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CONTROL	SECTION	JOB	
0088	02	062	

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

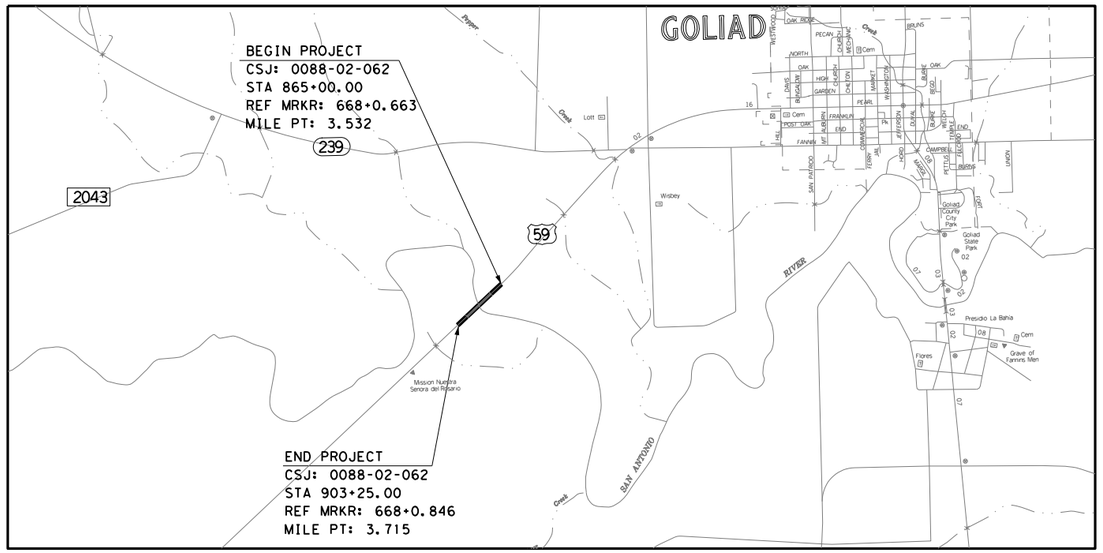
FEDERAL AID PROJECT
CSJ# 0088-02-062 PROJECT NO. BR 2025(159)

NET LENGTH OF PROJECT = 3445.50 FEET = 0.724 MILES
- ROADWAY = 2835.50 FT. = 0.537 MI.
- BRIDGE = 999.00 FT. = 0.187 MI.

GOLIAD COUNTY
US 59

LIMITS: FROM 1.3 MIL WEST OF TEXAS 239 TO 2.7 MI EAST OF FM 1351

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT,
RETAINING WALLS, GRADING, PAVEMENT, BRIDGE STRUCTURES, SIGNING & PAVEMENT MARKINGS.



LOCATION MAP NOT TO SCALE

EXCEPTIONS: N/A
EQUATIONS: N/A
R.R. CROSSINGS: N/A

DESIGN DATA

ADT 2024: 4,250
ADT 2044: 5,900
FUNCTIONAL CLASS: PRINCIPAL ARTERIAL
DESIGN CRITERIA: 4R
DESIGN SPEED: 75 MPH

CONSTRUCTION SPEED ZONE REQUESTED

TDLR INSPECTION NOT REQURIED

FINAL PLANS

DATE OF LETTING: _____

CONTRACTOR: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED AND ACCEPTED: _____

CONTRACT AMOUNT: $ _____

FINAL CONTRACT AMOUNT : $ _____

WORKING DAYS ALLOTTED: _____

WORKING DAYS USED: _____

FINAL PLANS STATEMENT

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

_____
AREA ENGINEER DATE

PLANS PREPARED BY:

LJA Engineering, Inc.
FRN - F-1386

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 2023).

Texas Department of Transportation

RECOMMENDED FOR LETTING: 8/9/2024

DocuSigned by: Paula Sales-Evans, P.E.
5975450A18CC435...
DISTRICT DIRECTOR OF TRANSPORTATION, PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 8/9/2024

DocuSigned by: Michael J. Walsh Jr., P.E.
6DF823F1D6384A8...
DISTRICT ENGINEER

DATE: 8/7/2024
FILE: c:\working\dirlja-pw.bentley.com lja-pw-01\javier.duarte\dms6634510 62 GT.dgn

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

S E Wright

9/3/2024

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

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED
PROFESSIONAL ENGINEER

Lori Neuwirth-Hirsch

9/3/2024

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

LJA Engineering, Inc. LJA
FRN - F-1386

US 59

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DATE: 9/3/2024
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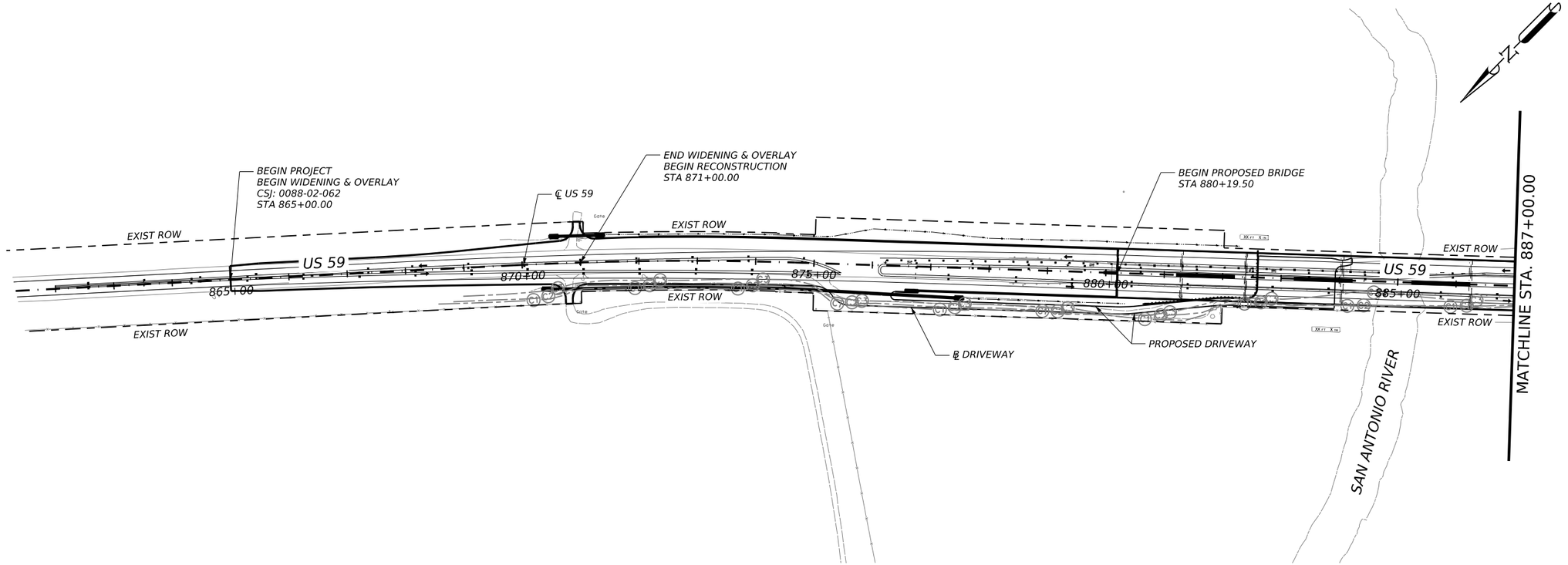

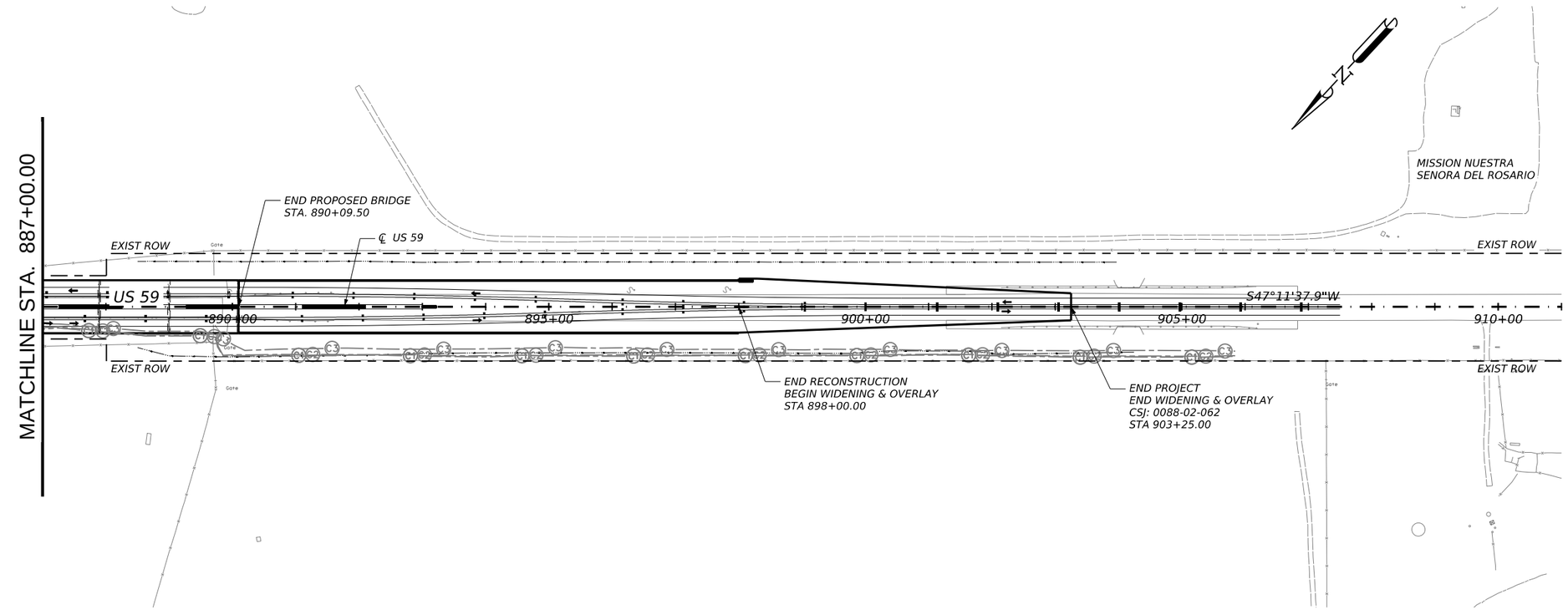

DATE: 7/3/2024
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STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation
©2024

US 59

PROJECT LAYOUT

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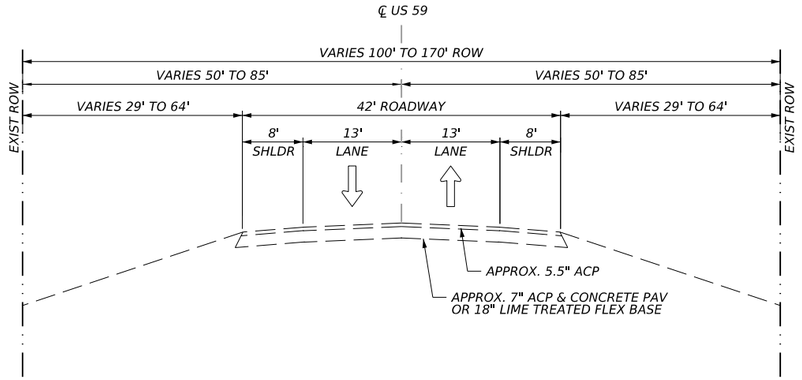
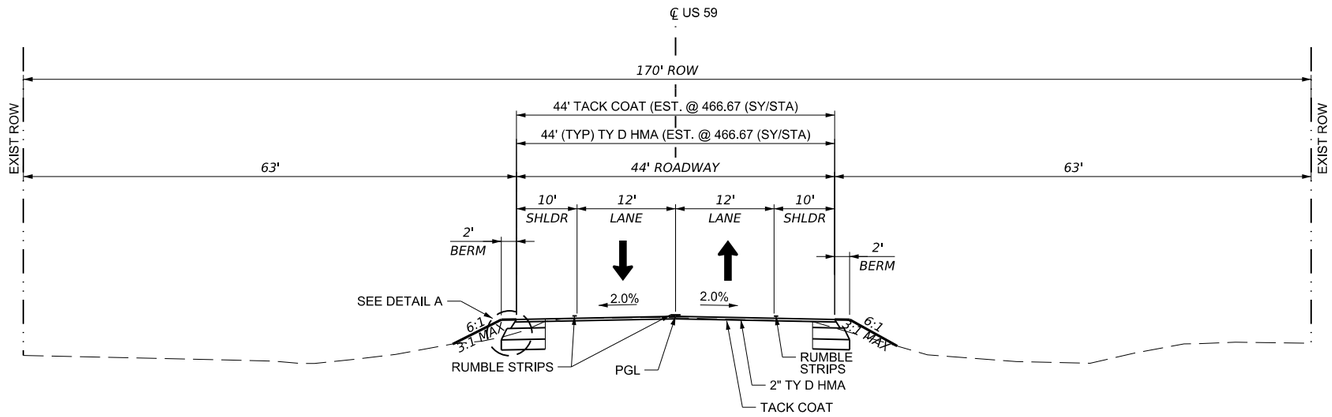


EXISTING TYPICAL SECTION

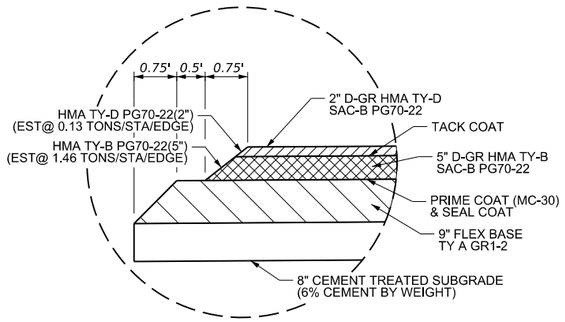
STA. 865+00.00 TO STA. 880+19.50
STA. 890+09.50 TO STA. 903+25.00

NOT TO SCALE



PROPOSED TYPICAL SECTION

STA. 865+00.00 TO STA. 871+00.00
STA. 898+00.00 TO STA. 903+25.00



DETAIL A

DATE: 7/24/2024
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STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER
7/24/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

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TYPICAL SECTION

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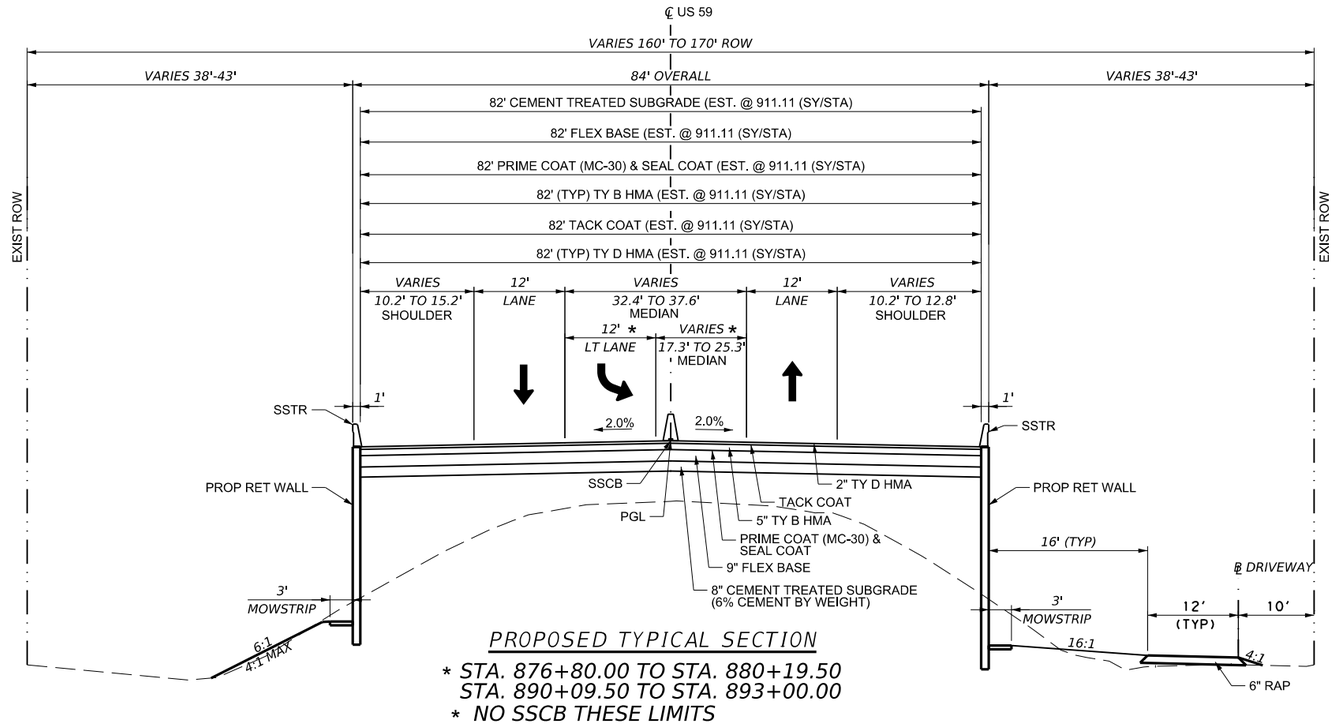
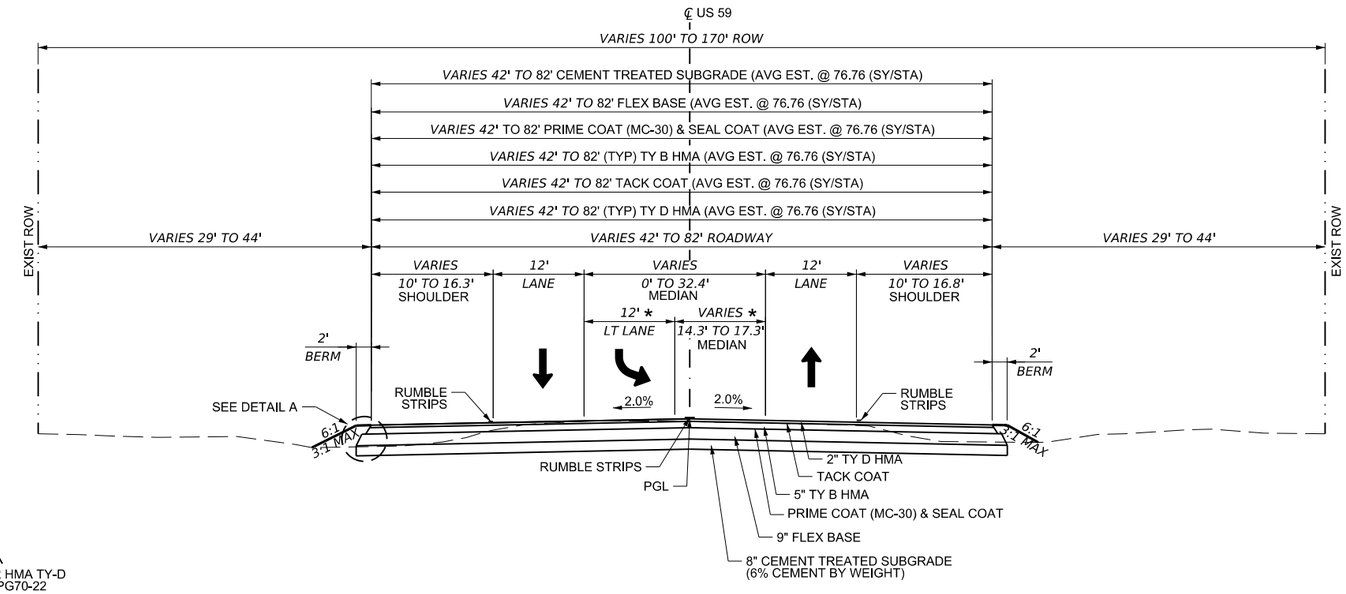


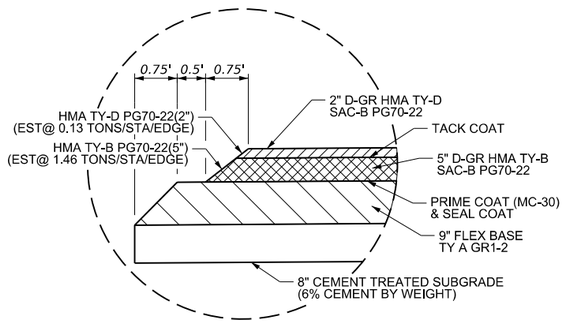
PROPOSED TYPICAL SECTION

* STA. 876+80.00 TO STA. 880+19.50
STA. 890+09.50 TO STA. 893+00.00
* NO SSCB THESE LIMITS



PROPOSED TYPICAL SECTION

STA. 871+00.00 TO STA. 876+12.00
* STA. 876+12.00 TO STA 876+80.00
STA. 893+00.00 TO STA. 898+00.00



DETAIL A

NOT TO SCALE

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation

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TYPICAL SECTIONS

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DATE: 7/3/2024
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GENERAL NOTES:

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

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

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

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

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

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

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

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

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

The following standards have been modified; FD

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

Nick Novosad, P.E.	Nick.Novosad@txdot.gov
Roberto Jimenez, P.E.	Roberto.A.Jimenez@txdot.gov

County: Goliad **Control: 0088-02-062**

Highway: US 59

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

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

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

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

ITEM 2

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

ITEM 5

For this project submit shop drawings for the fabrication of structural items to:

For Consultant Engineer designed items
Suzanne Wright, swright@lja.com, copy TxDOT Area Engineer and CRP-ShopPlanReview@txdot.gov and others as shown in the *Guide to Electronic Shop Drawing Submittal* found at https://ftp.txdot.gov/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf.

Field verify all dimensions and notify Engineer prior to initiating any work.

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

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

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before the work will commence. Drilled shaft locations or excavation areas must be staked prior to the notification so that the underground utilities can be located in relationship to the proposed work.

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

The responsibility for the construction surveying on this contract will be in accordance with Item 5.9.1, "Method A".

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

This project was developed using 3D design software and tools. A proposed 3D model of the project In Extensible Markup Language (XML) and 3d PDF format is available upon request. These models are specifically intended to aid the contractor in preparing bids and in the use of automated machine guidance equipment for the project construction. If discrepancies are found, numerical dimensions in the cross-sections and plan sheets govern over the 3D model.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

ITEM 6

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

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

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.

County: Goliad **Control: 0088-02-062**

Highway: US 59

ITEM 7

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

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

The total disturbed area for this project is 11 acres. The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs), within 1 mile of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. When the total area disturbed for all projects in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer

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

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

No significant traffic generator events identified.

ITEM 8

Prepare the progress schedule using the Critical Path Method (CPM). Submit (2) two 11" x 17" hard copies and an electronic file of the original or updated progress schedule. Submit the original progress schedule seven (7) days before the Preconstruction Conference.
Asphalt application season will be considered to be May 1 to Sept 30, except as established in Item 316.4.4 Adverse Weather Conditions or as directed by the Engineer.

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

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

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ITEM 9

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

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

ITEM 100

Coordinate all right of way preparation activities with the project's Storm Water Pollution Prevention Plan (SWP3) and Environmental Permit Issues, and Commitments Sheet (EPIC) or as approved.

Prune trees and shrubs as directed. Use accepted pruning practices in accordance with Item 192 and as defined by the National Arborist Association. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 110

For earth cuts, manipulate and compact subgrade in accordance with Item 132.3.4.2, "Compaction Methods, Density Control".

ITEM 132

Use embankment material with a plasticity index (PI) ranging from 10 to 40. Blend or treat approved materials to achieve the desired PI and pulverize the material so that 100% passes the 3 inch sieve. Retest materials as borrow sources change or when the material changes significantly. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Obtain approval to incorporate existing salvaged asphaltic surface and flexible base materials in the surface layer. If approved, incorporate existing materials no larger than 2 inches in the surface layer. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

The estimated quantities for embankments adjacent to culverts and bridges were calculated using the average-end-area method.

County: Goliad **Control: 0088-02-062**

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ITEM 164

Restore and seed areas not shown in the plans disturbed by the Contractor's operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Notify the Engineer of the unavailability of any seed mix. Make changes to the seed mix as approved.

Use a tacking agent of 50% SS-1 and 50% water and apply the agent at a rate of 0.10 gal/sy or as directed. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer's recommendations when approved. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 166

Furnish and apply slow-release nitrogen fertilizer with a rate of 60 pounds of nitrogen per acre.

ITEM 168

Distribute water to only those areas shown in the plans or as directed. Excessive overspray will not be permitted.

Water all areas of the project to be seeded or sodded every two (2) days for 90 days or as directed. Apply water in a manner to ensure adequate moisture but not to erode the soil in-place. During periods of adequate moisture, mechanical watering may not be required as approved. Upon final stabilization, the Engineer may require to continue watering as specified for a period not to exceed 30 days.

The Basis of Estimate below establishes the approximate quantity of water required to complete the 90-day watering cycle:

Rate	Water (Gal/Acre/Day)	Area (Acre)	Total Gallons (Min)
0.25 inch/week	1961	1	88,245

ITEM 247

For Table 1, "Material Requirements" a minimum plasticity index (PI) of 4 is required for Ty A Gr 1-2 Flex Base.

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Type E material consists of crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use crushed or uncrushed gravel. Blending of two or more sources, except sand or any other additive is allowed.

When requested, stake with blue tops, at 100-foot intervals, the lines and grade shown in the plans.

ITEM 275

Cement and/or asphalt stabilized base may be encountered in the existing pavement structure. Pulverize or scarify the existing material after shaping so that 100% passes a 2-1/2 inch sieve.

Use a mechanical mixer to mix the cement with the existing base material.

The three (3) day curing period is waived for roadways required to be opened to traffic the same day.

ITEM 310

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

Use SS-1 at the rate of 0.15 gallons per square yard per inch or as directed. Use a mixture of 5% SS-1 and 95% water and work the mixture into the top 2 inches of the flexible base surface. The water will not be measured or paid for directly, but will be subsidiary to pertinent Items.

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

ITEM 400

Compact each layer to meet the density and consolidation of the adjacent undisturbed material.

Use cement-stabilized backfill for culvert and storm drains located beneath the pavement structure.

ITEM 420

Set a Department-furnished brass disk on all bridge abutments and culvert headwalls as directed. The work performed will not be measured or paid directly, but will be subsidiary to pertinent Items.

County: Goliad **Control: 0088-02-062**

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Bent concrete will be a plans quantity item.

Place longitudinal construction joints at the lane line for bridge approach slabs. These construction joints will be subsidiary to Item 420.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

ITEM 422

Power-wash the surface of the precast panels before placement of concrete deck concrete to the satisfaction of the Engineer.

ITEM 423

Furnish and install pipe underdrains for all retaining walls. Include the details and manufacturer, the limits and dimensions, the outfall location, and all details necessary to incorporate the underdrain system in the working drawings. The work performed for the underdrain system within and outside the limits of the retaining wall to the outfall will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Provide a detail(s) of the coping between the MSE wall and the bridge back wall with the submission of the construction drawings for approval.

Place the select and embankment backfill to the same elevation where possible. Do not exceed a 2 feet difference in elevation at any time.

Use the approved Mechanically Stabilized Earth (MSE) wall systems listed at:
https://ftp.txdot.gov/pub/txdot-info/library/pubs/bus/bridge/mse_wall_ex.pdf

ITEM 432

Use Cap Option C for the joint between the face of the abutment and riprap as shown on the standard sheet "Concrete Riprap (CRR)".

Reinforce concrete riprap with flat sheets of welded wire fabric or with No. 3 reinforcing bars spaced at a maximum of 12 inch in each direction.

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Weep holes shall be required unless otherwise directed by engineer.

ITEM 467

The flowline of the safety end treatment shall match the flowline of the culvert. (For Item 467 – General)

Reinforce concrete riprap with 4 x 4 – W2.9 x W2.9 welded wire fabric or with No. 3 reinforcing bars spaced at a maximum of 12 inch in each direction.
The work performed for concrete collars will not be measured or paid for directly, but will be subsidiary to pertinent Items.

All safety end treatments shall include riprap to the dimensions shown on PSET-RR. This riprap shall be subsidiary to Item 467.

Riprap apron shall be considered subsidiary to pertinent items.

ITEM 496

Contractor shall provide a demolition plan to engineer for approval.

The structure(s) to be removed have surface coatings which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations.

Coordinate and identify the locations where the structure(s) will be cut at least 30 days prior to the demolition of the structure(s). If the surface coatings contain hazardous materials, the Department will arrange by separate Contract for the removal of a 4 inch wide strip around bearing attachments, at the anchor bolts, and as approved. Provide traffic control for the paint removal operations. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Notify the Engineer no later than 30 calendar days prior to the demolition of the structure(s) for coordination with the Texas Department of State Health Services.

Provide for approval a method of removal to prevent any materials from falling into water or traffic. The method used and work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 500

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

County: Goliad **Control: 0088-02-062**

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ITEM 502

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

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

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

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

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

Contractors' attention is directed to a construction speed zone, signage is subsidiary to Item 502.

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

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

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

ITEM 506

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

ITEM 512

Contractor will not be allowed to mix match between the two types of barriers unless approved by the Engineer.

GENERAL NOTES

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			US 59
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	GOLIAD	
CONTROL	SECTION	JOB	
0088	02	062	6D

The Contractor will retain ownership of precast concrete barrier at the end of the project, unless as directed by the Engineer.

ITEM 514

Align expansion joints with bridge decks and retaining wall coping joints.

ITEM 533

Construct shoulder texturing at a distance of 6 inches from the edgeline in accordance to RS(1)-13 Option 4.

ITEM 540

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

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

Type II Galvanization coatings will be used.

ITEM 545

Furnish and install cylinder covers for all REACT 350's. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

ITEM 644

Use crash worthy supports as shown on the BC sheets, the CWZTCD, or as directed for signs relocated using temporary supports. The work performed will not be measured or paid for directly, but will be subsidiary to pertinent Items.

All slip bases and hardware including but not limited to nuts, bolts, screws and washers will be galvanized. All sign and housing components will be galvanized. Slip bases shall be clamp-style.

ITEM 658

Furnish round delineators and object markers.

County: Goliad **Control: 0088-02-062**

Highway: US 59

ITEM 662

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

ITEM 666

Establish and mark the location of existing standard pavement markings including but not limited to edge lines, transitions, passing and no passing zones, gore areas, etc.
14 day requirement is already included in Item 662 which usually precedes the final striping.
Verify with District.

ITEM 677

Eliminate all conflicting pavement markings as work progresses or as directed.

Removal method must be approved by the Engineer.

No Surface Treatment Method on concrete surfaces.

When using Surface Treatment Method for asphaltic pavements, use a PB Grade 5 aggregate at an application rate of 1 cy/130 sy and asphalt AC-10, CRS-2 or HFRS-2 at a application rate of 0.39 Gal/sy.

GENERAL NOTES

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			US 59
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	GOLIAD	
CONTROL	SECTION	JOB	
0088	02	062	6E

County: Goliad **Control: 0088-02-062**

Highway: US 59

****

SPECIFICATION DATA

UNIT WEIGHT ESTIMATES

ITEM 247: FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS) ---------- 135 LBS/CF

BASIS OF ESTIMATE

ITEM 275: CEMENT TREAT (SUBGRADE) (8") ---------- 42 LBS/SY
ITEM 310: PRIME COAT ---------- 0.20 GAL/SY

COMPACTION REQUIREMENTS FOR BASE COURSE

ITEM 247: FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)
DENSITY ---------- 100% MIN.
LIFTS ---------- ALL

SURFACE TREATMENT DATA

TWO COURSE SURFACE TREATMENT (MULTI-OPTION)

FIRST COURSE

ASPHALT TYPE ---------- AC-10, CRS-2, OR HFRS-2
AVEREAGE ASPHALT RATE ---------- 0.39 GAL/SY
AGGREGATE RATE ---------- 1 CY/90 SY
AGGREGATE TYPE ---------- PB
AGGREGATE GRADE ---------- 3, SAC-B

SECOND COURSE

ASPHALT TYPE ---------- AC-15P, CRS-2P, OR HFRS-2P
AVEREAGE ASPHALT RATE ---------- 0.32 GAL/SY
AGGREGATE RATE ---------- 1 CY/115 SY
AGGREGATE TYPE ---------- PB
AGGREGATE GRADE ---------- 4, SAC-B

GENERAL NOTES

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			US 59
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	CRP	GOLIAD	
CONTROL	SECTION	JOB	
0088	02	062	6F

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0088-02-062 **DISTRICT** Corpus Christi **COUNTY** Goliad
HIGHWAY US 59

			CONTROL SECTION JOB		**0088-02-062**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00072145**		
			COUNTY		**Goliad**		
			HIGHWAY		**US 59**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-7002	PREPARING ROW	STA	35.000		35.000	
	104-7005	REMOV CONC (MOWSTRIP)	LF	1,030.000		1,030.000	
	110-7001	EXCAV (ROADWAY)	CY	4,611.190		4,611.190	
	132-7006	EMBANK (FNL)(DC)(TY C)	CY	37,143.060		37,143.060	
	152-7004	ROAD GRADER WORK (DENS CONT)	SY	2,500.000		2,500.000	
	164-7018	HYDRO MULCH SEED (PERM_RURAL_CLAY)	SY	96,207.000		96,207.000	
	164-7021	HYDRO MULCH SEED (TEMP_WARM)	SY	48,104.000		48,104.000	
	164-7022	HYDRO MULCH SEED (TEMP_COOL)	SY	48,104.000		48,104.000	
	166-7001	FERTILIZER	AC	20.000		20.000	
	168-7001	VEGETATIVE WATERING	TGL	38,979.700		38,979.700	
	169-7042	SOIL RET BLKT (OPT2)	SY	10,018.000		10,018.000	
	247-7176	FL BS (CMP IN PLC)(TYA GR1-2)(FNAL POS)	CY	3,517.000		3,517.000	
	275-7001	CEMENT	TON	253.000		253.000	
	275-7017	CEMENT TREAT (SUBGRADE) (8")	SY	14,068.000		14,068.000	
	305-7001	SALV, HAUL & STKPL RECLM ASPH PAV	CY	2,771.000		2,771.000	
	310-7004	PRIME COAT (MC-30)	GAL	3,517.000		3,517.000	
	341-7007	D-GR HMA TY-B SAC-B PG70-22	TON	3,660.000		3,660.000	
	341-7050	D-GR HMA TY-D SAC-B PG70-22	TON	1,847.000		1,847.000	
	341-7082	TACK COAT	GAL	1,007.000		1,007.000	
	400-7010	CEM STABIL BKFL	CY	241.000		241.000	
	403-7001	TEMPORARY SPL SHORING	SF	23,798.000		23,798.000	
	405-7003	FOUNDATON LOADTEST(D4945)(DRILLD SHAFT)	EA	1.000		1.000	
	416-7006	DRILL SHAFT (36 IN)	LF	1,323.000		1,323.000	
	416-7008	DRILL SHAFT (48 IN)	LF	1,950.000		1,950.000	
	416-7010	DRILL SHAFT (60 IN)	LF	1,320.000		1,320.000	
	420-7012	CL C CONC (ABUT)	CY	89.600		89.600	
	420-7022	CL C CONC (CAP)	CY	316.100		316.100	
	420-7038	CL C CONC (COLUMN)	CY	246.200		246.200	
	420-7067	CL C CONC (MISC)	CY	199.600		199.600	
	420-7071	CL F CONC (CAP)	CY	62.000		62.000	
	422-7001	REINF CONC SLAB	SF	83,160.000		83,160.000	
	423-7001	RETAINING WALL (MSE)	SF	37,558.000		37,558.000	
	423-7012	RETAINING WALL (TEMP WALL)	SF	37,530.000		37,530.000	
	425-7005	PRESTR CONC GIRDER (TX54)	LF	4,380.400		4,380.400	
	432-7001	RIPRAP (CONC)(4 IN)	CY	10.000		10.000	
	432-7013	RIPRAP (MOW STRIP)(4 IN)	CY	107.200		107.200	
	432-7043	RIPRAP (STONE PROTECTION)(18 IN)	CY	452.000		452.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0088-02-062

DISTRICT Corpus Christi
HIGHWAY US 59

COUNTY Goliad

				CONTROL SECTION JOB		TOTAL EST.	TOTAL FINAL
				PROJECT ID			
				COUNTY			
				HIGHWAY			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	434-7026	ELASTOMERIC BEARING (E6)	EA	10.000		10.000	
	434-7036	ELASTOMERIC BEARING (F6)	EA	10.000		10.000	
	434-7045	SLIDING ELASTOMERIC BEARING (ES 5)	EA	20.000		20.000	
	442-7001	STR STEEL (PLATE GIRDER)	LB	2,058,000.000		2,058,000.000	
	450-7024	RAIL (TY SSTR)	LF	1,262.000		1,262.000	
	450-7066	RAIL (TY SSTR)(MOD)	LF	1,980.000		1,980.000	
	454-7005	SEALED EXPANSION JOINT (5 IN) (SEJ - M)	LF	332.000		332.000	
	464-7005	RC PIPE (CL III)(24 IN)	LF	146.000		146.000	
	467-7328	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	2.000		2.000	
	496-7004	REMOV STR (SET)	EA	4.000		4.000	
	496-7007	REMOV STR (PIPE)	LF	89.000		89.000	
	496-7011	REMOV STR (BRIDGE 500 - 999 FT LENGTH)	EA	1.000		1.000	
	496-7028	REMOVE STR (BOLLARD)	EA	16.000		16.000	
	496-7036	REMOV STR (SMALL)	EA	1.000		1.000	
	500-7001	MOBILIZATION	LS	1.000		1.000	
	502-7001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	35.000		35.000	
	506-7002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	473.000		473.000	
	506-7011	ROCK FILTER DAMS (REMOVE)	LF	473.000		473.000	
	506-7020	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	340.000		340.000	
	506-7024	CONSTRUCTION EXITS (REMOVE)	SY	340.000		340.000	
	506-7039	TEMP SEDMT CONT FENCE (INSTALL)	LF	24,812.000		24,812.000	
	506-7041	TEMP SEDMT CONT FENCE (REMOVE)	LF	24,812.000		24,812.000	
	506-7045	BIODEG EROSN CONT LOGS (INSTL) (18")	LF	246.000		246.000	
	506-7046	BIODEG EROSN CONT LOGS (REMOVE)	LF	246.000		246.000	
	508-7001	CONSTRUCTING DETOURS	SY	5,398.000		5,398.000	
	512-7001	PORT CTB (FUR & INST)(SGL SLOPE)(TY 1)	LF	7,360.000		7,360.000	
	512-7025	PORT CTB (MOVE)(SGL SLP)(TY 1)	LF	3,002.000		3,002.000	
	512-7049	PORT CTB (REMOVE)(SGL SLP)(TY 1)	LF	7,340.000		7,340.000	
	514-7001	PERM CTB (SGL SLOPE) (TY 1) (42)	LF	1,290.000		1,290.000	
	533-7001	MILL RUMBLE STRIPS (ASPHALT) (SHLDR)	LF	6,920.000		6,920.000	
	533-7002	MILL RUMBLE STRIPS (ASPH) (CENTERLINE)	LF	1,536.000		1,536.000	
	540-7001	MTL W-BEAM GD FEN (TIM POST)	LF	100.000		100.000	
	540-7037	TL-2 31" SHORT RADIUS (W/O DAT)	EA	1.000		1.000	
	542-7001	REMOVE METAL BEAM GUARD FENCE	LF	500.000		500.000	
	542-7004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	4.000		4.000	
	544-7001	GUARDRAIL END TREATMENT (INSTALL)	EA	2.000		2.000	
	544-7003	GUARDRAIL END TREATMENT (REMOVE)	EA	4.000		4.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0088-02-062 **DISTRICT** Corpus Christi **COUNTY** Goliad
HIGHWAY US 59

		CONTROL SECTION JOB		**0088-02-062**		TOTAL EST.	TOTAL FINAL
		PROJECT ID		**A00072145**			
		COUNTY		**Goliad**			
		HIGHWAY		**US 59**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	545-7002	CRASH CUSH ATTEN (MOVE & RESET)	EA	13.000		13.000	
	545-7004	CRASH CUSH ATTEN (REMOVE)	EA	8.000		8.000	
	545-7006	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	8.000		8.000	
	545-7008	CRASH CUSH ATTEN (INSTL)(L)(W)(TL3)	EA	4.000		4.000	
	550-7016	GATE (REMOVE)	EA	1.000		1.000	
	556-7006	PIPE UNDERDRAINS (TY 6) (6")	LF	3,005.000		3,005.000	
	644-7001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2.000		2.000	
	644-7004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	5.000		5.000	
	644-7028	IN SM RD SN SUP&AM TYS80(1)SA(T)	EA	2.000		2.000	
	644-7061	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	EA	2.000		2.000	
	644-7073	REMOVE SM RD SN SUP&AM	EA	8.000		8.000	
	658-7014	INSTL DEL ASSM (D-SW)SZ 1(BRF)CTB (BR)	EA	32.000		32.000	
	658-7016	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF1 (BI)	EA	5.000		5.000	
	658-7033	INSTL DEL ASSM (D-SY)SZ 1(BRF)CTB (BR)	EA	12.000		12.000	
	658-7066	INSTL OM ASSM (OM-3L)(TWT)GND	EA	2.000		2.000	
	658-7070	INSTL OM ASSM (OM-3R)(TWT)GND	EA	2.000		2.000	
	662-7064	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	20,260.000		20,260.000	
	662-7097	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	18,580.000		18,580.000	
	666-7017	REFL PAV MRK TY I (W)8"(DOT)(090MIL)	LF	38.000		38.000	
	666-7023	REFL PAV MRK TY I (W)8"(SLD)(090MIL)	LF	887.000		887.000	
	666-7265	RE PROFILE PM TY I(W)6"(SLD)(090MIL)	LF	9,100.000		9,100.000	
	666-7269	RE PROFILE PM TY I(Y)6"(SLD)(090MIL)	LF	13,882.000		13,882.000	
	666-7273	RE PROFILE PM TY I(Y)6"(BRK)(090MIL)	LF	150.000		150.000	
	668-7091	PREFAB PM TY C (W)(ARROW)	EA	3.000		3.000	
	668-7103	PREFAB PM TY C (W)(WORD)	EA	3.000		3.000	
	672-7002	REFL PAV MRKR TY I-C	EA	22.000		22.000	
	672-7004	REFL PAV MRKR TY II-A-A	EA	593.000		593.000	
	677-7001	ELIM EXT PM & MRKS (4")	LF	14,766.000		14,766.000	
	677-7008	ELIM EXT PM & MRKS (24")	LF	631.000		631.000	
	4003-7001	TIP TESTING(DRILL SHAFT)	EA	24.000		24.000	
	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 WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	423 7012	508 7001	512 7001	512 7025	512 7049	545 7002	545 7004	545 7006	662 7064	662 7097
	RETAINING WALL (TEMP WALL)	CONSTRUCTING DETOURS	PORT CTB (FUR & INST) (SGL SLOPE) (TY 1)	PORT CTB (MOVE) (SGL SLP) (TY 1)	PORT CTB (REMOVE)(SGL SLP)(TY 1)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (L)(N) (TL3)	WK ZN PAV MRK REMOV (W)4"(SLD)	WK ZN PAV MRK REMOV (Y)4"(SLD)
	SF	SY	LF	LF	LF	EA	EA	EA	LF	LF
US 59										
SHEET 1 OF 10 BEGIN TO STA 873+00		2246	260					2		
SHEET 1 OF 10 STA 873+00 TO STA 885+00	16922	855	1240					2		
SHEET 2 OF 10 STA 885+00 TO STA 897+00	20608	644	1276					2		
SHEET 2 OF 10 STA 897+00 TO END		1653	226					2		
SHEET 3 OF 10 BEGIN TO STA 873+00				600		4			2200	2200
SHEET 3 OF 10 STA 873+00 TO STA 885+00			2260	900					2400	2400
SHEET 4 OF 10 STA 885+00 TO STA 897+00			1698	1502					2400	2400
SHEET 4 OF 10 STA 897+00 TO END			400			4			2100	2100
SHEET 5 OF 10 BEGIN TO STA 873+00					600		2		2200	2200
SHEET 5 OF 10 STA 873+00 TO STA 885+00					3140	2			2400	2400
SHEET 6 OF 10 STA 885+00 TO STA 897+00					3200	2			2400	2400
SHEET 6 OF 10 STA 897+00 TO END					400		2		1500	1500
SHEET 7 OF 10 BEGIN TO STA 873+00										
SHEET 7 OF 10 STA 873+00 TO STA 885+00							1			
SHEET 8 OF 10 STA 885+00 TO STA 897+00							1			
SHEET 8 OF 10 STA 897+00 TO END										
SHEET 9 OF 10 BEGIN TO STA 873+00									600	
SHEET 9 OF 10 STA 873+00 TO STA 885+00							1		720	510
SHEET 10 OF 10 STA 885+00 TO STA 897+00						1	1		690	470
SHEET 10 OF 10 STA 897+00 TO END									650	
PROJECT TOTALS	**37530**	**5398**	**7360**	**3002**	**7340**	**13**	**8**	**8**	**20260**	**18580**

SUMMARY OF RETAINING WALL ITEMS

LOCATION	403 7001	423 7001	432 7013	450 7024	556 7006
	TEMP SPL SHORING	RETAINING WALL (MSE)	RIPRAP (MOW STRIP)(4 IN)	RAIL (TY SSTR)	PIPE UNDERDRAINS (TY 6) (6")
	SF	SF	CY	LF	LF
RW01	3703	6137	12.8	340	326
RW02	352	1478	3.4		104
RW03	5533	9028	30.6	822	852
RW04	7073	10064	29.5	791	807
RW05	351	1155	3.4		104
RW06	6786	9696	29.5	791	812
PROJECT TOTALS	**23798**	**37558**	**92.2**	**1262**	**3005**

SUMMARY OF ROADWAY ITEMS

LOCATION	100 7002	110 7001	132 7006	152 7004	247 7176	275 7001	275 7017	310 7045	432 7043	432 7013	464 7005	467 7328	514 7001	540 7001	540 7037	544 7001	545 7008
	PREPARING ROW	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (DENS CONT) (TY C)	ROAD GRADER WORK (DENS CONT)	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	CEMENT	CEMENT TREAT (SUBGRADE) (8")	PRIME COAT (MC-30)	RIPRAP (STONE PROTECTION)(18 IN)	RIPRAP (MOW STRIP)(4 IN)	RC PIPE (CL III)(24 IN)	SET (TY II) (24 IN) (RCP) (6: 1) (P)	PERM CTB (SGL SLOPE) (TY 1) (42)	MTL W-BEAM GD FEN (TIM POST)	TL-2 31" SHORT RADIUS (W/O DAT)	GUARDRAIL END TREATMENT (INSTALL)	CRASH CUSH ATTEN (INSTL)(L) (W)(TL3)
	STA	CY	CY	SY	CY	TON	SY	GAL	CY	CY	LF	EA	LF	LF	EA	EA	EA
US 59																	
SHEET 1 OF 6 BEGIN TO STA 873+00	5	43.78	313.49		280	20	1120	280									
SHEET 2 OF 6 STA 873+00 TO STA 879+00	6	228.12	10310.23		1250	90	4999	1250			146	2					2
SHEET 3 OF 6 STA 879+00 TO STA 885+00	6	162.95	5641.35		285	21	1142	285	160	15				100	1	2	
SHEET 4 OF 6 STA 885+00 TO STA 891+00	6	43.13	1448.32		216	16	865	216	292				90				
SHEET 5 OF 6 STA 891+00 TO STA 897+00	6	130.59	8186.92		1323	95	5294	1323					210				2
SHEET 6 OF 6 STA 897+00 TO END	6	2.94	393.08		162	12	648	162									
PADDLING TRAIL DRIVEWAY																	
SHEET 1 OF 2				823													
SHEET 2 OF 2				1677													
PROJECT TOTALS	**35**	**611.51**	**26293.39**	**2500**	**3517**	**253**	**14068**	**3517**	**452**	**15**	**146**	**2**	**300**	**100**	**1**	**2**	**4**

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	*341 7007*	*341 7050*	*341 7082*
	D-GR HMA TY-B SAC-B PG70-22	*D-GR HMA TY-D SAC-B PG70-22*	*TACK COAT*
	TON	*TON*	*GAL*
US 59			
SHEET 1 OF 6 BEGIN TO STA 873+00	*284*	*268*	*146*
SHEET 2 OF 6 STA 873+00 TO STA 879+00	*1301*	*521*	*284*
SHEET 3 OF 6 STA 879+00 TO STA 885+00	*299*	*120*	*65*
SHEET 4 OF 6 STA 885+00 TO STA 891+00	*227*	*91*	*49*
SHEET 5 OF 6 STA 891+00 TO STA 897+00	*1382*	*553*	*302*
SHEET 6 OF 6 STA 897+00 TO END	*166*	*295*	*161*
PADDLING TRAIL DRIVEWAY			
SHEET 1 OF 2			
SHEET 2 OF 2			
PROJECT TOTALS	*3660*	*1847*	*1007*

SUMMARY OF REMOVAL ITEMS

LOCATION	104 7005	305 7001	496 7004	496 7007	496 7011	496 7028	542 7001	542 7004	544 7003	550 7016	644 7073
	REMOVING CONCRETE(MOW STRIP)	SALV, HAUL & STKPL RECLM ASPH PAV	REMOV STR (SET)	REMOV STR (PIPE)	REMOV STR (BRIDGE 500 - 999 FT LENGTH)	REMOVE STR (BOLLARD)	REMOVE METAL BEAM GUARD FENCE	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (REMOVE)	GATE (REMOVE)	REMOVE SM RD SN SUP&AM
	LF	CY	EA	LF	EA	EA	LF	EA	EA	EA	EA
US 59	1030	2771	4	89	1	16	500	4	4	1	8
PROJECT TOTALS	**1030**	**2771**	**4**	**89**	**1**	**16**	**500**	**4**	**4**	**1**	**8**

DATE: 7/5/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663451062_GSR00.dgn

LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation

US 59

SUMMARY OF QUANTITIES

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		8

SUMMARY OF SIGNING ITEMS

LOCATION	644 7001	644 7004	644 7028	644 7061	496 7036
	IN SM RD SN SUP&AM TY10BWG (1)SA(P)	IN SM RD SN SUP&AM TY10BWG (1)SA(T)	IN SM RD SN SUP&AM TYS80 (1)SA(T)	IN BRIDGE MNT CLEARANCE SGN ASSM(TY N)	REMOV STR (SMALL)
	EA	EA	EA	EA	EA
SHEET 1 OF 3 BEGIN TO STA 873+00		2			
SHEET 1 OF 3 STA 873+00 TO STA 879+00		1			
SHEET 2 OF 3 STA 879+00 TO STA 885+00	2		1	2	1
SHEET 2 OF 3 STA 885+00 TO STA 891+00			1		
SHEET 3 OF 3 891+00 TO STA 897+00		1			
SHEET 3 OF 3 STA 897+00 TO END		1			
PROJECT TOTALS	**2**	**5**	**2**	**2**	**1**

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	533 7001	533 7002	658 7066	658 7070	658 7016	658 7014	658 7033	666 7017	666 7023	666 7265	666 7273	666 7269	668 7091	668 7103	672 7002	672 7004	677 7001	677 7008
	RUMBLE STRIPS (SHOULDER)	RUMBLE STRIPS (CENTERLINE)	INSTL OM ASSM (OM-3L) (TWT)GND	INSTL OM ASSM (OM-3R) (TWT)GND	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 (BI)	INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BR)	INSTL DEL ASSM (D-SY) SZ (BRF) CTB (BI)	REFL PAV MRK TY I (W)8"(DOT) (090MIL)	REFL PAV MRK TY I (W)8"(SLD) (090MIL)	RE PM W/RET REQ TY I (W)6"(SLD) (090MIL)	RE PM W/RET REQ TY I (Y)6"(BRK) (090MIL)	RE PM W/RET REQ TY I (Y)6"(SLD) (090MIL)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (24")
	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	LF	LF
SHEET 1 OF 3 BEGIN TO STA 873+00	2200	786								2200	80	2180				118	2484	
SHEET 1 OF 3 STA 873+00 TO STA 879+00	1020					6			287	1200		2164	1	1	7	92	2030	278
SHEET 2 OF 3 STA 879+00 TO STA 885+00	228		1	1	5	12	5		600	1200		2400	2	2	15	100	2400	30
SHEET 2 OF 3 STA 885+00 TO STA 891+00	172		1	1		12	6	38		1200		2400				102	2400	23
SHEET 3 OF 3 891+00 TO STA 897+00	1200					2	1			1200		2400				100	2330	300
SHEET 3 OF 3 STA 897+00 TO END	2100	750								2100	70	2338				81	3122	
PROJECT TOTALS	**6920**	**1536**	**2**	**2**	**5**	**32**	**12**	**38**	**887**	**9100**	**150**	**13882**	**3**	**3**	**22**	**593**	**14766**	**631**

SUMMARY OF EROSION CONTROL ITEMS

LOCATION	164 7018	164 7021	164 7022	166 7001	168 7001	169 7042	506 7002	506 7011	506 7020	506 7024	506 7039	506 7041	506 4045	506 7046
	HYDRO MLCH SEED (PERM) (RURAL) (CLAY)	HYDRO MLCH SEED (TEMP) (WARM)	HYDRO MLCH SEED (TEMP) (COOL)	FERTILIZER	VEGETATIVE WATERING	SOIL RETENTION BLANKETS (CL 1) (TY B)	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (18")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	AC	MG	SY	LF	LF	SY	SY	LF	LF	LF	LF
SHEET 1 OF 6 BEGIN TO STA 873+00	5176	2588	2588	1	2097.1						1575	1575	75	75
SHEET 1 OF 6 STA 873+00 TO STA 885+00	4671	2335.5	2335.5	1	1892.5	1123	70	70	80	80	2385	2385		
SHEET 2 OF 6 STA 885+00 TO STA 897+00	8465	4232.5	4232.5	2	3429.7	2167	86	86			2325	2325		
SHEET 2 OF 6 STA 897+00 TO END	11625	5812.5	5812.5	2	4710.0						1890	1890		
SHEET 3 OF 6 BEGIN TO STA 873+00	8474	4237	4237	2	3433.4						2135	2135	75	75
SHEET 3 OF 6 STA 873+00 TO STA 885+00	5030	2515	2515	1	2038.0	1120	77	77	80	80	2520	2520		
SHEET 4 OF 6 STA 885+00 TO STA 897+00	8256	4128	4128	2	3345.0	2170	86	86			2135	2135		
SHEET 4 OF 6 STA 897+00 TO END	8918	4459	4459	2	3613.3						1496	1496		
SHEET 5 OF 6 BEGIN TO STA 873+00	10344	5172	5172	2	4191.0						2130	2130	96	96
SHEET 5 OF 6 STA 873+00 TO STA 885+00	5689	2844.5	2844.5	1	2305.0	1268	68	68	180	180	2395	2395		
SHEET 6 OF 6 STA 885+00 TO STA 897+00	9110	4555	4555	2	3691.1	2170	86	86			2330	2330		
SHEET 6 OF 6 STA 897+00 TO END	10449	5224.5	5224.5	2	4233.6						1496	1496		
PROJECT TOTALS	**96207**	**48104**	**48104**	**20**	**38979.7**	**10018**	**473**	**473**	**340**	**340**	**24812**	**24812**	**246**	**246**

DATE: 7/5/2024
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LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation

US 59

SUMMARY OF QUANTITIES

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		9

Earthwork Quantities Report

Report Created: Wednesday, July 3, 2024
Time: 10:27:41 AM

Cross Section Set 59_CL
Alignment Name: 59_CL
Input Grid Factor: 1

Baseline Station	Statio Cut Volum	Station Fill Volume
865+50.0000 R1	12.682	127.7832
866+00.0000 R1	13.747	139.1603
866+50.0000 R1	16.732	134.8801
867+00.0000 R1	15.211	143.513
867+50.0000 R1	12.442	152.8774
868+00.0000 R1	9.4735	163.7195
868+50.0000 R1	4.9279	179.5229
869+00.0000 R1	5.6803	187.7558
869+50.0000 R1	9.1392	191.0556
870+00.0000 R1	10.222	194.1145
870+50.0000 R1	11.944	171.9249
871+00.0000 R1	108.88	100.5875
871+50.0000 R1	191.44	40.9124
872+00.0000 R1	177.59	29.9612
872+50.0000 R1	165.27	33.4341
873+00.0000 R1	140.55	44.0497
873+50.0000 R1	114.44	60.5882
874+00.0000 R1	89.306	85.1583
874+50.0000 R1	63.595	109.6181
875+00.0000 R1	39.745	144.3582
875+50.0000 R1	27.294	307.7326
876+00.0000 R1	24.443	546.1925
876+50.0000 R1	23.700	752.7124
877+00.0000 R1	33.482	953.9165
877+50.0000 R1	47.516	1009.5368
878+00.0000 R1	70.141	1026.709
878+50.0000 R1	103.66	1157.42
879+00.0000 R1	123.85	1319.3454
879+50.0000 R1	129.46	1481.9568
880+00.0000 R1	123.23	1640.5536
880+50.0000 R1	85.783	861.8905
881+00.0000 R1	39.642	0.7946
881+50.0000 R1	29.216	0.7891
882+00.0000 R1	38.315	0.188
882+50.0000 R1	37.339	0.0302
883+00.0000 R1	97.470	0.7821
883+50.0000 R1	141.08	1.125
BRIDGE STATION STA 880+19.50 TO STA 890+09.50		
890+50.0000 R1	1263.5	10575.1241
891+00.0000 R1	57.091	1439.792
891+50.0000 R1	52.671	1279.5749
892+00.0000 R1	53.047	1100.8064
892+50.0000 R1	53.770	940.0271
893+00.0000 R1	53.677	802.9511
893+50.0000 R1	52.711	687.0488
894+00.0000 R1	52.325	582.7946
894+50.0000 R1	53.201	489.9576
895+00.0000 R1	53.184	419.2441
895+50.0000 R1	52.487	370.61
896+00.0000 R1	52.354	331.9558
896+50.0000 R1	52.157	297.1965
897+00.0000 R1	52.424	264.4644
897+50.0000 R1	54.195	229.069
898+00.0000 R1	60.538	201.9764
898+50.0000 R1	37.162	501.9591
899+00.0000 R1	8.0379	765.4032
899+50.0000 R1	7.3138	656.3918
900+00.0000 R1	7.4304	536.7585
900+50.0000 R1	8.1445	434.0578
901+00.0000 R1	9.3402	341.9667
901+50.0000 R1	10.160	249.5346
902+00.0000 R1	12.701	124.9965
902+50.0000 R1	21.724	22.6974
903+00.0000 R1	22.759	0.0446
903+25.0000 R1	8.2909	0.0108
Grand Total	4,611.19	37,143.06

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms66345\062_GSEW00.dgn

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US 59

SUMMARY OF EARTHWORK QUANTITIES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		10

SUMMARY OF SMALL SIGNS

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

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1	1	W8-13aT		36" X 36"	X		S80	1	SA	T		
1	2			36" x 36"	X		S80	1	SA	T		
1	3	R1-1		36" X 36"	X		S80	1	SA	T		
2	4	1-3		66" X 18"	X		S80	1	SA	T		
2	5	W12-2a		84" x 24"	X		BRIDGE MOUNT		BRIDGE MOUNT (SEE	NOTE 2)		N
2	6			18" x 24"	X		S80	1	SA	P		
2	6			12" X 18"	X		S80	1	SA	P		
2	8	W12-2a		84" x 24"	X		BRIDGE MOUNT		BRIDGE MOUNT (SEE	NOTE 2)		N
2	9	1-3		66" X 18"	X		S80	1	SA	T		
3	10			36" x 36"	X		S80	1	SA	T		
3	11	W8-13aT		36" X 36"	X		S80	1	SA	T		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0088	02	062	US59
4-16		DIST	COUNTY		SHEET NO.
8-16		CRP	GOLIAD		11

18

DATE: 7/3/2024 $TIME$
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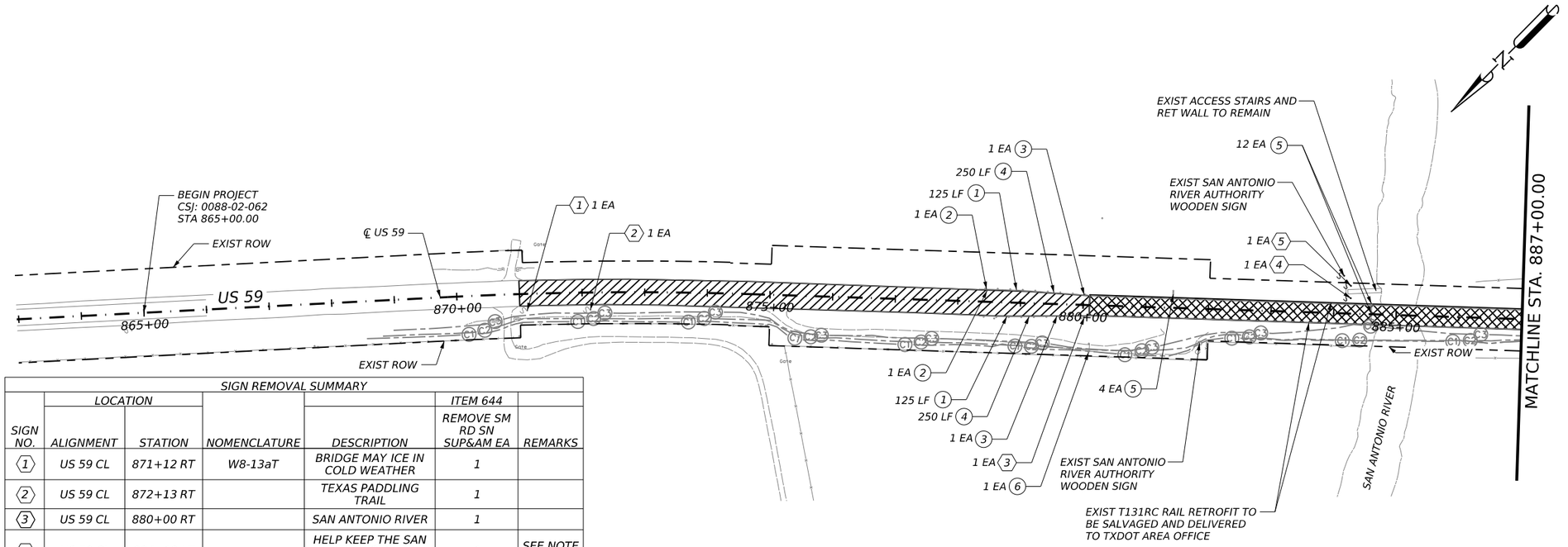
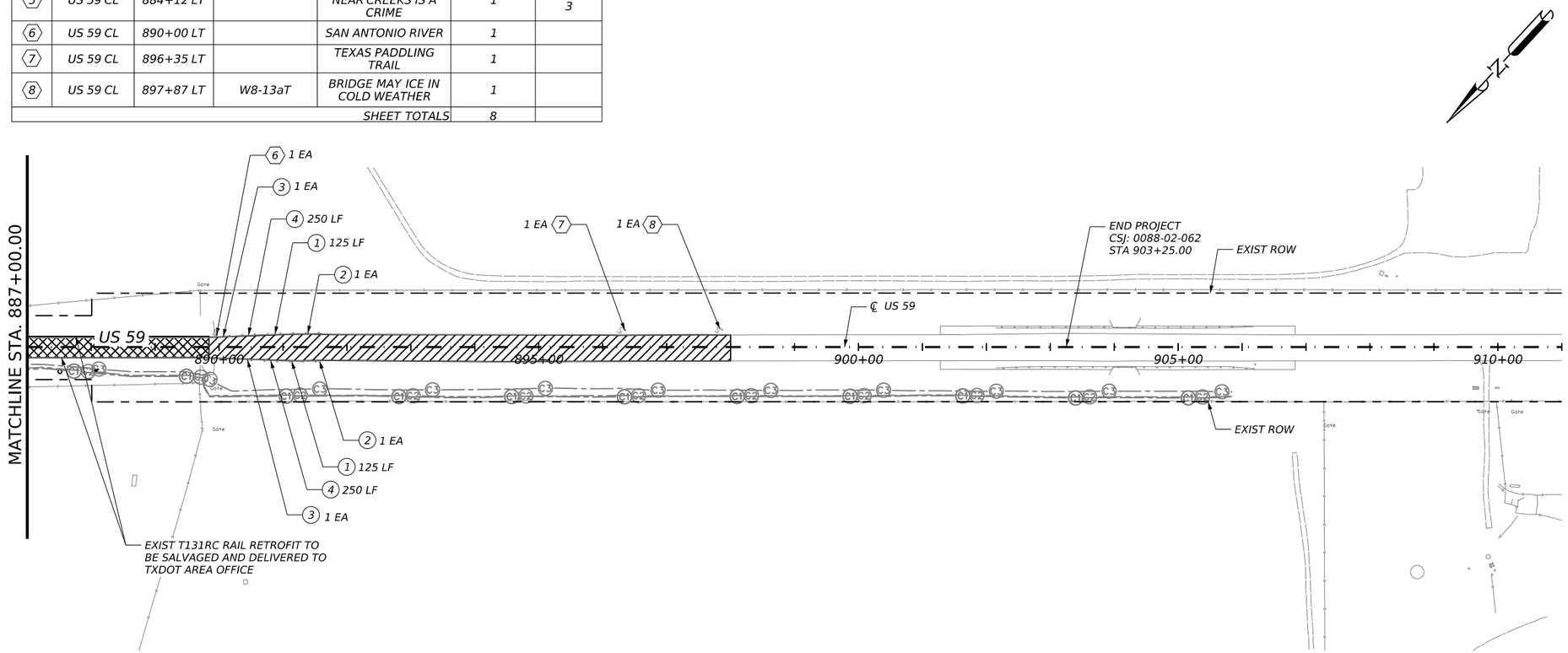


SIGN REMOVAL SUMMARY

SIGN NO.	LOCATION: ALIGNMENT	LOCATION: STATION	NOMENCLATURE	DESCRIPTION	ITEM 644: REMOVE SM RD SN SUP&AM EA	REMARKS
1	US 59 CL	871+12 RT	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	1	
2	US 59 CL	872+13 RT		TEXAS PADDLING TRAIL	1	
3	US 59 CL	880+00 RT		SAN ANTONIO RIVER	1	
4	US 59 CL	884+12 LT		HELP KEEP THE SAN ANTONIO RIVER CLEAN	1	SEE NOTE 3
5	US 59 CL	884+12 LT		ILLEGAL DUMPING NEAR CREEKS IS A CRIME	1	SEE NOTE 3
6	US 59 CL	890+00 LT		SAN ANTONIO RIVER	1	
7	US 59 CL	896+35 LT		TEXAS PADDLING TRAIL	1	
8	US 59 CL	897+87 LT	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	1	
				SHEET TOTALS	8	



LEGEND

- SAL, HAUL & STKPL RECLM ASPH PAV
- REMOV STR (BRIDGE 500-999 FT LENGTH)
- (1) REMOVE METAL BEAM GUARD FENCE
- (2) REMOVE SGT
- (3) REMOVE METAL BEAM GUARD FENCE TRANSITION (THRIE-BEAM)
- (4) REMOVE CONCRETE (MOWSTRIP)
- (5) REMOVE STR (BOLLARD)
- (6) GATE (REMOVE)
- (#) REMOVE SM RD SN SUP & AM

NOTES:

1. EXIST WOODEN SAN ANTONIO RIVER AUTHORITY SIGNS TO BE REMOVED AND DELIVERED TO TXDOT AREA OFFICE FOR STORAGE DURING DURATION OF CONSTRUCTION.
2. CONTRACTOR TO REMOVE AND RESTORE EXIST PORT-O-CAN(S). REMOVAL AND RESTORING OF EXIST PORT-O-CAN(S) WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO ITEM 496-7011.
3. CONTRACTOR TO REMOVE EXISTING ALUMINUM SIGN ASSEMBLY AND SUPPORT. EXISTING SIGN PANEL TO BE SET ASIDE AND KEPT PROTECTED. EXISTING SIGN PANEL TO BE RE-INSTALLED ON NEW SIGN SUPPORT ASSEMBLY AS SHOWN ON SUMMARY OF SMALL SIGNS AND SIGNING AND PAVEMENT MARKING LAYOUT.

0' 100' 200'

SCALE: 1"=200'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation
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US 59

REMOVAL LAYOUT

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		12

DATE: 7/3/2024
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US 59 TRAFFIC CONTROL PLAN SEQUENCE OF WORK

(1) THIS PROJECT WILL BE CONSTRUCTED IN 3 PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL ADVANCE WARNING SIGNS, TEMPORARY SIGNS AND BARRICADES IN ACCORDANCE WITH BC(1)-21 THRU BC(12)-21 AND OR AS DIRECTED/APPROVED BY THE ENGINEER. DROP OFF CONDITIONS OF GREATER THAN 2 INCHES MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS.
(2) CONTRACTOR TO MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES.
(3) PREPARING ROW TO BE DONE PRIOR TO ANY OTHER CONSTRUCTION, AS PER THE PHASES NOTED BELOW.
(4) REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.
(5) PLANING, SURFACE TREATMENTS AND OVERLAYS SHALL BE PERFORMED IN THE DIRECTION OF TRAFFIC. BEGIN SURFACE CONSTRUCTION ON HIGH SIDE OF ROAD TO AVOID WATER PONDING ISSUES.
(6) THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC" AND ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING", OF THE STANADARD SPECIFICATIONS, AND TO THE GENERAL NOTES.
(7) COVER ALL EXISTING AND/OR PROPOSED SIGNS THAT CONFLICT WITH OR ARE NOT REQUIRED FOR THE TRAFFIC CONTROL PLAN. UNCOVER AS NEEDED OR AS DIRECTED BY THE ENGINEER IN SUBSEQUENT PHASES AND/OR STEPS.
(8) A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1: CONSTRUCTION OF THE OUTSIDE BRIDGE LANES

THE INTENT OF THIS PHASE IS TO PREPARE RIGHT OF WAY FOR THE ENTIRE PROJECT; AND CONSTRUCT THE BRIDGE STRUCTURE, TEMPORARY RETANING WALLS, TEMPORARY, AND PROPOSED PAVEMENT EXCEPT FOR FINAL 2" RIDING SURFACE.

1. INSTALL ADVANCED WARNING SIGNS AND BARRICADES IN ACCORDANCE WITH THE TMUTCD AND STANDARD SHEETS BC (1)-21 THRU BC (12)-21.
2. INSTALL SW3P AS DIRECTED BY THE ENGINEER OR ACCORDING TO TXDOT STANDARDS.
3. INSTALL PSSCB & CRASH CUSHION ATTENUATORS (CCA) ALONG US 59 AS SHOWN.
4. TRAFFIC:
    a. TRAFFIC ALONG US 59 TO REMAIN IN EXISTING CONFIGURATION.
    b. CLOSE ACCESS TO PADDLING TRAIL.
5. CONSTRUCTION:
    a. PREPARE ROW ACCORDING TO ITEM 100 FOR FULL PROJECT LIMITS PRIOR TO BEGINNING ANY OTHER PHASE 1 CONSTRUCTION.
    b. CONTRUCT OUTSIDE BRIDGE STRUCTURE IN ACCORDANCE WITH THE TCP LAYOUTS. REFER TO BRIDGE PHASED CONSTRUCTION SHEETS FOR ADDITIONAL DETAILS.
    c. CONSTRUCT PROPOSED AND TEMPORARY RETAINING WALLS IN ACCORDANCE WITH TCP LAYOUTS.
    d. REMOVE EXIST SETs AND PIPES AT DRIVEWAYS.
    e. CONSTRUCT OUTSIDE TEMPORARY PAVEMENT.
    f. CONSTRUCT OUTSIDE PROPOSED PAVEMENT EXCEPT FOR FINAL 2" RIDING SURFACE.
    g. CONSTRUCT SSTR RAILS.
    h. PLACE WORK ZONE PAVEMENT MARKINGS FOR PHASE 2.

PHASE 2 & 2A, 2B, AND 2C: CONSTRUCTION OF THE INSIDE BRIDGE LANES

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE CENTER OF THE BRIDGE AND REMAINDER OF PROPOSED PAVEMENT EXCEPT FOR FINAL 2" RIDING SURFACE.

1. MAINTAIN ADVANCED WARNING SIGNS ACCORDING TO BC (1)-21 THRU BC (12)-21.
2. INSTALL SW3P AS DIRECTED BY THE ENGINEER AND ACCORDING TO TXDOT STANDARDS
3. INSTALL TRAFFIC CONTROL DEVICES ALONG THE PROJECT LIMITS AS SHOWN.
4. INSTALL PSSCB & CRASH CUSHION ATTENUATORS (CCA) ALONG US 59 AS SHOWN.
5. TRAFFIC:
    a. SHIFT TRAFFIC ONTO TEMPORARY PAVEMENT AND OUTSIDE BRIDGE LANES.
6. CONSTRUCTION:
    a. REFER TO BRIDGE PHASED CONSTRUCTION SHEETS FOR ADDITIONAL DETAILS. PHASE 2A IS THE CONSTRUCTION OF SPANS 1, 2, 6 & 7. PHASE 2A, 2B AND 2C IS THE CONSTRUCTION OF SPANS 3, 4, & 5. TYPICAL ORDER OF BRIDGE CONSTRUCTION IS OUTLINED BELOW AS IT APPLIES TO EACH PHASE.
    b. REMOVE AND SALVAGE EXISTING T131RC RAIL RETROFIT AND BREAKBACK BRIDGE.
    c. CONCTRUCT DRILL SHAFTS, FOUNDATIONS, COLUMNS, ABUTMENTS, ABUTMENT REATAINING WALLS, AND CAPS.
    d. INSTALL BEAMS.
    e. INSTALL DECK.
    f. CONSTRUCT INSIDE PROPOSED PAVEMENT EXCEPT FOR FINAL 2" RIDING SURFACE.
    g. PLACE WORK ZONE PAVEMENT MARKINGS FOR PHASE 3.
    h. REMOVE TEMPORARY RETAINING WALLS.
    i. REMOVE TEMPORARY PAVEMENT EXCEPT AT FOLLOWING LOCATIONS TO ALLOW FOR TEMPORARY CCA INSTALLATION:
        i. STA 876+79.92, 41.50' LT
        ii. STA 893+00.00, 42.00' RT

PHASE 3 STEP 1: CONSTRUCTION OF PROPOSED PADDLING TRAIL ACCESS DRIVEWAY

THE INTENT OF THIS PHASE IS TO CONSTRUCT PROPOSED PADDLING TRAIL ACCESS DRIVEWAY AND PARKING AREA UNDER THE BRIDGE.

1. MAINTAIN ADVANCED WARNING SIGNS ACCORDING TO BC (1)-21 THRU BC (12)-21.
2. INSTALL SW3P AS DIRECTED BY THE ENGINEER AND ACCORDING TO TXDOT STANDARDS
3. INSTALL TRAFFIC CONTROL DEVICES ACCORDING TO TXDOT STANDARD TCP (2-1)-18 IN AREA OF WORK.
4. TRAFFIC:
    a. SHIFT TRAFFIC INTO FINAL CONFIGURATION.
5. CONSTRUCTION:
    a. CONSTRUCT THE PADDLING TRAIL ACCESSS DRIVEWAY, CULVERTS, AND SETS.
    b. INTALL MBGF SEGMENTS AND END TREATMENTS FOR BENT PROTECTION AS SHOWN IN PLAN AND PROFILE PLAN SHEETS.
    c. CONSTRUCT DRIVEWAYS 1 AND 2.
    d. GRADE DITCHES TO THEIR FINAL CONDITON.

PHASE 3 STEP 2: CONSTRUCTION OF THE FINAL RIDING SURFACE

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE 2" TY-D HMA OVERLAY, PLUS CONSTRUCT THE MILL AND TAPER MAIN LANE AND SHOULDER TRANSITIONS ON THE SOUTHBOUND SIDE.

1. MAINTAIN ADVANCED WARNING SIGNS ACCORDING TO BC (1)-21 THRU BC (12)-21.
2. INSTALL SW3P AS DIRECTED BY THE ENGINEER AND ACCORDING TO TXDOT STANDARDS
3. INSTALL TRAFFIC CONTROL DEVICES ACCORDING TO TXDOT STANDARD TCP (2-2)-18 IN AREA OF WORK.
4. TRAFFIC:
    a. SB TRAFFIC TO UTILIZE THE NB SIDE USING ONE LANE TWO WAY TRAFFIC CONTROL ACCORDING TO TXDOT STANDARD TCP (2-2)-18 CONFIGURATION.
5. CONSTRUCTION:
    a. CONSTRUCT THE TAPER MILLING AND OVERLAY TRANSITION ALONG SOUTHBOUND MAIN LANE AND SHOULDER AS SHOWN IN THE TCP LAYOUTS. SEE MISC ROADWAY DETAILS PLAN SHEET FOR TAPER MILLING AND OVERLAY TRANSITION DETAILS.
    b. PLACE 2" TY-D HMA OVERLAY FROM BEGINNING OF PROJECT TO BRIDGE JOINT ON THE SOUTHBOUND SIDE AS SHOWN IN THE TCP LAYOUTS.
    c. PLACE PROPOSED CCA ON SOUTHBOUND BRIDGE RAIL.
    d. REMOVE TEMPORARY PAVEMENT SECTION AT STA 876+79.92, 41.50' LT.

PHASE 3 STEP 3: CONSTRUCTION OF THE FINAL RIDING SURFACE & PAVEMENT MARKINGS & FINAL CLEANUP

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE 2" TY-D HMA OVERLAY, CONSTRUCT THE MILL AND TAPER MAIN LANE AND SHOULDER TRANSITIONS ON THE NORTHBOUND SIDE, AND INSTALL FINAL PAVEMENT MARKINGS.

1. MAINTAIN ADVANCED WARNING SIGNS ACCORDING TO BC (1)-21 THRU BC (12)-21.
2. MAINTAIN SW3P DEVICES ACCORDING TO TXDOT STANDARDS.
3. INSTALL TRAFFIC CONTROL DEVICES ALONG US 59 AS SHOWN BELOW.
4. TRAFFIC:
    a. NB TRAFFIC TO UTILIZE THE SB SIDE USING ONE LANE TWO WAY TRAFFIC CONTROL ACCORDING TO TXDOT STANDARD TCP (2-2)-18 CONFIGURATION.
5. CONSTRUCTION:
    a. CONSTRUCT THE TAPER MILLING AND OVERLAY TRANSITION ALONG THE NORTHBOUND MAIN LANE AND SHOULDER AS SHOWN IN THE TCP LAYOUTS. SEE MISC ROADWAY DETAILS PLAN SHEET FOR TAPER MILLING AND OVERLAY TRANSITION DETAILS.
    b. PLACE 2" TY-D HMA OVERLAY FROM BEGINNING OF PROJECT TO BRIDGE JOINT ON THE NORTHBOUND SIDE AS SHOWN IN THE TCP LAYOUTS.
    c. PLACE PROPOSED CCA ON NORTHBOUND BRIDGE RAIL.
    d. PLACE CENTERLINE SSCB AND BOTH PROPOSED CCA'S
    e. PLACE PERMANENT PAVEMENT MARKINGS AND SIGNAGE.
    f. REMOVE TEMPORARY PAVEMENT SECTION AT STA 893+00.00, 42.00' RT.
    g. PERFORM FINAL CLEAN UP AND REMOVE SW3P & REMAINING TCP DEVICES.

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US 59

TRAFFIC CONTROL PLAN
SEQUENCE OF WORK

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		13

DATE: 7/3/2024
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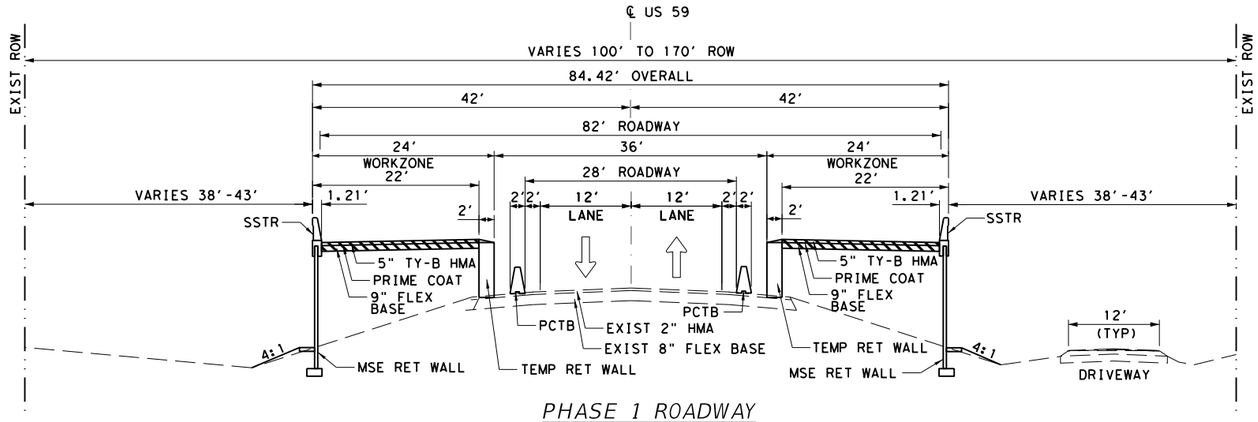
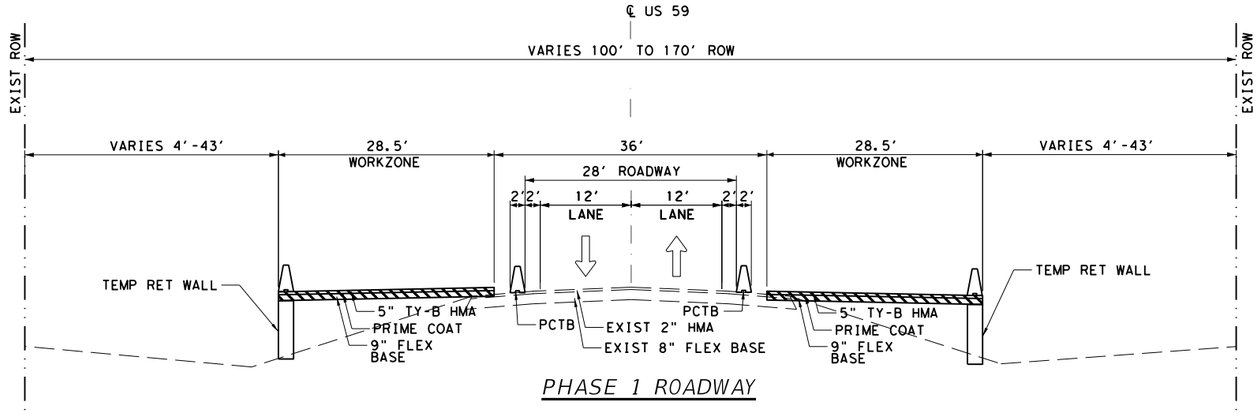


PHASE 1 ROADWAY



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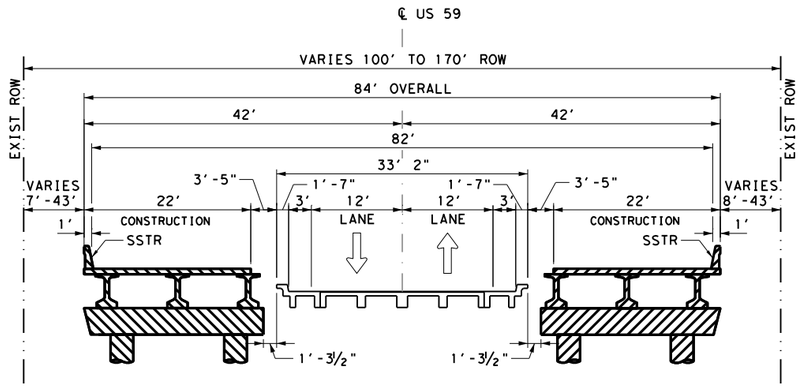

PHASE 1 BRIDGE

SEE BRIDGE PHASE CONSTRUCTION SHEETS FOR MORE DETAILS OF PHASE 1

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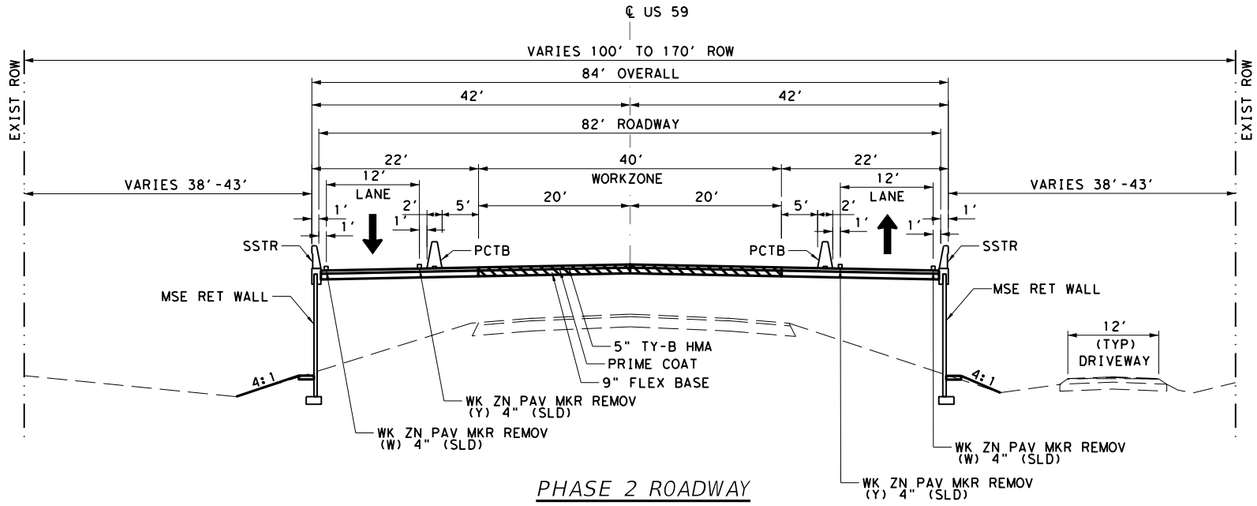
US 59

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE 1

SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		14



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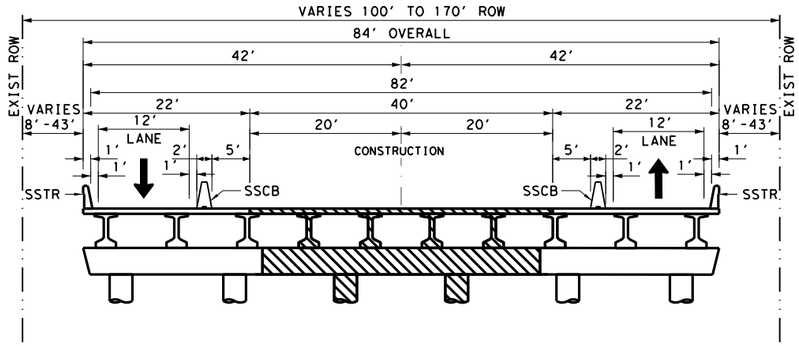

PHASE 2 BRIDGE

SEE BRIDGE PHASE CONSTRUCTION SHEETS FOR MORE DETAILS OF PHASE 2
(INCLUDES PH 2, PH 2A, PH 2B & PH 2C)

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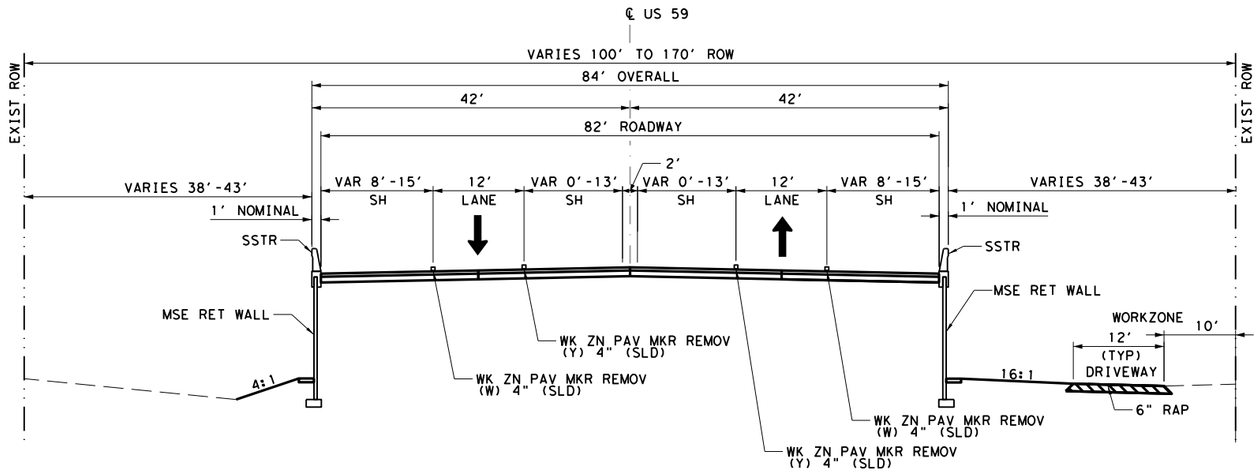
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE 2

SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		15



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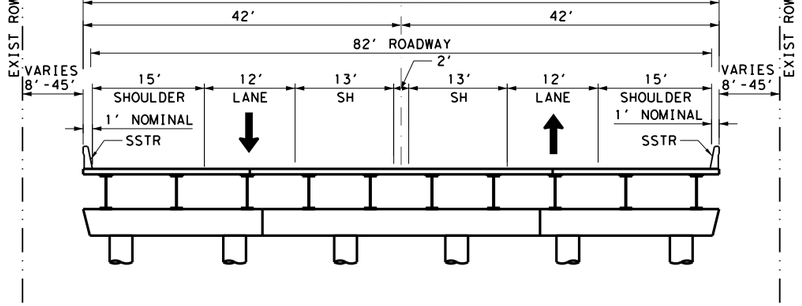

PHASE 3 STEP 1 BRIDGE

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TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE 3 STEP 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		16

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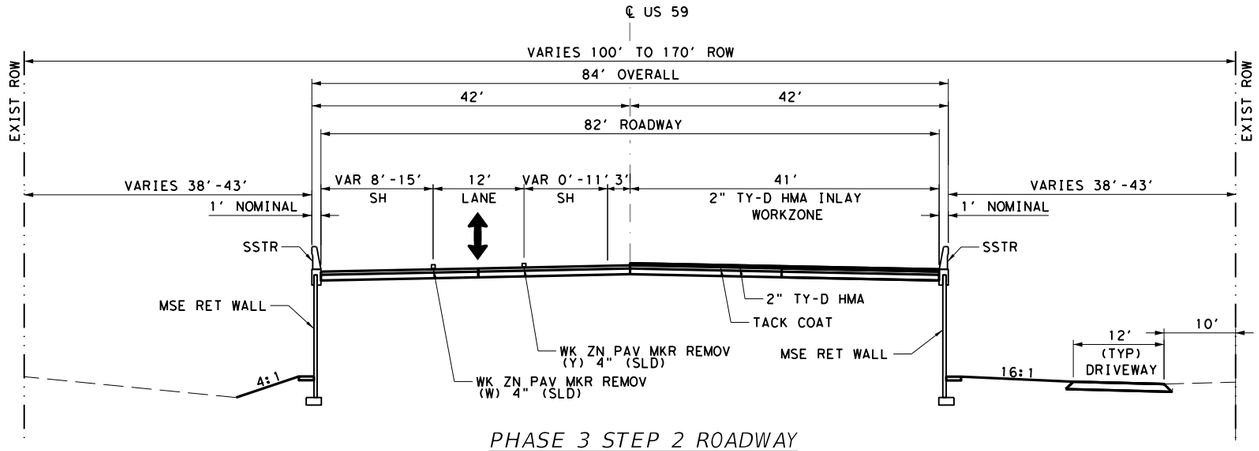

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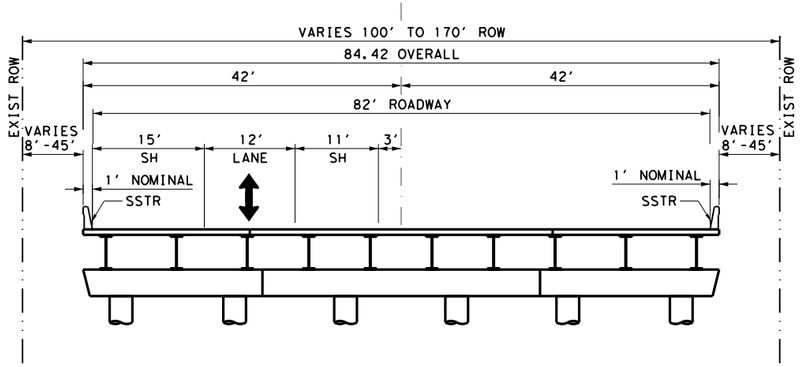

PHASE 3 STEP 2 BRIDGE

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TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE 3 STEP 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		17

DATE: 7/3/2024
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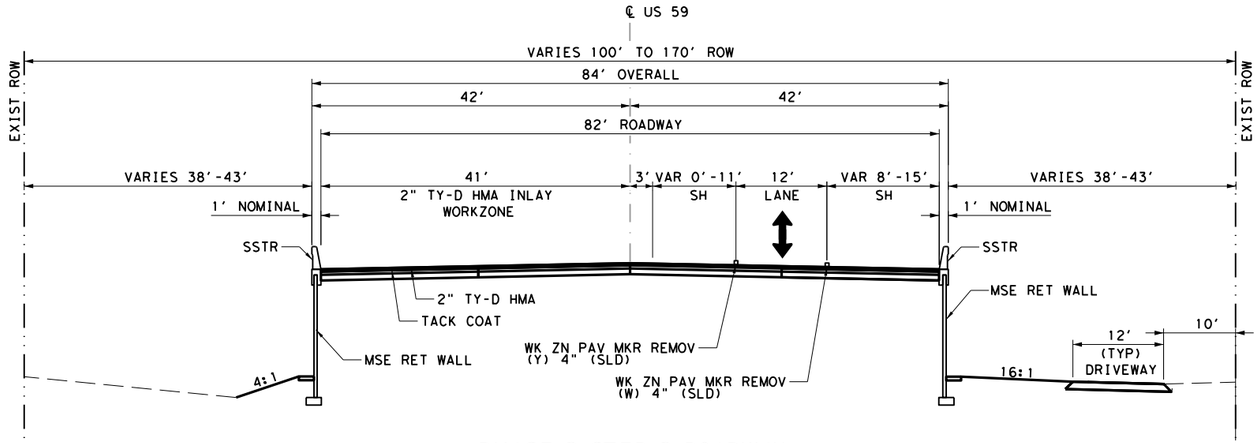

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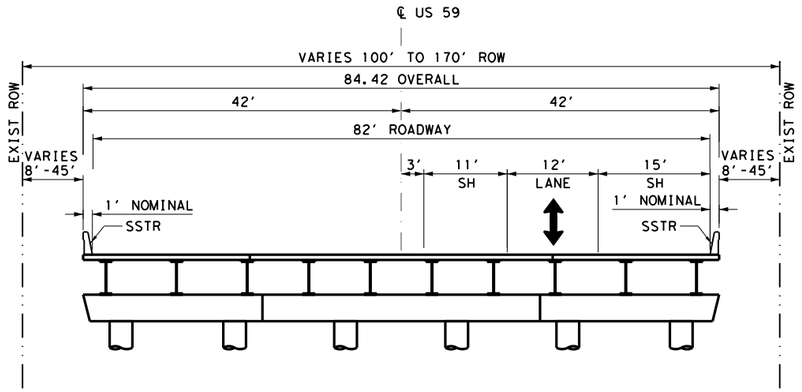

PHASE 3 STEP 3 BRIDGE

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US 59

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS
PHASE 3 STEP 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		18

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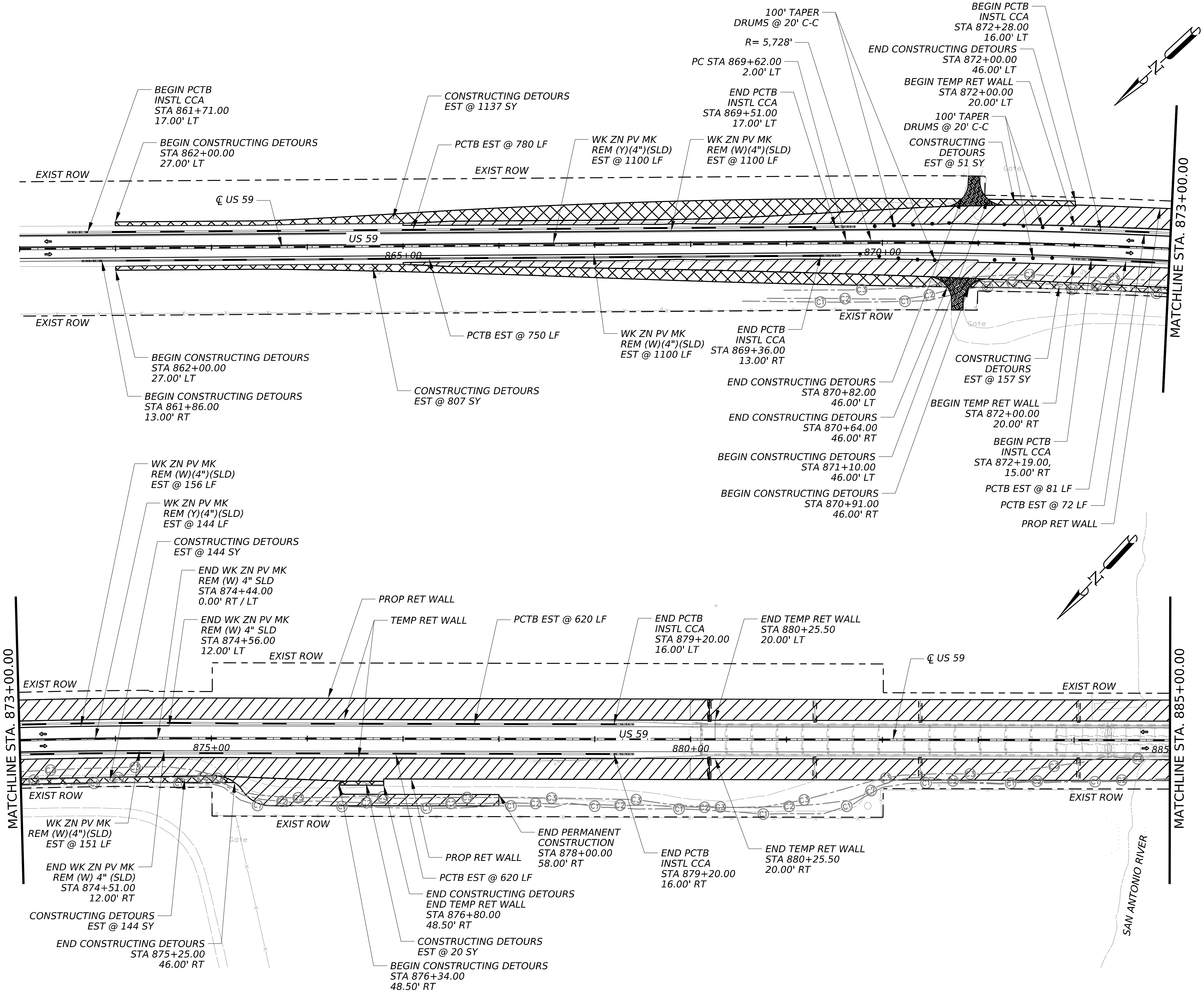

LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'
SCALE: 1"=100'

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US 59

TRAFFIC CONTROL PLAN
PHASE 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59

DIST	COUNTY	SHEET NO.
CRP	GOLIAD	19

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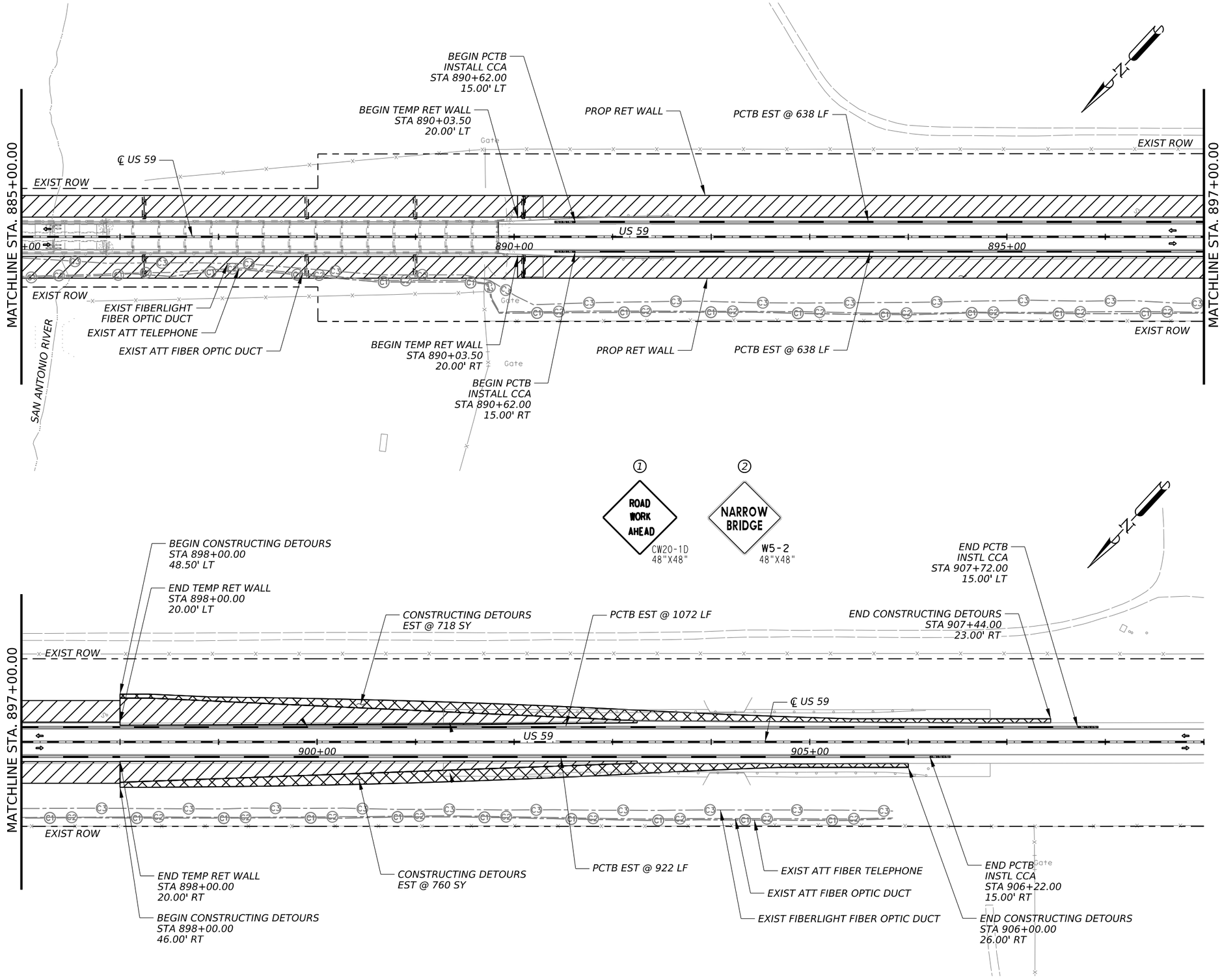

LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

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TRAFFIC CONTROL PLAN
PHASE 1

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		20

DATE: 7/3/2024
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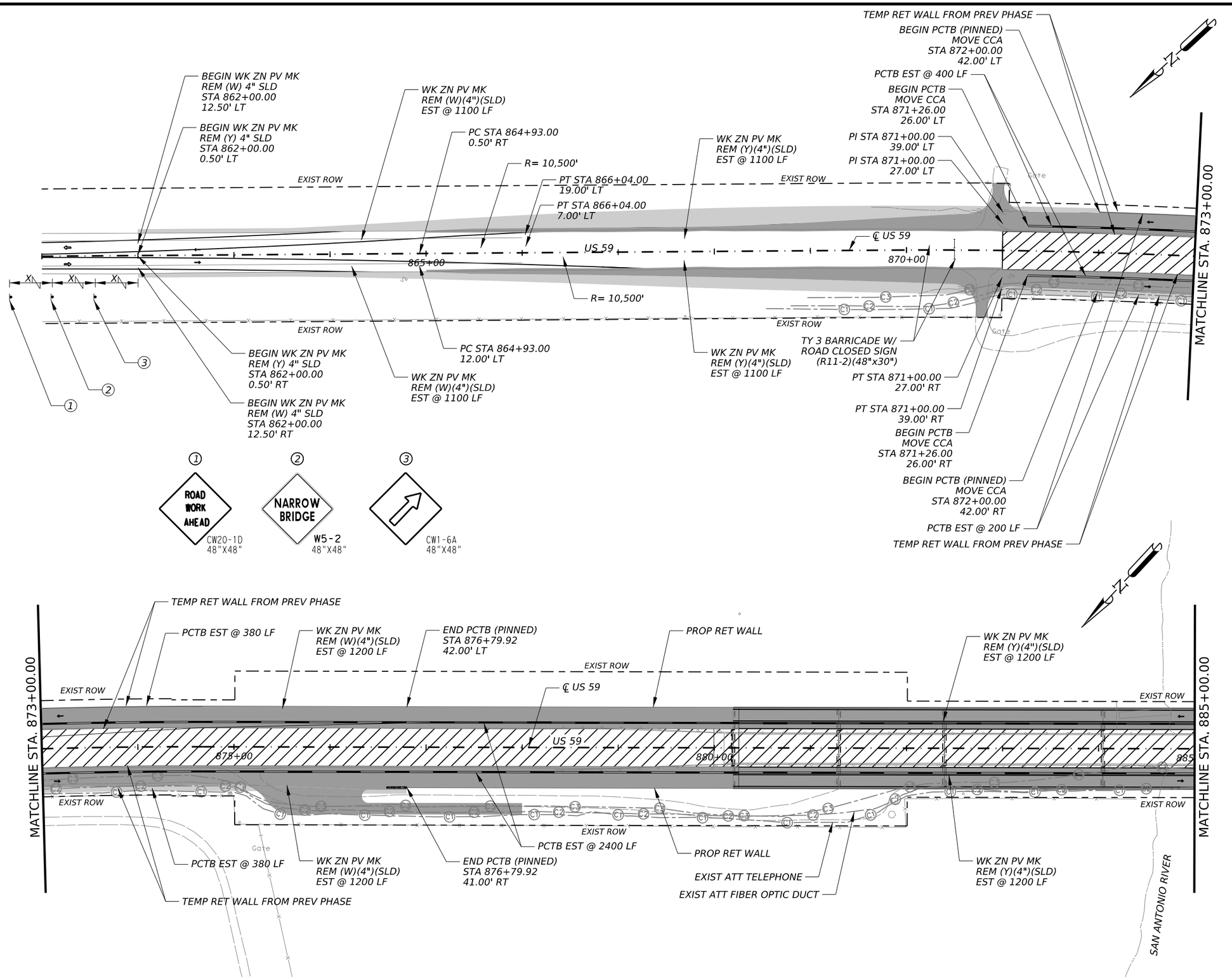

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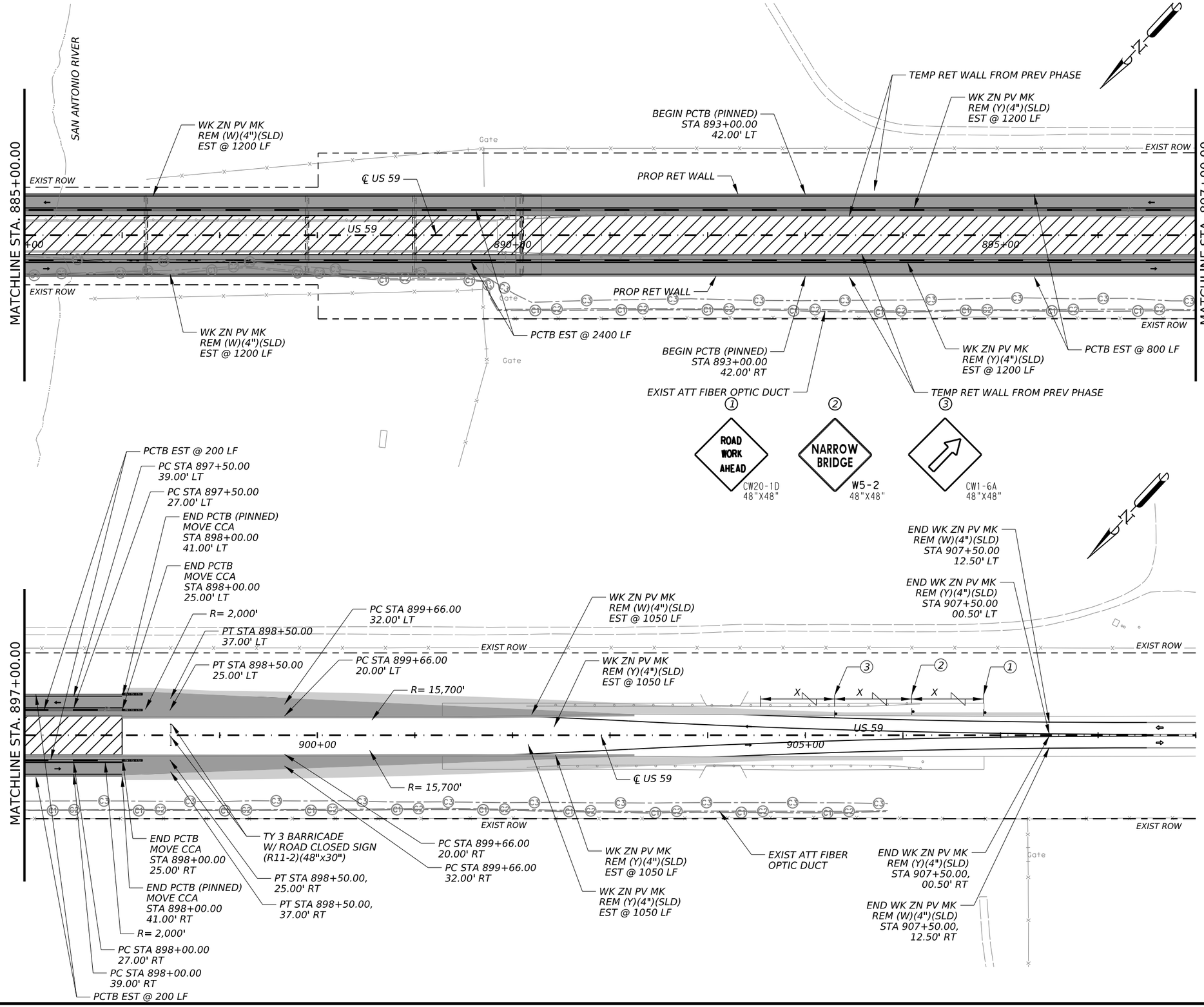
TRAFFIC CONTROL PLAN
PHASE 2

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		21



LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

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TRAFFIC CONTROL PLAN
PHASE 2

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		22

DATE: 7/3/2024
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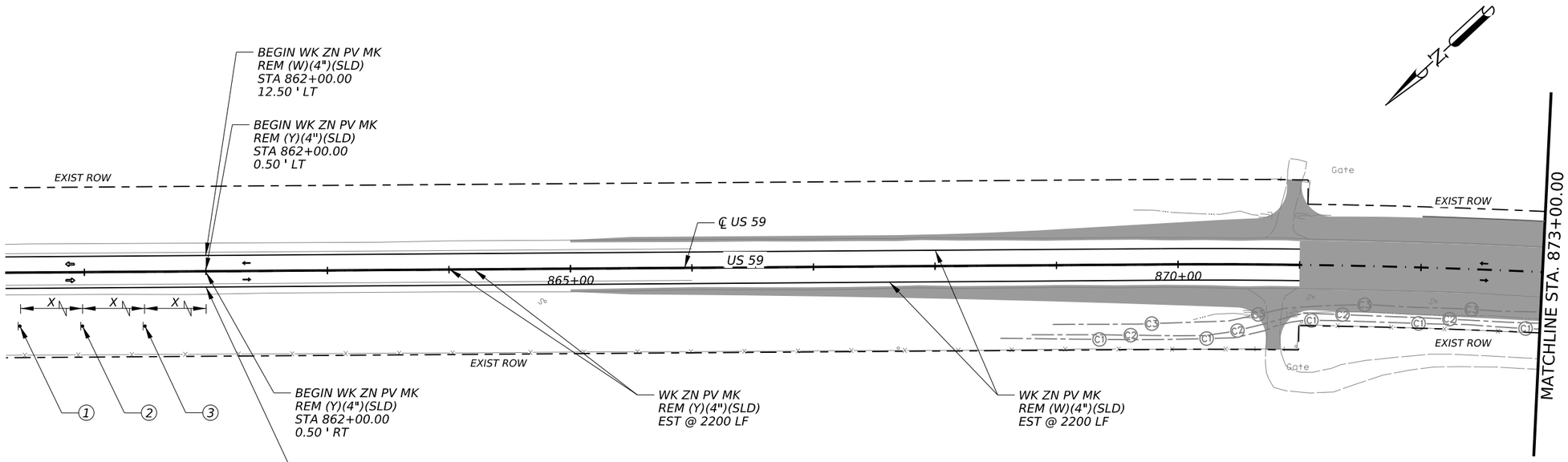

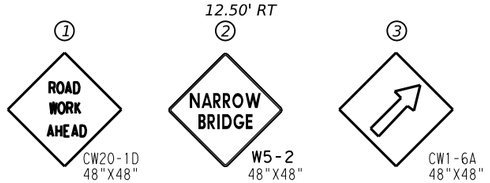

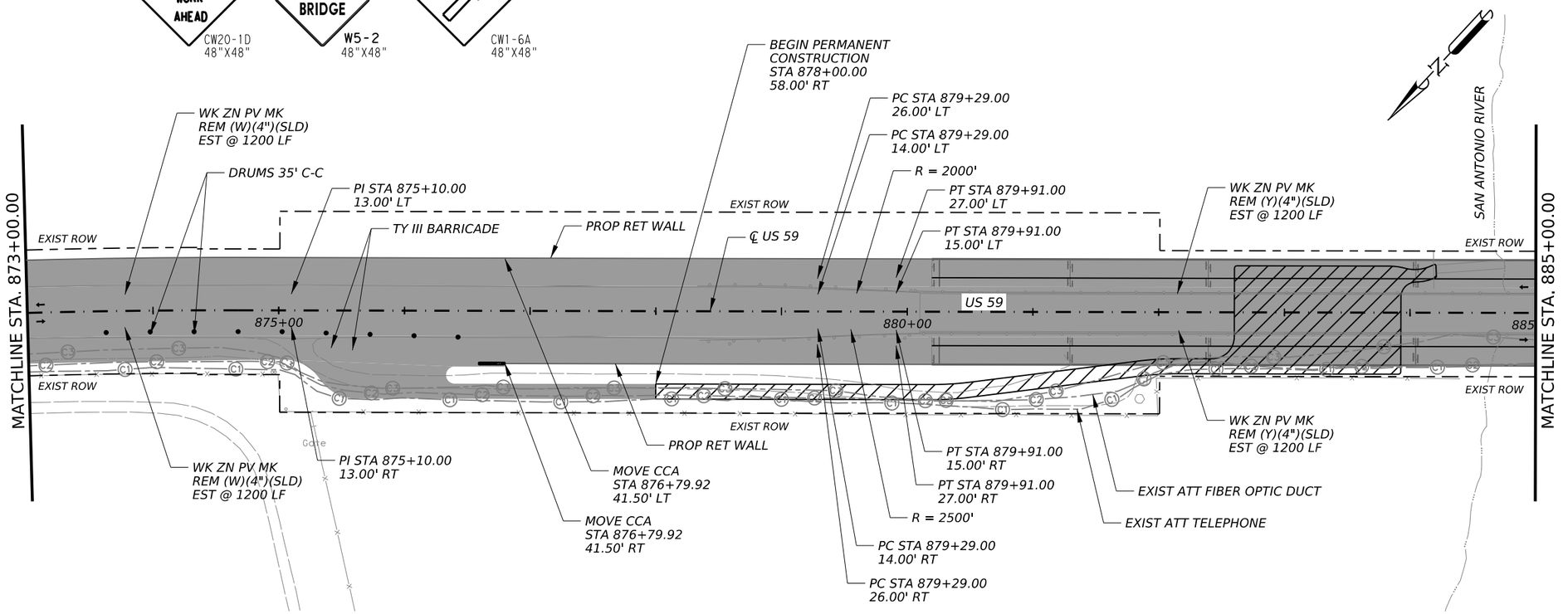

LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

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TRAFFIC CONTROL PLAN
PHASE 3 STEP 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		23

DATE: 7/3/2024
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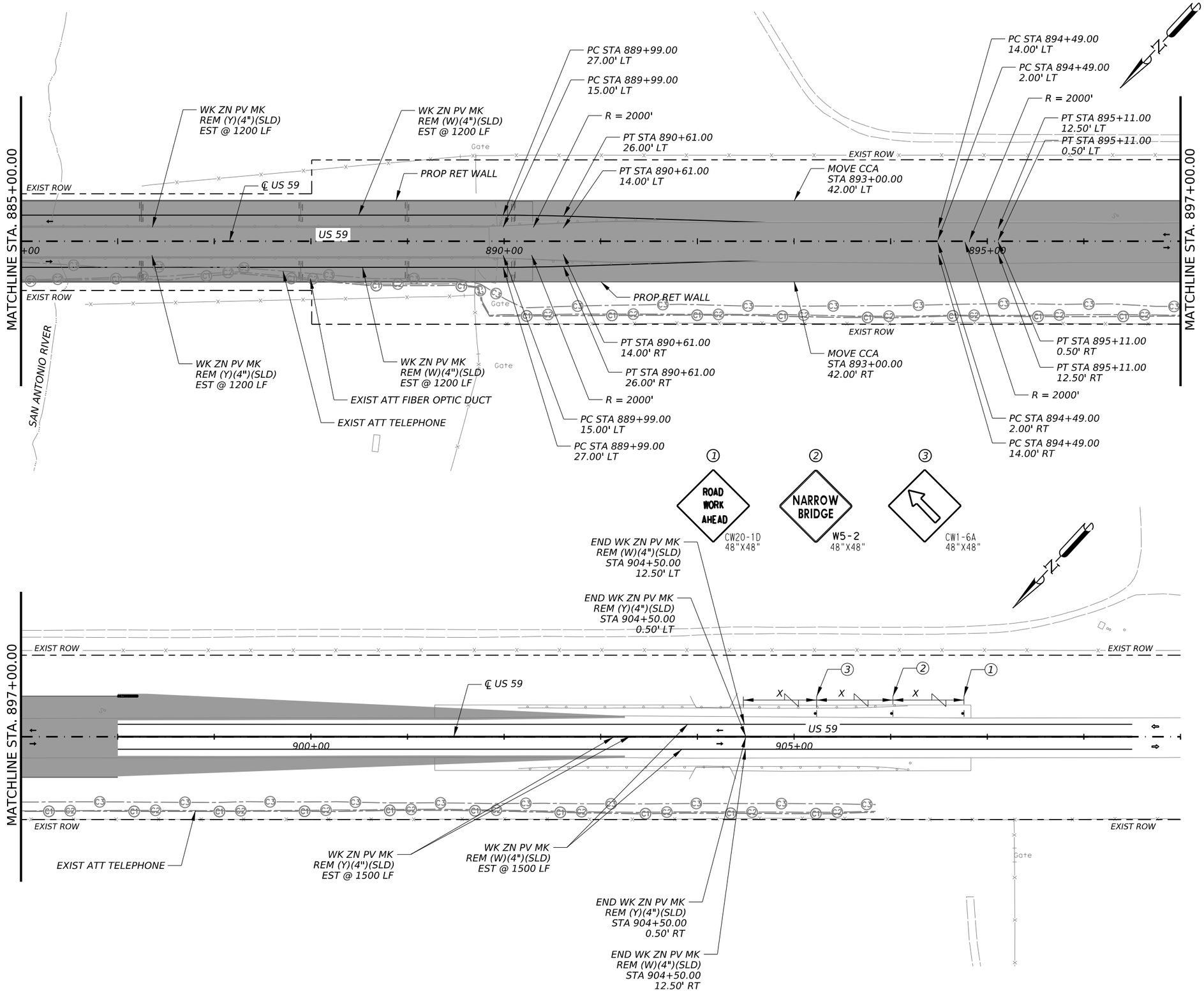

LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
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- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

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US 59

TRAFFIC CONTROL PLAN
PHASE 3 STEP 1

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		24

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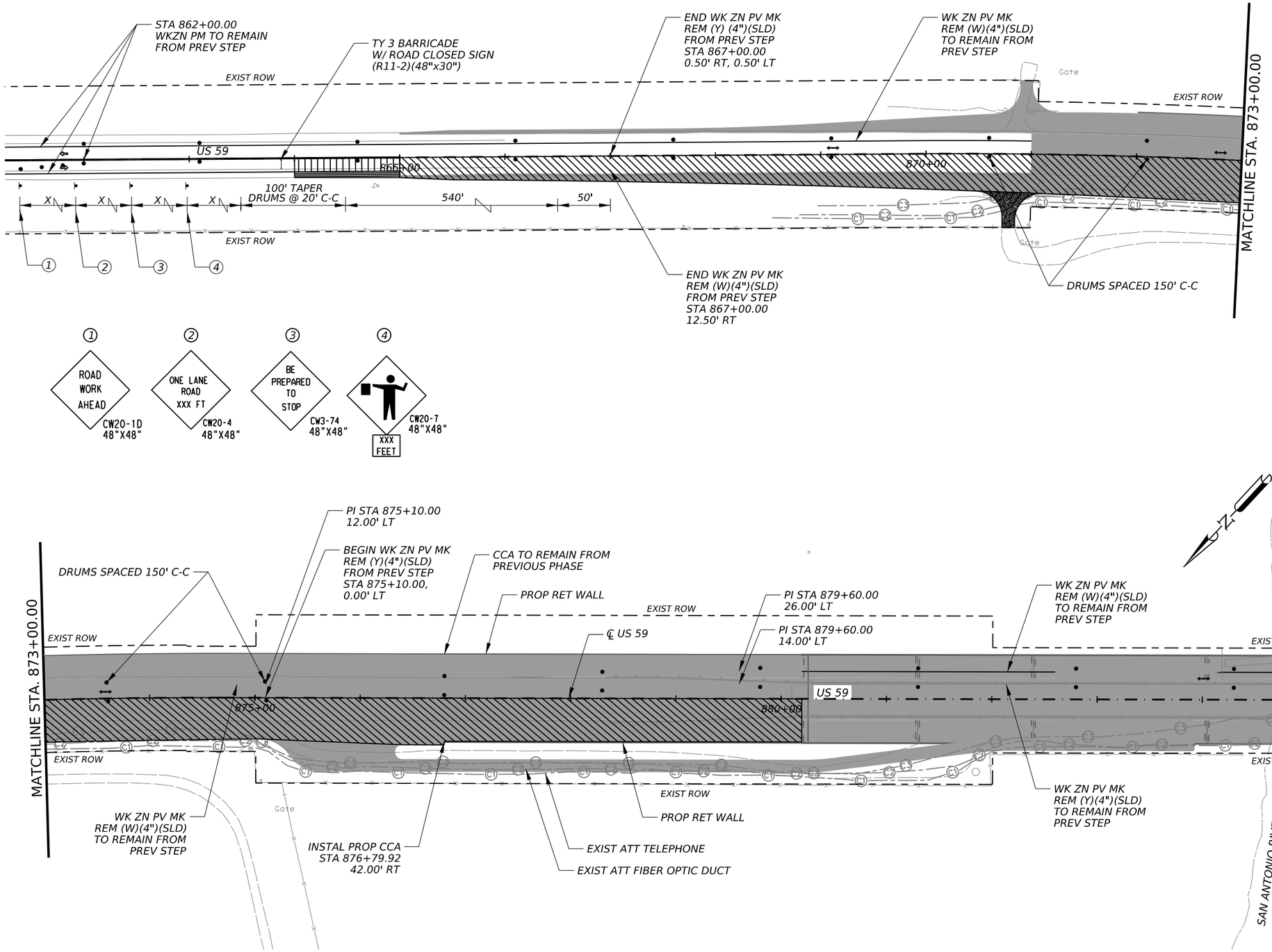

LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
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- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

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2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

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TRAFFIC CONTROL PLAN
PHASE 3 STEP 2

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		25

DATE: 7/3/2024
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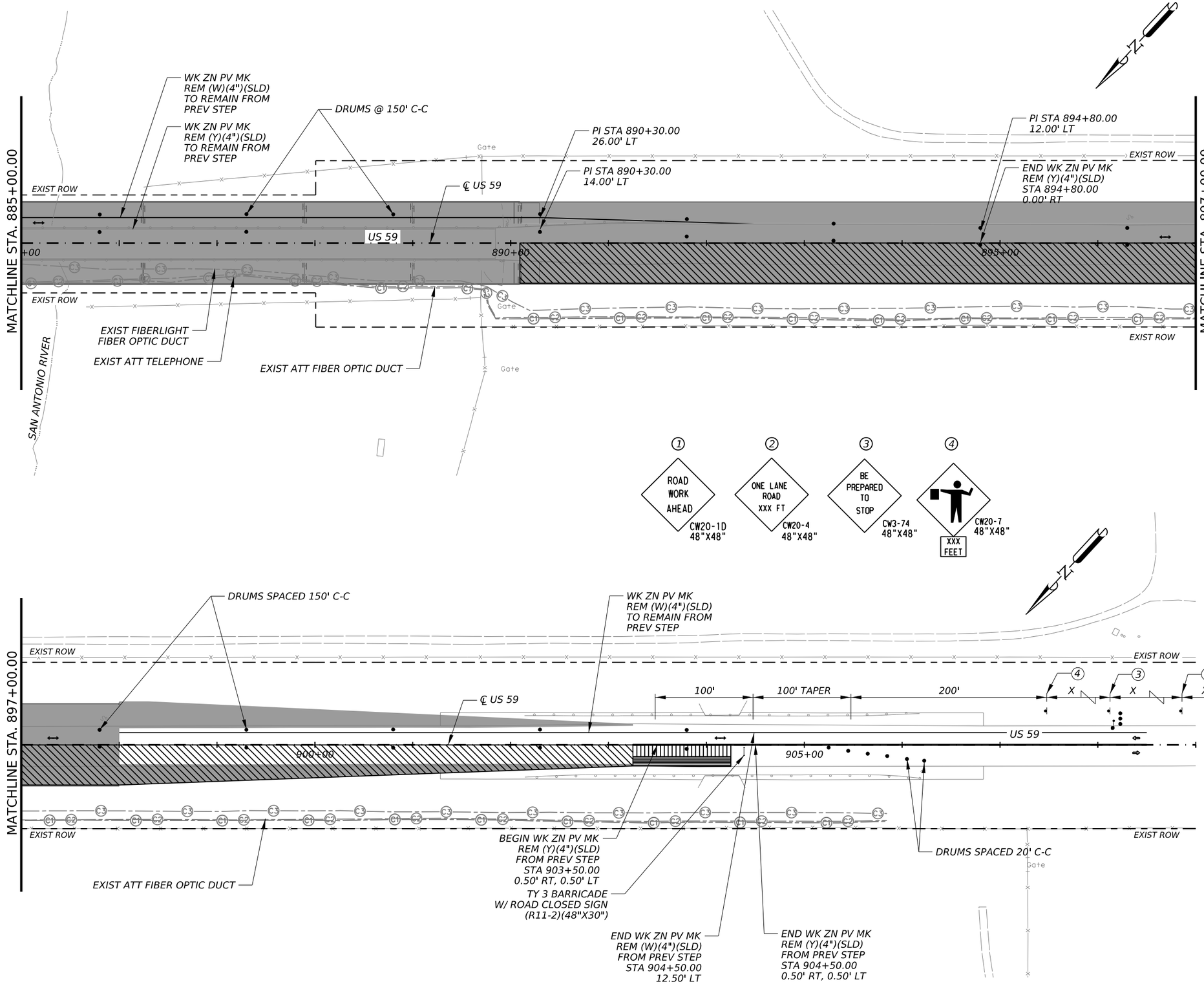

LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

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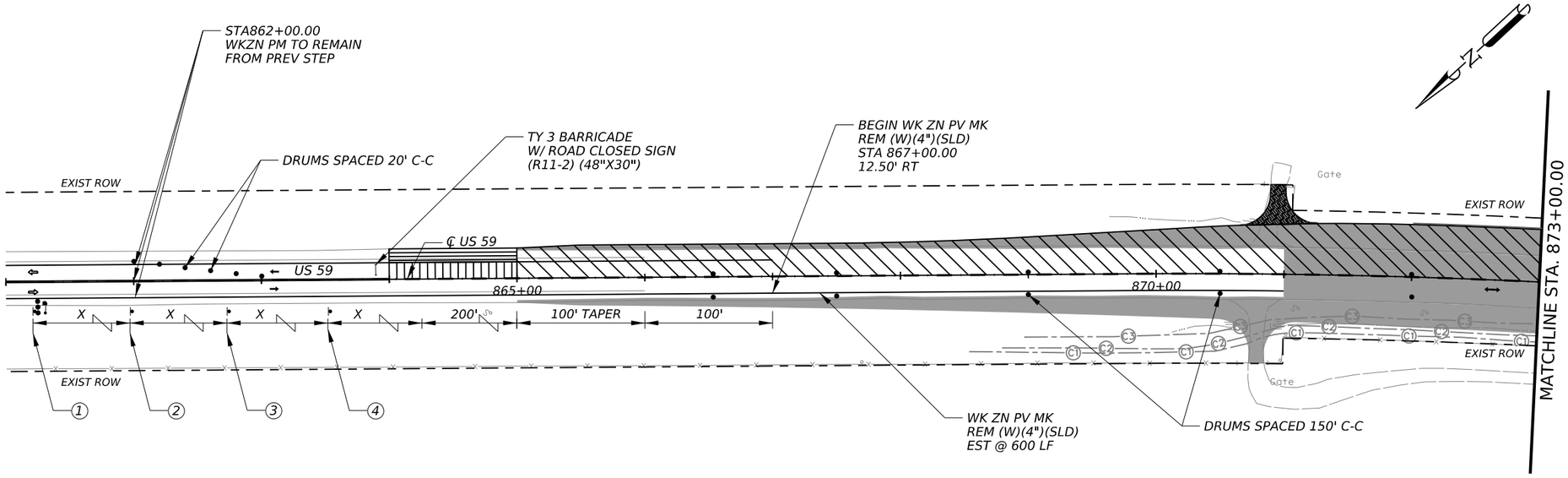
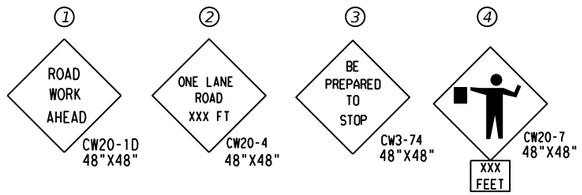
TRAFFIC CONTROL PLAN
PHASE 3 STEP 2

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		26

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663491062_TCP_P3S2_02.dgn





LEGEND

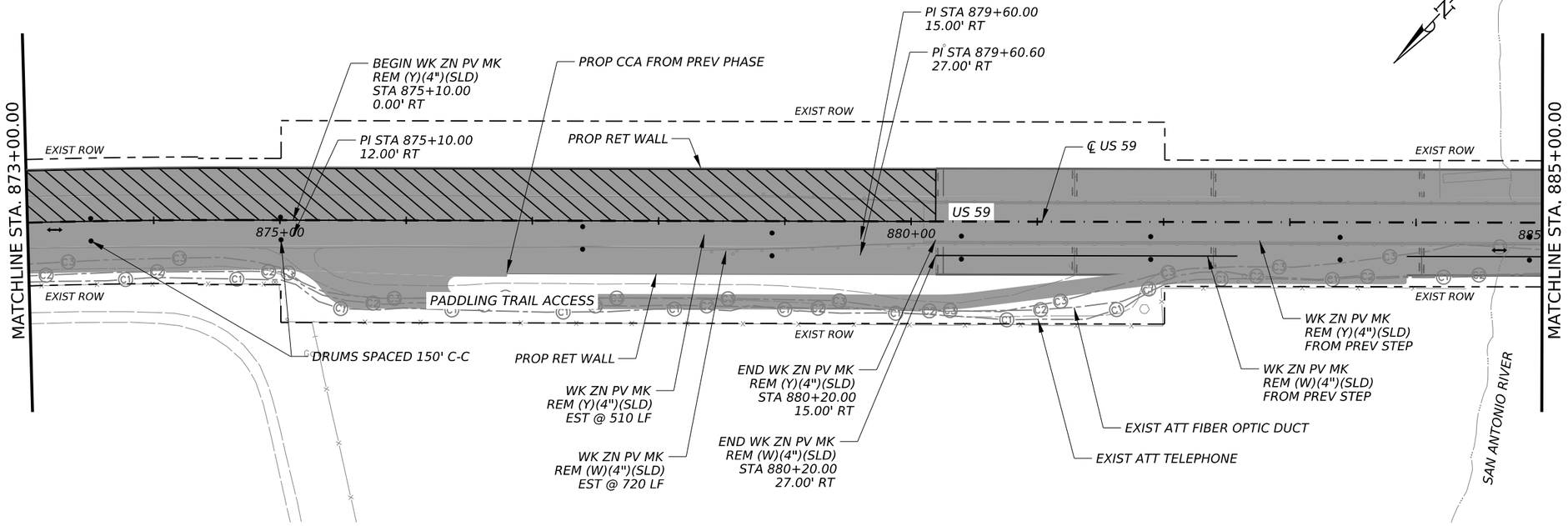
- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'



STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

LJA Engineering, Inc. LJA
FRN - F-1386

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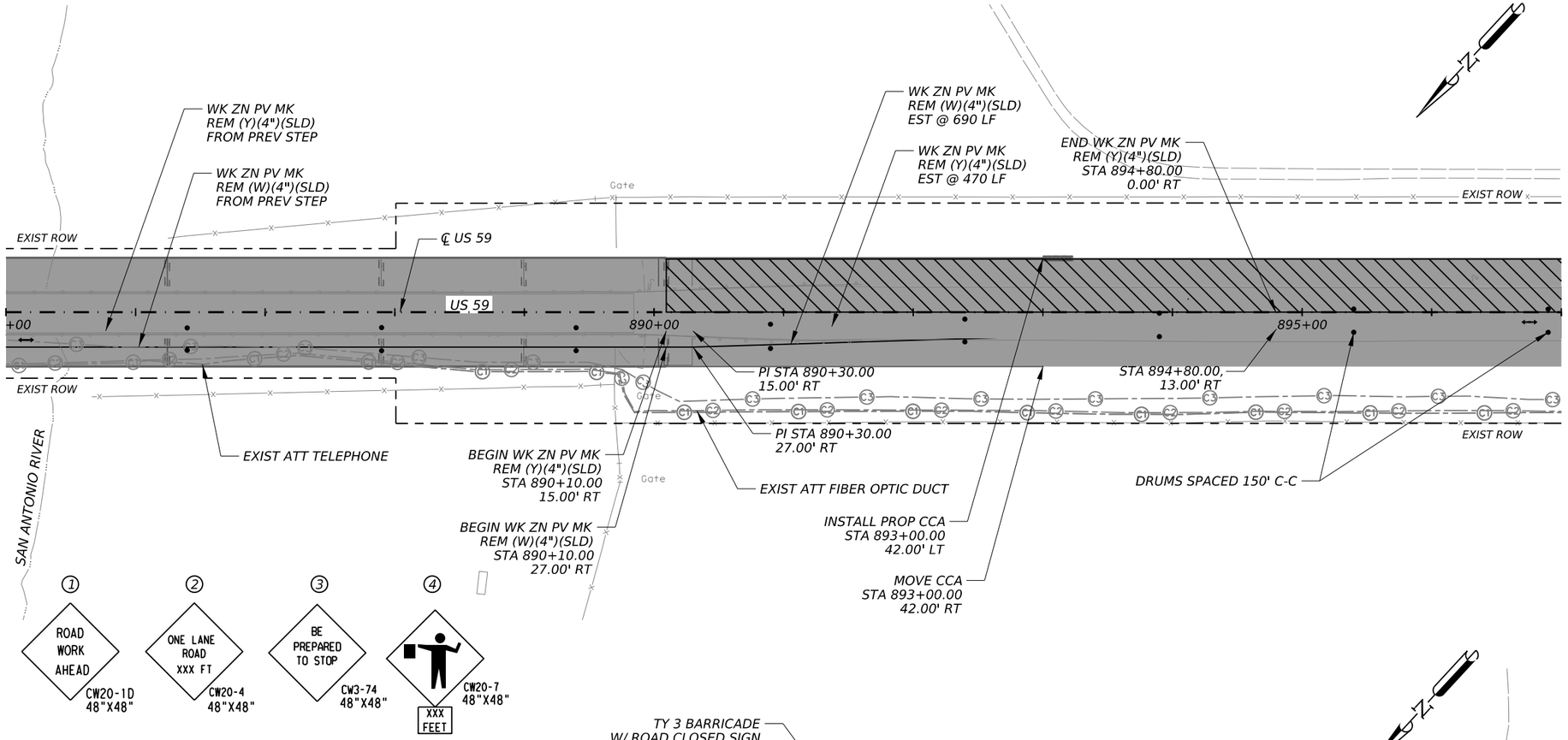
US 59

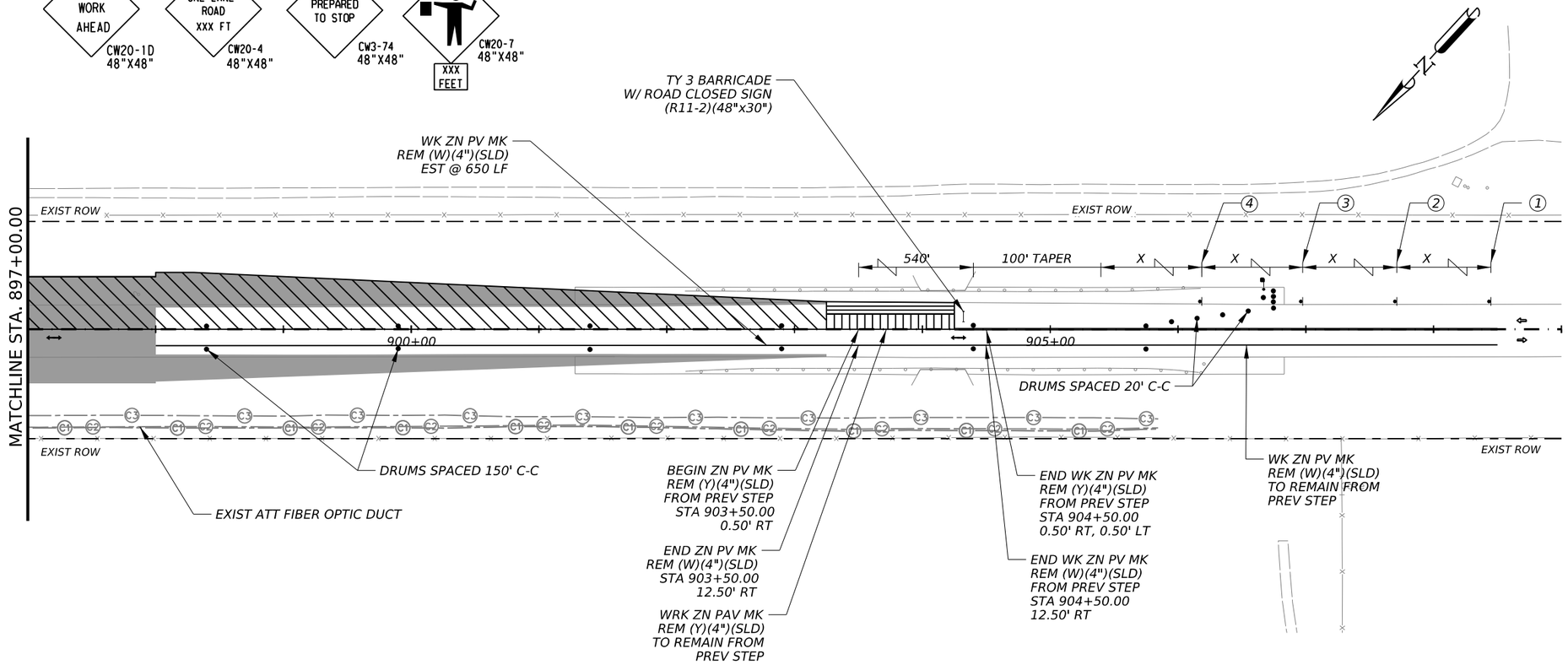
TRAFFIC CONTROL PLAN
PHASE 3 STEP 3

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		27

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms66349\062_TCP_P3S3_01.dgn





LEGEND

- PERMANENT CONSTRUCTION
- TEMPORARY PVMT CONSTRUCTION
- PREVIOUSLY CONSTRUCTED PVMT
- PREVIOUSLY CONSTRUCTED TEMP PVMT
- 2" TY-D HMA OVERLAY
- TAPER MILLING & OVERLAY TRANSITION
- SHLDR TRANSITION MILL & OVERLAY
- DRIVEWAYS (ACP)
- (A) WK ZN PAV MRK REMOV (W)4" (SLD)
- (B) WK ZN PAV MRK REMOV (Y)4" (SLD)
- DRUM
- PCTB
- TYPE 3 BARRICADE
- SIGN
- CRASH CUSHION ATTENUATOR
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

NOTES:

1. SEE "BC STANDARDS" FOR PROJECT LIMIT SIGNAGE.
2. SEE "BC STANDARDS" FOR SIGN SPACING (X).

0' 50' 100'

SCALE: 1"=100'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

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FRN - F-1386

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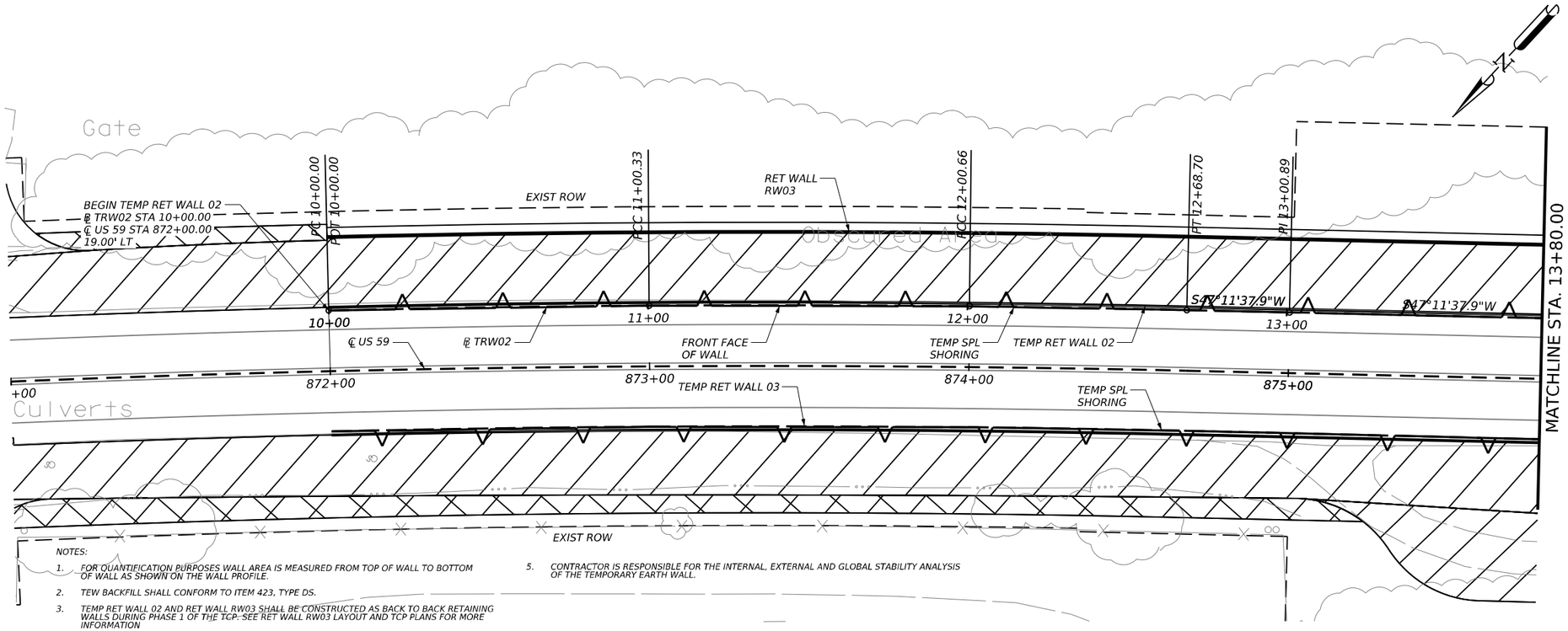
US 59

TRAFFIC CONTROL PLAN
PHASE 3 STEP 3

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		28

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms66349\062_TCP_P3S3_02.dgn

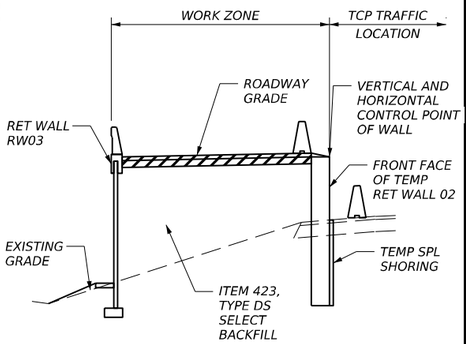


NOTES:

1. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL AS SHOWN ON THE WALL PROFILE.
2. TEW BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
3. TEMP RET WALL 02 AND RET WALL RW03 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE RET WALL RW03 LAYOUT AND TCP PLANS FOR MORE INFORMATION
4. SEE RW(TEW) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
5. CONTRACTOR IS RESPONSIBLE FOR THE INTERNAL, EXTERNAL AND GLOBAL STABILITY ANALYSIS OF THE TEMPORARY EARTH WALL.

LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL

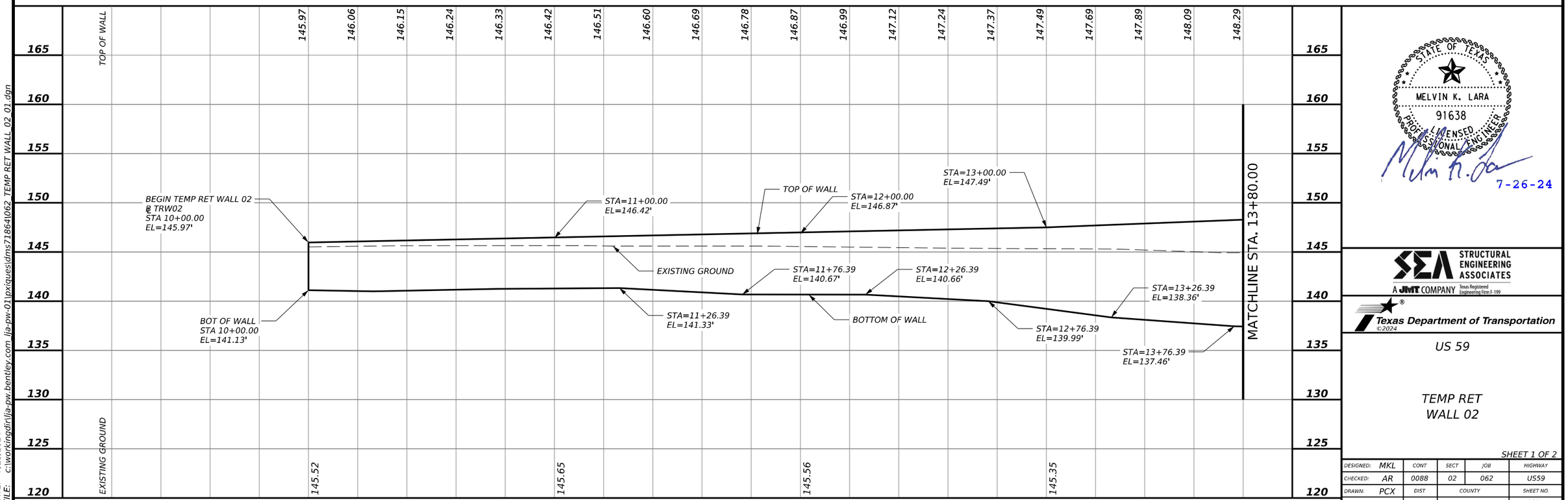


TEMP RET WALL TYPICAL SECTION

STA 10+00.00 TO STA 18+26.39

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0423	7012	RETAINING WALL (TEMP WALL)	SF	9,447



DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 02_01.dgn

STATE OF TEXAS
MELVIN K. LARA
91638
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7-26-24

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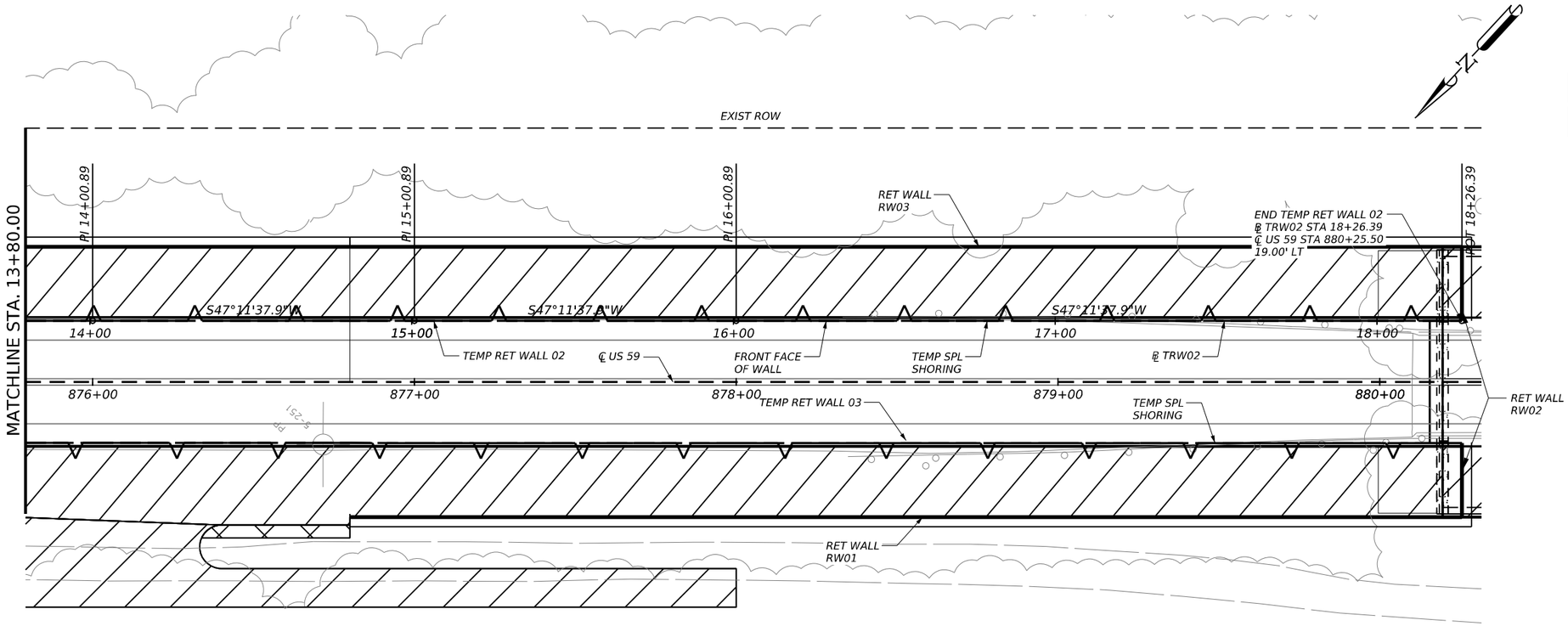
US 59

TEMP RET WALL 02

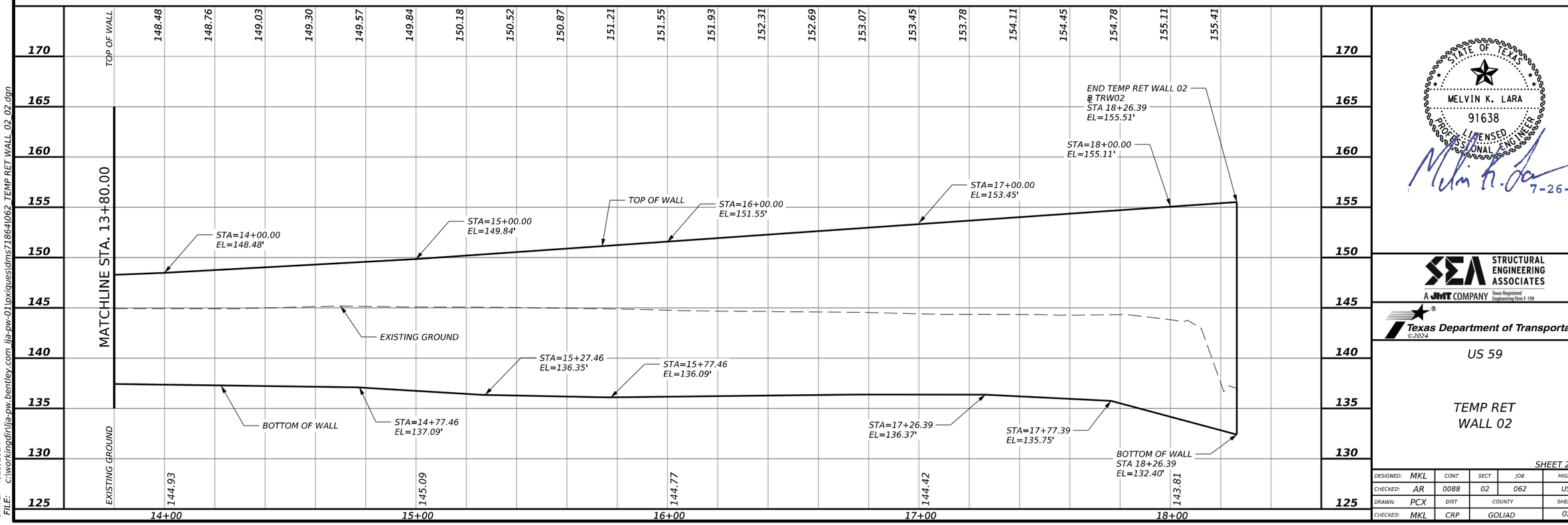
SHEET 1 OF 2

DESIGNED: MKL	CONT	SECT	JOB		HIGHWAY
CHECKED: AR	0088	02	062		US59
DRAWN: PCX	DIST	COUNTY			SHEET NO.
CHECKED: MKL	CRP	GOLIAD			029



LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 02_02.dgn

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91638
LICENSED
PROFESSIONAL ENGINEER
7-26-24

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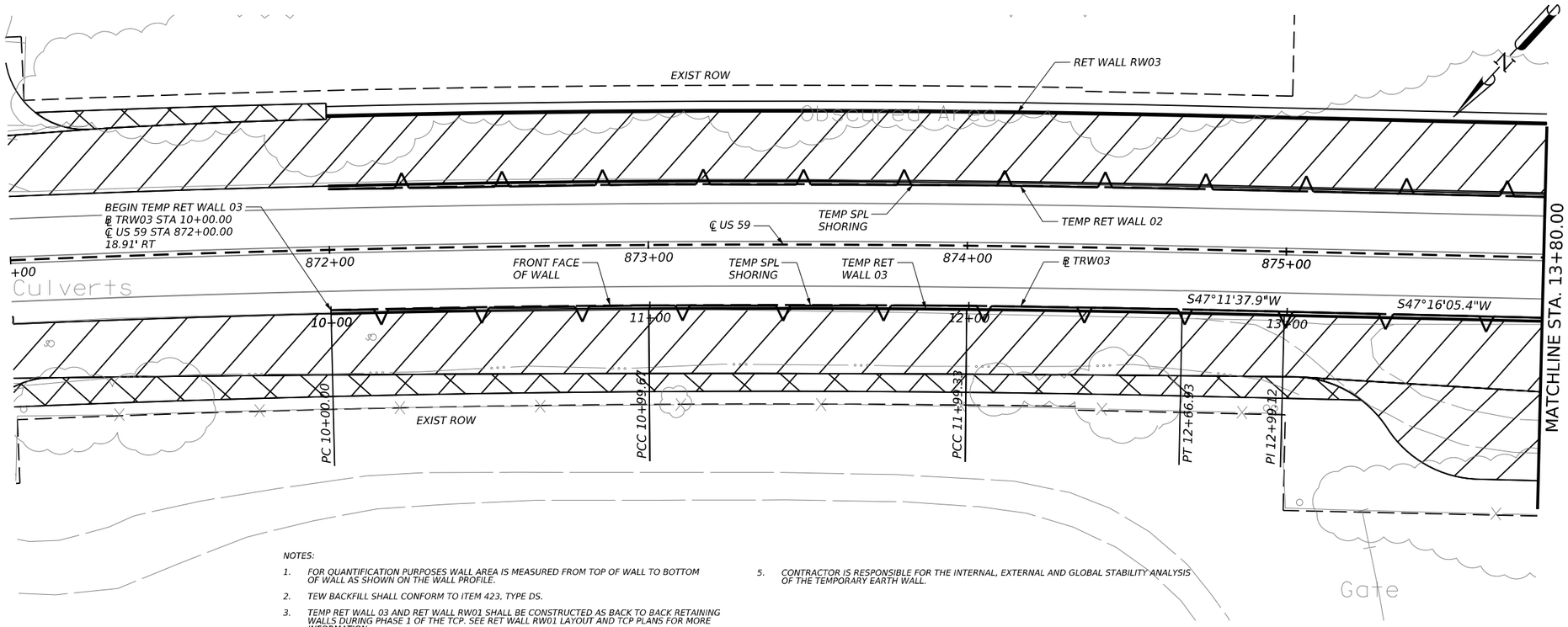
US 59

TEMP RET WALL 02

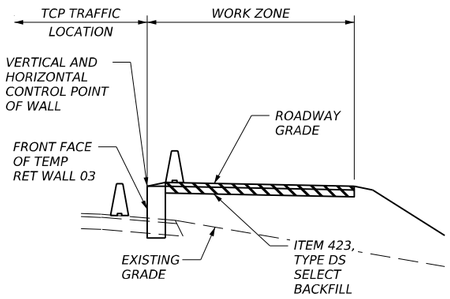
SHEET 2 OF 2

DESIGNED: MKL	CONT	SECT	JOB		HIGHWAY
CHECKED: AR	0088	02	062		US59
DRAWN: PCX	DIST	COUNTY			SHEET NO.
CHECKED: MKL	CRP	GOLIAD			030



LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



TEMP RET WALL TYPICAL SECTION

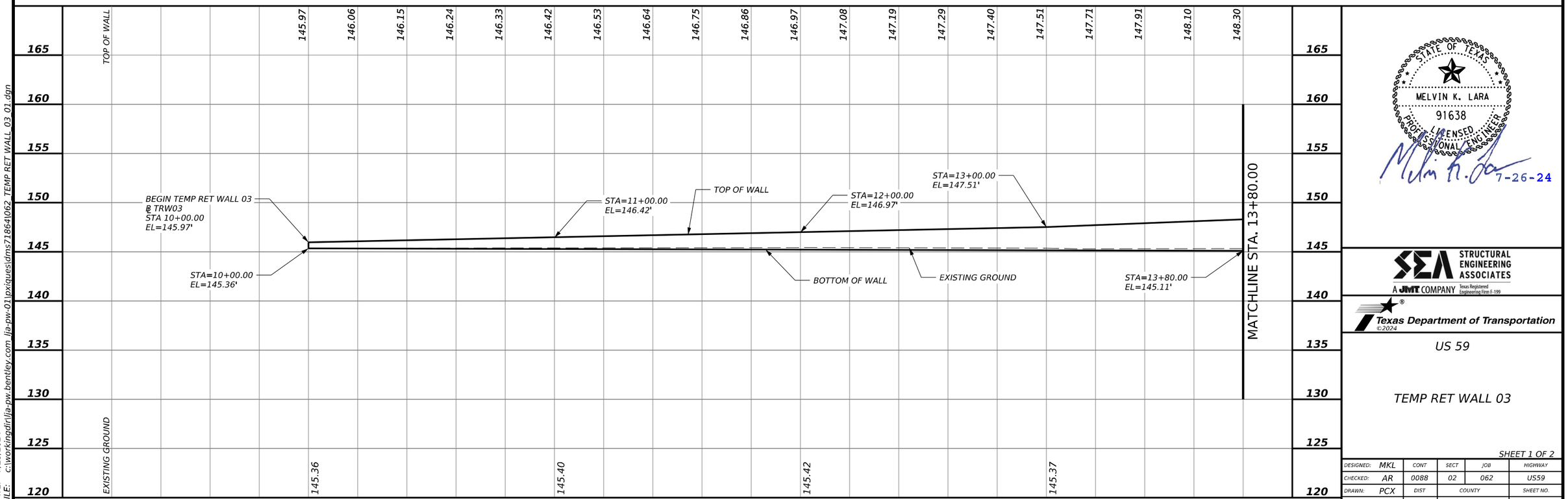
STA 10+00.00 TO STA 14+79.38

NOTES:

1. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL AS SHOWN ON THE WALL PROFILE.
2. TEW BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
3. TEMP RET WALL 03 AND RET WALL RW01 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE RET WALL RW01 LAYOUT AND TCP PLANS FOR MORE INFORMATION
4. SEE RW(TEW) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
5. CONTRACTOR IS RESPONSIBLE FOR THE INTERNAL, EXTERNAL AND GLOBAL STABILITY ANALYSIS OF THE TEMPORARY EARTH WALL.

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0423	7012	RETAINING WALL (TEMP WALL)	SF	7,475



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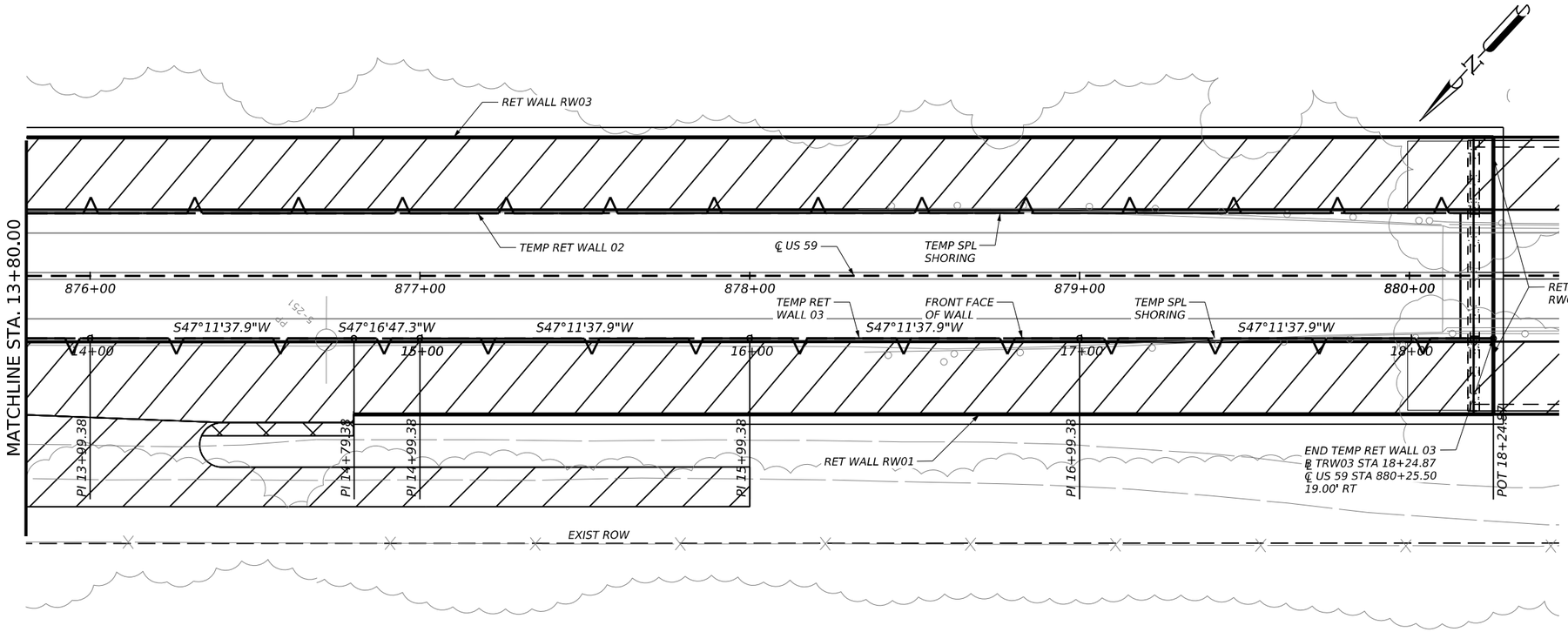
US 59

TEMP RET WALL 03

SHEET 1 OF 2

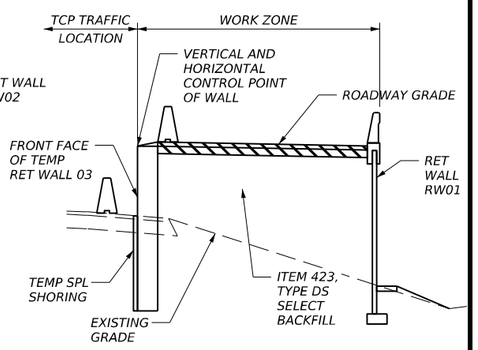
DESIGNED:	CONT	SECT	JOB	HIGHWAY
MKL				
CHECKED: AR	0088	02	062	US59
DRAWN: PCX	DIST	COUNTY		SHEET NO.
CHECKED: MKL	CRP	GOLIAD		031

DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 03_01.dgn



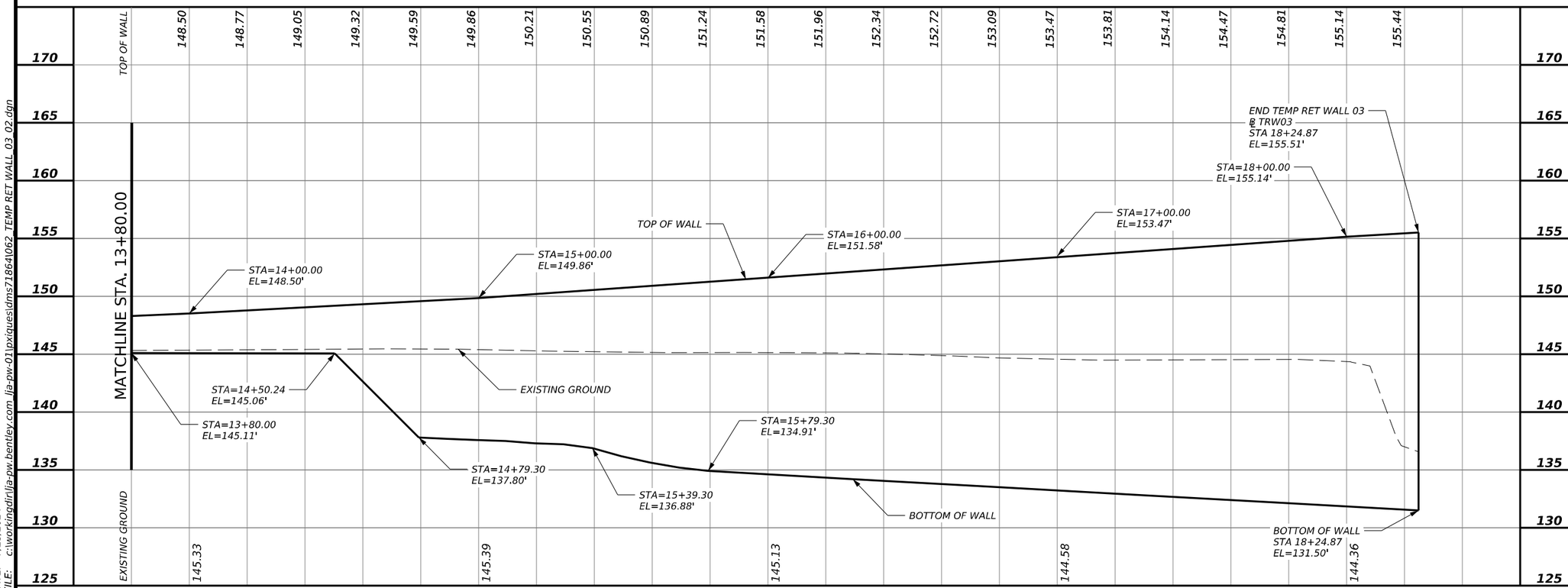
LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



TEMP RET WALL TYPICAL SECTION

STA 14+79.38 TO STA 18+24.87



DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 03_02.dgn

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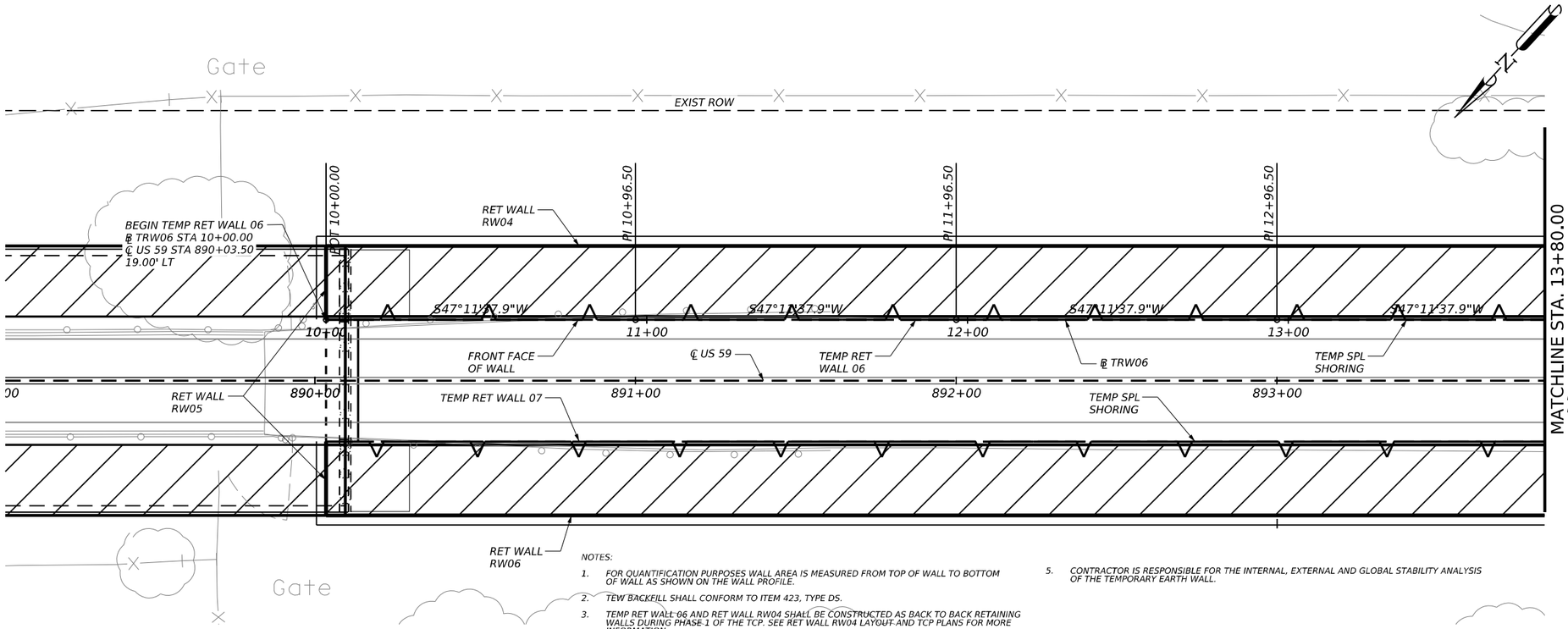
US 59

TEMP RET WALL 03

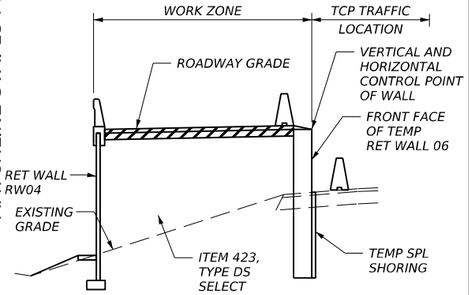
SHEET 2 OF 2

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		032



LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



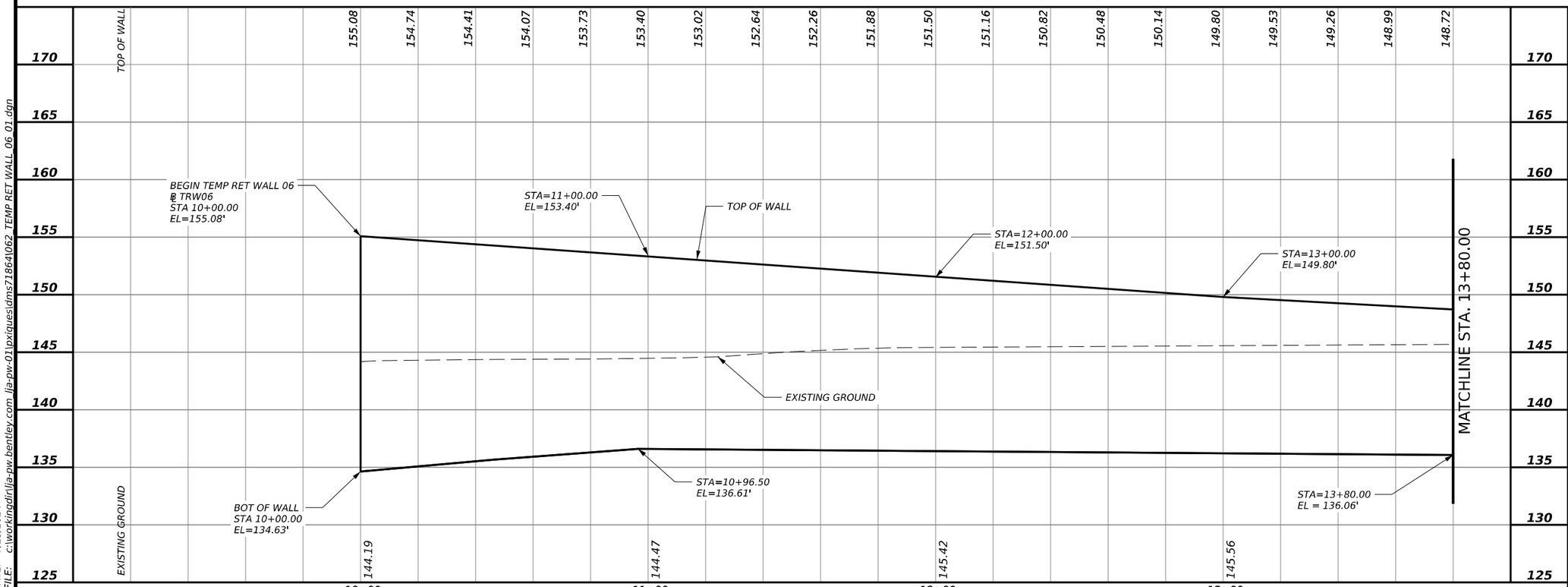
TEMP RET WALL TYPICAL SECTION

NOTES:

1. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL AS SHOWN ON THE WALL PROFILE.
2. TEW BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
3. TEMP RET WALL 06 AND RET WALL RW04 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE RET WALL RW04 LAYOUT AND TCP PLANS FOR MORE INFORMATION
4. SEE RW(TEW) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
5. CONTRACTOR IS RESPONSIBLE FOR THE INTERNAL, EXTERNAL AND GLOBAL STABILITY ANALYSIS OF THE TEMPORARY EARTH WALL.

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0423	7012	RETAINING WALL (TEMP WALL)	SF	10,501



STATE OF TEXAS
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7-26-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

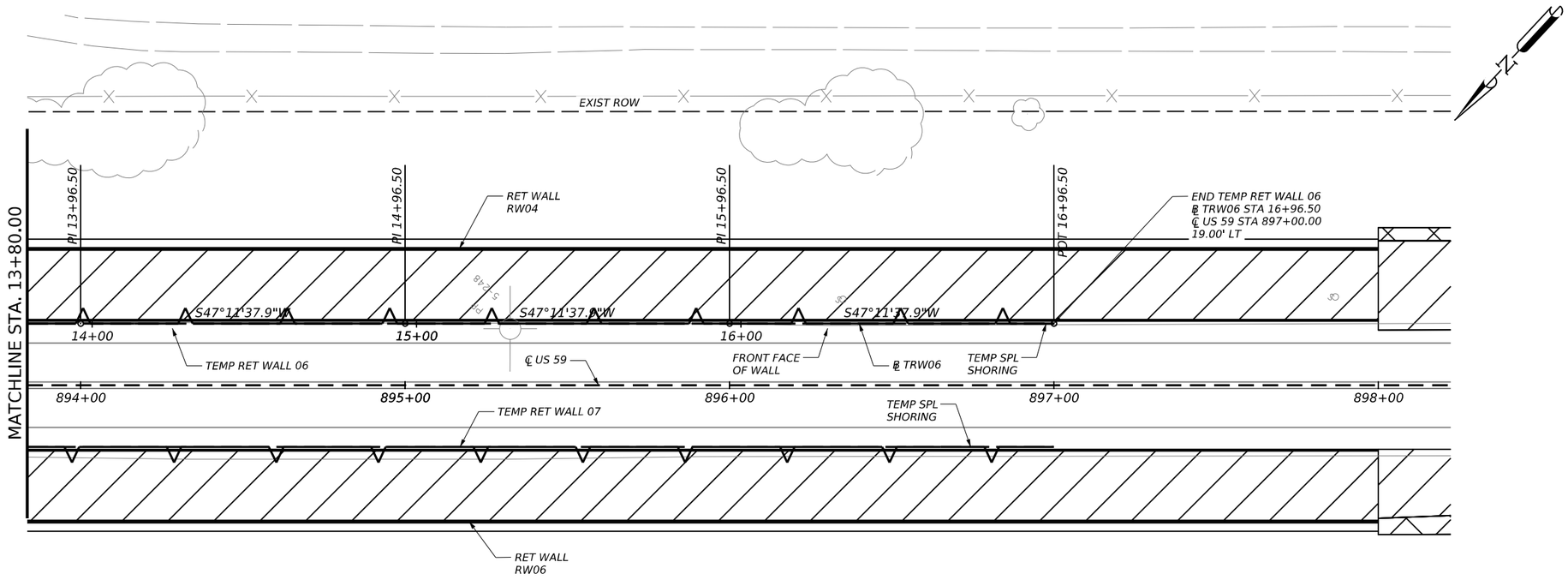
US 59

TEMP RET WALL 06

SHEET 1 OF 2

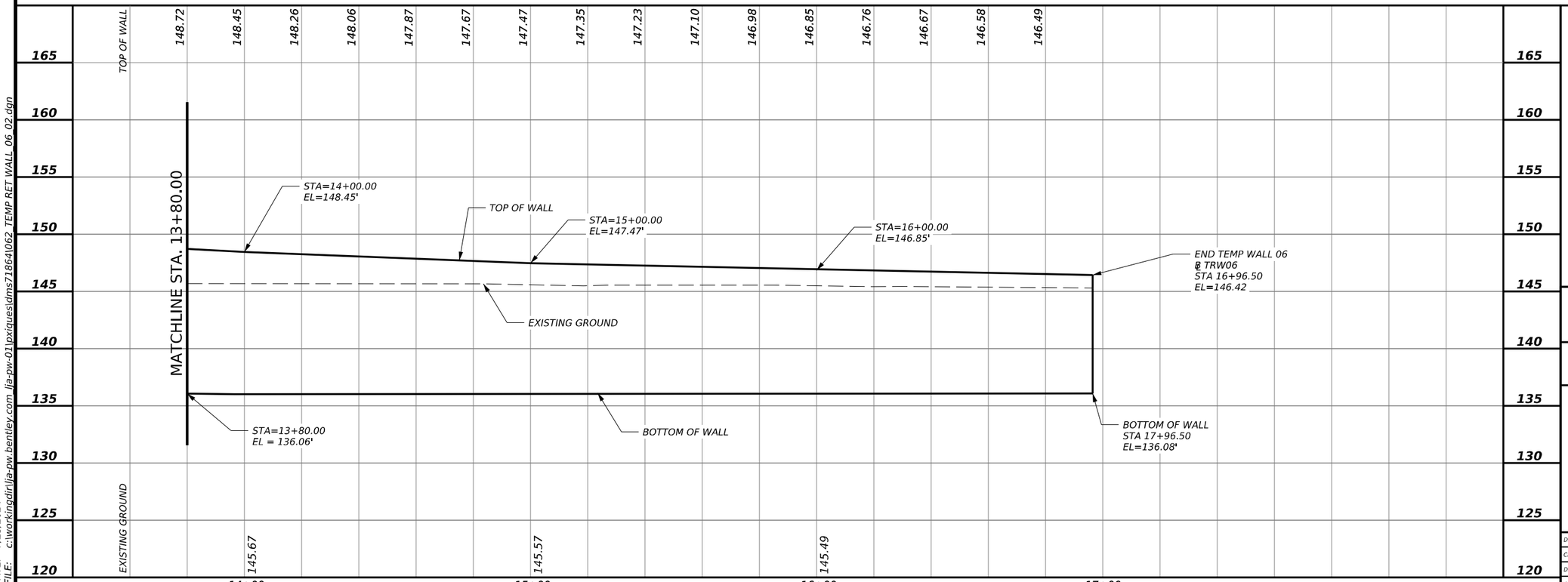
DESIGNED: MKL	CONT	SECT	JOB	HIGHWAY
CHECKED: AR	0088	02	062	US59
DRAWN: PCX	DIST	COUNTY		SHEET NO.
CHECKED: MKL	CRP	GOLIAD		033

DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 06_01.dgn



LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 06_02.dgn

STATE OF TEXAS
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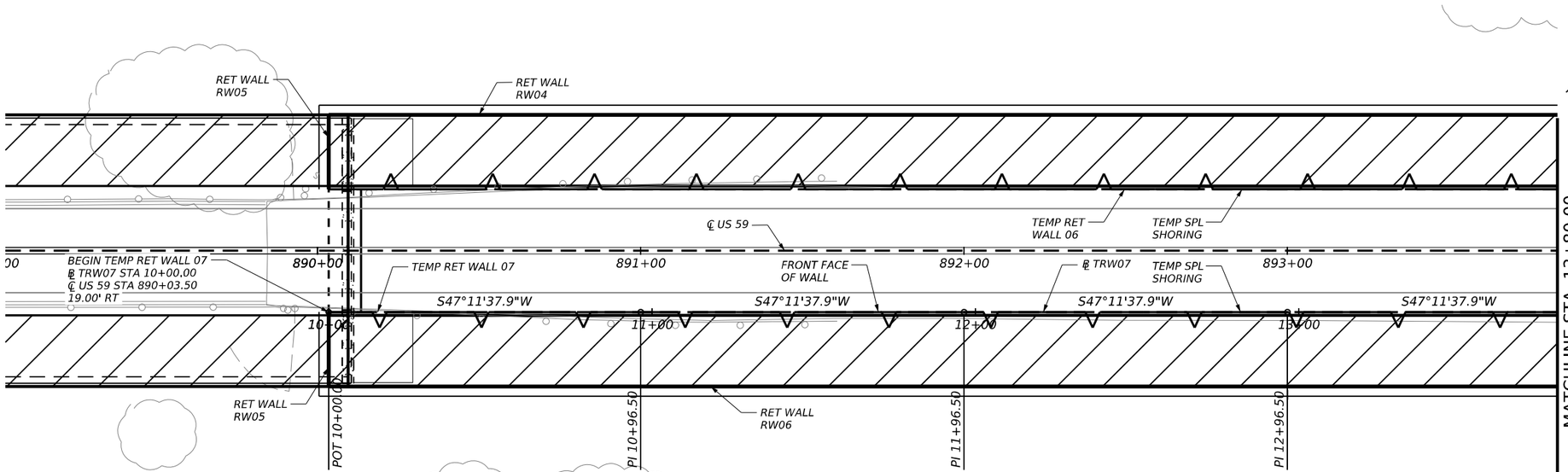
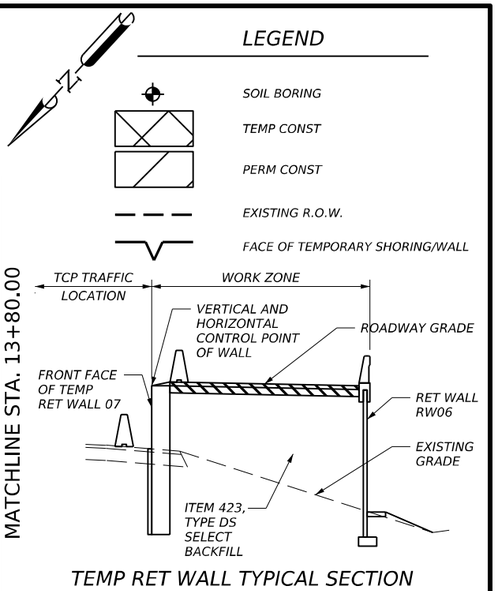
US 59

TEMP RET WALL 06

SHEET 2 OF 2

DESIGNED: MKL	CONT	SECT	JOB		HIGHWAY
CHECKED: AR	0088	02	062		US59
DRAWN: PCX	DIST	COUNTY			SHEET NO.
CHECKED: MKL	CRP	GOLIAD			034



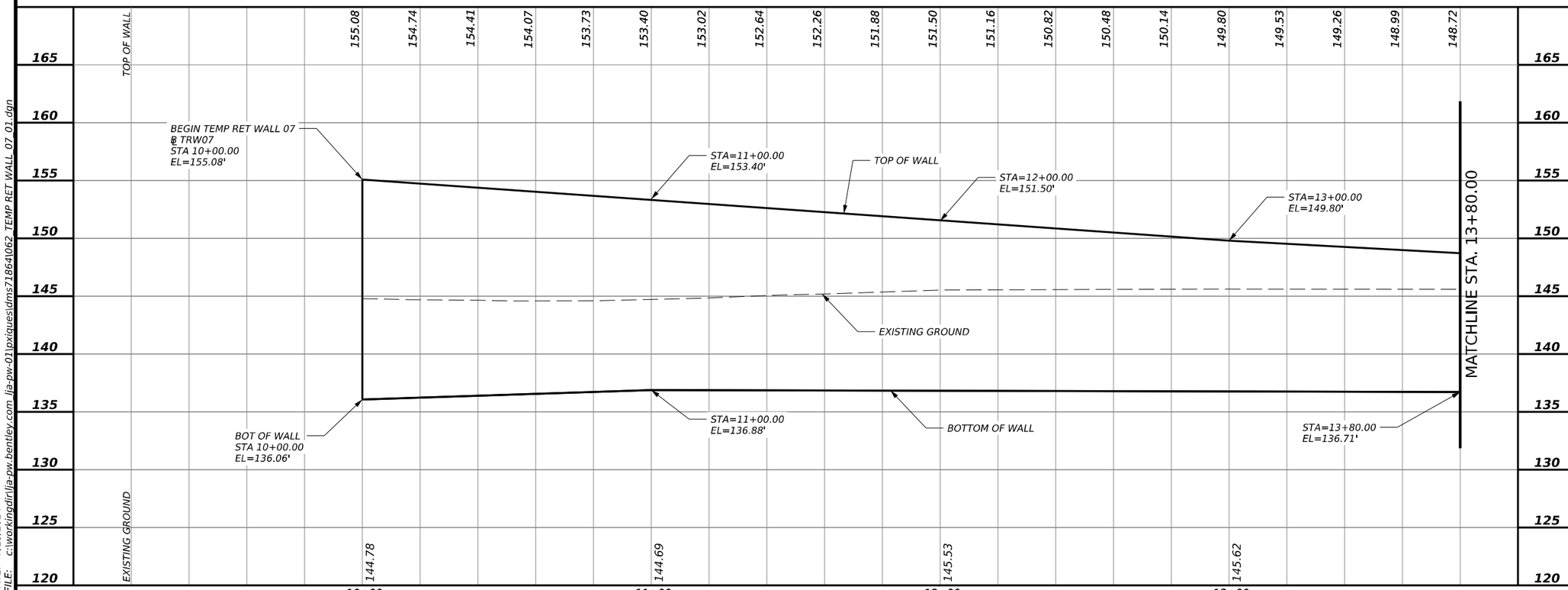


TEMP RET WALL TYPICAL SECTION

ESTIMATED RETAINING WALL QUANTITIES				
ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0423	7012	RETAINING WALL (TEMP WALL)	SF	10,107

NOTES:

1. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL AS SHOWN ON THE WALL PROFILE.
2. TEW BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
3. TEMP RET WALL 07 AND RET WALL RW06 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE RET WALL RW06 LAYOUT AND TCP PLANS FOR MORE INFORMATION
4. SEE RW(TEW) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
5. CONTRACTOR IS RESPONSIBLE FOR THE INTERNAL, EXTERNAL AND GLOBAL STABILITY ANALYSIS OF THE TEMPORARY EARTH WALL.



