs, in either the bridge slab or approach slab, to rest at the junction of the studs.

(7) See Span details for location of break point.

(8) Align shipping angle perpendicular to joint.



WELD LIMITS WELD LIMITS REAR VIEW

FIELD SPLICE DETAIL

FABRICATION NOTES:

Temporarily shop assemble corresponding sections of sealed expansion joints (SEJ), check for fit, and match mark for shipment. Secure corresponding sections together for shipment with shipping angle. Do not use erection bolts.

The seal must be continuous and included in the price bid for sealed expansion joint.

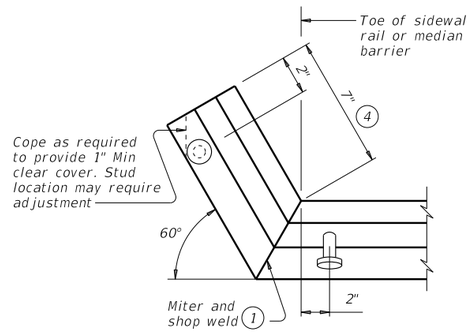
Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min and 4" Max.

Weld studs in accordance with AWS D1.1.

Butt weld all shop and field splices and grind smooth areas in contact with seal. Make all necessary field splice joint preparations in the shop.

Paint the entire steel section with System II or IV primer in accordance with Item 446, "Field Cleaning and Painting Steel", unless required to galvanize when shown in the plans. Provide galvanizing in accordance with Item 445, "Galvanizing". Provide paints in accordance with Item 446.2. Prepare steel and apply paint in accordance with Item 446.4.7.3 and 446.4.7.4.

Shop drawings for the fabrication of sealed expansion joints will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.



UPTURN DETAIL

CONSTRUCTION NOTES:

Secure the sealed expansion joint in position and place to the proper grade and alignment by welding braces to adjacent reinforcing steel, to prestressed beam stirrups, or to anchors cast in concrete diaphragms. Include cost of temporary bracing in the price bid for sealed expansion joint.

Remove shipping angle immediately after each joint half is secured in place. Grind smooth, and touch up with organic zinc-rich paint.

Clean and prepare seal cavity for seal installation as per the Manufacturer's installation procedures.

GENERAL NOTES:

Provide sealed expansion joints in the size and at locations shown on the plans.

Minimum slab and overhang thickness required for the use of SEJ-M is 6 ½".

Texas Department of Transportation

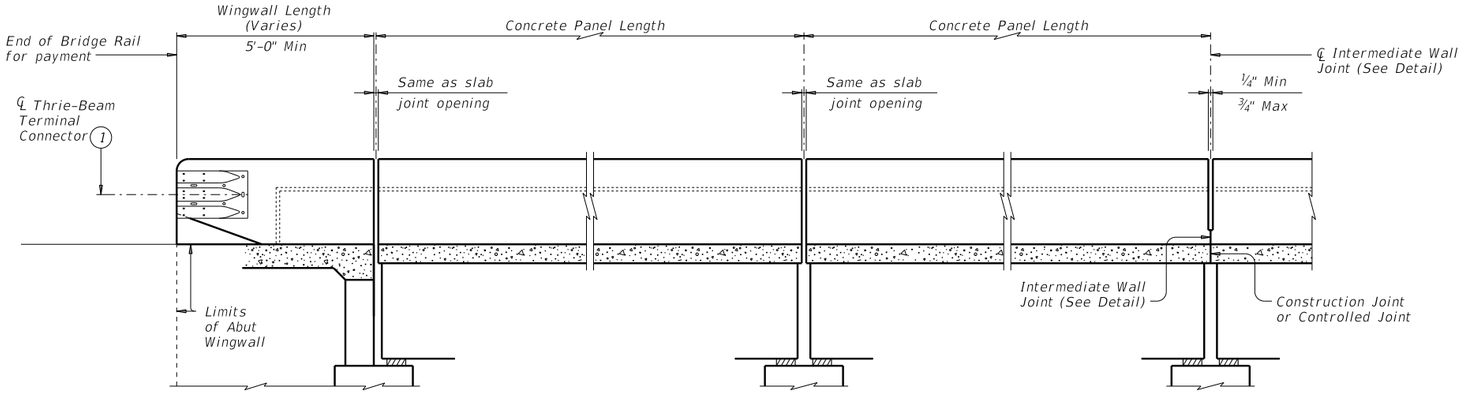
Bridge Division Standard

SEALED EXPANSION JOINT TYPE M WITHOUT OVERLAY

SEJ-M

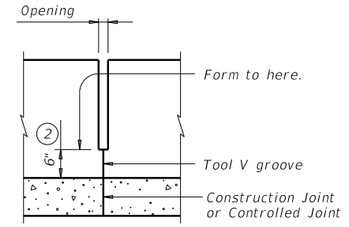
FILE: MS-SEJ-M-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		176

DATE:
FILE:



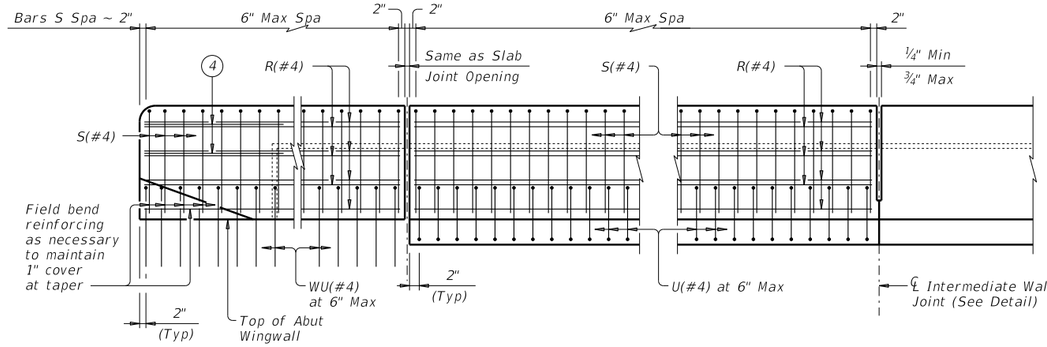
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

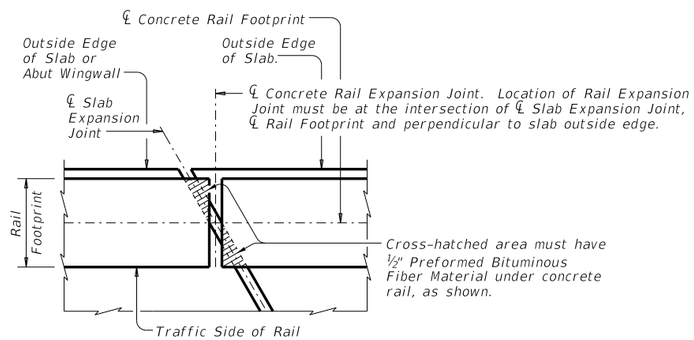


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



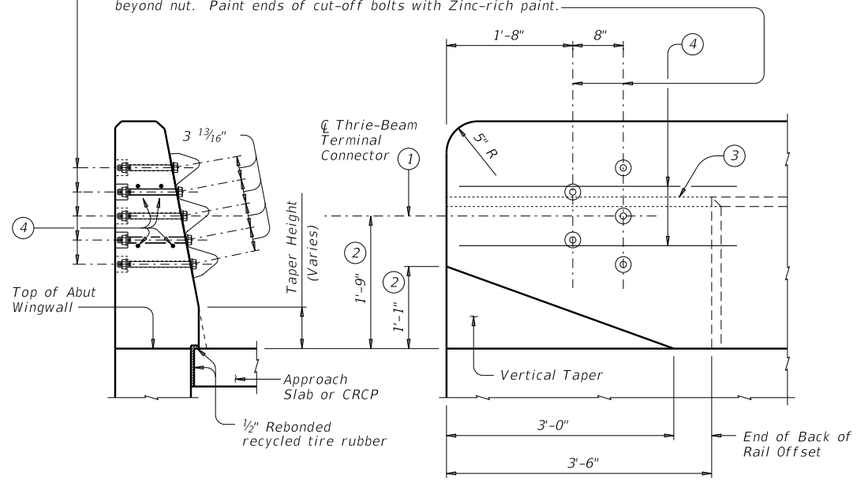
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

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

Texas Department of Transportation

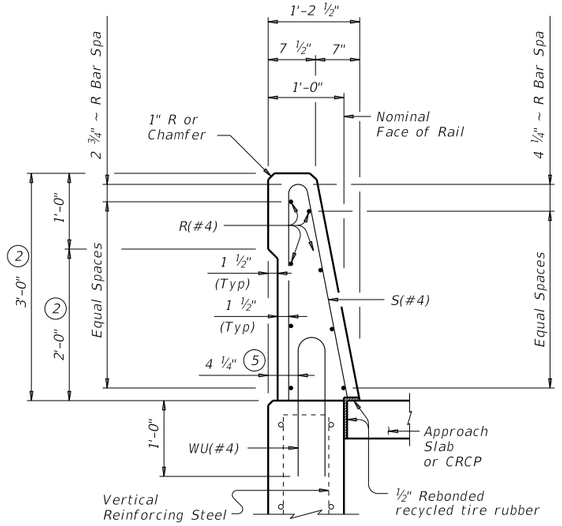
Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

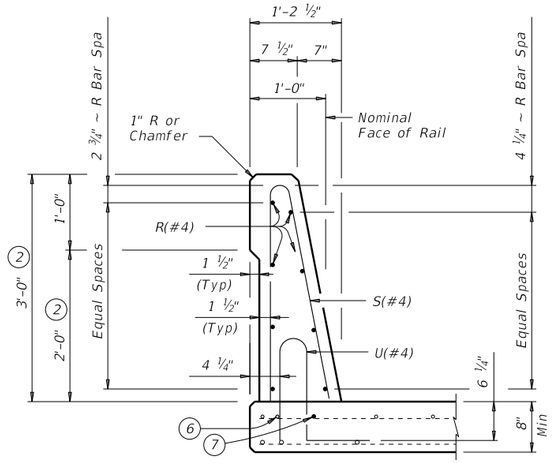
TYPE SSTR

FILE: RL-SSTR-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT.	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		177

DATE:
FILE:



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(5) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

(6) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

(7) Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.

(8) No longitudinal wires may be within upper bend.

(9) Bend or cut as required to clear drain slots.

(10) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greater to side slot drain.

CONSTRUCTION NOTES:

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

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

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

MATERIAL NOTES:

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

Provide Grade 60 reinforcing steel.

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

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

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #4 = 1'-7"

Epoxy coated ~ #4 = 2'-5"

GENERAL NOTES:

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

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

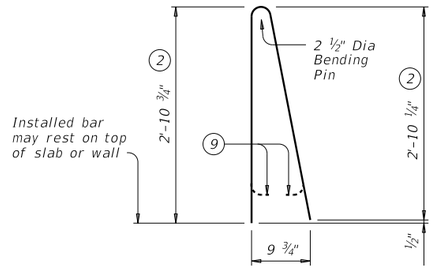
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

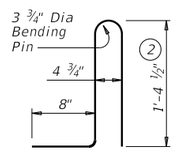
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

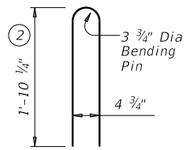
Reinforcing bar dimensions shown are out-to-out of bar.



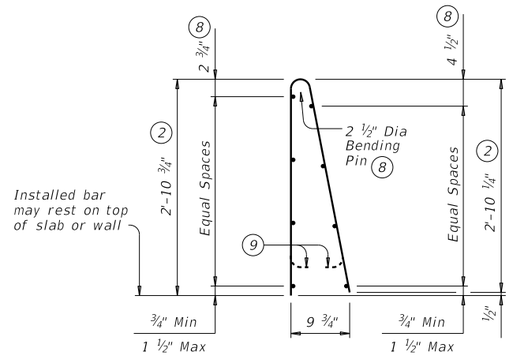
BARS S (#4)



BARS U (#4)

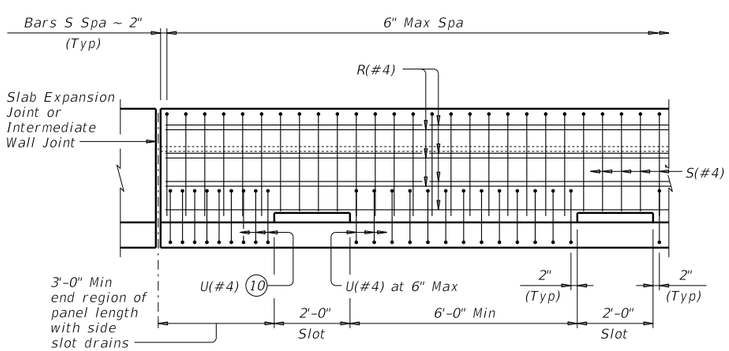


BARS WU (#4)



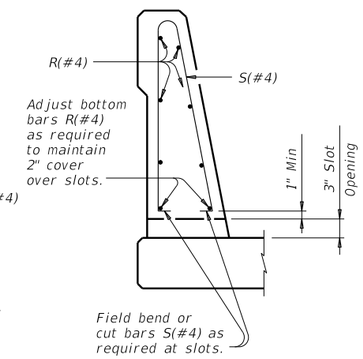
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

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



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: RL-SSTR-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		178

CK:
DW:
CK:
DW:

1 BEGIN Ⓐ & SHOULDER RUMBLE STRIPS
℄ SH70 STA 184+26.38

2 BEGIN ⒷⒸ & CENTERLINE RUMBLE STRIPS
℄ SH70 STA 184+26.38

3 END SHOULDER RUMBLE STRIPS
℄ SH70 STA 185+57.61

4 END CENTERLINE RUMBLE STRIPS
℄ SH70 STA 185+57.61

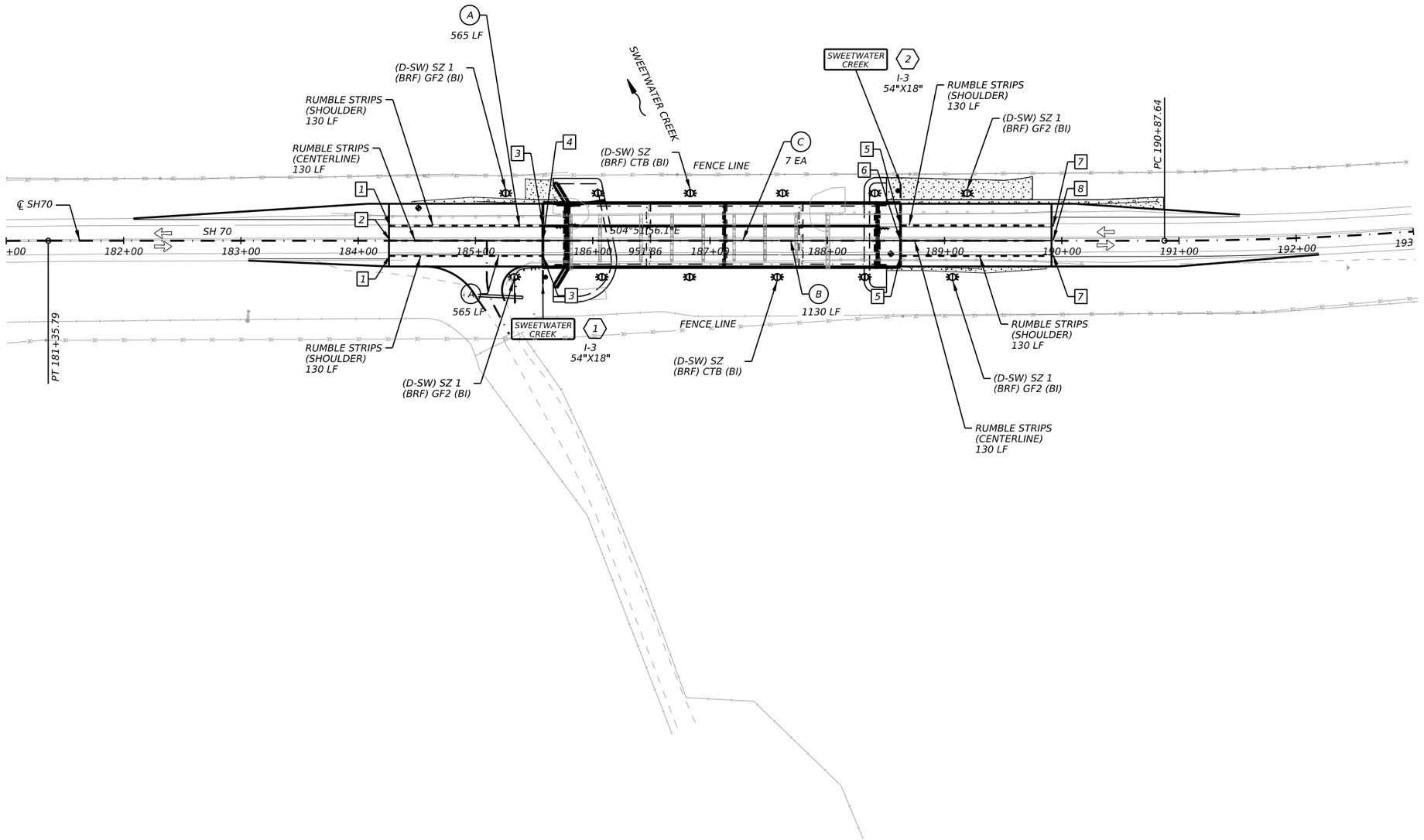
5 BEGIN SHOULDER RUMBLE STRIPS
℄ SH70 STA 188+62.61

6 BEGIN CENTERLINE RUMBLE STRIPS
℄ SH70 STA 188+62.61

7 END Ⓐ & SHOULDER RUMBLE STRIPS
℄ SH70 STA 189+91.38

8 END ⒷⒸ & CENTERLINE RUMBLE STRIPS
℄ SH70 STA 189+91.38

0 50 100
SCALE IN FEET



LEGEND

- Ⓐ 6" SLD (W)
- Ⓑ 6" DBL SLD (Y)
- Ⓒ REFL PAV MRKR TY II-A-A
- BIDIRECTIONAL DELINEATOR (GF2 OR CTB)
- SIGN
- X SIGN NUMBER
- DIRECTION OF TRAFFIC
- DIRECTION OF CREEK FLOW
- RUMBLE STRIPS

NOTES

1. CONTRACTOR TO REFER TO D&OM(5)-20 FOR OBJECT MARKER PLACEMENT AND SPACING.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

SWEETWATER CREEK SIGNING & PAVEMENT MARKING LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		179

DATE: 6/28/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WXN4706 - ABL Bridges/30 Project Data/SH70/Traffic/Sheets/Pavement Markings/SH70_PM01.dgn

CK:
DW:
CK:
DW:

DATE: 6/28/2024
FILE: pw://jacobs-US-VA.PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Traffic/Sheets/Pavement Markings/SH70_PM02.dgn

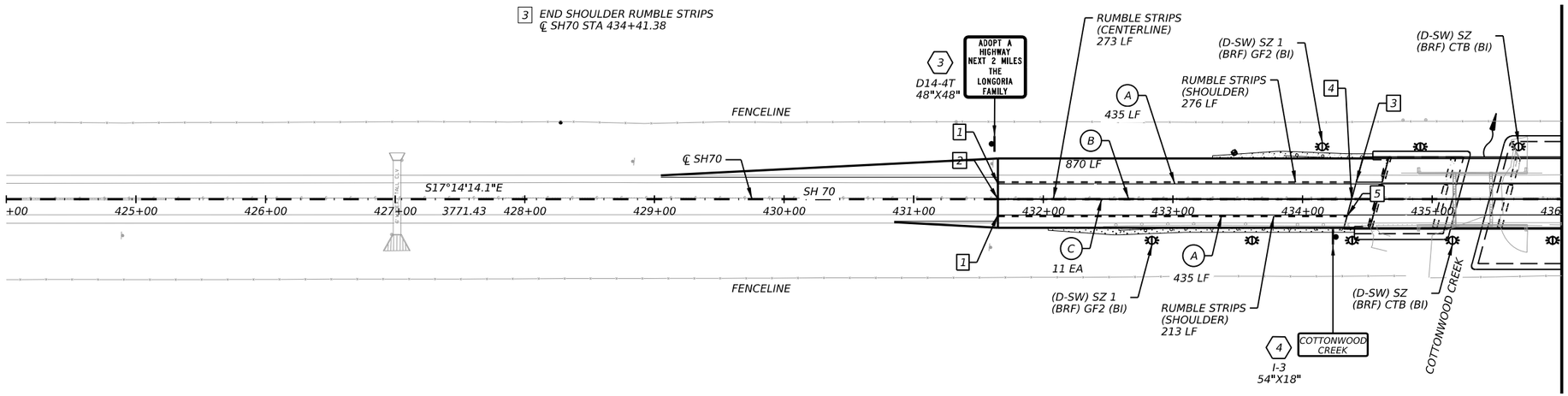
1 BEGIN (A) & SHOULDER RUMBLE STRIPS
℄ SH70 STA 431+65.00

2 BEGIN (B)(C) & CENTERLINE RUMBLE STRIPS
℄ SH70 STA 431+65.00

3 END SHOULDER RUMBLE STRIPS
℄ SH70 STA 434+41.38

4 END CENTERLINE RUMBLE STRIPS
℄ SH70 STA 434+37.90

5 END SHOULDER RUMBLE STRIPS
℄ SH70 STA 433+78.49



0 50 100
SCALE IN FEET

LEGEND

- (A) 6" SLD (W)
- (B) 6" DBL SLD (Y)
- (C) REFL PAV MRKR TY II-A-A
- BIDIRECTIONAL DELINEATOR (GF2 OR CTB)
- SIGN
- (X) SIGN NUMBER
- DIRECTION OF TRAFFIC
- DIRECTION OF CREEK FLOW
- RUMBLE STRIPS

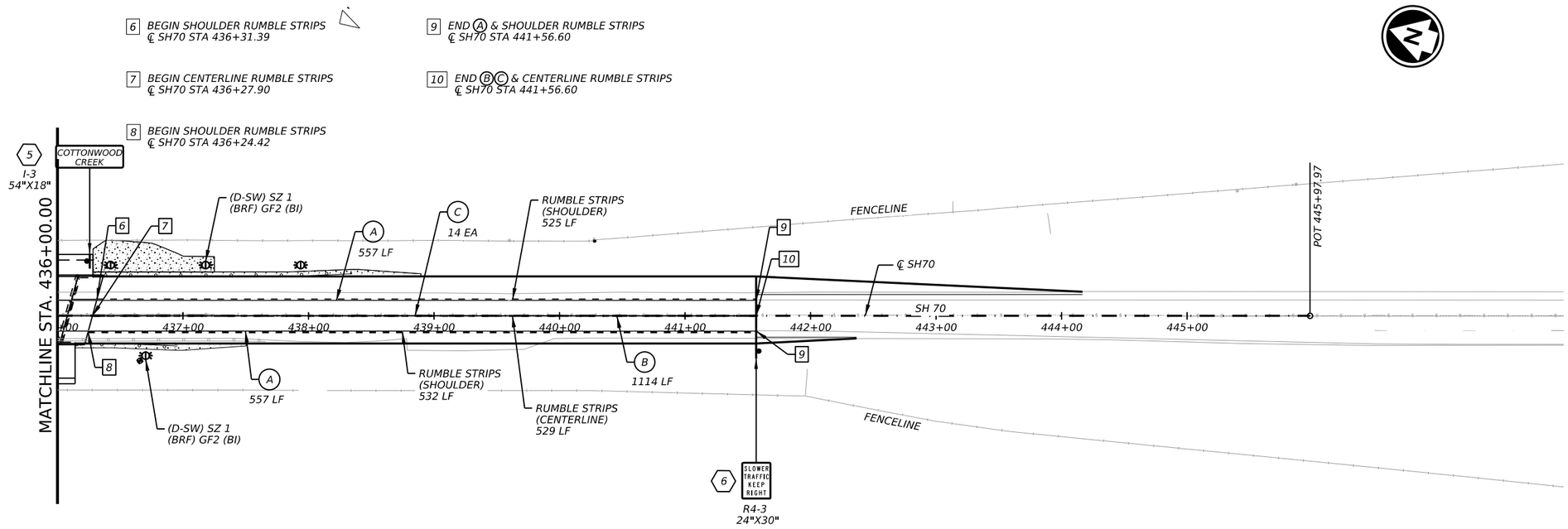
6 BEGIN SHOULDER RUMBLE STRIPS
℄ SH70 STA 436+31.39

7 BEGIN CENTERLINE RUMBLE STRIPS
℄ SH70 STA 436+27.90

8 BEGIN SHOULDER RUMBLE STRIPS
℄ SH70 STA 436+24.42

9 END (A) & SHOULDER RUMBLE STRIPS
℄ SH70 STA 441+56.60

10 END (B)(C) & CENTERLINE RUMBLE STRIPS
℄ SH70 STA 441+56.60



NOTES

1. CONTRACTOR TO REFER TO D&OM(5)-20 FOR OBJECT MARKER PLACEMENT AND SPACING.

Jorge Gonzalez
STATE OF TEXAS
JORGE GONZALEZ
119457
LICENSED
PROFESSIONAL ENGINEER

6/28/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

COTTONWOOD CREEK SIGNING & PAVEMENT MARKING LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		180

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	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	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
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"		TY N TY S
179	1	I-3	SWEETWATER CREEK	54" X 18"	X		TWT	1	WS	T		
179	2	I-3	SWEETWATER CREEK	54" X 18"	X		TWT	1	WS	T		
180	3	D14-4T	ADOPT A HIGHWAY NEXT 2 MILES THE LONGORIA FAMILY	48" X 48"	X		10BWG	1	SA	T		
180	4	I-3	COTTONWOOD CREEK	54" X 18"	X		TWT	1	WS	T		
180	5	I-3	COTTONWOOD CREEK	54" X 18"	X		TWT	1	WS	T		
180	6	R4-3	SLOWER TRAFFIC KEEP RIGHT	24" X 30"	X		10BWG	1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

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).

DATE:
FILE:

Texas Department of Transportation

Traffic Operations Division Standard

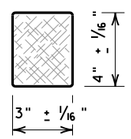
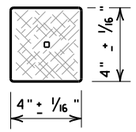
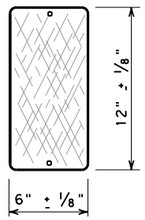
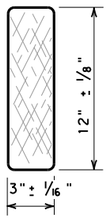
SUMMARY OF SMALL SIGNS

SOSS

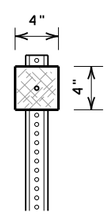
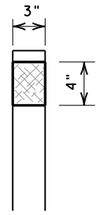
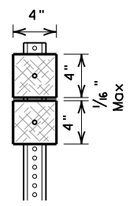
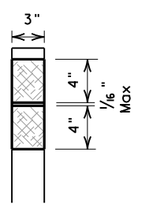
FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
4-16	DIST	COUNTY		SHEET NO.
8-16	ABL	NOLAN		181

DATE: 5/16/2024 4:33:20 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 4thABL SPRINGS\30 THE PROJECT\07 SHRO\TRAFFIC\SHEET\SHEET 257 D&OM(1)-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
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

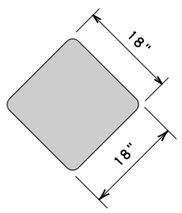
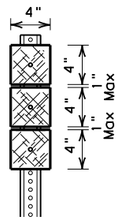
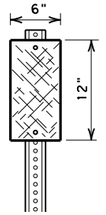
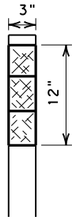
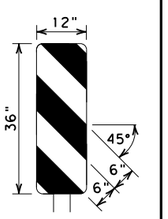
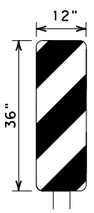
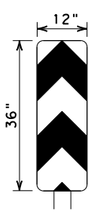
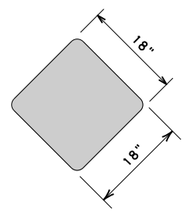
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

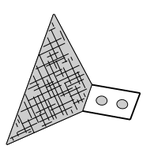
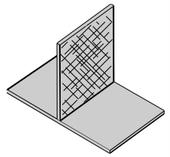
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

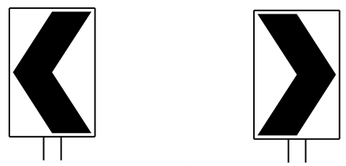
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			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

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
NOTE	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
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

DEVICE



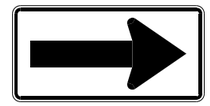
W1-8

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	

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).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

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.

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

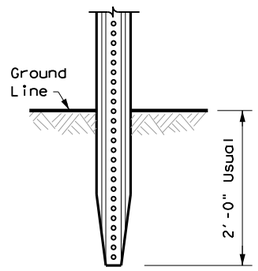
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ABL	NOLAN		182

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

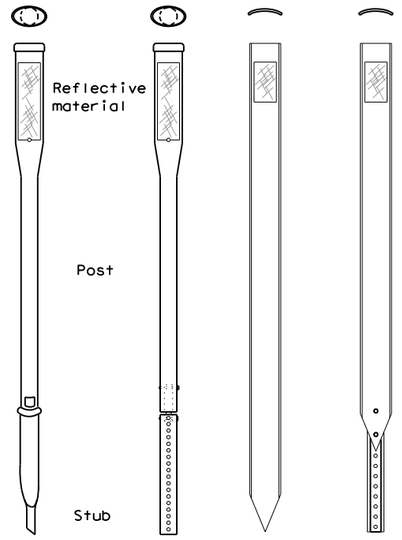


NOTES

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.

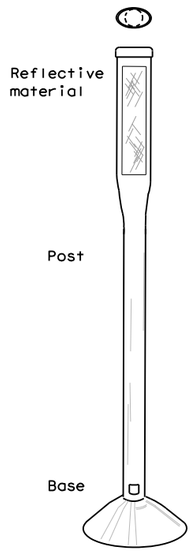
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



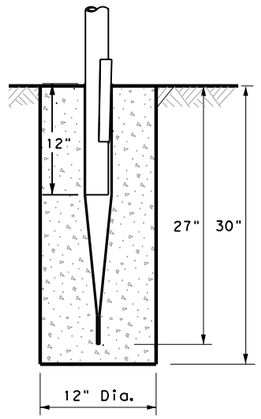
SURFACE MOUNT

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.

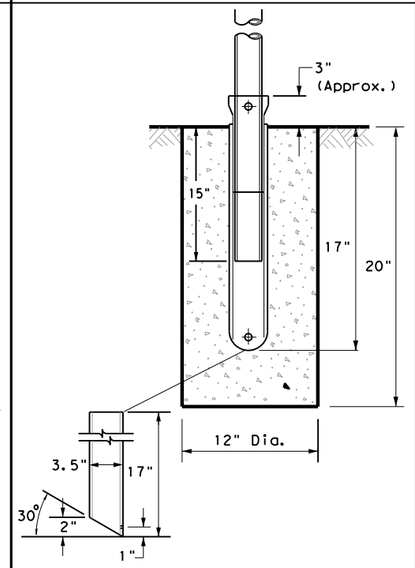
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

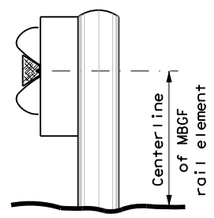
NOTE

1. Install per manufacturer's recommendations.

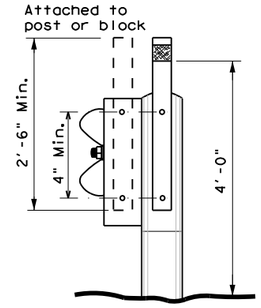
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

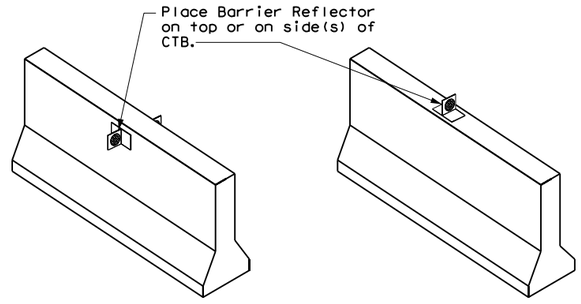
GF1



GF2



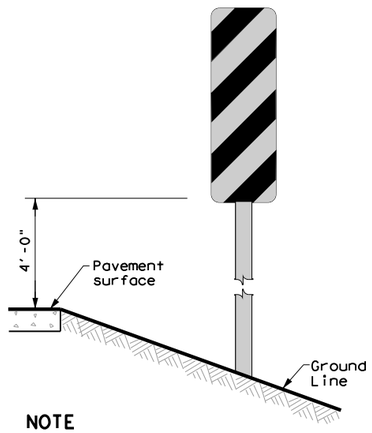
CONCRETE TRAFFIC BARRIER (CTB)



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.

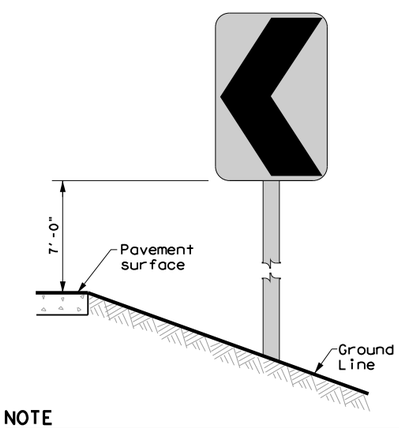
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

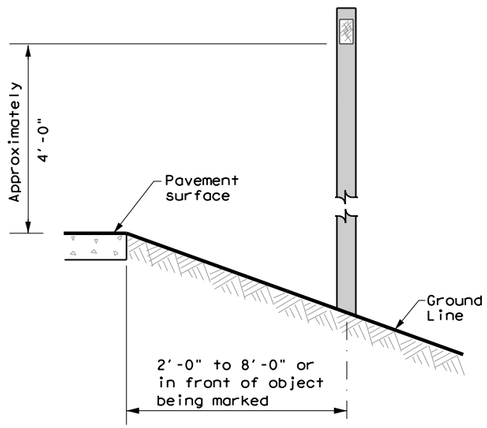
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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	0264	01	046, ETC	SH 70
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ABL	NOLAN		183

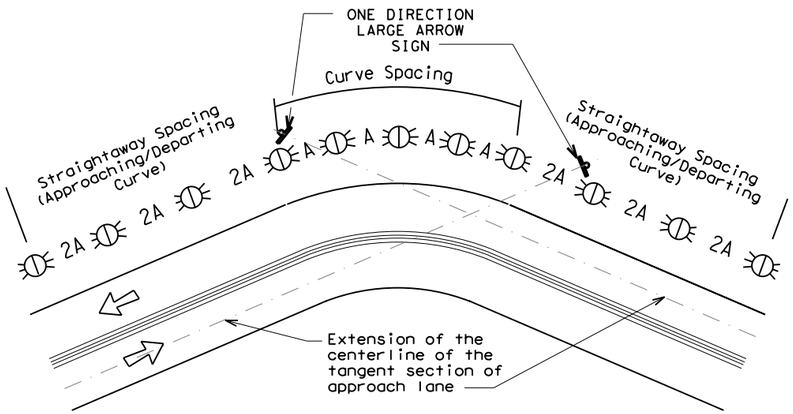
20B

DATE: 5/16/2024 4:33:46 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 th ABL SPRIGGS%20PKWY/Traffic/Sheets/SH70 ABL SPRIGGS%20PKWY 0264-01-046 ETC DOM3-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

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

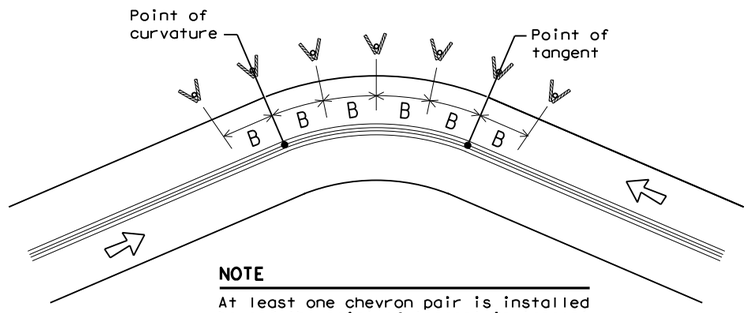
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

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

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

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

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

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

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

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

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

NOTES

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	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

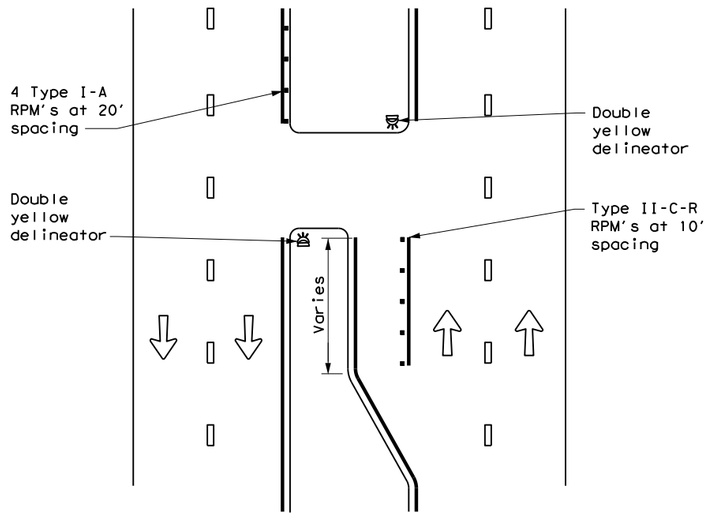
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		184

20C

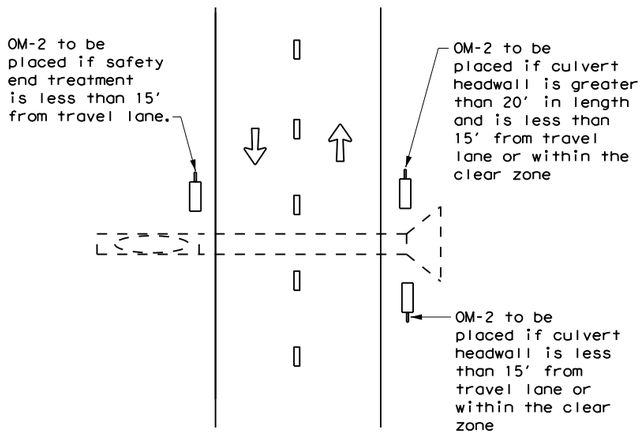
DATE: 5/16/2024 4:33:58 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 ABL SPRINGS/Projects/SHRO/Technical/SHEET 1 OF 2 D&OM(4)-20.dgn

CROSSOVERS



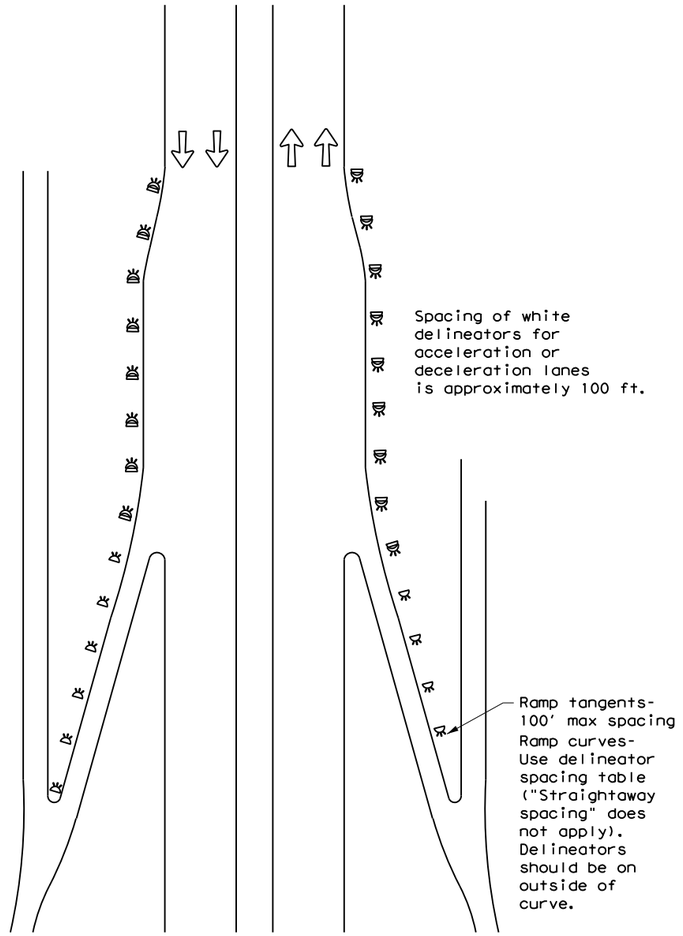
DETAIL 1

FOR CULVERTS WITHOUT MBGF



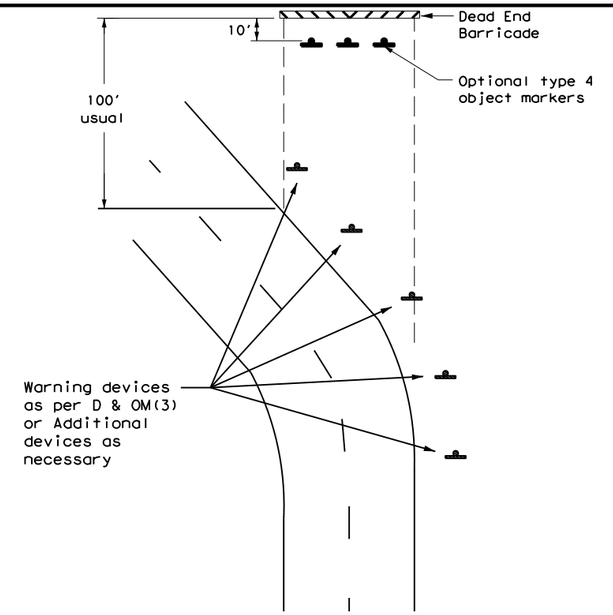
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



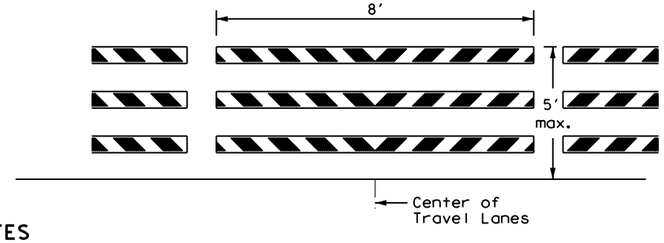
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