STATE OF TEXAS
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7-26-24

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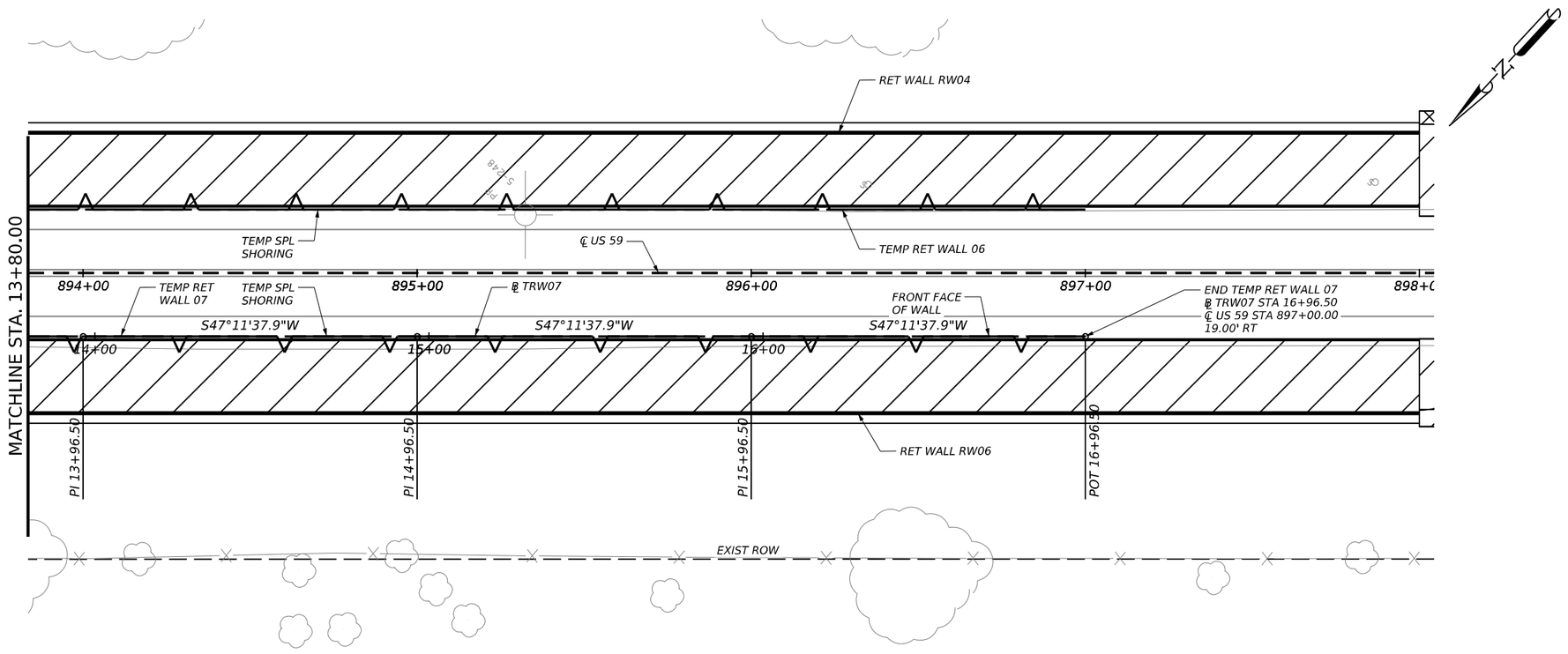
US 59

TEMP RET WALL 07

SHEET 1 OF 2

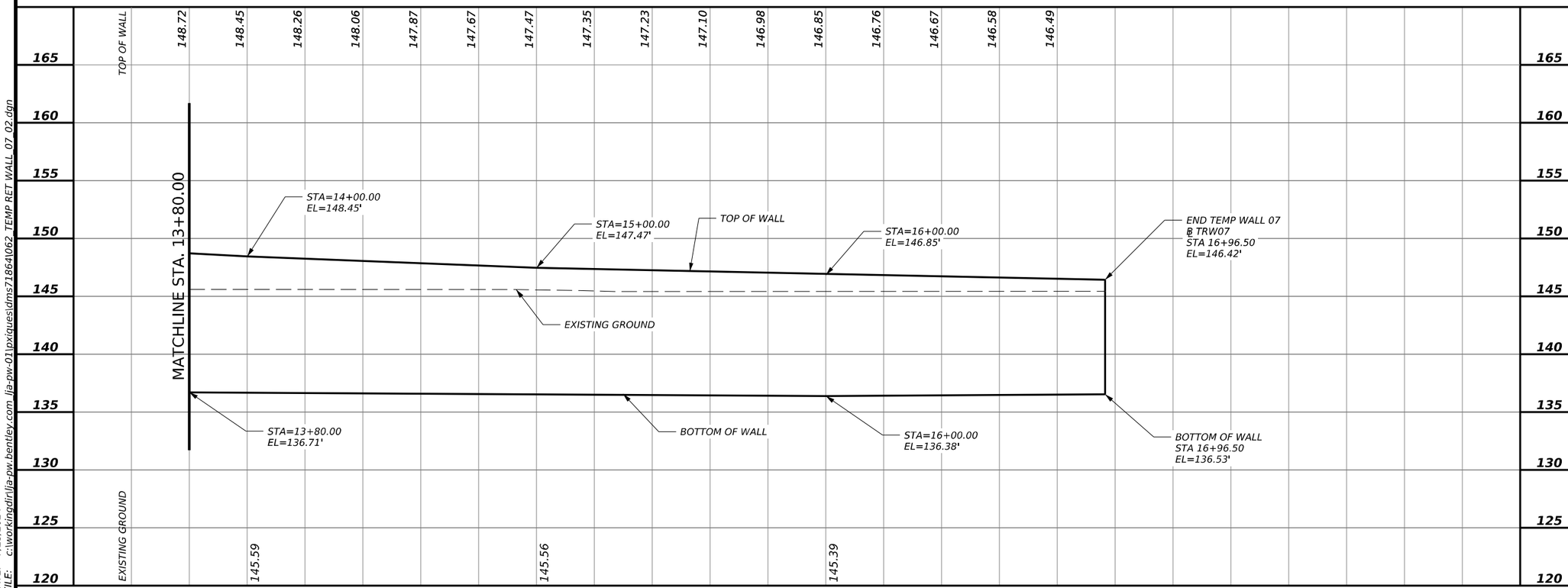
DESIGNED: MKL	CONT	SECT	JOB	HIGHWAY
CHECKED: AR	0088	02	062	US59
DRAWN: PCX	DIST	COUNTY		SHEET NO.
CHECKED: MKL	CRP	GOLIAD		035

DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 07_01.dgn



LEGEND

- SOIL BORING
- TEMP CONST
- PERM CONST
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_TEMP RET WALL 07_02.dgn

STATE OF TEXAS
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US 59

TEMP RET WALL 07

SHEET 2 OF 2

DESIGNED: MKL	CONT	SECT	JOB		HIGHWAY
CHECKED: AR	0088	02	062		US59
DRAWN: PCX	DIST	COUNTY			SHEET NO.
CHECKED: MKL	CRP	GOLIAD			036

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
1	1	1 OF 2	LT	871+70.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
2	1	1 OF 2	RT	871+70.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
3	1	1 OF 2	LT	879+20.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
4	1	1 OF 2	RT	879+20.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
5	1	2 OF 2	LT	890+62.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
6	1	2 OF 2	RT	890+62.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
7	1	2 OF 2	LT	898+13.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
8	1	2 OF 2	RT	898+13.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+	1								1	
9	2	1 OF 2	LT	872+00.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	1					1	
10	2	1 OF 2	LT	871+26.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	2					1	

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

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

CRASH CUSHION SUMMARY SHEET 1 OF 3

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	HIGHWAY
REVISIONS	0088	02 062	US59
	DIST	COUNTY	
	CRP	GOLIAD	
	FEDERAL AID PROJECT		SHEET NO.
			037

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
11	2	1 OF 2	RT	871+26.00	TL-3	UNI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	3					1	
12	2	1 OF 2	RT	872+00.00	TL-3	UNI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	4					1	
13	2	2 OF 2	LT	898+00.00	TL-3	UNI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	5					1	
14	2	2 OF 2	LT	898+00.00	TL-3	UNI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	6					1	
15	2	2 OF 2	RT	898+00.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	7					1	
16	2	2 OF 2	RT	898+00.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+			1	8					1	
17	3 STEP 1	1 OF 2	LT	871+26.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+		1		10						
18	3 STEP 1	1 OF 2	RT	871+26.00	TL-3	UNI	N/A	N/A	PCTB	24"	3'-6"	32'+		1		11						
19	3 STEP 1	1 OF 2	RT	876+79.92	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+			1	12						

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

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

CRASH CUSHION SUMMARY SHEET 2 OF 3

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
© TxDOT	CONT	SECT	HIGHWAY
REVISIONS	0088	02 062	US59
	DIST	COUNTY	
	CRP	GOLIAD	
	FEDERAL AID PROJECT		SHEET NO.
			038

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
20	3 STEP 1	1 OF 2	LT	876+79.92	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+			1	9					1	
21	3 STEP 1	2 OF 2	LT	893+00.00	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+			1	13					1	
22	3 STEP 1	2 OF 2	RT	893+00.00	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+			1	16					1	
23	3 STEP 1	2 OF 2	LT	898+00.00	TL-3	UNI	N/A	N/A	PCTB	24"	3'-6"	32'+		1		14						
24	3 STEP 1	2 OF 2	RT	898+00.00	TL-3	BI	N/A	N/A	PCTB	24"	3'-6"	32'+		1		15						
25	3 STEP 2	1 OF 2	RT	876+79.92	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+	1				1					
26	3 STEP 2	1 OF 2	RT	876+79.92	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+		1		19						
27	3 STEP 2	2 OF 2	LT	876+79.92	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+		1		22						
28	3 STEP 3	1 OF 2	LT	893+00.00	TL-3	BI	N/A	N/A	SSTR	24"	3'-6"	32'+		1		20						
29	3 STEP 3	2 OF 2	LT	893+00.00	TL-3	UNI	N/A	N/A	SSTR	24"	3'-6"	32'+	1				1					
30	3 STEP 3	2 OF 2	RT	893+00.00	TL-3	BI	N/A	N/A	SSTR	24"	3'-6"	32'+		1	1	21					1	
												TOTALS	10	8	13							

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

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

CRASH CUSHION SUMMARY SHEET 3 OF 3

FILE: ccss.dgn	DN: TxDOT	CK:	CK:
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REVISIONS	0088	02 062	US59
	DIST	COUNTY	
	CRP	GOLIAD	
	FEDERAL AID PROJECT		SHEET NO.
			039

DATE: 7/24/2024 $TIME$
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

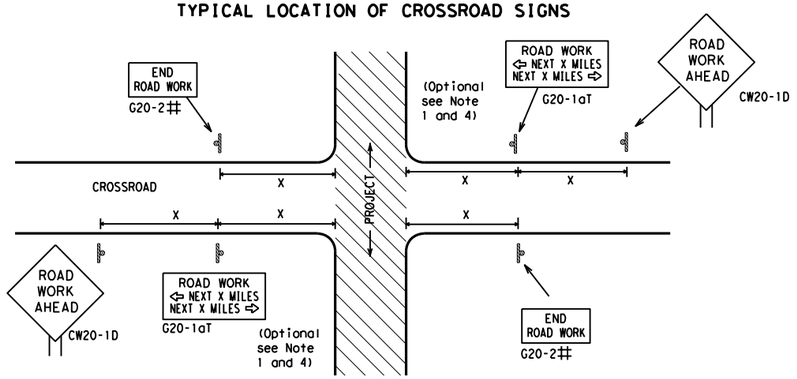
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	CRP	GOLIAD		040
5-10 5-21				

DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\ljo-pw.bentley.com_ljo-pw-01\javier duarte\dms71723\bc-21.dgn

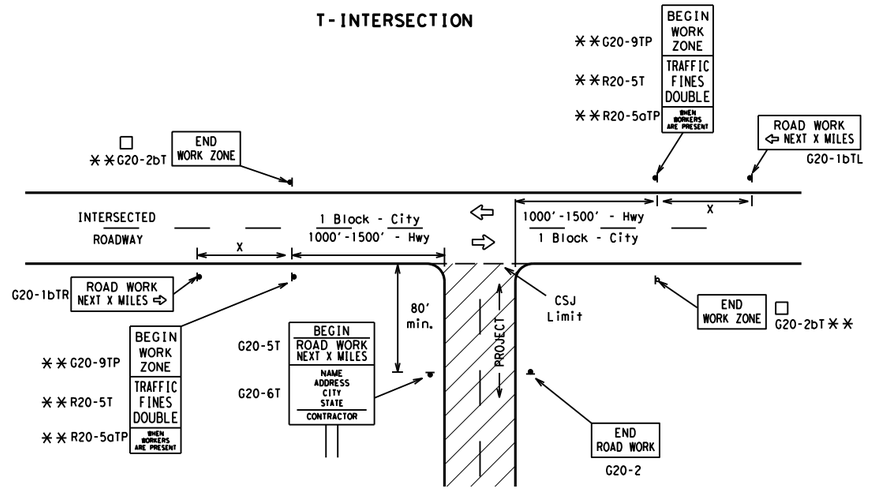
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

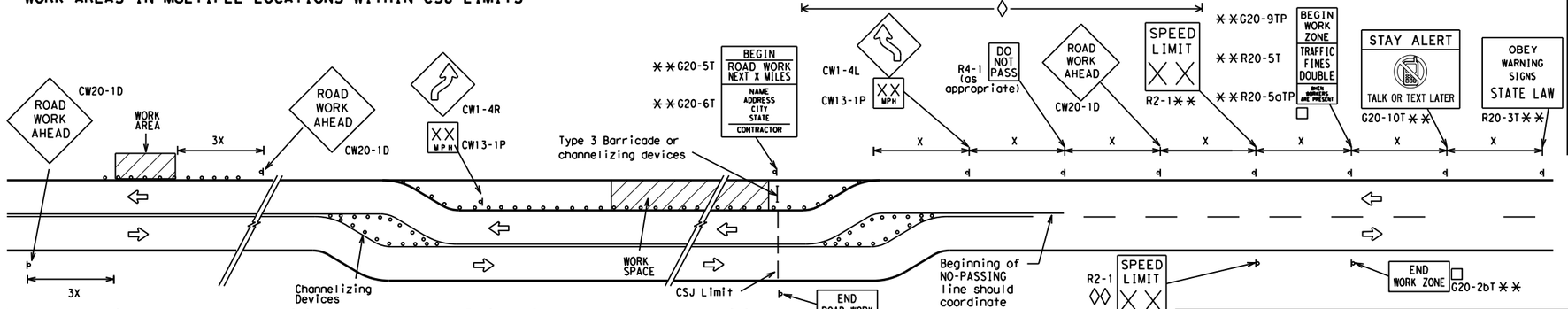
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

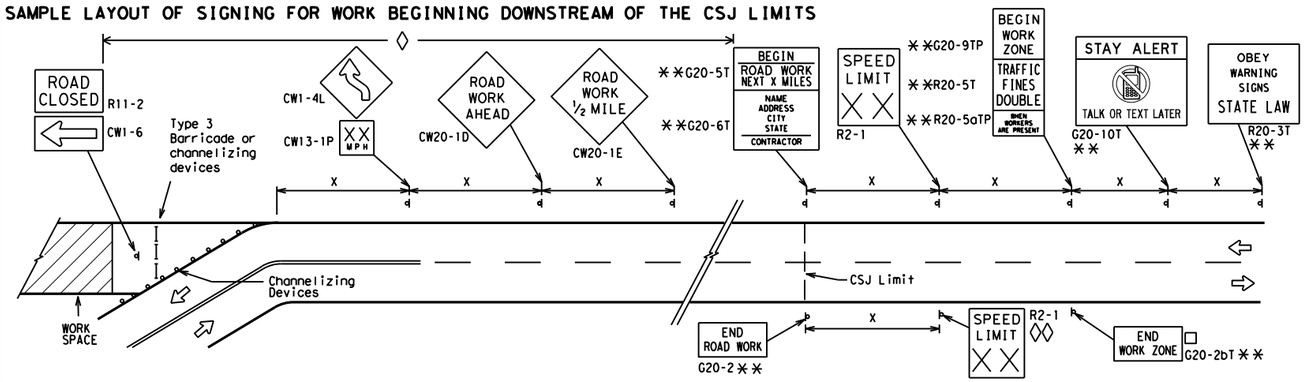
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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	0088	02	062	US59
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CRP	GOLIAD		041

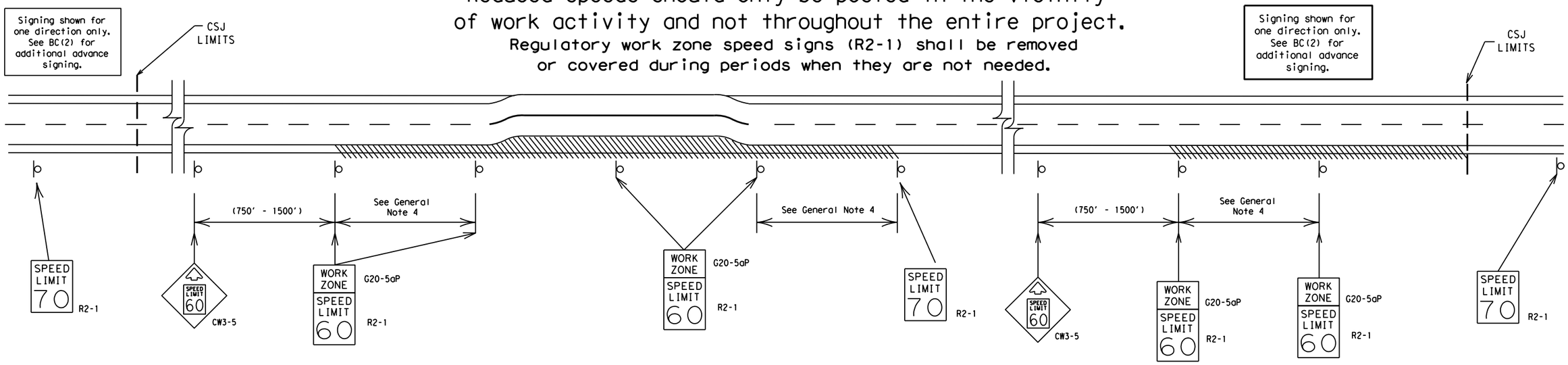
DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier duarte\dms71723\bc-21.dgn

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
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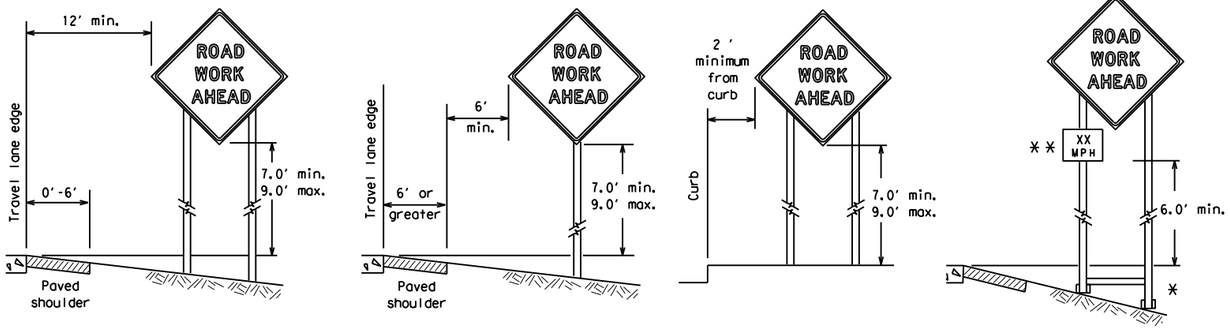
REVISIONS	0088	02	062	US59
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CRP	GOLIAD		042

DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\ljo-pw.bentley.com_ljo-pw-01\javier duarte\dms71723\bc-21.dgn

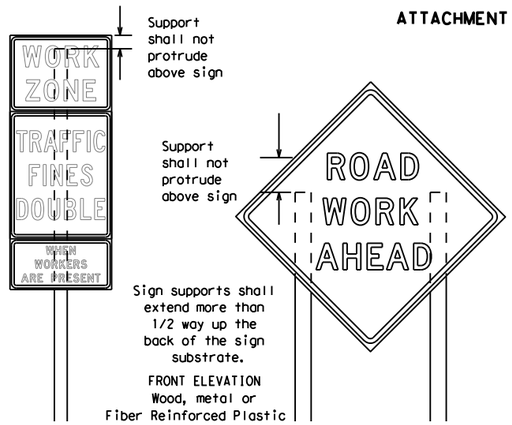
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

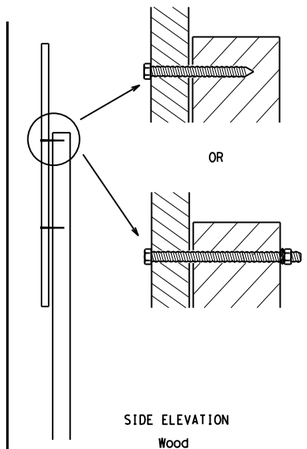


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





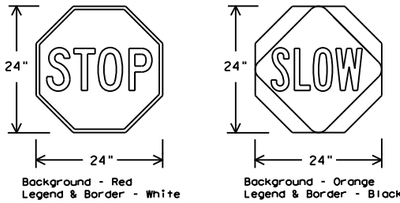
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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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	0088	02	062	US59
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CRP	GOLIAD		043

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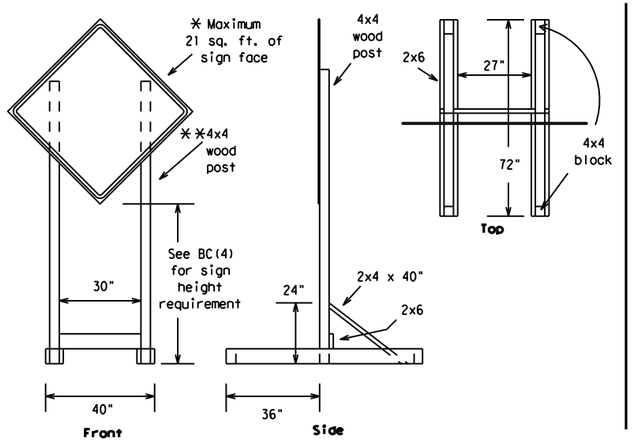
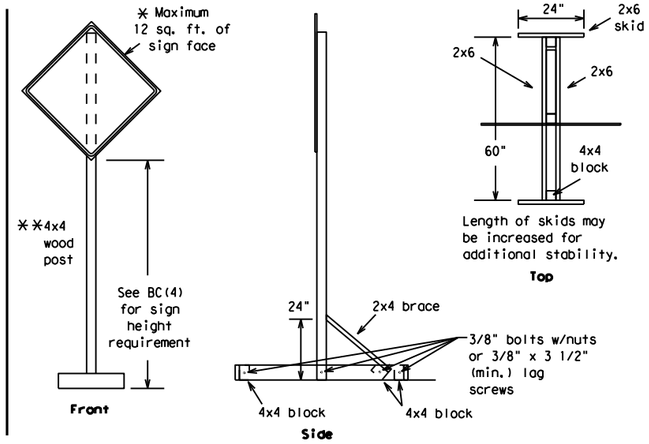
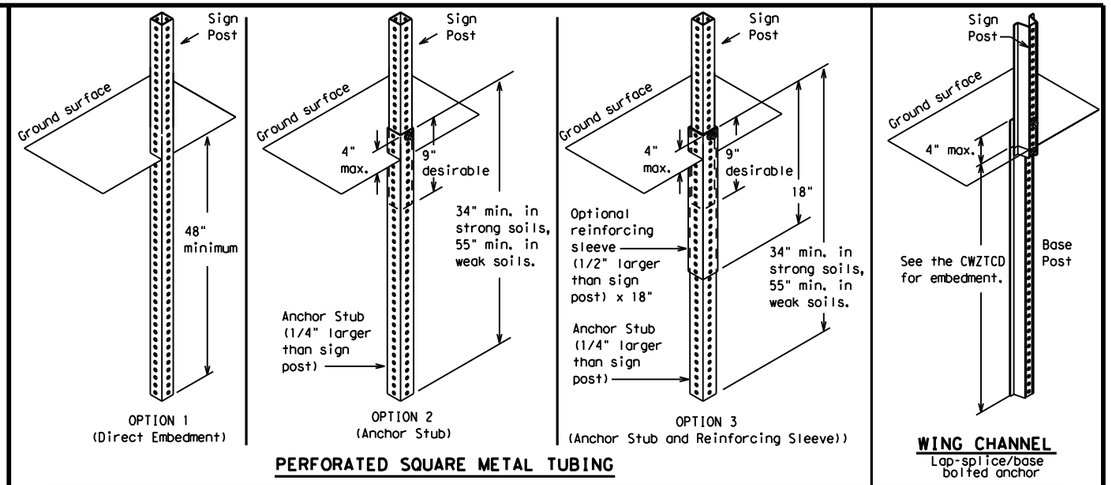




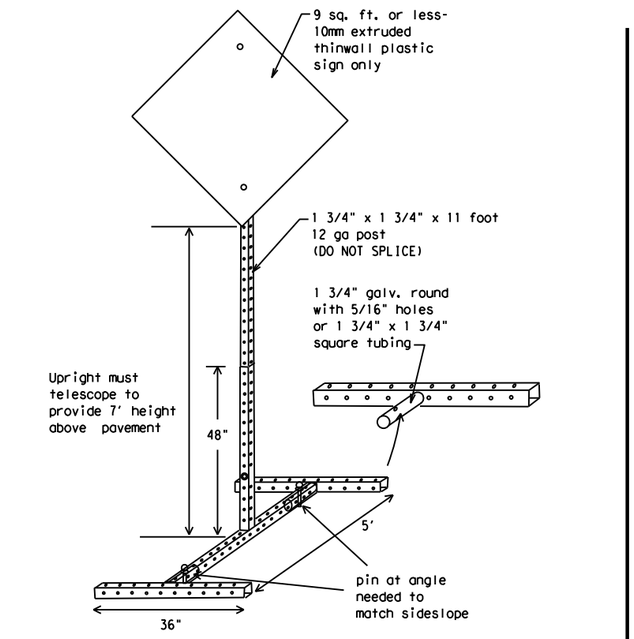
SKID MOUNTED WOOD SIGN SUPPORTS

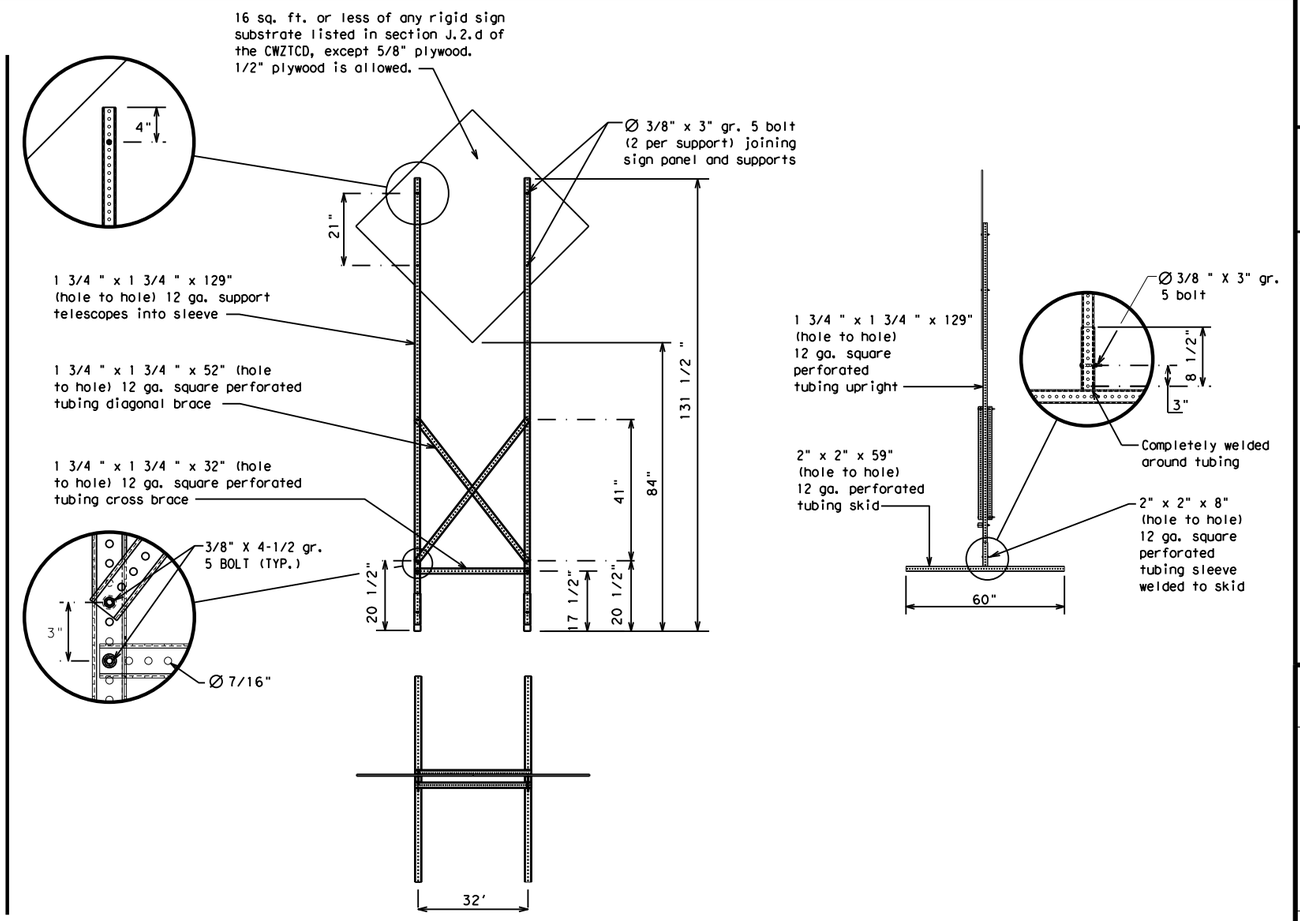
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

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





SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

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
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CRP	GOLIAD		044

DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\lia-pw.bentley.com_lja-pw-01\javier duarte\dms71723\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
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7-13 5-21	CRP	GOLIAD		045

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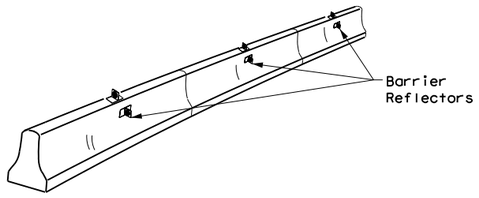
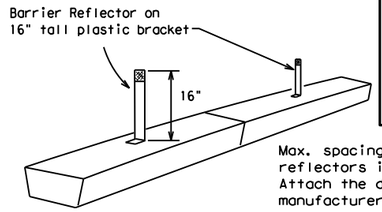
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



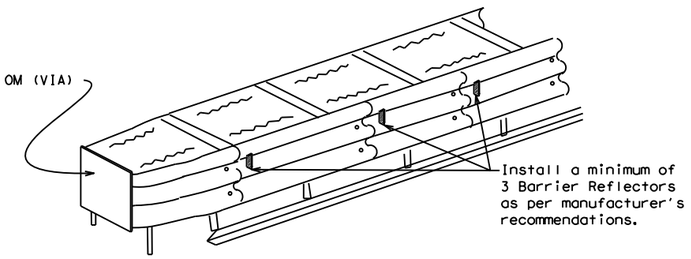
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

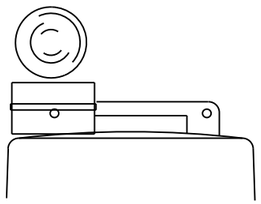
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

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

WARNING LIGHTS

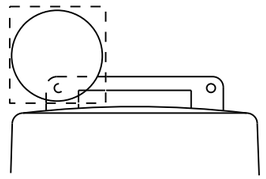


Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

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.



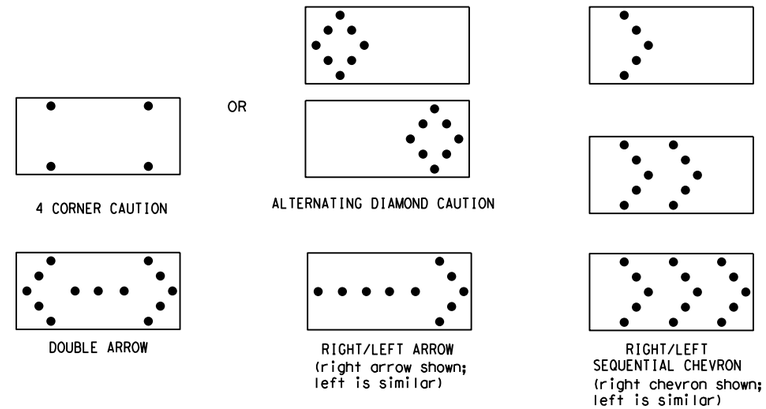
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

SHEET 7 OF 12

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
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CRP	GOLIAD		046

101

DATE: 7/24/2024 $TIME$
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

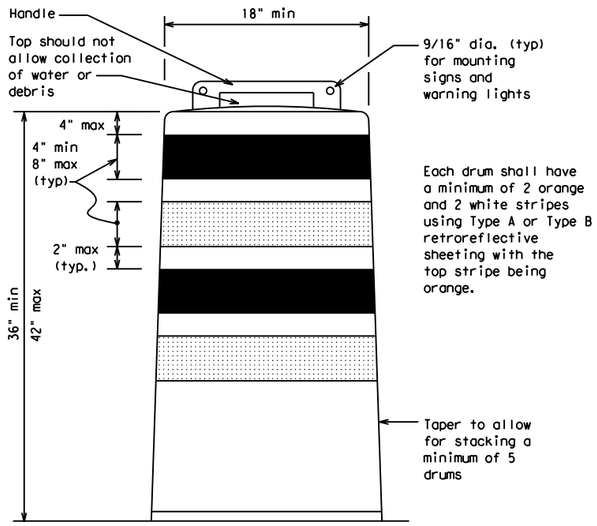
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

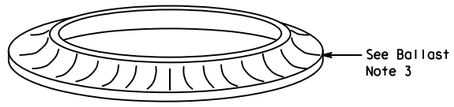
RETROREFLECTIVE SHEETING

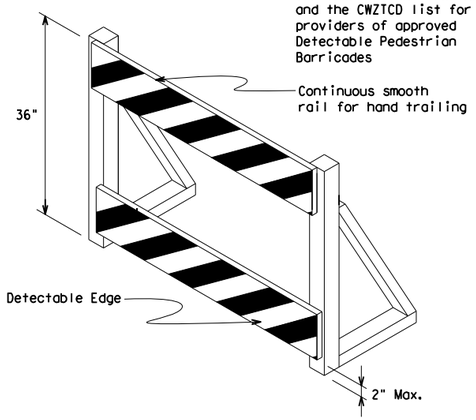
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

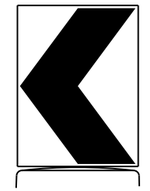




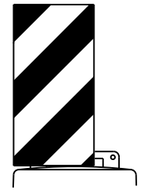


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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	0088	02	062	US59
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	CRP	GOLIAD		047
7-13				

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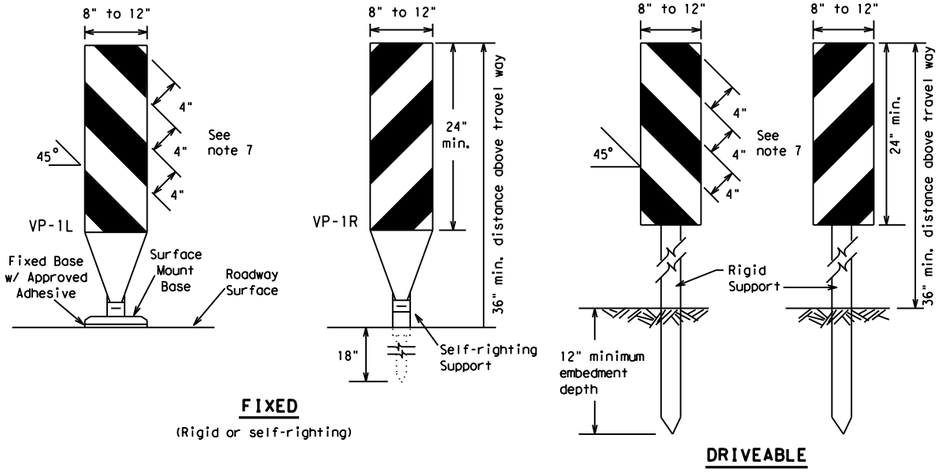
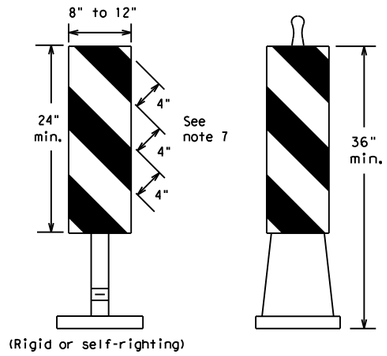


FIXED
(Rigid or self-righting)

DRIVEABLE

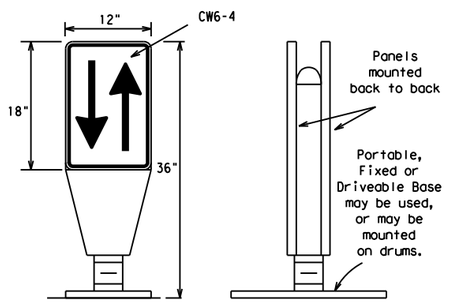


(Rigid or self-righting)

PORTABLE

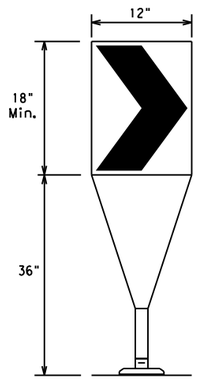
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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.

VERTICAL PANELS (VPs)



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)



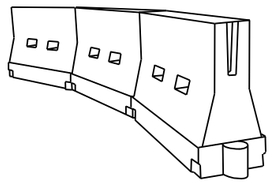
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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
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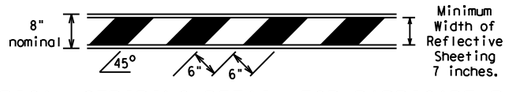
REVISIONS	0088	02	062	US59
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	CRP	GOLIAD		048

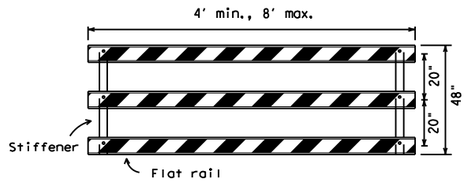
TYPE 3 BARRICADES

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.



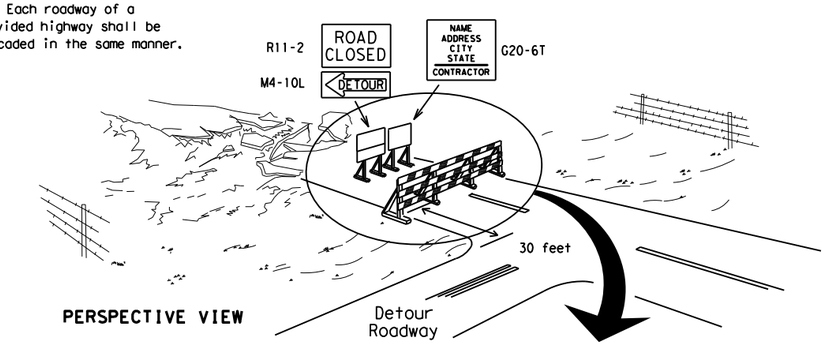
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

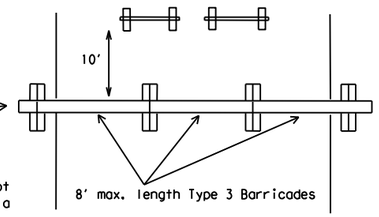
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

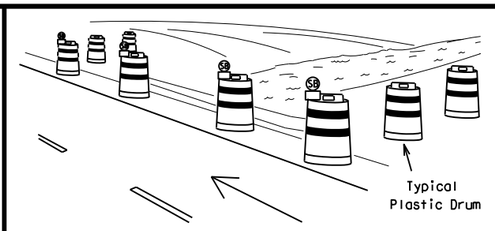
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

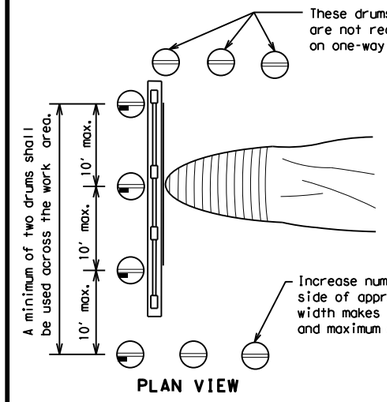
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

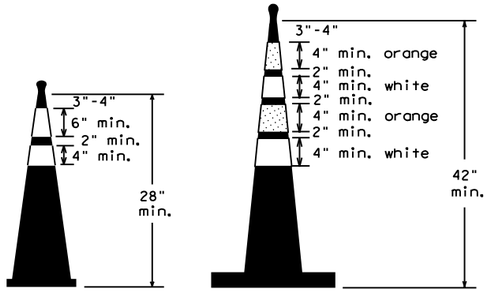
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



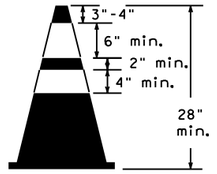
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

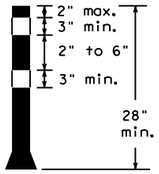
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

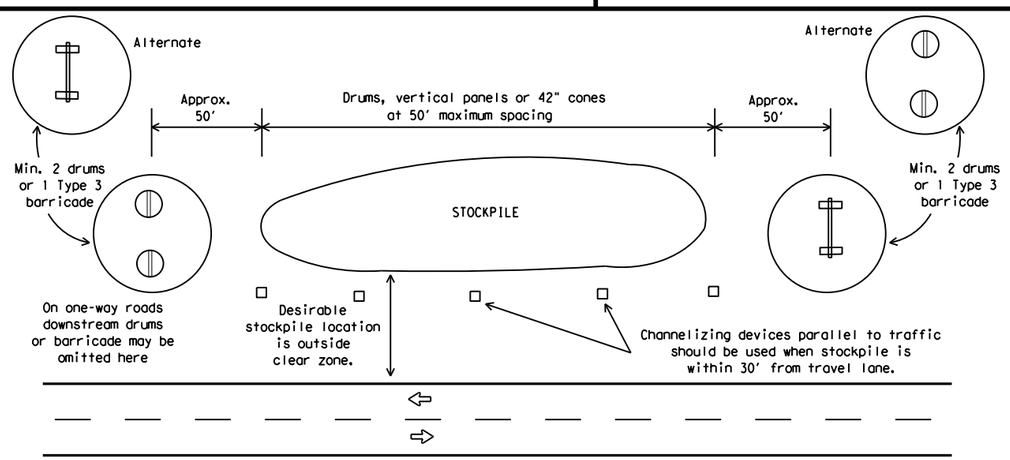


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

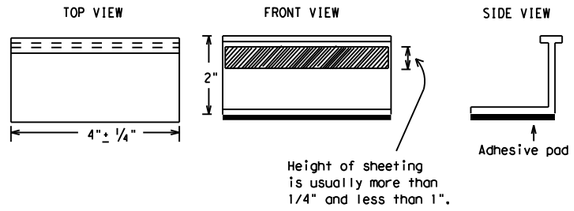
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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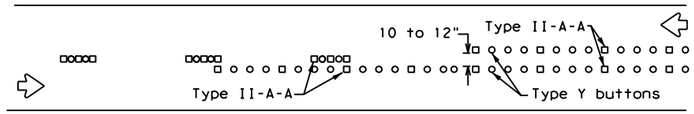
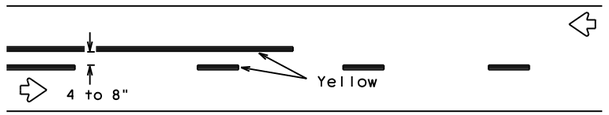
PAVEMENT MARKING PATTERNS

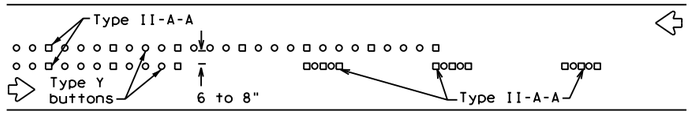
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



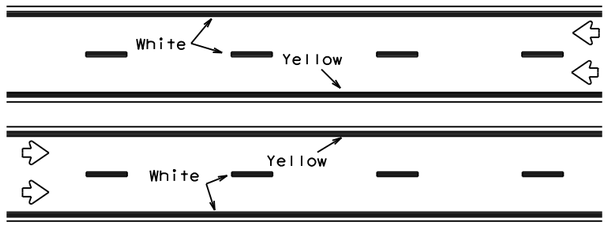
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



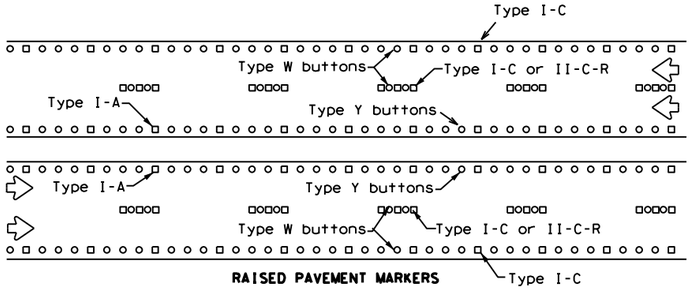
RAISED PAVEMENT MARKERS - PATTERN B

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

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



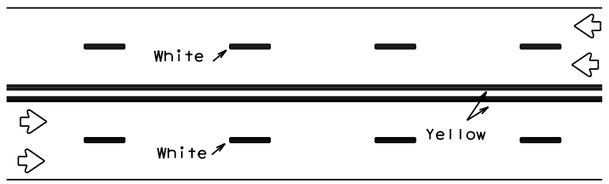
REFLECTORIZED PAVEMENT MARKINGS



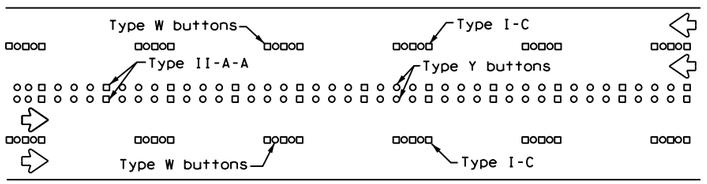
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



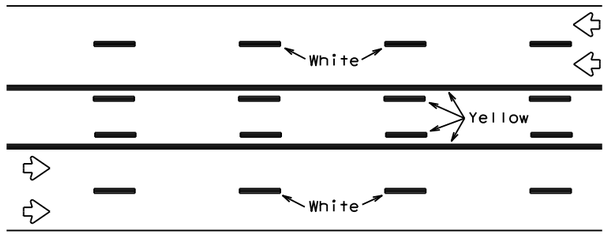
REFLECTORIZED PAVEMENT MARKINGS



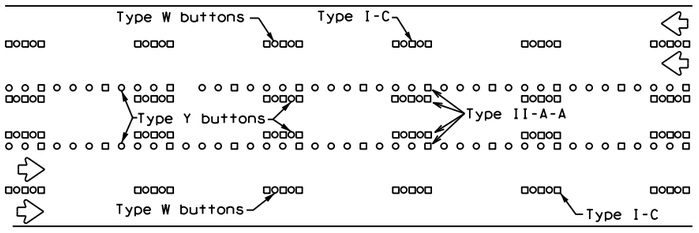
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

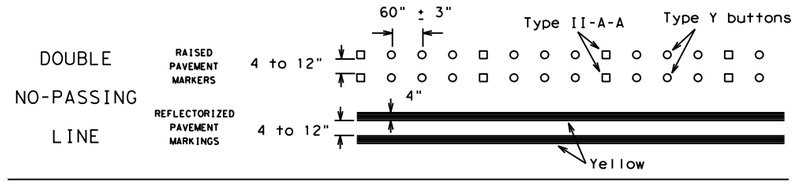
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

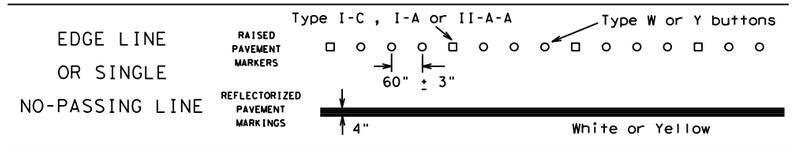
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

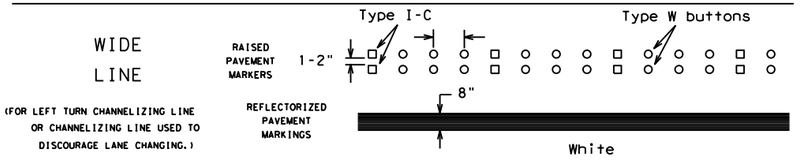


EDGE LINE OR SINGLE NO-PASSING LINE



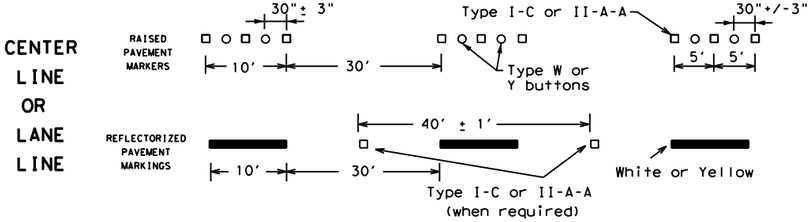
WIDE LINE

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

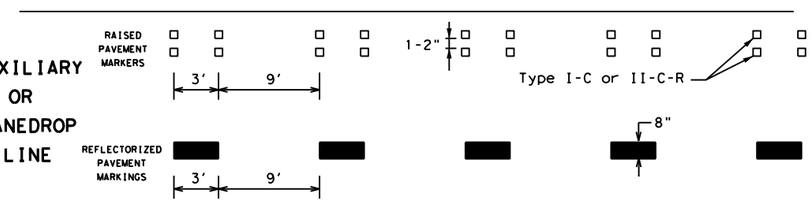


BROKEN LINES

CENTER LINE OR LANE LINE

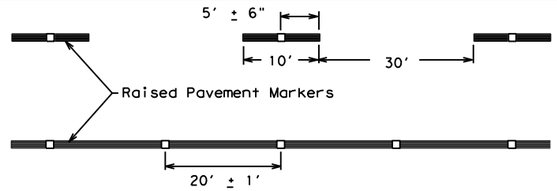


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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	CRP	GOLIAD		051

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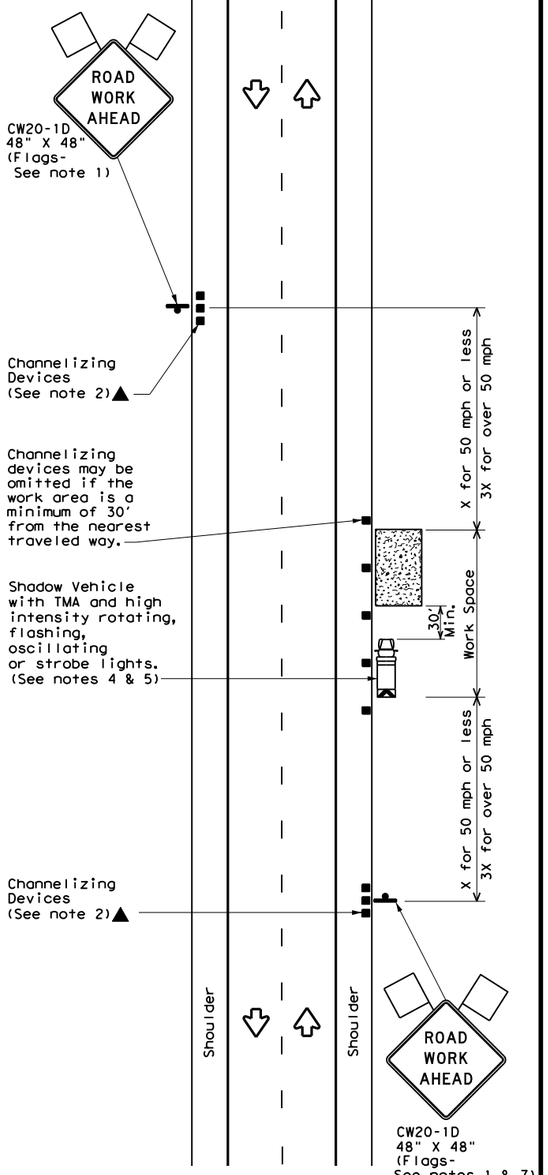
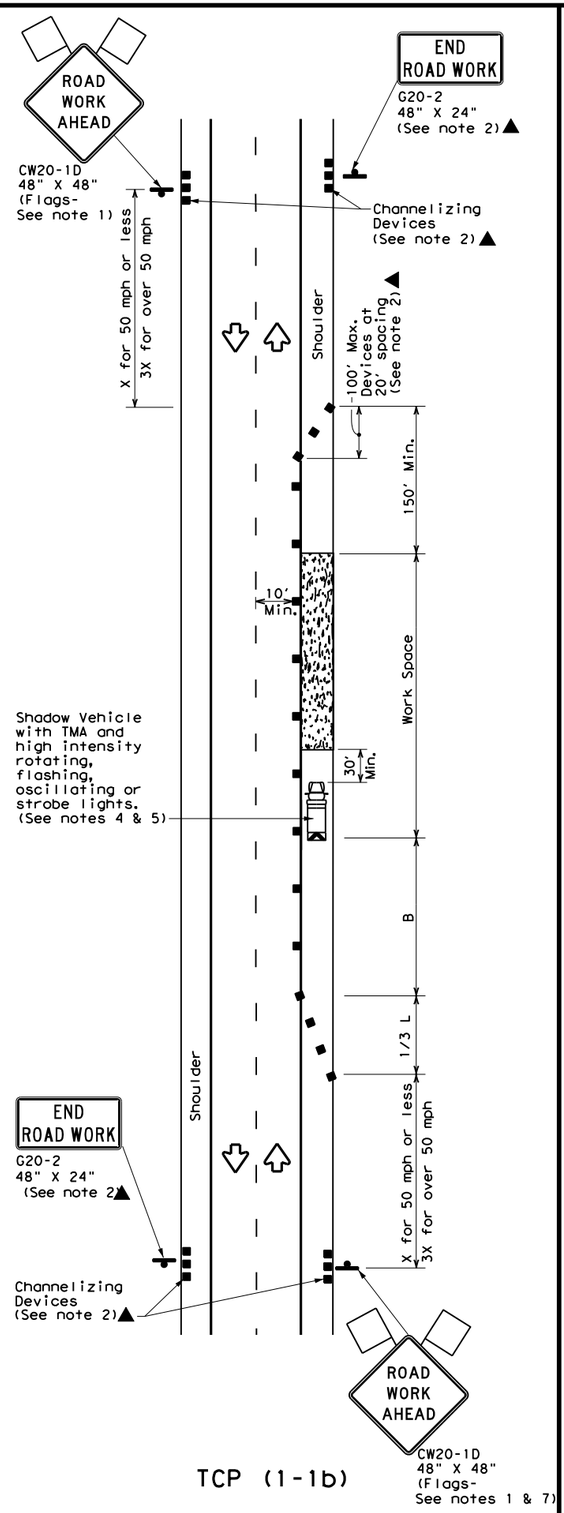


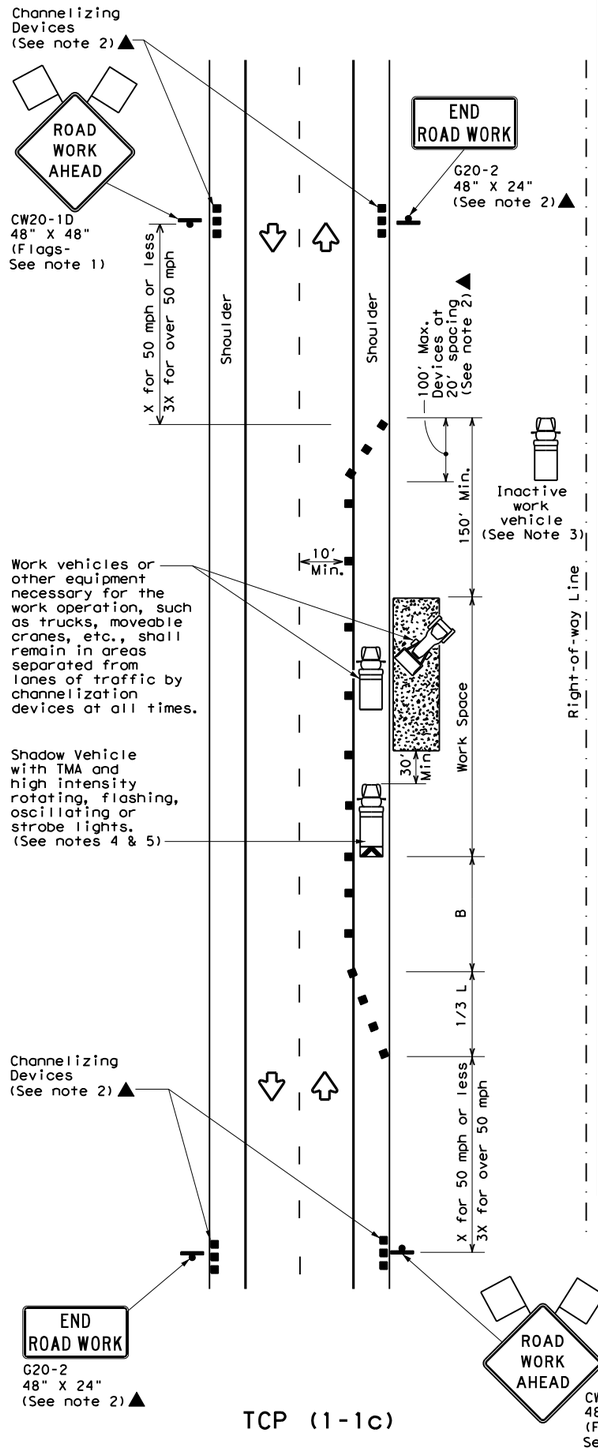
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. 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 wider work spaces.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. 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(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	CRP	GOLIAD		052
1-97 2-18				

DATE: 7/24/2024 $TIME$
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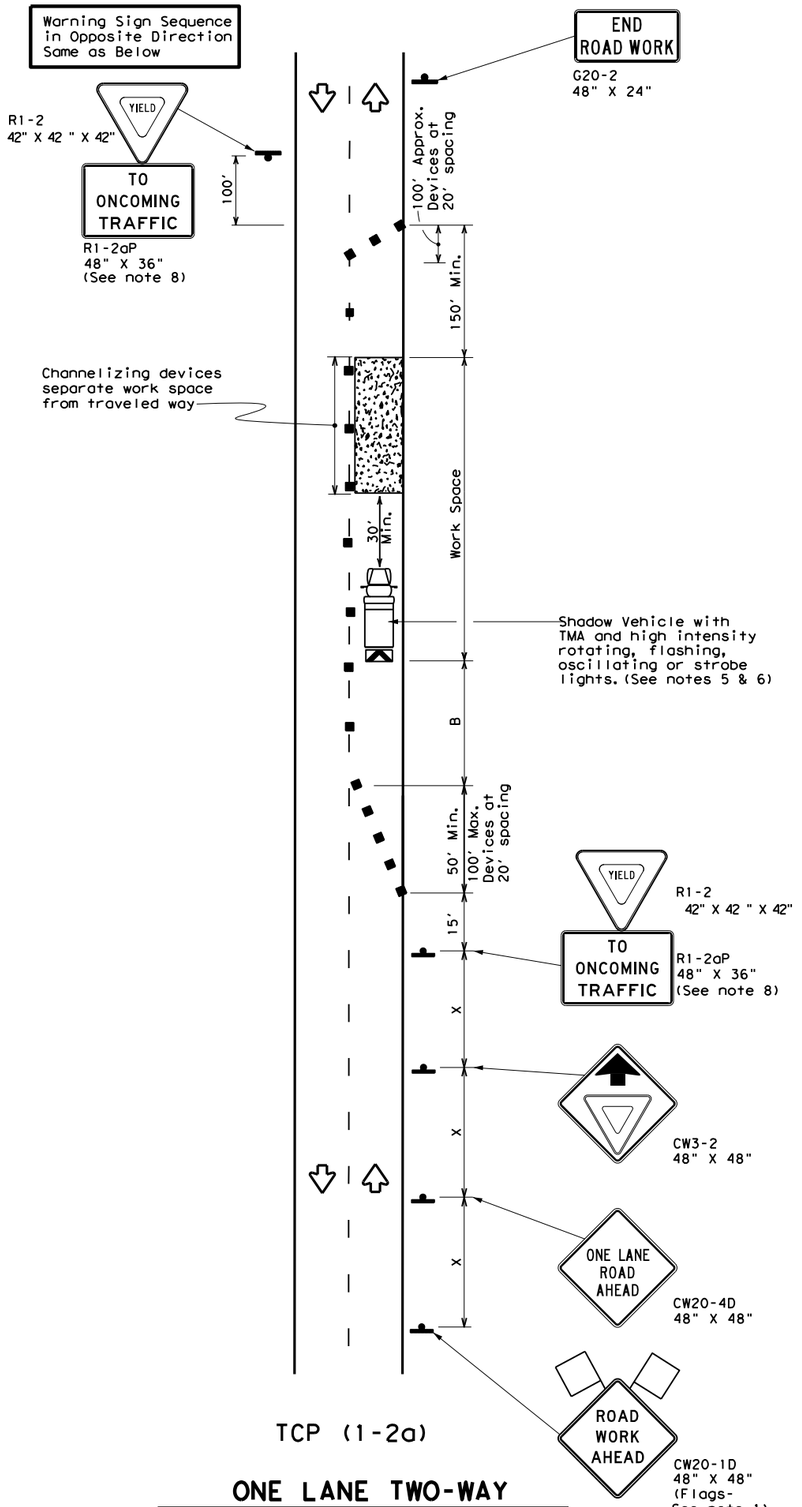
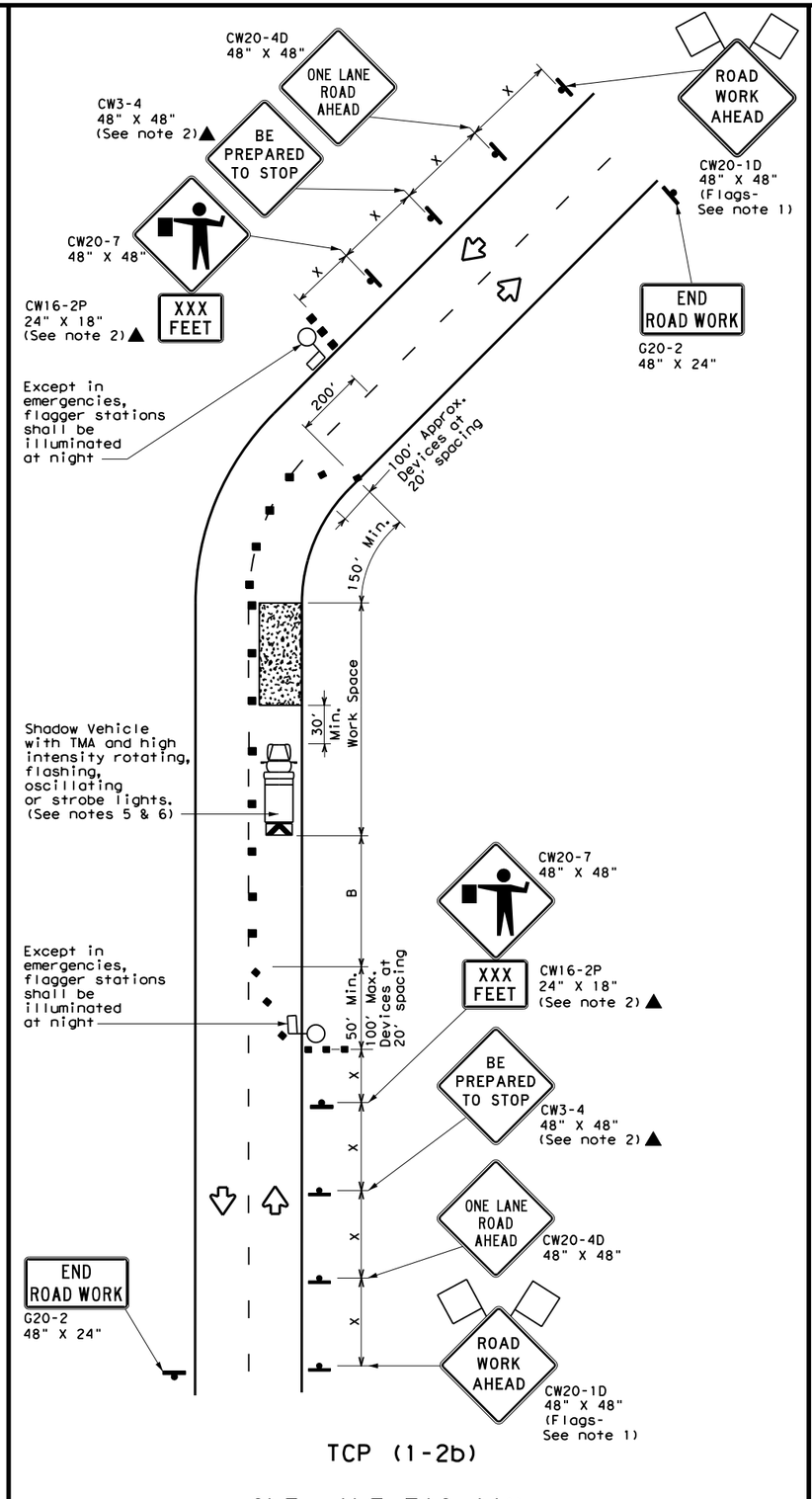


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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"	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. 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. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12	CRP	GOLIAD		053
1-97 2-18				

DATE: 7/24/2024 $TIME$
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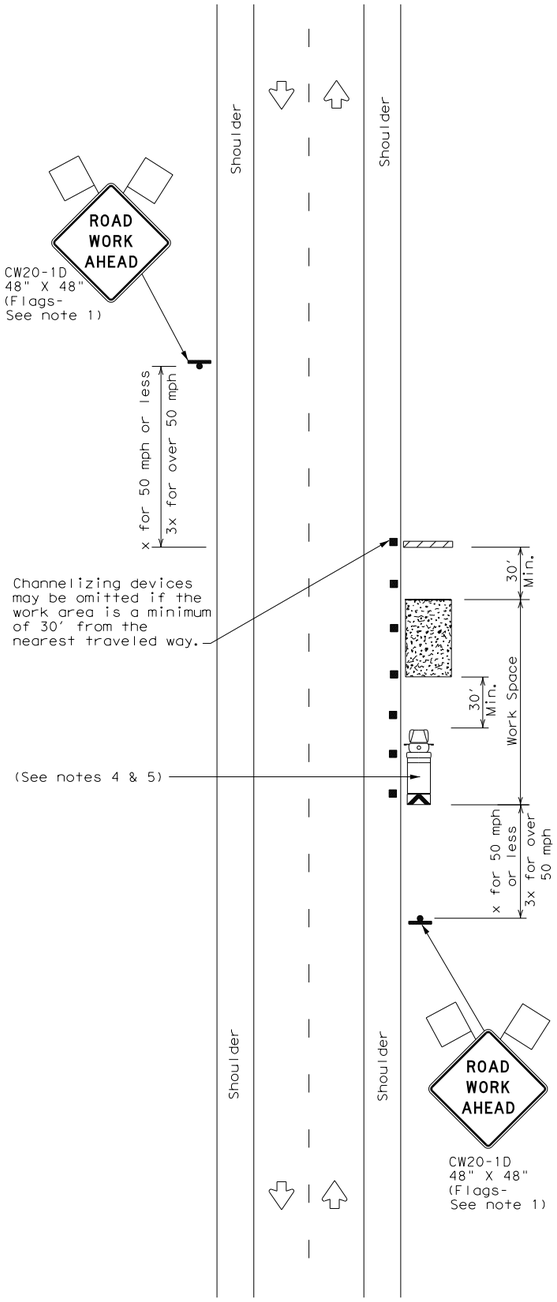
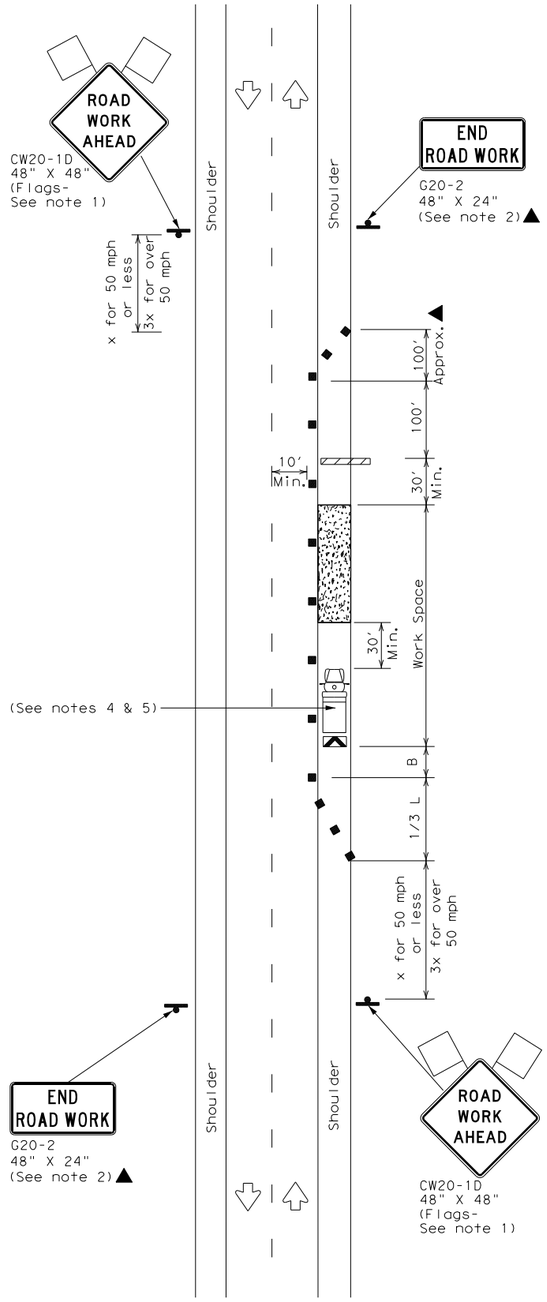


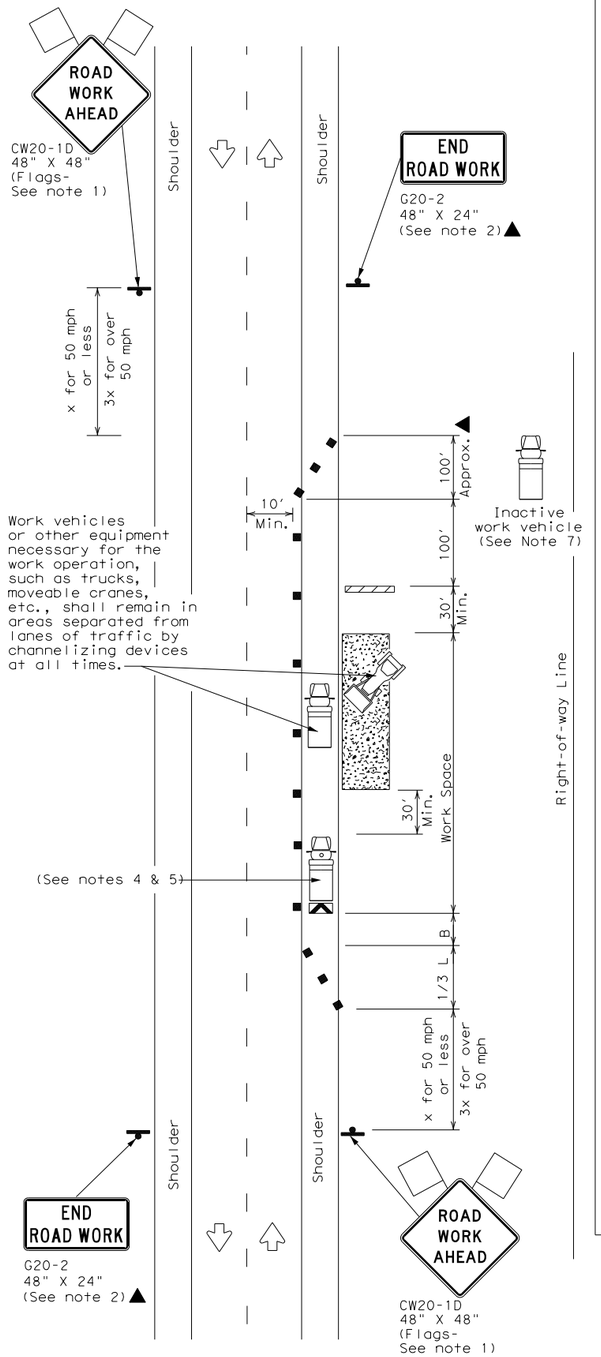
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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	0088	02	062	US59
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	CRP	GOLIAD		054
1-97 2-18				

DATE: 7/24/2024 $TIME$
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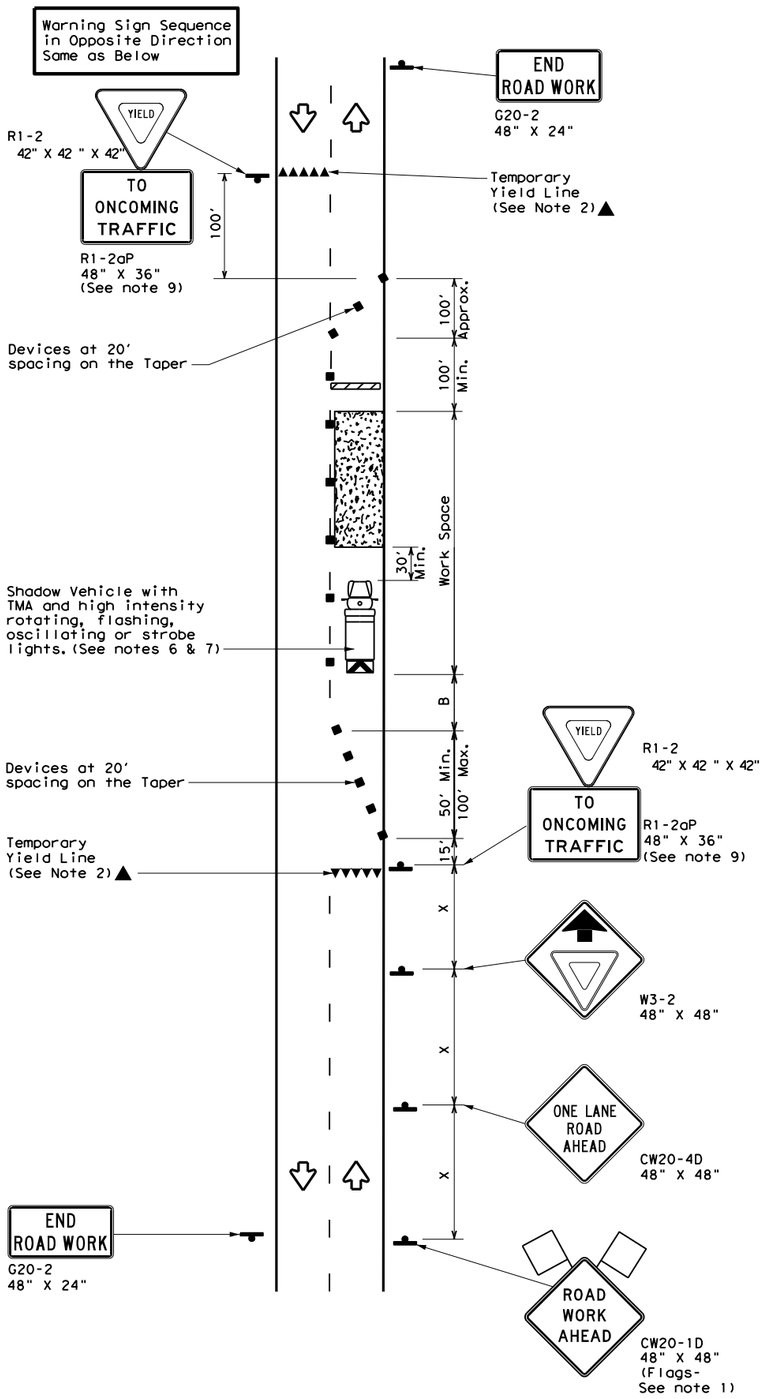
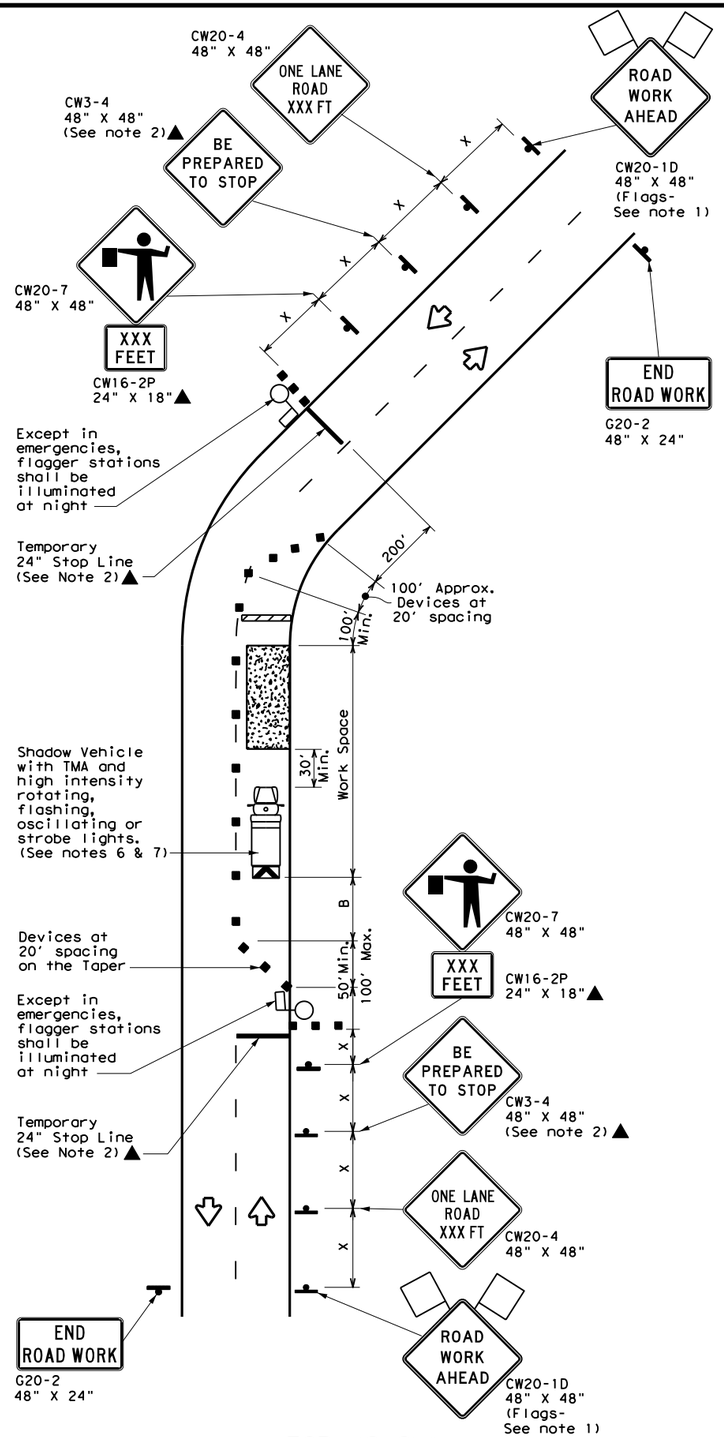


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



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

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	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"	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. 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. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. 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.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	CRP	GOLIAD		055
4-98 2-18				

DATE: 7/24/2024 $TIME$
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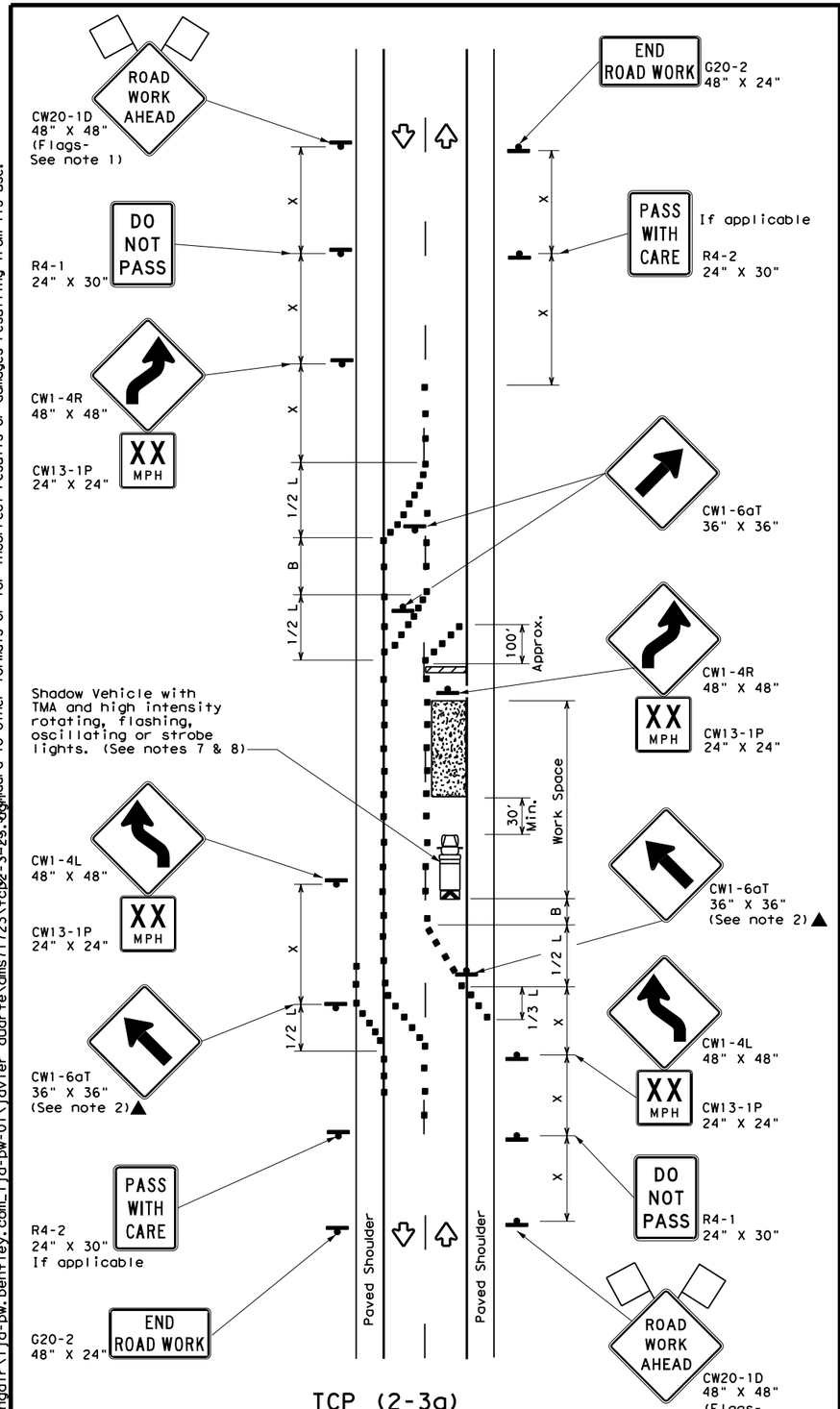
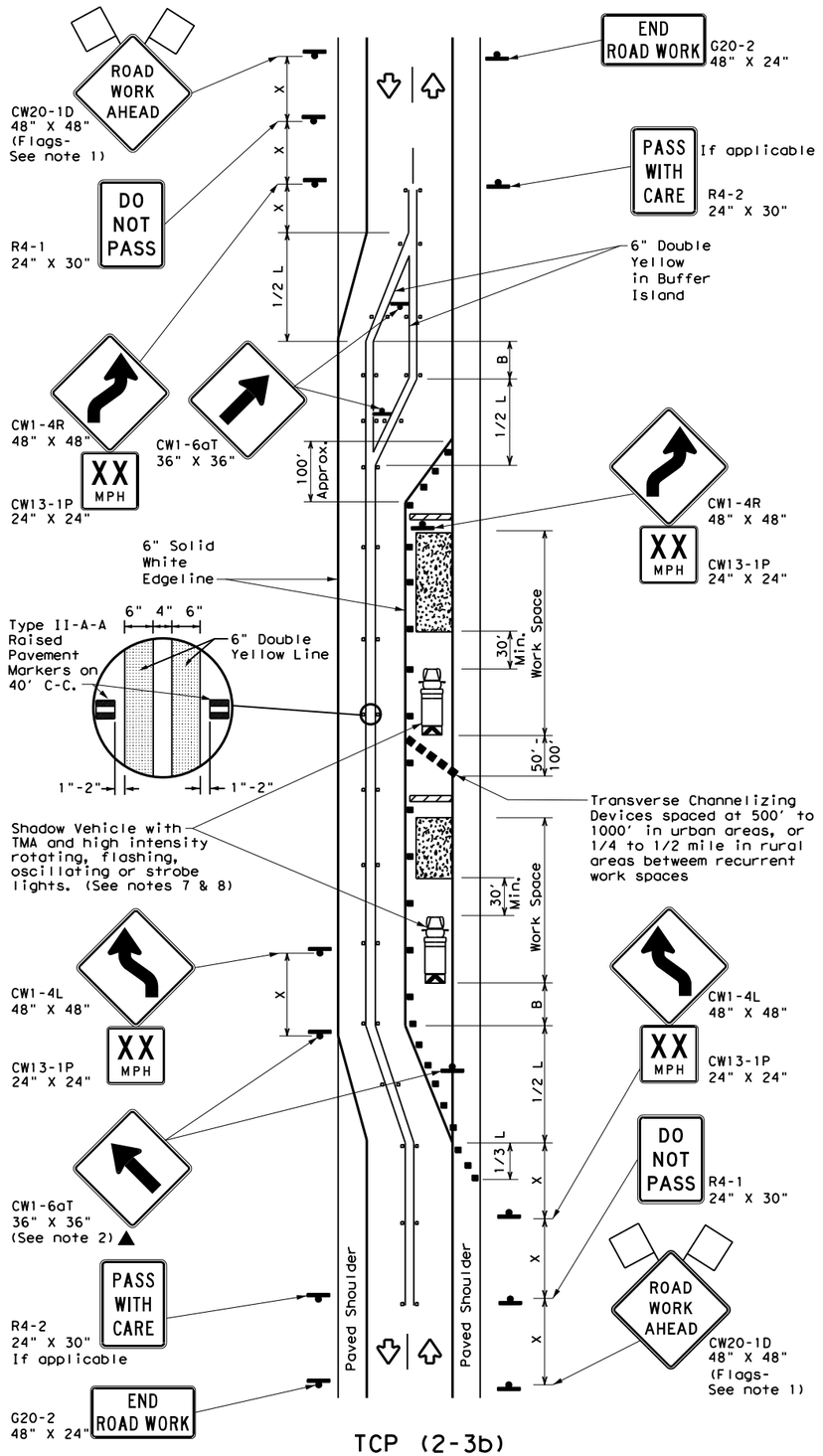


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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 8-95 3-03 4-23 1-97 2-12	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		056

DATE: 7/24/2024 $TIME$
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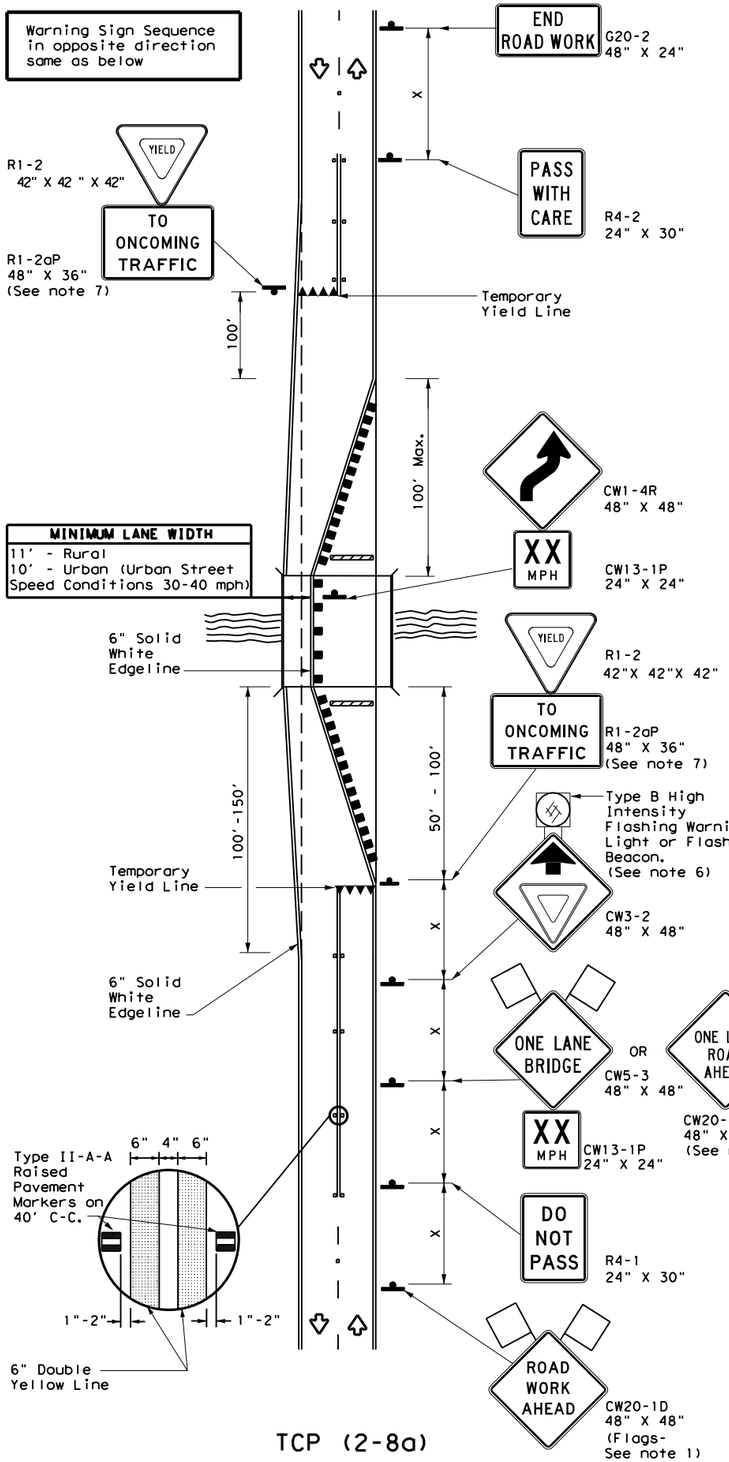
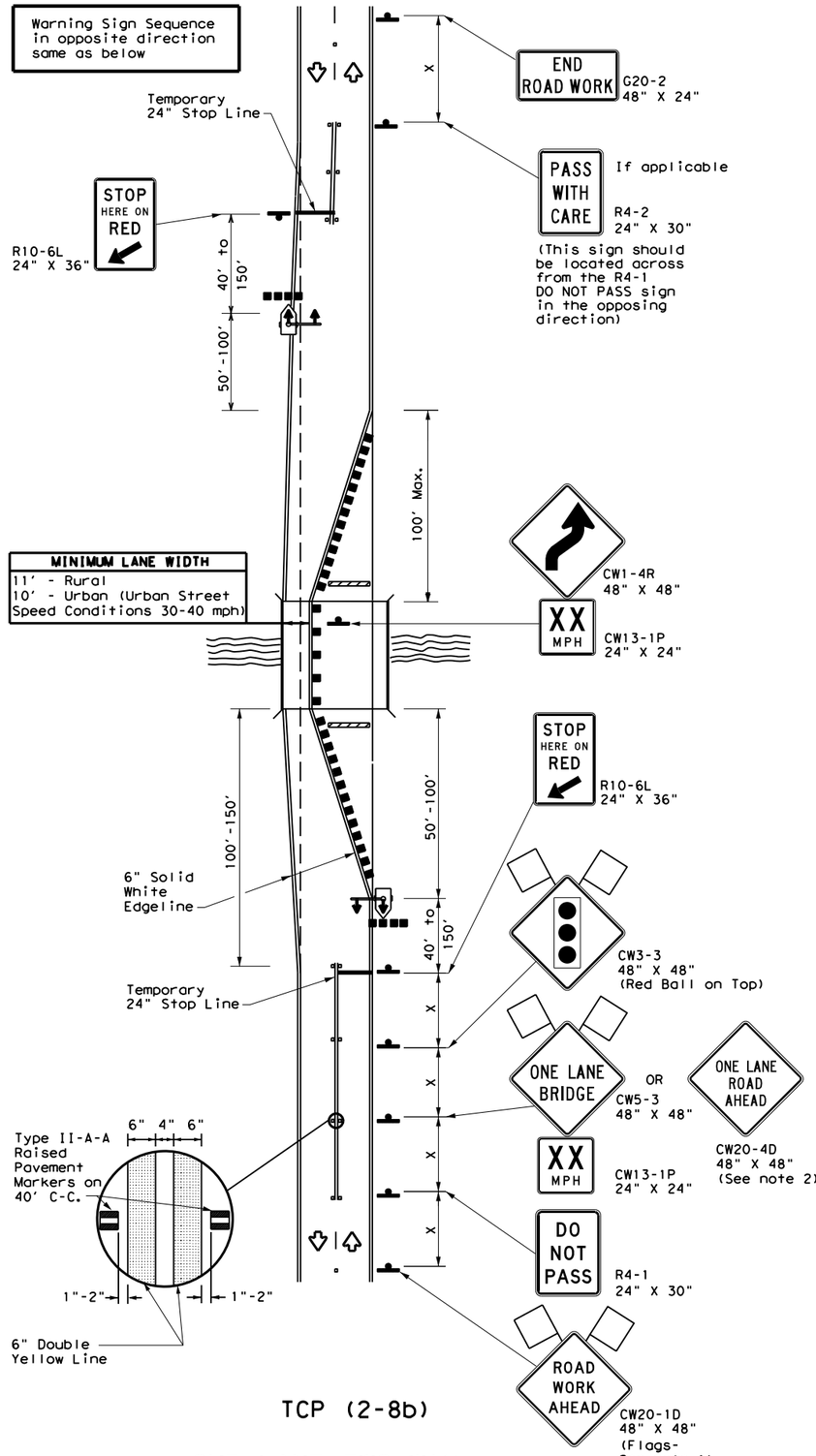


TCP (2-8a)

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
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12-85 4-98 2-18	DIST	COUNTY		SHEET NO.
8-95 3-03 4-23	CRP	GOLIAD		057
1-97 2-12				

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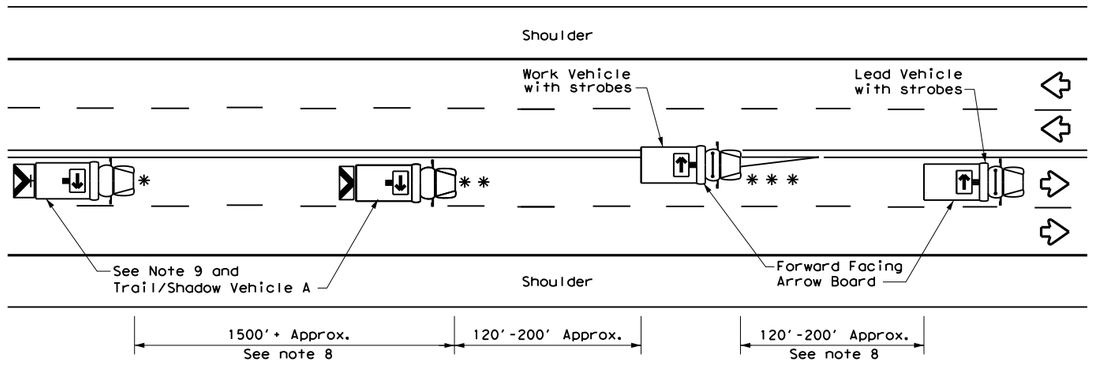
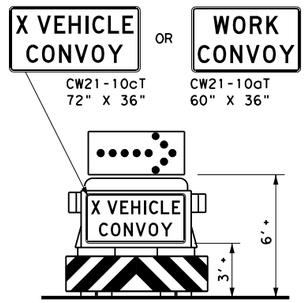


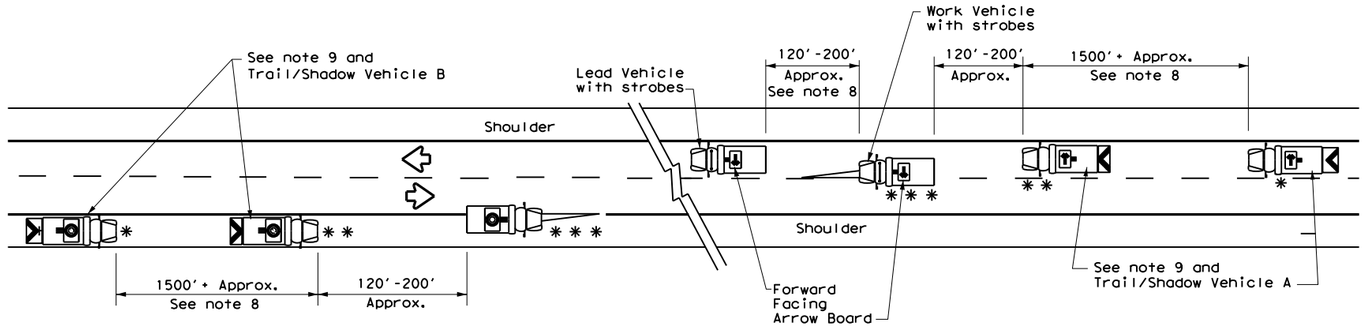
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

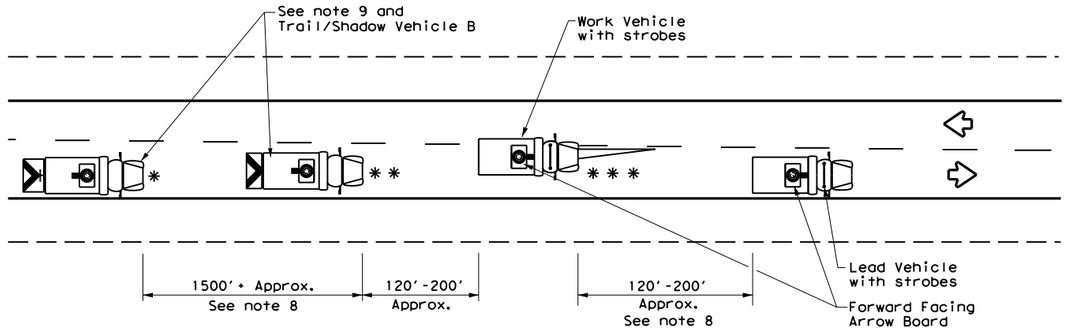


WORK ON SHOULDER

WORK ON TRAVEL LANE

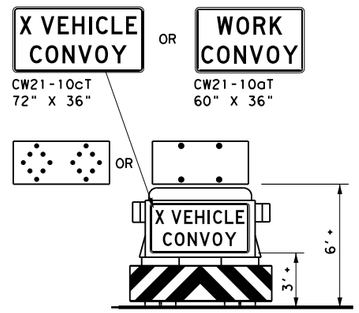
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

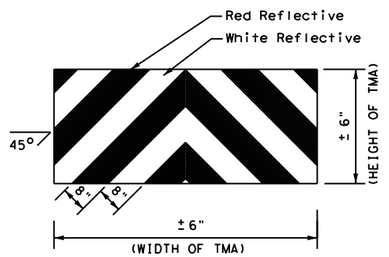
with Flashing Arrow Board in CAUTION display

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

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0088	02	062	US59
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	CRP	GOLIAD		058

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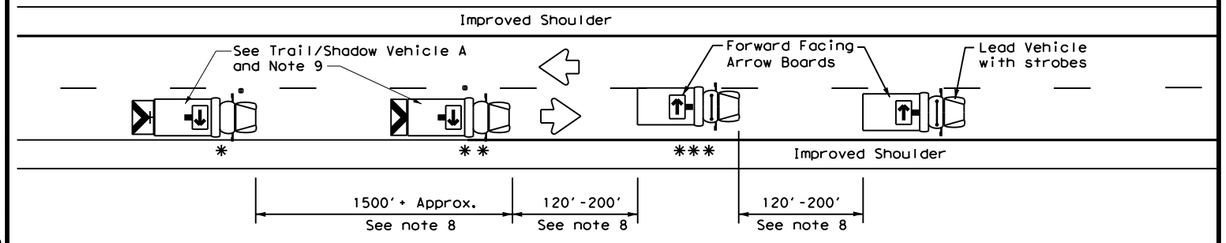
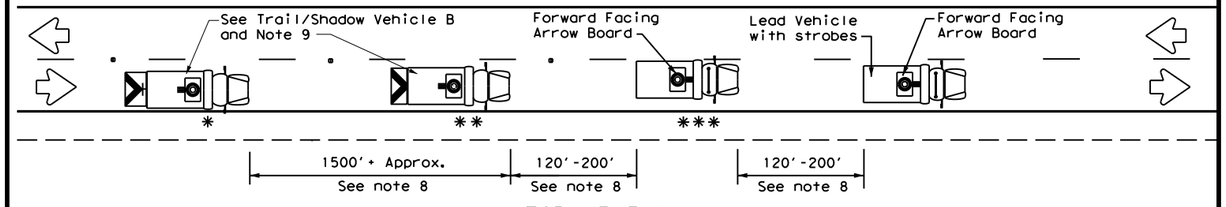


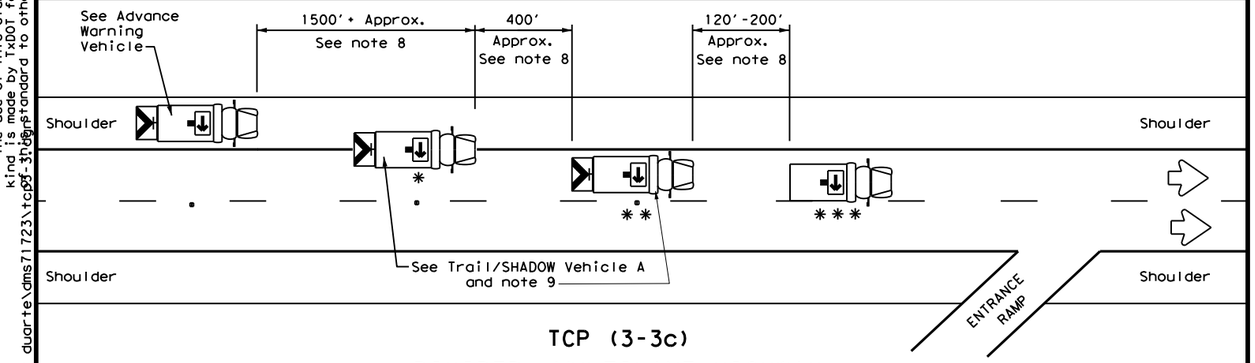
TCP (3-3a)

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



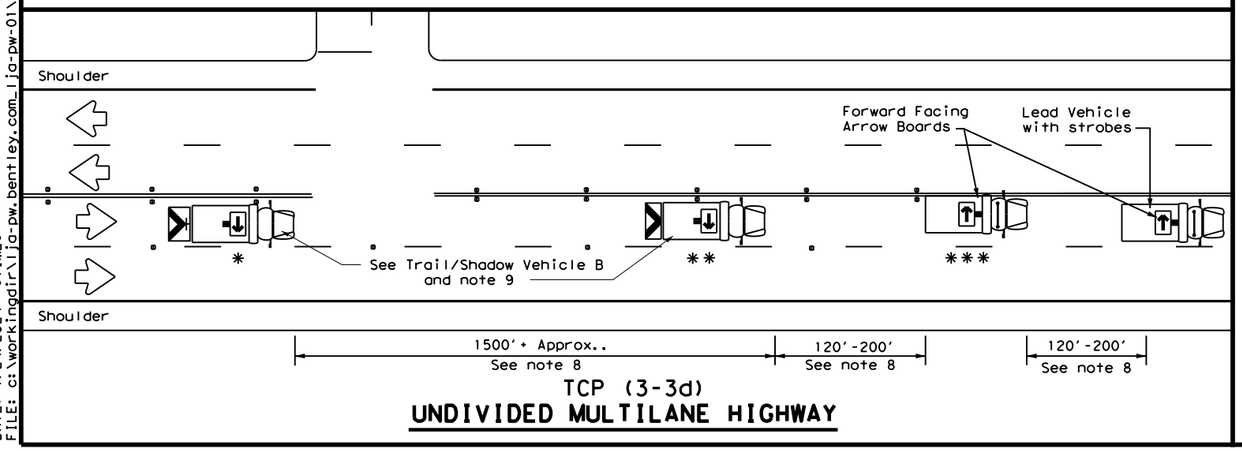
TCP (3-3b)

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



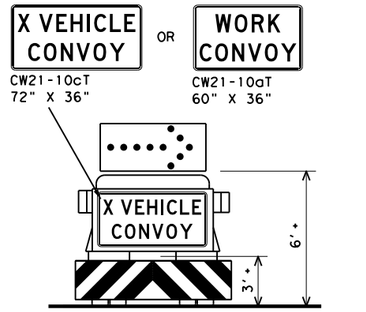
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



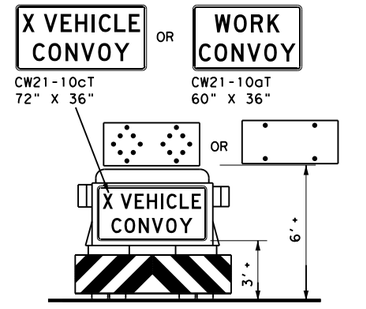
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



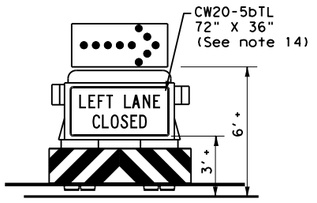
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

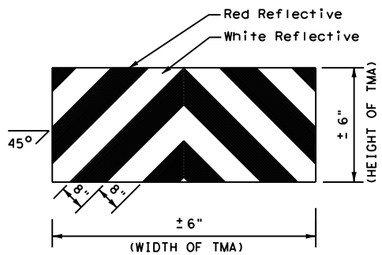


TRAIL/SHADOW VEHICLE B

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

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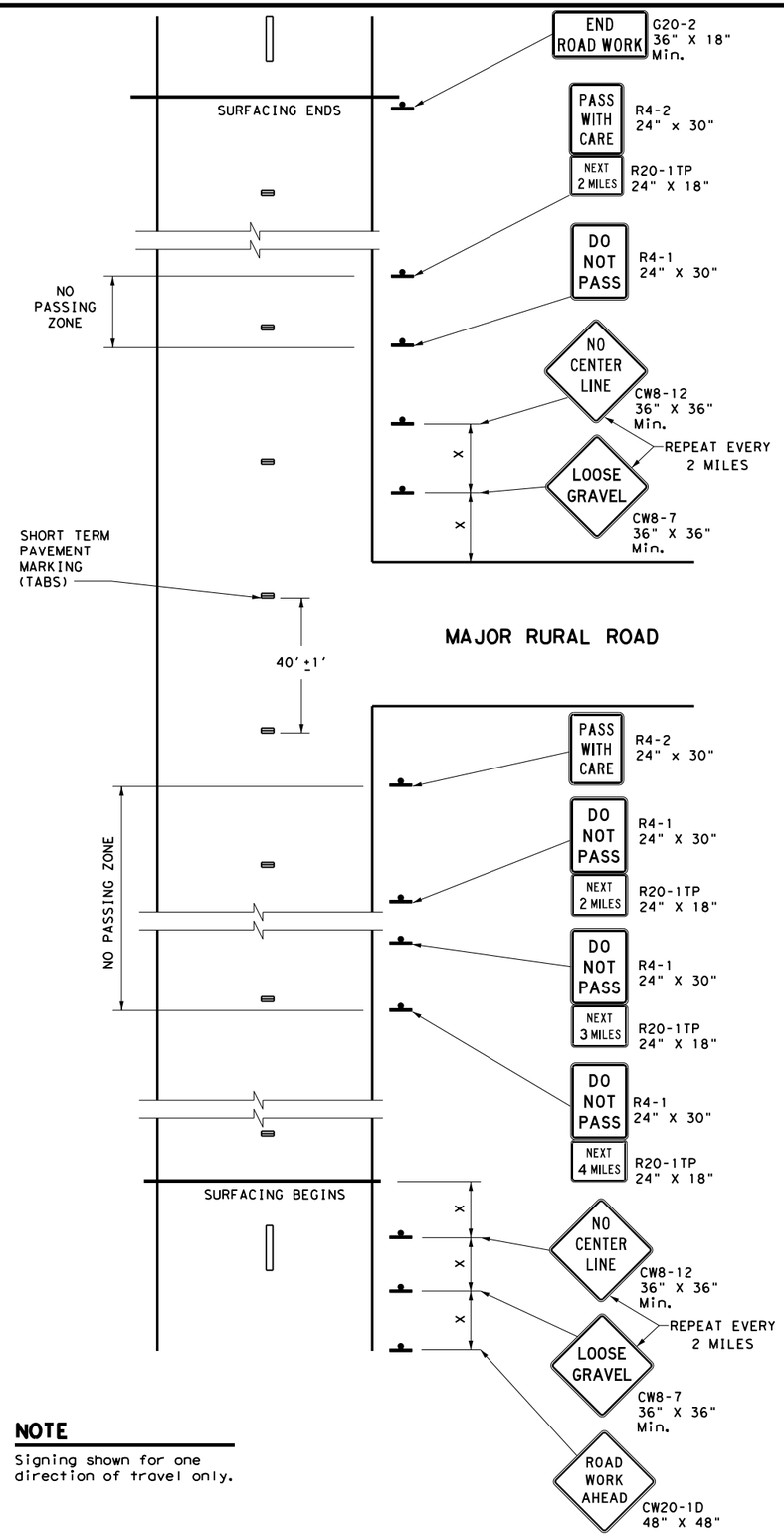
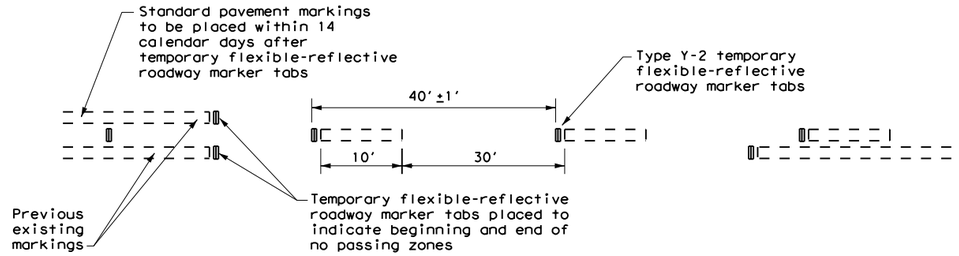


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

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

* Conventional Roads Only

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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1-97 7-13	CRP	GOLIAD		060

DATE: 7/24/2024 $TIME$
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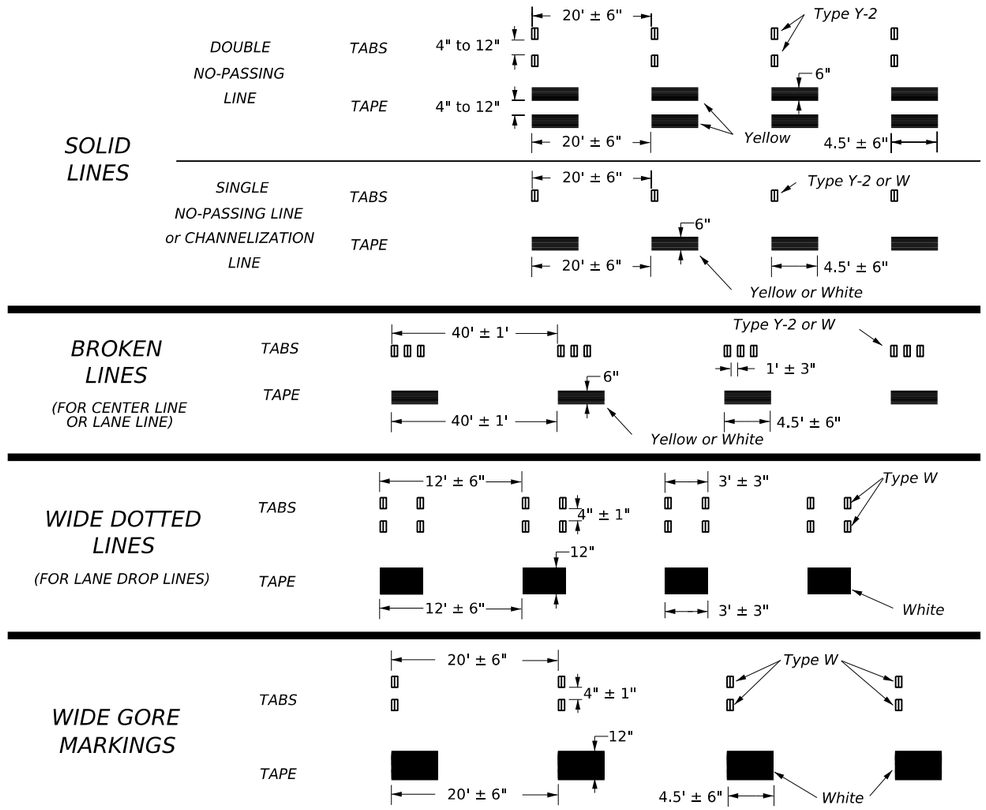
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



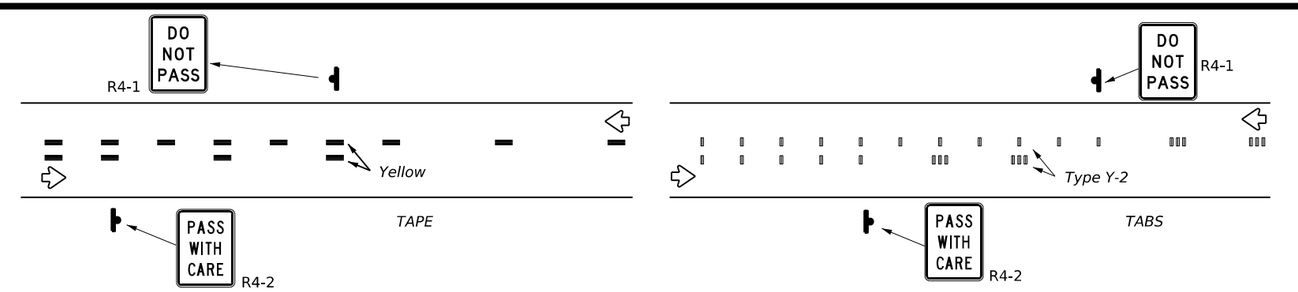
NOTES:

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.

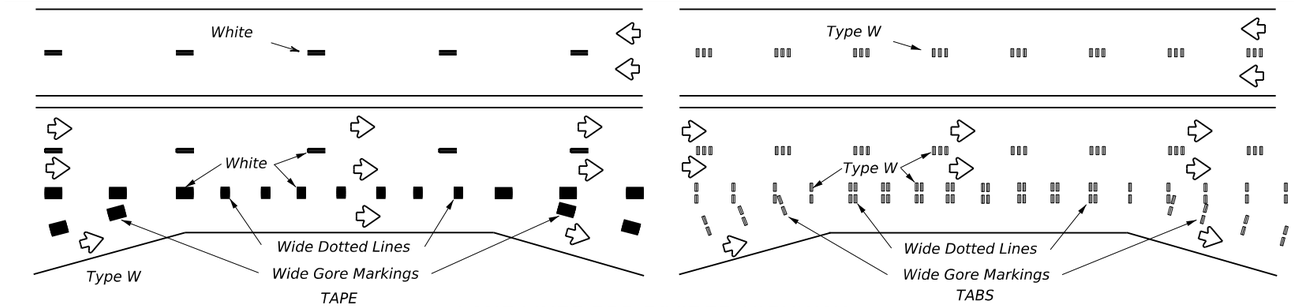
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

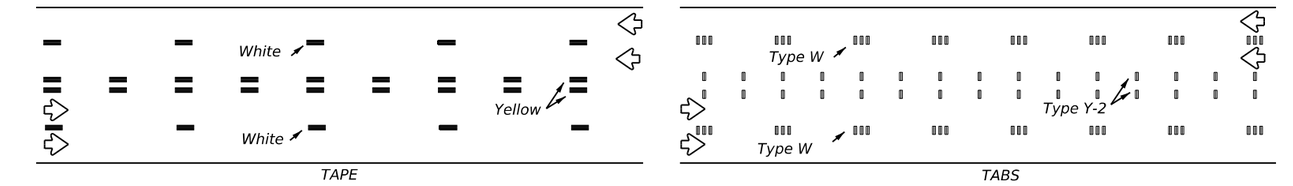
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



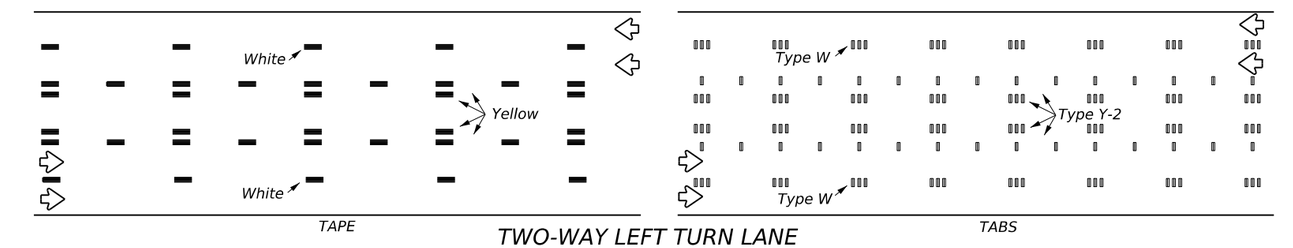
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



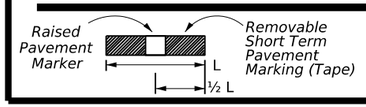
LANE LINES FOR DIVIDED HIGHWAY



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

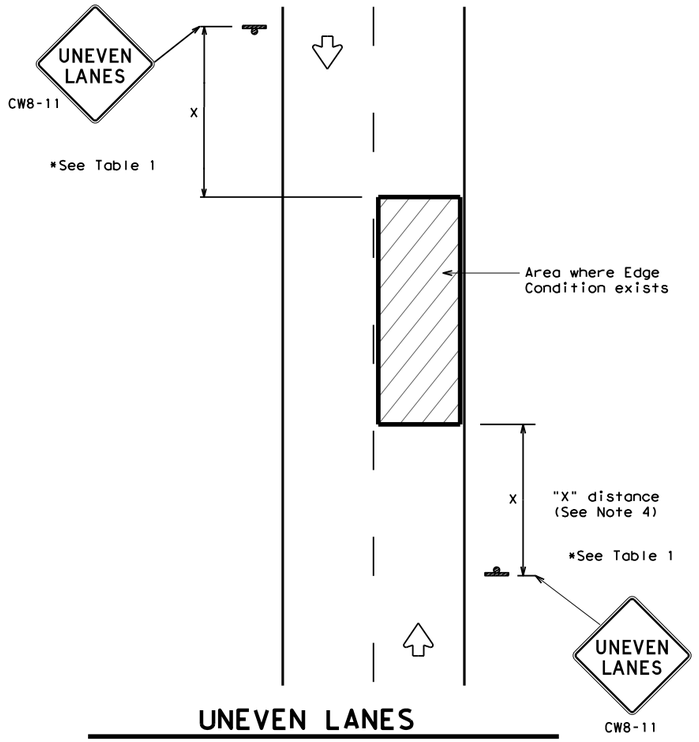
Traffic Safety Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

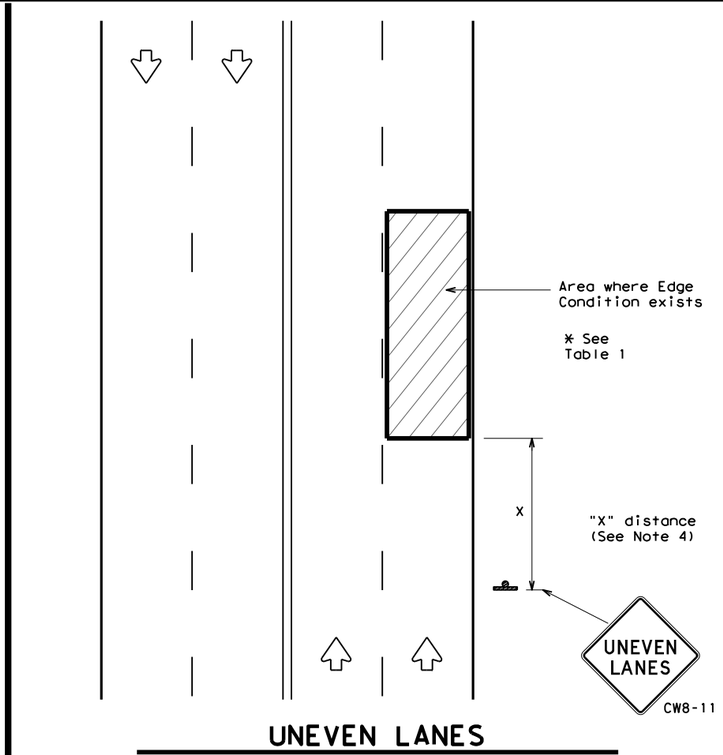
WZ(STPM)-23

FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	CRP	GOLIAD		061
3-03				

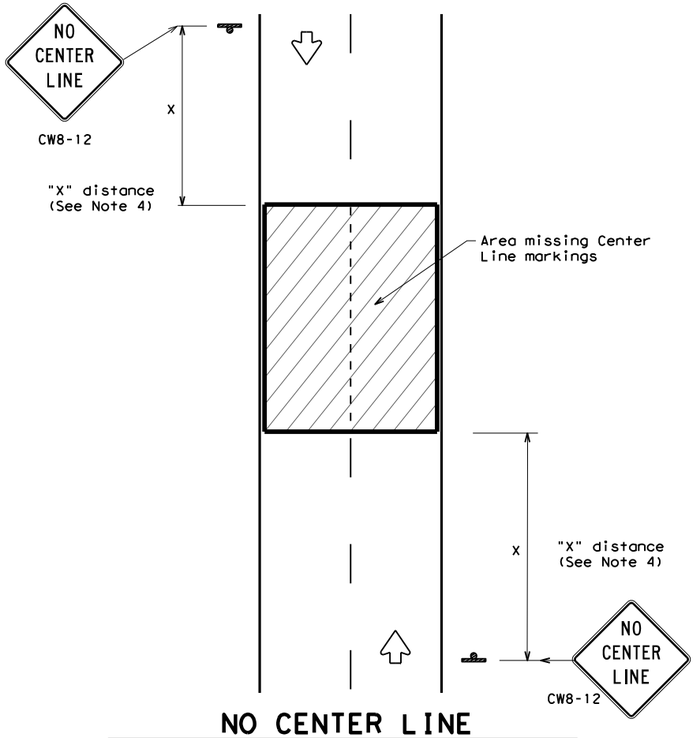
DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\ljg-pw.bentley.com_ljg-pw-01\javier duarte\dms71723\wzd-13_standard.dgn



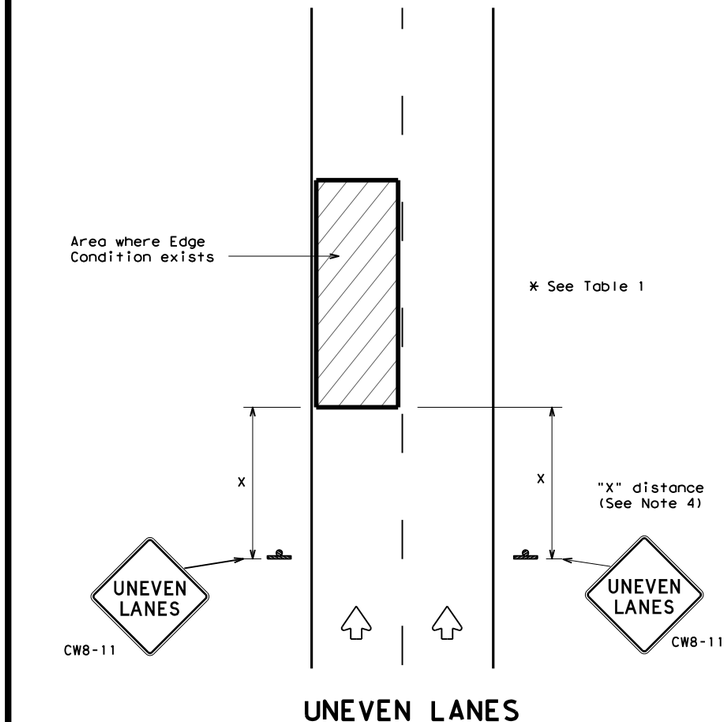
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

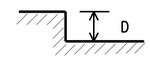
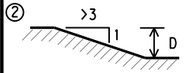
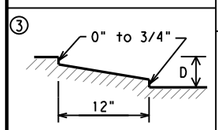
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

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

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

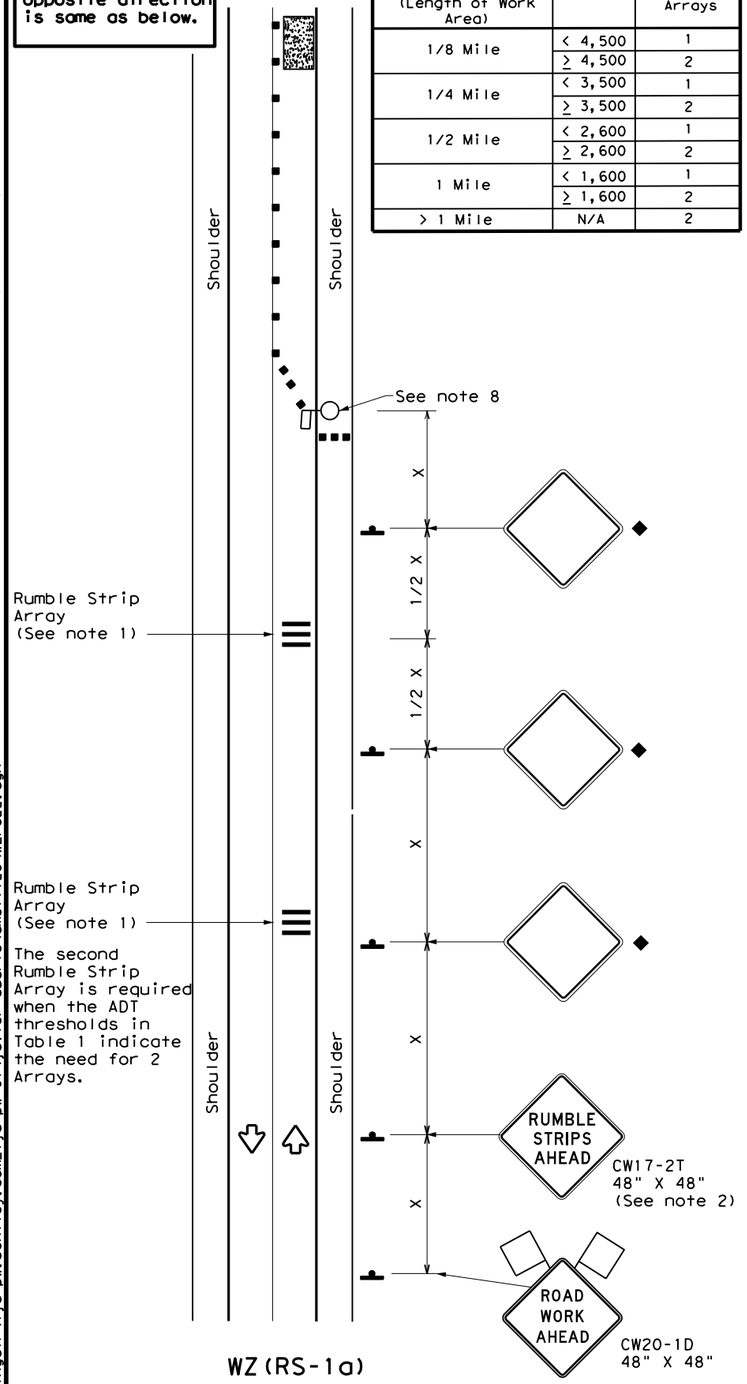
WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	CRP	GOLIAD		062

DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\javier.duarte\dms71723\wzrs22.dgn

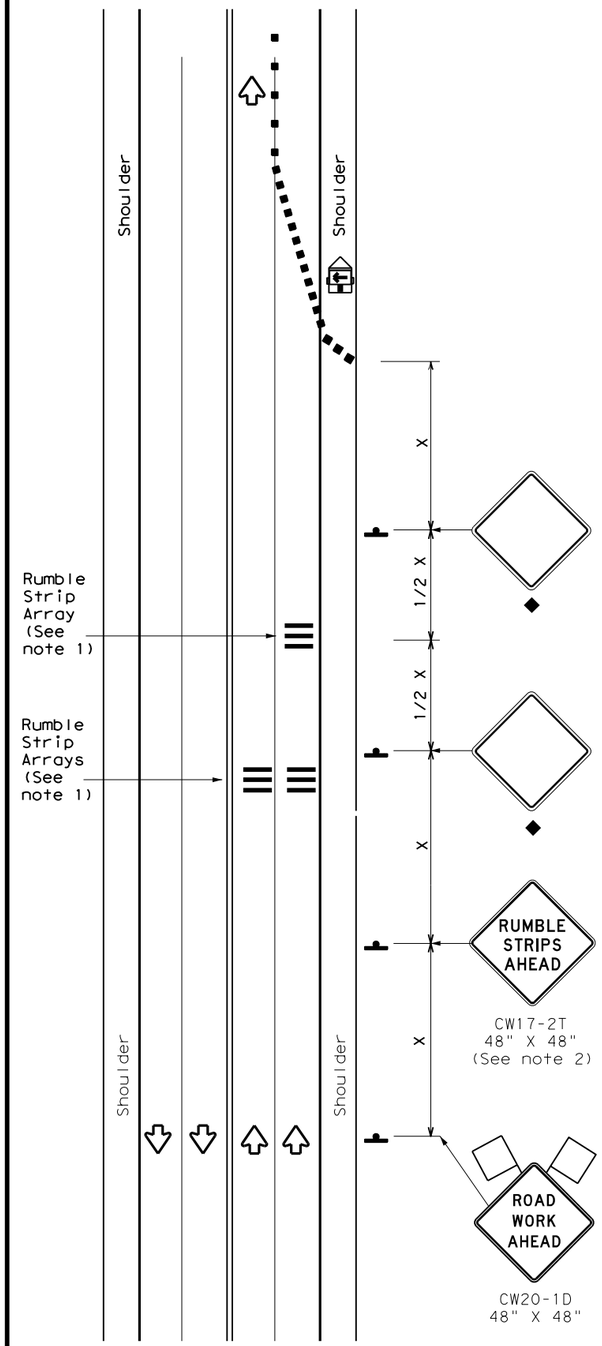
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	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
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

Texas Department of Transportation

Traffic Safety Division Standard

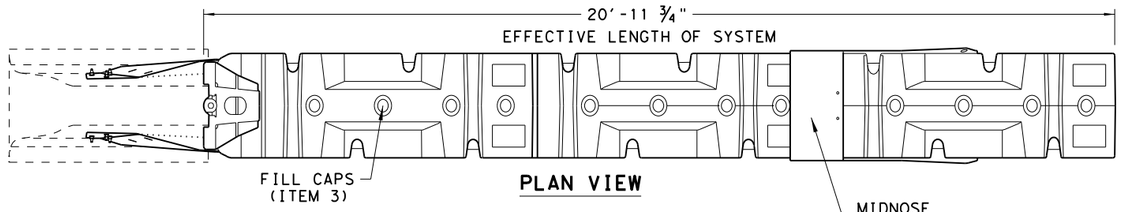
TEMPORARY RUMBLE STRIPS

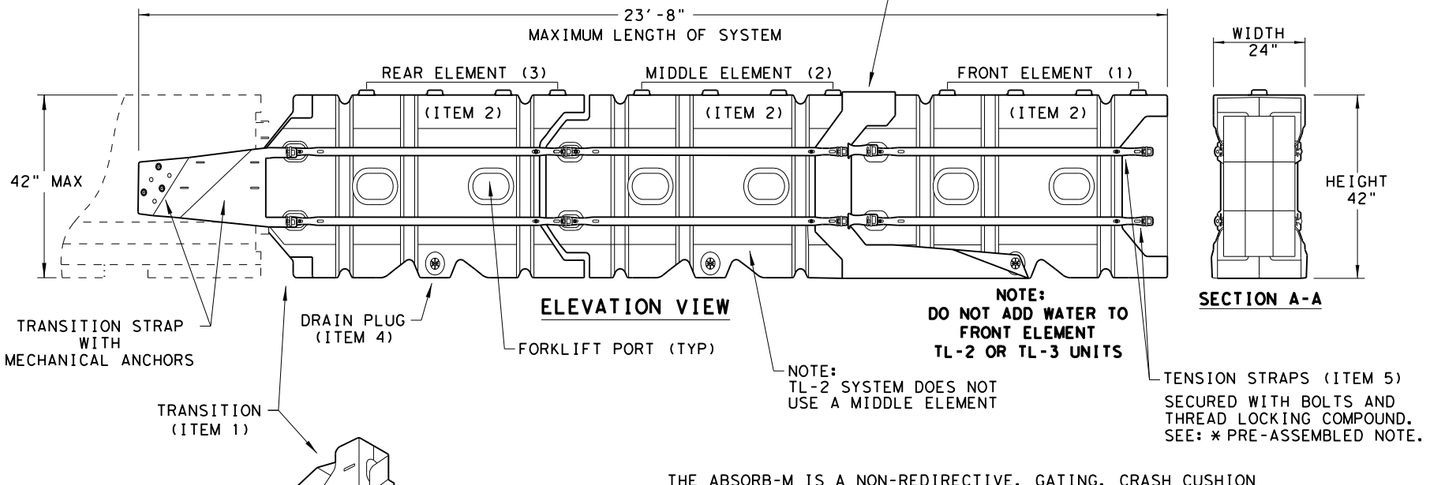
WZ(RS)-22

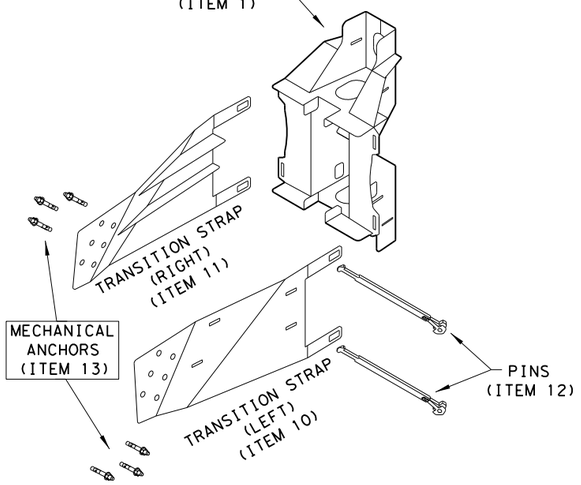
FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		063

DATE: 7/24/2024
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\javier.duarte\dms71723\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.

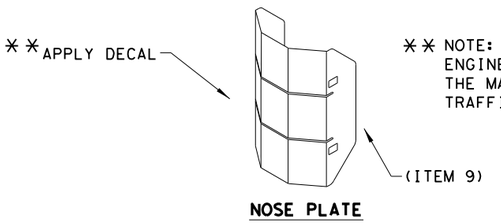
GENERAL NOTES

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



** 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
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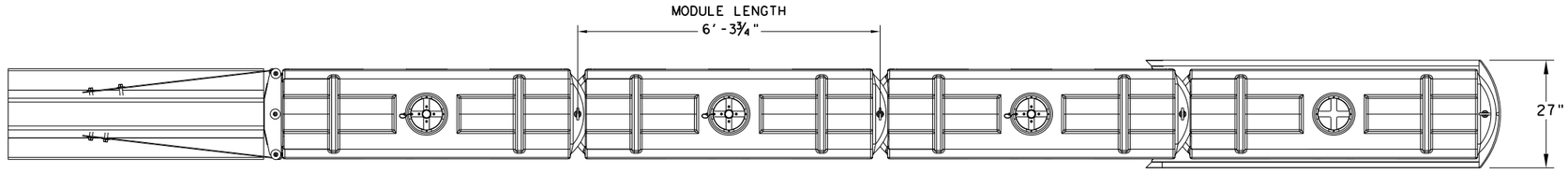
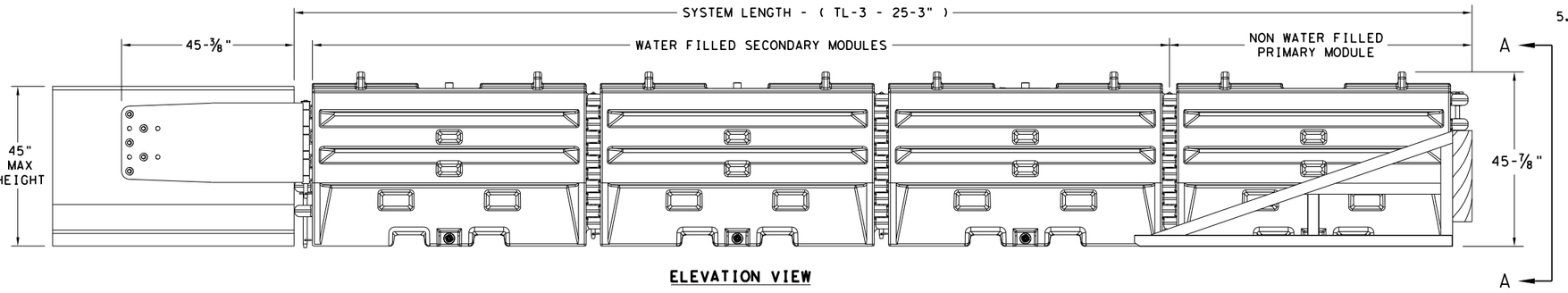
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		064



PLAN VIEW



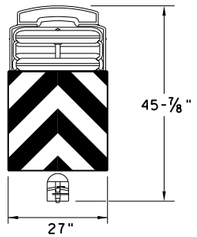
ELEVATION VIEW

GENERAL NOTES

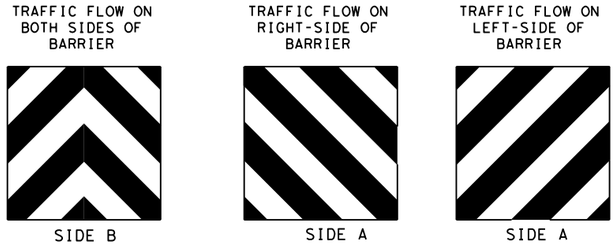
1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, 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

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



SECTION A-A

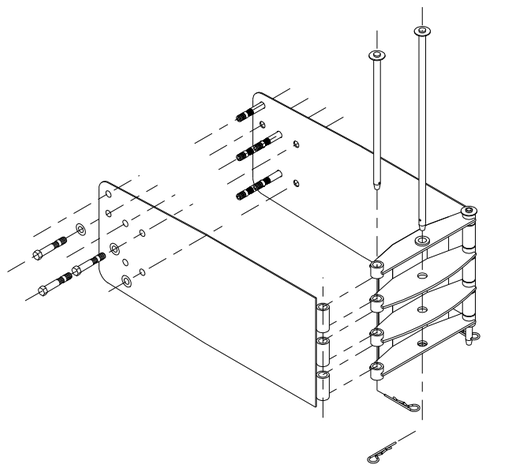


NOSE SHEETING PANEL DELINEATION

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

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
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	CRP	GOLIAD		065

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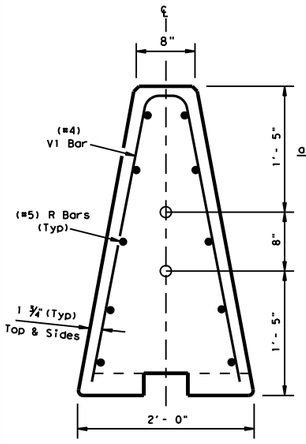
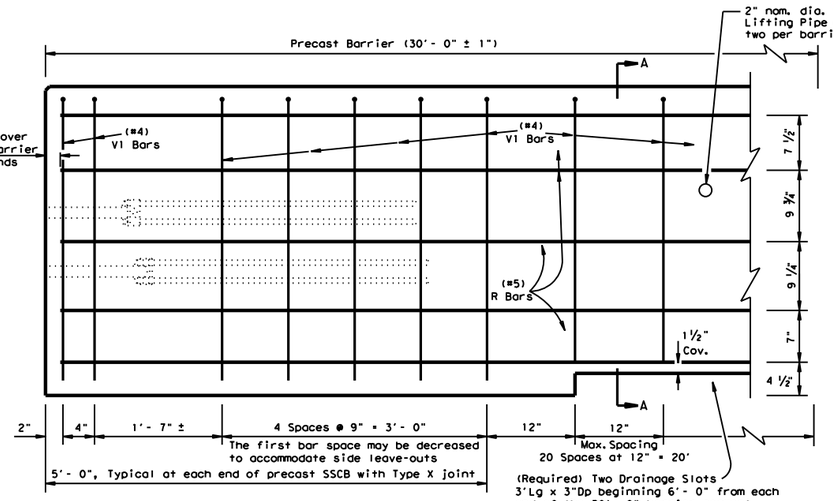


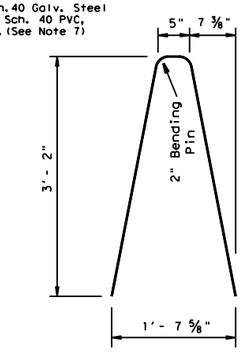
End View
Precast Barrier

Pipe locations for Joint Type X connection



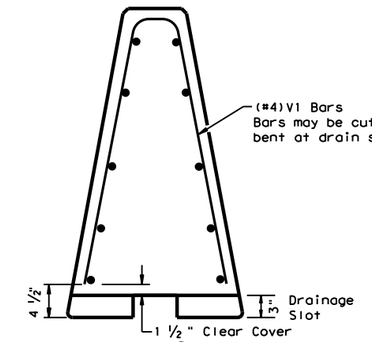
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)



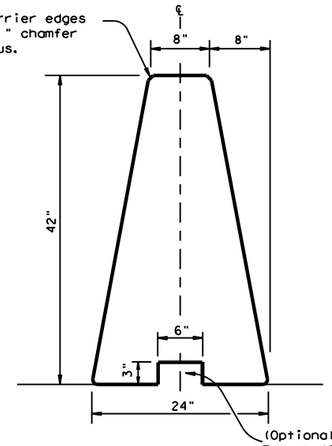
V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.



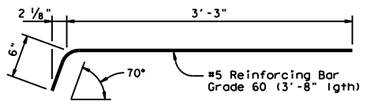
Section A-A
Steel Placement at (Required) Drainage Slots

All precast barrier edges shall have a ¾" chamfer or tooled radius.



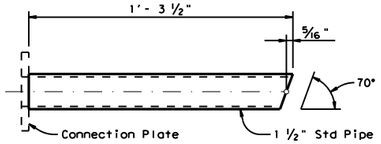
Single Slope Concrete Traffic Barrier

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



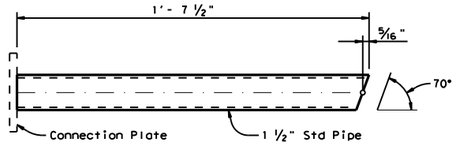
DEFORMED BAR ANCHOR DETAILS

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



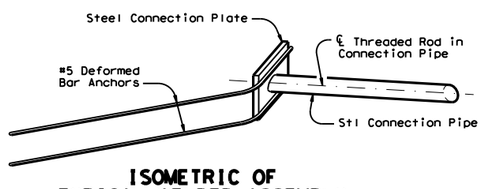
UPPER CONNECTION PIPE DETAILS

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



LOWER CONNECTION PIPE DETAILS

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

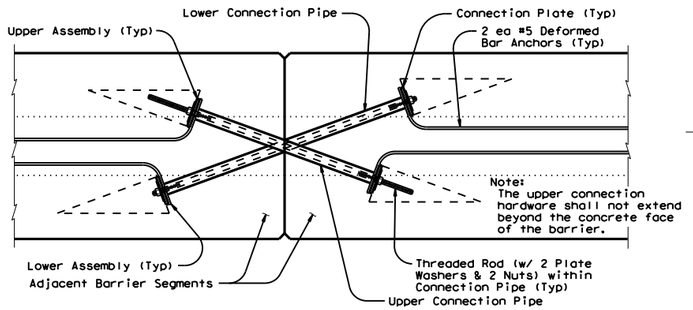


ISOMETRIC OF TYPICAL WELDED ASSEMBLY

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

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 a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
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.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

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

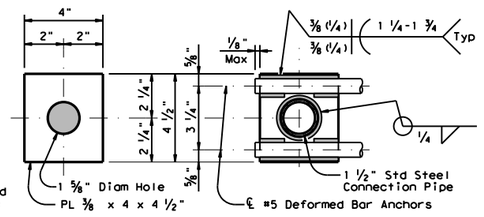
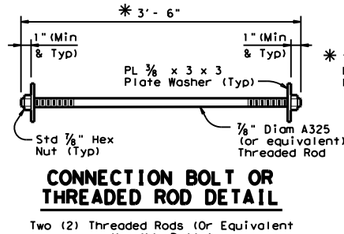


PLATE DIMENSIONS **WELDING DETAILS**

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.

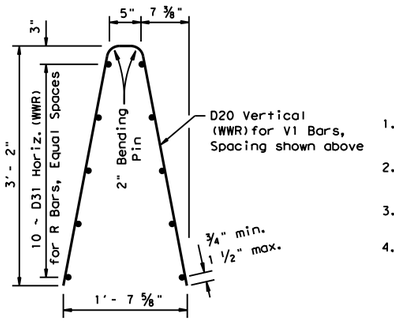


* The connection hardware shall not extend beyond the concrete face of the barrier. Hex head bolts may be provided. The proper length of all hardware should be verified.

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.

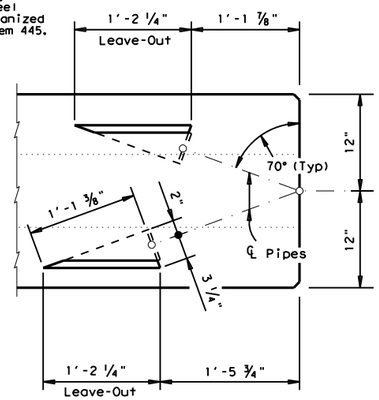
Weight of one precast 30 ft. (SSCB) segment = Approx. 10.5 Tons or 717 lbs per ft.



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

(WWR) General Notes

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".



BARRIER PLAN AT JOINT

SHEET 1 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

SSCB(2)-10

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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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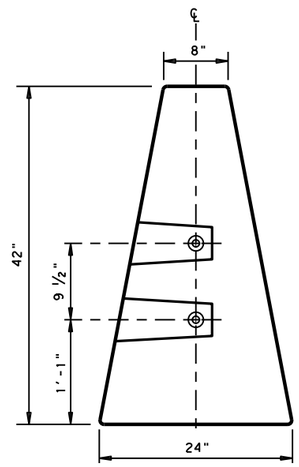
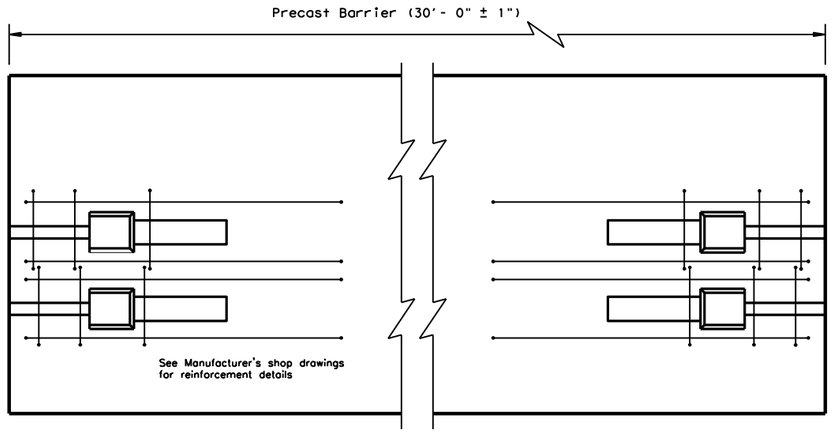
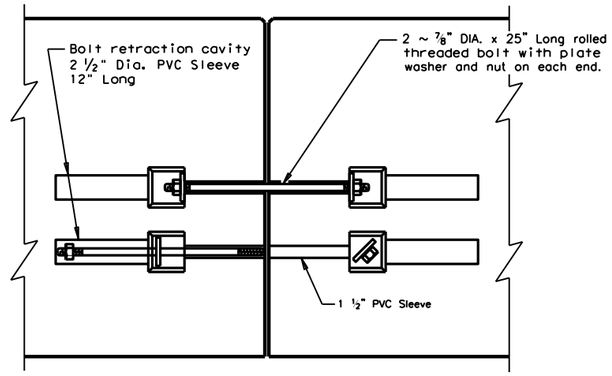


END VIEW
"QUICK-BOLT" POCKET LOCATIONS

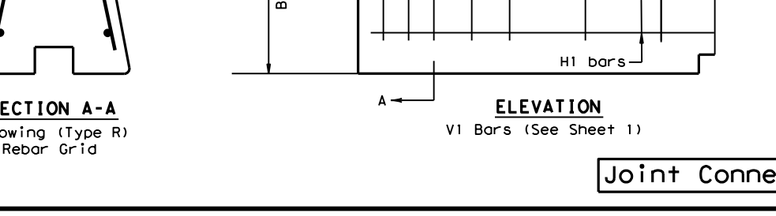


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details



ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

Joint Connection (Type Q)



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

VIEW FROM ABOVE
J-J HOOK CONNECTION

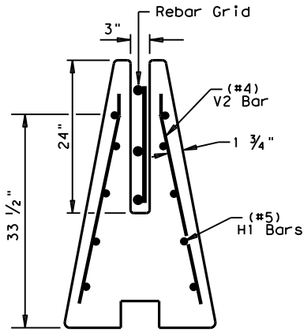
END VIEW

Proprietary Joint Connections (SSCB)

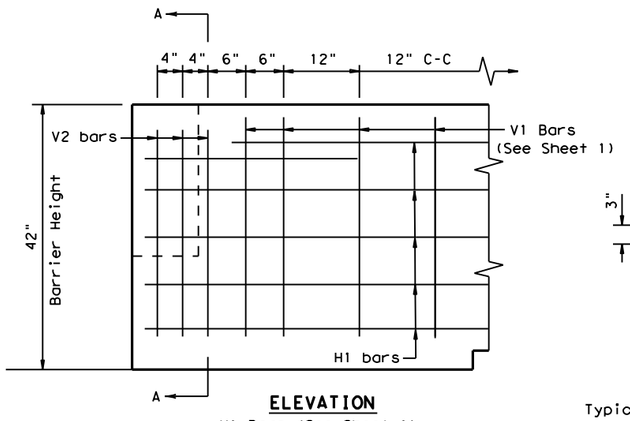
Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

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

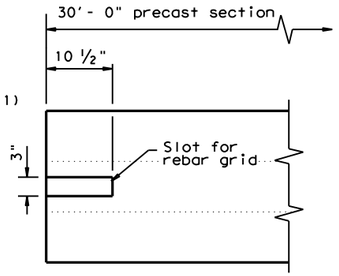
If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.



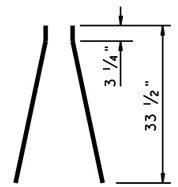
SECTION A-A
Showing (Type R) Rebar Grid



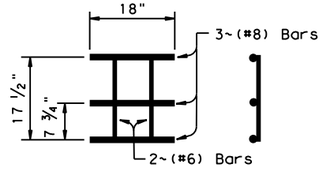
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



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



WELDED REBAR GRID

Joint Connection (Type R)

SHEET 2 OF 2

Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER
(TYPE 1)

SSCB(2)-10

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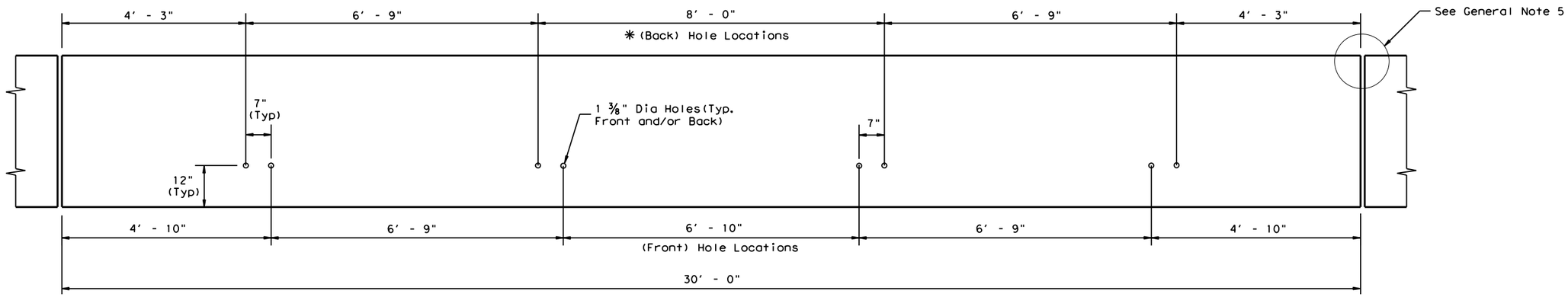
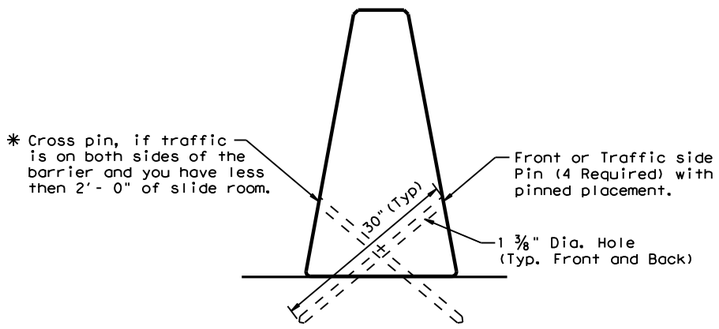


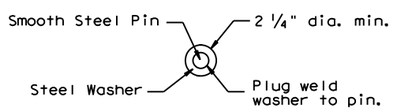
DETAIL 1

Precast SSCB(42")
Showing hole locations

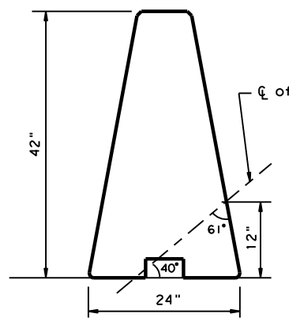


DETAIL 2

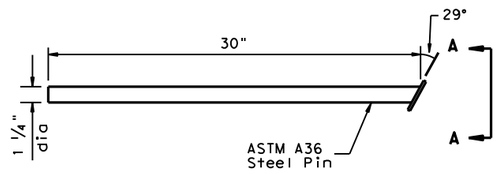
Placement on (ACP)
Asphalt Conc. Pavement
or Treated Base Material
(30" Pin required)



VIEW A-A

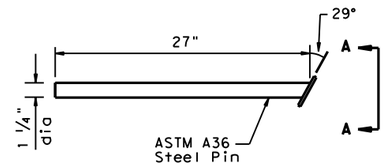


HOLE LOCATION DETAIL



(30") PIN DETAIL

See Detail 2



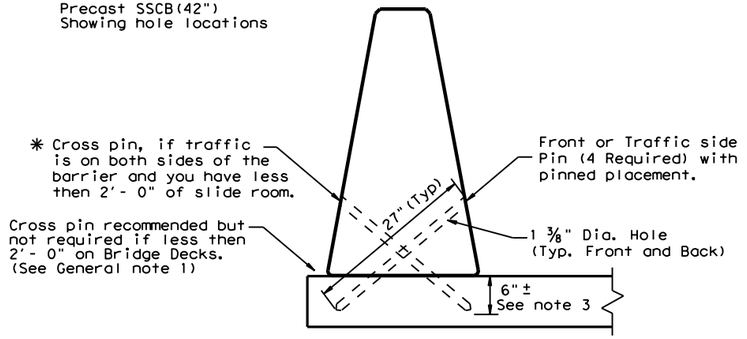
(27") PIN DETAIL

See Detail 3

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

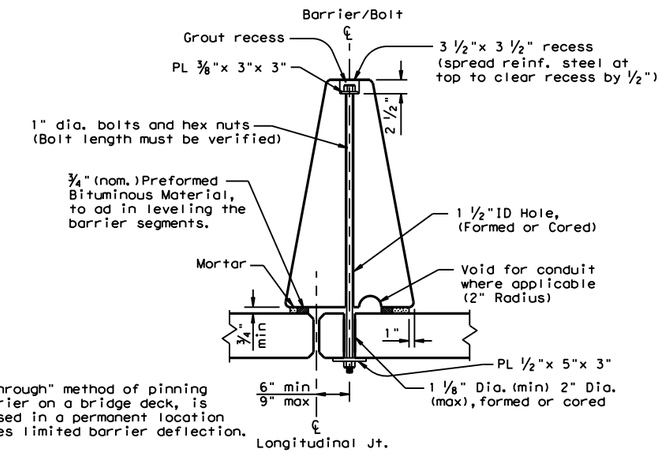
DETAIL 3

Bridge Deck or CRCP
(27" Pin required).



CORE DRILLING EXISTING BARRIER

Core drilling existing concrete barrier is permitted. Holes shall be drilled with coring or masonry drilling type equipment. Percussion (star) drilling shall not be used. A special drill bit (to cut through existing reinforcing) will likely be required. Spalls in the concrete exceeding ½" shall be patched.



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

PRECAST SSCB (BOLT THROUGH) PLACEMENT OVER LONGITUDINAL EXPANSION JOINT

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

GENERAL NOTES

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 in. ID holes formed or cored through the barrier. The center lines of the holes are shown in the hole location detail. If rebar is encountered, the entry point may be shifted 2" plus or minus longitudinally along the barrier. The eight holes are spaced along the length of the barrier as shown in Detail 1.
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 SSCB(2) standard sheet 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 ¼ in. 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. All steel pins shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
9. Weight of barrier is approx. 700 lbs per foot.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1) PINNED PLACEMENT

SSCB(5)-10

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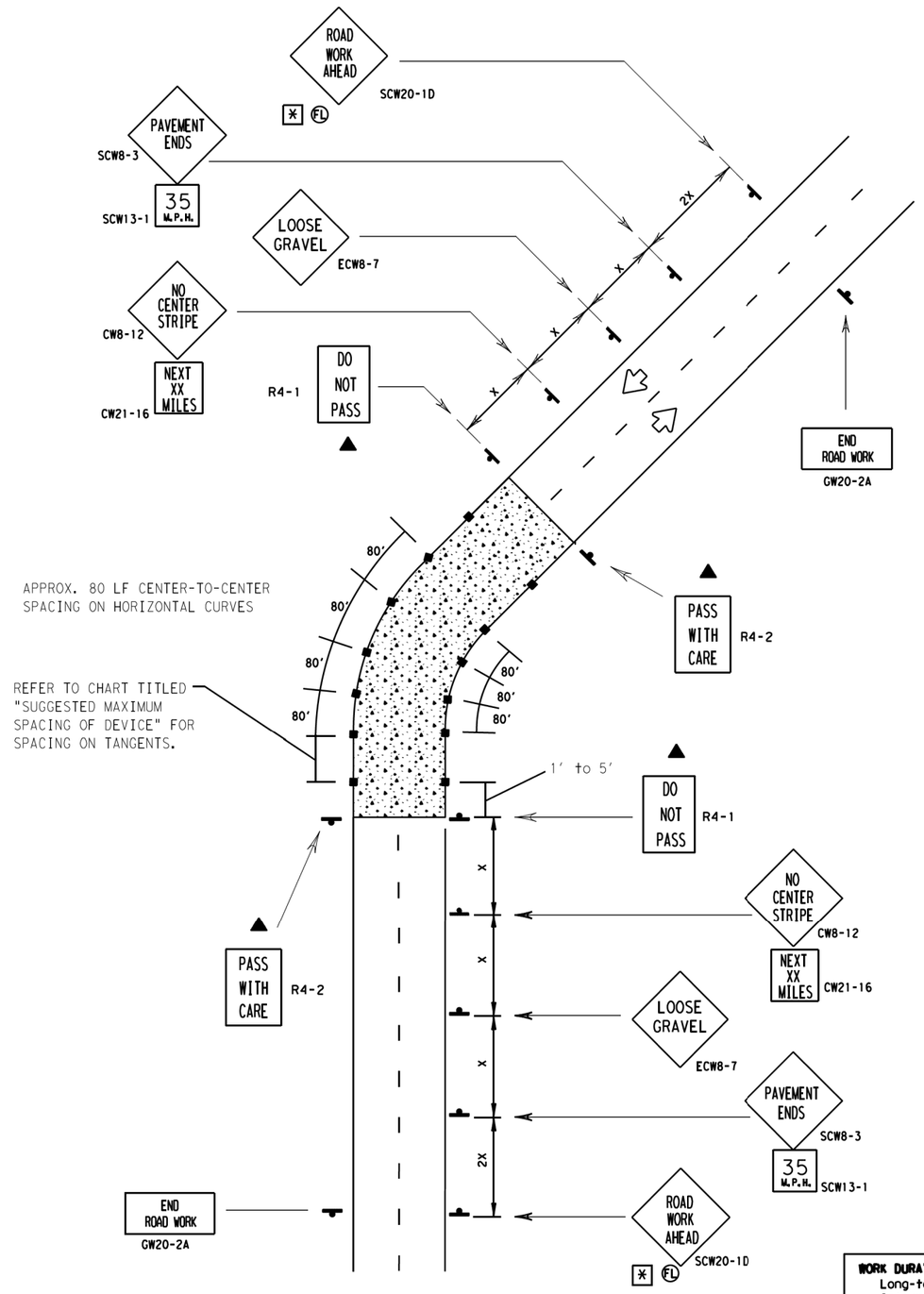


TCP
2-Lane UNSURFACED Roadway for Non-working Hours

(FOR UNSURFACED ROADWAY LENGTH > 250')

✳ The Type A Warning Lights shall not be used with signs manufactured with Type E Sheeting (Fluorescent Prismatic) meeting the requirements of Departmental Material Specification DMS-8300.

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

Prior to the beginning of construction, all currently striped no-passing zones should be signed with the DO NOT PASS sign (R4-1) and PASS WITH CARE sign (R4-2) placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined and signed as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES sign (R20-1) may be used at the beginning of such zones. The DO NOT PASS to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of a no-passing zone may be signed with a PASS WITH CARE and NEXT XX MILES sign.

Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshields and lights. The DO NOT PASS and NEXT XX MILES sign should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the to have the DO NOT PASS sign conflict with existing surfacing operation has passed this location so as not pavement markings. Also, unless one days operation completes the entire length of such combined zones, care must be taken to place DO NOT PASS and PASS WITH CARE signs in order to sign the beginning and end of the no-passing zones in the area where the surfacing operation has stopped for the day.

"LOOSE GRAVEL" SIGN (ECW8-7)

When construction begins, a LOOSE GRAVEL sign (ECW8-7) should be erected at each end of the work area LOOSE GRAVEL sign should be supplemented with the NEXT XX MILES sign (CW21-16) mounted below it.

The LOOSE GRAVEL sign should be erected as detailed on BC Standards. They should remain in place until the loose gravel condition no longer exists.

"NO CENTER STRIPE" SIGN (CW8-12)

At the time construction activity obliterates the existing centerline (low volume roads may not have an existing centerline), a NO CENTER STRIPE sign (CW8-12) should be erected at each end of the work area and just beyond major rural intersections and other location deemed necessary by the Engineer. Where possible, the signs erected at each end of the work area should be located in such a manner that drivers can read the sign and immediately see the change to no centerline. The NO CENTER STRIPE sign should be supplemented with the NEXT XX MILES sign (CW21-16) mounted below it.

The NO CENTER STRIPE sign should be erected as detailed on BC Standards. These signs are to remain in place until standard pavement markings are placed.

"NO CENTER STRIPE" SIGN (CW8-12)

WORK DURATION TERMINOLOGY-(as defined by the "Texas Manual on Uniform Traffic Control Devices" Part VI)
Long-term Stationary = occupies a location 3 or more days;
Intermediate-term Stationary = occupies a location from overnight to 3 days;
Short-term Stationary = daylight work that occupies a location from 1 to 12 hours;
Short Duration = occupies a location up to 1 hour.

SUPPORTS AND MOUNTING HEIGHT
The bottom of Long-term / Intermediate-term signs shall be at least 7 feet above the paved surface. The bottom of any supplementary plaques shall be at least 6 feet above the paved surface.

Regulatory signs shall be mounted at least 7 feet above the paved surface regardless of work duration.

Wood sign supports shall be painted white.

LEGEND

Type III Barricade; Edgeline Channelizing Devices; Flag; Heavy Work Vehicle; Truck Mounted Attenuator; Trailer Mounted Flashing Arrow Panel; (M) Portable Changeable Message Sign; Flagger; Sign Post; Unsurfaced Roadway; (FL) Flashing Type A-Low Intensity Warning Light

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

✳ 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. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where the surfacing operation has covered or obliterated existing pavement markings. These traffic control devices are to be used to supplement those required by BC Standards.
3. R4-1 and R4-2 signs should be mounted on fixed supports as detailed on BC Standards. These signs are to remain in place until standard pavement markings are placed.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
CRPTRAFF

TRAFFIC CONTROL PLAN
2-LANE, 2-WAY NON-WORKING HOURS

(CORPUS CHRISTI DISTRICT STANDARD)

DTCP (1-1)-03

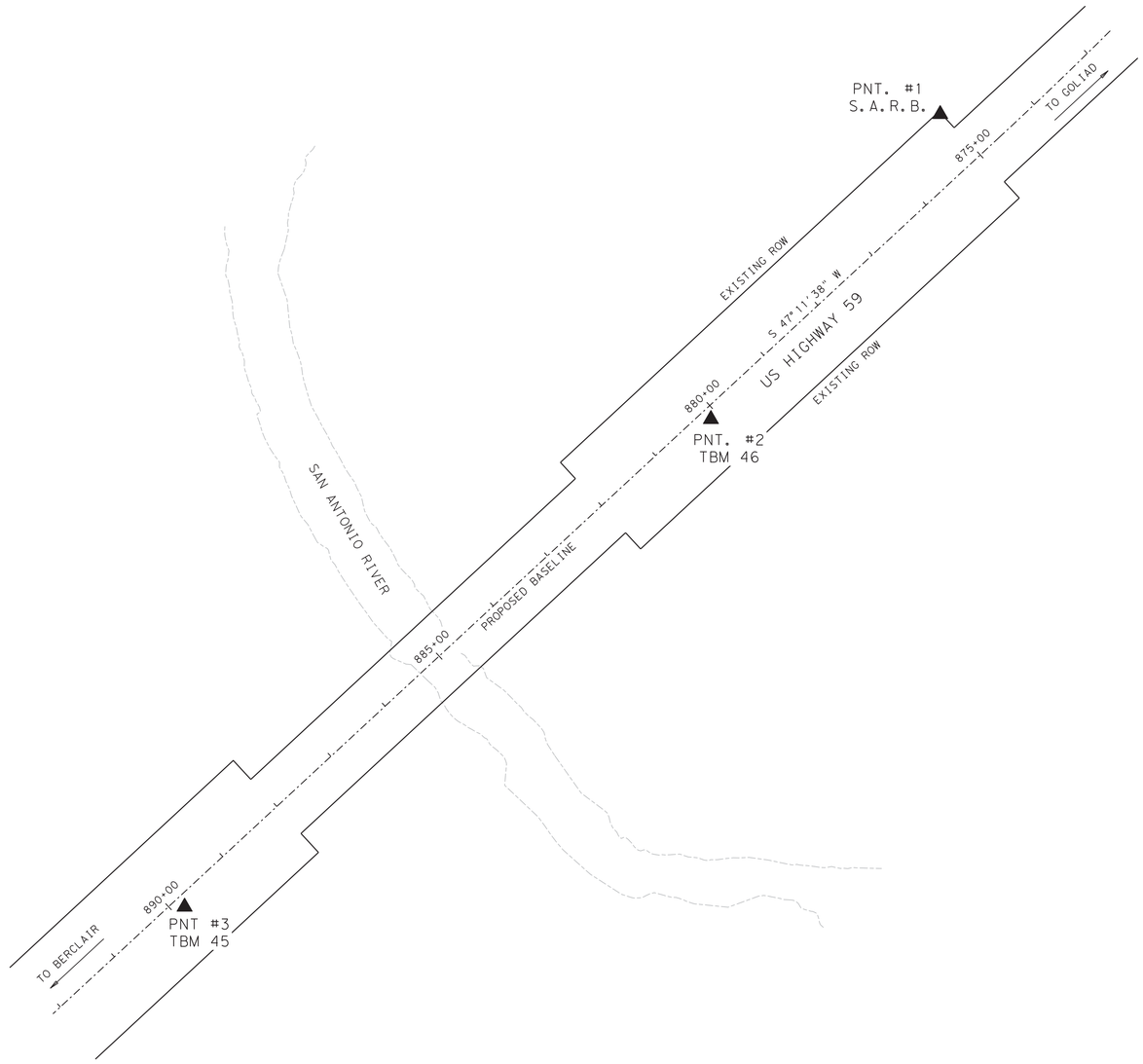
DN:	CK:	DW:	CK:	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	CRP			069

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
GOLIAD	0088	02	062	US59

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC:
FILE:



0 50 100

SCALE: 1"=50' (22" x 34" SHEET)
SCALE: 1"=100' (11" x 17" SHEET)

NOTES:

1. HORIZONTAL DATUM IS BASED ON THE TEXAS COORDINATE SYSTEM OF 1983 (NAD 83), CENTRAL ZONE, EPOCH 2010.00 (JUNE, 2012 ADJUSTMENT), US SURVEY FEET.
2. VERTICAL DATUM IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), GEOID 2018.
3. ALL DISTANCES AND COORDINATES SHOWN ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID VALUES BY DIVIDING BY TXDOT SURFACE ADJUSTMENT FACTOR OF 1.00009 FOR GOLIAD COUNTY.
4. TXDOT PRIMARY CONTROL STATION S.A.R.B. WAS HELD FOR HORIZONTAL AND VERTICAL CONTROL. S.A.R.B. IS A BRASS DISK ON A STAINLESS STEEL SECTIONAL ROD W/LID AT A CUTBACK ON THE NORTH EAST SIDE OF THE SAN ANTONIO RIVER ON THE NORTH SIDE OF US 59. APPROX. 2.94 MILES NORTH EAST OF FM 1351 OR 1.16 MILES SOUTH WEST OF SH 239, 79' NORTH OF US 59 CENTER OF PAVEMENT, IN THE CORNER OF THE CUTBACK APPROX. 1' OFF THE FENCE LINE.
5. S.A.R.B. PUBLISHED SURFACE COORDINATES: N = 13,425,990.298, E = 2,472,013.844, ELEVATION = 144.596
6. TXDOT SURFACE ADJUSTMENT FACTOR = 1.00009 (GOLIAD COUNTY)
7. UNIT OF MEASURE: U.S. SURVEY FEET

STATE OF TEXAS
REGISTERED
LEO M. DELATORRE
5113
PROFESSIONAL
LAND SURVEYOR

06/26/ 2024

LEO M. DELATORRE DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5469

SURVEY CONTROL INVERSE TABLE			
FROM POINT	BEARING	DISTANCE	TO POINT
S.A.R.B.	S 36°56'10" W	517.29'	TBM 46
TBM 46	S 47°11'01" W	972.77'	TBM 45

PRIMARY SURVEY CONTROL TABLE						
POINT	STATION	OFFSET	NORTHING(Y)	EASTING(X)	ELEVATION	DESCRIPTION
1	875+02.34	77.46' RT	13,425,990.30	2,472,013.84	144.60'	S.A.R.B. - BRASS DISK ON STAINLESS STEEL ROD
2	880+11.36	14.66' LT	13,425,576.83	2,471,702.99	145.92'	TBM 46 - CUT SQUARE ON BRIDGE
3	889+84.13	14.83' LT	13,424,915.68	2,470,989.43	146.04'	TBM 45 - CUT SQUARE ON BRIDGE

Texas Department of Transportation

LANDTECH
2525 North Loop West, Suite 300,
Houston, Texas 77008
T: 713-861-7068 F: 713-861-4131
TBPELS Registration No. 10019100

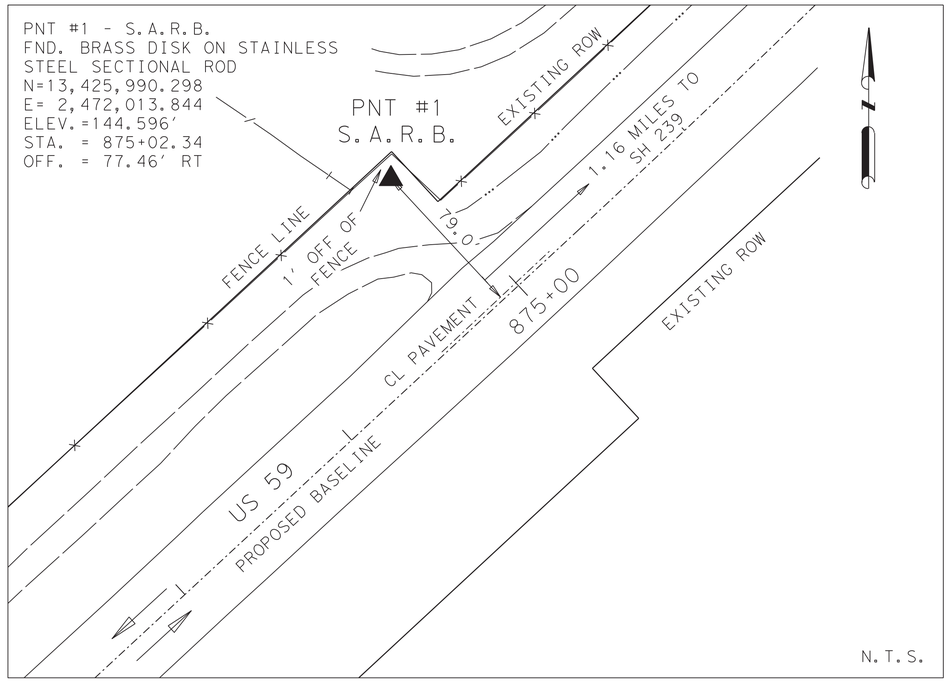
U.S. HIGHWAY 59

SURVEY CONTROL INDEX

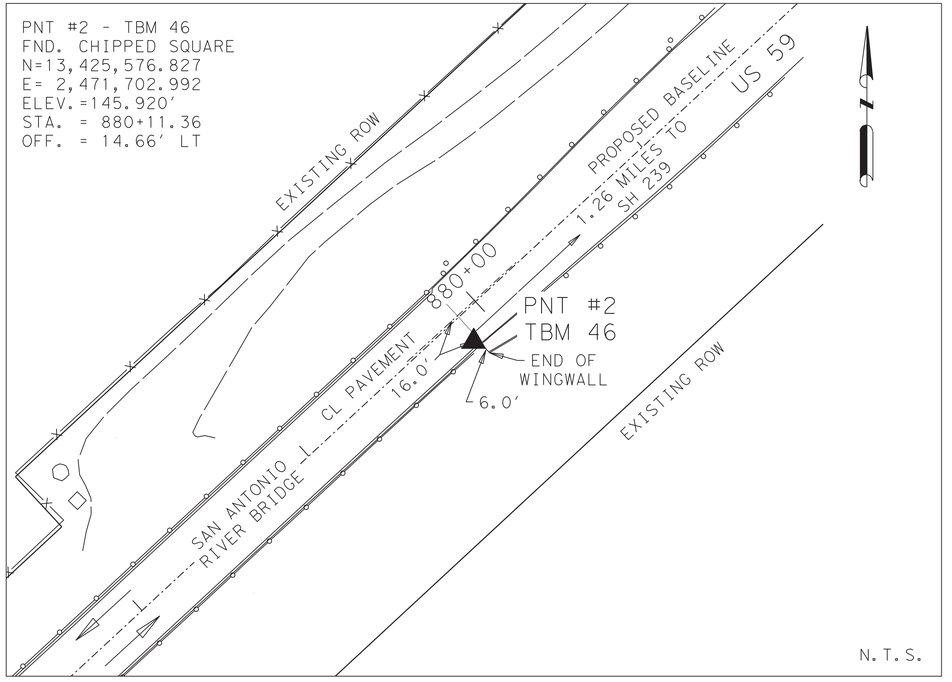
SHEET 1 OF 1

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TX				US 59
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
16	GOLIAD	0088	02	062	070

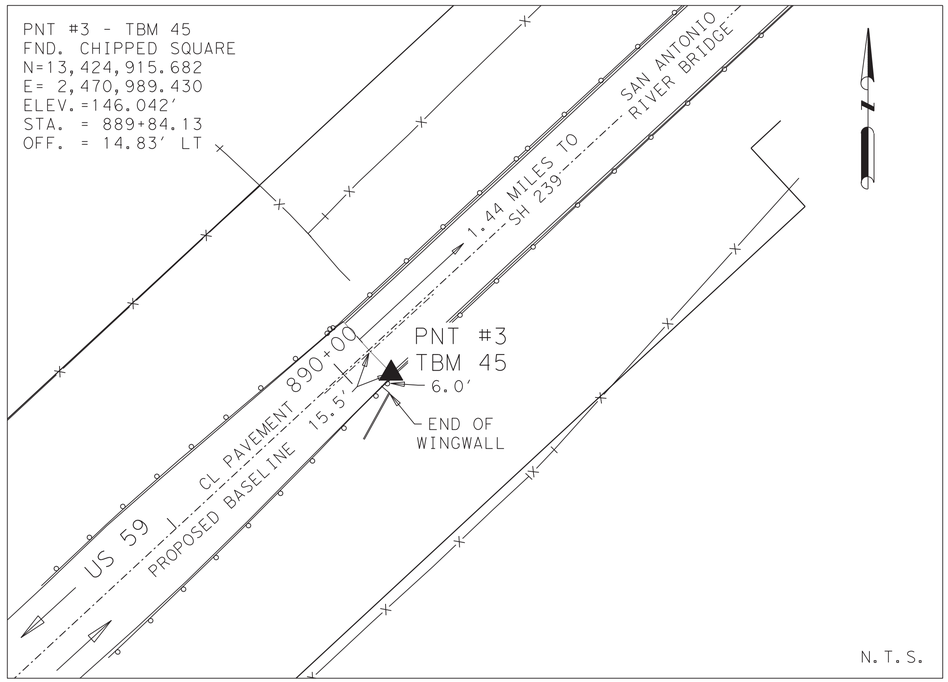
$FILE$



BRASS DISK ON A STAINLESS STEEL SECTIONAL ROD W/LID AT A CUTBACK ON THE NORTH EAST SIDE OF THE SAN ANTONIO RIVER ON THE NORTH SIDE OF US 59. APPROX. 2.94 MILES NORTH EAST OF FM 1351 OR 1.16 MILES SOUTH WEST OF SH 239, 79' NORTH OF US 59 CENTER OF PAVEMENT, IN THE CORNER OF THE CUTBACK APPROX. 1' OFF THE FENCE LINE.



CHIPPED SQUARE ON THE SOUTHEAST CORNER OF THE SAN ANTONIO RIVER BRIDGE ON THE TOP OF THE EAST END OF THE CURB. APPROX. 2.85 MILES NORTH EAST OF FM 1351 OR 1.26 MILES SOUTH WEST OF SH 239, 16' SOUTH OF THE CENTER OF US 59 & 6' NORTHWEST OF THE EAST END OF THE WING.



CHIPPED SQUARE ON THE SOUTHWEST CORNER OF THE SAN ANTONIO RIVER BRIDGE ON THE TOP OF THE WEST END OF THE CURB. APPROX. 2.66 MILES NORTH EAST OF FM 1351 OR 1.44 MILES SOUTH WEST OF SH 239, 15.5 FT. SOUTH OF THE CENTER OF US 59, AND 6' NORTHEAST OF THE WEST END OF THE WING WALL.

NOTES:

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2. VERTICAL DATUM IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), GEOID 2018.
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7. UNIT OF MEASURE: U.S. SURVEY FEET

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06/26/ 2024

LEO M. DELATORRE DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 5469

THIS SURVEY INFORMATION HAS BEEN ACCEPTED INTO THIS PS&E.