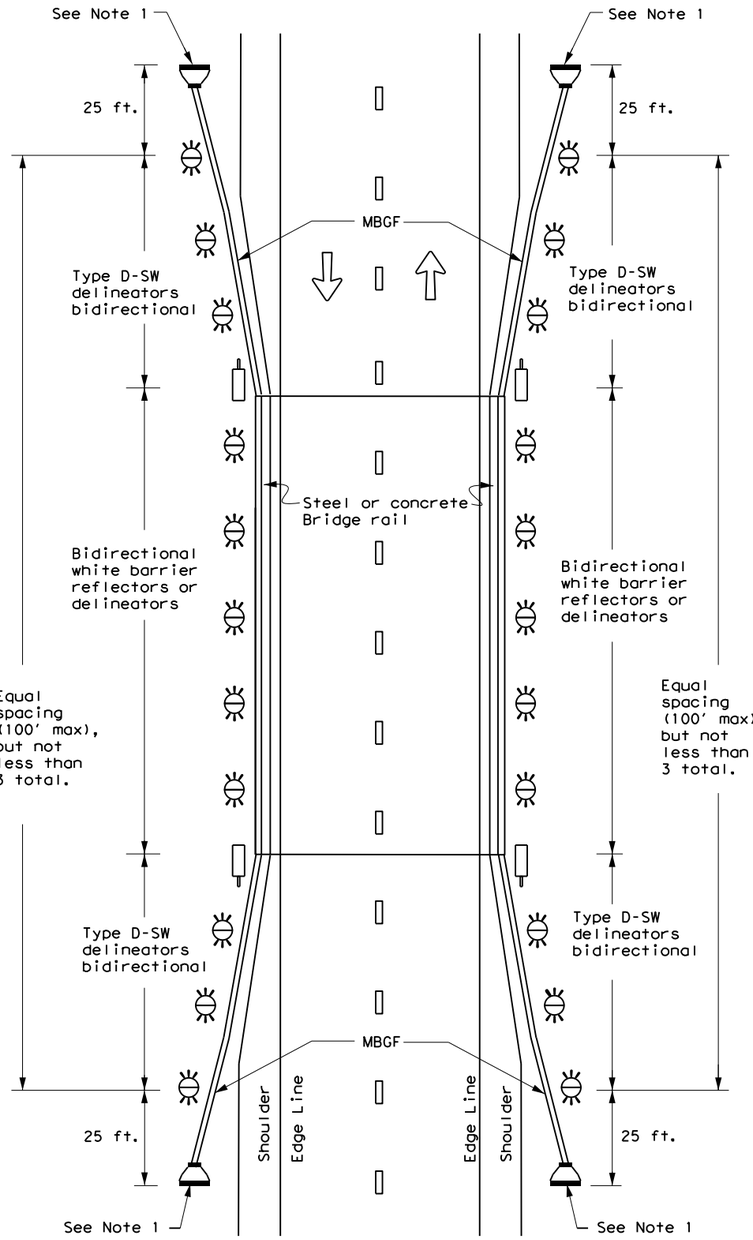
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
3-15	DIST	COUNTY		SHEET NO.
7-20	ABL	NOLAN		185

20D

DATE: 5/16/2024 4:34:10 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 ABL SH 70 Bridges/Design/Traffic/Safety/Delineator/dom5-20.dgn

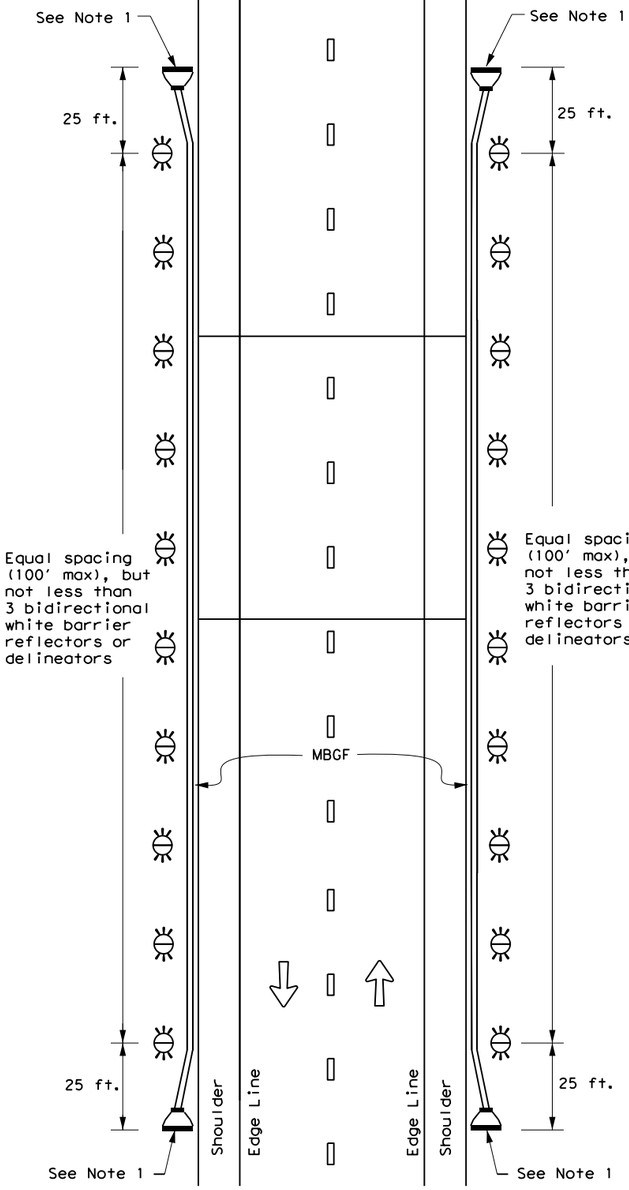
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

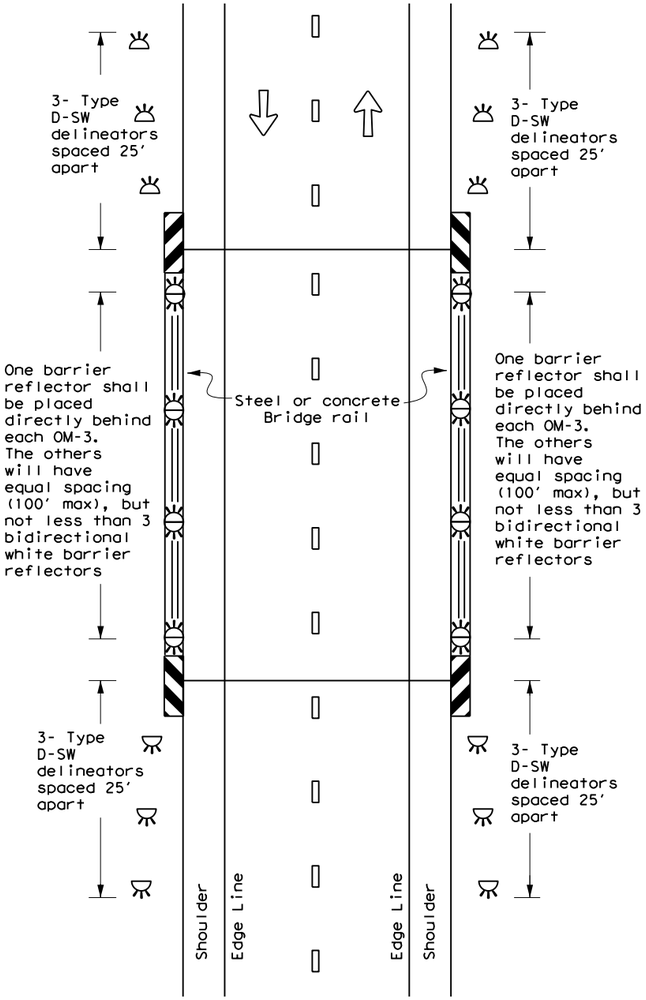
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

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

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

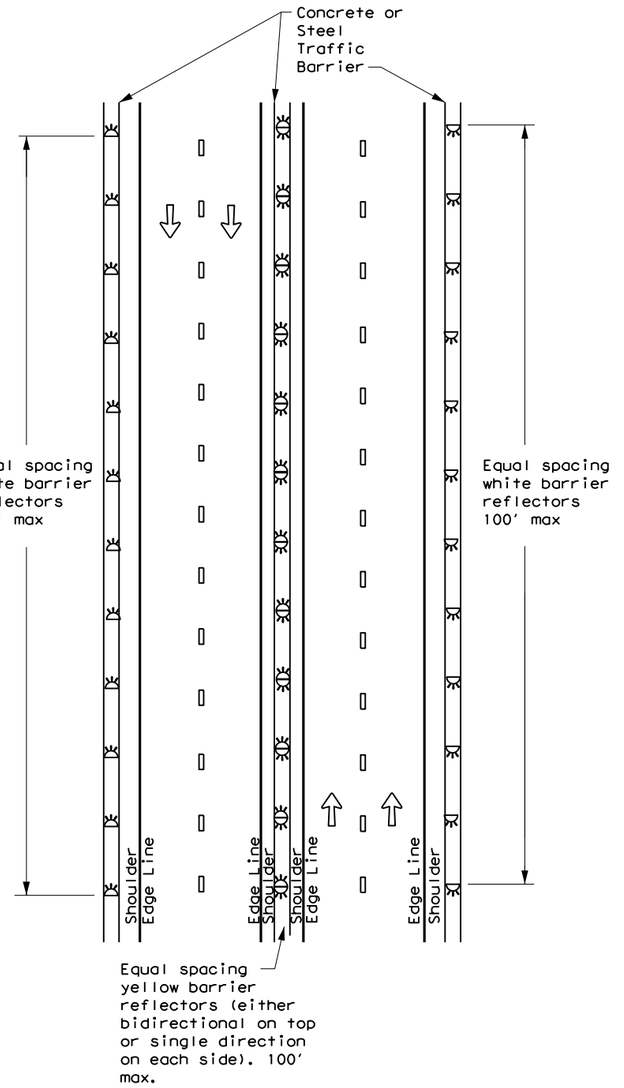
D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
7-20	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		186

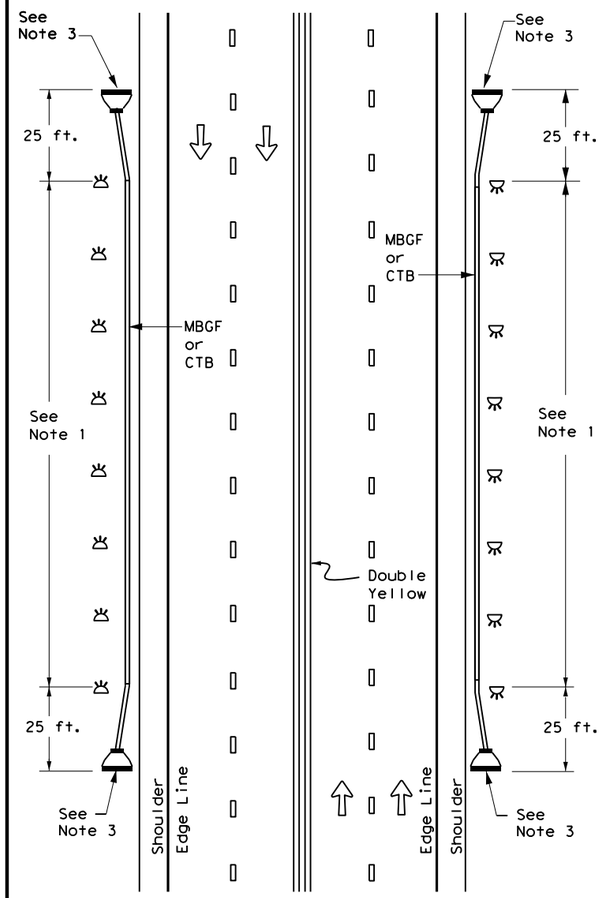
20E

DATE: 5/16/2024 4:34:25 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 4thABL SPRNGS/30 PROJECTS/SHRO/Permit/Sheet 1 of 2 dom6-20.dgn

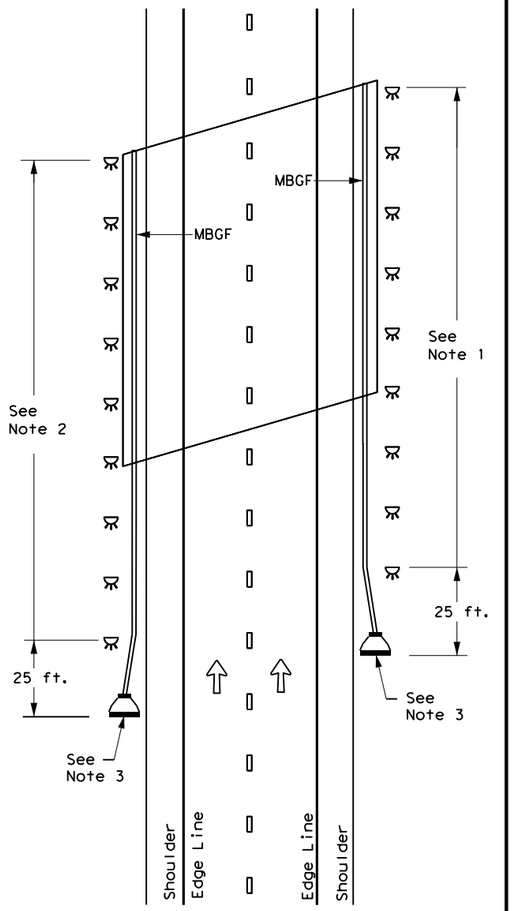
CONTINUOUS CONCRETE OR STEEL BARRIER



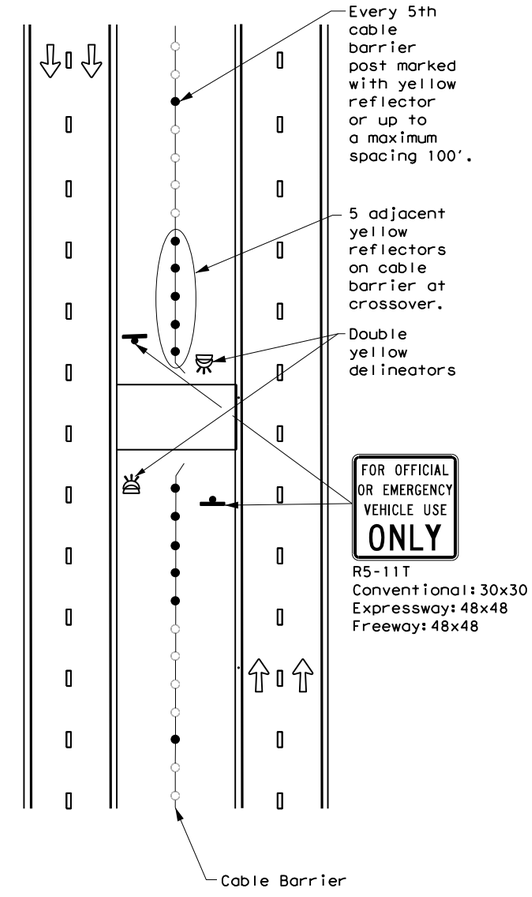
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

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

LEGEND

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

Texas Department of Transportation

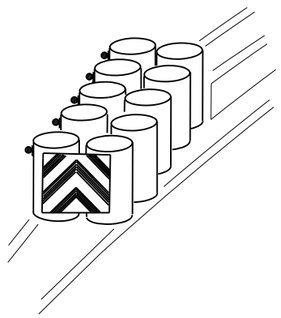
Traffic Safety Division Standard

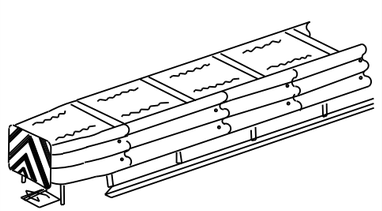
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

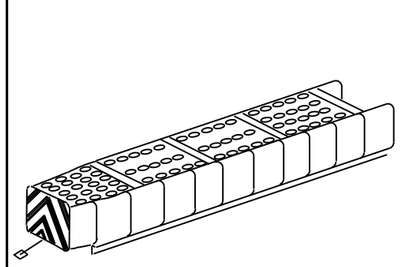
D & OM(6)-20

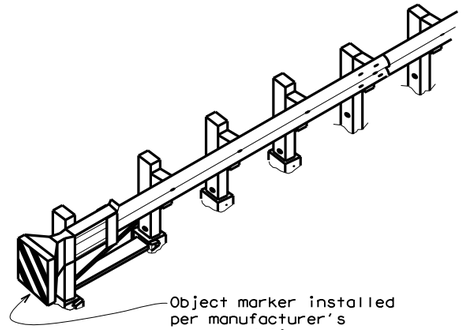
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
7-20	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		187

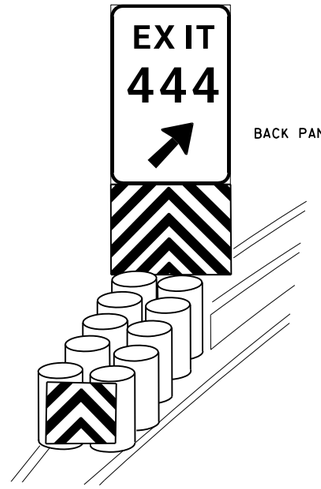
DATE: 5/16/2024 4:34:41 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN170d ABL SHEET 25 of 26.dgn

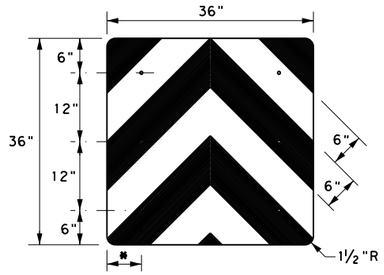


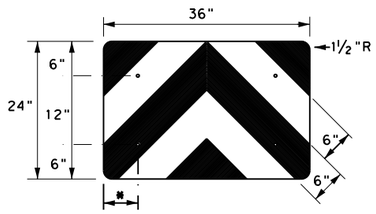




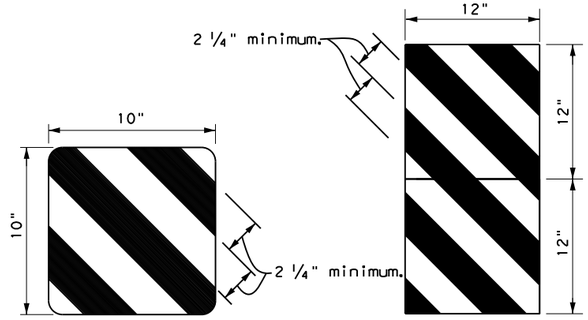




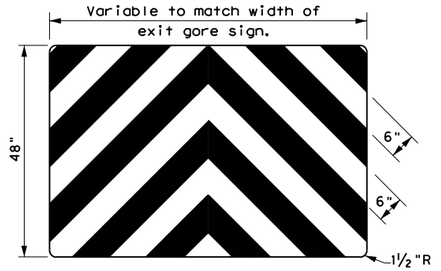


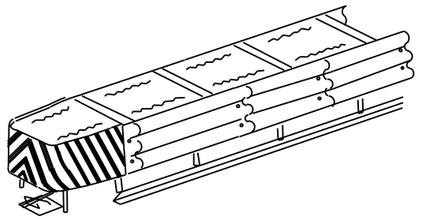


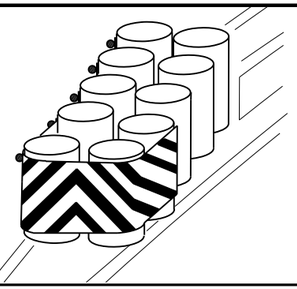
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

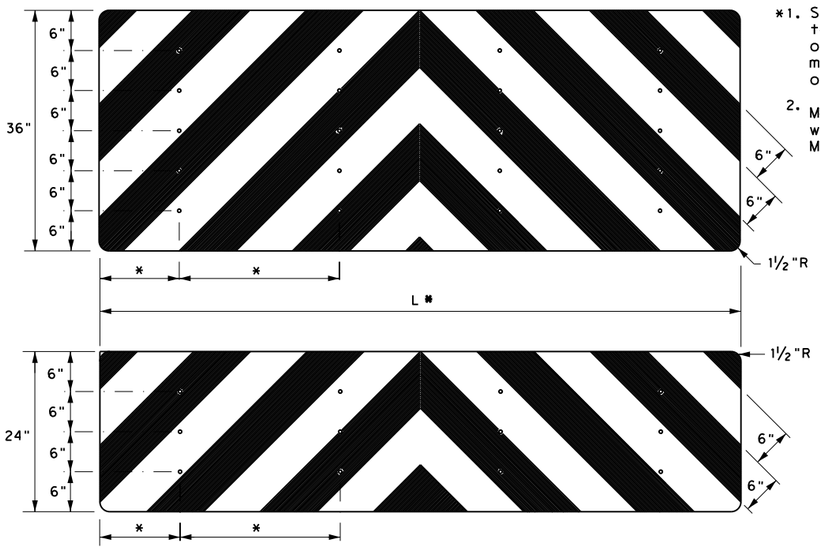


OBJECT MARKERS SMALLER THAN 3 FT^2









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

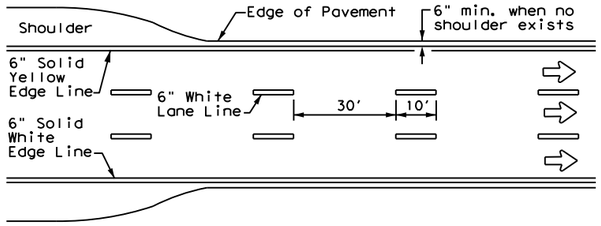
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

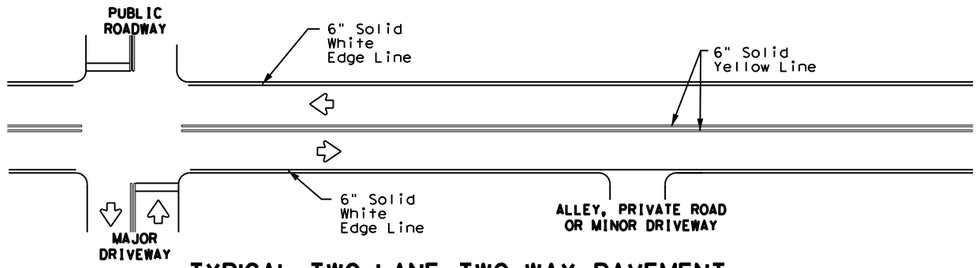
FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	ABL	NOLAN		188
4-98 7-20				

20G

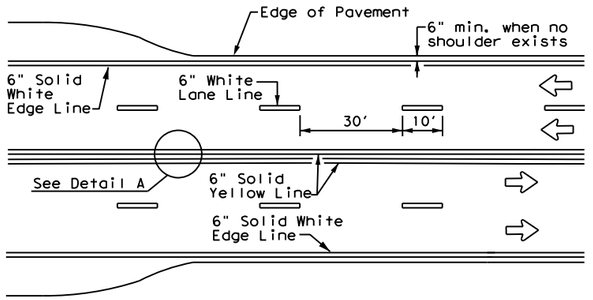
DATE: 5/16/2024 4:34:53 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 thABLS SPTP Edges%20Pavement Markings/Sheets/SH70 ABL 2250 pm1-22.dgn

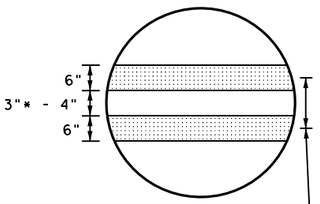


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





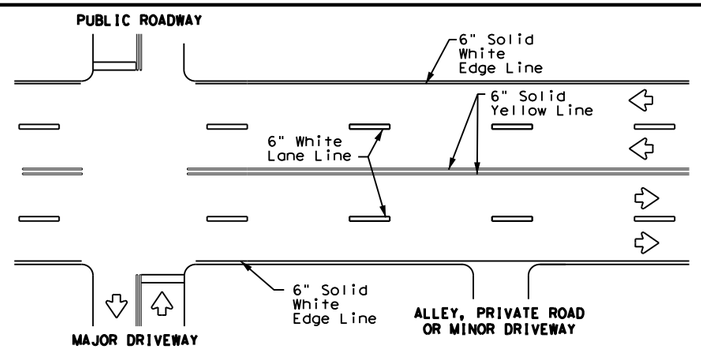
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

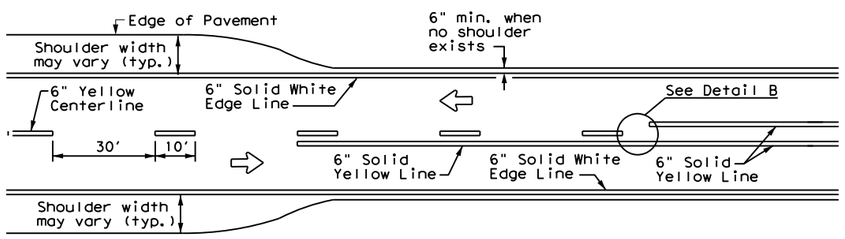
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

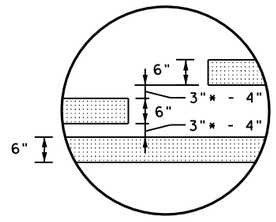
** 8" minimum for restripe projects when approved by the Engineer.