Texas Department of Transportation

LANDTECH
2525 North Loop West, Suite 300,
Houston, Texas 77008
T: 713-861-7068 F: 713-861-4131
TBPELS Registration No. 10019100

U.S. HIGHWAY 59
HORIZONTAL AND VERTICAL CONTROL SHEET

SHEET 1 OF 1

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TX				US 59
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
16	GOLIAD	0088	02	062	071

$FILE$

US 59 HORIZONTAL ALIGNMENT DATA

ALIGNMENT NAME: 59_CL
ALIGNMENT DESCRIPTION:
ALIGNMENT STYLE: ALIGNMENT\BASELINE

STATION		NORTHING	EASTING

ELEMENT: LINEAR

POT	( )	840+28.8000	R1	13428483.4461 2474424.1938
PC	( )	869+86.0792	R1	13426298.7477 2472431.0572

TANGENTIAL DIRECTION: S42°22'28.9765"W
TANGENTIAL LENGTH: 2957.2792

ELEMENT: CIRCULAR

PC	( )	869+86.0792	R1	13426298.7477 2472431.0572
PI	( )	872+27.0882	R1	13426120.7016 2472268.6228
CC	( )			13430158.8984 2468199.9045
PT	( )	874+67.8130	R1	13425956.9312 2472091.8049

RADIUS: 5727.4267
DELTA: 04°49'08.9292" RIGHT
DEGREE OF CURVATURE (ARC): 01°00'01.3522"
LENGTH: 481.7338

TANGENT: 241.0090
CHORD: 481.5918
MIDDLE ORDINATE: 5.0641
EXTERNAL: 5.0686
BACK TANGENT DIRECTION: S42°22'28.9765"W
BACK RADIAL DIRECTION: N47°37'31.0235"W
CHORD DIRECTION: S44°47'03.4411"W
AHEAD RADIAL DIRECTION: N42°48'22.0943"W
AHEAD TANGENT DIRECTION: S47°11'37.9057"W

ELEMENT: LINEAR

PT	( )	874+67.8130	R1	13425956.9312 2472091.8049
POT	( )	938+83.7698	R1	13421597.1609 2467384.6928

TANGENTIAL DIRECTION: S47°11'37.9057"W
TANGENTIAL LENGTH: 6415.9568

ALIGNMENT NAME: 59_SB BL
ALIGNMENT DESCRIPTION:
ALIGNMENT STYLE: ALIGNMENT\MAINLANE RT LABEL

STATION		NORTHING	EASTING

ELEMENT: LINEAR

POT	( )	861+00.0000	R1	13426957.7221 2473023.4519
PC	( )	869+67.8394	R1	13426316.6033 2472438.5485

TANGENTIAL DIRECTION: S42°22'28.97650"W
TANGENTIAL LENGTH: 867.8394

ELEMENT: CIRCULAR

PC	( )	869+67.8394	R1	13426316.6033 2472438.5485
PI	( )	870+57.7196	R1	13426250.2040 2472377.9714
CC	( )			13430167.3677 2468217.6842
PCC	( )	871+47.5849	R1	13426185.7431 2472315.3357

RADIUS: 5713.5000
DELTA: 01°48'09.0474" RIGHT
DEGREE OF CURVATURE (ARC): 01°00'10.1305"
LENGTH: 179.7455

TANGENT: 89.8802
CHORD: 179.7381
MIDDLE ORDINATE: 0.7068
EXTERNAL: 0.7069
BACK TANGENT DIRECTION: S42°22'28.97650"W
BACK RADIAL DIRECTION: N47°37'31.02350"W
CHORD DIRECTION: S43°16'33.50022"W
AHEAD RADIAL DIRECTION: N45°49'21.97606"W
AHEAD TANGENT DIRECTION: S44°10'38.02394"W

ELEMENT: CIRCULAR

PCC	( )	871+47.5849	R1	13426185.7431 2472315.3357
PI	( )	873+13.0362	R1	13426067.0835 2472200.0360
CC	( )			13428637.3674 2469792.2696
PCC	( )	874+78.2438	R1	13425959.7688 2472074.1088

RADIUS: 3518.0000
DELTA: 05°23'06.9469" RIGHT
DEGREE OF CURVATURE (ARC): 01°37'43.1270"
LENGTH: 330.6588

SB EDGE OF TRAVELWAY HORIZONTAL ALIGNMENT DATA

TANGENT: 165.4512
CHORD: 330.5371
MIDDLE ORDINATE: 3.8841
EXTERNAL: 3.8884
BACK TANGENT DIRECTION: S44°10'38.02394"W
BACK RADIAL DIRECTION: N45°49'21.97606"W
CHORD DIRECTION: S46°52'11.49741"W
AHEAD RADIAL DIRECTION: N40°26'15.02912"W
AHEAD TANGENT DIRECTION: S49°33'44.97088"W

ELEMENT: CIRCULAR

PCC	( )	874+78.2438	R1	13425959.7688 2472074.1088
PI	( )	875+34.1013	R1	13425922.8500 2472032.1914
CC	( )			13428215.5722 2470087.3056
PRC	( )	875+89.9460	R1	13425887.5139 2471988.9314

RADIUS: 3006.0000
DELTA: 02°07'44.7503" RIGHT
DEGREE OF CURVATURE (ARC): 01°54'21.7700"
LENGTH: 111.7022

TANGENT: 55.8575
CHORD: 111.6958
MIDDLE ORDINATE: 0.5188
EXTERNAL: 0.5189
BACK TANGENT DIRECTION: S48°37'40.62463"W
BACK RADIAL DIRECTION: N41°22'19.37537"W
CHORD DIRECTION: S49°41'32.99981"W
AHEAD RADIAL DIRECTION: N39°14'34.62502"W
AHEAD TANGENT DIRECTION: S50°45'25.37498"W

ELEMENT: CIRCULAR

PRC	( )	875+89.9460	R1	13425887.5139 2471988.9314
PI	( )	876+83.4933	R1	13425828.3350 2471916.4818
CC	( )			13423558.2940 2473891.5062
PT	( )	877+76.9804	R1	13425764.7677 2471847.8501

RADIUS: 3007.5000
DELTA: 03°33'47.4692" LEFT
DEGREE OF CURVATURE (ARC): 01°54'18.3477"
LENGTH: 187.0344

TANGENT: 93.5474
CHORD: 187.0043
MIDDLE ORDINATE: 1.4538
EXTERNAL: 1.4545
BACK TANGENT DIRECTION: S50°45'25.37498"W
BACK RADIAL DIRECTION: N39°14'34.62502"W
CHORD DIRECTION: S48°58'31.64036"W
AHEAD RADIAL DIRECTION: N42°48'22.09426"W
AHEAD TANGENT DIRECTION: S47°11'37.90574"W

ELEMENT: LINEAR

PT	( )	877+76.9804	R1	13425764.7677 2471847.8501
PC	( )	890+14.6092	R1	13424923.7742 2470939.8549

TANGENTIAL DIRECTION: S47°11'37.90574"W
TANGENTIAL LENGTH: 1237.6289

ELEMENT: CIRCULAR

PC	( )	890+14.6092	R1	13424923.7742 2470939.8549
PI	( )	892+82.4258	R1	13424741.7875 2470743.3694
CC	( )			13413409.7600 2481604.2401
PRC	( )	895+50.1904	R1	13424553.2027 2470553.2076

RADIUS: 15694.0000
DELTA: 01°57'19.0947" LEFT
DEGREE OF CURVATURE (ARC): 00°21'54.2909"
LENGTH: 535.5812

TANGENT: 267.8166
CHORD: 535.5552
MIDDLE ORDINATE: 2.2846
EXTERNAL: 2.2850
BACK TANGENT DIRECTION: S47°11'37.90574"W
BACK RADIAL DIRECTION: N42°48'22.09426"W
CHORD DIRECTION: S46°12'58.35840"W
AHEAD RADIAL DIRECTION: N44°45'41.18895"W
AHEAD TANGENT DIRECTION: S45°14'18.81105"W

ELEMENT: CIRCULAR

PRC	( )	895+50.1904	R1	13424553.2027 2470553.2076
PI	( )	898+18.4251	R1	13424364.3235 2470362.7490
CC	( )			13435714.0416 2459484.9232
PT	( )	900+86.6077	R1	13424182.0527 2470165.9567

RADIUS: 15718.5000
DELTA: 01°57'19.0947" RIGHT
DEGREE OF CURVATURE (ARC): 00°21'52.2423"
LENGTH: 536.4173

TANGENT: 268.2347
CHORD: 536.3913
MIDDLE ORDINATE: 2.2882
EXTERNAL: 2.2885
BACK TANGENT DIRECTION: S45°14'18.81105"W
BACK RADIAL DIRECTION: N44°45'41.18895"W
CHORD DIRECTION: S46°12'58.35840"W
AHEAD RADIAL DIRECTION: N42°48'22.09426"W
AHEAD TANGENT DIRECTION: S47°11'37.90574"W

ELEMENT: LINEAR

PT	( )	900+86.6077	R1	13424182.0527 2470165.9567
POT	( )	907+99.8173	R1	13423697.4126 2469642.7054

TANGENTIAL DIRECTION: S47°11'37.90574"W
TANGENTIAL LENGTH: 713.2096

DRIVEWAY HORIZONTAL ALIGNMENT DATA

ALIGNMENT NAME: BL_DRIVEWAY
ALIGNMENT DESCRIPTION:
ALIGNMENT STYLE: ALIGNMENT\INTERSECTING ROAD

STATION		NORTHING	EASTING

ELEMENT: CIRCULAR

PC	( )	10+00.0000	R1	13425961.5080 2472039.0250
PI	( )	10+18.8253	R1	13425948.5659 2472025.3540
CC	( )			13425986.9251 2472014.9632
PRC	( )	10+34.5436	R1	13425952.8384 2472007.0199

RADIUS: 35.0000
DELTA: 56°32'55.1974" RIGHT
DEGREE OF CURVATURE (ARC): 163°42'08.0178"
LENGTH: 34.5436

TANGENT: 18.8253
CHORD: 33.1586
MIDDLE ORDINATE: 4.1759
EXTERNAL: 4.7416
BACK TANGENT DIRECTION: S46°34'08.3677"W
BACK RADIAL DIRECTION: N43°25'51.6323"W
CHORD DIRECTION: S74°50'35.9663"W
AHEAD RADIAL DIRECTION: N13°07'03.5650"E
AHEAD TANGENT DIRECTION: N76°52'56.4350"W

ELEMENT: CIRCULAR

PRC	( )	10+34.5436	R1	13425952.8384 2472007.0199
PI	( )	10+53.1236	R1	13425957.0551 2471988.9247
CC	( )			13425918.7516 2471999.0766
PT	( )	10+68.7055	R1	13425944.4296 2471975.2934

RADIUS: 35.0000
DELTA: 55°55'25.6593" LEFT
DEGREE OF CURVATURE (ARC): 163°42'08.0178"
LENGTH: 34.1619

TANGENT: 18.5800
CHORD: 32.8219
MIDDLE ORDINATE: 4.0859
EXTERNAL: 4.6259
BACK TANGENT DIRECTION: N76°52'56.4350"W
BACK RADIAL DIRECTION: N13°07'03.5650"E
CHORD DIRECTION: S75°09'20.7354"W
AHEAD RADIAL DIRECTION: N42°48'22.0943"W
AHEAD TANGENT DIRECTION: S47°11'37.9057"W

ELEMENT: LINEAR

PT	( )	10+68.7055	R1	13425944.4296 2471975.2934
PC	( )	15+26.2229	R1	13425633.5374 2471639.6325

TANGENTIAL DIRECTION: S47°11'37.9057"W
TANGENTIAL LENGTH: 457.5174

ELEMENT: CIRCULAR

PC	( )	15+26.2229	R1	13425633.5374 2471639.6325
PI	( )	15+42.2152	R1	13425622.6704 2471627.8996
CC	( )			13425448.6559 2471810.8715
PT	( )	15+58.1647	R1	13425610.4073 2471617.6347

RADIUS: 252.0000
DELTA: 07°15'44.6856" LEFT
DEGREE OF CURVATURE (ARC): 22°44'11.1136"
LENGTH: 31.9418

TANGENT: 15.9923
CHORD: 31.9204
MIDDLE ORDINATE: 0.5059
EXTERNAL: 0.5069
BACK TANGENT DIRECTION: S47°11'37.9057"W
BACK RADIAL DIRECTION: N42°48'22.0943"W
CHORD DIRECTION: S43°33'45.5629"W
AHEAD RADIAL DIRECTION: N50°04'06.7799"W
AHEAD TANGENT DIRECTION: S39°55'53.2201"W

ELEMENT: LINEAR

PT	( )	15+58.1647	R1	13425610.4073 2471617.6347
PC	( )	16+93.0626	R1	13425506.9658 2471531.0476

TANGENTIAL DIRECTION: S39°55'53.2201"W
TANGENTIAL LENGTH: 134.8979

ELEMENT: CIRCULAR

PC	( )	16+93.0626	R1	13425506.9658 2471531.0476
PI	( )	17+08.2934	R1	13425495.2866 2471521.2714
CC	( )			13425661.0147 2471347.0125
PT	( )	17+23.4834	R1	13425484.9370 2471510.0973

RADIUS: 240.0000
DELTA: 07°15'44.6856" RIGHT
DEGREE OF CURVATURE (ARC): 23°52'23.6693"
LENGTH: 30.4207

TANGENT: 15.2308
CHORD: 30.4004
MIDDLE ORDINATE: 0.4818
EXTERNAL: 0.4828
BACK TANGENT DIRECTION: S39°55'53.2201"W
BACK RADIAL DIRECTION: N50°04'06.7799"W
CHORD DIRECTION: S43°33'45.5629"W
AHEAD RADIAL DIRECTION: N42°48'22.0943"W
AHEAD TANGENT DIRECTION: S47°11'37.9057"W

ELEMENT: LINEAR

PT	( )	17+23.4834	R1	13425484.9370 2471510.0973
POT	( )	19+58.1670	R1	13425325.4648 2471337.9200

TANGENTIAL DIRECTION: S47°11'37.9057"W
TANGENTIAL LENGTH: 234.6837

NB EDGE OF TRAVELWAY HORIZONTAL ALIGNMENT DATA

ALIGNMENT NAME: 59_NB BL
ALIGNMENT DESCRIPTION:
ALIGNMENT STYLE: ALIGNMENT\MAINLANE LT LABEL

STATION		NORTHING	EASTING

ELEMENT: LINEAR

POT	( )	861+00.0000	R1	13426948.9604 2473033.0556
PC	( )	869+86.7654	R1	13426293.8600 2472435.3967

TANGENTIAL DIRECTION: S42°22'28.97651"W
TANGENTIAL LENGTH: 886.7654

ELEMENT: CIRCULAR

PC	( )	869+86.7654	R1	13426293.8600 2472435.3967
PI	( )	870+80.7501	R1	13426224.4285 2472372.0532
CC	( )			13430157.7669 2468200.1267
PT	( )	871+74.7179	R1	13426157.1107 2472306.4679

RADIUS: 5733.0000
DELTA: 01°52'42.2534" RIGHT
DEGREE OF CURVATURE (ARC): 00°59'57.8511"
LENGTH: 187.9526

TANGENT: 93.9847
CHORD: 187.9441
MIDDLE ORDINATE: 0.7702
EXTERNAL: 0.7703
BACK TANGENT DIRECTION: S42°22'28.97651"W
BACK RADIAL DIRECTION: N47°37'31.02350"W
CHORD DIRECTION: S43°18'50.10320"W
AHEAD RADIAL DIRECTION: N45°44'48.77011"W
AHEAD TANGENT DIRECTION: S44°15'11.22989"W

ELEMENT: LINEAR

PT	( )	871+74.7179	R1	13426157.1107 2472306.4679
PC	( )	873+54.6412	R1	13426028.2381 2472180.9122

TANGENTIAL DIRECTION: S44°15'11.22989"W
TANGENTIAL LENGTH: 179.9233

ELEMENT: CIRCULAR

PC	( )	873+54.6412	R1	13426028.2381 2472180.9122
PI	( )	877+15.1586	R1	13425771.3724 2471927.9442
CC	( )			13437040.4078 2460999.0629
PT	( )	880+75.5492	R1	13425526.3936 2471663.4481

RADIUS: 15694.0000
DELTA: 02°37'54.8279" RIGHT
DEGREE OF CURVATURE (ARC): 00°21'54.2909"
LENGTH: 720.9080

TANGENT: 360.5174
CHORD: 720.8446
MIDDLE ORDINATE: 4.1392
EXTERNAL: 4.1403
BACK TANGENT DIRECTION: S44°33'43.07783"W
BACK RADIAL DIRECTION: N45°26'16.92217"W
CHORD DIRECTION: S45°52'40.49179"W
AHEAD RADIAL DIRECTION: N42°48'22.09426"W
AHEAD TANGENT DIRECTION: S47°11'37.90574"W

ELEMENT: LINEAR

PT	( )	880+75.5492	R1	13425526.3936 2471663.4481
PC	( )	890+15.9103	R1	13424887.3995 2470973.5455

TANGENTIAL DIRECTION: S47°11'37.90574"W
TANGENTIAL LENGTH: 940.3611

ELEMENT: CIRCULAR

PC	( )	890+15.9103	R1	13424887.3995 2470973.5455
PI	( )	892+83.7802	R1	13424705.3766 2470777.0208
CC	( )			13436401.4137 2460309.1603
PRC	( )	895+51.5981	R1	13424530.1664 2470574.3988

RADIUS: 15694.0000
DELTA: 01°57'20.4958" RIGHT
DEGREE OF CURVATURE (ARC): 00°21'54.2909"
LENGTH: 535.6878

TANGENT: 267.8699
CHORD: 535.6618
MIDDLE ORDINATE: 2.2855
EXTERNAL: 2.2859
BACK TANGENT DIRECTION: S47°11'37.90574"W
BACK RADIAL DIRECTION: N42°48'22.09426"W
CHORD DIRECTION: S48°10'18.15364"W
AHEAD RADIAL DIRECTION: N40°51'01.59847"W
AHEAD TANGENT DIRECTION: S49°08'58.40153"W

ELEMENT: CIRCULAR

PRC	( )	895+51.5981	R1	13424530.1664 2470574.3988
PI	( )	898+19.6728	R1	13424354.8223 2470371.6219
CC	( )			13412649.8420 2480847.4864
PT	( )	900+87.6955	R1	13424172.6601 2470174.9469

RADIUS: 15706.0000
DELTA: 01°57'20.4958" LEFT
DEGREE OF CURVATURE (ARC): 00°21'53.2867"
LENGTH: 536.0974

TANGENT: 268.0747
CHORD: 536.0714
MIDDLE ORDINATE: 2.2873
EXTERNAL: 2.2876
BACK TANGENT DIRECTION: S49°08'58.40153"W
BACK RADIAL DIRECTION: N40°51'01.59847"W
CHORD DIRECTION: S48°10'18.15364"W
AHEAD RADIAL DIRECTION: N42°48'22.09426"W
AHEAD TANGENT DIRECTION: S47°11'37.90574"W

ELEMENT: LINEAR

PT	( )	900+87.6955	R1	13424172.6601 2470174.9469
POT	( )	908+01.1184	R1	13423687.8751 2469651.5392

TANGENTIAL DIRECTION: S47°11'37.90574"W
TANGENTIAL LENGTH: 713.4229

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US 59

HORIZONTAL ALIGNMENT DATA

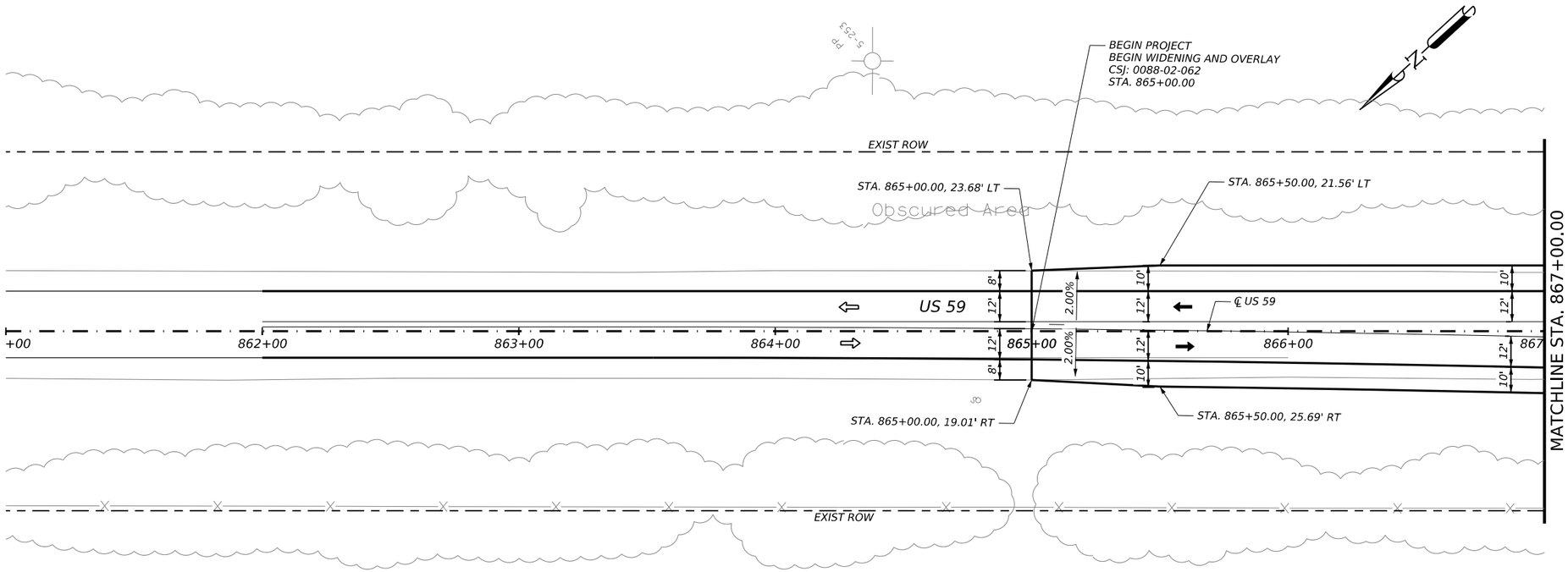
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		72

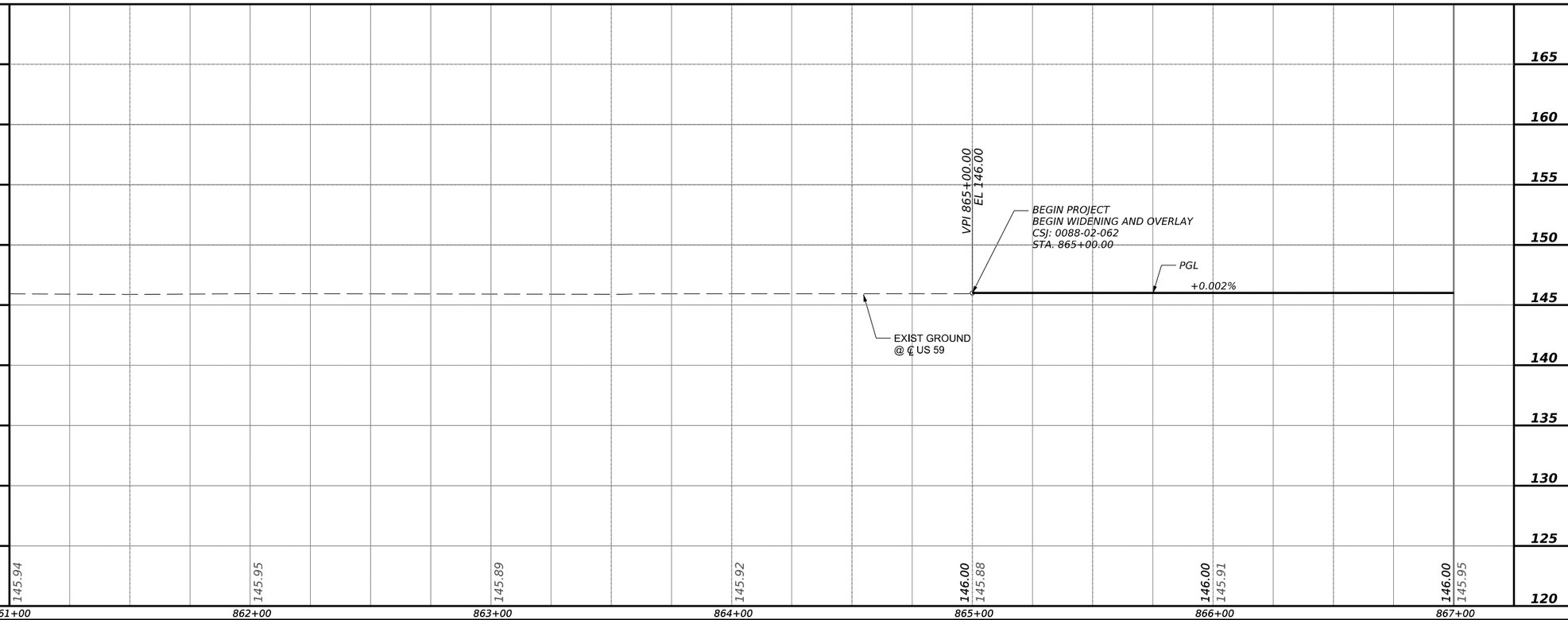
DATE: 7/3/2024
FILE: c:\working\dir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663501062_PHD01.dgn

LEGEND

- 1 - 1 — DRIVEWAY NUMBER
- P48CL-1 — CURVE DATA NUMBER
- DITCH FLOW ARROW
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW



SCALE: 1"=50'- HORZ
1"=10'- VERT



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US 59

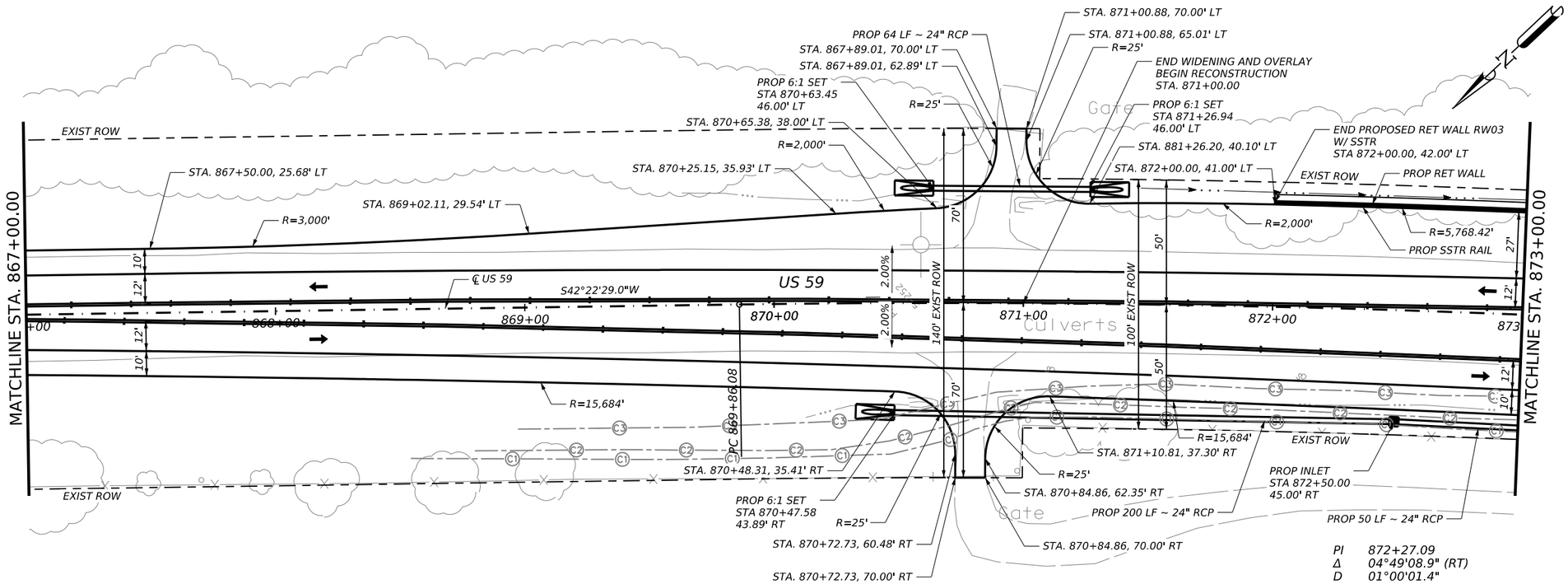
PLAN AND PROFILE

BEGIN TO STA. 873+00

SHEET 1 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59

DIST	COUNTY	SHEET NO.
CRP	GOLIAD	73



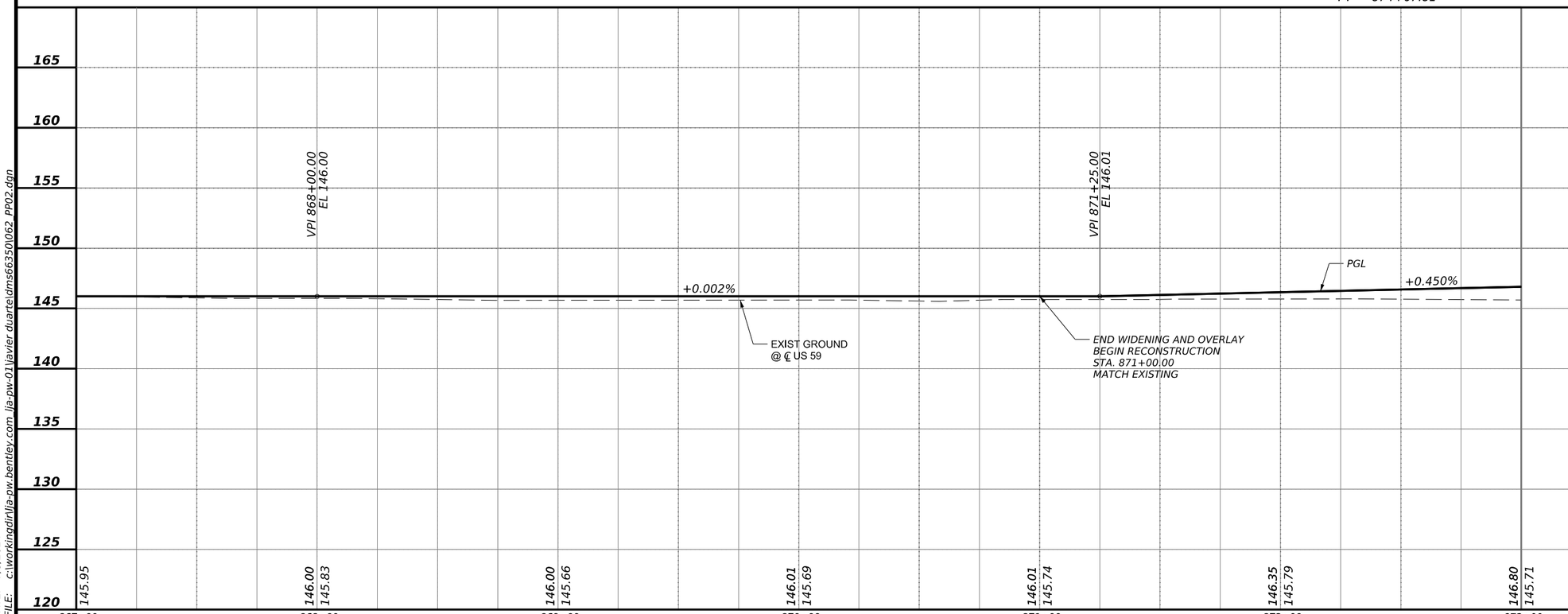
LEGEND

- 1 - 1 — DRIVEWAY NUMBER
- P48CL-1 — CURVE DATA NUMBER
- DITCH FLOW ARROW
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

PI	872+27.09
Δ	04°49'08.9" (RT)
D	01°00'01.4"
T	241.01'
L	481.73'
R	5727.43'
PC	869+86.08
PT	874+67.81

0' 25' 50'

SCALE: 1"=50'- HORZ
1"=10'- VERT



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US 59

PLAN AND PROFILE

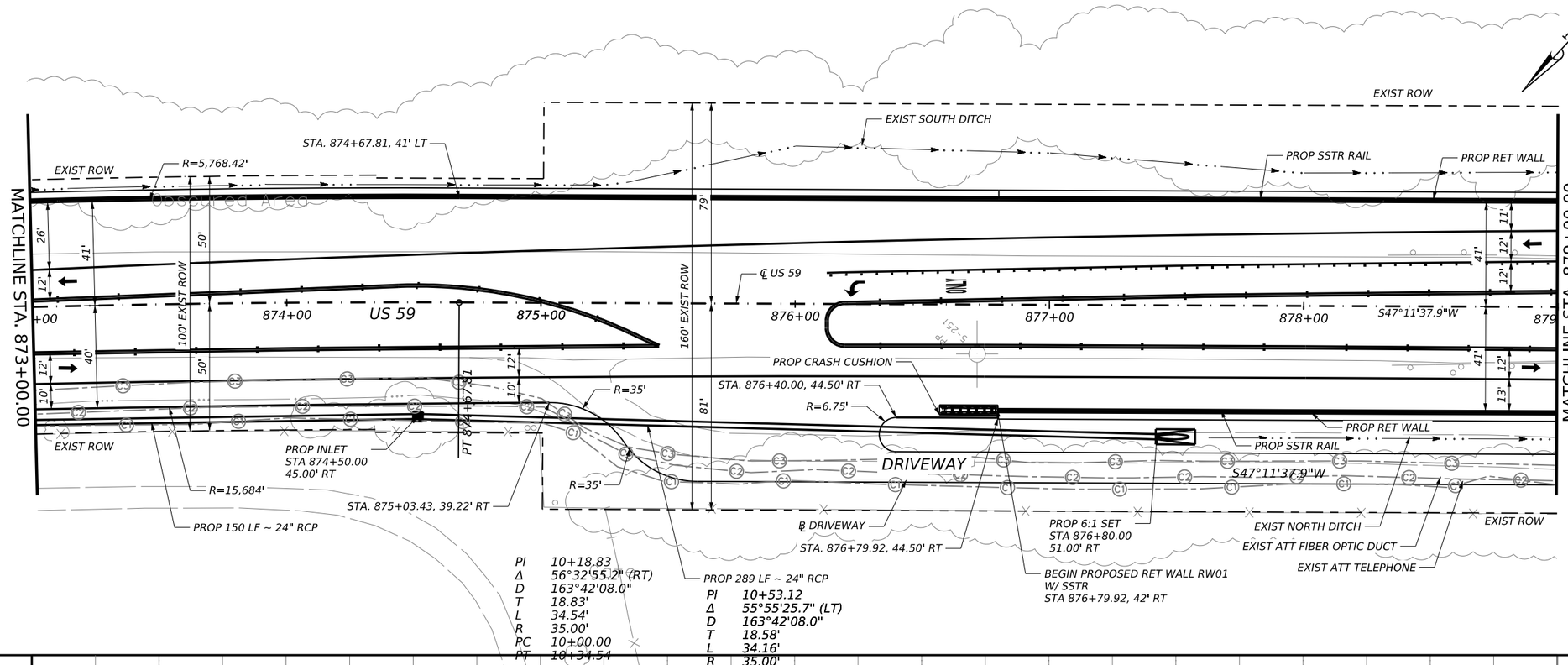
STA 867+00 TO STA. 873+00

SHEET 2 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		74

LEGEND

- 1 - 1 — DRIVEWAY NUMBER
- P48CL-1 — CURVE DATA NUMBER
- DITCH FLOW ARROW
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW



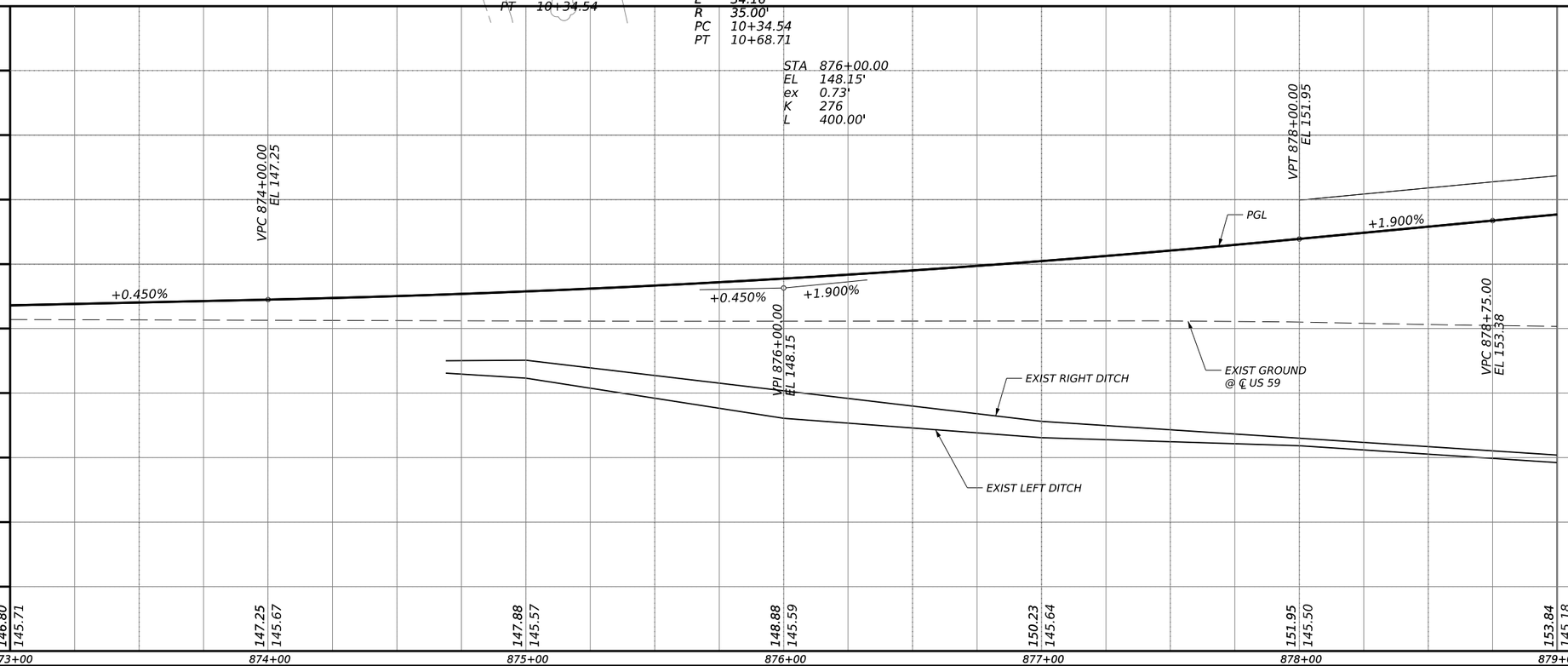
PI	10+18.83
Δ	56°32'55.2" (RT)
D	163°42'08.0"
T	18.83'
L	34.54'
R	35.00'
PC	10+00.00
PT	10+34.54

PI	10+53.12
Δ	55°55'25.7" (LT)
D	163°42'08.0"
T	18.58'
L	34.16'
R	35.00'
PC	10+34.54
PT	10+68.71

STA	876+00.00
EL	148.15'
ex	0.73'
K	276
L	400.00'

0' 25' 50'

SCALE: 1"=50'- HORZ
1"=10'- VERT



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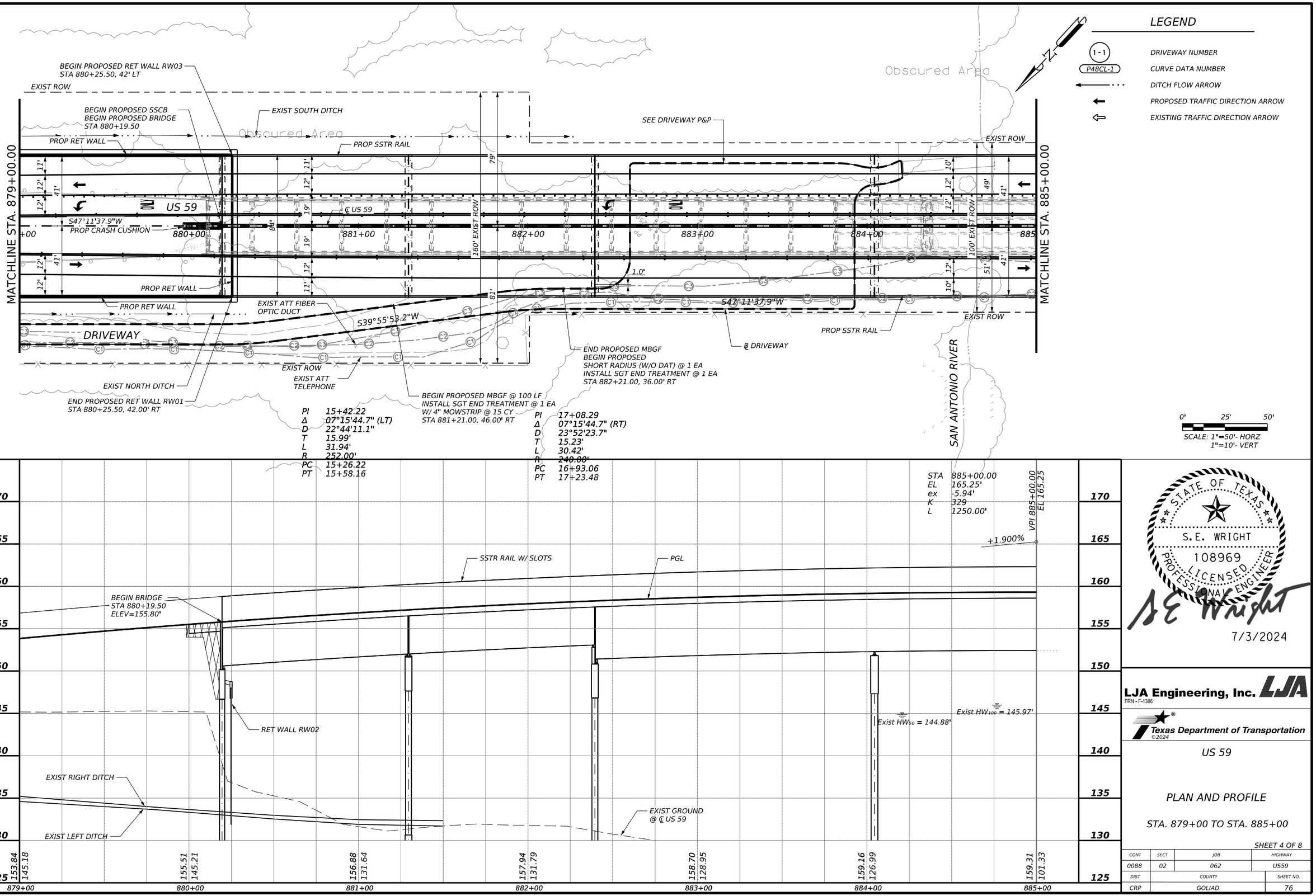
US 59

PLAN AND PROFILE

STA. 873+00 TO STA. 879+00

SHEET 3 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		75



DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663501062_PP04.dgn

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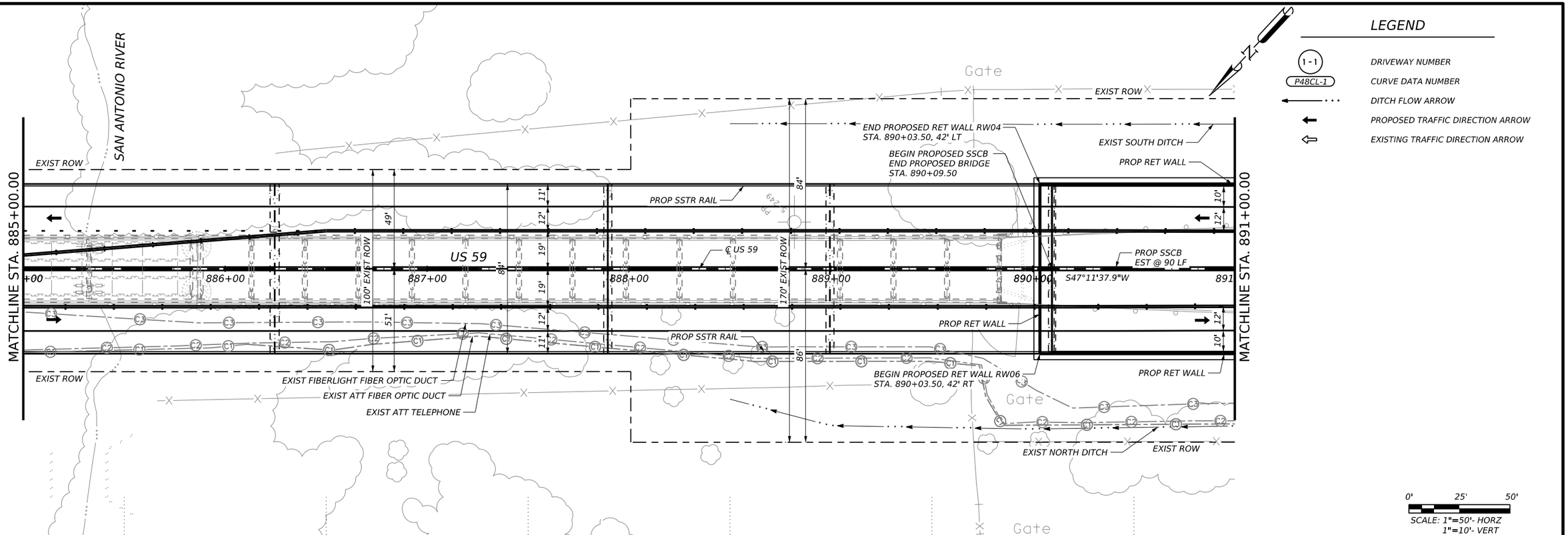
US 59

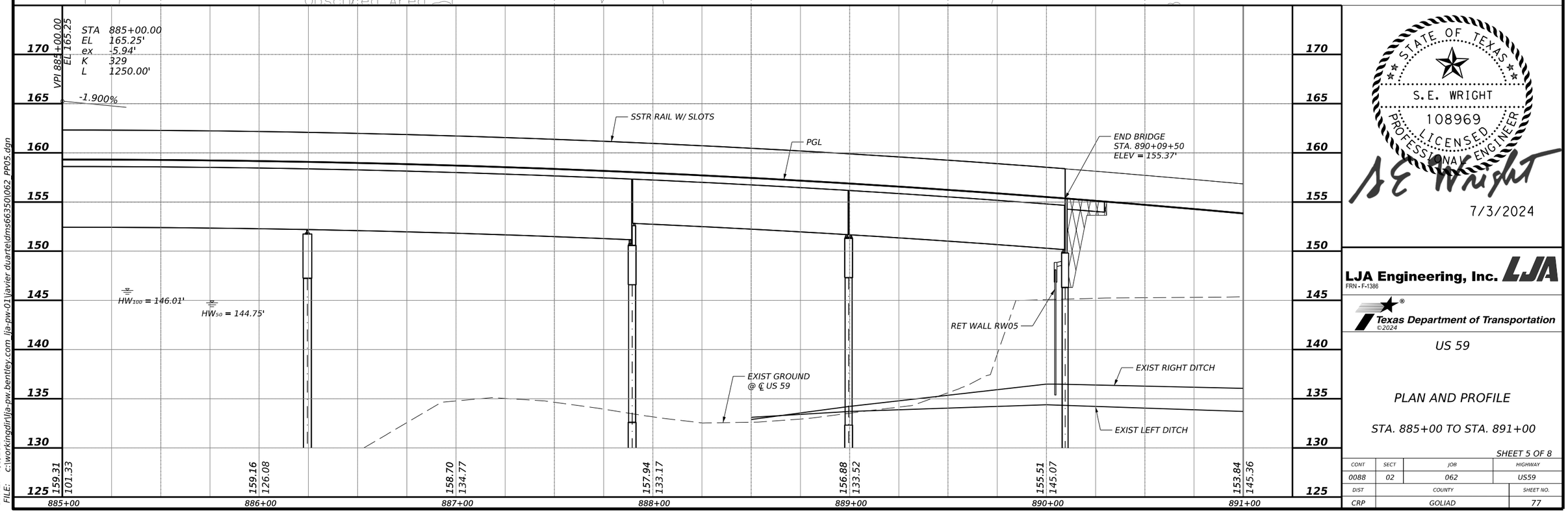
PLAN AND PROFILE

STA. 879+00 TO STA. 885+00

SHEET 4 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		76





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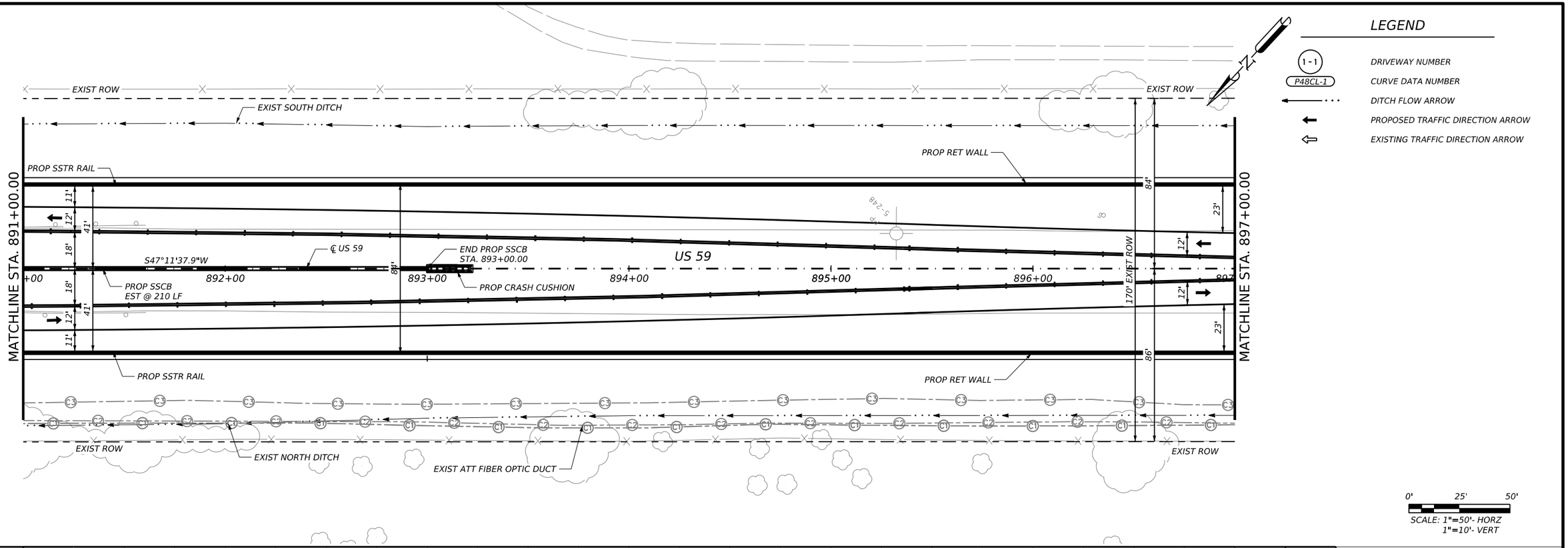
PLAN AND PROFILE

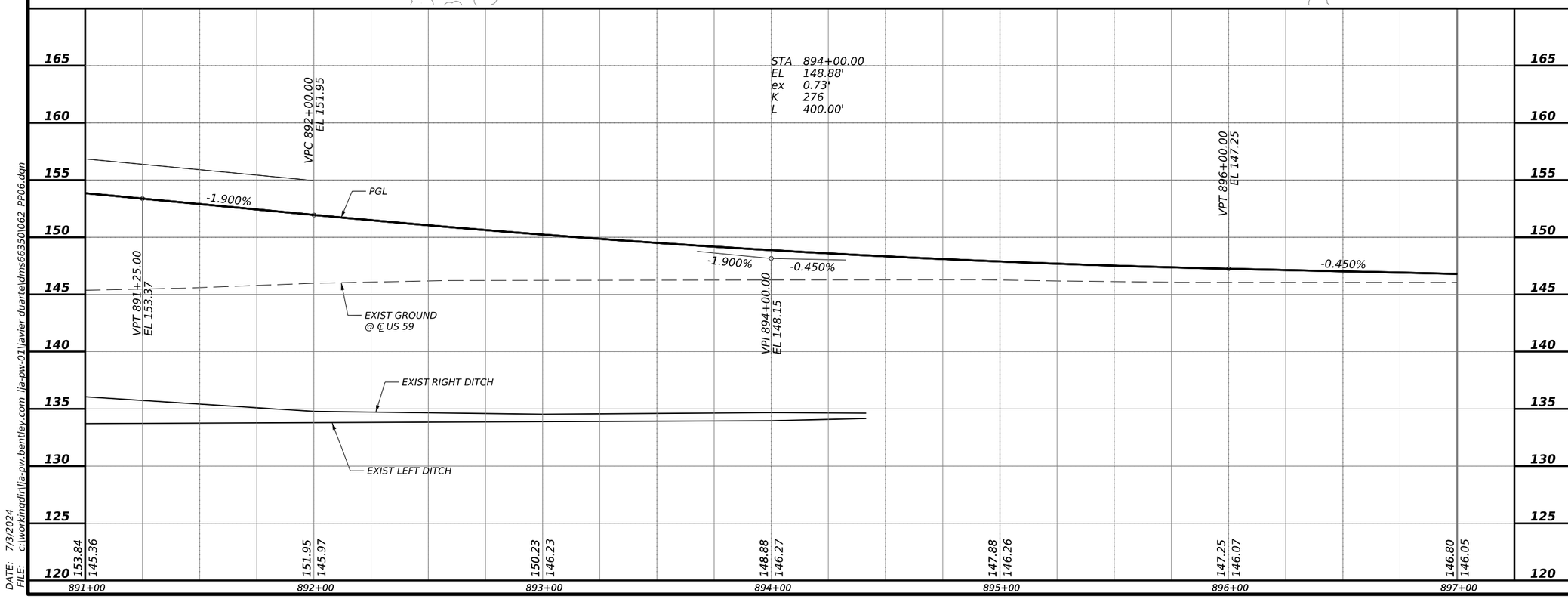
STA. 885+00 TO STA. 891+00

SHEET 5 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		77

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com :lja-pw-01\javier.duarte\dms663501\062_PP05.dgn





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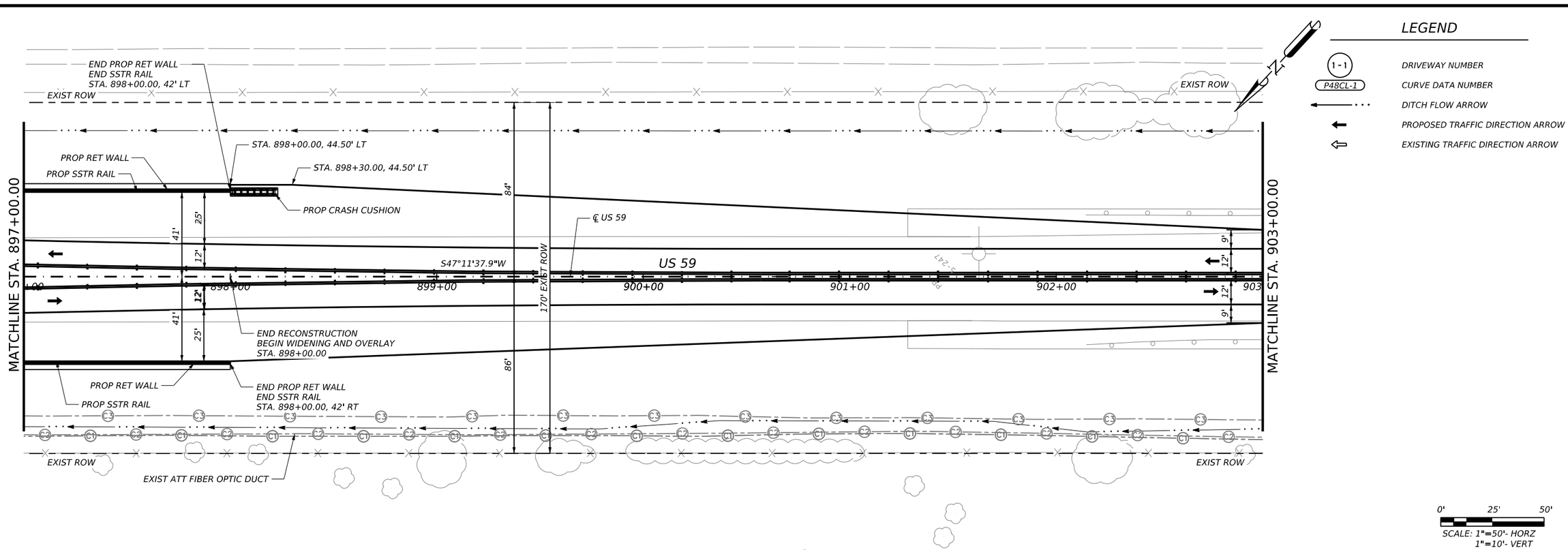
US 59

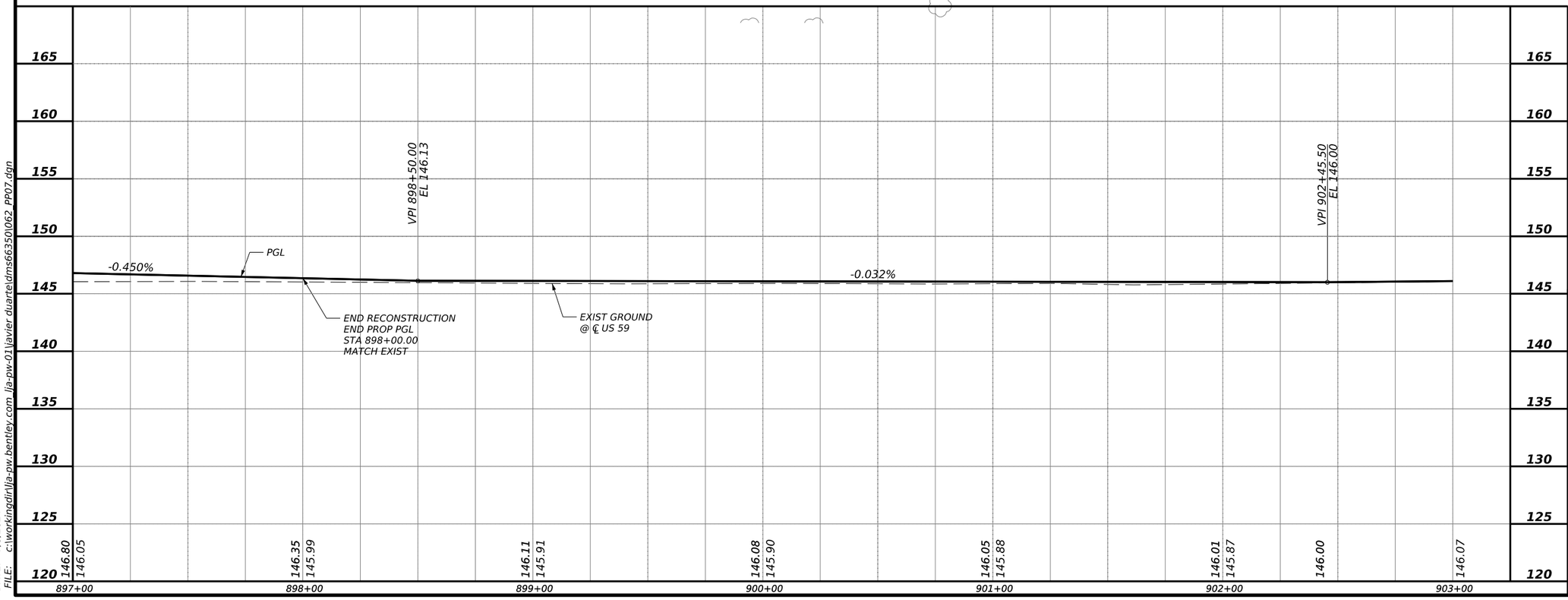
PLAN AND PROFILE

STA. 891+00 TO END

SHEET 6 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		78





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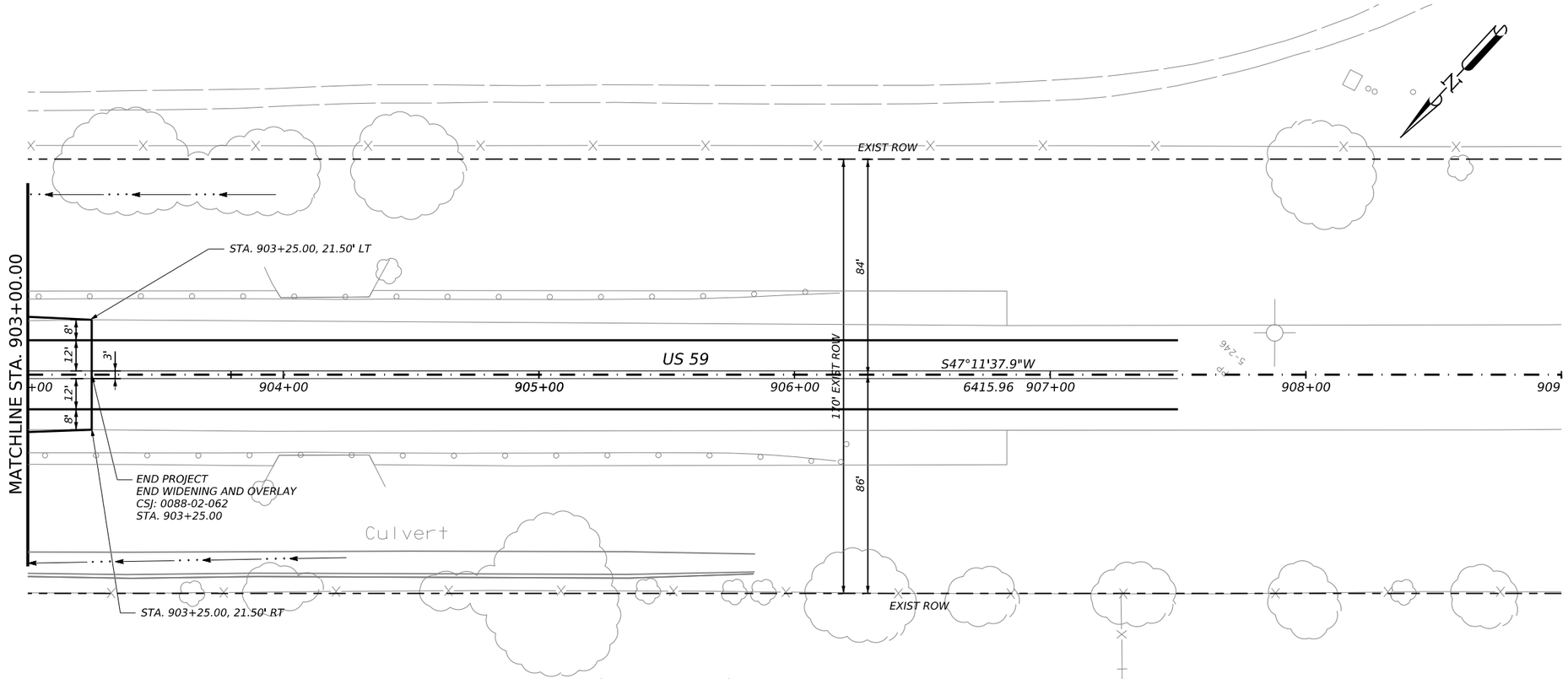
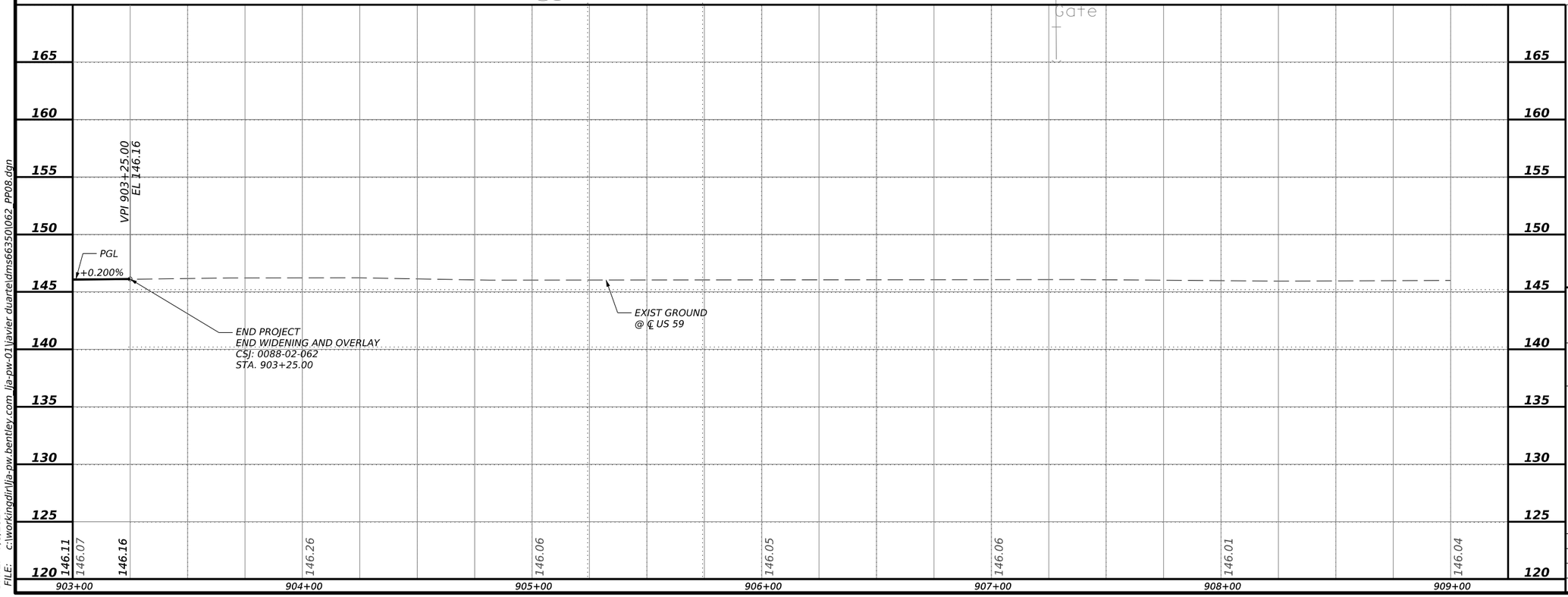
PLAN AND PROFILE

STA. 897+00 TO STA 903+00

SHEET 7 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		79





LEGEND

- 1 - 1 — DRIVEWAY NUMBER
- P48CL-1 — CURVE DATA NUMBER
- DITCH FLOW ARROW
- PROPOSED TRAFFIC DIRECTION ARROW
- EXISTING TRAFFIC DIRECTION ARROW

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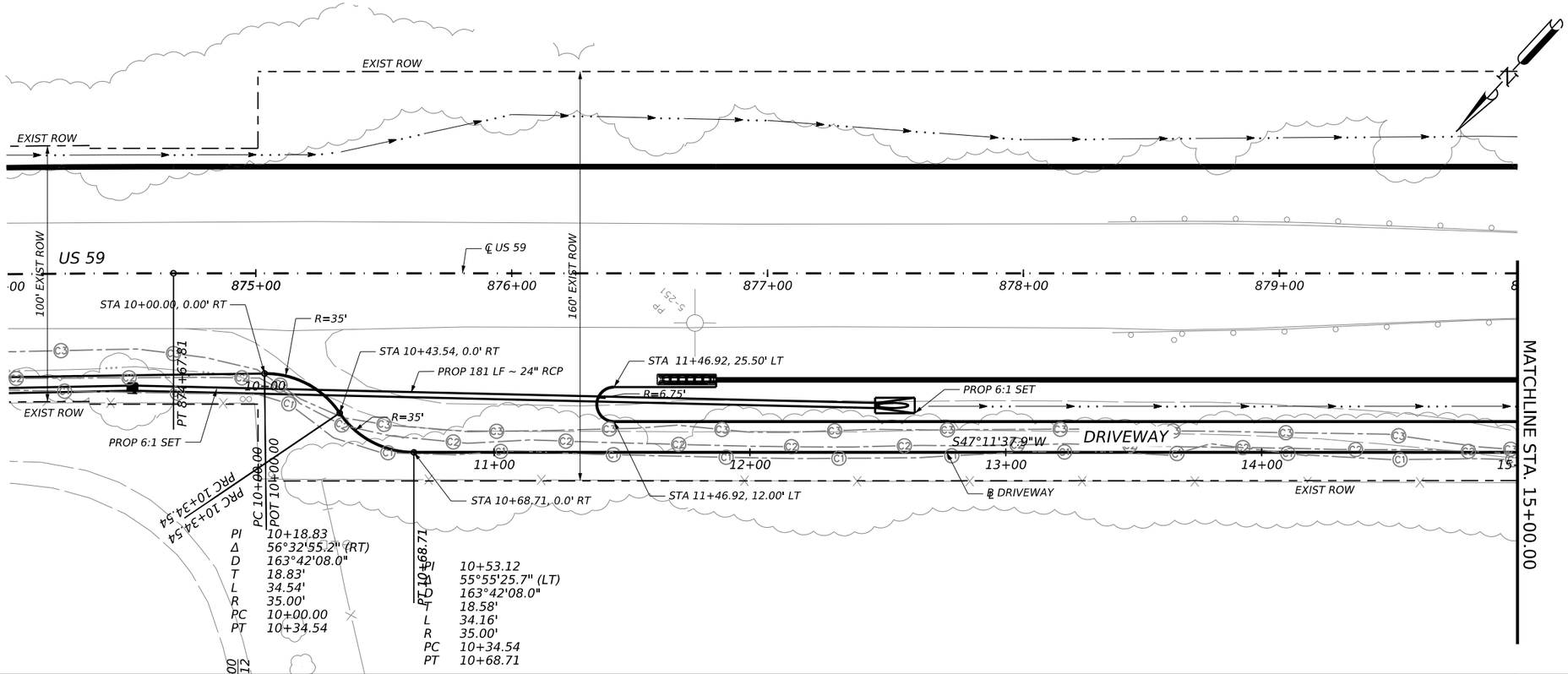
PLAN AND PROFILE

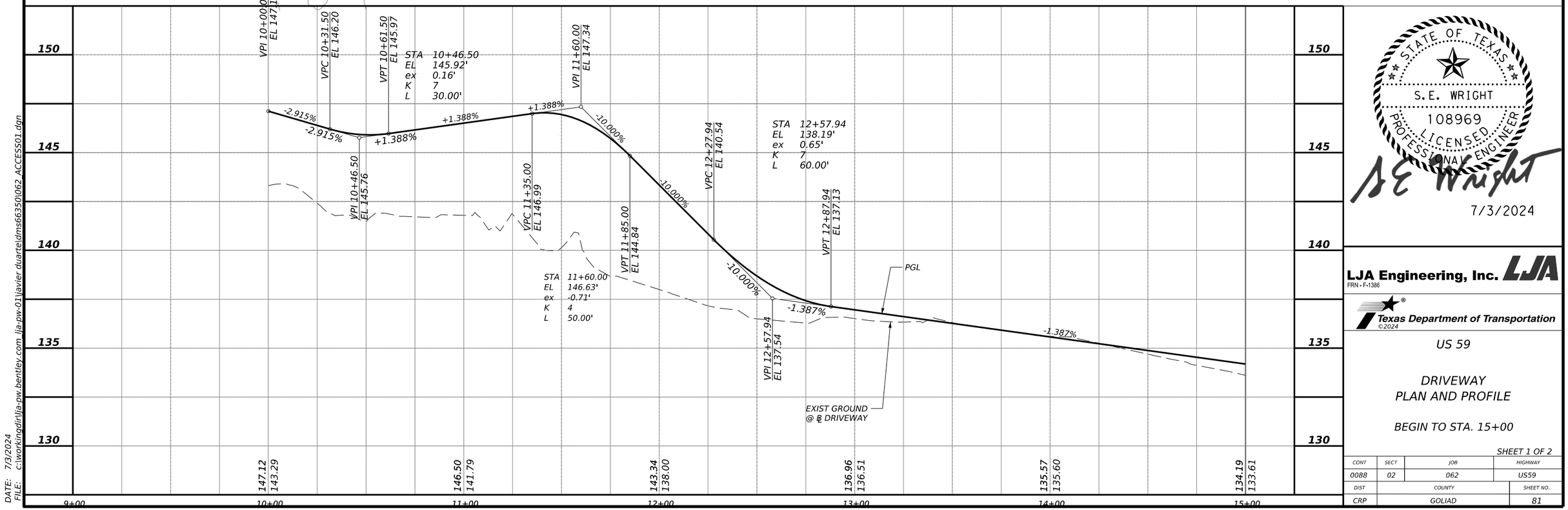
STA. 903+00 TO END

SHEET 8 OF 8

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		80

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms666350\062_PP08.dgn





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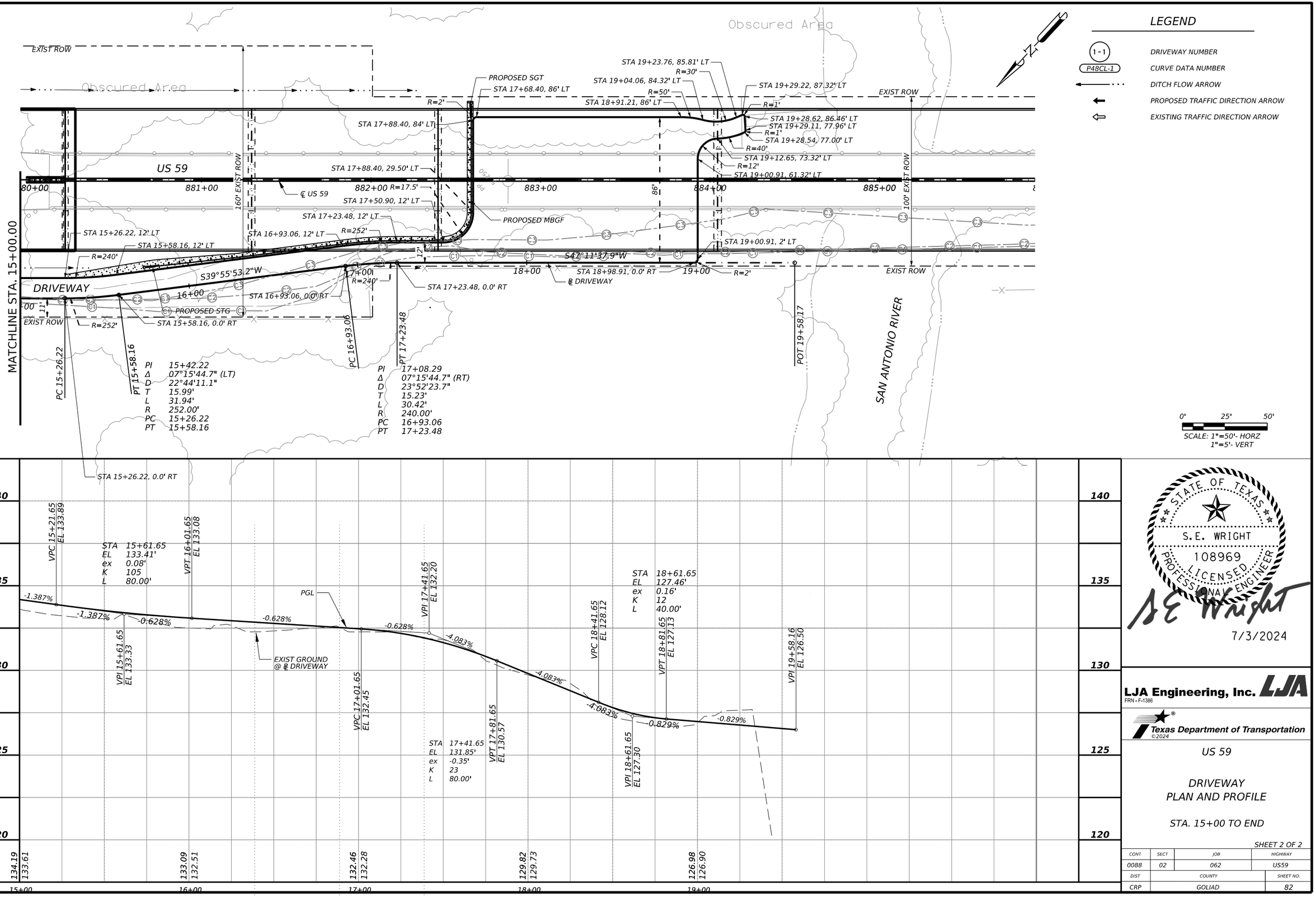
US 59

DRIVEWAY
PLAN AND PROFILE

BEGIN TO STA. 15+00

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		81



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7/3/2024

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US 59

DRIVEWAY
PLAN AND PROFILE

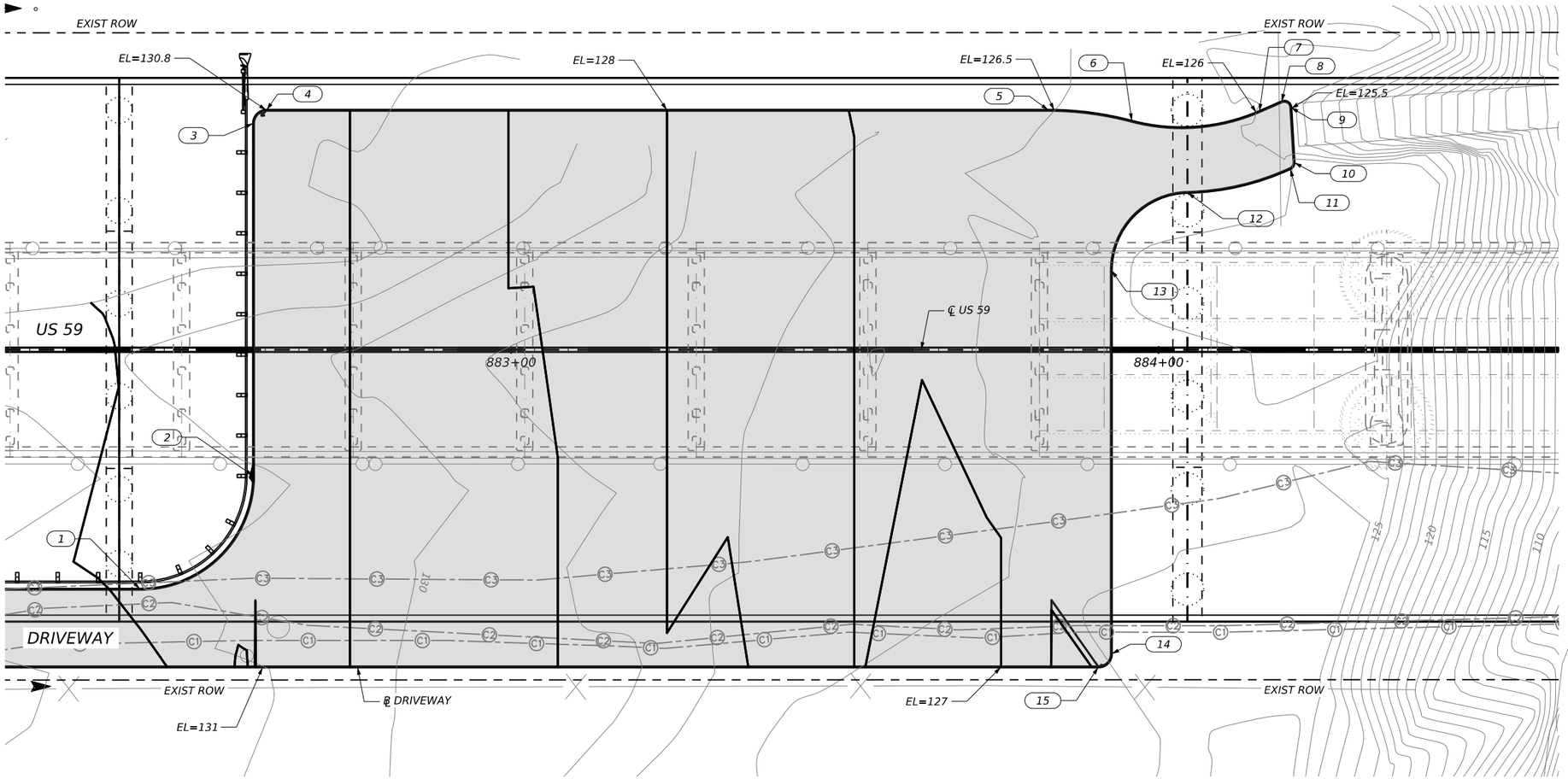
STA. 15+00 TO END

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		82

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663501062_ACCESS02.dgn

POINT	ALIGN	STA	OFF	ELEV	DESC
1	DRIVEWAY	17+59.25	-12.00	130.8	EOP
2	DRIVEWAY	17+76.75	-29.50	130.0	EOP
3	DRIVEWAY	17+76.75	-84.00	130.5	EOP
4	DRIVEWAY	17+78.75	-86.00	130.4	EOP
5	DRIVEWAY	18+99.56	-86.00	126.5	EOP
6	DRIVEWAY	19+12.41	-84.32	126.3	EOP
7	DRIVEWAY	19+32.11	-85.81	126.0	EOP
8	DRIVEWAY	19+35.57	-87.32	125.6	EOP
9	DRIVEWAY	19+36.96	-86.46	125.5	EOP
10	DRIVEWAY	19+37.46	-77.96	125.5	EOP
11	DRIVEWAY	19+36.88	-77.00	125.6	EOP
12	DRIVEWAY	19+21.00	-73.32	126.2	EOP
13	DRIVEWAY	19+09.26	-61.32	126.3	EOP
14	DRIVEWAY	19+09.26	-2.00	126.3	EOP
15	DRIVEWAY	19+07.26	0.00	126.3	EOP



0' 10' 20'

SCALE: 1"=20'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/4/2024

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FRN - F-1386

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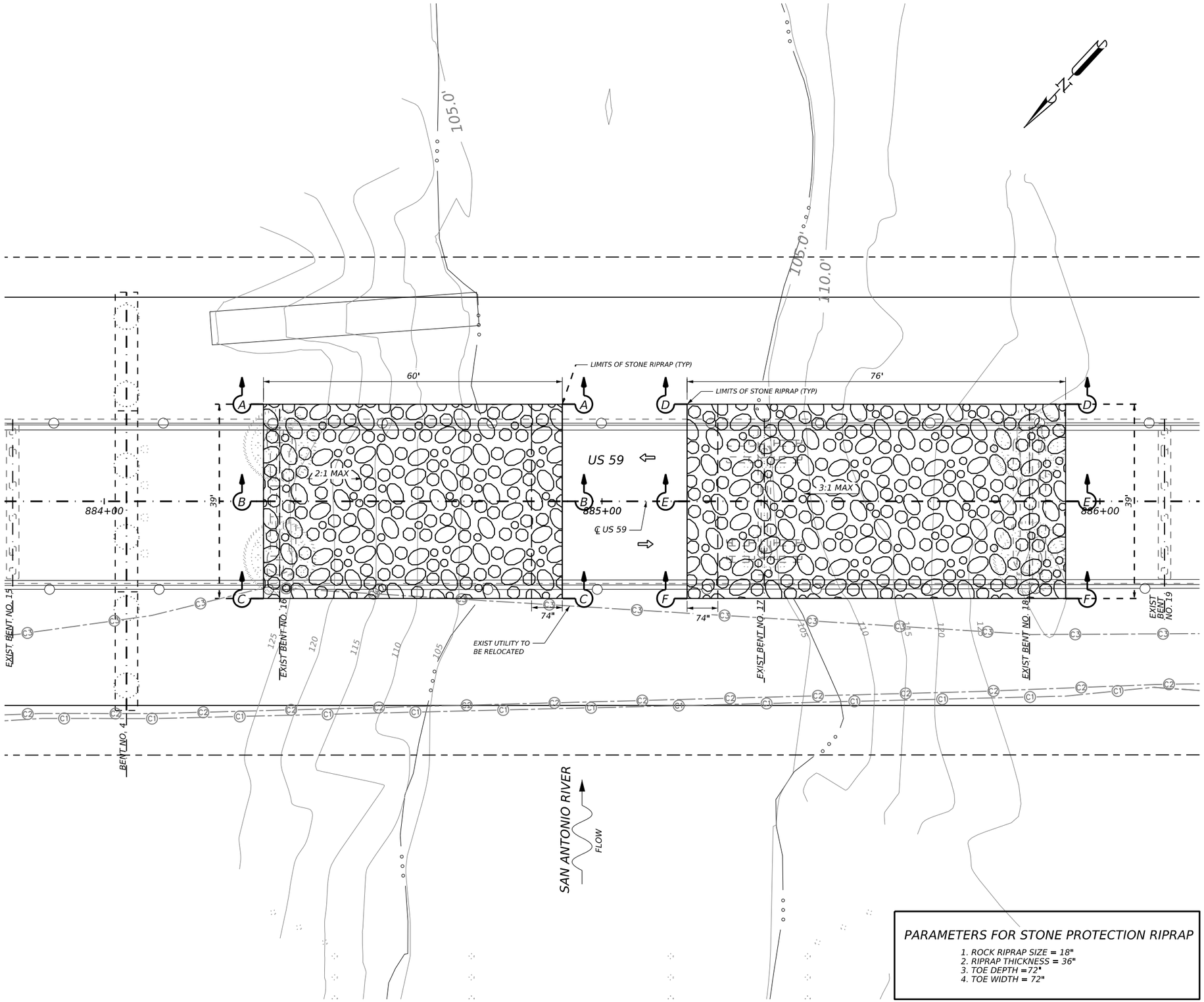
US 59

DRIVEWAY
GRADING PLAN

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		83

DATE: 7/4/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663501062_GRADE01.dgn



NOTES:

1. CONTRACTOR SHALL GRADE PROPOSED STONE RIPRAP ALONG THE RIVER BANK TO MATCH AS CLOSELY AS POSSIBLE TO THE CURRENT EXISTING SIDE SLOPES.

2. SEE "REMOVAL DETAILS EXIST BENT NOS. 16-19" SHEET FOR LIMITS OF DEMOLITION.

PARAMETERS FOR STONE PROTECTION RIPRAP

1. *ROCK RIPRAP SIZE = 18"*
2. *RIPRAP THICKNESS = 36"*
3. *TOE DEPTH =72"*
4. *TOE WIDTH = 72"*

0' 10' 20'

SCALE: 1"=20'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

LJA Engineering, Inc. LJA
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Texas Department of Transportation

US 59

SAN ANTONIO RIVER RIPRAP PLAN

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		84

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663501062_RIPRAP01.dgn

LEGEND

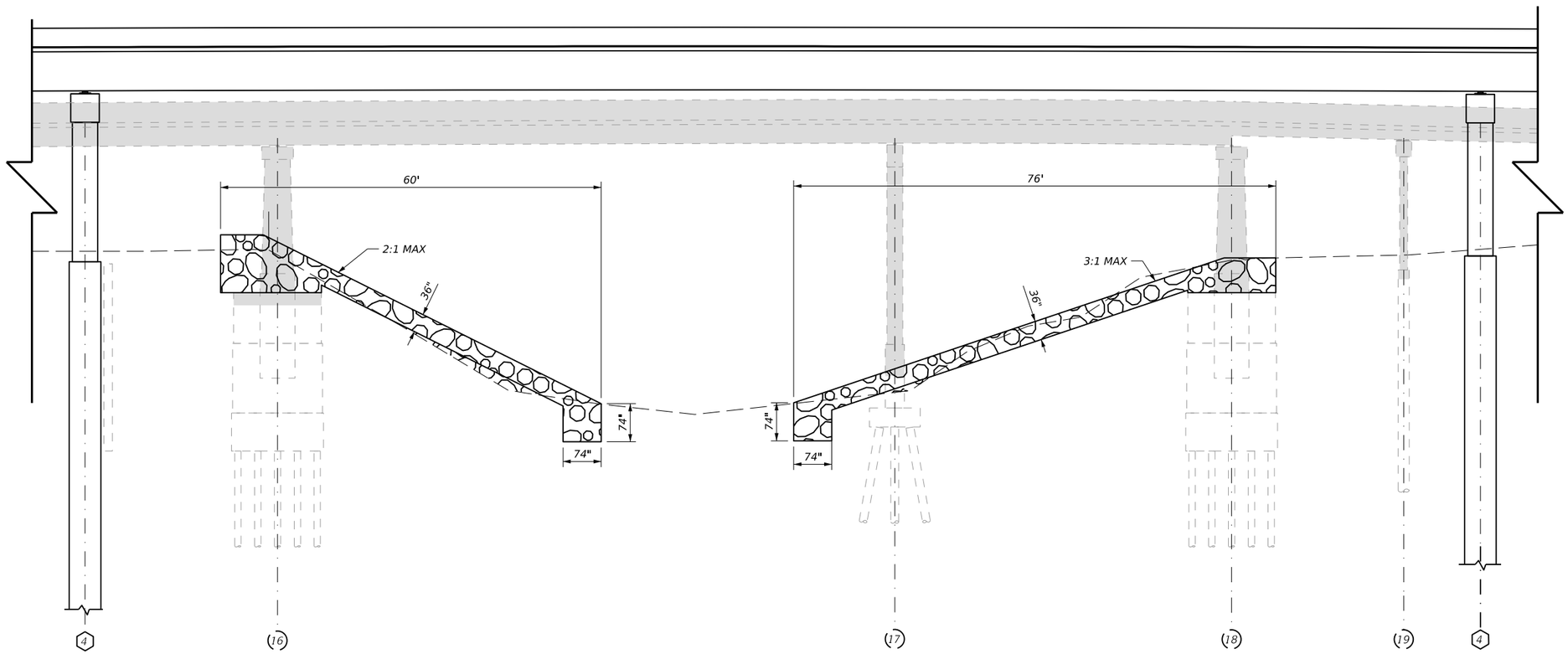
4 PROPOSED BENT NUMBER

(16) EXIST BENT NUMBER

ITEM	CODE	DESCRIPTION	UNIT	QTY
432	7043	RIPRAP (STONE PROTECTION)(18 IN)	CY	452

0' 10' 20'

SCALE: 1"=20'



STATE OF TEXAS
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PROFESSIONAL ENGINEER

7/3/2024

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US 59

SAN ANTONIO RIVER
RIPRAP PLAN

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		85

DATE: 7/3/2024
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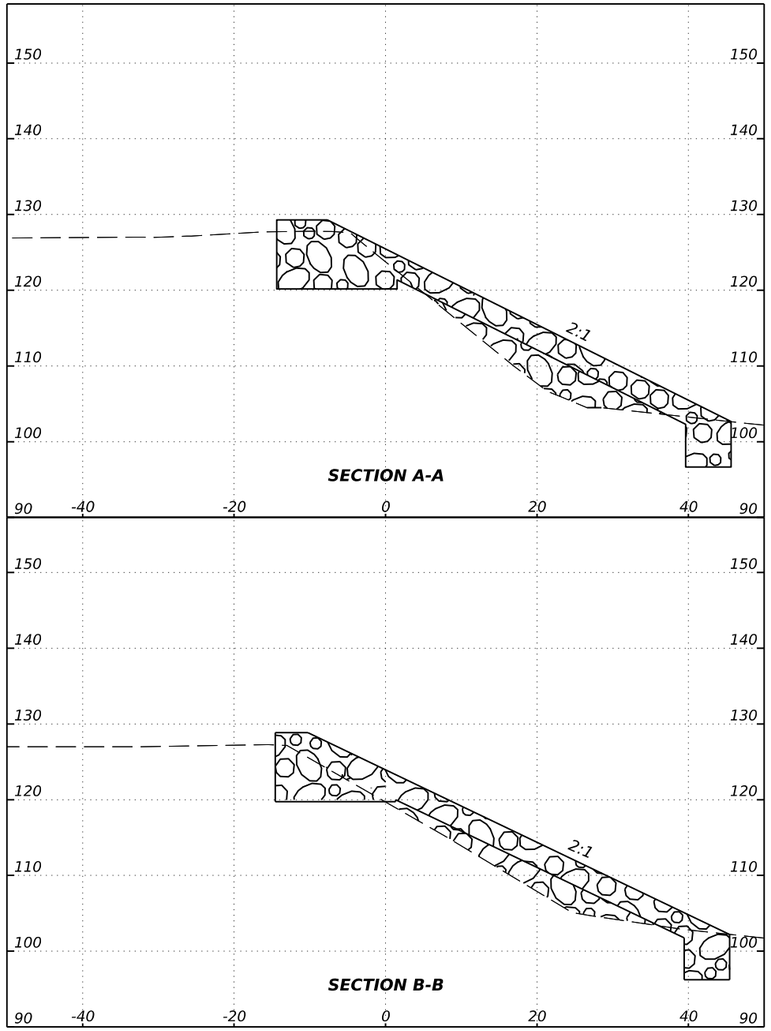
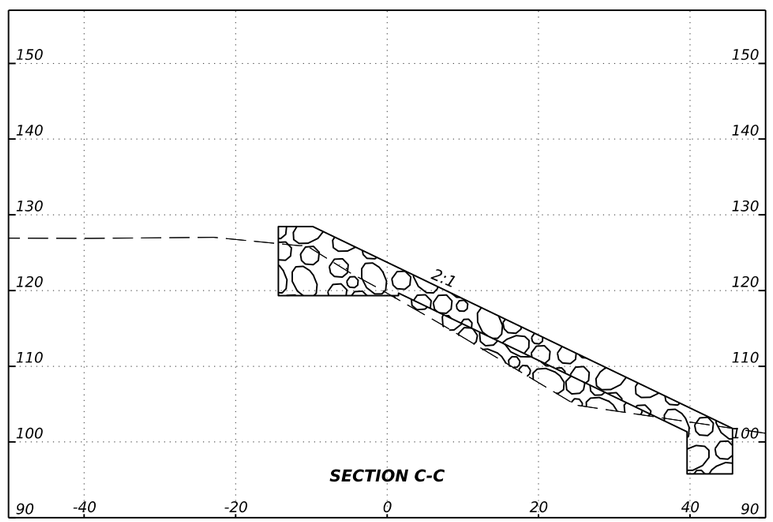


SECTION A-A

SECTION B-B



SECTION C-C

0' 10' 20'

SCALE: 1"=20'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

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US 59

PROTECTION STONE
RIPRAP
SECTIONS

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		86

DATE: 7/3/2024
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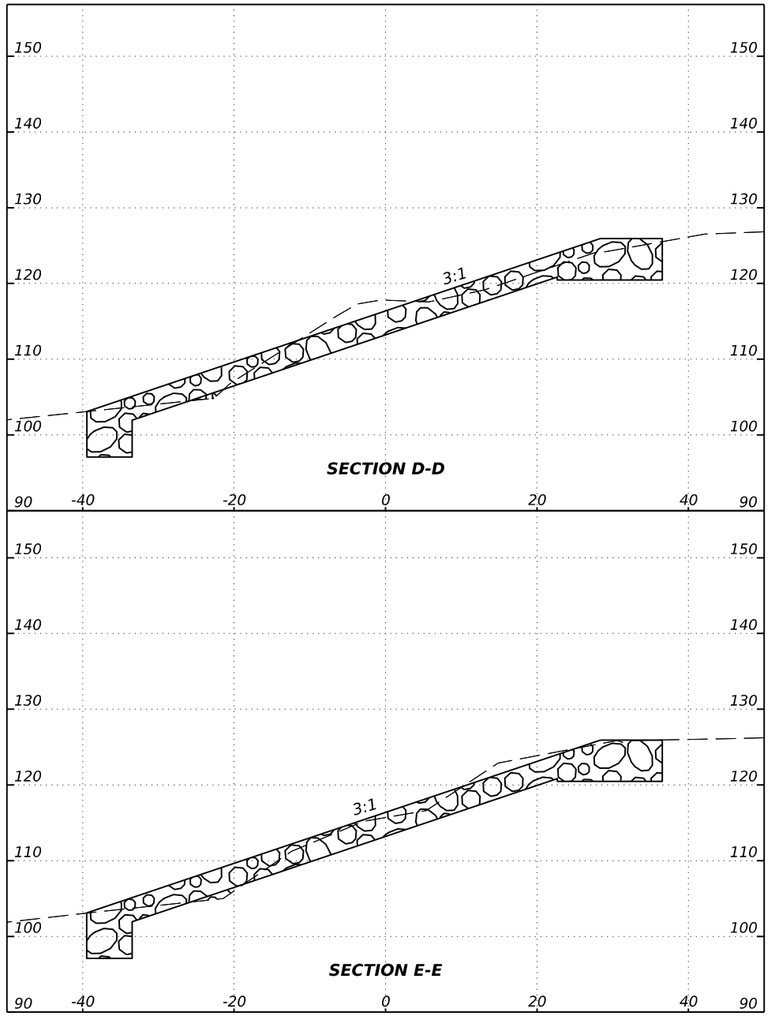
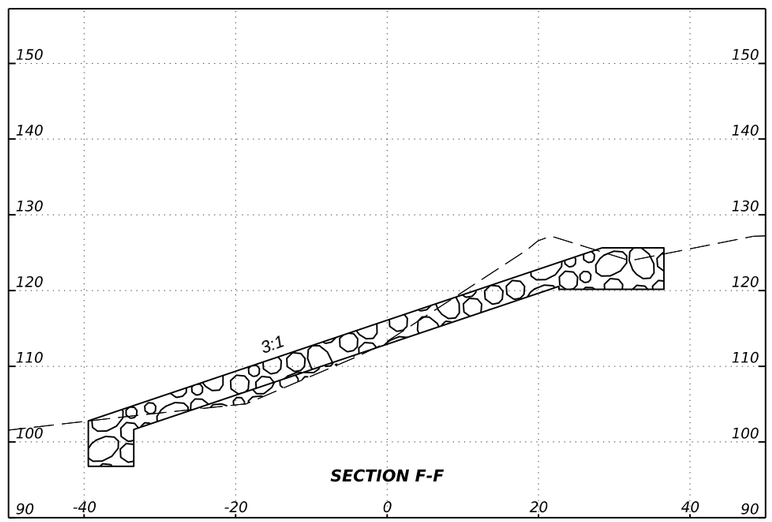


SECTION D-D

SECTION E-E



SECTION F-F

0' 10' 20'

SCALE: 1"=20'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

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US 59

PROTECTION STONE
RIPRAP
SECTIONS

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		87

DATE: 7/3/2024
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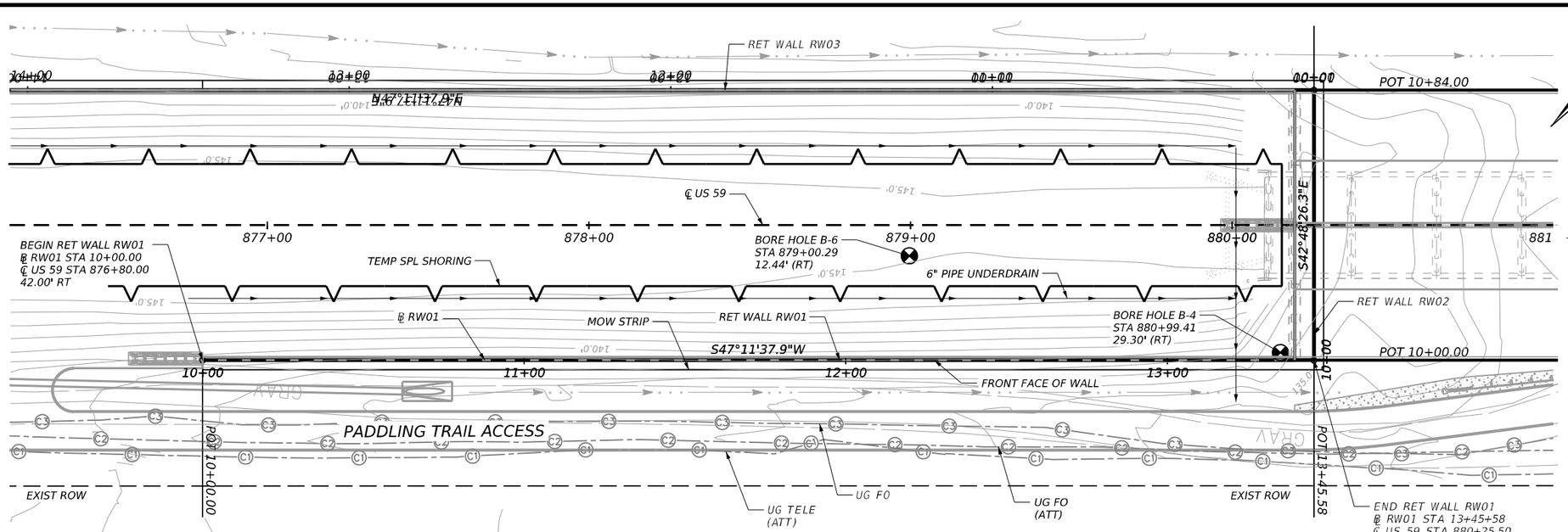
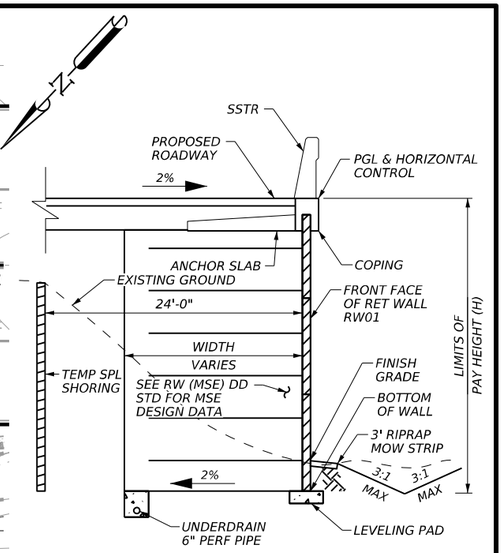




RET WALL TYPICAL SECTION

NTS

NOTES:

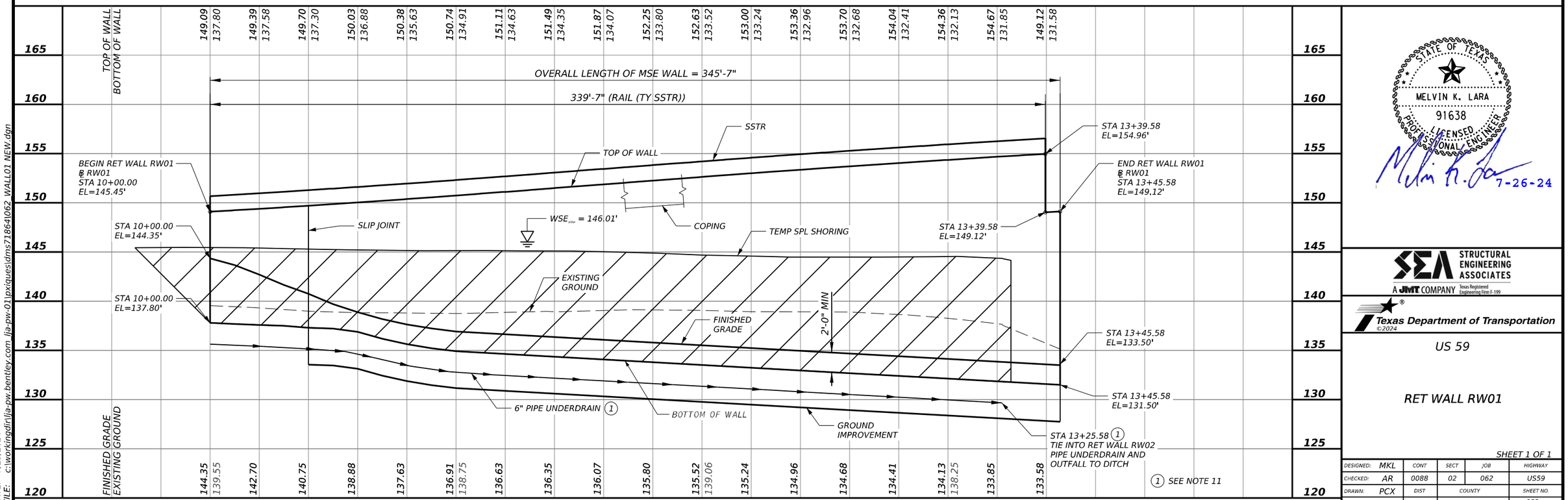
1. MINIMUM EMBEDMENT FROM THE TOP OF LEVELING PAD TO FINISHED GRADE SHALL BE 2 FT.
2. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL LOCATED AT 2 FT BELOW FINISHED GRADE AS SHOWN ON THE WALL PROFILE.
3. MSE BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
4. RET WALL RW01 AND TEMP RET WALL 03 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE TEMP RET WALL 03 LAYOUT AND TCP PLANS FOR MORE INFORMATION.
5. SEE RW(MSE), RW(MSE)DD, RW(TRF) AND RW(RI) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
6. RETAINING WALL AESTHETIC FINISH SHALL BE ASHLER STONE. COPING SHALL HAVE A SMOOTH FINISH.
7. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM RETAINING WALL AT ALL TIMES DURING AND AFTER CONSTRUCTION.
8. UNDERDRAIN QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.
9. SEE "BORE LOG" SHEETS FOR BORING LOG DATA.
10. GROUND IMPROVEMENT, WHERE REQUIRED, IS INCIDENTAL TO PAY ITEM 423, "RETAINING WALL (MSE)". SEE MSE(DD) SHEET FOR MORE INFORMATION.
11. PIPE UNDERDRAINS SHALL INCLUDE BLACKFLOW PREVENTION AT OUTFALL LOCATIONS TO MINIMIZE POTENTIAL FOR FLOODING DEBRIS TO CLOG THE UNDERDRAIN PIPE. TXDOT MAINTENANCE SHOULD INSPECT UNDERDRAIN PIPE OUTLETS AFTER EACH INUNDATION TO CONFIRM THAT THE PIPE UNDERDRAINS ARE NOT CLOGGED AND CAN DRAIN FREELY. COST OF BLACKFLOW PREVENTION SHALL BE SUBSIDARY TO ITEM 556, "PIPE UNDERDRAIN".

LEGEND

- SOIL BORING
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0403	7001	TEMP SPL SHORING	SF	3,703
0423	7001	RETAINING WALL (MSE)	SF	6,137
0432	7013	RIPRAP (MOW STRIP)(4IN)	CY	12.8
0450	7024	RAIL (TY SSTR)	LF	340
0556	7006	PIPE UNDERDRAINS (TY 6)(6 IN)	LF	326



DATE: 7/25/2024
FILE: c:\working\dir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_WALL01 NEW.dgn

STATE OF TEXAS
MELVIN K. LARA
91638
LICENSED PROFESSIONAL ENGINEER
7-26-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

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US 59

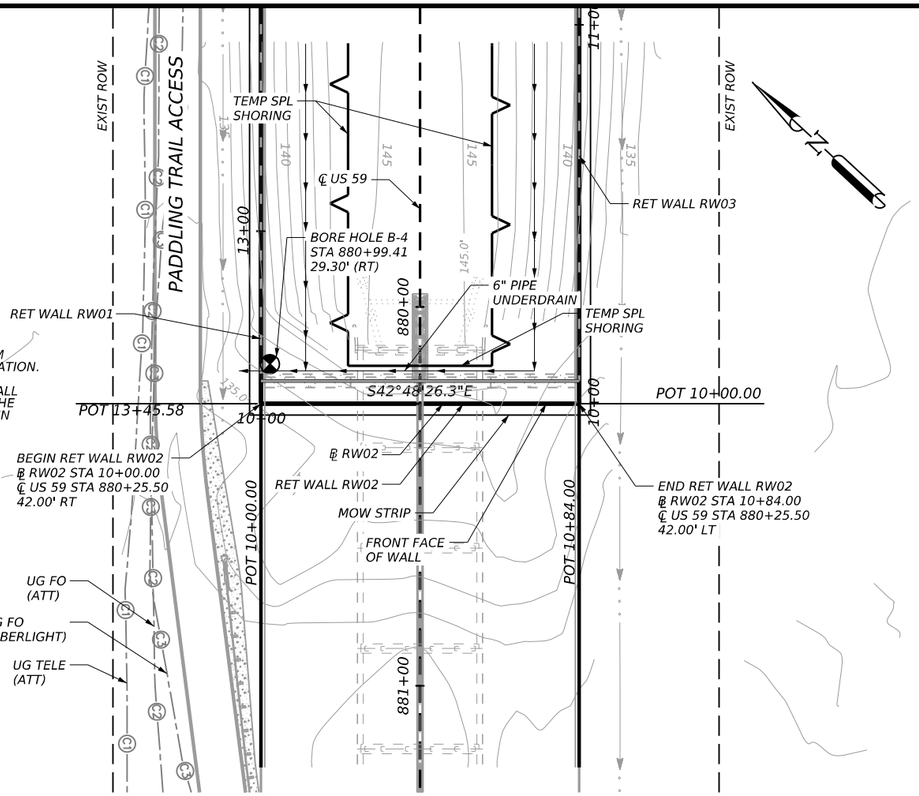
RET WALL RW01

SHEET 1 OF 1

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		088

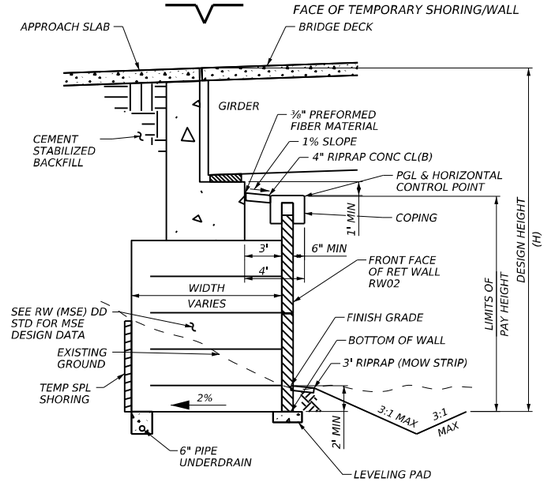
NOTES:

1. MINIMUM EMBEDMENT FROM THE TOP OF LEVELING PAD TO FINISHED GRADE SHALL BE 2 FT.
2. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL LOCATED AT 2 FT BELOW FINISHED GRADE AS SHOWN ON THE WALL PROFILE.
3. MSE BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
4. SEE RW(MSE), RW(MSE)DD, RW(TRF) AND RW(RI) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
5. RETAINING WALL AESTHETIC FINISH SHALL BE ASHLER STONE. COPING SHALL HAVE A SMOOTH FINISH.
6. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM RETAINING WALL AT ALL TIMES DURING AND AFTER CONSTRUCTION.
7. UNDERDRAIN QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.
8. SEE "BORE LOG" SHEETS FOR BORING LOG DATA.
9. GROUND IMPROVEMENT, WHERE REQUIRED, IS INCIDENTAL TO PAY ITEM 423, "RETAINING WALL (MSE)". SEE MSE(DD) SHEET FOR MORE INFORMATION.
10. PIPE UNDERDRAINS SHALL INCLUDE BLACKFLOW PREVENTION AT OUTFALL LOCATIONS TO MINIMIZE POTENTIAL FOR FLOODING DEBRIS TO CLOG THE UNDERDRAIN PIPE. TXDOT MAINTENANCE SHOULD INSPECT UNDERDRAIN PIPE OUTLETS AFTER EACH INUNDATION TO CONFIRM THAT THE PIPE UNDERDRAINS ARE NOT CLOGGED AND CAN DRAIN FREELY. COST OF BLACKFLOW PREVENTION SHALL BE SUBSIDARY TO ITEM 556, "PIPE UNDERDRAIN".



LEGEND

- SOIL BORING
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL

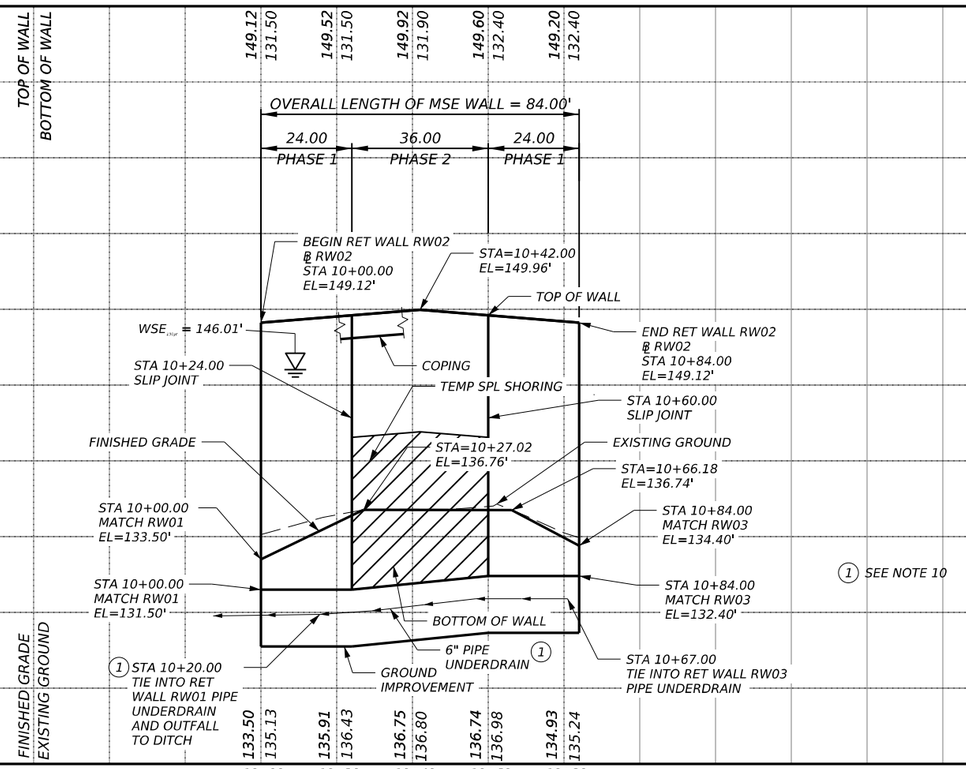


RET WALL TYPICAL SECTION @ ABUTMENT

NTS

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0403	7001	TEMP SPL SHORING	SF	352
0423	7001	RETAINING WALL (MSE)	SF	1,478
0432	7013	RIPRAP (MOW STRIP)(4IN)	CY	3.4
0556	7006	PIPE UNDERDRAINS (TY 6)(6 IN)	LF	104



DATE: 7/31/2024
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STATE OF TEXAS
MELVIN K. LARA
91638
PROFESSIONAL LICENSED ENGINEER

7-31-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

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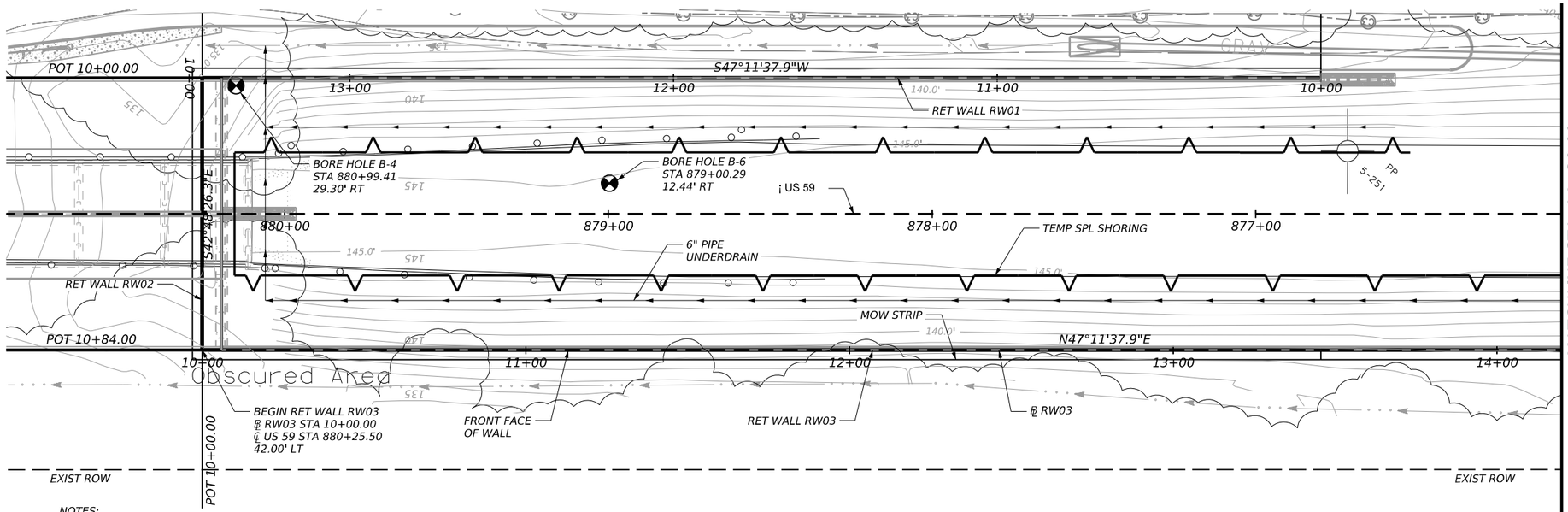
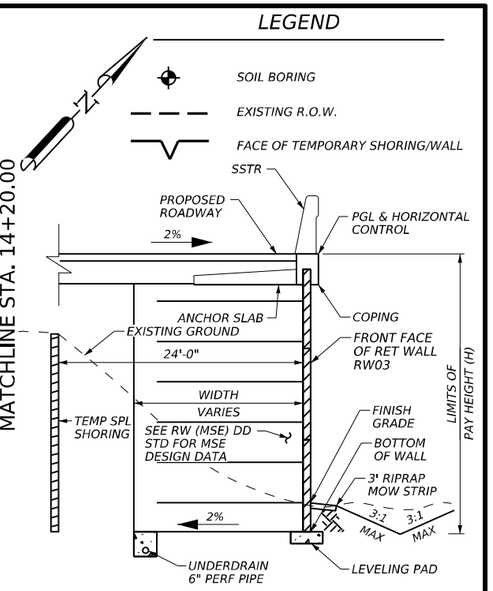
US 59

RET WALL RW02

SHEET 1 OF 1

DESIGNED: MKL	CONT	SECT	JOB	HIGHWAY
CHECKED: AR	0088	02	062	US59
DRAWN: PCX	DIST	COUNTY		SHEET NO.
CHECKED: MKL	CRP	GOLIAD		089





RET WALL TYPICAL SECTION

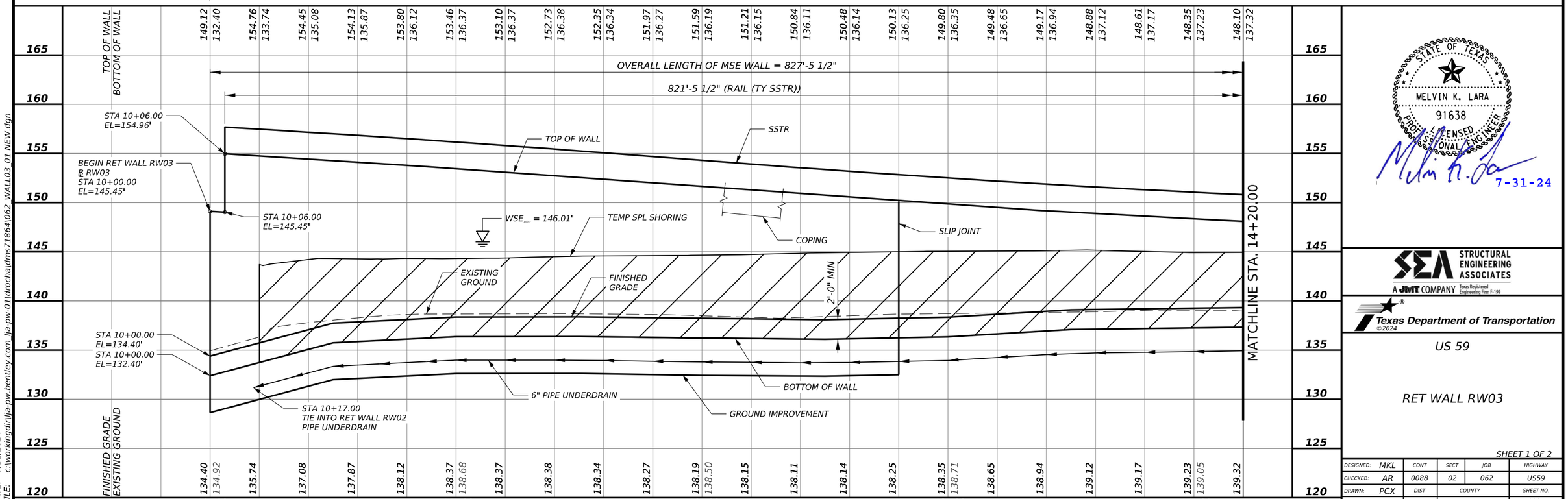
NTS

NOTES:

1. MINIMUM EMBEDMENT FROM THE TOP OF LEVELING PAD TO FINISHED GRADE SHALL BE 2 FT.
2. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL LOCATED AT 2 FT BELOW FINISHED GRADE AS SHOWN ON THE WALL PROFILE.
3. MSE BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
4. RET WALL RW03 AND TEMP RET WALL 02 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE TEMP RET WALL 02 LAYOUT AND TCP PLANS FOR MORE INFORMATION.
5. SEE RW(MSE), RW(MSE)DD, RW(TRF) AND RW(RI) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
6. RETAINING WALL AESTHETIC FINISH SHALL BE ASHLER STONE. COPING SHALL HAVE A SMOOTH FINISH.
7. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM RETAINING WALL AT ALL TIMES DURING AND AFTER CONSTRUCTION.
8. UNDERDRAIN QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.
9. SEE "BORE LOG" SHEETS FOR BORING LOG DATA.
10. GROUND IMPROVEMENT, WHERE REQUIRED, IS INCIDENTAL TO PAY ITEM 423, "RETAINING WALL (MSE)". SEE MSE(DD) SHEET FOR MORE INFORMATION.

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0403	7001	TEMP SPL SHORING	SF	5,533
0423	7001	RETAINING WALL (MSE)	SF	9,028
0432	7013	RIPRAP (MOW STRIP)(4IN)	CY	30.6
0450	7024	RAIL (TY SSTR)	LF	822
0556	7006	PIPE UNDERDRAINS (TY 6)(6 IN)	LF	852



STATE OF TEXAS
MELVIN K. LARA
91638
PROFESSIONAL ENGINEER
LICENSED
7-31-24

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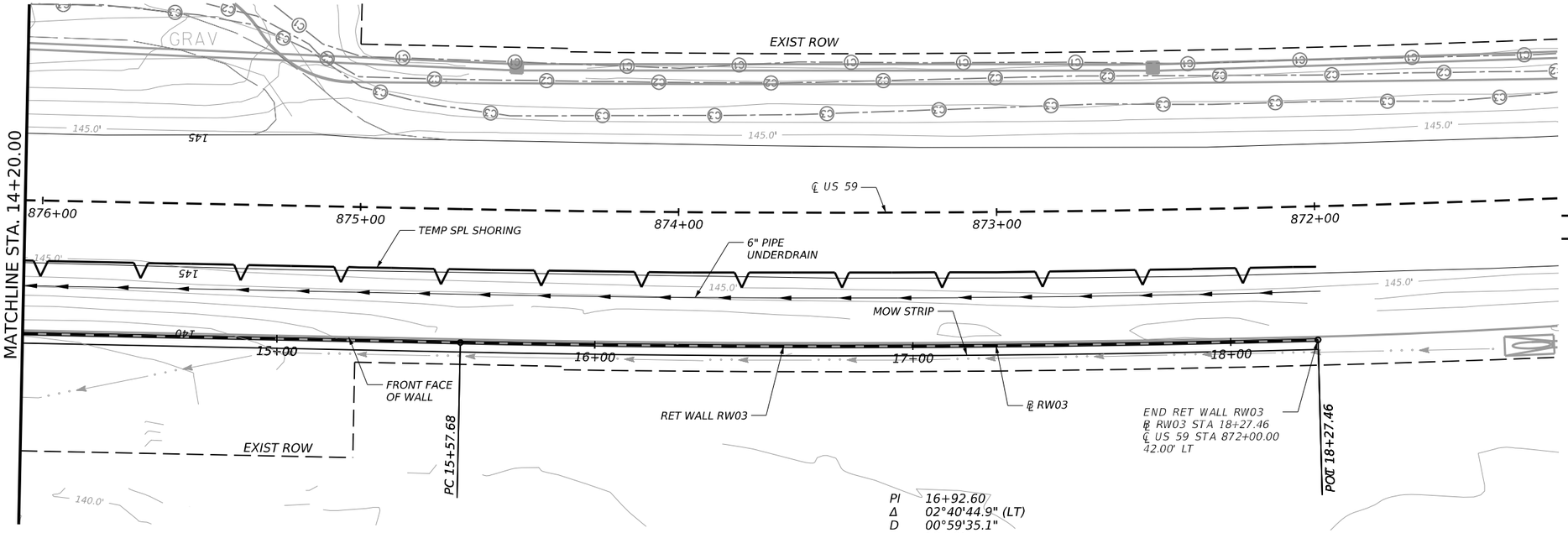
US 59

RET WALL RW03

SHEET 1 OF 2

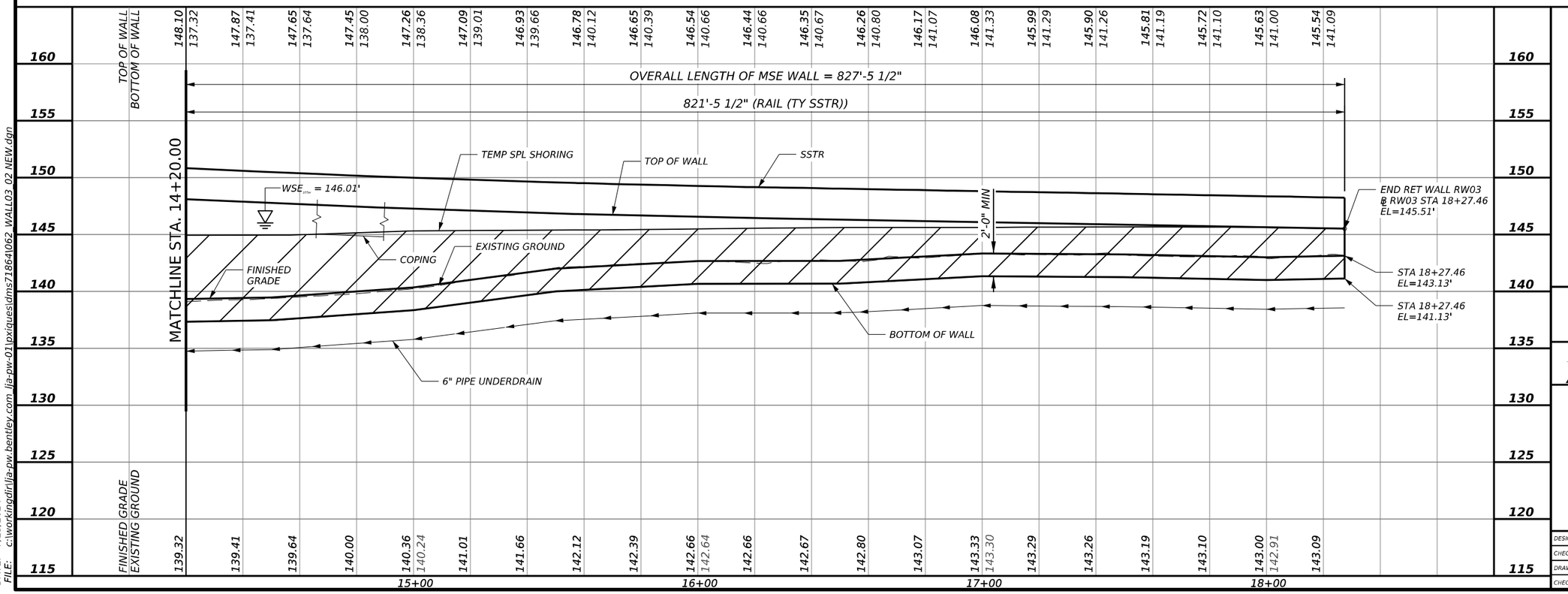
DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		090

DATE: 7/31/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\dfrochaidms\718641062_WALL03_01_NEW.dgn



LEGEND

- SOIL BORING
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



STATE OF TEXAS
MELVIN K. LARA
91638
LICENSED PROFESSIONAL ENGINEER
7-26-24

STRUCTURAL ENGINEERING ASSOCIATES
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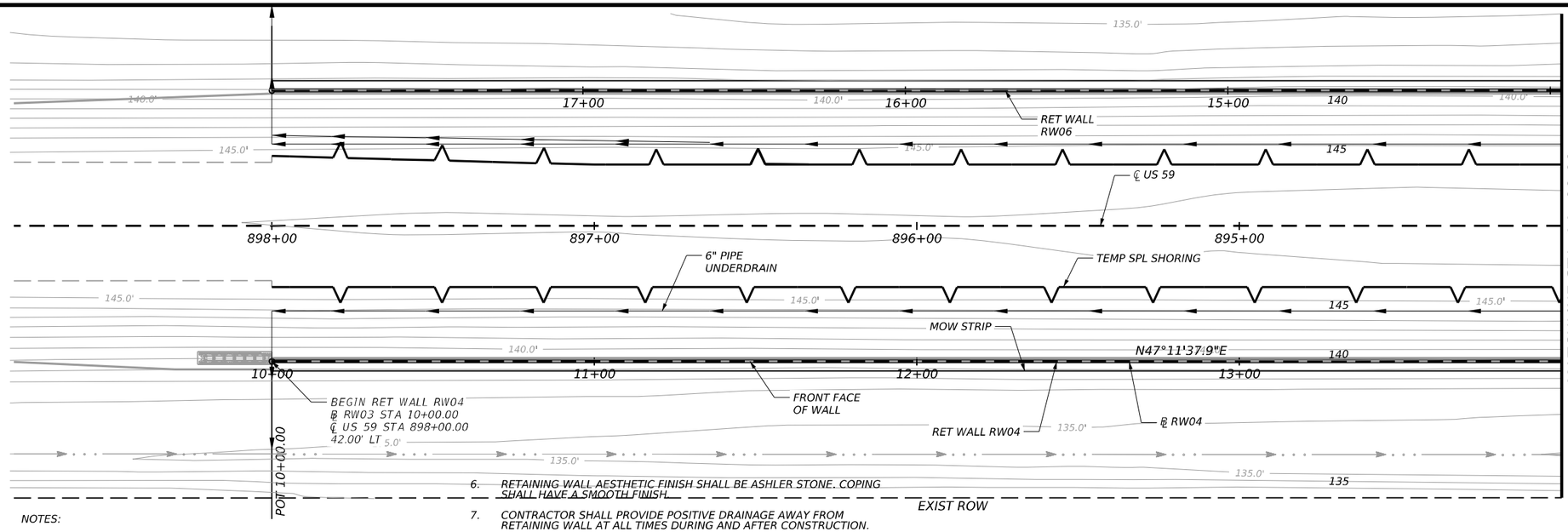
US 59

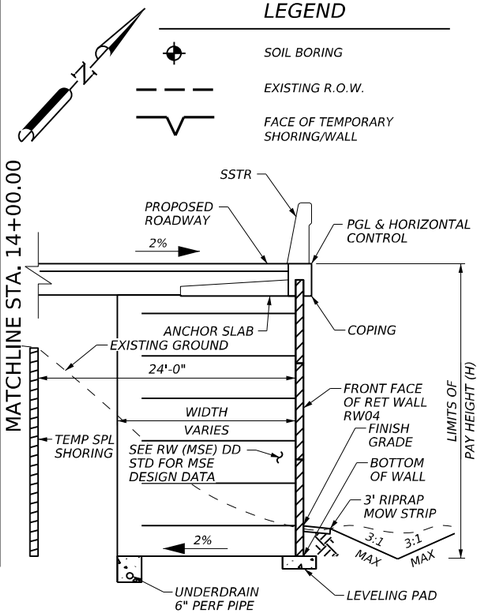
RET WALL RW03

SHEET 2 OF 2

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		091

DATE: 7/25/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\pxiques\dms718641062_WALL03_02 NEW.dgn





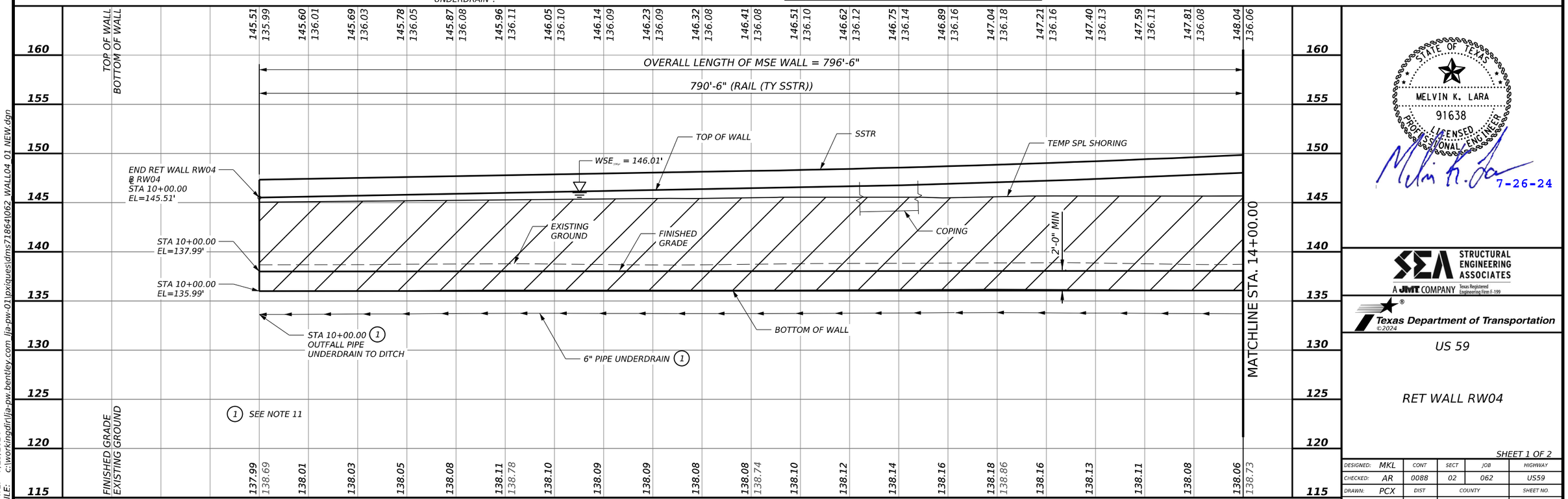
RET WALL TYPICAL SECTION
NTS

NOTES:

1. MINIMUM EMBEDMENT FROM THE TOP OF LEVELING PAD TO FINISHED GRADE SHALL BE 2 FT.
2. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL LOCATED AT 2 FT BELOW FINISHED GRADE AS SHOWN ON THE WALL PROFILE.
3. MSE BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
4. RET WALL RW04 AND TEMP RET WALL 06 SHALL BE CONSTRUCTED AS BACK TO BACK RETAINING WALLS DURING PHASE 1 OF THE TCP. SEE TEMP RET WALL 06 LAYOUT AND TCP PLANS FOR MORE INFORMATION.
5. SEE RW(MSE), RW(MSE)DD, RW(TRF) AND RW(RI) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
6. RETAINING WALL AESTHETIC FINISH SHALL BE ASHLER STONE. COPING SHALL HAVE A SMOOTH FINISH.
7. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM RETAINING WALL AT ALL TIMES DURING AND AFTER CONSTRUCTION.
8. UNDERDRAIN QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.
9. SEE "BORE LOG" SHEETS FOR BORING LOG DATA.
10. GROUND IMPROVEMENT, WHERE REQUIRED, IS INCIDENTAL TO PAY ITEM 423, "RETAINING WALL (MSE)". SEE MSE(DD) SHEET FOR MORE INFORMATION.
11. PIPE UNDERDRAINS SHALL INCLUDE BLACKFLOW PREVENTION AT OUTFALL LOCATIONS TO MINIMIZE POTENTIAL FOR FLOODING DEBRIS TO CLOG THE UNDERDRAIN PIPE. TXDOT MAINTENANCE SHOULD INSPECT UNDERDRAIN PIPE OUTLETS AFTER EACH INUNDATION TO CONFIRM THAT THE PIPE UNDERDRAINS ARE NOT CLOGGED AND CAN DRAIN FREELY. COST OF BLACKFLOW PREVENTION SHALL BE SUBSIDARY TO ITEM 556, "PIPE UNDERDRAIN".

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0403	7001	TEMP SPL SHORING	SF	7,073
0423	7001	RETAINING WALL (MSE)	SF	10,064
0432	7013	RIPRAP (MOW STRIP)(4IN)	CY	29.5
0450	7024	RAIL (TY SSTR)	LF	791
0556	7006	PIPE UNDERDRAINS (TY 6)(6 IN)	LF	807



STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

Texas Department of Transportation

US 59

RET WALL RW04

SHEET 1 OF 2

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		092

DATE: 7/25/2024
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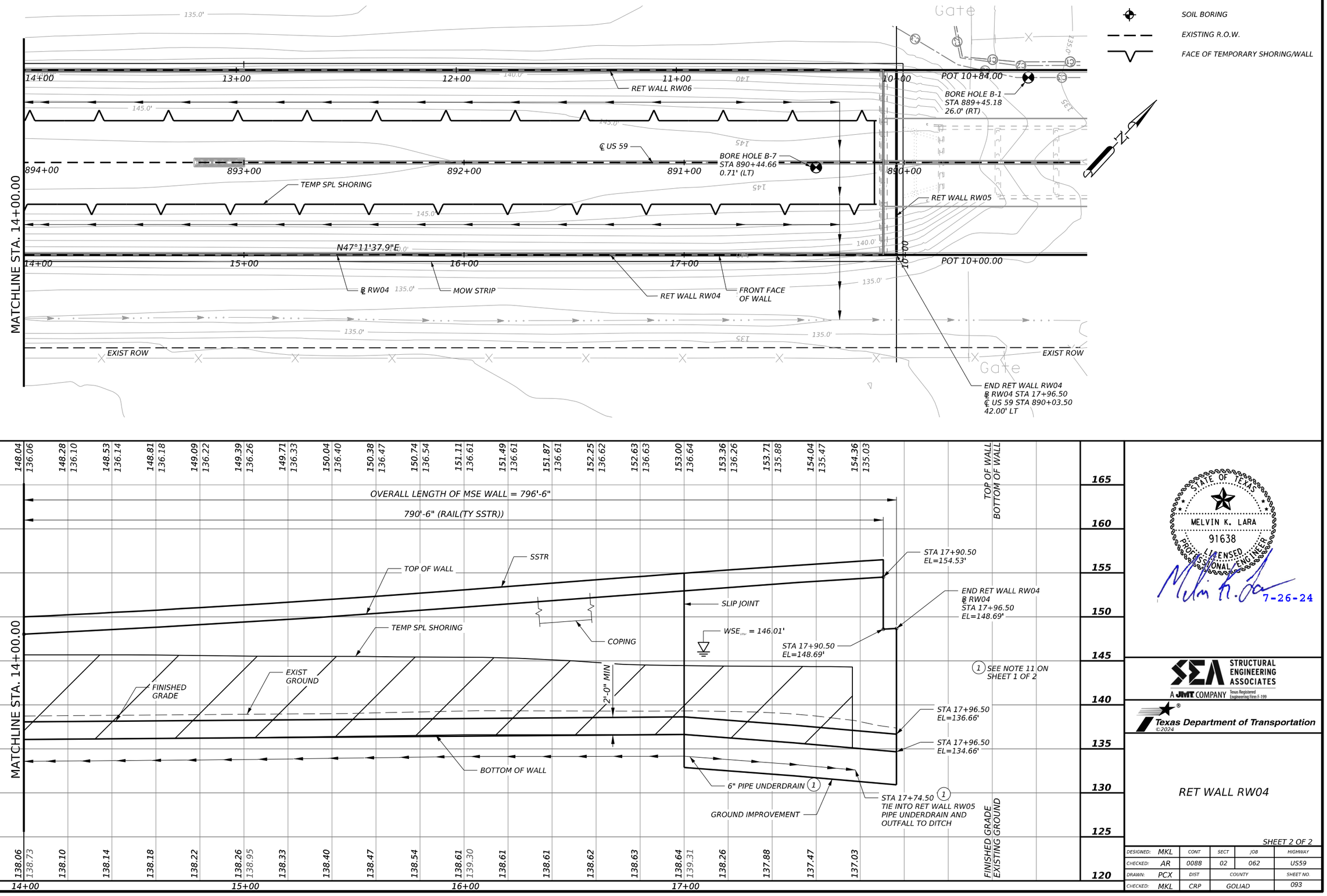

STATE OF TEXAS
MELVIN K. LARA
91638
LICENSED
PROFESSIONAL ENGINEER
7-26-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

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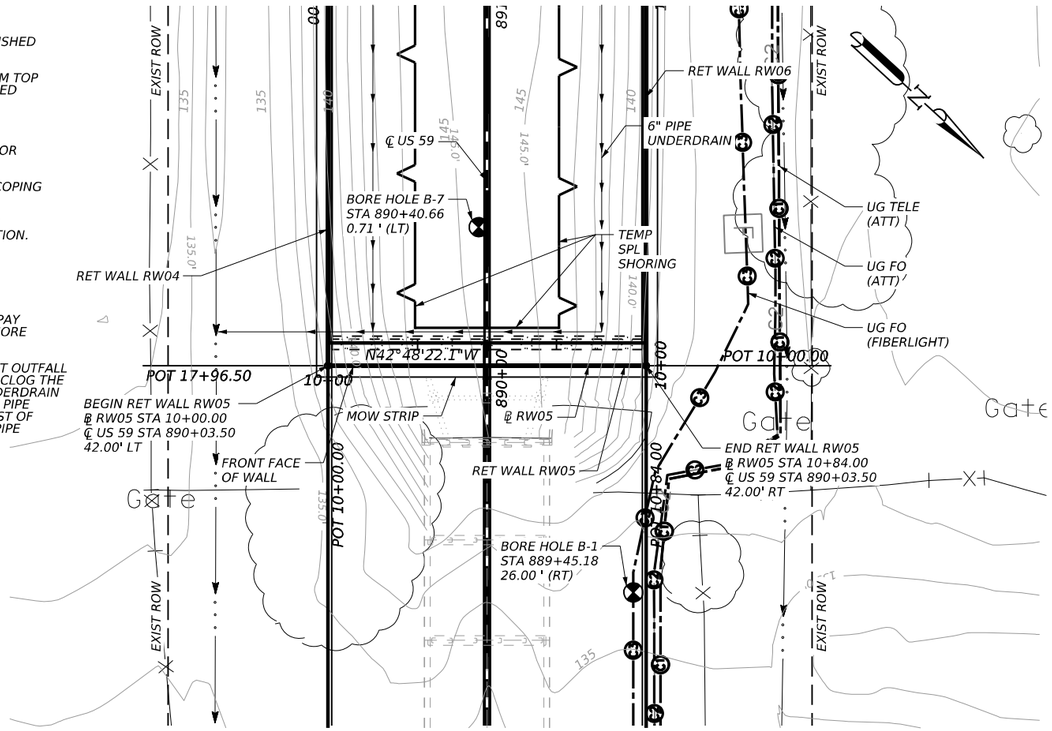
RET WALL RW04

SHEET 2 OF 2

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		093

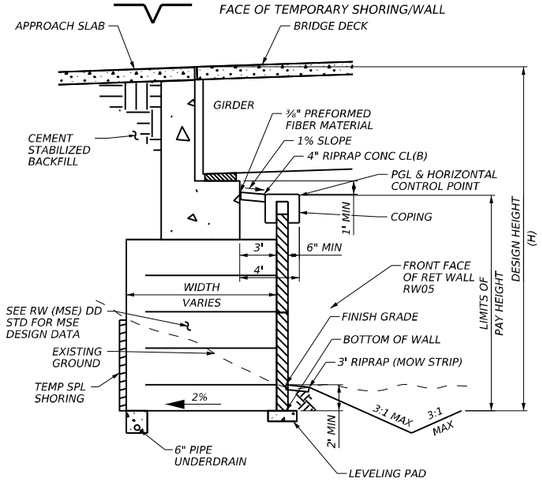
NOTES:

1. MINIMUM EMBEDMENT FROM THE TOP OF LEVELING PAD TO FINISHED GRADE SHALL BE 2 FT.
2. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL LOCATED AT 2 FT BELOW FINISHED GRADE AS SHOWN ON THE WALL PROFILE.
3. MSE BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
4. SEE RW(MSE), RW(MSE)DD, RW(TRF) AND RW(RI) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
5. RETAINING WALL AESTHETIC FINISH SHALL BE ASHLER STONE. COPING SHALL HAVE A SMOOTH FINISH.
6. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM RETAINING WALL AT ALL TIMES DURING AND AFTER CONSTRUCTION.
7. UNDERDRAIN QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.
8. SEE "BORE LOG" SHEETS FOR BORING LOG DATA.
9. GROUND IMPROVEMENT, WHERE REQUIRED, IS INCIDENTAL TO PAY ITEM 423, "RETAINING WALL (MSE)". SEE MSE(DD) SHEET FOR MORE INFORMATION.
10. PIPE UNDERDRAINS SHALL INCLUDE BLACKFLOW PREVENTION AT OUTFALL LOCATIONS TO MINIMIZE POTENTIAL FOR FLOODING DEBRIS TO CLOG THE UNDERDRAIN PIPE. TXDOT MAINTENANCE SHOULD INSPECT UNDERDRAIN PIPE OUTLETS AFTER EACH INUNDATION TO CONFIRM THAT THE PIPE UNDERDRAINS ARE NOT CLOGGED AND CAN DRAIN FREELY. COST OF BLACKFLOW PREVENTION SHALL BE SUBSIDARY TO ITEM 556, "PIPE UNDERDRAIN".



LEGEND

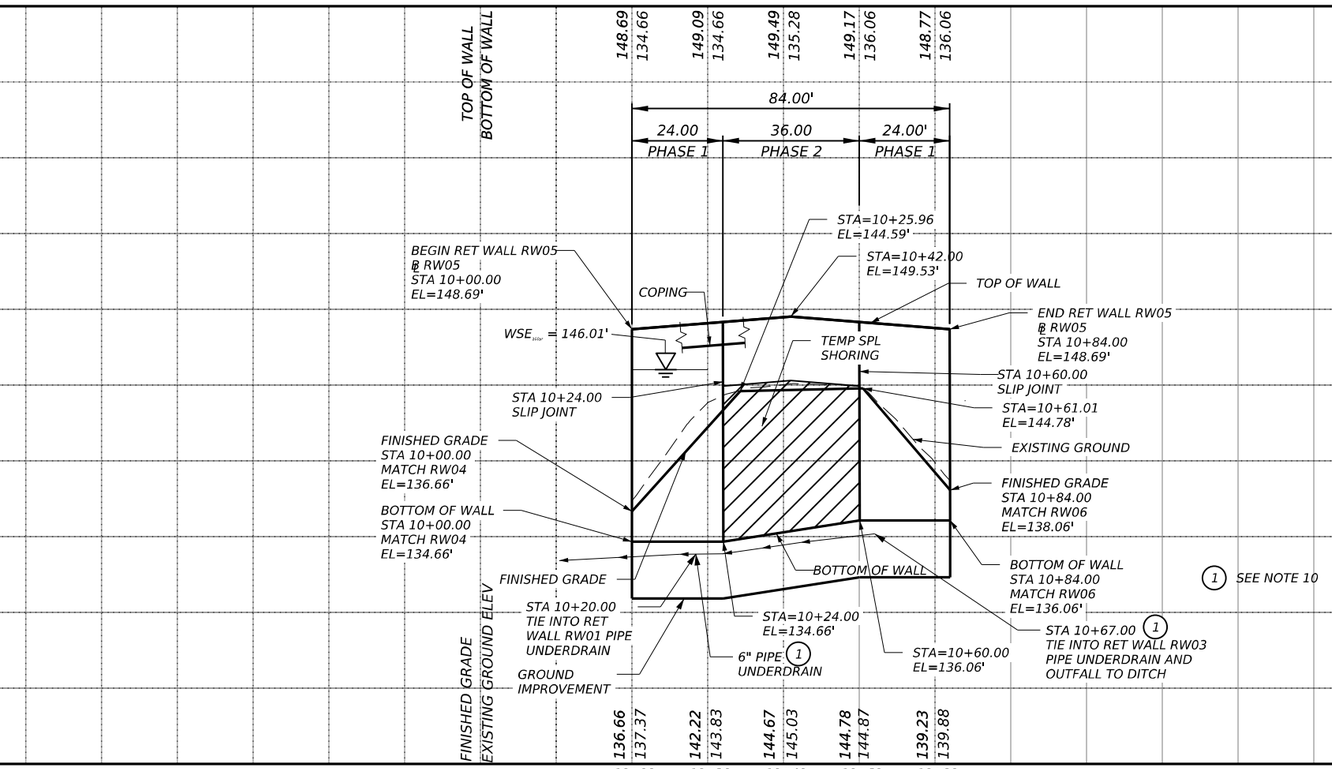
- SOIL BORING
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



RET WALL TYPICAL SECTION @ ABUTMENT

NTS

ESTIMATED RETAINING WALL QUANTITIES				
ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0403	7001	TEMP SPL SHORING	SF	351
0423	7001	RETAINING WALL (MSE)	SF	1,155
0432	7013	RIPRAP (MOW STRIP)(4IN)	CY	3.4
0556	7006	PIPE UNDERDRAINS (TY 6)(6 IN)	LF	104



DATE: 7/31/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\dfrochaidms\718641062_WALL05.dgn

STATE OF TEXAS
MELVIN K. LARA
91638
LICENSED
PROFESSIONAL ENGINEER
7-31-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

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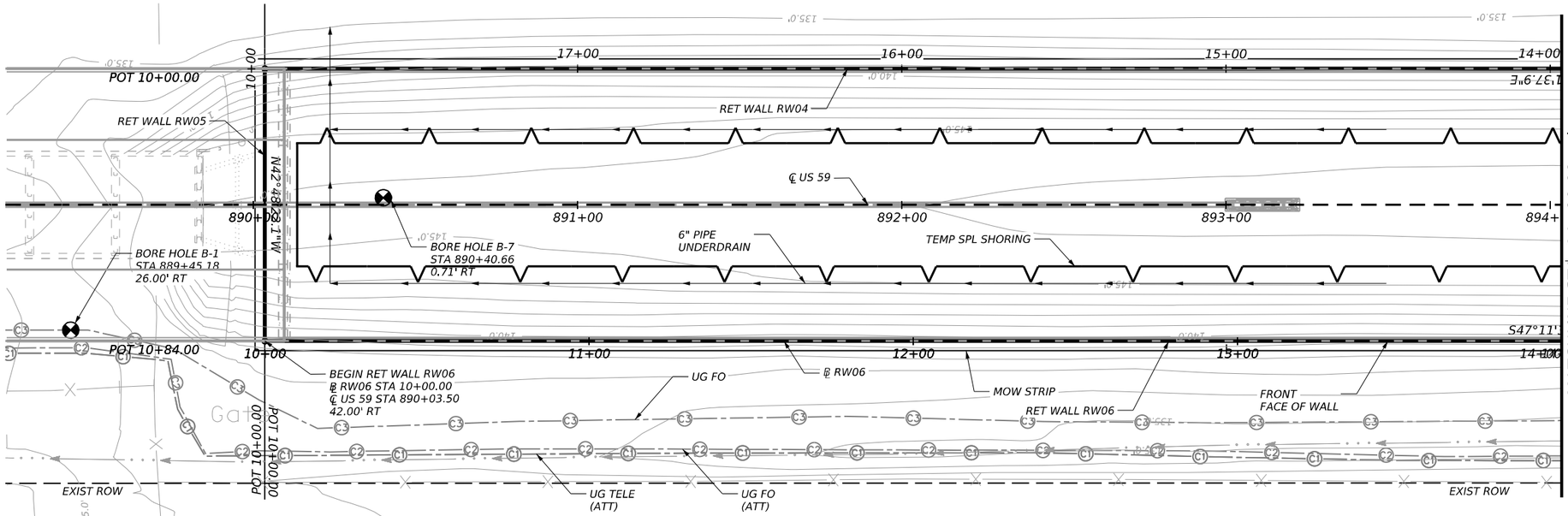
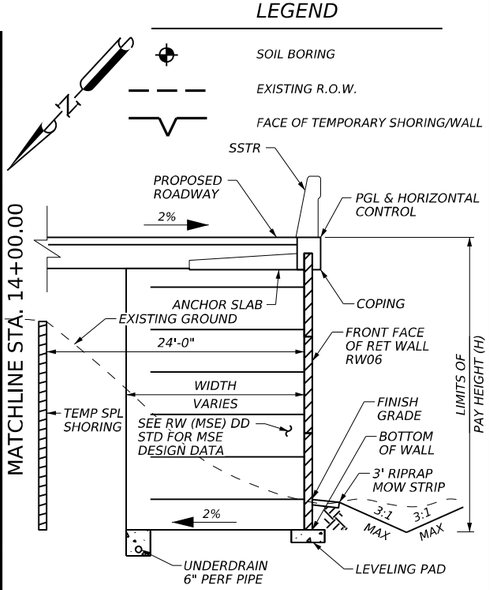
US 59

RET WALL RW05

SHEET 1 OF 1

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		094





RET WALL TYPICAL SECTION

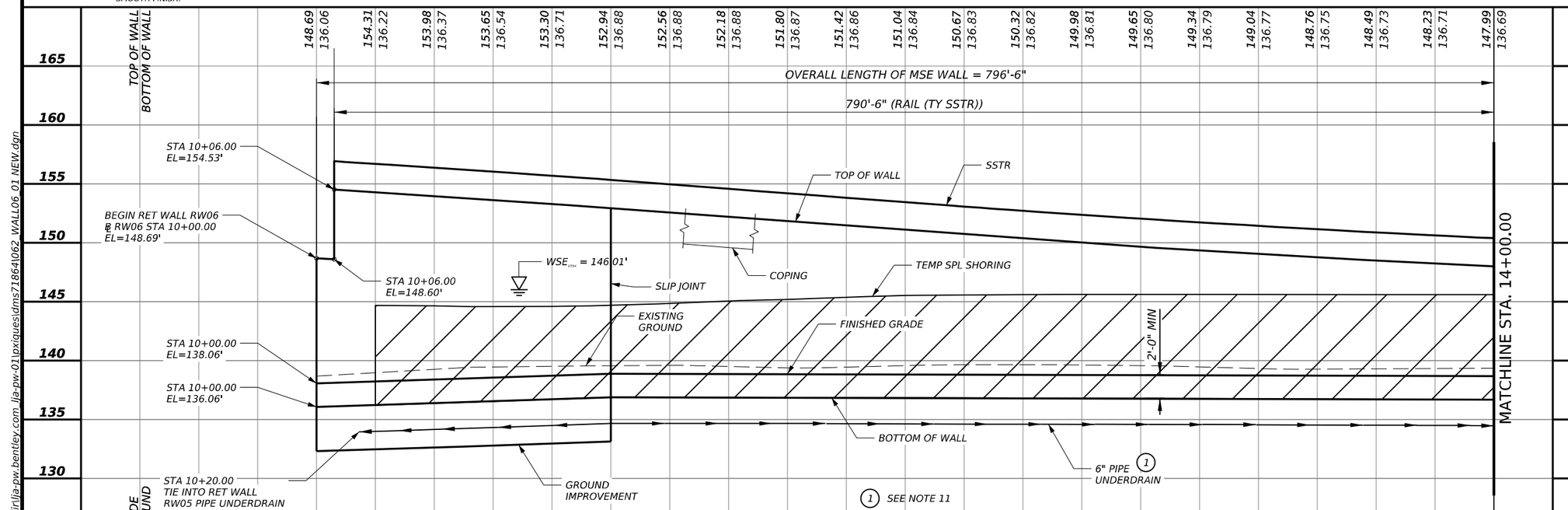
NTS

NOTES:

1. MINIMUM EMBEDMENT FROM THE TOP OF LEVELING PAD TO FINISHED GRADE SHALL BE 2 FT.
2. FOR QUANTIFICATION PURPOSES WALL AREA IS MEASURED FROM TOP OF WALL TO BOTTOM OF WALL LOCATED AT 2 FT BELOW FINISHED GRADE AS SHOWN ON THE WALL PROFILE.
3. MSE BACKFILL SHALL CONFORM TO ITEM 423, TYPE DS.
4. RET WALL RW06 AND TEMP RET WALL 07 SHALL BE CONSTRUCTED AS BACK TO BACK RETWAINING WALLS DURING PHASE 1 OF THE TCP. SEE TEMP RET WALL 07 LAYOUT AND TCP PLANS FOR MORE INFORMATION.
5. SEE RW(MSE), RW(MSE)DD, RW(TRF) AND RW(RI) STANDARDS FOR MORE INFORMATION, AS APPLICABLE.
6. RETAINING WALL AESTHETIC FINISH SHALL BE ASHLER STONE. COPING SHALL HAVE A SMOOTH FINISH.
7. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM RETAINING WALL AT ALL TIMES DURING AND AFTER CONSTRUCTION.
8. UNDERDRAIN QUANTITIES ARE SHOWN FOR CONTRACTOR'S INFORMATION ONLY.
9. SEE "BORE LOG" SHEETS FOR BORING LOG DATA.
10. GROUND IMPROVEMENT, WHERE REQUIRED, IS INCIDENTAL TO PAY ITEM 423, "RETAINING WALL (MSE)". SEE MSE(DD) SHEET FOR MORE INFORMATION.
11. PIPE UNDERDRAINS SHALL INCLUDE BLACKFLOW PREVENTION AT OUTFALL LOCATIONS TO MINIMIZE POTENTIAL FOR FLOODING DEBRIS TO CLOG THE UNDERDRAIN PIPE. TXDOT MAINTENANCE SHOULD INSPECT UNDERDRAIN PIPE OUTLETS AFTER EACH INUNDATION TO CONFIRM THAT THE PIPE UNDERDRAINS ARE NOT CLOGGED AND CAN DRAIN FREELY. COST OF BLACKFLOW PREVENTION SHALL BE SUBSIDARY TO ITEM 556, "PIPE UNDERDRAIN".

ESTIMATED RETAINING WALL QUANTITIES

ITEM	BID CODE	DESCRIPTION	UNIT	QTY
0403	7001	TEMP SPL SHORING	SF	6,786
0423	7001	RETAINING WALL (MSE)	SF	9,696
0432	7013	RIPRAP (MOW STRIP)(4IN)	CY	29.5
0450	7024	RAIL (TY SSTR)	LF	791
0556	7006	PIPE UNDERDRAINS (TY 6)(6 IN)	LF	812



DATE: 7/25/2024
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STATE OF TEXAS
MELVIN K. LARA
91638
PROFESSIONAL ENGINEER
LICENSED
7-26-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

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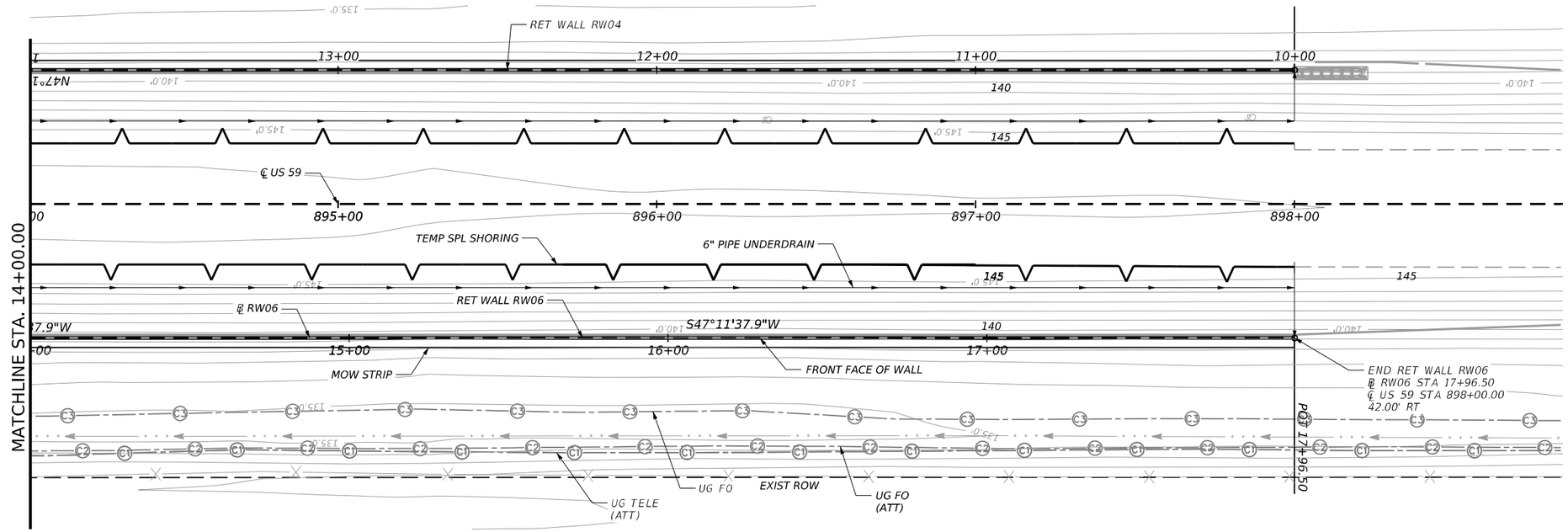
US 59

RET WALL RW06

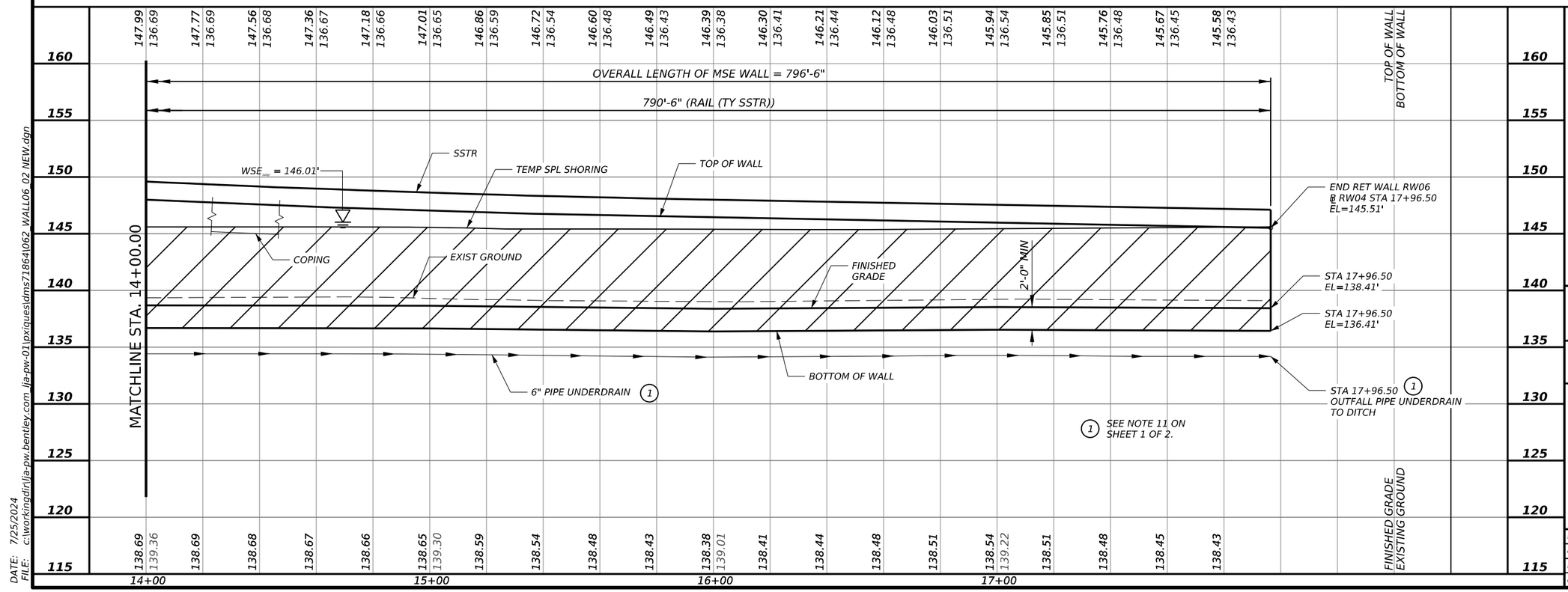
SHEET 1 OF 2

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		095



LEGEND

- SOIL BORING
- EXISTING R.O.W.
- FACE OF TEMPORARY SHORING/WALL



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STATE OF TEXAS
MELVIN K. LARA
91638
LICENSED
PROFESSIONAL ENGINEER
Melvin K. Lara 7-26-24

STRUCTURAL ENGINEERING ASSOCIATES
A JMT COMPANY Texas Registered Engineering Firm F-199

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US 59

RET WALL RW06

SHEET 2 OF 2

DESIGNED:	MKL	CONT	SECT	JOB	HIGHWAY
CHECKED:	AR	0088	02	062	US59
DRAWN:	PCX	DIST	COUNTY		SHEET NO.
CHECKED:	MKL	CRP	GOLIAD		096

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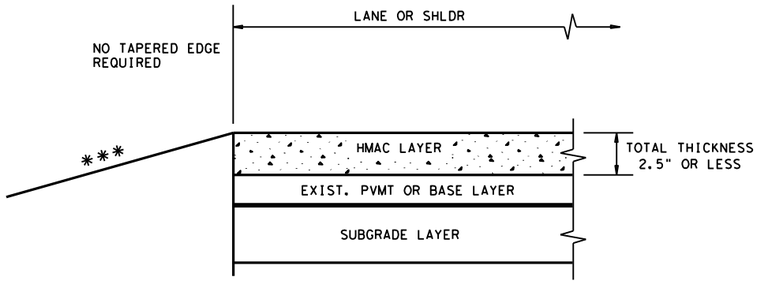
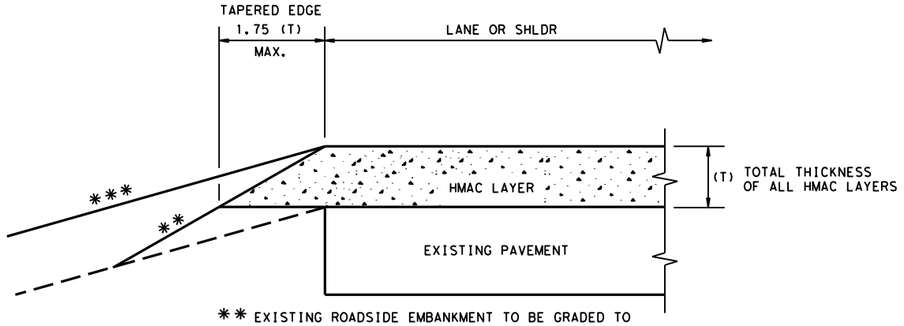


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

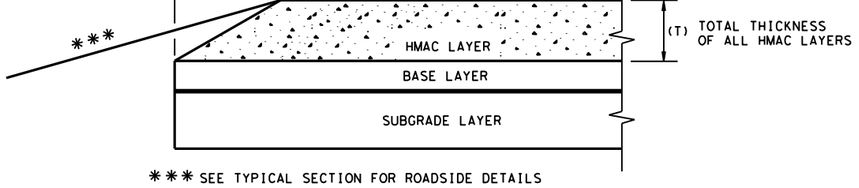
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** 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.

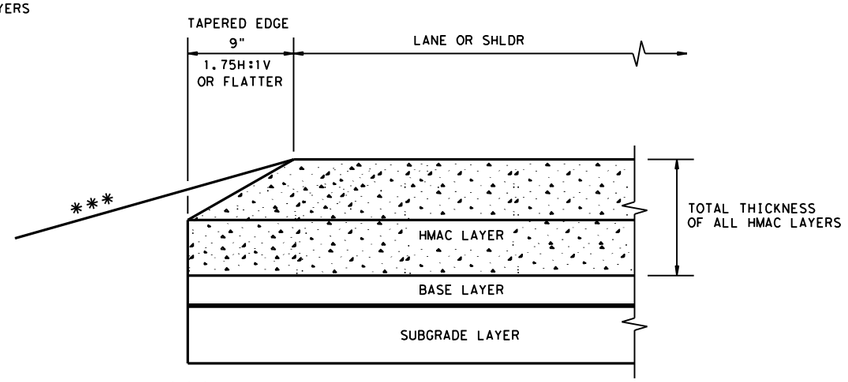
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

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

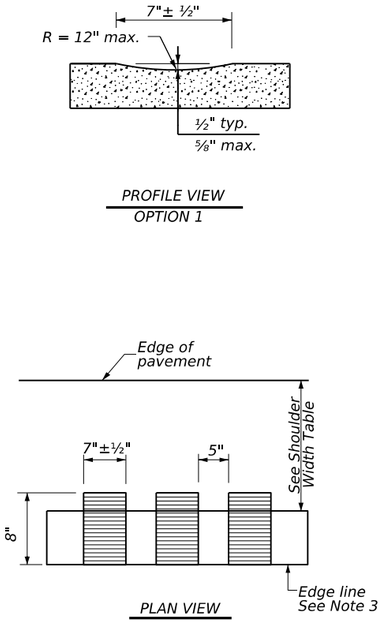
Design Division Standard

TAPERED EDGE DETAILS HMAC PAVEMENT

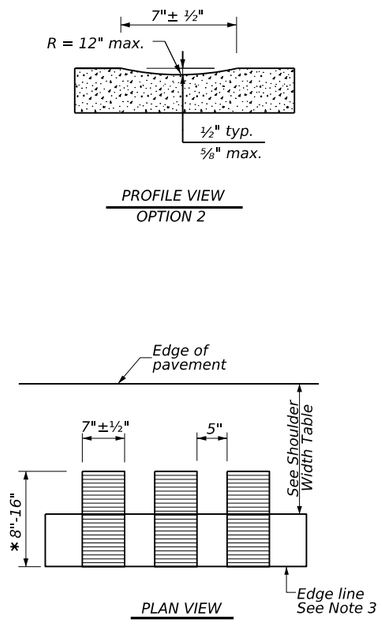
TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:		
© TxDOT January 2011	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0088	02	062		US59	
	DIST	COUNTY			SHEET NO.	
	CRP	GOLIAD			097	

DATE:
FILE:

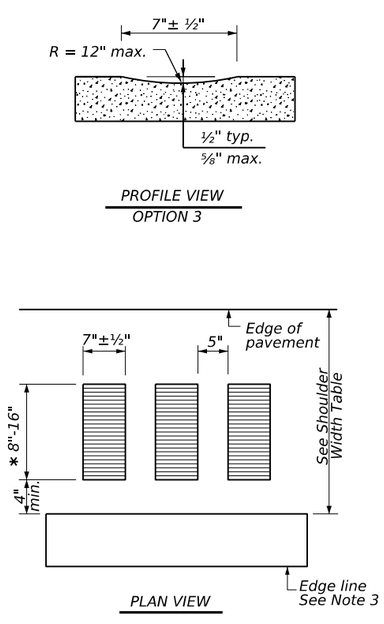


CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



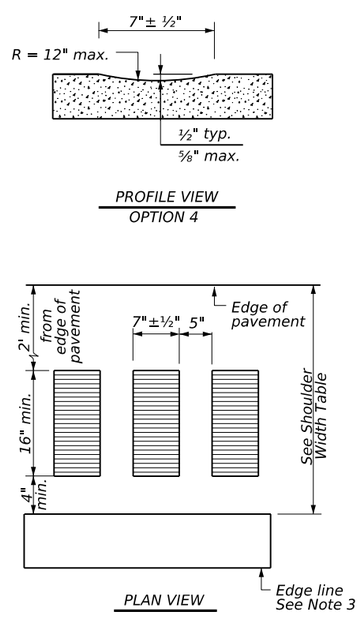
∗ This distance may vary based on width of shoulder

CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)

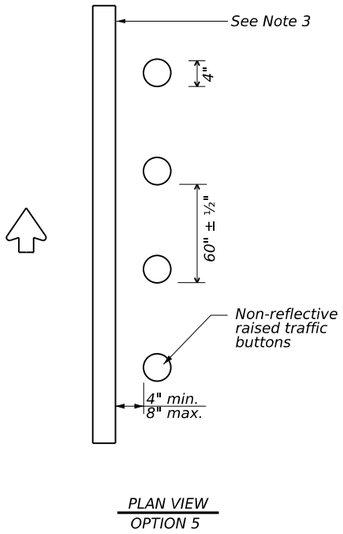


∗ This distance may vary based on width of shoulder

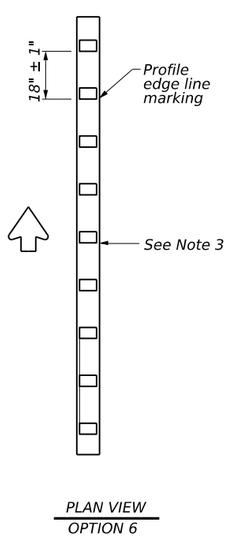
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



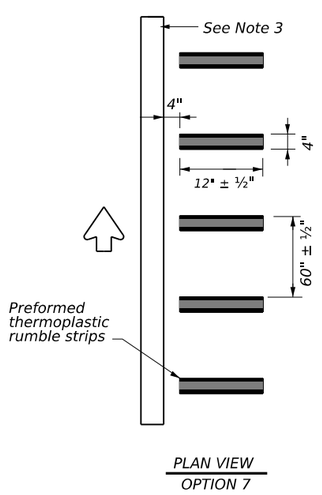
CONTINUOUS MILLED DEPRESSIONS (Rumble Strips)



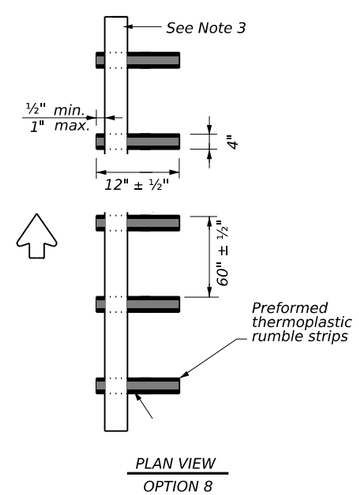
RAISED EDGE LINE (Rumble Strips)



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

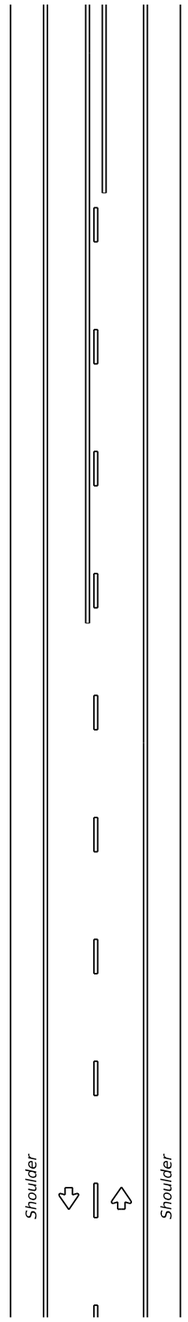
Traffic Safety Division Standard

EDGE LINE RUMBLE STRIPS ON UNDIVIDED OR TWO LANE HIGHWAYS RS(2)-23

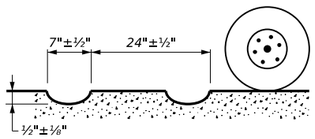
FILE: rs(2)-23.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
10-13	DIST	COUNTY		SHEET NO.
1-23	CRP	GOLIAD		098

DATE: 7/24/2024 $TIME$
FILE: c:\workingdir\ijo-pw.bentley.com_ijo-pw-01\javier.duarte\dms71724\rs(4)-13.dgn

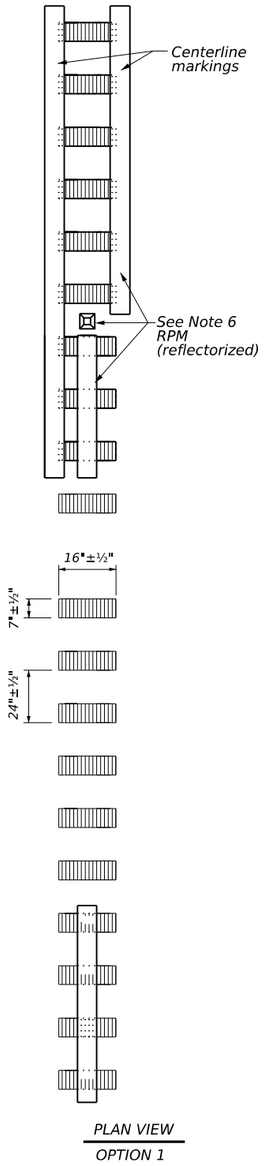
CENTERLINE RUMBLE STRIPS



TWO LANE TWO-WAY HIGHWAYS

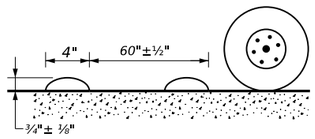


PROFILE VIEW

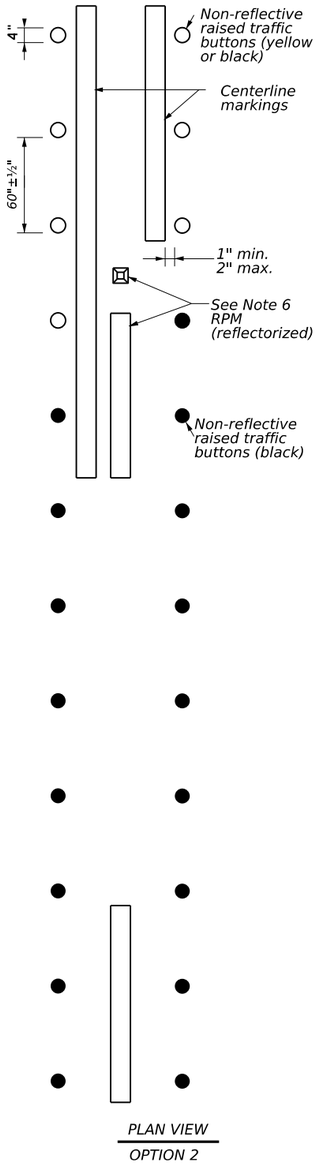


PLAN VIEW
OPTION 1

MILLED CENTERLINE RUMBLE STRIPS

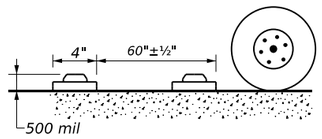


PROFILE VIEW

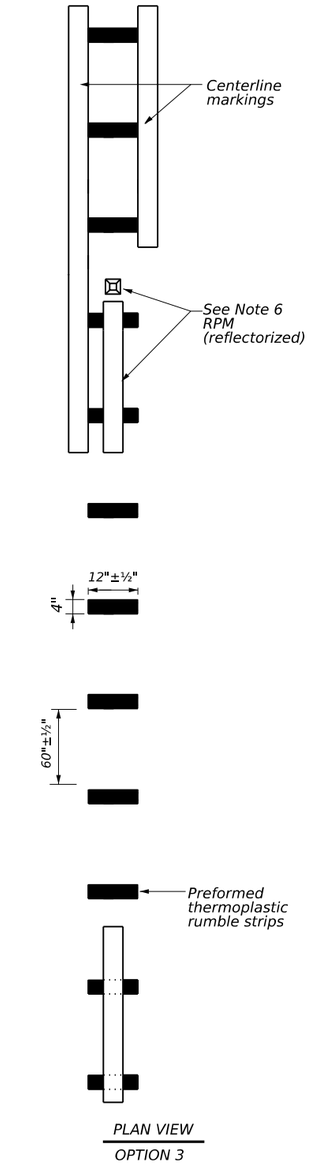


PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS

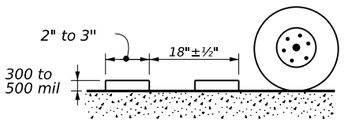


PROFILE VIEW

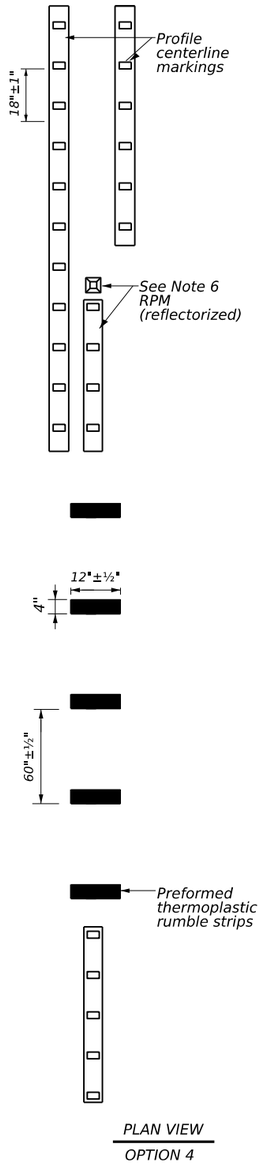


PLAN VIEW
OPTION 3

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	0088	02	062	US59
10-13	DIST	COUNTY		SHEET NO.
1-23	CRP	GOLIAD		099

DATE: 6/7/2024
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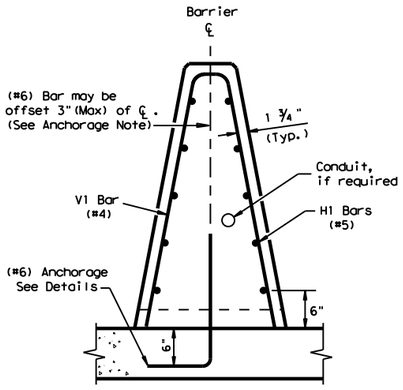
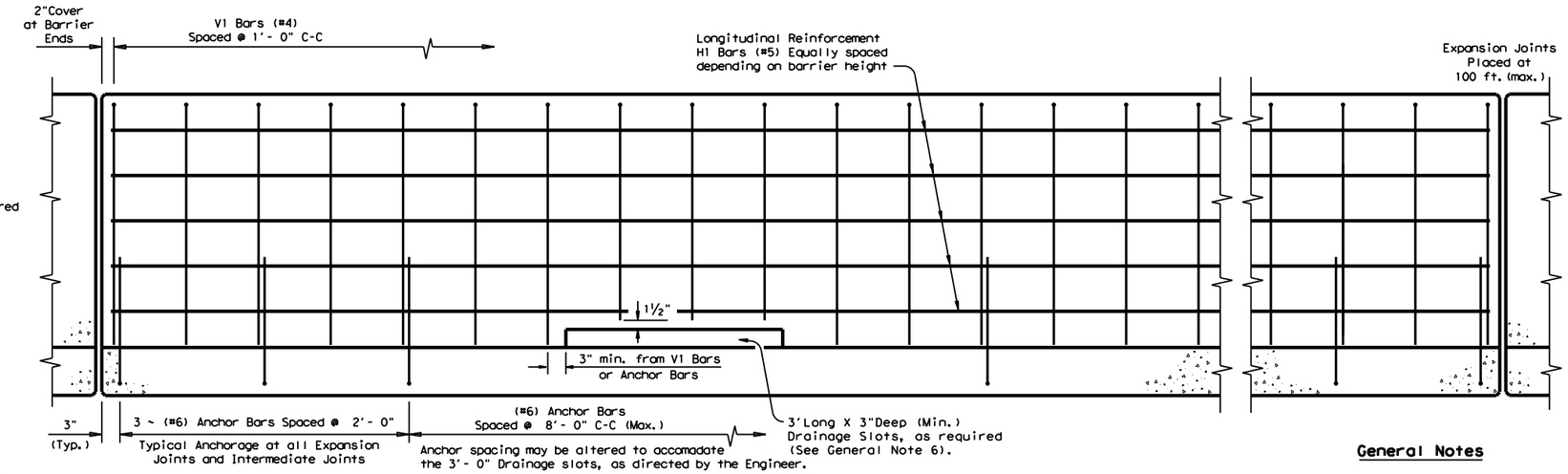


END VIEW

CAST-IN-PLACE (CIP) BARRIER

Barrier is Symmetrical About the Center Line

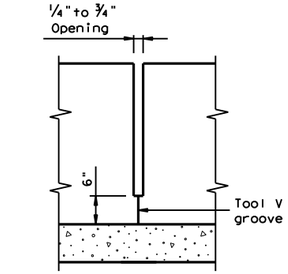


Note:
Reinforcement around the drainage slots may be cut or bent to accommodate the edge and top clearances.

The bottom of the reinforcement cage may rest on the top of the Concrete Bridge Deck or CRCP.

ELEVATION VIEW

Cast-in-Place (SSCB) on Bridge Decks or Continuously Reinforced Concrete Pavement (CRCP) (Showing Reinforcement and Anchor Placement)



INTERMEDIATE JOINT DETAIL

Place at all Bent ℄'s, without expansion joints and spaced at 33 ft. (max), 10 ft. (min).

EXPANSION JOINT PLACEMENT

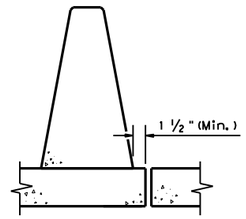
Place at all transverse joints or 100 ft. (max.), 10 ft. (min).

BARRIER PLACEMENT OVER (CRCP) JOINTS

Barrier may be cast over a "Longitudinal" CRCP joint.

CRCP Joints (with or without tiebars): Two layers of 30 lb roofing felt or ½" preformed bituminous fiber material.

Barrier Anchorage Note: Anchorage must be located at least 3" from a longitudinal joint.



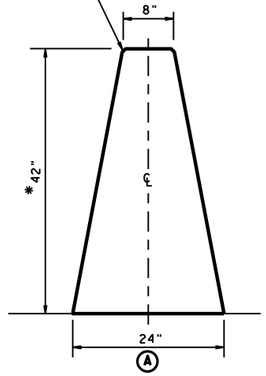
MINIMUM EDGE DISTANCE FROM LONGITUDINAL JOINT

Barrier placement over a longitudinal bridge joint is not recommended.

General Notes

1. Concrete shall be Class C. Unless otherwise specified in the plans.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615. If the bridge slab requires epoxy "coated" reinforcement, the barrier and/or anchorage may require the same, if shown elsewhere in the plans.
3. These details cover barrier per Item 514, "Permanent Concrete Traffic Barrier".
4. Anchorage: The "Optional" Anchor system shall be embedded 6" into fresh concrete or using a Type III, Class C Epoxy anchorage system. Follow the manufacturer's directions for installing the expoxied anchor bars. All anchorage shown is the minimum required, and considered subsidiary to the bid item.
5. Top edges of CIP barrier shall have a ¾" chamfer or tooled radius.
6. Drainage slot locations (12'- 0", C-C Min. Spacing) are shown elsewhere, or as directed by the Engineer. Drainage slot heights on the SSCB may be increased to a maximum of 5 inches, without geometric changes to the barrier face.
7. Cast-in-place barrier may be slip formed. Bracing may be tied or tack welded to the reinforcement cage to provide cage stability. Do not weld to anchor bars. The reinforcement cage may rest on the top of the finished grade.
8. For locations where lighting is required, see the SSCB(4) sheet for the proper reinforcement and anchorage.

Top edges of CIP barrier shall have a ¾" chamfer or tooled radius.

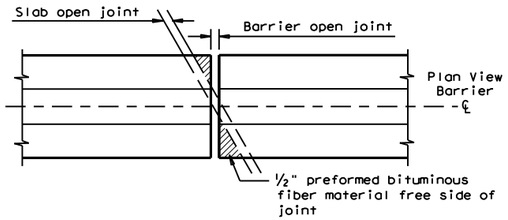


*Barrier height (IN.)	Dimensions (IN.)		
	Ⓐ	Ⓑ	Ⓒ
42	24	40 ¼	20 ½
48	26 ¼	46 ¼	22 ¾
54	28 ½	52 ¼	25 ⁱ⁄₁₆

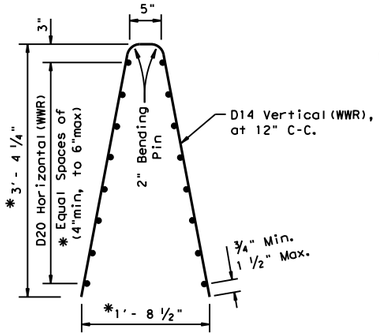
*(SSCB)(42") Barrier height may be increased to 48" or 54". This would increase the barrier and reinforcement dimensions accordingly.

SINGLE SLOPE CONCRETE BARRIER

(SSCB)(42")



BARRIER OVER TRANSVERSE OPEN JOINT



Welded Wire Reinforcement (WWR) Option for Bars V1 and H1

(WWR) General Notes

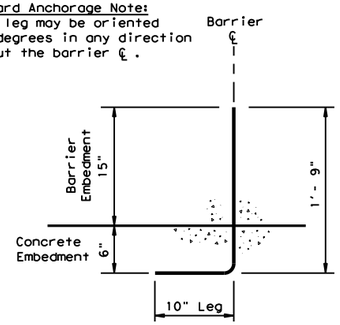
1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut and bent to accommodate the drainage slots, as directed by the Engineer.
3. Welded wire spilce locations shall have a "minimum" splice lap length of 12".
4. Combinations of reinforcing steel and WWR 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".

Cast-In-Place (CIP) or Slip-Formed (SSCB)

Cast-in-Place barrier may be connected to precast SSCB. Joint connection "Types" may be used in Cast-in-Place barrier, to match the precast barrier connection. (See required connection "Type" elsewhere in the plans)

The weight of Cast-in-Place (SSCB)42" is approx. 717 lbs per ft.

Standard Anchorage Note:
10" leg may be oriented 90 degrees in any direction about the barrier ℄.

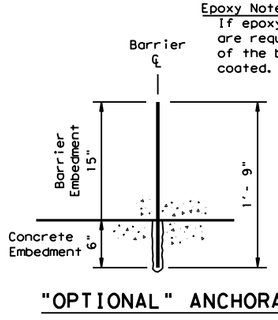


STANDARD ANCHORAGE

(#6) Bar

Concrete Pavement / Bridge Deck Anchorage: Cast-in-Place or Slip-Formed Barrier (See General Notes 2)

Epoxy Note:
If epoxy coated anchor bars are required, the lower 6" of the bars must not be epoxy coated.

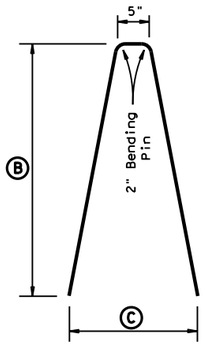


"OPTIONAL" ANCHORAGE

(#6) Bar

Fresh insertion method or Type III, Class C Epoxy Method

Concrete Pavement / Bridge Deck Anchorage: Cast-in-Place or Slip-Formed Barrier (See General Notes 2 & 4)



V1 Bar

(#4) Bar

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

CAST-IN-PLACE (TYPE 1) (BRIDGE DECK OR CRCP)

SSCB(1)-16

FILE: sscb116.dgn	DN: TxDOT	CK: HC/AN	DW: BD/VP	CK: KM
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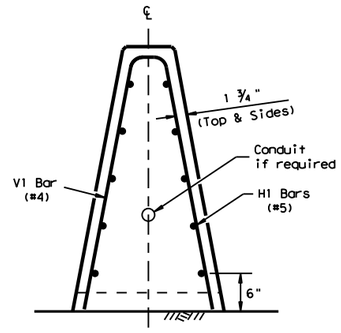
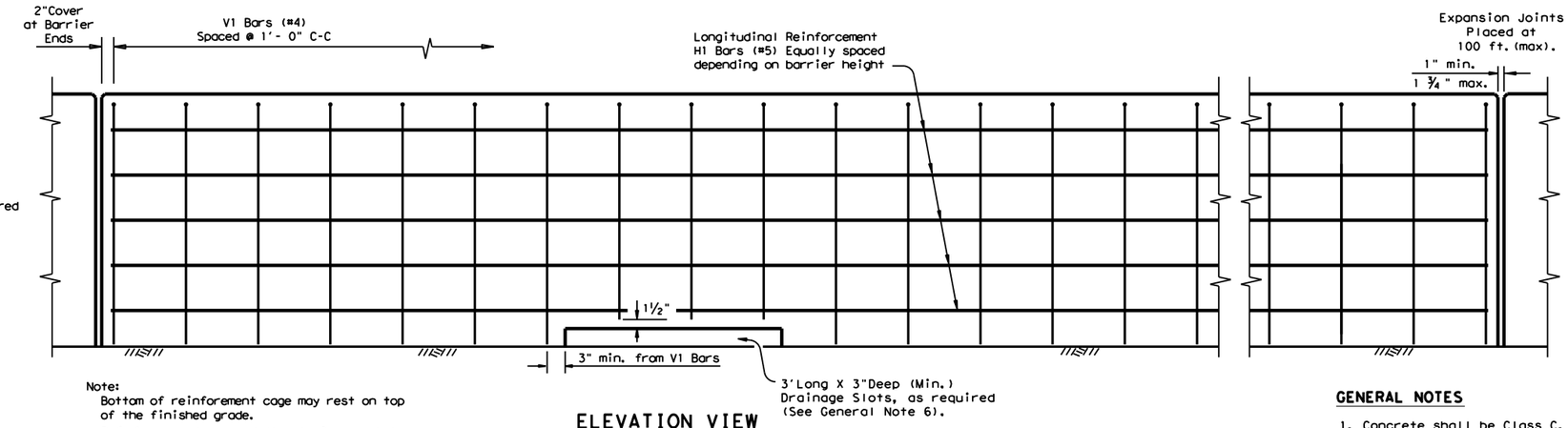


END VIEW

CAST-IN-PLACE (CIP) BARRIER

Barrier is Symmetrical About the Center Line



Note:
Bottom of reinforement cage may rest on top of the finished grade.

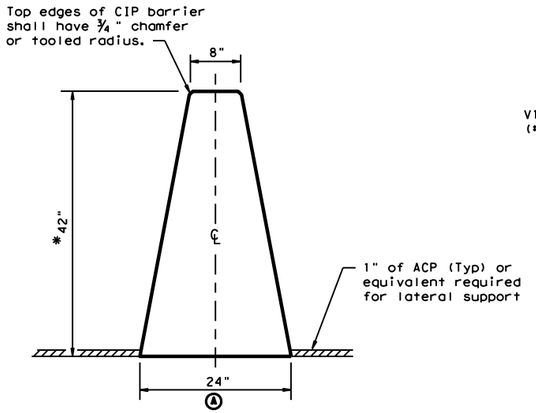
Reinforcement around the drainage slots may be cut or bent to accommodate the edge and top clearances.

ELEVATION VIEW

Cast-in-Place (SSCB)(Type 2)on Roadway

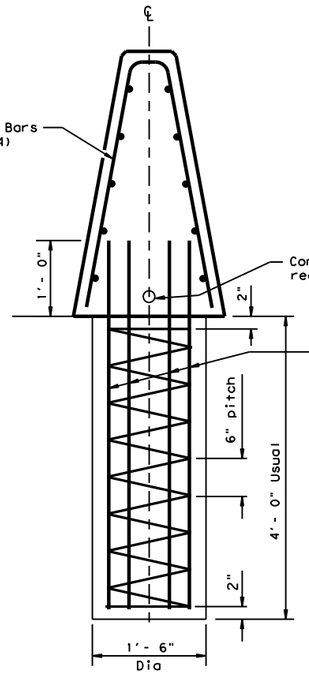
GENERAL NOTES

1. Concrete shall be Class C. Unless otherwise specified in the plans.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. These details cover barrier per Item 514,"Permanent Concrete Traffic Barrier".
4. The Anchorage shown is considered subsidiary to the bid item.
5. Top edges of CIP barrier shall have a ¾" chamfer or tooled radius.
6. Drainage slot locations (12'- 0", C-C Min. Spacing) are shown elsewhere, or as directed by the Engineer. Drainage slot heights on the SSCB may be increased to a maximum of 5 inches, without geometric changes to the barrier face.
7. Cast-in-place barrier may be slip formed. Bracing may be tied or tack welded to the reinforcement cage to provide cage stability. Do not weld to anchorage.
8. For locations where lighting is required, see the SSCB(4) sheet for the proper reinforcement and anchorage.



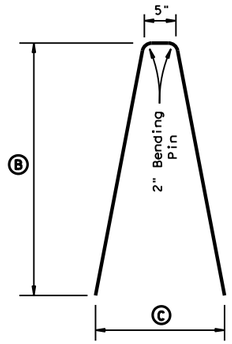
SINGLE SLOPE CONCRETE BARRIER

(SSCB)(42")



SECTION D-D

ANCHOR DETAIL



V1 Bar

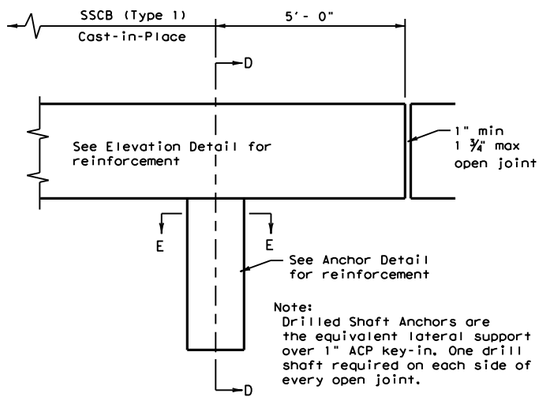
#4 Rebar

BARRIER HEIGHT (IN.)	* DIMENSIONS (IN.)		
	Ⓐ	Ⓑ	Ⓒ
42	24	40 ¼	20 ½
48	26 ¼	46 ¼	22 ¾
54	28 ½	52 ¼	25 ⅛

*(SSCB)(42") Barrier height may be increased to 48" or 54". This would increase the barrier and reinforcement dimensions accordingly.

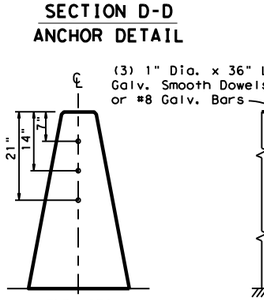
SECTION E-E

ANCHOR DETAIL



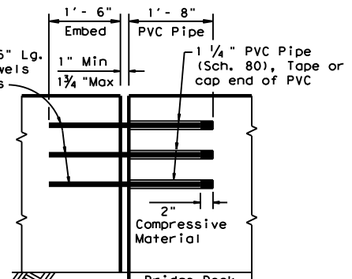
ELEVATION

ANCHOR LOCATION



END VIEW

Dowel locations



EXPANSION JOINT (Dowel Connection)

Dowels may be used, as directed by the Engineer, in locations where the barrier could be laterally displaced.

Welded Wire Reinforcement (WWR) Option for Bars V1 and H1

(WWR) General Notes

1. Deformed Welded Wire Reinforcement (WWR) shall conform to ASTM A497.
2. Welded wire cage may be cut and bent to accommodate the drainage slots, as directed by the Engineer.
3. Welded wire spilce locations shall have a "minimum" splice lap length of 12".
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".

Cast-In-Place (CIP) or Slip-Formed (SSCB)

Cast-in-Place barrier may be connected to precast SSCB. Joint connection "Types" may be used in Cast-in-Place barrier, to match the precast barrier connection. (See required connection "Type" elsewhere in the plans)

The weight of Cast-in-Place (SSCB)42" is approx. 717 lbs per ft.

Texas Department of Transportation

Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

CAST-IN-PLACE

(TYPE 1)

(FLEXIBLE PAVEMENT)

SSCB(1F)-10

FILE: sscb1f10.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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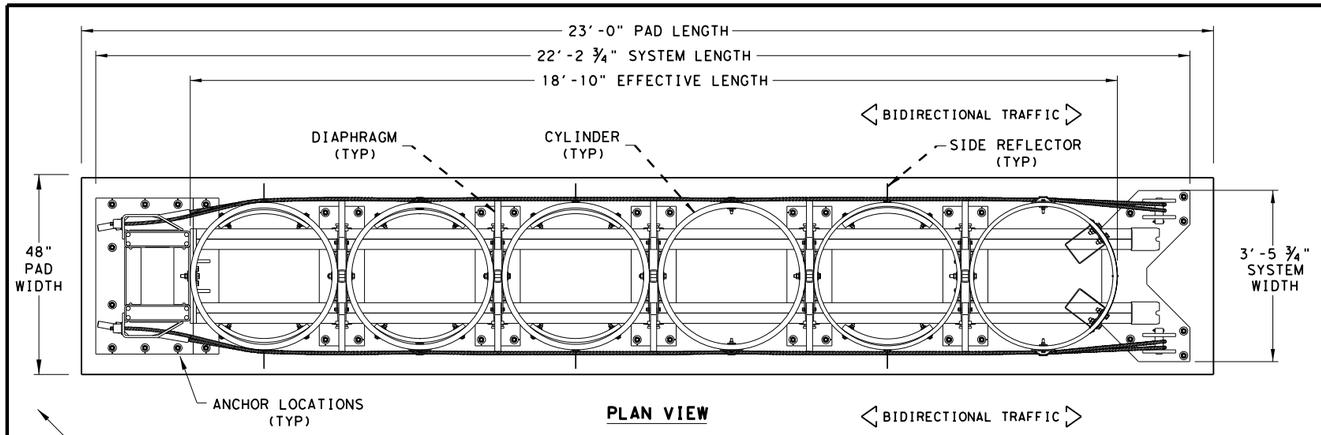
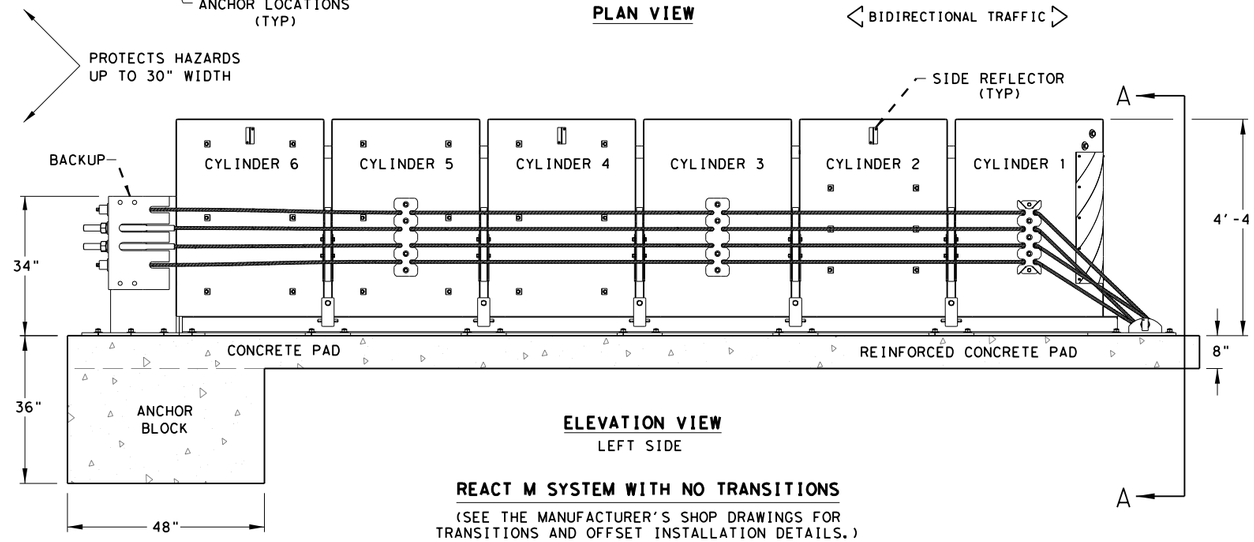
	CRP	GOLIAD		101



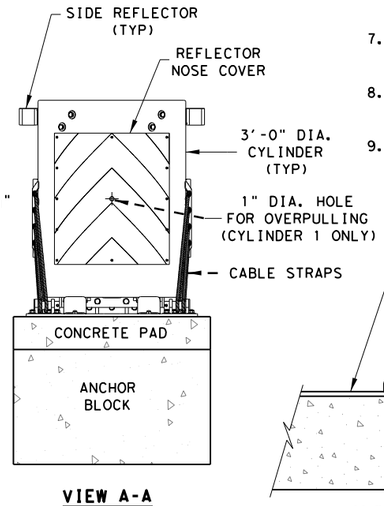
PLAN VIEW



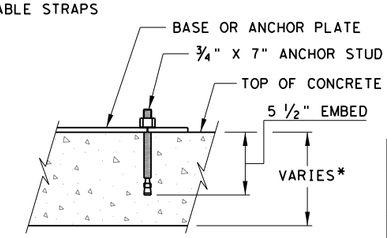
ELEVATION VIEW
LEFT SIDE

REACT M SYSTEM WITH NO TRANSITIONS

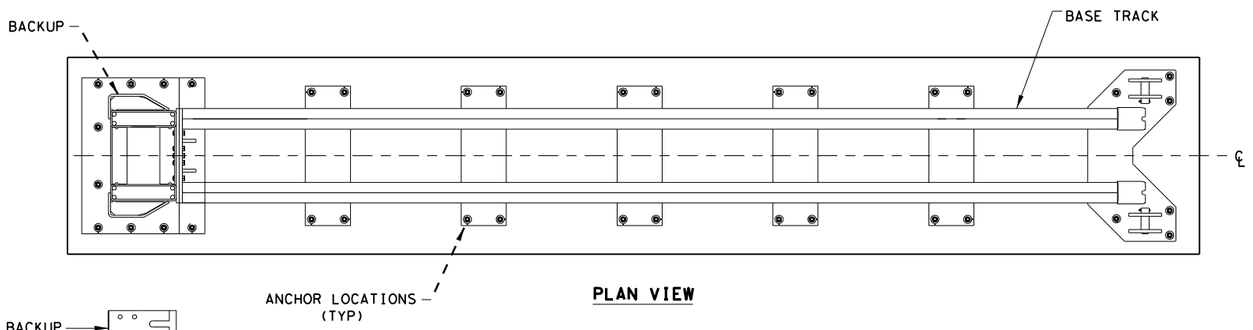
(SEE THE MANUFACTURER'S SHOP DRAWINGS FOR TRANSITIONS AND OFFSET INSTALLATION DETAILS.)



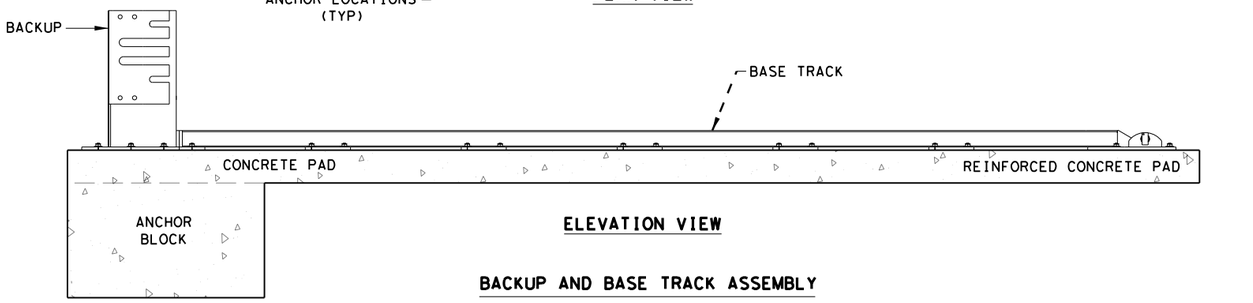
VIEW A-A



ANCHORING DETAIL
*SEE FOUNDATION TYPES TABLE



PLAN VIEW



ELEVATION VIEW

BACKUP AND BASE TRACK ASSEMBLY

(SEE THE MANUFACTURER'S SHOP DRAWINGS FOR TRANSITIONS, OFFSETS, BIDIRECTIONAL AND UNIDIRECTIONAL INSTALLATION DETAILS.)

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY - ENERGY ABSORPTION AT 1(888)323-6374 OR WEBSITE: www.trinityhighway.com.
2. THE NOSE OF THE REACT M SHALL BE CLAD WITH A PLASTIC WRAP WITH STANDARD DELINEATION ADHERED TO THE WRAP AND SHALL HAVE A SERIES OF SIDE MARKER REFLECTORS ON BOTH SIDES OF THE UNIT. SEE SITE PLAN VIEWS FOR MARKER AND PLASTIC WRAP COLOR ORIENTATION.
3. FOR BI-DIRECTIONAL TRAFFIC, APPROPRIATE TRANSITION DETAILS WILL BE AS SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS.
4. DETAILS OF COMPONENTS FOR THE REACT M, BACKUPS AND REINFORCING DETAILS WILL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS FURNISHED TO THE ENGINEER.
5. IF THE CROSS-SLOPE VARIES MORE THAN 2% OVER THE LENGTH OF THE SYSTEM, THE CONCRETE PAD WILL REQUIRE LEVELING. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE REACT M SYSTEM SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTERLINE OF MERGING BARRIERS.
8. ALL STEEL COMPONENTS TO BE HOT DIPPED GALVANIZED EXCEPT STAKES, DRIVE SPIKES, THREADED BOLTS IN BACKUP UNIT, AND WEDGE FITTINGS ON CABLES.
9. THIS DRAWING REPRESENTS THE REACT M TL-3 SYSTEM, RE-DIRECTIVE, NON-GATING CRASH CUSHION THAT CAN PROTECT HAZARDS UP TO 30-INCHES IN WIDTH.

DESIGN DATA TABLE FOR REACT M

TEST NUMBER	TEST LEVEL	OVERALL LENGTH	TRANSITION LENGTH	SYSTEM WIDTH
3-30 TO 3-36	TL-3	22'-2 ¾"	-	3'-5 ¾"
3-37A	TL-3	22'-2 ¾"	9'-10 ¾"	3'-5 ¾"
3-38	TL-3	22'-2 ¾"	-	3'-5 ¾"

ANCHOR SYSTEM TYPE

APPROVED ADHESIVE, 7" STUDS, 5.5" EMBEDMENT

FOUNDATION TYPES

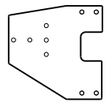
MINIMUM 8" REINFORCED PORTLAND CEMENT CONCRETE PAD (REQUIRED REINFORCING STEEL FOR CONCRETE PAD SHALL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS.

MINIMUM 8" NON-REINFORCED PORTLAND CEMENT CONCRETE ROADWAY MEASURING AT LEAST 12' WIDE BY 50' LONG)

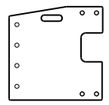
MINIMUM 7" CONCRETE DECK STRUCTURE, OR MINIMUM 6" REINFORCED CONCRETE ROADWAY

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE REACT M SYSTEM AND IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

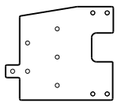
BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS



SAFETY SHAPE BARRIER TRANSITION (ADAPTER)
TRANSITION PLATE(S) (OPTIONAL)
REQUIRED W/BI-DIRECTIONAL TRAFFIC FLOWS ONLY.



VERTICAL WALL BARRIER TRANSITION (ADAPTER)
TRANSITION PLATE(S) (OPTIONAL)
REQUIRED W/UNIDIRECTIONAL TRAFFIC FLOWS ONLY.



VERTICAL WALL BARRIER TRANSITION (ADAPTER)
TRANSITION PLATE(S) (OPTIONAL)
REQUIRED W/BI-DIRECTIONAL TRAFFIC FLOWS ONLY.

NOTES:
CONTACT THE MANUFACTURER WITH SITE SPECIFIC DATA (SSD) FOR THE CORRECT BACKUP ASSEMBLY AND TRANSITION PANELS OR SIDE PANELS USED FOR STANDARD AND BI-DIRECTIONAL INSTALLATIONS: AT DIVIDED-HIGHWAY MEDIANS OR UNDIVIDED ROADWAYS WHERE THE SYSTEM IS EXPOSED TO IMPACTS FROM ONE OR TWO DIFFERENT DIRECTIONS OF TRAFFIC FLOW.

LOW MAINTENANCE

Texas Department of Transportation — Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION CRASH CUSHION REACT M (NARROW) (MASH TL-3)

REACT (M) -21

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	CRP	GOLIAD		102

DATE: 6/7/2024
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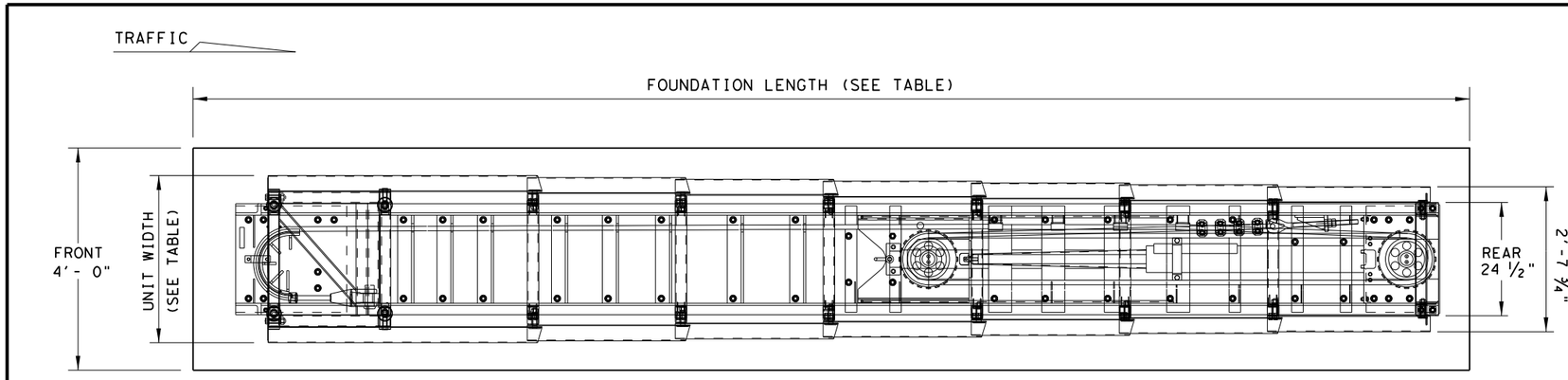
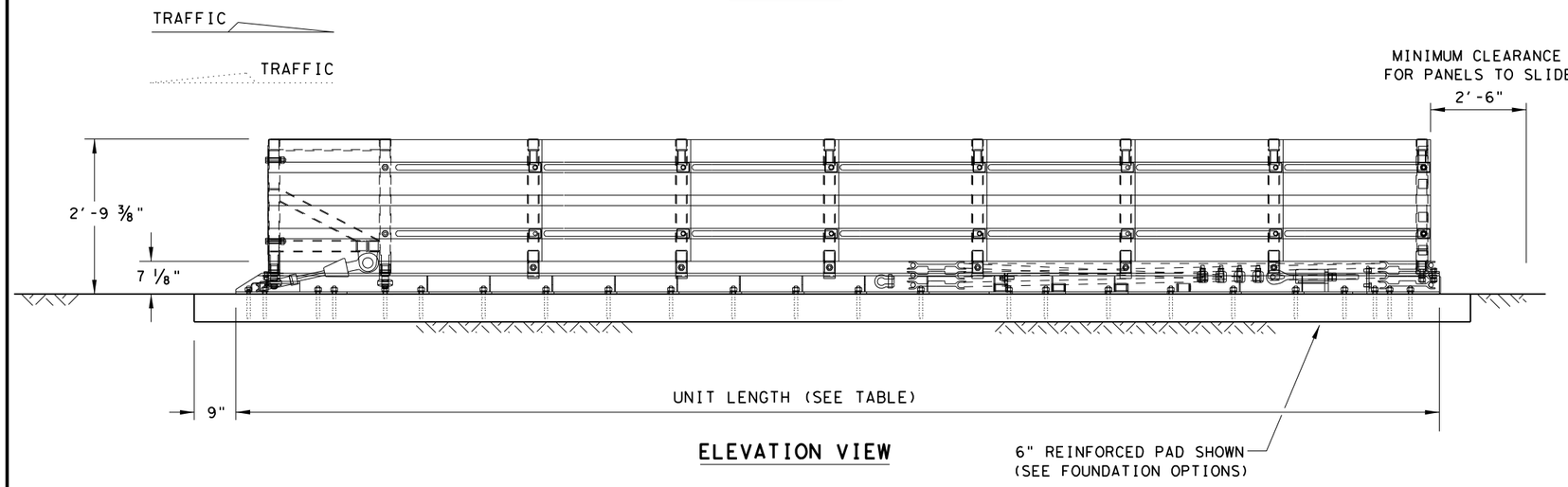


PLAN VIEW



ELEVATION VIEW

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: WORK AREA PROTECTION, CORP. AT (800) 327-4417, OR (630) 377-9100.
2. FOR BI-DIRECTIONAL TRAFFIC, APPROPRIATE TRANSITION PANELS WILL BE REQUIRED.
3. ADDITIONAL DETAILS FOR THE TRANSITION OPTION AND FOUNDATION OPTION WILL BE SHOWN ON THE MANUFACTURER'S SHOP DRAWINGS FURNISHED TO THE ENGINEER.
4. CONCRETE SHALL BE CLASS "S" WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
5. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
6. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
7. THE SCI100GM & SCI70GM SYSTEMS SHOULD BE APPROXIMATELY PARALLEL WITH THE BARRIER OR CENTERLINE OF MERGING BARRIERS.

NOTE:
FOR ATTACHMENT AND TRANSITIONS TO OTHER SHAPES, BARRIERS, RAILINGS AND BI-DIRECTIONAL TRAFFIC FLOWS ARE AVAILABLE. (SEE MANUFACTURER'S PRODUCT MANUAL)

NOTE:
SIDE PANELS CAN TRAVEL 30" BEYOND THE LAST TERMINAL BRACE AT THE REAR OF THE CUSHION. ALL OBJECTS THAT MAY INTERFERE WITH THIS MOTION CAN AFFECT PERFORMANCE OF AND MAY CAUSE UNDUE DAMAGE TO THE CRASH CUSHION.

MODEL	TEST LEVEL	UNIT LENGTH (approx.)	UNIT WIDTH	FOUNDATION LENGTH	OBSTACLE WIDTH
SCI70GM	TL-2	13′-6"	2′-10 ⅝"	15′- 6 ¼"	24"to 36"
SCI100GM	TL-3	21′-6"	3′-1 ½"	23′- 0"	24"to 36"

SYSTEM AND PAD LENGTHS VARY DEPENDING ON BACKUP TYPE.

FOUNDATION OPTIONS
6" REINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
8" UNREINFORCED CONCRETE (5 ½" ANCHOR EMBEDMENT)
3" MIN. ASPHALT OVER 3" MIN. CONCRETE (16 ½" ANCHOR EMBED.)
6" ASPHALT OVER 6" COMPACT SUBBASE (16 ½" ANCHOR EMBED.)
8" MINIMUM ASPHALT (16 ½" ANCHOR EMBEDMENT)

FOR STEEL PLACEMENT IN CONCRETE FOUNDATIONS, SEE MANUFACTURER'S PRODUCT MANUAL.

TRANSITION OPTIONS
CONCRETE VERTICAL WALL
CONCRETE TRAFFIC BARRIERS
GUARDRAIL (W-BEAM)
GUARDRAIL (THRIE-BEAM)

TRANSITION TYPES ARE SHOWN ELSEWHERE ON THE PLANS (I.E. ATTENUATOR LOCATION DETAILS OR IN THE GENERAL NOTES).

FOR BI-DIRECTIONAL TRANSITION PANEL AND END SHOE DETAILS, SEE MANUFACTURER'S PRODUCT MANUAL.

LOW MAINTENANCE

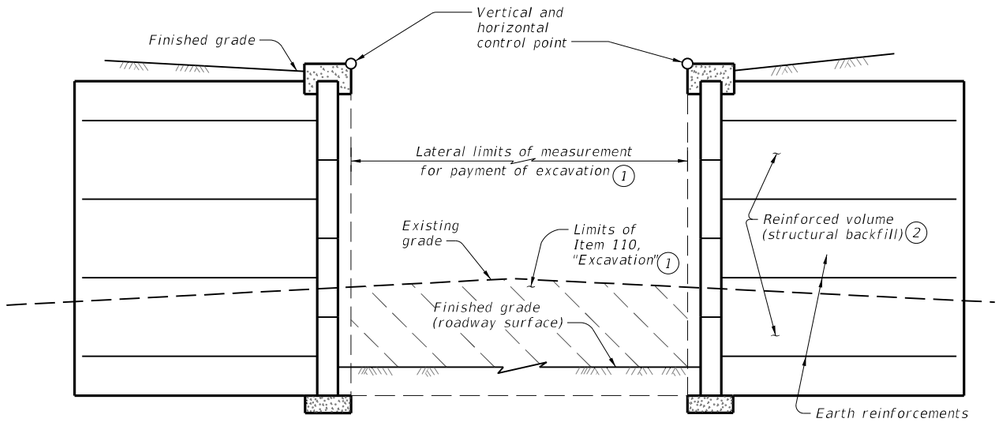
Texas Department of Transportation

Design Division Standard

WORK AREA PROTECTION CORP (SMART-NARROW)

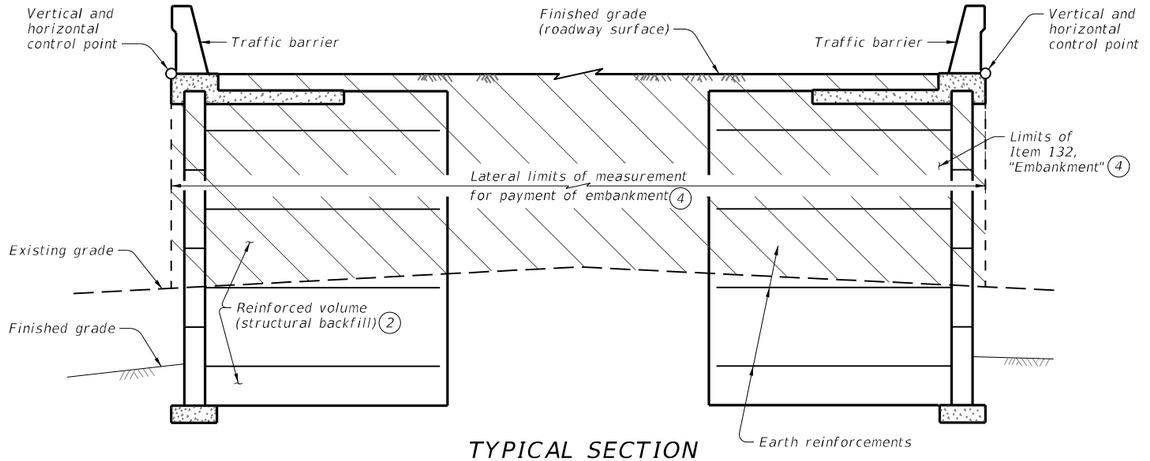
SMTC(N)-16

FILE: smtcn16.dgn	DN: TxDOT	CK: KM	DW: VP	CK: VP
©TxDOT: February 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
REVISED 06, 2013 (VP)	DIST	COUNTY		SHEET NO.
REVISED 03, 2016 (VP)	CRP	GOLIAD		102A



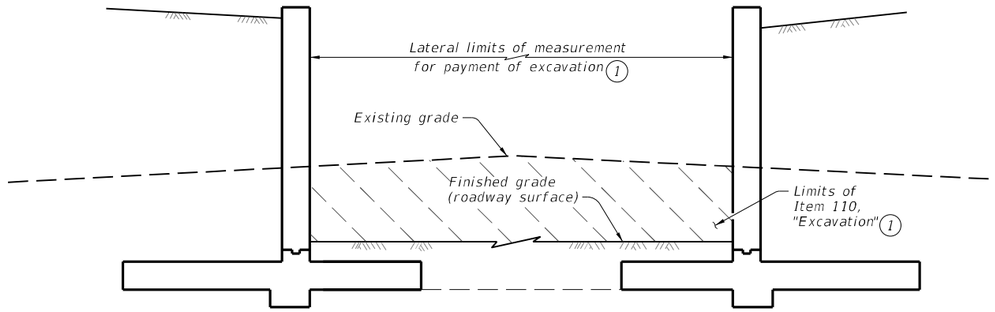
TYPICAL SECTION

(Excavation between MSE retaining walls.) (3)



TYPICAL SECTION

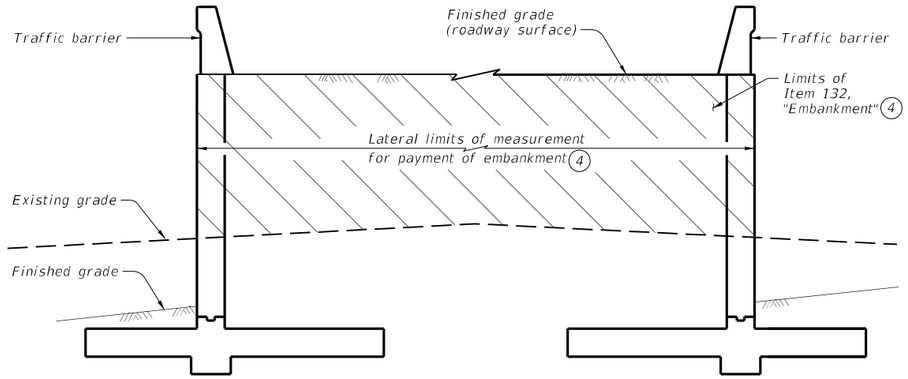
(Embankment between MSE retaining walls.) (3)



TYPICAL SECTION

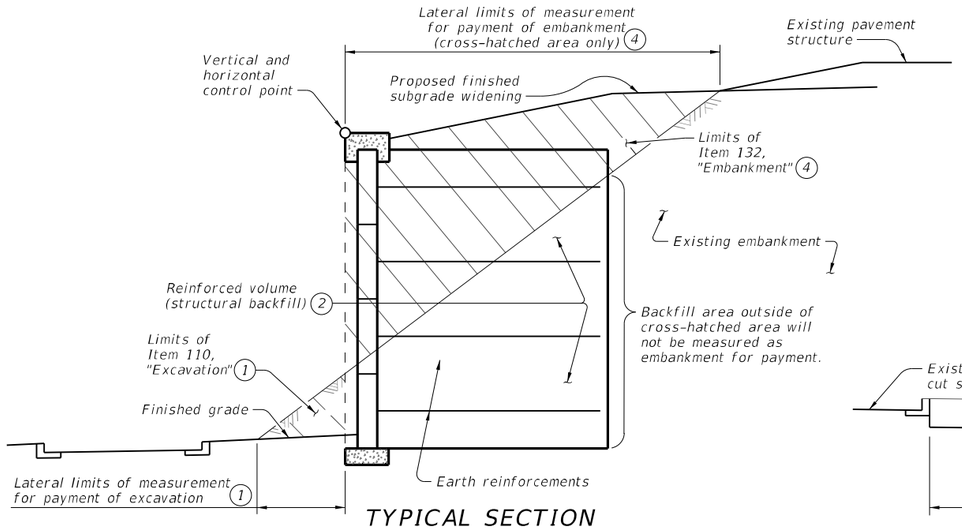
(Excavation between conventional retaining walls.)

1. Only the excavation above the proposed subgrade elevation will be measured for payment.
2. Meeting requirements for Item 423, "Retaining Walls."
3. Earthwork measurement with other retaining wall types will be made to the outside finished face in the same manner.
4. Only the embankment above the existing ground line will be measured for payment.



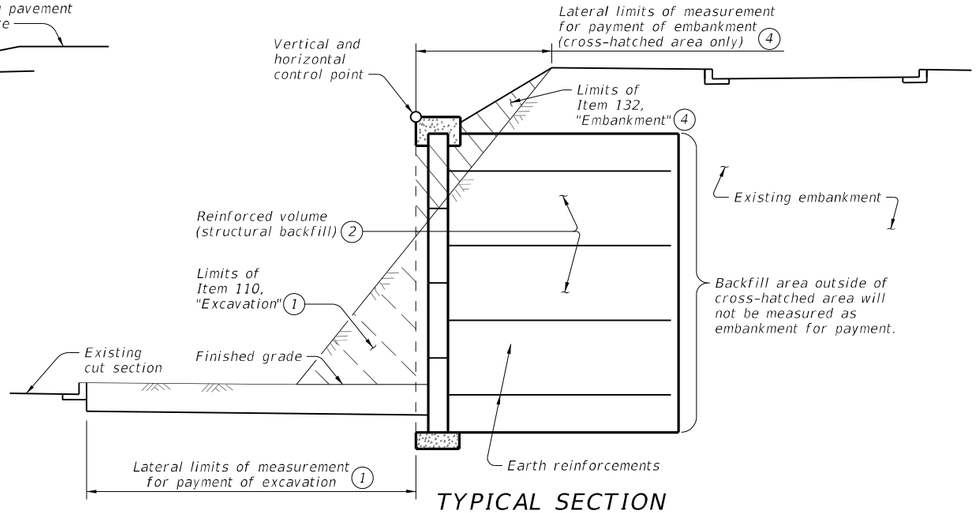
TYPICAL SECTION

(Embankment between conventional retaining walls.)



TYPICAL SECTION

(Widening embankment with MSE retaining walls.) (3)



TYPICAL SECTION

(Widening cut section with MSE retaining walls.) (3)

Texas Department of Transportation

Bridge Division Standard

EARTHWORK MEASUREMENT AT RETAINING WALL

RW(EM)

FILE: RW-EM-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE		
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0088	02	062	US 59		
	DIST	COUNTY		SHEET NO.		
	CRP	GOLIAD		103		

DATE:
FILE:

DATE:
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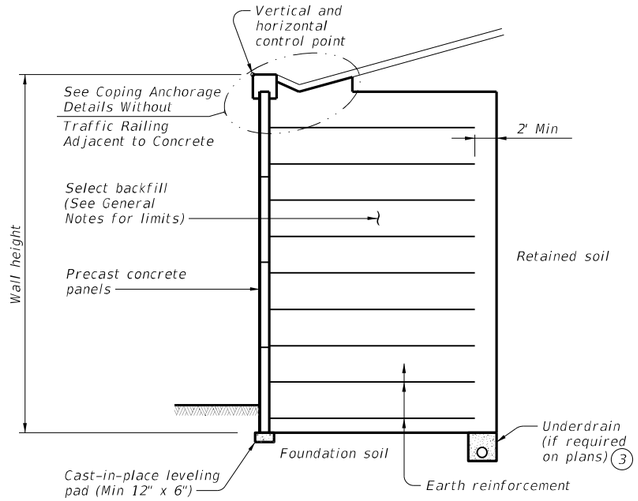
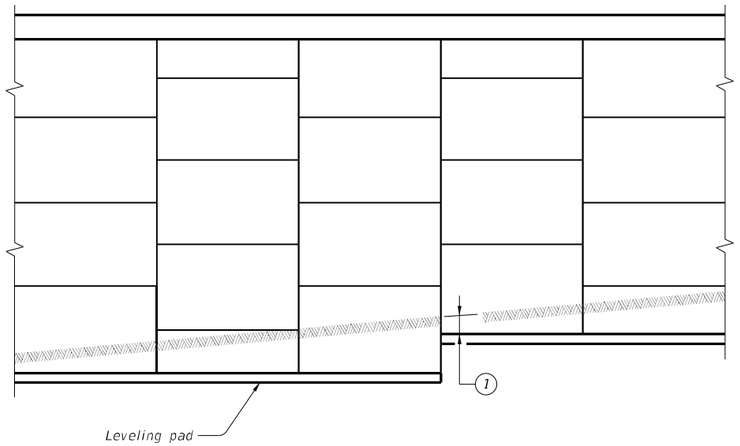


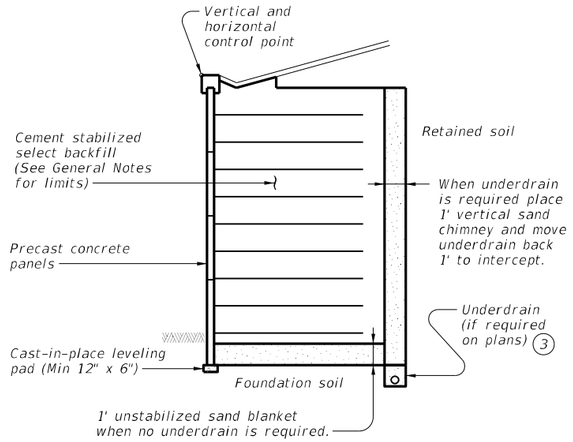
TYPICAL SECTION

(Wall at bottom of slope.)



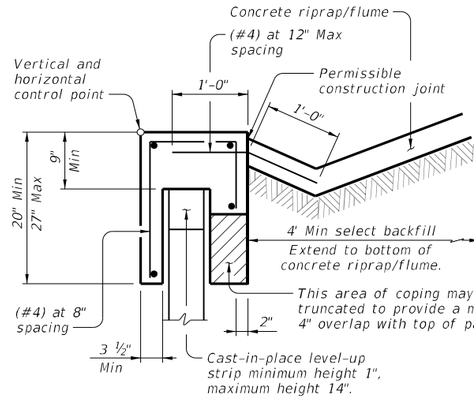
ELEVATION

1. Minimum embedment conforming to values given on the RW(MSE)DD standard.
2. Form map of Texas emblem into a wall panel next to each bridge abutment. Submit the exact location of each emblem to the Engineer for approval. The cost of forming the emblems will not be paid for directly, but is subsidiary to Item 423, "Retaining Walls." Inset the map of Texas a minimum of ¾" into the face of the panel with a smooth finish. Finish the inset area in a contrasting color as approved by the Engineer.
3. Provide underdrain pipe and filter material in accordance with Item 556, "Pipe Underdrains."
4. Anchor precast coping to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Provide details that include coping reinforcement. Concrete flume (if required) is paid for separately from Item 423, "Retaining Walls."



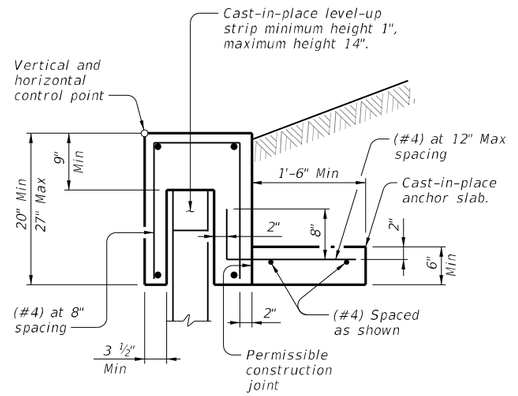
SPECIAL DRAINAGE PROVISIONS

(When cement stabilized backfill is used.)



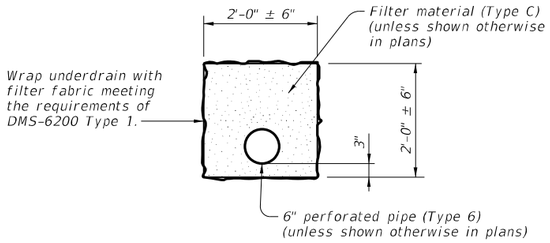
ADJACENT TO CONCRETE

(Excluding concrete pavement)

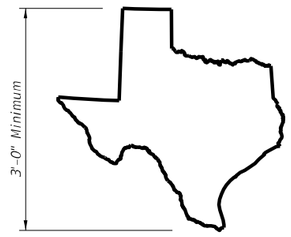


ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING 4



UNDERDRAIN DETAIL 3



MAP OF TEXAS EMBLEM 2

SHEET 1 OF 2

Texas Department of Transportation

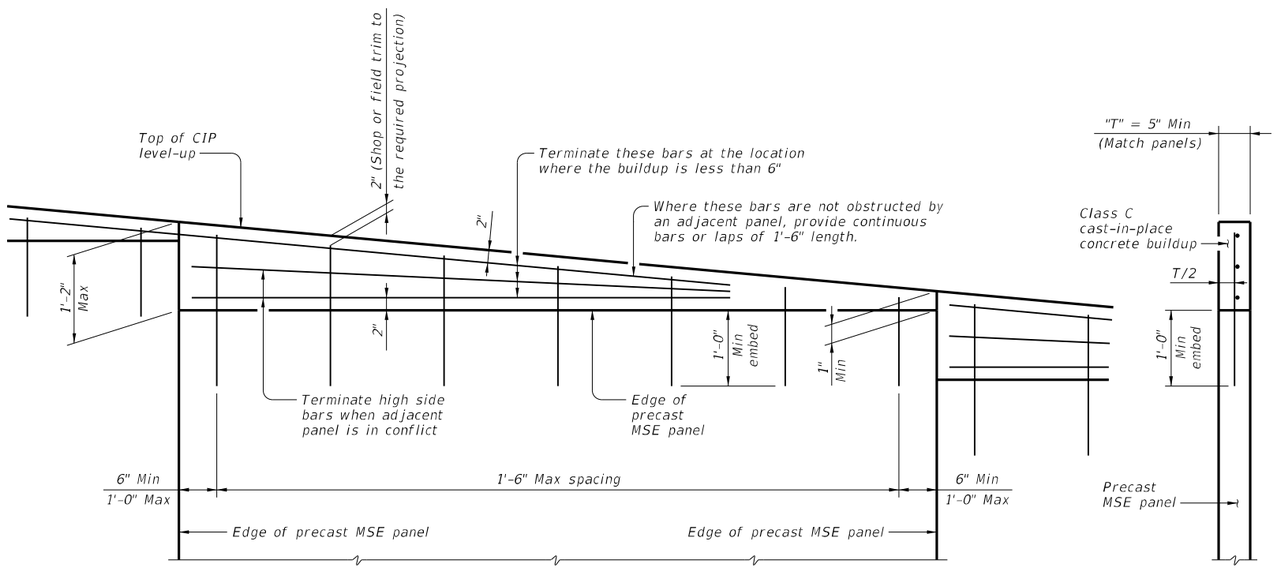
Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: RW-MSE-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US 59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		104

DATE:
FILE:



LEVEL UP DETAIL (5)

DESIGN CRITERIA NOTES:

Design Parameters:

Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Retained Soil	Unit Weight = 125 pcf ϕ = (6) C = 0 psf
Foundation Soil	ϕ = (6) C = 0 psf
Select Backfill	Unit Weight = See Table (7) ϕ = 34° C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf ϕ = 45° C = 0 psf

Limit stress in steel and concrete in accordance with current AASHTO Standard Specifications for Highway Bridges and Interim Specifications.

The minimum length of earth reinforcement are as shown on the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard.

Stability Criteria:

Stability criteria applies to both dry and drawdown analysis. Base design on the following factors of safety.

Sliding along the base of the structure	Factor of Safety ≥ 1.5
Overturning	Factor of Safety ≥ 2.0
Pullout of Earth Reinforcement at each level	Factor of Safety ≥ 1.5

Design the wall such that the base pressure resultant falls within the middle third of the retaining wall.

Determine pullout resistance from test data evaluated at ¾ inch strain.

Corrosion Criteria:

Design the earth reinforcement elements to have a minimum design life of 75 years, using current AASHTO corrosion rates.

Perform stress calculations (rupture) on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

(5) Cast vertical bars into the top of panels. At Contractor's option vertical bars may be embedded 4 inches with a Type III Class C epoxy anchorage system. Follow manufacturer's directions for installing the epoxy vertical bars.

(6) Soil design parameters must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

(7)

SELECT BACKFILL UNIT WEIGHT			
Type AS, BS & DS	Unit Weight	Internal Stability	External Stability
	105 PCF	Pullout	Sliding, Overturning, Eccentricity
	125 PCF	Rupture	Bearing

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Provide precast coping in 10-foot minimum lengths (typical.) To optimize coping lengths at radiuses, ends of runs, or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

EARTH REINFORCEMENT:

Place the uppermost earth reinforcement no more than 3 feet below the top of wall.

Place the lowest level of earth reinforcement no more than 2 feet above the top of the leveling pad.

Provide earth reinforcement with a minimum wire size of W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire must be at least 50% of the cross sectional area of the larger wire.

A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Provide unique transverse bar spacing for each mesh configuration, differing from other configurations by a minimum of 3 inches. Step earth reinforcement lengths in increments no finer than 12 inches.

PANELS:

Fabricate standard precast concrete panels to a maximum height of 6 feet and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel must not exceed 7 ft.-6 in. Provide a minimum panel thickness of 5 inches. Arrange panels to provide offset horizontal joints.

Provide an open joint around the perimeter of the concrete panels. Configure joints such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between ⅜" and ¾".

Provide a one-piece corner panel for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.

MATERIAL NOTES:

Provide Class C concrete for reinforced concrete and precast coping.
Provide Class H concrete for precast concrete panels.
Provide Class A concrete for unreinforced concrete.
Provide Grade 60 reinforcing steel.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Determine specific geometry based on wall layouts and other plan information.

Extend select backfill specified for use within the mechanically stabilized earth volume horizontally from the back of the panels a minimum 2 feet beyond the end of the earth reinforcement. Extend select backfill vertically to the top of the panels from either the top of the leveling pad, or from 4 inches below the lowest earth reinforcement, whichever is lower.

Provide concrete coping along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall.

Provide details and calculations that establish support for panels that are affected when obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcement in their normal locations. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcement, no adjustment in length is needed for skew angles less than or equal to 10 degrees. Adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall when skew angles are greater than 10 degrees. Provide calculations that justify any alterations made to the soil reinforcement or modifications to their normal placement. Do not use panels without any soil reinforcement connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting soil reinforcement attached to them and as approved by the Engineer.

Coping and anchor slabs are considered subsidiary to the Item 423, "Retaining Walls."

Use these details in conjunction with the retaining wall layout, the Mechanically Stabilized Earth Retaining Wall Design Data (RW[MSE]DD) standard and other applicable standards.

Cover dimensions are clear dimensions, unless noted otherwise.

Texas Department of Transportation

Bridge Division Standard

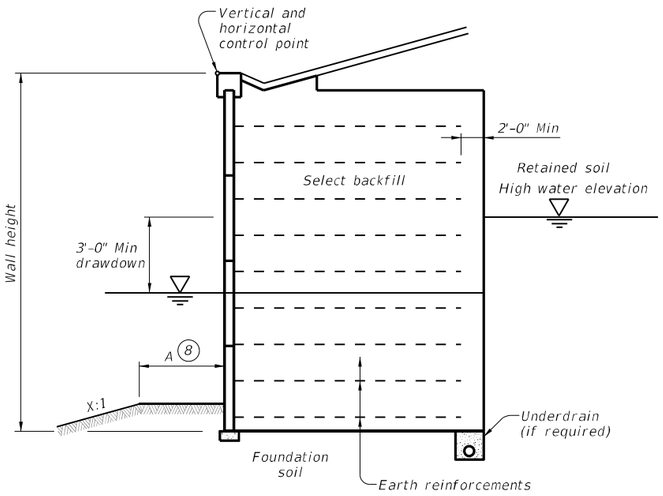
MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

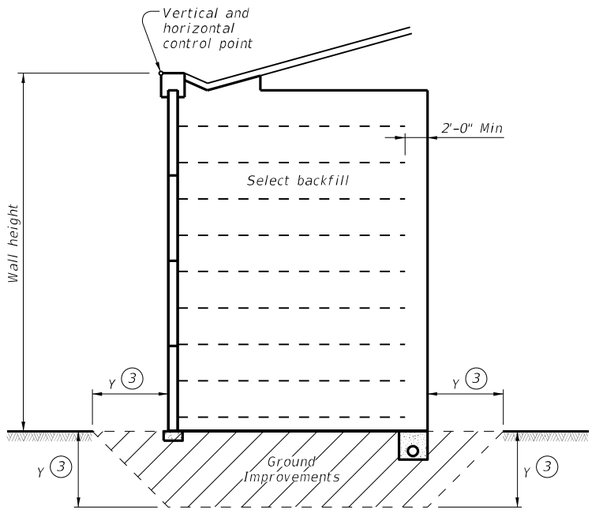
FILE: RW-MSE-22.dgn	DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US 59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		105

WALL SUMMARY

MSE Retaining Wall	Begin Station (1)	End Station (1)	Retained Soil Friction Angle (2)	Foundation Soil Friction Angle (2)	Ground Improvement (3)	Min Earth Reinf. Length (4)	Min Wall Embedment (5)	Underdrain Required (6)	Drawdown Analysis (7)	Bench Width (8)
RW01	10+00.00	10+40.00	28	28	NOT REQUIRED	1.38H or 17.0'	2'	REQUIRED	REQUIRED	2' MIN
	10+40.00	11+40.00	28	34	4' REQUIRED	1.03H or 18.0'	2'	REQUIRED	REQUIRED	2' MIN
	11+40.00	13+45.48	28	34	4' REQUIRED	0.93H or 20.0'	2'	REQUIRED	REQUIRED	2' MIN
RW02	10+00.00	10+84.00	28	34	4' REQUIRED	1.08H or 24.7'	2'	REQUIRED	REQUIRED	2' MIN
RW03	10+00.00	12+80.00	28	34	4' REQUIRED	0.94H or 17.0'	2'	REQUIRED	REQUIRED	2' MIN
	12+80.00	13+40.00	28	28	NOT REQUIRED	1.33H or 19.0'	2'	REQUIRED	REQUIRED	2' MIN
	13+40.00	14+80.00	28	28	NOT REQUIRED	1.39H or 17.0'	2'	REQUIRED	REQUIRED	2' MIN
	14+80.00	15+40.00	28	28	NOT REQUIRED	1.69H or 16.0'	2'	REQUIRED	REQUIRED	2' MIN
	15+40.00	18+27.46	28	28	NOT REQUIRED	1.93H or 14.0'	2'	REQUIRED	REQUIRED	2' MIN
RW04	10+00.00	17+00.00	28	26	NOT REQUIRED	1.19H or 20.0'	2'	REQUIRED	REQUIRED	4' MIN
	17+00.00	17+96.50	28	34	3' REQUIRED	0.94H or 19.0'	2'	REQUIRED	REQUIRED	4' MIN
RW05	10+00.00	10+84.00	28	34	3' REQUIRED	0.91H or 19.0'	2'	REQUIRED	REQUIRED	4' MIN
RW06	10+00.00	11+00.00	28	34	3' REQUIRED	0.93H or 17.0'	2'	REQUIRED	REQUIRED	4' MIN
	11+00.00	17+96.50	28	26	NOT REQUIRED	1.25H or 20.0'	2'	REQUIRED	REQUIRED	4' MIN



TYPICAL SECTION
(Rapid drawdown condition.)



GROUND IMPROVEMENT DETAIL

(1) Indicate limits for which the stated soil design requirements and assumptions are applicable.

(2) Base the listed retained and foundation friction angle on local experience or measured/correlated long term strength values.

(3) Indicate if ground improvement is required or not required. If shown as required, refer to ground improvement detail(s) shown on this sheet.

(4) Indicate on table both the minimum length and length ratio required. The minimum default length of earth reinforcements is either 8 feet or 70% of the wall height, whichever is greater. Wall height and design wall height may differ depending on project geometry and loading conditions. Note: Wall height at bridge abutments is equal to the distance between the top of leveling pad and finished grade at the bridge abutment backwall.

(5) Guidance to wall designer of record for determination of minimum wall embedment. Unless noted elsewhere in the plans, provide a minimum embedment from the top of leveling pad to finish grade of
- 1 foot for level ground where there is no potential for erosion or future excavation, or
- 2 feet for sloping ground (4.0H:1.0V or steeper) or where there is potential for removal of soil in front of the wall.

(6) Indicate if underdrain is required or not required.

(7) Indicate if rapid drawdown analysis is required.

(8) Horizontal bench width at base of wall varies. Use the following criteria to establish base width:
A = 2-foot Min for X > 4 or
A = 4-foot Min for X ≤ 4
Applicable to both drawdown and dry condition.

(9) Reinforcement lengths may be reduced in accordance with FHWA NHI-10-024, Section 6.4 provided the retaining wall is designed as a back-to-back wall with the opposite Temporary Earth Wall. If this option is used the Temporary Earth Wall reinforcement must be designed for a 75 year life. Contractor must provide supporting design calculation for both the permanent and temporary retaining walls. Additionally, ground improvement must extend to the face of the Temporary Earth Wall if required. Reinforcement from the permanent and temporary earth wall may not be tied together, but must be overlapped as required.

STATE OF TEXAS
MELVIN K. LARA
91638
LICENSED
PROFESSIONAL ENGINEER
8-1-24

Texas Department of Transportation

Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA

RW(MSE)DD

FILE: RW-MSEDD-22.dgn	DN: TxDOT	CK: RLE	DW: JER	CK: RLE
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
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	CRP	GOLIAD		106

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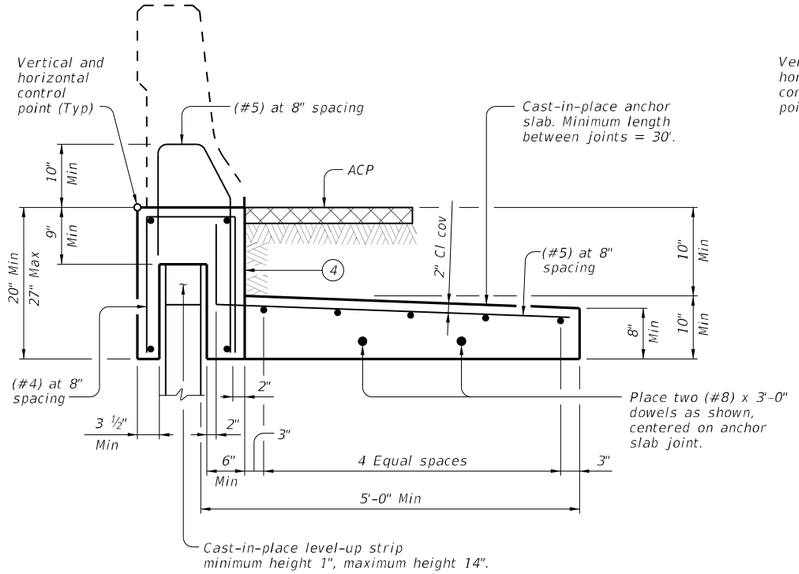
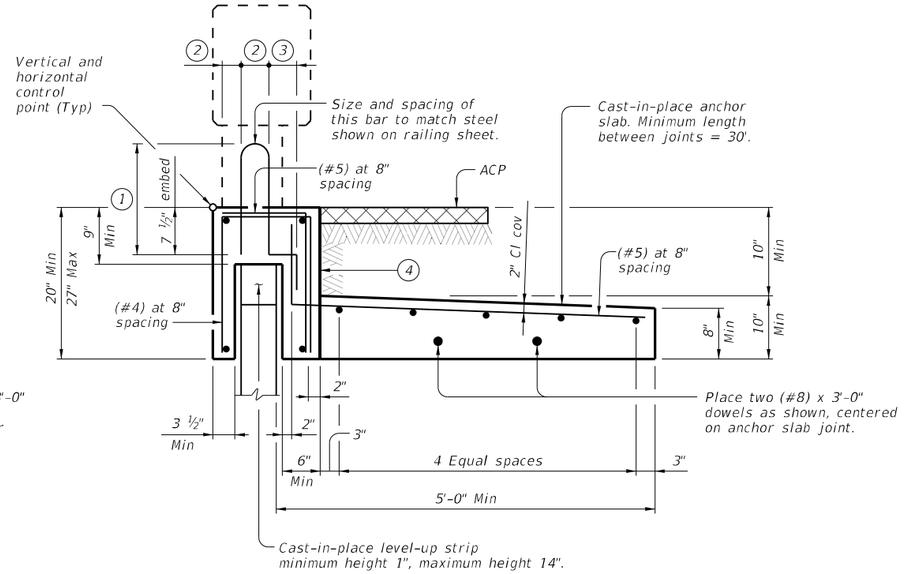


"WIDE BASED" ADJACENT TO ACP

(Showing T551 Rail, other rails listed similar.)



"NARROW BASED" ADJACENT TO ACP

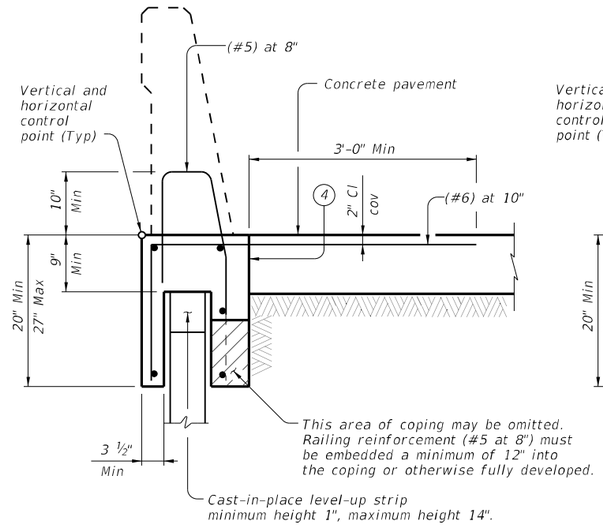
(Showing T223 Rail, other rails listed similar.)

(1) Reinforcement length equal to length shown on the appropriate rail standard plus 1 inch.

(2) Match dimension on the appropriate rail standard.

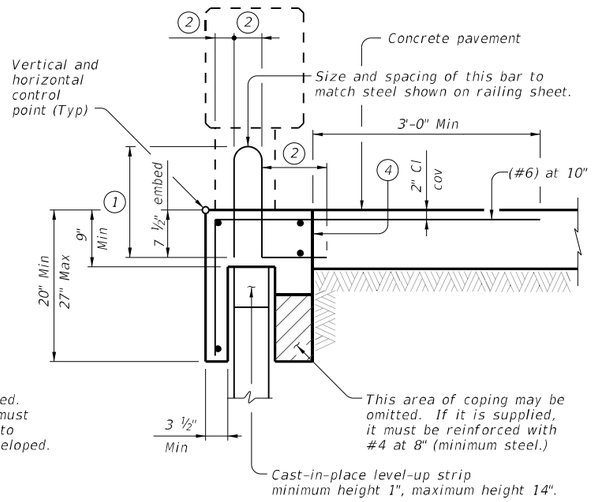
(3) Match dimension on the appropriate rail standard. Bend end of rail anchorage reinforcing as shown as required to maintain clear cover.

(4) See "Coping Joint Sealer Details."



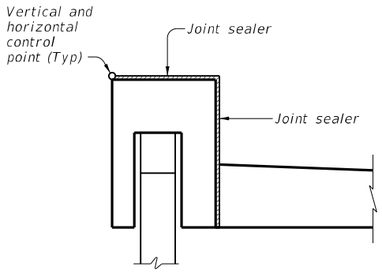
"WIDE BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing SSTR Rail, other rails listed similar.)

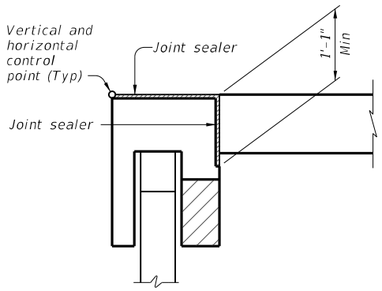


"NARROW BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing T223 Rail, other rails listed similar.)



ADJACENT TO ACP



ADJACENT TO CONCRETE PAVEMENT

COPING JOINT SEALER DETAILS

(Reinforcing steel not shown for clarity.)

Rail Type	Detail	Precasting Rail with Coping Allowed
T1F/T1W/C1W/T2P/C2P	NARROW	NO
T221/C221/T222	NARROW	YES
T223/C223	NARROW	NO
T402/C402	NARROW	NO
T411/C411	NARROW	NO
T551/T552	WIDE	YES
T66	NARROW	NO
SSTR	WIDE	YES

CAST-IN-PLACE COPINGS:

Provide compressible material to isolate precast panel from cast-in-place coping to prevent cracking. Attach compressible material to both sides of precast panel prior to casting concrete for coping.

When cast-in-place coping is anchored to reinforced concrete pavement, provide a smooth level-up strip on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.

Align coping and railing joints with precast panel joints. Optional rail joints are allowed as approved by Engineer. Provide railing construction joints or expansion joints at 100-foot maximum spacing.

PRECAST COPINGS:

Provide a smooth level-up strip on top of the precast panels prior to installation of the coping. Shims may be used on top of level-up strips to facilitate alignment. Total shim thickness not to exceed 1 inch.

Provide precast coping in 10-foot minimum lengths.

JOINTED CONCRETE PAVEMENT:

When coping is adjacent to and anchored into jointed concrete pavement, align the coping joints with the pavement joints.

JOINT SEALANT:

Seal joints between coping segments in accordance with Item 438, "Cleaning and Sealing Joints." Provide Class 4 joint seal. Place sealant flush with coping surface. The purpose of the joint sealing is to reduce surface drainage infiltration into the retaining wall backfill. Sealing coping joint is considered subsidiary to other items.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi.)
Provide Grade 60 reinforcing steel.
Provide #4 longitudinal bars, unless otherwise shown.

GENERAL NOTES:

Details on this sheet are to be used in development of specific details for mounting traffic railing on mechanically stabilized earth (MSE) walls.

The specific details proposed must have strengths equivalent to those shown on this sheet and must be submitted for approval. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.

Submit shop drawings for the traffic railing foundations to the Engineer in accordance with Item 423, "Retaining Walls." The shop drawings must include bar bending details.

Precasting of railing with the coping will be allowed as noted in the table on this sheet.

The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The Contractor must provide for use of these systems in accordance with Article 7.5.

Coping and anchor slabs are considered subsidiary to Item 423, "Retaining Walls." Payment for traffic railing is per the linear foot for the appropriate railing type.

Cover dimensions are clear dimensions, unless noted otherwise.

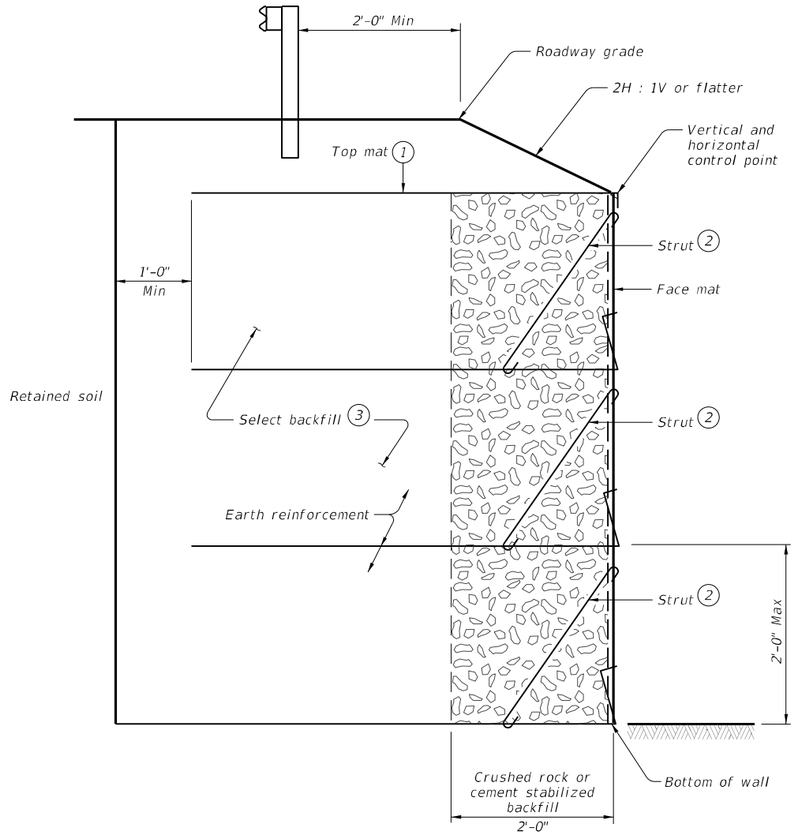
Texas Department of Transportation

Bridge Division Standard

RETAINING WALL TRAFFIC RAILING FOUNDATIONS

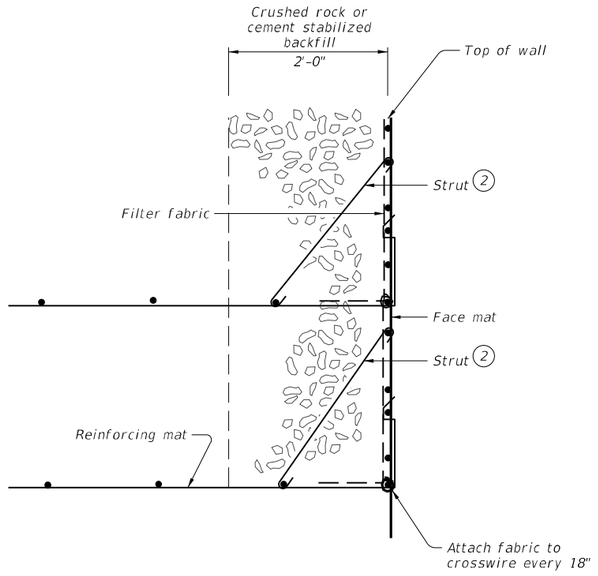
RW(TRF)

FILE: RW-TRF-22.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TAR
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US 59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		107



TYPICAL SECTION

(Showing top mat option.)



DETAIL OF WALL FACE

(Showing strut option.)

(1) Provide top mat to stabilize top of wall. Contractor may propose alternate method to stabilize top of wall for review.

(2) Provide intermediate struts to stabilize face. Wall supplier may propose alternate methods of face stabilization for review.

(3) Shop drawings must include drainage provisions and details for backfill composed of:
Cement stabilized sand,
Crushed concrete, or
Type CS fill with a fines content greater than 15%.

SPECIAL NOTE - FACE CONSTRUCTION

When constructing wire faced walls, it is critical that the area immediately behind the face mat be completely filled. Failure to fill and compact this area will result in bulging of the face mats and settlement of the top of wall. The filter fabric shall closely follow the contours of the face unit, with particular attention paid to the lower corner of the basket. Pull the fabric into the corner and attach to the basket with hog rings or tie wire. Extend the coarse rock or cement stabilized backfill in the 2-foot zone behind the face completely to the top of the face mat. Take particular care not to leave a gap or void below the next layer of earth reinforcement.

DESIGN CRITERIA NOTES:

Design Parameters:
Base design of retaining walls on the following design parameters unless stated elsewhere in the plans:

Random Backfill (Embankment or Existing Soils)	Unit Weight = 120 pcf ϕ = 30° C = 0 psf
Select Backfill	Unit Weight = 120 pcf ϕ = 30° C = 0 psf

Limit allowable stresses and pullout of earth reinforcement in accordance with current AASHTO Standard Specifications for Highway Bridges and Interim Specifications.

Stability Criteria:
Base design on the following factors of safety:

Sliding along the base of the structure	Factor of Safety ≥ 1.5
Overturning	Factor of Safety ≥ 2.0
Pullout of Earth Reinforcement	Factor of Safety ≥ 1.5

Design the wall such that the base pressure resultant falls within the middle third of the retaining wall.

EARTH REINFORCEMENT:

Space vertical earth reinforcement at 24 inch maximum.
Provide earth reinforcement lengths adhering to the following:
6-foot minimum for walls 6 feet and shorter
8-foot minimum for walls over 6 feet tall,
or as shown elsewhere in the plans.
Utilize a minimum W4.5 wire size for welded wire earth reinforcement. Space longitudinal wire at maximum of 12 inches and transverse wire at a maximum of 24 inches.
Geogrid earth reinforcement is permissible. If geogrid is to be used, provide a detail showing the connection between the welded wire face basket and the geogrid earth reinforcement.
Provide non-metallic or galvanized reinforcement for any temporary earth wall reinforcement that will be placed in the reinforced volume of a permanent MSE wall.

WALL FACE:

Provide welded wire in facing with a minimum W4.5 wire size. Space wire at 6 inches maximum in both the horizontal and vertical directions. Design the facing to maintain a vertical position during wall backfilling. Utilize wire struts, external bracing, or other means which provide acceptable performance. Stop construction if the face does not remain vertical during wall backfilling until the system is modified to meet this requirement.
Provide angled struts or a top mat to stabilize the top basket face. Space struts at 24 inch maximum.

GENERAL NOTES:

Sections shown are for informational purposes only. Determine specific geometry based on wall layouts and other plan information.
Extend the select backfill specified for use within the temporary earth wall select volume a minimum of 1 foot horizontally beyond the end of the earth reinforcement from the back of the 2-foot backfill zone.

Texas Department of Transportation

Bridge Division Standard

TEMPORARY EARTH RETAINING WALL

RW(TEW)

FILE: RW-TEW-22.dgn		DN: TxDOT	CK: TxDOT	DW: JER	CK: RLE		
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY			
REVISIONS	0088	02	062	US 59			
	DIST	COUNTY		SHEET NO.			
	CRP	GOLIAD		108			

DATE:
FILE:

DATE: 6/7/2024
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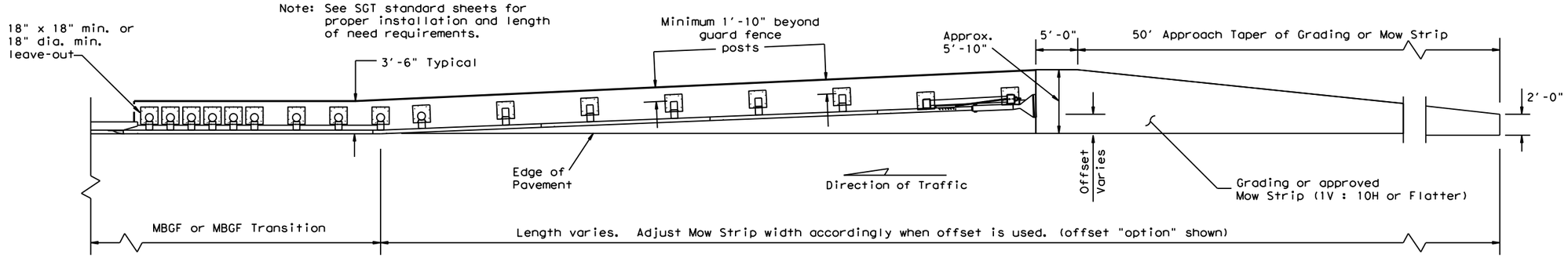
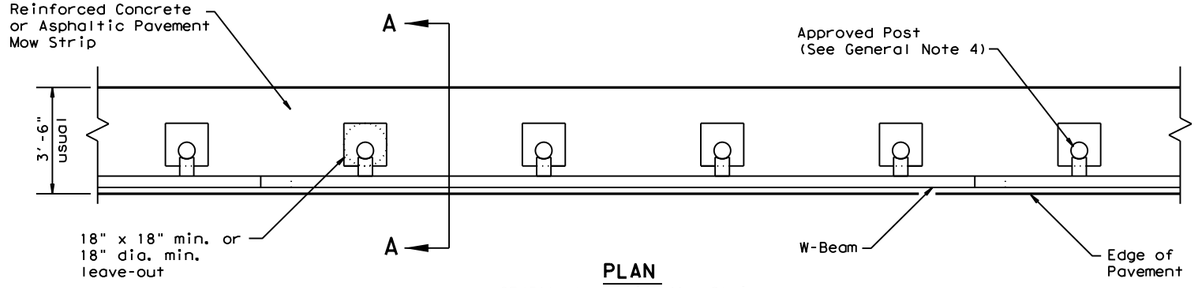
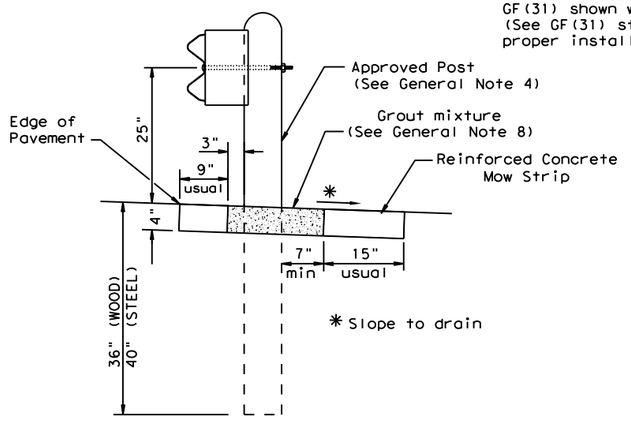


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



PLAN

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

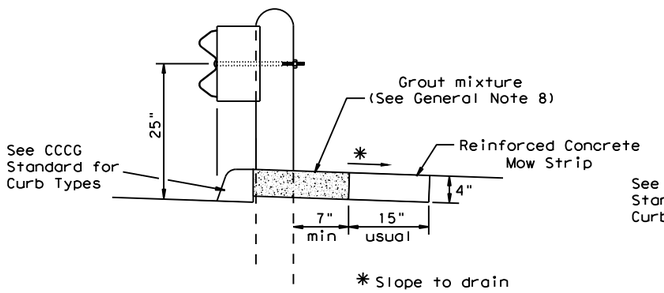


SECTION A-A

Typical

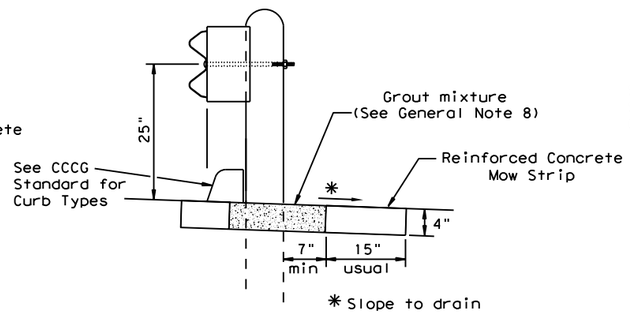
MOW STRIP DETAIL

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



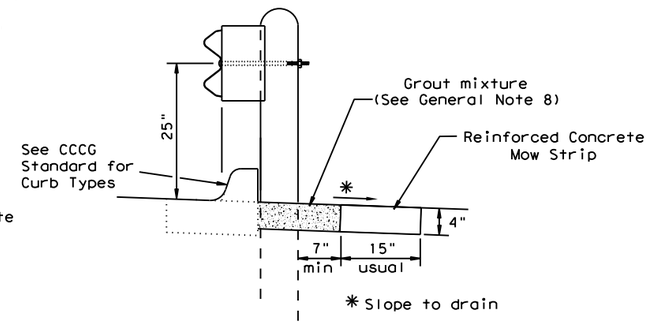
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

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

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	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		109

DATE: 6/7/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms71724\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

TRAFFIC FLOW

PLAN VIEW

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

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

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

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

SEE DETAIL 3

SEE NOTE: A

13/16" DIA. YIELDING HOLES

13/16" DIA. YIELDING HOLES

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 32" HEIGHT

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 ⅞")
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	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		110

DATE:
FILE:

(SEE GN NOTE 15)
STANDARD 31" MBGF

ITEM (6)
INNER SIDE SLIDER
(ISS) PANEL FOR RAIL 3

FIELD-SIDE
(RAIL 3)

NOTE:
RECESSED HEX NUTS FACING
TRAFFIC-SIDE **SEE DETAIL (C)**

REFERENCE LINE USED TO INSTALL
LINE POST(9) THRU POST(2)

POST 1 OFFSET DISTANCE MEASURED
7-5/8" FROM REFERENCE LINE

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

NO BLOCKOUT
AT (POST 1)

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2

RAIL 4 | RAIL 3 | RAIL 2 | RAIL 1

CABLES

NOTES:
1. ITEM (12) COMPOSITE BLOCKOUTS INSTALLED AT LINE POST(9) THRU LINE POST(2).
2. DO NOT INSTALL A BLOCKOUT AT LINE POST(1).

ITEM (5)
TRAFFIC SIDE SLIDER
(TSS) PANEL FOR RAIL 2

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

PLAN VIEW

MBGF RAIL 2 | MBGF RAIL 1

INSTALL GUARD FENCE RECESSED HEX NUTS ON TRAFFIC-SIDE

DETAIL (C)

TRAFFIC FLOW

ITEM (25)
MAX-TENSION HEAD
SEE DETAIL (A)

END PAYMENT (SGT) BY EACH

DO NOT BOLT
RAIL TO POST 6

BEGIN LENGTH OF NEED

INSTALLATION LENGTH 55'- 1/2"

49'-8 5/16"

6'-3" | 6'-3" | 6'-3" | 6'- 3/4" | 6'-3" | 6'-3" | 6'-3" | 37 1/2" | 5'-3 11/16"

RAIL HEIGHT 31" | ARROWS | RAIL HEIGHT 31" | HEAD HEIGHT

ITEM (13) RAIL 4 | ITEM (13) RAIL 3 | ITEM (13) RAIL 2 | ITEM (13) RAIL 1

DETAIL (D)

DETAIL (B)

32-1/4"

68-1/8"

FINISHED GRADE | FINISHED GRADE

CABLES

ITEM (10)
CABLE ASSEMBLY

ITEM (2)
GROUNDSTRUT

POST 9 | POST 8 | POST 7 | POST 6 | POST 5 | POST 4 | POST 3 | POST 2 | POST 1
ITEM (4)
I-BEAM
W6 X 9
NO BLOCKOUT
AT (POST 1)

(8) X-LITE LINE POST - ITEM (11)

ELEVATION VIEW

SOIL
ANCHOR POST
ITEM (1)

A — A

TSS PANEL
GALVANIZED
ITEM (5)

RSS PLATE
GALVANIZED
ITEM (8)

INSTALL THE TSS AND RSS
WITH THE ARROWS POINTING
TOWARDS THE MAX-HEAD

TSS PANEL AND RSS PLATE
DETAIL (D)

HEAD HEIGHT 32-1/4" | TOP OF POST | 31-7/8" | FINISHED GRADE | 40-1/8" | 68-1/8" ANCHOR POST DEPTH

ITEM (1)
ANCHOR

ITEM (11)
LINE POSTS
2 THRU 9
(NOTE: ITEM (4) POST 1 (NOT SHOWN), TO BE INSTALLED AT SAME DEPTH AS LINE POSTS.)

SOIL ANCHOR, POST 1 & LINE POST 2 THRU 9

SECTION VIEW A-A

NOTE:
USE THE MASH APPROVED
X-TENSION CABLE ASSEMBLY.

7 5/16" | 2 1/8"

UPPER CABLE
(BACK SIDE)

LOWER CABLE
(TRAFFIC SIDE)

DETAIL (B)

CABLE
FRICTION PLATE
HEAD UNIT
ITEM (9)

NOTE:
INSTALL 5/8" RECESSED HEX
NUTS ON TRAFFIC SIDE.

ITEM (24)
ITEM (21)
ITEM (20) 8X
ITEM (17) 8X
ITEM (23) 6X
3 SCREWS
EACH SIDE
ITEM (22)
BRACKET
SHIPPED FLAT
ITEM (3)
ITEM (16) 4X
* ITEM (25)
HIGH INTENSITY
REFLECTIVE SHEETING
(RAIL 1)

NOTE: DELINEATION MARKER IN ACCORDANCE WITH TEXAS MUTCD.

SPLICE FOR IMPACT-HEAD
TO GUARD FENCE (RAIL1)

DETAIL (A)

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

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

STANDARD
MBGF

APPROX 5'-10" | 5'-0" | 50' APPROACH GRADING | 2'-0"

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.

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

APPROACH GRADING AT GUARDRAIL END TREATMENTS

TRAFFIC FLOW

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE MAX-TENSION 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: 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	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO 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

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	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		111

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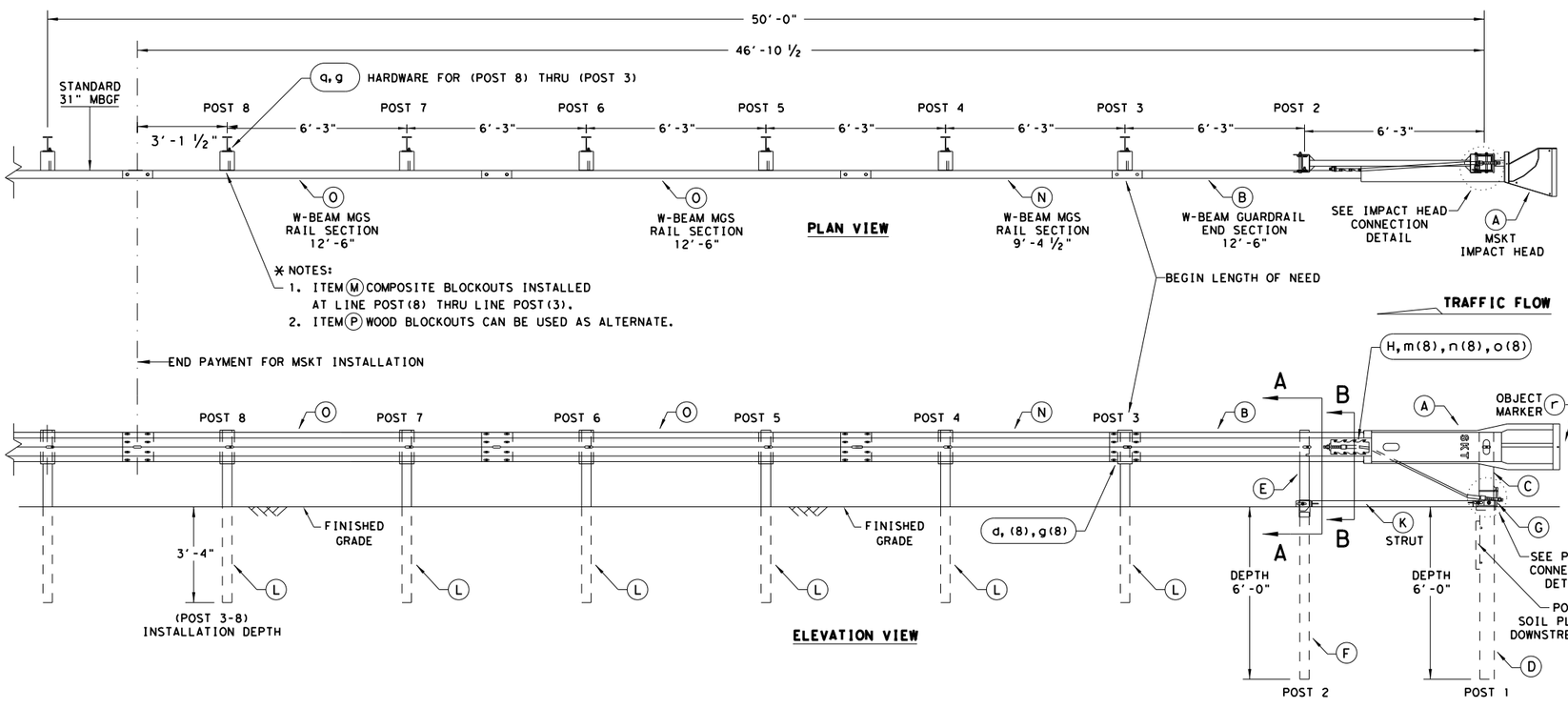
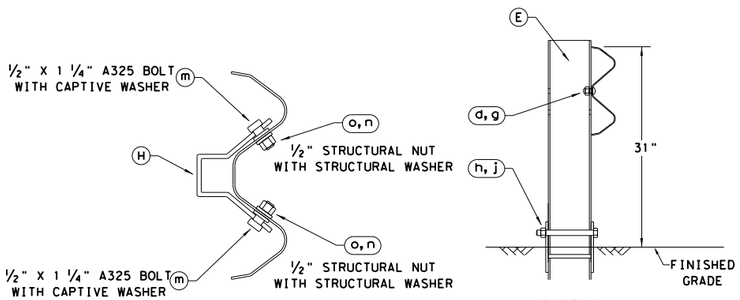
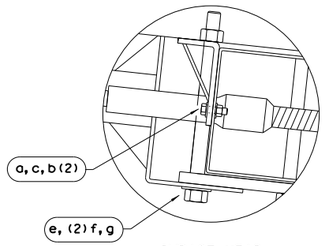
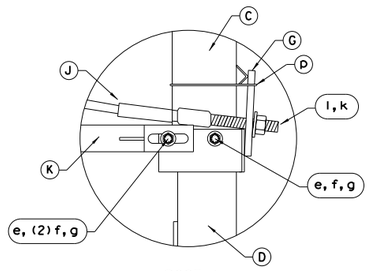
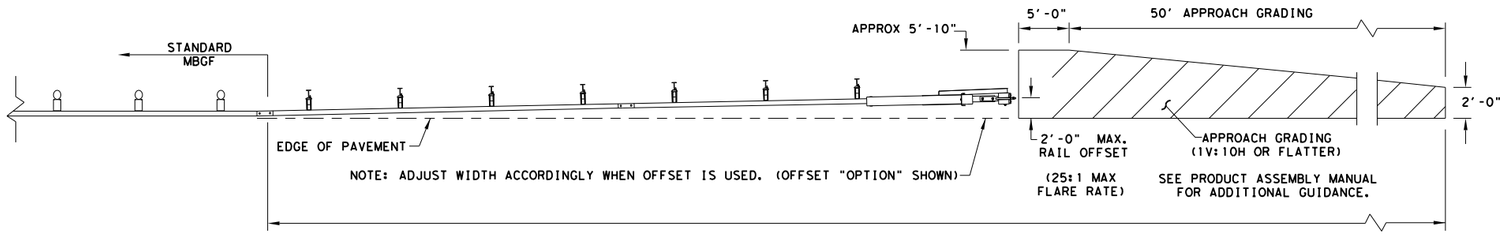


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









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

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.

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 ⅛" 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 ½")	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	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x ⅜" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: *

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

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	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		112

DATE: 9/3/2024
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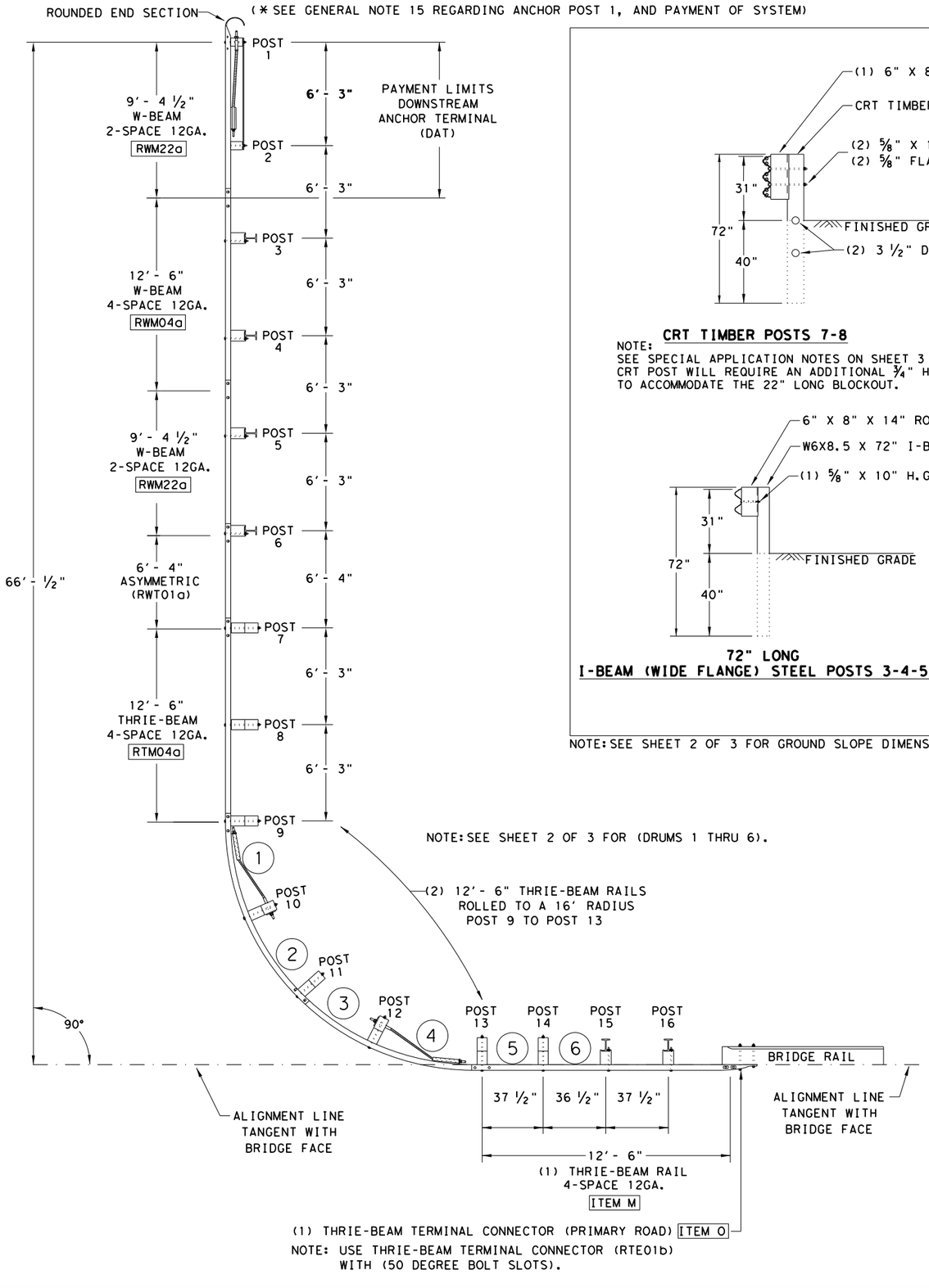
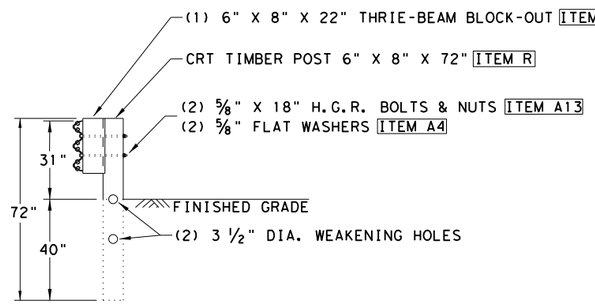
ROUNDED END SECTION (* SEE GENERAL NOTE 15 REGARDING ANCHOR POST 1, AND PAYMENT OF SYSTEM)



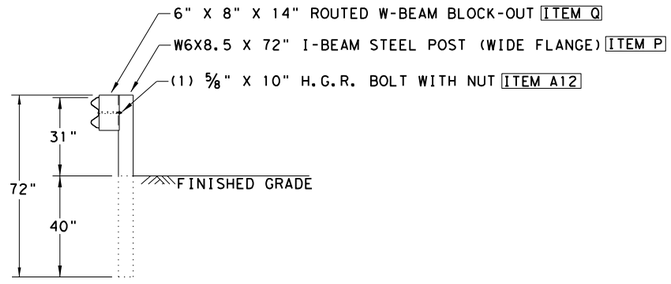
NOTE: USE THRIE-BEAM TERMINAL CONNECTOR (RTE01b) WITH (50 DEGREE BOLT SLOTS).

NOTE: SEE SHEET 2 OF 3 FOR (DRUMS 1 THRU 6).

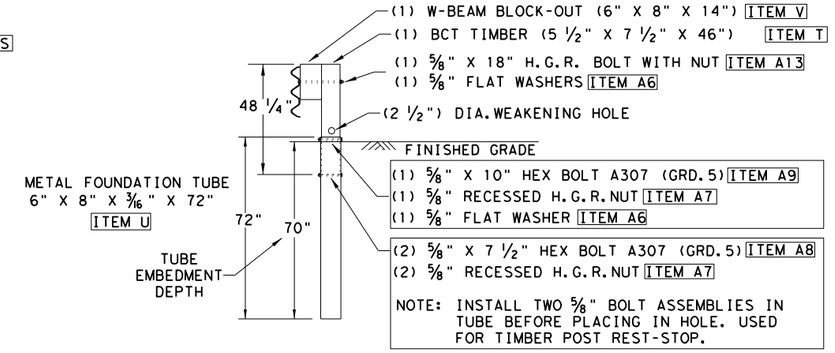


CRT TIMBER POSTS 7-8

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



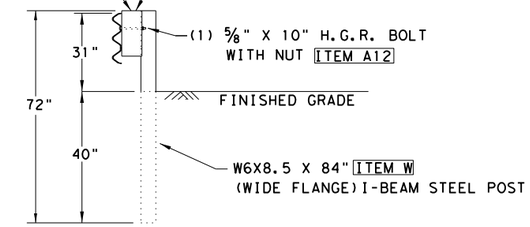
72" LONG
I-BEAM (WIDE FLANGE) STEEL POSTS 3-4-5-6



BCT TIMBER POSTS WITH METAL FOUNDATION TUBES
9-10-11-12-13-14

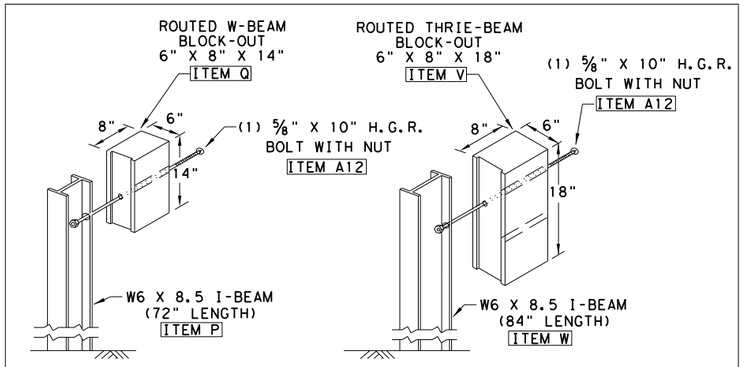
NOTE:
FOR I-BEAM (POST 15) ITEM V
USE (1) 6" X 8" X 14" ROUTED WOOD BLOCK-OUT ITEM A9
(1) H.G.R. BOLT & NUT

NOTE:
FOR I-BEAM (POST 16) ITEM X
USE (1) 6" X 8" X 18" ROUTED WOOD BLOCK-OUT ITEM A9
(1) H.G.R. BOLT & NUT



84" LONG
I-BEAM WIDE FLANGE STEEL POSTS 15-16

NOTE: SEE SHEET 2 OF 3 FOR GROUND SLOPE DIMENSIONS.



POST 3-4-5-6-15 **POST 16**

INSTALLATION DETAIL
ROUTED WOOD BLOCK-OUT WITH WIDE FLANGE STEEL POST

NOTE:
POST SYSTEM USES TWO TYPES OF 14" WOOD BLOCK-OUTS.
FOR CRT & BCT WOOD POSTS USE: (PDB01a)
FOR I-BEAM STEEL POSTS USE: (PDB01b)

POST (3-4-5-6)	USE:	14" BLOCK-OUT (PDB01b)
POST (7-8)	USE:	22" BLOCK-OUT (PDB02)
POST (9 THRU 14)	USE:	14" BLOCK-OUT (PDB01a)
POST (15)	USE:	14" BLOCK-OUT (PDB01b)
POST (16)	USE:	18" BLOCK-OUT (PDB01)

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

SHEET 1 OF 3

Texas Department of Transportation — Design Division Standard

TL-2
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-2)-21

FILE: srgtl221	TxDOT	CK:KM	DN:VP	CK:CGL
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REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		113

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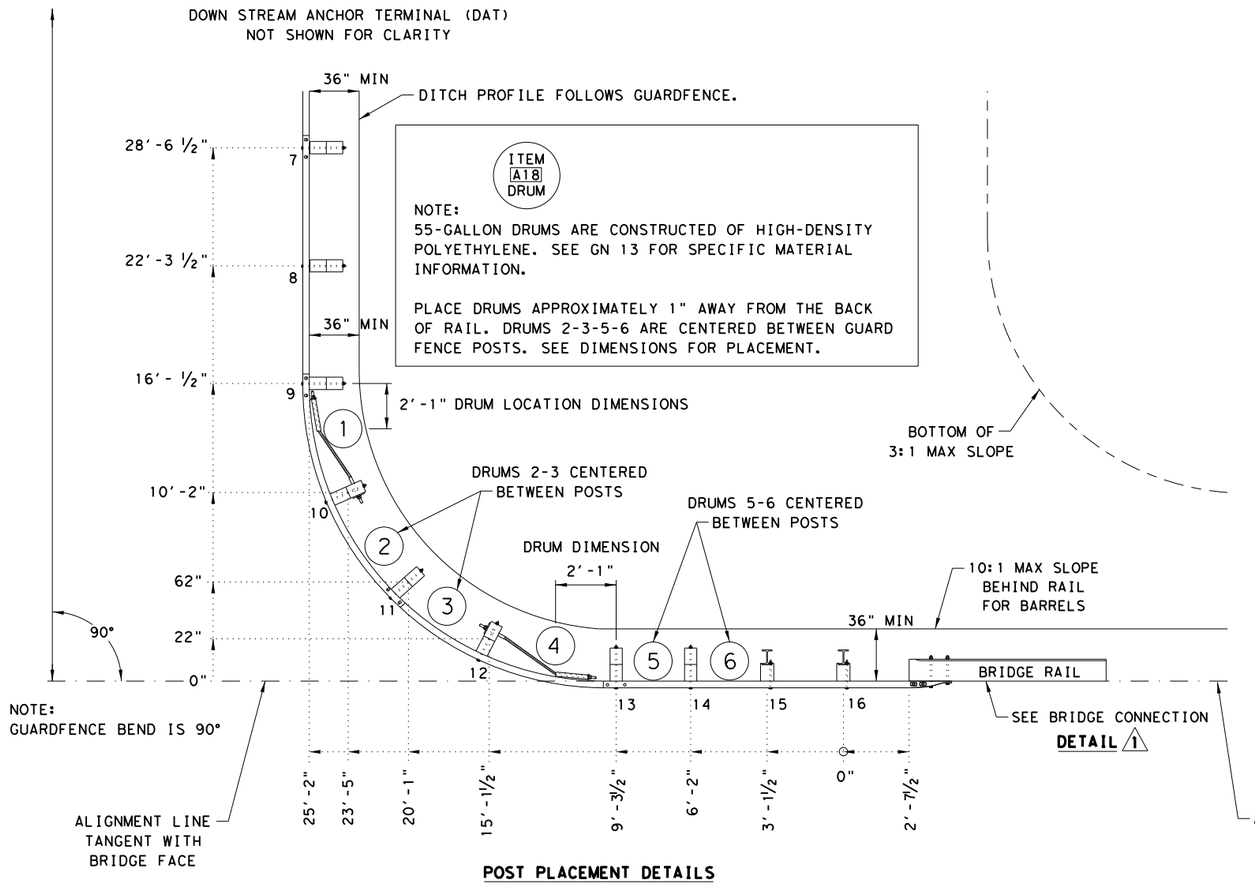
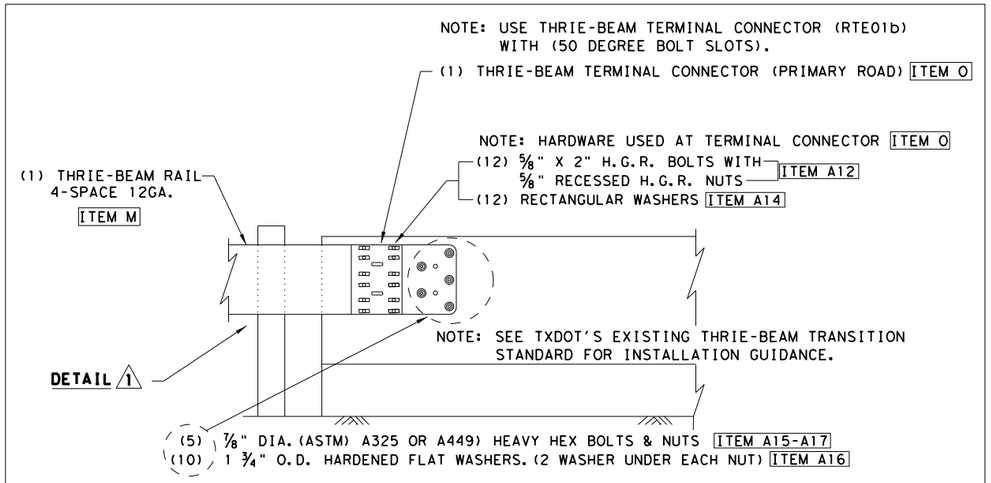


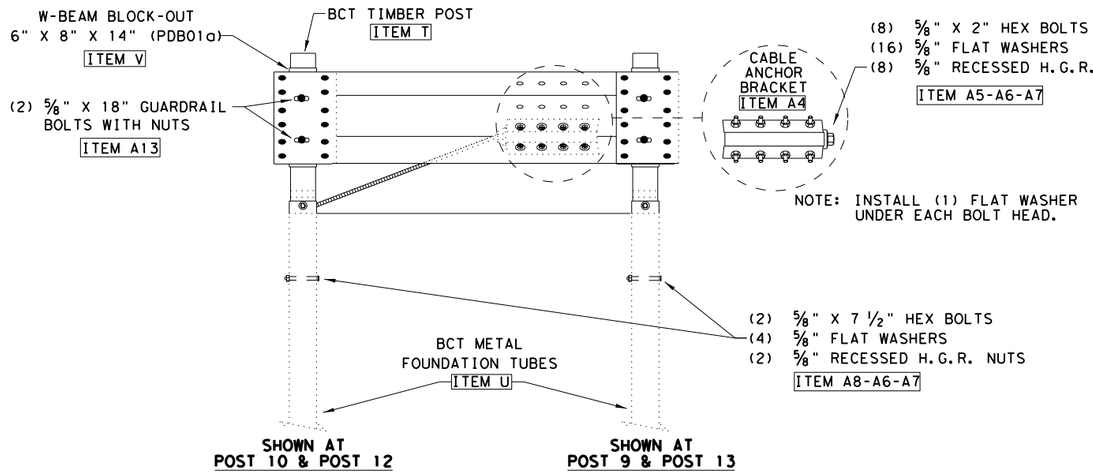
POST PLACEMENT DETAILS

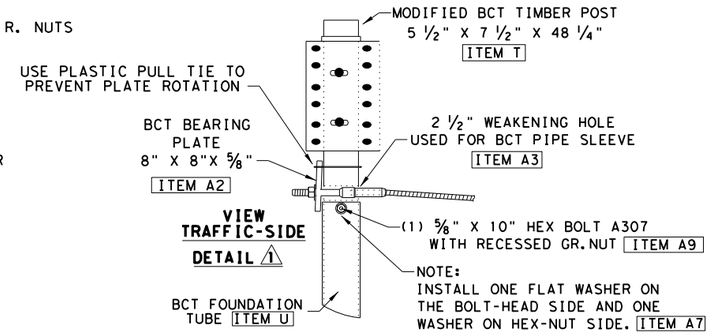


NOTE: TO ACCOMMODATE THE THRIE-BEAM TERMINAL CONNECTOR AT THE ROADWAY BRIDGE RAIL. DRILL (5) 1" DIA. HOLES. USE CONNECTOR PLATE FOR HOLE LOCATION TEMPLATE.

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.)

PRIMARY ROADWAY BRIDGE-RAIL DETAIL





SHOWN AT POST 10 & POST 12

BCT TIMBER POST WITH METAL FOUNDATION TUBE

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

Texas Department of Transportation — Design Division Standard

TL-2
SHORT RADIUS GUARDRAIL
MASH COMPLIANT

SRG(TL-2)-21

FILE: srgt1221	TxDOT	CK:KM	DN:VP	CK:CGL
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REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		114

DISCLAIMER:

DATE: 9/3/2024
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\javier.duarte.toms\T1724\srgt1221.dgn

ITEM	ALL LARGE & SMALL COMPONENT DESCRIPTIONS	TL-2 DOWNSTREAM ANCHOR TERMINAL (DAT) ☐ (PAYABLE BY EA.) ITEM	QTY	TL-2 SHORT RADIUS GUARDRAIL COMPLETE SYSTEM (INCL DAT) △ (ALL PAY ITEMS) ITEM	TOTAL QTY
A	POST 1 & 2 BCT TIMBER (5 ½" X 7 ½" X 48 ¼") (PDF01)	A	2	A	2
B	POST 1 & 2 BCT TUBE (6" X 8" X 3/16" X 72" LENGTH) (PTE05)	B	2	B	2
C	POST 1 & 2 CHANNEL STRUTS (C3 X 5 X 80") A36	C	2	C	2
D	POST 1 SHELF ANGLE BRACKET (6" X 7 ½" X ¼") SEE DAT DETAIL	D	1	D	1
E	POST 1 BCT POST SLEEVE (FMM02a)	E	1	E	1
F	POST 1 BCT CABLE BEARING PLATE (⅝" X 8" X 8") (FPB01)	F	1	F	1
G	BCT CABLE ANCHOR ASSEMBLIES (¾" X 6'-6 ¾" LENGTH) (FCA01)	G	1	G	1
H	W-BEAM RAIL (ROUNDED END ANCHOR-TYPE) 12GA. (RWE03a)	H	1	H	1
I	W-BEAM RAIL (LENGTH 9'-4 ½") 12GA. (RWM22a)	I	2	I	2
J	W-BEAM RAIL (LENGTH 12'-6") 12GA.(4 SPACE) (RWM04a)			J	1
K	W-BEAM RAIL (LENGTH 9'-4 ½") 12GA. (RWM22a)			K	1
L	W-BEAM TO THRIE-BEAM ASYMMETRIC RAIL (RWT01a). (LENGTH 6'-4")			L	1
M	THRIE-BEAM RAIL (LENGTH 12'-6") 12GA. (4 SPACE) (RTM04a)			M	1
N	THRIE-BEAM RAIL (LENGTH 12'-6") 12GA. (16' RADIUS) (RTM02a)			N	2
O	THRIE BEAM RAIL (TERMINAL CONNECTOR) (BRIDGE-RAIL) (RTE01b)			O	1
P	POSTS 3,4,5,6 I-BEAM POSTS (LENGTH W6X8.5 X 72") (PWE01)			P	4
Q	POSTS 3,4,5,6,15 ROUTED W-BEAM BLOCK-OUTS (6" X 8" X 14") (PDB01b)			Q	5
R	POSTS 7,8 CRT TIMBER POSTS (LENGTH 6" X 8" X 72") (PDE09)			R	2
S	POSTS 7,8 THRIE-BEAM BLOCK-OUTS (6" X 8" X 22") (PDB02a)			S	2
T	POSTS 9,10,11,12,13,14 BCT TIMBER (5 ½" X 7 ½" X 46") (PDF04)			T	6
U	POSTS 9,10,11,12,13,14 BCT TUBE (6" X 8" X 3/16" X 72") (PTE05)			U	6
V	POSTS 9,10,11,12,13,14, W-BEAM BLOCK-OUTS (6" X 8" X 14") (PDB01a)			V	6
W	POSTS 15,16 I-BEAM POSTS (LENGTH W6X8.5 X 84") (PWE07)			W	2
X	POSTS 16 ROUTED THRIE-BEAM BLOCK-OUT (6" X 8" X 18") (PDB01)			X	1
A1	MODIFIED BCT CABLE ANCHOR ASSEMBLIES (¾" X LENGTH 5'-5")			A1	2
A2	BCT CABLE BEARING PLATE (⅝" X 8" X 8") (POST 10 & POST 12) (FPB01)			A2	2
A3	BCT CABLE POST SLEEVE (POST 10 & POST 12) (FMM02)			A3	2
A4	BCT CABLE ANCHOR BRACKET (AT POST 9 & POST 13) (FPA01)			A4	2
A5	⅝" X 2" HEX BOLTS A307 GRD.5 (FOR CABLE ANCHOR BRACKETS)	A5	8	A5	24
A6	⅝" FLAT WASHER A307 GRD.5 (1 WASHER UNDER BOLT & 1 WASHER UNDER NUT)	A6	18	A6	48
A7	⅝" RECESSED H.G.R. NUTS (FOR ALL ⅝" BOLTS)	A7	20	A7	152
A8	⅝" X 7 ½" HEX BOLTS A307 GRD.5 BCT POSTS (9-10-11-12-13-14)	A8	4	A8	12
A9	⅝" X 10" HEX BOLTS A307 GRD.5 BCT POSTS (9-10-11-12-13-14)	A9	2	A9	6
A10	⅝" X 1 ¼" H.G.R. BOLTS SPLICES AT POST (2-3-4-5-6-7-9-11-13)(FBB01)	A10	4	A10	72
A11	⅝" X 2" H.G.R. BOLTS (ROUND TERM-POST 10-END SPLICE)(FBB02)			A11	18
A12	⅝" X 10" H.G.R. BOLTS (I-BEAM POSTS RAIL & BLOCKOUT)(FBB03)	A12	2	A12	10
A13	⅝" X 18" H.G.R. BOLTS (POSTS 9,10,11,12,13,14)(FBB04)			A13	10
A14	RECTANGULAR WASHERS (FWR03) (FOR TERMINAL CONNECTOR RTE01b)			A14	12
A15	⅞" X (LENGTH VARIES) HEX BOLTS A325 OR A449 GR.5			A15	5
A16	1 ¾" O.D. HARDENED FLAT WASHER A325			A16	10
A17	⅞" HEX NUT GR.5 A325			A17	5
A18	55 GALLON DRUM - FILLED WITH SAND 700-715lbs.			A18	6

SPECIAL APPLICATION NOTES.

1. THIS IS A MASH COMPLIANT TL-2 SHORT RADIUS GUARDRAIL SYSTEM 31 INCHES TALL. THE SYSTEM REQUIRES A MINIMUM PLACEMENT FOOTPRINT OF 35' ALONG THE PRIMARY ROAD AND 30' ALONG THE SECONDARY DRIVEWAY.

2. THE SYSTEM ALSO REQUIRES A MINIMUM 3' WIDE (WORK ZONE) DIRECTLY BEHIND THE GUARDRAIL SYSTEM, WITH A SLOPE AT 1V:10H, FROM THERE A 3:1 SLOPE IS RECOMMENDED. SEE SHEET 2 OF 3 FOR SLOPE DETAILS.

3. NOTE FOR INSTALLER: THE TWO (2) CRT POSTS ITEM (R), AT POST LOCATIONS 7 & 8.), WILL 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.

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 (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND TYPE A (1 ¾" O.D.) WASHER AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM A307) ARE ⅝" X 1 ¼" OR 2" LONG AT TRIPLE RAIL SPLICES WITH A DOUBLE RECESSED NUT (ASTM A563).

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 RAIL 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 DRUMS, 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 DRUMS ARE EAGLE MODEL 1656 FILLED WITH 715 LB (+/-15) SAND WITH THE PLASTIC LEVER-LOCK; OR AN APPROVED EQUIVALENT. THE APPROXIMATE HEIGHT OF THE DRUM IS 37" (+/-).

14. WHEN THE SHORT RADIUS SYSTEM IS TERMINATED BY A DAT, REFER TO THE LATEST DAT STANDARD FOR INSTALLATION OF THE DAT SYSTEM. IF THE SYSTEM IS TERMINATED BY ANOTHER END TERMINAL SYSTEM, REFER TO THE CORRESPONDING END TERMINAL STANDARD.

* 15. WHEN THE PLANNED LOCATION OF POST (1) IS WITHIN THE RIGHT-OF-WAY AND WITHIN THE CLEAR ZONE OF THE DIRECTION OF THE OPPOSING TRAFFIC, AN APPROPRIATE CRASHWORTHY END TERMINAL SHALL BE INSTALLED IN PLACE OF THE DOWNSTREAM ANCHOR TERMINAL (DAT). THE PAYMENT OF THE COMPLETE SHORT RADIUS SYSTEM WITH A DAT AT THE TERMINUS WILL BE WITH BID ITEMS: 540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION, AND 540 6046 TL-2 31" SHORT RADIUS (W/O DAT). THE PAYMENT OF THE SYSTEM TERMINATED BY A CRASHWORTHY END TERMINAL (IN LIEU OF THE DAT) WILL BE WITH BID ITEMS: 540 6046 TL-2 31" SHORT RADIUS (W/O DAT), AND 544 6001 GUARDRAIL END TREATMENT (INSTALL).

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.

NOTE: SEE SHEET 1 OF 3.

(MASH TL-2 COMPLIANT)
TESTED TO MASH TL-2 WITH A 3:1 SLOPE

Texas Department of Transportation — Design Division Standard

TL-2 SHORT RADIUS GUARDRAIL MASH COMPLIANT

SRG(TL-2)-21

FILE: srgt1221	TxDOT	CK:KM	DN:VP	CK:CGL
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REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		114A

DATE: 6/7/2024
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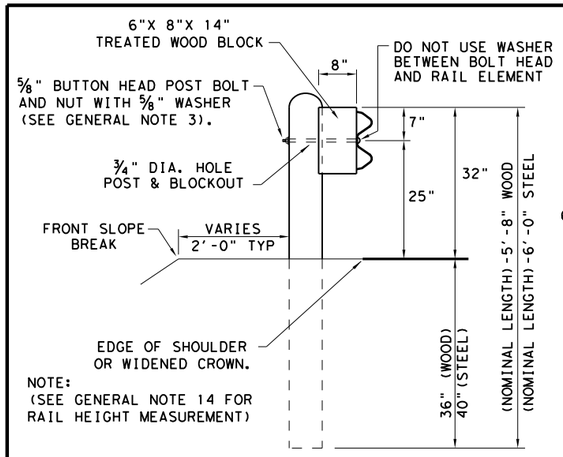
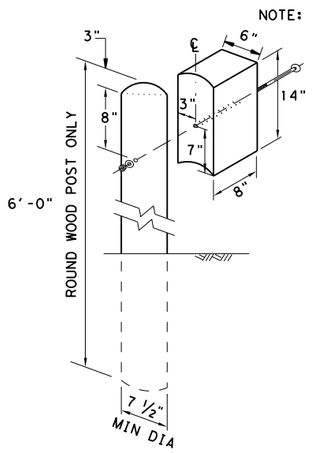
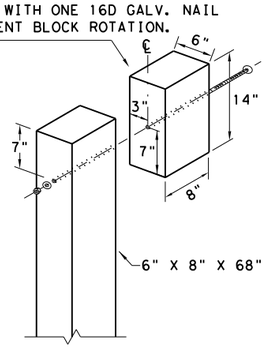


TYPICAL POST PLACEMENT

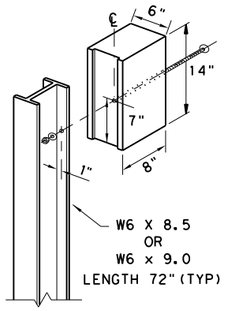


WOOD BLOCK TO ROUND WOOD POST

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

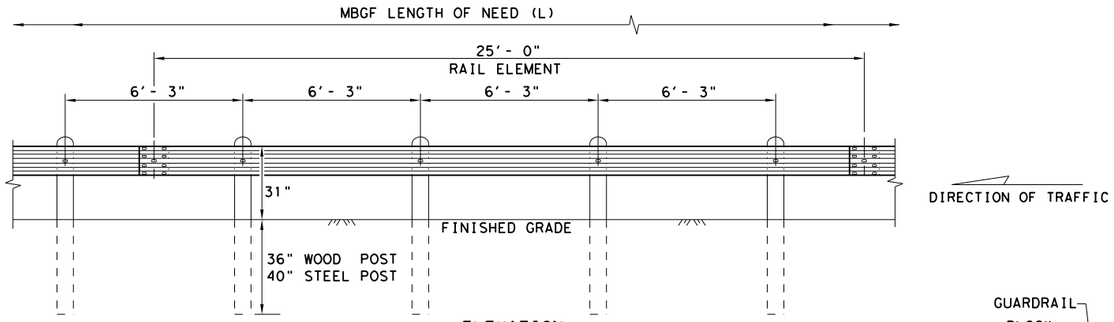


WOOD BLOCK TO RECTANGULAR WOOD POST



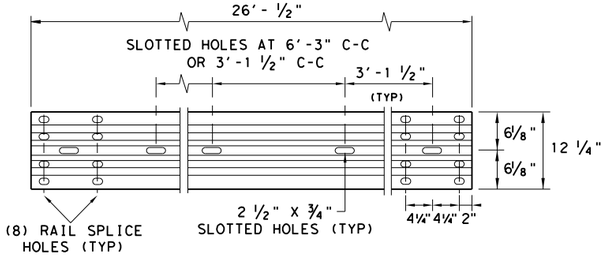
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

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



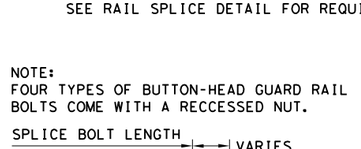
ELEVATION
MID-SPAN RAIL SPLICE

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



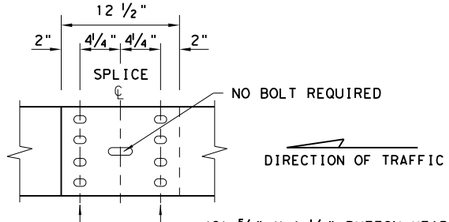
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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



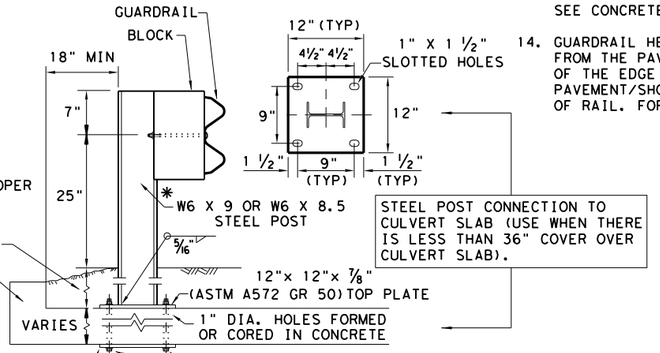
BUTTON HEAD BOLT

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



MID-SPAN RAIL SPLICE DETAIL

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



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

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

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
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	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		115

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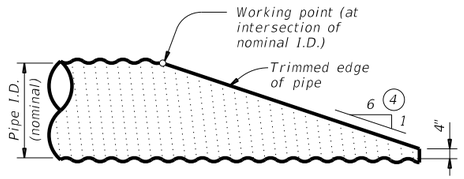
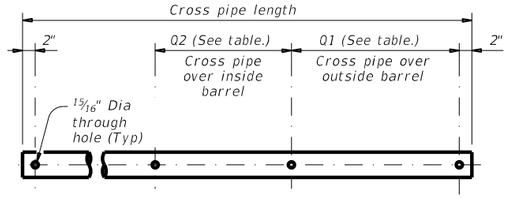


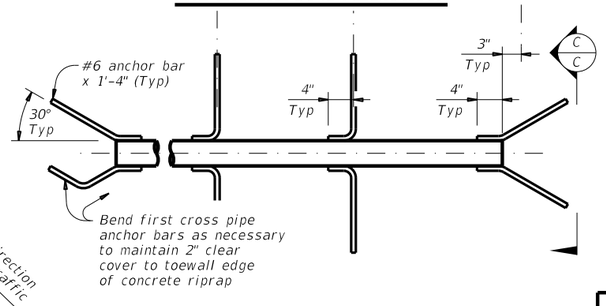
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

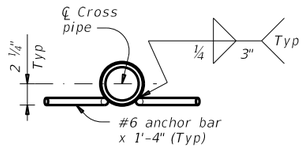
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



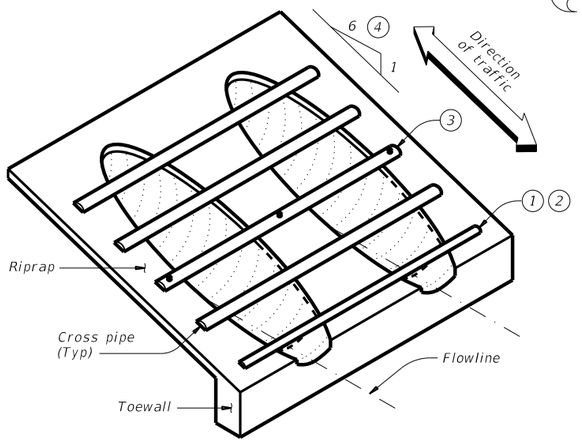
PIPE WITH BOLTED ANCHOR



PIPE WITH ANCHOR BARS

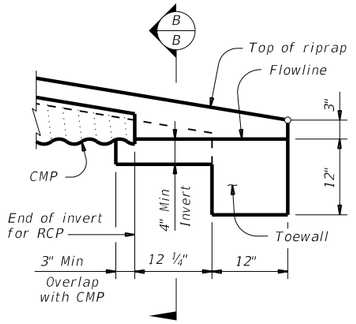


SECTION C-C



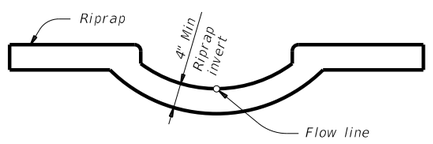
ISOMETRIC VIEW OF TYPICAL INSTALLATION

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

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

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

MATERIAL NOTES:

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

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

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

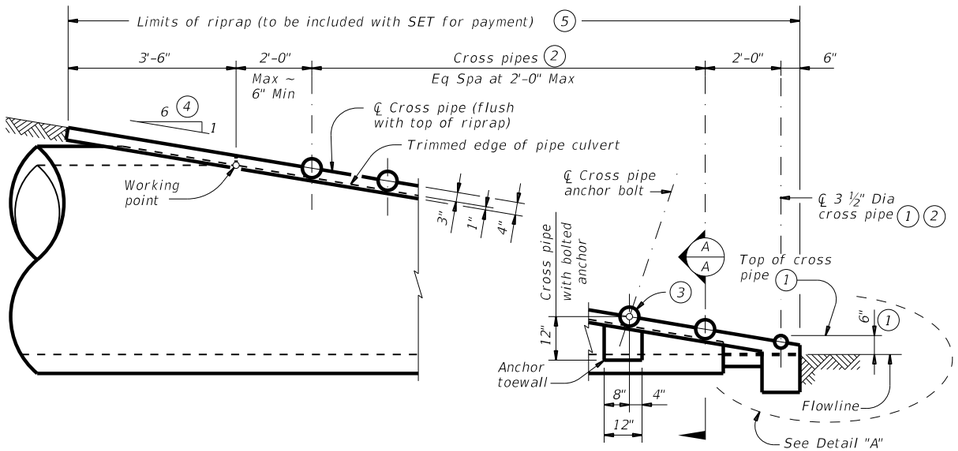
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

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

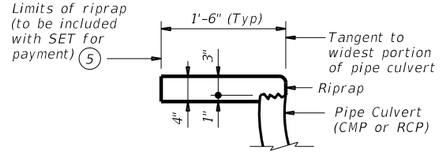
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

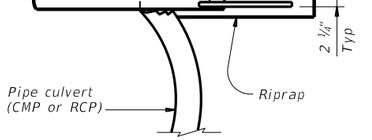


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

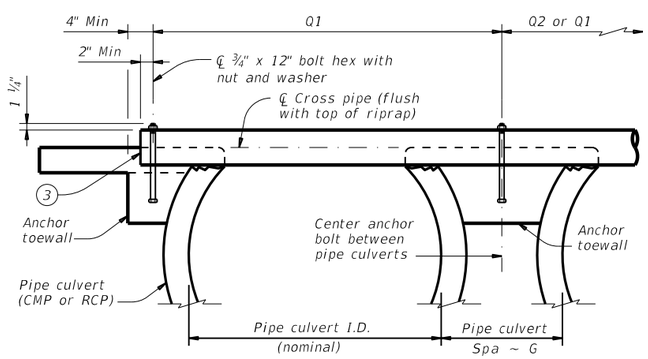
(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

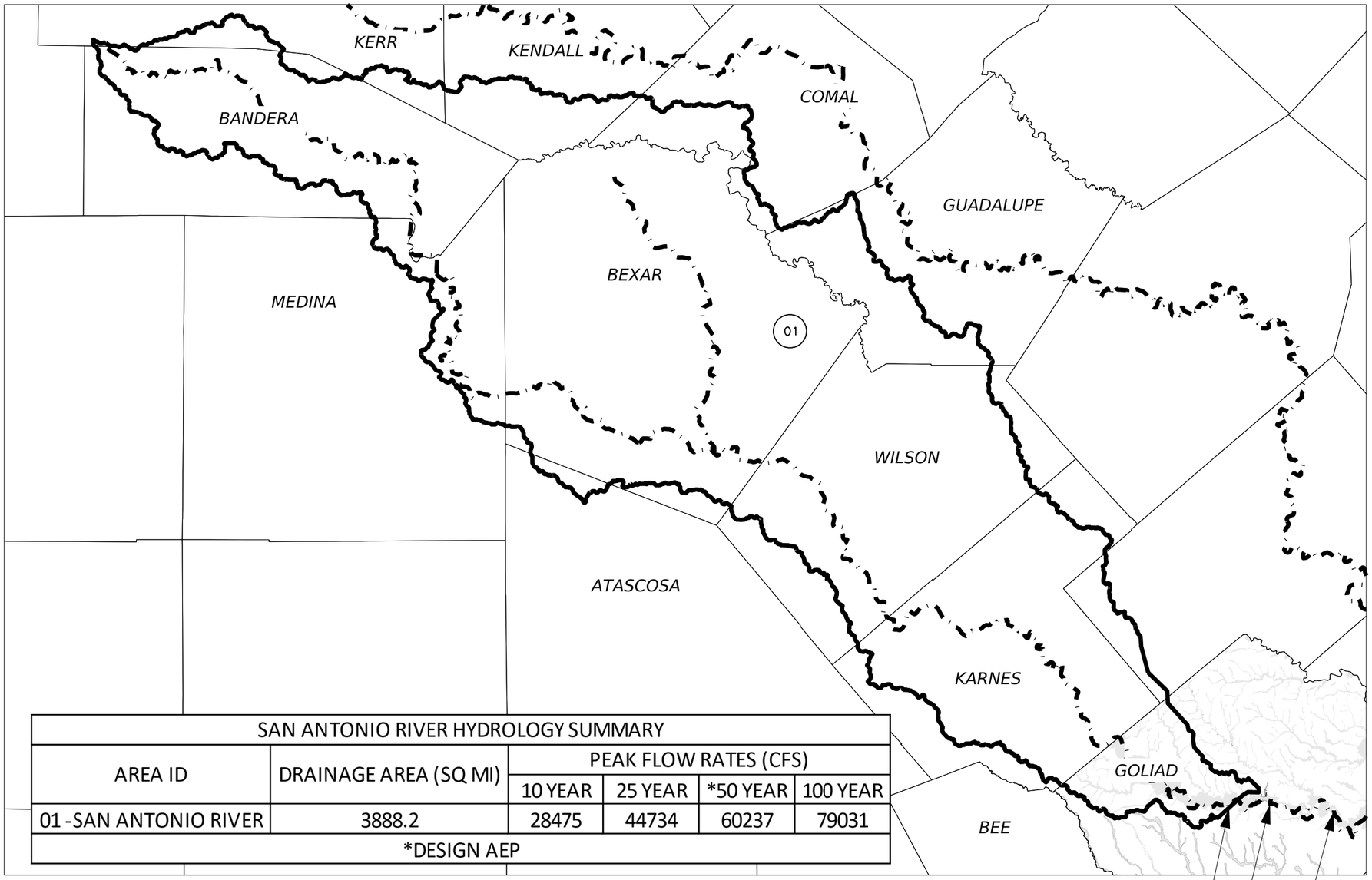
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		116



LEGEND

XX — DRAINAGE AREA ID

COUNTY LINES

RIVERS

DRAINAGE AREA BOUNDARY

FEMA FLOOD ZONE

N

NOTES:
1. DRAINAGE AREA DELINEATED USING GEOHEC-HMS 1.1.0.1763 AND VERIFIED USING USGS STREAM GAUGE DATA.
2. DATA WAS TRANSPOSED 12/7/22 FROM THE STREAM GAUGE AT LOCATION 08188500.
3. DISCHARGES DETERMINED USING BULLETIN 17 STATISTICAL ANALYSIS IN HEC-SSP 2.3
4. PROJECT DATA IMPACTING FEMA ZONE A SENT TO LOCAL FLOODPLAIN MANAGER CITY OF GOLIAD (GOLIAD COUNTY) ON 3/27/2023. SHOWN IN FEMA FIRM PANEL 48175C0270B

0' 35000' 70000'

SCALE: 1"=70000'

HL93 LOADING

SAN ANTONIO RIVER HYDROLOGY SUMMARY

AREA ID	DRAINAGE AREA (SQ MI)	PEAK FLOW RATES (CFS)			
		10 YEAR	25 YEAR	*50 YEAR	100 YEAR
01 -SAN ANTONIO RIVER	3888.2	28475	44734	60237	79031
*DESIGN AEP					

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US 59

DRAINAGE AREA MAP

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		117

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarteldms663521062_DAM01.dgn

HEC-RAS TABLE 1: US 59 Bridge													
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1008.4	1% AEP	Proposed	79031	102.55	144.82	133.01	145.06	0.000181	5.25	31617.01	7459.9	0.18
1	1008.4	1% AEP	Existing	79031	102.55	144.91	133.01	145.14	0.000176	5.2	31999.77	7474.4	0.18
1	1008.4	2% AEP	Proposed	60237	102.55	141.72	129.14	142.09	0.000273	5.91	19625.5	5834.27	0.22
1	1008.4	2% AEP	Existing	60237	102.55	141.82	129.14	142.18	0.000263	5.83	19993.68	5867.45	0.22
1	1008	1% AEP	Proposed	79031	102.78	144.36	131.42	144.95	0.000292	7.64	15903.88	7786.76	0.24
1	1008	1% AEP	Existing	79031	102.78	144.4	131.42	145.03	0.000302	7.77	15449.24	7805.41	0.24
1	1008	2% AEP	Proposed	60237	102.78	141.44	128.04	141.99	0.000285	7.08	13022.33	6762.63	0.23
1	1008	2% AEP	Existing	60237	102.78	141.51	128.04	142.08	0.000293	7.19	12626.08	6782.79	0.23
1	1007.67*	1% AEP	Proposed	79031	101.24	144.18	132.99	144.89	0.00035	8.32	15453.75	7364.25	0.26
1	1007.67*	1% AEP	Existing	79031	101.24	144.25	132.98	144.96	0.000347	8.31	15345.12	7395.48	0.26
1	1007.67*	2% AEP	Proposed	60237	101.24	141.28	127.87	141.92	0.000337	7.68	12586.22	6709.32	0.25
1	1007.67*	2% AEP	Existing	60237	101.24	141.37	127.85	142.01	0.000333	7.65	12535.58	6757.69	0.25
1	1007.51			Bridge									
1	1007.33*	1% AEP	Proposed	79031	100.7	143.27	131.25	144.64	0.000596	11	14406.68	5109.78	0.34
1	1007.33*	1% AEP	Existing	79031	100.7	143.28	131.27	144.64	0.000594	10.98	14324.07	5112.71	0.34
1	1007.33*	2% AEP	Proposed	60237	100.7	140.49	127.6	141.71	0.000551	9.97	11657.66	3618.95	0.32
1	1007.33*	2% AEP	Existing	60237	100.7	140.5	127.61	141.7	0.000548	9.95	11612.59	3619.85	0.32
1	1007	1% AEP	Proposed	79031	102.21	143.88	129.8	143.98	0.000092	3.84	51564.79	7718.09	0.13
1	1007	1% AEP	Existing	79031	102.21	143.88	129.8	143.98	0.000092	3.84	51564.79	7718.09	0.13
1	1007	2% AEP	Proposed	60237	102.21	140.83	126.94	141.25	0.000268	6.13	20444.29	6326.35	0.22
1	1007	2% AEP	Existing	60237	102.21	140.83	126.94	141.25	0.000268	6.13	20444.29	6326.35	0.22
1	1006.8	1% AEP	Proposed	79031	101.15	143.82	132.62	143.94	0.000124	4.1	39736.56	7593.95	0.15
1	1006.8	1% AEP	Existing	79031	101.15	143.82	132.62	143.94	0.000124	4.1	39736.56	7593.95	0.15
1	1006.8	2% AEP	Proposed	60237	101.15	140.9	130	141.11	0.000212	4.9	24691.17	6600.27	0.19
1	1006.8	2% AEP	Existing	60237	101.15	140.9	130	141.11	0.000212	4.9	24691.17	6600.27	0.19

NOTES:

1. HEC-RAS 6.3.1 WAS USED FOR THE HYDRAULIC ANALYSIS OF THE BRIDGE.
2. DRAINAGE AREA DELINEATED USING GEOHEC-HMS 1.1.0.1763 AND VERIFIED USING USGS STREAM GAUGE DATA.
3. DATA WAS TRANSPOSED 12/7/22 FROM THE STREAM GAUGE AT LOCATION 08188500.
4. DISCHARGES DETERMINED USING BULLETIN 17 STATISTICAL ANALYSIS IN HEC-SSP 2.3
5. THIS IS AN EXISTING BRIDGE LOCATION.
6. PROJECT DATA IMPACTING FEMA ZONE A SENT TO LOCAL FLOODPLAIN MANAGER CITY OF GOLIAD (GOLIAD COUNTY) ON 3/27/2023. SHOWN IN FEMA FIRM PANEL 48175C0270B
7. PRIMARY SOURCE FOR TERRAIN DATA WAS DEVELOPED FROM THE USGS LIDAR PROJECT CONDUCTED IN 2018
8. NORMAL DEPTH WAS USED AS THE DOWNSTREAM BOUNDARY CONDITION

STATE OF TEXAS
D'ANDRE JAMES
145862
LICENSED
PROFESSIONAL ENGINEER

7/3/2024

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FRN - F-1386

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US 59

HYDRAULIC DATA

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		118

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663521062_HYD_DATA01.dgn

Plan: Existing San Antonio 1 RS: 1007.51 Profile: 1% AEP				
E.G. US. (ft)	144.96	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	144.25	E.G. Elev (ft)	144.92	144.7
Q Total (cfs)	79031	W.S. Elev (ft)	144.13	143.42
Q Bridge (cfs)	79031	Crit W.S. (ft)	133.57	133.18
Q Weir (cfs)		Max Chl Dpth (ft)	42.89	42.72
Weir Sta Lft (ft)		Vel Total (ft/s)	5.66	5.8
Weir Sta Rgt (ft)		Flow Area (sq ft)	13958.48	13619.48
Weir Submerg		Froude # Chl	0.19	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	166213.9	159223.7
Min El Weir Flow (ft)	145.38	Hydr Depth (ft)	57.71	25.77
Min El Prs (ft)	144.89	W.P. Total (ft)	2440.72	2111.51
Delta EG (ft)	0.32	Conv. Total (cfs)	1987024	1681189
Delta WS (ft)	0.98	Top Width (ft)	241.88	528.55
BR Open Area (sq ft)	13969.6	Frctn Loss (ft)	0.06	0.04
BR Open Vel (ft/s)	5.8	C & E Loss (ft)	0.15	0.02
Coef of Q		Shear Total (lb/sq ft)	0.56	0.89
Br Sel Method	Energy only	Power Total (lb/ft s)	80666	80666

Plan: Proposed San Antonio 1 RS: 1007.51 Profile: 1% AEP				
E.G. US. (ft)	144.89	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	144.18	E.G. Elev (ft)	144.83	144.8
Q Total (cfs)	79031	W.S. Elev (ft)	143.96	143.92
Q Bridge (cfs)	79031	Crit W.S. (ft)	132.99	132.99
Q Weir (cfs)		Max Chl Dpth (ft)	42.72	42.68
Weir Sta Lft (ft)		Vel Total (ft/s)	5.28	5.3
Weir Sta Rgt (ft)		Flow Area (sq ft)	14960.04	14921.61
Weir Submerg		Froude # Chl	0.28	0.28
Weir Max Depth (ft)		Specif Force (cu ft)	171983.8	171436.8
Min El Weir Flow (ft)	145.92	Hydr Depth (ft)	15.46	15.42
Min El Prs (ft)	153.08	W.P. Total (ft)	1129.19	1128.71
Delta EG (ft)	0.24	Conv. Total (cfs)	3962426	3950349
Delta WS (ft)	0.91	Top Width (ft)	969.33	969.33
BR Open Area (sq ft)	22615.32	Frctn Loss (ft)	0.03	0.01
BR Open Vel (ft/s)	5.3	C & E Loss (ft)	0	0.15
Coef of Q		Shear Total (lb/sq ft)	0.33	0.33
Br Sel Method	Energy only	Power Total (lb/ft s)	80666	80666

NOTES:

1. HEC-RAS 6.3.1 WAS USED FOR THE HYDRAULIC ANALYSIS OF THE BRIDGE.
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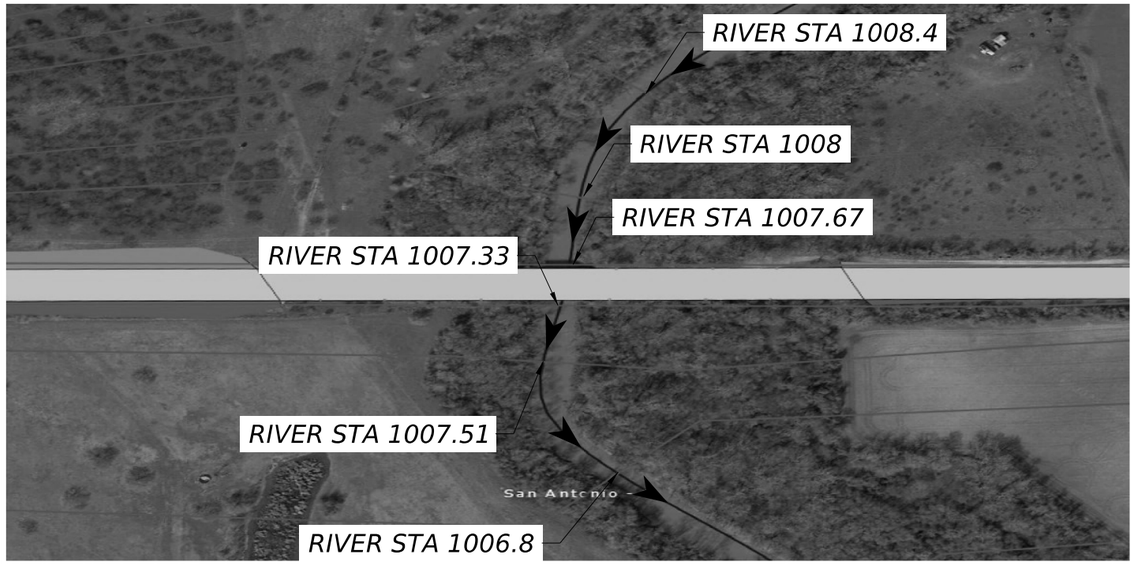
8. NORMAL DEPTH WAS USED AS THE DOWNSTREAM BOUNDARY CONDITION



EXISTING BRIDGE CONFIGURATION:
NBI: 16-089-00088-02-009
Q_{10YR} = 28475 CFS
HW_{10YR} = 135.96 FT
V_{10YR} = 5.50 FT/S
$Q50_{YR}$ = 60237 CFS
$HW50_{YR}$ = 141.37 FT
$V50_{YR}$ = 7.65 FT/S
Q_{100YR} = 79031 CFS
HW_{100YR} = 144.25 FT
V_{100YR} =8.31 FT/S

PROPOSED BRIDGE CONFIGURATION:
NBI: 16-089-0-0088-02-213
Q_{10YR} = 28475 CFS
HW_{10YR} = 135.92 FT
V_{10YR} = 5.51 FT/S
$Q50_{YR}$ = 60237 CFS
$HW50_{YR}$ = 141.28 FT
$V50_{YR}$ = 7.68 FT/S
Q_{100YR} = 79031 CFS
HW_{100YR} = 144.18 FT
V_{100YR} = 8.32 FT/S

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7/25/2024

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US 59

HYDRAULIC DATA

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		119

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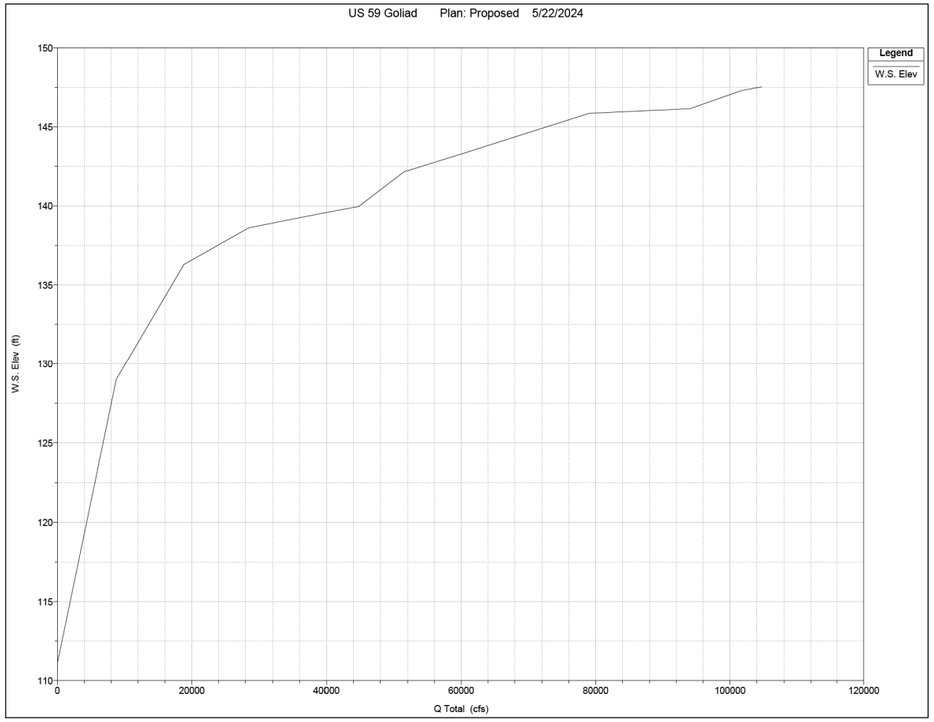

NOTES:

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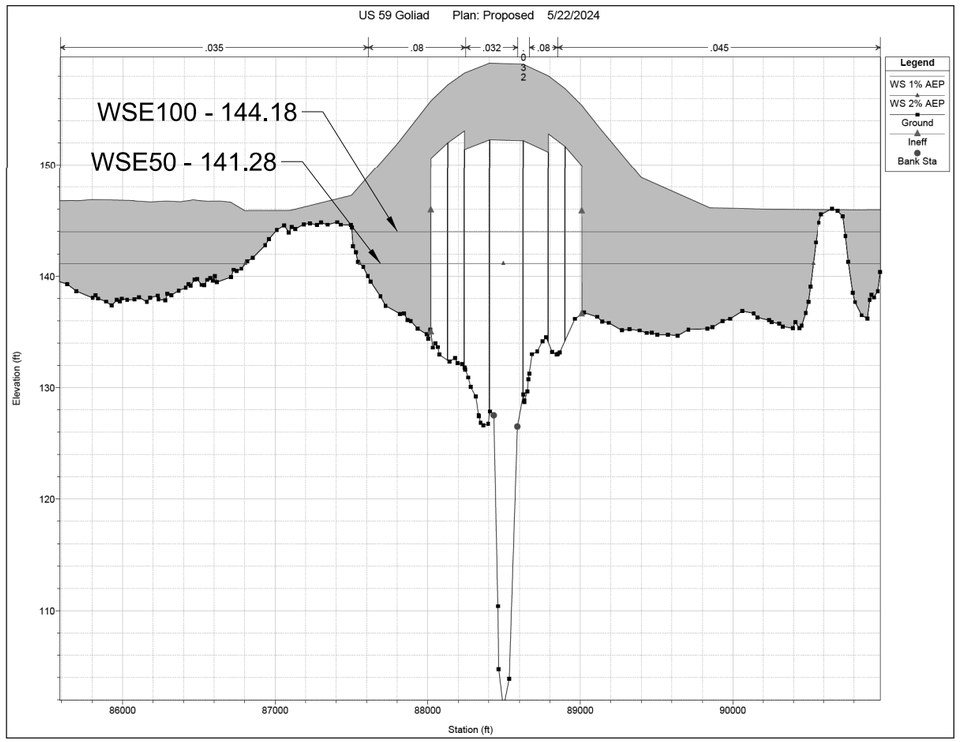

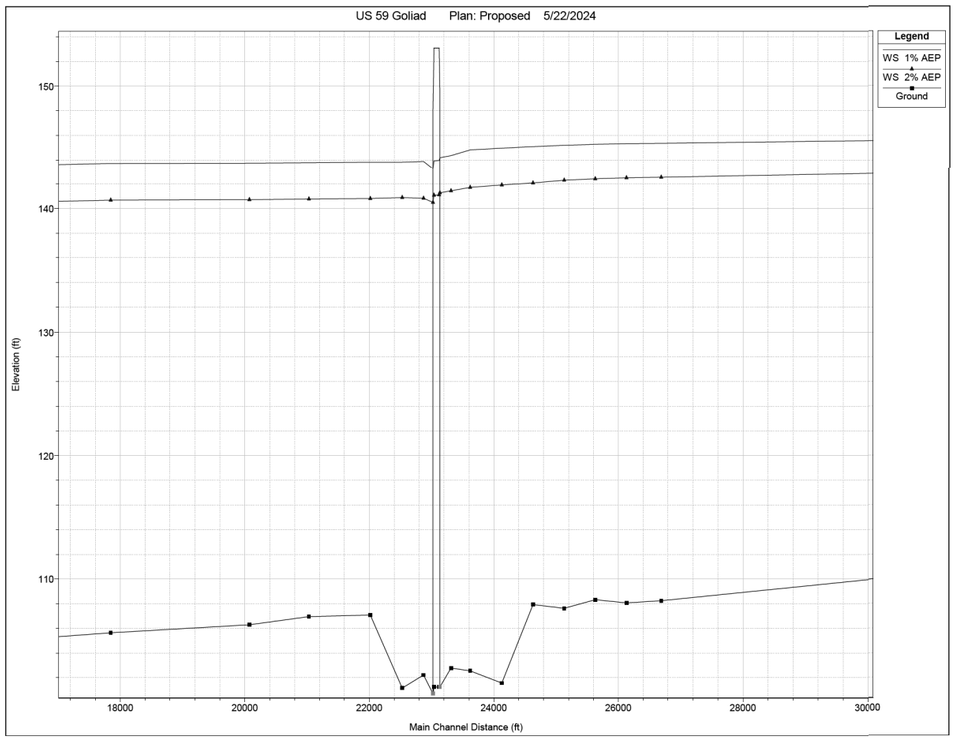

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HYDRAULIC DATA

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		120

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663521062_HYD_DATA03.dgn

SPECIAL NOTES

1. ALL PIPE SIZES WERE TAKEN FROM UTILITY RECORDS WHERE POSSIBLE. THE UTILITIES DEPICTED WERE INVESTIGATED BY THE RIOS GROUP, INC.. ALL OTHER PLAN INFORMATION, NOTABLY THE BACKGROUND INFORMATION, WAS PROVIDED BY OTHERS AND THE RIOS GROUP, INC. DISCLAIMS RESPONSIBILITY FOR ITS ACCURACY.

2. EXISTING SUBSURFACE UTILITY INVESTIGATIONS WERE COMPLETED ON 03/04/2022. THE RIOS GROUP, INC. EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS, MODIFICATIONS, AND/OR ADJUSTMENTS TO EXISTING UTILITIES AFTER THE COMPLETION DATE.

3. UTILITY LOCATIONS ON THESE DRAWINGS ARE INTENDED FOR DESIGN PURPOSES AND NOT CONSTRUCTION. THEY REFLECT SUBSURFACE UTILITIES AT THE TIME OF FIELD INVESTIGATION. CALL TEXAS ONE CALL SYSTEM (800)245-4545 FOR UTILITY LOCATIONS 48 HOURS PRIOR TO ANY WORK.

4. WHERE POSSIBLE, WATER, GAS, AND COMMUNICATION SERVICE LINES WERE DESIGNATED. HOWEVER, SOME SERVICE LINES ARE CONSTRUCTED OF NON-CONDUCTIVE MATERIAL AND UTILITY COMPANY DRAWINGS MAY NOT SHOW SERVICE LINE LOCATIONS. THEREFORE ALL SERVICE LINES MAY NOT BE SHOWN.

QUALITY LEVELS

QUALITY LEVEL "D" - INFORMATION DERIVED FROM EXISTING RECORDS AND/OR ORAL COLLECTION..

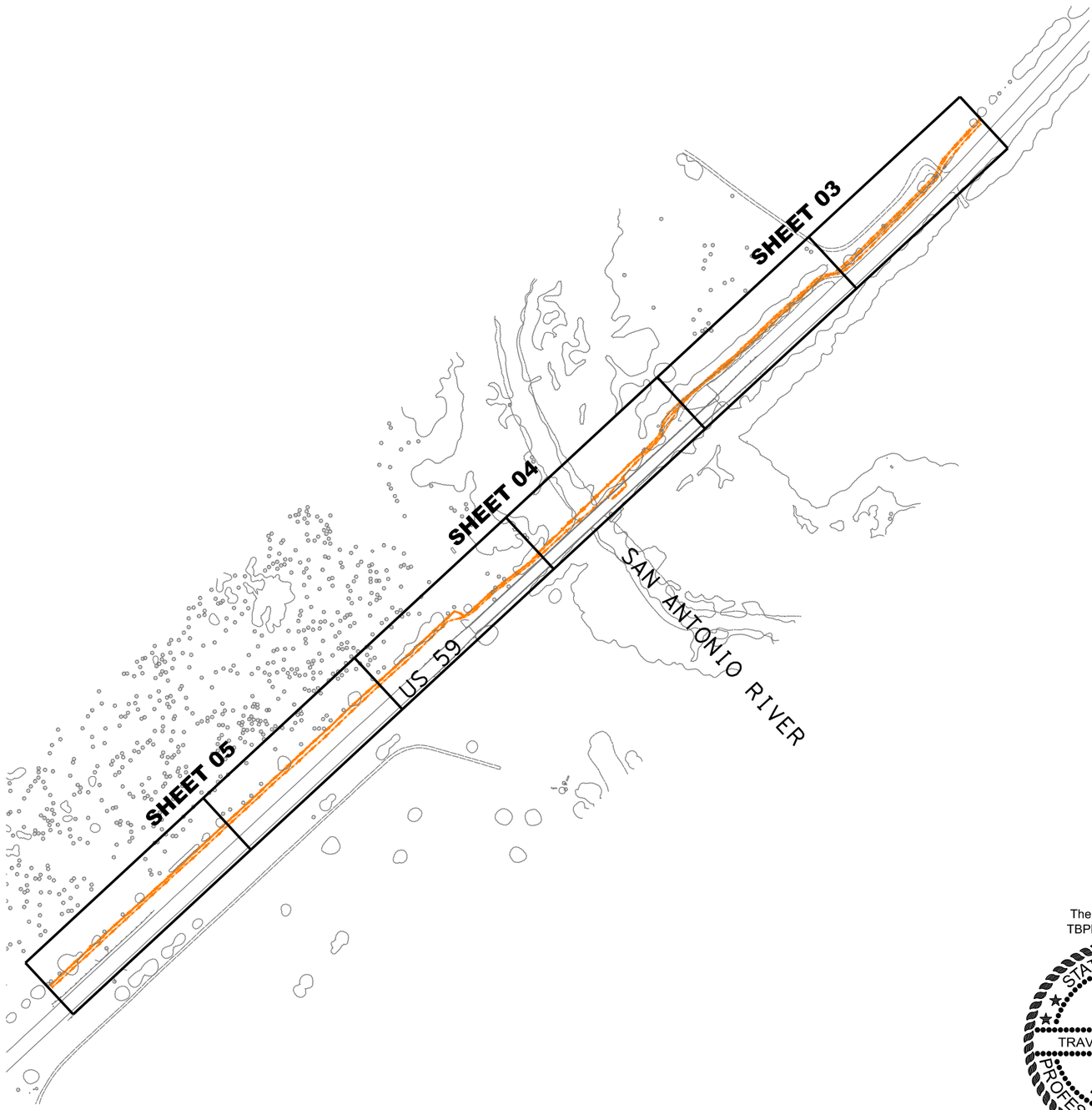
QUALITY LEVEL "C" - INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGEMENT IN CORRELATING INFORMATION TO QUALITY LEVEL "D" INFORMATION.

QUALITY LEVEL "B" - DESIGNATE: TWO-DIMENSIONAL HORIZONTAL MAPPING. THIS INFORMATION IS OBTAINED THROUGH THE APPLICATION AND INTERPRETATION OF APPROPRIATE NON-DESTRUCTIVE SURFACE GEOPHYSICAL METHODS. UTILITY INDICATIONS ARE REFERENCED TO ESTABLISH SURVEY CONTROL. INCORPORATES QUALITY LEVEL "C" AND "D" INFORMATION TO PRODUCE QUALITY LEVEL "B" INFORMATION.

QUALITY LEVEL "A" - LOCATE: PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES AT A SPECIFIC POINT. DIAMETERS SHOWN ARE VERIFIED VISUALLY AND MAY NOT BE EXACT.

MATERIAL ABBREVIATIONS

STL - STEEL
PE - POLYETHYLENE
AC - TRANSITE
CI - CAST IRON
DI - DUCTILE IRON
PVC - POLYVINYL CHLORIDE
DBC - DIRECT BURIED CABLE
RCP - REINFORCED CONCRETE PIPE
VC - VITRIFIED CLAY
FG - FIBERGLASS
CSC - CONCRETE/STEEL CYLINDER
CMP - CORRUGATED METAL PIPE
CONC - CONCRETE
CLAY - CLAY
UNK - UNKNOWN



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NOT TO SCALE

Subsurface Utility Engineering (SUE) Certification

The engineer's seal hereon is to certify that the utilities shown have been investigated in accordance with standard SUE industry practices. Where indicated utility sizes and materials taken from best available records. All other information hereon has been provided by others and is not a part of this certification.

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

06-03-2024

REV	DATE	BY	DESCRIPTION

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING UTILITY COORDINATION
1740 Universal City Boulevard Suite 200 Universal City, TX 78148

TEXAS DEPARTMENT OF TRANSPORTATION

US 59
AT SAN ANTONIO RIVER

S.U.E. PLAN SHEET

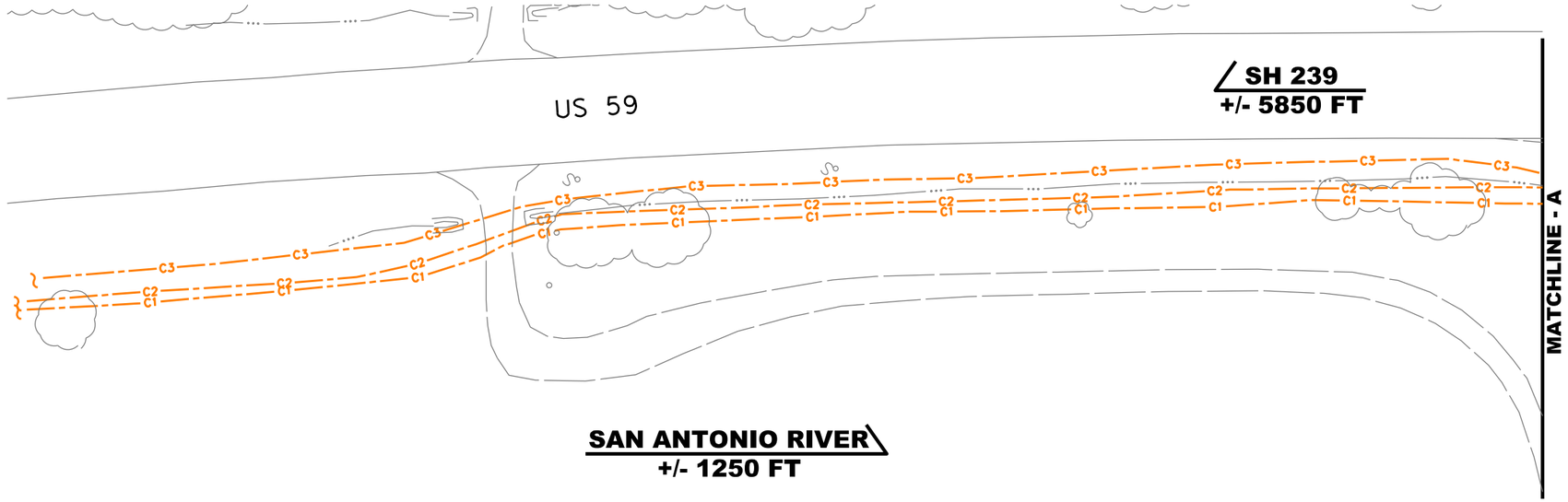
INDEX LAYOUT

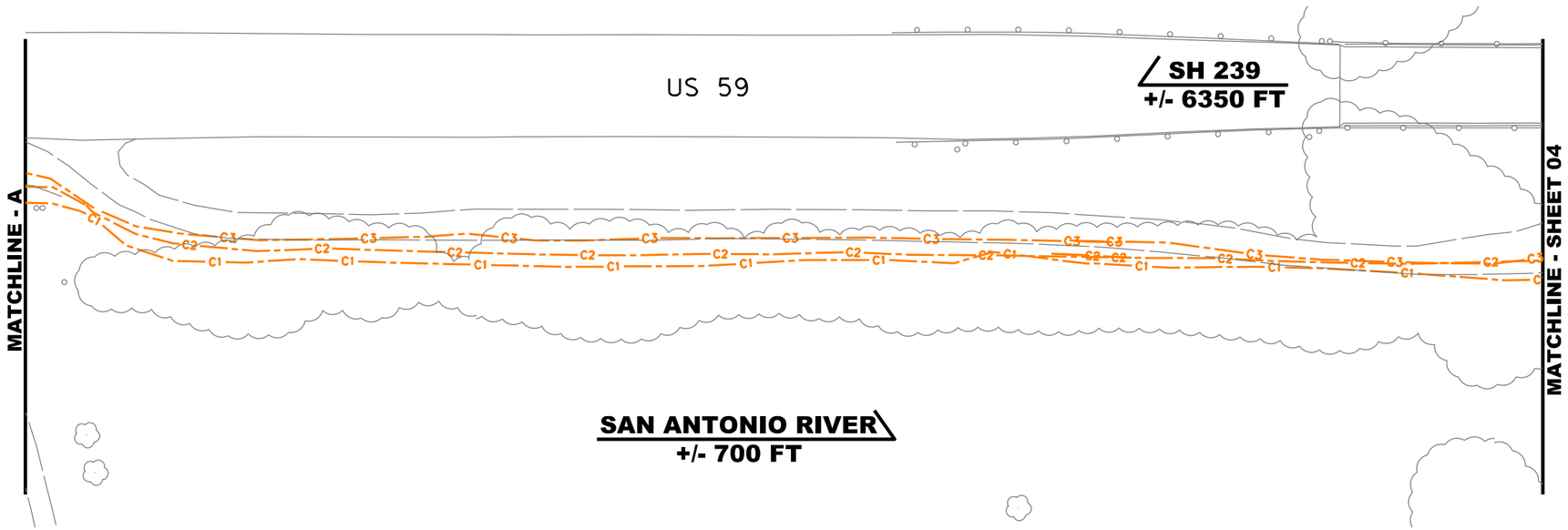
DESIGNED BY: WS	CHECKED BY: SJ	DATE: 06-03-2024
APPROVED BY:	CHECKED BY:	DATE:

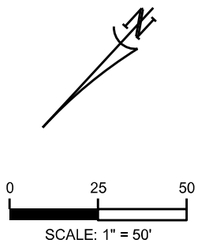
TRG PROJECT NUMBER	SUE SHEET NO.	DATE
LJA_2107.01	02 OF 05	06-03-2024

CSJ NUMBER	PLAN SHEET NO.
0088-02-062	121

STATE	DISTRICT	COUNTY
TX	CC	GOLIAD







LEGEND OF UTILITY TYPES

ABANDONED UTILITY
PROPOSED UTILITY
UNKNOWN UTILITY

COMMUNICATIONS

QL "B"
AT&T (TELE) — C1
AT&T (FO/DUCT) — C2
FIBERLIGHT (FO/DUCT) — C3

QL "C"/QL "D"
AT&T (TELE) — C1
AT&T (FO/DUCT) — C2
FIBERLIGHT (FO/DUCT) — C3

LEGEND OF UTILITY SYMBOLS

END CAP
QUALITY LEVEL CHANGE
TEST HOLE
UTILITY CONTINUATION
FIBER HANDHOLE
TELEPHONE PEDESTAL

Subsurface Utility Engineering (SUE) Certification

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The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

06-03-2024

REV	DATE	BY	DESCRIPTION

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING UTILITY COORDINATION
17140 Universal City Boulevard Suite 200 Universal City, TX 78148

US 59
AT SAN ANTONIO RIVER

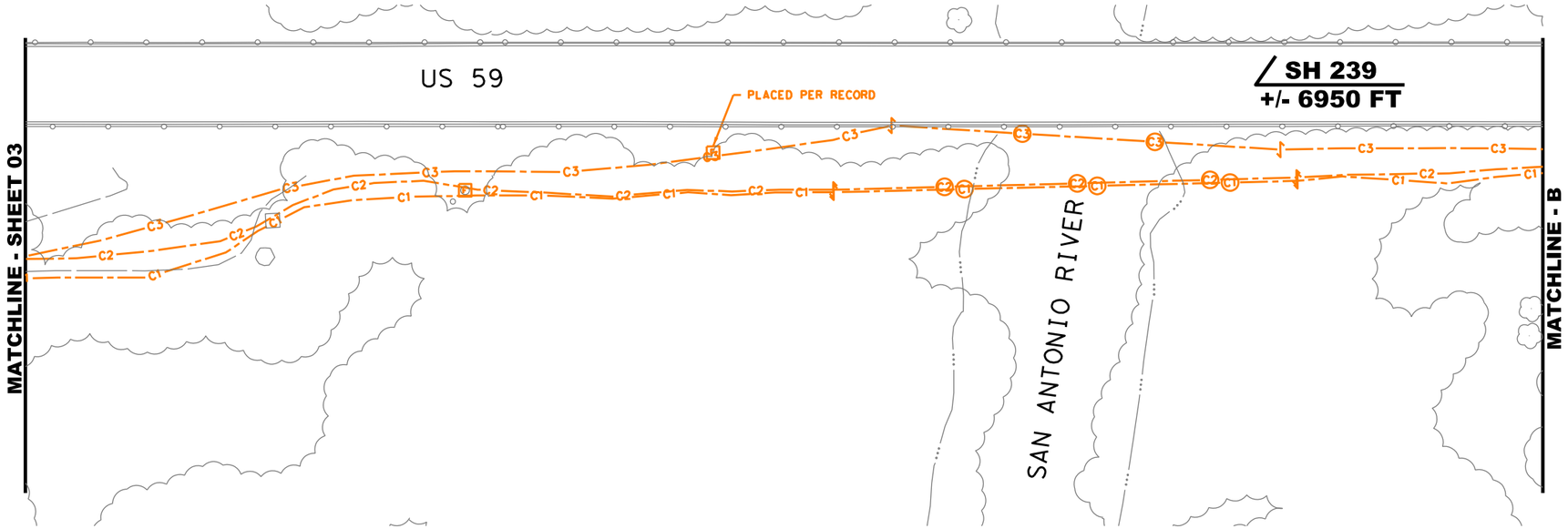
S.U.E. PLAN SHEET

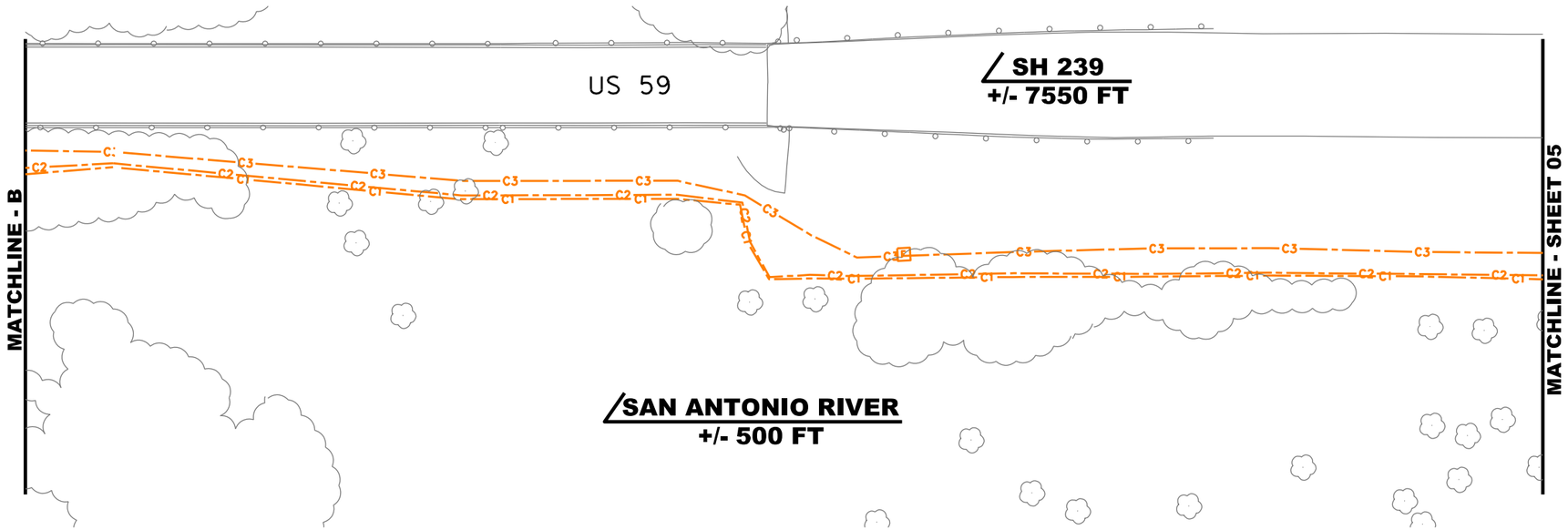
DESIGNED BY: WS	CHECKED BY: SJ	DATE: 06-03-2024
APPROVED BY:	CHECKED BY:	DATE:

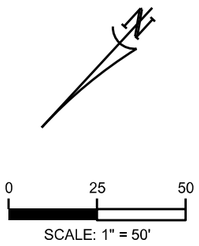
TRG PROJECT NUMBER	SUE SHEET NO.	DATE
LJA_2107.01	03 OF 05	06-03-2024

CSJ NUMBER	PLAN SHEET NO.
0088-02-062	122

STATE	DISTRICT	COUNTY
TX	CC	GOLIAD







LEGEND OF UTILITY TYPES

ABANDONED UTILITY —X—X—X—X—
PROPOSED UTILITY
UNKNOWN UTILITY

COMMUNICATIONS

QL "B"
AT&T (TELE) C1
AT&T (FO/DUCT) C2
FIBERLIGHT (FO/DUCT) C3

QL "C"/QL "D"
AT&T (TELE) C1
AT&T (FO/DUCT) C2
FIBERLIGHT (FO/DUCT) C3

LEGEND OF UTILITY SYMBOLS

END CAP
QUALITY LEVEL CHANGE
TEST HOLE
UTILITY CONTINUATION
FIBER HANDHOLE F
TELEPHONE PEDESTAL T

REV	DATE	BY	DESCRIPTION

THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING UTILITY COORDINATION
1740 Universal City Boulevard Suite 200 Universal City, TX 78148

US 59
AT SAN ANTONIO RIVER

S.U.E. PLAN SHEET

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED PROFESSIONAL ENGINEER

06-03-2024

Subsurface Utility Engineering (SUE) Certification

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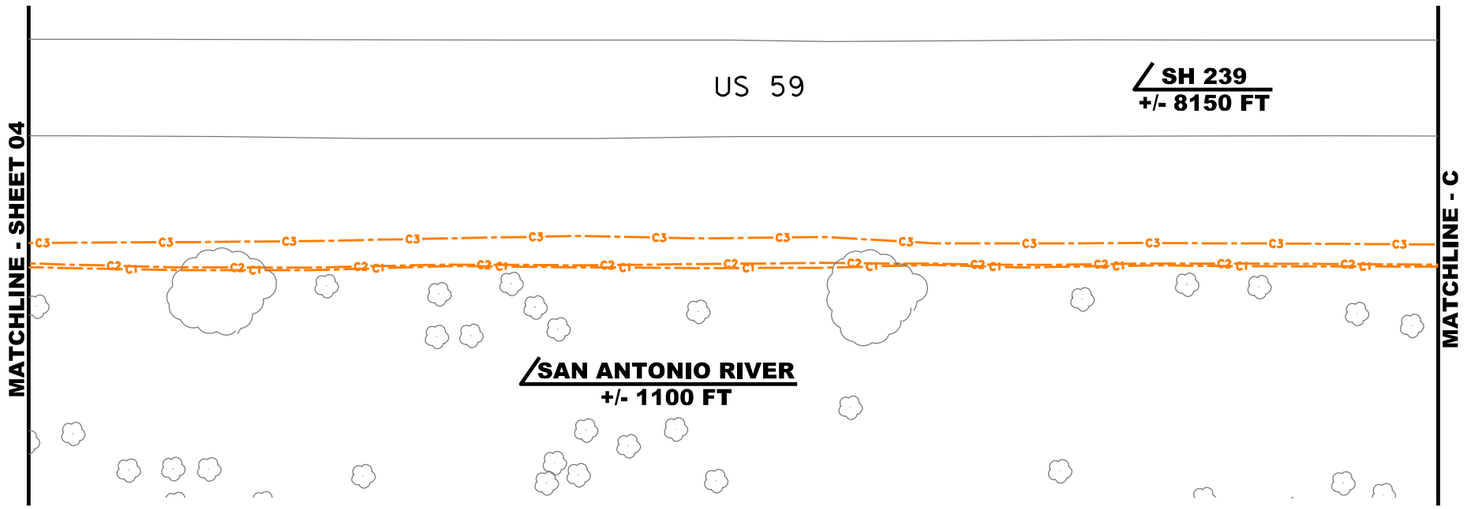
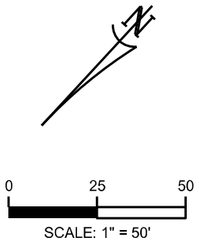
DESIGNED BY: WS	CHECKED BY: SJ	DATE: 06-03-2024
APPROVED BY:	CHECKED BY:	DATE:

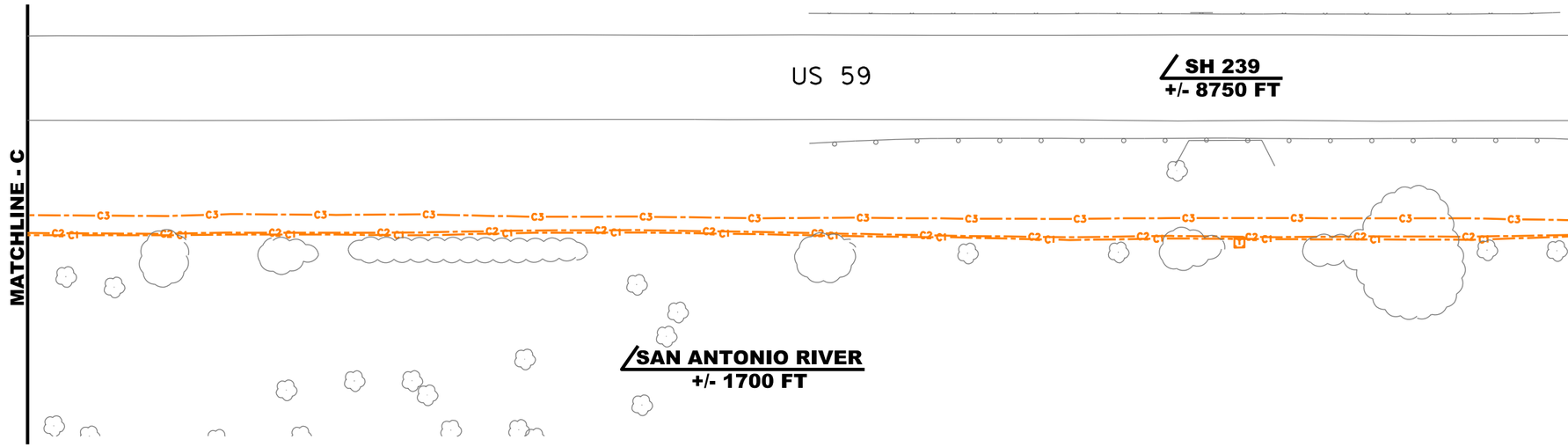
TRG PROJECT NUMBER	SUE SHEET NO.	DATE
LJA_2107.01	04 OF 05	06-03-2024

CSJ NUMBER	PLAN SHEET NO.
0088-02-062	123

STATE	DISTRICT	COUNTY
TX	CC	GOLIAD







LEGEND OF UTILITY TYPES

ABANDONED UTILITY	—X—X—X—X—
PROPOSED UTILITY	———
UNKNOWN UTILITY	— — — — —

COMMUNICATIONS

QL "B"	
AT&T (TELE)	C1
AT&T (FO/DUCT)	C2
FIBERLIGHT (FO/DUCT)	C3
QL "C"/QL "D"	
AT&T (TELE)	C1
AT&T (FO/DUCT)	C2
FIBERLIGHT (FO/DUCT)	C3

LEGEND OF UTILITY SYMBOLS

END CAP	
QUALITY LEVEL CHANGE	
TEST HOLE	
UTILITY CONTINUATION	
FIBER HANDHOLE	F
TELEPHONE PEDESTAL	T

REV	DATE	BY	DESCRIPTION

The Rios Group, Inc.
TBPE Firm # F-14595

STATE OF TEXAS
TRAVIS S. ISAACSON
100094
LICENSED
PROFESSIONAL ENGINEER

06-03-2024

Subsurface Utility Engineering (SUE) Certification

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THE RIOS GROUP
SUBSURFACE UTILITY ENGINEERING UTILITY COORDINATION
1740 Universal City Boulevard Suite 200 Universal City, TX 78148

US 59
AT SAN ANTONIO RIVER

S.U.E. PLAN SHEET

DESIGNED BY: WS	CHECKED BY: SJ	DATE: 06-03-2024
APPROVED BY:	CHECKED BY:	DATE:

TRG PROJECT NUMBER	SUE SHEET NO.	DATE
LJA_2107.01	05 OF 05	06-03-2024
CSJ NUMBER	PLAN SHEET NO.	
0088-02-062	124	
STATE / DISTRICT	COUNTY	
TX / CC	GOLIAD	

Utility Company	Description	Conflict #	STA	OFFSET
Fiber Light LLC	Fiber Light potential conflict with proposed SET, storm sewer, MBGF, bridge bent No. 3, 4, 5, 6,	1	Begin STA 870+41.00 to End STA 888+99.50	23.64' RT to 43.63' RT
AT&T	AT&T potential conflict with proposed storm sewer, bridge bent No. 3, 4, 5, 6	2	Begin STA 870+82.00 to End STA 887+89.50	26.55' RT to 45.56' RT
AT&T	TELE AT&T potential conflict with proposed storm sewer, bridge bent No. 3, 4, 5, 6	3	Begin STA 871+02.00 to End STA 887+89.50	39.41' RT to 45.78' RT
AT&T	Fiber marker potential conflict	4	886+98.78	43.47' RT
AT&T	AT&T manhole potential conflict	5	887+51.08	38.36' RT
AT&T	PBOX potential conflict	6	888+07.44	36.43' RT
AT&T	Fiber marker potential conflict	7	888+08.57	36.23' RT
AT&T	AT&T box potential conflict	8	888+10.65	34.84' RT

GENERAL NOTES:

1.THE USE OF THE HORIZONTAL LOCATIONS OF THE UTILITIES SHOWN ON THESE PLANS DOES NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITIES OF COMPLYING WITH APPLICABLE UTILITY DAMAGE PREVENTION LAWS AND REGULATIONS, INCLUDING, BUT NOT LIMITED TO, GIVING NOTIFICATION TO UTILITY OWNER'S "ONE-CALL" CENTERS BEFORE EXCAVATION.
2.SIZE INFORMATION SHOWN IS TAKEN FROM AVAILABLE UTILITY RECORDS.
3.ALL BURIED UTILITIES ARE ASSUMED TO BE AT MINIMUM COVER AS DIRECTED BY THE TEXAS ADMINISTRATIVE CODE UNLESS OTHERWISE NOTED.

UTILITY QUALITY LEVEL A:
PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE (OR VERIFICATION OF PREVIOUSLY EXPOSED AND SURVEYED UTILITIES) AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES, USUALLY AT A SPECIFIC POINT.

UTILITY QUALITY LEVEL B:
INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES. QUALITY LEVEL B DATA SHOULD BE REPRODUCIBLE BY SURFACE GEOPHYSICS AT ANY POINT OF THEIR DEPICTION. THIS INFORMATION IS SURVEYED TO APPLICABLE TOLERANCES DEFINED BY THE PROJECT AND REDUCED ONTO PLAN DOCUMENTS.

UTILITY QUALITY LEVEL C:
INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND BY USING PROFESSIONAL JUDGEMENT IN CORRELATING THIS INFORMATION TO QUALITY LEVEL D INFORMATION

UTILITY QUALITY LEVEL D:
INFORMATION DERIVED FROM EXISTING RECORDS OR ORAL RECOLLECTIONS.

SYMBOL LEGEND

- MH — AT&T MANHOLE
- F — FIBER MARKER
- P — PBOX
- ATT BOX

UTILITY LEGEND

Utility	Line	Company
TELEPHONE	C1	AT&T
FIBER OPTIC	C2	AT&T
INTERNET	C3	FIBERLIGHT

QUALITY LEVEL LEGEND

- C1 — QUALITY LEVEL C
- C2 — QUALITY LEVEL C
- C3 — QUALITY LEVEL C

CONTACT LIST				
COMPANY	UTILITY COORDINATOR	PHONE	EMAIL	MAILING ADDRESS
AT&T	Steven P. Popp	(361) 571-4458	sp1893@att.com	
FiberLight LLC	Brandon McCord	(989) 287-2764	brandon.mccord@fiberlight.com	3000 Summit Place, Suite 200 Alpharetta, GA 30009
SAM	William Post	(214) 600-5739	william.post@sam.biz	4801 Southwest Parkway, Bldg. Two, Suite 100 Austin, TX 78735
TxDOT	Leonel (Leo) Tovar District Utility Coordinator Corpus Christi District Justin Feeney	(361) 806-3576	justin.feeney@txdot.gov	1701 S. Padre Island Dr. Corpus Christi, TX 78416

NOT TO SCALE

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

S E Wright

8/7/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

UTILITY LAYOUT

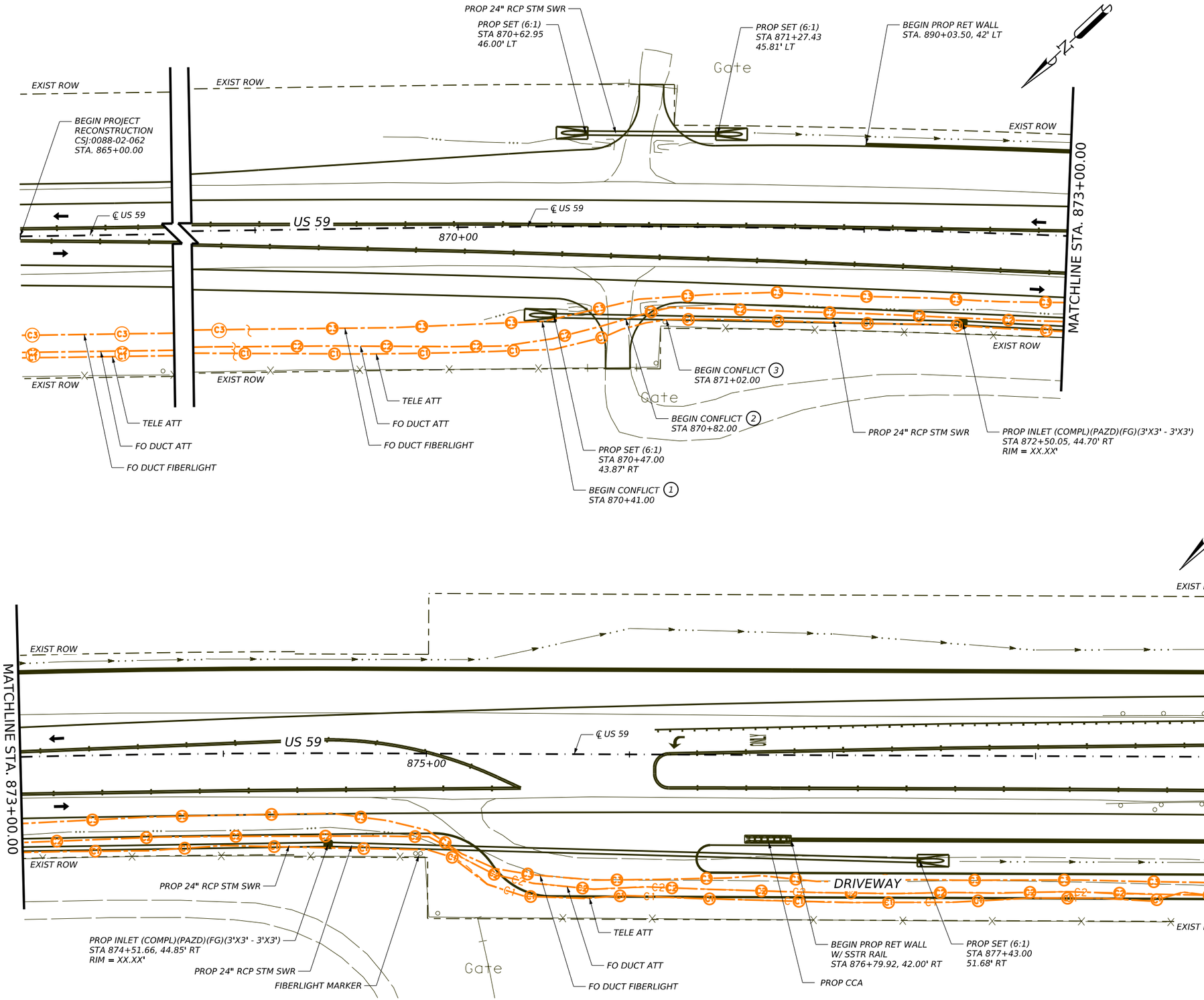
SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		126

DATE: 8/7/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663531062_UTL01.dgn

LEGEND

- C1 — TELE ATT
- C2 — FO DUCT ATT
- C3 — FO DUCT FIBERLIGHT
- # — UTILITY CONFLICT NUMBER



0' 25' 50'

SCALE: 1"=50'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

8/7/2024

LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation

US 59

UTILITY LAYOUT

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		127

DATE: 8/7/2024
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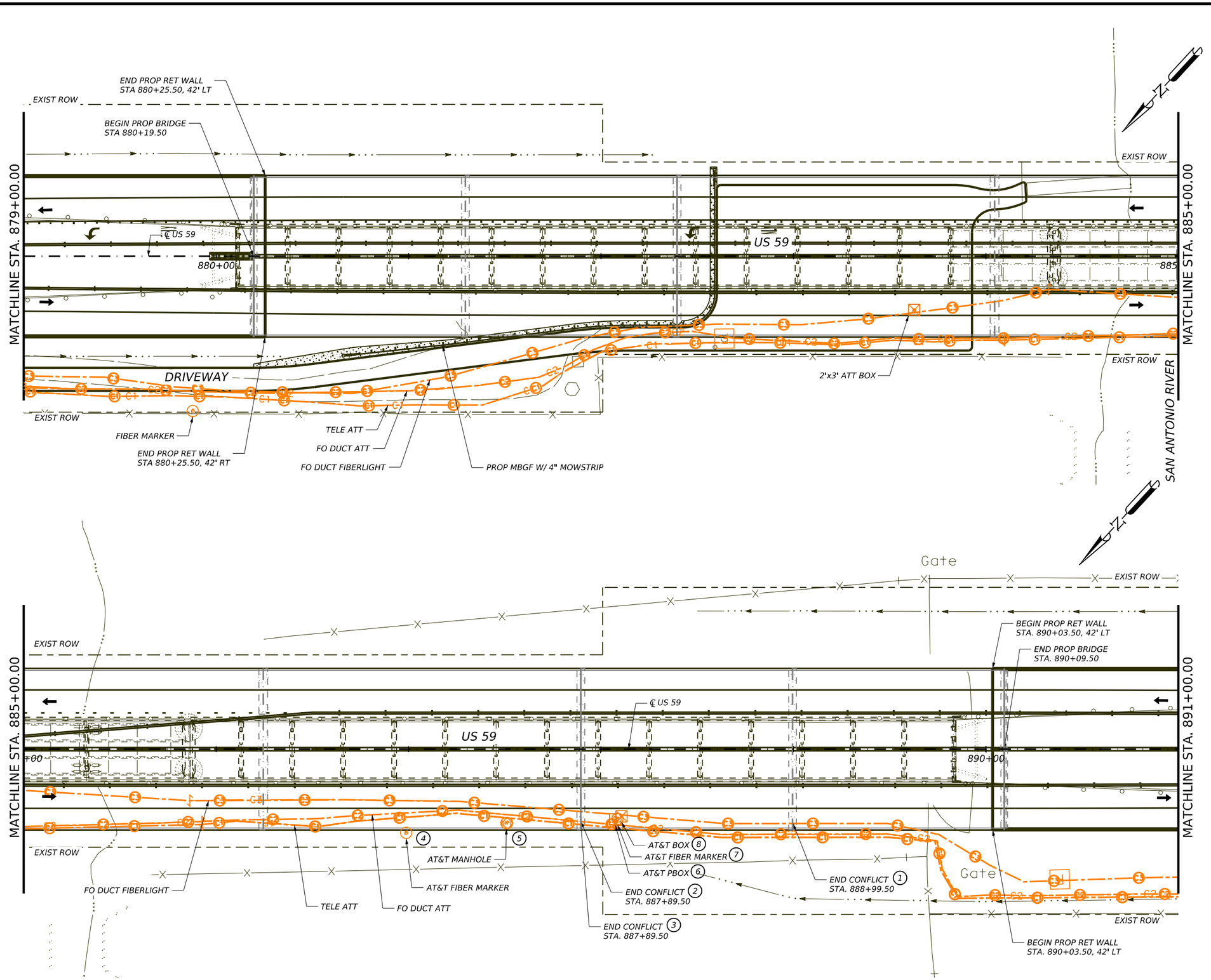

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

8/7/2024

LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation ©2024

US 59

UTILITY LAYOUT

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		128

DATE: 8/7/2024
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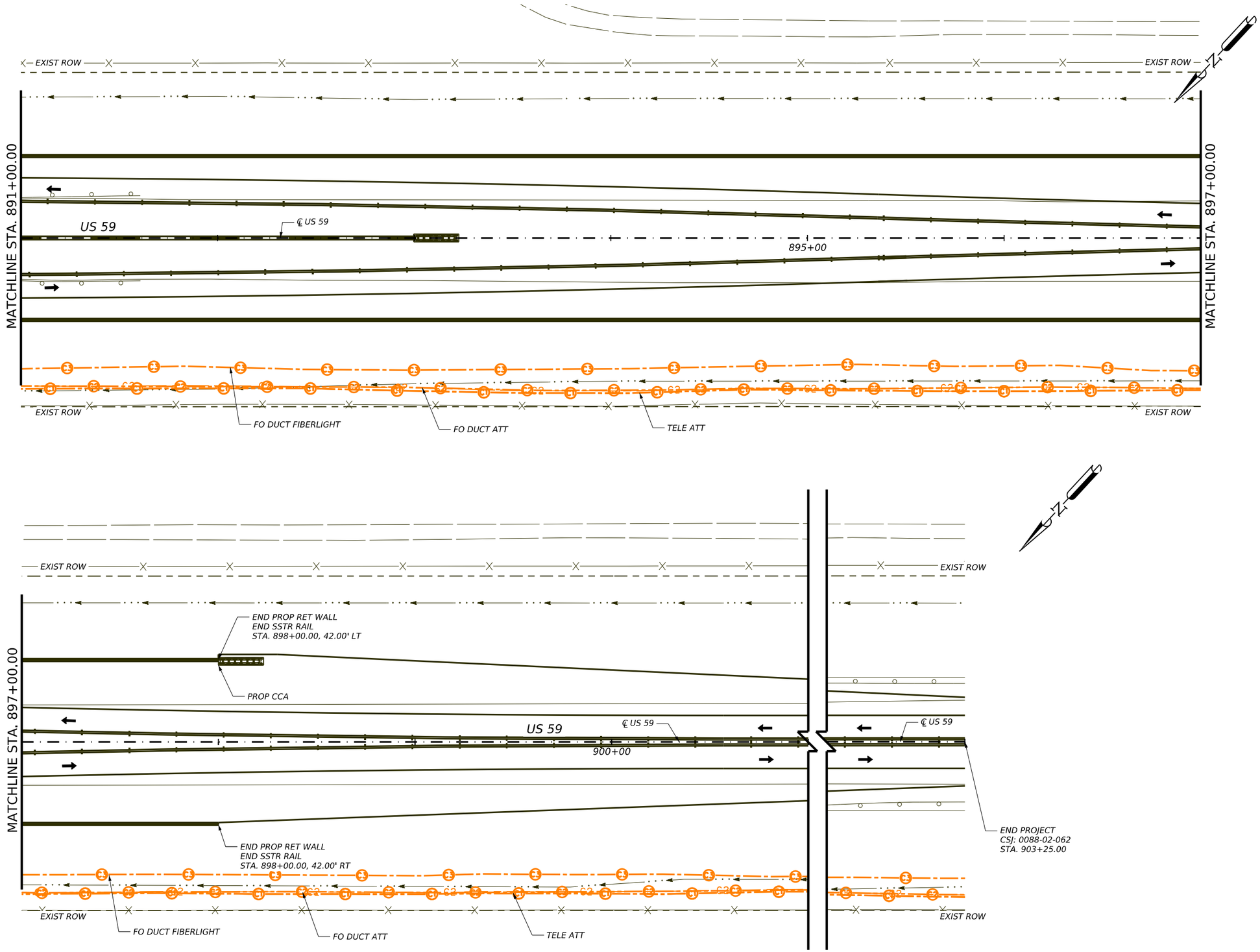

LEGEND

- TELE ATT
- FO DUCT ATT
- FO DUCT FIBERLIGHT
- # UTILITY CONFLICT NUMBER

0' 25' 50'

SCALE: 1"=50'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

8/7/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

UTILITY LAYOUT

SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		129

DATE: 8/7/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms663531062_UTL04.dgn

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-1	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	9/28/2021
CSJ	0088-02-062	Station	889+45.18	Grnd. Elev.	136.00 ft
		Offset	26.0R	GW Elev.	126.00 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, sandy, soft to stiff, dark brown (SC)			13	45	26		SPT(mod):5-3-4
5		13 (6) 15 (6)				14				SPT(mod):5-6-7
130.			SAND, clayey, compact, tan (SC)							
10		26 (6) 23 (6)				5				#200(%)-41; SPT(mod):9-7-10
15		22 (6) 29 (6)				2				SPT(mod):7-9-6
20		24 (6) 32 (6)				5				#200(%)-14; SPT(mod):16-23-37
113.			CLAY, fat, stiff to hard, gray (CH)							
25		45 (6) 50 (4)				14	50	26		SPT(mod):18-25-28
106. 30		50 (3) 50 (3)				24				SPT(mod):20-31-38
			CLAY, fat with sand, stiff to hard, gray (CH)							
35		46 (6) 49 (6)				22				#200(%)-84; SPT(mod):15-29-33
40		29 (6) 33 (6)				23				SPT(mod):20-25-29

Remarks: Advancement Method: Dry auger to 50 feet; Wet rotary thereafter. GPS: (Lat: 28.65036, Lon: -97.43397). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-1	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	9/28/2021
CSJ	0088-02-062	Station	889+45.18	Grnd. Elev.	136.00 ft
		Offset	26.0R	GW Elev.	126.00 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, fat with sand, stiff to hard, gray (CH)							
45		23 (6) 25 (6)				25	62	36		SPT(mod):20-27-29
50		17 (6) 22 (6)				27				SPT(mod):10-11-13
55		23 (6) 26 (6)				22				SPT(mod):7-12-15
60		22 (6) 19 (6)				31				HP=2.5
76.			CLAY, lean, stiff to very stiff, reddish brown to gray (CL)							
65		20 (6) 25 (6)				17				SPT(mod):13-15-16
70		14 (6) 17 (6)				15	32	18		SPT(mod):7-7-11
75		15 (6) 18 (6)		0	65	15				HP=4.5
56. 80		16 (6) 19 (6)				16				SPT(mod):8-9-11

Remarks: Advancement Method: Dry auger to 50 feet; Wet rotary thereafter. GPS: (Lat: 28.65036, Lon: -97.43397). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 16

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		129

DATE: 5/28/2024
FILE: c:\workingdir\ja-pw.bentley.com_ja-pw-01\thuy.nguyen\dms663541062_BOL01.dgn

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-2	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/1/2021
CSJ	0088-02-062	Station	886+45.99	Grnd. Elev.	129.50 ft
		Offset	26.7R	GW Elev.	106.50 ft

Elev. (ft)	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, stiff, dark brown (CH)			24				SPT(mod):5-5-6
5	10 (6) 14 (6)				17	54	31		#200(%)-89; SPT(mod):4-6-10
122.5		SAND, clayey, very loose to dense, tan (SC)							
10	2 (6) 3 (6)				9				SPT(mod):3-2-2
15	9 (6) 8 (6)				17				#200(%)-68; HP=2.75
20	12 (6) 11 (6)				18				#200(%)-33; HP=1.75
25	43 (6) 50 (4)				18				SPT(mod):6-17-21
101.5		CLAY, fat, very stiff, gray (CH)							
30	38 (6) 36 (6)				21				SPT(mod):19-32-40
35	29 (6) 34 (6)				26	62	36		SPT(mod):11-21-25
40	27 (6) 29 (6)				26				SPT(mod):14-20-23

Remarks: **Advancement Method: Dry auger to 40 feet; Wet rotary thereafter. GPS: (Lat: 28.65094, Lon: -97.43324). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.**

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-2	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/1/2021
CSJ	0088-02-062	Station	886+45.99	Grnd. Elev.	129.50 ft
		Offset	26.7R	GW Elev.	106.50 ft

Elev. (ft)	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, very stiff, gray (CH)							
86.5		CLAY, fat, sandy, stiff to hard, reddish brown (SC)							
45	24 (6) 26 (6)				24				SPT(mod):6-10-13
50	28 (6) 32 (6)				24	67	38		SPT(mod):6-9-10
55	26 (6) 30 (6)		0	22	24				#200(%)-69; HP=4.5
60	31 (6) 36 (6)				19				SPT(mod):10-14-17
65	50 (4) 50 (5)				19				HP=4.5
61.5		SAND, clayey, compact, gray (SC)							
70	29 (6) 38 (6)				18				SPT(mod):19-21-23
75	31 (6) 45 (6)				19				#200(%)-23; SPT(mod):13-23-27
80	29 (6) 37 (6)				16	41	19		SPT(mod):10-26-28

Remarks: **Advancement Method: Dry auger to 40 feet; Wet rotary thereafter. GPS: (Lat: 28.65094, Lon: -97.43324). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.**

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White

6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 2 OF 16

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		130

DATE: 5/28/2024
FILE: c:\working\dir\\\a-pw.bentley.com:_\a-pw-01\thuy.nguyen\dms663541062_BOL02.dgn

DRILLING LOG

WinCore Version 3.3	County	Goliad	Hole	B-2	District	Corpus Christi
	Highway	US 59	Structure	Retaining Wall	Date	10/1/2021
	CSJ	0088-02-062	Station	886+45.99	Grnd. Elev.	129.50 ft
			Offset	26.7R	GW Elev.	106.50 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, compact, gray (SC)							
46.5			CLAY, fat, stiff to hard, gray (CH)							
		22 (6) 39 (6)				26				SPT(mod):11-17-29
85										
						23				SPT(mod):25-45-50
90		37 (6) 50 (3)								
						20				SPT(mod):26-50
95		50 (3) 50 (2)								
						23	55	31		#200(%)-93; SPT(mod):13-21-24
100		19 (6) 32 (6)								
						20				SPT(mod):11-17-20
105		14 (6) 19 (6)								
						28				SPT(mod):10-17-19
19.5	110	18 (6) 23 (6)								
	115									
	120									

Remarks: Advancement Method: Dry auger to 40 feet; Wet rotary thereafter. GPS: (Lat: 28.65094, Lon: -97.43324). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White

6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 3 OF 16

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		131

DATE: 5/28/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BOL03.dgn

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-3	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/6/2021
CSJ	0088-02-062	Station	883+33.18	Grnd. Elev.	128.50 ft
		Offset	23.4R	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, lean, sandy, soft, dark brown (SC)			23	39	23		#200(%)-57; SPT(mod):6-5-6
5		6 (6) 6 (6)				15				SPT(mod):5-4-4
122.5			SAND, clayey, slightly compact to compact, tan (SC)							
10		9 (6) 13 (6)				12				#200(%)-41
15		15 (6) 18 (6)				17				SPT(mod):3-2-5
20		12 (6) 15 (6)				5				#200(%)-12; SPT(mod):2-3-5
25		11 (6) 11 (6)				22				SPT(mod):9-13-17
30		16 (6) 25 (6)				20				SPT(mod):12-18-22
35		19 (6) 19 (6)				21				#200(%)-14; SPT(mod):15-16-25
90.5			CLAY, fat, soft to stiff, gray (CH)							
40		9 (6) 11 (6)								SPT(mod):10-19-19

Remarks: Advancement Method: Dry auger to 35 feet; Wet rotary thereafter. GPS: (Lat: 28.65148, Lon: -97.43253). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-3	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/6/2021
CSJ	0088-02-062	Station	883+33.18	Grnd. Elev.	128.50 ft
		Offset	23.4R	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 to stiff, gray (CH)							
45		8 (6) 10 (6)				21	57	33		SPT(mod):7-14-12
50		6 (6) 8 (6)				24				SPT(mod):5-10-12
55		18 (6) 23 (6)				20				SPT(mod):8-7-17
60		19 (6) 19 (6)				20				#200(%)-71; SPT(mod):9-11-13
65.5			CLAY, lean, sandy, stiff to very stiff, gray (SC)							
65		18 (6) 20 (6)				18	38	17		SPT(mod):13-16-25
70		21 (6) 29 (6)				20				SPT(mod):9-18-23
75		27 (6) 29 (6)				27				SPT(mod):18-25-30
80		27 (6) 36 (6)				22				SPT(mod):24-21-19

Remarks: Advancement Method: Dry auger to 35 feet; Wet rotary thereafter. GPS: (Lat: 28.65148, Lon: -97.43253). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 4 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		132

DATE: 5/28/2024
FILE: c:\workingdir\ja-pw.bentley.com_ja-pw-01\thuy.nguyen\dms663541062_BOL04.dgn

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-3	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/6/2021
CSJ	0088-02-062	Station	883+33.18	Grnd. Elev.	128.50 ft
		Offset	23.4R	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, lean, sandy, stiff to very stiff, gray (SC)							
85		21 (6) 30 (6)				21				SPT(mod):16-29-35
90		19 (6) 23 (6)				19				SPT(mod):17-27-34
95		38 (6) 37 (6)				16	34	18		SPT(mod):16-22-29
30.5			CLAY, stiff to hard, reddish brwon (CL)			19				SPT(mod):42-50
100		39 (6) 50 (5)								
105		19 (6) 20 (6)				23				#200(%)-97; SPT(mod):10-13-21
18.5		14 (6) 21 (6)				23				SPT(mod):24-27-40
110										
115										
120										

Remarks: Advancement Method: Dry auger to 35 feet; Wet rotary thereafter. GPS: (Lat: 28.65148, Lon: -97.43253). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

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US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 5 OF 16

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		133

DATE: 5/28/2024
FILE: c:\workingdir\la-pw.bentley.com_la-pw-01\thuy.nguyen\dms663541062_BOL05.dgn

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-4	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/7/2021
CSJ	0088-02-062	Station	880+99.41	Grnd. Elev.	132.00 ft
		Offset	29.3R	GW Elev.	N/A

Elev. (ft)	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
130.		CLAY, fat, sandy, soft, dark brown (SC)			22	63	38		SPT(mod):4-3-6
		SAND, clayey, loose to slightly compact, dark brown (SC)							
5	8 (6) 7 (6)				14				#200(%)-39
10	10 (6) 13 (6)				15				SPT(mod):2-2-3
119.		CLAY, fat, sandy, soft, tan (SC)							
15	9 (6) 11 (6)				19				#200(%)-62
20	6 (6) 7 (6)				25				SPT(mod):2-3-5
109.		SAND, clayey, very loose to slightly compact, tan (SC)							
25	3 (6) 5 (6)				27				
30	2 (6) 4 (6)				25	29	14		#200(%)-42; SPT(mod):3-3-5
35	14 (6) 18 (6)				23				SPT(mod):13-17-17
40	13 (6) 17 (6)				13				#200(%)-16; SPT(mod):14-15-10

Remarks: Advancement Method: Dry auger to 35 feet; Wet rotary thereafter. GPS: (Lat: 28.65207, Lon: -97.43182). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-4	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	10/7/2021
CSJ	0088-02-062	Station	880+99.41	Grnd. Elev.	132.00 ft
		Offset	29.3R	GW Elev.	N/A

Elev. (ft)	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 loose to slightly compact, tan (SC)							
89.		CLAY, fat, soft to very stiff, gray to reddish brown (CH)							
45	11 (6) 15 (6)				32				SPT(mod):6-9-14
50	10 (6) 13 (6)				23				SPT(mod):7-11-15
55	10 (6) 10 (6)				42				SPT(mod):8-10-12
60	19 (6) 25 (6)				23	45	30		SPT(mod):16-24-27
65	21 (6) 25 (6)				25				SPT(mod):15-19-17
70	23 (6) 26 (6)				23				SPT(mod):12-21-26
57. 75	20 (6) 18 (6)				20				SPT(mod):35-50
		SAND, clayey, slightly compact to compact, gray (SC)							
52. 80	21 (6) 24 (6)				16				#200(%)-14; SPT(mod):26-50

Remarks: Advancement Method: Dry auger to 35 feet; Wet rotary thereafter. GPS: (Lat: 28.65207, Lon: -97.43182). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 6 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		134

DATE: 5/28/2024
FILE: c:\workingdir\ja-pw.bentley.com_ja-pw-01\thuy.nguyen\dms663541062_BOL06.dgn

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-5	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	3/11/2023
CSJ	0088-02-062	Station	881+98.51	Grnd. Elev.	132.38 ft
		Offset	40.44R	GW Elev.	114.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
131.4			CLAY, lean, soft, dark brown (CL)			16	30	15		SPT(mod):5-6-9
			SAND, silty, slightly compact to compact, gray							#200(%)-20; SPT(mod):8-8-5
5		11 (6) 12 (6)								SPT(mod):4-4-7
										SPT(mod):4-3-4
10		13 (6) 12 (6)								#200(%)-26; SPT(mod):5-4-5
15		21 (6) 20 (6)								SPT(mod):15-12-13
116.4			CLAY, very stiff, gray (CL)			7	39	25		SPT(mod):8-10-10
20		29 (6) 19 (6)								
110.4			SAND, clayey, loose to compact, gray (SC)							
25		30 (6) 33 (6)								SPT(mod):6-5-8
30		7 (6) 10 (6)								SPT(mod):7-7-9 Initial GW: 30ft
100.4			GRAVEL, with clay, slightly compact to dense, gray							
35		12 (6) 9 (6)				9				#200(%)-5; SPT(mod):7-6-5
										SPT(mod):2-3-8
40		50 (5) 50 (1)								

Remarks: Advancement Method: Flight auger to 60 feet; Wet rotary thereafter. GPS: (Latitude: 28.651729, Longitude: -97.432238). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-5	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	3/11/2023
CSJ	0088-02-062	Station	881+98.51	Grnd. Elev.	132.38 ft
		Offset	40.44R	GW Elev.	114.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			GRAVEL, with clay, slightly compact to dense, gray							
45										SPT(mod):10-11-50/5
86.4			SAND, clayey, compact, dark gray (SC)							
50		36 (6) 41 (6)								SPT(mod):6-7-9
80.4			CLAY, lean, stiff to hard, gray and reddish brown (CL)							
55		12 (6) 15 (6)								SPT(mod):16-18-20
60		36 (6) 28 (6)								SPT(mod):12-13-18
65		34 (6) 32 (6)				22	46	32		SPT(mod):9-13-17
70		32 (6) 50 (4)								SPT(mod):8-16-17
60.4			SAND, clayey, very dense, light gray (SC)							
75		50 (1) 50 (0)								SPT(mod):11-18-16
54.4			CLAY, lean, hard to very hard, dusky red (CL)							
80		50 (2) 50 (1)								SPT(mod):30-50/5

Remarks: Advancement Method: Flight auger to 60 feet; Wet rotary thereafter. GPS: (Latitude: 28.651729, Longitude: -97.432238). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

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US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 7 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		135

DATE: 5/28/2024
FILE: c:\workingdir\lja-pw.bentley.com :lja-pw-01\thuy.nguyen\dms663541062_BOL07.dgn

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-5	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	3/11/2023
CSJ	0088-02-062	Station	881+98.51	Grnd. Elev.	132.38 ft
		Offset	40.44R	GW Elev.	114.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, lean, hard to very hard, dusky red (CL)							
85		50 (5) 50 (3)								SPT(mod):23-39-50/5
90		50 (4) 50 (1)								SPT(mod):18-31-50/4
95		50 (2) 50 (3)				16	34	20		SPT(mod):20-37-50/1
100		50 (5) 50 (5)								SPT(mod):19-24-44
105		50 (5) 50 (5)				20	42	25		SPT(mod):14-18-21
110		44 (6) 39 (6)								SPT(mod):13-25-50/4
20.4			CLAY, fat, very stiff to very hard, dusky red (CH)							
115		50 (4) 50 (3)				27	73	57		SPT(mod):15-17-30
120		50 (3) 50 (1)								SPT(mod):20-29-37

Remarks: Advancement Method: Flight auger to 60 feet; Wet rotary thereafter. GPS: (Latitude: 28.651729, Longitude: -97.432238). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-5	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	3/11/2023
CSJ	0088-02-062	Station	881+98.51	Grnd. Elev.	132.38 ft
		Offset	40.44R	GW Elev.	114.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
			CLAY, fat, very stiff to very hard, dusky red (CH)			21	50	33		SPT(mod):21-23-32
125		50 (2) 50 (2)								
130		39 (6) 39 (6)								SPT(mod):14-12-21
135		50 (4) 50 (1)								SPT(mod):16-23-37
-7.6						23	56	35		SPT(mod):11-21-19
140		50 (4) 50 (3)								
145										
150										
155										
160										

Remarks: Advancement Method: Flight auger to 60 feet; Wet rotary thereafter. GPS: (Latitude: 28.651729, Longitude: -97.432238). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

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: Derrick Villarreal Logger: James Case Organization: Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED PROFESSIONAL ENGINEER

Adam White

6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 8 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		136

DATE: 5/28/2024
FILE: c:\workingdir\ja-pw.bentley.com_ja-pw-01\thuy.nguyen\dms663541062_BOL08.dgn

DRILLING LOG

WinCore Version 3.3	County	Goliad	Hole	B-6	District	Corpus Christi
	Highway	US 59	Structure	Retaining Wall	Date	3/9/2023
	CSJ	0088-02-062	Station	879+00.29	Grnd. Elev.	144.98 ft
			Offset	12.44R	GW Elev.	N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	Properties LL	Properties PI	Properties Wet Den. (pcf)	Additional Remarks
143.6			PAVEMENT, 4.5 in Asphalt, 8.5 in Base							SPT(mod):21-18-13
			SAND, clayey, very loose, dark brown. dark gray, light brown and gray, FILL (SC)							SPT(mod):13-8-8
		3 (6) 2 (6)				21	32	18		SPT(mod):3-4-4
5										
						17				#200(%)-42; SPT(mod):3-2-2
137.			SAND, clayey, very loose to slightly compact, dark brown, dark gray, light brown and gray (SC)							
10		3 (6) 5 (6)				10				#200(%)-19; SPT(mod):2-4-5
						18				#200(%)-31; SPT(mod):3-4-7
15		3 (6) 5 (6)								
										SPT(mod):4-4-5
20		3 (6) 6 (6)								
										SPT(mod):5-5-7
25		5 (6) 5 (6)								
						5				#200(%)-11; SPT(mod):5-8-8
30		9 (6) 11 (6)								
										SPT(mod):6-6-8
110. 35		15 (6) 12 (6)								
40										

Remarks: Advancement Method: Flight auger to 35 feet. GPS: (Latitude: 28.652221, Longitude: -97.431489). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\work\ngdir\lja-pw.bentley.com_lja-pw-011\thuy.nguyen\dms663541062_BOL09.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 9 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		137

DRILLING LOG

WinCore Version 3.3	County	Goliad	Hole	B-7	District	Corpus Christi
	Highway	US 59	Structure	Retaining Wall	Date	3/9/2023
	CSJ	0088-02-062	Station	890+40.66	Grnd. Elev.	145.27 ft
			Offset	0.71R	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
143.9			PAVEMENT, 4.5 in Asphalt, 9.5 in Base							SPT(mod):19-13-9
			CLAY, lean, sandy, soft to stiff, dark brown, FILL (SC)							SPT(mod):2-3-5
		6 (6) 5 (6)				17	41	28		SPT(mod):5-5-6
5										
						21				#200(%)-66; SPT(mod):4-6-6
136.3										
		9 (6) 9 (6)	CLAY, lean, sandy, soft to stiff, dark brown (SC)			18	45	29		SPT(mod):4-4-9
10										
15		10 (6) 13 (6)								SPT(mod):12-15-15
						10				#200(%)-52; SPT(mod):5-6-5
20		17 (6) 15 (6)								
123.3			SAND, with clay, slightly compact to compact, light brown and gray							
		5 (6) 35 (6)								SPT(mod):6-6-7
25										
						2				#200(%)-9; SPT(mod):20-18-18
30		16 (6) 19 (6)								
110.3		14 (6) 43 (6)								SPT(mod):24-39-32
35										
40										

Remarks: Advancement Method: Flight auger to 35 feet. GPS: (Latitude: 28.650097, Longitude: -97.434105). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Derrick Villarreal **Logger:** James Case **Organization:** Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\workingdir\ja-pw.bentley.com_ja-pw-01\thuy.nguyen\dms663541062_BOL10.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 10 OF 16

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		138

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-8	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	4/3/2024
CSJ	0088-02-062	Station	892+21.26	Grnd. Elev.	145.63 ft
		Offset	15.65 LT	GW Elev.	N/A

Elev. (ft)	Texas Cone Penetrometer	Strata Description	Triaxial Test Lateral Press. (psi)	Triaxial Test Deviator Stress (psi)	Properties MC	LL	PI	Wet Den. (pcf)	Additional Remarks
144.6		PAVEMENT, 4 in Asphalt over base							
		SAND, clayey, with gravel, loose, dark brown, FILL (SC)			17	28	5		#200(%)-40; SPT(mod):9-6-7
									SPT(mod):3-4-6
140.6 5	4 (6) 4 (6)								
		CLAY, lean, with sand, very soft to soft, dark brown, FILL (CL)			22	39	23		#200(%)-78; SPT(mod):4-5-5
									SPT(mod):2-4-5
137.6		CLAY, lean, sandy, soft to very stiff, dark brown to light brown (SC)							
10	4 (6) 5 (6)								SPT(mod):3-4-4
15	5 (6) 5 (6)								SPT(mod):6-8-9
20	22 (6) 26 (6)				17	26	10		#200(%)-64; SPT(mod):9-8-13
122.1		SAND, clayey, slightly compact to very dense, light brown (SC)							
25	25 (6) 20 (6)								SPT(mod):14-18-23
30	50 (2) 50 (2)								SPT(mod):15-18-50/5 in
112.1		SAND, with silt and gravel, dense, light brown			3				#200(%)-9; SPT(mod):31-39-43
110.6 35	50 (5) 50 (3)								
40									

Remarks: Advancement Method: Dry auger to completion. GPS: (Lat: 28.649731, Lon: -97.434489). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Craig Schena Logger: Francisco Colchado Organization: Terracon Consultants, Inc.