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



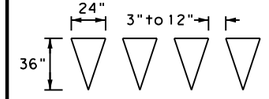
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



18" min. - 20" max.
(16" minimum for restripe projects when approved by the Engineer.)

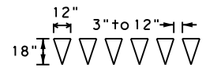
DETAIL "B"

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

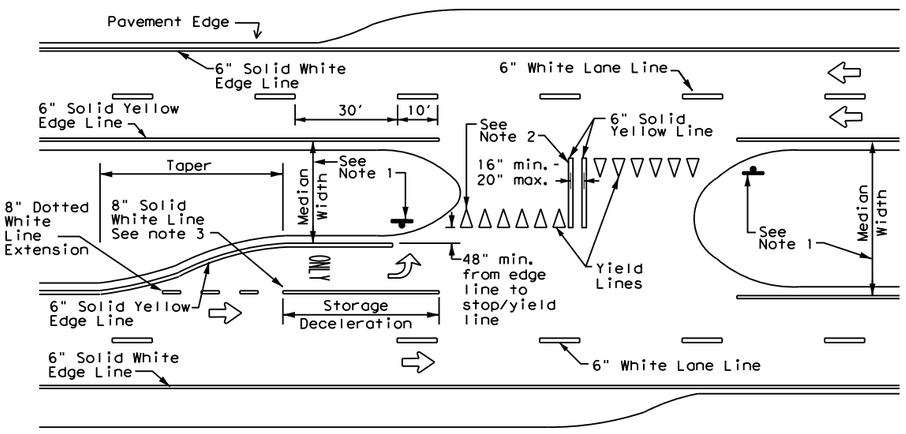


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

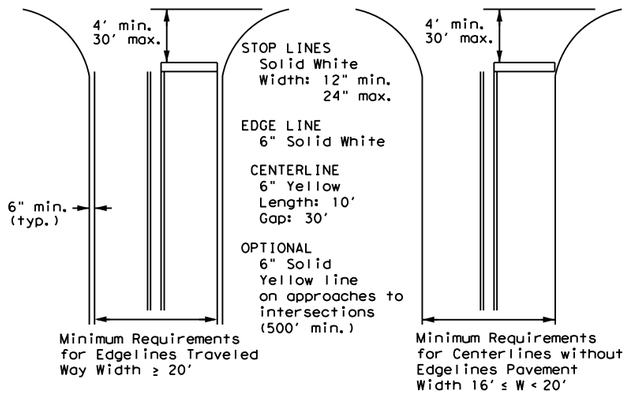
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

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.



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

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

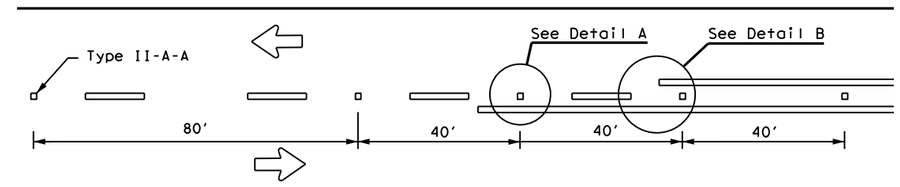
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

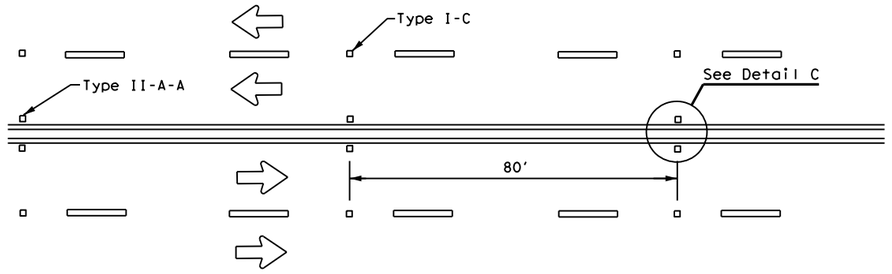
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22	ABL	NOLAN		189
5-00 2-12				

22A

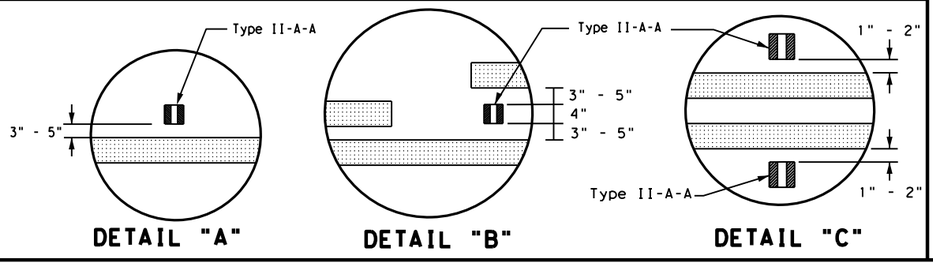
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



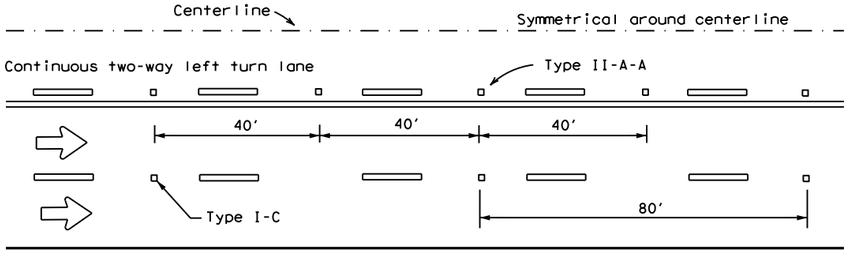
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



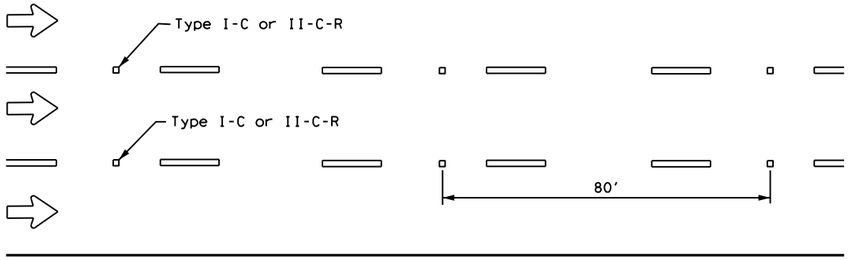
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



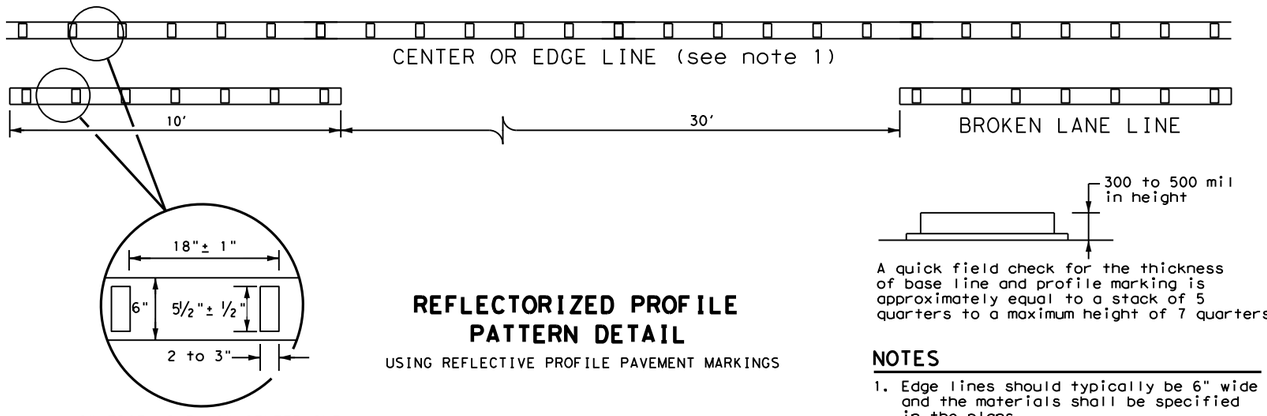
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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.



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

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

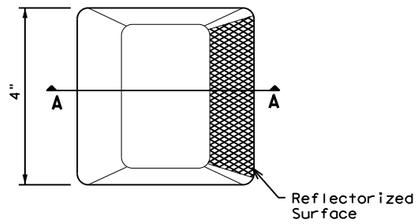
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

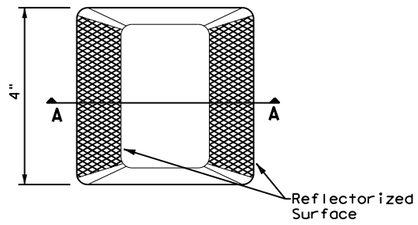
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians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

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

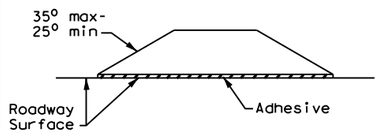
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

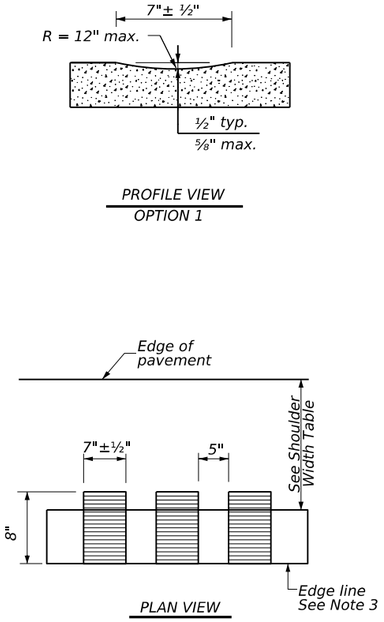
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		190

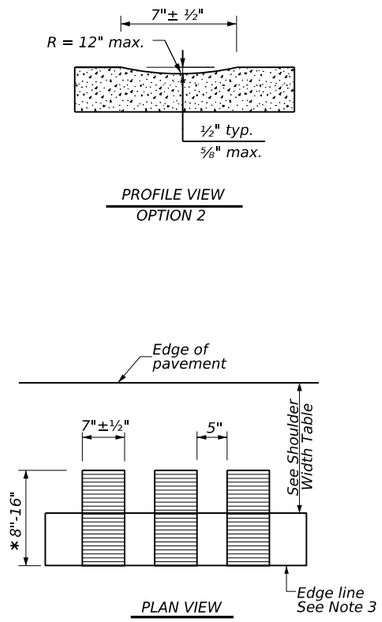
22B

DATE: 5/16/2024 4:35:06 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 ABL SPRINGS/Sheets/PM2-22.dgn

DATE: 5/16/2024 4:35:32 PM
FILE: pw://jacobs-US-VA-PW.Bentley.com:jacobs-us-vo-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Traffic/Sheets/2Standards/rs(2)-23.dgn

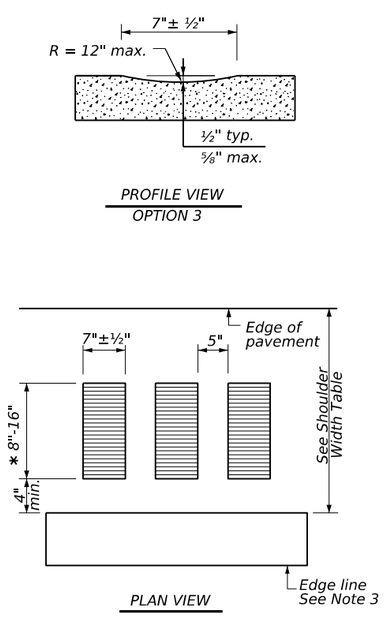


CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



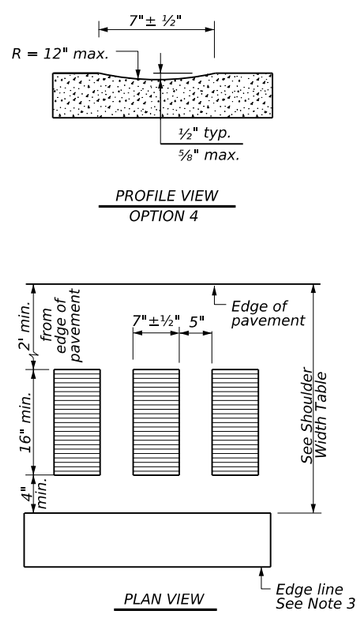
∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

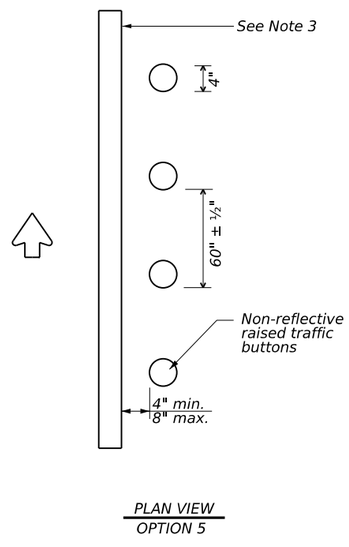


∗ This distance may vary based on width of shoulder

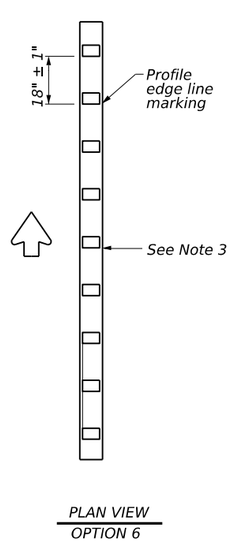
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



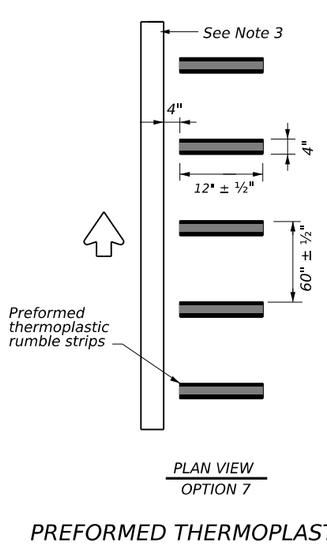
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



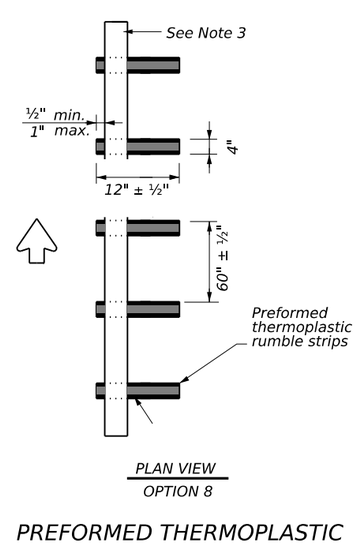
RAISED EDGE LINE (Rumble Strips)



PROFILE EDGE LINE MARKINGS (Rumble Strips)



PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)



PREFORMED THERMOPLASTIC EDGE LINE (Rumble Strips)

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5, 6 or 8	Option 1, 2, 3 5, 6 or 7	Option 2, 4, 5 6 or 7

GENERAL NOTES

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

WHEN INSTALLING MILLED DEPRESSION EDGE LINE RUMBLE STRIPS:

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

WHEN INSTALLING RAISED OR PROFILE EDGE LINE RUMBLE STRIPS:

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

Texas Department of Transportation

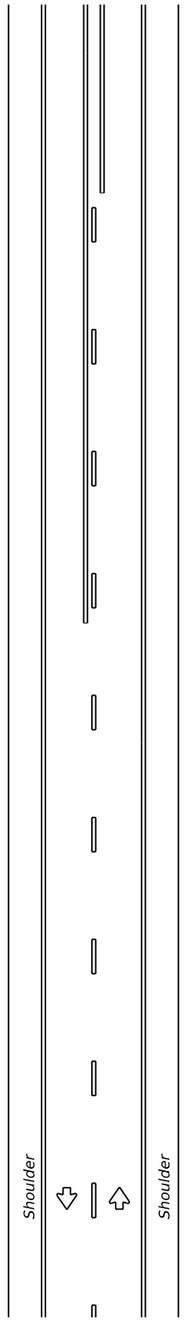
Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(2)-23

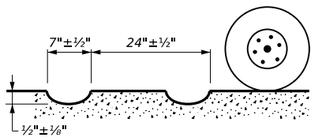
FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
10-13 1-23	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		191

DATE: 5/16/2024 4:35:44 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL BP Bridges/30 Project Data/SH 70/Traffic/Sheets/2S Standards/rs(4)-23.dgn

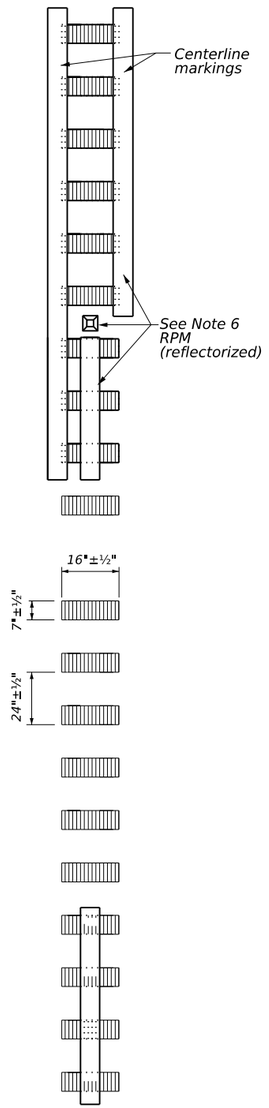
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

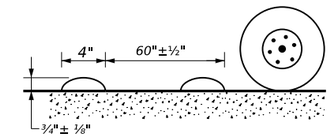


PROFILE VIEW

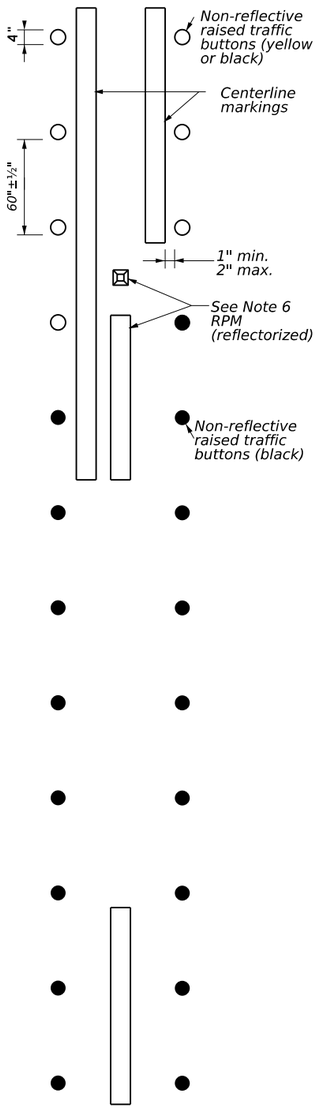


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

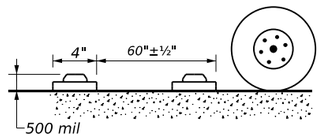


PROFILE VIEW

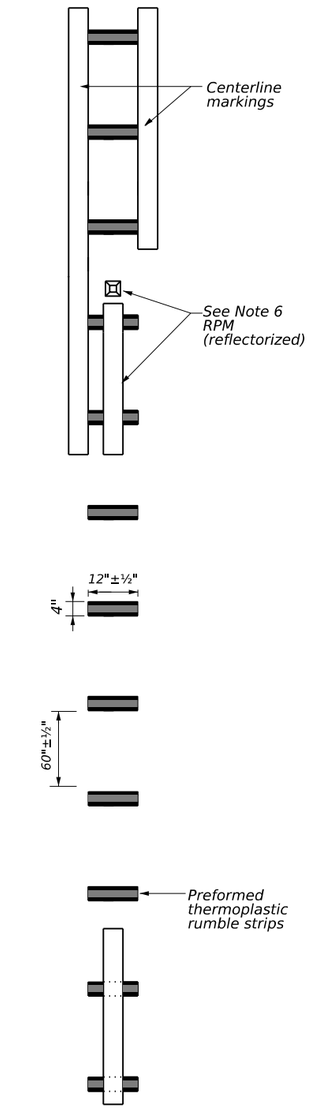


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

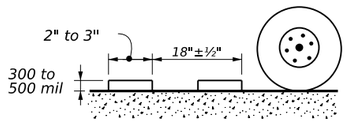


PROFILE VIEW

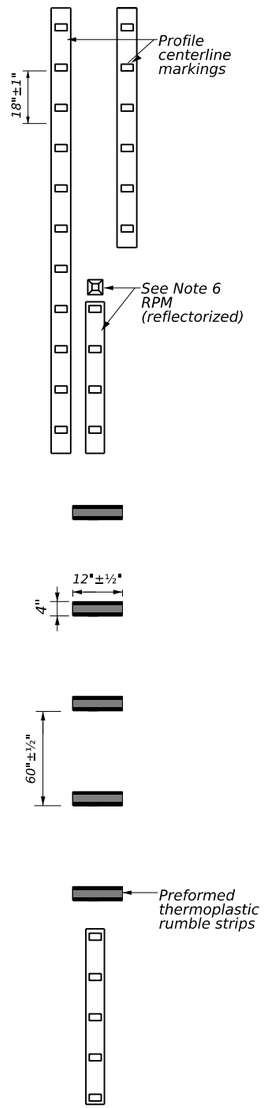


PLAN VIEW
OPTION 3

PREFORMED THERMOPLASTIC RUMBLE STRIPS



PROFILE VIEW



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC RUMBLE STRIPS

GENERAL NOTES

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

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

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

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

13. See standard sheet RS(2).

Texas Department of Transportation

Traffic Safety Division Standard

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

FILE: rs(4)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0264	01	046, ETC	SH 70
10-13 1-23	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		192