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		139

DATE: 5/28/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BOL11.dgn

DRILLING LOG

WinCore Version 3.3

County	Goliad	Hole	B-9	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	4/3/2024
CSJ	0088-02-062	Station	894+43.27	Grnd. Elev.	145.93 ft
		Offset	13.27 LT	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
144.9			PAVEMENT, 4 in Asphalt over base							
			SAND, clayey, with gravel, loose, light brown, FILL (SC)			16	30	12		#200(%)-34; SPT(mod):8-10-8
143.9			CLAY, lean, sandy, very soft, dark brown, FILL (CL)							SPT(mod):3-3-4
5		3 (6) 3 (6)								SPT(mod):4-4-4
						20	35	22		#200(%)-69; SPT(mod):2-3-3
137.9			CLAY, lean, sandy, very soft to soft, dark brown to brown (SC)							SPT(mod):7-10-14
10		4 (6) 4 (6)								
										SPT(mod):5-10-12
15		6 (6) 5 (6)								
127.4			SAND, silty, clayey, slightly compact, brown			13	24	7		#200(%)-37; SPT(mod):2-4-7
125.9		14 (6) 14 (6)								
20										

Remarks: Advancement Method: Dry auger to completion. GPS: (Lat: 28.649327, Lon: -97.435008). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Craig Schena Logger: Francisco Colchado Organization: Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BOL12.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 12 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		140

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-10	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	4/4/2024
CSJ	0088-02-062	Station	896+41.41	Grnd. Elev.	145.53 ft
		Offset	16.05 RT	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
			PAVEMENT, 4 in Asphalt over base							
144.5			CLAY, lean, silty, soft, light brown, with traces of gravel, FILL (CL)							SPT(mod):21-20-11
143.			CLAY, lean, sandy, very soft, dark brown to brown, FILL (SC)			21	46	31		#200(%)-68; SPT(mod):2-2-3
5		4 (6) 3 (6)								SPT(mod):2-3-3
138.			CLAY, lean, with sand, soft to stiff, dark brown to light brown (CL)							SPT(mod):5-6-7
						21	38	25		#200(%)-72; SPT(mod):0-1-2
10		3 (6) 7 (6)								
										SPT(mod):3-6-8
15		8 (6) 9 (6)								
										SPT(mod):4-4-5
125.5	20	11 (6) 19 (6)								

Remarks: Advancement Method: Dry auger to completion. GPS: (Lat: 28.649022, Lon: -97.435528). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Craig Schena Logger: Francisco Colchado Organization: Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\working\drlvla-pw.bentley.com:vla-pw-01\thuy.nguyen\dms66354\062 BOL13.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 13 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		141

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-11	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	4/3/2024
CSJ	0088-02-062	Station	877+4.99	Grnd. Elev.	145.43 ft
		Offset	12.84 LT	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
144.4			PAVEMENT, 4 in Asphalt over base							
			SAND, clayey, loose, light brown to dark brown, FILL (SC)			14	34	17		#200(%)-44; SPT(mod):12-15-6
		4 (6) 5 (6)								SPT(mod):2-3-4
140.4 5			SAND, clayey, loose, dark brown to brown (SC)							SPT(mod):4-4-5
										SPT(mod):2-3-4
		6 (6) 8 (6)				12	31	22		#200(%)-44; SPT(mod):3-3-4
10										
131.9			CLAY, lean, sandy, stiff, light brown (CL)							
15		12 (6) 15 (6)								SPT(mod):5-4-8
20		19 (6) 16 (6)								SPT(mod):6-7-8
121.9			SAND, silty, compact to dense, light brown							
25		50 (5) 50 (4)								SPT(mod):9-8-12
						2	13	3		#200(%)-22; SPT(mod):15-25-27
115.4 30		30 (6) 35 (6)								
35										
40										

Remarks: Advancement Method: Dry auger to completion. GPS: (Lat: 28.652529, Lon: -97.430984). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Craig Schena Logger: Francisco Colchado Organization: Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BOL14.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED PROFESSIONAL ENGINEER

Adam White
6/3/2024

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US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 14 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		142

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-12	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	4/4/2024
CSJ	0088-02-062	Station	874+52.33	Grnd. Elev.	145.65 ft
		Offset	5.17 LT	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
			PAVEMENT, 4 in Asphalt over base							
144.7			CLAY, lean, sandy, stiff, light brown to dark brown, with fat clay seams, FILL (SC)							SPT(mod):14-19-10
142.7			CLAY, lean, sandy, soft, dark brown to brown, with fat clay seams (SC)			14	34	23		#200(%)-51; SPT(mod):4-4-4
5		6 (6) 8 (6)								SPT(mod):7-7-7
139.2			SAND, clayey, slightly compact to dense, light brown (SC)			9	25	14		#200(%)-43; SPT(mod):6-6-6
10		13 (6) 12 (6)								SPT(mod):5-5-5
15		33 (6) 35 (6)								SPT(mod):8-8-8
20		45 (6) 48 (6)								SPT(mod):17-15-19

Remarks: Advancement Method: Dry auger to completion. GPS: (Lat: 28.653010, Lon: -97.430415). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Craig Schena Logger: Francisco Colchado Organization: Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BOL15.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

Texas Department of Transportation

US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 15 OF 16

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		143

DRILLING LOG

WinCore
Version 3.3

County	Goliad	Hole	B-13	District	Corpus Christi
Highway	US 59	Structure	Retaining Wall	Date	4/4/2024
CSJ	0088-02-062	Station	872+16.78	Grnd. Elev.	145.83 ft
		Offset	7.32 LT	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
144.8			PAVEMENT, 4 in Asphalt over base							
			SAND, silty, clayey, slightly compact, light brown, FILL			12	28	6		#200(%)-38; SPT(mod):21-19-10
143.8			SAND, lean, sandy, soft, dark brown to light brown (SC)							
										SPT(mod):4-4-6
5		9 (6) 9 (6)				13	39	27		#200(%)-64; SPT(mod):8-10-13
										SPT(mod):5-8-10
137.3			SAND, silty, clayey, slightly compact to dense, light brown			8	24	5		#200(%)-48; SPT(mod):8-10-13
10		12 (6) 17 (6)								
										SPT(mod):6-7-9
15		36 (6) 48 (6)								
										SPT(mod):23-19-18
125.8		36 (6) 29 (6)								
20										

Remarks: Advancement Method: Dry auger to completion. GPS: (Lat: 28.653451, Lon: -97.429876). SPT testing was modified using a 170-lb hammer with a 24-inch drop height.

The ground water elevation was not determined during the course of this boring.

Driller: Craig Schena Logger: Francisco Colchado Organization: Terracon Consultants, Inc.

DATE: 5/28/2024
FILE: c:\workingdir\ja-pw.bentley.com:ja-pw-01\thuy.nguyen\dms663541062_BOL16.dgn

STATE OF TEXAS
T. ADAM WHITE, P.E.
127495
LICENSED
PROFESSIONAL ENGINEER

Adam White
6/3/2024

Terracon

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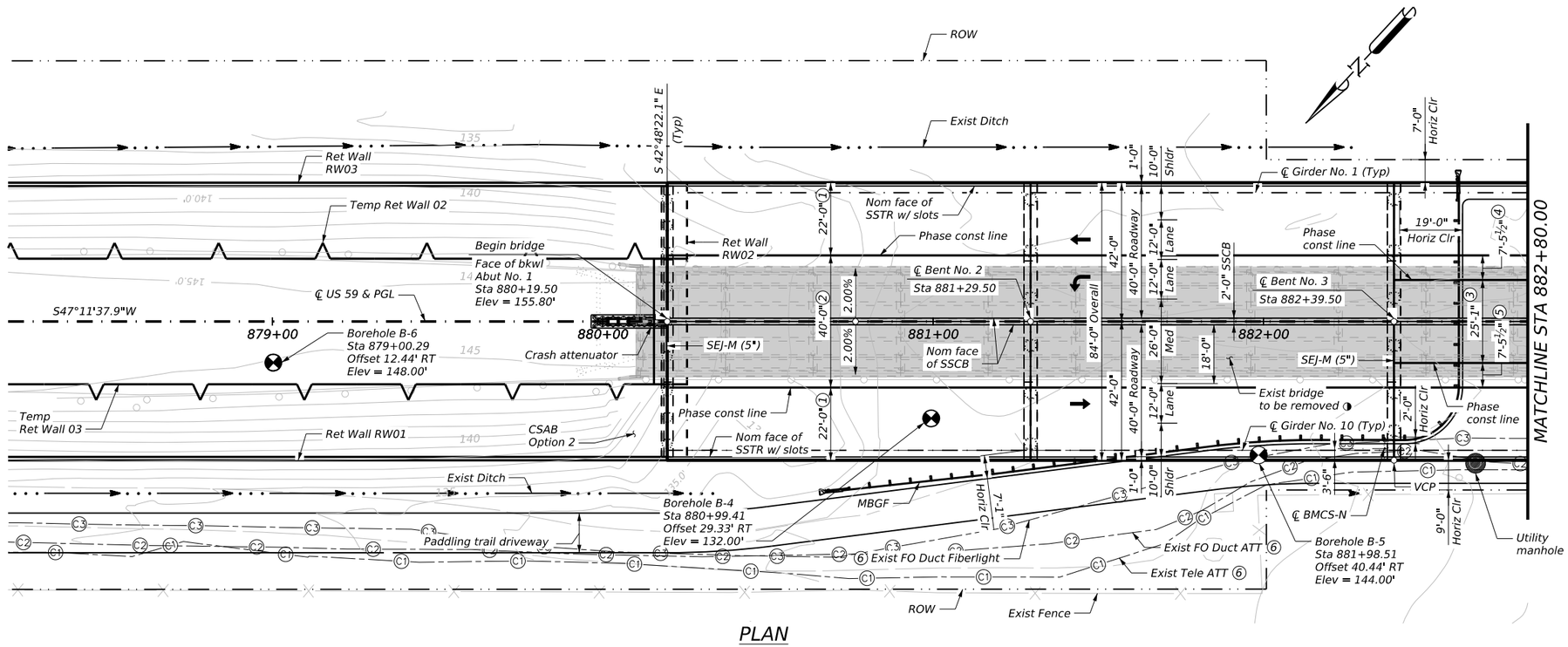
US 59

BORING LOG

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 16 OF 16

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		144



PLAN

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 9th edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

⊗ - *Denotes approximate soil boring location. See boring logs for test hole information.*

Girder end conditions:
- *D: Denotes dowel at exterior girders.*
- *Blank: Denotes no dowel.*
- *F: Denotes fixed bearing.*
- *E: Denotes expansion bearing.*

All bents are perpendicular to ℄ US 59.

For estimated column height "H" values, see Column Estimated Quantities Table on bent detail sheets. Contractor is responsible for calculating the actual column heights based on field conditions.

Contractor must verify the location and depth of all utilities prior to construction or fabrication.

See BRIDGE PHASED CONSTRUCTION sheets for bridge typical sections.

Exist NBI Number: 16-089-0-0088-02-009
New NBI Number: 16-089-0-0088-02-213
Functional Classification: Principal Arterial
Design Speed: 75 MPH
ADT (2024): 4,250 VPD
ADT (2044): 5,900 VPD

◑ *Existing US 59 over San Antonio River 973'-4" overall length. Concrete pan girder (29 spans) and 3-span steel plate girder unit. Concrete bents with driven piles. 33'-2" rdwy, 1,946'-8" rail (to be removed).*

① *Phase 1*

② *Phase 2 (Concrete spans only)*

③ *Phase 2A (Steel spans only)*

④ *Phase 2B (Steel spans only)*

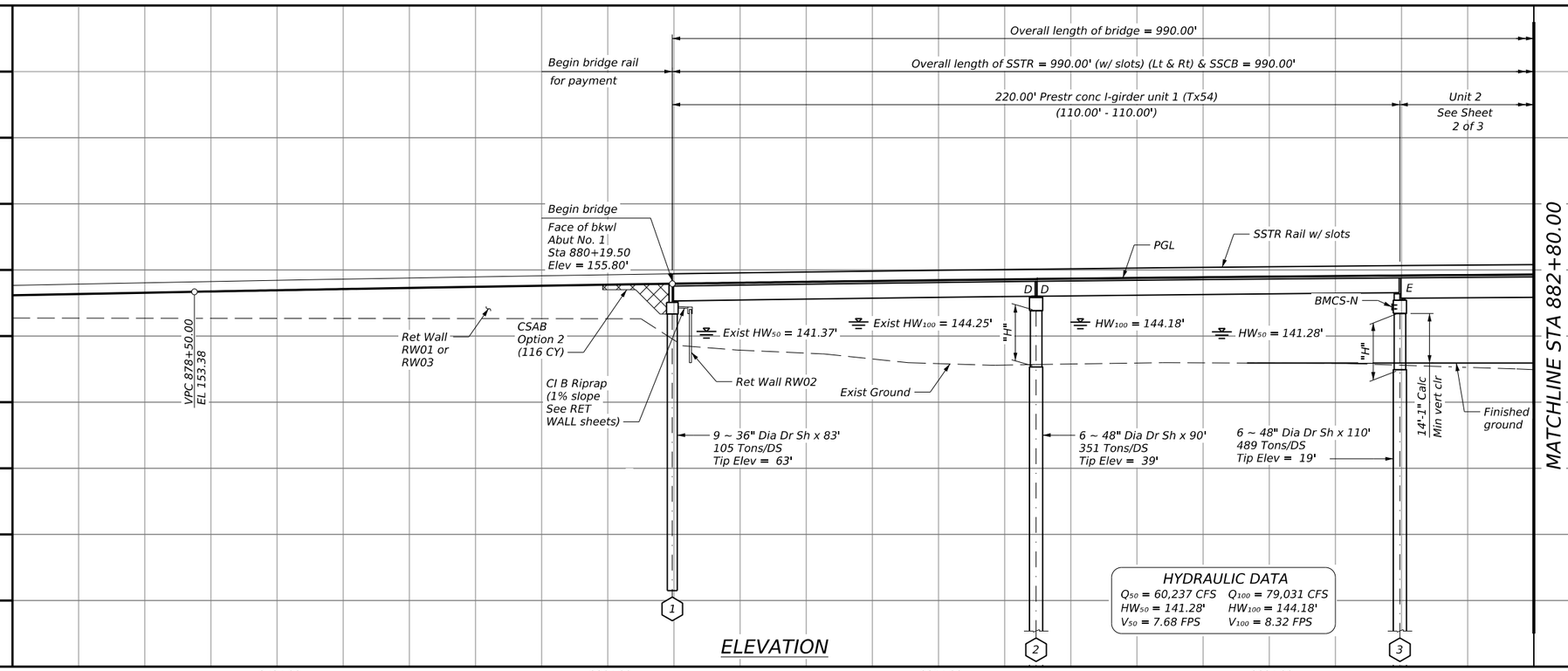
⑤ *Phase 2C (Steel spans only)*

⑥ *To be relocated or abandoned.*

0' 20' 40'

SCALE: 1"=40'

HL93 LOADING
SUPERSTRUCTURE INV/OPR RATINGS: 1.11/1.44



ELEVATION

HYDRAULIC DATA

Q_{50} = 60,237 CFS	Q_{100} = 79,031 CFS
HW_{50} = 141.28'	HW_{100} = 144.18'
V_{50} = 7.68 FPS	V_{100} = 8.32 FPS

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/31/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

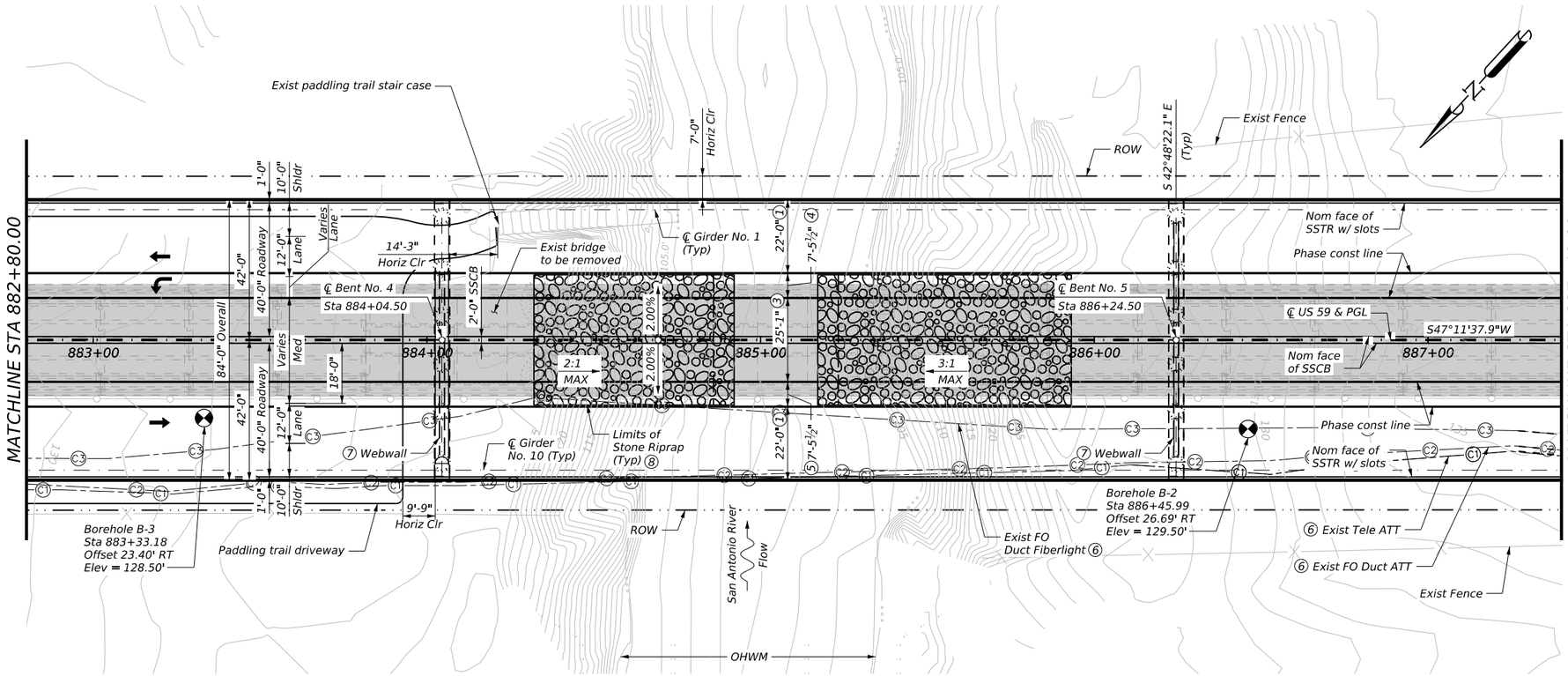
BRIDGE LAYOUT

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 1 OF 3

DESIGNED:	BZ	CONT	SECT	JOB	HIGHWAY
CHECKED:	LNH	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		145

DATE: 7/31/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_OBM_BLY01.dgn



PLAN

① Phase 1

③ Phase 2A (Steel spans only)

④ Phase 2B (Steel spans only)

⑤ Phase 2C (Steel spans only)

⑥ To be relocated or abandoned.

⑦ Webwall on Bent No. 4 & Bent No. 5. Webwall is omitted between Col No. 1 & Col No. 2 on Bent No. 4 for access to paddling trail.

⑧ See SAN ANTONIO RIVER RIPRAP PLAN sheets for details.

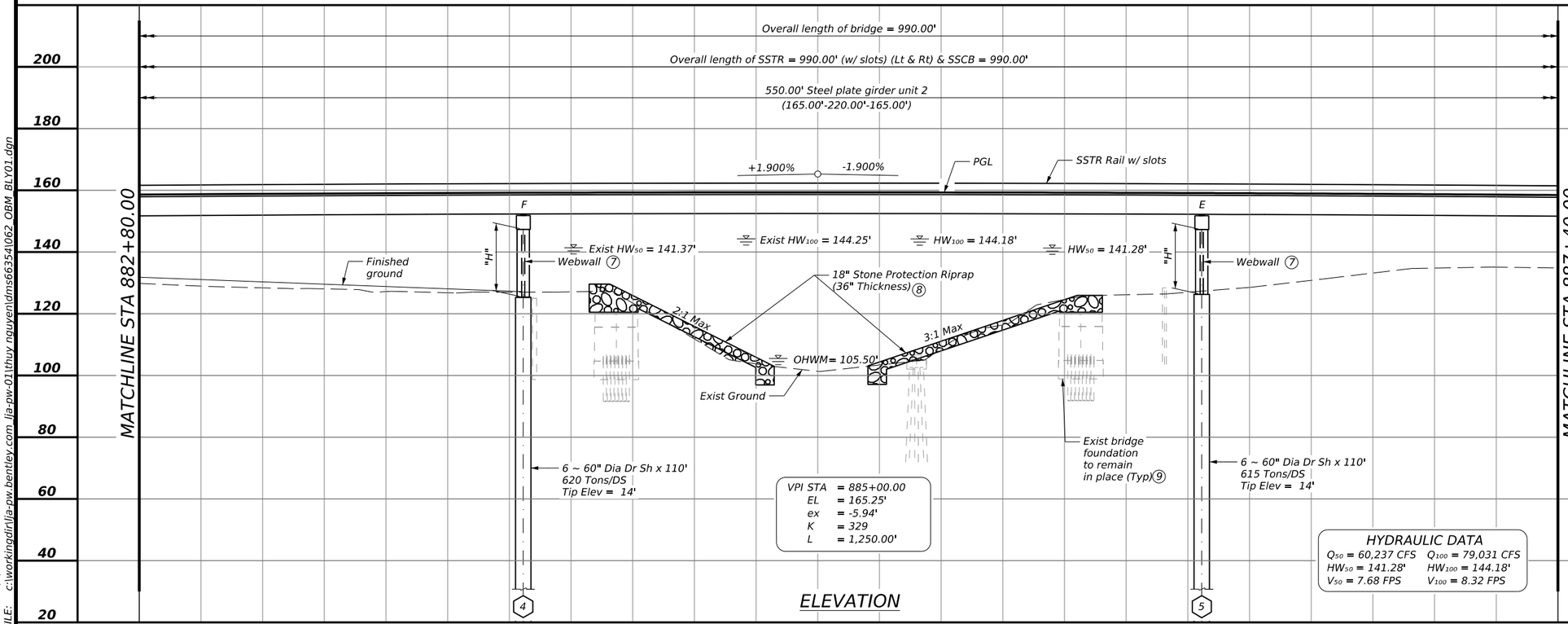
⑨ See REMOVAL DETAILS EXIST BENT NOS. 16-18 sheet for more information.

0' 20' 40'

SCALE: 1"=40'

HL93 LOADING

SUPERSTRUCTURE INV/OPR RATINGS: 1.11/1.44



ELEVATION

DATE: 7/3/2024
FILE: c:\working\dir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_OBM_BLY01.dgn

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/3/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

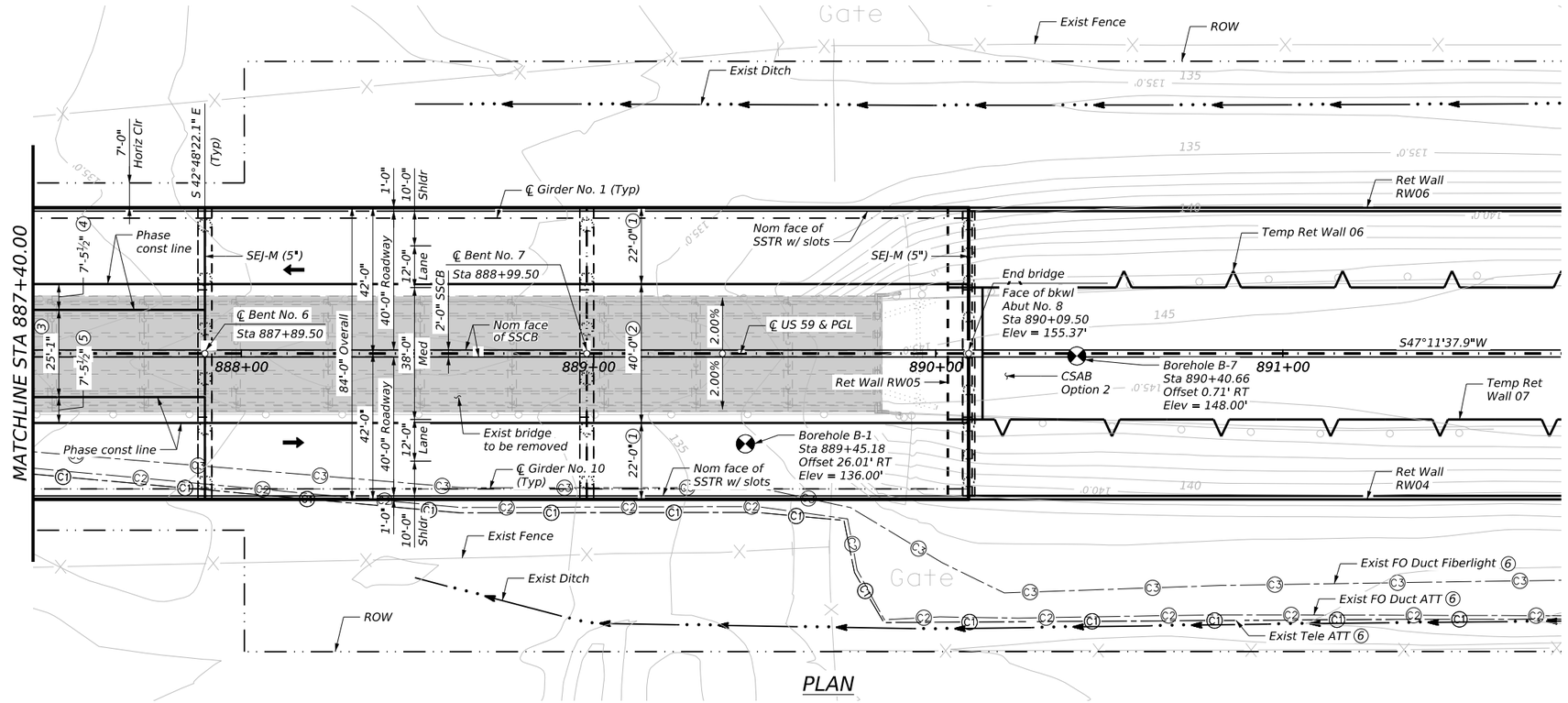
US 59

BRIDGE LAYOUT

SAN ANTONIO RIVER BRIDGE AT US 59

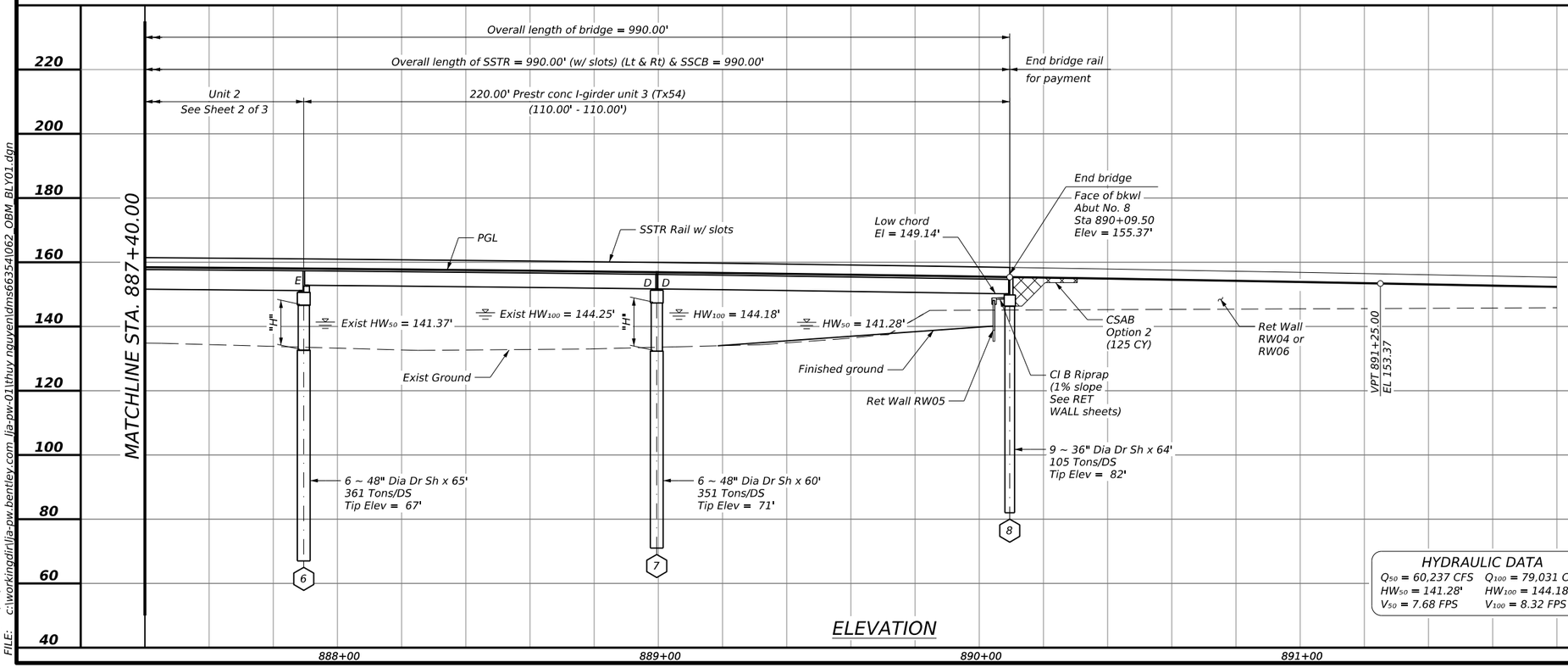
SHEET 2 OF 3

DESIGNED:	BZ	CONT	SECT	JOB	HIGHWAY
CHECKED:	LNH	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		146



① Phase 1
② Phase 2 (Concrete spans only)
③ Phase 2A (Steel spans only)
④ Phase 2B (Steel spans only)
⑤ Phase 2C (Steel spans only)
⑥ To be relocated or abandoned.

0' 20' 40'
SCALE: 1"=40'
HL93 LOADING
SUPERSTRUCTURE INV/OPR RATINGS: 1.11/1.44



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STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/31/2024

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FRN - F-1386

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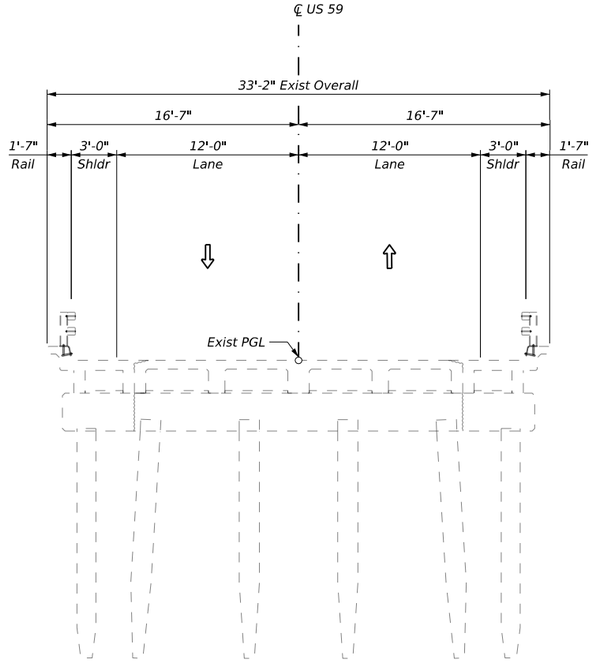
US 59

BRIDGE LAYOUT

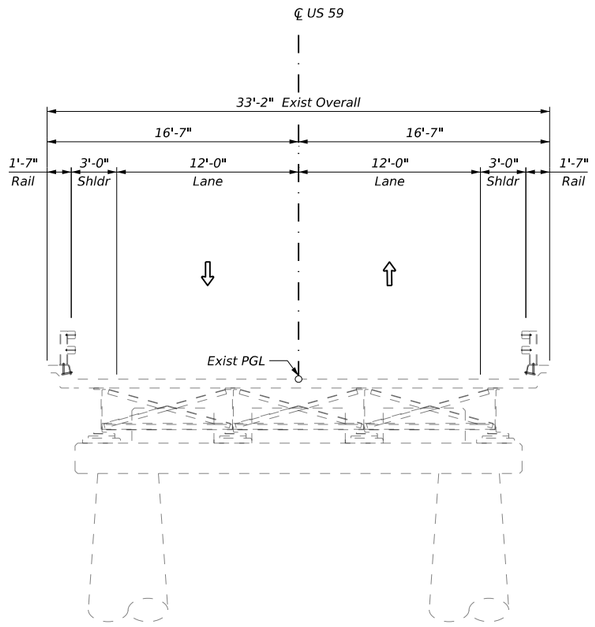
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 3 OF 3

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		147



Exist Typical Section
(Concrete Spans)



Exist Typical Section
(Steel Spans)

LEGEND:

- Existing bridge structure
- Exist structure to be removed this phase
- Constructed previous phase
- New construction phase

HL93 LOADING

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LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
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US 59

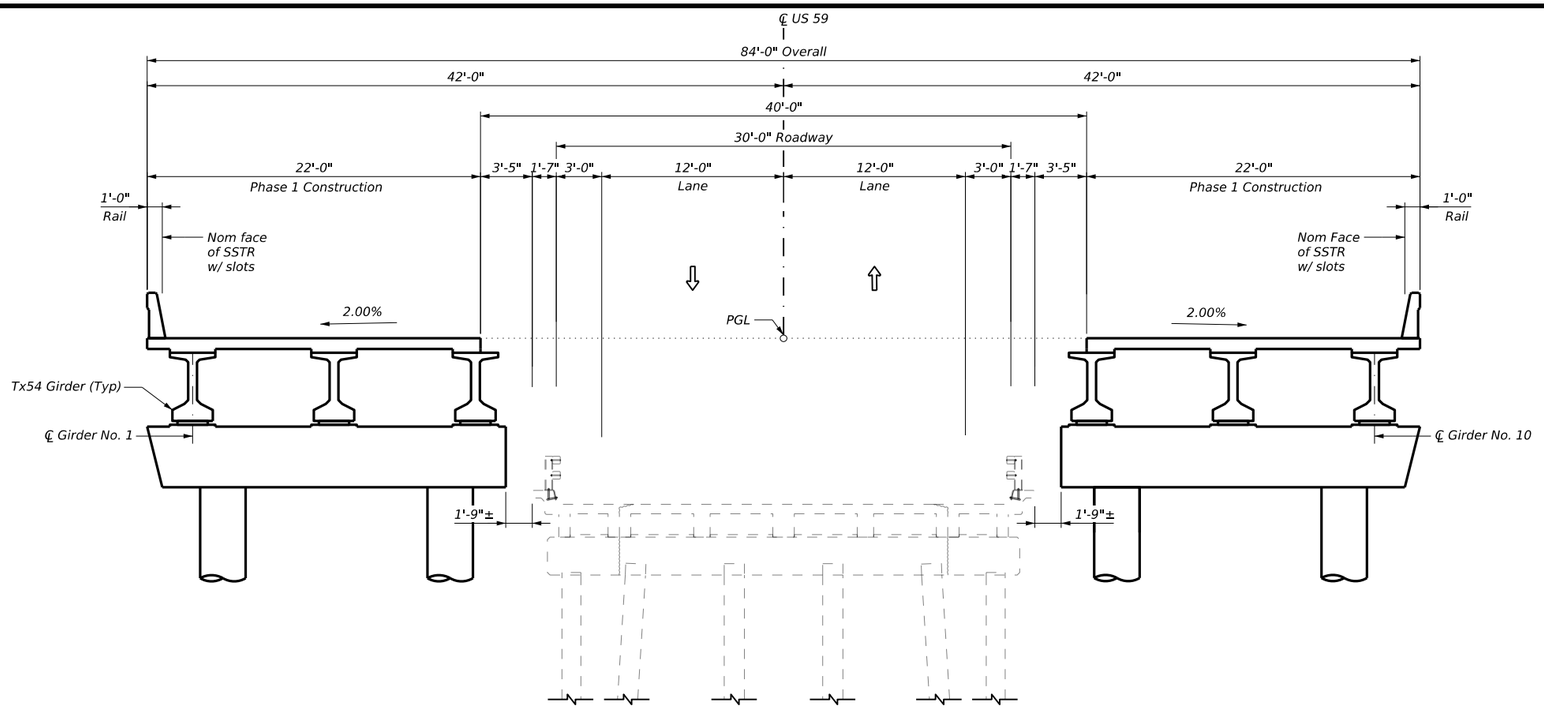
BRIDGE PHASED CONSTRUCTION

SAN ANTONIO RIVER BRIDGE
AT US 59

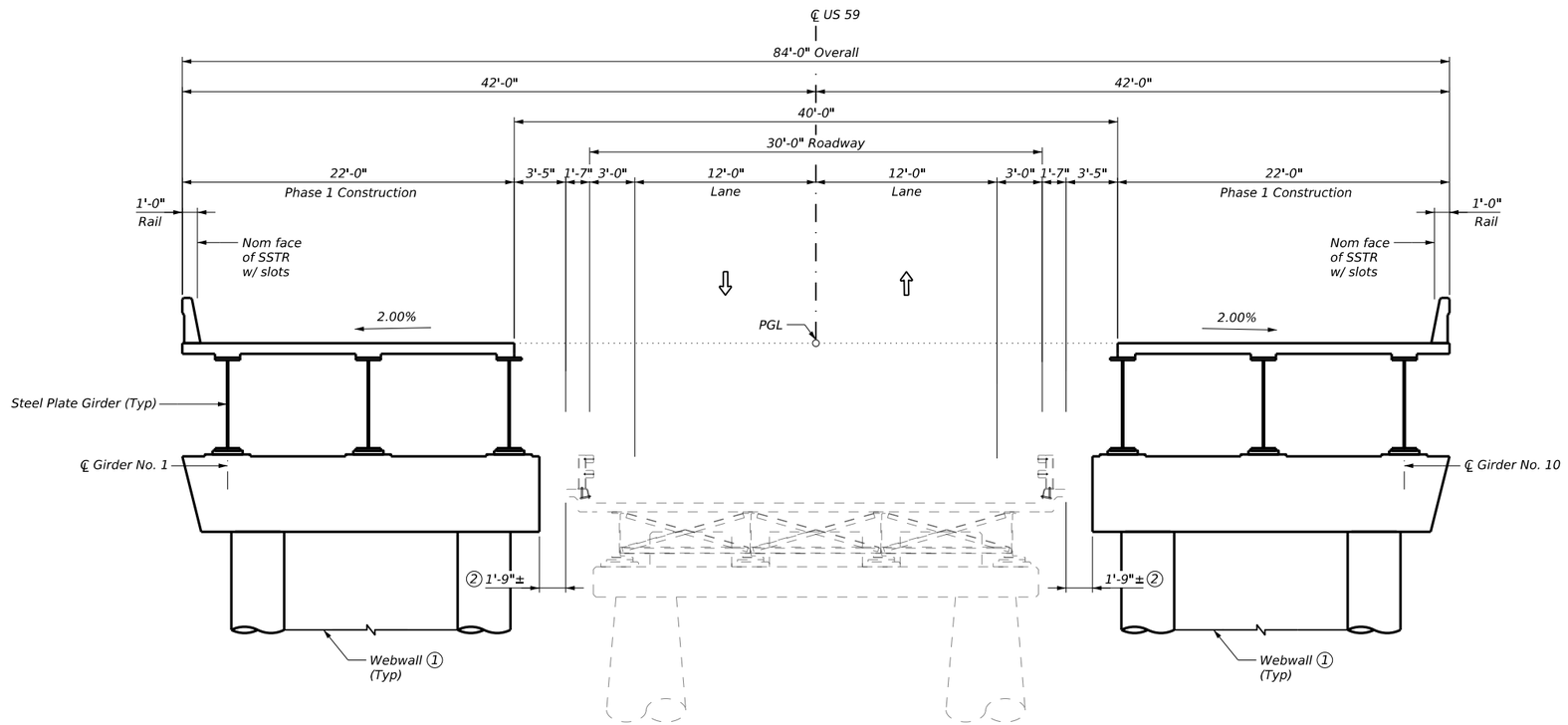
SHEET 1 OF 5

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		148

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BTS01.dgn



Phase 1 Bridge Construction
(Spans 1, 2, 6 & 7)



Phase 1 Bridge Construction
(Spans 3-5)

LEGEND:

- Existing bridge structure
- Exist structure to be removed tihs phase
- Constructed previous phase
- New construction phase

① Webwall on Bent No. 4 & Bent No. 5. Webwall is omitted between Col No. 1 & Col No. 2 on Bent No. 4 for access to paddling trail.

② 1'-7" ± at Bent 4 & 5.

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LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
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US 59

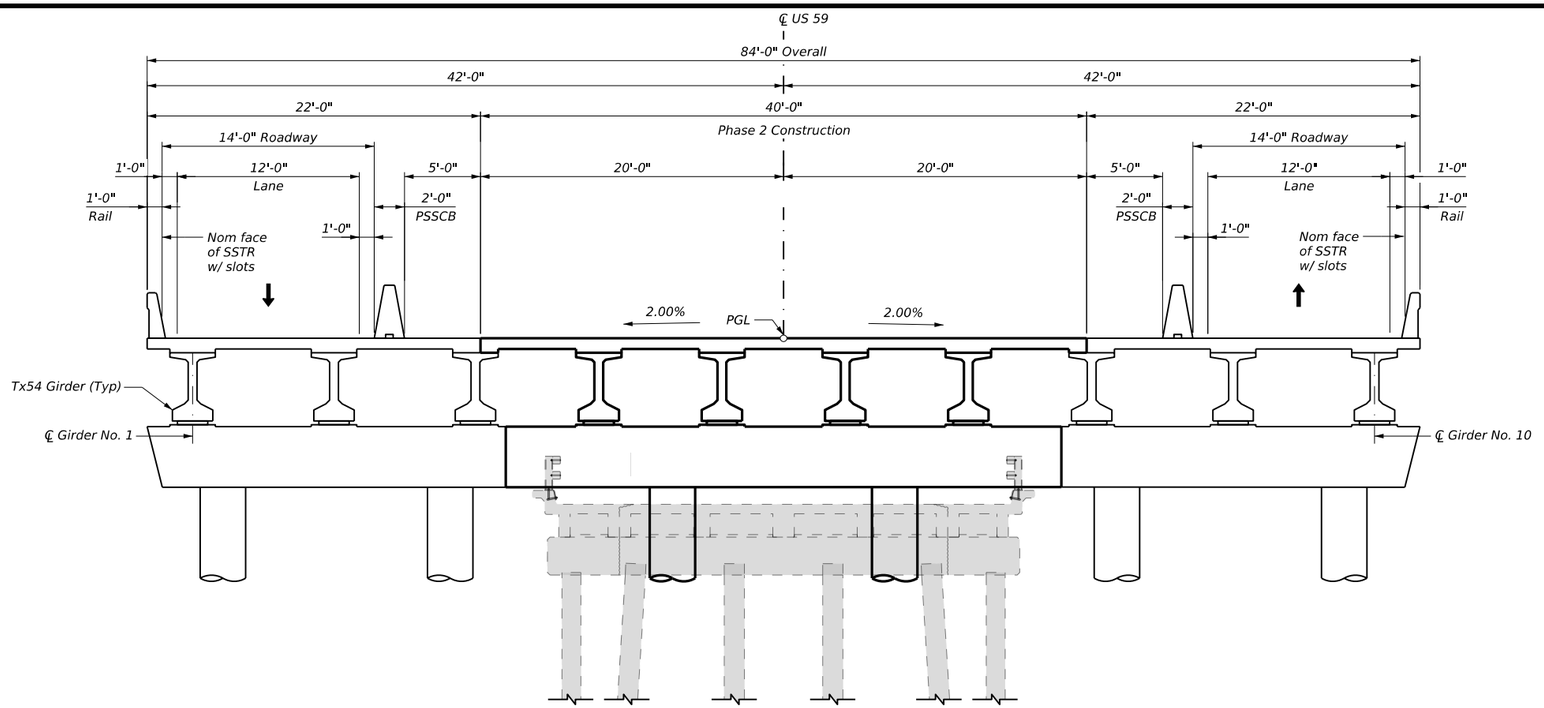
BRIDGE PHASED CONSTRUCTION

SAN ANTONIO RIVER BRIDGE
AT US 59

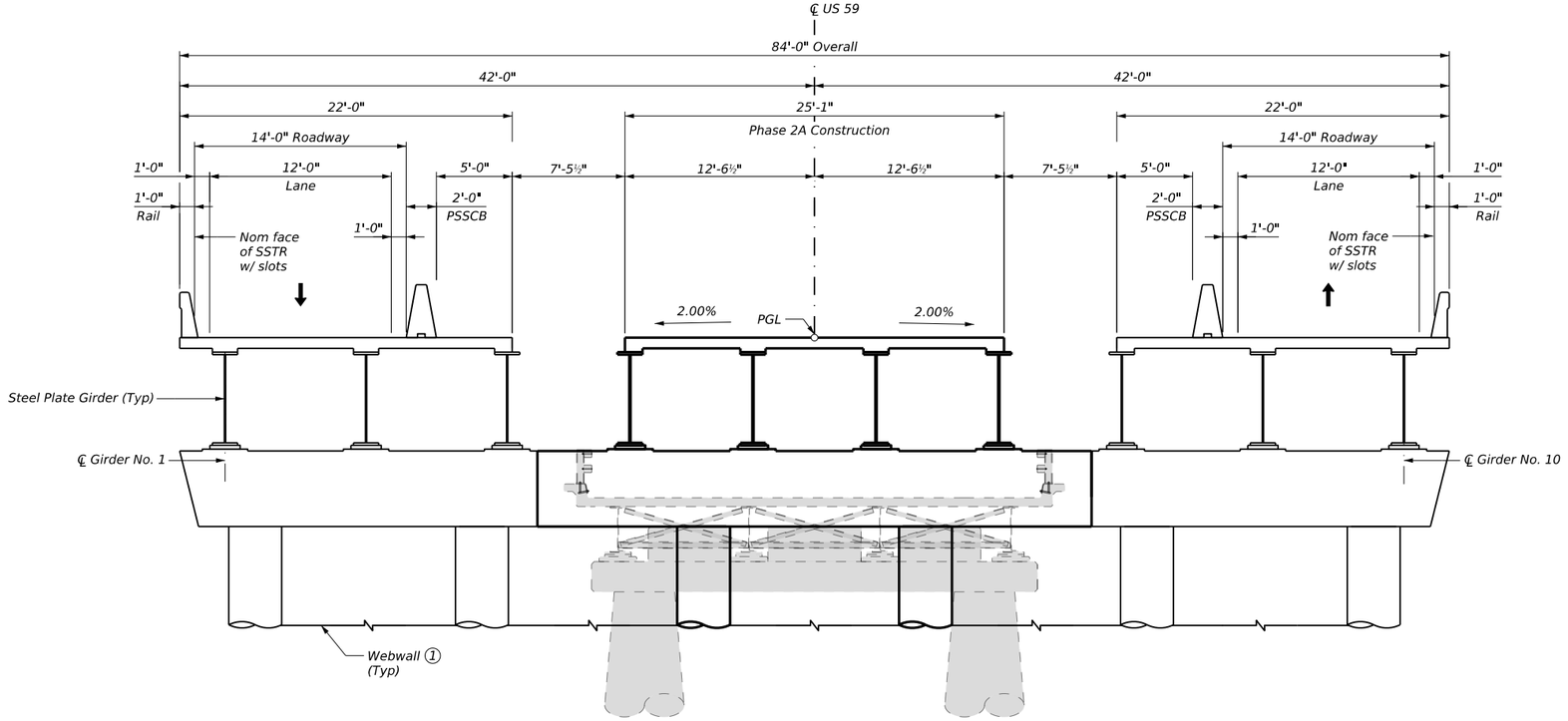
SHEET 2 OF 5

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		149

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BTS01.dgn



Phase 2 Bridge Construction
(Spans 1, 2, 6 & 7)



Phase 2A Bridge Construction
(Spans 3-5)

LEGEND:

- Existing bridge structure
- Exist structure to be removed tihs phase
- Constructed previous phase
- New construction phase

① Webwall on Bent No. 4 & Bent No. 5. Webwall is omitted between Col No. 1 & Col No. 2 on Bent No. 4 for access to paddling trail.

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LORI NEUWIRTH-HIRSCH
115919
LICENSED
PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/3/2024

LJA Engineering, Inc.
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US 59

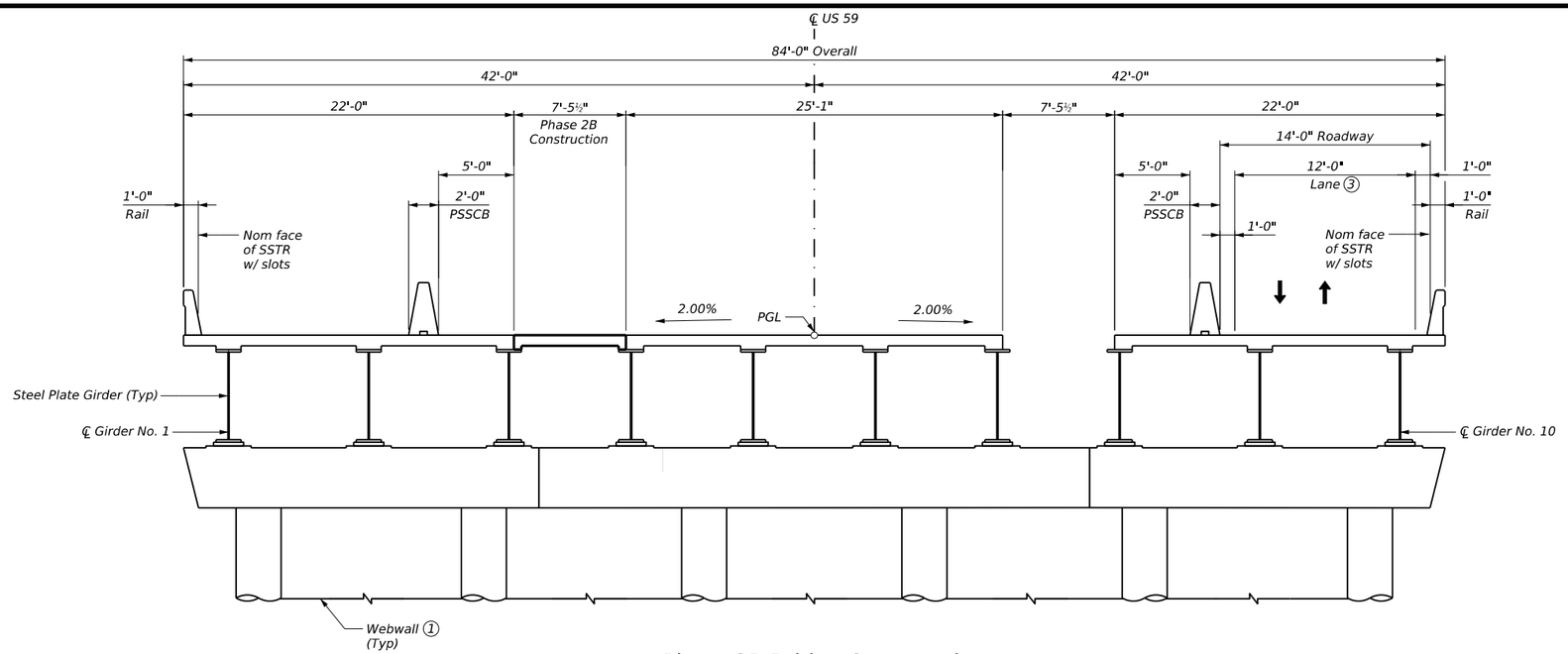
BRIDGE PHASED CONSTRUCTION

SAN ANTONIO RIVER BRIDGE
AT US 59

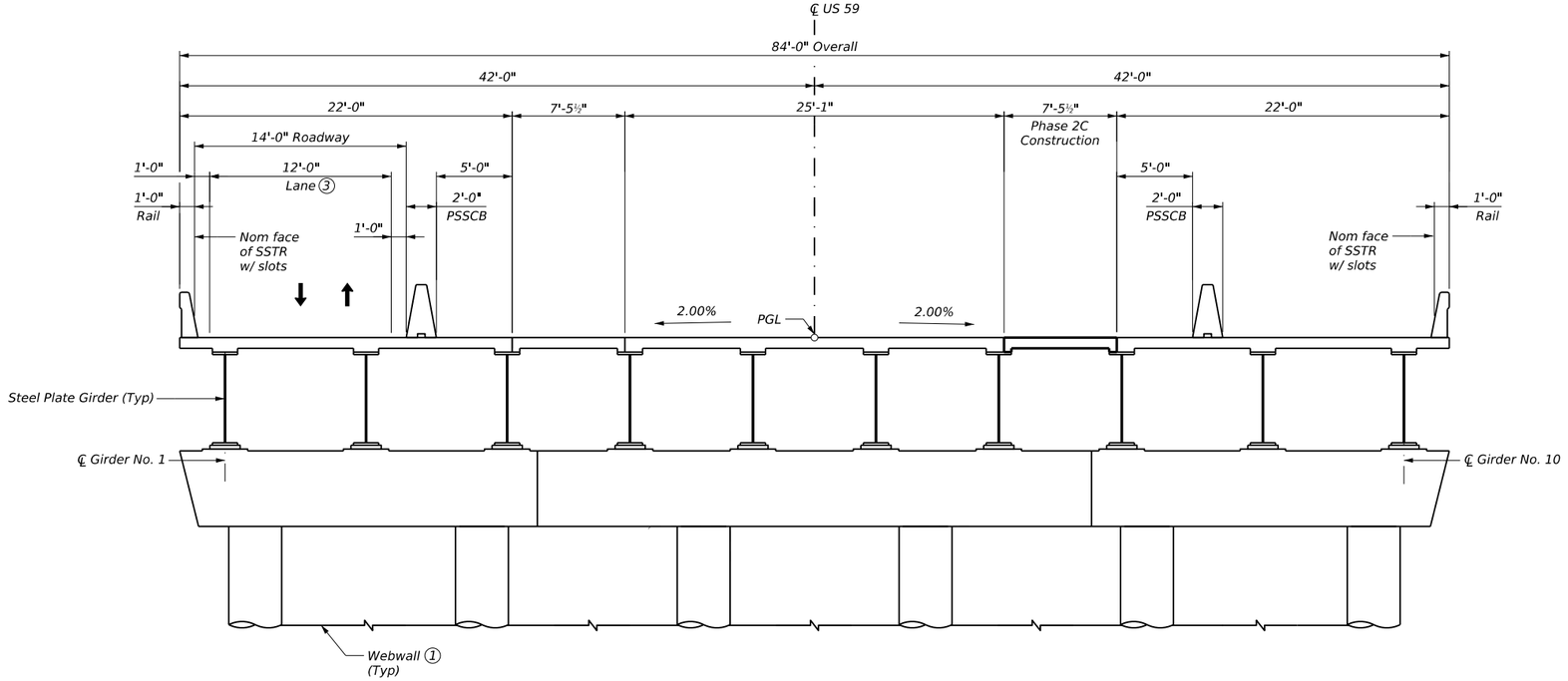
SHEET 3 OF 5

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		150

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BTS01.dgn



Phase 2B Bridge Construction
(Spans 3-5)



Phase 2C Bridge Construction
(Spans 3-5)

LEGEND:

- Existing bridge structure
- Exist structure to be removed tihs phase
- Constructed previous phase
- New construction phase

① Webwall on Bent No. 4 & Bent No. 5. Webwall is omitted between Col No. 1 & Col No. 2 on Bent No. 4 for access to paddling trail.

③ Flagged 2 way traffic. See TCP sheets for more details.

HL93 LOADING

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/3/2024

LJA Engineering, Inc.
FRN - F-1386

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US 59

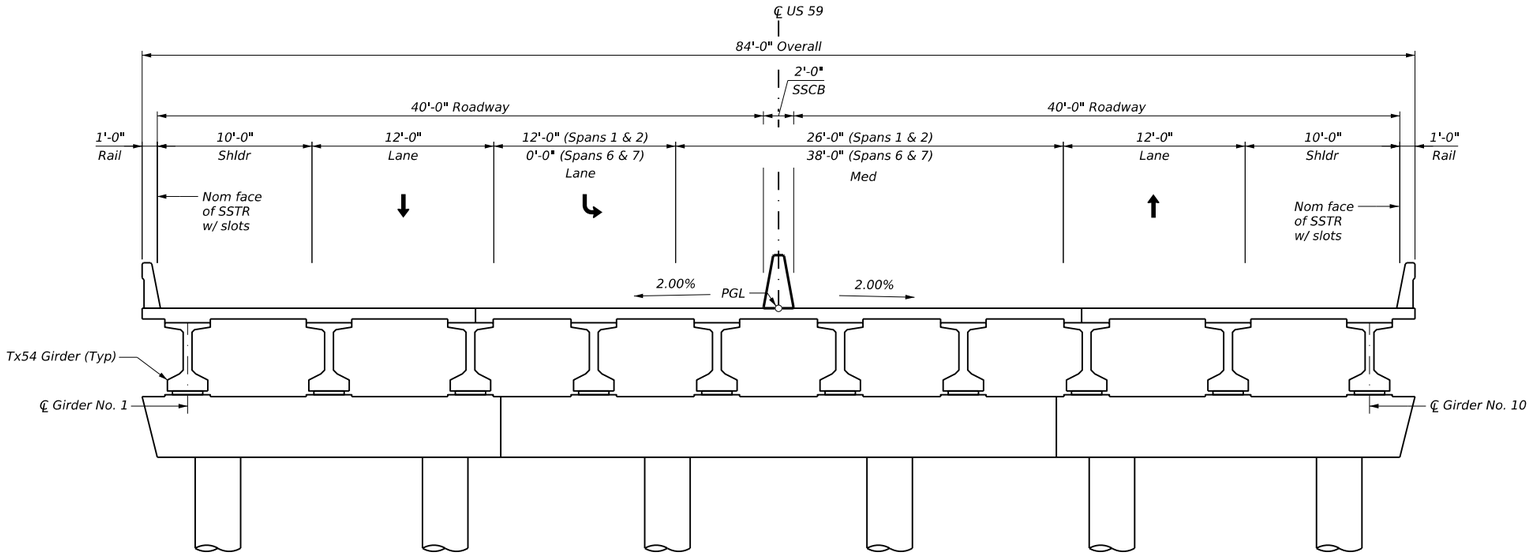
BRIDGE PHASED CONSTRUCTION

SAN ANTONIO RIVER BRIDGE
AT US 59

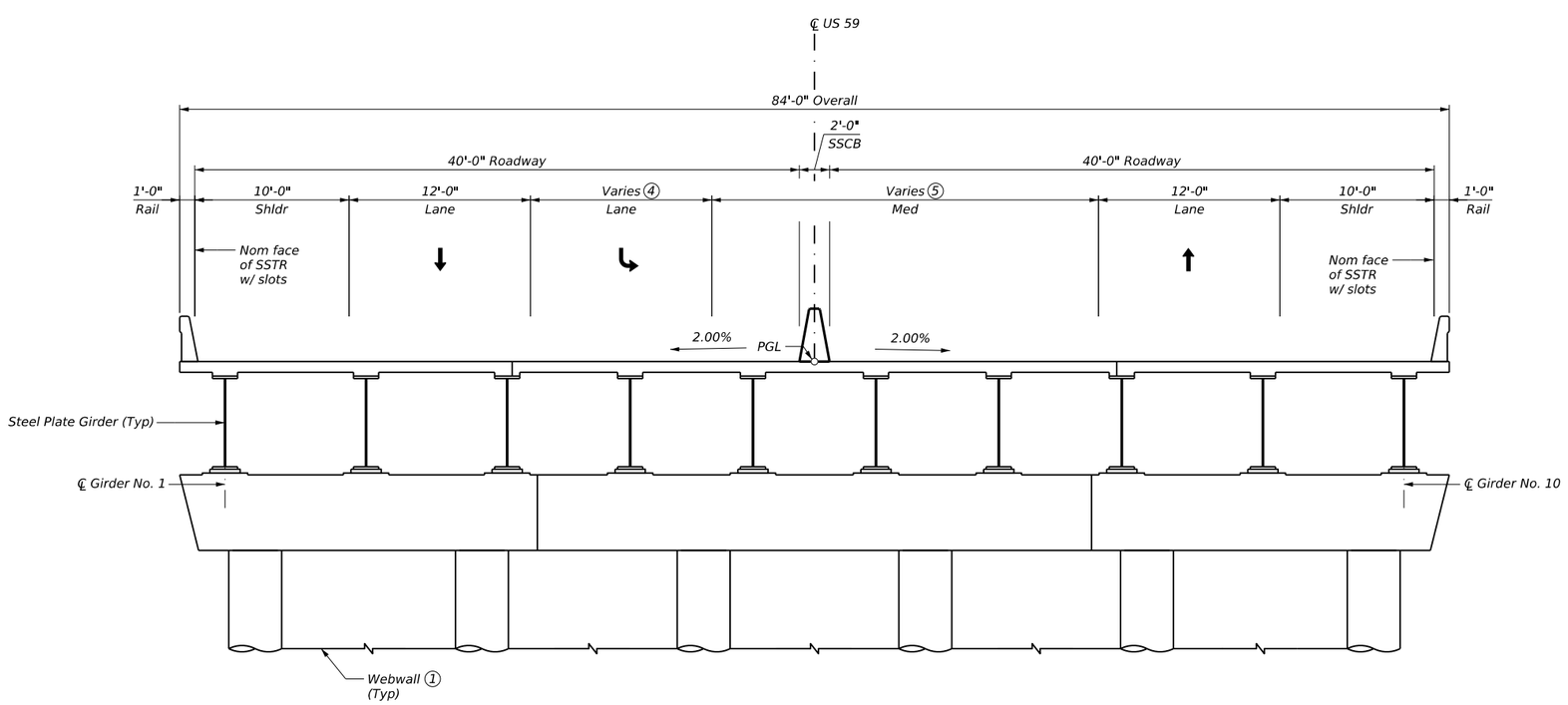
SHEET 4 OF 5

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		151

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms6635410\62_BTS01.dgn



Completed Bridge Section
(Spans 1, 2, 6 & 7)



Completed Bridge Section
(Spans 3-5)

LEGEND:

- Existing bridge structure
- Exist structure to be removed tihs phase
- Constructed previous phase
- New construction phase

① Webwall on Bent No. 4 & Bent No. 5. Webwall is omitted between Col No. 1 & Col No. 2 on Bent No. 4 for access to paddling trail.

④ Lane width varies:
12'-0" (STA 882+39.50 to STA 885+00.00)
Varies (STA 885+00.00 to STA 886+50.00)
0'-0" (STA 886+50.00 to STA 887+89.50)

⑤ Med width varies:
26'-0" (STA 882+39.50 to STA 885+00.00)
Varies (STA 885+00.00 to STA 886+50.00)
38'-0" (STA 886+50.00 to STA 887+89.50)

HL93 LOADING

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/3/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

BRIDGE PHASED CONSTRUCTION

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 5 OF 5

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		152

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms6635410 62_BTS01.dgn

SUMMARY OF BRIDGE QUANTITIES

	ITEM	400	405	416	416	416	420	420	420	420	420	422	425	432	434	434	434	442	450
	DESCRIPTION CODE	7010	7003	7006	7008	7010	7012	7022	7038	7071	7067	7001	7005	7001	7026	7036	7045	7001	7066
	ITEM DESCRIPTION	CEM STABIL BKFL	FOUNDATON LOAD TEST (D4945) (DRILLD SHAFT)	DRILL SHAFT (36 IN)	DRILL SHAFT (48 IN)	DRILL SHAFT (60 IN)	CL C CONC (ABUT)	CL C CONC (CAP)	CL C CONC (COLUMN)	CL F CONC (CAP)	CL C CONC (MISC)	REINF CONC SLAB	PRESTR CONC GIRDER (TX54)	RIPRAP (CONC)(4 IN)	ELASTOMERIC BEARING (E6)	ELASTOMERIC BEARING (F6)	SLIDING ELASTOMERIC BEARING (ES 5)	STR STEEL (PLATE GIRDER)	RAIL (TY SSTR) (MOD)
		CY	EA	LF	LF	LF	CY	CY	CY	CY	CY	SF	LF	CY	EA	EA	EA	LB	LF
PHASE 1	2 ~ ABUTMENTS	67	1	882			49.8							5					
	6 ~ INTERIOR BENTS				1,300	880		162.5	162.4	34.9	62.7				6	6	12		
	PRESTR CONC GIRDER UNIT 1											9,680	1,314.12						440.0
	PRESTR CONC GIRDER UNIT 3											9,680	1,314.12						440.0
	STEEL PLATE GIRDER UNIT 2											24,200						1,252,000	1,100.0
	PHASE 1 SUBTOTAL	67	1	882	1,300	880	49.8	162.5	162.4	34.9	62.7	43,560	2,628.24	5	6	6	12	1,252,000	1,980.0
PHASE 2	2 ~ ABUTMENTS	174		441			39.8							5					
	6 ~ INTERIOR BENTS				650	440		153.6	83.8	27.1	136.9				4	4	8		
	PRESTR CONC GIRDER UNIT 1											8,800	876.08						
	PRESTR CONC GIRDER UNIT 3											8,800	876.08						
	STEEL PLATE GIRDER UNIT 2											22,000						806,000	
	PHASE 2 SUBTOTAL	174	0	441	650	440	39.8	153.6	83.8	27.1	136.9	39,600	1,752.16	5	4	4	8	806,000	0.0
	TOTAL	241	1	1,323	1,950	1,320	89.6	316.1	246.2	62.0	199.6	83,160	4,380.40	10	10	10	20	2,058,000	1,980.0

SUMMARY OF BRIDGE QUANTITIES

	ITEM	454	514	4003
	DESCRIPTION CODE	7005	7001	7001
	ITEM DESCRIPTION	SEALED EXPANSION JOINT (5 IN) (SEJ - M)	PERM CTB (SGL SLOPE) (TY 1) (42)	TIP TESTING(DRILL SHAFT)
		LF	LF	EA
PHASE 1	2 ~ ABUTMENTS			
	6 ~ INTERIOR BENTS			16
	PRESTR CONC GIRDER UNIT 1	86		
	PRESTR CONC GIRDER UNIT 3	86		
	STEEL PLATE GIRDER UNIT 2			
	PHASE 1 SUBTOTAL	172	0.0	16
PHASE 2	2 ~ ABUTMENTS			
	6 ~ INTERIOR BENTS			8
	PRESTR CONC GIRDER UNIT 1	80	220.0	
	PRESTR CONC GIRDER UNIT 3	80	220.0	
	STEEL PLATE GIRDER UNIT 2		550.0	
	PHASE 2 SUBTOTAL	160	990.0	8
	TOTAL	332	990.0	24

NOTES:

For RR9 and Temp RW pay items, see "SUMMARY OF QUANTITIES" sheets.

For Bridge Removal pay item, see "SUMMARY OF QUANTITIES" sheets.

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED
PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

ESTIMATED QUANTITIES

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		153

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BEQ001.dgn

BEARING SEAT ELEVATIONS
(Tx Girders)

		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10
ABUT 1	(FWD)	149.350	149.537	149.724	149.886	150.049	150.049	149.886	149.724	149.537	149.350
BENT 2	(BK)	150.747	150.934	151.121	151.283	151.446	151.446	151.283	151.121	150.934	150.747
	(FWD)	150.770	150.956	151.143	151.306	151.468	151.468	151.306	151.143	150.956	150.770
BENT 3	(BK)	151.806	151.992	152.179	152.342	152.504	152.504	152.342	152.179	151.992	151.806

BEARING SEAT ELEVATIONS
(Steel Plate Girders)

		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10
BENT 3	(FWD)	149.946	150.133	150.320	150.482	150.645	150.645	150.482	150.320	150.133	149.946
BENT 4		150.611	150.797	150.984	151.188	151.351	151.351	151.188	150.984	150.797	150.611
BENT 5		150.514	150.700	150.887	151.091	151.254	151.254	151.091	150.887	150.700	150.514
BENT 6	(BK)	149.705	149.892	150.078	150.241	150.404	150.404	150.241	150.078	149.892	149.705

BEARING SEAT ELEVATIONS
(Tx Girders)

		GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9	GIRDER 10
BENT 6	(FWD)	151.562	151.749	151.936	152.098	152.261	152.261	152.098	151.936	151.749	151.562
BENT 7	(BK)	150.431	150.618	150.805	150.967	151.130	151.130	150.967	150.805	150.618	150.431
	(FWD)	150.407	150.594	150.780	150.943	151.106	151.106	150.943	150.780	150.594	150.407
ABUT 8	(BK)	148.915	149.101	149.288	149.451	149.613	149.613	149.451	149.288	149.101	148.915

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STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED
PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

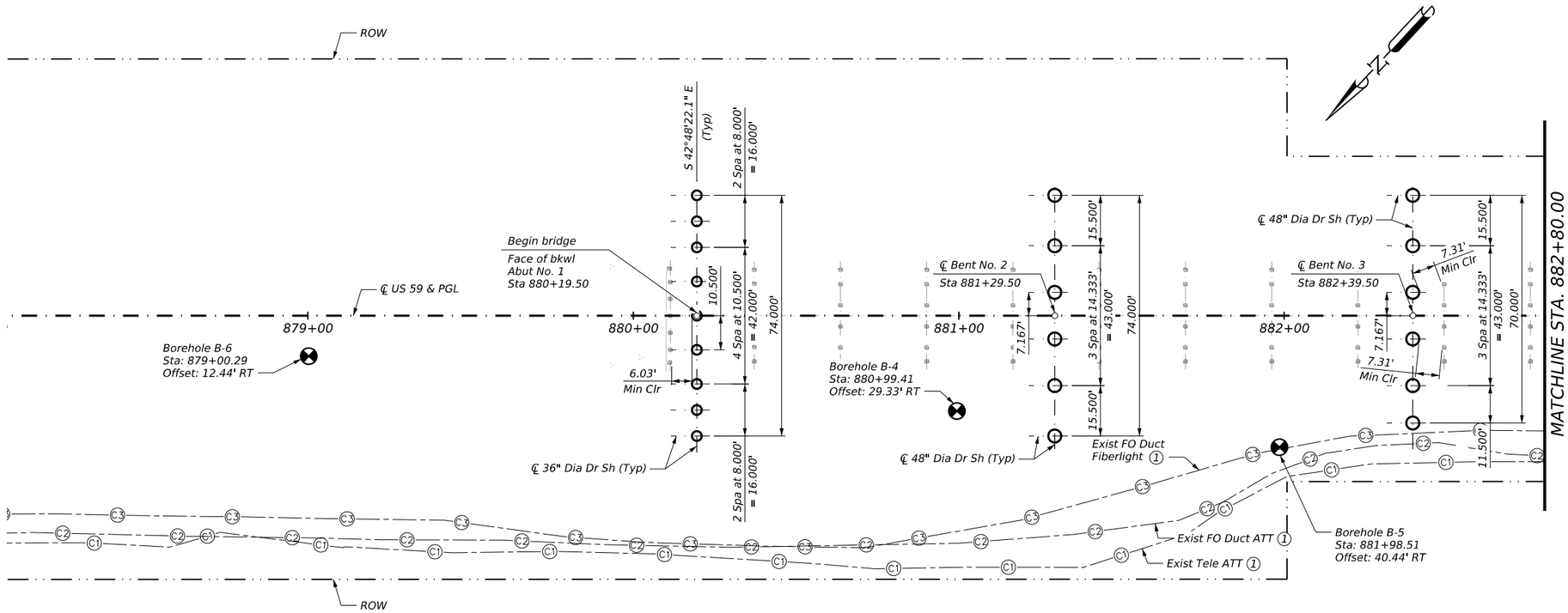
US 59

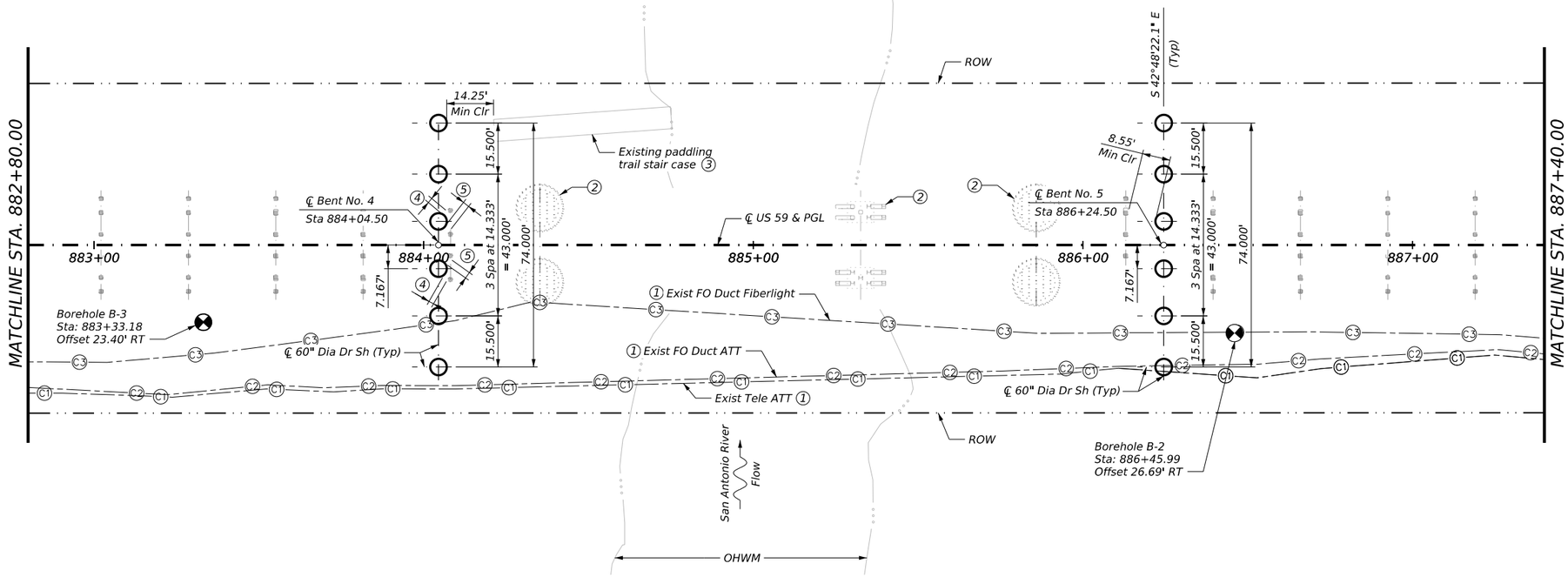
BEARING SEAT ELEVATIONS

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		154

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BSE001.dgn





GENERAL NOTES:

All information related to underground utilities shown in the FOUNDATION LAYOUT is not guaranteed to be accurate or inclusive. The Contractor is responsible for verifying the type and location of all utilities prior to construction to avoid damage. The Contractor must verify the location of underground pipelines, conduits, and structures by contacting the owners of underground utilities.

See Common Foundation Details (FD (MOD)) standard sheets and FOUNDATION DETAILS (60" DIA DRILLED SHAFT) sheet for all foundation details and notes not shown.

See BRIDGE LAYOUT sheets for foundation loads and lengths.

⊗ *- Denotes soil boring location, see BORING LOG sheets.*

Due to the presence of water bearing sand layers, temporary casing or slurry is required to install the drilled shafts. Contractor is responsible for the stability of shaft excavations.

The drilled shaft installation process should be monitored under the direction of the Geotechnical Engineer.

Thermal integrity profiler (TIP) testing is required for all drilled shafts of 60-inch diameter and for every other drilled shaft of 48-inch diameter. See Special Specification 4003 for details. See ESTIMATED QUANTITIES sheet for quantities.

High strain dynamic testing (ASTM D4945) is required for one drilled shaft on Bent No. 4 in Phase 1. See Item 405 for details. Test must be coordinated with the engineer a minimum of one week prior to the desired testing date. TxDOT personnel must be present during testing. See ESTIMATED QUANTITIES sheet for quantities.

LEGEND:

Removed existing foundation at least 2' below finished grade elevation unless otherwise noted.

(1) *To be relocated or abandoned.*

(2) *See REMOVAL DETAILS EXIST BENT NOS. 16-18 for more information.*

(3) *Contractor to exercise all care not to damage existing staircase.*

(4) *1.60' Min Clr*

(5) *2.02' Min Clr*

0' 20' 40'

SCALE: 1"=40'

HL93 LOADING

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
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7/3/2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

FOUNDATION LAYOUT

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 1 OF 2

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY	
CHECKED: LNH	0088	02	062	US59	
DRAWN: PS	DIST	COUNTY		SHEET NO.	
CHECKED: LNH	CRP	GOLIAD		155	

DATE: 7/3/2024
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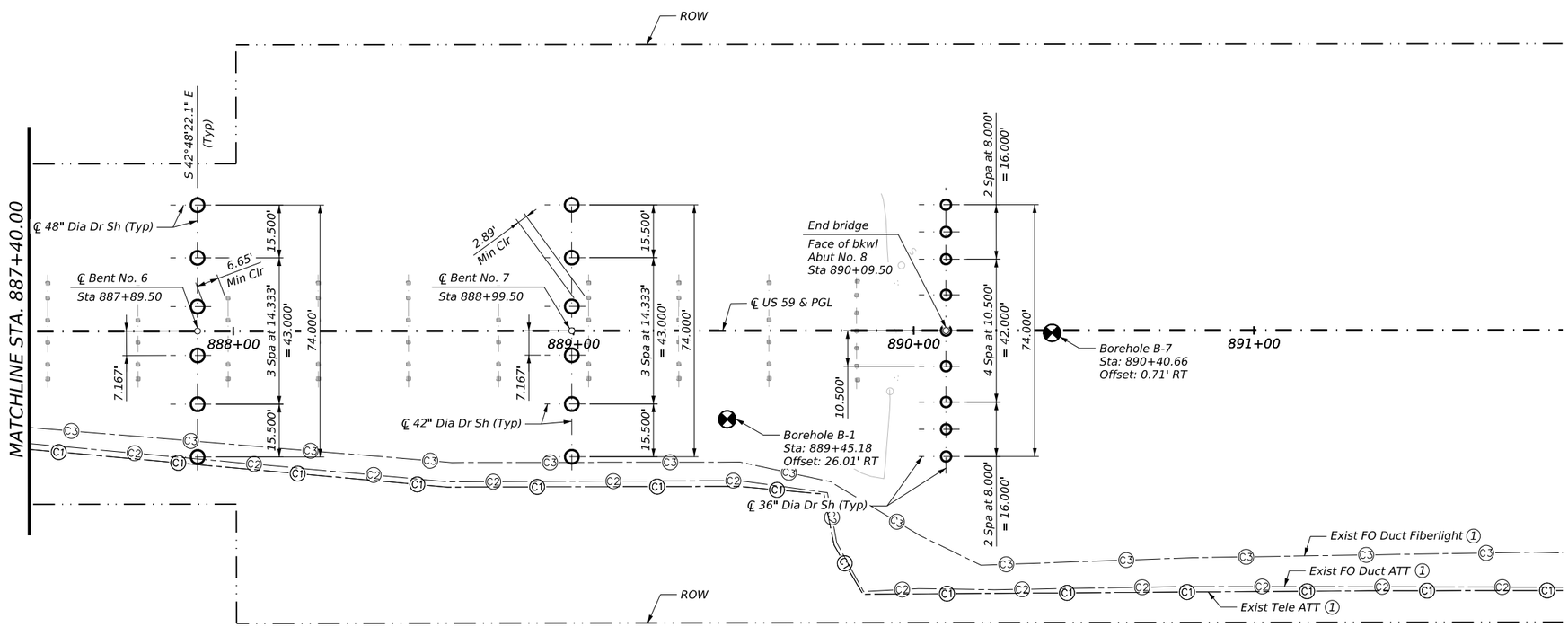

PLAN

LEGEND:

Removed existing foundation at least 2' below finished grade elevation.

(1) To be relocated or abandoned.

0' 20' 40'

SCALE: 1"=40'

HL93 LOADING

STATE OF TEXAS
LORI NEUWIRTH-HIRSCH
115919
LICENSED PROFESSIONAL ENGINEER
Lori Neuwirth-Hirsch
7/3/2024

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FRN - F-1386

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US 59

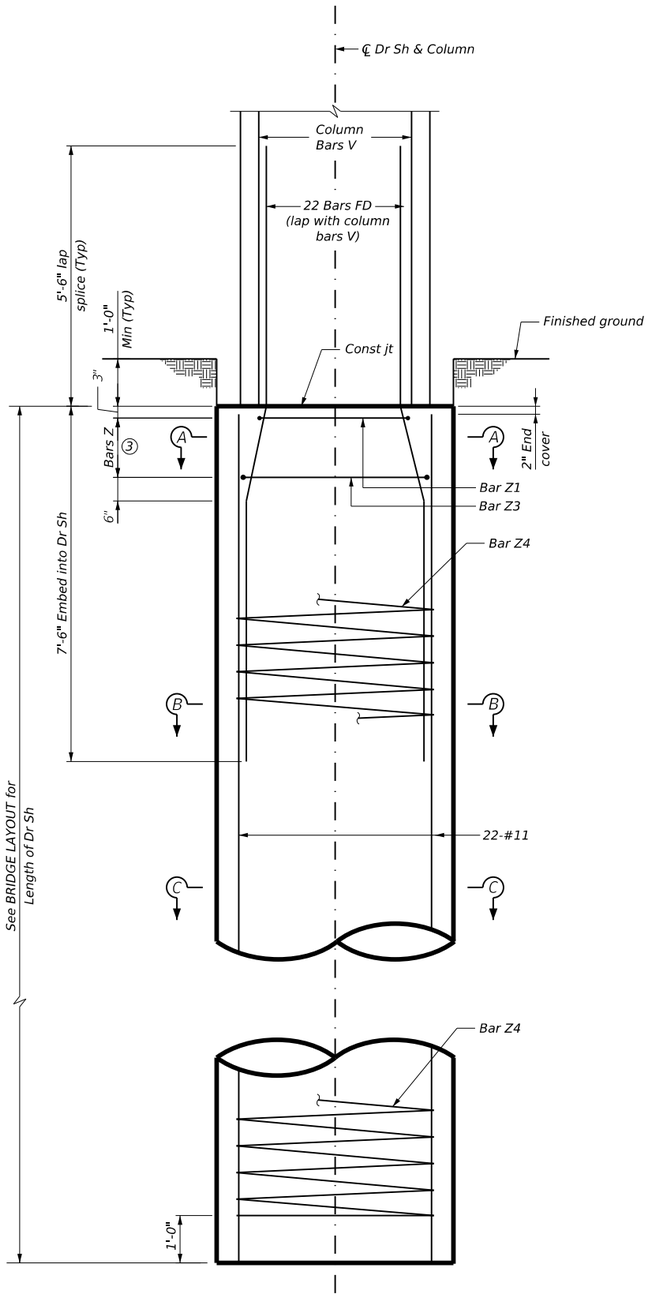
FOUNDATION LAYOUT

SAN ANTONIO RIVER BRIDGE
AT US 59

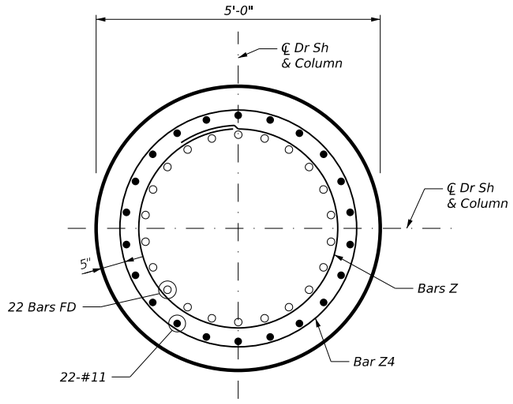
SHEET 2 OF 2

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: LNH	CRP	GOLIAD		156

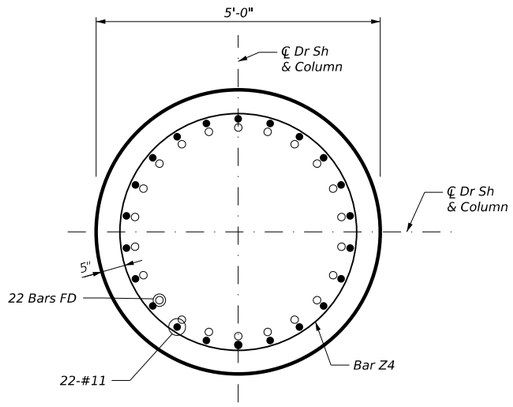
DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BFLY01.dgn



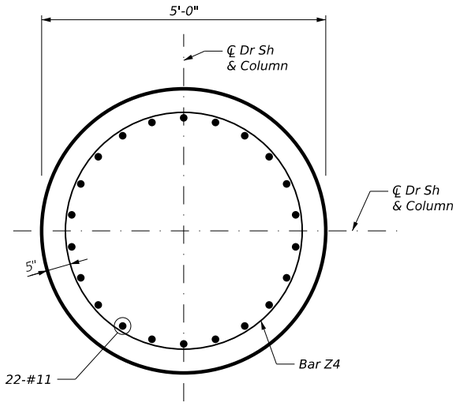
ELEVATION



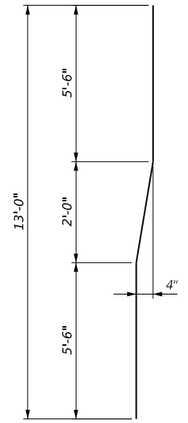
SECTION A-A



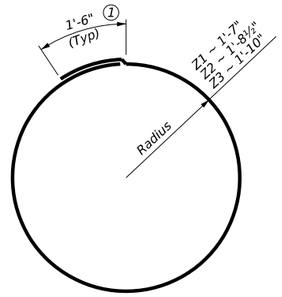
SECTION B-B



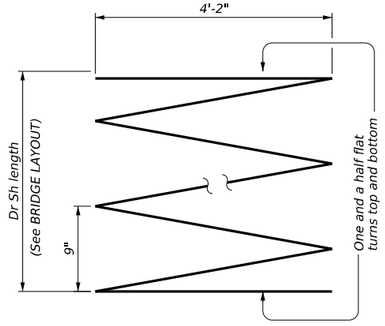
SECTION C-C



BARS FD



BARS Z1-Z3



BAR Z4

TABLE OF ESTIMATED QUANTITIES (ONE DRILLED SHAFT ONLY)

Bar	No.	Size	Length	Weight
FD	22	#11	13'-1"	1,530
Z1	1	#4	11'-6"	8
Z2	1	#4	12'-3"	9
Z3	1	#4	13'-1"	9
Z4	1	#4	1984'-3"	1,326
Reinforcing Steel (LB) (2)				2,882

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 9th edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

See FOUNDATION LAYOUT for foundation location.

See BRIDGE LAYOUT for drilled shaft load and length.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Concrete for drilled shafts shall conform to Item 416 "Drilled Shaft Foundations".

Provide Grade 60 reinforcing steel.

Provide bar laps for drilled shaft reinforcing, where required as follows:
Uncoated (#11) ~ 5'-3"

(1) Rotate lap 90° every layer when placing bars.

(2) Reinforcing steel quantities are for Contractor's information only.

(3) 2 Spa at 9" Max = 1'-3".

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US 59

FOUNDATION DETAILS
(60" DIA DRILLED SHAFT)

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		157

DATE: 7/3/2024
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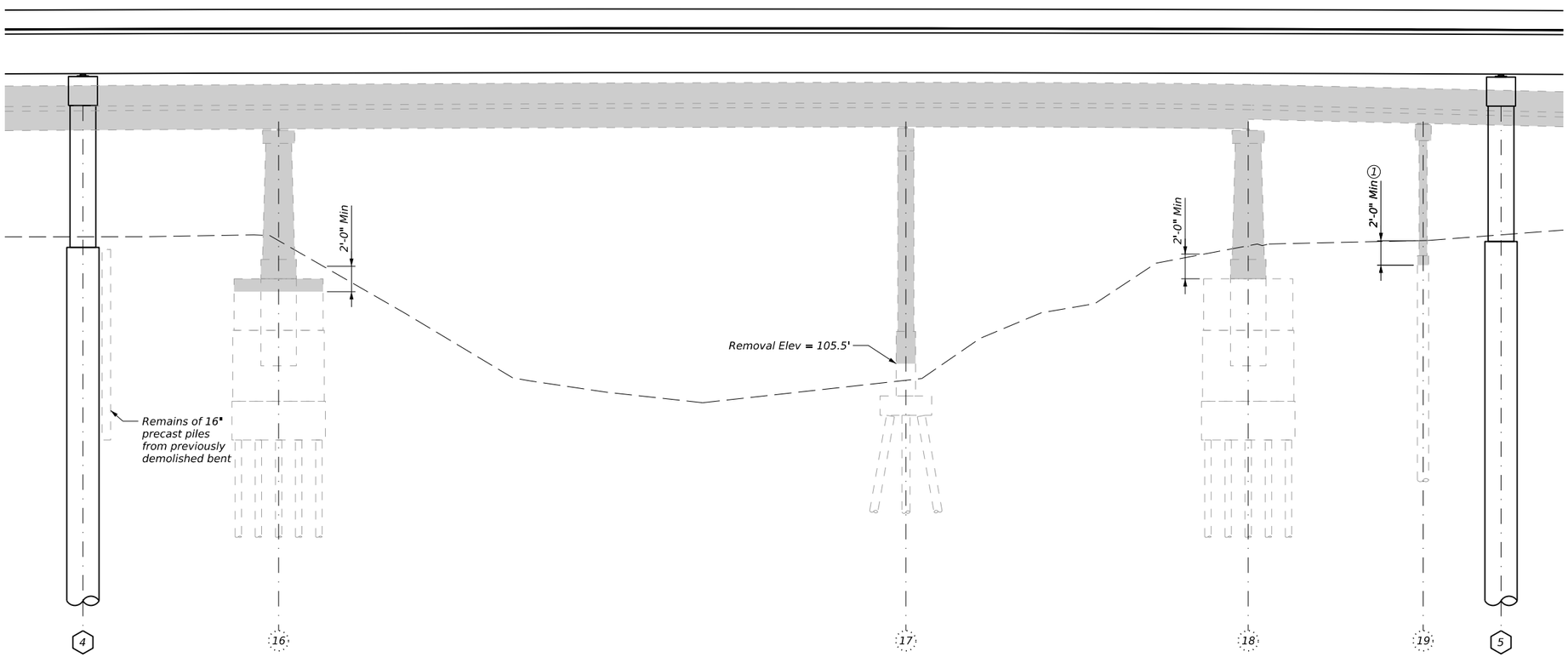

PARTIAL REMOVAL ELEVATION

GENERAL NOTES:

Dimensions shown for existing bridge are based on construction plans and/or field measurement provided by others. Actual values may differ from those shown and must be field verified by the Contractor.

See SAN ANTONIO RIVER RIPRAP PLAN sheets for riprap details.

LEGEND:

- Existing bridge structure
- Existing structure to be removed
- New construction
- 4 — Proposed bent number
- 16 — Exist bent number

① Typical at all bents out of the river banks.

0' 10' 20'

SCALE: 1"=20'

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US 59

REMOVAL DETAILS
EXIST BENT NOS. 16-19

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: LNH	CRP	GOLIAD		158

DATE: 7/3/2024
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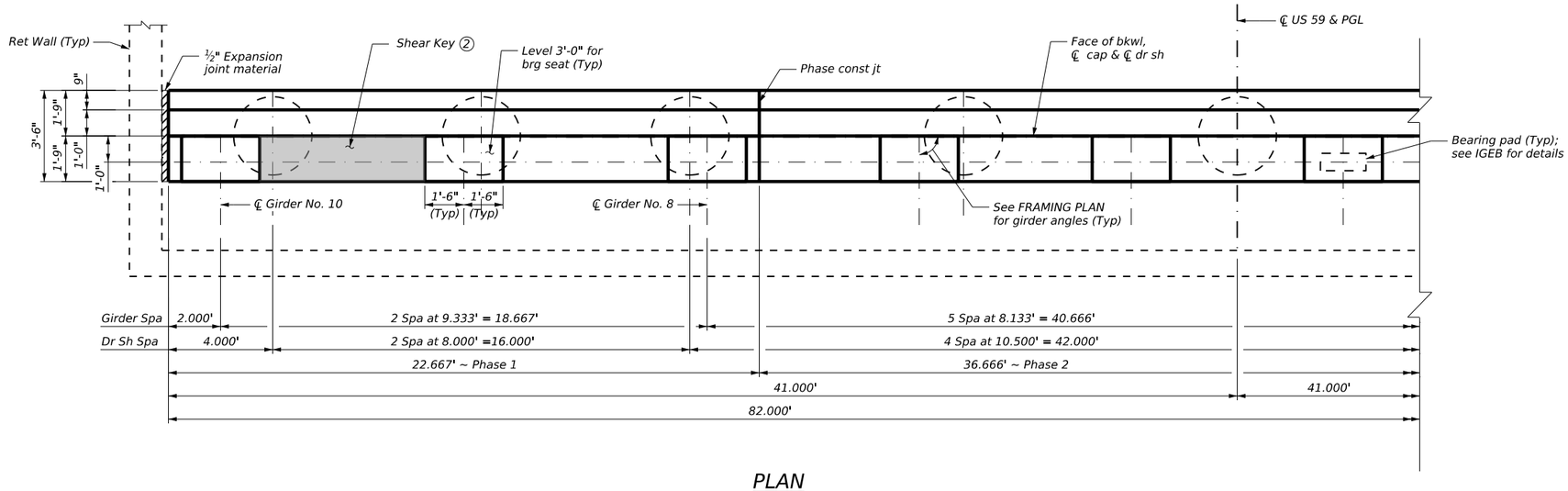
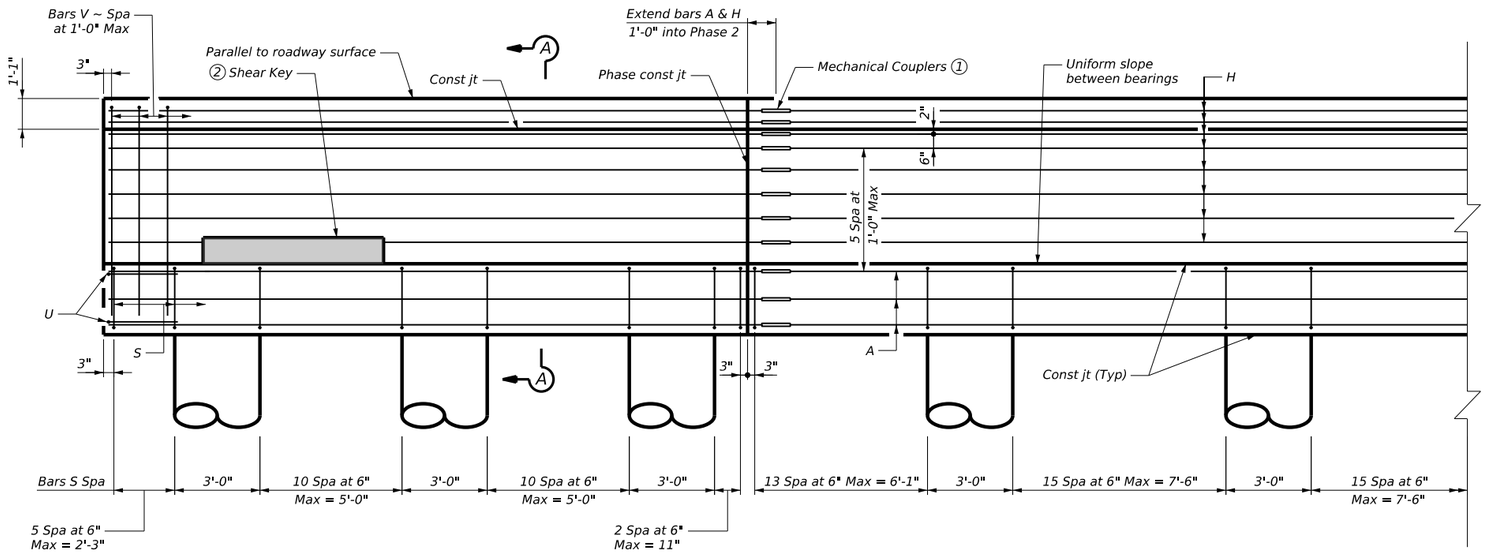


PLAN

Abutment 1 is shown. Abutment 8 is symmetrical by opposite hand.



ELEVATION

Abutment 1 is shown. Abutment 8 is symmetrical by opposite hand.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specification, 9th Edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

See BRIDGE LAYOUT for drilled shaft size and length.

For bearing seat elevations, see BEARING SEAT ELEVATIONS sheet.

See Common Foundation Details [FD (MOD)] standard sheet for all foundation details and notes not shown.

Calculated foundation load = 105 tons / dr sh.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Provide Class "C" Concrete (f'_c = 3,600 psi).

Provide Grade 60 reinforcing steel.

① *Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.*

② *A shear key is required between girders 9 & 10. Shear keys are to be cast after girders are set. See Shear Key (IGSK) standard sheet for more details.*

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US 59

ABUTMENT NO. 1 OR 8

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 3

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		159

DATE: 7/3/2024
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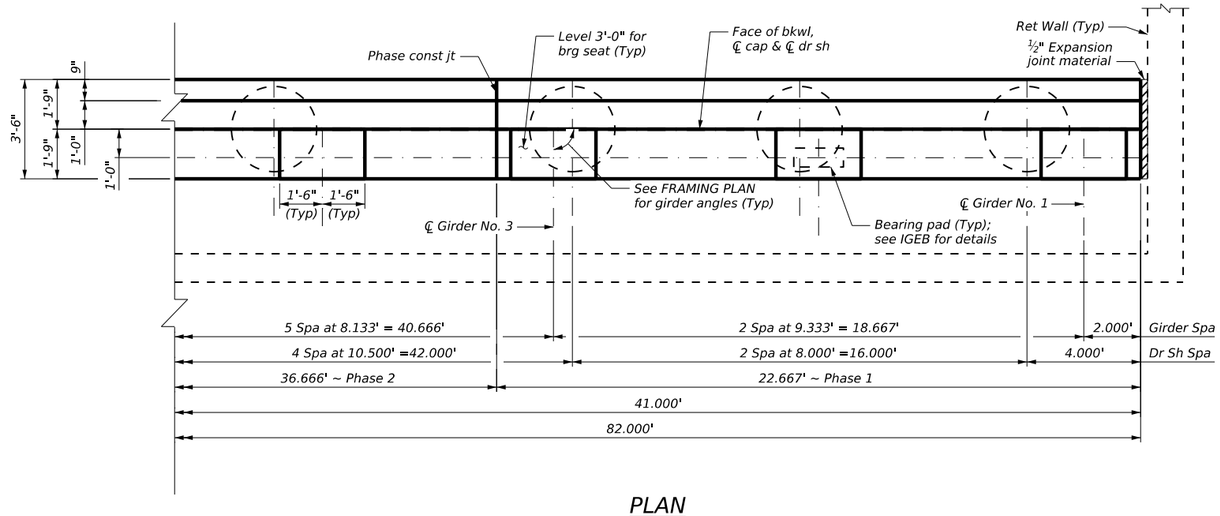
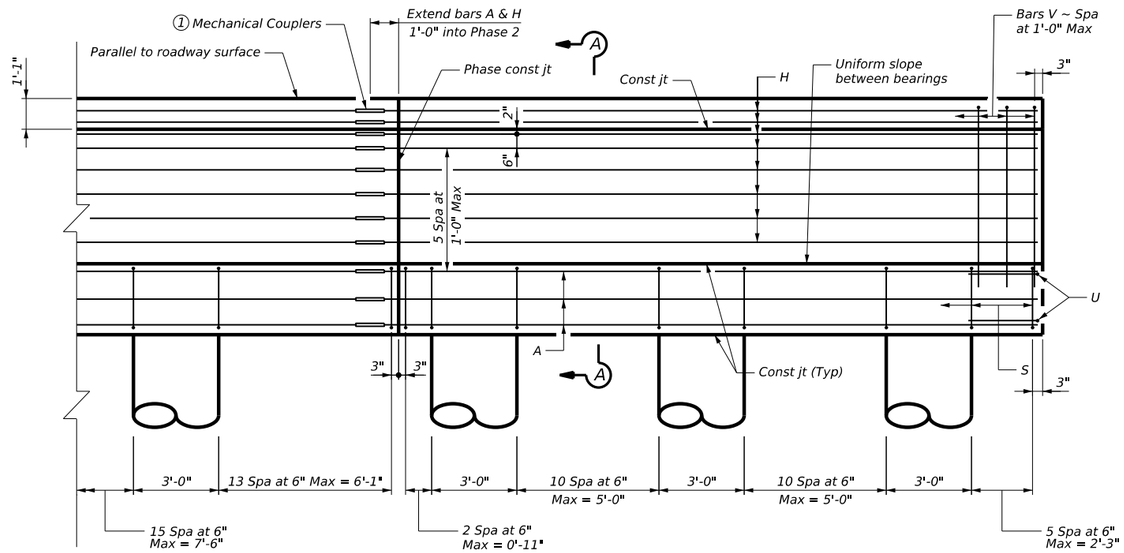


PLAN

Abutment 1 is shown. Abutment 8 is symmetrical by opposite hand.



ELEVATION

Abutment 1 is shown. Abutment 8 is symmetrical by opposite hand.

① *Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.*

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US 59

ABUTMENT NO. 1 OR 8

SAN ANTONIO RIVER BRIDGE AT US 59

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		160

DATE: 7/3/2024
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TABLE OF ESTIMATED QUANTITIES
Phase 1 (One Abutment Only)

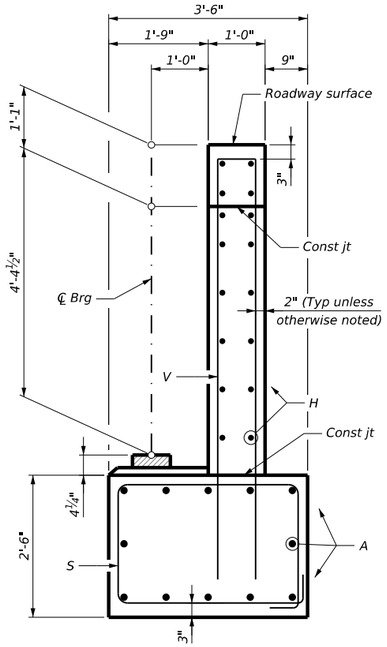
Bar	No.	Size	Length	Weight
A	24	#11	23'-6"	2,997
H	32	#6	23'-6"	1,130
S	62	#5	11'-6"	744
U	4	#6	8'-1"	49
V	48	#5	15'-6"	776
Reinforcing Steel (LB) ③				5,696
Class "C" Conc (Abut) (CY) ④				24.9

TABLE OF ESTIMATED QUANTITIES
Phase 2 (One Abutment Only)

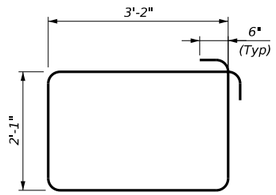
Bar	No.	Size	Length	Weight
A	12	#11	34'-8"	2,211
H	16	#6	34'-8"	834
S	60	#5	11'-6"	720
V	38	#5	15'-6"	615
Reinforcing Steel (LB) ③				4,380
Class "C" Conc (Abut) (CY)				19.9

③ Reinforcing steel quantities are for Contractor's information only.

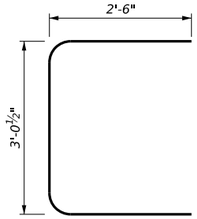
④ Includes shear key volume.



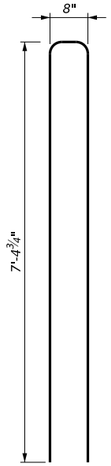
SECTION A-A



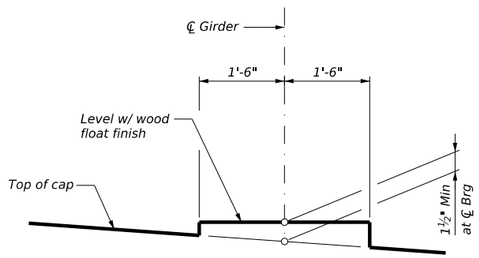
BARS S



BARS U



BARS V



BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)

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US 59

ABUTMENT NO. 1 OR 8

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 3 OF 3

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		161

DATE: 7/3/2024
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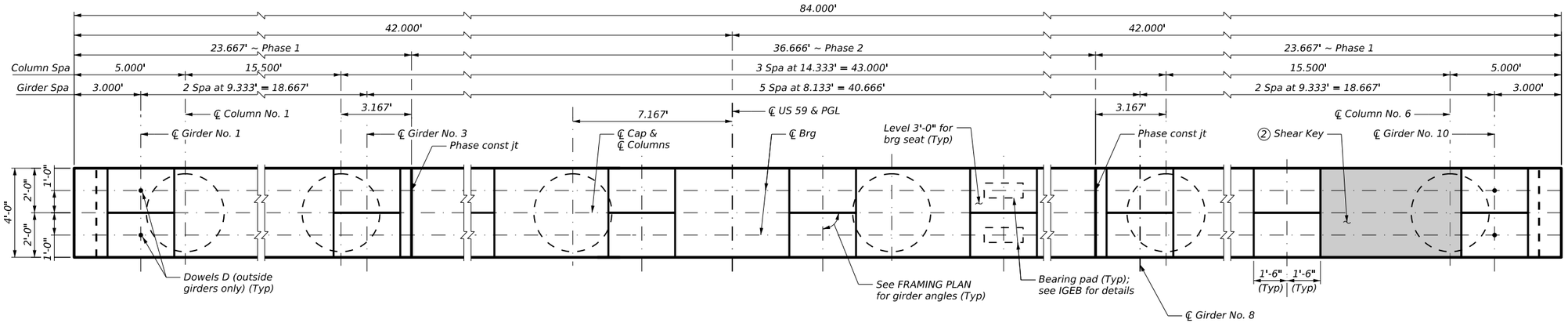

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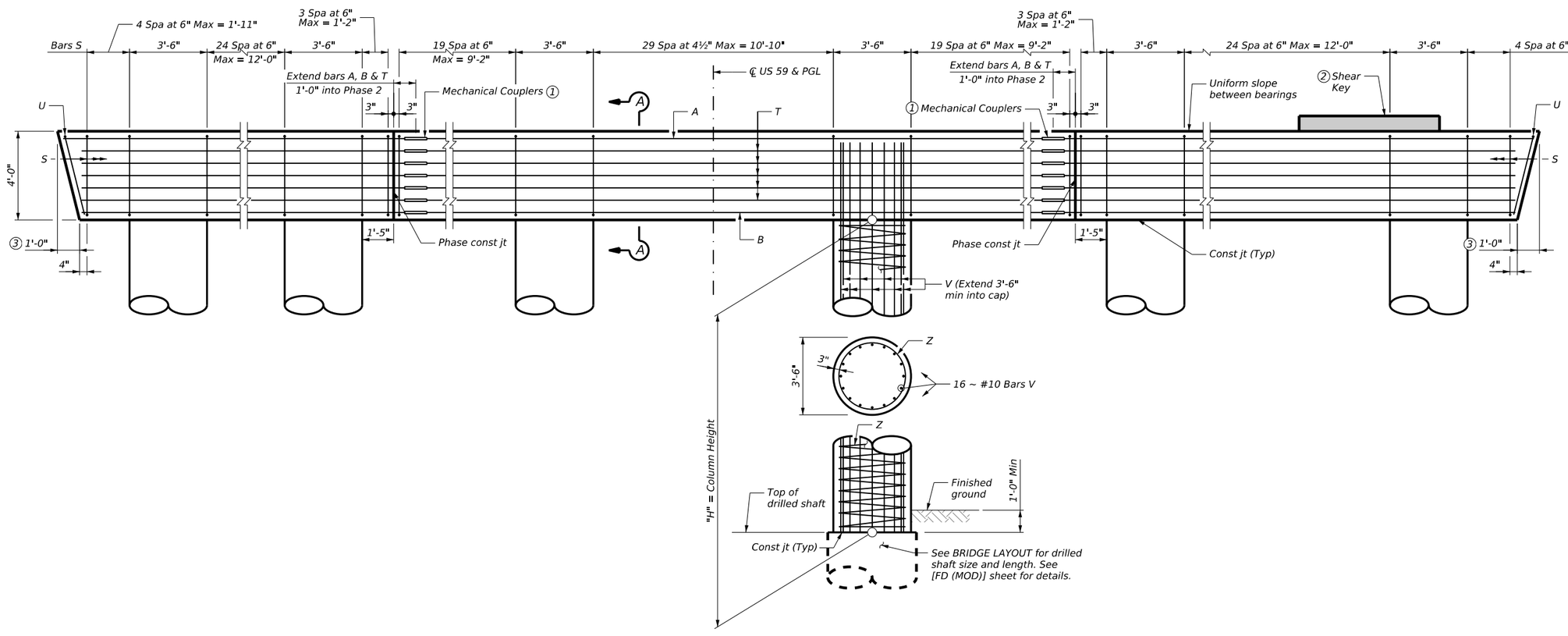

ELEVATION

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specification, 9th Edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

For bearing seat elevations, see BEARING SEAT ELEVATIONS sheet.

See Common Foundation Details [FD (MOD)] standard sheet for all foundation details and notes not shown.

Calculated foundation load = 351 tons / dr sh.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Provide Class "C" Concrete (f'_c = 3,600 psi).

Provide Grade 60 reinforcing steel.

Galvanize dowel bars D.

① Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.

② A shear key is required between girders 9 & 10. Shear keys are to be cast after girders are set. See Shear Key (IGSK) standard sheet for more details.

③ Measured parallel to top of cap cross-slope.

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US 59

BENT NO. 2 OR 7

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 2

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		162

DATE: 7/3/2024
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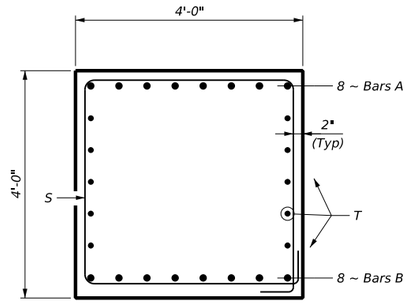

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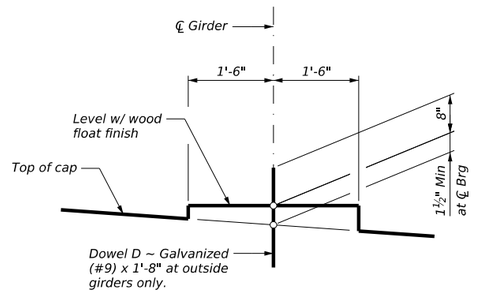


BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)

COLUMN ESTIMATED QUANTITIES ④

Bent No.	Column No.	Column Height "H"	Class "C" Conc (Column)	16 Bars V (#10)		Bar Z (#4)		Reinforcing Steel ⑤
		ft	CY	Length	Weight	Length	Weight	LB
2	1	16	5.7	19'-6"	1,343	632'-3"	423	1,766
	2	17	6.1	20'-6"	1,412	670'-0"	448	1,860
	3	17	6.1	20'-6"	1,412	670'-0"	448	1,860
	4	17	6.1	20'-6"	1,412	670'-0"	448	1,860
	5	17	6.1	20'-6"	1,412	670'-0"	448	1,860
	6	16	5.7	19'-6"	1,343	632'-3"	423	1,766
7	1	14	5.0	17'-6"	1,205	556'-9"	372	1,577
	2	14	5.0	17'-6"	1,205	556'-9"	372	1,577
	3	15	5.3	18'-6"	1,274	594'-6"	398	1,672
	4	15	5.3	18'-6"	1,274	594'-6"	398	1,672
	5	14	5.0	17'-6"	1,205	556'-9"	372	1,577
	6	14	5.0	17'-6"	1,205	556'-9"	372	1,577

TABLE OF ESTIMATED QUANTITIES
Phase 1 (One Bent Cap Only)

Bar	No.	Size	Length	Weight
A	16	#11	24'-6"	2,083
B	16	#11	23'-6"	1,998
D	4	#9	1'-8"	23
S	68	#5	15'-8"	1,112
T	20	#5	23'-6"	491
U	2	#5	11'-2"	24
Reinforcing Steel (LB) ⑤				5,731
Class "C" Conc (Cap) (CY) ⑥				28.6

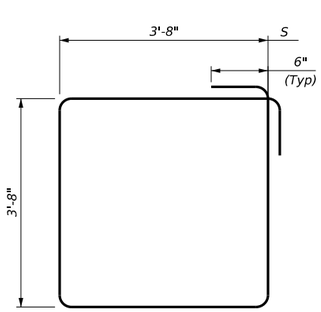
TABLE OF ESTIMATED QUANTITIES
Phase 2 (One Bent Cap Only)

Bar	No.	Size	Length	Weight
A	8	#11	34'-8"	1,474
B	8	#11	34'-8"	1,474
S	70	#5	15'-8"	1,144
T	10	#5	34'-8"	362
Reinforcing Steel (LB) ⑤				4,454
Class "C" Conc (Cap) (CY)				22.0

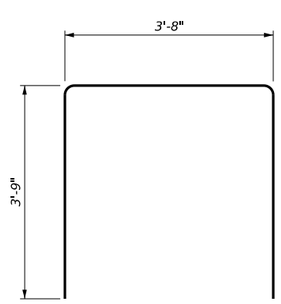
④ *For each linear foot variation in "H" value, make the following adjustments:*
Bars V length, 1'-0"
Bars Z length, 37'-9"
Reinforcing steel, 94 LB
Class "C" Conc (Col), 0.36 CY

⑤ *Reinforcing steel quantities are for Contractor's information only.*

⑥ *Includes shear key volume.*



BARS S



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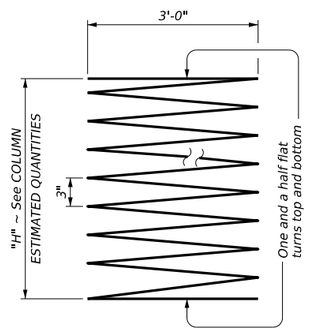

BARS Z

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US 59

BENT NO. 2 OR 7

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 2 OF 2

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		163

DATE: 7/3/2024
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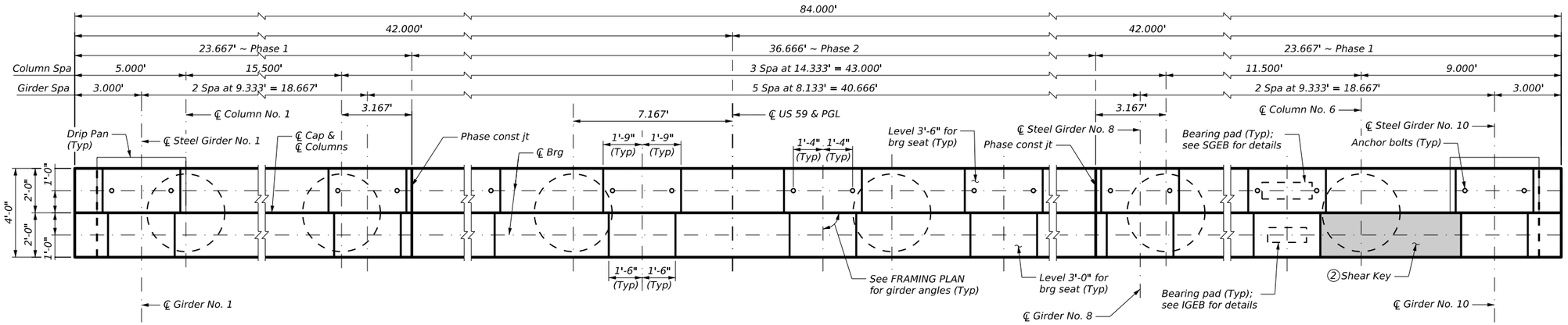
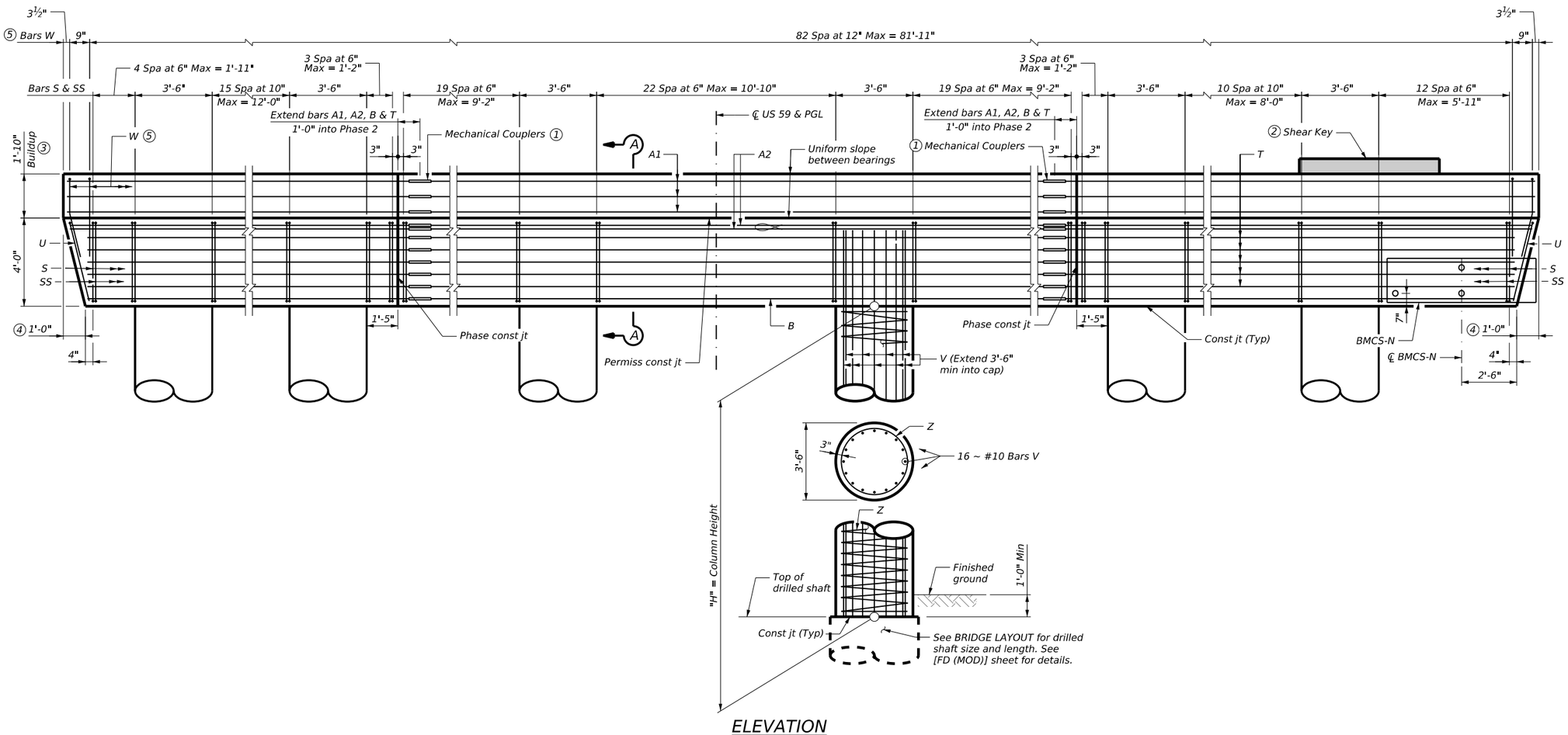


PLAN



ELEVATION

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specification, 9th Edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

For bearing seat elevations, see BEARING SEAT ELEVATIONS sheet.

See Common Foundation Details [FD (MOD)] standard sheet for all foundation details and notes not shown.

Provide drip pans at the exterior girders on the forward side during Phase 1. See DRIP PAN DETAILS sheets for more information. Payment for drip pans is subsidiary to Bid Item 0442-7001 - STR STEEL (PLATE GIRDER).

See Bridge Mounted Clearance Sign Assembly (BMCS) sheet for connection details to bent. Use connection detail specified for SSTR rail type.

Calculated foundation load = 489 tons / dr sh.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Provide Class "F" Concrete for bent cap ($f'c$ = 5,000 psi).

Provide Class "C" Concrete for columns ($f'c$ = 3,600 psi).

Provide Grade 60 reinforcing steel.

① Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.

② A shear key is required between girders 9 & 10 on the back side only. Shear keys are to be cast after girders are set. See Shear Key (IGSK) standard sheet for more details.

③ Buildup on back side only.

④ Measured parallel to top of cap cross-slope.

⑤ Bend first and last Bar W as required to maintain clear cover.

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US 59

BENT NO. 3

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 2

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		164

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BBD03.dgn

COLUMN ESTIMATED QUANTITIES ⑥

Bent No.	Column No.	Column Height "H"	Class "C" Conc (Column)	16 Bars V (#10)		Bar Z (#4)		Reinforcing Steel ⑦
		ft	CY	Length	Weight	Length	Weight	LB
3	1	15	5.3	18'-6"	1,274	594'-6"	398	1,672
	2	15	5.3	18'-6"	1,274	594'-6"	398	1,672
	3	16	5.7	19'-6"	1,343	632'-3"	423	1,766
	4	17	6.1	20'-6"	1,412	670'-0"	448	1,860
	5	16	5.7	19'-6"	1,343	632'-3"	423	1,766
	6	16	5.7	19'-6"	1,343	632'-3"	423	1,766

TABLE OF ESTIMATED QUANTITIES
Phase 1

Bar	No.	Size	Length	Weight
A1	14	#7	24'-6"	702
A2	32	#11	24'-5"	4,152
B	16	#11	23'-6"	1,998
S	53	#6	16'-8"	1,327
SS	53	#6	12'-10"	1,022
T	20	#5	23'-6"	491
U	2	#5	11'-2"	24
W	48	#5	9'-0"	451
Reinforcing Steel (LB) ⑦				10,167
Class "F" Conc (Cap) (CY) ⑧				34.9

TABLE OF ESTIMATED QUANTITIES
Phase 2

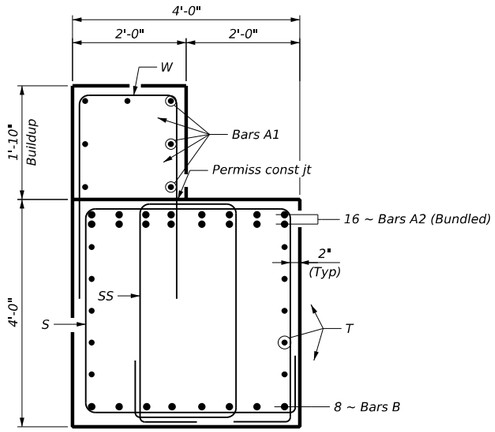
Bar	No.	Size	Length	Weight
A1	7	#7	34'-8"	497
A2	16	#11	34'-8"	2,947
B	8	#11	34'-8"	1,474
S	63	#6	16'-8"	1,578
SS	63	#6	12'-10"	1,215
T	10	#5	34'-8"	362
W	37	#5	9'-0"	348
Reinforcing Steel (LB) ⑦				8,421
Class "F" Conc (Cap) (CY)				27.1

⑥ For each linear foot variation in "H" value, make the following adjustments:
Bars V length, 1'-0"
Bars Z length, 37'-9"
Reinforcing steel, 94 LB
Class "C" Conc (Col), 0.36 CY

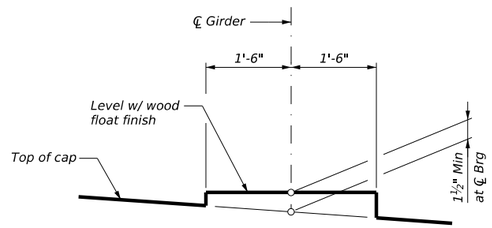
⑦ Reinforcing steel quantities are for Contractor's information only.

⑧ Includes shear key volume.

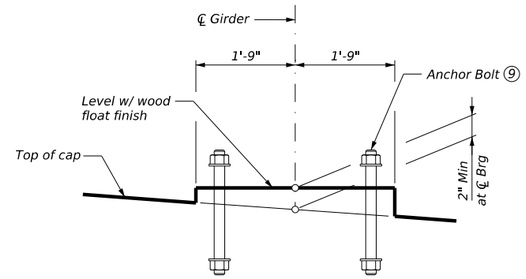
⑨ See SGEB standard sheets for anchor bolt details.



SECTION A-A



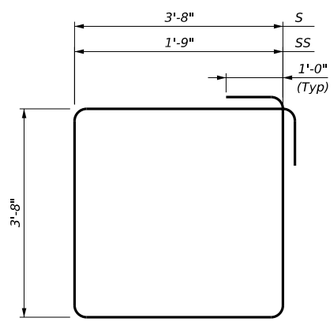
Span No. 2 - Tx Girders



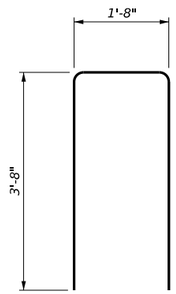
Span No. 3 - Steel Plate Girders

BEARING SEAT DETAIL

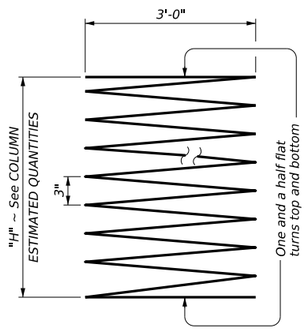
(Bearing surface must be clean and free of all loose material before placing bearing pad.)



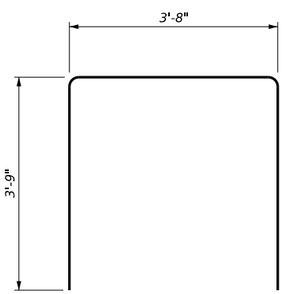
BARS S & SS



BARS W



BARS Z



BARS U

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7.3.2024

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US 59

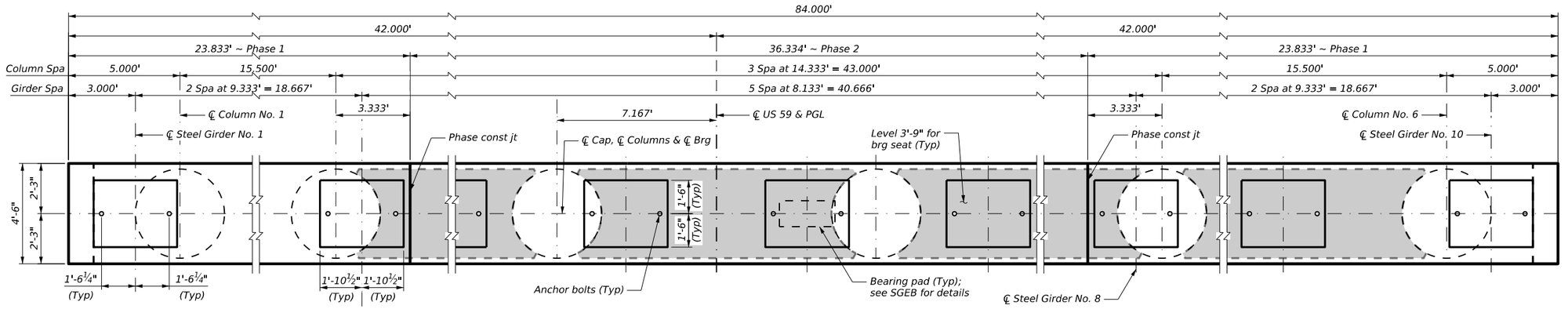
BENT NO. 3

SAN ANTONIO RIVER BRIDGE
AT US 59

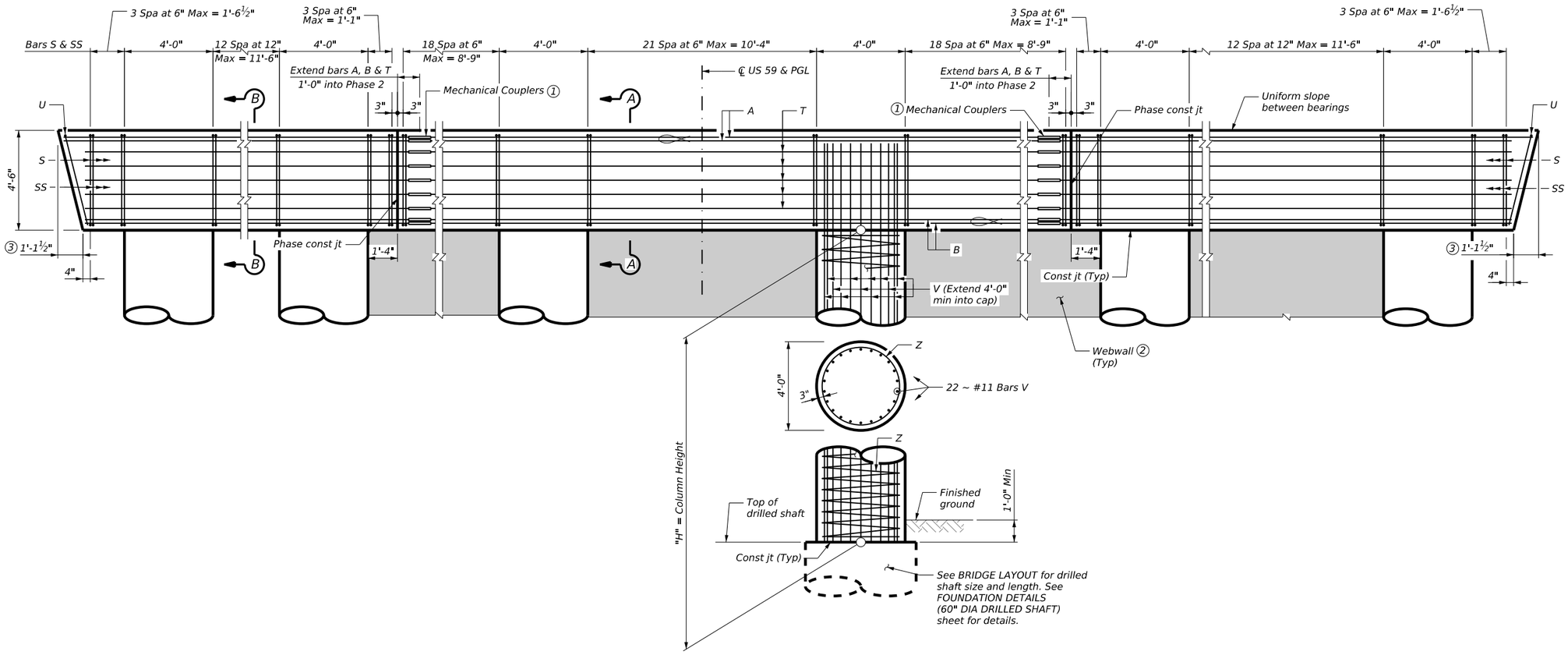
SHEET 2 OF 2

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		165

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms6635541062_BBD04.dgn



PLAN



ELEVATION

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specification, 9th Edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

For bearing seat elevations, see BEARING SEAT ELEVATIONS sheet.

See FOUNDATION DETAILS (60" DIA DRILLED SHAFT) sheet for foundation information not shown.

Calculated foundation load = 620 tons / dr sh.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Provide Class "C" Concrete (f'_c = 3,600 psi).

Provide Grade 60 reinforcing steel.

Webwall

① Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.

② Provide webwall between columns except between Column No. 1 & Column No. 2. See Sheet 3 of 3 for webwall details.

③ Measured parallel to top of cap cross slope.

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US 59

BENT NO. 4

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 3

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		166

DATE: 7/3/2024
FILE: c:\working\dirt\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BBD05.dgn

COLUMN ESTIMATED QUANTITIES ④

Bent No.	Column No.	Column Height "H"	Class "C" Conc (Column)	22 Bars V (#11)		Bar Z (#4)		Reinforcing Steel ⑤
		ft	CY	Length	Weight	Length	Weight	LB
4	1	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	2	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	3	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	4	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	5	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	6	21	9.8	25'-0"	2,923	957'-0"	640	3,563

TABLE OF ESTIMATED QUANTITIES

Phase 1

Bar	No.	Size	Length	Weight
A	24	#11	24'-8"	3,146
B	24	#11	23'-6"	2,997
S	42	#5	17'-8"	774
SS	42	#5	11'-6"	504
T	20	#5	23'-6"	491
U	2	#5	12'-8"	27
Reinforcing Steel (LB) ⑤				7,939
Class "C" Conc (Cap) (CY)				35.3

TABLE OF ESTIMATED QUANTITIES

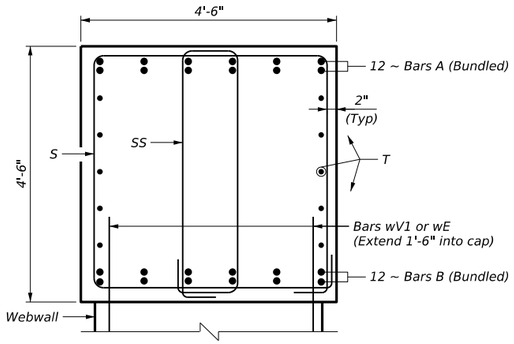
Phase 2

Bar	No.	Size	Length	Weight
A	12	#11	34'-4"	2,189
B	12	#11	34'-4"	2,189
S	60	#5	17'-8"	1,106
SS	60	#5	11'-6"	720
T	10	#5	34'-4"	359
Reinforcing Steel (LB) ⑤				6,563
Class "C" Conc (Cap) (CY)				27.7

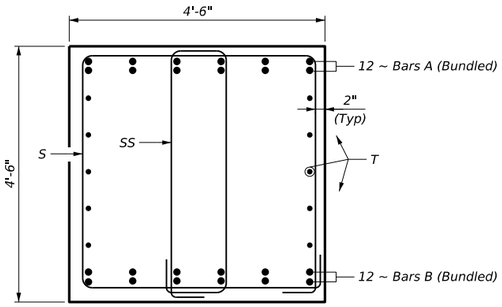
④ For each linear foot variation in "H" value, make the following adjustments:
- Bars V length, 1'-0"
- Bars Z length, 44'-0"
- Reinforcing steel, 146 LB
- Class "C" Conc (Col), 0.46 CY

⑤ Reinforcing steel quantities are for Contractor's information only.

⑥ See SGEB standard sheets for anchor bolt details.



SECTION A-A



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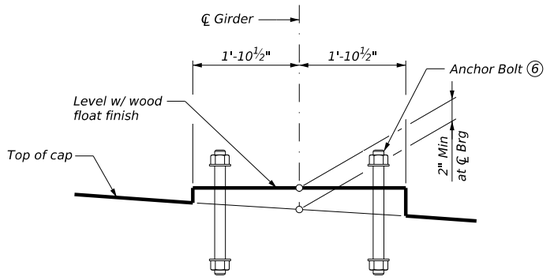
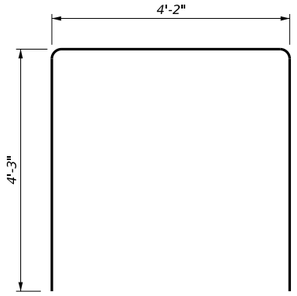
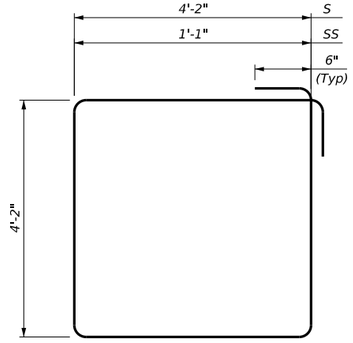


BEARING SEAT DETAIL

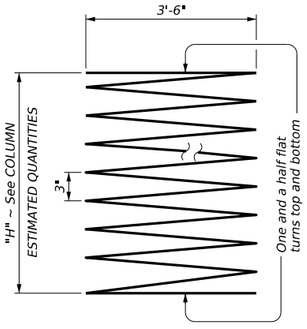
(Bearing surface must be clean and free of all loose material before placing bearing pad.)



BARS U



BARS S & SS



BARS Z

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7.3.2024

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Texas Department of Transportation

US 59

BENT NO. 4

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 2 OF 3

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		167

DATE: 7/3/2024
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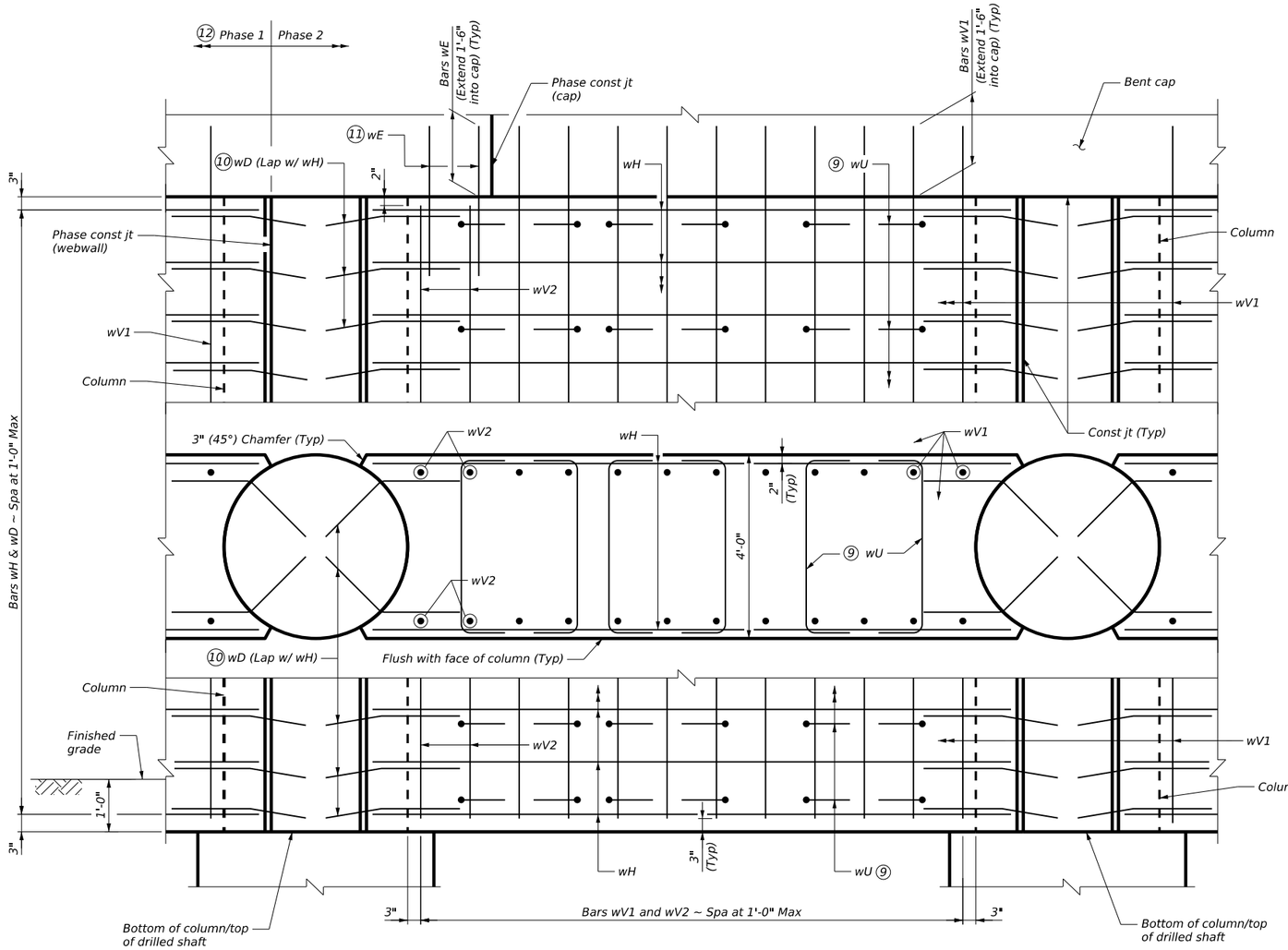
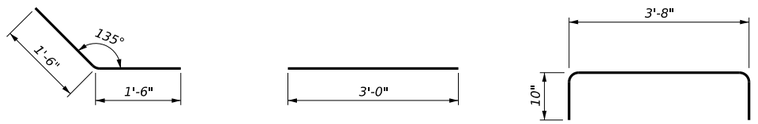


WEBWALL DETAILS



BARS wD BARS wE BARS wU

TABLE OF WEBWALL QUANTITIES
Phase 1 (7)

Bar	No.	Size	Length	Weight
wD	176	#6	3'-0"	794
wE	8	#6	3'-0"	37
wH	44	#6	12'-9"	843
wU	72	#5	5'-4"	401
wV1	24	#6	22'-3"	803
Reinforcing Steel (LB) (5)				2,878
Class "C" Conc (Webwall) (CY)				38.1

TABLE OF WEBWALL QUANTITIES
Phase 2 (8)

Bar	No.	Size	Length	Weight
wD	176	#6	3'-0"	794
wH	132	#6	11'-7"	2,297
wU	216	#5	5'-4"	1,202
wV1	58	#6	22'-3"	1,939
wV2	8	#6	20'-7"	248
Reinforcing Steel (LB) (5)				6,232
Class "C" Conc (Webwall) (CY)				103.4

(5) Reinforcing steel quantities are for Contractor's information only.

(7) For Phase 1, each linear foot variation in "H" value, make the following adjustments:
- Bars wD: ± 8 Bars
- Bars wH: ± 2 Bars
- Bars wU: ± 6 Bars
- Bars wV1 length, 1'-0"
- Reinforcing steel, 108 LB
- Class "C" Conc (Webwall), 1.8 CY

(8) For Phase 2, each linear foot variation in "H" value, make the following adjustments:
- Bars wD: ± 8 Bars
- Bars wH: ± 6 Bars
- Bars wU: ± 18 Bars
- Bars wV1 & wV2 length, 1'-0"
- Reinforcing steel, 241 LB
- Class "C" Conc (Webwall), 5.0 CY

(9) In plan view, Bars wU are to be spaced no more than 2'-0" apart and should be placed with every other wV bar. In elevation view, Bars wU are to be placed with the upper and lower most wH bars and spaced at every other wH bar in between.

(10) At Contractor's option, Bars wD may be placed with the column or may be attached using an adhesive anchorage system with the anchorage end sloped 1:6 into column.

(11) Bars wE and wV2 are used in place of Bars wV1 only between the face of column to phase const jt. Bars wE are to be placed with the bent cap during Phase 1 and Bars wV2 be placed to lap with Bars wE during Phase 2.

(12) Only provide webwall between Column No. 5 & Column No. 6 during Phase 1.

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FRN - F-1386

US 59

BENT NO. 4

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 3 OF 3

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		168

DATE: 7/3/2024
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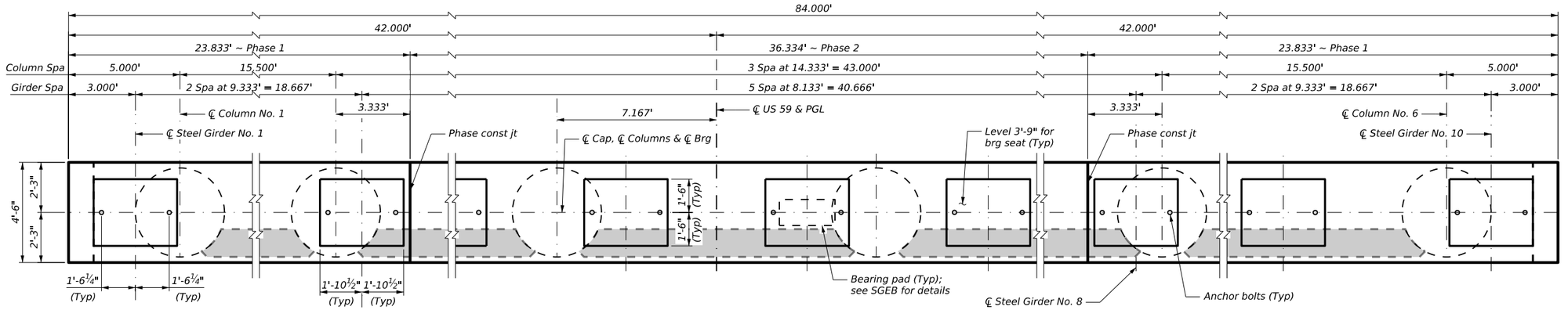
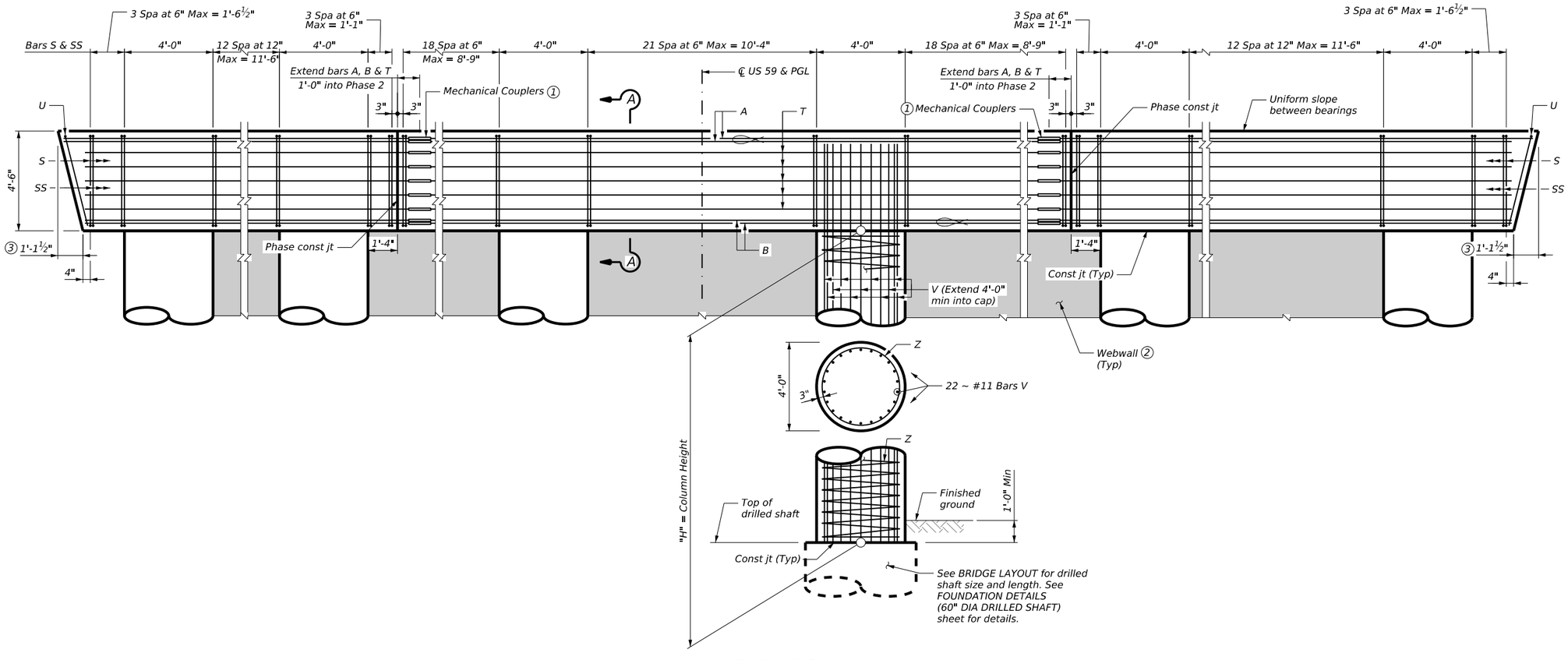


PLAN



ELEVATION

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specification, 9th Edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

For bearing seat elevations, see BEARING SEAT ELEVATIONS sheet.

See FOUNDATION DETAILS (60" DIA DRILLED SHAFT) sheet for foundation information not shown.

Calculated foundation load = 615 tons / dr sh.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Provide Class "C" Concrete (f'_c = 3,600 psi).

Provide Grade 60 reinforcing steel.

Webwall

① Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.

② Provide webwall between all columns. See Sheet 3 of 3 for webwall details.

③ Measured parallel to top of cap cross-slope.

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US 59

BENT NO. 5

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 3

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		169

DATE: 7/3/2024
FILE: c:\working\dir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BBD07.dgn

COLUMN ESTIMATED QUANTITIES ④

Bent No.	Column No.	Column Height "H"	Class "C" Conc (Column)	22 Bars V (#11)		Bar Z (#4)		Reinforcing Steel ⑤
		ft	CY	Length	Weight	Length	Weight	LB
5	1	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	2	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	3	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	4	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	5	21	9.8	25'-0"	2,923	957'-0"	640	3,563
	6	21	9.8	25'-0"	2,923	957'-0"	640	3,563

TABLE OF ESTIMATED QUANTITIES
Phase 1

Bar	No.	Size	Length	Weight
A	24	#11	24'-8"	3,146
B	24	#11	23'-6"	2,997
S	42	#5	17'-8"	774
SS	42	#5	11'-6"	504
T	20	#5	23'-6"	491
U	2	#5	12'-8"	27
Reinforcing Steel (LB) ⑤				7,939
Class "C" Conc (Cap) (CY)				35.3

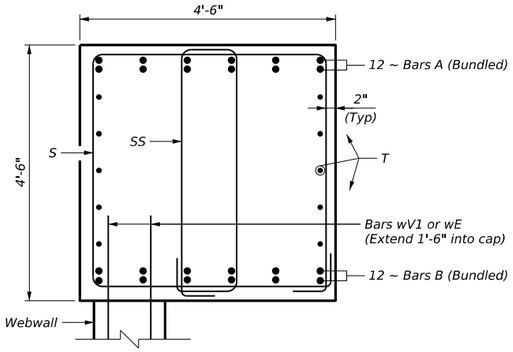
TABLE OF ESTIMATED QUANTITIES
Phase 2

Bar	No.	Size	Length	Weight
A	12	#11	34'-4"	2,189
B	12	#11	34'-4"	2,189
S	60	#5	17'-8"	1,106
SS	60	#5	11'-6"	720
T	10	#5	34'-4"	359
Reinforcing Steel (LB) ⑤				6,563
Class "C" Conc (Cap) (CY)				27.7

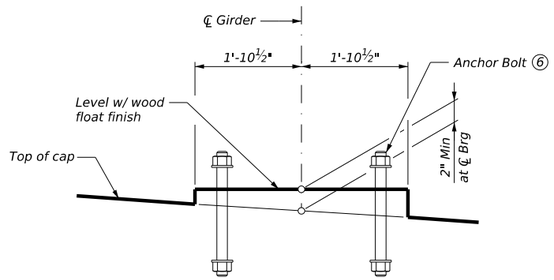
④ For each linear foot variation in "H" value, make the following adjustments:
- Bars V length, 1'-0"
- Bars Z length, 44'-0"
- Reinforcing steel, 146 LB
- Class "C" Conc (Col), 0.46 CY

⑤ Reinforcing steel quantities are for Contractor's information only.

⑥ See SGEB standard sheets for anchor bolt details.

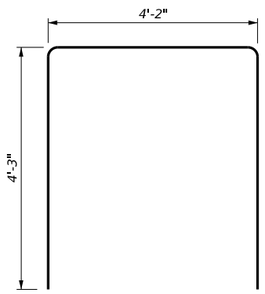


SECTION A-A

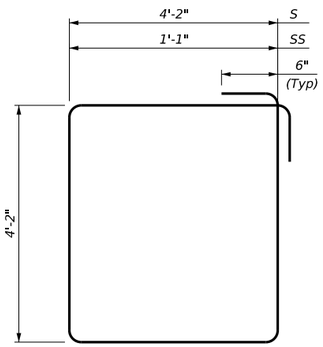


BEARING SEAT DETAIL

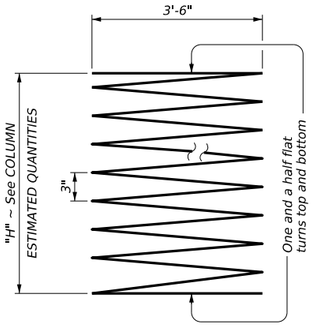
(Bearing surface must be clean and free of all loose material before placing bearing pad.)



BARS U



BARS S & SS



BARS Z

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PROFESSIONAL ENGINEER
7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

BENT NO. 5

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 2 OF 3

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		170

DATE: 7/3/2024
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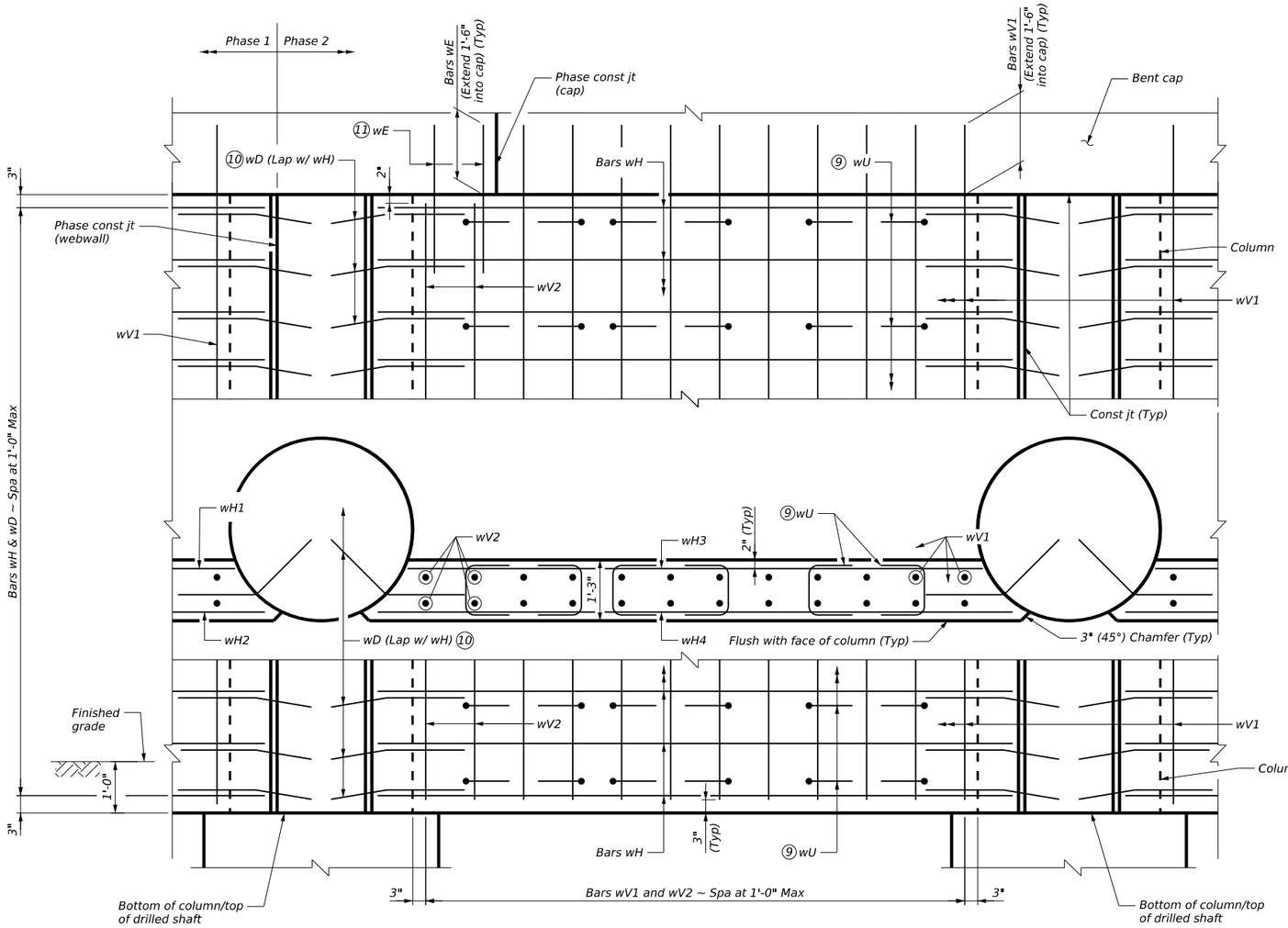
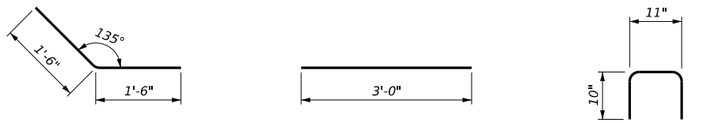


WEBWALL DETAILS



BARS wD | BARS wE | BARS wU

TABLE OF WEBWALL QUANTITIES
Phase 1 (7)

Bar	No.	Size	Length	Weight
wD	132	#6	3'-0"	595
wE	8	#6	3'-0"	37
wH1	44	#6	11'-2"	738
wH2	44	#6	12'-9"	843
wU	144	#5	2'-7"	388
wV1	52	#6	22'-3"	1,738
Reinforcing Steel (LB) (5)				4,339
Class "C" Conc (Webwall) (CY)				24.6

TABLE OF WEBWALL QUANTITIES
Phase 2 (8)

Bar	No.	Size	Length	Weight
wD	88	#6	3'-0"	397
wH3	66	#6	10'-0"	992
wH4	66	#6	11'-7"	1,149
wU	216	#5	2'-7"	582
wV1	58	#6	22'-3"	1,939
wV2	8	#6	20'-7"	248
Reinforcing Steel (LB) (5)				5,059
Class "C" Conc (Webwall) (CY)				33.5

(5) Reinforcing steel quantities are for Contractor's information only.

(7) For Phase 1, each linear foot variation in "H" value, make the following adjustments:
- Bars wD: ± 6 Bars
- Bars wH1 & wH2: ± 2 Bars
- Bars wU: ± 12 Bars
- Bars wV1 length, 1'-0"
- Reinforcing steel, 177 LB
- Class "C" Conc (Webwall), 1.2 CY

(8) For Phase 2, each linear foot variation in "H" value, make the following adjustments:
- Bars wD: ± 4 Bars
- Bars wH3 & wH4: ± 3 Bars
- Bars wU: ± 18 Bars
- Bars wV1 & wV2 length, 1'-0"
- Reinforcing steel, 115 LB
- Class "C" Conc (Webwall), 1.6 CY

(9) In plan view, Bars wU are to be spaced no more than 2'-0" apart and should be placed with every other wV bar. In elevation view, Bars wU are to be placed with the upper and lower most wH bars and spaced at every other wH bar in between.

(10) At Contractor's option, Bars wD may be placed with the column or may be attached using an adhesive anchorage system with the anchorage end sloped 1:6 into column.

(11) Bars wE and wV2 are used in place of Bars wV1 only between the face of column to phase const jt. Bars wE are to be placed with the bent cap during Phase 1 and Bars wV2 be placed to lap with Bars wE during Phase 2.

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US 59

BENT NO. 5

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 3 OF 3

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		171

DATE: 7/3/2024
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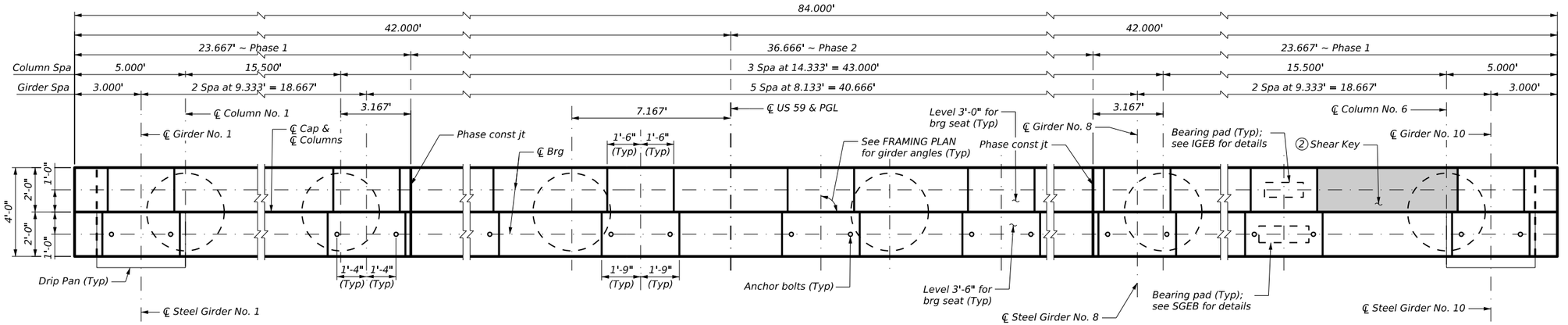
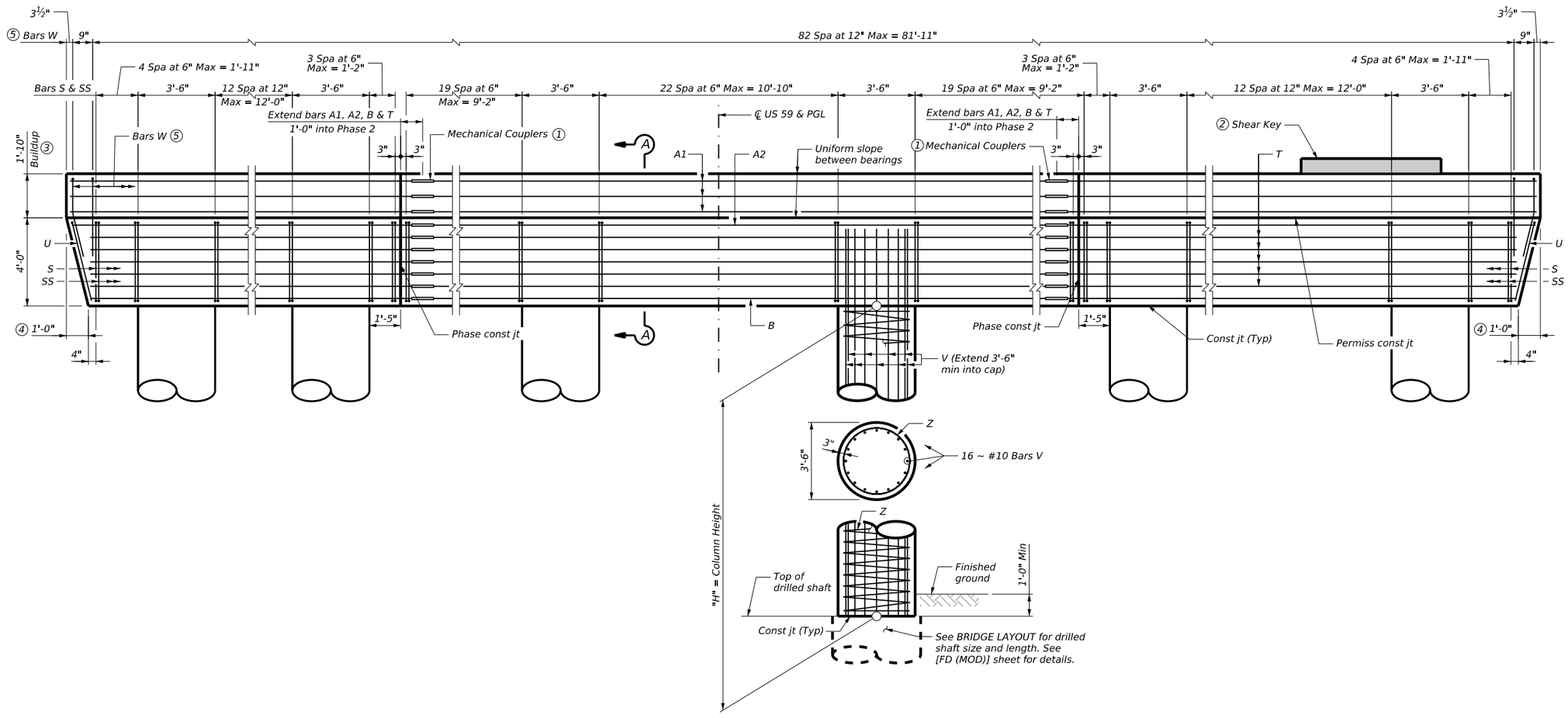


PLAN



ELEVATION

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specification, 9th Edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

For bearing seat elevations, see BEARING SEAT ELEVATIONS sheet.

See Common Foundation Details [FD (MOD)] standard sheet for all foundation details and notes not shown.

Provide drip pans at the exterior girders on the back side during Phase 1. See DRIP PAN DETAILS sheets for more information. Payment for drip pans is subsidiary to Bid Item 0442-7001 - STR STEEL (PLATE GIRDER).

Calculated foundation load = 361 tons / dr sh.

Cover dimensions are clear dimensions, unless noted otherwise.

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

MATERIAL NOTES:

Provide Class "C" Concrete ($f'c$ = 3,600 psi).

Provide Grade 60 reinforcing steel.

① Contractor to splice bars by using mechanical couplers in accordance with Standard Spec Item 440.2.9.

② A shear key is required between girders 9 & 10 on the forward side only. Shear keys are to be cast after girders are set. See Shear Key (IGSK) standard sheet for more details.

③ Buildup on forward side only.

④ Measured parallel to top of cap cross-slope.

⑤ Bend first and last Bar W as required to maintain clear cover.

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US 59

BENT NO. 6

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 2

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		172

DATE: 7/3/2024
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COLUMN ESTIMATED QUANTITIES ⑥

Bent No.	Column No.	Column Height "H"	Class "C" Conc (Column)	16 Bars V (#10)		Bar Z (#4)		Reinforcing Steel ⑦
		ft	CY	Length	Weight	Length	Weight	LB
6	1	13	4.6	16'-6"	1,136	519'-0"	347	1,483
	2	13	4.6	16'-6"	1,136	519'-0"	347	1,483
	3	14	5.0	17'-6"	1,205	556'-9"	372	1,577
	4	14	5.0	17'-6"	1,205	556'-9"	372	1,577
	5	13	4.6	16'-6"	1,136	519'-0"	347	1,483
	6	13	4.6	16'-6"	1,136	519'-0"	347	1,483

TABLE OF ESTIMATED QUANTITIES
Phase 1

Bar	No.	Size	Length	Weight
A1	14	#7	24'-6"	702
A2	16	#11	24'-5"	2,076
B	16	#11	23'-6"	1,998
S	44	#6	16'-8"	1,102
SS	44	#6	12'-10"	849
T	20	#5	23'-6"	491
U	2	#5	11'-2"	24
W	48	#5	9'-0"	451
Reinforcing Steel (LB) ⑦				7,693
Class "C" Conc (Cap) (CY) ⑧				34.7

TABLE OF ESTIMATED QUANTITIES
Phase 2

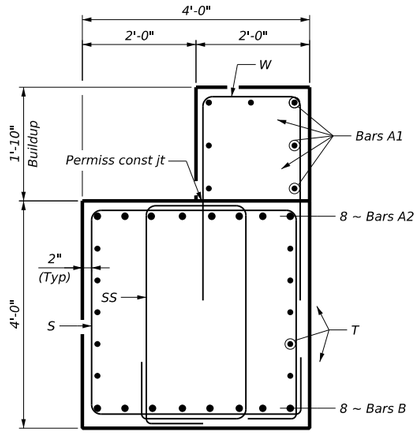
Bar	No.	Size	Length	Weight
A1	7	#7	34'-8"	497
A2	8	#11	34'-8"	1,474
B	8	#11	34'-8"	1,474
S	63	#6	16'-8"	1,578
SS	63	#6	12'-10"	1,215
T	10	#5	34'-8"	362
W	38	#5	9'-0"	357
Reinforcing Steel (LB) ⑦				6,957
Class "C" Conc (Cap) (CY)				27.1

⑥ For each linear foot variation in "H" value, make the following adjustments:
- Bars V length, 1'-0"
- Bars Z length, 37'-9"
- Reinforcing steel, 94 LB
- Class "C" Conc (Col), 0.36 CY

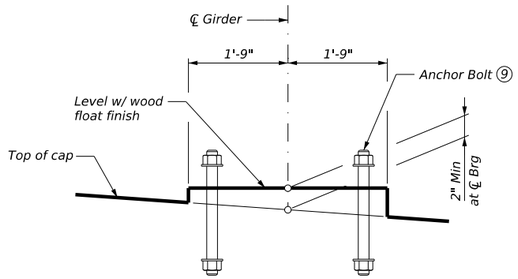
⑦ Reinforcing steel quantities are for Contractor's information only.

⑧ Includes shear key volume.

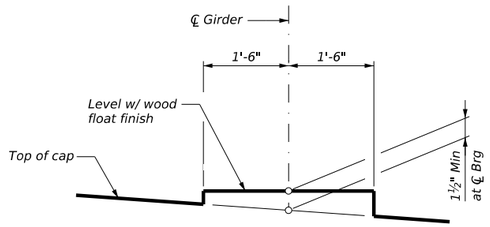
⑨ See SGEB standard sheets for anchor bolt details.



SECTION A-A



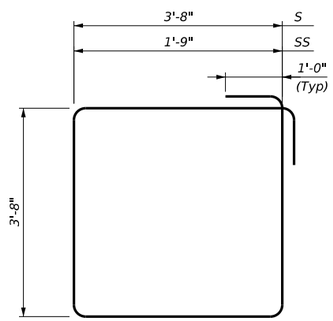
Span No. 5 - Plate Girders



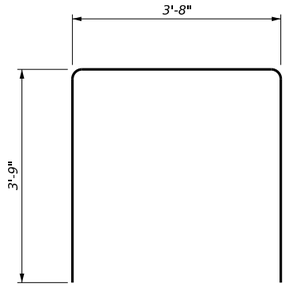
Span No. 6 - Tx Girders

BEARING SEAT DETAIL

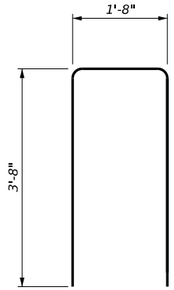
(Bearing surface must be clean and free of all loose material before placing bearing pad.)



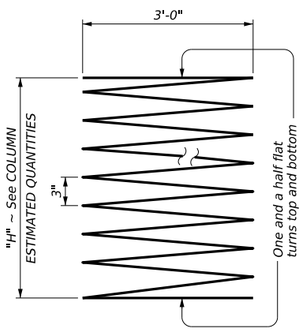
BARS S & SS



BARS U



BARS W



BARS Z

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US 59

BENT NO. 6

SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 2 OF 2

DESIGNED: BN	CONT	SECT	JOB		HIGHWAY
CHECKED: BZ	0088	02	062		US59
DRAWN: PS	DIST	COUNTY			SHEET NO.
CHECKED: BZ	CRP	GOLIAD			173

DATE: 7/3/2024
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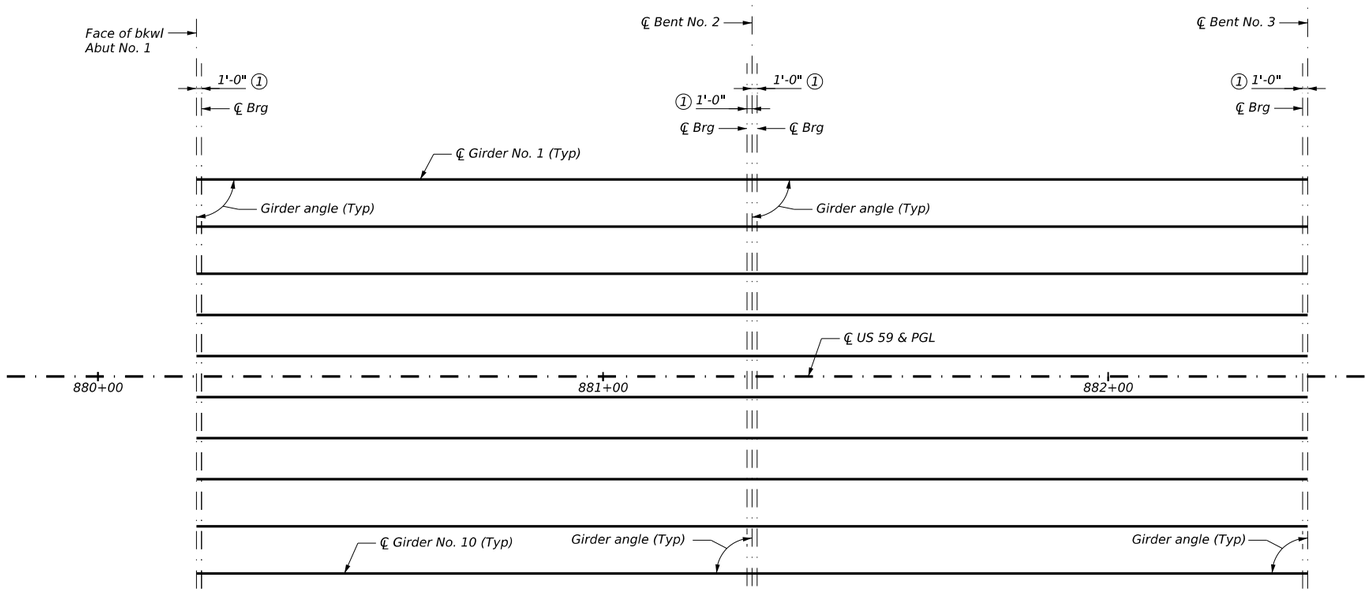

SPAN 1
(Tx54 Girders)

SPAN 2
(Tx54 Girders)

① See IGEB standard for orientation of dimensions.

② Girder lengths shown are bottom girder flange lengths with adjustments made for girder slope.