DATE: 5/16/2024 4:36:10 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/Traffic/Sheets/ZStandards/smdgen.dgn

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)

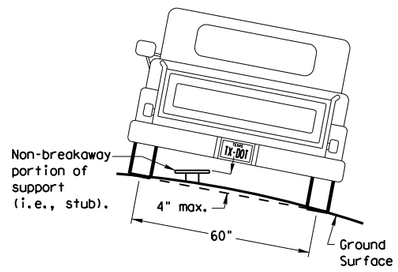
Anchor Type

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-1))

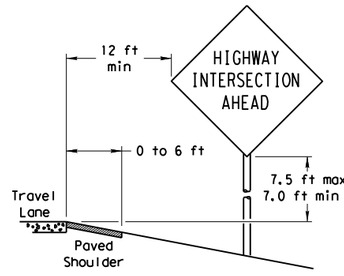
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

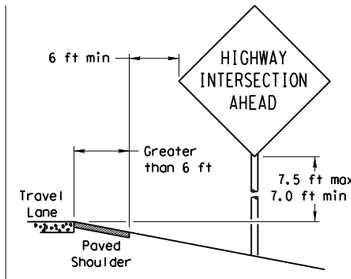
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

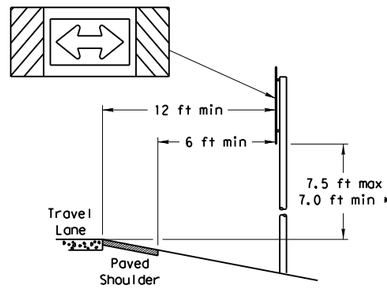
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



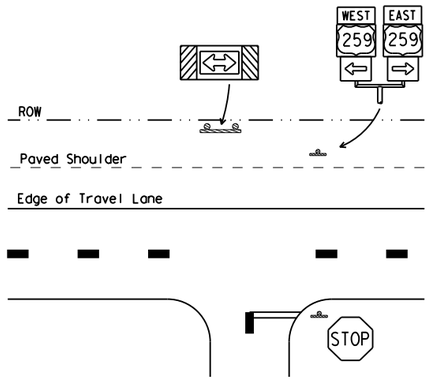
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

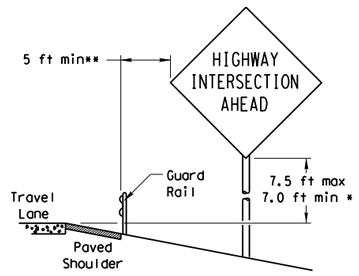
T-INTERSECTION



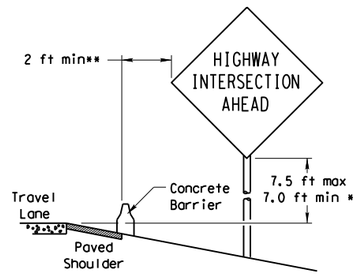
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



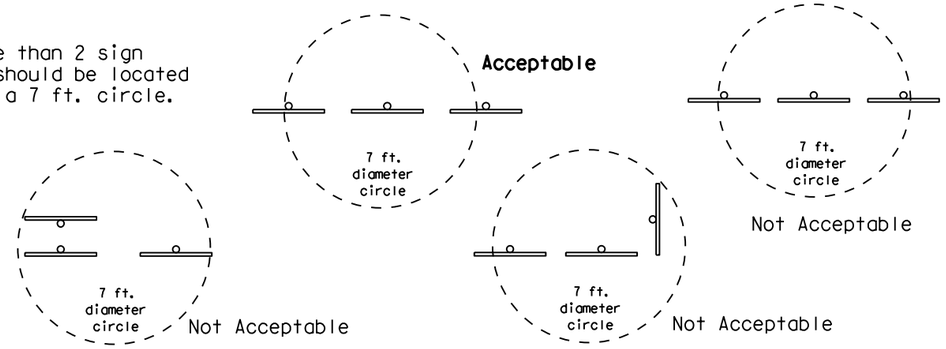
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

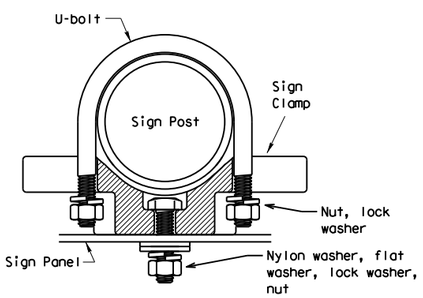
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

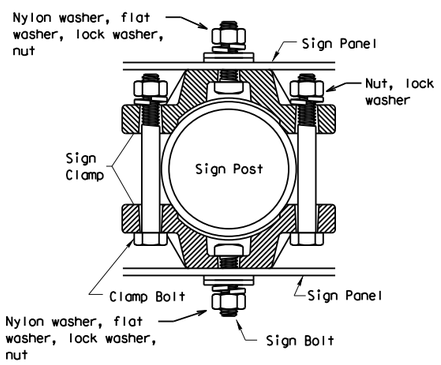


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

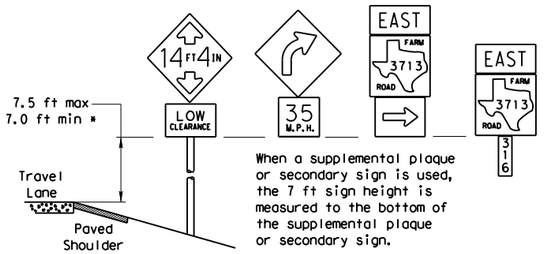
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



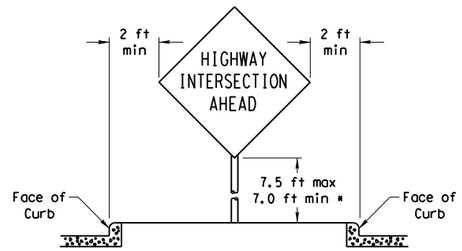
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



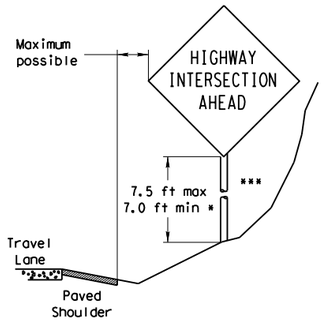
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

* 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

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

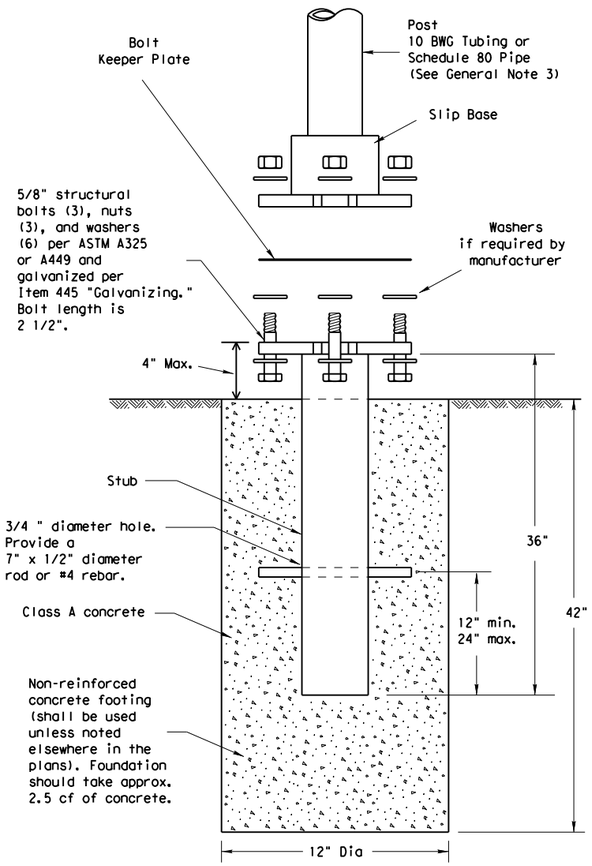
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		193

DATE: 5/16/2024 4:36:23 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/Traffic/Sheets/ZStandards/smdsl.dgn

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.

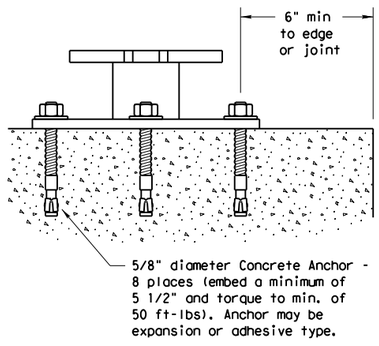
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

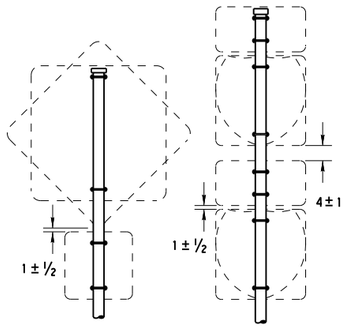
SMD(SLIP-1)-08

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

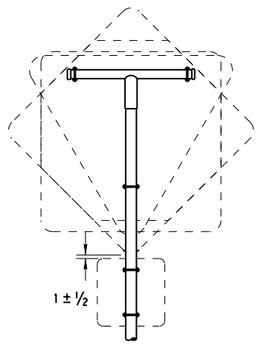
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70

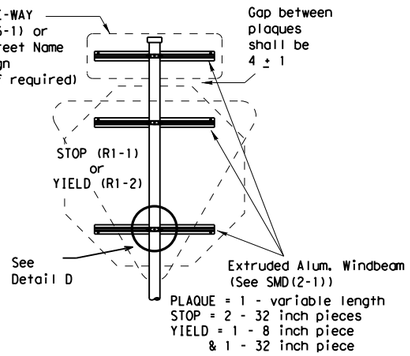
DIST	COUNTY	SHEET NO.
ABL	NOLAN	194



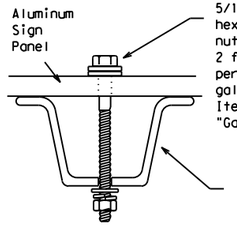
SM RD SGN ASSM TY XXXXX(1)XX(P)



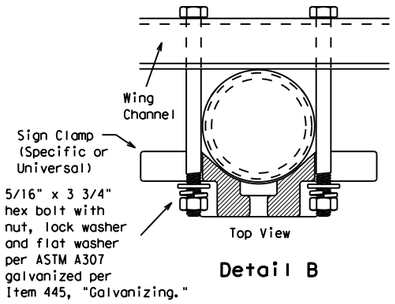
SM RD SGN ASSM TY XXXXX(1)XX(T)



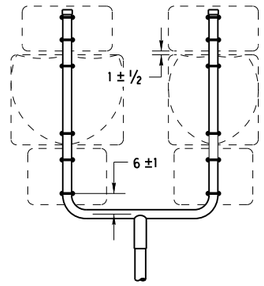
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



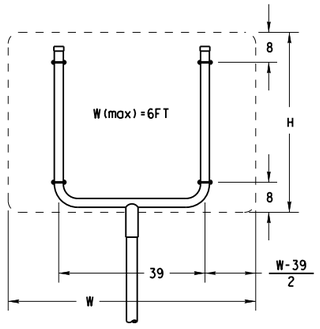
Detail A



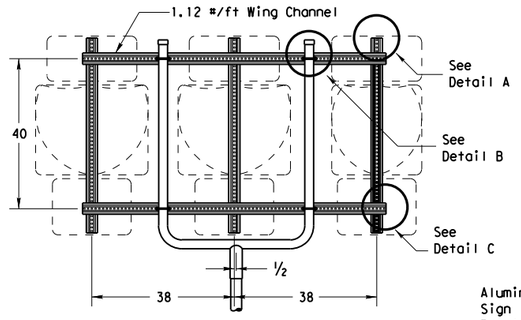
Detail B



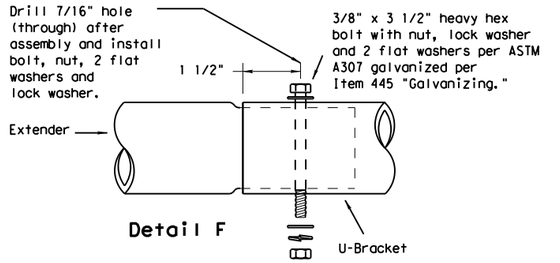
SM RD SGN ASSM TY XXXXX(1)XX(U)



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

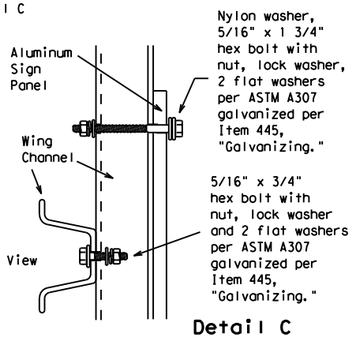


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

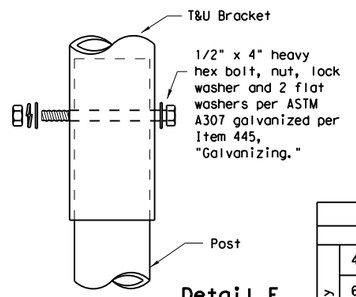


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



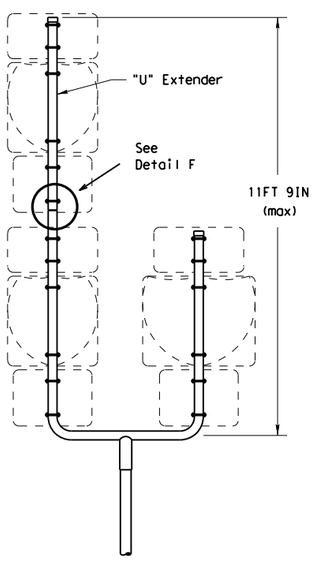
Detail E

GENERAL NOTES:

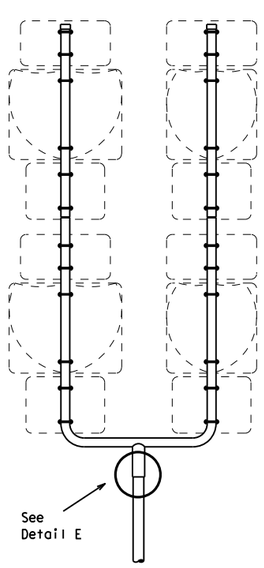
1.

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

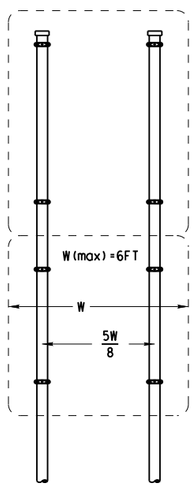
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material 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.



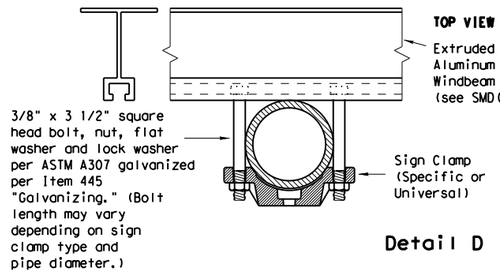
SM RD SGN ASSM TY S80(1)XX(U-1EXT)



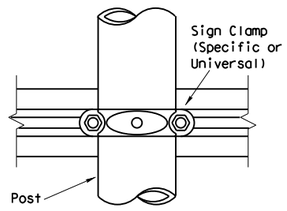
SM RD SGN ASSM TY S80(1)XX(U-2EXT)



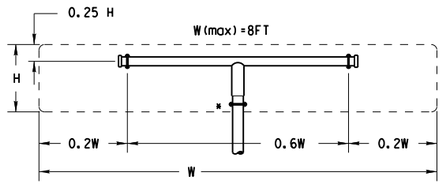
SM RD SGN ASSYM TY XXXXX(2)XX(P)



Detail D



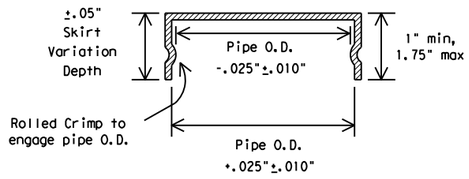
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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)



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.

Texas Department of Transportation
Traffic Operations Division

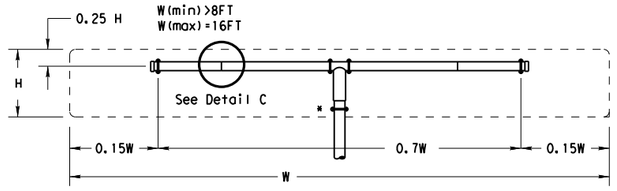
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

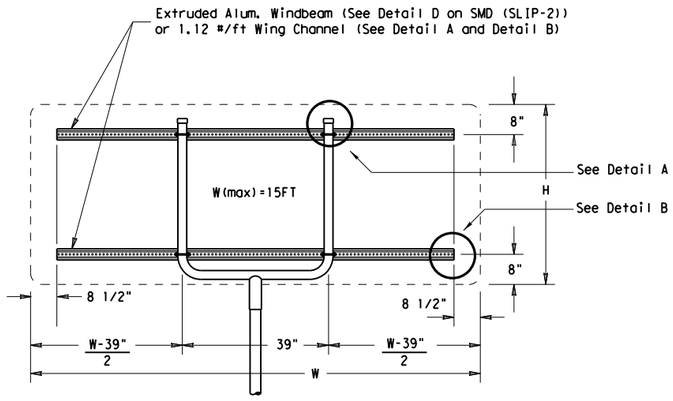
REVISIONS	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		195

DATE: 5/16/2024 4:36:36 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Traffic/Sheets/2Standards/smds2.dgn

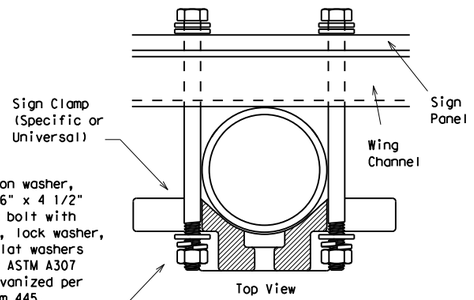
DATE: 5/16/2024 4:36:52 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SH70/Traffic/Sheets/ZStandards/smds3.dgn



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

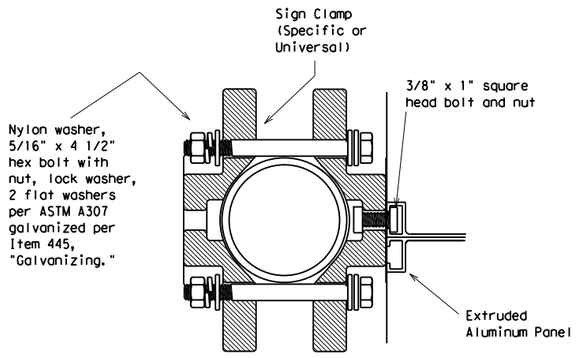


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

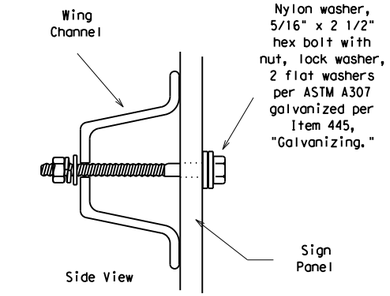


Top View

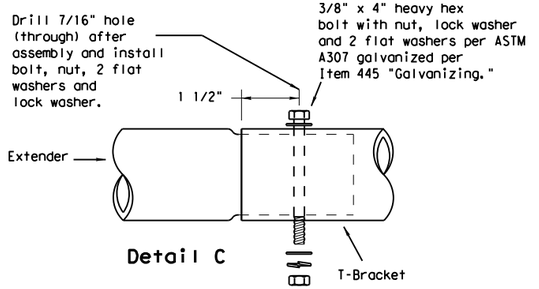
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

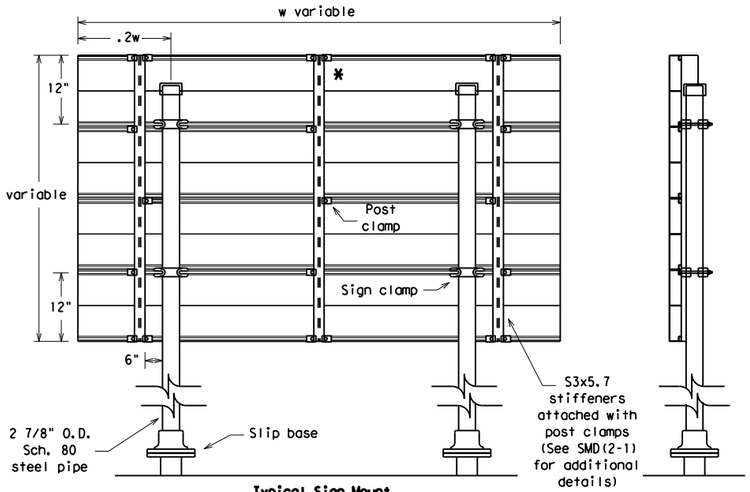


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

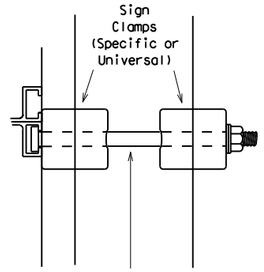


Typical Sign Mount

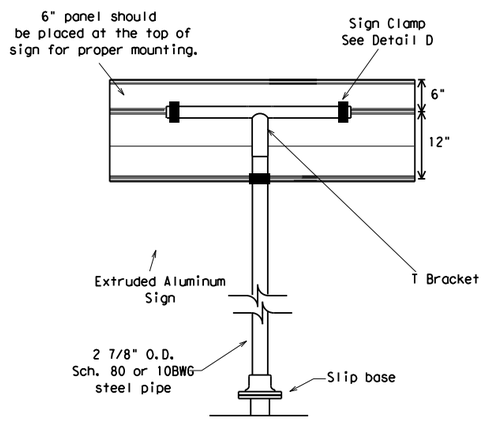
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

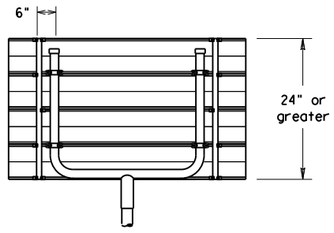
See Detail E
for clamp installation



Detail E



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

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.

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

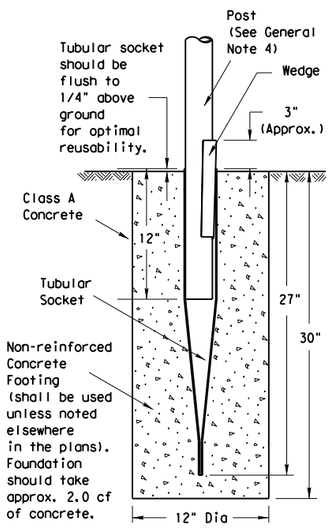
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0264	01	046, ETC	SH 70
	DIST	COUNTY		SHEET NO.
	ABL	NOLAN		196

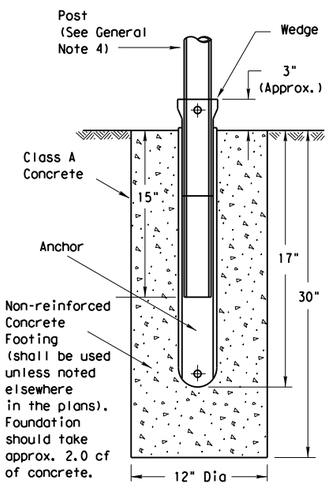
DATE: 5/16/2024 4:37:04 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/Traffic/Sheets/ZStandards/smdtwt.dgn

Wedge Anchor Steel System



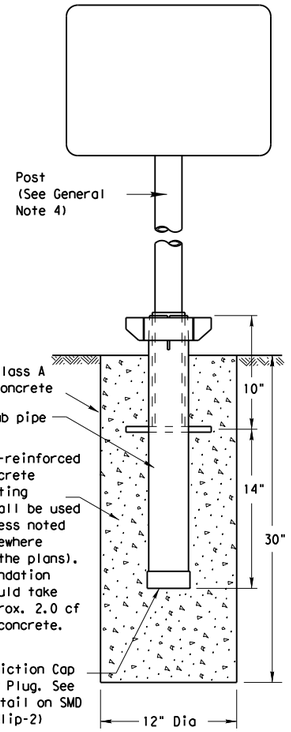
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

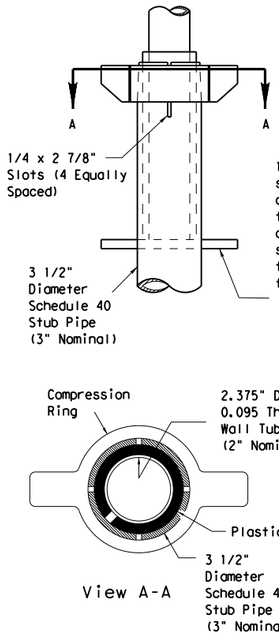


SMD RD SGN ASSM TY TWT(X)WP(X)

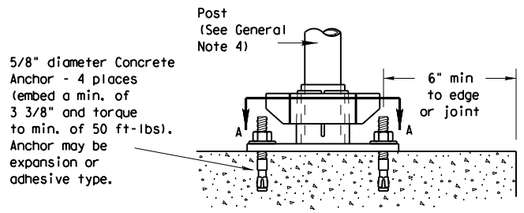
Universal Anchor System with Thin-Walled Tubing Post



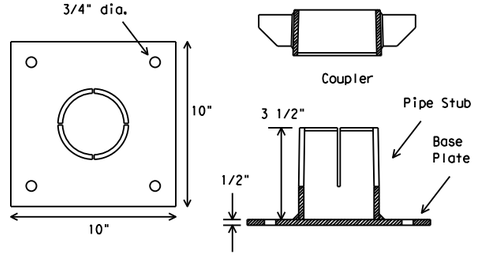
SM RD SGN ASSM TY TWT(X)UA(P)



Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

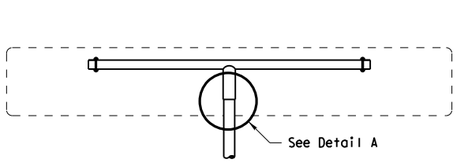


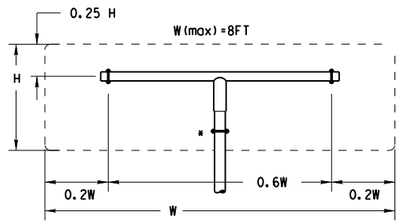
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.



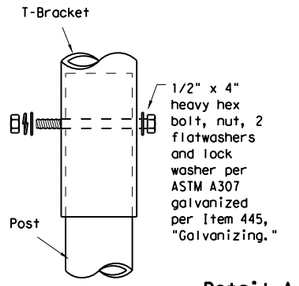
SM RD SGN ASSM TY TWT(X)UB(P)

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)
(* - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

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

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   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
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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

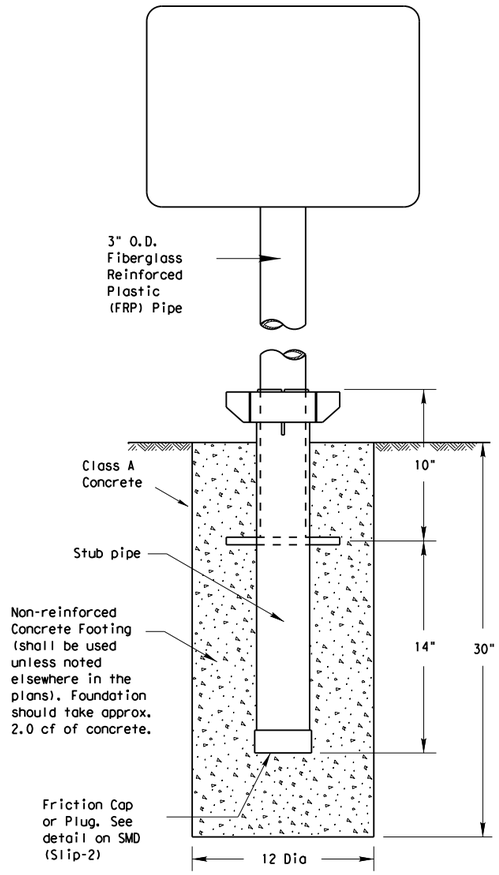
9-08 REVISIONS

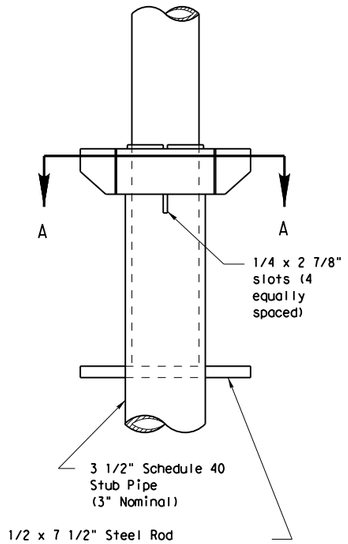
CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		197

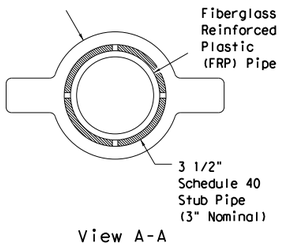
26E

DATE: 5/16/2024 4:35:57 PM
FILE: pw://Jacobs-US-VA-PW.Bentley.com:jacobs-us-va-pw-04/Documents/WJXN4706 - ABL Bridges/30 Project Data/SHTO/Traffic/Sheets/ZStandards/smdfrp.dgn

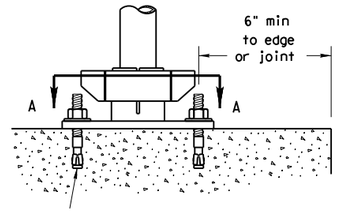
Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post





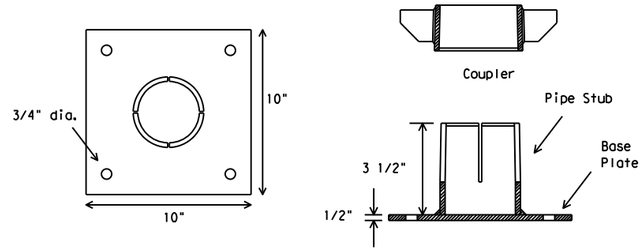


SM RD SGN ASSM TY FRP(X)UA(P)



Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.

BOLT-DOWN DETAILS



SM RD SGN ASSM TY FRP(X)UB(P)

GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

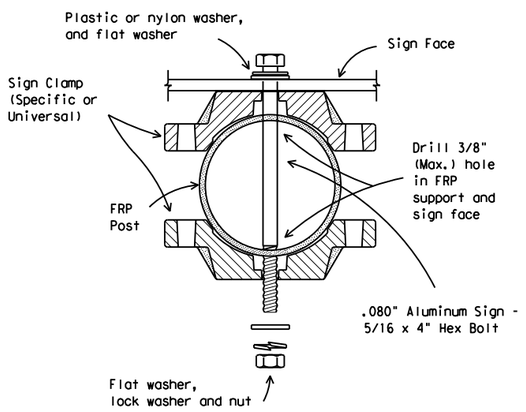
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

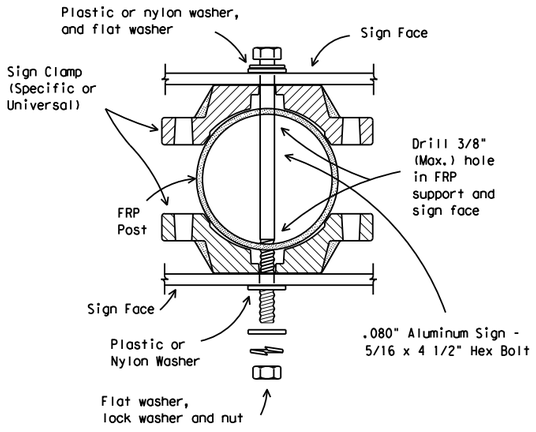
BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD(FRP)-08

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

CONT	SECT	JOB	HIGHWAY
0264	01	046, ETC	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		198

REVISIONS
9-08

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the 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):
CSJ : 0264-01-046

1.2 PROJECT LIMITS:
From: 0.05 MI. N OF SWEETWATER CREEK AT SH 70 (STA 182+08.36)

To: 0.06 MI. S OF SWEETWATER CREEK AT SH 70 (STA 192+18.69)

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 32^25'38.87"N ,(Long) 100^23'33.39"W

END: (Lat) 32^25'33.31"N ,(Long) 100^23'32.69"W

1.4 TOTAL PROJECT AREA (Acres): 2.16 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 1.60 AC (74%)

1.6 NATURE OF CONSTRUCTION ACTIVITY:
FOR THE CONSTRUCTION OF PROPOSED BRIDGE CONSISTING OF REPLACING EXISTING BRIDGE AND APPROACHES, GRADING, ACP BASE, SURFACE AND MBGF

1.7 MAJOR SOIL TYPES:

Soil Type	Description
NIPSUM CLAY LOAM, 0 TO 1% SLOPES	WELL DRAINED
COLORADO LOAM, 0 to 1% SLOPES	FREQUENTLY FLOODED

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:

X PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

X Mobilization
X Install sediment and erosion controls
X Blade existing topsoil into windrows, prep ROW, clear and grub
X Remove existing pavement
X Grading operations, excavation, and embankment
X Excavate and prepare subgrade for proposed pavement widening
X Remove existing culverts, safety end treatments (SETs)
X Remove existing metal beam guard fence (MBGF), bridge rail
X Install proposed pavement per plans
X Install culverts, culvert extensions, SETs
X Install mow strip, MBGF, bridge rail
X Place flex base
X Rework slopes, grade ditches
X Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
X Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

X Sediment laden stormwater from stormwater conveyance over disturbed area
X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
X Solvents, paints, adhesives, etc. from various construction activities
X Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
X Contaminated water from excavation or dewatering pump-out water
X Sanitary waste from onsite restroom facilities
X Trash from various construction activities/receptacles
X Long-term stockpiles of material and waste
X
☐ 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
CLEAR FORK BRAZOS RIVER	* BRAZOS RIVER BASIN (1232); IMPAIRED
BRAZOS RIVER ABOVE POSSUM KINGDOM LAKE	* BRAZOS RIVER BASIN (1208); IMPAIRED
BRAZOS RIVER BELOW POSSUM KINGDOM LAKE	BRAZOS RIVER BASIN (1206); NOT IMPAIRED
BRAZOS RIVER BELOW LAKE GRANBURRY	BRAZOS RIVER BASIN (1204); NOT IMPAIRED
BRAZOS RIVER BELOW LAKE WHITNEY	BRAZOS RIVER BASIN (1257); NOT IMPAIRED
NO TMDLs or I-PLANS WERE IDENTIFIED	

* 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

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			199
STATE	STATE DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0264	01	046	SH 70

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

2.5 POLLUTION PREVENTION MEASURES:

- ☒ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

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

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			200
STATE	STATE DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0264	01	046	SH 70

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the 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):
CSJ : 0264-01-047

1.2 PROJECT LIMITS:
From: 0.07 MI. N OF COTTONWOOD CREEK AT SH 70 (STA 429+05.00)

To: 0.11 MI. S OF COTTONWOOD CREEK AT SH 70 (STA 444+16.60)

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 32^22'2.61'N ,(Long) 100^21'35.74"W

END: (Lat) 32^21'53.24'N ,(Long) 100^21'32.22"W

1.4 TOTAL PROJECT AREA (Acres): 3.44 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 2.36 AC (69%)

1.6 NATURE OF CONSTRUCTION ACTIVITY:
FOR THE CONSTRUCTION OF PROPOSED BRIDGE CONSISTING OF REPLACING EXISTING BRIDGE AND APPROACHES, GRADING, ACP BASE, SURFACE AND MBGF

1.7 MAJOR SOIL TYPES:

Soil Type	Description
SHEP LOAM, 1 to 5% SLOPES	DRY, WELL DRAINED

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:

X PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

X Mobilization
X Install sediment and erosion controls
X Blade existing topsoil into windrows, prep ROW, clear and grub
X Remove existing pavement
X Grading operations, excavation, and embankment
X Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
X Remove existing metal beam guard fence (MBGF), bridge rail
X Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
X Install mow strip, MBGF, bridge rail
X Place flex base
X Rework slopes, grade ditches
X Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
X Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

X Sediment laden stormwater from stormwater conveyance over disturbed area
X Fuels, oils, and lubricants from construction vehicles, equipment, and storage
X Solvents, paints, adhesives, etc. from various construction activities
X Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
X Contaminated water from excavation or dewatering pump-out water
X Sanitary waste from onsite restroom facilities
X Trash from various construction activities/receptacles
X Long-term stockpiles of material and waste
X
☐ 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
CLEAR FORK BRAZOS RIVER	* BRAZOS RIVER BASIN (1232); IMPAIRED
BRAZOS RIVER ABOVE POSSUM KINGDOM LAKE	* BRAZOS RIVER BASIN (1208); IMPAIRED
BRAZOS RIVER BELOW POSSUM KINGDOM LAKE	BRAZOS RIVER BASIN (1206); NOT IMPAIRED
BRAZOS RIVER BELOW LAKE GRANBURRY	BRAZOS RIVER BASIN (1204); NOT IMPAIRED
BRAZOS RIVER BELOW LAKE WHITNEY	BRAZOS RIVER BASIN (1257); NOT IMPAIRED
NO TMDLs or I-PLANS WERE IDENTIFIED	

* 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

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			201
STATE	STATE DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0264	01	047	SH 70

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

2.5 POLLUTION PREVENTION MEASURES:

- ☒ Chemical Management
- ☒ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☒ Dust Control
- ☒ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

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

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

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

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

2.10 MAINTENANCE:

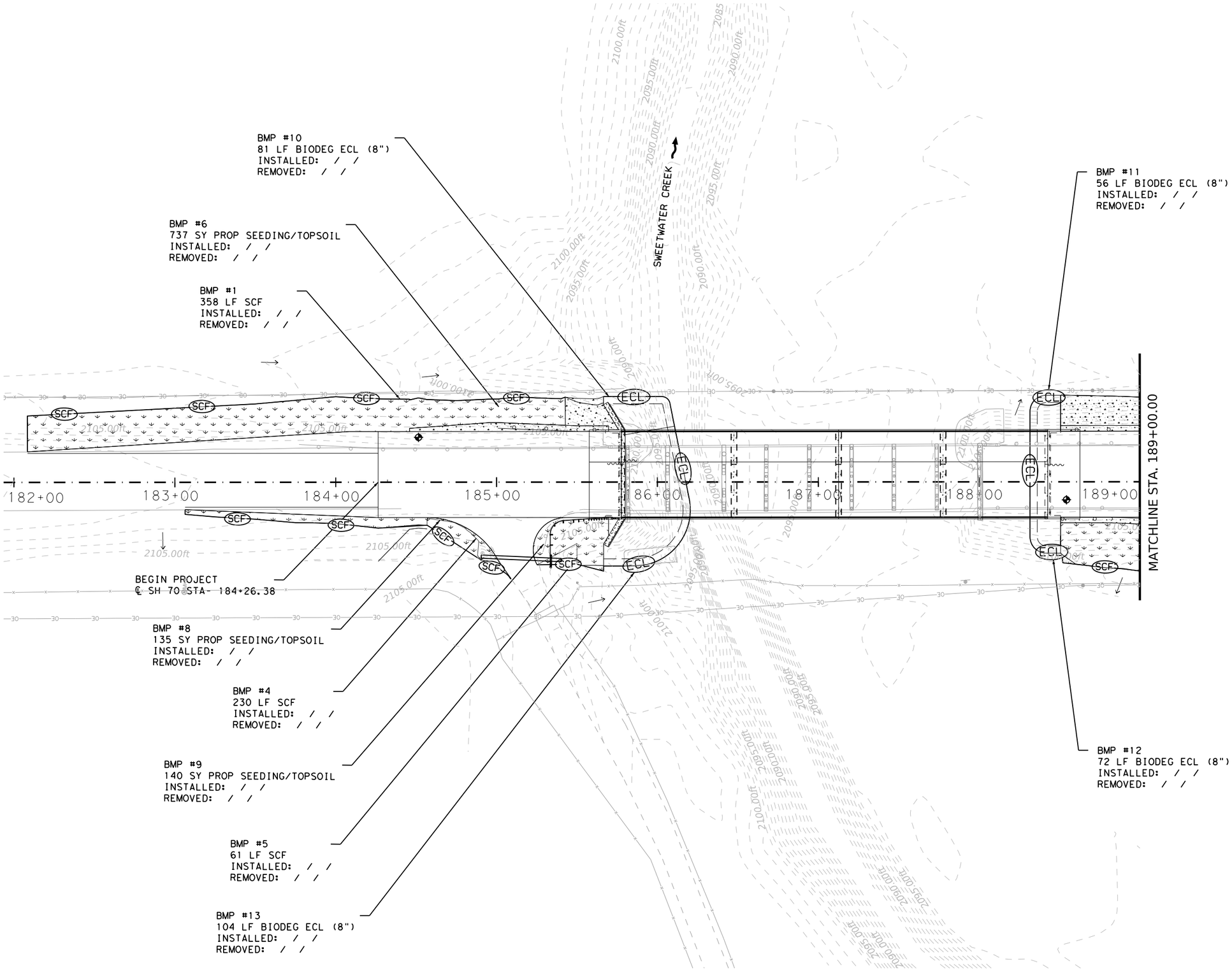
Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			202
STATE	STATE DIST.	COUNTY	
TEXAS	ABL	NOLAN	
CONT.	SECT.	JOB	HIGHWAY NO.
0264	01	047	SH 70



0 25 50 FT

LEGEND

- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — BIODEG EROSN CONT LOG (8")
- SEEDING/TOPSOIL AREA
- EXIST CONTOUR

NOTES:

1. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. OVERALL SWP3 INSTALLATION SHALL FOLLOW TCP PHASING AND CONSTRUCTION SEQUENCE.