BENT REPORT

ABUT NO. 1 (S 42 48 22.09 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 39.000 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 1	GIRDER	1	0.000	90 0 0
	GIRDER	2	9.333	90 0 0
	GIRDER	3	9.333	90 0 0
	GIRDER	4	8.133	90 0 0
	GIRDER	5	8.133	90 0 0
	GIRDER	6	8.133	90 0 0
	GIRDER	7	8.133	90 0 0
	GIRDER	8	8.133	90 0 0
	GIRDER	9	9.333	90 0 0
	GIRDER	10	9.333	90 0 0
	TOTAL		78.000	

BENT NO. 2 (S 42 48 22.09 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 39.000 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 1	GIRDER	1	0.000	90 0 0
	GIRDER	2	9.333	90 0 0
	GIRDER	3	9.333	90 0 0
	GIRDER	4	8.133	90 0 0
	GIRDER	5	8.133	90 0 0
	GIRDER	6	8.133	90 0 0
	GIRDER	7	8.133	90 0 0
	GIRDER	8	8.133	90 0 0
	GIRDER	9	9.333	90 0 0
	GIRDER	10	9.333	90 0 0
	TOTAL		78.000	
SPAN 2	GIRDER	1	0.000	90 0 0
	GIRDER	2	9.333	90 0 0
	GIRDER	3	9.333	90 0 0
	GIRDER	4	8.133	90 0 0
	GIRDER	5	8.133	90 0 0
	GIRDER	6	8.133	90 0 0
	GIRDER	7	8.133	90 0 0
	GIRDER	8	8.133	90 0 0
	GIRDER	9	9.333	90 0 0
	GIRDER	10	9.333	90 0 0
	TOTAL		78.000	

BENT NO. 3 (S 42 48 22.09 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 39.000 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D M S
SPAN 2	GIRDER	1	0.000	90 0 0
	GIRDER	2	9.333	90 0 0
	GIRDER	3	9.333	90 0 0
	GIRDER	4	8.133	90 0 0
	GIRDER	5	8.133	90 0 0
	GIRDER	6	8.133	90 0 0
	GIRDER	7	8.133	90 0 0
	GIRDER	8	8.133	90 0 0
	GIRDER	9	9.333	90 0 0
	GIRDER	10	9.333	90 0 0
	TOTAL		78.000	

GIRDER REPORT

GIRDER REPORT, SPAN 1

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GD. FLG.②	GIRDER SLOPE
GIRDER 1	110.000	108.000	109.51	0.0129
GIRDER 2	110.000	108.000	109.51	0.0129
GIRDER 3	110.000	108.000	109.51	0.0129
GIRDER 4	110.000	108.000	109.51	0.0129
GIRDER 5	110.000	108.000	109.51	0.0129
GIRDER 6	110.000	108.000	109.51	0.0129
GIRDER 7	110.000	108.000	109.51	0.0129
GIRDER 8	110.000	108.000	109.51	0.0129
GIRDER 9	110.000	108.000	109.51	0.0129
GIRDER 10	110.000	108.000	109.51	0.0129

GIRDER REPORT, SPAN 2

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GD. FLG.②	GIRDER SLOPE
GIRDER 1	110.000	108.000	109.51	0.0096
GIRDER 2	110.000	108.000	109.51	0.0096
GIRDER 3	110.000	108.000	109.51	0.0096
GIRDER 4	110.000	108.000	109.51	0.0096
GIRDER 5	110.000	108.000	109.51	0.0096
GIRDER 6	110.000	108.000	109.51	0.0096
GIRDER 7	110.000	108.000	109.51	0.0096
GIRDER 8	110.000	108.000	109.51	0.0096
GIRDER 9	110.000	108.000	109.51	0.0096
GIRDER 10	110.000	108.000	109.51	0.0096

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LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
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Texas Department of Transportation

US 59

FRAMING PLAN
(SPANS 1 & 2)

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		174

DATE: 7/3/2024
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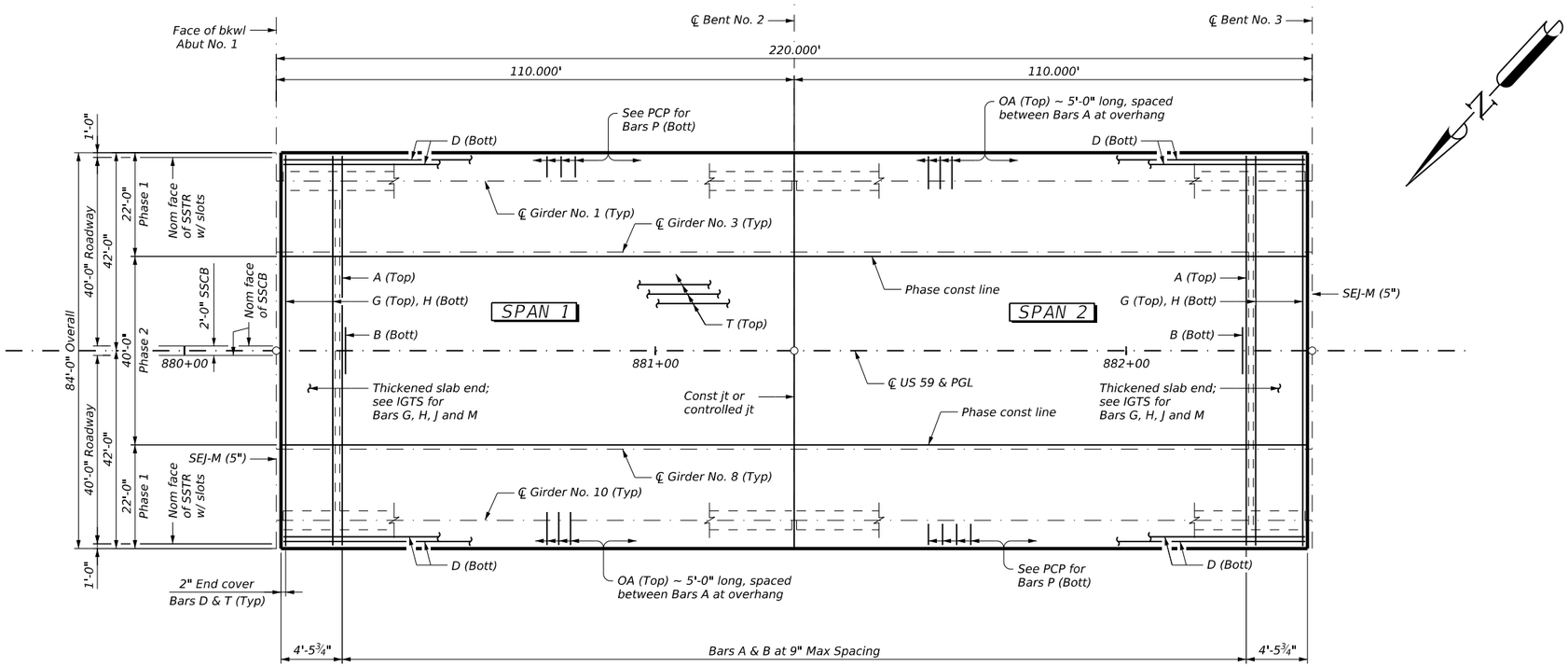

PLAN

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 9th edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

See Prestressed Concrete Panels (PCP) and Prestressed Concrete Panel Fabrication Details (PCP-FAB) standard sheets for panel details not shown.

See Thickened Slab End Details (IGTS) standard sheet for Thickened Slab End details and quantity adjustments.

See Miscellaneous Slab Details (IGMS) standard sheet for miscellaneous details.

See Traffic Rail Single Slope (SSTR) standard sheets for rail anchorage in slab.

See Single Slope Concrete Barrier (SSCB) standard sheet for rail anchorage in slab.

See Permanent Metal Deck Forms (PMDF) standard sheet for details and quantity adjustments if this option is used.

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 bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"

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 *Quantities shown are bottom girder flange lengths with adjustments made for girder slope. See FRAMING PLAN for girder lengths.*

② *For contractor's information only. Reinforcing steel weight is calculated using an approximate factor of 2.3 psf.*

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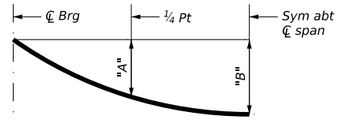
TABLE OF ESTIMATED QUANTITIES (Phase 1)

Span No.	Reinf Concrete Slab	Prestressed Conc Girders ①	Total Reinforcing Steel ②
		(Tx54)	
	SF	LF	LB
1	4,840	657.06	11,132
2	4,840	657.06	11,132
TOTAL	9,680	1,314.12	22,264

TABLE OF DEAD LOAD DEFLECTIONS (Phase 1)

Span No.	Girder No.	"A"	"B"
		FT	FT
1 & 2	1 - 3	0.119	0.169
	8 - 10	0.119	0.169



DEAD LOAD DEFLECTION DIAGRAM

Note: Deflections shown are due to prestressed concrete panels and cast-in-place slab only. (E_c = 5,000 ksi). Adjust deflections based on field observations as needed.

TABLE OF ESTIMATED QUANTITIES (Phase 2)

Span No.	Reinf Concrete Slab	Prestressed Conc Girders ①	Total Reinforcing Steel ②
		(Tx54)	
	SF	LF	LB
1	4,400	438.04	10,120
2	4,400	438.04	10,120
TOTAL	8,800	876.08	20,240

TABLE OF DEAD LOAD DEFLECTIONS (Phase 2)

Span No.	Girder No.	"A"	"B"
		FT	FT
1 & 2	4 - 7	0.103	0.147

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US 59

220.00' PRESTRESSED CONCRETE GIRDER UNIT (SPANS 1 & 2)

SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 2

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		175

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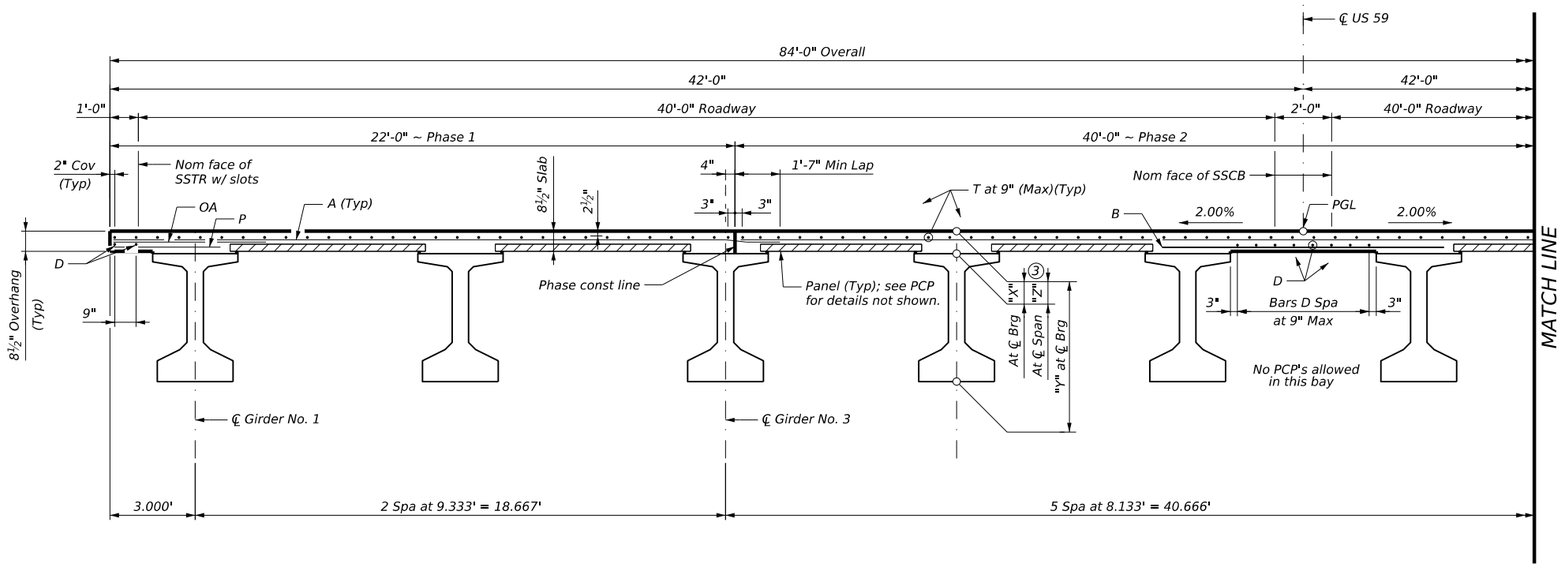
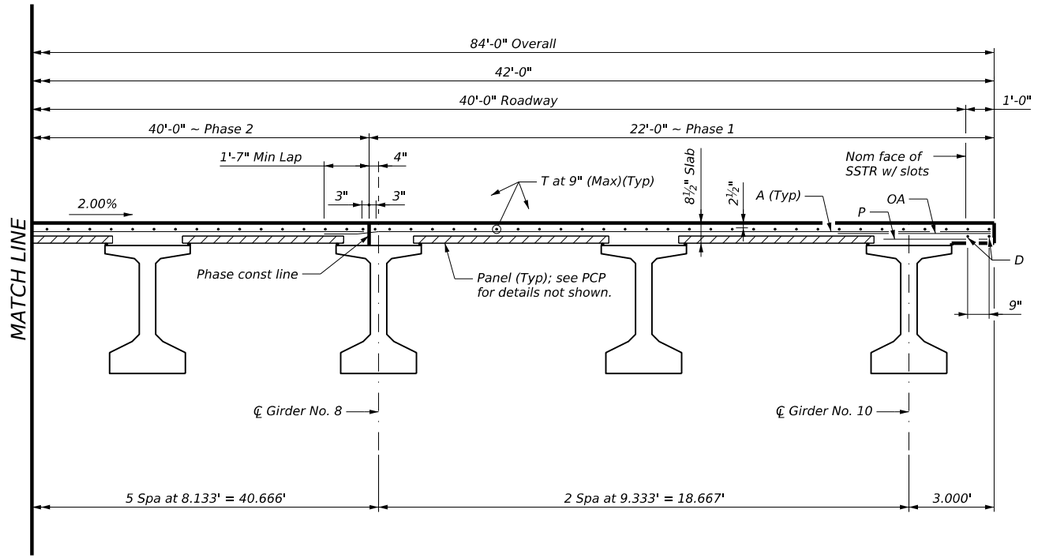


TYPICAL TRANSVERSE SECTION

BAR TABLE	
BAR	SIZE
A	#4
B	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

③ Theoretical dimension.



TYPICAL TRANSVERSE SECTION

TABLE OF SECTION DEPTHS (Phase 1)				
Span No.	Girder No.	"X" AT ℄ Brg	"Y" AT ℄ Brg	"Z" AT ℄ Span ③
1	1	11½"	5' - 5½"	9½"
	2	11½"	5' - 5½"	9⅞"
	3	11½"	5' - 5½"	9⅝"
	8	11½"	5' - 5½"	9⅝"
	9	11½"	5' - 5½"	9⅞"
	10	11½"	5' - 5½"	9½"
2	1	11½"	5' - 5½"	9½"
	2	11½"	5' - 5½"	9⅞"
	3	11½"	5' - 5½"	9⅝"
	8	11½"	5' - 5½"	9⅝"
	9	11½"	5' - 5½"	9⅞"
	10	11½"	5' - 5½"	9½"

TABLE OF SECTION DEPTHS (Phase 2)				
Span No.	Girder No.	"X" AT ℄ Brg	"Y" AT ℄ Brg	"Z" AT ℄ Span ③
1	4 - 7	11½"	5' - 5½"	9⅝"
2	4 - 7	11½"	5' - 5½"	9⅝"

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US 59

220.00' PRESTRESSED CONCRETE GIRDER UNIT
(SPANS 1 & 2)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 2 OF 2

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		176

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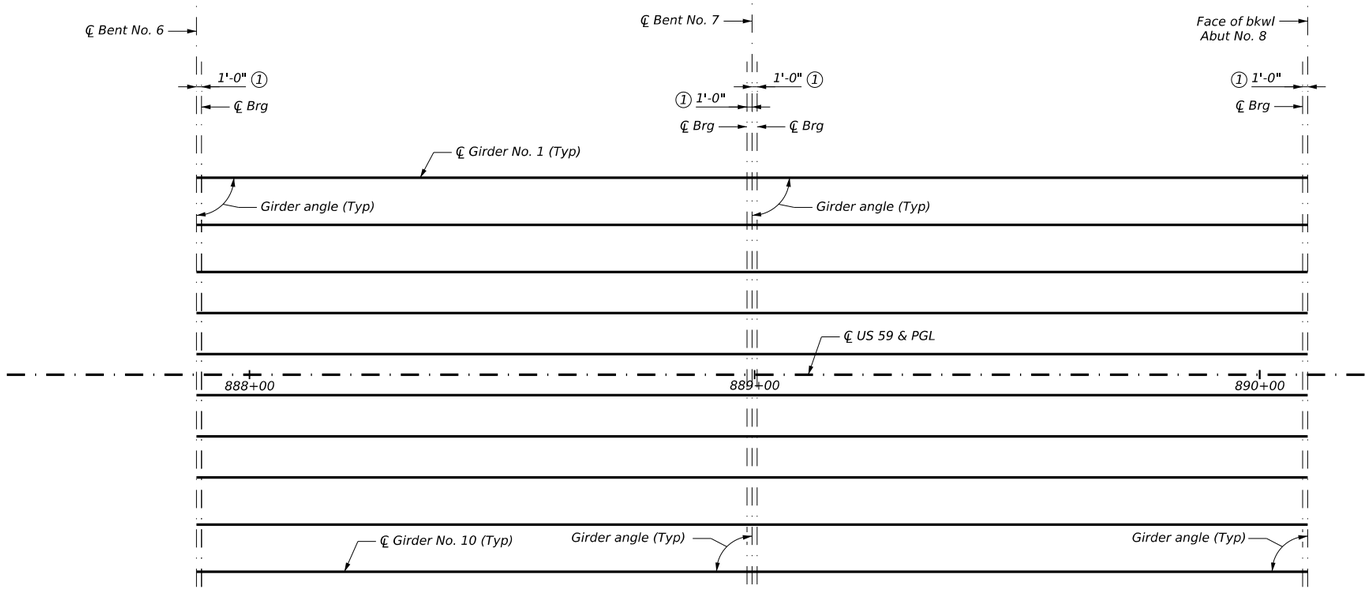

SPAN 6
(Tx54 Girders)

SPAN 7
(Tx54 Girders)

① See IGEB standard for orientation of dimensions.

② Girder lengths shown are bottom girder flange lengths with adjustments made for girder slope.

BENT REPORT

BENT NO. 6 (S 42 48 22.09 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 39.000 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 6	GIRDER	1	0.000	90	0	0
	GIRDER	2	9.333	90	0	0
	GIRDER	3	9.333	90	0	0
	GIRDER	4	8.133	90	0	0
	GIRDER	5	8.133	90	0	0
	GIRDER	6	8.133	90	0	0
	GIRDER	7	8.133	90	0	0
	GIRDER	8	8.133	90	0	0
	GIRDER	9	9.333	90	0	0
	GIRDER	10	9.333	90	0	0
	TOTAL		78.000			

BENT NO. 7 (S 42 48 22.09 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 39.000 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 6	GIRDER	1	0.000	90	0	0
	GIRDER	2	9.333	90	0	0
	GIRDER	3	9.333	90	0	0
	GIRDER	4	8.133	90	0	0
	GIRDER	5	8.133	90	0	0
	GIRDER	6	8.133	90	0	0
	GIRDER	7	8.133	90	0	0
	GIRDER	8	8.133	90	0	0
	GIRDER	9	9.333	90	0	0
	GIRDER	10	9.333	90	0	0
	TOTAL		78.000			
SPAN 7	GIRDER	1	0.000	90	0	0
	GIRDER	2	9.333	90	0	0
	GIRDER	3	9.333	90	0	0
	GIRDER	4	8.133	90	0	0
	GIRDER	5	8.133	90	0	0
	GIRDER	6	8.133	90	0	0
	GIRDER	7	8.133	90	0	0
	GIRDER	8	8.133	90	0	0
	GIRDER	9	9.333	90	0	0
	GIRDER	10	9.333	90	0	0
	TOTAL		78.000			

ABUT NO. 8 (S 42 48 22.09 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 39.000 L

			GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 7	GIRDER	1	0.000	90	0	0
	GIRDER	2	9.333	90	0	0
	GIRDER	3	9.333	90	0	0
	GIRDER	4	8.133	90	0	0
	GIRDER	5	8.133	90	0	0
	GIRDER	6	8.133	90	0	0
	GIRDER	7	8.133	90	0	0
	GIRDER	8	8.133	90	0	0
	GIRDER	9	9.333	90	0	0
	GIRDER	10	9.333	90	0	0
	TOTAL		78.000			

GIRDER REPORT

GIRDER REPORT, SPAN 6

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GD. FLG.②	GIRDER SLOPE
GIRDER 1	110.000	108.000	109.51	-0.0105
GIRDER 2	110.000	108.000	109.51	-0.0105
GIRDER 3	110.000	108.000	109.51	-0.0105
GIRDER 4	110.000	108.000	109.51	-0.0105
GIRDER 5	110.000	108.000	109.51	-0.0105
GIRDER 6	110.000	108.000	109.51	-0.0105
GIRDER 7	110.000	108.000	109.51	-0.0105
GIRDER 8	110.000	108.000	109.51	-0.0105
GIRDER 9	110.000	108.000	109.51	-0.0105
GIRDER 10	110.000	108.000	109.51	-0.0105

GIRDER REPORT, SPAN 7

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GD. FLG.②	GIRDER SLOPE
GIRDER 1	110.000	108.000	109.51	-0.0138
GIRDER 2	110.000	108.000	109.51	-0.0138
GIRDER 3	110.000	108.000	109.51	-0.0138
GIRDER 4	110.000	108.000	109.51	-0.0138
GIRDER 5	110.000	108.000	109.51	-0.0138
GIRDER 6	110.000	108.000	109.51	-0.0138
GIRDER 7	110.000	108.000	109.51	-0.0138
GIRDER 8	110.000	108.000	109.51	-0.0138
GIRDER 9	110.000	108.000	109.51	-0.0138
GIRDER 10	110.000	108.000	109.51	-0.0138

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

FRAMING PLAN
(SPANS 6 & 7)

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		177

DATE: 7/3/2024
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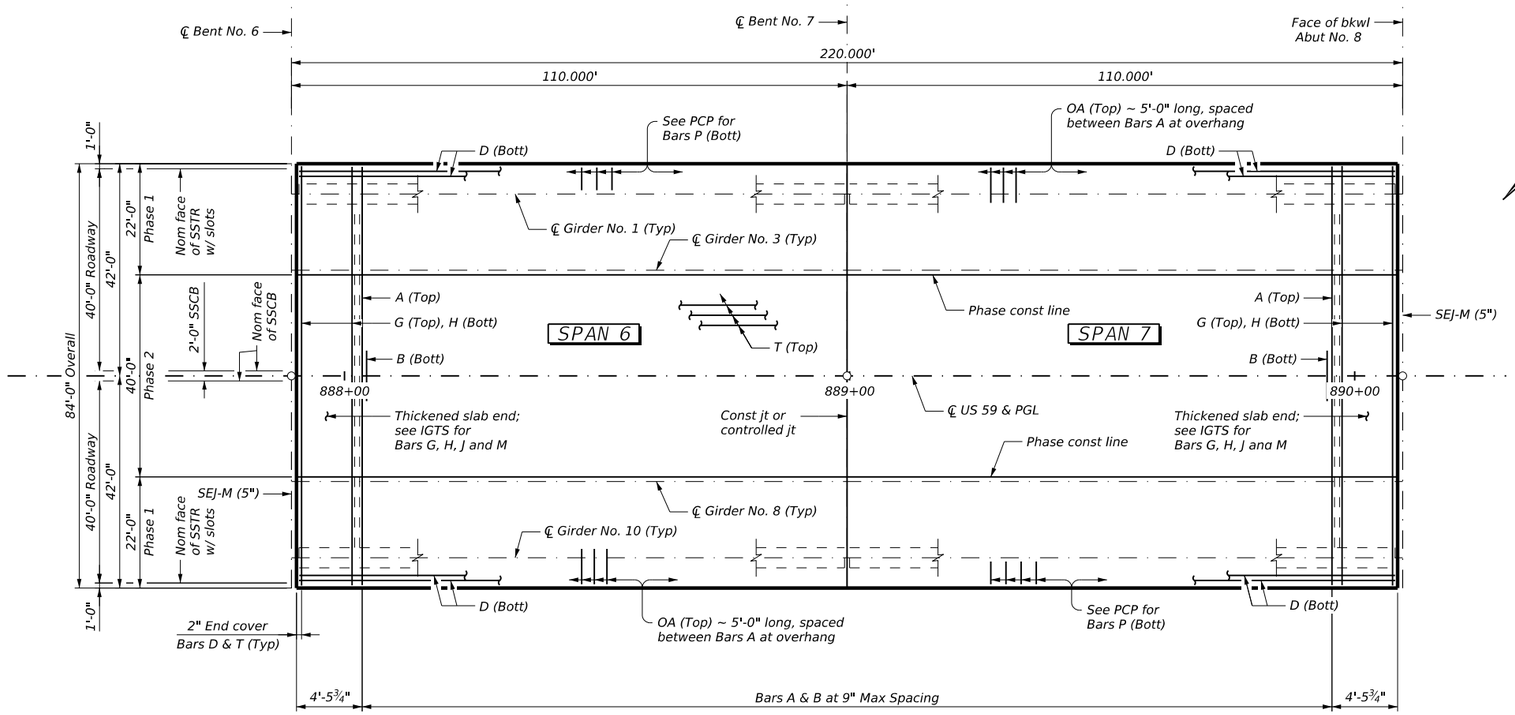


PLAN

TABLE OF ESTIMATED QUANTITIES (Phase 1)

Span No.	Reinf Concrete Slab	Prestressed Conc Girders (1) (Tx54)	Total Reinforcing Steel (2)
	SF	LF	LB
6	4,840	657.06	11,132
7	4,840	657.06	11,132
TOTAL	9,680	1,314.12	22,264

TABLE OF ESTIMATED QUANTITIES (Phase 2)

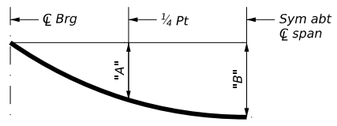
Span No.	Reinf Concrete Slab	Prestressed Conc Girders (1) (Tx54)	Total Reinforcing Steel (2)
	SF	LF	LB
6	4,400	438.04	10,120
7	4,400	438.04	10,120
TOTAL	8,800	876.08	20,240

TABLE OF DEAD LOAD DEFLECTIONS (Phase 1)

Span No.	Girder No.	"A" FT	"B" FT
6 & 7	1 - 3	0.119	0.169
	8 - 10	0.119	0.169

TABLE OF DEAD LOAD DEFLECTIONS (Phase 2)

Span No.	Girder No.	"A" FT	"B" FT
6 & 7	4 - 7	0.103	0.147



DEAD LOAD DEFLECTION DIAGRAM

Note: Deflections shown are due to prestressed concrete panels and cast-in-place slab only. (E_c = 5,000 ksi). Adjust deflections based on field observations as needed.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 9th edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

See Prestressed Concrete Panels (PCP) and Prestressed Concrete Panel Fabrication Details (PCP-FAB) standard sheets for panel details not shown.

See Thickened Slab End Details (IGTS) standard sheet for Thickened Slab End details and quantity adjustments.

See Miscellaneous Slab Details (IGMS) standard sheet for miscellaneous details.

See Traffic Rail Single Slope (SSTR) standard sheets for rail anchorage in slab.

See Single Slope Concrete Barrier (SSCB) standard sheet for rail anchorage in slab.

See Permanent Metal Deck Forms (PMDF) standard sheet for details and quantity adjustments if this option is used.

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 bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"

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) Quantities shown are bottom girder flange lengths with adjustments made for girder slope. See FRAMING PLAN for girder lengths.

(2) For contractor's information only. Reinforcing steel weight is calculated using an approximate factor of 2.3 psf.

HL93 LOADING

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BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER
7.3.2024

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US 59

220.00' PRESTRESSED CONCRETE GIRDER UNIT
(SPANS 6 & 7)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 1 OF 2

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		178

DATE: 7/3/2024
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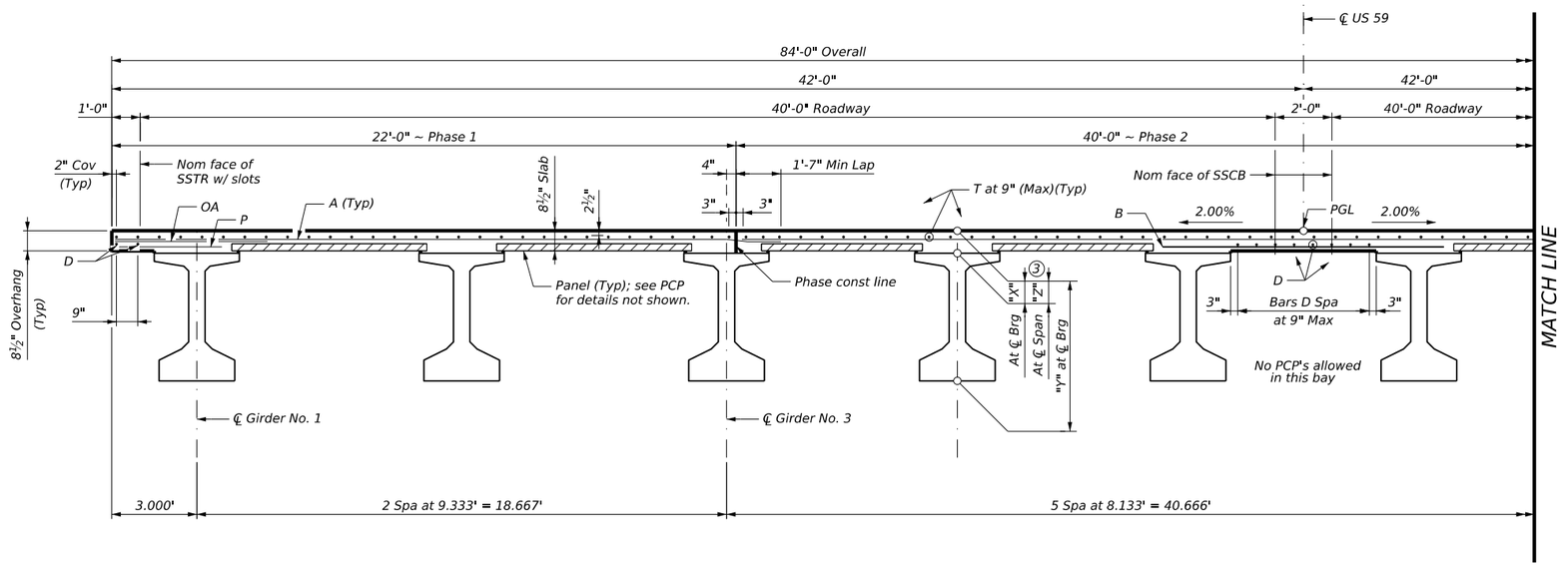
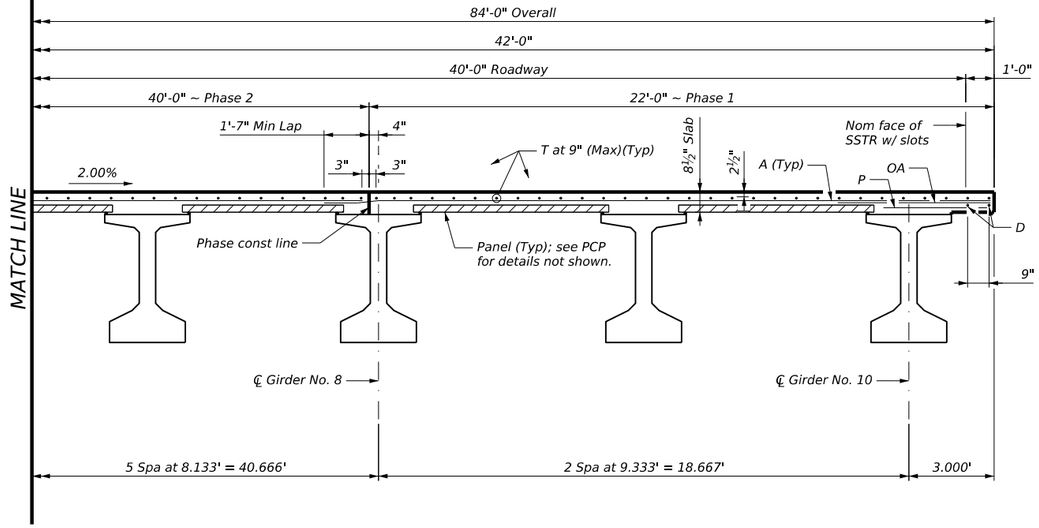


TYPICAL TRANSVERSE SECTION

BAR TABLE	
BAR	SIZE
A	#4
B	#4
D	#4
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

③ Theoretical dimension.



TYPICAL TRANSVERSE SECTION

TABLE OF SECTION DEPTHS (Phase 1)				
Span No.	Girder No.	"X" AT ℄ Brg	"Y" AT ℄ Brg	"Z" AT ℄ Span ③
6	1	11½"	5' - 5½"	9½"
	2	11½"	5' - 5½"	9⅞"
	3	11½"	5' - 5½"	9⅝"
	8	11½"	5' - 5½"	9⅝"
	9	11½"	5' - 5½"	9⅞"
	10	11½"	5' - 5½"	9½"
7	1	11½"	5' - 5½"	9½"
	2	11½"	5' - 5½"	9⅞"
	3	11½"	5' - 5½"	9⅝"
	8	11½"	5' - 5½"	9⅝"
	9	11½"	5' - 5½"	9⅞"
	10	11½"	5' - 5½"	9½"

TABLE OF SECTION DEPTHS (Phase 2)				
Span No.	Girder No.	"X" AT ℄ Brg	"Y" AT ℄ Brg	"Z" AT ℄ Span ③
6	4 - 7	11½"	5' - 5½"	9⅝"
7	4 - 7	11½"	5' - 5½"	9⅝"

HL93 LOADING

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER
7.3.2024

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US 59

220.00' PRESTRESSED CONCRETE GIRDER UNIT
(SPANS 6 & 7)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 2 OF 2

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		179

DATE: 7/3/2024
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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
SAN ANTONIO RIVER BRIDGE AT US 59	1, 2, 6, 7	1 - 10	Tx54		42	0.6	270	19.01	12.72	6	50.5	5.600	6.600	3.919	-4.065	8112	0.711	0.964	1.70	2.28	1.31

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.

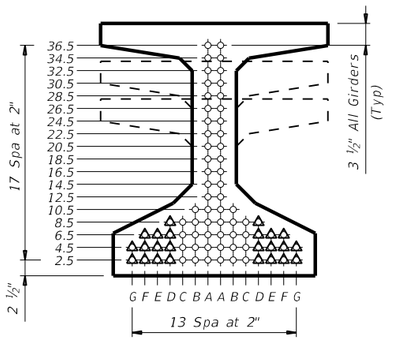
When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

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.

To complete this sheet input the girder designs in the table and the relative humidity under Design Notes. In all cases, remove this block. This sheet must be signed, sealed, and dated by a registered Professional Engineer.



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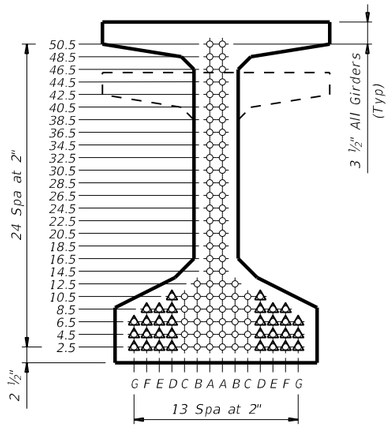

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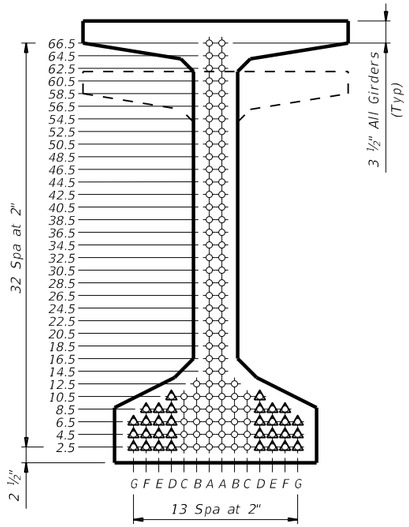

TYPE Tx62 & Tx70

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7.3.2024

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND

FILE: igndsts1-22.dgn	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.	0088	02	062	US59
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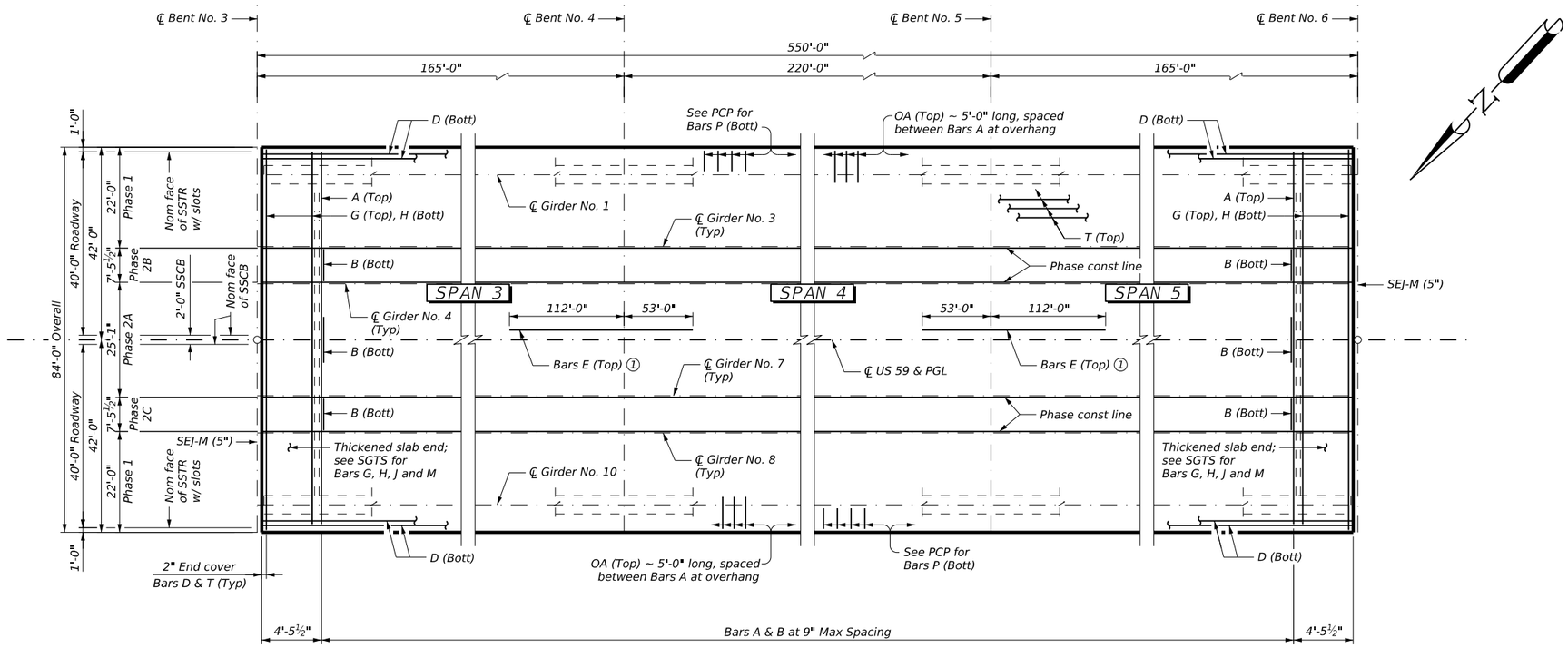
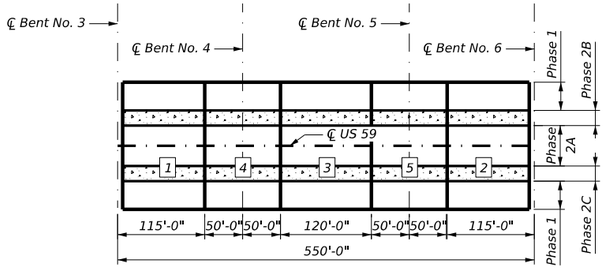
	CRP	GOLIAD		180



PLAN



PLACEMENT SEQUENCE

(Continuous placement permitted only in Phase 2B & Phase 2C.)

TABLE OF ESTIMATED QUANTITIES

(Phase 1)

Span No.	Reinf Concrete Slab	Reinforcing Steel ②	Str Steel (Plate Girder)
	SF	LB	LB
3	7,260	30,540	
4	9,680	40,721	
5	7,260	30,540	
TOTAL	24,200	71,261	1,252,000

TABLE OF ESTIMATED QUANTITIES

(Phase 2)

Span No.	Reinf Concrete Slab	Reinforcing Steel ②	Str Steel (Plate Girder)
	SF	LB	LB
3	6,600	27,764	
4	8,800	37,019	
5	6,600	27,764	
TOTAL	22,000	64,783	806,000

BAR TABLE

Bar	Size
A	#4
B	#4
D	#4
E	#5
G	#4
H	#4
J	#4
M	#4
OA	#5
P	#4
T	#4

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications 9th edition (2020) and TxDOT Bridge Design Manual (Jan 2023).

The Contractor is required to submit an erection plan in accordance with Item 441.3. The Contractor is cautioned that uplift can occur at the supports depending on the erection sequence and means of support of the partially erected structures. Evaluate the structure at various stages of completion for uplift and wind load and take positive measures to prevent uplift or sliding at the support.

See Prestressed Concrete Panels (PCP) and Prestressed Concrete Panel Fabrication Details (PCP-FAB) standard sheets for panel details not shown.

See Permanent Metal Deck Forms (PMDF) standard sheet for details and quantity adjustments if this option is used. Do not weld PMDF on tension flanges.

Do not pour the concrete deck until the installation of all girders and steel components in each phase is completed.

See Thickened Slab End Details (Steel Girders & Beams) (SGTS) standard for thickened slab end details and quantity adjustments.

See Miscellaneous Slab Details (SGMS) standard for miscellaneous details.

See Traffic Rail Single Slope (SSTR) standard sheets for rail anchorage in slab.

See Single Slope Concrete Barrier (SSCB) standard sheet for rail anchorage in 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 bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
#5 = 2'-0"

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 *1 - Bars E spaced between Bars T.*

② *For contractor's information only. Reinforcing steel weight is calculated using an approximate factor of 4.2 psf.*

LEGEND:

Continuous pour permitted

HL93 LOADING

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LICENSED PROFESSIONAL ENGINEER

7.3.2024

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US 59

550' STEEL PLATE GIRDER UNIT (SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 1 OF 9

DESIGNED:	BZ	CONT	SECT	JOB	HIGHWAY
CHECKED:	LNH	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		181

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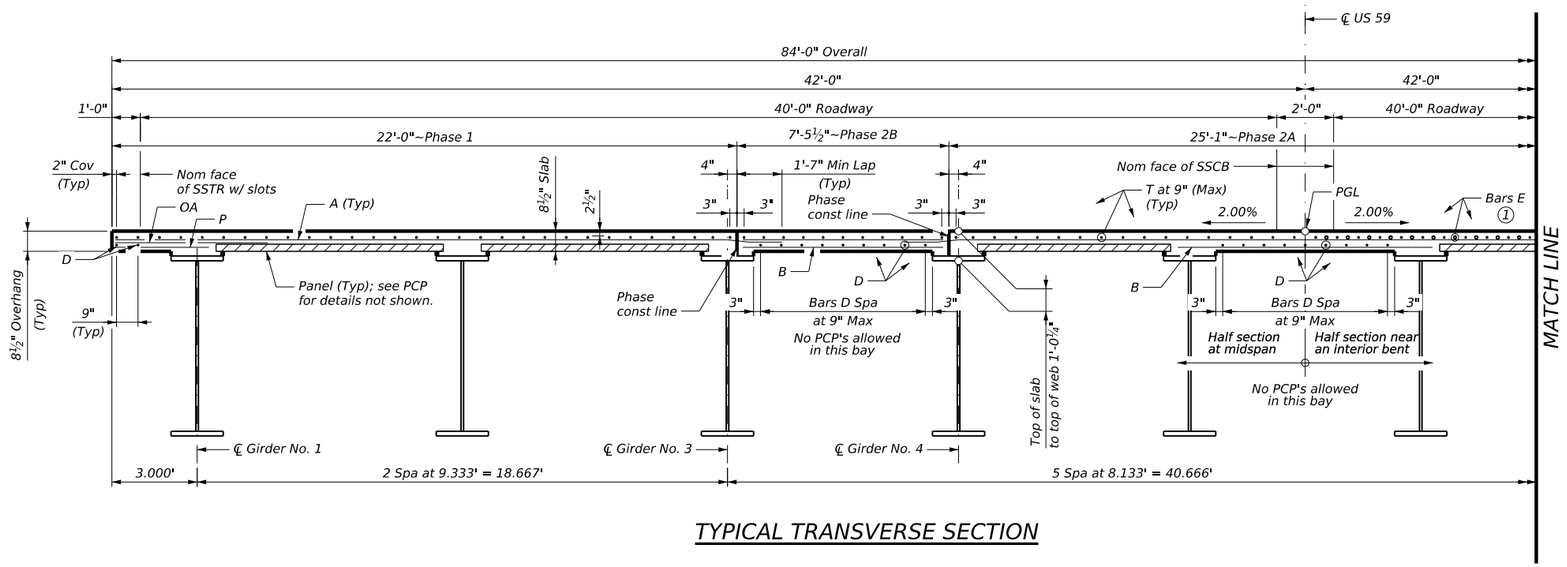
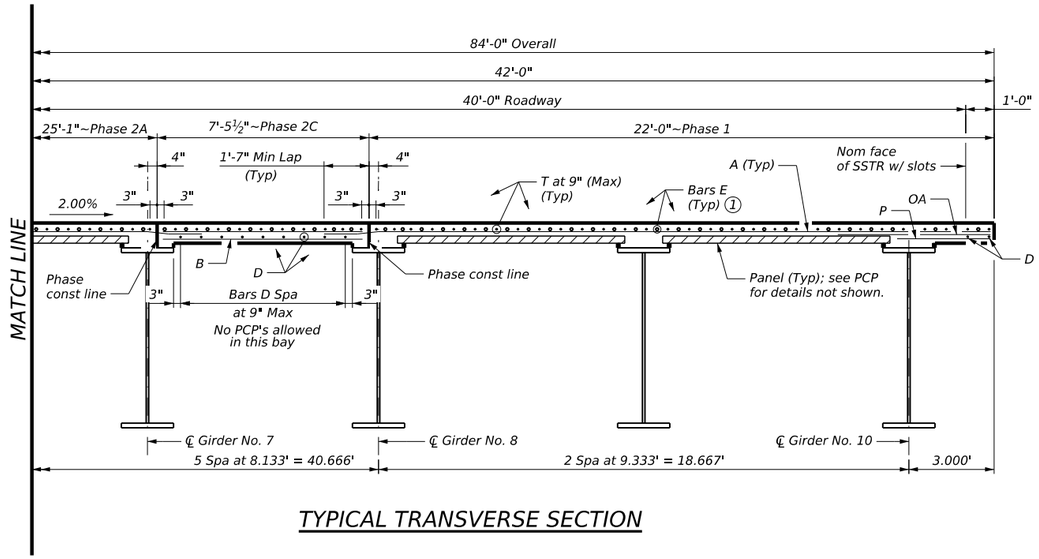
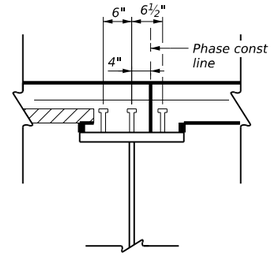


TYPICAL TRANSVERSE SECTION

① 1 - Bars E spaced between Bars T.



TYPICAL TRANSVERSE SECTION



STUD CONNECTOR DETAIL AT PHASE LINE

This detail is specifically applicable to Girders Nos. 3, 4, 7 & 8 to meet form work and PCP clearance requirements. Other stud connector spacings may be used for girders not at the phase line.

Weld studs to the flange in accordance with AWS D1.5. See Prestressed Concrete Panels (PCP) for details and notes not shown. Studs must be at least 5" in height.

HL93 LOADING

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US 59

550' STEEL PLATE GIRDER UNIT (SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 2 OF 9

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		182

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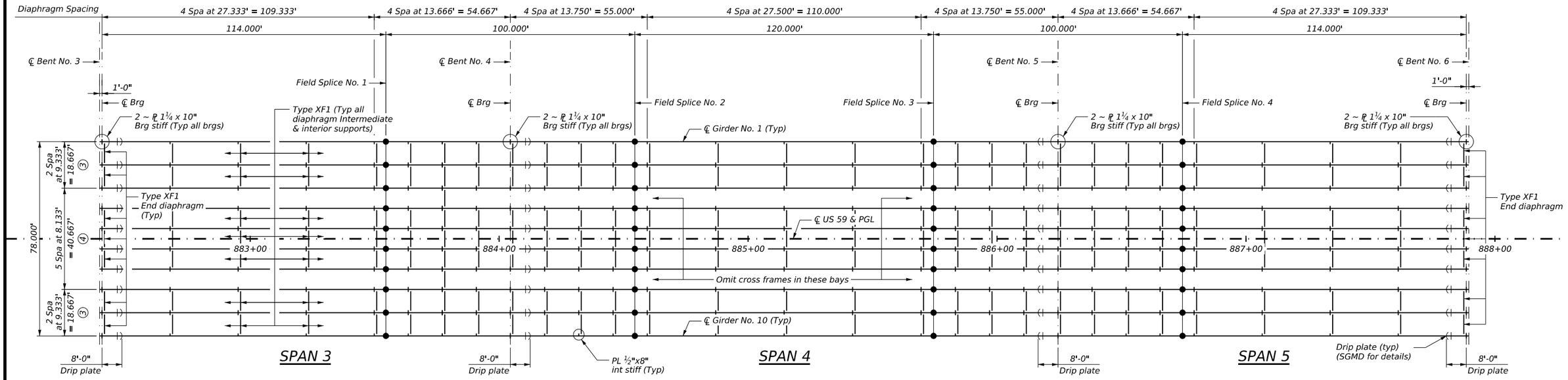

FRAMING PLAN

(Unit 2)

PLATE GIRDER FABRICATION NOTES:

See Sheet 1 of 9 for GENERAL NOTES.

All structural steel, including girders, stiffeners, diaphragms, splice plates, bolts, and shear studs will be paid for as Bid Item 442-7001 - STR STEEL (PLATE GIRDER).

Provide drip pans on every girder at both ends of unit. See DRIP PAN DETAILS sheets for more information. Payment for drip pans is subsidiary to Bid Item 0442-7001 - STR STEEL (PLATE GIRDER).

Provide ASTM A709 Grade 50W steel for all structural steel including steel for stiffeners and cross-frames, unless noted otherwise.

Do not paint structural steel.

Girder tension flanges and webs must conform to Item 442.2.1.2.2.

Shop flange and web splices will be made by full penetration groove welds in accordance with Item 441.

Locate shop flange and web splices at least 6 in. away from a web and flange splice respectively, or transverse stiffener in order to facilitate nondestructive testing of welds. Splices should be at least 10 ft. apart.

Field splices will be bolted. Structural steel pay weight is based on bolted field splices and it includes the weight of the splice plates. See Sheet 9 of 9 or bolted field splice details.

Provide Class **"A"** surface condition for the faying surfaces of bolted connections.

Support steel girders to prevent overturning immediately after the erection of the first girder.

Except at changes in sections, shop or field flange and web splices in plate girders may be located as desirable to optimize plate lengths and erection procedures, except that splices are not allowed where a 40 ft or less unspliced length would suffice.

Plate girders and all cross-frames will be detailed so that the girder webs are plumb at the steel dead load fit condition.

All dimensions shown in Girder Elevation are horizontal dimensions.

See Miscellaneous Details (Steel Girders And Beams) (SGMD) standard for cross frame details.

③ Phase 1

④ Phase 2A

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation
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US 59

550' STEEL PLATE GIRDER UNIT (SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 3 OF 9

DESIGNED: BZ	CONT	SECT	JOB	HIGHWAY
CHECKED: LNH	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		183

DATE: 7/3/2024
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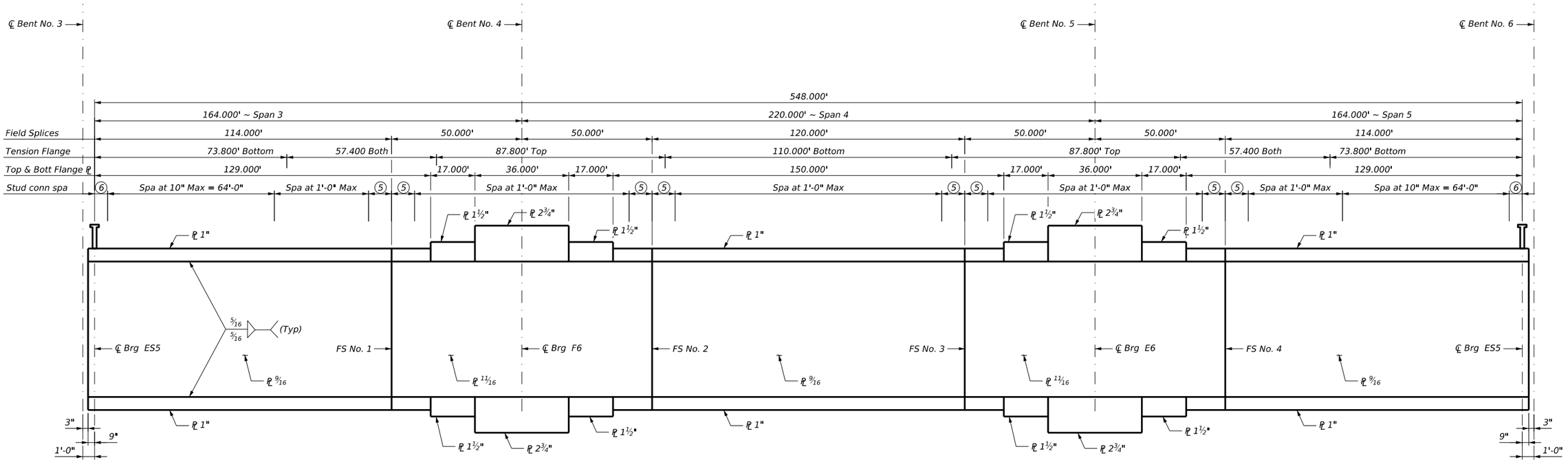

ELEVATION

(Unit 2)
Girder Nos. 1-3 & 8-10

HL93 LOADING

NOTES:

All web plates are 72" deep.

Both top and bottom flanges are 22" wide.

See plate girder fabrication notes on sheet 3 of 9.

⑤ Terminate 6" from either side of top flange splice plates.

⑥ 4 Spa at 6" = 2'-0".

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Texas Department of Transportation

US 59

550' STEEL PLATE
GIRDER UNIT
(SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 4 OF 9

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		184

DATE: 7/3/2024
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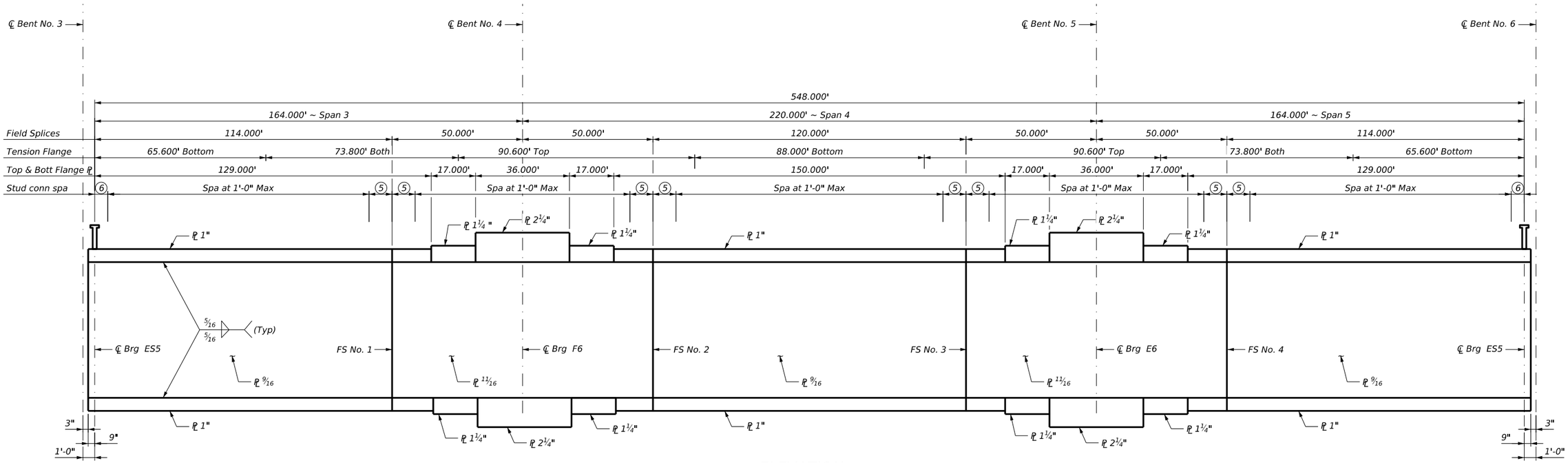

ELEVATION

(Unit 2)
Girder Nos. 4-7

NOTES:

All web plates are 72" deep.

Both top and bottom flanges are 22" wide.

See plate girder fabrication notes on sheet 3 of 9.

⑤ Terminate 6" from either side of top flange splice plates.

⑥ 4 Spa at 6" = 2'-0"

HL93 LOADING

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Texas Department of Transportation

US 59

550' STEEL PLATE
GIRDER UNIT
(SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 5 OF 9

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		185

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms6635410 62_BSP027.dgn

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 1)

Due to Cast-In-Place Concrete Only (ft.)

Location		Girder Nos. 1 & 10	Girder Nos. 2 & 9	Girder Nos. 3 & 8
Span No. 3	0	0.000	0.000	0.000
	1	0.036	0.043	0.024
	2	0.070	0.084	0.047
	3	0.100	0.121	0.068
	4	0.127	0.152	0.085
	5	0.147	0.177	0.099
	6	0.161	0.194	0.109
	7	0.169	0.204	0.114
	8	0.170	0.205	0.115
	9	0.165	0.198	0.111
	10	0.154	0.185	0.104
	11	0.137	0.165	0.093
	12	0.117	0.141	0.079
	13	0.094	0.113	0.063
	FS 1	0.072	0.087	0.049
	14	0.070	0.084	0.047
	15	0.047	0.056	0.032
	16	0.027	0.032	0.018
	17	0.011	0.014	0.008
	18	0.002	0.002	0.001
	19	-0.002	-0.003	-0.002
Span No. 4	20	0.000	0.000	0.000
	21	0.014	0.017	0.009
	22	0.038	0.046	0.026
	23	0.073	0.088	0.049
	24	0.116	0.139	0.078
	FS 2	0.141	0.170	0.095
	25	0.162	0.195	0.109
	26	0.207	0.249	0.139
	27	0.246	0.296	0.166
	28	0.277	0.333	0.187
	29	0.296	0.356	0.199
	30	0.302	0.364	0.204
	31	0.296	0.356	0.199
	32	0.277	0.333	0.187
	33	0.246	0.296	0.166
	34	0.207	0.249	0.139
	35	0.162	0.195	0.109
	FS 3	0.141	0.170	0.095
	36	0.116	0.139	0.078
	37	0.073	0.088	0.049
	38	0.038	0.046	0.026
	39	0.014	0.017	0.009
	40	0.000	0.000	0.000
Span No. 5	41	-0.002	-0.003	-0.002
	42	0.002	0.002	0.001
	43	0.011	0.014	0.008
	44	0.027	0.032	0.018
	45	0.047	0.056	0.032
	46	0.070	0.084	0.047
	FS 4	0.072	0.087	0.049
	47	0.094	0.113	0.063
	48	0.117	0.141	0.079
	49	0.137	0.165	0.093
	50	0.154	0.185	0.104
	51	0.165	0.198	0.111
	52	0.170	0.205	0.115
	53	0.169	0.204	0.114
	54	0.161	0.194	0.109
	55	0.147	0.177	0.099
	56	0.127	0.152	0.085
	57	0.100	0.121	0.068
	58	0.070	0.084	0.047
	59	0.036	0.043	0.024
	60	0.000	0.000	0.000

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 1)

Total Dead Load Deflection Including Steel (ft.)

Location		Girder Nos. 1 & 10	Girder Nos. 2 & 9	Girder Nos. 3 & 8
Span No. 3	0	0.000	0.000	0.000
	1	0.047	0.055	0.036
	2	0.093	0.107	0.070
	3	0.133	0.154	0.100
	4	0.168	0.193	0.126
	5	0.195	0.225	0.147
	6	0.214	0.247	0.161
	7	0.224	0.259	0.169
	8	0.226	0.260	0.170
	9	0.219	0.252	0.165
	10	0.204	0.235	0.154
	11	0.182	0.210	0.137
	12	0.155	0.179	0.117
	13	0.125	0.144	0.094
	FS 1	0.096	0.111	0.072
	14	0.093	0.107	0.070
	15	0.062	0.072	0.047
	16	0.036	0.041	0.027
	17	0.015	0.018	0.012
	18	0.002	0.003	0.002
	19	-0.003	-0.003	-0.002
Span No. 4	20	0.000	0.000	0.000
	21	0.019	0.022	0.014
	22	0.051	0.059	0.039
	23	0.098	0.113	0.074
	24	0.155	0.178	0.117
	FS 2	0.188	0.217	0.142
	25	0.216	0.249	0.163
	26	0.276	0.318	0.208
	27	0.328	0.378	0.248
	28	0.368	0.425	0.278
	29	0.394	0.454	0.298
	30	0.403	0.464	0.304
	31	0.394	0.454	0.298
	32	0.368	0.425	0.278
	33	0.328	0.378	0.248
	34	0.276	0.318	0.208
	35	0.216	0.249	0.163
	FS 3	0.188	0.217	0.142
	36	0.155	0.178	0.117
	37	0.098	0.113	0.074
	38	0.051	0.059	0.039
	39	0.019	0.022	0.014
	40	0.000	0.000	0.000
Span No. 5	41	-0.003	-0.003	-0.002
	42	0.002	0.003	0.002
	43	0.015	0.018	0.012
	44	0.036	0.041	0.027
	45	0.062	0.072	0.047
	46	0.093	0.107	0.070
	FS 4	0.096	0.111	0.072
	47	0.125	0.144	0.094
	48	0.155	0.179	0.117
	49	0.182	0.210	0.137
	50	0.204	0.235	0.154
	51	0.219	0.252	0.165
	52	0.226	0.260	0.170
	53	0.224	0.259	0.169
	54	0.214	0.247	0.161
	55	0.195	0.225	0.147
	56	0.168	0.193	0.126
	57	0.133	0.154	0.100
	58	0.093	0.107	0.070
	59	0.047	0.055	0.036
	60	0.000	0.000	0.000

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 2A)

Due to Cast-In-Place Concrete Only (ft.)

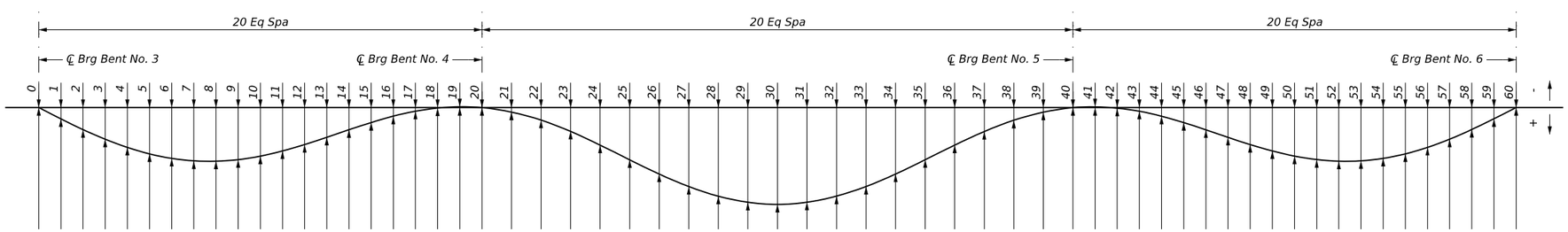
Location		Girder Nos. 4 & 7	Girder Nos. 5 & 6
Span No. 3	0	0.000	0.000
	1	0.022	0.039
	2	0.043	0.076
	3	0.063	0.110
	4	0.079	0.139
	5	0.092	0.161
	6	0.101	0.177
	7	0.106	0.186
	8	0.107	0.188
	9	0.104	0.182
	10	0.097	0.171
	11	0.087	0.153
	12	0.075	0.131
	13	0.060	0.106
	FS 1	0.047	0.082
	14	0.045	0.079
	15	0.030	0.054
	16	0.017	0.031
	17	0.007	0.012
	18	0.001	0.001
	19	-0.002	-0.003
Span No. 4	20	0.000	0.000
	21	0.010	0.018
	22	0.028	0.049
	23	0.052	0.092
	24	0.081	0.143
	FS 2	0.098	0.172
	25	0.112	0.197
	26	0.141	0.249
	27	0.167	0.294
	28	0.187	0.328
	29	0.199	0.350
	30	0.203	0.357
	31	0.199	0.350
	32	0.187	0.328
	33	0.167	0.294
	34	0.141	0.249
	35	0.112	0.197
	FS 3	0.098	0.172
	36	0.081	0.143
	37	0.052	0.092
	38	0.028	0.049
	39	0.010	0.018
	40	0.000	0.000
Span No. 5	41	-0.002	-0.003
	42	0.001	0.001
	43	0.007	0.012
	44	0.017	0.031
	45	0.030	0.054
	46	0.045	0.079
	FS 4	0.047	0.082
	47	0.060	0.106
	48	0.075	0.131
	49	0.087	0.153
	50	0.097	0.171
	51	0.104	0.182
	52	0.107	0.188
	53	0.106	0.186
	54	0.101	0.177
	55	0.092	0.161
	56	0.079	0.139
	57	0.063	0.110
	58	0.043	0.076
	59	0.022	0.039
	60	0.000	0.000

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 2A)

Total Dead Load Deflection Including Steel (ft.)

Location		Girder Nos. 4 & 7	Girder Nos. 5 & 6
Span No. 3	0	0.000	0.000
	1	0.034	0.051
	2	0.067	0.100
	3	0.096	0.144
	4	0.122	0.181
	5	0.142	0.211
	6	0.156	0.232
	7	0.163	0.244
	8	0.165	0.246
	9	0.160	0.239
	10	0.150	0.223
	11	0.135	0.201
	12	0.115	0.172
	13	0.093	0.139
	FS 1	0.072	0.108
	14	0.070	0.104
	15	0.047	0.070
	16	0.027	0.040
	17	0.011	0.016
	18	0.001	0.002
	19	-0.003	-0.004
Span No. 4	20	0.000	0.000
	21	0.016	0.024
	22	0.043	0.064
	23	0.081	0.121
	24	0.127	0.188
	FS 2	0.153	0.227
	25	0.174	0.259
	26	0.220	0.327
	27	0.259	0.386
	28	0.290	0.432
	29	0.309	0.460
	30	0.316	0.470
	31	0.309	0.460
	32	0.290	0.432
	33	0.259	0.386
	34	0.220	0.327
	35	0.174	0.259
	FS 3	0.153	0.227
	36	0.127	0.188
	37	0.081	0.121
	38	0.043	0.064
	39	0.016	0.024
	40	0.000	0.000
Span No. 5	41	-0.003	-0.004
	42	0.001	0.002
	43	0.011	0.016
	44	0.027	0.040
	45	0.047	0.070
	46	0.070	0.104
	FS 4	0.072	0.108
	47	0.093	0.139
	48	0.115	0.172
	49	0.135	0.201
	50	0.150	0.224
	51	0.160	0.239
	52	0.165	0.246
	53	0.163	0.244
	54	0.156	0.232
	55	0.142	0.211
	56	0.122	0.181
	57	0.096	0.144
	58	0.067	0.100
	59	0.034	0.051
	60	0.000	0.000



DEAD LOAD DEFLECTION DIAGRAM

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
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US 59

550' STEEL PLATE GIRDER UNIT (SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 6 OF 9

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		186

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BSP028.dgn

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 2B)

Due to Cast-In-Place Concrete Only (ft.)

Location		Girder No. 2	Girder No. 3	Girder No. 4	Girder No. 5
Span No. 3	0	0.000	0.000	0.000	0.000
	1	0.002	0.003	0.003	0.002
	2	0.004	0.005	0.005	0.004
	3	0.005	0.007	0.008	0.005
	4	0.006	0.009	0.010	0.007
	5	0.008	0.011	0.011	0.008
	6	0.008	0.012	0.013	0.009
	7	0.009	0.012	0.013	0.009
	8	0.009	0.013	0.013	0.009
	9	0.009	0.012	0.013	0.009
	10	0.008	0.011	0.012	0.009
	11	0.007	0.010	0.011	0.008
	12	0.006	0.009	0.010	0.007
	13	0.005	0.007	0.008	0.005
	FS 1	0.004	0.006	0.006	0.004
	14	0.004	0.005	0.006	0.004
	15	0.003	0.004	0.004	0.003
	16	0.002	0.002	0.002	0.002
	17	0.001	0.001	0.001	0.001
	18	0.000	0.000	0.000	0.000
	19	0.000	0.000	0.000	0.000
Span No. 4	20	0.000	0.000	0.000	0.000
	21	0.001	0.001	0.001	0.001
	22	0.002	0.003	0.004	0.003
	23	0.004	0.006	0.007	0.005
	24	0.007	0.009	0.011	0.008
	FS 2	0.008	0.011	0.013	0.009
	25	0.009	0.013	0.015	0.011
	26	0.012	0.016	0.019	0.013
	27	0.014	0.019	0.022	0.016
	28	0.015	0.022	0.025	0.017
	29	0.016	0.023	0.026	0.019
	30	0.017	0.024	0.027	0.019
	31	0.016	0.023	0.026	0.019
	32	0.015	0.022	0.025	0.017
	33	0.014	0.019	0.022	0.016
	34	0.012	0.016	0.019	0.013
	35	0.009	0.013	0.015	0.011
	FS 3	0.008	0.011	0.013	0.009
	36	0.007	0.009	0.011	0.008
	37	0.004	0.006	0.007	0.005
	38	0.002	0.003	0.004	0.003
	39	0.001	0.001	0.001	0.001
Span No. 5	40	0.000	0.000	0.000	0.000
	41	0.000	0.000	0.000	0.000
	42	0.000	0.000	0.000	0.000
	43	0.001	0.001	0.001	0.001
	44	0.002	0.002	0.002	0.002
	45	0.003	0.004	0.004	0.003
	46	0.004	0.005	0.006	0.004
	FS 4	0.004	0.006	0.006	0.004
	47	0.005	0.007	0.008	0.005
	48	0.006	0.009	0.010	0.007
	49	0.007	0.010	0.011	0.008
	50	0.008	0.011	0.012	0.009
	51	0.009	0.012	0.013	0.009
	52	0.009	0.013	0.013	0.009
	53	0.009	0.012	0.013	0.009
	54	0.008	0.012	0.013	0.009
	55	0.008	0.011	0.011	0.008
	56	0.006	0.009	0.010	0.007
	57	0.005	0.007	0.008	0.005
	58	0.004	0.005	0.005	0.004
	59	0.002	0.003	0.003	0.002
	60	0.000	0.000	0.000	0.000

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 2B)

Total Dead Load Deflection Including Steel & Previous Phases Without Rail (ft.)

Location		Girder No. 2	Girder No. 3	Girder No. 4	Girder No. 5
Span No. 3	0	0.000	0.000	0.000	0.000
	1	0.057	0.038	0.037	0.053
	2	0.110	0.075	0.072	0.104
	3	0.159	0.108	0.104	0.149
	4	0.200	0.136	0.131	0.188
	5	0.232	0.158	0.153	0.219
	6	0.255	0.173	0.168	0.241
	7	0.267	0.181	0.177	0.253
	8	0.269	0.183	0.178	0.255
	9	0.261	0.177	0.173	0.248
	10	0.243	0.165	0.162	0.232
	11	0.217	0.148	0.146	0.208
	12	0.185	0.126	0.125	0.178
	13	0.149	0.101	0.101	0.144
	FS 1	0.114	0.078	0.078	0.112
	14	0.111	0.075	0.076	0.108
	15	0.074	0.051	0.051	0.073
	16	0.043	0.029	0.029	0.042
	17	0.018	0.012	0.012	0.017
	18	0.003	0.002	0.001	0.002
	19	-0.004	-0.002	-0.003	-0.004
Span No. 4	20	0.000	0.000	0.000	0.000
	21	0.022	0.015	0.017	0.025
	22	0.061	0.042	0.047	0.067
	23	0.117	0.080	0.088	0.126
	24	0.185	0.126	0.137	0.196
	FS 2	0.225	0.154	0.166	0.236
	25	0.258	0.176	0.189	0.270
	26	0.330	0.225	0.239	0.341
	27	0.392	0.267	0.281	0.402
	28	0.440	0.300	0.314	0.449
	29	0.471	0.321	0.335	0.479
	30	0.481	0.328	0.342	0.489
	31	0.471	0.321	0.335	0.479
	32	0.440	0.300	0.314	0.449
	33	0.392	0.267	0.281	0.402
	34	0.330	0.225	0.239	0.341
	35	0.258	0.176	0.189	0.270
	FS 3	0.225	0.154	0.166	0.236
	36	0.185	0.126	0.137	0.196
	37	0.117	0.080	0.088	0.126
	38	0.061	0.042	0.047	0.067
	39	0.022	0.015	0.017	0.025
Span No. 5	40	0.000	0.000	0.000	0.000
	41	-0.004	-0.002	-0.003	-0.004
	42	0.003	0.002	0.001	0.002
	43	0.018	0.012	0.012	0.017
	44	0.043	0.029	0.029	0.042
	45	0.074	0.051	0.051	0.073
	46	0.111	0.075	0.076	0.108
	FS 4	0.114	0.078	0.078	0.112
	47	0.149	0.101	0.101	0.144
	48	0.185	0.126	0.125	0.178
	49	0.217	0.148	0.146	0.208
	50	0.243	0.165	0.162	0.232
	51	0.261	0.177	0.173	0.248
	52	0.269	0.183	0.178	0.255
	53	0.267	0.181	0.177	0.253
	54	0.255	0.173	0.168	0.241
	55	0.232	0.158	0.153	0.219
	56	0.200	0.136	0.131	0.188
	57	0.159	0.108	0.104	0.149
	58	0.110	0.075	0.072	0.104
	59	0.057	0.038	0.037	0.053
	60	0.000	0.000	0.000	0.000

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 2C)

Due to Cast-In-Place Concrete Only (ft.)

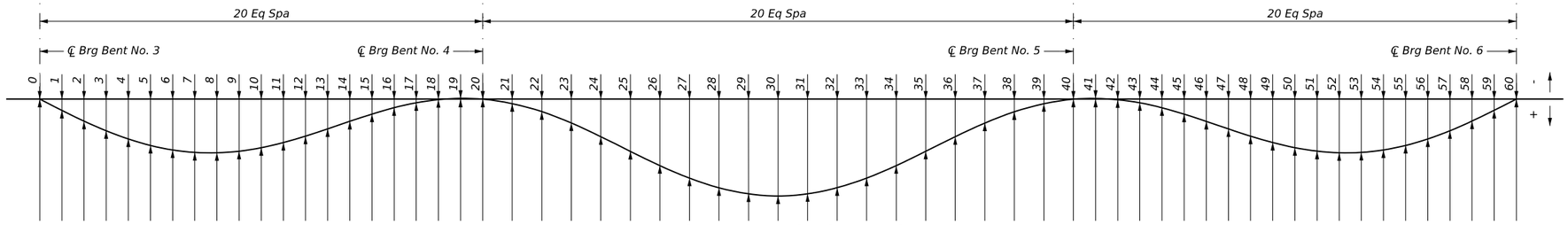
Location		Girder No. 6	Girder No. 7	Girder No. 8	Girder No. 9
Span No. 3	0	0.000	0.000	0.000	0.000
	1	0.002	0.003	0.003	0.002
	2	0.004	0.005	0.005	0.004
	3	0.005	0.008	0.007	0.005
	4	0.007	0.010	0.009	0.006
	5	0.008	0.011	0.011	0.008
	6	0.009	0.013	0.012	0.008
	7	0.009	0.013	0.012	0.009
	8	0.009	0.013	0.013	0.009
	9	0.009	0.013	0.012	0.009
	10	0.009	0.012	0.011	0.008
	11	0.008	0.011	0.010	0.007
	12	0.007	0.010	0.009	0.006
	13	0.005	0.008	0.007	0.005
	FS 1	0.004	0.006	0.006	0.004
	14	0.004	0.006	0.005	0.004
	15	0.003	0.004	0.004	0.003
	16	0.002	0.002	0.002	0.002
	17	0.001	0.001	0.001	0.001
	18	0.000	0.000	0.000	0.000
	19	0.000	0.000	0.000	0.000
Span No. 4	20	0.000	0.000	0.000	0.000
	21	0.001	0.001	0.001	0.001
	22	0.003	0.004	0.003	0.002
	23	0.005	0.007	0.006	0.004
	24	0.008	0.011	0.009	0.007
	FS 2	0.009	0.013	0.011	0.008
	25	0.011	0.015	0.013	0.009
	26	0.013	0.019	0.016	0.012
	27	0.016	0.022	0.019	0.014
	28	0.017	0.025	0.022	0.015
	29	0.019	0.026	0.023	0.016
	30	0.019	0.027	0.024	0.017
	31	0.019	0.026	0.023	0.016
	32	0.017	0.025	0.022	0.015
	33	0.016	0.022	0.019	0.014
	34	0.013	0.019	0.016	0.012
	35	0.011	0.015	0.013	0.009
	FS 3	0.009	0.013	0.011	0.008
	36	0.008	0.011	0.009	0.007
	37	0.005	0.007	0.006	0.004
	38	0.003	0.004	0.003	0.002
	39	0.001	0.001	0.001	0.001
Span No. 5	40	0.000	0.000	0.000	0.000
	41	0.000	0.000	0.000	0.000
	42	0.000	0.000	0.000	0.000
	43	0.001	0.001	0.001	0.001
	44	0.002	0.002	0.002	0.002
	45	0.003	0.004	0.004	0.003
	46	0.004	0.006	0.005	0.004
	FS 4	0.004	0.006	0.006	0.004
	47	0.005	0.008	0.007	0.005
	48	0.007	0.010	0.009	0.006
	49	0.008	0.011	0.010	0.007
	50	0.009	0.012	0.011	0.008
	51	0.009	0.013	0.012	0.009
	52	0.009	0.013	0.013	0.009
	53	0.009	0.013	0.012	0.009
	54	0.009	0.013	0.012	0.008
	55	0.008	0.011	0.011	0.008
	56	0.007	0.010	0.009	0.006
	57	0.005	0.008	0.007	0.005
	58	0.004	0.005	0.005	0.004
	59	0.002	0.003	0.003	0.002
	60	0.000	0.000	0.000	0.000

FS = Field splice

TABLE OF DEAD LOAD DEFLECTIONS (PHASE 2C)

Total Dead Load Deflection Including Steel & Previous Phases Without Rail (ft.)

Location		Girder No. 6	Girder No. 7	Girder No. 8	Girder No. 9
Span No. 3	0	0.000	0.000	0.000	0.000
	1	0.053	0.037	0.038	0.057
	2	0.104	0.072	0.075	0.110
	3	0.149	0.104	0.108	0.159
	4	0.188	0.131	0.136	0.200
	5	0.219	0.153	0.158	0.232
	6	0.241	0.168	0.173	0.255
	7	0.253	0.177	0.181	0.267
	8	0.255	0.178	0.183	0.269
	9	0.248	0.173	0.177	0.261
	10	0.232	0.162	0.165	0.243
	11	0.208	0.146	0.148	0.217
	12	0.178	0.125	0.126	0.185
	13	0.144	0.101	0.101	0.149
	FS 1	0.112	0.078	0.078	0.114
	14	0.108	0.076	0.075	0.111
	15	0.073	0.051	0.051	0.074
	16	0.042	0.029	0.029	0.043
	17	0.017	0.012	0.012	0.018
	18	0.002	0.001	0.002	0.003
	19	-0.004	-0.003	-0.002	-0.004
Span No. 4	20	0.000	0.000	0.000	0.000
	21	0.025	0.017	0.015	0.022
	22	0.067	0.047	0.042	0.061
	23	0.126	0.088	0.080	0.117
	24	0.196	0.137	0.126	0.185
	FS 2	0.236	0.166	0.154	0.225
	25	0.270	0.189	0.176	0.258
	26	0.341	0.239	0.225	0.330
	27	0.402	0.281	0.267	0.392
	28	0.449	0.314	0.300	0.440
	29	0.479	0.335	0.321	0.471
	30	0.489	0.342	0.328	0.481
	31	0.479	0.335	0.321	0.471
	32	0.449	0.314	0.300	0.440
	33	0.402	0.281	0.267	0.392
	34	0.341	0.239	0.225	0.330
	35	0.270	0.189	0.176	0.258
	FS 3	0.236	0.166	0.154	0.225
	36	0.196	0.137	0.126	0.185
	37	0.126	0.088	0.080	0.117
	38	0.067	0.047	0.042	0.061
	39	0.025	0.017	0.015	0.022
Span No. 5	40	0.000	0.000	0.000	0.000
	41	-0.004	-0.003	-0.002	-0.004
	42	0.002	0.001	0.002	0.003
	43	0.017	0.012	0.012	0.018
	44	0.042	0.029	0.029	0.043
	45	0.073	0.051	0.051	0.074
	46	0.108	0.076	0.075	0.111
	FS 4	0.112	0.078	0.078	0.114
	47	0.144	0.101	0.101	0.149
	48	0.178	0.125	0.126	0.185
	49	0.208	0.146	0.148	0.217
	50	0.232	0.162	0.165	0.243
	51	0.248	0.173	0.177	0.261
	52	0.255	0.178	0.183	0.269
	53	0.253	0.177	0.181	0.267
	54	0.241	0.168	0.173	0.255
	55	0.219	0.153	0.158	0.232
	56	0.188	0.131	0.136	0.200
	57	0.149	0.104	0.108	0.159
	58	0.104	0.072	0.075	0.110
	59	0.053	0.037	0.038	0.057
	60	0.000	0.000	0.000	0.000



DEAD LOAD DEFLECTION DIAGRAM

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED
PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation
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US 59

550' STEEL PLATE GIRDER UNIT (SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE AT US 59

SHEET 7 OF 9

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		187

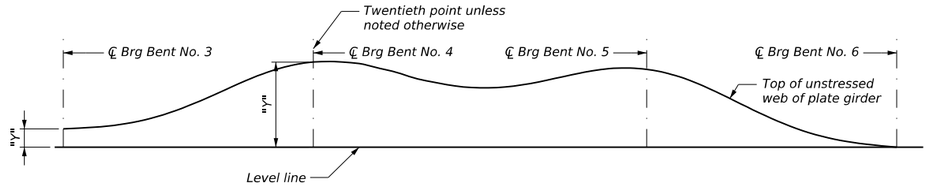
DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_BSP028B.dgn

FS = Field splice

CAMBER DIAGRAM TABLE

"Y" Values (ft.)

Location		Girder Nos. 1 & 10	Girder Nos. 2 & 9	Girder Nos. 3 & 8	Girder Nos. 4 & 7	Girder Nos. 5 & 6
Span No. 3	0	0.242	0.242	0.242	0.242	0.242
	1	0.258	0.251	0.269	0.271	0.254
	2	0.274	0.260	0.297	0.300	0.267
	3	0.293	0.273	0.326	0.330	0.283
	4	0.316	0.291	0.358	0.362	0.303
	5	0.345	0.315	0.393	0.398	0.328
	6	0.379	0.346	0.432	0.437	0.361
	7	0.420	0.386	0.475	0.481	0.401
	8	0.468	0.433	0.524	0.529	0.448
	9	0.522	0.489	0.576	0.581	0.502
	10	0.583	0.551	0.633	0.636	0.563
	11	0.647	0.620	0.692	0.695	0.629
	12	0.716	0.692	0.754	0.755	0.699
	13	0.785	0.766	0.816	0.817	0.771
	FS 1	0.847	0.833	0.871	0.871	0.836
	14	0.854	0.840	0.877	0.877	0.843
	15	0.920	0.910	0.935	0.935	0.912
	16	0.979	0.974	0.988	0.988	0.975
	17	1.031	1.028	1.034	1.035	1.030
	18	1.072	1.072	1.073	1.074	1.073
	19	1.105	1.105	1.104	1.105	1.106
	20	1.127	1.127	1.127	1.127	1.127
Span No. 4	21	1.138	1.135	1.143	1.141	1.133
	22	1.132	1.124	1.144	1.140	1.119
	23	1.108	1.093	1.132	1.124	1.085
	24	1.070	1.047	1.108	1.098	1.037
	FS 2	1.045	1.016	1.091	1.081	1.006
	25	1.024	0.991	1.077	1.066	0.981
	26	0.976	0.934	1.043	1.032	0.925
	27	0.932	0.882	1.012	1.001	0.874
	28	0.896	0.840	0.986	0.974	0.833
	29	0.871	0.811	0.967	0.956	0.805
	30	0.859	0.798	0.958	0.946	0.792
	31	0.861	0.801	0.958	0.946	0.795
	32	0.876	0.820	0.967	0.955	0.813
	33	0.903	0.853	0.983	0.971	0.845
	34	0.937	0.895	1.005	0.993	0.886
	35	0.976	0.943	1.028	1.017	0.933
	FS 3	0.992	0.964	1.038	1.028	0.953
	36	1.012	0.988	1.050	1.040	0.979
	37	1.040	1.025	1.064	1.057	1.017
	38	1.054	1.046	1.067	1.062	1.041
	39	1.051	1.048	1.055	1.053	1.046
	40	1.030	1.030	1.030	1.030	1.030
Span No. 5	41	1.000	1.001	1.000	1.000	1.002
	42	0.961	0.961	0.962	0.962	0.962
	43	0.912	0.910	0.916	0.916	0.911
	44	0.853	0.848	0.862	0.862	0.849
	45	0.786	0.777	0.802	0.802	0.779
	46	0.714	0.700	0.736	0.737	0.702
	FS 4	0.706	0.692	0.730	0.730	0.695
	47	0.638	0.619	0.668	0.669	0.623
	48	0.561	0.537	0.599	0.601	0.544
	49	0.485	0.458	0.530	0.533	0.467
	50	0.413	0.382	0.463	0.467	0.393
	51	0.346	0.312	0.400	0.404	0.326
	52	0.284	0.250	0.340	0.345	0.264
	53	0.229	0.195	0.284	0.290	0.210
	54	0.181	0.148	0.234	0.239	0.163
	55	0.139	0.109	0.187	0.193	0.123
	56	0.104	0.078	0.145	0.150	0.090
	57	0.074	0.053	0.106	0.110	0.063
	58	0.047	0.033	0.070	0.073	0.040
	59	0.023	0.016	0.035	0.037	0.020
	60	0.000	0.000	0.000	0.000	0.000



WEB CAMBER DIAGRAM

Webs may be cut on straight lines between ordinates shown or to a smooth curve at the Fabricator's option. Ordinates shown include total dead load deflection and vertical curve corrections.

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation
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US 59

550' STEEL PLATE
GIRDER UNIT
(SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 8 OF 9

DESIGNED: BN	CONT	SECT	JOB	HIGHWAY
CHECKED: BZ	0088	02	062	US59
DRAWN: PS	DIST	COUNTY		SHEET NO.
CHECKED: BZ	CRP	GOLIAD		188

DATE: 7/3/2024
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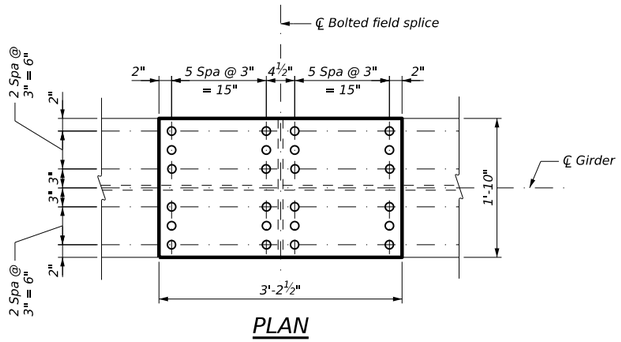
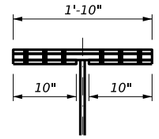
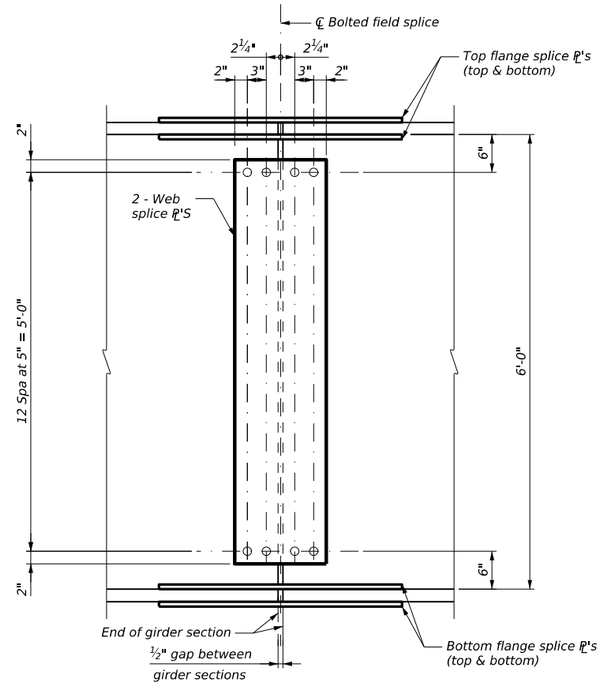


PLAN



SECTION

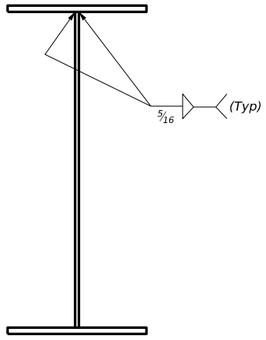
(Top flange splice
Bottom flange opposite hand)



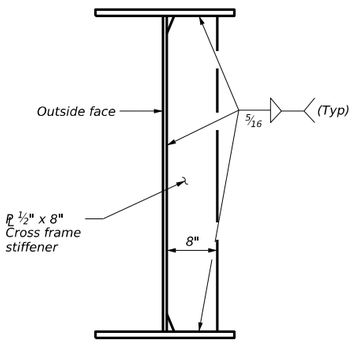
ELEVATION

Web Splice

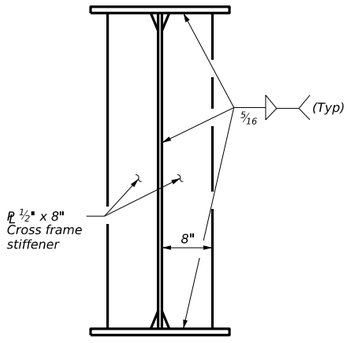
GIRDER NO.	FIELD SPLICE	LOCATION	SPLICE PLATE	TOTAL NO. BOLTS
All	All	Top Flange	PL 5/8" x 22" x 3'-2 1/2"	72
			2 - PL 5/8" x 10" x 3'-2 1/2"	
		Web	2 - PL 9/16" x 14 1/2" x 5'-4"	52
		Bottom Flange	PL 5/8" x 22" x 3'-2 1/2"	72
			2 - PL 5/8" x 10" x 3'-2 1/2"	



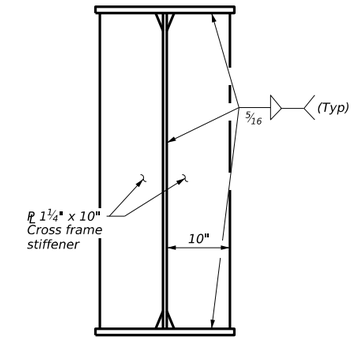
TYPICAL SECTION



INTERMEDIATE DIAPHRAGM (GIRDERS 1 & 10)



INTERMEDIATE DIAPHRAGM (GIRDERS 2-9)



END SUPPORT & INTERIOR SUPPORT DIAPHRAGM (ALL GIRDERS)

BOLTED FIELD SPLICE NOTES:

All bolts are 1" dia ASTM F3125 Gr A325 Type 3 with one hardened washer each and will be tightened in accordance with Item 447.

All holes are 1 1/16" dia.

Provide splice plates conforming to ASTM A709 Gr 50W.

Install bolts with heads on fascia side of web for exterior girders.

Install bottom flange splice bolts with heads facing down.

All splice plates must conform to item 442.2.1.2.2.

Design assumes Class A surface conditions.

Structural steel pay weight is based on bolted field splices regardless of splice type chosen.

Faying surfaces must be blast cleaned and be free of any mill scale. Provide an SSPC-SP 10 blast cleaning before shipment for weathering steel. Do not wire-brush weathering steel faying surfaces.

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation
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US 59

550' STEEL PLATE
GIRDER UNIT
(SPANS 3 - 5)
SAN ANTONIO RIVER BRIDGE
AT US 59

SHEET 9 OF 9

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		189

DATE: 7/3/2024
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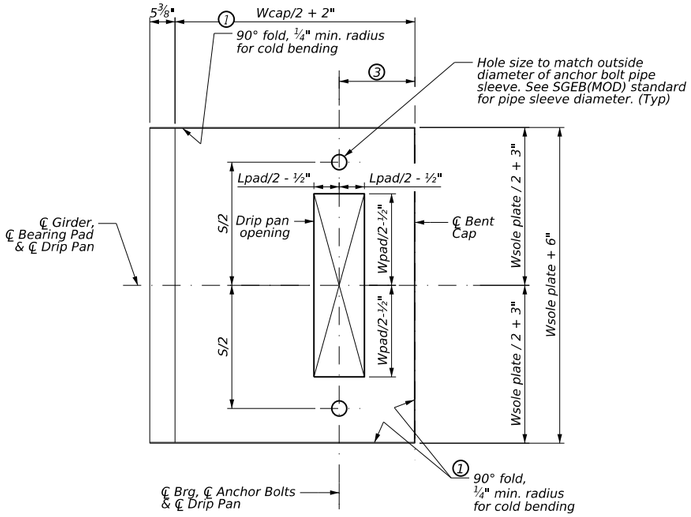
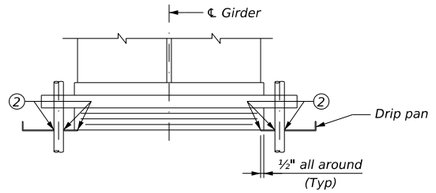
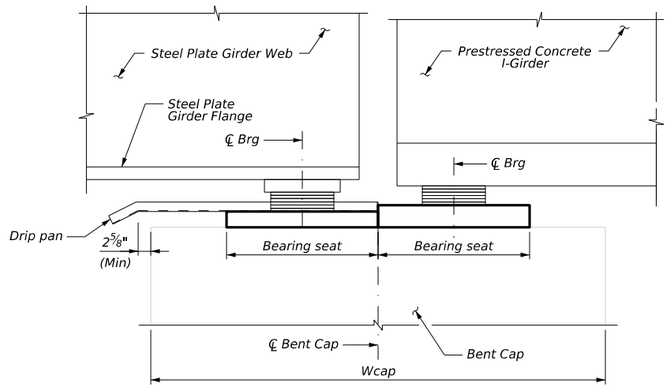
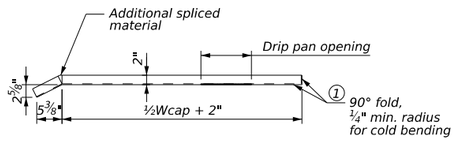


DRIP PAN PLAN



TRANSVERSE SECTION





DRIP PAN ELEVATION

STEEL-CONCRETE UNIT ENDS LONGITUDINAL SECTION

STEEL PLATE GIRDER END SUPPORT

DRIP PAN DETAILS FOR STEEL PLATE GIRDERS

GENERAL NOTES (DRIP PAN UNDER STEEL PLATE GIRDERS):

For dimension "Wcap" see applicable INTERIOR BENT detail sheets.

For Bearing Type see applicable STEEL PLATE GIRDER UNITS details.

For dimensions of Bearing ("Wpad", "Lpad", "Wsole plate", and "S") see SGEB standard.

Pans to be made from 11 gauge stainless steel sheet Type AISI 304 conforming to ASTM A240.

Sealant may be a commercial caulk, mastic, or roofing cement appropriate for an outdoor environment compatible with the materials specified.

Drip pans are subsidiary to Bid Item 442-7001 STR STEEL (PLATE GIRDER).

Drip pans are required on outside girders at both ends of the unit.

1. When bending to final geometry requires cuts to avoid distortion. Such cuts shall be welded or spliced and welded with additional material as necessary to maintain a watertight pan for the entire pan area (including corners). Welding shall use an approved electrode compatible with stainless steel of the thickness specified.
2. Provide continuous bead of sealant between concrete bearing seat and drip pan. To seal openings for anchor bolts and bearing pads, place sealant around perimeter of opening and offset ½" from edge of opening.
3. See STEEL PLATE GIRDER UNIT sheets for distance between ℄ Bent and ℄ Brg.

HL93 LOADING

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER

7.3.2024

LJA Engineering, Inc.
FRN - F-1386

Texas Department of Transportation

US 59

DRIP PAN DETAILS

SAN ANTONIO RIVER BRIDGE
AT US 59

DESIGNED:	BN	CONT	SECT	JOB	HIGHWAY
CHECKED:	BZ	0088	02	062	US59
DRAWN:	PS	DIST	COUNTY		SHEET NO.
CHECKED:	BZ	CRP	GOLIAD		190

DATE: 7/3/2024
FILE: c:\working\dir\lja-pw.bentley.com_lja-pw-01\thuy.nguyen\dms663541062_DPD01.dgn

DATE: 7/3/2024 $TIME$
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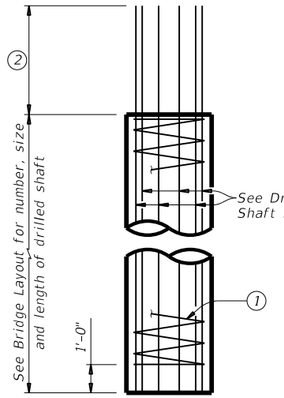
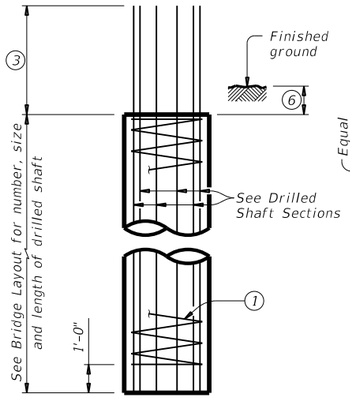
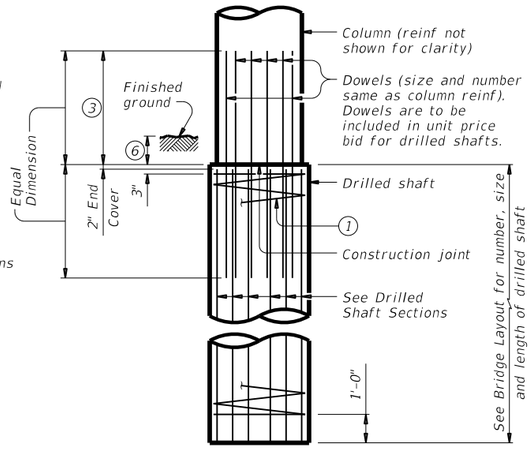


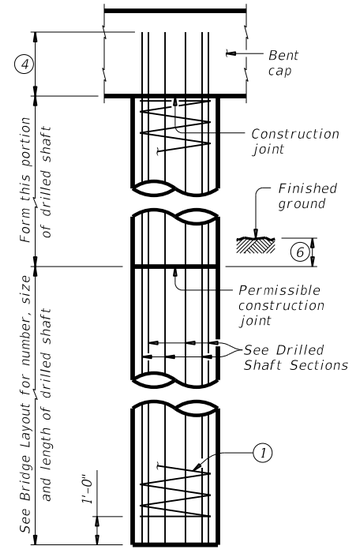
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



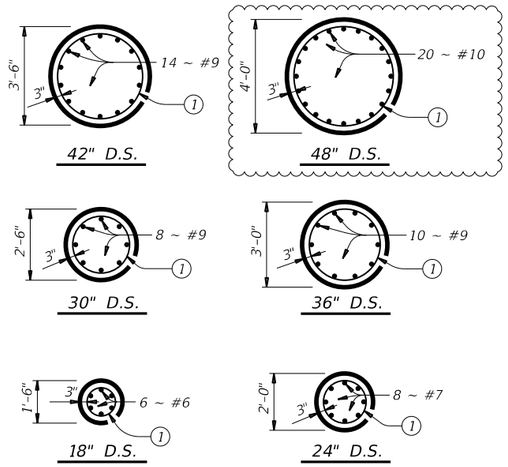
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

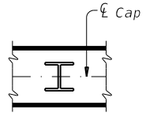


DRILLED SHAFT SECTIONS

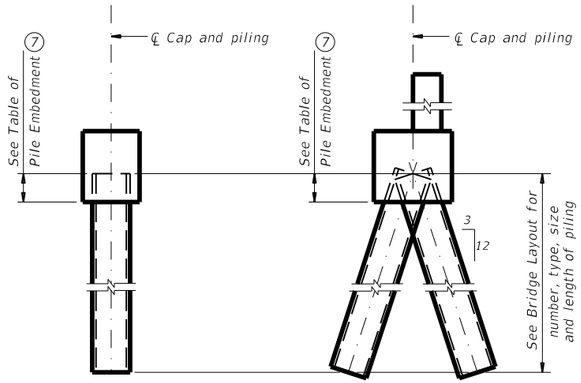
DRILLED SHAFT DETAILS

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.



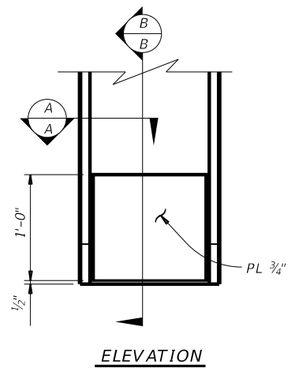
ORIENTATION OF STEEL H-PILING



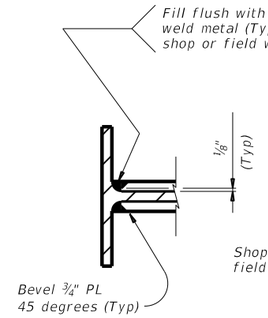
VERTICAL PILE BATTERED PILE

PILING DETAILS
(Concrete or steel H)

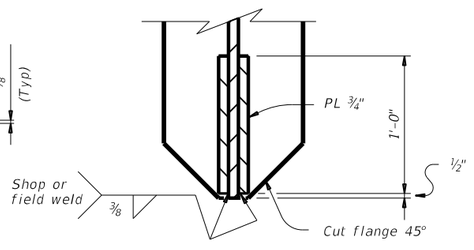
DETAIL "A"
(Showing plan view of a 30° skewed abutment)



ELEVATION



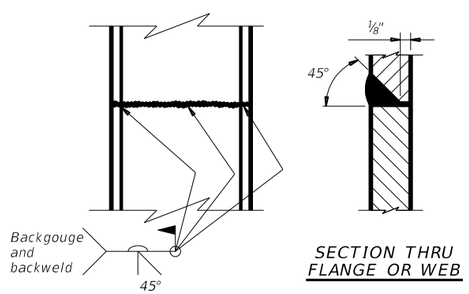
SECTION A-A



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"
#10 Bars = 4'-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.

LJA Engineering, Inc.
FRN - F-1386

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER
7.3.2024

Texas Department of Transportation
Bridge Division Standard

COMMON FOUNDATION DETAILS

FD(MOD)

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
06-23: Modified 48" drilled shaft reinforcing and reinforcing bar laps.	CRP	GOLIAD		191

DATE: 7/3/2024 $TIME$
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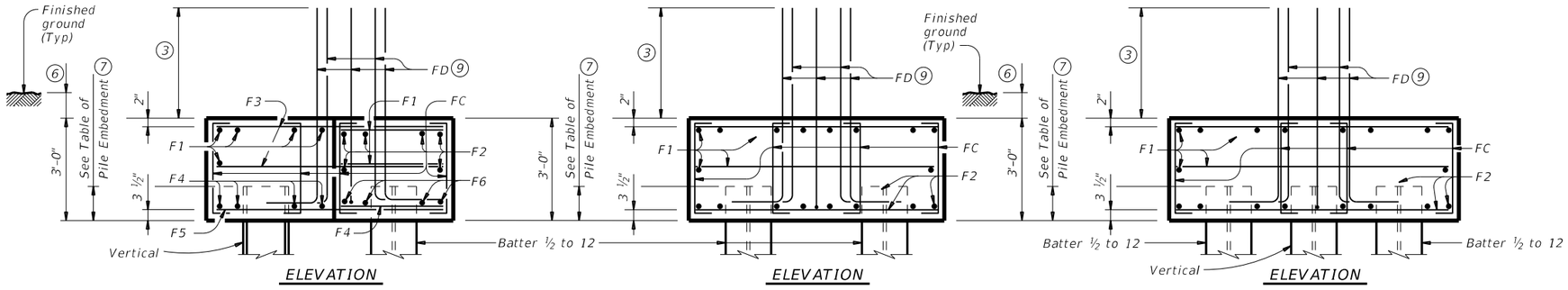
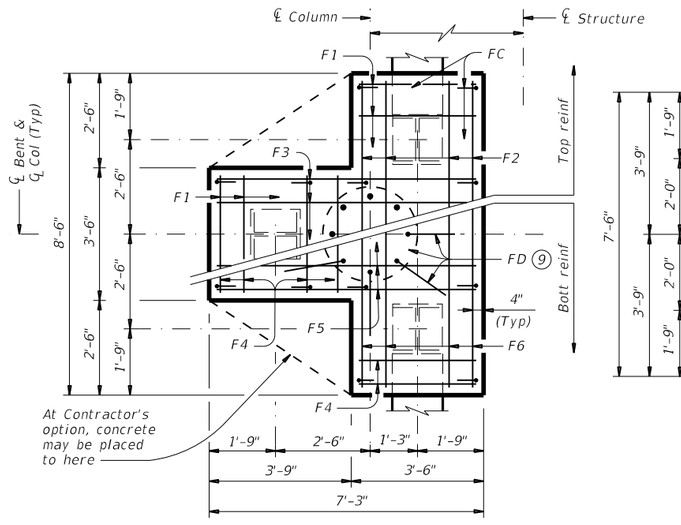
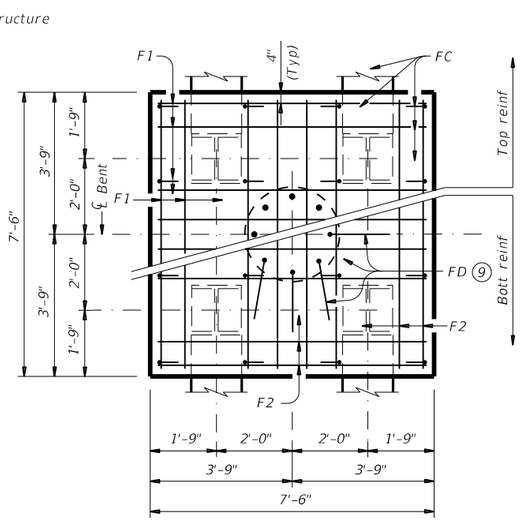




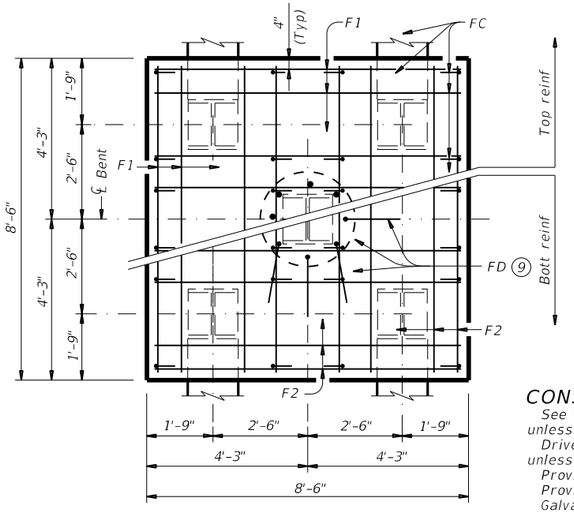
THREE PILE FOOTING (8)

For 36" Dia and smaller columns.



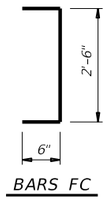
FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.

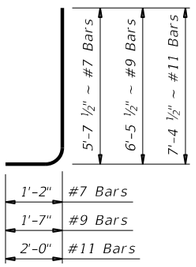


FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.



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.

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"
Uncoated or galvanized (#10) ~ 4'-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

LJA Engineering, Inc.
FRN - F-1386

STATE OF TEXAS
BASIL M. ZIBDAWI
138455
LICENSED PROFESSIONAL ENGINEER
7.3.2024

SHEET 2 OF 2

Texas Department of Transportation
Bridge Division Standard

COMMON FOUNDATION DETAILS

FD(MOD)

FILE: fdstde01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
01-20: Added #11 bars to the FD bars.	DIST	COUNTY		SHEET NO.
06-23: Modified 48" drilled shaft reinforcing and reinforcing bar laps.	CRP	GOLIAD		192

DATE: 7/3/2024 $TIME$
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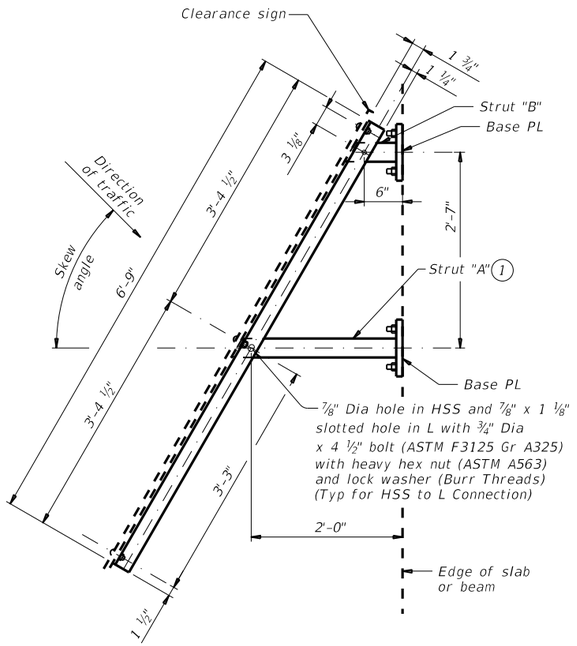
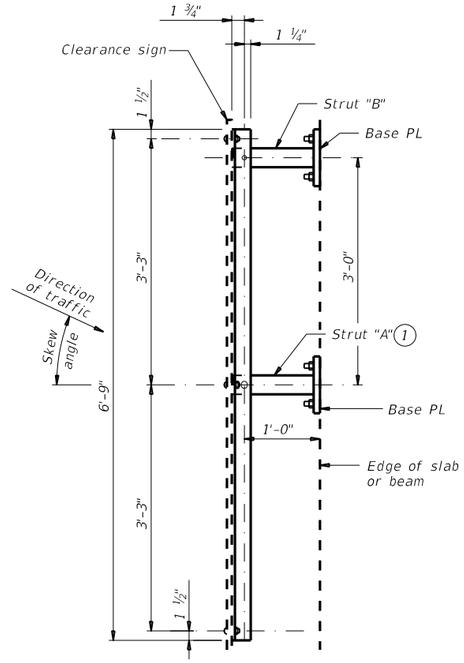


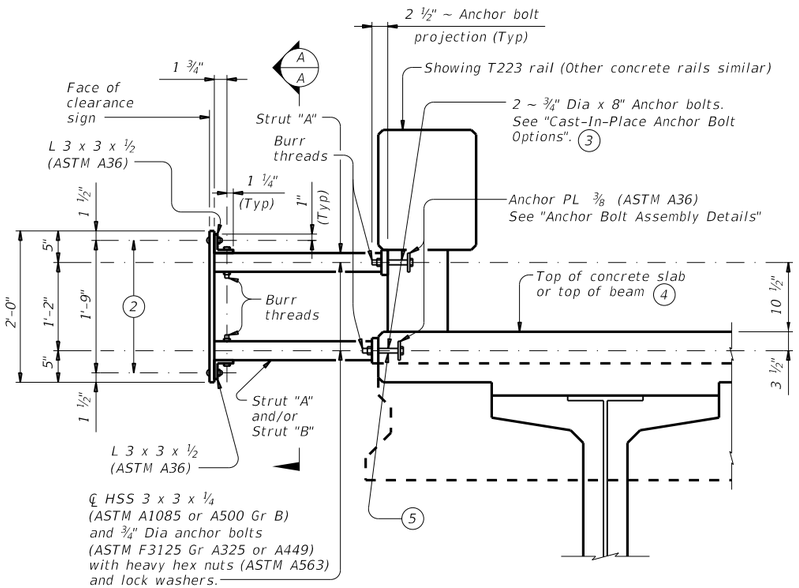
PLAN OF TYPE S MOUNT

(Used for skews over 30°)

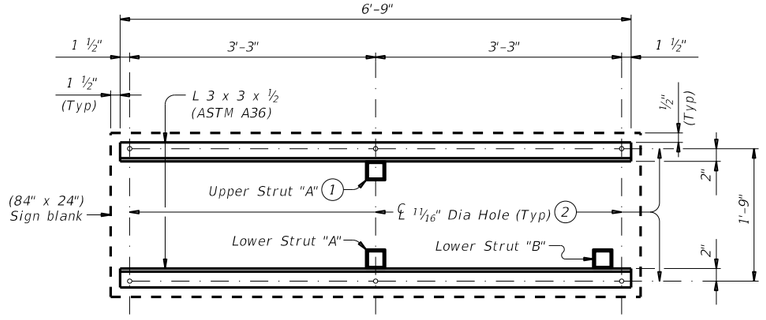


PLAN OF TYPE N MOUNT

(Used for 0° to 30° skews)



SECTION



SECTION A-A

1 Locate centerline of Strut A no closer than 12" from a vertical concrete edge.

2 ℄ ⅝" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.

3 At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

4 For decked slab beams topped with a 2 course surface treatment and ACP overlay.

5 Anchor bolts to be cast into decked slab beams topped with a 2 course surface treatment or ACP overlay. Anchor bolts with heavy hex nuts, regular lock washers, hardened washers and anchor plate that is embedded in the beam will be provided by the beam Fabricator.

CONSTRUCTION NOTES:

Install the vertical face of clearance sign plumb unless otherwise approved by the Engineer.

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 1 anchor per bridge mounted clearance sign installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

MATERIAL NOTES:

Galvanize all steel components after fabrication unless otherwise noted.

GENERAL NOTES:

This standard provides details to mount a vertical clearance sign (84" x 24") to bridges. Rail Types T631, T631LS, PR11, PR22 and PR3 are not accommodated.

The Engineer will furnish the clearance to be shown on the sign.

See Bridge Layout for sign location and mounting type (Type N or S).

Cost of furnishing, installing, relocating or removing a clearance sign, including structural steel for sign mount, is included in unit price bid for Item 644, "Small Roadside Sign Assemblies".

One Sign Blank (84" x 24") is 14 SF.

Average steel weight for one complete Type N Mount is 219 Lb.

Average steel weight for one complete Type S Mount is 233 Lb.

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		193

DATE: 7/3/2024 $TIME$
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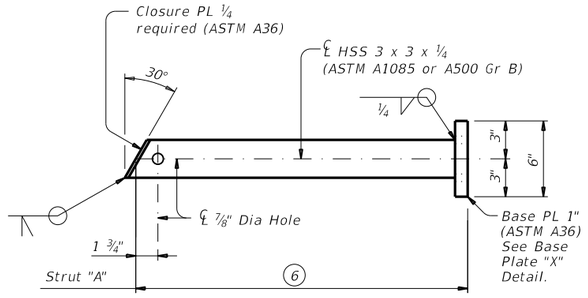
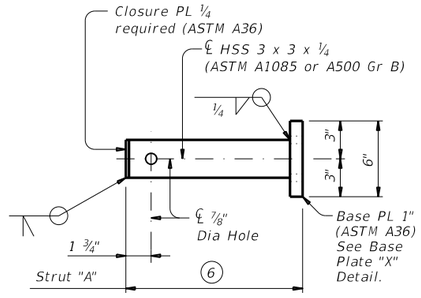
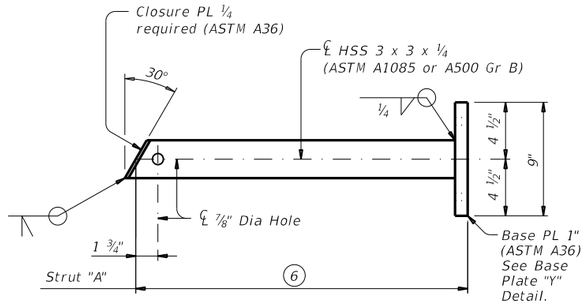


FOR T411 AND C411 RAIL TYPES



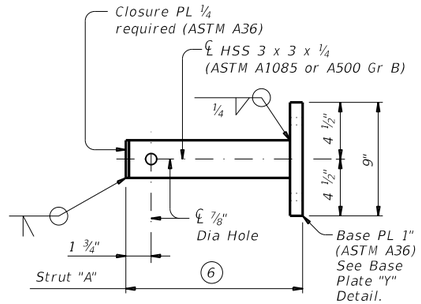
FOR T411 AND C411 RAIL TYPES



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

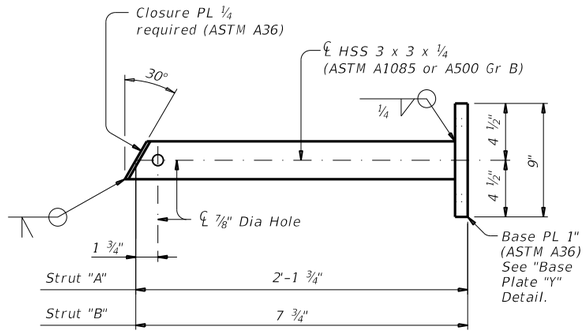
(Used for skews over 30°)



FOR T221, C221, T222, T223, C223, T401, T402, C402, T551, T552, T80HT, T80SS AND SSTR RAIL TYPES

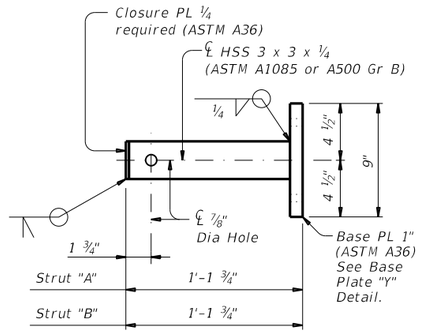
UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



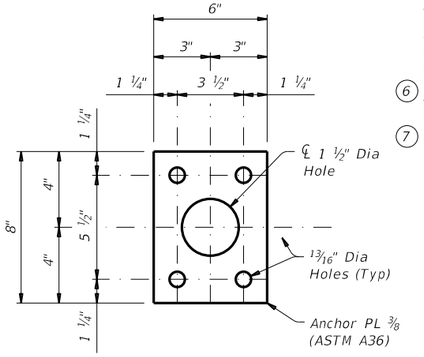
LOWER STRUT DETAILS FOR (TYPE S MOUNT)

(Used for skews over 30°)

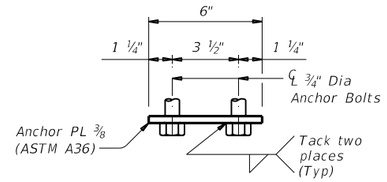


LOWER STRUT DETAILS FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)



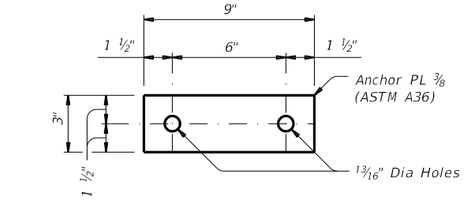
PLAN OF ANCHOR PLATE



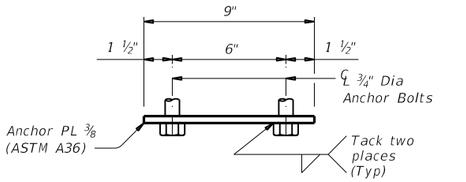
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

(Used on Base Plate "X" with T411 and C411 rail types.)



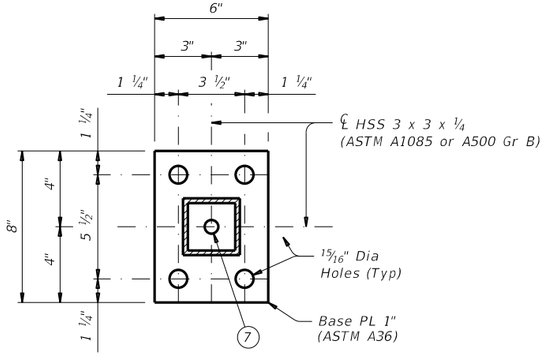
PLAN OF ANCHOR PLATE



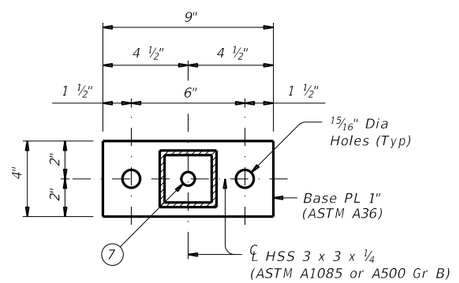
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS (3)

(Used on Base Plate "Y" and with T1F, T2P, C2P, T1W, C1W, T66 and C66 rail types.)

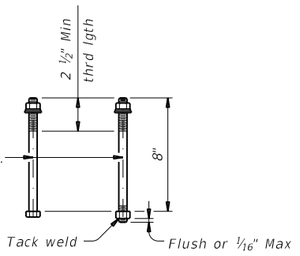


BASE PLATE "X" DETAIL



BASE PLATE "Y" DETAIL

℄ ¾" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ASTM A193 Gr B7 or F1554 Gr 105) with one hardened washer and one regular lock washer placed under heavy hex nut (ASTM A563). Furnish one additional heavy hex nut for each threaded rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS (3)

(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(7) Hole required to drain zinc from base plate during galvanizing.

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

FILE: bmcsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		194

DATE: 7/3/2024 $TIME$
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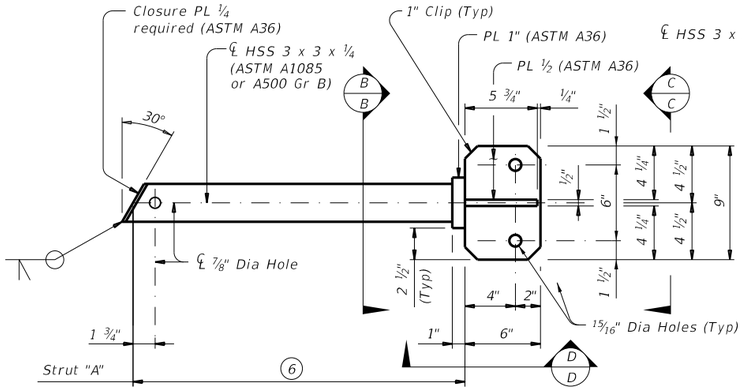
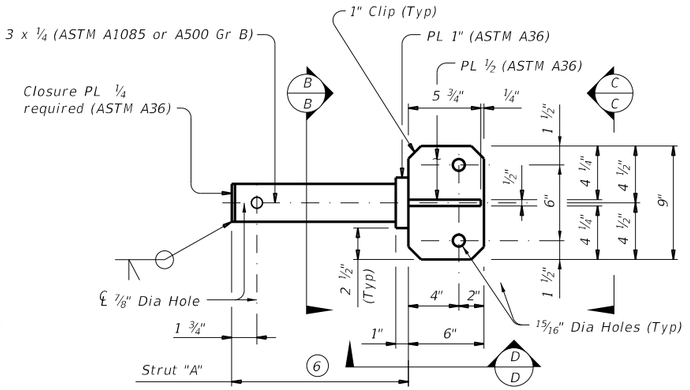


FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE S MOUNT)

(Used for skews over 30°)



FOR T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL TYPES

UPPER STRUT DETAIL FOR (TYPE N MOUNT)

(Used for 0° to 30° skews)

(2) ℄ ⅝" Dia x 2" Hexagon socket button head cap screws (ASTM A574) with hex nuts. Attach hex nuts to L 3 x 3 x ½ by tack welding in two places. Threads must have Class 3A fit tolerance in accordance ASME B1.1. Six screws required.

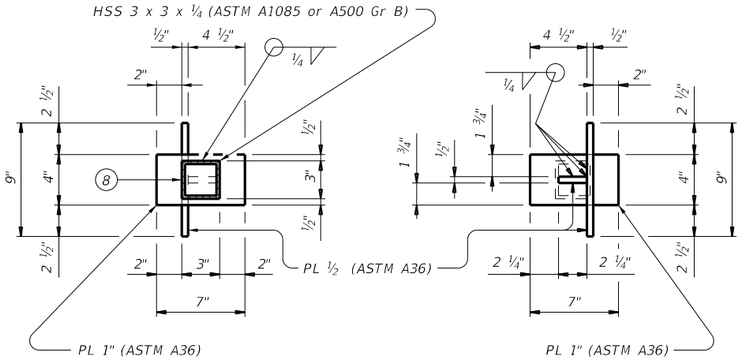
(3) At the Contractor's option fully threaded adhesive anchors may be use instead of cast-in-place anchor bolts. Expansion anchors are not allowed. Provide adhesive anchors that are ¾" Dia ASTM A193 Gr B7 or F1554 Gr 105 fully threaded rods with one hardened steel washer (ASTM F436) and one regular lock washer placed under heavy hex nut (ASTM A563). Embed fully threaded rods using a Type III, Class C, D, E, or F anchor adhesive. Adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a factored bond strength in tension of 2.2 kips per anchor (edge distance and spacing must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

(4) For decked slab beams topped with a 2 course surface treatment and ACP overlay.

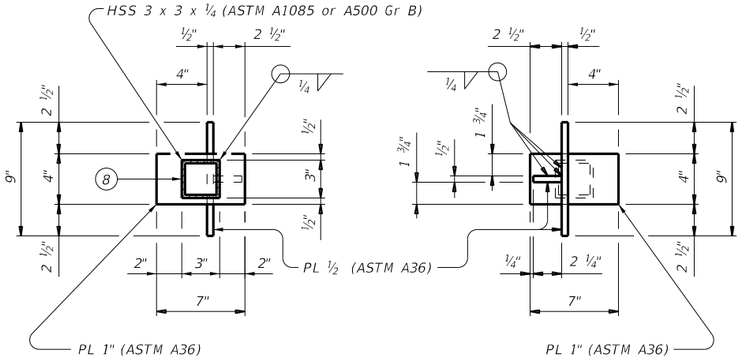
(6) Adjust length to accommodate edge of slab to back of rail for specific project conditions and to help plumb the vertical face of clearance sign.

(8) Hole required in bottom of HSS to drain zinc during galvanizing.

(9) 11" curb is for structures with 2" ACP overlay.



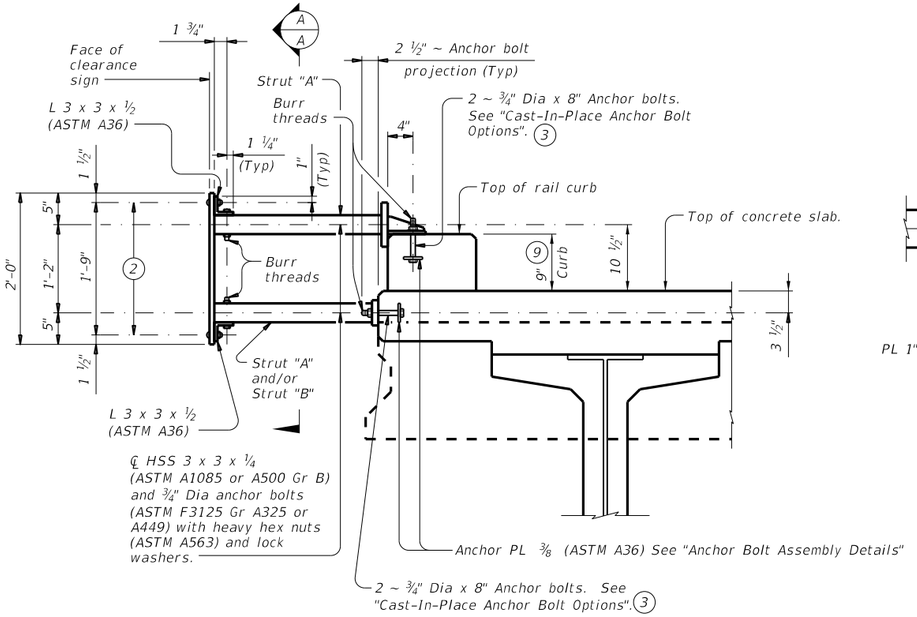
FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

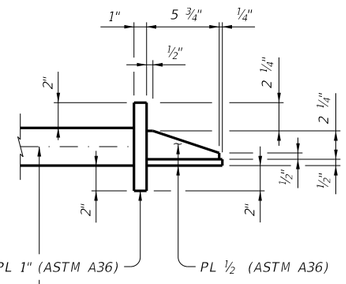
SECTION B-B

VIEW C-C

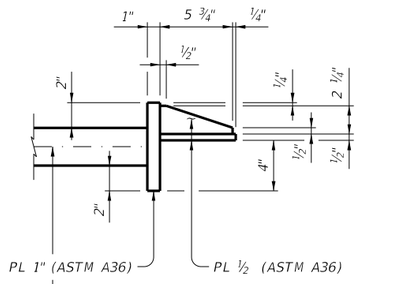


SECTION THRU T1F, T2P, C2P, T1W, C1W, T66 AND C66 RAIL CURB

Showing sign mount on a 9" high curb, 11" high curb similar.



FOR 9" HIGH CURBS



FOR 11" HIGH CURBS

VIEW D-D

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

BRIDGE MOUNTED CLEARANCE SIGN ASSEMBLY

BMCS

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	CRP	GOLIAD		195

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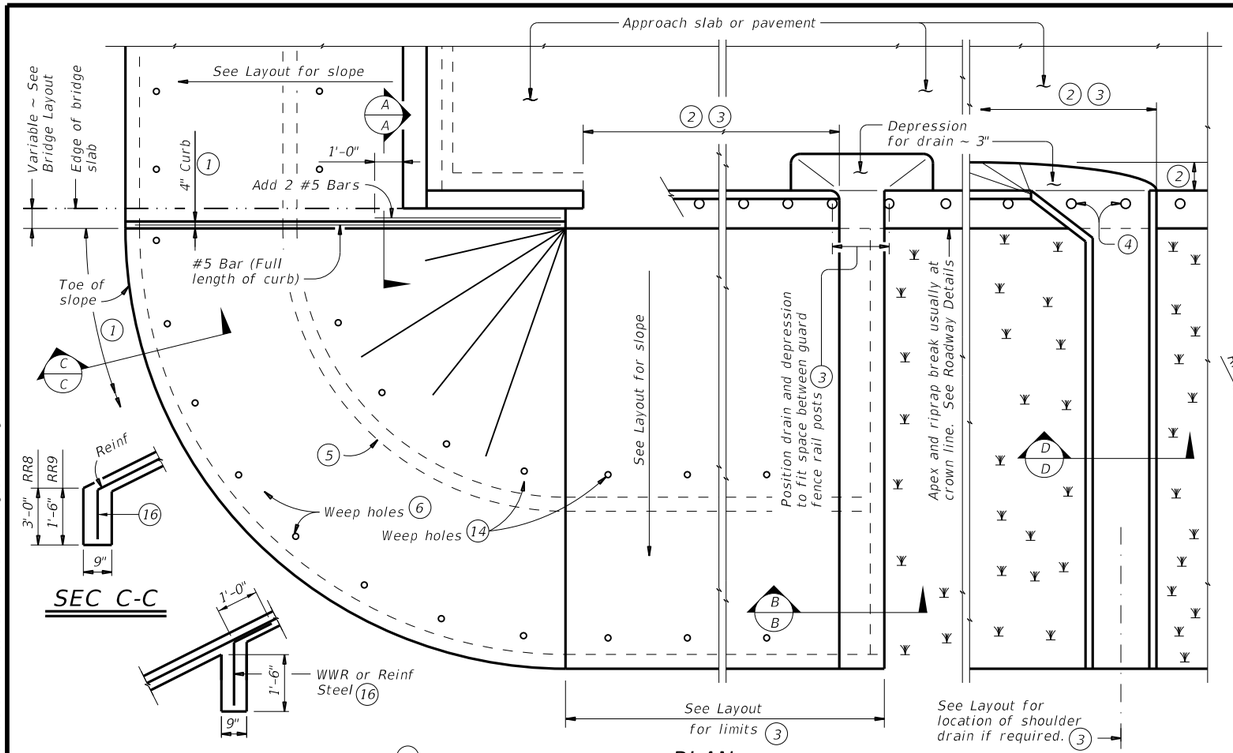
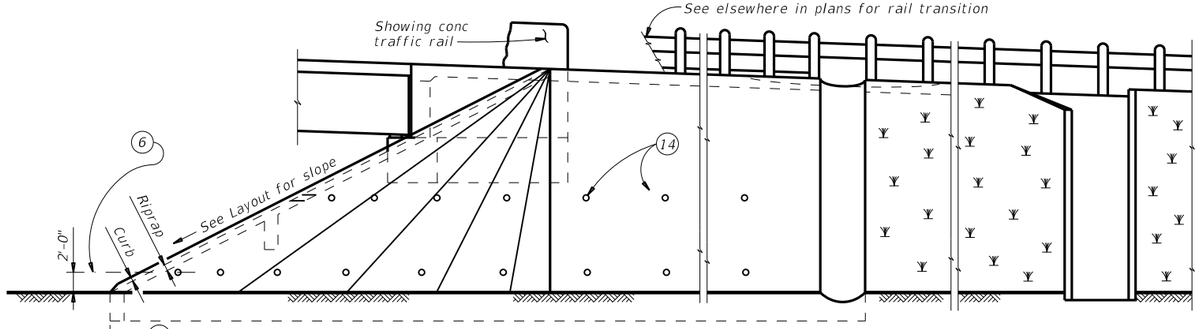


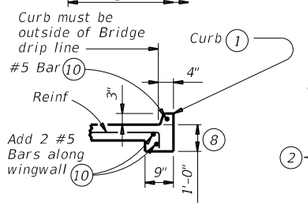
PLAN

SEC C-C

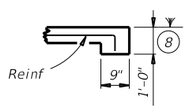
INTERMEDIATE TOEWALL (5)



ELEVATION

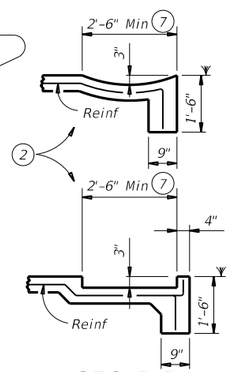


SEC A-A



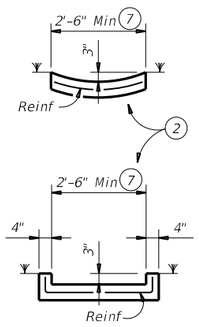
SEC B-B

(No drain)



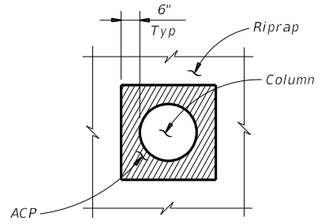
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

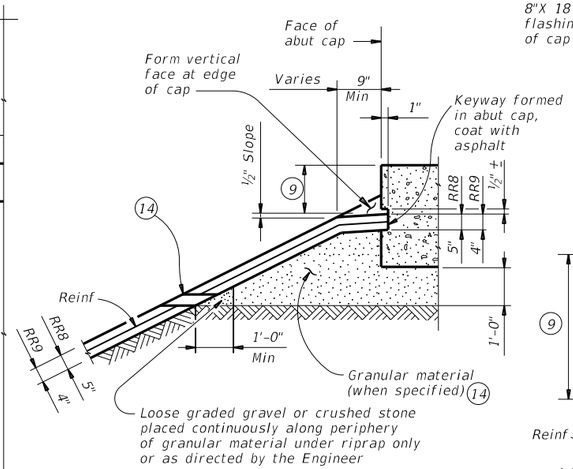
(Shoulder drain)



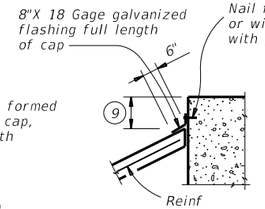
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

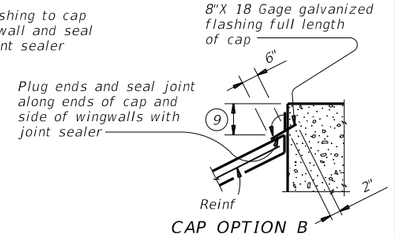
(As directed by the Engineer)



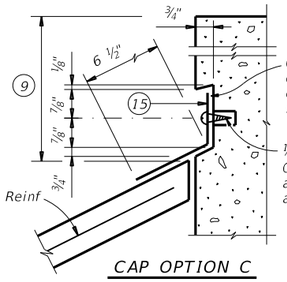
SHOWING KEYWAY OPTION



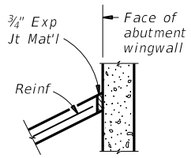
CAP OPTION A



CAP OPTION B

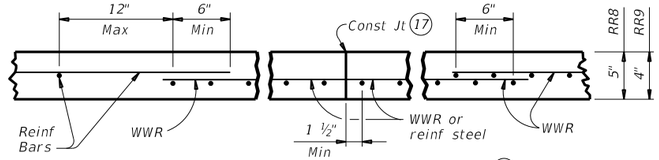


CAP OPTION C



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: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
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	CRP	GOLIAD		196

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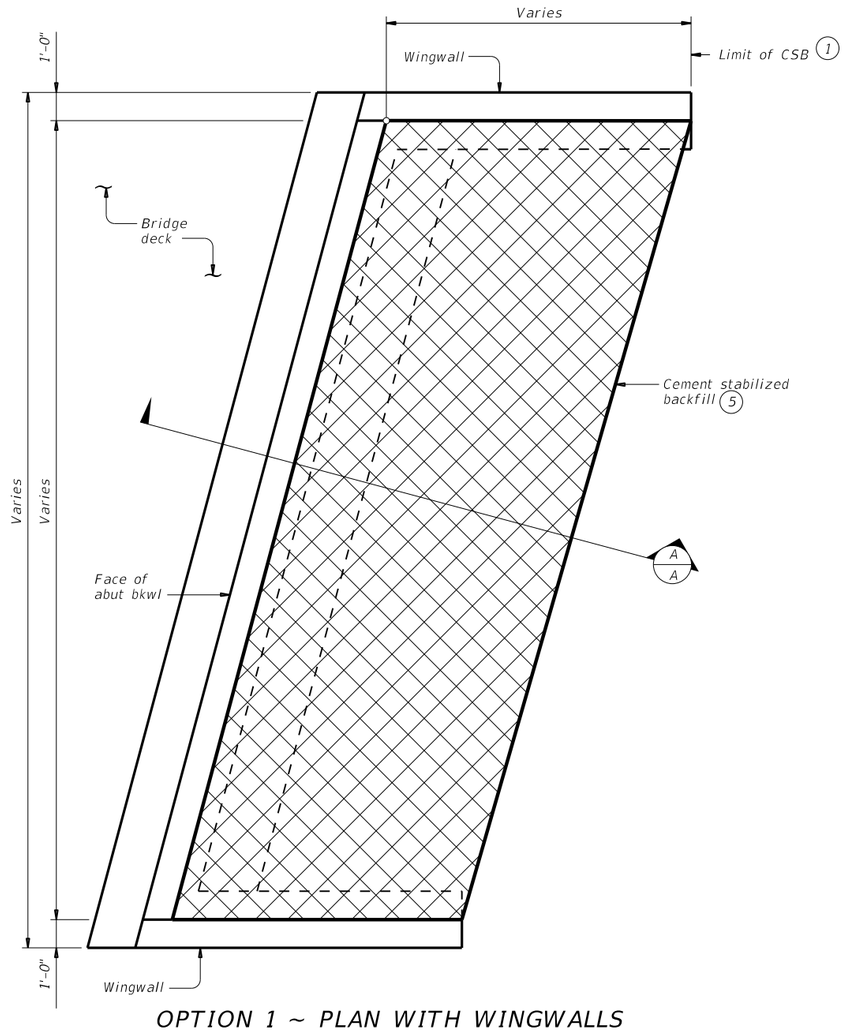
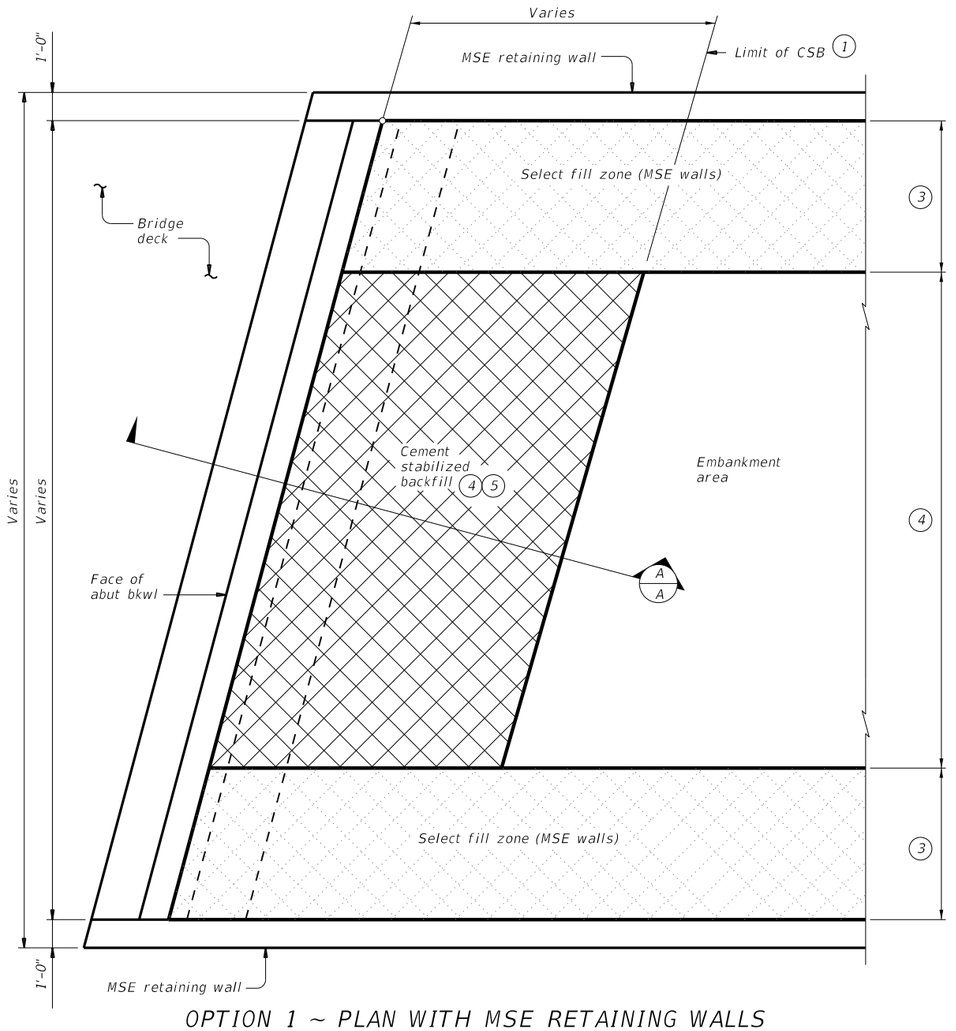
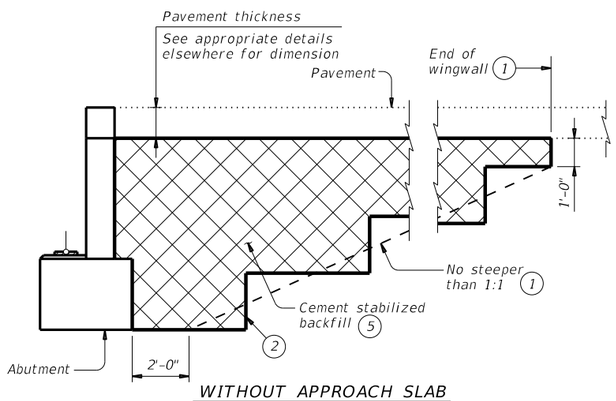


OPTION 1 ~ PLAN WITH WINGWALLS

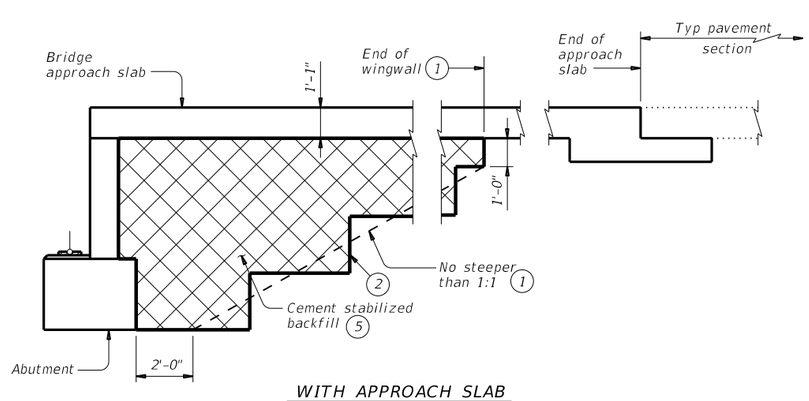
Cast-in-place retaining walls similar.



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	0088	02	062	US59
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
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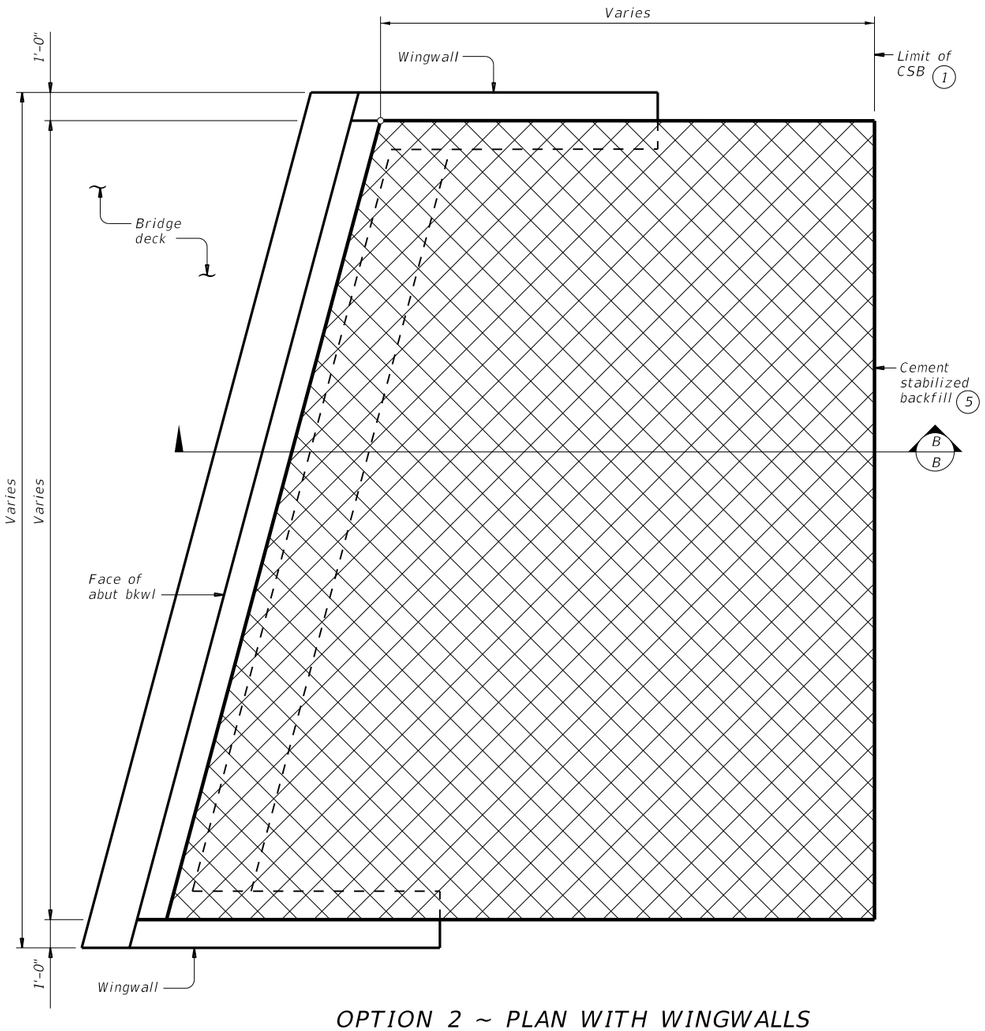
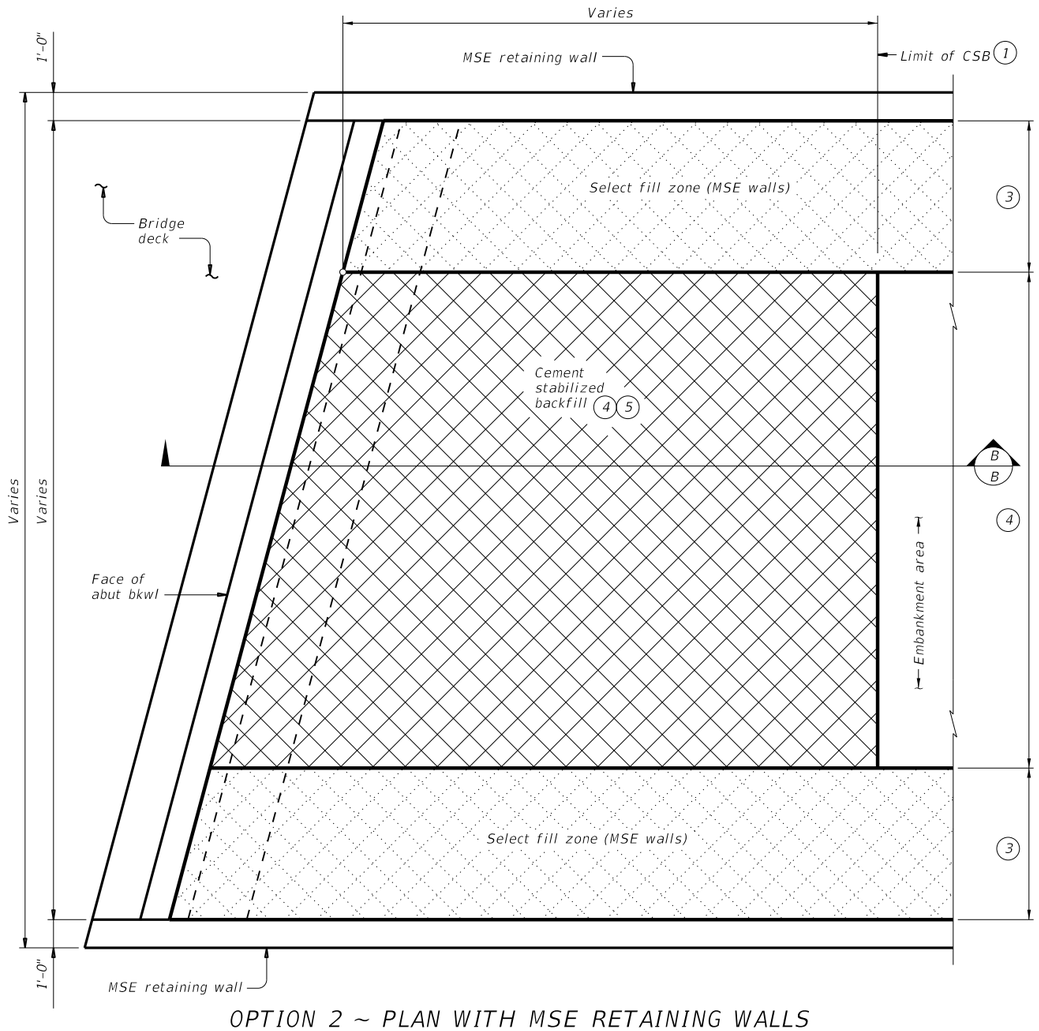


OPTION 2 ~ PLAN WITH WINGWALLS

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.

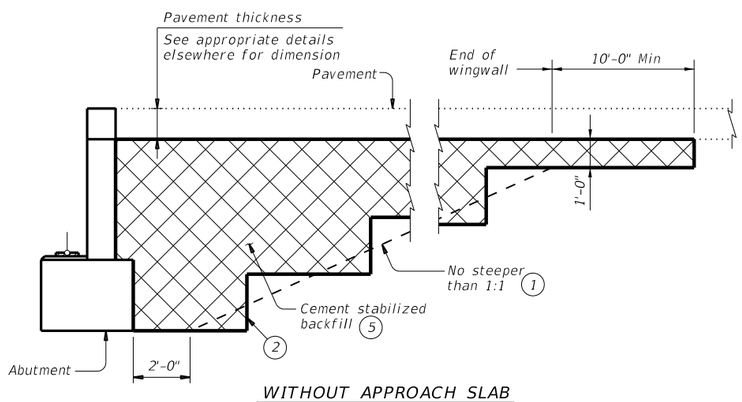
(2) Bench backfill as shown with 12" (approximate) bench depths.

(3) Where MSE retaining walls are present, adjust CSB limits to accommodate the select fill zone. See retaining wall details for additional information.

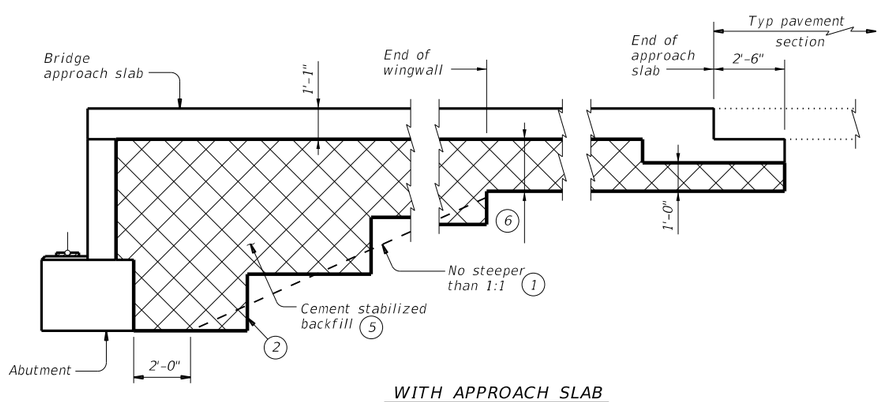
(4) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

(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	0088	02	062	US59
02-20: Added Option 2. 03-23: Updated General Notes.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		198

DATE: 7/3/2024 $TIME$
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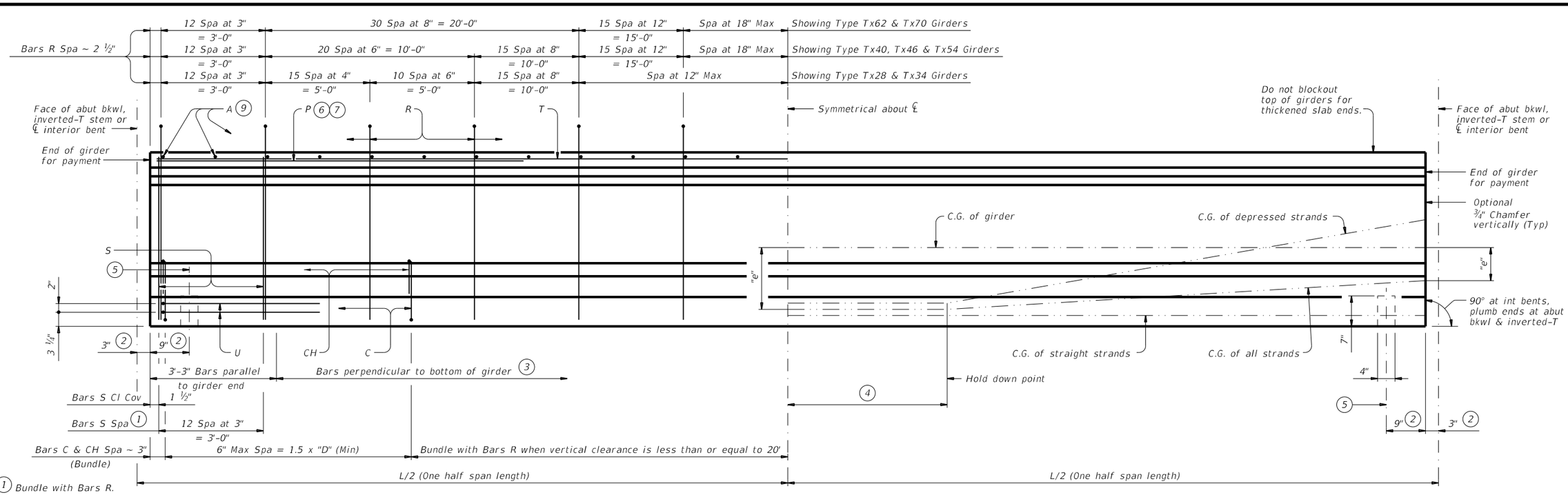


(1) Bundle with Bars R.

(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 5/8") 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.

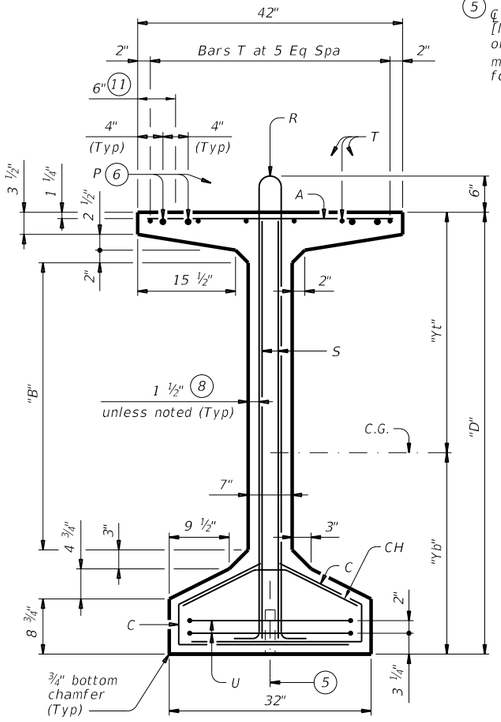
GIRDER DIMENSIONS AND SECTION PROPERTIES

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

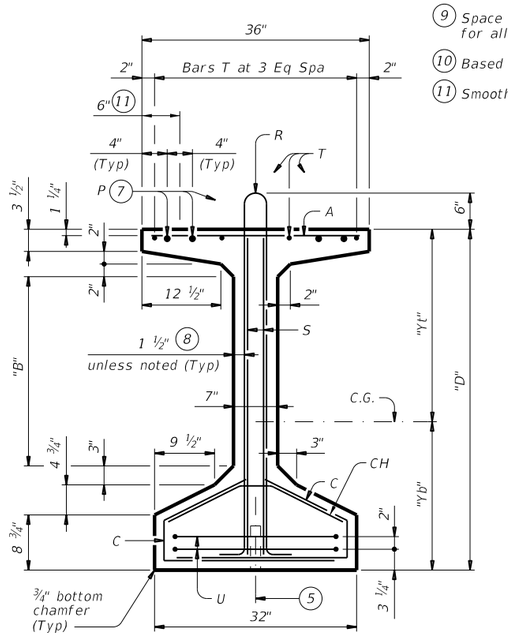
GENERAL NOTES:

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.

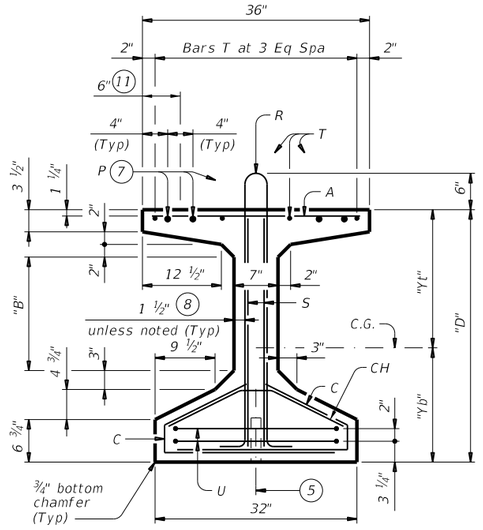
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



TYPE Tx62 & Tx70



TYPE Tx46 & Tx54



TYPE Tx28, Tx34 & Tx40

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 if full length for VC<= 20' 3-23: Clarified C and CH requirement	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		199

DATE: 7/3/2024 $TIME$
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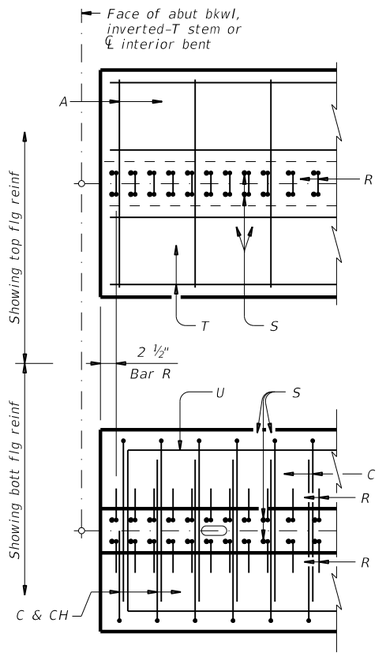
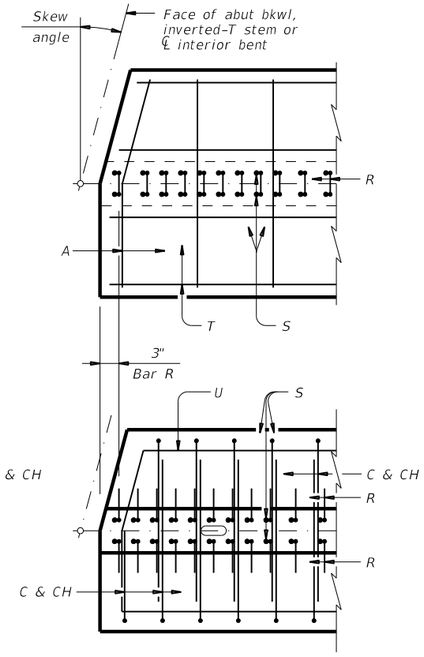
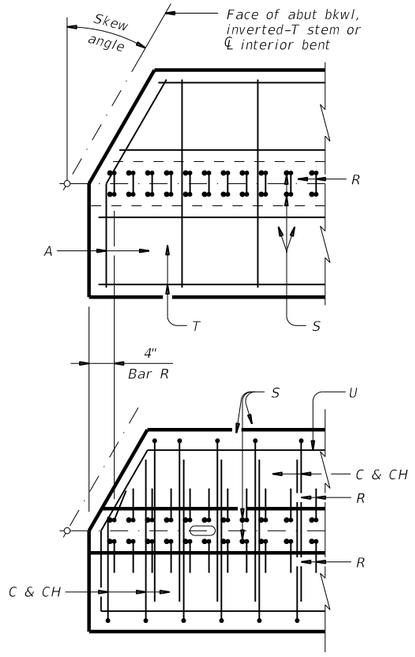


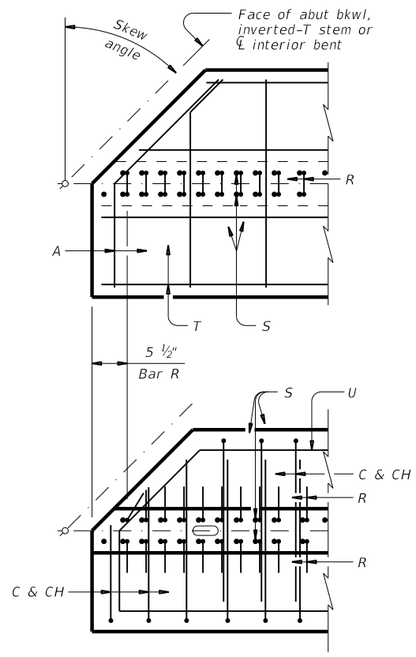
0° SKEW



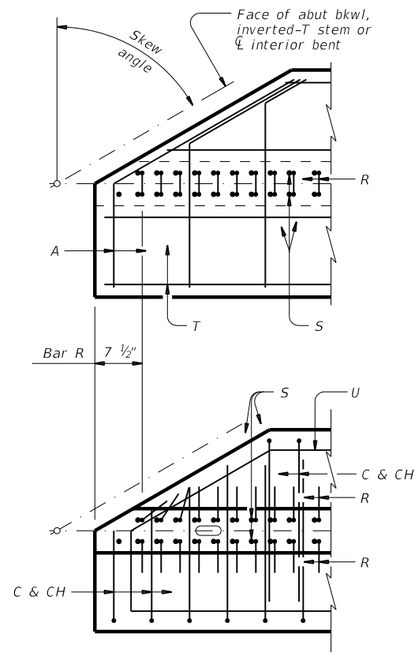
15° SKEW



30° SKEW



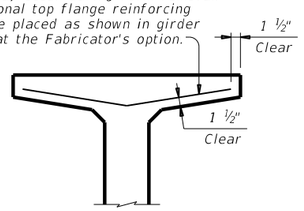
45° SKEW



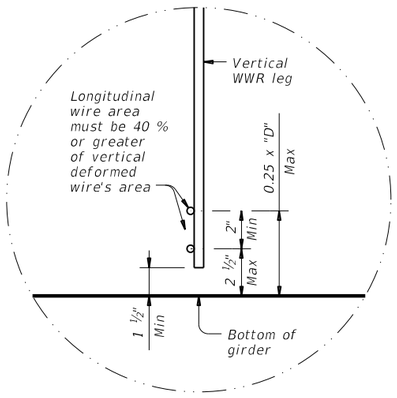
60° SKEW

PLAN OF GIRDER ENDS (12)

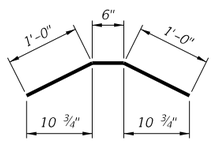
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



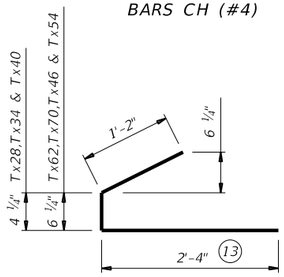
OPTIONAL TOP FLANGE REINFORCING DETAIL



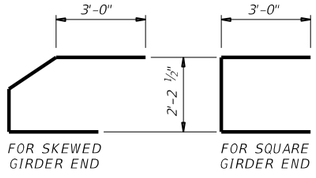
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



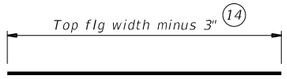
BARS CH (#4)



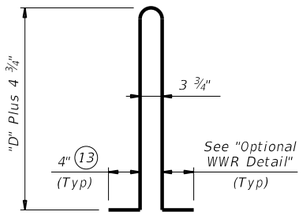
BARS C (#4)



BARS U (#5)

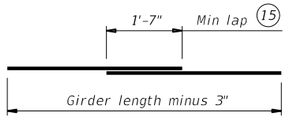


BARS A (#3)



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: IGD-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	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		200

DATE: 7/3/2024 $TIME$
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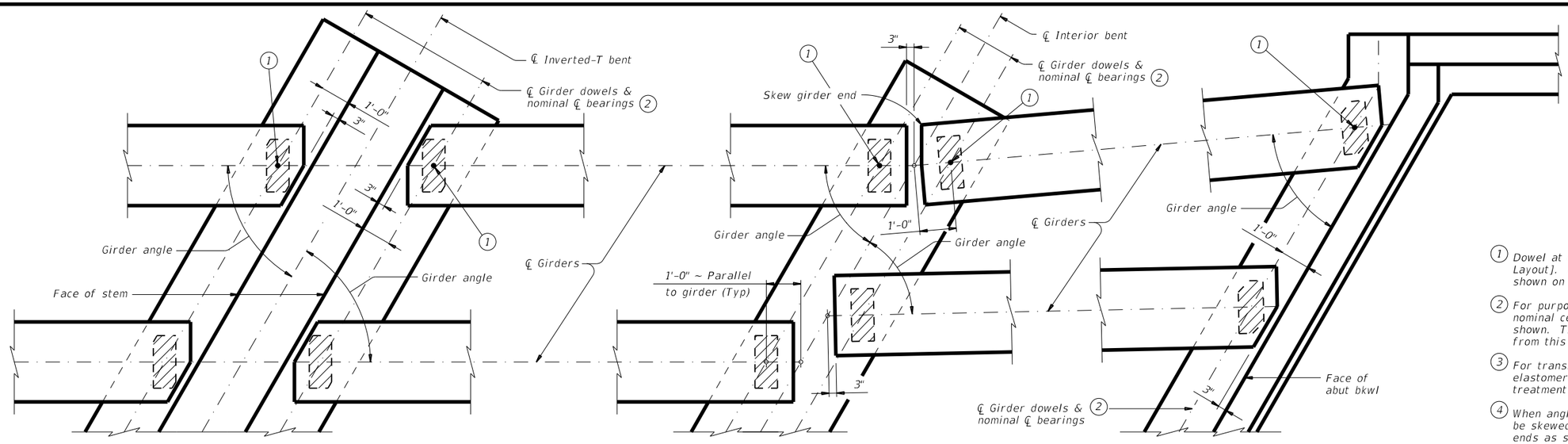


AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

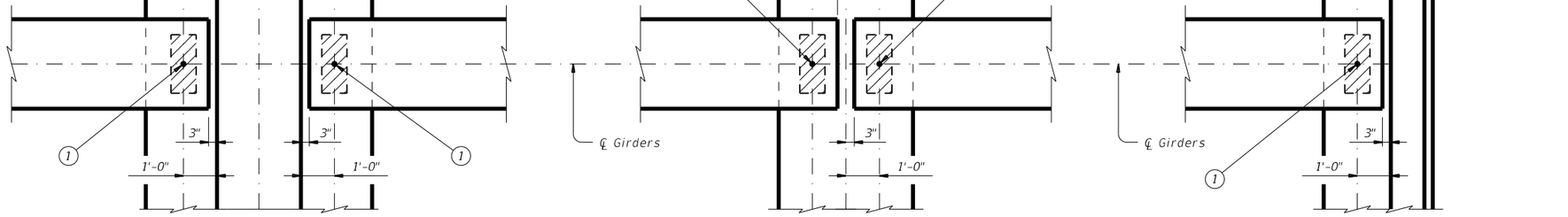
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(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.

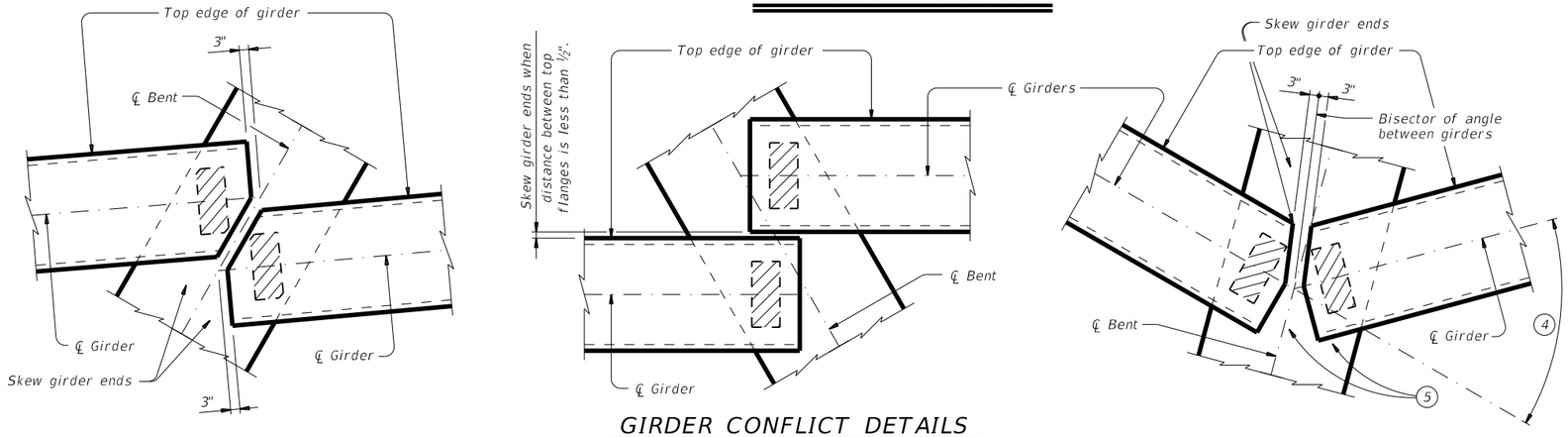


AT INVERTED-T BENT

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 SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS

PRESTR CONCRETE I-GIRDERS

IGEB

FILE: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		201

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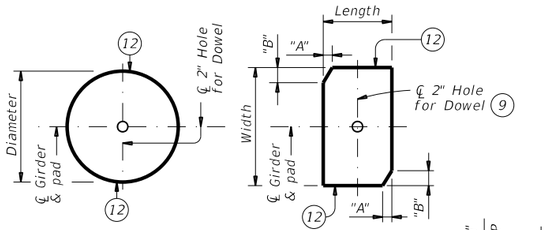
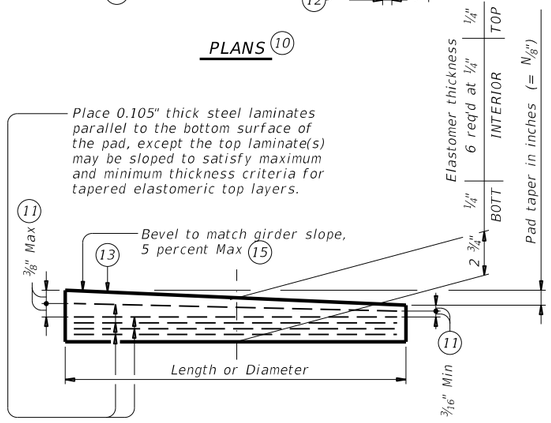


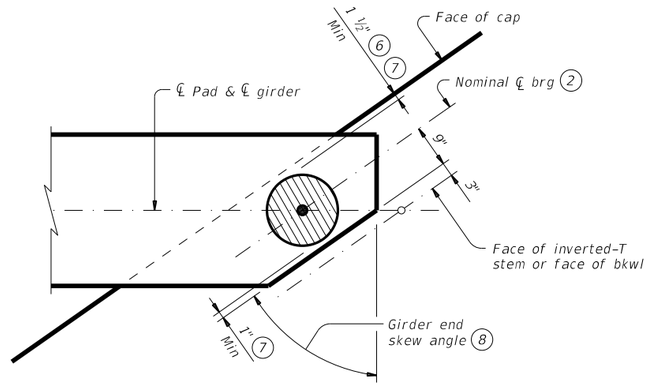
PLANS (10)



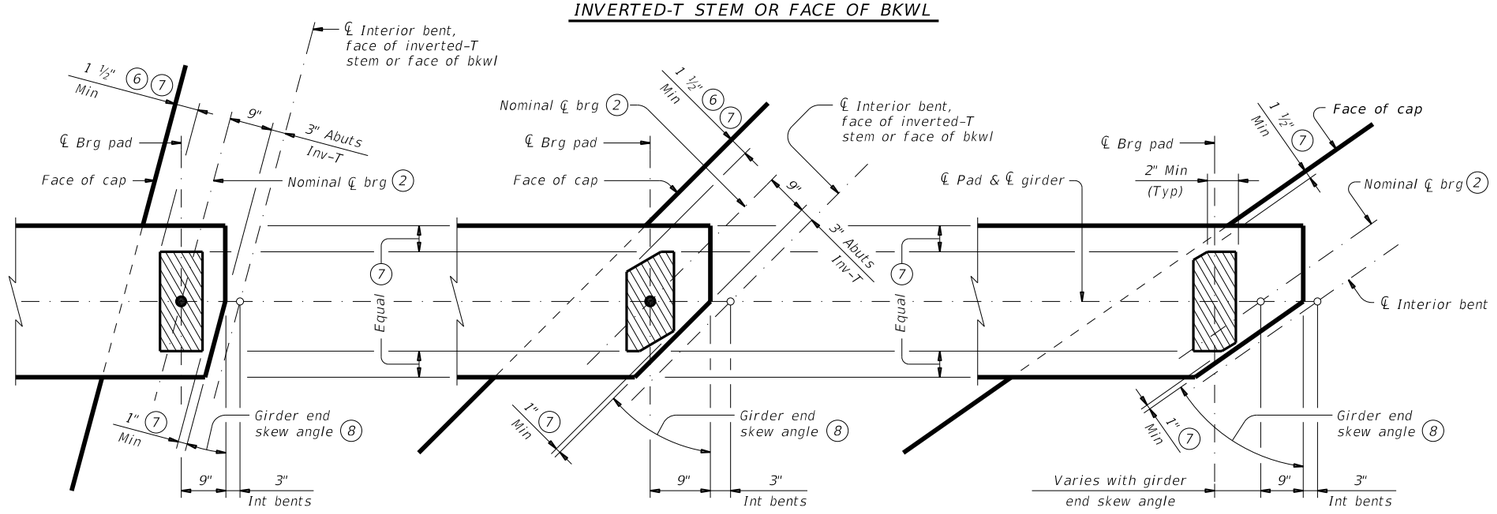
ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

(50 DUROMETER)



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

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

Girder Type	Abutments: Face of Bkwl to Face of Cap	Int Bents: Overall Cap Width	Inv-T Bents: 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"

(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: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
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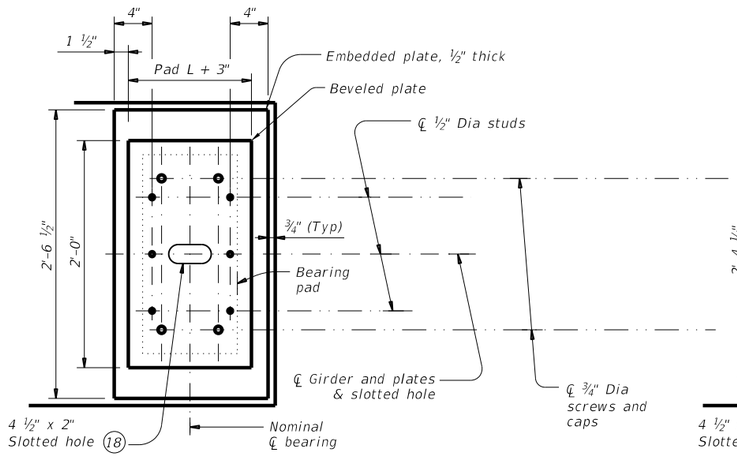
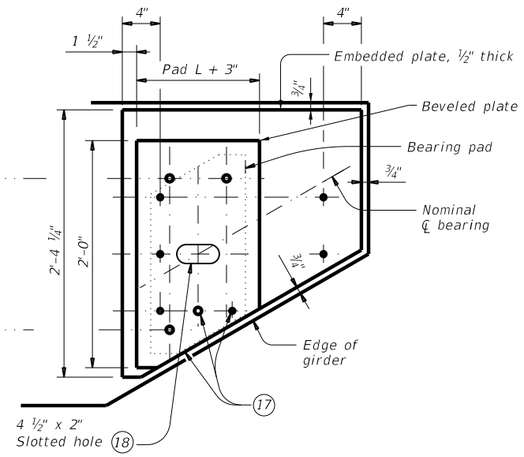
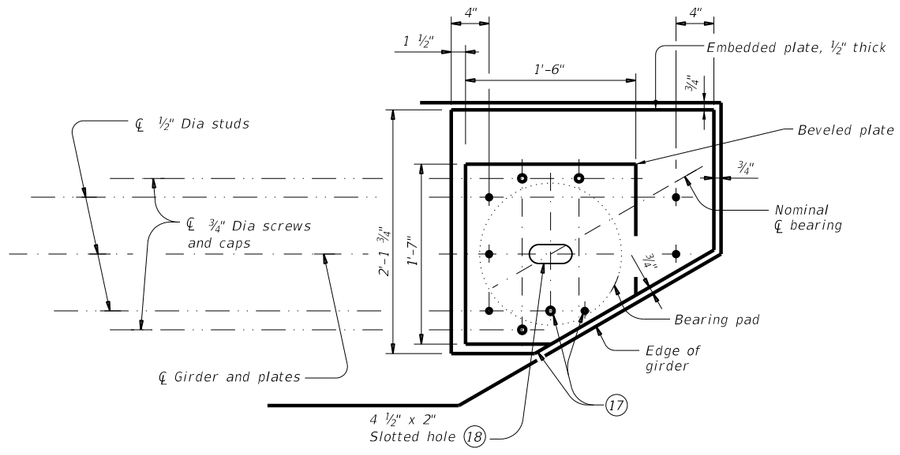


NORMAL GIRDER END
RECTANGULAR BEARING PAD

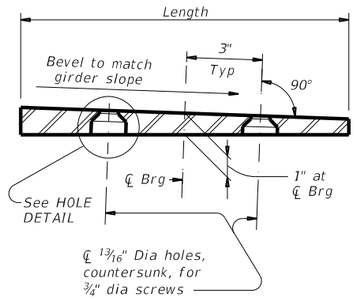


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

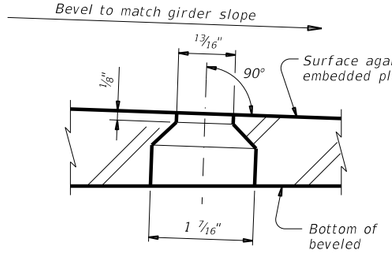


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS

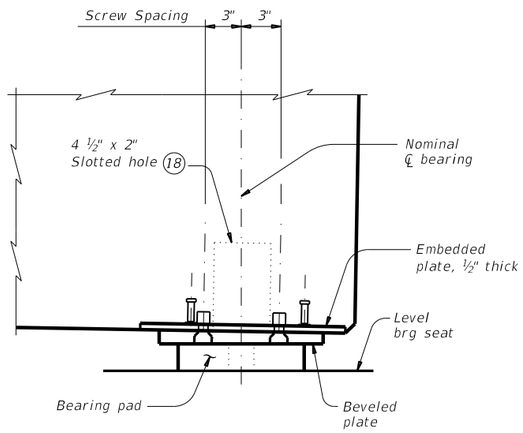


SECTION

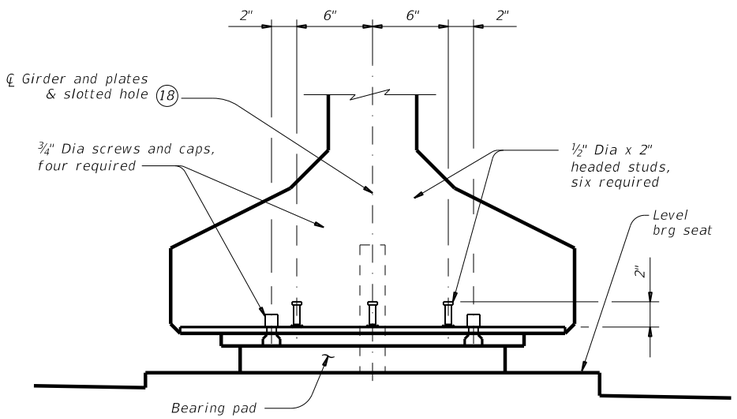


HOLE DETAIL

BEVELED PLATE DETAILS



SIDE ELEVATION



END ELEVATION
Showing normal girder end.

GIRDER DETAILS

(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.

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: igebsts1-17.dgn	DN: AEE	CK: JMH	DW: JTR	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		203

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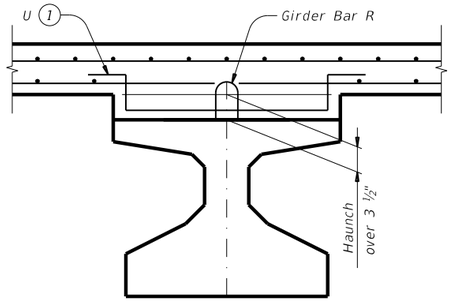
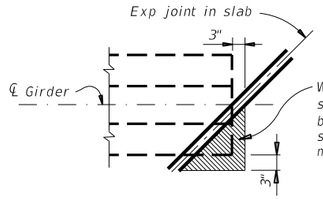
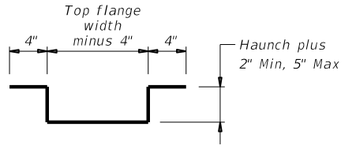


HAUNCH REINFORCING DETAIL

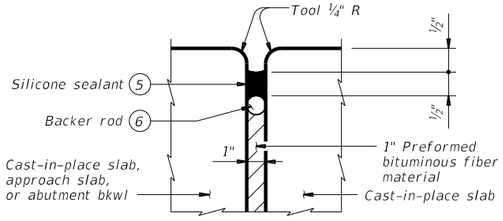


Where flanges project under slab of adjacent span, provide a minimum of ½" clearance between top of girder and bottom of adjacent slab. Polystyrene or other suitable compressible material may be used as a filler.

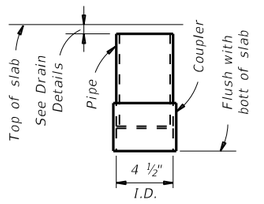
TREATMENT AT GIRDER END FOR SKEWED SPANS



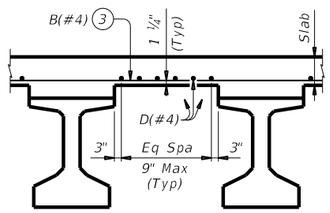
BARS U (#4)



TYPE A JOINT DETAIL (7)

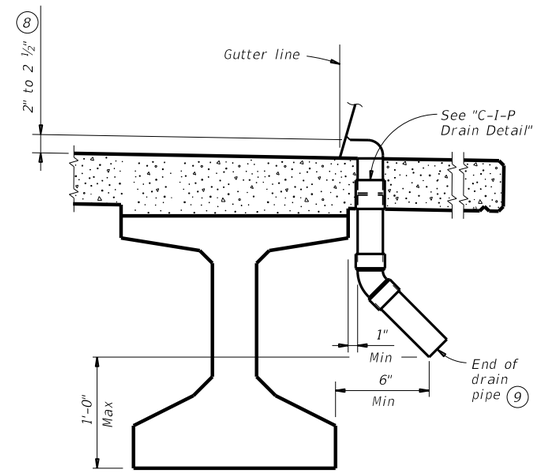


C-I-P DRAIN DETAIL (2)



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.

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

PRESTR CONCRETE I-GIRDERS

IGMS

FILE: igmssts1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
10-19: Modified Note 7. Type A now a pay item.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		204

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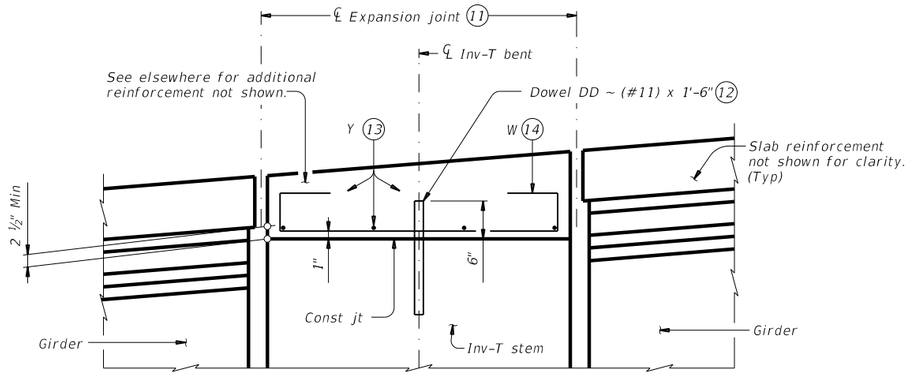
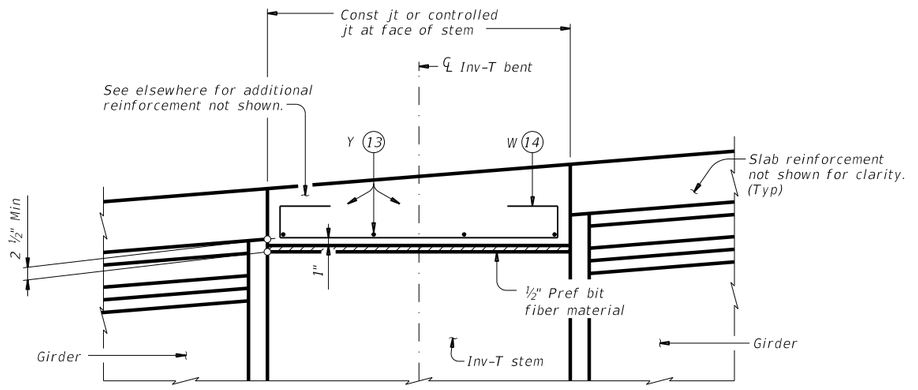
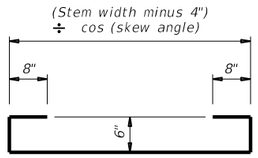


SHOWING EXPANSION JOINTS

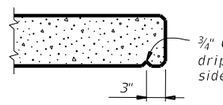


SHOWING CONST JTS OR CONTROLLED JTS

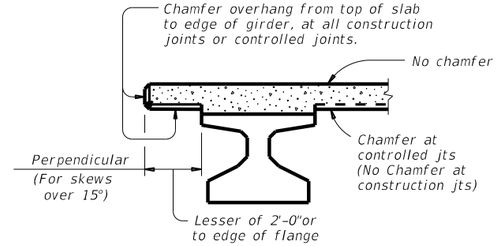
REINFORCEMENT OVER INV-T BENTS



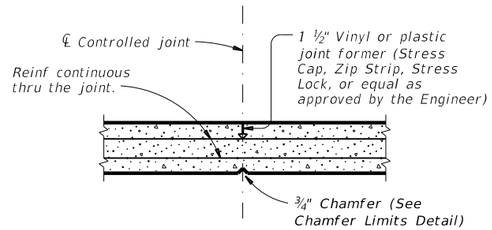
BARS W (#4)



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

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
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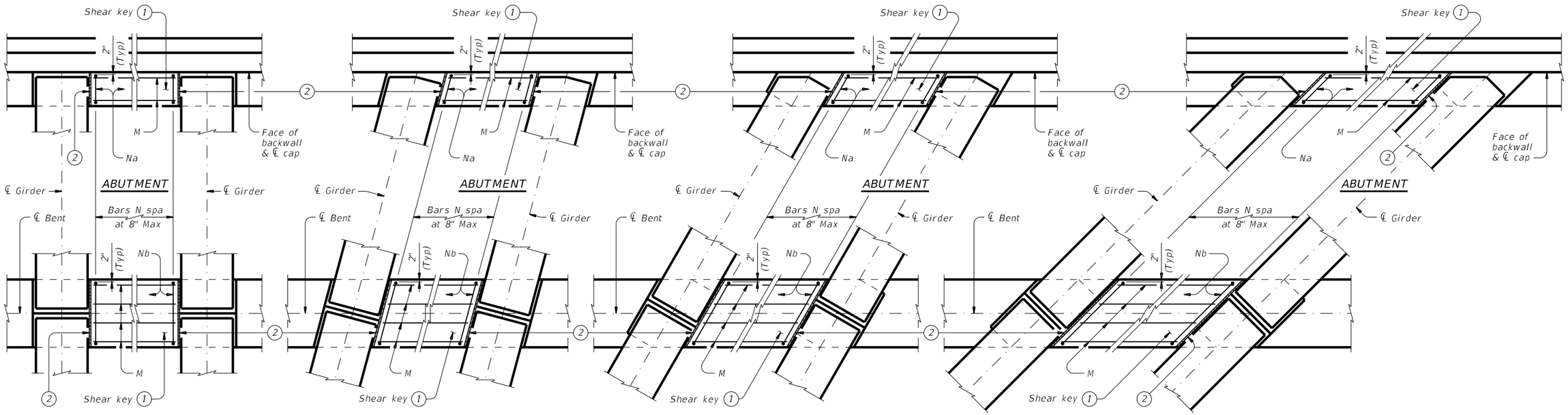


INTERIOR BENT

PARTIAL PLANS WITH NO SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

INTERIOR BENT

PARTIAL PLANS WITH 15° SKEW

Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

INTERIOR BENT

PARTIAL PLANS WITH 30° SKEW

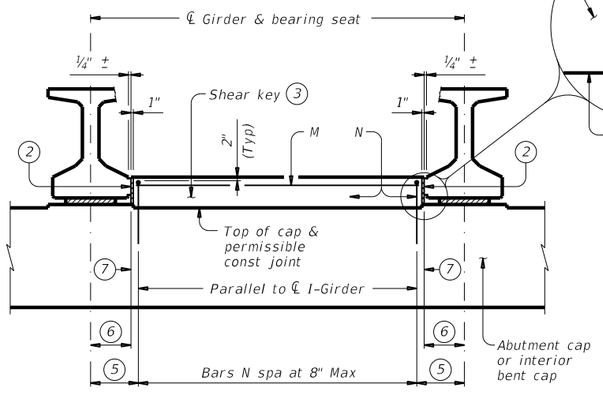
Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

INTERIOR BENT

PARTIAL PLANS WITH 45° SKEW

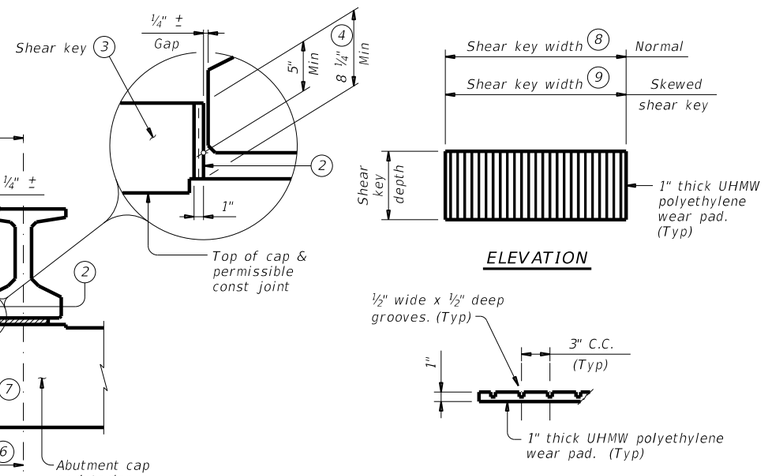
Showing shear keys on 3'-6" wide caps. 4'-0" caps similar.