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3138
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

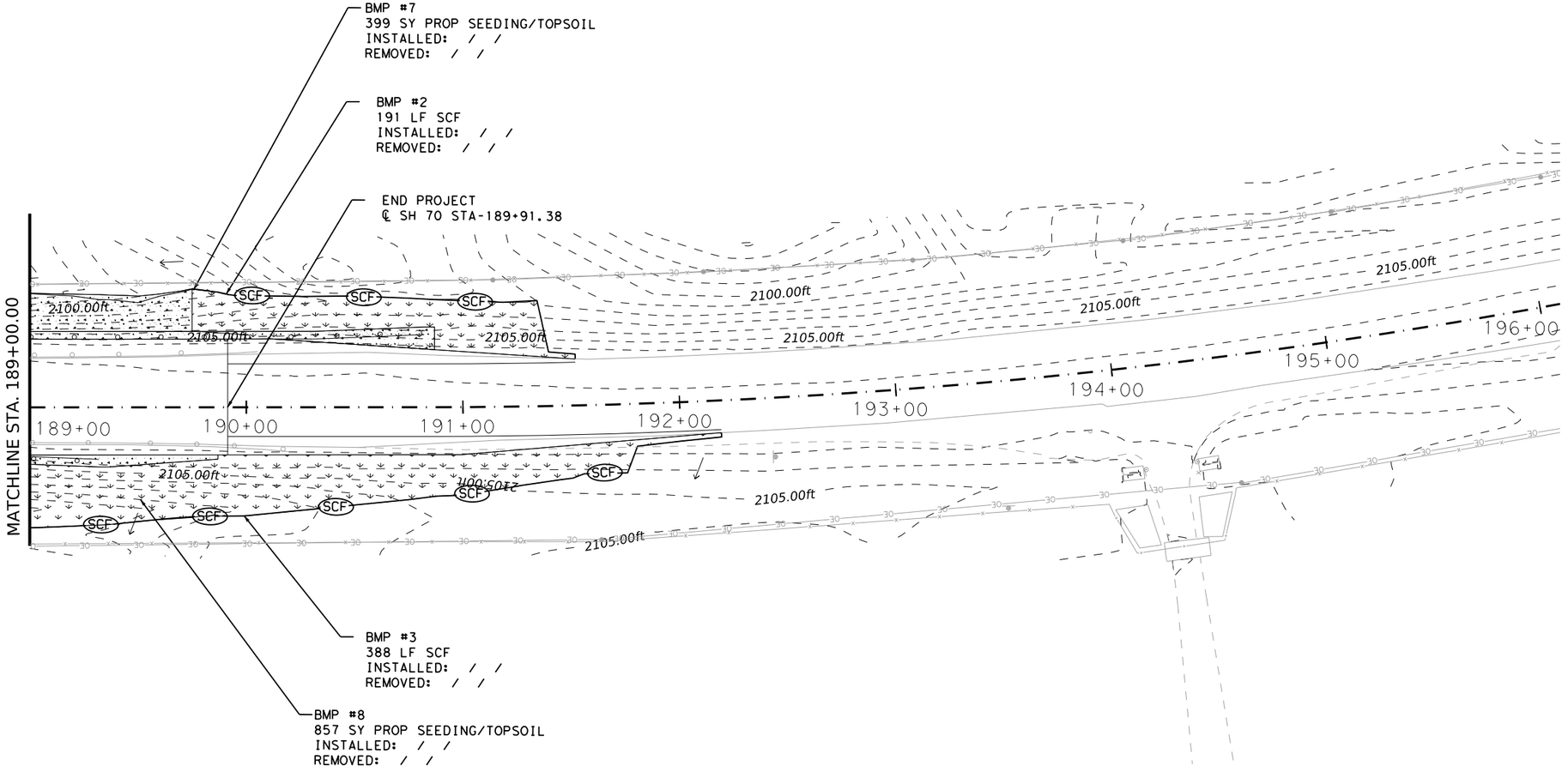
SH 70

ENVIRONMENTAL LAYOUT
SWEETWATER CREEK

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		203

DATE:
FILE:



0 25 50 FT

LEGEND

- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — BIODEG EROSN CONT LOG (18")
- SEEDING/TOPSOIL AREA
- EXIST CONTOUR

NOTES:

1. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. OVERALL SWP3 INSTALLATION SHALL FOLLOW TCP PHASING AND CONSTRUCTION SEQUENCE.

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration #-2966

Texas Department of Transportation

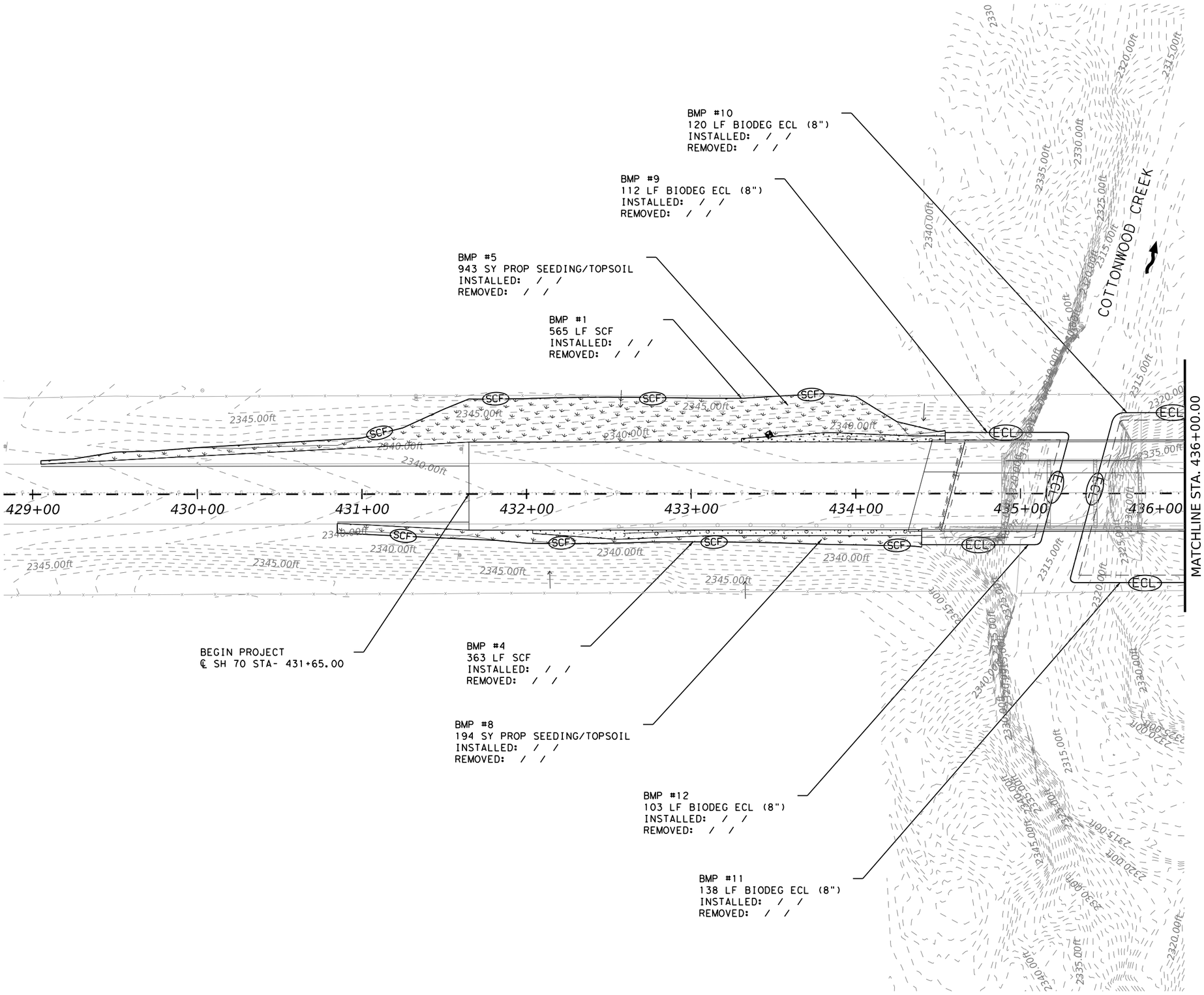
SH 70

ENVIRONMENTAL LAYOUT
SWEETWATER CREEK

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0264	01	046	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		204

DATE:
FILE:



0 25 50 FT

LEGEND

- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — BIODEG EROSN CONT LOG (8")
- SEEDING/TOPSOIL AREA
- EXIST CONTOUR

NOTES:

1. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. OVERALL SWP3 INSTALLATION SHALL FOLLOW TCP PHASING AND CONSTRUCTION SEQUENCE.

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

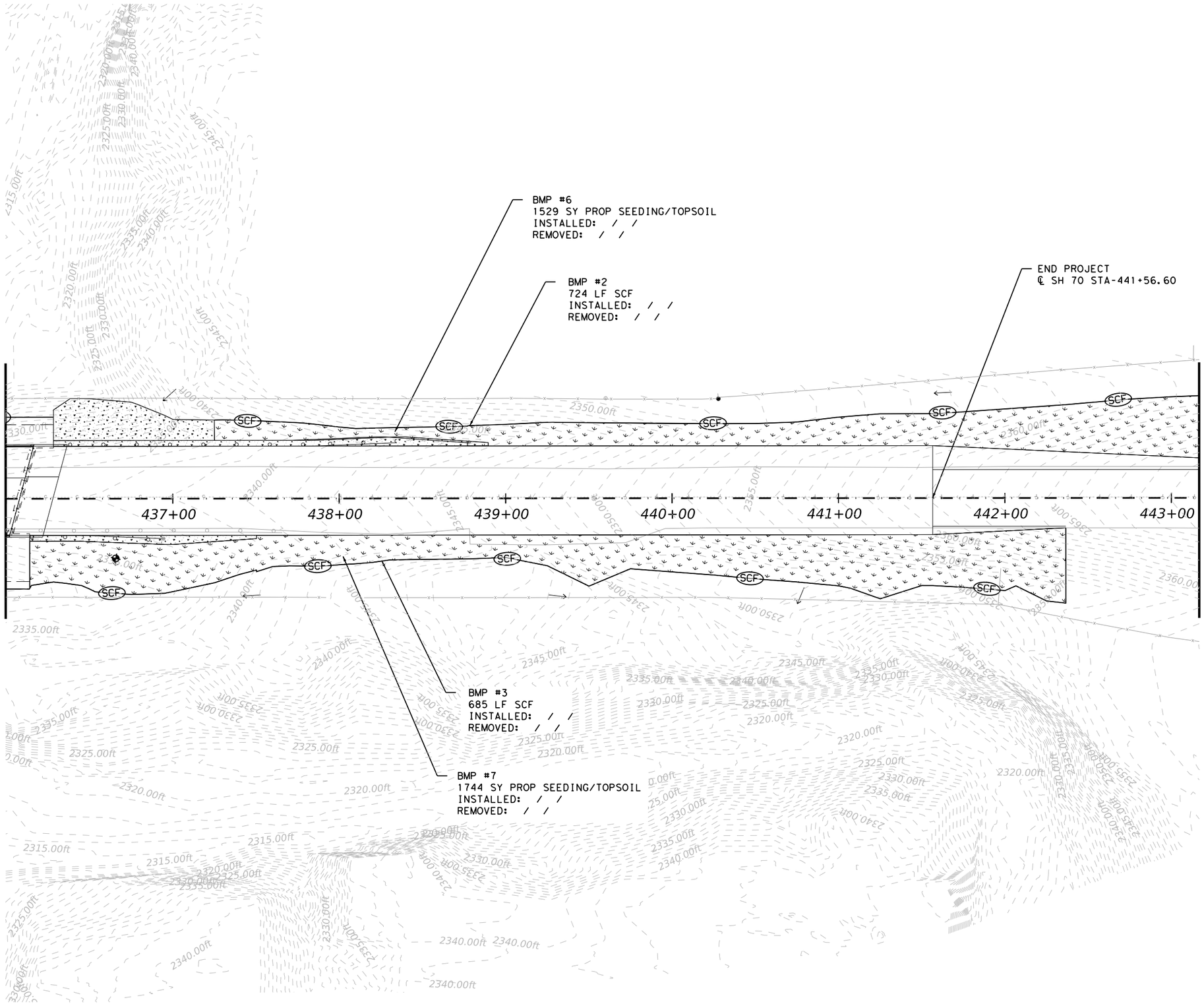
SH 70

ENVIRONMENTAL LAYOUT
COTTONWOOD CREEK

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		205

DATE:
FILE:



0 25 50 FT

LEGEND

- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — BIODEG EROSN CONT LOG (8")
- SEEDING/TOPSOIL AREA
- EXIST CONTOUR

NOTES:

1. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. OVERALL SWP3 INSTALLATION SHALL FOLLOW TCP PHASING AND CONSTRUCTION SEQUENCE.

STATE OF TEXAS
DANIEL DE LEON
112795
LICENSED
PROFESSIONAL ENGINEER

05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

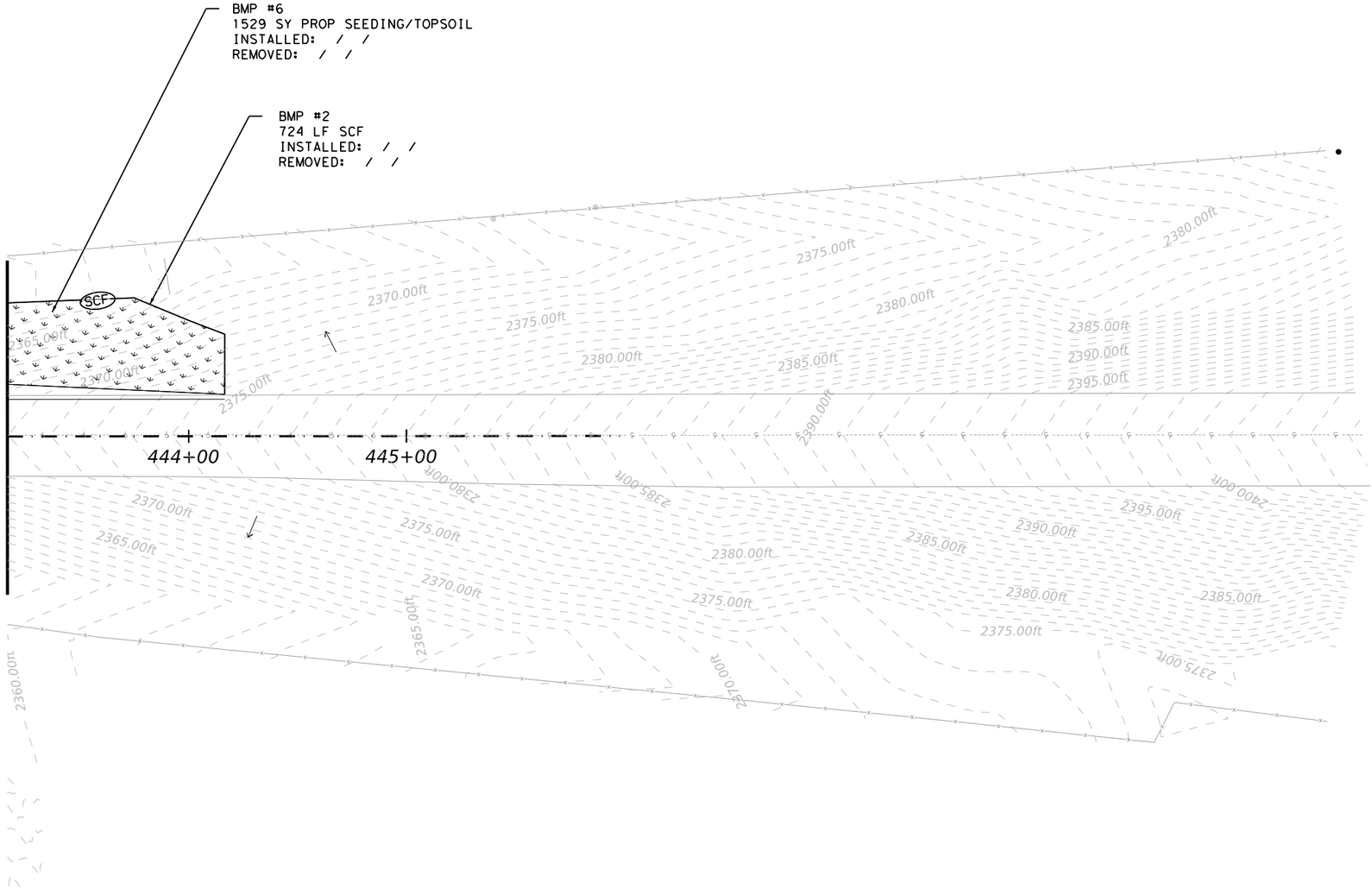
SH 70

ENVIRONMENTAL LAYOUT
COTTONWOOD CREEK

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		206

DATE:
FILE:



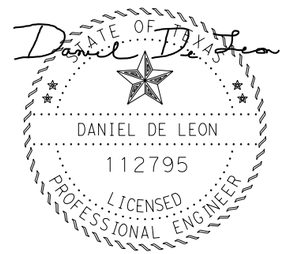
0 25 50 FT

LEGEND

- DIRECTION OF FLOW
- SCF — SEDIMENT CONTROL FENCE
- ECL — BIODEG EROSN CONT LOG (8")
- SEEDING/TOPSOIL AREA
- EXIST CONTOUR

NOTES:

1. EROSION CONTROL DEVICE INSTALLATION, MAINTENANCE AND REMOVAL SHALL BE IN ACCORDANCE WITH TXDOT STANDARDS FOR EROSION CONTROL.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. LOCATIONS OF EROSION CONTROL DEVICES ARE APPROXIMATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. OVERALL SWP3 INSTALLATION SHALL FOLLOW TCP PHASING AND CONSTRUCTION SEQUENCE.



05/20/2024

Jacobs
1999 BRYAN ST, SUITE 3500
DALLAS, TX 75201-3136
Phone: +1 (214) 638-0145
Firm Registration: F-2966

Texas Department of Transportation

SH 70

ENVIRONMENTAL LAYOUT
COTTONWOOD CREEK

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0264	01	047	SH 70
DIST	COUNTY		SHEET NO.
ABL	NOLAN		207

DATE:
FILE:

DATE:
FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SWP3 and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SWP3 information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required
☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

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

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☒ Mulch Filter Berm and Socks	☒ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☒ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ 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.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Comply with EO13112 on use of Native Vegetation.

2.

3.

4.

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

☐ No Action Required ☒ Required Action

Action No.

1. Comply with Migratory Bird Treaty Act (MBTA) on protection of birds.

2.

3.

4.

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

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☒ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☒ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☒ Required Action

Action No.

1. All soil, water, and slurry removed from drilled shafts shall be captured and disposed of properly. No discharge of these materials into, or in close proximity to, the surrounding water will be allowed

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

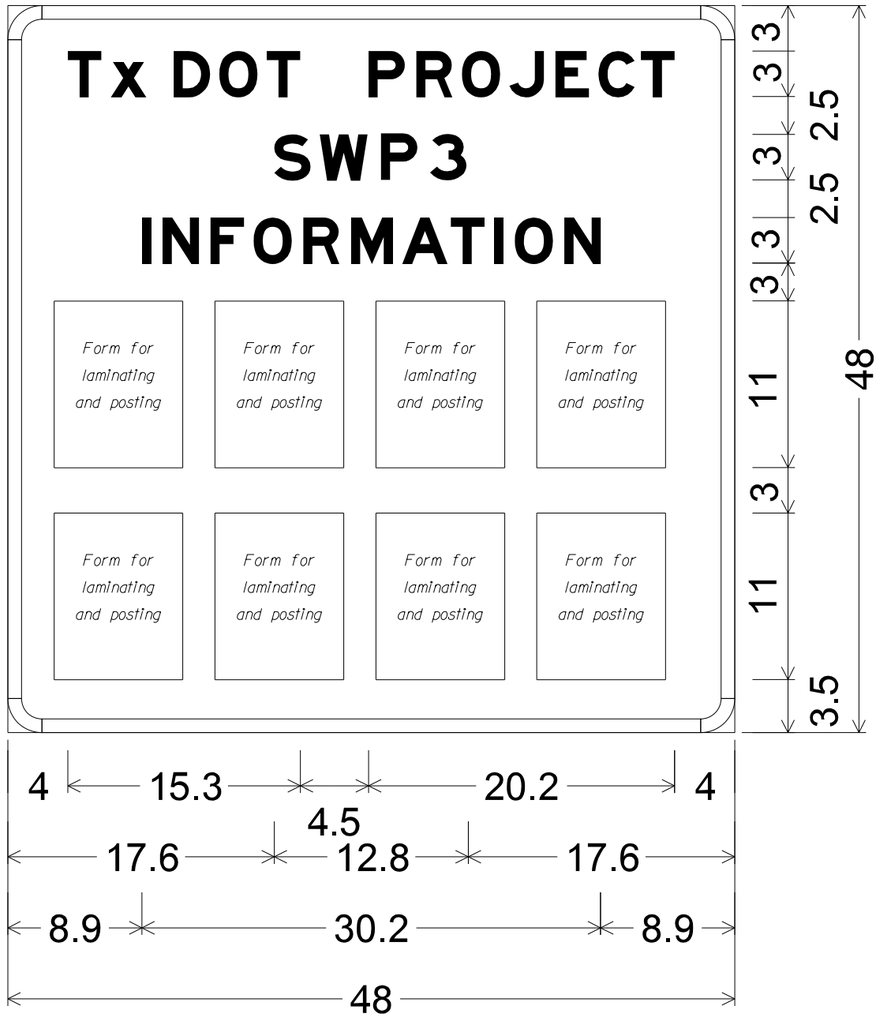
3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

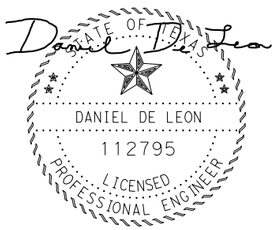
FILE: epic.dgn	DN: TxDOT	CK:	DW:	CK:	
© TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0264	01	046,ETC.	SH 70	
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.	
05-07-14 ADDED NOTE SECTION IV.	ABL	NOLAN		208	
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.					