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.

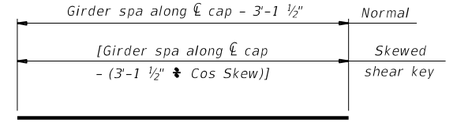


PARTIAL ELEVATION OF ABUTMENT OR INTERIOR BENT CAP (1)

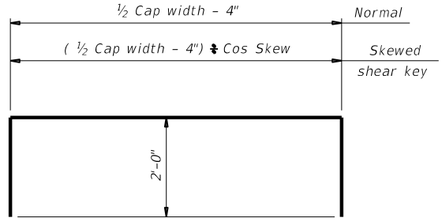
Showing shear key with girder Type Tx46. Other I-Girder types similar.



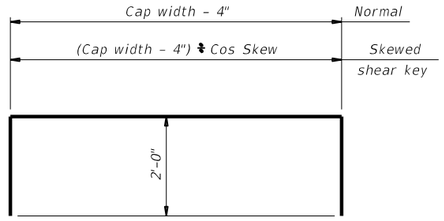
ULTRA HIGH MOLECULAR WEIGHT (UHMW) POLYETHYLENE WEAR PAD DETAILS



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

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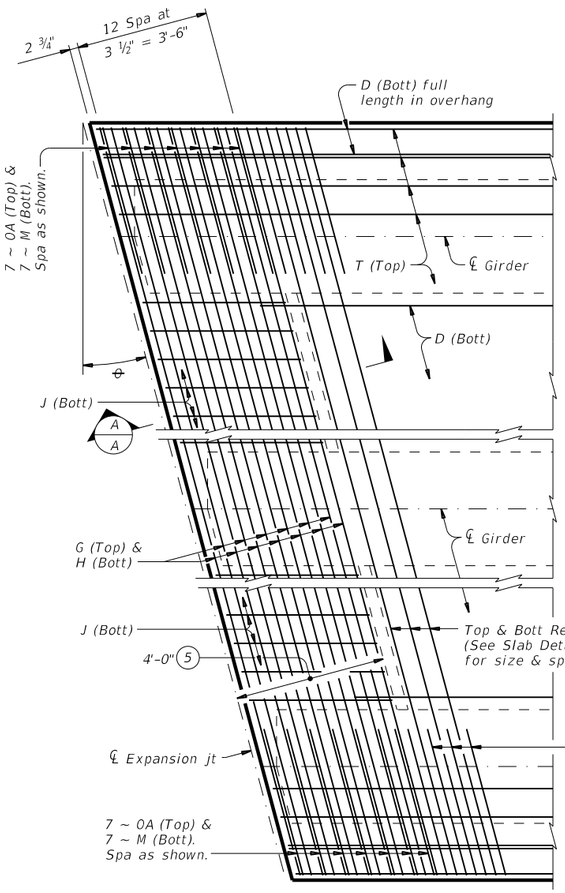
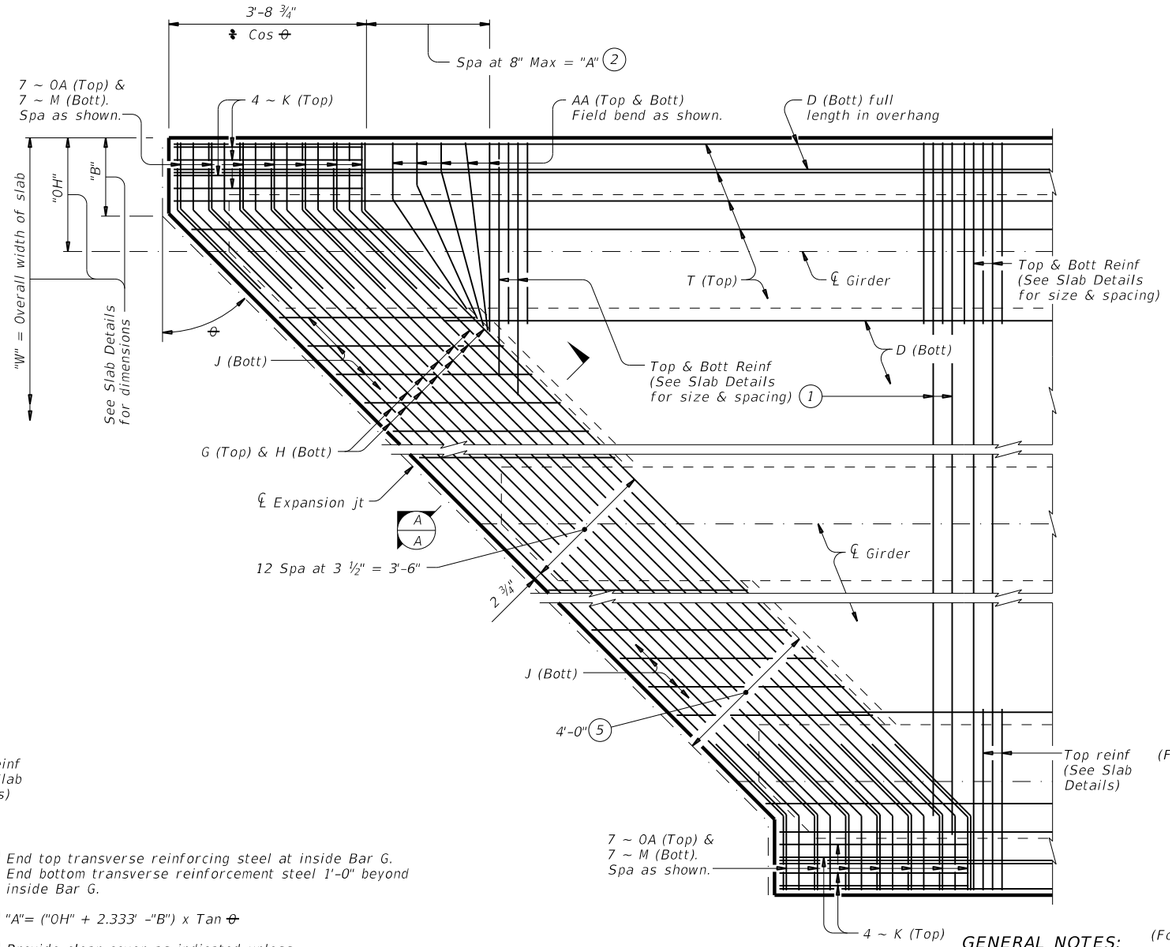


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

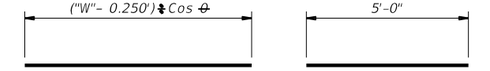
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("0H" + 2.333' -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

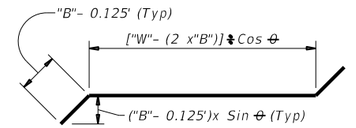
(4) Only required on slabs with breakbacks.

(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.

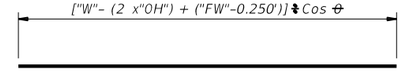


BARS G (#4) (For slabs without breakbacks)

BARS K (#4) (4)



BARS G (#4) (For slabs with breakbacks)

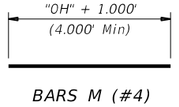


"FW" = girder's top flange width (ft)

BARS H (#4)

BARS AA (#5) (4)

BARS J (#4)



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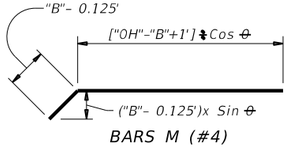

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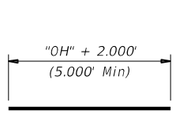
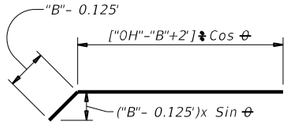


BARS OA (#5) (For slabs without breakbacks)



BARS OA (#5) (For slabs with breakbacks)

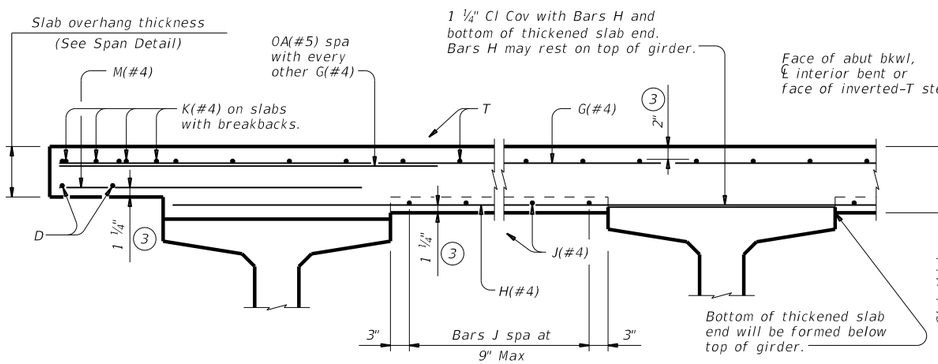
GENERAL NOTES:

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"

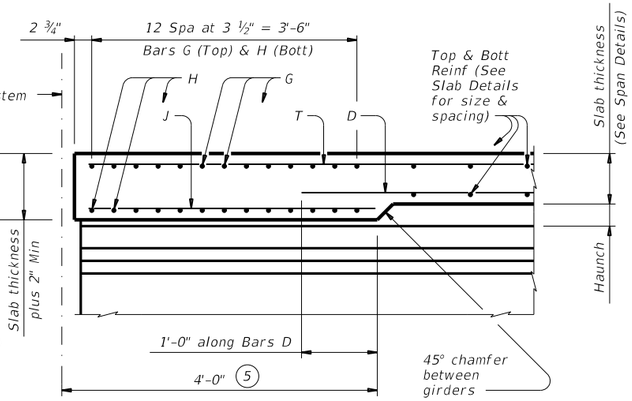
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



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: igtsstsl-17.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		207

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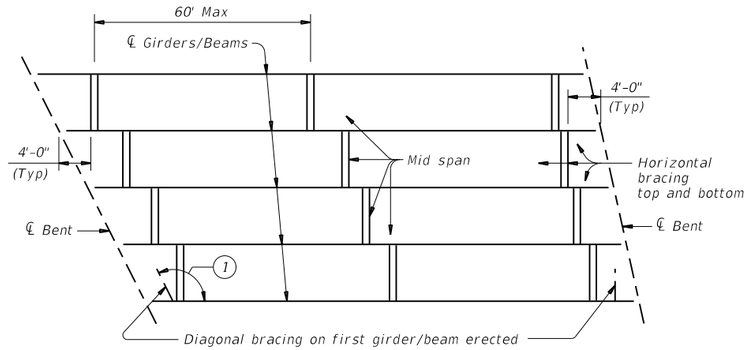
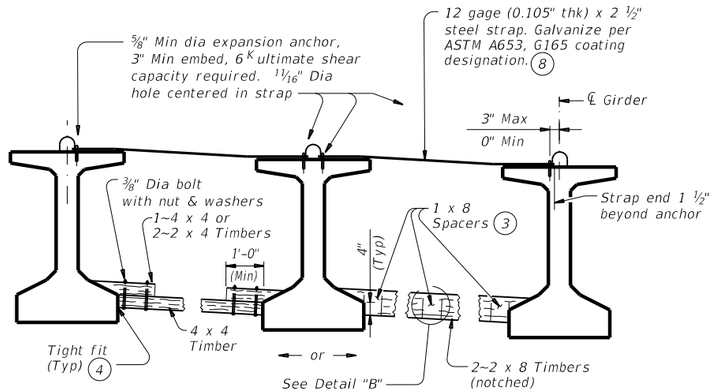
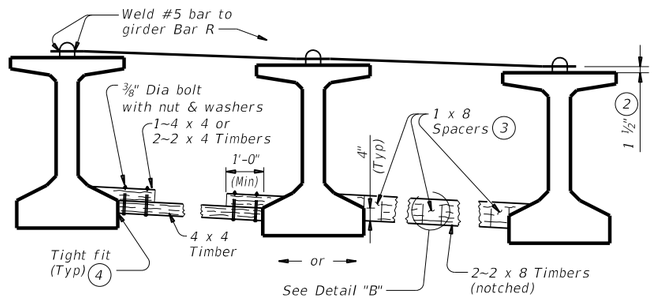


ERECTION BRACING



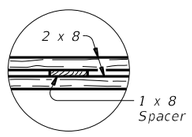
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



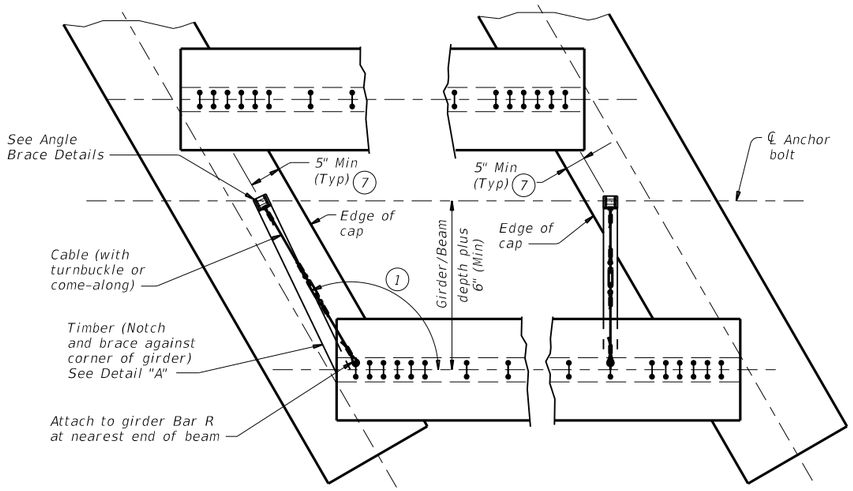
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS (5)

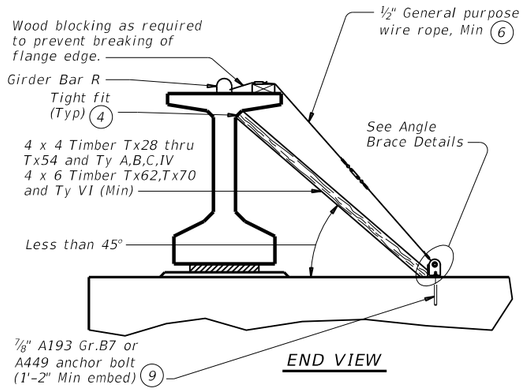


PLAN

DETAIL "B"



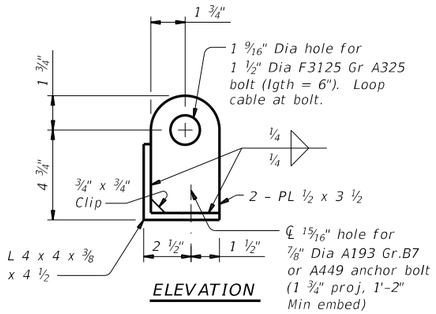
PLAN



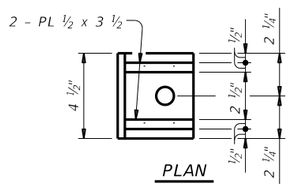
END VIEW

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.

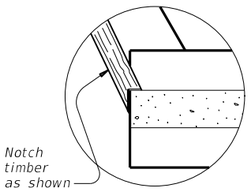
ERECTION BRACING:

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: mebcsts1-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2017 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	CRP	GOLIAD		208

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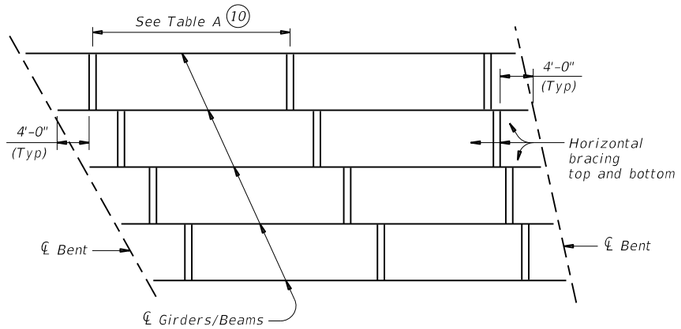


SLAB PLACEMENT BRACING

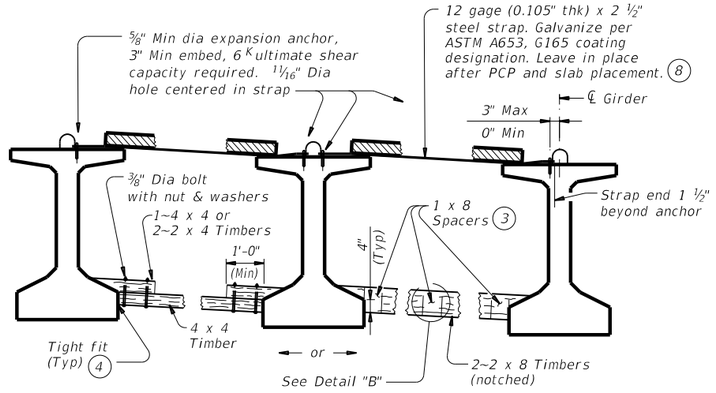
TABLE A

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

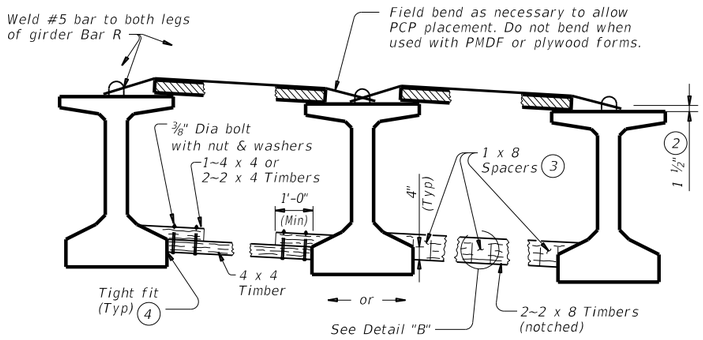
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

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

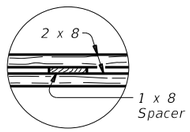
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



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)

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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
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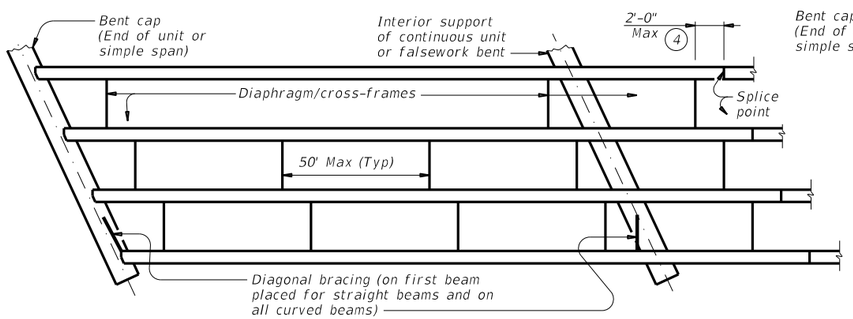
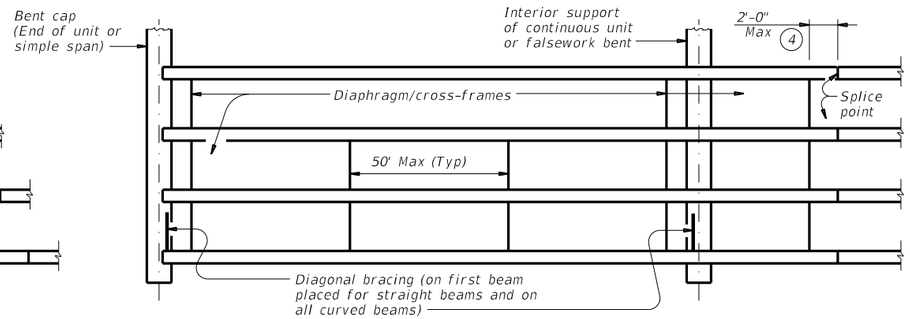
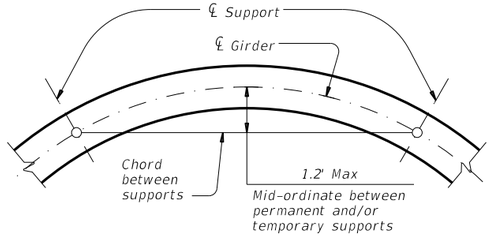


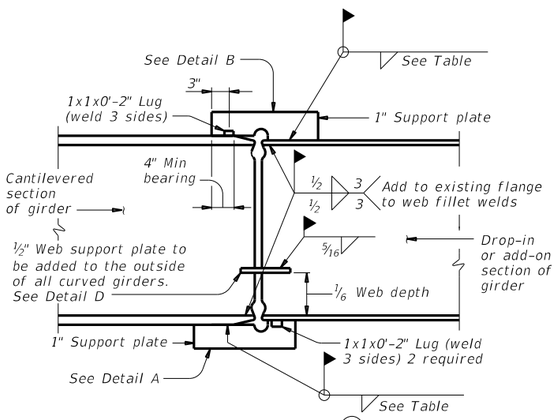


TYPICAL BRACING PLANS

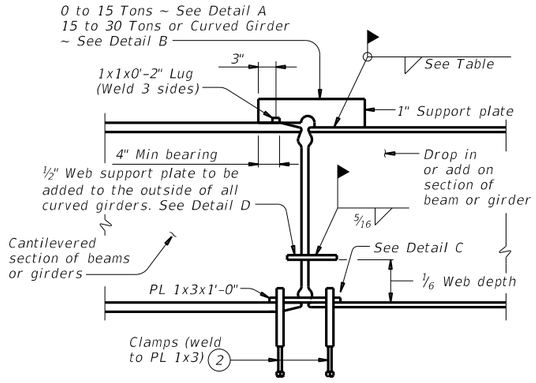


CURVED GIRDER ERECTION SUPPORT DETAIL

SKEWED

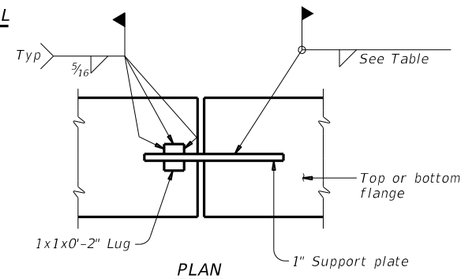


50 TON MAXIMUM (1)



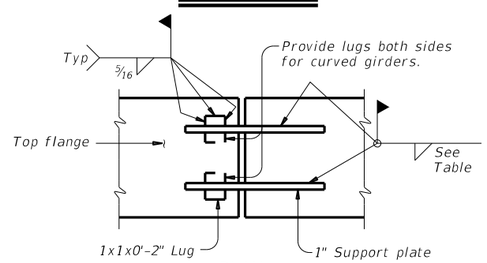
30 TON MAXIMUM (1)

NORMAL



PLAN

DETAIL A



PLAN

DETAIL B

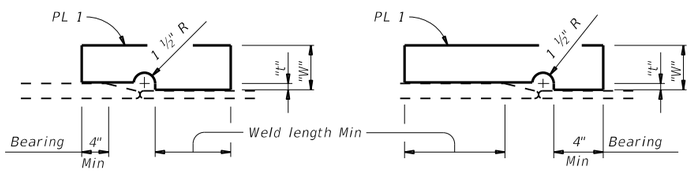
ELEVATION OF TYPICAL WELDED SPLICE SUPPORTS (3)

(1) Weights indicated are total weight of drop-in section. Special design will be required when weight of drop-in section exceeds 50 Tons or supported reaction of add-on section exceeds 25 Tons.

(2) Use extra heavy duty or extra heavy service clamps with a minimum screw diameter of ¾".

(3) Place all top and bottom flange support plates before the beam or girder is erected; attach web plates and lugs immediately after erection. Exercise care in removing the support plates and lugs. After removing support plates and lugs, grind flange and web smooth.

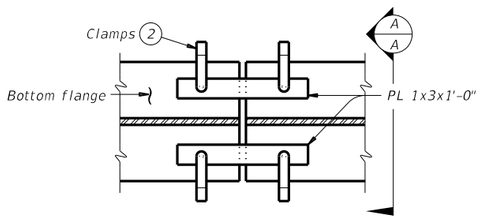
(4) Provide additional timber bracing if permanent diaphragms/cross-frames do not meet requirements shown.



SHOWING PLATE WELDED TO THINNER OR EQUAL FLANGE

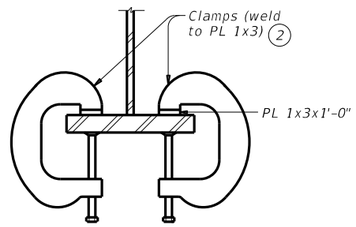
SHOWING PLATE WELDED TO THICKER FLANGE

SUPPORT PLATE DETAILS

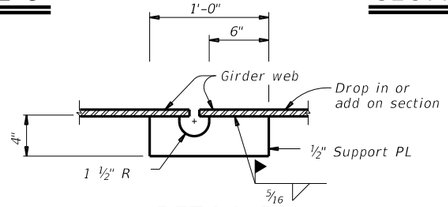


PLAN

DETAIL C



SECTION A-A



DETAIL D

Web support plates to be used for single line erection of curved girders.

"t"	1 PL to 15 T or 2 PLs ~ 15 T to 30 T				3 PLs ~ 30 T to 50 T				
	"W"	Required Weld Length			"W"	Required Weld Length			
inches		5/16" Weld	3/8" Weld	7/16" Weld		5/16" Weld	3/8" Weld	7/16" Weld	½" Weld
0 to ½	6"	10"	10"	10"	7"	15"	13"	12"	10"
½ to 1 ½	8"	12"	11"	10"	9 ½"	18"	16"	14"	12"

GENERAL NOTES:

This standard is to be used as a guide in preparing the required erection drawings (see Item 441). The contractor is responsible for the adequacy of bracing and shoring at all times.

Do not use timber sections less than 4 x 4 (nominal) as brace or shoring members. Do not use pressure treated landscape timbers or timbers that are twisted, warped or cracked as brace or shoring members.

All hardware used with cables must be able to develop the cable's ultimate strength, specified on the erection drawings. Use thimbles at all loops in cable. Install cable clamps with saddles bearing on the live end and U-bolt bearing on the dead end. Do not use worn, frayed, kinked, or corroded cable.

On the erection drawings, indicate the following:

1. Assumed loads (dead, live, wind, etc.) used to design the brace and shoring members.
2. Timber species, grade, and moisture content.
3. Grade and size of steel sections used for bracing or shoring members
4. Grade and size of all threaded hardware (bolts, lag screws, concrete anchors, etc.) required for bracing and shoring.
5. Minimum embedment of concrete anchors.
6. Required weld sizes and lengths.
7. Manufacturer's name and model number of manufactured shoring or bracing with a professional Engineer's seal and signature.

HORIZONTALLY CURVED I-GIRDERS:

Unless shown otherwise on the erection drawings, support girder sections such that the mid-ordinate of the girder does not exceed 1.2' between support points. See "Curved Girder Erection Support Detail". Brace girders at all supports. Do not remove temporary supports until continuous girders are supported by at least three permanent supports, cross-frames or diaphragms are fully installed, and splices built in conformance with Item 441 are completed.

When using the support plate details shown on this standard, as a minimum, use a support near the center of the girder section until the splice is completed.

Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS
STEEL GIRDERS AND BEAMS

MEBR(S)

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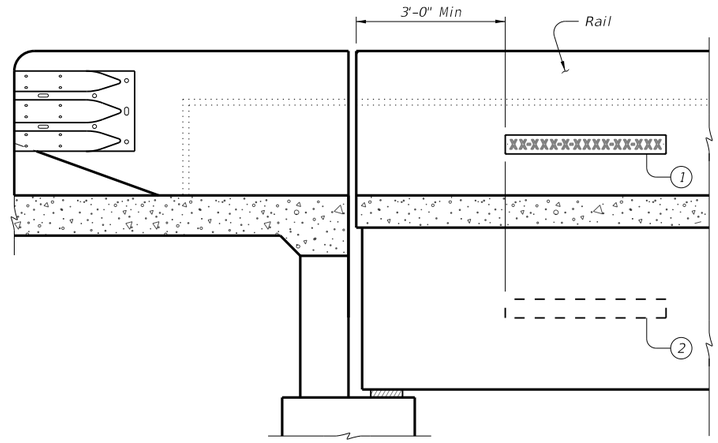
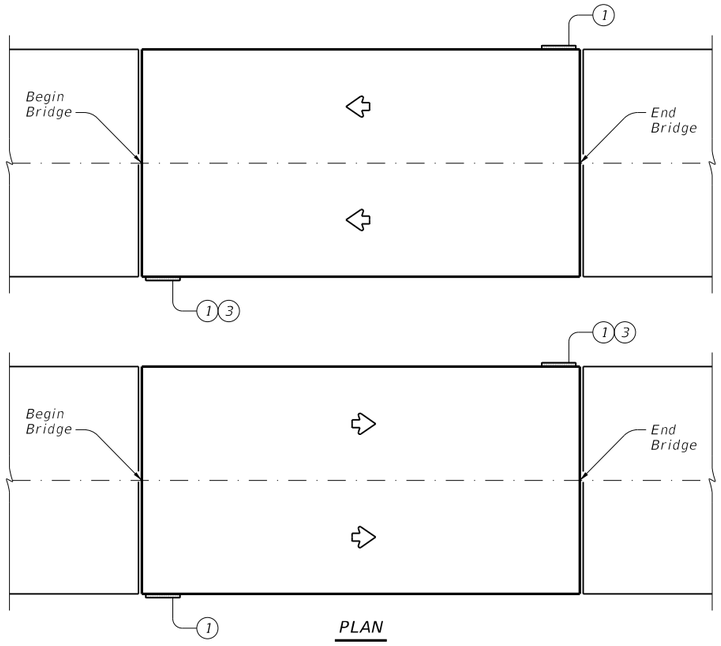
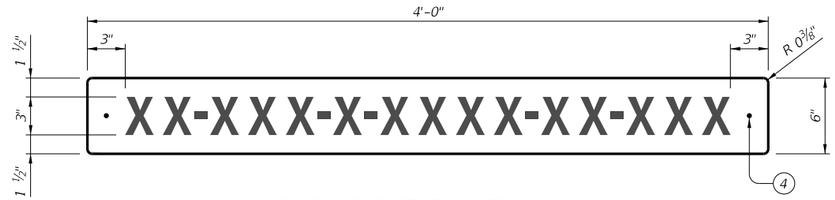


ELEVATION

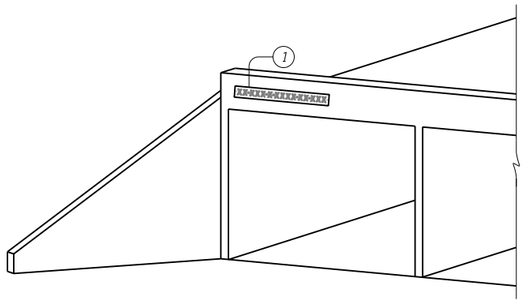


PLAN

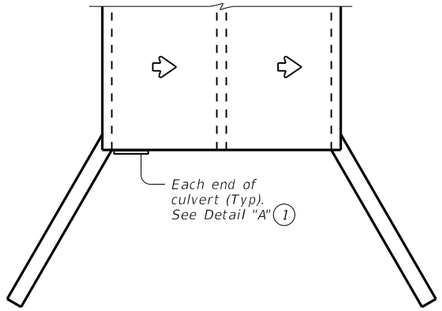
BRIDGE SIGN LOCATIONS



BRIDGE IDENTIFICATION SIGN

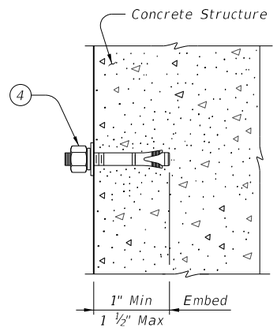


DETAIL "A"



PLAN

BRIDGE CLASS CULVERT SIGN PLACEMENT



ANCHOR DETAIL

SHEETING REQUIREMENTS		
Usage	Color	Sign Face Material
Background	White	Type B or C Sheeting
Letters and Symbols	Black	Type B or C Sheeting

(1) Bridge identification sign location

(2) Alternate sign placement location for exterior concrete beams.

(3) If adjacent bridges are less than 2 feet apart, these signs may be omitted.

(4) ¼" Diameter stainless steel expansion anchor with hex nut, washer, and spring-lock washer.

SIGN NOTES:

Standard sign designs can be found in the Standard Highway Sign Designs for Texas (SHSD).

Use the Clearview Alphabet CV-2W for the letters and symbols.

MATERIAL NOTES:

Provide lateral spacing between letters and numerals conforming with the SHSD, and any approved changes thereto. Provide a balanced appearance when spacing is not shown.

Provide aluminum sign blanks with a minimum thickness of 0.080" that meet the requirements of DMS-7110.

Provide sign face materials that meet the requirements of DMS-8300 and the sheeting requirements shown in the table.

Provide ¼" diameter stainless steel expansion anchors with one hex head nut, one flat washer, and one helical spring-lock washer each.

Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). Provide anchor products that have a designated ICC-ES Evaluation Report number. The approval status must be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environments, provide both stainless steel anchor bodies and expansion wedges.

GENERAL NOTES:

Prior to hole drilling, locate rebar to ensure clearing of existing reinforcement and/or strands.

Prior to installation, obtain approval of sign locations from the Engineer. Avoid placement of sign over travel lanes and pedestrian walkways. Submit proposed installation method to Engineer prior to beginning work. Install anchors as shown on plans and in accordance with the anchor manufacturer's published installation instructions.

Do not install anchors sections of members under tension.

For new construction, the signs and anchors are subsidiary to the bridge. For installations on existing structures, the signs and anchors are paid under Item 442, "Metal for Structures." Each sign weighs 28 lbs.

Texas Department of Transportation

Bridge Division Standard

NBI BRIDGE IDENTIFICATION SIGN STANDARD

NBIS

FILE: MS-NBIS-23.dgn	DN: TAR	CK: TxDOT	DW: JER	CK: TAR
©TxDOT March 2023	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		211

DATE: 7/3/2024 $TIME$
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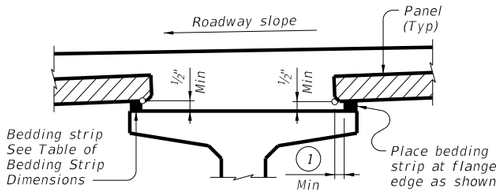
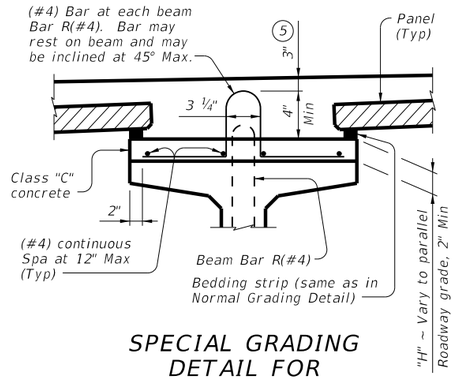


NORMAL GRADING DETAIL (3)

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..

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.

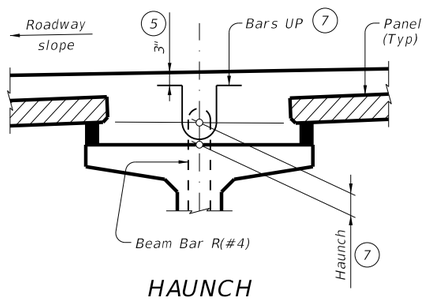
Use of Prestressed Concrete Panels is not permitted for horizontally curved steel plate or tub girders. See Span Details for other possible restrictions on their use.

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.

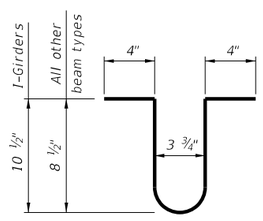
Any additional reinforcement or concrete required on this standard is considered subsidiary to the bid Item "Reinforced Concrete Slab".

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

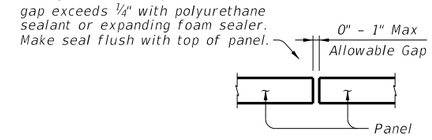


HAUNCH REINFORCING DETAIL

Showing prestressed concrete I-girders.
(Other beam types similar)

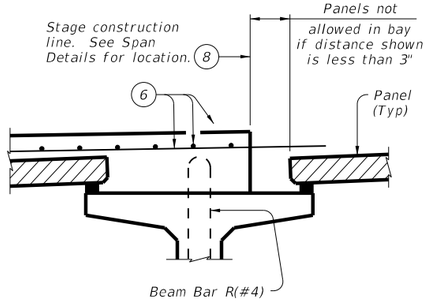


BARS UP (#4) (7)

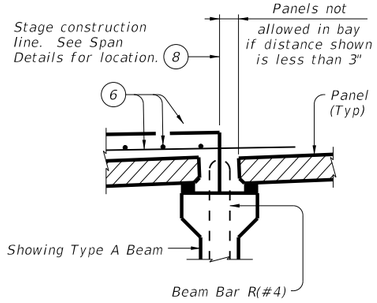


PANEL JOINTS

(Panel reinforcing not shown for clarity.
The gap cannot be considered as a panel fabrication tolerance. Adjust panel placement to minimize joint openings.)



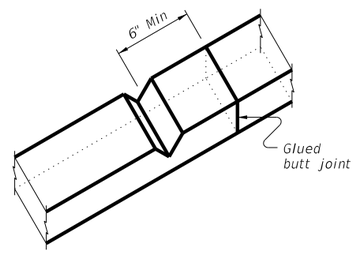
PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(Other beam types similar)



BEDDING STRIP DETAIL (9)

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation — Bridge Division Standard

PRESTRESSED CONCRETE PANELS DECK DETAILS

PCP

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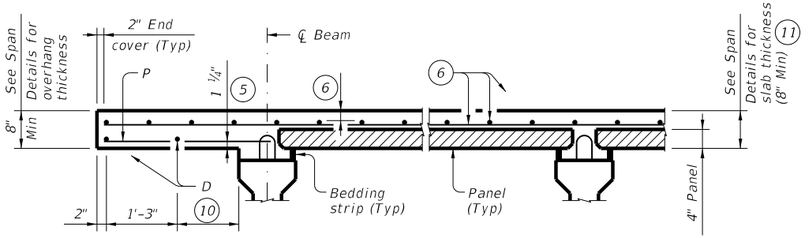
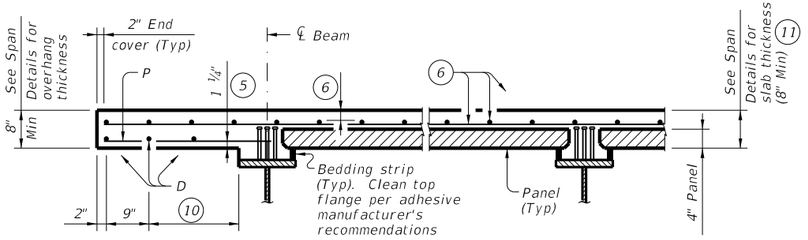
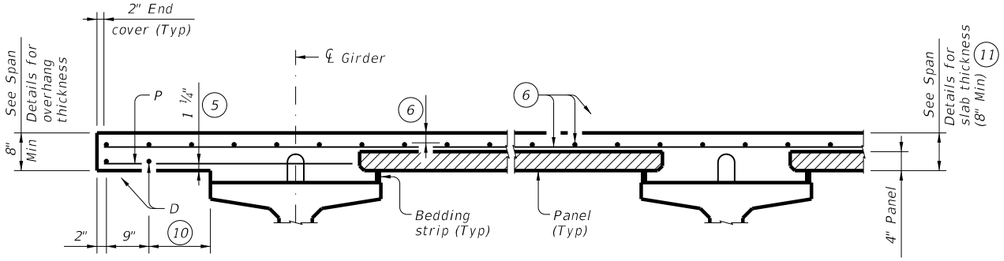


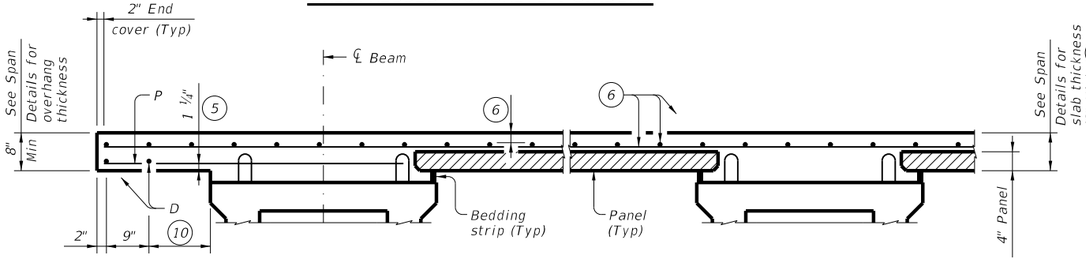
PRESTRESSED CONCRETE I-BEAMS



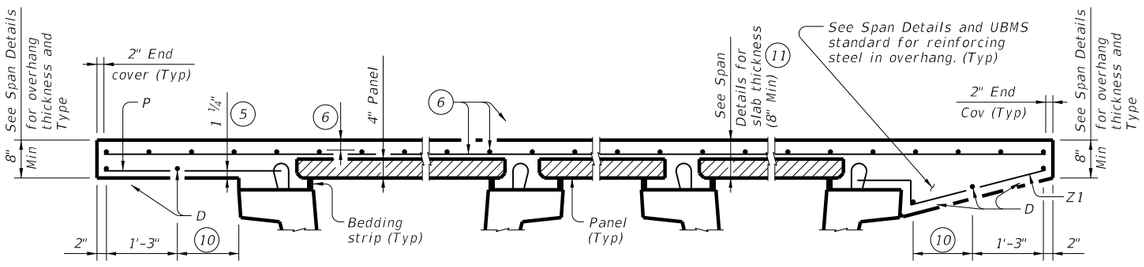
STEEL BEAMS (13)

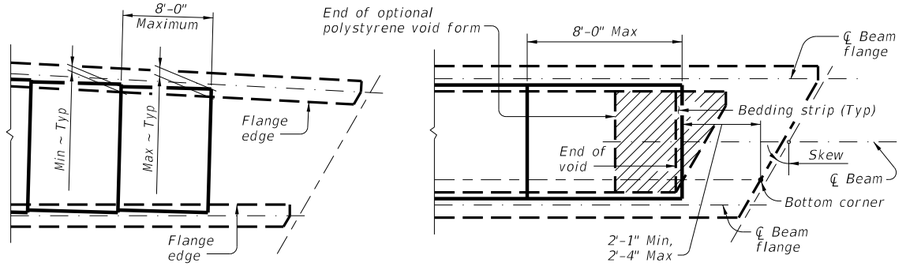


PRESTRESSED CONCRETE I-GIRDERS



PRESTRESSED CONCRETE X-BEAMS





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.

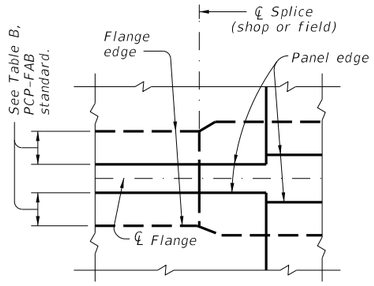
(9) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(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.

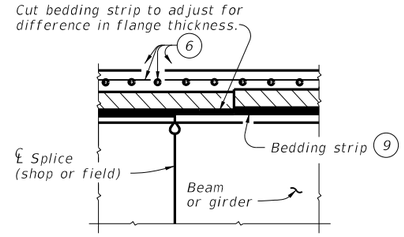
(12) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inverted-Tee stems only.

(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.



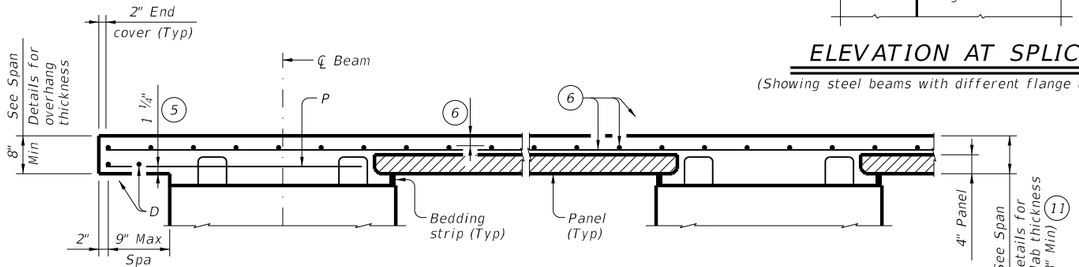
PLAN AT SPLICE

(Showing steel beams with flange width transition)



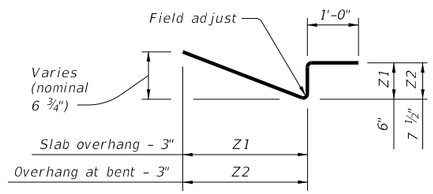
ELEVATION AT SPLICE

(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

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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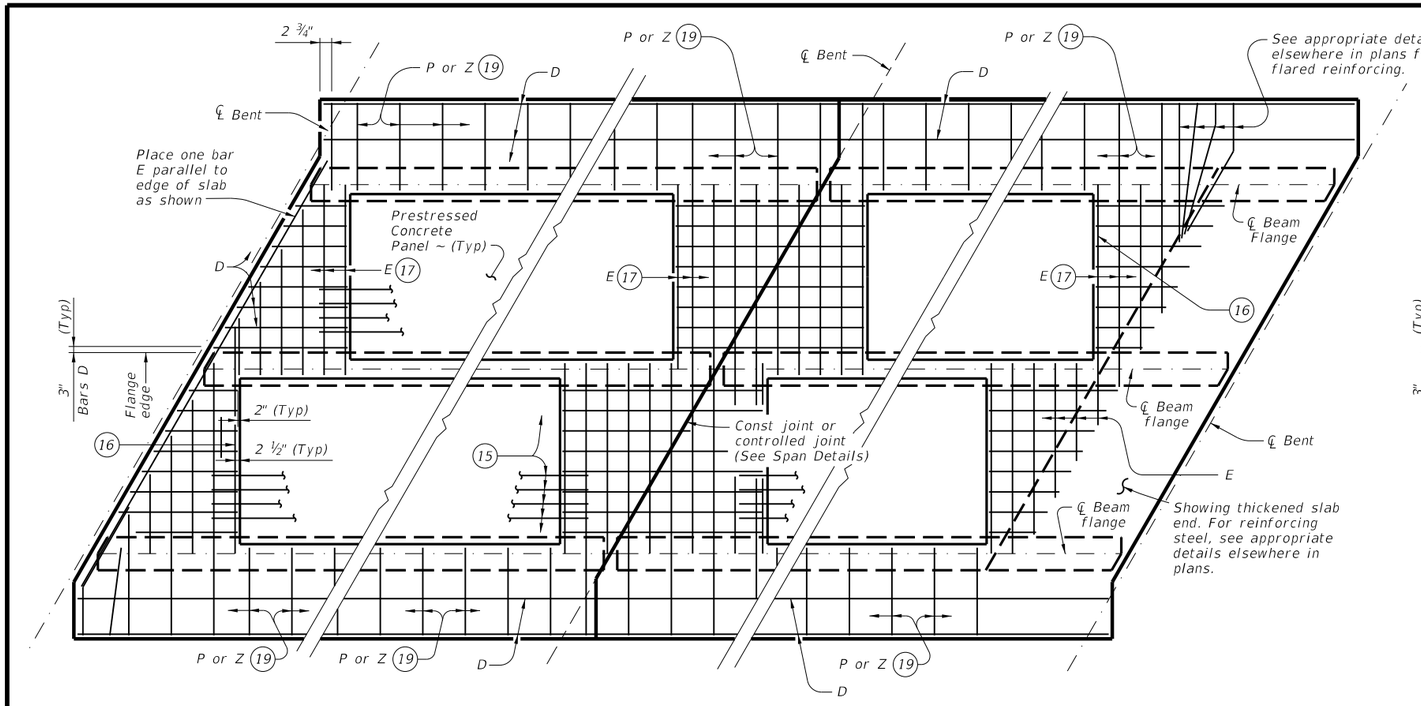
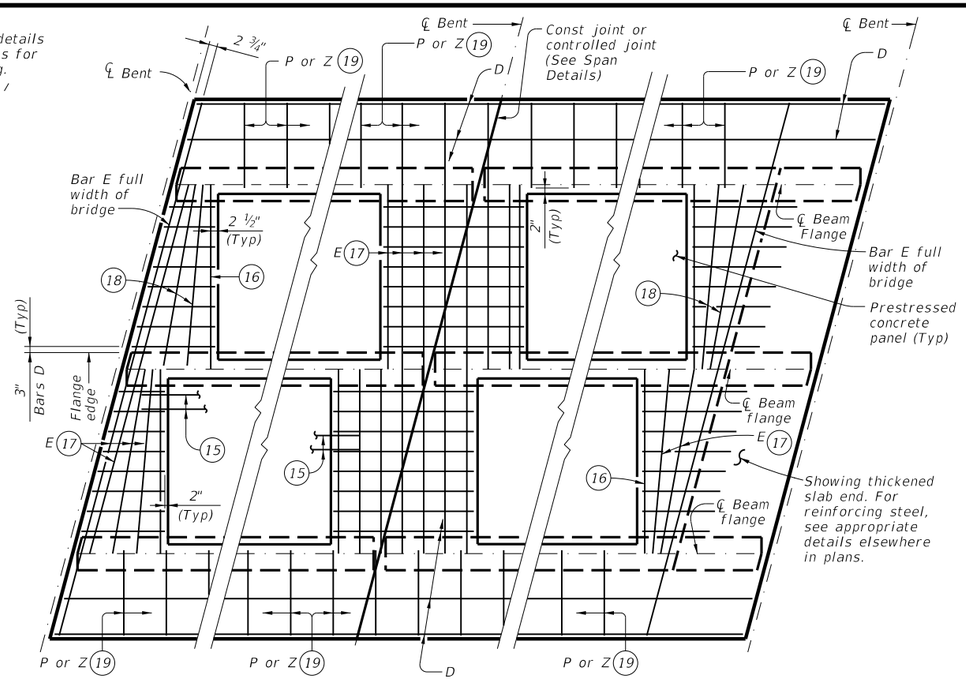


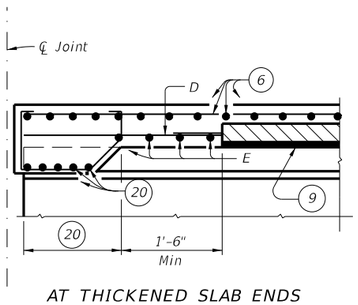
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

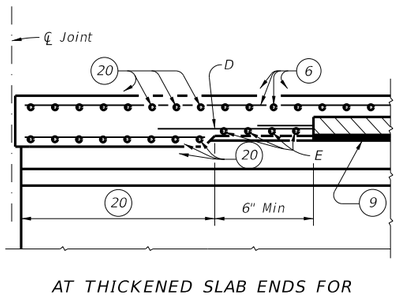


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

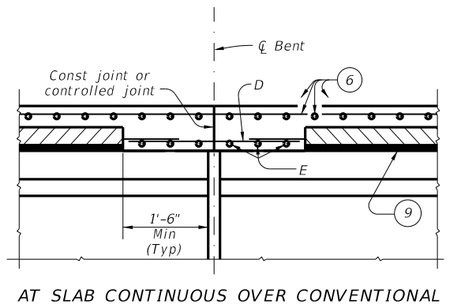
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



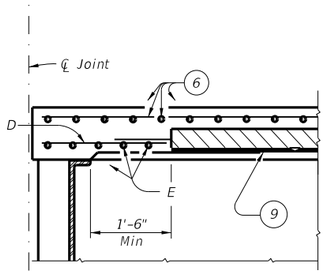
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



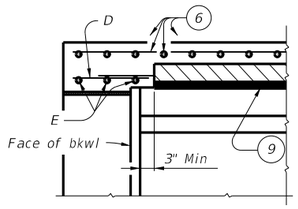
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



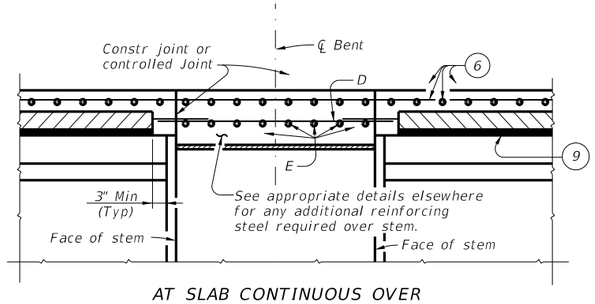
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



AT CONVENTIONAL END DIAPHRAGMS FOR STEEL BMS



AT SLAB OVER ABUTMENT BACKWALL FOR ALL BMS



AT SLAB CONTINUOUS OVER INVERTED-T BENTS FOR ALL BMS

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

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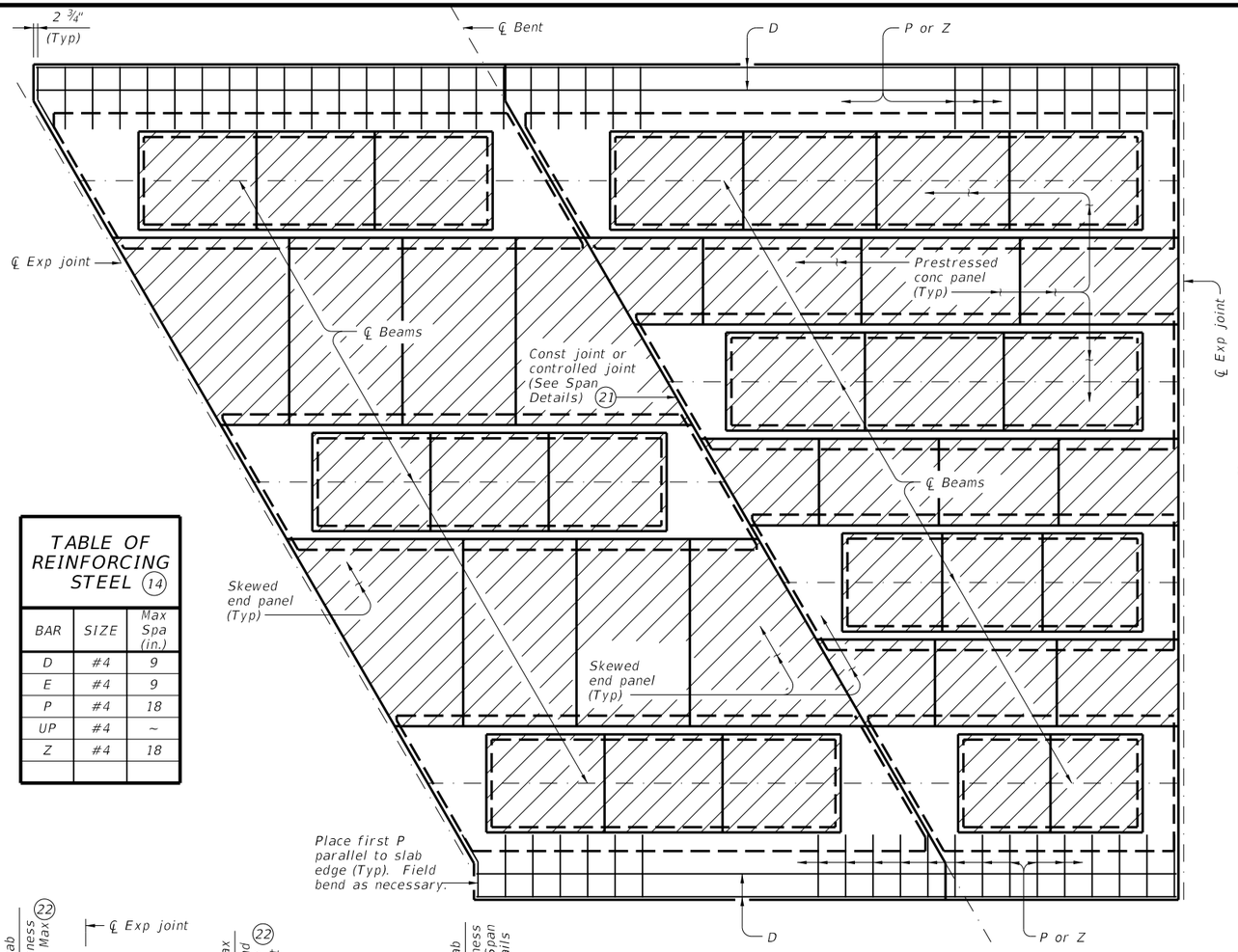
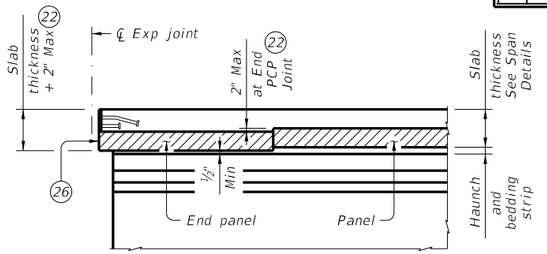


OPTION 2 ~ PLAN OF SLAB

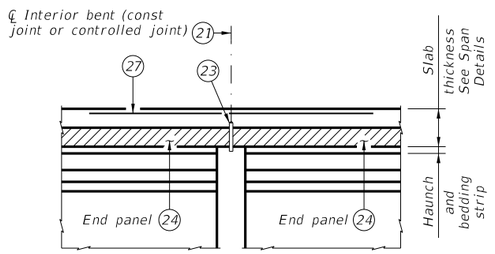
(Showing U-Beams; other beams similar)

TABLE OF REINFORCING STEEL (14)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



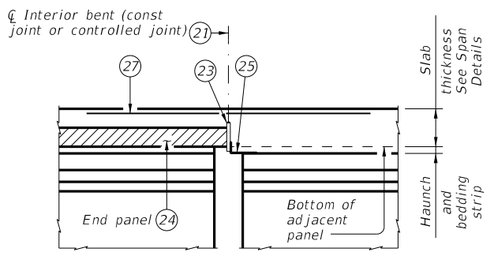
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-B, SEJ-M, SEJ-S(0), AJ, and Type A expansion joints only.



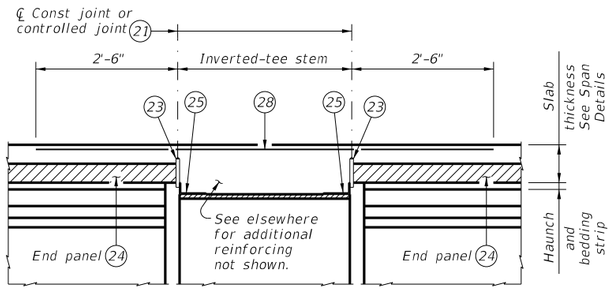
CONVENTIONAL INTERIOR BENT

Panel against panel between beams/girders.



CONVENTIONAL INTERIOR BENT

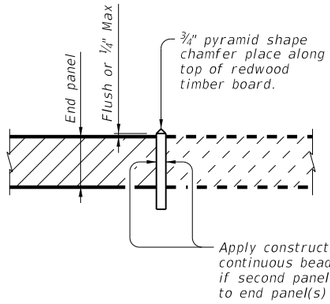
Panel against beam/girder end in adjacent span.



INVERTED-T BENT

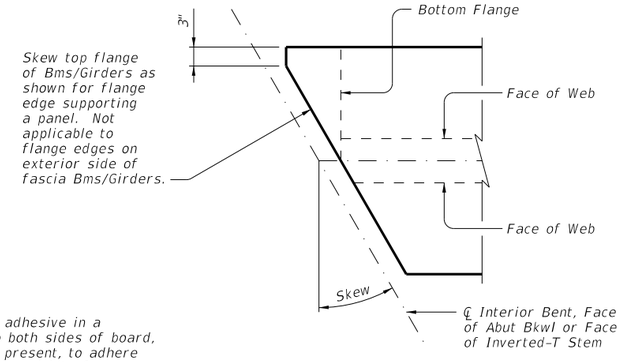
Panels against inverted-tee stem

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 0A from standard IGTS in the slab.

HL93 LOADING SHEET 4 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	0088	02	062	US59
3/2023: Removed top flange tension limit.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		215

DATE: 7/3/2024 $TIME$
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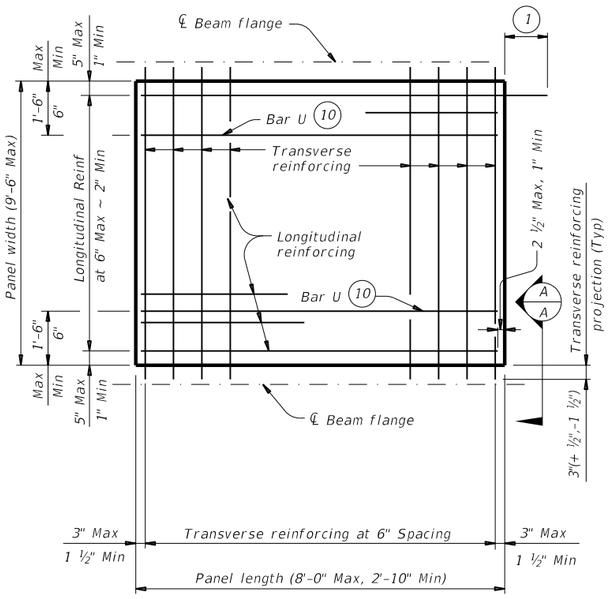
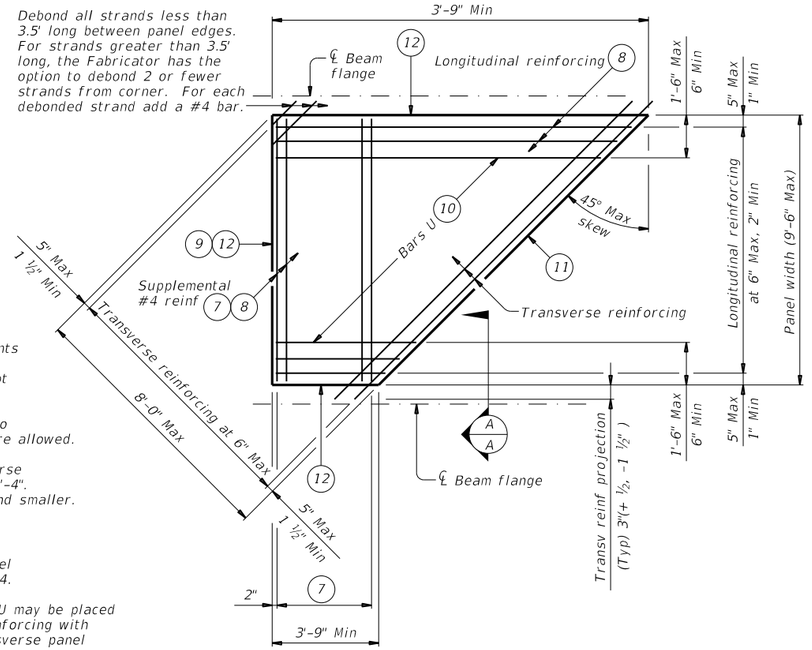


TYPICAL NON-SKEWED PANEL PLAN



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

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.

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.

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.

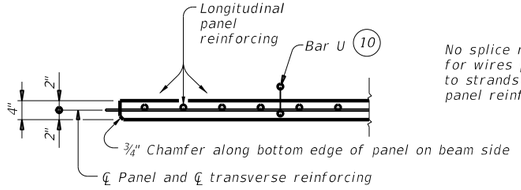
LONGITUDINAL PANEL REINFORCEMENT:

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.

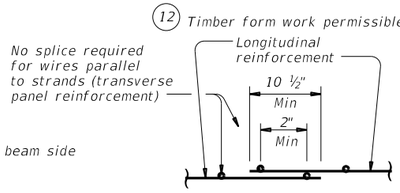
No combination of longitudinal reinforcement options in a panel is allowed.

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.

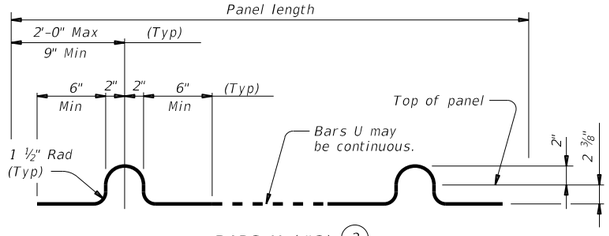


SECTION A-A

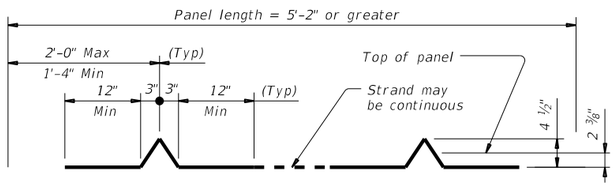
(Not showing supplemental #4 bars for skewed end panels.)



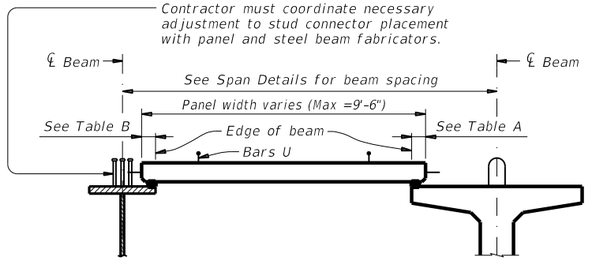
WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)



BARS U (#3) (2)



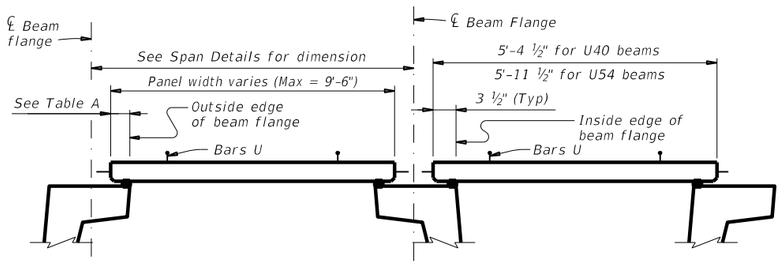
OPTIONAL STRAND FOR BARS U (3)



STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

Typ unless noted otherwise



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

PCP-FAB

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©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	CRP	GOLIAD		216

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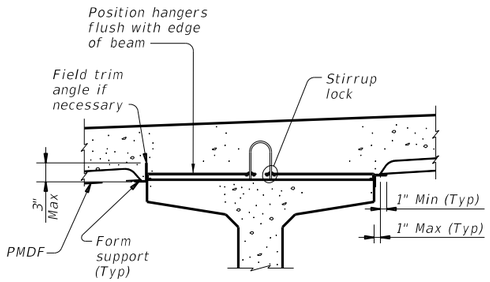
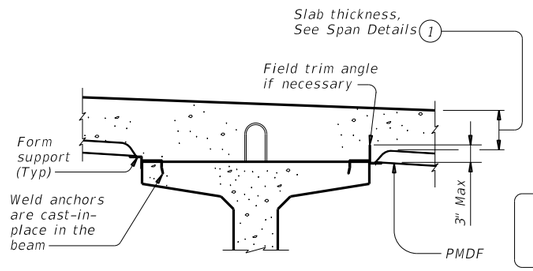
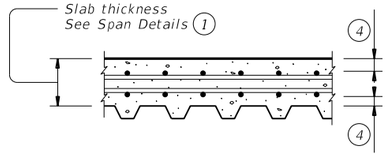


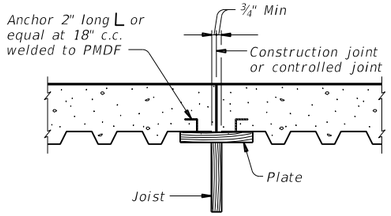
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

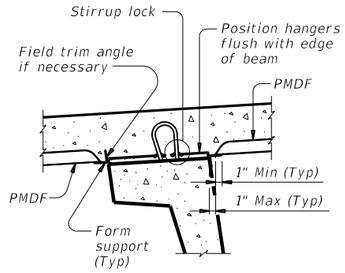


TYP LONGITUDINAL SLAB SECTION

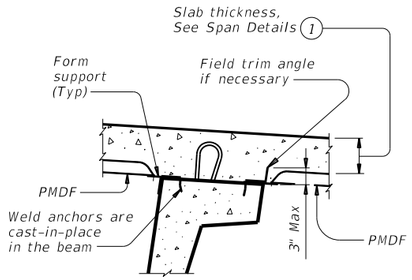


Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

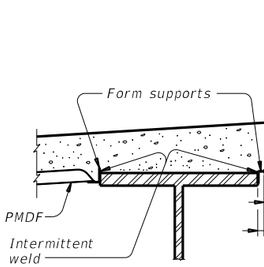
SECTION THRU CONSTRUCTION JOINT



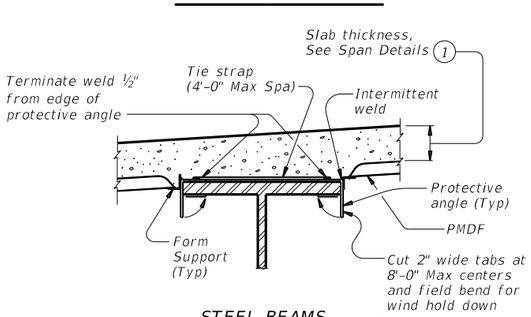
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

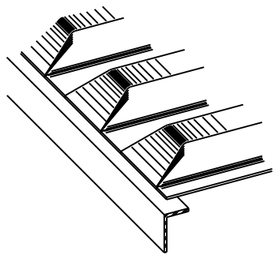


STEEL BEAMS AT COMPRESSION FLANGES



STEEL BEAMS AT TENSION FLANGES (2)

TYPICAL TRANSVERSE SECTIONS



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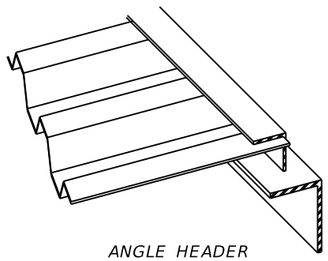
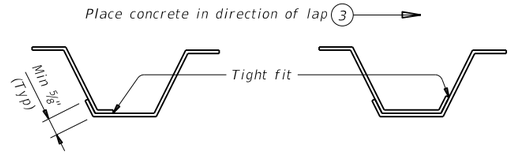


ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES



SIDE LAP DETAILS

(1) Slab thickness minus 5/8" if corrugations match reinforcing bars.

(2) Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.

(3) The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.

(4) See Span details for cover requirements.

FOR PRESTR CONC U-BEAM AND STEEL GIRDER BRIDGES:
Unless shown elsewhere in the plans, size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5. Bottom mat reinforcement and additional concrete is subsidiary to Item 422 "Concrete Superstructures."

FOR PRESTR CONC TX-GIRDER BRIDGES:
See Miscellaneous Slab Details, Prestr Concrete I-Girders (IGMS) standard sheet for bottom mat reinforcing.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, structural steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:

As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.

Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

1/240 of the form design span, but not more than 0.75", for all design spans of railroad overpass bridge spans fully or partially over railroad right-of-way, and for all bridge spans of railroad underpass structures.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

Texas Department of Transportation

Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
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02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST	COUNTY		SHEET NO.
12-21: Updated max deflection for RR.	CRP	GOLIAD		217

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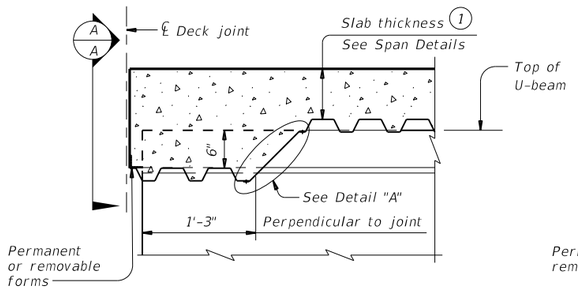
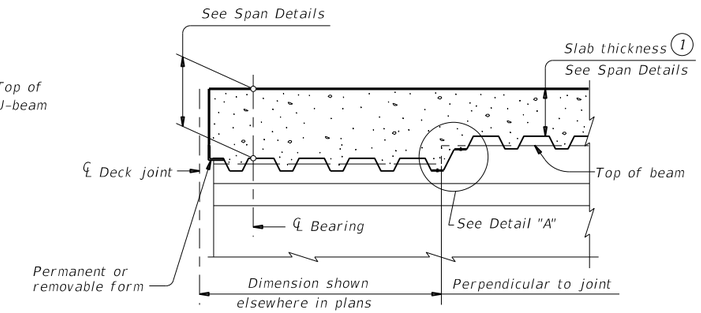
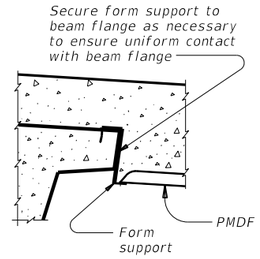


AT THICKENED SLAB END FOR U-BEAMS

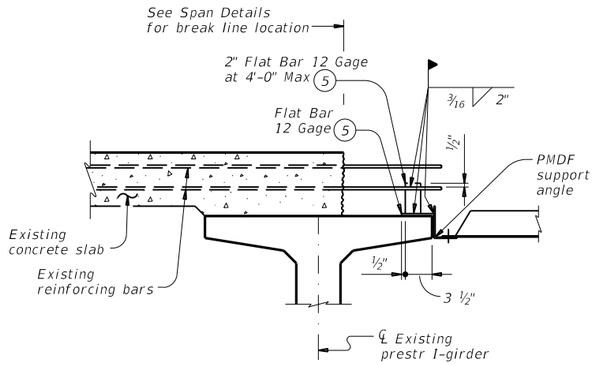


AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

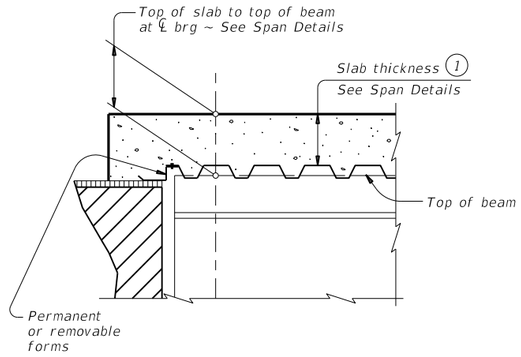
Showing I-beam block-out. No block-out for I-girders or steel beams.



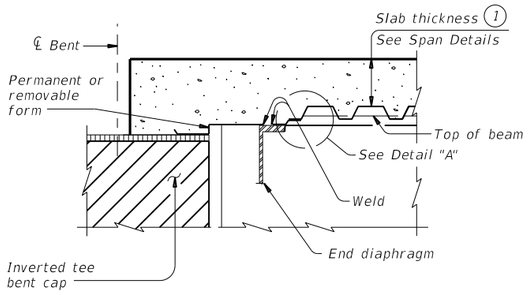
SECTION A-A



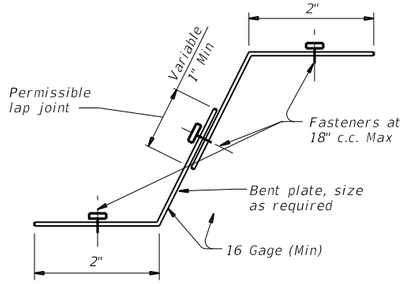
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



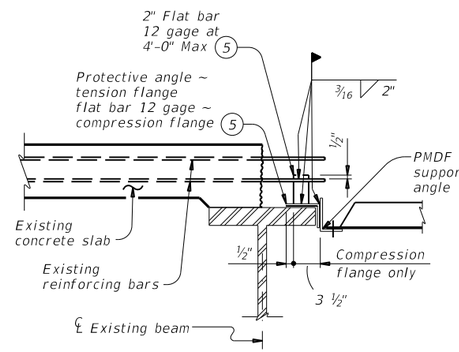
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END

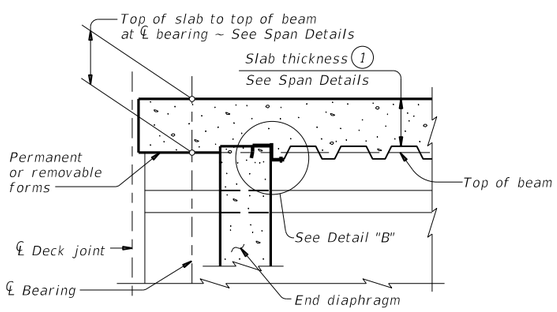


DETAIL "A"

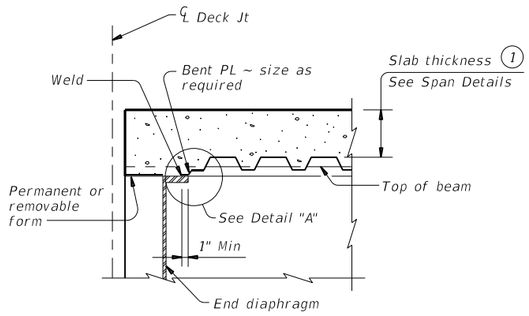


SHOWING STEEL BEAMS

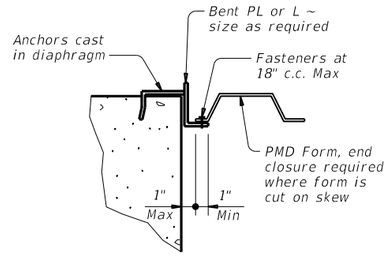
WIDENING DETAILS



AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

(1) Slab thickness minus 5/8" if corrugations match reinforcing bars

(5) Minimum yield stress of 12 gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

SHEET 2 OF 2

Texas Department of Transportation

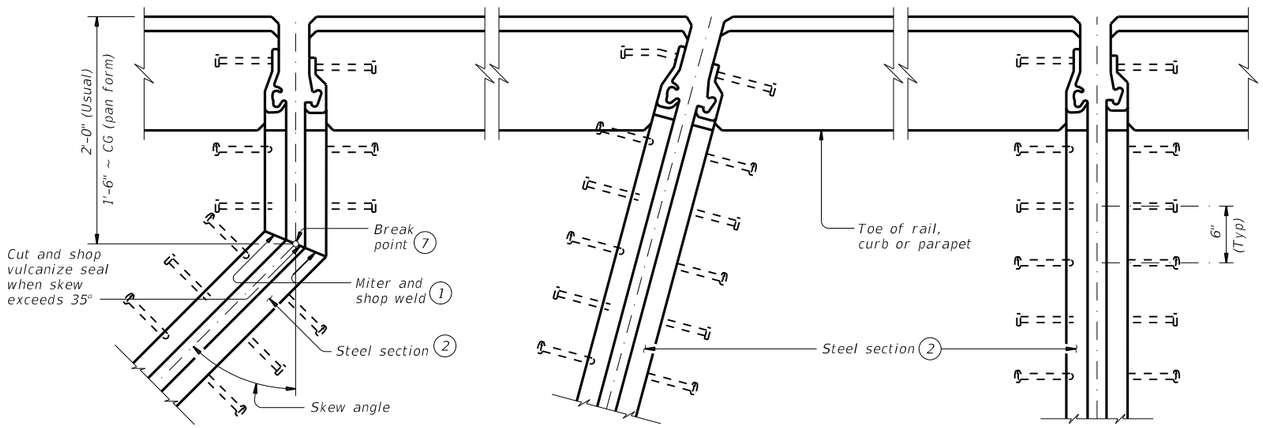
Bridge Division Standard

PERMANENT METAL DECK FORMS

PMDF

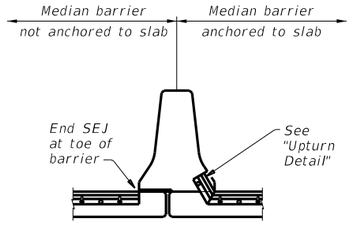
FILE: pmdfste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
02-20: Modified box note by adding steel beams/girders and subsidiary.	DIST	COUNTY		SHEET NO.
12-21: Updated max deflection for RR.	CRP	GOLIAD		218

DATE: 7/3/2024 $TIME$
FILE: c:\workingdir\ljo-pw.bentley.com_ljo-pw-01\thuy.nguyen\dms71725\sejm.dgn

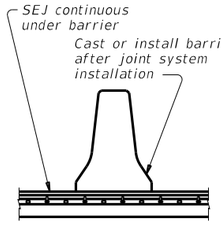


SHOWING SKEWS WITH SLAB BREAKBACKS | SHOWING SKEWS WITHOUT SLAB BREAKBACKS | SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

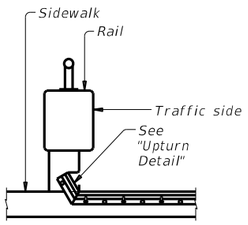
PLANS OF END CONDITIONS



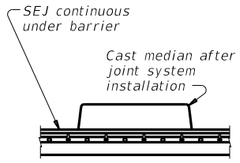
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



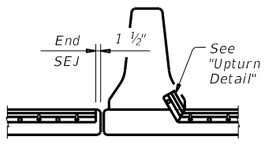
AT MEDIAN BARRIER



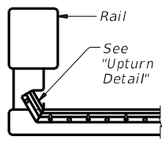
AT SIDEWALK BEHIND BRIDGE RAIL



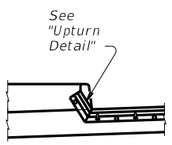
AT RAISED MEDIAN



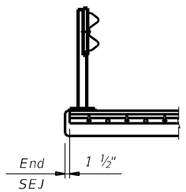
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL

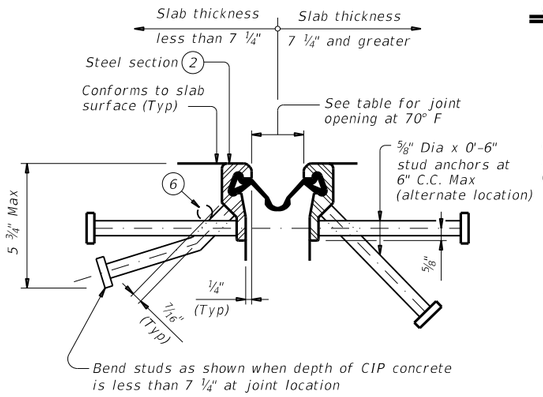


AT SIDEWALK

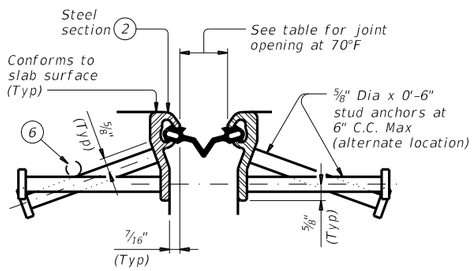


AT STEEL POST BRIDGE RAIL

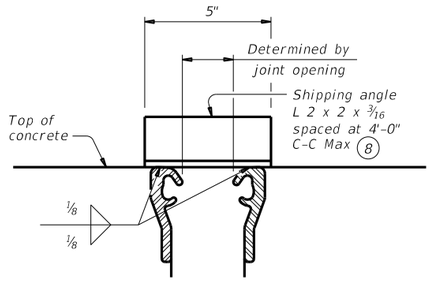
TYPICAL SECTIONS (5)



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.

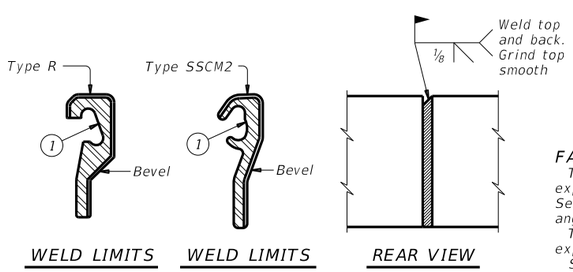
(4) Reduce for sidewalk or parapet heights less than 6".

(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.

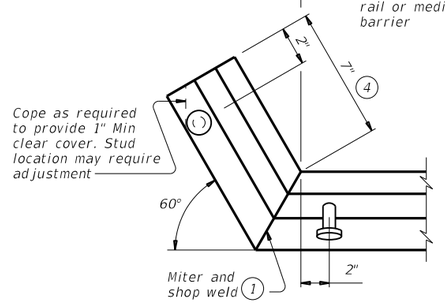
Ship steel sections in convenient lengths of 10'-0" Min and 24'-0" Max unless necessary for staged construction or widenings. One shop splice is permitted in each shipping length provided no piece is less than 2'-0" long and sufficient studs are added to limit the stud to shop splice distance to 2" Min 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: sejmste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		219

(1) Applicable to EE bearings only.

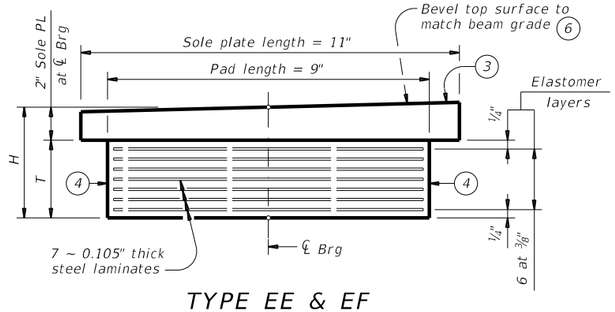
(2) Min DL can be reduced by the ratio of (actual exp length/max exp length).

(3) Locate "Bearing Type" identification here.

(4) Locate permanent mark here.

(5) Min Bearing Seat width, normal to girder, is "S" + 8".

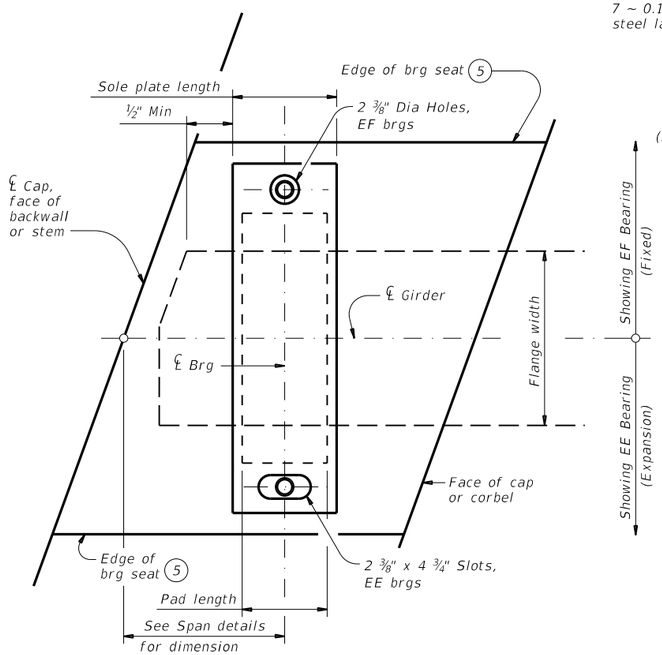
(6) See span details for beam grade (slope) at bearing locations.



TYPE EE & EF LAMINATED ELASTOMERIC BEARING DETAIL

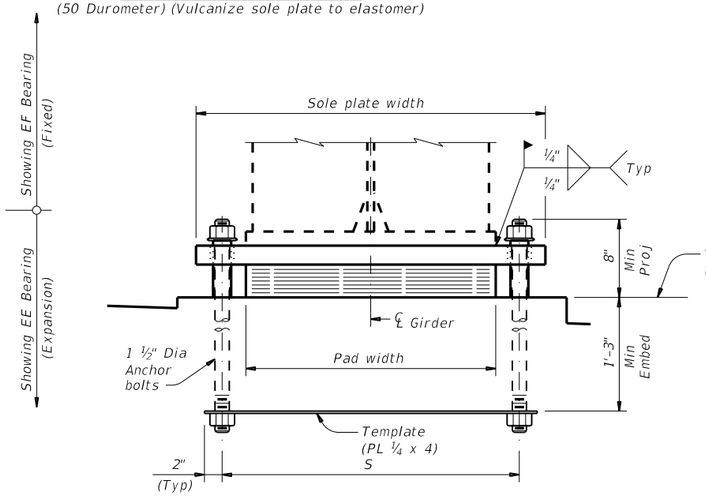
(50 Durometer) (Vulcanize sole plate to elastomer)

Bearing Type	Neoprene Pad		Sole Plate		H	S	T	Flange Width		Reactions (Unfactored)			Max Expansion Length (1)
	Width	Length	Width	Length				Min	Max	(1)(2) Min DL	Max DL	Max Total	
	in	in	in	in	in	in	in	in	in	kip	kip	kip	ft
EE1 or EF1	15	9	25.5	11	5.5	20.0	3.49	10	15	59	115	144	250
EE2 or EF2	18	9	28.5	11	5.5	23.0	3.49	10	18	71	148	185	250
EE3 or EF3	21	9	31.5	11	5.5	26.0	3.49	11	21	83	181	226	250
EE4 or EF4	24	9	34.5	11	5.5	29.0	3.49	14	24	95	215	269	250
EE5 or EF5	27	9	37.5	11	5.5	32.0	3.49	17	27	106	249	312	250
EE6 or EF6	30	9	40.5	11	5.5	35.0	3.49	20	30	118	284	355	250
EE7 or EF7	32	9	42.5	11	5.5	37.0	3.49	22	32	126	307	384	250
EE8 or EF8	34	9	44.5	11	5.5	39.0	3.49	24	34	134	331	414	250
EE9 or EF9	36	9	46.5	11	5.5	41.0	3.49	26	36	142	355	443	250

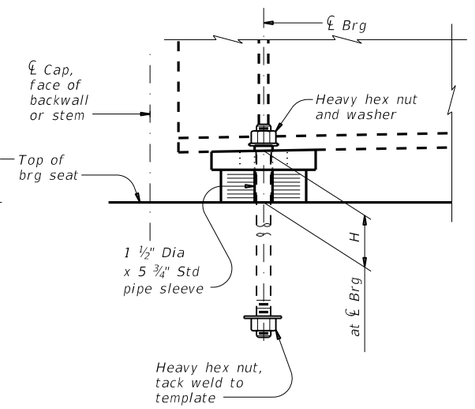


PLAN

Pipe sleeves, washers and nuts not shown for clarity



FRONT ELEVATION



SIDE ELEVATION

END FIXED (EF) AND EXPANSION (EE) BEARINGS

Paid for at unit price bid for "Elastomeric Bearing" as per Item 434.

MATERIAL NOTES:

Provide anchor bolts conforming to ASTM F1554 Grade 105 or ASTM A193 Grade B7. Provide nuts conforming to ASTM A563 Grade DH, heavy hex or A194 Grade 2H, heavy hex. Provide washers conforming to ASTM F436. Provide pipe sleeves conforming to the requirements of ASTM A53 Grade B or A 500 Grade B. Hot-dip galvanize all anchor bolts (exposed end plus 6" Min), nuts not embedded in concrete, and pipe sleeves as per Item 445, "Galvanizing".

For painted bridges, provide steel for sole plates conforming to ASTM A36 or A588. For unpainted (weathering) bridges, provide steel for sole plates conforming to ASTM A588.

GENERAL NOTES:

The bearings shown on this standard are intended for use with continuous and simple span rolled beams and plate girders. None of the bearings shown are designed to resist uplift.

See span details for bearing type and location.

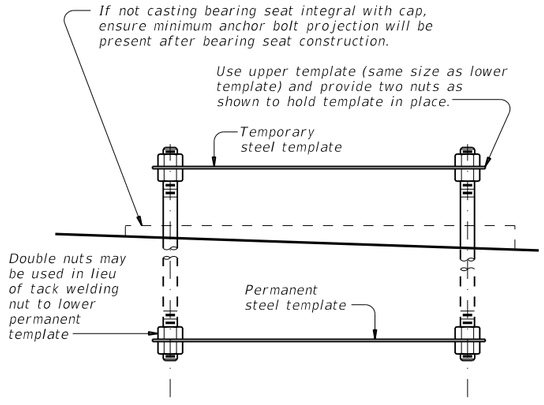
The bearing fabricator is required to develop a bearing layout which identifies location and orientation of all bearings. Permanently mark each bearing in accordance with the bearing layout. A copy of the bearing layout is to be provided to the Engineer.

Submit shop drawings for approval. Dimension sole plates to the nearest 1/16" based on required thickness at centerline of bearing and slope of the girder in the finished structure. Thickness tolerance variation from the shop drawings is 1/16" +/-, except the variation from a plane parallel to the theoretical top surface can not exceed 1/16" total.

Install anchor bolt nuts finger-tight or loosely snug.

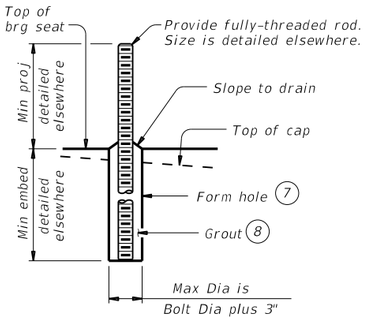
All bearings on this standard require wood float bearing seat surfaces that are clean and free of all loose material before placement of bearings.

These bearings are not intended for use with bridges over 100 ft wide. The anchor bolts are not designed to restrain temperature-induced lateral movement.



ANCHOR BOLT SETTING DETAIL

Applies to all bearings on this standard. Verify and correct, if necessary, anchor bolt location immediately after concrete placement, before initial set.

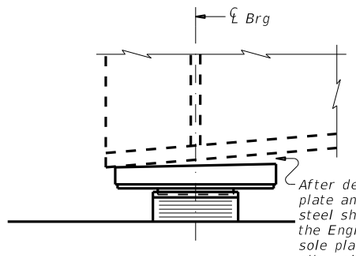


OPTIONAL ANCHOR BOLT SETTING DETAIL

Applies to all bearings on this standard.

(7) Form hole with either plastic duct meeting the requirements of Item 426.2.2 or galvanized corrugated metal post-tensioning duct. Do not use PVC or other smooth plastic or steel duct. Do not drill hole.

(8) Fill void with a pre-qualified grout conforming to DMS-4675 and capable of 4,000 psi compressive strength. Void may also be filled with epoxy grout using Type VIII epoxy conforming to DMS-6100. Clean holes before filling.



GIRDER TO SOLE PLATE WELD DETAIL

Applies to all end bearings on this standard. Small gaps between girders and sole plates are anticipated under steel dead load only.

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING DETAILS

STEEL GIRDERS AND BEAMS

SGEB

FILE: sgebste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
12-21: Updated note 11.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		220

DATE: 7/3/2024 $TIME$
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DATE: 7/3/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\thuy.nguyen\dms71725\sgeb.dgn

(2) Min DL can be reduced by the ratio of (actual exp length/max exp length).

(3) Locate "Bearing Type" identification here.

(4) Locate permanent mark here.

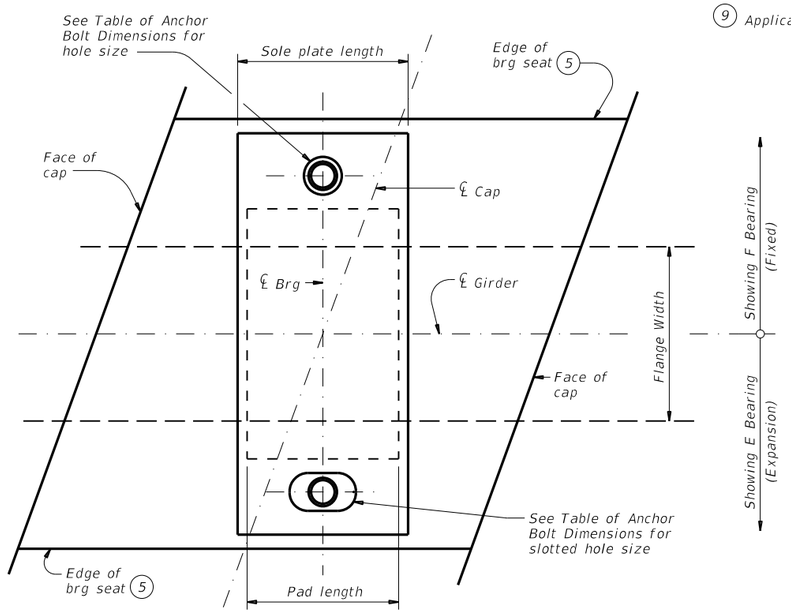
(5) Min Bearing Seat width, normal to girder, is "S" + 8".

(6) See span details for beam grade (slope) at bearing locations.

(9) Applicable to E bearings only.

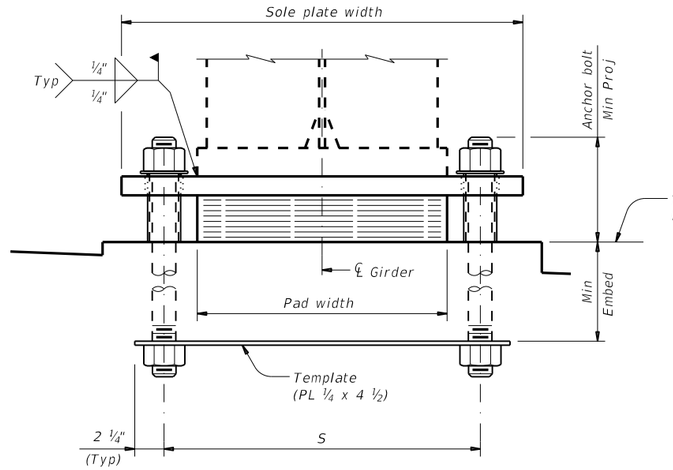
TABLE OF INTERIOR BEARING DESIGNS

Bearing Type	Neoprene Pad		Sole Plate		H	S	T	Flange Width		Reactions (Unfactored)			Max Expansion Length (9)
	Width	Length	Width	Length				Min	Max	(9)(2) Min DL	Max DL	Max Total	
	in	in	in	in	in	in	in	in	in	kip	kip	kip	ft
E1 or F1	15	10	27.0	12	5.1	20.5	3.09	10	15	66	180	225	206
E2 or F2	18	10	30.0	12	5.1	23.5	3.09	10	18	79	216	270	206
E3 or F3	21	10	33.0	12	5.1	26.5	3.09	11	21	92	252	315	206
E4 or F4	24	14	38.5	16	6.4	30.5	4.45	12	24	147	403	504	321
E5 or F5	27	14	41.5	16	6.4	33.5	4.45	15	27	165	454	567	321
E6 or F6	30	14	44.5	16	6.4	36.5	4.45	18	30	184	504	630	321
E7 or F7	32	16	48.0	18	6.9	39.0	4.93	19	32	224	614	768	355
E8 or F8	34	16	50.0	18	6.9	41.0	4.93	21	34	238	653	816	355
E9 or F9	36	16	52.0	18	6.9	43.0	4.93	23	36	252	691	864	355

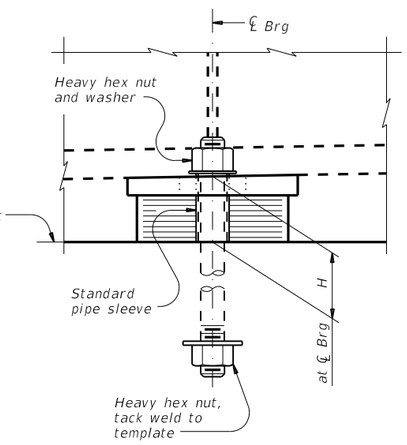


PLAN

Pipe sleeves, washers and nuts not shown for clarity



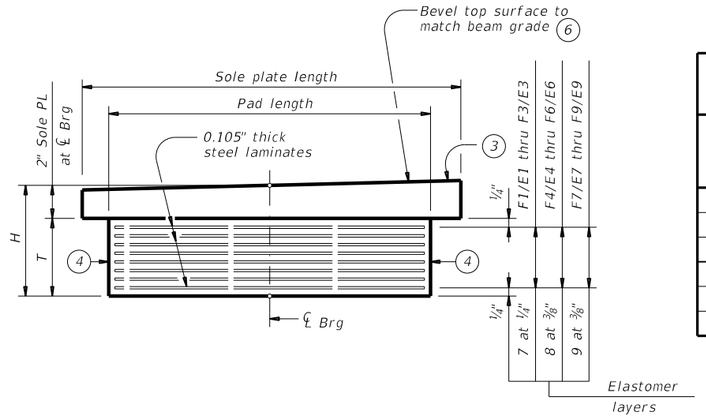
FRONT ELEVATION



SIDE ELEVATION

INTERIOR FIXED (F) AND EXPANSION (E) BEARINGS

Paid for at unit price bid for "Elastomeric Bearing" as per Item 434.



TYPE E & F LAMINATED ELASTOMERIC BEARING DETAIL

(50 Durometer) (Vulcanize sole plate to elastomer)

TABLE OF ANCHOR BOLT DIMENSIONS FOR TYPE E AND F BEARINGS

Bearing Type	Anchor Bolt Dia	Pipe Sleeve Size (Dia x Length)	Sole Plate Hole Size	Anchor Bolt	
				Embed	Proj
F1 thru F3	1 ¾"	2" x 5 ⅜"	2 ¾" Dia	1'- 6"	8"
F4 thru F6	2 ¼"	2 ½" x 6 ⅝"	3 ¼" Dia	2'- 0"	9 ½"
F7 thru F9	2 ½"	3" x 7 ¼"	3 ⅞" Dia	2'- 1"	10 ½"
E1 thru E3	1 ¾"	2" x 5 ⅜"	2 ¾" x 4 ½"	1'- 6"	8"
E4 thru E6	2 ¼"	2 ½" x 6 ⅝"	3 ¼" x 6 ¼"	2'- 0"	9 ½"
E7 thru E9	2 ½"	3" x 7 ¼"	3 ⅞" x 7"	2'- 1"	10 ½"

SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING DETAILS

STEEL GIRDERS AND BEAMS

SGEB

FILE: sgebste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
12-21: Updated note 11.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		221

DATE: 7/3/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\thuy.nguyen\dms71725\sgeb.dgn

(3) Locate "Bearing Type" identification here.

(4) Locate permanent mark here.

(5) Min bearing seat width, normal to girder, is "S" + 8".

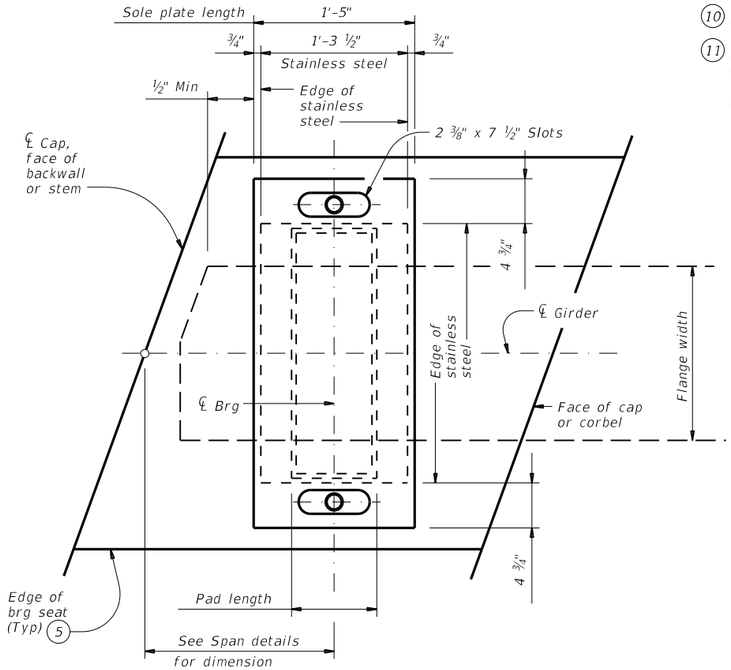
(6) See span details for beam grade (slope) at bearing locations.

(10) Bond PTFE to ½" plate with an approved adhesive.

(11) Provide steel for ½" plate conforming to ASTM A36. Vulcanize plate to elastomer. Paint plate (in the shop) with System III-B in accordance with Item 446. No paint is permitted in recess or on PTFE.

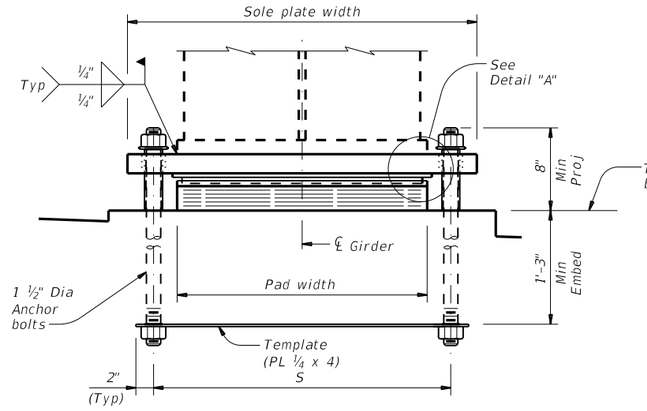
TABLE OF END SLIDING BEARING DESIGNS

Bearing Type	Neoprene Pad		Sole Plate		H	S	T	Flange Width		Reactions (Unfactored)		Max Expansion Length
	Width	Length	Width	Length				Min	Max	Max DL	Max Total	
	in	in	in	in	in	in	in	in	in	kip	kip	ft
ES1	15	9	25.5	17	5.5	20.0	2.65	10	15	108	203	500
ES2	18	9	28.5	17	5.5	23.0	2.65	10	18	130	243	500
ES3	21	9	31.5	17	5.5	26.0	2.65	11	21	151	284	500
ES4	24	9	34.5	17	5.5	29.0	2.65	14	24	173	324	500
ES5	27	9	37.5	17	5.5	32.0	2.65	17	27	194	365	500
ES6	30	9	40.5	17	5.5	35.0	2.65	20	30	216	405	500
ES7	32	9	42.5	17	5.5	37.0	2.65	22	32	230	432	500
ES8	34	9	44.5	17	5.5	39.0	2.65	24	34	245	459	500
ES9	36	9	46.5	17	5.5	41.0	2.65	26	36	259	486	500

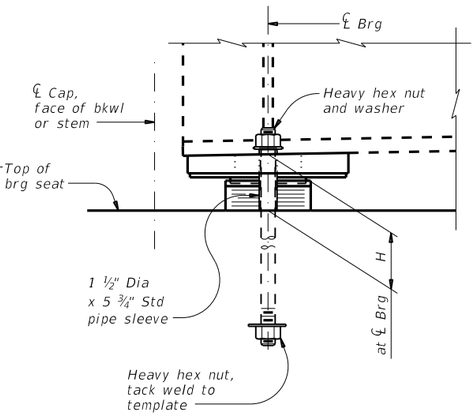


PLAN

Pipe sleeves, washers and nuts not shown for clarity



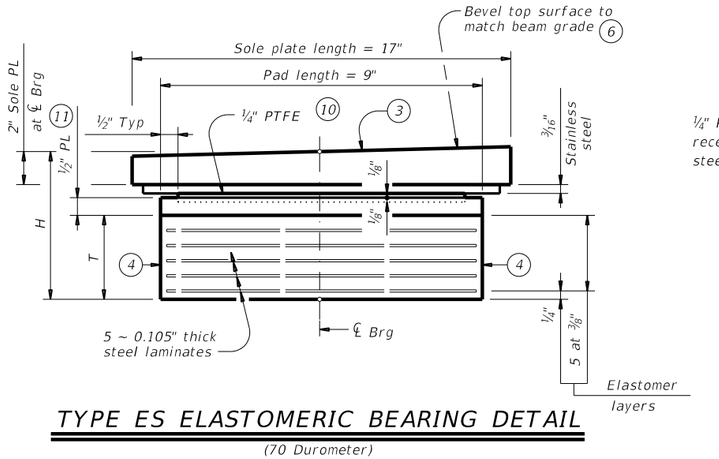
FRONT ELEVATION



SIDE ELEVATION

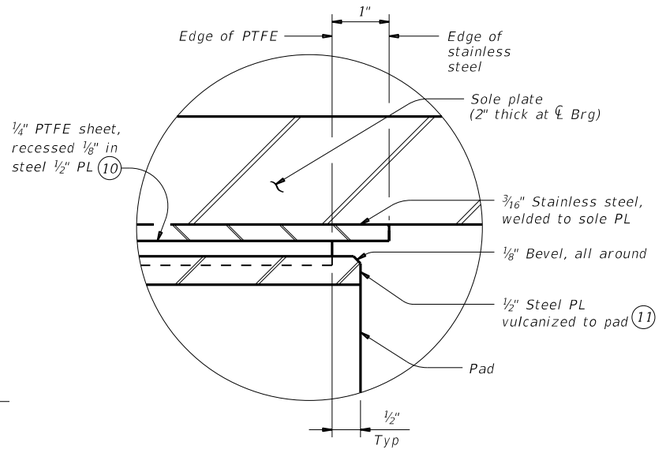
END SLIDING (ES) EXPANSION BEARINGS

Paid for at unit price bid for "Sliding Elastomeric Bearing" as per Item 434.



TYPE ES ELASTOMERIC BEARING DETAIL

(70 Durometer)



DETAIL "A"

SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

ELASTOMERIC BEARING DETAILS

STEEL GIRDERS AND BEAMS

SGEB

FILE: sgebste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
12-21: Updated note 11.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		222

DATE: 7/3/2024 $TIME$
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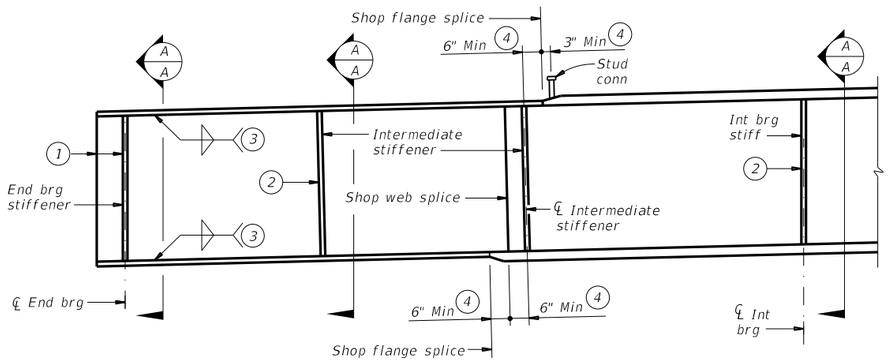
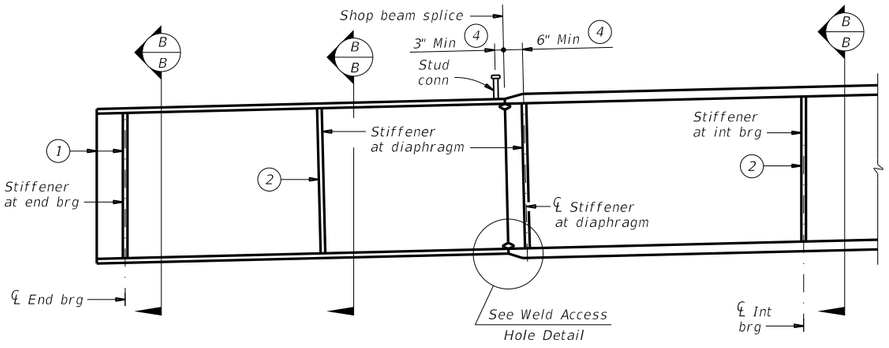


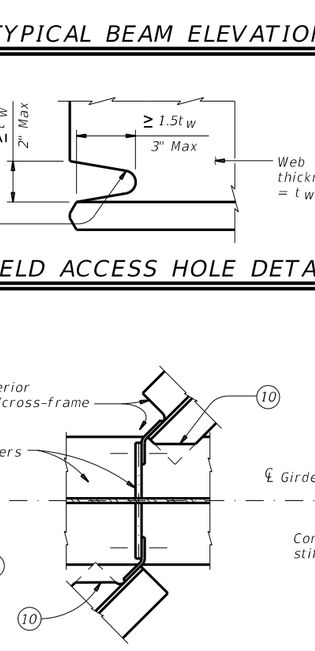
TYPICAL GIRDER ELEVATION



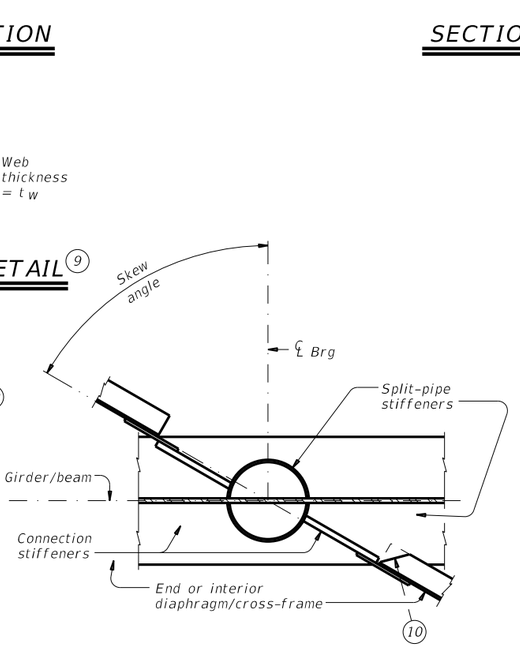
TYPICAL BEAM ELEVATION

WELD ACCESS HOLE DETAIL (9)

SKEW ANGLE = 0° THRU 20°



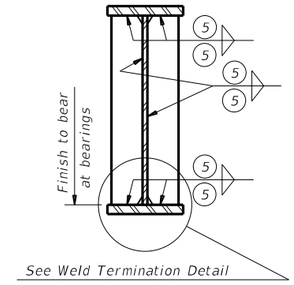
SKEW ANGLE = OVER 20° THRU 45°



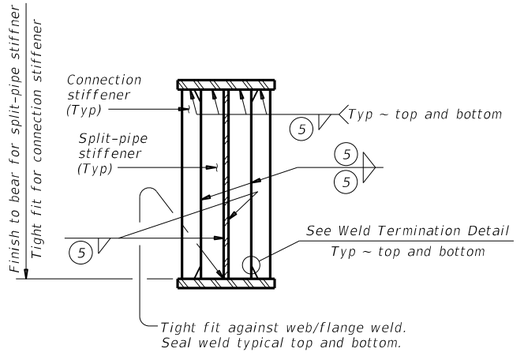
SPLIT-PIPE STIFFENER 60° MAX SKEW ANGLE

BEARING STIFFENER DETAILS

(Showing diaphragm/cross-frame connections.)

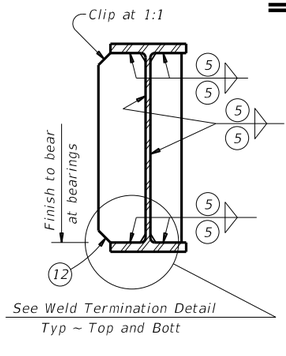


CONVENTIONAL STIFFENERS

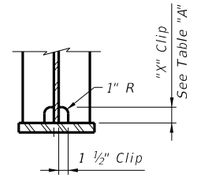


SPLIT-PIPE BEARING STIFFENERS

SECTION A-A

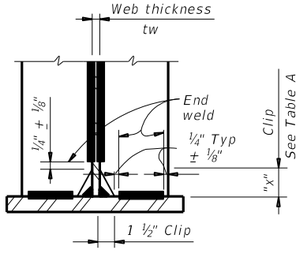


SECTION B-B

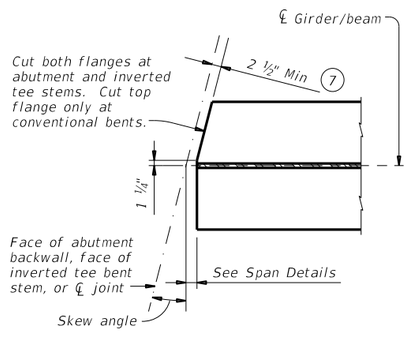


ALTERNATE STIFFENER CLIP DETAIL

(Welds not shown for clarity)
(Bottom shown, top similar)



WELD TERMINATION DETAIL



SKEWED GIRDER END DETAIL (11)

(1) Detail girder ends and end brg stiffeners, including split-pipe/connection stiffeners, to be plumb after all dead load deflection has occurred.

(2) Intermediate stiffeners and interior bearing stiffeners, including split-pipe/connection stiffeners, may be built perpendicular to girder flanges or plumb at the fabricator's option.

(3) See span details for weld size.

(4) Shop flange and web splices and stud connectors may be moved (6" Max), if required, to obtain clearances shown.

(5) Unless shown otherwise on the span details, use minimum size specified in AWS D1.5.

(6) The fabricator may use an "X" value different from what is shown provided that the following is satisfied:
$4tw \leq "X" \leq 6tw$.

(7) Unless shown otherwise on span details.

(8) Increase weld size by amount of gap if gap exceeds 1/16". Maximum gap permitted is 3/16".

(9) For rolled beam shop splices only.

(10) Clip flanges of W- and C-shape diaphragm/cross-frame members at 45°. Required only for skewed connections and at flanges making an acute angle with main girder web.

(11) This detail does not address conflicts with beams in an adjacent span.

(12) Clip at 1:1 or as required to clear bearing anchor bolt, allowing anchor bolt nut installation.

TABLE A	
Web Thickness tw	"X" (6)
5/16" to 3/8"	1 ½"
Over 3/8" to 5/8"	2 ½"
Over 5/8" to 1"	4"

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation | Bridge Division Standard

MISCELLANEOUS DETAILS
STEEL GIRDERS AND BEAMS

SGMD

FILE: spgdstei-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
02-20: Added alternate stiffener clip detail. 12-21: Added alternate split pipe for weathering steel.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		223

DATE: 7/3/2024 $TIME$
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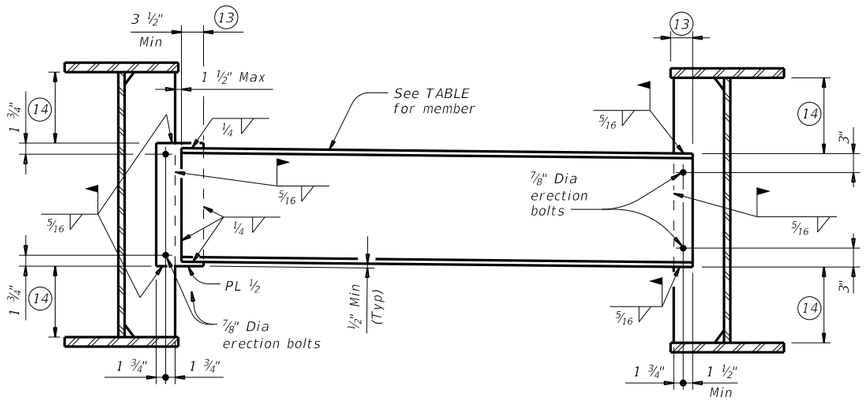
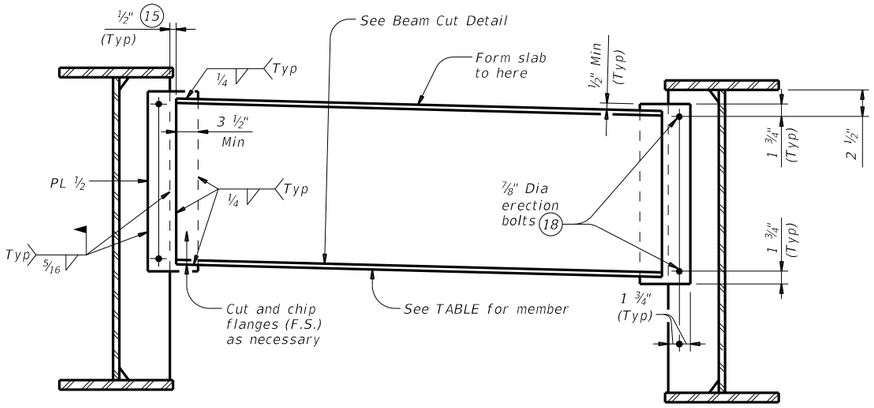


AT END BEARINGS WITH SKEW OVER 20°

AT INTERIOR LOCATIONS AND END BEARINGS WITH SKEW UP TO 20°

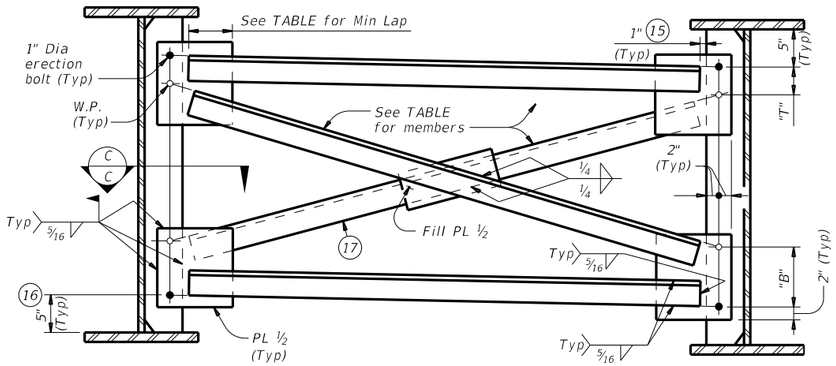
TYPE D1 THRU D5 DIAPHRAGMS

For straight rolled beams and for straight plate girders with web depths less than 52". For all locations, including end bearings when thickened slab ends, shown on standard SGTS, are used. Minimum stiffener width is 7" for use with these diaphragms.



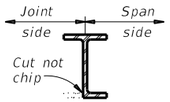
TYPE ED1 THRU ED4 END DIAPHRAGMS

For straight rolled beams and for straight plate girders with web depths less than 52". Not for use with thickened slab ends, shown on standard SGTS. Minimum stiffener width is 7" for use with these diaphragms.



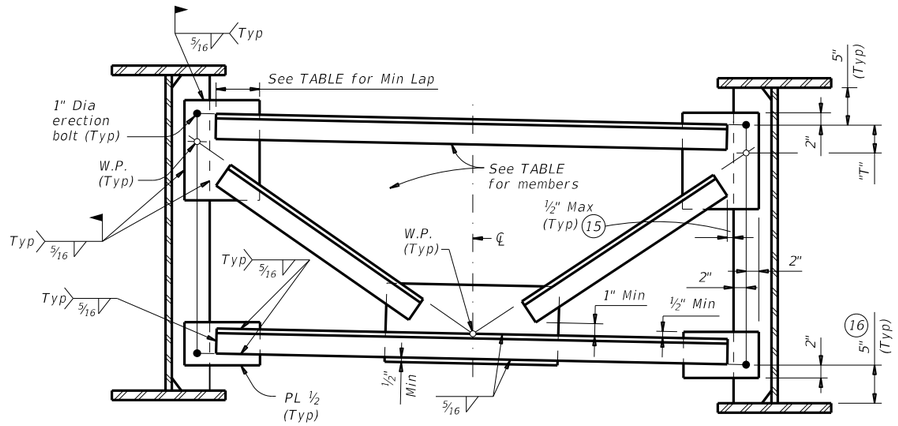
TYPE XF1 THRU XF3 CROSS-FRAMES

For Plate Girders with web depths of 52" to 96". For all locations, including end bearings when thickened slab ends, shown on standard SGTS are used. Minimum stiffener width is 8" for use with these cross-frames.



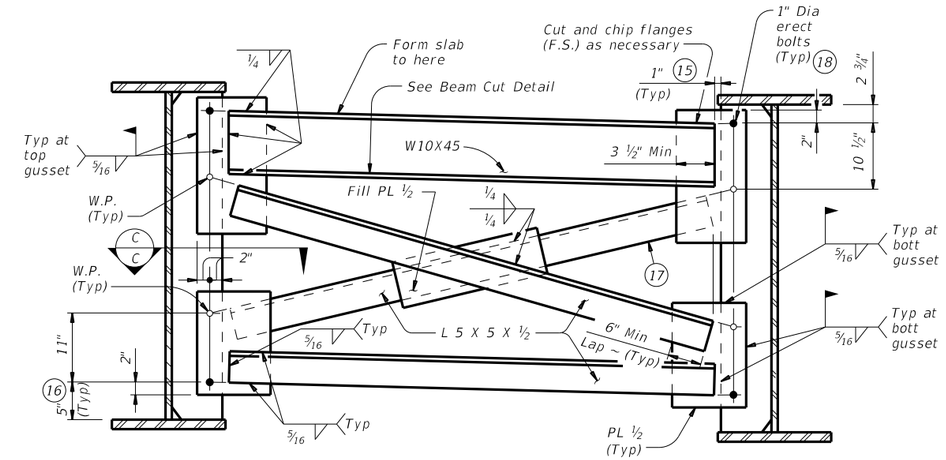
BEAM CUT DETAIL

At end diaphragms and end cross-frames, treat wide flange sections as shown between gusset plates.



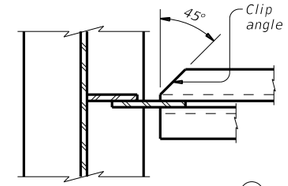
TYPE KF1 THRU KF3 CROSS-FRAMES

For plate girders with web depths of 52" to 96". For all locations, including end bearings when thickened slab ends, shown on standard SGTS, are used. Minimum stiffener width is 8" for use with these cross-frames.



TYPE EF END CROSS-FRAME

For plate girders with web depths of 52" to 96". Not for use with thickened slab ends, shown on standard SGTS. Minimum stiffener width is 8" for use with this cross-frame.



SECTION C-C (17)

Typical for Type XF1 thru XF3 and EF cross-frames.

(13) For wide flange diaphragm members, cut and chip F.S. of diaphragm flanges as required to clear stiffener/gusset plate.

(14) Center diaphragm between flanges (+/– ½").

(15) Increase as required when gusset plates are bent (end bearing locations with skew over 20°).

(16) At bearings, increase dimension (up to 1"), if necessary, to allow for bearing anchor bolt nut installation.

(17) Clip outstanding leg of indicated cross-frame angles at 45°; typical each end.

(18) Fully tighten top erection bolts in accordance with Item 447, "Structural Bolting" or seal weld top edge of gusset plate to stiffener to prevent moisture between gusset plate and stiffener.

TYPE D DIAPHRAGM TABLE

Type	Beam Size/ Web Depth, D	Diaphragm Member
D1	W21 & W24	C12 x 20.7
D2	W27 & W30	C15 x 33.9
D3	W33 & W36	MC18 x 42.7
D4	W40	W21 x 44
D5	40" ≤ D < 52"	W27 x 84

TYPE ED DIAPHRAGM TABLE

Type	Beam Size/ Web Depth, D	Diaphragm Member
ED1	W21	W10 x 45
ED2	W24 & W27	W16 x 36
ED3	W30 to W40	W21 x 44
ED4	40" ≤ D < 52"	W27 x 84

TYPE XF AND KF CROSS-FRAME TABLE

Type	Cross-Frame Members	Min Lap at Gussets	"B"	"T"
XF1	L 4 x 4 x ⅜	5"	9"	4 ½"
XF2	L 5 x 5 x ½	6"	11"	5 ½"
XF3	L 6 x 6 x ⅝	7"	13"	6 ½"
KF1	L 4 x 4 x ⅜	5"	----	4 ½"
KF2	L 5 x 5 x ½	6"	----	5 ½"
KF3	L 6 x 6 x ⅝	7"	----	6 ½"

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation — Bridge Division Standard

MISCELLANEOUS DETAILS

STEEL GIRDERS AND BEAMS

SGMD

FILE: spgdste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
02-20: Added alternate stiffener clip detail. 12-21: Added alternate split pipe for weathering steel.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		224

DATE: 7/3/2024 $TIME$
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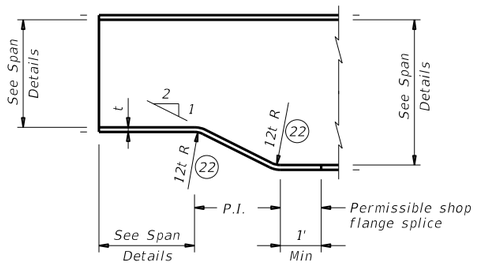
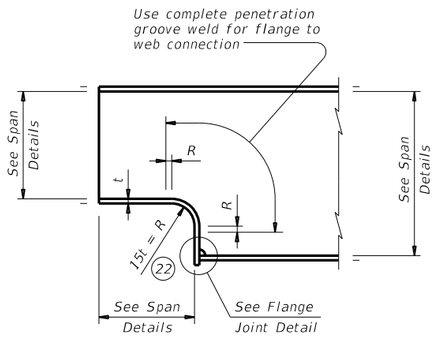


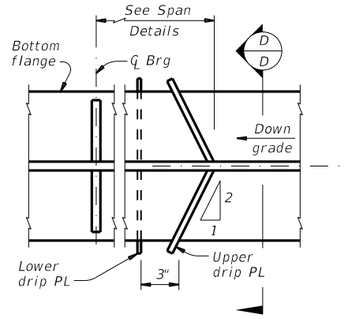
TYPE 1



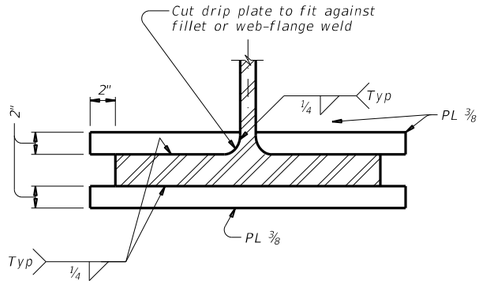
TYPE 2

DAPPED GIRDER END DETAILS

(Plate girders only)

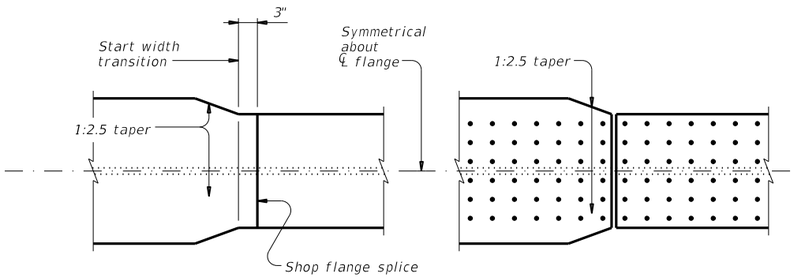


PLAN



SECTION D-D

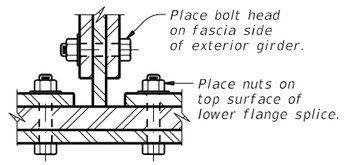
DRIP PLATE DETAILS (19)



WELDED SHOP SPLICE

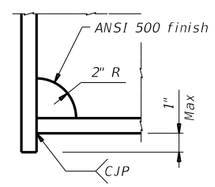
BOLTED FIELD SPLICE
(Bottom flange only)

FLANGE WIDTH TRANSITIONS

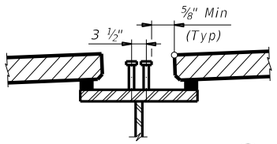


BOLTED SPLICE DETAIL

See Item 447, "Structural Bolting", for washer requirements.

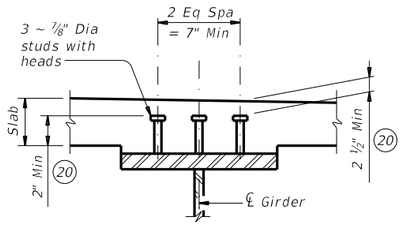


FLANGE JOINT DETAIL



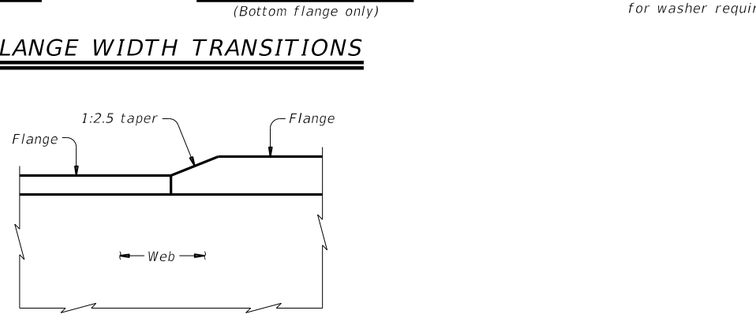
OPTION WITH PCP (21)

See Prestressed Concrete Panels (PCP) for details and notes not shown.

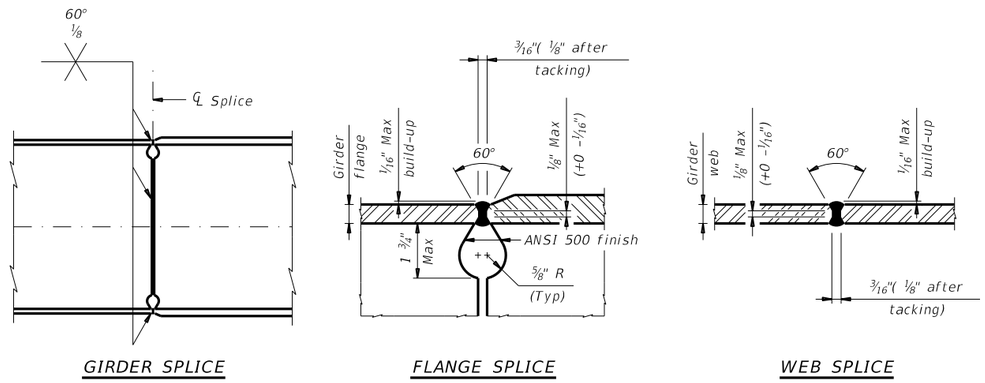


STUD CONNECTOR DETAILS (21)

Weld studs to the flange in accordance with AWS D1.5.



FLANGE THICKNESS TRANSITION



GIRDER SPLICE

FLANGE SPLICE

WEB SPLICE

WELDED FIELD SPLICE DETAILS

(19) Drip plates (ASTM A709 Gr 50W) are required for all girders in structures to remain unpainted.

(20) The Fabricator is required to provide studs meeting the restrictions shown. Studs must be at least 5" in height.

(21) If prestressed concrete panels are used (straight girders only), use optional stud spacing shown. Min allowable clear between studs and panels is 3/8". If this option is used, decrease spacing between rows by 1/3. The Contractor is responsible for coordinating necessary adjustment to stud connector placement with panel and steel fabricators.

(22) Optionally, a 12" radius can be used for plates up to 1.5" thick and a 24" radius for thicker plates.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Division Specifications.

These details are intended for use with W21 thru W40 rolled beams and I-shape welded plate girders with web depths up to 96". Maximum beam/girder C-C spacing is 10', measured perpendicular to beams/girders. Maximum skew angle is 45 degrees (60 degrees with split-pipe stiffeners). These details apply to both straight and curved girders, unless noted otherwise.

See span details for location of tension flanges; diaphragm location and type; cross-frame location and type; stiffener location, type and size; and stud connector spacing.

MATERIAL NOTES:

For unpainted weathering steel bridges, provide ASTM A709 Gr 50W steel for diaphragms, cross-frames, plate stiffeners or gusset plates unless noted otherwise on the span details. Provide ASTM A847 Round HSS or ASTM A709 Gr 50W rolled 5/8" plate for split-pipe stiffeners unless noted otherwise on the span details. Minimum wall thickness for round HSS is 1/2". Fabrication of rolled plate may use incremental cold bending with bend lines nominally 1" apart to obtain semi-circular shape. Provide ASTM F3125 Gr A325 erection bolts with two ASTM F436 hardened washers and one ASTM A563 Gr C3 or DH3 heavy hex nut each.

For painted bridges, provide ASTM A709 Gr 50, 50W, or 50S steel for diaphragms, cross-frames, plate stiffeners or gusset plates unless noted otherwise on the span details. Provide ASTM A500 Gr B or A1085 round HSS for split-pipe stiffeners unless noted otherwise on the span details. Minimum wall thickness for round HSS is 1/2". Provide galvanized ASTM F3125 Gr A325 erection bolts with two ASTM F436 hardened washers and one ASTM A563 Gr DH or A194 Gr 2H heavy hex nut each.

Provide galvanized bolts, nuts, and washers for all field connections in painted structures requiring ASTM F3125 Gr A325 bolts, including Erection Bolts. Galvanizing must meet the requirements of Item 445, "Galvanizing". Fit-up bolts are not required to be galvanized.

Do not provide galvanized ASTM F3125 Gr A490 bolts for any structure.

CONSTRUCTION/FABRICATION NOTES:

Provide complete joint penetration welds for all shop flange, web, and beam splices.

Erection bolt holes may be standard or oversize, at the Contractor's option. Erection bolts do not need to be tightened beyond snug tight. Leave erection bolts in the finished structure.

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS DETAILS
STEEL GIRDERS AND BEAMS

SGMD

FILE: spgdste1-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
02-20: Added alternate stiffener clip detail. 12-21: Added alternate split pipe for weathering steel.	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		225

DATE: 7/3/2024 $TIME$
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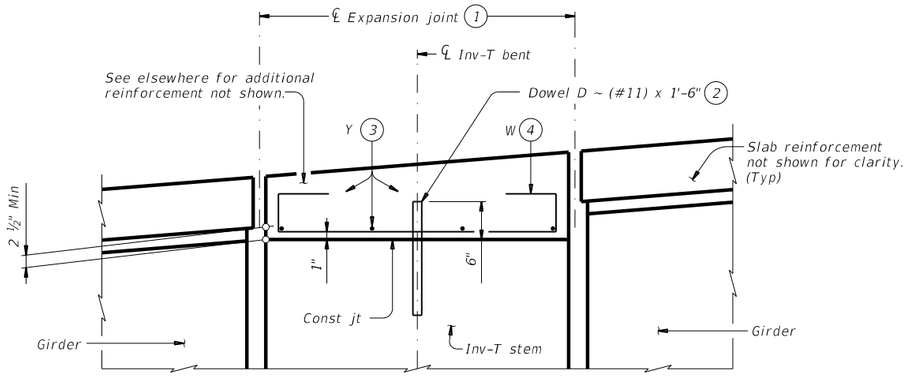
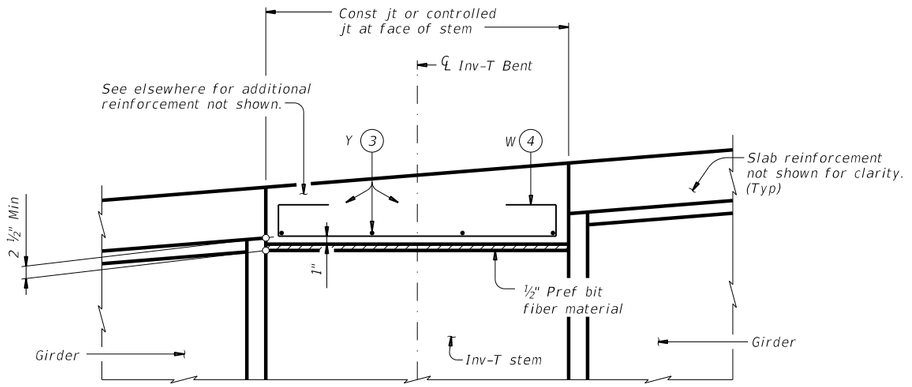
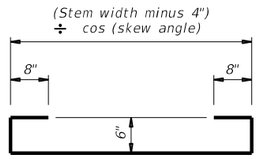


SHOWING EXPANSION JOINTS

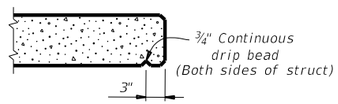


SHOWING CONST JTS OR CONTROLLED JTS

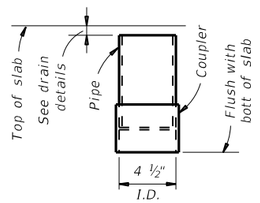
REINFORCEMENT OVER INV-T BENTS



BARS W (#4)

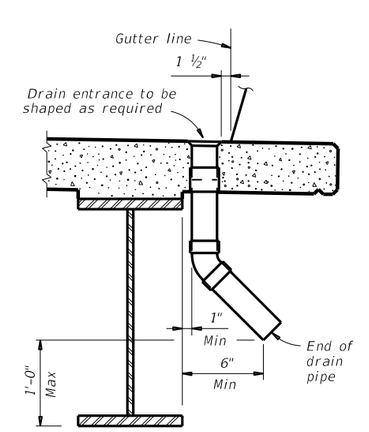


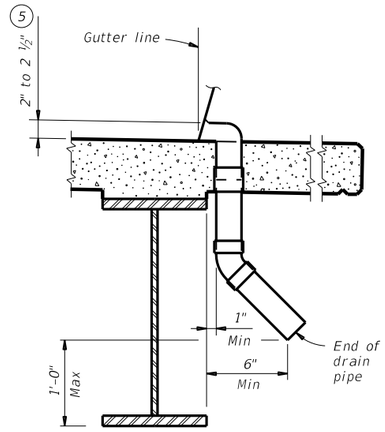
DRIP BEAD DETAIL



C-I-P DRAIN DETAIL

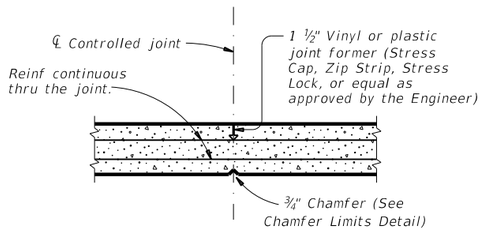
Note: Roughen outside of PVC with coarse rasp or equal to ensure bond with cast-in-place concrete.





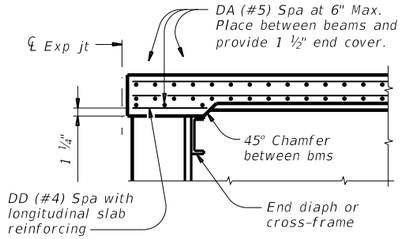
DRAIN DETAILS

Note: 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 are 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. Water may not be discharged onto girders.



CONTROLLED JOINT DETAIL

(Saw-cutting is not allowed)



SECTION AT SLAB ENDS

Showing additional required slab reinforcement when Thickened Slab Ends, shown on standard SGTS, are not indicated on the span details.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

All items (reinforcing steel, drains, joint formers, etc.) shown on this sheet are subsidiary to other bid items.

Provide Grade 60 reinforcing steel.

Cover dimensions are clear dimensions, unless noted otherwise.

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

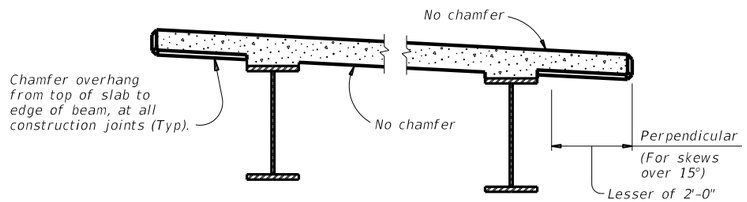
(1) See Layout for joint type.

(2) Dowels D (#11) spaced at 5 Ft Max. See inv-T bents for quantity and location.

(3) Space Bars Y (#4) at 12" Max. Use 2" end cover. Number of Bars Y must satisfy spacing limit. Place parallel to bent.

(4) Space Bars W at 12" Max (3" from end of cap). Tilt if necessary to maintain cover requirements. Place parallel to longitudinal slab reinforcement.

(5) Drain entrance formed in rail or sidewalk.



CHAMFER LIMITS DETAILS

Note: See Span details for const jt locations.

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS

STEEL GIRDERS AND BEAMS

SGMS

FILE: sgmstde1-19.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		226

DATE: 7/3/2024 $TIME$
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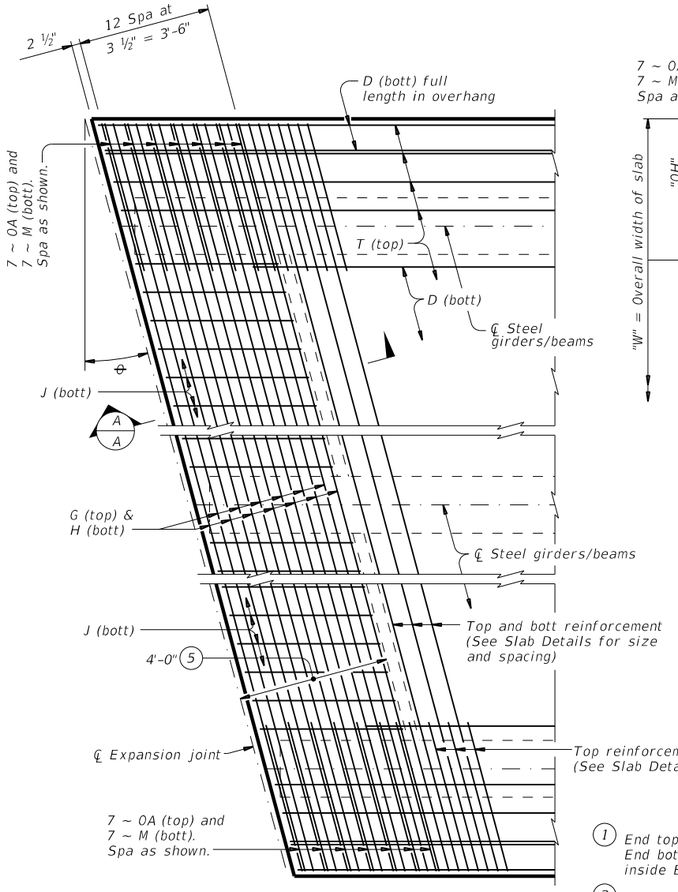
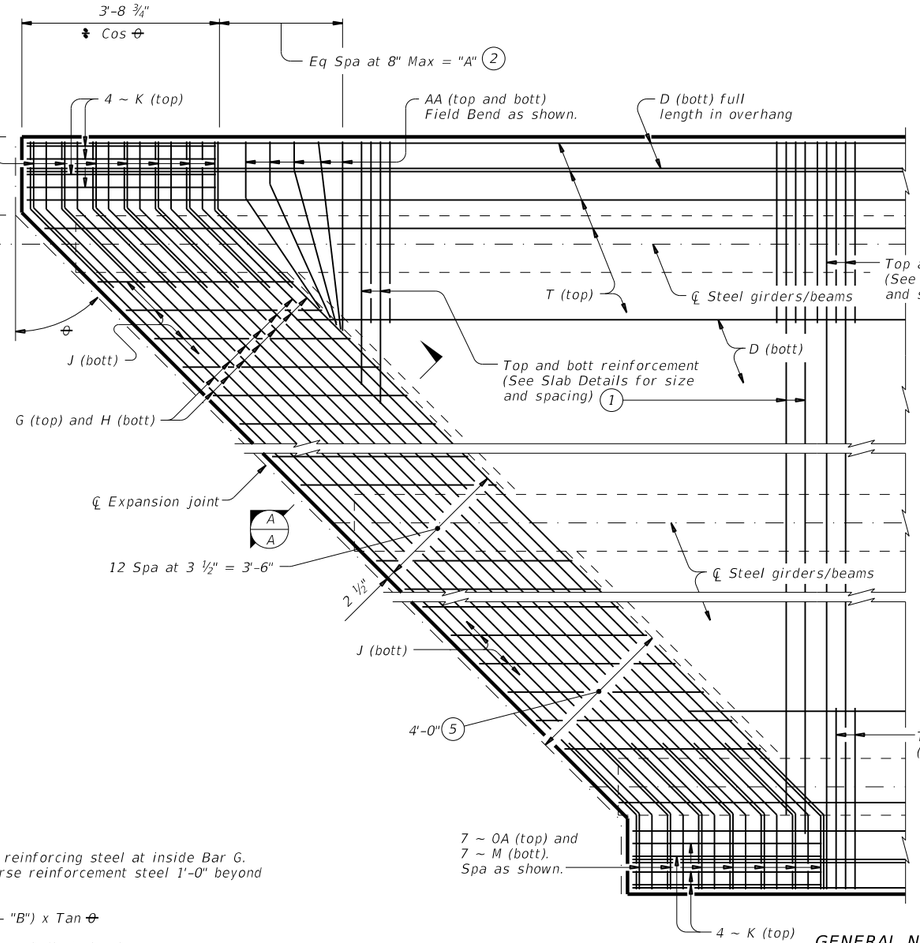


PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

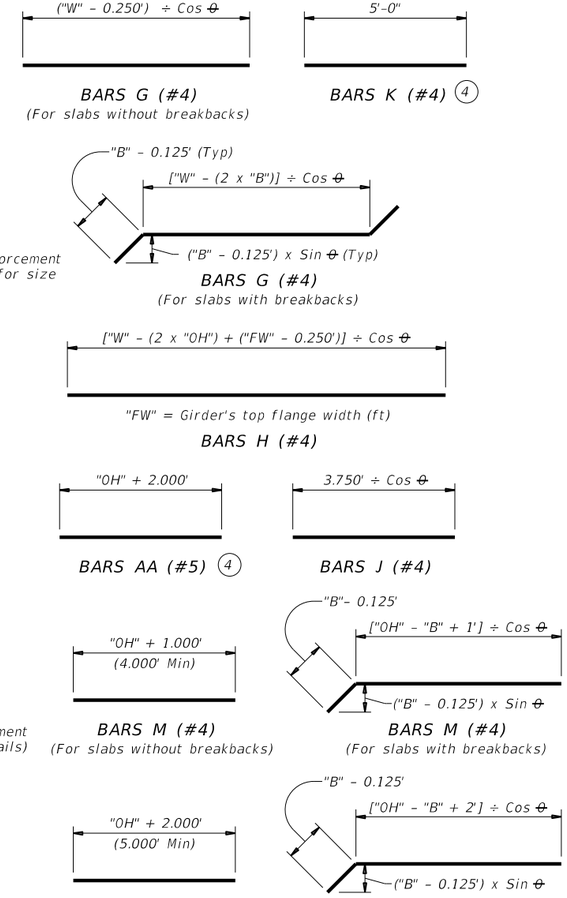
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

(2) "A"= ("OH" + 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.



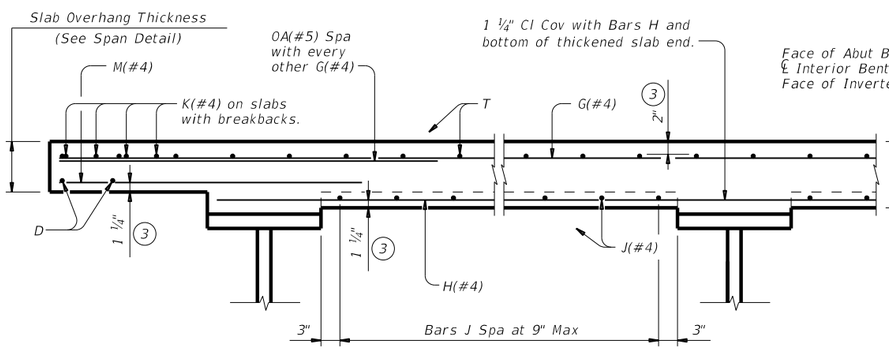
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to steel girder and beam spans.
These details are to be used in conjunction with the span details and Prestressed Concrete Panels (PCP) standard details (if prestressed concrete panels are used).
When Option 2 from Prestressed Concrete Panels (PCP) standard is used, provide Bars AA, G, K and OA in the slab.

MATERIAL NOTES:

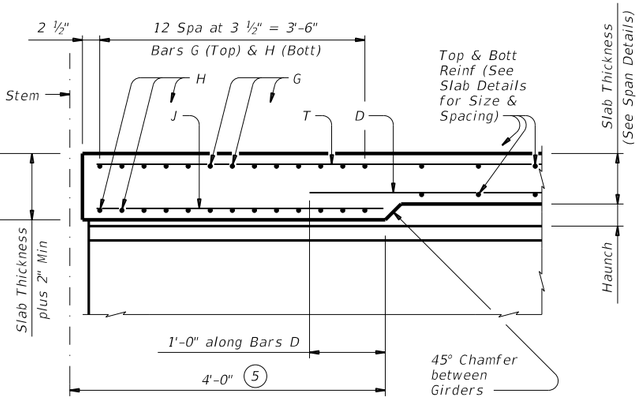
Provide Grade 60 reinforcing steel.
If slab reinforcing steel is shown on the slab details to be epoxy coated, then Bars AA, G, K, H, J, M and OA must be epoxy coated.
Provide bar laps, where required, as follows:
Uncoated ~ #4 = 1'-7"
Epoxy Coated ~ #4 = 2'-5"

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



TYPICAL TRANSVERSE SECTION

(Showing Steel 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

STEEL GIRDERS AND BEAMS

SGTS

FILE: sgtsste1-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
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	CRP	GOLIAD		227

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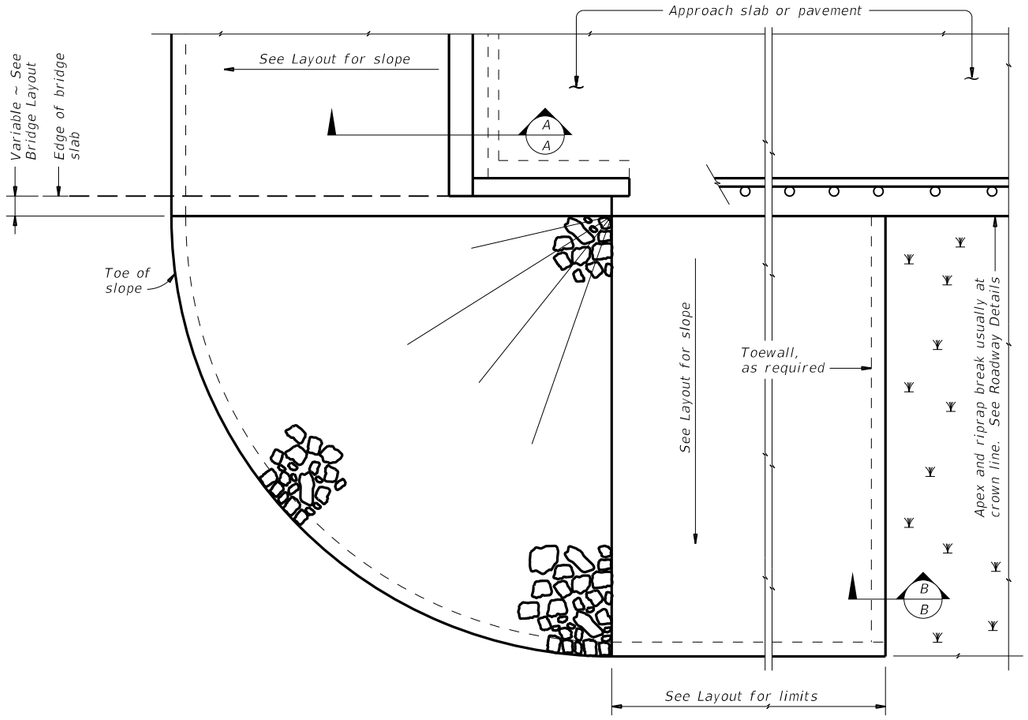
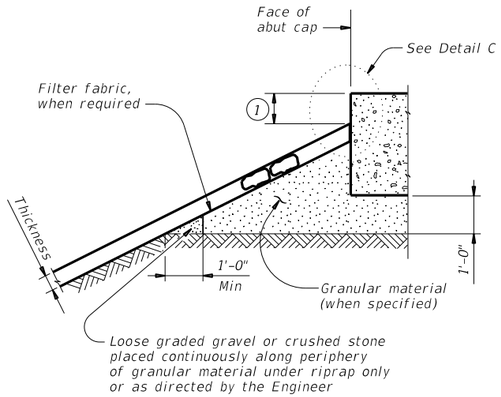
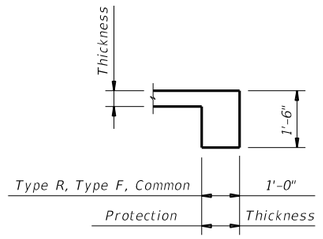


PLAN

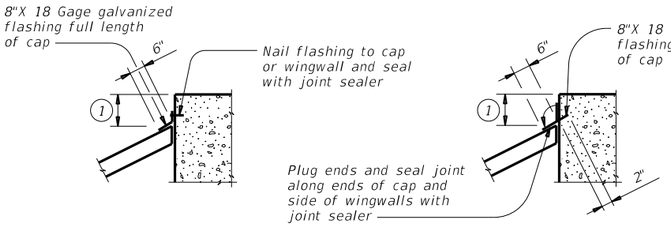


SECTION A-A AT CAP



SECTION B-B

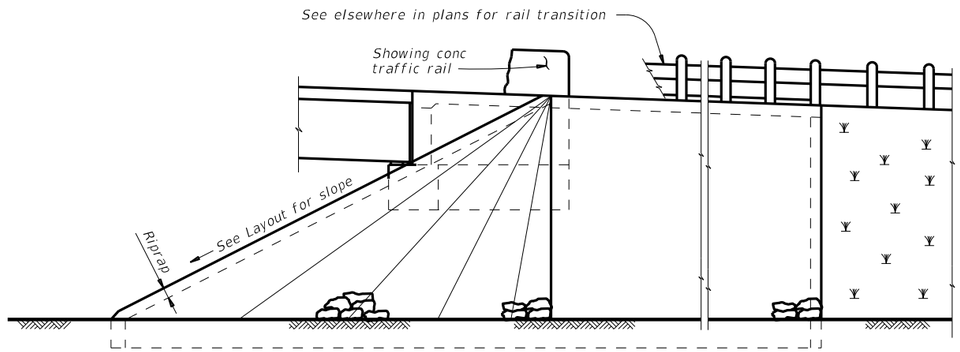
Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C



ELEVATION

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

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

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES		
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY		
REVISIONS	0088	02	062	US59		
	DIST	COUNTY		SHEET NO.		
	CRP	GOLIAD		228		

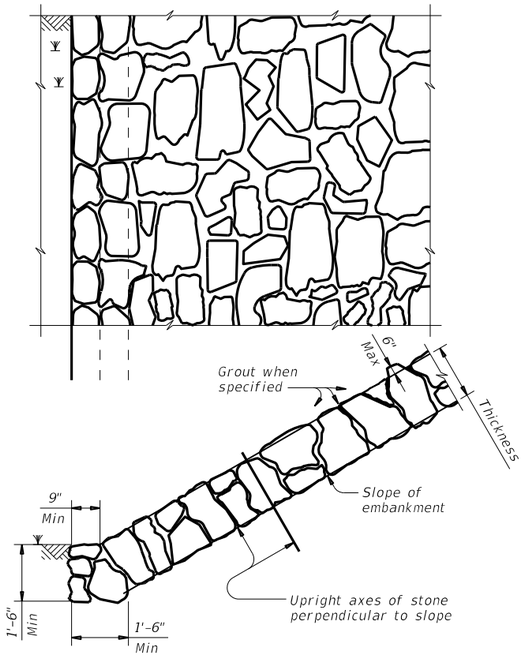


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

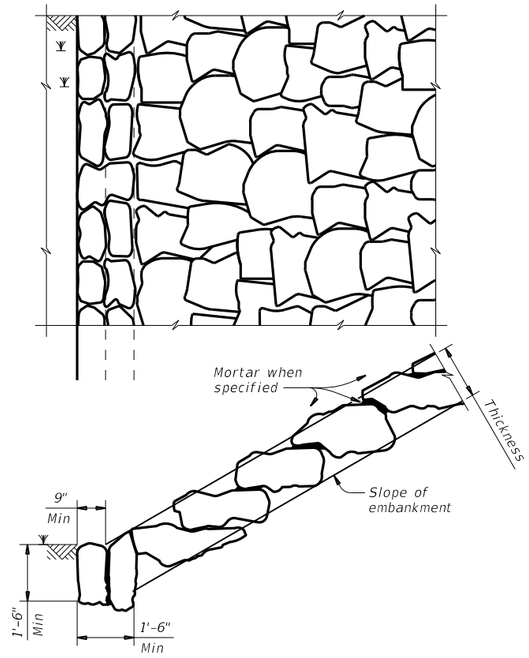


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

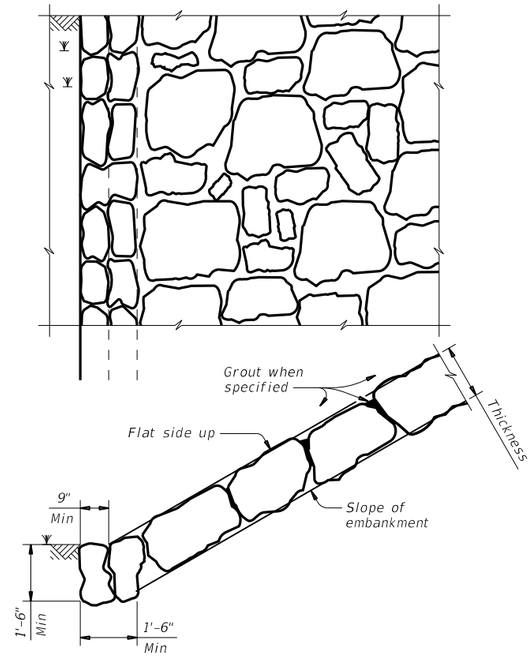


FIGURE 3 ~ TYPE F STONE RIPRAP

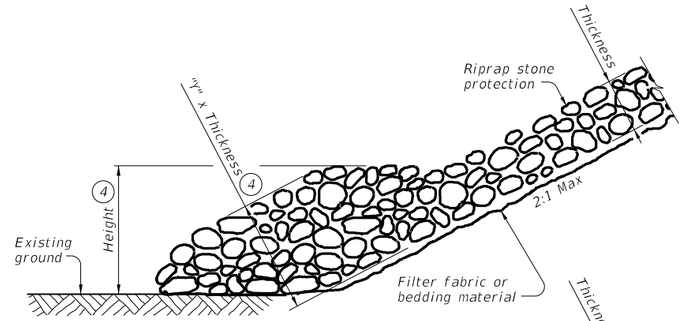
grouted

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

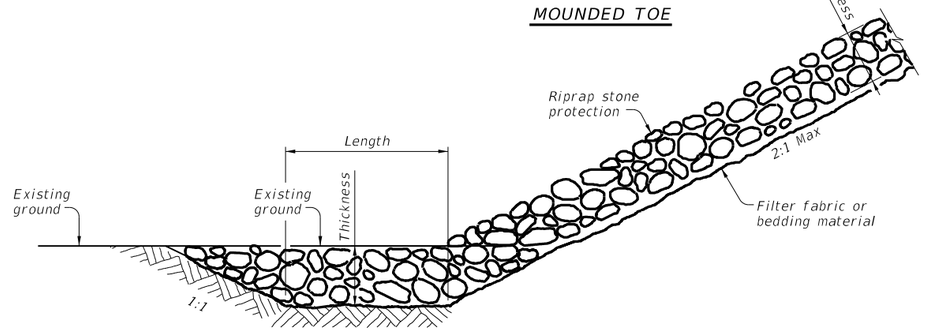
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(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)

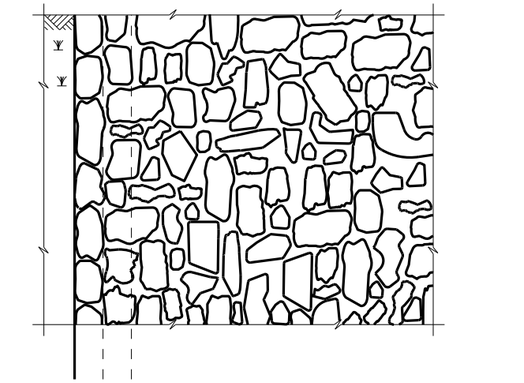


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

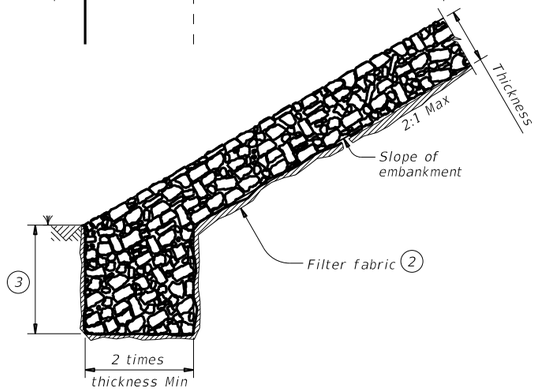


FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
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	CRP	GOLIAD		229

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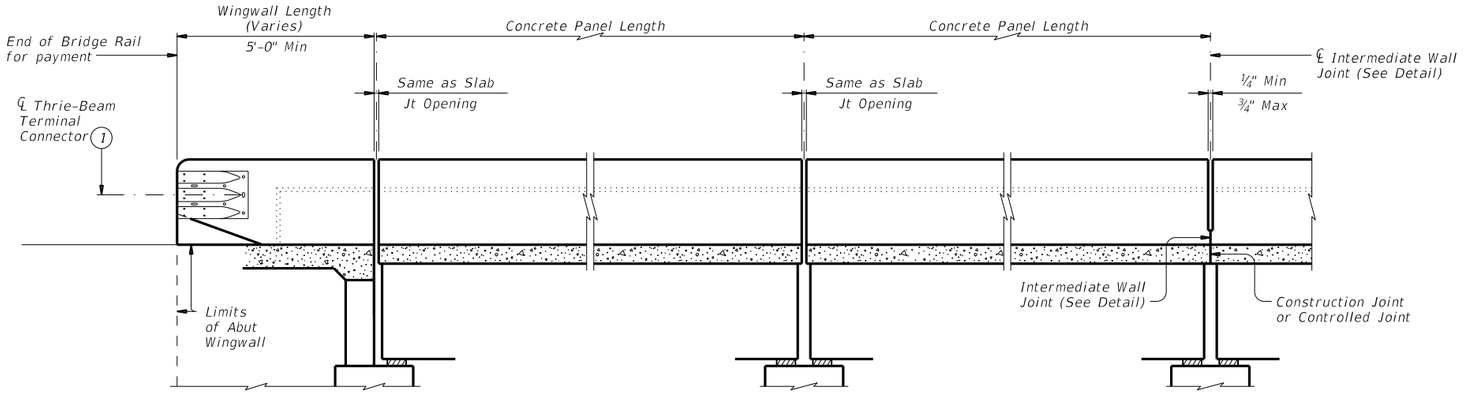
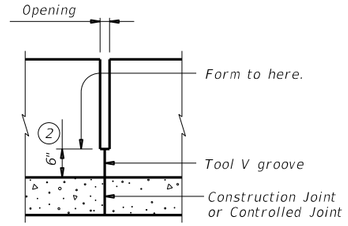


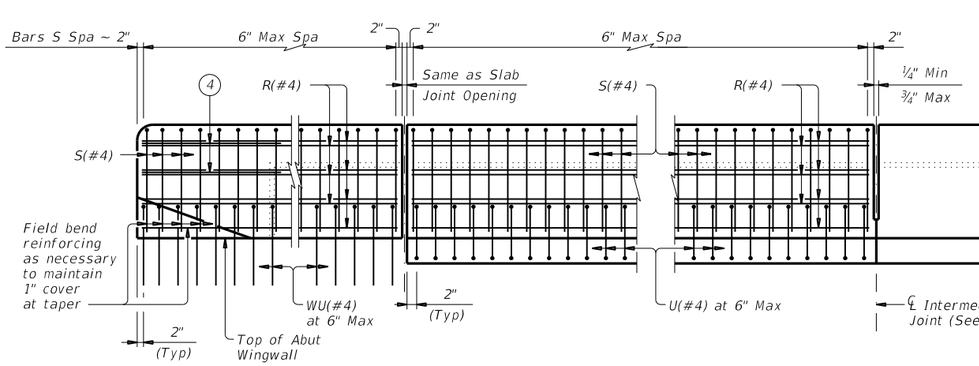
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

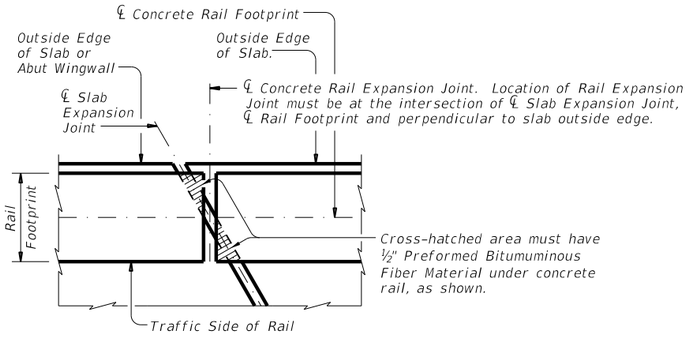


INTERMEDIATE WALL JOINT DETAIL

Provide at all interior bents without slab expansion joints.



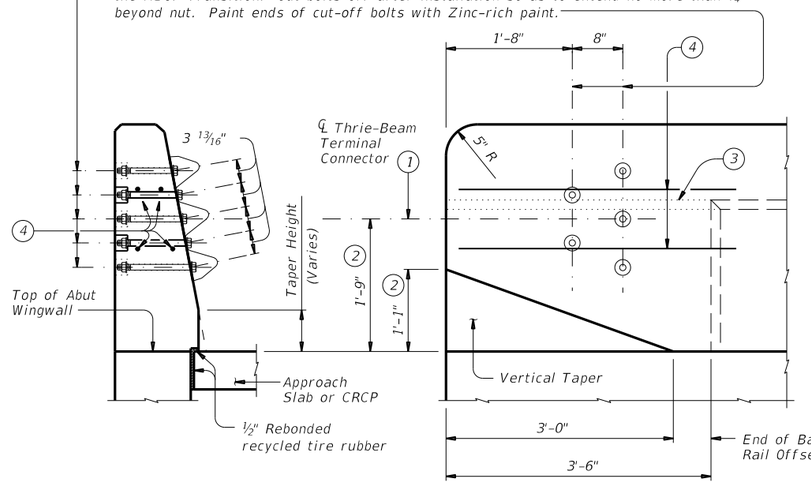
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT



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: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
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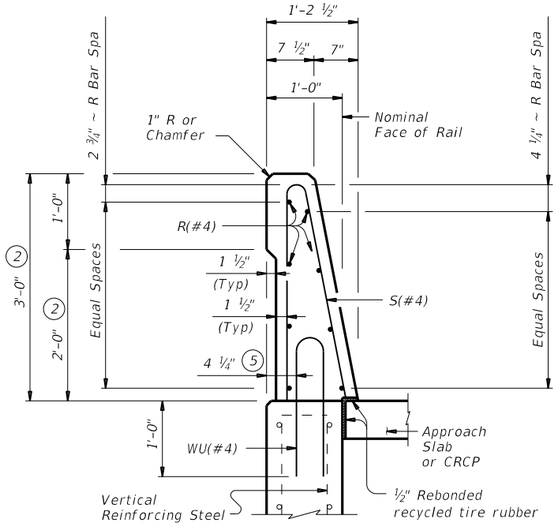
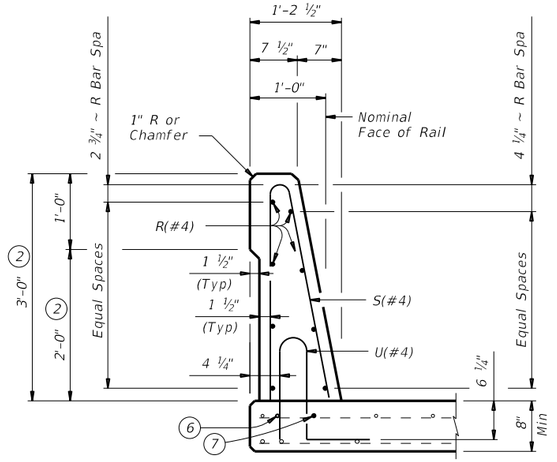
	CRP	GOLIAD		230



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 greator 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.

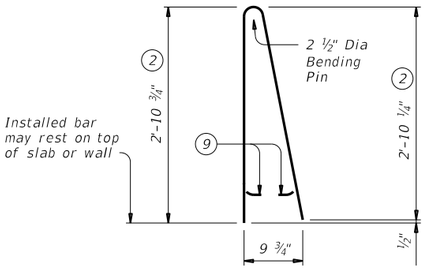
Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Shop drawings will not be required for this rail.

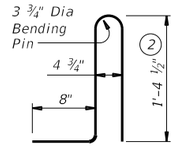
Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

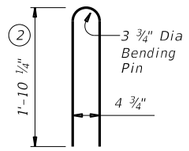
Reinforcing bar dimensions shown are out-to-out of bar.



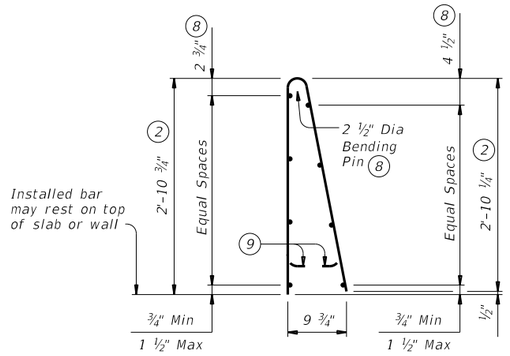
BARS S (#4)



BARS U (#4)

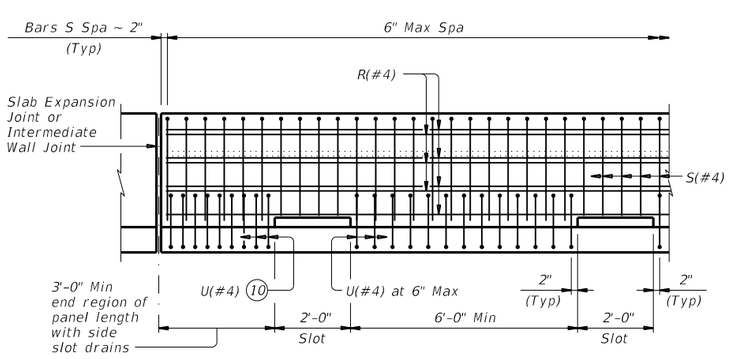


BARS WU (#4)



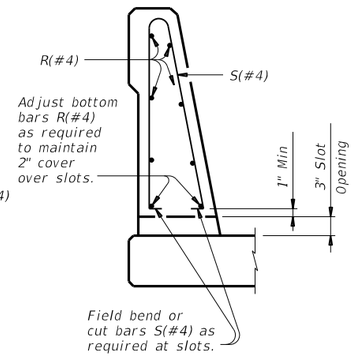
OPTIONAL WELDED WIRE
REINFORCEMENT (WWR)

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

DATE: 7/3/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\thuy.nguyen\dms71725\SSTR.dgn

SHEET 2 OF 2

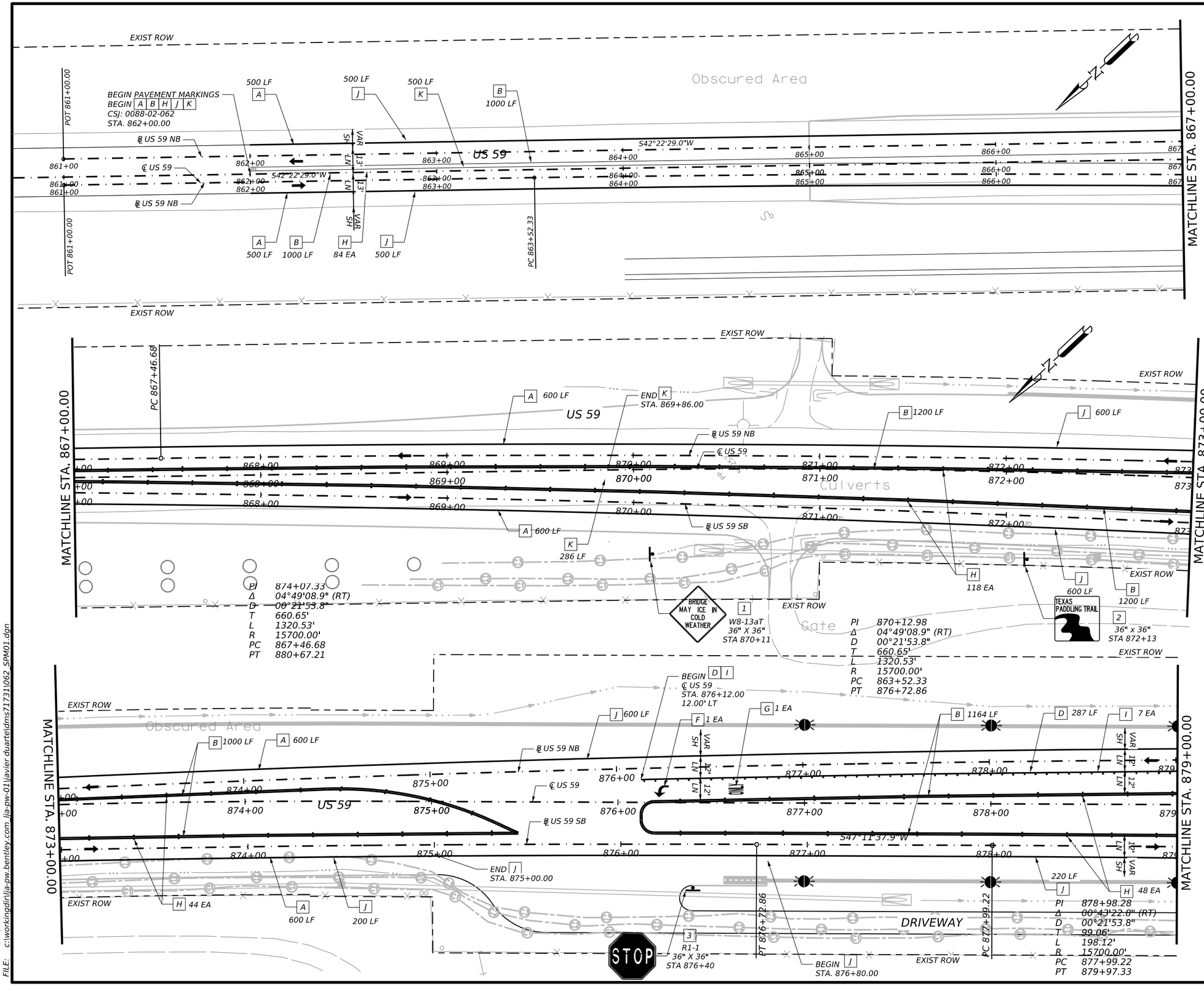
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		231



LEGEND

- A — RE PM W/RET REQ TY I (W) 6" (SLD)(90 MIL)
- B — RE PM W/RET REQ TY I (Y) 6" (SLD)(90 MIL)
- C — RE PM W/RET REQ TY I (Y) 6" (BRK)(90 MIL)
- D — REFL PAV MRK TY I (W) 8" (SLD)(90 MIL)
- E — REFL PAV MRK TY I (W) 8" (DOT)(90 MIL)
- F — PREFAB PAV MRK TY C (W) (ARROW)
- G — PREFAB PAV MRK TY C (W) (WORD)
- H — REFL PAV MRK TY II-A-A
- I — REFL PAV MRK TY I-C
- J — RUMBLE STRIPS (SHOULDER)
- K — RUMBLE STRIPS (CENTERLINE)
- DIRECTION OF TRAFFIC FLOW
- PROPOSED SIGN
- PROPOSED SIGN UNDER BRIDGE
- # — PROPOSED SIGN NUMBER
- INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BR)
- INSTL DEL ASSM (D-SY) SZ (BRF) CTB (BI)
- NSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
- INSTL OM ASSM (OM-3R/L) (TWT) GND

NOTES:
1. ALL SIGN DIMENSIONS ARE IN INCHES.
2. ALL EXISTING SIGNS MUST BE REMOVED WITHIN THE PROJECT LIMITS UNLESS OTHERWISE NOTED.
3. ALL SIGN LOCATIONS ARE APPROXIMATE AND CAN BE ADJUSTED TO ACCOMMODATE SITE CONDITIONS AS APPROVED BY THE ENGINEER.
4. ALL SIGNS MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS FOUND IN "TMUTCD" AND "STANDARD HIGHWAY SIGN DETAILS FOR TEXAS", LATEST EDITIONS.

0' 25' 50'
SCALE: 1"=50'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

7/24/2024

DATE: 7/24/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms717311\062_SPM01.dgn

LJA Engineering, Inc. LJA
FRN - F-1386

Texas Department of Transportation

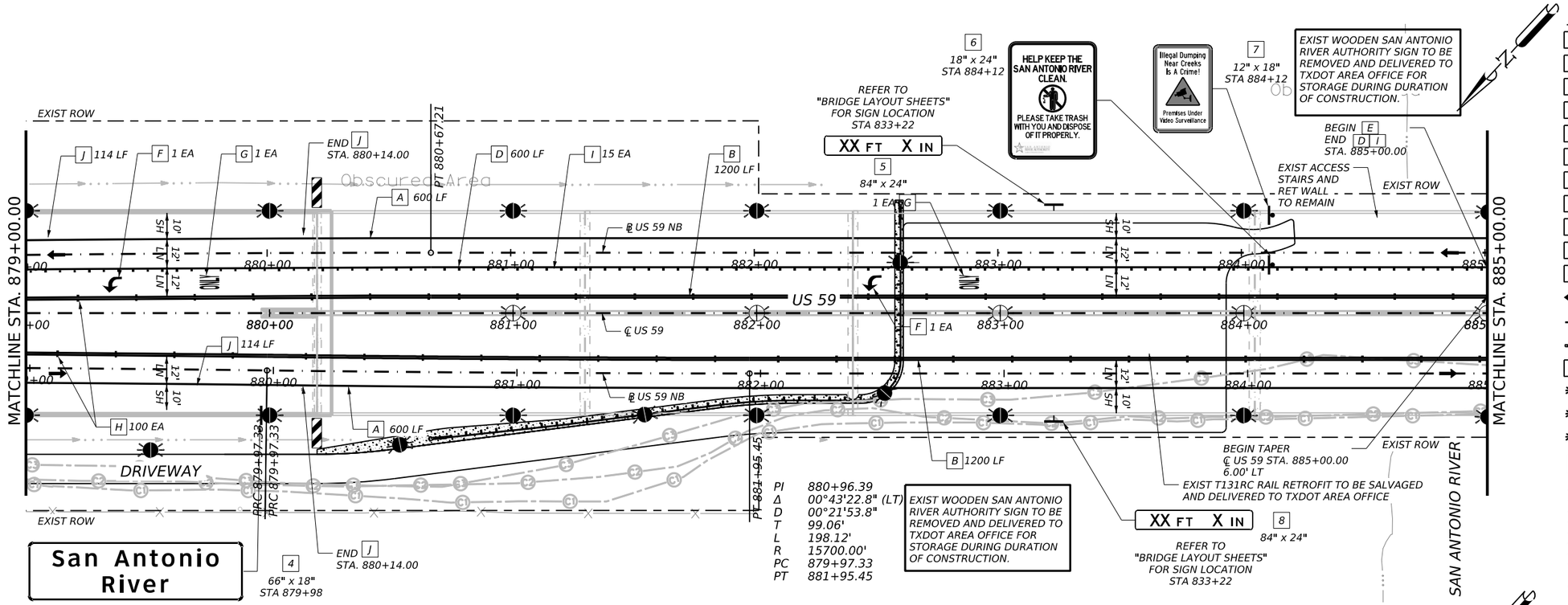
US 59

SIGNING AND PAVEMENT MARKING LAYOUT

BEGIN TO STA. 879+00

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		232



LEGEND

- A RE PM W/RET REQ TY I (W) 6" (SLD)(90 MIL)
- B RE PM W/RET REQ TY I (Y) 6" (SLD)(90 MIL)
- C RE PM W/RET REQ TY I (Y) 6" (BRK)(90 MIL)
- D REFL PAV MRK TY I (W) 8" (SLD)(90 MIL)
- E REFL PAV MRK TY I (W) 8" (DOT)(90 MIL)
- F PREFAB PAV MRK TY C (W) (ARROW)
- G PREFAB PAV MRK TY C (W) (WORD)
- H REFL PAV MRK TY II-A-A
- I REFL PAV MRK TY I-C
- J RUMBLE STRIPS (SHOULDER)
- K RUMBLE STRIPS (CENTERLINE)
- DIRECTION OF TRAFFIC FLOW
- PROPOSED SIGN
- PROPOSED SIGN UNDER BRIDGE
- # PROPOSED SIGN NUMBER
- INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BR)
- INSTL DEL ASSM (D-SY) SZ (BRF) CTB (BI)
- NSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
- INSTL OM ASSM (OM-3R/L) (TWT) GND

NOTES:
1. ALL SIGN DIMENSIONS ARE IN INCHES.
2. ALL EXISTING SIGNS MUST BE REMOVED WITHIN THE PROJECT LIMITS UNLESS OTHERWISE NOTED.
3. ALL SIGN LOCATIONS ARE APPROXIMATE AND CAN BE ADJUSTED TO ACCOMMODATE SITE CONDITIONS AS APPROVED BY THE ENGINEER.
4. ALL SIGNS MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS FOUND IN "TMUTCD" AND "STANDARD HIGHWAY SIGN DETAILS FOR TEXAS", LATEST EDITIONS.

0' 25' 50'
SCALE: 1"=50'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER
7/3/2024

LJA Engineering, Inc. LJA
FRN - F-1386

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US 59

SIGNING AND PAVEMENT MARKING LAYOUT

STA. 879+00 TO STA. 891+00

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		233

DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms717311062_SPM02.dgn

LEGEND

- A — RE PM W/RET REQ TY I (W) 6" (SLD)(90 MIL)
- B — RE PM W/RET REQ TY I (Y) 6" (SLD)(90 MIL)
- C — RE PM W/RET REQ TY I (Y) 6" (BRK)(90 MIL)
- D — REFL PAV MRK TY I (W) 8" (SLD)(90 MIL)
- E — REFL PAV MRK TY I (W) 8" (DOT)(90 MIL)
- F — PREFAB PAV MRK TY C (W) (ARROW)
- G — PREFAB PAV MRK TY C (W) (WORD)
- H — REFL PAV MRK TY II-A-A
- I — REFL PAV MRK TY I-C
- J — RUMBLE STRIPS (SHOULDER)
- K — RUMBLE STRIPS (CENTERLINE)
- DIRECTION OF TRAFFIC FLOW
- PROPOSED SIGN
- PROPOSED SIGN UNDER BRIDGE
- # — PROPOSED SIGN NUMBER
- INSTL DEL ASSM (D-SW) SZ (BRF) CTB (BR)
- INSTL DEL ASSM (D-SY) SZ (BRF) CTB (BI)
- NSTL DEL ASSM (D-SW) SZ 1 (BRF) GF2 (BI)
- INSTL OM ASSM (OM-3R/L) (TWT) GND

NOTES:
1. ALL SIGN DIMENSIONS ARE IN INCHES.
2. ALL EXISTING SIGNS MUST BE REMOVED WITHIN THE PROJECT LIMITS UNLESS OTHERWISE NOTED.
3. ALL SIGN LOCATIONS ARE APPROXIMATE AND CAN BE ADJUSTED TO ACCOMMODATE SITE CONDITIONS AS APPROVED BY THE ENGINEER.
4. ALL SIGNS MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS FOUND IN "TMUTCD" AND "STANDARD HIGHWAY SIGN DETAILS FOR TEXAS", LATEST EDITIONS.

0' 25' 50'
SCALE: 1"=50'

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER
7/24/2024

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FRN - F-1386

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US 59

SIGNING AND PAVEMENT MARKING LAYOUT

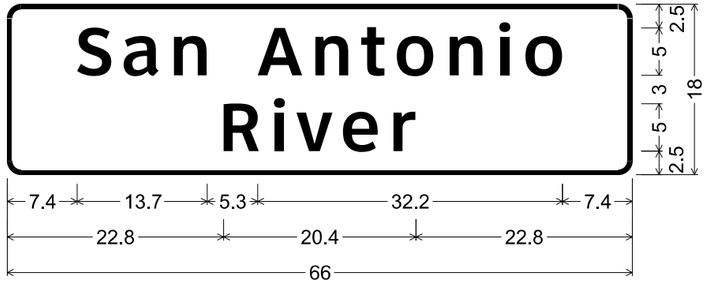
STA. 891+00 TO END

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		234

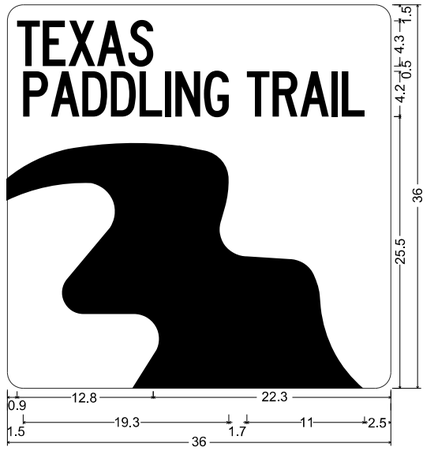
DATE: 7/24/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms71731\062_SPM03.dgn

1.0" Radius, 0.2" Border, 0.4" Indent, Red on White;
"Illegal Dumping" Black, C 50% spacing;
"Near Creeks" Black, C 50% spacing;
"Is A Crime!" Black, C 50% spacing;
"Premises Under" Black, C 50% spacing;
"Video Surveillance" Black, C 50% spacing;



I-3 5in;
1.5" Radius, 0.5" Border, White on Green;
"San Antonio", ClearviewHwy-5-W; "River", ClearviewHwy-5-W;

1.5" Radius, 0.2" Border, 0.3" Indent, Black on White;
"HELP KEEP THE", D 30% spacing;
"SAN ANTONIO RIVER", D 30% spacing;
"CLEAN.", D 30% spacing; " " White, D; " " White, D;
" " White, D; "PLEASE TAKE TRASH", D 30% spacing;
"WITH YOU AND DISPOSE", D 30% spacing;
"OF IT PROPERLY.", D 30% spacing;



1.5" Radius, No border, None on Blue;
"TEXAS " White, C 40% spacing; "PADDLING TRAIL"
White, C 40% spacing; " " White, C;

NOT TO SCALE

STATE OF TEXAS
S.E. WRIGHT
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7/3/2024

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FRN - F-1386

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US 59

SMALL SIGN DETAILS

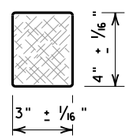
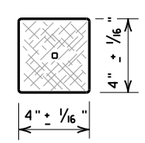
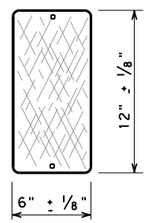
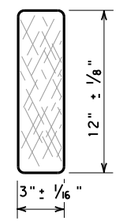
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		235

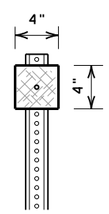
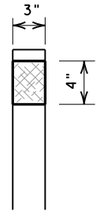
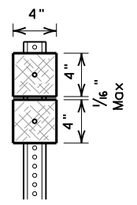
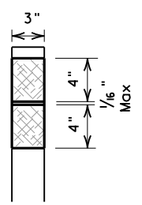
DATE: 7/3/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarteldms71731\062_DET01.dgn

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier duarte\dms71732\dom1-20.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)
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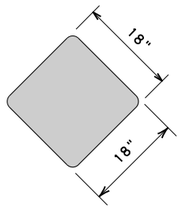
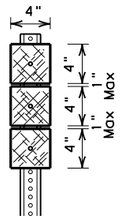
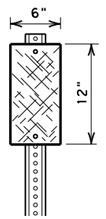
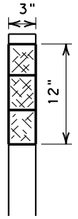
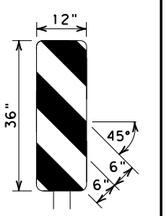
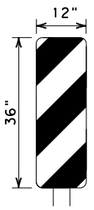
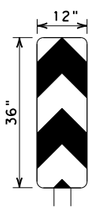
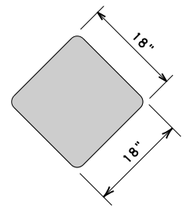
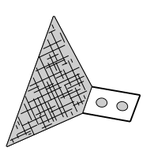
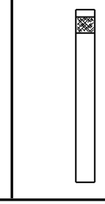
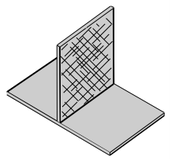
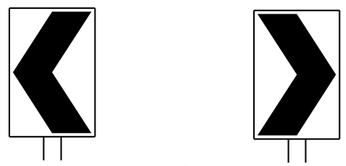
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} 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			
	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



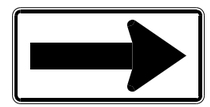
W1-8

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

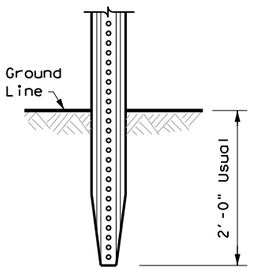
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	CRP	GOLIAD		236

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

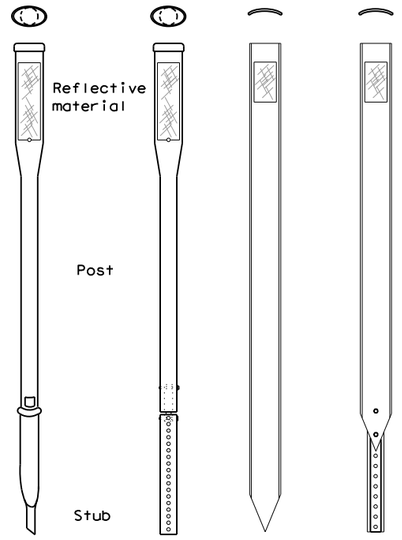


NOTES

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.