2.3" Radius, 0.9" Border, White on Blue;
[TxDOT PROJECT] E Mod;
[SWP3] E Mod;
[INFORMATION] E Mod;

NOTE:

The Forms needed for laminating and posting to the SWP3 Notification Board will be provided by the Engineer. The total number of forms may vary. Notification Boards are to be constructed from Plywood, ½ or ⅝-inch thick, in accordance with TxDOT Departmental Material Specification (DMS)-7100. 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 sign will be placed at a location within the right-of-way but outside the clear zone as directed by the Engineer. This work will not be paid for directly, but will be considered subsidiary to other items.



05/20/2024

SWP3 NOTIFICATION BOARD DETAIL

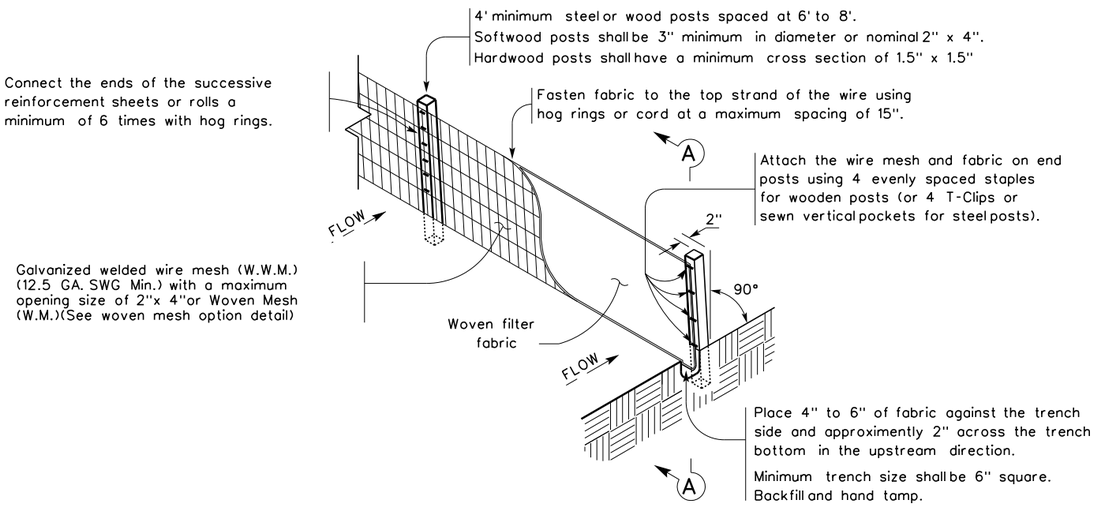
Texas Department of Transportation

NO SCALE SHEET 1 OF 1

FHWA DIVISION	PROJECT NO.		HIGHWAY NO.
6	SEE TITLE SHEET		SH 70
STATE	COUNTY		SHEET NO.
TEXAS	NOLAN		
DISTRICT	CONTROL	SECTION	JOB
ABL	0264	01	046, ETC

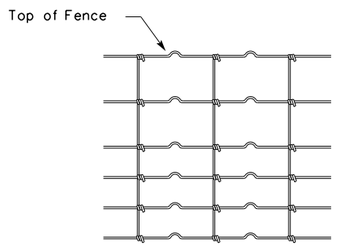
209

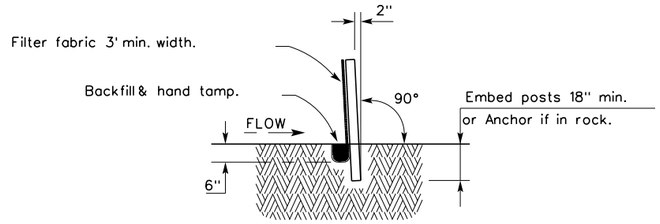
FILE: $FILE$ $TIME$
DATE: $DATE$



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

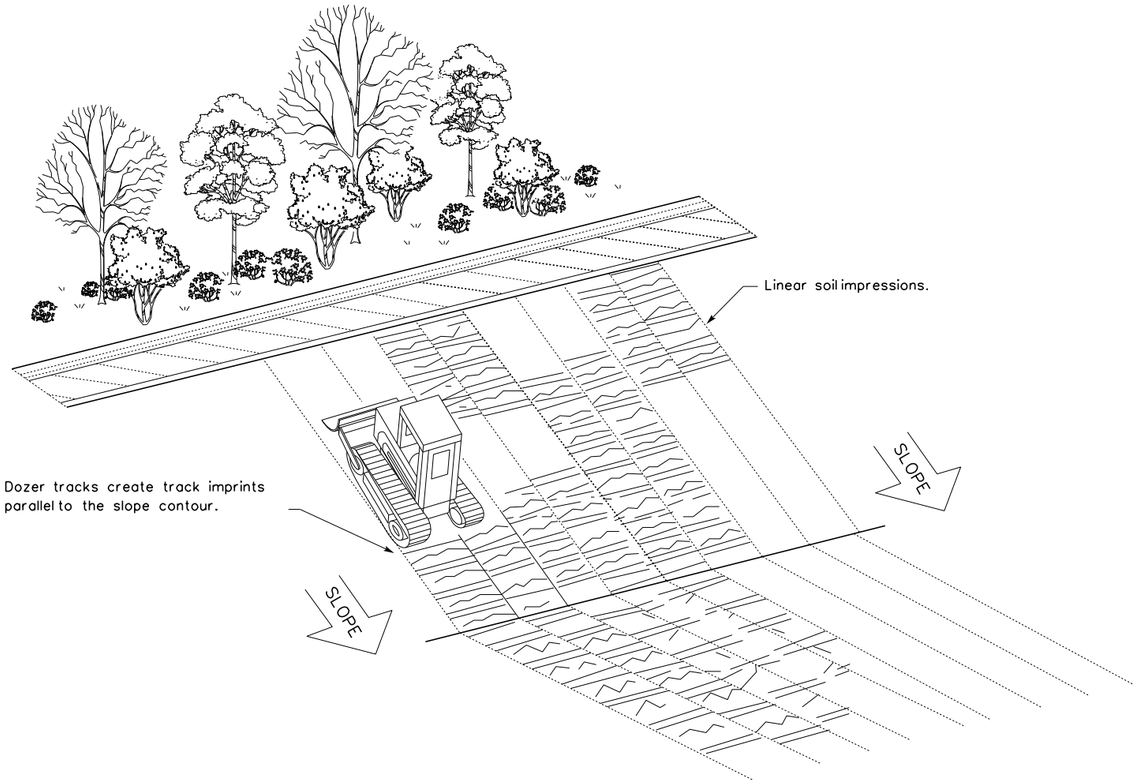
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

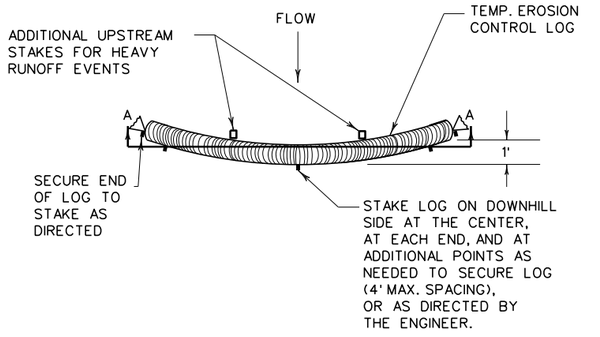
FENCE & VERTICAL TRACKING

EC(1)-16

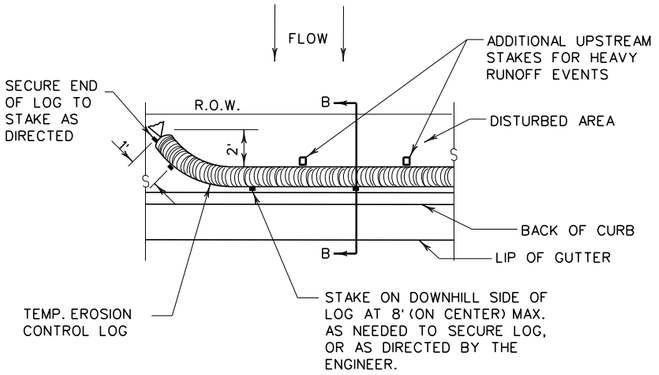
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS		
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0264	01	046,ETC.	SH 70		
	DIST	COUNTY		SHEET NO.		
	ABL	NOLAN		210		

DATE
FILE

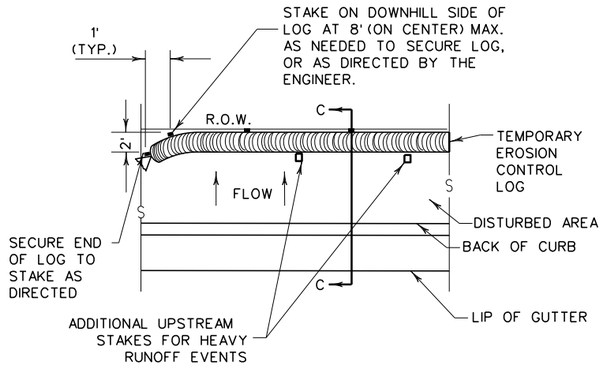
DATE:
FILE:



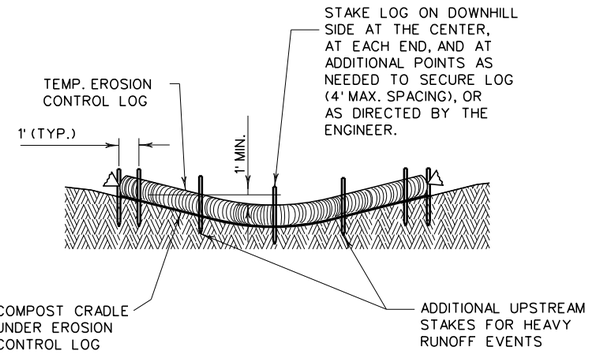
PLAN VIEW



PLAN VIEW



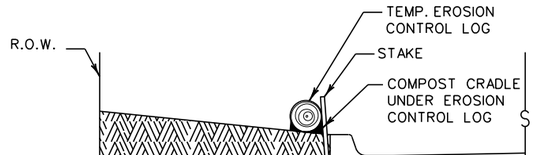
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

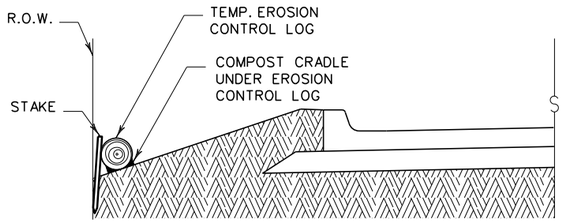
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

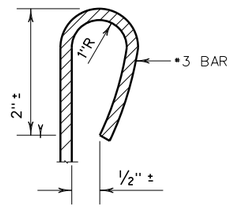
CL-BOC



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.

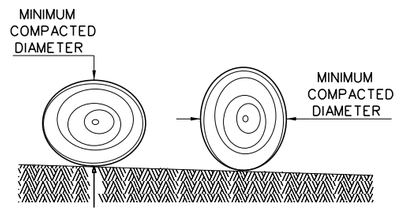
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

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

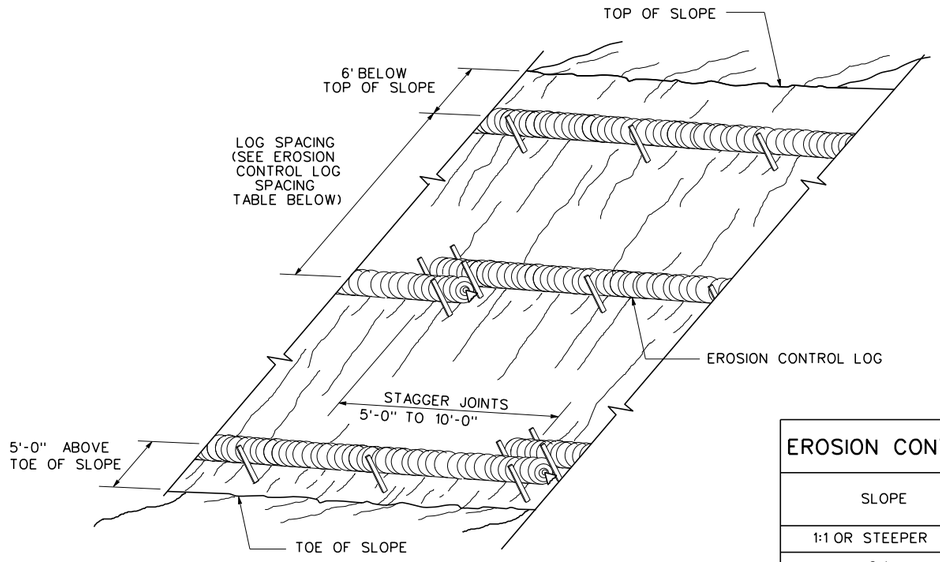
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

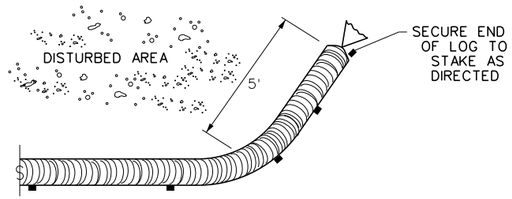
FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0264	01	046,ETC.		SH 70	
	DIST		COUNTY			SHEET NO.
	ABL		NOLAN			211

DATE:
FILE:



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

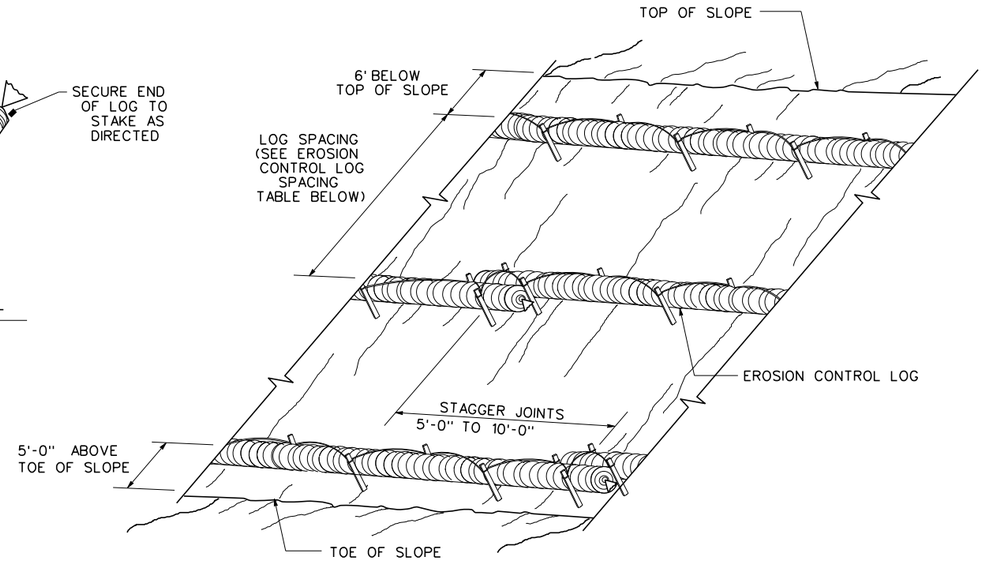
CL-SST



END SECTION RAP DETAIL

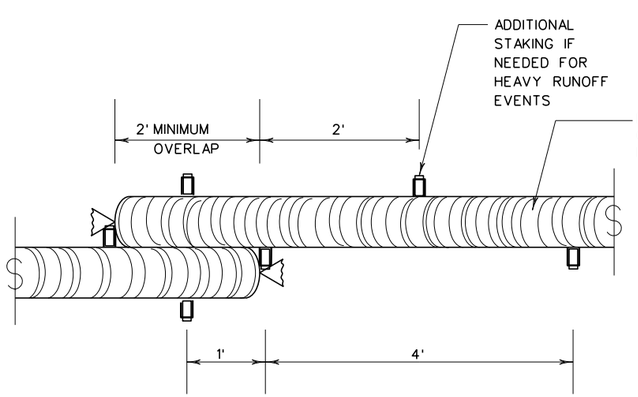
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

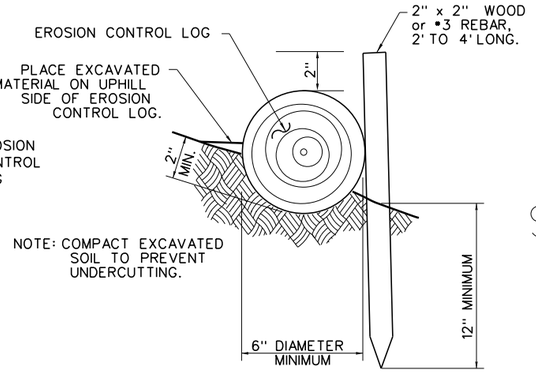
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

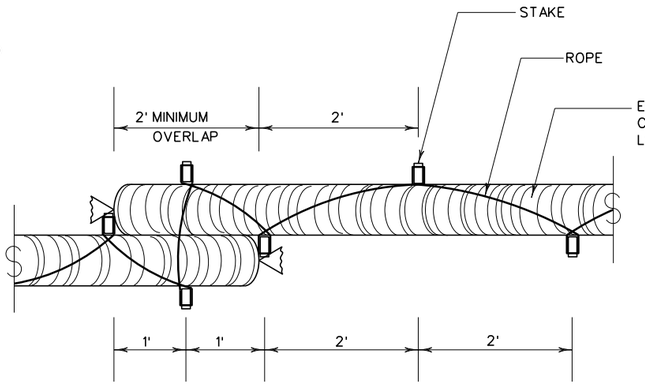


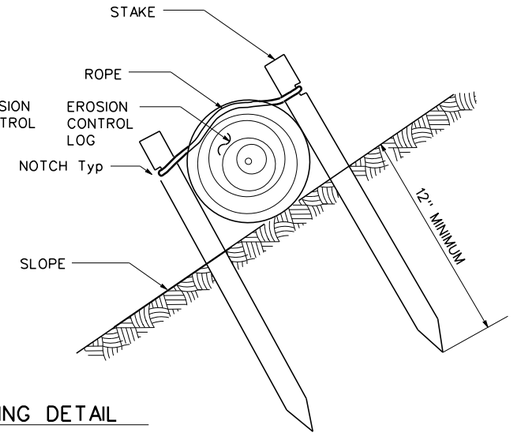


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

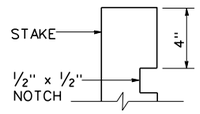
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

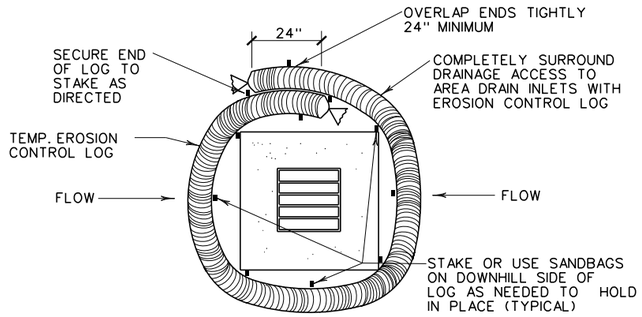
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

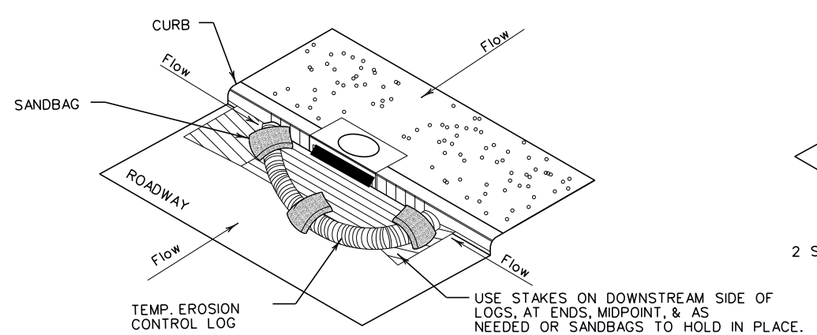
FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0264	01	046,ETC.		SH 70	
	DIST		COUNTY			SHEET NO.
	ABL		NOLAN			212

DATE:
FILE:



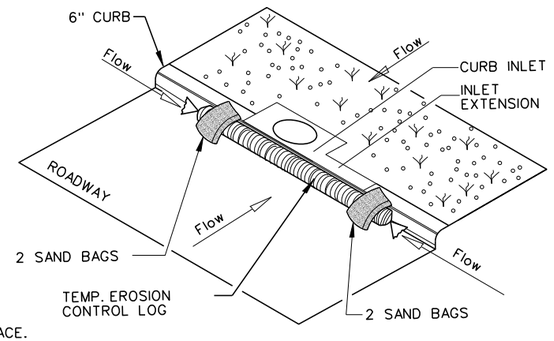
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

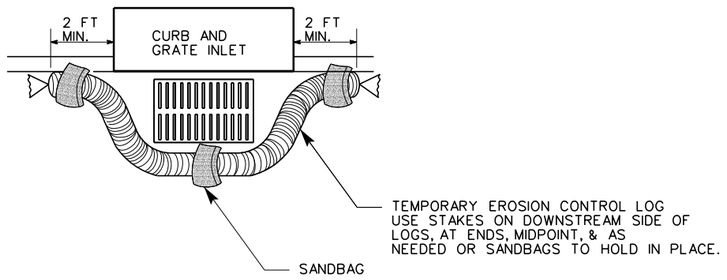
CL-CI



EROSION CONTROL LOG AT CURB INLET

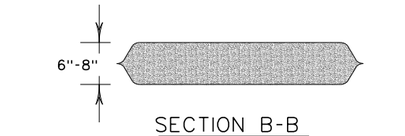
CL-CI

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

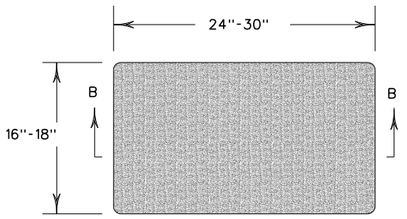


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



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

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0264	01	046,ETC.		SH 70		
	DIST	COUNTY				SHEET NO.	
	ABL	NOLAN				213	