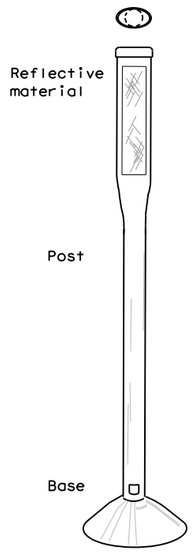
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



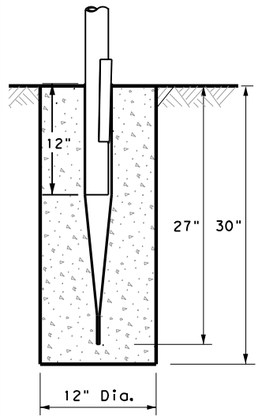
SURFACE MOUNT

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.

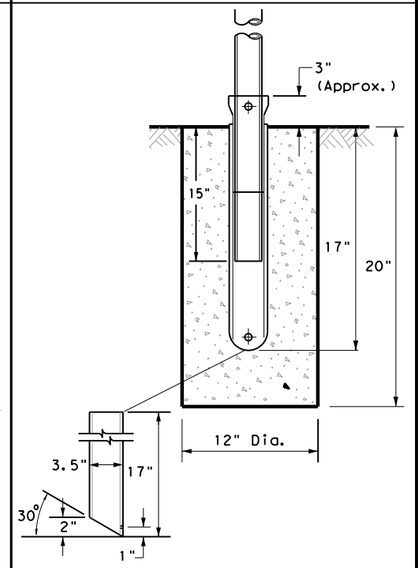
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

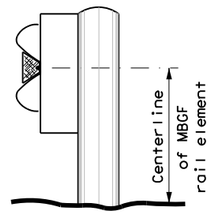
NOTE

1. Install per manufacturer's recommendations.

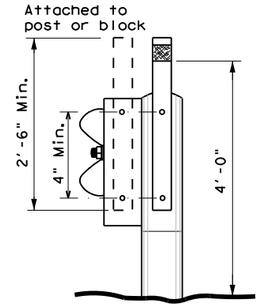
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

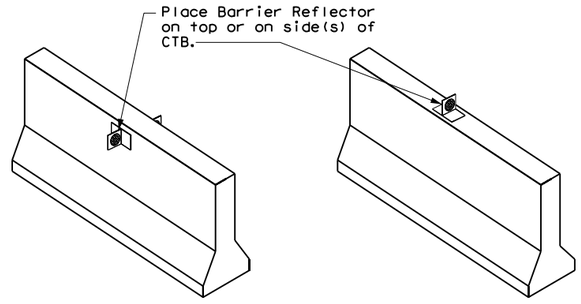
GF1



GF2



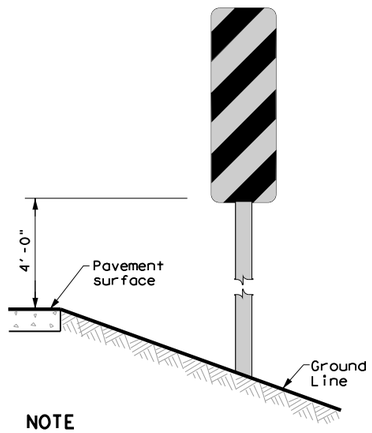
CONCRETE TRAFFIC BARRIER (CTB)



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.

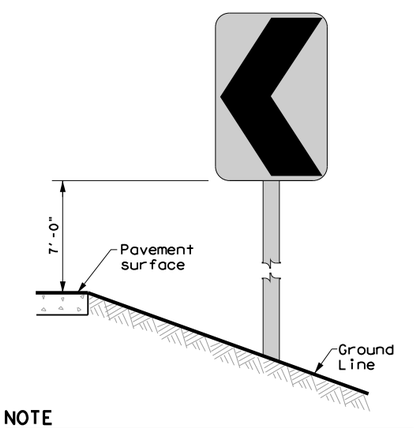
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



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)

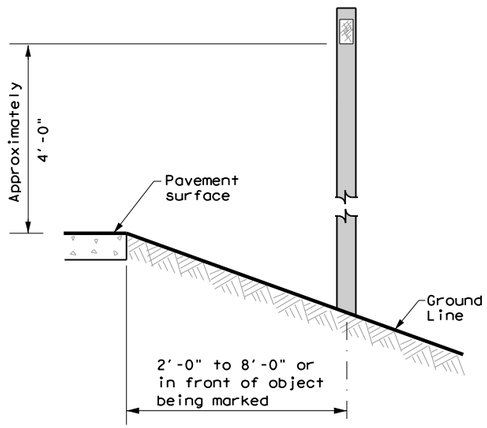
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



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

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REVISIONS	0088	02	062	US59
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	CRP	GOLIAD		237

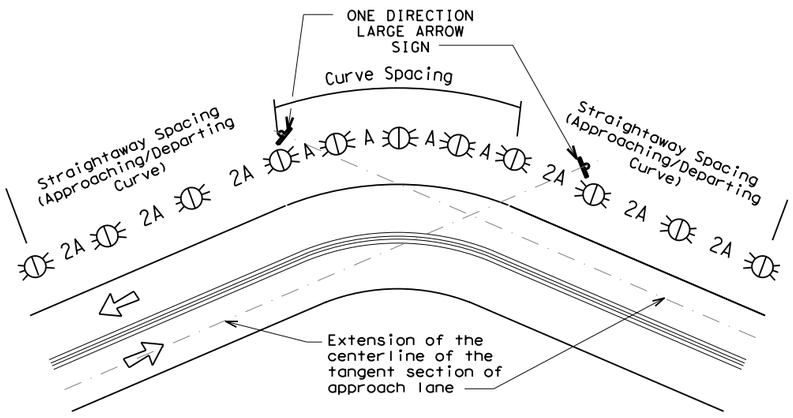
20B

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier duarte\dms71732\dom2-20.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

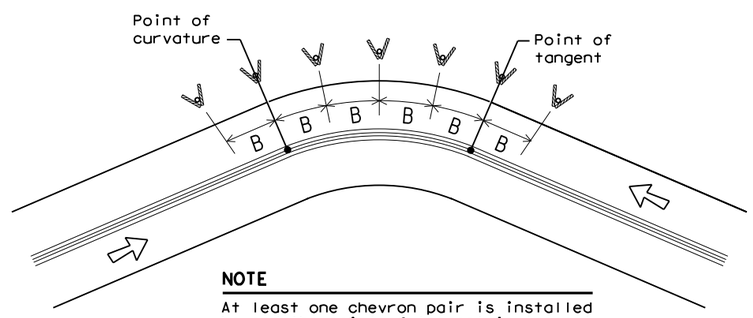
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



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
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3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	CRP	GOLIAD		238

20C

DATE: 6/7/2024 $TIME$
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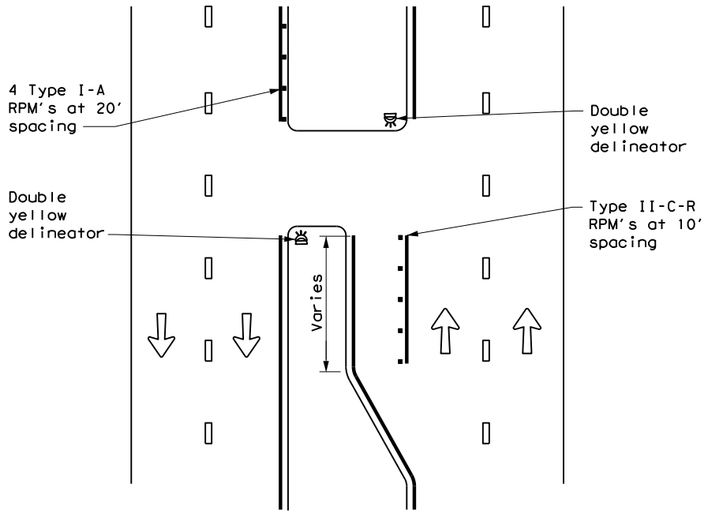
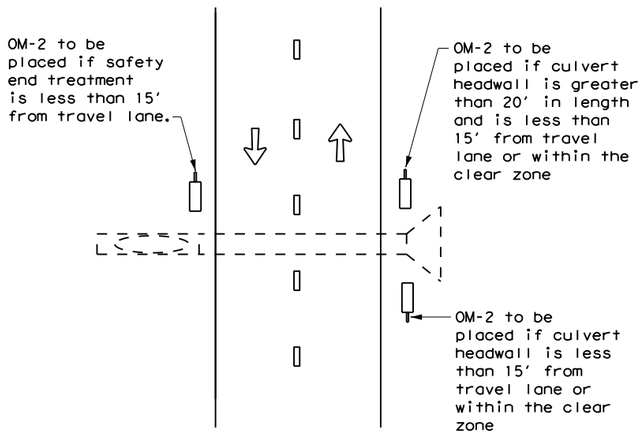
CROSSOVERS



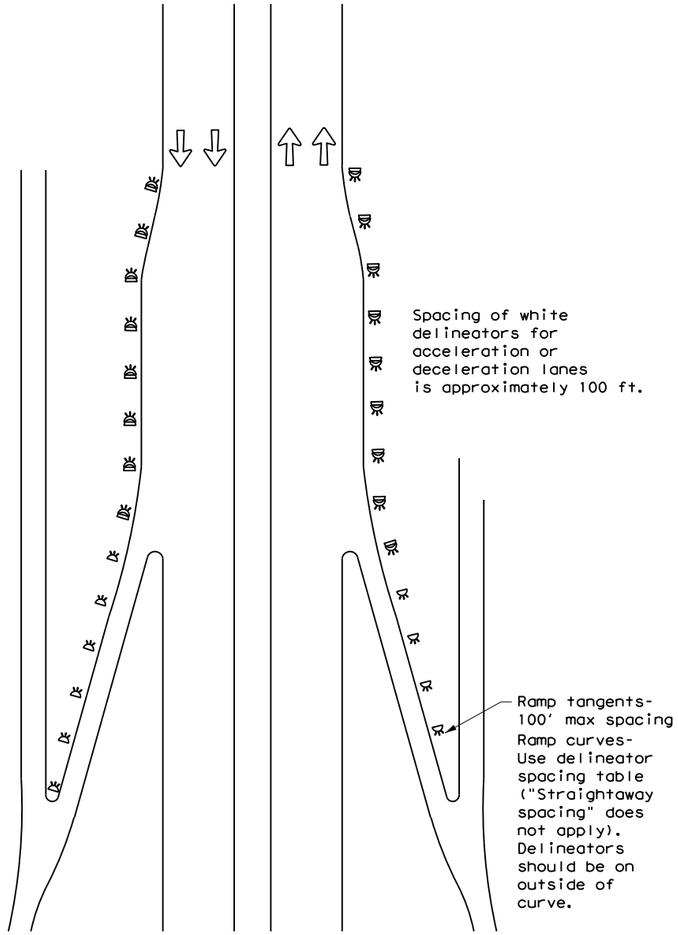
DETAIL 1

FOR CULVERTS WITHOUT MBGF



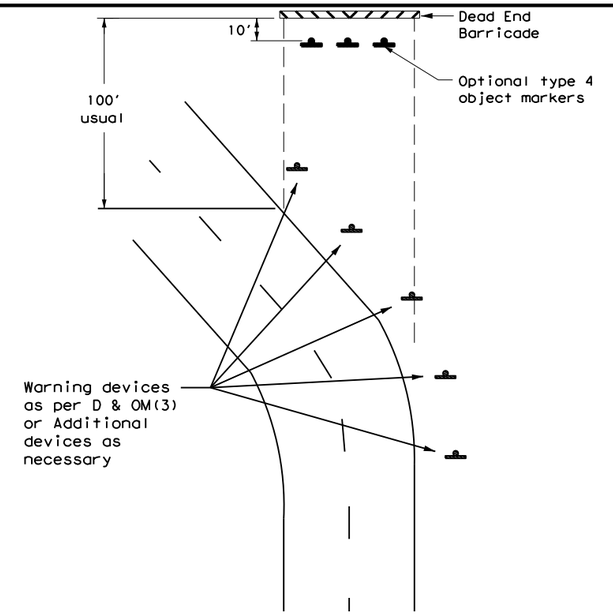
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



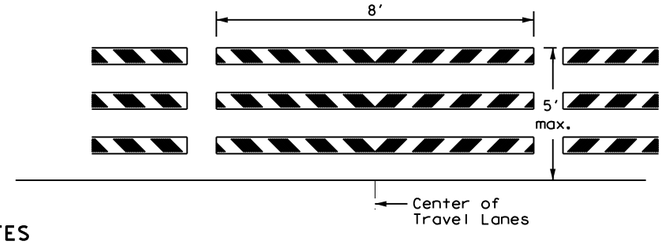
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

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

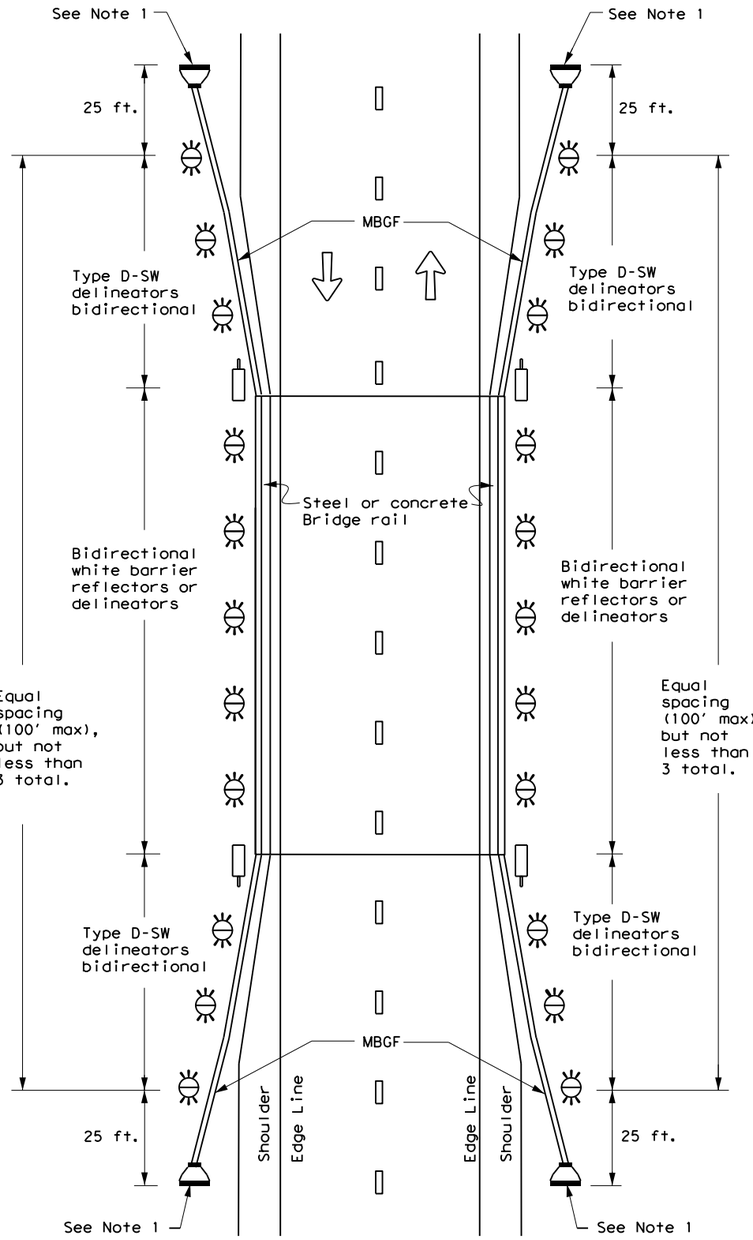
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
3-15	DIST	COUNTY		SHEET NO.
7-20	CRP	GOLIAD		239

20D

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier duarte\dms71732\dom5-20.dgn

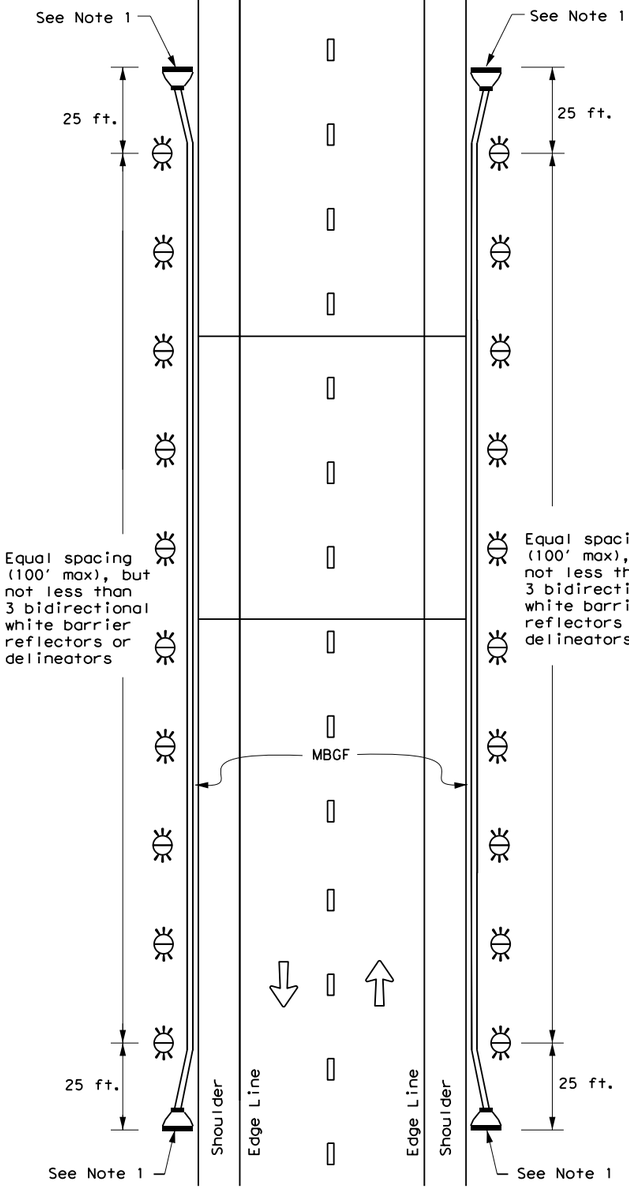
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



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.

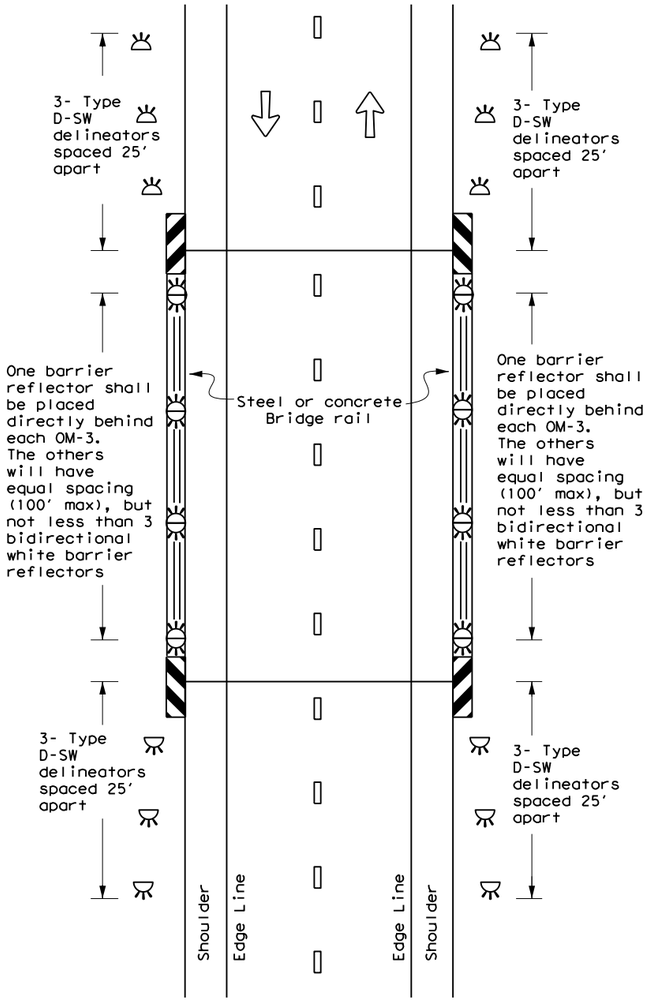
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

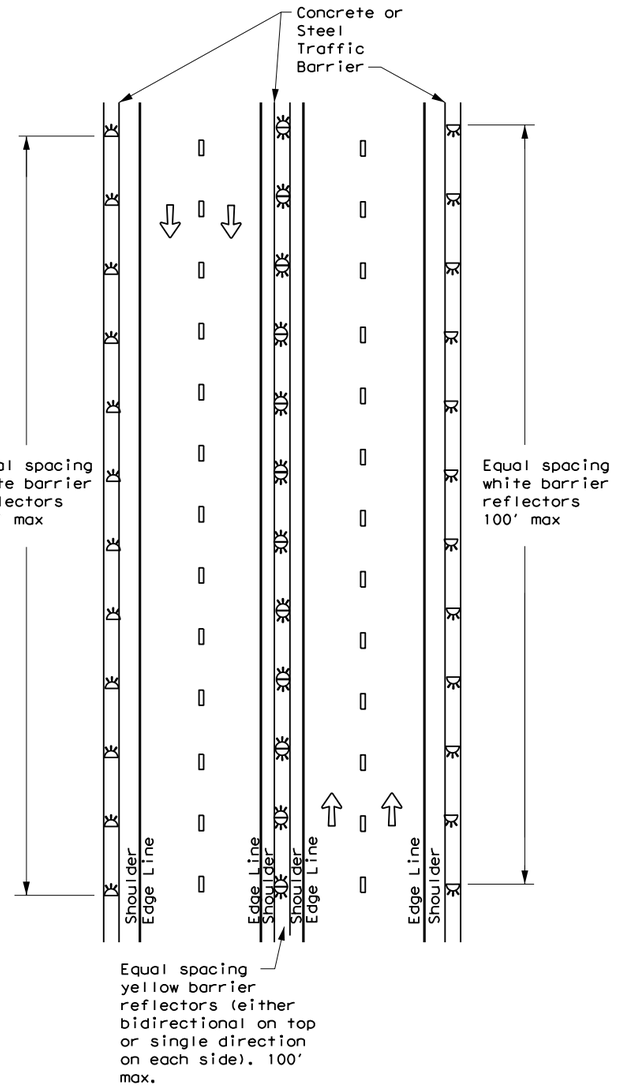
D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
7-20	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		240

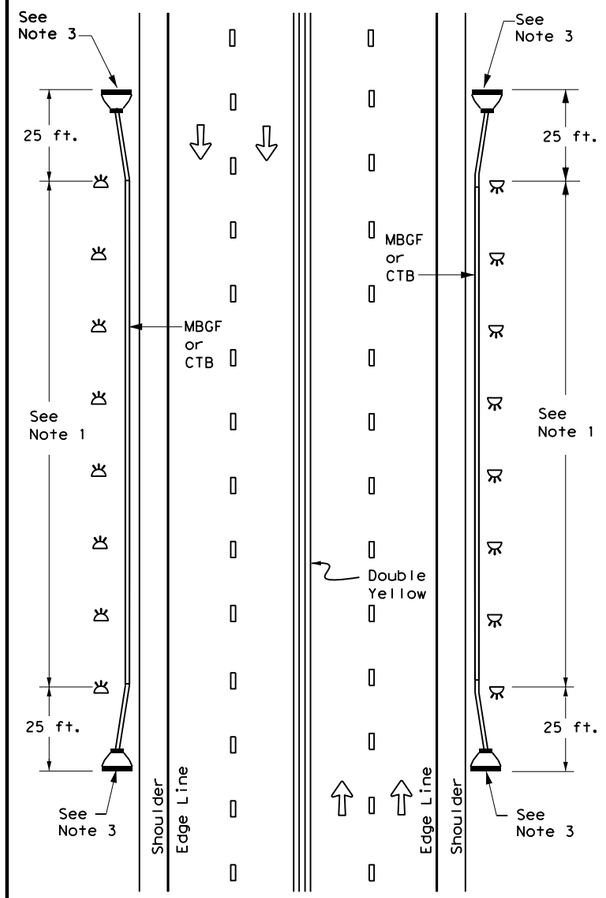
20E

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier.duarte\dms71732\dom6-20.dgn

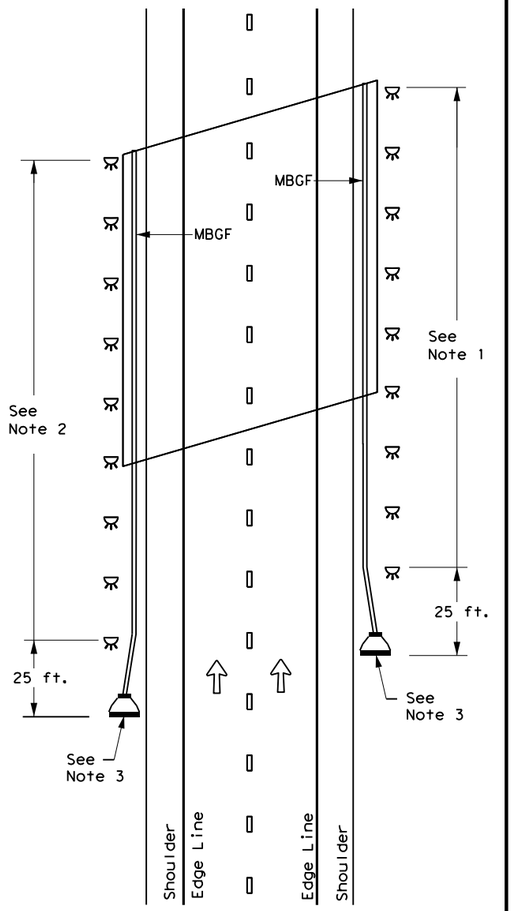
CONTINUOUS CONCRETE OR STEEL BARRIER



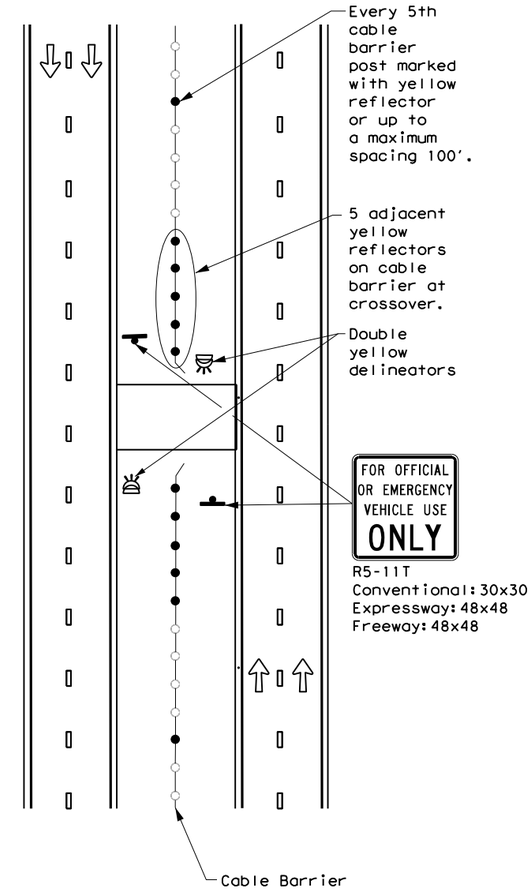
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

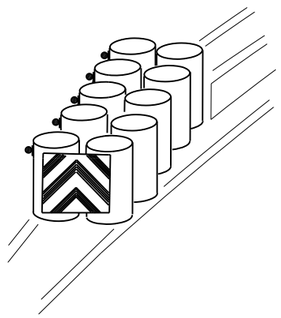
Texas Department of Transportation

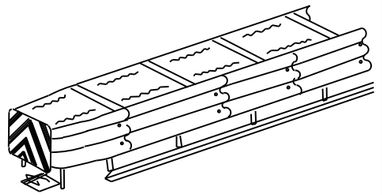
Traffic Safety Division Standard

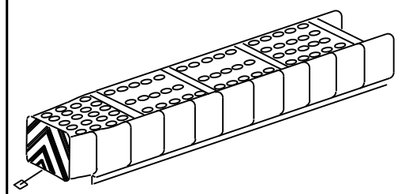
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

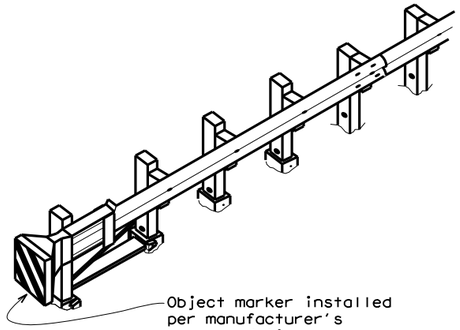
D & OM(6)-20

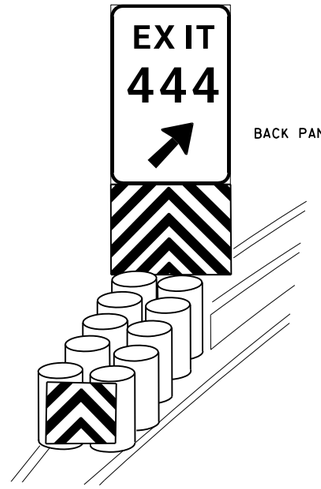
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
7-20	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		241

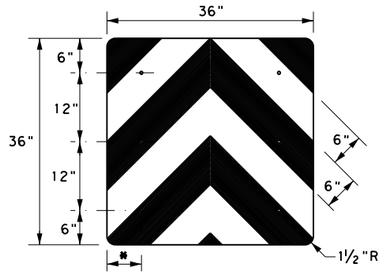


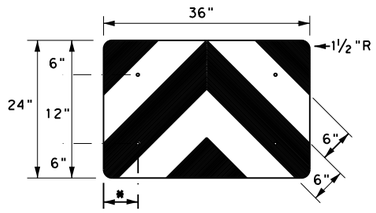




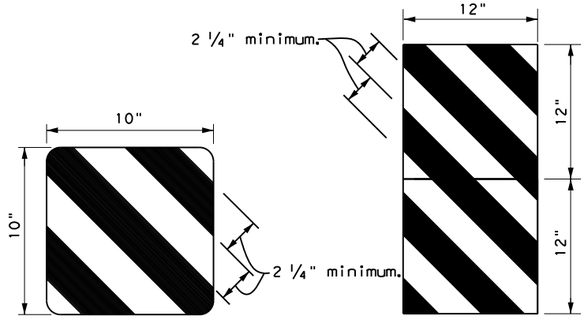




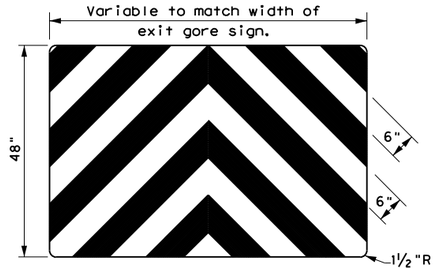


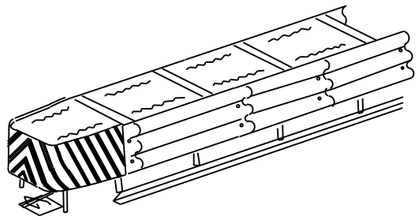


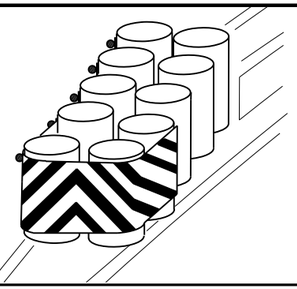
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

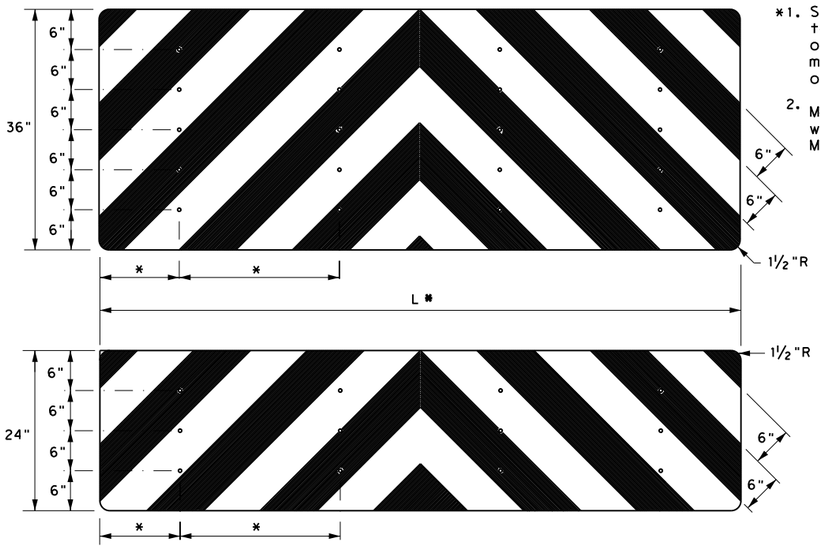


OBJECT MARKERS SMALLER THAN 3 FT^2









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	0088	02	062	US59
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	CRP	GOLIAD		242
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20G

DATE: 6/7/2024 $TIME$
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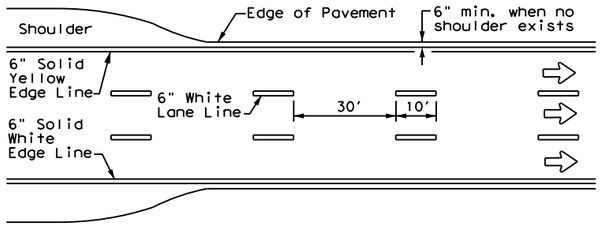
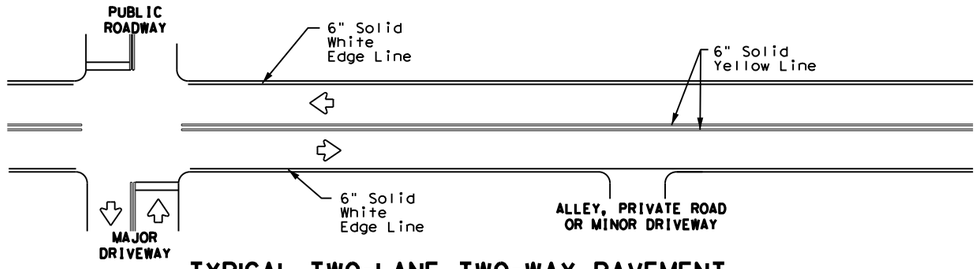
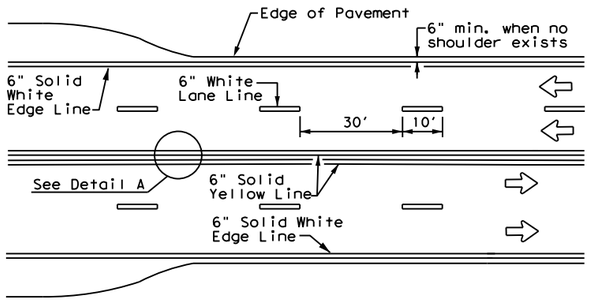
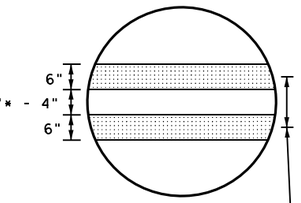


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



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





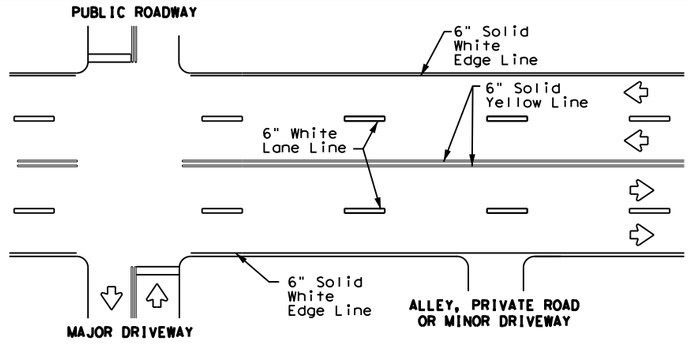
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

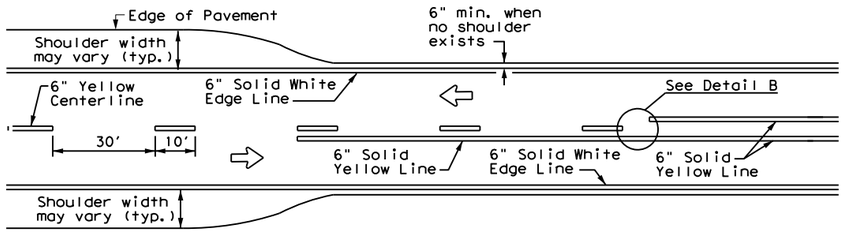
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

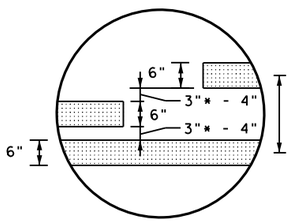
** 8" minimum for restripe projects when approved by the Engineer.



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

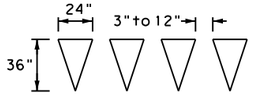


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



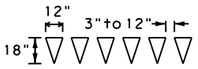
DETAIL "B"

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

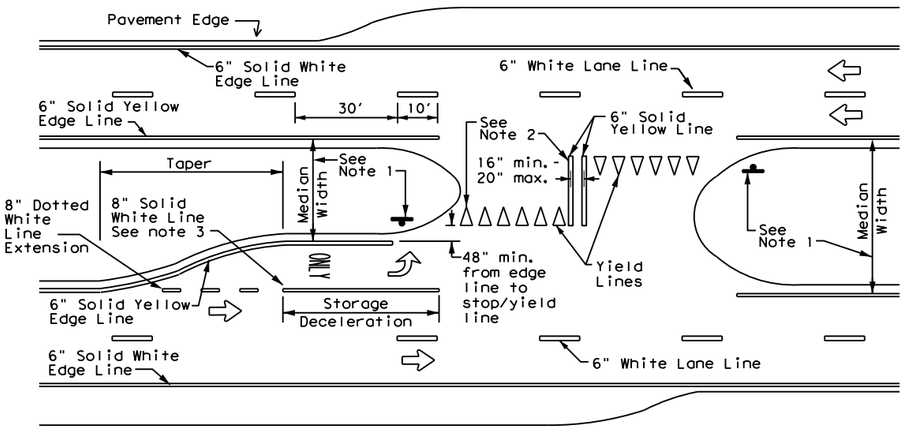


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

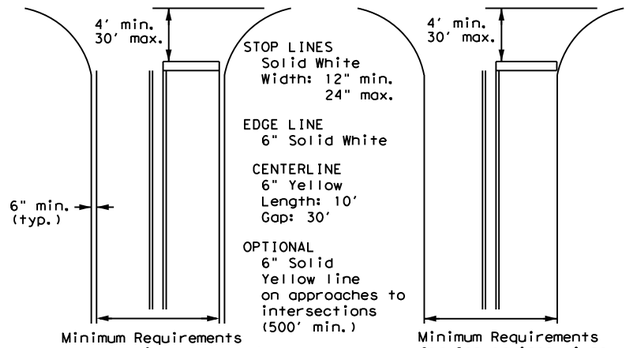
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

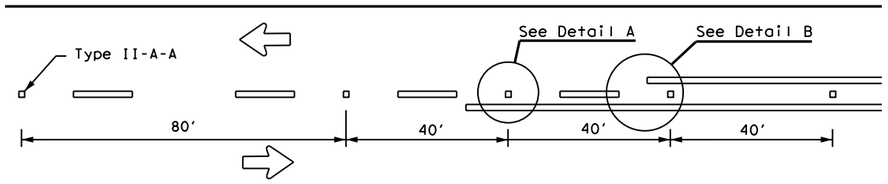
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

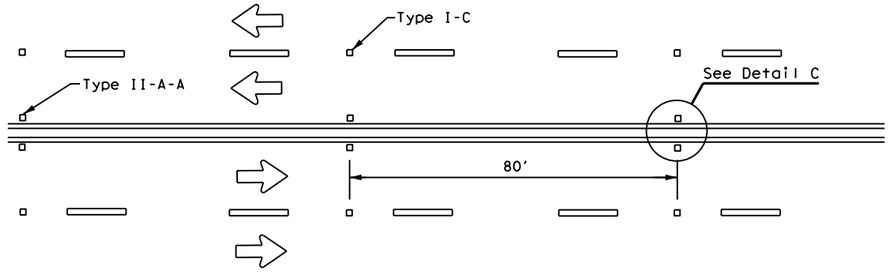
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0088	02	062	US59
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	CRP	GOLIAD		243

22A

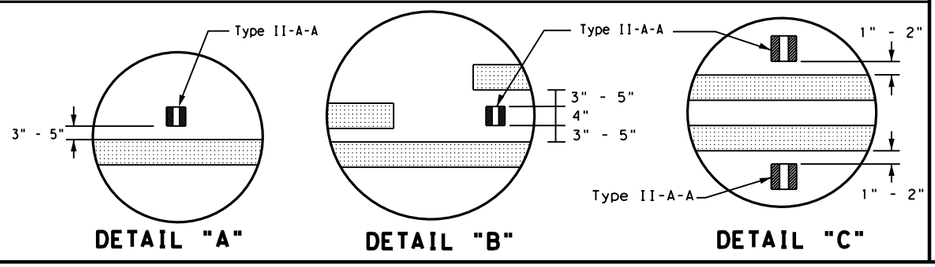
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

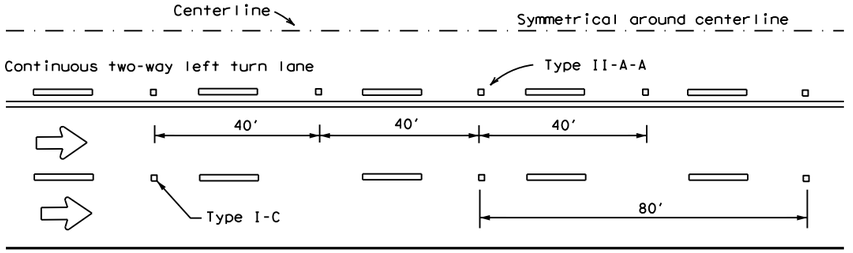


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

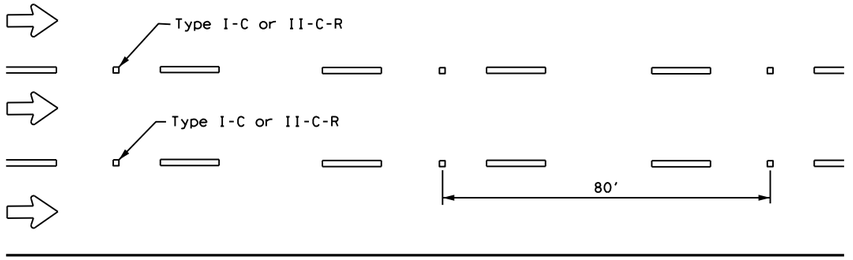


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





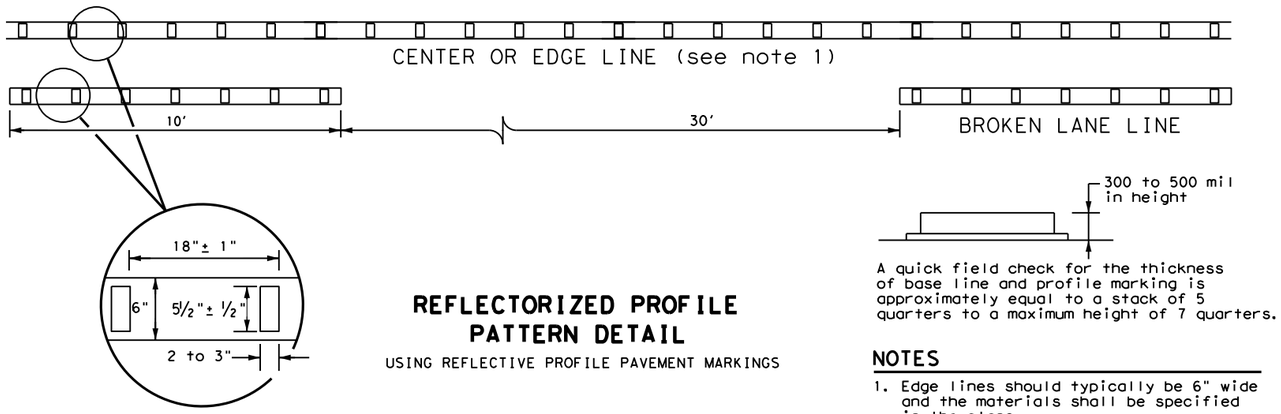
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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

See Note 3.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

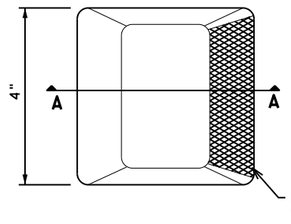
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

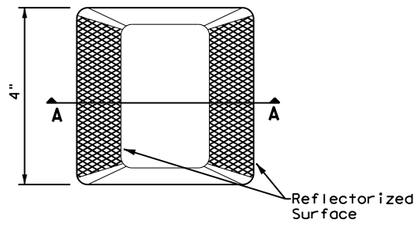
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians 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

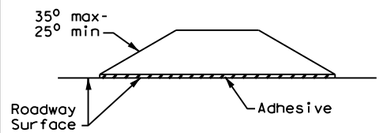
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



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	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		244

22B

DATE: 6/7/2024 $TIME$
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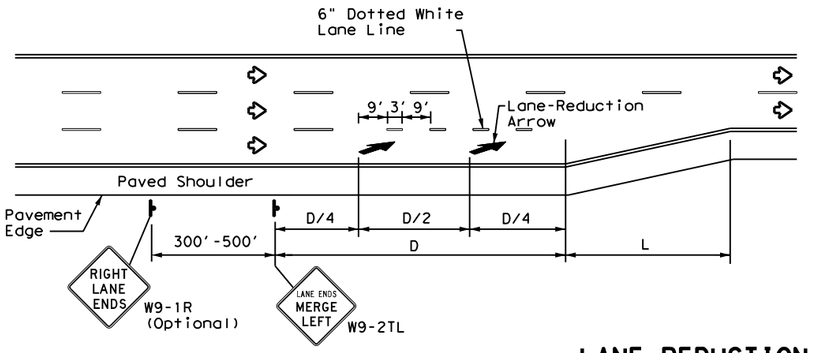
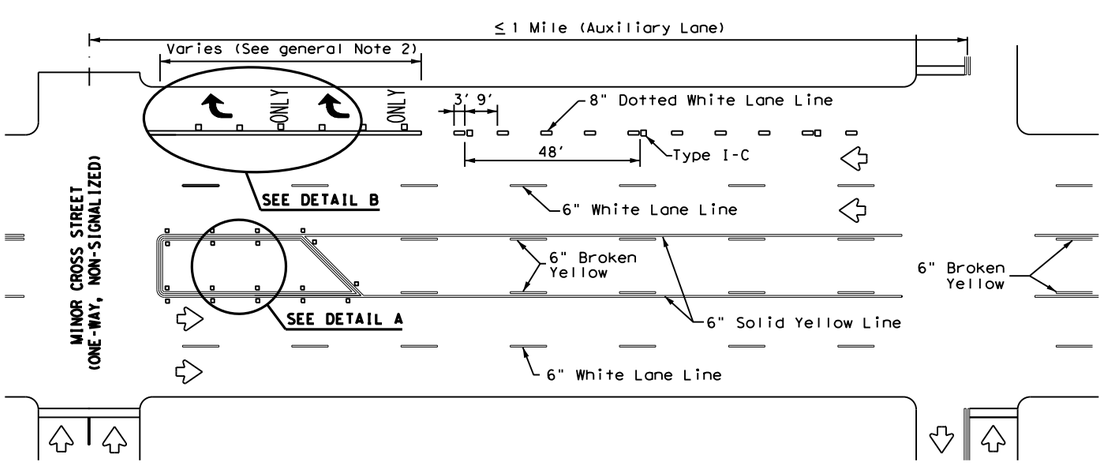


LANE REDUCTION

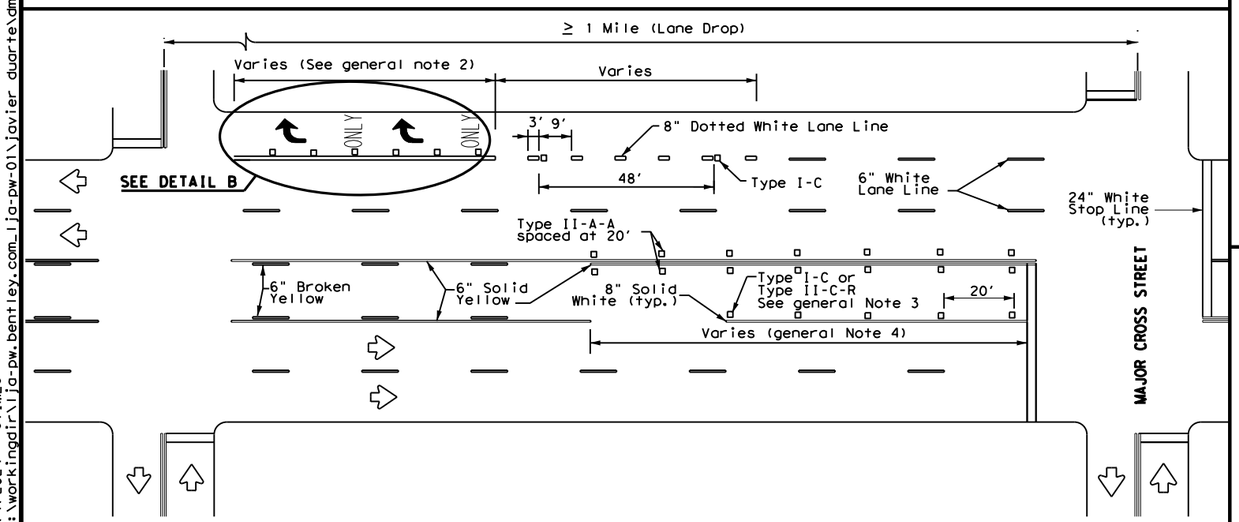
NOTES

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

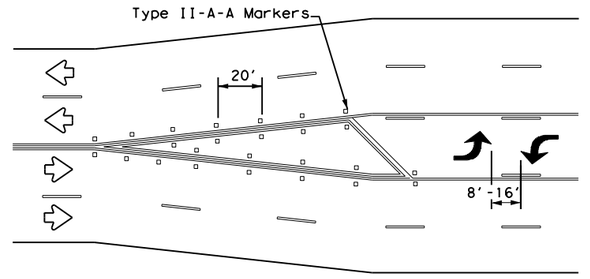
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



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



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



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

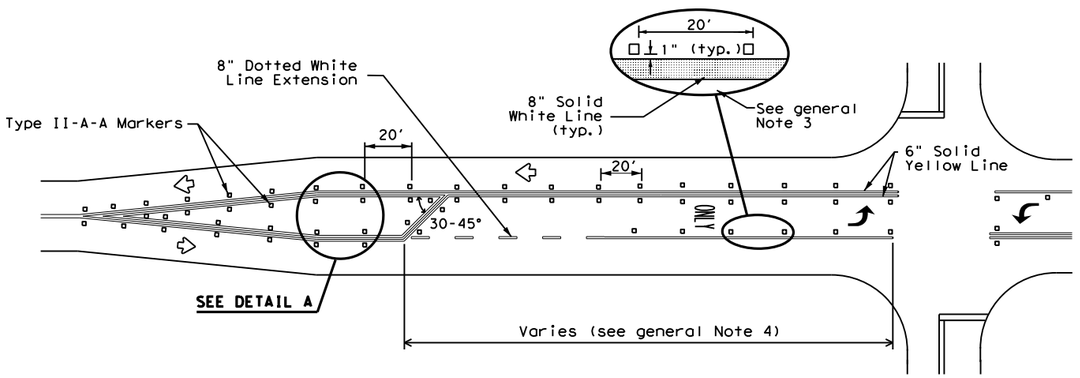
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

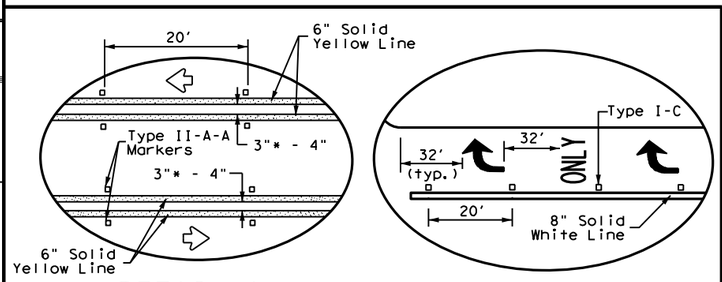
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

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



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



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

Texas Department of Transportation

Traffic Safety Division Standard

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

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20	0088	02	062	US59
5-00 2-10 12-22	DIST	COUNTY		SHEET NO.
8-00 2-12	CRP	GOLIAD		245

22C

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)

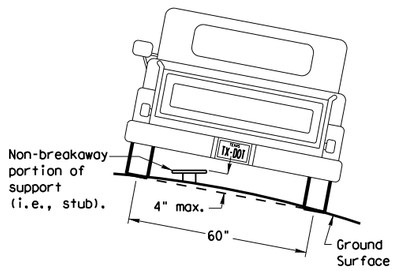
Anchor Type

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

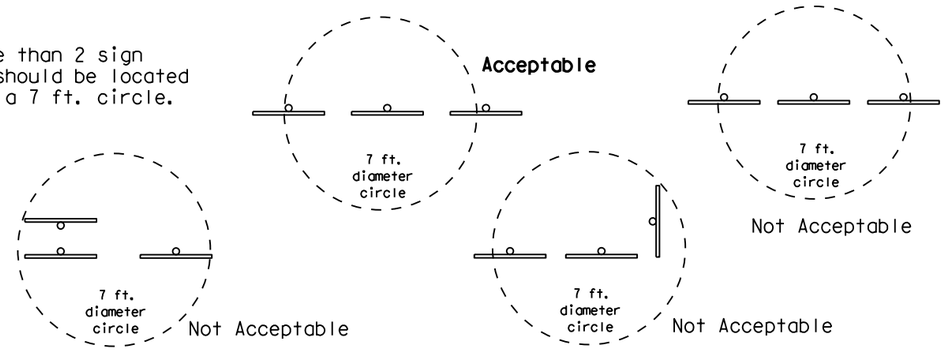
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1) to (SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



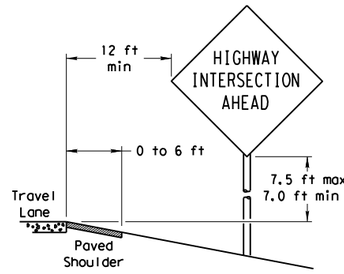
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

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



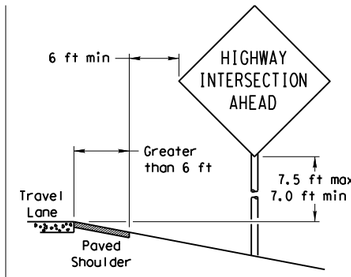
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

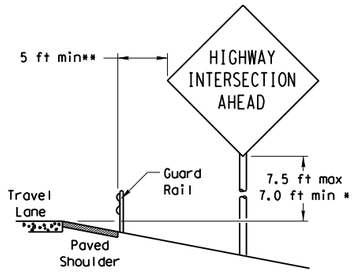
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



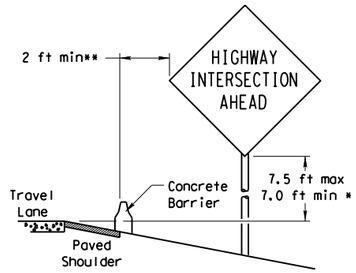
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



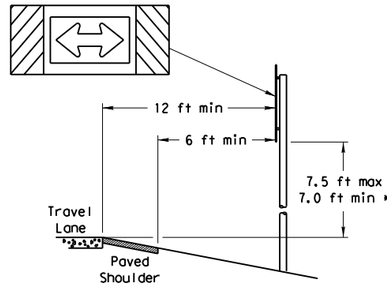
BEHIND GUARDRAIL



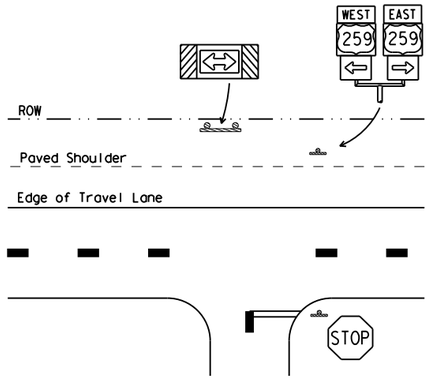
BEHIND CONCRETE BARRIER

****Sign clearance based on distance required for proper guard rail or concrete barrier performance.**

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.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

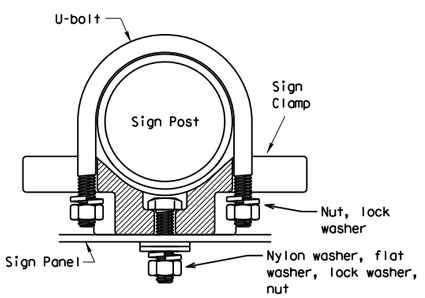
The maximum values may be increased when directed by the Engineer.

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

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

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

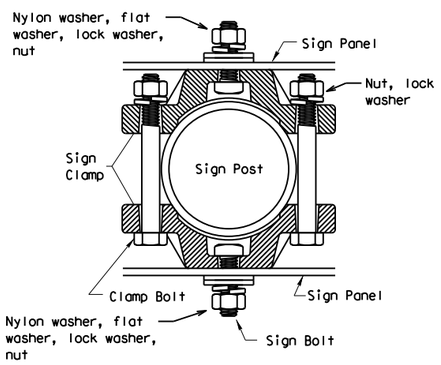


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

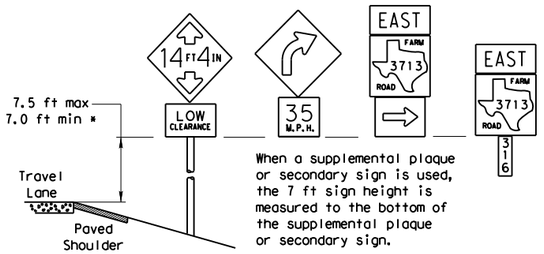
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



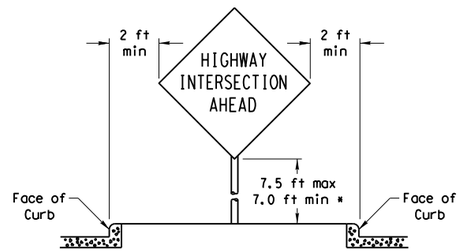
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



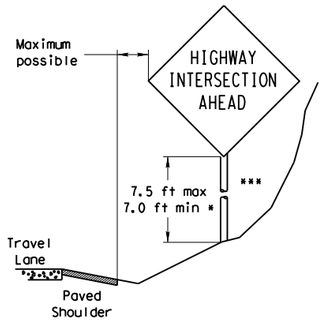
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		246

26A

DATE: 6/7/2024 $TIME$
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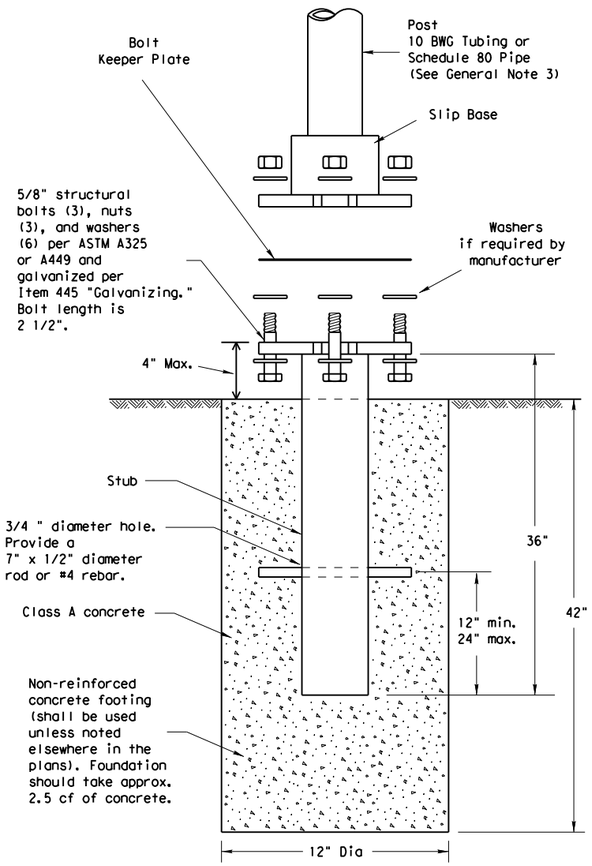
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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.

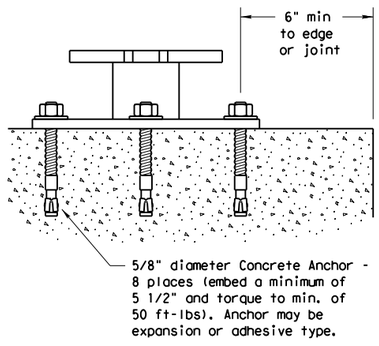
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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
0088	02	062	US59

DIST	COUNTY	SHEET NO.
CRP	GOLIAD	247

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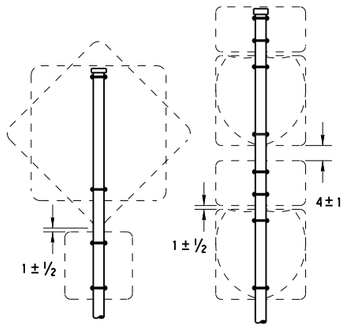
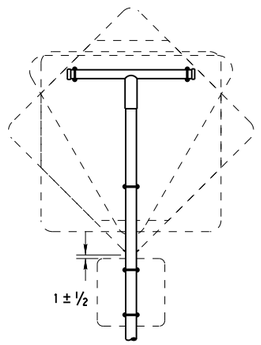


SM RD SGN ASSM TY XXXXX(1)XX(P)



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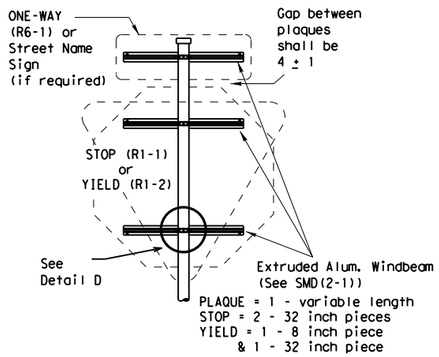

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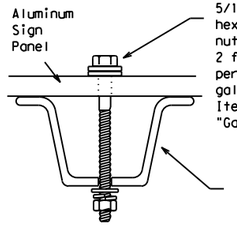
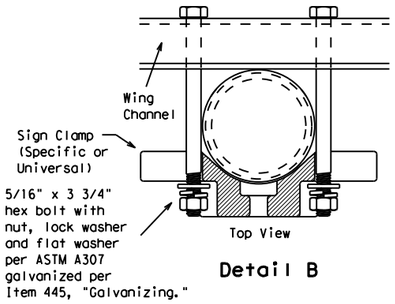
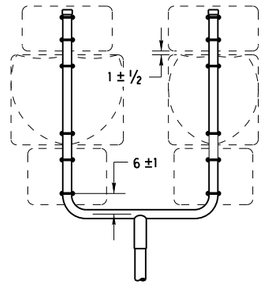


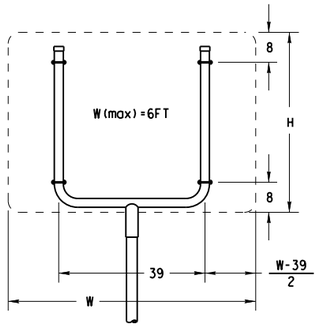
Detail A



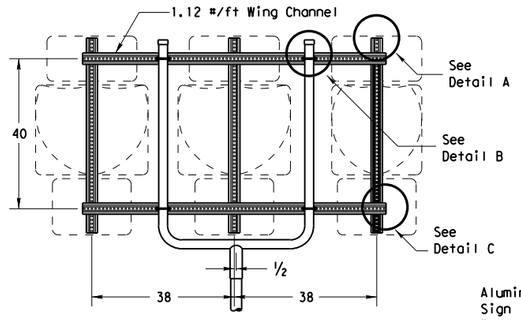
Detail B



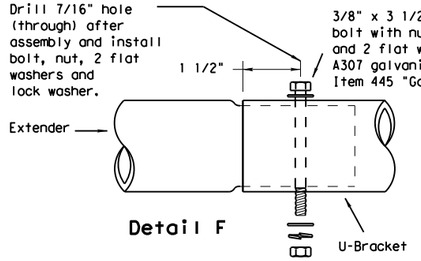
SM RD SGN ASSM TY XXXXX(1)XX(U)



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

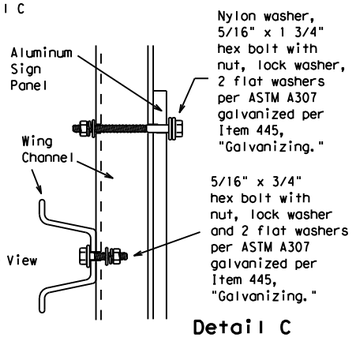


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

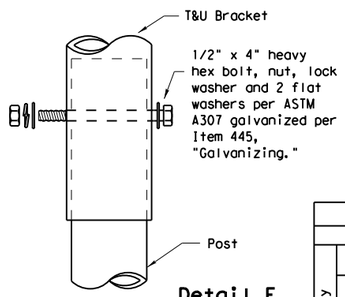


Detail F

Splices shall only be allowed behind the sign substrate.



Detail C



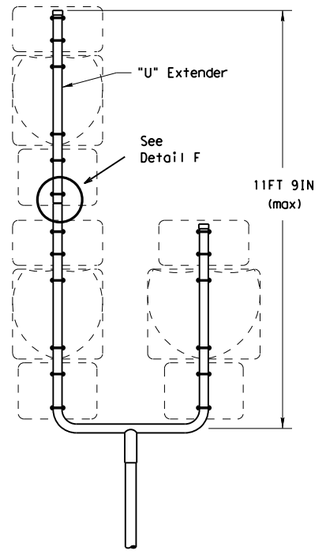
Detail E

GENERAL NOTES:

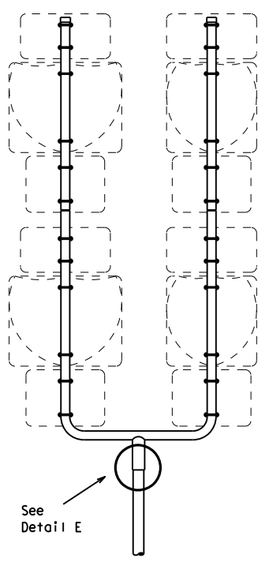
1.

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)



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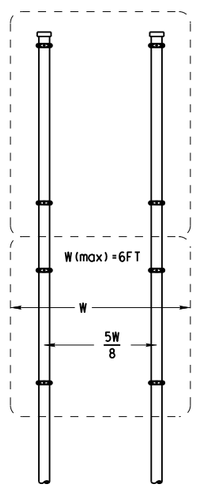

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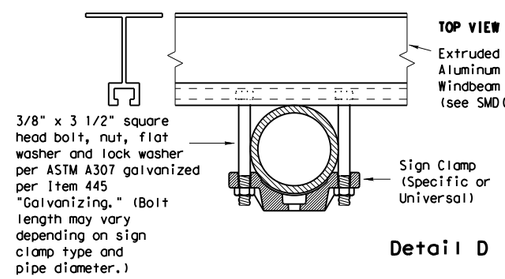
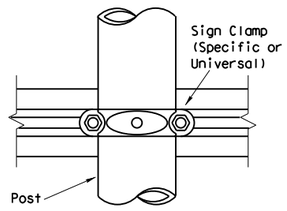
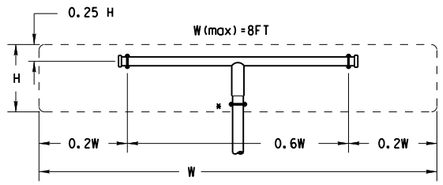


Detail D



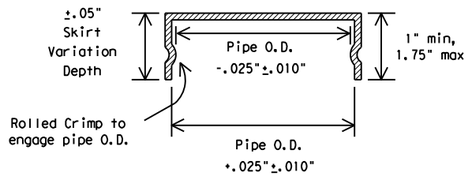
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0088	02	062	US59

DIST	COUNTY	SHEET NO.
CRP	GOLIAD	248

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\ljg-pw.bentley.com=ljg-pw-01\javier.duarte\dms71732\smds2.dgn

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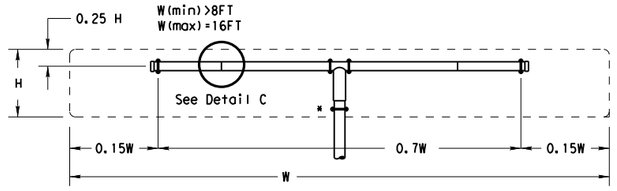
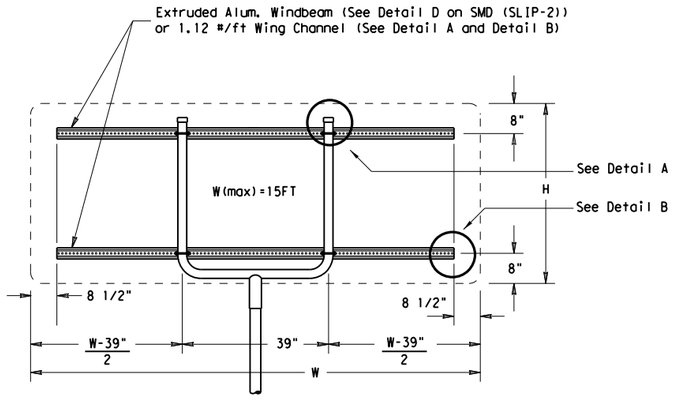
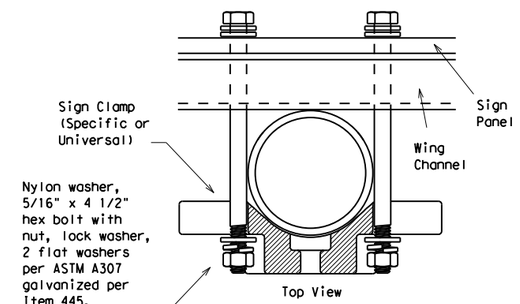


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)

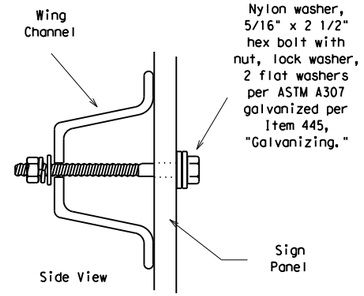


SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

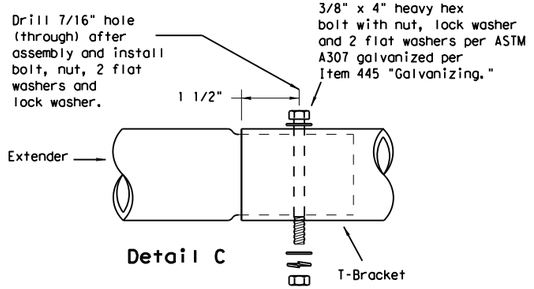


Top View

Detail A

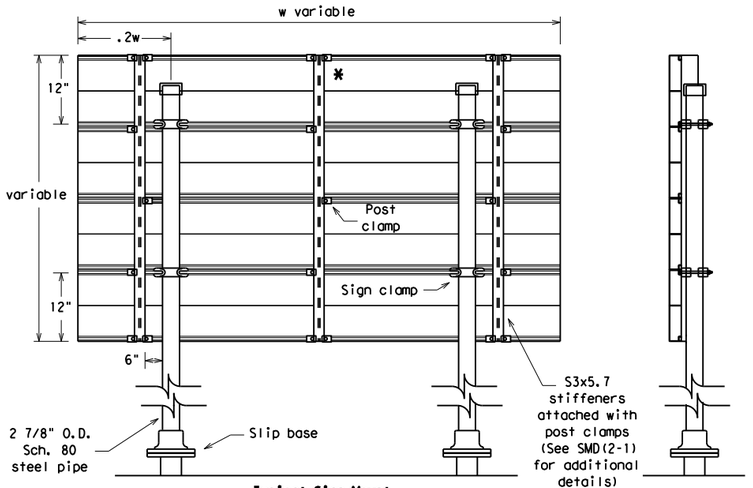


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

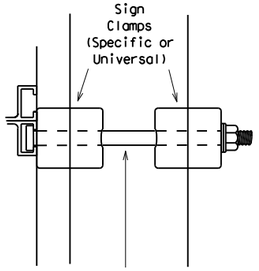


Typical Sign Mount

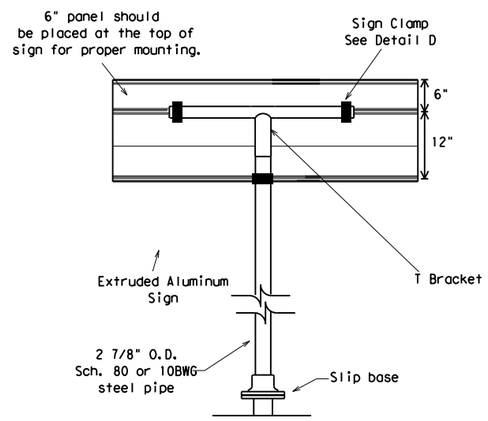
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

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

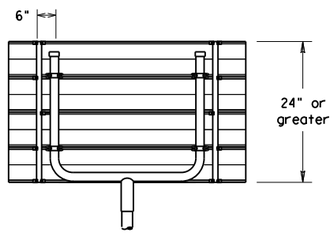
See Detail E
for clamp installation



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

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

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. See table above.
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. Sign blanks shall be the sizes and shapes shown on the plans.
11. 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.
12. 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

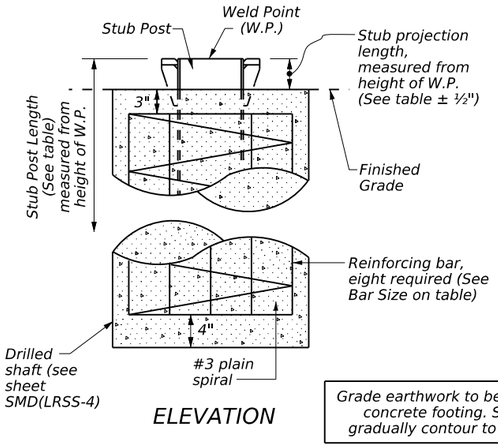
SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

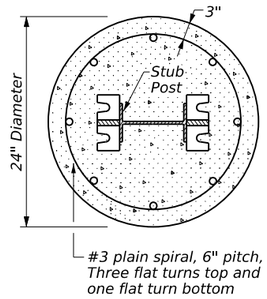
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		249

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com#ija-pw-01\javier_duarte\dms71732\smd21-08.dgn

REINFORCED FOUNDATION DETAIL



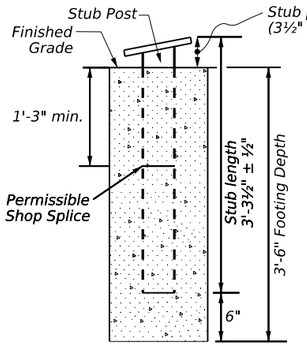
ELEVATION



PLAN

Grade earthwork to be flush with the concrete footing. Slopes shall gradually contour to match plans.

⊛ NON-REINFORCED FOUNDATION DETAIL



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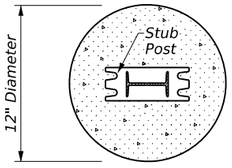


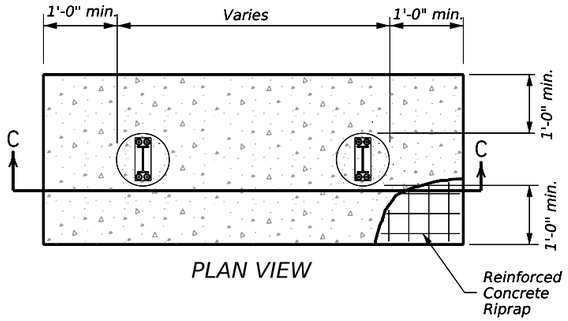
PLAN

Grade earthwork to be flush with the concrete footing. Slopes shall gradually contour to match plans.

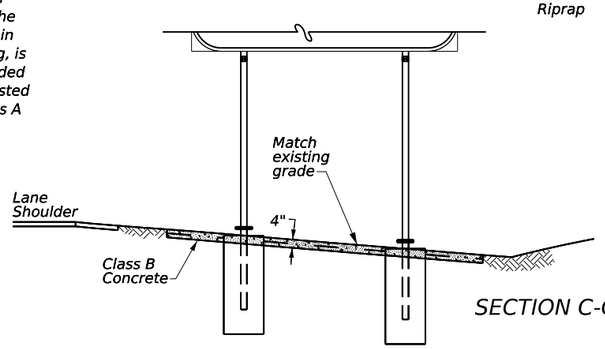
SIGN RIPRAP APRON DETAIL

NOTES:

1. Sign riprap aprons are optional.
2. If used, the depth of the apron shall be 4" or as indicated elsewhere on the plans.
3. Reinforced concrete shall be placed in accordance with Item 432, "Riprap."
4. Typical reinforcement is comprised of #3 or #4 bars @ 12" c.c. in both directions. However, the use of synthetic fiber, in lieu of steel reinforcing, is also acceptable; provided the fiber producer is listed on the "Fibers for Class A and Class B Concrete Applications" Material Producer List (MPL).



PLAN VIEW



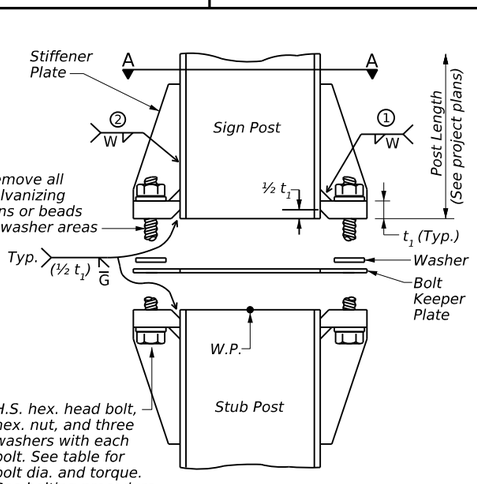
SECTION C-C

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

1. Assemble sign post, BOLT KEEPER PLATE and stub post with bolts and three flat washers per bolt, as shown.
2. Shim as required, to plumb post.
3. Tighten all bolts to the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.
4. Loosen each bolt in sequence and retighten bolts in a systematic order, to the prescribed torque. Do not overtighten.
5. To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

STRUCTURAL DATA TABLE

DIMENSIONS	BASE CONNECTION										BOLT KEEPER PLATE			FOUNDATION				
Post Size	Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R	P	S	U	Stub length	Stub projection	Drill Shaft diameter	Bar Size	Concrete Type
W12x26	¾"Φ x 3½" 740-750 inch pounds 62-63 foot pounds	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"	15"	1½"	16¾"	3'-0"	2½"	24"	#11	C
W10x22											12⅞"		14⅝"	3'-0"	2½"		#9	
W8x21											11"		12¾"	3'-0"	2½"		#8	
W8x18	⅝"Φ x 2¾" 440-450 inch pounds 36-38 foot pounds	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"	10⅝"	1"	12⅛"	2'-6"	3"		#7	
W6x15											8½"		10"	2'-6"	3"		#6	
W6x9											8⅜"		9⅞"	2'-0"	3"		#5	
S4x7.7	½"Φ x 2½" 440-450 inch pounds 36-38 foot pounds	See Sign Post Stub (S4x7.7 and S3x5.7)									See Sign Post Stub (S4x7.7 and S3x5.7)			3'-3½"	3½"	12"	Non-reinforced ⊛	A
S3x5.7																		



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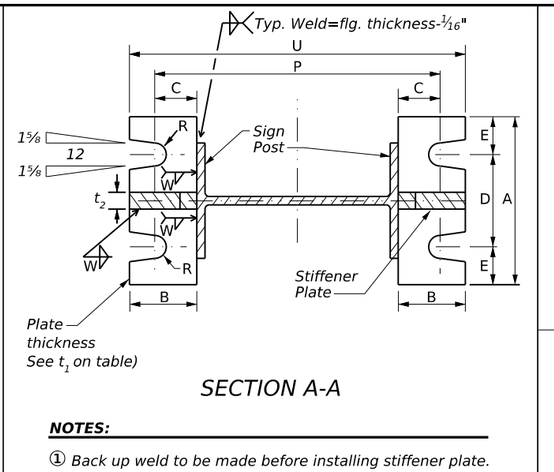
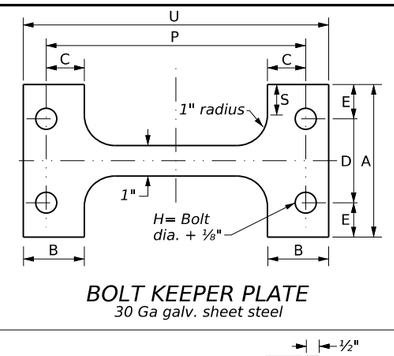


SECTION A-A

NOTES:

① Back up weld to be made before installing stiffener plate.

② Weld W may be continued across clips to seal joint.

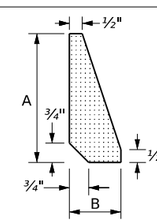


BOLT KEEPER PLATE
30 Ga galv. sheet steel

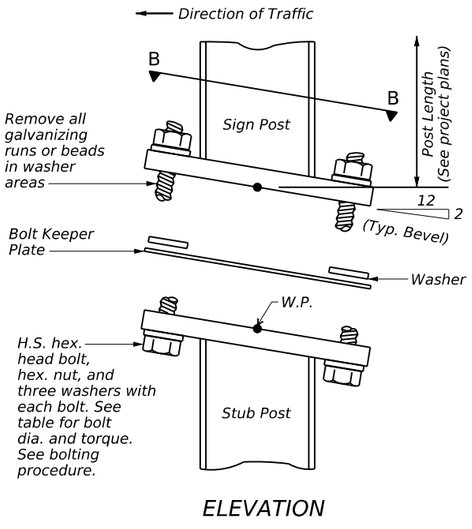
STIFFENER PLATE DETAIL

Steel Plate (thickness = t2)

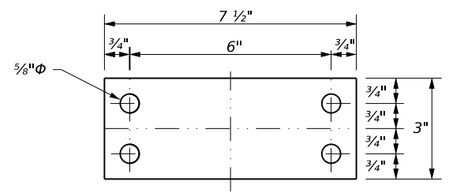
(See Structural Data Table for dimensions)



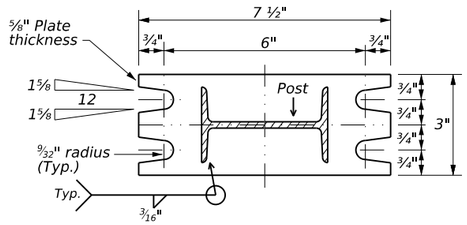
SIGN POST AND STUB POST FOR WIDE FLANGE BEAMS (W)



ELEVATION

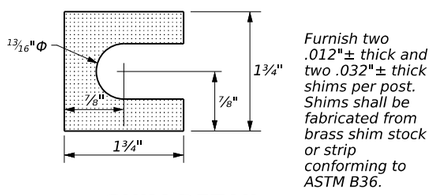


BOLT KEEPER PLATE
30 ga. galv. sheet steel



SECTION B-B

SIGN POST AND STUB POST (FOR S4x7.7 AND S3x5.7)



Furnish two .012"± thick and two .032"± thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.

SHIM DETAIL

Texas Department of Transportation

Traffic Safety Division Standard

SIGN MOUNTING DETAILS LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-1)-24

FILE: smd(2-1)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
8-95 5-24 4-98 9-08	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		250

27A

DATE: 6/7/2024 $TIME$
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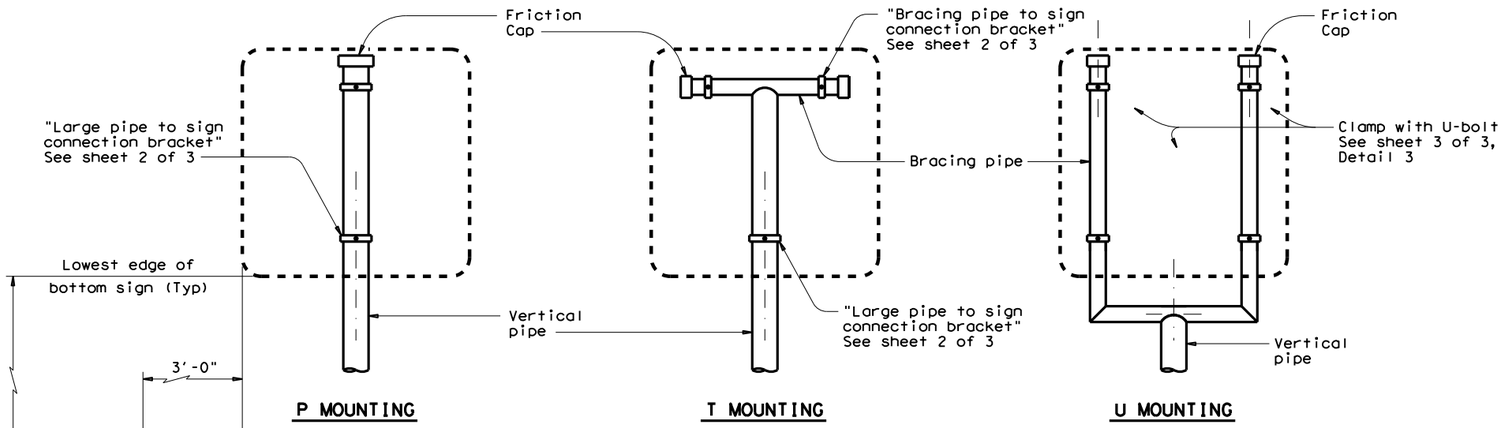
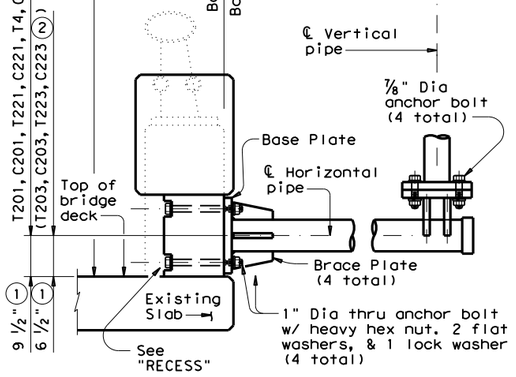
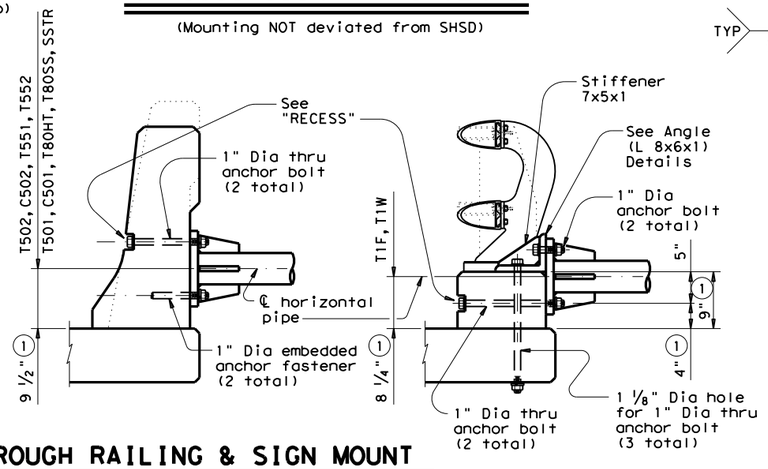


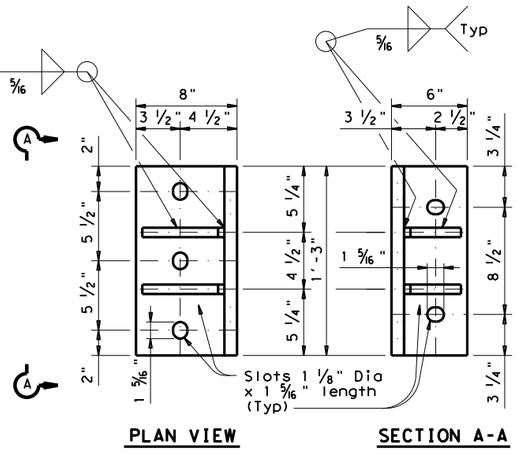
VARIOUS SIGN ATTACHMENTS

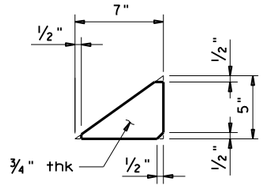
(Mounting NOT deviated from SHSD)





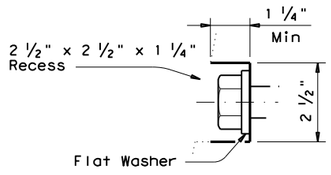
LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT





ANGLE (L 8x6x1) DETAILS

① Increase 2" for structure with overlay.
② Attached at ℄ post.



RECESS

PIPE SIZE AND THICKNESS			
Pipe Placement / Design Wind Speed	Horizontal	Vertical	Bracing
90 mph	5" X-Strong (.375")	4" X-Strong (.337")	2 ½" Standard (.203")
130 mph	6" X-Strong (.432")	5" X-Strong (.375")	3" X-Strong (.300")

GENERAL NOTES:

Design conforms to 2013 AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design 3-second gust wind speeds of 90 mph and 130 mph with a 1.14 gust factor, and a wind importance factor of 1.0 (50-year mean recurrence interval) for the supporting structures. For mounting connection between sign panel and pipe, wind importance factors of 0.71 and 0.54, for 90 mph and 130 mph winds, respectively, are applied to adjust the wind speeds to a 10-year mean recurrence interval.

See standard sheet WV & IZ(LTS2013) for the boundaries of each design wind zone. All mounting shall be based on 130 mph wind speed design except when located in 90 mph wind zone. Maximum panel area is 30 sq. ft. Maximum design height is 50 ft, with design height defined as the distance between natural ground (average elevation of surrounding terrain) and the center of sign(s) at the mounting location.

Material for pipe shall be ASTM A53 Grade B, or A501. Structural steel plates shall be ASTM A36, A572 Grade 50, or A588. Bolts used to connect pipe and mounting bracket, and wind beam to sign panel shall be ASTM A307. Anchor bolts shall be ASTM A325 or A193 B7. Each anchor bolt shall be provided with 2 flat washers, 1 lock washer, and 1 heavy hex nut. All parts shall be galvanized in accordance with Standard Specifications Item 445, "Galvanizing".

Attach horizontal pipe at least 2'-0" from the edge of any nearby drain slot.

Contractor shall verify applicable field dimensions before fabrication. Holes drilled through the railing parapet wall shall be drilled with rotary (coring or masonry drill) type equipment. Percussion (star) drilling shall not be allowed. Anchorage for pipe attached to rail shall be placed using an anchoring system approved by the engineer. Installation of anchor fasteners including hole depth, diameter and material shall be in accordance with the manufacturers' recommendation.

Each embedded anchor fastener shall resist an allowable design loading (after applying the reduction factors of bolt spacing and bolt edge distance) of:

	130 mph	90 mph
Tension	12.5 kips	7.5 kips
Shear	9.0 kips	5.0 kips

Each anchoring system shall provide a capacity to resist the required tension and shear acting simultaneously.

For sign connection to mounting, shop drill holes on sign blank in accordance with the current Standard Highway Sign Designs for Texas (SHSD). Additional hole(s) needed to meet a stipulated-type mounting may be field drilled. For multi-sign or back-to-back signs mounting, the engineer shall determine the proper type which ensures each individual mounting meets requirements.

Refer to Standard sheets SMD(GEN), SMD(SLIP-2 and SMD(2-1) for details not covered here.

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-1)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		251

DATE: 6/7/2024 $TIME$
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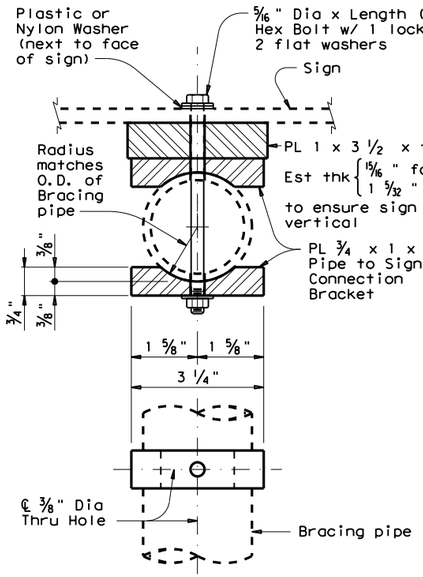
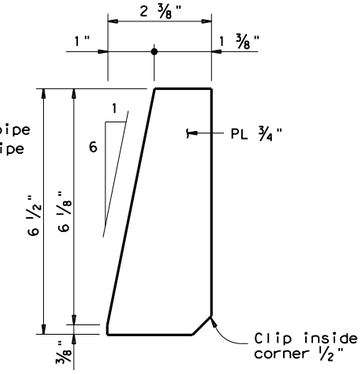
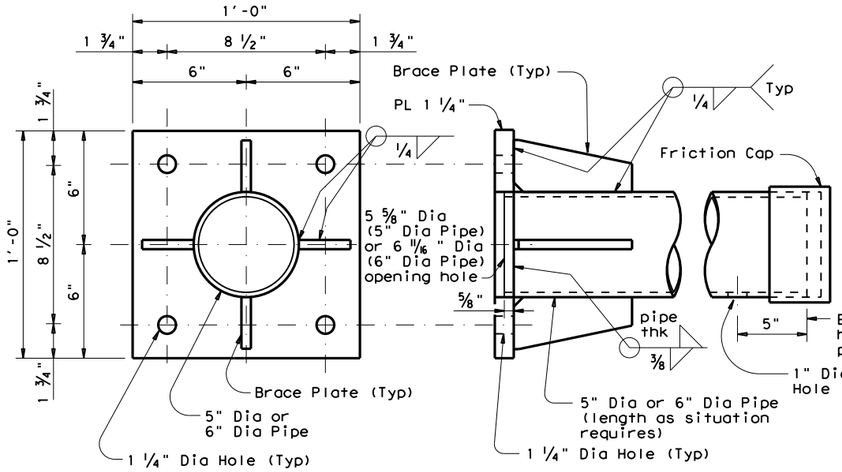


BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

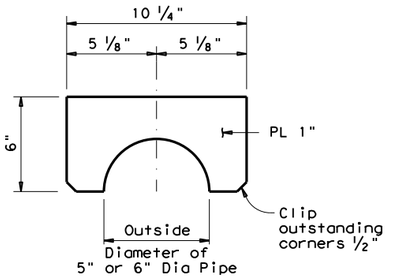
(Showing T Mounting)



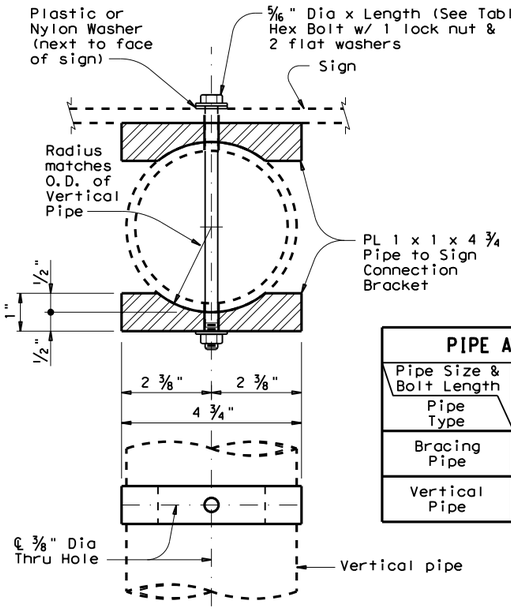
BRACE PLATE DETAILS



BASE PLATE DETAILS



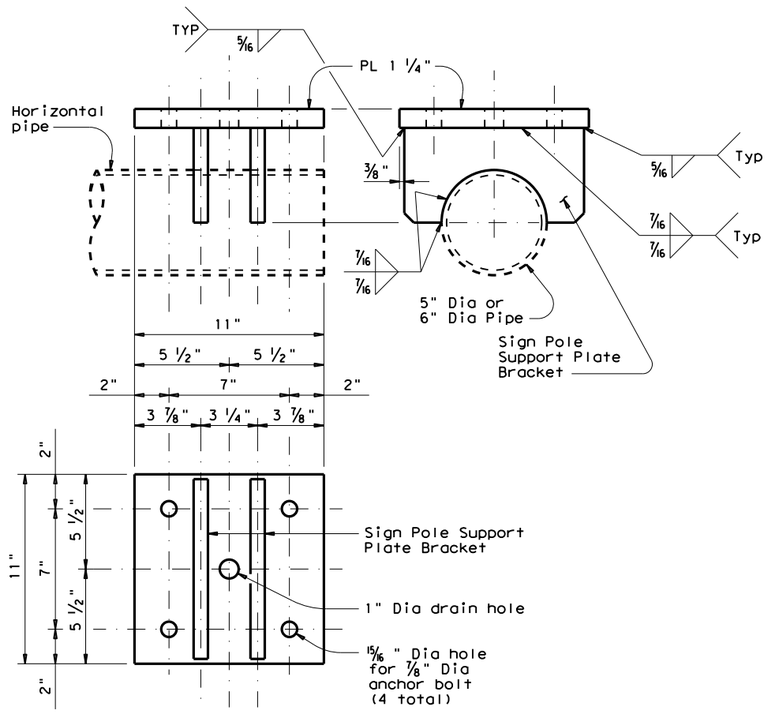
SIGN POLE SUPPORT PLATE BRACKET DETAILS



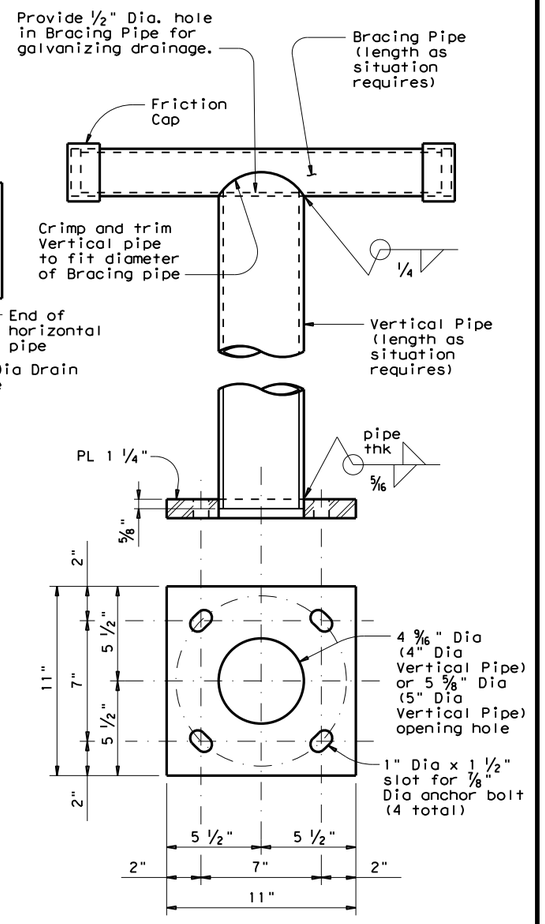
PIPE AND BOLT SPECIFICATIONS		
Pipe Size & Bolt Length / Pipe Type	Nominal Pipe Dia (in.)	Bolt Length (in.)
Bracing Pipe	2 1/2	6
	3	7
Vertical Pipe	4	7
	5	8

LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)



SIGN POLE SUPPORT PLATE DETAILS



SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)

SHEET 2 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-2)-14

FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		252

26H

DATE: 6/7/2024 $TIME$
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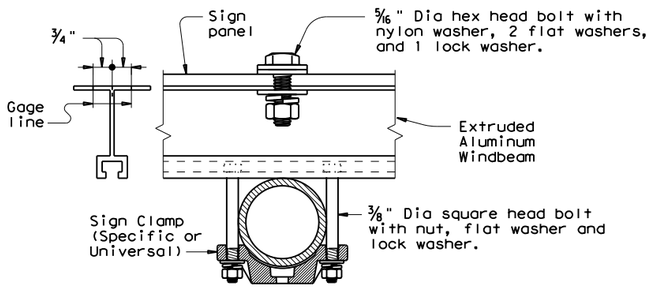
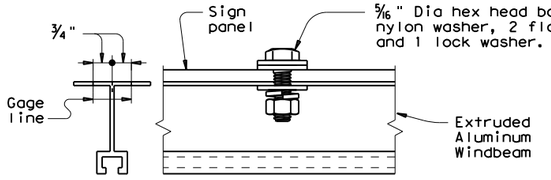


DETAIL 1



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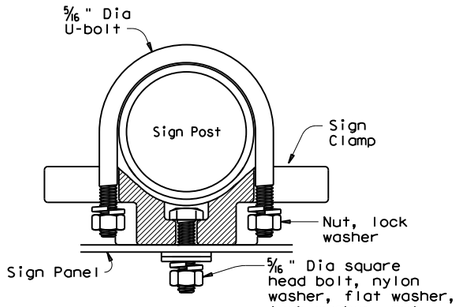
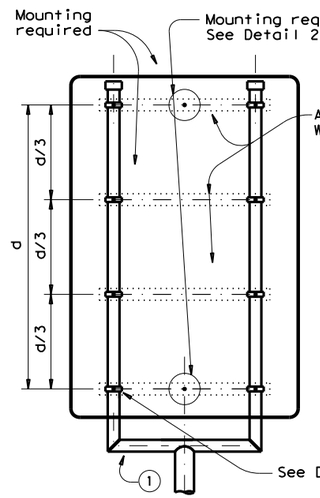


DETAIL 3

SIGN SHAPE	SQUARE			HORIZONTAL RECTANGLE			VERTICAL RECTANGLE			DIAMOND			OCTAGON			EQUILATERAL TRIANGLE			INTERSTATE SHIELD	PENTAGON (SCHOOL)	
Type of Sign Mounting on SHSD / Design Wind Speed	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	P	T
90 mph					(Type 23) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"		(Type 2) 36"x48" (Type 32) 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" 48"x72" (Type 3) 48"x84"			(Type 3) 60"x60"									(Type Special) 45"x36"		
130 mph	(Type 1) 30"x30" 36"x36"	(Type 3) 48"x48"		(Type 1) 36"x24" 36"x30"	(Type 23) 48"x42" 54"x42" 60"x30" 66"x36" 84"x24" (Type 3) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"	(Type 1) 30"x36" 30"x42"	(Type 3) 36"x48" 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" (Type 4) 48"x72" 48"x84"	(Type 3) 48"x60"	(Type 1) 36"x36"	(Type 3) 48"x48" 60"x60"					(Type 1) 48"x48"			(Type Special) 36"x36" 45"x36"		

Notes:
1. Drill holes in addition to the hole pattern of the Standard Highway Sign Designs for Texas (SHSD) at specified locations to meet a stipulated-type mounting indicated in the parenthesis ( ).
2. "Blank" in the above table indicates all other signs excluded from stipulated mounting shall be mounted in accordance with SHSD.

(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.



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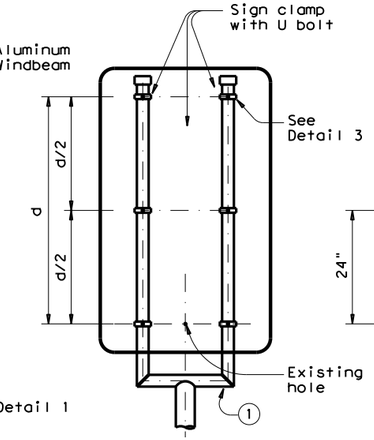

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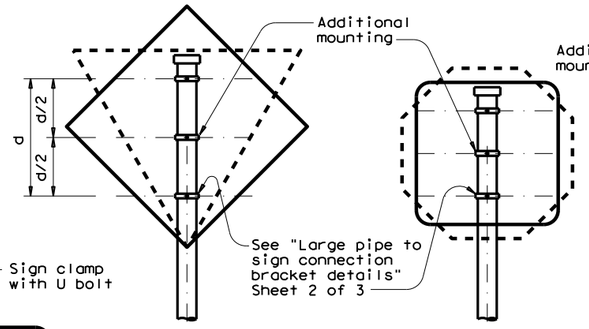
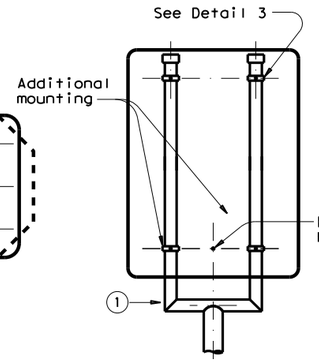


TYPE 1



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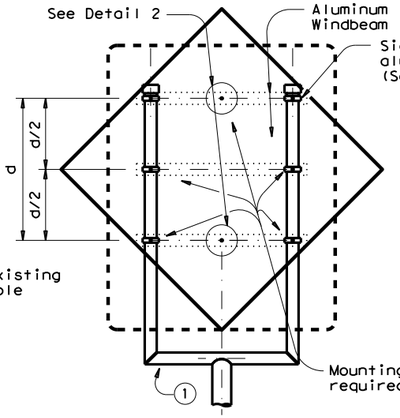

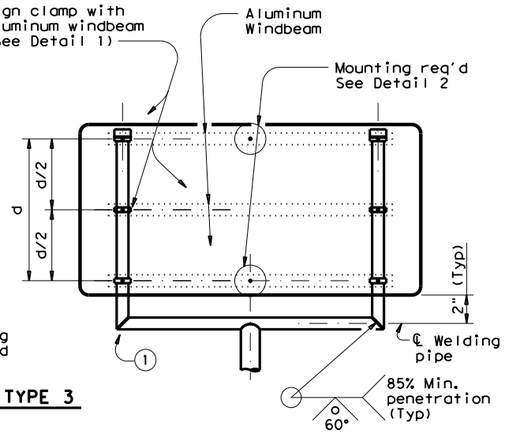

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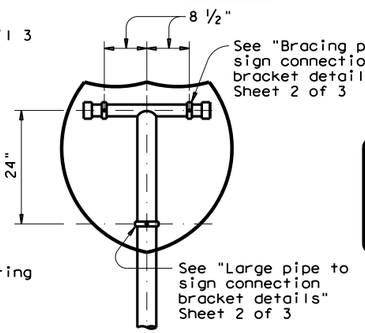

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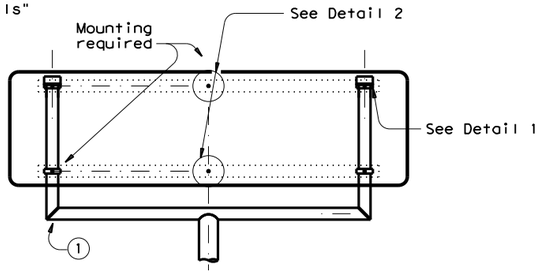


TYPE 23

SHEET 3 OF 3

Texas Department of Transportation | Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-3)-14

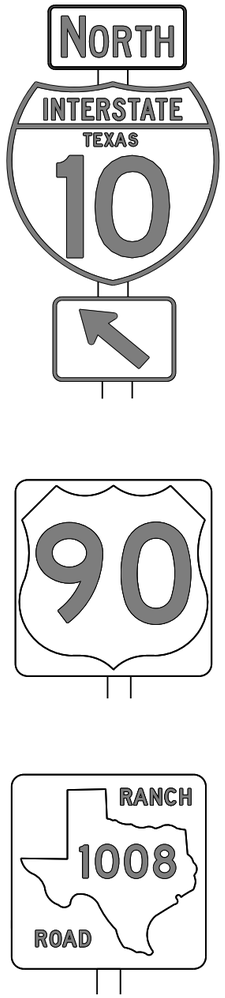
FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		253

26J

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\ljq-pw.bentley.com_ljq-pw-01\javier duarte\dms71732\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

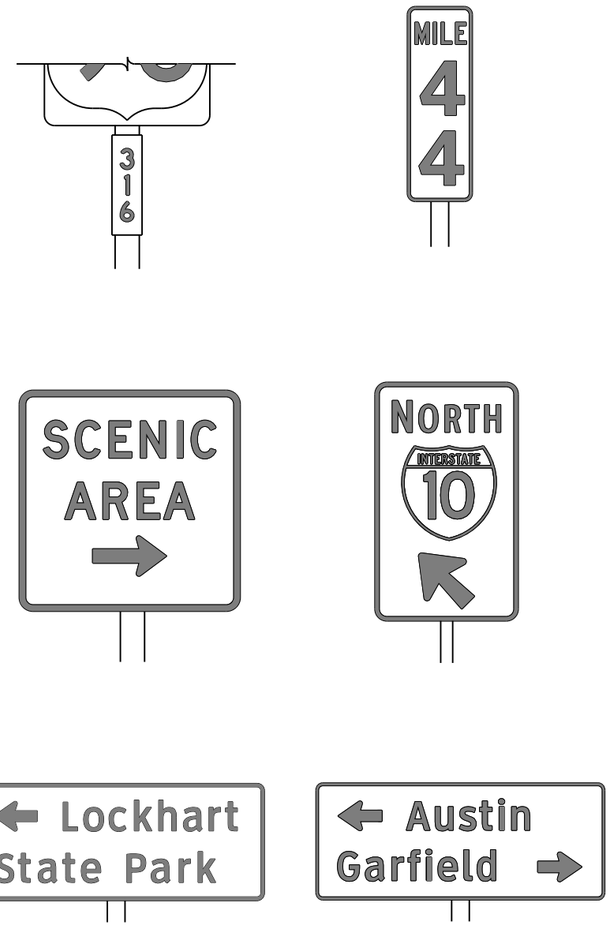
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

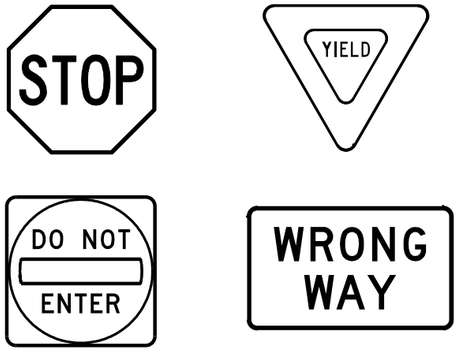
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	CRP	GOLIAD		254

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\javier duarte\dms71732\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

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

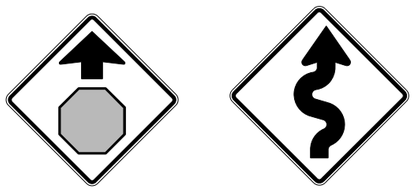
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

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

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

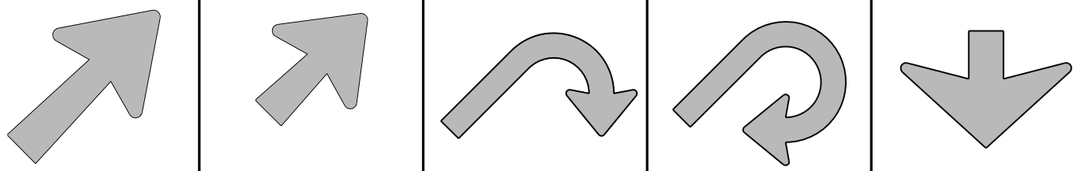
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	CRP	GOLIAD		255

DATE: 6/7/2024 $TIME$
FILE: c:\workingdir\ija-pw.bentley.com_ija-pw-01\javier duarte\dms71732\tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

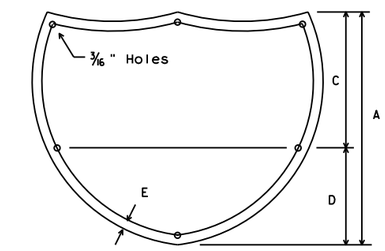
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

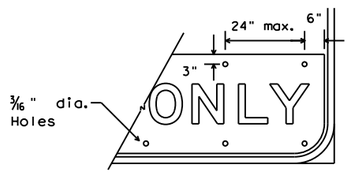
http://www.txdot.gov/

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

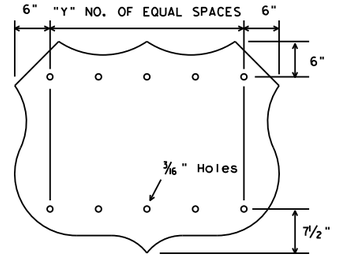


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

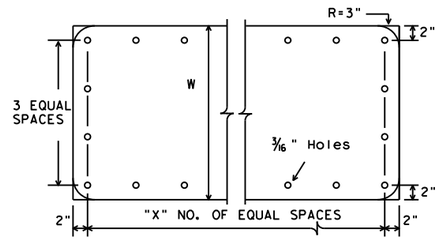


EXIT ONLY PANEL



U.S. ROUTE MARKERS

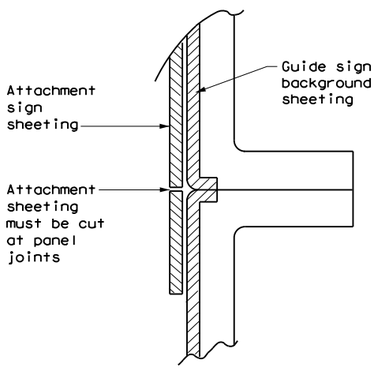
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

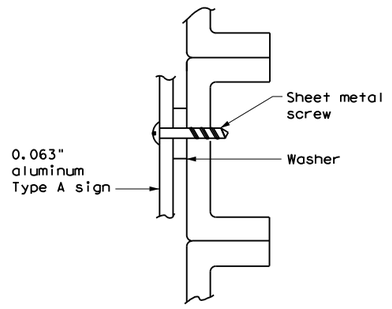
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



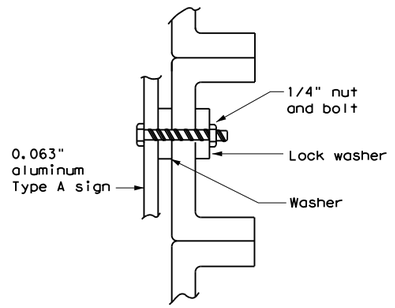
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



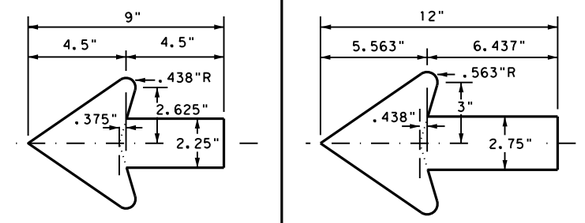
NUT/BOLT ATTACHMENT

NOTE:

Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.

Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

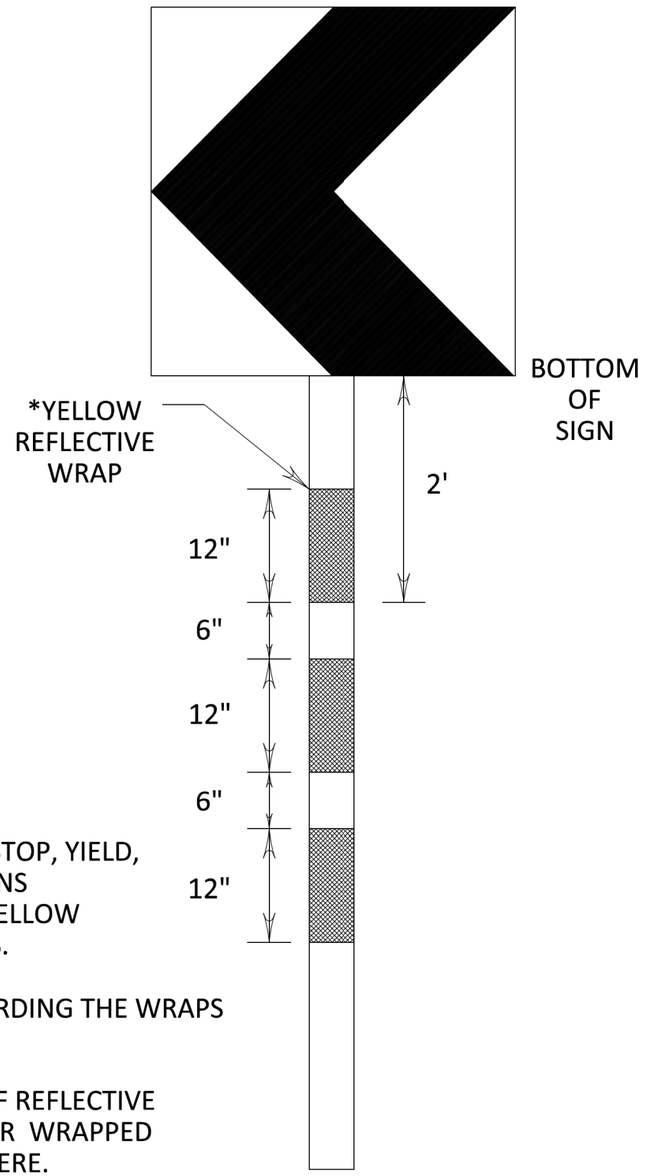
TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	CRP	GOLIAD		256

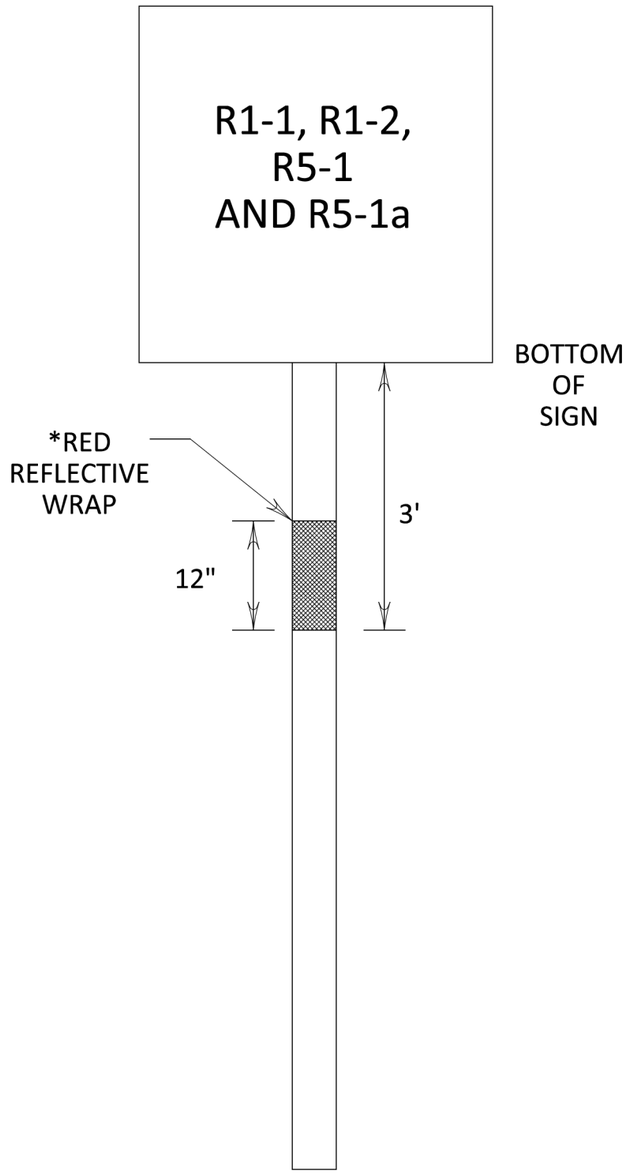
The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

W1-8



R1-1, R1-2, R5-1 AND R5-1a



APPLY RED REFLECTIVE WRAP TO ALL STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS (INDIVIDUAL SIGN MOUNTS). APPLY YELLOW REFLECTIVE WRAP TO CHEVRON SIGNS.

PLEASE DIRECT ANY QUESTIONS REGARDING THE WRAPS TO THE ENGINEER.

WRAP WILL CONSIST OF A 12" STRIP OF REFLECTIVE MATERIAL OF THE APPROPRIATE COLOR WRAPPED AROUND THE SIGN POST AS SHOWN HERE.

*SEE REFLECTIVE WRAP DETAIL FOR PLACEMENT.

WRAPS WILL BE FURNISHED BY THE CONTRACTOR AND SHALL BE SUBSIDIARY TO ITEM 644.

DATE:
FILE:

Texas Department of Transportation

Corpus Christi District Standard

CORPUS CHRISTI DISTRICT REFLECTIVE WRAP DETAIL

FILE: reflective wrap detail.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT Nov 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US 59
	DIST	COUNTY		SHEET NO.
	CRP	GOLIAD		257

DATE: 8/7/2024
FILE: c:\workingdir\lja-pw.bentley.com_lja-pw-01\javier duarte\dms66356\epic.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

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

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

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required

☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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. SAN ANTONIO RIVER

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

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

Please be advised of the potential occurrence of five state-listed threatened species, the black-spotted newt (Notophthalmus meridionalis), sheep frog (Hypopachus variolosus), white-faced ibis (Plegadis chihi), whitetailed hawk (Buteo albicaudatus), and Texas tortoise (Gopherus berlandieri), and 14 species of greatest conservation need (SGCN): the Strecker's chorus frog (Pseudacris streckeri), Woodhouse's toad (Anaxyrus woodhousii), eastern spotted skunk (Spilogale putorius), long-tailed weasel (Mustela frenata), swamp rabbit (Sylvilagus aquaticus), tricolored bat (Perimyotis subflavus), eastern box turtle (Terrapene carolina), slender glass lizard (Ophisaurus attenuatus), Tamaulipan spot-tailed earless lizard (Holbrookia subcaudalis), Texas indigo snake (Drymarchon melanurus erebennus),western box turtle (Terrapene ornata), low spurge (Euphorbia peplidion),Refugio rainlily (Zephyranthes refugiensis), and Texas tauschia (Tauschia texana).Ensure that SWPPP and 401 BMPs are implemented and maintained during construction.
Avoid harming these species if encountered.The Federal Migratory Bird Treaty Act (MBTA) states that it is unlawful to pursue, hunt, take, kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit.1/64 This project does not have a federal permit; therefore, in accordance with this regulation, the Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, etc. Typical breeding season occurs from March through August; therefore, tree trimming and other vegetation clearing activities that may disturb breeding birds should be done in the non-breeding season (September-February), when possible.If work must be performed during the breeding season, the Contractor shall have a qualified biologist conduct a survey of the right of way to determine if bird nests are present. In the event that active nests are encountered on-site during construction, the Contractor shall notify the Engineer and measures shall be taken to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the MBTA. Phasing of work during construction may be necessary to stay in compliance with the MBTA. The Contractor can discuss other preventative measures with the Project Engineer and/or District Environmental Staff.For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.

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. Silver lead containing paint (LCP) present on guard rail.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, using erosion control blankets or mats that contain no netting, or only contain loosely woven natural fiber netting is preferred. Plastic netting should be avoided to the extent practicable.

2.

3.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY	
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0088	02	062	US59	
	DIST	COUNTY		SHEET NO.	
	CRP	GOLIAD		258	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0088-02-062

1.2 PROJECT LIMITS:

From: 1.3 MILES WEST OF TEXAS 239

To: 2.7 MILES EAST OF FM 1351

1.3 PROJECT COORDINATES:

BEGIN: (Lat) 28.6520022 ,(Long) -97.4317210

END: (Lat) 28.6502134 ,(Long) -97.4339633

1.4 TOTAL PROJECT AREA (Acres): 12 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 11 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:

FOR THE CONSTRUCTION OF BRIDGE REPLACEMENT, WIDEN & REHAB ROADWAY, CONSISTING OF GRADING, BASE, SURFACE & STRUCTURES.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
CLAY	PRIMARILY DARK BROWN TO BROWN, HIGH PLASTICITY, FAT CLAY SOILS
SAND	TAN SAND WITH INTERBEDDED LAYERS OF CLAY
CLAY	GRAY TO REDDISH BROWN, FAT TO LEAN CLAYS

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement
☒ Grading operations, excavation, and embankment
☒ Excavate and prepare subgrade for proposed pavement widening
☒ Remove existing culverts, safety end treatments (SETs)
☒ Remove existing metal beam guard fence (MBGF), bridge rail
☒ Install proposed pavement per plans
☒ Install culverts, culvert extensions, SETs
☒ Install mow strip, MBGF, bridge rail
☒ Place flex base
☒ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☐ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
☐ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
SAN ANTONIO RIVER	CLASSIFIED SEGMENT ID: 1901* (BACTERIA IN WATER (RECREATIONAL)) (IMPAIRED FISH COMMUNITY IN WATER)

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STATE OF TEXAS
S.E. WRIGHT
108969
LICENSED
PROFESSIONAL ENGINEER

9/3/2024

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			259
STATE	STATE DIST.	COUNTY	
TEXAS	CRP	GOLIAD	
CONT.	SECT.	JOB	HIGHWAY NO.
0088	02	062	US 59

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

- X ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- X ☐ Temporary Seeding
- ☐ X Permanent Planting, Sodding or Seeding
- X ☐ Biodegradable Erosion Control Logs
- X ☐ 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

- X ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- X ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- X ☐ Sediment Control Fence
- X ☐ 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
  - X 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:

- X Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- X Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- X 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:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

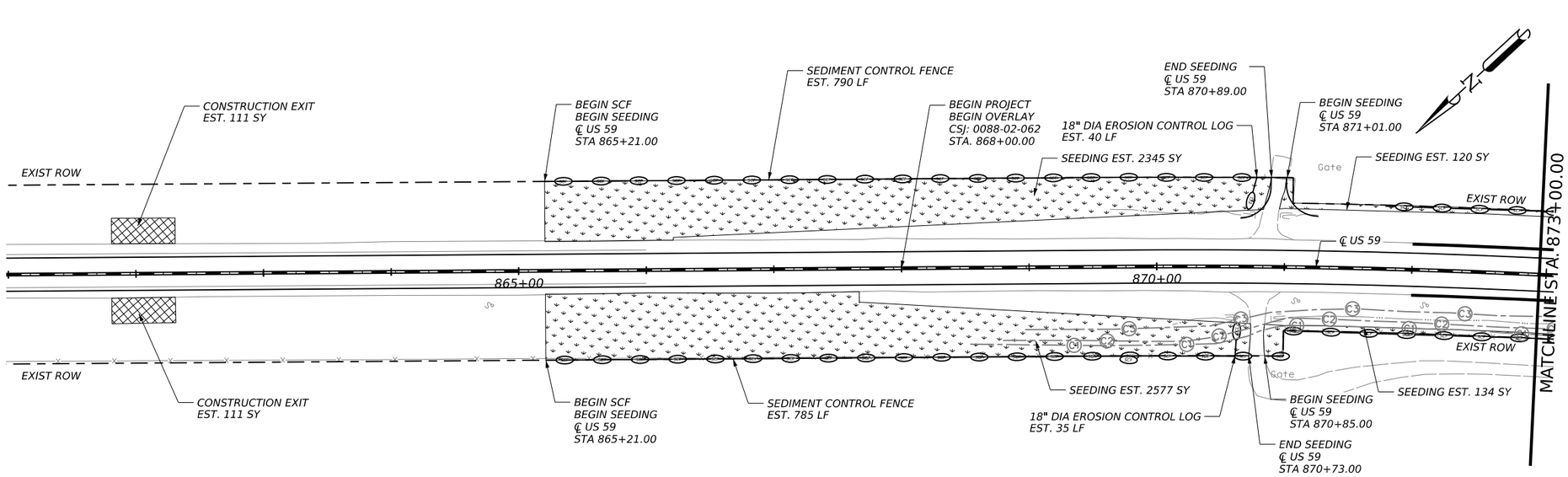
2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			260
STATE	STATE DIST.	COUNTY	
TEXAS	CRP	GOLIAD	
CONT.	SECT.	JOB	HIGHWAY NO.
0088	02	062	US 59



LEGEND

- CONSTRUCTION EXIT (TYPE 1)
- ECL — EROSION CONTROL LOG
- RFD2 — ROCK FILTER DAM TYPE 2
- SCF — SEDIMENT CONTROL FENCE
- SOIL RETENTION BLANKET
- PERM AND TEMP SEEDING
- FLOW LINE
- DIRECTION OF TRAFFIC

NOTES:

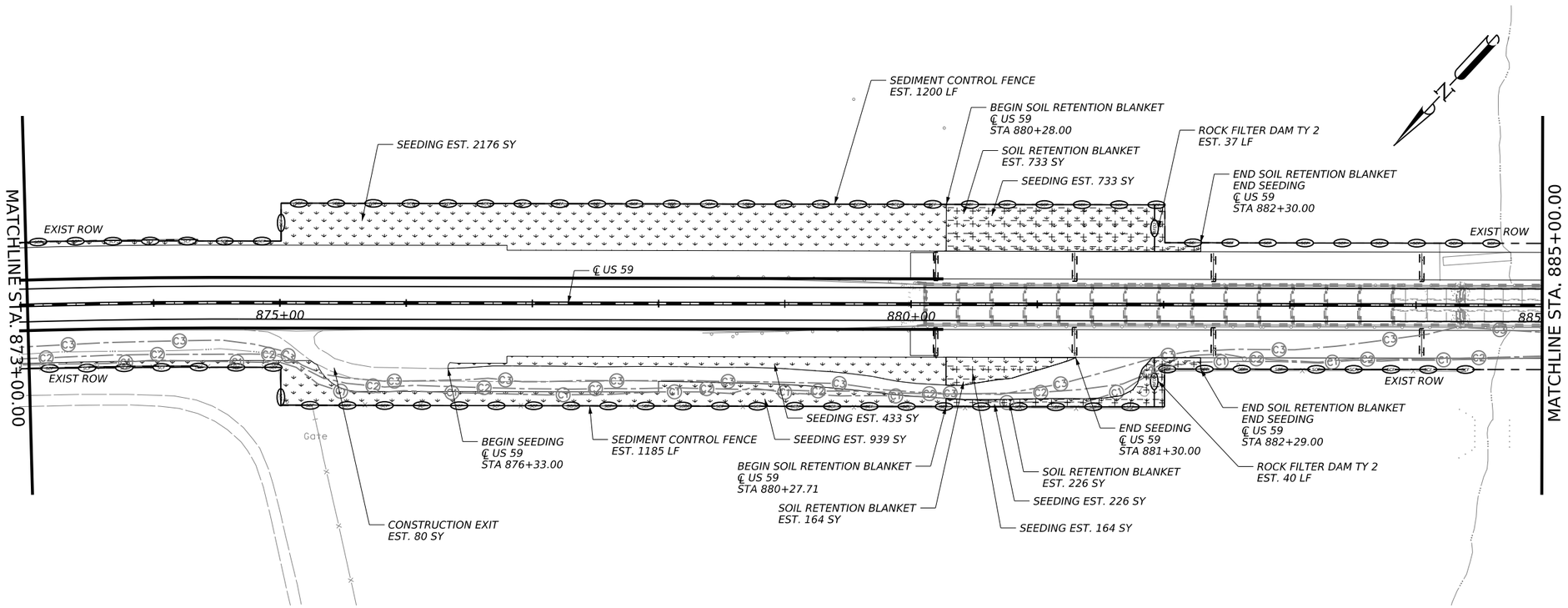
1. CONTRACTOR MUST INSTALL THE CONSTRUCTION EXIT WITH THE APPROVAL OF THE ENGINEER IN THE FIELD

2. FOR EROSION CONTROL LOGS USE SHREDDED MULCH OR BIODEGRADABLE MATERIAL AS FILL. NO COMPOST OR FINES. FILL MUST ALLOW WATER INFILTRATION

3. FOR TREE AND BRUSH REMOVAL, CONTRACTOR TO MULCH IN PLACE LEAVING ROOT SYSTEMS IN PLACE AT CHANNELS AND CREEKS

0' 50' 100'

SCALE: 1"=100'



STATE OF TEXAS
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7/3/2024

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US 59

SW3P LAYOUT
PHASE 1

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		261

DATE: 7/3/2024
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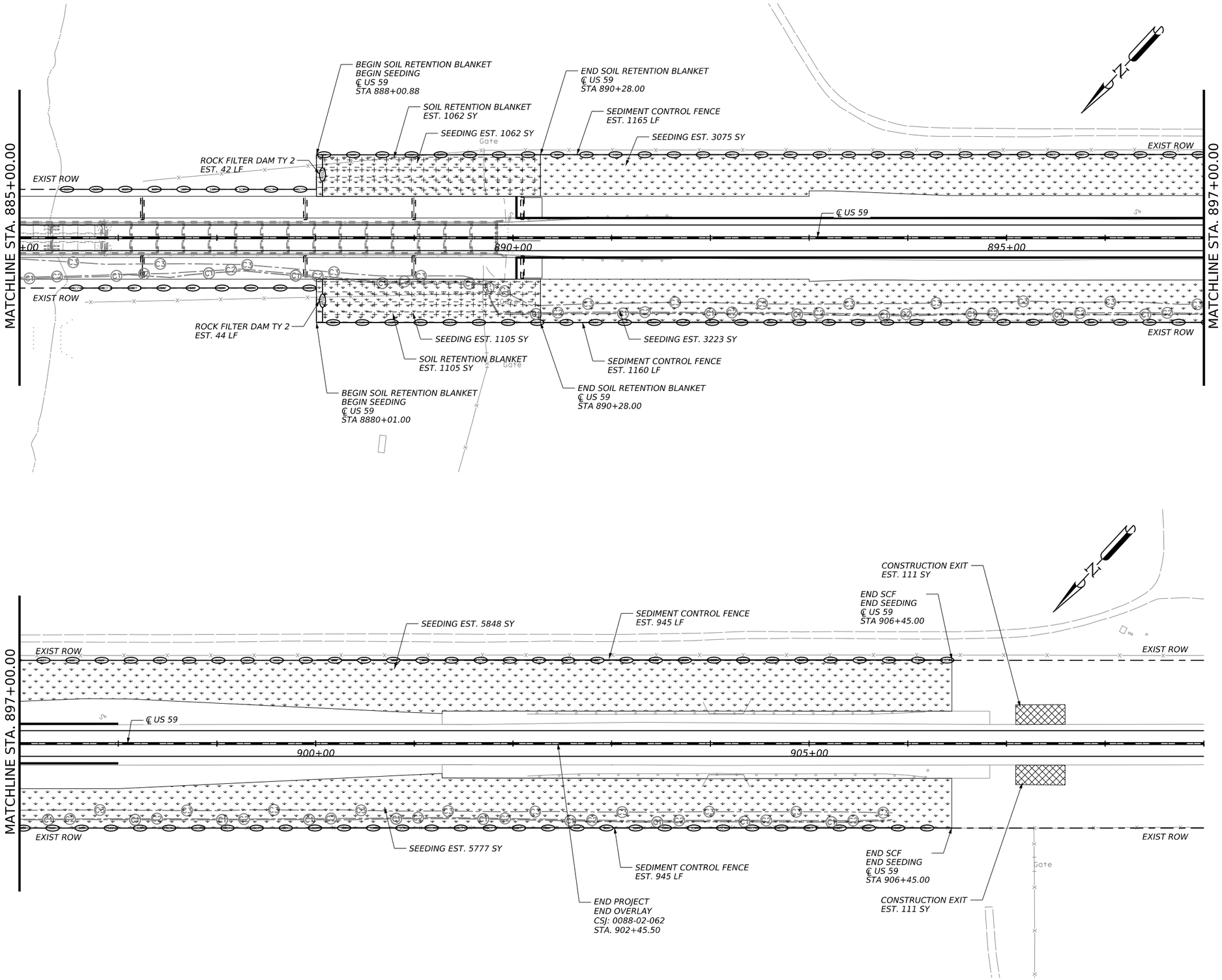

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0' 50' 100'

SCALE: 1"=100'

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SW3P LAYOUT
PHASE 1

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		262

DATE: 7/3/2024
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LEGEND

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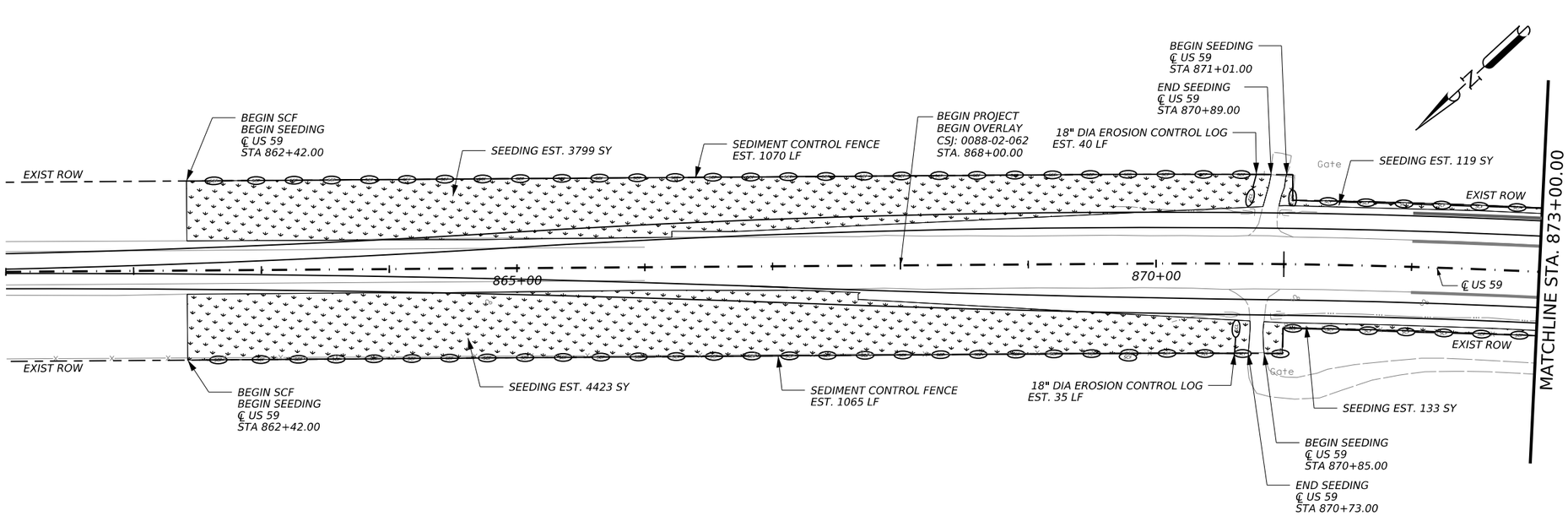

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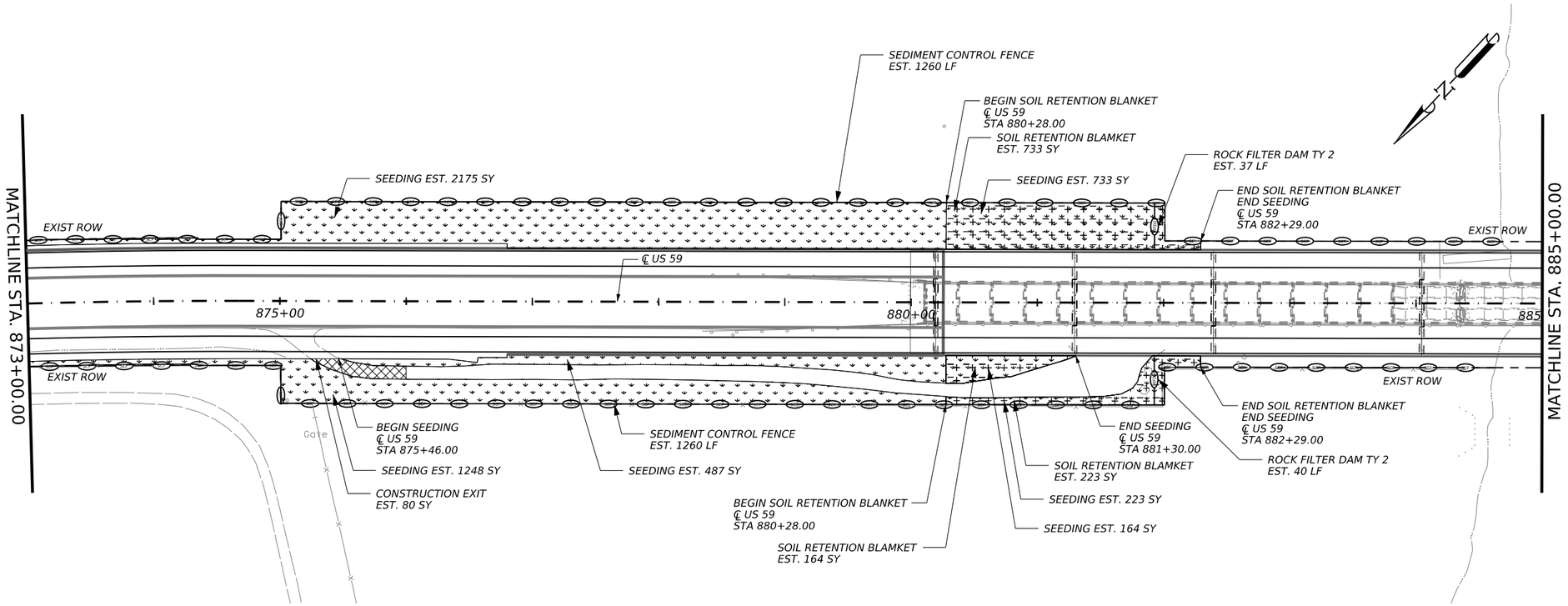
SCALE: 1"=100'



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SW3P LAYOUT
PHASE 2

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		263

DATE: 7/3/2024
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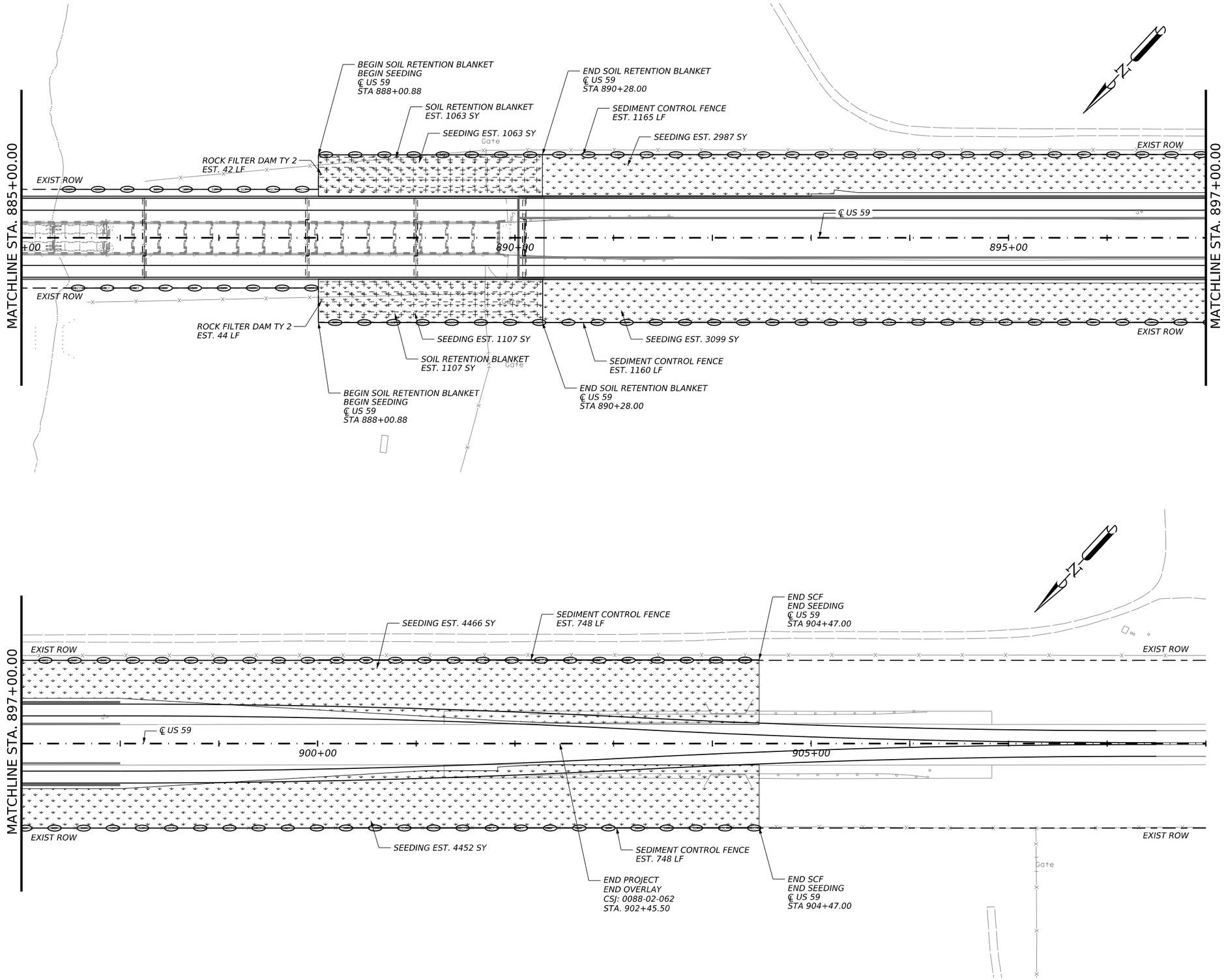

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SW3P LAYOUT
PHASE 2

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		264

DATE: 7/3/2024
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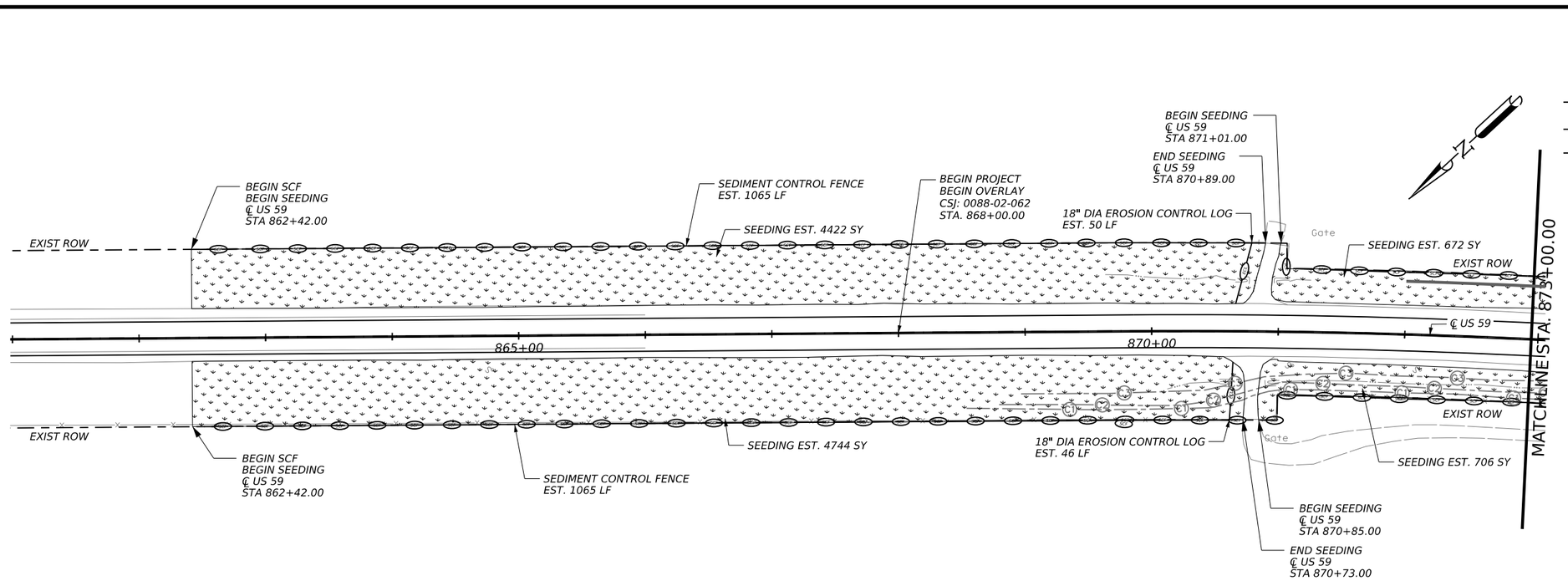

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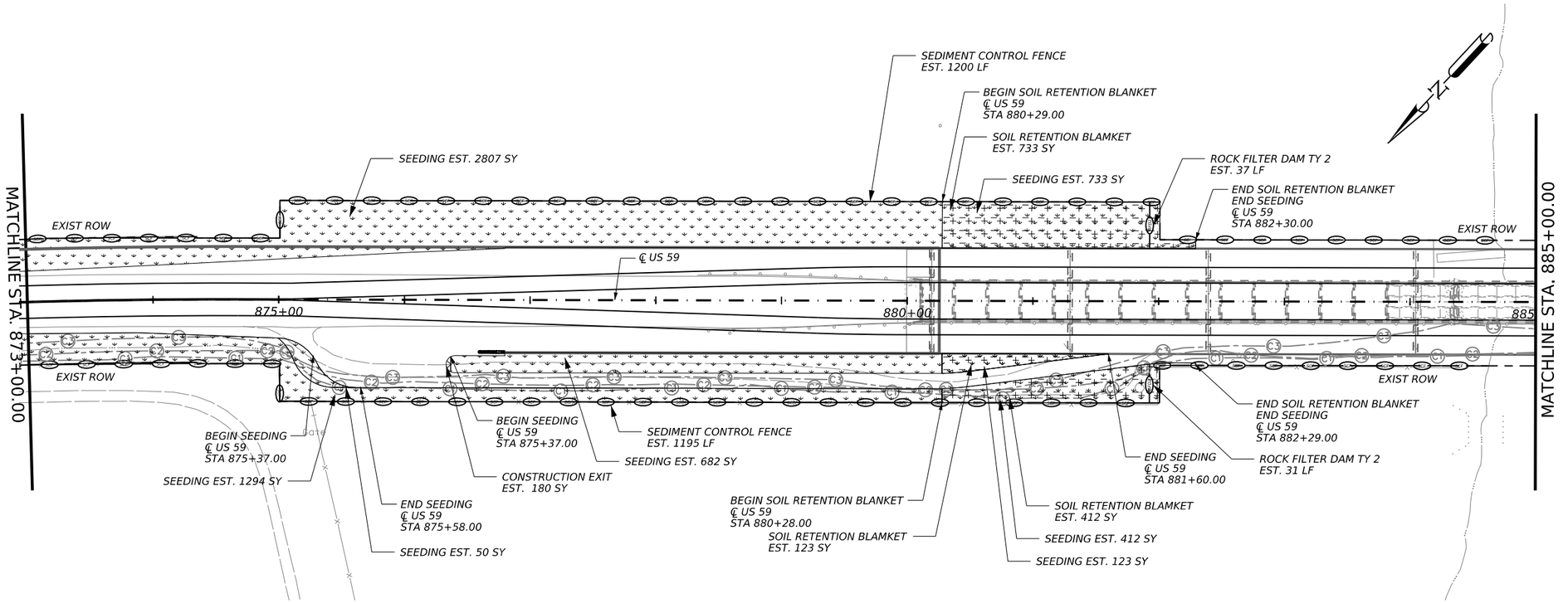

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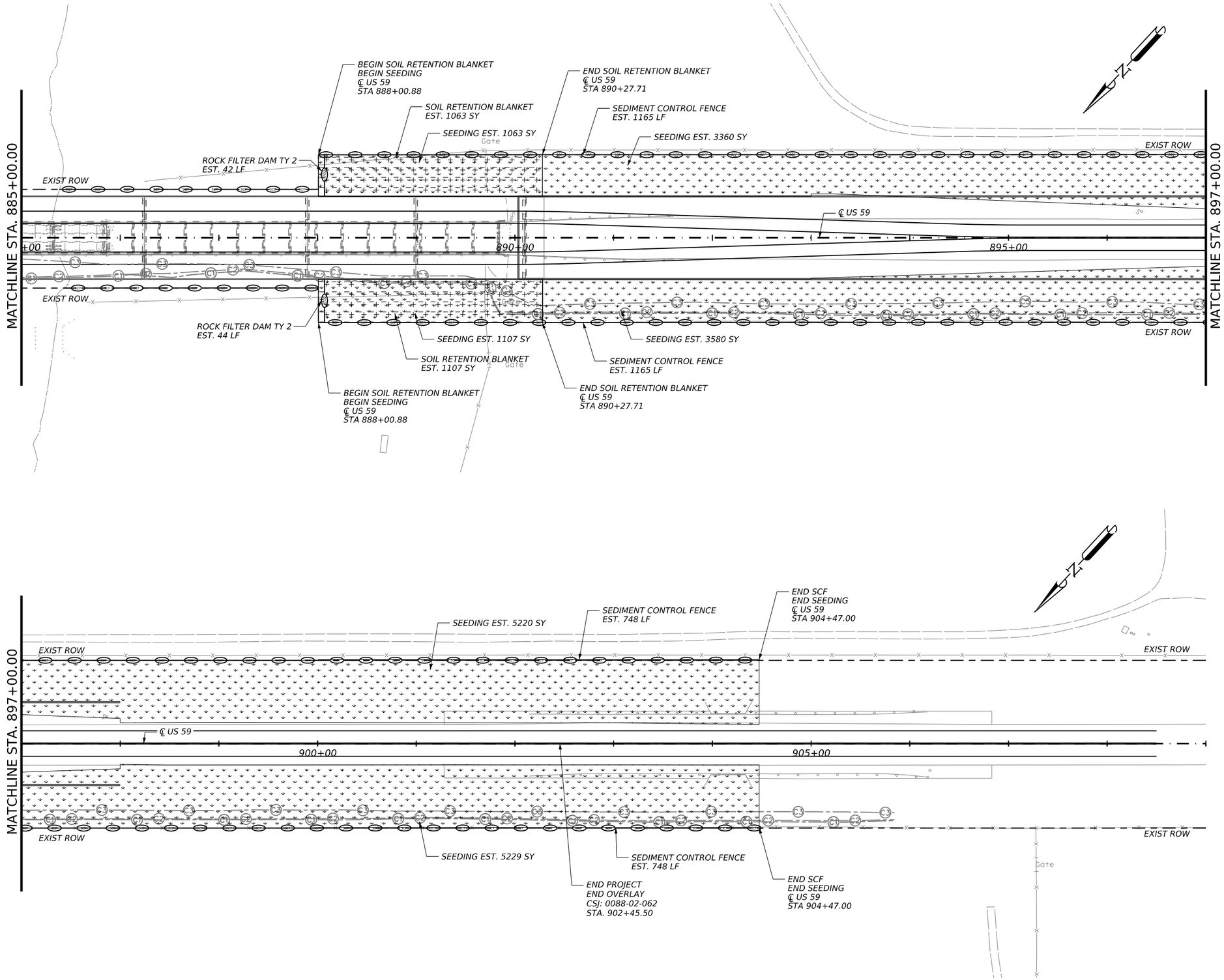
SW3P LAYOUT
PHASE 3

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		266



LEGEND

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SW3P LAYOUT
PHASE 3

SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY
0088	02	062	US59
DIST	COUNTY		SHEET NO.
CRP	GOLIAD		266

DATE: 7/3/2024
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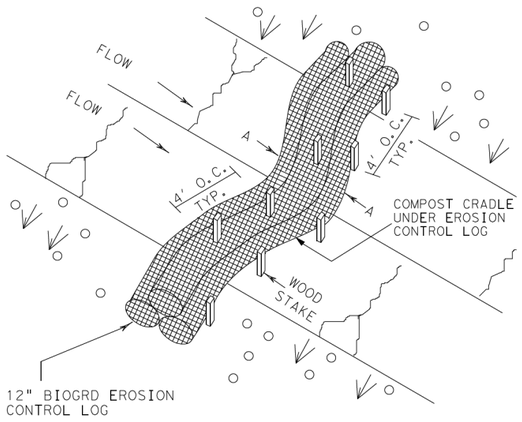
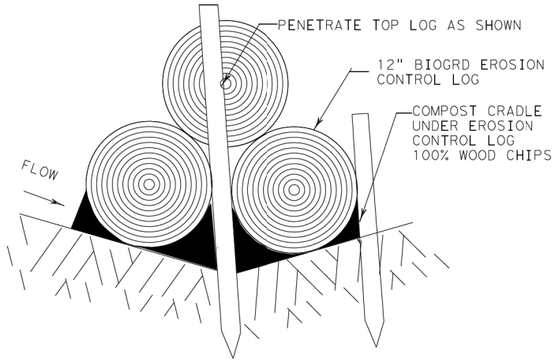
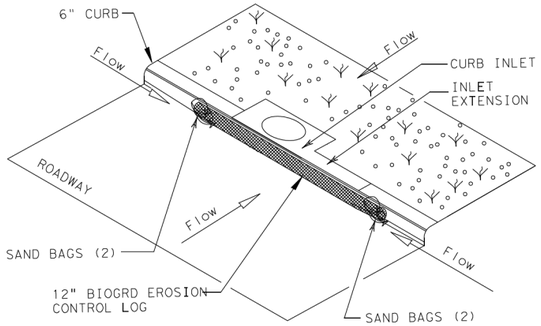


DITCH LINE SEDIMENT TRAP
NTS



SECTION A-A

DITCH LINE SEDIMENT TRAP A-A
NTS



CURB INLET SEDIMENT TRAP
NTS

SEDIMENT TRAP USAGE GUIDELINES

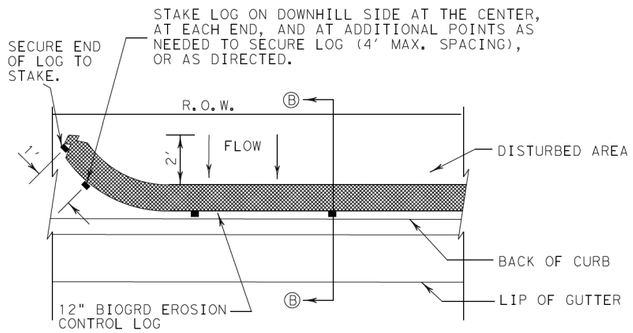
A sediment trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1,800 CF/Acre (0.5" over the drainage area).

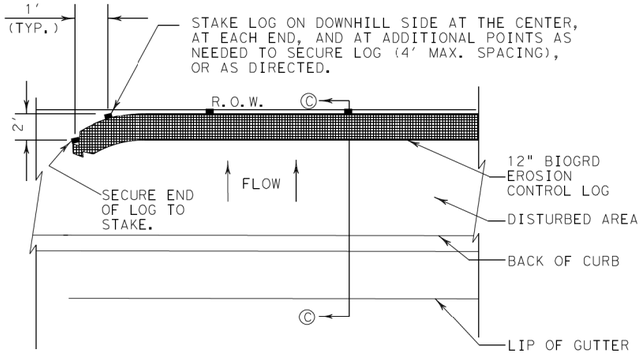
Sediment traps should be placed in the following locations:

1. Immediately preceding drain inlets
2. Just before the drainage enters a water course
3. Just before the drainage leaves the Right Of Way
4. Just before the drainage leaves the construction limits where drainage flows away from the project

The trap should be cleaned when the capacity has been reduced by half or the sediment has accumulated to a depth of 1', whichever is less. Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



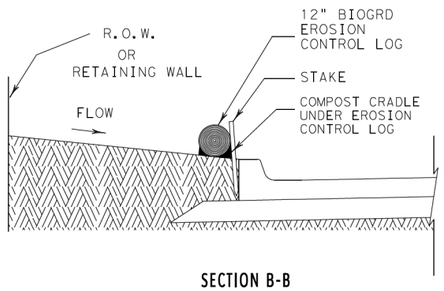
PLAN VIEW
NTS



PLAN VIEW
NTS

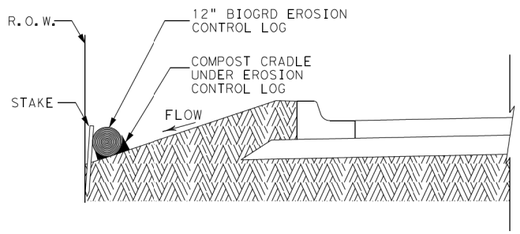
GENERAL NOTES

1. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED. MAXIMUM LENGTH OF LOGS SHALL BE 60' FOR 18" DIAMETER OR 30' FOR 12" DIAMETER LOGS.
2. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
3. STUFF LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE DENSITY THAT WILL HOLD SHAPE WITHOUT EXCESSIVE DEFORMATION.
4. STAKES SHALL BE 2" x 2" WOOD OR #3 REBAR, 4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED.
5. COMPOST CRADLE MATERIAL IS INCIDENTAL AND WILL NOT BE PAID FOR SEPARATELY.
6. SANDBAGS SHALL BE SUBSIDIARY TO ITEM 506 BIODEGRADABLE EROSION CONTROL LOGS.



SECTION B-B

BACK OF CURB SEDIMENT TRAP
NTS



SECTION C-C

RIGHT-OF-WAY SEDIMENT TRAP
NTS

Texas Department of Transportation

BIODEGRADABLE EROSION CONTROL LOGS

CRP-BECL

CORPUS CHRISTI DISTRICT STANDARD SHEET 1 OF 2

FILE: crp-becl.dgn	DN: TxDOT	CK:	DW: CAF	CK: PWS	STD:	
ORIG DATE: MAY 2008	DIST	FED REG	FEDERAL AID PROJECT •			SHEET
REVISIONS PJA 5/2015	CRP	6				267
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	GOLIAD		0088	02	062	US 59

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LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
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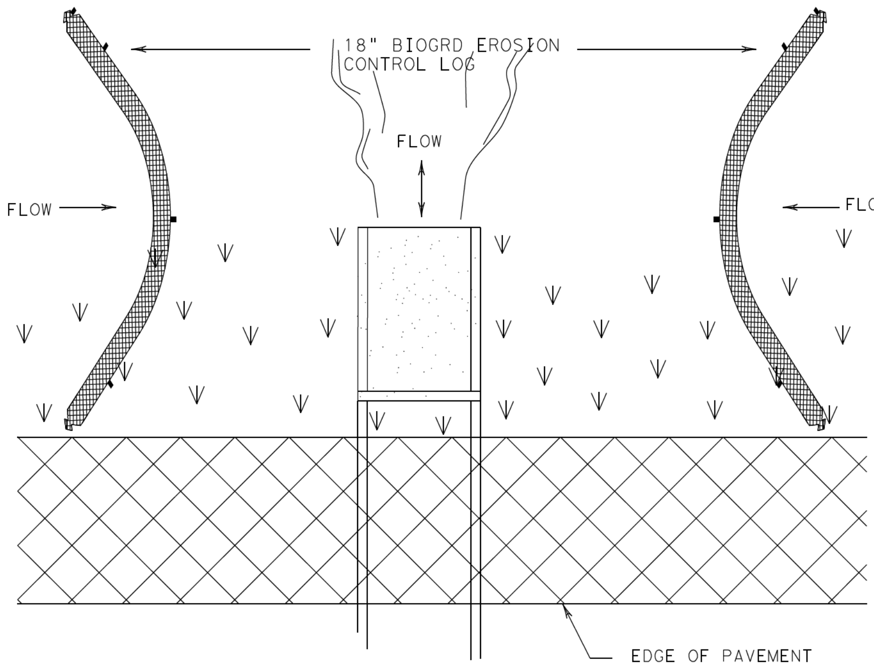
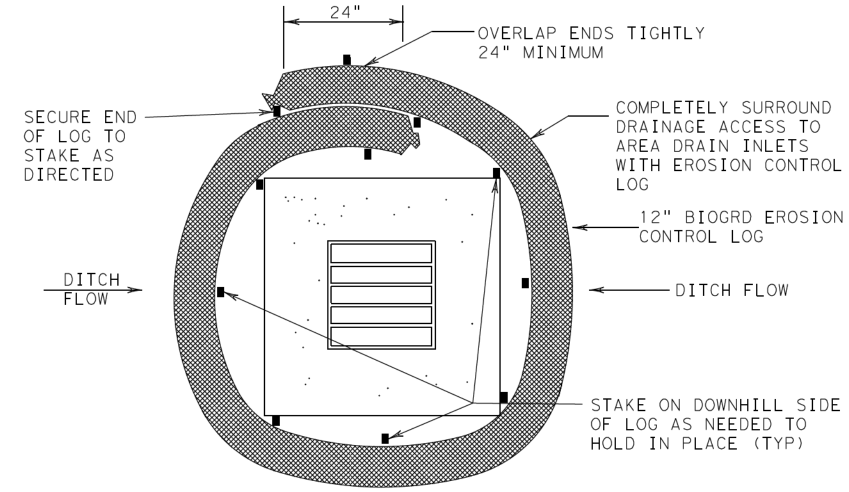
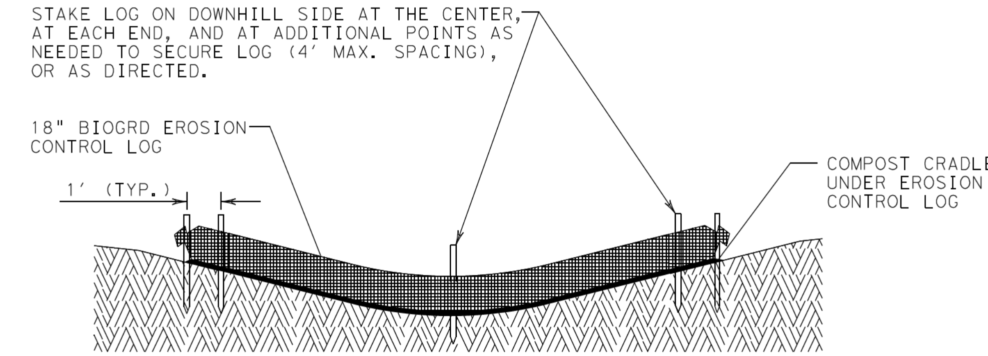


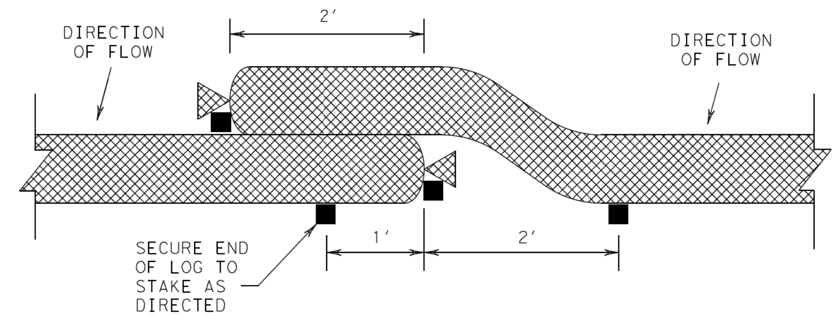
AT CULVERT ENDS
NTS



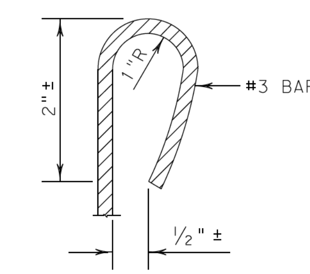
AT DROP INLETS
NTS



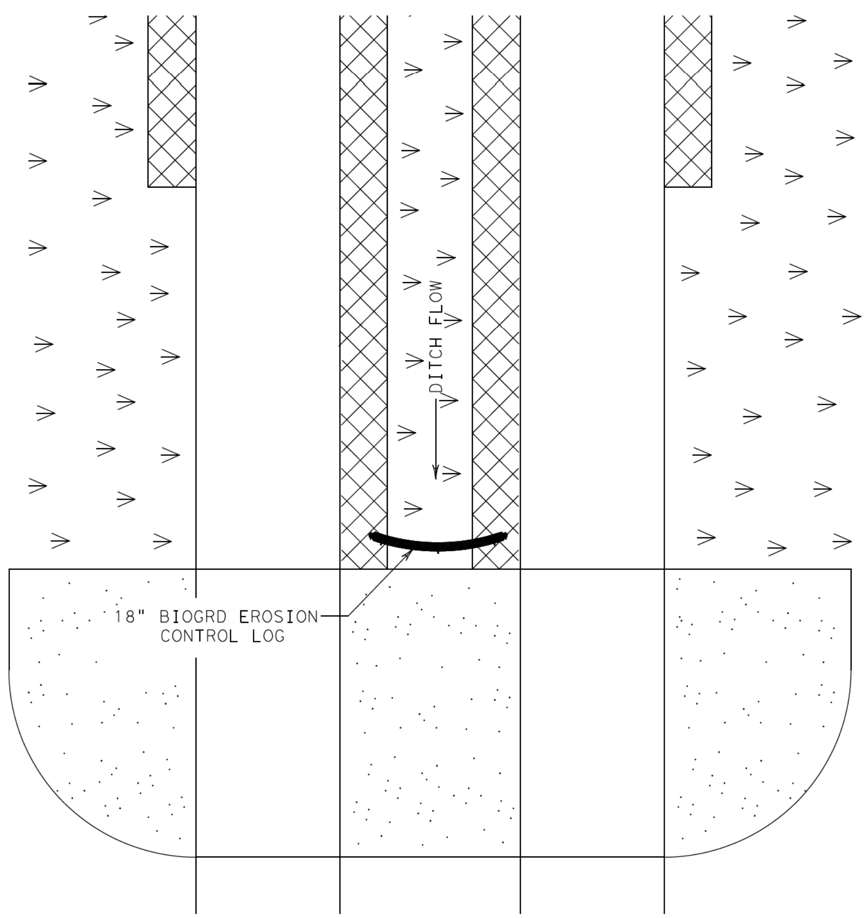
EROSION CONTROL LOG ELEVATION
NTS



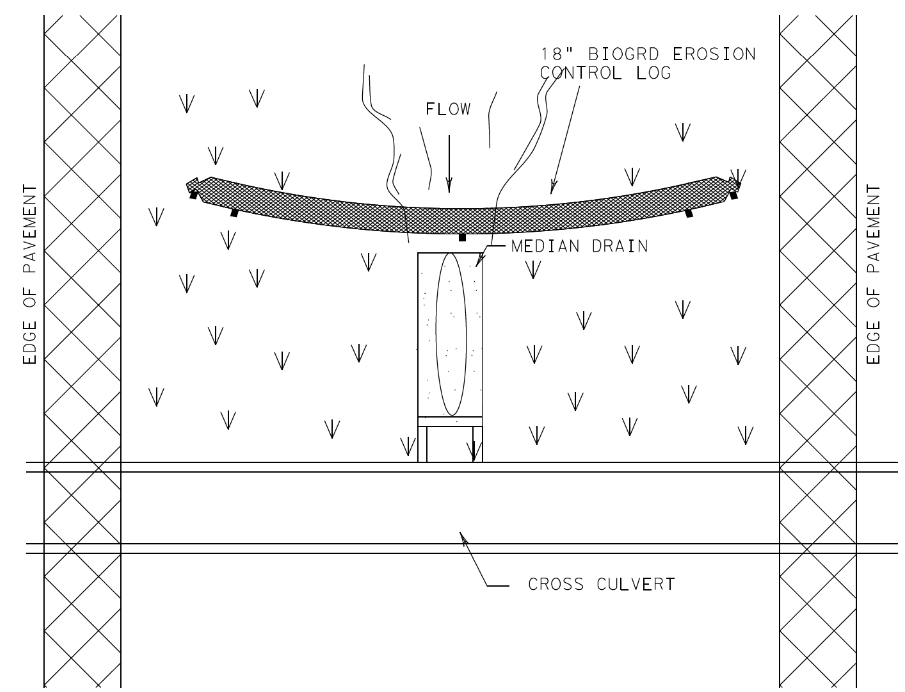
LAP DETAIL
NTS



REBAR STAKE DETAIL
NTS



AT BRIDGE MEDIAN
NTS



AT MEDIAN DRAINS
NTS

LEGEND

DISTURBED AREA

EXISTING VEGETATION

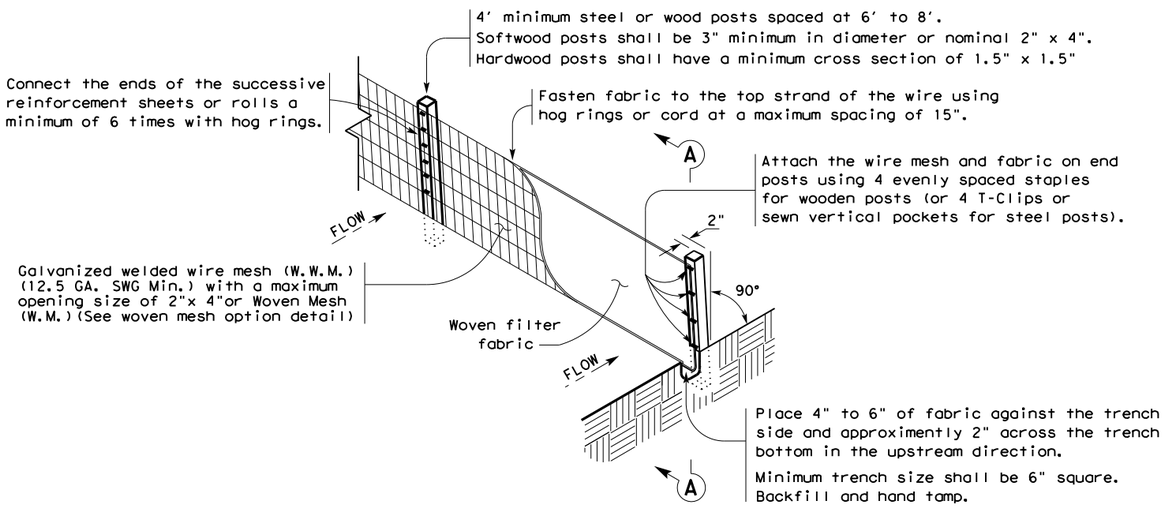
Texas Department of Transportation

BIODEGRADABLE EROSION CONTROL LOGS

CRP-BECL

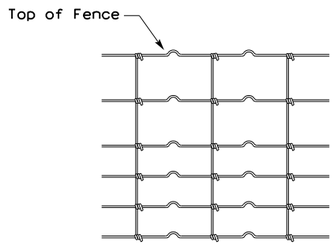
CORPUS CHRISTI DISTRICT STANDARD — SHEET 2 OF 2

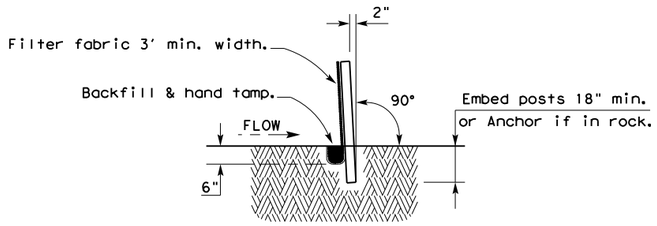
FILE: crp-becl.dgn	DN: TxDOT	CK:	DW: CAF	CK: PWS	STD:	
ORIG DATE: MAY 2008	DIST	FED REG	FEDERAL AID PROJECT ⊕			SHEET
REVISIONS PJA 5/2015	CRP	6				268
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	GOLIAD		0088	02	062	US 59



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.

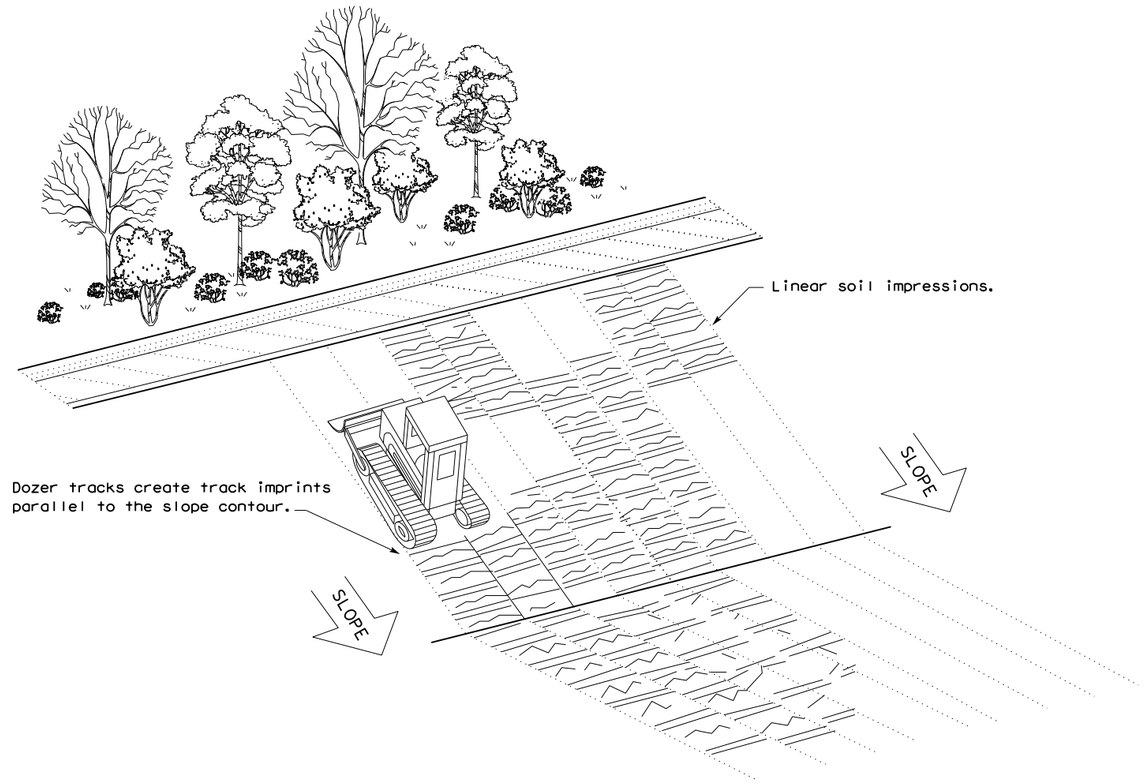
LEGEND

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	
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	CRP	GOLIAD			269	

8/8/2023
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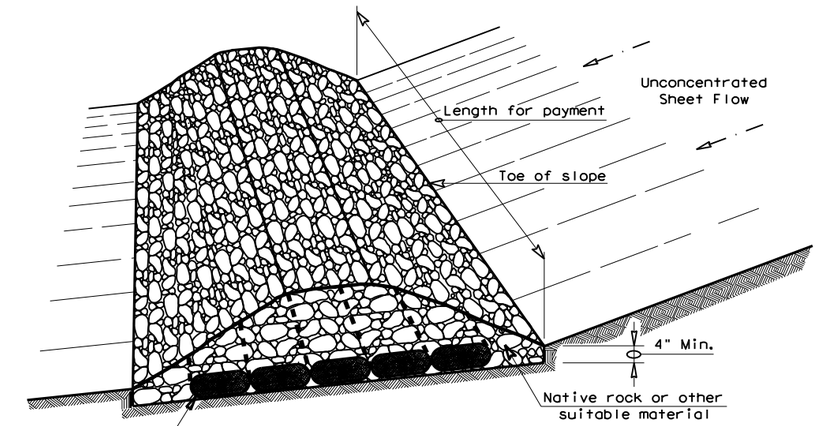
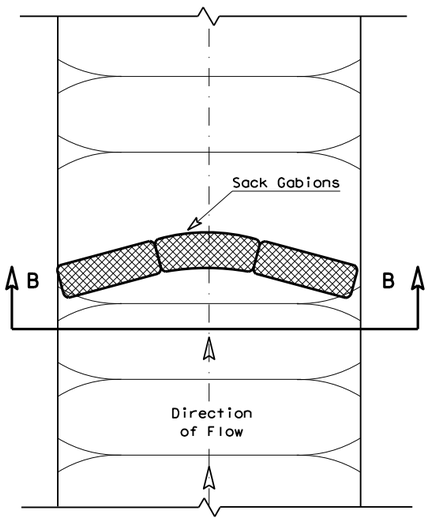
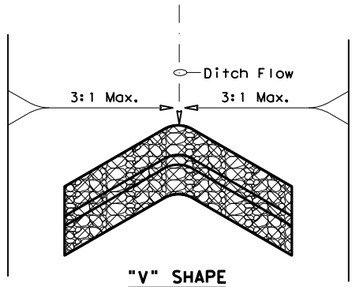


FILTER DAM AT TOE OF SLOPE

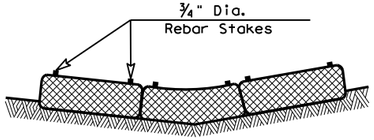
RFD1



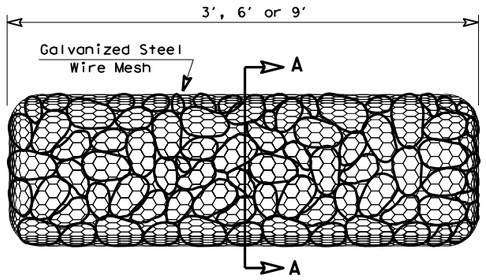
PLAN VIEW



"V" SHAPE PLAN VIEW

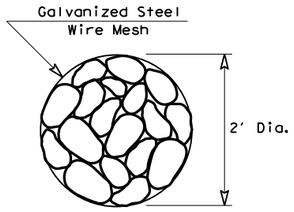


SECTION B-B

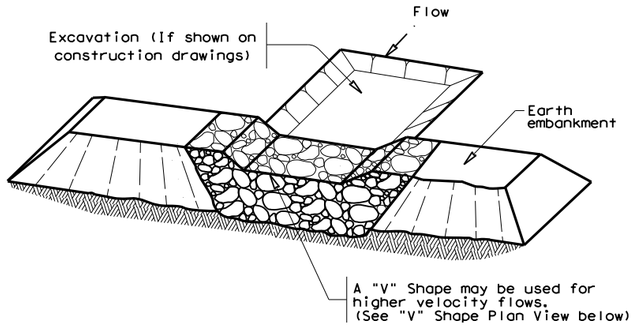


TYPE 4 (SACK GABIONS)

RFD4

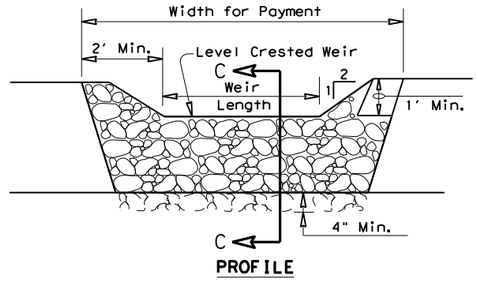


SECTION A-A

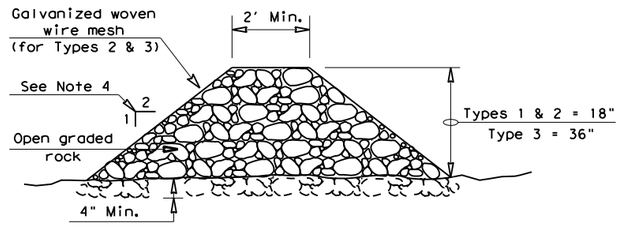


FILTER DAM AT SEDIMENT TRAP

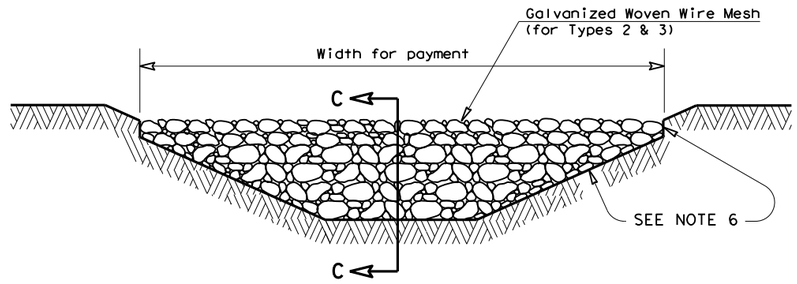
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

ROCK FILTER DAM USAGE GUIDELINES

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

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

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

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

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

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

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

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

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
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	CRP	GOLIAD		270

DATE: 8/9/2023
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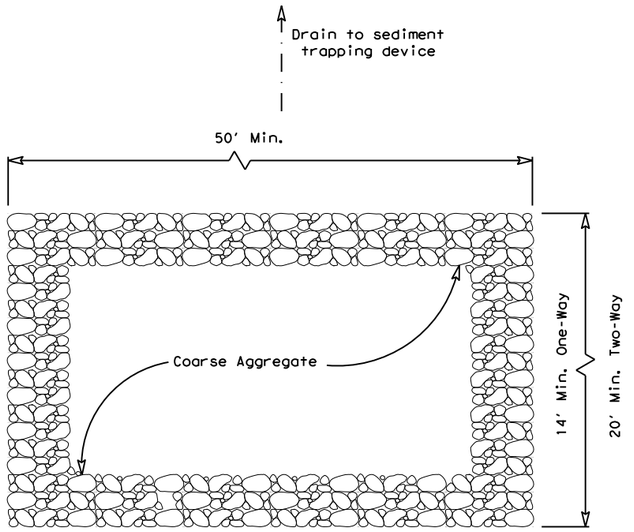
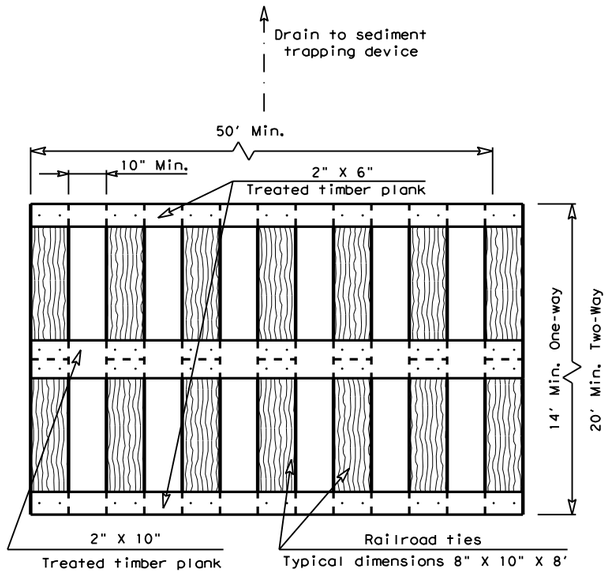


PLAN VIEW



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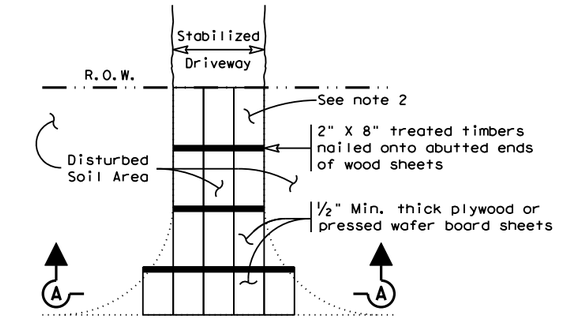

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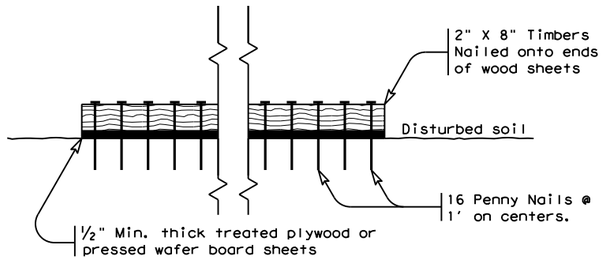
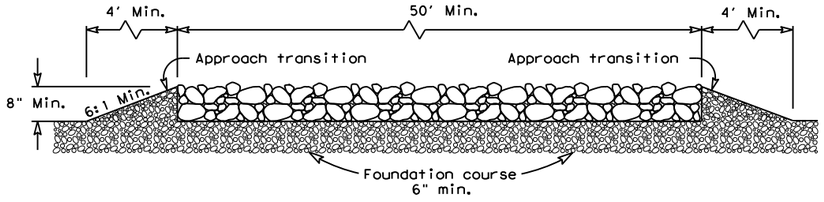


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

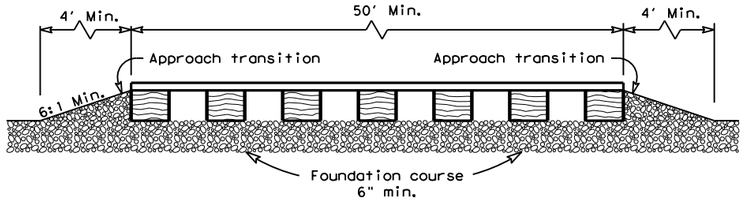
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0088	02	062	US59
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	CRP	GOLIAD		271